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[Continued on next page]

(54) Title: APPARATUSES, SYSTEMS AND METHODS USING MULTI-FUNCTIONAL ANTENNAS INCORPORATING IN-LINE-FILTER ASSEMBLIES

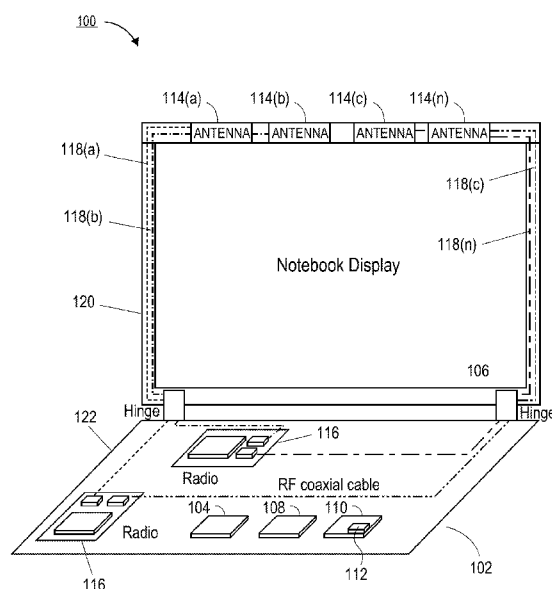


FIG. 1

(57) Abstract: Embodiments herein may provide an apparatus, comprising an antenna, the antenna including a same radiating element fed by more than one in-line-filter cables with complimentary pass and rejection bands, wherein the more than one in-line-filter cables have periodically inserted discontinuities in coaxial cables to create band rejection filter functionalities.

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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2012/031126****A. CLASSIFICATION OF SUBJECT MATTER*****H01Q 1/24(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)

H01Q 1/24; H01P 1/202; H01Q 11/12; H01Q 7/00; H01P 3/06; H01Q 1/38; H03H 7/30

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) &amp; Keywords: antenna, filter, cables, discontinuities, LTE, laptop, duplexer

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                          | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | US 04446566 A (HARRISON W. FULLER) 01 May 1984<br>See the abstract; figures 1-11; column 4 lines 59-69, column 16 lines 33-59;<br>and claims 1-3            | 1-20                  |
| A         | US 04296389 A (HARRISON W. FULLER et al.) 20 October 1981<br>See the abstract; figures 1-11; column 4 lines 37-69, column 9 lines 22-69;<br>and claims 1-12 | 1-20                  |
| A         | US 2002-0122008 A1 (FRANK M. CAIMI et al.) 05 September 2002<br>See the abstract; figures 10-13; paragraphs 31-39; and claims 1-26                          | 1-20                  |
| A         | US 06133877 A (JONAS SANDSTEDT et al.) 17 October 2000<br>See the abstract; figures 1-4; column 5 line 1&#8211;column 7 line 19;<br>and claims 1-15         | 1-20                  |

☐ 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

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"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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

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| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
| US 04446566 A                             | 01.05.1984          | US 04310816A A             | 12.01.1982          |
| US 04296389 A                             | 20.10.1981          | None                       |                     |
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