US 20110291893A1

(19) **United States**

(12) **Patent Application Publication**

Chen et al.

(10) **Pub. No.: US 2011/0291893 A1**

(43) **Pub. Date: Dec. 1, 2011**

(54) **ANTENNA**

(75) Inventors: **Huang-Chih Chen**, Hsinchu (TW); **Yung-Jinn Chen**, Hsinchu (TW)

(73) Assignee: **WISTRON NEWEB CORP.**, Hsinchu (TW)

(21) Appl. No.: **12/983,096**

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

(30) **Foreign Application Priority Data**

Jun. 1, 2010 (TW) TW99210355

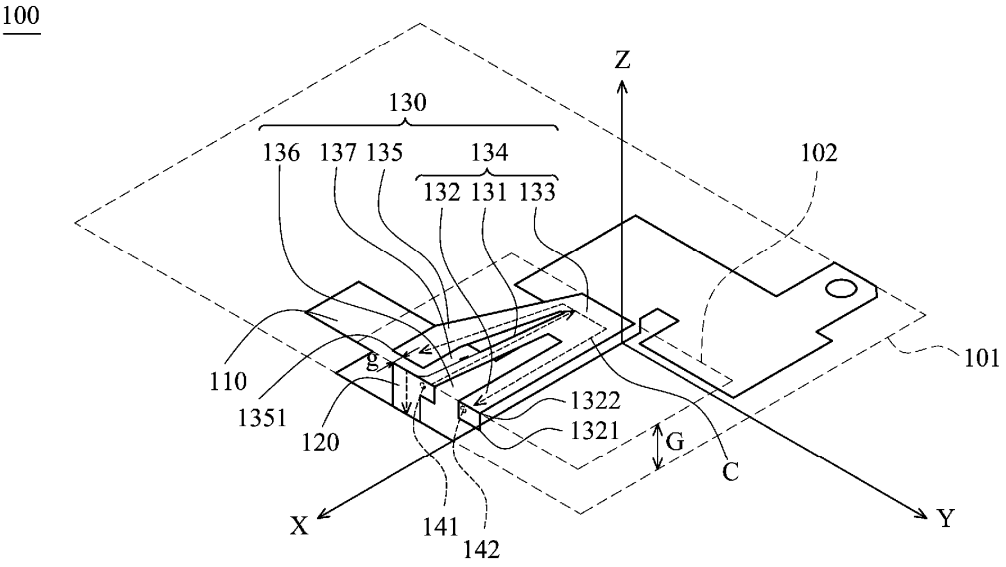
Publication Classification

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

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

(57) **ABSTRACT**

An antenna for transmitting a wireless signal is provided. The antenna includes a ground element, a short element and a transmitting element. The short element is connected to the ground element. The transmitting element is connected to the short element, wherein the transmitting element is a claw shaped structure, and the transmitting element includes a first section, a second section and an extending section, wherein an end of the first section is connected to the short element, and the other end of the first section is connected to ends of the second section and the extending section, and a first groove is formed between the first section and the second section, and a second groove is formed between the first section and the extending section.



US 20110291894A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0291894 A1

(43) Pub. Date: Dec. 1, 2011

Qi et al.

(54) **MULTIPLE-ELEMENT ANTENNA WITH FLOATING ANTENNA ELEMENT**

(75) Inventors: **Yihong Qi**, Waterloo (CA); **Ying Tong Man**, Kitchener (CA); **Michael E. Certain**, Kitchener (CA); **Perry Jarmuszewski**, Waterloo (CA)

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

(21) Appl. No.: **13/205,383**

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

Related U.S. Application Data

(63) Continuation of application No. 12/138,704, filed on Jun. 13, 2008, now Pat. No. 8,018,386, which is a continuation of application No. 11/590,200, filed on Oct. 31, 2006, now Pat. No. 7,400,300, which is a continuation of application No. 10/864,145, filed on Jun. 9, 2004, now Pat. No. 7,148,846.

(30) **Foreign Application Priority Data**

Jun. 12, 2003 (EP) 03253713.6

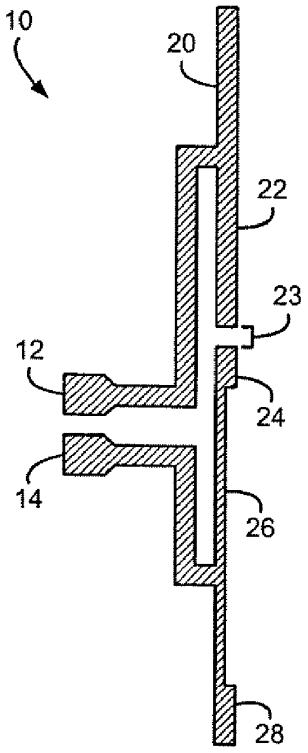
Publication Classification

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 5/01 (2006.01)

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

(57) **ABSTRACT**

A multiple-element antenna for a wireless communication device is provided. The antenna comprises a first antenna element having a first operating frequency band and a floating antenna element positioned adjacent the first antenna element to electromagnetically couple to the first antenna element. The floating antenna element is configured to operate in conjunction with the first antenna element within a second operating frequency band. A feeding port connected to the first antenna element connects the first antenna element to communications circuitry and exchanges communication signals in both the first operating frequency band and the second operating frequency band between the multiple-element antenna and the communications circuitry. In a wireless mobile communication device having a transceiver and a receiver, the feeding port is connected to both the transceiver and the receiver.



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(19) **United States**

(12) **Patent Application Publication**

Pascolini et al.

(10) **Pub. No.: US 2011/0291896 A1**

(43) **Pub. Date: Dec. 1, 2011**

(54) **HOUSING STRUCTURES FOR OPTIMIZING LOCATION OF EMITTED RADIO-FREQUENCY SIGNALS**

(76) Inventors: **Mattia Pascolini**, Campbell, CA (US); **Robert W. Schlub**, Cupertino, CA (US); **Ruben Caballero**, San Jose, CA (US); **Nanbo Jin**, Sunnyvale, CA (US); **Scott Myers**, San Francisco, CA (US)

(21) Appl. No.: **12/789,400**

(22) Filed: **May 27, 2010**

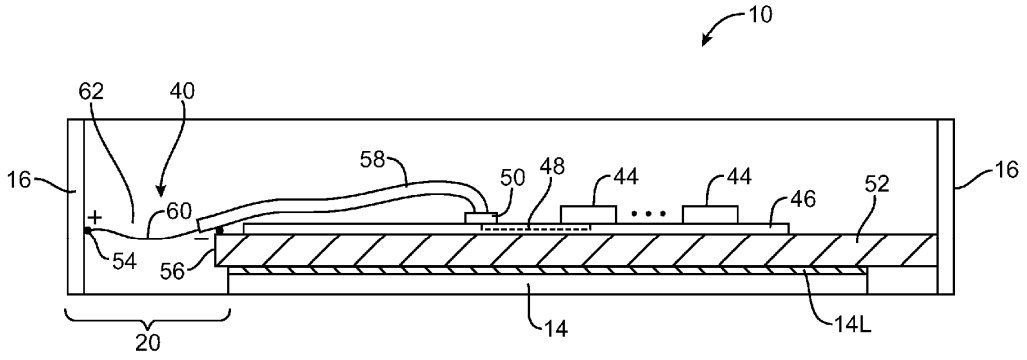
Publication Classification

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

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

(57) **ABSTRACT**

Electronic devices are provided that contain wireless communications circuitry. The wireless communications circuitry may include radio-frequency transceiver circuitry and antenna structures. A display may be mounted on a front face of an electronic device. A conductive member such as a bezel may surround the display. Internal housing support structures such as a metal midplate member may be used to support the display. The midplate member may be connected between opposing edges of the bezel. The antenna structures may include an antenna formed from part of the midplate member and part of the bezel. Antenna image currents in the midplate member may be blocked by slots in the midplate member. The slots may be located adjacent to the antenna and may ensure that the antenna emits radio-frequency signals in a desired pattern. The slots may be angled and segmented.



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(19) **United States**

(12) **Patent Application Publication**

Huang et al.

(10) **Pub. No.: US 2011/0291897 A1**

(43) **Pub. Date: Dec. 1, 2011**

(54) **ELECTRONIC DEVICE**

(76) Inventors: **Lin-Chin Huang**, Taoyuan County (TW); **Chia-Yan Hsu**, Taoyuan County (TW); **Kuo-Chuan Liao**, Taoyuan County (TW); **Ming-Chun Huang**, Taoyuan County (TW)

(21) Appl. No.: **13/015,881**

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

(30) **Foreign Application Priority Data**

Jun. 1, 2010 (TW) 99117548

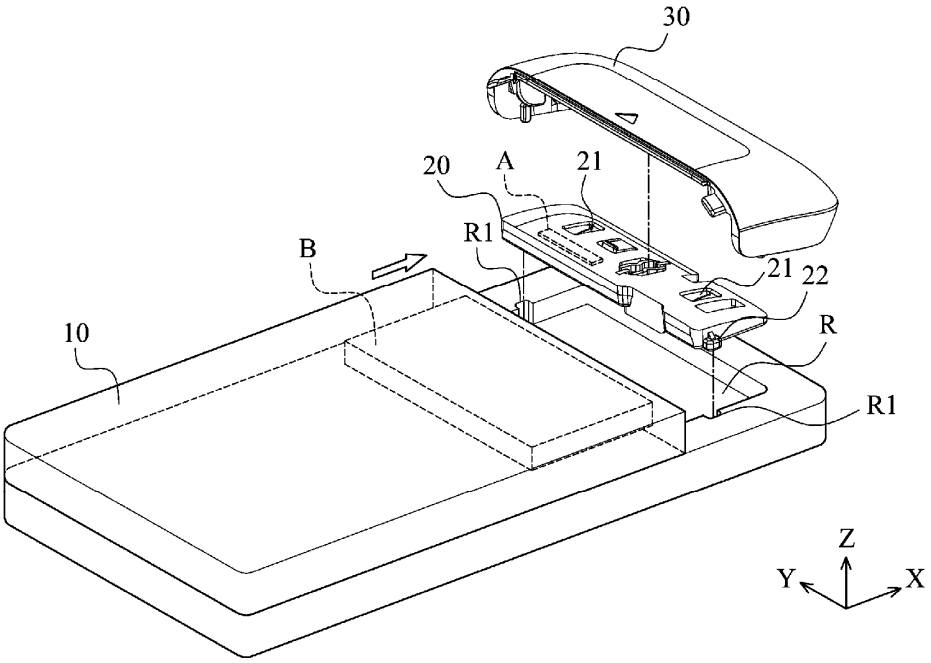
Publication Classification

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

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

(57) **ABSTRACT**

An electronic device is provided, including a main body, a battery detachably received in the main body, a stopper disposed in a predetermined position to restrict the battery in the main body, an antenna disposed on the stopper, and a cover connected with the stopper and movable relative to the stopper between a first position and a second position. When the cover is in the first position, the cover is engaged with the main body and restricts the stopper in the predetermined position. When the cover is moved from the first position along a first direction to the second position, the cover is disengaged from the main body, and the stopper is releasable from the predetermined position along a second direction.



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(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2011/0291899 A1**

(43) **Pub. Date: Dec. 1, 2011**

CHO et al.

