



US 20100302105A1

(19) **United States**(12) **Patent Application Publication****Yen et al.**(10) **Pub. No.: US 2010/0302105 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **ANTENNA STRUCTURE****Publication Classification**(76) Inventors: **Li-Jean Yen**, Taipei Hsien (TW);
Chia-Tien Li, Taipei Hsien (TW)(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 5/00 (2006.01)
(52) **U.S. Cl.** **343/700 MS**

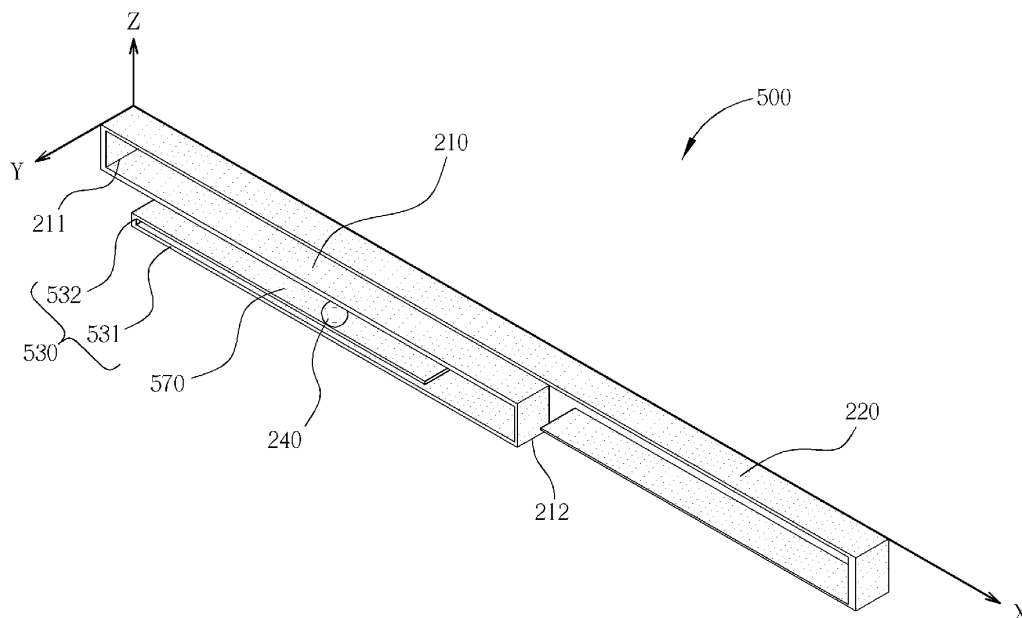
Correspondence Address:

**NORTH AMERICA INTELLECTUAL PROP-
ERTY CORPORATION**
P.O. BOX 506
MERRIFIELD, VA 22116 (US)(57) **ABSTRACT**

An antenna structure has a first resonance mode and a second resonance mode. The antenna structure consists of a first radiation element, a second radiation element, a grounding element, and a signal feeding element. The first radiation element resonates at a first operating frequency band corresponding to the first resonance mode. The second radiation element is extended from a first end of the first radiation element and resonates at a second operating frequency band corresponding to the second resonance mode. The grounding element is extended from a second end of the first radiation element. The signal feeding element is disposed between the first radiation element and the grounding element. The second radiation element, the first radiation element, and the grounding element are formed by bending a slender metal sheet.

(21) Appl. No.: **12/563,171**(22) Filed: **Sep. 21, 2009**(30) **Foreign Application Priority Data**

May 27, 2009 (TW) 098209373



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US 20100302108A1

(19) **United States**(12) **Patent Application Publication****Luke et al.**(10) **Pub. No.: US 2010/0302108 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **MOBILE COMMUNICATION DEVICE**(22) Filed: **Jan. 18, 2010**

(75) Inventors: **Hok-Sum Horace Luke**, Taoyuan County (TW); **Chih-Ling Chien**, Taoyuan County (TW); **Hung-Yi Huang**, Taoyuan County (TW); **Chung-Ting Hung**, Taoyuan County (TW); **Chien-Chun Cheng**, Taoyuan County (TW); **Chih-Hsien Wu**, Taoyuan County (TW); **Kuo-Cheng Chen**, Taoyuan County (TW)

(30) **Foreign Application Priority Data**

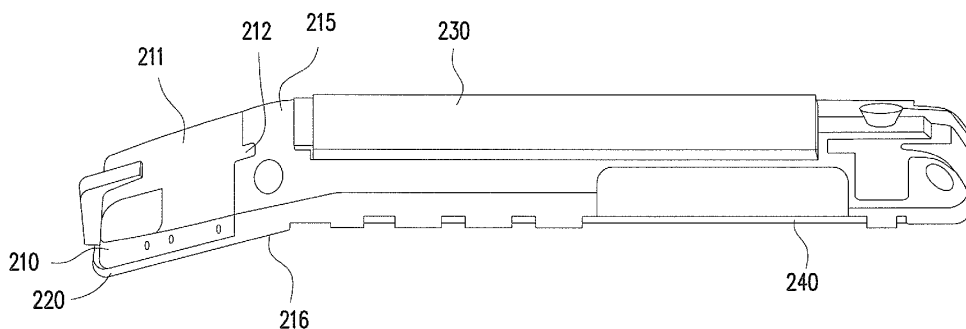
May 26, 2009 (TW) 98117456

Publication Classification(51) **Int. Cl.**
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702**(57) **ABSTRACT**

A mobile communication device including a first appearance and an antenna is provided. An upper surface of the first appearance is bent a first angle from a border between a display area and a non-display area toward a display direction, and a lower surface of the first appearance is bent a second angle from a bending point toward the display direction, wherein the bending point of the lower surface is corresponding to the display area of the upper surface. The antenna is disposed in the mobile communication device and corresponding to the non-display area of the first appearance. The antenna transmits and receives signals processed by the mobile communication device.

Correspondence Address:

**JIANQ CHYUN INTELLECTUAL PROPERTY
OFFICE**
**7 FLOOR-1, NO. 100, ROOSEVELT ROAD, SEC-
TION 2**
TAIPEI 100 (TW)

(73) Assignee: **HTC CORPORATION**, Taoyuan County (TW)(21) Appl. No.: **12/689,218**

Acrobat 文件



US 20100302110A1

(19) **United States**(12) **Patent Application Publication****Leem**(10) **Pub. No.: US 2010/0302110 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **PORTABLE TERMINAL AND ANTENNA
DEVICE THEREOF**

Jul. 30, 2009 (KR) 10-2009-0070255

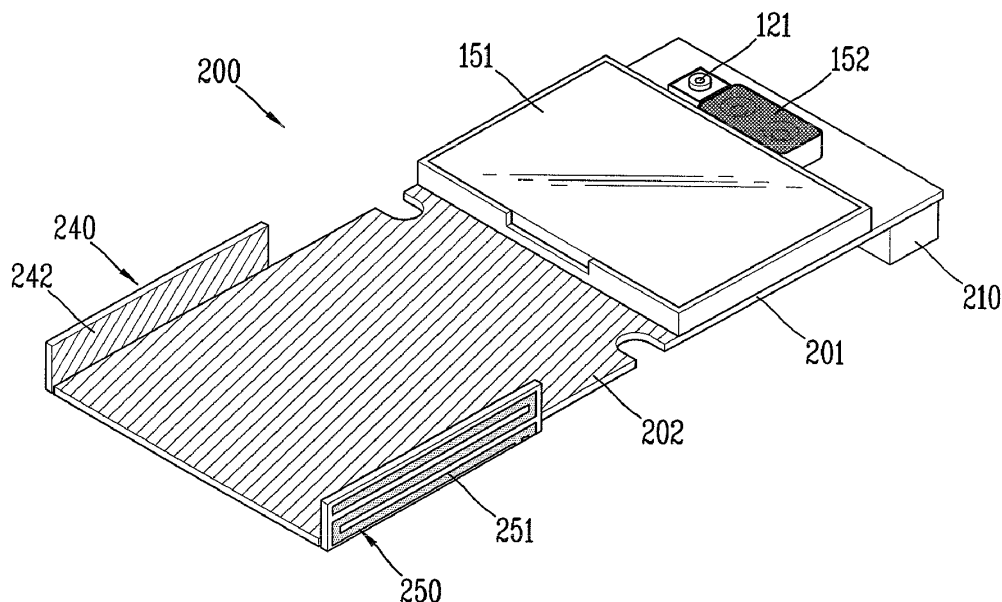
Publication Classification(75) Inventor: **Ji-Hun Leem**, Gyeonggi-do (KR)(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 21/00 (2006.01)

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LEE, HONG, DEGERMAN, KANG & WAIMEY
660 S. FIGUEROA STREET, Suite 2300
LOS ANGELES, CA 90017 (US)(52) **U.S. Cl.** **343/702; 343/893**(73) Assignee: **LG ELECTRONICS INC.**(57) **ABSTRACT**(21) Appl. No.: **12/709,427**(22) Filed: **Feb. 19, 2010**(30) **Foreign Application Priority Data**

May 26, 2009 (KR) 10-2009-0046102

A portable terminal includes a terminal body, a first antenna provided on a first portion of a circuit board having a first ground that is used by the first antenna, and an antenna assembly integrated into the terminal body. The antenna assembly of the portable terminal includes at least one diversity antenna fed to the circuit board and formed on a second portion of the circuit board having a ground that is independent from the first ground. The at least one diversity antenna is formed into an angled configuration with respect to the circuit board.



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US 20100302111A1

(19) **United States**(12) **Patent Application Publication**
KOTAKA et al.(10) **Pub. No.: US 2010/0302111 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **MULTIBAND PLANAR ANTENNA AND
ELECTRONIC EQUIPMENT****Publication Classification**(51) **Int. Cl.****H01Q 9/04** (2006.01)**H01Q 1/24** (2006.01)**H01Q 5/00** (2006.01)(52) **U.S. Cl.** **343/702; 343/700 MS**

(57)

ABSTRACT

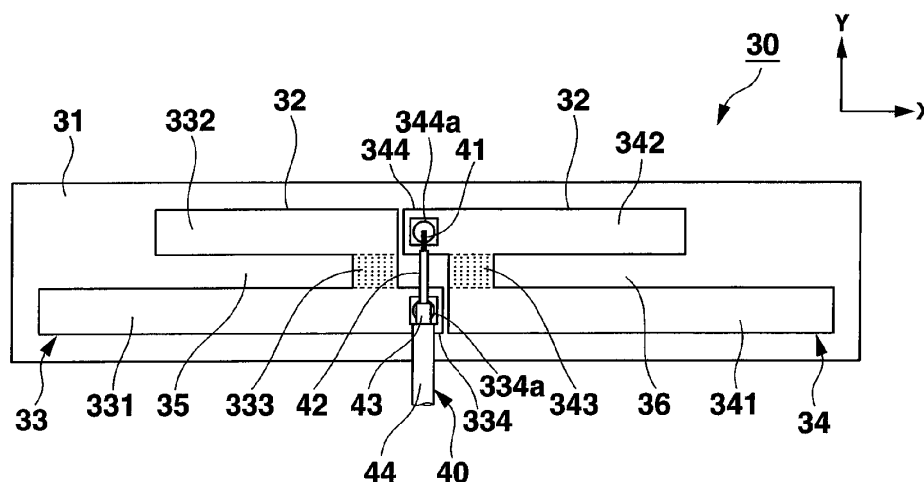
Disclosed is a multiband planar antenna including: an insulating film, a first antenna section and a second antenna section facing to the first antenna section across a feeding point on a film, wherein the first antenna section includes: a first antenna element including a side having a length in an extending direction corresponds to a first resonance frequency; a shorter second antenna element at a predetermined distance from and in parallel with the first antenna element; and a first coupling section to couple the first and second antenna elements, wherein a length in the extending direction of a first clearance corresponds to a resonance frequency higher than the first resonance frequency, and wherein the second antenna section includes: third and fourth antenna elements; a second coupling section; and a second clearance similar to the above.

