US 20120268326A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0268326 A1

(43) Pub. Date: Oct. 25, 2012

KAI et al.

(54) **PLANAR INVERTED F ANTENNA**

(75) Inventors: **Manabu KAI**, Kawasaki (JP); **Teruhisa NINOMIYA**, Kawasaki (JP); **Takahiro KOHARAGI**, Tokyo (JP); **Hiroaki KAWASUMI**, Tokyo (JP); **Katsumi KOBAYASHI**, Tokyo (JP); **Takuji FURUSAWA**, Tokyo (JP); **Masaharu NOZAWA**, Shizuoka (JP); **Masashi KUWAHARA**, Fukushima (JP)

(73) Assignee: **FUJITSU LIMITED**, Kawasaki-shi (JP)

(21) Appl. No.: **13/443,505**

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

(30) **Foreign Application Priority Data**

Apr. 25, 2011 (JP) 2011-097005

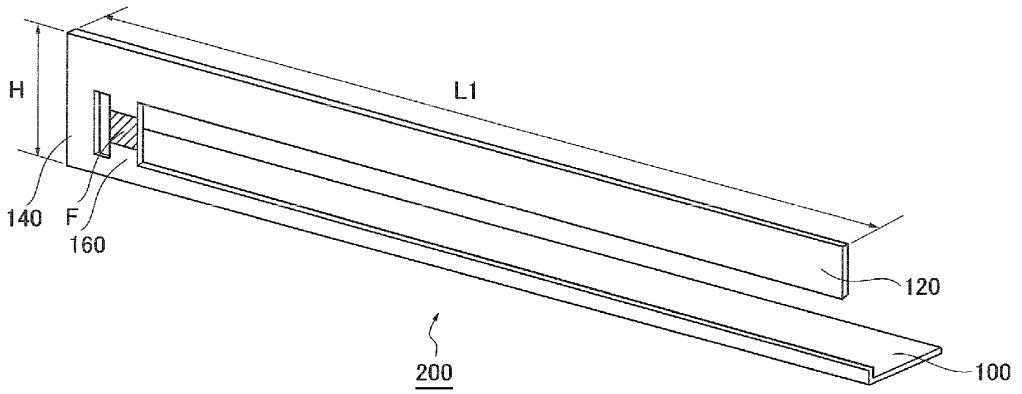
Publication Classification

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

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

(57) **ABSTRACT**

In a planar inverted F antenna, a second radiation element is provided parallel to the GND surface and extending partially with respect to a first radiation element in a longitudinal direction, so as to substantially increase a width of the first radiation element in the vicinity of a power supply section.



US 20120268328A1

(19) **United States**

(12) **Patent Application Publication**

KIM et al.

(10) **Pub. No.: US 2012/0268328 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA DEVICE FOR A PORTABLE TERMINAL**

(75) Inventors: **Jae-Hee KIM**, Gyeonggi-do (KR); **Dong-Hyun LEE**, Gyeonggi-do (KR); **Se-Hyun PARK**, Gyeonggi-do (KR); **Austin KIM**, Gyeonggi-do (KR); **Joon-Ho BYUN**, Gyeonggi-do (KR)

(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**, Gyeonggi-Do (KR)

(21) Appl. No.: **13/440,283**

(22) Filed: **Apr. 5, 2012**

(30) **Foreign Application Priority Data**

Apr. 22, 2011 (KR) 10-2011-0037897

Publication Classification

(51) **Int. Cl.**

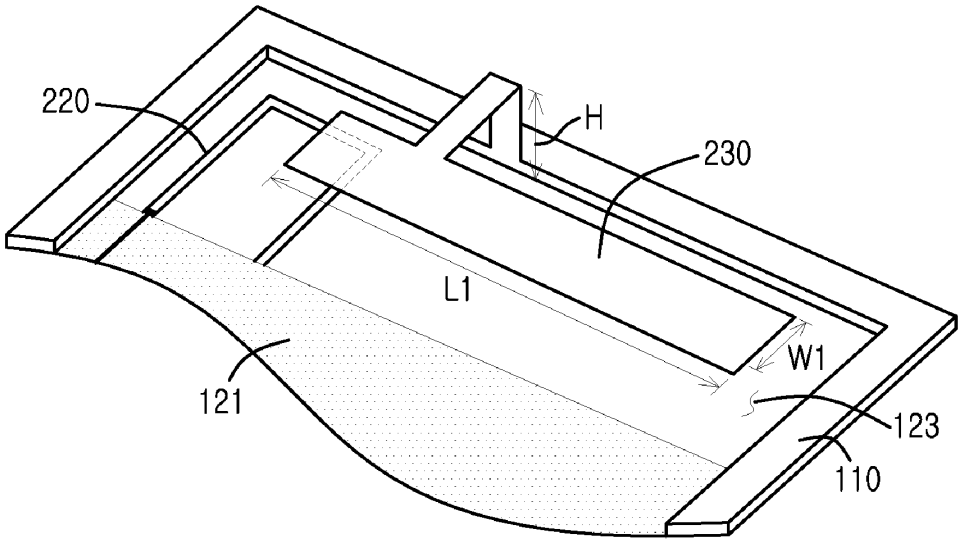
H01Q 1/24 (2006.01)

H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

An antenna device for improving antenna performance of a portable terminal having a metal edge installed on a case frame is disclosed. The antenna device includes a main board equipped with a power supply end for supplying power and a ground surface for grounding the main board, a loop radiator connected with the power supply end of the main board at first end and connected with the ground surface of the main board at a second end, and a metal body disposed along an edge of the portable terminal and electrically connected with the ground surface of the main board.



US 20120268330A1

(19) **United States**

(12) **Patent Application Publication**

Irmscher et al.

(10) **Pub. No.: US 2012/0268330 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA DEVICES AND PORTABLE ELECTRONIC DEVICES COMPRISING SUCH ANTENNA DEVICES**

(76) Inventors: **Stefan Irmscher**, Taby (SE); **Peter Lindberg**, Uppsala (SE)

(21) Appl. No.: **13/541,966**

(22) Filed: **Jul. 5, 2012**

Related U.S. Application Data

(63) Continuation of application No. PCT/EP2010/051289, filed on Feb. 3, 2010.

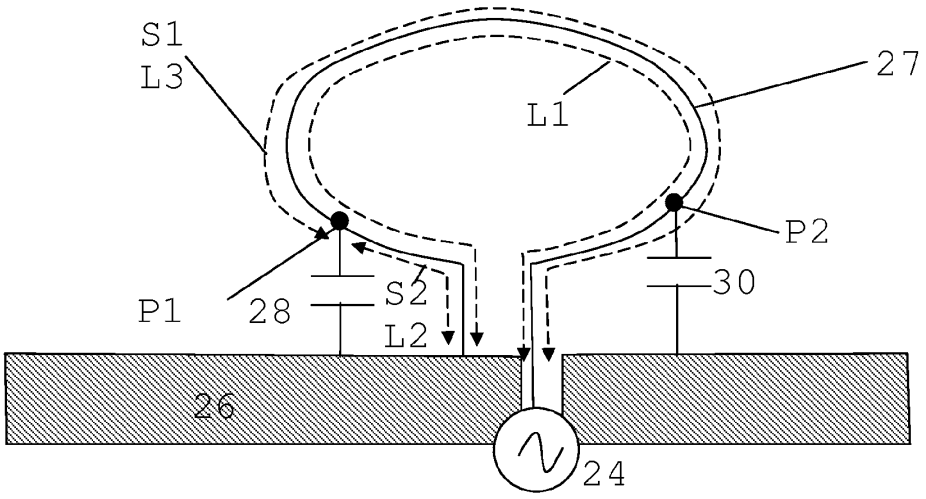
Publication Classification

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

(52) **U.S. Cl.** **343/702**; 343/748

(57) **ABSTRACT**

An exemplary embodiment of an antenna device generally includes a loop element having a length providing loop resonance at a first wavelength, where a resonance frequency of this wavelength is used in a desired frequency band. A capacitance is provided between a first position on the element and ground, thereby dividing the element into a first and a second section. The second section has an inductance that depends on the length and forms a resonance circuit with the capacitance which causes the element to function as a monopole element at the resonance frequency of the resonance circuit. The first position and capacitance are configured for the resonance circuit resonance frequency to lie in the desired frequency band. The first position is configured such that the length of the first section provides a monopole resonance at a second wavelength having one resonance frequency at the resonance circuit resonance frequency.



US 20120268332A1

(19) **United States**

(12) **Patent Application Publication**

GUAN et al.

(10) **Pub. No.: US 2012/0268332 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA DEVICE AND ANTENNA SYSTEM**

(75) Inventors: **Ning GUAN**, Sakura-shi (JP); **Hiroiku TAYAMA**, Sakura-shi (JP)

(73) Assignee: **FUJIKURA LTD.**, Tokyo (JP)

(21) Appl. No.: **13/539,955**

(22) Filed: **Jul. 2, 2012**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2011/050675, filed on Jan. 17, 2011.

(30) **Foreign Application Priority Data**

Jan. 18, 2010 (JP) 2010-008440
Oct. 5, 2010 (JP) 2010-226081

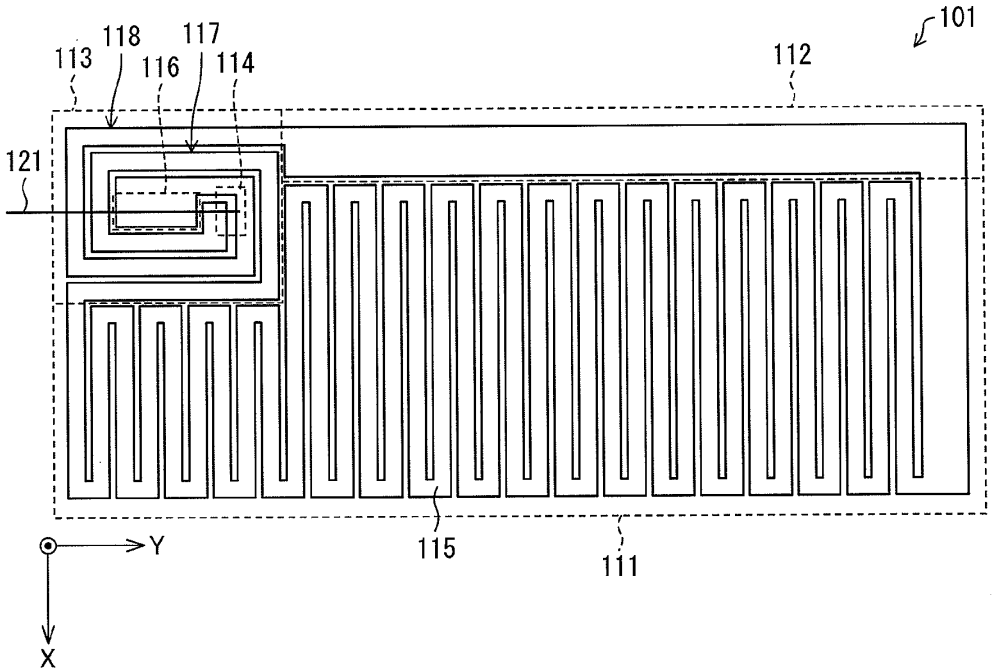
Publication Classification

(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 21/00 (2006.01)

(52) **U.S. Cl.** **343/713**; 343/741; 343/742

(57) **ABSTRACT**

An antenna element (**115**) of an antenna device has first and second root sections (**117**) and (**118**) and an intermediate section lying between the first and second root sections (**117**) and (**118**). A feed section (**114**) is provided in the first and second root sections (**117**) and (**118**). The first and second root sections (**117**) and (**118**) are arranged so as to surround the feed section (**114**), and are provided in a wind section (**113**). Tail end linear parts in the wind section (**113**) extend in respective opposite directions. At least one of the first and second root sections (**117**) and (**118**) has a wider width part, which is formed such that a portion that overlaps a feed line connected with the feed section (**114**) is larger in width than other portions. This makes it possible to realize high radiant gain and improve a VSWR characteristic for each radio wave.



US 20120268335A1

(19) **United States**

(12) **Patent Application Publication**

ZHANG et al.

(10) **Pub. No.: US 2012/0268335 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA AND METHOD OF MAKING SAME**

(75) Inventors: **XUE-LI ZHANG**, Shenzhen City (CN); **YONG YAN**, Shenzhen City (CN); **YONG-FA FAN**, Shenzhen City (CN); **ZHAO-YI WU**, Shenzhen City (CN); **QI-YUAN LI**, Shenzhen City (CN); **LI LIU**, Shenzhen City (CN)

(73) Assignees: **FIH (HONG KONG) LIMITED**, Kowloon (HK); **SHENZHEN FUTAIHONG PRECISION INDUSTRY CO., LTD.**, ShenZhen City (CN)

(21) Appl. No.: **13/277,462**

(22) Filed: **Oct. 20, 2011**

(30) **Foreign Application Priority Data**

Apr. 22, 2011 (CN) 201110101838.6

Publication Classification

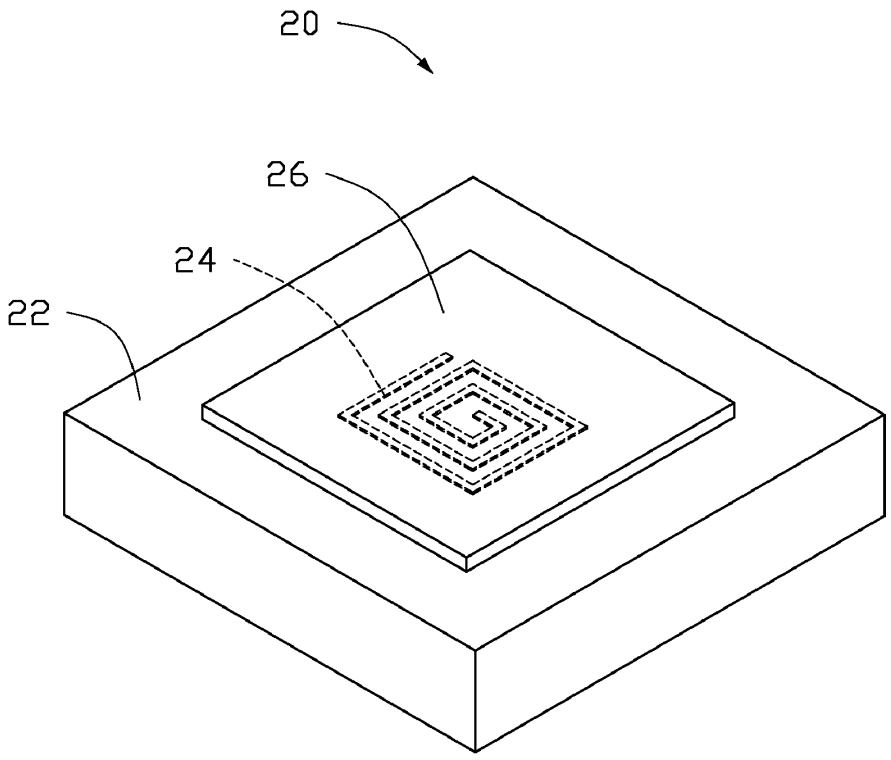
(51) **Int. Cl.**

H01Q 1/00	(2006.01)
C25D 5/02	(2006.01)
C25D 7/00	(2006.01)
C23C 14/14	(2006.01)

(52) **U.S. Cl.** **343/787**; 427/597; 205/122

(57) **ABSTRACT**

An antenna includes a base body, an antenna radiator and a ferrite core. The base body includes a laser direct structuring material. The antenna radiator is formed by selectively activating a portion of the base body with a laser and by plating the activated portion. The ferrite core is fixed to the antenna radiator.



