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(19) **United States**

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

(10) **Pub. No.: US 2010/0052997 A1**

(43) **Pub. Date: Mar. 4, 2010**

(54) **ANTENNA MODULES AND PORTABLE
ELECTRONIC DEVICES USING THE SAME**

(22) Filed: **Oct. 29, 2008**

(75) Inventors: **SHIH-TSUNG KAN**, Tu-Cheng
(TW); **CHIA-HONG LIN**,
Tu-Cheng (TW); **CHANG-HSIN**
KUO, Tu-Cheng (TW);
WEN-HSIU HSU, Tu-Cheng (TW)

(30) **Foreign Application Priority Data**

Aug. 29, 2008 (TW) 97133127

Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/24 (2006.01)
H01Q 1/12 (2006.01)

(52) **U.S. Cl.** **343/702; 343/700 MS; 343/878**

Correspondence Address:

PCE INDUSTRY, INC.

ATT. Steven Reiss

288 SOUTH MAYO AVENUE

CITY OF INDUSTRY, CA 91789 (US)

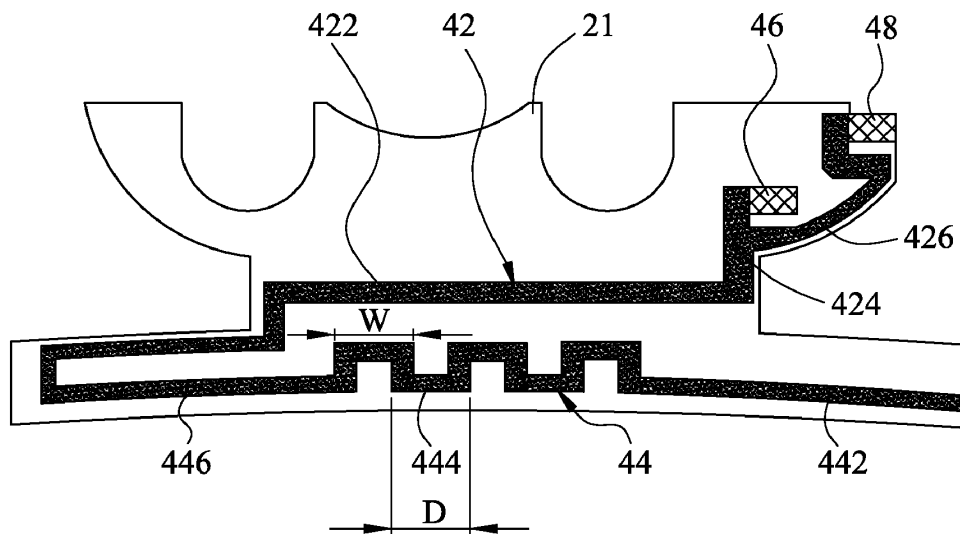
ABSTRACT

(73) Assignee: **CHI MEI COMMUNICATION
SYSTEMS, INC.**, Tu-Cheng City
(TW)

An antenna module includes an antenna set, a feeding point and a ground plane. The antenna set includes a first antenna, and a second antenna. The first antenna has a first resonant frequency and the second antenna a second resonant frequency.

(21) Appl. No.: **12/260,878**

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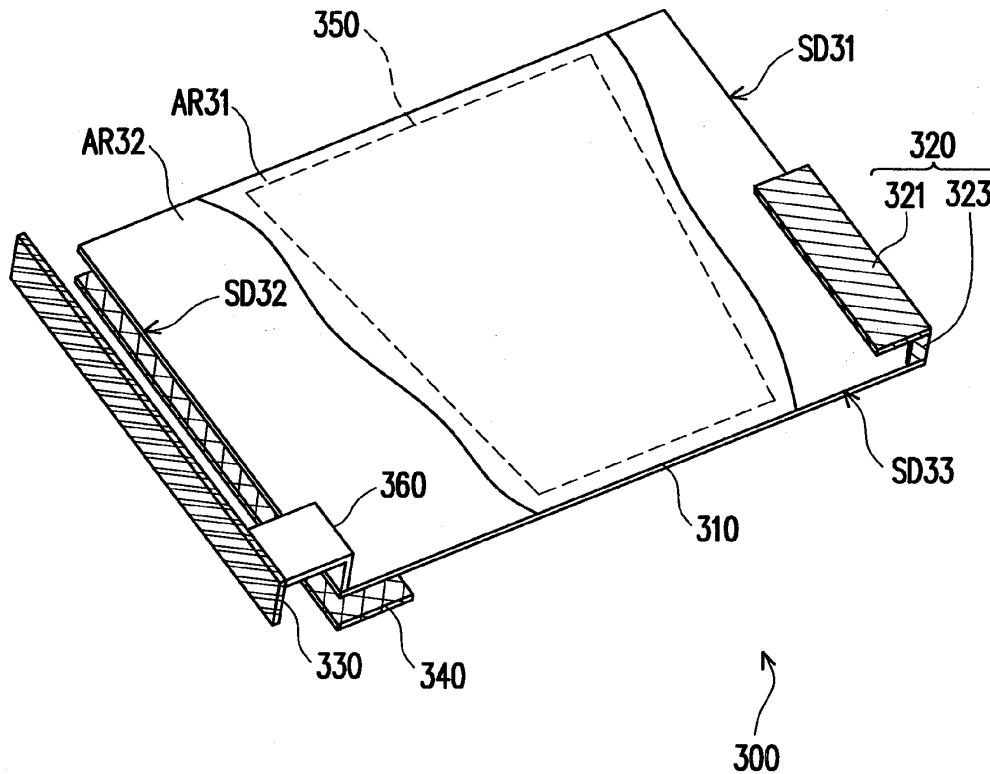
US 20100052998A1

(19) **United States**(12) **Patent Application Publication**
Teng et al.(10) **Pub. No.: US 2010/0052998 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **HANDSET DEVICE**(30) **Foreign Application Priority Data**(75) Inventors: **Pei-Ling Teng**, Taoyuan County
(TW); **Yi-Chun Chen**, Taoyuan
County (TW)

Sep. 3, 2008 (TW) 97133801

Publication Classification(51) **Int. Cl.**
H01Q 1/22 (2006.01)
H01Q 1/48 (2006.01)(52) **U.S. Cl.** **343/702; 343/848**(57) **ABSTRACT**

A handset device including a ground plane, an antenna, a first conductive strip and a second conductive strip is provided. The antenna is electrically connected to the ground plane and forms a current loop with the ground plane. The ground plane forms a current area according to the current loop. The first conductive strip is electrically connected to the current area and changes a current distribution on the ground plane to increase a current density passing through the current area.

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.: **12/371,633**(22) Filed: **Feb. 16, 2009**

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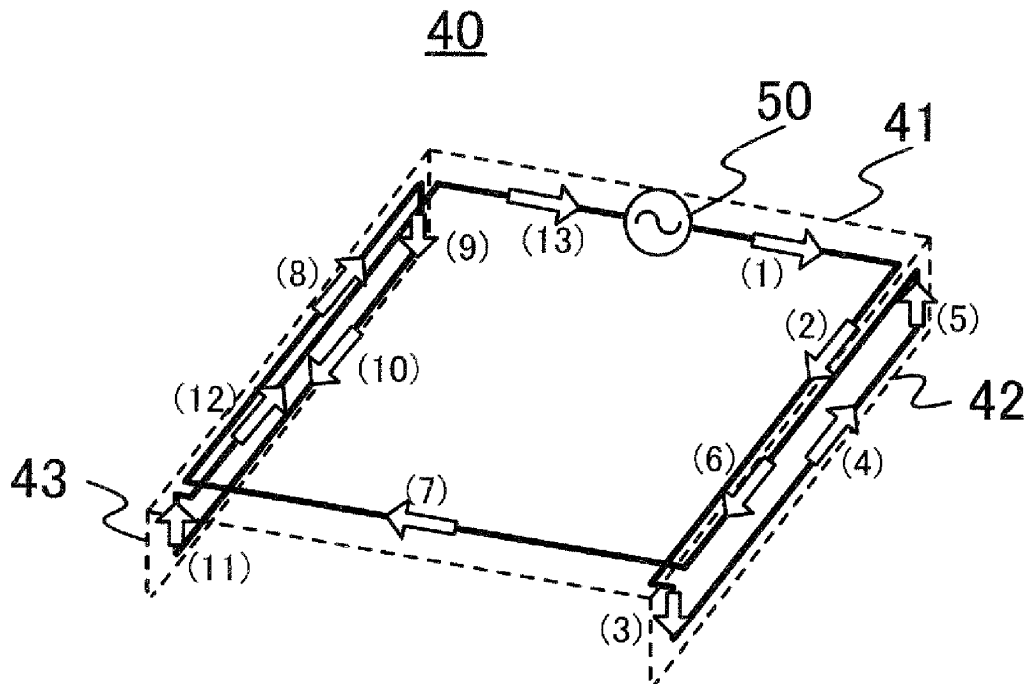
US 20100052999A1

(19) **United States**(12) **Patent Application Publication**
Minemura et al.(10) **Pub. No.: US 2010/0052999 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **RADIO APPARATUS AND ANTENNA
ADAPTED FOR CONTACTLESS
COMMUNICATION****Publication Classification**(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 7/04 (2006.01)(52) **U.S. Cl.** **343/702; 343/867**(75) **Inventors:** **Takashi Minemura**, Tokyo (JP);
Naoto Ito, Tokyo (JP)**Correspondence Address:**
FRISHAUF, HOLTZ, GOODMAN & CHICK, PC
220 Fifth Avenue, 16TH Floor
NEW YORK, NY 10001-7708 (US)(73) **Assignee:** **KABUSHIKI KAISHA**
TOSHIBA, Tokyo (JP)(21) **Appl. No.:** **12/402,647**(22) **Filed:** **Mar. 12, 2009**(30) **Foreign Application Priority Data**

Aug. 29, 2008 (JP) 2008-222699

ABSTRACT

A radio apparatus having a casing and an antenna is provided. The casing has first, second and third faces. The second face and the third face correspond to a side face and another side face of the first face, respectively. The antenna is formed by a conductive line in such a way that the conductive line forms a first loop shape, a second loop shape and a third loop shape, that the first loop shape includes a first portion and a second portion positioned adjacent to a third portion of the second loop shape and a fourth portion of the third loop shape, respectively, that directions of currents distributed on the first portion and the third portion if the antenna is fed are almost same, and that directions of currents distributed on the second portion and the fourth portion if the antenna is fed are almost same.



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US 20100053002A1

(19) **United States**(12) **Patent Application Publication**
Wojack et al.(10) **Pub. No.: US 2010/0053002 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **CONTINUOUS HOUSING WITH INTEGRAL ANTENNA****Publication Classification**(75) Inventors: **Jason P. Wojack**, Libertyville, IL (US); **Joseph L. Allore**, Mundelein, IL (US); **Gary R. Weiss**, Buffalo Grove, IL (US); **Istvan J. Szini**, Grayslake, IL (US)(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01P 11/00 (2006.01)(52) **U.S. Cl. 343/702; 29/600**

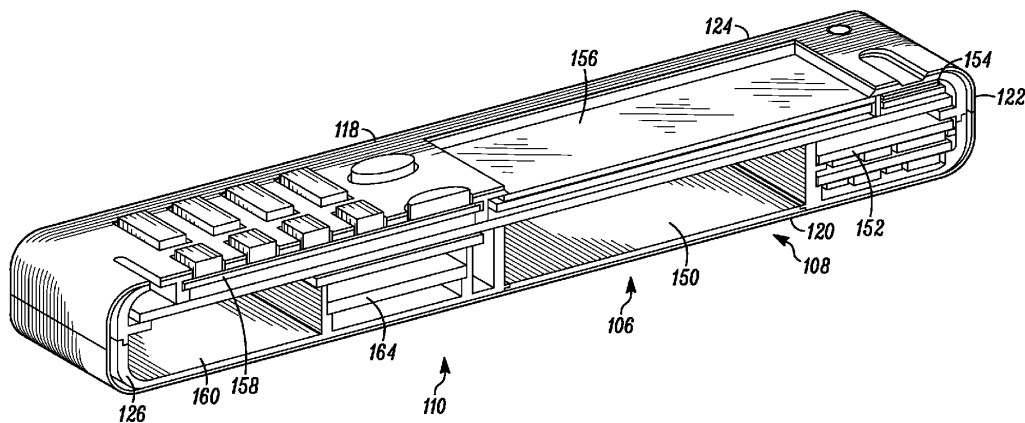
Correspondence Address:

MOTOROLA INC
600 NORTH US HIGHWAY 45, W4 - 39Q
LIBERTYVILLE, IL 60048-5343 (US)(73) Assignee: **MOTOROLA INC,**
LIBERTYVILLE, IL (US)(21) Appl. No.: **12/534,957**(22) Filed: **Aug. 4, 2009****Related U.S. Application Data**

(60) Provisional application No. 61/092,799, filed on Aug. 29, 2008.

(57) **ABSTRACT**

A continuous housing (100) and integral antenna (102) and method (300) of forming a housing (100) and integral antenna (102), including: forming (305) an extrusion housing with a side opening defining a pocket configured to receive electrical components; removing (310) material of the extrusion housing in proximity to a wall portion of the extrusion housing; and forming (315) a desired antenna construction integral to the extrusion housing. Advantageously, the continuous housing (100) can form a wireless communication device, which is particularly adapted for mass production. This arrangement is adapted to allow a customer to design the look and feel of an electronic device.



