FORM PTO-1390 (Modified) (REV. 9-2006) U.S. PATENT AND TRADEMARK OFFICE; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: **009289-08201**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5):

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP2007/055695	**March 20, 2007**	**March 20, 2006**

TITLE OF INVENTION

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

APPLICANT(S) FOR DO/EO/US

IMAMURA, Daichi; FUTAGI, Sadaki; MATSUMOTO, Atsushi; IWAI, Takashi; and TAKATA, Tomofumi

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a submission under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a submission under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (25) indicated below.
4. ☒ The US has been elected (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 23 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ An Application Data Sheet under 37 CFR 1.76.
18. ☐ A substitute specification.
19. ☐ A power of attorney and/or change of address letter.
20. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.2 and 37 CFR 1.821 - 1.825.
21. ☐ A second copy of the published International Application under 35 U.S.C. 154(d)(4).
22. ☐ A second copy of the English language translation of the International Application under 35 U.S.C. 154(d)(4).
23. ☐ Express Mail Label No.

PTO-1390 (Rev. 09-2006)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
	PCT/JP2007/055695	009289-08201

24. Other items or information:

Claim for Priority w/ PCT IB 304

The following fees have been submitted:	CALCULATIONS	PTO USE
25. ☒ Basic national fee (37 CFR 1.492(a)). **$310**	$ **$310.00**	
26. ☒ 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 **$0** All other situations. **$210**	$ **$210.00**	
27. ☒ Search fee (37 CFR 1.492(b)) If the written opinion of the 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. . . . . **$100** 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. . . . . **$410** All other situations. **$510**	$ **$410.00**	
TOTAL OF 25, 26 and 27 =	$ **$930.00**	
☐ 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)). The fee is **$260** for each additional 50 sheets of paper or fraction thereof.		

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round **up** to a whole	RATE		
- 100 =	0 /50 =	0	x $260.00	$ **$0.00**	
Surcharge of **$130.00** 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 $50.00	$ **$0.00**	
Independent claims	3 - 3 =	0	x $210.00	$ **$0.00**	
MULTIPLE DEPENDENT CLAIMS (if applicable)	☐		+ $370.00	$ **$0.00**	
TOTAL OF ABOVE CALCULATIONS =				$ **$930.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2.				$ **$0.00**	
SUBTOTAL =				$ **$930.00**	
Processing fee of **$130.00** for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)).				$ **$0.00**	
TOTAL NATIONAL FEE =				$ **$930.00**	
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** per property +				$ **$0.00**	
TOTAL FEES ENCLOSED =				$ **$930.00**	
				Amount to be	$
				Amount to be	$

PTO-1390 (Rev. 09-2006)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 04-1061 . A duplicate copy of this sheet is enclosed.

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

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.

SEND ALL CORRESPONDENCE TO:

James E. Ledbetter
Dickinson Wright PLLC
1901 L Street, N.W., Suite 800
Washington, D.C.
20036-3506
Telephone: 202.457.0160
Facsimile: 202.659.1559

/James Edward Ledbetter/
SIGNATURE

James E. Ledbetter
NAME

28732
REGISTRATION NUMBER

September 18, 2008
DATE

FORM PTO-1390 (Modified) U.S. PATENT AND TRADEMARK OFFICE; U.S. DEPARTMENT OF COMMERCE
(REV. 9-2006)

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: **009289-08201**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5):

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP2007/055695	**March 20, 2007**	**March 20, 2006**

TITLE OF INVENTION

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

APPLICANT(S) FOR DO/EO/US

IMAMURA, Daichi; FUTAGI, Sadaki; MATSUMOTO, Atsushi; IWAI, Takashi; and TAKATA, Tomofumi

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a submission under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a submission under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (25) indicated below.
4. ☒ The US has been elected (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 23 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ An Application Data Sheet under 37 CFR 1.76.
18. ☐ A substitute specification.
19. ☐ A power of attorney and/or change of address letter.
20. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.2 and 37 CFR 1.821 - 1.825.
21. ☐ A second copy of the published International Application under 35 U.S.C. 154(d)(4).
22. ☐ A second copy of the English language translation of the International Application under 35 U.S.C. 154(d)(4).
23. ☐ Express Mail Label No.

PTO-1390 (Rev. 09-2006)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
	PCT/JP2007/055695	009289-08201

24. Other items or information:

Claim for Priority w/ PCT IB 304

The following fees have been submitted:	CALCULATIONS	PTO USE
25. ☒ Basic national fee (37 CFR 1.492(a)). **$310**	$ **$310.00**	
26. ☒ 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 **$0** All other situations. **$210**	$ **$210.00**	
27. ☒ Search fee (37 CFR 1.492(b)) If the written opinion of the 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. . . . . **$100** 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. . . . . **$410** All other situations. **$510**	$ **$410.00**	
TOTAL OF 25, 26 and 27 =	$ **$930.00**	
☐ 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)). The fee is **$260** for each additional 50 sheets of paper or fraction thereof.		

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round **up** to a whole	RATE		
- 100 =	0 /50 =	0	x $260.00	$ **$0.00**	
Surcharge of **$130.00** 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 $50.00	$ **$0.00**	
Independent claims	3 - 3 =	0	x $210.00	$ **$0.00**	
MULTIPLE DEPENDENT CLAIMS (if applicable)	☐	+	$370.00	$ **$0.00**	
TOTAL OF ABOVE CALCULATIONS =				$ **$930.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2.				$ **$0.00**	
SUBTOTAL =				$ **$930.00**	
Processing fee of **$130.00** for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)).				$ **$0.00**	
TOTAL NATIONAL FEE =				$ **$930.00**	
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** per property +				$ **$0.00**	
TOTAL FEES ENCLOSED =				$ **$930.00**	
				Amount to be	$
				Amount to be	$

PTO-1390 (Rev. 09-2006)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **04-1061** . A duplicate copy of this sheet is enclosed.

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

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.

SEND ALL CORRESPONDENCE TO:

James E. Ledbetter
Dickinson Wright PLLC
1901 L Street, N.W., Suite 800
Washington, D.C.
20036-3506
Telephone: 202.457.0160
Facsimile: 202.659.1559

/James Edward Ledbetter/
SIGNATURE

James E. Ledbetter
NAME

28732
REGISTRATION NUMBER

September 18, 2008
DATE

PTO/SB/14 (08-05)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	009289-08201
	Application Number	
Title of Invention	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD	

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

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
	Daichi		IMAMURA	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Kanagawa	Country Of Residence[i]	JP
Citizenship under 37 CFR 1.41(b)[i]	JP		

Mailing Address of Applicant:

Address 1	c/o Matsushita Electric Industrial Co., Ltd.		
Address 2	1006, Oaza Kadoma, Kadoma-shi		
City	Osaka	State/Province	
Postal Code	571-8501	Country[i]	JP

Applicant 2

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
	Sadaki		FUTAGI	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Ishikawa	Country Of Residence[i]	JP
Citizenship under 37 CFR 1.41(b)[i]	JP		

Mailing Address of Applicant:

Address 1	c/o Panasonic Mobile Communications R&D Lab Co.,		
Address 2	Ltd., 5 Akedori 2-chome, Izumi-ku, Sendai-shi		
City	Miyagi	State/Province	
Postal Code	981-3206	Country[i]	JP

Applicant 3

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
	Atsushi		MATSUMOTO	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Ishikawa	Country Of Residence[i]	JP

PTO/SB/14 (08-05)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	009289-08201
	Application Number	
Title of Invention	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD	

Citizenship under 37 CFR 1.41(b) i	JP		
Mailing Address of Applicant:			
Address 1	c/o Panasonic Mobile Communications R&D Lab Co.		
Address 2	Ltd., 5 Akedori 2-chome, Izumi-ku, Sendai-shi		
City	Miyagi	**State/Province**	
Postal Code	981-3206	**Country**i	JP

Applicant 4

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
	Takashi		IWAI	

Residence Information (Select One) ( ) US Residency (•) Non US Residency ( ) Active US Military Service

City	Ishikawa	**Country Of Residence**i	JP
Citizenship under 37 CFR 1.41(b) i	JP		
Mailing Address of Applicant:			
Address 1	c/o Panasonic Mobile Communications R&D Lab Co.		
Address 2	Ltd., 5 Akedori 2-chome, Izumi-ku, Sendai-shi		
City	Miyagi	**State/Province**	
Postal Code	981-3206	**Country**i	JP

Applicant 5

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
	Tomohumi		TAKATA	

Residence Information (Select One) ( ) US Residency (•) Non US Residency ( ) Active US Military Service

City	Ishikawa	**Country Of Residence**i	JP
Citizenship under 37 CFR 1.41(b) i	JP		
Mailing Address of Applicant:			
Address 1	c/o Panasonic Mobile Communications R&D Lab Co.		
Address 2	Ltd., 5 Akedori 2-chome, Izumi-ku, Sendai-shi		
City	Miyagi	**State/Province**	
Postal Code	981-3206	**Country**i	JP

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

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

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

Customer Number	52989

PTO/SB/14 (08-05)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	009289-08201
	Application Number	
Title of Invention	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD	

Email Address	jledbetter@dickinsonwright.com	Add Email	Remove Email

Application Information:

Title of the Invention	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD		
Attorney Docket Number	009289-08201	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)		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 been and will not be the subject of an application filed in another country, or under a multilateral 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	○ US Representative (37 CFR 11.9)
Customer Number	52989		

Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). 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			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/JP2007/055695	2007-03-20

Additional Domestic Priority Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

PTO/SB/14 (08-05)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	009289-08201
	Application Number	
Title of Invention	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD	

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
2006-076995	JP	2006-03-20	(•) Yes ( ) No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

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

If the Assignee is an Organization check here. [X]

Organization Name	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.		
Mailing Address Information:			
Address 1	1006, OAZA KADOMA, KADOMA-SHI		
Address 2			
City	OSAKA	**State/Province**	
Country [i]	JP	Postal Code	571-8501
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button.

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	/James Edward Ledbetter/			Date (YYYY-MM-DD)	2008-09-18
First Name	James	Last Name	Ledbetter	Registration Number	28732

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.

DESCRIPTION

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Technical Field

[0001] The present invention relates to a radio communication mobile station apparatus and a radio communication method.

Background Art

[0002] Presently, studies are underway to use RACH (Random Access Channel) for initial access from a radio communication mobile station apparatus (hereinafter simply "mobile station") to a radio communication base station apparatus (hereinafter simply "base station"), in 3GPP RAN LTE (Long Term Evolution) (see Non-Patent Document 1). The RACH is utilized, for example, to make an association request and a resource request to the base station, and in initial access upon acquiring uplink transmission timing synchronization.

[0003] A mobile station transmitting a RACH signal selects one of a plurality of unique signatures in the RACH and transmits the selected signature to the base station to distinguish itself from other mobile stations transmitting RACH signals.

[0004] Moreover, in the RACH, taking into account that a plurality of signatures are transmitted from a plurality

of mobile stations at the same time, studies are underway to use code sequences having low cross-correlation and high autocorrelation as signatures so as to demultiplex and detect those signatures in the base station. As a code sequence having such characteristics, the CAZAC (Constant Amplitude Zero Auto-Correlation) sequence is known, which is one of GCL (Generalized Chirp-Like) sequences (see Non-Patent Document 2).

[0005] Furthermore, to reduce the processing delay after the initial access, studies are underway to report, in the RACH, control information including the mobile station ID, the reason for RACH transmission, bandwidth allocation request information (QoS information, the amount of data, and so on), and downlink received quality information (see Non-Patent Document 3).

Non-patent Document 1: 3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060047, NTT DoCoMo, NEC, Sharp, "Random Access Transmission in E-UTRA Uplink," Helsinki, Finland, 23-25 January, 2006

Non-patent Document 2: 3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink," Helsinki, Finland, 23-25 January, 2006

Non-patent Document 3: 3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060480, Qualcomm, "Principles of RACH," Denver, USA, 13-17 February, 2006

Disclosure of Invention

Problems to be Solved by the Invention

[0006] Various studies are presently conducted for a method for reporting control information in the RACH, and efficient reporting of control information in the RACH meets a strong demand.

[0007] It is therefore an object of the present invention to provide a mobile station and radio communication method for efficiently reporting control information in the RACH.

Means for Solving the Problem

[0008] The mobile station of the present invention adopts a configuration including: a selecting section that selects one code sequence from a base code sequence associated with control information to be reported and a plurality of derived code sequences derived from the associated base code sequence, or from a plurality of derived code sequences derived from the base code sequence associated with the control information to be reported; and a transmitting section that transmits the selected code sequence in a random access channel.

[0009] The radio transmission method of the present invention includes steps of: selecting one code sequence from a base code sequence associated with control information to be reported and a plurality of derived code sequences derived from the corresponding base code

sequence, or from a plurality of derived code sequences derived from the base code sequence associated with the control information to be reported; and transmitting the selected code sequence in a random access channel.

Advantageous Effect of the Invention

[0010] The present invention provides an advantage of reporting control information efficiently in the RACH.

Brief Description of Drawings

[0011]

FIG.1 is a block diagram showing the configuration of the mobile station according to Embodiment 1;

FIG.2 illustrates the CAZAC sequences according to Embodiment 1;

FIG.3 shows the control information according to Embodiment 1;

FIG.4 is the reference table (table example 1) according to Embodiment 1;

FIG.5 is the reference table (a simplified version of the reference table in FIG.4) according to Embodiment 1;

FIG.6 shows an example of control information multiplexing according to Embodiment 1;

FIG.7 shows the rate of occurrence of control information according to Embodiment 1;

FIG.8 shows the reference table (table example 2)

according to Embodiment 1;

FIG.9 shows the reference table (table example 3) according to Embodiment 2;

FIG.10 is a block diagram showing the configuration of the mobile station according to Embodiment 3; and

FIG.11 is the reference table (table example 4) according to Embodiment 3.

Best Mode for Carrying Out the Invention

[0012] Now, embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[0013] (Embodiment 1)

FIG.1 shows the configuration of mobile station 10 of the present embodiment.

[0014] RACH generating section 11 is constructed of signature selecting section 111 and modulating section 112, and generates a RACH signal as follows.

[0015] Signature selecting section 111 selects one of a plurality of unique code sequences as a signature, according to inputted control information, and outputs the selected code sequence to modulating section 112. The signature selection (code sequence selection) will be described later in detail.

[0016] Modulating section 112 modulates the signature (code sequence) to generate a RACH signal and outputs the RACH signal to multiplexing section 12.

[0017] On the other hand, encoding section 13 encodes user data and outputs the encoded user data to modulating section 14.

[0018] Modulating section 14 modulates the encoded user data and outputs the modulated user data to multiplexing section 12.

[0019] Multiplexing section 12 time-domain-multiplexes the RACH signal and the user data, and outputs the time-domain-multiplexed RACH signal and user data to radio transmitting section 15. That is, after the RACH signal transmission is completed, multiplexing section 12 outputs the user data to radio transmitting section 15.

[0020] Radio transmitting section 15 performs radio processing including up-conversion on the RACH signal and user data, and transmits the result to the base station via antenna 16.

[0021] Next, the signature selection (code sequence selection) will be described in detail.

[0022] In the present embodiment, GCL sequences or CAZAC sequences are used as signatures (code sequences).

[0023] GCL sequence $C_k(n)$ is given by equations 1 and 2. GCL sequence is a code sequence having high autocorrelation and low cross-correlation and having frequency response characteristics of constant amplitude. Here, N is an arbitrary integer and represents the sequence length. Moreover, k is an integer between 1 and N-1.

Further, n represents the n-th in the code sequence length N and is an integer between 0 and N-1. The GCL sequence found by equations 1 and 2 serves as the base code sequence.

[1]

$$C_k(n) = \alpha \cdot \exp\left(\frac{j2\pi k}{N}\left(\beta \cdot n + \frac{n(n+1)}{2}\right)\right)$$ where N is an odd number

...(Equation 1)

[2]

$$C_k(n) = \alpha \cdot \exp\left(\frac{j2\pi k}{N}\left(\beta \cdot n + \frac{n^2}{2}\right)\right)$$ where N is an even number

...(Equation 2)

[0024] Here, to acquire a large number of GCL sequences of low cross-correlations, the sequence length N is preferably an odd number and a prime number. Then, if the sequence length N is an odd number, by cyclically shifting, according to equation 3, the base code sequence given by equation 1, a plurality of derived code sequences $C_{k,m}(n)$ of respective numbers of cyclic shifts, can be acquired from a base code sequence $C_k(n)$.

[3]

$$C_{k,m}(n) = \alpha \cdot \exp\left(\frac{j2\pi k}{N}\left(\beta \cdot (n + m \cdot \Delta) \bmod N + \frac{(n + m \cdot \Delta) \bmod N \cdot ((n + m \cdot \Delta) \bmod N + 1)}{2}\right)\right)$$

...(Equation 3)

[0025] Then, the GCL sequence where α and β are 1 in equations 1 to 3 is a CAZAC sequence, and the CAZAC sequences are code sequences of the lowest cross-correlation among GCL sequences. That is, the base

code sequence of CAZAC sequence $C_k(n)$ is found by equations 4 and 5. When the code sequence length N is an odd number, by cyclically shifting, according to equation 6, the base code sequence found by equation 4, with CAZAC sequences similar to GCL sequences, a plurality of derived code sequences $C_{k,m}(n)$ of respective numbers of cyclic shifts can be acquired from a base code sequence $C_k(n)$.

[4]

$$C_k(n) = \exp\left(\frac{j2\pi k}{N}\left(n + \frac{n(n+1)}{2}\right)\right) \quad \text{where N is odd number}$$

...(Equation 4)

[5]

$$C_k(n) = \exp\left(\frac{j2\pi k}{N}\left(n + \frac{n^2}{2}\right)\right) \quad \text{where N is even number}$$

...(Equation 5)

$$C_{k,m}(n) = \exp\left(\frac{j2\pi k}{N}\left((n + m\cdot\Delta) \bmod N + \frac{(n + m\cdot\Delta) \bmod N \cdot ((n + m\cdot\Delta) \bmod N + 1)}{2}\right)\right)$$

...(Equation 6)

[0026] Although an example of cases will be explained below where the CAZAC sequence is used as a signature (code sequence), it is obvious from the above explanation that the present invention is also implemented when the GCL sequence is used as a signature (a code sequence).

[0027] FIG.2 shows, in CAZAC sequences, eight derived code sequences $C_{1,0}(n)$ to $C_{1,7}(n)$ of the numbers of cyclic shifts m = 0 to 7 (i.e. shift 0 to 7) that can be generated from a single base code sequence (CAZAC sequence #1),

given that the sequence length N is 293, the cyclic shift value Δ is 36 and k is 1. If k is 2 or greater, equally, eight derived code sequences may be generated from a single base code sequence. That is, if CAZAC sequences #1 to #8 are used as the base code sequences, sixty four code sequences in total can be utilized as signatures. A base code sequence and a derived code sequence where the shift is zero are the same. Moreover, the cyclic shift value Δ needs to be set greater than the maximum propagation delay time of signatures. This results from occurring error detection of signatures in the base station, if a plurality of mobile stations transmit a plurality of signatures at the same time and delay waves are received with delays beyond the cyclic shit value Δ, the base station is unable to decide whether it received signature with large delay time or it received signatures of different cyclic shift values. This maximum propagation delay time depends on the cell radius, that is, the distance of the maximum propagation path between the mobile station and the base station.

[0028] In the present embodiment, the base code sequences and derived code sequences acquired as such associated with control information are used as the signatures.

[0029] Signature selecting section 111 receives received quality information as, for example, control information shown in FIG.3. Pieces of control information "000" to "111" are associated with received

quality (i.e. SINRs) shown in FIG.3, respectively, and one of pieces of the control information "000" to "111" is inputted to signature selecting section 111 as the control information to be reported.

[0030] Signature selecting section 111, which has the table shown in FIG.4, selects one of the signatures (code sequences) with reference to the table shown in FIG.4 based on the inputted control information to be reported.

[0031] In this table, as shown in FIG.4, control information "000" to "111" are provided in association with CAZAC sequences #1 to #8, which are the base code sequences. Furthermore, for each CAZAC sequence #1 to #8, control information "000" to "111" are provided in association with derived code sequences of shifts 0 to 7 derived from each CAZAC sequence #1 to #8. FIG.5 shows a simplified version of the table shown in FIG.4.

[0032] In the table shown in FIG.4, for example, the control information "000" is provided in association with CAZAC sequence #1 and derived code sequences of shifts 0 to 7 derived from CAZAC sequence #1. The derived code sequences of shifts 0 to 7 of CAZAC sequence #1 correspond to signatures #1 to #8, respectively. Moreover, control information "001" is provided in association with CAZAC sequence #2 and derived code sequences of shifts 0 to 7 derived from CAZAC sequence #2. The derived code sequences of shifts 0 to 7 of CAZAC sequence #2 correspond to signatures #9 to #16, respectively. The same applies

to control information "010" to "111." That is, in the present embodiment, one piece of control information is associated with a single base code sequence and a plurality of unique derived code sequences derived from this single base code sequence. Moreover, the unique 64 code sequences are associated with signatures #1 to #64.

[0033] Then, when, for example, "000" is inputted as the control information to be reported, signature selecting section 111 selects one code sequence from code sequences of shifts 0 to 7 of CAZAC sequence #1 as the signature. The base code sequence and a derived code sequence of shift 0 are the same, so that signature selecting section 111 selects one code sequence as a signature from the base code sequence corresponding control information to be reported and a plurality of derived code sequences derived from the corresponding base code sequence, or from a plurality of derived code sequences derived from the base code sequence corresponding to the control information to be reported.

[0034] Consequently, according to the present embodiment, the mobile station utilizes signatures as control information upon reporting control information in the RACH, so that the mobile station does not need to transmit control information in addition to signatures. Moreover, the base station that receives a signature can detect control information by detecting the signature at the same time. In this way, according to the present

embodiment, control information can be reported efficiently in the RACH.

[0035] In the present embodiment, taking into account that a plurality of mobile stations transmit the identical control information at the same time, it is preferable that signature selecting section 111 selects one of the eight code sequences corresponding to the inputted control information on a random basis. For example, when the control information "000" is inputted, taking into account that a plurality of mobile stations report identical control information "000" at the same time, signature selecting section 111 preferably selects one of code sequences (signatures #1 to #8) of shifts #0 to #7 of CAZAC sequence #1 corresponding to the control information "000" on a random basis. Even when a plurality of mobile stations transmit the identical control information at the same time, this random selection reduces the likelihood of selecting the same code sequence between separate mobile stations, so that the base station is more likely to improve the likelihood of demultiplexing and detecting the signatures transmitted from the individual mobile stations.

[0036] Moreover, a configuration may also be employed where signature selecting section 111 may select the code sequence associated with the control information to be reported from the code sequences prepared in advance (here, 64 code sequences #1 to #64), or select the CAZAC sequence

number k and the number of shifts m associated with the control information to be reported to generate a code sequence $C_{k,m}(n)$ from equation 6 every selection. Whichever configuration is employed, as a result, signature selecting section 111 selects one of signatures (code sequences) based on control information to be reported.

[0037] Here, a plurality of derived code sequences derived from a single base code sequence are completely orthogonal, and the cross-correlation is zero between these derived code sequences.

[0038] On the other hand, although cross-correlation between a plurality of base code sequences is relatively low, these base code sequences are not completely orthogonal, and the cross-correlation is not zero. The same applies to derived code sequences derived from different code sequences.

[0039] That is, a plurality of derived code sequences derived from a single base code sequence have a feature of having a lower cross-correlation than the cross correlation between a plurality of base code sequences and the cross-correlation between derived code sequences derived from different code sequences.

[0040] That is, in the table shown in FIG.4, with CAZAC sequence #1 corresponding to control information "000" and CAZAC sequence #2 corresponding to control information "001," the cross-correlation between the code

sequences of shifts 0 to 7 of CAZAC sequence #1 is lower than the cross-correlation between CAZAC sequence #1 and CAZAC sequence #2 and the cross-correlation between the code sequences of shifts 0 to 7 of CAZAC sequence #1 and the code sequences of shifts 0 to 7 of CAZAC sequence #2. That is, the cross-correlation between the identical control information can be lower in than the cross-correlation between different control information by adopting the associations shown in FIG.4.

[0041] That is, as shown in FIG.6, even when identical control information ("000") is reported at the same time from a plurality of mobile stations (mobile stations A to C) and a plurality of signatures are multiplexed in the RACH, if code sequences with unique numbers of shifts (shifts 0, 3 and 7) derived from the same base code sequence (CAZAC sequence #1) are multiplexed as signatures, intersymbol interference between the signatures is ideally zero, and the performance of demultiplexing and detecting signatures in the base station hardly degrades compared with a case where multiplexing is not performed, even when the number of multiplexing increases.

[0042] On the other hand, as shown in FIG.6, when there is a mobile station (mobile station D) reporting different control information ("001"), code sequence (shift 2) derived from the different base code sequence (CAZAC sequence #2) is multiplexed as a signature, and so the performance of demultiplexing and detecting signatures

in the base station degrades when the number of multiplexing increases.

[0043] That is, the present embodiment is effective particularly when the identical control information is reported from a plurality of mobile stations at the same time. The specific and identical control information is more likely to be reported from a plurality of mobile stations at the same time when the rate of occurrence of the pieces of control information is less uniform.

[0044] For example, in a situation where there is a train station in the cell and there are always a large number of mobile stations in a specific location in the cell, the mobile stations in this specific location are likely to have nearly uniform received quality, so that the specific and identical control information is likely to have a high rate of occurrence and are reported from a plurality of mobile stations at the same time.

[0045] Moreover, received quality in a mobile station increases closer to the center of a cell where the base station is located and gradually decreases farther from the center of the cell. Further, this area increases as farther from the center of the cell. Accordingly, in the situation where mobile stations are uniformly distributed in the cell, as shown in FIG.7, it is possible that when the rate of occurrence is high at lower received quality (SINR), there are a large number of mobile stations reporting control information showing lower received

quality (SINR). Accordingly, in the situation as such, for control information showing lower received quality, the identical control information is likely to be reported from a plurality of mobile stations at the same time. That is, in this situation, the specific and identical control information is likely to be reported from a plurality of mobile stations at the same time.

[0046] In this way, according to the present embodiment, it is possible to keep the rate of detection of signatures and control information at the base station high, in the situation where there are a large number of mobile stations reporting the identical control information in the RACH.

[0047] When the cell radius is small, the table shown in FIG.8 may be used instead of the table shown in FIG.4. That is, the maximum propagation delay time of the signatures is small and the cyclic shift value Δ can be less when the cell radius is small, so that, to decrease the cross-correlation between different pieces of control information, as shown in FIG.8, a plurality of pieces of control information may be associated with a single base code sequence. In the table shown in FIG.8, control information "000" to "011" are associated with CAZAC sequence #1, and control information "000" is associated with the code sequence of shifts 0 to 7 of CAZAC sequence #1, control information "001" is associated with the code sequence of shifts 8 to 15 of CAZAC sequence #1, control information "010" is associated with the code sequence

of shifts 16 to 23 of CAZAC sequence #1, and control information "011" is associated with the code sequence of shifts 24 to 31 of CAZAC sequence #1. Moreover, control information "100" to "111" are associated with CAZAC sequence #2, control information "100" is associated with the code sequence of shifts 0 to 7 of CAZAC sequence #2, control information "101" is associated with the code sequence of shifts 8 to 15 of CAZAC sequence #2, control information "110" is associated with the code sequence of shifts 16 to 23 of CAZAC sequence #2, and control information "111" is associated with the code sequence of shifts 24 to 31 of CAZAC sequence #2. These associations make it possible to associate different pieces of control information with derived code sequences of different shift values derived from a single base code sequence, so that it is possible to decrease the cross-correlation between different pieces of control information and keep the rate of detection of signatures and control information at the base station high even when there are a large number of mobile stations reporting the different control information at the same time.

[0048] (Embodiment 2)

As shown in FIG.7 above, there are cases where the rate of occurrence is not uniform between control information in the cell. That is, in such a case, it is preferable to assign more code sequences to control information occurred much.

[0049] Now, the present embodiment does not employ tables (FIGs.4, 5 and 8) that provide various pieces of control information in association with the same number of code sequences as in Embodiment 1. Instead, the present embodiment employs a table that associates control information of a higher rate of occurrence with more base code sequences or more derived code sequences, as shown in FIG.9.

[0050] When control information of high rate of occurrence is reported from a plurality of mobile stations at the same time, use of this table reduces the rate of transmitting the same code sequences from a plurality of mobile stations, so that it is possible to reduce the rate of collisions between code sequences and to keep the rate of detection of signatures and control information at the base station high.

[0051] Moreover, at this time, when one piece of control information is provided in association with a plurality of base code sequences, to keep the cross-correlation between the identical control information low, it is preferable to associate derived code sequences derived from a single base code sequence preferentially. For example, when one piece of control information like control information "000" in FIG.9 is provided in association with CAZAC sequences #1 and #2, control information "000" is preferentially associated with all derived code sequences derived from CAZAC sequence #1

and, the rest of the piece is associated with part of the derived code sequences derived from CAZAC sequence #2. That is, in the table shown in FIG.9, one piece of control information is provided in association with a plurality of base code sequences and all of the derived code sequences derived from at least one of a plurality of the base code sequences.

[0052] Moreover, although a case has been described above with the present embodiment where the number of code sequences assigned to each control information is determined according to the rate of occurrence of each control information, the number of code sequences assigned to each control information is determined according to, for example, the significance, priority, the number of retransmissions, and QoS of each control information. That is, the present embodiment employs the table that provides the pieces of control information in association with different numbers of base code sequences or different numbers of derived code sequences.

[0053] (Embodiment 3)

The rate of occurrence of control information changes in a cell. For example, at a single place in a cell, there are a number of mobile stations in daytime larger than in nighttime, and the rate of occurrence for the specific and identical control information is higher in daytime than nighttime in such a case.

[0054] Then, according to the present embodiment, the

number of base code sequences or the number of derived code sequences associated with pieces of control information change according to changes of the rate of occurrence of control information.

[0055] FIG.10 shows the configuration of mobile station 30 according to the present embodiment. In FIG.10, the same reference numerals will be assigned to the same component in FIG.1 (Embodiment 1), and description thereof will be omitted.

[0056] Radio receiving section 31 receives control signal transmitted from the base station via antenna 16, performs radio processing including down-conversion of the control signal, and outputs the control signal to demodulating section 32. This control signal is transmitted in the broadcast control channel from the base station and designates to change the associations between control information and the code sequences in the table according to the rate of occurrence of control information. The rate of occurrence of control information is measured in the base station receiving signatures.

[0057] Demodulating section 32 demodulates the control signal and outputs the demodulated control signal to control section 33.

[0058] Control section 33 changes the associations in the table provided in the signature selecting section 111 according to the control signal. For example, control

section 33 changes the associations in the table shown in FIG.9 above as shown in FIG.11. FIG.11 shows a case where the number of code sequences associated with control information "000" is increased due to an increased rate of occurrence of control information "000" and where the number of code sequences associated with control information "001" is decreased due to a decreased rate of occurrence of control information "001."

[0059] In this way, according to the present embodiment, the number of code sequences associated with each control information is changed according to changes of rate of occurrence of control information, so that it is possible to keep the rate of detection of signatures and control information at the base station high even when the rate of occurrence of control information is changed.

[0060] The embodiments of the present invention have been explained.

[0061] Although cases have been explained above with the embodiments where signature selecting section 111 adopts the configuration of the tables above, the tables above may also be adopted outside of signature selecting section 111. Moreover, the tables are not particularly required if the control information and the code sequence are associated in different manners.

[0062] Moreover, in the embodiments, although GCL sequence and CAZAC sequence are explained as an example of code sequences, any code sequence may be used if levels

of cross-correlations vary between the code sequences.

[0063] Moreover, control information reported from the mobile station is not limited to received quality information. Other control information includes, for example, a mobile station ID, a reason of RACH transmission, bandwidth allocation request information (QoS information and an amount of data and so on), RACH transmission power, and difference between the maximum value of RACH transmission power and present transmission power.

[0064] Moreover, the mobiles station and the base station according to the embodiments may be referred to as "UE" and "Node-B."

[0065] Moreover, although cases have been described with the embodiments above where the present invention is configured by hardware, the present invention may be implemented by software.

[0066] Each function block employed in the description of the aforementioned embodiment may typically be implemented as an LSI constituted by an integrated circuit. These may be individual chips or partially or totally contained on a single chip. "LSI" is adopted here but this may also be referred to as "IC," "system LSI," "super LSI" or "ultra LSI" depending on differing extents of integration.

[0067] Further, the method of circuit integration is not limited to LSI's, and implementation using dedicated

circuitry or general purpose processors is also possible. After LSI manufacture, utilization of an FPGA (Field Programmable Gate Array) or a reconfigurable processor where connections and settings of circuit cells within an LSI can be reconfigured is also possible.

[0068] Further, if integrated circuit technology comes out to replace LSI's as a result of the advancement of semiconductor technology or a derivative other technology, it is naturally also possible to carry out function block integration using this technology. Application of biotechnology is also possible.

[0069] The disclosure of Japanese Patent Application No.2006-076995, filed on March 20, 2006, including the specification, drawings and abstract, is incorporated herein by reference in its entirety.

Industrial Applicability

[0070] The present invention is suitable for use in transmission of uplink common channels including a RACH.

CLAIMS

1. A radio communication mobile station apparatus comprising:

a selecting section that selects one code sequence from a base code sequence associated with control information to be reported and a plurality of derived code sequences derived from the associated base code sequence, or from a plurality of derived code sequences derived from the base code sequence associated with the control information to be reported; and

a transmitting section that transmits the selected code sequence in a random access channel.

2. The radio communication mobile station apparatus according to claim 1, further comprising a table in which a plurality of pieces of control information are provided in association with the plurality of base code sequences and the plurality of derived code sequences derived from the plurality of base code sequences on a per base code sequence basis,

wherein the selecting section selects the one of the code sequences with reference to the table based on the control information to be reported.

3. The radio communication mobile station apparatus according to claim 1, further comprising a table in which one of the plurality of pieces of control information

is provided in association with one base code sequence and the plurality of derived code sequences derived from said one base code sequence,

wherein the selecting section selects the one of the code sequences with reference to the table based on the control information to be reported.

4. The radio communication mobile station apparatus according to claim 1, further comprising a table in which one of the plurality of pieces of control information is provided in association with the plurality of base code sequences and all of the derived code sequences derived from at least one of said plurality of base code sequence;

wherein the selecting section selects the one of the code sequences with reference to the table based on the control information to be reported.

5. The radio communication mobile station apparatus according to claim 1, further comprising a table in which a plurality of pieces of control information are provided in association with respective numbers of base code sequences or respective numbers of derived code sequences derived from the base code sequences,

wherein the selecting section selects the one of the code sequences with reference to the table based on the control information to be reported.

6. The radio communication mobile station apparatus according to claim 5, wherein, in the table, control information of a higher rate of occurrence is provided in association with more base code sequences or more derived code sequences.

7. The radio communication mobile station apparatus according to claim 6, further comprising a control section that changes the number of base code sequences or the number of the derived code sequences associated with pieces of control information according to changes of the rate of occurrence.

8. The radio communication mobile station apparatus according to claim 1, wherein the derived code sequences are generated by cyclically shifting the base code sequence.

9. The radio communication mobile station apparatus according to claim 1, wherein the base code sequence comprises a generalized chirp-like sequence.

10. The radio communication mobile station apparatus according to claim 1, wherein the base code sequence comprises a constant amplitude zero auto-correlation sequence.

11. A radio communication method comprising the steps of:

selecting one code sequence from a base code sequence associated with control information to be reported and a plurality of derived code sequences derived from the associated base code sequence, or from a plurality of derived code sequences derived from the base code sequence associated with the control information to be reported; and

transmitting the selected code sequence in a random access channel.

ABSTRACT

Provided is a mobile station capable of effectively reporting control information in RACH. In the mobile station, a signature selection unit (111) selects one of different code sequences as a signature according to inputted control information and a modulation unit (112) modulates a signature (code sequence). In a table provided in the signature selection unit (111), for control information '000', CAZAC sequence #1 as a basic code sequence and a derived code sequence of shifts 0 to 7 derived from the CAZAC sequence #1 are set while being correlated to each other. The derived code sequence of shifts 0 to 7 of the CAZAC sequence #1 respectively correspond to signatures #1 to #8. Moreover, for control information '001', CAZAC sequence #2 as a basic code sequence and a derived code sequence of shifts 0 to 7 derived from CAZAC sequence #2 are set while being correlated to each other. The derived code sequence of shifts 0 to 7 of the CAZAC sequence #2 respectively correspond to the signatures #9 to #16.

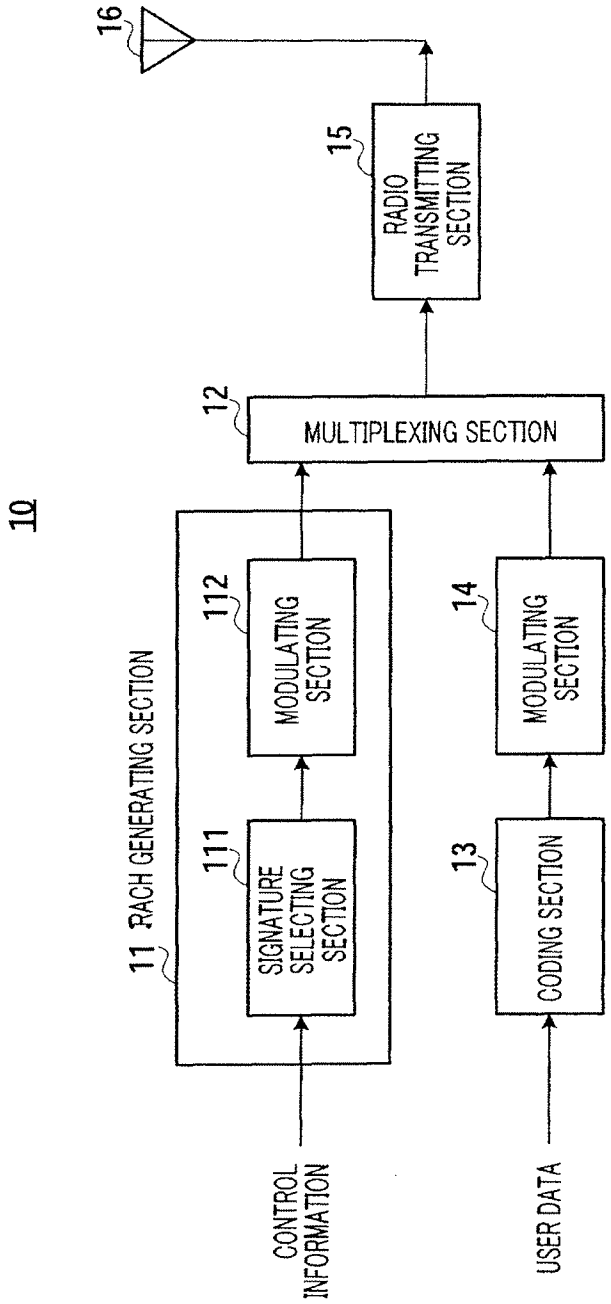

10
16
15
RADIO TRANSMITTING SECTION
12
MULTIPLEXING SECTION
11 RACH GENERATING SECTION
112
MODULATING SECTION
111
SIGNATURE SELECTING SECTION
14
MODULATING SECTION
13
CODING SECTION
CONTROL INFORMATION
USER DATA

FIG.1

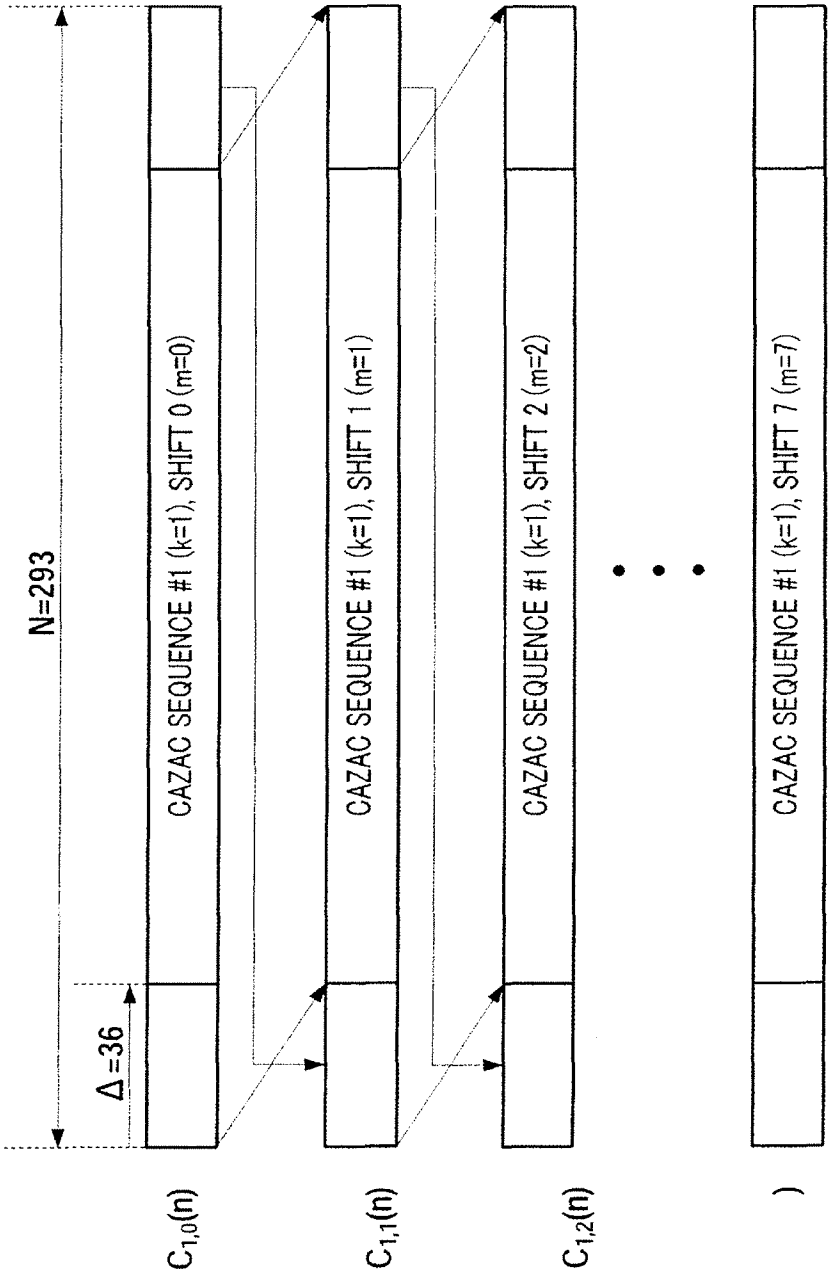

N=293
Δ=36
CAZAC SEQUENCE #1 (k=1), SHIFT 0 (m=0)
CAZAC SEQUENCE #1 (k=1), SHIFT 1 (m=1)
CAZAC SEQUENCE #1 (k=1), SHIFT 2 (m=2)
CAZAC SEQUENCE #1 (k=1), SHIFT 7 (m=7)
C1,0(n)
C1,1(n)
C1,2(n)
C1,7(n)

FIG.2

RECEIVED QUALITY	CONTROL INFORMATION
SINR＜-5dB	000
-5dB≦SINR＜ 0dB	001
0dB≦SINR＜ 5dB	010
5dB≦SINR＜10dB	011
10dB≦SINR＜15dB	100
15dB≦SINR＜20dB	101
20dB≦SINR＜25dB	110
25dB≦SINR	111

FIG.3

CONTROL INFORMATION	CAZAC SEQUENCE NUMBER: k	SHIFT: m	SIGNATURE NUMBER
000	#1	0	#1
		1	#2
		⋮	⋮
		7	#8
001	#2	0	#9
		1	#10
		⋮	⋮
		7	#16
010	#3	0	#17
		1	#18
		⋮	⋮
		7	#24
011	#4	0	#25
		1	#26
		⋮	⋮
		7	#32
100	#5	0	#33
		1	#34
		⋮	⋮
		7	#40
101	#6	0	#41
		1	#42
		⋮	⋮
		7	#48
110	#7	0	#49
		1	#50
		⋮	⋮
		7	#56
111	#8	0	#57
		1	#58
		⋮	⋮
		7	#64

TABLE

FIG.4

CONTROL INFORMATION	CAZAC SEQUENCE NUMBER: k	SHIFT: m
000	#1	0～7
001	#2	0～7
010	#3	0～7
011	#4	0～7
100	#5	0～7
101	#6	0～7
110	#7	0～7
111	#8	0～7

TABLE

FIG.5

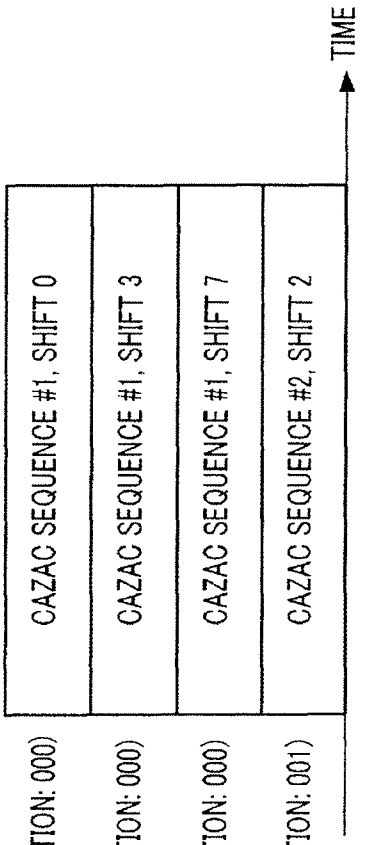

MOBILE STATION A (CONTROL INFORMATION: 000)
MOBILE STATION B (CONTROL INFORMATION: 000)
MOBILE STATION C (CONTROL INFORMATION: 000)
MOBILE STATION D (CONTROL INFORMATION: 001)
CAZAC SEQUENCE #1, SHIFT 0
CAZAC SEQUENCE #1, SHIFT 3
CAZAC SEQUENCE #1, SHIFT 7
CAZAC SEQUENCE #2, SHIFT 2
TIME

FIG.6

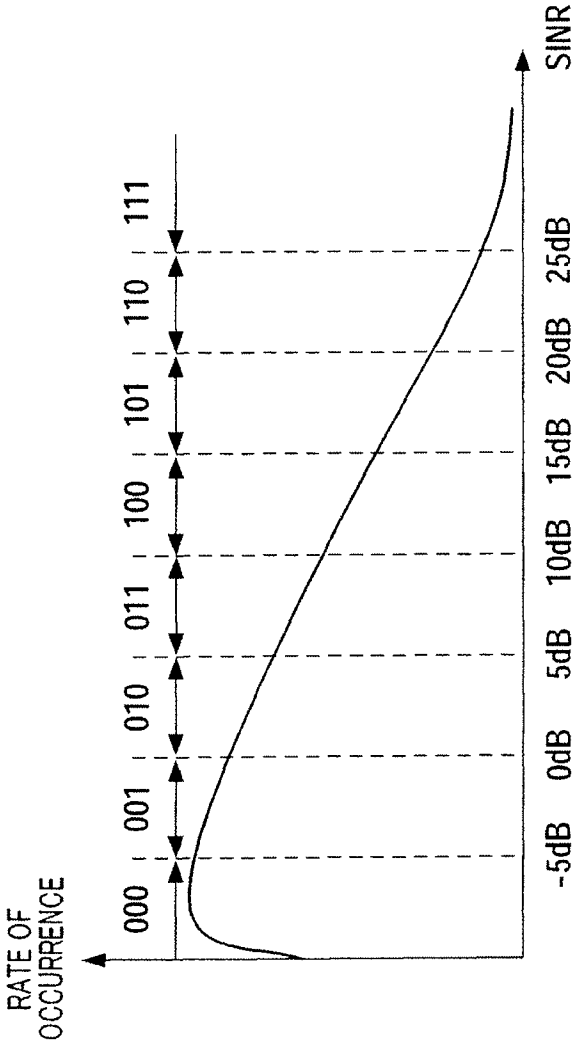

RATE OF OCCURRENCE
000
001
010
011
100
101
110
111
-5dB
0dB
5dB
10dB
15dB
20dB
25dB
SINR

FIG.7

CONTROL INFORMATION	CAZAC SEQUENCE NUMBER: k	SHIFT: m
000	#1	0～ 7
001		8～15
010		16～23
011		24～31
100	#2	0～ 7
101		8～15
110		16～23
111		24～31

TABLE

FIG.8

9/11

CONTROL INFORMATION	CAZAC SEQUENCE NUMBER: k	SHIFT: m	SIGNATURE NUMBER
000	#1	0	#1
		1	#2
		2	#3
		3	#4
		4	#5
		5	#6
		6	#7
		7	#8
	#2	0	#9
		1	#10
		2	#11
		3	#12
		4	#13
		5	#14
001		6	#15
		7	#16
	#3	0	#17
		1	#18
		2	#19
		3	#20
		4	#21
		5	#22
		6	#23
		7	#24
⋮	⋮	⋮	⋮
101	#8	0	#57
		1	#58
		2	#59
		3	#60
		4	#61
111		5	#62
		6	#63
		7	#64

TABLE

FIG.9

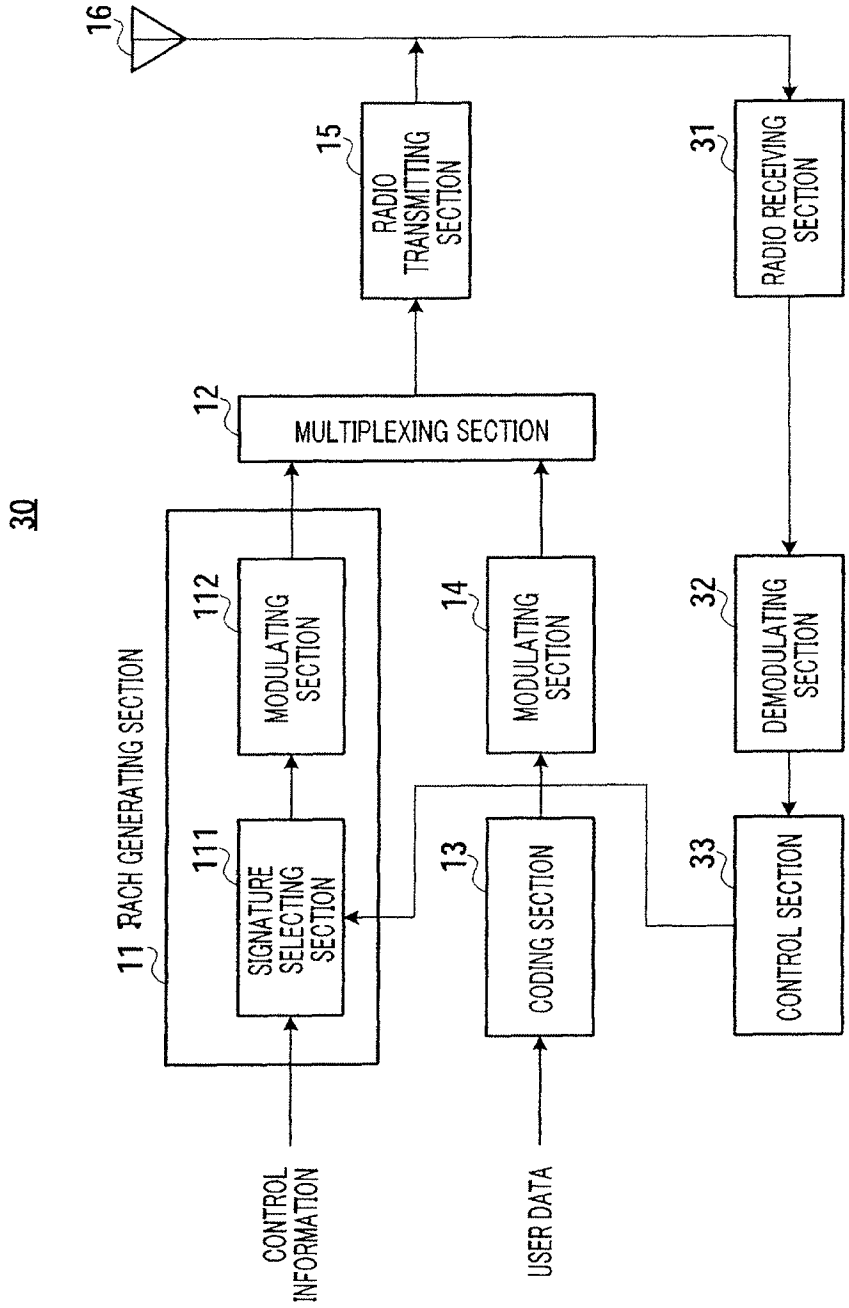

30
16
15
RADIO TRANSMITTING SECTION
31
RADIO RECEIVING SECTION
12
MULTIPLEXING SECTION
11 RACH GENERATING SECTION
112
MODULATING SECTION
111
SIGNATURE SELECTING SECTION
14
MODULATING SECTION
13
CODING SECTION
32
DEMODULATING SECTION
33
CONTROL SECTION
CONTROL INFORMATION
USER DATA

FIG.10

11/11

CONTROL INFORMATION	CAZAC SEQUENCE NUMBER: k	SHIFT: m	SIGNATURE NUMBER
000	#1	0	#1
		1	#2
		2	#3
		3	#4
		4	#5
		5	#6
		6	#7
		7	#8
	#2	0	#9
		1	#10
		2	#11
		3	#12
		4	#13
		5	#14
		6	#15
		7	#16
001	#3	0	#17
		1	#18
		2	#19
		3	#20
		4	#21
		5	#22
		6	#23
		7	#24
⋮	⋮	⋮	⋮
	#8	0	#57
101		1	#58
		2	#59
		3	#60
		4	#61
111		5	#62
		6	#63
		7	#64

TABLE

FIG.11

MEI Form -2.1, (Sep, 2007)

Matsushita Ref*: P044766-01 (*must be filled)
Japan Firm Name: WASHIDA & ASSOCIATES
US Firm Name: DW

Application Serial No.
Japan Firm Ref: 2F06320-US-P
US Firm Ref:

DECLARATION AND POWER OF ATTORNEY FOR U.S. PATENT APPLICATION

(a) ■ Original (b) ☐ Supplemental (c) ☐ Substitute (d) ☐ PCT (e) ☐ Design

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; and I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title of Invention:
RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

which is described and claimed in *(if the following box is not checked, the specification of which is attached hereto):*

1. For use when submitting this Declaration prior to U.S. application filing date				
(f) ☐ the attached specification, or				
2. For use when submitting this Declaration after U.S. application filing date				
(g) ☐ the specification in the U.S. Application:	Application No. (if available)		filed on: (must be filled)	
	and with amendments (if applicable):		filed on	,or
3. For PCT-US national entry under §5 U.S.C. 371 (for use when filing this Declaration before and after the U.S. national entry date)				
(h) ■ the specification in the International Application:	PCT Application No.	PCT/JP2007/055695	filed on: (PCT filing date)	March 20, 2007,
(Check here only for US national entry under §5 U.S.C. 371.)	and with amendments (if applicable):		filed on:	

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above.

