US 20120157175A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0157175 A1

(43) Pub. Date: Jun. 21, 2012

Golko et al.

(54) **PERIPHERAL ELECTRONIC DEVICE HOUSING MEMBERS WITH GAPS AND DIELECTRIC COATINGS**

(76) Inventors: **Albert J. Golko**, Saratoga, CA (US); **Daniel W. Jarvis**, Sunnyvale, CA (US)

(21) Appl. No.: **12/973,586**

(22) Filed: **Dec. 20, 2010**

Publication Classification

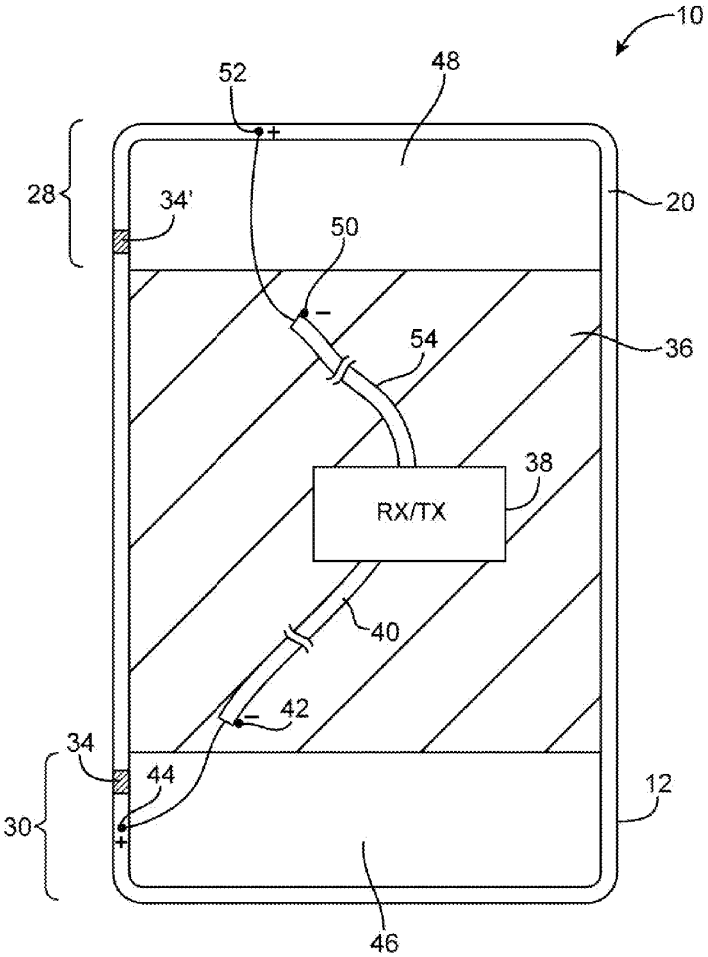
(51) **Int. Cl.**

H04W 88/02	(2009.01)
H05K 5/00	(2006.01)
H01Q 1/24	(2006.01)

(52) **U.S. Cl.** **455/575.7**; 343/702; 174/520

(57) **ABSTRACT**

An electronic device such as a handheld device may have a rectangular housing with a rectangular periphery. A conductive peripheral housing member may run along the rectangular periphery and may surround the rectangular housing. Radio-frequency transceiver circuitry within the electronic device may be coupled to antenna structures for transmitting and receiving radio-frequency signals. The conductive peripheral housing member may form part of the antenna structures. A gap in the conductive peripheral housing member may be filled with dielectric. The conductive peripheral housing member may be configured to form a recess. The recess may have the shape of a rectangle, oval, diamond, or other shape that overlaps and is bisected by the gap. The recess may also have the shape of a groove that extends around the entire periphery of the housing. The dielectric in the recess may include one or more different materials such as clear and opaque polymers.



US 20120162016A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2012/0162016 A1**

(43) **Pub. Date: Jun. 28, 2012**

LIN

(54) **ANTENNA MODULE, AND TOUCH DEVICE AND ELECTRONIC DEVICE HAVING THE SAME**

(75) Inventor: **LIEN CHIH LIN**, Penghu County (TW)

(73) Assignee: **SMART APPROACH CO., LTD**, Hsinchu (TW)

(21) Appl. No.: **13/019,347**

(22) Filed: **Feb. 2, 2011**

(30) **Foreign Application Priority Data**

Dec. 22, 2010 (TW) 099224827

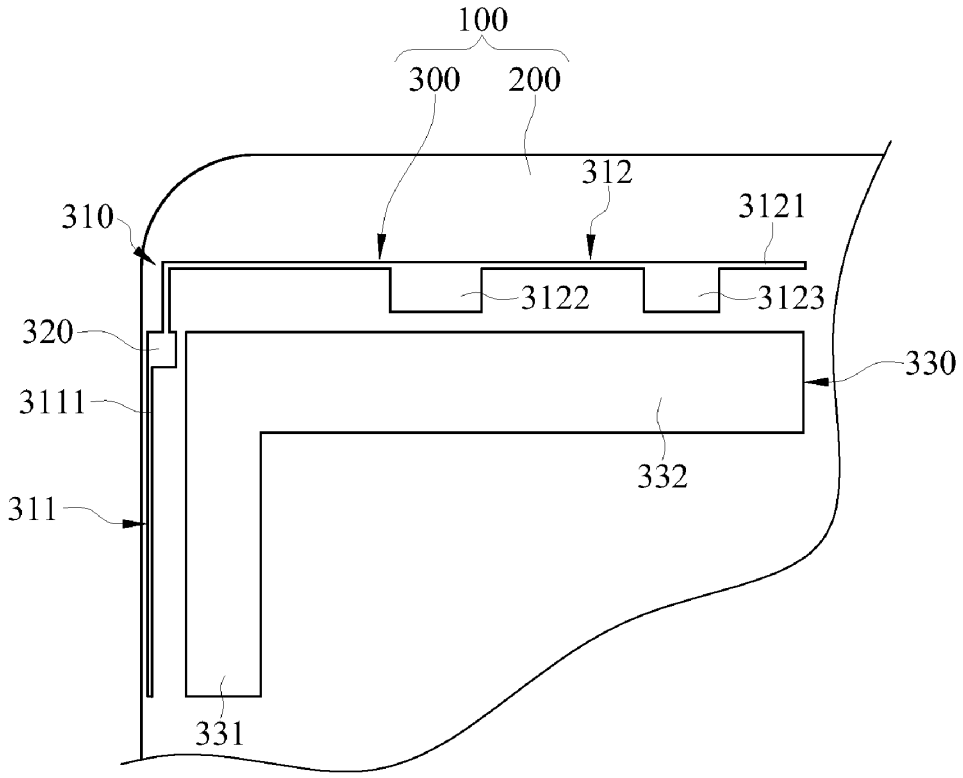
Publication Classification

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

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

(57) **ABSTRACT**

The antenna module includes a transparent substrate and an antenna component disposed on the transparent substrate. The antenna component includes a radiation portion, a feed portion and a grounding portion. The grounding portion is located at a corner of the transparent substrate, and the grounding portion includes a first strip portion and a second strip portion that are connected and integrated.



US 20120162017A1

(19) **United States**

(12) **Patent Application Publication**

LEE

(10) **Pub. No.: US 2012/0162017 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **MULTIBAND ANTENNA**

(75) Inventor: **YI-CHIEH LEE**, Tu-Cheng (TW)

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

(21) Appl. No.: **13/038,478**

(22) Filed: **Mar. 2, 2011**

(30) **Foreign Application Priority Data**

Dec. 28, 2010 (TW) 99146447

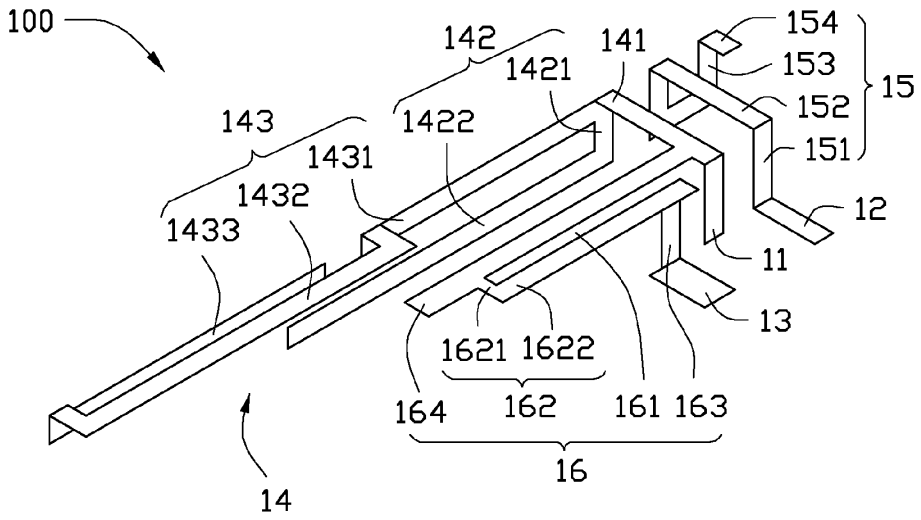
Publication Classification

(51) **Int. Cl.**
H01Q 5/01 (2006.01)

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

(57) **ABSTRACT**

A multiband antenna includes a feed unit, a first radio unit, a second radio unit, and a resonance unit. When feed signals are input from the feed unit, the feed signals are respectively transmitted to the first radio unit and the second radio unit to enable the first radio unit and the second radio unit to respectively receive and send wireless signals of different frequencies, and the resonance unit is driven to resonate and is thereby enabled to receive and send wireless signals of predetermined frequencies, such that the multiband antenna is capable of receiving and sending wireless signals in more than two frequency bands.



US 20120162021A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0162021 A1

(43) Pub. Date: Jun. 28, 2012

LEE et al.

(54) **CIRCULARLY POLARIZED ANTENNA WITH WIDE BEAM WIDTH**

(75) Inventors: **Kyong-Hee LEE**, Daejeon (KR); **Gwang-Ja Jin**, Daejeon (KR); **Moon-Kyun Oh**, Daejeon (KR); **Hae-Won Son**, Jeonju-si (KR)

(73) Assignees: **INDUSTRIAL COOPERATION FOUNDATION CHONBUK NATIONAL UNIVERSITY**, Jeonju-si (KR); **ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE**, Daejeon (KR)

(21) Appl. No.: **13/334,906**

(22) Filed: **Dec. 22, 2011**

(30) **Foreign Application Priority Data**

Dec. 23, 2010 (KR) 10-2010-0133956

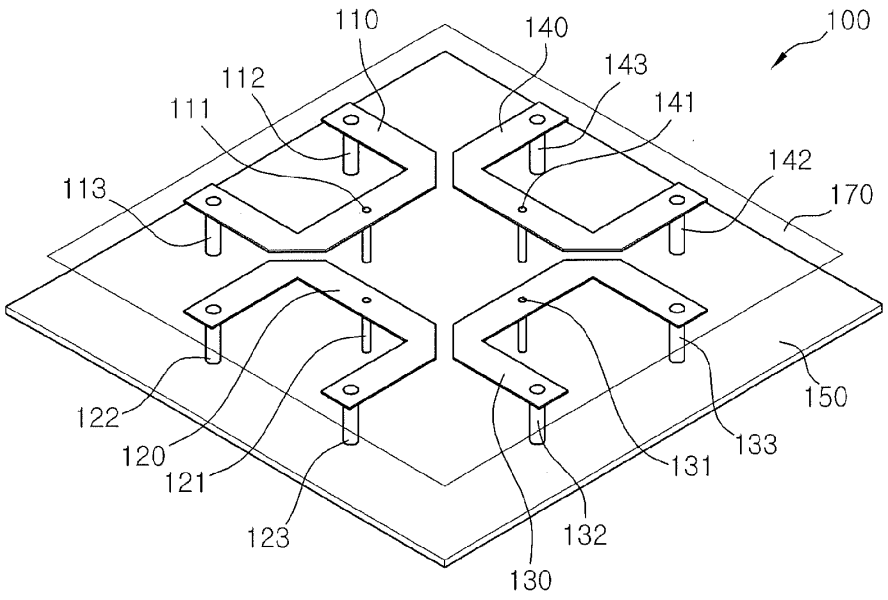
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

Disclosed herein is a circularly polarized antenna with a wide beam width, in which four U-shaped metal strips are disposed in a circular shape, and four signals having the same magnitude and phase difference intervals of 90 degrees are fed to the respective metal strips so as to transceive circularly polarized waves. The disclosed circularly polarized antenna includes a ground plane, a central patch formed in the center of an upper surface of the ground plane, and a plurality of radiation patches disposed above the ground plane and around the central patch in a circular shape, wherein signals having the same magnitude and preset phase differences are fed to respective radiation patches.



US 20120162022A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0162022 A1

(43) Pub. Date: Jun. 28, 2012

WEI

(54) **MULTI-BAND ANTENNA**

(75) Inventor: **CHENG-FAN WEI**, New Taipei (TW)

(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW)

(21) Appl. No.: **13/335,949**

(22) Filed: **Dec. 23, 2011**

(30) **Foreign Application Priority Data**

Dec. 23, 2010 (TW) 099145490

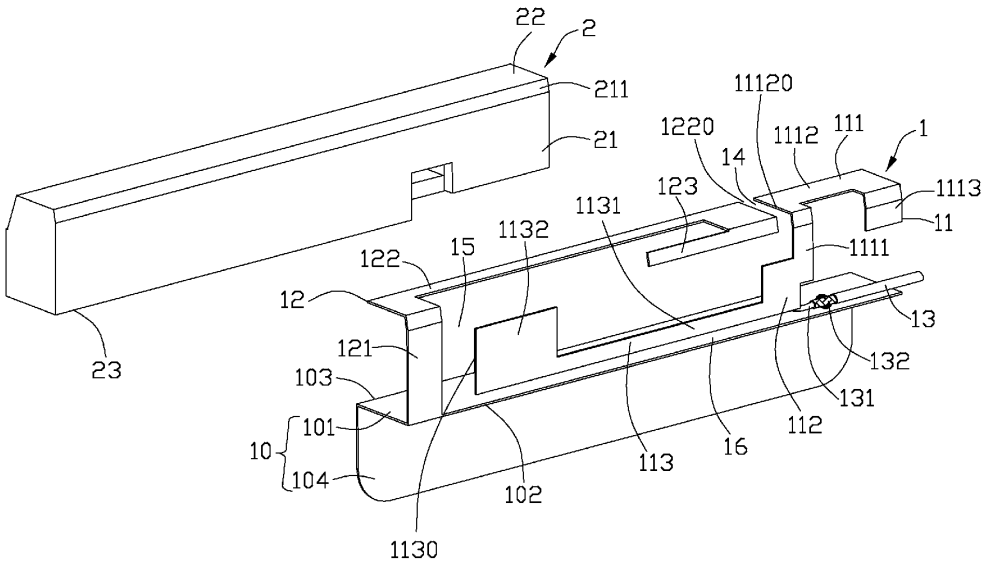
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

A multi-band antenna includes a grounding element extending along a lengthwise direction to form a side edge, a first radiating element, a second radiating element and a feeding line. The first radiating element is separated from and unconnected to the grounding element and comprises a feeding portion perpendicular to and separated from the grounding element and a first and second radiating portion respectively extending from the feeding portion along two different directions, the first radiating element being used on a first higher frequency band. The second radiating element is located on one side of the first radiating portion. The second radiating element works on a second lower frequency band by coupled to the second radiating portion. The second radiating portion of the first radiating element is separated from the second radiating element and the grounding element to respectively form two slots.



US 20120162023A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0162023 A1

(43) Pub. Date: Jun. 28, 2012

TAI

(54) **MULTI-BAND ANTENNA**

(75) Inventor: **LUNG-SHENG TAI**, New Taipei (TW)

(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW)

(21) Appl. No.: **13/336,469**

(22) Filed: **Dec. 23, 2011**

(30) **Foreign Application Priority Data**

Dec. 23, 2010 (TW) 099145491

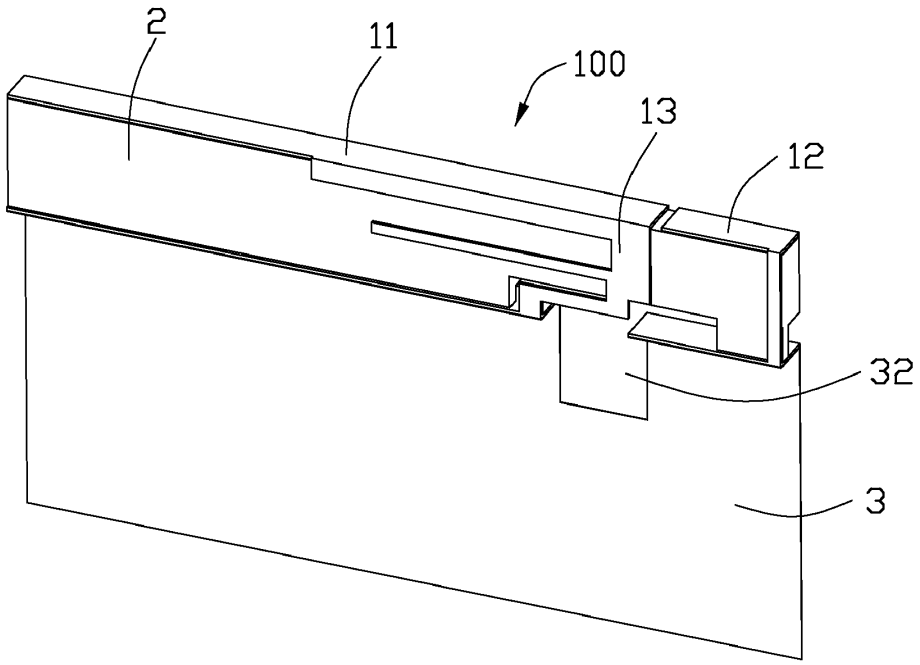
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

A multi-band antenna includes a main body and a metal foil. The main body includes a first radiating element and a second radiating element separated from the first radiating element to form an opening therebetween. The metal foil has a slot connected to the opening of the main body.



US 20120162025A1

(19) **United States**

(12) **Patent Application Publication**

OHNO et al.

(10) **Pub. No.: US 2012/0162025 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **MOBILE TERMINAL**

(75) Inventors: **Junichi OHNO**, Saitama (JP); **Aiko Yoshida**, Kanagawa (JP)

(73) Assignee: **SONY ERICSSON MOBILE COMMUNICATIONS JAPAN, INC.**, Minato-ku (JP)

(21) Appl. No.: **13/213,219**

(22) Filed: **Aug. 19, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/426,711, filed on Dec. 23, 2010.

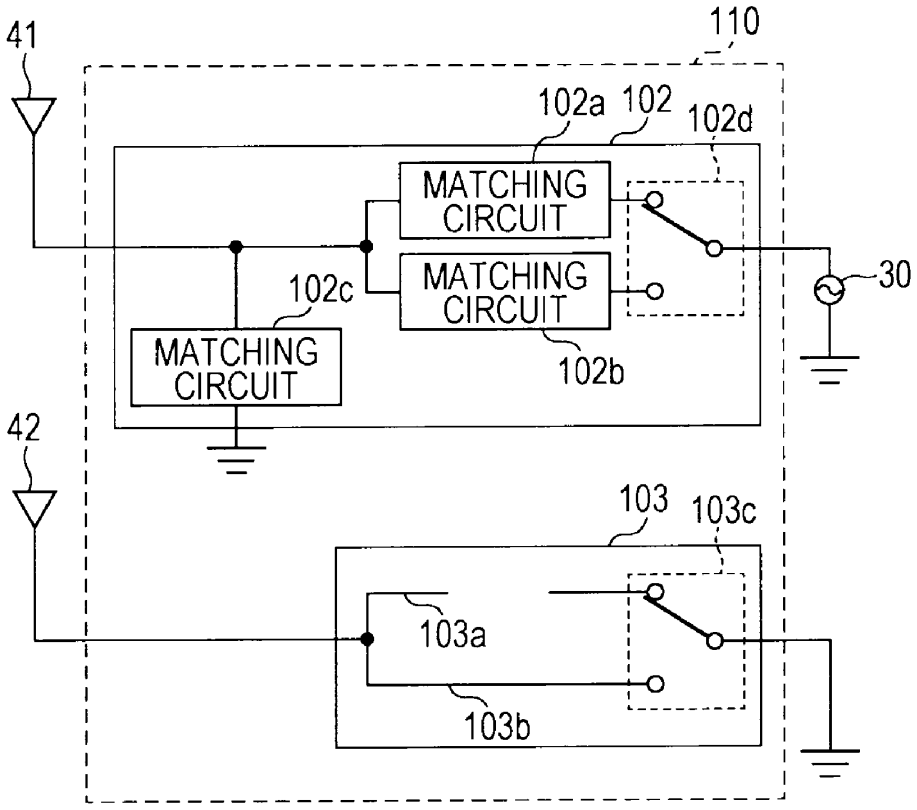
Publication Classification

(51) **Int. Cl.**
H01Q 1/50 (2006.01)
H01Q 1/24 (2006.01)

(52) **U.S. Cl.** **343/702**; 343/852

(57) **ABSTRACT**

A mobile terminal including an antenna device including an antenna element and a first non-feeding element, a radio-frequency unit that receives a signal from the antenna element, first and second matching circuits connected to the antenna element, a first switch that selectively connects one of the first and second matching circuits to the radio-frequency unit, a second switch that selectively grounds the first non-feeding element, an attitude-detection unit that detects an attitude of the mobile terminal, and a control unit that controls the first and second switches based on an output of the attitude-detection unit.