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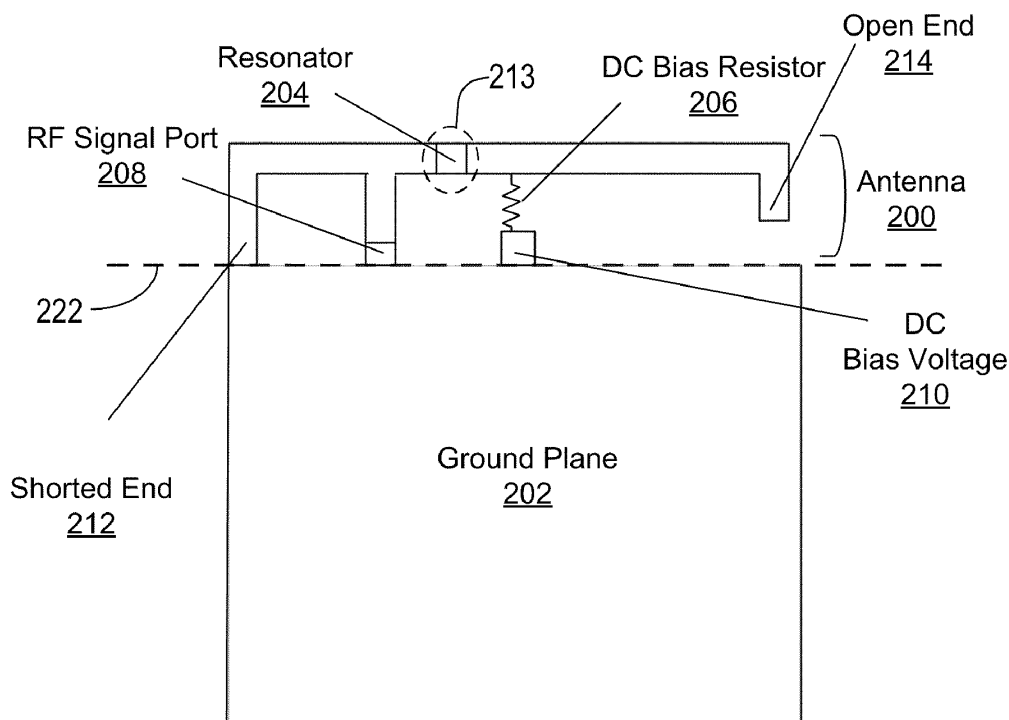
US 20100053007A1

(19) **United States**(12) **Patent Application Publication**
Ni et al.(10) **Pub. No.: US 2010/0053007 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **TUNABLE DUAL-BAND ANTENNA USING LC
RESONATOR****Publication Classification**(75) Inventors: **Nan Ni**, Santa Barbara, CA (US);
Albert Humirang Cardona, Santa
Barbara, CA (US)(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 9/00 (2006.01)(52) **U.S. Cl.** **343/745; 343/700 MS**

Correspondence Address:

FENWICK & WEST LLP
SILICON VALLEY CENTER, 801 CALIFORNIA
STREET
MOUNTAIN VIEW, CA 94041 (US)(73) Assignee: **AGILE RF, INC.**, Goleta, CA (US)(21) Appl. No.: **12/545,549**(22) Filed: **Aug. 21, 2009****Related U.S. Application Data**(60) Provisional application No. 61/093,151, filed on Aug.
29, 2008.(57) **ABSTRACT**

An Inverted-F antenna (IFA) includes a tunable parallel LC resonator physically inserted between two antenna bodies of the IFA structure. The LC resonator is comprised of a tunable capacitor C1 connected in parallel with a combination of a DC blocking capacitor C2 and an inductor L1 connected in series to each other. A DC bias voltage is applied to the tunable capacitor C1 through a DC bias resistor R1, in order to adjust the capacitance of the tunable capacitor C1. The IFA exhibits dual band characteristics, and its resonant frequencies and bandwidths may be turned by adjusting the capacitance of the tunable capacitor C1. The tunable capacitor C1 may be a BST capacitor.



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US 20100053012A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0053012 A1**

(43) **Pub. Date: Mar. 4, 2010**

(54) **ANTENNA APPARATUS FOR PRINTED
CIRCUIT BOARD HAVING AUXILIARY
ANTENNA**

Publication Classification

(51) **Int. Cl.**
H01Q 21/00 (2006.01)
H01Q 13/10 (2006.01)
H01Q 1/38 (2006.01)
H01P 11/00 (2006.01)
H05K 3/30 (2006.01)

(75) Inventors: **Jae-Min Seo**, Gyeonggi-do (KR);
Jae-Sun Park, Gyeonggi-do (KR);
Kee-Dug Kim, Seoul (KR)

Correspondence Address:
CHA & REITER, LLC
210 ROUTE 4 EAST STE 103
PARAMUS, NJ 07652 (US)

(52) **U.S. Cl. 343/770; 343/893; 29/601**

(57) **ABSTRACT**

An antenna apparatus for a printed circuit board including an auxiliary antenna which includes a printed circuit board and mounting components. An antenna pattern is formed on the printed circuit board, and the antenna apparatus includes a first auxiliary antenna unit formed on an upper surface of the printed circuit board; and a second auxiliary antenna unit provided at a location on a lower surface of the printed circuit board that corresponds to location of the first auxiliary antenna unit on the upper surface of the printed circuit board. Efficiency by the antenna apparatus according to the present invention can be increased by approximately 17%.

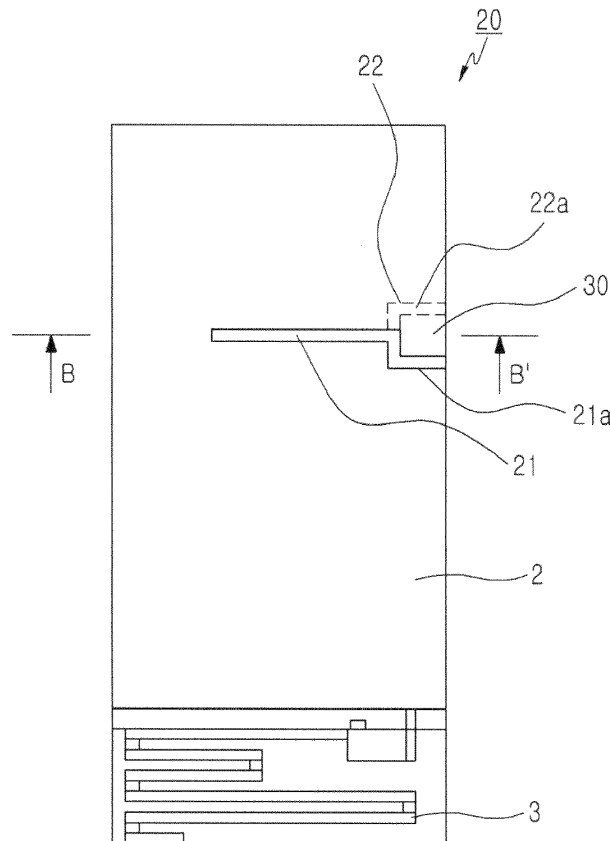
(73) Assignee: **Samsung Electronics Co., LTD.**,
Gyeonggi-Do (KR)

(21) Appl. No.: **12/584,099**

(22) Filed: **Aug. 31, 2009**

(30) **Foreign Application Priority Data**

Sep. 1, 2008 (KR) 10-2008-0085917



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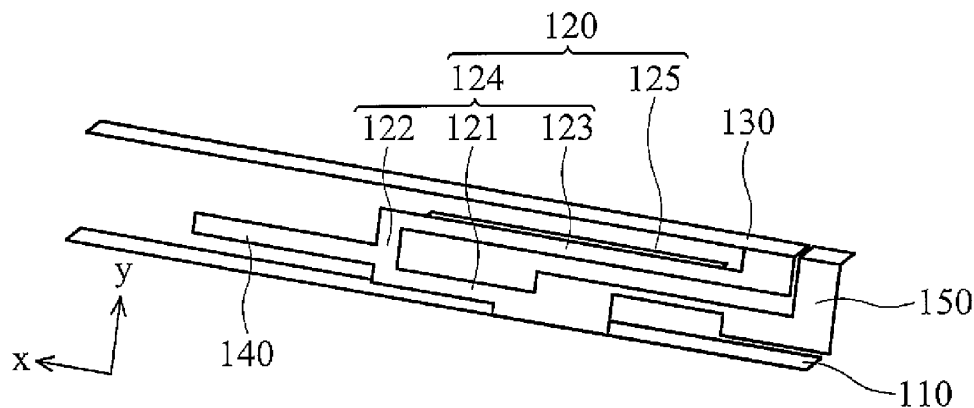
US 20100053016A1

(19) **United States**(12) **Patent Application Publication**
Tseng et al.(10) **Pub. No.: US 2010/0053016 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **ANTENNA**(30) **Foreign Application Priority Data**(75) Inventors: **Kuan-Hsueh Tseng**, Taipei (TW);
Yi-Ling Chiu, Taipei (TW);
Chia-Tien Li, Taipei (TW)

Jul. 4, 2006 (TW) TW95124300

Publication ClassificationCorrespondence Address:
QUINTERO LAW OFFICE, PC
615 Hampton Dr, Suite A202
Venice, CA 90291 (US)(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/48 (2006.01)(52) **U.S. Cl.** **343/846; 343/700 MS**(73) Assignee: **WISTRON NEWEB CORP.**,
Taipei Shien (TW)(57) **ABSTRACT**(21) Appl. No.: **12/614,302**(22) Filed: **Nov. 6, 2009****Related U.S. Application Data**(63) Continuation of application No. 11/674,055, filed on
Feb. 12, 2007.

An antenna comprises a ground element, a transmission element, a conductive element and a coupling element. The conductive element connects the ground element and the transmission element. The coupling element extends from the conductive element substantially parallel to the transmission element, wherein the coupling element is located on a first plane, the transmission element is located on a second plane, and the second plane is parallel to the first plane.

100

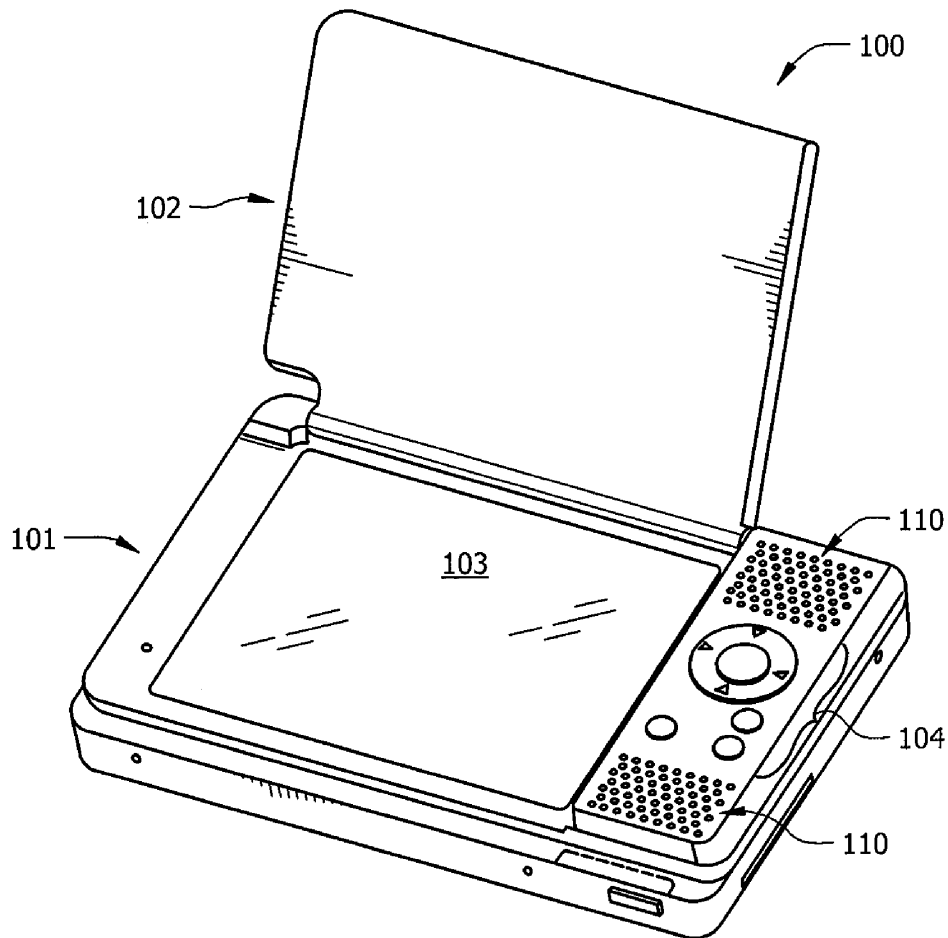
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US 2010053456A1

(19) **United States**(12) **Patent Application Publication**
Rowell et al.(10) **Pub. No.: US 2010/0053456 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **MOBILE MULTIMEDIA TERMINAL
ANTENNA SYSTEMS AND METHODS FOR
USE THEREOF**(21) Appl. No.: **12/200,843**(22) Filed: **Aug. 28, 2008****Publication Classification**(75) Inventors: **Corbett R. Rowell**, Mongkok
(HK); **Chi-Lun Mak**, Ma On Shan
(HK); **Angus C.K. Mak**, Shaton
(HK)(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H04N 5/455 (2006.01)(52) **U.S. Cl.** **348/726; 343/702; 348/E05.113**Correspondence Address:
FULBRIGHT & JAWORSKI L.L.P
2200 ROSS AVENUE, SUITE 2800
DALLAS, TX 75201-2784 (US)(57) **ABSTRACT**(73) Assignee: **Hong Kong Applied Science and
Technology Research Institute
Co., Ltd.**, Shatin (HK)

A mobile device comprises a main compartment, a flip cover coupled to the main compartment, wherein the main compartment includes a Radio Frequency (RF) feed and ground, and wherein the flip cover includes at least one multiband antenna system in communication with the RF feed and ground, the antenna operating in at least one television broadcast band.



