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the Director of the U.S. Patent and Trades

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U.S. DEPARTMENT OF COMMERCE

103592189

Name of conveying party(ies):

Yong Su LEE Wenbo WANG

Nature of conveyance:

Young-il KIM Kan ZHENG

2. Name and Address of receiving party(ies):

Electronics and Telecommunications Research Institute 161, Gajeong-dong, Yuseong-gu, Daejeon 305-350, Republic of Korea

	<u>X</u>	Assignn	nent		Merger			
		Security	Agreemer	nt	Change o	f Name		
	<u>X</u>	Other:	In respor	nse to the Notice	of Non-Record	ation		
	Execut	ion Date	s): <u>Decer</u>	mber 11, 2009	•			
4. OR				atent number(s): filed together w		ation.		
0 11	(a) (b)	Patent A		l filed after filing No(s). <u>12/616,98</u> ued.				
5.	STAAS Attention 1201 N	S & HALS on: <u>J. Ra</u> lew York		<u>ers</u>		erning document s et: 2033,1080	should be mailed:	
6.	Total n	umber of	application	ns and patents in	volved: 1		٠	
7.	Total fe ⊠ □	Enclose	d	(\$ 40.0	•	Application in Ass	signment)	
8.	Depos Accour		t No.: 19-3	935 (Any unde	rpayment is auth	norized to be char	ged to this Deposit	
		<u>ckers, R</u> son Signi	eg. No. 30 ng) <u>,358</u>	Manual Ma	be_	3/16/18 Date	
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Docket No.: 2033.1080

U.S. ASSIGNMENT

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IN CONSIDERATION of the sum of One Dollar (\$1.00), and of other good and valuable consideration paid to the undersigned inventor(s) (hereinafter, "ASSIGNOR") by

(Insert Name(s) & Address(es) of ASSIGNEE(S))

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE 161, Gajeong-dong, Yuseong-gu, Daejeon 305-350, Republic of Korea

(hereinafter, "ASSIGNEE"), the receipt of which is hereby acknowledged, the undersigned ASSIGNOR hereby sells, assigns and transfers to ASSIGNEE the entire and exclusive right, title and interest to the invention entitled (Title of Invention)

on even date herewith or, if not so executed	and/or for which application for Letters Patent of the United States was executed d, was:
(a) executed on ;	(Insert date of execution of application, if not concurrent)
(b) filed on , November 12, 2009 Serial No. 12/616,980	Any registered attorney of STAAS & HALSEY ILP, 1201 New York Avenue, N.W., Suite 700 Washington, D.C. 20005 (202/434-1500) is hereby authorized to insert in (b) the specified data, when known.
substitute, reissue or reexamination applica granted and including any extensions there The ASSIGNOR agree(s), when to do all acts which the ASSIGNEE may de said invention, including in the preparation interference, reissue, reexamination, or put declared in relation to same, such acts to in	ent(s) of the United States granted on said application and any continuation, division, renewal, ation based thereon, for the full term or terms for which the said Letters Patent(s) may be set (collectively, hereinafter, "said application(s) and Letters Patent(s)"). I requested by said ASSIGNEE and without charge to but at the expense of said ASSIGNEE, eem necessary, desirable or expedient, for securing, maintaining and enforcing protection for and prosecution of said application(s) and the issuance of said Letters Patent(s), in any blic use proceeding, and in any litigation or other legal proceeding which may arise or be include but not be limited to executing all papers, including separate assignments and ding sworn testimony, and obtaining and producing evidence.
IN WITNESS WHEREOF, the undersige (Typed Name & Signature of Inventor(ned inventor(s) has (have) affixed his/her/their signature(s). (s)) (Date) (Typed Name & Signature of Witness(es))
1) Yong Su Lee Yong Su LEE	2009.12.11
1) Young Su Lee Young Su Lee 2) Young II KIM	200f. 12.11 - 200f. 12.11
1) Yong Su Lee Yong Su Lee 2) young - I Kin Young il KIM 3) Wenbo WANG	200f. 12.11 - 200f. 12.11

U.S. ASSIGNMENT

Docket No.: 2033.1080

IN CONSIDERATION of the sum of One Dollar (\$1.00), and of other good and valuable consideration paid to the undersigned Inventor(s) (hereinafter, "ASSIGNOR") by