US 20120162026A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0162026 A1

(43) Pub. Date: Jun. 28, 2012

Andersson et al.

(54) **ANTENNA ARRANGEMENT FOR A PORTABLE RADIO COMMUNICATION DEVICE HAVING A METAL CASING**

(76) Inventors: **M. Charlotta Andersson**, Solna (SE); **Per Erlandsson**, Stockholm (SE); **Göran Johansson**, Jarfalla (SE); **Ulf Palin**, Ljustero (SE); **Axel von Arbin**, Taby (SE); **Johan Bäckman**, Taby (SE)

(21) Appl. No.: **13/313,985**

(22) Filed: **Dec. 7, 2011**

(30) **Foreign Application Priority Data**

Dec. 22, 2010 (EP) 10196640.6

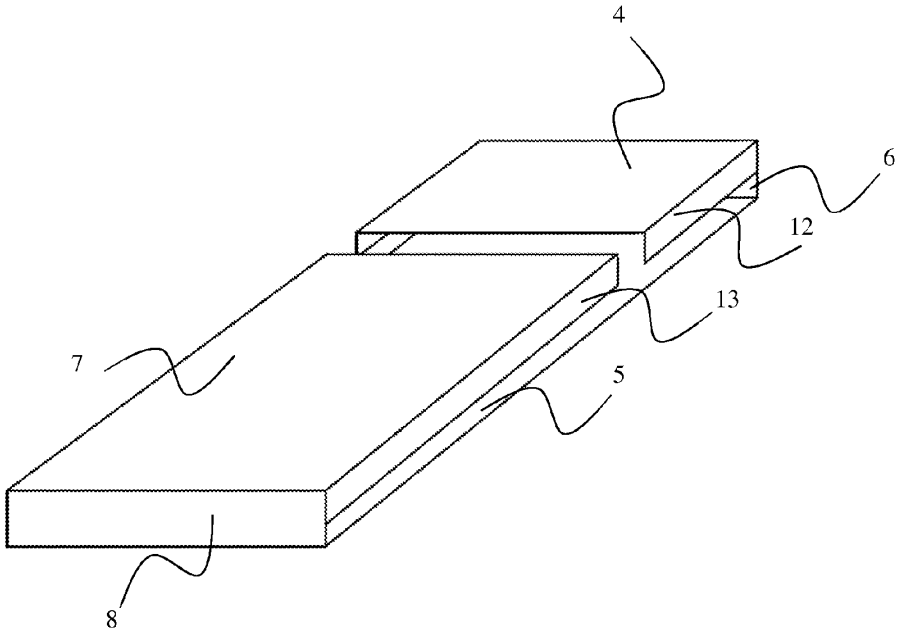
Publication Classification

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

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

(57) **ABSTRACT**

Exemplary embodiments are disclosed of antenna arrangements for portable radio communication devices. In an exemplary embodiment, there is an antenna arrangement for a portable communication device having a metal casing. The antenna arrangement generally includes a front side part of the metal casing. A first back side part is connected to the front side part through a top side part of the metal casing. A second back side part is connected to the front side part through a bottom side part of the metal casing. The bottom and top side parts are positioned at opposite ends of the front side part. The first and second back side parts are positioned and distanced from each other by a gap.



US 20120162027A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0162027 A1

(43) Pub. Date: Jun. 28, 2012

Chacinski et al.

(54) **ANTENNA ARRANGEMENT FOR A PORTABLE RADIO COMMUNICATION DEVICE**

(76) Inventors: **Marek Chacinski**, Farsta (SE); **Andrei Kaikkonen**, Jarfalla (SE); **Johan Backman**, Taby (SE); **Lukasz Grynczel**, Sollentuna (SE)

(21) Appl. No.: **13/333,092**

(22) Filed: **Dec. 21, 2011**

(30) **Foreign Application Priority Data**

Dec. 22, 2010 (EP) 10196418.7

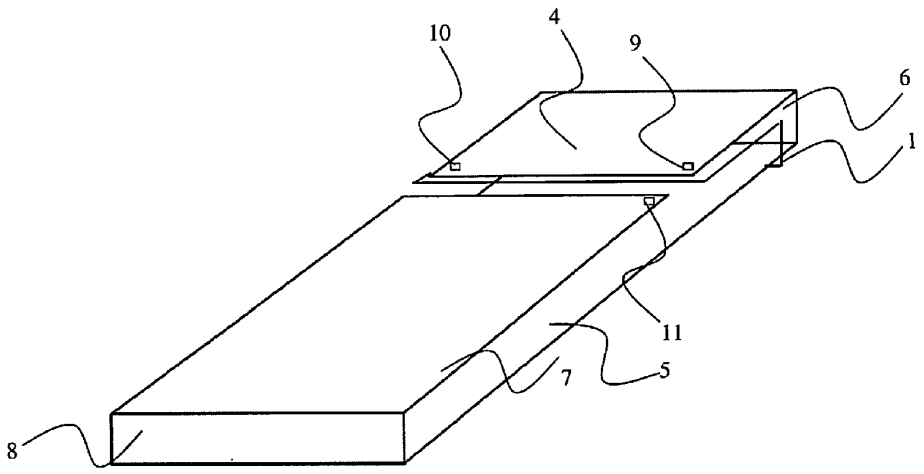
Publication Classification

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

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

(57) **ABSTRACT**

Exemplary embodiments are disclosed of antenna arrangements for portable radio communication devices. In an exemplary embodiment, there is an antenna arrangement for a portable communication device having a metal casing. A front side part forms a ground plane means for the portable radio communication device. A first back side part is connected to the front side part through a top side part. A second back side part is connected to the front side part through a bottom side part. The top and bottom side parts are positioned at opposite ends of the front side part. The first and second back side parts are positioned and distanced from each other by a gap. A magnetic type antenna element is positioned partly in the gap and positioned partly over or along the first back side part, the top side part, or the front side part.



US 20120162035A1

(19) **United States**

(12) **Patent Application Publication**

JUNG et al.

(10) **Pub. No.: US 2012/0162035 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **ALL-IN-ONE MULTI-BAND ANTENNA FOR WIRELESS COMMUNICATION SYSTEM**

(75) Inventors: **Young-Bae JUNG**, Daejeon (KR); **Soon-Young Eom**, Daejeon (KR); **Soon-Ik Jeon**, Daejeon (KR); **Jae-Ick Choi**, Daejeon (KR); **Chang-Joo Kim**, Daejeon (KR)

(73) Assignee: **ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE**, Daejeon (KR)

(21) Appl. No.: **13/020,373**

(22) Filed: **Feb. 3, 2011**

(30) **Foreign Application Priority Data**

Dec. 28, 2010 (KR) 10-2010-0136470

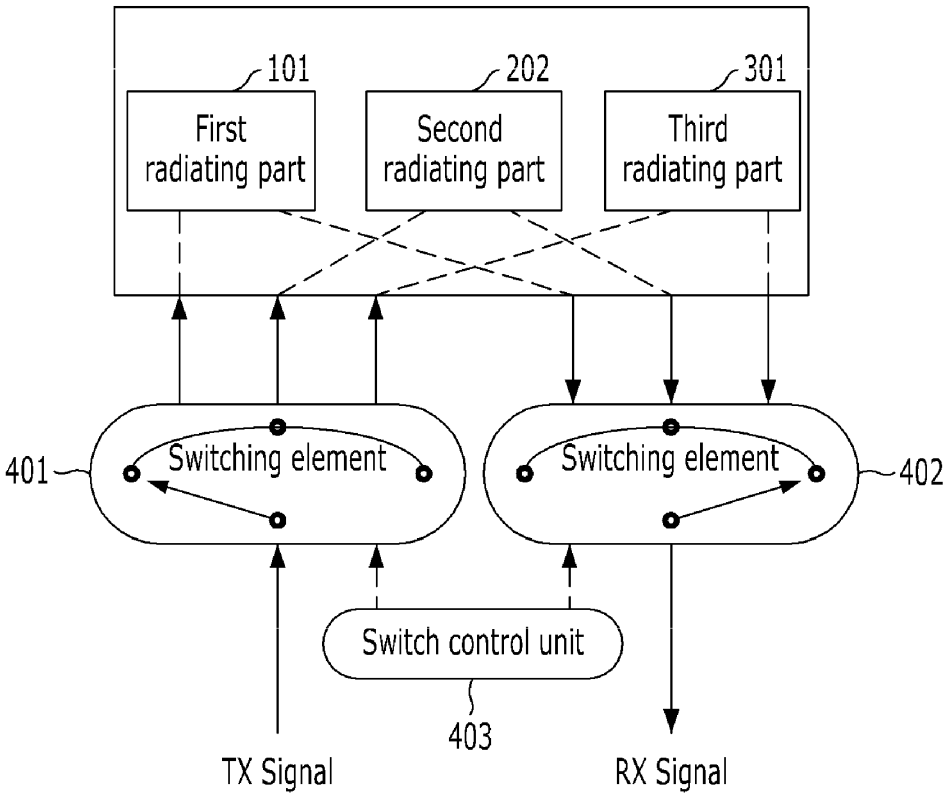
Publication Classification

(51) **Int. Cl.**
H01Q 21/30 (2006.01)

(52) **U.S. Cl.** **343/727**; 343/876; 343/893

(57) **ABSTRACT**

An all-in-one multi-band antenna includes: a first antenna element configured to operate at a first frequency band, the first antenna element including a first ground, a first radiating part, and a first feed line and a first feed point through which a signal power is applied to the first radiating part; and a second antenna element configured to operate at a second frequency band, the second antenna element including a second ground, a second radiating part, and a second feed line and a second feed point through which a signal power is applied to the second radiating part, wherein the second radiating part is provided within a pseudo-cavity formed at a center portion of the first radiating part.



US 20120162036A1

(19) **United States**

(12) **Patent Application Publication**

Yanagi et al.

(10) **Pub. No.: US 2012/0162036 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **ANTENNA DEVICE**

(75) Inventors: **Masahiro Yanagi**, Tokyo (JP); **Shigemi Kurashima**, Tokyo (JP); **Hideaki Yoda**, Tokyo (JP)

(73) Assignee: **FUJITSU COMPONENT LIMITED**

(21) Appl. No.: **13/329,452**

(22) Filed: **Dec. 19, 2011**

(30) **Foreign Application Priority Data**

Dec. 28, 2010 (JP) 2010-294268

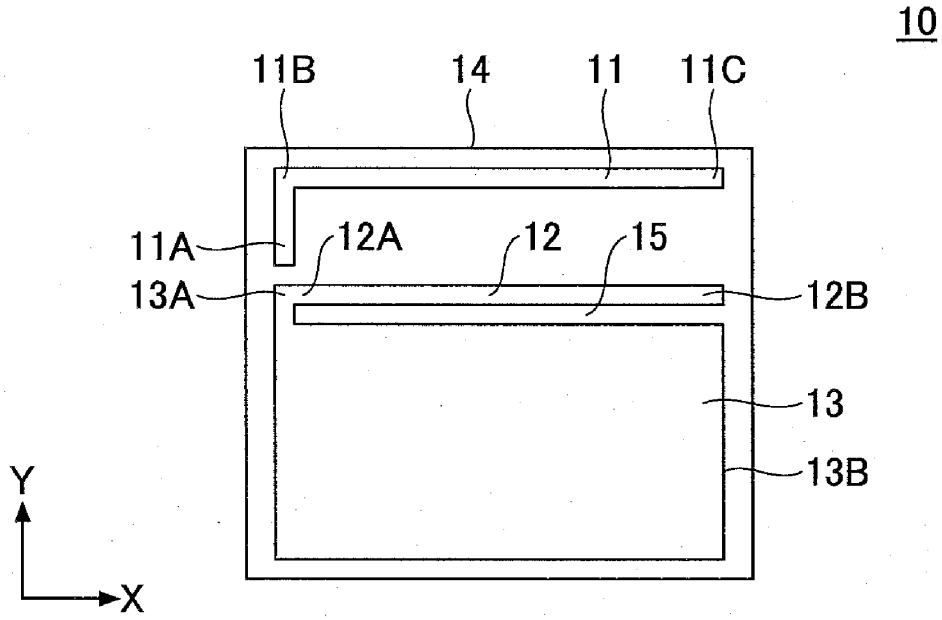
Publication Classification

(51) **Int. Cl.**
H01Q 19/00 (2006.01)

(52) **U.S. Cl.** **343/729**; 343/833

(57) **ABSTRACT**

A disclosed antenna device includes a ground element configured to be grounded, a first antenna to be connected to a radio communication module, and a second antenna configured to be parasitic on the first antenna, the second antenna receiving no power feed.



US 20120162038A1

(19) **United States**

(12) **Patent Application Publication**

LEE

(10) **Pub. No.: US 2012/0162038 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **MULTIBAND ANTENNA**

(75) Inventor: **YI-CHIEH LEE**, Tu-Cheng (TW)

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

(21) Appl. No.: **13/052,208**

(22) Filed: **Mar. 21, 2011**

(30) **Foreign Application Priority Data**

Dec. 28, 2010 (TW) 99146342

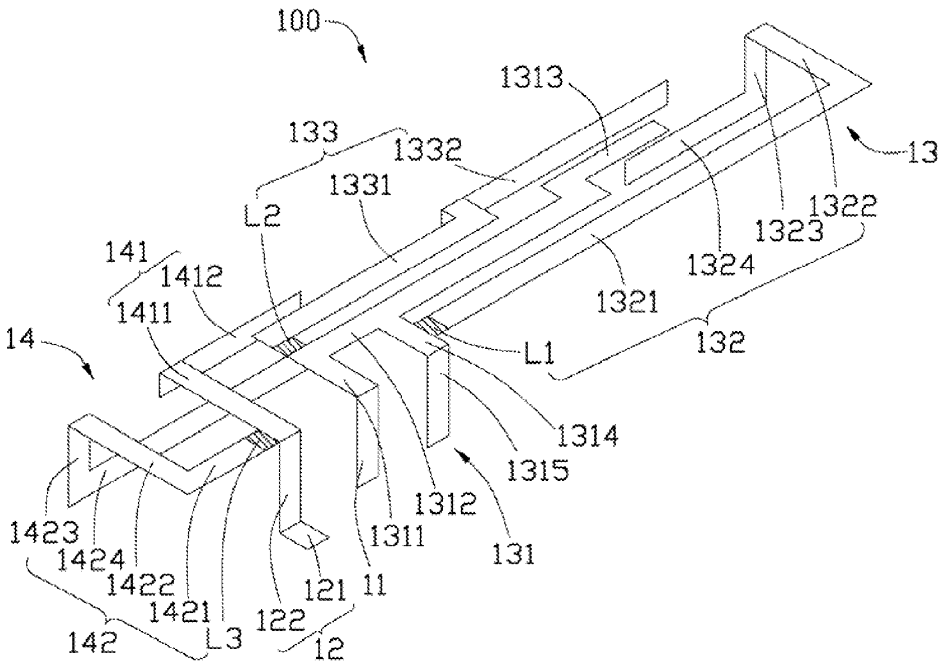
Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)

(52) **U.S. Cl.** **343/749**

(57) **ABSTRACT**

A multiband antenna includes a feed unit, a transceiving unit, and a resonance unit positioned adjacent to but separate from the feed unit and the transceiving unit. When feed signals are input to the feed unit, the feed signals are transmitted to the transceiving unit to form current paths of different lengths, and the resonance unit is driven to resonate and generates additional current paths of different lengths. In this way, the transceiving unit and the resonance unit are enabled to respectively receive and send wireless signals of different frequencies, and thus the multiband antenna is capable of receiving and sending wireless signals in more than two frequency bands.



US 20120162040A1

(19) **United States**

(12) **Patent Application Publication**

Taura et al.

(10) **Pub. No.: US 2012/0162040 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **MOBILE WIRELESS TERMINAL**

(76) Inventors: **Toru Taura**, Tokyo (JP); **Eiji Hankui**, Tokyo (JP); **Naoshi Kitamoto**, Tokyo (JP)

(21) Appl. No.: **13/257,924**

(22) PCT Filed: **Feb. 26, 2010**

(86) PCT No.: **PCT/JP2010/001318**

§ 371 (c)(1),
(2), (4) Date: **Mar. 16, 2012**

(30) **Foreign Application Priority Data**

Mar. 23, 2009 (JP) 2009-069684

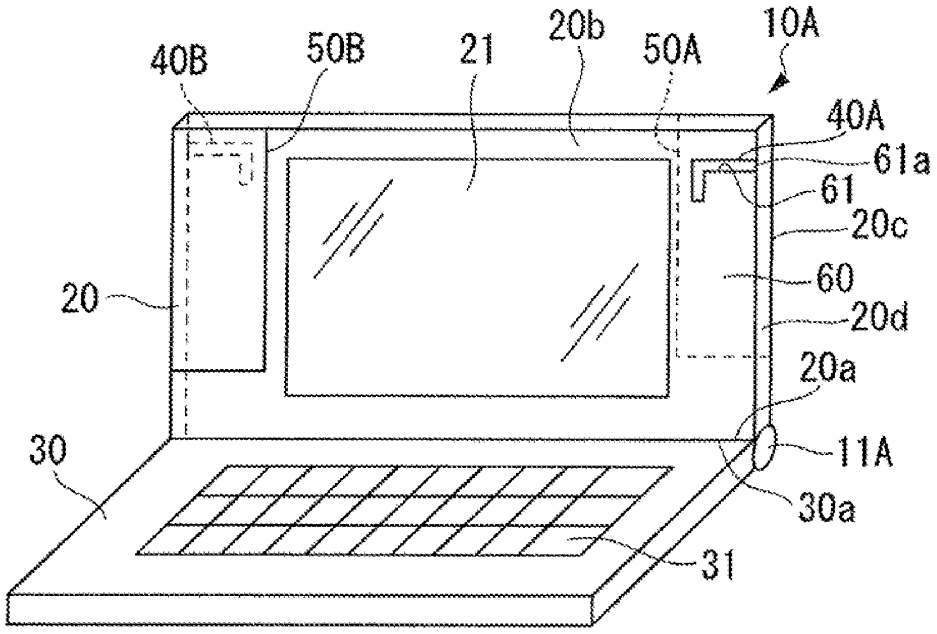
Publication Classification

(51) **Int. Cl.**
H01Q 21/28 (2006.01)
H01Q 13/10 (2006.01)

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

(57) **ABSTRACT**

A mobile wireless terminal is provided which has an antenna constitution that does not have deterioration on a wireless function regardless of when a clamshell type chassis is opened or closed. In such a mobile wireless terminal, a first antenna element is set on a side of a inside surface of a display chassis, and a second antenna element is set on a side of an external surface. A first/second conductive board is arranged so as to face the first/second antenna element. When a display chassis and a main body chassis are in an opened state, both the first and second antennas work which are arranged in the display chassis. When a display chassis and a main body chassis are in a closed state, the second conductive board affects on the second antenna element so as to avoid effects of a metal of the main body chassis, and the second antenna element works without being affected from the metal of the main body chassis.