US 20120268337A1

(19) **United States**

(12) **Patent Application Publication**

Platt

(10) **Pub. No.: US 2012/0268337 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **OPEN SLOT TRAP FOR A DIPOLE ANTENNA**

(75) Inventor: **John Jeremy Churchill Platt**, Grand Haven, MI (US)

(73) Assignee: **R.A. MILLER INDUSTRIES, INC.**, Grand Haven, MI (US)

(21) Appl. No.: **13/341,984**

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

Related U.S. Application Data

(60) Provisional application No. 61/477,647, filed on Apr. 21, 2011.

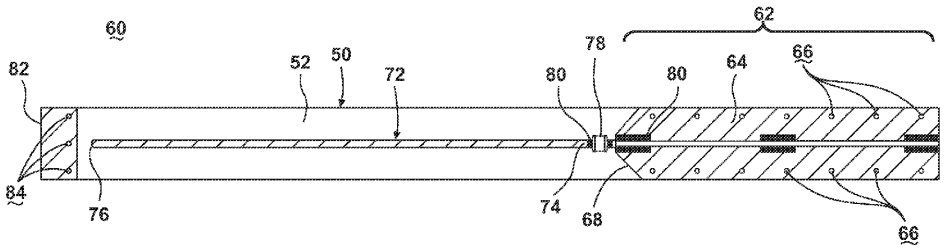
Publication Classification

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

(52) **U.S. Cl.** **343/795**

(57) **ABSTRACT**

A dipole antenna includes a circuit board with a first side and a second side, at least one dipole disposed on the circuit board comprising an upper half and a lower half, a microstrip transmission line disposed on the circuit board coupled to at least one of the upper half and lower half of the at least one dipole, and a choke element disposed on the circuit board. The choke element and the lower half of the at least one dipole form an open slot trap with a high impedance point.



US 20120268339A1

(19) **United States**

(12) **Patent Application Publication**

Qi et al.

(10) **Pub. No.: US 2012/0268339 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA WITH NEAR-FIELD RADIATION CONTROL**

(75) Inventors: **Yihong Qi**, Waterloo (CA); **Perry Jarmuszewski**, Waterloo (CA); **Adam D. Stevenson**, Waterloo (CA)

(73) Assignee: **RESEARCH IN MOTION LIMITED**, Waterloo (CA)

(21) Appl. No.: **13/529,531**

(22) Filed: **Jun. 21, 2012**

Related U.S. Application Data

(63) Continuation of application No. 13/358,126, filed on Jan. 25, 2012, now Pat. No. 8,223,078, which is a continuation of application No. 13/156,728, filed on Jun. 9, 2011, now Pat. No. 8,125,397, which is a continuation of application No. 12/474,075, filed on May 28, 2009, now Pat. No. 7,961,154, which is a continuation of application No. 11/774,383, filed on Jul. 6, 2007, now Pat. No. 7,541,991, which is a continuation of application No. 10/940,869, filed on Sep. 14, 2004, now Pat. No. 7,253,775, which is a continuation of application No. 10/317,659, filed on Dec. 12, 2002, now Pat. No. 6,791,500.

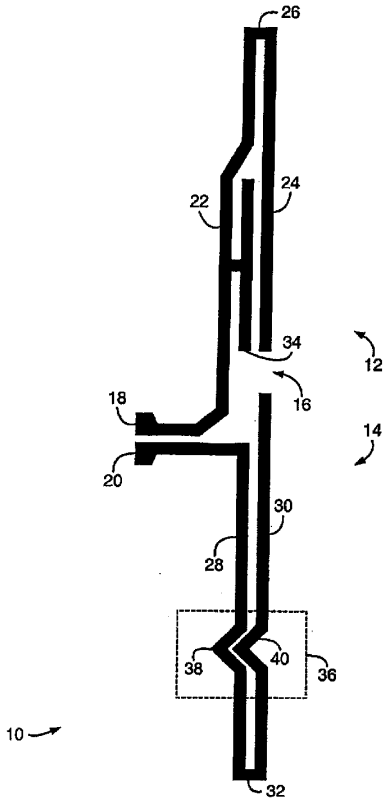
Publication Classification

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

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

(57) **ABSTRACT**

An antenna and a wireless mobile communication device incorporating the antenna are provided. The antenna includes a first conductor section electrically coupled to a first feeding point, a second conductor section electrically coupled to a second feeding point, and a near-field radiation control structure adapted to control characteristics of near-field radiation generated by the antenna. Near-field radiation control structures include a parasitic element positioned adjacent the first conductor section and configured to control characteristics of near-field radiation generated by the first conductor section, and a diffuser in the second conductor section configured to diffuse near-field radiation generated by the second conductor section into a plurality of directions.



US 20120268342A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0268342 A1

(43) Pub. Date: Oct. 25, 2012

SATHATH

(54) ELECTRONIC APPARATUS

(75) Inventor: **Anwar SATHATH**, Ome-shi (JP)

(73) Assignee: **KABUSHIKI KAISHA TOSHIBA**, Tokyo (JP)

(21) Appl. No.: **13/536,911**

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

Related U.S. Application Data

(63) Continuation of application No. 12/954,311, filed on Nov. 24, 2010.

(30) **Foreign Application Priority Data**

Nov. 26, 2009 (JP) 2009-269147

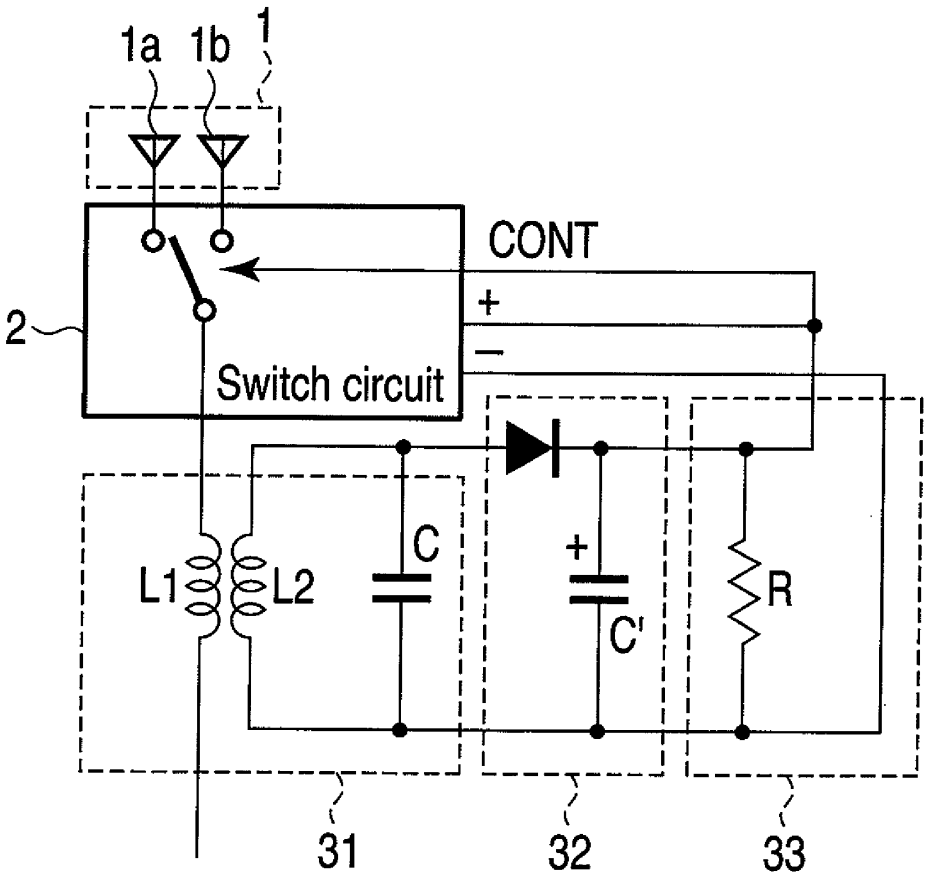
Publication Classification

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

(52) **U.S. Cl.** **343/861**

(57) **ABSTRACT**

According to one embodiment, an electronic apparatus includes an antenna, a switch circuit and a control circuit. The antenna is configured to have a first resonance frequency band and a second resonance frequency band. The switch circuit is connected between a feeder line and the antenna and configured to switch a resonance frequency band of the antenna from the first resonance frequency band to the second resonance frequency band in accordance with a control signal. The control circuit is configured to resonate with a transmission signal of the second resonance frequency band, which flows from a wireless communication module through the feeder line, and to generate the control signal by using energy which is obtained by the resonance with the transmission signal.



US 20120268343A1

(19) **United States**

(12) **Patent Application Publication**

Yanagi et al.

(10) **Pub. No.: US 2012/0268343 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA APPARATUS**

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

(73) Assignee: **FUJITSU COMPONENT LIMITED**, Tokyo (JP)

(21) Appl. No.: **13/444,915**

(22) Filed: **Apr. 12, 2012**

(30) **Foreign Application Priority Data**

Apr. 25, 2011 (JP) 2011-097608

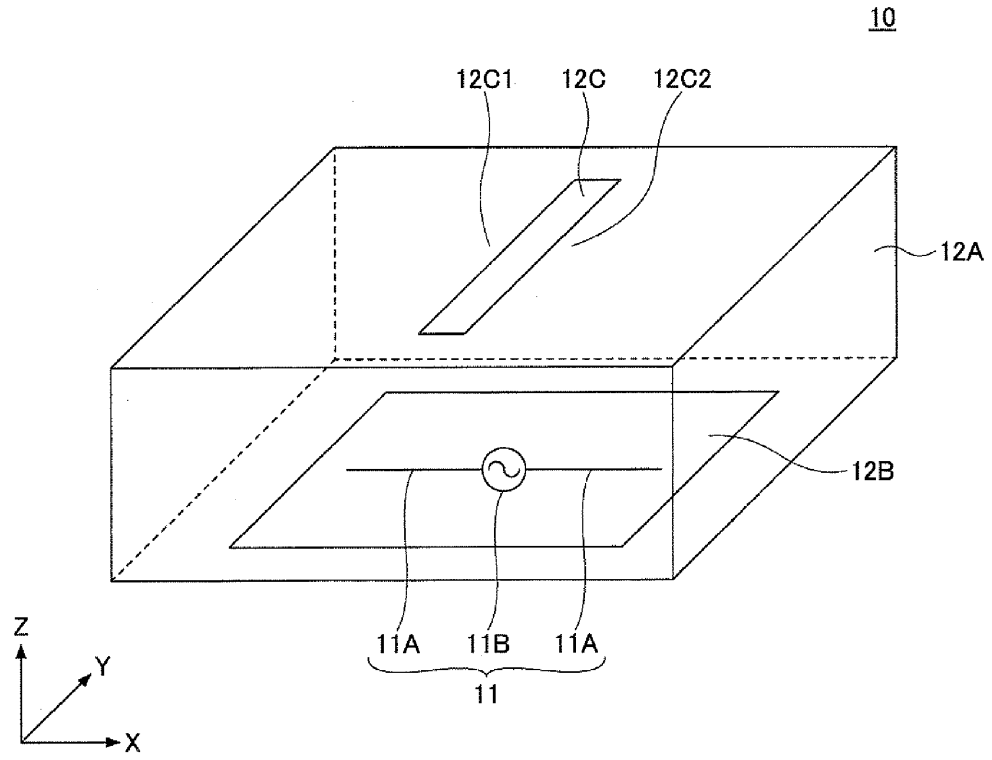
Publication Classification

(51) **Int. Cl.**
H01Q 1/42 (2006.01)

(52) **U.S. Cl.** **343/872**

(57) **ABSTRACT**

An antenna apparatus includes a housing made of a conductive material and having a slot formed in a first surface, and an antenna disposed in the housing. The longitudinal direction of the slot is oriented at a predetermined angle with respect to the longitudinal direction of the antenna.



US 20120268345A1

(19) **United States**

(12) **Patent Application Publication**

BUNGO

(10) **Pub. No.: US 2012/0268345 A1**

(43) **Pub. Date: Oct. 25, 2012**

(54) **ANTENNA APPARATUS**

(75) Inventor: **Akihiro BUNGO**, Tokyo (JP)

(73) Assignee: **SONY ERICSSON MOBILE COMMUNICATIONS JAPAN, INC.**, Tokyo (JP)

(21) Appl. No.: **13/358,059**

(22) Filed: **Jan. 25, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/478,288, filed on Apr. 22, 2011.

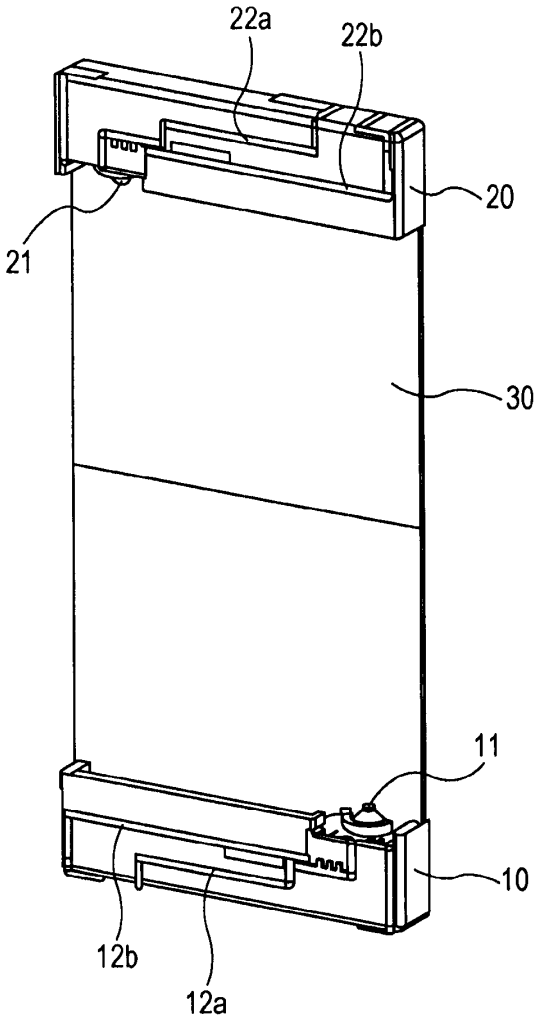
Publication Classification

(51) **Int. Cl.**
H01Q 21/00 (2006.01)

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

(57) **ABSTRACT**

An antenna apparatus that includes a first antenna having a first feed point, a second antenna having a second feed point, and a first non-feed element grounded at a first ground point disposed at a first predetermined distance from the first feed point and the second feed point.



US 20120268347A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0268347 A1

(43) Pub. Date: Oct. 25, 2012

Tatarnikov et al.

(54) **COMPACT DUAL-FREQUENCY PATCH ANTENNA**

(75) Inventors: **Dmitry Tatarnikov**, Moscow (RU); **Anton Stepanenko**, Dedovsk (RU); **Andrey Astakhov**, Moscow (RU)

(73) Assignee: **TOPCON POSITIONING SYSTEMS, INC.**, Livermore, CA (US)

(21) Appl. No.: **13/448,450**

(22) Filed: **Apr. 17, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/478,632, filed on Apr. 25, 2011.

