

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,271,243 B2
APPLICATION NO. : 14/123672
DATED : February 23, 2016
INVENTOR(S) : Yoon et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Claim 11, at Column 11, Line 22, delete "grouped".
In Claim 11, at Column 11, Line 22, delete "points" and insert therefore --point--.
In Claim 11, at Column 11, Line 28, delete "grouped".
In Claim 11, at Column 11, Line 28, delete "points" and insert therefore --point--.

Signed and Sealed this
Twentieth Day of June, 2023



Katherine Kelly Vidal
Director of the United States Patent and Trademark Office



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.
14/123,672	05/15/2014	Byung Wan Yoon	Q208223	3204
3624	7590	06/01/2023		
VOLPE KOENIG 30 SOUTH 17TH STREET, 18TH FLOOR PHILADELPHIA, PA 19103			EXAMINER DUONG, DUC T	
			ART UNIT	PAPER NUMBER
			2467	
			NOTIFICATION DATE	DELIVERY MODE
			06/01/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

eoffice@vklaw.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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Patent No.: 9271243
Issue Date: 02/23/2016
Appl. No.: 14/123,672
Filed: 05/15/2014

PART (A) RESPONSE FOR CERTIFICATES OF CORRECTION

This is a decision on the Certificate of Correction request filed 18 May 2023.

The request for issuance of Certificate of Correction for the above-identified correction(s) under the provisions of 37 CFR 1.322 and/or 1.323 is hereby:

(Check one)

☒ Approved ☐ Approved in Part ☐ Denied

Comments: _____

PART (B) PETITION UNDER 37 CFR 1.324 OR 37 CFR 1.48

☐ This is a decision on the petition filed _____ to correct inventorship under 37 CFR 1.324.

☐ This is a decision on the request under 37 CFR 1.48, petition filed _____. In view of the fact that the patent has already issued, the request under 37 CFR 1.48 has been treated as a petition to correct inventorship under 37 CFR 1.324.

The petition is hereby: ☐ Granted ☐ Dismissed

Comment: _____

The patented filed is being forwarded to Certificate of Corrections Branch for issuance of a certificate naming only the actual inventor or inventors.

/HASSAN A PHILLIPS/
Supervisory Patent Examiner, Art Unit 2467
Technology Center 2400
Phone: (571)272-3940

Certificates of Correction Branch email: CustomerServiceCoC@uspto.gov CoC Central Phone Number: (703) 756-1814



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
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/123,672	05/15/2014	Byung Wan Yoon	Q208223

CONFIRMATION NO. 3204

POWER OF ATTORNEY NOTICE



OC000000057466144

23373
SUGHRUE MION, PLLC
2000 PENNSYLVANIA AVENUE, N.W.
SUITE 9000
WASHINGTON, DC 20006

Date Mailed: 05/24/2023

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/18/2023.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/vostuart/



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
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/123,672	05/15/2014	Byung Wan Yoon	Q208223

CONFIRMATION NO. 3204

POA ACCEPTANCE LETTER



OC000000057466165

3624
VOLPE KOENIG
30 SOUTH 17TH STREET, 18TH FLOOR
PHILADELPHIA, PA 19103

Date Mailed: 05/24/2023

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/18/2023.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/vostuart/

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:
GOLDEN EYE TECHNOLOGIES LLC

Application No.: 14/123,673

Confirmation No.: 3204

Filed: May 15, 2014

For: WIRELESS ACCESS POINT
AND METHOD AND DEVICE FOR
CONTROLLING WIRELESS ACCESS
POINT

Group: 2467

Our File: HARFGET-GETP004USU1

Date: May 18, 2023

COMMUNICATION TO UPDATE APPLICANT INFORMATION

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

A supplemental Application Data Sheet (ADS) in compliance with 37 CFR 1.76, marked up showing appropriate changes, is herewith submitted. The ADS updates the name of the applicant in the appropriate applicant information section. The applicant is GOLDEN EYE TECHNOLOGIES LLC. The Power of Attorney and a proper statement showing ownership under 37 CFR 3.73(c) are submitted herewith.

7943893.1

Applicant: GOLDEN EYE TECHNOLOGIES LLC
Application No.: 14/547,108

We respectfully request that the name of the applicant be updated.

Respectfully submitted,

GOLDEN EYE TECHNOLOGIES LLC

By /Robert D. Leonard/
Robert D. Leonard
Registration No. 57204

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
Telephone: (215) 568-6400
Facsimile: (215) 568-6499
RDL/amw

- 2 -

7943893.1

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: GOLDEN EYE TECHNOLOGIES LLC
Application No./Patent No.: 9271243 Filed/Issue Date: February 23, 2016
Titled: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
GOLDEN EYE TECHNOLOGIES LLC, a limited liability company

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest **must be submitted** to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest **must be submitted** to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest **must be submitted** to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Yoon et al To: KT CORPORATION

The document was recorded in the United States Patent and Trademark Office at
Reel 032180, Frame 0040, or for which a copy thereof is attached.

2. From: KT CORPORATION To: GOLDEN EYE TECHNOLOGIES LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 054148, Frame 0426, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

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

4. From: _____ To: _____

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

5. From: _____ To: _____

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

6. From: _____ To: _____

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

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Robert D. Leonard/

Signature

Robert D. Leonard

Printed or Typed Name

May 18, 2023

Date

57204

Title or Registration Number

[Page 2 of 2]

Privacy Act Statement

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

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

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

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

- ☒ I hereby appoint the Patent Practitioner(s) associated with the following 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) or identified above:
- OR**
- ☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) 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 patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

- ☒ The address associated with the above-mentioned Customer Number

OR

- ☐ The address associated with Customer Number:

OR

- ☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

GOLDEN EYE TECHNOLOGIES LLC

- ☐ 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).

Signature

Date (Optional)

Name

Christian Dubuc

Title

President and CEO

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 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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	Q208223
		Application Number	14123672
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
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.)

Applicant Information:

Applicant 1					Remove
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118	
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	Gunpo-si	Country Of Residenceⁱ	KR		
Citizenship under 37 CFR 1.41(b)ⁱ		KR			
Mailing Address of Applicant:					
Address 1		#1111-701, Jugong 11 Danji Apt.			
Address 2		Sanbon 2-dong, Gyeonggi-do			
City	Gunpo-si	State/Province			
Postal Code	435-748	Countryⁱ	KR		
Applicant 2					Remove
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jae Ho		CHUNG		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Seoul	Country Of Residenceⁱ	KR		
Citizenship under 37 CFR 1.41(b)ⁱ		KR			
Mailing Address of Applicant:					
Address 1		#202-505, Sangnoksu Apt.			
Address 2		Irwonbon-dong, Gangnam-gu			
City	Seoul	State/Province			
Postal Code	135-947	Countryⁱ	KR		
Applicant 3					Remove
Applicant Authority ☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Joo Young		YOON		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Yongin-si	Country Of Residenceⁱ	KR		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		Q208223	
		Application Number		14123672	
Title of Invention		WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT			

Citizenship under 37 CFR 1.41(b) i		KR			
Mailing Address of Applicant:					
Address 1		#505-101, Unam Apt.			
Address 2		Sinbong-dong, Suji-gu, Gyeonggi-do			
City	Yongin-si		State/Province		
Postal Code	448-935		Countryi	KR	
Applicant 4					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	
				☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name		Middle Name		Family Name
	Kyu Jeong				HAN
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Suwon-si		Country Of Residencei		KR
Citizenship under 37 CFR 1.41(b) i		KR			
Mailing Address of Applicant:					
Address 1		#732-1401, Shinsung Apt., Bidan-maeul			
Address 2		Cheoncheon-dong, Jangan-gu, Gyeonggi-do			
City	Suwon-si		State/Province		
Postal Code	440-330		Countryi	KR	
Applicant 5					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	
				☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name		Middle Name		Family Name
	Yung Ha				JI
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Seongnam-si		Country Of Residencei		KR
Citizenship under 37 CFR 1.41(b) i		KR			
Mailing Address of Applicant:					
Address 1		#814-1001, Imaechon Jinheung Apt.			
Address 2		Imae-dong, Bundang-gu, Gyeonggi-do			
City	Seongnam-si		State/Province		
Postal Code	463-904		Countryi	KR	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

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

Customer Number ~~23373~~ 3624

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q208223
		Application Number	14123672
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
Email Address	sughrue@sughrue.com	Add Email	Remove Email

Application Information:

Title of the Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
Attorney Docket Number	Q208223	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	06	Suggested Figure for Publication (if any)	

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). Enter either 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~~ 3624		

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(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/KR2011/007792	2011-10-19
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q208223
		Application Number	14123672
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).			
			Remove
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
10-2011-0054124	KR	2011-06-03	☒ Yes ☐ No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.			
			Remove
Assignee 1			
If the Assignee is an Organization check here. ☒			
Organization Name	~~KT Corporation~~ GOLDEN EYE TECHNOLOGIES INC.		
Mailing Address Information:			
Address 1	~~206, Jeongja-dong~~ 1000 HERITAGE CENTER CIRCLE		
Address 2	~~Bundang-gu, Gyeonggi-do~~ SUITE 508		
City	~~Seongnam-si~~ ROUND ROCK	State/Province	TX
Country ⁱ	~~KR~~ US	Postal Code	~~463-741~~ 78664
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the Add button.			Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
Signature	/ROBERT D. LEONARD/			Date (YYYY-MM-DD)	
First Name	ROBERT D	Last Name	LEONARD	Registration Number	57204

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.

Electronic Patent Application Fee Transmittal				
Application Number:		14123672		
Filing Date:		15-May-2014		
Title of Invention:		WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
First Named Inventor/Applicant Name:		Byung Wan Yoon		
Filer:		Robert D. Leonard/Angel Wolf		
Attorney Docket Number:		Q208223		
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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:				
PROCESSING FEE CORRECTING INVENTORSHIP	1816	1	160	160

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				160

Electronic Acknowledgement Receipt	
EFS ID:	48025721
Application Number:	14123672
International Application Number:	
Confirmation Number:	3204
Title of Invention:	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
First Named Inventor/Applicant Name:	Byung Wan Yoon
Customer Number:	23373
Filer:	Robert D. Leonard/Angel Wolf
Filer Authorized By:	Robert D. Leonard
Attorney Docket Number:	Q208223
Receipt Date:	18-MAY-2023
Filing Date:	15-MAY-2014
Time Stamp:	18:00:05
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$160
RAM confirmation Number	E20235HI00435927
Deposit Account	220493
Authorized User	Angel Wolf
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.17 (Patent application and reexamination processing fees) 37 CFR 1.19 (Document supply fees)	

37 CFR 1.20 (Post Issuance fees)					
37 CFR 1.21 (Miscellaneous fees and charges)					
37 CFR 1.492 (National application filing, search, and examination fees)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	HARFGET-GETP001USU1_CertofCorrectionRequest_20230518_EFS.pdf	86793	no	3
			2a903bf730284d23266cab9a9fd7af105ae40e8b		
Warnings:					
Information:					
2	Request for Certificate of Correction	HARFGET-GETP001USU1__SB44_EFS.pdf	108338	no	1
			6cc6aed65104c433548387d70ab0a55fbab16e2b		
Warnings:					
Information:					
3	Request under 37CFR1.46(c) to correct, update, change applicant	HARFGET-GETP001USU1_Communication_20230518_EFS.pdf	84018	no	2
			c8826c0e0ec794823cc402f549f764c397abf893		
Warnings:					
Information:					
4	Assignee showing of ownership per 37 CFR 3.73	HARFGET-GETP001USU1_373Statement_EFS.pdf	151079	no	3
			51ee058ce5b83d8ce15cb66e7c6eb121540ebb1e		
Warnings:					
Information:					
5	Power of Attorney	HARFGET-GETP001USU1_POA_Transmittal_EFS.pdf	277052	no	1
			7572c3b47505a1e59514b0da921da8823d6842cb		
Warnings:					
Information:					
6	Power of Attorney	HARFGET-GETP001USU1_POA_EFS.pdf	83866	no	1
			891eac80e646518cf16a09bfb7d38c2590073fd5		
Warnings:					
Information:					

7	Application Data Sheet	HARFGET- GETP001USU1_UPDATEDADS_ EFS.pdf	228781 62c8adfab6a5989c6a1f82c4c0895b9c2c2423b7	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
8	Fee Worksheet (SB06)	fee-info.pdf	38156 10c06d2e55249a9dbcf9ddc9c4553935043cd4ac	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				1058083	
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.					

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/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	14/123,672
Filing Date	May 15, 2014
First Named Inventor	Byung Wan Yoon
Title	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
Art Unit	2467
Examiner Name	DUC T DUONG
Attorney Docket Number	HARFGET-GETP001USU1

SIGNATURE of Applicant or Patent Practitioner			
Signature	/Robert D. Leonard/	Date (Optional)	
Name	Robert D. Leonard	Registration Number	57204
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)		GOLDEN EYE TECHNOLOGIES LLC	
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 _____ forms are submitted.			

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT** of:

GOLDEN EYE TECHNOLOGIES LLC

Patent No.: 9,271,243

Issued: February 23, 2016

Appln. No.: 14/123,672

Filed: May 15, 2014

For: WIRELESS ACCESS POINT
AND METHOD AND DEVICE FOR
CONTROLLING WIRELESS ACCESS POINT

Our File: HARFGET-GETP001USU1

Date: May 18, 2023

REQUEST FOR CERTIFICATE OF CORRECTION

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

A Certificate of Correction under 35 U.S.C. §255 and 37 C.F.R. §1.323 is requested for U.S. Patent No. 9,271,243. Correction of the following errors are requested:

7943242.1

Applicant: GOLDEN EYE TECHNOLOGIES LLC
Patent No.: 9,271,243

IN THE CLAIMS

In claim 11, at column 11, line 22, delete “grouped”.

In claim 11, at column 11, line 22, delete “points” and insert therefore “point”.

In claim 11, at column 11, line 28, delete “grouped”.

In claim 11, at column 11, line 28, delete “points” and insert therefore “point”.

Applicant: GOLDEN EYE TECHNOLOGIES LLC
Patent No.: 9,271,243

REMARKS

Patentee believes that the above errors are of such a nature as to justify the issuance of a Certificate of Correction. Patentee has enclosed a completed Certificate of Correction Form PTO/SB/44. The surcharge fee of \$160 is paid by credit card herewith. Please charge any additional fees or credit any overpayment to Deposit Account No. 220493.

Patentee respectfully requests that the Certificate of Correction be issued.

Respectfully submitted,

GOLDEN EYE TECHNOLOGIES LLC

By /Robert D. Leonard/
Robert D. Leonard
Registration No. 57204
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza
30 South 17th Street
Philadelphia, PA 19103-4009
RDL/amw

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 9,271,243

APPLICATION NO.: 14/123,672

ISSUE DATE : February 23, 2016

INVENTOR(S) : Yoon et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

In claim 11, at column 11, line 22, delete "grouped".

In claim 11, at column 11, line 22, delete "points" and insert therefore "point".

In claim 11, at column 11, line 28, delete "grouped".

In claim 11, at column 11, line 28, delete "points" and insert therefore "point".

MAILING ADDRESS OF SENDER (Please do not use Customer Number below):

VOLPE KOENIG
30 SOUTH 17TH STREET, SUITE 1800
PHILADELPHIA PA 19103

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PATENT 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
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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.

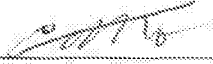
5. Assignor authorizes and empowers Assignee, its successors, assigns and legal representatives or nominees, to invoke and claim for any application for patent or other form of protection for the inventions, the benefit of the right of priority provided by the International Convention for the Protection 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.

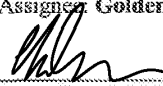
Signature Page Follows

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 Dubuc
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	640062482	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	1034195182	Method For Communicating Encoded Traffic Indication Map Information
P20120969P1	KR	1020140121105	9/12/2014	10193211281	Method For Communicating Of Information Of Traffic Indication Map Encoded
P20120969	KR	1020130025959	3/12/2013	10156111481	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	104412631B	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	101553858B1	Method For Reassignment Of Association Identification And Apparatus For Performing The Method
P20130322P1	KR	1020140121116	9/12/2014	101991482B1	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	104541551B	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	101422251B1	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	1020090115913	11/27/2009	100094840B1	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



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/123,672	02/23/2016	9271243	Q208223	3204

23373 7590 02/03/2016
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 120 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, Gunpo-si, KOREA, REPUBLIC OF;
Jae Ho Chung, Seoul, KOREA, REPUBLIC OF;
Joo Young Yoon, Yongin-si, KOREA, REPUBLIC OF;
Kyu Jeong Han, Suwon-si, KOREA, REPUBLIC OF;
Yung Ha Ji, Seongnam-si, KOREA, REPUBLIC OF;

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23373

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/123,672	05/15/2014	Byung Wan YOON	Q208223	3204

TITLE OF INVENTION: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	Undiscounted	\$960	\$0	\$0	\$960	09/22/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
DUONG, DUC T	2467	370-252000

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,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Sughrue Mion, PLLC

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)

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

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.
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☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 19-4880 (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 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: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature	/ Diallo T. Crenshaw 52,778 /	Date	September 21, 2015
Typed or Printed Name	Diallo T. Crenshaw	Registration No.	52,778

This collection of information 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.
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Electronic Patent Application Fee Transmittal				
Application Number:		14123672		
Filing Date:		15-May-2014		
Title of Invention:		WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
First Named Inventor/Applicant Name:		Byung Wan Yoon		
Filer:		Travis Blue Ribar/Christopher Healey		
Attorney Docket Number:		Q208223		
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt	
EFS ID:	23553729
Application Number:	14123672
International Application Number:	
Confirmation Number:	3204
Title of Invention:	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
First Named Inventor/Applicant Name:	Byung Wan Yoon
Customer Number:	23373
Filer:	Travis Blue Ribar/Christopher Healey
Filer Authorized By:	Travis Blue Ribar
Attorney Docket Number:	Q208223
Receipt Date:	21-SEP-2015
Filing Date:	15-MAY-2014
Time Stamp:	15:36:18
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
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Payment was successfully received in RAM	\$ 960
RAM confirmation Number	2245
Deposit Account	194880
Authorized User	SUGHRUE MION, PLLC
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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)	Q208223IssueFeeTransmittal.pdf	34529 94a9b722c97dbff4a142435f35386b3e89194f2c	no	1

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	31019 0bcb0716a11ae66e6eb13193f1dedbc3c0d62820	no	2
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Warnings:

Information:

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New Applications Under 35 U.S.C. 111

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

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

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

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EXAMINER

DUONG, DUC T

ART UNIT

PAPER NUMBER

2467

DATE MAILED: 06/22/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/123,672	05/15/2014	Byung Wan Yoon	Q208223	3204

TITLE OF INVENTION: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	09/22/2015

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.

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(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/123,672	05/15/2014	Byung Wan Yoon	Q208223	3204

TITLE OF INVENTION: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	09/22/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
DUONG, DUC T	2467	370-252000

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. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/123,672	05/15/2014	Byung Wan Yoon	Q208223	3204
23373 7590 06/22/2015 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER DUONG, DUC T	
			ART UNIT 2467	PAPER NUMBER

DATE MAILED: 06/22/2015

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. 14/123,672	Applicant(s) YOON ET AL.	
	Examiner DUC DUONG	Art Unit 2467	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to 12/3/13.
☐ 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) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____ 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other ____
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DETAILED ACTION

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

Allowable Subject Matter

2. Claims 1-11 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art of record Scherzer et al (US Publishing 2004/0037258 A1) discloses a device 21 (fig. 2) for controlling a group of wireless access points 25-30 using a same channel (fig. 1a page 3 paragraph 0041). However, the prior fails to teach or make obvious for **“an optimal output strength value calculator configured to compute a corrected output strength value based on the highest RSSI value of the extracted wireless access point, a predetermined threshold value of the RSSI between the grouped wireless access points, and a currently used output strength value”**, when such unit is considered within the specific structure of the device recited in claim 1. The prior art of record fails to teach or make obvious for **“an interference occurrence notifier configured to transmit a message indicating that interference has occurred to the device for controlling the wireless access point if it is determined that the interference with the neighboring wireless access points has occurred, based on the computed number of ACK communication failures with the wireless terminal and the RSSI value”**, when such notifier is considered within the specific structure of the device recited in claim 6. The prior art of record fails to teach or make obvious for **“computing a corrected output strength value for reducing the interference and**

transmitting the corrected output strength value to the grouped wireless access points, the computing and the transmitting the corrected output strength being performed by the device for controlling the wireless access point and adjusting a current output strength value based on the corrected output strength value, the adjusting being performed by the grouped wireless access points”, when the computing and adjusting are considered within the specific combination of steps recited in the method of claim 11.

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

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUC DUONG whose telephone number is (571)272-3122. The examiner can normally be reached on M-F (9:00 AM-6:00 PM).

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

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

/DUC DUONG/
Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 14/123,672	Applicant(s)/Patent Under Reexamination YOON ET AL.	
	Examiner DUC DUONG	Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0037258 A1	02-2004	Scherzer et al.	370/338
*	B	US-2012/0224483 A1	09-2012	Babiarz et al.	370/232
*	C	US-2011/0122788 A1	05-2011	Sombrutski et al.	370/252
*	D	US-2009/0081970 A1	03-2009	Yavuz et al.	455/114.2
*	E	US-2006/0187873 A1	08-2006	Friday et al.	370/328
*	F	US-2009/0010229 A1	01-2009	Kazmi et al.	370/336
*	G	US-2008/0130541 A1	06-2008	Kokku et al.	370/311
*	H	US-2007/0049319 A1	03-2007	Hart et al.	455/522
*	I	US-7,715,353 B2	05-2010	Jain et al.	370/338
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Search Notes 	Application/Control No. 14123672	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner DUC DUONG	Art Unit 2467

CPC- SEARCHED		
Symbol	Date	Examiner
see CPC search printout	6/15/2015	DTD

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
East text	6/15/2015	DTD
inventor name	6/15/2015	DTD
h04b17/318 (text search)	6/15/2015	DTD
h04w40/16 (text search)	6/15/2015	DTD
h04w88/08,h04w88/085,h04w88/12 (text search)	6/15/2015	DTD
h04w52/0206,h04w52/0245,h04w52/245 (text search)	6/15/2015	DTD
h04w28/048 (text search)	6/15/2015	DTD

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	see interference search printout	6/15/2015	DTD

/DUC DUONG/ Examiner.Art Unit 2467	
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BIB DATA SHEET

CONFIRMATION NO. 3204

SERIAL NUMBER 14/123,672	FILING or 371(c) DATE 05/15/2014 RULE	CLASS 370	GROUP ART UNIT 2467	ATTORNEY DOCKET NO. Q208223	
APPLICANTS INVENTORS Byung Wan Yoon, Gunpo-si, KOREA, REPUBLIC OF; Jae Ho Chung, Seoul, KOREA, REPUBLIC OF; Joo Young Yoon, Yongin-si, KOREA, REPUBLIC OF; Kyu Jeong Han, Suwon-si, KOREA, REPUBLIC OF; Yung Ha Ji, Seongnam-si, KOREA, REPUBLIC OF; ** CONTINUING DATA ***** This application is a 371 of PCT/KR2011/007792 10/19/2011 ** FOREIGN APPLICATIONS ***** REPUBLIC OF KOREA 10-2011-0054124 06/03/2011 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 04/11/2014					
Foreign Priority claimed ☒ Yes ☐ No 35 USC 119(a-d) conditions met ☒ Yes ☐ No Verified and /DUC T DUONG/ Acknowledged Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY KOREA, REPUBLIC OF	SHEETS DRAWINGS 6	TOTAL CLAIMS 11	INDEPENDENT CLAIMS 3
ADDRESS SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 UNITED STATES					
TITLE WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT					
FILING FEE RECEIVED 1620	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		

<i>Index of Claims</i> 	Application/Control No. 14123672	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner DUC DUONG	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	06/15/2015							
	1	=							
	2	=							
	3	=							
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	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
L1	11588	(cluster\$3 or group\$3) near5 ((access adj2 point) or ap or wlan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:28
L2	872	1 and ((comput\$3 or calculat\$3 or determin\$3 or detect\$3 or monitor\$3) near5 interference)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:29
L3	373	2 and ((adjust\$4 or chang\$3) near5 (power or strength))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:30
L4	333	3 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:30
L5	19	2 and (correct\$3 near3 (power or strength))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:31
L6	223	h04w40/16.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:36
L7	1	3 and 6	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:36
L8	1	2 and 6	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:36
L9	11068	h04w88/08.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:38
L10	84	2 and 9	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:38
L11	1907	h04w88/085.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:38
L12	4	2 and 11	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:38
L14	1502	h04w88/12.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:38
L15	11	2 and 14	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:38
L16	1503	h04w52/0206.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:40
L17	7	2 and 16	US-PGPUB; USPAT; EPO;	OR	ON	2015/06/15 11:40

			DERWENT			
L18	1186	h04w52/0245.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:40
L19	0	2 and 18	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:40
L20	2	"20140321300"	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:46
L21	1070	h04w52/245.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:49
L22	11	2 and 21	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:49
L23	817	h04w28/048.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:50
L24	10	2 and 23	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:50
L25	2233	h04b17/318.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:51
L26	9	2 and 25	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:51
L27	0	(yoon near2 byung\$1wan).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:51
L28	338	(yoon near2 byung).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:51
L29	1	28 and (access and point and strength and interference).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:52
L30	1522	(chung near2 ho).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:52
L31	1	30 and (access and point and strength and interference).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:52
L32	2936	(yoon near2 young).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:52
L33	2	32 and (access and point and strength and interference).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:52
L34	940	(han near2 jeong).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:53
L35	1	34 and (access and point and strength and interference).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:53
L36	167	(ji near2 ha).inv.	US-PGPUB; USPAT; EPO;	OR	ON	2015/06/15 11:53

			DERWENT			
L37	1	36 and (access and point and strength and interference).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:53
L38	1065	1 and ((adjust\$4 or reduc\$3 or lessen\$3) near5 interference)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:07
L39	574	38 and ((comput\$3 or calculat\$3 or determin\$3 or detect\$3 or monitor\$3) near5 (strength or power))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:08
L40	475	39 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:08
L41	143	38 and ((comput\$3 or calculat\$3 or determin\$3 or detect\$3 or monitor\$3) near5 (strength or power) with (ap or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:32
L42	104	41 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:33
L43	5233	((comput\$3 or calculat\$3 or determin\$3) near5 (strength or power or value) with (ap or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:48
L44	40	43 same ((reduc\$3 or lessen\$3 or decreas\$3 or lower\$3) near5 interference)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:48
L45	37	44 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 12:49
L46	119	((comput\$3 or calculat\$3 or determin\$3) near5 (strength or power or value)) same ((cluster or group) near3 (ap or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 13:01
L47	25	46 and ((reduc\$3 or lessen\$3 or decreas\$3 or lower\$3) near5 interference)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 13:01
S1	81	(cluster\$3 or group\$3) near5 ((access adj2 point) or ap) with ("same" or shar\$3) near3 channel	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:44
S2	61	S1 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:46
S3	11588	(cluster\$3 or group\$3) near5 ((access adj2 point) or ap or wlan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:53
S4	33168	(comput\$3 or calculat\$3 or determin\$3) near5 ((signal adj2 strength) or rssi)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:54
S5	822	S3 and S4	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:54
S6	507	S5 and interference	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:55
S7	436	S6 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 10:55

S8	2	S5 and ((highest or biggest) adj2 rssi same interference)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:04
S9	41	((highest or biggest) adj2 rssi same interference same (ap or (access adj2 point) or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:05
S10	41	((highest or biggest or greastest) adj2 rssi same interference same (ap or (access adj2 point) or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:05
S11	41	((highest or biggest or greatest) adj2 rssi same interference same (ap or (access adj2 point) or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:05
S12	76	((high\$3 or big\$4 or great\$3) adj2 rssi same interference same (ap or (access adj2 point) or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:06
S13	63	S12 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:06
S14	356	S5 and (ack or acknowledg\$6)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:15
S15	57	S5 and ((ack or acknowledg\$6 or nack) same interference)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:16
S16	47	S15 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:16
S17	1810	S3 and (interference with (neighbor\$3 or peer or near\$1by or adjacent))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:21
S18	1151	S3 and (interference with (neighbor\$3 or peer or near\$1by or adjacent) with (ap or (access adj2 point) or wlan))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:22
S19	377	S18 and ((adjust\$4 or chang\$3) near5 (power or strength))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:22
S20	346	S19 and (@ad<"20110603" or @rlad<"20110603")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/06/15 11:23

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L49	28	(strength and interference and group and (access adj2 point) and channel).clm.	USPAT; UPAD	OR	ON	2015/06/15 13:56
L50	7	(strength and interference and group and (access adj2 point) and channel and output).clm.	USPAT; UPAD	OR	ON	2015/06/15 13:57
L51	0	(strength and interference and group and (access adj2 point) and channel and ack).clm.	USPAT; UPAD	OR	ON	2015/06/15 13:57

6/ 15/ 2015 1:59:16 PM**C:\Users\dduong\Documents\EAST\Workspaces\14123672.wsp**

Issue Classification 	Application/Control No. 14123672	Applicant(s)/Patent Under Reexamination YOON ET AL.	
	Examiner DUC DUONG	Art Unit 2467	

CPC					
Symbol				Type	Version
H04W	52	/	245	F	2013-01-01
H04W	28	/	048	A	2013-01-01
H04W	24	/	02	I	2013-01-01
H04W	84	/	045	A	2013-01-01
H04B	17	/	318	I	2015-01-15
H04L	1	/	18	I	2013-01-01
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CPC Combination Sets						
Symbol			Type	Set	Ranking	Version
		/				
		/				

/DUC DUONG/ Examiner.Art Unit 2467 (Assistant Examiner)		Total Claims Allowed: 11	
/DUC DUONG/ Examiner.Art Unit 2467 (Primary Examiner)		06/15/2015 (Date)	O.G. Print Claim(s) 1
			O.G. Print Figure 2

Issue Classification 	Application/Control No. 14123672	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner DUC DUONG	Art Unit 2467

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION													
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED								
						H	O	4	W	24 / 02 (2009.01.01)									
CROSS REFERENCE(S)																			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		

/DUC DUONG/ Examiner.Art Unit 2467 (Assistant Examiner)		Total Claims Allowed: 11	
/DUC DUONG/ Examiner.Art Unit 2467 (Primary Examiner)		06/15/2015 (Date)	O.G. Print Claim(s) 1
			O.G. Print Figure 2

Issue Classification 	Application/Control No. 14123672	Applicant(s)/Patent Under Reexamination YOON ET AL.	
	Examiner DUC DUONG	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
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	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														
	11														

/DUC DUONG/ Examiner.Art Unit 2467 (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 11	
/DUC DUONG/ Examiner.Art Unit 2467 06/15/2015 (Primary Examiner) _____ (Date) _____		O.G. Print Claim(s) 1	O.G. Print Figure 2



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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/123,672	05/15/2014	Byung Wan Yoon	Q208223

CONFIRMATION NO. 3204

PUBLICATION NOTICE



0000000071613272

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

Title: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

Publication No. US-2014-0321300-A1

Publication Date: 10/30/2014

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 Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, 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 <http://pair.uspto.gov/>. 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



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U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
14/123,672	Byung Wan Yoon	Q208223

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

INTERNATIONAL APPLICATION NO.	
PCT/KR2011/007792	
I.A. FILING DATE	PRIORITY DATE
10/19/2011	06/03/2011

CONFIRMATION NO. 3204
371 ACCEPTANCE LETTER



Date Mailed: 07/23/2014

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office, in its capacity as a Designated / Elected Office (37 CFR 1.495), has ACCEPTED the above identified international application for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

05/15/2014
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1),
(c)(2) and (c)(4) REQUIREMENTS

05/15/2014
DATE OF COMPLETION OF ALL
35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).

The following items have been received:

- Copy of the International Application filed on 12/03/2013
- English Translation of the IA filed on 12/03/2013
- Copy of the International Search Report filed on 12/03/2013
- Copy of IPE Report filed on 12/03/2013
- Preliminary Amendments filed on 12/03/2013
- Inventor's Oath or Declaration filed on 05/15/2014
- Request for Immediate Examination filed on 02/07/2014
- U.S. Basic National Fees filed on 12/03/2013
- Substitute Specification filed on 12/03/2013
- Priority Documents filed on 12/03/2013
- Application Data Sheet (37 CFR 1.76) filed on 12/03/2013

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

CHARITTA A SHELTON

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page 2 of 2



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/123,672	05/15/2014		1620	Q208223	11	3

CONFIRMATION NO. 3204

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

FILING RECEIPT



OC00000006970978

Date Mailed: 07/23/2014

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

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Assignment For Published Patent Application

KT CORPORATION, Seongnam-si, KR

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

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/KR2011/007792 10/19/2011

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 10-2011-0054124 06/03/2011

If Required, Foreign Filing License Granted: 04/11/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/123,672**

Projected Publication Date: 10/30/2014

Non-Publication Request: No

Early Publication Request: No

Title

WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

Preliminary Class

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.

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Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/123,672			
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	480		
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(j))	11	minus 20 =	*			x 80 =	0.00		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =	*			x 420 =	0.00		
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00		
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	1480		
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 =	x =	x =		
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	x =	x =		
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
				TOTAL ADD'L FEE		TOTAL ADD'L FEE			
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 =	x =	x =		
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	x =	x =		
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
				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.									

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371		ATTORNEY DOCKET NO. Q208223
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 14/123,672
INTERNATIONAL APPLICATION NO. PCT/KR2011/007792	INTERNATIONAL FILING DATE October 19, 2011	PRIORITY DATE CLAIMED June 3, 2011
TITLE OF INVENTION WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
FIRST NAMED INVENTOR Byung Wan YOON		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.		
1. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.		
2. ☐ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).		
3. ☐ An English language translation of the International Application (35 U.S.C. 371(c)(2))		
a. ☐ is attached hereto.		
b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).		
4. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))		
a. ☒ is attached.		
b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).		
Items 5 to 8 below concern amendments made in the international phase.		
<u>PCT Article 19 and 34 amendments</u>		
5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).		
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).		
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).		
<u>Cancellation of amendments made in the international phase</u>		
8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.		
8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.		
NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).		
The following items 9 to 17 concern a document(s) or information included.		
9. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.		
10. ☐ A preliminary amendment.		
11. ☐ An Application Data Sheet under 37 CFR 1.76.		
12. ☐ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).		
13. ☒ A power of attorney and/or change of address letter.		
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.3 and 37 CFR 1.821- 1.825.		
15. ☐ Assignment papers (<i>cover sheet and document(s)</i>). Name of Assignee: KT Corporation		
16. ☐ 37 CFR 3.73(c) Statement (<i>when there is an Assignee</i>).		

U.S. APPLN NO. (if known, see 37 CFR 1.5) 14/123,672	INTERNATIONAL APPLICATION NO. PCT/KR2011/007792	ATTORNEY DOCKET NO. Q208223
17. ☐ Other items or information:		
The following fees have been submitted.		CALCULATIONS PTO USE ONLY
18. ☐ Basic national fee (37 CFR 1.492(a))..... \$280		\$
19. ☐ Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) \$0 All other situations \$720		\$
20. ☐ Search fee (37 CFR 1.492(b)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) \$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority \$120 International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... \$480 All other situations... \$600		\$
TOTAL OF 18, 19 and 20 =		\$
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof..... \$400		\$
Total Sheets	Extra Sheets	
- 100 =	/50 =	
Number of each additional 50 or fraction thereof (round up to a whole number)		x \$400
Surcharge of \$140.00 for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).		\$140
CLAIMS	NUMBER FILED	NUMBER EXTRA
Total claims	- 20 =	x \$80
Independent claims	- 3 =	x \$420
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$780
Processing fee of \$140.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)).		\$
TOTAL OF ABOVE CALCULATIONS =		\$140
☐ Applicant asserts small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2		
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Fees above are reduced by 3/4. Applicant must attach form PTO/SB/15A or B or equivalent.		
TOTAL NATIONAL FEE =		\$140
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40/ EFS - \$0 per property +		
Fee for Extension of Time		
TOTAL FEES ENCLOSED =		N/A
		Amount to be refunded:
		\$
		Amount to be charged
		\$

- a. ☐ A check in the amount of \$ _____ to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. 19-4880 in the amount of \$ _____ to cover the above fees.
- c. ☒ 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.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is not recommended and by doing so **your credit card information may be displayed via PAIR**. To protect your information, it is recommended to pay fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

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 1: 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.

NOTE 2: A U.S. national stage application may not claim priority to the international application of which it is the national phase. The filing date of a U.S. national stage application is the international filing date. See 35 U.S.C. 363.

SEND ALL CORRESPONDENCE TO:

The address associated with Customer Number:

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

SIGNATURE	/ Diallo T. Crenshaw 52,778 /	DATE	May 15, 2014
NAME (Print/Type)	Diallo T. Crenshaw	REGISTRATION NO. (Attorney/Agent)	52,778

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q208223

Byung Wan YOON, et al.

U.S. Appln. No.: 14/123,672

Group Art Unit: Not Yet Assigned

Confirmation No.: 3204

Examiner: Not Yet Assigned

Filed: December 3, 2013

For: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING
WIRELESS ACCESS POINT

SUBMISSION OF EXECUTED DECLARATION AND POWER OF ATTORNEY

MAIL STOP PCT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In view of the application filed on December 3, 2013, and in response to the “Notification of Defective Response” for the above application, Applicants submit herewith a copy of the Declaration and Power of Attorney for the above identified application properly executed by the inventors.

The submitted Declaration properly identifies the Country of Citizenship for each inventor.

SUBMISSION OF EXECUTED DECLARATION AND POWER OF ATTORNEY
Attorney Docket No.: Q208223
U.S. Appln No.: 14/123,672

Applicants believe there is no fee due with respect to this filing, however, if a fee is due, 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

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: May 15, 2014

/ Diallo T. Crenshaw 52,778 /

Diallo T. Crenshaw
Registration No. 52,778

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (37 C.F.R. 1.63)

특허 출원 관련 선언 및 위임장

Korean Language Declaration

한국어 선언서

본인은 다음과 같이 선언합니다.

각 발명자의 거주지, 우편 주소 및 국적은 하기 각 발명자의 성명의 아래칸에 기재된 것과 동일합니다.

본인은, 하기의 발명자(들)이, 다음의 제목을 갖는 발명과 관련하여 특허를 받고자 하며 또 특허청구 범위에 기재되어 있는 대상에 대하여 원래의 최초 발명자(들)이라고 믿습니다.

본 특허 출원 신청서는,

☐ 첨부된 바와 같습니다.

또는

☐ 미합중국 출원번호 또는 PCT 국제 출원 번호는
_____()로
____일에 출원되었고
____일에 보정되었음 (해당 경우).

본인은 위에 구체적으로 언급된 보정서에 의해 보정된 상기 특허출원(특허청구 범위 포함)의 내용을 검토 및 이해했음을 확인합니다.

본인은 연방 규정 코드 제 37 장 제 1.56 항에 규정된 바에 따라, 특허성의 판단에 중요한 자료 정보를 공개할 의무가 있음을 인정하며, 이와 같은 의무에는, 부분 연속 출원(들)의 경우에, 선출원의 출원일과 부분 연속 출원의 국내 출원일 혹은 PCT 국제 출원일 사이에 입수되었던 중요한 자료 정보를 공개하는 것이 포함됨을 인정합니다.

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

WIRELESS ACCESS POINT AND METHOD AND DEVICE

FOR CONTROLLING WIRELESS ACCESS POINT

the application of which:

☐ is attached hereto

OR

☒ was filed on October 19, 2011
as United States Application Number or PCT
International Application Number PCT/KR2011/007792
and was amended on

_____(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for continuation-in-part application(s), material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Korean Language Declaration

본인은 아래 기재된 바와 같은 외국 특허출원(들), 외국 발명자출원(들) 또는 외국 식물 육종가 권리출원(들)에 기초하여 미합중국 코드 제 35 장 제 119(a)-(d)항 또는 (f)항, 또는 365(b)항에 규정된 외국 우선권 혹은 미합중국을 제외한 최소한 한 국가를 지정하는 PCT 국제출원(들)에 기초하여 미합중국 코드 제 35 장 제 365(a)항에 규정된 외국 우선권을 주장하며, 나아가 우선권이 주장되는 출원의 출원일 이전에 출원된 외국 특허출원(들), 외국 발명자출원(들) 혹은 외국 식물육종가 권리출원(들) 또는 PCT 국제출원(들)도 아래 해당란을 체크함으로써 표시하였습니다.

Prior Foreign Application Number(s)
이전의 외국 출원번호(들)

10-2011-0054124	Korea, Republic of
(Application Number) (출원 번호)	(Country) (국가)

(Application Number) (출원 번호)	(Country) (국가)
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본인은 미합중국 코드인 제 35 장 제 119(e)항에 명시된 바와 같이 하기 미합중국 가출원의 국내 우선권을 주장합니다.

(Application Number) (출원 번호)	(Filing Date) (출원 일자)
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(Application Number) (출원 번호)	(Filing Date) (출원 일자)
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본인은 미합중국 코드 제 35 장 제 120 항에 의거 미합중국 출원(들)의 이익 또는 제 365(c)항에 의거 미합중국을 지정하는 PCT 국제출원(들)의 이익을 하기와 같이 주장합니다. 또한, 본 특허출원의 각 특허청구범위에 기재된 대상이 미합중국 코드 제 35 장 제 112 항의 첫번째 패러그래프에 규정된 바에 따라 선 미합중국 출원 또는 선 PCT 국제출원에 기재되어 있지 않은 경우에는, 본 출원의 특허성을 판단하는데 중요한 자료 정보로서 연방 규정 코드 제 37 장 제 1.56 항에 규정된 바에 따라, 선 출원의 출원일과 본 출원의 국내 출원일 또는 PCT 국제 출원일 사이에 발생한 모든 자료 정보들을 공개할 의무가 있음을 인정합니다.

Prior U.S. or International Application Number(s)
이전의 국내 또는 국제 출원 번호(들)

PCT/KR2011/007792	2011-10-19
(Application Number) (출원 번호)	(Filing Date) (출원 일자)

(Application Number) (출원 번호)	(Filing Date) (출원 일자)
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본인이 이는 한도 내에서 여기에 제공된 모든 내용이 사실이고, 제공된 정보나 소신이 모두 사실임을 확인하며, 더 나아가 미합중국 코드 제 18 장의 1001 항에 명시된 바와 같이 그 외의 허위 진술 및 이와 유사한 행위는 벌금이나 투옥으로 처벌 받거나 벌금과 감옥형을 모두 받을 수 있고 어떠한 고의의 허위 진술은 특허 출원이나 후에 발급된 특허의 유효성을 위태롭게 함을 인지하면서 여기에 진술함을 선언합니다.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application(s) which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application(s) having a filing date before that of the application on which priority is claimed.

Priority Claimed?
우선권 주장함

Yes 예	No 아니오
☒	☐

2011-06-03	☐	☐
(Filing Date) (출원 일자)		

I hereby claim domestic priority under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

I hereby claim benefit under 35 U.S.C. 120 of any United States application(s) or 365(c) of any PCT international application(s) designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in a listed prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge my duty to disclose any information material to the patentability of this application as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

pending
(Status: patented, pending, abandoned) (현황: 특허 획득, 출원중, 포기)

(Status: patented, pending, abandoned) (현황: 특허 획득, 출원중, 포기)
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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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Korean Language Declaration

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), 세계지적재산권기구(WIPO) 및 기타 특허청들에게 상기 언급된 특허출원 정보를 공개할지 여부를 결정할 권한을 미국특허청(USPTO)에 허여합니다. 연방 규정 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.

연방 규정 코드 제 37 장 제 1.14(h)(3)항에 따라, 다음의 경우에 한해 출원된 내용의 사본을 열람할 수 있습니다: 1) 상기 언급된 특허출원, 2) 미합중국 코드 제 35 장 119(a)-(d)항에 따라 상기 언급된 특허출원이 우선권을 주장하는 대상인 기타 외국 특허출원으로, 그 외국 특허출원 사본이 연방 규정 코드 제 37 장 제 1.55 항의 사본 증명 요건에 부합되며, 상기 언급된 특허출원에 이미 출원되어 있는 경우, 3) 상기 언급된 특허출원이 부수적인 이익을 주장하고자 하는 대상인 기타 미국 특허출원.

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

위임장: 본인은 본건 출원을 수행하고 그와 관련하여 미국 특허상표청 업무의 모든 사무를 처리하기 위하여 하기 표기한 USPTO 고객 번호에 등재된 **SUGHRUE MION, PLLC** 의 모든 변호사들을 본인의 대리인으로 지명하는 바이며, 해당 고객 번호에 등재된 어떤 특정 변호사들이 **Sughrue Mion, PLLC** 의 재량에 따라 수시로 변동될 수 있음을 인정하며, 출원에 대한 모든 서신을 동일한 USPTO 고객 번호에 기재된 주소로 송부해 줄 것을 요청합니다.

출원과 관련된 모든 우편 연락은 다음의 미국 특허청(USPTO) 고객 번호 아래에 나와 있는 주소로 보내 주십시오.

Authorization To Permit Access To Application by 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 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 Offices.

POWER OF ATTORNEY: I hereby appoint all attorneys of **SUGHRUE MION, PLLC** who are listed under the USPTO Customer Number shown below as my attorneys to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, recognizing that the specific attorneys listed under that Customer Number may be changed from time to time at the sole discretion of Sughrue Mion, PLLC, and request that all correspondence about the application be addressed to the address filed under the same USPTO Customer Number.

Direct all correspondence about the application to the address filed under the USPTO Customer Number below.