(Insert Name(s) & Address(es) of ASSIGNEE(S))

161, Gajeong-dong, Yuse		-350, Republic of Korea
(hereinafter, "ASSIGNEE"), the receipt of which is here transfers to ASSIGNEE the entire and exclusive right, (Title of Invention)		
CHANNEL ESTIMATING METHOD IN WIRELE	SS COMMUNICATION	SYSTEM AND APPARATUS THEREOF
relating to International Patent Applicationexecuted on even date herewith or, if not so executed,		ion for Letters Patent of the United States was
(a) executed on ;	(Insert date of exec	ution of application, if not concurrent)
(b) filed on , November 12, 2009		mey of STAAS & HALSEY ILP, 1201 New York 700 Washington, D.C. 20005 (202/434-1500) is
Serial No. 12/616,980		o insert in (b) the specified data, when known.
granted and including any extensions thereof (collective The ASSIGNOR agree(s), when requested by to do all acts which the ASSIGNEE may deem necessal said invention, including in the preparation and prosect interference, reissue, reexamination, or public use production of relation to same, such acts to include but in declarations, taking all rightful paths, providing sworm for the WITNESS WHEREOF, the undersigned inventor (Typed Name & Signature of Inventor(s))	ly said ASSIGNEE and with ry, desirable or expedient, ution of said application(s) seeding, and in any litigation to be limited to executing a estimony, and obtaining ar	nout charge to but at the expense of said ASSIGNEE, for securing, maintaining and enforcing protection for and the issuance of said Letters Patent(s), in any on or other legal proceeding which may arise or be all papers, including separate assignments and and producing evidence.
1)Yong Su LEE		
2)	 .	
a (Algho hy	Dec. 11, 2009	
Wenbo WANG Lem Zheig	Dec. 11, 2009	

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U.S. DEPARTMENT OF COMMERCE

103586114

1.	Name	of	conveying	party(ies):
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2.	Name and Address of receiving party(ies):
	Electronics and Telecommunications Research Institute 161, Gajeong-dong, Yuseong-gu, Daejeon 305-350, Republic of Korea
3.	Nature of conveyance: X
4.	Application number(s) or patent number(s): This document is being filed together with a new application.
	OR This document is being filed after filing of the application: (a) Patent Application No(s). 12/616,980, filed November 12, 2009; or (b) Patent No(s)., issued.
5.	Name and address of party to whom correspondence concerning document should be mailed: STAAS & HALSEY LLP Our Docket: 2033.1080 Attention: J. Randall Beckers 1201 New York Ave., N.W., 7th Floor Washington, D.C. 20005
6.	Total number of applications and patents involved: 1
7.	Total fee (37 CFR 3.41) (\$ 40.00 per Patent or Application in Assignment) Enclosed Authorized to be charged to deposit account.
8.	Deposit Account No.: 19-3935 (Any underpayment is authorized to be charged to this Deposit Account) (Attach duplicate copy of this page if paying by deposit account)
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Revised January, 2005

PATENT REEL: 024105 FRAME: 0423

Docket No.: 2033.1080

U.S. ASSIGNMENT

S&H 1/XX

IN CONSIDERATION of the sum of One Dollar (\$1.00), and of other good and valuable consideration paid to the undersigned inventor(s) (hereinafter, "ASSIGNOR") by

(Insert Name(s) & Address(es) of ASSIGNEE(S))

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE 161, Gajeong-dong, Yuseong-gu, Daejeon 305-350, Republic of Korea

