504139344 12/09/2016

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT4179188

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|-----------------------|----------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

CONVEYING PARTY DATA

| Name | Execution Date |
|----------------|----------------|
| JINWON LEE | 11/03/2016 |
| SEUNGRYUL YANG | 11/28/2016 |
| WOOSUK KO | 11/28/2016 |
| SUNGRYONG HONG | 11/28/2016 |
| MINSUNG KWAK | 11/28/2016 |
| KYOUNGSOO MOON | 11/03/2016 |
| SEUNGJOO AN | 12/01/2016 |

RECEIVING PARTY DATA

| Name: | LG ELECTRONICS INC. |
|-----------------|----------------------------------|
| Street Address: | 128, YEOUI-DAERO YEONGDEUNGPO-GU |
| City: | SEOUL |
| State/Country: | KOREA, REPUBLIC OF |
| Postal Code: | 150-721 |

PROPERTY NUMBERS Total: 1

| Property Type | Number | |
|---------------------|----------|--|
| Application Number: | 15317359 | |

CORRESPONDENCE DATA

Fax Number: (703)205-8050

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.

Phone: (703)205-8000

Email: mailroom@bskb.com, tuyet.a.nguyen@bskb.com
Correspondent Name: BIRCH, STEWART, KOLASCH & BIRCH, LLP

Address Line 1: P.O. BOX 747

Address Line 4: FALLS CHURCH, VIRGINIA 22040-0747

| ATTORNEY DOCKET NUMBER: | 0465-5885PUS1 |
|-------------------------|--------------------|
| NAME OF SUBMITTER: | TUYET ANH NGUYEN |
| SIGNATURE: | /TUYET ANH NGUYEN/ |
| DATE SIGNED: | 12/08/2016 |

PATENT 504139344 REEL: 040702 FRAME: 0472

Total Attachments: 9 source=2016-12-08_DecAssignment_0465-5885PUS1#page1.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page2.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page3.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page4.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page5.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page6.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page7.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page8.tif source=2016-12-08_DecAssignment_0465-5885PUS1#page8.tif

PATENT REEL: 040702 FRAME: 0473

Filed on December 8, 2016

Attorney Docket No.: 0465-5885PUS1

15FASL417US02

BIRCH, STEWART, KOLASCH & BIRCH, LLP

P.O. Box 747 • Falls Church, Virginia 22040-0747

Telephone: (703) 205-8000 • Facsimile: (703) 205-8050 • Email: mailroom@bskb.com

DECLARATION AND ASSIGNMENT FOR PATENT AND DESIGN APPLICATIONS

UNITED STATES PATENT RIGHTS, OR
UNITED STATES PLUS ALL FOREIGN PATENT RIGHTS

| | | United States Flus all Foreign Patent Rights |
|-------------------------------|---|---|
| Title of Invention | ₽ | BROADCAST RECEIVING DEVICE, METHOD OF OPERATING BROADCAST RECEIVING DEVICE, LINKING DEVICE FOR LINKING TO BROADCAST RECEIVING DEVICE, AND METHOD OF OPERATING LINKING DEVICE |
| | | As a below named inventor (hereinafter designated as the undersigned), I hereby declare that: |
| | | This declaration is directed to the application attached hereto. |
| Application not Attached | ⇔ | If the application is not attached hereto, the application is as identified by the attorney docket number as set forth above and/or the following: |
| Enter Appln. No. | ₽ | United States Application Number or PCT International Appln. No. |
| Enter Filing Date | ⇔ | filed on |
| | | The above-identified application was made or 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 above-identified application, including the claims. |
| | | I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56. |
| | | WHEREAS, the undersigned has invented certain new and useful improvements described in the application identified. |
| Insert Name of Assignee | 4 | WHEREAS, LG ELECTRONICS INC. |
| Insert Address of Assignee | 4 | of 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, Republic of Korea |
| | | its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and |
| Check Box if Appropriate | 4 | in any foreign countries. |
| | | NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, the undersigned has sold, assigned and transferred, and by these presents does (do) sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions reissues continuations conversions and extensions thereof for the full term or |

terms for which the same may be granted.