STATEMENT OF ACCURATE TRANSLATION IN ACCORDANCE WITH 37 C.F.R. §1.69(b):

The declaration and power of attorney is an accurate translation of the corresponding English language declaration and power of attorney.

Signature

Date

August 19, 2009

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

직통 전화 번호:

SUGHRUE MION, PLLC
202.293.7060

Direct Telephone Calls to:

SUGHRUE MION, PLLC
202.293.7060

NAME OF SOLE OR FIRST INVENTOR: 단독 혹은 최초 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외)		Family Name or Surname 성(姓)	
Byung Wan		YOON	
Inventor's signature 발명자의 서명		Date 일자	May 14, 2014
Residence: 거주지:		Citizenship 국적	
Gunpo-si, Republic of Korea		KR	
Mailing Address: 우편 주소: #1111-701, Jugong 11 Dangji Apt, Sanbon 2-dong, Gunpo-si, Gyeonggi-do, 435-748, Republic of Korea			
NAME OF SECOND INVENTOR: 두번째 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외)		Family Name or Surname 성(姓)	
Jae Ho		CHUNG	
Inventor's signature 발명자의 서명		Date 일자	May 14, 2014
Residence: 거주지:		Citizenship 국적	
Seoul, Republic of Korea		KR	
Mailing Address: 우편 주소: #202-505, Sangnoksu Apt., Irwonbon-dong, Gangnam-gu, Seoul, 135-947, Republic of Korea			
NAME OF THIRD INVENTOR: 세번째 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외)		Family Name or Surname 성(姓)	
Joo Young		YOON	
Inventor's signature 발명자의 서명		Date 일자	May 14, 2014
Residence: 거주지:		Citizenship 국적	
Yongin-si, Republic of Korea		KR	
Mailing Address: 우편 주소: #505-101, Unam Apt., Sinbong-dong, Suji-gu, Yongin-si, Gyeonggi-do, 448-935, Republic of Korea			
NAME OF FOURTH INVENTOR: 네번째 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외)		Family Name or Surname 성(姓)	
Kyu Jeong		HAN	
Inventor's signature 발명자의 서명		Date 일자	May 14, 2014
Residence: 거주지:		Citizenship 국적	
Suwon-si, Republic of Korea		KR	
Mailing Address: 우편 주소: #732-1401, Shinsung Apt., Bidan-maeul, Cheoncheon-dong, Jangan-gu, Suwon-si, Gyeonggi-do, 440-330, Republic of Korea			
NAME OF FIFTH INVENTOR: 다섯번째 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외)		Family Name or Surname 성(姓)	
Yung Ha		JI	
Inventor's signature 발명자의 서명		Date 일자	May 14, 2014
Residence: 거주지:		Citizenship 국적	
Seongnam-si, Republic of Korea		KR	
Mailing Address: 우편 주소: #814-1001, Imaechon Jinheung Apt., Imac-dong, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-904, Republic of Korea			

Electronic Acknowledgement Receipt	
EFS ID:	19038493
Application Number:	14123672
International Application Number:	
Confirmation Number:	3204
Title of Invention:	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
First Named Inventor/Applicant Name:	Byung Wan Yoon
Customer Number:	23373
Filer:	Travis Blue Ribar/Audrey Titus
Filer Authorized By:	Travis Blue Ribar
Attorney Docket Number:	Q208223
Receipt Date:	15-MAY-2014
Filing Date:	
Time Stamp:	13:39:45
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	Q208223SubmissionExecutedDeclaration051514.pdf	58486 3c3b1a8974ffe8e97c03ffac19dc4174732c3ad9	no	5

Warnings:

Information:

2	Oath or Declaration filed	Q208223DeclarationandPOAExecuted.pdf	1115043 a58315d5a8910919e3fc636fed99f7b99ff9f08f	no	4
Warnings:					
Information:					
Total Files Size (in bytes):			1173529		
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
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Alexandria, Virginia 22313-1450
www.uspto.gov

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
14/123,672	Byung Wan Yoon	Q208223

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

INTERNATIONAL APPLICATION NO.	
PCT/KR2011/007792	

LA. FILING DATE	PRIORITY DATE
10/19/2011	06/03/2011

CONFIRMATION NO. 3204
371 FORMALITIES LETTER



0000000067760447

Date Mailed: 04/16/2014

NOTIFICATION OF DEFECTIVE RESPONSE

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as a Designated Office (37 CFR 1.495).

- Priority Document
- Copy of the International Application filed on 12/03/2013
- English Translation of the IA filed on 12/03/2013
- Copy of the International Search Report filed on 12/03/2013
- Copy of IPE Report filed on 12/03/2013
- Preliminary Amendments filed on 12/03/2013
- Inventor's Oath or Declaration filed on 02/07/2014
- Request for Immediate Examination filed on 02/07/2014
- U.S. Basic National Fees filed on 12/03/2013
- Substitute Specification filed on 12/03/2013
- Priority Documents filed on 12/03/2013
- Application Data Sheet (37 CFR 1.76) filed on 12/03/2013

Applicant's response filed 02/07/2014 is hereby acknowledged. The following requirements set forth in the NOTIFICATION of MISSING REQUIREMENTS mailed 12/24/2013 have not been completed.

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date. The current oath or declaration does not comply with 37 CFR 1.497(a) and (b) in that it:
 - does not identify the citizenship of each inventor.
 - International filing date prior to 16 September 2012. The declaration is not subject to the rules under the American Invents Act. Please provide a new oath/declaration.

Applicant is required to complete the response within a time limit of ONE MONTH from the date of this Notification or within the time remaining in the response set forth in the Notification of Missing Requirements, whichever is the longer. No extension of this time limit may be granted under 37 CFR 1.136, but the period for response set in the Notification of Missing Requirements may be extended under 37 CFR 1.136(a).

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

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

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

CHARITTA A SHELTON

Telephone: (571) 272-3926

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/123,672			
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	480		
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(j))	11	minus 20 = *			OR	x 80 =	0.00		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 420 =	0.00		
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00		
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	1480		
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		OR	TOTAL ADD'L FEE		
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		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.									

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371		ATTORNEY DOCKET NO. Q208223
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 14/123,672
INTERNATIONAL APPLICATION NO. PCT/KR2011/007792	INTERNATIONAL FILING DATE October 19, 2011	PRIORITY DATE CLAIMED June 3, 2011
TITLE OF INVENTION WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
FIRST NAMED INVENTOR Byung Wan YOON		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.		
1. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.		
2. ☐ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).		
3. ☐ An English language translation of the International Application (35 U.S.C. 371(c)(2))		
a. ☐ is attached hereto.		
b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).		
4. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))		
a. ☒ is attached.		
b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).		
Items 5 to 8 below concern amendments made in the international phase.		
<u>PCT Article 19 and 34 amendments</u>		
5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).		
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).		
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).		
<u>Cancellation of amendments made in the international phase</u>		
8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.		
8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.		
NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).		
The following items 9 to 17 concern a document(s) or information included.		
9. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.		
10. ☐ A preliminary amendment.		
11. ☐ An Application Data Sheet under 37 CFR 1.76.		
12. ☐ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).		
13. ☒ A power of attorney and/or change of address letter.		
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.3 and 37 CFR 1.821- 1.825.		
15. ☐ Assignment papers (<i>cover sheet and document(s)</i>). Name of Assignee: KT Corporation		
16. ☐ 37 CFR 3.73(c) Statement (<i>when there is an Assignee</i>).		

U.S. APPLN NO. (if known, see 37 CFR 1.5) 14/123,672	INTERNATIONAL APPLICATION NO. PCT/KR2011/007792	ATTORNEY DOCKET NO. Q208223
17. ☐ Other items or information: Response to Notice to File Missing Requirements		
The following fees have been submitted.		CALCULATIONS PTO USE ONLY
18. ☐ Basic national fee (37 CFR 1.492(a))..... \$280		\$
19. ☐ Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... \$0 All other situations \$720		\$
20. ☐ Search fee (37 CFR 1.492(b)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... \$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority \$120 International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB \$480 All other situations... \$600		\$
TOTAL OF 18, 19 and 20 =		\$
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof..... \$400		\$
Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round up to a whole number)
- 100 =	/50 =	x \$400
Surcharge of \$140.00 for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).		\$140
CLAIMS	NUMBER FILED	NUMBER EXTRA
Total claims	- 20 =	x \$80
Independent claims	- 3 =	x \$420
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$780
Processing fee of \$140.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)).		\$
TOTAL OF ABOVE CALCULATIONS =		\$140
☐ Applicant asserts small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2		
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Fees above are reduced by 3/4. Applicant must attach form PTO/SB/15A or B or equivalent.		
TOTAL NATIONAL FEE =		\$140
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40/EFS - \$0 per property +		
Fee for Extension of Time		
TOTAL FEES ENCLOSED =		\$140
		Amount to be refunded: \$
		Amount to be charged \$

- a. ☐ A check in the amount of \$_____ to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. 19-4880 in the amount of \$ _____ to cover the above fees.
- c. ☒ 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.
- d. ☒ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is not recommended and by doing so **your credit card information may be displayed via PAIR**. To protect your information, it is recommended to pay fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

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: A U.S. national stage application may not claim priority to the international application of which it is the national phase. The filing date of a U.S. national stage application is the international filing date. See 35 U.S.C. 363.

SEND ALL CORRESPONDENCE TO:

The address associated with Customer Number:

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

SIGNATURE	<u>/ Diallo T. Crenshaw 52,778 /</u>	DATE	<u>February 7, 2014</u>
NAME (Print/Type)	Diallo T. Crenshaw	REGISTRATION NO. (Attorney/Agent)	52,778

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q208223

Byung Wan YOON, et al.

Appln. No.: 14/123,672

Group Art Unit: Not Yet Assigned

Confirmation No.: 3204

Examiner: Not Yet Assigned

Filed: December 3, 2013

For: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING
WIRELESS ACCESS POINT

**RESPONSE TO NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN
THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)**

MAIL STOP PCT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In response to the "Notification of Missing Requirements Under 35 U.S.C. 371 in the United States Designated/Elected Office (DO/EO/US)," for the above application, Applicant respectfully submits herewith a copy of the Declaration (4 page) properly executed by the inventors for the above identified application.

The statutory fee of \$140 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,

/ Diallo T. Crenshaw 52,778 /

Diallo T. Crenshaw

Registration No. 52,778

SUGHRUE MION, PLLC

Telephone: 202.293.7060

Facsimile: 202.293.7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: February 7, 2014

DECLARATION FOR PATENT APPLICATION (37 C.F.R. 1.63)

특허 출원 관련 선언

Korean Language Declaration

한국어 선언서

본인은 다음과 같이 선언합니다.

각 발명자의 거주지, 우편 주소 및 국적은 하기 각 발명자의 성명의 아래칸에 기재된 것과 동일합니다.

본인은, 하기의 발명자(들)이, 다음의 제목을 갖는 발명과 관련하여 특허를 받고자 하며 또 특허청구 범위에 기재되어 있는 대상에 대하여 원래의 최초 발명자(들)이라고 믿습니다.

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

WIRELESS ACCESS POINT AND METHOD AND DEVICE
FOR CONTROLLING WIRELESS ACCESS POINT

본 특허 출원 신청서는,

☐ 첨부된 바와 같습니다.

또는

☐ 미합중국 출원번호 또는 PCT 국제 출원 번호는
()로
일에 출원되었고
일에 보정되었음 (해당 경우).

the application of which:

☐ is attached hereto

OR

☒ was filed on October 19, 2011
as United States Application Number or PCT
International Application Number PCT/KR2011/007792
and was amended on

(if applicable).

본인은 위에 구체적으로 언급된 보정서에 의해 보정된 상기 특허출원(특허청구 범위 포함)의 내용을 검토 및 이해했음을 확인합니다.

본인은 연방 규정 코드 제 37장 제 1.56항에 규정된 바에 따라, 특허성의 판단에 중요한 자료 정보를 공개할 의무가 있음을 인정하며, 이와 같은 의무에는, 부분 연속 출원(들)의 경우에, 선출원의 출원일과 부분 연속 출원의 국내 출원일 혹은 PCT 국제 출원일 사이에 입수되었던 중요한 자료 정보를 공개하는 것이 포함됨을 인정합니다.

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for continuation-in-part application(s), material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Korean Language Declaration

본인은 아래 기재된 바와 같은 외국 특허출원(들), 외국 발명자증 출원(들) 또는 외국 식물 육종가 권리증 출원(들)에 기초하여 미합중국 코드 제 35 장 제 119(a)-(d)항 또는 (f)항, 또는 365(b)항에 규정된 외국 우선권 혹은 미합중국을 제외한 최소한 한 국가를 지정하는 PCT 국제출원(들)에 기초하여 미합중국 코드 제 35 장 제 365(a)항에 규정된 외국 우선권을 주장하며, 나아가 우선권이 주장되는 출원의 출원일 이전에 출원된 외국 특허출원(들), 외국 발명자증 출원(들) 혹은 외국 식물육종가 권리증(들) 또는 PCT 국제출원(들)도 아래 해당란을 체크함으로써 표시하였습니다.

Prior Foreign Application Number(s)
이전의 외국 출원번호(들)

10-2011-0054124 Korea, Republic of
(Application Number) (Country)
(출원 번호) (국가)

(Application Number) (Country)
(출원 번호) (국가)

본인은 미합중국 코드인 제 35 장 제 119(e)항에 명시된 바와 같이 하기 미합중국 기출원의 국내 우선권을 주장합니다.

(Application Number) (Filing Date)
(출원 번호) (출원 일자)

(Application Number) (Filing Date)
(출원 번호) (출원 일자)

본인은 미합중국 코드 제 35 장 제 120 항에 의거 미합중국 출원(들)의 이익 또는 제 365(c)항에 의거 미합중국을 지정하는 PCT 국제출원(들)의 이익을 하기와 같이 주장합니다. 또한, 본 특허출원의 각 특허청구범위에 기재된 대상이 미합중국 코드 제 35 장 제 112 항의 첫번째 패러그라프에 규정된 바에 따라 선 미합중국 출원 또는 선 PCT 국제출원에 기재되어 있지 않은 경우에는, 본 출원의 특허성을 판단하는데 중요한 자료 정보로서 연방 규정 코드 제 37 장 제 1.56 항에 규정된 바에 따라, 선 출원의 출원일과 본 출원의 국내 출원일 또는 PCT 국제 출원일 사이에 발생한 모든 자료 정보들을 공개할 의무가 있음을 인정합니다.

Prior U.S. or International Application Number(s)
이전의 국내 또는 국제 출원 번호(들)

PCT/KR2011/007792 2011-10-19
(Application Number) (Filing Date)
(출원 번호) (출원 일자)

(Application Number) (Filing Date)
(출원 번호) (출원 일자)

본인이 아는 한도 내에서 여기에 제공된 모든 내용이 사실이고, 제공된 정보나 소신이 모두 사실임을 확인하며, 더 나아가 미합중국 코드 제 18 장의 1001 항에 명시된 바와 같이 그 외의 허위 진술 및 이와 유사한 행위는 벌금이나 투옥으로 처벌 받거나 벌금과 감옥형을 모두 받을 수 있고 어떠한 고의의 허위 진술은 특허 출원이나 후에 발급된 특허의 유효성을 위태롭게 함을 인지하면서 여기에 진술함을 선언합니다.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application(s) which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application(s) having a filing date before that of the application on which priority is claimed.

Priority Claimed?
우선권 주장함

Yes	No
예	아니오
☒	☐

2011-06-03
(Filing Date)
(출원 일자)

(Filing Date)
(출원 일자)

I hereby claim domestic priority under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

I hereby claim benefit under 35 U.S.C. 120 of any United States application(s) or 365(c) of any PCT international application(s) designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in a listed prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge my duty to disclose any information material to the patentability of this application as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

pending
(Status: patented, pending, abandoned)
(현황: 특허 획득, 출원중, 포기)

(Status: patented, pending, abandoned)
(현황: 특허 획득, 출원중, 포기)

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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Korean Language Declaration

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), 세계지적재산기구(WIPO) 및 기타 특허청들에게 상기 언급된 특허출원 정보를 공개할지 여부를 결정할 권한을 미국특허청(USPTO)에 허여합니다. 연방 규정 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.

연방 규정 코드 제 37 장 제 1.14(h)(3)항에 따라, 다음의 경우에 한해 출원된 내용의 사본을 열람할 수 있습니다: 1) 상기 언급된 특허출원, 2) 미합중국 코드 제 35 장 119(a)-(d)항에 따라 상기 언급된 특허출원이 우선권을 주장하는 대상인 기타 외국 특허출원으로, 그 외국 특허출원 사본이 연방 규정 코드 제 37 장 제 1.55 항의 사본 증명 요건에 부합되며, 상기 언급된 특허출원에 이미 출원되어 있는 경우, 3) 상기 언급된 특허출원이 부수적인 이익을 주장하고자 하는 대상인 기타 미국 특허출원.

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

출원과 관련된 모든 우편 연락은 다음의 미국 특허청(USPTO) 고객 번호 아래에 나와 있는 주소로 보내 주십시오.

Authorization To Permit Access To Application by 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 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 Offices.

Direct all correspondence about the application to the address filed under the USPTO Customer Number below.

STATEMENT OF ACCURATE TRANSLATION IN ACCORDANCE WITH 37 C.F.R. §1.69(b):

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

Signature *[Signature]*

Date August 19, 2009

WASHINGTON OFFICE

23373

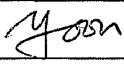
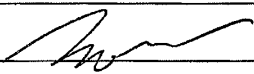
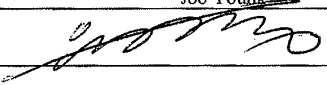
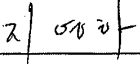
CUSTOMER NUMBER

직통 전화 번호:

SUGHRUE MION, PLLC
202.293.7060

Direct Telephone Calls to:

SUGHRUE MION, PLLC
202.293.7060

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) YOON
Inventor's signature 발명자의 서명 	Date 일자 November 28, 2013	
Residence: 거주지: Gunpo-si, Republic of Korea		
Mailing Address: 우편 주소: #1111-701, Jugong 11 Dangji Apt, Sanbon 2-dong, Gunpo-si, Gyeonggi-do, 435-748, Republic of Korea		
NAME OF SECOND INVENTOR: 두번째 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외) Jae Ho		Family Name or Surname 성(姓) CHUNG
Inventor's signature 발명자의 서명 	Date 일자 Nov. 28, 2013	
Residence: 거주지: Seoul, Republic of Korea		
Mailing Address: 우편 주소: #202-505, Sangnoksu Apt., Irwonbon-dong, Gangnam-gu, Seoul, 135-947, Republic of Korea		
NAME OF THIRD INVENTOR: 세번째 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외) Joo Young		Family Name or Surname 성(姓) YOON
Inventor's signature 발명자의 서명 	Date 일자 Nov 28, 2013	
Residence: 거주지: Yongin-si, Republic of Korea		
Mailing Address: 우편 주소: #505-101, Unam Apt., Sinbong-dong, Suji-gu, Yongin-si, Gyeonggi-do, 448-935, Republic of Korea		
NAME OF FOURTH INVENTOR: 네번째 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외) Kyu Jeong		Family Name or Surname 성(姓) HAN
Inventor's signature 발명자의 서명 	Date 일자 Nov. 28, 2013	
Residence: 거주지: Suwon-si, Republic of Korea		
Mailing Address: 우편 주소: #732-1401, Shinsung Apt., Bidan-maeul, Cheoncheon-dong, Jangan-gu, Suwon-si, Gyeonggi-do, 440-330, Republic of Korea		
NAME OF FIFTH INVENTOR: 다섯번째 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외) Yung Ha		Family Name or Surname 성(姓) JI
Inventor's signature 발명자의 서명 	Date 일자 Nov. 28, 2013	
Residence: 거주지: Seongnam-si, Republic of Korea		
Mailing Address: 우편 주소: #814-1001, Imaechon Jinheung Apt., Imae-dong, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-904, Republic of Korea		
[Page 4]		

Electronic Patent Application Fee Transmittal				
Application Number:		14123672		
Filing Date:				
Title of Invention:		WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
First Named Inventor/Applicant Name:		Byung Wan YOON		
Filer:		Richard C. Turner/Brian Murray		
Attorney Docket Number:		Q208223		
Filed as Large Entity				
U.S. National Stage under 35 USC 371 Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Oath/Decl > 30 Mos From 371 commencement	1617	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				140

Electronic Acknowledgement Receipt	
EFS ID:	18144278
Application Number:	14123672
International Application Number:	
Confirmation Number:	3204
Title of Invention:	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
First Named Inventor/Applicant Name:	Byung Wan YOON
Customer Number:	23373
Filer:	Richard C. Turner/Brian Murray
Filer Authorized By:	Richard C. Turner
Attorney Docket Number:	Q208223
Receipt Date:	07-FEB-2014
Filing Date:	
Time Stamp:	15:07:37
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$140
RAM confirmation Number	1488
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Applicant Response to Pre-Exam Formalities Notice	Q208223TransmittalINTFMR.pdf	288343 7927232279375abf931470d70c46390ead112747	no	3
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	Q208223ResponseNTFMR.pdf	88000 1ed3db806b12be99b54d5dffa50398e8a4e272e	no	1
Warnings:					
Information:					
3	Oath or Declaration filed	Q208223declaration.pdf	423053 f3afb18a3be0508379763fad35d01a09990b3125	no	4
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30208 99aeb47f5064ba2644e0003c586d50bdcee41e6	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			829604		
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

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
14/123,672	Byung Wan YOON	Q208223

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

INTERNATIONAL APPLICATION NO.	
PCT/KR2011/007792	

LA. FILING DATE	PRIORITY DATE
10/19/2011	06/03/2011

CONFIRMATION NO. 3204
371 FORMALITIES LETTER



0000000065699296

Date Mailed: 12/24/2013

**NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)**

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as a Designated Office (37 CFR 1.495).

- Priority Document
- Copy of the International Application filed on 12/03/2013
- English Translation of the IA filed on 12/03/2013
- Copy of the International Search Report filed on 12/03/2013
- Copy of IPE Report filed on 12/03/2013
- Preliminary Amendments filed on 12/03/2013
- U.S. Basic National Fees filed on 12/03/2013
- Substitute Specification filed on 12/03/2013
- Priority Documents filed on 12/03/2013
- Application Data Sheet (37 CFR 1.76) filed on 12/03/2013

The applicant needs to satisfy supplemental fees problems indicated below.

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.492(h) of \$140 for an undiscounted entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fees required for this application is \$140 for an Undiscounted Entity:

- \$140 Surcharge.

ALL OF THE ITEMS SET FORTH ABOVE MUST BE SUBMITTED WITHIN TWO (2) MONTHS FROM THE DATE OF THIS NOTICE OR BY 32 MONTHS FROM THE PRIORITY DATE FOR THE APPLICATION, WHICHEVER IS LATER. FAILURE TO PROPERLY RESPOND WILL RESULT IN ABANDONMENT.

The time period set above may be extended by filing a petition and fee for extension of time under the provisions of 37 CFR 1.136(a).

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

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

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

CHARITTA A SHELTON

Telephone: (571) 272-3926

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET Substitute for Form PTO-1360 (For use with Form PTO/SB/06)							Application Number 14123672		Filing Date				
							Applicant(s) Byung Wan YOON						
							* May be used for additional claims or amendments						
CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT			*		*		*	
	Indep	Depend	Indep	Depend	Indep	Depend		Indep	Depend	Indep	Depend	Indep	Depend
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Total Indep	3		3		0								
Total Depend	8		8		0								
Total Claims	11		11		0								

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/123,672			
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	480		
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(j))	11	minus 20 = *				x 80 =	0.00		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				x 420 =	0.00		
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00		
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	1480		
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		OR	TOTAL ADD'L FEE		
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		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.									

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371		ATTORNEY DOCKET NO. Q208223
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) Not Yet Assigned
INTERNATIONAL APPLICATION NO. PCT/KR2011/007792	INTERNATIONAL FILING DATE October 19, 2011	PRIORITY DATE CLAIMED June 3, 2011
TITLE OF INVENTION WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
FIRST NAMED INVENTOR Byung Wan YOON		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.		
1. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.		
2. ☐ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).		
3. ☒ An English language translation of the International Application (35 U.S.C. 371(c)(2))		
a. ☒ is attached hereto.		
b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).		
4. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).		
a. ☐ is attached.		
b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).		
Items 5 to 8 below concern amendments made in the international phase.		
<u>PCT Article 19 and 34 amendments</u>		
5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).		
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).		
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).		
<u>Cancellation of amendments made in the international phase</u>		
8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.		
8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.		
NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).		
The following items 9 to 17 concern a document(s) or information included.		
9. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.		
10. ☒ A preliminary amendment.		
11. ☒ An Application Data Sheet under 37 CFR 1.76.		
12. ☒ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).		
13. ☐ A power of attorney and/or change of address letter.		
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.3 and 37 CFR 1.821- 1.825.		
15. ☐ Assignment papers (<i>cover sheet and document(s)</i>). Name of Assignee: KT Corporation		
16. ☐ 37 CFR 3.73(c) Statement (<i>when there is an Assignee</i>).		

U.S. APPLN NO. (if known, see 37 CFR 1.5) Not Yet Assigned		INTERNATIONAL APPLICATION NO. PCT/KR2011/007792		ATTORNEY DOCKET NO. Q208223	
17. ☒ Other items or information: Copies of Forms PCT/RO/101, PCT/RO/105, PCT/RO/106, PCT/IB/301, PCT/IB/304, PCT/IB/306, PCT/IB/308, PCT/IB/311, PCT/ISA/202, PCT/ISA/220, PCT/ISA/237, Copies of Substitute Specification clean (18 pages), Substitute Specification marked up (18 pages) and a copy of the ISR.					
The following fees have been submitted.				CALCULATIONS PTO USE ONLY	
☒ Basic national fee (37 CFR 1.492(a))..... \$280				\$280	
☒ Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) \$0 All other situations \$720				\$720	
☒ Search fee (37 CFR 1.492(b)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) \$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority \$120 International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... \$480 All other situations... \$600				\$480	
TOTAL OF 18, 19 and 20 =				\$1,480	
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof..... \$400					
Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round up to a whole number)	RATE		
33 - 100 =	0/50 =	0	x \$400	\$0	
Surcharge of \$140.00 for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).				\$	
CLAIMS		NUMBER FILED	NUMBER EXTRA	RATE	
Total claims		11 - 20 =	0	x \$80	\$0
Independent claims		3 - 3 =	0	x \$420	\$0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$780	\$0
Processing fee of \$140.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)).				+	\$
TOTAL OF ABOVE CALCULATIONS =				\$1,480	
☐ Applicant asserts small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2					
☐ Applicant certifies micro entity status. See 37 CFR 1.97. Fees above are reduced by 3/4. Applicant must attach form PTO/SB/15A or B or equivalent.					
TOTAL NATIONAL FEE =				\$1,480	
Fee for recording the attached assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property					
+					
Fee for Extension of Time					
TOTAL FEES ATTACHED =				\$1,480	
				Amount to be refunded:	\$
				Amount to be charged	\$

- a. ☐ A check in the amount of \$ _____ to cover the above fees is attached.
- b. ☐ Please charge my Deposit Account No. 19-4880 in the amount of \$ _____ to cover the above fees.
- c. ☒ 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.
- d. ☒ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is not recommended and by doing so **your credit card information may be displayed via PAIR**. To protect your information, it is recommended to pay fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

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: A U.S. national stage application may not claim priority to the international application of which it is the national phase. The filing date of a U.S. national stage application is the international filing date. See 35 U.S.C. 363.

SEND ALL CORRESPONDENCE TO:

The address associated with Customer Number:

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

SIGNATURE / Diallo T. Crenshaw 52,778 /

DATE December 3, 2013

NAME
(Print/Type) / Diallo T. Crenshaw 52,778 /

REGISTRATION NO.
(Attorney/Agent) 52,778

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	Q208223
		Application Number	
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
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.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
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	Gunpo-si	Country Of Residenceⁱ	KR		
Citizenship under 37 CFR 1.41(b)ⁱ		KR			
Mailing Address of Applicant:					
Address 1		#1111-701, Jugong 11 Danji Apt.			
Address 2		Sanbon 2-dong, Gyeonggi-do			
City	Gunpo-si	State/Province			
Postal Code	435-748	Countryⁱ	KR		
Applicant 2					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jae Ho		CHUNG		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Seoul	Country Of Residenceⁱ	KR		
Citizenship under 37 CFR 1.41(b)ⁱ		KR			
Mailing Address of Applicant:					
Address 1		#202-505, Sangnoksu Apt.			
Address 2		Irwonbon-dong, Gangnam-gu			
City	Seoul	State/Province			
Postal Code	135-947	Countryⁱ	KR		
Applicant 3					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Joo Young		YOON		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Yongin-si	Country Of Residenceⁱ	KR		

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		Q208223	
		Application Number			
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT				

Citizenship under 37 CFR 1.41(b) i		KR			
Mailing Address of Applicant:					
Address 1		#505-101, Unam Apt.			
Address 2		Sinbong-dong, Suji-gu, Gyeonggi-do			
City	Yongin-si		State/Province		
Postal Code	448-935		Countryi	KR	
Applicant 4					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	
				☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name		Middle Name		Family Name
	Kyu Jeong				HAN
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Suwon-si		Country Of Residencei		KR
Citizenship under 37 CFR 1.41(b) i		KR			
Mailing Address of Applicant:					
Address 1		#732-1401, Shinsung Apt., Bidan-maeul			
Address 2		Cheoncheon-dong, Jangan-gu, Gyeonggi-do			
City	Suwon-si		State/Province		
Postal Code	440-330		Countryi	KR	
Applicant 5					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	
				☐ Party of Interest under 35 U.S.C. 118	
Prefix	Given Name		Middle Name		Family Name
	Yung Ha				JI
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Seongnam-si		Country Of Residencei		KR
Citizenship under 37 CFR 1.41(b) i		KR			
Mailing Address of Applicant:					
Address 1		#814-1001, Imaechon Jinheung Apt.			
Address 2		Imae-dong, Bundang-gu, Gyeonggi-do			
City	Seongnam-si		State/Province		
Postal Code	463-904		Countryi	KR	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

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

Customer Number 23373

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q208223
		Application Number	
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
Email Address	sughrue@sughrue.com	Add Email	Remove Email

Application Information:

Title of the Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		
Attorney Docket Number	Q208223	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	06	Suggested Figure for Publication (if any)	

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). Enter either 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		

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(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/KR2011/007792	2011-10-19
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

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	Q208223
		Application Number	
Title of Invention	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT		

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).

Remove			
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
10-2011-0054124	KR	2011-06-03	☒ Yes ☐ No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1				Remove
If the Assignee is an Organization check here. ☒				
Organization Name	KT Corporation			
Mailing Address Information:				
Address 1	206, Jeongja-dong			
Address 2	Bundang-gu, Gyeonggi-do			
City	Seongnam-si	State/Province		
Country ⁱ	KR	Postal Code	463-711	
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/ Diallo T. Crenshaw 52,778 /		Date (YYYY-MM-DD)	2013-12-03
First Name	Diallo T.	Last Name	Crenshaw	Registration Number
			52778	

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.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q208223

Byung Wan YOON, et al.

Appln. No.: National Stage of PCT/KR2011/007792

Confirmation No.: Not Yet Assigned

Group Art Unit: Not Yet Assigned

Filed: December 3, 2013

Examiner: Not Yet Assigned

For: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING
WIRELESS ACCESS POINT

PRELIMINARY AMENDMENT

MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Prior to examination, please amend the above-identified application as follows on the
accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE SPECIFICATION.....	2
AMENDMENTS TO THE CLAIMS	4
REMARKS	9

AMENDMENTS TO THE SPECIFICATION

Applicants provide herein a Substitute Specification under 37 C.F.R. § 1.125(a). In accordance with 37 C.F.R. § 1.125(b)(1), the undersigned states that the Substitute Specification contains no new matter. In accordance with 37 C.F.R. § 1.125(b)(2), a redline copy of the original specification showing the amendments thereto is attached to this Amendment. In accordance with 37 C.F.R. § 1.125(c), a clean copy of the Substitute Specification is attached to this Amendment. Entry of the Substitute Specification is requested.

Please delete the present Abstract of the Disclosure.

Please add the following new Abstract of the Disclosure:

ABSTRACT

The device for controlling a wireless access point comprises: a grouping unit which groups wireless access points which use the same channel, by using channel use information received from the wireless access points; a map generator which computes each received signal strength value of the grouped wireless access points and each output strength value of the grouped wireless access points; an extractor which extracts a wireless access point having the highest received signal strength value among the grouped wireless access points, if interference occurs between said grouped wireless access points; and an optimal output strength value-calculator which computes a corrected output strength value by using the received signal strength value of the extracted wireless access point, a threshold value of predetermined received signal strength, and a currently used output strength value between said grouped wireless access points.

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 device for controlling a wireless access point comprising:

a grouping unit configured to group wireless access points using ~~the a~~ same channel based on channel use information received from the wireless access points;

a map ~~generating unit~~ generator configured to compute a received signal strength indicator (RSSI) between the grouped wireless access points and an output strength value for each of the grouped wireless access points;

an ~~extracting unit~~ extractor configured to extract a wireless access point having ~~the a~~ highest RSSI value among the grouped wireless access points, if interference occurs between the grouped wireless access points; and

an optimal output strength value ~~computing unit~~ calculator configured to compute a corrected output strength value based on the highest RSSI value of the extracted wireless access point, a predetermined threshold value of the RSSI between the grouped wireless access points, and a currently used output strength value.

2. (Currently Amended) The device of claim 1, further comprising an output adjustment ~~requesting unit~~ requester configured to transmit an output strength adjustment request to each of the grouped wireless access points, the output strength adjustment request being ~~configured for~~ related to adjusting a current output strength value based on the corrected output strength value.

3. (Currently Amended) The device of claim 1, further comprising an interference occurrence notification ~~receiving unit~~ receiver configured to receive a message ~~notifying~~ indicating whether interference has occurred between the grouped wireless access points, wherein occurrence of the interference is determined by the grouped wireless access points based on an RSSI value and ~~the a~~ a number of ACK communication failures between the grouped wireless access points and a wireless terminal that ~~is accessed~~ accesses ~~to~~ the grouped wireless access points.

4. (Currently Amended) The device of claim 1, wherein the map ~~generating unit~~ generator is configured to generate a virtual map including RSSI values between the grouped wireless access points and the output strength value of each of the grouped wireless access points.

5. (Currently Amended) The device of claim 1, wherein the optimal output strength value ~~computing unit~~ calculator is configured to compute the corrected output strength value by subtracting a difference between the RSSI value of the extracted wireless access point and ~~the a~~ a predetermined threshold value of an RSSI value between the grouped wireless access points, from the currently used output strength value.

6. (Currently Amended) A wireless access point having an output strength value thereof controlled by a device for controlling ~~a the~~ a wireless access point, the wireless access point comprising:

a channel ~~setting-unit~~ setter configured to set a channel for communication;

an information ~~transmitting-unit~~ transmitter configured to search for neighboring wireless access points ~~that are present within a predetermined range~~ through the set channel and transmit information on the searched neighboring wireless access points and the wireless access point;

a ~~computing-unit~~ calculator configured to compute ~~the~~ a number of ACK communication failures with a wireless terminal and a received signal strength indicator (RSSI) value ~~at every predetermined interval~~, once the wireless terminal is connected; and

an interference occurrence ~~notifying-unit~~ notifier configured to transmit a message ~~notifying~~ indicating that interference has occurred, to the device for controlling ~~a~~ the wireless access point if it is determined that the interference with the neighboring wireless access points has occurred, based on the computed number of ACK communication failures with the wireless terminal and the RSSI value.

7. (Currently Amended) The wireless access point of claim 6, further comprising an output strength ~~adjusting-unit~~ adjuster configured to receive a corrected output strength value from the device for controlling ~~a~~ the wireless access point and adjust a current output strength value based on the corrected output strength value.

8. (Currently Amended) The wireless access point of claim 6, wherein the ~~computing-unit~~ calculator is configured to check whether the wireless terminal is connected ~~at predetermined intervals~~ and, if there is no wireless terminal connected, the calculator requests the information ~~transmitting-unit~~ transmitter to search for the neighboring wireless access points ~~that are present within the predetermined range~~.

9. (Currently Amended) The wireless access point of claim 6, wherein the interference occurrence ~~notifying unit~~ notifier is configured to determine that the occurrence has occurred if a current RSSI value is greater than a previous RSSI value and the number of ACK communication failures with a current wireless terminal is greater than the number of ACK communication failure with a previous wireless terminal, ~~based on the predetermined interval.~~

10. (Currently Amended) The wireless access point of claim 9, wherein the interference occurrence ~~notifying unit~~ notifier is configured to apply a predetermined margin value to the previous RSSI value and the number of ACK communication failures with the current wireless terminal, ~~whereas and~~ fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

11. (Currently Amended) A method for controlling an output strength value of a wireless access point by a device for controlling ~~a~~ the wireless access point, the method comprising:

(a) setting a channel for communication, searching for neighboring wireless access points ~~that are present within a predetermined range~~, and transmitting information on the wireless access point and the searched neighboring wireless access points to the device for controlling a ~~the~~ wireless access point, wherein the setting, searching and transmitting ~~being~~ is performed by the wireless access point;

(b) grouping wireless access points using ~~the~~ a same channel, based on the information on the wireless access point and the neighboring wireless access points received from the

wireless access point, the grouping being performed by the device for controlling ~~a~~the wireless access point;

(c) determining whether interference has occurred between the grouped wireless access points and transmitting the determination to the device for controlling a wireless access point, the determining and the transmitting the determination being performed by the grouped wireless access points;

(d) computing a corrected output strength value for reducing the interference and transmitting the corrected output strength value to the grouped wireless access points, the computing and the transmitting the corrected output strength being performed by the device for controlling ~~a~~the wireless access point; and

(e) adjusting a current output strength value based on the corrected output strength value, the adjusting being performed by the grouped wireless access points.

PRELIMINARY AMENDMENT
Appln. No.: National Stage of PCT/KR2011/007792

Attorney Docket No.: Q208223

REMARKS

Entry and consideration of this Amendment are respectfully requested.

Respectfully submitted,

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23373

CUSTOMER NUMBER

Date: December 3, 2013

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First Named Inventor/Applicant Name:		Byung Wan YOON		
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Natl Stage Search Fee - Report provided	1642	1	480	480
National Stage Exam - all other cases	1633	1	720	720
Pages:				
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Q208223Specificationasfiled.pdf	86929	yes	27
			b98628927d26382a9b43266536ba298633ecbd78		
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	Document Description		Start	End	
	Specification		1	21	
	Claims		22	26	
	Abstract		27	27	
Warnings:					
Information:					
2	Specification	Q208223SubstituteSpecifictionClean.pdf	121089	no	18
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3	Applicant Arguments/Remarks Made in an Amendment	Q208223SubstituteSpecifictionMarkedup.pdf	124122	no	18
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4	Drawings-only black and white line drawings	Q208223Drawingsasfiled.pdf	2989983	no	6
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Warnings:					
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5	Documents submitted with 371 Applications	Q208223InternationalSearchReport.pdf	342469	no	5
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Warnings:					
Information:					
6	Documents submitted with 371 Applications	Q208223PCTRequest.pdf	260615	no	6
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Warnings:					
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7	Documents submitted with 371 Applications	Q208223PCTRO105.pdf	126751 3d44b9fcb67ea97da4ca4bd0aa72c49363d14e7f	no	1
Warnings:					
Information:					
8	Documents submitted with 371 Applications	Q208223PCTRO106.pdf	472222 5ecd18978cad323f482749e3012db7eaa2cd92f9	no	6
Warnings:					
Information:					
9	Documents submitted with 371 Applications	Q208223PCTIB301.pdf	157467 4473f1dad9c7ef7a3d32d21f0b83508e3182517d	no	1
Warnings:					
Information:					
10	Documents submitted with 371 Applications	Q208223PCTIB304.pdf	162213 11be27689343f9695055eabff027a2e7a68edd43	no	1
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11	Documents submitted with 371 Applications	Q208223PCTIB306.pdf	137587 5f987cc00fa9fed6e6dff86aa0736c013e9a468a	no	1
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12	Documents submitted with 371 Applications	Q208223PCTIB308.pdf	218013 44c6c7d94425b8c317a5453b12f421bb0214ad55	no	2
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15	Documents submitted with 371 Applications	Q208223PCTISA220.pdf	175781 84fcfeac444dcdbf77b1d9a992fe7eacb7775fe2	no	2
Warnings:					
Information:					

16	Documents submitted with 371 Applications	Q208223PCTISA237.pdf	263391 cb7cc799a765e80290ffc938d5c158ff50f5a7	no	4
Warnings:					
Information:					
17	Transmittal of New Application	Q208223TransmittalNewApp.pdf	49532 6bffa5b529a2c54932dc8d1aca441e156eee1096	no	3
Warnings:					
Information:					
18	Application Data Sheet	Q208223ADS.pdf	1088750 857afb8be1e01724e2ab7c9507b6e15b37ee55f5a	no	5
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19	Preliminary Amendment	Q208223PreliminaryAmendme nt.pdf	61465 630ba51dd5bc0d56d9c4c37a3671e2fbd01ebf1	no	9
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20	Fee Worksheet (SB06)	fee-info.pdf	33417 2ddff4af704032a88a52504c85daf1fd166a87f3	no	2
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WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

TECHNICAL FIELD

5 Exemplary embodiments relate to a wireless access point and a method and a device for controlling the wireless access point, more specifically to a method and a device for controlling a wireless access point to optimize its coverage and capacity under in an environment of interference.

10 BACKGROUND ART

When services are provided using a wireless LAN, a house or a specific area is serviced using a single access point ("AP" hereinafter).

However, due to the structure of a building or the geographical features, the house or specific area may not be completely covered by the service using a single AP.

15 One way of solving this problem is by installing a separate AP (low-output AP) in shadow areas to widen the user's range of wireless communication.

However, in case two APs happen to use the same channel, interference can be occurred in a certain area.

That is, when a separate AP is used to eliminate the shadow areas, the separate
20 AP is designed to transmit a fixed transmission power, and the separate AP transmits an

excessive transmission power in order to eliminate the shadow areas, causing interference and deteriorating the performance of the wireless network.

For this, Korean Patent Publication 2006-0034461 (Sub Access Point, system and method for controlling power of transmitting signal) discloses that the power level
5 of a transmission signal output from a sub-AP is adjusted based on received signal strength indicator (RSSI) readings and frame error rate (FER) of a main AP, thereby eliminating shadow areas and minimizing interference between the main AP and the sub-AP, but it is restricted with the condition that the sub-AP itself needs to adjust the transmission power.

10 That is, since each of a plurality of sub-APs using the same channel needs to adjust the transmission power individually, it is impossible and inefficient to minimize the interference within a shortest time.

SUMMARY

15 To solve the above-described problem of the conventional art, Exemplary embodiments provide a method and a device for minimizing interference between neighboring access points without a cell planning step.

The objects of the present invention are not limited to the above description, and any other objects not described herein will be clearly understood from the
20 disclosure below.

According to an aspect of an exemplary embodiment, a device for controlling a wireless access point is provided. The device includes: a grouping unit configured to group wireless access points using the same channel based on channel use information received from the wireless access points; a map generating unit configured to compute a
5 received signal strength indicator (RSSI) between the grouped wireless access points and an output strength value for each of the grouped wireless access points; an extracting unit configured to extract a wireless access point having the highest RSSI value among the grouped wireless access points, if interference occurs between the grouped wireless access points; and an optimal output strength value-computing unit
10 configured to compute a corrected output strength value based on the RSSI value of the extracted wireless access point, a predetermined threshold value of RSSI between the grouped wireless access points, and a currently used output strength value.

According to an aspect of an exemplary embodiment, the device for controlling a wireless access point can also include an output adjustment requesting unit configured
15 to transmit an output strength adjustment request, which is for adjusting a current output strength value based on the corrected output strength value, to each of the grouped wireless access points.

The device for controlling a wireless access point can also include an interference occurrence notification receiving unit configured to receive a message
20 notifying whether interference has occurred between the grouped wireless access points.

Occurrence of the interference can be determined by the grouped wireless access points based on an RSSI value and the number of ACK communication failure between the grouped wireless access points and a wireless terminal that is accessed to the grouped wireless access points.

5 The map generating unit can generate a virtual map including RSSI values between the grouped wireless access points and the output strength value of each of the grouped wireless access points.

 The optimal output strength value computing unit can compute the corrected output strength value by subtracting a difference between the RSSI value of the
10 extracted wireless access point and the predetermined threshold value of RSSI value between the grouped wireless access points from the currently used output strength value.

 According to an aspect of an exemplary embodiment, a wireless access point having an output strength value thereof controlled by a device for controlling a wireless
15 access point is provided. The wireless access point in accordance with an exemplary embodiment can include: a channel setting unit configured to set a channel for communication; an information transmitting unit configured to search for neighboring wireless access points that are present within a predetermined range through the set channel and transmit information on the searched neighboring wireless access points
20 and the wireless access point; a computing unit configured to compute the number of

ACK communication failure with a wireless terminal and a received signal strength indicator (RSSI) value at every predetermined interval, once the wireless terminal is connected; and an interference occurrence notifying unit configured to transmit a message notifying that interference has occurred to the device for controlling a wireless
5 access point if it is determined that the interference with neighboring wireless access point has occurred, based on the computed number of ACK communication failure with the wireless terminal and RSSI value.

The wireless access point can also include an output strength adjusting unit configured to receive a corrected output strength value from the device for controlling a
10 wireless access point and adjust a current output strength value based on the corrected output strength value.

