

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT5841832

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| <b>SUBMISSION TYPE:</b>   | NEW ASSIGNMENT                           |
| <b>NATURE OF CONVEYANCE:</b>  | ASSIGNMENT                               |
| <b>CONVEYING PARTY DATA</b>   |  |
| <b>Name</b>   | <b>Execution Date</b>                    |
| ANAND RAGHAWA PRASAD  | 11/25/2019                               |
| SIVAKAMY LAKSHMINARAYANAN   | 11/03/2019                               |
| SIVABALAN ARUMUGAM  | 11/11/2019                               |
| SHEEBA BACKIA MARY BASKARAN   | 11/01/2019                               |
| HIRONORI ITO  | 11/25/2019                               |
| TOSHIYUKI TAMURA  | 11/25/2019                               |
| HISASHI FUTAKI  | 11/25/2019                               |
| <b>RECEIVING PARTY DATA</b>   |  |
| <b>Name:</b>  | NEC CORPORATION                          |
| <b>Street Address:</b>  | 7-1, SHIBA 5-CHOME, MINATO-KU            |
| <b>City:</b>  | TOKYO                                    |
| <b>State/Country:</b>   | JAPAN                                    |
| <b>Postal Code:</b>   | 108-8001                                 |
| <b>PROPERTY NUMBERS Total: 1</b>  |  |
| <b>Property Type</b>  | <b>Number</b>                            |
| <b>Application Number:</b>  | 16617595                                 |
| <b>CORRESPONDENCE DATA</b>  |  |
| <b>Fax Number:</b>  | (202)293-7860                            |
| <i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i> |  |
| <b>Phone:</b>   | 2022937060                               |
| <b>Email:</b>   | rknight@sughrue.com, sughrue@sughrue.com |
| <b>Correspondent Name:</b>  | SUGHRUE MION, PLLC                       |
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| <b>ATTORNEY DOCKET NUMBER:</b>  | Q251633                                  |
| <b>NAME OF SUBMITTER:</b>   | CHRISTOPHER KNIGHT                       |
| <b>SIGNATURE:</b>   | /CHRISTOPHER KNIGHT/                     |
| <b>DATE SIGNED:</b>   | 11/27/2019                               |

PATENT

**Total Attachments: 15**

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**ASSIGNMENT WITH DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)**

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

Whereas, NEC Corporation, (assignee), desires to acquire the entire and exclusive right, title, and interest in the application and invention, and to any patents that may be obtained therefor in the United States, in any U.S. territorial possessions, and in any and all foreign countries;

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

I/we, the above named assignor(s), hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire and exclusive right, title and interest in the application and the invention disclosed therein for the United States, U.S. territorial possessions, and in any and all foreign countries, including all divisions, and continuations, and continuations-in-part thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues and reexaminations, renewals, and substitutions thereof, and including the right to claim priority under 35 U.S.C. §119, and all rights for past infringement, under the International Convention, and under any other relevant International Treaties and Arrangements, and I/we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; I/we will execute without further consideration all papers deemed necessary by the assignee, and generally perform all necessary acts to aid the assignee, its successors and assigns, to obtain and enforce proper protection for the invention in connection with the United States and foreign applications, including but not limited to all divisional, continuation, reissue and other applications for Letters Patent on the invention and execute all assignments thereof to the above named assignee its successors and assigns, when called upon to do so by the assignee; and I/we will communicate to the above named assignee or its representatives all facts known to the undersigned respecting the invention, whenever requested, testify in any legal proceedings in which any of the applications or patents may become involved, and do generally everything necessary to assist the above named assignee its successors or assigns to obtain patent protection for the invention in the United States and foreign countries.

(Legalization not required for recording but is prima facie evidence of execution under 35 U.S.C. §261)

As the below named inventor, I hereby declare that:

This assignment with declaration is directed to:  The attached application, or  
 United States Application or PCT International Application Number PCT/JP2018/020235 filed on May 25, 2018 (Confirmation No. \_\_\_\_\_).