I acknowledge my duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a-d), §172, or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, and have also identified below any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed:

(Foreign Priority Information)

COUNTRY	APPLICATION NO.	DATE OF FILING	PRIORITY CLAIMED
JAPAN	2006-076995	March 20, 2006	Yes

☐ Additional foreign or international application numbers are listed on a supplemental priority sheet attached hereto.

MEI Form -2.1, (Sep, 2007)

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States Provisional application(s) listed below.

(US Provisional Application Information)

APPLICATION NO.	U.S. PROVISIONAL APPLICATION FILING DATE

□ Additional U.S. provisional application numbers are listed on a supplemental priority sheet attached hereto.

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

(Domestic Priority Information)

APPLICATION NO.	U.S. FILING DATE	STATUS: PATENTED, PENDING, ABANDONED

□ Additional U.S. or international application numbers are listed on a supplemental priority sheet attached hereto.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the attorneys and agents associated with U.S. Patent and Trademark Office Customer Number identified below to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to that customer number.

I hereby authorize the U.S. attorneys and agents associated with the customer number to accept and follow instructions from Matsushita Electric Industrial Co., Ltd., and any affiliated or subsidiary company thereof, received via their corporate representatives and/or their foreign patent attorneys or agents, if any, as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys or agents and myself.

Direct Correspondence to:

CUSTOMER NUMBER 52989

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

INVENTOR (s)

Full Name of Sole or First Inventor	FIRST NAME Daichi	LAST NAME IMAMURA	SIGNATURE Daichi Imamura	DATE OF SIGNATURE August 29, 2008
Residence & Citizenship	CITY, STATE or COUNTRY Kanagawa, JAPAN			CITIZENSHIP JAPAN
Post office address	ADDRESS c/o Matsushita Electric Industrial Co., Ltd. 1006, Oaza Kadoma, Kadoma-shi, Osaka, Japan 571-8501	CITY	STATE OR COUNTRY	ZIP CODE

Full Name of Second Inventor	FIRST NAME Sadaki	LAST NAME FUTAGI	SIGNATURE Sadaki Futagi	DATE OF SIGNATURE Sep. 2, 2008
Residence & Citizenship	CITY, STATE or COUNTRY Ishikawa, JAPAN			CITIZENSHIP JAPAN
Post office address	ADDRESS c/o Panasonic Mobile Communications R&D Lab. Co., Ltd. 5, Akedori 2-chome, Izumi-ku, Sendai-shi, Miyagi, Japan 981-3206	CITY	STATE OR COUNTRY	ZIP CODE

MEI Form -2.1. (Sep, 2007)

INVENTOR (s)

Full Name of Third Inventor	FIRST NAME	LAST NAME	SIGNATURE	DATE OF SIGNATURE
	Atsushi	MATSUMOTO	Atsushi Matsumoto	Sep. 2, 2008
Residence & Citizenship	CITY, STATE or COUNTRY			CITIZENSHIP
	Ishikawa, JAPAN			JAPAN
Post office address	ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	c/o Panasonic Mobile Communications R&D Lab. Co., Ltd. 5, Akedori 2-chome, Izumi-ku, Sendai-shi, Miyagi, Japan 981-3206			

Full Name of Fourth Inventor	FIRST NAME	LAST NAME	SIGNATURE	DATE OF SIGNATURE
	Takashi	IWAI	Takashi Iwai	Sep. 2, 2008
Residence & Citizenship	CITY, STATE or COUNTRY			CITIZENSHIP
	Ishikawa, JAPAN			JAPAN
Post office address	ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	c/o Panasonic Mobile Communications R&D Lab. Co., Ltd. 5, Akedori 2-chome, Izumi-ku, Sendai-shi, Miyagi, Japan 981-3206			

Full Name of Fifth Inventor	FIRST NAME	LAST NAME	SIGNATURE	DATE OF SIGNATURE
	Tomofumi	TAKATA	Tomofumi Takata	Sep. 2, 2008
Residence & Citizenship	CITY, STATE or COUNTRY			CITIZENSHIP
	Ishikawa, JAPAN			JAPAN
Post office address	ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	c/o Panasonic Mobile Communications R&D Lab. Co., Ltd. 5, Akedori 2-chome, Izumi-ku, Sendai-shi, Miyagi Japan 981-3206			

Full Name of Sixth Inventor	FIRST NAME	LAST NAME	SIGNATURE	DATE OF SIGNATURE
Residence & Citizenship	CITY, STATE or COUNTRY			CITIZENSHIP
Post office address	ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE

Full Name of Seventh Inventor	FIRST NAME	LAST NAME	SIGNATURE	DATE OF SIGNATURE
Residence & Citizenship	CITY, STATE or COUNTRY			CITIZENSHIP
Post office address	ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE

Full Name of Eighth Inventor	FIRST NAME	LAST NAME	SIGNATURE	DATE OF SIGNATURE
Residence & Citizenship	CITY, STATE or COUNTRY			CITIZENSHIP
Post office address	ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE

☐ Check if additional paper(s) is/are attached. Total of 3 pages are submitted.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventors: Daichi IMAMURA, et al.

Appln. No.: New National Phase Patent Application

Filed: September 18, 2008

For: RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

CLAIM FOR PRIORITY

Assistant Commissioner of Patents
Washington, D.C. 20231

Dear Sir:

The benefit of the filing date of the following prior foreign application filed in the following foreign country is hereby requested for the above-identified application and the priority provided in 35 USC 119 is hereby claimed:

Japanese Appln. No. 2006-076995 March 20, 2006 (JP)

The International Bureau received the priority document within the time limit, as evidenced by the attached copy of the PCT/IB/304.

It is requested that the file of this application be marked to indicate that the requirements of 35 USC 119 have been fulfilled and that the Patent and Trademark Office kindly acknowledge receipt of this document.

Respectfully submitted,

/James Edward Ledbetter/

Date: September 18, 2008

James E. Ledbetter
Registration No. 28,732

JEL/att

ATTORNEY DOCKET NO. 009289-08201

Dickinson Wright PLLC
1901 L Street, N.W., Suite 800
Washington, D.C.
20036-3506
Telephone: 202.457.0160
Facsimile: 202.659.1559

PATENT COOPERATION TREATY PCT/JP2007/055695

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

WASHIDA, Kimihito
5th Floor, Shintoshicenter Bldg., 24-1, Tsurumaki
1-chome, Tama-shi, Tokyo
2060034
JAPON

Date of mailing *(day/month/year)* 01 June 2007 (01.06.2007)	
Applicant's or agent's file reference P044766P0	**IMPORTANT NOTIFICATION**
International application No. PCT/JP2007/055695	International filing date *(day/month/year)* 20 March 2007 (20.03.2007)
International publication date *(day/month/year)* **Not yet published**	Priority date *(day/month/year)* 20 March 2006 (20.03.2006)
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al	

1. By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt 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 a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).

2. *(If applicable)* The **letters "NR"** appearing in the right-hand column denote **a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau** under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit 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.

3. *(If applicable)***An asterisk (*)** appearing next to a date of receipt, in the right-hand column, denotes **a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b)** (the priority document was received after the time limit prescribed in Rule 17.1(a) or 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)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), 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.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
20 March 2006 (20.03.2006)	2006-076995	JP	25 May 2007 (25.05.2007)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Masashi Honda Facsimile No. +41 22 338 82 70 Telephone No. +41 22 338 74 08

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventors: Daichi IMAMURA, et al.

Appln. No.: New National Phase Patent Application

Filed: September 18, 2008

For: RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner of Patents
Washington, DC 20231

Dear Sir:

Pursuant to Rules 56 and 99, Applicants hereby call the attention of the Patent Office to the art listed on the attached Form PTO 1449.

Copies of the art cited in the International Search Report (ISR), which issued by the JPO, are made available to the U.S. examiner in the national stage application, pursuant to MPEP 1893.03(g), and therefore copies of such are not submitted herewith.

The art cited in the ISR is listed on the attached PTO-1449 for an indication of consideration by the examiner.

Copies of any other references listed on the PTO-1449, besides those cited in the ISR and U.S. patent documents, are submitted herewith.

Applicants present this art so that the Patent Office may, in the first instance, determine any relevancy thereof to the presently claimed invention, see Beckman Instruments, Inc. v. Chemtronics, Inc., 439 F.2d 1369, 1380, 165 USPQ 355, 364 (5th Cir. 1970). Also see Patent Office Rules 104 and 106.

Applicants respectfully request that this art be expressly considered during the prosecution of this application and made of record herein and appear among the "References Cited" on any patent to issue herefrom.

Respectfully submitted,

/James Edward Ledbetter/

Date: September 18, 2008

James E. Ledbetter
Registration No. 28,732

JEL/att

ATTORNEY DOCKET NO. 009289-08201

Dickinson Wright PLLC
1901 L Street, N.W., Suite 800
Washington, D.C.
20036-3506
Telephone: 202.457.0160
Facsimile: 202.659.1559

SHEET 1 OF 1

SUBSTITUTE FOR FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary)	ATTY. DOCKET NO. **009289-08201**	SERIAL NO. **New Patent Application**
	APPLICANT **Daichi IMAMURA, et al.**	
	FILING DATE **September 18, 2008**	GROUP **Unassigned**

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CORRESPONDENT	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	6 859 445	**2/2005**	**Moon**		

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CORRESPONDENT	TRANSLATION?	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	01/05050	**1/2001**	**WO**	**US 6 859 445**		

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

		DISCUSSED AND CITED IN SPEC?
	International Search Report dated June 5, 2007.	
	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink," Helsinki, Finland, 23-25 January, 2006.	**Page 2, line 20 (also cited in ISR)**
	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060047, NTT DoCoMo, NEC, Sharp, "Random Access Transmission in E-UTRA Uplink," Helsinki, Finland, 23–25 January, 2006, pages 1-8.	**Page 2, line 16**
	3GPP TS 25.214 V6.7.1 (2005-12), 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical Layer Procedures (FDD) (Release 6), December, 2005, pages 1-60.	
	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060480, Qualcomm, "Principles of RACH," Denver, USA, 13-17 February, 2006, pages 1-7.	**Page 2, line 24**

EXAMINER: Initial if citation is considered, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(Form PTO-1449 [6-4])

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi IMAMURA
Filer:	James Edward Ledbetter/Fatou Sonko
Attorney Docket Number:	009289-08201

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:				
National Stage Fee	1631	1	310	310
Natl Stage Search Fee - Report provided	1642	1	410	410
National Stage Exam - all other cases	1633	1	210	210
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**930**

Electronic Acknowledgement Receipt

EFS ID:	3968150
Application Number:	12293530
International Application Number:	PCT/JP2007/055695
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi IMAMURA
Customer Number:	52989
Filer:	James Edward Ledbetter
Filer Authorized By:	
Attorney Docket Number:	009289-08201
Receipt Date:	18-SEP-2008
Filing Date:	
Time Stamp:	18:10:40
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	$930
RAM confirmation Number	3352
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Transmittal of New Application	TRANS.PDF	131029 cf348f6316ae0ac43d2706a8aead810bd80ce9ce	no	3
Warnings:					
Information:					
2	Application Data Sheet	ADS.PDF	255081 50f900f5df79ecfe3f1d5d94f09e1426c16ae59b	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3		SPEC.PDF	911083 b1022cbffa801f0f558816e502d1d874544a8f79	yes	39

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	23
Claims	24	27
Abstract	28	28
Drawings-only black and white line drawings	29	39

Warnings:					
Information:					
4	Oath or Declaration filed	Dec.PDF	150345 3eb4771f27be3d86f7de8fa1f3c41d6af04d9c74	no	3
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	CFP.PDF	84500 4f1917a5fe4ff15bae5e1acd0a3aa4854f9d3bb90	no	3
Warnings:					
Information:					
6	Information Disclosure Statement Letter	IDS.PDF	169065 c02e3d7e957b7a4f10955c1d5577db814a20c6cb	no	5
Warnings:					
Information:					
7	NPL Documents	NPL1.PDF	334836 70fd11696cfd2c82adbf6a55410cce822ab2e875	no	8

Warnings:					
Information:					
8	NPL Documents	NPL2.PDF	2994833 11e771e363ab16d1c3b07bfb87e0964f5adf ff90	no	60
Warnings:					
Information:					
9	NPL Documents	NPL3.PDF	419845 5848f5694e7080300111b7b577ea7f182f752 0ddb	no	7
Warnings:					
Information:					
10	Fee Worksheet (PTO-06)	fee-info.pdf	33328 a22e8455ce49496790ace19d2fa335e12fd0 af99	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	5483945		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

(12) 特許協力条約に基づいて公開された国際出願

(19) 世界知的所有権機関
国際事務局

(43) 国際公開日
2007 年9 月27 日 (27.09.2007)

PCT

(10) 国際公開番号
WO 2007/108476 A1

(51) 国際特許分類:
H04Q 7/38 (2006.01) *H04B 1/707* (2006.01)

(21) 国際出願番号: PCT/JP2007/055695

(22) 国際出願日: 2007 年3 月20 日 (20.03.2007)

(25) 国際出願の言語: 日本語

(26) 国際公開の言語: 日本語

(30) 優先権データ:
特願2006-076995 2006 年3 月20 日 (20.03.2006) JP

(71) 出願人 (米国を除く全ての指定国について): 松下電器産業株式会社 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) [JP/JP]; 〒5718501 大阪府門真市大字門真１００６番地 Osaka (JP).

(72) 発明者; および

(75) 発明者/出願人 (米国についてのみ): 今村 大地 (IMAMURA, Daichi). 二木 貞樹 (FUTAGI, Sadaki). 松元 淳志 (MATSUMOTO, Atsushi). 岩井 敬 (IWAI, Takashi). 高田 智史 (TAKATA, Tomofumi).

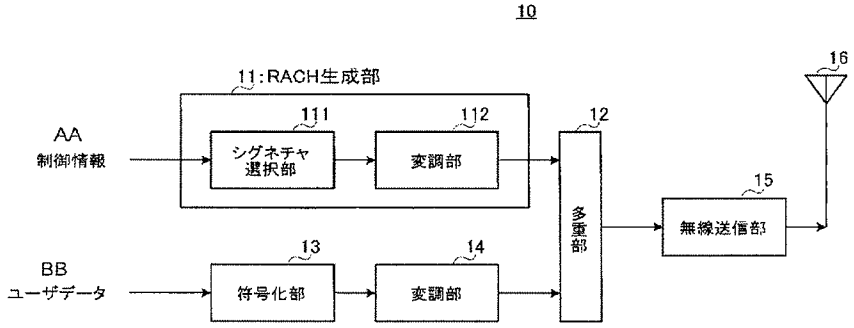
(74) 代理人: 鷲田 公一 (WASHIDA, Kimihito); 〒2060034 東京都多摩市鶴牧１丁目２４－１新都市センタービル５階 Tokyo (JP).

(81) 指定国 (表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, 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, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL,

[続葉有]

(54) Title: RADIO COMMUNICATION MOBILE STATION DEVICE AND RADIO COMMUNICATION METHOD

(54) 発明の名称: 無線通信移動局装置および無線通信方法



AA... CONTROL INFORMATION
BB... USER DATA
11... RACH GENERATION UNIT
111... SIGNATURE SELECTION UNIT
112... MODULATION UNIT
13... CODING UNIT
14... MODULATION UNIT
12... MULTIPLEXING UNIT
15... RADIO TRANSMISSION UNIT

(57) **Abstract:** Provided is a mobile station capable of effectively reporting control information in RACH. In the mobile station, a signature selection unit (111) selects one of different code sequences as a signature according to inputted control information and a modulation unit (112) modulates a signature (code sequence). In a table provided in the signature selection unit (111), for control information '000', CAZAC sequence #1 as a basic code sequence and a derived code sequence of shifts 0 to 7 derived from the CAZAC sequence #1 are set while being correlated to each other. The derived code sequence of shifts 0 to 7 of the CAZAC sequence #1 respectively correspond to signatures #1 to #8. Moreover, for control information '001', CAZAC sequence #2 as a basic code sequence and a derived code sequence of shifts 0 to 7 derived from CAZAC sequence #2 are set while being correlated to each other. The derived code sequence of shifts 0 to 7 of the CAZAC sequence #2 respectively correspond to the signatures #9 to #16.

(57) 要約: ＲＡＣＨにおける制御情報の通知を効率よく行うことができる移動局。この移動局において、シグネチャ選択部（１１１）は入力される制御情報に応じて、互いに異なる複数の符号系列の中からいずれか１つの符号系列をシグネチャとして選択し、変調部（１１２）はシグネチャ（符号系列）を変調する。シグネチャ選択部（１１１）に備えられるテーブルでは、制御情報‘００

[続葉有]

WO 2007/108476 A1

WO 2007/108476 A1

SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) 指定国 (表示のない限り、全ての種類の広域保護が可能): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

添付公開書類:
— 国際調査報告書

２文字コード及び他の略語については、定期発行される各*PCT*ガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

０’に対して、基本符号系列であるＣＡＺＡＣ系列＃１およびＣＡＺＡＣ系列＃１から派生したシフト０～７の派生符号系列が対応付けて設定され、ＣＡＺＡＣ系列＃１のシフト０～７の派生符号系列はそれぞれシグネチャ＃１～＃８に対応する。また、制御情報‘００１’に対しては、基本符号系列であるＣＡＺＡＣ系列＃２およびＣＡＺＡＣ系列＃２から派生したシフト０～７の派生符号系列が対応付けて設定され、ＣＡＺＡＣ系列＃２のシフト０～７の派生符号系列はそれぞれシグネチャ＃９～＃１６に対応する。

明 細 書

無線通信移動局装置および無線通信方法

技術分野

[0001] 本発明は、無線通信移動局装置および無線通信方法に関する。

背景技術

[0002] 現在、3GPP RAN LTE(Long Term Evolution)において、無線通信移動局装置(以下、移動局と省略する)から無線通信基地局装置(以下、基地局と省略する)への初期アクセスにRACH(Random Access Channel)を用いることが検討されている(非特許文献1参照)。RACHは、基地局への接続要求(Association Request)、基地局への帯域割当要求(Resource Request)、および、上り送信タイミングの同期取得等を行う際の初期アクセスに利用される。

[0003] RACH信号を送信する移動局は、RACH信号を送信する他の移動局と自局とを区別するために、RACHにおいて、複数の互いに異なるシグネチャの中からいずれか1つのシグネチャを選択して基地局へ送信する。

[0004] また、RACHでは複数の移動局から同時に複数のシグネチャが送信されることを考慮し、それらのシグネチャを基地局にて分離・検出できるように、シグネチャとして、相互相関が低く、かつ、自己相関が高い符号系列を用いることが検討されている。このような特性を有する符号系列として、GCL系列(Generalized Chirp-like)の1つであるCAZAC(Constant Amplitude Zero Auto-Correlation)系列が知られている(非特許文献2参照)。

[0005] さらに、初期アクセス以降の処理遅延を減少させるために、移動局ID、RACH送信理由、帯域割当要求情報(QoS情報やデータ量等)、および、下り回線での受信品質情報等の制御情報をRACHにて通知することが検討されている(非特許文献3参照)。

非特許文献1:3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060047, NTT DoCoMo, NEC, Sharp,"Random Access Transmission in E-UTRA Uplink", Helsinki, Finland, 23-25 January, 2006

非特許文献2:3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCo Mo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink", Helsinki , Finland, 23-25 January, 2006

非特許文献3:3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060480, Qualcomm, "Principles of RACH", Denver, USA, 13-17 February, 2006

発明の開示

発明が解決しようとする課題

[0006] 現在、RACHにおける制御情報の通知方法については様々な検討がなされているところであり、RACHにおいて制御情報を効率よく通知することが強く求められている。

[0007] 本発明の目的は、RACHにおける制御情報の通知を効率よく行うことができる移動局および無線通信方法を提供することである。

課題を解決するための手段

[0008] 本発明の移動局は、通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか1つの符号系列を選択する選択手段と、選択された符号系列をランダムアクセスチャネルにおいて送信する送信手段と、を具備する構成を採る。

[0009] また、本発明の無線通信方法は、通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか1つの符号系列を選択し、その選択した符号系列をランダムアクセスチャネルにおいて送信するようにした。

発明の効果

[0010] 本発明によれば、RACHにおける制御情報の通知を効率よく行うことができる。

図面の簡単な説明

[0011] [図1]実施の形態1に係る移動局の構成を示すブロック図

[図2]実施の形態1に係るCAZAC系列

[図3]実施の形態1に係る制御情報

[図4]実施の形態1に係る参照テーブル(テーブル例1)

[図5]実施の形態1に係る参照テーブル(図4の参照テーブルの簡略版)

[図6]実施の形態1に係る制御情報多重例

[図7]実施の形態1に係る制御情報発生率

[図8]実施の形態1に係る参照テーブル(テーブル例2)

[図9]実施の形態2に係る参照テーブル(テーブル例3)

[図10]実施の形態3に係る移動局の構成を示すブロック図

[図11]実施の形態3に係る参照テーブル(テーブル例4)

発明を実施するための最良の形態

[0012] 以下、本発明の実施の形態について、図面を参照して詳細に説明する。

[0013] (実施の形態1)

本実施の形態に係る移動局10の構成を図1に示す。

[0014] RACH生成部11は、シグネチャ選択部111および変調部112から構成され、以下のようにしてRACH信号を生成する。

[0015] シグネチャ選択部111は、入力される制御情報に応じて、互いに異なる複数の符号系列の中からいずれか1つの符号系列をシグネチャとして選択して変調部112に出力する。シグネチャ選択(符号系列選択)の詳細については後述する。

[0016] 変調部112は、シグネチャ(符号系列)を変調してRACH信号を生成し多重部12に出力する。

[0017] 一方、符号化部13は、ユーザデータを符号化して変調部14に出力する。

[0018] 変調部14は、符号化後のユーザデータを変調して多重部12に出力する。

[0019] 多重部12は、RACH信号とユーザデータとを時間多重して無線送信部15に出力する。すなわち、多重部12は、RACH信号の送信完了後、ユーザデータを無線送信部15に出力する。

[0020] 無線送信部15は、RACH信号およびユーザデータに対しアップコンバート等の無線処理を行って、アンテナ16を介して基地局へ送信する。

[0021] 次いで、シグネチャ選択(符号系列選択)の詳細について説明する。

[0022] 本実施の形態では、シグネチャ(符号系列)としてGCL系列またはCAZAC系列を用いる。

[0023] GCL系列C_k(n)は、式(1)および式(2)により与えられる。また、GCL系列は自己相関が高くかつ相互相関が低い符号系列であり、一定振幅の周波数応答特性を有する。ここで、Nは任意の整数で系列長を表す。また、kは1からN－1までのいずれかの整数である。また、nは、系列長Nのうちのn番目であることを示し、0からN－1までのいずれかの整数である。そして、式(1)および式(2)により与えられるGCL系列が基本符号系列となる。

[数1]

$$C_k(n) = \alpha \cdot \exp\left(\frac{j2\pi k}{N}\left(\beta \cdot n + \frac{n(n+1)}{2}\right)\right) \quad \text{Nが奇数の場合} \quad \cdots\text{式（1）}$$

[数2]

$$C_k(n) = \alpha \cdot \exp\left(\frac{j2\pi k}{N}\left(\beta \cdot n + \frac{n^2}{2}\right)\right) \quad \text{Nが偶数の場合} \quad \cdots\text{式（2）}$$

[0024] ここで、相互相関が低いGCL系列を数多く得るために、系列長Nは奇数かつ素数とするのが好ましい。そこで、系列長Nを奇数とした場合、式(1)により与えられる基本符号系列を式(3)に従って巡回シフトさせることにより、1つの基本符号系列C_k(n)から互いに巡回シフト数が異なる複数の派生符号系列$C_{k,m}$(n)を得ることができる。

[数3]

$$C_{k,m}(n) = \alpha \cdot \exp\left(\frac{j2\pi k}{N}\left(\beta \cdot (n + m \cdot \Delta) \bmod N + \frac{(n + m \cdot \Delta) \bmod N \cdot ((n + m \cdot \Delta) \bmod N + 1)}{2}\right)\right)$$

$\cdots$式（3）

[0025] そして、式(1)～式(3)においてα＝β＝1としたときのGCL系列がCAZAC系列となり、CAZAC系列はGCL系列の中でも最も相互相関が低い符号系列となる。つまり、CAZAC系列C_k(n)の基本符号系列は式(4)および式(5)により与えられ、系列長Nを奇数とした場合、式(4)により与えられる基本符号系列を式(6)に従って巡

回シフトさせることにより、CAZAC系列においても、GCL系列同様、1つの基本符号系列C_k(n)から互いに巡回シフト数が異なる複数の派生符号系列$C_{k,m}$(n)を得ることができる。

[数4]

$$C_k(n) = \exp\left(\frac{j2\pi k}{N}\left(n + \frac{n(n+1)}{2}\right)\right)$$ Nが奇数の場合 …式（4）

[数5]

$$C_k(n) = \exp\left(\frac{j2\pi k}{N}\left(n + \frac{n^2}{2}\right)\right)$$ Nが偶数の場合 …式（5）

[数6]

$$C_{k,m}(n) = \exp\left(\frac{j2\pi k}{N}\left((n + m\cdot\Delta) \bmod N + \frac{(n + m\cdot\Delta) \bmod N\cdot((n + m\cdot\Delta) \bmod N + 1)}{2}\right)\right)$$

…式（6）

[0026] 以下、シグネチャ(符号系列)としてCAZAC系列を用いた場合を一例として説明するが、上記説明からシグネチャ(符号系列)としてGCL系列を用いた場合も本発明を同様に実施できることは明らかである。

[0027] 図2に、CAZAC系列において、系列長N＝293、巡回シフト量(Cyclic shift value)Δ＝36、k＝1とした場合に、同一基本符号系列(CAZAC系列＃1)から生成可能な巡回シフト数m＝0～7(シフト0～7)の8つの派生符号系列$C_{1,0}$(n)～$C_{1,7}$(n)を示す。k＝2以上でも、同様に、同一基本符号系列からそれぞれ8つの派生符号系列が生成可能である。よって、基本符号系列としてCAZAC系列＃1～＃8を用いる場合は、合計64の符号系列をシグネチャとして利用することができる。なお、基本符号系列とシフト0の派生符号系列とは同一のものになる。また、巡回シフト量Δは、シグネチャの最大伝搬遅延時間より大きく設定する必要がある。これは、複数の移動局から同時に複数のシグネチャが送信された場合に、遅延波の遅延時間が巡回シフト量Δを超えると、基地局において、遅延時間が大きいシグネチャを受信したのか、シフト量が互いに異なるシグネチャを受信したのかのいずれであるかの判断が困難となり、

その結果、基地局においてシグネチャの誤検出が発生してしまうからである。この最大伝搬遅延時間は、セル半径、つまり移動局と基地局との間の最大伝搬経路長に依存する。

[0028] そして、本実施の形態では、このようにして得られるCAZAC系列の基本符号系列および派生符号系列を制御情報に対応付けてシグネチャとして用いる。

[0029] シグネチャ選択部111には、例えば図3に示すような受信品質情報が制御情報として入力される。制御情報'000'～'111'はそれぞれ図3に示す受信品質:SINRに対応し、制御情報'000'～'111'のいずれか1つが通知すべき制御情報としてシグネチャ選択部111に入力される。

[0030] シグネチャ選択部111は、図4に示すテーブルを備え、入力された通知すべき制御情報に基づいて図4に示すテーブルを参照していずれか1つのシグネチャ(符号系列)を選択する。

[0031] このテーブルでは、図4に示すように、制御情報'000'～'111'に対し、基本符号系列であるCAZAC系列＃1～＃8およびCAZAC系列＃1～＃8からそれぞれ派生したシフト0～7の派生符号系列がCAZAC系列＃1～＃8毎に対応付けて設定されている。なお、図4に示すテーブルを簡略化して示したものが図5である。

[0032] 図4に示すテーブルおいて、例えば、制御情報'000'に対しては、基本符号系列であるCAZAC系列＃1およびCAZAC系列＃1から派生したシフト0～7の派生符号系列が対応付けて設定されている。そして、CAZAC系列＃1のシフト0～7の派生符号系列はそれぞれシグネチャ＃1～＃8に対応する。また、制御情報'001'に対しては、基本符号系列であるCAZAC系列＃2およびCAZAC系列＃2から派生したシフト0～7の派生符号系列が対応付けて設定されている。そして、CAZAC系列＃2のシフト0～7の派生符号系列はそれぞれシグネチャ＃9～＃16に対応する。制御情報'010'～'111'についても同様である。つまり、本実施の形態では、1つの制御情報に対し、1つの基本符号系列およびその1つの同一基本符号系列から派生した互いに異なる複数の派生符号系列が対応付けられている。また、互いに異なる64個の符号系列に対し、シグネチャ＃1～＃64が対応付けられている。

[0033] そして、シグネチャ選択部111は、例えば通知すべき制御情報として'000'が入力

された場合は、CAZAC系列＃1のシフト0～7の符号系列の中からいずれか1つの符号系列をシグネチャとして選択する。基本符号系列とシフト0の派生符号系列とは同一のものとなるため、つまりシグネチャ選択部111は、通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか1つの符号系列をシグネチャとして選択すると言える。

[0034] よって、本実施の形態によれば、移動局は、RACHでの制御情報の通知にあたり、シグネチャを制御情報としても利用するため、シグネチャの他に別途制御情報を送信する必要がなくなる。また、シグネチャを受信した基地局では、シグネチャを検出することにより、同時に制御情報も検出することができる。このように、本実施の形態によれば、RACHにおける制御情報の通知を効率よく行うことができる。

[0035] なお、本実施の形態では、複数の移動局が同一の制御情報を同時に送信する場合を考慮し、シグネチャ選択部111は、入力された制御情報に対応する8つの符号系列の中からいずれか1つの符号系列をランダムに選択するのが好ましい。例えば、シグネチャ選択部111は、制御情報'000'が入力された場合には、複数の移動局が同一の制御情報'000'を同時に通知することを考慮し、制御情報'000'に対応するCAZAC系列＃1のシフト0～7の符号系列(シグネチャ＃1～＃8)の中からいずれか1つをランダムに選択するのが好ましい。このようにランダムに選択することにより、複数の移動局が同一の制御情報を同時に送信する場合でも、各移動局にて同一の符号系列が選択される確率が減少するため、基地局にて各移動局から送信されたシグネチャを分離・検出できる確率を高めることができる。

[0036] また、シグネチャ選択部111は、予め用意された符号系列(ここでは＃1～＃64の64個の符号系列)の中から通知すべき制御情報に対応する符号系列を選択する構成としてもよいし、または、通知すべき制御情報に対応するCAZAC系列番号kおよびシフト数mを選択して、その都度式(6)より符号系列$C_{k,m}(n)$を生成する構成としてもよい。いずれの構成を採っても、結果として、シグネチャ選択部111は、通知すべき制御情報に基づいていずれか1つのシグネチャ(符号系列)を選択することになる。

[0037] ここで、同一の基本符号系列から上記のようにして派生した複数の派生符号系列は完全に直交しており、それらの相互相関はゼロになる。

[0038] 一方で、複数の基本符号系列間での相互相関は比較的低いが、それらは完全には直交しておらずそれらの相互相関はゼロとはならない。異なる基本符号系列から派生した派生符号系列間でも同様である。

[0039] つまり、同一の基本符号系列から派生した複数の派生符号系列間での相互相関は、複数の基本符号系列間での相互相関、および、異なる基本符号系列から派生した派生符号系列間での相互相関よりも低いという特徴がある。

[0040] よって、図4に示すテーブルでは、例えば制御情報'000'に対応するCAZAC系列＃1と制御情報'001'に対応するCAZAC系列＃2とにおいて、CAZAC系列＃1のシフト0～7の符号系列間での相互相関は、CAZAC系列＃1とCAZAC系列＃2との間の相互相関、および、CAZAC系列＃1のシフト0～7の符号系列とCAZAC系列＃2のシフト0～7の符号系列との間の相互相関よりも低くなる。つまり、図4に示すような対応を採ることにより、同一制御情報間での相互相関を、異なる制御情報間での相互相関よりも低くすることができる。

[0041] よって、図6に示すように、複数の移動局(移動局A～C)から同時に同一の制御情報('000')が通知され、RACHにおいて複数のシグネチャが多重される場合でも、同一の基本符号系列(CAZAC系列＃1)から派生した互いに異なるシフト数(シフト0, 3, 7)の符号系列がシグネチャとして多重される場合には、シグネチャ間での符号間干渉は理想的にはゼロとなり、多重数が増加しても、多重がなされない場合と比較して基地局でのシグネチャの分離・検出性能はほとんど劣化しない。

[0042] 一方で、図6に示すように、異なる制御情報('001')を通知する移動局(移動局D)が存在する場合には、異なる基本符号系列(CAZAC系列＃2)から派生した符号系列(シフト2)がシグネチャとして多重されるため、基地局でのシグネチャの分離・検出性能は多重数が増えるほど劣化してしまう。

[0043] よって、本実施の形態は、複数の移動局から同時に同一の制御情報が通知される場合に特に有効である。そして、各制御情報の発生率に偏りがあるほど、ある特定の同一の制御情報が複数の移動局から同時に通知される可能性が高くなる。

[0044] 例えば、セル内に駅等が存在し、セル内の特定の箇所にいつも多数の移動局が存在するような状況では、その特定の箇所に位置する多数の移動局では受信品質がほぼ同一になると考えられるため、ある特定の同一の制御情報の発生率が高く、その特定の同一の制御情報が多数の移動局から同時に通知される可能性が高くなる。

[0045] また、移動局での受信品質は基地局が位置するセル中心ほど高く、セル中心から離れるに従って徐々に低くなる。また、セル中心から離れるほど面積は増加する。よって、移動局がセル内に一様に分布しているような状況では、図7に示すように、より低い受信品質(SINR)ほど発生率が高く、より低い受信品質(SINR)を示す制御情報を通知する移動局ほどより多く存在すると考えられる。よって、このような状況では、より低い受信品質を示す制御情報ほど、多数の移動局から同時に同一の制御情報が通知される可能性が高くなる。つまり、このような状況でも、ある特定の同一の制御情報が多数の移動局から同時に通知される可能性が高くなる。

[0046] このように、本実施の形態によれば、RACHにおいて同一の制御情報を通知する移動局が多数存在する状況において、特に基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

[0047] なお、セル半径が小さい場合は、図4に示すテーブルに代えて図8に示すテーブルを用いてもよい。すなわち、セル半径が小さい場合はシグネチャの最大伝搬遅延時間も小さく、巡回シフト量Δを小さくできるため、異なる制御情報間での相互相関をより低くすべく、図8に示すように、複数の制御情報に対し1つの基本符号系列を対応付けてもよい。図8に示すテーブルでは、制御情報'000'～'011'に対しCAZAC系列＃1を対応付けるとともに、制御情報'000'にはCAZAC系列＃1のシフト0～7の符号系列、制御情報'001'にはCAZAC系列＃1のシフト8～15の符号系列、制御情報'010'にはCAZAC系列＃1のシフト16～23の符号系列、制御情報'011'にはCAZAC系列＃1のシフト24～31の符号系列を対応付けた。また、制御情報'100'～'111'に対しCAZAC系列＃2を対応付けるとともに、制御情報'100'にはCAZAC系列＃2のシフト0～7の符号系列、制御情報'101'にはCAZAC系列＃2のシフト8～15の符号系列、制御情報'110'にはCAZAC系列＃2のシフト16～23の符号系列、制御情報'111'にはCAZAC系列＃2のシフト24～31の符号系列を

対応付けた。このような対応付けを行うことにより、異なる制御情報に対し同一基本符号系列からそれぞれ派生したシフト数の異なる派生符号系列を対応付けることできるため、異なる制御情報間での相互相関をより低くでき、異なる制御情報を同時に通知する移動局が多数存在する状況においても基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

[0048] (実施の形態2)

上記図7に示すように、セル内において各制御情報の発生率には偏りがある場合がある。よって、このような場合には、より多く発生する制御情報に対してより多くの符号系列を割り当てるのが好ましい。

[0049] そこで、本実施の形態では、実施の形態1のように各制御情報に対し同一数の符号系列が対応付けて設定されたテーブル(図4, 図5, 図8)を用いるのではなく、図9に示すように、発生率がより高い制御情報に対してより多くの基本符号系列またはより多くの派生符号系列が対応付けて設定されたテーブルを用いる。

[0050] このようなテーブルを用いることにより、発生率が高い制御情報が複数の移動局から同時に通知される場合に、複数の移動局から同一符号系列が送信される確率を減少させることができるため、符号系列間での衝突確率を減少させて、基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

[0051] また、この際、1つの制御情報に対し複数の基本符号系列が対応付けて設定される場合には、同一制御情報間での相互相関を低く維持するために、同一基本符号系列から派生した派生符号系列から優先的に対応付けるのが好ましい。例えば、図9の制御情報'000'のように、1つの制御情報に対しCAZAC系列#1, #2が対応付けて設定される場合には、CAZAC系列#1から派生したすべての派生符号系列から優先的に対応付け、残りの部分は、CAZAC系列#2から派生した一部の派生符号系列を対応付ける。つまり、図9に示すテーブルでは、1つの制御情報に対し、複数の基本符号系列およびそれら複数の基本符号系列の少なくとも1つから派生したすべての派生符号系列が対応付けて設定されている。

[0052] なお、本実施の形態では、各制御情報の発生率に応じて各制御情報に対し割り当てる符号系列の数を決めたが、例えば、各制御情報の重要度、優先度、再送回数、

QoS等に応じて、各制御情報に対し割り当てる符号系列の数を決めてもよい。つまり、本実施の形態は、各制御情報に対し、互いに異なる数の基本符号系列または互いに異なる数の派生符号系列が対応付けて設定されたテーブルを用いるものである。

[0053] (実施の形態3)

セル内において各制御情報の発生率は変化する場合がある。例えば、セル内における同一箇所でも、夜間より日中の方が存在する移動局の数が多い場合があり、このような場合には、ある特定の同一の制御情報であっても、夜間より日中の方が発生率が高くなる。

[0054] そこで、本実施の形態では、制御情報の変化する発生率に応じて、各制御情報に対して対応付ける基本符号系列の数または派生符号系列の数を変化させる。

[0055] 本実施の形態に係る移動局30の構成を図10に示す。なお、図10において上記図1(実施の形態1)と同一の構成部分には同一符号を付し説明を省略する。

[0056] 無線受信部31は、基地局から送信された制御信号をアンテナ16を介して受信し、制御信号に対しダウンコンバート等の無線処理を行って復調部32に出力する。この制御信号は、基地局からブロードキャスト制御チャネルで送信されるものであり、制御情報の発生率に応じて、テーブルにおける制御情報と符号系列との対応付けの変更を指示するものである。なお、各制御情報の発生率は、シグネチャを受信する基地局において測定される。

[0057] 復調部32は、制御信号を復調して制御部33に出力する。

[0058] 制御部33は、シグネチャ選択部111に備えられたテーブルでの対応付けを制御信号に従って変化させる。例えば、制御部33は、上記図9に示すテーブルでの対応付けを図11に示すように変化させる。図11では、制御情報'000'の発生率が上がったため制御情報'000'に対応付ける符号系列の数を増やすとともに、制御情報'001'の発生率が下がったため制御情報'001'に対応付ける符号系列の数を減らした場合を示す。

[0059] このように、本実施の形態によれば、制御情報の変化する発生率に合わせて各制御情報に対して対応付ける符号系列の数を変化させるため、制御情報の発生率が変化しても基地局でのシグネチャおよび制御情報の検出率を高く維持することができ

る。

[0060] 以上、本発明の実施の形態について説明した。

[0061] なお、上記実施の形態では、シグネチャ選択部111が上記テーブルを備える構成を採るものとして説明したが、上記テーブルはシグネチャ選択部111の外部に備えられていてもよい。また、制御情報と符号系列との対応付けが別の方法で行えるのであれば、特にテーブルを備える必要はない。

[0062] また、上記実施の形態では、符号系列の一例としてGCL系列およびCAZAC系列を挙げたが、符号系列間で相互相関の高さにばらつきがあるものであればいかなる符号系列を用いてもよい。

[0063] また、移動局から通知する制御情報は受信品質情報に限られない。他の制御情報としては、例えば、移動局ID、RACH送信理由、帯域割当要求情報(QoS情報やデータ量等)、RACH送信電力、RACH送信電力の最大値と現在の送信電力との差等がある。

[0064] また、上記各実施の形態における移動局はUE、基地局はNode Bと表されることがある。

[0065] また、上記各実施の形態では、本発明をハードウェアで構成する場合を例にとって説明したが、本発明はソフトウェアで実現することも可能である。

[0066] また、上記各実施の形態の説明に用いた各機能ブロックは、典型的には集積回路であるLSIとして実現される。これらは個別に1チップ化されてもよいし、一部または全てを含むように1チップ化されてもよい。ここでは、LSIとしたが、集積度の違いにより、IC、システムLSI、スーパーLSI、ウルトラLSIと呼称されることもある。

[0067] また、集積回路化の手法はLSIに限るものではなく、専用回路または汎用プロセッサで実現してもよい。LSI製造後に、プログラムすることが可能なFPGA(Field Programmable Gate Array)や、LSI内部の回路セルの接続や設定を再構成可能なリコンフィギュラブル・プロセッサーを利用してもよい。

[0068] さらには、半導体技術の進歩または派生する別技術によりLSIに置き換わる集積回路化の技術が登場すれば、当然、その技術を用いて機能ブロックの集積化を行ってもよい。バイオ技術の適用等が可能性としてありえる。

[0069] 2006年3月20日出願の特願2006－076995の日本出願に含まれる明細書、図面および要約書の開示内容は、すべて本願に援用される。

産業上の利用可能性

[0070] 本発明は、RACH等の上り回線共通チャネルの伝送に好適である。

請求の範囲

[1] 通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか1つの符号系列を選択する選択手段と、

選択された符号系列をランダムアクセスチャネルにおいて送信する送信手段と、

を具備する無線通信移動局装置。

[2] 複数の制御情報に対し、複数の基本符号系列およびそれら複数の基本符号系列からそれぞれ派生した複数の派生符号系列が基本符号系列毎に対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか1つの符号系列を選択する、

請求項1記載の無線通信移動局装置。

[3] 複数の制御情報のうちの1つの制御情報に対し、1つの基本符号系列およびその1つの基本符号系列から派生した複数の派生符号系列が対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか1つの符号系列を選択する、

請求項1記載の無線通信移動局装置。

[4] 複数の制御情報のうちの1つの制御情報に対し、複数の基本符号系列およびそれら複数の基本符号系列の少なくとも1つから派生したすべての派生符号系列が対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか1つの符号系列を選択する、

請求項1記載の無線通信移動局装置。

[5] 複数の制御情報の各々に対し、互いに異なる数の基本符号系列または基本符号系列から派生した互いに異なる数の派生符号系列が対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか1つの符号系列を選択する、