(75) Inventors: **Yuki KOTAKA**, Tokyo (JP);
Shigeru Yagi, Tokyo (JP)

Correspondence Address:

HOLTZ, HOLTZ, GOODMAN & CHICK PC
220 Fifth Avenue, 16TH Floor
NEW YORK, NY 10001-7708 (US)(73) Assignee: **Casio Computer Co., Ltd.**, Tokyo
(JP)(21) Appl. No.: **12/776,583**(22) Filed: **May 10, 2010**(30) **Foreign Application Priority Data**

May 27, 2009 (JP) 2009-127122



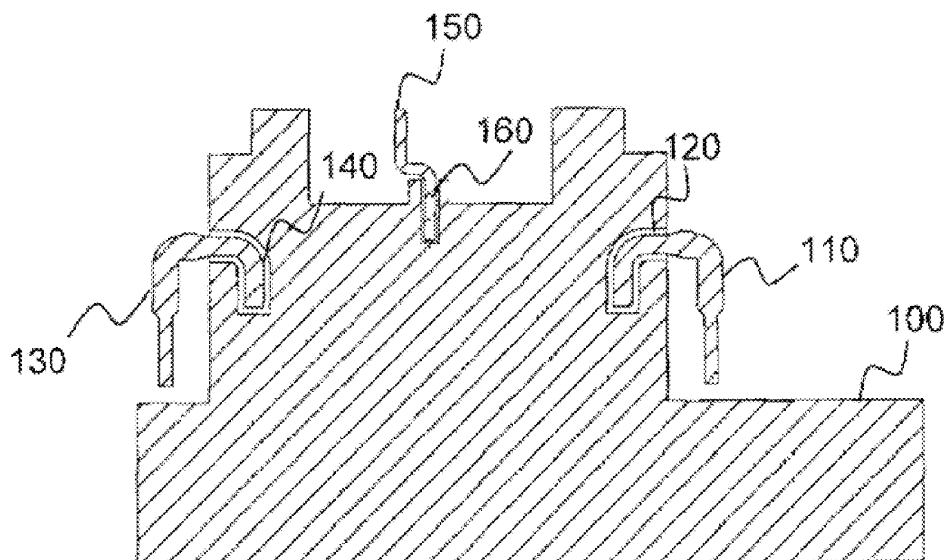
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US 20100302115A1

(19) **United States**(12) **Patent Application Publication**
CHEN(10) **Pub. No.: US 2010/0302115 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **HYBRID DUAL DIPOLE SINGLE SLOT
ANTENNA FOR MIMO COMMUNICATION
SYSTEMS****Publication Classification**(51) **Int. Cl.**
H01Q 21/29 (2006.01)
H01Q 5/01 (2006.01)(52) **U.S. Cl.** **343/727**(57) **ABSTRACT**(76) **Inventor: Mexx CHEN, Taipei City (TW)****Correspondence Address:****SpryIP, LLC LAN**
5009 163rd PL SE
Bellevue, WA 98006 (US)(21) **Appl. No.: 12/855,689**(22) **Filed: Aug. 12, 2010****Related U.S. Application Data**(63) Continuation of application No. 11/969,243, filed on
Jan. 4, 2008, now Pat. No. 7,786,942.

An antenna arrangement implemented within a printed circuit board (PCB) having three metal co planar layers, for use in multiple input multiple output (MIMO) communication systems. The antenna arrangement comprises a first dipole antenna and second dipole antenna, substantially symmetrical to the first dipole antenna a slot antenna positioned substantially between the first and the second dipole antennas. The antenna arrangement is implemented in three coplanar metal layers. The antennas are used for MIMO communication systems, specifically complying with IEEE 802.11n and are shaped such that their combined radiation pattern exhibits a substantially omni-directional radiation pattern.



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US 20100302121A1

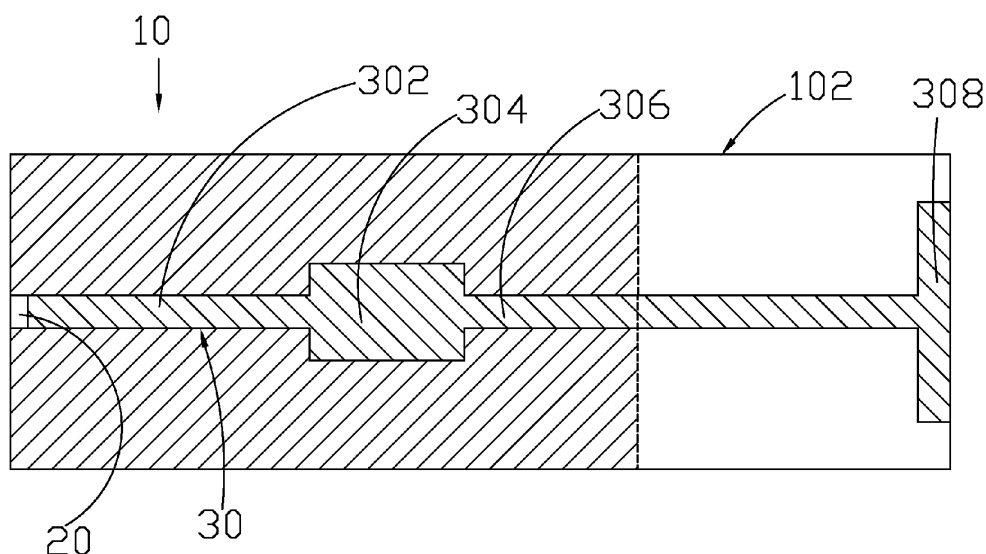
(19) **United States**(12) **Patent Application Publication**
Tu(10) **Pub. No.: US 2010/0302121 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **MICROSTRIP ANTENNA****Publication Classification**(75) Inventor: **Hsin-Lung Tu, Tu-Cheng (TW)**(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)

Correspondence Address:

Altis Law Group, Inc.**ATTN: Steven Reiss****288 SOUTH MAYO AVENUE****CITY OF INDUSTRY, CA 91789 (US)**(52) **U.S. Cl.** **343/846; 343/700 MS**(57) **ABSTRACT**(73) Assignee: **HON HAI PRECISION**
INDUSTRY CO., LTD., Tu-Cheng
(TW)(21) Appl. No.: **12/699,252**(22) Filed: **Feb. 3, 2010**(30) **Foreign Application Priority Data**

Jun. 2, 2009 (CN) 200910302835.1

A microstrip antenna located on a substrate with a first surface and a second surface opposite to the first surface includes a feeding portion, a grounding portion, and a radiating portion. The feeding portion is located on the first surface of the substrate to feed electromagnetic signals. The grounding portion is located on the second surface of the substrate. The radiating portion is located on the first surface and includes a first radiating part, a second radiating part, a third radiating part, and a fourth radiating part. Each of the first radiating part, the second radiating part, and the third radiating part is on a rectangle-shaped strip line. The first radiating part is connected to the feeding portion. The fourth radiating part is perpendicularly connected to a second end of the third radiating part.



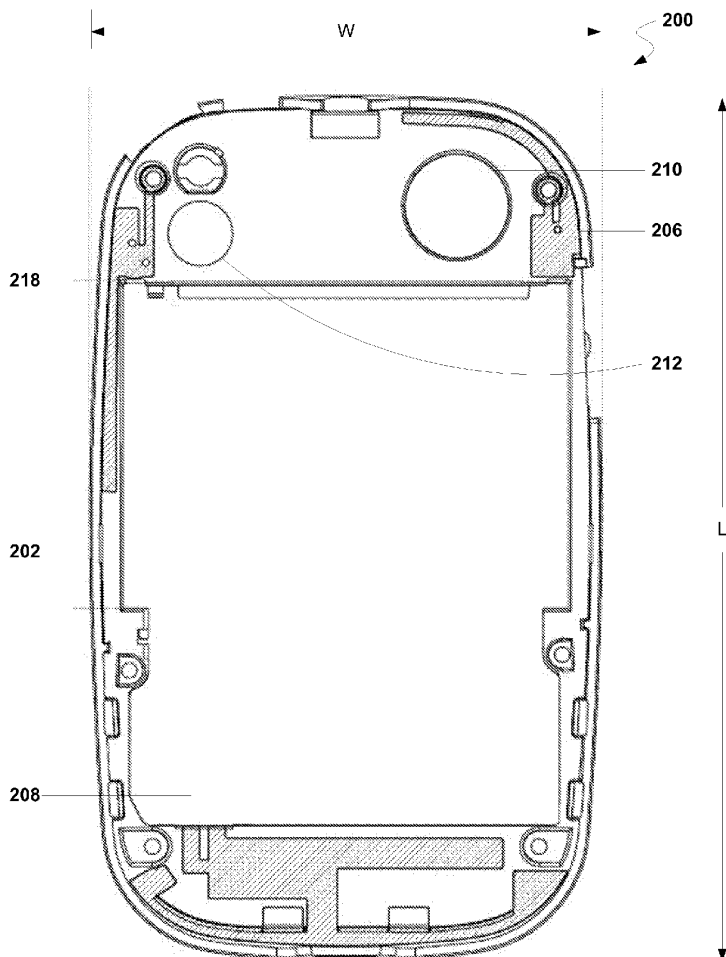
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US 20100304785A1

(19) **United States**(12) **Patent Application Publication**
Marlett et al.(10) **Pub. No.: US 2010/0304785 A1**(43) **Pub. Date: Dec. 2, 2010**(54) **ENHANCED INTERNAL ANTENNA
ARCHITECTURE FOR A MOBILE
COMPUTING DEVICE****Publication Classification**(51) **Int. Cl.**
H04M 1/00 (2006.01)(52) **U.S. Cl.** **455/552.1; 455/575.1**(75) **Inventors:** **Jeff Marlett**, Los Altos, CA (US);
Philip Wright, Sunnyvale, CA
(US); **Guining Shi**, San Diego, CA
(US); **Jerome Tu**, Saratoga, CA
(US)**Correspondence Address:**
KACVINSKY DAISAK PLLC (1070)
4500 BROOKTREE ROAD, SUITE 302
WEXFORD, PA 15090 (US)(73) **Assignee:** **Palm, Inc.**, Sunnyvale, CA (US)(21) **Appl. No.:** **12/476,007**(22) **Filed:** **Jun. 1, 2009**(57) **ABSTRACT**

Various embodiments of an internal multi-band antenna architecture for a mobile computing device are described. An internal antenna architecture for a mobile computing device may include multiple antenna elements, including a first internal antenna element configured to operate in a downlink frequency sub-band of at least one frequency band for communication in a first mode, and a second internal antenna element configured to operate in an uplink frequency sub-band of the at least one frequency band for communication in the first mode. Other embodiments are described and claimed.



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US 20100307787A1

(19) **United States**(12) **Patent Application Publication**
Ohmori et al.(10) **Pub. No.: US 2010/0307787 A1**(43) **Pub. Date: Dec. 9, 2010**(54) **SLIDABLE-TYPE PORTABLE TERMINAL**(30) **Foreign Application Priority Data**(75) Inventors: **Hiroaki Ohmori**, Miyagi (JP);
Hideo Nakanishi, Kanagawa (JP);
Takeshi Yamaguchi, Kanagawa
(JP); **Akito Sakamoto**, Kanagawa
(JP); **Yasunori Komukai**, Miyagi
(JP)

Jan. 31, 2008 (JP) 2008-020757

Publication Classification(51) **Int. Cl.**
H05K 5/02 (2006.01)(52) **U.S. Cl.** 174/51

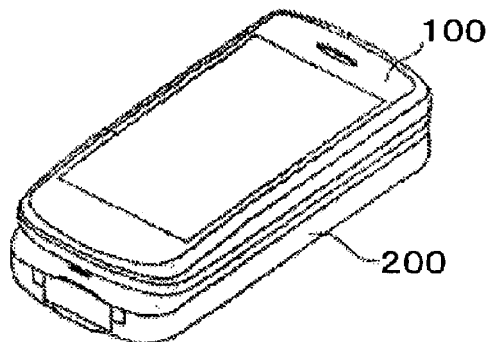
Correspondence Address:

Seed Intellectual Property Law Group PLLC
701 Fifth Avenue, Suite 5400
Seattle, WA 98104 (US)(57) **ABSTRACT**

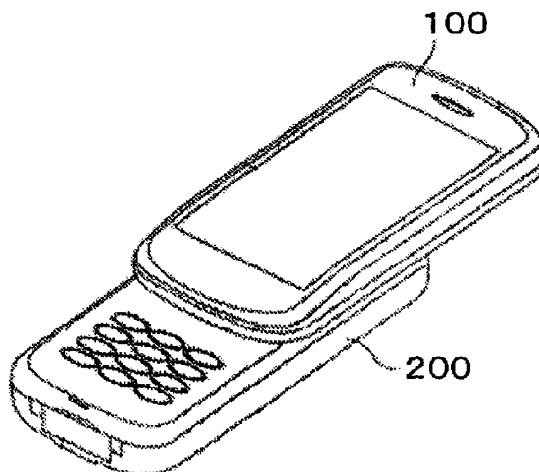
A slidable-type portable terminal has a first enclosure; a second enclosure; a first board arranged in the first enclosure; a second board arranged in the second enclosure; an antenna electrically connected to the first board; a connecting unit that electrically connects together the first board and the second board; a plurality of sliding units that slidably connects the first enclosure to the second enclosure; and a conductor for electrically connecting the connecting unit to one of the plurality of sliding units. The one of the plurality of sliding units is electrically connected to a ground of the connecting unit by means of the conductor.