The application is entitled:

**COMMUNICATION METHOD, COMMUNICATION SYSTEM, AND USER EQUIPMENT**

The above identified application was made or was authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the application for which this assignment with declaration is being submitted, including the claims.

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

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



**Authorization To Permit Access To Application by Participating Office**

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

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

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

| NAME OF SOLE OR FIRST INVENTOR:   |                        |
|---|------------------------|
| Given Name<br>(first and middle [if any])   | Anand Raghava          |
| Family Name or Surname  | PRASAD                 |
| Inventor's signature  | Date November 25, 2019 |
| Residence:  |                        |
| Mailing Address: c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan  |                        |
| NAME OF SECOND INVENTOR:  |                        |
| Given Name<br>(first and middle [if any])   | Sivakamy               |
| Family Name or Surname  | LAKSHMINARAYANAN       |
| Inventor's signature  | Date                   |
| Residence:  |                        |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                        |
| NAME OF THIRD INVENTOR:   |                        |
| Given Name<br>(first and middle [if any])   | Sivabalan              |
| Family Name or Surname  | ARUMUGAM               |
| Inventor's signature  | Date                   |
| Residence:  |                        |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                        |
| NAME OF FOURTH INVENTOR:  |                        |
| Given Name<br>(first and middle [if any])   | Sheeba Backia Mary     |
| Family Name or Surname  | BASKARAN               |
| Inventor's signature  | Date                   |
| Residence:  |                        |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                        |
| NAME OF FIFTH INVENTOR:   |                        |
| Given Name<br>(first and middle [if any])   | Hironori               |
| Family Name or Surname  | ITO                    |
| Inventor's signature  | Date                   |
| Residence: Tokyo, Japan   |                        |
| Mailing Address: c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan  |                        |

|   |   |
|---|---|
| <b>NAME OF SIXTH INVENTOR:</b>            |   |
| Given Name<br>(first and middle [if any]) | Toshiyuki   |
| Family Name or Surname                    | TAMURA  |
| Inventor's signature                      |  |
| Date                                      | November 25, 2019   |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan         |
| <b>NAME OF SEVENTH INVENTOR:</b>          |   |
| Given Name<br>(first and middle [if any]) | Hisashi   |
| Family Name or Surname                    | FUTAKI  |
| Inventor's signature                      |  |
| Date                                      | November 25, 2019   |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan         |

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I/we, the above named assignor(s), hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire and exclusive right, title and interest in the application and the invention disclosed therein for the United States, U.S. territorial possessions, and in any and all foreign countries, including all divisions, and continuations, and continuations-in-part thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues and reexaminations, renewals, and substitutions thereof, and including the right to claim priority under 35 U.S.C. §119, and all rights for past infringement, under the International Convention, and under any other relevant International Treaties and Arrangements, and I/we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; I/we will execute without further consideration all papers deemed necessary by the assignee, and generally perform all necessary acts to aid the assignee, its successors and assigns, to obtain and enforce proper protection for the invention in connection with the United States and foreign applications, including but not limited to all divisional, continuation, reissue and other applications for Letters Patent on the invention and execute all assignments thereof to the above named assignee its successors and assigns, when called upon to do so by the assignee; and I/we will communicate to the above named assignee or its representatives all facts known to the undersigned respecting the invention, whenever requested, testify in any legal proceedings in which any of the applications or patents may become involved, and do generally everything necessary to assist the above named assignee its successors or assigns to obtain patent protection for the invention in the United States and foreign countries.

(Legalization not required for recording but is prima facie evidence of execution under 35 U.S.C. §261)

As the below named inventor, I hereby declare that:

This assignment with declaration is directed to:  The attached application, or  
 United States Application or PCT International Application Number PCT/JP2018/020235 filed on May 25, 2018 (Confirmation No. \_\_\_\_\_).

The application is entitled:

**COMMUNICATION METHOD, COMMUNICATION SYSTEM, AND USER EQUIPMENT**

The above identified application was made or was authorized to be made by me.

