US 20130049900A1

(19) **United States**

(12) **Patent Application Publication**

CHUNG et al.

(10) **Pub. No.: US 2013/0049900 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **PRINTED FILTERING ANTENNA**

(75) Inventors: **Shyh-Jong CHUNG**, Hsinchu County (TW); **Chao-Tang CHUANG**, Hualien County (TW)

(73) Assignee: **NATIONAL CHIAO TUNG UNIVERSITY**, Hsinchu City (TW)

(21) Appl. No.: **13/342,116**

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

(30) **Foreign Application Priority Data**

Aug. 29, 2011 (TW) 100130932

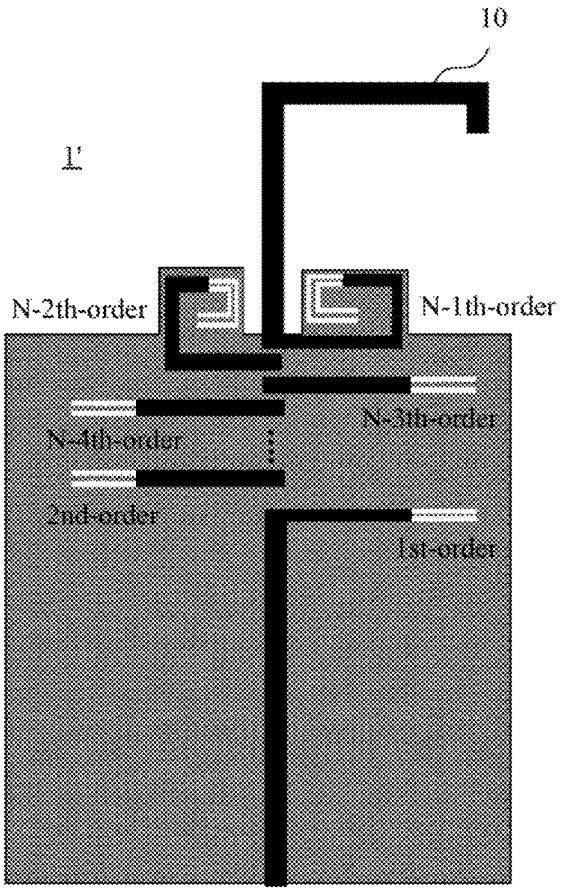
Publication Classification

(51) **Int. Cl.**
H01P 1/203 (2006.01)

(52) **U.S. Cl.** **333/204**

(57) **ABSTRACT**

A printed filtering antenna is provided. This filtering antenna comprises an antenna part and a coupled line resonator. The antenna part is directly connected to a coupled line resonator and occupies an antenna area. The coupled line resonator provides a filtering mechanism together with the antenna part. The coupled line resonator comprises a short-circuited stub and an open-circuited stub. The short-circuited stub comprises an open-circuited end and a short-circuited end connected to ground. The open-circuited stub is parallel to the short-circuited stub. The open-circuited stub comprises a first end o and a second end. The first end is connected to the feed point and is corresponding to the open-circuited end of the short-circuited stub such that the open-circuited stub is coupled to the short-circuited stub.



US 20130049965A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0049965 A1

(43) Pub. Date: Feb. 28, 2013

Lee et al.

(54) **ELECTRONIC SEAL WITH MULTIPLE MEANS OF IDENTIFICATION AND METHOD BASED ON ELECTRONIC SEAL FOR INSPECTING GOODS**

(75) Inventors: **Ming-Town Lee**, Taoyuan County (TW); **Yu-Cheng Chang**, Taoyuan County (TW); **Wei-Yi Tseng**, Taoyuan County (TW)

(73) Assignees: **Directorate General of Customs, Ministry of Frames, R.O.C.**, Taipei (TW); **Chung-Shan Institute of Science and Technology, Armaments, Bureau, Ministry of National Defense**, Taoyuan County (TW)

(21) Appl. No.: **13/220,852**

(22) Filed: **Aug. 30, 2011**

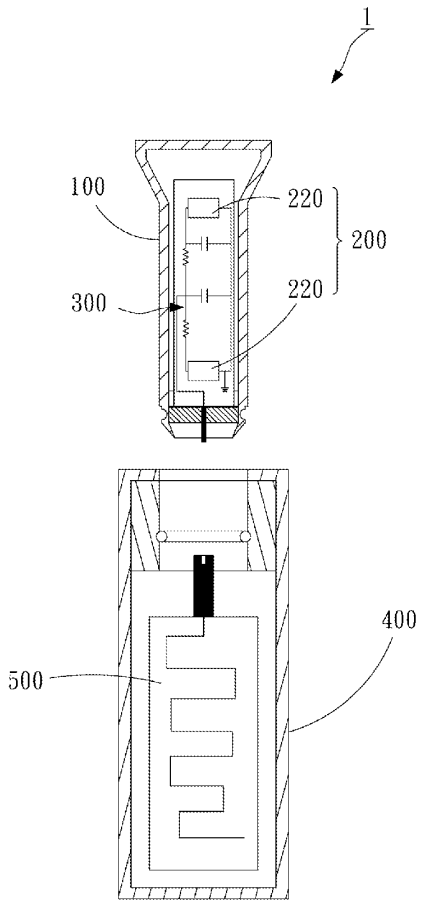
Publication Classification

(51) **Int. Cl.**
G08B 13/14 (2006.01)

(52) **U.S. Cl.** **340/572.7**

(57) **ABSTRACT**

An electronic seal includes a radio frequency identification apparatus, an antenna assembly and an impedance matching circuit. The radio frequency identification apparatus includes at least two radio frequency identification units each for providing a specific code for identification. The antenna assembly is electrically connected to the radio frequency identification units. The antenna assembly is used to receive an electromagnetic signal for identification to excite the radio frequency identification units to transmit the specific codes through the antenna assembly. The impedance matching circuit is provided between the radio frequency identification units and the antenna assembly for adjusting the impedance matching of the radio frequency identification units to the antenna assembly, thus adjusting excitation powers and feedback powers of the specific codes from the radio frequency identification units through the antenna assembly.



US 20130050015A1

(19) **United States**

(12) **Patent Application Publication**

Black et al.

(10) **Pub. No.: US 2013/0050015 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **ANTENNA-COUPLED ANTENNA ARRAYS**

(75) Inventors: **Stephen H. Black**, Buellton, CA (US); **Michael A. Gritz**, Goleta, CA (US); **Borys Pawel Kolasa**, Santa Barbara, CA (US); **Robert F. Burkholder**, Goleta, CA (US)

(73) Assignee: **Raytheon Company**, Waltham, MA (US)

(21) Appl. No.: **13/215,430**

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

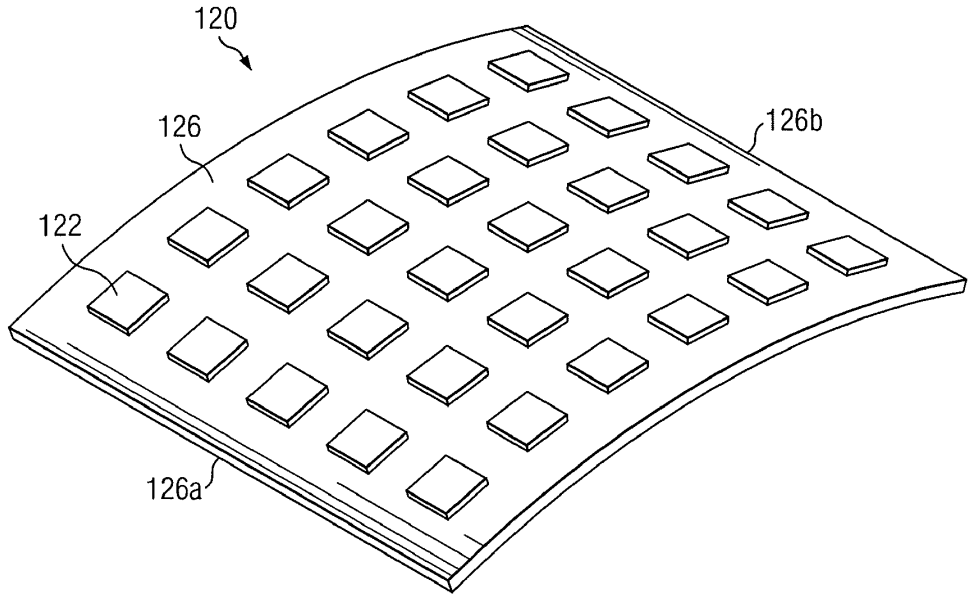
Publication Classification

(51) **Int. Cl.**
G01S 13/89 (2006.01)

(52) **U.S. Cl.** **342/175**

(57) **ABSTRACT**

According one embodiment, a non-heterodyne radiation imager includes a substrate having a ground plane layer. The radiation imager also includes a plurality of antenna elements operable to receive radiative input. Each support element of a plurality of support elements mechanically couples an antenna element of the plurality of antenna elements to the substrate. A plurality of energy detectors is operable to measure the radiative input received by the plurality of antenna elements.



US 20130050025A1

(19) **United States**

(12) **Patent Application Publication**

PU et al.

(10) **Pub. No.: US 2013/0050025 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **ANTENNA STRUCTURE**

(75) Inventors: **TA CHUN PU**, KAOHSIUNG CITY (TW); **CHUN YIH WU**, TAIPEI CITY (TW); **JUI HUNG CHEN**, TAICHUNG CITY (TW); **HUNG HSUAN LIN**, HSINCHU COUNTY (TW)

(73) Assignee: **INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE**, HSINCHU (TW)

(21) Appl. No.: **13/298,121**

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

(30) **Foreign Application Priority Data**

Aug. 25, 2011 (TW) 100130435

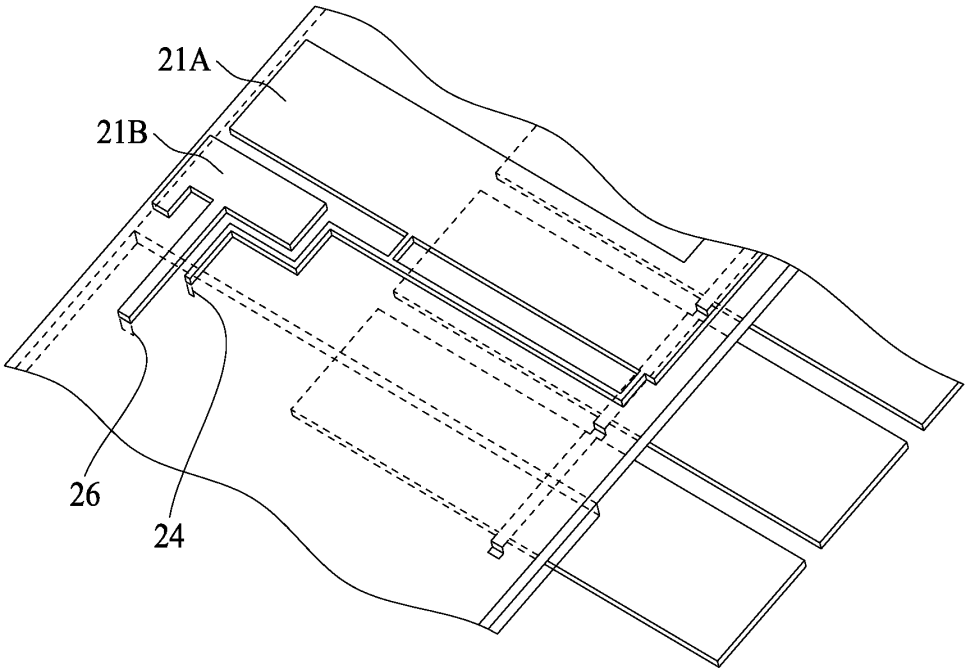
Publication Classification

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

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

(57) **ABSTRACT**

An antenna structure comprises a substrate having a first surface and a second surface, an array of conductor units positioned on the first surface and including at least two conductor units which are coupled, and at least one load metal sheet positioned on at least one of the first surface or the second surface. Each of the conductor units includes an intervening material with two conductors positioned on opposite surfaces of the intervening material.



US 20130050026A1

(19) **United States**

(12) **Patent Application Publication**

VIN et al.