(54) **ANTENNA RADIATOR, METHOD OF MANUFACTURING ELECTRONIC DEVICE CASE HAVING PLURALITY OF ANTENNA PATTERN RADIATORS EMBEDDED THEREIN, AND ELECTRONIC DEVICE CASE**

(75) Inventors: **Sung Eun CHO**, Suwon (KR); **Ha Ryong HONG**, Hwaseong (KR); **Tae Sung KIM**, Seoul (KR); **Byung Hwa LEE**, Suwon (KR); **Dae Kyu LEE**, Suwon (KR); **Chan Gwang AN**, Suwon (KR); **Jae Suk SUNG**, Yongin (KR); **Hyun Sam MUN**, Suwon (KR); **Dae Ki LIM**, Seongnam (KR); **Sang Woo BAE**, Suwon (KR)

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

(21) Appl. No.: **13/069,511**

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

(30) **Foreign Application Priority Data**

May 31, 2010 (KR) 10-2010-0051149

Publication Classification

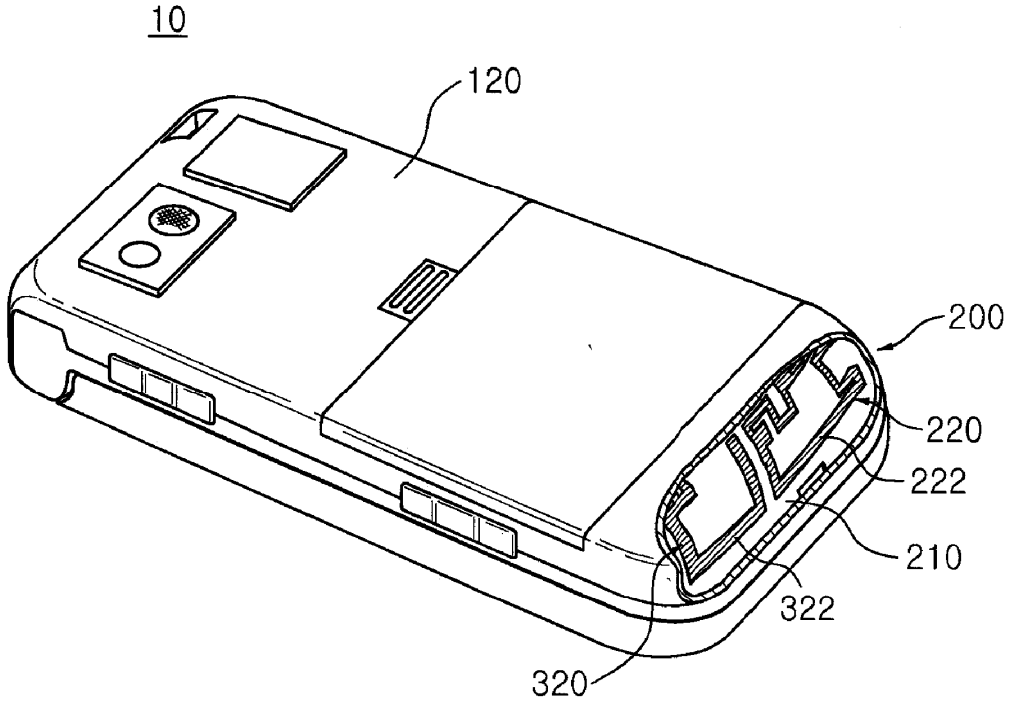
(51) **Int. Cl.**

H01Q 1/24	(2006.01)
H01P 11/00	(2006.01)
H01Q 1/00	(2006.01)

(52) **U.S. Cl.** **343/702**; 343/720; 29/600

(57) **ABSTRACT**

An antenna radiator includes a plurality of antenna pattern radiators including antenna pattern portions receiving or transmitting an external signal, respectively, a bridge configured to connect the antenna pattern portions, and a cutting assistance part formed in a connection portion between the bridge and the antenna pattern portions and facilitating detachment of the bridge from the antenna pattern portions.



US 20110298574A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0298574 A1

(43) Pub. Date: Dec. 8, 2011

Sato et al.

(54) **CONTACTLESS COMMUNICATION MEDIUM, ANTENNA PATTERN ARRANGEMENT MEDIUM, COMMUNICATION APPARATUS, AND COMMUNICATION METHOD**

(75) Inventors: **Keisuke Sato**, Miyagi (JP); **Sachio Saitoh**, Miyagi (JP)

(73) Assignee: **Sony Corporation**, Tokyo (JP)

(21) Appl. No.: **13/068,048**

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

(30) **Foreign Application Priority Data**

May 10, 2010 (JP) P2010-108803

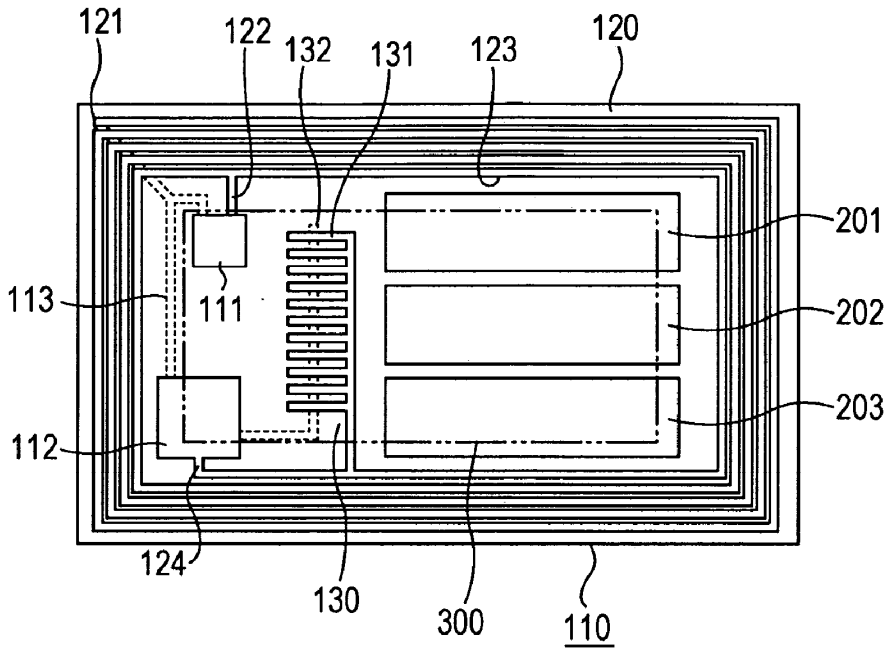
Publication Classification

(51) **Int. Cl.**
H01F 38/14 (2006.01)

(52) **U.S. Cl.** ..... **336/84 C**

(57) **ABSTRACT**

A contactless communication medium includes: a base material made of an insulating material; an antenna coil portion formed by winding a conductor in a plane on the base material; a capacitor connected to the antenna coil portion; a communication processing section connected to the antenna coil portion and the capacitor to perform a contactless communication process; and a metal pattern having a predetermined area and disposed in a region surrounded by the antenna coil portion, the metal pattern being not electrically connected to the antenna coil portion or the capacitor.



US 20110298666A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0298666 A1

(43) Pub. Date: Dec. 8, 2011

Kim et al.

(54) **MIMO ANTENNA HAVING PARASITIC ELEMENTS**

(75) Inventors: **Chan Ho Kim**, Incheon-shi (KR); **Jin Myung Kim**, Seongnam-shi (KR); **Chang-Gyu Choi**, Incheon-shi (KR); **Gyoung Rok Beak**, Siheung-shi (KR); **Young Hun Park**, Cheongju-shi (KR); **Heung Ju Ahn**, Suwon-shi (KR); **Yeon Ho Yang**, Goyang-shi (KR)

(73) Assignee: **MOBITECH CORP.**, Seoul (KR)

(21) Appl. No.: **13/202,589**

(22) PCT Filed: **Oct. 19, 2009**

(86) PCT No.: **PCT/KR09/06003**

§ 371 (c)(1),
(2), (4) Date: **Aug. 22, 2011**

(30) **Foreign Application Priority Data**

Feb. 27, 2009 (KR) 10-2009-0016593

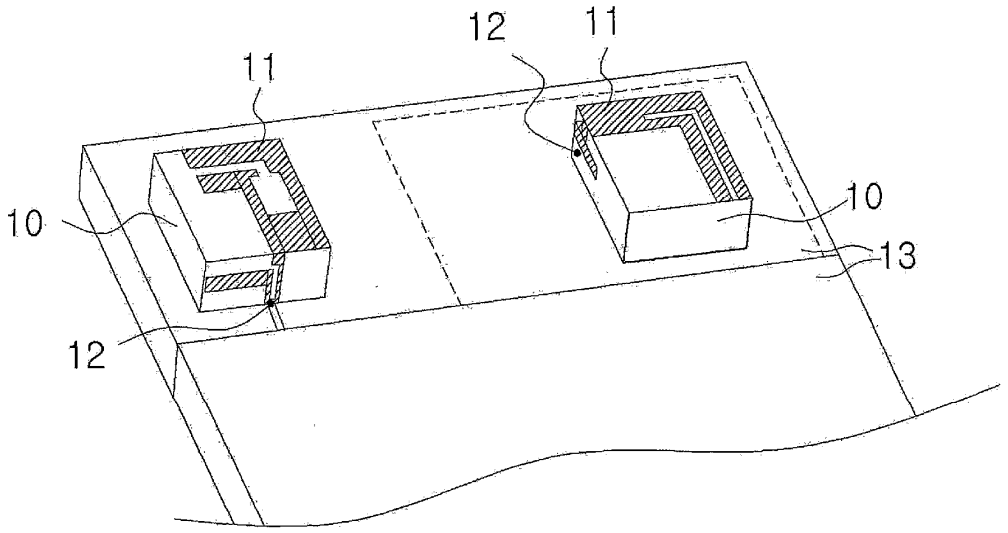
Publication Classification

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

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

(57) **ABSTRACT**

A Multiple-Input Multiple-Output (MIMO) antenna having parasitic elements is provided. The MIMO antenna includes a plurality of antenna elements, a plurality of parasitic elements, and a bridge. The plurality of antenna elements is symmetrically disposed on one side surface of a board while maintaining a predetermined distance therebetween. The plurality of parasitic elements is disposed on the other side surface of the board in a one-to-one correspondence with the plurality of antenna elements. The bridge is formed of a metal pattern line, and is configured to connect the plurality of parasitic elements to each other.



US 20110298668A1

(19) **United States**

(12) **Patent Application Publication**

Mercer et al.

(10) **Pub. No.: US 2011/0298668 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **MOBILE DEVICE ANTENNA WITH DIELECTRIC LOADING**

(75) Inventors: **Sean R. Mercer**, Issaquah, WA (US); **Gerald R. DeJean**, Redmond, WA (US)

(73) Assignee: **Microsoft Corporation**, Redmond, WA (US)