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| NAME OF SOLE OR FIRST INVENTOR:   |                    |
|---|--------------------|
| Given Name<br>(first and middle [if any])   | Anand Raghava      |
| Family Name or Surname  | PRASAD             |
| Inventor's signature  | Date               |
| Residence:  |                    |
| Mailing Address: c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan  |                    |
| NAME OF SECOND INVENTOR:  |                    |
| Given Name<br>(first and middle [if any])   | Sivakamy           |
| Family Name or Surname  | LAKSHMINARAYANAN   |
| Inventor's signature  | Date 08 Nov 2019   |
| Residence:  |                    |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                    |
| NAME OF THIRD INVENTOR:   |                    |
| Given Name<br>(first and middle [if any])   | Sivabalan          |
| Family Name or Surname  | ARUMUGAM           |
| Inventor's signature  | Date               |
| Residence:  |                    |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                    |
| NAME OF FOURTH INVENTOR:  |                    |
| Given Name<br>(first and middle [if any])   | Sheeba Backia Mary |
| Family Name or Surname  | BASKARAN           |
| Inventor's signature  | Date               |
| Residence:  |                    |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                    |
| NAME OF FIFTH INVENTOR:   |                    |
| Given Name<br>(first and middle [if any])   | Hironori           |
| Family Name or Surname  | ITO                |
| Inventor's signature  | Date               |
| Residence: Tokyo, Japan   |                    |
| Mailing Address: c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan  |                    |

|   |   |
|---|---|
| <b>NAME OF SIXTH INVENTOR:</b>            |   |
| Given Name<br>(first and middle [if any]) | Toshiyuki   |
| Family Name or Surname                    | TAMURA  |
| Inventor's signature                      | Date  |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan |
| <b>NAME OF SEVENTH INVENTOR:</b>          |   |
| Given Name<br>(first and middle [if any]) | Hisashi   |
| Family Name or Surname                    | FUTAKI  |
| Inventor's signature                      | Date  |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan |



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As the below named inventor, I hereby declare that:

This assignment with declaration is directed to:  The attached application, or  
 United States Application or PCT International Application Number PCT/JP2018/020735  
Filed on May 25, 2018 (Confirmation No. \_\_\_\_\_).

The application is entitled:

**COMMUNICATION METHOD, COMMUNICATION SYSTEM, AND USER EQUIPMENT**

The above identified application was made or was authorized to be made by me.

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|   |                    |
|---|--------------------|
| <b>NAME OF SOLE OR FIRST INVENTOR:</b>  |                    |
| Given Name<br>(first and middle [if any])   | Anand Raghava      |
| Family Name or Surname  | PRASAD             |
| Inventor's signature  | Date               |
| Residence:  |                    |
| Mailing Address: c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan  |                    |
| <b>NAME OF SECOND INVENTOR:</b>   |                    |
| Given Name<br>(first and middle [if any])   | Sivakany           |
| Family Name or Surname  | LAKSHMINAKAYANAN   |
| Inventor's signature  | Date               |
| Residence:  |                    |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                    |
| <b>NAME OF THIRD INVENTOR:</b>  |                    |
| Given Name<br>(first and middle [if any])   | Sivabalan          |
| Family Name or Surname  | ARUMUGAM           |
| Inventor's signature  | Date               |
| Residence:  |                    |
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| <b>NAME OF FOURTH INVENTOR:</b>   |                    |
| Given Name<br>(first and middle [if any])   | Sheeba Backia Mary |
| Family Name or Surname  | BASKARAN           |
| Inventor's signature  | Date               |
| Residence:  |                    |
| Mailing Address: c/o NEC Technologies India Pvt. Ltd., SP Infocity, Block-A, 9th Floor, Module-2A, 40, MGR Salai, Kandanchavadi, Perungudi, Chennai, Tamil Nadu 600096, India |                    |
| <b>NAME OF FIFTH INVENTOR:</b>  |                    |
| Given Name<br>(first and middle [if any])   | Hironori           |
| Family Name or Surname  | IIO                |
| Inventor's signature  | Date               |
| Residence: Tokyo, Japan   |                    |
| Mailing Address: c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan  |                    |

|   |   |
|---|---|
| <b>NAME OF SIXTH INVENTOR:</b>            |   |
| Given Name<br>(first and middle [if any]) | Toshiyuki   |
| Family Name or Surname                    | TAMURA  |
| Inventor's signature                      | Date  |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan |
| <b>NAME OF SEVENTH INVENTOR:</b>          |   |
| Given Name<br>(first and middle [if any]) | Hisashi   |
| Family Name or Surname                    | FUTAKI  |
| Inventor's signature                      | Date  |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan |

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**COMMUNICATION METHOD, COMMUNICATION SYSTEM, AND USER EQUIPMENT**

The above identified application was made or was authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the application for which this assignment with declaration is being submitted, including the claims.