The computing unit can check whether the wireless terminal is connected at predetermined intervals and, if there is no wireless terminal connected, request the information transmitting unit to search for neighboring wireless access points that are
15 present within the predetermined range.

The interference occurrence notifying unit can determine that the occurrence has occurred if a current RSSI value is greater than a previous RSSI value and the number of ACK communication failure with a current wireless terminal is greater than the number of ACK communication failure with a previous wireless terminal, based on
20 the predetermined interval.

The interference occurrence notifying unit can apply a predetermined margin value to the previous RSSI value and the number of ACK communication failure with the current wireless terminal, whereas fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

5 According to an aspect of an exemplary embodiment, a method for controlling an output strength value of a wireless access point by a device for controlling a wireless access point is provided. The method for controlling an output strength value of a wireless access point can include: (a) setting a channel for communication, searching for neighboring wireless access points that are present within a predetermined range,
10 and transmitting information on the wireless access point and the searched neighboring wireless access points to the device for controlling a wireless access point, the setting, searching and transmitting being performed by the wireless access point; (b) grouping wireless access points using the same channel, based on the information on the wireless access point and the neighboring wireless access points received from the wireless
15 access point, the grouping being performed by the device for controlling a wireless access point; (c) determining whether interference has occurred between the grouped wireless access points and transmitting the determination to the device for controlling a wireless access point, the determining and transmitting being performed by the grouped wireless access points; (d) computing a corrected output strength value for reducing the
20 interference and transmitting the corrected output strength value to the grouped wireless

access points, the computing and transmitting being performed by the device for controlling a wireless access point; and (e) adjusting a current output strength value based on the corrected output strength value, the adjusting being performed by the grouped wireless access points.

5 Specific details for achieving the above objects will become more apparent by referring to the accompanying drawings as well as the embodiments described below.

 However, the present invention shall not be restricted to the embodiments disclosed below and can be configured in various other forms, and the embodiments described herein are provided only to complete the disclosure of the present invention
10 and to allow a person of ordinary skill in the art to which the present invention pertains to fully understand the scope of the present invention.

 According to the method and device for controlling a wireless access point described above, the interference between the access points can be minimized without introducing cell planning procedures.

15 Moreover, minimizing the interference between neighboring access points can take a shorter time, and an optimal wireless communication environment can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

20 FIG. 1 illustrates the configuration of a system for controlling a wireless access

point in accordance with an exemplary embodiment.

FIG. 2 is a block diagram showing the configuration of a wireless access point in accordance with an exemplary embodiment.

FIG. 3 illustrates the configuration of a device for controlling the wireless
5 access point in accordance with an exemplary embodiment.

FIGS. 4 and 5 are flow diagrams illustrating how the wireless access point is controlled in accordance with an exemplary embodiment.

FIG. 6 is a virtual map generated by the device for controlling the wireless access point in accordance with an exemplary embodiment.

10

DETAILED DESCRIPTION

Hereinafter, exemplary embodiments will be described in detail with reference to the accompanying drawings in such a way that a person of ordinary skill in the art to which the present invention pertains can readily embody the present invention.

15 Nevertheless, the exemplary embodiments can be realized in various forms and shall not be restricted to the embodiment described herein.

Moreover, in order to describe the exemplary embodiments more clearly, any portions of the drawings that are not related to the description are omitted, and throughout the specification, similar reference numerals are designated to similar

20 elements.

When a certain element is described to be "connected" to another element, it includes not only the case of "directly being connected" but also "electrically being connected" with another device therebetween.

Moreover, when a portion is described to "include" a certain element, it does
5 not mean that another element is excluded but means that another element can be further included, unless otherwise described.

Hereinafter, an embodiment of the present invention will be described in detail with reference to the accompanying drawings that illustrate the configurations and process flows.

10 FIG. 1 illustrates the configuration of a system for controlling a wireless access point in accordance with an embodiment of the present invention.

The system for controlling a wireless access point in accordance with an embodiment of the present invention includes a plurality of wireless access points 100 and a device 200 for controlling a wireless access point.

15 The wireless access point ("AP" hereinafter) 100 outputs a transmission signal for wireless communication to a wireless network terminal that is present in a wireless network environment, and transmits a Beacon frame and a data frame to wireless network devices.

Moreover, the AP 100 can provide a certain service to the wireless network
20 devices through the transmission signal and allow the wireless network devices to

communicate with one another.

FIG. 1 shows that there are a plurality of APs 100. Each AP 100 uses a channel for wireless communication, and if interference occurs between APs 100 using the same channel, the device 200 for controlling a wireless access point can simultaneously

5 control the output strength values of the APs 100 using the same channel.

For this, the AP 100 configures the channel for communication and searches for neighboring APs that are present in a predetermined range.

Afterwards, the AP 100 transmits information on the searched neighboring APs and information on itself 100, i.e., the channel used, a Received Signal Strength

10 Indicator ("RSSI" hereinafter) value and the output strength value to the device 200 for controlling a wireless access point.

Moreover, the AP 100 determines whether interference occurs with neighboring APs that use the same channel at predetermined intervals, and if it is determined that interference has occurred between the APs, the AP 100 transmits a notification message

15 to the device 200 for controlling a wireless access point.

Then, the AP 100 receives a corrected output strength value from the device 200 for controlling a wireless access point, and adjusts the current output strength value based on the received output strength value.

Here, each of the APs using the same channel simultaneously receives the

20 corrected output strength value from the device 200 for controlling a wireless access

point and adjusts the current output strength value, making it possible to minimize the interference between the APs in the shortest time.

Meanwhile, the device 200 for controlling a wireless access point ("AP control device" hereinafter) 200 receives from the AP 100 information on neighboring AP and itself 100, groups the APs using the same channel, and generates a virtual map based on the RSSI value between the grouped APs and the output strength value of each AP.

Then, if the AP control device 200 receives from the AP 100 a message notifying that interference has occurred between APs using the same channel, the AP control device 200 computes an optimal output strength value for each AP, with which the interference can be minimized, based on the generated virtual map and transmits the computed optimal output strength value to each AP using the channel.

Afterwards, the plurality of APs (using the same channel) having received the corrected output strength value from the AP control device 200 can adjust the current output strength value simultaneously based on the received output strength value.

FIG. 2 is a block diagram showing the configuration of the AP 100 in accordance with an exemplary embodiment.

The AP 100 in accordance with an exemplary embodiment includes a channel setting unit 110, an information transmitting unit 120, a computing unit 130, an interference occurrence determining unit 140 and an output strength adjusting unit 150.

The channel setting unit 110 sets a channel for communication, and the

information transmitting unit 120 searches for neighboring APs that are present within a predetermined range through the set channel and transmits information on the searched neighboring APs and the AP 100 itself.

Here, the information on the searched neighboring APs and AP 100 can include
5 at least one of a currently used channel, an RSSI value and an output strength value.

Once the wireless network terminal ("wireless terminal" hereinafter) is accessed to the AP 100, the computing unit 130 computes the number of ACK communication failure and the RSSI value at every predetermined interval.

Here, due to the characteristics of WiFi, the wireless terminal can transmit ACK
10 (signal) to the AP 100 after the transmission of data frame is completed, and the computing unit 130 can monitor the status of the channel by counting ACK.

Moreover, the computing unit 130 can check whether the wireless terminal is connected at predetermined intervals, and if there is no connection of the wireless terminal, the computing unit 130 can request the information transmitting unit 120 to
15 search for neighboring APs.

The interference occurrence determining unit 140 determines whether interference with neighboring AP has occurred, based on the number of ACK communication failure and the RSSI value with the wireless terminal computed by the computing unit 130.

20 Specifically, the interference occurrence determining unit 140 can determine

that interference has occurred between APs if a current RSSI value (RSSI_current) is greater than a previous RSSI value (RSSI_past) and the number of ACK communication failure with a current wireless terminal (data_fail_cnt_current) is greater than the number of ACK communication failure with a previous wireless terminal

5 (data_fail_cnt_past), based on the predetermined interval.

Here, the interference occurrence determining unit 140 can apply a predetermined margin value to RSSI_past and data_fail_cnt_current, wherein fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

10 For instance, RSSI_margin, which is a margin value indicating an allowed range of fluctuation of RSSI, can be subtracted from RSSI_past, and cnt_margin, which is a margin value indicating an allowed range of fluctuation the data fail count, can be multiplied to data_fail_cnt_current.

As a result, if the interference occurrence determining unit 140 determines that
15 interference has occurred between the APs that are grouped with the same channel, it can be briefly indicated as follows.

$$\text{RSSI_past} - \text{RSSI_margin} < \text{RSSI_current} \text{ and}$$

$$\text{data_fail_cnt_past} < \text{data_fail_cnt_current} * \text{cnt_margin}$$

Later, if the interference occurrence determining unit 140 determines that
20 interference has occurred between APs, the interference occurrence determining unit

140 transmits a message notifying that interference has occurred to the AP control device 200.

The output strength adjusting unit 150 receives the corrected output strength value for minimizing the interference from the AP control device 200 and adjusts the
5 current output strength value based on the corrected output strength value.

Here, adjusting the current output strength value based on the corrected output strength value based on the corrected output strength value received from the AP control device 200 can be simultaneously performed for every AP that uses the same channel.

10 FIG. 3 illustrates the configuration of the AP control device 200 in accordance with an exemplary embodiment.

The AP control device 200 in accordance with an exemplary embodiment includes a grouping unit 210, a map generating unit 220, an interference occurrence notification receiving unit 230, an extracting unit 240, an optimal output strength value
15 computing unit 250 and an output adjustment requesting unit 260.

The grouping unit 210 groups APs that use the same channel based on the information on channels currently used by the APs, once the information on currently used channels, RSSI values and output strength values of neighboring APs and the AP 100 is received from the AP 100.

20 The map generating unit 220 computes the RSSI value between the grouped

APs that use the same channel and the output strength value of the grouped APs.

Then, the map generating unit 220 generates a virtual map that includes the RSSI value between the grouped APs and the output strength value of the grouped APs.

The interference occurrence notification receiving unit 230 receives a message
5 notifying whether interference has occurred between the grouped APs from the AP 100.

The occurrence of interference between the grouped APs can be determined by the AP 100 based on the RSSI value and the number of communication failure (data_fail_cnt_past, data_fail_cnt_current) between the grouped AP and the wireless terminal that is accessed to the grouped AP. As this was described earlier with reference
10 to the AP 100, it will not be described herein.

Once interference occurs between the grouped APs, the extracting unit 240 refers to the virtual map generated by the map generating unit 220 to extract the AP that has the highest RSSI value among the grouped APs.

For example, if the grouped APs include AP1, AP2 and AP3 and the RSSI
15 value (RSSI_13) between AP1 and AP3 has the highest value in the virtual map, the AP that has the highest RSSI value is AP1.

In the virtual map, the RSSI value of the n^{th} AP received from the m^{th} AP can be expressed as RSSI_mn, and the m^{th} AP can be regarded as having the highest RSSI value if RSSI_mn has the highest value in the virtual map.

20 The optimal output strength value computing unit 250 computes the corrected
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output strength value (Ptx_modi) for minimizing the interference between the APs, based on an RSSI value (RSSI_m) of AP extracted by the extracting unit 240, a predetermined threshold value (RSSI_th) of RSSI between the grouped APs and a currently used output strength value (Ptx_c) of the grouped APs.

- 5 The optimal output strength value computing unit 250 computes the corrected output strength value (Ptx_modi) by subtracting the difference between RSSI_m and RSSI_th from Ptx_c.

This can be mathematically expressed as follows.

$$\text{Ptx_modi} = \text{Ptx_c} - (\text{RSSI_m} - \text{RSSI_th})$$

- 10 The output adjustment requesting unit 260 sends an output strength adjustment request to each of the grouped APs so as to adjust the current output strength value based on Ptx_modi.

- The elements illustrated in FIG. 2 and FIG. 3 in accordance with an exemplary embodiment refer to hardware configurations, such as FPGA (Field Programmable Gate
15 Array) or ASIC (Application Specific Integrated Circuit), and perform certain functions.

Nevertheless, it shall not mean that the elements are restricted to either software or hardware, and it is possible that each of the elements is configured to be in an addressable storage medium and to run one or more processors.

- Therefore, the elements can include, for example, elements such as software
20 elements, object-oriented software elements, class elements and task elements, as well

as processes, functions, attributes, procedures, sub-routines, segments of program code, drivers, firmware, micro codes, circuits, data, database, data structures, tables, arrays and variables.

The elements and functions provided within the elements can be combined into
5 a smaller number of elements or separated into additional elements.

FIGS. 4 and 5 are flow diagrams illustrating how the wireless access point is controlled in accordance with exemplary embodiment.

Hereinafter, the flow diagrams of FIGS. 4 and 5 will be described with reference to the elements of the system shown in FIG. 1.

10 First, the AP 100 sets the channel for communication and searches for neighboring APs that are present within a predetermined range (S401).

After the step of S401, the AP 100 sends the information on the searched neighboring APs and the information on the AP 100 to the AP control device 200 (S402).

15 Here, the information on the neighboring APs and the information on the AP 100 can include at least one of the channel that is currently used, the RSSI value and the output strength value.

After the step of S402, the AP control device 200 groups the APs that are using the same channel based on the information on the neighboring APs and the information
20 on the AP 100 received from the AP 100, and generates a virtual map based on the RSSI

value and the output strength value between the grouped APs (S403).

After the step of S403, the AP 100 (more specifically, the grouped APs) checks for connection by the terminal at every predetermined interval (S404) and, if the terminal is connected, computes an average of accumulated values of RSSI_{current} and

5 data_fail_cnt_{current} at the predetermined intervals (S405).

After the step of S405, the AP 100 determines whether interference has occurred by checking “RSSI_{past} - RSSI_{margin} < RSSI_{current} and data_fail_cnt_{past} < data_fail_cnt_{current} * cnt_{margin}” (S406).

If the step of S406 determines that interference has occurred, the AP 100 sends
10 an interference occurrence notification message to the AP control device 200 (S407).

If the step of S406 determines that interference has not occurred, the AP 100 can maintain the current service.

Here, if, upon checking for the connection of the terminal at the predetermined intervals, the step of S406 determines that no terminal is connected, the AP 100 can be
15 switched to a station mode and repeat the step of S402.

After the step of S407, the AP control device 200 refers to the virtual map generated in the step of S403 to check whether there is any RSSI_{mn} that is greater than RSSI_{th} (S408).

If, upon checking in the step of S408, there is RSSI_{mn} that is greater than
20 RSSI_{th}, the AP control device 200 extracts an AP that has the highest RSSI value in

the virtual map generated in the step of S403 (S409).

If, upon checking in the step of S408, there is no RSSI_{mn} that is greater than RSSI_{th}, the AP control device 200 can maintain the current service.

After the step of S409, the AP control device 200 computes the corrected output
5 strength value, i.e., Ptx_{modi}, based on the RSSI value of AP extracted in the step of S407, i.e., RSSI_m, the predetermined threshold value of RSSI between the grouped APs, i.e., RSSI_{th}, and the currently used output strength value of the grouped APs, i.e., Ptx_c (S410).

After the step of S410, the AP control device 200 simultaneously transmits
10 Ptx_{modi} to the grouped APs (S411), and the grouped APs adjust the current output strength value based on the received Ptx_{modi} (S412).

FIG. 6 is a virtual map generated by the device for controlling the wireless access point in accordance with an exemplary embodiment.

In FIG. 6, APs that use the same channel (CH 1, CH 5) are grouped together to
15 generate the virtual map.

The APs using CH 1 are AP 1, AP 3 and AP 5, and it can be seen that the RSSI value between these APs and the output strength value of each of these APs are included.

Moreover, the APs using CH 5 are AP 2 and AP 4, and the RSSI value between
20 these APs and the output strength value of each of these APs are included in the virtual

map.

As described earlier, if the highest RSSI value is RSSI₁₃, i.e., the RSSI value between AP 1 and AP 3, AP 1 becomes the AP having the highest RSSI value, which is expressed as “RSSI_m” in the exemplary embodiment.

5 As illustrated in 6, the virtual map generated by the AP control device 200 can be generated and managed as a multi-group (or a multi-layer), depending on the channel used.

The above description of the present invention is for illustrative purpose only, and it shall be appreciated that the present invention can be readily modified to a
10 different specific form without changing the technical ideas or essential features of the present invention by a person having ordinary skill in the art to which the present invention pertains.

Therefore, it shall be appreciated that the embodiment described above is illustrative but not restrictive in every aspect.

15 For instance, it is possible that any element described in the singular form is embodied by being separated and, likewise, any separated elements can be embodied by being combined.

The scope of the present invention is defined by the claims appended below rather than by the above description, and it shall be understood that the meanings and
20 scope of the claims as well as any and every modification and permutation derived from

the equivalents are included in the scope of the present invention.

WHAT IS CLAIMED IS:

1. A device for controlling a wireless access point comprising: a grouping unit configured to group wireless access points using the same channel based on channel use information received from the wireless access points;

5 a map generating unit configured to compute a received signal strength indicator (RSSI) between the grouped wireless access points and an output strength value for each of the grouped wireless access points;

 an extracting unit configured to extract a wireless access point having the highest RSSI value among the grouped wireless access points, if interference occurs
10 between the grouped wireless access points; and

 an optimal output strength value-computing unit configured to compute a corrected output strength value based on the RSSI value of the extracted wireless access point, a predetermined threshold value of RSSI between the grouped wireless access points, and a currently used output strength value.

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2. The device of claim 1, further comprising an output adjustment requesting unit configured to transmit an output strength adjustment request to each of the grouped wireless access points, the output strength adjustment request being configured for adjusting a current output strength value based on the corrected output strength value.

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3. The device of claim 1, further comprising an interference occurrence notification receiving unit configured to receive a message notifying whether interference has occurred between the grouped wireless access points,

wherein occurrence of the interference is determined by the grouped wireless access points based on an RSSI value and the number of ACK communication failure between the grouped wireless access points and a wireless terminal that is accessed to the grouped wireless access points.

4. The device of claim 1, wherein the map generating unit is configured to generate a virtual map including RSSI values between the grouped wireless access points and the output strength value of each of the grouped wireless access points.

5. The device of claim 1, wherein the optimal output strength value computing unit is configured to compute the corrected output strength value by subtracting a difference between the RSSI value of the extracted wireless access point and the predetermined threshold value of RSSI value between the grouped wireless access points from the currently used output strength value.

6. A wireless access point having an output strength value thereof controlled by a device for controlling a wireless access point, the wireless access point comprising:

a channel setting unit configured to set a channel for communication;

an information transmitting unit configured to search for neighboring wireless access points that are present within a predetermined range through the set channel and transmit information on the searched neighboring wireless access points and the
5 wireless access point;

a computing unit configured to compute the number of ACK communication failure with a wireless terminal and a received signal strength indicator (RSSI) value at every predetermined interval, once the wireless terminal is connected; and

an interference occurrence notifying unit configured to transmit a message
10 notifying that interference has occurred to the device for controlling a wireless access point if it is determined that the interference with neighboring wireless access point has occurred, based on the computed number of ACK communication failure with the wireless terminal and RSSI value.

15 7. The wireless access point of claim 6, further comprising an output strength adjusting unit configured to receive a corrected output strength value from the device for controlling a wireless access point and adjust a current output strength value based on the corrected output strength value.

20 8. The wireless access point of claim 6, wherein the computing unit is

configured to check whether the wireless terminal is connected at predetermined intervals and, if there is no wireless terminal connected, request the information transmitting unit to search for neighboring wireless access points that are present within the predetermined range.

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9. The wireless access point of claim 6, wherein the interference occurrence notifying unit is configured to determine that the occurrence has occurred if a current RSSI value is greater than a previous RSSI value and the number of ACK communication failure with a current wireless terminal is greater than the number of
10 ACK communication failure with a previous wireless terminal, based on the predetermined interval.

10. The wireless access point of claim 9, wherein the interference occurrence notifying unit is configured to apply a predetermined margin value to the previous RSSI
15 value and the number of ACK communication failure with the current wireless terminal, whereas fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

11. A method for controlling an output strength value of a wireless access point
20 by a device for controlling a wireless access point, the method comprising:

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(a) setting a channel for communication, searching for neighboring wireless access points that are present within a predetermined range, and transmitting information on the wireless access point and the searched neighboring wireless access points to the device for controlling a wireless access point, the setting, searching and
5 transmitting being performed by the wireless access point;

(b) grouping wireless access points using the same channel, based on the information on the wireless access point and the neighboring wireless access points received from the wireless access point, the grouping being performed by the device for controlling a wireless access point;

10 (c) determining whether interference has occurred between the grouped wireless access points and transmitting the determination to the device for controlling a wireless access point, the determining and transmitting being performed by the grouped wireless access points;

(d) computing a corrected output strength value for reducing the interference
15 and transmitting the corrected output strength value to the grouped wireless access points, the computing and transmitting being performed by the device for controlling a wireless access point; and

(e) adjusting a current output strength value based on the corrected output strength value, the adjusting being performed by the grouped wireless access points.

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ABSTRACT

A wireless access point and a method and a device for controlling the wireless access point are provided. The device for controlling a wireless access point comprises:
a grouping unit which groups wireless access points which use the same channel, by
5 using channel use information received from said wireless access points; a map
generating unit which computes each received signal strength value of said grouped
wireless access points and each output strength value of said grouped wireless access
points; an extracting unit which extracts a wireless access point having the highest
received signal strength value among said grouped wireless access points, if interference
10 occurs between said grouped wireless access points; and an optimal output strength
value-computing unit which computes a corrected output strength value by using the
received signal strength value of said extracted wireless access point, a threshold value
of predetermined received signal strength, and a currently used output strength value
between said grouped wireless access points.

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WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] The present application is a National Stage of International Application No. PCT/KR2011/007792, filed on October 19, 2011, which claims priority from Korean Patent Application No. 10-2011-0054124, filed on June 3, 2011, the contents of which are all incorporated herein by reference in their entirety.

BACKGROUND

1. Field

[0002] Apparatuses and methods consistent with exemplary embodiments relate to a wireless access point and a method and a device for controlling the wireless access point, and more specifically to a method and a device for controlling a wireless access point to optimize its coverage and capacity under in an environment of interference.

2. Description of Related Art

[0003] When services are provided using a wireless LAN, a house or a specific area is serviced using a single access point ("AP" hereinafter).

[0004] However, due to the structure of a building or the geographical features, the house or specific area may not be completely covered by the service using a single AP.

[0005] One way of solving this problem is by installing a separate AP (low-output AP) in shadow areas to widen the user's range of wireless communication.

[0006] However, when two APs happen to use the same channel, interference can occur in a certain area.

[0007] That is, when a separate AP is used to eliminate the shadow areas, the separate AP is designed to transmit a fixed transmission power, and the separate AP transmits an excessive transmission power in order to eliminate the shadow areas, causing interference and deteriorating the performance of the wireless network.

[0008] For this reason, Korean Patent Publication 2006-0034461 (Sub Access Point, system and method for controlling power of transmitting signal) discloses that the power level of a transmission signal output from a sub-AP is adjusted based on received signal strength indicator (RSSI) readings and frame error rate (FER) of a main AP, thereby eliminating shadow areas and minimizing interference between the main AP and the sub-AP. However, this Korean Patent Publication is restricted with the condition that the sub-AP itself needs to adjust the transmission power.

[0009] That is, since each of a plurality of sub-APs using the same channel needs to adjust the transmission power individually, it is impossible and inefficient to minimize the interference within a short period of time.

SUMMARY

[0010] To solve the above-described problem of the conventional art, exemplary embodiments provide a method and a device for minimizing interference between neighboring access points without a cell planning step.

[0011] The objects of the present invention are not limited to the above description, and any other objects not described herein will be clearly understood from the disclosure below.

[0012] According to an aspect of an exemplary embodiment, a device for controlling a wireless access point is provided. The device includes: a grouping unit configured to group

wireless access points using a same channel based on channel use information received from the wireless access points; a map generator configured to compute a received signal strength indicator (RSSI) between the grouped wireless access points and an output strength value for each of the grouped wireless access points; an extractor configured to extract a wireless access point having the highest RSSI value among the grouped wireless access points, if interference occurs between the grouped wireless access points; and an optimal output strength value-calculator configured to compute a corrected output strength value based on the highest RSSI value of the extracted wireless access point, a predetermined threshold value of the RSSI between the grouped wireless access points, and a currently used output strength value.

[0013] According to an aspect of an exemplary embodiment, the device for controlling a wireless access point can also include an output adjustment requester configured to transmit an output strength adjustment request, which is related to adjusting a current output strength value based on the corrected output strength value, to each of the grouped wireless access points.

[0014] The device for controlling a wireless access point can also include an interference occurrence notification receiver configured to receive a message indicating whether interference has occurred between the grouped wireless access points. Occurrence of the interference can be determined by the grouped wireless access points based on an RSSI value and a number of ACK communication failures between the grouped wireless access points and a wireless terminal that accesses the grouped wireless access points.

[0015] The map generator can generate a virtual map including RSSI values between the grouped wireless access points and the output strength value of each of the grouped

wireless access points.

[0016] The optimal output strength value calculator can compute the corrected output strength value by subtracting a difference between the RSSI value of the extracted wireless access point and the predetermined threshold value of an RSSI value between the grouped wireless access points from the currently used output strength value.

[0017] According to an aspect of an exemplary embodiment, a wireless access point having an output strength value thereof controlled by a device for controlling the wireless access point is provided. The wireless access point in accordance with an exemplary embodiment can include: a channel setter configured to set a channel for communication; an information transmitter configured to search for neighboring wireless access points through the set channel and transmit information on the searched neighboring wireless access points and the wireless access point; a calculator configured to compute a number of ACK communication failures with a wireless terminal and a received signal strength indicator (RSSI) value, once the wireless terminal is connected; and an interference occurrence notifier configured to transmit a message indicating that interference has occurred, to the device for controlling the wireless access point if it is determined that the interference with the neighboring wireless access point has occurred, based on the computed number of ACK communication failure with the wireless terminal and the RSSI value.

[0018] The wireless access point can also include an output strength adjuster configured to receive a corrected output strength value from the device for controlling the wireless access point and adjust a current output strength value based on the corrected output strength value.

[0019] The calculator can check whether the wireless terminal is connected and, if

there is no wireless terminal connected, request the information transmitter to search for the neighboring wireless access points.

[0020] The interference occurrence notifier can determine that the occurrence has occurred if a current RSSI value is greater than a previous RSSI value and the number of ACK communication failure with a current wireless terminal is greater than the number of ACK communication failure with a previous wireless terminal.

[0021] The interference occurrence notifier can apply a predetermined margin value to the previous RSSI value and the number of ACK communication failure with the current wireless terminal, and fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

[0022] According to an aspect of an exemplary embodiment, a method for controlling an output strength value of the wireless access point by a device for controlling a wireless access point is provided. The method for controlling an output strength value of a wireless access point can include: (a) setting a channel for communication, searching for neighboring wireless access points, and transmitting information on the wireless access point and the searched neighboring wireless access points to the device for controlling the wireless access point, wherein the setting, searching and transmitting being performed by the wireless access point; (b) grouping wireless access points using a same channel, based on the information on the wireless access point and the neighboring wireless access points received from the wireless access point, the grouping being performed by the device for controlling the wireless access point; (c) determining whether interference has occurred between the grouped wireless access points and transmitting the determination to the device for controlling a wireless access point, the determining and the transmitting the determination being performed by the

grouped wireless access points; (d) computing a corrected output strength value for reducing the interference and transmitting the corrected output strength value to the grouped wireless access points, the computing and the transmitting the corrected output strength being performed by the device for controlling the wireless access point; and (e) adjusting a current output strength value based on the corrected output strength value, the adjusting being performed by the grouped wireless access points.

[0023] According to another aspect of an exemplary embodiment, the information transmitter may search for the neighboring wireless access points within a predetermined range.

[0024] According to another aspect of an exemplary embodiment, the calculator may compute the number of ACK communication failures with a wireless terminal and the received signal strength indicator (RSSI) at every predetermined interval.

[0025] According to another aspect of an exemplary embodiment, the output adjustment requester may transmit the output strength adjustment request to each of the grouped wireless access points via the same channel.

[0026] Specific details for achieving the above objects will become more apparent by referring to the accompanying drawings as well as the embodiments described below.

[0027] However, the present invention shall not be restricted to the embodiments disclosed below and can be configured in various other forms, and the embodiments described herein are provided only to complete the disclosure of the present invention and to allow a person of ordinary skill in the art to which the present invention pertains to fully understand the scope of the present invention.

[0028] According to the method and device for controlling a wireless access point

described above, the interference between the access points can be minimized without introducing cell planning procedures.

[0029] Moreover, minimizing the interference between neighboring access points can take a shorter time, and an optimal wireless communication environment can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIG. 1 illustrates the configuration of a system for controlling a wireless access point in accordance with an exemplary embodiment.

[0031] FIG. 2 is a block diagram showing the configuration of a wireless access point in accordance with an exemplary embodiment.

[0032] FIG. 3 illustrates the configuration of a device for controlling the wireless access point in accordance with an exemplary embodiment.

[0033] FIGS. 4 and 5 are flow diagrams illustrating how the wireless access point is controlled in accordance with an exemplary embodiment.

[0034] FIG. 6 is a virtual map generated by the device for controlling the wireless access point in accordance with an exemplary embodiment.

DETAILED DESCRIPTION

[0035] Hereinafter, exemplary embodiments will be described in detail with reference to the accompanying drawings in such a way that a person of ordinary skill in the art to which the present invention pertains can readily implement the present invention.

[0036] Nevertheless, the exemplary embodiments can be realized in various forms and shall not be restricted to the exemplary embodiments described herein.

[0037] Moreover, in order to describe the exemplary embodiments more clearly, any

portions of the drawings that are not related to the description are omitted, and throughout the specification, similar reference numerals are designated to similar elements.

[0038] When a certain element is described to be “connected” to another element, it includes not only the case of “directly being connected” but also “electrically being connected” with another device therebetween.

[0039] Moreover, when a portion is described to “include” a certain element, it does not mean that another element is excluded but means that another element can be further included, unless otherwise described.

[0040] Hereinafter, an exemplary embodiment will be described in detail with reference to the accompanying drawings that illustrate the configurations and process flows.

[0041] FIG. 1 illustrates the configuration of a system for controlling a wireless access point in accordance with an exemplary embodiment.

[0042] The system for controlling a wireless access point in accordance with an exemplary embodiment includes a plurality of wireless access points 100 and a device 200 for controlling a wireless access point.

[0043] The wireless access point (“AP” hereinafter) 100 outputs a transmission signal for wireless communication to a wireless network terminal that is present in a wireless network environment, and transmits a Beacon frame and a data frame to wireless network devices.

[0044] Moreover, the AP 100 can provide a certain service to the wireless network devices through the transmission signal and allow the wireless network devices to communicate with one another.

[0045] FIG. 1 shows that there are a plurality of APs 100. Each AP 100 uses a channel

for wireless communication, and if interference occurs between APs 100 using the same channel, the device 200 for controlling a wireless access point can simultaneously control the output strength values of the APs 100 using the same channel.

[0046] For this, the AP 100 configures the channel for communication and searches for neighboring APs that are present in a predetermined range.

[0047] Afterwards, the AP 100 transmits information on the searched neighboring APs and information on itself 100, i.e., the channel used, a Received Signal Strength Indicator (“RSSI” hereinafter) value and the output strength value to the device 200 for controlling a wireless access point.

[0048] Moreover, the AP 100 determines whether interference occurs with neighboring APs that use the same channel at predetermined intervals, and if it is determined that interference has occurred between the APs, the AP 100 transmits a notification message to the device 200 for controlling a wireless access point.

[0049] Then, the AP 100 receives a corrected output strength value from the device 200 for controlling a wireless access point, and adjusts the current output strength value based on the received output strength value.

[0050] Here, each of the APs using the same channel simultaneously receives the corrected output strength value from the device 200 for controlling a wireless access point and adjusts the current output strength value, making it possible to minimize the interference between the APs in the shortest amount of time.

[0051] Meanwhile, the device 200 for controlling a wireless access point (“AP control device” hereinafter) receives from the AP 100 information on neighboring APs and itself, groups the APs using the same channel, and generates a virtual map based on the RSSI value

between the grouped APs and the output strength value of each AP.

[0052] Then, if the AP control device 200 receives from the AP 100 a message notifying that interference has occurred between APs using the same channel, the AP control device 200 computes an optimal output strength value for each AP, with which the interference can be minimized, based on the generated virtual map and transmits the computed optimal output strength value to each AP using the channel.

[0053] Afterwards, the plurality of APs (using the same channel) having received the corrected output strength value from the AP control device 200 can adjust the current output strength value simultaneously based on the received output strength value.

[0054] FIG. 2 is a block diagram showing the configuration of the AP 100 in accordance with an exemplary embodiment.

[0055] The AP 100 in accordance with an exemplary embodiment includes a channel setting unit 110 ("channel setter"), an information transmitting unit 120 ("information transmitter"), a computing unit 130 ("calculator"), an interference occurrence determining unit 140 ("interference occurrence determiner") and an output strength adjusting unit 150 ("output strength adjuster").

[0056] The channel setting unit 110 sets a channel for communication, and the information transmitting unit 120 searches for neighboring APs that are present within a predetermined range through the set channel and transmits information on the searched neighboring APs and the AP 100 itself.

[0057] Here, the information on the searched neighboring APs and AP 100 can include at least one of a currently used channel, an RSSI value and an output strength value.

[0058] Once the wireless network terminal ("wireless terminal" hereinafter) accesses

the AP 100, the computing unit 130 computes the number of ACK communication failures and the RSSI value at every predetermined interval.

[0059] Here, due to the characteristics of WiFi, the wireless terminal can transmit an ACK (signal) to the AP 100 after the transmission of data frames is completed, and the computing unit 130 can monitor the status of the channel by counting ACKs.

[0060] Moreover, the computing unit 130 can check whether the wireless terminal is connected at predetermined intervals, and if there is no connection of the wireless terminal, the computing unit 130 can request the information transmitting unit 120 to search for neighboring APs.

[0061] The interference occurrence determining unit 140 determines whether interference with a neighboring AP has occurred, based on the number of ACK communication failures and the RSSI value with respect to the wireless terminal. The ACK communication failures and the RSSI value are computed by the computing unit 130.

[0062] Specifically, the interference occurrence determining unit 140 can determine that interference has occurred between APs if a current RSSI value (RSSI_{current}) is greater than a previous RSSI value (RSSI_{past}) and the number of ACK communication failures with a current wireless terminal (data_fail_cnt_{current}) is greater than the number of ACK communication failures with a previous wireless terminal (data_fail_cnt_{past}), based on the predetermined interval.

[0063] Here, the interference occurrence determining unit 140 can apply a predetermined margin value to RSSI_{past} and data_fail_cnt_{current}, wherein fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

[0064] For instance, RSSI_margin, which is a margin value indicating an allowed range of fluctuation of RSSI, can be subtracted from RSSI_past, and cnt_margin, which is a margin value indicating an allowed range of fluctuation of the data fail count, can be multiplied by data_fail_cnt_current.

[0065] As a result, if the interference occurrence determining unit 140 determines that interference has occurred between the APs that are grouped with the same channel, it can be briefly indicated as follows.

$$\begin{aligned} & \text{RSSI_past} - \text{RSSI_margin} < \text{RSSI_current} \text{ and} \\ & \text{data_fail_cnt_past} < \text{data_fail_cnt_current} * \text{cnt_margin} \end{aligned}$$

[0066] Later, if the interference occurrence determining unit 140 determines that interference has occurred between APs, the interference occurrence determining unit 140 transmits a message indicating that interference has occurred, to the AP control device 200.

[0067] The output strength adjusting unit 150 receives the corrected output strength value for minimizing the interference from the AP control device 200 and adjusts the current output strength value based on the corrected output strength value.

[0068] Here, adjusting the current output strength value based on the corrected output strength value based on the corrected output strength value received from the AP control device 200 can be simultaneously performed for every AP that uses the same channel.

[0069] FIG. 3 illustrates the configuration of the AP control device 200 in accordance with an exemplary embodiment.

[0070] The AP control device 200 in accordance with an exemplary embodiment includes a grouping unit 210, a map generating unit 220 (“map generator”), an interference occurrence notification receiving unit 230 (“interference occurrence notification receiver”, an

extracting unit 240 (“extractor”), an optimal output strength value computing unit 250 (“optimal output strength value calculator”) and an output adjustment requesting unit 260 (“output adjustment requester”).

[0071] The grouping unit 210 groups APs that use the same channel based on the information on channels currently used by the APs, once the information on currently used channels, RSSI values and output strength values of neighboring APs and the AP 100 is received from the AP 100.

[0072] The map generating unit 220 computes the RSSI value between the grouped APs that use the same channel and the output strength value of the grouped APs.

[0073] Then, the map generating unit 220 generates a virtual map that includes the RSSI value between the grouped APs and the output strength value of the grouped APs.

[0074] The interference occurrence notification receiving unit 230 receives a message indicating whether interference has occurred between the grouped Aps, from the AP 100.

[0075] The occurrence of interference between the grouped APs can be determined by the AP 100 based on the RSSI value and the number of communication failures (data_fail_cnt_past, data_fail_cnt_current) between the grouped AP and the wireless terminal that is accessed to the grouped AP. As this was described earlier with reference to the AP 100, it will not be described herein below.

[0076] Once interference occurs between the grouped APs, the extracting unit 240 refers to the virtual map generated by the map generating unit 220 to extract the AP that has the highest RSSI value among the grouped APs.

[0077] For example, if the grouped APs include AP1, AP2 and AP3 and the RSSI value (RSSI₁₃) between AP1 and AP3 has the highest value in the virtual map, the AP that

has the highest RSSI value is AP1.

[0078] In the virtual map, the RSSI value of the n^{th} AP received from the m^{th} AP can be expressed as RSSI_{mn}, and the m^{th} AP can be regarded as having the highest RSSI value if RSSI_{mn} has the highest value in the virtual map.

[0079] The optimal output strength value computing unit 250 computes the corrected output strength value (Ptx_{modi}) for minimizing the interference between the APs, based on an RSSI value (RSSI_m) of an AP extracted by the extracting unit 240, a predetermined threshold value (RSSI_{th}) of RSSI between the grouped APs and a currently used output strength value (Ptx_c) of the grouped Aps.

[0080] The optimal output strength value computing unit 250 computes the corrected output strength value (Ptx_{modi}) by subtracting the difference between RSSI_m and RSSI_{th} from Ptx_c.

[0081] This can be mathematically expressed as follows.

$$\text{Ptx}_{\text{modi}} = \text{Ptx}_{\text{c}} - (\text{RSSI}_{\text{m}} - \text{RSSI}_{\text{th}})$$

[0082] The output adjustment requesting unit 260 sends an output strength adjustment request to each of the grouped APs so as to adjust the current output strength value based on Ptx_{modi}.

[0083] The elements illustrated in FIG. 2 and FIG. 3 in accordance with an exemplary embodiment refer to hardware configurations, such as FPGA (Field Programmable Gate Array) or ASIC (Application Specific Integrated Circuit), and perform certain functions.

[0084] Nevertheless, it shall not mean that the elements are restricted to either software or hardware, and it is possible that each of the elements is configured to be in an addressable storage medium and to run one or more processors.

[0085] Therefore, the elements can include, for example, elements such as software elements, object-oriented software elements, class elements and task elements, as well as processes, functions, attributes, procedures, sub-routines, segments of program code, drivers, firmware, micro codes, circuits, data, database, data structures, tables, arrays and variables.

[0086] The elements and functions provided within the elements can be combined into a smaller number of elements or separated into additional elements.

[0087] FIGS. 4 and 5 are flow diagrams illustrating how the wireless access point is controlled in accordance with an exemplary embodiment.

[0088] Hereinafter, the flow diagrams of FIGS. 4 and 5 will be described with reference to the elements of the system shown in FIG. 1.

[0089] First, the AP 100 sets the channel for communication and searches for neighboring APs that are present within a predetermined range (S401).

[0090] After the operation of S401, the AP 100 sends the information on the searched neighboring APs and the information on the AP 100 to the AP control device 200 (S402).

[0091] Here, the information on the neighboring APs and the information on the AP 100 can include at least one of the channels that is currently used, the RSSI value and the output strength value.

[0092] After the operation of S402, the AP control device 200 groups the APs that are using the same channel based on the information on the neighboring APs and the information on the AP 100 received from the AP 100, and generates a virtual map based on the RSSI value and the output strength value between the grouped APs (S403).

[0093] After the operation of S403, the AP 100 (more specifically, the grouped APs) checks for connection by the terminal at every predetermined interval (S404) and, if the

terminal is connected, computes an average of accumulated values of RSSI_{current} and data_fail_cnt_{current} at the predetermined intervals (S405).

[0094] After the operation of S405, the AP 100 determines whether interference has occurred by checking “RSSI_{past} - RSSI_{margin} < RSSI_{current} and data_fail_cnt_{past} < data_fail_cnt_{current} * cnt_{margin}” (S406).

[0095] If the operation of S406 determines that interference has occurred, the AP 100 sends an interference occurrence notification message to the AP control device 200 (S407).

[0096] If the operation of S406 determines that interference has not occurred, the AP 100 can maintain the current service.

[0097] Here, if, upon checking for the connection of the terminal at the predetermined intervals, the operation of S406 determines that no terminal is connected, the AP 100 can be switched to a station mode and repeat the operation of S402.

[0098] After the operation of S407, the AP control device 200 refers to the virtual map generated in the operation of S403 to check whether there is any RSSI_{mn} that is greater than RSSI_{th} (S408).

[0099] If, upon checking in the operation of S408, there is RSSI_{mn} that is greater than RSSI_{th}, the AP control device 200 extracts an AP that has the highest RSSI value in the virtual map generated in the operation of S403 (S409).

[0100] If, upon checking in the operation of S408, there is no RSSI_{mn} that is greater than RSSI_{th}, the AP control device 200 can maintain the current service.

[0101] After the operation of S409, the AP control device 200 computes the corrected output strength value, i.e., Ptx_{modi}, based on the RSSI value of AP extracted in the operation of S407, i.e., RSSI_m, the predetermined threshold value of RSSI between the

grouped APs, i.e., RSSI_th, and the currently used output strength value of the grouped APs, i.e., Ptx_c (S410).

[0102] After the operation of S410, the AP control device 200 simultaneously transmits Ptx_modi to the grouped APs (S411), and the grouped APs adjust the current output strength value based on the received Ptx_modi (S412).

[0103] FIG. 6 is a virtual map generated by the device for controlling the wireless access point in accordance with an exemplary embodiment.

[0104] In FIG. 6, APs that use the same channel (CH 1, CH 5) are grouped together to generate the virtual map.

[0105] The APs using CH 1 are AP 1, AP 3 and AP 5, and it can be seen that the RSSI value between these APs and the output strength value of each of these APs are included.

[0106] Moreover, the APs using CH 5 are AP 2 and AP 4, and the RSSI value between these APs and the output strength value of each of these APs are included in the virtual map.

[0107] As described earlier, if the highest RSSI value is RSSI_13, i.e., the RSSI value between AP 1 and AP 3, AP 1 becomes the AP having the highest RSSI value, which is expressed as "RSSI_m" in the exemplary embodiment.

[0108] As illustrated in 6, the virtual map generated by the AP control device 200 can be generated and managed as a multi-group (or a multi-layer), depending on the channel used.

[0109] The above description of exemplary embodiments is for illustrative purpose only, and it shall be appreciated that the present inventive concept can be readily modified to a different specific form without changing the technical ideas or essential features of the present inventive concept by a person having ordinary skill in the art to which the present

invention pertains.

[0110] Therefore, it shall be appreciated that the exemplary embodiment described above is illustrative but not restrictive in every aspect.

[0111] For instance, it is possible that any element described in the singular form is embodied by being separated and, likewise, any separated elements can be embodied by being combined.

[0112] The scope of the present invention is defined by the claims appended below rather than by the above description, and it shall be understood that the meanings and scope of the claims as well as any and every modification and permutation derived from the equivalents are included in the scope of the present invention.

WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] The present application is a National Stage of International Application No. PCT/KR2011/007792, filed on October 19, 2011, which claims priority from Korean Patent Application No. 10-2011-0054124, filed on June 3, 2011, the contents of which are all incorporated herein by reference in their entirety.

BACKGROUND

1. TECHNICAL FIELD

[0002] Apparatuses and methods consistent with ~~Exemplary~~ exemplary embodiments relate to a wireless access point and a method and a device for controlling the wireless access point, and more specifically to a method and a device for controlling a wireless access point to optimize its coverage and capacity under in an environment of interference.

2. BACKGROUND ARTDescription of Related Art

[0003] When services are provided using a wireless LAN, a house or a specific area is serviced using a single access point ("AP" hereinafter).

[0004] However, due to the structure of a building or the geographical features, the house or specific area may not be completely covered by the service using a single AP.

[0005] One way of solving this problem is by installing a separate AP (low-output AP) in shadow areas to widen the user's range of wireless communication.

[0006] However, ~~in case~~ when two APs happen to use the same channel, interference can ~~be occurred~~ in a certain area.

[0007] That is, when a separate AP is used to eliminate the shadow areas, the separate AP is designed to transmit a fixed transmission power, and the separate AP transmits an excessive transmission power in order to eliminate the shadow areas, causing interference and deteriorating the performance of the wireless network.

[0008] For this reason, Korean Patent Publication 2006-0034461 (Sub Access Point, system and method for controlling power of transmitting signal) discloses that the power level of a transmission signal output from a sub-AP is adjusted based on received signal strength indicator (RSSI) readings and frame error rate (FER) of a main AP, thereby eliminating shadow areas and minimizing interference between the main AP and the sub-AP; ~~but~~. However, this Korean Patent Publication ~~it~~ is restricted with the condition that the sub-AP itself needs to adjust the transmission power.