(10) **Pub. No.: US 2013/0050026 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **ANTENNA DEVICE OF A MOBILE TERMINAL**

(75) Inventors: **Young Boo VIN**, Hwasung-si (KR); **Dong Hyun LEE**, Suwon-si (KR); **Soon Ho HWANG**, Seoul (KR); **Hae Yeon KIM**, Suwon-si (KR); **Bum Jin CHO**, Hwasung-si (KR); **Se Hyun PARK**, Suwon-si (KR); **Joon Ho BYUN**, Seongnam-si (KR)

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

(21) Appl. No.: **13/343,863**

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

(30) **Foreign Application Priority Data**

Aug. 22, 2011 (KR) 10-2011-0083212

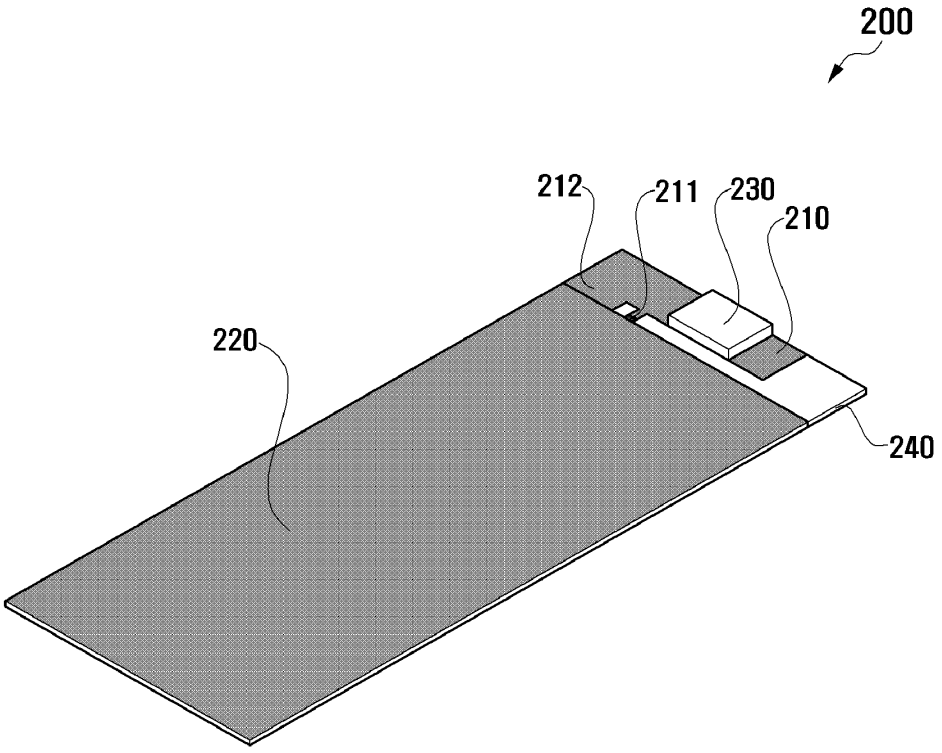
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device of a mobile terminal having improved performance by utilizing a metal object located in proximity to the antenna device as an antenna radiator is provided. The antenna device includes an antenna pattern connected to a feeder and a ground line, and a metal component positioned on the antenna pattern and including a metal that forms an antenna radiator.



US 20130050027A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0050027 A1

(43) Pub. Date: Feb. 28, 2013

KIM et al.

(54) **MIMO/DIVERSITY ANTENNA WITH HIGH ISOLATION**

(75) Inventors: **Tae-Hyung KIM**, Gyeonggi-do (KR); **Ki-Hyun KONG**, Gyeonggi-do (KR); **Je-Min LEE**, Gyeonggi-do (KR); **Byung-Je LEE**, Seoul (KR); **Byeong-Kwan KIM**, Seoul (KR); **Hyun-Ho WI**, Seoul (KR); **Bong-Gyu SHIN**, Gyeonggi-do (KR)

(73) Assignee: **LS Mtron Ltd.**, Gyeonggi-do (KR)

(21) Appl. No.: **13/530,493**

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

(30) **Foreign Application Priority Data**

Aug. 29, 2011 (KR) 10-2011-0086616

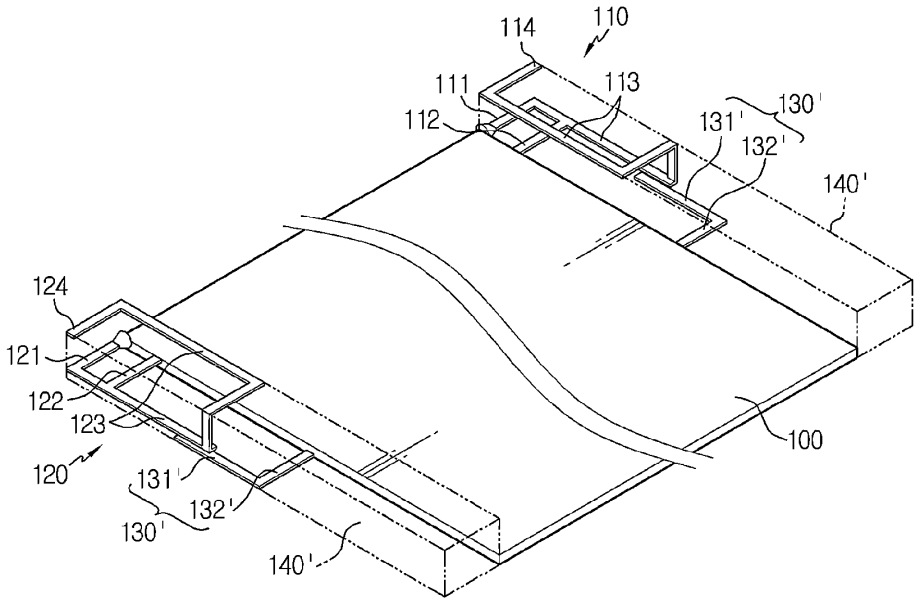
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed is a MIMO/diversity antenna high isolation including a printed circuit board, a plurality of antenna elements, a current conversion element connected with a common ground of the printed circuit board apart from the antenna elements at a predetermined distance, wherein the current conversion element is coupled with the antenna elements to induce an electric current from the antenna elements into the antenna elements again via the common ground.



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(19) **United States**

(12) **Patent Application Publication**

NOGAMI

(10) **Pub. No.: US 2013/0050028 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **ANTENNA DEVICE**

(75) Inventor: **HIDEKATSU NOGAMI**, Kusatsu-shi (JP)

(73) Assignee: **OMRON CORPORATION**, KYOTO (JP)

(21) Appl. No.: **13/547,448**

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

(30) **Foreign Application Priority Data**

Aug. 26, 2011 (JP) 2011184518

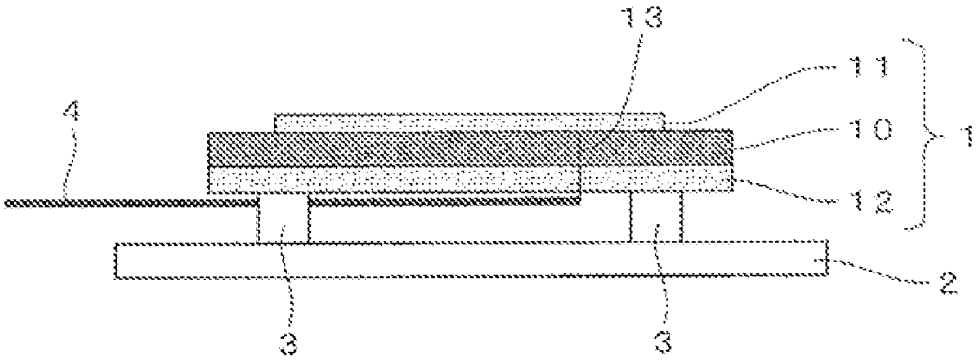
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device comprises an antenna board, wherein an antenna pattern is formed in or on a front surface of a dielectric layer, a ground layer is formed in or on a rear surface of the dielectric layer, and a feed pin is inserted into a thickness of the antenna board through the ground layer and the dielectic layer. The diameter of the antenna pattern is set to one half of the wavelength of an RF signal passed through the antenna pattern, and a length of one side of the dielectric plate is set shorter than the wavelength. A metallic plate is coupled to the ground layer with a plurality of metallic spacers interposed therebetween, whereby the metallic plate is electrically connected to the ground layer. .



US 20130050029A1

(19) **United States**

(12) **Patent Application Publication**

Xu et al.

(10) **Pub. No.: US 2013/0050029 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **NON-PLANAR METAMATERIAL ANTENNA STRUCTURES**

(71) Applicant: **Tyco Electronics Services GMBH**, Schaffhausen (CH)

(72) Inventors: **Nan Xu**, San Diego, CA (US); **Sunil Kumar Rajgopal**, San Diego, CA (US); **Norberto Lopez**, San Diego, CA (US); **Vaneet Pathak**, Palo Alto, CA (US); **Ajay Gummalla**, Sunnyvale, CA (US); **Gregory Poilasne**, El Cajon, CA (US); **Maha Achour**, Encinitas, CA (US)

(73) Assignee: **Tyco Electronics Services GMBH**, Schaffhausen (CH)

(21) Appl. No.: **13/663,351**

(22) Filed: **Oct. 29, 2012**

Related U.S. Application Data

(63) Continuation of application No. 12/465,571, filed on May 13, 2009, now Pat. No. 8,299,967.

(60) Provisional application No. 61/056,790, filed on May 28, 2008.

Publication Classification

(51) **Int. Cl.**

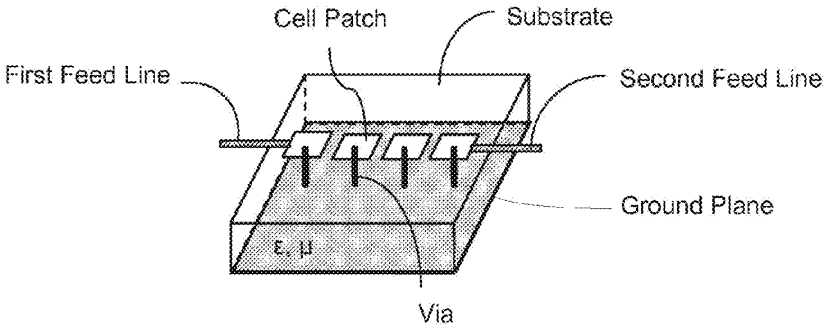
H01Q 1/38 (2006.01)

H01P 11/00 (2006.01)

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

(57) **ABSTRACT**

Antennas for wireless communications based on metamaterial (MTM) structures to arrange one or more antenna sections of an MTM antenna away from one or more other antenna sections of the same MTM antenna so that the antenna sections of the MTM antenna are spatially distributed in a non-planar configuration to provide a compact structure adapted to fit to an allocated space or volume of a wireless communication device, such as a portable wireless communication device.



US 20130050031A1

(19) **United States**

(12) **Patent Application Publication**

Zhu et al.