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

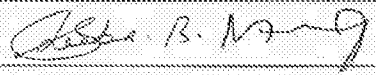
I hereby acknowledge that any willful false statement made in this assignment with declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

**Authorization To Permit Access To Application by Participating Office**

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

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

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

| NAME OF SOLE OR FIRST INVENTOR:  |                    |
|--|--------------------|
| Given Name<br>(first and middle [if any])  | Anand Baghawa      |
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| Family Name or Surname   | ARUMUGAM           |
| Inventor's signature   | Date               |
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| NAME OF FOURTH INVENTOR:   |                    |
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| Inventor's signature    | Date 01 NOV 2019   |
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| NAME OF FIFTH INVENTOR:  |                    |
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| Family Name or Surname   | ITO                |
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|   |   |
|---|---|
| <b>NAME OF SIXTH INVENTOR:</b>            |   |
| Given Name<br>(first and middle [if any]) | Toshiyuki   |
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| <b>NAME OF SEVENTH INVENTOR:</b>          |   |
| Given Name<br>(first and middle [if any]) | Hisashi   |
| Family Name or Surname                    | FUTAKI  |
| Inventor's signature                      | Date  |
| Residence:                                | Tokyo, Japan  |
| Mailing Address:                          | c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan |

**ASSIGNMENT WITH DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)**

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

Whereas, NEC Corporation, (assignee), desires to acquire the entire and exclusive right, title, and interest in the application and invention, and to any patents that may be obtained therefor in the United States, in any U.S. territorial possessions, and in any and all foreign countries;

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

I/we, the above named assignor(s), hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire and exclusive right, title and interest in the application and the invention disclosed therein for the United States, U.S. territorial possessions, and in any and all foreign countries, including all divisions, and continuations, and continuations-in-part thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues and reexaminations, renewals, and substitutions thereof, and including the right to claim priority under 35 U.S.C. §119, and all rights for past infringement, under the International Convention, and under any other relevant International Treaties and Arrangements, and I/we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; I/we will execute without further consideration all papers deemed necessary by the assignee, and generally perform all necessary acts to aid the assignee, its successors and assigns, to obtain and enforce proper protection for the invention in connection with the United States and foreign applications, including but not limited to all divisional, continuation, reissue and other applications for Letters Patent on the invention and execute all assignments thereof to the above named assignee its successors and assigns, when called upon to do so by the assignee; and I/we will communicate to the above named assignee or its representatives all facts known to the undersigned respecting the invention, whenever requested, testify in any legal proceedings in which any of the applications or patents may become involved, and do generally everything necessary to assist the above named assignee its successors or assigns to obtain patent protection for the invention in the United States and foreign countries.

(Legalization not required for recording but is prima facie evidence of execution under 35 U.S.C. §261)

As the below named inventor, I hereby declare that:

This assignment with declaration is directed to:  The attached application, or  
 United States Application or PCT International Application Number PCT/JP2018/029235 filed on May 25, 2018 (Confirmation No. \_\_\_\_\_).

The application is entitled:

**COMMUNICATION METHOD, COMMUNICATION SYSTEM, AND USER EQUIPMENT**

The above identified application was made or was authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the application for which this assignment with declaration is being submitted, including the claims.

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| Given Name<br>(first and middle [if any])   | Sivabalan          |
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| Family Name or Surname  | BASKARAN           |
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| NAME OF FIFTH INVENTOR:   |                    |
| Given Name<br>(first and middle [if any])   | Hironori           |
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**NAME OF SIXTH INVENTOR:**

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