US 20120162043A1

(19) **United States**

(12) **Patent Application Publication**

LEE

(10) **Pub. No.: US 2012/0162043 A1**

(43) **Pub. Date: Jun. 28, 2012**

(54) **MULTIBAND ANTENNA**

(75) Inventor: **YI-CHIEH LEE**, Tu-Cheng (TW)

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

(21) Appl. No.: **13/038,481**

(22) Filed: **Mar. 2, 2011**

(30) **Foreign Application Priority Data**

Dec. 28, 2010 (TW) 99146448

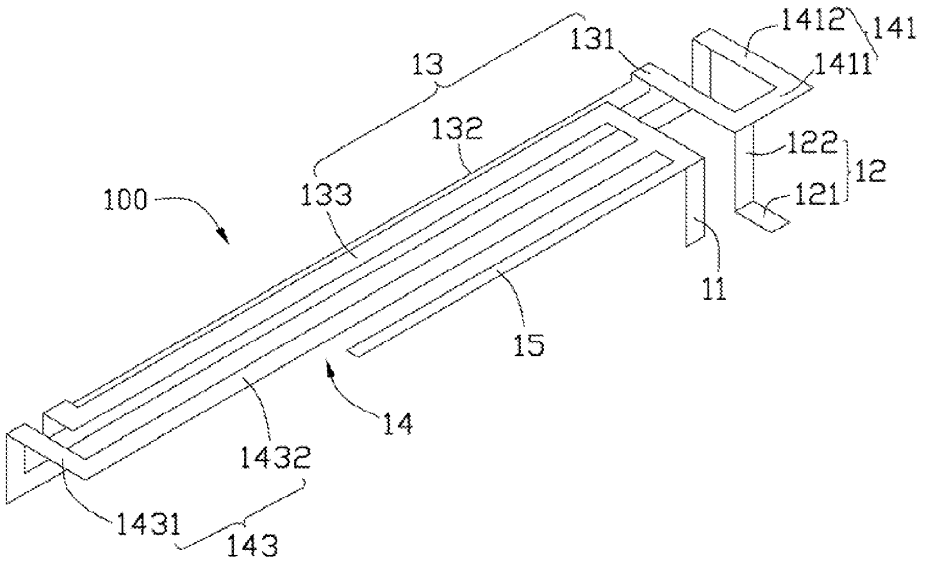
Publication Classification

(51) **Int. Cl.**
H01Q 5/01 (2006.01)
H01Q 7/00 (2006.01)

(52) **U.S. Cl.** **343/870**; 343/866

(57) **ABSTRACT**

A multiband antenna includes a feed unit, a first transceiving unit, a second transceiving unit, and a resonance unit. The first transceiving unit and the second transceiving unit cooperatively form a loop. When feed signals are input to the feed unit, the feed signals are respectively transmitted through the first transceiving unit and the second transceiving unit to enable the first transceiving unit and the second transceiving unit to respectively receive and send wireless signals of different frequencies, and the resonance unit is driven to resonate and cooperate with the first transceiving unit and the second transceiving unit to respectively form additional antenna members, such that the multiband antenna is capable of receiving and sending wireless signals in more than two frequency bands.



US 20120169439A1

(19) **United States**

(12) **Patent Application Publication**

Ikehata et al.

(10) **Pub. No.: US 2012/0169439 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **BATTERY AND WIRELESS COMMUNICATION APPARATUS**

(76) Inventors: **Kazuhiko Ikehata**, Osaka-shi (JP); **Hiroyuki Takebe**, Osaka-shi (JP)

(21) Appl. No.: **13/496,424**

(22) PCT Filed: **Jun. 16, 2010**

(86) PCT No.: **PCT/JP10/60244**

§ 371 (c)(1),
(2), (4) Date: **Mar. 15, 2012**

(30) **Foreign Application Priority Data**

Sep. 18, 2009 (JP) 2009-217822

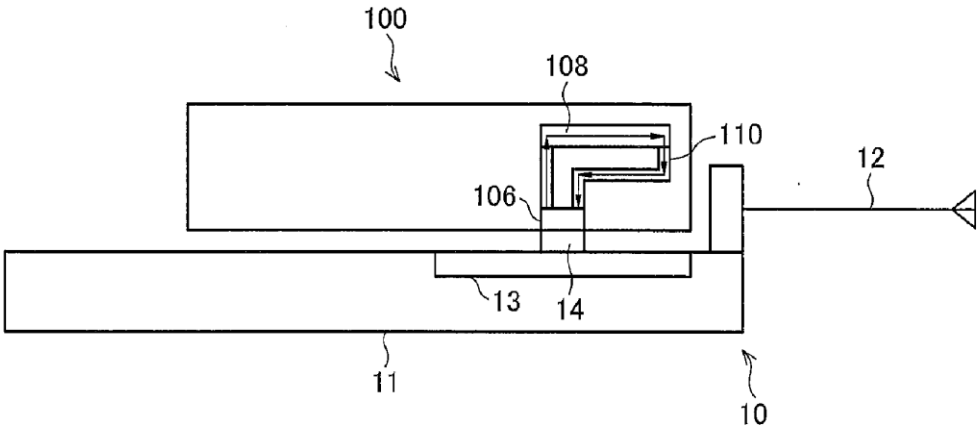
Publication Classification

(51) **Int. Cl.**
H01P 1/04 (2006.01)

(52) **U.S. Cl.** ..... **333/24 C**

(57) **ABSTRACT**

Used is a battery a battery (**100**) including: a battery terminal (**106**); a circuit (**108**) being electrically connected with the battery terminal (**106**); and a resonance frequency adjusting section (**110**) being directly connected or capacitively-coupled with the circuit (**108**), and being electrically connected with the battery terminal (**106**) not via the circuit (**108**). This makes it possible to provide a battery which does not require electrical connection except via a battery terminal for connection with an apparatus on which the battery is mounted, and which battery is unlikely to deteriorate an antenna characteristic.



US 20120169543A1

(19) **United States**

(12) **Patent Application Publication**

Sharma et al.

(10) **Pub. No.: US 2012/0169543 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **TRUE OMNI-DIRECTIONAL ANTENNA**

(75) Inventors: **Arun Kumar Sharma**, Cupertino, CA (US); **David Arthur Candee**, Milpitas, CA (US); **Robert J. Hill**, Prunedale, CA (US)

(73) Assignee: **SecureALL Corporation**, Mountain View, CA (US)

(21) Appl. No.: **13/340,520**

(22) Filed: **Dec. 29, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/428,155, filed on Dec. 29, 2010.

Publication Classification

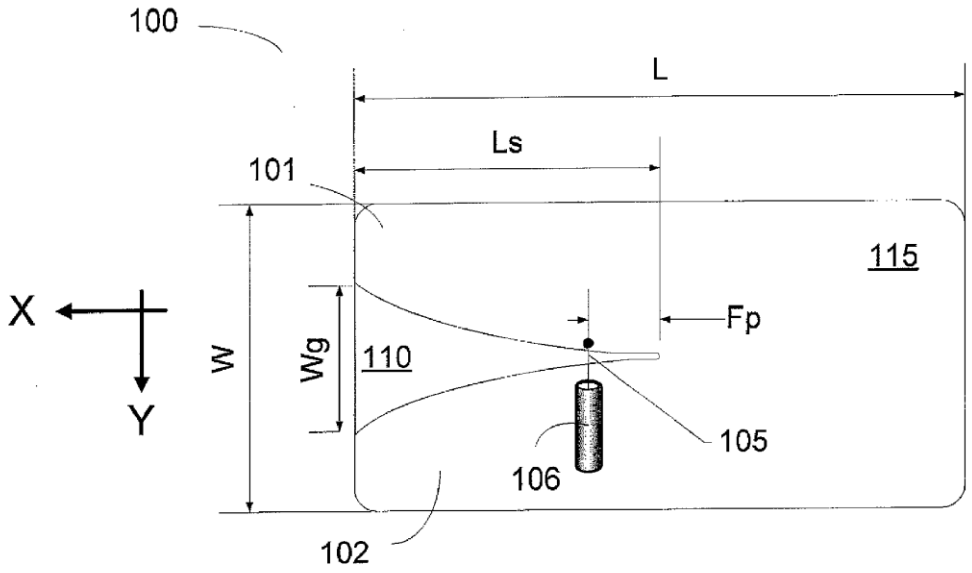
(51) **Int. Cl.**

G01S 3/02	(2006.01)
H04B 17/00	(2006.01)
H01Q 13/10	(2006.01)

(52) **U.S. Cl.** **342/458**; 343/767; 29/593

(57) **ABSTRACT**

An antenna and a method for using the antenna in a wireless appliance are provided. The antenna includes a conducting surface having a length and a width; a dielectric slit having a slit length portion oriented along either the length or the width, the slit forming two lips on the conducting surface; the slit having an opening on one of the length and the width, the opening having a flare size; a feed-point element connecting the two lips; wherein the dimensions of the length, the width, the slit length portion, and the flare size are smaller than an effective propagation wavelength of the RF radiation in the antenna. An antenna including a conducting surface having a conductive plate with a plate area defined by a plate perimeter overlaying a portion of a conducting surface is also provided. A method to provide an antenna as above is also disclosed.



US 20120169544A1

(19) **United States**

(12) **Patent Application Publication**

Yen-Hao et al.

(10) **Pub. No.: US 2012/0169544 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MULTI-FREQUENCY ANTENNA**

(75) Inventors: **Yu Yen-Hao**, Taipei County (TW); **Liu Shih-Chia**, Taipei County (TW); **Chiu Tsung-Wen**, Taipei County (TW); **Hsiao Fu-Ren**, Taipei County (TW)

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

(21) Appl. No.: **13/152,643**

(22) Filed: **Jun. 3, 2011**

(30) **Foreign Application Priority Data**

Dec. 30, 2010 (TW) 099146897

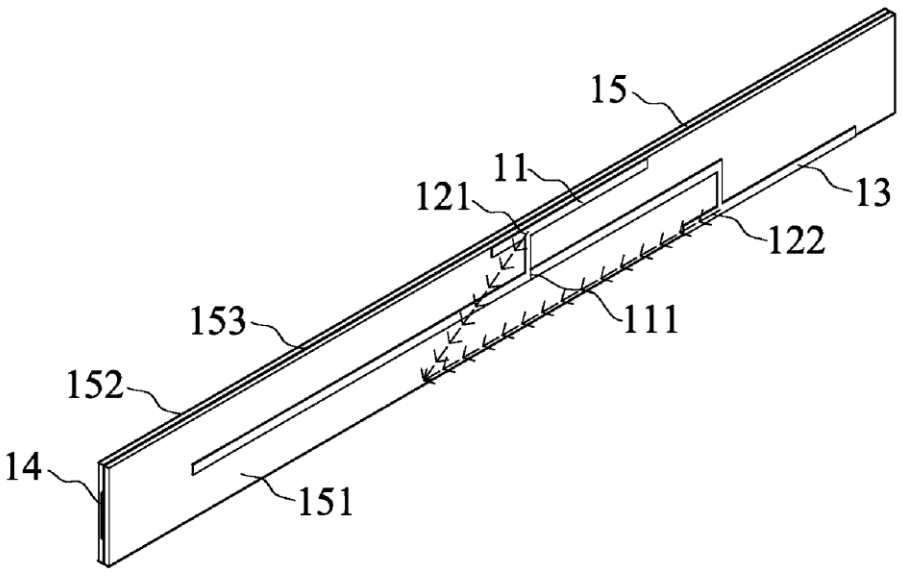
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

A multi-frequency antenna comprises a first conductor, a second conductor, a grounding member, and a third conductor. The first and second conductors are respectively arranged on a first plane and a second plane. The grounding member is arranged on a third plane existing between the first and second planes. The third conductor is connected with the first conductor and arranged on the first plane also. The first and third conductors are respectively coupled to the radiation signals of the second conductor to form a first path and a second path. The first path and the second path have a phase difference of 180 degrees. The present invention features the additional third conductor. The third conductor and the first conductor are coupled to the radiation signals of the second conductor to generate opposite-phase signals. Thus are counterbalanced the interferences among the antenna systems of an identical frequency band.



US 20120169545A1

(19) **United States**

(12) **Patent Application Publication**

Suleiman

(10) **Pub. No.: US 2012/0169545 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **OMNI-DIRECTIONAL ANTENNA**

(75) Inventor: **Shady Hasan Suleiman**, Burlington, IA (US)

(73) Assignee: **WINEGARD COMPANY**, Burlington, IA (US)

(21) Appl. No.: **13/343,488**

(22) Filed: **Jan. 4, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/429,634, filed on Jan. 4, 2011.

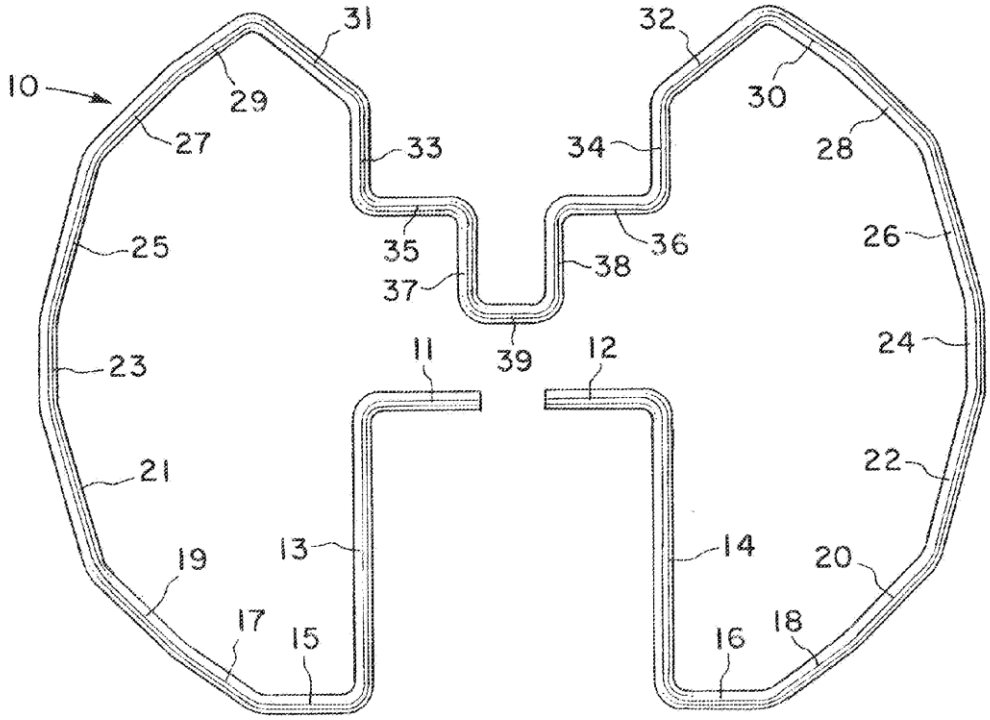
Publication Classification

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

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

(57) **ABSTRACT**

An omni-directional antenna is made of a series of straight conductor segments of varying lengths that form two symmetrical ear-shaped lobes.



US 20120169546A1

(19) **United States**

(12) **Patent Application Publication**

Kwak et al.

(10) **Pub. No.: US 2012/0169546 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MULTI-BAND ANTENNA AND APPARATUS AND METHOD FOR ADJUSTING OPERATING FREQUENCY OF THE MULTI-BAND ANTENNA IN A WIRELESS COMMUNICATION SYSTEM**

(75) Inventors: **Yong-Soo Kwak**, Suwon-si (KR); **Joon-Ho Byun**, Yongin-si (KR); **Seong-Tae Jeong**, Yongin-si (KR); **Bum-Jin Cho**, Hwaseong-si (KR); **Soon-Ho Hwang**, Seoul (KR); **Austin Kim**, Seongnam-si (KR); **Jae-Hoon Jo**, Seoul (KR); **Jae-Hyung Kim**, Seoul (KR); **A-Hyun Sin**, Busan (KR)

(73) Assignee: **SAMSUNG ELECTRONICS CO. LTD.**, Suwon-si, Gyeonggi-do (KR)

(21) Appl. No.: **13/395,789**

(22) PCT Filed: **Sep. 17, 2010**

(86) PCT No.: **PCT/KR2010/006451**

§ 371 (c)(1),
(2), (4) Date: **Mar. 13, 2012**

(30) **Foreign Application Priority Data**

Sep. 17, 2009 (KR) 10-2009-0088095

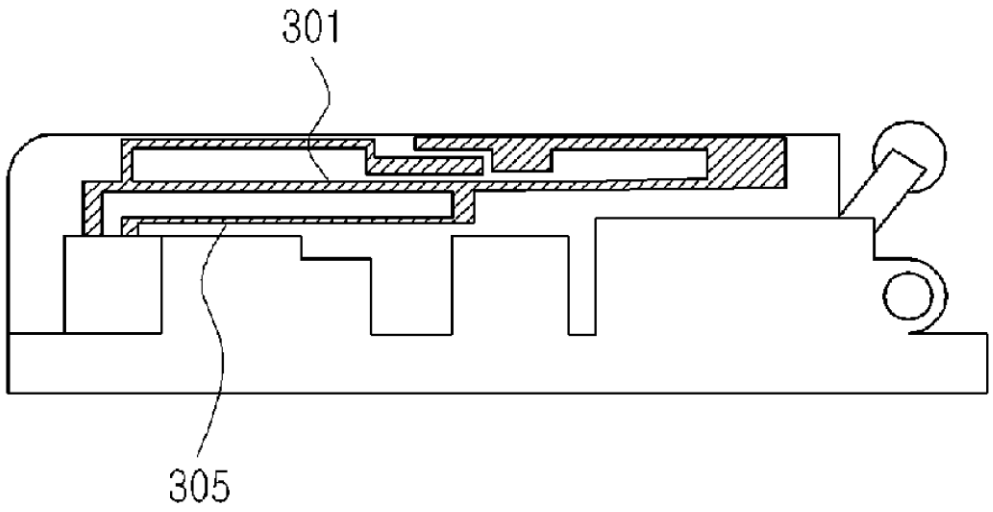
Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)

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

(57) **ABSTRACT**

An apparatus and method for adjusting an operating frequency of a multi-band antenna and a system supporting the same in a wireless communication system are provided, in which a plurality of shorting pins spaced from a radiation patch by difference distances, and a switch connects one of the shorting pins to the radiation patch.



US 20120169547A1

(19) **United States**

(12) **Patent Application Publication**

Oh et al.

(10) **Pub. No.: US 2012/0169547 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MULTIBAND ANTENNA WITH SURROUNDING CONDUCTIVE COSMETIC FEATURE**

(75) Inventors: **Sung-Hoon Oh**, Cupertino, CA (US); **Thomas Liu**, Sunnyvale, CA (US); **Thorsten Hertel**, San Jose, CA (US); **Joselito Gavilan**, Sunnyvale, CA (US)

(73) Assignee: **PALM, INC.**, Sunnyvale, CA (US)

(21) Appl. No.: **12/983,665**

(22) Filed: **Jan. 3, 2011**

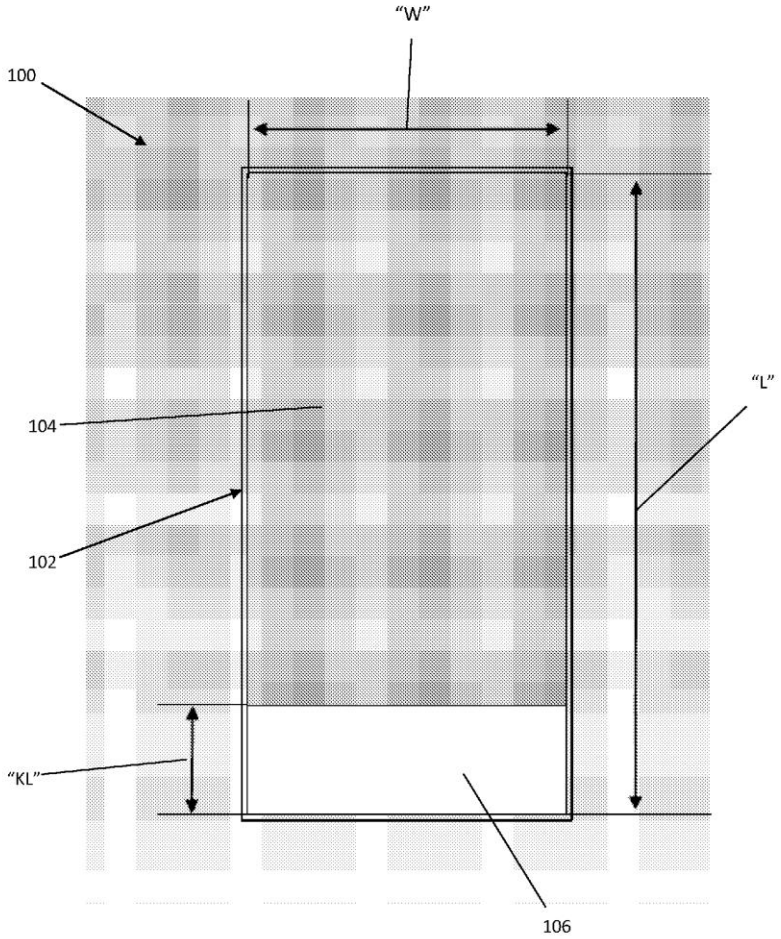
Publication Classification

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

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

(57) **ABSTRACT**

Various embodiments of an antenna structure for mobile devices are described. In one or more embodiments a multi-band antenna includes a multi-band antenna with a conductive cosmetic feature operating as a resonating element. In some embodiments, an antenna includes a folded monopole element, a loop element formed between a portion of the conductive cosmetic feature and the printed circuit board and an L-shaped slot antenna element defined in part by a side surface of the conductive cosmetic feature. In some embodiments the folded monopole element, the loop element, and the slot antenna element are capable of resonating in response to a signal applied to the folded monopole element. Other embodiments are described and claimed.