(10) **Pub. No.: US 2013/0050031 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **ANTENNA ISOLATION ELEMENTS**

(76) Inventors: **Jiang Zhu**, Sunnyvale, CA (US); **Jerzy Guterman**, Mountain View, CA (US); **Mattia Pascolini**, San Mateo, CA (US); **Jayesh Nath**, Santa Clara, CA (US); **Robert W. Schlub**, Cupertino, CA (US)

(21) Appl. No.: **13/216,012**

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

Publication Classification

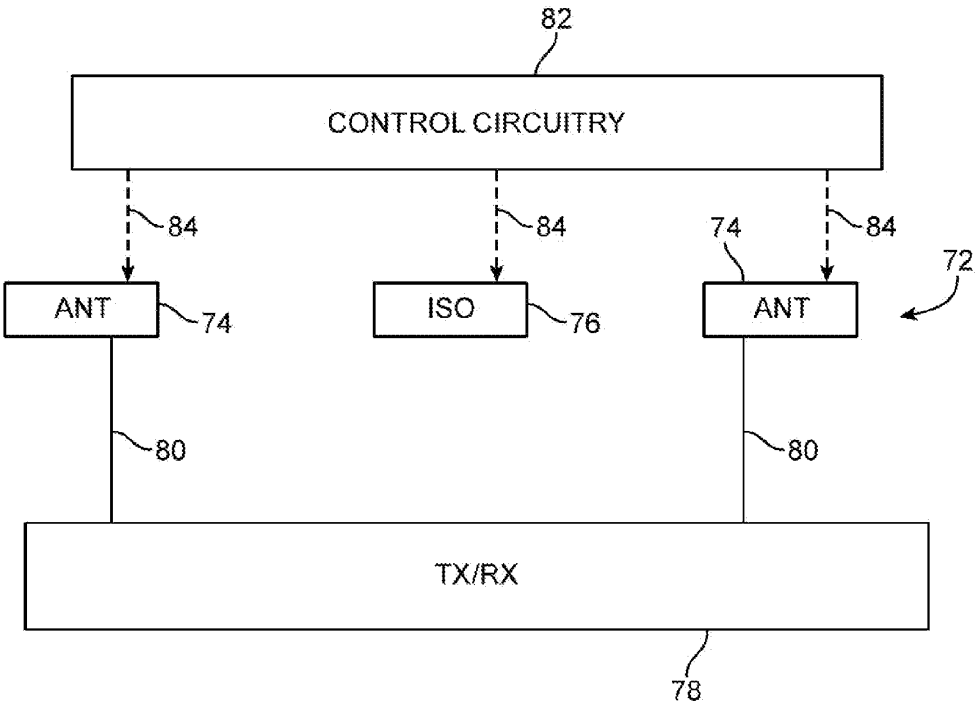
(51) **Int. Cl.**

H01Q 7/04	(2006.01)
H01Q 1/52	(2006.01)
H01Q 1/24	(2006.01)

(52) **U.S. Cl.** **343/702**; 343/907; 343/841; 343/842

(57) **ABSTRACT**

Electronic devices may be provided with antenna structures and antenna isolation element structures. An antenna array may be located within an electronic device. The antenna array may have multiple antennas and interposed antenna isolation element structures for isolating the antennas from each other. An antenna isolation element structure may have a dielectric carrier with a longitudinal axis. A sheet of conductive material may extend around the longitudinal axis to form a conductive loop structure. The loop structure in the antenna isolation element may have a gap that spans the sheet of conductive material parallel to the longitudinal axis. Electronic components may bridge the gap. Control circuitry may adjust the electronic components to tune the antenna isolation element.



US 20130050036A1

(19) **United States**

(12) **Patent Application Publication**

Kashiwagi et al.

(10) **Pub. No.: US 2013/0050036 A1**

(43) **Pub. Date: Feb. 28, 2013**

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

(76) Inventors: **Ippei Kashiwagi**, Fuchu-shi (JP); **Koichi Sato**, Tachikawa-shi (JP); **Hiroyuki Hotta**, Hamura-shi (JP)

(21) Appl. No.: **13/460,350**

(22) Filed: **Apr. 30, 2012**

(30) **Foreign Application Priority Data**

Aug. 30, 2011 (JP) 2011-187569

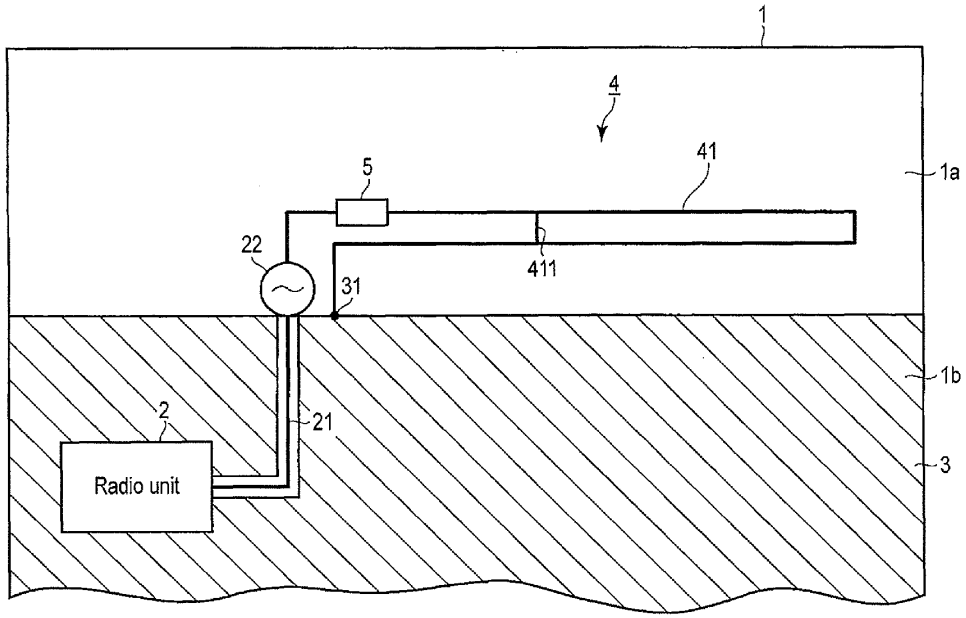
Publication Classification

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

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

(57) **ABSTRACT**

According to one embodiment; an antenna device according to this embodiment includes the first antenna element formed from a folded monopole element and a capacitor element. The first antenna element has a first end connected to a feeding terminal, a second end connected to the first ground terminal, and a middle portion folded, with a stub being provided between the forward portion and backward portion formed by this folding. The capacitor element is inserted between the stub and the above feeding terminal of the forward portion of the first antenna element.



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(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0050045 A1

(43) Pub. Date: Feb. 28, 2013

Chacinski et al.

(54) **MULTIPLE-TURN LOOP ANTENNA ARRANGEMENT AND A PORTABLE RADIO COMMUNICATION DEVICE COMPRISING SUCH AN ARRANGEMENT**

(76) Inventors: **Marek Chacinski**, Farsta (SE); **Andrei Kaikkonen**, Jarfalla (SE); **Lukasz Grynczel**, Sollentuna (SE); **Per Erlandsson**, Stockholm (SE); **Peter Lindberg**, Uppsala (SE)

(21) Appl. No.: **13/589,226**

(22) Filed: **Aug. 20, 2012**

(30) **Foreign Application Priority Data**

Aug. 22, 2011 (EP) 11178226.4

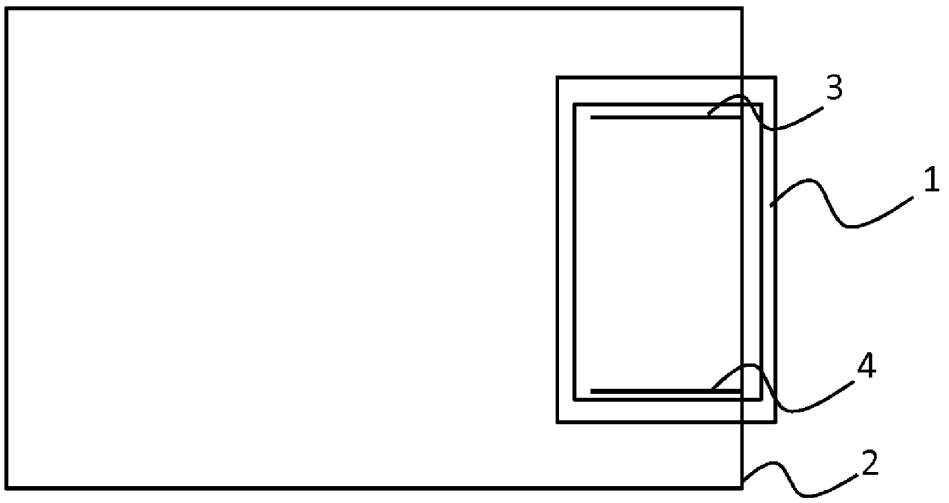
Publication Classification

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

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

(57) **ABSTRACT**

An exemplary embodiment includes a multiple-turn loop antenna arrangement comprising a multiple-turn loop element. The multiple-turn loop element is arranged in a first layer. A ground plane element is arranged in a second layer. The first and second layers are arranged in parallel. The multiple-turn loop element is arranged on top of the ground plane element. The ground plane element comprises slots interrupting eddy currents in the ground plane element, which would short signals in the multiple-turn loop element.



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(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2013/0050046 A1**

(43) **Pub. Date: Feb. 28, 2013**

Jarvis et al.

(54) **CUSTOMIZABLE ANTENNA FEED STRUCTURE**

(76) Inventors: **Daniel W. Jarvis**, Sunnyvale, CA (US); **Mattia Pascolini**, San Mateo, CA (US); **Joshua G. Nickel**, San Jose, CA (US)

(21) Appl. No.: **13/223,102**

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

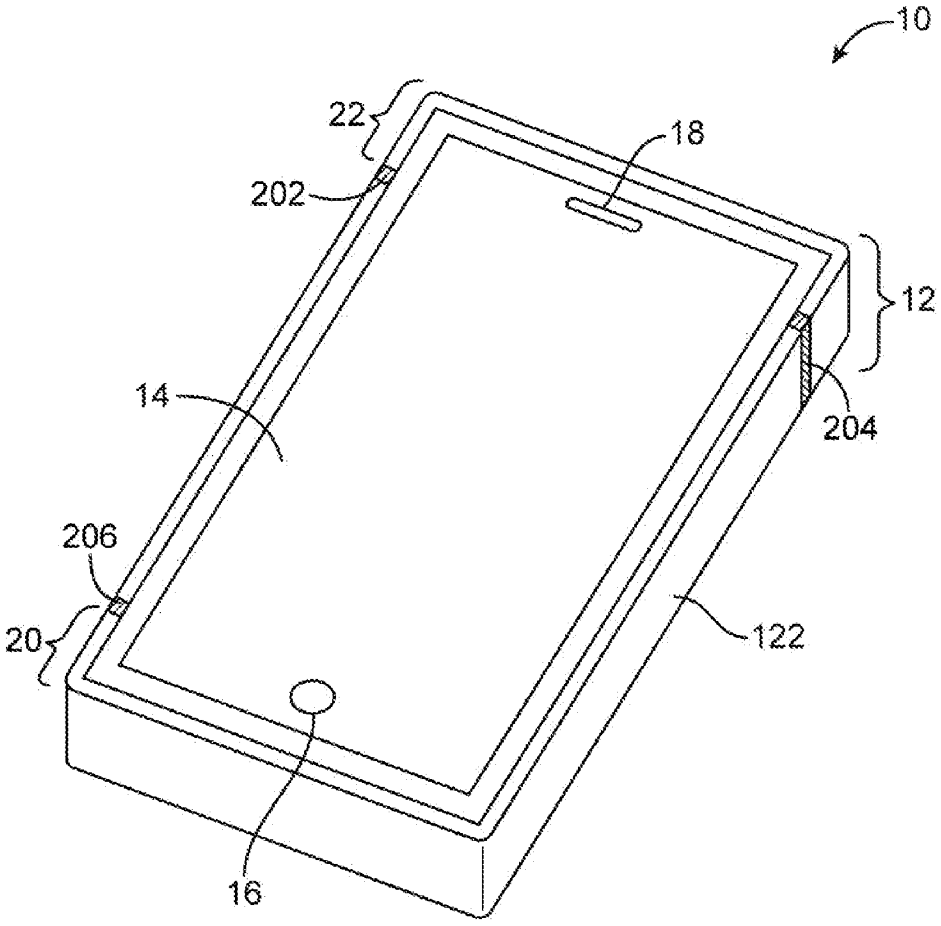
Publication Classification

(51) **Int. Cl.**
H01Q 1/50 (2006.01)
G01R 31/28 (2006.01)

(52) **U.S. Cl.** **343/852**; 29/593

(57) **ABSTRACT**

Custom antenna structures may be used to compensate for manufacturing variations in electronic device antennas. An antenna may have an antenna feed and conductive structures such as portions of a peripheral conductive electronic device housing member. The custom antenna structures compensate for manufacturing variations that could potentially lead to undesired variations in antenna performance. The custom antenna structures may make customized alterations to antenna feed structures or conductive paths within an antenna. An antenna may be formed from a conductive housing member that surrounds an electronic device. The custom antenna structures may be formed from a printed circuit board with a customizable trace. The customizable trace may have a contact pad portion on the printed circuit board. The customizable trace may be customized to connect the pad to a desired one of a plurality of contacts associated with the conductive housing member to form a customized antenna feed terminal.



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(19) **United States**

(12) **Patent Application Publication**

Zhu et al.

