US 20110234457A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2011/0234457 A1**

(43) **Pub. Date: Sep. 29, 2011**

CHEN

(54) **BROADBAND ANTENNA**

(75) Inventor: **LUNG-PAO CHEN**, Tu-Cheng (TW)

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

(21) Appl. No.: **12/894,117**

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

(30) **Foreign Application Priority Data**

Mar. 25, 2010 (CN) 201020141776.2

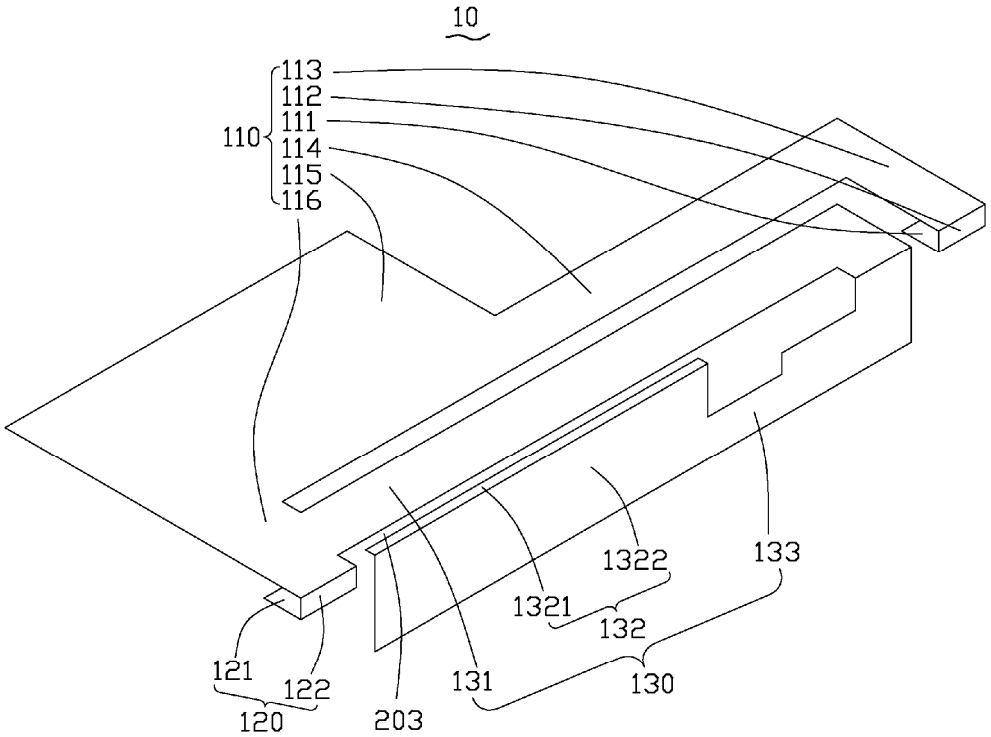
Publication Classification

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

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

(57) **ABSTRACT**

A broadband antenna printed on a substrate. The substrate includes a first surface, a second surface perpendicular to the first surface, and a third surface parallel to the first surface. The broadband antenna includes a grounding portion, a feeding portion, and a radiating portion. The grounding portion is located on the first surface. The feeding portion feeds electromagnetic signals and includes a first feeding section printed on the third surface and a second feeding section printed on the second surface. The radiating portion includes a first radiating section, a second radiating section, and a third radiating section. The first radiating section is printed on the first surface. The second radiating section comprises a first radiating segment and a second radiating segment. The third radiating section is printed on the second surface and formed a ladder portion.



US 20110234459A1

(19) **United States**

(12) **Patent Application Publication**

YABE

(10) **Pub. No.: US 2011/0234459 A1**

(43) **Pub. Date: Sep. 29, 2011**

(54) **MOBILE WIRELESS DEVICE**

(76) Inventor: **Shintaro YABE**, Yokohama (JP)

(21) Appl. No.: **13/070,199**

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

(30) **Foreign Application Priority Data**

Mar. 26, 2010 (JP) 2010-071350

Publication Classification

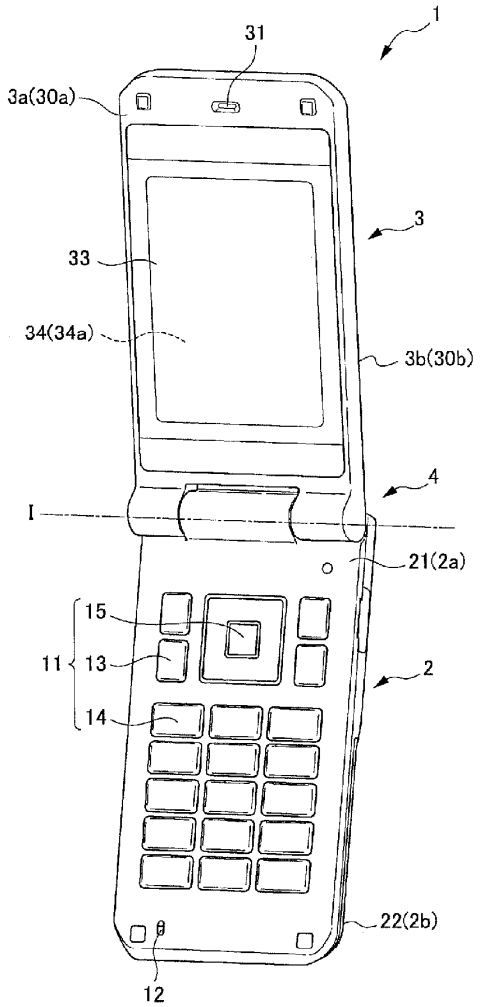
(51) **Int. Cl.**

H01Q 1/24	(2006.01)
B32B 37/02	(2006.01)
B32B 37/10	(2006.01)
B32B 37/14	(2006.01)
B32B 38/00	(2006.01)

(52) **U.S. Cl.** **343/702**; 156/293

(57) **ABSTRACT**

A mobile wireless device and method are disclosed. A circuit board is located in a housing, and antenna element means is adhered to an internal surface of the housing by an electrically conductive rubber member comprising adhesive agent means. A power input terminal is located on the circuit board and electrically coupled to an end of the electrically conductive rubber member.



US 20110234470A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2011/0234470 A1**

(43) **Pub. Date: Sep. 29, 2011**

Chen

(54) **ANTENNA STRUCTURE**

(76) Inventor: **Shuen-Sheng Chen**, Taipei Hsien (TW)

(21) Appl. No.: **12/767,805**

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

(30) **Foreign Application Priority Data**

Mar. 26, 2010 (TW) 099109089

Publication Classification

(51) **Int. Cl.**

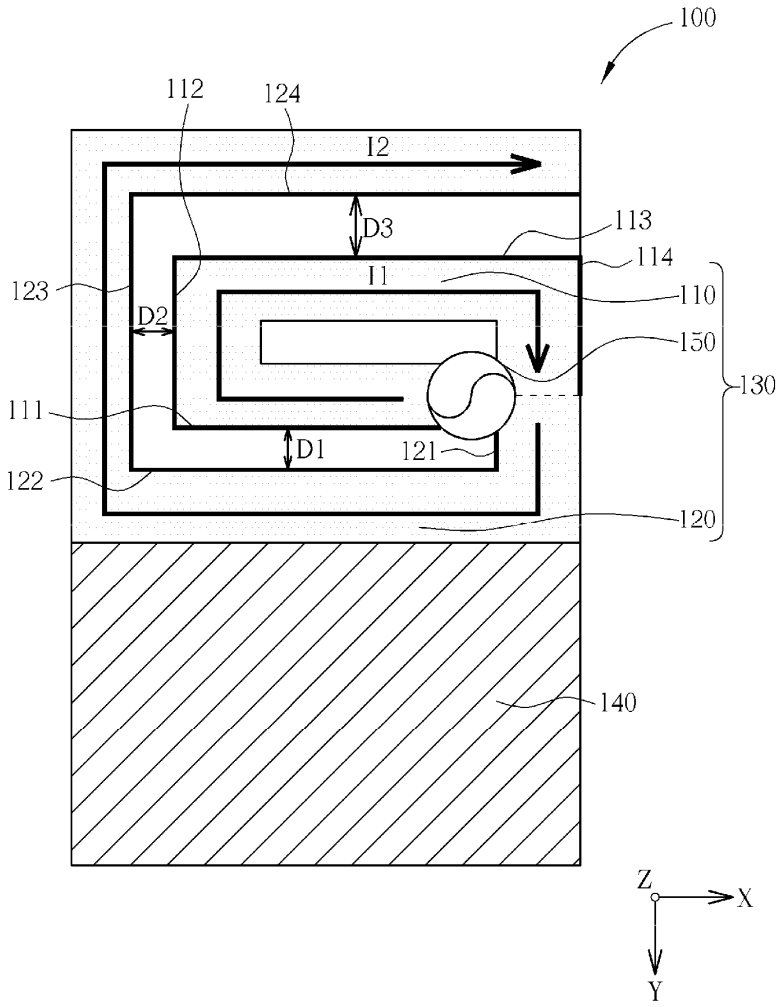
H01Q 9/04 (2006.01)

H01Q 1/36 (2006.01)

(52) **U.S. Cl.** ..... **343/895**; 343/700 MS

(57) **ABSTRACT**

An antenna structure includes a positive feeding point, a negative feeding point, a radiation element, and a grounding element. The radiation element includes a first radiator and a second radiator. The first radiator has a first end coupled to the positive feeding point, and has a plurality of first side edges. The second radiator has a first end coupled to the negative feeding point, and has a plurality of second side edges. Herein the second radiator at least partially surrounds the first radiator, such that there are a plurality of predetermined gaps existed in between the plurality of first side edges of the first radiator and the plurality of second side edges of the second radiator to form coupling effects. The grounding element is coupled to the second radiator.



US 20110234471A1

(19) **United States**

(12) **Patent Application Publication**

TANABE et al.

(10) **Pub. No.: US 2011/0234471 A1**

(43) **Pub. Date: Sep. 29, 2011**

(54) **SPIRAL ANTENNA**

(76) Inventors: **Masahiro TANABE**, Kawasaki-shi (JP); **Hisamatsu Nakano**, Koganei-shi (JP)

(21) Appl. No.: **12/964,034**

(22) Filed: **Dec. 9, 2010**

(30) **Foreign Application Priority Data**

Mar. 29, 2010 (JP) 2010-076044

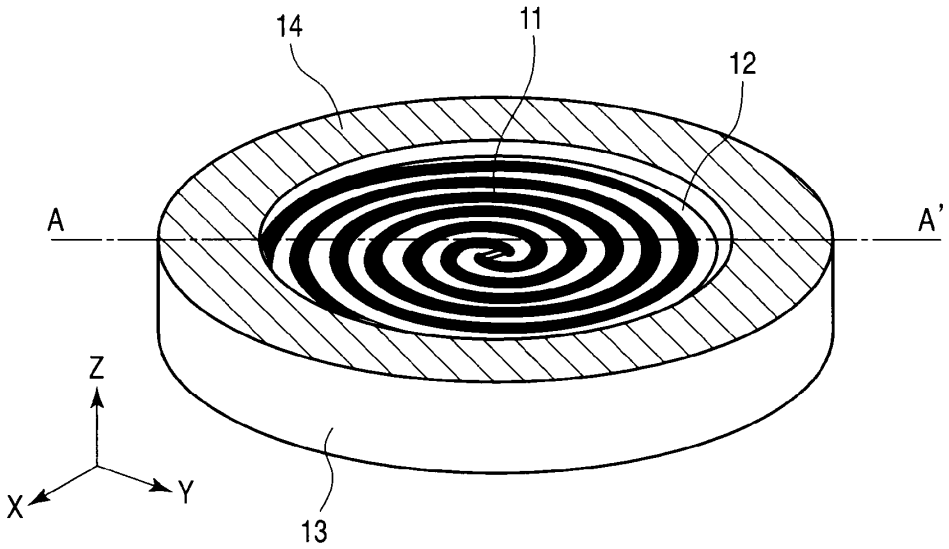
Publication Classification

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

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

(57) **ABSTRACT**

According to one embodiment, a spiral antenna includes an antenna element, a cavity, and a radio wave absorber. The spiral antenna is formed into a spiral shape on a dielectric substrate. The cavity is formed to have a space with the antenna element. The radio wave absorber is placed to cover a terminal end portion of the spiral.



US 20110237309A1

(19) **United States**

(12) **Patent Application Publication**

SHOJI et al.

(10) **Pub. No.: US 2011/0237309 A1**

(43) **Pub. Date: Sep. 29, 2011**

(54) **ANTENNA DEVICE AND MOBILE DEVICE**

(75) Inventors: **Hideaki SHOJI**, Tokyo (JP); **Yoshiki Kanayama**, Saitama (JP)

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

(21) Appl. No.: **12/955,535**

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

Related U.S. Application Data

(60) Provisional application No. 61/317,307, filed on Mar. 25, 2010.

Publication Classification

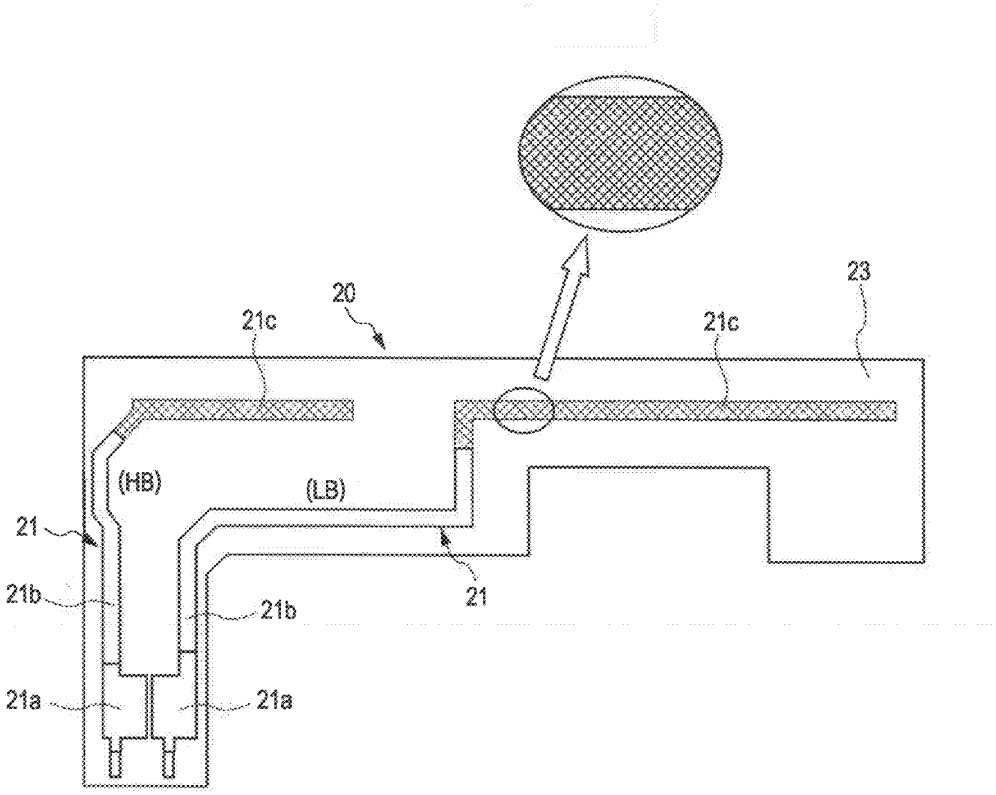
(51) **Int. Cl.**

H04M 1/00	(2006.01)
H01Q 1/36	(2006.01)
H01Q 21/00	(2006.01)
H01Q 1/06	(2006.01)
H01Q 21/30	(2006.01)

(52) **U.S. Cl.** **455/575.1**; 343/897; 343/893; 343/721

(57) **ABSTRACT**

An antenna element including a feeding part and a mesh part including at least a part of an area formed in a mesh state. The feeding part and an area of the antenna element in close proximity to the mesh part are formed of a finer mesh than the mesh part or formed of a solid.