Publication Classification

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

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

(57) **ABSTRACT**

A dual-frequency patch antenna includes a ground plane, an inside radiator, and an outside radiator. The inside radiator is configured as a region with a periphery, along which is a series of first protrusions separated by first grooves. The outside radiator is configured as a ring with an outer periphery and an inner periphery, along which is a series of second protrusions separated by second grooves. A set of conducting elements electrically connect the series of second protrusions with the ground plane. The inside radiator and the outside radiator can be fabricated on a dielectric substrate separated from the ground plane by a dielectric solid or air. The inside radiator and the outside radiator can be disposed on the same surface or on different surfaces of the dielectric substrate, with specific geometries of the first protrusions and first grooves relative to the second protrusions and second grooves.

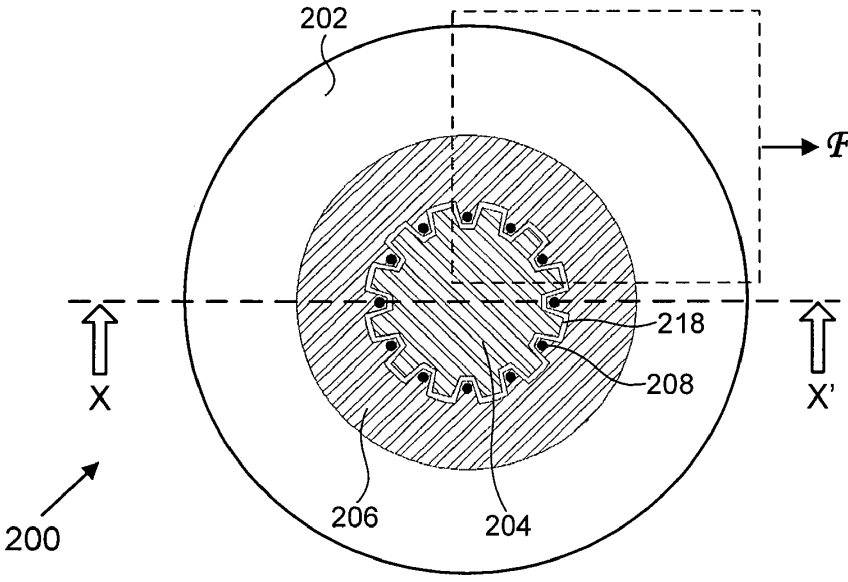


FIG. 2C

VIEW A

US 20120274517A1

(19) **United States**

(12) **Patent Application Publication**

NAGOSHI et al.

(10) **Pub. No.: US 2012/0274517 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **ANTENNA APPARATUS RESONATING IN FREQUENCY BANDS IN INVERTED F ANTENNA APPARATUS**

(76) Inventors: **Masahiko NAGOSHI**, Osaka (JP); **Wataru Noguchi**, Hyogo (JP); **Hiroyuki Yurugi**, Osaka (JP)

(21) Appl. No.: **13/545,340**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2011/007104, filed on Dec. 20, 2011.

(30) **Foreign Application Priority Data**

Dec. 24, 2010 (JP) 2010-287079

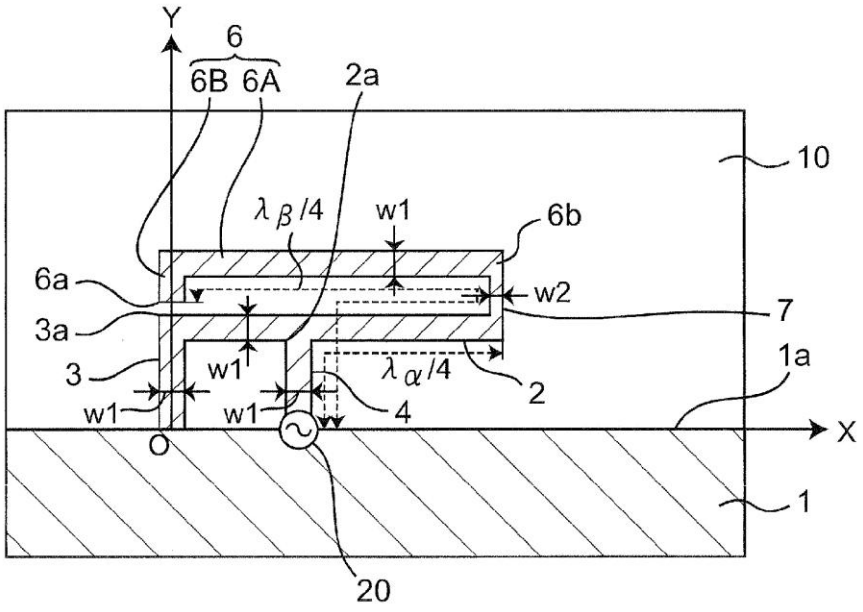
Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

In an inverted F pattern antenna apparatus having a first antenna element and an electrical length of a quarter wavelength of a first resonance frequency, the inverted F pattern antenna apparatus having two resonance frequencies is configured to include a third antenna element and a second antenna element at an end portion of the first antenna element, and setting a length having an electrical length obtained by adding the electrical length of a further provided antenna element to the electrical length of the inverted F pattern antenna apparatus to the electrical length of a quarter wavelength of a second resonance frequency to achieve resonance at the second resonance frequency. In addition, a loop antenna is configured to include the first, third and second antenna elements and the grounding antenna element by capacitively coupling another end of the third antenna element to the grounding antenna element.



US 20120274522A1

(19) **United States**

(12) **Patent Application Publication**

Ayatollahi

(10) **Pub. No.: US 2012/0274522 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **MULTIPLE ANTENNA ASSEMBLY UTILIZING ELECTRO BAND GAP ISOLATION STRUCTURES**

(76) Inventor: **Mina Ayatollahi**, Waterloo (CA)

(21) Appl. No.: **13/095,256**

(22) Filed: **Apr. 27, 2011**

Publication Classification

(51) **Int. Cl.**

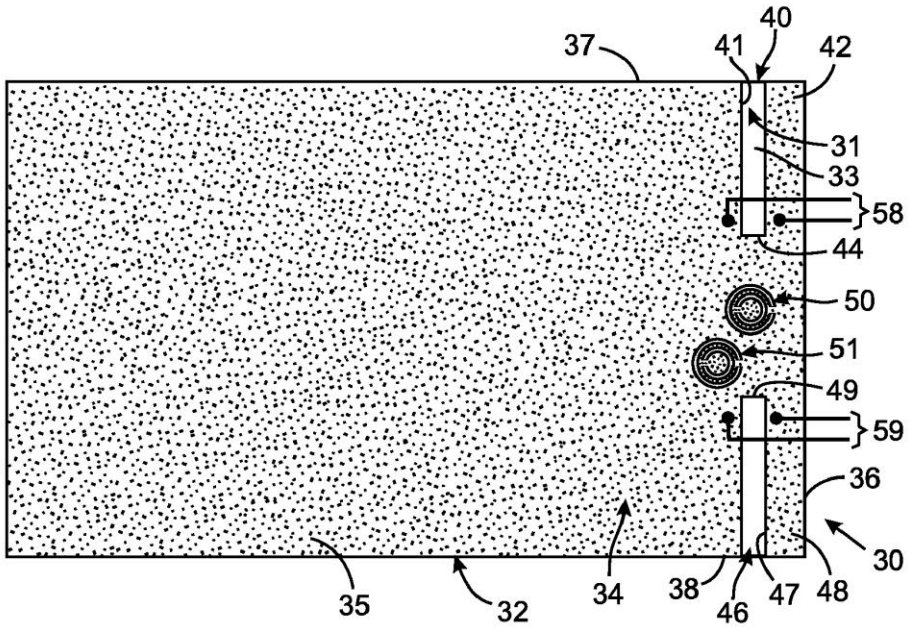
H01Q 19/10 (2006.01)

H01Q 21/28 (2006.01)

(52) **U.S. Cl.** **343/745**; 343/836

(57) **ABSTRACT**

A multiple antenna assembly with high isolation between the antennas is disclosed. The assembly includes a dielectric substrate with a ground plane and first and second antennas thereon. One or more metal-dielectric isolation structures are on the substrate at locations at which an electric current is present that has a current density greater than a predefined threshold. Each metal-dielectric isolation structure resonates at a given frequency that inhibits mutual signal coupling between the first and second antennas. Various configurations, such as concentric ring patterns, for the metal-dielectric isolation structures are disclosed. A device can be provided to dynamically tune the given frequency of the metal-dielectric isolation structures to correspond to radio frequency signals emitted by the first and second antennas.



US 20120274526A1

(19) **United States**

(12) **Patent Application Publication**

Koriyama

(10) **Pub. No.: US 2012/0274526 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **LINE CONVERSION STRUCTURE AND ANTENNA USING THE SAME**

(75) Inventor: **Shinichi Koriyama**, Kirishima-shi (JP)

(73) Assignee: **KYOCERA CORPORATION**, Kyoto-shi, Kyoto (JP)

(21) Appl. No.: **13/318,334**

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

(86) PCT No.: **PCT/JP2010/072720**

§ 371 (c)(1),
(2), (4) Date: **Nov. 30, 2011**

(30) **Foreign Application Priority Data**

Dec. 22, 2009 (JP) 2009-289990
Jan. 25, 2010 (JP) 2010-013207
Jun. 29, 2010 (JP) 2010-148374

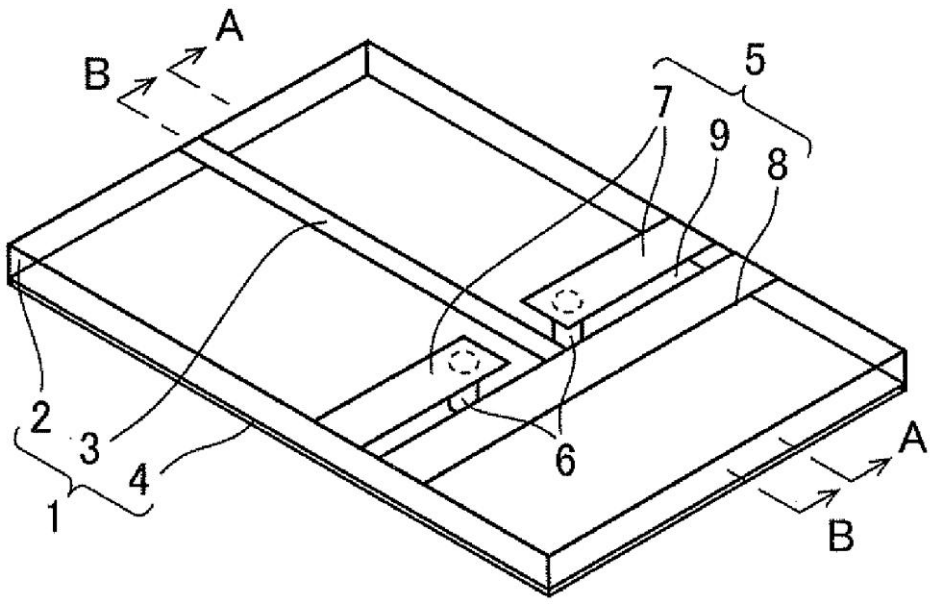
Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01P 5/08 (2006.01)

(52) **U.S. Cl.** ..... **343/767**; 333/24 R

(57) **ABSTRACT**

In a line conversion structure, a slot line includes a slot ground conductor connected to a ground layer with a through conductor that passes through the dielectric layer, a slot signal conductor, and a slot disposed between the slot ground conductor and the slot signal conductor. A signal conductor of a microstrip line is orthogonal to the slot ground conductor and the slot, with a gap between the signal conductor and the slot ground conductor, and an end of the signal conductor is connected to the slot signal conductor, and a length L of a portion of the slot ground conductor, the portion being parallel to the signal conductor with the gap, is less than or equal to 0.25 times a wavelength of a signal transmitted through the microstrip line.



US 20120274527A1

(19) **United States**

(12) **Patent Application Publication**

Ayatollahi

(10) **Pub. No.: US 2012/0274527 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **ANTENNA ASSEMBLY UTILIZING METAL-DIELECTRIC STRUCTURES**

(76) Inventor: **Mina Ayatollahi**, Waterloo (CA)

(21) Appl. No.: **13/095,338**

(22) Filed: **Apr. 27, 2011**

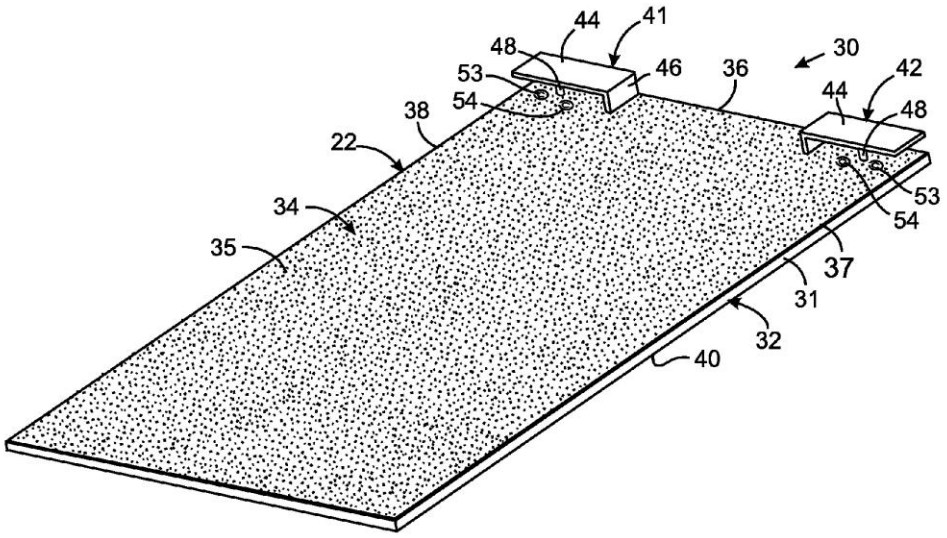
Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/48 (2006.01)

(52) **U.S. Cl.** **343/770**; 343/848

(57) **ABSTRACT**

An antenna assembly for a wireless communication device includes a substrate of dielectric material that has opposing first and second surfaces. A ground plane formed by a layer of electrically conductive material on the first surface. An antenna with a physical length is disposed on the substrate. At least one metal-dielectric structure is disposed on the substrate. The metal-dielectric structures resonate so as to interact with the antenna and thereby alter the effective electrical length of the antenna. That interaction causes the antenna to function as though it had a greater physical length. In one embodiment, that interaction enables an antenna, that is shorter than one-fourth the wavelength of a radio frequency signal applied thereto, to function as through the physical length of the antenna was one-fourth that wavelength.



US 20120274532A1

(19) **United States**

(12) **Patent Application Publication**

Kurashima et al.