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US 20100056234A1

(19) **United States**(12) **Patent Application Publication**
Yamamoto et al.(10) **Pub. No.: US 2010/0056234 A1**(43) **Pub. Date: Mar. 4, 2010**(54) **MOBILE WIRELESS COMMUNICATION
APPARATUS**(30) **Foreign Application Priority Data**

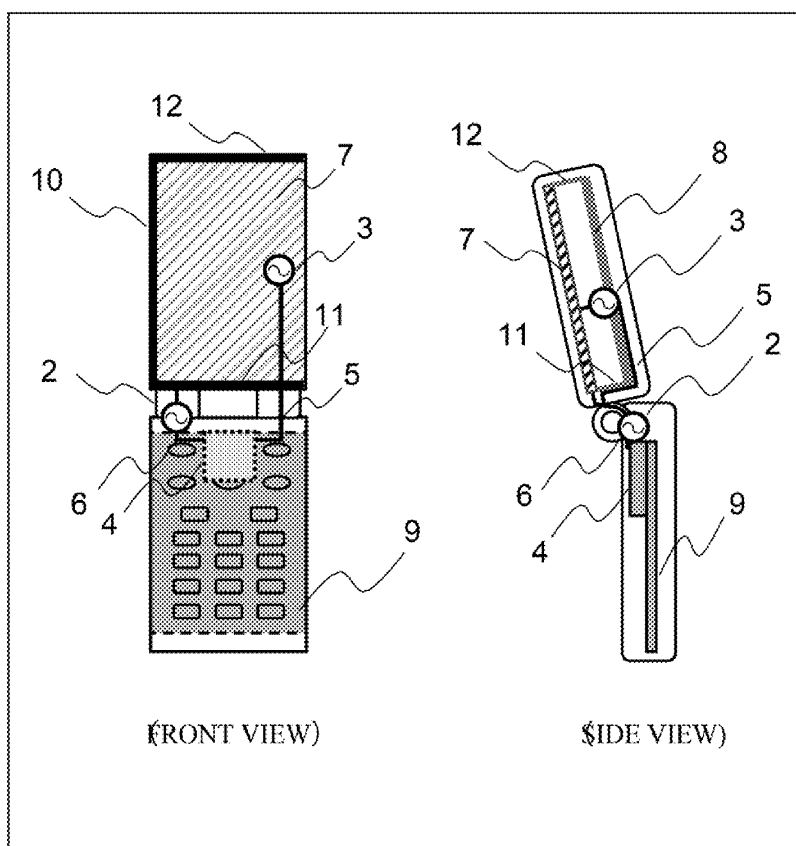
Oct. 2, 2007 (JP) 2007-258655

Publication Classification(76) Inventors: **Atsushi Yamamoto**, Kyoto (JP);
Hiroshi Iwai, Osaka (JP); **Tsutomu
Sakata**, Osaka (JP); **Yoshio
Koyanagi**, Ishikawa (JP); **Toshiteru
Hayashi**, Kanagawa (JP)(51) **Int. Cl.**
H04M 1/00 (2006.01)
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **455/575.7; 343/702**(57) **ABSTRACT**

Correspondence Address:

WENDEROTH, LIND & PONACK L.L.P.
1030 15th Street, N.W., Suite 400 East
Washington, DC 20005-1503 (US)

A housing antenna 20 includes a first conductor section 7, a ground conductor section 9, and a first power supply section 2. The first conductor section 7 is a ground plane of the upper casing of a flip-type telephone. The ground conductor section 9 is a ground plane of the lower housing of the flip type telephone. The half-wavelength slot antenna 30 includes a first conductor section 7, a second conductor section 8, three short-circuit conductor sections 10-12, and a second power supply section 3. The first power supply section 2 is a power supply section for the housing antenna 20. The second power supply section 3 is a power supply section for the half-wavelength slot antenna 30. The first and the second power supply sections 2 and 3 are connected to a wireless communication circuit 4 and allow a wireless communication.

(21) Appl. No.: **12/516,611**(22) PCT Filed: **Sep. 30, 2008**(86) PCT No.: **PCT/JP2008/002753**§ 371 (c)(1),
(2), (4) Date:**Jul. 14, 2009**

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US 20100060524A9

(19) **United States**(10) **Pub. No.: US 2010/0060524 A9**(12) **Patent Application Publication**
Okamura et al.(48) **Pub. Date: Mar. 11, 2010**
CORRECTED PUBLICATION(54) **INTEGRATED ANTENNA WITH IDENTICAL**
GROUND MEMBER(30) **Foreign Application Priority Data**(75) Inventors: **Shinichiro Okamura,**
Kyotanabe-shi (JP); **Hisashi**
Ozawa, Kusatsu-shi (JP); **Yuzo**
Okano, Kusatsu-shi (JP)

Aug. 10, 2007 (JP) 2007-209167

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

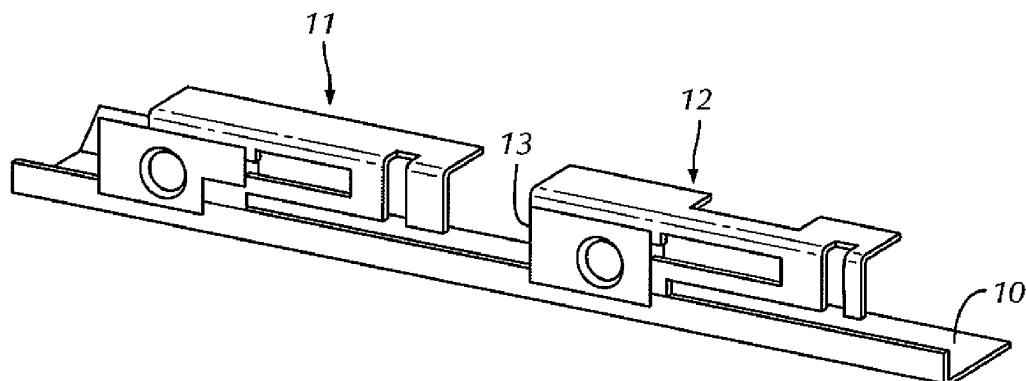
Correspondence Address:

OSHA LIANG L.L.P.**TWO HOUSTON CENTER, 909 FANNIN, SUITE**
3500
HOUSTON, TX 77010 (US)(57) **ABSTRACT**(73) Assignee: **OMRON CORPORATION,**
Kyoto-shi (JP)

The present invention provides an integrated antenna with an identical ground member, in which the interference between the adjacent antennas can be suppressed while the antenna is miniaturized in not only the width direction but also the height direction. In the integrated antenna with the identical ground member, plural antenna elements having two different resonance frequency bands are disposed in an identical ground member. Each antenna element includes a first radiation portion corresponding to one of the resonance frequency bands and a second radiation portion corresponding to the other resonance frequency band. At a point where the two antenna elements are adjacent to each other, a dielectric material is disposed in one of radiation portions located inside the antenna element such that the dielectric material contacts the radiation portion.

(21) Appl. No.: **12/188,108**(22) Filed: **Aug. 7, 2008****Prior Publication Data**(15) Correction of US 2009/0040114 A1 Feb. 12, 2009
See Claim 4.

(65) US 2009/0040114 A1 Feb. 12, 2009



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US 20100060525A1

(19) **United States**(12) **Patent Application Publication****Yang et al.**(10) **Pub. No.: US 2010/0060525 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **MULTI-BAND ANTENNA**(52) **U.S. CL. 343/700 MS**

(76) Inventors: **Wen-Chieh Yang**, Tu-Cheng City (TW); **Yu-Yuan Wu**, Tu-Cheng City (TW); **Kai Shih**, Tu-Cheng City (TW); **Hsin-Tsung Wu**, Tu-Cheng City (TW)

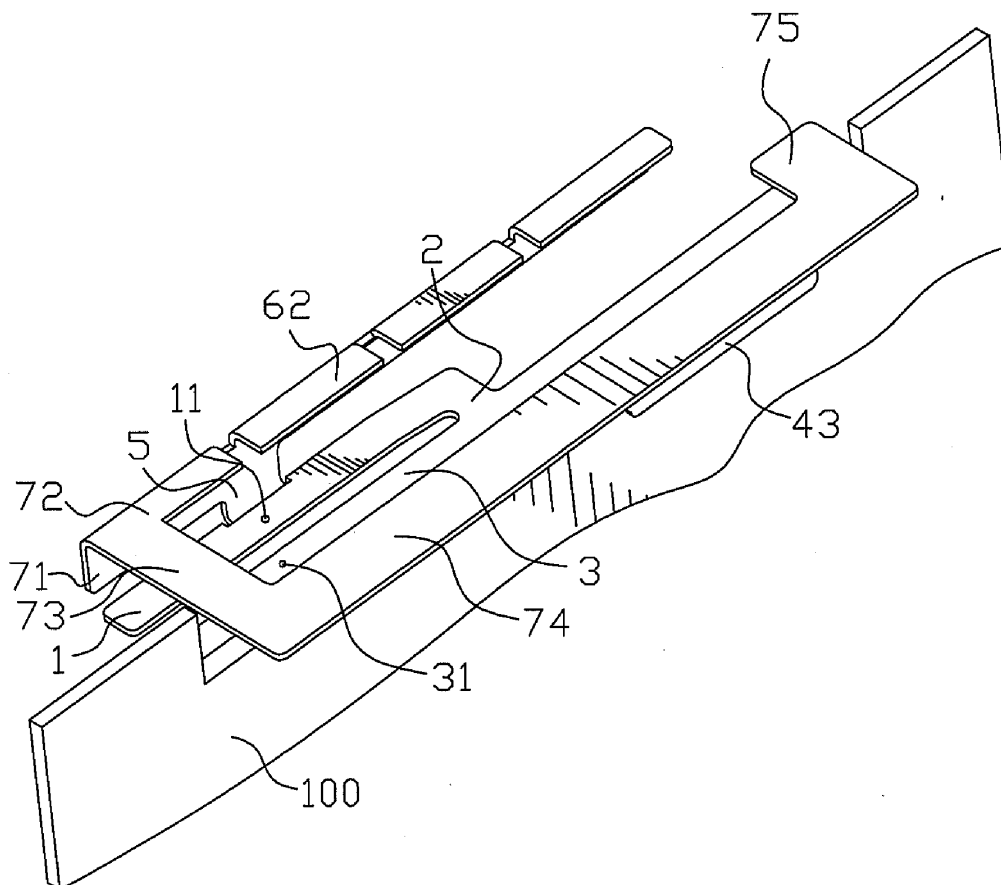
Correspondence Address:
Muncy, Geissler, Olds & Lowe, PLLC
P.O. BOX 1364
FAIRFAX, VA 22038-1364 (US)

(21) Appl. No.: **12/204,920**(22) Filed: **Sep. 5, 2008****Publication Classification**

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

(57) **ABSTRACT**

A multi-band antenna includes a feed-in element having a feed-in point thereon. A first connecting portion extends from one side of the feed-in element. A ground element connects to a side of the first connecting portion and is parallel to the feed-in element. A holding portion perpendicularly extends from a side of the ground element opposite the first connecting portion. A second connecting portion perpendicularly bends and extends from a side of the feed-in element opposite the first connecting portion. A first radiating portion extends from one side of the second connecting portion. A second radiating portion extends from the other side of the second connecting portion opposite the first radiating portion. The first radiating portion and part of the second radiating portion are disposed at one side of the holding portion. The rest part of the second radiating portion is disposed at the other side of the holding portion.



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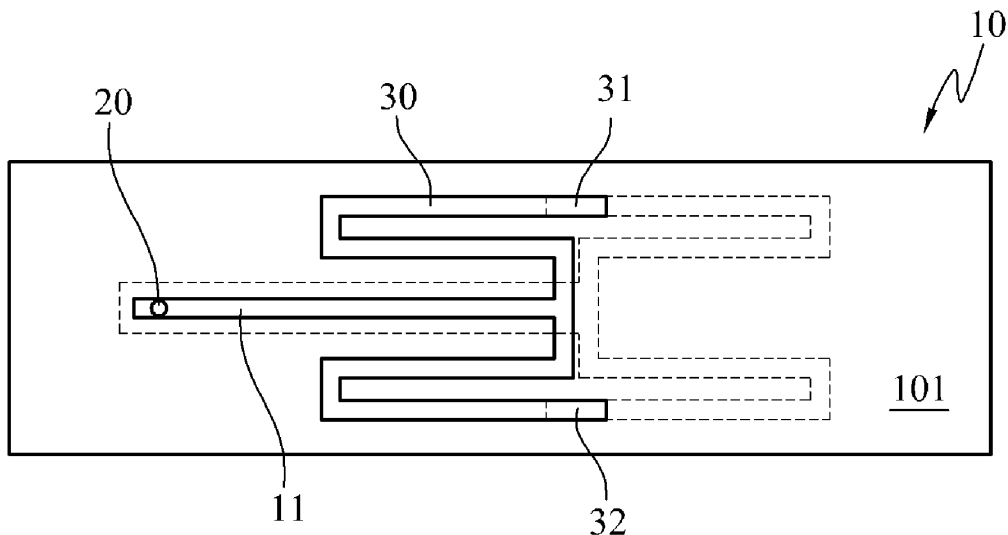
US 20100060526A1

(19) **United States**(12) **Patent Application Publication**
CHENG(10) **Pub. No.: US 2010/0060526 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **OMNIDIRECTIONAL ANTENNA****Publication Classification**(75) Inventor: **Chih-Jen CHENG**, Taipei City
(TW)(51) **Int. Cl.**
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**

Correspondence Address:
Workman Nydegger
1000 Eagle Gate Tower
60 East South Temple
Salt Lake City, UT 84111 (US)

(73) Assignee: **SMARTANT TELECOM CO.,**
LTD., Jhudong Township (TW)(21) Appl. No.: **12/204,936**(22) Filed: **Sep. 5, 2008**

An omnidirectional antenna includes a substrate, a signal feed-in portion, a first radiation unit, and a second radiation unit. The first radiation unit is located on a first surface of the substrate, and electrically connected to a first circuit of the first surface. The first radiation unit has a first extension end and a second extension end. The second radiation unit is located on a second surface of the substrate, and electrically connected to a second circuit of the second surface. The second radiation unit has a third extension end and a fourth extension end. The first extension end is disposed corresponding to the third extension end, and the second extension end is disposed corresponding to the fourth extension end. The signal feed-in portion is located on the first circuit and the second circuit. Thus, the impedance is improved, a wider bandwidth is achieved, and the process is simplified.