US 20120169548A1

(19) **United States**

(12) **Patent Application Publication**

Yang

(10) **Pub. No.: US 2012/0169548 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ANTENNA MODULE**

(76) Inventor: **Chun-Fei Yang**, New Taipei City (TW)

(21) Appl. No.: **13/080,642**

(22) Filed: **Apr. 5, 2011**

(30) **Foreign Application Priority Data**

Dec. 29, 2010 (TW) 099146587

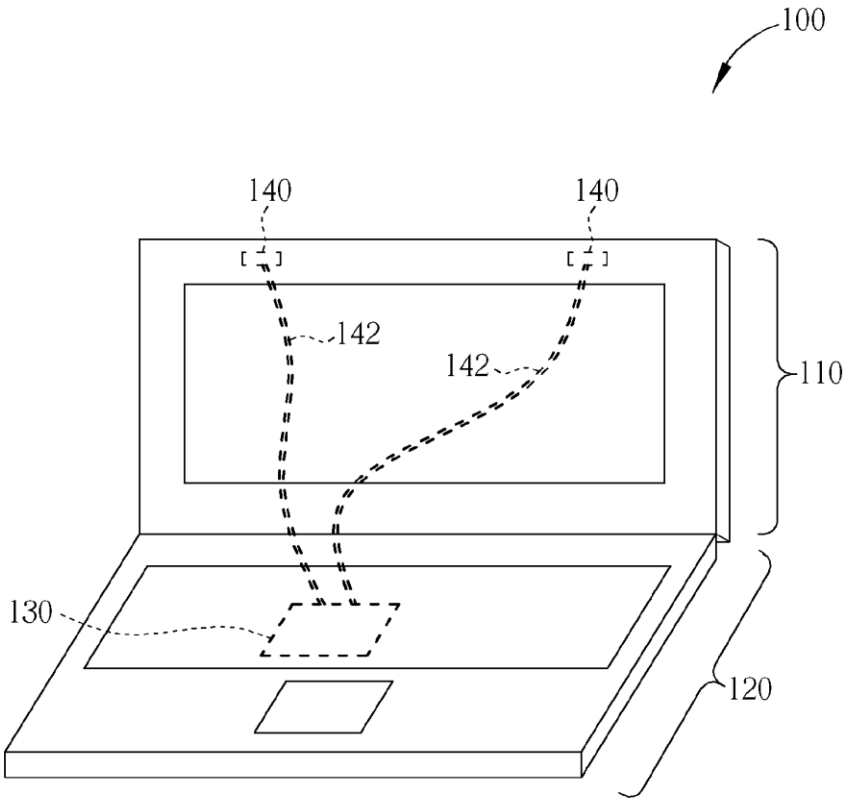
Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/52 (2006.01)

(52) **U.S. Cl.** **343/702**; 343/841

(57) **ABSTRACT**

An antenna module for an electronic device includes a shielding metal sheet for isolation of electromagnetic interference, and an antenna placed on the shielding metal sheet for radio signal reception and transmission, wherein the shielding metal sheet includes a first ground point working as a ground point of the antenna module and the antenna includes a first feeding point working as a feeding point of the antenna module.



US 20120169549A1

(19) **United States**

(12) **Patent Application Publication**

LIN et al.

(10) **Pub. No.: US 2012/0169549 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ANTENNA MODULE AND PORTABLE ELECTRONIC DEVICE USING THE SAME**

(75) Inventors: **CHIA-JU LIN**, Tu-Cheng (TW); **MIN-SHENG WANG**, Tu-Cheng (TW); **PEN-UEI LU**, Tu-Cheng (TW); **CHENG-YI CHEN**, Tu-Cheng (TW)

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

(21) Appl. No.: **13/176,347**

(22) Filed: **Jul. 5, 2011**

(30) **Foreign Application Priority Data**

Dec. 31, 2010 (TW) 99147411

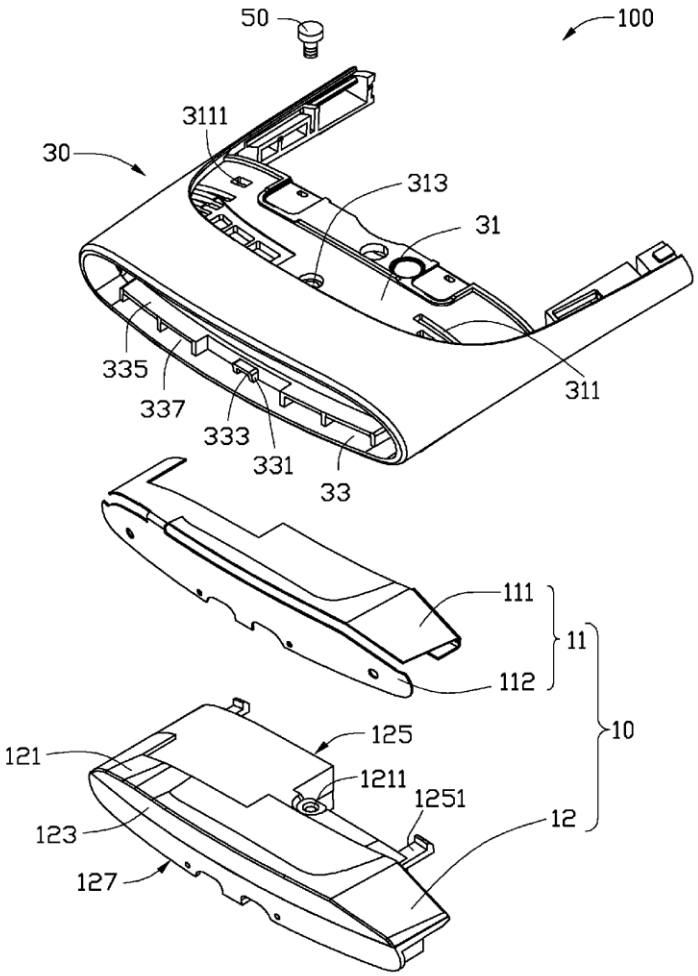
Publication Classification

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

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

(57) **ABSTRACT**

A portable electronic device includes a housing and an antenna module detachably assembled to the housing. The housing defines at least one latching hole. The antenna module includes a base and an antenna attached to the base. The base includes at least one latching member. The base is received in the housing. The at least one latching member engages with the at least one latching hole to detachably assemble the base and the antenna to the housing.



US 20120169550A1

(19) **United States**

(12) **Patent Application Publication**

Schlub et al.

(10) **Pub. No.: US 2012/0169550 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ANTENNA ISOLATION FOR PORTABLE ELECTRONIC DEVICES**

(76) Inventors: **Robert W. Schlub**, Santa Clara, CA (US); **Robert J. Hill**, Salinas, CA (US)

(21) Appl. No.: **13/418,655**

(22) Filed: **Mar. 13, 2012**

Related U.S. Application Data

(63) Continuation of application No. 13/073,872, filed on Mar. 28, 2011, now Pat. No. 8,144,063, which is a continuation of application No. 11/969,684, filed on Jan. 4, 2008, now Pat. No. 7,916,089.

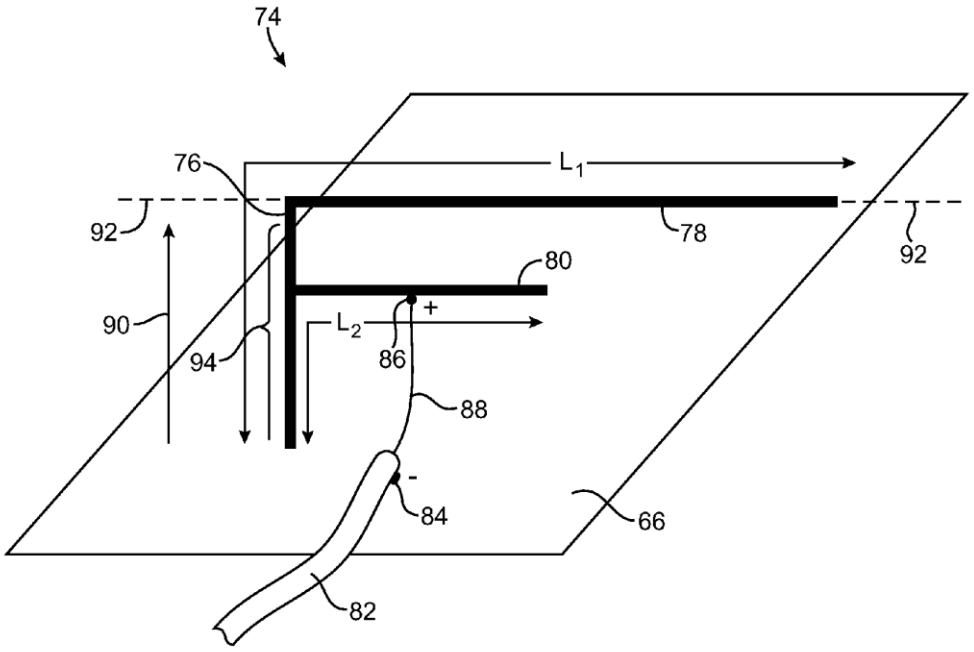
Publication Classification

(51) **Int. Cl.**
H01Q 21/30 (2006.01)

(52) **U.S. Cl.** **343/702**; 343/893

(57) **ABSTRACT**

Portable electronic devices are provided with wireless circuitry that includes antennas and antenna isolation elements. The antennas may include antennas that have multiple arms and that are configured to handle communications in multiple frequency bands. The antennas may also include one or more antennas that are configured to handle communications in a single frequency band. The antennas may be coupled to different radio-frequency transceivers. For example, there may be first, second, and third antennas and first and second transceivers. The first and third antennas may be coupled to the first transceiver and the second antenna may be coupled to the second transceiver. The antenna isolation elements may be interposed between the antennas and may serve to reduce radio-frequency interference between the antennas. There may be a first antenna isolation element between the first and second antennas and a second antenna isolation element between the second and third antennas.



US 20120169552A1

(19) **United States**

(12) **Patent Application Publication**

LEE et al.

(10) **Pub. No.: US 2012/0169552 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **HYBRID MULTI-ANTENNA SYSTEM AND WIRELESS COMMUNICATION APPARATUS USING THE SAME**

(75) Inventors: **Cheng-Tse LEE**, Jiaoxi Township (TW); **Saou-Wen Su**, Keelung City (TW)

(73) Assignees: **LITE-ON TECHNOLOGY CORPORATION**, Taipei City (TW); **SILITEK ELECTRONIC (GUANGZHOU) CO., LTD.**, Guangzhou (CN)

(21) Appl. No.: **13/038,633**

(22) Filed: **Mar. 2, 2011**

(30) **Foreign Application Priority Data**

Dec. 31, 2010 (CN) 201010616086.2

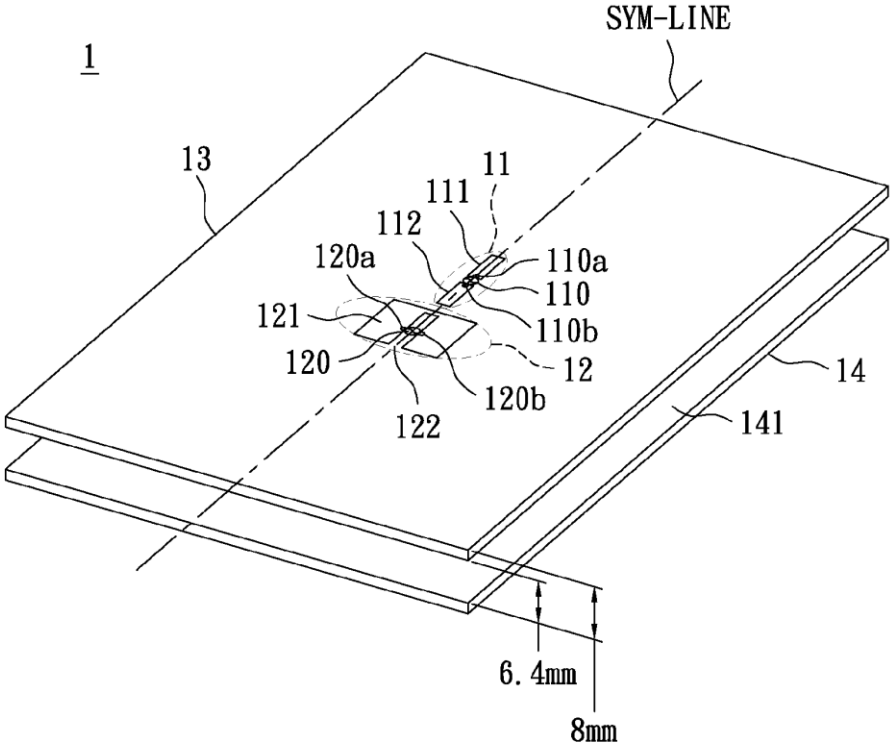
Publication Classification

(51) **Int. Cl.**
H01Q 21/30 (2006.01)

(52) **U.S. Cl.** **343/727**

(57) **ABSTRACT**

A hybrid multi-antenna system includes a system circuit board, an antenna substrate, at least a dipole antenna, and at least a monopole-slot antenna. The system board has at least a system ground plate, and the system ground plate is served as a reflector of the hybrid multi-antenna system. The antenna substrate and the system ground plate have a first distance therebetween. The dipole antenna having a first signal feed-in source and the monopole-slot antenna having a second signal feed-in source respectively provide a first and second operating band, and they are on a surface of the antenna substrate. The monopole-slot antenna is located nearby the dipole antenna. The monopole-slot antenna and the dipole antenna have a second distance therebetween. The first and second signal feed-in sources are vertical to each other, and have the phase difference of 90°.



US 20120169554A1

(19) **United States**

(12) **Patent Application Publication**

Behdad et al.

(10) **Pub. No.: US 2012/0169554 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ULTRA-WIDEBAND, LOW PROFILE ANTENNA**

(76) Inventors: **Nader Behdad**, Madison, WI (US); **Mudar Ala Al-Joumayly**, Madison, WI (US); **Moshen Salehi**, Blacksburg, VA (US)

(21) Appl. No.: **12/861,053**

(22) Filed: **Aug. 23, 2010**

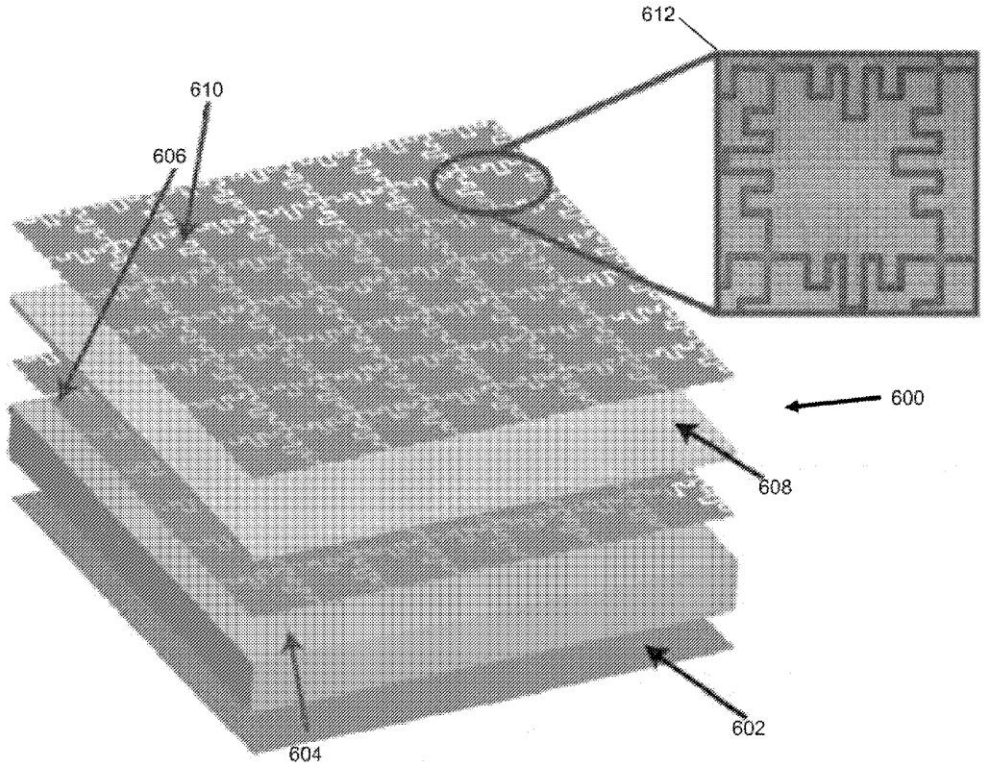
Publication Classification

(51) **Int. Cl.**
H01Q 11/12 (2006.01)

(52) **U.S. Cl.** **343/742**

(57) **ABSTRACT**

An ultra-wideband, low profile antenna is provided. The antenna includes a ground plane substrate and a radiating element. The radiating element includes at least two loop sections, wherein each of the at least two loop sections is electrically connected to a feed network and to the ground plane substrate. The radiating element is configured to radiate over a first frequency band when the feed network provides an in-phase input signal to the at least two loop sections and to radiate over a second frequency band when the feed network provides an out-of-phase input signal to the at least two loop sections. The second frequency band includes a lower frequency than the first frequency band.



US 20120169555A1

(19) **United States**

(12) **Patent Application Publication**

TSOU

(10) **Pub. No.: US 2012/0169555 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MULTIBAND ANTENNA**

(75) Inventor: **TUN-YUAN TSOU**, Tu-Cheng (TW)

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

(21) Appl. No.: **13/047,967**

(22) Filed: **Mar. 15, 2011**

(30) **Foreign Application Priority Data**

Dec. 30, 2010 (CN) 201010614658.3

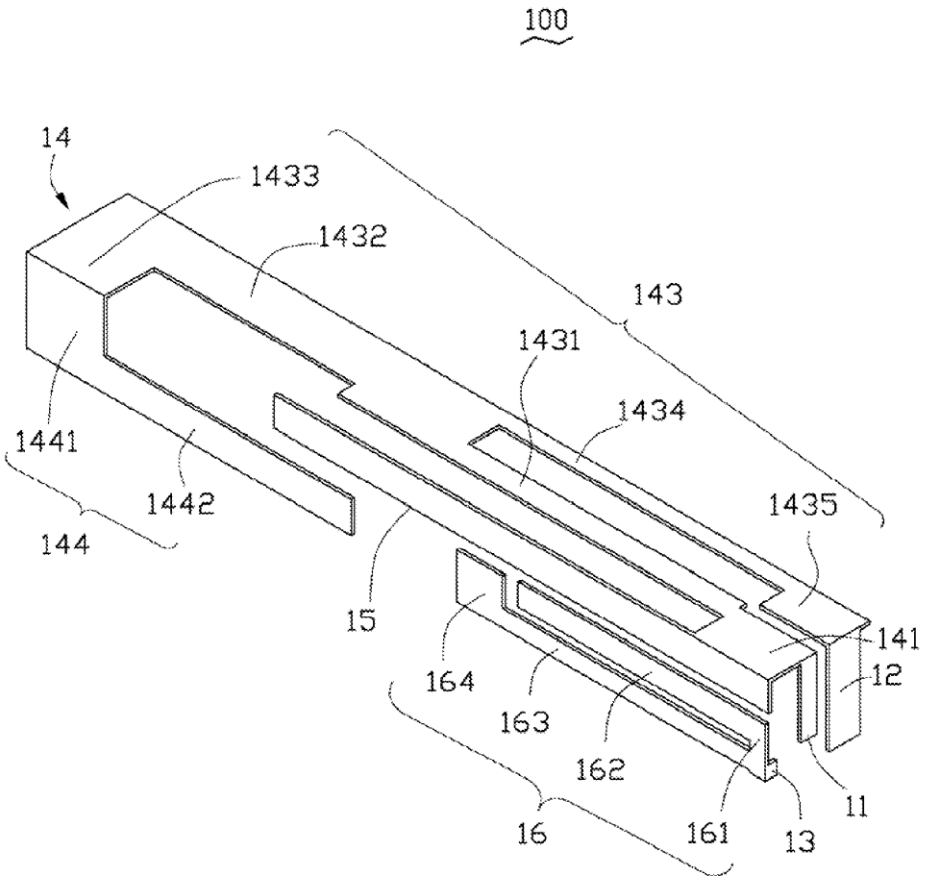
Publication Classification

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

(52) **U.S. Cl.** **343/749**

(57) **ABSTRACT**

A multiband antenna includes a feed unit, a first transceiving unit, a second transceiving unit, and a resonance unit. When feed signals are input from the feed unit, the feed signals are respectively transmitted to the first transceiving unit and the second transceiving unit to enable the first transceiving unit and the second transceiving unit to respectively receive and send wireless signals of different frequencies. In addition, the resonance unit is driven to resonate and serve as a coupled ground resonator that generates additional current paths of at least two different lengths. Such that the resonance unit is enabled to receive and send wireless signals of at least two additional frequencies, and the multiband antenna is further enabled to receive and send wireless signals in more than two frequency bands.



US 20120169559A1

(19) **United States**

(12) **Patent Application Publication**

Amari et al.