(10) **Pub. No.: US 2012/0274532 A1**

(43) **Pub. Date: Nov. 1, 2012**

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

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

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

(21) Appl. No.: **13/429,683**

(22) Filed: **Mar. 26, 2012**

(30) **Foreign Application Priority Data**

Apr. 27, 2011 (JP) 2011-099919

Publication Classification

(51) **Int. Cl.**

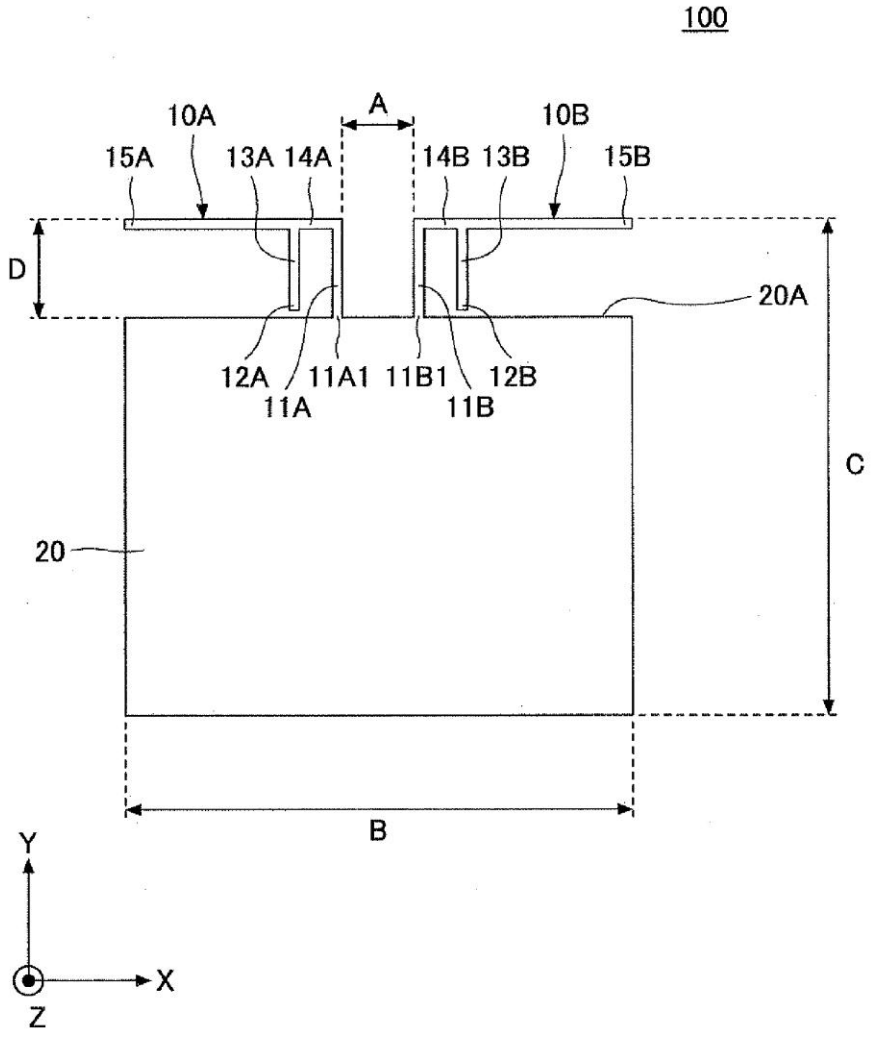
H01Q 1/48 (2006.01)

H01Q 19/02 (2006.01)

(52) **U.S. Cl.** **343/833**; 343/848

(57) **ABSTRACT**

A disclosed antenna device includes a ground part, a first stub connected to the ground part, a first inverted-F antenna element including a first power feeder, a second stub connected to the ground part, and a second inverted-F antenna element including a second power feeder, wherein the ground part has a linear part between a first connecting part between the first stub part and the ground part and a second connecting part between the second stub part and the ground part.



US 20120274534A1

(19) **United States**

(12) **Patent Application Publication**

PAN et al.

(10) **Pub. No.: US 2012/0274534 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **DUAL-BAND ANTENNA AND RELATED WIRELESS COMMUNICATION APPARATUS**

(76) Inventors: **Bo PAN**, Irvine, CA (US); **Ching-Wei LING**, Tainan County (TW)

(21) Appl. No.: **13/096,436**

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

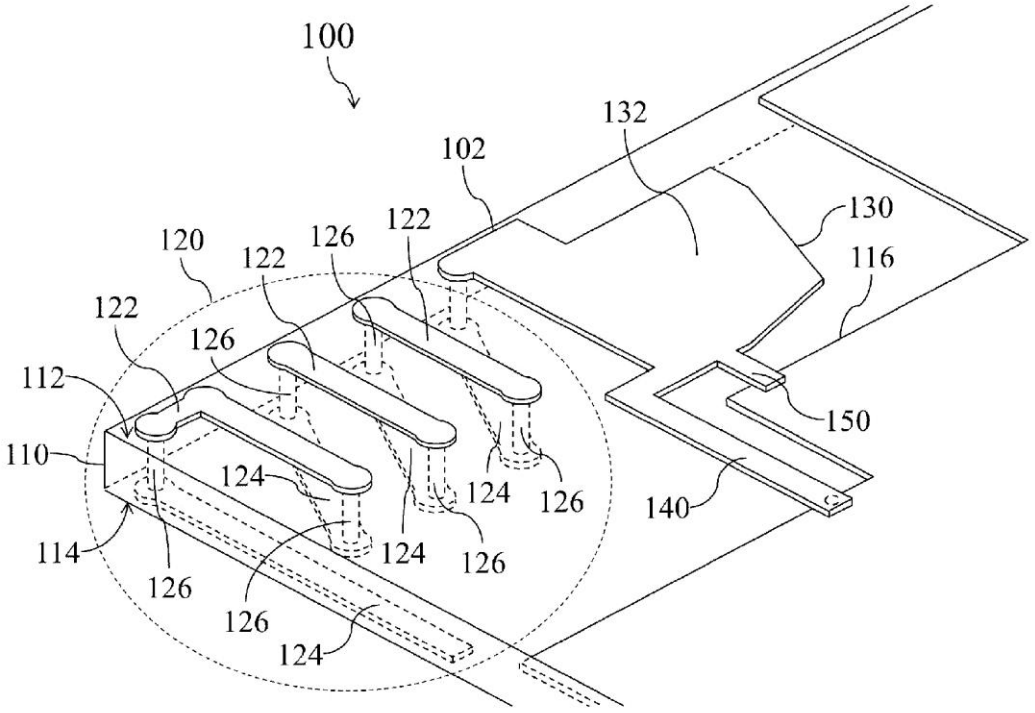
Publication Classification

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

(52) **U.S. Cl.** **343/843**; 343/893

(57) **ABSTRACT**

A dual-band antenna is disclosed including: a first antenna comprising: a first radiating portion including a plurality of separated radiating strips positioned on a first plane of a circuit board; a second radiating portion including a plurality of separated radiating strips positioned on a second plane of the circuit board; and a plurality of vias for coupling the plurality of radiating strips on the first plane with the plurality of radiating strips on the second plane to form a spiral radiating body; a second antenna having a radiating plane coupled with the first radiating portion or the second radiating portion; a shorting element coupled with the radiating plane and shared by the first and second antennas; and a feeding element coupled with the radiating plane and shared by the first and second antennas; wherein the width of part of the radiating plane gradually increases along a direction.



US 20120274536A1

(19) **United States**

(12) **Patent Application Publication**

PAN

(10) **Pub. No.: US 2012/0274536 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **MULTIPLE-INPUT MULTIPLE-OUTPUT ANTENNA**

(75) Inventor: **CHUN-JUI PAN**, Tu-Cheng (TW)

(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW)

(21) Appl. No.: **13/457,410**

(22) Filed: **Apr. 26, 2012**

(30) **Foreign Application Priority Data**

Apr. 27, 2011 (CN) 201110107390.9

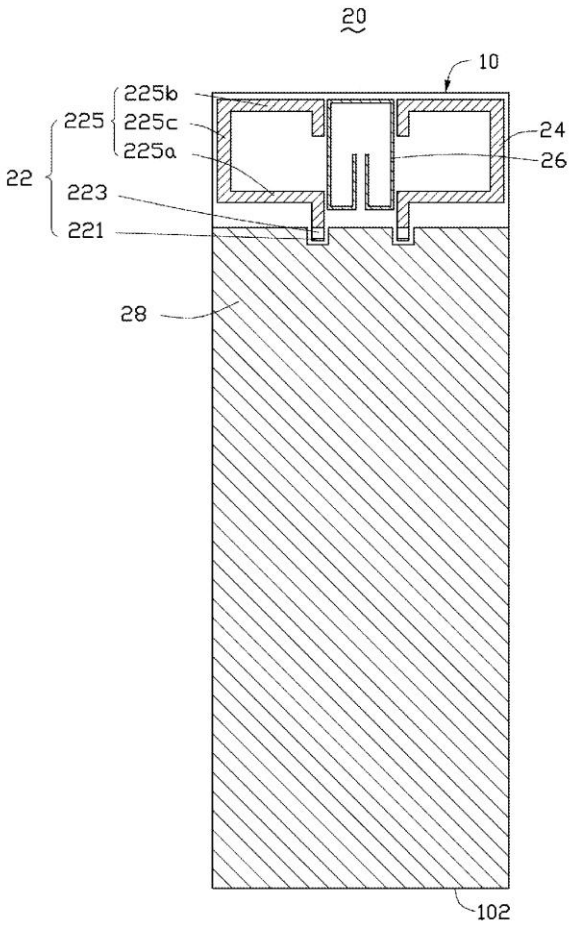
Publication Classification

(51) **Int. Cl.**
H01Q 21/00 (2006.01)

(52) **U.S. Cl.** **343/853**

(57) **ABSTRACT**

A Multiple-Input Multiple-Output (MIMO) antenna on a substrate includes first and second antennas defined in axial symmetry, a coupling portion, and a grounding portion. The substrate includes a first surface and an opposite second surface. Each of the antennas includes a feeding portion, a radiating portion, and a matching portion. The feeding portion feeds electromagnetic signals to the antenna. The radiating portion radiates the electromagnetic signals, and is in a meandering "S" pattern. A length of the radiating portion is substantially equal to a quarter wavelength of the electromagnetic signals. The matching portion implements impedance matching between the feeding portion and the radiating portion. The coupling portion is located between the first antenna and the second antenna and is serpentine shape. A length of the coupling portion is substantially equal to a half wavelength of the electromagnetic signals. The grounding portion is located on both the first and second surface.



US 20120274537A1

(19) **United States**

(12) **Patent Application Publication**

Kitchener et al.

(10) **Pub. No.: US 2012/0274537 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **LOW-PROFILE WIDE-BANDWIDTH RADIO FREQUENCY ANTENNA**

(75) Inventors: **Dean Kitchener**, Brentwood (GB); **Andrew Urquhart**, Hertfordshire (GB)

(73) Assignee: **Rockstar BIDCO LP**, New York, NY (US)

(21) Appl. No.: **13/229,870**

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

Related U.S. Application Data

(63) Continuation of application No. 12/415,604, filed on Mar. 31, 2009, now Pat. No. 8,040,289.

(60) Provisional application No. 61/050,028, filed on May 2, 2008.

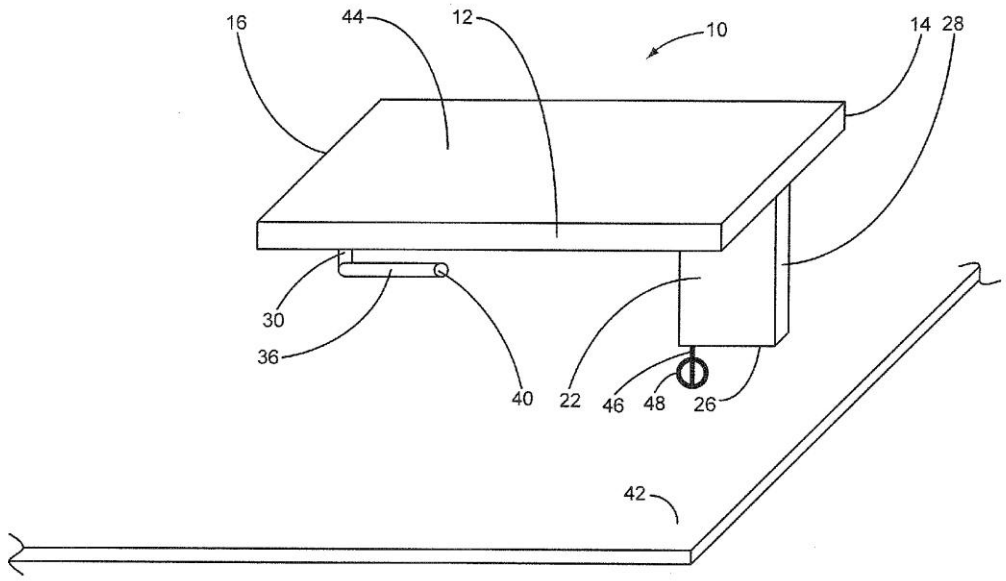
Publication Classification

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

(52) **U.S. Cl.** **343/860**

(57) **ABSTRACT**

The present invention relates to an RF antenna structure that includes a planar structure and a loading plate, such that the planar structure is mounted between a ground plane and the loading plate to form an RF antenna. The loading plate may be about parallel to the ground plane and the planar structure may be about perpendicular to the loading plate and the ground plane. The loading plate may allow the height of the RF antenna structure above the ground plane to be relatively small. For example, the height may be significantly less than one-quarter of a wavelength of RF signals of interest. The planar structure may include two conductive matching elements to help increase the bandwidth of the RF antenna structure.



US 20120274538A1

(19) **United States**

(12) **Patent Application Publication**

TSOU et al.

(10) **Pub. No.: US 2012/0274538 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **MULTIBAND ANTENNA AND WIRELESS COMMUNICATION DEVICE EMPLOYING THE SAME**

(75) Inventors: **TUN-YUAN TSOU**, Tu-Cheng (TW); **YI-CHIEH LEE**, Tu-Cheng (TW)

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

(21) Appl. No.: **13/188,053**

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

(30) **Foreign Application Priority Data**

Apr. 27, 2011 (TW) 100114621

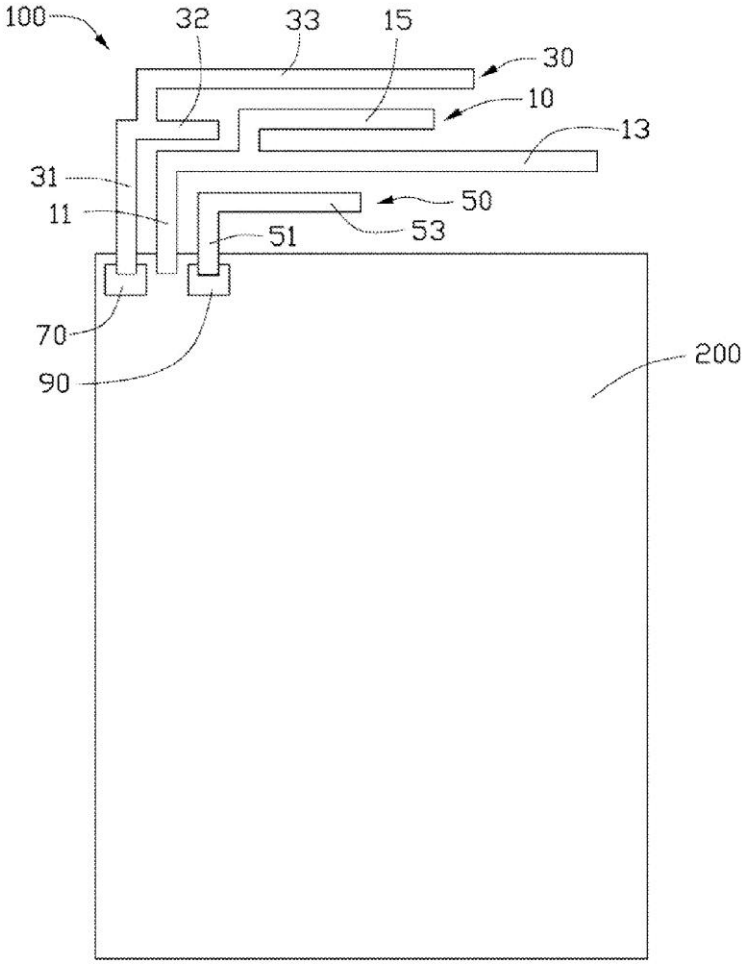
Publication Classification

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

(52) **U.S. Cl.** **343/876**

(57) **ABSTRACT**

A multiband antenna in a wireless communication device includes a main antenna, a first parasitic portion, a second parasitic portion, a first switch, and a second switch, the first switch is used to control functioning of the first parasitic portion. The second switch is used to control functioning of the second parasitic portion. Therefore, the main antenna can resonate alone or in combination with the functioning first parasitic portion and/or the functioning second parasitic portion, the multiband antenna has different operating frequency bands and different operating SAR.