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US 20100060528A1

(19) **United States**(12) **Patent Application Publication****Chiu et al.**(10) **Pub. No.: US 2010/0060528 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **DUAL-FREQUENCY ANTENNA****Publication Classification**

(75) Inventors: **Tsung-Wen Chiu**, Taipei County (TW); **Hung-Chi Chang**, Taipei County (TW); **Wen-His Lee**, Taipei County (TW); **Fu-Ren Hsiao**, Taipei County (TW)

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

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

(57) **ABSTRACT**

The present invention discloses a dual-frequency antenna, which comprises a radiation conductor, an extension conductor, a feeder member, a short-circuit member, and a ground plane. The radiation conductor has a first terminal and a second terminal, which are arranged close to each other but do not contact each other. The extension conductor is connected to the second terminal and disposed along the contour of the first terminal to have a gap between the extension conductor and the first terminal. The feeder member is connected to the radiation conductor. One end of the short-circuit member is connected to the radiation conductor, and the other end is connected to the ground plane. The radiation conductor generates a low-frequency resonant mode and a first high-frequency resonant mode. In the present invention, a single radiation conductor generates two resonant modes to form the operational frequency bands of the dual-frequency antenna.

Correspondence Address:

SCHMEISER OLSEN & WATTS
18 E UNIVERSITY DRIVE, SUITE # 101
MESA, AZ 85201

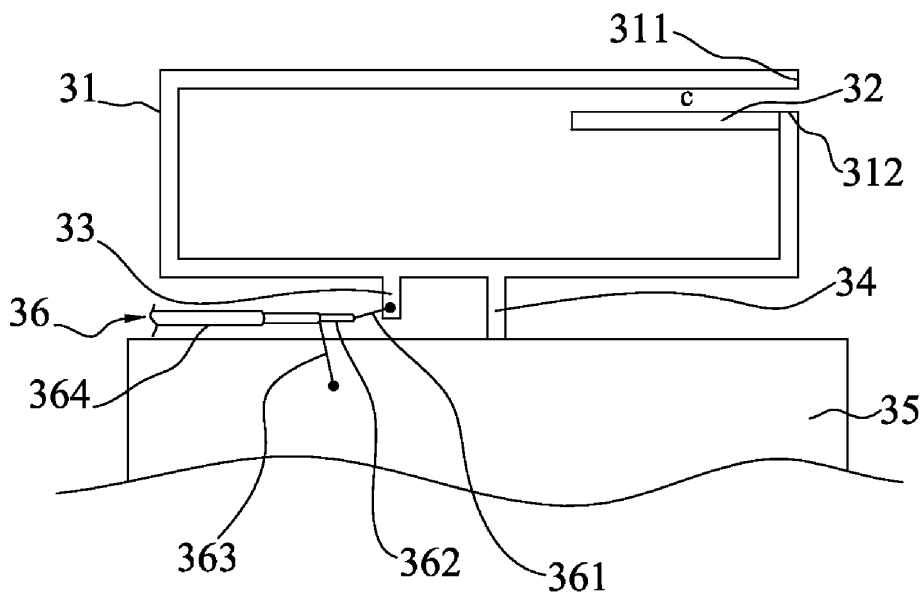
(73) Assignee: **ADVANCED CONNECTEK INC.**, Taipei County (TW)

(21) Appl. No.: **12/253,167**

(22) Filed: **Oct. 16, 2008**

(30) **Foreign Application Priority Data**

Sep. 5, 2008 (TW) 097134186



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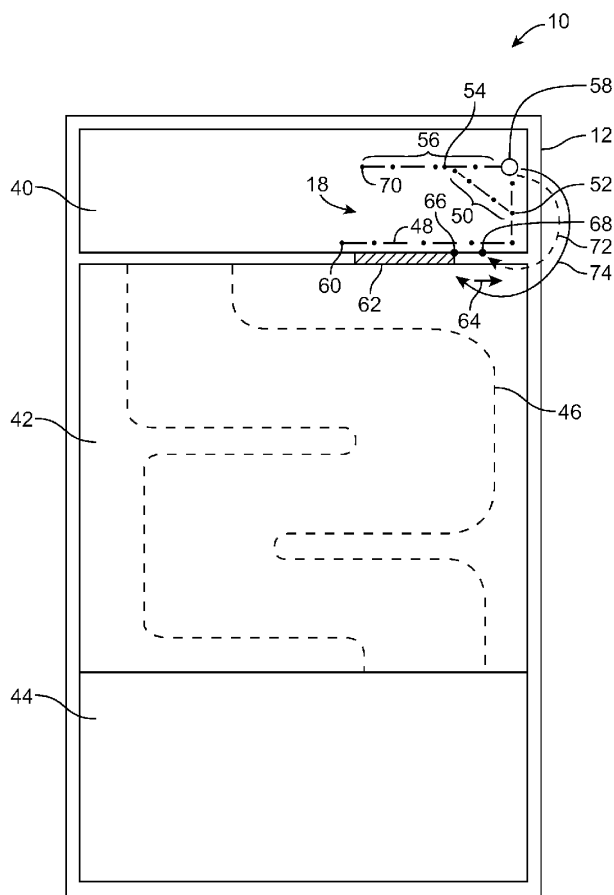
US 20100060529A1

(19) **United States**(12) **Patent Application Publication****Schlub et al.**(10) **Pub. No.: US 2010/0060529 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **ANTENNAS WITH TUNING STRUCTURE
FOR HANDHELD DEVICES****Publication Classification**(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702; 343/723**(57) **ABSTRACT**

Handheld electronic devices are provided that contain wireless communications circuitry. The wireless communications circuitry may include antenna structures. To accommodate manufacturing variations, the antenna structures and handheld electronic devices may be characterized by performing measurements such as antenna performance measurements. Appropriate antenna adjustments may be made during manufacturing of a handheld electronic device based on the characterizing measurements. An antenna may be formed using an inverted-F design in which an antenna flex circuit is mounted to a dielectric antenna support structure. Cavities in the support may be selectively filled with dielectric material and dielectric patches may be added to the antenna flex circuit to adjust the dielectric loading of the antenna. The length of a ground return path in the antenna may be adjusted by appropriate positioning of an electrical connector within the ground return path.

(76) Inventors: **Robert W. Schlub**, Campbell, CA (US); **Dean F. Darnell**, Santa Clara, CA (US); **Robert J. Hill**, Salinas, CA (US); **Teodor Dabov**, Mountain View, CA (US); **Hui Leng Lim**, San Jose, CA (US)

Correspondence Address:

Treyz Law Group**870 Market Street, Suite 984****SAN FRANCISCO, CA 94102 (US)**(21) Appl. No.: **12/205,829**(22) Filed: **Sep. 5, 2008**

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US 20100060530A1

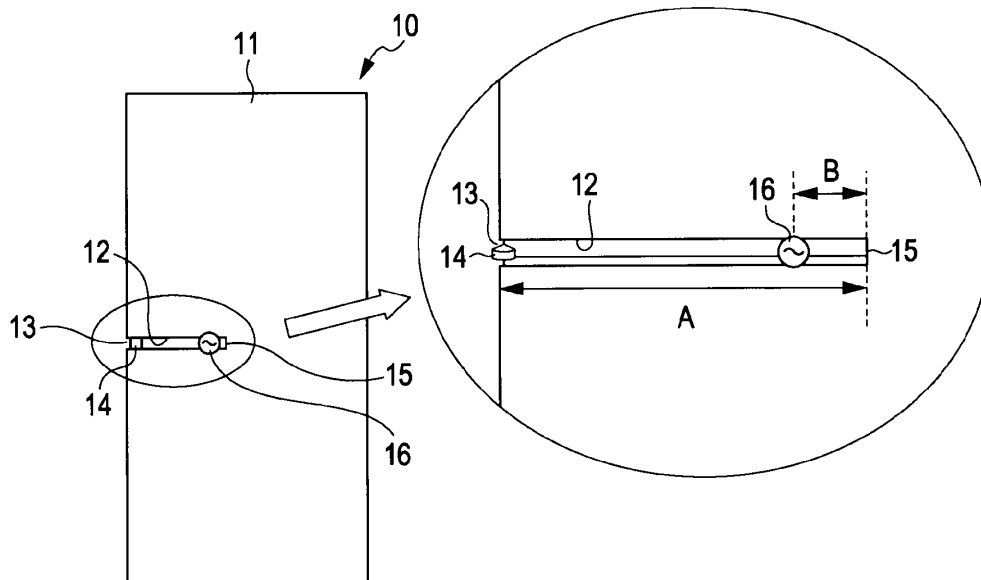
(19) **United States**(12) **Patent Application Publication**
SHOJI(10) **Pub. No.: US 2010/0060530 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **NOTCH ANTENNA AND WIRELESS DEVICE****Publication Classification**(75) Inventor: **Hideaki SHOJI**, Chiba (JP)(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/24 (2006.01)

Correspondence Address:

**OBLON, SPIVAK, MCCLELLAND MAIER &
NEUSTADT, L.L.P.**
1940 DUKE STREET
ALEXANDRIA, VA 22314 (US)(52) **U.S. Cl.** **343/702; 343/767**(73) Assignee: **SONY ERICSSON MOBILE
COMMUNICATIONS JAPAN,
INC.**, Tokyo (JP)(57) **ABSTRACT**(21) Appl. No.: **12/541,355**(22) Filed: **Aug. 14, 2009**(30) **Foreign Application Priority Data**

Sep. 5, 2008 (JP) 2008-228002

A notch antenna includes a ground conductor having a slit and a reactance circuit containing a capacitive reactance element and an inductive reactance element, the reactance circuit being placed at an open end of the slit so as to bridge the slit and being connected to the ground conductor. The slit has a closed end to which power is supplied, and the capacitance of the capacitive reactance element and the inductance of the inductive reactance element are set so that the reactance circuit has a capacitance desired to obtain a first antenna resonance point at a first frequency and a capacitance desired to obtain a second antenna resonance point at a second frequency.



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US 20100060533A1

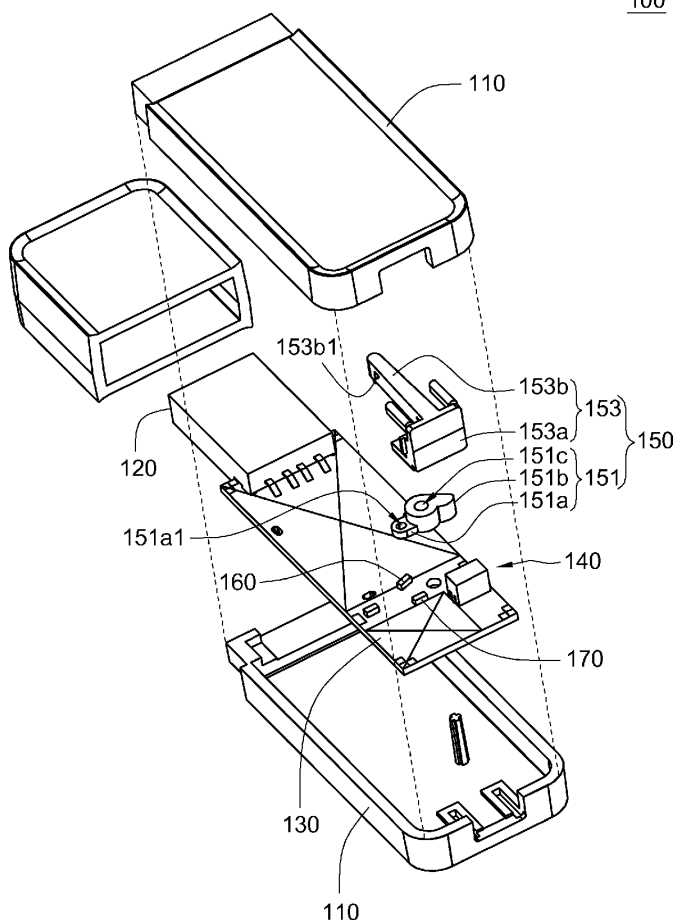
(19) **United States**(12) **Patent Application Publication**
CHEN(10) **Pub. No.: US 2010/0060533 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **ANTENNA MODULE****Publication Classification**(75) Inventor: **Liang-Wei CHEN**, Hsinchu (TW)(51) **Int. Cl.**
H01Q 1/06 (2006.01)
H01Q 1/50 (2006.01)(52) **U.S. Cl.** **343/721; 343/906**(57) **ABSTRACT**

Correspondence Address:

RABIN & Berdo, PC**1101 14TH STREET, NW, SUITE 500****WASHINGTON, DC 20005 (US)**(73) Assignee: **Arcadyan Technology Corporation**, Hsinchu (TW)(21) Appl. No.: **12/543,716**(22) Filed: **Aug. 19, 2009**(30) **Foreign Application Priority Data**

Sep. 10, 2008 (TW) 097134680

An antenna module including a casing, a USB connecting end, an antenna, a key and a moving component is provided. The casing has a terminal end opposite to the USB connecting end and a hole located at the terminal end. The antenna is disposed in the casing near the terminal end. The key disposed in the casing has an enabling portion for enabling the key when being touched. The moving component disposed in the casing includes a contacting member and an actuating member. The contacting member has first and second ends and a pivotal portion. The pivotal portion is pivotally connected to the casing between the first and second ends. The actuating member exposed from the hole is for moving toward the USB connecting end. The first end is driven by the actuating member, so that the second end is rotated around the pivotal portion to touch the enabling portion.