(10) **Pub. No.: US 2013/0050050 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **DISTRIBUTED LOOP ANTENNAS**

(76) Inventors: **Jiang Zhu**, Sunnyvale, CA (US); **Jerzy Guterman**, Mountain View, CA (US); **Mattia Pascolini**, San Mateo, CA (US); **Jayesh Nath**, Santa Clara, CA (US); **Robert W. Schlub**, Cupertino, CA (US)

(21) Appl. No.: **13/216,073**

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

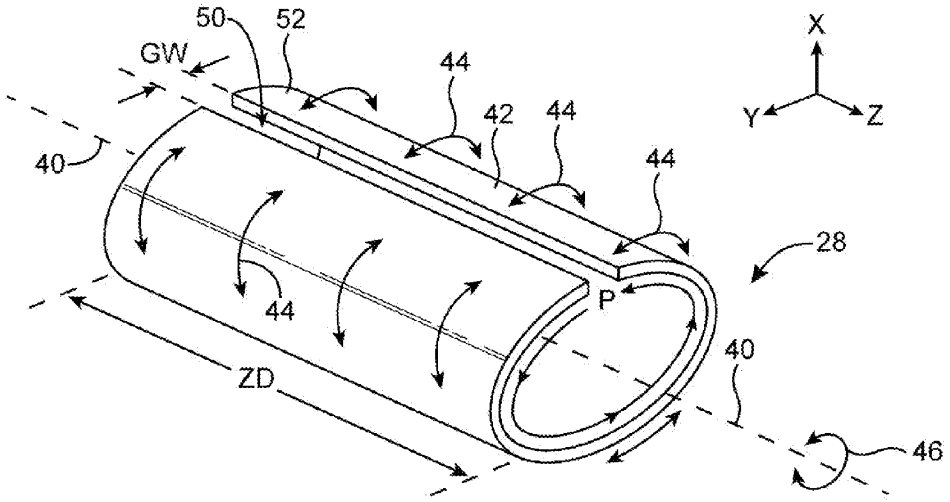
Publication Classification

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

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

(57) **ABSTRACT**

Electronic devices may be provided with antenna structures such as distributed loop antenna resonating element structures. A distributed loop antenna may be formed on an elongated dielectric carrier and may have a longitudinal axis. The distributed loop antenna may include a loop antenna resonating element formed from a sheet of conductive material that extends around the longitudinal axis. A gap may be formed in the sheet of conductive material. The loop antenna resonating element may be directly fed or indirectly fed. In indirect feeding arrangements, an antenna feed structure for indirectly feeding the loop antenna resonating element may be formed from a directly fed loop antenna structure on the elongated dielectric carrier.



US 20130050052A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0050052 A1

(43) Pub. Date: Feb. 28, 2013

Park et al.

(54) **MIMO ANTENNA AND COMMUNICATION DEVICE USING THE SAME**

(75) Inventors: **Se-hyun Park**, Suwon-si (KR); **Dong-jin Kim**, Yongin-si (KR); **Byung-tae Yoon**, Suwon-si (KR)

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

(21) Appl. No.: **13/426,032**

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

Related U.S. Application Data

(62) Division of application No. 12/112,033, filed on Apr. 30, 2008, now Pat. No. 8,164,525.

(30) **Foreign Application Priority Data**

Oct. 17, 2007 (KR) 10-2007-0104549

Publication Classification

(51) **Int. Cl.**

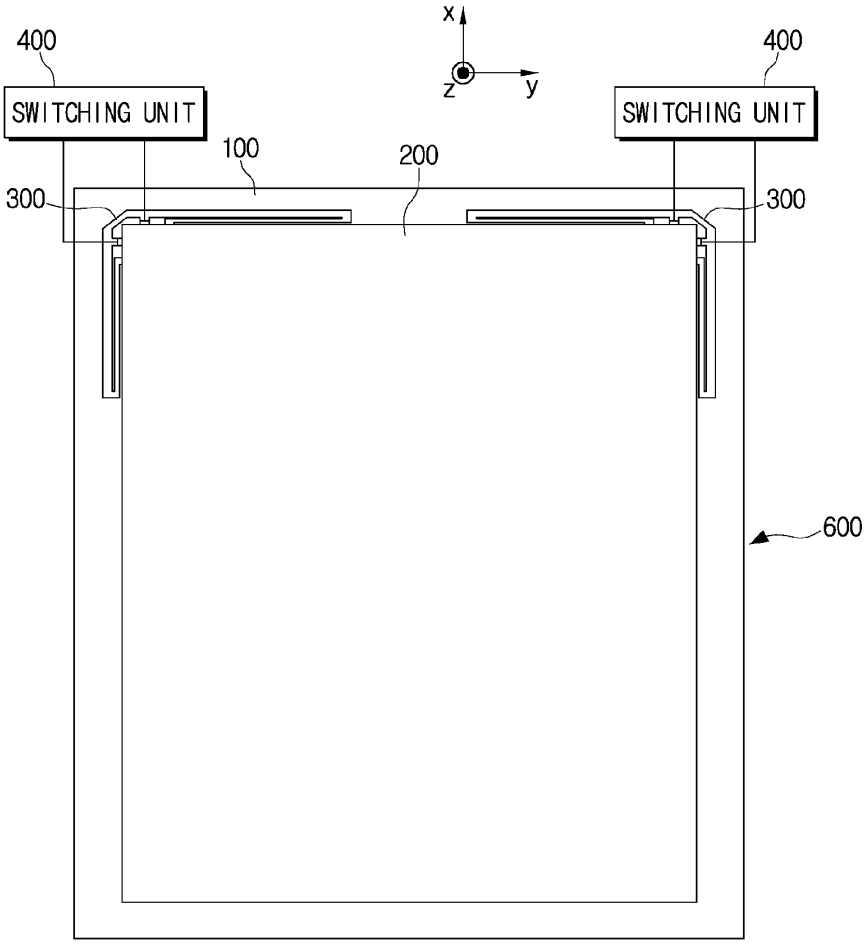
H01Q 21/00 (2006.01)

H01Q 3/24 (2006.01)

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

(57) **ABSTRACT**

A multiple-input multiple-output (MIMO) antenna and a communication device using the same is provided. The MIMO antenna includes a plurality of antenna elements in which a feeding unit is formed at one end, and another end is connected to a ground, and a connection unit which connects the antenna elements.



US 20130050055A1

(19) **United States**

(12) **Patent Application Publication**

Paradiso et al.

(10) **Pub. No.: US 2013/0050055 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **PHASED ARRAY ANTENNA MODULE AND METHOD OF MAKING SAME**

(75) Inventors: **Louis R. Paradiso**, Satellite Beach, FL (US); **Sean Ortiz**, West Melbourne, FL (US); **Donald Franklin Hege**, Palm Bay, FL (US); **James J. Rawnick**, Palm Bay, FL (US); **Lora A. Theiss**, Indialantic, FL (US); **Jerry B. Schappacher**, Melbourne Beach, FL (US)

(73) Assignee: **Harris Corporation**, Melbourne, FL (US)

(21) Appl. No.: **13/221,382**

(22) Filed: **Aug. 30, 2011**

Publication Classification

(51) **Int. Cl.**

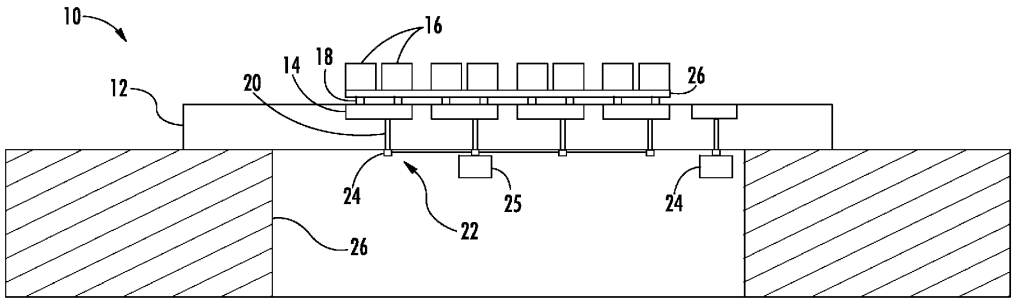
H01Q 21/00 (2006.01)

H01L 21/77 (2006.01)

(52) **U.S. Cl.** **343/893**; 438/34; 257/E21.598

(57) **ABSTRACT**

A phased array antenna includes a semiconductor wafer, with radio frequency (RF) circuitry fabricated on top side of the semiconductor wafer. There is an array of antenna elements above the top side of the semiconductor wafer, and a coaxial coupling arrangement coupling the RF circuitry and the array of antenna elements. The coaxial coupling arrangement may include a plurality of coaxial connections, each having an outer conductor, an inner conductor, and a dielectric material therebetween. The dielectric material may be air.



US 20130050056A1

(19) **United States**

(12) **Patent Application Publication**

Lee et al.

(10) **Pub. No.: US 2013/0050056 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **WIRELESS DEVICE WITH 3-D ANTENNA SYSTEM**

(75) Inventors: **Cheol-Woong Lee**, San Jose, CA (US); **Mohammad A. Tassoudji**, Cardiff, CA (US); **Roger Brockenbrough**, Los Gatos, CA (US)

(73) Assignee: **QUALCOMM INCORPORATED**, San Diego, CA (US)

(21) Appl. No.: **13/223,127**

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

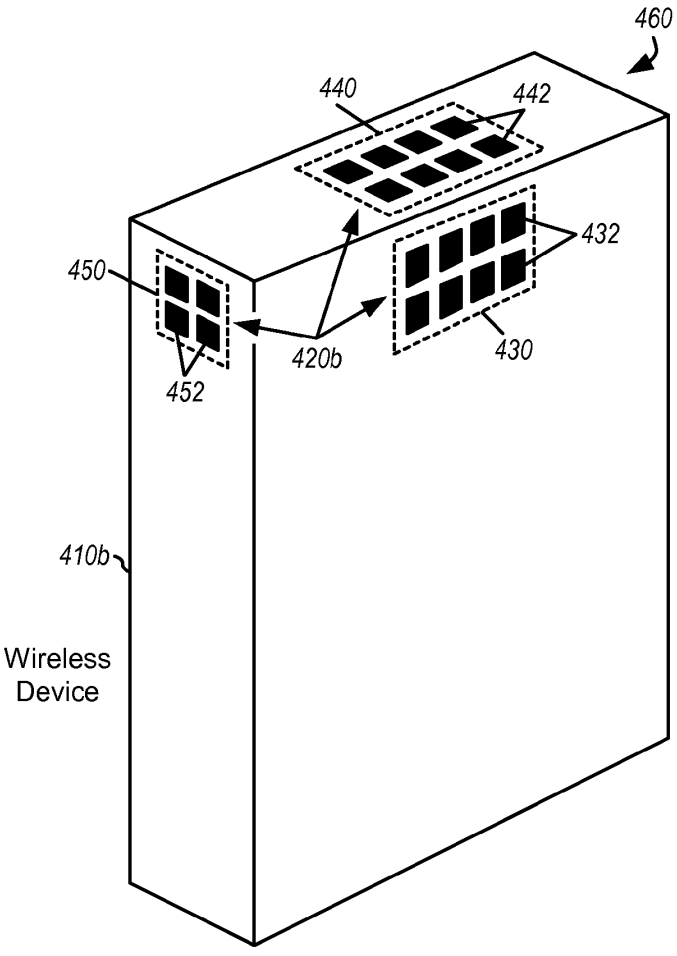
Publication Classification

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

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

(57) **ABSTRACT**

Techniques for improving coverage of an antenna system are disclosed. In an aspect, a wireless device includes a 3-D antenna system to improve coverage and enhance performance. The 3-D antenna system includes antenna elements formed on multiple planes pointing in different spatial directions. Antenna elements formed on the multiple planes are associated with different antenna beams, which can provide a larger line-of-sight (LOS) coverage for the wireless device. Beamforming may be performed for the antennas on a given plane to further improve LOS coverage. Non-LOS (NLOS) coverage may also improve since antenna beams pointing in different spatial directions may result in reflected signals of higher power levels due to better signal reflection for some antenna beams.



US 20130050057A1

(19) **United States**

(12) **Patent Application Publication**

Hayashi et al.