US 20120276856A1

(19) **United States**

(12) **Patent Application Publication**

JOSHI et al.

(10) **Pub. No.: US 2012/0276856 A1**

(43) **Pub. Date: Nov. 1, 2012**

(54) **IMPLANTABLE MEDICAL DEVICE ANTENNA**

(75) Inventors: **HIMANSHU JOSHI**, Houston, TX (US); **Eric Y. Chow**, Houston, TX (US); **Clint Warren**, Dickinson, TX (US)

(73) Assignee: **CYBERONICS, INC.**, Houston, TX (US)

(21) Appl. No.: **13/328,241**

(22) Filed: **Dec. 16, 2011**

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/098,279, filed on Apr. 29, 2011.

Publication Classification

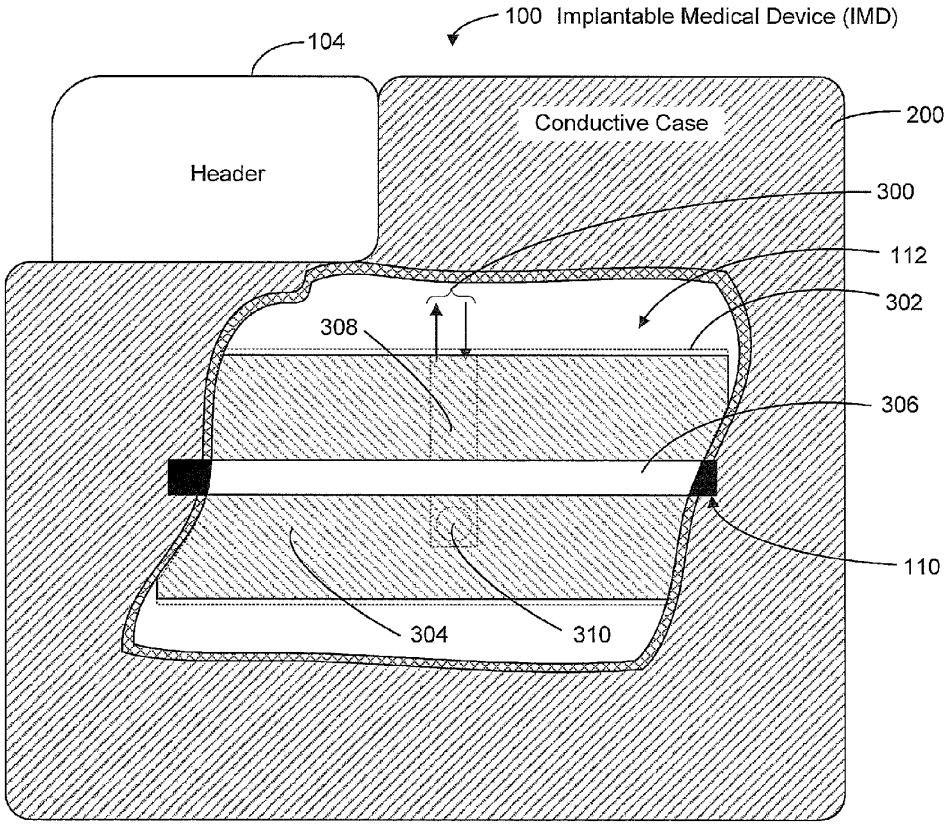
(51) **Int. Cl.**

H04B 1/38	(2006.01)
H04B 1/06	(2006.01)
H01Q 1/42	(2006.01)
A61N 1/36	(2006.01)
H01P 11/00	(2006.01)

(52) **U.S. Cl.** **455/73**; 607/60; 29/601; 343/789; 455/130

(57) **ABSTRACT**

An implantable medical device includes a case having a conductive housing defining an opening. A dielectric material is coupled to the conductive housing to hermetically seal the opening. An antenna is within the case under the dielectric material. A header block is coupled to the case over the dielectric material.



US 20120276861A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0276861 A1

(43) Pub. Date: Nov. 1, 2012

ISOBE et al.

(54) **INFORMATION PROCESSING APPARATUS AND RADIO WAVE INTENSITY CONTROL METHOD**

(75) Inventors: **Yasuhiko ISOBE**, Inagi (JP); **Michihiro Konishi**, Sagamihara (JP)

(73) Assignee: **FUJITSU LIMITED**, Kawasaki-shi (JP)

(21) Appl. No.: **13/447,422**

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

(30) **Foreign Application Priority Data**

Apr. 28, 2011 (JP) 2011-100395

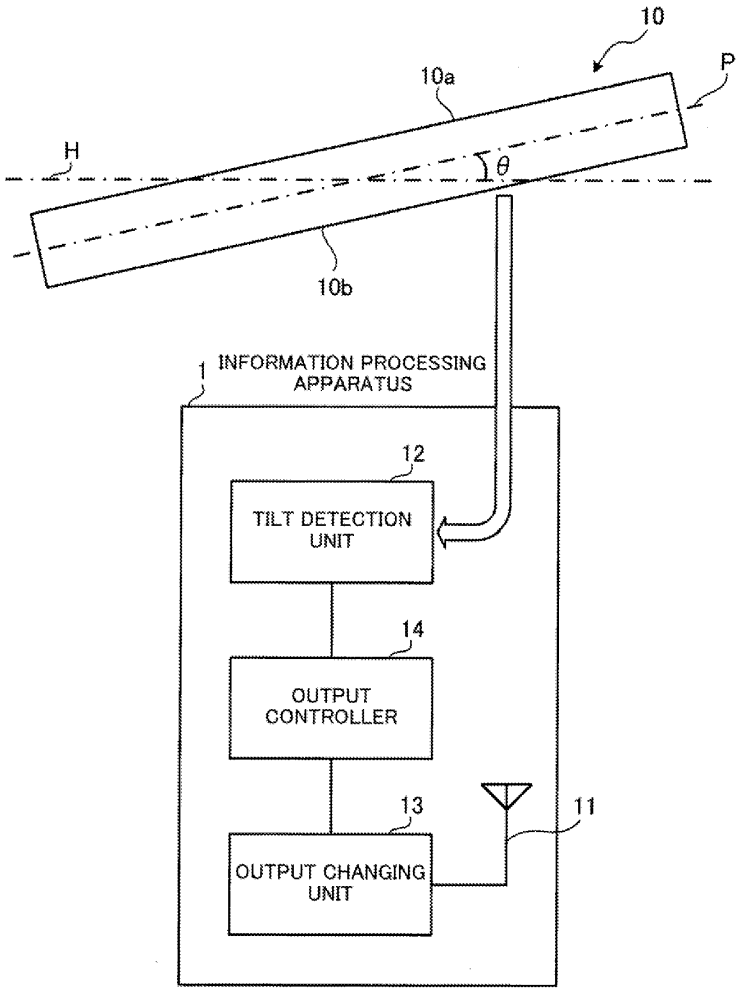
Publication Classification

(51) **Int. Cl.**
H04B 1/04 (2006.01)

(52) **U.S. Cl.** **455/127.1**

(57) **ABSTRACT**

An information processing apparatus has radio communication function. A tilt detection unit detects a tilt of the information processing apparatus. An output changing unit changes an output of radio waves from an antenna for radio communication. Based on a detection result through the tilt detection unit, when a tilt θ of a predetermined external surface of a chassis of the information processing apparatus to a horizontal surface H is a predetermined angle or less, an output controller reduces an output of radio waves from the antenna to a predetermined value or less with respect to the output changing unit.



US 20120277738A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0277738 A1

(43) Pub. Date: Nov. 1, 2012

ROSSETTO et al.

(54) **LEAKY-WAVE ANTENNAS FOR MEDICAL APPLICATIONS**

(75) Inventors: **FRANCESCA ROSSETTO**, LONGMONT, CO (US); **JOSEPH D. BRANNAN**, ERIE, CO (US); **JOSEPH A. PAULUS**, LOUISVILLE, CO (US); **CHRISTOPHER A. DEBORSKI**, DENVER, CO (US)

(73) Assignee: **Vivant Medical, Inc.**, Boulder, CO (US)

(21) Appl. No.: **13/483,858**

(22) Filed: **May 30, 2012**

Related U.S. Application Data

(63) Continuation of application No. 12/389,906, filed on Feb. 20, 2009, now Pat. No. 8,197,473.

Publication Classification

(51) **Int. Cl.**

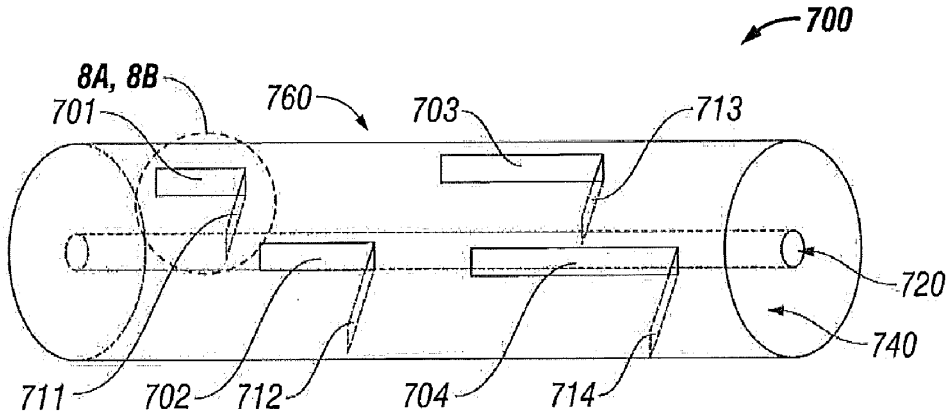
A61B 18/12 (2006.01)

A61B 18/18 (2006.01)

(52) **U.S. Cl.** **606/33**; 606/41

(57) **ABSTRACT**

A device for directing energy to a target volume of tissue includes an inner conductor having a length and an outer conductor coaxially surrounding the inner conductor along the length. The outer conductor has a proximal portion and a distal portion. The distal portion of the outer conductor is provided with a number of apertures N defined therein for radiating energy, where N is an integer greater than 1, each aperture having a size and extending at an angle relative to a longitudinal axis of the outer conductor. At least one of the size and the angle of each aperture is varied in relation to the other apertures N−1 such that the energy radiated along the distal portion is substantially uniform.



US 20120280867A1

(19) **United States**

(12) **Patent Application Publication**

Baek et al.

(10) **Pub. No.: US 2012/0280867 A1**

(43) **Pub. Date: Nov. 8, 2012**

(54) **INTERNAL ANTENNA MODULE**

(75) Inventors: **Hyungil Baek**, Seoul (KR); **Eulyoung Jung**, Incheon (KR); **Jinwon Noh**, Incheon (KR); **Sunghyun Kim**, Gwacheon-si (KR); **Miyeon Cho**, Incheon (KR)

(73) Assignee: **AMOTECH CO., LTD**, Incheon (KR)

(21) Appl. No.: **13/262,233**

(22) PCT Filed: **Mar. 31, 2010**

(86) PCT No.: **PCT/KR2010/001979**

§ 371 (c)(1),
(2), (4) Date: **Sep. 30, 2011**

(30) **Foreign Application Priority Data**

Apr. 2, 2009 (KR) 10-2009-0028341
Apr. 8, 2009 (KR) 10-2009-0030229

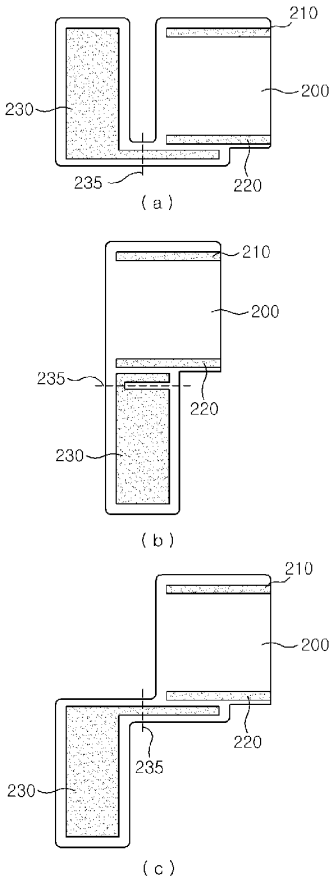
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed herein is an internal antenna module that is installed in a terminal and that can receive signals in both the FM and Bluetooth frequency bands so as to achieve a small-sized, slim terminal. The internal antenna module includes a polyhedral chip antenna configured to have a first radiant pattern and a coupling pattern formed thereon, a flexible circuit board configured to have a first conductive pad connected to the first radiant pattern, a second conductive pad connected to a coupling pattern, and a second radiant pattern connected to the first radiant pattern, and a signal switching unit formed between the second conductive pad and a ground, and configured to prevent any one of a first frequency band signal and a second frequency band signal, received through the chip antenna and the flexible circuit board, from reaching the ground.



US 20120280868A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0280868 A1

(43) Pub. Date: Nov. 8, 2012

YANG et al.

(54) **MOBILE WIRELESS COMMUNICATIONS DEVICE HAVING ANTENNA ASSEMBLY WITH ELECTRICALLY CONDUCTIVE BASE ENCLOSING AN ELONGATE SLOT AND ASSOCIATED METHODS**

(75) Inventors: **Shing Lung Steven YANG**, San Diego, CA (US); **Firass Mirza Badaruzzaman**, Forest Park, IL (US); **David Kazmierz Szczypinski**, Elgin, IL (US)

(73) Assignee: **RESEARCH IN MOTION LIMITED**, WATERLOO (CA)

(21) Appl. No.: **13/439,924**

(22) Filed: **Apr. 5, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/472,289, filed on Apr. 6, 2011.

