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- (71) Applicant: MARCONI CORPORATION P.L.C.
[GB/GB]; One Bruton Street, London W1J 6AQ (GB).
- (72) Inventors: FORSTER, Ian, J.; 31 Great Cob, Springfield,
Chelmsford, Essex CM1 6LA (GB). KING, Patrick, F.;
418 North Park Boulevard, Glen Ellyn, IL 60137 (US).
- (74) Agent: MCGOWAN, Nigel, George; Marconi Intellectual
Property, Marrable House, The Vineyards, Gt. Baddow,
Chelmsford, Essex CM2 7DS (GB).

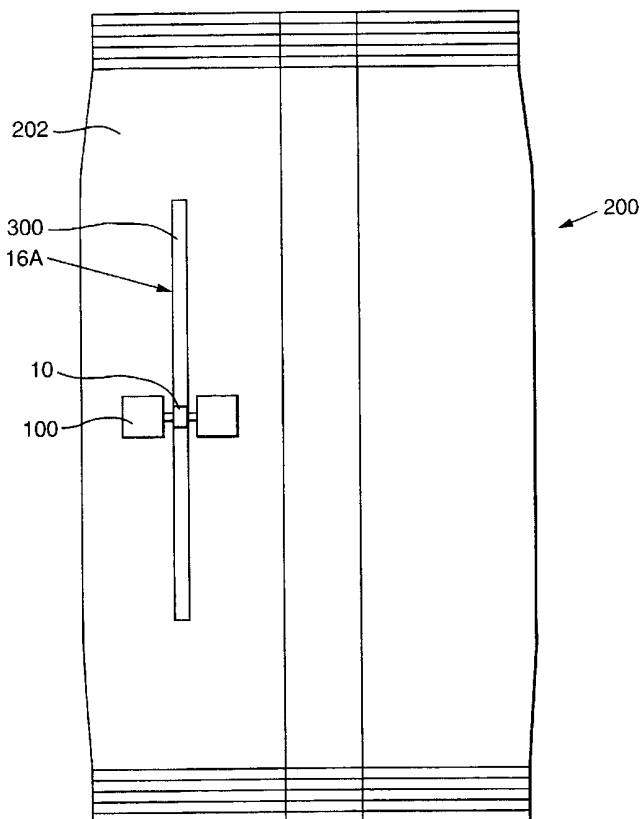
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- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: WIRELESS COMMUNICATION DEVICE AND METHOD



(57) **Abstract:** The invention relates to a wireless communication device that is capable of communicating using a pole antenna in a first mode and a slot antenna in a second mode. The wireless communication device contains at least one conductive tab that provides an antenna. The tab(s) form a pole antenna, and the tabs may also be attached across a slot to form a slot antenna. The wireless communication device can communicate at different frequencies using the pole antenna in a first mode and the slot antenna in a second mode. The tab(s) may be attached across a slot created in a package to form a slot antenna, or the tab(s) may be attached to a slot that is created as part of the wireless communication device to form a slot antenna. The tab(s) and/or the slot may also contain an adhesive material to attach the wireless communication device to a package, container or other material. More than one slot may be provided to form a circularly polarized antenna. The wireless communication device can be placed inside a conductive package using a slot antenna to provide unshielded communications. The wireless communication device can be further adapted to detect when the package is opened and to communicate such information. The wireless communication devices can be printed or placed on a carrier or support, such as film, to be stamped onto packages in a manufacturing facility and/or assembly line. The carrier may be a conductive material in which tabs are formed as part of the carrier before the wireless communication device is attached.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 01/03239

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06K19/077

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)
IPC 7 G06K H04B H01Q

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 practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 031 503 A (DONALDSON STEPHEN R ET AL) 29 February 2000 (2000-02-29) claims 1,3,6,12 ---	1,2,4,5
A	GB 2 335 081 A (NEC TECHNOLOGIES) 8 September 1999 (1999-09-08) claim 1 ---	1-5
A	PATENT ABSTRACTS OF JAPAN vol. 015, no. 459 (E-1136), 21 November 1991 (1991-11-21) & JP 03 196704 A (MAZDA MOTOR CORP), 28 August 1991 (1991-08-28) abstract -----	1,3-5

Further documents are listed in the continuation of box C.

Patent family members are listed in 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 document 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

3 December 2001

Date of mailing of the international search report

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Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

HERSKOVIC, M

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 01/03239

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

This International Search 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.:
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:

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:

see additional sheet

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.:

1-13

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-13

Wireless communication device being capable of communicating in a first mode as a slot antenna and in a second mode as a pole antenna.

2. Claims: 14-40,52,53

Wireless communication device for attaching to a package with a slot antenna, formed by a non-conductive portion in a conductive material, connected to the device.

3. Claims: 41-51

Method of wirelessly communicating on two different frequencies: a wireless communication device connected to at least one conductive tab to communicate at a first frequency and attaching said at least one conductive tab across a slot to communicate at a second frequency.

4. Claims: 54-57

Method of attaching wireless communication devices to packages in a assembly line.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/03239

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 6031503	A	29-02-2000	AU 6178698 A WO 9837590 A2	09-09-1998 27-08-1998
GB 2335081	A	08-09-1999	AU 1858099 A JP 11317610 A US 6266538 B1	16-09-1999 16-11-1999 24-07-2001
JP 03196704	A	28-08-1991	NONE	