US 20110241944A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0241944 A1

(43) Pub. Date: Oct. 6, 2011

Wolf et al.

(54) **ANTENNA HAVING PLANAR CONDUCTING ELEMENTS, ONE OF WHICH HAS A SLOT**

(75) Inventors: **Forrest D. Wolf**, Reno, NV (US); **Claude Jean Michel Laurent**, Aalborg (DK)

(73) Assignee: **PINYON TECHNOLOGIES, INC.**, Reno, NV (US)

(21) Appl. No.: **12/755,294**

(22) Filed: **Apr. 6, 2010**

Publication Classification

(51) **Int. Cl.**

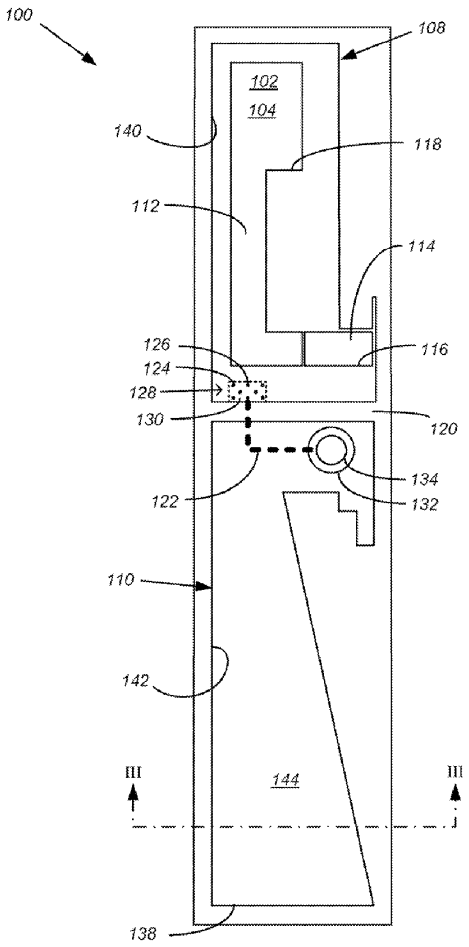
H01Q 9/04 (2006.01)

H01Q 1/38 (2006.01)

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

(57) **ABSTRACT**

An antenna includes a dielectric material having i) a first side opposite a second side, and ii) a conductive via therein. A first planar conducting element is on the first side of the dielectric material and has i) at least one closed slot therein, and ii) an electrical connection to the conductive via. A second planar conducting element is on the first side of the dielectric material. Each of the first and second planar conducting elements is positioned adjacent a gap that electrically isolates the first planar conducting element from the second planar conducting element. An electrical microstrip feed line is on the second side of the dielectric material, is electrically connected to the conductive via, and has a route extending from the conductive via, to across the gap, to under the second planar conducting element. The second planar conducting element provides a reference plane for the electrical microstrip feed line.



US 20110241945A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0241945 A1

(43) Pub. Date: Oct. 6, 2011

ZHAO

(54) **MULTIPLE-BAND ANTENNA**

(75) Inventor: **MENG-GANG ZHAO**, Shenzhen City (CN)

(73) Assignees: **FU TAI HUA INDUSTRY (SHENZHEN) CO., LTD.**, ShenZhen City (CN); **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW)

(21) Appl. No.: **12/871,927**

(22) Filed: **Aug. 31, 2010**

(30) **Foreign Application Priority Data**

Mar. 31, 2010 (CN) 201010137046.X

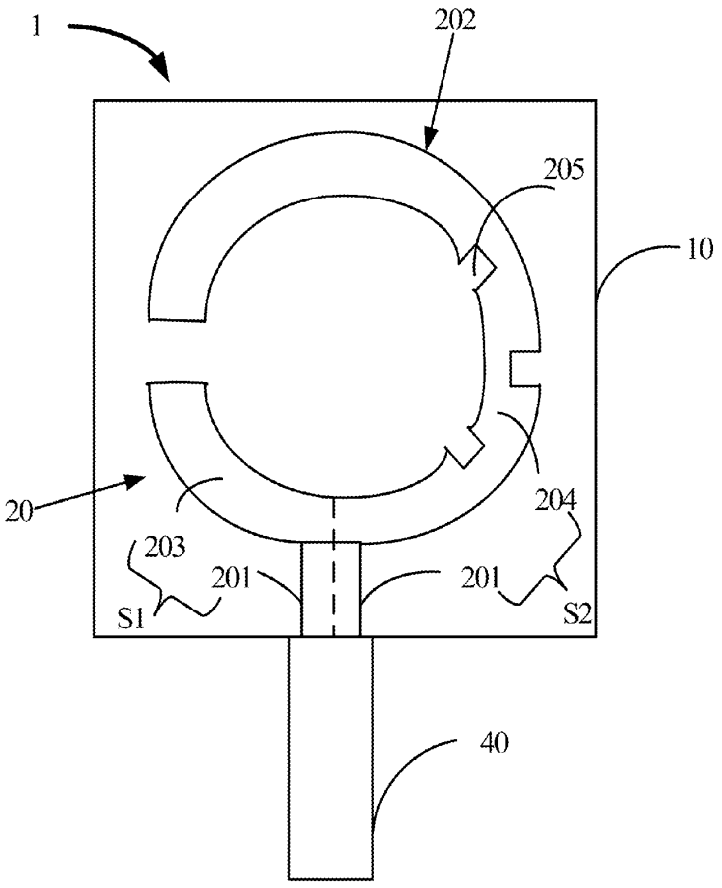
Publication Classification

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

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

(57) **ABSTRACT**

A multiple-band antenna includes a planar substrate, a feed back line, a first and a second antenna body. The feedback line is configured for receiving wireless communication signals. The first antenna body includes a feedback terminal connected to the feedback line and a ring structure connected to the feed back terminal. The ring structure is divided into a left and a right arc portion by an axis line of the feedback terminal, the left arc portion cooperates with the feedback terminal to form a first antenna structure, and the right arc portion cooperates with the feedback terminal to form a second antenna structure, the first and the second antenna structure are configured for working in a first and a second frequency band respectively. The second antenna body is configured for working in a third frequency band by coupling the first and the second antenna structure.



US 20110241946A1

(19) **United States**

(12) **Patent Application Publication**

Thornwall et al.

(10) **Pub. No.: US 2011/0241946 A1**

(43) **Pub. Date: Oct. 6, 2011**

(54) **HOLLOW CELL CRLH ANTENNA DEVICES**

(76) Inventors: **Shane Thornwall**, San Diego, CA (US); **Norberto Lopez**, San Diego, CA (US); **Vaneet Pathak**, San Diego, CA (US); **Nan Xu**, San Diego, CA (US)

(21) Appl. No.: **13/078,431**

(22) Filed: **Apr. 1, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/320,481, filed on Apr. 2, 2010.

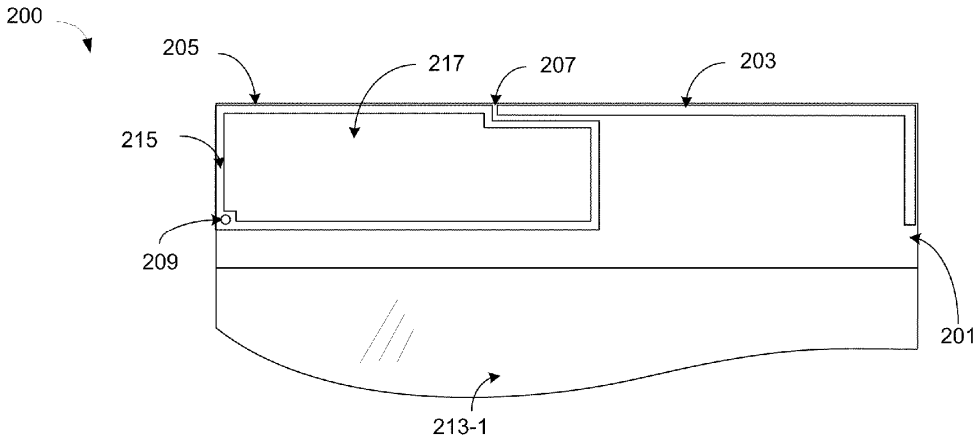
Publication Classification

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

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

(57) **ABSTRACT**

A CRLH antenna device is presented having a hollow cell patch structure.



US 20110241948A1

(19) **United States**

(12) **Patent Application Publication**

Bevelacqua et al.

(10) **Pub. No.: US 2011/0241948 A1**

(43) **Pub. Date: Oct. 6, 2011**

(54) **CAVITY-BACKED SLOT ANTENNA WITH NEAR-FIELD-COUPLED PARASITIC SLOT**

(76) Inventors: **Peter Bevelacqua**, Cupertino, CA (US); **Robert J. Hill**, Salinas, CA (US)

(21) Appl. No.: **12/750,661**

(22) Filed: **Mar. 30, 2010**

Publication Classification

(51) **Int. Cl.**

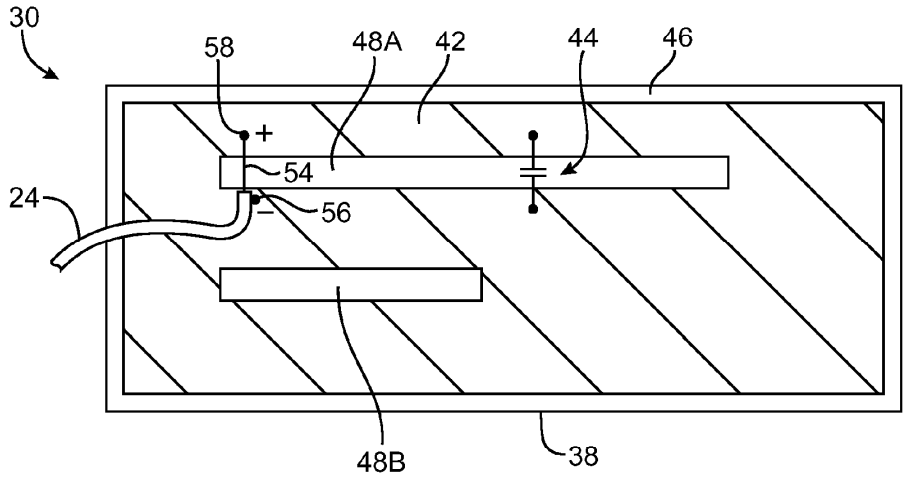
H01Q 13/10 (2006.01)

H01Q 1/24 (2006.01)

(52) **U.S. Cl.** **343/702**; 343/770

(57) **ABSTRACT**

Electronic devices may be provided with antennas. The antennas may include conductive antenna cavities. Antenna resonating elements may be mounted in the antenna cavities to form cavity antennas. An antenna cavity may be formed from metal structures with curved edges that define a curved cavity opening. A flexible printed circuit substrate may be coated with a layer of metal. Slot antenna structures such as a directly fed antenna slot and a parasitic antenna slot may be formed from openings in the metal layer. The flexible printed circuit substrate may be flexed so that the antenna resonating element forms a non-planar curved shape that mates with the opening of the antenna cavity. A ring of solder may be used to electrically seal the edges of the cavity opening to the metal layer in the antenna resonating element. The curved opening may be aligned with curved housing walls in an electronic device.



US 20110241949A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0241949 A1

(43) Pub. Date: Oct. 6, 2011

Nickel et al.

(54) **MULTIBAND ANTENNAS FORMED FROM BEZEL BANDS WITH GAPS**

(76) Inventors: **Josh Nickel**, San Jose, CA (US); **Juan Zavala**, Watsonville, CA (US); **Yijun Zhou**, Sunnyvale, CA (US); **Mattia Pascolini**, Campbell, CA (US); **Robert W. Schlub**, Campbell, CA (US); **Ruben Caballero**, San Jose, CA (US)

(21) Appl. No.: **12/752,966**

(22) Filed: **Apr. 1, 2010**

Publication Classification

(51) **Int. Cl.**

H01Q 1/38 (2006.01)

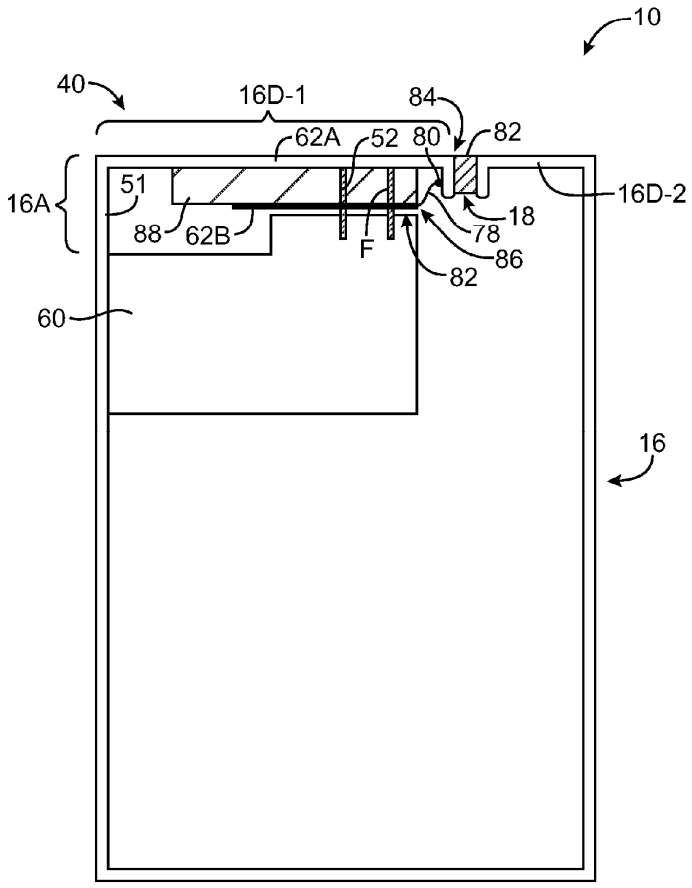
H01Q 1/24 (2006.01)

H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

Electronic devices are provided that contain wireless communications circuitry. The wireless communications circuitry may include radio-frequency transceiver circuitry and antenna structures. An inverted-F antenna may have first and second short circuit legs and a feed leg. The first and second short circuit legs and the feed leg may be connected to a folded antenna resonating element arm. The antenna resonating element arm and the first short circuit leg may be formed from portions of a conductive electronic device bezel. The folded antenna resonating element arm may have a bend. The bezel may have a gap that is located at the bend. Part of the folded resonating element arm may be formed from a conductive trace on a dielectric member. A spring may be used in connecting the conductive trace to the electronic device bezel portion of the antenna resonating element arm.



