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To the Assistant Commissioner for Patents: Please record the attached original documents or copy thereof.

1. Name of conveying party(ies):

Neelesh B. Mehta
Andreas F. Molisch
Jinyun Zhang

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

3. Nature of Conveyance:

☒ Assignment ☐ Merger
☐ Security Agreement ☐ Change of Name

Execution Dates: July 20, 2004

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

Name: Mitsubishi Electric Research Laboratories, Inc.

Street Address: 201 Broadway

City: Cambridge State: MA Zip: 02139

Additional name(s) and address(es) attached? ☐ Yes ☒ No

4. Application number(s) or patent number(s):

If this document is being filed together with a new application, the execution date of the application is: **July 20, 2004**

A. Patent Application No. (s)

B. Patent No. (s)

101895167

Additional numbers attached? ☐ Yes ☒ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: Mitsubishi Electric Research Laboratories, Inc.

Street Address: 201 Broadway

City: Cambridge State: MA Zip: 02139

6. Total number of applications and patents involved: [1]

7. Total fee (37CFR 3.41): \$40.00

☐ Enclosed

☒ Authorized to be charged to deposit account

8. Deposit account number: 50-0749

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9. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Dirk Brinkman

Name of Person Signing

Signature

Date

Total number of pages comprising cover sheet: [1]

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PATENT
REEL: 015614 FRAME: 0241

ASSIGNMENT

WHEREAS, I, have made certain inventions or discoveries (or both) set forth in an Application for Letters Patent of the United States of America entitled PILOT AND DATA SIGNALS FOR MIMO SYSTEMS USING CHANNEL STATISTICS, the specification of which:

 X was executed by us on the date indicated below;
 was filed on as Application Serial No. ;
 was patented under U.S. Patent No. on ;

WHEREAS, Mitsubishi Electric Research Laboratories, Inc., a corporation of the State of Delaware, whose address is 201 Broadway, Cambridge, Massachusetts 02139, and who, together with its successors and assigns is hereinafter called "Assignee", is desirous of acquiring the entire right, title, and interest together with the benefits and privileges hereinafter recited;

NOW, THEREFORE, for valuable consideration furnished by Assignee to us, receipt and sufficiency of which I hereby acknowledge, I hereby, without reservation;

1. Assign, transfer and convey to Assignee the entire right, title and interest together with the benefits and privileges in and to said inventions and discoveries, said Application for Letters Patent or similar forms of protection of the United States of America, and all other applications for Letters Patent on said inventions and discoveries in whatsoever countries, including all divisional, renewal, substitute, continuation and convention applications based in whole or in part upon said inventions or discoveries, or upon said application, and any and all Letters Patent, reissues and extensions of Letters Patent or similar forms of protection granted for said inventions and discoveries or upon said applications, and every priority right that is or may be predicated upon or arise from said inventions, said discoveries, said applications and said Letters Patent;

2. Authorize Assignee to file patent applications in any or all countries or groups of countries on any or all of said inventions and discoveries in my name or in the name of Assignee or otherwise as Assignee may deem advisable, under

the International Convention or any other relevant convention or treaty or otherwise;

3. Authorize and request the Assistant Commissioner for Patents of the United States of America and the empowered officials of all other governments to issue or transfer all said Letters Patent to Assignee, as Assignee of the entire right, title and interest therein or otherwise as Assignee may direct;

4. Warrant that I have not knowingly conveyed to others any rights in said inventions, discoveries, applications or patents or any license to use the same or to make, use or sell anything embodying or utilizing any of said inventions or discoveries; and that I have good right to assign the same to Assignee without encumbrance;

5. Bind my heirs, legal representatives and assigns, as well as myself, to do, upon Assignee's request and at Assignee's expense, but without additional consideration to us or them, all acts reasonable serving to assure that said inventions and discoveries, said patent applications and said Letters Patent shall be held and enjoyed by Assignee as fully and entirely as the same could have been held and enjoyed by us, my heirs, legal representatives and assigns if this assignment had not been made; and particularly to execute and deliver to Assignee all lawful application documents including petitions, specifications, and oaths, and all assignments, disclaimers, and lawful affidavits in form and substance as may be requested by Assignee; to communicate to Assignee all facts known to us relating to said inventions and discoveries or the history thereof; and to furnish Assignee with any and all documents, photographs, models, samples and other physical exhibits in my control or in the control of my heirs, legal representatives or assigns which may be useful for establishing any facts of my conceptions, disclosures, and reduction to practice of said inventions or discoveries.

IN WITNESS WHEREOF:

Inventor Signature : Neelesh
Neelesh B. MehtaToday's Date: 7/20/2004Date Inventor Signed Declaration : 7/20/2004Witnessed: Guodong Guo
Print Witness NameGuo Guodong
Signature of Witness7/20/04
DateWitnessed: Clifton D. Mueller
Print Witness NameClifton D. Mueller
Signature of WitnessJuly 20, 2004
Date

IN WITNESS WHEREOF:

Inventor Signature : _____
Fadel F. Digham

Today's Date: _____

Date Inventor Signed Declaration : _____

Witnessed: _____
Print Witness Name

Signature of Witness Date

Witnessed: _____
Print Witness Name

Signature of Witness Date

IN WITNESS WHEREOF:

Inventor Signature : Molisch
Andreas F. Molisch

Today's Date: 07/20/04

Date Inventor Signed Declaration : 07/20/04

Witnessed: Dmitry Malinoutov
Print Witness Name

[Signature]
Signature of Witness

07/20/04
Date

Witnessed: Clifton D. Mueller
Print Witness Name

Clifton D. Mueller
Signature of Witness

July 20, 2004
Date

IN WITNESS WHEREOF:

Inventor Signature : Jinyun Zhang
Jinyun Zhang

Today's Date: July 20, 2004

Date Inventor Signed Declaration : July 20, 2004

Witnessed: Adam Bogue
Print Witness Name

Adam Bogue
Signature of Witness

20 July 04
Date

Witnessed: Clifton D Mueller
Print Witness Name

Clifton D. Mueller
Signature of Witness

July 20, 2004
Date