[0009] That is, since each of a plurality of sub-APs using the same channel needs to adjust the transmission power individually, it is impossible and inefficient to minimize the interference within a ~~shortest~~ period of time.

SUMMARY

[0010] To solve the above-described problem of the conventional art, ~~Exemplary~~ exemplary embodiments provide a method and a device for minimizing interference between neighboring access points without a cell planning step.

[0011] The objects of the present invention are not limited to the above description, and any other objects not described herein will be clearly understood from the disclosure below.

[0012] According to an aspect of an exemplary embodiment, a device for controlling a wireless access point is provided. The device includes: a grouping unit configured to group

wireless access points using ~~the a~~ same channel based on channel use information received from the wireless access points; a map ~~generating unit-generator~~ configured to compute a received signal strength indicator (RSSI) between the grouped wireless access points and an output strength value for each of the grouped wireless access points; an ~~extracting unit~~ extractor configured to extract a wireless access point having the highest RSSI value among the grouped wireless access points, if interference occurs between the grouped wireless access points; and an optimal output strength value-~~computing unit~~calculator configured to compute a corrected output strength value based on the highest RSSI value of the extracted wireless access point, a predetermined threshold value of the RSSI between the grouped wireless access points, and a currently used output strength value.

[0013] According to an aspect of an exemplary embodiment, the device for controlling a wireless access point can also include an output adjustment ~~requesting unit~~ requester configured to transmit an output strength adjustment request, which is ~~for-related to~~ adjusting a current output strength value based on the corrected output strength value, to each of the grouped wireless access points.

[0014] The device for controlling a wireless access point can also include an interference occurrence notification ~~receiving unit-receiver~~ configured to receive a message ~~notifying-indicating~~ whether interference has occurred between the grouped wireless access points. Occurrence of the interference can be determined by the grouped wireless access points based on an RSSI value and ~~the a~~ number of ACK communication failures between the grouped wireless access points and a wireless terminal that ~~is-accessed to~~ accesses the grouped wireless access points.

[0015] The map ~~generating unit-generator~~ can generate a virtual map including RSSI

values between the grouped wireless access points and the output strength value of each of the grouped wireless access points.

[0016] The optimal output strength value ~~computing unit~~ calculator can compute the corrected output strength value by subtracting a difference between the RSSI value of the extracted wireless access point and the predetermined threshold value of an RSSI value between the grouped wireless access points from the currently used output strength value.

[0017] According to an aspect of an exemplary embodiment, a wireless access point having an output strength value thereof controlled by a device for controlling ~~a~~ the wireless access point is provided. The wireless access point in accordance with an exemplary embodiment can include: a channel ~~setting unit~~ setter configured to set a channel for communication; an information ~~transmitting unit~~ transmitter configured to search for neighboring wireless access points ~~that are present within a predetermined range~~ through the set channel and transmit information on the searched neighboring wireless access points and the wireless access point; a ~~computing unit~~ calculator configured to compute ~~the~~ a number of ACK communication failures with a wireless terminal and a received signal strength indicator (RSSI) value ~~at every predetermined interval~~, once the wireless terminal is connected; and an interference occurrence ~~notifying unit~~ notifier configured to transmit a message ~~notifying~~ indicating that interference has occurred, to the device for controlling ~~a~~ the wireless access point if it is determined that the interference with the neighboring wireless access point has occurred, based on the computed number of ACK communication failure with the wireless terminal and the RSSI value.

[0018] The wireless access point can also include an output strength ~~adjusting unit~~ adjuster configured to receive a corrected output strength value from the device for

controlling ~~a~~the wireless access point and adjust a current output strength value based on the corrected output strength value.

[0019] The ~~computing unit~~calculator can check whether the wireless terminal is connected ~~at predetermined intervals~~ and, if there is no wireless terminal connected, request the information ~~transmitting unit~~transmitter to search for the neighboring wireless access points ~~that are present within the predetermined range~~.

[0020] The interference occurrence ~~notifying unit~~notifier can determine that the occurrence has occurred if a current RSSI value is greater than a previous RSSI value and the number of ACK communication failure with a current wireless terminal is greater than the number of ACK communication failure with a previous wireless terminal, ~~based on the predetermined interval~~.

[0021] The interference occurrence ~~notifying unit~~notifier can apply a predetermined margin value to the previous RSSI value and the number of ACK communication failure with the current wireless terminal, ~~whereas~~and fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

[0022] According to an aspect of an exemplary embodiment, a method for controlling an output strength value of ~~a~~the wireless access point by a device for controlling a wireless access point is provided. The method for controlling an output strength value of a wireless access point can include: (a) setting a channel for communication, searching for neighboring wireless access points ~~that are present within a predetermined range~~, and transmitting information on the wireless access point and the searched neighboring wireless access points to the device for controlling ~~a~~the wireless access point, wherein the setting, searching and transmitting being performed by the wireless access point; (b) grouping wireless access

points using ~~the a~~ same channel, based on the information on the wireless access point and the neighboring wireless access points received from the wireless access point, the grouping being performed by the device for controlling ~~a the~~ wireless access point; (c) determining whether interference has occurred between the grouped wireless access points and transmitting the determination to the device for controlling a wireless access point, the determining and the transmitting the determination being performed by the grouped wireless access points; (d) computing a corrected output strength value for reducing the interference and transmitting the corrected output strength value to the grouped wireless access points, the computing and the transmitting the corrected output strength being performed by the device for controlling ~~a the~~ wireless access point; and (e) adjusting a current output strength value based on the corrected output strength value, the adjusting being performed by the grouped wireless access points.

[0023] According to another aspect of an exemplary embodiment, the information transmitter may search for the neighboring wireless access points within a predetermined range.

[0024] According to another aspect of an exemplary embodiment, the calculator may compute the number of ACK communication failures with a wireless terminal and the received signal strength indicator (RSSI) at every predetermined interval.

[0025] According to another aspect of an exemplary embodiment, the output adjustment requester may transmit the output strength adjustment request to each of the grouped wireless access points via the same channel.

[0026] Specific details for achieving the above objects will become more apparent by referring to the accompanying drawings as well as the embodiments described below.

[0027] However, the present invention shall not be restricted to the embodiments disclosed below and can be configured in various other forms, and the embodiments described herein are provided only to complete the disclosure of the present invention and to allow a person of ordinary skill in the art to which the present invention pertains to fully understand the scope of the present invention.

[0028] According to the method and device for controlling a wireless access point described above, the interference between the access points can be minimized without introducing cell planning procedures.

[0029] Moreover, minimizing the interference between neighboring access points can take a shorter time, and an optimal wireless communication environment can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIG. 1 illustrates the configuration of a system for controlling a wireless access point in accordance with an exemplary embodiment.

[0031] FIG. 2 is a block diagram showing the configuration of a wireless access point in accordance with an exemplary embodiment.

[0032] FIG. 3 illustrates the configuration of a device for controlling the wireless access point in accordance with an exemplary embodiment.

[0033] FIGS. 4 and 5 are flow diagrams illustrating how the wireless access point is controlled in accordance with an exemplary embodiment.

[0034] FIG. 6 is a virtual map generated by the device for controlling the wireless access point in accordance with an exemplary embodiment.

DETAILED DESCRIPTION

[0035] Hereinafter, exemplary embodiments will be described in detail with reference to the accompanying drawings in such a way that a person of ordinary skill in the art to which the present invention pertains can readily ~~embody~~ implement the present invention.

[0036] Nevertheless, the exemplary embodiments can be realized in various forms and shall not be restricted to the exemplary embodiments described herein.

[0037] Moreover, in order to describe the exemplary embodiments more clearly, any portions of the drawings that are not related to the description are omitted, and throughout the specification, similar reference numerals are designated to similar elements.

[0038] When a certain element is described to be “connected” to another element, it includes not only the case of “directly being connected” but also “electrically being connected” with another device therebetween.

[0039] Moreover, when a portion is described to “include” a certain element, it does not mean that another element is excluded but means that another element can be further included, unless otherwise described.

[0040] Hereinafter, an exemplary embodiment ~~of the present invention~~ will be described in detail with reference to the accompanying drawings that illustrate the configurations and process flows.

[0041] FIG. 1 illustrates the configuration of a system for controlling a wireless access point in accordance with an exemplary ~~embodiment of the present invention~~.

[0042] The system for controlling a wireless access point in accordance with an exemplary ~~embodiment of the present invention~~ includes a plurality of wireless access points 100 and a device 200 for controlling a wireless access point.

[0043] The wireless access point (“AP” hereinafter) 100 outputs a transmission signal for wireless communication to a wireless network terminal that is present in a wireless network environment, and transmits a Beacon frame and a data frame to wireless network devices.

[0044] Moreover, the AP 100 can provide a certain service to the wireless network devices through the transmission signal and allow the wireless network devices to communicate with one another.

[0045] FIG. 1 shows that there are a plurality of APs 100. Each AP 100 uses a channel for wireless communication, and if interference occurs between APs 100 using the same channel, the device 200 for controlling a wireless access point can simultaneously control the output strength values of the APs 100 using the same channel.

[0046] For this, the AP 100 configures the channel for communication and searches for neighboring APs that are present in a predetermined range.

[0047] Afterwards, the AP 100 transmits information on the searched neighboring APs and information on itself 100, i.e., the channel used, a Received Signal Strength Indicator (“RSSI” hereinafter) value and the output strength value to the device 200 for controlling a wireless access point.

[0048] Moreover, the AP 100 determines whether interference occurs with neighboring APs that use the same channel at predetermined intervals, and if it is determined that interference has occurred between the APs, the AP 100 transmits a notification message to the device 200 for controlling a wireless access point.

[0049] Then, the AP 100 receives a corrected output strength value from the device 200 for controlling a wireless access point, and adjusts the current output strength value

based on the received output strength value.

[0050] Here, each of the APs using the same channel simultaneously receives the corrected output strength value from the device 200 for controlling a wireless access point and adjusts the current output strength value, making it possible to minimize the interference between the APs in the shortest amount of time.

[0051] Meanwhile, the device 200 for controlling a wireless access point (“AP control device” hereinafter) ~~200~~ receives from the AP 100 information on neighboring APs and itself ~~400~~, groups the APs using the same channel, and generates a virtual map based on the RSSI value between the grouped APs and the output strength value of each AP.

[0052] Then, if the AP control device 200 receives from the AP 100 a message notifying that interference has occurred between APs using the same channel, the AP control device 200 computes an optimal output strength value for each AP, with which the interference can be minimized, based on the generated virtual map and transmits the computed optimal output strength value to each AP using the channel.

[0053] Afterwards, the plurality of APs (using the same channel) having received the corrected output strength value from the AP control device 200 can adjust the current output strength value simultaneously based on the received output strength value.

[0054] FIG. 2 is a block diagram showing the configuration of the AP 100 in accordance with an exemplary embodiment.

[0055] The AP 100 in accordance with an exemplary embodiment includes a channel setting unit 110 (“channel setter”), an information transmitting unit 120 (“information transmitter”), a computing unit 130 (“calculator”), an interference occurrence determining unit 140 (“interference occurrence determiner”) and an output strength adjusting unit 150

(“output strength adjuster”).

[0056] The channel setting unit 110 sets a channel for communication, and the information transmitting unit 120 searches for neighboring APs that are present within a predetermined range through the set channel and transmits information on the searched neighboring APs and the AP 100 itself.

[0057] Here, the information on the searched neighboring APs and AP 100 can include at least one of a currently used channel, an RSSI value and an output strength value.

[0058] Once the wireless network terminal (“wireless terminal” hereinafter) ~~is accessed~~ accesses to the AP 100, the computing unit 130 computes the number of ACK communication failures and the RSSI value at every predetermined interval.

[0059] Here, due to the characteristics of WiFi, the wireless terminal can transmit an ACK (signal) to the AP 100 after the transmission of data frames is completed, and the computing unit 130 can monitor the status of the channel by counting ACKs.

[0060] Moreover, the computing unit 130 can check whether the wireless terminal is connected at predetermined intervals, and if there is no connection of the wireless terminal, the computing unit 130 can request the information transmitting unit 120 to search for neighboring ~~As~~ APs.

[0061] The interference occurrence determining unit 140 determines whether interference with a neighboring AP has occurred, based on the number of ACK communication failures and the RSSI value with respect to the wireless terminal. The ACK communication failures and the RSSI value are computed by the computing unit 130.

[0062] Specifically, the interference occurrence determining unit 140 can determine that interference has occurred between APs if a current RSSI value (RSSI_{current}) is greater

than a previous RSSI value (RSSI_past) and the number of ACK communication failures with a current wireless terminal (data_fail_cnt_current) is greater than the number of ACK communication failures with a previous wireless terminal (data_fail_cnt_past), based on the predetermined interval.

[0063] Here, the interference occurrence determining unit 140 can apply a predetermined margin value to RSSI_past and data_fail_cnt_current, wherein fluctuation of the RSSI value caused by a movement of the wireless terminal is considered for the predetermined margin value.

[0064] For instance, RSSI_margin, which is a margin value indicating an allowed range of fluctuation of RSSI, can be subtracted from RSSI_past, and cnt_margin, which is a margin value indicating an allowed range of fluctuation of the data fail count, can be multiplied ~~to~~ by data_fail_cnt_current.

[0065] As a result, if the interference occurrence determining unit 140 determines that interference has occurred between the APs that are grouped with the same channel, it can be briefly indicated as follows.

$$\text{RSSI_past} - \text{RSSI_margin} < \text{RSSI_current} \text{ and}$$

$$\text{data_fail_cnt_past} < \text{data_fail_cnt_current} * \text{cnt_margin}$$

[0066] Later, if the interference occurrence determining unit 140 determines that interference has occurred between APs, the interference occurrence determining unit 140 transmits a message ~~notifying~~ indicating that interference has occurred, to the AP control device 200.

[0067] The output strength adjusting unit 150 receives the corrected output strength value for minimizing the interference from the AP control device 200 and adjusts the current

output strength value based on the corrected output strength value.

[0068] Here, adjusting the current output strength value based on the corrected output strength value based on the corrected output strength value received from the AP control device 200 can be simultaneously performed for every AP that uses the same channel.

[0069] FIG. 3 illustrates the configuration of the AP control device 200 in accordance with an exemplary embodiment.

[0070] The AP control device 200 in accordance with an exemplary embodiment includes a grouping unit 210, a map generating unit 220 (“map generator”), an interference occurrence notification receiving unit 230 (“interference occurrence notification receiver”), an extracting unit 240 (“extractor”), an optimal output strength value computing unit 250 (“optimal output strength value calculator”) and an output adjustment requesting unit 260 (“output adjustment requester”).

[0071] The grouping unit 210 groups APs that use the same channel based on the information on channels currently used by the APs, once the information on currently used channels, RSSI values and output strength values of neighboring APs and the AP 100 is received from the AP 100.

[0072] The map generating unit 220 computes the RSSI value between the grouped APs that use the same channel and the output strength value of the grouped APs.

[0073] Then, the map generating unit 220 generates a virtual map that includes the RSSI value between the grouped APs and the output strength value of the grouped APs.

[0074] The interference occurrence notification receiving unit 230 receives a message ~~notifying~~ indicating whether interference has occurred between the grouped APs, from the AP 100.

[0075] The occurrence of interference between the grouped APs can be determined by the AP 100 based on the RSSI value and the number of communication failures (data_fail_cnt_past, data_fail_cnt_current) between the grouped AP and the wireless terminal that is accessed to the grouped AP. As this was described earlier with reference to the AP 100, it will not be described herein below.

[0076] Once interference occurs between the grouped APs, the extracting unit 240 refers to the virtual map generated by the map generating unit 220 to extract the AP that has the highest RSSI value among the grouped APs.

[0077] For example, if the grouped APs include AP1, AP2 and AP3 and the RSSI value (RSSI₁₃) between AP1 and AP3 has the highest value in the virtual map, the AP that has the highest RSSI value is AP1.

[0078] In the virtual map, the RSSI value of the n^{th} AP received from the m^{th} AP can be expressed as RSSI_{mn}, and the m^{th} AP can be regarded as having the highest RSSI value if RSSI_{mn} has the highest value in the virtual map.

[0079] The optimal output strength value computing unit 250 computes the corrected output strength value (Ptx_modi) for minimizing the interference between the APs, based on an RSSI value (RSSI_m) of an AP extracted by the extracting unit 240, a predetermined threshold value (RSSI_th) of RSSI between the grouped APs and a currently used output strength value (Ptx_c) of the grouped Aps.

[0080] The optimal output strength value computing unit 250 computes the corrected output strength value (Ptx_modi) by subtracting the difference between RSSI_m and RSSI_th from Ptx_c.

[0081] This can be mathematically expressed as follows.

$$\text{Ptx_modi} = \text{Ptx_c} - (\text{RSSI_m} - \text{RSSI_th})$$

[0082] The output adjustment requesting unit 260 sends an output strength adjustment request to each of the grouped APs so as to adjust the current output strength value based on Ptx_modi.

[0083] The elements illustrated in FIG. 2 and FIG. 3 in accordance with an exemplary embodiment refer to hardware configurations, such as FPGA (Field Programmable Gate Array) or ASIC (Application Specific Integrated Circuit), and perform certain functions.

[0084] Nevertheless, it shall not mean that the elements are restricted to either software or hardware, and it is possible that each of the elements is configured to be in an addressable storage medium and to run one or more processors.

[0085] Therefore, the elements can include, for example, elements such as software elements, object-oriented software elements, class elements and task elements, as well as processes, functions, attributes, procedures, sub-routines, segments of program code, drivers, firmware, micro codes, circuits, data, database, data structures, tables, arrays and variables.

[0086] The elements and functions provided within the elements can be combined into a smaller number of elements or separated into additional elements.

[0087] FIGS. 4 and 5 are flow diagrams illustrating how the wireless access point is controlled in accordance with an exemplary embodiment.

[0088] Hereinafter, the flow diagrams of FIGS. 4 and 5 will be described with reference to the elements of the system shown in FIG. 1.

[0089] First, the AP 100 sets the channel for communication and searches for neighboring APs that are present within a predetermined range (S401).

[0090] After the ~~step~~ operation of S401, the AP 100 sends the information on the

searched neighboring APs and the information on the AP 100 to the AP control device 200 (S402).

[0091] Here, the information on the neighboring APs and the information on the AP 100 can include at least one of the channels that is currently used, the RSSI value and the output strength value.

[0092] After the ~~step~~operation of S402, the AP control device 200 groups the APs that are using the same channel based on the information on the neighboring APs and the information on the AP 100 received from the AP 100, and generates a virtual map based on the RSSI value and the output strength value between the grouped APs (S403).

[0093] After the ~~step~~operation of S403, the AP 100 (more specifically, the grouped APs) checks for connection by the terminal at every predetermined interval (S404) and, if the terminal is connected, computes an average of accumulated values of RSSI_{current} and data_fail_cnt_{current} at the predetermined intervals (S405).

[0094] After the ~~step~~operation of S405, the AP 100 determines whether interference has occurred by checking “RSSI_{past} - RSSI_{margin} < RSSI_{current} and data_fail_cnt_{past} < data_fail_cnt_{current} * cnt_{margin}” (S406).

[0095] If the ~~step~~operation of S406 determines that interference has occurred, the AP 100 sends an interference occurrence notification message to the AP control device 200 (S407).

[0096] If the ~~step~~operation of S406 determines that interference has not occurred, the AP 100 can maintain the current service.

[0097] Here, if, upon checking for the connection of the terminal at the predetermined intervals, the ~~step~~operation of S406 determines that no terminal is connected, the AP 100 can

be switched to a station mode and repeat the stepoperation of S402.

[0098] After the stepoperation of S407, the AP control device 200 refers to the virtual map generated in the stepoperation of S403 to check whether there is any RSSI_mn that is greater than RSSI_th (S408).

[0099] If, upon checking in the stepoperation of S408, there is RSSI_mn that is greater than RSSI_th, the AP control device 200 extracts an AP that has the highest RSSI value in the virtual map generated in the stepoperation of S403 (S409).

[0100] If, upon checking in the stepoperation of S408, there is no RSSI_mn that is greater than RSSI_th, the AP control device 200 can maintain the current service.

[0101] After the stepoperation of S409, the AP control device 200 computes the corrected output strength value, i.e., Ptx_modi, based on the RSSI value of AP extracted in the stepoperation of S407, i.e., RSSI_m, the predetermined threshold value of RSSI between the grouped APs, i.e., RSSI_th, and the currently used output strength value of the grouped APs, i.e., Ptx_c (S410).

[0102] After the stepoperation of S410, the AP control device 200 simultaneously transmits Ptx_modi to the grouped APs (S411), and the grouped APs adjust the current output strength value based on the received Ptx_modi (S412).

[0103] FIG. 6 is a virtual map generated by the device for controlling the wireless access point in accordance with an exemplary embodiment.

[0104] In FIG. 6, APs that use the same channel (CH 1, CH 5) are grouped together to generate the virtual map.

[0105] The APs using CH 1 are AP 1, AP 3 and AP 5, and it can be seen that the RSSI value between these APs and the output strength value of each of these APs are included.

[0106] Moreover, the APs using CH 5 are AP 2 and AP 4, and the RSSI value between these APs and the output strength value of each of these APs are included in the virtual map.

[0107] As described earlier, if the highest RSSI value is RSSI_13, i.e., the RSSI value between AP 1 and AP 3, AP 1 becomes the AP having the highest RSSI value, which is expressed as “RSSI_m” in the exemplary embodiment.

[0108] As illustrated in 6, the virtual map generated by the AP control device 200 can be generated and managed as a multi-group (or a multi-layer), depending on the channel used.

[0109] The above description of ~~the present invention~~ exemplary embodiments is for illustrative purpose only, and it shall be appreciated that the present ~~invention~~ inventive concept can be readily modified to a different specific form without changing the technical ideas or essential features of the present ~~invention~~ inventive concept by a person having ordinary skill in the art to which the present invention pertains.

[0110] Therefore, it shall be appreciated that the exemplary embodiment described above is illustrative but not restrictive in every aspect.

[0111] For instance, it is possible that any element described in the singular form is embodied by being separated and, likewise, any separated elements can be embodied by being combined.

[0112] The scope of the present invention is defined by the claims appended below rather than by the above description, and it shall be understood that the meanings and scope of the claims as well as any and every modification and permutation derived from the equivalents are included in the scope of the present invention.

FIG. 1
AP Control Device

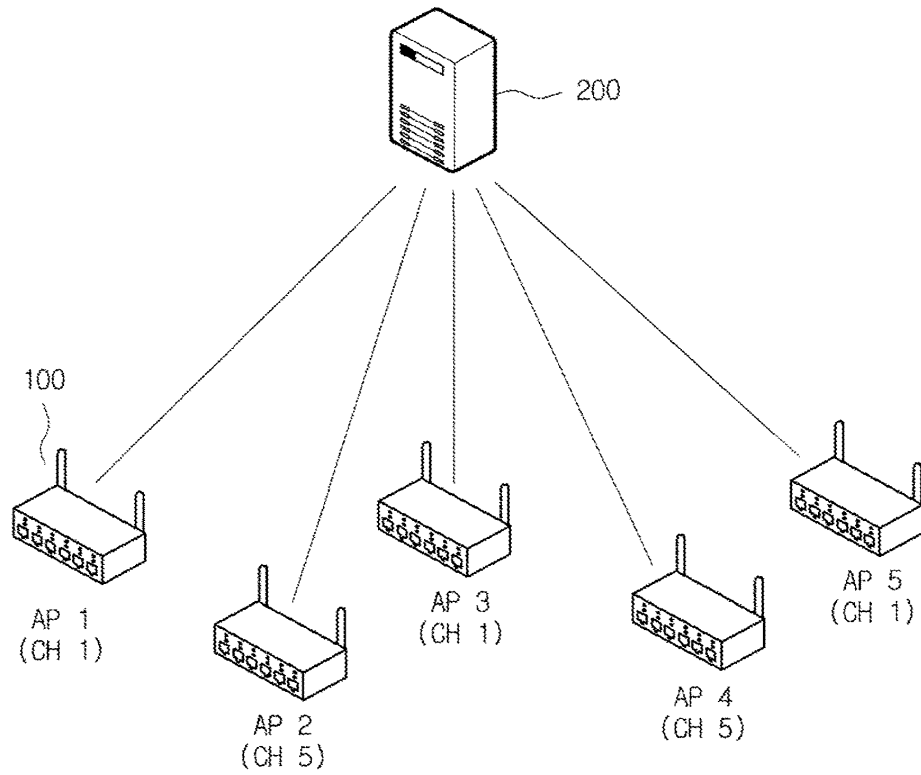


FIG. 2

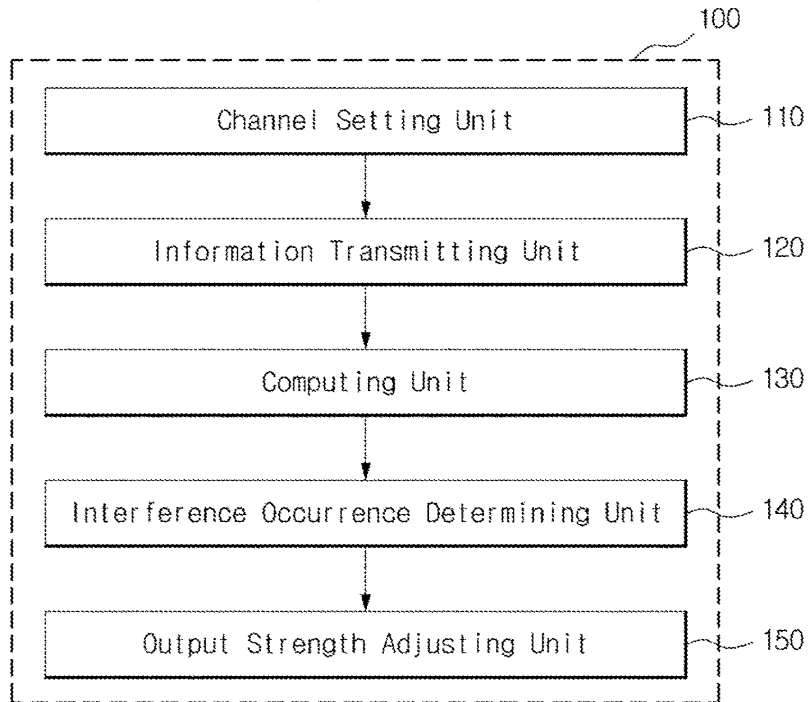


FIG. 3

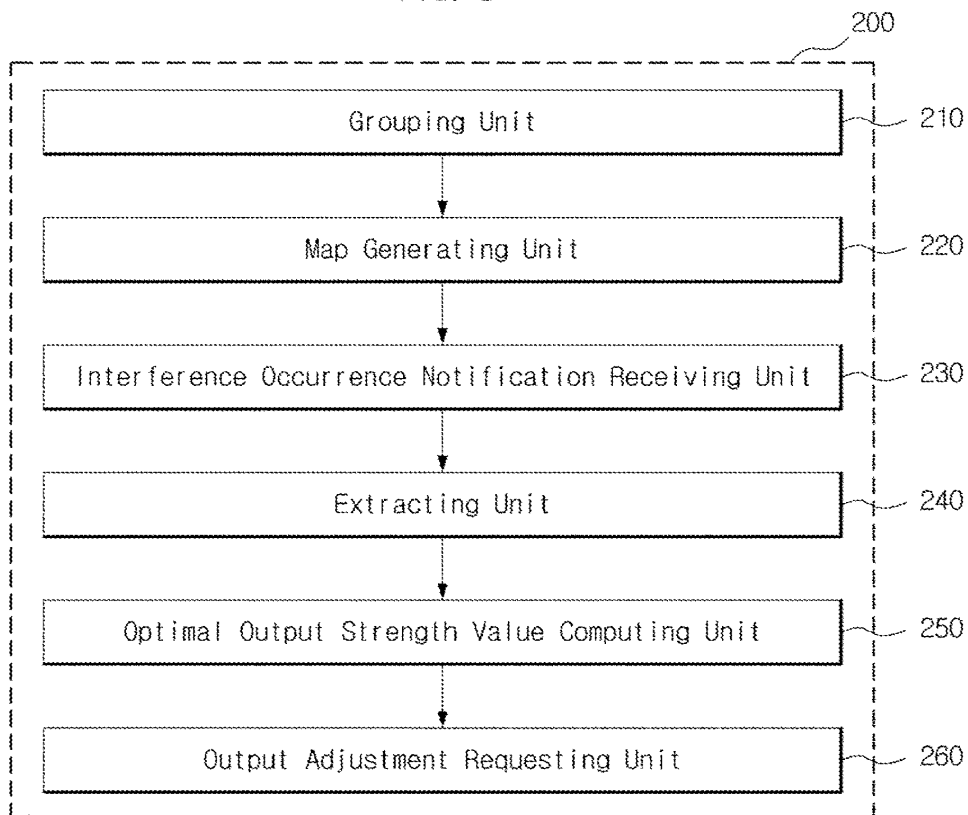


FIG. 4

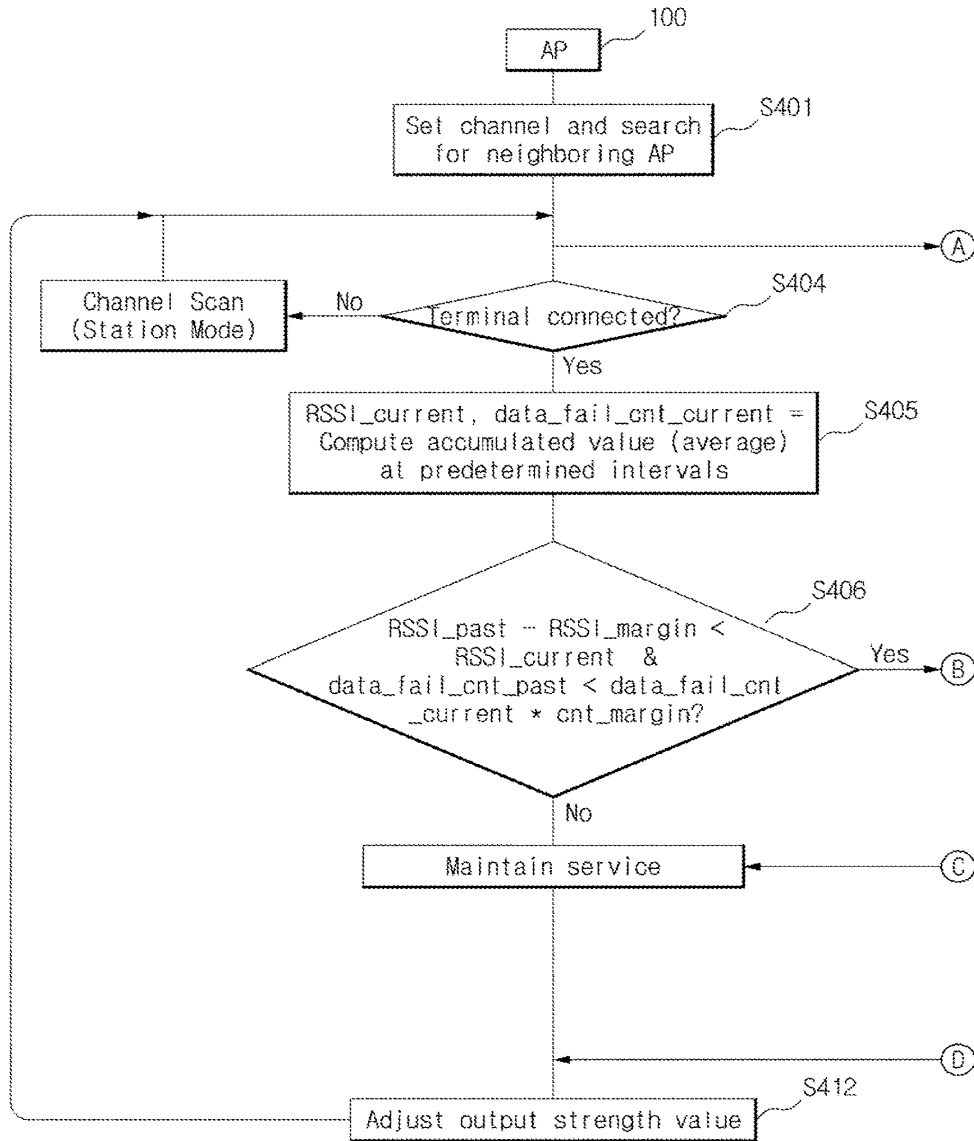


FIG. 5

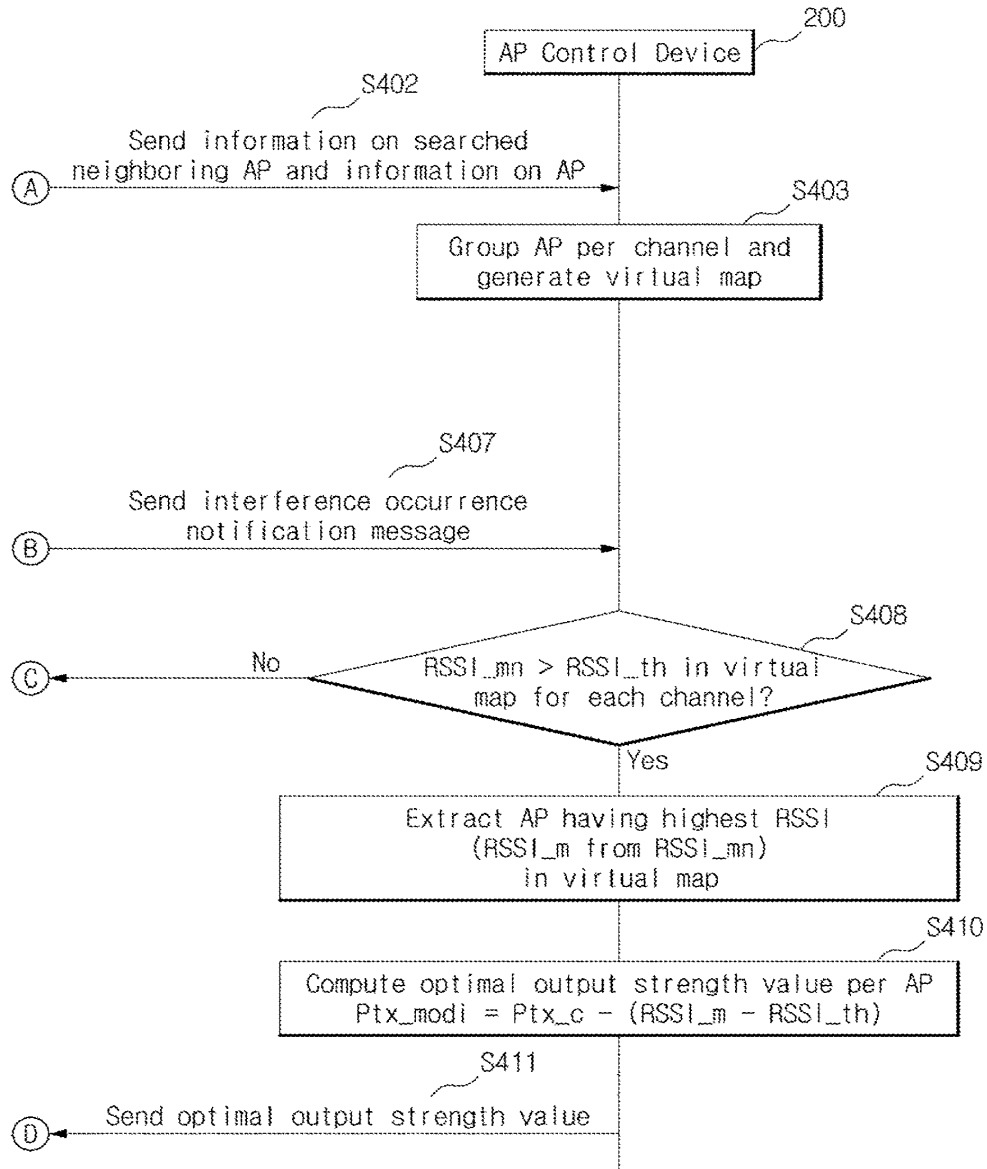
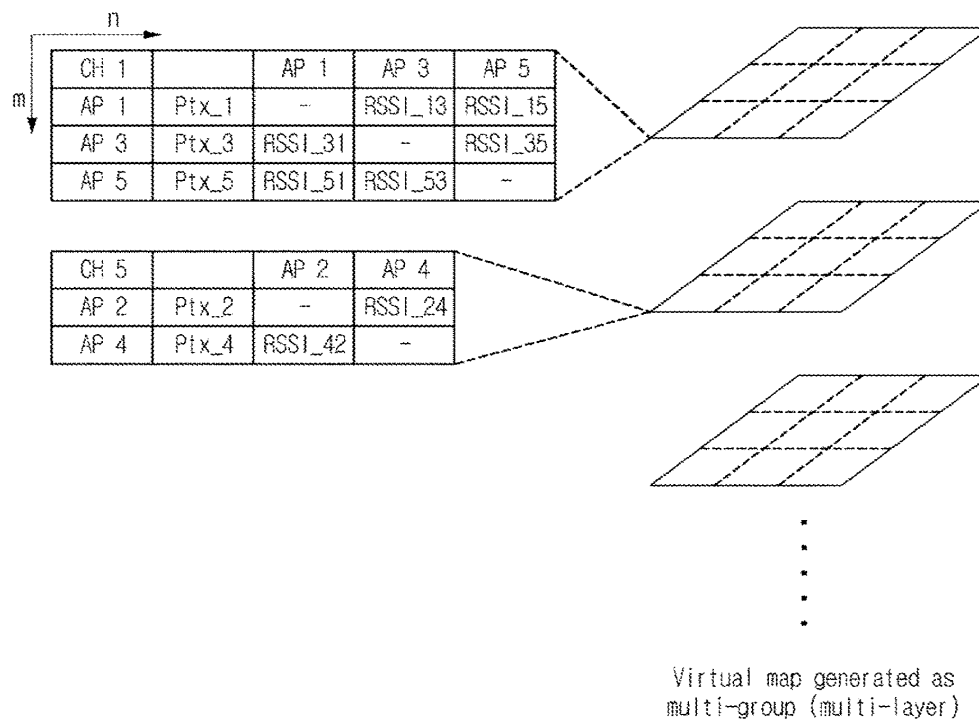


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2011/007792**A. CLASSIFICATION OF SUBJECT MATTER****H04W 88/12(2009.01)i, H04W 24/02(2009.01)i, H04W 16/18(2009.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W 88/12; H04W 16/26; H04W 24/10; H04W 52/20; H04B 1/00; H04W 24/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models: IPC as above

Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: identical, channel, frequency, AP, interference, transmit, output, electric power, power

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007-0060057 A1 (RYOKO MATSUO et al.) 15 March 2007 See abstract, figures 1, 3, and claims 1, 6, 10.	1-11
A	JP 2010-213040 A (NEC INFRONTIA CORP) 24 September 2010 See abstract, claims 1-2.	1-11
A	KR 10-2006-0034461 A (SAMSUNG ELECTRONICS CO., LTD.) 24 April 2006 See abstract, figure 4, claims 1-3.	1-11
A	MIN SUK KANG et al. "Adaptive Interference-Aware Multi-Channel Clustering Algorithm in a ZigBee Network in the Presence of WLAN Interference", Wireless Pervasive Computing, 2007. ISWPC '07. 2nd International Symposium on 05-07 February 2007 See pages 201-203.	1-11

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 MAY 2012 (22.05.2012)

Date of mailing of the international search report

22 MAY 2012 (22.05.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2011/007792

Patent document cited in search report	Publication date	Patent family member	Publication date
US 2007-0060057 A1	15.03.2007	EP 1925100 A2 JP 2009-506652 A JP 2009-506652 T US 7653357 B2 WO 2007-024895 A2 WO 2007-024895 A3 WO 2007-024895 A3	28.05.2008 12.02.2009 12.02.2009 26.01.2010 01.03.2007 11.10.2007 01.03.2007
JP 2010-213040 A	24.09.2010	NONE	
KR 10-2006-0034461 A	24.04.2006	US 2006-0083206 A1 US 7675892 B2	20.04.2006 09.03.2010

Form PCT/ISA/210 (patent family annex) (July 2009)

특허협력조약

PCT

국제조사보고서
(PCT 제 18 조 및 PCT규칙 43 및 44)

출원인 또는 대리인의 서류참조기호 OPF1964PCT	추가적인 조치 서식 PCT/ISA/220 및 아래 5.(해당하는 경우) 참조	
국제출원번호 PCT/KR2011/007792	국제출원일 (일/월/년) 2011년 10월 19일 (19.10.2011)	(최) 우선일 (일/월/년) 2011년 06월 03일 (03.06.2011)
출원인 주식회사 케이티 등		

본 국제조사보고서는 본 국제조사기관에 의하여 작성되었으며 PCT 제18조의 규정에 따라 출원인에게 송부됩니다. 이 국제조사보고서의 사본은 국제사무국에 송부됩니다.

본 국제조사보고서는 총 3 대로 구성되어 있습니다.

☐ 본 보고서에서 인용된 각 선행기술 문헌의 사본도 첨부되어 있습니다.

1. 보고서의 기초

a. 언어와 관련하여, 국제조사는 아래에 기초하여 수행되었습니다.

☒ 출원시의 언어로 된 국제출원

☐ 국제조사를 위해 _____ 로 번역되어 제출된 국제출원의 번역문(PCT규칙 12.3(a) 및 23.1(b))

b. ☐ 본 국제조사보고서는 PCT규칙 91의 규정에 따라 당해 기관이 허가하였거나 또는 당해 기관에 통보된 **명백한 잘못의 정정**을 고려하여 작성되었습니다(PCT규칙 43.6의2(a)).

c. ☐ 국제출원에 개시된 **핵산염기 및/또는 아미노산 서열**에 관하여는 제1기제란을 참조하십시오.

2. ☐ 일부 청구항은 조사할 수 없습니다(제2기제란 참조).

3. ☐ 발명의 단일성이 결여되어 있습니다(제3기제란 참조).

4. 발명의 명칭과 관련하여,

☒ 출원인이 제출한 대로 승인합니다.

☐ 본 국제조사기관이 다음과 같이 발명의 명칭을 작성하였습니다:

5. 요약서와 관련하여,

☒ 출원인이 제출한 대로 승인합니다.

☐ PCT규칙 38.2의 규정에 따라 본 기관이 제4기제란에 표시된 대로 요약서를 작성하였습니다. 출원인은 본 국제조사보고서의 발송일로부터 1월 이내에 본 기관에 의견을 제출할 수 있습니다.

6. 도면과 관련하여,

a. 요약서와 함께 공개될 도면은 제 1 도이며

☒ 출원인이 제안하였습니다.

☐ 출원인이 도면의 번호를 제안하지 않았기 때문에 본 기관이 선택하였습니다.

☐ 본 도면이 발명의 특징을 더 잘 나타내고 있기 때문에 본 기관이 선택하였습니다.

b. ☐ 요약서와 함께 공개될 도면이 없습니다.

서식 PCT/ISA/210 (첫 번째 용지) (2009년 7월)

국제조사보고서

국제출원번호
PCT/KR2011/007792

A. 발명이 속하는 기술분류(국제특허분류(IPC))

H04W 88/12(2009.01)i, H04W 24/02(2009.01)i, H04W 16/18(2009.01)i

B. 조사된 분야

조사된 최소문헌(국제특허분류를 기재)

H04W 88/12; H04W 16/26; H04W 24/10; H04W 52/20; H04B 1/00; H04W 24/08

조사된 기술분야에 속하는 최소문헌 이외의 문헌

한국등록실용신안공보 및 한국공개실용신안공보: 조사된 최소문헌란에 기재된 IPC

일본등록실용신안공보 및 일본공개실용신안공보: 조사된 최소문헌란에 기재된 IPC

국제조사에 이용된 전산 데이터베이스(데이터베이스의 명칭 및 검색어(해당하는 경우))

eKOMPASS(특허청 내부 검색시스템) & 키워드: 동일, 채널, 주파수, AP, 간섭, 송신, 출력, 전력, 파워

C. 관련 문헌

카테고리*	인용문헌명 및 관련 구절(해당하는 경우)의 기재	관련 청구항
A	US 2007-0060057 A1 (RYOKO MATSUO 외 5명) 2007.03.15 초록, 도 1, 3, 및 청구항 1, 6, 10 참조.	1-11
A	JP 2010-213040 A (NEC INFRONTIA CORP) 2010.09.24 초록, 청구항 1-2 참조.	1-11
A	KR 10-2006-0034461 A (삼성전자주식회사) 2006.04.24 초록, 도 4, 청구항 1-3 참조.	1-11
A	MIN SUK KANG 외 5명. "Adaptive Interference-Aware Multi-Channel Clustering Algorithm in a ZigBee Network in the Presence of WLAN Interference", Wireless Pervasive Computing, 2007. ISWPC '07. 2nd International Symposium on, 5-7 Feb. 2007 pp. 201-203 참조.	1-11

☐ 추가 문헌이 C(계속)에 기재되어 있습니다.

☒ 대응특허에 관한 별지를 참조하십시오.

* 인용된 문헌의 특별 카테고리:

"A" 특별히 관련이 없는 것으로 보이는 일반적인 기술수준을 정의한 문헌

"I" 국제출원일 또는 우선일 후에 공개된 문헌으로, 출원과 상충하지 않으며 발명의 기초가 되는 원리나 이론을 이해하기 위해 인용된 문헌

"E" 국제출원일보다 빠른 출원일 또는 우선일을 가지나 국제출원일 이후에 공개된 선출원 또는 특허 문헌

"X" 특별한 관련이 있는 문헌. 해당 문헌 하나만으로 청구된 발명의 신규성 또는 진보성이 없는 것으로 본다.

