

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference F201908-0003	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/KR2019/016957	International filing date (<i>day/month/year</i>) 03 December 2019 (03.12.2019)	(Earliest) Priority Date (<i>day/month/year</i>) 04 December 2018 (04.12.2018)
Applicant SAMSUNG ELECTRONICS CO., LTD.		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

- the international application in the language in which it was filed
 a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (See Box No. II)

3. **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title**,

- the text is approved as submitted by the applicant.
 the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant.
 the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 3
 as suggested by the applicant.
 as selected by this Authority, because the applicant failed to suggest a figure.
 as selected by this Authority, because this figure better characterizes the invention.
- b. none of the figures is to be published with the abstract.

A. CLASSIFICATION OF SUBJECT MATTER**H04B 17/19(2014.01)i, H04B 1/44(2006.01)i, H04B 17/14(2014.01)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)

H04B 17/19; H01Q 1/50; H03F 3/68; H04B 1/16; H04B 1/44; H04B 15/00; H04B 17/00; H04B 7/04; H04B 17/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & keywords: FEM (front-end module), transceiver, switch, antenna, PCB (printed circuit board), calibration, attenuate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010-0093282 A1 (RISTO MARTIKKALA et al.) 15 April 2010 paragraphs [0003], [0030], [0074], [0089], [0093]; and figure 3	1-15
Y	WO 2018-119153 A2 (INTEL CORPORATION et al.) 28 June 2018 paragraphs [0641], [1189]; and claims 15-16, 88	1-15
Y	US 2014-0120968 A1 (RAYTHEON COMPANY) 01 May 2014 paragraph [0022]; and figure 1	7-10
A	KR 10-2016-0009230 A (SAMSUNG ELECTRONICS CO., LTD.) 26 January 2016 claims 12-13	1-15
A	KR 10-2008-0006155 A (SAMSUNG ELECTRONICS CO., LTD.) 16 January 2008 claim 1; and figure 1	1-15

 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

"D" document cited by the applicant in the international application

"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

10 March 2020 (10.03.2020)

Date of mailing of the international search report

10 March 2020 (10.03.2020)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2019/016957

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0093282 A1	15/04/2010	US 8045926 B2	25/10/2011
WO 2018-119153 A2	28/06/2018	CN 110447146 A DE 112017006442 T5 EP 3560111 A2 KR 10-2019-0089955 A TW 201838352 A WO 2018-119153 A3	12/11/2019 19/09/2019 30/10/2019 31/07/2019 16/10/2018 14/03/2019
US 2014-0120968 A1	01/05/2014	US 8886137 B2	11/11/2014
KR 10-2016-0009230 A	26/01/2016	CN 105281690 A CN 105281690 B EP 2975774 A1 EP 2975774 B1 US 2016-0020738 A1 US 9553552 B2	27/01/2016 09/08/2019 20/01/2016 05/12/2018 21/01/2016 24/01/2017
KR 10-2008-0006155 A	16/01/2008	KR 10-1009781 B1 US 2008-0012748 A1	19/01/2011 17/01/2008