(73) Assignee: **PANASONIC CORPORATION**,
Osaka (JP)(21) Appl. No.: **12/865,352**(22) PCT Filed: **Dec. 22, 2008**(86) PCT No.: **PCT/JP2008/003902**§ 371 (c)(1),
(2), (4) Date: **Jul. 29, 2010**

(a)



(b)



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US 20100309063A1

(19) **United States**

(12) **Patent Application Publication**
Wong et al.

(10) **Pub. No.: US 2010/0309063 A1**

(43) **Pub. Date: Dec. 9, 2010**

(54) **MOBILE COMMUNICATION DEVICE**

Publication Classification

(75) Inventors: **Kin-lu Wong**, Hsichih (TW);
Cheng-Tse Lee, Hsichih (TW)

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/38 (2006.01)

Correspondence Address:

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TION 2**
TAIPEI 100 (TW)

(52) **U.S. Cl.** **343/702; 343/700 MS**

(57) **ABSTRACT**

The present invention is related to a mobile communication device. The device comprises a dielectric substrate, a first ground plane, an antenna element, a second ground plane, and an equivalent band-stop circuit. The first ground plane is disposed on the dielectric substrate. The antenna element is disposed on the dielectric substrate or nearby the dielectric substrate and is connected to a signal source disposed on the dielectric substrate. The second ground plane is disposed nearby one edge of the first ground plane and is connected to the first ground plane through a metal strip. The equivalent band-stop circuit is disposed on the second ground plane and includes a slit and a capacitive element. The open end of the slit is near the metal strip. The capacitive element is mounted across the slit.

(73) Assignee: **ACER INCORPORATED**,
Hsichih (TW)

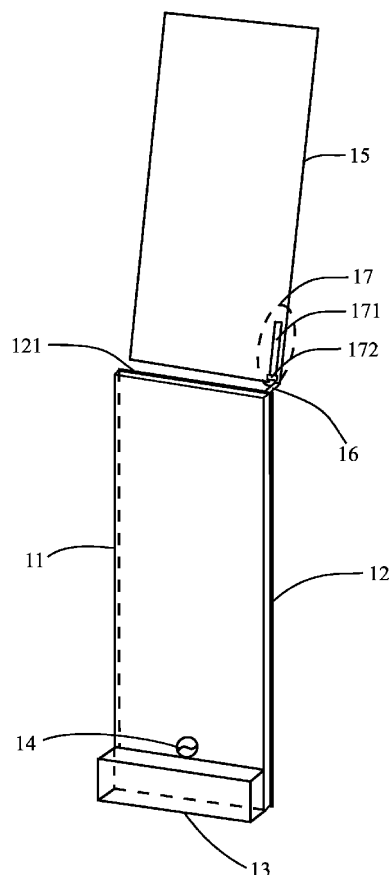
(21) Appl. No.: **12/554,904**

(22) Filed: **Sep. 5, 2009**

(30) **Foreign Application Priority Data**

Jun. 6, 2009 (TW) 098118973

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US 20100309064A1

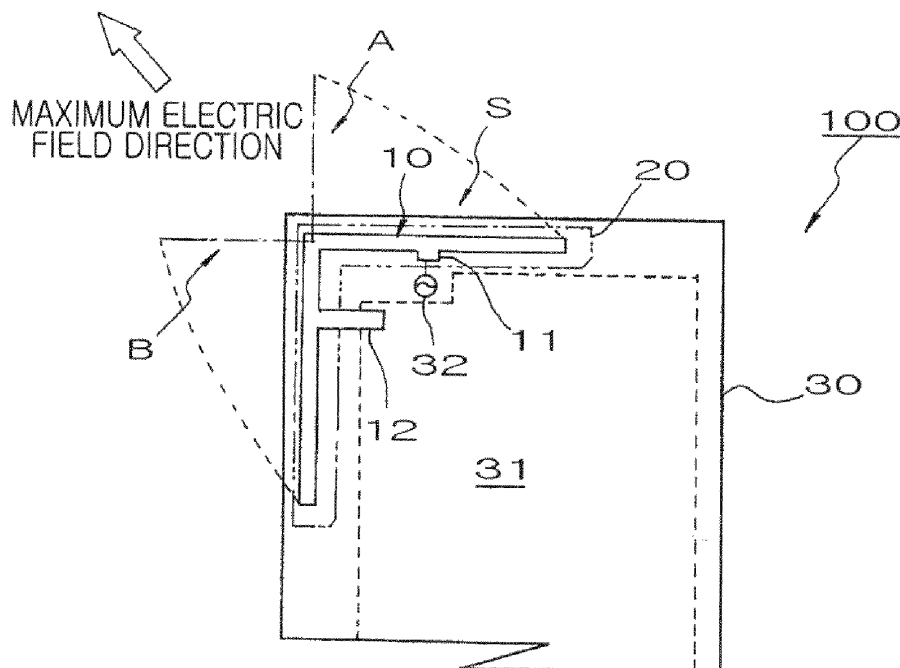
(19) **United States**(12) **Patent Application Publication****Sung et al.**(10) **Pub. No.: US 2010/0309064 A1**(43) **Pub. Date: Dec. 9, 2010**(54) **BUILT-IN ANTENNA FOR GLOBAL POSITIONING SYSTEM IN A PORTABLE TERMINAL**(30) **Foreign Application Priority Data**

Jun. 9, 2009 (KR) 10-2009-0050970

(75) Inventors: **Sang-Bong Sung**, Gyeonggi-do (KR); **Kong-Min Sa**, Gyeongbuk (KR); **Kyung-Jong Lee**, Gyeonggi-do (KR); **Dong-Hwan Kim**, Gyeonggi-do (KR); **Jae-Ho Lee**, Yongin-si (KR); **Byung-Chan Jang**, Gyeongbuk (KR)**Publication Classification**(51) **Int. Cl.**
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702**(57) **ABSTRACT**

A built-in antenna apparatus for a Global Positioning System (GPS) of a portable terminal is provided. The apparatus includes a case frame for forming an exterior of the terminal, a main board fastened by the case frame and having a feeding portion and a ground portion of an antenna radiator, and an antenna radiator having a feeding point and ground point to be electrically connected to the feeding portion and ground portion of the main board, and is curved in a horizontal direction and a vertical direction of the terminal about a center of one upper-side corner of the terminal.

Correspondence Address:

Cha & Reiter, LLC
17 Arcadian Avenue, Suite 208
Paramus, NJ 07652 (US)(73) Assignee: **Samsung Electronics Co., LTD.**,
Gyeonggi-Do (KR)(21) Appl. No.: **12/802,592**(22) Filed: **Jun. 9, 2010**

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US 20100309067A1

(19) **United States**(12) **Patent Application Publication**
TSOU et al.(10) **Pub. No.: US 2010/0309067 A1**(43) **Pub. Date: Dec. 9, 2010**(54) **MULTIBAND ANTENNA**(30) **Foreign Application Priority Data**(75) Inventors: **TUN-YUAN TSOU**, Tu-Cheng
(TW); **YI-CHIEH LEE**, Tu-Cheng
(TW)

Jun. 8, 2009 (CN) 200910303052.5

Publication Classification

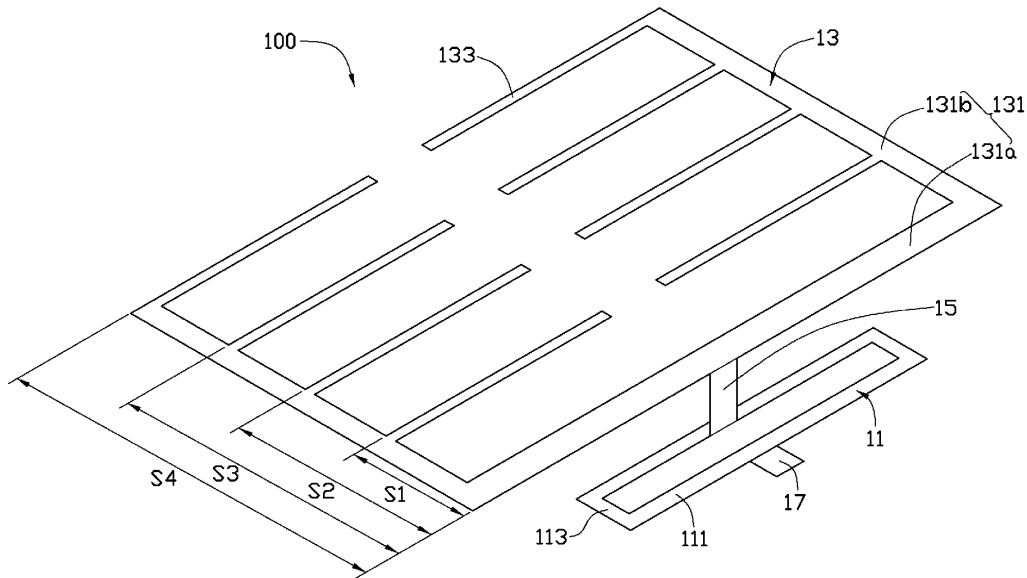
Correspondence Address:

Altis Law Group, Inc.**ATTN: Steven Reiss****288 SOUTH MAYO AVENUE****CITY OF INDUSTRY, CA 91789 (US)**(51) **Int. Cl.****H01Q 21/30** (2006.01)**H01Q 1/38** (2006.01)(52) **U.S. Cl. 343/726; 343/700 MS**(73) Assignee: **CHI MEI COMMUNICATION**
SYSTEMS, INC., Tu-Cheng City
(TW)

(57)

ABSTRACT(21) Appl. No.: **12/693,641**(22) Filed: **Jan. 26, 2010**

A multiband antenna includes a first radio unit closed loop and a second radio unit connected to the first radio unit and symmetrical structure. When the multiband antenna functions, the first radio unit functions as a balanced loop antenna, and the second radio unit functions as a dipole antenna.



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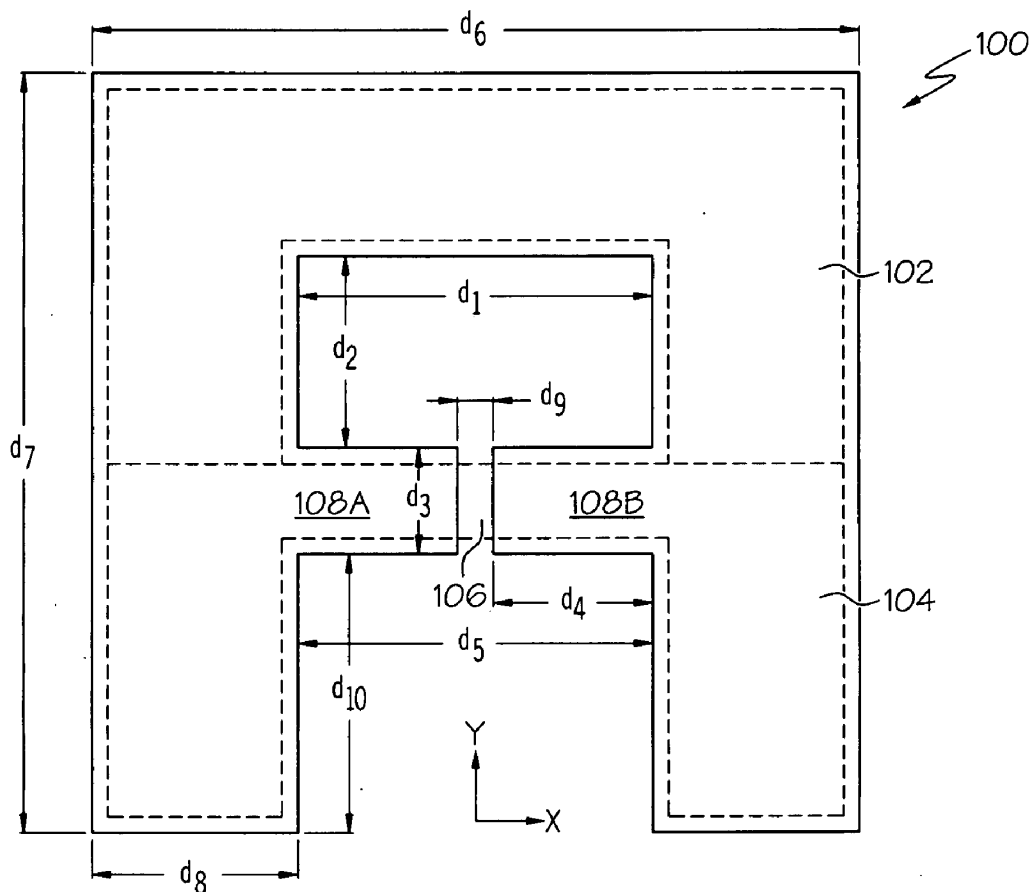
US 20100309068A1