US 20110241950A1

(19) **United States**

(12) **Patent Application Publication**

Milosavljevic et al.

(10) **Pub. No.: US 2011/0241950 A1**

(43) **Pub. Date: Oct. 6, 2011**

(54) **COMBINATION ANTENNA AND METHODS**

(76) Inventors: **Zlatoljub Milosavljevic**, Espoo (FI); **Heikki Korva**, Tupos (FI)

(21) Appl. No.: **13/120,412**

(22) PCT Filed: **Sep. 17, 2009**

(86) PCT No.: **PCT/FI2009/050744**

§ 371 (c)(1), (2), (4) Date: **Jun. 20, 2011**

(30) **Foreign Application Priority Data**

Sep. 25, 2008 (FI) 20085907

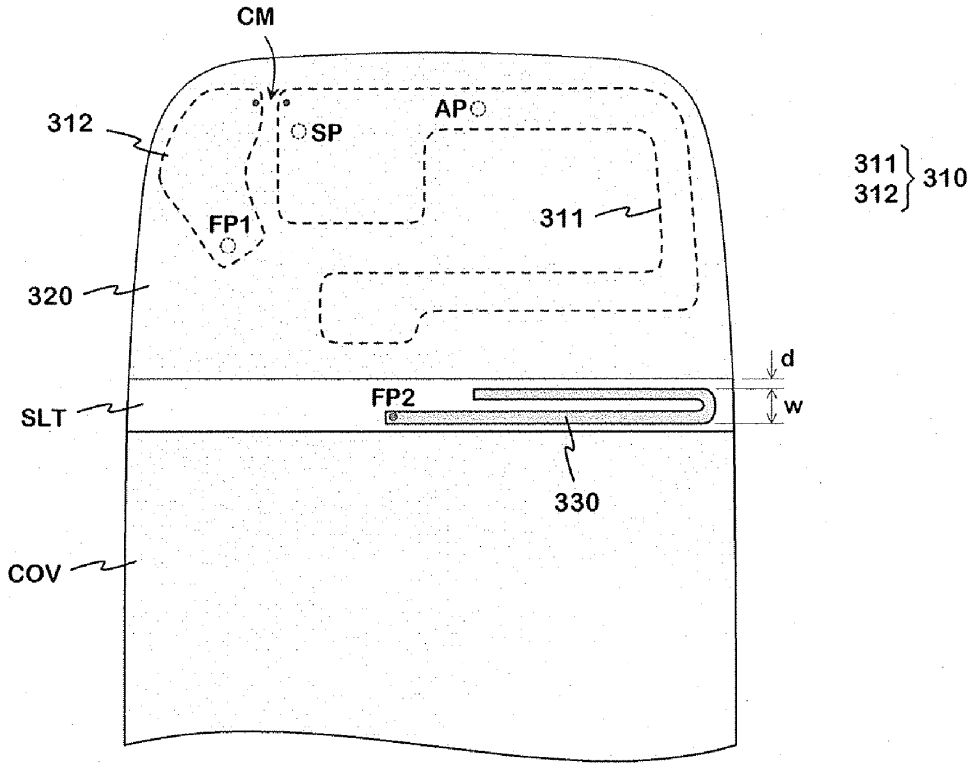
Publication Classification

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

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

(57) **ABSTRACT**

An antenna combination especially intended for small radio devices. It comprises a main antenna, the radiator (**320**) of which is a conductive part of the outer cover of the device, and a second antenna to enable simultaneous operation in the frequency bands close to each other. The second antenna is a narrow ILA, and its radiator (**330**) is placed in a slot (SLT) between the radiator (**320**) of the main antenna and the rest (COV) of the cover. The matching circuits of the antennas are implemented so that they function at the same time as filters, which enhance the electric isolation of the antennas. A second antenna can be added to a radio device with a cover radiator so that its radiator does not require extra space, and the electric isolation between the antennas is good despite the closeness of their radiators.



US 20110241951A1

(19) **United States**

(12) **Patent Application Publication**

Sakamoto et al.

(10) **Pub. No.: US 2011/0241951 A1**

(43) **Pub. Date: Oct. 6, 2011**

(54) **PORTABLE WIRELESS APPARATUS**

(75) Inventors: **Akito Sakamoto**, Kanagawa (JP); **Hideki Hayama**, Tokyo (JP); **Takeshi Yamaguchi**, Kanagawa (JP)

(73) Assignee: **PANASONIC CORPORATION**, Osaka (JP)

(21) Appl. No.: **13/131,935**

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

(86) PCT No.: **PCT/JP2009/002826**

§ 371 (c)(1), (2), (4) Date: **May 31, 2011**

(30) **Foreign Application Priority Data**

Dec. 12, 2008 (JP) 2008-317387

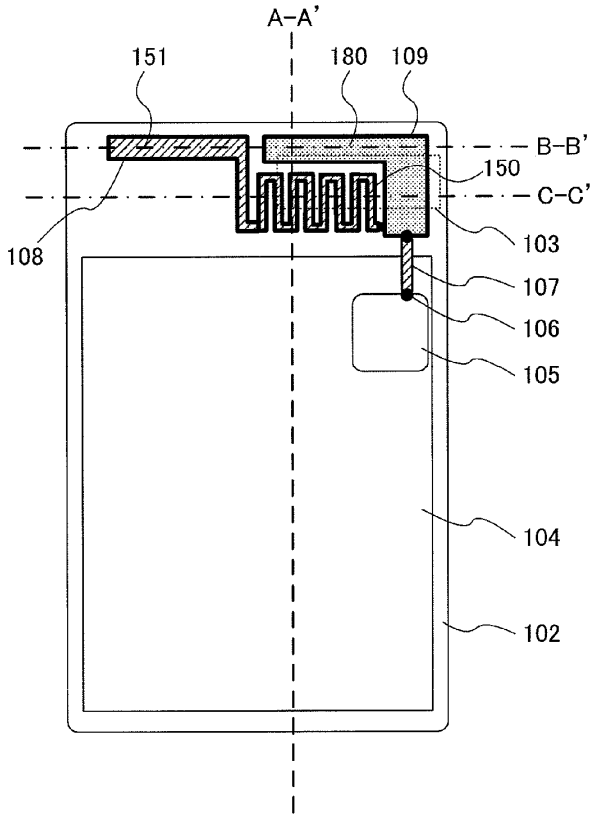
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed is a portable wireless apparatus that can be miniaturised and reduced in thickness without increasing in manufacturing costs and that can prevent degradation of reception sensitivity when placed on a metal plate, without impairing design characteristics. In this apparatus, a conductive hinge (**103**) links a first case (**101**) and second case (**102**) in a mutually movable fashion. A first antenna element (**108**) has a base end (**150**) that is supplied with power from a power supply section (**106**) and provided in a position facing the hinge (**103**), and is arranged on the second case (**102**) in such a way that the distance **r1** from the bottom face (**160**) of the second case (**102**) on the side of the tip (**151**) extending from the base end (**150**) is larger than the distance **r2** from the bottom face (**160**) of the second case (**102**) on the side of the base end (**150**).



US 20110241962A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0241962 A1

(43) Pub. Date: Oct. 6, 2011

Chen et al.

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

(75) Inventors: **Min-Che Chen**, Taoyuan County (TW); **Chia-I Lin**, Taoyuan County (TW); **Chih-Wei Hsu**, Taoyuan County (TW)

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

(21) Appl. No.: **13/041,435**

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

(30) **Foreign Application Priority Data**

Mar. 30, 2010 (TW) 99109633

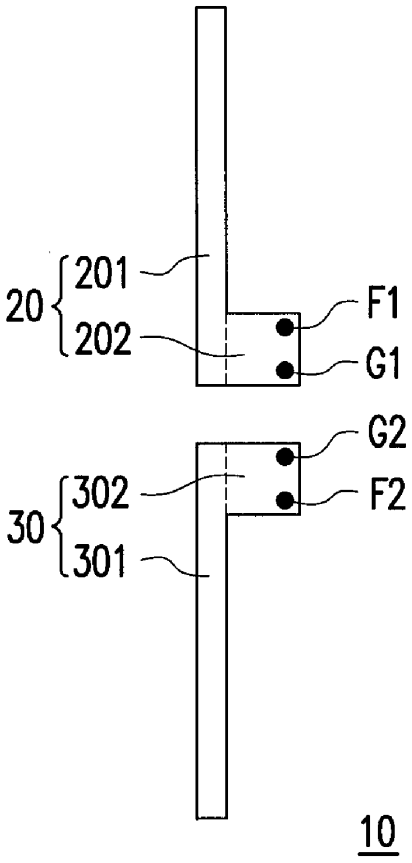
Publication Classification

(51) **Int. Cl.**
H01Q 1/48 (2006.01)
H01Q 1/36 (2006.01)

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

(57) **ABSTRACT**

A planar antenna and a handheld device are provided. The handheld device includes the planar antenna and a system ground plane. The planar antenna has a first feed point, a first ground point, a second feed point, and a second ground point. The first ground point and the second ground point are located between the first feed point and the second feed point. The system ground plane is electrically connected to the first feed point, the first ground point, the second feed point, and the second ground point. Thereby, the performance in radio signal transceiving is improved.



US 20110241963A1

(19) **United States**

(12) **Patent Application Publication**

Kim

(10) **Pub. No.: US 2011/0241963 A1**

(43) **Pub. Date: Oct. 6, 2011**

(54) **INTERNAL ANTENNA SUPPORTING WIDEBAND IMPEDANCE MATCHING**

(75) Inventor: **Byong-Nam Kim**, Kyeonggi-Do (KR)

(73) Assignee: **ACE TECHNOLOGIES CORPORATION**, Incheon (KR)

(21) Appl. No.: **13/133,582**

(22) PCT Filed: **Mar. 30, 2009**

(86) PCT No.: **PCT/KR2009/001599**

§ 371 (c)(1), (2), (4) Date: **Jun. 8, 2011**

(30) **Foreign Application Priority Data**

Dec. 10, 2008 (KR) 10-2008-0125477

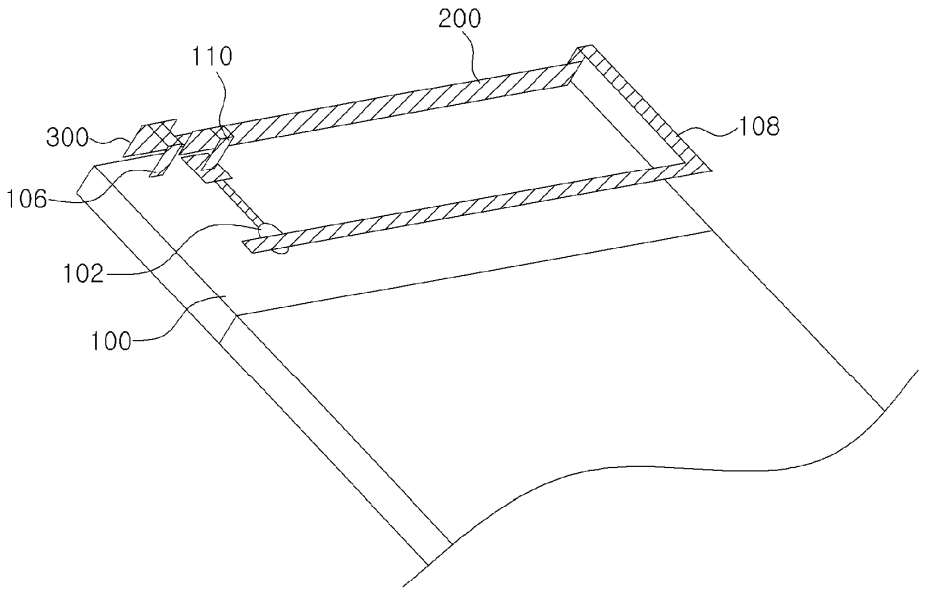
Publication Classification

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

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

(57) **ABSTRACT**

An internal antenna providing impedance matching for a wide band is disclosed. The disclosed antenna may include: a substrate; an impedance matching/feeding unit comprising a feeding member, separated from the substrate at a designated distance, configured to receive RF signals, and of a designated length in a first direction, and a ground member, separated from the substrate at a designated distance, separated from the feeding member at a designated in a second direction perpendicular to the first direction, and of a designated length in the first direction; and a radiator extending from the ground member; wherein the impedance matching/feeding unit performs impedance matching by way of coupling between the feeding member and the ground member, and the radiator receives coupling feeding from the feeding member. The disclosed antenna has the advantages of overcoming the narrow band problem of a planar inverted-F antenna, and of allowing more efficient utilization of space in an internal antenna.



US 20110241964A1

(19) **United States**

(12) **Patent Application Publication**

Kim

(10) **Pub. No.: US 2011/0241964 A1**

(43) **Pub. Date: Oct. 6, 2011**

(54) **BUILT-IN ANTENNA WHICH SUPPORTS BROADBAND IMPEDANCE MATCHING AND HAS FEEDING PATCH COUPLED TO SUBSTRATE**

(75) Inventor: **Byong-Nam Kim**, Kyeonggi-Do (KR)

(73) Assignee: **ACE TECHNOLOGIES CORPORATION**, Incheon (KR)

(21) Appl. No.: **13/139,431**

(22) PCT Filed: **Mar. 30, 2009**

(86) PCT No.: **PCT/KR2009/001604**

§ 371 (c)(1),
(2), (4) Date: **Jun. 13, 2011**

(30) **Foreign Application Priority Data**

Dec. 18, 2008 (KR) 10-2008-0129669

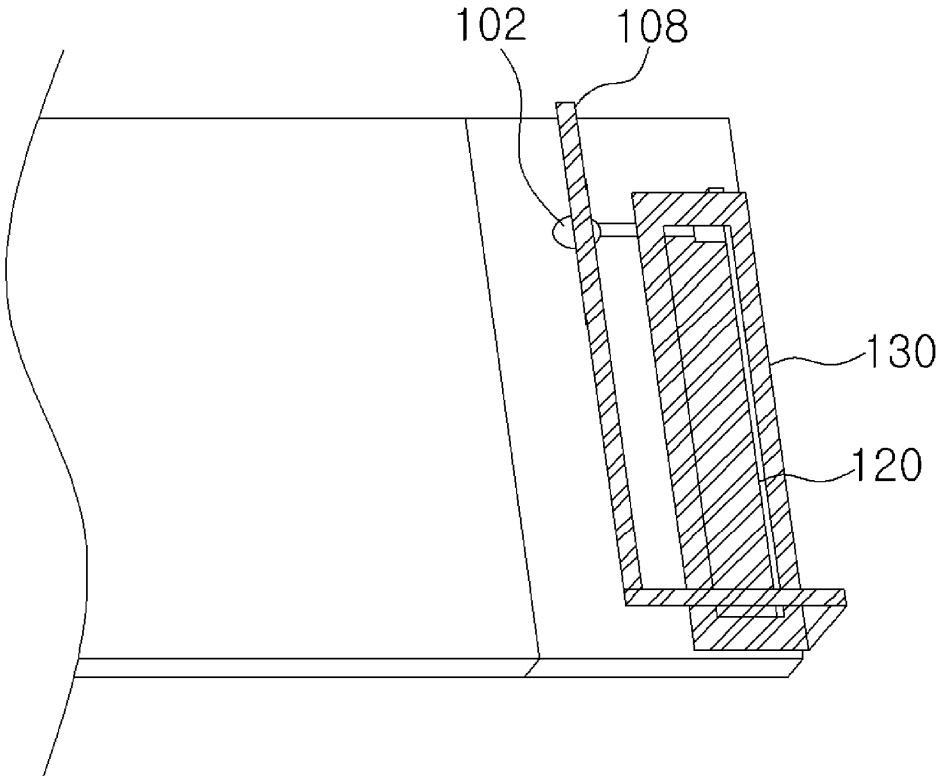
Publication Classification

(51) **Int. Cl.**
H01Q 1/50 (2006.01)
H01Q 1/48 (2006.01)

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

(57) **ABSTRACT**

Disclosed is an internal antenna providing impedance matching for a wide band where a feeding patch is placed on a substrate. The disclosed antenna may include: a substrate; an impedance matching/feeding unit including a feeding patch, which is formed on the substrate and electrically connected to a feeding point, and a ground patch, which is electrically connected to a ground and formed above the feeding patch separated at a designated distance from the feeding patch; and a radiator formed extending from the ground patch, where the impedance matching/feeding unit performs impedance matching by way of coupling between the feeding patch and the ground patch, and the radiator receives coupling feeding from the feeding patch. The disclosed antenna has the advantages of overcoming the narrow band problem of a planar inverted-F antenna, and of allowing more efficient utilization of space in an internal antenna for a wide band using coupling matching and coupling feeding.