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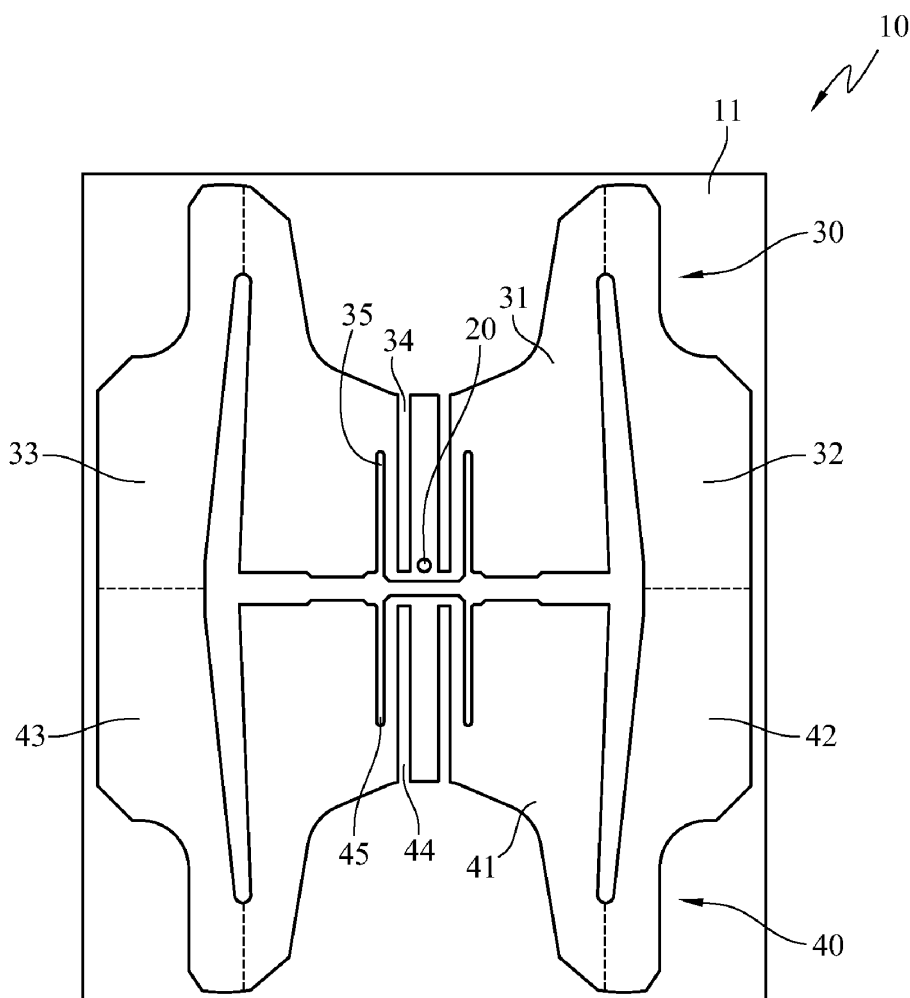
US 20100060541A1

(19) **United States**(12) **Patent Application Publication**
Jeng et al.(10) **Pub. No.: US 2010/0060541 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **ANTENNA****Publication Classification**(75) Inventors: **Jr-Ren Jeng**, Taipei City (TW);
Chau-Min Yang, Yunlin County (TW)(51) **Int. Cl.**
H01Q 9/16 (2006.01)(52) **U.S. Cl.** **343/795**(57) **ABSTRACT**

Correspondence Address:

APEX JURIS, PLLC
12733 LAKE CITY WAY NORTHEAST
SEATTLE, WA 98125 (US)(73) Assignee: **SmartAnt Telecom Co., Ltd.**,
Hsinchu County (TW)(21) Appl. No.: **12/206,342**(22) Filed: **Sep. 8, 2008**

An antenna includes a substrate, a radiation portion, and a signal feed-in portion. The radiation portion includes a first radiation unit and a second radiation unit. The first radiation unit and the second radiation unit are disposed on the same surface of the substrate. The signal feed-in portion is disposed on the first radiation unit. The second radiation unit and the first radiation unit have the same shape and are symmetrical in position, and the second radiation unit is connected to the first radiation unit, such that the first radiation unit and the second radiation unit form a closed loop. Thus, the impedance is improved and a wider bandwidth is achieved.



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US 20100060542A1

(19) **United States**(12) **Patent Application Publication****Zheng et al.**(10) **Pub. No.: US 2010/0060542 A1**(43) **Pub. Date: Mar. 11, 2010**(54) **MULTI-BAND ANTENNA ARRANGEMENT**(30) **Foreign Application Priority Data**(75) Inventors: **Ming Zheng**, Farnborough (GB);
Hanyang Wang, Abingdon (GB)

Jul. 20, 2004 (US) 10/896212

Publication Classification

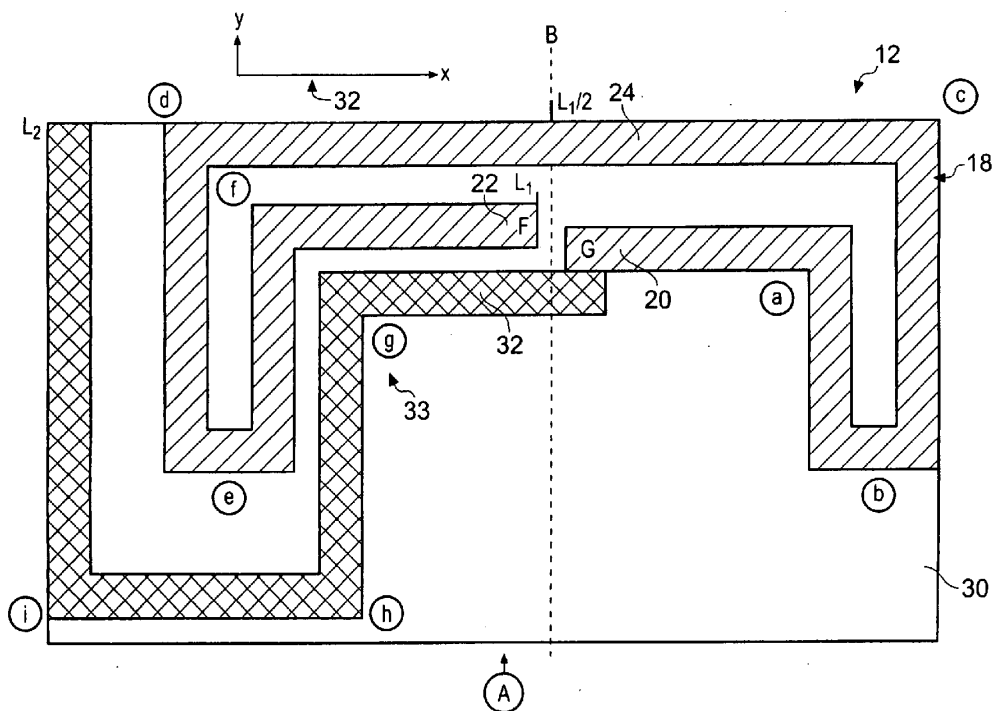
Correspondence Address:

HARRINGTON & SMITH, PC
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212 (US)(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 1/48 (2006.01)
H01Q 21/00 (2006.01)
H01Q 1/36 (2006.01)(73) Assignee: **NOKIA CORPORATION**, Espoo
(FI)(52) **U.S. Cl.** **343/843; 343/848; 343/866**(21) Appl. No.: **11/632,090**(22) PCT Filed: **May 6, 2005**(86) PCT No.: **PCT/IB2005/001253**

§ 371 (c)(1),

(2), (4) Date: **Nov. 23, 2009**(57) **ABSTRACT**

A multi-band antenna arrangement having a plurality of resonant modes and including a ground plane; and a first antenna forming a loop-like structure between a ground point and a feed point, wherein the first antenna is located in proximity to the ground plane and has resonant modes at $X/2$ and X .



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(19) **United States**

(10) **Pub. No.: US 2010/0066609 A1**

(54) **DIGITAL TELEVISION ANTENNA**

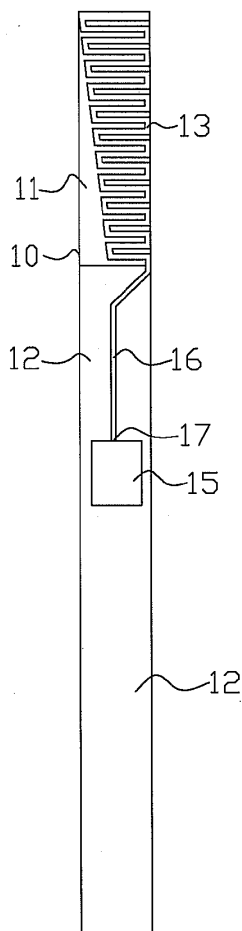
(76) Inventors: **Chung-Wen YANG**, Tu-Cheng City (TW); **Yu-Yuan Wu**, Tu-Cheng City (TW); **Hung-Jen Chen**, Tu-Cheng City (TW)

Correspondence Address:
Muncy, Geissler, Olds & Lowe, PLLC
P.O. BOX 1364
FAIRFAX, VA 22038-1364 (US)

(21) Appl. No.: 12/210,417

Publication Classification

(51) **Int. Cl.**
H01O 1/38 (2006.01)



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US 20100066610A1

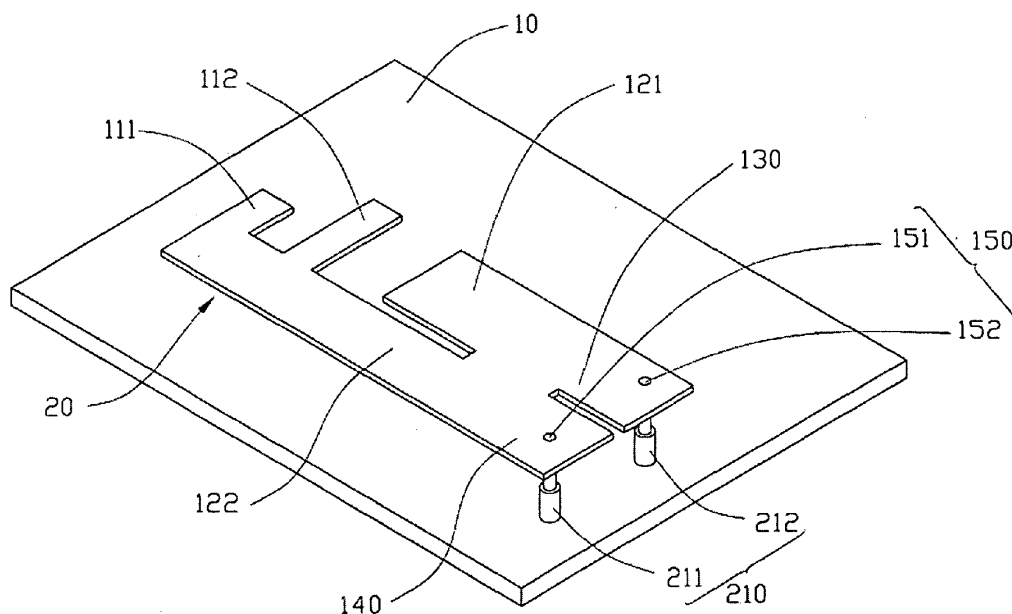
(19) **United States**(12) **Patent Application Publication**
Hsu(10) **Pub. No.: US 2010/0066610 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **MULTIBAND ANTENNA****Publication Classification**(75) Inventor: **Mao-Hsiu Hsu**, Tu-Cheng (TW)(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 5/00 (2006.01)

Correspondence Address:

PCE INDUSTRY, INC.**ATT. Steven Reiss****288 SOUTH MAYO AVENUE****CITY OF INDUSTRY, CA 91789 (US)**(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**(73) Assignee: **HON HAI PRECISION**
INDUSTRY CO., LTD., Tu-Cheng
(TW)(21) Appl. No.: **12/409,498**(22) Filed: **Mar. 24, 2009**(30) **Foreign Application Priority Data**

Sep. 16, 2008 (CN) 200810304519.3

A multiband antenna located on a substrate includes a feed portion, a grounded portion, and an antenna body. The feed portion is connected to the substrate, delivering electromagnetic signals. The grounded portion is connected to the substrate. The antenna body is electrically connected to the feed portion and the grounded portion, transceiving electromagnetic signals. The antenna body includes a first radiator, a second radiator, a first resonator, and a second resonator. The first radiator is connected to the first radiator and the grounded portion. The second radiator is connected to the first radiator and the grounded portion. The first resonator is connected to the second radiator. The second resonator is connected to the second radiator. The second resonator and the first radiator are parallel and of different lengths.