(21) Appl. No.: **12/795,340**

(22) Filed: **Jun. 7, 2010**

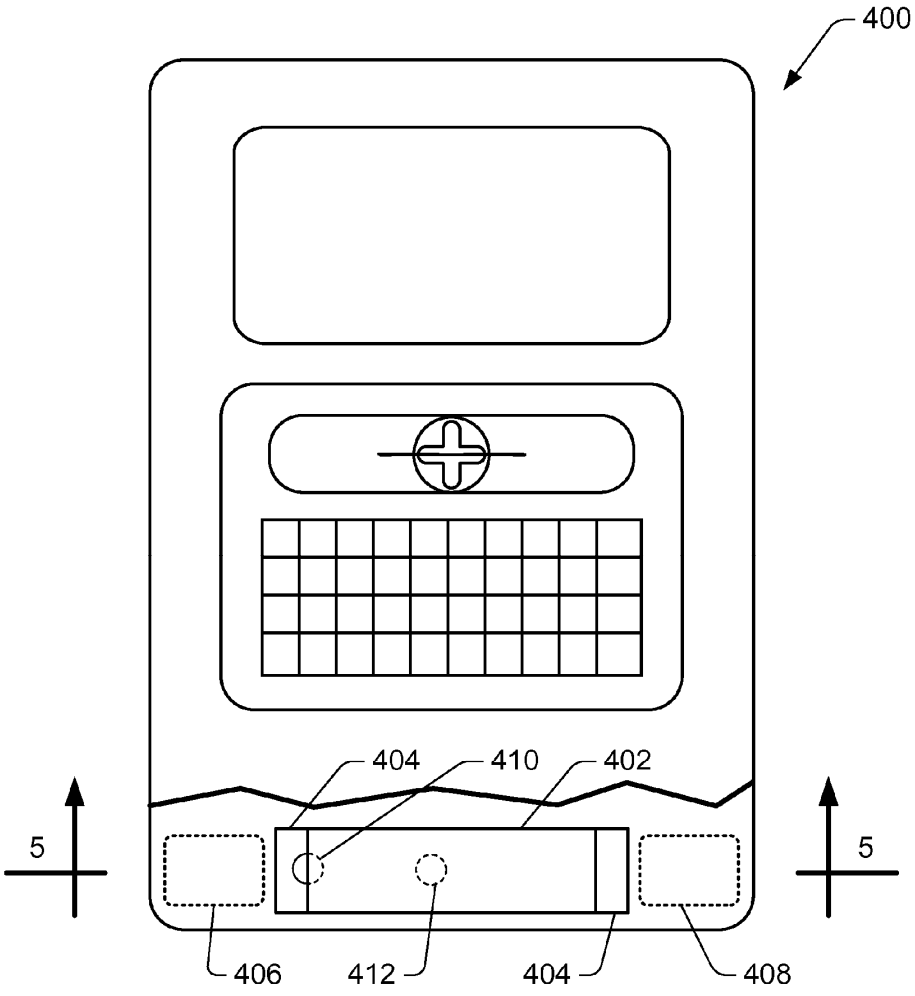
Publication Classification

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

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

(57) **ABSTRACT**

Mobile device antennas with dielectric loading are described herein. In one example, a mobile device includes a ground plane, carried within an enclosure. An antenna is connected to the ground plane. Dielectric loading material is provided within at least a portion of an area defined between the ground plane and the antenna. The dielectric loading material results in a shortening of a required antenna length, thereby creating a recovered area, i.e., valuable space within the enclosure "recovered" by the use of dielectric loading material.



US 20110298669A1

(19) **United States**

(12) **Patent Application Publication**

RAO et al.

(10) **Pub. No.: US 2011/0298669 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **LOW FREQUENCY DUAL-ANTENNA DIVERSITY SYSTEM**

(75) Inventors: **QINJIANG RAO**, WATERLOO (CA); **DONG WANG**, WATERLOO (CA)

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

(21) Appl. No.: **12/797,599**

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

(30) **Foreign Application Priority Data**

Jun. 8, 2010 (EP) 10165259.2

Publication Classification

(51) **Int. Cl.**

H01Q 9/04 (2006.01)

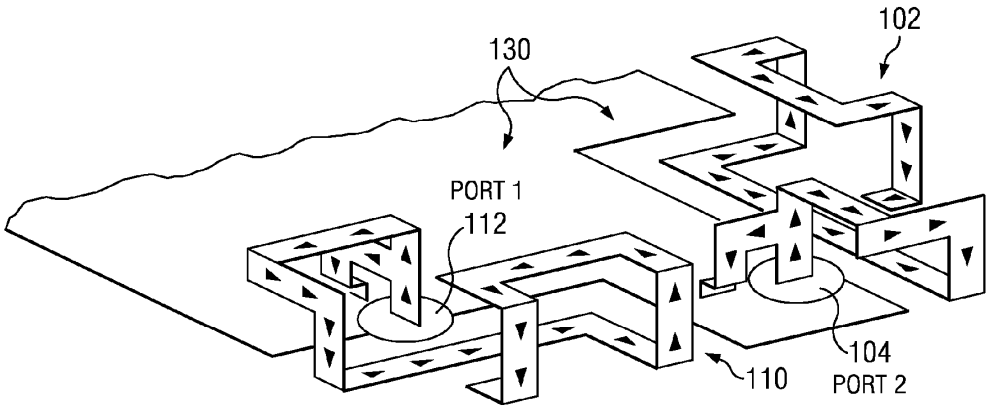
H01Q 21/00 (2006.01)

H01Q 1/24 (2006.01)

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

(57) **ABSTRACT**

A dual-antenna diversity antenna system that operates within a low frequency band range is disclosed. Two antennas are folded separately onto a single three dimensional dielectric substrate in a meander pattern configuration. Each antenna has an independent feed port and ground pin. The two antennas are configured within a compact mobile terminal to produce high isolation and low correlation at resonating frequencies within the 700 Megahertz frequency band.



US 20110298670A1

(19) **United States**

(12) **Patent Application Publication**

Jung et al.

(10) **Pub. No.: US 2011/0298670 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **MOBILE TERMINAL AND METHOD FOR FABRICATING ANTENNA OF MOBILE TERMINAL**

(75) Inventors: **Byungwoon Jung**, Seoul (KR); **Ansun Hyun**, Seoul (KR); **Changwon Yun**, Gwangmyeong (KR); **Yochuol Ho**, Seongnam (KR); **Yongseok Park**, Gumi (KR); **Gihoon Tho**, Seoul (KR); **Youngtae Lim**, Anyang (KR); **Hanki Kim**, Suwon (KR); **Euntaek Jeoung**, Anyang (KR)

(73) Assignee: **LG Electronics Inc.**

(21) Appl. No.: **13/071,423**

(22) Filed: **Mar. 24, 2011**

(30) **Foreign Application Priority Data**

Jun. 4, 2010 (KR) 10-2010-0053060

Publication Classification

(51) **Int. Cl.**

H01Q 1/24 (2006.01)

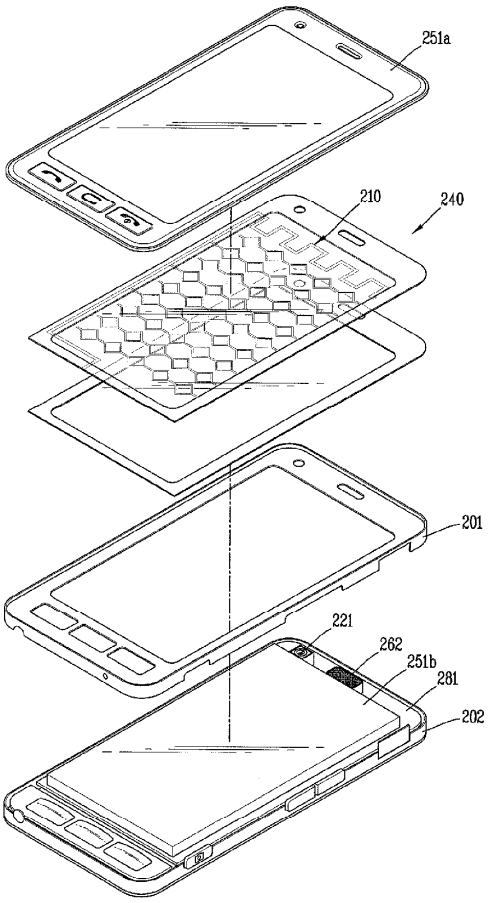
H01P 11/00 (2006.01)

G06F 3/02 (2006.01)

(52) **U.S. Cl.** **343/702**; 345/173; 345/168; 29/600

(57) **ABSTRACT**

A mobile terminal includes a body having a user input unit for receiving a control command; an antenna unit mounted on the body to transmit and receive a radio signal; and a circuit board connected to the antenna unit to process the radio signal, wherein the antenna unit includes: a base film made of a light-transmissive material; a first conductive oxide film formed on one surface of the base film; a metal conductive part laminated on the first conductive oxide film and forming an antenna pattern corresponding to the radio signal; and a second conductive oxide film configured to cover the metal conductive part.



US 20110298671A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0298671 A1

(43) Pub. Date: Dec. 8, 2011

Qi et al.

(54) **MOBILE WIRELESS COMMUNICATIONS DEVICE INCLUDING A GROUND PATCH PROVIDING SPECIFIC ABSORPTION RATE (SAR) REDUCTION AND RELATED METHODS**

(75) Inventors: **Yihong Qi**, St. Agatha (CA); **Ying Tong Man**, Waterloo (CA); **Perry Jarmuszewski**, Waterloo (CA)

(73) Assignee: **Research In Motion Limited**, Waterloo (CA)

(21) Appl. No.: **13/206,552**

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

Related U.S. Application Data

(63) Continuation of application No. 12/872,533, filed on Aug. 31, 2010, now Pat. No. 8,013,797, which is a continuation of application No. 12/472,638, filed on May 27, 2009, now Pat. No. 7,791,547, which is a continuation of application No. 11/733,360, filed on Apr. 10, 2007, now Pat. No. 7,554,496.

Publication Classification

(51) **Int. Cl.**

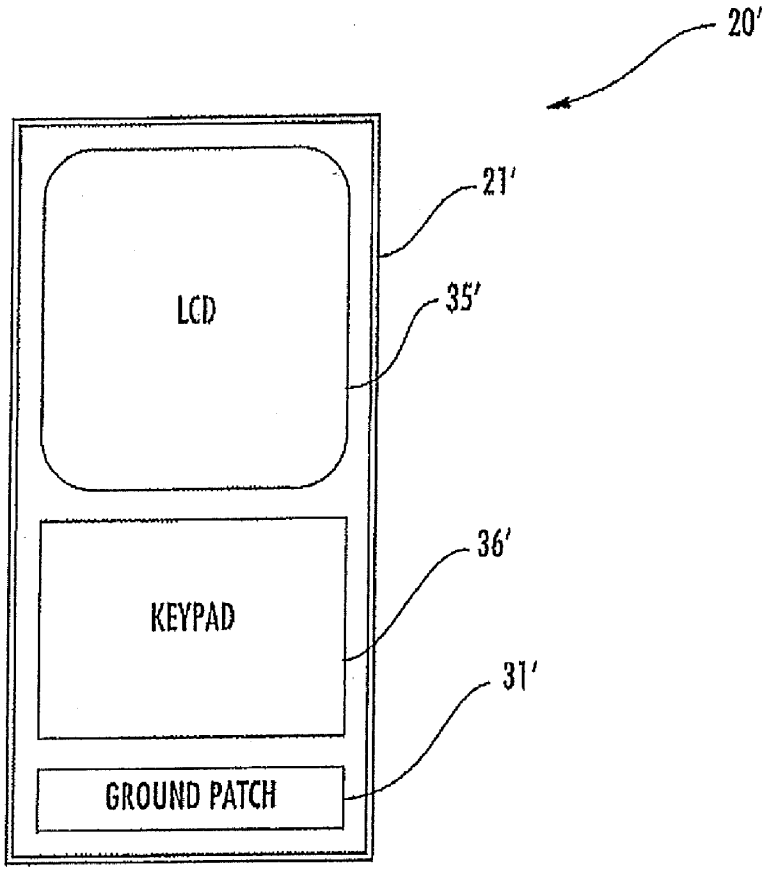
H01Q 1/24 (2006.01)

H05K 13/04 (2006.01)

(52) **U.S. Cl.** **343/702**; 29/825

(57) **ABSTRACT**

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



US 20110298674A1

(19) **United States**

(12) **Patent Application Publication**

HSU et al.