US 20110241970A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0241970 A1

(43) Pub. Date: Oct. 6, 2011

Wang et al.

(54) **HOLDING DEVICE WITH AN ANTENNA AND METHOD FOR ASSEMBLING THE SAME**

(76) Inventors: **Tun-Ping Wang**, Taipei (TW); **Ho-Hsin Chou**, Taipei (TW); **Jeng-Hsiang Lee**, Taipei (TW); **Jun-Long Wu**, Taipei (TW)

(21) Appl. No.: **12/752,103**

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

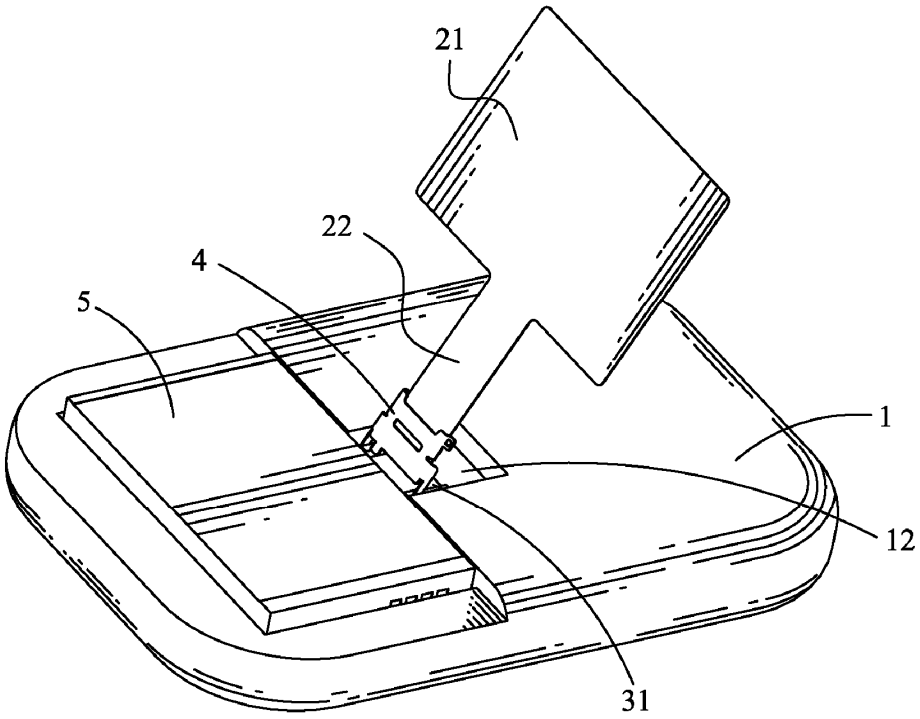
Publication Classification

(51) **Int. Cl.**
H01Q 3/02 (2006.01)
H01P 11/00 (2006.01)

(52) **U.S. Cl.** **343/882**; 29/600

(57) **ABSTRACT**

A holding device having a printed circuit board includes a base having a securing recess at a top surface thereof, a securing connector fixed in the securing recess and connected with the printed circuit board, a holding shell rotatably covered to the securing connector, and a flexible antenna of flat plate shape. The antenna has a rectangular radiating body, and a strip-shaped connecting portion extended outwards from a side of the radiating body. A free end of the connecting portion is held by the holding shell and rotated to connect with the securing connector electrically and detachably. An exposed portion of the connecting portion is bent so that the radiating body is attached to the top surface of the base.



US 20110248890A1

(19) **United States**

(12) **Patent Application Publication**

LEE et al.

(10) **Pub. No.: US 2011/0248890 A1**

(43) **Pub. Date: Oct. 13, 2011**

(54) **DIELECTRIC RESONATOR ANTENNA EMBEDDED IN MULTILAYER SUBSTRATE FOR ENHANCING BANDWIDTH**

(75) Inventors: **Jung Aun LEE**, Gyunggi-do (KR); **Chul Gyun PARK**, Gyunggi-do (KR); **Moonil KIM**, Gyunggi-do (KR); **Kook Joo LEE**, Seoul (KR)

(73) Assignee: **SAMSUNG ELECTRO-MECHANICS CO ., LTD.**, Gyunggi-do (KR)

(21) Appl. No.: **12/833,688**

(22) Filed: **Jul. 9, 2010**

(30) **Foreign Application Priority Data**

Apr. 13, 2010 (KR) 10-2010-0033998

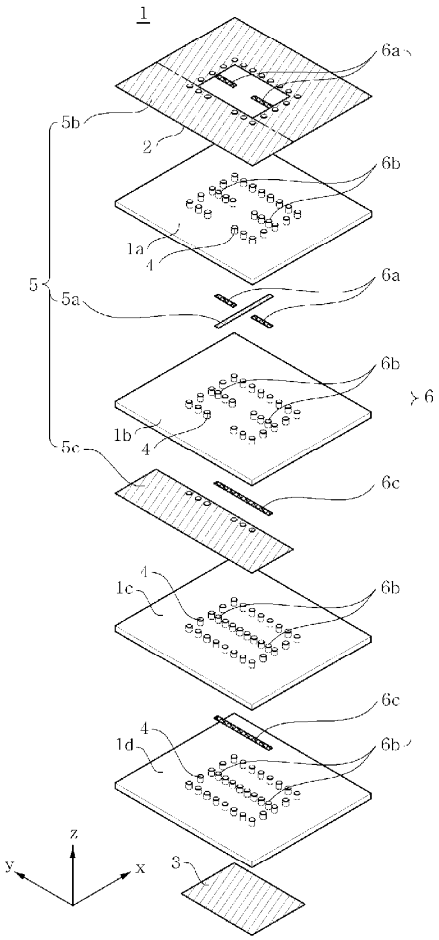
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed herein is a dielectric resonator antenna embedded in a multilayer substrate for enhancing bandwidth. The dielectric resonator antenna includes a multilayer substrate, a first conductive plate, a second conductive plate, a plurality of first metal via holes, a feeding part configured to feed a dielectric resonator, and a conductive pattern part inserted into the dielectric resonator so that a vertical metal interface is formed in the dielectric resonator. Accordingly, the dielectric resonator antenna has low sensitivity to fabrication errors and an external environment, and can enhance the radiation characteristics of the antenna when multiple resonances occur.



US 20110248895A1

(19) **United States**

(12) **Patent Application Publication**

BUNGO et al.

(10) **Pub. No.: US 2011/0248895 A1**

(43) **Pub. Date: Oct. 13, 2011**

(54) **MOBILE WIRELESS TERMINAL AND ANTENNA DEVICE**

(75) Inventors: **Akihiro BUNGO**, Tokyo (JP); **Toshiya Kusama**, Kanagawa (JP)

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

(21) Appl. No.: **13/069,956**

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

Related U.S. Application Data

(60) Provisional application No. 61/322,494, filed on Apr. 9, 2010.

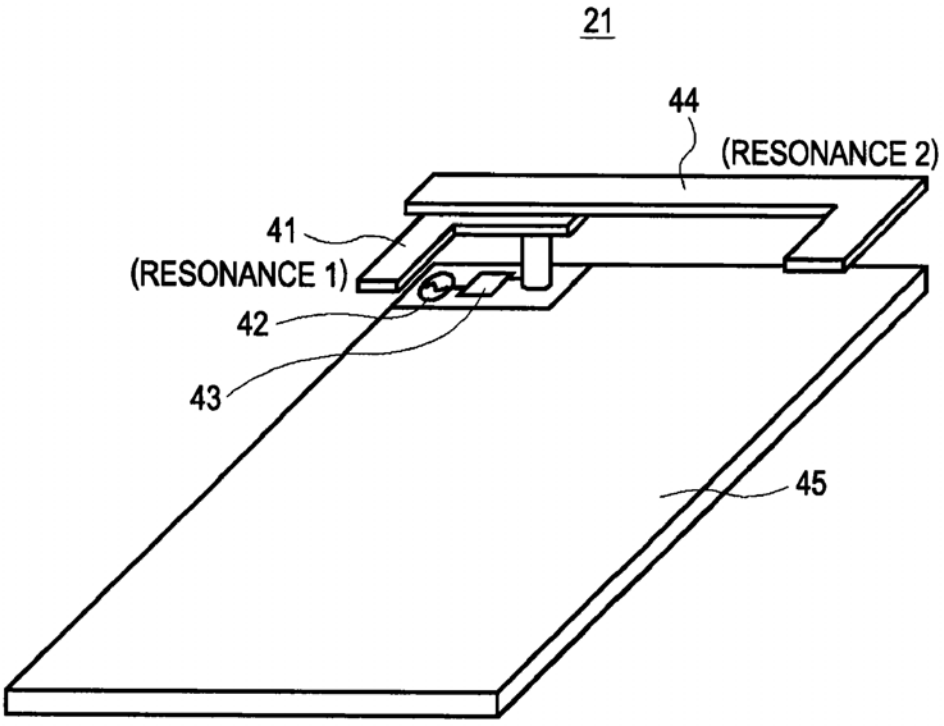
Publication Classification

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

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

(57) **ABSTRACT**

A mobile wireless terminal includes a housing, a cover removably attached to the housing, and an antenna device disposed inside the housing. The antenna device includes a first antenna element that is disposed inside the housing and serves as a feed element, a plate that provides a ground plane for the first antenna element, and a second antenna element that is formed on one surface of the cover so as to face the first antenna element with the cover being attached to the housing and capacitively couple to the first antenna element and that serves as a parasitic element.



US 20110248896A1

(19) **United States**

(12) **Patent Application Publication**

Qi et al.

(10) **Pub. No.: US 2011/0248896 A1**

(43) **Pub. Date: Oct. 13, 2011**

(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.: **13/156,728**

(22) Filed: **Jun. 9, 2011**

Related U.S. Application Data

(63) 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.

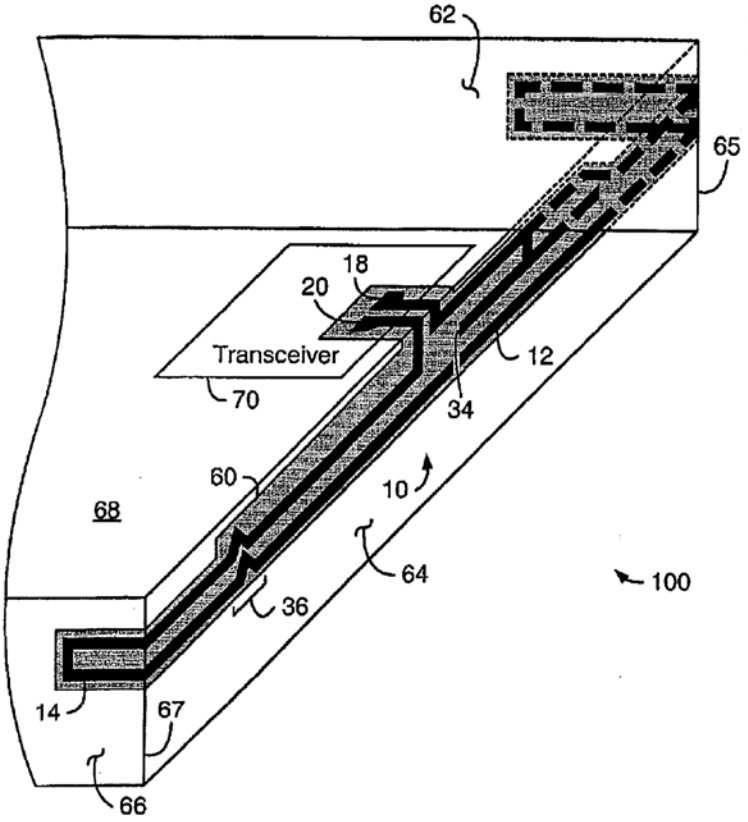
Publication Classification

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

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

(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 20110248900A1

(19) **United States**

(12) **Patent Application Publication**

de Rochemont

(10) **Pub. No.: US 2011/0248900 A1**

(43) **Pub. Date: Oct. 13, 2011**

(54) **FREQUENCY-SELECTIVE DIPOLE ANTENNAS**

(76) Inventor: **L. Pierre de Rochemont**, Austin, TX (US)

(21) Appl. No.: **13/163,654**

(22) Filed: **Jun. 17, 2011**

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/818,025, filed on Jun. 17, 2010.

(60) Provisional application No. 61/187,687, filed on Jun. 17, 2009, provisional application No. 61/355,755, filed on Jun. 17, 2010.