請求項1記載の無線通信移動局装置。

[6] 前記テーブルにおいて、発生率がより高い制御情報に対してより多くの基本符号系列またはより多くの派生符号系列が対応付けて設定される、

請求項5記載の無線通信移動局装置。

[7] 変化する前記発生率に応じて、各制御情報に対して対応付ける基本符号系列の数または派生符号系列の数を変化させる制御手段、をさらに具備する、

請求項6記載の無線通信移動局装置。

[8] 前記派生符号系列は、前記基本符号系列を巡回シフトして生成されるものである、

請求項1記載の無線通信移動局装置。

[9] 前記基本符号系列はGCL系列である、

請求項1記載の無線通信移動局装置。

[10] 前記基本符号系列はCAZAC系列である、

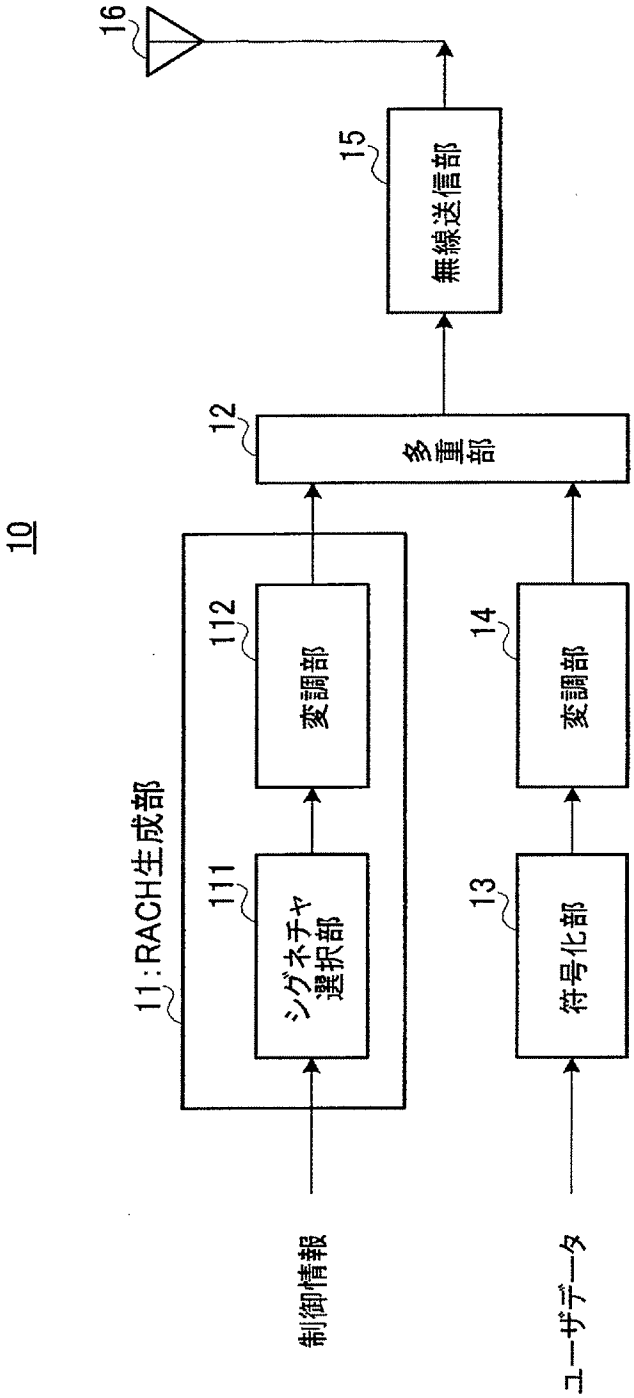
請求項1記載の無線通信移動局装置。

[11] 通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか1つの符号系列を選択し、

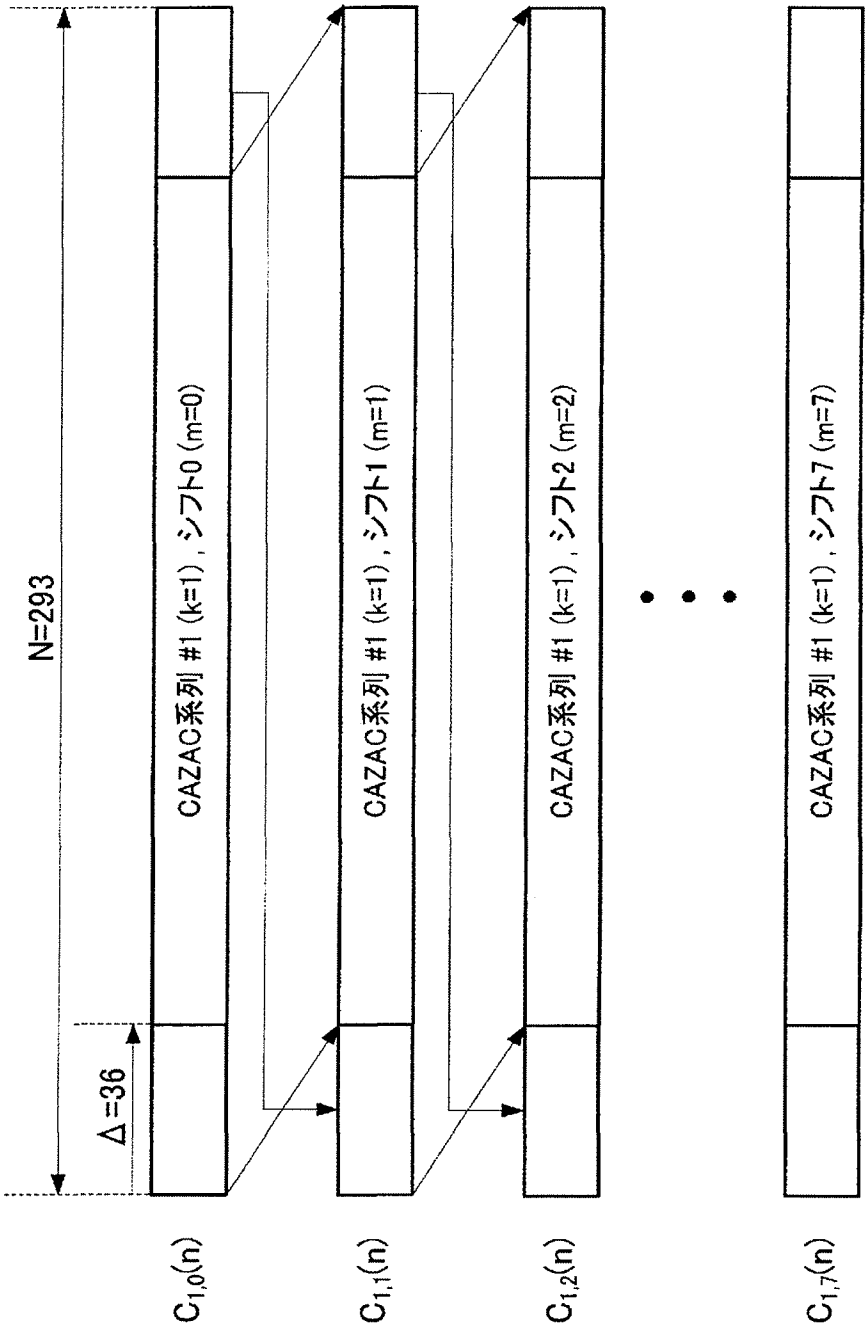
その選択した符号系列をランダムアクセスチャネルにおいて送信する、

無線通信方法。

[図1]


10
16
15
無線送信部
12
多重部
11:RACH生成部
112
変調部
111
シグネチャ選択部
14
変調部
13
符号化部
制御情報
ユーザデータ

[図2]


N=293
Δ=36
CAZAC系列 #1 (k=1)，シフト0 (m=0)
CAZAC系列 #1 (k=1)，シフト1 (m=1)
CAZAC系列 #1 (k=1)，シフト2 (m=2)
CAZAC系列 #1 (k=1)，シフト7 (m=7)
C1,0(n)
C1,1(n)
C1,2(n)
C1,7(n)

[図3]

受信品質	制御情報
SINR＜−5dB	000
−5dB≦SINR＜ 0dB	001
0dB≦SINR＜ 5dB	010
5dB≦SINR＜10dB	011
10dB≦SINR＜15dB	100
15dB≦SINR＜20dB	101
20dB≦SINR＜25dB	110
25dB≦SINR	111

[図4]

制御情報	CAZAC系列番号:k	シフト:m	シグネチャ番号
000	#1	0	#1
		1	#2
		⋮	⋮
		7	#8
001	#2	0	#9
		1	#10
		⋮	⋮
		7	#16
010	#3	0	#17
		1	#18
		⋮	⋮
		7	#24
011	#4	0	#25
		1	#26
		⋮	⋮
		7	#32
100	#5	0	#33
		1	#34
		⋮	⋮
		7	#40
101	#6	0	#41
		1	#42
		⋮	⋮
		7	#48
110	#7	0	#49
		1	#50
		⋮	⋮
		7	#56
111	#8	0	#57
		1	#58
		⋮	⋮
		7	#64

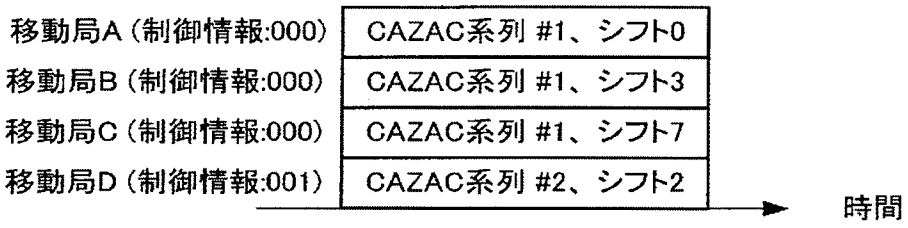
テーブル

[図5]

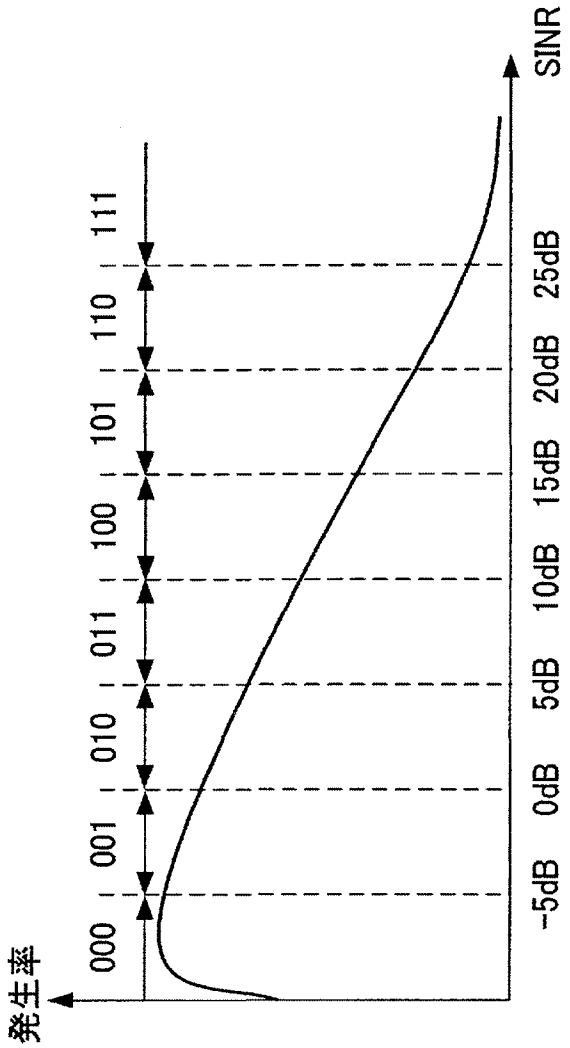
制御情報	CAZAC系列番号:k	シフト:m
000	#1	0～7
001	#2	0～7
010	#3	0～7
011	#4	0～7
100	#5	0～7
101	#6	0～7
110	#7	0～7
111	#8	0～7

テーブル

[図6]


移動局A (制御情報:000)
CAZAC系列 #1、シフト0
移動局B (制御情報:000)
CAZAC系列 #1、シフト3
移動局C (制御情報:000)
CAZAC系列 #1、シフト7
移動局D (制御情報:001)
CAZAC系列 #2、シフト2
時間

[図7]


SINR
111
110
101
100
011
010
001
000
25dB
20dB
15dB
10dB
5dB
0dB
-5dB
発生率

[図8]

制御情報	CAZAC系列番号:k	シフト:m
000	#1	0～ 7
001		8～15
010		16～23
011		24～31
100	#2	0～ 7
101		8～15
110		16～23
111		24～31

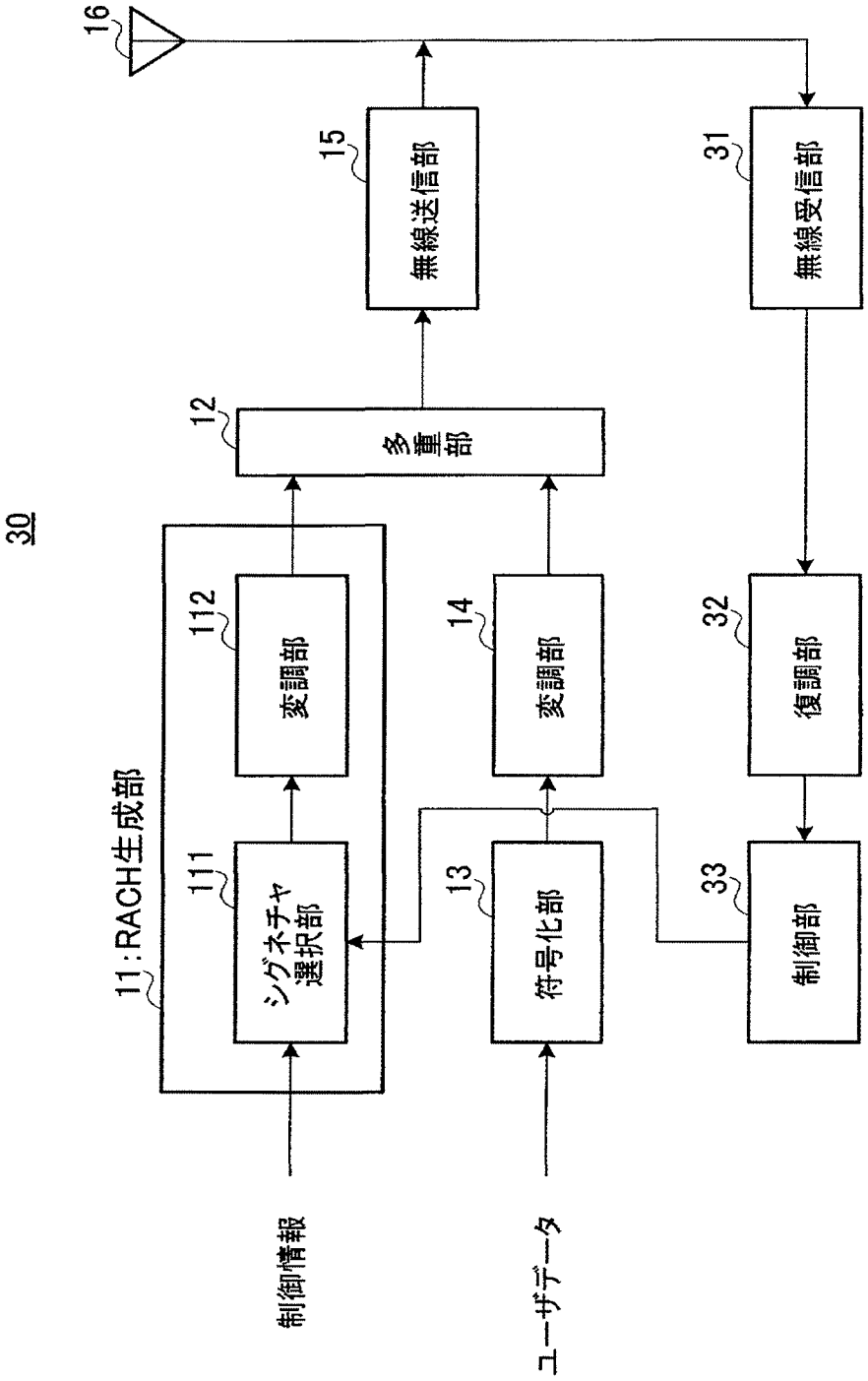
テーブル

[図9]

制御情報	CAZAC系列番号:k	シフト:m	シグネチャ番号
000	#1	0	#1
		1	#2
		2	#3
		3	#4
		4	#5
		5	#6
		6	#7
		7	#8
	#2	0	#9
		1	#10
		2	#11
		3	#12
		4	#13
		5	#14
001		6	#15
		7	#16
	#3	0	#17
		1	#18
		2	#19
		3	#20
		4	#21
		5	#22
		6	#23
		7	#24
⋮	⋮	⋮	⋮
	#8	0	#57
101		1	#58
		2	#59
		3	#60
		4	#61
111		5	#62
		6	#63
		7	#64

テーブル

[図10]


16
15
無線送信部
31
無線受信部
12
多重部
30
112
変調部
14
変調部
32
復調部
11:RACH生成部
111
シグネチャ選択部
13
符号化部
33
制御部
制御情報
ユーザデータ

[図11]

制御情報	CAZAC系列番号:k	シフト:m	シグネチャ番号
000	#1	0	#1
		1	#2
		2	#3
		3	#4
		4	#5
		5	#6
		6	#7
		7	#8
	#2	0	#9
		1	#10
		2	#11
		3	#12
		4	#13
		5	#14
		6	#15
		7	#16
001	#3	0	#17
		1	#18
		2	#19
		3	#20
		4	#21
		5	#22
		6	#23
		7	#24
⋮	⋮	⋮	⋮
101	#8	0	#57
		1	#58
		2	#59
		3	#60
		4	#61
111		5	#62
		6	#63
		7	#64

テーブル

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2007/055695

A. CLASSIFICATION OF SUBJECT MATTER
H04Q7/38(2006.01)i, *H04B1/707*(2006.01)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)
H04Q7/38, H04B1/707

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007
Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	WO 01/05050 A1 (SAMSUNG ELECTRONICS CO., LTD.), 18 January, 2001 (18.01.01), Page 4, lines 5 to 34 & JP 2003-504935 A & EP 1353448 A1 & US 06859445 B1	1-5,11 8-10 6,7
Y	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink", Helsinki, Finland, 23-25 January, 2006	8-10

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 May, 2007 (31.05.07)	12 June, 2007 (12.06.07)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

国際調査報告

国際出願番号　ＰＣＴ／ＪＰ２００７／０５５６９５

Ａ．　発明の属する分野の分類（国際特許分類（ＩＰＣ））

Int.Cl.　H04Q7/38(2006.01)i, H04B1/707(2006.01)i

Ｂ．　調査を行った分野

調査を行った最小限資料（国際特許分類（ＩＰＣ））

Int.Cl.　H04Q7/38, H04B1/707

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報	１９２２－１９９６年
日本国公開実用新案公報	１９７１－２００７年
日本国実用新案登録公報	１９９６－２００７年
日本国登録実用新案公報	１９９４－２００７年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

Ｃ．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
X Y A	WO 01/05050 A1, (SAMSUNG ELECTRONICS CO., LTD.) 2001.01.18, 第４頁第５行-第34行, & JP 2003-504935 A & EP 1353448 A1 & US 06859445 B1	1-5,11 8-10 6,7
Y	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink", Helsinki, Finland, 23-25 January, 2006	8-10

☐　Ｃ欄の続きにも文献が列挙されている。

☐　パテントファミリーに関する別紙を参照。

＊　引用文献のカテゴリー

「Ａ」特に関連のある文献ではなく、一般的技術水準を示すもの

「Ｅ」国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの

「Ｌ」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）

「Ｏ」口頭による開示、使用、展示等に言及する文献

「Ｐ」国際出願日前で、かつ優先権の主張の基礎となる出願の日の後に公表された文献

「Ｔ」国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの

「Ｘ」特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの

「Ｙ」特に関連のある文献であって、当該文献と他の１以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの

「＆」同一パテントファミリー文献

国際調査を完了した日	国際調査報告の発送日
３１．０５．２００７	１２．０６．２００７

国際調査機関の名称及びあて先	特許庁審査官（権限のある職員）	
日本国特許庁（ＩＳＡ／ＪＰ） 郵便番号１００－８９１５ 東京都千代田区霞が関三丁目４番３号	佐藤　聡史	５Ｊ　８９４３
	電話番号　０３－３５８１－１１０１　内線　３５３４	

様式ＰＣＴ／ＩＳＡ／２１０（第２ページ）（２００５年４月）

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/JP2007/055695

International filing date: 20 March 2007 (20.03.2007)

Document type: Certified copy of priority document

Document details: Country/Office: JP
Number: 2006-076995
Filing date: 20 March 2006 (20.03.2006)

Date of receipt at the International Bureau: 25 May 2007 (25.05.2007)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

日 本 国 特 許 庁
JAPAN PATENT OFFICE

別紙添付の書類に記載されている事項は下記の出願書類に記載されている事項と同一であることを証明する。

This is to certify that the annexed is a true copy of the following application as filed with this Office.

出 願 年 月 日 Date of Application:	２００６年　３月２０日
出 願 番 号 Application Number:	特願２００６－０７６９９５
パリ条約による外国への出願に用いる優先権の主張の基礎となる出願の国コードと出願番号 The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is	ＪＰ２００６－０７６９９５
出 願 人 Applicant(s):	松下電器産業株式会社

２００７年　５月　９日

特許庁長官
Commissioner,
Japan Patent Office

中嶋 誠

【書類名】　特許願
【整理番号】　2040880026
【提出日】　平成18年 3月20日
【あて先】　特許庁長官殿
【国際特許分類】　H04B 7/26
H04J 1/00
H04L 12/00
【発明者】
【住所又は居所】　大阪府門真市大字門真１００６番地　松下電器産業株式会社内
【氏名】　今村　大地
【発明者】
【住所又は居所】　石川県金沢市西念一丁目１番３号　株式会社パナソニックモバイル金沢研究所内
【氏名】　二木　貞樹
【発明者】
【住所又は居所】　石川県金沢市西念一丁目１番３号　株式会社パナソニックモバイル金沢研究所内
【氏名】　松元　淳志
【発明者】
【住所又は居所】　石川県金沢市西念一丁目１番３号　株式会社パナソニックモバイル金沢研究所内
【氏名】　岩井　敬
【発明者】
【住所又は居所】　石川県金沢市西念一丁目１番３号　株式会社パナソニックモバイル金沢研究所内
【氏名】　高田　智史
【特許出願人】
【識別番号】　000005821
【氏名又は名称】　松下電器産業株式会社
【代理人】
【識別番号】　100105050
【弁理士】
【氏名又は名称】　鷲田　公一
【手数料の表示】
【予納台帳番号】　041243
【納付金額】　16,000円
【提出物件の目録】
【物件名】　特許請求の範囲　1
【物件名】　明細書　1
【物件名】　図面　1
【物件名】　要約書　1
【包括委任状番号】　9700376

【書類名】特許請求の範囲

【請求項１】

通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか１つの符号系列を選択する選択手段と、

選択された符号系列をランダムアクセスチャネルにおいて送信する送信手段と、

を具備する無線通信移動局装置。

【請求項２】

複数の制御情報に対し、複数の基本符号系列およびそれら複数の基本符号系列からそれぞれ派生した複数の派生符号系列が基本符号系列毎に対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか１つの符号系列を選択する、

請求項１記載の無線通信移動局装置。

【請求項３】

複数の制御情報のうちの１つの制御情報に対し、１つの基本符号系列およびその１つの基本符号系列から派生した複数の派生符号系列が対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか１つの符号系列を選択する、

請求項１記載の無線通信移動局装置。

【請求項４】

複数の制御情報のうちの１つの制御情報に対し、複数の基本符号系列およびそれら複数の基本符号系列の少なくとも１つから派生したすべての派生符号系列が対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか１つの符号系列を選択する、

請求項１記載の無線通信移動局装置。

【請求項５】

複数の制御情報の各々に対し、互いに異なる数の基本符号系列または基本符号系列から派生した互いに異なる数の派生符号系列が対応付けて設定されたテーブル、をさらに具備し、

前記選択手段は、前記通知すべき制御情報に基づいて前記テーブルを参照して前記いずれか１つの符号系列を選択する、

請求項１記載の無線通信移動局装置。

【請求項６】

前記テーブルにおいて、発生率がより高い制御情報に対してより多くの基本符号系列またはより多くの派生符号系列が対応付けて設定される、

請求項５記載の無線通信移動局装置。

【請求項７】

変化する前記発生率に応じて、各制御情報に対して対応付ける基本符号系列の数または派生符号系列の数を変化させる制御手段、をさらに具備する、

請求項６記載の無線通信移動局装置。

【請求項８】

前記派生符号系列は、前記基本符号系列を巡回シフトして生成されるものである、

請求項１記載の無線通信移動局装置。

【請求項９】

前記基本符号系列はＧＣＬ系列である、

請求項１記載の無線通信移動局装置。

【請求項１０】
前記基本符号系列はＣＡＺＡＣ系列である、
請求項１記載の無線通信移動局装置。
【請求項１１】
通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか１つの符号系列を選択し、
その選択した符号系列をランダムアクセスチャネルにおいて送信する、
無線通信方法。

【書類名】明細書
【発明の名称】無線通信移動局装置および無線通信方法
【技術分野】
【０００１】
本発明は、無線通信移動局装置および無線通信方法に関する。
【背景技術】
【０００２】
現在、３ＧＰＰ ＲＡＮ ＬＴＥ（Long Term Evolution）において、無線通信移動局装置（以下、移動局と省略する）から無線通信基地局装置（以下、基地局と省略する）への初期アクセスにＲＡＣＨ（Random Access Channel）を用いることが検討されている（非特許文献１参照）。ＲＡＣＨは、基地局への接続要求（Association Request）、基地局への帯域割当要求（Resource Request）、および、上り送信タイミングの同期取得等を行う際の初期アクセスに利用される。
【０００３】
ＲＡＣＨ信号を送信する移動局は、ＲＡＣＨ信号を送信する他の移動局と自局とを区別するために、ＲＡＣＨにおいて、複数の互いに異なるシグネチャの中からいずれか１つのシグネチャを選択して基地局へ送信する。
【０００４】
また、ＲＡＣＨでは複数の移動局から同時に複数のシグネチャが送信されることを考慮し、それらのシグネチャを基地局にて分離・検出できるように、シグネチャとして、相互相関が低く、かつ、自己相関が高い符号系列を用いることが検討されている。このような特性を有する符号系列として、ＧＣＬ系列（Generalized Chirp-like）の１つであるＣＡＺＡＣ(Constant Amplitude Zero Auto-Correlation)系列が知られている（非特許文献２参照）。
【０００５】
さらに、初期アクセス以降の処理遅延を減少させるために、移動局ＩＤ、ＲＡＣＨ送信理由、帯域割当要求情報（ＱｏＳ情報やデータ量等）、および、下り回線での受信品質情報等の制御情報をＲＡＣＨにて通知することが検討されている（非特許文献３参照）。
【非特許文献１】3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060047, NTT DoCoMo, NEC, Sharp,"Random Access Transmission in E-UTRA Uplink", Helsinki, Finland, 23-25 January, 2006
【非特許文献２】3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink", Helsinki, Finland, 23-25 January, 2006
【非特許文献３】3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060480, Qualcomm, "Principles of RACH", Denver, USA, 13-17 February, 2006
【発明の開示】
【発明が解決しようとする課題】
【０００６】
現在、ＲＡＣＨにおける制御情報の通知方法については様々な検討がなされているところであり、ＲＡＣＨにおいて制御情報を効率よく通知することが強く求められている。
【０００７】
本発明はかかる点に鑑みてなされたものであり、ＲＡＣＨにおける制御情報の通知を効率よく行うことができる移動局および無線通信方法を提供することを目的とする。
【課題を解決するための手段】
【０００８】
本発明の移動局は、通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか１つの符号系列を選択する選択手段と、選択された符号系列をランダムアクセスチャネルにおいて送信す

る送信手段と、を具備する構成を採る。

【０００９】

また、本発明の無線通信方法は、通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、前記通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか１つの符号系列を選択し、その選択した符号系列をランダムアクセスチャネルにおいて送信するようにした。

【発明の効果】

【００１０】

本発明によれば、ＲＡＣＨにおける制御情報の通知を効率よく行うことができる。

【発明を実施するための最良の形態】

【００１１】

以下、本発明の実施の形態について、図面を参照して詳細に説明する。

【００１２】

（実施の形態１）

本実施の形態に係る移動局１０の構成を図１に示す。

【００１３】

ＲＡＣＨ生成部１１は、シグネチャ選択部１１１および変調部１１２から構成され、以下のようにしてＲＡＣＨ信号を生成する。

【００１４】

シグネチャ選択部１１１は、入力される制御情報に応じて、互いに異なる複数の符号系列の中からいずれか１つの符号系列をシグネチャとして選択して変調部１１２に出力する。シグネチャ選択（符号系列選択）の詳細については後述する。

【００１５】

変調部１１２は、シグネチャ（符号系列）を変調してＲＡＣＨ信号を生成し多重部１２に出力する。

【００１６】

一方、符号化部１３は、ユーザデータを符号化して変調部１４に出力する。

【００１７】

変調部１４は、符号化後のユーザデータを変調して多重部１２に出力する。

【００１８】

多重部１２は、ＲＡＣＨ信号とユーザデータとを時間多重して無線送信部１５に出力する。すなわち、多重部１２は、ＲＡＣＨ信号の送信完了後、ユーザデータを無線送信部１５に出力する。

【００１９】

無線送信部１５は、ＲＡＣＨ信号およびユーザデータに対しアップコンバート等の無線処理を行って、アンテナ１６を介して基地局へ送信する。

【００２０】

次いで、シグネチャ選択（符号系列選択）の詳細について説明する。

【００２１】

本実施の形態では、シグネチャ（符号系列）としてＧＣＬ系列またはＣＡＺＡＣ系列を用いる。

【００２２】

ＧＣＬ系列C_k（ｎ）は、式（１）および式（２）により与えられる。また、ＧＣＬ系列は自己相関が高くかつ相互相関が低い符号系列であり、一定振幅の周波数応答特性を有する。ここで、Ｎは任意の整数で系列長を表す。また、ｋは１からＮ－１までのいずれかの整数である。また、ｎは、系列長Ｎのうちのｎ番目であることを示し、０からＮ－１までのいずれかの整数である。そして、式（１）および式（２）により与えられるＧＣＬ系列が基本符号系列となる。

【数１】

$$C_k(n)=\alpha\cdot\exp\left(\frac{j2\pi k}{N}\left(\beta\cdot n+\frac{n(n+1)}{2}\right)\right)$$ Ｎが奇数の場合　…式（１）

【数２】

$$C_k(n)=\alpha\cdot\exp\left(\frac{j2\pi k}{N}\left(\beta\cdot n+\frac{n^2}{2}\right)\right)$$ Ｎが偶数の場合　…式（２）

【００２３】

ここで、相互相関が低いＧＣＬ系列を数多く得るために、系列長Ｎは奇数かつ素数とするのが好ましい。そこで、系列長Ｎを奇数とした場合、式（１）により与えられる基本符号系列を式（３）に従って巡回シフトさせることにより、１つの基本符号系列C_k（ｎ）から互いに巡回シフト数が異なる複数の派生符号系列$C_{k,m}$（ｎ）を得ることができる。

【数３】

$$C_{k,m}(n)=\alpha\cdot\exp\left(\frac{j2\pi k}{N}\left(\beta\cdot(n+m\cdot\Delta)\bmod N+\frac{(n+m\cdot\Delta)\bmod N\cdot((n+m\cdot\Delta)\bmod N+1)}{2}\right)\right)$$ …式（３）

【００２４】

そして、式（１）～式（３）においてα＝β＝１としたときのＧＣＬ系列がＣＡＺＡＣ系列となり、ＣＡＺＡＣ系列はＧＣＬ系列の中でも最も相互相関が低い符号系列となる。つまり、ＣＡＺＡＣ系列C_k（ｎ）の基本符号系列は式（４）および式（５）により与えられ、系列長Ｎを奇数とした場合、式（４）により与えられる基本符号系列を式（６）に従って巡回シフトさせることにより、ＣＡＺＡＣ系列においても、ＧＣＬ系列同様、１つの基本符号系列C_k（ｎ）から互いに巡回シフト数が異なる複数の派生符号系列$C_{k,m}$（ｎ）を得ることができる。

【数４】

$$C_k(n)=\exp\left(\frac{j2\pi k}{N}\left(n+\frac{n(n+1)}{2}\right)\right)$$ Ｎが奇数の場合　…式（４）

【数５】

$$C_k(n)=\exp\left(\frac{j2\pi k}{N}\left(n+\frac{n^2}{2}\right)\right)$$ Ｎが偶数の場合　…式（５）

【数６】

$$C_{k,m}(n)=\exp\left(\frac{j2\pi k}{N}\left((n+m\cdot\Delta)\bmod N+\frac{(n+m\cdot\Delta)\bmod N\cdot((n+m\cdot\Delta)\bmod N+1)}{2}\right)\right)$$ …式（６）

【００２５】

以下、シグネチャ（符号系列）としてＣＡＺＡＣ系列を用いた場合を一例として説明するが、上記説明からシグネチャ（符号系列）としてＧＣＬ系列を用いた場合も本発明を同様に実施できることは明らかである。

【００２６】

図２に、ＣＡＺＡＣ系列において、系列長Ｎ＝２９３、巡回シフト量（Cyclic shift value）Δ＝３６、ｋ＝１とした場合に、同一基本符号系列（ＣＡＺＡＣ系列＃１）から生成可能な巡回シフト数ｍ＝０～７（シフト０～７）の８つの派生符号系列$C_{1,0}$（ｎ）～$C_{1,7}$（ｎ）を示す。ｋ＝２以上でも、同様に、同一基本符号系列からそれぞれ８つの派生符号系列が生成可能である。よって、基本符号系列としてＣＡＺＡＣ系列＃１～＃

８を用いる場合は、合計６４の符号系列をシグネチャとして利用することができる。なお、基本符号系列とシフト０の派生符号系列とは同一のものになる。また、巡回シフト量Δは、シグネチャの最大伝搬遅延時間より大きく設定する必要がある。これは、複数の移動局から同時に複数のシグネチャが送信された場合に、遅延波の遅延時間が巡回シフト量Δを超えると、基地局において、遅延時間が大きいシグネチャを受信したのか、シフト量が互いに異なるシグネチャを受信したのかのいずれであるかの判断が困難となり、その結果、基地局においてシグネチャの誤検出が発生してしまうからである。この最大伝搬遅延時間は、セル半径、つまり移動局と基地局との間の最大伝搬経路長に依存する。

【００２７】

そして、本実施の形態では、このようにして得られるＣＡＺＡＣ系列の基本符号系列および派生符号系列を制御情報に対応付けてシグネチャとして用いる。

【００２８】

シグネチャ選択部１１１には、例えば図３に示すような受信品質情報が制御情報として入力される。制御情報‘０００’～‘１１１’はそれぞれ図３に示す受信品質：ＳＩＮＲに対応し、制御情報‘０００’～‘１１１’のいずれか１つが通知すべき制御情報としてシグネチャ選択部１１１に入力される。

【００２９】

シグネチャ選択部１１１は、図４に示すテーブルを備え、入力された通知すべき制御情報に基づいて図４に示すテーブルを参照していずれか１つのシグネチャ（符号系列）を選択する。

【００３０】

このテーブルでは、図４に示すように、制御情報‘０００’～‘１１１’に対し、基本符号系列であるＣＡＺＡＣ系列＃１～＃８およびＣＡＺＡＣ系列＃１～＃８からそれぞれ派生したシフト０～７の派生符号系列がＣＡＺＡＣ系列＃１～＃８毎に対応付けて設定されている。なお、図４に示すテーブルを簡略化して示したものが図５である。

【００３１】

図４に示すテーブルおいて、例えば、制御情報‘０００’に対しては、基本符号系列であるＣＡＺＡＣ系列＃１およびＣＡＺＡＣ系列＃１から派生したシフト０～７の派生符号系列が対応付けて設定されている。そして、ＣＡＺＡＣ系列＃１のシフト０～７の派生符号系列はそれぞれシグネチャ＃１～＃８に対応する。また、制御情報‘００１’に対しては、基本符号系列であるＣＡＺＡＣ系列＃２およびＣＡＺＡＣ系列＃２から派生したシフト０～７の派生符号系列が対応付けて設定されている。そして、ＣＡＺＡＣ系列＃２のシフト０～７の派生符号系列はそれぞれシグネチャ＃９～＃１６に対応する。制御情報‘０１０’～‘１１１’についても同様である。つまり、本実施の形態では、１つの制御情報に対し、１つの基本符号系列およびその１つの同一基本符号系列から派生した互いに異なる複数の派生符号系列が対応付けられている。また、互いに異なる６４個の符号系列に対し、シグネチャ＃１～＃６４が対応付けられている。

【００３２】

そして、シグネチャ選択部１１１は、例えば通知すべき制御情報として‘０００’が入力された場合は、ＣＡＺＡＣ系列＃１のシフト０～７の符号系列の中からいずれか１つの符号系列をシグネチャとして選択する。基本符号系列とシフト０の派生符号系列とは同一のものとなるため、つまりシグネチャ選択部１１１は、通知すべき制御情報に対応する基本符号系列およびその対応する基本符号系列から派生した複数の派生符号系列の中、または、通知すべき制御情報に対応する基本符号系列から派生した複数の派生符号系列の中から、いずれか１つの符号系列をシグネチャとして選択すると言える。

【００３３】

よって、本実施の形態によれば、移動局は、ＲＡＣＨでの制御情報の通知にあたり、シグネチャを制御情報としても利用するため、シグネチャの他に別途制御情報を送信する必要がなくなる。また、シグネチャを受信した基地局では、シグネチャを検出することにより、同時に制御情報も検出することができる。このように、本実施の形態によれば、ＲＡ

ＣＨにおける制御情報の通知を効率よく行うことができる。

【００３４】

なお、本実施の形態では、複数の移動局が同一の制御情報を同時に送信する場合を考慮し、シグネチャ選択部１１１は、入力された制御情報に対応する８つの符号系列の中からいずれか１つの符号系列をランダムに選択するのが好ましい。例えば、シグネチャ選択部１１１は、制御情報‘０００’が入力された場合には、複数の移動局が同一の制御情報‘０００’を同時に通知することを考慮し、制御情報‘０００’に対応するＣＡＺＡＣ系列＃１のシフト０～７の符号系列（シグネチャ＃１～＃８）の中からいずれか１つをランダムに選択するのが好ましい。このようにランダムに選択することにより、複数の移動局が同一の制御情報を同時に送信する場合でも、各移動局にて同一の符号系列が選択される確率が減少するため、基地局にて各移動局から送信されたシグネチャを分離・検出できる確率を高めることができる。

【００３５】

また、シグネチャ選択部１１１は、予め用意された符号系列（ここでは＃１～＃６４の６４個の符号系列）の中から通知すべき制御情報に対応する符号系列を選択する構成としてもよいし、または、通知すべき制御情報に対応するＣＡＺＡＣ系列番号ｋおよびシフト数ｍを選択して、その都度式（６）より符号系列$C_{k,m}(n)$を生成する構成としてもよい。いずれの構成を採っても、結果として、シグネチャ選択部１１１は、通知すべき制御情報に基づいていずれか１つのシグネチャ（符号系列）を選択することになる。

【００３６】

ここで、同一の基本符号系列から上記のようにして派生した複数の派生符号系列は完全に直交しており、それらの相互相関はゼロになる。

【００３７】

一方で、複数の基本符号系列間での相互相関は比較的低いが、それらは完全には直交しておらずそれらの相互相関はゼロとはならない。異なる基本符号系列から派生した派生符号系列間でも同様である。

【００３８】

つまり、同一の基本符号系列から派生した複数の派生符号系列間での相互相関は、複数の基本符号系列間での相互相関、および、異なる基本符号系列から派生した派生符号系列間での相互相関よりも低いという特徴がある。

【００３９】

よって、図４に示すテーブルでは、例えば制御情報‘０００’に対応するＣＡＺＡＣ系列＃１と制御情報‘００１’に対応するＣＡＺＡＣ系列＃２とにおいて、ＣＡＺＡＣ系列＃１のシフト０～７の符号系列間での相互相関は、ＣＡＺＡＣ系列＃１とＣＡＺＡＣ系列＃２との間の相互相関、および、ＣＡＺＡＣ系列＃１のシフト０～７の符号系列とＣＡＺＡＣ系列＃２のシフト０～７の符号系列との間の相互相関よりも低くなる。つまり、図４に示すような対応を採ることにより、同一制御情報間での相互相関を、異なる制御情報間での相互相関よりも低くすることができる。

【００４０】

よって、図６に示すように、複数の移動局（移動局Ａ～Ｃ）から同時に同一の制御情報（‘０００’）が通知され、ＲＡＣＨにおいて複数のシグネチャが多重される場合でも、同一の基本符号系列（ＣＡＺＡＣ系列＃１）から派生した互いに異なるシフト数（シフト０，３，７）の符号系列がシグネチャとして多重される場合には、シグネチャ間での符号間干渉は理想的にはゼロとなり、多重数が増加しても、多重がなされない場合と比較して基地局でのシグネチャの分離・検出性能はほとんど劣化しない。

【００４１】

一方で、図６に示すように、異なる制御情報（‘００１’）を通知する移動局（移動局Ｄ）が存在する場合には、異なる基本符号系列（ＣＡＺＡＣ系列＃２）から派生した符号系列（シフト２）がシグネチャとして多重されるため、基地局でのシグネチャの分離・検出性能は多重数が増えるほど劣化してしまう。

【００４２】

よって、本実施の形態は、複数の移動局から同時に同一の制御情報が通知される場合に特に有効である。そして、各制御情報の発生率に偏りがあるほど、ある特定の同一の制御情報が複数の移動局から同時に通知される可能性が高くなる。

【００４３】

例えば、セル内に駅等が存在し、セル内の特定の箇所にいつも多数の移動局が存在するような状況では、その特定の箇所に位置する多数の移動局では受信品質がほぼ同一になると考えられるため、ある特定の同一の制御情報の発生率が高く、その特定の同一の制御情報が多数の移動局から同時に通知される可能性が高くなる。

【００４４】

また、移動局での受信品質は基地局が位置するセル中心ほど高く、セル中心から離れるに従って徐々に低くなる。また、セル中心から離れるほど面積は増加する。よって、移動局がセル内に一様に分布しているような状況では、図７に示すように、より低い受信品質（ＳＩＮＲ）ほど発生率が高く、より低い受信品質（ＳＩＮＲ）を示す制御情報を通知する移動局ほどより多く存在すると考えられる。よって、このような状況では、より低い受信品質を示す制御情報ほど、多数の移動局から同時に同一の制御情報が通知される可能性が高くなる。つまり、このような状況でも、ある特定の同一の制御情報が多数の移動局から同時に通知される可能性が高くなる。

【００４５】

このように、本実施の形態によれば、ＲＡＣＨにおいて同一の制御情報を通知する移動局が多数存在する状況において、特に基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

【００４６】

なお、セル半径が小さい場合は、図４に示すテーブルに代えて図８に示すテーブルを用いてもよい。すなわち、セル半径が小さい場合はシグネチャの最大伝搬遅延時間も小さく、巡回シフト量Δを小さくできるため、異なる制御情報間での相互相関をより低くすべく、図８に示すように、複数の制御情報に対し１つの基本符号系列を対応付けてもよい。図８に示すテーブルでは、制御情報‘０００’～‘０１１’に対しＣＡＺＡＣ系列＃１を対応付けるとともに、制御情報‘０００’にはＣＡＺＡＣ系列＃１のシフト０～７の符号系列、制御情報‘００１’にはＣＡＺＡＣ系列＃１のシフト８～１５の符号系列、制御情報‘０１０’にはＣＡＺＡＣ系列＃１のシフト１６～２３の符号系列、制御情報‘０１１’にはＣＡＺＡＣ系列＃１のシフト２４～３１の符号系列を対応付けた。また、制御情報‘１００’～‘１１１’に対しＣＡＺＡＣ系列＃２を対応付けるとともに、制御情報‘１００’にはＣＡＺＡＣ系列＃２のシフト０～７の符号系列、制御情報‘１０１’にはＣＡＺＡＣ系列＃２のシフト８～１５の符号系列、制御情報‘１１０’にはＣＡＺＡＣ系列＃２のシフト１６～２３の符号系列、制御情報‘１１１’にはＣＡＺＡＣ系列＃２のシフト２４～３１の符号系列を対応付けた。このような対応付けを行うことにより、異なる制御情報に対し同一基本符号系列からそれぞれ派生したシフト数の異なる派生符号系列を対応付けることできるため、異なる制御情報間での相互相関をより低くでき、異なる制御情報を同時に通知する移動局が多数存在する状況においても基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

【００４７】

（実施の形態２）

上記図７に示すように、セル内において各制御情報の発生率には偏りがある場合がある。よって、このような場合には、より多く発生する制御情報に対してより多くの符号系列を割り当てるのが好ましい。

【００４８】

そこで、本実施の形態では、実施の形態１のように各制御情報に対し同一数の符号系列が対応付けて設定されたテーブル（図４，図５，図８）を用いるのではなく、図９に示すように、発生率がより高い制御情報に対してより多くの基本符号系列またはより多くの派

生符号系列が対応付けて設定されたテーブルを用いる。

【００４９】

このようなテーブルを用いることにより、発生率が高い制御情報が複数の移動局から同時に通知される場合に、複数の移動局から同一符号系列が送信される確率を減少させることができるため、符号系列間での衝突確率を減少させて、基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

【００５０】

また、この際、１つの制御情報に対し複数の基本符号系列が対応付けて設定される場合には、同一制御情報間での相互相関を低く維持するために、同一基本符号系列から派生した派生符号系列から優先的に対応付けるのが好ましい。例えば、図９の制御情報‘０００’のように、１つの制御情報に対しＣＡＺＡＣ系列＃１，＃２が対応付けて設定される場合には、ＣＡＺＡＣ系列＃１から派生したすべての派生符号系列から優先的に対応付け、残りの部分は、ＣＡＺＡＣ系列＃２から派生した一部の派生符号系列を対応付ける。つまり、図９に示すテーブルでは、１つの制御情報に対し、複数の基本符号系列およびそれら複数の基本符号系列の少なくとも１つから派生したすべての派生符号系列が対応付けて設定されている。

【００５１】

なお、本実施の形態では、各制御情報の発生率に応じて各制御情報に対し割り当てる符号系列の数を決めたが、例えば、各制御情報の重要度、優先度、再送回数、ＱｏＳ等に応じて、各制御情報に対し割り当てる符号系列の数を決めてもよい。つまり、本実施の形態は、各制御情報に対し、互いに異なる数の基本符号系列または互いに異なる数の派生符号系列が対応付けて設定されたテーブルを用いるものである。

【００５２】

（実施の形態３）

セル内において各制御情報の発生率は変化する場合がある。例えば、セル内における同一箇所でも、夜間より日中の方が存在する移動局の数が多い場合があり、このような場合には、ある特定の同一の制御情報であっても、夜間より日中の方が発生率が高くなる。

【００５３】

そこで、本実施の形態では、制御情報の変化する発生率に応じて、各制御情報に対して対応付ける基本符号系列の数または派生符号系列の数を変化させる。

【００５４】

本実施の形態に係る移動局３０の構成を図１０に示す。なお、図１０において上記図１（実施の形態１）と同一の構成部分には同一符号を付し説明を省略する。

【００５５】

無線受信部３１は、基地局から送信された制御信号をアンテナ１６を介して受信し、制御信号に対しダウンコンバート等の無線処理を行って復調部３２に出力する。この制御信号は、基地局からブロードキャスト制御チャネルで送信されるものであり、制御情報の発生率に応じて、テーブルにおける制御情報と符号系列との対応付けの変更を指示するものである。なお、各制御情報の発生率は、シグネチャを受信する基地局において測定される。

【００５６】

復調部３２は、制御信号を復調して制御部３３に出力する。

【００５７】

制御部３３は、シグネチャ選択部１１１に備えられたテーブルでの対応付けを制御信号に従って変化させる。例えば、制御部３３は、上記図９に示すテーブルでの対応付けを図１１に示すように変化させる。図１１では、制御情報‘０００’の発生率が上がったため制御情報‘０００’に対応付ける符号系列の数を増やすとともに、制御情報‘００１’の発生率が下がったため制御情報‘００１’に対応付ける符号系列の数を減らした場合を示す。

【００５８】

このように、本実施の形態によれば、制御情報の変化する発生率に合わせて各制御情報に対して対応付ける符号系列の数を変化させるため、制御情報の発生率が変化しても基地局でのシグネチャおよび制御情報の検出率を高く維持することができる。

【００５９】

以上、本発明の実施の形態について説明した。

【００６０】

なお、上記実施の形態では、シグネチャ選択部１１１が上記テーブルを備える構成を採るものとして説明したが、上記テーブルはシグネチャ選択部１１１の外部に備えられていてもよい。また、制御情報と符号系列との対応付けが別の方法で行えるのであれば、特にテーブルを備える必要はない。

【００６１】

また、上記実施の形態では、符号系列の一例としてＧＣＬ系列およびＣＡＺＡＣ系列を挙げたが、符号系列間で相互相関の高さにばらつきがあるものであればいかなる符号系列を用いてもよい。

【００６２】

また、移動局から通知する制御情報は受信品質情報に限られない。他の制御情報としては、例えば、移動局ＩＤ、ＲＡＣＨ送信理由、帯域割当要求情報（ＱｏＳ情報やデータ量等）、ＲＡＣＨ送信電力、ＲＡＣＨ送信電力の最大値と現在の送信電力との差等がある。

【００６３】

また、上記各実施の形態における移動局はUE、基地局はNode Bと表されることがある。

【００６４】

また、上記各実施の形態では、本発明をハードウェアで構成する場合を例にとって説明したが、本発明はソフトウェアで実現することも可能である。

【００６５】

また、上記各実施の形態の説明に用いた各機能ブロックは、典型的には集積回路であるＬＳＩとして実現される。これらは個別に１チップ化されてもよいし、一部または全てを含むように１チップ化されてもよい。ここでは、ＬＳＩとしたが、集積度の違いにより、ＩＣ、システムＬＳＩ、スーパーＬＳＩ、ウルトラＬＳＩと呼称されることもある。

【００６６】

また、集積回路化の手法はＬＳＩに限るものではなく、専用回路または汎用プロセッサで実現してもよい。ＬＳＩ製造後に、プログラムすることが可能なＦＰＧＡ（Field Programmable Gate Array）や、ＬＳＩ内部の回路セルの接続や設定を再構成可能なリコンフィギュラブル・プロセッサーを利用してもよい。

【００６７】

さらには、半導体技術の進歩または派生する別技術によりＬＳＩに置き換わる集積回路化の技術が登場すれば、当然、その技術を用いて機能ブロックの集積化を行ってもよい。バイオ技術の適応等が可能性としてありえる。