"L" 우선권 주장에 의문을 제기하는 문헌 또는 다른 인용문헌의 공개일 또는 다른 특별한 이유(이유를 명시)를 밝히기 위하여 인용된 문헌

"Y" 특별한 관련이 있는 문헌. 해당 문헌이 하나 이상의 다른 문헌과 조합하는 경우로 그 조합이 당업자에게 자명한 경우 청구된 발명은 진보성이 없는 것으로 본다.

"O" 구두 개시, 사용, 전시 또는 기타 수단을 언급하고 있는 문헌

"&" 동일한 대응특허문헌에 속하는 문헌

국제조사의 실제 완료일

2012년 05월 22일 (22.05.2012)

국제조사보고서 발송일

2012년 05월 22일 (22.05.2012)

ISA/KR의 명칭 및 우편주소

 대한민국 특허청
(302-701) 대전광역시 서구 청사로 189,
4동 (둔산동, 정부대전청사)
팩스 번호 82-42-472-7140

심사관

이다나

전화번호 -



서식 PCT/ISA/210 (두 번째 용지) (2009년 7월)

국제조사보고서
대응특허에 관한 정보

국제출원번호

PCT/KR2011/007792

국제조사보고서에서 인용된 특허문헌	공개일	대응특허문헌	공개일
US 2007-0060057 A1	2007.03.15	EP 1925100 A2 JP 2009-506652 A JP 2009-506652 T US 7653357 B2 WO 2007-024895 A2 WO 2007-024895 A3 WO 2007-024895 A3	2008.05.28 2009.02.12 2009.02.12 2010.01.26 2007.03.01 2007.10.11 2007.03.01
JP 2010-213040 A	2010.09.24	없음	
KR 10-2006-0034461 A	2006.04.24	US 2006-0083206 A1 US 7675892 B2	2006.04.20 2010.03.09

서식 PCT/ISA/210 (대응특허 추가용지) (2009년 7월)

PCT 출원서

출력(전자적 형태가 원본)

0	수리관청 전용	
0-1	국제출원번호	
0-2	국제출원일자	
0-3	수리관청 명칭 및 "PCT 국제출원"	
0-4	서식 PCT/RO/101 - PCT 출원서	
0-4-1	우측에 기재된 바와 같이 작성되었다.	PCT-SAFE 버전 3.51.050.226 MT/FOP 20110701/0.20.5.19
0-5	신청 아래 서명인은 본 국제 출원서가 특허협력조약에 의해 처리될 것을 청구합니다.	
0-6	출원인이 지정한 수리관청	대한민국 특허청 (RO/KR)
0-7	출원인 또는 대리인의 서류참조기호	OPF1964PCT
I	발명의 명칭	무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치
II	출원인	
II-1	이 사람은	오직 출원인
II-2	우측 지정국에 관한 출원인	미국을 제외한 모든 지정국
II-4ko	성명	주식회사 케이티
II-4en	Name:	KT CORPORATION
II-5ko	주소	경기 성남시 분당구 정자동 206 463-711 대한민국
II-5en	Address:	206, Jeongja-dong Bundang-gu, Seongnam-si Gyeonggi-do 463-711 Republic of Korea
II-6	국적	대한민국 KR
II-7	거주국	대한민국 KR
II-11	출원인 코드	2-1998-005456-3

PCT 출원서

출력(전자적 형태가 원본)

III-1	출원인 및/또는 발명자	출원인 겸 발명자
III-1-1	이 사람은	오직 미국만
III-1-2	우측 지정국에 관한 출원인	윤병완
III-1-4ko	성명	YOON, Byung Wan
III-1-4en	Name (LAST, First):	경기
III-1-5ko	주소	군포시 산본2동
		주공11단지아파트 1111동 701호
		435-748
		대한민국
III-1-5en	Address:	#1111-701, Jugong 11 Danji Apt
		Sanbon 2-dong, Gunpo-si
		Gyeonggi-do 435-748
		Republic of Korea
III-1-6	국적	대한민국 KR
III-1-7	거주국	대한민국 KR
III-2	출원인 및/또는 발명자	출원인 겸 발명자
III-2-1	이 사람은	오직 미국만
III-2-2	우측 지정국에 관한 출원인	정재호
III-2-4ko	성명	CHUNG, Jae Ho
III-2-4en	Name (LAST, First):	서울
III-2-5ko	주소	강남구 일원본동
		상록수아파트 202동 505호
		135-947
		대한민국
III-2-5en	Address:	#202-505, Sangnoksu Apt.
		Irwonbon-dong, Gangnam-gu
		Seoul 135-947
		Republic of Korea
III-2-6	국적	대한민국 KR
III-2-7	거주국	대한민국 KR

PCT 출원서

출력(전자적 형태가 원본)

III-3	출원인 및/또는 발명자	출원인 겸 발명자
III-3-1	이 사람은	오직 미국만
III-3-2	우측 지정국에 관한 출원인	윤주영
III-3-4ko	성명	YOON, Joo Young
III-3-4en	Name (LAST, First):	서울
III-3-5ko	주소	금천구 독산동
		독산한신아파트 7동 801호
		153-753
		대한민국
III-3-5en	Address:	#7-801, Doksan Hanshin Apt.
		Doksan-dong, Geumcheon-gu
		Seoul 153-753
		Republic of Korea
III-3-6	국적	대한민국 KR
III-3-7	거주국	대한민국 KR
III-4	출원인 및/또는 발명자	출원인 겸 발명자
III-4-1	이 사람은	오직 미국만
III-4-2	우측 지정국에 관한 출원인	한규정
III-4-4ko	성명	HAN, Kyu Jeong
III-4-4en	Name (LAST, First):	경기
III-4-5ko	주소	수원시 장안구 천천동
		비단마을 신성아파트 732동 1401호
		440-330
		대한민국
III-4-5en	Address:	#732-1401, Shinsung Apt., Bidan-maeul
		Cheoncheon-dong, Jangan-gu, Suwon-si
		Gyeonggi-do 440-330
		Republic of Korea
III-4-6	국적	대한민국 KR
III-4-7	거주국	대한민국 KR

PCT 출원서

출력(전자적 형태가 원본)

III-5	출원인 및/또는 발명자	
III-5-1	이 사람은	출원인 겸 발명자
III-5-2	우측 지정국에 관한 출원인	오직 미국만
III-5-4ko	성명	지영하
III-5-4en	Name (LAST, First):	Jl, Yung Ha
III-5-5ko	주소	경기 성남시 분당구 이매동 이매촌진흥아파트 814동 1001호 463-904 대한민국
III-5-5en	Address:	#814-1001, Imaechon Jinheung Apt. Imae-dong, Bundang-gu, Seongnam-si Gyeonggi-do 463-904 Republic of Korea
III-5-6	국적	대한민국 KR
III-5-7	거주국	대한민국 KR
IV-1	대리인 또는 대표자 아래에 기재된 자는 관할 국제기관에 대하여 우측에 표시된 자격으로 출원인을 대리하는 것으로 선임되었다.	
IV-1-1ko	성명	대리인 (agent)
IV-1-1en	Name:	특허법인이지 EZ INTERNATIONAL PATENT & TRADEMARK LAW OFFICE
IV-1-2ko	주소	서울 금천구 가산동 470-8 KCC 웰츠밸리 302~303호 153-803 대한민국
IV-1-2en	Address:	Suite 302~303, KCC Welltz Valley 470-8 Gasan-dong, Geumcheon-gu Seoul 153-803 Republic of Korea
IV-1-3	전화번호	82-2-565-6727
IV-1-4	팩스번호	82-2-565-6726
IV-1-5	이메일 주소	ez@ezpat.com
IV-1-5(a)	이메일 사용동의 수리관청, 국제조사기관, 국제사무국, 국제예비심사기관이 필요 시 이 이메일 주소를 사용하여 이 국제 출원과 관련하여 발행된 통지서를 송부할 것에 동의한다.	서면 통지서에 앞서 선람용 사본 송부
IV-1-6	대리인 코드	9-2008-100041-4

PCT 출원서

출력(전자적 형태가 원본)

V	지정국		
V-1	본 출원서의 제출로, 규칙 4.9(a)에 따라, 부여될 수 있는 모든 종류의 권리 보호를 위하여, 그리고 해당하는 경우 지역특허 및 국내특허 모두를 위하여 당해 국제출원일에 PCT에 기속되는 모든 계약국이 지정된다.		
V-2	V.2란은 출원서 제출시 또는 규칙 26의2.1에 의해 그 이후 출원서 제6기재란에 외 특정 관련 계약국의 국내 선출원에 대한 우선권주장이 포함되어 있을 경우 당해 계약국의 국내법에 의해 해당 국내 선출원의 효력이 상실되는 것을 방지하기 위한 목적으로 당해 계약국의 지정을 제외하는 데에만 사용될 수 있다 (지정 제외시 이의 취소 불가능).	KR	
VI-1 VI-1-1 VI-1-2 VI-1-3	선국내출원에 대한 우선권 주장 출원일 출원번호 국가	2011년 06월 03일 (03.06.2011) 10-2011-0054124 KR	
VI-2	우선권 주장 요청 수리관청에 대하여 위에 명시된 선출원의 인증등본을 준비하여 국제사무국에 송부하여 줄 것을 신청한다.	VI-1	
VI-3	인용에 의한 보완 조약 제11조(1)(iii)(d) 또는 (e)에서 규정하는 국제출원의 요소, 또는 규칙 20.5(a)에서 규정하는 명세서, 청구 범위 또는 도면의 일부가 본 국제출원에는 포함되어 있지 않지만 조약 제11조(1)(iii) 규정의 요소 중 하나 이상이 수리관청에 최초로 접수된 날에 우선권주장의 기초가 된 선출원에 완전히 포함되어 있는 경우, 그 요소 또는 부분은 규칙 20.6 규정에 의한 확인을 조건으로, 규칙 20.6의 규정과 관련하여 본 국제출원에 있어서 인용에 의해 보완된다.		
VII-1	국제조사기관(ISA) 선택	대한민국 특허청 (ISA/KR)	
VIII	선언서	선언서 개수	
VIII-1	발명자의 동일성에 관한 선언	-	
VIII-2	국제출원일에 특허출원 및 특허를 받을 수 있는 출원인의 자격에 관한 선언	-	
VIII-3	국제출원일에 선출원의 우선권을 주장할 수 있는 출원인의 자격에 관한 선언	-	
VIII-4	발명자 선언(미국에 대한 지정의 경우에 한함)	-	
VIII-5	신규성을 해치지 아니하는 개시 또는 신규성 상실의 예외에 관한 선언	-	
IX	체크 리스트	용지 수	전자적 파일 첨부
IX-1	출원서(선언서 포함)	6	✓
IX-2	명세서	11	✓
IX-3	청구범위	3	✓
IX-4	요약서	1	✓
IX-5	도면	5	✓
IX-7	용지매수 소계	26	

PCT 출원서

출력(전자적 형태가 원본)

	첨부 항목	서면 첨부	전자적 파일 첨부
IX-8	수수료 계산 용지	-	✓
IX-9	개별위임장 원본	-	✓
IX-18	PCT-SAFE 전자출원 매체	-	-
IX-20	요약서에 수반되어야 할 도면 번호	1	
IX-21	국제출원의 출원 언어	한국어	
X-1	출원인, 대리인 또는 대표자의 서명 또는 날인		
X-1-1	성명		
X-1-2	서명인의 성명		
X-1-3	권한 (출원서를 통해 서명자의 자격이 명백하지 않은 경우에는 그 자격도 표시)		

수리관청 전용

10-1	국제출원으로 제출된 서류의 실제 접수일	
10-2	도면	
10-2-1	접수	
10-2-2	미접수	
10-3	국제출원으로 제출된 서류를 완성하는 서류 또는 도면의 추후 기간내 제출에 따른 정정된 실제 접수일	
10-4	PCT 제11조(2)에 따라 제출이 요구된 보완서로서 기간내 제출된 보완서의 접수일	
10-5	국제조사기관(ISA)	ISA/KR
10-6	조사료 납부시까지 지연된 조사용 사본의 송부	

국제 사무국 전용

11-1	국제 사무국의 기록원본 접수일	
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특 허 협 력 조 약
(PATENT COOPERATION TREATY)

발신:수리관청

수신:

특허법인이지

서울 금천구 가산동 470-8 KCC 웰츠벨리 302~303호
153-803 대한민국**PCT**

국제출원번호 및 국제출원일 통지서

(PCT 규칙 20.2(c))

출원인 또는 대리인의 서류참조기호 OPF1964PCT		발송일 (일/월/년) 2011년 10월 24일 (24.10.2011)
국제출원번호 PCT/KR2011/007792		국제출원일 (일/월/년) 2011년 10월 19일 (19.10.2011)
		우선일 (일/월/년) 2011년 06월 03일 (03.06.2011)
출원인 주식회사 케이티 등		
발명의 명칭 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치		

1. 이 국제출원은 위에 기재된 바와 같이 국제출원번호와 국제출원일이 부여되었습니다.
2. 이 국제출원의 기록원본은:
- ☐ _____ 자료 국제사무국에 송부되었습니다.
- ☐ 아래의 사유로 인하여 아직 국제사무국에 송부되지 않았으며,이 통지서의 사본은 국제사무국에 송부되었습니다*:
- ☐ 국가안전보장에 필요한 허가를 얻지 못했음
- ☐ 기타 (이유를 상술):

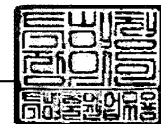
* 국제사무국은 수리관청에 의한 기록원본의 송달을 감시하고 그 접수사실을 출원인에게 통지합니다.
(서식 PCT/IB/301). 국제사무국은 우선일부터 14월이 경과할 때까지 기록원본을 수령하지 않은 때에는 출원인에게 이를 통지합니다. (규칙 22.1(c)).

수리관청명칭 및 우편주소

 대한민국 특허청
(302-701) 대전광역시 서구 청사로 189,
정부대전청사
팩스번호: 82-42-472-7140

특허청장

전화번호: 82-42-481-5131



서식 PCT/RO/105 (2008년 7월)

특 허 협 력 조 약
(PATENT COOPERATION TREATY)

PCT/KR2011/007792

발신: 수리관청

수신:
특허법인이지
서울 금천구 가산동 470-8 KCC 웰츠밸리 302~303호
153-803 대한민국

PCT

국제출원보정요구서

(PCT 3(4)(i) 및 14(1); 규칙 26)

출원인 또는 대리인의 서류참조기호 OPF1964PCT	발송일 (일/월/년) 2011년 10월 24일 (24.10.2011)
국제출원번호 PCT/KR2011/007792	답변기간 상기 발송일부터 2월 이내
출원인 주식회사 케이티 등	국제출원일자 (일/월/년) 2011년 10월 19일 (19.10.2011)

1. ☒ 출원인은 기제출하신 이 국제출원에 있어서, 아래의 첨부물에 열거된 흠결에 대하여 위의 지정기 한내에 이를 보정하시기 바랍니다.
- ☒ 부록 A
☐ 부록 B1 (국제출원의 서식상의 요건에 관한 사항)
☐ 부록 C1 (국제출원의 도면에 관한 사항)
2. ☐ 출원인은 규칙 12.3 및 12.4에 의하여 기 제출하신 국제출원번역문에 있어서, 아래의 첨부물에 열거된 흠결에 대하여 위의 지정기간내에 이를 보정하시기 바랍니다.
- ☐ 부록 A
☐ 부록 B2 (국제출원번역문의 서식상의 요건에 관한 사항)
☐ 부록 C2 (국제출원번역문의 도면에 관한 사항)

기타사항 (필요한 경우 때):

흠결의 보정방법?

흠결이 출원서에 있는 경우를 제외하고, 보정은 보정을 포함하는 대체용지 및 대체용지에 수반되는 서한을 제출함으로써 행해져야 하며, 서한에는 대체되는 용지와 대체용지사이의 차이점에 대하여 주의를 환기하여야 합니다. 출원서상의 흠결에 대하여는, 기록원본의 출원서에 명확하게 옮겨적을 수 있는 것인 경우에만 서한에 기재할 수 있습니다 (규칙 26.4).

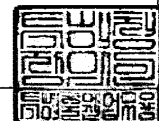
주의

흠결이 보정되지 않는 경우에는 이 국제출원이 취하된 것으로 간주합니다(규칙 26.5).

이 보정요구서와 첨부물의 사본은 국제사무국(☐ 과 국제조사기관)에 송부되었습니다.

수리관청명칭 및 우편주소
대한민국 특허청
(302-701) 대전광역시 서구 청사로 189,
정부대전청사
팩스번호: 82-42-472-7140

특허청장
전화번호: 82-42-481-5131



서식 PCT/RO/106 (2007년 4월)

이 국제출원의 결함은 다음과 같습니다.

1. 국제출원의 서명*에 관하여 (규칙 4.15, 26.2bis(a) 및 90.4), 출원서에:

- a. ☐ 출원인의 서명(출원인이 2이상인 경우 최소한 1인)이 누락됨.
- b. ☐ 미국을 지정국으로 한 출원인의 서명이 되지 않은데 대하여, 출원서 박스번호 IX의 점검표에 언급된 것과 같은 설명서가 없음.
- c. ☐ 대리인/공동대표자로 표시된 자의 서명이 있으나,
☐ 이에 해당하는 위임장이 없음.
☐ 위임장에 모든 출원인이 서명하지는 않았음.
- d. ☒ 기타(상술):
 위임장에 발명의명칭이 기재되지 않음. 주식회사 케이티의 위임장이 누락됨.

* 규칙 4.15의 규정에 의하여 조약 14(1)(a)(i)의 요건상 모든 출원인이 출원서에 서명할 것을 규정하고 있음 (예를 들면, 미국을 위한 모든 출원인/발명자를 포함)에도 불구하고, 출원인이 2인 이상인 경우 출원인중 1인이 출원서에 서명하는 경우에는 그 요건을 충족한 것으로 본다(규칙 26.2bis(a)). 그러나, 출원인은 각 지정관청의 국내법상 국내단계에서 국제출원의 처리와 관련하여 출원서에 서명하지 아니한 출원인의 서명을 통해 국제출원을 확인할 것을 요구할 수 있음에 유의하여야 한다.(규칙 51bis.1(a)(vi)).

2. 규칙 19.1에 의거 수리관청에 국제출원을 제출할 수 있는 자격을 갖춘 출원인의 기재에 관하여, 출원서에 (규칙 4.4, 4.5 및 26.2bis(b)):

- a. ☐ 출원인의 성명을 올바르게 기재하지 않았음(상술):
- b. ☐ 출원인의 주소를 기재하지 않았음.
- c. ☐ 출원인의 주소를 올바르게 기재하지 않았음(상술):
- d. ☐ 출원인의 국적을 기재하지 않았음.
- e. ☐ 출원인의 거주지를 기재하지 않았음.

☐ 다른 출원인에 관한 기재에 대한 추가사항(있는 경우):

* 규칙 4.4 및 4.5의 규정에 의하여 조약 14(1)(a)(ii)의 요건상 출원인, 또는 출원인이 여러명인 경우 출원인 각각에 관한 기재가 있어야 한다고 규정하고 있음에도 불구하고, 출원인이 2인 이상인 경우 규칙 4.5(a)(ii) 및 (iii)에 의한 기재는 출원인 중 규칙 19.1에 따라 국제출원할 자격이 있는 출원인 중 1인에 대한 기재가 있는 경우 그 요건을 충족한 것으로 본다(규칙 26.2bis(b)). 그러나, 출원인은 각 지정관청의 국내법상 국내단계에서 국제출원의 처리와 관련하여 지정국을 위한 출원인에 대하여 규칙 4.5(a)(ii) 및 (iii)에 따른 누락된 기재사항을 제출할 것을 요구할 수 있음에 유의하여야 한다(규칙 51bis.1(a)(vii)).

3. 명세서와 청구의 범위를 제외한 국제출원의 언어에 관하여(규칙 12.1(c), 26.3ter(a) 및 (c)):

- a. ☐ 출원서가 당 수리관청이 인정하는 공개언어인
 로 작성되지 않았음
- b. ☐ 도면중 설명부분이 이 국제출원이 공개될 언어인
 로 작성되지 않았음.
- c. ☐ 요약서가 이 국제출원이 공개될 언어인
 로 작성되지 않았음.

4. 발명의 명칭이:

- a. ☐ 출원서 박스번호 I에 기재되지 않았음(규칙 4.1 (a)).
- b. ☐ 명세서 첫 페이지의 첫머리에 기재되지 않았음(규칙 5.1 (a)).
- c. ☐ 출원서 박스번호 I의 기재와 명세서 첫 머리에 표시된 것이 일치하지 아니함(규칙 5.1(a)).

5. 요약서에 관하여(규칙 8):

- ☐ 국제출원에 요약서가 포함되지 않았음.

서식 PCT/RO/106 (부록 A) (2007년 4월)

이 국제출원의 서식상의 요건이 아래와 같은 정도까지 충족되지 못했습니다.

1. ☐ 균일한 국제공개에 위하여 필요한 정도까지(규칙 11 및 26.3(a)(i))(결함을 상술):

	출원서	명세서	청구의 범위	요약서
a. ☐ 직접복제를 허용하지 않음.	☐	☐	☐	☐
b. ☐ 각 요소가 별개의 용지에 작성되지 않았음.	☐	☐	☐	☐
c. ☐ 용지에 주름 또는 찢어진 곳이 있거나, 접어진곳이 있음.	☐	☐	☐	☐
d. ☐ 용지를 세로로 사용하지 않았음.	☐	☐	☐	☐
e. ☐ 용지의 양면을 사용했음.	☐	☐	☐	☐
f. ☐ 유연성있는/튼튼한/흰색의/부드러운/무광택의/내구성 있는 종이가 아님.	☐	☐	☐	☐
g. ☐ 용지가 규정대로 절하여지지 않았음.(규칙11.4 (b)).	☐	☐	☐	☐
h. ☐ 용지가A4사이즈 (29.7cm x 21cm)가 아님.	☐	☐	☐	☐
i. ☐ 최소여백이 규정에 미치지 못함. (상단: 2cm; 좌단: 2.5cm; 우단: 2cm; 하단: 2cm).		☐	☐	☐
j. ☐ 서류번호가 용지의 상단으로부터 1.5cm이내의 좌측 구석이 아닌 곳에 기재되어 있음.		☐	☐	☐
k. ☐ 서류번호의 문자수가 12자를 초과함.	☐	☐	☐	☐
l. ☐ 명세서, 청구의 범위 및 요약서의 용지에 아라비아숫자로 일련번호를 붙이지 않았음.		☐	☐	☐
m. ☐ 용지번호가 용지의 상단 또는 하단의 중앙에 위치하지 않음.	☐	☐	☐	☐
n. ☐ 용지번호가 여백에 위치함(여백의 크기는 위 i. 참조)		☐	☐	☐
o. ☐ 문언이 타자 또는 인쇄되지 않았음.	☐	☐	☐	☐
p. ☐ 타자에 의한 경우, 행의 간격이 1.5문자폭이 아님.		☐	☐	☐
q. ☐ 기재사항 중 대문자의 크기가 세로 0.28cm미만임.	☐	☐	☐	☐
r. ☐ 지워지지 않는 어두운 색으로 기재되지 않았음.	☐	☐	☐	☐
s. ☐ 각 요소가 도면을 포함함.	☐	☐	☐	☐
t. ☐ 용지에 변경/덧쓰기/행간삽입/과도한 삭제가 있음.	☐	☐	☐	☐
u. ☐ 용지에 복사한 흔적이 있음.	☐	☐	☐	☐

2. ☐ 만족스러운 복제를 위하여 필요한 정도까지(규칙 11 및 26.3(b)(i)).

기타사항(필요한 경우):

이 국제출원 번역문의 서식상의 요건이 아래와 같은 정도까지 충족되지 못했습니다.

1. ☐ 균일한 국제공개를 위하여 필요한 정도까지(규칙 11 및 26.3(a)(ii))(결함을 상술):

	출원서	명세서	청구의 범위	요약서
a. ☐ 직접복제를 허용하지 않음.	☐	☐	☐	☐
b. ☐ 각 요소가 별개의 용지에 작성되지 않았음.	☐	☐	☐	☐
c. ☐ 용지에 주름 또는 찢어진 곳이 있거나, 접어진곳이 있음.	☐	☐	☐	☐
d. ☐ 용지를 세로로 사용하지 않았음.	☐	☐	☐	☐
e. ☐ 용지의 양면을 사용했음.	☐	☐	☐	☐
f. ☐ 유연성있는/튼튼한/흰색의/부드러운/무광택의/내구성 있는 종이가 아님.	☐	☐	☐	☐
g. ☐ 용지가 규정대로 철하여지지 않았음.(규칙 11.4 (b)).	☐	☐	☐	☐
h. ☐ 용지가A4사이즈 (29.7cm x 21cm)가 아님.	☐	☐	☐	☐
i. ☐ 최소여백이 규정에 미치지 못함. (상단: 2cm; 좌단: 2.5cm; 우단: 2cm; 하단: 2cm).		☐	☐	☐
j. ☐ 서류번호가 용지의 상단으로부터 1.5cm이내의 좌측 구석이 아닌 곳에 기재되어 있음.		☐	☐	☐
k. ☐ 서류번호의 문자수가 12자를 초과함.	☐	☐	☐	☐
l. ☐ 명세서, 청구의 범위 및 요약서의 용지에 아라비아숫자로 일련번호를 붙이지 않았음.		☐	☐	☐
m. ☐ 용지번호가 용지의 상단 또는 하단의 중앙에 위치하지 않음.	☐	☐	☐	☐
n. ☐ 용지번호가 여백에 위치함(여백의 크기는 위 i. 참조)		☐	☐	☐
o. ☐ 문언이 타자 또는 인쇄되지 않았음.	☐	☐	☐	☐
p. ☐ 타자에 의한 경우, 행의 간격이 1.5문자폭이 아님.		☐	☐	☐
q. ☐ 기재사항 중 대문자의 크기가 세로 0.28cm미만임.	☐	☐	☐	☐
r. ☐ 지워지지 않는 어두운 색으로 기재되지 않았음.	☐	☐	☐	☐
s. ☐ 각 요소가 도면을 포함함.	☐	☐	☐	☐
t. ☐ 용지에 변경/덧쓰기/행간삽입/과도한 삭제가 있음.	☐	☐	☐	☐
u. ☐ 용지에 복사한 흔적이 있음.	☐	☐	☐	☐

2. ☐ 만족스러운 복제를 위하여 필요한 정도까지(규칙 11 및 26.3(b)(ii)).

기타사항(필요한 경우):

서식 PCT/RO/106 부록 C1

이 국제출원의 도면이 아래와 같은 정도까지 충족되지 못했습니다.

1. ☐ 균일한 국제공개를 위하여 필요한 정도까지 (규칙 11 및 26.3(a)(i)) (결함을 상술):

도면이 그려진 용지:

- a. ☐ 직접복제를 허용하지 않음.
- b. ☐ 용지에 주름 또는 찢어진 곳이 있거나, 접어진 곳이 있음
- c. ☐ 용지의 양면을 사용했음
- d. ☐ 유연성 있는/튼튼한/흰색의/ 부드러운/무광택의/내구성 있는 종이 아님.
- e. ☐ 도면이 별개의 용지에 작성되지 않았음.
- f. ☐ 용지가 규정대로 철하여지지 않았음(규칙 11.4(b)).
- g. ☐ 용지가 A4사이즈 (29.7cm x 21cm)가 아님.
- h. ☐ 최소여백이 규정에 미치지 못함
(상단: 2.5cm; 좌단: 2.5cm; 우단: 1.5cm; 하단: 1cm).
- i. ☐ 서류번호가 용지의 상단으로부터 1.5cm 이내의 좌측구석이 아닌곳에 기재되어 있음.
- j. ☐ 서류번호의 문자수가 12자를 초과함.
- k. ☐ 용지의 사용할 수 있는 면 또는 사용한 면의 테두리를 표시함.
- l. ☐ 용지에 아라비아숫자로 일련번호를 붙이지 않았음 (예: 1/3, 2/3, 3/3).
- m. ☐ 용지번호가 용지의 상단 또는 하단의 중앙에 위치하지 않음.
- n. ☐ 용지번호가 여백에 위치함(여백의 크기는 위 h. 참조
- o. ☐ 용지에 변경/덧쓰기/행간삽입/과도한 삭제가 있음.
- p. ☐ 용지에 복사한 흔적이 있음.

도면 (규칙 11.13):

- a. ☐ 직접복제를 허용하지 않음.
- b. ☐ 불필요한 문헌을 기재함.
- c. ☐ 번역할 경우, 어구가 도면의 선을 침범함.
- d. ☐ 내구성 있는 흑색으로 작성되지 않았음; 선은 두께가 균일하지 않고 선명하지 않음.
- e. ☐ 절단면이 올바르게 표시되지 않았음.
- f. ☐ 축소복제하는 경우 쉽게 식별되지 못함.
- g. ☐ 축척이 도식으로 표시되지 않았음.
- h. ☐ 간결하지 않고 명료하지 않은 숫자, 문자 및 인출선이 있음.
- i. ☐ 제도용구를 사용하지 않고 그은 선이 있음.
- j. ☐ 도가 불필요하게 다른 비율로 표시된 부분이 있음.
- k. ☐ 세로 0.32cm미만인 숫자 및 문자가 있음.
- l. ☐ 라틴문자 및 관계적인 그리스 문자와 부합하지 않는 문자가 있음.
- m. ☐ 2이상의 용지에 그려진 도형들이 일부분을 생략하지 않고는 한 개의 도형을 구성토록 합쳐지지 않음.
- n. ☐ 올바르게 배열되지 않고 명확하게 분리되지 않은 도가 있음.
- o. ☐ 연속된 아라비아숫자로 일련번호를 붙이지 않은 도가 있음.
- p. ☐ 용지의 번호와는 관계없이 번호를 붙이지 않은 도가 있음.
- q. ☐ 명세서에 사용하지 않은 인용부호를 사용했음.
- r. ☐ 명세서에 사용된 인용부호를 사용하지 않았음.
- s. ☐ 동일한 부분이 서로 다른 인용부호로써 표시됨.
- t. ☐ 도의 상하가 바르게 되어있지 않고, 개개의 도가 상호 충분히 분리되어 있지 않음.
- u. ☐ 도를 가로로 배열한 경우, 도의 상단이 용지의 좌측에 배열하지 않았음.

2. ☐ 만족스러운 복제를 위하여 필요한 정도까지(규칙 11 및 26.3(b)(i)).

기타사항(필요한 경우):

이 국제출원의 번역문의 도면이 아래와 같은 정도까지 충족되지 못했습니다.

1. ☐ 균일한 국제공개를 위하여 필요한 정도까지 (규칙 11 및 26.3(b)(ii)) (결함을 상술):

도면이 그려진 용지:

- a. ☐ 직접복제를 허용하지 않음.
- b. ☐ 용지에 주름 또는 찢어진 곳이 있거나, 접어진 곳이 있음.
- c. ☐ 용지의 양면을 사용했음.
- d. ☐ 유연성 있는/튼튼한/흰색의/ 부드러운/무광택의/내구성 있는 종이 아님.
- e. ☐ 도면이 별개의 용지에 작성되지 않았음.
- f. ☐ 용지가 규정대로 절하여지지 않았음. (규칙 11.4(b))
- g. ☐ 용지가 A4사이즈 (29.7cm x 21cm)가 아님.
- h. ☐ 최소여백이 규정에 미치지 못함.
(상단: 2.5cm; 좌단: 2.5cm; 우단: 1.5cm; 하단: 1cm)
- i. ☐ 서류번호가 용지의 상단으로부터 1.5cm 이내의 좌측구석이 아닌곳에 기재되어 있음.
- j. ☐ 서류번호의 문자수가 12자를 초과함.
- k. ☐ 용지의 사용할 수 있는 면 또는 사용한 면의 테두리를 표시함.
- l. ☐ 용지에 아라비아숫자로 일련번호를 붙이지 않았음. (예: 1/3, 2/3, 3/3)
- m. ☐ 용지번호가 용지의 상단 또는 하단의 중앙에 위치하지 않음.
- n. ☐ 용지번호가 여백에 위치함. (여백의 크기는 위 h. 참조)
- o. ☐ 용지에 변경/덧쓰기/행간삽입/과도한 삭제 있음.
- p. ☐ 용지에 복사한 흔적이 있음.

도면 (규칙 11.13):

- a. ☐ 직접복제를 허용하지 않음.
- b. ☐ 불필요한 문헌을 기재함.
- c. ☐ 번역할 경우, 어구가 도면의 선을 침범함.
- d. ☐ 내구성 있는 흑색으로 작성되지 않았음; 선은 두께가 균일하지 않고 선명하지 않음.
- e. ☐ 절단면이 올바르게 표시되지 않았음.
- f. ☐ 축소복제하는 경우 쉽게 식별되지 못함.
- g. ☐ 축척이 도식으로 표시되지 않았음.
- h. ☐ 간결하지 않고 명료하지 않은 숫자, 문자 및 인출선이 있음.
- i. ☐ 제도용구를 사용하지 않고 그은 선이 있음.
- j. ☐ 도가 불필요하게 다른 비율로 표시된 부분이 있음.
- k. ☐ 세로 0.32cm 미만인 숫자 및 문자가 있음.
- l. ☐ 라틴문자 및 관계적인 그리스 문자와 부합하지 않는 문자가 있음.
- m. ☐ 2이상의 용지에 그려진 도형들이 일부분을 생략하지 않고는 한 개의 도형을 구성토록 합쳐지지 않음.
- n. ☐ 올바르게 배열되지 않고 명확하게 분리되지 않은 도가 있음.
- o. ☐ 연속된 아라비아숫자로 일련번호를 붙이지 않은 도가 있음.
- p. ☐ 용지의 번호와는 관계없이 번호를 붙이지 않은 도가 있음.
- q. ☐ 명세서에 사용하지 않은 인용부호를 사용했음.
- r. ☐ 명세서에 사용된 인용부호를 사용하지 않았음.
- s. ☐ 동일한 부분이 서로 다른 인용부호로써 표시됨.
- t. ☐ 도의 상하가 바르게 되어있지 않고, 개개의 도가 상호 충분히 분리되어 있지 않음.
- u. ☐ 도를 가로로 배열한 경우, 도의 상단이 용지의 좌측에 배열하지 않았음.

2. ☐ 만족스러운 복제를 위하여 필요한 정도까지 (규칙 11 및 26.3(a)(ii)).

기타사항(필요한 경우):

ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF RECEIPT OF
RECORD COPY

(PCT Rule 24.2(a))

To:

EZ INTERNATIONAL PATENT & TRADEMARK
LAW OFFICE
Suite 302~303, KCC Welltz Valley
470-8 Gasan-dong, Geumcheon-gu
Seoul 153-803
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 04 November 2011 (04.11.2011)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference OPF1964PCT	International application No. PCT/KR2011/007792

The applicant is hereby **notified** that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

KT CORPORATION (for all designated States except US)
YOON, Byung Wan et al (for US)

International filing date: 19 October 2011 (19.10.2011)
Priority date(s) claimed: 03 June 2011 (03.06.2011)
Date of receipt of the record copy by the International Bureau: 01 November 2011 (01.11.2011)
List of designated Offices:

AP: BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW

EA: AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

EP: AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR

OA: BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

National: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

ATTENTION: The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau. **In addition, the applicant's attention is drawn to:**

- time limits for entry into the national phase (see www.wipo.int/pct/en/texts/time_limits.html and *PCT Applicant's Guide*, National Phase, especially Chapters 3 and 4)
- requirements regarding priority documents (if applicable) (see *PCT Applicant's Guide*, International Phase, paragraph 5.070)

A copy of this notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Sunder Jutaporn e-mail pt01.pct@wipo.int Telephone No. +41 22 338 74 01
Facsimile No. +41 22 338 70 90	

Form PCT/IB/301 (July 2010)

1/T6H2GEASVN7W60

ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING SUBMISSION,
OBTENTION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

EZ INTERNATIONAL PATENT & TRADEMARK
LAW OFFICE
Suite 302~303, KCC Welltz Valley
470-8 Gasan-dong, Geumcheon-gu
Seoul 153-803
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 09 November 2011 (09.11.2011)	
Applicant's or agent's file reference OPF1964PCT	IMPORTANT NOTIFICATION
International application No. PCT/KR2011/007792	International filing date (day/month/year) 19 October 2011 (19.10.2011)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 03 June 2011 (03.06.2011)
Applicant KT CORPORATION et al	

The applicant is hereby notified of the date of receipt (or of obtaining by the International Bureau) of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to the date of receipt, **the priority document concerned was submitted or transmitted to or obtained by the International Bureau in compliance with Rule 17.1(a), (b) or (b-bis)**. This Form replaces any previously issued notification concerning submission, transmittal or obtaining of priority documents.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
03 June 2011 (03.06.2011)	10-2011-0054124	KR	01 November 2011 (01.11.2011)

The letters "NR" denote a priority document which, on the date of mailing of this Form, had not yet been received or obtained by the International Bureau in compliance with Rule 17.1(a), (b) or (b-bis). Where the applicant has failed to either submit, request to prepare and transmit or obtain and transmit, or to request the International Bureau to obtain the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

An asterisk "*" next to a date of receipt, denotes a priority document submitted or transmitted to or obtained by the International Bureau but not in compliance with Rule 17.1(a), (b) or (b-bis) (the priority document was received after the time limit prescribed in Rule 17.1(a); the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b) or the request to the receiving Office or the International Bureau to obtain the priority document was made after the applicable time limit under Rule 17.1(b-bis)). Even though the priority document was not furnished in compliance with Rule 17.1(a), (b) or (b-bis), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Philippe Bécamel e-mail pt01.pct@wipo.int Telephone No. +41 22 338 74 01
Facsimile No. +41 22 338 70 90	

ADVANCE E-MAIL

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

EZ INTERNATIONAL PATENT & TRADEMARK
LAW OFFICE
Suite 302~303, KCC Welltz Valley
470-8 Gasan-dong, Geumcheon-gu
Seoul 153-803
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 11 November 2013 (11.11.2013)			
Applicant's or agent's file reference OPF1964PCT		IMPORTANT NOTIFICATION	
International application No. PCT/KR2011/007792		International filing date (day/month/year) 19 October 2011 (19.10.2011)	
1. The following indications appeared on record concerning:			
☒ the applicant ☒ the inventor ☐ the agent ☐ the common representative			
Name and Address YOON, Joo Young #7-801, Doksan Hanshin Apt. Doksan-dong, Geumcheon-gu Seoul 153-753 Republic of Korea		State of Nationality KR	State of Residence KR
		Telephone No.	
		Facsimile No.	
		E-mail address	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:			
☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence			
Name and Address YOON, Joo Young #505-101, Unam Apt. Sinbong-dong Suji-gu Yongin-si Gyeonggi-do 448-935 Republic of Korea		State of Nationality KR	State of Residence KR
		Telephone No.	
		Facsimile No.	
		E-mail address ☐ Notifications by e-mail authorized	
3. Further observations, if necessary:			
4. A copy of this notification has been sent to:			
☒ the receiving Office ☐ the International Searching Authority ☐ the Authority(ies) specified for supplementary search		☐ the International Preliminary Examining Authority ☒ the designated Offices concerned ☐ the elected Offices concerned ☐ other:	
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland		Authorized officer Lee Sun Hwa e-mail pt01.pct@wipo.int Telephone No. +41 22 338 74 01	
Facsimile No. +41 22 338 70 90			

Form PCT/IB/306 (January 2009)

1/H94EH976UM9VK0



ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

FIRST NOTICE INFORMING THE APPLICANT OF
THE COMMUNICATION OF THE INTERNATIONAL
APPLICATION (TO DESIGNATED OFFICES WHICH
DO NOT APPLY THE 30 MONTH TIME LIMIT
UNDER ARTICLE 22(1))

(PCT Rule 47.1(c))

Date of mailing (day/month/year) 03 January 2013 (03.01.2013)		To: EZ INTERNATIONAL PATENT & TRADEMARK LAW OFFICE Suite 302~303, KCC Welltz Valley 470-8 Gasan-dong, Geumcheon-gu Seoul 153-803 RÉPUBLIQUE DE CORÉE	
Applicant's or agent's file reference OPF1964PCT			
International application No. PCT/KR2011/007792		International filing date (day/month/year) 19 October 2011 (19.10.2011)	Priority date (day/month/year) 03 June 2011 (03.06.2011)
Applicant KT CORPORATION et al			

IMPORTANT NOTICE

1. **ATTENTION:** For any designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002 (30 months from the priority date), **does apply**, please see Form PCT/IB/308(Second and Supplementary Notice) (to be issued promptly after the expiration of 28 months from the priority date).

2. Notice is hereby given that the following designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002, **does not apply**, has/have requested that the communication of the international application, as provided for in Article 20, be effected under Rule 93bis.1. The International Bureau has effected that communication on the date indicated below:
06 December 2012 (06.12.2012)

None

In accordance with Rule 47.1(c-bis)(i), those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

3. The following designated Offices, for which the time limit under Article 22(1), as in force from 1 April 2002, **does not apply**, have not requested, as at the time of mailing of the present notice, that the communication of the international application be effected under Rule 93bis.1 :

LU, TZ, UG

In accordance with Rule 47.1(c-bis)(ii), those Offices accept the present notice as conclusive evidence that the Contracting State for which that Office acts as a designated Office does not require the furnishing, under Article 22, by the applicant of a copy of the international application.

4. TIME LIMITS for entry into the national phase

For the designated Office(s) listed above, and unless a demand for international preliminary examination has been filed before the expiration of **19 months** from the priority date (see Article 39(1)), the applicable time limit for entering the national phase will, **subject to what is said in the following paragraph**, be **20 MONTHS** from the priority date.

In practice, **time limits other than the 20-month time limit** will continue to apply, for various periods of time, in respect of certain of the designated Offices listed above. For **regular updates on the applicable time limits** (20 or 21 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

It is the applicant's **sole responsibility** to monitor all these time limits.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Philippe Bécamel e-mail: pt01.pct@wipo.int
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Form PCT/IB/308(First Notice) (January 2004)



ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

SECOND AND SUPPLEMENTARY NOTICE
INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION (TO DESIGNATED OFFICES
WHICH APPLY THE 30 MONTH TIME
LIMIT UNDER ARTICLE 22(1))

(PCT Rule 47.1(c))

To:

EZ INTERNATIONAL PATENT & TRADEMARK LAW
OFFICE
Suite 302-303, KCC Welltz Valley
470-8 Gasan-dong, Geumcheon-gu
Seoul 153-803
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year)

03 October 2013 (03.10.2013)

Applicant's or agent's file reference
OPF1964PCT

IMPORTANT NOTICE

International application No.

PCT/KR2011/007792

International filing date (day/month/year)

19 October 2011 (19.10.2011)

Priority date (day/month/year)

03 June 2011 (03.06.2011)

Applicant

KT CORPORATION et al

1. **ATTENTION:** For any designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002 (30 months from the priority date), **does not apply**, please see Form PCT/IB/308(First Notice) issued previously.

2. Notice is hereby given that the following designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002, **does apply**, has/have requested that the communication of the international application, as provided for in Article 20, be effected under Rule 93bis.1. The International Bureau has effected that communication on the date indicated below:
06 December 2012 (06.12.2012)

AZ, BY, CN, EP, HU, KG, KP, MD, MK, MZ, NA, NG, PG, RU, SY, TM, US

In accordance with Rule 47.1(c-bis)(i), those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

3. The following designated Offices, for which the time limit under Article 22(1), as in force from 1 April 2002, **does apply**, have not requested, as at the time of mailing of the present notice, that the communication of the international application be effected under Rule 93bis.1 :

AE, AG, AL, AM, AO, AP, AT, AU, BA, BB, BG, BH, BR, BW, BZ, CA, CH, CL, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EA, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, ID, IL, IN, IS, JP, KE, KM, KN, KZ, LA, LC, LK, LR, LS, LT, LY, MA, ME, MG, MN, MW, MX, MY, NI, NO, NZ, OA, OM, PE, PH, PL, PT, QA, RO, RS, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, TH, TJ, TN, TR, TT, UA, UZ, VC, VN, ZA, ZM, ZW

In accordance with Rule 47.1(c-bis)(ii), those Offices accept the present notice as conclusive evidence that the Contracting State for which that Office acts as a designated Office does not require the furnishing, under Article 22, by the applicant of a copy of the international application.

4. TIME LIMITS for entry into the national phase

For the designated or elected Office(s) listed above, the applicable time limit for entering the national phase will, **subject to what is said in the following paragraph**, be **30 MONTHS** from the priority date.

In practice, **time limits other than the 30-month time limit** will continue to apply, for various periods of time, in respect of certain of the designated or elected Office(s) listed above. For **regular updates on the applicable time limits** (30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

It is the applicant's **sole responsibility** to monitor all these time limits.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Kihwan Moon

Facsimile No. +41 22 338 82 70

e-mail: pt01.pct@wipo.int

Form PCT/IB/308(Second and Supplementary Notice) (January 2004)



PATENT COOPERATION TREATY

WO 2012/165724
PCT/KR2011/007792

ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
AVAILABILITY OF THE PUBLICATION
OF THE INTERNATIONAL APPLICATION

To:

EZ INTERNATIONAL PATENT & TRADEMARK LAW
OFFICE
Suite 302~303, KCC Welltz Valley
470-8 Gasan-dong, Geumcheon-gu
Seoul 153-803
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year)

06 December 2012 (06.12.2012)

Applicant's or agent's file reference

OPF1964PCT

IMPORTANT NOTICE

International application No.