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US 20100066612A1

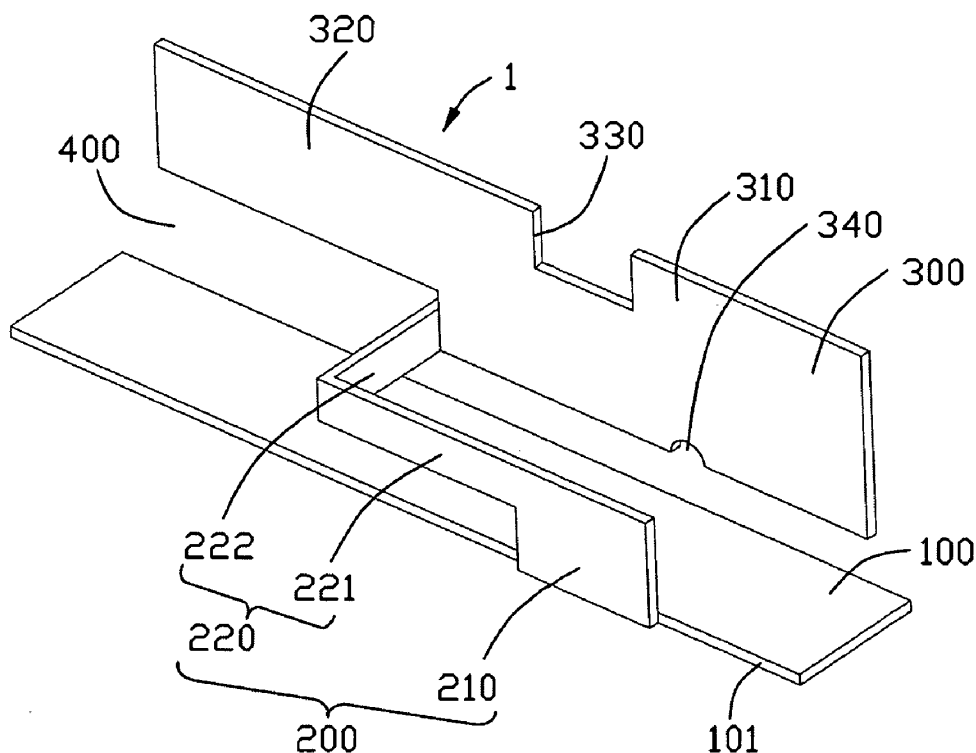
(19) **United States**(12) **Patent Application Publication**
Tai(10) **Pub. No.: US 2010/0066612 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **WIDEBAND ANTENNA****Publication Classification**(75) Inventor: **Lung-Sheng Tai, Tu-cheng (TW)**(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/48 (2006.01)

Correspondence Address:

WEI TE CHUNG**FOXCONN INTERNATIONAL, INC.****1650 MEMOREX DRIVE****SANTA CLARA, CA 95050 (US)**(52) **U.S. Cl. 343/700 MS; 343/846**(57) **ABSTRACT**(73) Assignee: **HON HAI PRECISION. CO., LTD.**(21) Appl. No.: **12/586,149**(22) Filed: **Sep. 16, 2009**(30) **Foreign Application Priority Data**

Sep. 16, 2008 (TW) 97216670

A wideband antenna includes a grounding element, a connecting element, a radiating element electrically connected to the connecting element, and a feeding line. The connecting element includes a first side arm extending from the grounding element and a second side arm having at least one bending portion. The second side arm includes at least one segment located on a plane different from a plane the first side arm located, and has an edge parallel to the grounding element. The radiating element includes a first radiating portion and a second radiating portion. The feeding line includes an inner conductor connected to the first radiating portion and an outer conductor connected to the grounding element.



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US 20100066615A1

(19) **United States**(12) **Patent Application Publication**
Okayama et al.(10) **Pub. No.: US 2010/0066615 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **ANTENNA DEVICE AND ELECTRONIC
APPARATUS USING THE SAME****Publication Classification**(76) Inventors: **Motoyuki Okayama**, Osaka (JP);
Akihiro Ozaki, Gifu (JP)(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/702; 343/700 MS**

Correspondence Address:

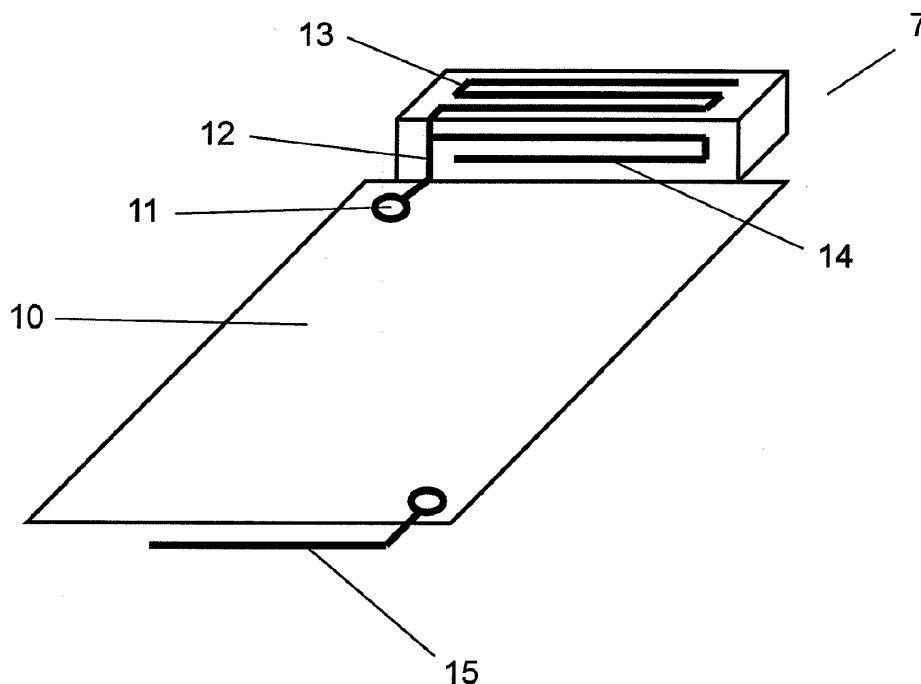
WENDEROTH, LIND & PONACK L.L.P.
1030 15th Street, N.W., Suite 400 East
Washington, DC 20005-1503 (US)(57) **ABSTRACT**(21) Appl. No.: **12/516,616**(22) PCT Filed: **Dec. 3, 2007**(86) PCT No.: **PCT/JP2007/073290**

§ 371 (c)(1),

(2), (4) Date: **May 28, 2009**(30) **Foreign Application Priority Data**

Dec. 4, 2006 (JP) 2006-326599

The present invention improves reception quality in an electronic apparatus including plural antenna devices. For this purpose, first antenna device (8) of electronic apparatus (7) according to the present invention includes ground organizer (10); feeding unit (11) placed on ground organizer (10); first antenna conductor (12) with its one end connected to feeding unit (11); and second antenna conductor (13) and third antenna conductor (14) both branch connected to the other end of first antenna conductor (12). The sum of the length of first antenna conductor (12) and that of second antenna conductor (13) is substantially $(1/4+n/2)$ times the wavelength of a signal in the first frequency band, and additionally the sum of the length of second antenna conductor (13) and that of third antenna conductor (14) is substantially $(1/2+m/2)$ times the wavelength of a signal in the second frequency band.



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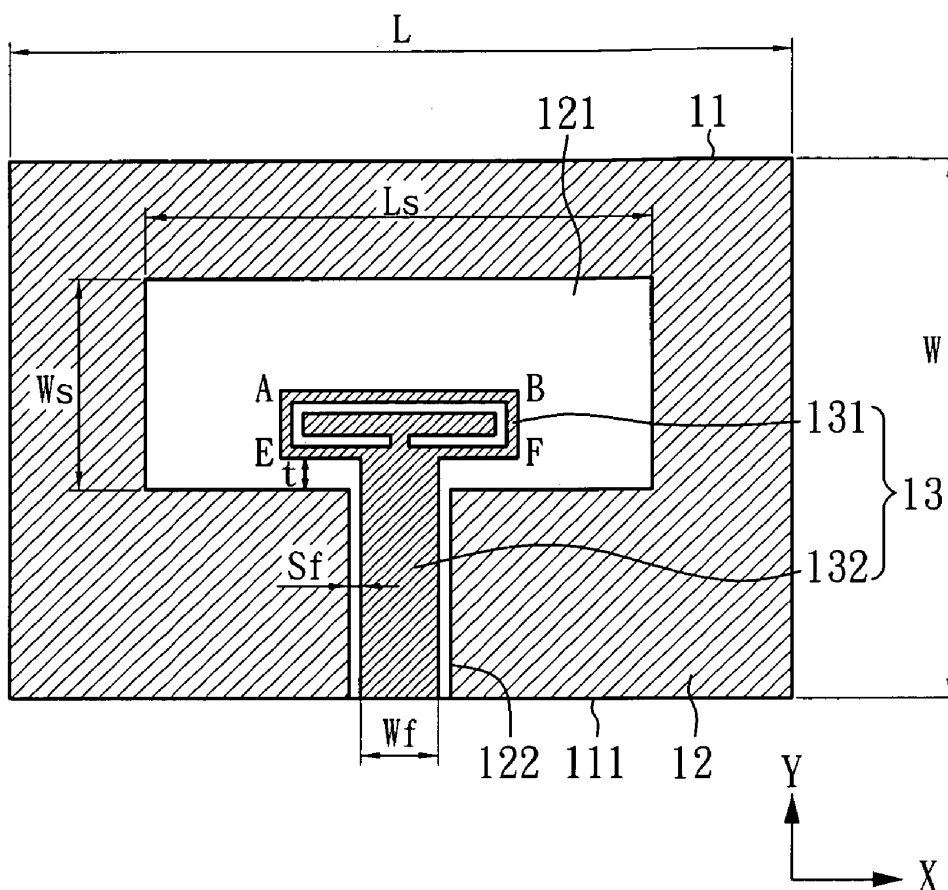


US 20100066621A1

(19) **United States**(12) **Patent Application Publication**
Chang et al.(10) **Pub. No.: US 2010/0066621 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **ULTRA WIDEBAND ANTENNA WITH
BAND-NOTCHED CHARACTERISTICS****Publication Classification**(51) **Int. Cl.**
H01Q 13/10 (2006.01)(52) **U.S. Cl.** **343/767**(57) **ABSTRACT**(75) Inventors: **The-Nan Chang**, Taipei (TW);
Min-Chi Wu, Taipei (TW)Correspondence Address:
BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314-1176 (US)(73) Assignees: **Tatung University**, Taipei (TW);
Tatung Company, Taipei (TW)(21) Appl. No.: **12/314,398**(22) Filed: **Dec. 10, 2008**(30) **Foreign Application Priority Data**

Sep. 18, 2008 (TW) 097135741

The invention relates to an ultra wideband antenna with band-notched characteristics, particularly to an ultra wideband antenna capable of suppressing transmission and reception in a particular frequency range. The ultra wideband antenna includes: a substrate; a grounding unit, installed on the substrate and scooped with a first slot and a first strip hole; a signal feeding unit, installed on the substrate and including a horizontal portion and a vertical portion, in which the horizontal portion is located in the first slot and the vertical portion is located in the first strip hole; a first complementary, separate, circular resonator; and a second complementary, separate, circular resonator, wherein the first complementary, separate, circular resonator and the second complementary, separate, circular resonator are installed in the horizontal portion of the signal feeding unit and are connected with each other.



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US 20100066622A1

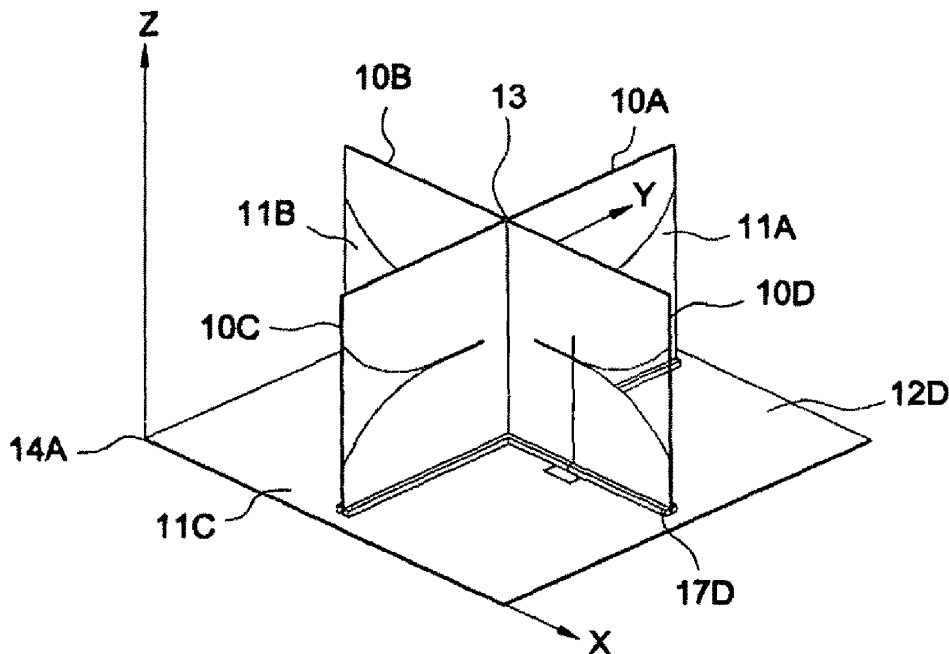
(19) **United States**(12) **Patent Application Publication**
Thevenard et al.(10) **Pub. No.: US 2010/0066622 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **MULTI-SECTOR ANTENNA**(86) PCT No.: **PCT/FR2007/052419**(76) Inventors: **Julian Thevenard**, Laiz (FR);
Dominique Lo Hine Tong, Rennes (FR); **Ali Louzir**, Rennes (FR);
Corinne Nicolas, La Chapelle Des Fougereux (FR); **Christian Person**, Locmaria Plouzane (FR);
Jean-Philippe Coupez, Le Relecq Kerhuon (FR)§ 371 (c)(1),
(2), (4) Date:**May 27, 2009**(30) **Foreign Application Priority Data**

Dec. 1, 2006 (FR) 0655246

Publication Classification(51) **Int. Cl.**
H01Q 13/10 (2006.01)(52) **U.S. Cl.** **343/770**(57) **ABSTRACT**

The present invention relates to a multi-sector antenna comprising N (N>1) planar antennas each constituted of a longitudinal radiation slot etched on a first substrate provided with a ground plane and supplied by an excitation line. The N first substrates are fixed on a second common substrate so that the radiation axis of each antenna is parallel to said second substrate, the N first substrates being interconnected around an axis perpendicular to the second substrate. The invention can be applied to high definition wireless cameras.