(19) **United States**(12) **Patent Application Publication****Duron et al.**(10) **Pub. No.: US 2010/0309068 A1**(43) **Pub. Date: Dec. 9, 2010**(54) **METHODS AND APPARATUS FOR A LOW REFLECTIVITY COMPENSATED ANTENNA****Publication Classification**(75) Inventors: **Mark Duron**, East Patchogue, NY (US); **Richard Knadle**, Dix Hills, NY (US)(51) **Int. Cl.**
H01Q 1/00 (2006.01)
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/730; 343/700 MS**

Correspondence Address:

MOTOROLA, INC.**1303 EAST ALGONQUIN ROAD, IL01/3RD**
SCHAUMBURG, IL 60196(73) Assignee: **SYMBOL TECHNOLOGIES, INC.**, Holtsville, NY (US)(21) Appl. No.: **12/480,370**(22) Filed: **Jun. 8, 2009**(57) **ABSTRACT**

An antenna includes a dipole radiator region forming a series resonant tank having a first quality factor value Q_1 , and a loop compensator/radiator region integral with the dipole region and forming a parallel resonant tank having a second quality factor value Q_2 that is substantially equal to Q_1 . The antenna may be a conductive sheet antenna (e.g., comprising copper tape) having a generally "A" shaped structure with a discontinuity in a middle segment.



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US 20100309070A1

(19) **United States**

(12) **Patent Application Publication**
Wong et al.

(10) **Pub. No.: US 2010/0309070 A1**

(43) **Pub. Date: Dec. 9, 2010**

(54) **MULTIBAND SINGLE-STRIP MONOPOLE ANTENNA**

Publication Classification

(75) Inventors: **Kin-Lu Wong**, Hsichih (TW);
Shu-Chuan Chen, Hsichih (TW)

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 9/00 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.** **343/749**; 343/700 MS; 343/843;
343/848

Correspondence Address:

Wang Law Firm, Inc.
4989 Peachtree Parkway, Suite 200
Norcross, GA 30092 (US)

(57) **ABSTRACT**

A multiband single-strip monopole antenna includes a dielectric substrate, a ground plane, and a radiating portion. The ground plane is disposed on one surface of the dielectric substrate without completely covering the surface of the dielectric substrate. The radiating portion is disposed on the surface of the dielectric substrate without overlapping the ground plane, and is internally embedded with an inductive element, via which a continuous path through the inductive element is formed between a start point and an open end of the radiating portion. Since the inductive element can compensate for an increased capacitive reactance caused by a reduced antenna length, good antenna matching can still be achieved even when the size of the antenna is reduced.

(73) Assignee: **ACER INCORPORATED**,
Hsichih (TW)

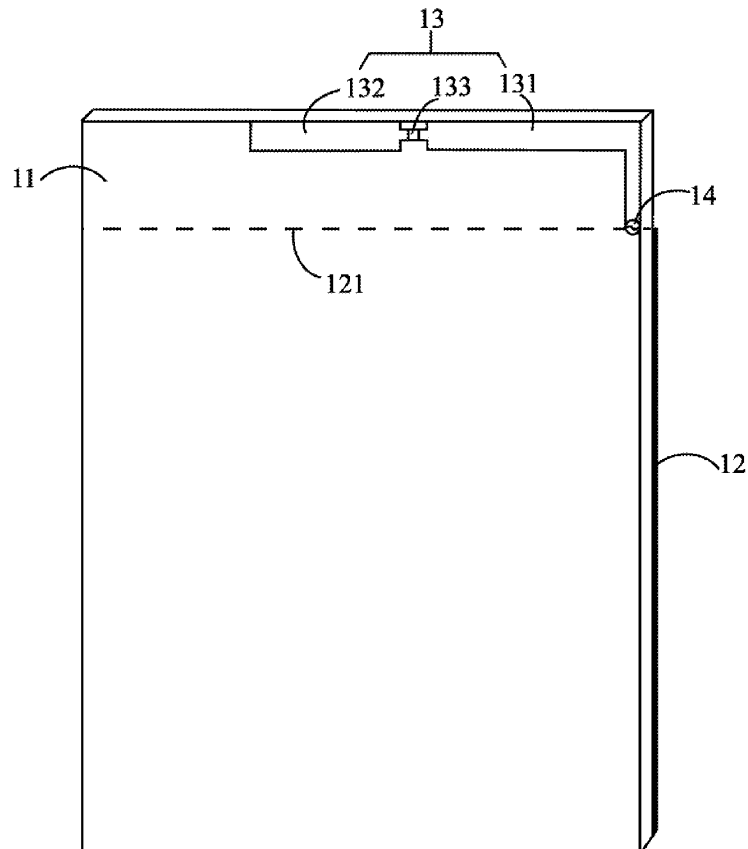
(21) Appl. No.: **12/561,226**

(22) Filed: **Sep. 16, 2009**

(30) **Foreign Application Priority Data**

Jun. 6, 2009 (TW) 098118975

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US 20100309087A1

(19) **United States**(12) **Patent Application Publication****Tsai et al.**(10) **Pub. No.: US 2010/0309087 A1**(43) **Pub. Date: Dec. 9, 2010**(54) **CHIP ANTENNA DEVICE****Publication Classification**

(75) Inventors: **Yueh-Lin Tsai**, Yunlin County (TW); **Sheng-Kai Wen**, Kaohsiung City (TW); **Chih-Wei Chen**, Miaoli County (TW)

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/50 (2006.01)
(52) **U.S. Cl.** **343/861; 343/700 MS**

(57) **ABSTRACT**

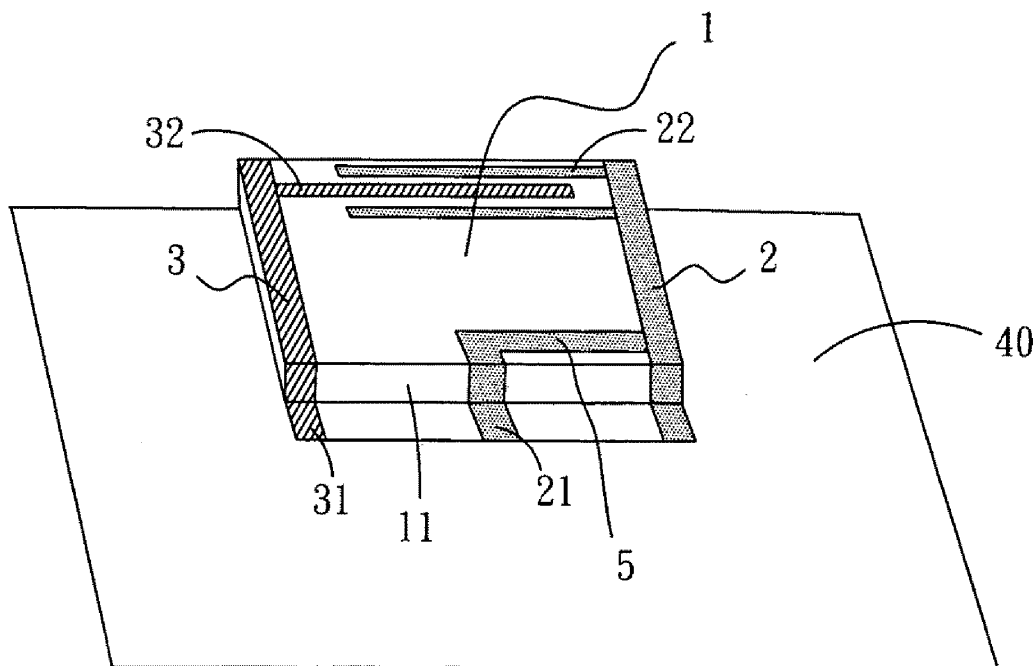
Correspondence Address:
BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314-1176 (US)

(73) Assignee: **INPAQ TECHNOLOGY CO., LTD.**, Hsinchu (TW)

(21) Appl. No.: **12/457,229**

(22) Filed: **Jun. 4, 2009**

A chip antenna device includes a single or multi-layer dielectric substrate, a radiator body, one or a plurality of first coupling electrodes formed on the radiator body, and a ground radiator formed on the upper or lower surface or inter-layer in another end of the substrate. It is designed by using loops and coupling concepts. The chip antenna device does not require large areas and clear space but has high radiation efficiency. It adjusts the impedance matching and operation frequency by changing the signal feed position, so that low frequency operation can be achieved without increasing the area of said antenna meeting the requirements of compact size for electronic products.



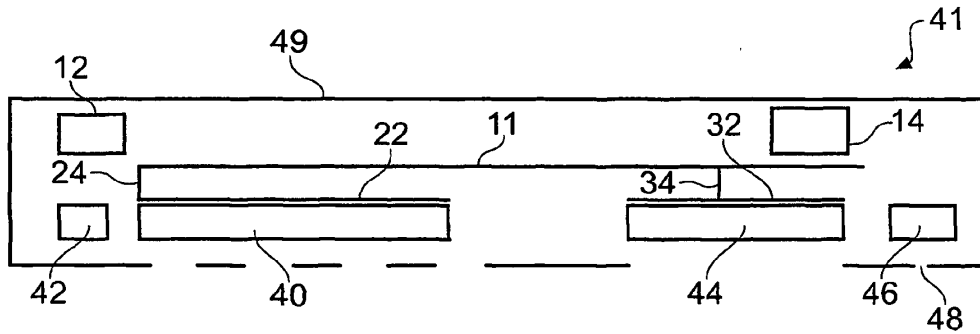
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US 20100315293A1

(19) **United States**(12) **Patent Application Publication**
Lehtola et al.(10) **Pub. No.: US 2010/0315293 A1**(43) **Pub. Date: Dec. 16, 2010**(54) **RADIATION PATTERN CONTROL**(86) PCT No.: **PCT/IB2007/001678**(75) Inventors: **Antero Lehtola**, Turku (FI); **Aimo Arkko**, Ruutana (FI)§ 371 (c)(1),
(2), (4) Date:**Aug. 18, 2009****Publication Classification**Correspondence Address:
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4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212 (US)(51) **Int. Cl.**
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**(73) Assignee: **NOKIA CORPORATION**,
ESPOO (FI)(21) Appl. No.: **12/449,631**(22) PCT Filed: **Feb. 28, 2007**

An apparatus including: a first antenna element; a second antenna element; a ground plane element for at least one of the first and second antenna elements; a first choke arranged to affect a first maximum of current density produced in the ground plane element by the first antenna element; and a second choke arranged to affect a second maximum of current density produced in the ground plane element by the second antenna element.