PCT/KR2011/007792

International filing date (day/month/year)

19 October 2011 (19.10.2011)

Priority date (day/month/year)

03 June 2011 (03.06.2011)

Applicant

KT CORPORATION et al

The applicant is hereby **notified** that the International Bureau:☒ has **published** the above-indicated international application on 06 December 2012 (06.12.2012) under
No. WO 2012/165724☐ has **republished** the above-indicated international application on under
No. WO
For an explanation as to the reason for this republication of the international application, reference is made to INID codes
(15), (48) or (88) (*as the case may be*) on the front page of the published international application.A copy of the international application is available for viewing and downloading on WIPO's website at the following address:
www.wipo.int/pctdb (in the appropriate field of the structured search, enter the PCT or WO number).The applicant may also obtain a paper copy of the published international application from the International Bureau by sending an e-mail
to patentscope@wipo.int or by submitting a written request to the contact details provided below.The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Philippe Bécamel

Facsimile No. +41 22 338 82 70

e-mail: pt01.pct@wipo.int

Form PCT/IB/311 (January 2009)

특 허 협 력 조 약
(PATENT COOPERATION TREATY)

발신 : 국제조사기관

수신 : 특허법인이지 서울 금천구 가산동 470-8 KCC 웰츠밸리 302~303호 153-803 대한민국
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PCT

조사용사본 수령 통지서

(PCT 규칙 25.1)

출원인 또는 대리인의 서류참조기호 OPF1964PCT		발송일 (일/월/년) 2011년 11월 01일 (01.11.2011)
출원인 또는 대리인의 서류참조기호 OPF1964PCT		중요통지
국제출원번호 PCT/KR2011/007792	국제출원일(일/월/년) 2011년 10월 19일 (19.10.2011)	우선일(일/월/년) 2011년 06월 03일 (03.06.2011)
출원인 주식회사 케이티 등		

1. 국제조사기관 및 수리관청이 동일한 관청이 아닌 경우:

본 국제조사기관이 아래 기재된 날에 국제출원의 조사용사본을 수령하였음을 출원인에게 통지합니다.

국제조사기관 및 수리관청이 동일한 관청인 경우:

아래 기재된 날에 국제출원의 조사용사본을 수령하였음을 출원인에게 통지합니다.

2011년 10월 25일 (25.10.2011) (접수일)

2. ☐ 조사용사본에 전자적 형태의 핵산염기 및/또는 아미노산 서열목록이 첨부되어 있습니다.
3. ☐ 조사용사본에 전자적 형태의 핵산염기 및/또는 아미노산 서열목록이 포함되어 있습니다.
4. **국제조사보고서 및 국제조사기관의 견해서 작성기한**
 국제조사보고서 및 국제조사기관의 견해서의 작성기한은 상기의 접수일로부터 3월 또는 우선일
 부터 9월중 늦게 만료하는 날까지임을 통지합니다(조약규칙 42.1 및 43의 2.1(a)).

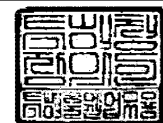
이 통지서의 사본은 국제사무국에 송부되었습니다. 다만, 1.의 첫 번째 문장에 해당하는 경우에는 수리관청에도 송부됩니다.

ISA/KR의 명칭 및 우편주소

 대한민국 특허청
 (302-701) 대전광역시 서구 청사로 189,
 정부대전청사
 팩스번호 82-42-472-7140

특허청장

전화번호 82-42-481-8752



서식 PCT/ISA/202 (2009년 7월)

특 허 협 력 조 약
(PATENT COOPERATION TREATY)

발신 : 국제조사기관

수신 :

특허법인이지

서울 금천구 가산동 470-8 KCC 웰츠밸리 302~303호
153-803 대한민국**PCT**

국제조사보고서 및 국제조사기관의 견해서,
또는 국제조사보고서
부작성 선언서 송부 통지서
(PCT 규칙 44.1)

발송일 2012년 05월 22일 (22.05.2012)
(일/월/년)

출원인 또는 대리인 서류참조기호
OPF1964PCT

이후의 절차에 대하여는 아래 1. 및 4. 참조

국제출원번호
PCT/KR2011/007792국제출원일
2011년 10월 19일 (19.10.2011)
(일/월/년)

출원인

주식회사 케이티 등

1. ☒ 국제보고서 및 국제조사기관의 견해서가 작성되어 이를 송부함을 출원인에게 통지합니다.
조약 제19조의 규정에 의한 보정서 및 설명서의 제출:
희망하는 경우 출원인은 국제출원의 청구의 범위를 보정할 수 있습니다.(조약규칙 46):
기간 보정서 제출기간은 통상 국제조사보고서 송부일로부터 2월.

제출처 International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No. : +41 22 338 82 70

보다 자세한 지침에 대하여는 PCT 출원인안내의 국제단계 9.004-9.011 단락을 참조.

2. ☐ 국제조사보고서가 작성되지 아니할 것이며 조약 제17조(2)(a)의 규정에 의한 선언서 및 국제조사기관의 견해서가 송부됨을 출원인에게 통지합니다.
3. ☐ 조약규칙 40.2의 규정에 의한 추가수수료 납부에 대한 **이의신청과 관련하여** 아래 사항을 출원인에게 통지합니다.
- ☐ 이의신청 및 이의신청에 대한 결정 통지서를 지정관청에 송부하여 줄 것을 요청하는 신청서와 함께 이의신청 및 이의신청 결정 통지서를 국제사무국에 송부하였습니다.
- ☐ 이의신청에 대한 결정이 아직 이루어지지 않았습니다; 결정이 이루어지는 대로 출원인에게 통지할 것입니다.

4. 주의사항

출원인은 비공식적으로 국제조사기관의 견해서에 대한 의견서를 국제사무국에 제출할 수 있다. 국제사무국은 국제예비심사보고서가 작성되지 아니했거나 작성되지 아니할 예정인 경우 당해 의견서의 사본을 모든 지정관청에 송부할 것이다. 당해 의견서는 공중에 이용가능하게 될 것이나, 우선일로부터 30일 만료 후에, 당해 의견서는 공중에 이용가능하게 될 것입니다.

우선일로부터 **18월** 만료직후 국제사무국은 국제출원을 공개합니다. 공개를 하지 않거나 또는 연기할 것을 희망하는 경우에는 출원인은 국제공개의 기술적 준비가 완료되기 전에 국제사무국에 제출하여야 합니다. 국제출원 취하서 또는 우선권주장 취하서를 국제사무국에 제출하여야 합니다(조약 규칙 90bis.1 및 90bis.3).

일부 지정관청에 대하여는 출원인이 우선일로부터 **30일까지** (일부관청에 대하여는 더 늦을수도 있음) 국내단계의 개시를 연기하고자 하는 경우에는 우선일로부터 **19월** 이내에 국제예비심사를 청구하여야 합니다; 그렇지 않은 경우 출원인은 우선일로부터 **20월 이내에** 당해 지정관청에 대한 국내단계의 개시를 위한 규정된 절차를 밟아야 합니다.

다른 지정관청에 대하여는, 우선일로부터 19월 이내에 국제예비심사를 청구하지 않더라도 30월(또는 더 늦을 수도 있음)의 기간이 적용될 것입니다.

각 특허청마다의 적용기간에 대한 구체적인 사항은 www.wipo.int/pct/en/texts/time_limits.html 및 PCT출원인안내의 국내단계를 참조하시기 바랍니다.

ISA/KR의 명칭 및 우편주소

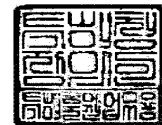


대한민국 특허청
(302-701) 대전광역시 서구 청사로 189,
4동 (둔산동, 정부대전청사)

팩스 번호 82-42-472-7140

특허청장

전화번호 82-42-481-8754



서식 PCT/ISA/220 (2010년 7월)

* 참고사항

국제조사보고서에 인용된 문헌의 사본은 아래 특허청 영문홈페이지를 통해 국제조사보고서
발송일부터 3개월간 다운로드 할 수 있습니다.

<http://www.kipo.go.kr/en/> => Patent Search => PCT-Service

ID : PCT 국제출원번호 (예: PCT/KR2008/012345)

PW : **6DTYV9RS**

서식 PCT/ISA/220에 대한 설명(제1용지) (2010년 7월)

특허협력조약

발신: 국제조사기관

수신:

특허법인이지

서울 금천구 가산동 470-8 KCC 웰즈밸리 302~303호 153-803 대한민국

PCT

국제조사기관의 견해서

(PCT규칙 43의2.1)

발송일
(일/월/년)

2012년 05월 22일 (22.05.2012)

출원인 또는 대리인의 서류참조기호

OPF1964PCT

추가적인 조치

아래 2를 참조

국제출원번호

PCT/KR2011/007792

국제출원일 (일/월/년)

2011년 10월 19일 (19.10.2011)

우선일 (일/월/년)

2011년 06월 03일 (03.06.2011)

국제특허분류(IPC)

H04W 88/12(2009.01)i, H04W 24/02(2009.01)i, H04W 16/18(2009.01)i

출원인

주식회사 케이티 등

1. 본 견해서는 다음 기재란에 관한 내용을 포함합니다.

- ☒ 제1기재란 견해서의 기초
- ☐ 제2기재란 우선권
- ☐ 제3기재란 신규성, 진보성 및 산업상이용가능성에 관한 견해 부작성
- ☐ 제4기재란 발명의 단일성 결여
- ☒ 제5기재란 신규성, 진보성 또는 산업상이용가능성에 관한 견해(PCT규칙 43의2.1(a)(i)), 이를 뒷받침하는 인용문헌 및 설명
- ☐ 제6기재란 특이 인용문헌
- ☐ 제7기재란 국제출원의 homes
- ☐ 제8기재란 국제출원에 관한 의견

2. 추가적인 조치

국제예비심사가 청구되면, 본 견해서는 국제예비심사기관("IPEA")의 견해서로 간주될 것입니다. 다만, 출원인이 본 기관 이외의 기관을 IPEA로 선택하고, 그 선택된 IPEA가 PCT규칙 66.1의2(b)에 따라 본 국제조사기관의 견해서가 위와 같이 간주되지 않을 것임을 국제사무국에 통보한 경우에는 그러하지 않습니다.

본 견해서가 상기와 같이 IPEA의 견해서로 간주되는 경우, 출원인은 서식 PCT/ISA/220의 발송일로부터 3월 또는 우선일로부터 22월 중 늦게 만료되는 날 이전에 의견서 및 보정서(해당하는 경우)를 IPEA에 제출할 수 있습니다.

다른 선택사항에 대하여는 서식 PCT/ISA/220에 대한 안내문을 참조하십시오.

ISA/KR의 명칭 및 우편주소

대한민국 특허청
(302-701) 대전광역시 서구 청사로 189,
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팩스번호 82-42-472-7140

본 견해서의 완료일

2012년 05월 22일 (22.05.2012)

심사관

이다나

전화번호 -



서식 PCT/ISA/237 (표지) (2011년 7월)

제1기재란 본 견해서의 기초

1. 언어와 관련하여, 본 견해서는 아래에 기초하여 작성되었습니다.

☒ 출원시의 언어로 된 국제출원

☐ 국제조사를 위하여 _____ 로 번역되어 제출된 국제출원의 번역문
(PCT규칙 12.3(a) 및 23.1(b))

2. ☐ 본 견해서는 PCT규칙 91에 따라 당해 기관이 허가하였거나 당해 기관에 통보된 **명백한 잘못의 정정**을 고려하여 작성되었습니다(PCT규칙 43의2.1(a)).

3. 국제출원에 개시된 **핵산염기 서열 및/또는 아미노산 서열**과 관련하여, 본 견해서는 아래에 기초하여 작성되었습니다.

a. 출원시 또는 추후 제출된 서열목록

☐ 서면

☐ 전자적 형태

b. 제출시기

☐ 출원시 국제출원에 포함

☐ 국제출원과 함께 전자적 형태로 제출

☐ 조사를 위해 본 기관에 추후 제출

4. ☐ 추가로 서열목록에 대하여 하나 이상의 버전이나 사본이 제출된 경우, 후속 버전 또는 추가된 사본에 기재되어 있는 정보가 출원시의 정보와 동일하거나 또는 출원시의 개시범위를 벗어나지 않는다는 진술서가 제출되었습니다.

5. 추가 의견:

제5기재란 신규성, 진보성 또는 산업상이용가능성에 관한 견해(PCT규칙 43의2.1(a)(i)),
이를 뒷받침하는 인용문헌 및 설명

1. 견해

신규성 (N)	청구항	1-11	있음
	청구항	없음	없음
진보성 (IS)	청구항	1-11	있음
	청구항	없음	없음
산업상 이용가능성 (IA)	청구항	1-11	있음
	청구항	없음	없음

2. 인용문헌 및 설명:

참고한 인용문헌은 다음과 같습니다.

D1: US 2007-0060057 A1 (RYOKO MATSUO 외 5명) 2007.03.15

D2: JP 2010-213040 A (NEC INFRONTIA CORP) 2010.09.24

D3: KR 10-2006-0034461 A (삼성전자주식회사) 2006.04.24

D4: MIN SUK KANG 외 5명. "Adaptive Interference-Aware Multi-Channel Clustering Algorithm in a ZigBee Network in the Presence of WLAN Interference", 5-7 Feb. 2007.

본 발명은 무선 액세스 포인트로부터 수신한 채널 사용 정보를 이용하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 그룹핑부, 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵 생성부, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기 그룹핑된 무선 액세스 포인트 중 가장 높은 수신 신호 세기 값을 가지는 무선 액세스 포인트를 추출하는 추출부 및 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과 현재 사용중인 출력 세기 값을 이용하여 보정된 출력 세기 값을 산출하는 최적 출력 세기 값 산출부를 포함하는 무선 액세스 포인트를 제어하는 장치에 관한 것이다.

인용문헌 D1은 제1 무선 네트워크에서의 제2 무선 네트워크로부터의 간섭을 저감하는 시스템 및 방법에 관한 것으로, 간섭하는 액세스 포인트 AP로부터 혹은 그 간섭하는 액세스 포인트 AP의 네트워크 내에 있는 스테이션으로부터 간섭을 받고 있는 간섭된 액세스 포인트 AP의 네트워크 내에 스테이션을 가지는 간섭된 액세스 포인트 AP가, 예를 들면 송신 전력 제어(TPC), 채널(channel) 스위칭(switching)(CS) 등, 복수의 간섭 저감 방법으로부터 어떻게 해 간섭을 저감하는지를 선택하는 것에 관한 것이다.

인용문헌 D2는 단말과 무선 LAN 네트워크 내에서 상기 단말과 무선 LAN 통신을 실시하는 액세스 포인트와, 상기 액세스 포인트와의 유선 LAN 통신을 통해 상기 단말과 통신하는 제어장치를 구비하는 무선 LAN 시스템이며, 상기 제어 장치는 상기 단말로부터 외부 액세스 포인트의 정보를 수집하는 수집부와, 상기 수집부에서 수집된 외부 액세스 포인트의 정보를 기본으로 상기 액세스 포인트에서 현재 사용하고 있는 접속 채널마다에 외부 액세스 포인트로부터의 간섭의 유무를 판단하는 판단부와, 상기 판단부에서 간섭이 있다고 판단된 접속 채널이 있는 경우, 그 간섭원이 되는 외부 액세스 포인트의 정보를 출력하는 출력부를 가지는 무선 LAN 시스템에 관한 것이다.

인용문헌 D3는 메인 AP의 수신 신호 강도 및 데이터 에러율을 이용하여, 서브 AP의 송신 신호의 파워를 조절하는 서브 액세스 포인트에 관한 것이다.

인용문헌 D4는 동일 채널을 가진 디바이스들 간에 그룹핑되고, 그 동일 채널 그룹에서 간섭 발생 여부는 수신 신호 세기 값 및 ACK 송수신 실패 회수 등을 이용하여 검출되고, 간섭 발생시 그 디바이스의 채널을 변경하는 방법에 관한 것이다.

1. 신규성 및 진보성

독립항 제1항, 제6항, 및 제11항에 기재된 동일 주파수 AP 간에 그룹핑되어서 무선 액세스 제어 포인트에 의하여 간섭 상황이 조정되는 점은 상기 인용문헌 D1 내지 D4에 기재되어 있지 않을 뿐 아니라, 본 기술 발명의 당업자에게 자명하지도 않습니다.

청구항 제2-5항, 제7-10항은 각각 청구항 제1항, 제6항을 인용하고 있습니다.

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.

____ 기재란의 연속

따라서 청구항 제1항-11항은 신규성(PCT 제33조(2)) 및 진보성(PCT 제33조(3))이 인정됩니다.

2. 산업상 이용가능성

청구항 제1항-11항에 기재된 발명은 산업상 이용가능합니다(PCT 제33조(4)).

Electronic Acknowledgement Receipt	
EFS ID:	17539718
Application Number:	14123672
International Application Number:	PCT/KR2011/007792
Confirmation Number:	3204
Title of Invention:	WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT
First Named Inventor/Applicant Name:	Byung Wan YOON
Customer Number:	23373
Filer:	Seok-Won Stuart Lee/Betsy Bai
Filer Authorized By:	Seok-Won Stuart Lee
Attorney Docket Number:	Q208223
Receipt Date:	03-DEC-2013
Filing Date:	
Time Stamp:	16:35:48
Application Type:	U.S. National Stage under 35 USC 371

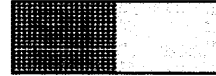
Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1480
RAM confirmation Number	4044
Deposit Account	194880
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Q208223Specificationasfiled.pdf	86929	yes	27
			b98628927d26382a9b43266536ba298633ecbd78		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	21	
	Claims		22	26	
	Abstract		27	27	
Warnings:					
Information:					
2	Specification	Q208223SubstituteSpecifictionClean.pdf	121089	no	18
			182faf339b2e37cd405a6d839456e5a3200e7eb		
Warnings:					
Information:					
3	Applicant Arguments/Remarks Made in an Amendment	Q208223SubstituteSpecifictionMarkedup.pdf	124122	no	18
			ba1be8f1670ff27af6d1bb2fef6e8b6ee84a7858f		
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Information:					
4	Drawings-only black and white line drawings	Q208223Drawingsasfiled.pdf	2989983	no	6
			e366bdf79b2d6c4d9f7bc8edc22b344c67bf019		
Warnings:					
Information:					
5	Documents submitted with 371 Applications	Q208223InternationalSearchReport.pdf	342469	no	5
			2a6728ec7c53fec0e2f3a77107b0e0ba442fd36		
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Information:					
6	Documents submitted with 371 Applications	Q208223PCTRequest.pdf	260615	no	6
			030ca7cc073fab50144f2dfad579911e432e85		
Warnings:					
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7	Documents submitted with 371 Applications	Q208223PCTRO105.pdf	126751 3d44b9fcb67ea97da4ca4bd0aa72c49363d14e7f	no	1
Warnings:					
Information:					
8	Documents submitted with 371 Applications	Q208223PCTRO106.pdf	472222 5ecd18978cad323f482749e3012db7eaa2cd92f9	no	6
Warnings:					
Information:					
9	Documents submitted with 371 Applications	Q208223PCTIB301.pdf	157467 4473f1da9c7ef7a3d32d21f0b83508e3182517d	no	1
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Information:					
10	Documents submitted with 371 Applications	Q208223PCTIB304.pdf	162213 11be27689343f9695055eabff027a2e7a68edd43	no	1
Warnings:					
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11	Documents submitted with 371 Applications	Q208223PCTIB306.pdf	137587 5f987cc00fa9fed6e6dff86aa0736c013e9a468a	no	1
Warnings:					
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12	Documents submitted with 371 Applications	Q208223PCTIB308.pdf	218013 44c6c7d94425b8c317a5453b12f421bb0214ad55	no	2
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13	Documents submitted with 371 Applications	Q208223PCTIB311.pdf	109207 a6c155957c04be63aeaac74c991f784a41f41871	no	1
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Information:					
14	Documents submitted with 371 Applications	Q208223PCTISA202.pdf	117385 7241bd5aaadc60e7ea0a045971bcc409678963d	no	1
Warnings:					
Information:					
15	Documents submitted with 371 Applications	Q208223PCTISA220.pdf	175781 84fcfeac444dcdbf77b1d9a992fe7eacb7775fe2	no	2
Warnings:					
Information:					

16	Documents submitted with 371 Applications	Q208223PCTISA237.pdf	263391 cb7cc799a765e80290ffc938d5c158ff50f5a7	no	4
Warnings:					
Information:					
17	Transmittal of New Application	Q208223TransmittalNewApp.pdf	49532 6bffa5b529a2c54932dc8d1aca441e156eee1096	no	3
Warnings:					
Information:					
18	Application Data Sheet	Q208223ADS.pdf	1088750 857afb8be1e01724e2ab7c9507b6e15b37ee55f5a	no	5
Warnings:					
Information:					
19	Preliminary Amendment	Q208223PreliminaryAmendme nt.pdf	61465 630ba51dd5bcd5d6d9c4c37a3671e2fbd01ebf1	no	9
Warnings:					
Information:					
20	Fee Worksheet (SB06)	fee-info.pdf	33417 2ddfaaf704032a88a52504c85daf1fd166a87f3	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			7098388		
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별첨 사본은 아래 출원의 원본과 동일함을 증명함.

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출 원 번 호 : 10-2011-0054124
Application Number

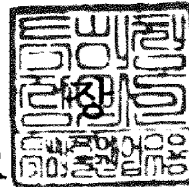
출 원 년 월 일 : 2011년 06월 03일
Filling Date JUN 03, 2011

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

2011 년 10 월 27 일

특 허 청

COMMISSIONER



【서지사항】

【서류명】 특허출원서
【참조번호】 NPF 19636
【출원구분】 특허출원
【출원인】
【명칭】 주식회사 케이티
【출원인코드】 2-1998-005456-3
【대리인】
【명칭】 특허법인이지
【대리인코드】 9-2008-100041-4
【지정된변리사】 이경란
【포괄위임등록번호】 2009-046245-0
【발명의 국문명칭】 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는
 방법 및 장치
【발명의 영문명칭】 WIRELESS ACCESS POINT, METHOD AND APPARATUS FOR
 CONTROLLING THEREOF
【발명자】
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【성명의 영문표기】 Yoon, Joo-Young
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【우편번호】 440-730
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【국적】 KR

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 특허법인이지

(서명 또는 인)

【수수료】

【출원료】	0 면	38,000 원
【가산출원료】	31 면	0 원
【우선권주장료】	0 건	0 원
【심사청구료】	0 항	0 원
【합계】	38,000 원	

【명세서】

【발명의 명칭】

무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치
{WIRELESS ACCESS POINT, METHOD AND APPARATUS FOR CONTROLLING THEREOF}

【기술분야】

- <1> 본 발명은 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치에 관한 것으로서, 보다 상세하게는, 간섭 환경하에서 무선 액세스 포인트의 서비스 범위(coverage) 및 수용 능력(capacity)을 최적화하도록 제어하는 방법 및 장치에 관한 것이다.

【배경기술】

- <2> 일반적으로, 무선 랜을 이용해서 서비스를 제공하고자 할 때, 하나의 액세스 포인트(Access Point: 이하, 'AP' 라 칭함)를 이용하여 한 가정 또는 특정 지역을 서비스 한다.
- <3> 그러나, 건물의 구조 또는 지형의 특성 때문에 하나의 AP를 이용해서 한 가정 또는 특정 지역을 전부 서비스할 수 없는 경우가 발생된다.
- <4> 이와 같은 문제를 해결하기 위한 방법으로, 별도의 AP(소출력 AP)를 음영 지역에 설치하여 사용자의 무선 통신 이용 범위를 넓히는 방법이 있다.
- <5> 그러나, 두개의 AP가 동일한 채널을 사용할 경우, 소정 지역에서 간섭이 발

생되는 문제점이 있다.

<6> 즉, 별도의 AP를 구비하여 음영 지역을 해소하는 경우, 별도의 AP는 고정된 송신 파워(power)를 전송하도록 되어 있는데, 이때, 별도의 AP는 음영 지역을 해소하기 위해 필요 이상의 송신 파워를 전송함으로써, 많은 간섭이 발생되어 무선 네트워크의 성능을 감소시키는 문제점이 있다.

<7> 이에, 한국 공개 특허 제2006-0034461호(송신 신호의 파워를 조절하는 서버 액세스 포인트, 시스템 및 그 방법)에서는, 메인 AP의 수신 신호 강도 및 데이터 에러율을 기초로, 서버 AP의 송신 신호의 파워를 조절하여 전파가 단절되는 음영 지역 해소 및 간섭 현상을 최소화하는 기술을 개시하고 있으나, 서버 AP 자체에서 별도로 송신 파워를 조절해야 하는 한계가 있었다.

<8> 즉, 동일한 채널을 사용하는 다수의 서버 AP 각각이 별도로 송신 파워를 조절해야 하므로 최단 시간 내에 간섭을 최소화할 수 없어 효율적이지 못한 문제가 있었다.

【발명의 내용】

【해결하려는 과제】

<9> 상술한 종래 기술의 문제점을 해결하기 위해, 본 발명은 셀 플래닝(Cell Planning)의 과정 없이 주변 액세스 포인트간의 간섭을 최소화 할 수 있는 방법 및 장치를 제공한다.

<10> 본 발명의 목적들은 이상에서 언급한 목적들로 제한되지 않으며, 언급되지 않은 또 다른 목적들은 아래의 기재로부터 명확하게 이해될 수 있을 것이다.

【과제의 해결 수단】

<11> 상기 목적을 달성하기 위하여, 본 발명의 일 측면에 따른 무선 액세스 포인트를 제어하는 장치는, 상기 무선 액세스 포인트로부터 수신한 채널 사용 정보에 기초하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 그룹핑부, 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵 생성부, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기 그룹핑된 무선 액세스 포인트 중 가장 큰 수신 신호 세기 값을 가지는 무선 액세스 포인트를 추출하는 추출부 및 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과 현재 사용중인 출력 세기 값에 기초하여 보정된 출력 세기 값을 산출하는 최적 출력 세기 값 산출부를 포함한다.

<12> 본 발명의 일 측면에서, 상기 무선 액세스 포인트를 제어하는 장치는, 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하도록 하는 출력 세기 조정 요청을 상기 그룹핑된 각 무선 액세스 포인트로 전송하는 출력 조정 요청부를 더 포함한다.

<13> 또한, 본 발명의 일 측면에서, 상기 무선 액세스 포인트를 제어하는 장치는,

원래 횡수와 수신 신호 세기 값에 기초하여, 상기 주변 무선 액세스 포인트와의 간
신 신호 세기 값을 산출하는 산출부 및 상기 산출된 무선 단말기와의 ACK 송수신
면, 미리 정해진 시간 간격으로, 상기 무선 단말기와의 ACK 송수신 원래 횡수와 수
기 무선 액세스 포인트 제어 장치로 전송하는 정보 전송부, 무선 단말기가 접속된
면 무선 액세스 포인트에 대한 정보 및 상기 무선 액세스 포인트에 대한 정보를 상
정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색하고, 상기 검색된 주
트는, 통신을 위한 채널을 설정하는 채널 설정부, 상기 설정된 채널을 통하여 미리
<16> 상기 목적을 달성하기 위하여, 본 발명의 일 측면에 따른 무선 액세스 포인
이를 빼 값을 상기 보정된 출력 세기 값으로 산출한다.

기 그룹화된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과의 차
종인 출력 세기 값에서 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값과 상
<15> 또한, 본 발명의 일 측면에서, 상기 꺾적 출력 세기 값 산출부는 현재 사용
기 값을 포함하는 가상의 맵(map)을 생성한다.

포인트간의 수신 신호 세기 값과 상기 그룹화된 무선 액세스 포인트의 각 출력 세
<14> 또한, 본 발명의 일 측면에서, 상기 맵 생성부는 상기 그룹화된 무선 액세스
포인트에서 판단된다.

의 수신 신호 세기와 ACK 송수신 원래 횡수에 기초하여 상기 그룹화된 무선 액세스
무선 액세스 포인트와 상기 그룹화된 무선 액세스 포인트에 접속한 무선 단말기 간
는 간접 발생 안테나 수신부를 더 포함하여, 상기 간접 발생 안테나 수신부는 상기 그룹화된
상기 그룹화된 무선 액세스 포인트간의 간접 발생 안테나 수신부를 안테나를 수신하

2011-06-03

접이 발생한 것으로 판단되면, 상기 간섭이 발생했음을 알리는 메시지를 상기 무선 액세스 포인트 제어 장치로 전송하는 간섭 발생 알람부를 포함한다.

<17> 또한, 본 발명의 일 측면에서, 상기 무선 액세스 포인트는 상기 무선 액세스 포인트 제어 장치로부터 보정된 출력 세기 값을 수신하여, 상기 보정된 출력 세기 값을 기준으로 현재 출력 세기 값을 조정하는 출력 세기 조정부를 더 포함한다.

<18> 또한, 본 발명의 일 측면에서, 상기 산출부는 미리 정해진 시간 간격으로 상기 무선 단말기의 접속 여부를 확인하고, 상기 무선 단말기의 접속이 없는 경우, 상기 정보 전송부로 상기 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색을 요청한다.

<19> 또한, 본 발명의 일 측면에서, 상기 간섭 발생 알람부는 상기 미리 정해진 시간 간격을 기준으로, 현재의 수신 신호 세기 값이 이전의 수신 신호 세기 값보다 크고, 현재 무선 단말기와의 ACK 송수신 실패 횟수가 이전 무선 단말기와의 ACK 송수신 실패 횟수보다 크면 상기 간섭이 발생한 것으로 판단한다.

<20> 또한, 본 발명의 일 측면에서, 상기 간섭 발생 알람부는 상기 이전의 수신 신호 세기 값과 상기 현재 무선 단말기와의 ACK 송수신 실패 횟수에 미리 정해진 마진(margine) 값을 적용하되, 상기 미리 정해진 마진 값은 상기 무선 단말기의 움직임으로 인한 수신 신호 세기 값의 변동을 고려한다.

<21> 상기 목적을 달성하기 위하여, 본 발명의 일 측면에 따른 무선 액세스 포인트 제어 장치에서 무선 액세스 포인트의 출력 세기 값을 제어하는 방법은 (a) 상기

무선 액세스 포인트에서, 통신을 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색하여, 상기 무선 액세스 포인트 및 검색된 주변 무선 액세스 포인트에 대한 정보를 상기 무선 액세스 포인트 제어 장치로 전송하는 단계, (b) 상기 무선 액세스 포인트 제어 장치에서, 상기 무선 액세스 포인트로부터 수신한 상기 무선 액세스 포인트 및 주변 무선 액세스 포인트에 대한 정보에 기초하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 단계, (c) 상기 그룹핑된 무선 액세스 포인트에서, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생했는지 여부를 판단하여 상기 무선 액세스 포인트 제어 장치로 전송하는 단계, (d) 상기 무선 액세스 포인트 제어 장치에서, 상기 간섭을 감소시키기 위한 보정된 출력 세기 값을 산출하여 상기 그룹핑된 무선 액세스 포인트로 전송하는 단계 및 (e) 상기 그룹핑된 무선 액세스 포인트에서, 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하는 단계를 포함한다.

<22> 상기 목적을 달성하기 위한 구체적인 사항들은 첨부된 도면과 함께 상세하게 후술된 실시예들을 참조하면 명확해질 것이다.

<23> 그러나 본 발명은 이하에서 개시되는 실시예들에 한정되는 것이 아니라, 서로 다른 다양한 형태로 구성될 수 있으며, 본 실시예들은 본 발명의 개시가 완전하도록 하고 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에게 발명의 범주를 완전하게 알려주기 위해 제공되는 것이다.

【발명의 효과】

<24> 전술한 본 발명의 무선 액세스 포인트를 제어하는 방법 및 장치의 과제 해결 수단 중 하나에 의하면, 셀 플래닝(Cell Planning)의 과정 없이 액세스 포인트간의 간섭을 최소화 할 수 있다.

<25> 또한, 주변 액세스 포인트간의 간섭을 최소화하는데 소요되는 시간을 절약할 수 있으며, 최적의 무선 통신 환경을 제공할 수 있다.

【도면의 간단한 설명】

<26> 도 1은 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 시스템의 구성을 도시한 도면이다.

 도 2는 본 발명의 일 실시예에 따른 무선 액세스 포인트의 구성을 도시한 블록도이다.

 도 3은 본 발명의 일 실시예에 따른 무선 액세스 포인트 제어 장치의 구성을 도시한 도면이다.

 도 4는 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 과정을 도시한 흐름도이다.

 도 5는 본 발명의 일 실시예에 따른 무선 액세스 포인트 제어 장치에서 생성한 가상의 맵을 도시한 도면이다.

【발명을 실시하기 위한 구체적인 내용】

- <27> 아래에서는 첨부한 도면을 참조하여 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 본 발명의 실시예를 상세히 설명하도록 한다.
- <28> 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다.
- <29> 그리고 도면에서 본 발명을 명확하게 설명하기 위해서 설명과 관계없는 부분은 생략하였으며, 명세서 전체를 통하여 유사한 부분에 대해서는 유사한 도면 부호를 붙였다.
- <30> 참고로, 명세서 전체에서, 어떤 부분이 다른 부분과 "연결"되어 있다고 할 때, 이는 "직접적으로 연결"되어 있는 경우뿐 아니라, 그 중간에 다른 소자를 사이에 두고 "전기적으로 연결"되어 있는 경우도 포함한다.
- <31> 또한 어떤 부분이 어떤 구성 요소를 "포함"한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성 요소를 제외하는 것이 아니라 다른 구성 요소를 더 포함할 수 있는 것을 의미한다.
- <32> 이하, 첨부된 구성도 또는 처리 흐름도를 참고하여, 본 발명의 실시를 위한 구체적인 내용을 설명하도록 한다.
- <33> 도 1은 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 시스템의 구성을 도시한 도면이다.

<34> 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 시스템은 다수의 무선 액세스 포인트(100) 및 무선 액세스 포인트 제어 장치(200)를 포함한다.

<35> 각 구성 요소를 설명하면, 무선 액세스 포인트(Access Point ; 이하, AP라 칭함)(100)는 무선 네트워크 환경에 존재하는 무선 네트워크 단말기에게 무선 통신을 위한 송신 신호를 출력하며, 무선 네트워크 장치들에게 비콘 프레임 및 데이터 프레임을 전송한다.

<36> 또한, AP(100)는 송신 신호를 통해 무선 네트워크 장치들에게 소정의 서비스를 제공하고, 무선 네트워크 장치들이 상호 통신할 수 있도록 할 수 있다.

<37> 도 1에는 이러한 AP(100)가 다수 존재하며, 각 AP(100)는 무선 통신을 위한 채널을 사용하는데, 이 경우, 동일한 채널을 사용하는 AP(100)간에 간섭이 발생하면, 무선 액세스 포인트 제어 장치(200)에서 동일한 채널을 사용하는 AP(100)들의 출력 세기 값을 동시에 제어할 수 있다.

<38> 이를 위해 AP(100)는 통신을 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 AP를 검색한다.

<39> 이후, AP(100)는 검색된 주변 AP에 대한 정보 및 자신(100)에 대한 정보, 즉, 사용하는 채널, 수신 신호 세기(Received Signal Strength Indicator, 이하 ‘RSSI’라 칭함) 값 및 출력 세기 값을 무선 액세스 포인트 제어 장치(200)로 전송한다.

<40> 또한, AP(100)는 미리 정해진 시간 간격으로, 동일한 채널을 사용하는 주변

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AP와의 간섭 발생 여부를 판단하여, AP간에 간섭이 발생된 것으로 판단되면, 이를 알리는 메시지를 무선 액세스 포인트 제어 장치(200)로 전송한다.

<41> 이후, AP(100)는 무선 액세스 포인트 제어 장치(200)로부터 보정된 출력 세기 값을 수신하고, 수신된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정한다.

<42> 이때, 동일한 채널을 사용하는 AP는 무선 액세스 포인트 제어 장치(200)로부터 동시에 보정된 출력 세기 값을 수신하여 각각 현재의 출력 세기 값을 조정하게 되어 일단 시간 내에 AP간의 간섭을 최소화할 수 있다.

<43> 한편, 무선 액세스 포인트 제어 장치(이하, 'AP 제어 장치'라 칭함)(200)는 AP(100)로부터 주면 AP에 대한 정보와 자신(100)에 대한 정보를 수신하여, 동일한 채널을 사용하는 AP별로 그룹핑을 수행하고, 그룹핑된 AP간의 RSSI 값과 각 AP의 출력 세기 값을 기준으로 자신의 맵(map)을 생성한다.

<44> 이후, AP 제어 장치(200)는 AP(100)로부터 동일한 채널을 사용하는 AP간에 간섭이 발생했음을 알리는 메시지를 수신하면, 자기 생성된 자신의 맵을 기준으로 해당 간섭을 최소화할 수 있는 AP별 최적의 출력 세기 값을 산출하여 해당 채널을 사용하여 각 AP로 전송한다.

<45> 이후, AP 제어 장치(200)로부터 보정된 출력 세기 값을 수신한 다수의 AP(동일한 채널을 사용)는, 수신된 출력 세기 값을 기준으로 현재의 출력 세기 값을 동시에 조정할 수 있다.

- <46> 도 2는 본 발명의 일 실시예에 따른 AP(100)의 구성을 도시한 블록도이다.
- <47> 본 발명의 일 실시예에 따른 AP(100)는 채널 설정부(110), 정보 전송부(120), 산출부(130), 간섭 발생 판단부(140) 및 출력 세기 조정부(150)를 포함한다.
- <48> 각 구성 요소를 설명하면, 채널 설정부(110)는 통신을 위한 채널을 설정하며, 정보 전송부(120)는 설정된 채널을 통하여 미리 정해진 범위 내에 존재하는 주변 AP를 검색하고, 검색된 주변 AP에 대한 정보와 AP(100)에 대한 정보를 AP 제어 장치(200)로 전송한다.
- <49> 여기에서, 검색된 주변 AP에 대한 정보와 AP(100)에 대한 정보는 현재 사용 중인 채널, RSSI 세기 값 및 출력 세기 값 중 하나 이상을 포함할 수 있다.
- <50> 한편, 산출부(130)는 무선 네트워크 단말기(이하, '무선 단말기'라 칭함)가 AP(100) 접속되면, 미리 정해진 시간 간격으로, 무선 단말기와의 ACK 송수신 실패 횟수와 RSSI 값을 산출한다.
- <51> 참고로 WiFi의 특성 상, 데이터 프레임 전송 완료 후 무선 단말기는 ACK(신호)를 AP(100)에 전송할 수 있는데, 산출부(130)는 이를 count하여 채널의 상태를 모니터링 할 수 있다.
- <52> 또한, 산출부(130)는 미리 정해진 시간 간격으로 무선 단말기의 접속 여부를 확인하고, 무선 단말기의 접속이 없는 경우, 정보 전송부(120)로 주변 AP의 검색을 요청할 수 있다.

<53> 한편, 간섭 발생 판단부(140)는 산출부(130)에서 산출된 무선 단말기와의 ACK 송수신 실패 횟수와 RSSI 값에 기초하여, 주변 AP와의 간섭 발생 여부를 판단한다.

<54> 더 상세히 설명하면, 간섭 발생 판단부(140)는 미리 정해진 시간 간격을 기준으로, 현재의 RSSI(이하, 'RSSI_current' 라 칭함) 값이 이전의 RSSI(이하, 'RSSI_past' 라 칭함) 값보다 크고, 현재 무선 단말기와의 ACK 송수신 실패 횟수(이하, 'data_fail_cnt_current' 라 칭함)가 이전 무선 단말기와의 ACK 송수신 실패 횟수(이하, 'data_fail_cnt_past' 라 칭함)보다 크면, AP간에 간섭이 발생한 것으로 판단할 수 있다.

<55> 이때, 간섭 발생 판단부(140)는 RSSI_past 값과 data_fail_cnt_current에 미리 정해진 마진(margin) 값을 적용할 수 있는데, 여기에서, 미리 정해진 마진 값은 무선 단말기의 움직임으로 인한 RSSI 값의 변동을 고려한 것이다.

<56> 예를 들어, RSSI_past 값에는 허용 RSSI 변동폭을 나타내는 마진 값인 RSSI_margin을 빼서 적용할 수 있고, data_fail_cnt_current에는 data fail count 허용폭을 나타내는 마진 값인 cnt_margin을 곱하여 적용할 수 있다.

<57> 결과적으로, 간섭 발생 판단부(140)에서 동일한 채널 별로 그룹핑된 AP간에 간섭이 발생한 것으로 판단하는 경우를 간략히 나타내면,

<58> $RSSI_past - RSSI_margin < RSSI_current$ and

<59> $data_fail_cnt_past < data_fail_cnt_current * cnt_margin$

- <60> 으로 나타낼 수 있다.
- <61> 이후, 간섭 발생 판단부(140)는 AP간에 간섭이 발생한 것으로 판단되면, 간섭이 발생했음을 알리는 메시지를 AP 제어 장치(200)로 전송한다.
- <62> 한편, 출력 세기 조정부(150)는 AP 제어 장치(200)로부터 간섭을 최소화하기 위한 보정된 출력 세기 값을 수신하고, 보정된 출력 세기 값을 기준으로 현재 출력 세기 값을 조정한다.
- <63> 이때, AP 제어 장치(200)로부터 수신한 보정된 출력 세기 값을 기준으로 현재 출력 세기 값을 조정하는 동작은 동일한 채널을 사용하는 각각의 AP에도 동시에 수행될 수 있다.
- <64> 도 3은 본 발명의 일 실시예에 따른 AP 제어 장치(200)의 구성을 도시한 도면이다.
- <65> 본 발명의 일 실시예에 따른 AP 제어 장치(200)는 그룹핑부(210), 맵 생성부(220), 간섭 발생 알림 수신부(230), 추출부(240), 최적 출력 세기 값 산출부(250), 출력 조정 요청부(260)를 포함한다.
- <66> 각 구성 요소를 설명하면, 그룹핑부(210)는 AP(100)로부터 수신한 주변 AP 및 AP(100)의 현재 사용중인 채널, RSSI 값 및 출력 세기 값이 수신되면, 각 AP의 현재 사용중인 채널 정보에 기초하여, 동일한 채널을 사용하는 AP별로 그룹핑을 수행한다.
- <67> 한편, 맵 생성부(220)는 동일한 채널을 사용하는 그룹핑된 AP(이하, 그룹핑

된 AP라 칭함)간의 RSSI 값과 그룹핑된 AP의 각 출력 세기 값을 산출한다.

<68> 이후, 맵 생성부(220)는 그룹핑된 AP간의 RSSI 값과 그룹핑된 AP의 각 출력 세기 값을 포함하는 가상의 맵(map)을 생성한다.

<69> 가상의 맵에 대해서는 도 X를 참조하여 상세히 후술하도록 한다.

<70> 한편, 간섭 발생 알림 수신부(230)는 AP(100)로부터, 그룹핑된 AP간의 간섭 발생 여부를 알리는 메시지를 수신한다.

<71> 참고로, 그룹핑된 AP간의 간섭 발생 여부의 판단은, 그룹핑된 AP와 그룹핑된 AP에 접속한 무선 단말기 간의 RSSI 값 및 송수신 실패 회수(data_fail_cnt_past, data_fail_cnt_current)에 기초하여 AP(100)에서 판단할 수 있으며, 이에 대한 상세한 설명은 AP(100)를 참조하여 전술하였으므로 생략하도록 한다.

<72> 한편, 추출부(240)는 그룹핑된 AP간에 간섭이 발생하면, 맵 생성부(220)에서 생성한 가상의 맵을 참조하여, 그룹핑된 AP중 가장 큰 RSSI 값을 가지는 AP를 추출한다.

<73> 예를 들어, 그룹핑된 AP에 AP 1, AP 2 및 AP 3가 존재하고, 가상의 맵에서

<74> AP 1과 AP 3간의 RSSI 값(RSSI_13)이 가장 큰 경우, 가장 큰 RSSI 값을 가지는 AP는 AP 1이 된다.

<75> 이를 간략히 설명하면, 가상의 맵에서 m번째 AP에서 수신된 n번째 AP의 RSSI 값은 RSSI_{mn}으로 나타낼 수 있으며, 가상의 맵에서 RSSI_{mn} 값이 가장 큰 경우, m번째 AP가 가장 큰 RSSI 값을 가진다고 표현할 수 있다.

<76> 한편, 최적 출력 세기 값 산출부(250)는 추출부(240)에서 추출된 AP의 RSSI 값(이하, 'RSSI_m' 이라 칭함), 그룹핑된 AP간에 미리 정해진 RSSI의 임계값(이하, 'RSSI_th' 라 칭함), 그룹핑된 AP에서 현재 사용중인 출력 세기(이하, 'Ptx_c' 라 칭함) 값에 기초하여, AP간의 간섭을 최소화하기 위한 '보정된 출력 세기(이하, 'Ptx_modi' 라 칭함)' 값을 산출한다.

<77> 이때, 최적 출력 세기 값 산출부(250)는 Ptx_c 값에서, RSSI_m 값과 RSSI_th 값과의 차이를 뺀 값을 보정된 출력 세기, 즉, Ptx_modi 값으로 산출한다.

<78> 이를 간략히 나타내면

<79>
$$Ptx_modi = Ptx_c - (RSSI_m - RSSI_th)$$

<80> 으로 나타낼 수 있다.