(hereinafter, "ASSIGNEE"), the receipt of which is transfers to ASSIGNEE the entire and exclusive r (Title of Invention)	s hereby acknowledged, the underight, title and interest to the inver-	ersigned ASSIGNOR hereby sells, assigns and nation entitled
CHANNEL ESTIMATING METHOD IN WI	RELESS COMMUNICATION	N SYSTEM AND APPARATUS THEREOF
relating to International Patent Application on even date herewith or, if not so executed, was:	and/or for which applicatio	n for Letters Patent of the United States was executed
(a) executed on ;	(Insert date of exec	ution of application, if not concurrent)
(b) filed on , November 12, 2009 Serial No. 12/616,980	Avenue, N.W., Suite	ney of STAAS & HALSEY LLP, 1201 New York e 700 Washington, D.C. 20005 (202/434-1500) is o insert in (b) the specified data, when known.
and to said application and all Letters Patent(s) of substitute, reissue or reexamination application be granted and including any extensions thereof (coll	ased thereon, for the full term or	id application and any continuation, division, renewal, terms for which the said Letters Patent(s) may be ation(s) and Letters Patent(s)*).
The ASSIGNOR agree(s), when request to do all acts which the ASSIGNEE may deem ne said invention, including in the preparation and printerference, reissue, reexamination, or public used declared in relation to same, such acts to include declarations, taking all rightful oaths, providing sweets.	cessary, desirable or expedient, osecution of said application(s) a proceeding, and in any litigation but not be limited to executing at	or other legal proceeding which may arise or be I papers, including separate assignments and
IN WITNESS WHEREOF, the undersigned inv (Typed Name & Signature of Inventor(s))	ventor(s) has (have) affixed his/he	er/their signature(s). (Typed Name & Signature of Witness(es))
1) Yong Su Lee Yong Su LEE	2009.12.11	
2) young - 1 Km	70°P. 12.11	
3)Wenbo WANG		
4)		

PATENT

REEL: 024105 FRAME: 0424

U.S. ASSIGNMENT

Docket No.: 2033.1080

SAH 1400

IN CONSIDERATION of the sum of One Dollar (\$1.00), and of other good and valuable consideration paid to the undersigned inventor(s) (hereinafter, "ASSIGNOR") by

(Insert Name(s) & Address(es) of ASSIGNEE(S))

RECORDED: 03/16/2010

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE 161, Gajeong-dong, Yuseong-gu, Daejeon 305-350, Republic of Korea

(hereinafter, "ASSIGNEE"), the receipt of which is transfers to ASSIGNEE the entire and exclusive r		
(Title of Invention)	s hereby acknowledged, the undersign ight, title and interest to the invention	ned ASSIGNOR hereby sells, assigns and a entitled
CHANNEL ESTIMATING METHOD IN WIR	RELESS COMMUNICATION SY	STEM AND APPARATUS THEREOF
relating to International Patent Application executed on even date herewith or, if not so executed on even date herewith or, if not so executed on even date herewith or, if not so executed the executed of t	and/or for which application fouled, was:	r Letters Patent of the United States was
(a) executed on ;	(Insert date of execution	of application, if not concurrent)
(b) filed on , November 12, 2009 Serial No. 12/616,980	Avenue, N.W., Suite 700	of STAAS & HALSEY LLP, 1201 New York Washington, D.C. 20005 (202/434-1500) is ent in (b) the specified data, when known.
and to said application and all Letters Patent(s) of t substitute, reissue or reexamination application ba granted and including any extensions thereof (coll	ased thereon, for the full term or term	s for which the said Letters Patent(s) may be
The ASSIGNOR agree(s), when request to do all acts which the ASSIGNEE may deem neo said invention, including in the preparation and preinterference, reissue, reexamination, or public use declared in relation to same, such acts to include the declarations, taking all rightful oaths, providing sw	essary, desirable or expedient, for se osecution of said application(s) and t proceeding, and in any litigation or o but not be limited to executing all pay	he issuance of said Letters Patent(s), in any other legal proceeding which may arise or be
		ducing evidence.
IN WITNESS WHEREOF, the undersigned inve (Typed Name & Signature of Inventor(s))	entor(s) has (have) affixed his/her/th (Dale)	ducing evidence.
(Typed Name & Signature of Inventor(s)) 1)		ducing evidence. eir signature(s).
IN WITNESS WHEREOF, the undersigned inve (Typed Name & Signature of Inventor(s)) 1) Yong Su LEE		ducing evidence. eir signature(s).
(Typed Name & Signature of Inventor(s)) 1)		ducing evidence. eir signature(s).
(Typed Name & Signature of Inventor(s)) 1) Yong Su LEE		ducing evidence. eir signature(s).

PATENT REEL: 024105 FRAME: 0425