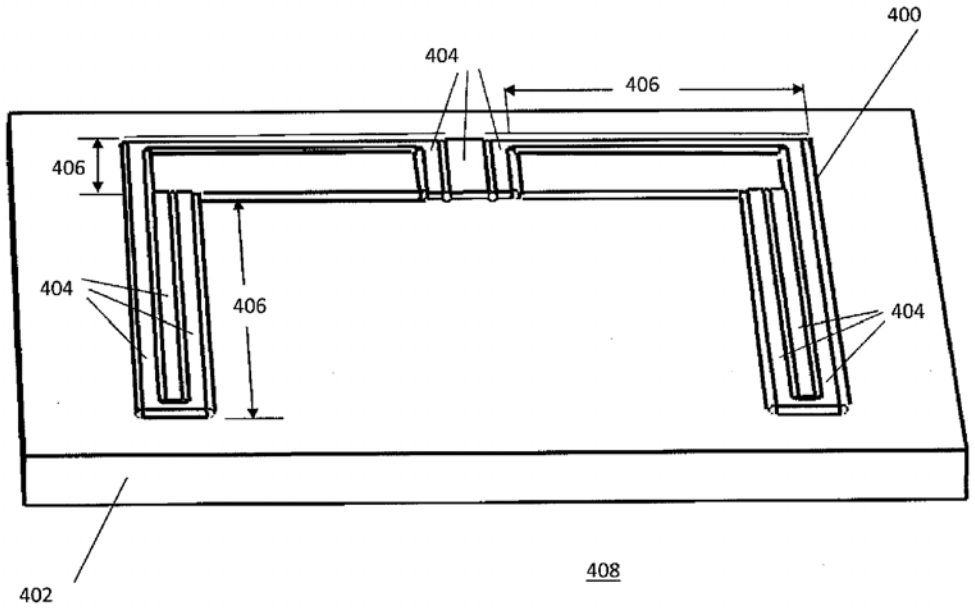
Publication Classification

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

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

(57) **ABSTRACT**

A dipole antenna forms a distributed network filter



US 20110249415A1

(19) **United States**

(12) **Patent Application Publication**

TAKEZAKI

(10) **Pub. No.: US 2011/0249415 A1**

(43) **Pub. Date: Oct. 13, 2011**

(54) **ELECTRONIC APPARATUS**

(75) Inventor: **Satoshi TAKEZAKI**, Ome-shi (JP)

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

(21) Appl. No.: **13/163,467**

(22) Filed: **Jun. 17, 2011**

Related U.S. Application Data

(63) Continuation of application No. 12/704,009, filed on Feb. 11, 2010.

(30) **Foreign Application Priority Data**

May 29, 2009 (JP) 2009-131132

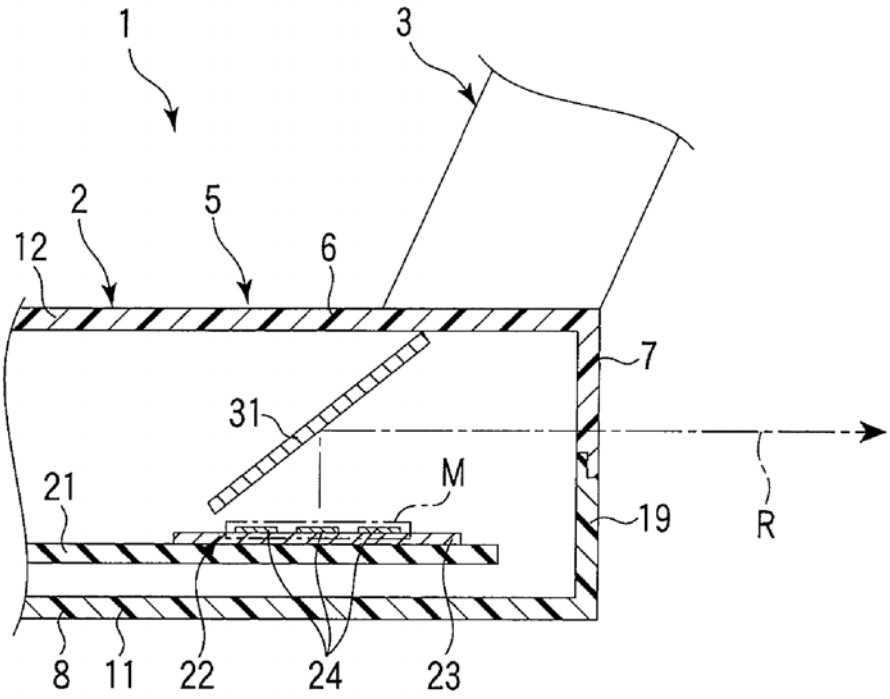
Publication Classification

(51) **Int. Cl.**
H05K 5/00 (2006.01)

(52) **U.S. Cl.** **361/752**

(57) **ABSTRACT**

According to one embodiment, an electronic apparatus includes a main unit with a housing having an upper wall, a front wall, a rear wall facing a communicating party, a display rotatably attached to the main unit, a circuit board in the housing of the main unit, a directional antenna on the circuit board, and a reflecting plate between the antenna and an inner surface of the housing. The antenna emits a radio wave in a direction substantially orthogonal to the upper wall. The reflecting plate reflects the radio wave from the antenna toward the rear wall in order to allow the radio wave to travel toward the communicating party through the rear wall. The electronic apparatus can be operated with the display screen and the communicating party in a same direction from the perspective of a position facing the front wall.



US 20110254737A1

(19) **United States**

(12) **Patent Application Publication**

Chiu et al.

(10) **Pub. No.: US 2011/0254737 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **SLOTTED ANTENNA DEVICE**

(75) Inventors: **Chieh-Ping Chiu**, Tao Yuan Shien (TW); **Feng-Jen Weng**, Tao Yuan Shien (TW); **Hsiao-Wei Wu**, Tao Yuan Shien (TW); **I-Ping Yen**, Tao Yuan Shien (TW)

(73) Assignee: **QUANTA COMPUTER INC.**

(21) Appl. No.: **12/848,347**

(22) Filed: **Aug. 2, 2010**

(30) **Foreign Application Priority Data**

Apr. 20, 2010 (TW) 099112350

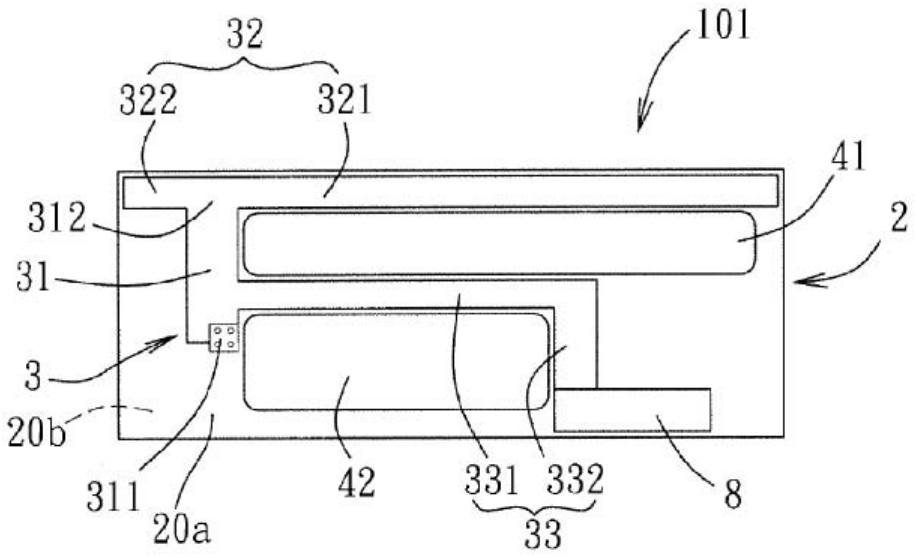
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device includes a substrate and an antenna disposed on the substrate. The substrate has opposite first and second surfaces. The antenna is disposed on the first surface, and includes a feed-in portion, a radiator portion, and a grounding portion. The feed-in portion has a feed-in section for feeding of signals, and a connecting section opposite to the feed-in section. The radiator portion is connected to the connecting section and extends along a first longitudinal line. The grounding portion includes a first grounding section extending along a second longitudinal line from the feed-in section and spaced apart from the radiator portion. The substrate has a region that is between the first and second longitudinal lines and that is formed with a slot extending through the first and second surfaces.



US 20110254738A1

(19) **United States**

(12) **Patent Application Publication**

CHIU et al.

(10) **Pub. No.: US 2011/0254738 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **MULTI-BAND ANTENNA**

(76) Inventors: **Chieh-Ping CHIU**, Erlun Township (TW); **Feng-Jen WENG**, Kuei Shan Hsiang (TW); **Hsiao-Wei WU**, Zhongli City (TW); **I-Ping YEN**, Kuei Shan Hsiang (TW)

(21) Appl. No.: **12/872,038**

(22) Filed: **Aug. 31, 2010**

(30) **Foreign Application Priority Data**

Apr. 20, 2010 (TW) 099112352

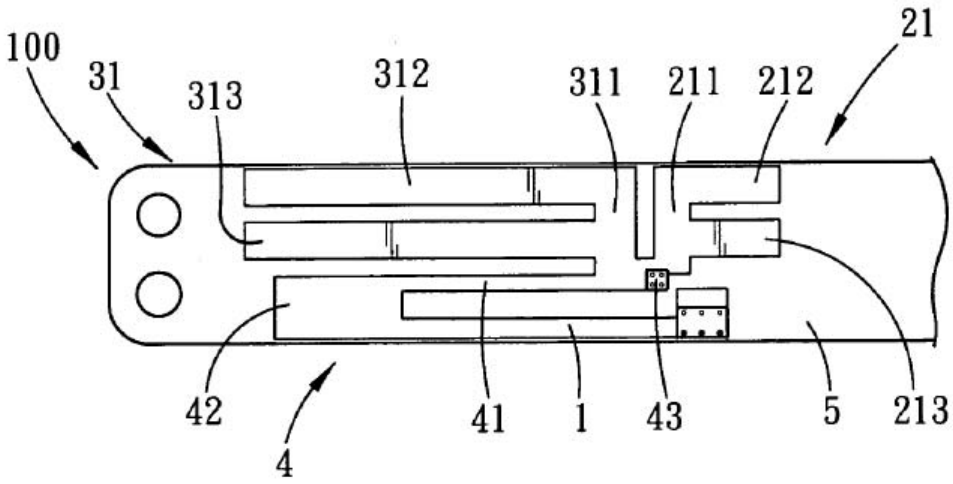
Publication Classification

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

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

(57) **ABSTRACT**

An antenna includes a grounding element, a connecting element, and first and second radiator elements. The connecting element includes an elongated first connecting section, and a second connecting section connecting the first connecting section to the grounding element. The first radiator element includes a first radiator section extending substantially perpendicular from one side of the first connecting section, and second and third radiator sections extending substantially perpendicular from one side of the first radiator section. The second radiator element includes a first radiator portion extending substantially perpendicular from the one side of the first connecting section, and second and third radiator portions extending substantially perpendicular from one side of the first radiator portion and extending in an opposite direction relative to the second and third radiator sections.



US 20110254740A1

(19) **United States**

(12) **Patent Application Publication**

Maeda et al.

(10) **Pub. No.: US 2011/0254740 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **MICROSTRIP ANTENNA**

(75) Inventors: **Hiroyuki Maeda**, Novi, MI (US); **Yingcheng Dai**, Novi, MI (US)

(73) Assignee: **HARADA INDUSTRY OF AMERICA, INC.**, Novi, MI (US)

(21) Appl. No.: **13/167,110**

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

Related U.S. Application Data

(62) Division of application No. 11/948,628, filed on Nov. 30, 2007, now Pat. No. 7,994,999.

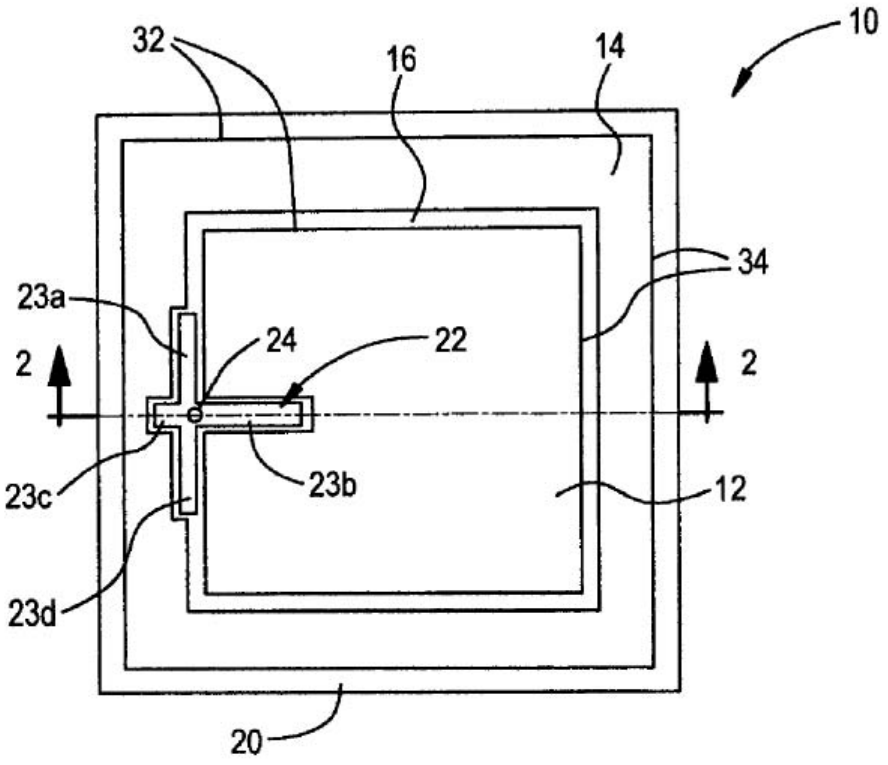
Publication Classification

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

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

(57) **ABSTRACT**

A microstrip antenna that can be linear, co-circular, or dual-circularly polarized having co-planar radiating elements and operating at dual frequency bands wherein an inner radiating element is surrounded by and spaced from an outer radiating element. Each radiating element resonates at a different frequency. In one embodiment of the invention a feed network has a single, cross-shaped, feed line that is positioned between the inner and outer radiating elements and capacitively coupled to the inner and outer radiating elements. In another embodiment of the present invention, the radiating elements are fed separately by first and second feed networks each having a plurality of feed points. The radiating elements each have one active feed point that is either directly or indirectly coupled to its respective feed network.



US 20110254741A1

(19) **United States**

(12) **Patent Application Publication**

Ishimiya

(10) **Pub. No.: US 2011/0254741 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **WIRELESS COMMUNICATION DEVICE WITH HOUSING MEMBER THAT FUNCTIONS AS A RADIATING ELEMENT OF AN ANTENNA**

(76) Inventor: **Katsunori Ishimiya**, Tokyo (JP)

(21) Appl. No.: **12/761,591**

(22) Filed: **Apr. 16, 2010**

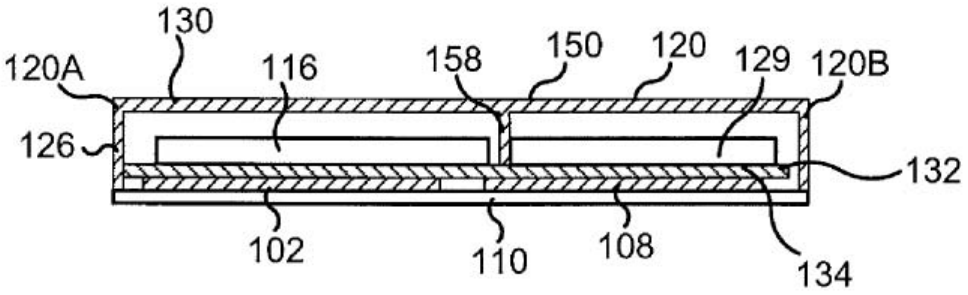
Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 9/04 (2006.01)

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

(57) **ABSTRACT**

A wireless communication device includes a housing including a first exterior portion and a second exterior portion defining a space therebetween for mounting electronic circuitry within the housing. The second exterior portion of the housing includes a conductive layer having a first end and a second end opposite the first end, and a printed wiring board within the housing. The printed wiring board includes a ground plane and is spaced apart from the conductive layer. An antenna feed element electrically couples a lead on the printed wiring board to the conductive layer at a point that is displaced from the first end of the conductive layer towards a center of the conductive layer, and a ground connection electrically couples the conductive layer to the ground plane of the printed circuit board. The conductive layer may provide a conductive outer cover of the device.