(10) **Pub. No.: US 2012/0169559 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ANTENNA APPARATUS INCLUDING MULTIPLE ANTENNA PORTIONS ON ONE ANTENNA ELEMENT ASSOCIATED WITH MULTIPLE FEED POINTS**

(76) Inventors: **Satoru Amari**, Osaka (JP); **Atsushi Yamamoto**, Kyoto (JP); **Tsutomu Sakata**, Osaka (JP)

(21) Appl. No.: **13/394,940**

(22) PCT Filed: **Jun. 2, 2011**

(86) PCT No.: **PCT/JP2011/003114**

§ 371 (c)(1),
(2), (4) Date: **Mar. 8, 2012**

(30) **Foreign Application Priority Data**

Jul. 5, 2010 (JP) 2010-152774

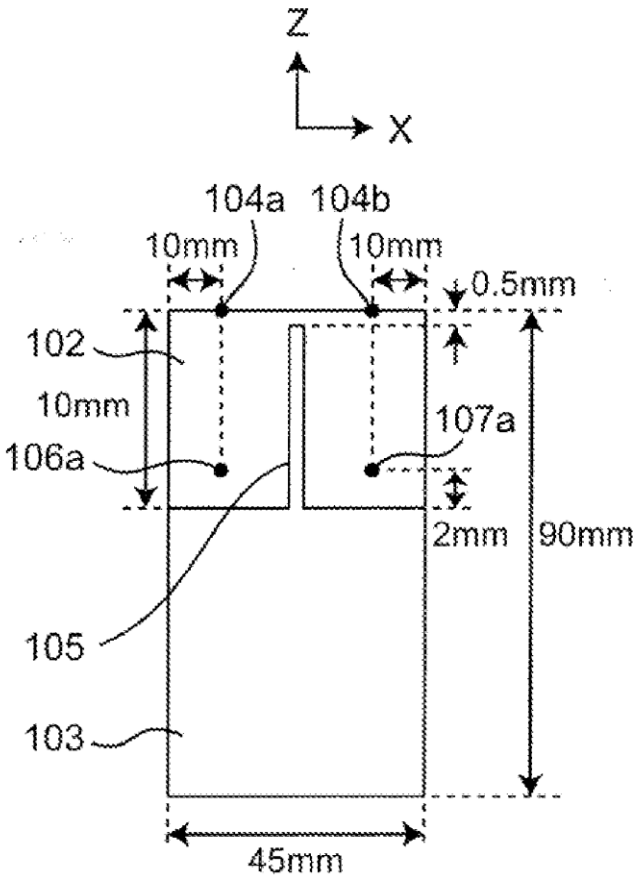
Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)

(52) **U.S. Cl.** **343/767**

(57) **ABSTRACT**

An antenna apparatus includes: an extension conductor connected to a first section of an outer perimeter of an antenna element and along an entire length of the first section; connecting conductors connecting the antenna element to a ground conductor between the extension conductor and feed points on the antenna element; and a slit extending from the extension conductor to the antenna element so as to intersect a portion between connecting points of the connecting conductors and to intersect a portion between the feed points on the antenna element. The slit has a short-circuited end on the extension conductor.



US 20120169562A1

(19) **United States**

(12) **Patent Application Publication**

Nysen

(10) **Pub. No.: US 2012/0169562 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ANTENNA**

(75) Inventor: **Paul A. Nysen**, Carlsbad, CA (US)

(73) Assignee: **Sierra Wireless Inc.**

(21) Appl. No.: **12/983,679**

(22) Filed: **Jan. 3, 2011**

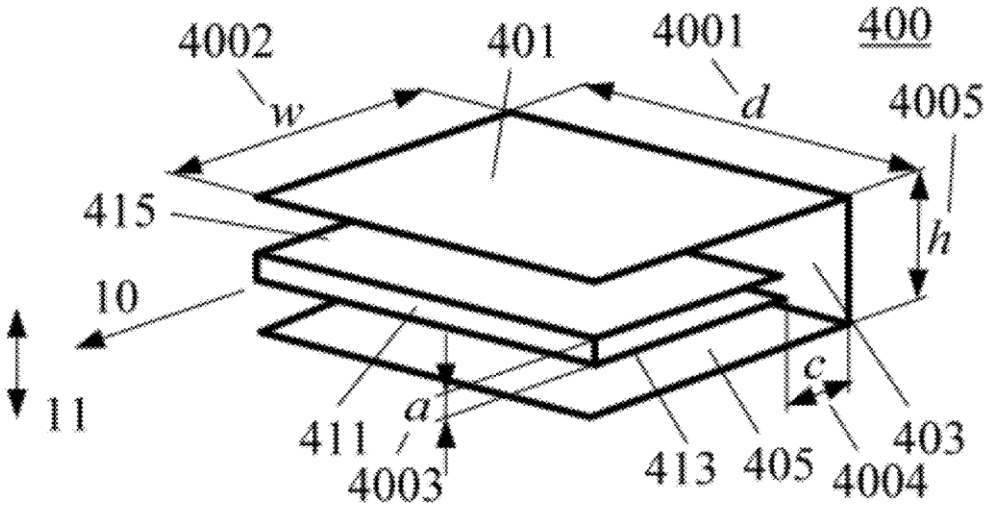
Publication Classification

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

(52) **U.S. Cl.** **343/843**

(57) **ABSTRACT**

The present technology provides an antenna comprising a conductive first plate, a conductive second plate and a conductive third plate. The conductive first plate and the conductive second plate are disposed and have an electrical connection to form an external antenna structure having a substantially U-shaped cross section. The conductive third plate is disposed substantially parallel to the conductive first plate between the conductive first plate and the conductive second plate and has a proximate edge proximate the electrical connection. The conductive third plate has an electrical length with respect to the proximate edge corresponding to substantially an odd integer multiple of a quarter of a guide wavelength associated with a resonant frequency of the antenna. The conductive third plate forms part of an internal antenna structure.



US 20120169563A1

(19) **United States**

(12) **Patent Application Publication**

Tsai et al.

(10) **Pub. No.: US 2012/0169563 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MULTI-BAND ANTENNA**

(76) Inventors: **Yung-Chih Tsai**, Taipei (TW); **Jia-Hung Su**, Taipei (TW); **Kai Shih**, Taipei (TW)

(21) Appl. No.: **12/980,333**

(22) Filed: **Dec. 29, 2010**

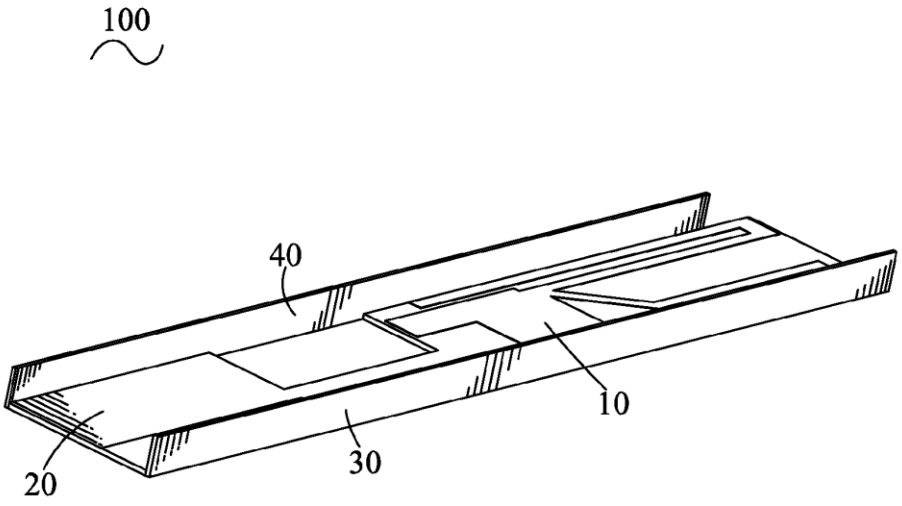
Publication Classification

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

(52) **U.S. Cl.** **343/848**

(57) **ABSTRACT**

A multi-band antenna mounted on a circuit board includes a ground plate perpendicularly connected to one side edge of the circuit board, a radiating plate perpendicularly connected to the other side edge of the circuit board, and a planar antenna element includes a high frequency radiating portion, a lower frequency radiating portion, a base plate, a capacitance portion and an inductance portion. The high frequency radiating portion and the lower frequency radiating portion are located at two ends of the circuit board, respectively, and both connected to the radiating plate. The base plate is connected to the radiating plate and located between the high and lower frequency radiating portions. The capacitance portion is parallel with the ground plate to form a capacitive coupling therebetween. The inductance portion is soldered to the ground plate. A simulation inductance is formed by the inductance portion.



US 20120169564A1

(19) **United States**

(12) **Patent Application Publication**

Tsung-Wen et al.

(10) **Pub. No.: US 2012/0169564 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **ANTENNA WITH IMPROVED HOLED SYSTEM GROUND PLANE**

(75) Inventors: **Chiu Tsung-Wen**, Taipei County (TW); **Hsiao Fu-Ren**, Taipei County (TW)

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

(21) Appl. No.: **13/153,142**

(22) Filed: **Jun. 3, 2011**

(30) **Foreign Application Priority Data**

Dec. 30, 2010 (TW) 099146901

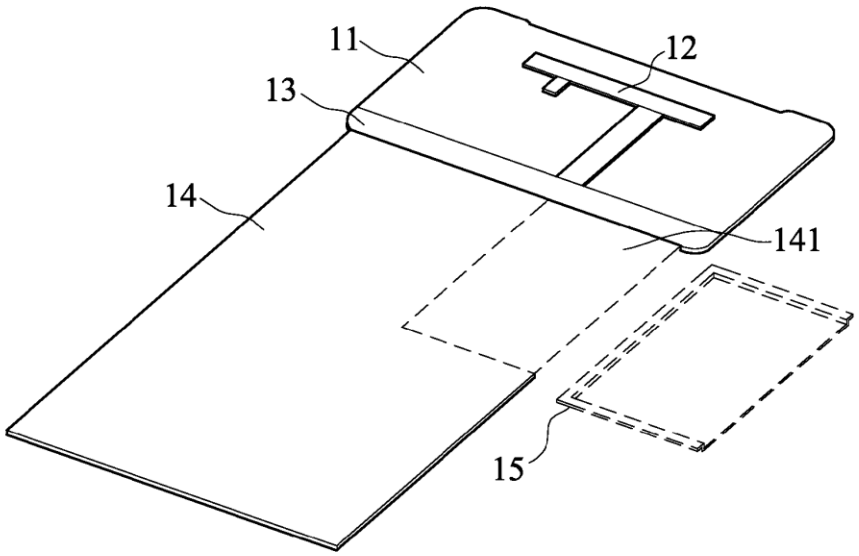
Publication Classification

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

(52) **U.S. Cl.** **343/848**

(57) **ABSTRACT**

An antenna with an improved holed system ground plane comprises a substrate, a radiation conductor member, a grounding member and a system ground plane. The radiation conductor member is arranged on the surface of the substrate. The grounding member is arranged on one edge of the substrate. The radiation conductor member is connected with the grounding member. The system ground plane is connected with one side of the grounding member. The system ground plane has at least one arbitrary-shaped hole. A radiation-enhancing filler is disposed in the arbitrary-shaped hole. The present invention solves the conventional problems that the system ground plane is drilled or cut to accommodate components and IC chips, keep away from wiring routes and avoid protrusions on the appearance, via disposing radiation-enhancing fillers in the arbitrary-shaped holes. Thereby is kept integrality of the system ground plane and promoted omnidirectionality of signal transmission.



US 20120169568A1

(19) **United States**

(12) **Patent Application Publication**

Oh et al.

(10) **Pub. No.: US 2012/0169568 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MULTIBAND ANTENNA WITH GROUND RESONATOR AND TUNING ELEMENT**

(75) Inventors: **Sung-Hoon Oh**, Cupertino, CA (US); **Thomas Liu**, Sunnyvale, CA (US); **Thorsten Hertel**, San Jose, CA (US)

(73) Assignee: **PALM, INC.**, Sunnyvale, CA (US)

(21) Appl. No.: **12/983,695**

(22) Filed: **Jan. 3, 2011**

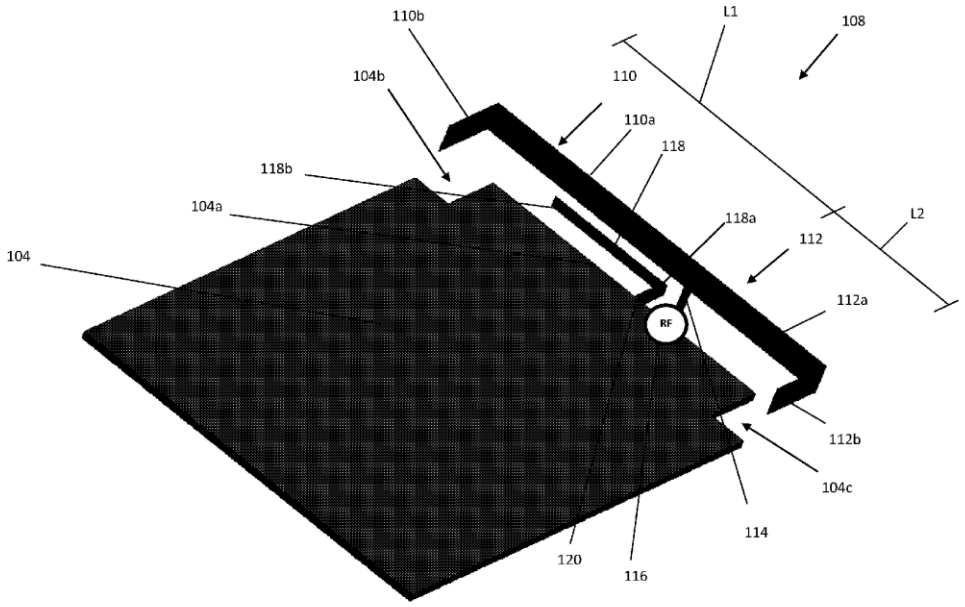
Publication Classification

(51) **Int. Cl.**
H01Q 21/30 (2006.01)

(52) **U.S. Cl.** **343/893**

(57) **ABSTRACT**

Various embodiments of an antenna structure for mobile devices are described. In one or more embodiments a multiband antenna includes first, second and third resonating elements. The first and second resonating elements may each have an L-shape, and may be fed by a single feed leg. The third resonating element may be coupled to ground. In some embodiments, the first resonating element may be longer than the second resonating element, and the third resonating element may be positioned adjacent to the first resonating element. In other embodiments, a tuning element is coupled to the signal feed and is positioned adjacent to the second resonating element. The tuning element may have a geometry that is similar to a geometry of the second resonating element. The combination of these structures creates a plurality of distinct resonance modes which creases a wide effective bandwidth for the disclosed antenna. Other embodiments are described and claimed.



US 20120170736A1

(19) **United States**

(12) **Patent Application Publication**

HSIEH et al.

(10) **Pub. No.: US 2012/0170736 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **WIRELESS TELEPHONE HAVING SUPPORT WITH BUILT-IN ANTENNA**

(75) Inventors: **KUN-CHIH HSIEH**, Tu-Cheng (TW); **CHIA-MIN WANG**, Tu-Cheng (TW); **TONG-YOU QUAN**, Shenzhen City (CN)

(73) Assignees: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW); **HONG FU JIN PRECISION INDUSTRY (ShenZhen) CO., LTD.**, Shenzhen City (CN)

(21) Appl. No.: **13/159,429**

(22) Filed: **Jun. 14, 2011**

(30) **Foreign Application Priority Data**

Dec. 30, 2010 (CN) 201010614481.7

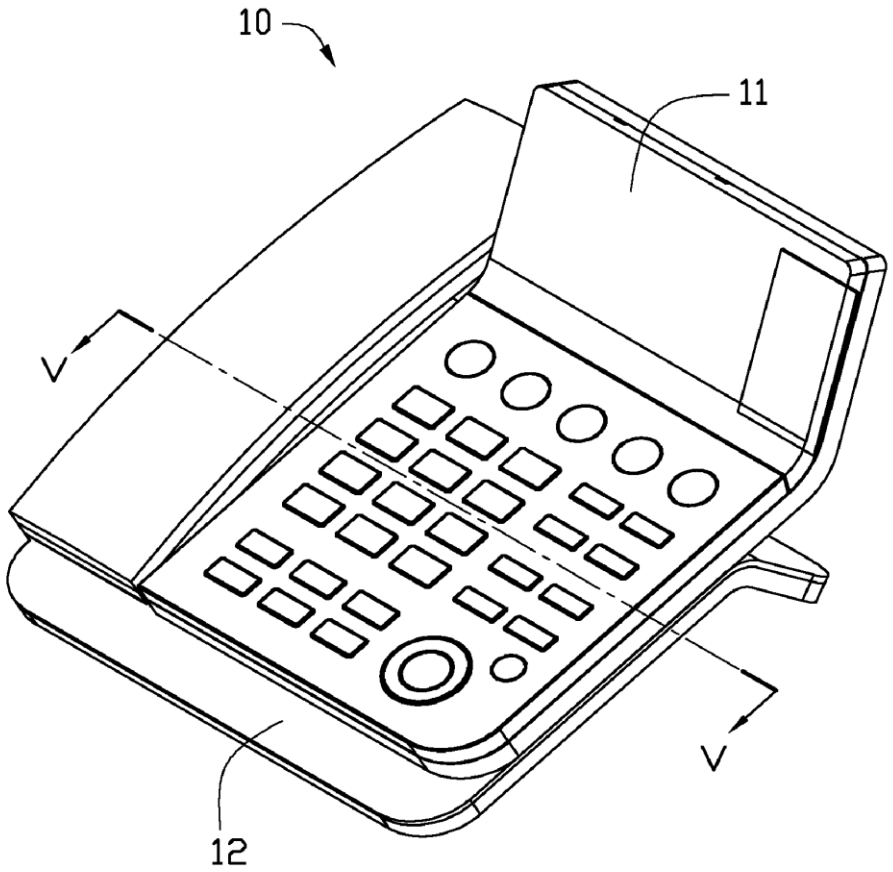
Publication Classification

(51) **Int. Cl.**
H04M 1/02 (2006.01)

(52) **U.S. Cl.** **379/428.01**

(57) **ABSTRACT**

A wireless telephone includes a support and a base unit supported by the support. The support includes an antenna and defines a number of through holes. The antenna includes a number of electrically conductive pins that are aligned with the through holes. The base unit includes a number of protruding, conductive terminals that respectively pass through the through holes and contact the electrically conductive pins to allow signals to be transmitted through the antenna.



US 20120172084A1

(19) **United States**

(12) **Patent Application Publication**

Wu et al.

(10) **Pub. No.: US 2012/0172084 A1**

(43) **Pub. Date: Jul. 5, 2012**

(54) **MOBILE COMMUNICATION DEVICE AND METHOD FOR TRANSCEIVING DATA AND VOICE THEREOF**

(75) Inventors: **Wei-Yang Wu**, Taoyuan County (TW); **Yen-Chuan Lin**, Taoyuan County (TW); **Wei-Chih Ku**, Taoyuan County (TW); **Chih-Wei Hsu**, Taoyuan County (TW); **Jiun-Nan Wu**, Taoyuan County (TW)

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

(21) Appl. No.: **13/052,125**

(22) Filed: **Mar. 21, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/430,116, filed on Jan. 5, 2011.

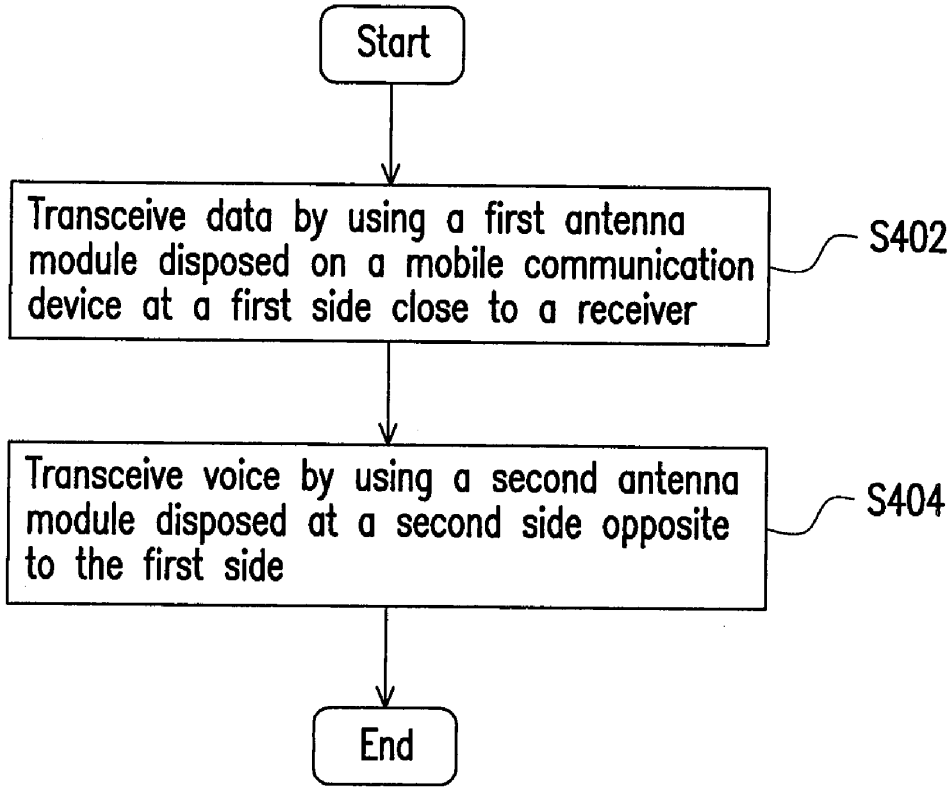
Publication Classification

(51) **Int. Cl.**
H04W 88/06 (2009.01)

(52) **U.S. Cl.** **455/552.1**

(57) **ABSTRACT**

A mobile communication device and a method for transceiving data and voice thereof are proposed. The mobile communication device includes a receiver, a first antenna module, and a second antenna module. The receiver is used to output voice. The first antenna module is disposed in the mobile communication device at a first side close to the receiver, and is used to transceive data of a first wireless communication system or a second wireless communication system. The second antenna module is disposed at a second side opposite to the first side, and is used to transceive voice of the first wireless communication system. A first distance between the first antenna module and the receiver is less than a second distance between the second antenna module and the receiver.