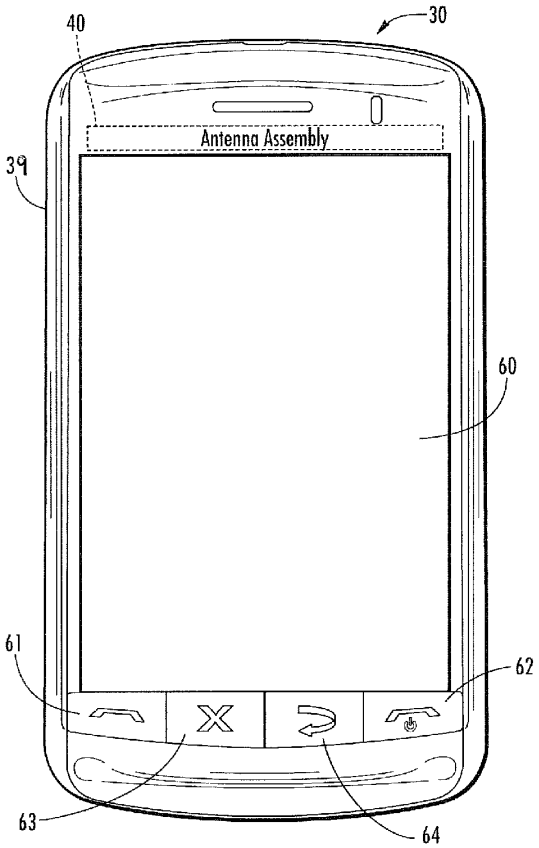
Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01P 11/00 (2006.01)

(52) **U.S. Cl.** **343/702**; 29/600

(57) **ABSTRACT**

A mobile wireless communications device may include a housing carrying a circuit board and wireless communications circuitry. An antenna assembly is carried by the housing and coupled to the wireless communications circuitry. The antenna assembly may include an electrically conductive base having a rectangular shape with opposing first and second ends and opposing first and second sides extending between the first and second ends. The electrically conductive base may have an elongate slot therein extending within a medial portion thereof and contained within the opposing first and second ends and the opposing first and second sides. The antenna assembly also may include an electrically conductive feed arm extending outwardly from the first side of the electrically conductive base adjacent the first end thereof. The electrically conductive feed arm may have a distal end with an antenna feed defined thereon.



US 20120280871A1

(19) **United States**

(12) **Patent Application Publication**

Shamblin et al.

(10) **Pub. No.: US 2012/0280871 A1**

(43) **Pub. Date: Nov. 8, 2012**

(54) **ANTENNA WITH ACTIVE ELEMENTS**

(75) Inventors: **Jeff Shamblin**, San Marcos, CA (US); **Chulmin Han**, San Diego, CA (US); **Rowland Jones**, Carlsbad, CA (US); **Sebastian Rowson**, San Diego, CA (US); **Laurent Desclos**, San Diego, CA (US)

(73) Assignee: **ETHERTRONICS, INC.**, San Diego, CA (US)

(21) Appl. No.: **13/289,901**

(22) Filed: **Nov. 4, 2011**

Related U.S. Application Data

(63) Continuation of application No. 12/894,052, filed on Sep. 29, 2010, now Pat. No. 8,077,116, Continuation of application No. 11/841,207, filed on Aug. 20, 2007, now Pat. No. 7,830,320.

Publication Classification

(51) **Int. Cl.**

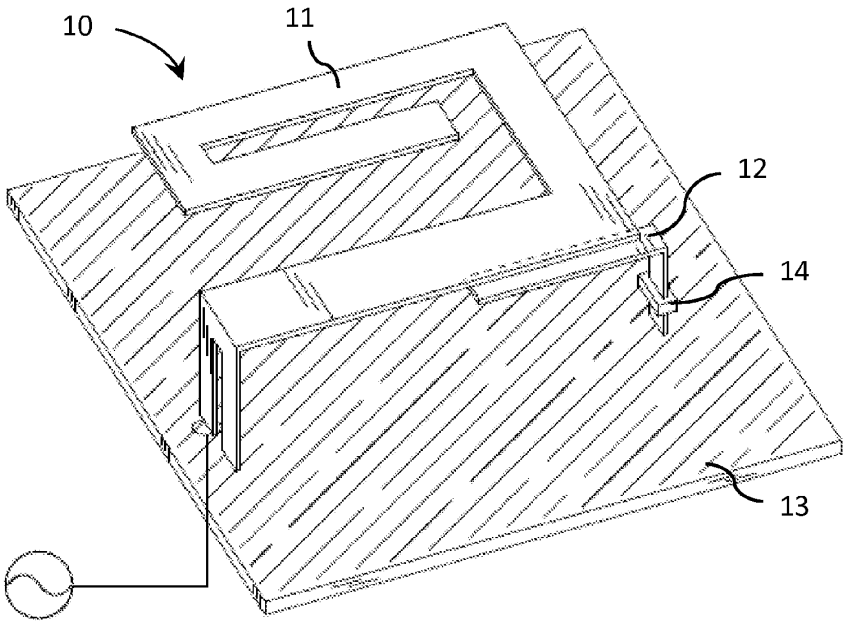
H01Q 9/04 (2006.01)

H01Q 9/16 (2006.01)

(52) **U.S. Cl.** **343/747**; 343/745

(57) **ABSTRACT**

A multi-frequency antenna comprising an IMD element, one or more active tuning elements and one or more parasitic elements. The IMD element is used in combination with the active tuning and parasitic elements for enabling a variable frequency at which the antenna operates, wherein, when excited, the parasitic elements may couple with the IMD element to change an operating characteristic of the IMD element.



US 20120280876A1

(19) **United States**

(12) **Patent Application Publication**

Qu

(10) **Pub. No.: US 2012/0280876 A1**

(43) **Pub. Date: Nov. 8, 2012**

(54) **WIRELESS EQUIPMENT**

(75) Inventor: **Lanying Qu**, Shenzhen (CN)

(73) Assignee: **ZTE CORPORATION**, Shenzhen, Guangdong (CN)

(21) Appl. No.: **13/520,358**

(22) PCT Filed: **Jul. 23, 2010**

(86) PCT No.: **PCT/CN10/75440**

§ 371 (c)(1),
(2), (4) Date: **Jul. 3, 2012**

(30) **Foreign Application Priority Data**

Mar. 23, 2010 (CN) 201010134226.2

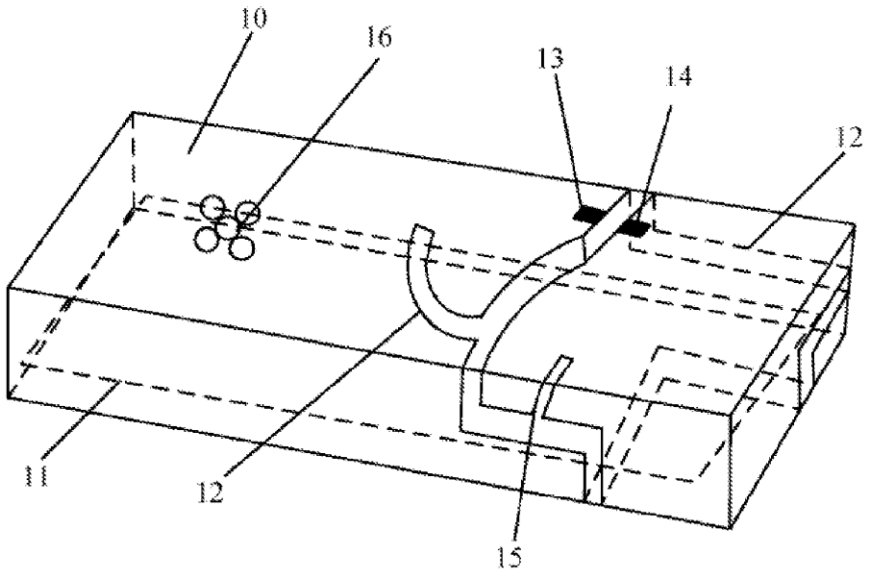
Publication Classification

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

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

(57) **ABSTRACT**

The disclosure discloses a wireless device, includes a shell and a signal circuit board, wherein one or more loop-closed slot antennae are arranged on the shell; the slot antenna is provided with a feeding point and a grounding point; the feeding point and the grounding point are respectively connected with two ends of an slot antenna; and the feeding point is connected with the signal circuit board polarly. In the wireless device provided by the disclosure, one or more loop-closed slot antennae are arranged on the shell, and receiving and transmitting effects are achieved directly by utilizing a conductor slot on the shell, so that antenna in the shell can be saved; therefore, the space on a Printed Circuit Board (PCB) is saved and the wireless device is miniaturized.



US 20120280877A1

(19) **United States**

(12) **Patent Application Publication**

Chirila

(10) **Pub. No.: US 2012/0280877 A1**

(43) **Pub. Date: Nov. 8, 2012**

(54) **ANTENNA HAVING AN EMBEDDED RADIO DEVICE**

(75) Inventor: **Laurian Petru Chirila**, Irvine, CA (US)

(73) Assignee: **PSION INC.**, Mississauga, ON (CA)

(21) Appl. No.: **13/520,737**

(22) PCT Filed: **Jan. 6, 2011**

(86) PCT No.: **PCT/US11/20381**

§ 371 (c)(1),
(2), (4) Date: **Jul. 5, 2012**

(30) **Foreign Application Priority Data**

Jan. 6, 2010 (US) 12/683294

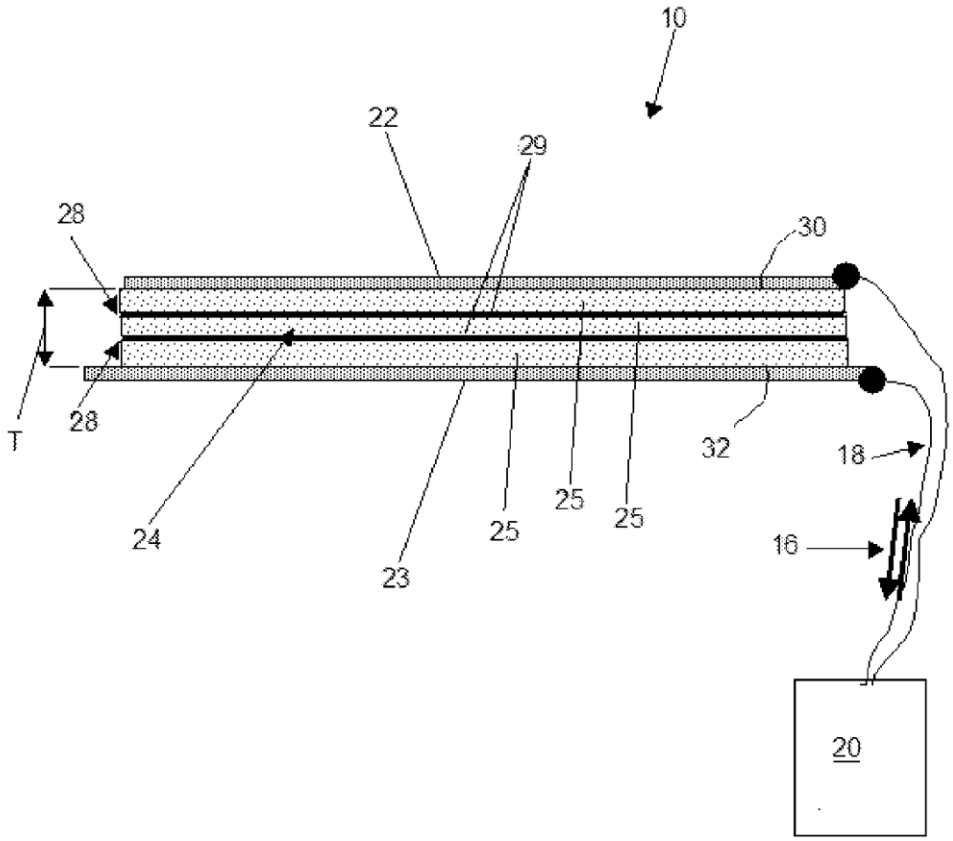
Publication Classification

(51) **Int. Cl.**
H01Q 1/52 (2006.01)
H01Q 1/48 (2006.01)

(52) **U.S. Cl.** **343/787**; 343/841

(57) **ABSTRACT**

An antenna for radio frequency (RF) applications comprising: a dielectric element including a dielectric material; an active element attached to a first external surface of the dielectric element; a cavity in the dielectric element; a radio device deposited in the cavity and adapted for coupling to the active element; and an electromagnetic interference (EMI) shield positioned in the cavity and between the radio device and the dielectric element, the EMI shield configured for inhibiting EMI between the radio device and the active element.



US 20120280883A1

(19) **United States**

(12) **Patent Application Publication**

Ying

(10) **Pub. No.: US 2012/0280883 A1**

(43) **Pub. Date: Nov. 8, 2012**

(54) **ANTENNA ARRANGEMENT**

(75) Inventor: **Zhinong Ying**, Lund (SE)

(73) Assignee: **SONY MOBILE COMMUNICATIONS AB**, Lund (SE)

(21) Appl. No.: **13/438,885**

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

Related U.S. Application Data

(60) Provisional application No. 61/482,228, filed on May 4, 2011.

(30) **Foreign Application Priority Data**

May 4, 2011 (EP) 11164710.3

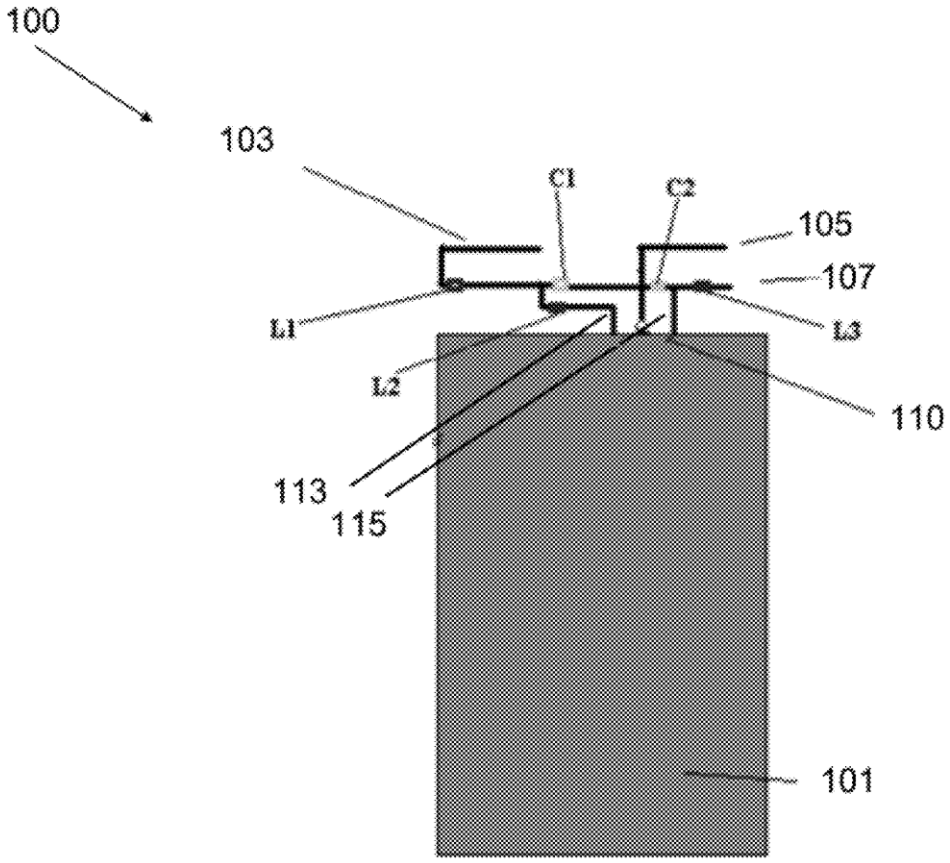
Publication Classification

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

(52) **U.S. Cl.** **343/845**

(57) **ABSTRACT**

The embodiments herein relate to an antenna arrangement comprising a ground element, and a first branch comprising a first inductor loading (L**1**) and a second inductor loading (L**2**). The antenna arrangement further comprises a second branch connected to the ground element via a feeding point, a third branch comprising a third inductor loading (L**3**) and a first grounding pin connected to the first branch. A first conductor loading (C**1**) is arranged between the first branch and the second branch. A second conductor loading (C**2**) is arranged between the second branch and the third branch. And the second branch is connected to the first branch via the first conductor loading (C**1**) and the second branch is connected to the third branch via the second conductor loading (C**2**).