US 20110254743A1

(19) **United States**

(12) **Patent Application Publication**

Kobayashi et al.

(10) **Pub. No.: US 2011/0254743 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **PORTABLE WIRELESS DEVICE**

(75) Inventors: **Hiroaki Kobayashi**, Miyagi (JP); **Toshihiro Asahina**, Kanagawa (JP); **Shingo Sumi**, Miyagi (JP)

(73) Assignee: **PANASONIC CORPORATION**, Osaka (JP)

(21) Appl. No.: **13/140,994**

(22) PCT Filed: **Jun. 8, 2009**

(86) PCT No.: **PCT/JP2009/002581**

§ 371 (c)(1), (2), (4) Date: **Jun. 20, 2011**

(30) **Foreign Application Priority Data**

Dec. 24, 2008 (JP) 2008-328483

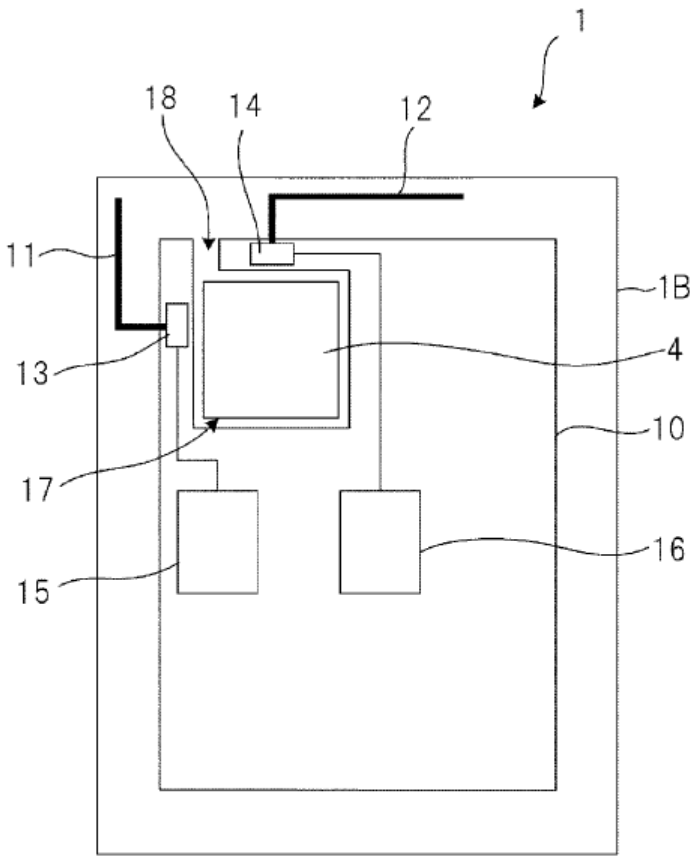
Publication Classification

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

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

(57) **ABSTRACT**

An object of the invention is to provide a portable wireless device that can attain a high level of antenna performance when a plurality of antenna elements is present, and for which a housing can be made thinner. Among paths between a first power supply unit **13** and a second power supply unit **14** provided at edges of a notched part **17** of a circuit board, a ground pattern of a path with a short electrical length relative to a wavelength of an operating frequency of a first wireless unit **15** or an operating frequency of a second wireless unit **16** is split to give an electrically unconnected state. In this way, ground current caused by one of the antenna elements (for example, second antenna element **12**) will not flow to or will be reduced in the other antenna element (for example, first antenna element **11**), so that deterioration in the characteristics of the other antenna element can be kept low.



US 20110254744A1

(19) **United States**

(12) **Patent Application Publication**

Sumi

(10) **Pub. No.: US 2011/0254744 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **PORTABLE WIRELESS APPARATUS**

(75) Inventor: **Shingo Sumi**, Kanagawa (JP)

(73) Assignee: **PANASONIC CORPORATION**, Osaka (JP)

(21) Appl. No.: **13/141,140**

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

(86) PCT No.: **PCT/JP2009/002827**

§ 371 (c)(1), (2), (4) Date: **Jun. 21, 2011**

(30) **Foreign Application Priority Data**

Dec. 26, 2008 (JP) 2008-334010

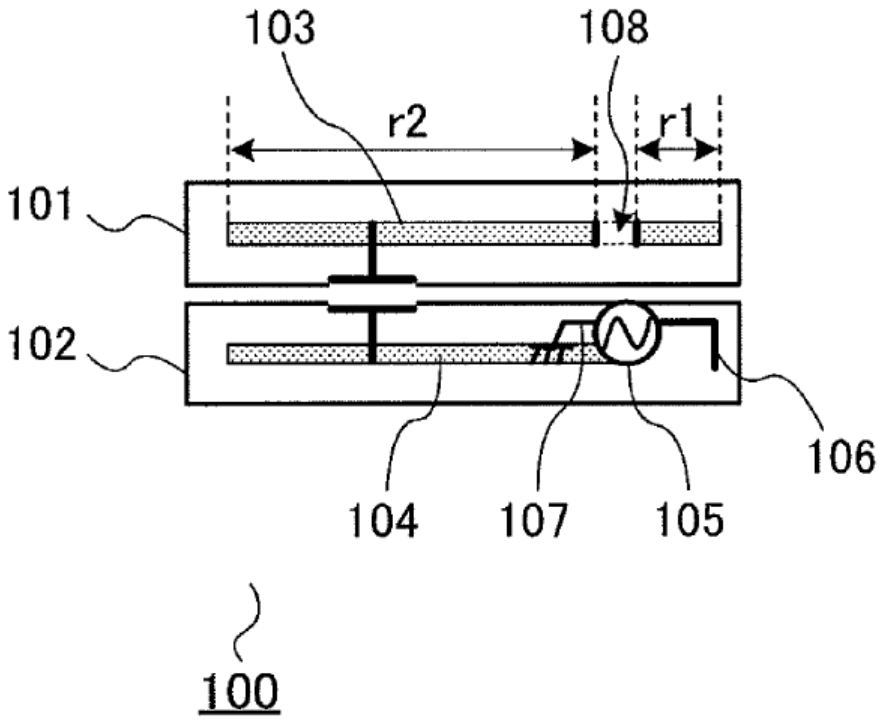
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed is a portable wireless apparatus that can be miniaturized and that can achieve high antenna performance even when the antenna and circuit board overlap in the vertical direction. In this apparatus, a second case (**102**) is mounted so as to be slidable with respect to a first case (**101**). An antenna (**106**) is provided on the second case (**102**). A circuit board (**104**) is provided on the first case (**101**) and has a slit (**108**) that extends in the direction intersecting the sliding direction, at the boundary of a region (**r1**) including a region opposite the antenna (**106**) in the vertical direction and a region (**r2**) other than this region (**r1**), when the first case (**101**) and second case (**102**) are overlapping and closed.



US 20110254748A1

(19) **United States**

(12) **Patent Application Publication**

Rowson et al.

(10) **Pub. No.: US 2011/0254748 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **ANTENNA AND METHOD FOR STEERING ANTENNA BEAM DIRECTION**

(76) Inventors: **Sebastian Rowson**, San Diego, CA (US); **Laurent Desclos**, San Diego, CA (US); **Jeffrey Shamblin**, San Marcos, CA (US)

(21) Appl. No.: **13/029,564**

(22) Filed: **Feb. 17, 2011**

Related U.S. Application Data

(63) Continuation of application No. 12/043,090, filed on Mar. 5, 2008, now Pat. No. 7,911,402.

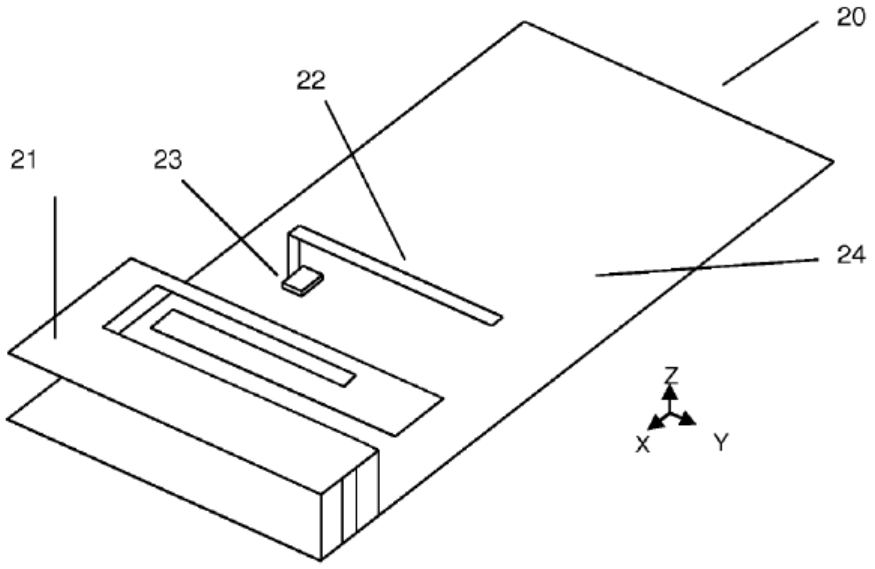
Publication Classification

(51) **Int. Cl.**
H01Q 9/38 (2006.01)

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

(57) **ABSTRACT**

An antenna comprising an IMD element, and one or more parasitic and active tuning elements is disclosed. The IMD element, when used in combination with the active tuning and parasitic elements, allows antenna operation at multiple resonant frequencies. In addition, the direction of antenna radiation pattern may be arbitrarily rotated in accordance with the parasitic and active tuning elements.



US 20110254749A1

(19) **United States**

(12) **Patent Application Publication**

Amari et al.

(10) **Pub. No.: US 2011/0254749 A1**

(43) **Pub. Date: Oct. 20, 2011**

(54) **ANTENNA APPARATUS INCLUDING MULTIPLE ANTENNA PORTIONS ON ONE ANTENNA ELEMENT OPERABLE AT MULTIPLE FREQUENCIES**

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

(21) Appl. No.: **13/125,373**

(22) PCT Filed: **May 25, 2010**

(86) PCT No.: **PCT/JP2010/003483**

§ 371 (c)(1),
(2), (4) Date: **Jul. 5, 2011**

(30) **Foreign Application Priority Data**

Aug. 25, 2009 (JP) 2009-194062

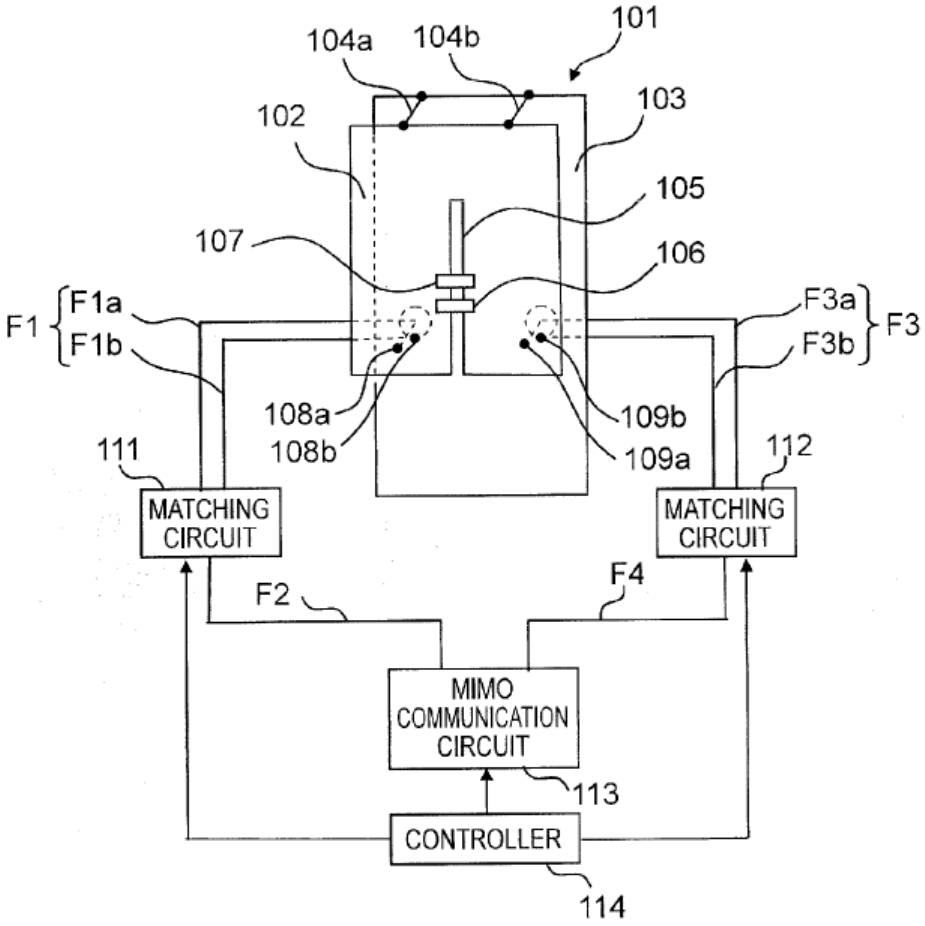
Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 1/50 (2006.01)

(52) **U.S. Cl.** **343/750**; 343/858

(57) **ABSTRACT**

An antenna element has first and second feed ports, and is simultaneously excited through the feed ports so as to simultaneously operate as first and second antenna portions respectively, associated with the feed ports. The antenna element is excited at one of a first frequency and a second frequency higher than the first frequency. An antenna apparatus is provided with: a slit that provides isolation between the feed ports; a trap circuit that allows the slit to provide isolation at the first or second frequency when the antenna element is excited at the first or second frequency; and a reactance element that shifts a frequency at which the slit provides isolation between the feed ports, to the first frequency, when the antenna element is excited at the first frequency.