US 20120175165A1

(19) **United States**

(12) **Patent Application Publication**

Merz et al.

(10) **Pub. No.: US 2012/0175165 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **SYSTEMS AND METHODS FOR COUPLING SECTIONS OF AN ELECTRONIC DEVICE**

(75) Inventors: **Nicholas Merz**, San Francisco, CA (US); **Dan Jarvis**, Cupertino, CA (US)

(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(21) Appl. No.: **12/987,741**

(22) Filed: **Jan. 10, 2011**

Publication Classification

(51) **Int. Cl.**

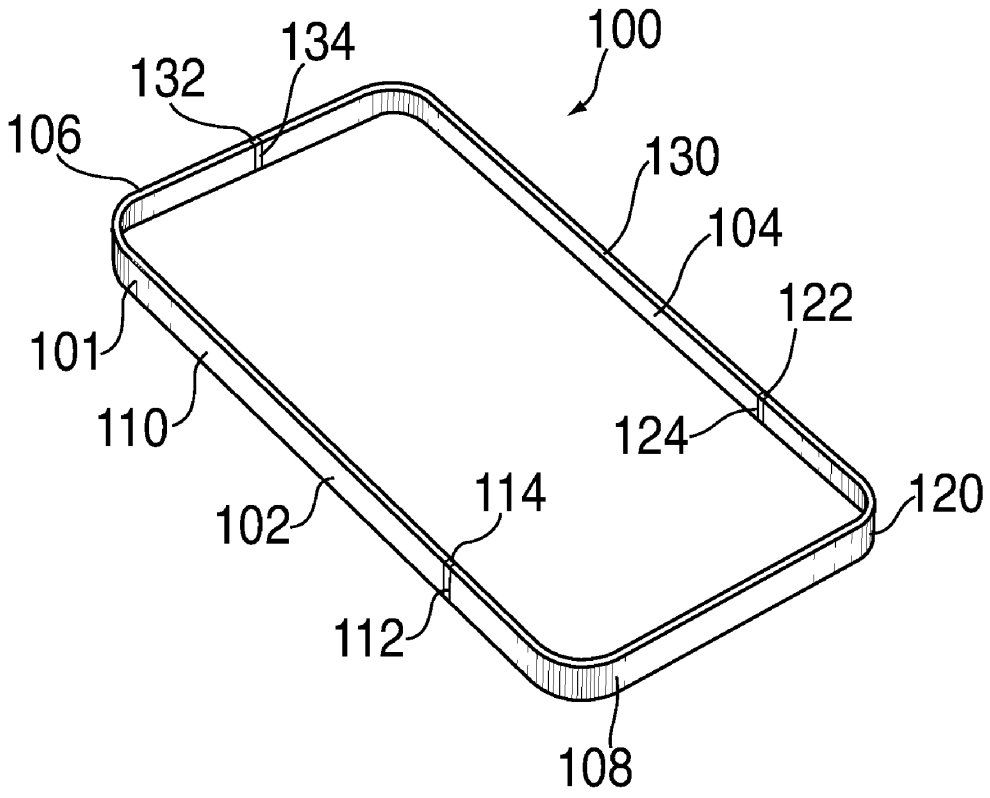
H05K 5/00 (2006.01)

H05K 13/00 (2006.01)

(52) **U.S. Cl.** **174/520**; 174/50; 29/592.1

(57) **ABSTRACT**

This is directed to systems and methods for coupling sections of an electronic device together. Sections of an electronic device can be coupled together via "knuckles." The particular shape and structure of the knuckles can be based on various design considerations. For example, in some embodiments each section can function as an individual antenna. In this case, the knuckles can be designed in order to provide electrical isolation between the sections, thus allowing proper operation of the antennas. For example, the knuckles can be formed from a dielectric material, etc. As another design example, the knuckles can be designed in order to provide increased strength in areas of high strain, and/or to counteract torsional twisting in areas of high impact. As yet another design example, the knuckle can be designed in a manner that is aesthetically pleasing or which otherwise meets cosmetic requirements.



US 20120176273A1

(19) **United States**

(12) **Patent Application Publication**

YU et al.

(10) **Pub. No.: US 2012/0176273 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **MULTI-BAND ANTENNA**

(75) Inventors: **CHIH-YIN YU**, YILAN COUNTY (TW); **SHIH-CHI LAI**, MIAOLI COUNTY (TW); **CHIA-LUN TANG**, MIAOLI COUNTY (TW); **JIA-YI SZE**, TAOYUAN COUNTY (TW)

(73) Assignee: **AUDEN TECHNO CORP.**, TAOYUAN COUNTY (TW)

(21) Appl. No.: **13/004,253**

(22) Filed: **Jan. 11, 2011**

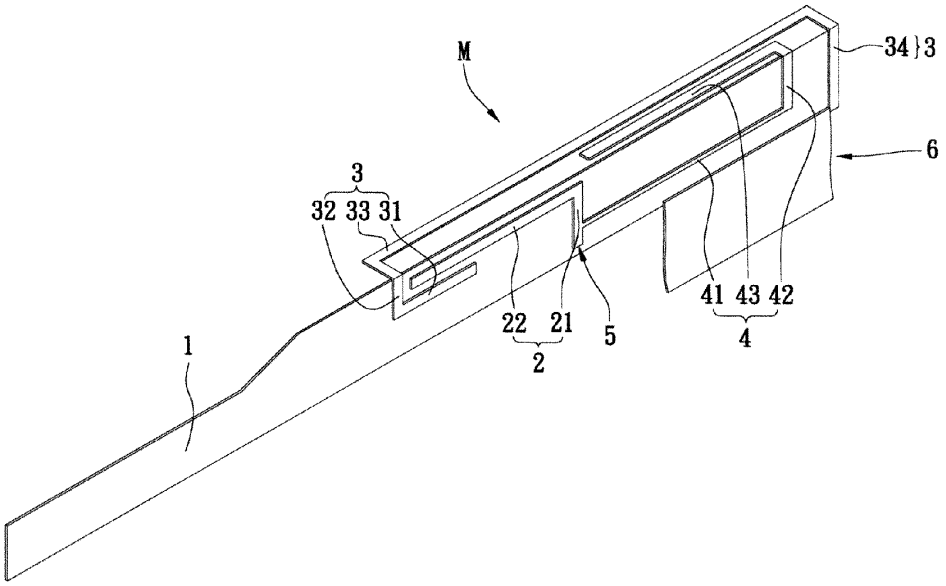
Publication Classification

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

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

(57) **ABSTRACT**

A multi-frequency antenna includes a microwave substrate, a first antenna unit, a second antenna unit, a third antenna unit and a grounding unit. The first antenna unit, the second antenna unit, and the third antenna unit are disposed on the microwave substrate surface. The grounding unit is disposed at an edge on the surface of the microwave substrate. The grounding unit is in connection with the second antenna unit. The second antenna unit and the third antenna unit are bent to form perpendicular structures to the microwave substrate. The compact arrangement reduces the physical footprint of the antenna module to enable fitment in a wide range of products having tight special constraint.



US 20120176274A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0176274 A1

(43) Pub. Date: Jul. 12, 2012

Tsai et al.

(54) **WIDE-BAND ANTENNA**

(76) Inventors: **Yung-Chih Tsai**, Taipei (TW); **Jia-Hung Su**, Taipei (TW); **Kai Shih**, Taipei (TW)

(21) Appl. No.: **13/005,527**

(22) Filed: **Jan. 12, 2011**

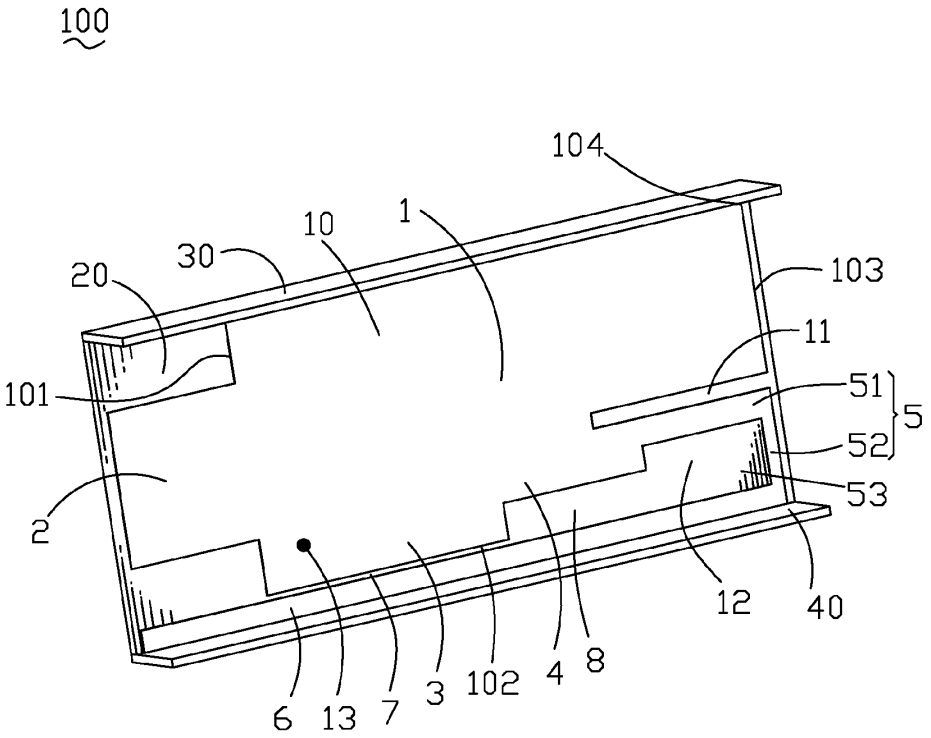
Publication Classification

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

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

(57) **ABSTRACT**

A wide-band antenna mounted on a circuit board includes a ground plate, a radiating plate perpendicularly connected to two side edges of the circuit board, and a planar antenna element which includes a base plate, an extending plate, and a ground portion. One side of the base plate defines a gap with a first coupling portion being formed, and a slot adjacent to the gap with a first strip being formed therebetween. A second strip is extended perpendicularly from the first strip. The extending plate is extended outward from one end of the base plate. The ground portion is extended outward from the second strip and connected to the ground plate. The first coupling portion and the ground portion have an interspace to form a capacitive coupling therebetween. A groove is formed among the first and second strips and the ground portion to form a simulation inductance thereamong.



US 20120176280A1

(19) **United States**

(12) **Patent Application Publication**

Chen et al.

(10) **Pub. No.: US 2012/0176280 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **SHIELDING ANTENNAS IN WIRELESS APPLICATION DEVICES**

(76) Inventors: **Jia-Woei Chen**, Taipei City (TW); **Po-Chih Chen**, Taipei County (TW)

(21) Appl. No.: **13/420,714**

(22) Filed: **Mar. 15, 2012**

Related U.S. Application Data

(63) Continuation of application No. PCT/IB2009/006971, filed on Sep. 16, 2009.

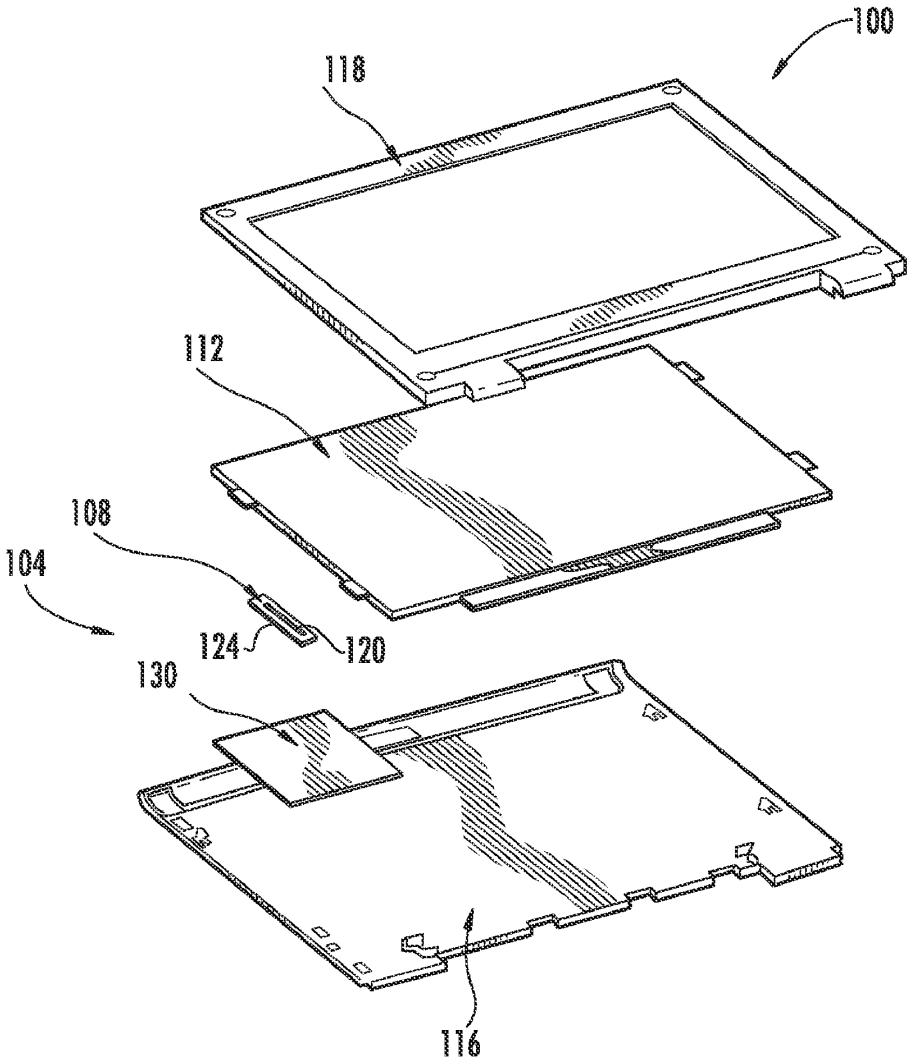
Publication Classification

(51) **Int. Cl.**
H01Q 1/52 (2006.01)
H01Q 1/24 (2006.01)

(52) **U.S. Cl.** **343/702**; 343/841

(57) **ABSTRACT**

An antenna assembly that includes an antenna module fitting between a display panel of an electronic device and a metallic cover of the device. The antenna module includes an antenna and a support for the antenna. A shielding layer fits between the antenna module and the cover. The shielding layer has a grounding area configured for electrical connection with the antenna and for electrical isolation from the cover.



US 20120176288A1

(19) **United States**

(12) **Patent Application Publication**

Furuya et al.

(10) **Pub. No.: US 2012/0176288 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **MAGNETIC DIELECTRIC ANTENNA**

(76) Inventors: **Kota Furuya**, Tama-shi (JP); **Hiroki Yoshioka**, Kawasaki-shi (JP); **Koki Sato**, Sagamihara-shi (JP)

(21) Appl. No.: **13/499,156**

(22) PCT Filed: **Sep. 22, 2010**

(86) PCT No.: **PCT/JP2010/066374**

§ 371 (c)(1), (2), (4) Date: **Mar. 29, 2012**

(30) **Foreign Application Priority Data**

Sep. 30, 2009 (JP) 2009-227342

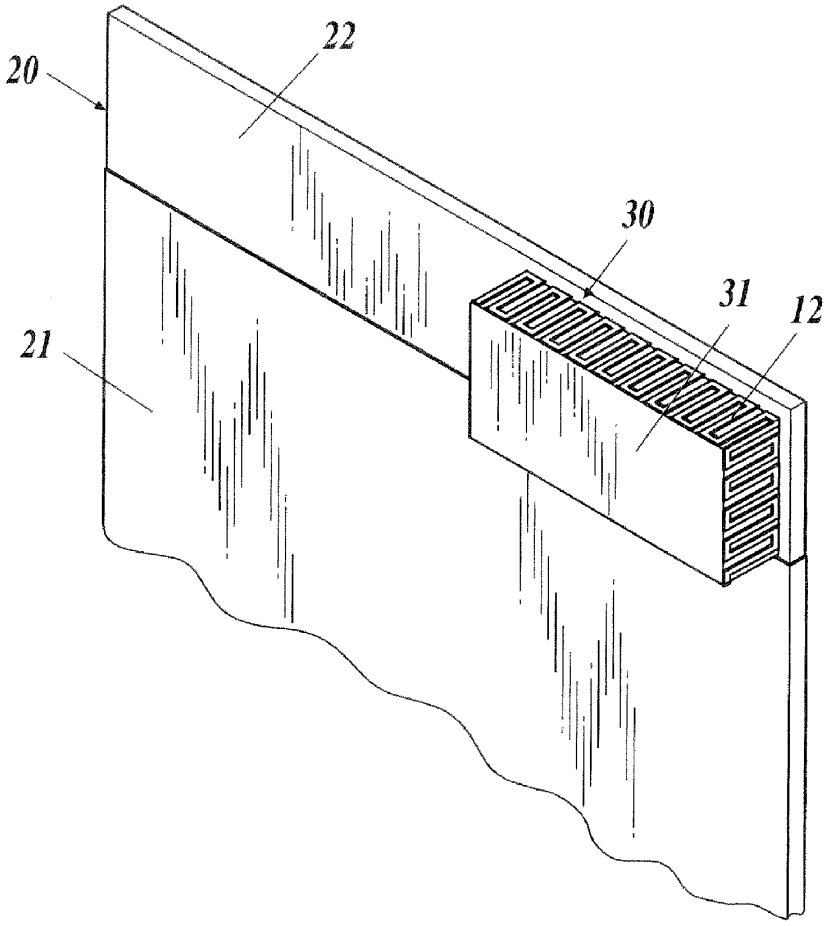
Publication Classification

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

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

(57) **ABSTRACT**

The objective is realizing downsizing of an antenna, suppressing the decrease in radiation efficiency, and suppressing narrowing of band. A magnetic dielectric antenna **10** is provided with a L-shaped electrode **12** having a meander shape, and a magnetic dielectric body base portion **11** provided to cover at least a part of the electrode **12**, wherein the electrode **12** comprises an electrode portion **12***a* arranged so that the extending direction of electrode portion **12***a* is parallel with a ground portion with a predetermined gap therefrom, and an electrode portion **12***b* connected to the electrode portion **12***a*.



US 20120176289A1

(19) **United States**

(12) **Patent Application Publication**

LEE

(10) **Pub. No.: US 2012/0176289 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **ASYMMETRICAL DIPOLE ANTENNA**

(76) Inventor: **Chang-Jung LEE**, Taoyuan County (TW)

(21) Appl. No.: **13/347,157**

(22) Filed: **Jan. 10, 2012**

(30) **Foreign Application Priority Data**

Jan. 10, 2011 (TW) 100100823

Publication Classification

(51) **Int. Cl.**

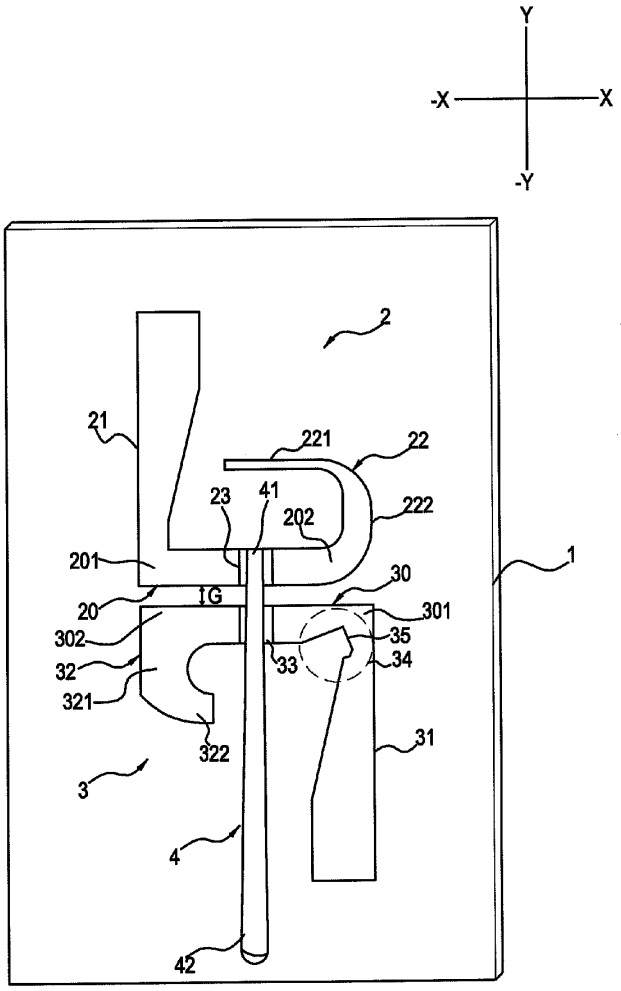
H01Q 9/16 (2006.01)

H01Q 19/10 (2006.01)

(52) **U.S. Cl.** **343/818**; 343/793

(57) **ABSTRACT**

An asymmetrical dipole antenna is provided. A radiation module and a ground module are formed by a metallic conductor and arranged at an interval on a substrate of the antenna, and the radiation module and the ground module, respectively, have a radiation base and a ground base. Two radiation arms and two ground arms are formed by extending from two ends of the two respective bases in opposite directions. The two radiation arms are orthogonal to the radiation base, and the second radiation arm is bent and extended toward the first radiation arm to form an arc opened toward the first radiation arm. The two ground arms are orthogonal to the ground base, and a hook is formed by extending and bending the second ground arm toward the first ground arm. A feeder unit connects the feed point and the ground point of the two bases.