【産業上の利用可能性】

【００６８】

本発明は、ＲＡＣＨ等の上り回線共通チャネルの伝送に好適である。

【図面の簡単な説明】

【００６９】

【図１】実施の形態１に係る移動局の構成を示すブロック図

【図２】実施の形態１に係るＣＡＺＡＣ系列

【図３】実施の形態１に係る制御情報

【図４】実施の形態１に係る参照テーブル（テーブル例１）

【図５】実施の形態１に係る参照テーブル（図４の参照テーブルの簡略版）

【図６】実施の形態１に係る制御情報多重例

【図７】実施の形態１に係る制御情報発生率

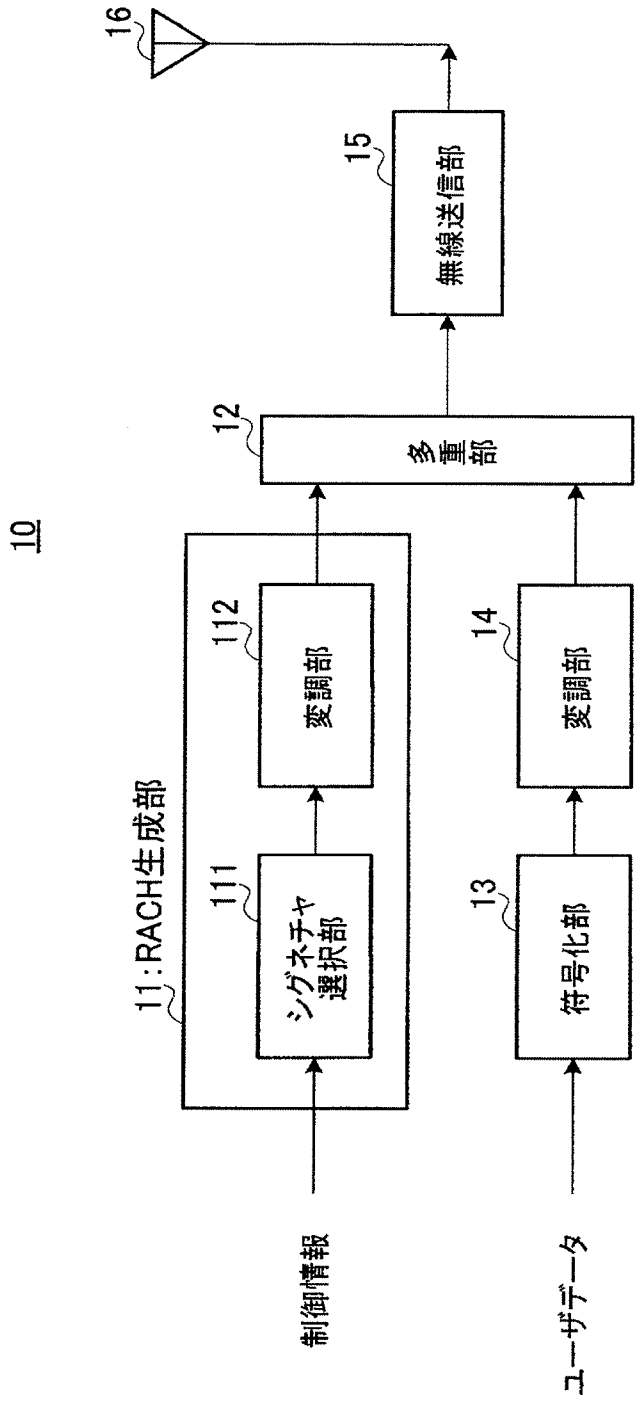
【図８】実施の形態１に係る参照テーブル（テーブル例２）

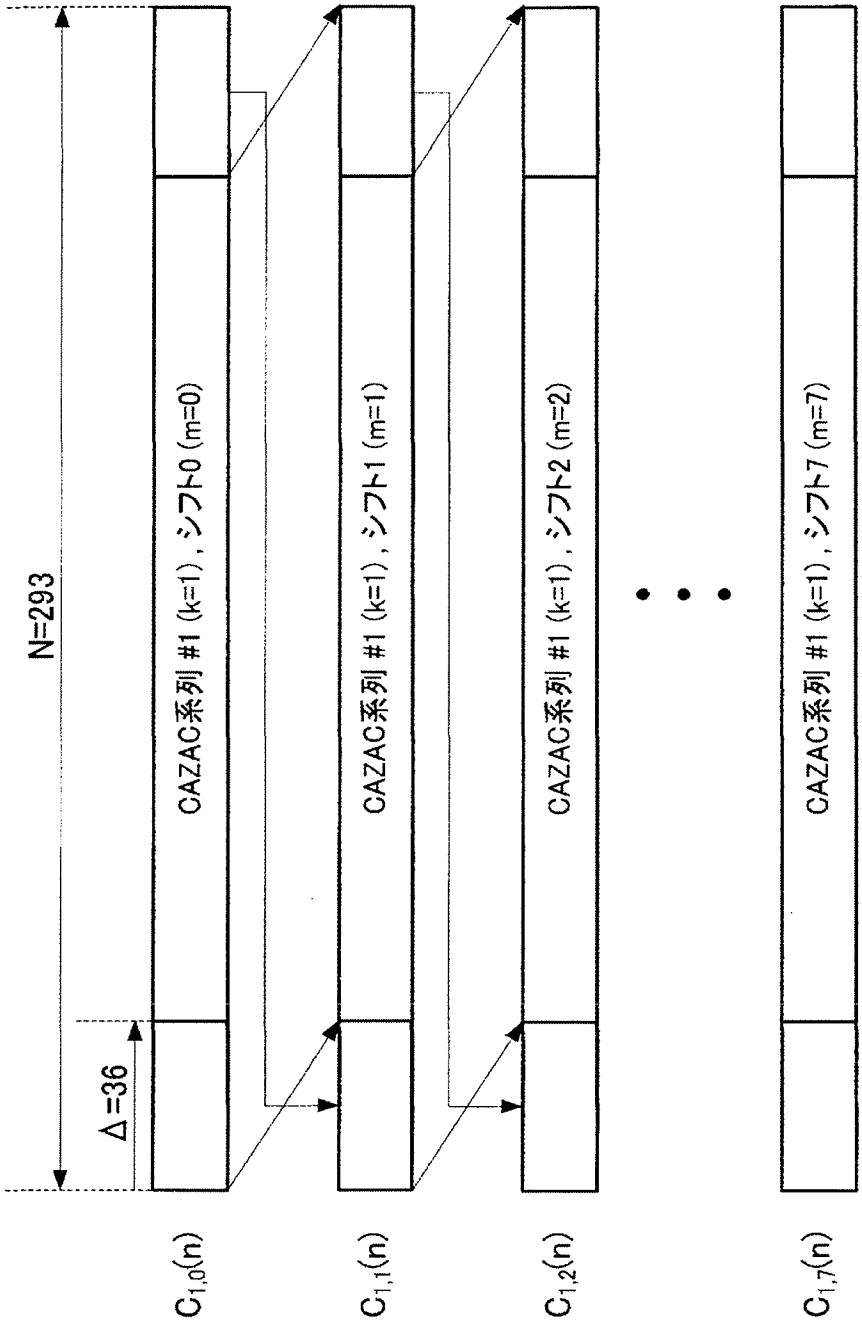
【図９】実施の形態２に係る参照テーブル（テーブル例３）
【図１０】実施の形態３に係る移動局の構成を示すブロック図
【図１１】実施の形態３に係る参照テーブル（テーブル例４）

【符号の説明】

【００７０】

１０、３０　移動局
１１　ＲＡＣＨ生成部
１１１　シグネチャ選択部
１１２　変調部
１２　多重部
１３　符号化部
１４　変調部
１５　無線送信部
１６　アンテナ
３１　無線受信部
３２　復調部
３３　制御部


10
16
15
無線送信部
12
多重部
11:RACH生成部
112
変調部
111
シグネチャ選択部
14
変調部
13
符号化部
制御情報
ユーザデータ


N=293
Δ=36
CAZAC系列 #1 (k=1)，シフト0 (m=0)
CAZAC系列 #1 (k=1)，シフト1 (m=1)
CAZAC系列 #1 (k=1)，シフト2 (m=2)
CAZAC系列 #1 (k=1)，シフト7 (m=7)
C1,0(n)
C1,1(n)
C1,2(n)
C1,7(n)

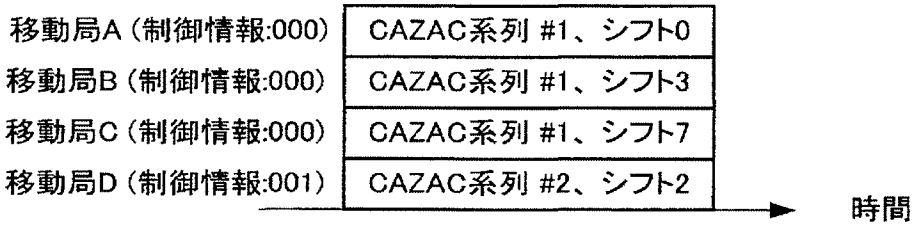
受信品質	制御情報
SINR＜−5dB	000
−5dB≦SINR＜ 0dB	001
0dB≦SINR＜ 5dB	010
5dB≦SINR＜10dB	011
10dB≦SINR＜15dB	100
15dB≦SINR＜20dB	101
20dB≦SINR＜25dB	110
25dB≦SINR	111

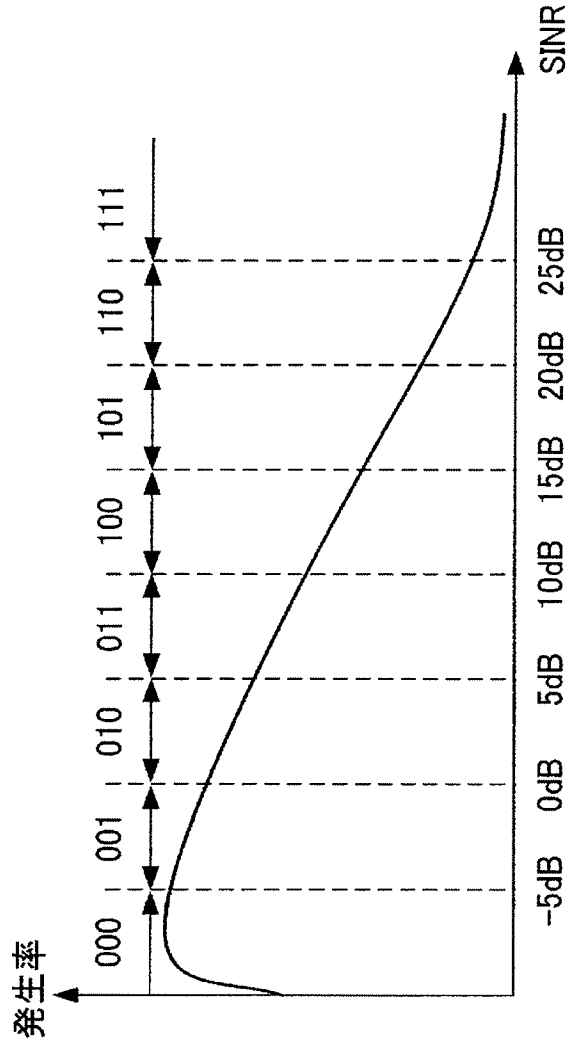
制御情報	CAZAC系列番号:k	シフト:m	シグネチャ番号
000	#1	0	#1
		1	#2
		⋮	⋮
		7	#8
001	#2	0	#9
		1	#10
		⋮	⋮
		7	#16
010	#3	0	#17
		1	#18
		⋮	⋮
		7	#24
011	#4	0	#25
		1	#26
		⋮	⋮
		7	#32
100	#5	0	#33
		1	#34
		⋮	⋮
		7	#40
101	#6	0	#41
		1	#42
		⋮	⋮
		7	#48
110	#7	0	#49
		1	#50
		⋮	⋮
		7	#56
111	#8	0	#57
		1	#58
		⋮	⋮
		7	#64

テーブル

制御情報	CAZAC系列番号:k	シフト:m
000	#1	0～7
001	#2	0～7
010	#3	0～7
011	#4	0～7
100	#5	0～7
101	#6	0～7
110	#7	0～7
111	#8	0～7

テーブル


移動局A（制御情報:000）
CAZAC系列 #1、シフト0
移動局B（制御情報:000）
CAZAC系列 #1、シフト3
移動局C（制御情報:000）
CAZAC系列 #1、シフト7
移動局D（制御情報:001）
CAZAC系列 #2、シフト2
時間

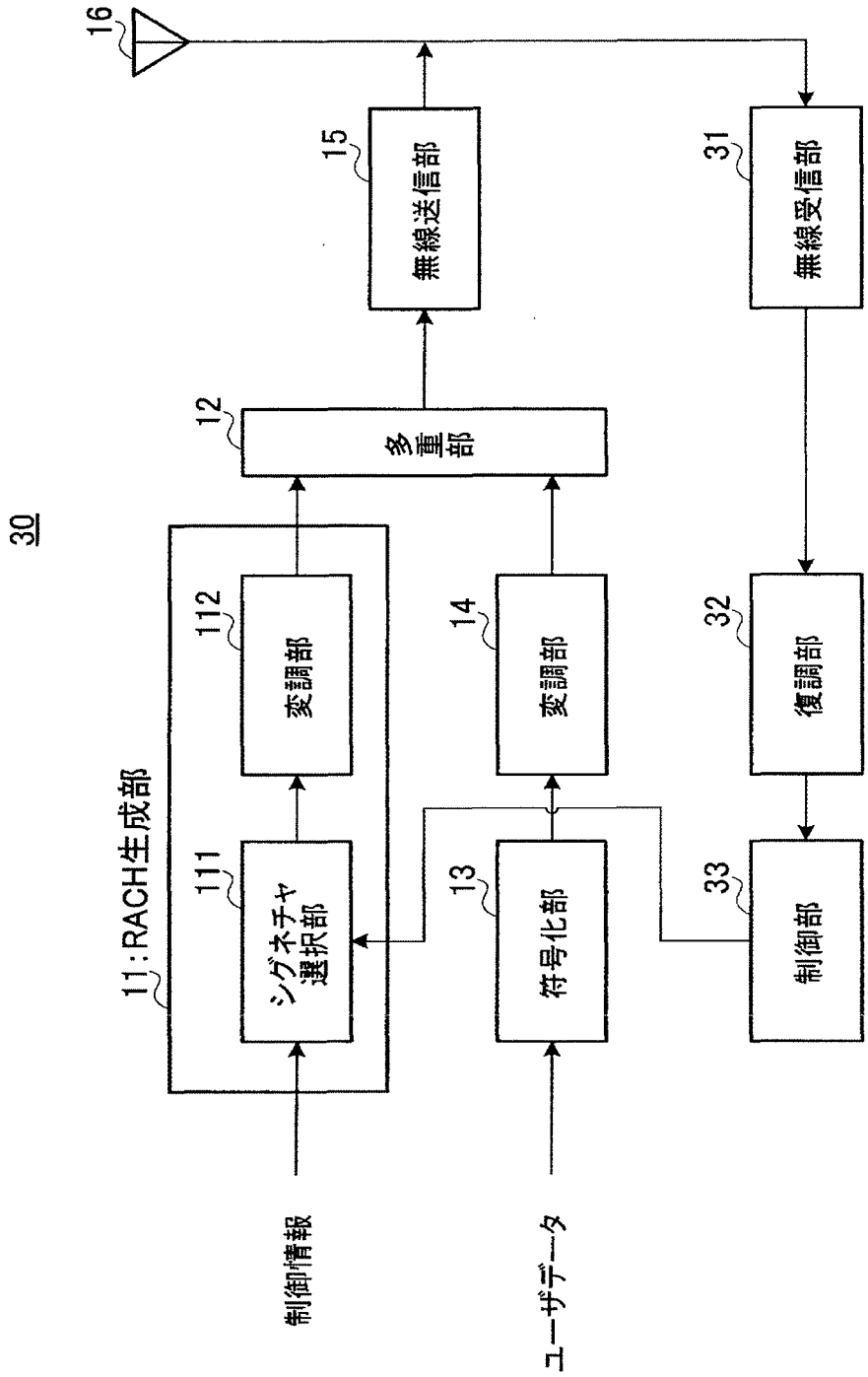

SINR
111
110
101
100
011
010
001
000
発生率
25dB
20dB
15dB
10dB
5dB
0dB
-5dB

制御情報	CAZAC系列番号:k	シフト:m
000	#1	0～ 7
001		8～15
010		16～23
011		24～31
100	#2	0～ 7
101		8～15
110		16～23
111		24～31

テーブル

制御情報	CAZAC系列番号:k	シフト:m	シグネチャ番号
000	#1	0	#1
		1	#2
		2	#3
		3	#4
		4	#5
		5	#6
		6	#7
		7	#8
	#2	0	#9
		1	#10
		2	#11
		3	#12
		4	#13
		5	#14
001		6	#15
		7	#16
	#3	0	#17
		1	#18
		2	#19
		3	#20
		4	#21
		5	#22
		6	#23
		7	#24
⋮	⋮	⋮	⋮
101	#8	0	#57
		1	#58
		2	#59
		3	#60
		4	#61
111		5	#62
		6	#63
		7	#64

テーブル


16
15
無線送信部
31
無線受信部
12
多重部
30
112
変調部
14
変調部
32
復調部
11:RACH生成部
111
シグネチャ選択部
13
符号化部
33
制御部
制御情報
ユーザデータ

制御情報	CAZAC系列番号:k	シフト:m	シグネチャ番号
000	#1	0	#1
		1	#2
		2	#3
		3	#4
		4	#5
		5	#6
		6	#7
		7	#8
	#2	0	#9
		1	#10
		2	#11
		3	#12
		4	#13
		5	#14
		6	#15
		7	#16
001	#3	0	#17
		1	#18
		2	#19
		3	#20
		4	#21
		5	#22
⋮		6	#23
		7	#24
	⋮	⋮	⋮
101	#8	0	#57
		1	#58
		2	#59
		3	#60
		4	#61
111		5	#62
		6	#63
		7	#64

テーブル

【書類名】要約書

【要約】

【課題】ＲＡＣＨにおける制御情報の通知を効率よく行うこと。

【解決手段】シグネチャ選択部１１１は入力される制御情報に応じて、互いに異なる複数の符号系列の中からいずれか１つの符号系列をシグネチャとして選択し、変調部１１２はシグネチャ（符号系列）を変調する。シグネチャ選択部１１１に備えられるテーブルでは、制御情報‘０００’に対して、基本符号系列であるＣＡＺＡＣ系列＃１およびＣＡＺＡＣ系列＃１から派生したシフト０～７の派生符号系列が対応付けて設定され、ＣＡＺＡＣ系列＃１のシフト０～７の派生符号系列はそれぞれシグネチャ＃１～＃８に対応する。また、制御情報‘００１’に対しては、基本符号系列であるＣＡＺＡＣ系列＃２およびＣＡＺＡＣ系列＃２から派生したシフト０～７の派生符号系列が対応付けて設定され、ＣＡＺＡＣ系列＃２のシフト０～７の派生符号系列はそれぞれシグネチャ＃９～＃１６に対応する。

【選択図】図１

０００００５８２１
19900828
新規登録
５０６１７８４４９

大阪府門真市大字門真１００６番地
松下電器産業株式会社

DO/ EO WORKSHEET

GORDON, Dian Sellers, Patent Application Specialist/ National Stage Division

U.S. Appl. No. 12/293,530 International Appl. No. PCT/JP2007/055695

Application filed by : ☐ 20 months ☑ 30 months

WIPO PUBLICATION INFORMATION :

Publication No.: WO200 7/108476 Publication Language : ☐ English ☐ German ☑ Japanese ☐ Chinese ☐ Korean ☐ French ☐ Spanish ☐ Russian ☐ Other : ____

Publication Date : 09 27 2007 Not Published : ☐ U.S. only designated ☐ EP request Published : ☐ EP request

INTERNATIONAL APPLICATION PAPERS IN THE APPLICATION FILE :

- ☑ International Application *(RECORD COPY)*
- ☐ Article 19 Amendments
- ☐ PCT/IPEA/409 IPER : ☐ EP ☐ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ ___
- ☐ Annexes to 409
- ☐ PCT/ISA/237 : ☐ EP ☐ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ __
  - ☐ PCT/IPEA/409 or PCT/ISA/237 was NOT AVAILABLE at the time of paralegal review
- ☐ PCT/IB/306
- ☐ Request form PCT/RO/101
- ☑ PCT/ISA/210 - Search Report : ☐ EP ☑ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ __ ☐ NONE
- ☐ Search Report References
- ☑ Priority Document (s) No. 1
  - ☐ N/A
  - ☐ Priority Document was NOT AVAILABLE at the time of paralegal review
- ☑ Other : express

RECEIPTS FROM THE APPLICANT *(other than checked above)* :

- ☑ Basic National Fee *(or authorization to charge)*
- ☑ Description ☑ Claims ☑ Abstract (30)
- ☑ Drawing Figure(s) - (# of drwgs. 11)
- ☐ Translation of Article 19 Amendments ☐ entered ☐ not entered :
  - ☐ not a page for page substitution
  - ☐ replaced by Article 34 Amendment
- ☐ Annexes to 409 ☐ entered ☐ not entered :
  - ☐ not a page for page substitution
  - ☐ no translation ☐ other : ____
- ☑ Application Data Sheet
- ☐ Power of Attorney
- ☐ Change of Address
- ☐ Preliminary Amendment(s) Filed on : 1. ☐ same as 371 request date 2. ____ 3. ____
- ☑ Information Disclosure Statement(s) Filed on : 1. ☑ same as 371 request date 2. ____ 3. ____
- ☐ Assignment Document (forwarded to Assignment Branch)
- ☐ Assignee Statement Under 37 CFR 3.73(b)
- ☑ Assignee PG Publication Notice
- ☐ Substitute Specification Filed on : 1. ☐ same as 371 request date 2. ____ 3. ____
- ☐ Verified Small Status Statement
- ☑ Oath/ Declaration (executed)
- ☐ Oath/ Declaration ☐ unsigned ☐ no citizenship ☐ other
- ☐ DNA Diskette ☐ Sequence Listing
- ☐ Other : ____

NOTES : ☐ I.A. used as Specification ☐ Other :

35 U.S.C. 371 - Receipt of Request (PTO-1390)	mo. 09 day 18 / yr. 2008
Date Acceptable Oath/ Declaration Received	☐ Same as 371 Req. Date; ☐ mo. 09 / day 18 / yr. 2008
Date of Completion of requirements under 35 U.S.C. 371	☐ Same as 371 Req. Date; ☐ Same as OATH Date; ☐ mo. 09 / day 18 / yr. 2008
Date of Completion of DO/ EO 903 - Notification of Acceptance	
Date of Completion of DO/ EO 905 - Notification of Missing Requirements	
Date of Completion of DO/ EO 909 - Notification of Abandonment	
Date of Completion of DO/ EO 916 - Notification of Defective Response	
Date of Completion of DO/ EO 922 - Notification to Comply w/ Requirements for Patent Applications Containing Nucleotide and/or Amino Acid Sequence Disclosures	
Date of Completion of DO/ EO 923	

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET (FOR USE WITH FORM PTO-875)	SERIAL NO.	FILING DATE
11	12/293,530	9.18.2008
	APPLICANT(S)	

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
1	1					
2		1				
3		1				
4		1				
5		1				
6		1				
7		1				
8		1				
9		1				
10		1				
11	1					
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
TOTAL IND.	2	⬇		⬇		⬇
TOTAL DEP.	9	⬅		⬅		⬅
TOTAL CLAIMS	11					

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						
76						
77						
78						
79						
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91						
92						
93						
94						
95						
96						
97						
98						
99						
100						
TOTAL IND.		⬇		⬇		⬇
TOTAL DEP.		⬅		⬅		⬅
TOTAL CLAIMS						

PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 8, 2004

Application or Docket Number: 12/293,530

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY TYPE ☐ RATE	FEE	OR	OTHER THAN SMALL ENTITY RATE	FEE
U.S. NATIONAL STAGE FEES							
BASIC FEE	SMALL ENT. = $ 150	LARGE ENT. = $ 300	BASIC FEE		OR	BASIC FEE	310
EXAMINATION FEE	Satisfies PCT Article 33(1)-(4) = $ 50 / $ 100	All other situations = $ 100 / $ 200	EXAM. FEE			EXAM. FEE	210
SEARCH FEE	U.S. is ISA = $ 50 / $ 100 ALL other countries = $ 200 / $ 400	ALL other situations = $ 250 / $ 500	SEARCH FEE			SEARCH FEE	410
FEE FOR EXTRA SPEC. PGS.	minus 100 =	/ 50 =	X $ 125 =			X $ 250 =	
TOTAL CHARGEABLE CLAIMS	11 minus 20 =	*	X $ 25 =		OR	X $ 50 =	
INDEPENDENT CLAIMS	9 minus 3 =	*	X $ 100 =		OR	X $ 200 =	
MULTIPLE DEPENDENT CLAIM PRESENT	☐		+ $ 180 =		OR	+ $ 360 =	
			TOTAL		OR	TOTAL	930

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

SMALL ENTITY RATE	ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	ADDITIONAL FEE
X $ 25 =		OR	X $ 50 =	
X $ 100 =		OR	X $ 200 =	
+ $ 180 =		OR	+ $ 360 =	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X $ 25 =		OR	X $ 50 =	
X $ 100 =		OR	X $ 200 =	
+ $ 180 =		OR	+ $ 360 =	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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.

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.
12/293,530	Daichi Imamura	009289-08201

52989
Dickinson Wright PLLC
James E. Ledbetter, Esq.
International Square
1875 Eye Street, N.W., Suite 1200
Washington, DC 20006

INTERNATIONAL APPLICATION NO.	
PCT/JP2007/055695	
I.A. FILING DATE	PRIORITY DATE
03/20/2007	03/20/2006

CONFIRMATION NO. 2058
371 ACCEPTANCE LETTER

Date Mailed: 03/13/2009

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 determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED 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:

09/18/2008	09/18/2008
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS	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).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Copy of the International Application filed on 09/18/2008
- English Translation of the IA filed on 09/18/2008
- Copy of the International Search Report filed on 09/18/2008
- Information Disclosure Statements filed on 09/18/2008
- Oath or Declaration filed on 09/18/2008
- Request for Immediate Examination filed on 09/18/2008
- U.S. Basic National Fees filed on 09/18/2008
- Priority Documents filed on 09/18/2008
- Non-English Language Application filed on 09/18/2008

FORM PCT/DO/EO/903 (371 Acceptance Notice)

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)

DIAN S GORDON

Telephone: (703) 308-9290 EXT 125

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/293,530	09/18/2008	2617	930	009289-08201	11	2

CONFIRMATION NO. 2058

FILING RECEIPT

52989
Dickinson Wright PLLC
James E. Ledbetter, Esq.
International Square
1875 Eye Street, N.W., Suite 1200
Washington, DC 20006

OC000000034918565

Date Mailed: 03/13/2009

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**

Applicant(s)

Daichi Imamura, Kanagawa, JAPAN;
Sadaki Futagi, Ishikawa, JAPAN;
Atsushi Matsumoto, Ishikawa, JAPAN;
Takashi Iwai, Ishikawa, JAPAN;
Tomohumi Takata, Ishikawa, JAPAN;

Assignment For Published Patent Application

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD, OSAKA, JAPAN

Power of Attorney: The patent practitioners associated with Customer Number 52989

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/JP2007/055695 03/20/2007

Foreign Applications

JAPAN 2006-076995 03/20/2006

If Required, Foreign Filing License Granted: 03/09/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/293,530**

Projected Publication Date: 06/25/2009

Non-Publication Request: No

Early Publication Request: No

Title

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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

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

NOT GRANTED

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/293,530	09/18/2008	Daichi Imamura	009289-08201

CONFIRMATION NO. 2058

PUBLICATION NOTICE

52989
Dickinson Wright PLLC
James E. Ledbetter, Esq.
International Square
1875 Eye Street, N.W., Suite 1200
Washington, DC 20006

Title:RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Publication No.US-2009-0161650-A1
Publication Date:06/25/2009

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventor:	Daichi IMAMURA, et al.	Art Unit 2473
Appln. No.:	12/293,530	Exr. K. Yao
Filed:	September 18, 2008	Conf. No. 2058
For:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD	

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner of Patents
Alexandria, VA 22131

Dear Sir:

Pursuant to Rules 56 and 99, Applicants hereby call the attention of the Patent Office to the art listed on the attached Form PTO 1449. Attached is a Chinese Office Action dated June 11, 2010, which issued in a corresponding Chinese Patent Application. References "3GPP R1-060047" and "3GPP R1-060046" were previously cited in the Information Disclosure Statement of September 18, 2008.

The cited art not previously listed in an Information Disclosure Statement is listed in the attached PTO-1449 for an indication of consideration by the examiner. Copies of any references listed on the PTO-1449, besides U.S. patent documents, are submitted herewith.

Applicants present this art so that the Patent Office may, in the first instance, determine any relevancy thereof to the presently claimed invention; see Beckman Instruments, Inc. v. Chemtronics, Inc., 439 F.2d 1369, 1380, 165 USPQ 355, 364 (5th Cir. 1970).

Applicants respectfully request that this art be expressly considered during the prosecution of this application and made of record herein and appear among the "References Cited" on any patent to issue herefrom.

If any additional fee is due please charge it to Deposit Account 04-1061.

Respectfully submitted,

/James Edward Ledbetter/

Date: September 9, 2010

James E. Ledbetter
Registration No. 28,732

JEL/sef

ATTORNEY DOCKET NO. 009289-08201
Dickinson Wright PLLC
1875 Eye Street, N.W., Suite 1200
Washington, D.C. 20006
Telephone: 202.457.0160
Fax: 202.659.1559

DC 9289-8201 159938

SHEET 1 OF 1

SUBSTITUTE FOR FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary)	ATTY. DOCKET NO. 009289-08201	SERIAL NO. 12/293,530
	APPLICANT Daichi IMAMURA, et al.	
	FILING DATE September 18, 2008	GROUP 2473

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CORRESPONDENT	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	2002/0041578	04/2002	Kim		

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CORRESPONDENT	TRANSLATION?	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	1381107	11/2002	CN	US 2002/0041578	Abstract	

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

		DISCUSSED AND CITED IN SPEC?
	Chinese Office Action dated June 11, 2010.	
	3 GPP TSG RAN1#44, "RACH Design for EUTRA," February 2006, R1-060387, pp 25-37.	

EXAMINER: Initial if citation is considered, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Method for selecting RACH in CDMA mobile communication system

Publication number: CN1381107 (A)

Publication date: 2002-11-20

Inventor(s): KYOU-WOONG KIM [KR]; CHANG-HOI KOO [KR] +

Applicant(s): SAMSUNG ELECTRONICS CO LTD [KR] +

Classification:

- international: *H04J13/04; H04W74/08;* **H04J13/02; H04W74/00;** (IPC1-7): H04B7/26

- European: H04Q7/38C2U; H04W74/08F; H04W74/08F2

Application number: CN20018001560 20010602

Priority number(s): KR20000030497 20000602; KR20000034609 20000622; KR20000038083 20000704

Also published as:

CN1157872 (C)

WO0193462 (A1)

US2002041578 (A1)

US7061890 (B2)

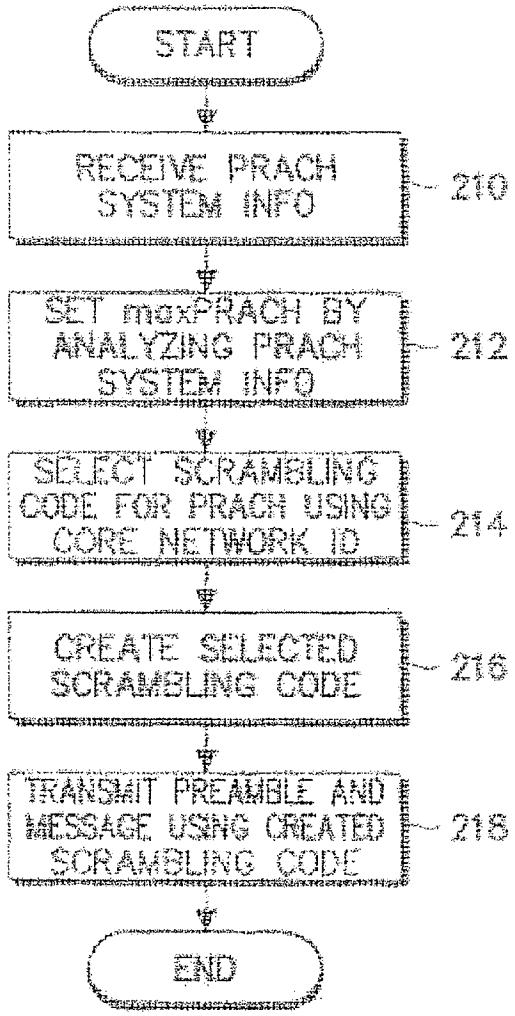
KR20010110188 (A)

more >>

Abstract not available for CN 1381107 (A)

Abstract of corresponding document: **WO 0193462 (A1)**

A method selecting a RACH comprises determining an access service class (ASC) associated with a unique access class of a user equipment (UE) by analyzing a radio resource control (RRC) message received from a UTRAN (UMTS (Universal Mobile Telecommunication System) Terrestrial Radio Access Network); receiving mapping information from the UTRAN; analyzing ASCs and scrambling codes to be used for available RACHs associated with each of the ASCs based on the received mapping information; mapping the analyzed scrambling codes to scrambling code groups associated with the ASCs; selecting a scrambling code group associated with the determined ASC; and selecting one of the scrambling codes using a total number of the scrambling codes mapped to the selected scrambling code group and a unique identifier of the UE.



[19]中华人民共和国国家知识产权局

[51]Int. Cl[7]
H04B 7/26

[12]发明专利申请公开说明书

[21]申请号 01801560.3

[43]公开日 2002年11月20日

[11]公开号 CN 1381107A

[22]申请日 2001.6.2 [21]申请号 01801560.3
[30]优先权
[32]2000.6.2 [33]KR [31]2000-30497
[32]2000.6.22 [33]KR [31]2000-34609
[32]2000.7.4 [33]KR [31]2000-38083
[86]国际申请 PCT/KR01/00943 2001.6.2
[87]国际公布 WO01/93462 英 2001.12.6
[85]进入国家阶段日期 2002.1.31
[71]申请人 三星电子株式会社
地址 韩国京畿道
[72]发明人 金奎雄 具昌会

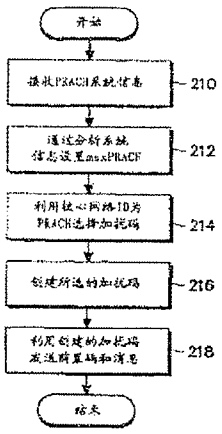
[74]专利代理机构 北京市柳沈律师事务所
代理人 马莹 邵亚丽

权利要求书3页 说明书11页 附图4页

[54]发明名称 码分多址移动通信系统中选择随机访问信道的方法

[57]摘要

一种选择RACH的方法，包括：通过分析从UTRAN（UMTS（通用移动电信系统）地面无线电访问网络）接收的无线电资源控制（RRC）消息，确定用户设备（UE）的唯一访问类别相联系的访问服务类别（ASC）；从UTRAN接收映射信息；根据接收的映射信息，分析ASC和要用于与每个ASC相联系的适用RACH的加扰码；把所分析的加扰码映射到与ASC相联系的加扰码组；选择与所确定的ASC相联系的加扰码组；和利用被映射到所选加扰码组的加扰码的总数和UE的唯一标识符，选择加扰码之一。



ISSN1008-4274

1. 一种在包括 UTRAN(UMTS(通用移动电信系统)地面无线电访问网络)的 CDMA(码分多址)移动通信系统中由 UE(用户设备)从数个加扰码中选择随机访问信道(RACH)加扰码的方法，该方法包括下列步骤：

把有关数个加扰码的信息从 UTRAN 发送到 UE，数个加扰码具有与随机访问信道(RACH)相联系的序号；和

由 UE(用户设备)从数个加扰码中选择一个加扰码，其中每个 UE 利用数个 UE 的每一个所规定的唯一标识符，从数个加扰码中选择该加扰码。

2. 根据权利要求 1 所述的方法，其中，UE 所选的加扰码具有把所规定的唯一标识符除以数个加扰码的总数所得的余数所定义的序号。

3. 根据权利要求 1 所述的方法，其中，UE 所选的加扰码具有把所规定的唯一标识符除以数个加扰码的总数除以从 UTRAN 发送的持续级所得的商所得的余数所定义的序号。

4. 根据权利要求 3 所述的方法，其中，持续级是根据 UE 的优先级确定的。

5. 根据权利要求 3 所述的方法，其中，对于优先级较高的 UE，把持续级设置成较低的值。

6. 一种选择随机访问信道(RACH)的方法，包括下列步骤：

从 UTRAN(UMTS(通用移动电信系统)地面无线电访问网络)接收 RACH 系统信息消息，和按照接收的 RACH 系统信息确定小区中适用的 RACH 总数；和

利用所确定的 RACH 总数和用户设备(UE)的唯一标识符，为 RACH 之一选择加扰码。

7. 根据权利要求 6 所述的方法，其中，所选的加扰码具有把 UE 的唯一标识符除以 RACH 的总数所得的余数所定义的序号。

8. 根据权利要求 6 所述的方法，其中，所选的加扰码具有把 UE 的唯一标识符除以 RACH 的总数除以从 UTRAN 发送的持续级所得的商所得的余数所定义的序号。

9. 根据权利要求 8 所述的方法，其中，持续级是根据 UE 的优先级确定的。

10. 根据权利要求 8 所述的方法，其中，对于优先级较高的 UE，把持续级设置成较低的值。

11. 一种选择随机访问信道(RACH)的方法，包括下列步骤：

通过分析从 UTRAN(UMTS(通用移动电信系统)地面无线电访问网络)接收的无线电资源控制(RRC)消息，确定与用户设备(UE)的唯一访问类别相联系的访问服务类别(ASC)；

从 UTRAN 接收 ASC 与 PRACH 之间的映射信息消息，和根据接收的映射信息，分析 ASC 和要用于与每个 ASC 相联系的适用 RACH 的加扰码；

把所分析的加扰码映射到与 ASC 相联系的加扰码组；

选择与所确定的 ASC 相联系的加扰码组；和

利用被映射到所选加扰码组的加扰码的总数和 UE 的唯一标识符，选择加扰码之一。

12. 根据权利要求 11 所述的方法，其中，所选的加扰码具有把 UE 的唯一标识符除以加扰码的总数所得的余数所定义的序号。

13. 根据权利要求 11 所述的方法，其中，所选的加扰码具有把 UE 的唯一标识符除以加扰码的总数除以从 UTRAN 发送的持续级所得的商所得的余数所定义的序号。

14. 根据权利要求 13 所述的方法，其中，持续级是根据 UE 的优先级确定的。

15. 根据权利要求 13 所述的方法，其中，对于优先级较高的 UE，把持续级设置成较低的值。

16. 根据权利要求 11 所述的方法，其中，要用于与每个 ASC 相联系的适用 RACH 的加扰码是通过构成映射信息的、一组适用 RACH 的开始索引和结束索引确定的。

17. 一种在包括 UTRAN(UMTS(通用移动电信系统)地面无线电访问网络)的 CDMA(码分多址)移动通信系统中由 UE(用户设备)从数个加扰码中选择加扰码，和把具有与 RACH(随机访问信道)相联系的序号的数个加扰码从 UTRAN 发送给数个 UE 的方法，包括下列步骤：

通过替代从 UTRAN 供应给每个 UE 的持续级，确定持续值，所述持续值由 $pi=2^{-(k-1)}$ 定义；

确定在 0 与 1 之间的值 R；

确定持续值是否大于或等于值 R；和

如果持续值大于或等于 R，那么利用值 R、每个 UE 的唯一标识符和加扰码的总数(maxPRACH)，由 UE 选择加扰码，其中所选加扰码由下式定义：

$$PRACH\# = (\lfloor R \times 8 \rfloor \times maxPRACH) \% maxPRACH$$

码分多址移动通信系统中选择随机访问信道的方法

发明背景

1．发明领域

本发明一般涉及 CDMA(码分多址)移动通信系统中的信息分配方法,尤其涉及分配随机访问信道(RACH)的方法。

2．相关技术描述

随着移动通信工业的迅速发展，需要能够支持数据和图像服务，以及公共话音服务的移动通信系统。这样的移动通信一般被称为“未来移动通信系统”。未来移动通信系统通常应用 CDMA 技术，并且分为其运行的标准化已经得到独立实施的同步系统和异步系统。具体地说，欧洲的未来移动通信系统被称为 UMTS(通用移动电信系统)。运行的标准化应该定义未来移动通信系统所要求的、有关数据和图像服务以及话音服务的各种技术规范。作为欧洲未来移动通信系统的异步 UMTS 或 W-CDMA(宽带 CDMA)移动通信系统使用随机访问信道(RACH)和公用分组信道(CPCH)作为上行链路公用信道。至于 W－CDMA 移动通信系统的上行链路公用信道，当用户设备(UE；或异步 CDMA－2000 系统中的移动台)没有与 UTRAN(UMTS 地面无线电访问网络；或异步 CDMA－2000 系统中的基站)相连接的信道时，UE 就访问 RACH 信道。在利用 RACH 的消息发送过程中，UE 利用 RACH 的访问标记发送前置码，然后，一旦接收到对发送的前置码作出响应的 ACK(确认)信号，就发送消息。在发送之前，通过为 RACH 选择的加扰码对 UE 发送的消息进行扩展。

为了使 UE 能够访问 RACH，也称为 UTRAN Node(节点)-B 的 UTRAN 通过广播信道把相应小区中适用的 PRACH(物理 RACH)系统信息发送给小区中的每个 UE。小区中的每个 UE 在广播信道上接收从 UTRAN 发送的 PRACH 系统信息消息。一旦接收到 PRACH 系统信息消息，打算在 RACH 上发送的消息的 UE 必须选择包括在接收的 PRACH 系统信息消息中的适用加扰码之一。选择接收的 RACH 加扰码之一在 UE 的 RRC(无线电资源控制)

层中进行。选择也可以根据系统的配置，甚至在 MAC(媒体访问控制)层中进行。最好，必须这样选择要用于 RACH 的加扰码，以便在系统的过载控制期间应该均匀地分配它们。

最新的 UMTS 标准只公开了 PRACH 系统信息消息的发送，但没有具体描述 UE 如何选择 RACH，即，UE 如何选择用于发送 PRACH 系统信息的加扰码。另外，最新的 UMTS 标准没有具体描述均匀地分配要用于 RACH 的加扰码的方案。因此，当 UE 选择同一 RACH 加扰码时，RACH 发送消息的冲突概率就会增加，导致 UE 性能变差和 RACH 消息的发送成功统降低。另外，频率冲突引起访问次数增加，从而导致 UE 的电池工作时间缩短。

发明概述

因此，本发明的一个目的是提供一种通过对 RACH 进行有效管理和利用，使唯一分配给每个 UE 的随机访问信道(RACH)发送消息的冲突达到最小的方法。

本发明的另一个目的是提供一种通过把同一小区中适用的 RACH 均匀地分配给小区中的 UE，使 RACH 消息的冲突达到最小的 RACH 加扰码分配方法。

本发明的另一个目的是提供一种通过把同一小区中适用的 RACH 均匀地分配给小区中的 UE，使 UE 的性能得到改善和使电池能耗达到最小的 RACH 分配方法。

本发明的另一个目的是提供一种通过根据 UE 的访问服务类别和小区中的业务密度分类适用 RACH 加扰码，把更多的 RACH 加扰码分配给优先级更高的 UE 的 RACH 分配方法。

本发明的另一个目的是提供一种通过随着小区中的业务密度提高而增加适用 PRACH 加扰码的个数，使 UE 接收 RACH 消息时可能发生的冲突达到最小的 RACH 分配方法。

本发明的另一个目的是提供一种通过根据分配给 UE 的持续(persistence)值选择加扰码，控制系统过载的方法。

为了实现上面和其它目的，本发明提供了选择 RACH 的方法。该方法包括：通过分析从 UTRAN 接收的无线电资源控制(RRC)消息，确定与 UE 的唯一访问类别相联系的访问服务类别(ASC)；从 UTRAN 接收映射信息；根据从 UTRAN 接收的映射信息，分析 ASC 和要用于与每个 ASC 相联系的

适用 RACH 的加扰码；把所分析的加扰码映射到与 ASC 相联系的加扰码组；选择与所确定的 ASC 相联系的加扰码组；和利用被映射到所选加扰码组的加扰码的总数和 UE 的唯一标识符，选择加扰码之一。

最好，所选加扰码具有把 UE 的唯一标识符除以加扰码的总数所得的余数所定义的序号。

最好，所选加扰码具有把 UE 的唯一标识符除以加扰码的总数除以从 UTRAN 发送的持续级所得的商所得的余数所定义的序号。

最好，根据 UE 的优先级确定持续级，和对于优先级较高的 UE，把持续级设置成较低的值。

最好，通过构成映射信息的、一组适用 RACH 的开始索引和结束索引确定要用于与每个 ASC 相联系的适用 RACH 的加扰码。

附图简述

通过结合附图进行如下详细描述，本发明的上面和其它目的、特征和优点将更加清楚，在附图中：

图 1 是显示根据本发明实施例的 UE 的分层结构的图形；

图 2 是显示在根据本发明第一实施例的 UE 的 RRC 层中选择 RACH 加扰码的过程的流程图；

图 3 是显示在根据本发明第二实施例的 UE 的 RRC 层中选择 PRACH 加扰码的过程的流程图；和

图 4 是显示根据本发明实施例的映射表的图形。

优选实施例详述

下文参照附图描述本发明的优选实施例。在如下的描述中，对那些众所周知的功能或结构将不作详细描述，因为，否则的话，它们将会把本发明的特征淹没在不必要的细节之中。

在本发明的示范性实施例中，要求接收从 UTRAN 发送的 PRACH 系统信息的 UE(或 W－CDMA UE 系统)包括 USIM(UMTS 用户 ID 模块)，USIM 存储用于标识 UE 的 UE ID，并且还存储 UE 的访问服务类别(ASC)。用于标识 UE 的 UE ID 可以包括 IMSI(国际移动台 ID)、TMSI(临时移动用户 ID)、IMSI(国际移动设备 ID)、和 PMSI(分组移动用户 ID)。

图 1 显示了根据本发明实施例的 UE 的分层结构。参照图 1，物理层 120 在物理信道上接收来自 UTRAN 的 PRACH 系统信息消息，并且把接收的

PRACH 系统信息消息提供给它的上层，即，RRC 层 110。PRACH 系统信息消息包括有关适用于 UTRAN 的 PRACH 加扰码的个数的信息。RRC 层 110 按照有关从 UTRAN 接收的适用 PRACH 加扰码的个数的信息，确定(选择)要使用的加扰码，并且通过 CPHY_RL_SETUP_REQ 原语把所选的加扰码提供给物理层 120。物理层 120 利用所选 PRACH 加扰码扩展前置码和消息，然后，把扩展的前置码和消息发送到 UTRAN。也就是说，从 RRC 层 110 提供给物理层 120 的 CPHY_RL_ SETUP_REQ 原语包括有关所选加扰码的信息。正是物理层 120 根据包括在 CPHY_RL_SETUP_REQ 原语中的加扰码信息生成加扰码，并且利用生成的加扰码扩展要发送的前置码和消息。

如上所述，RRC 层 110 可以利用 ASC 信息和 UTRAN 提供的 PRACH 系统信息选择小区中适用的 PRACH 加扰码之一。也就是说，RRC 层 110 按照 UTRAN 提供的 PRACH 系统信息选择要使用的 PRACH 加扰码，然后，通过 CPHY_RL_ SETUP_REQ 原语把所选的 PRACH 加扰码信息提供给物理层 120。

图 2 显示了根据本发明第一实施例在 UE 的 RRC 层中选择 PRACH 加扰码的过程。图 2 所示的第一实施例包括按照从 UTRAN 接收的 RPACH 系统信息消息选择要使用的加扰码，然后利用所选的加扰码把前置码和消息发送到 UTRAN 的处理。图 3 显示了根据本发明第二实施例在 UE 的 RRC 层 110 中选择 PRACH 加扰码的过程。图 4 显示了根据本发明实施例的映射表。

下面参照附图对实施例加以详细描述。UTRAN 通过广播信道发送含有它服务的小区中适用的 PRACH 加扰码的个数的 PRACH 系统信息消息，以便存在于小区中的 UE 可以选择 PRACH 加扰码。为此，UTRAN 使用了如下表 1 举例示出的预定消息。

表 1

信息元	Need	Multi	类型和引用
PRACH 系统信息	MP	maxPRACH	
PRACH info	MP		PRACH info(用于 RACH)

参照上表 1，“Multi” 指的是 PRACH 系统信息消息中 PRACH info(信息)的重复数。精确地说，含有 maxPRACH 数的 PRACH info 包含在 PRACH 系统信息消息中。另外，“MP” 指的是强制性的和 “Need” 指的是必要的。

把从 UTRAN 发送的 PRACH 系统信息消息提供给 UTRAN 正在服务的

小区中的每个 UE。同时，一旦接收到 UTRAN 提供的 PRACH 系统信息消息，UE 就根据图 2 所示的处理，利用 PRACH 发送消息。

更具体地说，在图 2 所示的步骤 210，UE 的物理层 120 在物理信道上接收来自 UTRAN 的 PRACH 系统信息消息。然后，物理层 120 把接收的 PRACH 系统信息消息提供给 RRC 层 110 的上层。

一旦接收到 PRACH 系统信息消息，RRC 层 110 就执行图 2 所示的步骤 212。在步骤 212，RRC 层 110 分析物理层 120 提供的 PRACH 系统信息消息，以便计算出小区中适用的 PRACH 加扰码的总数(maxPRACH)。含有 maxPRACH 数的 PRACH info 包含在 PRACH 系统信息消息中。把计算的 maxPRACH 设置成 N_PRACH(PRACH 的个数)。此后，在步骤 214，RRC 层 110 根据设置的 N_PRACH 和 UE ID(即 TMSI、IMEI、IMSI 或 PMSI)选择供 PRACH 使用的加扰码。要使用的 PRACH 可以按照下式(1)计算：

$$PRACH_{No}=IMSI \% N\_PRACH \quad \cdots\cdots(1)$$

在等式(1)中，$PRACH_{No}$ 表示所选 PRACH 加扰码的码号。如等式(1)所示，$PRACH_{No}$ 由 IMSI 除以 N_PRACH 所得的余数确定，即，通过求模运算确定(参见步骤 214)。在等式(1)中，IMSI 用作 UE ID 的一个例子。