US 20110260924A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0260924 A1

(43) Pub. Date: Oct. 27, 2011

Roy

(54) **TUNEABLE PCB ANTENNA**

(76) Inventor: **Iain Campbell Roy**, Irvine (CA)

(21) Appl. No.: **12/765,917**

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

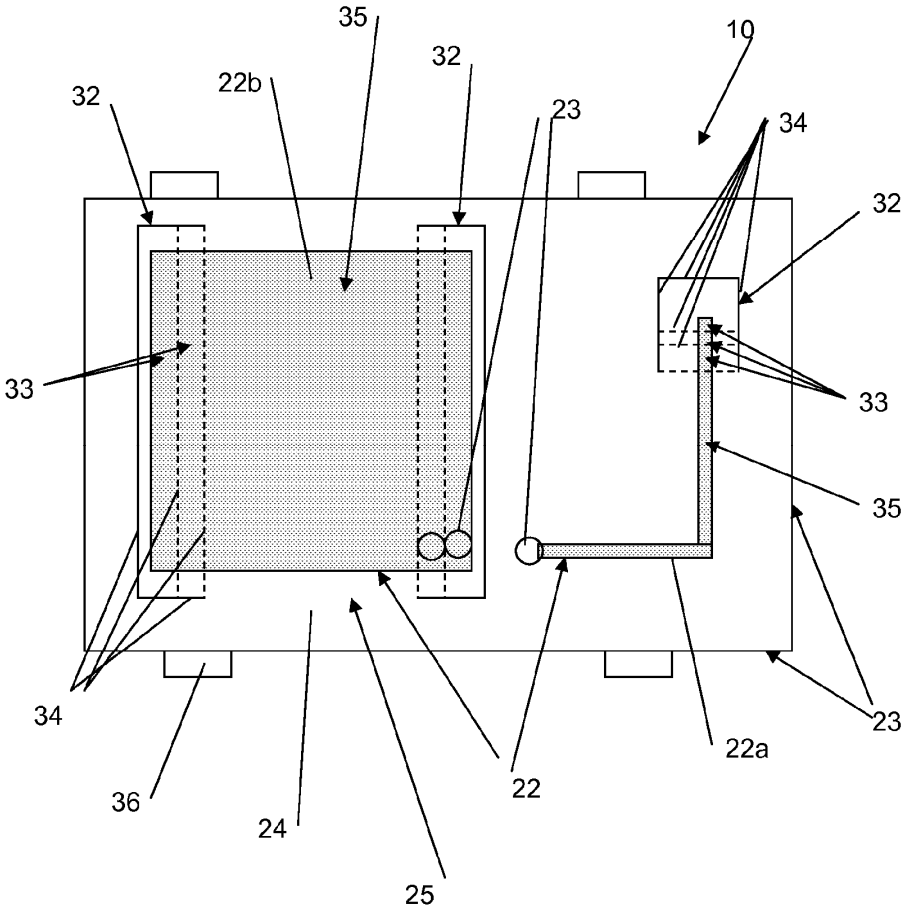
Publication Classification

(51) **Int. Cl.**
H01Q 9/14 (2006.01)
H01Q 1/38 (2006.01)

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

(57) **ABSTRACT**

An antenna and antenna manufacturing process for an antenna configured for at least one of transmission or reception of electromagnetic waves with respect to a surrounding environment, the antenna having an antenna element positioned in metal trace on a carrier body, antenna element being isolated from an electrical ground of the antenna. The antenna comprises: at least one predefined removal portion positioned in the carrier body for containing a removal fraction of the antenna element, such that the carrier body located outside of the predefined removal portion is configured to contain the remainder fraction of the antenna element; and a weakness pattern in the carrier body about at least part of the periphery of the at least one predefined removal portion, the weakness pattern configured for predisposing the carrier body to break along the weakness pattern upon application of force, such that the at least one predefined removal portion and corresponding removal fraction would be separated from the antenna upon application; wherein the separation of the predefined removal portion and corresponding removal fraction provides for modification of at least one tuning parameter of the antenna having the remainder fraction as the tuned antenna element.



US 20110260925A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0260925 A1

(43) Pub. Date: Oct. 27, 2011

Chirila

(54) **MULTIBAND INTERNAL PATCH ANTENNA FOR MOBILE TERMINALS**

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

(21) Appl. No.: **12/766,008**

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

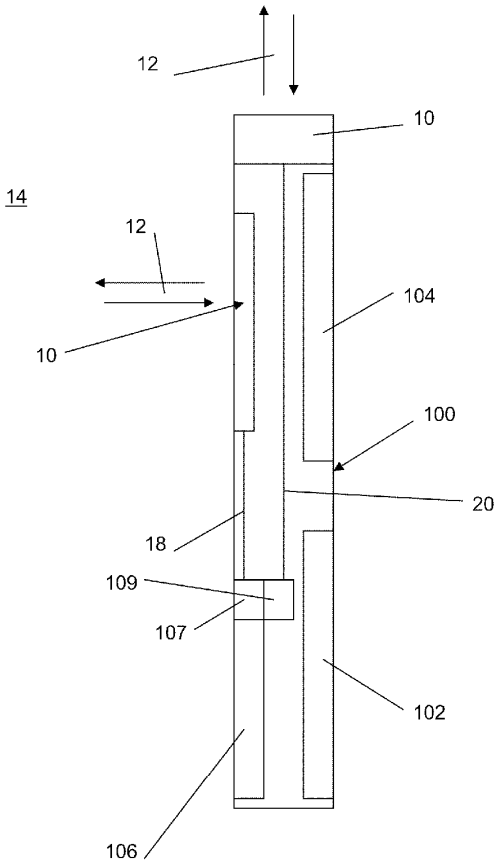
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band patch antenna configured for at least one of transmission or reception of electromagnetic waves in two or more frequency bands with respect to a surrounding environment, the antenna comprising: a conductive antenna element isolated from an electrical ground element of the antenna and configured for operating as a radiating surface for the electromagnetic waves with respect to the surrounding environment, the antenna element having a pair of slots dividing the antenna element into a first parasitic element, a second parasitic element, and a third element such that a first slot of the pair of slots electrically isolates the first parasitic element from the third element and a second slot of the pair of slots electrically isolates the second parasitic element from the third element; the ground element having at least one ground slot; a substrate having a selected dielectric constant and being positioned between the antenna element and the ground element, such that the antenna element is attached to a first surface of the substrate and the ground element is attached to a second surface of the substrate opposite the first surface; a feed point location of the antenna element positioned on the third element, such that only the third element of the antenna element is configured to be coupled to a signal conductor of a transmission line, such that the transmission line is configured to conduct current flow for at least one of towards the antenna element for transmission of the electromagnetic waves from the antenna element or away from the antenna element as a result of reception of the electromagnetic waves by the antenna element; and a feed point location of the ground element configured to be coupled to a ground conductor of the transmission line.



US 20110260926A1

(19) **United States**

(12) **Patent Application Publication**

Illera et al.

(10) **Pub. No.: US 2011/0260926 A1**

(43) **Pub. Date: Oct. 27, 2011**

(54) **MULTIBAND ANTENNA**

(76) Inventors: **Ramiro Quintero Illera**, Barcelona (ES); **Carles Puerlte Baliarda**, Barcelona (ES)

(21) Appl. No.: **12/910,016**

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

Related U.S. Application Data

(63) Continuation of application No. 12/229,483, filed on Aug. 22, 2008, now Pat. No. 7,920,097, which is a continuation of application No. 11/702,791, filed on Feb. 6, 2007, now Pat. No. 7,439,923, which is a continuation of application No. 10/823,257, filed on Apr. 13, 2004, now Pat. No. 7,215,287, which is a continuation of application No. PCT/EP01/11912, filed on Oct. 16, 2001.

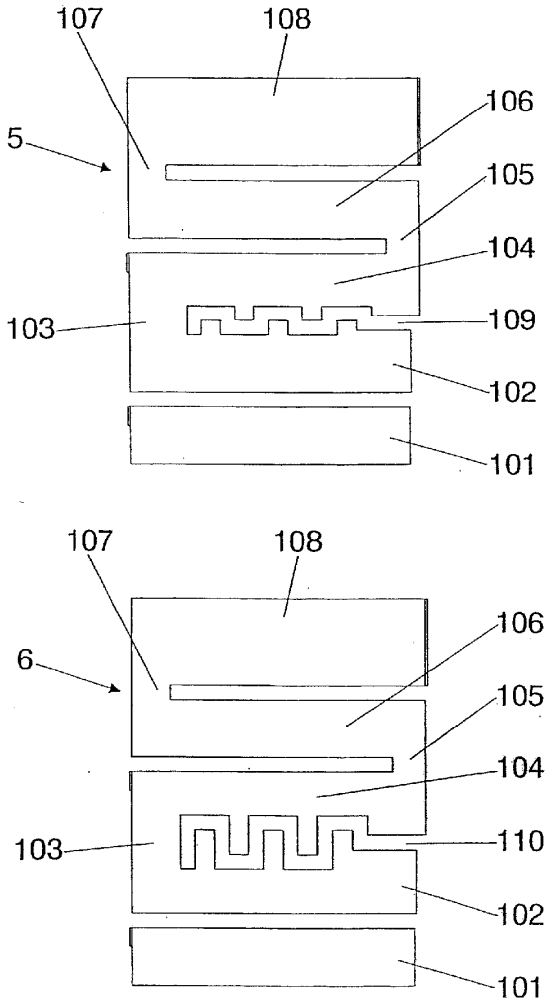
Publication Classification

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

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

(57) **ABSTRACT**

A multiband antenna includes at least two polygons. The at least two polygons are spaced by means of a non-straight gap shaped as a space-filling curve, in such a way that the whole gap length is increased yet keeping its size and the same overall antenna size allowing for an effective tuning of frequency bands of the anenna.



US 20110260927A1

(19) **United States**

(12) **Patent Application Publication**

WONG et al.

(10) **Pub. No.: US 2011/0260927 A1**

(43) **Pub. Date: Oct. 27, 2011**

(54) **MOBILE COMMUNICATION DEVICE**

(75) Inventors: **Kin Lu WONG**, Kaohsiung City (TW); **Yu Wei Chang**, Waipu Township (TW); **Chun Yih Wu**, Taipei City (TW); **Wei Yu Li**, Yilan City (TW)

(73) Assignees: **NATIONAL SUN YAT-SEN UNIVERSITY**, Kaohsiung (TW); **INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE**, Hsinchu (TW)

(21) Appl. No.: **12/968,863**

(22) Filed: **Dec. 15, 2010**

(30) **Foreign Application Priority Data**

Apr. 27, 2010 (TW) 099113215

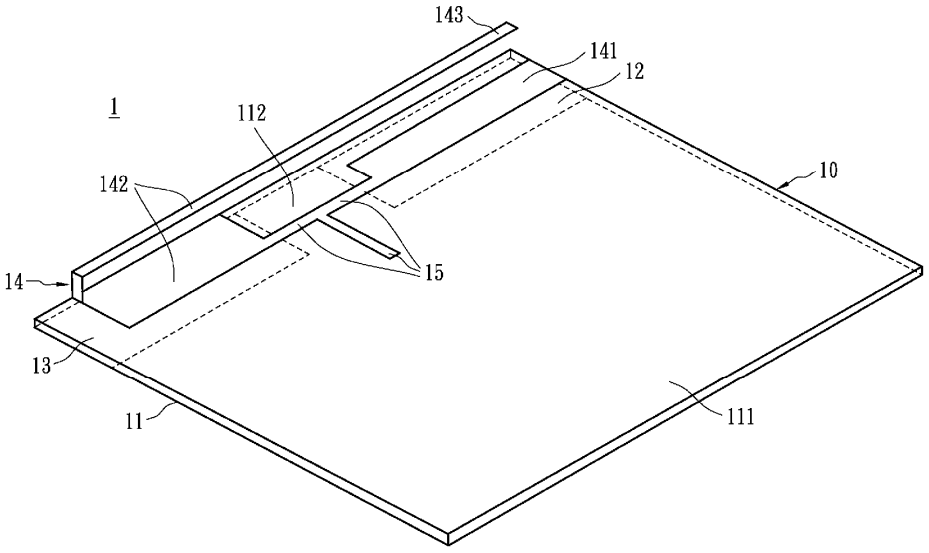
Publication Classification

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

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

(57) **ABSTRACT**

A mobile communication device comprises a dielectric substrate and an antenna. The dielectric substrate has a ground region, a first no-ground region and a second no-ground region. The ground region comprises a primary ground plane and a protruded ground plane. The protruded ground plane is electrically connected to the primary ground plane and extends between the first no-ground region and the second no-ground region, such that the protruded ground plane separates the first no-ground region from the second no-ground region. The antenna comprises a first radiating portion and a second radiating portion. The first radiating portion is disposed in the first no-ground region. The start terminal of the second radiating portion is disposed in the second no-ground region. The second radiating portion extends and crosses over the protruded ground plane such that the end terminal of the second radiating portion is disposed in the first no-ground region.



US 20110260929A1

(19) **United States**

(12) **Patent Application Publication**

Ali et al.

(10) **Pub. No.: US 2011/0260929 A1**

(43) **Pub. Date: Oct. 27, 2011**

(54) **ANTENNA ASSEMBLY WITH ELECTRICALLY EXTENDED GROUND PLANE ARRANGEMENT AND ASSOCIATED METHOD**

(75) Inventors: **Shirook M. Ali**, Waterloo (CA); **James Paul Warden**, Irving, TX (US); **Kelce Steven Wilson**, Irving, TX (US)

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

(21) Appl. No.: **12/765,581**

(22) Filed: **Apr. 22, 2010**

Publication Classification

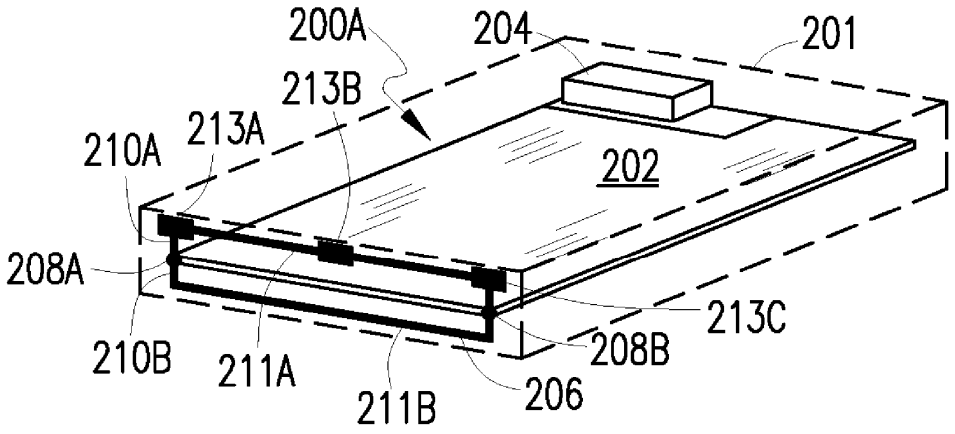
(51) **Int. Cl.**

H01Q 7/06	(2006.01)
H01Q 1/24	(2006.01)
H01Q 7/00	(2006.01)

(52) **U.S. Cl.** **343/702**; 343/788; 343/866

(57) **ABSTRACT**

Antenna assembly having an electrically or virtually extended ground plane, adapted for use in a mobile communications device, for example. The antenna assembly comprises at least one radiation element having an operating frequency and a ground plane coupled to the radiation element. At least one conductive member is electrically coupled to the ground plane at one or more connection points such that the conductive member forms a loop with the ground plane having a minimum distance therefrom that is less than a predetermined fraction of one wavelength of the operating frequency.