US 20120280885A1

(19) **United States**

(12) **Patent Application Publication**

Arai et al.

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(43) **Pub. Date: Nov. 8, 2012**

(54) **ANTENNA APPARATUS AND COMMUNICATION APPARATUS**

(75) Inventors: **Hiroyuki Arai**, Hodogaya-ku (JP); **Takayuki Hirabayashi**, Tokyo (JP); **Takashi Enomoto**, Tokyo (JP); **Sunghyuk Yoon**, Tokyo (JP)

(73) Assignee: **SONY CORPORATION**, Tokyo (JP)

(21) Appl. No.: **13/203,434**

(22) PCT Filed: **Dec. 27, 2010**

(86) PCT No.: **PCT/JP2010/073550**

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(30) **Foreign Application Priority Data**

Jan. 5, 2010 (JP) 2010-000739

Publication Classification

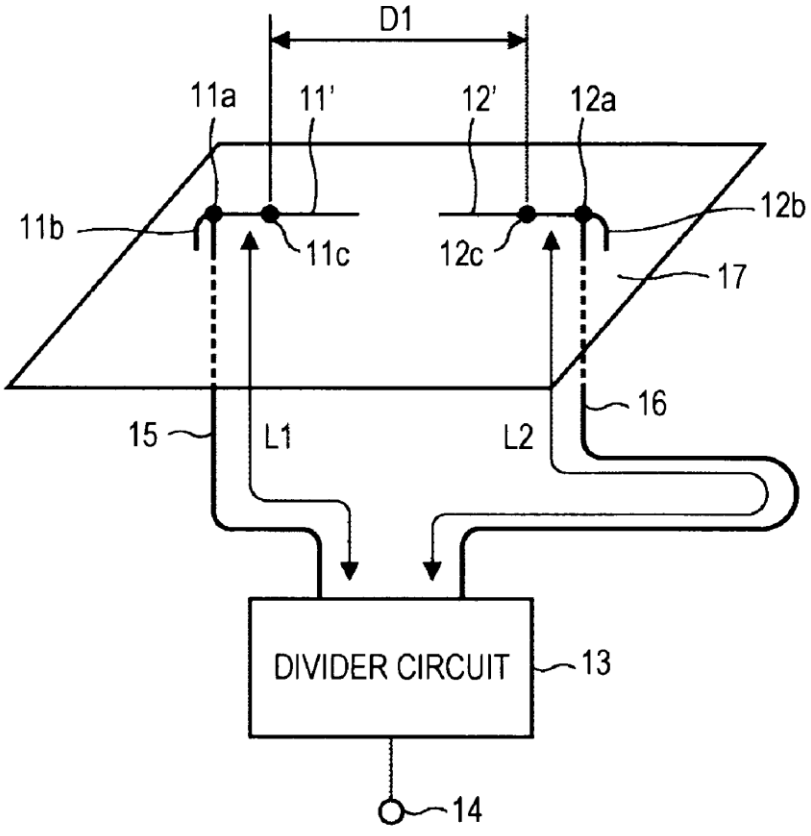
(51) **Int. Cl.**
H01Q 21/30 (2006.01)

(52) **U.S. Cl.** **343/860**

(57) **ABSTRACT**

The present invention relates to an antenna apparatus and a communication apparatus able to provide an antenna apparatus having wide band characteristics or diversity characteristics.

A first antenna element **11**, a second antenna element **12**, and a divider circuit **13** to which both the antenna elements **11** and **12** are coupled via respectively separate transmission lines **15** and **16** are included. Additionally, a delay process is conducted on one of the transmission lines by modifying the lengths of the transmission line **15** coupling the first antenna element **11** to the divider circuit **13** and the transmission line **16** coupling the second antenna element **12** to the divider circuit **13**. By conducting this delay adjustment, the input impedance and/or phase of the first and second antenna elements are adjusted, and wider band characteristics than the antenna characteristics of the first and second antenna elements individually are configured.



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(19) **United States**

(12) **Patent Application Publication**

KUSUMOTO

(10) **Pub. No.: US 2012/0280890 A1**

(43) **Pub. Date: Nov. 8, 2012**

(54) **ANTENNA AND WIRELESS COMMUNICATION DEVICE**

(75) Inventor: **Yusuke KUSUMOTO**, Kyoto-fu (JP)

(73) Assignee: **MURATA MANUFACTURING CO., LTD.**, Kyoto-fu (JP)

(21) Appl. No.: **13/550,199**

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

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/JP2010/063071, filed on Aug. 3, 2010.

(30) **Foreign Application Priority Data**

Jan. 18, 2010 (JP) 2010-007932

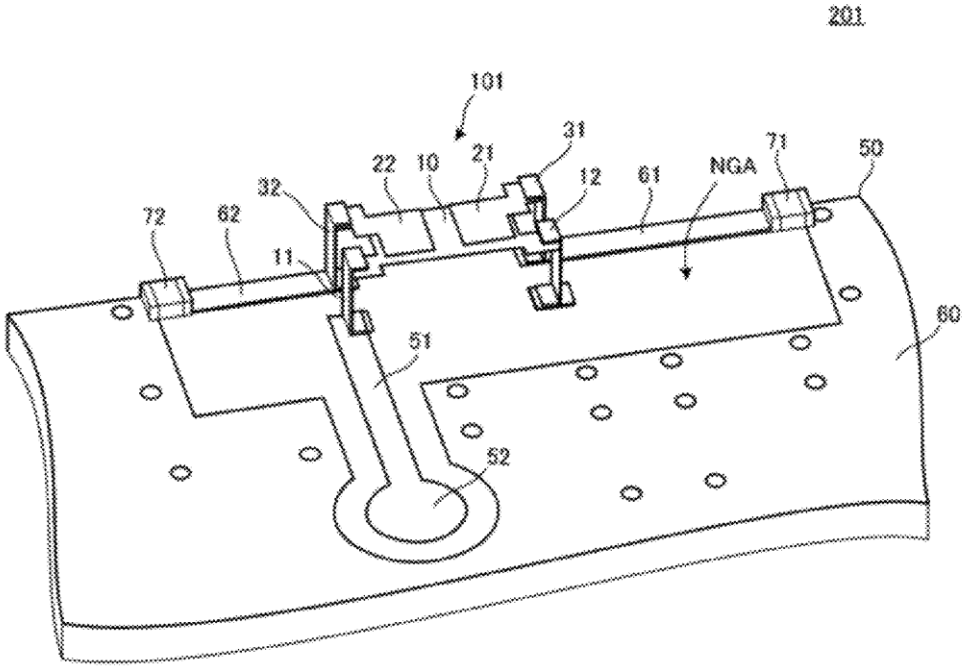
Publication Classification

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

(52) **U.S. Cl.** **343/906**

(57) **ABSTRACT**

An antenna having a high design freedom, a wide bandwidth characteristic, and a high efficiency characteristic, and a wireless communication device equipped therewith, are provided. The antenna includes at least first and second radiation electrodes and a feeding electrode that faces each of the radiation electrodes such that capacitance occurs between each of the radiation electrodes and the feeding electrode. Each of the radiation electrodes includes a first end portion thereof connected to a ground electrode and a second end portion open, and is capacitively fed by the feeding electrode.



US 20120287001A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0287001 A1

(43) Pub. Date: Nov. 15, 2012

Sanz et al.

(54) **MULTI-BAND MONOPOLE ANTENNA FOR A MOBILE COMMUNICATIONS DEVICE**

(76) Inventors: **Alfonso Sanz**, Barcelona (ES); **Carles Puente Baliarda**, Barcelona (ES)

(21) Appl. No.: **13/556,626**

(22) Filed: **Jul. 24, 2012**

Related U.S. Application Data

(63) Continuation of application No. 13/029,382, filed on Feb. 17, 2011, now Pat. No. 8,259,016, which is a continuation of application No. 12/652,974, filed on Jan. 6, 2010, now Pat. No. 8,253,633, which is a continuation of application No. 12/055,748, filed on Mar. 26, 2008, now Pat. No. 7,675,470, which is a continuation of application No. 11/713,324, filed on Mar. 2, 2007, now Pat. No. 7,403,164, which is a continuation of application No. 11/124,768, filed on May 9, 2005, now Pat. No. 7,411,556, which is a continuation of application No. PCT/EP02/14706, filed on Dec. 22, 2002.

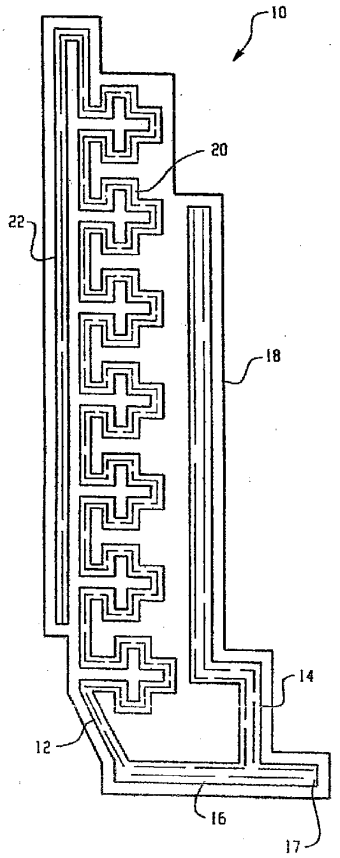
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band monopole antenna for a mobile communications device includes a common conductor coupled to both a first radiating arm and a second radiating arm. The common conductor includes a feeding port for coupling the antenna to communications circuitry in a mobile communications device. In one embodiment, the first radiating arm includes a space-filling curve. In another embodiment, the first radiating arm includes a meandering section extending from the common conductor in a first direction and a contiguous extended section extending from the meandering section in a second direction.



US 20120287009A1

(19) **United States**

(12) **Patent Application Publication**

TU et al.

(10) **Pub. No.: US 2012/0287009 A1**

(43) **Pub. Date: Nov. 15, 2012**

(54) **SOLID ANTENNA**

(75) Inventors: **HSIN-LUNG TU**, Tu-Cheng (TW); **HUANG-CHAN LIN**, Tu-Cheng (TW)

(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW)

(21) Appl. No.: **13/457,413**

(22) Filed: **Apr. 26, 2012**

(30) **Foreign Application Priority Data**

May 10, 2011 (CN) 201110119619.0

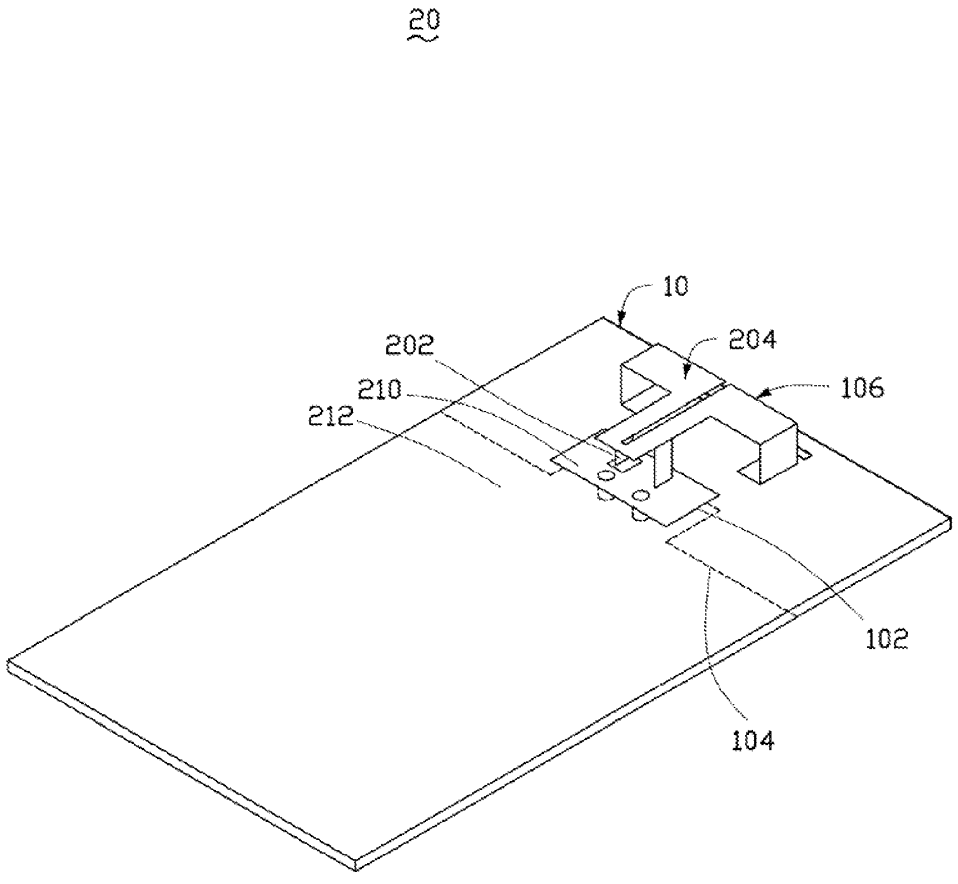
Publication Classification

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

(52) **U.S. Cl.** **343/845**

(57) **ABSTRACT**

A solid antenna disposed on a substrate includes a first grounding portion disposed on the substrate, a feeding portion perpendicular to the substrate, a radiating portion, and a coupling portion disposed on the substrate and separated from the radiating portion. The radiating portion includes a first radiating part, a second radiating part, a connection part, a third radiating part perpendicularly connected to the feeding portion, and a fourth radiating part connected in series. The second radiating part, the connection part, and the third radiating part are disposed on a plane parallel with the substrate. Both the first radiating part and the fourth radiating part extend from the plane to the substrate. The coupling portion is disposed on the substrate and is separated from the radiating portion.