(10) **Pub. No.: US 2011/0298674 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **ELECTRONIC DEVICE WITH ANTENNA SWITCH AND ANTENNA SWITCHING METHOD THEREOF**

(75) Inventors: **CHO-KANG HSU**, Tu-Cheng (TW); **CHIA-HUNG SU**, Tu-Cheng (TW)

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

(21) Appl. No.: **12/965,429**

(22) Filed: **Dec. 10, 2010**

(30) **Foreign Application Priority Data**

Jun. 2, 2010 (TW) 99117768

Publication Classification

(51) **Int. Cl.**

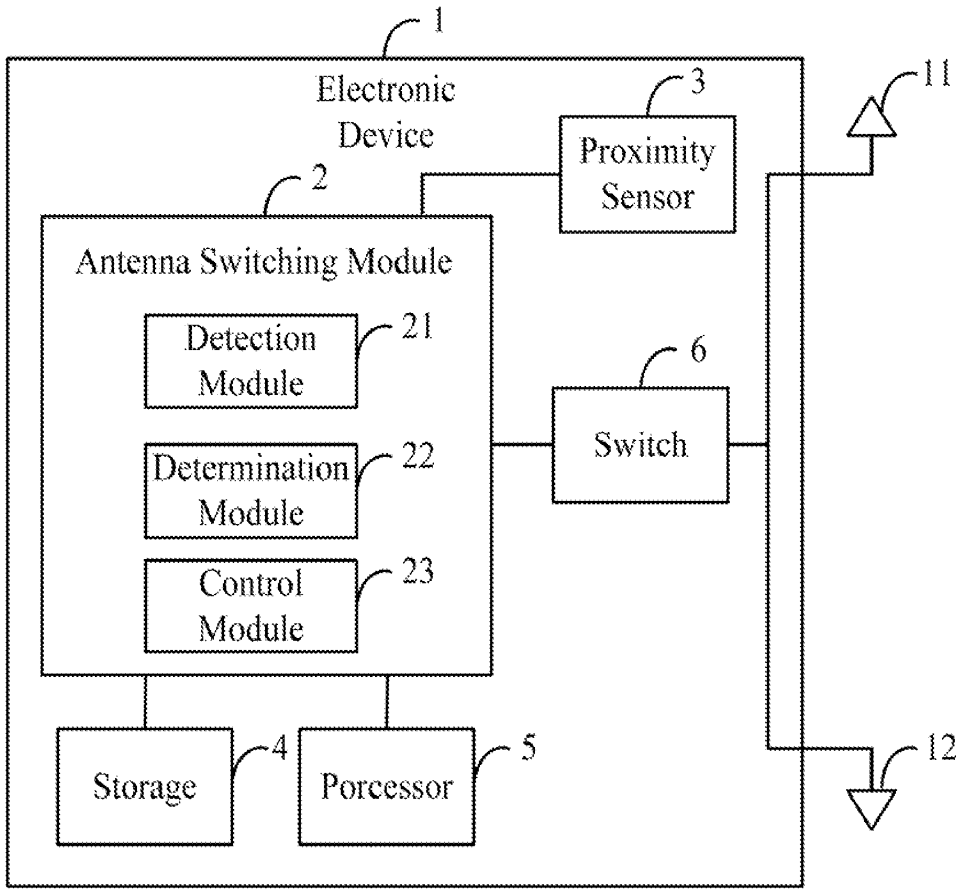
H01Q 3/24 (2006.01)

G01R 29/08 (2006.01)

(52) **U.S. Cl.** **343/703**; 343/876

(57) **ABSTRACT**

An electronic device with antenna switch comprises a first antenna, a first proximity sensor, a second antenna, a detection module, a determination module and a control module. The first proximity sensor is located with the first antenna at a first side portion of the electronic device. The detection module detects an approach signal from the first proximity sensor. The determination module determines whether the strength of the approach signal is stronger than a threshold value in real time. The control module initiate the second antenna to receive signals through the switch if the strength of the approach signal is stronger then the strength of the threshold value.



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(19) **United States**

(12) **Patent Application Publication**

Tu

(10) **Pub. No.: US 2011/0298681 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **SLOT ANTENNA**

(75) Inventor: **Hsin-Lung Tu**, Tu-Cheng (TW)

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

(21) Appl. No.: **12/826,624**

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

(30) **Foreign Application Priority Data**

Jun. 7, 2010 (CN) 201010193324.3

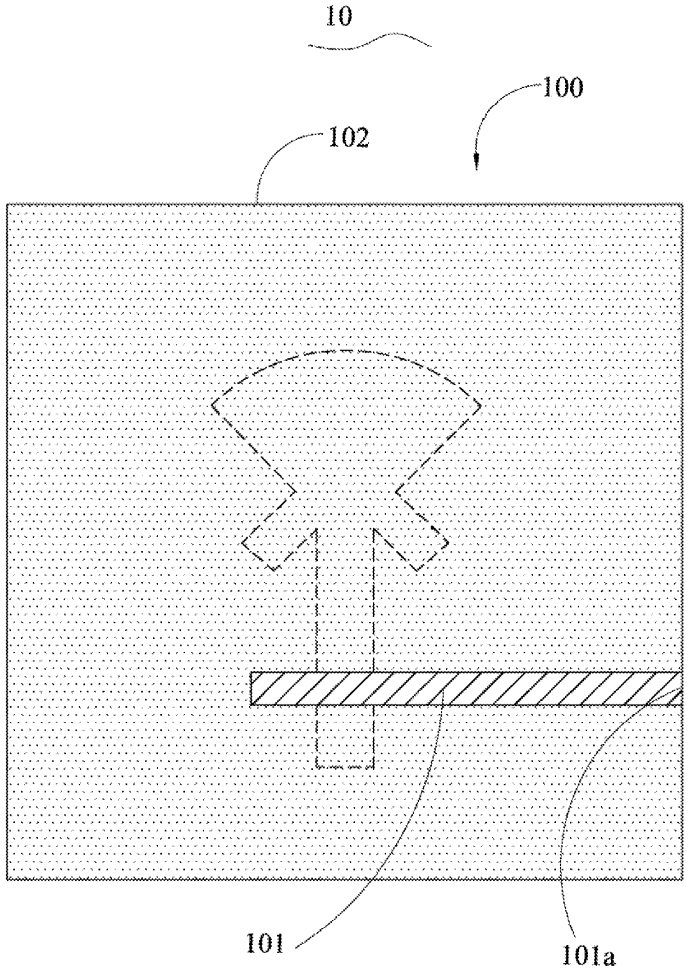
Publication Classification

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

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

(57) **ABSTRACT**

A slot antenna located on a substrate with a first surface and a second surface opposite to the first surface includes a feeding portion and a radiating portion. The feeding portion is located on the first surface of the substrate to feed electromagnetic signals. The radiating portion is located on the second surface of the substrate and defines a sector-shaped slot, a first rectangle-shaped slot, a second rectangle-shaped slot, and a third rectangle-shaped slot, wherein the sector-shaped slot is defined by a first semidiameter, a second semidiameter, and an arc connected one by one.



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(19) **United States**

(12) **Patent Application Publication**

TANAKA et al.

(10) **Pub. No.: US 2011/0298683 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **CHIP ANTENNA AND ANTENNA DEVICE**

(75) Inventors: **Hiroya TANAKA**, Kyoto-fu (JP); **Ryo KOMURA**, Kyoto-fu (JP); **Kazuhisa YAMAKI**, Kyoto-fu (JP); **Yuichi KUSHIHI**, Kyoto-fu (JP)

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

(21) Appl. No.: **13/213,940**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2009/066338, filed on Sep. 18, 2009.

(30) **Foreign Application Priority Data**

Feb. 20, 2009 (JP) 2009-038436

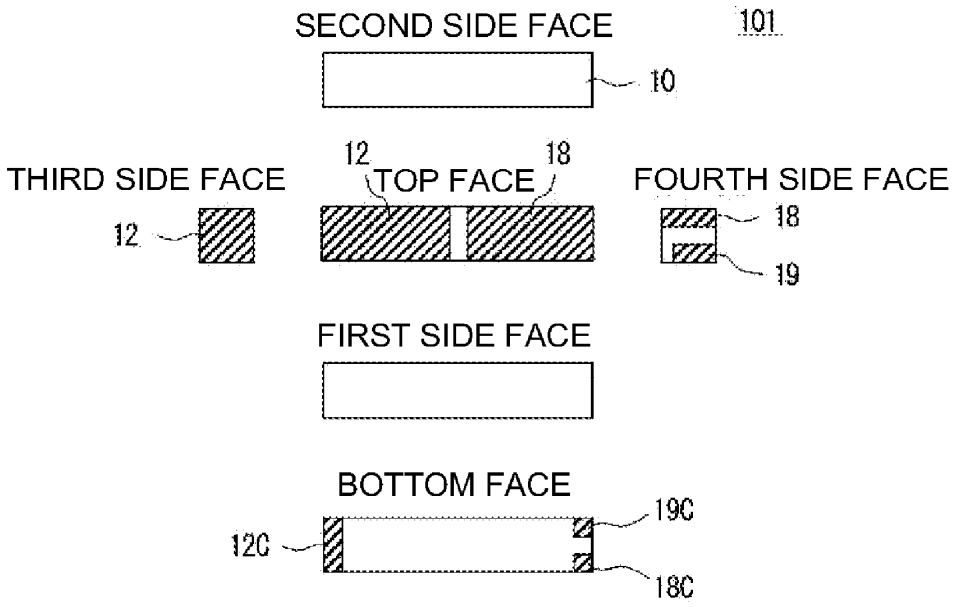
Publication Classification

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

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

(57) **ABSTRACT**

This disclosure provides a chip antenna and an antenna device including the chip antenna. The chip antenna is not likely to be affected by a ground electrode located lower than the chip antenna when the chip antenna is mounted on a circuit board, and can have resulting small frequency variation and small reduction in gain. The chip antenna includes a dielectric substrate having a bottom face, a top face, a first side face, a second side face, a third side face, and a fourth side face. A non-feeding electrode extends from the fourth side face to the top face, another non-feeding electrode extends from the third side face to the top face. An end of the non-feeding electrode and an end of the non-feeding electrode face each other on the top face with a certain space therebetween. The bottom face includes bottom-face electrodes electrically connected to the non-feeding electrodes and a bottom-face electrode electrically connected to a feeding electrode.



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(19) **United States**

(12) **Patent Application Publication**

Schmidhammer

(10) **Pub. No.: US 2011/0298685 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **IMPEDANCE ADJUSTMENT CIRCUIT FOR ADJUSTING PLANAR ANTENNAS**

(75) Inventor: **Edgar Schmidhammer**, Stein an der Traun (DE)

(73) Assignee: **EPCOS AG**, Muenchen (DE)

(21) Appl. No.: **13/142,397**

(22) PCT Filed: **Dec. 29, 2009**

(86) PCT No.: **PCT/EP2009/068010**

§ 371 (c)(1),
(2), (4) Date: **Aug. 25, 2011**

(30) **Foreign Application Priority Data**

Jan. 15, 2009 (DE) 10 2009 004 720.4

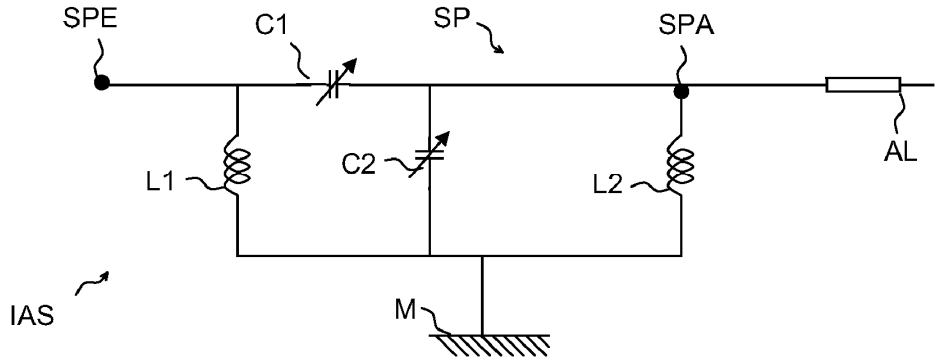
Publication Classification

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

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

(57) **ABSTRACT**

An impedance matching circuit for matching planar antennas includes a signal path with a signal path input and a signal path output. A first capacitive element with variable capacitance is connected between the signal path input and signal path output. A second capacitive element with variable capacitance is connected between the signal path and ground. A first inductive element is connected between the signal path input and ground. A second inductive element is connected between the signal path output and ground. An antenna line with an impedance between 30 and 60 ohm is connected to the signal path output.