在按照等式(1)为 PRACH 选择加扰码之后，RRC 层 110 把所选加扰码号包括在 CPHY_RL_SETUP_REQ 原语中，并且向物理层 120 提供含有 CPHY_RL_SETUP_REQ 原语。在步骤 216，物理层 120 根据所提供的加扰码号，创建加扰码。在步骤 218，物理层 120 利用创建的加扰码发送前置码和消息。在这个技术领域中用创建的加扰码发送前置码和消息的处理是众所周知的。在第一实施例中，位于同一小区中的每个 UE 按照 UTRAN 提供的同一 PRACH 系统信息消息选择要使用的 PRACH。在本发明的第二实施例中，给每个 UE 指定不同的 PRACH 加扰码组，每个 UE 选择包含在 UE 所属的 PRACH 加扰码组中的 PRACH 加扰码之一。也就是说，在本发明的第二实施例中，根据同一小区中 UE 的访问服务类别(ASC)把适用 PRACH 加扰码分组，从而选择 PRACH 加扰码。为此，UTRAN 必须在广播信道上与 PRACH 系统信息一起发送 ASC 和加扰码组之间的映射信息。因此，UE 可以从在广播信道上从 UTRAN 接收的、与它的 ASC 相联系的 PRACH 加扰码组中选择 PRACH 加扰码。在本发明的第二实施例中，UE 必须事先确定它们的唯一加扰码组。具体描述一下这种处理，每个 UE 含有在其制造过程

中确定的唯一 ASC(访问服务类别)。并且，UTRAN 发送指定 ASC 的 RRC 消息，以便 UE 接收来自 UTRAN 的 RRC 消息和确定 ASC。

在确定了其加扰码组之后，UE 按照如下操作选择要使用的 PRACH 加扰码。

下表 2 显示了由 UTRAN 发送的、使 UE 能够根据 ASC 选择 PRACH 加扰码的示范性 PRACH 映射信息。

表 2

信息元/组名称	Need	Multi	类型和引用
访问服务类别	MP	1 至 8	
> 适用 PRACH 开始索引	MP		Integer(0..maxPRACH)
> 适用 PRACH 结束索引	MP		Integer(0..maxPRACH)

下面参照表 2 和图 3 对第二实施例加以描述。UE 的 RRC 层 110 在步骤 310 接收表 2 所示的映射信息和 PRACH 系统信息。包含 ASC 和 PRACH 的映射信息和 PRACH 系统信息是在物理层 120 上从 UTRAN 接收，然后提供给 RRC 层 110 的。

在步骤 310 接收到包含 ASC 和 PRACH 的映射信息之后，在步骤 312，RRC 层 110 从接收的映射信息中分析出 ASC。ASC 是用于确定 PRACH 加扰码组的个数的信息。RRC 层 110 还根据接收的映射信息分析适用于每个加扰码组的 PRACH 加扰码的个数。适用于每个加扰码组的 PRACH 加扰码的个数是通过表 2 所示的“适用 PRACH 开始索引”和“适用 PRACH 结束索引”确定的。

在步骤 314，RRC 层 110 通过按照分析的 ASC 确定 PRACH 加扰码组，然后确定属于各个组的 PRACH 加扰码，构造映射表。例如，如表 2 所示，假设存在 8 个 ASC ASC#1－ASC#8，那么，映射表可以具有图 4 所示的结构。如图 4 所示，与 ASC ASC#1－ASC#8 联系在一起确定 8 个 PRACH 组。同时，属于所确定的 8 个 PRACH 组的 PRACH 加扰码通过“适用 PRACH 开始索引”和“适用 PRACH 结束索引”确定。也就是说，第一 PRACH 加扰码组的 PRACH 加扰码被确定在由“适用 PRACH 开始索引”指定的第一个加扰码与由“适用 PRACH 结束索引”指定的最后一个加扰码之间。属于第二 PRACH 加扰码组的 PRACH 加扰码也可以以用在确定第一 PRACH 加扰码组的适用 PRACH 加扰码中的相同方法确定。

同时，表 2 显示了 ASC 被分类成 8 个组 ASC#1-ASC#8 的例子。“适用 PRACH 开始索引”和“适用 PRACH 结束索引”表示属于分组的 ASC 的 PRACH 加扰码的索引。也就是说，UTRAN 把从 1 到 8 的号码分配给 ASC 组，然后，设置“适用 PRACH 开始索引”和“适用 PRACH 结束索引”，以便把属于各个 ASC 组的加扰码通知给 UE。因此，UE 可以按照它所属的 ASC，选择适用加扰码之一。

在确定了与 PRACH 加扰码组(ASC 组)相联系的适用 PRACH 加扰码之后，RRC 层 110 选择与以前确定的 UE 的 ASC 相联系的 PRACH 加扰码组。图 4 显示了确定 UE 具有 ASC#2，因此选择 PRACH 加扰码组#2 的例子。当确定了指定给 UE 的 PRACH 加扰码组时，在步骤 316，RRC 层 110 根据接收的 PRACH 系统信息，从 UE 的码组中选择适用加扰码之一。然后，在步骤 318，RRC 层 110 利用所选的加扰码发送前置码和消息。由于步骤 316 和 318 的处理以与参照图 2 所述的第一实施例相同的方式进行，因此，不再提供详细描述。但是，在步骤 316 和 318 中，UE 不是从 UTRAN 提供的整个适用 PRACH 加扰码中，而是从属于所确定的 PRACH 加扰码组的加扰码中选择 PRACH 加扰码。

下表 3 显示了通过把表 2 所示的 PRACH 映射信息包括在表 1 所示的 PRACH 系统信息中具体实现的 PRACH 系统信息的例子。

表 3

信息元	Need	Multi	类型和引用
PRACH 系统信息	MP	1..<maxPRACH)>	
> PRACH Info	MP		PRACH Info(用于 RACH)
> PRACH Mapping Info	OP		

在表 3 中，“OP”指的是可选的和“MP”指的是强制性的。并且，在表 3 中，“ > PRACH Mapping(映射) Info”包括表 2 所示的结构，和除了“ > PRACH Mapping Info”之外的其它信息等同于表 1 所示的信息。

在本发明通过表 3 具体实现的情况中，UE 将按照如下过程选择 PRACH 加扰码。首先，UE 按照 UTRAN 提供的 RRC 消息确定它的 ASC。此后，一旦接收到表 3 所示的 PRACH 系统信息，UE 就利用 ASC、接收 PRACH 系统信息的“适用 PRACH 开始索引”和“适用 PRACH 结束索引”构造映射表。在构造了映射表之后，UE 根据事先确定的它的 ASC，选择映射表中

PRACH 加扰码组的任何一个。在选择了 PRACH 加扰码组之后，UE 通过把属于所选 PRACH 加扰码组的 PRACH 加扰码的个数 N_PRACH 应用于等式(1)，可以选择 PRACH 加扰码号。在选择了要使用的 PRACH 加扰码号之后，RRC 层 110 通过将其插入 CPHY_RL_ SETUP_REQ 原语中，把所选加扰码号提供给物理层 120。然后，物理层 120 利用提供的加扰码号创建 PRACH 加扰码，扩展带有前置码和消息的创建加扰码，并且把扩展数据发送到 UTRAN。

ASC 与由 UTRAN 发送到 UE 以选择加扰码的加扰码组之间的映射信息也可以以新的信息元(IE)格式构造。也就是说，PRACH 系统信息列表消息含有表 3 所示的 PRACH 映射信息，和 PRACH 映射信息消息如表 2 所示那样构造。在另一个实施例中，UTRAN 可以把表 2 所示的 PRACH 映射信息发送到发送给 UE 的 PRACH 分块信息。PRACH 分块信息是根据 ASC 发送有关访问子信道的信息和适用标记的消息块，并且还可以将本发明提出的映射信息发送到 UTRAN。即使在这种方法中，UE 也具有相同的操作，除了只对发送相关信息的消息块稍作改变之外。

现在，象上面所提到的那样，对选择要被 UE 使用的 PRACH 加扰码的其它实施例作更详细描述。由于上面已经描述了第一实施例，因此从第二实施例开始提供描述。

1. 第二实施例

为了建立 UE 与 UTRAN 之间的 PRACH，必须定义 PRACH 资源，即访问时隙和前置码标记。这样的资源用于有效地利用 RACH。UE 利用通过 RRC 消息接收的持续级，计算用于有效访问控制的持续值，并且把计算的持续值用作访问参数。这里，发送到 UE 的持续级被定义为从 1 至 8 的整数，并且用系统信息块#5(SIB#5)广播。

UTRAN 与 PRACH 系统信息一起发送包含持续级和 PRACH 的映射信息，以便根据持续级分配 PRACH。下表 4 显示了由 UTRAN 发送到 UE 以便具体实现第二实施例的消息格式。

表 4

信息元/组名称	Need	Multi	类型和引用	语义描述
访问服务类别持续级	MP	1 至 8		
> 适用 PRACH 开始索引	MP		Integer(0..maxPRACHcount)	适用于 PRACH 的加扰码的开始索引

>适用 PRACH 结束索引	MP		Integer(0..maxPRACHcount)	适用于 PRACH 的加扰码的结束索引

为此，与包含在上表 3 中的系统信息相比，应该改变 PRACH 系统信息。至于 PRACH 处理，RRC 层 110 按照持续级选择 PRACH 组(ASC)，然后通过应用等式(1)选择要使用的 PRACH。RRC 层 110 通过把加扰码插入 CPHY_RL_ SETUP_REQ 原语中，把所选的加扰码发送到物理层 120。如图 4 所示，如果 UE 的持续级是‘2’，那么 RRC 层 110 就从包含在 PRACH 组#2 中的 PRACH PRACH#a－PRACH#n 中选择要使用的 PRACH。如上所述，如果 PRACH 组#2 中 PRACH 的个数是 N_PRACH，那么，要使用的 PRACH 是与上面等式(1)相一致的。

2．第三实施例

UE 的访问尝试概率是按照从 UTRAN 发送到 UE 的持续级确定的。持续级的降低引起 UE 通过 RACH 访问 UTRAN 的概率降低。因此，通过利用持续级控制 PRACH 加扰码的分配和选择，也可以控制存在于一个小区中的 UE 内的访问成功概率。也就是说，通过增加适用加扰码在低持续级上的个数和减少适用加扰码在高持续级上的个数，可以降低优先级高的 UE 之间的 PRACH 冲突概率，从而保证高访问成功概率。但是，优先级低的 UE 之间的冲突概率增加了，引起访问成功概率降低，致使不能保证通过优先级低的 UE 的 RACH 的数据发送。为了使这种情况得以实现，可以按如下分配加扰码。

首先，有必要分配指示分配给持续级的加扰码的组索引。这样的分配可以通过 UTRAN 向 UE 广播的、表 4 所示的 RRC 消息来定义。另外，必须把持续级与加扰码组之间的、表 4 所定义的映射信息插入表 3 所示的“PRACH System Info”中。如上所述，有必要增加在具有高访问成功概率的低持续级上的适用加扰码个数；否则，有必要限制适用加扰码的个数。下式(2)显示了按照持续级选择的加扰码。

$$PRACH\#=IMSI\ \%\lfloor N/K \rfloor \qquad \cdots\cdots(2)$$

在等式(2)中，N 表示 maxPRACH，和 K 表示成功率，它可以是持续级或持续级号。当 K 表示持续级时，可以通过把当前 RRC 消息值应用于等式(2)选择加扰码。但是，当 K 表示持续级号时，必须如下表 5 所示那样改变表示动态持续级的 RRC 消息的 IE(信息元)。

表 5

信息元/组名称	Need	Multi	类型和引用	语义描述
动态持续级	MP	1 至 8	Integer(1..8)	级别应被映射到范围 0..1 中的动态持续级
> 持续级号	MP		Integer(1..8)	用于 PRACH 加扰码的持续级号

如表 5 所示，持续级号是 1 至 8。如果这个值是 1，UE 就可以选择与 maxPRACH 一样多的加扰码，从而，由于重叠的加扰码，可以使冲突达到最小。但是，如果这个值是 8，UE 就可以从最少 1 个加扰码或最多 2 个加扰码中选择一个加扰码，以便可以限制对 PRACH 的访问。

3. 第四实施例

在这个实施例中，加扰码的选择是在 MAC 层中，而不是在 RRC 层中进行的。

MAC 层接收在 RRC 层中按照下式(3)计算的持续值，然后对接收的持续值进行持续性测试。

$$Pi=2^{-(k-1)} \quad \cdots\cdots(3)$$

将通过等式(3)计算的持续值与为持续性测试随机生成的值 R 相比较。随机生成的值 R 被确定成具有在 0 与 1 之间的值(以 0.1 为单位增加)，并且按照下列条件(1)确定可访问性。

条件(1)

R ≤ Pi：分配成功

R > Pi：分配失败

从条件(1)可以看出，只有当 R ≤ Pi 时，UE 才可以开始访问 RACH。UE 利用生成值 R 选择 PRACH 时使用的 PRACH 加扰码按照下式(4)确定。

$$PRACH\# = (\lfloor R \times 8 \rfloor \times maxPRACH) \% maxPRACH \quad \cdots\cdots(4)$$

在等式(4)中，PRACH# 表示由 UE 选择的加扰码号，和 maxPRACH 表示由 UTRAN 分配给一个 UE 的 PRACH 加扰码的最大个数。等式(4)显示了取决于由某个 UE 进行的持续性测试的结果的值，并且只有当持续性测试成功时才可以选择加扰码。MAC 层把通过等式(4)选择的加扰码与 PHY_DATA_REQ 原语一起发送到物理层，以便物理层在发送 PRACH 的访问前置码和消息部分时使用加扰码。

如上所述，本发明均匀地分配 RACH，以便同一小区中的每个 UE 可以

选择它的 RACH，从而降低在信道访问期间由不同 UE 选择的 RACH 之间的冲突。另外，通过按照 UE 的 ASC 选择要使用的 RACH，可以有效地管理 RACH，这样，可以降低 UE 访问 RACH 的次数，有助于降低 UE 的电池能耗。另外，通过按照持续级分配加扰码，可以利用 UTRAN 为 UE 的访问控制发送的持续级来控制系统负载。

虽然通过参照本发明的某些优选实施例，已经对本发明进行了图示和描述，但本领域的普通技术人员应该明白，可以在形式上和细节上对其作各种各样的改变，而不偏离所附权利要求书所限定的本发明的精神和范围。

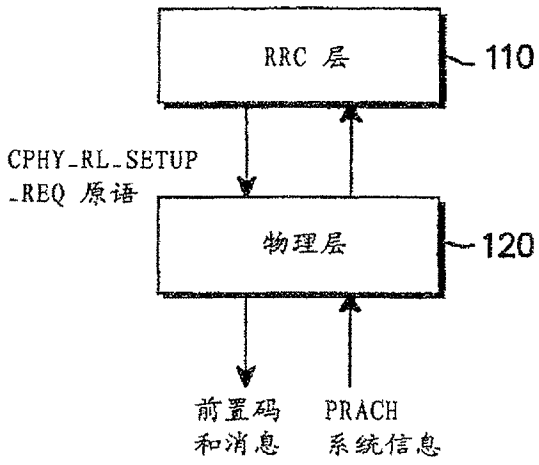


图 1

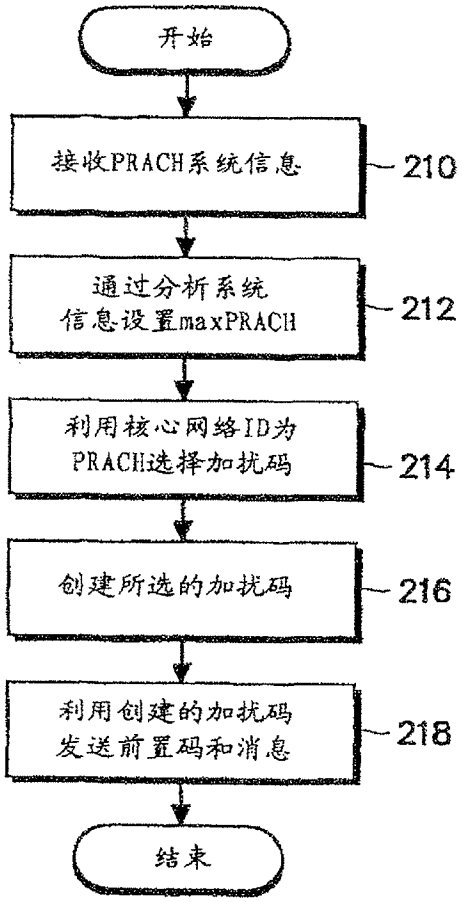

开始
接收PRACH系统信息
210
通过分析系统信息设置maxPRACH
212
利用核心网络ID为PRACH选择加扰码
214
创建所选的加扰码
216
利用创建的加扰码发送前置码和消息
218
结束

图 2

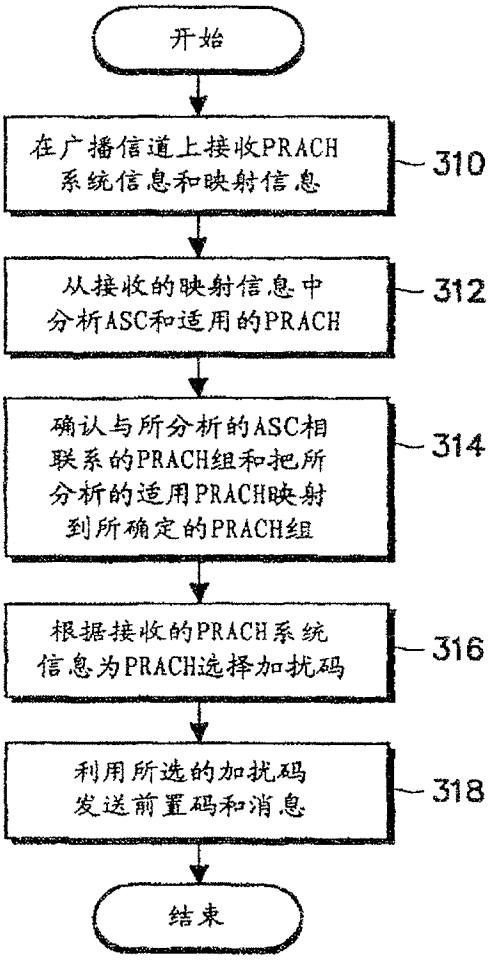

开始
在广播信道上接收PRACH系统信息和映射信息
310
从接收的映射信息中分析ASC和适用的PRACH
312
确认与所分析的ASC相联系的PRACH组和把所分析的适用PRACH映射到所确定的PRACH组
314
根据接收的PRACH系统信息为PRACH选择加扰码
316
利用所选的加扰码发送前置码和消息
318
结束

图 3

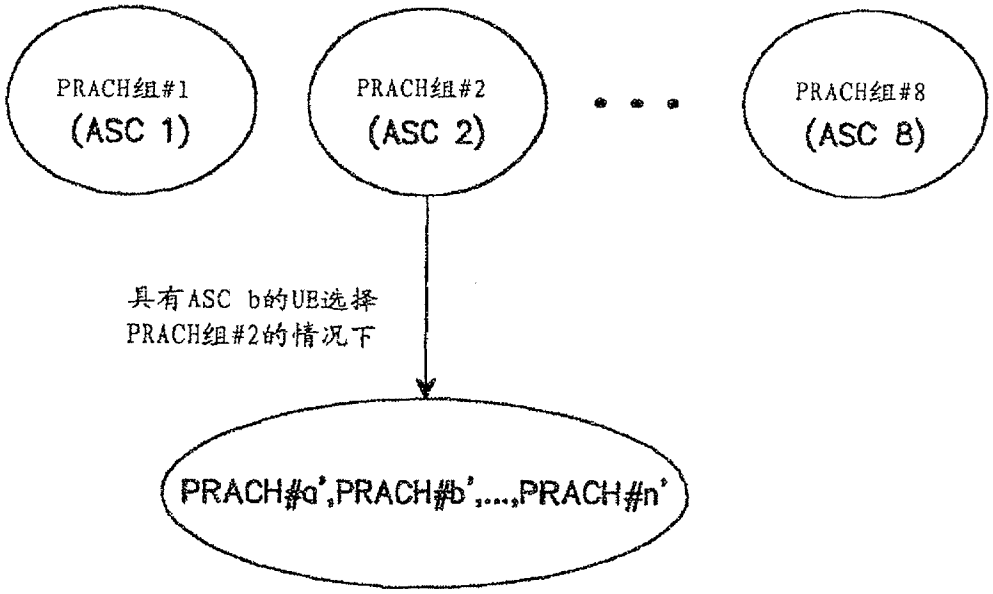

PRACH组#1
(ASC 1)
PRACH组#2
(ASC 2)
PRACH组#8
(ASC 8)
具有ASC b的UE选择
PRACH组#2的情况下
PRACH#a',PRACH#b',...,PRACH#n'

图 4

Electronic Acknowledgement Receipt

EFS ID:	8380707
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	52989
Filer:	James Edward Ledbetter
Filer Authorized By:	
Attorney Docket Number:	009289-08201
Receipt Date:	09-SEP-2010
Filing Date:	18-SEP-2008
Time Stamp:	17:08:23
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	IDS.pdf	83799 6810f32d14ddffbdf786283e351a423419e8d1b2	no	3

Warnings:

Information:

This is not an USPTO supplied IDS fillable form

2	Foreign Reference	FR1.pdf	829688 df0c7f73f42251fc8dfdbdc8005af80b06a2785b	no	20
Warnings:					
Information:					
3	NPL Documents	NPL1.pdf	327480 f8a050d3482ba12eca36f747ad30e00dcc91895b	no	5
Warnings:					
Information:					
4	NPL Documents	NPL2.pdf	630188 f23eb69b3fea87a286207d9610839e56b21aa5b6	no	13
Warnings:					
Information:					
		Total Files Size (in bytes):	1871155		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventor:	Daichi IMAMURA, et al.	Art Unit 2473
Appln. No.:	12/293,530	Exr. K. Yao
Filed:	September 18, 2008	Conf. No. 2058
For:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD	

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner of Patents
Alexandria, VA 22131

Dear Sir:

Pursuant to Rules 56 and 99, Applicants hereby call the attention of the Patent Office to the art listed on the attached Form PTO 1449. Attached is a Japanese Office Action dated January 18, 2011, which issued in a corresponding Japanese Patent Application. Reference "Orthogonal Pilot Channel Structure in E-UTRA Uplink" was previously cited in the Information Disclosure Statement of September 18, 2008.

The cited art not previously listed in an Information Disclosure Statement is listed in the attached PTO-1449 for an indication of consideration by the examiner. Copies of any references listed on the PTO-1449, besides U.S. patent documents, are submitted herewith.

Applicants present this art so that the Patent Office may, in the first instance, determine any relevancy thereof to the presently claimed invention; see Beckman Instruments, Inc. v. Chemtronics, Inc., 439 F.2d 1369, 1380, 165 USPQ 355, 364 (5th Cir. 1970).

Applicants respectfully request that this art be expressly considered during the prosecution of this application and made of record herein and appear among the "References Cited" on any patent to issue herefrom.

If any additional fee is due please charge it to Deposit Account 04-1061.

Respectfully submitted,

/James Edward Ledbetter/

Date: March 3, 2011

James E. Ledbetter
Registration No. 28,732

JEL/ak

ATTORNEY DOCKET NO. 009289-08201
Dickinson Wright PLLC
1875 Eye Street, N.W., Suite 1200
Washington, D.C. 20006
Telephone: 202.457.0160
Fax: 202.659.1559

DC 9289-8201 170893v1

SHEET 1 OF 1

SUBSTITUTE FOR FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary)	ATTY. DOCKET NO. 009289-08201	SERIAL NO. 12/293,530
	APPLICANT Daichi IMAMURA, et al.	
	FILING DATE September 18, 2008	GROUP 2473

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CORRESPONDENT	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CORRESPONDENT	TRANSLATION?	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	2006/019710	02/2006	WO			

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

		DISCUSSED AND CITED IN SPEC?
	Japanese Notice of the Reasons for Rejection dated January 18, 2011.	

EXAMINER: Initial if citation is considered, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

PCT

(43) International Publication Date
23 February 2006 (23.02.2006)

(10) International Publication Number
WO 2006/019710 A1

(51) International Patent Classification[7]: H04Q 7/38

(21) International Application Number:
PCT/US2005/024614

(22) International Filing Date: 11 July 2005 (11.07.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/590,113 21 July 2004 (21.07.2004) US
11/020,457 22 December 2004 (22.12.2004) US

(71) Applicant (*for all designated States except US*): **QUALCOMM INCORPORATED** [US/US]; 5775 Morehouse Drive, San Diego, California 92121 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **SUTTVONG, Arak** [TH/US]; 8840 Costa Verde Boulevard, #3439, San Diego, California 92122 (US). **TEAGUE, Edward Harrison** [US/US]; 4614 Bryson Terrace, San Diego, California 92130 (US). **GOROKHOV, Alexei** [FR/US]; 12543 El Camino Real, San Diego, California 92130 (US).

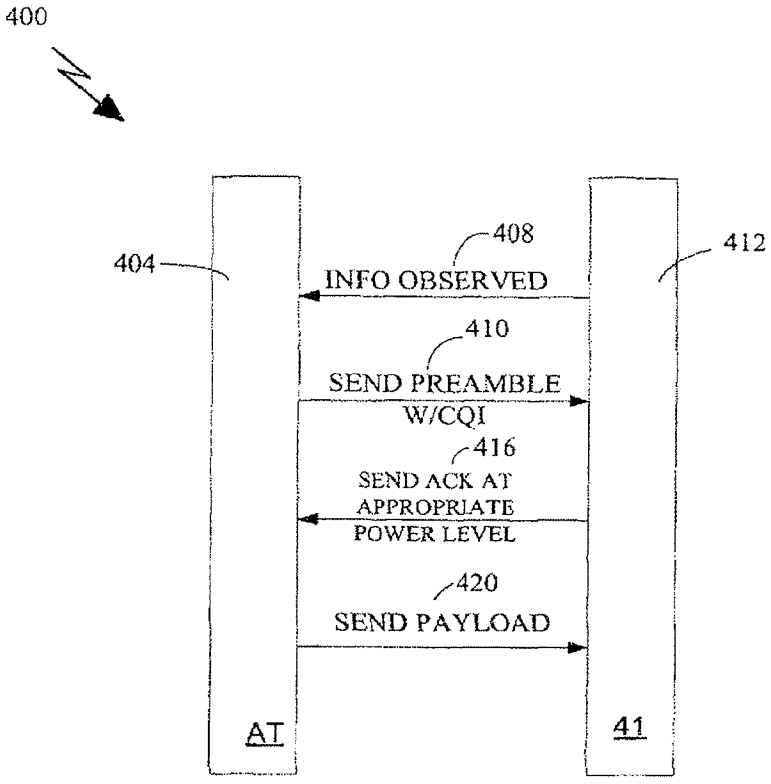
(74) Agents: **WADSWORTH, Philip R.** et al.; 5775 Morehouse Drive, San Diego, California 92121 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: EFFICIENT SIGNALING OVER ACCESS CHANNEL



(57) Abstract: An apparatus and method for transmitting an indicator of channel quality while minimizing the use of a broadcast channel is described. A metric of forward link geometry of observed transmission signals is determined. An indicator of channel quality value is determined as a function of the observed transmission signals. An access sequence is selected, randomly, from one group of a plurality of groups of access sequences, wherein each of the plurality of groups of access sequences correspond to different ranges of channel quality values.

WO 2006/019710 A1

WO 2006/019710 A1

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

EFFICIENT SIGNALING OVER ACCESS CHANNEL

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Patent Application Serial No. 60/590,113, filed July 21, 2004, which is incorporated herein by reference in its entirety.

BACKGROUND

Field

[0002] The invention relates generally to wireless communications, and more specifically to data transmission in a multiple access wireless communication system.

Background

[0003] An access channel is used on the reverse link by an access terminal for initial contact with an access point. The access terminal may initiate an access attempt in order to request dedicated channels, to register, or to perform a handoff, etc. Before initiating an access attempt, the access terminal receives information from the downlink channel in order to determine the strongest signal strength from nearby access points and acquire downlink timing. The access terminal is then able to decode the information transmitted by the given access point on a broadcast channel regarding choice of parameters governing the access terminal's access attempt.

[0004] In some wireless communication systems, an access channel refers both to a probe and message being rendered. In other wireless communication systems, the access channel refers to the probe only. Once the probe is acknowledged, a message governing the access terminal's access attempt is transmitted.

[0005] In an orthogonal frequency division multiple access (OFDMA) system, an access terminal typically separates the access transmission to be transmitted on the access channel into parts, a preamble transmission and a payload transmission. To prevent intra-cell interference due to lack of fine timing on the reverse link during the access preamble transmission, a CDM-based preamble transmission may be time-division-multiplexed with the rest of the transmissions (i.e., traffic, control, and access payload). To access the system, the access terminal then randomly selects one PN

sequence out of a group of PN sequences and sends it as its preamble during the access slot.

[0006] The access point searches for any preambles (i.e., all possible PN sequences) that may have been transmitted during the access slot. Access preamble transmission performance is measured in terms of collision probability, misdetection probability and false alarm probability. Collision probability refers to the probability that a particular pseudo-random (PN) sequence is chosen by more than one access terminal as its preamble in the same access slot. This probability is inversely proportional to the number of preamble sequences available. Misdetection probability refers to the probability that a transmitted PN sequence is not detected by the base station. False alarm probability refers to the probability that an access point erroneously declared that a preamble has been transmitted while no preamble is actually transmitted. This probability increases with the number of preambles available.

[0007] The access point then transmits an acknowledgment for each of the preambles detected. The acknowledgement message may include a PN sequence detected, timing offset correction, and index of the channel for access payload transmission. Access terminal terminals whose PN sequence is acknowledged can then transmit the respective access payload using the assigned resource.

[0008] Because the access point has no prior knowledge of where the access terminal is in the system (i.e. what its power requirements, buffer level, or quality of service may be), the acknowledgement message is broadcasted at a power level high enough such that all access terminals in the given cell can decode the message. The broadcast acknowledgement is inefficient as it requires a disproportionate amount of transmit power and/or frequency bandwidth to close the link. Thus, there is a need to more efficiently send an acknowledgment message to access terminals in a given cell.

SUMMARY

[0009] Embodiments of the invention minimize use of a broadcast acknowledgement channel during its preamble transmission. Embodiments of the invention further addresses how information regarding forward link channel quality can be efficiently signaled over the access channel during access preamble transmission.

In one embodiment, an apparatus and method for transmitting an indicator of channel quality minimizing the use of a broadcast channel is described. A metric of

forward link geometry of observed transmission signals is determined. An indicator of channel quality value is determined as a function of the observed transmission signals. An access sequence is selected, randomly, from one group of a plurality of groups of access sequences, wherein each of the plurality of groups of access sequences correspond to different ranges of channel quality values.

[0010] The metric of forward link geometry may be determined as a function of observed pilot signals, noise, and/or traffic on data channels. The quantity of access sequences in the plurality of groups access sequences are distributed non-uniformly. In an embodiment, the access sequences are distributed to reflect the distribution of access terminals about the access point. In another embodiment, the access sequences are distributed in proportion to the number of access terminals that need a given amount of power needed to send an indicator of acknowledgment to the access terminal.

[0011] In another embodiment, a method of partitioning a plurality of access sequences, is described. A probability distribution of a plurality of access terminals about an access point is determined. The probability distribution is determined as a function of a plurality of access terminals having CQI values within a predetermined ranges. Groups of access sequences are assigned in proportion to the probability distribution. Access sequences can be reassigned as a function of a change in distribution of access terminals about the access point.

[0012] In yet another embodiment, an apparatus and method of transmitting an acknowledgement of a detected access sequence is described. An access sequence is received. The access sequence can be looked-up in a look-up table, stored in memory, to determine at least one attribute of the given access terminal (as a function of the access sequence). The attribute can be information such as a channel quality indicator, a buffer level and a quality of service indicator. Information is then transmitted to the access terminal, where the information is commensurate and consistent with the attribute. Information transmitted may include an indicator of acknowledgment. The indicator of acknowledgment may be transmitted over a shared signalling channel (SSCH).

[0013] Various aspects and embodiments of the invention are described in further detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The features and nature of the present invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify correspondingly throughout and wherein:

[0015] FIG. 1 illustrates a block diagram of a transmitter and a receiver;

[0016] FIG. 2 illustrates the access probe structure and the access probe sequence;

[0017] FIG. 3 illustrates a traditional call flow between an access terminal and an access point;

[0018] FIG. 4 illustrates an embodiment of the invention that avoids the use of the broadcast acknowledgement;

[0019] FIG. 5 illustrates a cell partitioned using uniform spacing;

[0020] FIG. 6 illustrates a diagram showing weighted partitioning based on quantized CQI values;

[0021] FIG. 7 illustrates a table stored in memory that partitions the group of access sequences into sub-groups of access sequences based on a variety of factors; and

[0022] FIG. 8 illustrates a process for dynamically allocating access sequences.

DETAILED DESCRIPTION

[0023] The word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any embodiment or design described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments or designs.

[0024] The techniques described herein for using multiple modulation schemes for a single packet may be used for various communication systems such as an Orthogonal Frequency Division Multiple Access (OFDMA) system, a Code Division Multiple Access (CDMA) system, a Time Division Multiple Access (TDMA) system, a Frequency Division Multiple Access (FDMA) system, an orthogonal frequency division multiplexing (OFDM)-based system, a single-input single-output (SISO) system, a multiple-input multiple-output (MIMO) system, and so on. These techniques may be used for systems that utilize incremental redundancy (IR) and systems that do not utilize IR (e.g., systems that simply repeats data).

[0025] Embodiments of the invention avoid use of a broadcast acknowledgement channel by having the access terminals indicate a parameter, such as forward link channel quality (i.e., CQI), buffer level requirements, quality of service requirements, etc., during its preamble transmission. By having the access terminals indicate forward link channel quality, the access point can transmit each acknowledgment on a channel using an appropriate amount of power for a given access terminal or group of access terminals. In the case of the acknowledgment message being transmitted to a group of access terminals, an acknowledgment message is sent to multiple access terminals who have indicated the same or similar CQI values (within a range). Embodiments of the invention further address how CQI can be efficiently signaled over the access channel during access preamble transmission.

[0026] An "access terminal" refers to a device providing voice and/or data connectivity to a user. An access terminal may be connected to a computing device such as a laptop computer or desktop computer, or it may be a self contained device such as a personal digital assistant. An access terminal can also be called a subscriber station, subscriber unit, mobile station, wireless device, mobile, remote station, remote terminal, user terminal, user agent, or user equipment. A subscriber station may be a cellular telephone, PCS telephone, a cordless telephone, a Session Initiation Protocol (SIP) phone, a wireless local loop (WLL) station, a personal digital assistant (PDA), a handheld device having wireless connection capability, or other processing device connected to a wireless modem.

[0027] An "access point" refers to a device in an access network that communicates over the air-interface, through one or more sectors, with the access terminals or other access points. The access point acts as a router between the access terminal and the rest of the access network, which may include an IP network, by converting received air-interface frames to IP packets. Access points also coordinate the management of attributes for the air interface. An access point may be a base station, sectors of a base station, and/or a combination of a base transceiver station (BTS) and a base station controller (BSC).

[0028] FIG. 1 illustrates a block diagram of a transmitter 210 and a receiver 250 in a wireless communication system 200. At transmitter 210, a TX data processor 220 receives data packets from a data source 212. TX data processor 220 processes (e.g., formats, encodes, partitions, interleaves, and modulates) each data packet in accordance

with a mode selected for that packet and generates up to T blocks of data symbols for the packet. The selected mode for each data packet may indicate (1) the packet size (i.e., the number of information bits for the packet) and (2) the particular combination of code rate and modulation scheme to use for each data symbol block of that packet. A controller 230 provides various controls to data source 212 and TX data processor 220 for each data packet based on the selected mode. TX data processor 220 provides a stream of data symbol blocks (e.g., one block for each frame), where the blocks for each packet may be interlaced with the blocks for one or more other packets.

[0029] A transmitter unit (TMTR) 222 receives the stream of data symbol blocks from TX data processor 220 and generates a modulated signal. Transmitter unit 222 multiplexes in pilot symbols with the data symbols (e.g., using time, frequency, and/or code division multiplexing) and obtains a stream of transmit symbols. Each transmit symbol may be a data symbol, a pilot symbol, or a null symbol having a signal value of zero. Transmitter unit 222 may perform OFDM modulation if OFDM is used by the system. Transmitter unit 222 generates a stream of time-domain samples and further conditions (e.g., converts to analog, frequency upconverts, filters, and amplifies) the sample stream to generate the modulated signal. The modulated signal is then transmitted from an antenna 224 and via a communication channel to receiver 250.

[0030] At receiver 250, the transmitted signal is received by an antenna 252, and the received signal is provided to a receiver unit (RCVR) 254. Receiver unit 254 conditions, digitizes, and pre-processes (e.g., OFDM demodulates) the received signal to obtain received data symbols and received pilot symbols. Receiver unit 254 provides the received data symbols to a detector 256 and the received pilot symbols to a channel estimator 258. Channel estimator 258 processes the received pilot symbols and provides channel estimates (e.g., channel gain estimates and SINR estimates) for the communication channel. Detector 256 performs detection on the received data symbols with the channel estimates and provides detected data symbols to an RX data processor 260. The detected data symbols may be represented by log-likelihood ratios (LLRs) for the code bits used to form the data symbols (as described below) or by other representations. Whenever a new block of detected data symbols is obtained for a given data packet, RX data processor 260 processes (e.g., deinterleaves and decodes) all detected data symbols obtained for that packet and provides a decoded packet to a data

sink 262. RX data processor 260 also checks the decoded packet and provides the packet status, which indicates whether the packet is decoded correctly or in error.

[0031] A controller 270 receives the channel estimates from channel estimator 258 and the packet status from RX data processor 260. Controller 270 selects a mode for the next data packet to be transmitted to receiver 250 based on the channel estimates. Controller 270 also assembles feedback information. The feedback information is processed by a TX data processor 282, further conditioned by a transmitter unit 284, and transmitted via antenna 252 to transmitter 210.

[0032] At transmitter 210, the transmitted signal from receiver 250 is received by antenna 224, conditioned by a receiver unit 242, and further processed by an RX data processor 244 to recover the feedback information sent by receiver 250. Controller 230 obtains the received feedback information, uses the ACK/NAK to control the IR transmission of the packet being sent to receiver 250, and uses the selected mode to process the next data packet to send to receiver 250. Controllers 230 and 270 direct the operation at transmitter 210 and receiver 250, respectively. Memory units 232 and 272 provide storage for program codes and data used by controllers 230 and 270, respectively.

[0033] FIG. 2 illustrates the access probe structure and the access probe sequence 200. In FIG. 2, Ns probe sequences are shown, where each probe sequence has Np probes. The media access control layer (MAC) protocol transmits access probes by instructing the physical layer to transmit a probe. With the instruction, the access channel MAC protocol provides the physical layer with a number of elements, including, but not limited to, the power level, access sequence identification, pilot PN of the sector to which the access probe is to be transmitted, a timing offset field and a control segment field. Each probe in a sequence is transmitted at increasing power until the access terminal receives an access grant. Transmission is aborted if the protocol received a deactivate command, or if a maximum number of probes per sequence have been transmitted. Prior to transmission of the first probe of all probe sequences, the access terminal forms a persistence test which is used to control congestion on the access channel.

[0034] FIG. 3 illustrates a traditional call flow between an access terminal and an access point 300. Access terminal 304 randomly selects a preamble, or PN sequence, out of a group of PN sequences and sends 308 the preamble during the access slot to the access

point 312. Upon receipt, the access point 312 then transmits 316 an access grant, including a broadcast acknowledgement, for each of the preambles detected. This acknowledgement is a broadcasted acknowledgement transmitted at a high enough power such that all of the access terminals in a given cell are able to decode the broadcast acknowledgement. This is deemed necessary because the access point has no prior knowledge where the access terminals are in the system, and thus has no knowledge as to the power level necessary for the access terminal to decode the broadcasted acknowledgement. On receipt of the accent grant 316, access terminal 304 sends 320 the payload as per the defined resources allocated in the access grant.

[0035] The broadcast acknowledgement transmission described above is relatively inefficient as it requires a disproportionate amount of transmit power and/or frequency bandwidth to close the link. FIG 4 illustrates an embodiment 400 that avoids the use of the broadcast acknowledgement. An access terminal observes 408 transmissions from access points. In observing, the access terminal determines the power of transmissions it receives. These observations typically involve determining forward link channel quality from observed acquisition pilot signal transmissions or pilot transmissions as part of a shared signalling channel (SSCH) channel.

[0036] The access terminal 404 then randomly selects a preamble, or access sequence, out of a group of access sequences and sends the preamble 410 to the access point 412. This preamble is transmitted along with some knowledge of forward link channel quality (CQI). CQI information may be transmitted as within the preamble, or appended to it. In another embodiment, an access sequence is randomly chosen out of a plurality of groups of access sequences, where each group of access sequences is designated for a range of CQI values. For example, indications of forward link channel quality may be observed pilot signal power. The observed pilot signal power may be quantized to CQI values based on a predetermined set of values. Thus, a given range of received pilot signal power may correspond to a given CQI value. Accordingly, the access point 412 may determine the CQI of a given access terminal by virtue of the access sequence chosen by the access terminal.

[0037] Because the access terminal sends an indicator of forward link channel quality during its initial access attempt with the access point 412, the access point 412 has the knowledge needed to transmit 416 each acknowledgement on a channel using an appropriate amount of power for the designated access terminal 404. In an

embodiment, the acknowledgment message may be sent to a group of access terminals having the same or similar CQI values. This may be through use of the SSCH. Thus, based on the power level needed for the access terminal to successfully receive the transmission, the access point sends the acknowledgement message in the appropriate section of the SSCH message.

[0038] In addition to CQI information, the access terminal may send other information of interest to the access point during the initial access phase. For example, the access terminal may send a buffer level indicator, indicating the amount of data the access terminal intends to send to the access point. With such knowledge, the access point is able to appropriately dimension initial resource assignments.

[0039] The access terminal may also send information regarding priority groups or quality of service. This information may be used to prioritize access terminals in the event of limited access point capability or system overload.

[0040] Upon receipt of the access grant message by the access terminal, the access terminal 404 sends 420 payload as per the resources defined in the access grant message. By receiving additional information during the initial access phase, the access point will be able to take advantage of knowing the CQI, buffer level and quality of service information as part of the access grant message.

[0041] FIG. 5 illustrates a cell 500 partitioned using uniform spacing. The cell is divided into a number of regions R, wherein each region is defined by having a probability of observed metrics within a given range. In an embodiment, observations of forward link geometry are used. For example, metrics such as C/I, where C is the received pilot power and I is the observed noise, may be used. Also, C/(C+I) may be used. In other words, some measure that utilizes observed signal power and noise is used. These observed metrics correspond to given CQI values, or value ranges, which thus define the region. For example, Region R_1 defines a Region having CQI values corresponding to power and/or noise levels greater than P_1. Region R_2 defines a region having CQI values corresponding to power and/or noise levels such that $P_2 > R_2 > P_1$. Similarly, Region R_3 defines a Region having CQI values corresponding to power and/or noise levels such that $P_3 > R_3 > P_2$, and so on. Region R_{N-1} has CQI values corresponding to power and/or noise levels such that they fall in the range of $P_x > R_{N-1} > P_y$. Similarly, Region R_N has CQI values corresponding to power and/or noise levels observed $< P_x$.

[0042] Theoretically, by choosing to transmit one of N possible preamble sequences, up to $\log_2(N)$ bits of information may be conveyed. For example, when $N = 1024$, as many as $\log_2(1024) = 10$ bits may be conveyed. Thus, by choosing which preamble sequence to transmit, it is possible for user dependent information to be embedded as part of the preamble transmission.

[0043] A commonly used technique is to partition then N preamble sequences into M distinct sets, labeled $\{1,2,\cdots,M\}$To signal one of $\log_2(M)$ possibilities (i.e., $\log_2(M)$ bits), a sequence in an appropriate set is chosen and transmitted. For instance, to signal message index $k\in\{1,2,\cdots, M\}$, a sequence in the k^{th} set is (randomly) chosen and transmitted. Assuming correct detection at the receiver, the transmitted information (i.e., the $\log_2(M)$ -bit message) can be obtained based on the index of the set that the received sequence belongs to.

[0044] In a uniform partitioning strategy, where the N preamble sequences are uniformly partitioned into M groups (i.e., each group contains N/M sequences). Based on the measured CQI value, one of the preamble sequences from an appropriate set is selected and transmitted. The collision probability, then, depends on the mapping/quantization of the measured CQI and the number of simultaneous access attempts.

[0045] This can be illustrated by considering a simple 2-level quantization of CQI (i.e.,M=2), with Pr(M(CQI)=1)=α and Pr(M(CQI)=1)=α, where $M(x)$ is a quantization function mapping the measured CQI value into one of the two levels.

[0046] With uniform access sequence partitioning, the N preamble sequences are partitioned into two sets with N/2 sequences in each set. As by example, assume that there are two simultaneous access attempts (i.e., exactly two access terminals are trying to access the system in each access slot). The collision probability is given by

$$\alpha^2 \frac{1}{\left(\frac{N}{2}\right)} + (1-\alpha)^2 \frac{1}{\left(\frac{N}{2}\right)}.$$

[0047] With probability α^2, the two access terminals wish to send M=1(i.e., they both have quantized CQI level = 1). Since there are N/2 preamble sequences to choose from in the first set, the collision probability (given that both access terminals choose their sequence from this set) is 1/(N/2). Following the same logic, the collision probability for the other set can be derived.

[0048] Thus, the overall collision probability depends on the parameter α and number of simultaneous access attempts. The collision probability can be as high as $2/N$ (α =0,1) or as low as $1/N$ (α = 0.5). Thus, the best choice of α in this case is α =0.5. However, it is unclear whether the CQI quantization function that results in α =0.5 is a desirable function.

[0049] The access point will transmit the acknowledgment channel at the power level required to close the link as indicated by the CQI level. In this example, with probability α, the access point has to transmit at the power corresponding to that of a broadcast channel and with probability 1-α, the access point can transmit at some lower power. Thus, with α = 0.5, half the time the access point has to broadcast the acknowledgment channel. On the other hand, by choosing α = 0.5, the access point is forced to broadcast the acknowledgement channel less frequently but incurring an increase in the transmit power in the remaining of the time and higher overall collision probability.

[0050] FIG. 6 illustrates a diagram showing weighted partitioning 600 based on quantized CQI values. The region is partitioned into various regions that are not of a uniform space, but are rather partitioned based on quantized CQI values that are weighted. By weighting the regions, additional preamble sequences are available in regions that have a higher probability of access terminals being in that region (i.e., a higher mass function). For example, regions 604, 608, and 612 are larger regions that may correspond to having a larger number of access sequences available. Conversely, regions 616 and 620 are smaller regions that may indicate smaller quantities of users present and thus fewer access sequences available. Thus, the regions may be partitioned having some prior knowledge as to the distribution of C/I or received power in a specified range in a given cell. It is contemplated that geographic regions may not always represent concentrations of users within given CQI ranges. Rather, the graphical representations of non-uniform spacing is to indicate the non-uniform distribution of access sequences through a given cell region.

[0051] In an embodiment, the probability distribution of access terminals within the cell may be dynamic based on the distribution of access terminals over time. Accordingly, certain partitioned regions may be larger or smaller based on the absence or presence of access terminals at a given time of the day, or otherwise adjusted as a function of the concentration of access terminals present in a given CQI region.

[0052] Thus, the sequences available for initial access are divided into *N* number of partitions. The access terminal determines the partition to be used for the access attempt based on at least the observed pilot power and buffer level. It is contemplated that the partition may also be determined on a number of other factors, such as packet size, traffic type, bandwidth request, or quality of service. Once the partition is determined, the access terminals select the sequence ID using a uniform probability over that partition. Of the available sequences for access, a subset of sequences is reserved for active set operations, and another subset of sequences are available for initial access. In one embodiment, sequences 0, 1 and 2 are reserved for active set operations, and sequences 3 through the total number of access sequences are available for initial access.

[0053] The size of each partition is determined by the access sequence partition field in the system information bock. This is typically part of the sector parameter. A particular partition number *N* comprises sequence identifiers ranging from a lower threshold, partition *N* lower, to an upper threshold, partition *N* upper. Both thresholds are determined using the partitions size, partially provided in table 1 below:

Access Sequence Partition	Partition N Size (N from 1 to 8)							
	1	2	3	4	5	6	7	8
00000	0	0	0	0	0	0	0	0
00001	S2	S2	S2	S2	S2	S2	S2	S2
00010	S3	S3	S	S1	S1	S1	S1	S1
00011	S1	S1	S1	S3	S3	S3	S1	S1
00100	S1	S1	S1	S1	S1	S1	S3	S3
00101	S3	S1	S1	S3	S1	S1	S3	S1
00101	S1	S3	S1	S1	S3	S1	S1	S3
00110	S1	S1	S3	S1	S1	S3	S1	S1
00111	S3	S3	S1	S3	S1	S1	S1	S1
01000	S1	S1	S1	S3	S3	S1	S3	S1

[0054] Thus, in this embodiment the access terminal selects its pilot level based on the ratio, measured in decibels, of the acquisition pilot power from the sector where the access attempt is being made to the total power received in the acquisition channel time slot. The pilot threshold values are determined based on the pilot strength segmentation field of the system information message.

[0055] Embodiments describe a technique whereby the access sequence space is partitioned according to the statistics of the quantized CQI. More precisely,

$$p = [p_1 \quad p_2 \quad \cdots \quad p_M]$$

is the probability mass function of the quantized CQI values, where

$$\Pr(CQI = 1) = p_1, \Pr(CQI = 2) = p_2, \cdots, \Pr(CQI = M) = p_M).$$

The access sequence space is then partitioned to have a similar probability mass function. That is, the ratio of the number of access sequences in each set to the total number of access sequences should be proportional, such that

[0056] $$p = [p_1 \quad p_2 \quad \cdots \quad p_M] \text{(i.e., } \left(\frac{N_1}{N}, \quad \frac{N_2}{N}, \quad \cdots, \quad \frac{N_M}{N} \right) = (p_1 \quad p_2 \quad \cdots \quad p_M),$$

where N_k is the number of access sequences in set $K \in \{1,2,\cdots,M\}$

[0057] In the example describing the 2-level CQI quantization function yields the following:

$$\Pr(M(CQI) = 1) = \alpha \text{ and } \Pr(M(CQI) = 2) = 1 - \alpha$$

The number of access sequences in each set is, therefore, $(\alpha)N$ and $(1-\alpha)N$, respectively. The resulting collision probability is

$$\alpha^2 \frac{1}{(\alpha N)} + (1-\alpha)^2 \frac{1}{((1-\alpha)N)} = \frac{\alpha}{N} + \frac{(1-\alpha)}{N} = \frac{1}{N},$$

which is the smallest collision probability possible.