US 20120176291A1

(19) **United States**

(12) **Patent Application Publication**

Hsueh

(10) **Pub. No.: US 2012/0176291 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **INPUT DEVICE FOR COMPUTER SYSTEM**

(75) Inventor: **Tsung-Wen Hsueh**, Taipei (TW)

(73) Assignee: **PRIMAX ELECTRONICS LTD.**, Taipei (TW)

(21) Appl. No.: **13/045,355**

(22) Filed: **Mar. 10, 2011**

(30) **Foreign Application Priority Data**

Jan. 7, 2011 (TW) 100100589

Publication Classification

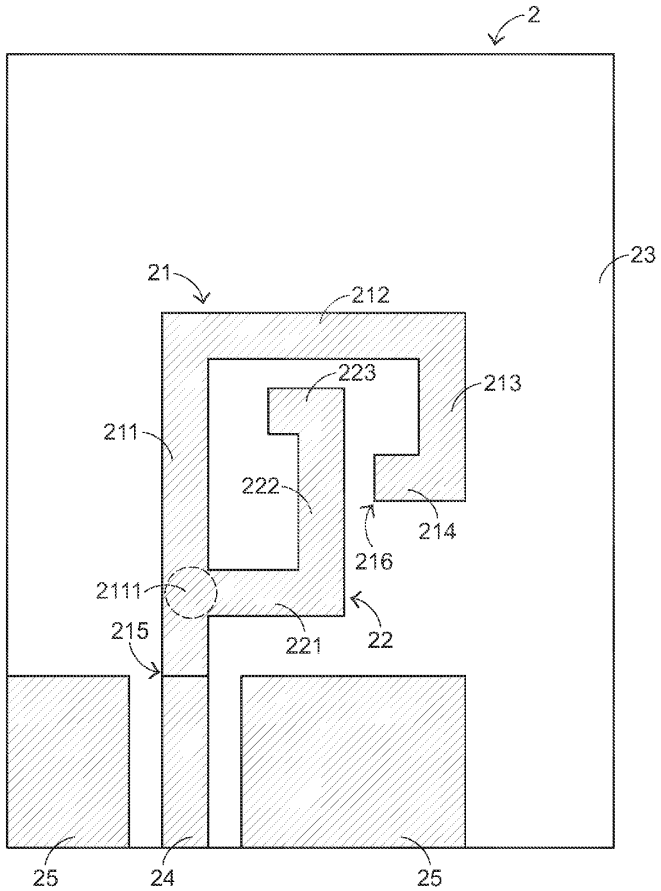
(51) **Int. Cl.**

H01Q 5/00 (2006.01)
H01Q 1/38 (2006.01)
H01Q 9/00 (2006.01)

(52) **U.S. Cl.** ..... **343/843**; 343/700 MS

(57) **ABSTRACT**

A planar dual-band antenna is provided. The planar dual-band antenna is G-shaped, and includes a first radiating part and a second radiating part. The first radiating part includes a first vertical radiating strip, a first horizontal radiating strip, a second vertical radiating strip and a second horizontal radiating strip. The second radiating part includes a third horizontal radiating strip, a third vertical radiating strip and a fourth horizontal radiating strip. The first vertical radiating strip has a connecting node. A first end of the first vertical radiating strip is served as a feeding point of the planar dual-band antenna. The second radiating part is connected with the connecting node of the first vertical radiating strip. In such way, two current paths of the planar dual-band antenna are defined.



US 20120176292A1

(19) **United States**

(12) **Patent Application Publication**

Hung et al.

(10) **Pub. No.: US 2012/0176292 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **MEANDER SLOT ANTENNA STRUCTURE AND ANTENNA MODULE UTILIZING THE SAME**

(75) Inventors: **Kuo-Fong Hung**, Changhua City (TW); **Ming-Hao Yeh**, Taipei City (TW)

(73) Assignee: **MEDIATEK INC.**, Hsin-Chu (TW)

(21) Appl. No.: **13/005,366**

(22) Filed: **Jan. 12, 2011**

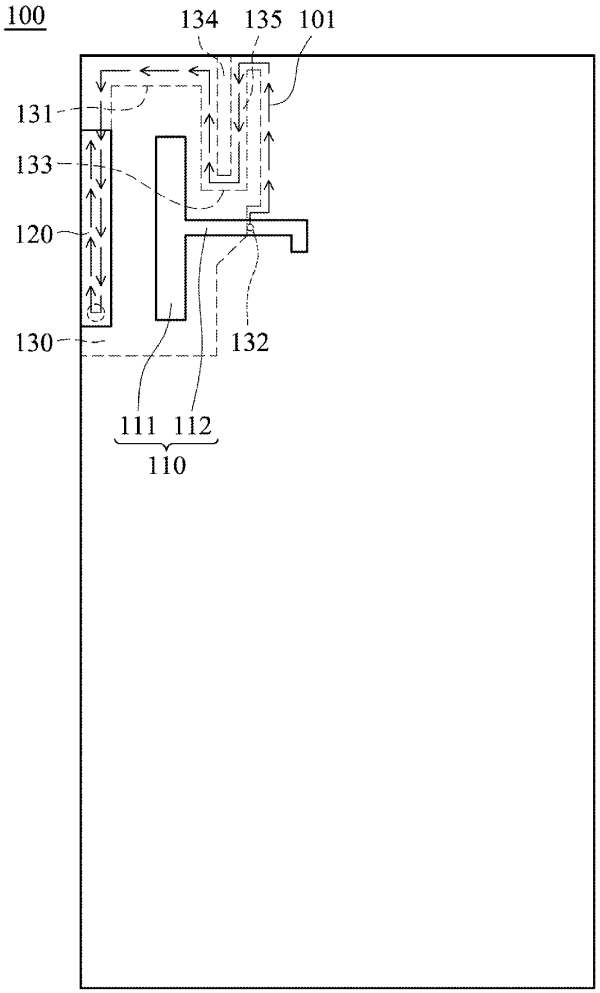
Publication Classification

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

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

(57) **ABSTRACT**

A meander slot antenna structure for transmitting a wireless signal is provided. The meander slot antenna structure includes a substrate, a ground element, a feed conductor and a couple conductor. The substrate includes a first surface and a second surface, wherein the first surface is opposite to the second surface. The ground element is disposed on the second surface, wherein a meander slot is formed in the ground element. The feed conductor is disposed on the first surface, wherein the feed conductor corresponds to the meander slot. The couple conductor is disposed on the first surface and coupled with the feed conductor, wherein a via passes through the substrate and electrically connects the couple conductor to the ground element.



US 20120176293A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0176293 A1

(43) Pub. Date: Jul. 12, 2012

Itho et al.

(54) **ANTENNA, WIRELESS COMMUNICATION APPARATUS AND METHOD OF CONFIGURING ANTENNA**

(75) Inventors: **Ryoh Itho**, Minato-ku (JP); **Jun Uchida**, Kakegawa-shi (JP)

(73) Assignee: **NEC CORPORATION**, Minato-ku, Tokyo (JP)

(21) Appl. No.: **13/496,789**

(22) PCT Filed: **Sep. 14, 2010**

(86) PCT No.: **PCT/JP2010/066274**

§ 371 (c)(1),
(2), (4) Date: **Mar. 16, 2012**

(30) **Foreign Application Priority Data**

Sep. 17, 2009 (JP) 2009-215824

Publication Classification

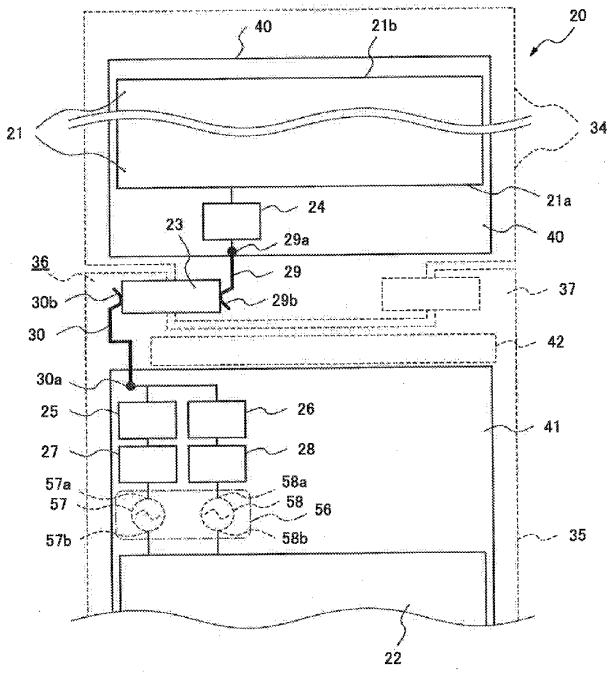
(51) **Int. Cl.**
H01Q 1/48 (2006.01)
H01P 11/00 (2006.01)

(52) **U.S. Cl.** **343/848**; 29/600

(57) **ABSTRACT**

The present invention enables to restrain the enlargement of the wireless communication apparatus and prevent the manufacturing processes from increasing and to increase the frequency bands which can be used by the wireless communication.

An antenna **1** includes a first ground pattern **3**, a second ground pattern **4**, a hinge conductor member **5** and a current control circuit **6**. The first ground pattern **3** is formed on a first printed wiring board **7**. The hinge conductor member **5** is arranged on a hinge Z which connects indirectly the first printed wiring board **7** and a second printed wiring board **8** each other. The current control circuit **6** is arranged on the first printed wiring board **7**. The current control circuit **6** has a function to flow the electric current of a first frequency band and attenuate the electric current of a second frequency band. An electric current of the first frequency band flows from a feeding source **10** to the second ground pattern **4** and flows into the first ground pattern **3** through the hinge conductor member **5** and the current control circuit **6**. A part, on which the electric current of the first frequency band flows, functions as an antenna which communicate the signal of the first frequency band. An electric current of the second frequency band flows from the feeding source **10** to the second ground pattern **4** and flows until reaching the current control circuit **6** through the hinge conductor member **5**. A part, on which the electric current of the second frequency band flows, functions as an antenna which communicate the signal of the second frequency band.



US 20120178503A1

(19) **United States**

(12) **Patent Application Publication**

Merz et al.

(10) **Pub. No.: US 2012/0178503 A1**

(43) **Pub. Date: Jul. 12, 2012**

(54) **RESONATING ELEMENT FOR REDUCING RADIO-FREQUENCY INTERFERENCE IN AN ELECTRONIC DEVICE**

(76) Inventors: **Nicholas G. L. Merz**, San Francisco, CA (US); **Scott A. Myers**, San Francisco, CA (US); **Tang Yew Tan**, Palo Alto, CA (US); **Jaydeep V. Ranade**, Cupertino, CA (US); **Mattia Pascolini**, Campbell, CA (US)

(21) Appl. No.: **13/017,568**

(22) Filed: **Jan. 31, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/431,522, filed on Jan. 11, 2011.

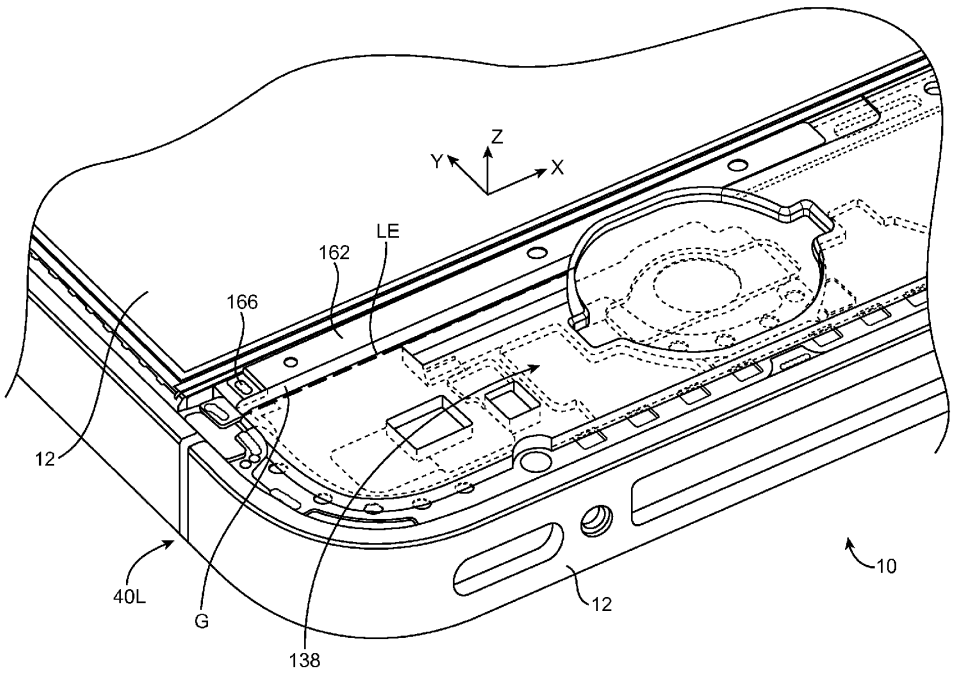
Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H04M 1/02 (2006.01)

(52) **U.S. Cl.** **455/566**; 343/702

(57) **ABSTRACT**

An electronic device may be provided with a display and wireless circuits. The wireless circuits may include antenna structures and radio-frequency transceiver circuitry that transmits and receives radio-frequency signals using the antenna structures. A ground plane for the antenna structures may be located in the center of the electronic device under the display. A resonating element may be used to reduce signal interference that otherwise arises when simultaneously operating the display and the antenna structures. The resonating element may be implemented using an L-shaped structure have an arm that extends parallel to one of the edges of the display.



US 20120182186A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0182186 A1

(43) Pub. Date: Jul. 19, 2012

YANG et al.

(54) SURFACE MOUNT DEVICE MULTIPLE-BAND ANTENNA MODULE

(75) Inventors: **Tsai-Yi YANG**, Tainan City (TW); **Chia-Tsung Wu**, Tainan City (TW)

(73) Assignees: **TAOGLAS GROUP HOLDINGS LIMITED.**; **Cirocomm Technology Corp.**

(21) Appl. No.: **13/351,211**

(22) Filed: **Jan. 16, 2012**

(30) **Foreign Application Priority Data**

Jan. 18, 2011 (TW) 100101869

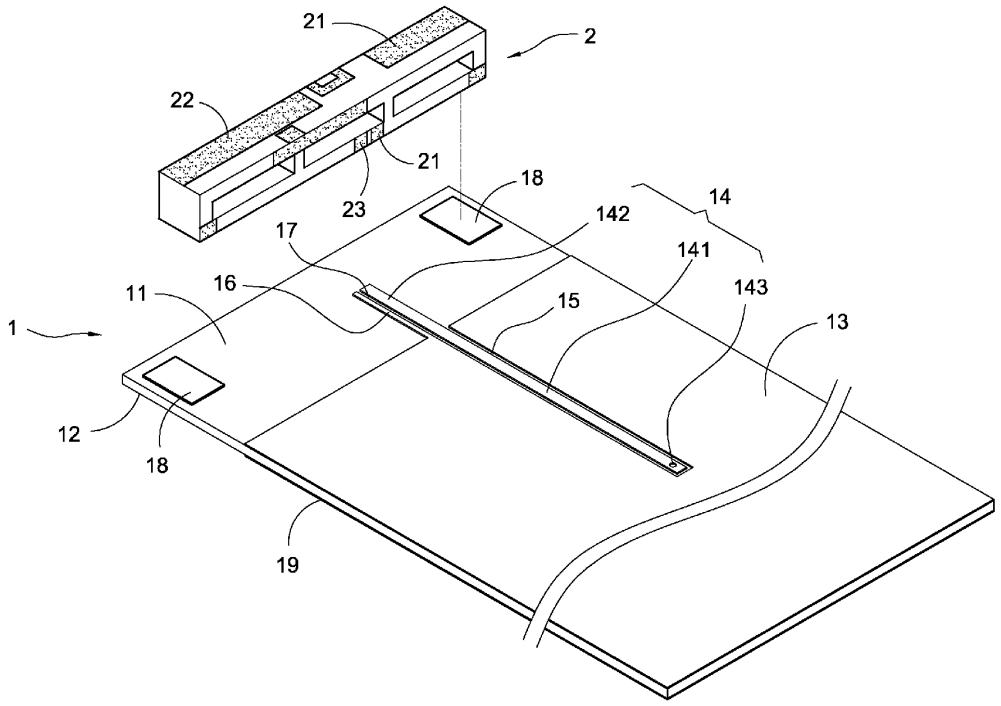
Publication Classification

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

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

(57) **ABSTRACT**

A surface mount device multiple-band antenna module includes a substrate and a carrier. The substrate has a first grounding metal surface and a first micro-strip line on a side thereof. The first grounding metal surface has a second micro-strip line connected thereto. There is a space between the first micro-strip line and the second micro-strip line. The substrate has a second grounding metal surface on the other side thereof The carrier is made of ceramic material with high dielectric constant, which has a first radiative metal portion, a second radiative metal portion and a third radiative metal portion. The carrier is electrically connected with the substrate. The joint of the first radiative metal portion and the second radiative metal portion is electrically connected to the first micro-strip line. The third radiative metal portion is electrically connected to the second micro-strip line. Thus, the multiple-band antenna module is obtained.



US 20120182187A1

(19) **United States**

(12) **Patent Application Publication**

TSENG

(10) **Pub. No.: US 2012/0182187 A1**

(43) **Pub. Date: Jul. 19, 2012**

(54) **THIN ANTENNA AND AN ELECTRONIC DEVICE HAVING THE THIN ANTENNA**

(76) Inventor: **Kuan-Hsueh TSENG**, Taipei Hsien (TW)

(21) Appl. No.: **13/432,463**

(22) Filed: **Mar. 28, 2012**

Related U.S. Application Data

(62) Division of application No. 12/385,111, filed on Mar. 31, 2009.

(30) **Foreign Application Priority Data**

Jun. 26, 2008 (TW) 097123919

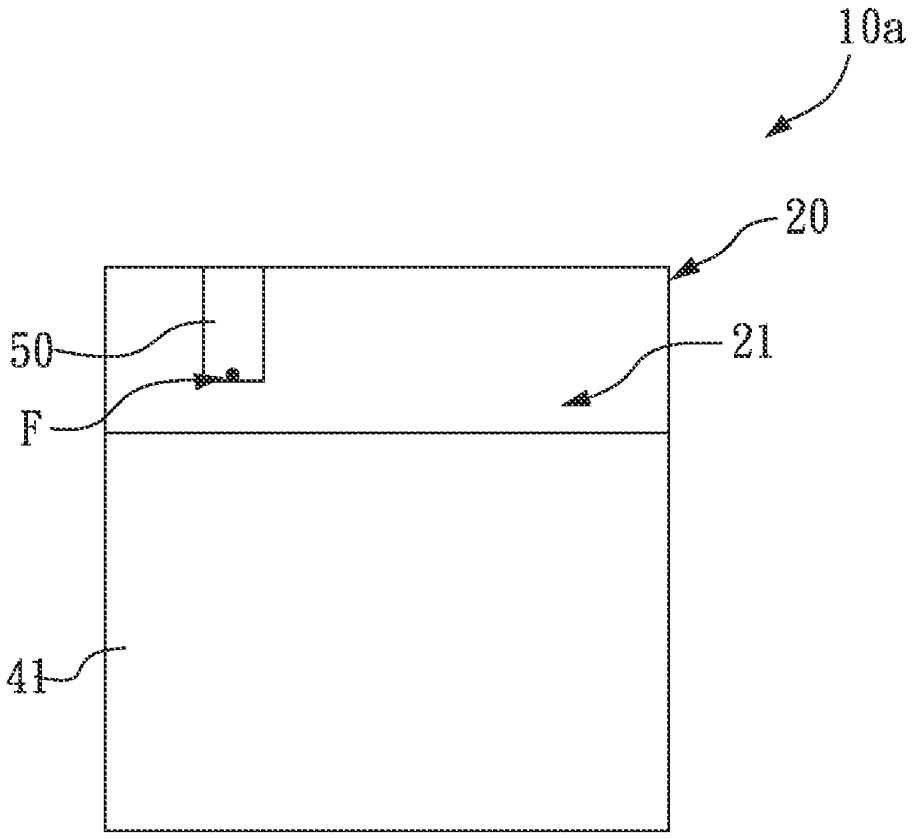
Publication Classification

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

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

(57) **ABSTRACT**

A thin antenna for wireless signal transmission of an electronic device is disclosed. The thin antenna comprises a base board, a first radiation area, a first ground area and a feeding plane. The base board has a first plane and a second plane. The first radiation area is printed on the second plane. The first ground area is printed on the first plane. The feeding plane is printed on the first plane. The feeding plane has a feeding point. Wherein the area of the feeding plane is smaller than the area of the first radiation area, and the area of the feeding plane is partly covered by the region which is projected from the first radiation area corresponding to the first plane.