<81> 한편, 출력 조정 요청부(260)는 Ptx_modi 값을 기준으로 현재의 출력 세기 값을 조정하도록 하는 출력 세기 조정 요청을 그룹핑된 AP로 각각 전송한다.

<82> 참고로, 본 발명의 실시예에 따른 도 2 및 도 3에 도시된 구성 요소들은 소프트웨어 또는 FPGA(Field Programmable Gate Array) 또는 ASIC(Application Specific Integrated Circuit)와 같은 하드웨어 구성 요소를 의미하며, 소정의 역할을 수행한다.

<83> 그렇지만 '구성 요소들'은 소프트웨어 또는 하드웨어에 한정되는 의미는 아니며, 각 구성 요소는 어드레싱할 수 있는 저장 매체에 있도록 구성될 수도 있고 하나 또는 그 이상의 프로세서들을 재생시키도록 구성될 수도 있다.

- <84> 따라서, 일 예로서 구성 요소는 소프트웨어 구성요소들, 객체지향 소프트웨어 구성 요소들, 클래스 구성 요소들 및 태스크 구성 요소들과 같은 구성 요소들과, 프로세스들, 함수들, 속성들, 프로시저들, 서브루틴들, 프로그램 코드의 세그먼트들, 드라이버들, 펌웨어, 마이크로 코드, 회로, 데이터, 데이터베이스, 데이터 구조들, 테이블들, 어레이들 및 변수들을 포함한다.
- <85> 구성 요소들과 해당 구성 요소들 안에서 제공되는 기능은 더 작은 수의 구성 요소들로 결합되거나 추가적인 구성 요소들로 더 분리될 수 있다.
- <86> 도 4는 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 과정을 도시한 흐름도이다.
- <87> 이하, 도 1에 도시된 시스템의 구성 요소를 참고하여 도 4의 흐름도를 설명 하도록 한다.
- <88> 먼저, AP(100)에서, 통신을 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 AP를 검색한다(S401).
- <89> S401 후, AP(100)는 S401에서 검색된 주변 AP에 대한 정보와 AP(100)에 대한 정보를 AP 제어 장치(200)로 전송한다(S402).
- <90> 여기에서, 주변 AP에 대한 정보와 AP(100)에 대한 정보는 현재 사용중인 채널, RSSI 값 및 출력 세기 값 중 하나 이상을 포함할 수 있다.
- <91> S402 후, AP 제어 장치(200)는 AP(100)로부터 수신한 주변 AP에 대한 정보와 AP(100)에 대한 정보에 기초하여, 동일한 채널을 사용하는 AP별로 그룹핑을 수행하

고, 그룹핑된 AP간의 RSSI 값과 출력 세기 값에 기초하여 가상의 맵을 생성한다 (S403).

<92> S403 후, AP(더 상세하게는 그룹핑된 AP)(100)는 미리 정해진 시간 간격으로 단말의 접속을 확인하고(S404), 단말이 접속한 경우, RSSI_current 값과 data_fail_cnt_current에 대하여 미리 정해진 시간 간격으로 누적된 값의 평균을 산출한다(S405).

<93> S405 후, AP(100)는 “RSSI_past - RSSI_margin < RSSI_current and data_fail_cnt_past < data_fail_cnt_current * cnt_margin”에 대한 판단, 즉, 간섭이 발생했는지를 판단한다(S406).

<94> S406 판단 결과, 간섭이 발생한 경우, AP(100)는 간섭 발생 알림 메시지를 AP 제어 장치(200)로 전송한다(S407).

<95> 만일, S406 판단 결과, 간섭이 발생하지 않으면, AP(100)는 기존의 서비스를 유지할 수 있다.

<96> 참고로, S404에서 미리 정해진 시간 간격으로 단말의 접속을 확인한 결과, 단말이 접속하지 않은 경우, AP(100)는 스테이션 모드(station mode)로 전환하여 S402의 과정을 반복할 수 있다.

<97> S407 후, AP 제어 장치(200)는 S403에서 생성된 가상의 맵을 참조하여 RSSI_th 보다 큰 RSSI_mn 값이 존재하는지 확인한다(S408).

<98> S408 확인 결과, 존재 하는 경우, AP 제어 장치(200)는 S403에서 생성된 가

상의 맵에서 가장 큰 RSSI 값을 가지는 AP를 추출한다(S409).

<99> 만일, S408 확인 결과, 존재 하지 않는 경우, AP 제어 장치(200)는 기존과 같이 서비스가 유지되도록 할 수 있다.

<100> S409 후, AP 제어 장치(200)는 S407에서 추출된 AP의 RSSI 값, 즉, RSSI_m 값, 그룹핑된 AP간에 미리 정해진 RSSI의 임계값, 즉, RSSI_{th} 값 및 그룹핑된 AP에서 현재 사용중인 출력 세기 값, 즉, Ptx_c 값에 기초하여 보정된 출력 세기 값, 즉, Ptx_{modi} 값을 산출한다(S410).

<101> S410 후, AP 제어 장치(200)는 Ptx_{modi} 값을 그룹핑된 AP에 동시 전송하고 (S411), 그룹핑된 AP에서는 수신된 Ptx_{modi} 값을 기준으로 현재의 출력 세기 값을 조정한다(S412).

<102> 도 5는 본 발명의 일 실시예에 다른 무선 액세스 포인트 제어 장치에서 생성한 가상의 맵을 도시한 도면이다.

<103> 도 5에서는 동일한 채널(CH 1), (CH 5)을 사용하는 AP별로 그룹핑되어 가상의 맵이 생성되었다.

<104> CH 1을 사용하는 AP는 AP 1, AP 3 및 AP 5이고, 각 AP간의 RSSI 값과, 각 AP의 출력 세기 값이 포함되어 있음을 알 수 있다.

<105> 또한, CH 5를 사용하는 AP는 AP 2 및 AP 4이고, 각 AP간의 RSSI 값과, 각 AP의 출력 세기 값이 가상의 맵에 포함되어 있다.

<106> 전술하였지만, 도 5에 도시된 가상의 맵에서, 가장 큰 RSSI 값이 RSSI₁₃,

한다.

<111> 본 발명의 범위는 상기 상세한 설명보다는 후술하는 특허청구범위에 의하여 나타내어지며, 특허청구범위의 의미 및 범위 그리고 그 균등 개념으로부터 도출되는 모든 변경 또는 변형된 형태가 본 발명의 범위에 포함되는 것으로 해석되어야 한다.

시될 수 있다.

<110> 예를 들어, 단일형으로 설명되어 있는 각 구성 요소는 분산되어 실시될 수도 있으며, 마찬가지로 분산된 것으로 설명되어 있는 구성 요소들도 결합된 형태로 실시될 수 있다.

이 아닌 것으로 이해해야만 한다.

<109> 그러므로 이상에서 기술한 실시예들은 모든 면에서 예시적인 것이며 한정적

고서 다른 구체적인 형태로 쉽게 변형이 가능하다는 것을 이해할 수 있을 것이다.

<108> 전술한 본 발명의 설명은 예시를 위한 것이며, 본 발명이 속하는 기술분야의 통상의 지식을 가진 자는 본 발명의 기술적 사상이나 필수적인 특징을 변경하지 않고서 다른 구체적인 형태로 쉽게 변형이 가능하다는 것을 이해할 수 있을 것이다.

있다.

<107> 참고로, 도 5에 도시된 바와 같이, AP 제어 장치(200)에서 생성된 가상의 맵은 사용되는 채널에 따라서 멀티 그룹(또는 멀티 레이아웃)으로 생성되어 관리될 수 있다.

되고, 본 발명의 실시예에서는 이를 'RSSI_m'으로 나타내었다.

즉, AP 1과 AP 3간의 RSSI 값인 경우, 가장 큰 RSSI 값을 가지는 AP는 AP 1이

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【부호의 설명】

<112>	100 : AP
	110 : 채널 설정부
	120 : 정보 전송부
	130 : 산출부
	140 : 간섭 발생 판단부
	150 : 출력 세기 조정부
	200 : AP 제어 장치
	210 : 그룹핑부
	220 : 맵 생성부
	230 : 간섭 발생 알림 수신부
	240 : 추출부
	250 : 최적 출력 세기값 산출부
	260 : 출력 조정 요청부

【특허청구범위】

【청구항 1】

무선 액세스 포인트를 제어하는 장치에 있어서,

상기 무선 액세스 포인트로부터 수신한 채널 사용 정보에 기초하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 그룹핑부,

상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵 생성부,

상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기 그룹핑된 무선 액세스 포인트 중 가장 큰 수신 신호 세기 값을 가지는 무선 액세스 포인트를 추출하는 추출부 및

상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과 현재 사용중인 출력 세기 값에 기초하여 보정된 출력 세기 값을 산출하는 최적 출력 세기 값 산출부

를 포함하는, 무선 액세스 포인트 제어 장치.

【청구항 2】

제 1 항에 있어서,

상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하도록 하는 출력 세기 조정 요청을 상기 그룹핑된 각 무선 액세스 포인트로 전송하는 출력

조정 요청부

를 더 포함하는, 무선 액세스 포인트 제어 장치.

【청구항 3】

제 1 항에 있어서,

상기 그룹핑된 무선 액세스 포인트간의 간섭 발생 여부를 알리는 메시지를 수신하는 간섭 발생 알림 수신부

를 더 포함하되,

상기 간섭 발생 여부는 상기 그룹핑된 무선 액세스 포인트와 상기 그룹핑된 무선 액세스 포인트에 접속한 무선 단말기 간의 수신 신호 세기와 ACK 송수신 실패 회수에 기초하여 상기 그룹핑된 무선 액세스 포인트에서 판단되는 것인, 무선 액세스 포인트 제어 장치.

【청구항 4】

제 1 항에 있어서,

상기 맵 생성부는 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 포함하는 가상의 맵 (map)을 생성하는, 무선 액세스 포인트 제어 장치.

기중하여, 상기 주변 무선 액세스 포인트와의 간섭이 발생한 것으로 판단되면, 상

상기 산출된 무선 단말기와의 ACK 송수신 실패 횟수와 수신 신호 세기 값에

ACK 송수신 실패 횟수와 수신 신호 세기 값을 산출하는 산출부 및

무선 단말기가 접속되면, 미리 정해진 시간 간격으로, 상기 무선 단말기와의

정보 전송부,

무선 액세스 포인트에 대한 정보를 상기 무선 액세스 포인트 제어 장치로 전송하는

스 포인트를 검색하고, 상기 검색된 주변 무선 액세스 포인트에 대한 정보 및 상기

상기 설정된 채널을 통하여 미리 정해진 범위 내에 존재하는 주변 무선 액세스

통신을 위한 채널을 설정하는 채널 설정부,

스 포인트에 있어서,

무선 액세스 포인트 제어 장치에 의해서 출력 세기 값이 제어되는 무선 액세스

【청구항 6】

력 세기 값으로 산출하는, 무선 액세스 포인트 제어 장치.

트간에 미리 정해진 수신 신호 세기의 임계값과의 차이를 뺀 값을 상기 보정된 출

출된 무선 액세스 포인트의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인

상기 최적 출력 세기 값 산출부는 현재 사용중인 출력 세기 값에서 상기 주

제 1 항에 있어서,

【청구항 5】

2011-06-03

기 간섭이 발생했음을 알리는 메시지를 상기 무선 액세스 포인트 제어 장치로 전송하는 간섭 발생 알람부

를 포함하는, 무선 액세스 포인트.

【청구항 7】

제 6 항에 있어서,

상기 무선 액세스 포인트 제어 장치로부터 보정된 출력 세기 값을 수신하여, 상기 보정된 출력 세기 값을 기준으로 현재 출력 세기 값을 조정하는 출력 세기 조정부를 더 포함하는, 무선 액세스 포인트.

【청구항 8】

제 6 항에 있어서,

상기 산출부는 미리 정해진 시간 간격으로 상기 무선 단말기의 접속 여부를 확인하고, 상기 무선 단말기의 접속이 없는 경우, 상기 정보 전송부로 상기 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색을 요청하는, 무선 액세스 포인트.

【청구항 9】

제 6 항에 있어서,

상기 간섭 발생 알림부는 상기 미리 정해진 시간 간격을 기준으로, 현재의 수신 신호 세기 값이 이전의 수신 신호 세기 값보다 크고, 현재 무선 단말기와의 ACK 송수신 실패 횟수가 이전 무선 단말기와의 ACK 송수신 실패 횟수보다 크면 상기 간섭이 발생한 것으로 판단하는, 무선 액세스 포인트.

【청구항 10】

제 9 항에 있어서,

상기 간섭 발생 알림부는 상기 이전의 수신 신호 세기 값과 상기 현재 무선 단말기와의 ACK 송수신 실패 횟수에 미리 정해진 마진(margine) 값을 적용하되, 상기 미리 정해진 마진 값은 상기 무선 단말기의 움직임으로 인한 수신 신호 세기 값의 변동을 고려한 것인, 무선 액세스 포인트.

【청구항 11】

무선 액세스 포인트 제어 장치에서 무선 액세스 포인트의 출력 세기 값을 제어하는 방법에 있어서,

(a) 상기 무선 액세스 포인트에서, 통신을 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색하여, 상기 무선 액세스 포인트 및 검색된 주변 무선 액세스 포인트에 대한 정보를 상기 무선 액세스 포인트 제어 장치로 전송하는 단계,

(b) 상기 무선 액세스 포인트 제어 장치에서, 상기 무선 액세스 포인트로부터 수신한 상기 무선 액세스 포인트 및 주변 무선 액세스 포인트에 대한 정보에 기초하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 단계,

(c) 상기 그룹핑된 무선 액세스 포인트에서, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생했는지 여부를 판단하여 상기 무선 액세스 포인트 제어 장치로 전송하는 단계,

(d) 상기 무선 액세스 포인트 제어 장치에서, 상기 간섭을 감소시키기 위한 보정된 출력 세기 값을 산출하여 상기 그룹핑된 무선 액세스 포인트로 전송하는 단계 및

(e) 상기 그룹핑된 무선 액세스 포인트에서, 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하는 단계를 포함하는, 무선 액세스 포인트 제어 방법.

【요약서】

【요약】

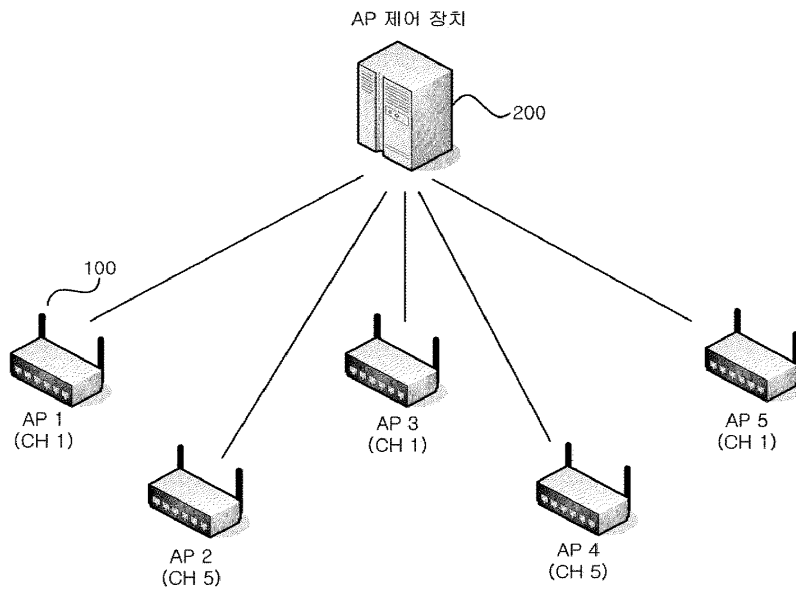
무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치가 제공된다. 무선 액세스 포인트를 제어하는 장치는, 상기 무선 액세스 포인트로부터 수신한 채널 사용 정보에 기초하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 그룹핑부, 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵 생성부, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기 그룹핑된 무선 액세스 포인트 중 가장 큰 수신 신호 세기 값을 가지는 무선 액세스 포인트를 추출하는 추출부 및 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과 현재 사용중인 출력 세기 값에 기초하여 보정된 출력 세기 값을 산출하는 최적 출력 세기 값 산출부를 포함한다.

【대표도】

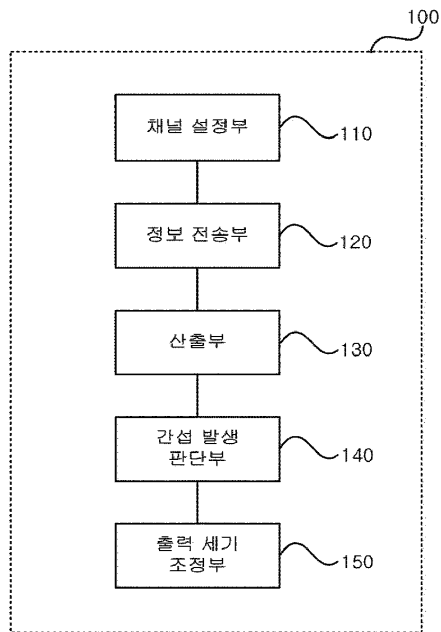
도 1

【도면】

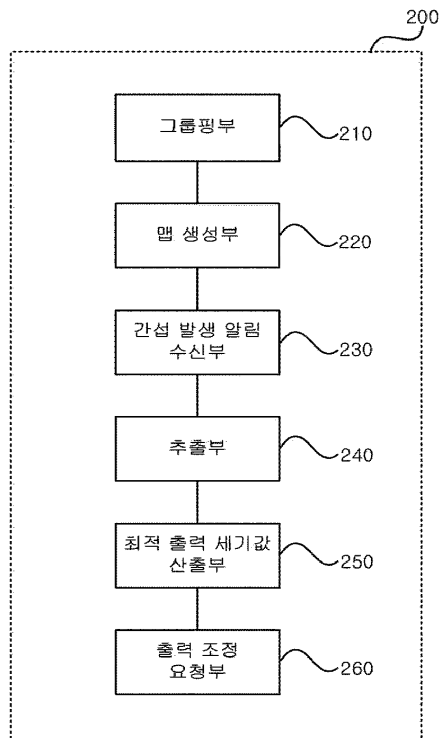
【도 1】



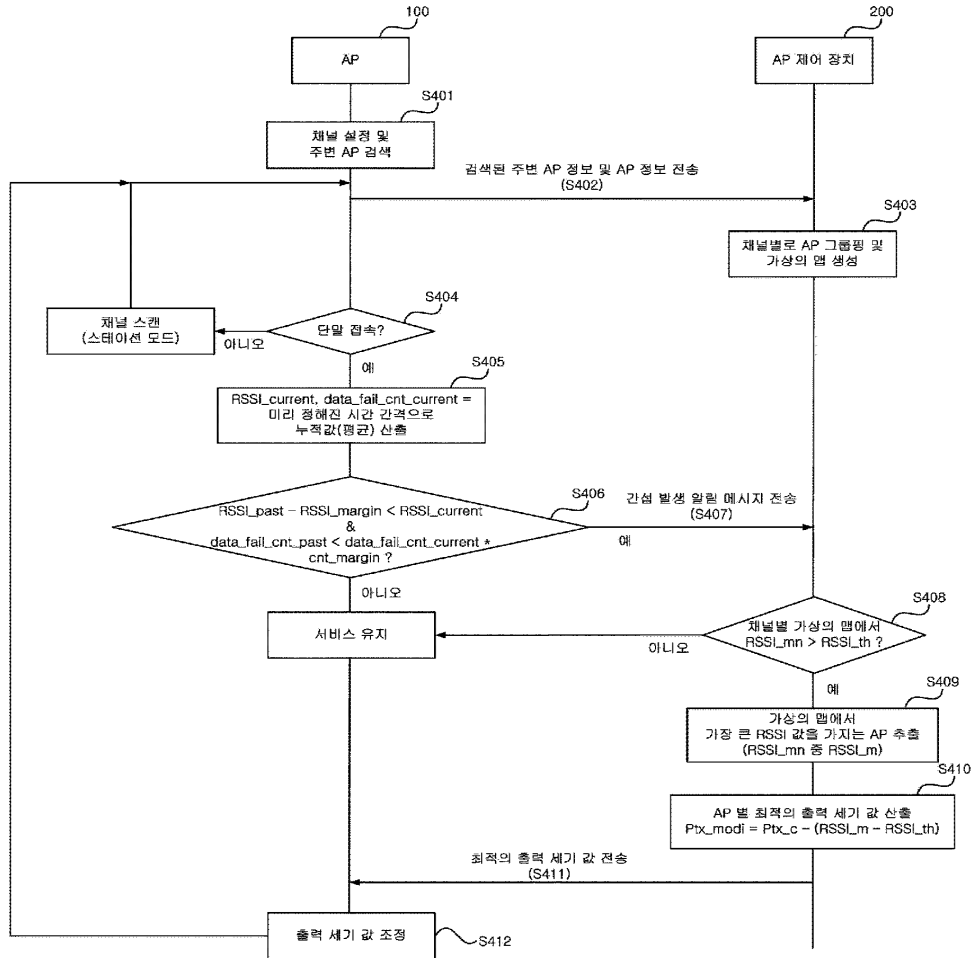
【도 2】



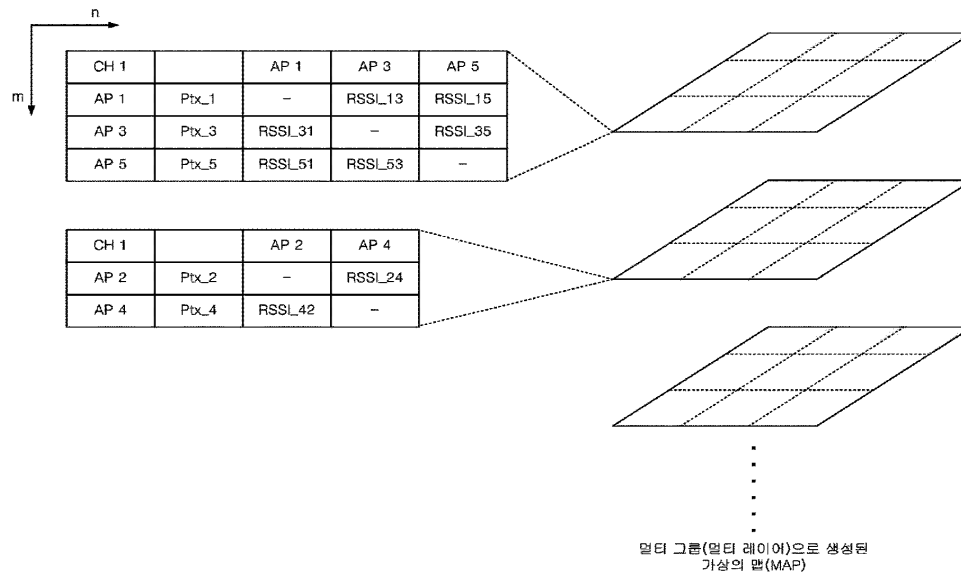
【도 3】



【도 4】



【도 5】



**DOCUMENT MADE AVAILABLE UNDER THE
PATENT COOPERATION TREATY (PCT)**

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PCT 출원서

출력(전자적 형태가 원본)

0	수리관청 전용	
0-1	국제출원번호	PCT/KR2011/007792
0-2	국제출원일자	2011년 10월 19일 (19.10.2011)
0-3	수리관청 명칭 및 "PCT 국제출원"	RO/KR
0-4	서적 PCT/RO/101 - PCT 출원서	
0-4-1	우측에 기재된 바와 같이 작성되었다.	PCT-SAFE 버전 3.51.050.226 MT/FOP 20110701/0.20.5.19
0-5	신청 아래 서명인은 본 국제 출원서가 특허협력조약에 의해 처리될 것을 정구합니다.	
0-6	출원인이 지정한 수리관청	대한민국 특허청 (RO/KR)
0-7	출원인 또는 대리인의 서류참조기호	OPF1964PCT
I	발명의 명칭	무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치
II	출원인	
II-1	이 사람은	오직 출원인
II-2	우측 지정국에 관한 출원인	미국을 제외한 모든 지정국
II-4ko	성명	주식회사 케이티
II-4en	Name:	KT CORPORATION
II-5ko	주소	경기 성남시 분당구 정자동 206 463-711 대한민국
II-5en	Address:	206, Jeongja-dong Bundang-gu, Seongnam-si Gyeonggi-do 463-711 Republic of Korea
II-6	국적	대한민국 KR
II-7	거주국	대한민국 KR
II-11	출원인 코드	2-1998-005456-3

PCT 출원서

출력(전자적 형태가 원본)

III-1	출원인 및/또는 발명자	출원인 겸 발명자 오직 미국만 윤병완 YOON, Byung Wan 경기 군포시 산본2동 주공11단지아파트 1111동 701호 435-748 대한민국 #1111-701, Jugong 11 Danji Apt Sanbon 2-dong, Gunpo-si Gyeonggi-do 435-748 Republic of Korea
III-1-1	이 사람은	
III-1-2	우측 지정국에 관한 출원인	
III-1-4ko	성명	
III-1-4en	Name (LAST, First):	
III-1-5ko	주소	
III-1-5en	Address:	
III-1-6	국적	대한민국 KR
III-1-7	거주국	대한민국 KR
III-2	출원인 및/또는 발명자	출원인 겸 발명자 오직 미국만 정재호 CHUNG, Jae Ho 서울 강남구 일원본동 상록수아파트 202동 505호 135-947 대한민국 #202-505, Sangnoksu Apt. Irwonbon-dong, Gangnam-gu Seoul 135-947 Republic of Korea
III-2-1	이 사람은	
III-2-2	우측 지정국에 관한 출원인	
III-2-4ko	성명	
III-2-4en	Name (LAST, First):	
III-2-5ko	주소	
III-2-5en	Address:	
III-2-6	국적	대한민국 KR
III-2-7	거주국	대한민국 KR

PCT 출원서

출력(전자적 형태가 원본)

III-3	출원인 및/또는 발명자	
III-3-1	이 사람은	출원인 겸 발명자
III-3-2	우측 지정국에 관한 출원인	오직 미국만
III-3-4ko	성명	윤주영
III-3-4en	Name (LAST, First):	YOON, Joo Young
III-3-5ko	주소	서울 금천구 독산동 독산한신아파트 7동 801호 153-753 대한민국
III-3-5en	Address:	#7-801, Doksan Hanshin Apt. Doksan-dong, Geumcheon-gu Seoul 153-753 Republic of Korea
III-3-6	국적	대한민국 KR
III-3-7	거주국	대한민국 KR
III-4	출원인 및/또는 발명자	
III-4-1	이 사람은	출원인 겸 발명자
III-4-2	우측 지정국에 관한 출원인	오직 미국만
III-4-4ko	성명	한규정
III-4-4en	Name (LAST, First):	HAN, Kyu Jeong
III-4-5ko	주소	경기 수원시 장안구 천천동 비단마을 신성아파트 732동 1401호 440-330 대한민국
III-4-5en	Address:	#732-1401, Shinsung Apt., Bidan-maeul Cheoncheon-dong, Jangan-gu, Suwon-si Gyeonggi-do 440-330 Republic of Korea
III-4-6	국적	대한민국 KR
III-4-7	거주국	대한민국 KR

PCT 출원서

출력(전자적 형태가 원본)

III-5	출원인 및/또는 발명자	
III-5-1	이 사람은	출원인 겸 발명자
III-5-2	우측 지정국에 관한 출원인	오직 미국만
III-5-4ko	성명	지영하
III-5-4en	Name (LAST, First):	JI, Yung Ha
III-5-5ko	주소	경기 성남시 분당구 이매동 이매촌진흥아파트 814동 1001호 463-904 대한민국
III-5-5en	Address:	#814-1001, Imaechon Jinheung Apt. Imae-dong, Bundang-gu, Seongnam-si Gyeonggi-do 463-904 Republic of Korea
III-5-6	국적	대한민국 KR
III-5-7	거주국	대한민국 KR
IV-1	대리인 또는 대표자	대리인 (agent)
	아래에 기재된 자는 관할 국제기관에 대하여 우측에 표시된 자격으로 출원인을 대리하는 것으로 선임되었다.	
IV-1-1ko	성명	특허법인이지
IV-1-1en	Name:	EZ INTERNATIONAL PATENT & TRADEMARK LAW OFFICE
IV-1-2ko	주소	서울 금천구 가산동 470-8 KCC 웰츠밸리 302~303호 153-803 대한민국
IV-1-2en	Address:	Suite 302~303, KCC Welltz Valley 470-8 Gasan-dong, Geumcheon-gu Seoul 153-803 Republic of Korea
IV-1-3	전화번호	82-2-565-6727
IV-1-4	팩스번호	82-2-565-6726
IV-1-5	이메일 주소	ez@ezpat.com
IV-1-5(a)	이메일 사용동의 수리관청, 국제조사기관, 국제사무국, 국제예비심사기관이 필요 시 이 이메일 주소를 사용하여 이 국제 출원과 관련하여 발행된 통지서를 송부할 것에 동의한다.	서면 통지서에 앞서 선람용 사본 송부
IV-1-6	대리인 코드	9-2008-100041-4

PCT 출원서

출력(전자적 형태가 원본)

V	지정국	
V-1	본 출원서의 제출로, 규칙 4.9(a)에 따라, 부여될 수 있는 모든 종류의 권리 보호를 위하여, 그리고 해당하는 경우 지역특허 및 국내특허 모두를 위하여 당해 국제출원일에 PCT에 기록되는 모든 계약국이 지정된다.	
V-2	V-2란은 출원서 제출시 또는 규칙 26의2.1에 의해 그 이후 출원서 제6기제란에 위 특정 관련 계약국의 국내 선출원에 대한 우선권주장이 포함되어 있을 경우 당해 계약국의 국내법에 의해 해당 국내 선출원의 효력이 상실되는 것을 방지하기 위한 목적으로 당해 계약국의 지정을 제외하는 데에만 사용될 수 있다(지정 제외시 이의 취소 불가능).	KR
VI-1	선국내출원에 대한 우선권 주장	
VI-1-1	출원일	2011년 06월 03일 (03.06.2011)
VI-1-2	출원번호	10-2011-0054124
VI-1-3	국가	KR
VI-2	우선권 주장 요청 수리관청에 대하여 위에 명시된 선출원의 인증증본을 준비하여 국제사무국에 송부하여 줄 것을 신청한다.	VI-1
VI-3	인용에 의한 보완 조약 제11조(1)(iii)(d) 또는 (e)에서 규정하는 국제출원의 요소, 또는 규칙 20.5(a)에서 규정하는 명세서, 청구 범위 또는 도면의 일부가 본 국제출원에는 포함되어 있지 않지만 조약 제11조(1)(iii) 규정의 요소 중 하나 이상이 수리관청에 최초로 접수된 날에 우선권주장의 기초가 된 선출원에 완전히 포함되어 있는 경우, 그 요소 또는 부분은 규칙 20.6 규정에 의한 확인을 조건으로, 규칙 20.6의 규정과 관련하여 본 국제출원에 있어서 인용에 의해 보완된다.	
VII-1	국제조사기관(ISA) 선택	대한민국 특허청 (ISA/KR)
VIII	선언서	선언서 개수
VIII-1	발명자의 동일성에 관한 선언	-
VIII-2	국제출원일에 특허출원 및 특허를 받을 수 있는 출원인의 자격에 관한 선언	-
VIII-3	국제출원일에 선출원의 우선권을 주장할 수 있는 출원인의 자격에 관한 선언	-
VIII-4	발명자 선언(미국에 대한 지정의 경우에 한함)	-
VIII-5	신규성을 해치지 아니하는 개시 또는 신규성 상실의 예외에 관한 선언	-
IX	체크 리스트	용지 수
IX-1	출원서(선언서 포함)	6
IX-2	명세서	11
IX-3	청구범위	3
IX-4	요약서	1
IX-5	도면	5
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PCT 출원서

출력(전자적 형태가 원본)

	첨부 항목	서면 첨부	전자적 파일 첨부
IX-8	수수료 계산 용지	-	✓
IX-9	개별위임장 원본	-	✓
IX-18	PCT-SAFE 전자출원 매체	-	-
IX-20	요약서에 수반되어야 할 도면 번호	1	
IX-21	국제출원의 출원 언어	한국어	
X-1	출원인, 대리인 또는 대표자의 서명 또는 날인	(PKCS7 전자서명)	
X-1-1	성명	특허법인이지 ez	
X-1-2	서명인의 성명		
X-1-3	권한 (출원서를 통해 서명자의 자격이 명백하지 않은 경우에는 그 자격도 표시)		

수리판청 전용

10-1	국제출원으로 제출된 서류의 실제 접수일	2011년 10월 19일 (19.10.2011)
10-2	도면	
10-2-1	접수	
10-2-2	미접수	
10-3	국제출원으로 제출된 서류를 완성하는 서류 또는 도면의 추후 기간내 제출에 따른 정정된 실제 접수일	
10-4	PCT 제11조(2)에 따라 제출이 요구된 보완서로서 기간내 제출된 보완서의 접수일	
10-5	국제조사기관(ISA)	ISA/KR
10-6	조사료 납부시까지 지연된 조사용 사본의 충부	

국제 사무국 전용

11-1	국제 사무국의 기록원본 접수일	
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ADVANCE E-MAIL

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

EZ INTERNATIONAL PATENT & TRADEMARK
LAW OFFICE
Suite 302~303, KCC Welltz Valley
470-8 Gasan-dong, Geumcheon-gu
Seoul 153-803
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 11 November 2013 (11.11.2013)	
Applicant's or agent's file reference OPF1964PCT	IMPORTANT NOTIFICATION
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1. The following indications appeared on record concerning:

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 ☒ the inventor

 ☐ the agent

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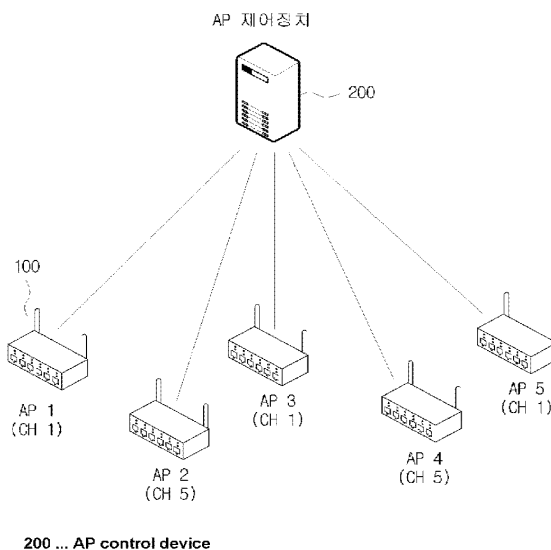
- (74) 대리인: 특허법인이지 (EZ INTERNATIONAL PATENT & TRADEMARK LAW OFFICE); 서울 금천구 가산동 470-8 KCC 웰츠밸리 302~303 호, 153-803 Seoul (KR).
- (81) 지정국 (별도의 표시가 없는 한, 가능한 모든 종류의 국내 권리의 보호를 위하여): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) 지정국 (별도의 표시가 없는 한, 가능한 모든 종류의 역내 권리의 보호를 위하여): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), 유라시아 (AM, AZ, BY, KG, KZ, MD, RU, TJ,

[다음 쪽 계속]

(54) Title: WIRELESS ACCESS POINT AND METHOD AND DEVICE FOR CONTROLLING WIRELESS ACCESS POINT

(54) 발명의 명칭 : 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치

[Fig. 1]



(57) Abstract: A wireless access point and a method and a device for controlling the wireless access point are provided. The device for controlling a wireless access point comprises: a grouping unit which groups wireless access points which use the same channel, by using channel use information received from said wireless access points; a map generating unit which computes each received signal strength value of said grouped wireless access points and each output strength value of said grouped wireless access points; an extracting unit which extracts a wireless access point having the highest received signal strength value among said grouped wireless access points, if interference occurs between said grouped wireless access points; and an optimal output strength value-computing unit which computes a corrected output strength value by using the received signal strength value of said extracted wireless access point, a threshold value of predetermined received signal strength, and a currently used output strength value between said grouped wireless access points.

(57) 요약서:

[다음 쪽 계속]

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TM), 유럽 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

공개:

— 국제조사보고서와 함께 (조약 제 21 조(3))

무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치가 제공된다. 무선 액세스 포인트를 제어하는 장치는, 상기 무선 액세스 포인트로부터 수신한 채널 사용 정보를 이용하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 그룹핑부, 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵 생성부, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기 그룹핑된 무선 액세스 포인트 중 가장 높은 수신 신호 세기 값을 가지는 무선 액세스 포인트를 추출하는 추출부 및 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과 현재 사용중인 출력 세기 값을 이용하여 보정된 출력 세기 값을 산출하는 최적 출력 세기 값 산출부를 포함한다.

명세서

발명의 명칭: 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치

기술분야

- [1] 본 발명은 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치에 관한 것이다.
- [2] 보다 상세하게는, 간섭 환경하에서 무선 액세스 포인트의 서비스 범위(coverage) 및 수용 능력(capacity)을 최적화하도록 제어하는 방법 및 장치에 관한 것이다.

[3]

배경기술

- [4] 일반적으로, 무선 랜을 이용해서 서비스를 제공하고자 할 때, 하나의 액세스 포인트(Access Point: 이하, 'AP'라 칭함)를 이용하여 한 가정 또는 특정 지역을 서비스 한다.
- [5] 그러나, 건물의 구조 또는 지형의 특성 때문에 하나의 AP를 이용해서 한 가정 또는 특정 지역을 전부 서비스할 수 없는 경우가 발생된다.
- [6] 이와 같은 문제를 해결하기 위한 방법으로, 별도의 AP(소출력 AP)를 음영 지역에 설치하여 사용자의 무선 통신 이용 범위를 넓히는 방법이 있다.
- [7] 그러나, 두 개의 AP가 동일한 채널을 사용할 경우, 소정 지역에서 간섭이 발생하는 문제점이 있다.
- [8] 즉, 별도의 AP를 구비하여 음영 지역을 해소하는 경우, 해당 AP는 고정된 송신 파워(power)를 전송하도록 되어 있다.
- [9] 이때, 해당 AP는 음영 지역을 해소하기 위해 필요 이상의 송신 파워를 전송한다.
- [10] 그 결과, 해당 AP간에 많은 간섭이 발생되어 무선 네트워크의 성능을 감소시키는 문제점이 있다.
- [11] 이에, 한국 공개 특허 제2006-0034461호(송신 신호의 파워를 조절하는 서버 액세스 포인트, 시스템 및 그 방법)에서는, 메인 AP의 수신 신호 강도 및 데이터 에러율을 이용하여, 서버 AP의 송신 신호의 파워를 조절한다.
- [12] 따라서, 전파가 단절되는 음영 지역 해소 및 간섭 현상을 최소화 할 수 있다.
- [13] 그러나, 상기한 기술은 서버 AP 자체에서 별도로 송신 파워를 조절해야 하는 한계가 있다.
- [14] 즉, 동일한 채널을 사용하는 다수의 서버 AP 각각이 별도로 송신 파워를 조절해야 한다.
- [15] 따라서, 최단 시간 내에 다수의 서버 AP 간의 간섭을 최소화할 수 없어 효율적이지 못한 문제가 있었다.

[16]

발명의 상세한 설명**기술적 과제**

[17] 상술한 종래 기술의 문제점을 해결하기 위해, 본 발명은 셀 플래닝(Cell Planning)의 과정 없이 주변 액세스 포인트(Access Point)간의 간섭을 최소화 할 수 있는 방법 및 장치를 제공한다.

[18] 본 발명의 목적들은 이상에서 언급한 목적들로 제한되지 않으며, 언급되지 않은 또 다른 목적들은 아래의 기재로부터 명확하게 이해될 수 있을 것이다.

[19]

과제 해결 수단

[20] 상기 목적을 달성하기 위하여, 본 발명의 일 측면에 따른 무선 액세스 포인트를 제어하는 장치는, 상기 무선 액세스 포인트로부터 수신한 채널 사용 정보를 이용하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 그룹핑부, 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵 생성부, 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기 그룹핑된 무선 액세스 포인트 중 가장 높은 수신 신호 세기 값을 가지는 무선 액세스 포인트를 추출하는 추출부 및 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의 임계값과 현재 사용중인 출력 세기 값을 이용하여 보정된 출력 세기 값을 산출하는 최적 출력 세기 값 산출부를 포함한다.

[21] 본 발명의 일 측면에서, 상기 무선 액세스 포인트를 제어하는 장치는, 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하도록 하는 출력 세기 조정 요청을 상기 그룹핑된 각 무선 액세스 포인트로 전송하는 출력 조정 요청부를 더 포함한다.

[22] 또한, 본 발명의 일 측면에서, 상기 무선 액세스 포인트를 제어하는 장치는, 상기 그룹핑된 무선 액세스 포인트간의 간섭 발생 여부를 알리는 메시지를 수신하는 간섭 발생 알림 수신부를 더 포함하되, 상기 간섭 발생 여부는 상기 그룹핑된 무선 액세스 포인트와 상기 그룹핑된 무선 액세스 포인트에 접속한 무선 단말기 간의 수신 신호 세기 값 및 ACK 송수신 실패 회수를 이용하여 상기 그룹핑된 무선 액세스 포인트에서 판단된다.

[23] 또한, 본 발명의 일 측면에서, 상기 맵 생성부는 상기 그룹핑된 무선 액세스 포인트 간의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 포함하는 가상의 맵(map)을 생성한다.

[24] 또한, 본 발명의 일 측면에서, 상기 최적 출력 세기 값 산출부는 현재 사용 중인 출력 세기 값에서 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트 간에 미리 정해진 수신 신호 세기의 임계값과의

- [25] 상기 목적을 달성하기 위하여, 본 발명의 일 측면에 따른 무선 액세스 포인트는, 데이터를 수신하기 보정된 출력 세기 값으로 산출한다.
- [26] 또한, 본 발명의 일 측면에서, 상기 무선 액세스 포인트는 상기 무선 액세스 포인트 제어 장치로부터 보정된 출력 세기 값을 수신하여, 상기 보정된 출력 세기 값을 기준으로 현재 출력 세기를 조정하는 출력 세기 조정부를 더 포함한다.
- [27] 또한, 본 발명의 일 측면에서, 상기 산출부는 미리 정해진 시간 간격으로 상기 무선 단말기의 접속 여부를 확인하고, 상기 무선 단말기의 접속이 없는 경우, 상기 정보 전송부로 상기 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트 검색을 요청한다.
- [28] 또한, 본 발명의 일 측면에서, 상기 간섭 발생 알림부는 상기 미리 정해진 시간 간격을 기준으로, 현재의 수신 신호 세기 값이 이전의 수신 신호 세기 값으로, 현재의 수신 신호 세기 값이 이전의 수신 신호 세기 값보다 크고, 현재 무선 단말기와 상기 무선 액세스 포인트의 신호 세기 차이가 미리 정해진 ACK 송수신 실패 횟수 이하인 경우, 상기 간섭 발생 알림부는 상기 이전의 수신 신호 세기 값과 상기 현재 무선 단말기 간의 ACK 송수신 실패 횟수에 미리 정해진 마진(margin) 값을 적용하여, 상기 미리 정해진 마진 값은 상기 무선 단말기의 움직임으로 인한 수신 신호 세기 값의 변동을 고려한다.
- [30] 상기 목적을 달성하기 위하여, 본 발명의 일 측면에 따른 무선 액세스 포인트는, 상기 장치에서 무선 액세스 포인트의 출력 세기 값을 제어하는 방법은 (a) 상기 무선 액세스 포인트가, 통신을 하기 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색하여, 상기 무선 액세스 포인트 및 검색된 주변 무선 액세스 포인트에 대한 정보를 상기 무선 액세스 포인트 제어 장치로 전송하는 단계, (b) 상기 무선 액세스 포인트 제어 장치가 상기 무선 액세스 포인트로부터 수신한 상기 무선 액세스 포인트 및 주변 무선 액세스 포인트에 대한 정보를 이용하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 단계, (c) 상기 그룹핑된 무선 액세스 포인트가, 상기 그룹핑된 무선 액세스 포인트 간에 간섭이 발생했는지 여부를 판단하고, 상기 판단 결과를 상기 무선 액세스 포인트 제어 장치로 전송하는 단계, (d) 상기 무선

액세스 포인트 제어 장치가 상기 간섭을 감소시키기 위한 보정된 출력 세기 값을 산출하고, 상기 보정된 출력 세기 값을 상기 그룹핑된 무선 액세스 포인트로 전송하는 단계 및 (e) 상기 그룹핑된 무선 액세스 포인트가 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하는 단계를 포함한다.

[31] 상기 목적을 달성하기 위한 구체적인 사항들은 첨부된 도면과 함께 상세하게 후술된 실시예들을 참조하면 명확해질 것이다.

[32] 그러나 본 발명은 이하에서 개시되는 실시예들에 한정되는 것이 아니라, 서로 다른 다양한 형태로 구성될 수 있으며, 본 실시예들은 본 발명의 개시가 완전하도록 하고 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에게 발명의 범주를 완전하게 알려주기 위해 제공되는 것이다.

[33]

발명의 효과

[34] 전술한 본 발명의 무선 액세스 포인트와 그 무선 액세스 포인트를 제어하는 방법 및 장치의 과제 해결 수단 중 하나에 의하면, 셀 플래닝(Cell Planning)의 과정 없이 액세스 포인트간의 간섭을 최소화 할 수 있다.

[35] 또한, 주변 액세스 포인트간의 간섭을 최소화하는데 소요되는 시간을 절약할 수 있으며, 최적의 무선 통신 환경을 제공할 수 있다.

[36]

도면의 간단한 설명

[37] 도 1은 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 시스템의 구성을 도시한 도면이다.

[38] 도 2는 본 발명의 일 실시예에 따른 무선 액세스 포인트의 구성을 도시한 블록도이다.