[0058] For a more general setting with M possible CQI levels and U simultaneous attempts, the analytical expression of the collision probability becomes more complex.

[0059] In another example, consider M=6 ,U=8 , and N=1024. Assume that the CQI values are quantized in the step of 4-5 dB. The quantized CQI values are given by [-3, 1, 5, 10, 15, 20] dB with the following probability mass function [0.05, 0.25, 0.25 0.20 0.15 0.10]. That is, 5% of the time, users will report CQI values lower than -3 dB, 25% of the time with CQI values between -3 and 1 dB, and so on. The access point can then adjust the power for the acknowledgment channel based on the reported CQI.

[0060] Using the proposed access sequence partitioning technique, the resulting collision probability is approximately 2.5%. The collision probability using uniform access sequence partitioning compared is 3.3%. However, to get a similar collision probability when a uniform access sequence partitioning is used, the total number of sequences has to be increased by 25% to 1280. Accordingly, a larger number of access

sequences to search translates directly to higher complexity and higher false alarm probability.

[0061] This partitioning strategy can also be used when signaling other information such as packet size, traffic type, and bandwidth request over the access channel. This is particularly useful when the access channel (the preamble portion) is used as a means for users to get back into the system or to request resources. If information regarding the statistics of information to be conveyed is known (e.g., percentage of times a certain traffic connection (http, ftp, SMS) is requested or how much bandwidth is often required, etc.), then this information can be used in determining the partition of the access preamble sequence space.

[0062] FIG. 7 illustrates a table 700 stored in memory that partitions the group of access sequences into sub-groups of access sequences based on a variety of factors. Factors include CQI ranges, buffer level, quality of service, packet size, frequency bandwidth request, or other factors. The quantity of access sequences in a given sub-group may be initially determined on statistics maintained of past concentration of users in the given cell as a function of the factors being considered. Thus,. each cell may have a predetermined mass distribution of access sequences for combinations of the various factors. In so doing, the collision probability of multiple users selecting the same access sequence is minimized.

[0063] In an embodiment, the quantity of access sequences assigned to various combinations of factors may dynamically change based on changes in the composition of users needs. Thus, if a higher quantity of users migrate to a region with a CQI within a given range and a buffer level of a certain amount, and other various factors, that region may be assigned additional access sequences. Dynamic allocation of access sequences thus mimics an optimal scenario whereby the collision probability is minimized.

[0064] FIG. 8 illustrates such a process 800. Initial partitions are set 804, thereby partitioning the plurality of access sequences into a number of groups of access sequences. These groups may be based on ranges of CQI values. In an embodiment, the initial set may be based on uniform distribution of access sequences. In another embodiment, the initial partition sizes may be based on historical data. A counter 808 counts the access attempts in each subset. The counter can keep track of the access attempts over time to determine if there are patterns of varying heavy or light usage.

Based on this access attempts over time, the expected value of access attempts in given subsets may be updated 812. The expected value may be represented by the following equation:

$$E_m := (1-\beta)E_m + \beta\, a_m (a_m - 1)$$

where E_m is the expected value, a_m represents the quantity of access sequences in a given subset, and β is the forgetting factor. The forgetting factor computes an average recursively, that gives a larger weight to more recent data and a lesser weight to less recent data.

[0065] Based on the new expected value, the new subset size may be determined 816. In an embodiment, the subset size is determined by the following equation:

$$N_m = N\frac{\sqrt{E_m}}{\sum_{k=1}^{M}\sqrt{E_k}}, \quad 1 \le m \le M$$

where N_m is the new subset size, E_k is the "old" expectation value of the k^{th} subset, m is the given subset out of *M* total subsets.

[0066] A determination is made 820 as to whether newly determined subset size is substantially different than the previously set subset size. The threshold for what constitutes "substantially different" is configurable. If a determination is made that the newly determined subset size is substantially different 824, then the subset sizes are reset. If not (828), the current subset sizes are maintained 832.

[0067] The various aspects and features of the present invention have been described above with regard to specific embodiments. As used herein, the terms 'comprises,' 'comprising,' or any other variations thereof, are intended to be interpreted as non-exclusively including the elements or limitations which follow those terms. Accordingly, a system, method, or other embodiment that comprises a set of elements is not limited to only those elements, and may include other elements not expressly listed or inherent to the claimed embodiment.

[0068] While the present invention has been described with reference to particular embodiments, it should be understood that the embodiments are illustrative and that the scope of the invention is not limited to these embodiments. Many variations, modifications, additions and improvements to the embodiments described above are possible. It is contemplated that these variations, modifications, additions and

improvements fall within the scope of the invention as detailed within the following claims.

WHAT IS CLAIMED IS:

CLAIMS

1. In a wireless communication system, a method of determining an indicator of channel quality, the method comprising:

determining a metric of an observed transmission;

determining an estimate of channel quality based on at least the metric of the observed transmission; and

selecting an access sequence, randomly, from one group of a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond to different ranges of channel quality values, and wherein the selected access sequence is from the group of the plurality of groups corresponding to the determined estimate of channel quality.

2. The method set forth in claim 1, wherein determining the metric further comprises determining the power of an observed pilot signal.

3. The method set forth in claim 1, wherein determining the estimate of channel quality further comprises determining the ratio of received pilot power to noise.

4. The method set forth in claim 1, wherein determining the estimate of channel quality further comprises determining the ratio of received pilot power to the sum of received pilot and power and noise.

5. The method set forth in claim 1, wherein the plurality of access sequences in the plurality of groups of access sequences are distributed non-uniformly.

6. The method set forth in claim 1, further comprising transmitting the selected access sequence.

7. The method set forth in claim 6, wherein transmitting further comprises transmitting in accordance with a Frequency Division Multiplex (FDM) scheme.

8. The method set forth in claim 6, wherein transmitting further comprises transmitting in accordance with a Code Division Multiplex (CDM) scheme.

9. The method set forth in claim 6, wherein the act of transmitting further comprises transmitting in accordance with an Orthogonal Frequency Division Multiple Access (OFDMA) scheme.

10. The method set forth in claim 1, wherein selecting further comprises selecting information indicative of access terminal requirements.

11. The method set forth in claim 10, wherein selecting information further comprises selecting information buffer level needs, quality of service requirements, a forward-link channel quality indicator.

12. In a wireless communication system, an apparatus to determine an indicator of channel quality, the apparatus comprising:

a receiver configured to receive observed transmissions;

a processor configured to determine a metric of the observed transmission, and to determine an estimate of channel quality as a function of at least the metric of the observed transmission;

a memory element configured to store a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond to different ranges of channel quality values; and

a selector configured to select an access sequence, randomly, from the group of the plurality of groups corresponding to the determined channel quality value.

13. The apparatus set forth in claim 12, the processor further comprises determining the ratio of received pilot power to noise.

14. The apparatus set forth in claim 12, the plurality of access sequences in the plurality of groups of access sequences are distributed non-uniformly.

15. The apparatus set forth in claim 12, further comprising a transmitter configured to transmit the selected access sequence.

16. The apparatus set forth in claim 15, wherein the transmitter is further configured to transmit in accordance with a Frequency Division Multiplex (FDM) scheme.

17. The apparatus set forth in claim 15, wherein the transmitter is further configured to transmit in accordance with a Code Division Multiplex (CDM) scheme.

18. The apparatus set forth in claim 14, wherein the transmitter is further configured to transmit in accordance with an Orthogonal Frequency Division Multiple Access (OFDMA) scheme.

19. The apparatus set forth in claim 11, wherein the selector is further configured to select information indicative of access terminal requirements.

20. The apparatus set forth in claim 19, wherein the information indicative of access terminal requirements comprises buffer level, quality of service requirements, a forward-link channel quality indicator.

21. In a wireless communication system, an apparatus for determining an indicator of channel quality, the means comprising:

means for determining a power level of an observed transmission;

means for determining a CQI value as a function of the power level of the observed transmission; and

means for selecting an access sequence, randomly, from one group of a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond to different ranges of CQI values, and wherein the selected access sequence is from the group of the plurality of groups corresponding to the determined CQI value.

22. The apparatus set forth in claim 21, wherein means for determining a power level further comprises means for determining the power level of an observed pilot signal.

23. The apparatus set forth in claim 21, wherein the plurality of access sequences in the plurality of groups of access sequences are distributed non-uniformly.

24. The apparatus set forth in claim 21, further comprising means for transmitting the selected access sequence.

25. The apparatus set forth in claim 24, wherein means for transmitting further comprises means for transmitting in accordance with a Frequency Division Multiplex (FDM) scheme.

26. The apparatus set forth in claim 24, wherein means for transmitting further comprises means for transmitting in accordance with a Code Division Multiplex (CDM) scheme.

27. The apparatus set forth in claim 24, wherein means for transmitting further comprises transmitting in accordance with an Orthogonal Frequency Division Multiplex (OFDM) scheme.

28. The apparatus set forth in claim 24, wherein the means for transmitting further comprises means for transmitting in accordance with an Orthogonal Frequency Division Multiple Access (OFDMA) scheme.

29. The apparatus set forth in claim 21, wherein selecting further comprises means for selecting information indicative of access terminal requirements.

30. The apparatus set forth in claim 29, wherein means for selecting information further comprises selecting information regarding buffer level needs, quality of service requirements, and/or a forward-link channel quality indicator.

31. In a wireless communication system, a method of transmitting information regarding access terminal needs, the method comprising:

determining a received power level of an observed pilot signal;

determining a CQI value as a function of the received power level; and

selecting an access sequence, randomly, from one group of a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond to a plurality of predetermined factors.

32. The method set forth in claim 31, wherein the predetermined factors include on or more of ranges of CQI values, ranges of buffer levels, packet size, traffic type, frequency bandwidth request and ranges of quality of service indicators.

33. In a wireless communication system, a method of communicating a channel quality indicator (CQI), the method comprising:

determining a power level of an observed pilot signal;

determining a CQI value as a function of the power level of the observed pilot signal;

selecting an access sequence, randomly, from one group of a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond different the CQI values;

appending the CQI value to the selected access sequence; and

transmitting the access sequence and CQI value.

34. A method of partitioning a plurality of access sequences, the method comprising:

determining a probability distribution of a plurality of access terminals about an access point, wherein the probability distribution is a function of a plurality of access terminals being partitioned into a plurality of sub-groups, wherein each sub-group is categorized as a function of CQI values within a predetermined range; and

assigning groups of access sequences in proportion to the probability distribution.

35. The method set forth in claim 34, further comprising reassigning access sequences as a function of a change in distribution of access terminals about the access point.

36. In a wireless communication system, an apparatus for transmitting information regarding access terminal needs, the apparatus comprising:

means for determining a received power level of an observed pilot signal;

means for determining a CQI value as a function of the received power level; and

means for selecting an access sequence, randomly, from one group of a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond to a plurality of predetermined factors.

37. The apparatus set forth in claim 31, wherein the predetermined factors include on or more of ranges of CQI values, ranges of buffer levels, packet size, traffic type, frequency bandwidth request and ranges of quality of service indicators.

38. In a wireless communication system, an apparatus for communicating a channel quality indicator (CQI), the apparatus comprising:

means for determining a power level of an observed pilot signal;

means for determining a CQI value as a function of the power level of the observed pilot signal;

means for selecting an access sequence, randomly, from one group of a plurality of groups of access sequences, wherein the plurality of groups of access sequences correspond different the CQI values;

means for appending the CQI value to the selected access sequence; and

means for transmitting the access sequence and CQI value.

39. An apparatus for partitioning a plurality of access sequences, the apparatus comprising:

means for determining a probability distribution of a plurality of access terminals about an access point, wherein the probability distribution is a function of a plurality of access terminals being partitioned into a plurality of sub-groups, wherein each sub-group is categorized as a function of CQI values within a predetermined range; and

means for assigning groups of access sequences in proportion to the probability distribution.

40. The apparatus set forth in claim 34, further comprising means for reassigning access sequences as a function of a change in distribution of access terminals about the access point.

41. In a wireless communication system, a method of transmitting an acknowledgement of a detected access sequence, the method comprising:

receiving an access sequence;

determining at least one attribute of a given access terminal as a function of the access sequence; and

transmitting information commensurate with the at least one attribute.

42. The method set forth in claim 41, wherein the attribute is at least one of a channel quality indicator, a buffer level indicator, a priority indicator and a quality of service indicator.

43. The method set forth in claim 41, wherein the transmitting information further comprises transmitting an indictor of acknowledgment.

44. The method set forth in claim 43, further comprising transmitting an indicator of acknowledgment over a shared signaling channel (SSCH).

45. The method set forth in claim 44, wherein the indicator of acknowledgment is included in a particular section of a shared signaling channel (SSCH), wherein the section of the SSCH is partitioned on a basis of the transmission power needed for the indicator of acknowledgment to be successfully received.

46. In a wireless communication system, a memory medium comprising *N* dimensions, wherein at least one of the dimensions comprises data correlating access sequences with indicators of channel quality.

47. The memory medium of claim 46, further comprising a dimension comprising data correlating access sequences with buffer level.

48. The memory medium of claim 46, further comprising a dimension comprising data correlating access sequences with packet size.

49. The memory medium of claim 46, further comprising a dimension comprising data correlating access sequences with traffic type.

50. The memory medium of claim 46, further comprising a dimension comprising data correlating access sequences with quality of service indicators.

51. The memory medium of claim 46, further comprising a dimension comprising data correlating access sequences with requests regarding frequency bandwidth.

52. In a wireless communication system, an apparatus for transmitting an acknowledgement of a detected access sequence, the apparatus comprising:

means for receiving an access sequence;

means for determining at least one attribute of a given access terminal as a function of the access sequence; and

means for transmitting information commensurate with the at least one attribute.

53. The apparatus set forth in claim 52, wherein the attribute is at least one of a channel quality indicator, a buffer level indicator, a priority indicator and a quality of service indicator.

54. The apparatus set forth in claim 52, wherein the means for transmitting information further comprises transmitting an indictor of acknowledgment.

55. The apparatus set forth in claim 54, further comprising means for transmitting an indicator of acknowledgment over a shared signaling channel (SSCH).

56. The apparatus set forth in claim 54, wherein the indicator of acknowledgment is included in a particular section of a shared signaling channel (SSCH), wherein the section of the SSCH is partitioned on a basis of the transmission power needed for the indicator of acknowledgment to be successfully received.

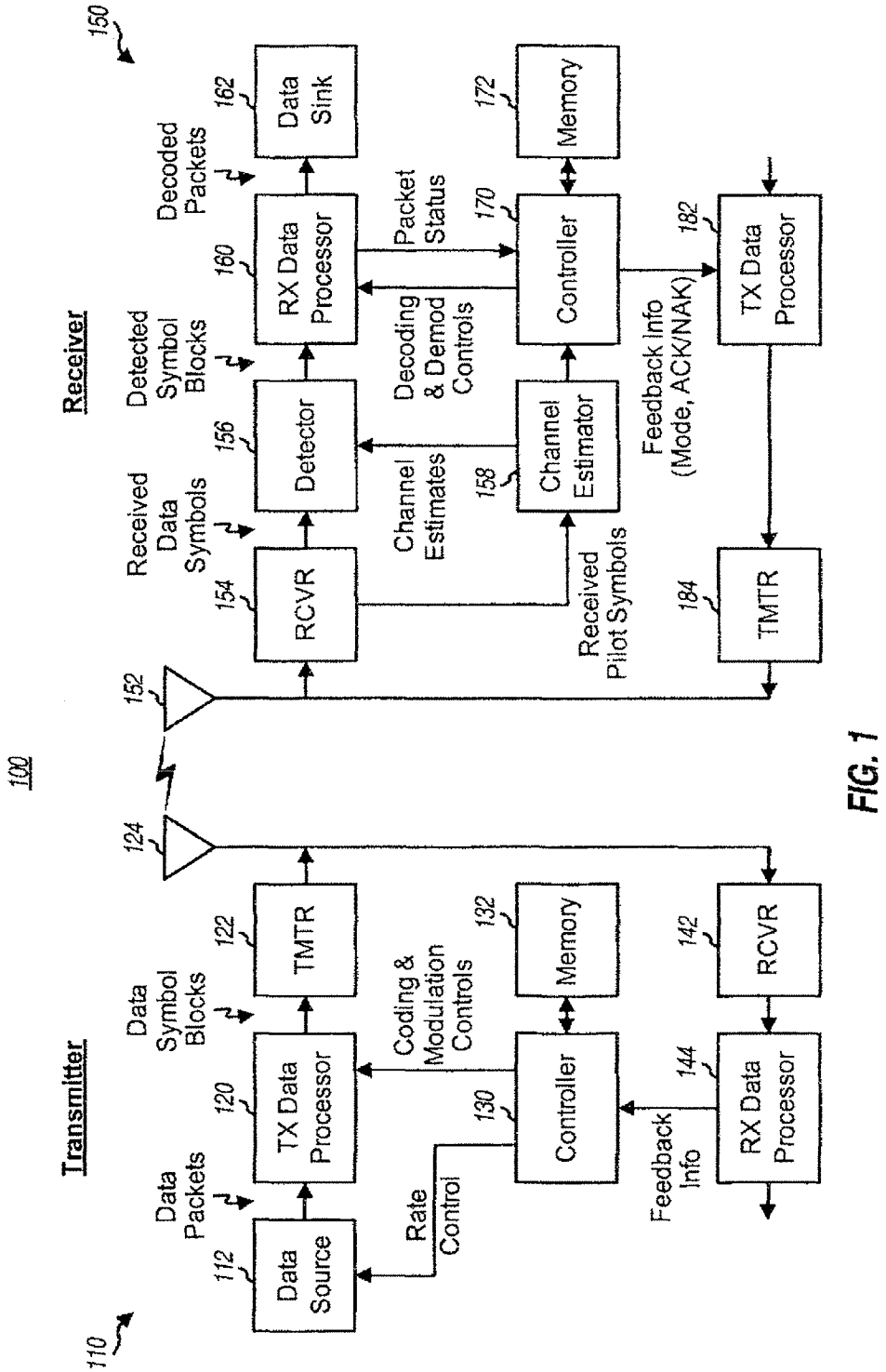

100
110
Transmitter
Data Source
112
Data Packets
TX Data Processor
120
Data Symbol Blocks
TMTR
122
124
Rate Control
Coding & Modulation Controls
Controller
130
Memory
132
RCVR
142
RX Data Processor
144
Feedback Info
152
150
Receiver
RCVR
154
Received Data Symbols
Detector
156
Detected Symbol Blocks
Channel Estimator
158
Channel Estimates
Received Pilot Symbols
RX Data Processor
160
Decoding & Demod Controls
Data Sink
162
Decoded Packets
Controller
170
Packet Status
Memory
172
TX Data Processor
182
Feedback Info (Mode, ACK/NAK)
TMTR
184

FIG. 1

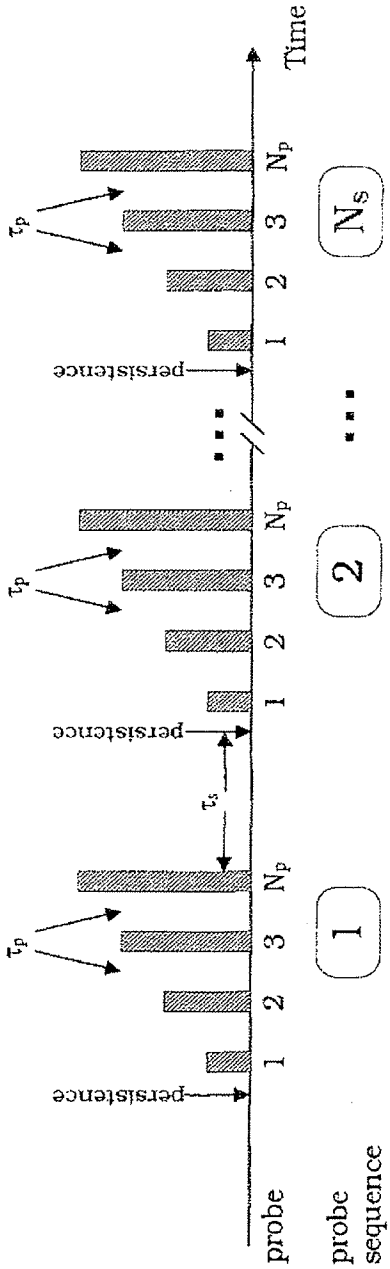

Time
probe
probe sequence
persistence
persistence
persistence
1
2
3
N_p
N_s
τ_p
τ_s

Fig. 2

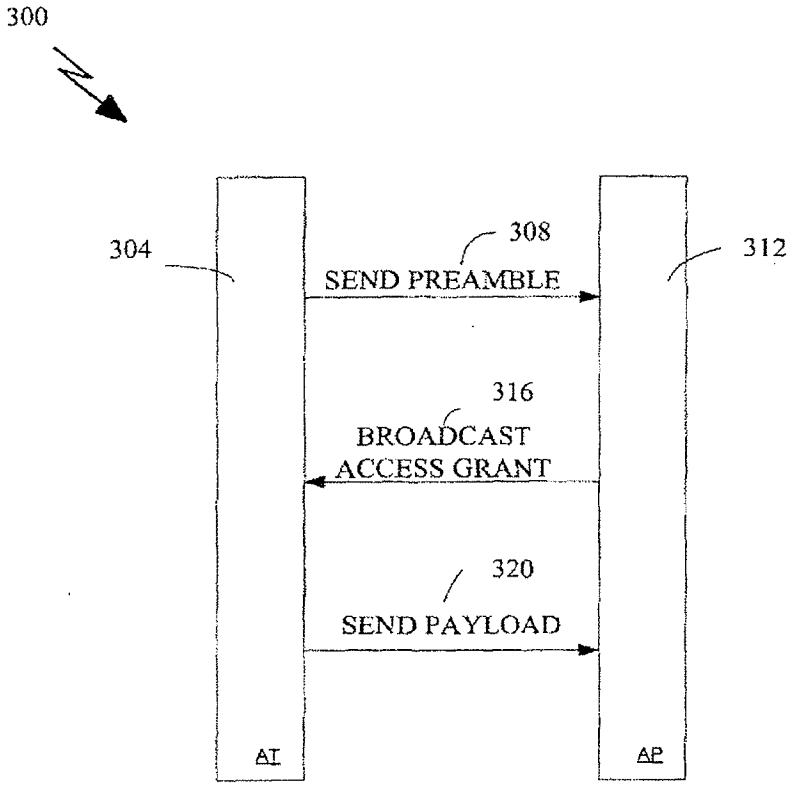

300
304
308
SEND PREAMBLE
312
316
BROADCAST
ACCESS GRANT
320
SEND PAYLOAD
AT
AP

FIG. 3

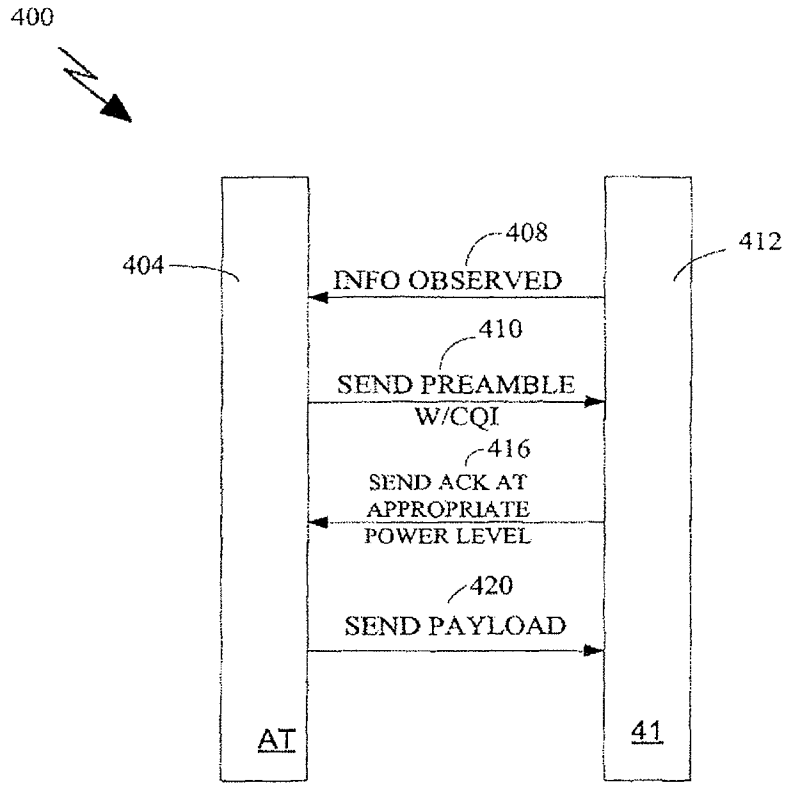

400
404
408
INFO OBSERVED
412
410
SEND PREAMBLE
W/CQI
416
SEND ACK AT
APPROPRIATE
POWER LEVEL
420
SEND PAYLOAD
AT
41

FIG. 4

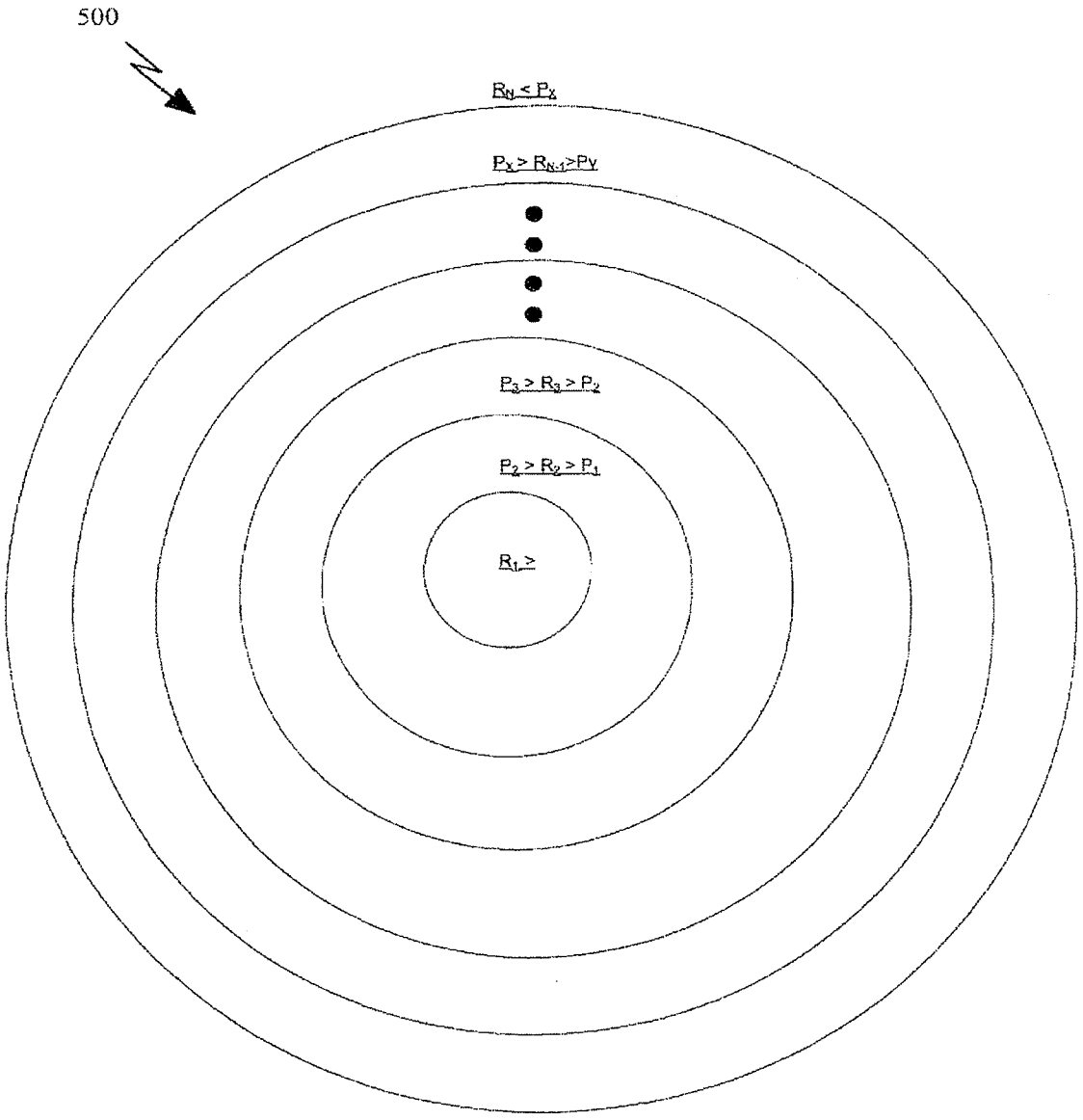


FIGURE 5

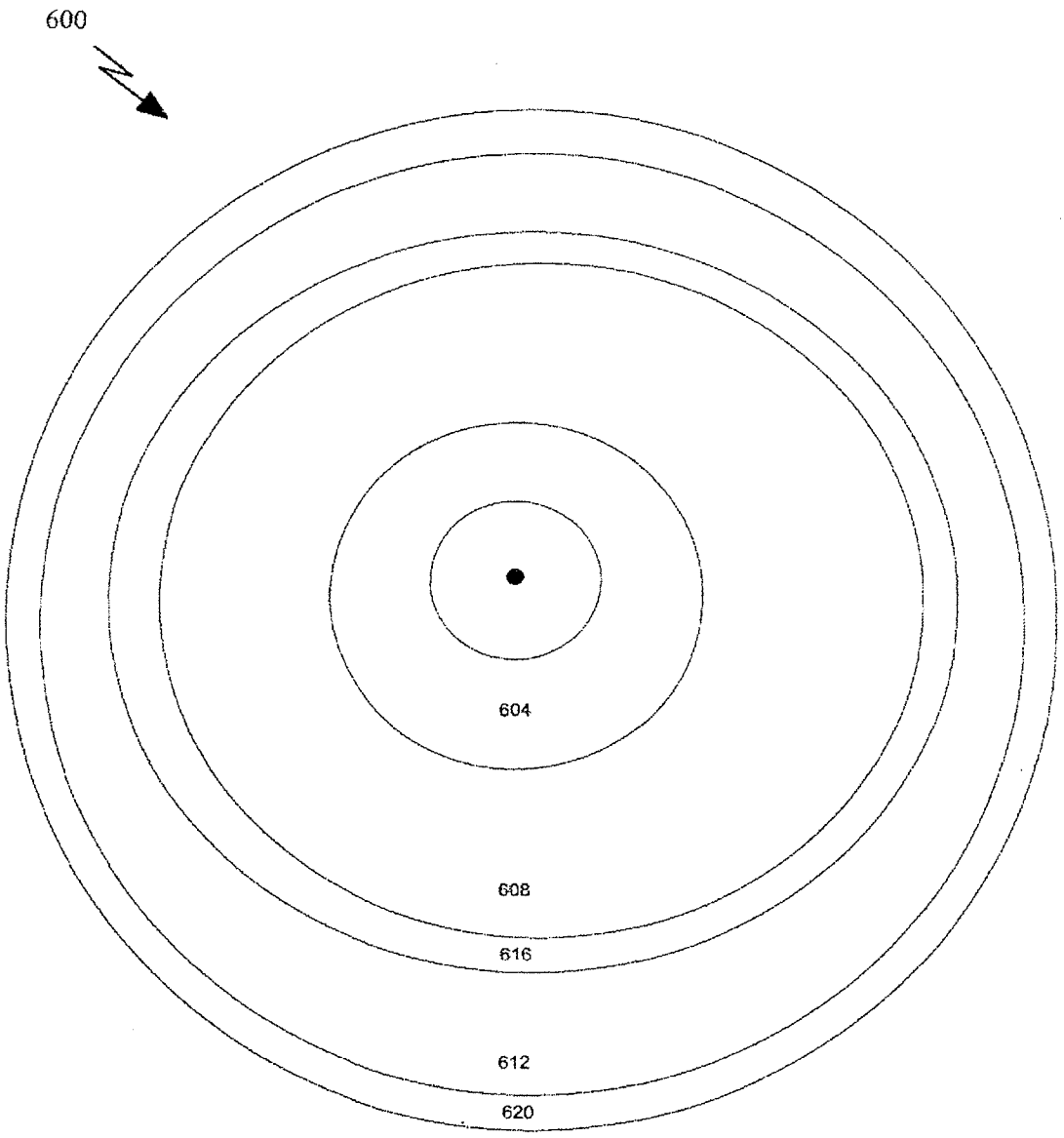


FIGURE 6

700

CQI	PACKET SIZE	TRAFFIC TYPE	BW REQUEST	. . .	QOS	BUFFER LEVEL
$R_1 > P_1$	$AS_{1,1}$	$AS_{2,1}$	$AS_{3,1}$	. . .	$AS_{M-1,1}$	$AS_{M,1}$
$P_2>R_2>P_1$	$AS_{1,2}$	$AS_{2,2}$	$AS_{2,2}$	. . .	$AS_{M-1,2}$	$AS_{M,2}$
$P_3>R_3>P_2$ . .	$AS_{1,3}$ . .	$AS_{2,3}$ . .	$AS_{3,3}$ . .	. . .	$AS_{M-1,3}$ . .	$AS_{M,3}$ . .
. $P_X>R_{N-1}>Py$	. $AS_{1,N-1}$	. $AS_{2,N-1}$	. $AS_{3,N-1}$	. . .	. $AS_{M-1,N-1}$	. $AS_{M,N-1}$
$R_N < Px$	$AS_{1,N}$	$AS_{2,N}$	$AS_{3,N}$	. . .	$AS_{M-1,N}$	$AS_{M,N}$

FIGURE 7

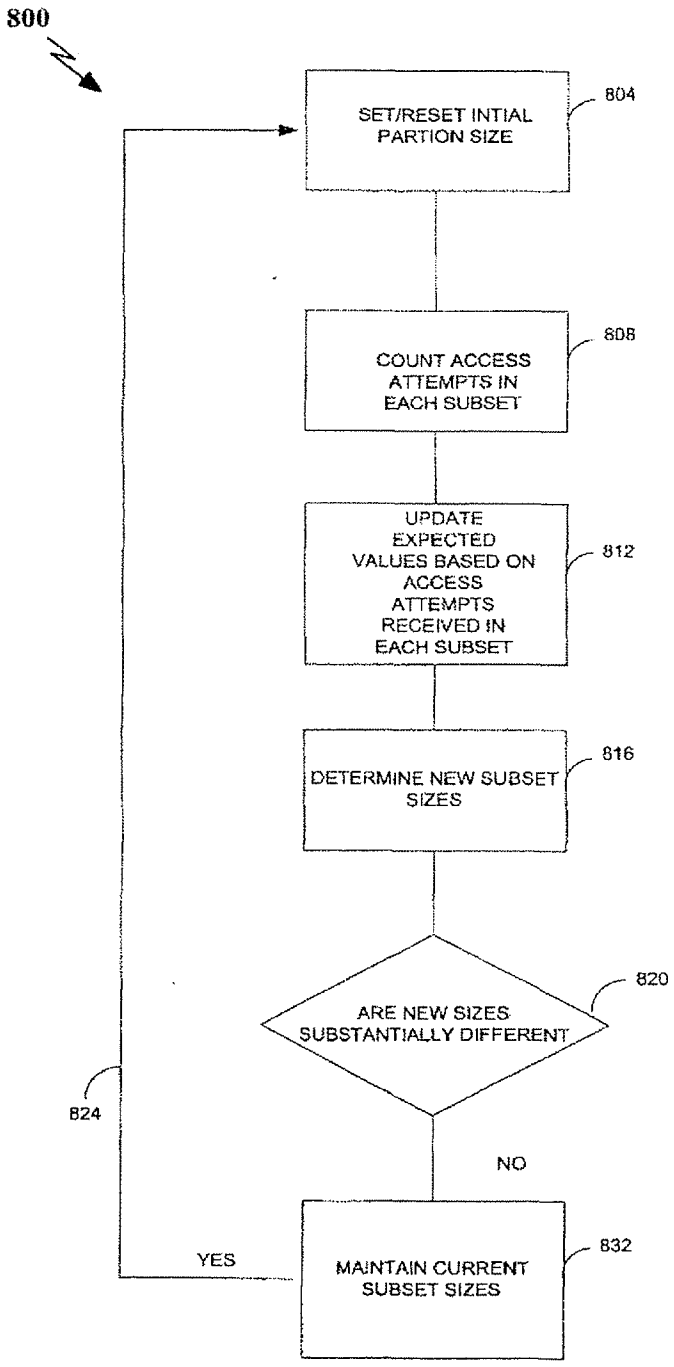

800
SET/RESET INTIAL PARTION SIZE
804
COUNT ACCESS ATTEMPTS IN EACH SUBSET
808
UPDATE EXPECTED VALUES BASED ON ACCESS ATTEMPTS RECEIVED IN EACH SUBSET
812
DETERMINE NEW SUBSET SIZES
816
ARE NEW SIZES SUBSTANTIALLY DIFFERENT
820
824
NO
YES
MAINTAIN CURRENT SUBSET SIZES
832

FIGURE 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/024614

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/38

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)
IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/003792 A1 (SCHMIDL TIMOTHY M ET AL) 10 January 2002 (2002-01-10)	1,12,21, 31,33, 34,36, 38,41, 46,52
Y	paragraph '0078! - paragraph '0079!	2-11, 13-20, 22-30, 32,35, 37,40, 42-45, 47-51, 53-56
	paragraph '0094! - paragraph '0100! figure 18	
	----- -/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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 document but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

'&' document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 October 2005	20/10/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Rabe, M

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/024614

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 674 787 B1 (DICK STEPHEN G ET AL) 6 January 2004 (2004-01-06) column 3, paragraph 6 - paragraph 27	2-11, 13-20, 22-30, 32,35, 37,40, 42-45, 47-51, 53-56
A	US 2003/223452 A1 (TOSKALA ANTTI ET AL) 4 December 2003 (2003-12-04) paragraph '0008! - paragraph '0018!	1-56
A	US 2001/055293 A1 (PARSA KOUROSH ET AL) 27 December 2001 (2001-12-27) paragraph '0039! - paragraph '0042!	1-56

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2005/024614

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002003792 A1	10-01-2002	NONE	
US 6674787 B1	06-01-2004	US 2004131033 A1	08-07-2004
US 2003223452 A1	04-12-2003	AU 2003212571 A1	12-12-2003
		EP 1508217 A2	23-02-2005
		WO 03100988 A2	04-12-2003
US 2001055293 A1	27-12-2001	NONE	

Electronic Acknowledgement Receipt

EFS ID:	9582518
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	52989
Filer:	James Edward Ledbetter
Filer Authorized By:	
Attorney Docket Number:	009289-08201
Receipt Date:	03-MAR-2011
Filing Date:	18-SEP-2008
Time Stamp:	18:54:32
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	IDS.pdf	74332 d50e9c59f5fe7c57bfb16482e7f6254a2f911a2d	no	3

Warnings:	
Information:	

This is not an USPTO supplied IDS fillable form

2	Foreign Reference	OFFICEACTION.pdf	214421 03b1d629598229942246a7e4adccf1e1ca68a3535	no	5
Warnings:					
Information:					
3	Foreign Reference	FR1.pdf	1141521 265e82c3c8ee4e5392395c89aa8627c2fd4be498	no	38
Warnings:					
Information:					
		Total Files Size (in bytes):	1430274		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

ELECTION AND POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners at Seed IP Law Group PLLC, Customer Number: **96896**

OR

☐ Practitioner(s) named below:

Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications (and any continuation/divisional applications therefrom) assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

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

OR

☐ The address associated with Customer Number:

OR

☐ Firm *or* Individual Name					
Address					
Address					
City		State		ZIP	
Country					
Telephone		Email			

Assignee Name and Address:

Panasonic Corporation
1006, Oaza Kadoma
Kadoma-shi, Osaka, Japan 571-8501

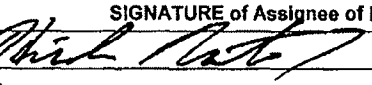
A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

I am the:

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☒ As assignee of record of the entire interest we hereby elect, under 37 CFR 3.71, to prosecute the application to the exclusion of the inventor(s).

SIGNATURE of Assignee of Record

Signature		Date	May 27, 2010
Name	Hiroki Naito		
Title and Company (Assignee)	Director, IP Development Center Authorized Signing Officer Panasonic Corporation		

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

Electronic Acknowledgement Receipt

EFS ID:	9986089
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	52989
Filer:	Shoko I. Leek/Caley Jansen
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	009289-08201
Receipt Date:	29-APR-2011
Filing Date:	18-SEP-2008
Time Stamp:	13:41:48
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		733156_428USPC_Statement_POA.pdf	111007 9fee87a9872c437fbaf9a4ab79f69f412d5895d1	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Power of Attorney	2	2
Warnings:			
Information:			
	Total Files Size (in bytes):	111007	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: **Daichi Imamura et al.**

Application No./Patent No.: **12/293,530** Filed/Issue Date: **September 18, 2008**

Entitled: **RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD**

Panasonic Corporation (Name of Assignee) a **Corporation** (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [X] the assignee of the entire right, title, and interest in;
2. [ ] an assignee of less than the entire right, title and interest in (The extent (by percentage) of its ownership interest is _____%); or
3. [ ] the assignee of an undivided right, title and interest in the entirety of (a complete assignment from one or more of the joint inventors was made)

the patent application/patent identified above by virtue of either:

A. [X] 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 **021792**, Frame **0957**, or for which a copy thereof is attached.

OR

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

1. From:_____ To:_____

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

2. From:_____ To:_____

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

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.

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

[X] As required by 37 CFR 3.73(b)(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.

Signature — **April 29, 2011** Date

Shoko I. Leek Typed or printed name — **Attorney of Record** Title

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/293,530	09/18/2008	Daichi Imamura	009289-08201

CONFIRMATION NO. 2058

POWER OF ATTORNEY NOTICE

52989
James Edward Ledbetter
1875 Eye Street
Suite 1200
Washington, DC 20006

OC000000047564274

Date Mailed: 05/11/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/29/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/tnnguyen/

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC

CONFIRMATION NO. 2058

96896
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

POA ACCEPTANCE LETTER

Date Mailed: 05/11/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/29/2011.

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.

/tnnguyen/

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
For	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Art Unit	:	2617
Docket No.	:	733156.428USPC
Date	:	May 13, 2011

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

REQUEST FOR CORRECTED FILING RECEIPT

Commissioner for Patents:

Attached is a copy of the official Filing Receipt received from the PTO in the above-identified application, for which issuance of a corrected Filing Receipt is respectfully requested.

There is an error with respect to the following data, which is incorrectly entered. There is an error in Applicant's name, which should read Tomofumi Takata.

The correction to be made has been marked on the attached copy of the Filing Receipt.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/Shoko Leek/
Shoko I. Leek
Registration No. 43,746

SIL:ccj
Enclosure:
Copy of Filing Receipt

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

1888047_1.DOC

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/293,530	09/18/2008	2617	930	009289-08201	11	2

CONFIRMATION NO. 2058

52989
Dickinson Wright PLLC
James E. Ledbetter, Esq.
International Square
1875 Eye Street, N.W., Suite 1200
Washington, DC 20006

FILING RECEIPT

Date Mailed: 03/13/2009

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**

Applicant(s)

Daichi Imamura, Kanagawa, JAPAN;
Sadaki Futagi, Ishikawa, JAPAN;
Atsushi Matsumoto, Ishikawa, JAPAN;
Takashi Iwai, Ishikawa, JAPAN;
Tomofumi ~~Tomohumi~~ Takata, Ishikawa, JAPAN;

Assignment For Published Patent Application

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD, OSAKA, JAPAN

Power of Attorney: The patent practitioners associated with Customer Number 52989

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/JP2007/055695 03/20/2007

Foreign Applications

JAPAN 2006-076995 03/20/2006

If Required, Foreign Filing License Granted: 03/09/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/293,530**

Projected Publication Date: 06/25/2009

Non-Publication Request: No

Early Publication Request: No

Title

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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

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

NOT GRANTED

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

SUPPLEMENTAL APPLICATION DATA SHEET

Application Information

Application number::	12/293,530
Filing Date::	09/18/08
Application Type::	Regular
Subject Matter::	Utility
Suggested classification::	
Suggested Group Art Unit::	
CD-ROM or CD-R?::	None
Number of CD disks::	
Number of copies of CDs::	
Sequence submission?::	
Computer Readable Form (CRF)?::	No
Number of copies of CRF::	
Title ::	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
Attorney Docket Number::	733156.428USPC
Request for Early Publication?::	No
Request for Non-Publication?::	No
Suggested Drawing Figure::	
Total Drawing Sheets::	11
Small Entity?::	No
Petition included?::	No
Petition Type::	
Licensed U.S. Gov't Agency::	
Contract or Grant No::	
Secrecy Order in Parent Appl.?::	No

First Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full capacity
Given Name::	Daichi
Middle Name::	
Family Name::	Imamura
Name Suffix::	
City of Residence::	Kanagawa
State or Province of Residence::	
Country of Residence::	Japan
Street of mailing address::	c/o Panasonic Corporation 1006, Oaza Kadoma, Kadoma-shi
City of mailing address::	Osaka
State or Province of mailing address::	
Country of mailing address::	Japan
Postal or Zip Code of mailing address::	571-8501

Second Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full capacity
Given Name::	Sadaki
Middle Name::	
Family Name::	Futagi
Name Suffix::	
City of Residence::	Ishikawa
State or Province of Residence::	
Country of Residence::	Japan

Street of mailing address::	c/o Panasonic Mobile Communications R&D Lab Co., Ltd. 5 Akedori 2-chome, Izumi-ku, Sendai-shi
City of mailing address::	Miyagi
State or Province of mailing address::	
Country of mailing address::	Japan
Postal or Zip Code of mailing address::	981-3206

Third Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full capacity
Given Name::	Atsushi
Middle Name::	
Family Name::	Matsumoto
Name Suffix::	
City of Residence::	Ishikawa
State or Province of Residence::	
Country of Residence::	Japan
Street of mailing address::	c/o Panasonic Mobile Communications R&D Lab Co., Ltd. 5 Akedori 2-chome, Izumi-ku, Sendai-shi
City of mailing address::	Miyagi
State or Province of mailing address::	
Country of mailing address::	Japan
Postal or Zip Code of mailing address::	981-3206

Fourth Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full capacity
Given Name::	Takashi
Middle Name::	
Family Name::	Iwai
Name Suffix::	
City of Residence::	Ishikawa
State or Province of Residence::	
Country of Residence::	Japan
Street of mailing address::	c/o Panasonic Mobile Communications R&D Lab Co., Ltd., 5 Akedori 2-chome, Izumi-ku, Sendai-shi
City of mailing address::	Miyagi
State or Province of mailing address::	
Country of mailing address::	Japan
Postal or Zip Code of mailing address::	981-3206

Fifth Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	Japan
Status::	Full capacity
Given Name::	Tomofumi
Middle Name::	
Family Name::	Takata
Name Suffix::	
City of Residence::	Ishikawa
State or Province of Residence::	
Country of Residence::	Japan

Street of mailing address::	c/o Panasonic Mobile Communications R&D Lab Co., Ltd., 5 Akedori 2-chome, Izumi-ku, Sendai-shi
City of mailing address::	Miyagi
State or Province of mailing address::	
Country of mailing address::	Japan
Postal or Zip Code of mailing address::	981-3206

Correspondence Information

Correspondence Customer Number :: **96896**

Representative Information

Representative Customer Number::		**96896**

Domestic Priority Information

Application ::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	National Stage of	PCT/JP2007/055695	03/20/07

Foreign Priority Information

Country::	Application number::	Filing Date::	Priority Claimed::
Japan	2006-076995	03/20/06	Yes

Assignee Information

Assignee name::	Panasonic Corporation
Street of mailing address::	1006, Oaza Kadoma, Kadoma-Shi
City of mailing address::	Osaka
State or Province of mailing address::	
Country of mailing address::	Japan
Postal or Zip Code of mailing address::	571-8501

Signature

Signature	/Shoko Leek/			Date	05/13/11
First Name	Shoko	Last Name	Leek	Reg. No.	43,746

Electronic Acknowledgement Receipt

EFS ID:	10086064
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	Shoko I. Leek/Caley Jansen
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	733156.428USPC
Receipt Date:	13-MAY-2011
Filing Date:	18-SEP-2008
Time Stamp:	15:31:55
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	733156_428USPC_Request_for_Corrected_Filing_Receipt.pdf	214928 d51a2c8d1bcce0f2388232b04ae1a90f609b3e93	no	5
Warnings:					
Information:					

2	Application Data Sheet	733156_428USPC_Supplemental_ADS.pdf	87906 5618ef51a45ed9ffbc24eb7fba868a7fbd356a63	no	6

Warnings:

Information:

This is not an USPTO supplied ADS fillable form

Total Files Size (in bytes):	302834

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/293,530	09/18/2008	2464	930	733156.428USPC	11	2

CONFIRMATION NO. 2058

96896
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

CORRECTED FILING RECEIPT

OC000000047675084

Date Mailed: 05/17/2011

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**

Applicant(s)

Daichi Imamura, Kanagawa, JAPAN;
Sadaki Futagi, Ishikawa, JAPAN;
Atsushi Matsumoto, Ishikawa, JAPAN;
Takashi Iwai, Ishikawa, JAPAN;
Tomofumi Takata, Ishikawa, JAPAN;

Assignment For Published Patent Application

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD, OSAKA, JAPAN

Power of Attorney: The patent practitioners associated with Customer Number 96896

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/JP2007/055695 03/20/2007

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.)
JAPAN 2006-076995 03/20/2006

If Required, Foreign Filing License Granted: 03/09/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/293,530**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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

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

NOT GRANTED

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
Title	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Examiner	:	Iqbal Zaidi
Art Unit	:	2464
Docket No.	:	733156.428USPC
Date	:	May 31, 2011

PRELIMINARY AMENDMENT

Commissioner for Patents:

Please amend the application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 5 of this paper.