(10) **Pub. No.: US 2013/0050057 A1**

(43) **Pub. Date: Feb. 28, 2013**

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

(76) Inventors: **Kouji Hayashi**, Akishima-shi (JP); **Koichi Sato**, Tachikawa-shi (JP); **Natsumi Endo**, Sagamihara-shi (JP)

(21) Appl. No.: **13/533,770**

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

(30) **Foreign Application Priority Data**

Aug. 31, 2011 (JP) 2011-189730

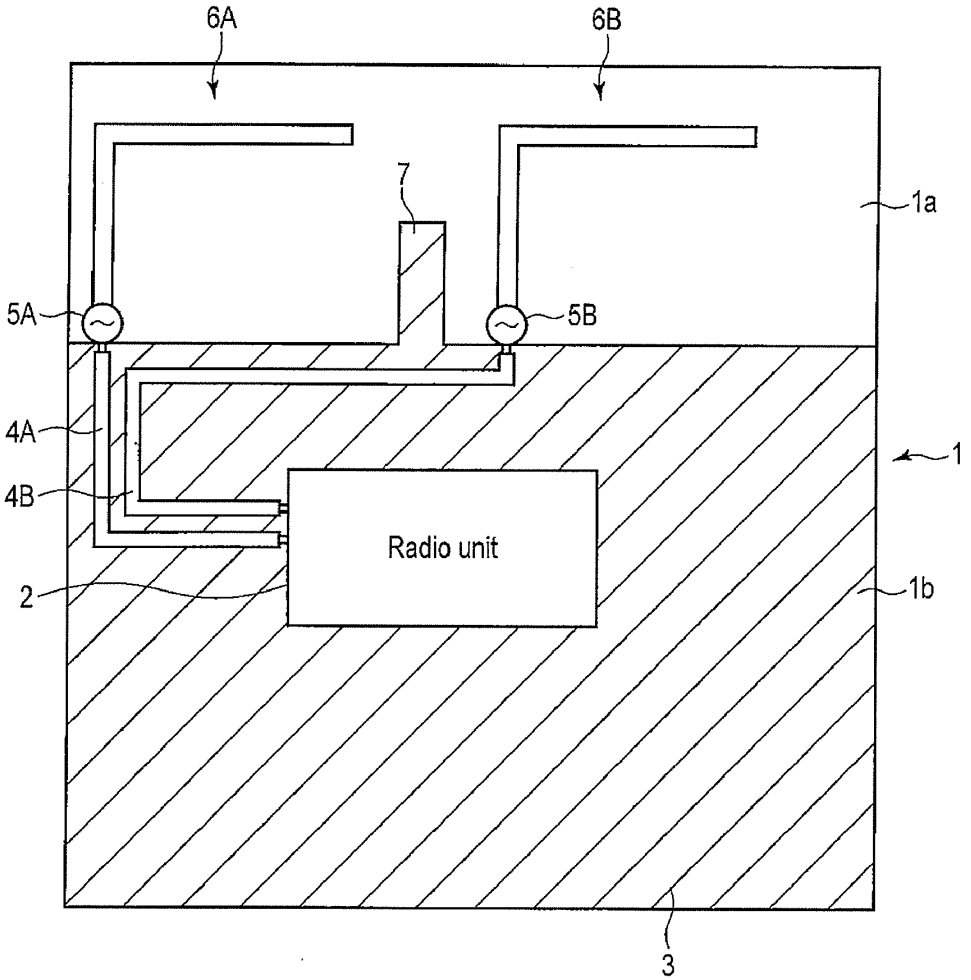
Publication Classification

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

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

(57) **ABSTRACT**

According to one embodiment, an antenna device according to this embodiment includes first and second feed terminals. The distance between the first and second feed terminals is set to a distance less than or equal to almost one quarter a wavelength corresponding to a predetermined resonant frequency. A first end of the first antenna including a first band, as a communication band, including the resonant frequency is connected to the first feed terminal. A first end of the second antenna including a second band, as a communication band, including at least the resonant frequency of the first antenna is connected to the second feed terminal. A first protruding portion is provided between the first and second antennas so as to protrude from a ground pattern of an antenna board.



US 20130050960A1

(19) **United States**

(12) **Patent Application Publication**

CHANG et al.

(10) **Pub. No.: US 2013/0050960 A1**

(43) **Pub. Date: Feb. 28, 2013**

(54) **PORTABLE ELECTRONIC DEVICE**

(76) Inventors: **Yu-Chia CHANG**, Taipei (TW); **Wang-Ta HSIEH**, Taipei (TW)

(21) Appl. No.: **13/587,311**

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

Related U.S. Application Data

(60) Provisional application No. 61/526,046, filed on Aug. 22, 2011.

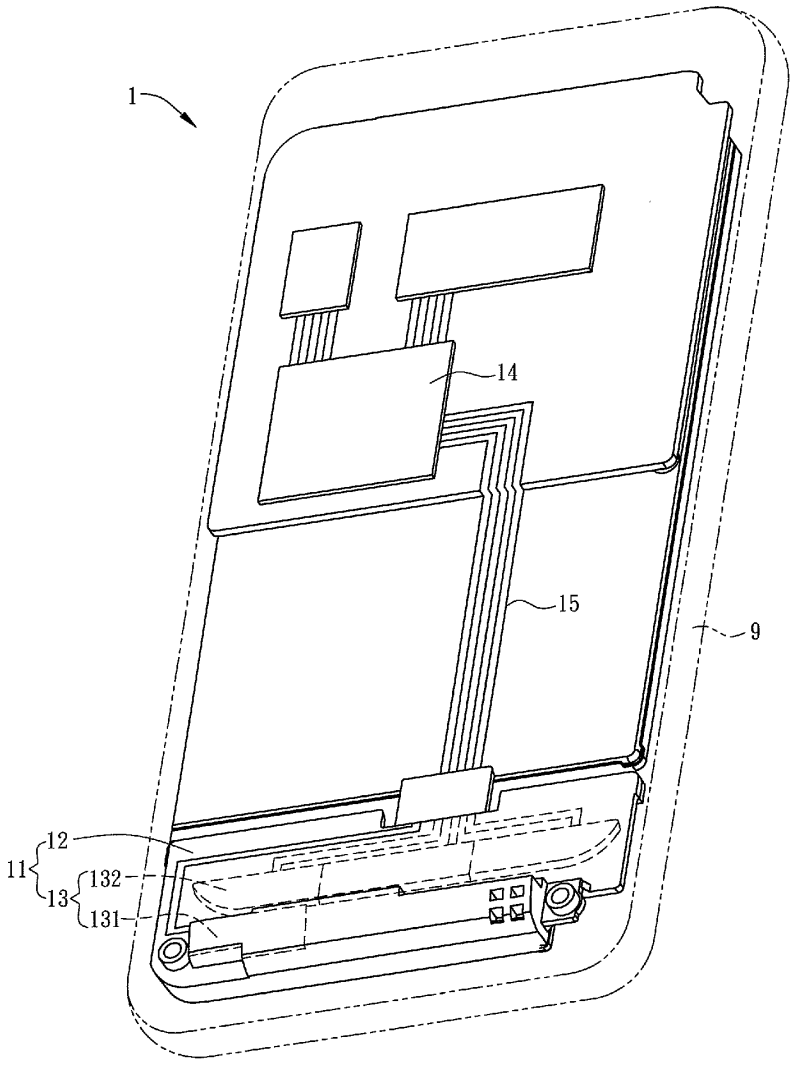
Publication Classification

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

(52) **U.S. Cl.** **361/748**

(57) **ABSTRACT**

A portable electronic device includes an integration unit and a main circuit. The integration unit includes a carrier and at least one electronic element disposed on the carrier. The electronic element includes an antenna unit, a button input unit or a sound transmission unit. The main circuit is electrically connected to the electronic element through a conducting wire.



US 20130052958A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0052958 A1

(43) Pub. Date: Feb. 28, 2013

Hasegawa

(54) **RECEPTION APPARATUS, RADIO COMMUNICATION METHOD, AND RADIO COMMUNICATION SYSTEM**

(75) Inventor: **Tsuyoshi Hasegawa**, Kawasaki (JP)

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

(21) Appl. No.: **13/559,758**

(22) Filed: **Jul. 27, 2012**

(30) **Foreign Application Priority Data**

Aug. 25, 2011 (JP) 2011-184190

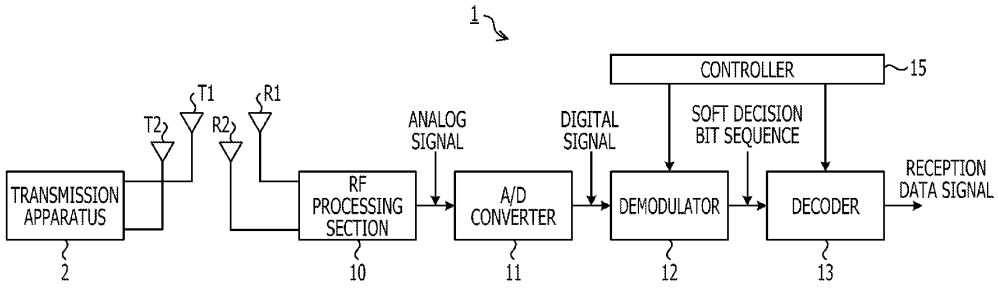
Publication Classification

(51) **Int. Cl.**
H04B 15/00 (2006.01)

(52) **U.S. Cl.** **455/63.1**

(57) **ABSTRACT**

A reception apparatus includes a plurality of reception antennas configured to receive transmission signals transmitted from a plurality of transmission antennas, a first interference processing section configured to perform a weighting processing of imparting a weight to reduce a multipath interference component corresponding to an intersymbol interference based on a multipath while leaving an inter-antenna interference component corresponding to an interference component imparted by a transmission signal from one transmission antenna on the transmission signal from another transmission antenna among the plurality of transmission antennas with respect to each of a plurality of reception signals received by the plurality of reception antennas, and a second interference processing section configured to remove the inter-antenna interference component with respect to each of the plurality of reception signals on which the weighting processing is performed.



US 20130057367A1

(19) **United States**

(12) **Patent Application Publication**

Smith

(10) **Pub. No.: US 2013/0057367 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **CAPACITIVE RF COUPLER FOR UTILITY SMART METER RADIO FREQUENCY COMMUNICATIONS**

(75) Inventor: **Norman J. Smith**, Santa Rosa, CA (US)

(73) Assignee: **ALPHA MICRO COMPONENTS U.S.A., INC.**, Jupiter, FL (US)

(21) Appl. No.: **13/603,219**

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

Related U.S. Application Data

(60) Provisional application No. 61/530,547, filed on Sep. 2, 2011.

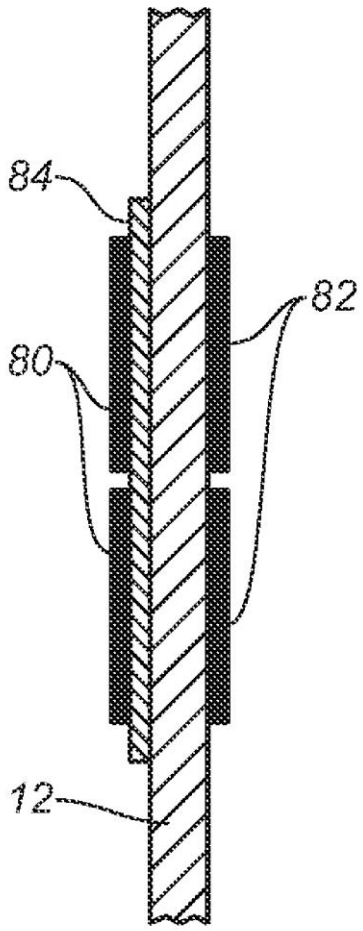
Publication Classification

(51) **Int. Cl.**
H01P 5/02 (2006.01)

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

(57) **ABSTRACT**

Method and apparatus for locating a low insertion loss apparatus for capacitive coupling of radio frequency (RF) signals from within the confines of a dielectric housing of a utility meter, through the dielectric cover, avoiding the need for drilling a hole in the utility meter body or meter dielectric cover, to route the coaxial RF cable from the embedded wireless modem to an external remote antenna or in-line power amplifier. Specifically the invention relates to an improved capacitive coupling method, which provides for an un-tethered or tethered integral radio frequency (RF) coupler where said RF coupler is located within and on the outer surface of a replacement dielectric cover or alternately retro-fitted on the inner surface and outer surface of an existing utility meter dielectric cover. A method and apparatus for a, standalone, alternative embodiment of the capacitive RF Coupler apparatus is also described and illustrated herein.