US 20110299703A1

(19) **United States**

(12) **Patent Application Publication**

Annamaa et al.

(10) **Pub. No.: US 2011/0299703 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **MINIATURE TRANSDUCER ASSEMBLY WITH INTEGRATED DE-COUPLING COILS**

(75) Inventors: **Petteri Annamaa**, Oulunsalo (FI); **Petri Huhtalo**, Tupos (FI); **Matti Niemi**, Arkkukari (FI); **Aki Lamponen**, Kempele (FI); **Yasser Amin**, Tilst (DK); **Morten Kjeldsen Andersen**, Odder (DK)

(73) Assignee: **Gettop Europe R&D ApS**, Herlve (DE)

(21) Appl. No.: **13/132,192**

(22) PCT Filed: **Dec. 3, 2009**

(86) PCT No.: **PCT/EP2009/066331**

§ 371 (c)(1), (2), (4) Date: **Aug. 26, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/201,120, filed on Dec. 5, 2008.

Publication Classification

(51) **Int. Cl.**

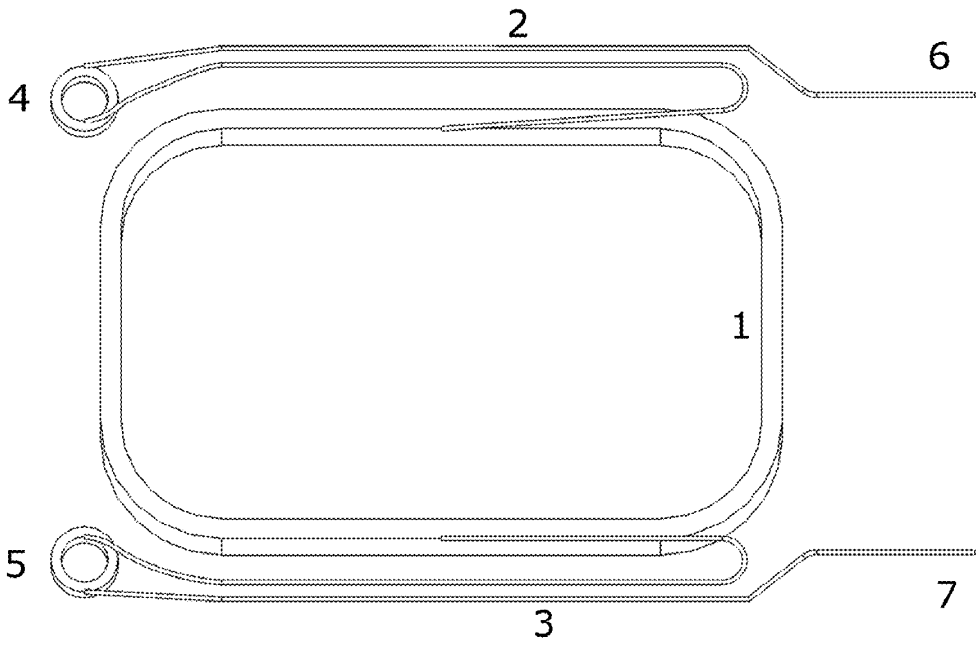
H04R 13/00 (2006.01)

H04R 13/02 (2006.01)

(52) **U.S. Cl.** **381/94.1**

(57) **ABSTRACT**

The present invention relates to a miniature transducer assembly for a wireless portable terminal. The miniature transducer assembly of the present invention comprises a transducer unit comprising a number of voice coils for displacing a diaphragm of said transducer unit. Moreover, the transducer assembly comprises at least one de-coupling coil for avoiding interference between the transducer unit and an antenna of the wireless portable terminal. In order to reduce the dimensions of the transducer assembly at least one de-coupling coil forms an integral part of a lead-out wire from of a voice coil.



US 20110300907A1

(19) **United States**

(12) **Patent Application Publication**

Hill et al.

(10) **Pub. No.: US 2011/0300907 A1**

(43) **Pub. Date: Dec. 8, 2011**

(54) **PARALLEL-FED EQUAL CURRENT DENSITY DIPOLE ANTENNA**

(76) Inventors: **Robert J. Hill**, Salinas, CA (US); **Robert W. Schlub**, Cupertino, CA (US); **Ruben Caballero**, San Jose, CA (US)

(21) Appl. No.: **12/793,641**

(22) Filed: **Jun. 3, 2010**

Publication Classification

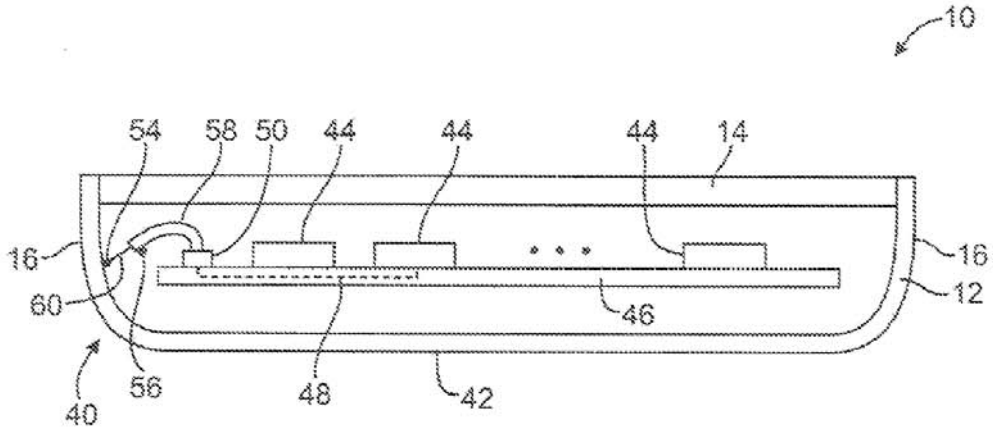
(51) **Int. Cl.**

H01Q 1/24	(2006.01)
H04W 88/02	(2009.01)
H01Q 13/10	(2006.01)

(52) **U.S. Cl.** **455/566**; 343/702; 343/767; 455/575.1

(57) **ABSTRACT**

Electronic devices such as handheld devices may have wireless communications circuitry. The wireless communications circuitry may include a broadband antenna and circuitry that covers multiple communications bands. The broadband antenna may be formed from a parallel-fed dipole. The antenna may have first and second antenna resonating element regions on opposing sides of a slot. The slot may be an open slot that has one open end and one closed end. The slot may be formed from an opening in conductive housing structures in a conductive housing for an electronic device. The conductive housing structures may include sidewall structures, rear housing wall structures, and other conductive structures. The antenna may have a feed with a feed line that crosses the slot. An interposed dielectric substrate member may separate the feed line from the conductive structures. The feed line may have sections with different widths to minimize feed line length.



US 20110304511A1

(19) **United States**

(12) **Patent Application Publication**

FAN et al.

(10) **Pub. No.: US 2011/0304511 A1**

(43) **Pub. Date: Dec. 15, 2011**

(54) **HOUSING OF PORTABLE ELECTRONIC DEVICE AND METHOD FOR MAKING THE SAME**

(75) Inventors: **YONG-FA FAN**, Shenzhen City (CN); **YONG YAN**, Shenzhen City (CN); **ZHI-GUO ZHAO**, Shenzhen City (CN); **JIN-RONG WANG**, Shenzhen City (CN)

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

(21) Appl. No.: **12/900,665**

(22) Filed: **Oct. 8, 2010**

(30) **Foreign Application Priority Data**

Jun. 15, 2010 (CN) 201010201021.1

Publication Classification

(51) **Int. Cl.**

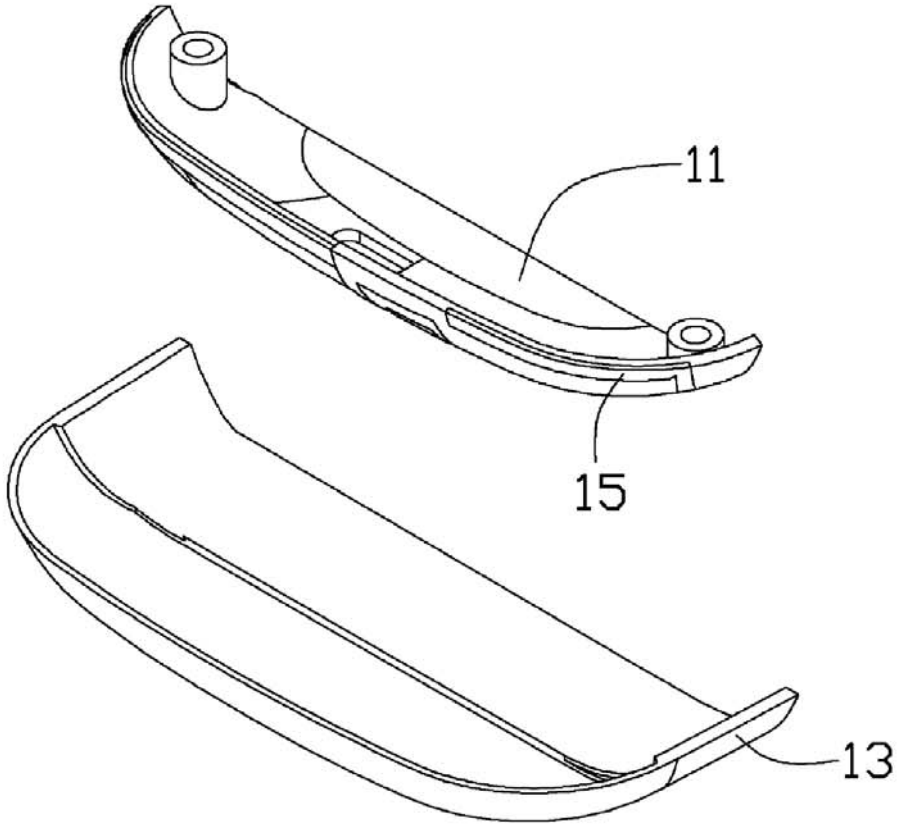
H01Q 1/24 (2006.01)

H01P 11/00 (2006.01)

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

(57) **ABSTRACT**

A housing includes a first main body, a three-dimensional antenna, and a second main body. The three-dimensional antenna attaches to the first main body. The second main body is attached to the first main body and partially covering the three-dimensional antenna. The three-dimensional antenna is sandwiched between the first main body and the second main body, and the antenna is partially exposed from the first main body and the second main body to form a terminal



US 20110304512A1

(19) **United States**

(12) **Patent Application Publication**

Friederich et al.

(10) **Pub. No.: US 2011/0304512 A1**

(43) **Pub. Date: Dec. 15, 2011**

(54) **MOBILE TERMINAL WITH TWO ANTENNAS FOR REDUCING THE RF RADIATION EXPOSURE OF THE USER**

(76) Inventors: **Alexander Friederich**, Aalborg (DK); **Ole Jagielski**, Frederikshavn (DK); **Sinan Köksoy**, Aalborg Ost (DK); **Simon Svendsen**, Aalborg Ost (DK)

(21) Appl. No.: **12/914,738**

(22) Filed: **Oct. 28, 2010**

Related U.S. Application Data

(63) Continuation of application No. 12/306,555, now abandoned, filed as application No. PCT/EP2007/056300 on Jun. 25, 2007.