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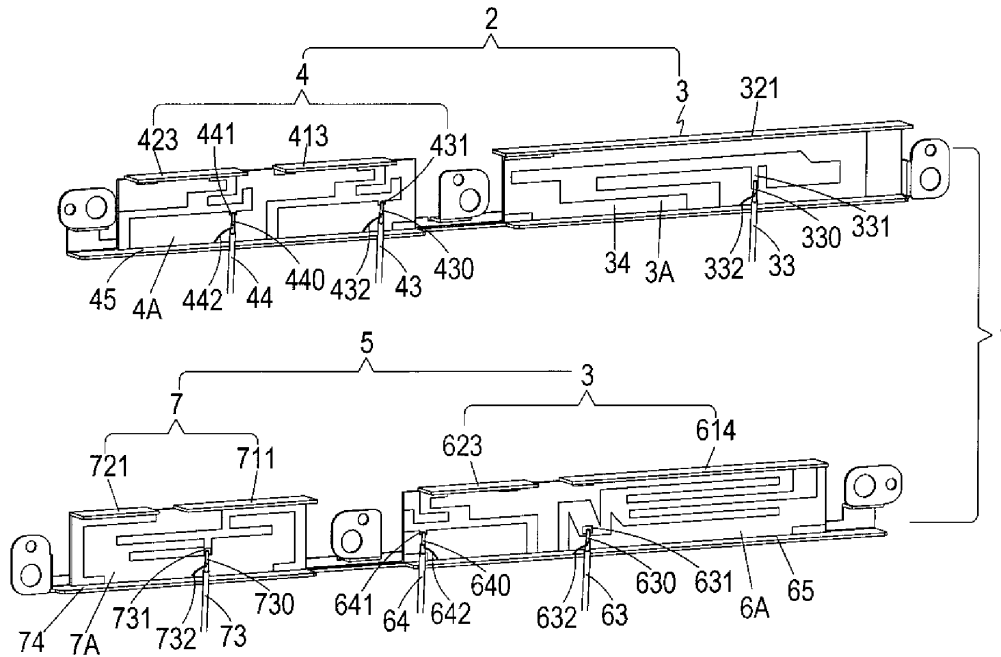
US 20100315294A1

(19) **United States**(12) **Patent Application Publication**
Chang et al.(10) **Pub. No.: US 2010/0315294 A1**(43) **Pub. Date: Dec. 16, 2010**(54) **INTEGRATED MULTI-BAND ANTENNA
MODULE**(52) **U.S. CL. 343/700 MS**(76) Inventors: **Pao-Sui Chang**, Taoyuan County
(TW); **Yu-Sheng Wu**, Taoyuan
County (TW)

Correspondence Address:

Pao-Sui Chang
235 Chung - Ho Box 8-24 Taipei, Taiwan, R. O. C.
Taipei 235 (TW)(21) Appl. No.: **12/482,457**(22) Filed: **Jun. 11, 2009****Publication Classification**(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 5/00 (2006.01)(57) **ABSTRACT**

An integrated multi-band antenna module includes a first antenna body having a first body and a second body, and a second antenna body having a third body and a fourth body. The first to the fourth body have relative radiating portions, feed lines, and ground lines. The radiating portions have relative arms, antenna portions, feed arms, and conducting top plates. Resonant excitation sources are formed by capacitive coupling effects from gaps between the above components. The capacitive coupling effects also lower the inductance effect and the reflection loss. Mirror effect and large-scaling conducting top plates are used to raise a radiating effect. The relative gaps form the capacitive coupling effects to receive optimized frequencies so that a small-size integrated antenna with multi-band, high radiating effect, good resonant effect, and suitable for an ultra wide bandwidth operation is achieved.



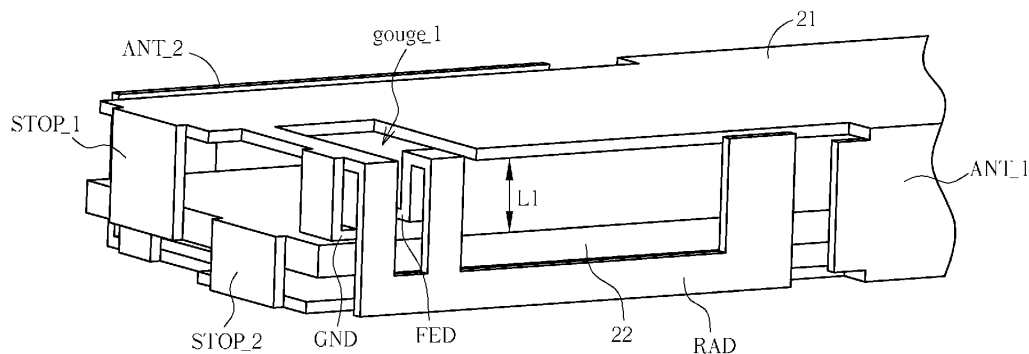
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US 20100315297A1

(19) **United States**(12) **Patent Application Publication**
Wu et al.(10) **Pub. No.: US 2010/0315297 A1**(43) **Pub. Date: Dec. 16, 2010**(54) **WIRELESS DEVICE AND METHOD FOR
MANUFACTURING THE SAME****Publication Classification**(76) Inventors: **Min-Chung Wu**, Taoyuan County
(TW); **Shao-Chin Lo**, Miaoli City
(TW)(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H05K 13/00 (2006.01)Correspondence Address:
**NORTH AMERICA INTELLECTUAL PROP-
ERTY CORPORATION**
P.O. BOX 506
MERRIFIELD, VA 22116 (US)(52) **U.S. Cl. 343/702; 29/592.1**(21) Appl. No.: **12/562,122**(22) Filed: **Sep. 17, 2009****Related U.S. Application Data**(60) Provisional application No. 61/186,381, filed on Jun.
12, 2009.(57) **ABSTRACT**

The present invention discloses a wireless device, which includes a housing and a printed circuit board (PCB). The housing has an opening at one end, and includes at least one antenna each formed on one side of the housing. The PCB, disposed inside the housing, includes a plurality of contacts, formed on both sides of the PCB, for coupling to the at least one antenna such that vertical position of the PCB is fixed by the at least one antenna. The housing and the PCB further form a connector of the wireless device at the opening.



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US 20100315300A1

(19) **United States**

(12) **Patent Application Publication**
Wu et al.

(10) **Pub. No.: US 2010/0315300 A1**

(43) **Pub. Date: Dec. 16, 2010**

(54) **HANDHELD ELECTRONIC DEVICE**

(30) **Foreign Application Priority Data**

(75) Inventors: **Wei-Yang Wu**, Taoyuan (TW);
Ying-Cong Deng, Taoyuan (TW);
Chung-Ting Hung, Taoyuan (TW);
Kuo-Cheng Chen, Taoyuan (TW)

Jun. 15, 2009 (TW) 098119958

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)

(52) **U.S. Cl.** **343/702**

Correspondence Address:

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1101 14TH STREET, NW, SUITE 500
WASHINGTON, DC 20005 (US)

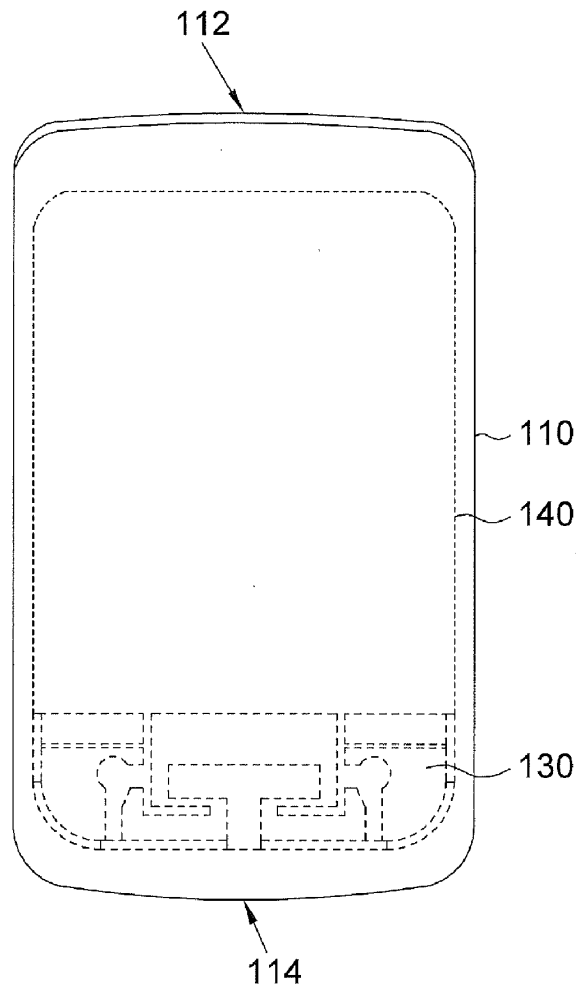
(57) **ABSTRACT**

(73) Assignee: **HTC Corporation**, Taoyuan
County (TW)

(21) Appl. No.: **12/694,432**

(22) Filed: **Jan. 27, 2010**

A handheld electronic device comprises a housing, a receiver, a balance antenna and a body. The housing comprises a top end and a bottom end. The receiver is located in the housing and near the top end, and the balance antenna is located in the housing and near the bottom end. The body is located in the housing and electrically couples to the receiver and the balance antenna.



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US 20100321264A1

(19) **United States**(12) **Patent Application Publication**
TU(10) **Pub. No.: US 2010/0321264 A1**(43) **Pub. Date: Dec. 23, 2010**(54) **SLOT ANTENNA****Publication Classification**(75) Inventor: **HSIN-LUNG TU, Tu-Cheng (TW)**(51) **Int. Cl.**
H01Q 13/10 (2006.01)(52) **U.S. Cl.** **343/767**

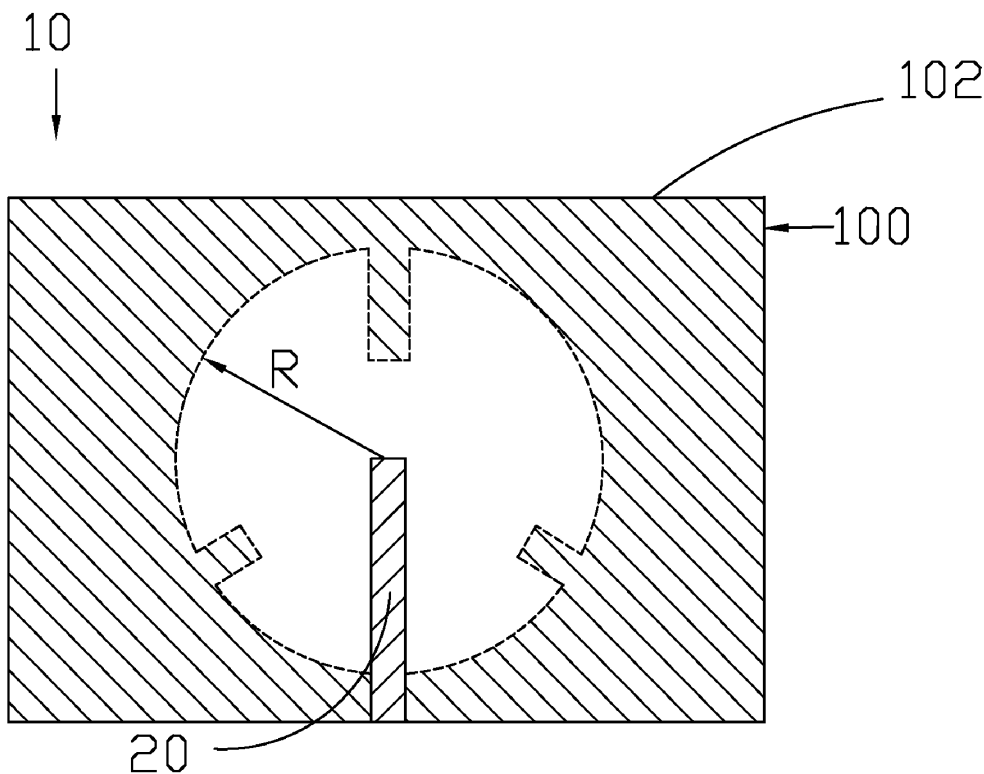
Correspondence Address:

Altis Law Group, Inc.**ATTN: Steven Reiss****288 SOUTH MAYO AVENUE****CITY OF INDUSTRY, CA 91789 (US)**(73) Assignee: **HON HAI PRECISION**
INDUSTRY CO., LTD., Tu-Cheng
(TW)(21) Appl. No.: **12/641,576**(22) Filed: **Dec. 18, 2009**(30) **Foreign Application Priority Data**

Jun. 18, 2009 (CN) 200910303410.2

(57) **ABSTRACT**

A slot antenna located on a substrate with a first surface and a second surface opposite to the first surface includes a feeding portion, a grounding portion and a radiating portion. The feeding portion is located on the first surface of the substrate to feed electromagnetic signals. The grounding portion is rectangular and located on the second surface of the substrate, and defines a circular clearance in a substantial center portion thereof. The radiating portion is located on the second surface of the substrate and comprises at least one elongated microstrip with one end connected to the grounding portion and the other end extending towards the centre of the circular clearance, wherein the feeding portion interacts with the radiating portion to transmit the electromagnetic signals.