US 20130057438A1

(19) **United States**

(12) **Patent Application Publication**

Satou et al.

(10) **Pub. No.: US 2013/0057438 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **ANTENNA DEVICE AND PORTABLE WIRELESS TERMINAL EQUIPPED WITH THE SAME**

(75) Inventors: **Hiroshi Satou**, Kanagawa (JP); **Yoshio Koyanagi**, Kanagawa (JP); **Takanori Hirobe**, Ishikawa (JP)

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

(21) Appl. No.: **13/696,951**

(22) PCT Filed: **May 12, 2011**

(86) PCT No.: **PCT/JP2011/002656**

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

(30) **Foreign Application Priority Data**

May 13, 2010 (JP) 2010-110742

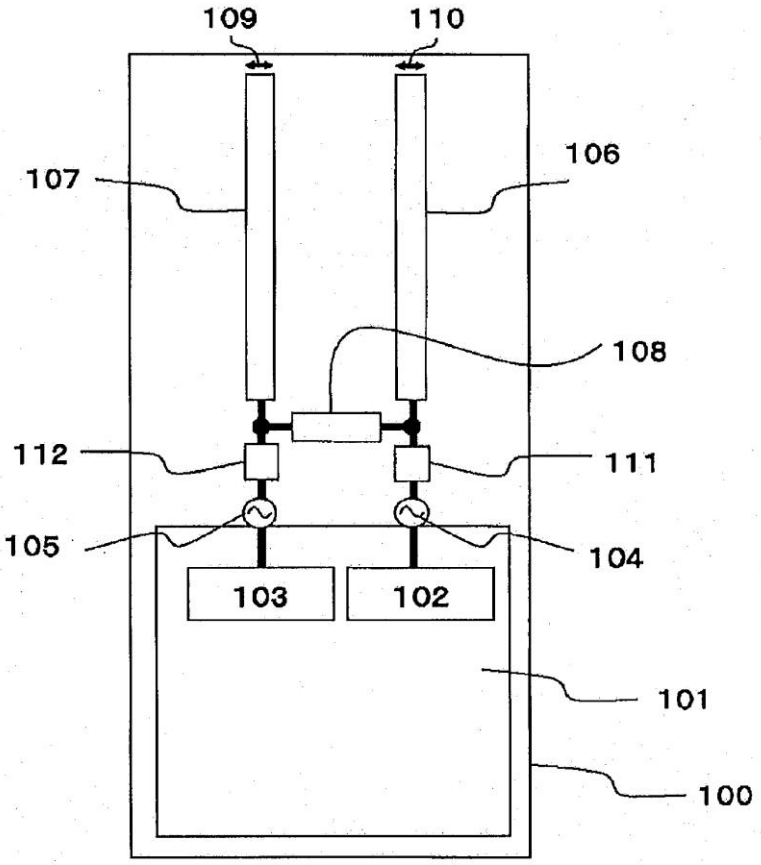
Publication Classification

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

(52) **U.S. Cl.** **343/702**; 343/893; 343/843; 343/853

(57) **ABSTRACT**

The connection circuit **108** reduces degradation in the coupling between the antenna elements by performing adjustment to cancel the mutual coupling between the first antenna element **106** and the second antenna element **107** in a first frequency band. Concurrently, the length **110** of the short side of the first antenna element and the length **109** of the short side of the second antenna element are set to predetermined lengths which are different, thereby reducing the amounts of current which does not contribute to radiation. With such a configuration, it is possible to achieve high-efficiency loosely coupled MIMO array antennas operating in the same frequency in a portable wireless terminal.



US 20130057440A1

(19) **United States**

(12) **Patent Application Publication**

Brown et al.

(10) **Pub. No.: US 2013/0057440 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **SINGLE-SIDED MULTI-BAND ANTENNA**

(75) Inventors: **Forrest James Brown**, Carson City, NV (US); **Ryan James Orsi**, San Diego, CA (US); **Matthew Robert Foster**, San Diego, CA (US)

(73) Assignee: **DOCKON AG**, Zurich (CH)

(21) Appl. No.: **13/402,777**

(22) Filed: **Feb. 22, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/530,902, filed on Sep. 2, 2011.

Publication Classification

(51) **Int. Cl.**

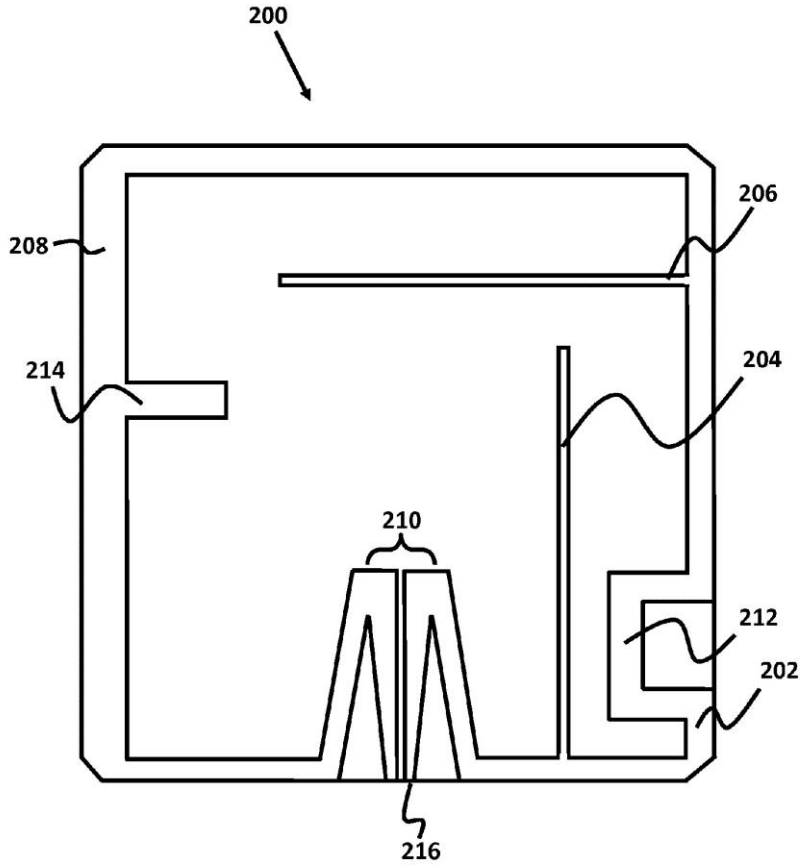
H01Q 7/00 (2006.01)

H01Q 9/36 (2006.01)

(52) **U.S. Cl.** **343/749**; 343/866

(57) **ABSTRACT**

Embodiments provide multi-band, compound loop antennas (multi-band antennas). Embodiments of the multi-band antennas produce signals at two or more frequency bands, with the two or more frequency bands capable of being adjusted and tuned independently of each other. Embodiments of a multi-band antenna are comprised of at least one electric field radiator and at least one monopole formed out of the magnetic loop. At a particular frequency, the at least one electric field radiator in combination with various portions of the magnetic loop resonate and radiate an electric field at a first frequency band. At yet another particular frequency, the at least one monopole in combination with various portions of the magnetic loop resonate and radiate an electric field at a second frequency band. The shape of the magnetic loop can be tuned to increase the radiation efficiency at particular frequency bands and enable the multi-band operation of antenna embodiments.



US 20130057441A1

(19) **United States**

(12) **Patent Application Publication**

Brown et al.

(10) **Pub. No.: US 2013/0057441 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **MULTI-LAYERED MULTI-BAND ANTENNA WITH PARASITIC RADIATOR**

(75) Inventors: **Forrest James Brown**, Carson City, NV (US); **Ryan James Orsi**, San Diego, CA (US); **Matthew Robert Foster**, San Diego, CA (US)

(73) Assignee: **DOCKON AG**, Zurich (CH)

(21) Appl. No.: **13/402,817**

(22) Filed: **Feb. 22, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/530,902, filed on Sep. 2, 2011.

Publication Classification

(51) **Int. Cl.**

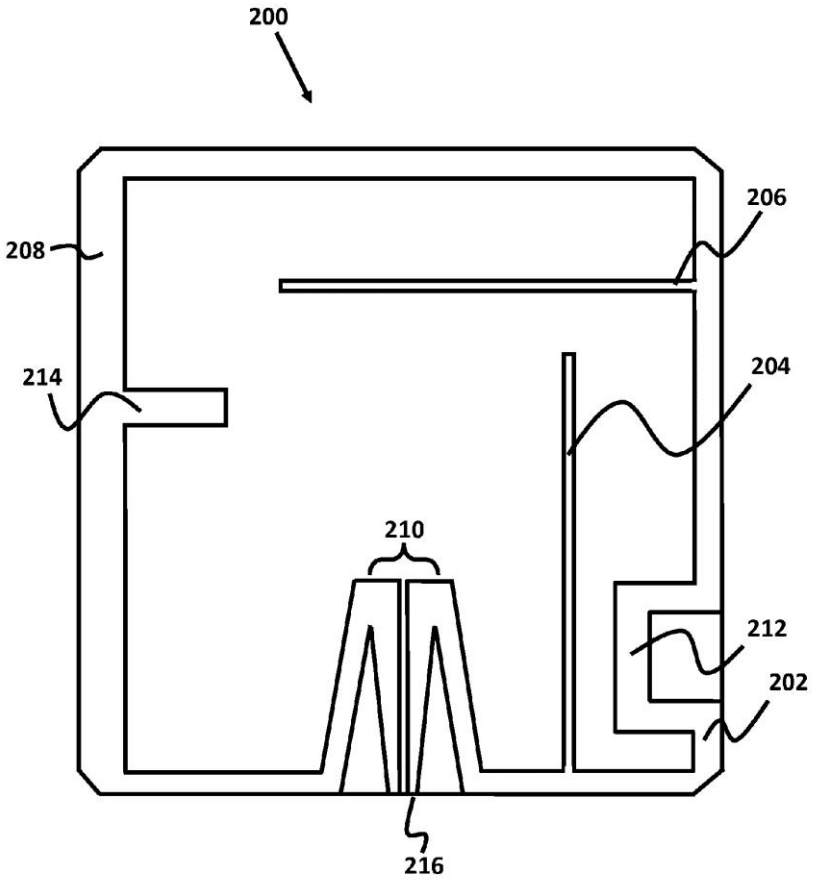
H01Q 9/36 (2006.01)

H01Q 7/00 (2006.01)

(52) **U.S. Cl.** **343/749**; 343/866

(57) **ABSTRACT**

Embodiments provide multi-band, compound loop antennas (multi-band antennas). Embodiments of the multi-band antennas produce signals at two or more frequency bands, with the two or more frequency bands capable of being adjusted and tuned independently of each other. Embodiments of a multi-band antenna are comprised of at least one electric field radiator and at least one monopole formed out of the magnetic loop. At a particular frequency, the at least one electric field radiator in combination with various portions of the magnetic loop resonate and radiate an electric field at a first frequency band. At yet another particular frequency, the at least one monopole in combination with various portions of the magnetic loop resonate and radiate an electric field at a second frequency band. The shape of the magnetic loop can be tuned to increase the radiation efficiency at particular frequency bands and enable the multi-band operation of antenna embodiments.



US 20130057442A1

(19) **United States**

(12) **Patent Application Publication**

Brown et al.

(10) **Pub. No.: US 2013/0057442 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **MULTI-LAYERED MULTI-BAND ANTENNA**

(75) Inventors: **Forrest James Brown**, Carson City, NV (US); **Ryan James Orsi**, San Diego, CA (US); **Matthew Robert Foster**, San Diego, CA (US)

(73) Assignee: **DockOn AG**, Zurich (CH)

(21) Appl. No.: **13/402,806**

(22) Filed: **Feb. 22, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/530,902, filed on Sep. 2, 2011.