Amendments to the Claims:

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

Listing of Claims

1-11. (Canceled)

12. (New) A mobile station apparatus comprising:

a selecting unit configured to randomly select a sequence from a group of sequences corresponding to an amount of data or reception quality, wherein a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with different amounts of data or reception qualities, such that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

a transmitting unit configured to transmit the selected sequence.

13. (New) The mobile station apparatus according to claim 12, wherein said transmitting unit transmits the selected sequence on a random access channel.

14. (New) The mobile station apparatus according to claim 12, wherein the predetermined number is determined from received control information.

15. (New) The mobile station apparatus according to claim 12, wherein the predetermined number varies in accordance with received control information.

16. (New) The mobile station apparatus according to claim 12, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with received control information.

17. (New) The mobile station apparatus according to claim 12, wherein each of the plurality of groups is comprised of a different number of the sequences.

18. (New) The mobile station apparatus according to claim 12, wherein the plurality of sequences are grouped by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences.

19. (New) The mobile station apparatus according to claim 18, wherein a position at which the plurality of sequences are partitioned varies in accordance with received control information.

20. (New) The mobile station apparatus according to claim 12, wherein one group associated with one of the different amounts of data or reception qualities is comprised of all of the sequences generated from at least one of the plurality of base sequences.

21. (New) The mobile station apparatus according to claim 12, wherein a group associated with the amount of data or reception quality with higher probability of occurrence is comprised of a greater number of the sequences.

22. (New) The mobile station apparatus according to claim 12, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or reception quality.

23. (New) The mobile station apparatus according to claim 12, wherein a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences.

24. (New) The mobile station apparatus according to claim 12, wherein the base sequence is a Generalized Chirp-like (GCL) sequence.

25. (New) A random access method comprising:

grouping a plurality of sequences generated from a plurality of base sequences into a plurality of groups, which are respectively associated with different amounts of data or reception

qualities, such that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

randomly selecting a sequence from the sequences contained in a group corresponding to one of the amounts of data or reception qualities.

REMARKS

This preliminary amendment is filed concurrently with a request for participation in the Patent Prosecution Highway (PPH) program and a petition to make the present application special under the PPH program.

Claims 1-11 are canceled and new claims 12-25 are added, which respectively correspond to claims 1-14 allowed in the corresponding Japanese application (JPSN 2010-265294).

Examination and allowance of claims 12-25 in the present application are earnestly solicited.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/Shoko Leek/

Shoko I. Leek
Registration No. 43,746

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

1896781_1.DOC

Doc Code: PPH.PET.652

Document Description: Petition to make special under Patent Pros Hwy

PTO/SB/20JP (05-10)
Approved for use through 01/31/2012. OMB 0651-0058
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REQUEST FOR PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PROGRAM BETWEEN THE JAPAN PATENT OFFICE (JPO) AND THE USPTO

Application No.:	12/293,530	Filing Date:	9/18/2008
First Named Inventor:	Daichi Imamura		
Attorney Docket No.:	733156.428USPC		
Title of the Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD		

THIS REQUEST FOR PARTICIPATION IN THE PPH PROGRAM ALONG WITH THE REQUIRED DOCUMENTS MUST BE SUBMITTED VIA EFS-WEB. INFORMATION REGARDING EFS-WEB IS AVAILABLE AT HTTP://WWW.USPTO.GOV/EBC/EFS_HELP.HTML.

APPLICANT HEREBY REQUESTS PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PROGRAM AND PETITIONS TO MAKE THE ABOVE-IDENTIFIED APPLICATION SPECIAL UNDER THE PPH PROGRAM.

The above-identified application (1) validly claims priority under 35 U.S.C. 119(a) and 37 CFR 1.55 to one or more corresponding JPO application(s) or to a PCT application that does not contain any priority claim, or (2) is a national stage entry of a PCT application that does not contain any priority claim.

The JPO/PCT application number(s) is/are: JPSN 2006-076995 (based on which PCT/JP2007/055695 was filed on March 20, 2007, based on which JPSN 2008-506313 was filed as a JP national phase application thereof, based on which JPSN 2010-265294 was filed as a divisional application thereof and was found allowable).

The filing date of the JPO/PCT application(s) is/are: March 20, 2006

I. List of Required Documents:

a. **A copy of the latest JPO office actions (other than "Decision to Grant a Patent"*) in the above-identified JPO application(s)**

☑ Is attached.

☐ Is not attached because the JPO application was allowed in a first office action.

*It is not necessary to submit a copy of the "Decision to Grant a Patent" and an English translation thereof.

b. **A copy of all claims which were determined to be patentable by the JPO in the above-identified JPO application(s)**

☑ Is attached.

c. **English translations of the documents in a. and b. above along with a statement that the English translations are accurate are attached (if the documents are not in the English language). An accuracy statement for the English translation of the documents in a. above is not required if the English translation is a machine translation provided by the JPO.**

d. **(1) An information disclosure statement listing the documents cited in the JPO office actions**

☐ Is attached.

☑ Has already been filed in the above-identified U.S. application on 9/18/2008 and 3/3/2011

(2) Copies of all documents (except for U.S. patents or U.S. patent application publications)

☐ Are attached.

☑ Have already been filed in the above-identified U.S. application on 9/18/2008 and 3/3/2011

PTO/SB/20JP (05-10)
Approved for use through 01/31/2012. OMB 0651-0058
U.S.Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REQUEST FOR PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) BETWEEN THE JAPAN PATENT OFFICE (JPO) AND THE USPTO

(continued)

Application No.:	12/293,530
First Named Inventor:	Daichi Imamura

II. Claims Correspondence Table:

Claims in US Application	Patentable Claims in JPO Application	Explanation regarding the correspondence
12	1	the same
13	2	the same
14	3	the same, except multiple dependency in JP claim is removed
15	4	the same, except multiple dependency in JP claim is removed
16	5	the same, except multiple dependency in JP claim is removed
17	6	the same, except multiple dependency in JP claim is removed
18	7	the same, except multiple dependency in JP claim is removed
19	8	the same
20	9	the same, except multiple dependency in JP claim is removed
21	10	the same, except multiple dependency in JP claim is removed
22	11	the same, except multiple dependency in JP claim is removed
23	12	the same, except multiple dependency in JP claim is removed
24	13	the same, except multiple dependency in JP claim is removed
25	14	the same

III. All the claims in the US application sufficiently correspond to the patentable/allowable claims in the JPO application.

Signature /Shoko Leek/	Date 2011-05-31
Name (Print/Typed) Shoko I. Leek	Registration Number 43,746

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.

Electronic Acknowledgement Receipt

EFS ID:	10200980
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	Shoko I. Leek/Tracy Taylor
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	733156.428USPC
Receipt Date:	31-MAY-2011
Filing Date:	18-SEP-2008
Time Stamp:	19:58:42
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	733156_428USPC_Explanation_Priority.pdf	78925 2813241f409bc6cf7388276acbe36c20b7d42361	no	2
Warnings:					
Information:					

2	Miscellaneous Incoming Letter	733156_428USPC_JP_Office_Action.pdf	1799521 b3695e58b365b34064f02a8959cc2af01dfec904	no	5
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	733156_428USPC_Accuracy_Statement_JO_OA.pdf	37405 8d9e165797b9984dc3877b8d45566ce65f1746d5	no	1
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	733156_428USPC_Translation_JP_Office_Action.pdf	83042 7b532823f6ab96547971311fcd912fe694475660	no	5
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	733156_428USPC_JP_Allowed_Claims.pdf	618771 5848f4658655dfc6380c1eec56340f9aadf061332	no	2
Warnings:					
Information:					
6	Miscellaneous Incoming Letter	733156_428USPC_Accuracy_Statement_JP_Claims.pdf	36944 54bb42424c0819f8a89cfc6eed887cf7aa4fc559	no	1
Warnings:					
Information:					
7	Miscellaneous Incoming Letter	733156_428USPC_Translation_JP_Claims.pdf	61803 88bdf491953d94653b142aed78767e4a066f33c6	no	3
Warnings:					
Information:					
8		733156_428USPC_Preliminary_Amendment.pdf	70487 ed728190905617893338f6dbdda5b21ed078c7c0	yes	5

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Claims	2	4
Applicant Arguments/Remarks Made in an Amendment	5	5

Warnings:	
Information:	

9	Petition to make special under Patent Prosecution Hwy	733156_428USPC_Request_for_PPH_Form.PDF	760841 9675387daaa116140a2ce6d82c25b41256a7339b	no	3

Warnings:	
Information:	
Total Files Size (in bytes):	3547739

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
Title	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Examiner	:	Iqbal Zaidi
Art Unit	:	2464
Docket No.	:	733156.428USPC
Date	:	May 31, 2011

EXPLANATION REGARDING THE RELATIONSHIP BETWEEN THE JPO PRIORITY APPLICATION AND THE JPO APPLICATION WITH ALLOWED CLAIMS

This paper is filed to provide an explanation regarding the relationship between the JPO priority application of the present application, in which a "REQUEST FOR PARTICIPATION IN THE PPH PROGRAM BETWEEN THE JPO AND THE USPTO" is concurrently filed herewith, and the JPO application with allowed claims.

The present U.S. application is a national stage application of PCT/JP2007/055695, filed March 20, 2007, which PCT application validly claims priority to JPO application JPSN 2006-076995, filed March 20, 2006. Therefore, the present application falls under PPH Eligible Category (1)(b)(i) described in page 2 of the "Notice Regarding Full Implementation of Patent Prosecution Highway Program between the United States Patent and Trademark Office and the Japan Patent Office," dated December 15, 2007. (*See also* "Revised Requirements for Requesting Participation in the Patent Prosecution Highway Program in the USPTO," dated May 17, 2007, page 1, third paragraph, (1)(d).)

The JPO application with allowed claims (JPSN 2010-265294) is a divisional application of a national stage Japanese application (JPSN 2008-506313) of the same PCT

application, on which the present U.S. application is also based. Thus, the allowed JPSN 2010-265294 corresponds to the JPO priority application.

If there should be any questions regarding the relationship between JPSN 2010-265294 and the JPO priority application, please contact the undersigned at the number set forth below.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/Shoko Leek/
Shoko I. Leek
Registration No. 43,746

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

1896780_1.DOC

拒絶理由通知書

特許出願の番号	特願２０１０－２６５２９４	
起案日	平成２３年　１月１２日	
特許庁審査官	佐々木　洋	４８７９　５Ｋ００
特許出願人代理人	鷲田　公一　様	
適用条文	第２９条第２項	

この出願は、次の理由によって拒絶をすべきものです。これについて意見がありましたら、この通知書の発送の日から６０日以内に意見書を提出してください。

理　由

この出願の下記の請求項に係る発明は、その出願前に日本国内又は外国において、頒布された下記の刊行物に記載された発明又は電気通信回線を通じて公衆に利用可能となった発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第２９条第２項の規定により特許を受けることができない。

記　　（引用文献等については引用文献等一覧参照）

【引用文献等一覧】

１．国際公開第２００６／０１９７１０号

２．NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink", 3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, ２００６年　１月２５日, ＵＲＬ, http://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_AH/LTE_AH_January-06/Docs/R1-060046.zip

（注）法律又は契約等の制限により、提示した非特許文献の一部又は全てが送付されない場合があります。

【請求項】２、１６

【引用文献】１、２

引用文献１（特に段落[0009]～[0011]、[0038]）には、「アクセスプリアンブル送信中に、アクセスチャネルを介してフォワードリンクのチャネル品質を通知する無線通信システムであって、チャネル品質に対応づけられたアクセス系列の

グループを作成し（本願の「それぞれが異なる受信品質に関連付けられた複数のグループにグループ化され」ることに相当。）、通知したいチャネル品質に対応するグループの中から、ランダムにアクセス系列を選択し（本願の「前記データ量又は前記受信品質に対応するグループに含まれる複数の前記系列の中から、いずれか１つの系列をランダムに選択する選択手段」を設けることに相当。）、送信する（本願の「選択された前記系列を送信する送信手段」に相当。）端末（本願の「移動局装置」に相当。）を有する無線通信システムであり、チャネル品質以外にアクセス端末からアクセスポイントへ伝送するデータ量（本願の「データ量」に相当。）を通知すること、グループのアクセス系列は確率に比例して割り当てられること及びアクセス系列を再割り当てすることができる無線通信システム。」の発明が記載されている。

本願の請求項２に係る発明と引用文献１に記載された発明を対比すると、本願の請求項２に係る発明では、複数の基本系列から生成された複数の系列が、基本系列の系列番号の昇順に所定数の系列が同一のグループに含まれるのに対して、引用文献１には、そのような記載がない点で相違している。

上記相違点について検討する。

引用文献２（特に2. Proposed Generation Method for Orthogonal Pilot Channel、Figure 1)に記載された技術では、ランダムアクセスチャネルにおいて、ＣＡＺＡＣ系列（本願の「複数の基本系列から生成された複数の系列」に相当。）を使用している。また、基本系列の系列番号の昇順に所定数の系列が同一のグループに含まれるようにすることは、当業者が適宜なしうる設計的事項である。そして、引用文献１に記載された発明と、引用文献２に記載された技術は、「無線通信におけるアクセスチャネル」という同一の技術分野に属するので、引用文献１に記載された発明において、引用文献２に記載された技術を適用して、複数の基本系列から生成された複数の系列が、基本系列の系列番号の昇順に所定数の系列が同一のグループに含まれるようにすることは当業者にとって容易である。

また、本願の請求項２に係る発明の効果は、引用文献１に記載された発明及び引用文献２に記載された技術が有している効果の総和を超えるものではなく、当業者が予測しうるものである。

本願の請求項１６に係る発明についても同様である。

【請求項】３
【引用文献】１、２
引用文献１に記載された発明は、アクセスプリアンブルにおいて、選択された系列を送信する（本願の「送信手段は、ランダムアクセスチャネルにて、選択さ

れた前期系列を送信する」に相当。）ものである。

また、本願の請求項３に係る発明の効果は、引用文献１に記載された発明及び引用文献２に記載された技術が有している効果の総和を超えるものではなく、当業者が予測しうるものである。

【請求項】４～６
【引用文献】１、２
本願の請求項４に係る発明と引用文献１に記載された発明を対比すると、本願の請求項４に係る発明では、受信した制御情報を用いているのに対して、引用文献１には、そのような記載がない点で相違している。

上記相違点について検討する。
引用文献１に記載された発明において、グループに対応するアクセス系列を決定及び再割り当てする際に、受信した制御情報を用いるようにすることは、当業者が適宜なしうる設計的事項であり、その効果も格別のものでは無い。

本願の請求項５、６に係る発明についても同様である。

【請求項】７
【引用文献】１、２
引用文献１に記載された発明は、グループに対応するアクセス系列を確率に比例して割り当てる（本願の「複数のグループは、それぞれ、異なる数の系列からなる」に相当。）ものである。

また、本願の請求項７に係る発明の効果は、引用文献１に記載された発明及び引用文献２に記載された技術が有している効果の総和を超えるものではなく、当業者が予測しうるものである。

【請求項】８、９
【引用文献】１、２
本願の請求項８に係る発明と引用文献１に記載された発明を対比すると、本願の請求項８に係る発明では、基本系列の系列番号の昇順に並べられた複数の系列を区分することによって、複数の系列がグループ化されるのに対して、引用文献１には、そのような記載がない点で相違している。

上記相違点について検討する。
引用文献１に記載された発明において、基本系列の系列番号の昇順に並べられた複数の系列を区分することによって、複数の系列をグループ化することは、当

業者が適宜なしうる設計的事項であり、その効果も格別のものでは無い。

また、本願の請求項９に係る発明については、制御情報を用いること及び複数の系列を区分する位置を変化させるようにすることは、当業者が適宜なしうる設計的事項であり、その効果も格別のものでは無い。

【請求項】１１、１２
【引用文献】１、２
引用文献１に記載された発明は、グループのアクセス系列は確率に比例して割り当てられ（本願請求項１１の「発生率がより高い前記データ量又は前記受信品質に関連付けられたグループは、より多くの前記系列からなる」に相当。）、アクセス系列を再割り当てされる（本願請求項１２の「前記データ量又は前記受信品質の発生率に応じて、前記複数のグループのそれぞれに含まれる前記系列の数が変化する」に相当。）ものである。

また、本願の請求項１１、１２に係る発明の効果は、引用文献１に記載された発明及び引用文献２に記載された技術が有している効果の総和を超えるものではなく、当業者が予測しうるものである。

【請求項】１３
【引用文献】１、２
本願の請求項１３に係る発明と引用文献１に記載された発明を対比すると、本願の請求項１３に係る発明では、複数の基本系列のそれぞれから、巡回シフトが異なる複数の系列が生成されるのに対して、引用文献１には、そのような記載がない点で相違している。

上記相違点について検討する。
引用文献２に記載された技術では、一つのＣＡＺＡＣ系列をサイクリックシフトしたＣＡＺＡＣ系列を用いている（本願請求項１３の「複数の基本系列のそれぞれから、巡回シフトが異なる複数の系列が生成される」ことに相当。）。そして、引用文献１に記載された発明において、引用文献２に記載された技術を適用して、複数の基本系列のそれぞれから、巡回シフトが異なる複数の系列が生成されるようにすることは当業者にとって容易である。

【請求項】１４
【引用文献】１、２
本願の請求項１４に係る発明と引用文献１に記載された発明を対比すると、本願の請求項１４に係る発明では、基本系列はＧＣＬ系列であるのに対して、引用文献１には、そのような記載がない点で相違している。

上記相違点について検討する。

引用文献２に記載された技術では、一つのＣＡＺＡＣ系列をサイクリックシフトしたＣＡＺＡＣ系列を用いている（本願請求項１４の「基本系列はＧＣＬ系列」に相当。）。そして、引用文献１に記載された発明において、引用文献２に記載された技術を適用して、基本系列はＧＣＬ系列とすることは当業者にとって容易である。

＜拒絶の理由を発見しない請求項＞

請求項（１、１０、１５）に係る発明については、現時点では、拒絶の理由を発見しない。拒絶の理由が新たに発見された場合には拒絶の理由が通知される。

先行技術文献調査結果の記録

・調査した分野　　ＩＰＣ　Ｈ０４Ｊ　　１３／００－１３／０６

・先行技術文献　　国際公開第０１／０５０５０号

この先行技術文献調査結果の記録は、拒絶理由を構成するものではありません。

この拒絶理由通知の内容に関するお問い合わせ又は面接のご希望がございましたら下記までご連絡ください。

特許審査第四部デジタル通信　藤江大望
ＴＥＬ．０３（３５８１）１１０１　内線　３５５６
ＦＡＸ．０３（３５０１）０６９９

TRANSLATOR'S STATEMENT

The undersigned is proficient in both English and the Japanese language and states that the attached is an accurate translation of the Japanese language Notice of Grounds for Rejection mailed January 18, 2011, in Japanese Patent Application No. JP 2010-265294.

Date: May 31, 2011

Translator's Name: /Shoko Leek/
Shoko I. Leek

TRANSLATION OF NOTICE OF GROUNDS FOR REJECTION

Patent Application Serial No.	2010-265294
Date Drafted:	H23 (2011) January 12
Date Mailed:	H23 (2011) January 18
JPO Examiner:	Hiroshi Sasaki
Patent Applicant's Attorney/Agent:	Kimihito Washida
Applicable Patent Law Sections:	Section 29-2

This patent application should be rejected based on the following grounds. The applicant may submit a statement regarding the rejection within sixty (60) days from the mailing date of this notice.

GROUND(S)

The invention as recited in the below-identified claims of the present application cannot receive a patent under Patent Law Section 29(2), because the invention could have been readily made, prior to the filing of this application, by a person of ordinary skill in the art, on the basis of the invention(s) disclosed in the below-identified publication(s) distributed or made available to the public through electric telecommunication lines in Japan or elsewhere prior to the filing of this application.

CITED REFERENCE(S)

1. WO 2006/019710

2. NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink," 3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, January 25, 2006, URL, http://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_AH/LTE_AH_January-06/Docs/R1-060046.zip

[Claims] 2, 16
[Cited References] 1, 2

Cited Reference 1 (in particular, paragraphs [0009]~[0011], [0038]) describes an invention of "a wireless communication system that reports channel quality of a forward link via an access channel during transmission of an access preamble, the system including a mobile terminal (corresponding to the claimed "mobile station apparatus"), which forms groups of access sequences associated with channel qualities (corresponding to the claimed "[being] grouped into a plurality of groups, which are respectively associated with different reception

qualities"), which randomly selects an access sequence from a group associated with the channel quality to be reported (corresponding to the claimed "selecting means for randomly selecting a sequence from a plurality of sequences contained in a group corresponding to the amount of data or reception quality"), and which transmits [the selected access sequence] (corresponding to the claimed "transmitting means for transmitting the selected sequence"), wherein an access mobile terminal reports, aside from the channel quality, an amount of data to be transmitted to an access point (corresponding to the claimed "amount of data"), the access sequences in the groups are allocated proportionately to the probability of occurrence, and the access sequences can be reallocated."

Comparing the invention of claim 2 of the present application and the invention described in Cited Reference 1, they differ in that in the invention of claim 2 of the present application, a plurality of sequences generated from a plurality of base sequences are included in the same group in an increasing order of sequence indices of the base sequences, by a predetermined number of the sequences, whereas no such description is found in Cited Reference 1.

The above noted difference is examined.

Cited Reference 2 (in particular, 2. Proposed Generation Method for Orthogonal Pilot Channel, Figure 1) describes a technique wherein, in a random access channel, CAZAC sequences (corresponding to the claimed "plurality of sequences generated from a plurality of base sequences") are used. Further, including a predetermined number of the sequences in the same group in an increasing order of the sequence indices of the base sequences is a matter of design choice suitably adopted by one skilled in the art. Still further, because the invention described in Cited Reference 1 and the technique described in Cited Reference 2 belong to the same technical field directed to "an access channel in wireless communication," one skilled in the art would have readily applied the technique described in Cited Reference 2 in the invention described in Cited Reference 1, to generate a plurality of sequences from a plurality of base sequences and to include a predetermined number of the sequences in the same group in an increasing order of the sequence indices of the base sequences.

Also, the effect of the invention of claim 2 of the present application does not exceed the combined effects of the invention described in Cited Reference 1 and the technique described in Cited Reference 2 and, as such, would have been predicable by one skilled in the art.

The same analysis applies to the invention of claim 16 of the present application.

[Claim] 3
[Cited References] 1, 2

The invention described in Cited Reference 1 transmits the selected sequence in an access preamble (corresponding to the claimed "the transmitting means for transmitting the selected sequence on a random access channel").

Also, the effect of the invention of claim 3 of the present application does not exceed the combined effects of the invention described in Cited Reference 1 and the technique described in Cited Reference 2 and, as such, would have been predicable by one skilled in the art.

[Claims] 4~6
[Cited References] 1, 2

Comparing the invention of claim 4 of the present application and the invention described in Cited Reference 1, they differ in that the invention of claim 4 uses received control information, whereas no such description is found in Cited Reference 1.

The above noted difference is examined.

In the invention described in Cited Reference 1, to use received control information when determining the access sequences corresponding to the groups or reallocating the sequences would have been a matter of design choice suitably adopted by one skilled in the art and, further, is without any particular effect.

The same analysis applies to the inventions of claims 5 and 6 of the present application.

[Claim] 7
[Cited References] 1, 2

The invention described in Cited Reference 1 allocates the access sequences associated with the groups proportionately to the probability of occurrence (corresponding to the claimed "each of the plurality of groups is comprised of a different number of the sequences").

Also, the effect of the invention of claim 7 of the present application does not exceed the combined effects of the invention described in Cited Reference 1 and the technique described in Cited Reference 2 and, as such, would have been predicable by one skilled in the art.

[Claims] 8, 9
[Cited References] 1, 2

Comparing the invention of claim 8 of the present application and the invention described in Cited Reference 1, they differ in that the invention of claim 8 groups the plurality of sequences by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences, whereas no such description is found in Cited Reference 1.

The above noted difference is examined.

In the invention described in Cited Reference 1, to group the plurality of sequences by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences would have been a matter of design choice suitably adopted by one skilled in the art and, further, is without any particular effect.

With respect to the invention of claim 9 of the present application, to use control information and to change a position at which the plurality of sequences are partitioned would

have been a matter of design choice suitably adopted by one skilled in the art and, further, is without any particular effect.

[Claims] 11, 12
[Cited References] 1, 2

The invention described in Cited Reference 1 allocates the access sequences in the groups proportionately to the probability of occurrence (corresponding to that "a group associated with the amount of data or reception quality with higher probability of occurrence is comprised of a greater number of the sequences" in claim 11), and reallocates the access sequences (corresponding to that "a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or reception quality" in claim 12).

Also, the effect of the invention of claims 11 and 12 of the present application does not exceed the combined effects of the invention described in Cited Reference 1 and the technique described in Cited Reference 2 and, as such, would have been predicable by one skilled in the art.

[Claim] 13
[Cited References] 1, 2

Comparing the invention of claim 13 of the present application and the invention described in Cited Reference 1, they differ in that, in the invention of claim 13, a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences, whereas no such description is found in Cited Reference 1.

The above noted difference is examined.

In the technique described in Cited Reference 2, CAZAC sequences generated by cyclically shifting one CAZAC sequence are used (corresponding to that "a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences" in claim 13). One skilled in the art would have readily generated a plurality of the sequences with different cyclic shifts from each of the plurality of base sequences by applying the technique described in Cited Reference 2 in the invention described in Cited Reference 1.

[Claim] 14
[Cited References] 1, 2

Comparing the invention of claim 14 of the present application and the invention described in Cited Reference 1, they differ in that in the invention of claim 14 the base sequence is a GCL sequence, whereas no such description is found in Cited Reference 1.

The above noted difference is examined.

In the technique described in Cited Reference 2, CAZAC sequences generated by cyclically shifting one CAZAC sequence are used (corresponding to that "the base sequence is a GCL sequence" in claim 14). One skilled in the art would have readily used a GCL sequence as

the base sequence by applying the technique described in Cited Reference 2 in the invention described in Cited Reference 1.

<Claims for which no grounds for rejection are found>

Regarding the invention recited in claims (1, 10, 15), at the present moment no grounds for rejection are found. If a ground for rejection is newly found, such ground for rejection will be notified.

...

【書類名】 手続補正書
【提出日】 平成23年 2月17日
【あて先】 特許庁長官殿
【事件の表示】
【出願番号】 特願2010-265294
【補正をする者】
【識別番号】 000005821
【氏名又は名称】 パナソニック株式会社
【代理人】
【識別番号】 100105050
【弁理士】
【氏名又は名称】 鷲田 公一
【電話番号】 042-338-4600
【発送番号】 031673
【手続補正1】
【補正対象書類名】 特許請求の範囲
【補正対象項目名】 全文
【補正方法】 変更
【補正の内容】
【書類名】特許請求の範囲
【請求項１】
複数の基本系列から生成された複数の系列が、同一の前記基本系列から生成された系列を優先的に含む所定数の前記系列が同一のグループに含まれるように、それぞれが異なるデータ量又は受信品質に関連付けられた複数のグループにグループ化され、前記データ量又は前記受信品質に対応するグループから、１つの系列をランダムに選択する選択手段と、
選択された前記系列を送信する送信手段と、
を具備する移動局装置。
【請求項２】
前記送信手段は、ランダムアクセスチャネルにて、選択された前記系列を送信する、
請求項１に記載の移動局装置。
【請求項３】
前記所定数は、受信した制御情報から決定される、
請求項１又は２に記載の移動局装置。
【請求項４】
受信した制御情報に応じて、前記所定数が変化する、
請求項１から３のいずれかに記載の移動局装置。
【請求項５】
受信した制御情報に応じて、前記複数のグループのそれぞれに含まれる前記系列の数が変化する、
請求項１から４のいずれかに記載の移動局装置。
【請求項６】
前記複数のグループは、それぞれ、異なる数の前記系列からなる、
請求項１から５のいずれかに記載の移動局装置。
【請求項７】
前記基本系列の系列番号の昇順に並べられた前記複数の系列を区分することによって、前記複数の系列がグループ化される、
請求項１から６のいずれかに記載の移動局装置。
【請求項８】
受信した制御情報に応じて、前記複数の系列を区分する位置が変化する、

請求項７に記載の移動局装置。
【請求項９】
複数の異なる前記データ量又は前記受信品質のうちの１つに関連付けられた一つのグループは、前記複数の基本系列の少なくとも１つから生成されたすべての前記系列からなる、
請求項１から８のいずれかに記載の移動局装置。
【請求項１０】
発生率がより高い前記データ量又は前記受信品質に関連付けられたグループは、より多くの前記系列からなる、
請求項１から９のいずれかに記載の移動局装置。
【請求項１１】
前記データ量又は前記受信品質の発生率に応じて、前記複数のグループのそれぞれに含まれる前記系列の数が変化する、
請求項１から１０のいずれかに記載の移動局装置。
【請求項１２】
前記複数の基本系列のそれぞれから、巡回シフトが異なる複数の前記系列が生成される、
請求項１から１１のいずれかに記載の移動局装置。
【請求項１３】
前記基本系列はＧＣＬ系列である、
請求項１から１２のいずれかに記載の移動局装置。
【請求項１４】
複数の基本系列から生成された複数の系列を、同一の前記基本系列から生成された系列を優先的に含む所定数の前記系列が同一のグループに含まれるように、それぞれが異なるデータ量又は受信品質に関連付けられた複数のグループにグループ化し、
前記データ量又は前記受信品質に対応するグループに含まれる複数の前記系列の中から、いずれか１つの系列をランダムに選択する、
ランダムアクセス方法。

TRANSLATOR'S STATEMENT

The undersigned is proficient in both English and the Japanese language and states that the attached is an accurate translation of the Japanese language claims as allowed on March 15, 2011, in Japanese Patent Application No. JP 2010-265294.

Date: May 31, 2011 Translator's Name: /Shoko Leek/
Shoko I. Leek

Serial No. 12/293,530
Docket No. 733156.428USPC
Inventors: Daichi Imamura et al.

TRANSLATION OF ALLOWED CLAIMS IN JPSN 2010-265294

1. A mobile station apparatus comprising:

a selecting unit configured to randomly select a sequence from a group of sequences corresponding to an amount of data or reception quality, wherein a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with different amounts of data or reception qualities, such that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

a transmitting unit configured to transmit the selected sequence.

2. The mobile station apparatus according to claim 1, wherein said transmitting unit transmits the selected sequence on a random access channel.

3. The mobile station apparatus according to claim 1 or 2, wherein the predetermined number is determined from received control information.

4. The mobile station apparatus according to any of claims 1-3, wherein the predetermined number varies in accordance with received control information.

5. The mobile station apparatus according to any of claims 1-4, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with received control information.

6. The mobile station apparatus according to any of claims 1-5, wherein each of the plurality of groups is comprised of a different number of the sequences.

7. The mobile station apparatus according to any of claims 1-6, wherein the plurality of sequences are grouped by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences.

8. The mobile station apparatus according to claim 7, wherein a position at which the plurality of sequences are partitioned varies in accordance with received control information.

9. The mobile station apparatus according to any of claims 1-8, wherein one group associated with one of the different amounts of data or reception qualities is comprised of all of the sequences generated from at least one of the plurality of base sequences.

10. The mobile station apparatus according to any of claims 1-9, wherein a group associated with the amount of data or reception quality with higher probability of occurrence is comprised of a greater number of the sequences.

11. The mobile station apparatus according to any of claims 1-10, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or reception quality.

12. The mobile station apparatus according to any of claims 1-11, wherein a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences.

13. The mobile station apparatus according to any of claims 1-12, wherein the base sequence is a Generalized Chirp-like (GCL) sequence.

14. A random access method comprising:

grouping a plurality of sequences generated from a plurality of base sequences into a plurality of groups, which are respectively associated with different amounts of data or reception qualities,

such that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

randomly selecting a sequence from the sequences contained in a group corresponding to one of the amounts of data or reception qualities.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/293,530	09/18/2008	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☒ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	310
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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			TOTAL	310

APPLICATION AS AMENDED – PART II

AMENDMENT 05/31/2011

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 14	Minus	** 20	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 9	Minus	*** 9	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) 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))									
☐ 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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/TAMMY MCBETH BROWN/

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.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

96896 7590 06/14/2011

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

EXAMINER
ZAIDI, IQBAL

ART UNIT	PAPER NUMBER
2464	

NOTIFICATION DATE	DELIVERY MODE
06/14/2011	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):

jeffs.docketing@seedip.com

Office Action Summary	Application No.	Applicant(s)	
	12/293,530	IMAMURA ET AL.	
	Examiner	Art Unit	
	IQBAL ZAIDI	2464	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-25* is/are rejected.

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

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

Application Papers

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

10)☒ The drawing(s) filed on *18 September 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The instant application having application No 12/293530 on 09/18/2008 is presented for examination by the examiner.

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R 1.63.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 09/18/2008 and 09/09/2010 and 03/03/2011. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 12-25** are rejected under 35 U.S.C 102(e) as being anticipated by Ludwig et al (US 2007/0165567, Jul. 19, 2007) (Hereinafter Tan et al).

1-11. (Canceled)

Regarding **claim 12**, Tan discloses a mobile station apparatus comprising a selecting unit configured to randomly select a sequence from a group of sequences corresponding to an amount of data or reception quality *(see Fig 14 block 1404, page 4, par (0052), line 5-10, shows the UE selects one of the signature sequences (from a group of sequences), the selection is randomly selected (randomly selects the sequence). However, the select sequence could be predefined or selected to reduce the possibility of interference (reception quality))*,

wherein a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups*(see Fig 14, page 4, par (0052), line 5-10, the UE defines 1400 a plurality of spread sequences (plurality of sequences) derived (generated) from a plurality of constant amplitude zero autocorrelation (CAZAC) sequences(generated from a plurality of bases sequences), the UE then combines 1402 (making plurality of groups) the spread sequences with an orthogonal code to form extended spread sequences (signature sequences))*,

which are respectively associated with different amounts of data or reception qualities *(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined so that every group consists of signature sequences and different groups (having different amount of data) can be assigned to different neighboring sectors)*, such that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group*(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined (predetermined) so that every group consists of signature sequences(number of sequences contained in the same group)*; and a transmitting unit configured to transmit the selected sequence*(page 4, par (0053), line 3-7, the UE transmits 1410(transmitting unit) the RACH preamble using the selected slot, signature sequence(selected sequence), and power, and then monitors 1412 for a positive acquisition indicator (ACKnowledgement) from the node-B, if positive acquisition indicator is detected, the UE sends RACH message to Node-B).*

Regarding **claim 13**, Tan discloses transmitting unit transmits the selected sequence on a random access channel*(page 4, par (0053), line 3-7, the UE transmits 1410(transmitting unit) the RACH (random access channel) preamble using the selected slot, signature sequence(selected sequence), and power, and then monitors 1412 for a positive acquisition indicator (ACKnowledgement) from the node-B, if positive acquisition indicator is detected, the UE sends RACH message to Node-B).*

Regarding **claim 14**, Tan discloses the predetermined number is determined from received control information *(page 4, par (0047), line 3-7, At the Node B, once the RACH preamble is successfully received(received control information), a four-bit acknowledgement corresponding to the sequence number(predetermined number) is transmitted to the UE).*

Regarding **claim 15**, Tan discloses the predetermined number varies in accordance with received control information *(page 2, par (0026), line 3-7, the number of RACH opportunities thus varies according to different bandwidth deployments).*

Regarding **claim 16**, Tan discloses a number of the sequences contained in each of the plurality of groups varies in accordance with received control information *(page 2, par (0026), line 3-7, the length of a signature sequence is fifteen. For the scalable bandwidth structure, the length of a signature sequence is fixed to fifteen. The number of RACH opportunities (number of sequences) thus varies according to different bandwidth deployments).*

Regarding **claim 17**, Tan discloses each of the plurality of groups is comprised of a different number of the sequences *(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined so that every group consists of signature sequences and different groups (having different number of sequences) can be assigned to different neighboring sectors).*

Regarding **claim 18**, Tan discloses the plurality of sequences are grouped by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences *(page 2, par (0025), line 5-10, the subcarriers are divided into resource blocks with each resource block using a fixed number of contiguous sub-carriers, for each of the resource blocks, a number of signature sequence groups are pre-defined so that every group consists of Ns signature sequences and different groups can be assigned to different neighboring sectors).*

Regarding **claim 19**, Tan discloses a position at which the plurality of sequences are partitioned varies in accordance with received control information *(page 2, par (0026), line 1-5, the length of a signature sequence is fixed to fifteen. The number of RACH opportunities thus varies according to different bandwidth deployments).*

Regarding **claim 20**, Tan discloses one group associated with one of the different amounts of data or reception qualities is comprised of all of the sequences generated from at least one of the plurality of base sequences *(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined so that every group consists of signature sequences and different groups (having different amount of data) can be assigned to different neighboring sectors).*

Regarding **claim 21**, Tan discloses a group associated with the amount of data or reception quality with higher probability of occurrence is comprised of a greater number of the sequences *(page 5, par (0059), line 5-10, the RACH preamble sequencing without the need for reserved RACH access resources enhances the peak rate of data transmission and can reduce latency issues for data transmissions, expect to achieve higher probability and user packet call throughput).*

Regarding **claim 22**, Tan discloses a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or reception quality *(page 2, par (0026), line 3-7, the number of RACH opportunities thus varies according to different bandwidth deployments).*

Regarding **claim 23**, Tan discloses a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences *(page 2, par (0025), line 7-10, Each group also consists of several cyclically shifted (different cyclic shifts) versions of the signature sequences).*

Regarding **claim 24**, Tan discloses the base sequence is a Generalized Chirp-like (GCL) sequence *(page 2, par (0028), line 1-7, the signature sequences are obtained from a constant amplitude zero auto correleation (CAZAC) sequence, which include different "classes" of generalized chirp like (GCL) or Chu-sequences).*

Regarding **claim 25**, Tan discloses a random access method comprising grouping a plurality of sequences generated from a plurality of base sequences into a plurality of groups*(see Fig 14, page 4, par (0052), line 5-10, the UE defines 1400 a plurality of spread sequences (plurality of sequences) derived (generated) from a plurality of constant amplitude zero autocorrelation (CAZAC) sequences (generated from a plurality of bases sequences), the UE then combines 1402 (making plurality of groups) the spread sequences with an orthogonal code to form extended spread sequences (signature sequences))*, which are respectively associated with different amounts of data or reception qualities*(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined so that every group consists of signature sequences and different groups (having different amount of data) can be assigned to different neighboring sectors)*, such that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group*(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined (predetermined) so that every group consists of signature sequences(number of sequences contained in the same group)*; and randomly selecting a sequence from the sequences contained in a group corresponding to one of the amounts of data or reception qualities*(see Fig 14 block 1404, page 4, par (0052), line 5-10, shows the UE selects one of the signature sequences (from a group of sequences), the selection is randomly selected (randomly selects the sequence). However, the select sequence could be predefined or selected to reduce the possibility of interference (reception quality))*.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are:

- Lu Ming et al. (US 6519462, Feb. 11, 2003) teaches Method and Apparatus for Multi-user resources.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IQBAL ZAIDI whose telephone number is (571) 270-3943. The examiner can normally be reached on 7:30a.m to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NGO RICKY can be reached on 571-272-3139. 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).

/Pao Sinkantarakorn/
Primary Examiner, Art Unit 2464
6/6/2011

/IQBAL ZAIDI/
Examiner, Art Unit 2464

Notice of References Cited	Application/Control No. 12/293,530	Applicant(s)/Patent Under Reexamination IMAMURA ET AL.	
	Examiner IQBAL ZAIDI	Art Unit 2464	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,519,462	02-2003	Lu et al.	455/453
*	B	US-2007/0165567	07-2007	Tan et al.	370/329
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

BIB DATA SHEET

CONFIRMATION NO. 2058

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/293,530	09/18/2008 RULE	370	2464	733156.428USPC

APPLICANTS

Daichi Imamura, Kanagawa, JAPAN;
Sadaki Futagi, Ishikawa, JAPAN;
Atsushi Matsumoto, Ishikawa, JAPAN;
Takashi Iwai, Ishikawa, JAPAN;
Tomofumi Takata, Ishikawa, JAPAN;

**** CONTINUING DATA ***************************

This application is a 371 of PCT/JP2007/055695 03/20/2007

**** FOREIGN APPLICATIONS ***************************

JAPAN 2006-076995 03/20/2006

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

03/09/2009

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /IQBAL ZAIDI/ Examiner's Signature	☐ Met after Allowance iz Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		JAPAN	11	11	2

ADDRESS

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104
UNITED STATES

TITLE

RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
930	No._____ to charge/credit DEPOSIT ACCOUNT	☐ 1.16 Fees (Filing)
	No._____ for following:	☐ 1.17 Fees (Processing Ext. of time)
		☐ 1.18 Fees (Issue)
		☐ Other _____
		☐ Credit

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	48	(Generalized near2 Chirp near2 like GCL)with (sequence)same (group)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/06 01:48
L2	31	(Generalized near2 Chirp near2 like GCL)with (sequence)same (group)and (370/329-338, 370/342, 370/210, 370/344). ccls.370/280-281,	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/06 01:51
L3	20	(Generalized near2 Chirp near2 like GCL)with (sequence)same (group)and (370/329-338, 370/342, 370/210, 370/344, 370/280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/06 01:57
S1	344	(Generalized near2 Chirp near2 like GCL)with (sequence)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/03 19:47

6/ 6/ 2011 1:57:33 AM
C:\ Documents and Settings\ izaidi\ My Documents\ EAST\ Workspaces\ 12293530(1). wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12293530	IMAMURA ET AL.
	Examiner	**Art Unit**
	IQBAL ZAIDI	2464

✓	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	06/06/2011								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
	10	-								
	11	-								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								
	22	✓								
	23	✓								
	24	✓								
	25	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12293530	IMAMURA ET AL.
	Examiner	Art Unit
	IQBAL ZAIDI	2464

SEARCHED			
Class	Subclass	Date	Examiner
370	329-338, 342, 210, 344, 280-281	06/01/2011	iz

SEARCH NOTES		
Search Notes	Date	Examiner
EAST(see search history)	06/01/2011	iz
See Inventor search at PALM and EAST	06/01/2011	iz
Google, IEEE	06/01/2011	iz

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Receipt date: 03/03/2011

12293530 - GAU: 2464

SHEET 1 OF 1

SUBSTITUTE FOR FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary)	ATTY. DOCKET NO. 009289-08201	SERIAL NO. 12/293,530
	APPLICANT Daichi IMAMURA, et al.	
	FILING DATE September 18, 2008	GROUP 2473

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CORRESPONDENT	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CORRESPONDENT	TRANSLATION?	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	2006/019710	02/2006	WO			

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

		DISCUSSED AND CITED IN SPEC?
	Japanese Notice of the Reasons for Rejection dated January 18, 2011.	
	/Iqbal Zaidi/ (06/06/2011)	06/06/2011

EXAMINER: Initial if citation is considered, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(Form PTO-1449 [6-4])

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /I.Z./

Receipt date: 09/09/2010

SHEET 1 OF 1

SUBSTITUTE FOR FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary)	ATTY. DOCKET NO. **009289-08201**	SERIAL NO. **12/293,530**
	APPLICANT **Daichi IMAMURA, et al.**	
	FILING DATE **September 18, 2008**	GROUP **2473**

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CORRESPONDENT	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	2002/0041578	04/2002	Kim		

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CORRESPONDENT	TRANSLATION?	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	1381107	11/2002	CN	US 2002/0041578	Abstract	

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

		DISCUSSED AND CITED IN SPEC?
	Chinese Office Action dated June 11, 2010.	
	3 GPP TSG RAN1#44, "RACH Design for EUTRA," February 2006, R1-060387, pp 25-37.	
	/Iqbal Zaidi/ (06/06/2011)	06/06/2011

EXAMINER: Initial if citation is considered, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(Form PTO-1449 [6-4])

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /I.Z./

Receipt date: 09/18/2008

SUBSTITUTE FOR FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary)	ATTY. DOCKET NO. **009289-08201**	SERIAL NO. **New Patent Application**
	APPLICANT **Daichi IMAMURA, et al.**	
	FILING DATE **September 18, 2008**	GROUP **Unassigned**

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CORRESPONDENT	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	6 859 445	**2/2005**	**Moon**		

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CORRESPONDENT	TRANSLATION?	DISCUSSED AND CITED IN SPEC? (insert page and line number where cited)
	01/05050	**1/2001**	**WO**	**US 6 859 445**		

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

		DISCUSSED AND CITED IN SPEC?
	International Search Report dated June 5, 2007.	
	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060046, NTT DoCoMo, NEC, Sharp, "Orthogonal Pilot Channel Structure in E-UTRA Uplink," Helsinki, Finland, 23-25 January, 2006.	**Page 2, line 20 (also cited in ISR)**
	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060047, NTT DoCoMo, NEC, Sharp, "Random Access Transmission in E-UTRA Uplink," Helsinki, Finland, 23–25 January, 2006, pages 1-8.	**Page 2, line 16**
	3GPP TS 25.214 V6.7.1 (2005-12), 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical Layer Procedures (FDD) (Release 6), December, 2005, pages 1-60.	
	3GPP TSG-RAN WG1 LTE Ad Hoc Meeting, R1-060480, Qualcomm, "Principles of RACH," Denver, USA, 13-17 February, 2006, pages 1-7.	**Page 2, line 24**

EXAMINER: Initial if citation is considered, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

/Iqbal Zaidi/ (06/06/2011) 06/06/2011 (Form PTO-1449 [6-4])

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /I.Z./

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.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

96896 7590 06/15/2011
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

EXAMINER	
ZAIDI, IQBAL	

ART UNIT	PAPER NUMBER
2464	

NOTIFICATION DATE	DELIVERY MODE
06/15/2011	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):

jeffs.docketing@seedip.com

UNITED STATES PATENT AND TRADEMARK OFFICE

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

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle WA 98104

In re Application of: IMAMURA, DAICHI et al.
Application No. 12/293,530
Filed: September 18, 2008
For: RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

DECISION ON REQUEST TO PARTICIPATE IN PATENT PROSECUTION HIGHWAY PROGRAM AND PETITION TO MAKE SPECIAL UNDER 37 CFR 1.102(d)

MAILED

JUN 15 2011

DIRECTOR OFFICE
TECHNOLOGY CENTER 2400

This is a decision on the request to participate in the Patent Prosecution Highway (PPH) program and the petition under 37 CFR 1.102(d), filed May 31, 2011, to make the above-identified application special.

The petition is **DISMISSED AS MOOT.**

A grantable request to participate in the PPH program and petition to make special require:

(1) The U.S. application is
(a) a Paris Convention application which either (i) validly claims priority under 35 U.S.C. 119(a) and 37 CFR 1.55 to one or more applications filed in the JPO, or (ii) validly claims priority to a PCT application that contains no priority claims, or
(b) a national stage application under the PCT (an application which entered the national stage in the U.S. from a PCT international application after compliance with 35 U.S.C. 371), which PCT application (i) validly claims priority to an application filed in the JPO, or (ii) validly claims priority to a PCT application that contains no priority claims, or (iii) contains no priority claim, or
(c) a so-called bypass application filed under 35 U.S.C. 111 (a) which validly claims benefit under 35 U.S.C. 120 to a PCT application, which PCT application (i) validly claims priority to an application filed in the JPO, or (ii) validly claims priority to a PCT application that contains no priority claims, or (iii) contains no priority claim.

Where the JPO application that contains the allowable/patentable claims is not the same application for which priority is claimed in the U.S. application, applicant must identify the relationship between the JPO application that contains the allowable/patentable claims and the JPO priority application claimed in the U.S. application;

(2) Applicant must submit a copy of:
a. The allowable/patentable claim(s) from the Japanese application(s);
b. An English translation of the allowable/patentable claim(s), if the claims were published in a language other than English); and
c. A statement that the English translation is accurate;

(3) Applicant must:
a. Ensure that all the claims in the U.S. application sufficiently correspond or be amended to sufficiently correspond to the allowable/patentable claim(s) in the JPO application(s) and
b. Submit a claim correspondence table in English;

(4) Examination of the U.S. application has not begun;

(5) Applicant must submit:
a. A copy of all the office action(s) (which are relevant to patentability), excluding "Decision to Grant a Patent" from each of the Japanese application(s) containing the allowable/patentable claim(s);
b. An English language translation of the JPO office action(s) (if the office action(s) are not in the English language); and
c. A statement that the English translation is accurate;

(6) Applicant must submit:
a. An IDS listing the documents cited by the JPO examiner in the JPO office action (unless already filed in this application); and
b. Copies of all the documents cited in the JPO office action, except U.S. patents or U.S. patent application publications (unless already filed in this application).

The request to participate in the PPH program and petition do not meet the requirement set forth in item **(4)** above because examination of the application has already begun. A first Office action has already been issued on 6/14/2011.

Since examination of the application has already begun, the Petition is **DISMISSED AS MOOT.**

Telephone inquiries concerning this decision should be directed to Aaron Strange at 571-272-3959.

All other inquiries concerning the examination or status of the application is accessible in the PAIR system at http://www.uspto.gov/ebc/index.html.

The application is being forwarded to the examiner for action on the merits commensurate with this decision.

/Christopher Grant/

Christopher Grant
Quality Assurance Specialist
Technology Center 2400

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12293530
Filing Date	2008-09-18
First Named Inventor	Daichi Imamura
Art Unit	2464
Examiner Name	Iqbal Zaidi
Attorney Docket Number	733156.428USPC

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12293530
	Filing Date	2008-09-18
	First Named Inventor	Daichi Imamura
	Art Unit	2464
	Examiner Name	Iqbal Zaidi
	Attorney Docket Number	733156.428USPC

	1	Motorola, "RACH Design for EUTRA," R1-060025, 3GPP TSG RAN1#43, Helsinki, Finland, January 23-25, 2006, 11 pages.	☐
	2	NTT DoCoMo, Fujitsu, Mitsubishi Electric, NEC, Panasonic, Sharp, Toshiba Corporation, "Orthogonal Pilot Channel Structure for E-UTRA Uplink," R1-060319 (Original R1-060046), 3GPP TSG RAN WG1 Meeting #44, Denver, USA, February 13-17, 2006, pp. 1-7.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12293530
	Filing Date	2008-09-18
	First Named Inventor	Daichi Imamura
	Art Unit	2464
	Examiner Name	Iqbal Zaidi
	Attorney Docket Number	733156.428USPC

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Shoko Leek/	Date (YYYY-MM-DD)	2011-07-21
Name/Print	Shoko I. Leek	Registration Number	43,746

This collection of information is required by 37 CFR 1.97 and 1.98. 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 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: 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 record s.