Correspondence Address:
Robert D. Shedd, Patent Operations
THOMSON Licensing LLC
P.O. Box 5312
Princeton, NJ 08543-5312 (US)

(21) Appl. No.: **12/312,797**(22) PCT Filed: **Nov. 29, 2007**

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US 20100066624A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0066624 A1**

(43) **Pub. Date: Mar. 18, 2010**

(54) **SPIRAL ANTENNA**

Publication Classification

(76) Inventors: **Yasuharu Masuda**, Kawasaki-shi
(JP); **Masahiro Tanabe**,
Kawasaki-shi (JP)

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/00 (2006.01)

Correspondence Address:

**OBLON, SPIVAK, MCCLELLAND MAIER &
NEUSTADT, L.L.P.**
1940 DUKE STREET
ALEXANDRIA, VA 22314 (US)

(52) **U.S. Cl.** **343/787; 343/895**

(57) **ABSTRACT**

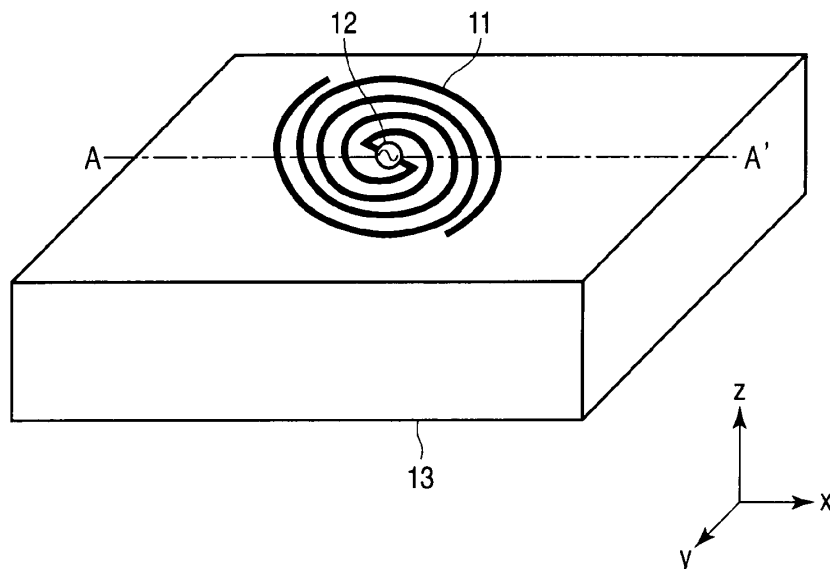
A spiral antenna includes an antenna element which is formed in a spiral pattern on a dielectric substrate, a cavity which is formed with a space provided between the antenna element, and a magnetic material which is arranged between the antenna element and the cavity. The cross-section of the spiral antenna is formed in a manner which the sum of a distance between the antenna element and the magnetic material and a thickness of the magnetic material increases from the center portion towards the outer circumference of the spiral.

(21) Appl. No.: **12/466,874**

(22) Filed: **May 15, 2009**

(30) **Foreign Application Priority Data**

Sep. 12, 2008 (JP) 2008-235645



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US 20100066628A1

(19) **United States**(12) **Patent Application Publication**
Ishimiya(10) **Pub. No.: US 2010/0066628 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **FOLDED DIPOLE ANTENNA DEVICE AND
MOBILE RADIO TERMINAL**(30) **Foreign Application Priority Data**

Nov. 18, 2005 (JP) 2005-333783

(75) Inventor: **Katsunori Ishimiya, Tokyo (JP)****Publication Classification**

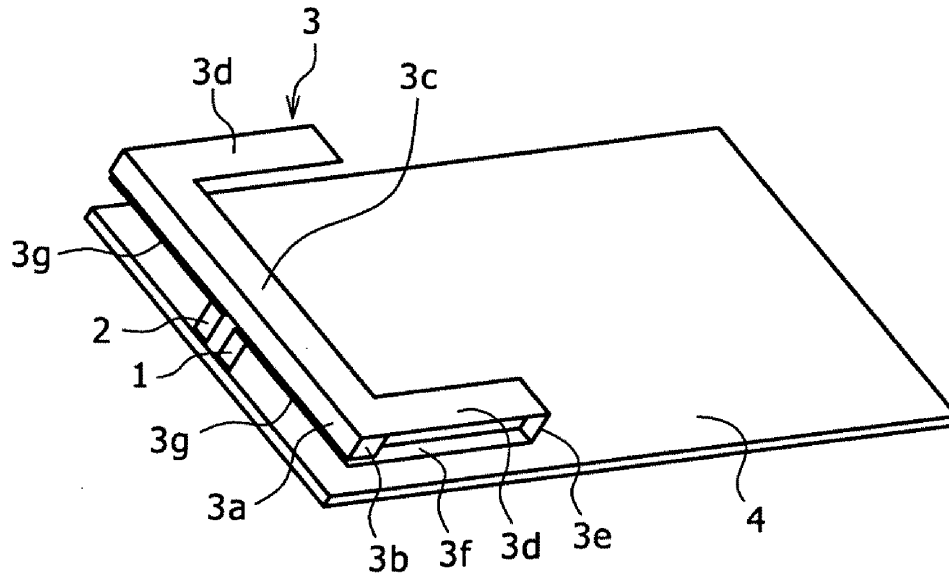
Correspondence Address:

**RADER FISHMAN & GRAUER PLLC
LION BUILDING, 1233 20TH STREET N.W.,
SUITE 501
WASHINGTON, DC 20036 (US)**(51) **Int. Cl.**
H01Q 9/26 (2006.01)(52) **U.S. Cl.** **343/804**(57) **ABSTRACT**

Disclosed is a folded dipole antenna device which is of an unbalanced feed type and includes an antenna element of approximately plate-like loop structure, connected to an antenna feed point and an antenna ground provided on a base plate. In the folded dipole antenna device, the antenna element of loop structure includes a pair of first element sections which extend approximately parallel to the base plate, a second element section formed by merging element sections that are folded back from both ends of the first element sections and extend approximately parallel to the first element sections, and a third element section which extends from a folded top part of the second element section toward the first element sections and an end part thereof is close to the first element sections.

(73) Assignee: **Sony Ericsson Mobile
Communications, Tokyo (JP)**(21) Appl. No.: **12/585,270**(22) Filed: **Sep. 10, 2009****Related U.S. Application Data**

(63) Continuation of application No. 11/588,289, filed on Oct. 27, 2006, now Pat. No. 7,605,764.



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US 20100066630A1

(19) **United States**(12) **Patent Application Publication****Su et al.**(10) **Pub. No.: US 2010/0066630 A1**(43) **Pub. Date: Mar. 18, 2010**(54) **DUAL-BAND ANTENNA****Publication Classification**

(75) Inventors: **Jia-Hung Su**, Taipei Hsien (TW);
Ching-Chi Lin, Taipei Hsien (TW);
Kai Shih, Taipei Hsien (TW);
Yu-Yuan Wu, Taipei Hsien (TW)

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

(52) **U.S. Cl.** **343/846**

(57) **ABSTRACT**

Correspondence Address:

WPAT, PC**INTELLECTUAL PROPERTY ATTORNEYS****2030 MAIN STREET, SUITE 1300****IRVINE, CA 92614 (US)**

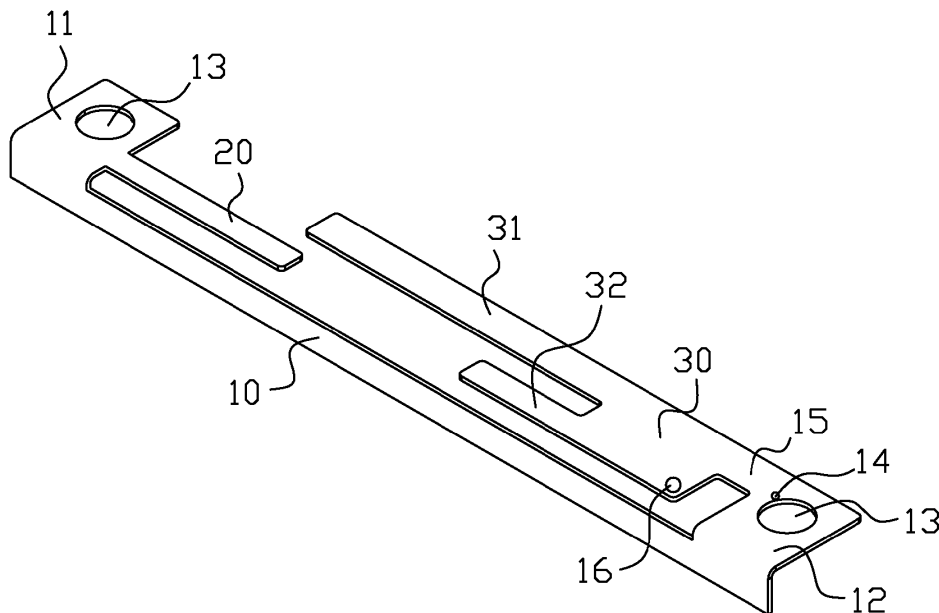
(73) Assignee: **CHENG UEI PRECISION**
INDUSTRY CO., LTD., Taipei
Hsien (TW)

(21) Appl. No.: **12/209,597**

(22) Filed: **Sep. 12, 2008**

A dual-band antenna has a grounding portion, two ends of which extend substantially perpendicular to the grounding portion towards a same side to form a first fixing portion and a second fixing portion. An antenna unit extends towards the first fixing portion from the second fixing portion. The antenna unit includes a basic portion spaced from the grounding portion, a feeding point positioned at the basic portion, and a first and second radiating portion extending towards the first fixing portion from the basic portion side by side to space from each other. The first radiating portion extends beyond the second radiating portion. A coupling portion extends towards the second fixing portion from the first fixing portion along a substantially longitudinal centerline of the second radiating portion, with a free end thereof away from the second radiating portion and beyond a free end of the first radiating portion to define a space therebetween.

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US 20100066636A1

(19) **United States**

(12) **Patent Application Publication**
Carr

(10) **Pub. No.: US 2010/0066636 A1**

(43) **Pub. Date: Mar. 18, 2010**

(54) **MULTIPLE-CAVITY ANTENNA**

Publication Classification

(76) Inventor: **William N. Carr**, Montclair, NJ
(US)

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/38 (2006.01)
H01Q 23/00 (2006.01)

Correspondence Address:
DEMONT & BREYER, LLC
100 COMMONS WAY, Ste. 250
HOLMDEL, NJ 07733 (US)

(52) **U.S. Cl. 343/904; 343/700 MS**

(21) Appl. No.: **12/621,451**

(57) **ABSTRACT**

(22) Filed: **Nov. 18, 2009**

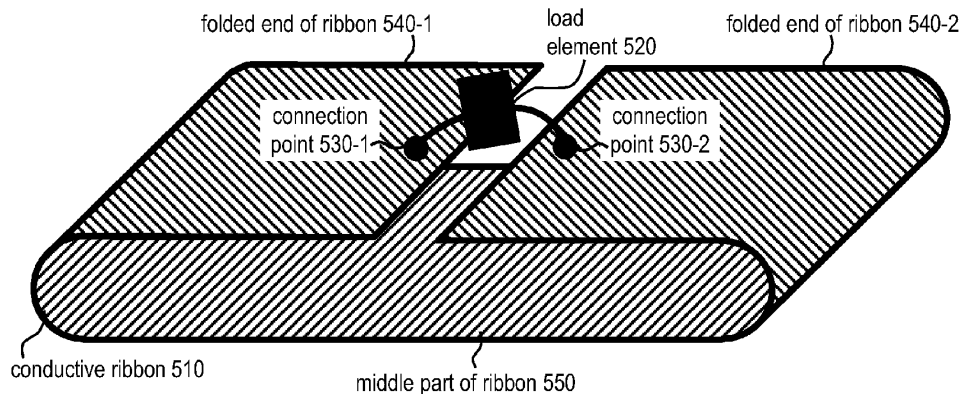
Related U.S. Application Data

(63) Continuation-in-part of application No. 12/535,768,
filed on Aug. 5, 2009.

An antenna for a Radio-Frequency IDentification (RFID) system is disclosed that comprises a pair of resonant cavities. The antenna is realized by folding the ends of a ribbon of conductive material, such as metal foil, over the middle part of the ribbon. The antenna generates a higher voltage than prior-art antennas used in RFID systems, and it makes possible RFID systems with an improved range. In an alternative embodiment, the antenna comprises a reflector that enables the RFID system to better tolerate the presence of nearby metal objects.

(60) Provisional application No. 61/207,467, filed on Feb. 13, 2009, provisional application No. 61/273,814, filed on Aug. 10, 2009.

Dual-cavity antenna with load element 500



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US 20100071197A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0071197 A1**

(43) **Pub. Date: Mar. 25, 2010**

(54) **INTEGRAL ANTENNAS IN METAL LAMINATES**

(22) Filed: **Sep. 22, 2008**

Publication Classification

(76) Inventors: **Joseph M. Fridy**, Pittsburgh, PA (US); **Daniel Sarafin**, Baden, PA (US); **Robert E. Bombalski**, Pittsburgh, PA (US)

(51) **Int. Cl.**
H01P 11/00 (2006.01)

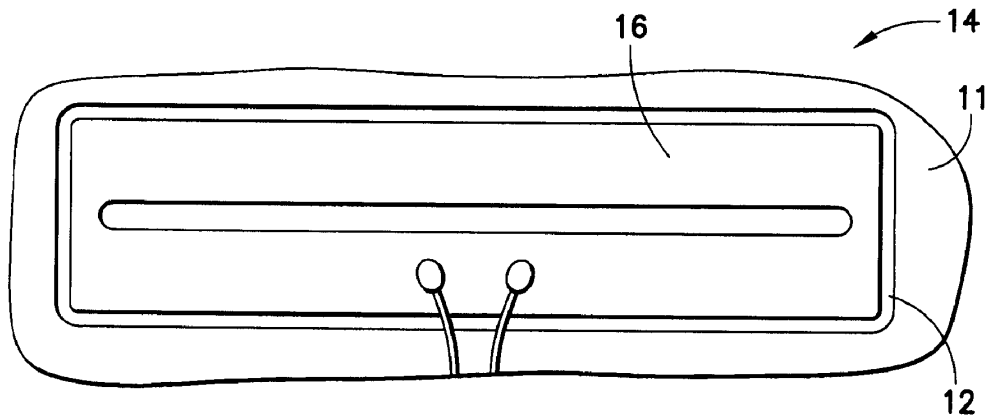
(52) **U.S. Cl.** **29/600**

(57) **ABSTRACT**

Correspondence Address:
INTELLECTUAL PROPERTY
ALCOA TECHNICAL CENTER, BUILDING C,
100 TECHNICAL DRIVE
ALCOA CENTER, PA 15069-0001 (US)

A method of making an integral antenna from a metal laminate is provided. The metal laminate comprises a top metal layer, a middle thermoplastic layer, and a bottom metal layer. A portion of the top metal layer of the metal laminate is isolated to create an antenna structure so that the antenna remains a part of the metal laminate to create an integral antenna.