Filed on December 8, 2016

Attorney Docket No.: 0465-5885PUS1

The undersigned agrees to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agrees to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letters Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agrees to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agrees to perform all affirmative acts which may be necessary to obtain a grant of (a) valid United States of America patent(s) or a grant of (a) valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorizes and requests the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patent(s) resulting from said application or any continuing, divisional conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has the full right to convey the entire interest herein assigned, and that he has not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby grants the law firm of Birch, Stewart, Kolasch & Birch, LLP the power to insert any further identification which may be necessary or desirable in order to comply with the rules of the U.S. Patent and Trademark Office.

The undersigned hereby covenants that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

The undersigned hereby acknowledges that any willful false statement made in this declaration is punishable under 18 U.S.C. § 1001 by fine or imprisonment of not more than five (5) years, or both.

In witness whereof, executed by the undersigned on the date opposite the undersigned name.

| | LEGAL NA | AME OF INVENTOR | |
|-------------------------------------|-----------------------------------|---|--|
| Inventor's Name | Inventor: | LEE, Jinwon Date | e: 11/3/2016 |
| Inventor's Signature ⇔ | Signature: | ffin | |
| An application de Use a separate fo | ata sheet (PTC orm for each in | O/SB/14 or equivalent), including naming the entire inventive entineentor; or check the box below and complete the attached page(s) | ty, must accompany this form. to list additional inventors. |

Additional inventors are being named on the 1 supplemental sheet(s) attached hereto.

Attorney Docket No.: 0465-5885PUS1

SUPPLEMENTAL SHEET FOR DECLARATION AND ASSIGNMENT

ADDITIONAL INVENTOR Supplemental Sheet Page 1 of 1

| | LEGAL N. | AME OF JOINT INVENTOR, IF ANY | |
|----------------------|--------------|---------------------------------------|---------------------|
| Inventor's Name | ⇒ Inventor: | YANG, Seungryul | Date: 11-18-2016 |
| Inventor's Signature | ⇒ Signature: | 240 | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | |
| Inventor's Name | ⇒ Inventor: | KO, Woosuk | Date: 28 Nov. 2016 |
| Inventor's Signature | ⇒ Signature: | 49 | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | |
| Inventor's Name | ⇔Inventor: | HONG, Sungryong | Date: 28, Nov. 2-16 |
| Inventor's Signature | ⇔Signature: | -15 | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | |
| Inventor's Name | ⇔Inventor: | KWAK, Minsung | Date: 28. Nov. 2016 |
| Inventor's Signature | ⇒Signature: | Peush | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | • |
| Inventor's Name | ⇔Inventor: | MOON, Kyoungsoo | Date: |
| Inventor's Signature | ⇔Signature: | | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | |
| Inventor's Name | ⇔Inventor: | AN, Seungjoo | Date: |
| Inventor's Signature | ⇔Signature: | | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | |
| Inventor's Name | ⇒Inventor: | | Date: |
| Inventor's Signature | ⇔Signature: | · · · · · · · · · · · · · · · · · · · | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | |
| Inventor's Name | ⇒Inventor: | | Date: |
| Inventor's Signature | ⇔Signature: | | |

BSKB-DECASSIGN\(09-12)

PATENT REEL: 040702 FRAME: 0476

Filed on December 8, 2016

15FASL417US02

Attorney Docket No.: 0465-5885PUS1

BIRCH, STEWART, KOLASCH & BIRCH, LLP

P.O. Box 747 • Falls Church, Virginia 22040-0747

Telephone: (703) 205-8000 • Facsimile: (703) 205-8050 • Email: mailroom@bskb.com

DECLARATION AND ASSIGNMENT FOR PATENT AND DESIGN APPLICATIONS

| | United States Patent Rights, or United States Plus all Foreign Patent Rights | |
|-----------------------------|--|------|
| Title of Invention | BROADCAST RECEIVING DEVICE, METHOD OF OPERATING BROADCAST RECEIVING DEVICE LINKING DEVICE FOR LINKING TO BROADCAST RECEIVING DEVICE, AND METHOD OPERATING LINKING DEVICE | |
| | As a below named inventor (hereinafter designated as the undersigned), I hereby declare that: | |
| | This declaration is directed to the application attached hereto. | |
| Application not Attached | ⇒ If the application is not attached hereto, the application is as identified by the attorney docket number set forth above and/or the following: | t as |
| Enter Appln. No. | → United States Application Number or PCT International Appln. No | |
| Enter Filing Date | ⇒ filed on | |
| | The above-identified application was made or authorized to be made by me. | |
| | I believe that I am the original inventor or an original joint inventor of a claimed invention in application. | the |
| | I have reviewed and understand the contents of the above-identified application, including the claims. | |
| | I acknowledge the duty to disclose information which is material to patentability as defined in Title Code of Federal Regulations § 1.56. | 37 |
| | WHEREAS, the undersigned has invented certain new and useful improvements described in application identified. | the |
| Insert Name of Assignee | ⇒ WHEREAS, LG ELECTRONICS INC. | |