US 20120287012A1

(19) **United States**

(12) **Patent Application Publication**

AIZAWA

(10) **Pub. No.: US 2012/0287012 A1**

(43) **Pub. Date: Nov. 15, 2012**

(54) **MULTI-BAND COMPATIBLE MULTI-ANTENNA DEVICE AND COMMUNICATION EQUIPMENT**

(75) Inventor: **Daisuke AIZAWA**, Daito-shi (JP)

(73) Assignee: **FUNAI ELECTRIC CO., LTD.**, Osaka (JP)

(21) Appl. No.: **13/468,217**

(22) Filed: **May 10, 2012**

(30) **Foreign Application Priority Data**

May 13, 2011 (JP) 2011-108676
May 13, 2011 (JP) 2011-108683

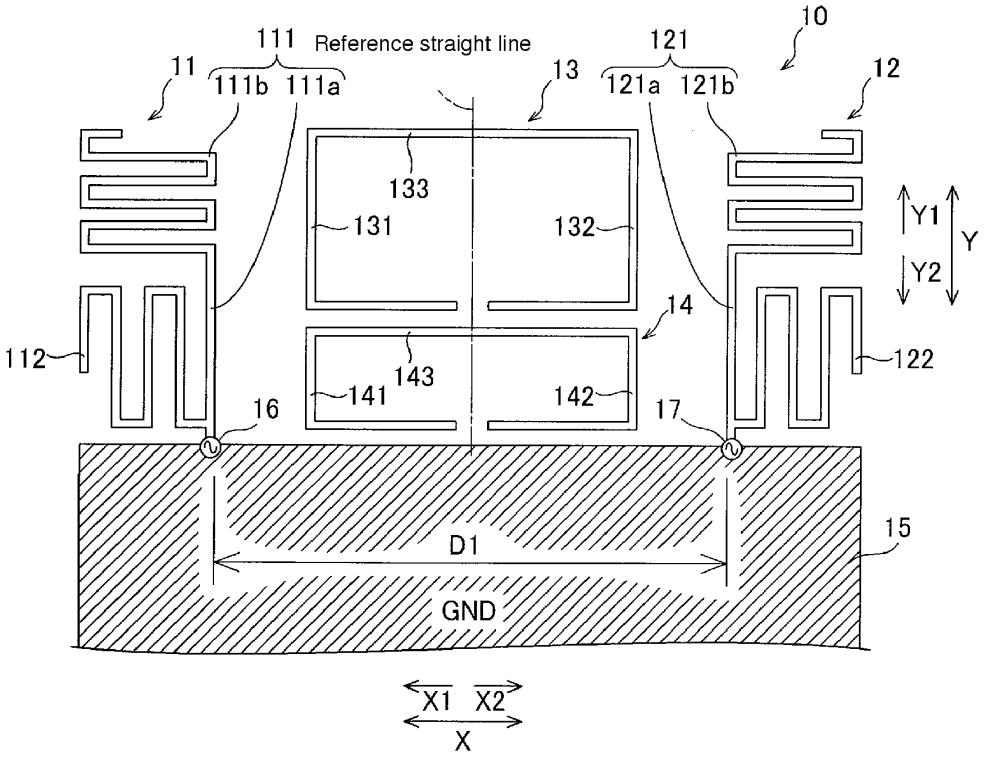
Publication Classification

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

(52) **U.S. Cl.** **343/853**; 343/893

(57) **ABSTRACT**

A multi-band compatible multi-antenna device which is miniaturized by reducing a distance between antenna elements includes a first antenna element corresponding to a 1.5 GHz band and a 2.0 GHz band, a second antenna element corresponding to the 1.5 GHz band and the 2.0 GHz band, a first passive element which is arranged between the first antenna element and the second antenna element and which resonates at a frequency corresponding to the 1.5 GHz band, and a second passive element which is arranged between the first antenna element and the second antenna element separately from the first passive element and which resonates at a frequency corresponding to the 2.0 GHz band.



US 20120287014A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0287014 A1

(43) Pub. Date: Nov. 15, 2012

TSENG et al.

(54) **HANDHELD DEVICE AND PLANAR ANTENNA THEREOF**

(75) Inventors: **Chun-Wei TSENG**, Taoyuan City (TW); **Yen-Liang KUO**, Taoyuan City (TW); **Wan-Ming CHEN**, Taoyuan City (TW)

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

(21) Appl. No.: **13/106,934**

(22) Filed: **May 13, 2011**

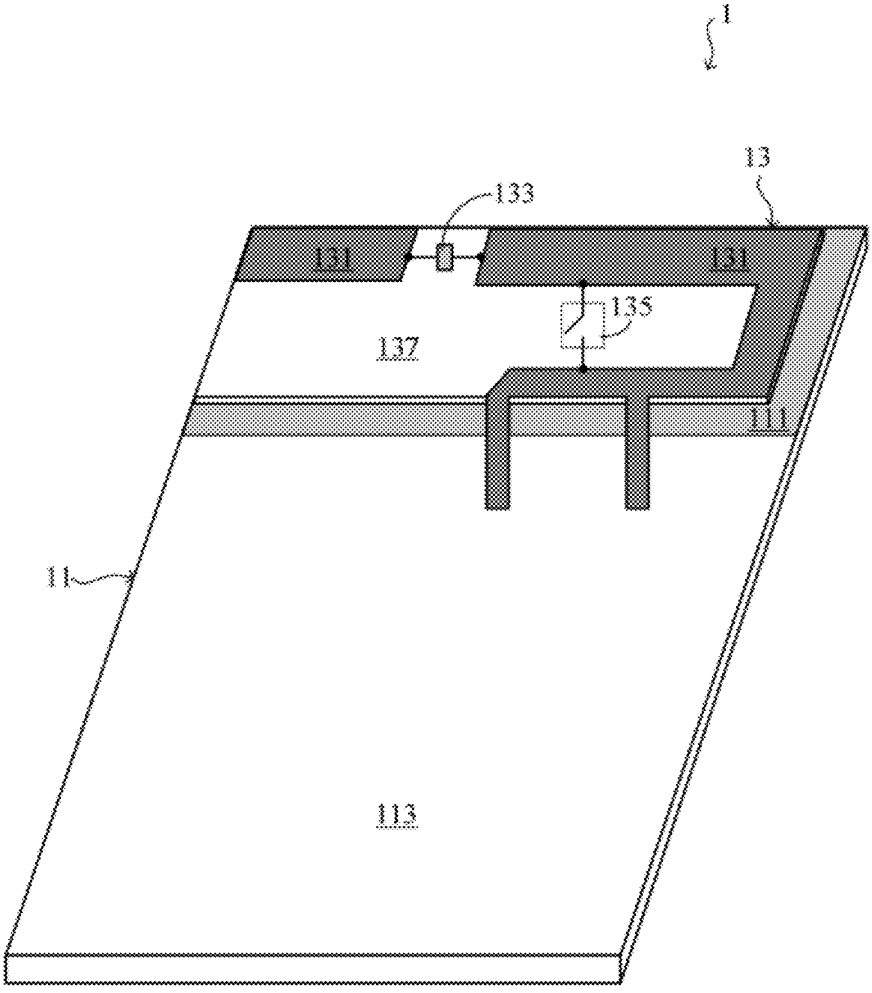
Publication Classification

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

(52) **U.S. Cl.** **343/876**

(57) **ABSTRACT**

A handheld device and a planar antenna thereof are provided. The planar antenna comprises a radiator, a screening element and a switch. The screening element is configured to make the planar antenna operating in a first high-frequency (HF) current path and a first low-frequency (LF) current path, and the switch is configured to make the planar antenna operating in a second HF current path and a second LF current path. The planar antenna operates at a first HF central frequency corresponding to the first HF current path and a first LF central frequency corresponding to the first LF current path when the switch is turned off, and operates at a second HF central frequency corresponding to the second HF current path and a second LF central frequency corresponding to the second LF current path when the switch is turned on.



US 20120287015A1

(19) **United States**

(12) **Patent Application Publication**

CHUNG et al.

(10) **Pub. No.: US 2012/0287015 A1**

(43) **Pub. Date: Nov. 15, 2012**

(54) **MULTI-LAYER ANTENNA**

(75) Inventors: **CHO-JU CHUNG**, Tu-Cheng (TW); **AI-NING SONG**, Shanghai (CN)

(73) Assignees: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW); **AMBIT MICROSYSTEMS (SHANGHAI) LTD.**, SHANGHAI (CN)

(21) Appl. No.: **13/449,293**

(22) Filed: **Apr. 17, 2012**

(30) **Foreign Application Priority Data**

May 11, 2011 (CN) 201120148427.8

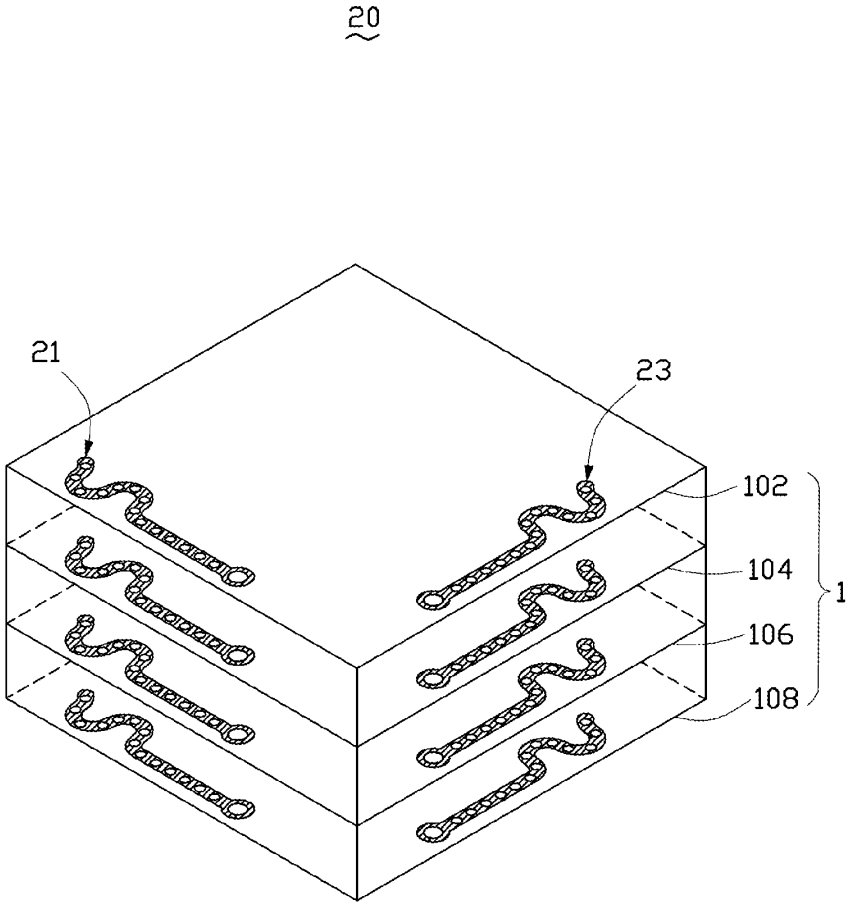
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 21/00 (2006.01)

(52) **U.S. Cl.** ..... **343/893**; 343/700 MS

(57) **ABSTRACT**

A multi-layer antenna comprising a plurality of antenna units disposed on a multi-layer printed circuit board (PCB). Each layer of the multi-layer PCB respectively comprises two antenna units along two conjoined edges of the layer. Each antenna unit comprises a feeding portion and a radiating portion. The feeding portion is operable to feed received electromagnetic wave signals to the antenna unit. The radiating portion is operable to radiate the electromagnetic wave signals, and comprises a first radiating part and a second radiating part. The first radiating part is rectangular, and a first end of the first radiating part connects to the feeding portion while a second end of the first radiating part connects to the second radiating part. The second radiating part extends away from the first radiating part and forms a meandering "S" pattern.



US 20120287019A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0287019 A1

(43) Pub. Date: Nov. 15, 2012

SUDO et al.

(54) **WIDEBAND ANTENNA**

(75) Inventors: **Kaoru SUDO**, Kyoto-fu (JP); **Hirotaka FUJII**, Kyoto-fu (JP); **Toshiro HIRATSUKA**, Kyoto-fu (JP)

(73) Assignee: **MURATA MANUFACTURING CO., LTD.**, Kyoto-fu (JP)

(21) Appl. No.: **13/555,959**

(22) Filed: **Jul. 23, 2012**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2010/069537, filed on Nov. 3, 2010.

(30) **Foreign Application Priority Data**

Jan. 27, 2010 (JP) 2010-015562

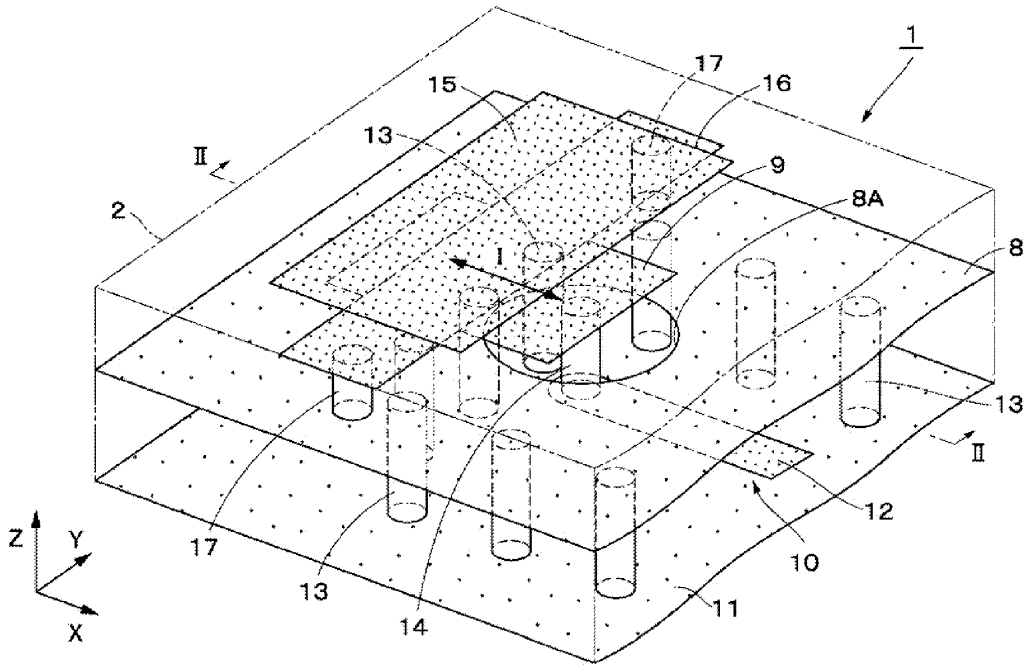
Publication Classification

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/50 (2006.01)

(52) **U.S. Cl.** **343/904**; 343/905

(57) **ABSTRACT**

This disclosure provides a wideband antenna including a feed line, a ground conductor plate and a radiating conductor element connected to the feed line and facing the ground conductor plate at a distance from the ground conductor plate. A parasitic conductor element is provided on a side opposite to the ground conductor plate as viewed from the radiating conductor plate and is insulated from these plates. A coupling adjusting conductor plate is positioned between the radiating conductor element and the parasitic conductor element, is configured to adjust an amount of coupling between them, overlaps an area where the radiating conductor element and the parasitic conductor element overlap, and straddles the radiating conductor element in a direction orthogonal to the direction of a current I that flows therein. Both end sides of the coupling adjusting conductor plate are electrically connected to the ground conductor plate via via-holes.



US 20120289172A1

(19) **United States**

(12) **Patent Application Publication**

Holter

(10) **Pub. No.: US 2012/0289172 A1**

(43) **Pub. Date: Nov. 15, 2012**

(54) **ARRAY ANTENNA SYSTEM**

(75) Inventor: **Henrik Holter**, Saltsjo-Boo (SE)

(73) Assignee: **SAAB AB**, München (SE)

(21) Appl. No.: **13/511,901**

(22) PCT Filed: **Nov. 25, 2009**

(86) PCT No.: **PCT/SE2009/051338**

§ 371 (c)(1),
(2), (4) Date: **May 24, 2012**

Publication Classification

(51) **Int. Cl.**
H04B 1/44 (2006.01)

(52) **U.S. Cl.** **455/78**

(57) **ABSTRACT**

A method for an antenna system including a transmitting phase array antenna including a transmitting antenna subarray including a number of antenna elements transmitting on a first frequency and a receiving phase array antenna including a receiving antenna subarray including a number of antenna elements. The transmitting antenna subarray antenna is positioned at a distance relative the receiving antenna subarray antenna and the coupling between two antenna subarrays are decided and used for controlling the transmitting subarray antenna to transmit in such a way that there will be nulling of the energy in the receiving antenna subarray antenna with respect to the transmitting antenna subarray.