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 Acknowledgement Receipt

EFS ID:	10572171
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	Shoko I. Leek/Tracy Taylor
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	733156.428USPC
Receipt Date:	21-JUL-2011
Filing Date:	18-SEP-2008
Time Stamp:	18:07:34
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	733156_428USPC_Supp_IDS_Transmittal.pdf	48762 2d7ca7cf80a0f955de2b2887f8baaf5decc970fd	no	2

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	733156_428USPC_Supp_IDS_Form.pdf	883585 4abe759e731664a33ab737cf1bc1764aaa317cdd	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	NPL_R1_060025.pdf	287385 f28bfe06e643a29304a34535b7372c5cd381f763	no	11
Warnings:					
Information:					
4	Non Patent Literature	NPL_R1_060319.pdf	210457 03f56d07aacfac0e28aba01333f4b26782f5479e	no	7
Warnings:					
Information:					
			Total Files Size (in bytes):	1430189	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
For	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
Examiner	:	Iqbal Zaidi
Art Unit	:	2464
Docket No.	:	733156.428USPC
Date	:	July 21, 2011

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT TRANSMITTAL

Commissioner for Patents:

In accordance with 37 CFR 1.56 and 1.97 through 1.98, applicants wish to make known to the U.S. Patent and Trademark Office the references set forth on the attached Information Disclosure Statement. Copies of cited U.S. patents and published patent applications are not required and accordingly have not been provided. Copies of any other cited references are enclosed. As to any reference cited, applicants do not admit that it is "prior art" under 35 U.S.C. §§ 102 or 103, and specifically reserve the right to traverse or antedate any such reference, as by a showing under 37 CFR 1.131 or other method. Although the aforesaid references are made known to the Patent and Trademark Office in compliance with applicants' duty to disclose all information they are aware of which is believed relevant to the examination of the above-identified application, applicants believe that their invention is patentable.

We hereby certify that no item of information contained in the attached Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to our knowledge, after making reasonable inquiry, no item of information contained in the attached Information Disclosure Statement was known to any

individual designated in 37 CFR 1.56(c) more than three months prior to the filing of this Information Disclosure Statement.

Please acknowledge receipt of this Information Disclosure Statement and kindly make the cited references of record in the above-identified application.

Applicants believe this Information Disclosure Statement has been timely filed, however, the Director is authorized to charge any fee due by way of this Information Disclosure Statement to our Deposit Account No. 19-1090.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/Shoko Leek/

Shoko I. Leek
Registration No. 43,746

SIL:tt

Enclosures:
Information Disclosure Statement
Cited References (2)

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

1943140_1.DOCX

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
Title	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Examiner	:	Iqbal Zaidi
Art Unit	:	2464
Docket No.	:	733156.428USPC
Date	:	September 8, 2011

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

AMENDMENT

Commissioner for Patents:

In response to the Office Action dated June 14, 2011, please amend the application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 5 of this paper.

REMARKS

In the Office Action mailed June 14, 2011, claims 12-25 were rejected under 35 U.S.C. 102(e) as being identically disclosed by Tan et al. (US 2007/0165567, "Tan"). Applicants respectfully traverse the rejection of these claims and submit the following. In this connection, applicants' attorney thanks the Examiner for his time and consideration in conducting a telephone interview on August 9, 2011, to discuss the present application vis-à-vis Tan. Although no agreement was reached during the interview, the present claim amendment and response have been prepared based on what was discussed, to advance the examination of the present application. Specifically, both independent claims 12 and 25, as well as dependent claims 20-22, are amended, and new claims 26 and 27 are added. No new matter is added.

Prior to discussing why claims 12-27 of the present application are allowable over Tan, a brief description of an exemplary embodiment of the invention is set forth below. It should be understood that the following is provided merely to assist the Office's examination of the present application, and is not intended to limit the scope of the claims.

In accordance with an exemplary embodiment of the present invention, a mobile station apparatus is configured to randomly select a sequence and transmit the selected sequence on a random access channel to a base station. (See paragraph [0003] of the application.) To this end, a set of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with different amounts of data and different reception qualities. For example, as shown in Figure 9, a set of sequences ("SIGNATURE NUMBER #1 - #64") generated from a plurality of base sequences ("CAZAC SEQUENCE NUMBER k: #1 - #8") are grouped into a plurality of groups, which are respectively associated with both different amounts of data and different reception qualities. Thus, each of the groups provides an indication of an amount of data and a reception quality. (See paragraphs [0029] and [0063] of the application.) Additionally, the set of sequences are grouped such that those sequences that are generated from the same base sequence (e.g., those "SIGNATURE NUMBER #1 - #8" generated from the "CAZAC SEQUENCE NUMBER #1") are first included in a predetermined number of the sequences contained in the same group (e.g., the fourteen (14)

sequences contained in the group corresponding to the "CONTROL INFORMATION 000"). In the example of Figure 9, after those eight (8) sequences generated from the "CAZAC SEQUENCE NUMBER #1" are first included, six (6) sequences generated from the "CAZAC SEQUENCE NUMBER #2" are next included in the same group. (See paragraph [0051] of the application.) The mobile station apparatus randomly selects a sequence from one of these groups corresponding to one of the amounts of data and one of the reception qualities.

Tan discloses deriving a plurality of spread sequences from a plurality of CAZAC sequences and combining those derived spread sequences with an orthogonal code to form "extended spread sequences (signature sequences)." Tan further discloses "randomly select[ing]" one of these extended spread sequences or, in the alternative, selecting a "predefined" one of these extended spread sequences in order "to reduce the possibility of interference." Paragraph [0052].

Also, Tan discloses that "[for each of the N_{RB} resource blocks,] a number of signature sequence groups are pre-defined so that every group consists of N_S signature sequences and different groups can be assigned to different neighboring sectors. Each group also consists of several cyclically shifted versions of the signature sequences (N_{SH})." Paragraph [0025].

In the Office Action, the Office found that Tan's selection of a "predefined" one of the extended spread sequences in order "to reduce the possibility of interference" corresponds to the claimed selection of "a sequence from a group of sequences[, the group] corresponding to ... reception quality." Applicants respectfully traverse this finding.

According to the present invention as recited in claim 12, as amended, "a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with both different amounts of data and different reception qualities, such that each group provides an indication of an amount of data and a reception quality and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group." Claim 25 has been similarly amended. While Tan teaches forming different groups of signature sequences, Tan is silent as to preparing groups "which are respectively associated with both different amounts of data and different reception qualities, such that each group provides an indication of

an amount of data and a reception quality" as explicitly recited in claims 12 and 25. Further, because Tan does not teach forming different groups of signature sequences "which are respectively associated with both different amounts of data and different reception qualities, such that each group provides an indication of an amount of data and a reception quality" as discussed above, it follows that Tan cannot teach or suggest "randomly select[ing] a sequence from [a group of] sequences[, the] group corresponding to an amount of data and a reception quality," as further recited in claims 12 and 25.

The Office also found that Tan's groups, each consisting of "N_S" number of signature sequences (paragraph [0025]), correspond to the claimed "plurality of groups, which are respectively associated with different amounts of data." The Office's interpretation is based on equating Tan's "N_S signature sequences" included in every group with "different amounts of data [respectively associated with a plurality of groups]" as claimed. Applicants respectfully disagree with the finding because claims 12 and 25 of the present application both explicitly recite "different amounts of data [respectively associated with a plurality of groups]" separately from "a predetermined number of the sequences contained in the same group." As such, the "different amounts of data" as claimed cannot correspond to the number "N_S" of sequences contained in a group in Tan. Furthermore, Tan's "N_S" is not provided to the Node-B so that the group of Tan including "N_S signature sequences" does *not* provide an indication of an amount of data, as explicitly recited in claims 12 and 25. Still further, as discussed above, claims 12 and 25 recite that "each group provides an indication of an amount of data and a reception quality," which is not taught or suggested by the group of Tan.

Based on the foregoing, applicants submit that Tan fails to teach or suggest various features of the present invention as recited in claims 12 and 25. Thus, Tan does not anticipate claims 12 and 25 under 35 U.S.C. 102(e). Withdrawal of the rejection of claims 12 and 25 on this basis is respectfully requested.

Claims 13-24, 26 and 27 all depend from claim 12 and, therefore, these claims are likewise submitted as allowable for at least the same reasons why claim 12 is allowable.

Closing

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/Shoko Leek/
Shoko I. Leek
Registration No. 43,746

SIL:tt:ms

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

1978540_1.DOCX

Electronic Acknowledgement Receipt

EFS ID:	10907773
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	Shoko I. Leek/Monica Satterthwaite
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	733156.428USPC
Receipt Date:	08-SEP-2011
Filing Date:	18-SEP-2008
Time Stamp:	17:46:29
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		733156_428USPC_AMENDMENT.pdf	98806 da12f1885260a1beacae905d7bc0cdf22d93e81a	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	8
Warnings:			
Information:			
	Total Files Size (in bytes):	98806	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/293,530	09/18/2008	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY ☐ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 09/08/2011

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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))									
☐ 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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ERIC DAVIS/

Application No. 12/293,530
Reply to Office Action dated June 14, 2011

Amendments to the Claims:

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

Listing of Claims

1-11. (Canceled)

12. (Currently Amended) A mobile station apparatus comprising:

a selecting unit configured to randomly select a sequence from a group of sequences, the group corresponding to an amount of data ~~or~~ and a reception quality, wherein a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with both different amounts of data ~~or~~ and different reception qualities, such that each group provides an indication of an amount of data and a reception quality and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

a transmitting unit configured to transmit the selected sequence.

13. (Previously Presented) The mobile station apparatus according to claim 12, wherein said transmitting unit transmits the selected sequence on a random access channel.

14. (Previously Presented) The mobile station apparatus according to claim 12, wherein the predetermined number is determined from received control information.

15. (Previously Presented) The mobile station apparatus according to claim 12, wherein the predetermined number varies in accordance with received control information.

16. (Previously Presented) The mobile station apparatus according to claim 12, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with received control information.

17. (Previously Presented) The mobile station apparatus according to claim 12, wherein each of the plurality of groups is comprised of a different number of the sequences.

18. (Previously Presented) The mobile station apparatus according to claim 12, wherein the plurality of sequences are grouped by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences.

19. (Previously Presented) The mobile station apparatus according to claim 18, wherein a position at which the plurality of sequences are partitioned varies in accordance with received control information.

20. (Currently Amended) The mobile station apparatus according to claim 12, wherein one group associated with both one of the different amounts of data ~~or~~ and one of the different reception qualities is comprised of all of the sequences generated from at least one of the plurality of base sequences.

21. (Currently Amended) The mobile station apparatus according to claim 12, wherein a group associated with the amount of data or the reception quality with higher probability of occurrence is comprised of a greater number of the sequences.

22. (Currently Amended) The mobile station apparatus according to claim 12, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or the reception quality.

23. (Previously Presented) The mobile station apparatus according to claim 12, wherein a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences.

24. (Previously Presented) The mobile station apparatus according to claim 12, wherein the base sequence is a Generalized Chirp-like (GCL) sequence.

25. (Currently Amended) A random access method comprising:

grouping a plurality of sequences generated from a plurality of base sequences into a plurality of groups, which are respectively associated with both different amounts of data ~~or~~ and different reception qualities, such that each group provides an indication of an amount of data and a reception quality and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

randomly selecting a sequence from the sequences contained in a group corresponding to ~~one of the amounts~~ an amount of data ~~or~~ and a reception ~~qualities~~ quality.

26. (New) The mobile station apparatus according to claim 12, wherein the plurality of groups are respectively associated with both the different amounts of data to be transmitted from the mobile station apparatus and the different reception qualities measured at the mobile station apparatus.

27. (New) The mobile station apparatus according to claim 12, wherein the plurality of sequences generated from the plurality of base sequences are grouped into the plurality of groups, such that all of sequences that are generated from one of the base sequences and at least one of sequences that are generated from another of the base sequences are included in the predetermined number of the sequences contained in the same group.

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.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

96896 7590 11/02/2011

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

EXAMINER	
ZAIDI, IQBAL	

ART UNIT	PAPER NUMBER
2464	

NOTIFICATION DATE	DELIVERY MODE
11/02/2011	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):

patentinfo@seedip.com

Office Action Summary	Application No.	Applicant(s)	
	12/293,530	IMAMURA ET AL.	
	Examiner	Art Unit	
	IQBAL ZAIDI	2464	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

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

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *12-27* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *12-27* is/are rejected.

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

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

Application Papers

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

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to applicant's amendment filed on Sep 8, 2011 for Application No. 12/293530.

2. Claims 12-27, are pending in this application.

Response to Argument

3. Applicant's arguments with respect to claims 12-25, have been considered but are moot in view of the new ground(s) of rejection. However the new ground(s) of rejection is made in view of Tan et al (US 2007/0165567, Jul. 19, 2007) and Suttvong et al. (WO 2006/019710, Feb. 23, 2006).

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 12- 27** are rejected under 35 U.S.C 103(a) as being unpatentable over Tan et al (US 2007/0165567, Jul. 19, 2007) in view of Suttvong et al. (WO 2006/019710, Feb. 23, 2006).

1-11. (Canceled)

Regarding **Claim 12**, Tan discloses a mobile station apparatus comprising a selecting unit configured to randomly select a sequence from a group of sequences*(see Fig 14 block 1404, page 4, par (0052), line 5-10, shows the UE selects one of the signature sequences (from a group of sequences), the selection is randomly selected (randomly selects the sequence), page 2, par(0025), line 8-11, a number of signature sequence groups are pre-defined so that every group consists of signature sequences(selecting a sequence from a group of sequences))*,

wherein a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups*(see Fig 14, page 4, par (0052), line 5-10, the UE defines 1400 a plurality of spread sequences (plurality of sequences) derived (generated) from a plurality of constant amplitude zero autocorrelation (CAZAC) sequences(generated from a plurality of bases sequences), the UE then combines 1402 (making plurality of groups) the spread sequences with an orthogonal code to form extended spread sequences (signature sequences))*,

and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group*(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined (predetermined) so that every group consists of signature sequences(number of sequences contained in the same group)*;

and a transmitting unit configured to transmit the selected sequence *(page 4, par (0053), line 3-7, the UE transmits 1410(transmitting unit) the RACH preamble using the*

selected slot, signature sequence (selected sequence), and power, and then monitors 1412 for a positive acquisition indicator (ACKnowledgement) from the node-B, if positive acquisition indicator is detected, the UE sends RACH message to Node-B).

Tan discloses all aspects of the claimed invention, except *the group corresponding to an amount of data and a reception quality, which are respectively, associated with both different amounts of data and different reception qualities, such that each group provides an indication of an amount of data and a reception quality.*

Suttvong is the same field of invention teaches the group corresponding to an amount of data and a reception quality*(page 14, (0062), see Fig 7, shows group of access sequences based on a variety of factors, Factors include CQI ranges(different reception quality), buffer level(see page 9, (0038), the quantity of access sequences assigned to various combinations of factors , the access terminal send a buffer level indicator, indicating the amount of data), quality of service (reception quality), packet size, frequency bandwidth request, or other factors),* which are respectively associated with both different amounts of data and different reception qualities*(page 14, (0062), see Fig 7, shows group of access sequences based on a variety of factors, Factors include CQI ranges(different reception quality), buffer level(see page 9, (0038), the quantity of access sequences assigned to various combinations of factors , the access terminal send a buffer level indicator, indicating the amount of data(levels are different amount of data)), quality of service (reception quality), packet size, frequency bandwidth request, or other factors),*

such that each group provides an indication of an amount of data and a reception quality *(page 14, (0062), see Fig 7, shows group of access sequences based on a variety of factors, Factors include CQI ranges(a reception quality), buffer level, quality of service (reception quality), packet size(an amounts of data), frequency bandwidth request, or other factors).*

Tan and Suttvong are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Tan to include the teaching of Suttvong because it is providing the techniques to minimize the use of a broadcast acknowledgement channel during its preamble transmission.

Regarding **claim 13**, Tan discloses transmitting unit transmits the selected sequence on a random access channel *(page 4, par (0053), line 3-7, the UE transmits 1410(transmitting unit) the RACH (random access channel) preamble using the selected slot, signature sequence(selected sequence), and power, and then monitors 1412 for a positive acquisition indicator (ACKnowledgement) from the node-B, if positive acquisition indicator is detected, the UE sends RACH message to Node-B).*

Regarding **claim 14**, Tan discloses the predetermined number is determined from received control information *(page 4, par (0047), line 3-7, At the Node B, once the RACH preamble is successfully received(received control information), a four-bit*

acknowledgement corresponding to the sequence number(predetermined number) is transmitted to the UE).

Regarding **claim 15**, Tan discloses the predetermined number varies in accordance with received control information *(page 2, par (0026), line 3-7, the number of RACH opportunities thus varies according to different bandwidth deployments).*

Regarding **claim 16**, Tan discloses a number of the sequences contained in each of the plurality of groups varies in accordance with received control information *(page 2, par (0026), line 3-7, the length of a signature sequence is fifteen. For the scalable bandwidth structure, the length of a signature sequence is fixed to fifteen. The number of RACH opportunities (number of sequences) thus varies according to different bandwidth deployments).*

Regarding **claim 17**, Tan discloses each of the plurality of groups is comprised of a different number of the sequences *(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined so that every group consists of signature sequences and different groups (having different number of sequences) can be assigned to different neighboring sectors).*

Regarding **claim 18**, Tan discloses the plurality of sequences are grouped by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences*(page 2, par (0025), line 5-10, the subcarriers are divided*

into resource blocks with each resource block using a fixed number of contiguous sub-carriers, for each of the resource blocks, a number of signature sequence groups are pre-defined so that every group consists of Ns signature sequences and different groups can be assigned to different neighboring sectors).

Regarding **claim 19**, Tan discloses a position at which the plurality of sequences are partitioned varies in accordance with received control information *(page 2, par (0026), line 1-5, the length of a signature sequence is fixed to fifteen. The number of RACH opportunities thus varies according to different bandwidth deployments).*

Regarding **claim 20**, Tan discloses one group associated with one of the different amounts of data or reception qualities is comprised of all of the sequences generated from at least one of the plurality of base sequences *(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined so that every group consists of signature sequences and different groups (having different amount of data) can be assigned to different neighboring sectors).*

Regarding **claim 21**, Tan discloses a group associated with the amount of data or reception quality with higher probability of occurrence is comprised of a greater number of the sequences *(page 5, par (0059), line 5-10, the RACH preamble sequencing without the need for reserved RACH access resources enhances the peak*

rate of data transmission and can reduce latency issues for data transmissions, expect to achieve higher probability and user packet call throughput).

Regarding **claim 22**, Tan discloses a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or reception quality *(page 2, par (0026), line 3-7, the number of RACH opportunities thus varies according to different bandwidth deployments).*

Regarding **claim 23**, Tan discloses a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences*(page 2, par (0025), line 7-10, Each group also consists of several cyclically shifted (different cyclic shifts) versions of the signature sequences).*

Regarding **claim 24**, Tan discloses the base sequence is a Generalized Chirp-like (GCL) sequence*(page 2, par (0028), line 1-7, the signature sequences are obtained from a constant amplitude zero auto correleation (CAZAC) sequence, which include different "classes" of generalized chirp like (GCL) or Chu-sequences).*

Regarding **Claim 25**, Tan discloses a random access method comprising grouping a plurality of sequences generated from a plurality of base sequences into a plurality of groups*(see Fig 14, page 4, par (0052), line 5-10, the UE defines 1400 a plurality of spread sequences (plurality of sequences) derived (generated) from a*

plurality of constant amplitude zero autocorrelation (CAZAC) sequences (generated from a plurality of bases sequences), the UE then combines 1402 (making plurality of groups) the spread sequences with an orthogonal code to form extended spread sequences (signature sequences)), and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group *(page 2, par (0025), line 5-10, a number of signature sequence groups are pre-defined (predetermined) so that every group consists of signature sequences(number of sequences contained in the same group).*

Tan discloses all aspects of the claimed invention, except which are respectively associated with both different amounts of data and different reception, such that each group provides an indication of an amount of data and a reception quality, and randomly selecting a sequence from the sequences contained in a group corresponding to an amount of data and a reception quality.

Suttvong is the same field of invention teaches which are respectively associated with both different amounts of data and different reception *(page 14, (0062), see Fig 7, shows group of access sequences based on a variety of factors, Factors include CQI ranges(different reception quality), buffer level(see page 9, (0038), the quantity of access sequences assigned to various combinations of factors , the access terminal send a buffer level indicator, indicating the amount of data), quality of service (reception quality), packet size, frequency bandwidth request, or other factors)*,

such that each group provides an indication of an amount of data and a reception quality *(page 14, (0062), see Fig 7, shows group of access sequences based on a*

variety of factors, Factors include CQI ranges(different reception quality), buffer level(see page 9, (0038), the quantity of access sequences assigned to various combinations of factors , the access terminal send a buffer level indicator, indicating the amount of data), quality of service (reception quality), packet size, frequency bandwidth request, or other factors);

and randomly selecting a sequence from the sequences contained in a group corresponding to an amount of data and a reception quality *(page 14, (0062), see Fig 7, shows group of access sequences based on a variety of factors, Factors include CQI ranges (a reception quality), buffer level(see page 9, (0038), the quantity of access sequences assigned to various combinations of factors , the access terminal send a buffer level indicator, indicating the amount of data), quality of service (reception quality), packet size, frequency bandwidth request, or other factors).*

Tan and Suttvong are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Tan to include the teaching of Suttvong because it is providing the techniques to minimize the use of a broadcast acknowledgement channel during its preamble transmission.

Regarding **Claim 26**, Tan discloses all aspects of the claimed invention, except *the plurality of groups are respectively associated with both the different amounts of data to be transmitted from the mobile station apparatus.*

Suttvong is the same field of invention teaches the plurality of groups are respectively associated with both the different amounts of data to be transmitted from the mobile station apparatus *(page 14, (0062), see Fig 7, shows group of access sequences based on a variety of factors, Factors include CQI ranges(different reception quality), buffer level(see page 9, (0038), the quantity of access sequences assigned to various combinations of factors , the access terminal send a buffer level indicator, indicating the amount of data), quality of service (reception quality), packet size, frequency bandwidth request, or other factors)* and the different reception qualities measured at the mobile station apparatus.

Regarding **Claim 27**, Tan discloses the plurality of sequences generated from the plurality of base sequences are grouped into the plurality of groups *(page 2, par (0028), line 1-5, the signature sequences are obtained(plurality of sequences generated) from a constant amplitude zero autocorrelation (CAZAC) sequences(from the plurality of base sequences),*

such that all of sequences that are generated from one of the base sequences and at least one of sequences that are generated from another of the base sequences are included in the predetermined number of the sequences contained in the same group *(page 2, par (0028), line 5-10, the CAZAC, Chu and GCL sequences can be used interchangeably (other base sequences to generate sequences)).*

Conclusion

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

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IQBAL ZAIDI whose telephone number is (571)270-3943. The examiner can normally be reached on 7:30a.m to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 571-272-3139. 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.

/Pao Sinkantarakorn/

Primary Examiner, Art Unit 2464

/IQBAL ZAIDI/

Examiner, Art Unit 2464

Notice of References Cited	Application/Control No. 12/293,530	Applicant(s)/Patent Under Reexamination IMAMURA ET AL.	
	Examiner IQBAL ZAIDI	Art Unit 2464	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0165567	07-2007	Tan et al.	370/329
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	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	WO2006019710	02-2006		SUTTVONG	H04Q
	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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	143	(CAZAC) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:37
L2	65	(CAZAC) and (amount quantit$3 siz $3)same (data packet $3) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:38
L3	23	(CAZAC) and (amount quantit$3 siz $3)same (data packet $3) and (CQI recept $6) same (qualit$6) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:38

L4	23	(CAZAC) and (amount quantit$3 siz $3)same (data packet $3) and (CQI recept $6 audi$3 vide$5) same(qualit $6) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:39

10/27/2011 8:40:00 PM
C:\Documents and Settings\izaidi\My Documents\EAST\Workspaces\12293530(1).wsp

Receipt date: 07/21/2011

12293530 - GAU: 2464

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (07-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	12293530
	Filing Date	2008-09-18
	First Named Inventor	Daichi Imamura
	Art Unit	2464
	Examiner Name	Iqbal Zaidi
	Attorney Docket Number	733156.428USPC

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					
If you wish to add additional U.S. Patent citation information please click the Add button.						

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					
If you wish to add additional U.S. Published Application citation information please click the Add button.						

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐
If you wish to add additional Foreign Patent Document citation information please click the Add button								

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /I.Z./

Receipt date: 07/21/2011	Application Number	12293530 12293530 - GAU: 2464
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2008-09-18
	First Named Inventor	Daichi Imamura
	Art Unit	2464
(Not for submission under 37 CFR 1.99)	Examiner Name	Iqbal Zaidi
	Attorney Docket Number	733156.428USPC

	1	Motorola, "RACH Design for EUTRA," R1-060025, 3GPP TSG RAN1#43, Helsinki, Finland, January 23-25, 2006, 11 pages.	☐
	2	NTT DoCoMo, Fujitsu, Mitsubishi Electric, NEC, Panasonic, Sharp, Toshiba Corporation, "Orthogonal Pilot Channel Structure for E-UTRA Uplink," R1-060319 (Original R1-060046), 3GPP TSG RAN WG1 Meeting #44, Denver, USA, February 13-17, 2006, pp. 1-7.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/Iqbal Zaidi/	Date Considered	10/25/2011

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

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /I.Z./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12293530	IMAMURA ET AL.
	Examiner	Art Unit
	IQBAL ZAIDI	2464

✓	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	06/06/2011	10/27/2011							
	1	-	-							
	2	-	-							
	3	-	-							
	4	-	-							
	5	-	-							
	6	-	-							
	7	-	-							
	8	-	-							
	9	-	-							
	10	-	-							
	11	-	-							
	12	✓	✓							
	13	✓	✓							
	14	✓	✓							
	15	✓	✓							
	16	✓	✓							
	17	✓	✓							
	18	✓	✓							
	19	✓	✓							
	20	✓	✓							
	21	✓	✓							
	22	✓	✓							
	23	✓	✓							
	24	✓	✓							
	25	✓	✓							
	26		✓							
	27		✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12293530	IMAMURA ET AL.
	Examiner	Art Unit
	IQBAL ZAIDI	2464

SEARCHED

Class	Subclass	Date	Examiner
370	329-338, 342, 210, 344, 280-281	06/01/2011	iz
370	329-338, 342, 210, 344, 280-281	10/27/2011	iz

SEARCH NOTES

Search Notes	Date	Examiner
EAST(see search history)	06/01/2011	iz
See Inventor search at PALM and EAST	06/01/2011	iz
Google, IEEE	06/01/2011	iz
EAST(See Updated search)	10/27/2011	iz
Google, IEEE	10/27/2011	iz

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE - EXAMINING GROUP 2460

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
For	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Examiner	:	Iqbal Zaidi
Art Unit	:	2464
Docket No.	:	733156.428USPC
Date	:	December 22, 2011

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

AMENDMENT UNDER 37 CFR 1.116

Commissioner for Patents:

In response to the Office Action dated November 2, 2011, please amend the application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 6 of this paper.

Amendments to the Claims:

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

Listing of Claims

1-11. (Canceled)

12. (Currently Amended) A mobile station apparatus comprising:

a selecting unit configured to randomly select a sequence from a group of sequences, the group corresponding to an amount of data and a reception quality, wherein a plurality of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with both different amounts of data and different reception qualities, such that each group provides an indication of an amount of data and a reception quality and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

a transmitting unit configured to transmit the selected sequence,

wherein the plurality of sequences generated from the plurality of base sequences are grouped into the plurality of groups, such that all of sequences that are generated from one of the base sequences and at least one of sequences that are generated from another of the base sequences are included in the predetermined number of the sequences contained in the same group.

13. (Previously Presented) The mobile station apparatus according to claim 12, wherein said transmitting unit transmits the selected sequence on a random access channel.

14. (Previously Presented) The mobile station apparatus according to claim 12, wherein the predetermined number is determined from received control information.

15. (Previously Presented) The mobile station apparatus according to claim 12, wherein the predetermined number varies in accordance with received control information.

16. (Previously Presented) The mobile station apparatus according to claim 12, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with received control information.

17. (Previously Presented) The mobile station apparatus according to claim 12, wherein each of the plurality of groups is comprised of a different number of the sequences.

18. (Previously Presented) The mobile station apparatus according to claim 12, wherein the plurality of sequences are grouped by partitioning the plurality of sequences arranged in an increasing order of sequence indices of the base sequences.

19. (Previously Presented) The mobile station apparatus according to claim 18, wherein a position at which the plurality of sequences are partitioned varies in accordance with received control information.

20. (Previously Presented) The mobile station apparatus according to claim 12, wherein one group associated with both one of the different amounts of data and one of the different reception qualities is comprised of all of the sequences generated from at least one of the plurality of base sequences.

21. (Previously Presented) The mobile station apparatus according to claim 12, wherein a group associated with the amount of data or the reception quality with higher probability of occurrence is comprised of a greater number of the sequences.

22. (Previously Presented) The mobile station apparatus according to claim 12, wherein a number of the sequences contained in each of the plurality of groups varies in accordance with probability of occurrence of the amount of data or the reception quality.

23. (Previously Presented) The mobile station apparatus according to claim 12, wherein a plurality of the sequences with different cyclic shifts are generated from each of the plurality of base sequences.

24. (Previously Presented) The mobile station apparatus according to claim 12, wherein the base sequence is a Generalized Chirp-like (GCL) sequence.

25. (Currently Amended) A random access method comprising:

grouping a plurality of sequences generated from a plurality of base sequences into a plurality of groups, which are respectively associated with both different amounts of data and different reception qualities, such that each group provides an indication of an amount of data and a reception quality and that those sequences that are generated from the same base sequence are first included in a predetermined number of the sequences contained in the same group; and

randomly selecting a sequence from the sequences contained in a group corresponding to an amount of data and a reception quality,

wherein the plurality of sequences generated from the plurality of base sequences are grouped into the plurality of groups, such that all of sequences that are generated from one of the base sequences and at least one of sequences that are generated from another of the base sequences are included in the predetermined number of the sequences contained in the same group.

26. (Previously Presented) The mobile station apparatus according to claim 12, wherein the plurality of groups are respectively associated with both the different

amounts of data to be transmitted from the mobile station apparatus and the different reception qualities measured at the mobile station apparatus.

27. (Canceled)

REMARKS

The Examiner is thanked for the clearly stated action. Claims 12-27 were pending in the application, of which independent claims 12 and 25 are currently amended to incorporate the subject matter previously recited in dependent claim 27, respectively, to place the application in condition for allowance. Claim 27 is therefore canceled. No new matter is added, and entry of the amendments and allowance of the present application are respectfully requested.

Claims 12-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tan et al. (US 2007/0165567) in view of Suttvong et al. (WO 2006/019710). In response, prior to discussing why claims 12 and 25, now amended to additionally recite the subject matter previously recited in dependent claim 27, are allowable, a brief description of an exemplary embodiment of the invention is set forth below. It should be understood that the following is provided merely to assist the Office's examination of the present application and is not intended to limit the scope of the claims.

In accordance with an exemplary embodiment of the present invention, a mobile station apparatus is configured to randomly select a sequence and transmit the selected sequence on a random access channel to a base station. (See paragraph [0003] of the present application as published, U.S. Pub. No. 2009/0161650.) To this end, a set of sequences generated from a plurality of base sequences are grouped into a plurality of groups, which are respectively associated with different amounts of data and different reception qualities. For example, as shown in Figure 9, a set of sequences ("SIGNATURE NUMBER #1 - #64") generated from a plurality of base sequences ("CAZAC SEQUENCE NUMBER k: #1 - #8") are grouped into a plurality of groups, which are respectively associated with both different amounts of data and different reception qualities. Thus, each of the groups provides an indication of an amount of data and a reception quality. (See paragraphs [0041] and [0078] of the published application.) Additionally, the set of sequences are grouped such that *all* of the sequences that are generated from the same base sequence (e.g., "SIGNATURE NUMBER #1 - #8" generated from the "CAZAC SEQUENCE NUMBER #1") are first included in a predetermined number of the sequences contained in the same group (e.g., the fourteen (14) sequences contained in the group

corresponding to the "CONTROL INFORMATION 000"), and *at least one of sequences that are generated from another of the plurality of base sequences* are included in the predetermined number of the sequences in the same group. In the example of Figure 9, after *all* of those eight (8) sequences ("SIGNATURE NUMBER #1 - #8") generated from the "CAZAC SEQUENCE NUMBER #1" are first included, six (6) additional sequences ("SIGNATURE NUMBER #9 - #14) generated from the "CAZAC SEQUENCE NUMBER #2" are also included in the same group. (See paragraph [0066] of the published application.) The mobile station apparatus randomly selects a sequence from one of these groups corresponding to one of the amounts of data and one of the reception qualities.

The feature previously recited in claim 27 and now added to each of claims 12 and 25 has a technical advantage of lowering the cross-mutual correlation among the sequences within the same group, to thereby improve the likelihood that a receiver (a base station) can demultiplex (separate) and detect those sequences. (See paragraphs [0004] and [0055] of the published application.) Specifically, those sequences generated from a single base sequences are ideally orthogonal to each other to have zero cross-correlation and, therefore, sequences derived from a single base sequence have a lower cross-correlation than the cross-correlation among sequences derived from different base sequences. (See paragraphs [0051] - [0054] of the published application.) According to the present invention as now recited in claims 12 and 25, when "the plurality of sequences generated from the plurality of base sequences are grouped into the plurality of groups," the cross-correlation among the sequences included in the same group is advantageously lowered based on "that *all* of sequences that are generated from one of the base sequences and at least one of sequences that are generated from *another* of the base sequences are included in the predetermined number of the sequences contained in the same group." (Emphases added.) In other words, when sequences generated from a plurality of base sequences are grouped into the same group, *all* of the sequences generated from one of the base sequences are first included in a predetermined number of the sequences contained in the same group, before at least one of sequences generated from *another* of the base sequences are included.

Tan discloses deriving a plurality of spread sequences from a plurality of CAZAC sequences and combining those derived spread sequences with an orthogonal code to form

"extended spread sequences (signature sequences)." Paragraph [0052]. Tan also discloses grouping the extended spread sequences into multiple groups, wherein "a number of signature sequence groups are pre-defined so that every group consists of N_S signature sequences" (paragraph [0025]) and that "the CAZAC, Chu and GCL sequences can be used interchangeably" (paragraph [0028]).

Applicants respectfully note that Tan's disclosure in the cited sections above merely teaches grouping sequences generated from different base sequences into multiple groups; it does not teach or suggest the details of *how* to group sequences generated from different base sequences, so as to provide a specific technical advantage as described above. In particular, Tan does not teach or suggest *how* to group those sequences generated from one base sequence vis-à-vis those sequences generated from another, different base sequence. That is, Tan does not teach or suggest including "all of sequences that are generated from one of the base sequences and at least one of sequences that are generated from another of the base sequences ... in the predetermined number of the sequences contained in the same group," as recited in claims 12 and 25.

Further, Suttvong et al. too fails to teach or suggest this feature now recited in claims 12 and 25.

Accordingly, applicants respectfully submit that Tan and Suttvong et al, alone or in combination, do not render obvious the subject matter recited in claims 12 and 25 because Tan and Suttvong et al., even in combination, do not teach or suggest at least this feature of the invention discussed above. Withdrawal of the rejection of claims 12 and 25 on this basis is respectfully requested.

Claims 13-24 and 26 depend from claims 12 and 25, respectively, and therefore these dependent claims are further believed to be allowable for at least the same reasons why claims 12 and 25 are now allowable.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/Shoko Leek/
Shoko I. Leek
Registration No. 43,746

SIL:tt

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

2025517_1.DOCX

Electronic Acknowledgement Receipt

EFS ID:	11690215
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	Shoko I. Leek/Tracy Taylor
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	733156.428USPC
Receipt Date:	22-DEC-2011
Filing Date:	18-SEP-2008
Time Stamp:	14:57:35
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		733156_428USPC_Amendment_AF.pdf	107035 0290605fbf762b459e6581d7bd289034214014b1	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment After Final	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	9
Warnings:			
Information:			
	Total Files Size (in bytes):	107035	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/293,530	09/18/2008	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY ☐ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $250 ($125 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))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT 12/22/2011

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0	X $ =		OR	X $60=	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $250=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) 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))									
☐ 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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DEBORAH NASH/

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

96896 7590 01/19/2012
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

EXAMINER
ZAIDI, IQBAL

ART UNIT	PAPER NUMBER
2464	

DATE MAILED: 01/19/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

TITLE OF INVENTION: RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	04/19/2012

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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

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

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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

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

96896 7590 01/19/2012
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

TITLE OF INVENTION: RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	04/19/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
ZAIDI, IQBAL	2464	370-342000

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 _____
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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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 _____ Date _____

Typed or printed name _____ Registration No. _____

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.

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.

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.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

96896 7590 01/19/2012

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

EXAMINER	
ZAIDI, IQBAL	

ART UNIT	PAPER NUMBER
2464	

DATE MAILED: 01/19/2012

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

The Patent Term Adjustment to date is 573 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 573 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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.	Applicant(s)	
	12/293,530	IMAMURA ET AL.	
	Examiner	Art Unit	
	IQBAL ZAIDI	2464	

-- 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 *12/22/2011*.

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 *12-26(renumbered to 1-15)*.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   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. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ 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).

7. ☐ 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. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Pao Sinkantarakorn/
Primary Examiner, Art Unit 2464

REASONS FOR ALLOWANCE

1. Claims 12-26 are allowed.

2. The following is an examiner's statement of reasons for allowance:

Claims 12 and 25 are allowed over the prior art of record since the cited references taken individually or in combination fails to particularly disclose **Plurality of sequences generated from the plurality of base sequences are grouped into the plurality of groups, such that all of sequences that are generated from one of the base sequences and at least one of sequences that are generated from another of the base sequences are included in the predetermined number of the sequences contained in the same group.**

It is noted that the closest prior art, Tan et al. (US20070165567, Jul. 19, 2007) shows the UE selects one of the signature sequences from a group of sequences, the signature sequence is randomly selected.

It is noted that the closest prior art, Suttvong et al. (WO 2006019710, Feb. 23, 2006) shows group of access sequences based on a variety of factors, Factors include CQI ranges.

However, Tan et al. and Suttvong. et al. fails to disclose or render obvious the above underlined limitations as claimed.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Iqbal Zaidi whose telephone number is (571)

270-3943. The examiner can normally be reached on Monday to Friday 8:30 AM to 5:00 PM.

If attempts to reach the above noted Examiner by telephone are unsuccessful, the Examiner's supervisor, NGO RICKY can be reached on 571-272-3139.

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).

/Pao Sinkantarakorn/

Primary Examiner, Art Unit 2464

/IQBAL ZAIDI/

Examiner, Art Unit 2464

OK TO ENTER: /I.Z./

01/13/2012

RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE - EXAMINING GROUP 2460

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Daichi Imamura et al.
Application No.	:	12/293,530
Filed	:	September 18, 2008
For	:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

Examiner	:	Iqbal Zaidi
Art Unit	:	2464
Docket No.	:	733156.428USPC
Date	:	December 22, 2011

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

AMENDMENT UNDER 37 CFR 1.116

Commissioner for Patents:

In response to the Office Action dated November 2, 2011, please amend the application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 6 of this paper.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	282	(base near3 seque$6) and (CAZAC$9)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/10 20:50
L2	9	(base near3 seque$6) and (CAZAC$9)and (amount quantit$3 siz$3)same(data packet$3) and (CQI) and "370"/(203-210, "441", 329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/10 20:52
L3	16	(base near3 seque$6) and (CAZAC$9)and (amount quantit$3 siz$3)same(data packet$3) and (CQI channel with quality) and "370"/(203-210, "441", 329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/10 20:52
S1	143	(CAZAC) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:37
S2	65	(CAZAC) and (amount quantit $3 siz$3)same(data packet$3) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:38
S3	23	(CAZAC) and (amount quantit $3 siz$3)same(data packet$3) and (CQI recept$6) same (qualit$6) and "370"/(329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/10/27 20:38
S4	555611	(control near3 infor$9)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 15:27
S5	80	S4 same(CAZAC$9)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 15:28

S6	74	S5 same (sequen$9 signat$9)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 15:28
S7	131539	(base near3 sequence)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 22:22
S8	279	(base near3 sequence) and (CAZAC$9)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 22:23
S9	29	(base near3 sequence) and (CAZAC$9) and (@pd<"20060331" or @rlad<"20060331" or @ptad<"20060331")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 22:26
S10	29	(base near3 seque$6) and (CAZAC$9) and (@pd<"20060331" or @rlad<"20060331" or @ptad<"20060331")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/01/04 22:35

1/ 10/ 2012 8:53:28 PM
C:\ Documents and Settings\ izaidi\ My Documents\ EAST\ Workspaces\ 12293530(2).wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12293530	IMAMURA ET AL.
	Examiner	Art Unit
	IQBAL ZAIDI	2464

SEARCHED

Class	Subclass	Date	Examiner
370	329-338, 342, 210, 344, 280-281	06/01/2011	iz
370	329-338, 342, 210, 344, 280-281	10/27/2011	iz
370	203-210, 441, 329-338, 342, 210, 344, 280-281	01/08/2012	iz

SEARCH NOTES

Search Notes	Date	Examiner
EAST(see search history)	06/01/2011	iz
See Inventor search at PALM and EAST	06/01/2011	iz
Google, IEEE	06/01/2011	iz
EAST(See Updated search)	10/27/2011	iz
Google, IEEE	10/27/2011	iz
EAST(See Updated search)	01/08/2012	iz
See Inventor search at PALM and EAST, IEEE and Google	01/08/2012	iz

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
370	All	01/08/2012	iz

Issue Classification	**Application/Control No.**	**Applicant(s)/Patent Under Reexamination**
	12293530	IMAMURA ET AL.
	Examiner	**Art Unit**
	IQBAL ZAIDI	2464

ORIGINAL		**INTERNATIONAL CLASSIFICATION**									
CLASS	**SUBCLASS**	**CLAIMED**					**NON-CLAIMED**				
370	208	H	0	4	J	11 / 00 (2006.0)					
CROSS REFERENCE(S)											
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**										
370	335	342	441								

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

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

/IQBAL ZAIDI/ Examiner.Art Unit 2464	01/10/2012	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	15	
/PAO SINKANTARAKORN/ Primary Examiner.Art Unit 2464	01/12/2012	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	11

EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	16	(base near3 seque$6) and (CAZAC $9)and (amount quantit$3 siz $3)same (data packet $3) and (CQI channel with quality) and "370"/(203-210, "441", 329-338, "342", "210", "344", 280-281).ccls.	US-PGPUB; USPAT; UPAD	OR	ON	2012/01/10 20:52

1/10/2012 8:53:20 PM
C:\Documents and Settings\izaidi\My Documents\EAST\Workspaces\12293530(2).wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12293530	IMAMURA ET AL.
	Examiner	Art Unit
	IQBAL ZAIDI	2464

✓	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	06/06/2011	10/27/2011	01/10/2012						
-	1	-	-	-						
-	2	-	-	-						
-	3	-	-	-						
-	4	-	-	-						
-	5	-	-	-						
-	6	-	-	-						
-	7	-	-	-						
-	8	-	-	-						
-	9	-	-	-						
-	10	-	-	-						
-	11	-	-	-						
1	12	✓	✓	=						
2	13	✓	✓	=						
3	14	✓	✓	=						
4	15	✓	✓	=						
5	16	✓	✓	=						
6	17	✓	✓	=						
7	18	✓	✓	=						
8	19	✓	✓	=						
9	20	✓	✓	=						
10	21	✓	✓	=						
11	22	✓	✓	=						
12	23	✓	✓	=						
13	24	✓	✓	=						
14	25	✓	✓	=						
15	26		✓	=						
-	27		✓	-						

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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

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

96896 7590 01/19/2012
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC	2058

TITLE OF INVENTION: RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	04/19/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
ZAIDI, IQBAL	2464	370-342000

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 **Seed IP Law Group 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: **Panasonic Corporation**

(B) RESIDENCE: (CITY and STATE OR COUNTRY): **Osaka, Japan**

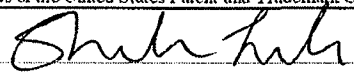
Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☒ Advance Order - # of Copies 2

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 credit any overpayment, to Deposit Account Number **19-1090** (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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  Date **February 8, 2012**

Typed or printed name **Shoko I. Leek** Registration No. **43,746**

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.

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.

Electronic Patent Application Fee Transmittal

Application Number:	12293530
Filing Date:	18-Sep-2008
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Filer:	Shoko I. Leek/Caley Jansen
Attorney Docket Number:	733156.428USPC

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:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
Printed copy of patent - no color	8001	2	3	6
		Total in USD ($)		**2046**

Electronic Acknowledgement Receipt

EFS ID:	12032012
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	Shoko I. Leek/Caley Jansen
Filer Authorized By:	Shoko I. Leek
Attorney Docket Number:	733156.428USPC
Receipt Date:	08-FEB-2012
Filing Date:	18-SEP-2008
Time Stamp:	17:17:30
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2046
RAM confirmation Number	4112
Deposit Account	191090
Authorized User	

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)	733156_428USPC_Issue_Fee_Transmittal.pdf	114011 233445c09126016312642490adf6960f0da688b3f	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	33854 ae0575a2609d634a31e18e266dba233f0da7bfb3	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	147865		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/293,530	03/20/2012	8139473	733156.428USPC	2058

96896 7590 02/29/2012

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

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 757 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):

Daichi Imamura, Kanagawa, JAPAN;
Sadaki Futagi, Ishikawa, JAPAN;
Atsushi Matsumoto, Ishikawa, JAPAN;
Takashi Iwai, Ishikawa, JAPAN;
Tomofumi Takata, Ishikawa, JAPAN;

PTO/SB/80 (11-09)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 23117

OR

☐ Practitioner(s) named below (If more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 23117

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
Optis Wireless Technology, LLC
P.O. Box 250649
Plano, Texas 75025

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date
Name	James W. Riboman	Telephone
Title	President	

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Electronic Acknowledgement Receipt

EFS ID:	19274534
Application Number:	12293530
International Application Number:	
Confirmation Number:	2058
Title of Invention:	RADIO COMMUNICATION MOBILE STATION APPARATUS AND RADIO COMMUNICATION METHOD
First Named Inventor/Applicant Name:	Daichi Imamura
Customer Number:	96896
Filer:	John R. Lastova/Margaret Grey
Filer Authorized By:	John R. Lastova
Attorney Docket Number:	733156.428USPC
Receipt Date:	11-JUN-2014
Filing Date:	18-SEP-2008
Time Stamp:	15:08:01
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73.	473-sb0096.pdf	428604 356aca212beefd5146974735be6ed5b8d917fbd8	no	2

Warnings:	
Information:	

2	Maintenance Fee Address Change	473-sb0047.pdf	203811 5a85d131449023cbbb38563c5481464bcc1bbd6e	no	2
Warnings:					
Information:					
3	Power of Attorney	OPTISWIRELESSPOA.pdf	218416 13c919e23f444e259c181a13a9137b6425ce92cc	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	850831		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Imamura , et al.

Application No./Patent No.: 8139473 Filed/Issue Date: 20-Mar-12

Titled: Radio communication mobile station apparatus and radio communication method

OPTIS WIRELESS TECHNOLOGY, LLC , a corporation

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

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

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 therefore is attached.

OR

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

1. From: Imamura , et al. To: Matsushita Electric Industrial Co., Ltd.

The document was recorded in the United States Patent and Trademark Office at
Reel 021792 , Frame 0957 , or for which a copy thereof is attached.

2. From: Matsushita Electric Industrial Co., Ltd. To: Panasonic Corporation

The document was recorded in the United States Patent and Trademark Office at
Reel 031814 , Frame 0732 , or for which a copy thereof is attached.

3. From: Panasonic Corporation To: OPTIS WIRELESS TECHNOLOGY, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 032326 , Frame 0707 , 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(b)(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.

/John R. Lastova/ June 11, 2014

Signature Date

Printed or Typed Name Title

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.

PTO/SB/47 (03-09)
Approved for use through 05/31/2015. OMB 0651-0016
U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

"FEE ADDRESS" INDICATION FORM

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

- OR -

Fax to:
571-273-6500

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. **When to check the first box below**: If you have a Customer Number to represent the fee address. **When to check the second box below**: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☑ Customer Number: 000204

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
8139473	12/293530

Completed by (check one):

☐ Applicant/Inventor

/John R. Lastova/
Signature

☑ Attorney or Agent of record 33,149 (Reg. No.)

John R. Lastova
Typed or printed name

☐ Assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

703-816-4000
Requester's telephone number

☐ Assignee recorded at Reel _____ Frame _____

June 11, 2014
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more that one signature is required, see below*.

☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.363. 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 5 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 COMPLETED FORMS TO THIS ADDRESS.
SEND TO: Mail Stop M Correspondence, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/293,530	09/18/2008	Daichi Imamura	

CONFIRMATION NO. 2058

POA ACCEPTANCE LETTER

23117
NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

OC000000069105806

Date Mailed: 06/19/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/11/2014.

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.

/rmturner myles/

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/293,530	09/18/2008	Daichi Imamura	733156.428USPC

CONFIRMATION NO. 2058

96896
Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104

POWER OF ATTORNEY NOTICE

OC000000069105760

Date Mailed: 06/19/2014

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/11/2014.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/rmturner myles/

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/293,530	8139473	2464	9200

OC000000089321885

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 23117 on 06/27/2014

- **Correspondence Address**

The address of record for Customer Number 23117 is:

23117
NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203