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(19) **United States**

(12) **Patent Application Publication**

GU et al.

(10) **Pub. No.: US 2012/0182188 A1**

(43) **Pub. Date: Jul. 19, 2012**

(54) **COMPUTER WITH ANTENNA**

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(73) Assignees: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW); **HONG FU JIN PRECISION INDUSTRY (ShenZhen) CO., LTD.**, Shenzhen City (CN)

(21) Appl. No.: **13/095,950**

(22) Filed: **Apr. 28, 2011**

(30) **Foreign Application Priority Data**

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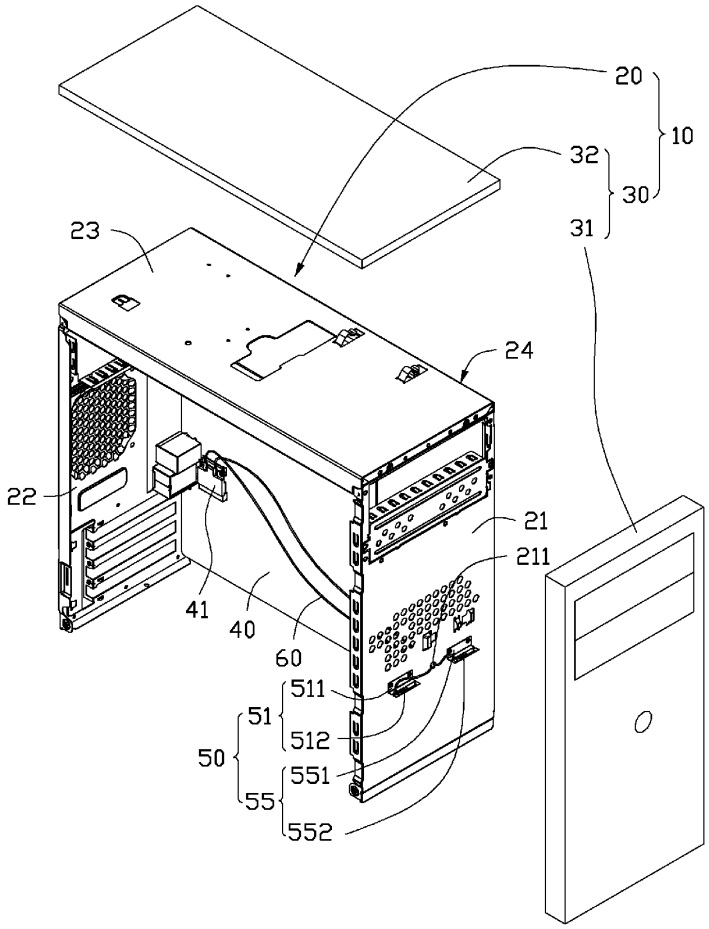
Publication Classification

(51) **Int. Cl.**
H01Q 1/22 (2006.01)

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

(57) **ABSTRACT**

A computer includes an enclosure, a mainboard, a main antenna, and an auxiliary antenna. The enclosure includes an inner case and an outer cover. The mainboard is received in the inner case. The main antenna and the auxiliary antenna are mounted at an outer surface of the enclosure. The main antenna and the auxiliary antenna are electrically connected to the mainboard, respectively. The outer cover is mounted on the case and covers and protects the main antenna and the auxiliary antenna.



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(19) United States

(12) Patent Application Publication

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(43) Pub. Date: Jul. 19, 2012

WU et al.

(54) ELECTRONIC APPARATUS

(76) Inventors: **Chang-Hsun WU**, Taipei City (TW); **Chien-Yi WU**, Taipei City (TW)

(21) Appl. No.: **13/350,593**

(22) Filed: **Jan. 13, 2012**

(30) **Foreign Application Priority Data**

Jan. 14, 2011 (TW) 100101475

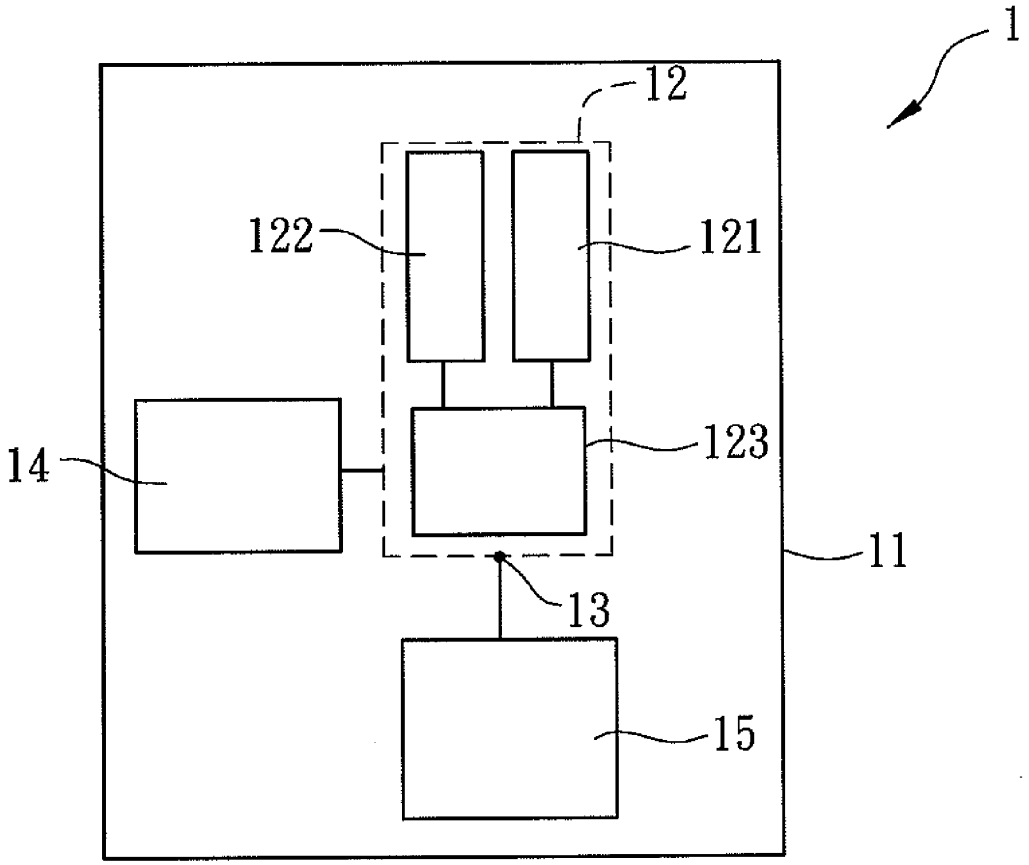
Publication Classification

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

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

(57) **ABSTRACT**

An electronic apparatus includes a casing, at least an antenna body, a feeding point and a control unit. The casing has a display portion. The antenna body is disposed at the casing and at least has two radiation paths and a switching element. Parts of the radiation paths are respectively disposed at two sides of the display portion. The switching element is electrically connected with the radiation paths. The feeding point is electrically connected with the switching element and operationally connected to one of the radiation paths. The control unit controls the switching element based on the rotation of the electronic apparatus. When one of the radiation paths is located between a user and the display portion, the control unit controls to selectively switch the switching element for connecting the other radiation path to the feeding point.



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(19) **United States**

(12) **Patent Application Publication**

Kinoshita

(10) **Pub. No.: US 2012/0182197 A1**

(43) **Pub. Date: Jul. 19, 2012**

(54) **WIRELESS RECEIVER**

(75) Inventor: **Keisuke Kinoshita**, Kyoto (JP)

(73) Assignee: **PANASONIC CORPORATION**, Kadoma-shi, Osaka (JP)

(21) Appl. No.: **13/496,966**

(22) PCT Filed: **Oct. 29, 2010**

(86) PCT No.: **PCT/JP2010/006401**

§ 371 (c)(1), (2), (4) Date: **Mar. 19, 2012**

(30) **Foreign Application Priority Data**

Nov. 2, 2009 (JP) 2009-251686

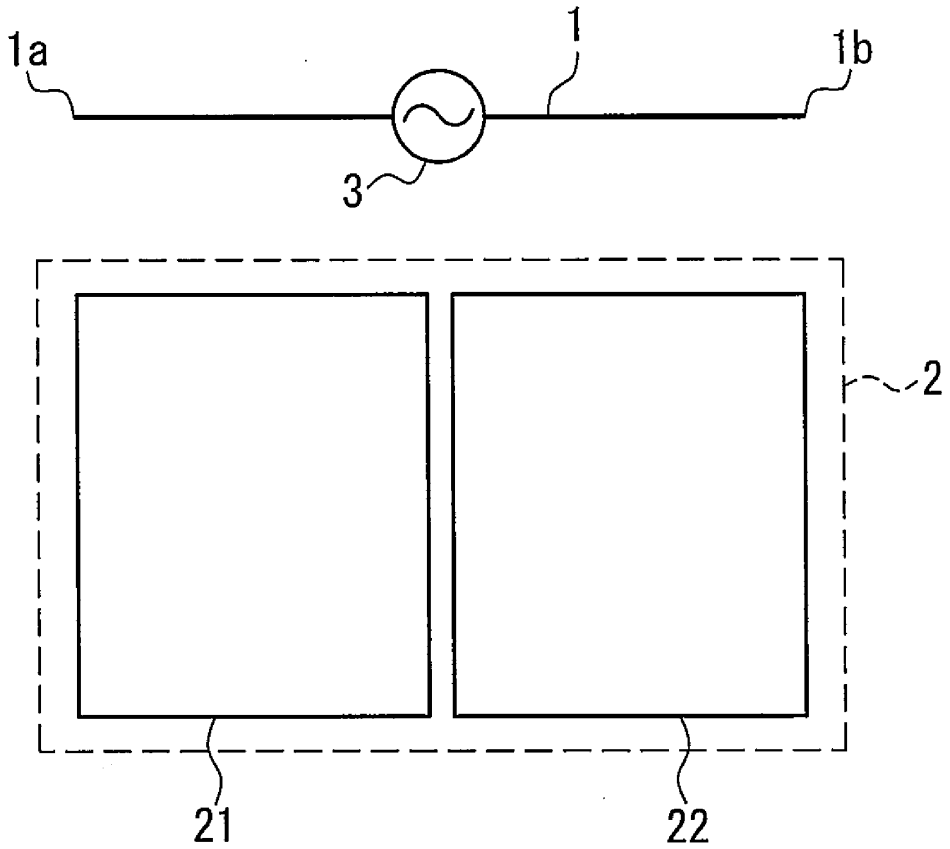
Publication Classification

(51) **Int. Cl.**
H01Q 9/26 (2006.01)
H01Q 9/16 (2006.01)

(52) **U.S. Cl.** **343/803**; 343/793

(57) **ABSTRACT**

A wireless receiver including a dipole antenna and a circuit board, wherein high directivity characteristics can be acquired for wireless signals is provided. The wireless receiver includes a balanced feed antenna and a circuit board arranged in parallel to the longitudinal direction of the aforementioned balanced feed antenna. A conductive pattern formed on the aforementioned circuit board is composed of two or more partial patterns arranged with a gap interposed therebetween. The gap is formed at a position in between both ends of the aforementioned balanced feed antenna.



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(19) **United States**

(12) **Patent Application Publication**

HOTTA et al.

(10) **Pub. No.: US 2012/0188134 A1**

(43) **Pub. Date: Jul. 26, 2012**

(54) **ANTENNA DEVICE AND ELECTRONIC DEVICE INCLUDING ANTENNA DEVICE**

(76) Inventors: **Hiroyuki HOTTA**, Hamaura-shi (JP); **Koichi Sato**, Tachikawa-shi (JP); **Isao Ohba**, Hachioji-shi (JP)

(21) Appl. No.: **13/291,388**

(22) Filed: **Nov. 8, 2011**

(30) **Foreign Application Priority Data**

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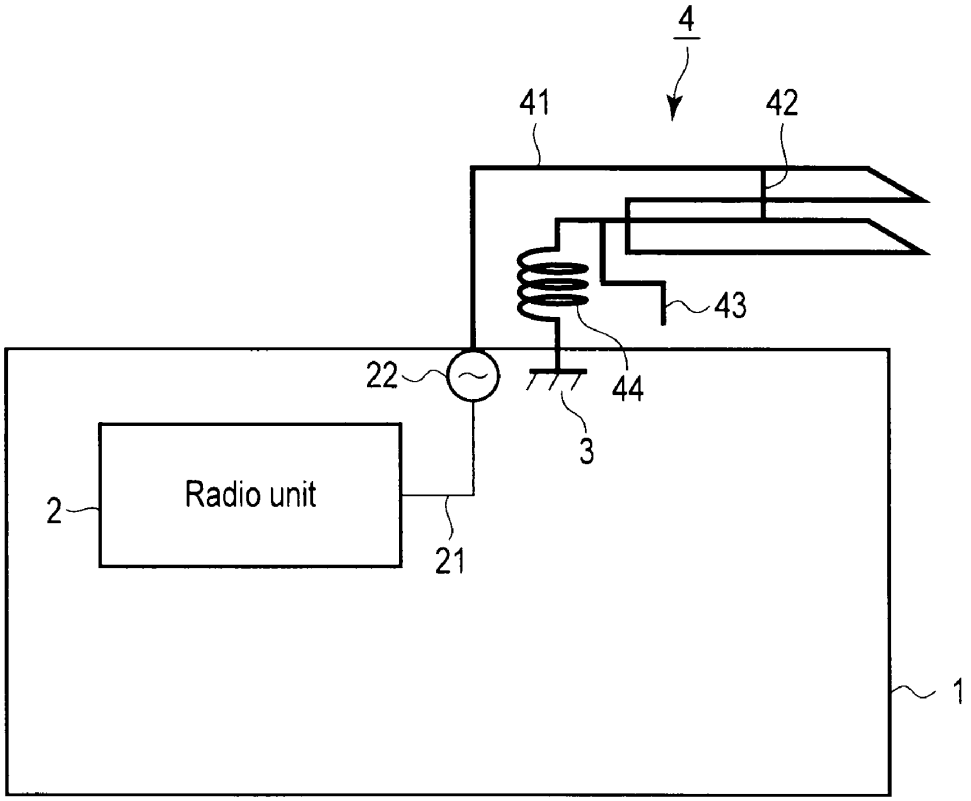
Publication Classification

(51) **Int. Cl.**
H01Q 1/50 (2006.01)

(52) **U.S. Cl.** **343/722**

(57) **ABSTRACT**

According to one embodiment, an antenna device includes a first element, a stub, and an open end element. The first element has a folded monopole structure in which a conductor is folded at a folding portion to form a forward portion and a backward portion. A base end of the forward portion is connected to a feeding point, and a distal end of the backward portion is connected to a ground via a first lumped parameter. The stub is provided between the forward portion and the backward portion of the first element so as to shunt the forward portion and the backward portion. The open end element includes a conductor placed in parallel to the first lumped parameter. A base end of the conductor is connected between the stub of the backward portion of the first element and the ground, and the distal end of the conductor is open.



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(19) **United States**

(12) **Patent Application Publication**

WONG et al.

(10) **Pub. No.: US 2012/0188135 A1**

(43) **Pub. Date: Jul. 26, 2012**

(54) **COMMUNICATION DEVICE AND ANTENNA STRUCTURE THEREIN**

(75) Inventors: **Kin-Lu WONG**, Kaohsiung City (TW); **Wun-Jian LIN**, Kaohsiung City (TW)

(73) Assignee: **ACER INCORPORATED**, Taipei Hsien (TW)

(21) Appl. No.: **13/439,191**

(22) Filed: **Apr. 4, 2012**

(30) **Foreign Application Priority Data**

Jan. 16, 2011 (TW) 101101545

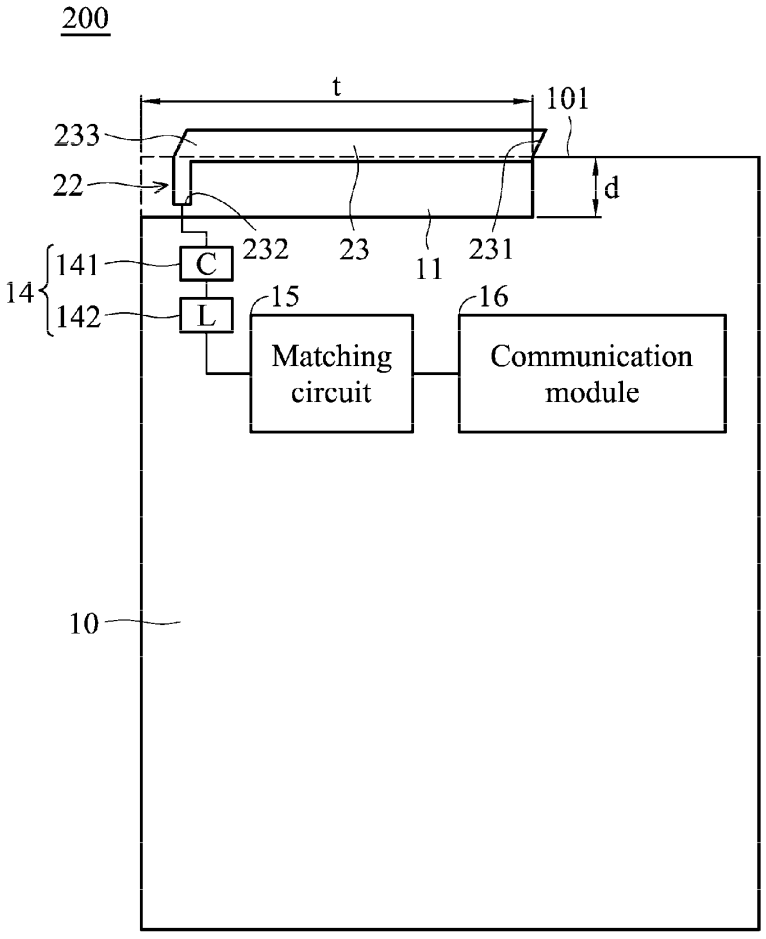
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)

(52) **U.S. Cl.** **343/749**

(57) **ABSTRACT**

A communication device including an antenna structure is provided, wherein the antenna structure includes a ground element, an antenna element, and a circuit element group. The ground element has a notch at one of its edges, and a long edge of the notch is at least two times longer than a short edge of the notch. The antenna element includes a metal portion disposed in the notch. Two ends of the metal portion are extended away from each other and are positioned substantially at or around two opposite edges of the notch. One end of the metal portion is coupled to the ground element, and the other end of the metal portion is a feeding terminal of the antenna element. The circuit element group includes at least a capacitive element and an inductive element.



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(19) United States

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(43) Pub. Date: Jul. 26, 2012

Islam

(54) **MILTIRESONANCE ANTENNA AND METHODS**

(76) Inventor: **Muhammad Nazrul Islam**, Oulu (FI)

(21) Appl. No.: **13/145,555**

(22) PCT Filed: **Jan. 15, 2010**

(86) PCT No.: **PCT/FI2010/050017**

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(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

H01Q 1/36	(2006.01)
H01Q 5/01	(2006.01)
H01Q 1/50	(2006.01)

(52) **U.S. Cl.** ..... **343/860**; 343/700 MS

(57) **ABSTRACT**

A multiresonance antenna useful in small-sized radio devices. In one embodiment, radiating element of the antenna comprises, a first and a second radiating arm of nearly equal electric lengths. The tail portions of the arms are located on different sides of the area determined by the outline of the radiator and point to opposite directions away from each other thereby exciting a double resonance in the antenna. The second arm comprises at least one branch extending towards the tail portion of the first arm thereby widening antenna operating band in the frequency range of 900 MHz.