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US 20100321266A1

(19) **United States**(12) **Patent Application Publication**
Schreider et al.(10) **Pub. No.: US 2010/0321266 A1**(43) **Pub. Date: Dec. 23, 2010**(54) **ANTENNA HAVING A REFLECTOR WITH
COVERAGE AND FREQUENCY
FLEXIBILITY AND SATELLITE
COMPRISING SUCH AN ANTENNA****Publication Classification**(51) **Int. Cl.**
H01Q 15/14 (2006.01)(52) **U.S. Cl.** **343/777**(75) **Inventors:** **Ludovic Schreider**, Ville (FR);
Pierre Bosshard, Tournefeuille
(FR); **Serge Depeyre**, Blagnac (FR)

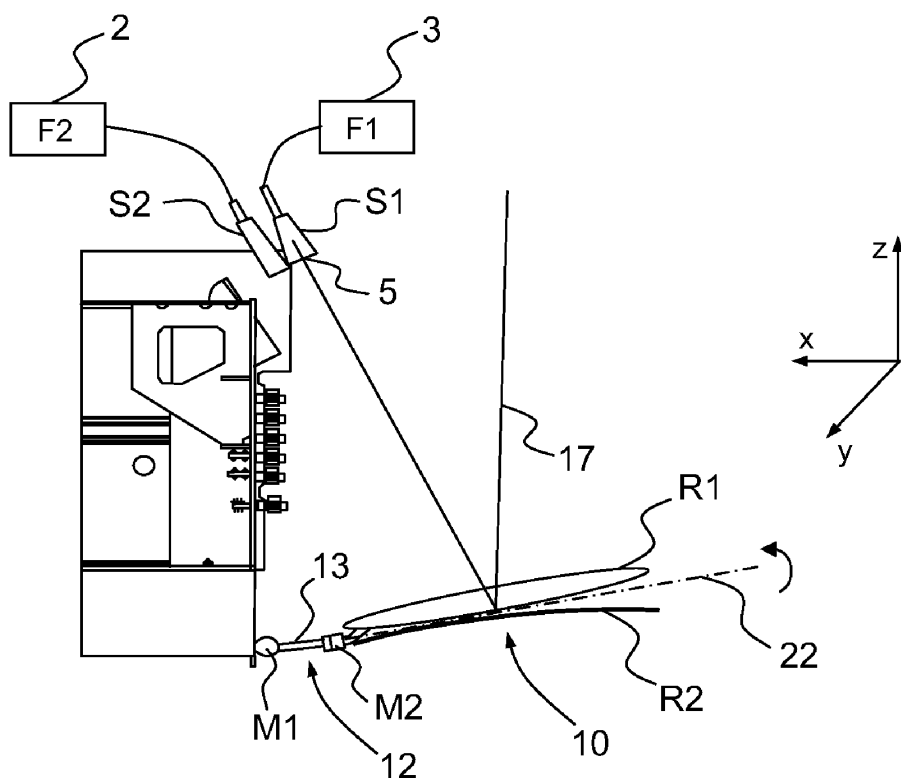
Correspondence Address:

BAKER & HOSTETLER LLP
WASHINGTON SQUARE, SUITE 1100, 1050
CONNECTICUT AVE. N.W.
WASHINGTON, DC 20036-5304 (US)(73) **Assignee:** **THALES**, Neuilly-sur-Seine (FR)(21) **Appl. No.:** **12/820,013**(22) **Filed:** **Jun. 21, 2010**(30) **Foreign Application Priority Data**

Jun. 19, 2009 (FR) 0902995

ABSTRACT

An antenna including a reflector with coverage and frequency flexibility is provided. The antenna comprises a reversible reflector having two separate reflecting surfaces shaped geometrically so as to cover respectively a first and a second geographical zone which are different and have predetermined shapes, in which the two reflecting surfaces are fastened back to back on a common support, and at least two independent sources arranged in a fixed configuration and connected to separate radiofrequency supply chains defining different and predefined operating frequency planes, the reflector having a first deployment position, in which the focal point of the first reflecting surface is located at the phase centre of the first source, and a second deployment position, in which the focal point of the second reflecting surface is located at the phase centre of the second source. Application notably to the field of satellite telecommunication antennae.



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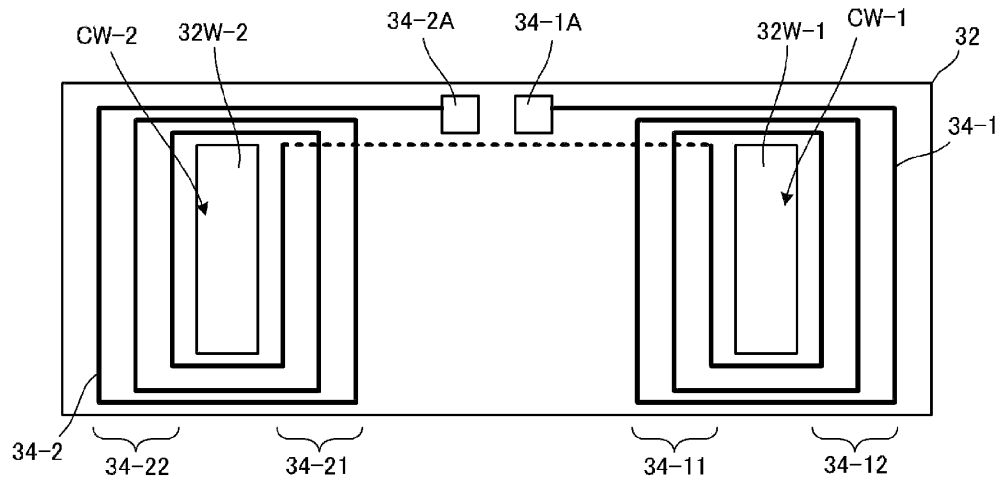
US 20100321267A1

(19) **United States**(12) **Patent Application Publication**
ITO et al.(10) **Pub. No.: US 2010/0321267 A1**(43) **Pub. Date: Dec. 23, 2010**(54) **ANTENNA DEVICE**(30) **Foreign Application Priority Data**(75) Inventors: **Hiromitsu ITO**, Kyoto-fu (JP);
Hiroyuki KUBO, Shiga-ken (JP);
Kuniaki YOSUI, Kyoto-fu (JP)

Jun. 22, 2009 (JP) 2009-147496

Publication Classification(51) **Int. Cl.**
H01Q 7/08 (2006.01)(52) **U.S. Cl.** **343/788**(57) **ABSTRACT**Correspondence Address:
Stuebaker & Brackett PC
One Fountain Square, 11911 Freedom Drive, Suite
750
Reston, VA 20190 (US)

An antenna device includes a circuit board and an antenna coil that includes a flexible board on which plural coil conductors are formed and a magnetic core inserted into through holes provided in the flexible board. In each of the plural coil conductors, a first conductor portion is adjacent to a first principal surface of the magnetic core and a second conductor portion is adjacent to a second principal surface of the magnetic core and are positioned so as not to overlap each other in a normal direction with respect to the first or second principal surfaces. The second conductor portion is located farther from the center of the circuit board than the first conductor portion.

(73) Assignee: **MURATA MANUFACTURING**
CO., LTD., Kyoto-fu (JP)(21) Appl. No.: **12/819,853**(22) Filed: **Jun. 21, 2010**

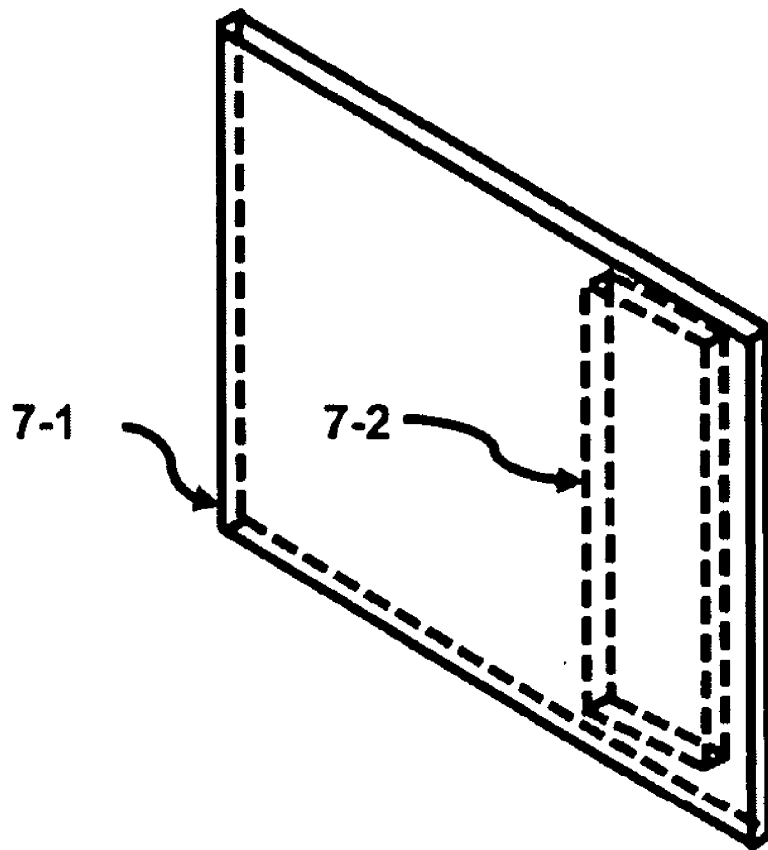
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US 20100321270A1

(19) **United States**(12) **Patent Application Publication**
Pan et al.(10) **Pub. No.: US 2010/0321270 A1**(43) **Pub. Date: Dec. 23, 2010**(54) **HIGH GAIN MULTIPLE PLANAR
REFLECTOR ULTRA-WIDE BAND (UWB)
ANTENNA STRUCTURE**(75) Inventors: **Bo Pan**, Irvine, CA (US); **Frederic
Battaglia**, Irvine, CA (US);
KuangYu Li, Irvine, CA (US);
Ran-Hong Yan, Irvine, CA (US);
Kuan Loek Sun, Irvine, CA (US)Correspondence Address:
THADDEUS GABARA
62 BURLINGTON ROAD
MURRAY HILL, NJ 07974 (US)(73) Assignee: **Wionics Technologies, Inc.**, Irvine,
CA (US)(21) Appl. No.: **12/488,509**(22) Filed: **Jun. 19, 2009****Publication Classification**(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 19/10 (2006.01)
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/837; 343/700 MS**(57) **ABSTRACT**

Multiple out-of-plane planar reflectors can be used to build a receive/transmit high-gain directional antenna. The driver portion and the first reflector of the antenna are formed within a metal layer of a PWB. A plurality of sets of reflector plates can be placed on the PWB, on a non-conductive low-dielectric constant material coating both opposing planar surfaces of the PWB, or on the opposing sidewalls of the product housing unit. The metal layer in the PWB is placed between the reflector plates. The plates can have either a parallel or non-parallel orientation to each another. This greatly increase the received power and thus increases the operating range of a low-power UWB system, as well as significantly improves wireless data transmission throughput. This antenna is applicable for USB communications systems.



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US 20100328158A1

(19) **United States**(12) **Patent Application Publication**
SAVOLAINEN(10) **Pub. No.: US 2010/0328158 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **ANTENNA ARRANGEMENT**(30) **Foreign Application Priority Data**(75) Inventor: **Risto Kalevi SAVOLAINEN**, Le
Rouret (FR)

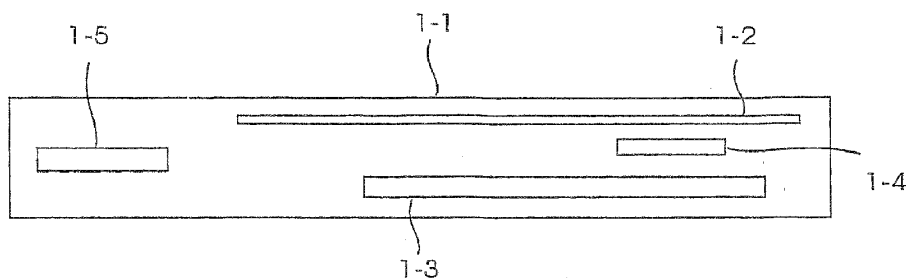
Oct. 19, 2005 (EP) 05109729.3

Publication Classification

Correspondence Address:

YOUNG & THOMPSON
209 Madison Street, Suite 500
Alexandria, VA 22314 (US)(51) **Int. Cl.****G01S 3/02** (2006.01)**H01Q 1/00** (2006.01)(52) **U.S. Cl.** **342/451**; 343/722; 342/450(73) Assignee: **BLUESKY POSITIONING**
LIMITED, Surbiton (GB)(57) **ABSTRACT**(21) Appl. No.: **12/877,371**(22) Filed: **Sep. 8, 2010****Related U.S. Application Data**(62) Division of application No. 12/090,650, filed on May
31, 2008, filed as application No. PCT/FI2006/050448
on Oct. 18, 2006.