US 20110260931A1

(19) **United States**

(12) **Patent Application Publication**

Tsai et al.

(10) **Pub. No.: US 2011/0260931 A1**

(43) **Pub. Date: Oct. 27, 2011**

(54) **ANTENNA MODULE, AND ELECTRONIC APPARATUS INCLUDING THE ANTENNA MODULE**

(75) Inventors: **Tiao-Hsing Tsai**, Yunghe City (TW); **Ying-Chih Wang**, Tao Yuan Shien (TW); **Jui-Teng Cheng**, Kaohsiung City (TW)

(73) Assignee: **Quanta Computer Inc.**, Tao Yuan Shien (TW)

(21) Appl. No.: **12/883,719**

(22) Filed: **Sep. 16, 2010**

(30) **Foreign Application Priority Data**

Apr. 27, 2010 (TW) 099113273

Publication Classification

(51) **Int. Cl.**

H01Q 9/04 (2006.01)

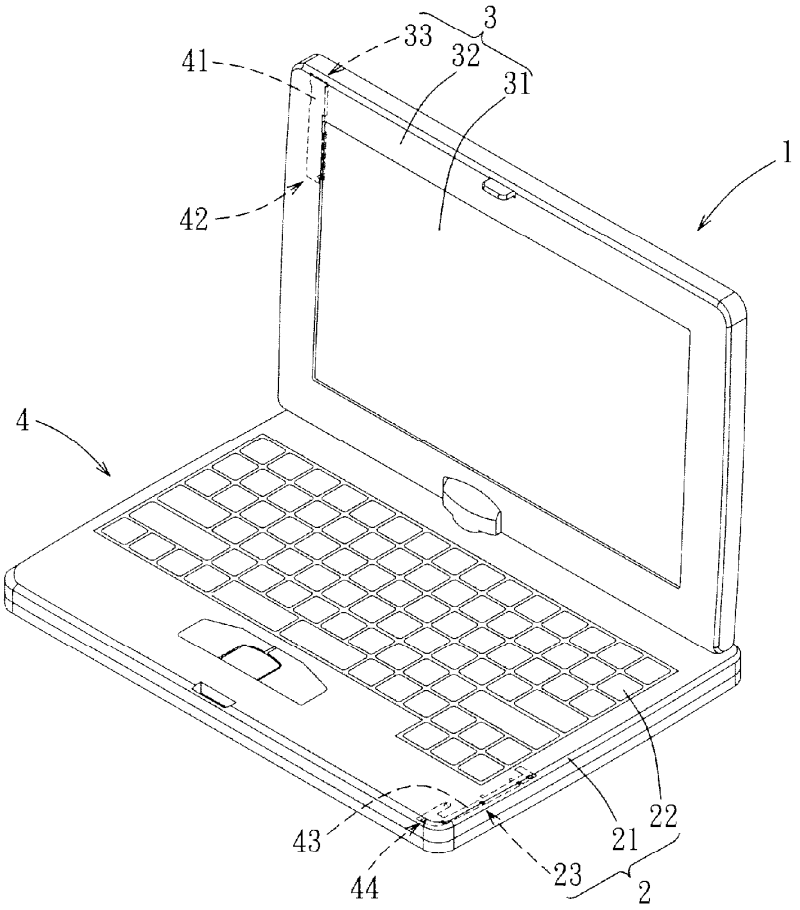
H01Q 21/00 (2006.01)

H01Q 1/24 (2006.01)

(52) **U.S. Cl.** ..... **343/702**; 343/893; 343/700 MS

(57) **ABSTRACT**

An antenna module is adapted for disposing in an electronic apparatus that includes first and second housing members and that is operable in a tablet mode, in which the first and second housing members are disposed in a manner that the first housing member overlaps the second housing member. The antenna module includes: a first antenna element to be disposed in the first housing member; and a second antenna element to be disposed in the second housing member, and corresponding substantially in position and proximate to the first antenna element for electromagnetic coupling therewith when the electronic apparatus is operated in the tablet mode.



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(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0260932 A1

(43) Pub. Date: Oct. 27, 2011

HONG et al.

(54) **ANTENNA PATTERN FRAME, ELECTRONIC DEVICE CASE PROVIDED WITH ANTENNA PATTERN FRAME AND ELECTRONIC DEVICE INCLUDING ELECTRONIC DEVICE CASE**

(75) Inventors: **Ha Ryong HONG**, Hwaseong (KR); **Sung Eun CHO**, Suwon (KR); **Tae Sung KIM**, Seoul (KR); **Duk Woo LEE**, Suwon (KR); **Dae Kyu LEE**, Suwon (KR); **Chan Gwang AN**, Suwon (KR); **Jae Suk SUNG**, Yongin (KR); **Ki Won CHANG**, Suwon (KR); **Chang Mok HAN**, Cheonan (KR); **Hyun Do PARK**, Yongin (KR)

(73) Assignee: **SAMSUNG ELECTRO-MECHANICS CO., LTD.**, Gyunggi-do (KR)

(21) Appl. No.: **13/032,365**

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

(30) **Foreign Application Priority Data**

Apr. 22, 2010 (KR) 10-2010-0037351

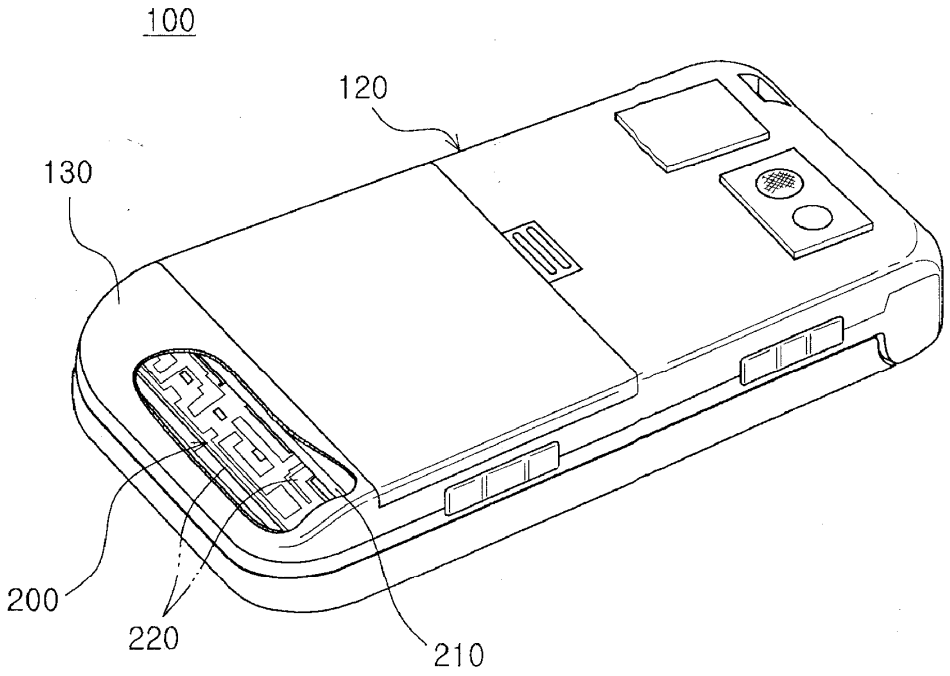
Publication Classification

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

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

(57) **ABSTRACT**

There is provided an antenna pattern frame according to an exemplary embodiment of the present invention, including: a film radiator that includes a protective film supporting one surface or both surfaces of a radiator provided with an antenna pattern part; and a radiator frame that is an injection molded part to which the film radiator is fixed and embeds the antenna pattern part in the electronic device case.



US 20110260938A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2011/0260938 A1**

(43) **Pub. Date: Oct. 27, 2011**

Xie

(54) **ANTENNA AND ANTENNA ASSEMBLY USING SAME**

(76) Inventor: **Jia-Jun Xie**, Shenzhen (CN)

(21) Appl. No.: **13/015,903**

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

(30) **Foreign Application Priority Data**

Apr. 27, 2010 (CN) 201020178660.6

Publication Classification

(51) **Int. Cl.**

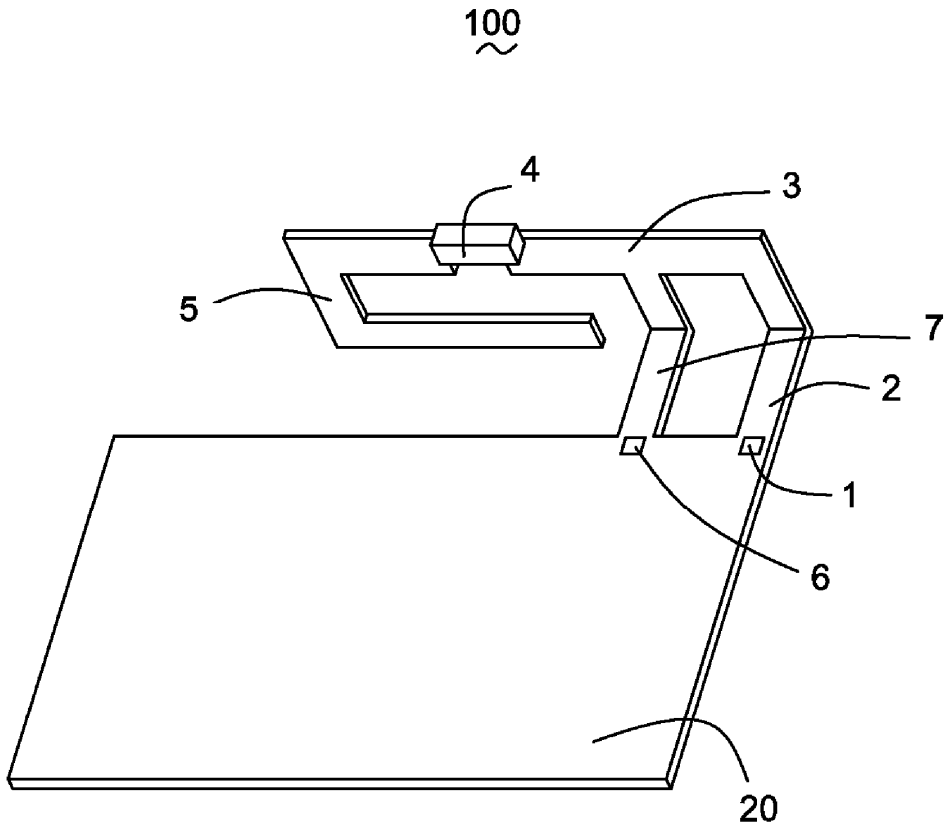
H01Q 5/00 (2006.01)

H01Q 1/00 (2006.01)

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

(57) **ABSTRACT**

The present invention provides an antenna for transmitting/receiving a first frequency signal and a second frequency signal. The antenna includes a first frequency antenna branch for transmitting/receiving the first frequency signal, a second frequency antenna branch separated from the first frequency antenna branch for transmitting/receiving the second frequency signal and an inductance for connecting the first and second frequency antenna branches in series with one another. The inductance is capable of preventing the first frequency signal passing through the second frequency antenna branch.



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(19) **United States**

(12) **Patent Application Publication**

Korva et al.

(10) **Pub. No.: US 2011/0260939 A1**

(43) **Pub. Date: Oct. 27, 2011**

(54) **DISTRIBUTED MULTIBAND ANTENNA AND METHODS**

(76) Inventors: **Heikki Korva**, Tupos (FI); **Petteri Annamaa**, Oulunsalo (FI); **Ari Raappana**, Kello (FI)

(21) Appl. No.: **12/764,826**

(22) Filed: **Apr. 21, 2010**

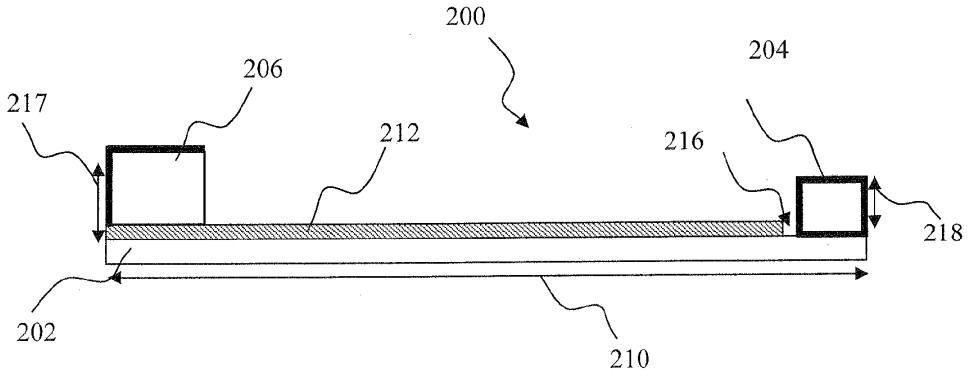
Publication Classification

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

(52) **U.S. Cl.** **343/725**

(57) **ABSTRACT**

A distributed multiband antenna intended for radio devices, and methods for designing manufacturing the same. In one embodiment, a planar inverted-F antenna (PIFA) configured to operate in a high-frequency band, and a matched monopole configured to operate in a low-frequency band, are used within a handheld mobile device (e.g., cellular telephone). The two antennas are placed on substantially opposing regions of the portable device. The use of a separate low-frequency antenna element facilitates frequency-specific antenna matching, and therefore improves the overall performance of the multiband antenna. The use of high-band PIFA reduces antenna volume, and enables a smaller device housing structure while also reducing signal losses in the high frequency band. These attributes also advantageously facilitate compliance with specific absorption rate (SAR) tests; e.g., in the immediate proximity of hand and head "phantoms" as mandated under CTIA regulations. Matching of the low-frequency band monopole antenna is further described.



US 20110263289A1

(19) **United States**

(12) **Patent Application Publication**

Vance

(10) **Pub. No.: US 2011/0263289 A1**

(43) **Pub. Date: Oct. 27, 2011**

(54) **COMMUNICATIONS STRUCTURES INCLUDING ANTENNAS WITH SEPARATE ANTENNA BRANCHES COUPLED TO FEED AND GROUND CONDUCTORS**

(76) Inventor: **Scott LaDell Vance**, Staffanstorp (SE)

(21) Appl. No.: **12/767,162**

(22) Filed: **Apr. 26, 2010**

Publication Classification

(51) **Int. Cl.**

H04W 88/02	(2009.01)
H01Q 1/00	(2006.01)
H01Q 9/04	(2006.01)
H01Q 1/50	(2006.01)

(52) **U.S. Cl.** ..... **455/550.1**; 343/860; 343/905; 343/700 MS

(57) **ABSTRACT**

A communications structure may include a ground plane, a ground conductor electrically coupled to the ground plane and extending from the ground plane, and a feed conductor. A first antenna branch may be electrically coupled to the ground conductor, with an electrical coupling between the first antenna branch and the ground conductor being spaced apart from an electrical coupling between the ground plane and the ground connector. A second antenna branch may be electrically coupled to the feed conductor, with the first and second antenna branches being spaced apart. In addition, a radio frequency (RF) transmitter and/or receiver may be provided with the ground plane and the feed conductor being electrically coupled to the RF transmitter and/or receiver.