Insert Address of Assignee

⇒ of 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, Republic of Korea

its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and

Check Box if Appropriate

in any foreign countries.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, the undersigned has sold, assigned and transferred, and by these presents does (do) sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues, continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

Filed on December 8, 2016

Attorney Docket No.: 0465-5885PUS1

The undersigned agrees to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agrees to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letters Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agrees to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agrees to perform all affirmative acts which may be necessary to obtain a grant of (a) valid United States of America patent(s) or a grant of (a) valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorizes and requests the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patent(s) resulting from said application or any continuing, divisional conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has the full right to convey the entire interest herein assigned, and that he has not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby grants the law firm of Birch, Stewart, Kolasch & Birch, LLP the power to insert any further identification which may be necessary or desirable in order to comply with the rules of the U.S. Patent and Trademark Office.

The undersigned hereby covenants that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

The undersigned hereby acknowledges that any willful false statement made in this declaration is punishable under 18 U.S.C. § 1001 by fine or imprisonment of not more than five (5) years, or both.

In witness whereof, executed by the undersigned on the date opposite the undersigned name.

LEGAL NAME OF INVENTOR

| Inventor's Name | ⇒ Inventor: | LEE, Jinwon | Date: |
|---------------------|---------------------------|---|-------|
| Inventor's Signatur | ^{e ⇒} Signature: | | |
| | | O/SB/14 or equivalent), including naming the entire inventive inventor; or check the box below and complete the attached pa | |
| Additiona | l inventors are l | being named on the $\underline{1}$ supplemental sheet(s) attached hereto. | |

Attorney Docket No.: 0465-5885PUS1

SN: 15/317,359 Filed on December 8, 2016

SUPPLEMENTAL SHEET FOR DECLARATION AND ASSIGNMENT

ADDITIONAL INVENTOR Supplemental Sheet Page 1 of 1

LEGAL NAME OF JOINT INVENTOR, IF ANY Inventor's Name

Inventor: YANG, Seungryul

Date: Inventor's Signature → Signature: LEGAL NAME OF JOINT INVENTOR, IF ANY Inventor's Name Inventor: KO, Woosuk Date: Inventor's Signature ⇒ Signature: LEGAL NAME OF JOINT INVENTOR, IF ANY Inventor's Name ⇒Inventor: HONG, Sungryong Date: Inventor's Signature ⇒Signature: LEGAL NAME OF JOINT INVENTOR, IF ANY Inventor's Name ⇒Inventor: KWAK, Minsung Date: Inventor's Signature ⇒Signature: LEGAL NAME OF JOINT INVENTOR, IF ANY Date: 2016.11.3 Inventor's Name [⇔]Inventor: MOON, Kyoungsoo Inventor's Signature ⇔Signature: LEGAL NAME OF JOINT INVENTOR, IF ANY Finventor: AN, Seungjoo Date: Inventor's Name Inventor's Signature

⇒Signature: ______ LEGAL NAME OF JOINT INVENTOR, IF ANY _____ Date: _____ Inventor's Name Inventor's Signature ⇒Signature: LEGAL NAME OF JOINT INVENTOR, IF ANY ⇒Inventor: Date: Inventor's Name Inventor's Signature Signature:

Filed on December 8, 2016

Attorney Docket No.: 0465-5885PUS1

15FASL417US02

BIRCH, STEWART, KOLASCH & BIRCH, LLP

P.O. Box 747 • Falls Church, Virginia 22040-0747

Telephone: (703) 205-8000 • Facsimile: (703) 205-8050 • Email: mailroom@bskb.com

DECLARATION AND ASSIGNMENT FOR PATENT AND DESIGN APPLICATIONS

United States Patent Rights, or United States Plus all Foreign Patent Rights

| Title of Invention | ⇒ BROADCAST RECEIVING DEVICE, METHOD OF OPERATING BROADCAST RECEIVING DEVICE |
|--------------------|--|
| | LINKING DEVICE FOR LINKING TO BROADCAST RECEIVING DEVICE, AND METHOD OF |
| | OPERATING LINKING DEVICE |
| | |