An antenna (2-20) for use in a mobile device (1-1) includes elements for receiving (2-5, 3-1, 4-1, 5-1, 6-5) a signal from a satellite positioning system; a first layer of dielectric material (2-4a, 2-4b, 3-2, 3-3, 5-2, 4-3, 5-2, 5-3, 6-4, 6-15) and a second layer of dielectric material (2-4a, 2-4b, 3-2, 3-3, 5-2, 4-3, 5-2, 5-3, 6-4, 6-15), wherein the elements for receiving (2-5, 3-1, 4-1, 5-1, 6-5, 7-6) the signal is at least partly between the first dielectric layer (2-4a, 2-4b, 3-2, 3-3, 5-2, 4-3, 5-2, 5-3, 6-4, 6-15) and the second dielectric layer (2-4a, 2-4b, 3-2, 3-3, 5-2, 4-3, 5-2, 5-3, 6-4, 6-15).



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US 20100328159A1

(19) **United States**(12) **Patent Application Publication****Yang et al.**(10) **Pub. No.: US 2010/0328159 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **ANTENNA STRUCTURE****Publication Classification**

(76) Inventors: **Chung-Wen Yang**, Taipei (TW);
Yu-Yuan Wu, Taipei (TW);
Hung-Jen Chen, Taipei (TW)

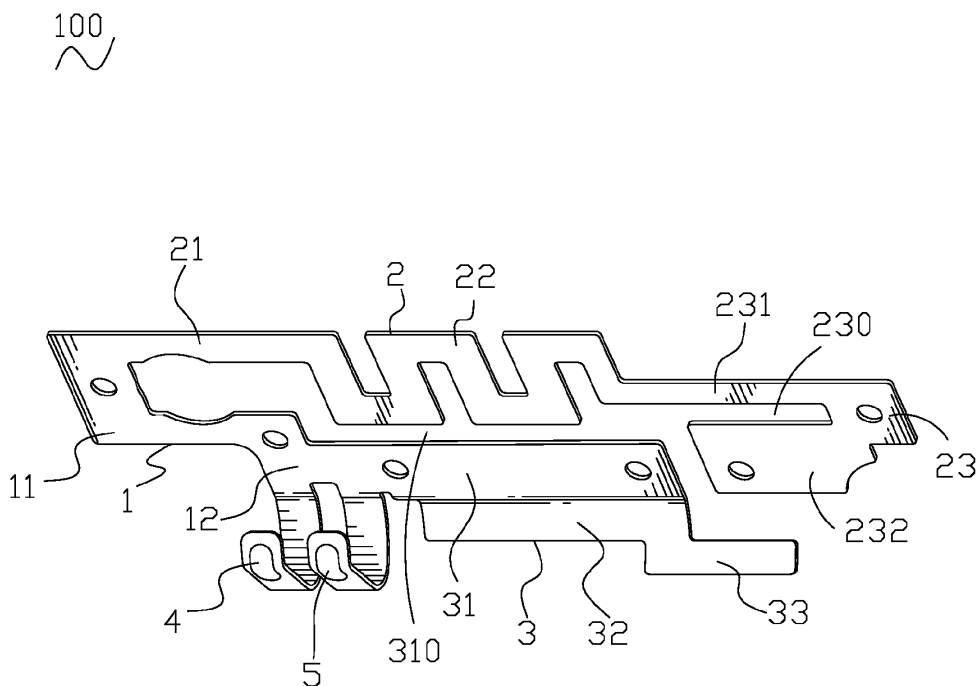
(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 1/36 (2006.01)
(52) **U.S. Cl.** **343/700 MS**

(57) **ABSTRACT**

Correspondence Address:

LIN & ASSOCIATES INTELLECTUAL PROP-
ERTY, INC.**P.O. BOX 2339****SARATOGA, CA 95070-0339 (US)**

An antenna structure includes a low frequency radiator, a high frequency radiator, and a connecting element. The connecting element has a rear end and a front end opposite to the rear end. A feeding element and a grounding element are extended from the front end of the connecting element and arranged adjacent to each other. The low frequency radiator includes a substantially inverted-L shaped first radiating part extended from the rear end of the connecting element, a meander-like second radiating part extended frontward from a front end of the first radiating part, and a substantially lying U-shaped third radiating part with a rearward opening extended from a free end of the second radiating part. The high frequency radiator includes a first extension piece extended frontward from the front end of the connecting element and located under the second radiating part with space.

(21) Appl. No.: **12/491,242**(22) Filed: **Jun. 25, 2009**

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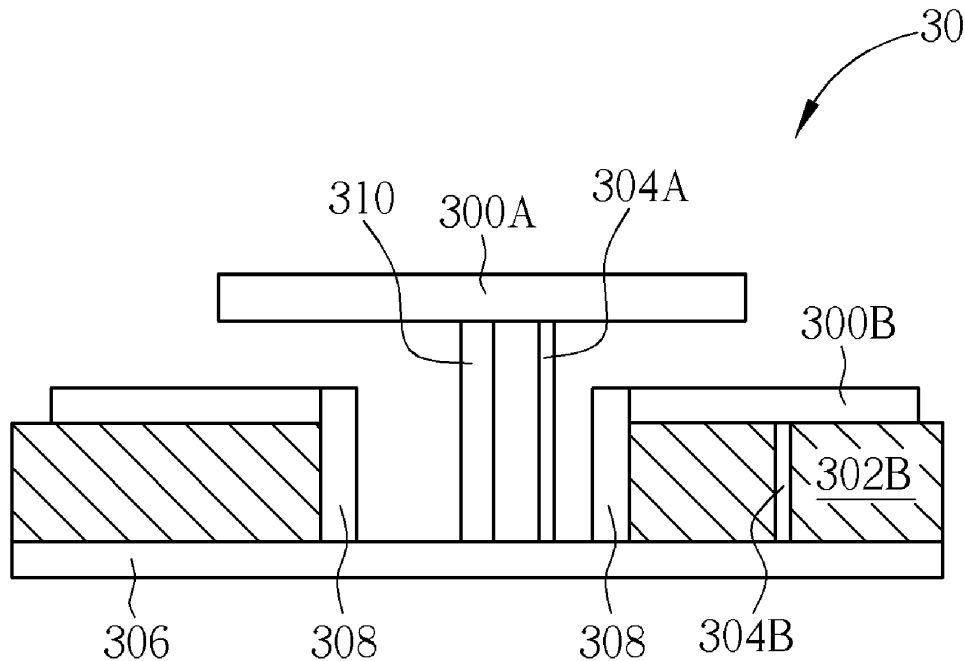
US 20100328160A1

(19) **United States**(12) **Patent Application Publication****Hsu et al.**(10) **Pub. No.: US 2010/0328160 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **DUAL ANTENNA DEVICE****Publication Classification**(76) Inventors: **Chieh-Sheng Hsu**, Taipei Hsien (TW); **Chang-Hsiu Huang**, Taipei Hsien (TW)(51) **Int. Cl.**
H01Q 9/04 (2006.01)(52) **U.S. Cl.** **343/700 MS**Correspondence Address:
**NORTH AMERICA INTELLECTUAL PROP-
ERTY CORPORATION**
P.O. BOX 506
MERRIFIELD, VA 22116 (US)(57) **ABSTRACT**

A dual antenna device includes a first antenna of a first polarization, a second antenna of a second polarization, and a conducting wall. The first antenna includes a grounding unit, a first substrate positioned on the grounding unit, a first radiating unit positioned on the first substrate, and a first feeding unit coupled to the first radiating unit. The conducting wall is coupled to the grounding unit and the first radiating unit, and forms a space above the grounding unit. The second antenna includes a second radiating unit and a second feeding unit coupled to the second radiating unit and placed through the space.

(21) Appl. No.: **12/783,525**(22) Filed: **May 19, 2010**(30) **Foreign Application Priority Data**

Jun. 30, 2009 (TW) 098122033



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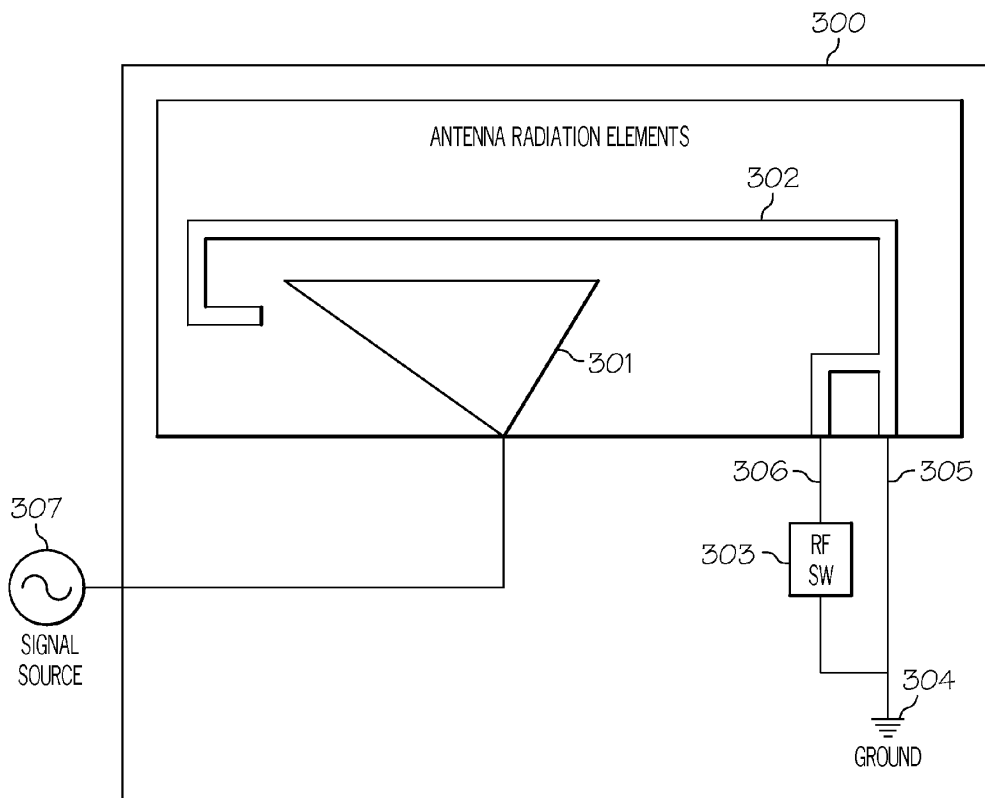
US 20100328164A1

(19) **United States**(12) **Patent Application Publication**
Huynh(10) **Pub. No.: US 2010/0328164 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **SWITCHED ANTENNA WITH AN ULTRA
WIDEBAND FEED ELEMENT**(52) **U.S. CL.** 343/702; 343/700 MS(76) Inventor: **Minh-Chau Huynh**, Morrisville,
NC (US)(57) **ABSTRACT**

Correspondence Address:

MOORE AND VAN ALLEN PLLC FOR SEMC
P.O. BOX 13706, 430 DAVIS DRIVE, SUITE 500
RESEARCH TRIANGLE PARK, NC 27709 (US)(21) Appl. No.: **12/494,513**(22) Filed: **Jun. 30, 2009****Publication Classification**(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/24 (2006.01)

An antenna that includes an ultra wideband (UWB) feed element, a parasitic conductive element, and a radio frequency (RF) switch. The UWB feed element is capable of radiating a first frequency band. The parasitic conductive element is connected to an electrical ground and capable of radiating a second frequency band. The parasitic conductive element has no electrical contact with the UWB feed element. The RF switch is connected between the parasitic conductive element and the electrical ground and configured to vary an electrical current path between the parasitic conductive element and the electrical ground. The varying of the electrical current path changes a resonant frequency of the second frequency band of the antenna.