[39] 도 3은 본 발명의 일 실시예에 따른 무선 액세스 포인트 제어 장치의 구성을 도시한 도면이다.

[40] 도 4 및 도 5는 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 과정을 도시한 흐름도이다.

[41] 도 6은 본 발명의 일 실시예에 따른 무선 액세스 포인트 제어 장치에서 생성한 가상의 맵을 도시한 도면이다.

[42]

발명의 실시를 위한 형태

[43] 아래에서는 첨부한 도면을 참조하여 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 본 발명의 실시예를 상세히 설명하도록 한다.

[44] 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다.

[45] 그리고 도면에서 본 발명을 명확하게 설명하기 위해서 설명과 관계없는 부분은

생략하였으며, 명세서 전체를 통하여 유사한 부분에 대해서는 유사한 도면 부호를 붙였다.

- [46] 참고로, 명세서 전체에서, 어떤 부분이 다른 부분과 ‘연결’되어 있다고 할 때, 이는 ‘직접적으로 연결’되어 있는 경우뿐 아니라, 그 중간에 다른 구성 요소들 사이에 두고 ‘간접적으로 연결’되어 있는 경우도 포함한다.
- [47] 또한 어떤 부분이 어떤 구성 요소를 ‘포함’한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성 요소를 제외하는 것이 아니라 다른 구성 요소를 더 포함할 수 있는 것을 의미한다.
- [48] 이하, 첨부된 구성도 또는 처리 흐름도를 참고하여, 본 발명의 실시를 위한 구체적인 내용을 설명하도록 한다.
- [49] 도 1은 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 시스템의 구성을 도시한 도면이다.
- [50] 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 시스템은 다수의 무선 액세스 포인트(100) 및 무선 액세스 포인트 제어 장치(200)를 포함한다.
- [51] 각 구성 요소를 설명하면, 무선 액세스 포인트(Access Point ; 이하, AP라 칭함)(100)는 무선 네트워크 환경에 존재하는 무선 네트워크 단말기에게 무선 통신을 위한 송신 신호를 출력한다.
- [52] 또한, AP(100)는 무선 네트워크 장치들에게 비콘 프레임 및 데이터 프레임을 전송한다.
- [53] 또한, AP(100)는 송신 신호를 통해 무선 네트워크 장치들에게 소정의 서비스를 제공하여 무선 네트워크 장치들이 상호 통신할 수 있도록 할 수 있다.
- [54] 도 1에는 이러한 AP(100)가 다수 존재하며, 각 AP(100)는 무선 통신을 위한 채널을 사용한다.
- [55] 이때, 동일한 채널을 사용하는 AP(100)간에 간섭이 발생하면, 무선 액세스 포인트 제어 장치(200)가 동일한 채널을 사용하는 AP(100)들의 출력 세기 값을 동시에 제어할 수 있다.
- [56] 이를 위해 AP(100)는 통신을 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변의 AP들(이하, ‘주변 AP’라 칭함)을 검색한다.
- [57] 이후, AP(100)는 검색된 주변 AP에 대한 정보 및 자신(100)에 대한 정보, 즉, 사용하는 채널, 수신 신호 세기(Received Signal Strength Indicator, 이하 ‘RSSI’라 칭함) 값 및 출력 세기 값을 무선 액세스 포인트 제어 장치(200)로 전송한다.
- [58] 이후, AP(100)는 미리 정해진 시간 간격으로, 동일한 채널을 사용하는 주변 AP와의 간섭 발생 여부를 판단한다.
- [59] 판단 결과, AP(100) 간에 간섭이 발생된 것으로 판단되면, AP(100)는 이를 알리는 메시지를 무선 액세스 포인트 제어 장치(200)로 전송한다.
- [60] 이후, AP(100)는 무선 액세스 포인트 제어 장치(200)로부터 주변 AP와의 간섭을 최소화할 수 있는 최적의 출력 세기 값(이하, ‘보정된 출력 세기 값’이라 칭함)을 수신한다.

- [61] 이후, AP(100)는 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정한다.
- [62] 도 1과 같이 동일한 채널을 사용하는 AP(100)가 다수 존재하는 경우, 동일한 채널을 사용하는 각 AP(100)들은 무선 액세스 포인트 제어 장치(200)로부터 보정된 출력 세기 값을 동시에 수신한다.
- [63] 이후, 동일한 채널을 사용하는 각 AP(100)들은 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정할 수 있다.
- [64] 따라서, 최단 시간 내에, 동일한 채널을 사용하는 AP(100) 간의 간섭을 최소화할 수 있다.
- [65] 한편, 무선 액세스 포인트 제어 장치(이하, 'AP 제어 장치'라 칭함)(200)는 AP(100)로부터 AP(100)에 대한 정보 및 주변 AP에 대한 정보를 수신한다.
- [66] 이후, AP 제어 장치(200)는 동일한 채널을 사용하는 AP별로 그룹핑을 수행한다.
- [67] 이후, AP 제어 장치(200)는 그룹핑된 AP(100)간의 RSSI 값 및 각 AP(100)의 출력 세기 값을 이용하여 가상의 맵(map)을 생성한다.
- [68] 이후, AP 제어 장치(200)는 AP(100)로부터 동일한 채널을 사용하는 AP 간에 간섭이 발생했음을 알리는 메시지를 수신한다,
- [69] 이후, AP 제어 장치(200)는 생성된 가상의 맵을 기초로 보정된 출력 세기 값을 산출한다.
- [70] 이후, AP 제어 장치(200)는 보정된 출력 세기 값을 동일한 채널을 사용하는 다수의 AP(100)로 전송한다.
- [71] 이후, AP 제어 장치(200)로부터 보정된 출력 세기 값을 수신한 다수의 AP(동일한 채널을 사용)는, 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 동시에 조정할 수 있다.
- [72] 도 2는 본 발명의 일 실시예에 따른 AP(100)의 구성을 도시한 블록도이다.
- [73] 본 발명의 일 실시예에 따른 AP(100)는 채널 설정부(110), 정보 전송부(120), 산출부(130), 간섭 발생 판단부(140) 및 출력 세기 조정부(150)를 포함한다.
- [74] 각 구성 요소를 설명하면, 채널 설정부(110)는 통신을 하기 위한 채널을 설정한다.
- [75] 한편, 정보 전송부(120)는 채널 설정부(110)에서 설정된 채널을 통하여 미리 정해진 범위 내에 존재하는 주변 AP를 검색한다.
- [76] 이후, 정보 전송부(120)는 검색된 주변 AP에 대한 정보 및 AP(100)에 대한 정보를 AP 제어 장치(200)로 전송한다.
- [77] 여기에서, 검색된 주변 AP에 대한 정보와 AP(100)에 대한 정보는 현재 사용 중인 채널, RSSI 세기 값 및 출력 세기 값 중 하나 이상을 포함할 수 있다.
- [78] 한편, 산출부(130)는 무선 네트워크 단말기(이하, '무선 단말기'라 칭함)가 AP(100) 접속되면, 미리 정해진 시간 간격으로, AP(100)와 무선 단말기 간의 ACK 송수신 실패 횟수 및 RSSI 값을 산출한다.

- [79] 참고로 WiFi의 특성 상, 무선 단말기는 데이터 프레임 전송 완료 후 ACK(신호)를 AP(100)에 전송할 수 있는데, 산출부(130)는 이를 count하여 채널의 상태를 모니터링 할 수 있다.
- [80] 또한, 산출부(130)는 미리 정해진 시간 간격으로 AP(100)에 대한 무선 단말기의 접속 여부를 확인한다.
- [81] 확인 결과 무선 단말기의 접속이 없는 경우, 산출부(130)는 정보 전송부(120)에게 주변 AP의 검색을 요청할 수 있다.
- [82] 한편, 간섭 발생 판단부(140)는 산출부(130)에서 산출된 AP(100)와 무선 단말기 간의 ACK 송수신 실패 횟수 및 RSSI 값을 이용하여, AP(100)와 주변 AP 간의 간섭 발생 여부를 판단한다.
- [83] 더 상세히 설명하면, 간섭 발생 판단부(140)는 미리 정해진 시간을 기준으로, 현재의 RSSI(이하, 'RSSI_current'라 칭함) 값이 이전의 RSSI(이하, 'RSSI_past'라 칭함) 값보다 크고, 현재 무선 단말기와의 ACK 송수신 실패 횟수(이하, 'data_fail_cnt_current'라 칭함)가 이전 무선 단말기와의 ACK 송수신 실패 횟수(이하, 'data_fail_cnt_past'라 칭함)보다 크면, AP간에 간섭이 발생한 것으로 판단할 수 있다.
- [84] 이때, 간섭 발생 판단부(140)는 RSSI_past값과 data_fail_cnt_current에 미리 정해진 마진(margin) 값을 적용할 수 있다.
- [85] 여기에서, 상기한 미리 정해진 마진 값은 무선 단말기의 움직임으로 인한 RSSI 값의 변동을 고려한 것이다.
- [86] 예를 들어, RSSI_past값에는 허용 RSSI 변동폭을 나타내는 마진 값인 RSSI_margin을 빼서 적용할 수 있다.
- [87] 또한, data_fail_cnt_current에는 data fail count 허용폭을 나타내는 마진 값인 cnt_margin을 곱하여 적용할 수 있다.
- [88] 결과적으로, 간섭 발생 판단부(140)가 동일한 채널 별로 그룹핑된 AP 간에 간섭이 발생한 것으로 판단하는 경우를 간략히 나타내면,
- [89] $RSSI_past - RSSI_margin < RSSI_current$ and
- [90] $data_fail_cnt_past < data_fail_cnt_current * cnt_margin$
- [91] 으로 나타낼 수 있다.
- [92] 이후, 간섭 발생 판단부(140)는 AP 간에 간섭이 발생한 것으로 판단되면, 간섭이 발생했음을 알리는 메시지를 AP 제어 장치(200)로 전송한다.
- [93] 한편, 출력 세기 조정부(150)는 AP 제어 장치(200)로부터 AP 간의 간섭을 최소화하기 위한 보정된 출력 세기 값을 수신한다.
- [94] 이후, 출력 세기 조정부(150)는 보정된 출력 세기 값을 기준으로 현재 출력 세기 값을 조정한다.
- [95] 참고로, 전송한 AP(100)의 구성에 의한 동작은 동일한 채널을 사용하는 그룹핑된 AP 각각에서 동시에 수행될 수 있다.
- [96] 도 3은 본 발명의 일 실시예에 따른 AP 제어 장치(200)의 구성을 도시한

도면이다.

- [97] 본 발명의 일 실시예에 따른 AP 제어 장치(200)는 그룹핑부(210), 맵 생성부(220), 간섭 발생 알림 수신부(230), 추출부(240), 최적 출력 세기 값 산출부(250), 출력 조정 요청부(260)를 포함한다.
- [98] 각 구성 요소를 설명하면, 그룹핑부(210)는 AP(100)로부터 주변 AP 및 AP(100)의 현재 사용 중인 채널, RSSI 값 및 출력 세기 값이 수신되면, 각 AP의 현재 사용 중인 채널 정보를 이용하여, 동일한 채널을 사용하는 AP별로 그룹핑을 수행한다.
- [99] 한편, 맵 생성부(220)는 동일한 채널을 사용하는 그룹핑된 AP(이하, 그룹핑된 AP라 칭함)간의 RSSI 값과 그룹핑된 각 AP의 출력 세기 값을 산출한다.
- [100] 이후, 맵 생성부(220)는 그룹핑된 AP 간의 RSSI 값 및 그룹핑된 각 AP의 출력 세기 값을 포함하는 가상의 맵(map)을 생성한다.
- [101] 가상의 맵에 대해서는 도 6을 참조하여 상세히 후술하도록 한다.
- [102] 한편, 간섭 발생 알림 수신부(230)는 AP(100)로부터, 그룹핑된 AP 간의 간섭 발생 여부를 알리는 메시지를 수신한다.
- [103] 참고로, 그룹핑된 AP 간의 간섭 발생 여부의 판단은, 그룹핑된 AP와 그룹핑된 AP에 접속한 무선 단말기 간의 RSSI 값 및 송수신 실패 회수(data_fail_cnt_past, data_fail_cnt_current)를 이용하여 AP(100)에서 판단할 수 있다.
- [104] 이에 대한 상세한 설명은 AP(100)를 참조하여 전술하였으므로 생략하도록 한다.
- [105] 한편, 추출부(240)는 그룹핑된 AP 간에 간섭이 발생하면, 맵 생성부(220)에서 생성한 가상의 맵을 참조하여, 그룹핑된 AP중 가장 높은 RSSI 값을 가지는 AP를 추출한다.
- [106] 예를 들어, 그룹핑된 AP에 AP 1, AP 2 및 AP 3가 존재하고, 가상의 맵에서 AP 1과 AP 3간의 RSSI 값(RSSI_13)이 가장 높은 경우, 가장 높은 RSSI 값을 가지는 AP는 AP 1이 된다.
- [107] 이를 간략히 설명하면, 가상의 맵에서 m번째 AP로부터 수신된 n번째 AP의 RSSI 값은 RSSI_mn으로 나타낼 수 있다.
- [108] 그리고, 가상의 맵에서 RSSI_mn 값이 가장 높은 경우, m번째 AP가 가장 높은 RSSI 값을 가진다고 표현할 수 있다.
- [109] 한편, 최적 출력 세기 값 산출부(250)는 추출부(240)에서 추출된 가장 높은 RSSI 값을 가지는 AP의 RSSI 값(이하, 'RSSI_m'이라 칭함), 그룹핑된 AP 간에 미리 정해진 RSSI의 임계값(이하, 'RSSI_th'라 칭함), 그룹핑된 AP에서 현재 사용중인 출력 세기(이하, 'Ptx_c'라 칭함) 값을 이용하여, AP간의 간섭을 최소화하기 위한 '보정된 출력 세기(이하, 'Ptx_modi'라 칭함)' 값을 산출한다.
- [110] 이때, 최적 출력 세기 값 산출부(250)는 Ptx_c 값에서 RSSI_m 값과 RSSI_th 값과의 차이를 뺀 값을 보정된 출력 세기, 즉, Ptx_modi 값으로 산출한다.
- [111] 이를 간략히 나타내면

- [112] $Ptx_modi = Ptx_c - (RSSI_m - RSSI_th)$
- [113] 으로 나타낼 수 있다.
- [114] 한편, 출력 조정 요청부(260)는 Ptx_modi 값을 기준으로 현재의 출력 세기 값을 조정하도록 하는 출력 세기 조정 요청을 그룹핑된 각 AP로 동시에 전송한다.
- [115] 참고로, 본 발명의 실시예에 따른 도 2 및 도 3에 도시된 구성 요소들은 소프트웨어 또는 FPGA(Field Programmable Gate Array) 또는 ASIC(Application Specific Integrated Circuit)와 같은 하드웨어 구성 요소를 의미하며, 조정의 역할들을 수행한다.
- [116] 그렇지만 '구성 요소들'은 소프트웨어 또는 하드웨어에 한정되는 의미는 아니며, 각 구성 요소는 어드레싱할 수 있는 저장 매체에 있도록 구성될 수도 있고 하나 또는 그 이상의 프로세서들을 재생시키도록 구성될 수도 있다.
- [117] 따라서, 일 예로서 구성 요소는 소프트웨어 구성요소들, 객체지향 소프트웨어 구성 요소들, 클래스 구성 요소들 및 태스크 구성 요소들과 같은 구성 요소들과, 프로세스들, 함수들, 속성들, 프로시저들, 서브루틴들, 프로그램 코드의 세그먼트들, 드라이버들, 펌웨어, 마이크로 코드, 회로, 데이터, 데이터베이스, 데이터 구조들, 테이블들, 어레이들 및 변수들을 포함한다.
- [118] 구성 요소들과 해당 구성 요소들 안에서 제공되는 기능은 더 작은 수의 구성 요소들로 결합되거나 추가적인 구성 요소들로 더 분리될 수 있다.
- [119] 도 4 및 도 5는 본 발명의 일 실시예에 따른 무선 액세스 포인트를 제어하는 과정을 도시한 흐름도이다.
- [120] 이하, 도 1에 도시된 시스템의 구성 요소를 참고하여 도 4 및 도 5의 흐름도를 설명하도록 한다.
- [121] 먼저, AP(100)는 통신을 하기 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 AP를 검색한다(S401).
- [122] S401 후, AP(100)는 S401에서 검색된 주변 AP에 대한 정보 및 AP(100)에 대한 정보를 AP 제어 장치(200)로 전송한다(S402).
- [123] 여기에서, 주변 AP에 대한 정보와 AP(100)에 대한 정보는 현재 사용 중인 채널, RSSI 값 및 출력 세기 값 중 하나 이상을 포함할 수 있다.
- [124] S402 후, AP 제어 장치(200)는 AP(100)로부터 수신한 주변 AP에 대한 정보 및 AP(100)에 대한 정보를 이용하여, 동일한 채널을 사용하는 AP별로 그룹핑을 수행한다.
- [125] 그리고, 그룹핑된 AP 간의 RSSI 값과 출력 세기 값을 이용하여 가상의 맵을 생성한다(S403).
- [126] S403 후, AP(더 상세하게는 그룹핑된 AP)(100)는 미리 정해진 시간 간격으로 무선 단말기의 접속을 확인한다(S404).
- [127] 확인 결과, 단말(무선 단말기)이 AP(100)에 접속한 경우, AP(100)는 $RSSI_current$ 값과 $data_fail_cnt_current$ 에 대하여 미리 정해진 시간 간격으로 누적된 값의 평균을 산출한다(S405).

- [128] S405 후, AP(100)는 “RSSI_past - RSSI_margin < RSSI_current and data_fail_cnt_past < data_fail_cnt_current * cnt_margin”에 대한 판단, 즉, 간섭이 발생했는지를 판단한다(S406).
- [129] 판단 결과, 간섭이 발생한 경우, AP(100)는 간섭 발생 알림 메시지를 AP 제어 장치(200)로 전송한다(S407).
- [130] 만일 S406의 판단 결과, 간섭이 발생하지 않으면, AP(100)는 기존의 서비스를 유지할 수 있다.
- [131] 참고로 S404의 확인 결과, 단말이 접속하지 않은 경우, AP(100)는 스테이션 모드(station mode)로 전환하여 S402의 과정을 반복할 수 있다.
- [132] S407 후, AP 제어 장치(200)는 S403에서 생성된 가상의 맵을 참조하여 RSSI_th 보다 큰 RSSI_mn 값이 존재하는지 확인한다(S408).
- [133] 확인 결과, 존재 하는 경우, AP 제어 장치(200)는 S403에서 생성된 가상의 맵으로부터 가장 높은 RSSI 값을 가지는 AP를 추출한다(S409).
- [134] 만일 S408의 확인 결과, 존재 하지 않는 경우, AP 제어 장치(200)는 기존과 같이 서비스가 유지되도록 할 수 있다.
- [135] S409 후, AP 제어 장치(200)는 S407에서 추출된 AP의 RSSI 값(RSSI_m 값), 그룹핑된 AP 간에 미리 정해진 RSSI의 임계값(RSSI_th 값) 및 그룹핑된 AP에서 현재 사용중인 출력 세기(Ptx_c) 값을 이용하여 보정된 출력 세기(Ptx_modi) 값을 산출한다(S410).
- [136] S410 후, AP 제어 장치(200)는 보정된 출력 세기(Ptx_modi) 값을 그룹핑된 각 AP로 동시에 전송한다(S411).
- [137] S411 후, 그룹핑된 각 AP는 AP 제어 장치(200)로부터 수신된 보정된 출력 세기(Ptx_modi) 값을 기준으로 현재의 출력 세기 값을 조정한다(S412).
- [138] 도 6은 본 발명의 일 실시예에 따른 무선 액세스 포인트 제어 장치에서 생성한 가상의 맵을 도시한 도면이다.
- [139] 도 6에서는 동일한 채널(CH 1), (CH 5)을 사용하는 AP별로 그룹핑되어 가상의 맵이 생성되었다.
- [140] CH 1을 사용하는 AP는 AP 1, AP 3 및 AP 5이고, 각 AP간의 RSSI 값과 각 AP의 출력 세기 값이 포함되어 있다.
- [141] 또한, CH 5를 사용하는 AP는 AP 2 및 AP 4이고, 각 AP간의 RSSI 값과 각 AP의 출력 세기 값이 가상의 맵에 포함되어 있다.
- [142] 전술하였지만, 도 6에 도시된 가상의 맵에서, 가장 높은 RSSI 값이 RSSI_13, 즉, AP 1과 AP 3간의 RSSI 값인 경우, 가장 높은 RSSI 값을 가지는 AP는 AP 1이 되고, 본 발명의 실시예에서는 이를 ‘RSSI_m’으로 나타내었다.
- [143] 참고로, 도 6에 도시된 바와 같이, AP 제어 장치(200)에서 생성된 가상의 맵은 사용되는 채널에 따라서 멀티 그룹(또는 멀티 레이어)으로 생성되어 관리될 수 있다.
- [144] 전술한 본 발명의 설명은 예시를 위한 것이며, 본 발명이 속하는 기술분야의

통상의 지식을 가진 자는 본 발명의 기술적 사상이나 필수적인 특징을 변경하지 않고서 다른 구체적인 형태로 쉽게 변형이 가능하다는 것을 이해할 수 있을 것이다.

- [145] 그러므로 이상에서 기술한 실시예들은 모든 면에서 예시적인 것이며 한정적이 아닌 것으로 이해해야만 한다.
- [146] 예를 들어, 단일형으로 설명되어 있는 각 구성 요소는 분산되어 실시될 수도 있으며, 마찬가지로 분산된 것으로 설명되어 있는 구성 요소들도 결합된 형태로 실시될 수 있다.
- [147] 본 발명의 범위는 상기 상세한 설명보다는 후술하는 특허청구범위에 의하여 나타내어지며, 특허청구범위의 의미 및 범위 그리고 그 균등 개념으로부터 도출되는 모든 변경 또는 변형된 형태가 본 발명의 범위에 포함되는 것으로 해석되어야 한다.

청구범위

[청구항 1]

무선 액세스 포인트를 제어하는 장치에 있어서,
 상기 무선 액세스 포인트로부터 수신한 채널 사용 정보를
 이용하여, 동일한 채널을 사용하는 무선 액세스 포인트별로
 그룹핑하는 그룹핑부,
 상기 그룹핑된 무선 액세스 포인트간의 수신 신호 세기 값과 상기
 그룹핑된 무선 액세스 포인트의 각 출력 세기 값을 산출하는 맵
 생성부,
 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생하면, 상기
 그룹핑된 무선 액세스 포인트 중 가장 높은 수신 신호 세기 값을
 가지는 무선 액세스 포인트를 추출하는 추출부 및
 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값, 상기
 그룹핑된 무선 액세스 포인트간에 미리 정해진 수신 신호 세기의
 임계값 및 현재 사용중인 출력 세기 값을 이용하여 보정된 출력
 세기 값을 산출하는 최적 출력 세기 값 산출부
 를 포함하는, 무선 액세스 포인트 제어 장치.

[청구항 2]

제 1 항에 있어서,
 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을
 조정하도록 하는 출력 세기 조정 요청을 상기 그룹핑된 각 무선
 액세스 포인트로 전송하는 출력 조정 요청부
 를 더 포함하는, 무선 액세스 포인트 제어 장치.

[청구항 3]

제 1 항에 있어서,
 상기 그룹핑된 무선 액세스 포인트 간의 간섭 발생 여부를 알리는
 메시지를 수신하는 간섭 발생 알림 수신부
 를 더 포함하되,
 상기 간섭 발생 여부는 상기 그룹핑된 무선 액세스 포인트와, 상기
 그룹핑된 무선 액세스 포인트에 접속한 무선 단말기 간의 수신
 신호 세기 값 및 ACK 송수신 실패 회수를 이용하여, 상기
 그룹핑된 무선 액세스 포인트에서 판단되는 것인, 무선 액세스
 포인트 제어 장치.

[청구항 4]

제 1 항에 있어서,
 상기 맵 생성부는 상기 그룹핑된 무선 액세스 포인트 간의 수신
 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트의 각 출력 세기
 값을 포함하는 가상의 맵(map)을 생성하는, 무선 액세스 포인트
 제어 장치.

[청구항 5]

제 1 항에 있어서,
 상기 최적 출력 세기 값 산출부는 현재 사용 중인 출력 세기 값에서

- 상기 추출된 무선 액세스 포인트의 수신 신호 세기 값과 상기 그룹핑된 무선 액세스 포인트 간에 미리 정해진 수신 신호 세기의 임계값과의 차이를 뺀 값을 상기 보정된 출력 세기 값으로 산출하는, 무선 액세스 포인트 제어 장치.
- [청구항 6] 무선 액세스 포인트 제어 장치에 의해서 출력 세기 값이 제어되는 무선 액세스 포인트에 있어서,
통신을 하기 위한 채널을 설정하는 채널 설정부,
상기 설정된 채널을 통하여 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색하고, 상기 무선 액세스 포인트 및 주변 무선 액세스 포인트에 대한 정보를 상기 무선 액세스 포인트 제어 장치로 전송하는 정보 전송부,
무선 단말기가 접속되면, 미리 정해진 시간 간격으로, 상기 무선 단말기와의 ACK 송수신 실패 횟수와 수신 신호 세기 값을 산출하는 산출부 및
상기 산출된 ACK 송수신 실패 횟수와 수신 신호 세기 값에 기초하여, 상기 주변 무선 액세스 포인트와의 간섭이 발생한 것으로 판단되면, 상기 간섭이 발생했음을 알리는 메시지를 상기 무선 액세스 포인트 제어 장치로 전송하는 간섭 발생 알림부를 포함하는, 무선 액세스 포인트.
- [청구항 7] 제 6 항에 있어서,
상기 무선 액세스 포인트 제어 장치로부터 보정된 출력 세기 값을 수신하여, 상기 보정된 출력 세기 값을 기준으로 현재 출력 세기 값을 조정하는 출력 세기 조정부를 더 포함하는, 무선 액세스 포인트.
- [청구항 8] 제 6 항에 있어서,
상기 산출부는 미리 정해진 시간 간격으로 상기 무선 단말기의 접속 여부를 확인하고, 상기 무선 단말기의 접속이 없는 경우, 상기 정보 전송부로 상기 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트 검색을 요청하는, 무선 액세스 포인트.
- [청구항 9] 제 6 항에 있어서,
상기 간섭 발생 알림부는 상기 미리 정해진 시간 간격을 기준으로, 현재의 수신 신호 세기 값이 이전의 수신 신호 세기 값보다 크고, 현재 무선 단말기와의 ACK 송수신 실패 횟수가 이전 무선 단말기와의 ACK 송수신 실패 횟수보다 크면 상기 간섭이 발생한 것으로 판단하는, 무선 액세스 포인트.
- [청구항 10] 제 9 항에 있어서,
상기 간섭 발생 알림부는 상기 이전의 수신 신호 세기 값과 상기 현재 무선 단말기 간의 ACK 송수신 실패 횟수에 미리 정해진

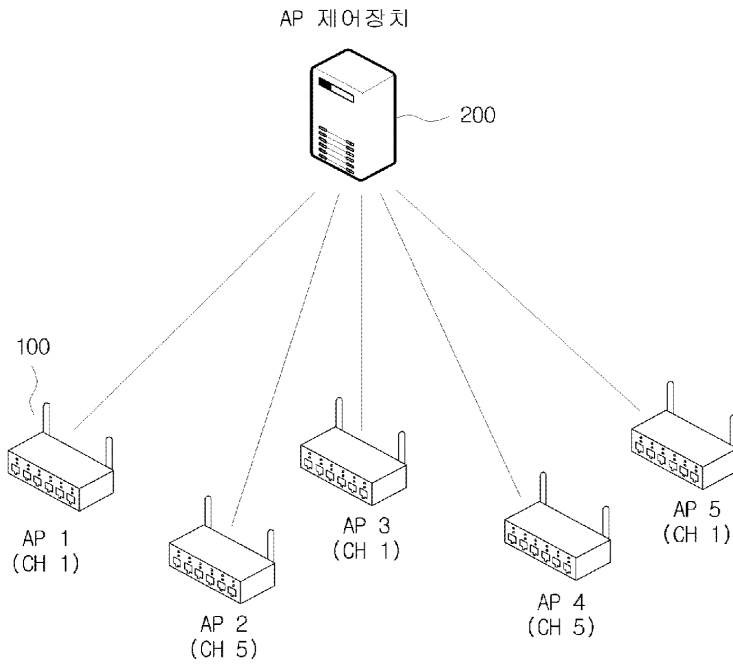
[청구항 11]

마진(margine) 값을 적용하되, 상기 미리 정해진 마진 값은 상기 무선 단말기의 움직임으로 인한 수신 신호 세기 값의 변동을 고려한 것인, 무선 액세스 포인트,

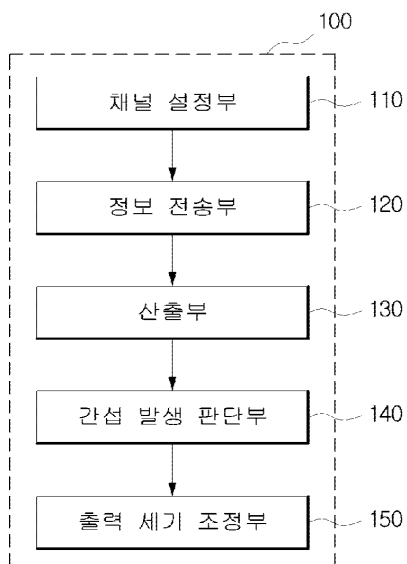
무선 액세스 포인트 제어 장치에서 무선 액세스 포인트의 출력 세기 값을 제어하는 방법에 있어서,

- (a) 상기 무선 액세스 포인트가 통신을 하기 위한 채널을 설정하고, 미리 정해진 범위 내에 존재하는 주변 무선 액세스 포인트를 검색하여, 상기 무선 액세스 포인트 및 주변 무선 액세스 포인트에 대한 정보를 상기 무선 액세스 포인트 제어 장치로 전송하는 단계,
- (b) 상기 무선 액세스 포인트 제어 장치가 상기 무선 액세스 포인트로부터 수신한 상기 무선 액세스 포인트 및 주변 무선 액세스 포인트에 대한 정보를 이용하여, 동일한 채널을 사용하는 무선 액세스 포인트별로 그룹핑하는 단계,
- (c) 상기 그룹핑된 무선 액세스 포인트가 상기 그룹핑된 무선 액세스 포인트간에 간섭이 발생했는지 여부를 판단하고, 상기 판단 결과를 상기 무선 액세스 포인트 제어 장치로 전송하는 단계,
- (d) 상기 무선 액세스 포인트 제어 장치가 상기 간섭을 감소시키기 위한 보정된 출력 세기 값을 산출하고, 상기 보정된 출력 세기 값을 상기 그룹핑된 무선 액세스 포인트로 전송하는 단계 및
- (e) 상기 그룹핑된 무선 액세스 포인트가, 상기 보정된 출력 세기 값을 기준으로 현재의 출력 세기 값을 조정하는 단계를 포함하는, 무선 액세스 포인트 제어 방법.

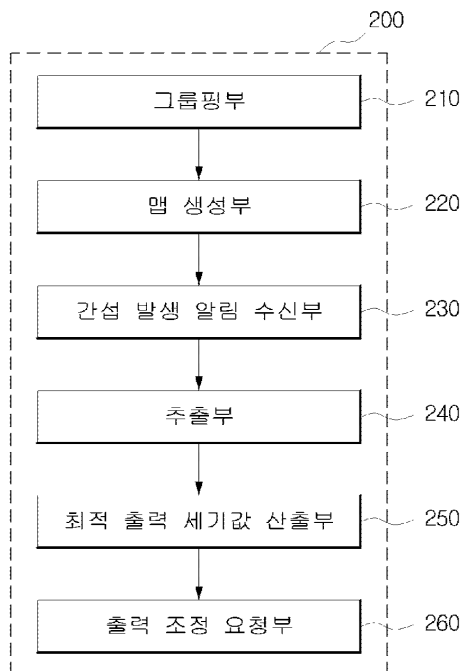
[Fig. 1]



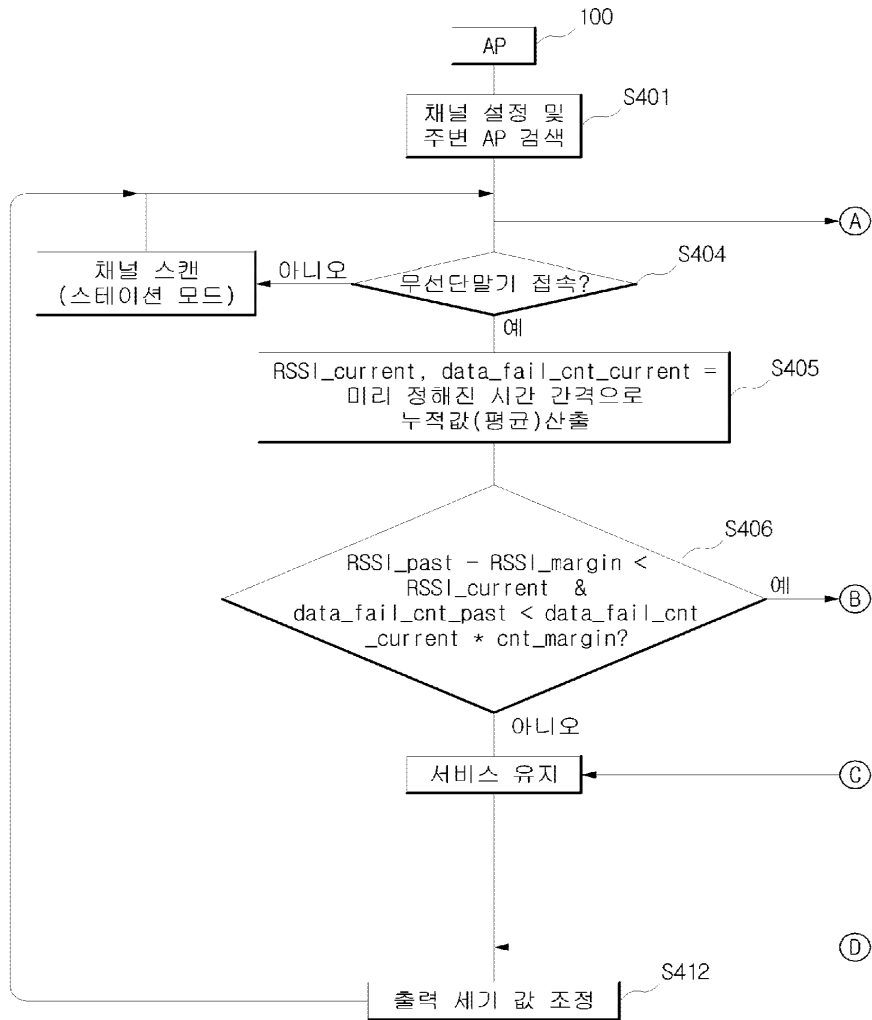
[Fig. 2]



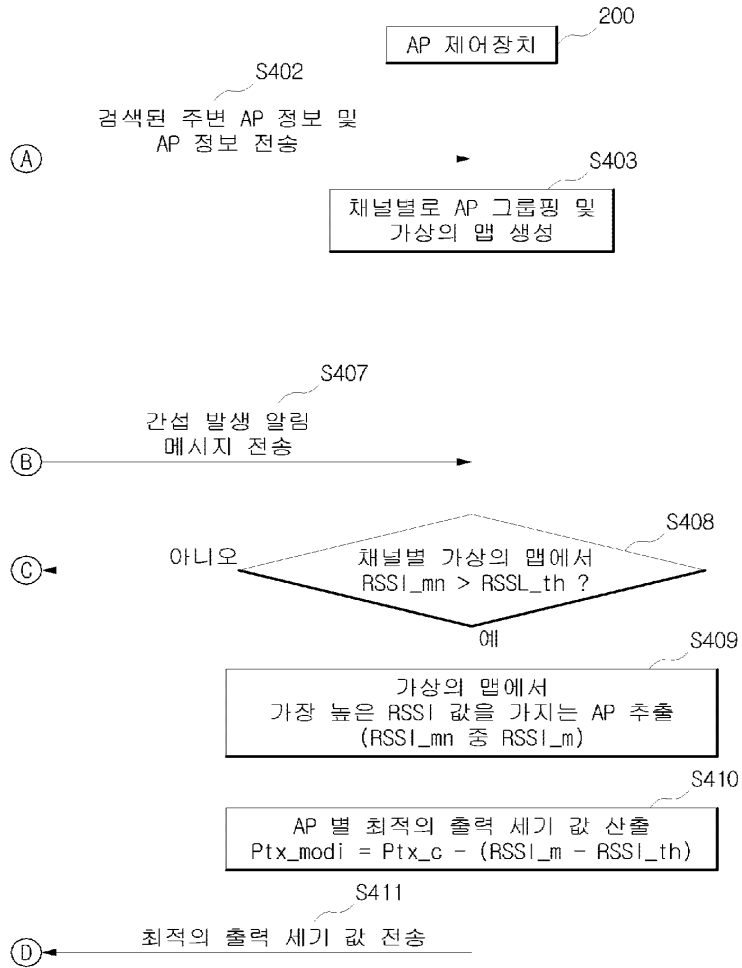
[Fig. 3]



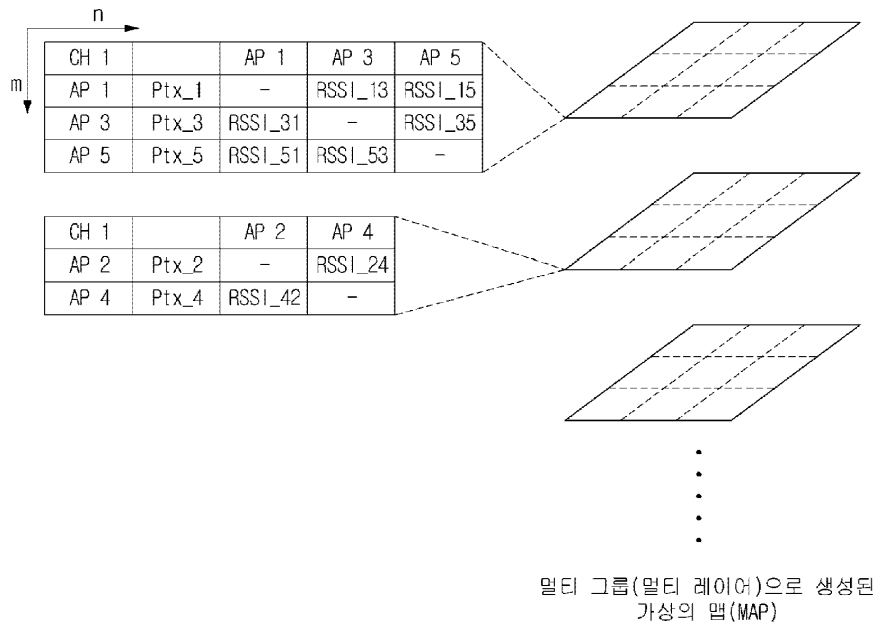
[Fig. 4]



[Fig. 5]



[Fig. 6]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2011/007792**A. CLASSIFICATION OF SUBJECT MATTER****H04W 88/12(2009.01)i, H04W 24/02(2009.01)i, H04W 16/18(2009.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W 88/12; H04W 16/26; H04W 24/10; H04W 52/20; H04B 1/00; H04W 24/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models: IPC as above

Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: identical, channel, frequency, AP, interference, transmit, output, electric power, power**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007-0060057 A1 (RYOKO MATSUO et al.) 15 March 2007 See abstract, figures 1, 3, and claims 1, 6, 10.	1-11
A	JP 2010-213040 A (NEC INFRONTIA CORP) 24 September 2010 See abstract, claims 1-2.	1-11
A	KR 10-2006-0034461 A (SAMSUNG ELECTRONICS CO., LTD.) 24 April 2006 See abstract, figure 4, claims 1-3.	1-11
A	MIN SUK KANG et al. "Adaptive Interference-Aware Multi-Channel Clustering Algorithm in a ZigBee Network in the Presence of WLAN Interference", Wireless Pervasive Computing, 2007. ISWPC '07. 2nd International Symposium on 05-07 February 2007 See pages 201-203.	1-11

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 MAY 2012 (22.05.2012)

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 Republic of Korea

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Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2011/007792

Patent document cited in search report	Publication date	Patent family member	Publication date
US 2007-0060057 A1	15.03.2007	EP 1925100 A2 JP 2009-506652 A JP 2009-506652 T US 7653357 B2 WO 2007-024895 A2 WO 2007-024895 A3 WO 2007-024895 A3	28.05.2008 12.02.2009 12.02.2009 26.01.2010 01.03.2007 11.10.2007 01.03.2007
JP 2010-213040 A	24.09.2010	NONE	
KR 10-2006-0034461 A	24.04.2006	US 2006-0083206 A1 US 7675892 B2	20.04.2006 09.03.2010

Form PCT/ISA/210 (patent family annex) (July 2009)

A. 발명이 속하는 기술분류(국제특허분류(IPC)) H04W 88/12(2009.01)i, H04W 24/02(2009.01)i, H04W 16/18(2009.01)i		
B. 조사된 분야 조사된 최소문헌(국제특허분류들 기재) H04W 88/12; H04W 16/26; H04W 24/10; H04W 52/20; H04B 1/00; H04W 24/08 조사된 기술분야에 속하는 최소문헌 이외의 문헌 한국등록실용신안공보 및 한국공개실용신안공보: 조사된 최소문헌란에 기재된 IPC 일본등록실용신안공보 및 일본공개실용신안공보: 조사된 최소문헌란에 기재된 IPC 국제조사에 이용된 전산 데이터베이스(데이터베이스의 명칭 및 검색어(해당하는 경우)) eKOMPASS(특허청 내부 검색시스템) & 키워드: 동일, 채널, 주파수, AP, 간섭, 송신, 출력, 전력, 파워		
C. 관련 문헌		
카테고리*	인용문헌명 및 관련 구절(해당하는 경우)의 기재	관련 청구항
A	US 2007-0060057 A1 (RYOKO MATSUO 외 5명) 2007.03.15 초록, 도 1, 3, 및 청구항 1, 6, 10 참조.	1-11
A	JP 2010-213040 A (NEC INFRONTIA CORP) 2010.09.24 초록, 청구항 1-2 참조.	1-11
A	KR 10-2006-0034461 A (삼성전자주식회사) 2006.04.24 초록, 도 4, 청구항 1-3 참조.	1-11
A	MIN SUK KANG 외 5명. "Adaptive Interference-Aware Multi-Channel Clustering Algorithm in a ZigBee Network in the Presence of WLAN Interference", Wireless Pervasive Computing, 2007. ISWPC '07. 2nd International Symposium on, 5-7 Feb. 2007 pp. 201-203 참조.	1-11
☐ 추가 문헌이 C(계속)에 기재되어 있습니다. ☒ 대응특허에 관한 별지를 참조하십시오.		
* 인용된 문헌의 특별 카테고리: "A" 특별히 관련이 없는 것으로 보이는 일반적인 기술수준을 정의한 문헌 "E" 국제출원일보다 빠른 출원일 또는 우선일을 가지나 국제출원일 이후에 공개된 선출원 또는 특허 문헌 "L" 우선권 주장에 의문을 제기하는 문헌 또는 다른 인용문헌의 공개일 또는 다른 특별한 이유(이유를 명시)를 밝히기 위하여 인용된 문헌 "O" 구두 개시, 사용, 전시 또는 기타 수단을 언급하고 있는 문헌 "P" 우선일 이후에 공개되었으나 국제출원일 이전에 공개된 문헌 "T" 국제출원일 또는 우선일 후에 공개된 문헌으로, 출원과 상충하지 않으며 발명의 기초가 되는 원리나 이론을 이해하기 위해 인용된 문헌 "X" 특별한 관련이 있는 문헌. 해당 문헌 하나만으로 청구된 발명의 신규성 또는 진보성이 없는 것으로 본다. "Y" 특별한 관련이 있는 문헌. 해당 문헌이 하나 이상의 다른 문헌과 조합하는 경우로 그 조합이 당업자에게 자명한 경우 청구된 발명은 진보성이 없는 것으로 본다. "&" 동일한 대응특허문헌에 속하는 문헌		
국제조사의 실제 완료일 2012년 05월 22일 (22.05.2012)		국제조사보고서 발송일 2012년 05월 22일 (22.05.2012)
ISA/KR의 명칭 및 우편주소  대한민국 특허청 (302-701) 대전광역시 서구 청사로 189, 4동 (둔산동, 정부대전청사) 팩스 번호 82-42-472-7140		심사관 이다나 전화번호 - 

서식 PCT/ISA/210 (두 번째 용지) (2009년 7월)

국제조사보고서에서 인용된 특허문헌	공개일	대응특허문헌	공개일
US 2007-0060057 A1	2007.03.15	EP 1925100 A2 JP 2009-506652 A JP 2009-506652 T US 7653357 B2 WO 2007-024895 A2 WO 2007-024895 A3 WO 2007-024895 A3	2008.05.28 2009.02.12 2009.02.12 2010.01.26 2007.03.01 2007.10.11 2007.03.01
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KR 10-2006-0034461 A	2006.04.24	US 2006-0083206 A1 US 7675892 B2	2006.04.20 2010.03.09

서식 PCT/ISA/210 (대응특허 추가용지) (2009년 7월)

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875			Application or Docket Number 14/123,672		Filing Date 05/15/2014		☐ 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), (l), 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(j))	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	12/03/2013	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 \$80 =		0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$420 =		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.								

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