Publication Classification

(51) **Int. Cl.**

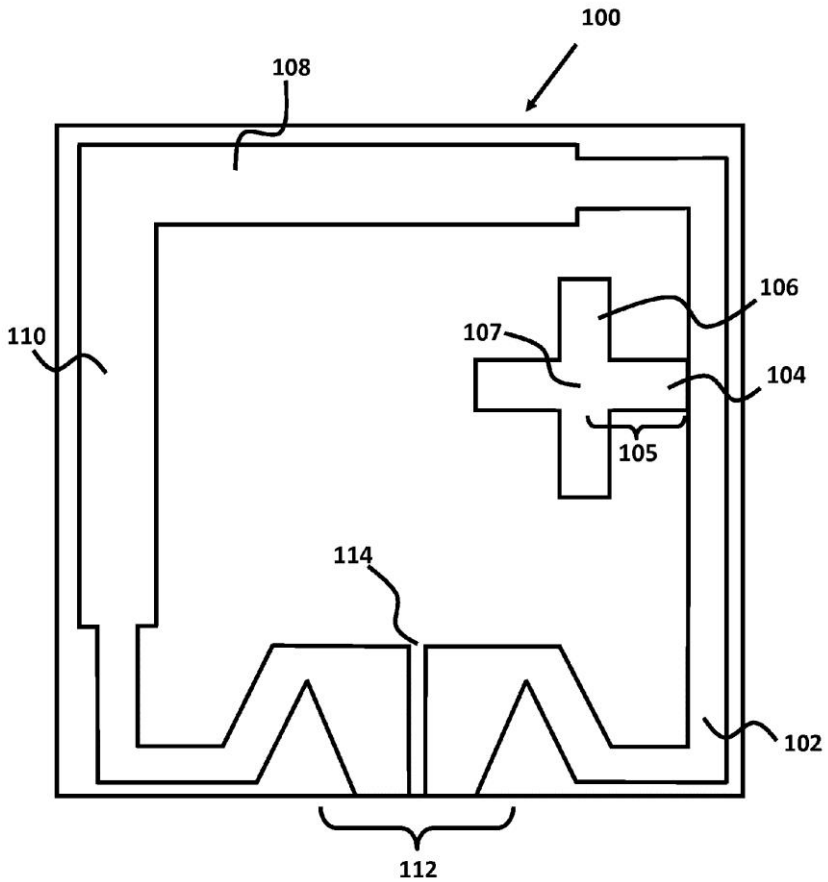
H01Q 1/38 (2006.01)

H01Q 9/36 (2006.01)

(52) **U.S. Cl.** ..... **343/750**; 343/700 MS

(57) **ABSTRACT**

Embodiments provide multi-band, compound loop antennas (multi-band antennas). Embodiments of the multi-band antennas produce signals at two or more frequency bands, with the two or more frequency bands capable of being adjusted and tuned independently of each other. Embodiments of a multi-band antenna are comprised of at least one electric field radiator and at least one monopole formed out of the magnetic loop. At a particular frequency, the at least one electric field radiator in combination with various portions of the magnetic loop resonate and radiate an electric field at a first frequency band. At yet another particular frequency, the at least one monopole in combination with various portions of the magnetic loop resonate and radiate an electric field at a second frequency band. The shape of the magnetic loop can be tuned to increase the radiation efficiency at particular frequency bands and enable the multi-band operation of antenna embodiments.



US 20130057443A1

(19) **United States**

(12) **Patent Application Publication**

Asanuma et al.

(10) **Pub. No.: US 2013/0057443 A1**

(43) **Pub. Date: Mar. 7, 2013**

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

(76) Inventors: **Kenichi Asanuma**, Kyoto (JP); **Atsushi Yamamoto**, Kyoto (JP); **Tsutomu Sakata**, Osaka (JP); **Kenichi Kozaki**, Miyazaki (JP)

(21) Appl. No.: **13/697,892**

(22) PCT Filed: **Jan. 31, 2012**

(86) PCT No.: **PCT/JP2012/000615**

§ 371 (c)(1),
(2), (4) Date: **Nov. 14, 2012**

(30) **Foreign Application Priority Data**

Mar. 16, 2011 (JP) 2011-057555

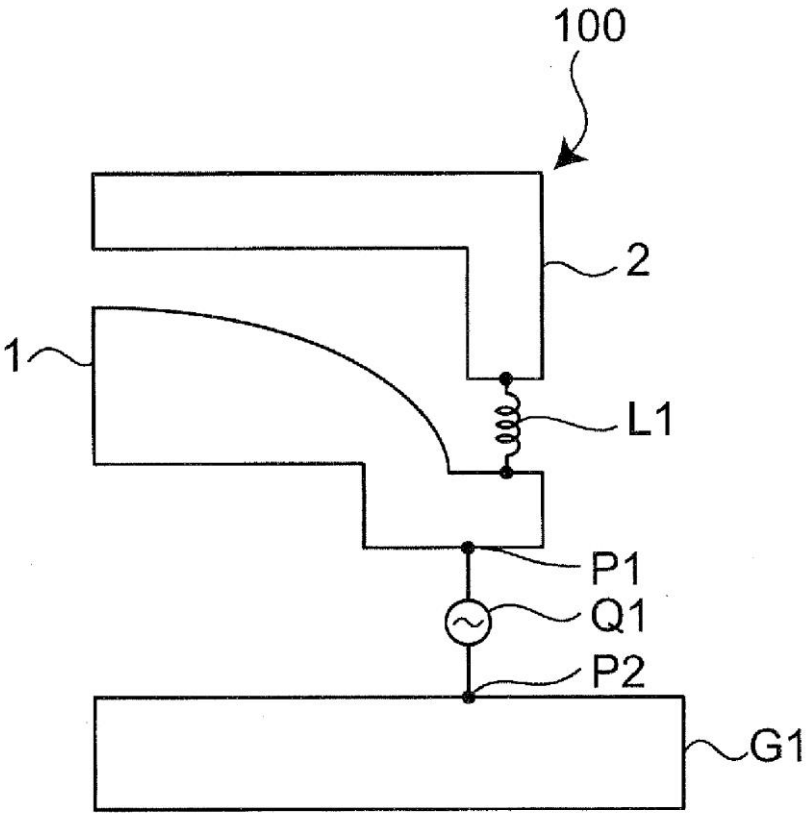
Publication Classification

(51) **Int. Cl.**
H01Q 9/16 (2006.01)
H01Q 21/28 (2006.01)

(52) **U.S. Cl.** **343/751**; 343/749

(57) **ABSTRACT**

A radiators has looped radiation conductors, an inductor, a capacitor, a feed point on the radiation conductor. The capacitor is formed by a capacitance between the radiation conductors, and the capacitance varies depending on positions on the radiation conductors within a portion where the radiation conductors are close to each other. The radiators is configured to: resonate along a portion of the radiator at a low-band resonance frequency, the portion including the inductor and the capacitor and being along the loop of the radiation conductor, and resonate along a portion of the radiator at a high-band resonance frequency, the portion including a section along the loop of the radiation conductor, the section including at least one of the at least one capacitor, not including the inductor, and extending between the feed point and the inductor.



US 20130057446A1

(19) **United States**

(12) **Patent Application Publication**

Hirobe et al.

(10) **Pub. No.: US 2013/0057446 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **ANTENNA DEVICE AND PORTABLE WIRELESS TERMINAL EQUIPPED WITH THE SAME**

(75) Inventors: **Takanori Hirobe**, Ishikawa (JP); **Tomoaki Nishikido**, Ishikawa (JP); **Hiroshi Satou**, Kanagawa (JP); **Yoshio Koyanagi**, Kanagawa (JP)

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

(21) Appl. No.: **13/698,178**

(22) PCT Filed: **May 16, 2011**

(86) PCT No.: **PCT/JP2011/002715**

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

(30) **Foreign Application Priority Data**

May 17, 2010 (JP) 2010-112851

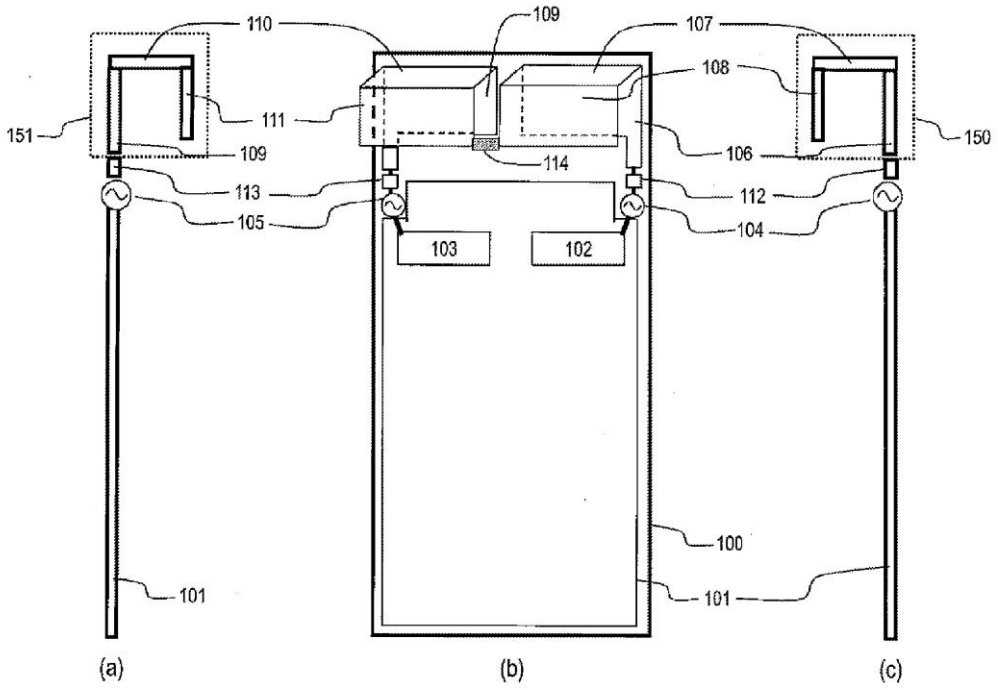
Publication Classification

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

(52) **U.S. Cl.** **343/851**

(57) **ABSTRACT**

A first connection circuit **114** is adjusted to cancel the impedance of the mutual coupling between a first antenna element **150** and a second antenna element **151** in the range from the first frequency band to the second frequency band, thereby reducing degradation in the coupling between the antenna elements. With such a configuration, it is possible to achieve high-efficiency loosely coupled antennas operating in the same wide frequency band in a portable wireless terminal.



US 20130057448A1

(19) **United States**

(12) **Patent Application Publication**

Satou et al.

(10) **Pub. No.: US 2013/0057448 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **ANTENNA DEVICE AND PORTABLE WIRELESS TERMINAL EQUIPPED WITH THE SAME**

(75) Inventors: **Hiroshi Satou**, Kanagawa (JP); **Takanori Hirobe**, Ishikawa (JP); **Yoshio Koyanagi**, Kanagawa (JP); **Tomoaki Nishikido**, Ishikawa (JP)

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

(21) Appl. No.: **13/698,181**

(22) PCT Filed: **May 16, 2011**

(86) PCT No.: **PCT/JP2011/002714**

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

(30) **Foreign Application Priority Data**

May 17, 2010 (JP) 2010-112852

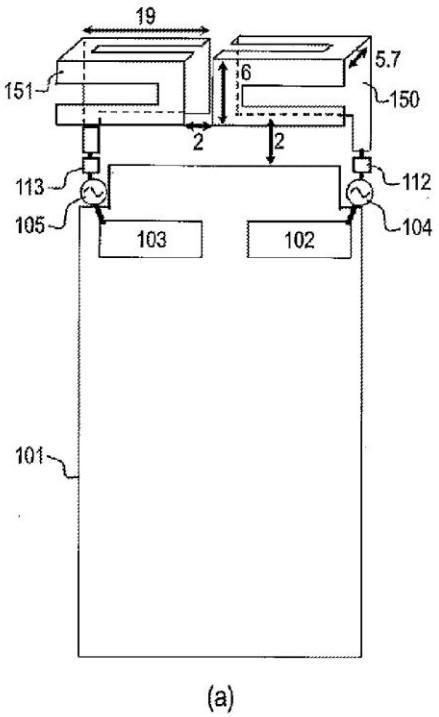
Publication Classification

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

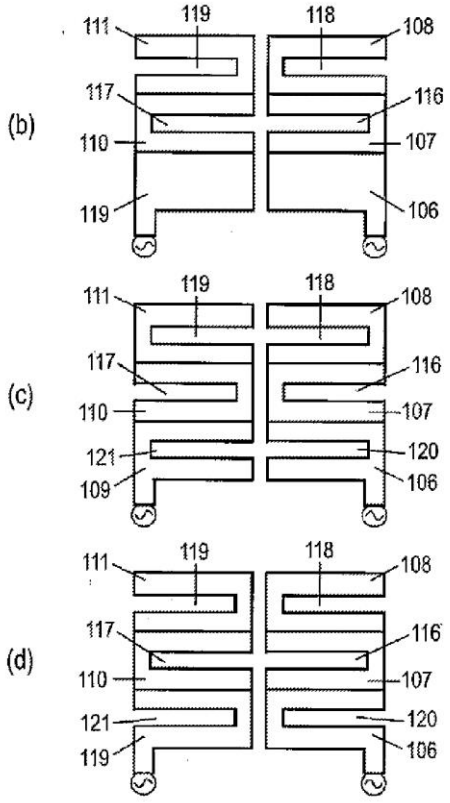
(52) **U.S. Cl.** **343/853**; 343/893

(57) **ABSTRACT**

A second slit **117** and a fourth slit **119** provided in a first antenna element **150** and a first slit **116** and a third slit **118** provided in a second antenna element **151** are adjusted such that the mutual coupling between the first antenna element **150** and the second antenna element **151** in the desired frequency band is canceled, and reduces degradation in coupling between antenna elements without connecting the antenna elements through components and the like. With such a configuration, it is possible to achieve high-efficiency loosely coupled MIMO array antennas operating in the same frequency band in a portable wireless terminal.