(30) **Foreign Application Priority Data**

Jun. 30, 2006 (EP) 06116453.9

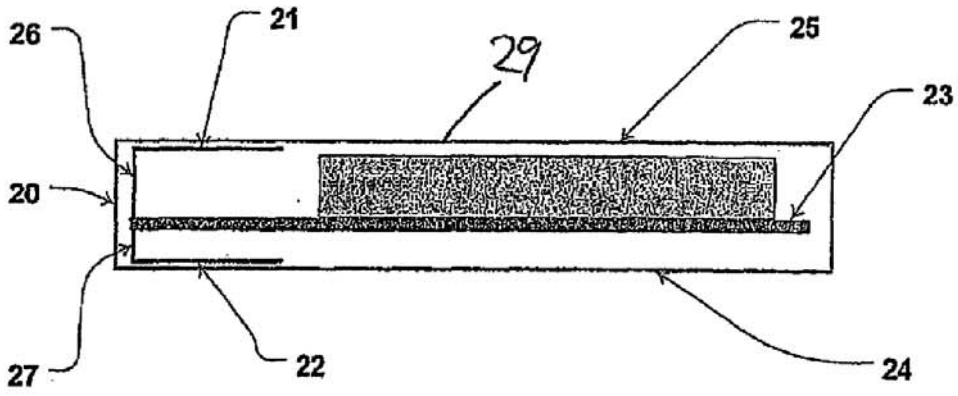
Publication Classification

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

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

(57) **ABSTRACT**

For a mobile terminal for receiving wireless transmissions from a transmitter and transmitting wireless transmissions to a receiver it proposed to provide an antenna arrangement having a plurality of antenna elements each provided on or within a common body or a respective body of the terminal in a defined spatial relation to a conducting chassis part, wherein at least one first antenna element is located on a first side and at least one second antenna element is located on a second side of the same conductive chassis part or of the respective conducting chassis part, wherein high frequency circuitry, for transmitting a respective wireless transmission, is adapted to simultaneously drive said first antenna element and said second antenna element by feeding the same or corresponding high frequency signals to said first antenna element and to said second antenna element.



US 20110304514A1

(19) **United States**

(12) **Patent Application Publication**

CHEN et al.

(10) **Pub. No.: US 2011/0304514 A1**

(43) **Pub. Date: Dec. 15, 2011**

(54) **ANTENNA-EMBEDDED ELECTRONIC DEVICE CASE**

(75) Inventors: **Yu-Ju CHEN**, Taipei City (TW); **Shih-Wei LI**, Taipei City (TW); **Der-Chung HWANG**, Taipei City (TW); **Chen-Ta HUNG**, Taipei City (TW)

(73) Assignee: **COMPAL ELECTRONICS, INC.**, Taipei City (TW)

(21) Appl. No.: **13/157,328**

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

Related U.S. Application Data

(60) Provisional application No. 61/354,690, filed on Jun. 14, 2010.

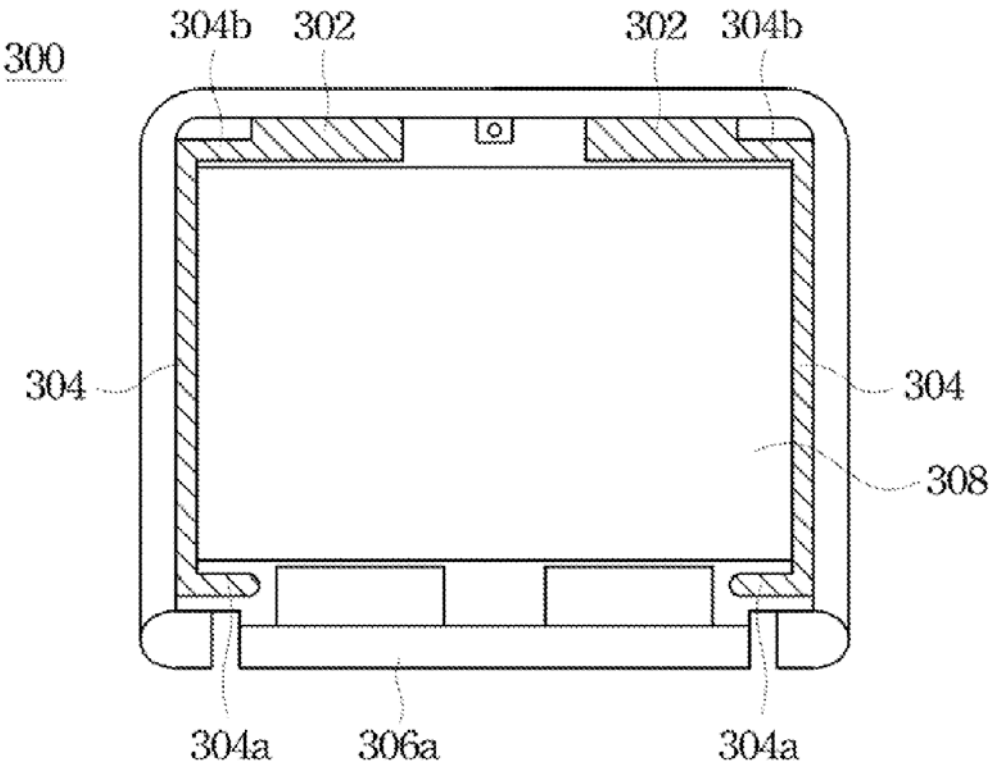
Publication Classification

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

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

(57) **ABSTRACT**

An antenna-embedded electronic device case includes an electrically-insulated case wall, a lower and an upper ground conductive layers, a lower and an upper electrically-insulated layer, and a continuous conductive layer. The lower ground conductive layer is in contact with the electrically-insulated case wall. The lower and upper electrically-insulated layers are sandwiched between the lower and upper ground conductive layers. The continuous conductive layer has a first portion sandwiched between the lower and upper electrically-insulated layers and a second portion protruding out to serve as an antenna radiator for transmitting or receiving electromagnetic signals.



US 20110304516A1

(19) **United States**

(12) **Patent Application Publication**

Ko et al.

(10) **Pub. No.: US 2011/0304516 A1**

(43) **Pub. Date: Dec. 15, 2011**

(54) **INFINITE WAVELENGTH ANTENNA DEVICE**

(75) Inventors: **Jae Woo Ko**, Gyeonggi-do (KR); **Jeong Hae Lee**, Seoul (KR); **Joon Hyun Baek**, Seoul (KR); **Jae Hyun Park**, Gyeonggi-do (KR)

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

(21) Appl. No.: **13/142,937**

(22) PCT Filed: **Dec. 9, 2009**

(86) PCT No.: **PCT/KR2009/007342**

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

(30) **Foreign Application Priority Data**

Dec. 31, 2008 (KR) 10-2008-0137669

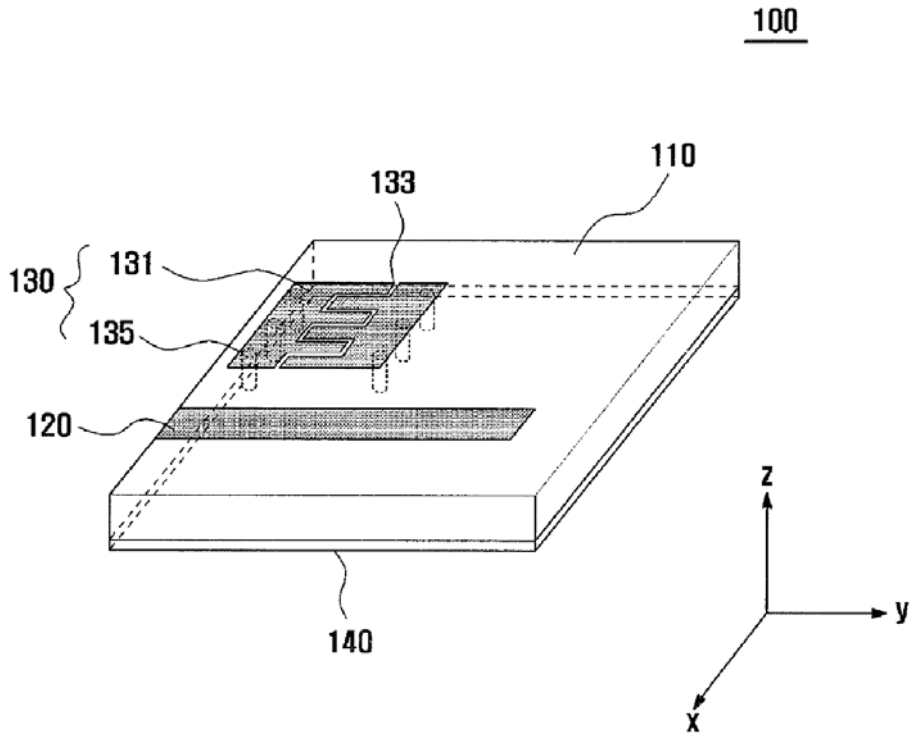
Publication Classification

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

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

(57) **ABSTRACT**

The present invention relates to an infinite wavelength antenna device, which includes: a board body made of a dielectric and having a slab structure; a feed part arranged on one surface of the board body, and generating a magnetic field when power is applied; and an MNG resonance part arranged on the board body so that a preset distance is maintained from the feed part and at least a portion thereof is placed within the magnetic field, grounded through both ends thereof, resonating at a specific frequency band when the magnetic field is generated, and having a negative permeability. In the present invention, as the infinite wavelength antenna device operates according to the infinite wavelength property, the resonant frequency band may be determined independently of the size of the antenna device. Hence, miniaturization of the infinite wavelength antenna device can be realized. In addition, as power feeding is performed using magnetic coupling in the infinite wavelength antenna device, power can be easily fed to multiple resonance parts of the antenna device. Consequently, the infinite wavelength antenna device may resonate at multiple frequency bands or a wider frequency band.



US 20110304517A1

(19) **United States**

(12) **Patent Application Publication**

FAN et al.

(10) **Pub. No.: US 2011/0304517 A1**

(43) **Pub. Date: Dec. 15, 2011**

(54) **HOUSING OF PORTABLE ELECTRONIC DEVICE AND METHOD FOR MAKING THE SAME**

(75) Inventors: **YONG-FA FAN**, Shenzhen City (CN); **YONG YAN**, Shenzhen City (CN); **ZHI-GUO ZHAO**, Shenzhen City (CN); **XUE-LI ZHANG**, Shenzhen City (CN)

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

(21) Appl. No.: **12/900,661**

(22) Filed: **Oct. 8, 2010**

(30) **Foreign Application Priority Data**

Jun. 15, 2010 (CN) 201010200770.2

Publication Classification

(51) **Int. Cl.**

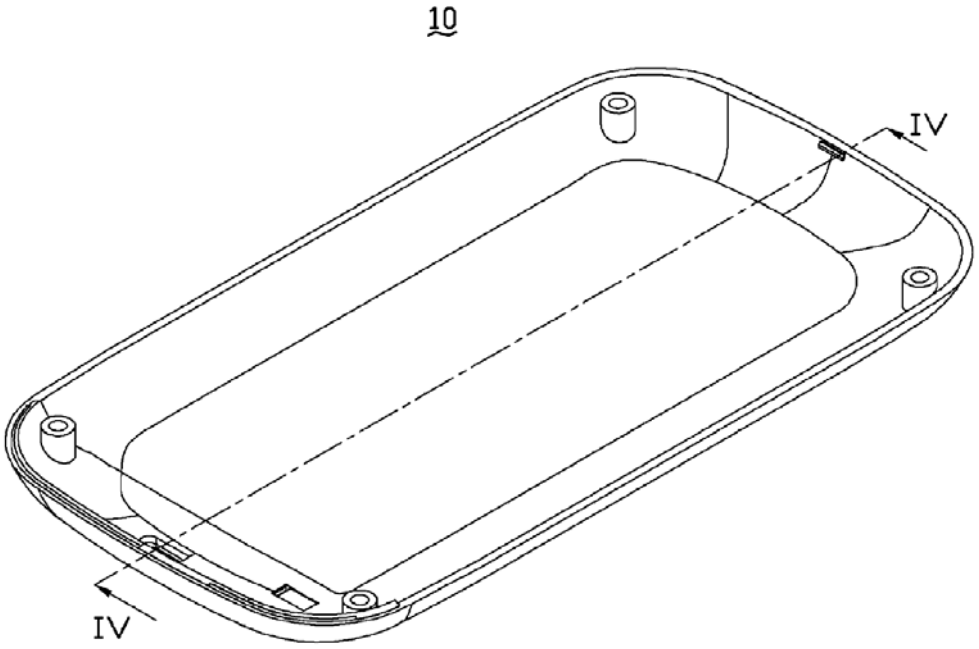
H01Q 1/42 (2006.01)

B05D 5/12 (2006.01)

(52) **U.S. Cl.** **343/872**; 427/105

(57) **ABSTRACT**

A housing includes a first main body, a three-dimensional antenna, and a second main body. The three-dimensional antenna includes a printing layer attached to the first main body and a plating layer formed on the printing layer. The second main body is attached to the first main body and partially covering the three-dimensional antenna. The three-dimensional antenna is sandwiched between the first main body and the second main body, and the antenna is partially exposed from the first main body and the second main body to form a terminal.



