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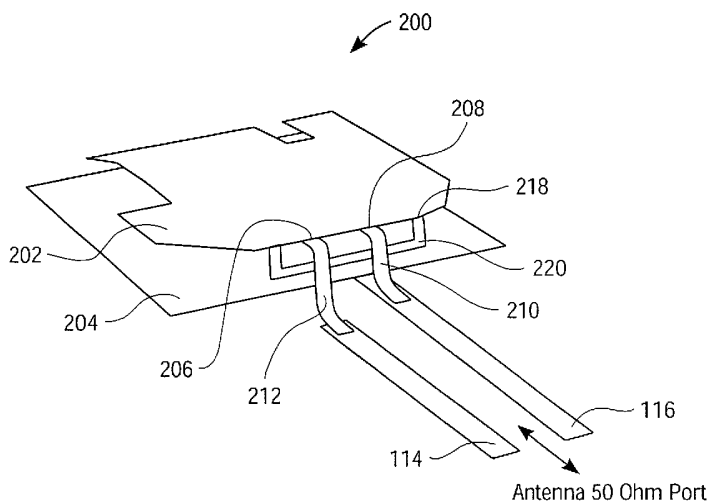
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(54) Title: BROADBAND PLANAR INVERTED F ANTENNA



(57) Abstract: A mono-band planar inverted F antenna (PIFA) structure (200) comprises a planar radiating element (202) having a first area, and a ground plane (204) having a second area that is substantially parallel to the radiating element first area. An electrically conductive first line (210) is coupled to the radiating element (202) at a first contact located at an edge on a side of the radiating element (202). The first line (210) is also coupled to the ground plane (204). An electrically conductive second line (212) is coupled to the radiating element (202) at second and third contacts located along the same side as the first line (210), but at different locations on the edge than the first contact. Useable bandwidth of the PIFA is increased by using multiple contact locations to couple the conductive second line (212) to the radiating element (202). The first and second lines (210 and 212) are adapted to couple to a desired impedance, e.g., 50 ohms, at frequencies of operation of the PIFA.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/02884

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :H01Q 1/38, 1/24
US CL :343/700ms, 846, 702
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)

U.S. : 343/700ms, 846, 702, 848, 725, 829

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
NONE	NONE	NONE

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier document published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search 24 APRIL 2003	Date of mailing of the international search report 12 APR 2004
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/02884

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 1-26
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

Please See Extra Sheet.

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

BOX I. OBSERVATIONS WHERE CLAIMS WERE FOUND UNSEARCHABLE

2. Where no meaningful search could be carried out, specifically:

the recited antenna is not clearly disclosed in the specification. A planar inverted F antenna has a patch element above a ground plane with a feed and ground connection extending from the patch towards the ground plane in the shape of an inverted F. This is not the recited antenna. The antenna that is recited is disclosed in the specification, but it is referred to as an inverted F antenna. The recited antenna does not have an inverted F shape. The drawings disclose an inverted F antenna, and not the recited antenna. Consequently, it is not clear which antenna should be searched; the inverted F antenna disclosed in the drawings or the recited antenna which is recited as an inverted F antenna but does not appear to be an inverted F antenna.