(21) Appl. No.: **12/234,925**



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US 20100072287A1

(19) **United States**(12) **Patent Application Publication****KAI et al.**(10) **Pub. No.: US 2010/0072287 A1**(43) **Pub. Date: Mar. 25, 2010**(54) **LOOP ANTENNA****Publication Classification**(75) Inventors: **Manabu KAI**, Kawasaki (JP); **Toru MANIWA**, Kawasaki (JP); **Takashi YAMAGAJI**, Kawasaki (JP)(51) **Int. Cl.**
G06K 19/07 (2006.01)
H01Q 11/12 (2006.01)(52) **U.S. Cl.** **235/492; 343/741**

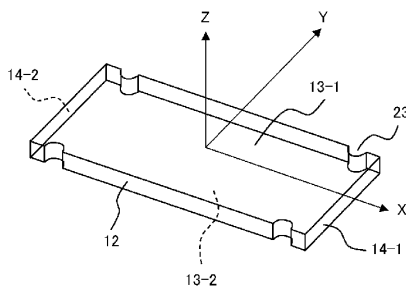
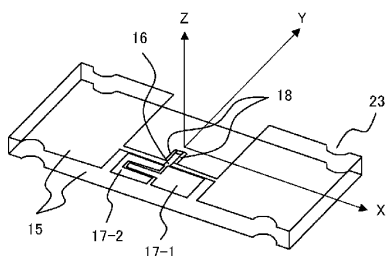
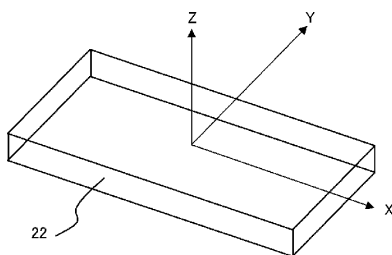
Correspondence Address:

HANIFY & KING PROFESSIONAL CORPORATION**1055 Thomas Jefferson Street, NW, Suite 400
WASHINGTON, DC 20007 (US)**(73) Assignee: **Fujitsu Limited**, Kawasaki-shi (JP)(21) Appl. No.: **12/629,693**(22) Filed: **Dec. 2, 2009****Related U.S. Application Data**

(63) Continuation of application No. PCT/JP2007/000717, filed on Jun. 29, 2007.

(57) **ABSTRACT**

A loop antenna includes a dielectric substrate taking a cuboid form, and a loop part composed of a metal that covers two pairs of facing surfaces of the dielectric substrate. The loop part is formed by leaving a blank portion at the center of one surface of the pair of facing surfaces having a wider area. In the blank portion, a feeding point to an LSI chip and a capacitance part connected to the loop part in parallel to the feeding point are formed. The capacitance part is provided to compensate for an internal capacitance of the LSI chip so that a small LSI chip matches the antenna. A convex part having a length is arranged with a gap within a corresponding concave part to form a large capacitance.



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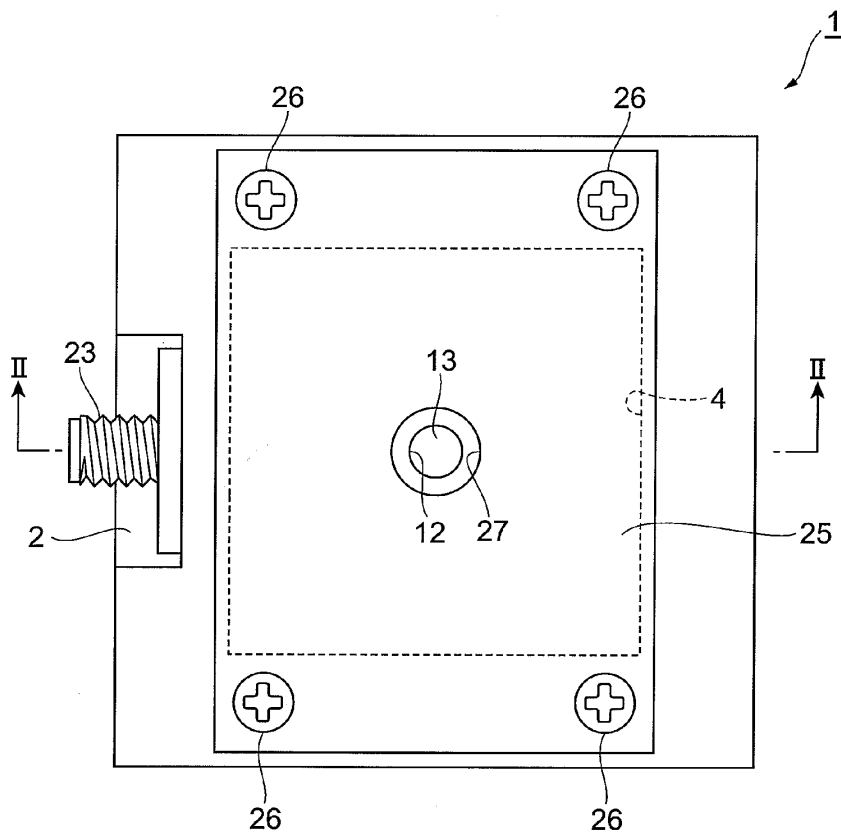
US 20100072373A1

(19) **United States**(12) **Patent Application Publication**
Nakajima(10) **Pub. No.: US 2010/0072373 A1**(43) **Pub. Date: Mar. 25, 2010**(54) **TERAHERTZ ANTENNA MODULE****Publication Classification**(75) Inventor: **Kazutoshi Nakajima**, Shizuoka
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H01L 31/09 (2006.01)Correspondence Address:
DRINKER BIDDLE & REATH (DC)
1500 K STREET, N.W., SUITE 1100
WASHINGTON, DC 20005-1209 (US)(52) **U.S. Cl.** **250/353; 250/338.4**(57) **ABSTRACT**

In a terahertz antenna module 1, a photoconductive antenna element 17 is fixed to a wiring board 9, and electrically connected to an electric signal input/output pin 24 of an electric signal input/output port 23 via a signal electrode of the wiring board 9. Further, a buffer member 7, a hemispherical lens 8, a photoconductive antenna element 17, and the wiring board 9 are disposed in a recess 3 of a container 2 in this order from an opening 6 side of the container 2, and by attaching a cover 25 to the container 2, the wiring board 9, the photoconductive antenna element 17, and the hemispherical lens 8 are pressed against the buffer member 7. Further, the wiring board 9 is positioned by the recess 4 and the hemispherical lens 8 is positioned by the buffer member 7 so that the optical axis OA of the hemispherical lens 8 passes just through a photoconductive antenna part of the photoconductive antenna element 17.

(73) Assignee: **Hamamatsu Photonics K.K.**,
Hamamatsu-shi (JP)(21) Appl. No.: **12/523,270**(22) PCT Filed: **Mar. 12, 2008**(86) PCT No.: **PCT/JP2008/054503**§ 371 (c)(1),
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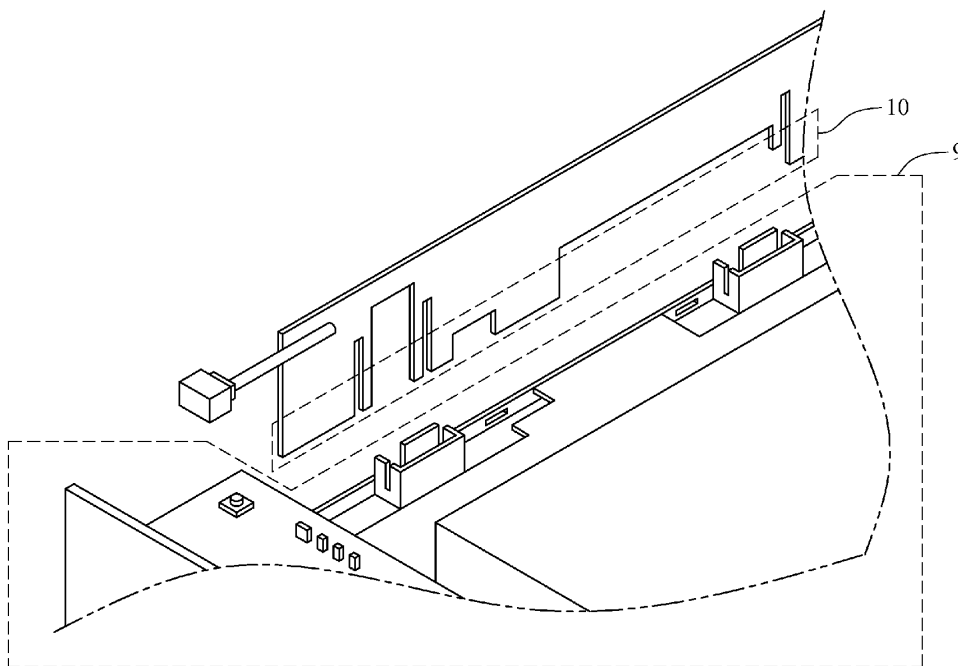
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CHENG et al.(10) **Pub. No.: US 2010/0073240 A1**(43) **Pub. Date: Mar. 25, 2010**(54) **ANTENNA****Publication Classification**(75) Inventors: **SHIH-CHIEH CHENG**, Tainan
County (TW); **KUO-CHANG LO**,
Miaoli County (TW)(51) **Int. Cl.**
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Correspondence Address:

WPAT, PC**INTELLECTUAL PROPERTY ATTORNEYS****7225 BEVERLY ST.****ANNANDALE, VA 22003 (US)**(57) **ABSTRACT**(73) Assignee: **ARCADYAN TECHNOLOGY**
CORPORATION, Hsinchu City
(TW)(21) Appl. No.: **12/564,977**(22) Filed: **Sep. 23, 2009**(30) **Foreign Application Priority Data**

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An antenna is disclosed, which comprises: a substrate with a first surface and a second surface; a first radiation unit, disposed on the first surface; an insulating unit, disposed on the first surface on top of the first radiation unit; a first feed point, formed on the second surface and electrically connected to the first radiation unit; a grounding unit, disposed coplanar and connected with the first radiation unit; a first gap, formed between the first radiation unit and the grounding unit; and a second feed point, formed on the second surface and electrically connected to the grounding unit; wherein, as the second surface with the two feed points disposed thereon is adjacent to at least a metallic component and the radiation units are disposed on the first surface, the radiation units do not directly face the metallic component and thus prevent the same from being interfered by metallic shielding.



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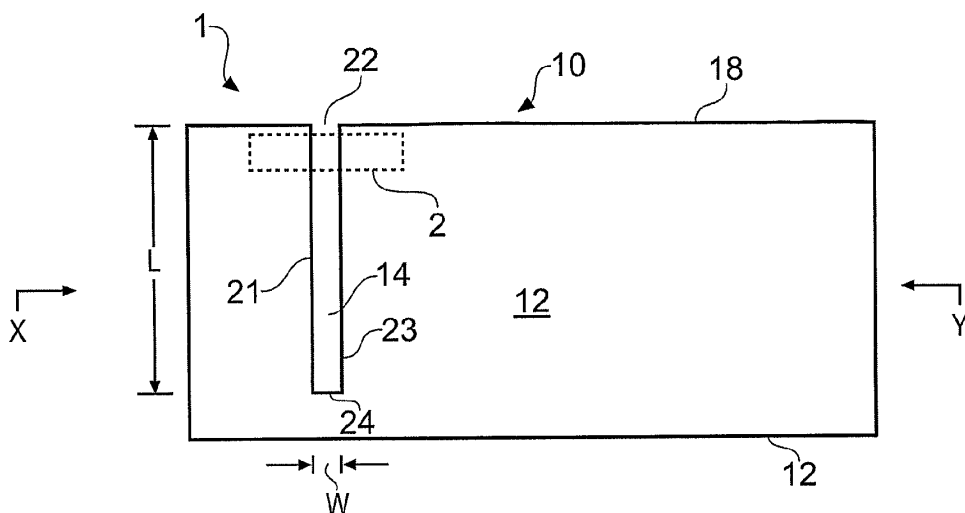
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(19) **United States**(12) **Patent Application Publication****Arkko et al.**(10) **Pub. No.: US 2010/0073247 A1**(43) **Pub. Date: Mar. 25, 2010**(54) **ANTENNA ARRANGEMENT AND ANTENNA HOUSING**(86) PCT No.: **PCT/IB2007/002217**(76) Inventors: **Aimo Arkko**, Ruutana (FI); **Jani Ollikainen**, Helsinki (FI)

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H01Q 9/00 (2006.01)(52) **U.S. Cl.** **343/745; 343/872**(57) **ABSTRACT**Correspondence Address:
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212 (US)(21) Appl. No.: **12/595,056**(22) PCT Filed: **Apr. 10, 2007**

An antenna arrangement including an antenna occupying at least a first plane; a conductive structure that is isolated from the antenna but is arranged to be parasitically fed by the antenna, the conductive structure having a slot and occupying at least a second plane different to but adjacent the first plane.



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