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US 20100328165A1

(19) **United States**(12) **Patent Application Publication**
HSU(10) **Pub. No.: US 2010/0328165 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **ANTENNA AND PORTABLE WIRELESS
COMMUNICATION DEVICE USING THE
SAME**(30) **Foreign Application Priority Data**

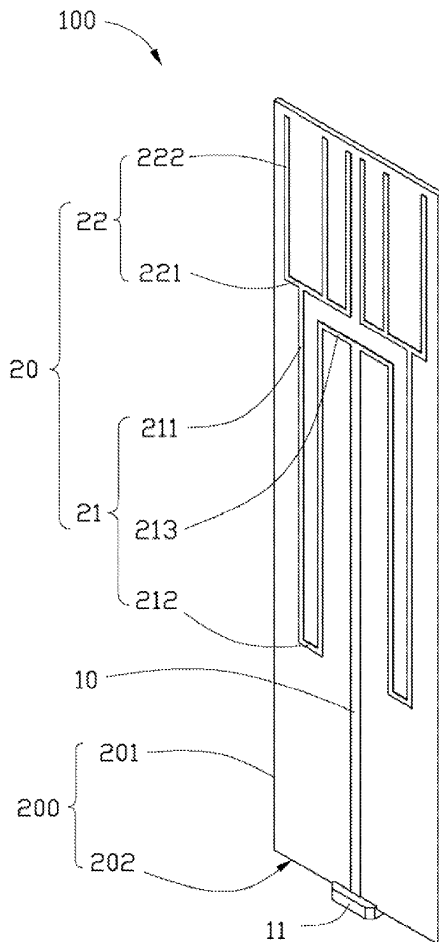
Jun. 25, 2009 (CN) 200910303679.0

Publication Classification(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702; 343/700 MS**(57) **ABSTRACT**

An antenna mounted on a baseboard including a first surface and a second surface opposite to the first surface includes a feed portion, two radiating portions, a ground portion and a coupling portion. The feed portion and the two radiating portions are disposed on the first surface, and the two radiating portions are connected to the feed portion. The ground portion and the coupling portion are disposed on the second surface, and the coupling portion is connected to the ground portion. The coupling portion passes through the baseboard and couples with two radiating portions.

(75) Inventor: **CHO-KANG HSU, Taipei (TW)**

Correspondence Address:

Altis Law Group, Inc.**ATTN: Steven Reiss****288 SOUTH MAYO AVENUE****CITY OF INDUSTRY, CA 91789 (US)**(73) Assignee: **CHI MEI COMMUNICATION
SYSTEMS, INC., Tu-Cheng City
(TW)**(21) Appl. No.: **12/617,358**(22) Filed: **Nov. 12, 2009**

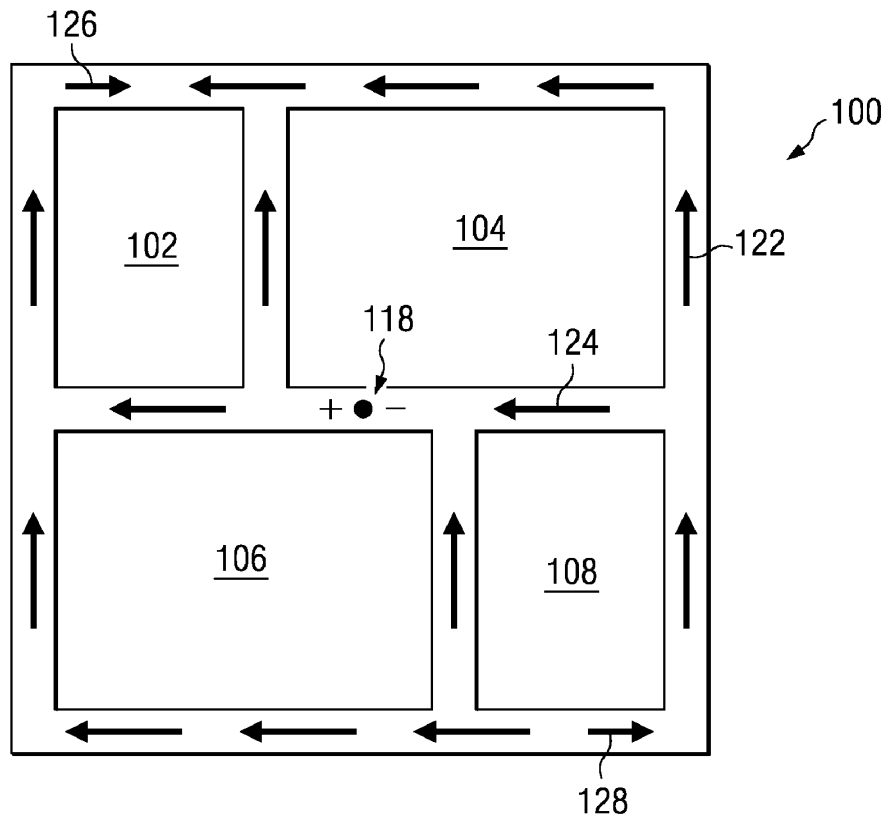
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US 20100328173A1

(19) **United States**(12) **Patent Application Publication**
Rao(10) **Pub. No.: US 2010/0328173 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **SINGLE FEED PLANAR
DUAL-POLARIZATION MULTI-LOOP
ELEMENT ANTENNA****Publication Classification**(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 1/36 (2006.01)(75) Inventor: **Qinjiang Rao, Waterloo (CA)**(52) **U.S. Cl.** **343/742; 343/700 MS; 343/843;
343/867**Correspondence Address:
Hamilton & Terrile, LLP- RIM
P.O. Box 203518
Austin, TX 78720 (US)(57) **ABSTRACT**

Dual polarization in an antenna structure that results from a number of radiating elements arranged in a loop configuration. The antenna structure is excited by a single coaxial feedline in an interior portion of the antenna structure. The antenna structure may include a ground plane that enables a directional radiation pattern. The antenna structure may also be operational without a ground plane to enable an omnidirectional radiation pattern. The antenna structure may be configured in a number of loop configurations electrically connected to each other by a number of microstrip loops extending in a horizontal and vertical planar direction.

(73) Assignee: **RESEARCH IN MOTION
LIMITED, Waterloo (CA)**(21) Appl. No.: **12/494,246**(22) Filed: **Jun. 29, 2009**

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US 20100328182A1

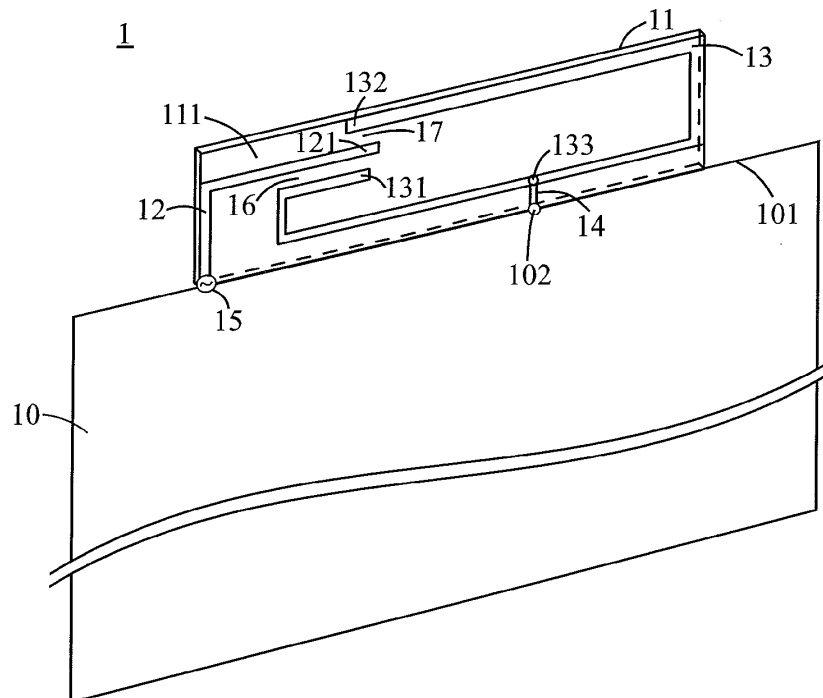
(19) **United States**(12) **Patent Application Publication**
Wong et al.(10) **Pub. No.: US 2010/0328182 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **MULTIBAND ANTENNA**(52) **U.S. CL.** **343/848; 343/700 MS**(76) **Inventors:** **Kin-Lu Wong**, Hsichih (TW);
Li-Chun Lee, Hsichih (TW)(57) **ABSTRACT**

Correspondence Address:
KAMRATH & ASSOCIATES P.A.
4825 OLSON MEMORIAL HIGHWAY, SUITE
245
GOLDEN VALLEY, MN 55422 (US)

The present invention discloses a multiband antenna. The antenna comprises a ground plane, a dielectric substrate and a radiating metal portion. The dielectric substrate is located at one side edge of the ground plane. The radiating metal portion is disposed on one surface of the dielectric substrate and comprises a first metal portion and a second metal portion. The first metal portion is substantially of an L-shape. One end of the first metal portion is adjacent to the side edge of the ground plane and is the antenna's feeding point connected to a signal source, and the other end of the first metal portion is an open end. The second metal portion comprises a U-shape portion. The second metal portion comprises a first open end and a second open end, which are respectively located on two opposite sides of the open end of the first metal portion. The first open end has a first coupling gap between the first open end and the open end of the first metal portion; and the second open end has a second coupling gap between the second open end and the open end of the first metal portion. The second metal portion is further short-circuited to the ground plane by a shorting metal line.

(21) **Appl. No.: 12/559,569**(22) **Filed: Sep. 15, 2009**(30) **Foreign Application Priority Data**

Jun. 29, 2009 (TW) 098121911

Publication Classification(51) **Int. Cl.**
H01Q 1/48 (2006.01)
H01Q 1/38 (2006.01)

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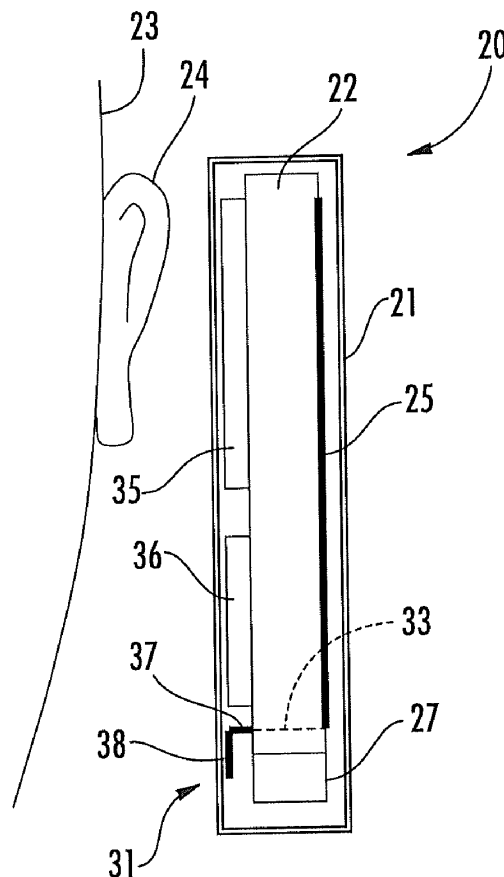
US 20100328183A1

(19) **United States**(12) **Patent Application Publication**
Qi et al.(10) **Pub. No.: US 2010/0328183 A1**(43) **Pub. Date: Dec. 30, 2010**(54) **MOBILE WIRELESS COMMUNICATIONS
DEVICE INCLUDING A GROUND PATCH
PROVIDING SPECIFIC ABSORPTION RATE
(SAR) REDUCTION AND RELATED
METHODS**(75) Inventors: **Yihong Qi**, St. Agatha (CA); **Ying
Tong Man**, Waterloo (CA); **Perry
Jarmuszewski**, Waterloo (CA)

Correspondence Address:

Allen, Dyer, Doppelt, Milbrath & Gilchrist - RIM
255 S. Orange Avenue, Suite 1401
Orlando, FL 32801 (US)(73) Assignee: **Research In Motion Limited**,
Waterloo (CA)(21) Appl. No.: **12/872,533**(22) Filed: **Aug. 31, 2010****Related U.S. Application Data**(63) Continuation of application No. 12/472,638, filed on
May 27, 2009, now Pat. No. 7,791,547, which is a
continuation of application No. 11/733,360, filed on
Apr. 10, 2007, now Pat. No. 7,554,496.**Publication Classification**(51) **Int. Cl.**
H01Q 1/48 (2006.01)(52) **U.S. Cl.** **343/848**(57) **ABSTRACT**

A mobile wireless communications device may include a portable housing, a dielectric substrate carried by the portable housing having a front side facing toward a user and a back side opposite the front side, and a ground plane carried by the dielectric substrate. The device may further include at least one circuit carried by the dielectric substrate, and an antenna carried by the dielectric substrate adjacent an end thereof and electrically connected to the at least one circuit. A ground patch may be adjacent the front side of the dielectric substrate that is electrically connected to the ground plane and spaced apart from and at least partially overlapping the antenna.



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