As a below named inventor (hereinafter designated as the undersigned), I hereby declare that:

This declaration is directed to the application attached hereto.

| Application not Attached | → If the application is not attached hereto, the application is as identified by the attorney docket number as set forth above and/or the following: |
|-----------------------------|--|
| Enter Appln. No. | ⇒ United States Application Number or PCT International Appln. No |
| Enter Filing Date | ⇔ filed on |

THE OIL

The above-identified application was made or 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 above-identified application, including the claims.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56.

WHEREAS, the undersigned has invented certain new and useful improvements described in the application identified.

Insert Name of Assignee ➡ WHEREAS, LG ELECTRONICS INC.

Insert Address of Assignee ⇒ of 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, Republic of Korea

its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and

Check Box if Appropriate

in any foreign countries.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, the undersigned has sold, assigned and transferred, and by these presents does (do) sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues, continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

Filed on December 8, 2016

Attorney Docket No.: 0465-5885PUS1

The undersigned agrees to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

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The undersigned hereby authorizes and requests the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patent(s) resulting from said application or any continuing, divisional conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has the full right to convey the entire interest herein assigned, and that he has not executed, and will not execute, any agreement in conflict herewith.

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The undersigned hereby acknowledges that any willful false statement made in this declaration is punishable under 18 U.S.C. § 1001 by fine or imprisonment of not more than five (5) years, or both.

In witness whereof, executed by the undersigned on the date opposite the undersigned name.

LEGAL NAME OF INVENTOR

| Inventor's Name ⇒ | Inventor: | LEE, Jinwon | Date: | | | |
|--|------------|--|-------|--|--|--|
| Inventor's Signature ⇔ | Signature: | | | | | |
| | | O/SB/14 or equivalent), including naming the entire inventiv nventor; or check the box below and complete the attached pa | | | | |
| Additional inventors are being named on the 1 supplemental sheet(s) attached hereto. | | | | | | |

Filed on December 8, 2016

Attorney Docket No.: 0465-5885PUS1

SUPPLEMENTAL SHEET FOR DECLARATION AND ASSIGNMENT

ADDITIONAL INVENTOR Supplemental Sheet Page 1 of 1

LEGAL NAME OF JOINT INVENTOR, IF ANY

| | | • | | |
|------------------------|-------------|--|-------|--------------|
| nventor's Name s | Inventor: | YANG, Seungryul | Date: | ······ |
| inventor's Signature ≤ | Signature: | | | · . |
| | LEGAL NA | AME OF JOINT INVENTOR, IF ANY | i | de de |
| inventor's Name 5 | Inventor: | KO, Woosuk | Date: | |
| inventor's Signature S | Signature: | | | |
| | LEGAL NA | AME OF JOINT INVENTOR, IF ANY | | |
| Inventor's Name | ⇔Inventor: | HONG, Sungryong | Date: | |
| Inventor's Signature | ⇒Signature: | | | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | | |
| Inventor's Name | ⇒Inventor: | KWAK, Minsung | Date: | |
| Inventor's Signature | ⇒Signature: | | | |
| | LEGAL N. | AME OF JOINT INVENTOR, IF ANY | | |
| Inventor's Name | ⇔Inventor: | MOON, Kyoungsoo | Date: | |
| Inventor's Signature | ⇒Signature: | | | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | | |
| Inventor's Name | ⇔Inventor: | AN, Seangjoo | Date: | Dec, 1, 2016 |
| Inventor's Signature | ⇔Signature: | A STATE OF THE STA | | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | | |
| Inventor's Name | ⇒Inventor: | | Date: | |
| Inventor's Signature | ⇔Signature: | | | |
| | LEGAL N | AME OF JOINT INVENTOR, IF ANY | | |
| Inventor's Name | ⇒Inventor: | | Date: | |
| Inventor's Signature | ⇒Signature: | | | |
| | | | | |