US 20110304520A1

(19) **United States**

(12) **Patent Application Publication**

Djordjevic et al.

(10) **Pub. No.: US 2011/0304520 A1**

(43) **Pub. Date: Dec. 15, 2011**

(54) **METHOD OF MANUFACTURING AND OPERATING AN ANTENNA ARRANGEMENT FOR A COMMUNICATION DEVICE**

(75) Inventors: **Miomir B. Djordjevic**, Wheeling, IL (US); **William H. Meitzler**, Elk Grove Village, IL (US); **Ignatius Gerardus T. de Wilde**, Rotterdam (NL); **Paul R. Jelonek**, Geneva, IL (US); **Tun-Jen Chu**, Plainfield, IL (US)

(73) Assignee: **ILLINOIS TOOL WORKS INC.**, Glenview, IL (US)

(21) Appl. No.: **13/104,504**

(22) Filed: **May 10, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/353,865, filed on Jun. 11, 2010.

Publication Classification

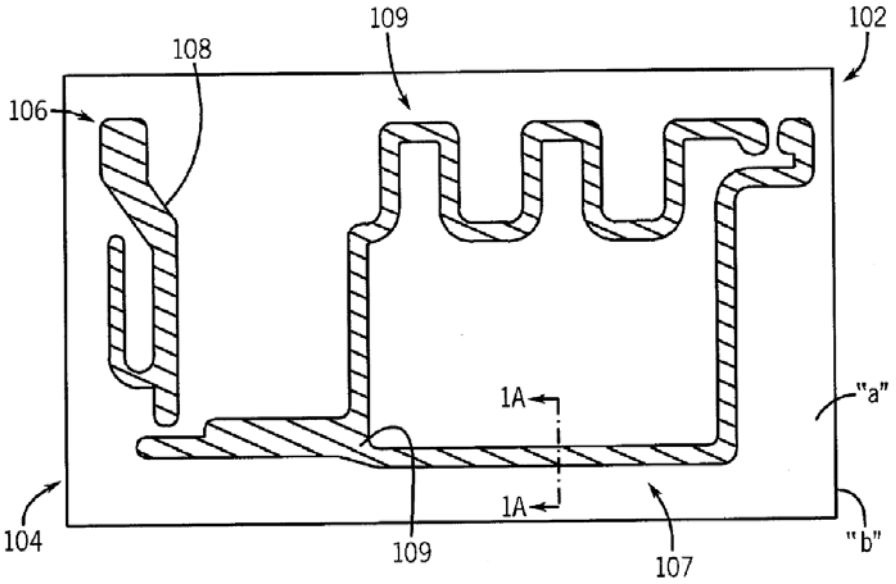
(51) **Int. Cl.**

H01Q 1/38	(2006.01)
H01P 11/00	(2006.01)
H01Q 21/28	(2006.01)

(52) **U.S. Cl.** ..... **343/893**; 343/700 MS; 29/600

(57) **ABSTRACT**

Thin, flexible antenna arrangements for use in communication devices, such as mobile communications devices, and methods of making and using the antenna arrangements are provided. The methods used to make the antenna arrangements are print-based and provide a simplified procedure, with a reduced number of process steps, the use of fewer materials and the production of less material waste than conventional methods based on etching and die cutting.



US 20110309986A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2011/0309986 A1**

(43) **Pub. Date: Dec. 22, 2011**

Ying

(54) **MULTI-BAND ANTENNAS USING MULTIPLE PARASITIC COUPLING ELEMENTS AND WIRELESS DEVICES USING THE SAME**

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

(73) Assignee: **Sony Ericsson Mobile Communications AB**

(21) Appl. No.: **12/816,661**

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

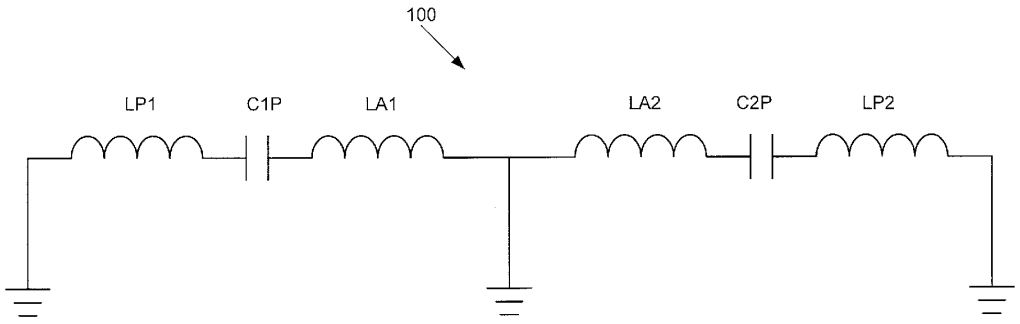
Publication Classification

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

(52) **U.S. Cl.** **343/752**

(57) **ABSTRACT**

A multi-band antenna includes a ground plane, a branch active element connected to the ground plane, and a plurality of parasitic coupling elements connected to the ground plane. Respective ones of the parasitic coupling elements are electrically coupled to the branch active element such that the multi-band antenna resonates at a plurality of frequency bands.



US 20110309994A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0309994 A1

(43) Pub. Date: Dec. 22, 2011

KATO et al.

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

(75) Inventors: **Noboru KATO**, Nagaokakyo-shi (JP); **Kenichi ISHIZUKA**, Nagaokakyo-shi (JP)

(73) Assignee: **Murata Manufacturing Co., Ltd.**, Nagaokakyo-shi (JP)

(21) Appl. No.: **13/218,501**

(22) Filed: **Aug. 26, 2011**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2011/050884, filed on Jan. 19, 2011.

(30) **Foreign Application Priority Data**

Jan. 19, 2010 (JP) 2010-009513
Apr. 21, 2010 (JP) 2010-098312
Apr. 21, 2010 (JP) 2010-098313
Aug. 11, 2010 (JP) 2010-180088
Sep. 17, 2010 (JP) 2010-209295
Jan. 19, 2011 (JP) 2011-008534

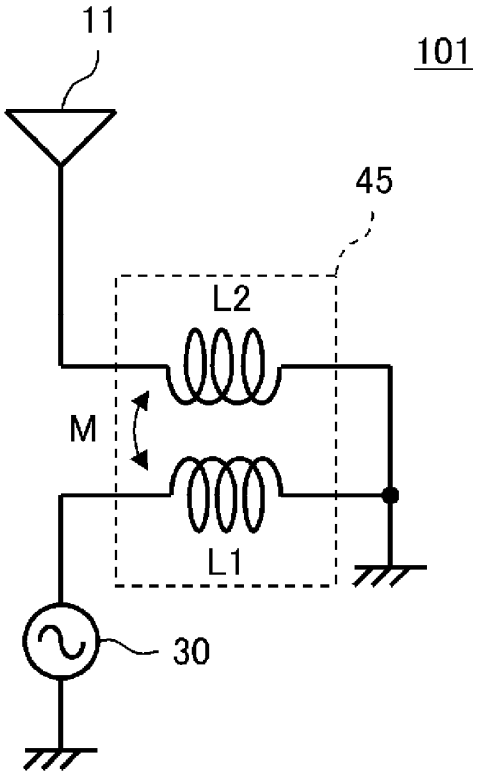
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device includes an antenna element and an impedance converting circuit connected to the antenna element. The impedance converting circuit is connected to a power-supply end of the antenna element. The impedance converting circuit is interposed between the antenna element and a power-supply circuit. The impedance converting circuit includes a first inductance element connected to the power-supply circuit and a second inductance element coupled to the first inductance element. A first end and a second end of the first inductance element are connected to the power-supply circuit and the antenna, respectively. A first end and a second end of the second inductance element are connected to the antenna element and ground, respectively.



US 20110309995A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0309995 A1

(43) Pub. Date: Dec. 22, 2011

Jang et al.

(54) **PROTECTIVE CIRCUIT MODULE AND SECONDARY BATTERY PACK INCLUDING THE SAME**

(76) Inventors: **Youngcheol Jang**, Yongin-si (KR); **Nohyun Kwag**, Yongin-si (KR)

(21) Appl. No.: **13/220,566**

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

Related U.S. Application Data

(63) Continuation of application No. 12/246,763, filed on Oct. 7, 2008, now Pat. No. 8,031,122.

(30) **Foreign Application Priority Data**

Oct. 30, 2007 (KR) 2007-109726

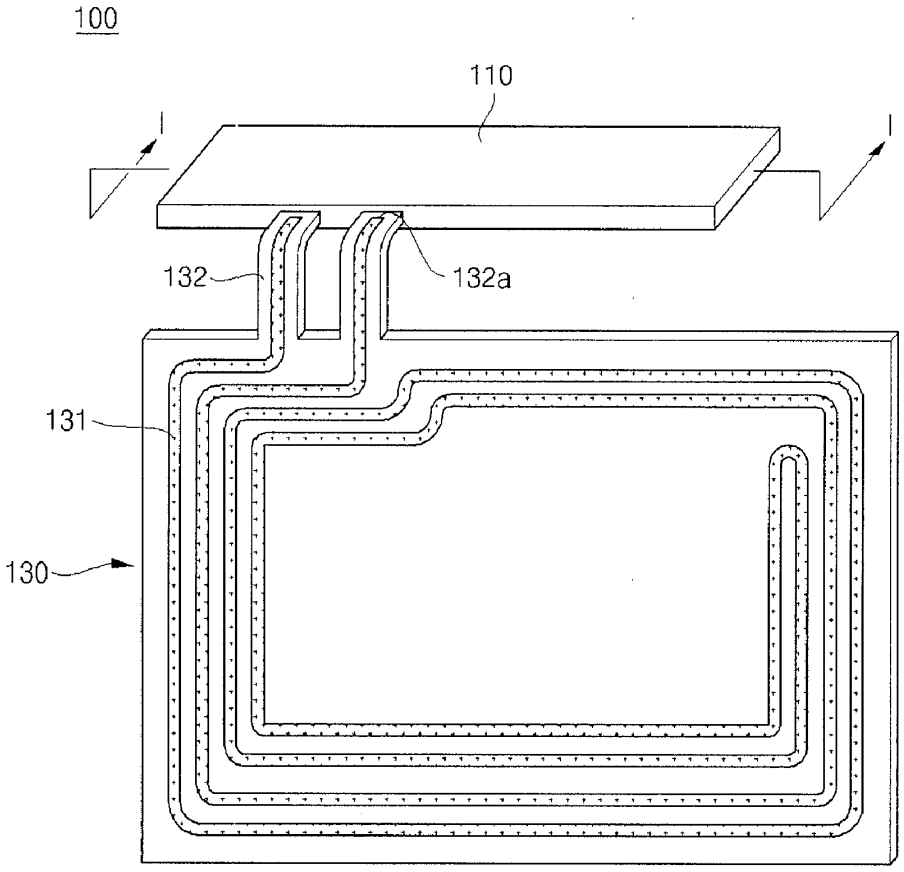
Publication Classification

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

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

(57) **ABSTRACT**

A protective circuit board including a layered insulating substrate, a printed circuit pattern disposed within the insulating substrate, and a loop antenna electrically connected to the printed circuit pattern. Ends of the loop antenna can be inserted into the insulating substrate and connected to the printed circuit pattern. Portions of the printed circuit pattern may extend out of the insulating substrate, and may be connected to the loop antenna. The protective circuit board can be included in a secondary battery pack comprising a secondary battery. The loop antenna can be adhered to the secondary battery.



US 20110309998A1

(19) **United States**

(12) **Patent Application Publication**

Sakurai

(10) **Pub. No.: US 2011/0309998 A1**

(43) **Pub. Date: Dec. 22, 2011**

(54) **WIRELESS APPARATUS**

(76) Inventor: **Masanori Sakurai**, Tokyo (JP)

(21) Appl. No.: **13/148,845**

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

(86) PCT No.: **PCT/JP2010/052581**

§ 371 (c)(1),
(2), (4) Date: **Aug. 10, 2011**

(30) **Foreign Application Priority Data**

Feb. 25, 2009 (JP) 2009-042293

Publication Classification

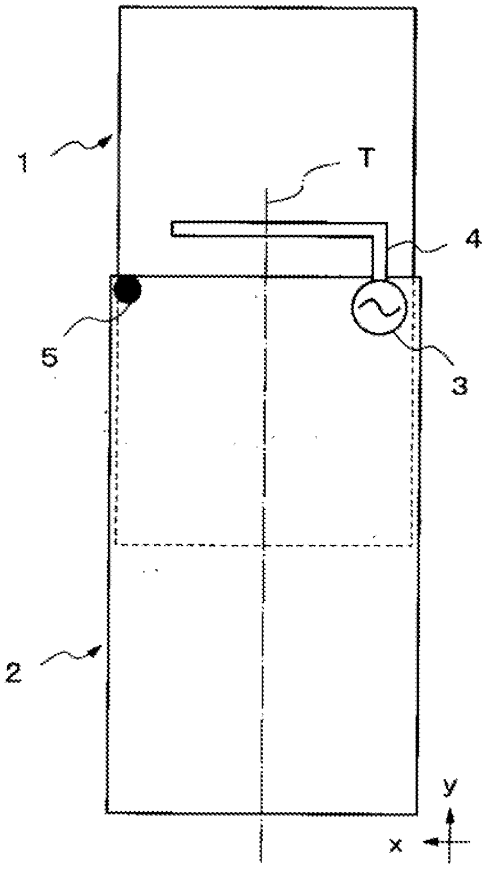
(51) **Int. Cl.**
H01Q 1/50 (2006.01)

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

(57) **ABSTRACT**

In a wireless apparatus which includes two circuit boards overlapping each other, it is contrived to improve antenna characteristics without using a sleeve ground part of a flexible cable.

A wireless apparatus **20** includes a first circuit board **21**, a second circuit board **22** and a connector **23**. An antenna element **25** is mounted to the first circuit board **21**. The second circuit board **22** can be in a state that the second circuit board **22** overlaps with the first circuit board at least partially. The connector **23** has a shape extending from one side of an area overlapping the first circuit board **21** and the second circuit board **22** toward the other side. The connector **23** is connected electrically with the first circuit board **21** and the second circuit board **22**. The connector **23** controls electrical current distribution which is generated in the first circuit board **21** and the second circuit board **22** due to applying an electrical current to the antenna element **25**.



US 20110310572A1

(19) **United States**

(12) **Patent Application Publication**

Murakami

(10) **Pub. No.: US 2011/0310572 A1**

(43) **Pub. Date: Dec. 22, 2011**

(54) **ELECTRONIC APPARATUS**

(75) Inventor: **Mitsuhiro Murakami**, Tachikawa-shi (JP)

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

(21) Appl. No.: **13/109,899**

(22) Filed: **May 17, 2011**

(30) **Foreign Application Priority Data**

Jun. 18, 2010 (JP) 2010-139790

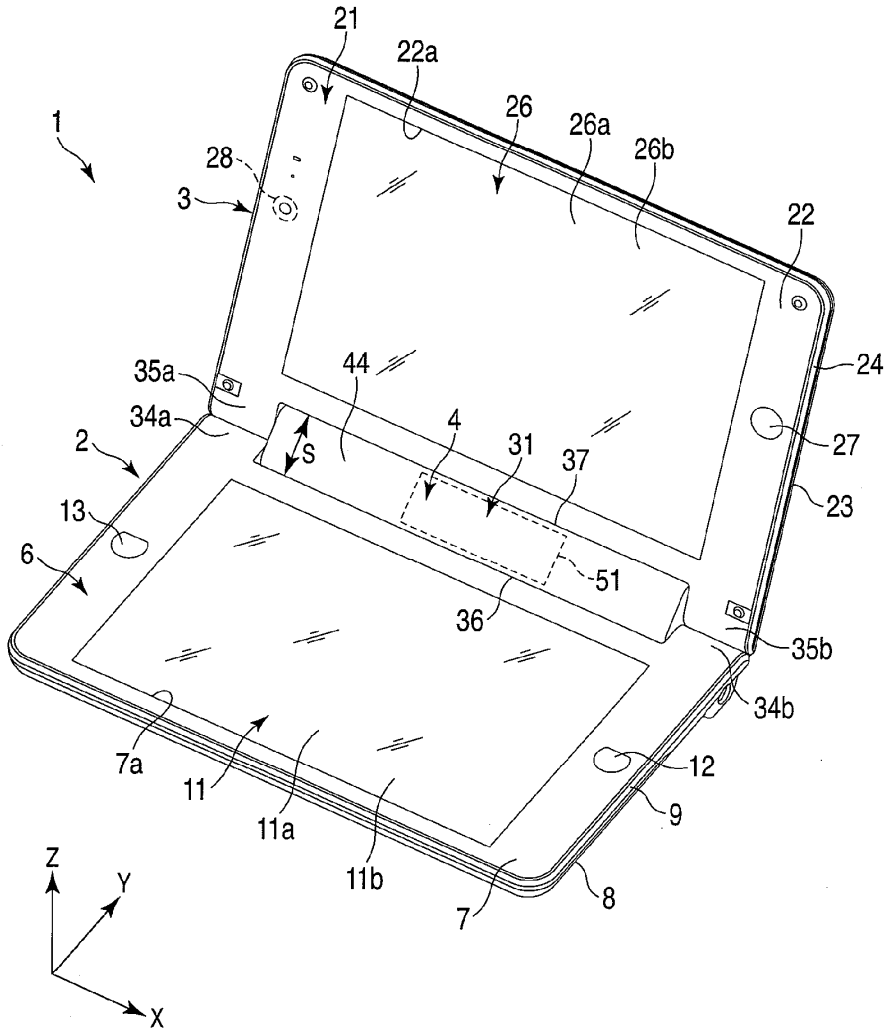
Publication Classification

(51) **Int. Cl.**
H05K 7/02 (2006.01)

(52) **U.S. Cl.** **361/752**; 361/679.01

(57) **ABSTRACT**

According to one embodiment, an electronic apparatus includes a first housing, a second housing, a third housing between the first housing and the second housing, the third housing being rotatably connected to the first housing and the second housing, and an antenna in the third housing.



US 20110312382A1

(19) **United States**

(12) **Patent Application Publication**

Itay et al.

(10) **Pub. No.: US 2011/0312382 A1**

(43) **Pub. Date: Dec. 22, 2011**

(54) **RETROFIT CONTACTLESS SMART SIM FUNCTIONALITY IN MOBILE COMMUNICATORS**

(75) Inventors: **Nehemya Itay**, Beit Hillel (IL); **Yaacov Haroosh**, Migdal HaEmek (IL); **Oded Bashan**, Rosh Pina (IL)

(73) Assignee: **ON TRACK INNOVATIONS LTD.**, Rosh Pina (IL)

(21) Appl. No.: **12/816,669**

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

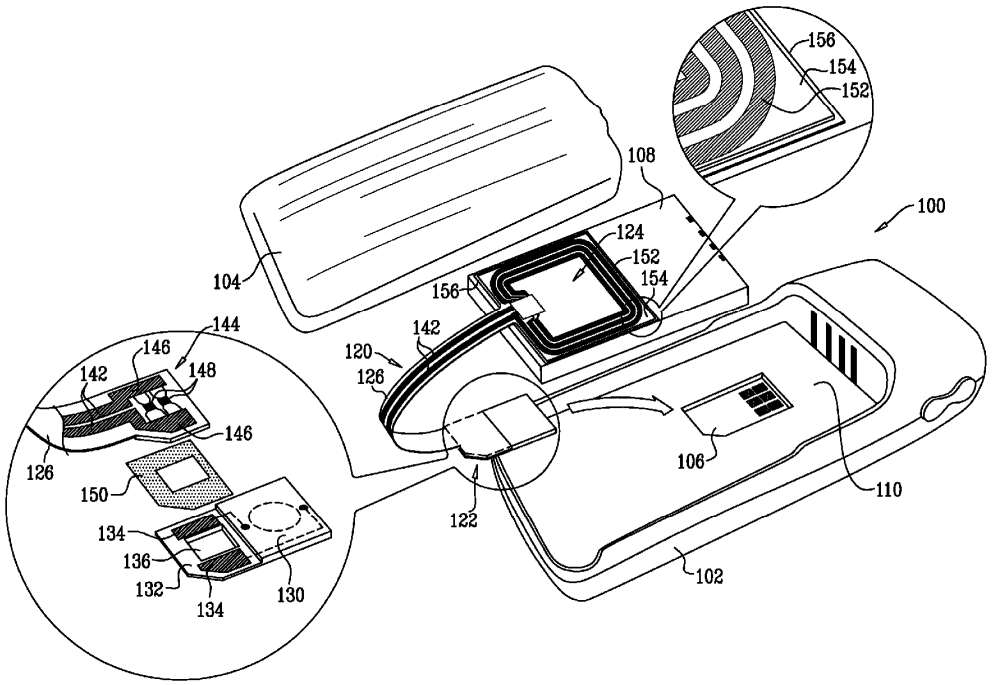
Publication Classification

(51) **Int. Cl.**
H04B 1/38 (2006.01)

(52) **U.S. Cl.** **455/558**

(57) **ABSTRACT**

A mobile communicator including a main housing portion, defining a SIM card socket, a battery located at a battery location defined by the main housing portion, a cover over the battery and a retrofit contactless smart SIM functionality assembly, having a SIM card shaped portion which is mounted in the SIM card socket, a contactless smart card antenna portion located between the battery and the cover and an antenna tail portion which interconnects the contactless smart card antenna portion with the SIM card shaped portion, the antenna tail portion being attached and electrically connected to the SIM card shaped portion by means of an electrically conductive adhesive.



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(54) **ANTENNA SYSTEM WITH PARASITIC ELEMENT FOR HEARING AID COMPLIANT ELECTROMAGNETIC EMISSION**

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(57) **ABSTRACT**

A system for production of an electromagnetic (EM) field having EM emissions mitigated at one or more predetermined locations within a Hearing Aid Compliant (HAC) measurement plane is provided. The EM field mitigation system includes a ground plane, an antenna element, and a parasitic resonator element. The antenna element is coupled to the ground plane and resonates within at least one predetermined frequency band for transmitting and receiving the radio frequency (RF) signals modulated at one or more frequencies within the at least one predetermined first frequency band. The parasitic resonator element includes at least a first leg and a second leg connected to the ground plane and located a predetermined distance from the antenna element for mitigation of the EM emissions of the antenna element at the one or more predetermined locations within the HAC measurement plane. The first leg of the parasitic resonator element is connected to the ground plane on a first side of an effective electric field mid-line laterally dividing the ground plane and the second leg of the parasitic antenna element is connected to the ground plane on a second side of the effective electric field mid-line of the ground plane.