(a)



US 20130057450A1

(19) **United States**

(12) **Patent Application Publication**

PUENTE BALIARDA et al.

(10) **Pub. No.: US 2013/0057450 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **MULTILEVEL ANTENNAE**

(71) Applicant: **Fractus, S.A.**, Barcelona (ES)

(72) Inventors: **CARLES PUENTE BALIARDA**, Sant Cugat del Valles (ES); **CARMEN BORJA BORAU**, Barcelona (ES); **JAUME ANGUERA PROS**, Vinaros (ES); **JORDI SOLER CASTANY**, Mataro (ES)

(73) Assignee: **FRACTUS, S.A.**, BARCELONA (ES)

(21) Appl. No.: **13/669,916**

(22) Filed: **Nov. 6, 2012**

Related U.S. Application Data

(63) Continuation of application No. 13/411,212, filed on Mar. 2, 2012, now Pat. No. 8,330,659, which is a continuation of application No. 13/044,189, filed on Mar. 9, 2011, now Pat. No. 8,154,463, which is a continuation of application No. 12/400,888, filed on Mar. 10, 2009, now Pat. No. 8,009,111, which is a continuation of application No. 11/780,932, filed on Jul. 20, 2007, now Pat. No. 7,528,782, which is a continuation of application No. 11/179,257, filed on Jul. 12, 2005, now Pat. No. 7,397,431, which is a continuation of application No. 11/102,390, filed on Apr. 8, 2005, now Pat. No. 7,123,208, which is a continuation of application No. 10/963,080, filed on Oct. 12, 2004, now Pat. No. 7,015,868, which is a continuation of application No. 10/102,568, filed on Mar. 18, 2002, now abandoned.

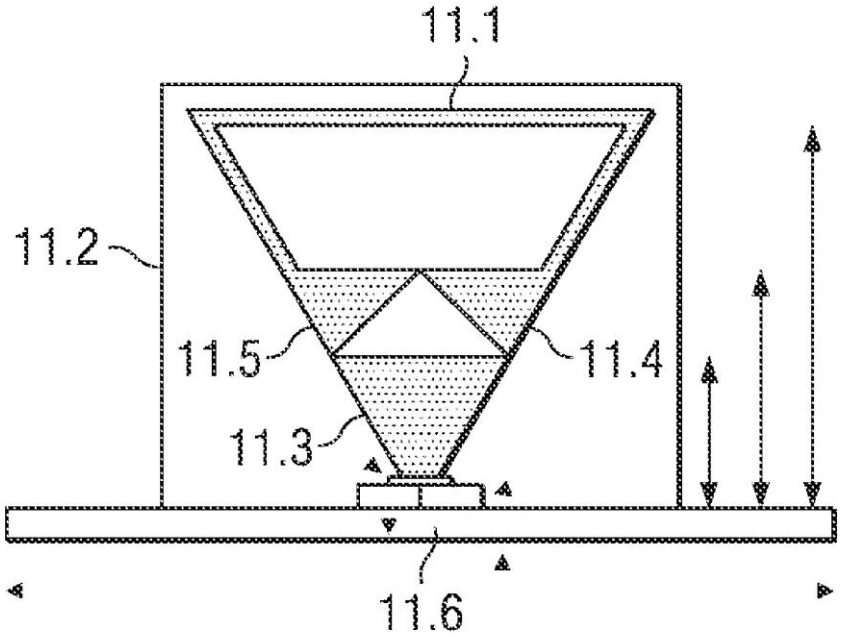
Publication Classification

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

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

(57) **ABSTRACT**

An apparatus including a wireless communications device has an internal antenna system located within the wireless communications device. The internal antenna system includes a passive antenna set comprising at least one antenna element having at least one multilevel structure, a feeding point to the at least one antenna element and a ground plane. The feeding point and a point on the ground plane define an input/output port for said passive antenna set. The passive antenna set provides a similar impedance level and radiation pattern at two or more frequency bands such that the passive antenna set is capable of both transmitting and receiving wireless signals on selected channels. The selected channels are selectable from a plurality of channels throughout an entire frequency range within each of said two or more frequency bands.



US 20130057452A1

(19) **United States**

(12) **Patent Application Publication**

WATANABE

(10) **Pub. No.: US 2013/0057452 A1**

(43) **Pub. Date: Mar. 7, 2013**

(54) **HIGH-FREQUENCY MODULE AND HIGH-FREQUENCY DEVICE USING THE SAME**

(76) Inventor: **Hideki WATANABE**, Miyagi-ken (JP)

(21) Appl. No.: **13/604,057**

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

(30) **Foreign Application Priority Data**

Sep. 5, 2011 (JP) 2011-193082

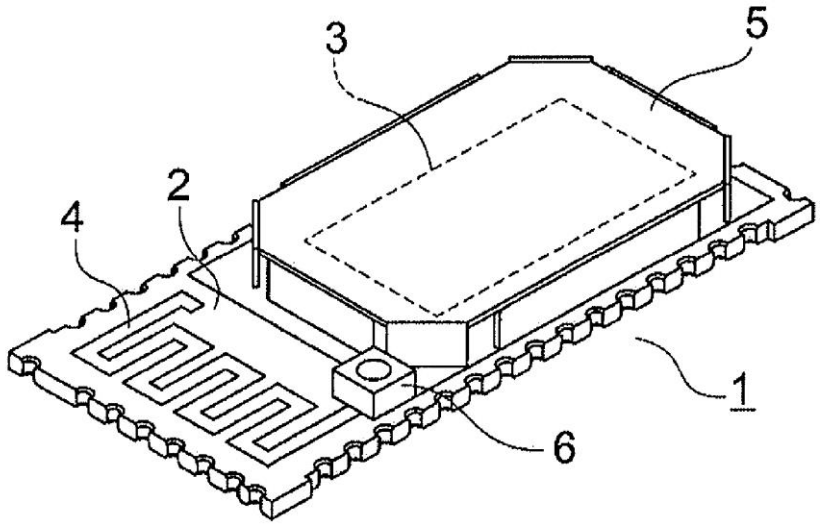
Publication Classification

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

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

(57) **ABSTRACT**

On a circuit board of the high-frequency module, an RF circuit and an antenna element are arranged, and transmission lines between both the RF circuit and the antenna element are provided. The transmission line of the RF circuit side among the transmission lines is led-out from the top of the circuit board to a rear surface side of the circuit board through a via hole, and the transmission line of the antenna element side is led-out from the top of the circuit board to the rear surface side through another via hole. Electrical continuity between tip portions of the transmission lines is blocked off on the rear surface of the circuit board; however, when the high-frequency module is mounted on the motherboard, a bridging connection land is soldered to each of the tip portions, so that the transmission lines are connected with each other.



US 20130059620A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0059620 A1

(43) Pub. Date: Mar. 7, 2013

CHO

(54) **BEAMFORMING APPARATUS AND BEAMFORMING METHOD FOR ANTENNA**

(75) Inventor: **Jeong Hoon CHO**, Seoul (KR)

(73) Assignee: **LG INNOTEK CO., LTD.**, Seoul (KR)

(21) Appl. No.: **13/602,860**

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

(30) **Foreign Application Priority Data**

Sep. 2, 2011 (KR) 10-2011-0089181

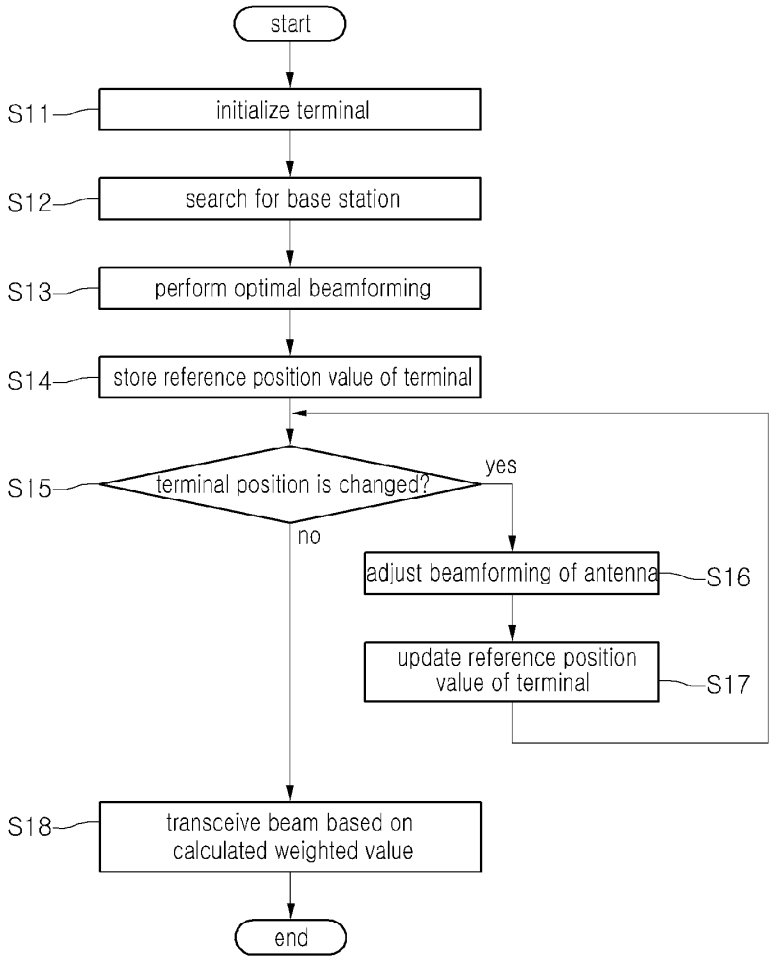
Publication Classification

(51) **Int. Cl.**
H04W 48/16 (2009.01)

(52) **U.S. Cl.** **455/515**

(57) **ABSTRACT**

Disclosed are a beamforming method and a beamforming apparatus for an adaptive antenna. A mobile terminal equipped with the adaptive antenna is initialized, a base station to transceive a signal with the mobile terminal is searched, beamforming is performed based on the searched base station, a reference position value of the mobile terminal is stored, and the beamforming of the antenna is adjusted if a sensing module in the mobile terminal detects position change of the mobile terminal based on a reference position. A changed position of the mobile terminal is stored as the reference position value, so that the position of the terminal is detected based on the reference position in real time, thereby simply and accurately performing the beamforming.



US 20130063236A1

(19) **United States**

(12) **Patent Application Publication**

SHIN et al.

(10) **Pub. No.: US 2013/0063236 A1**

(43) **Pub. Date: Mar. 14, 2013**

(54) **MOBILE TERMINAL AND METHOD FOR MANUFACTURING THE SAME**

(75) Inventors: **Donghan SHIN**, Busan (KR); **Wonseok JOO**, Seoul (KR)

(73) Assignee: **LG ELECTRONICS INC.**, Seoul (KR)

(21) Appl. No.: **13/540,284**

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

(30) **Foreign Application Priority Data**

Sep. 9, 2011 (KR) 10-2011-0092212

Publication Classification

(51) **Int. Cl.**

H01F 27/06 (2006.01)

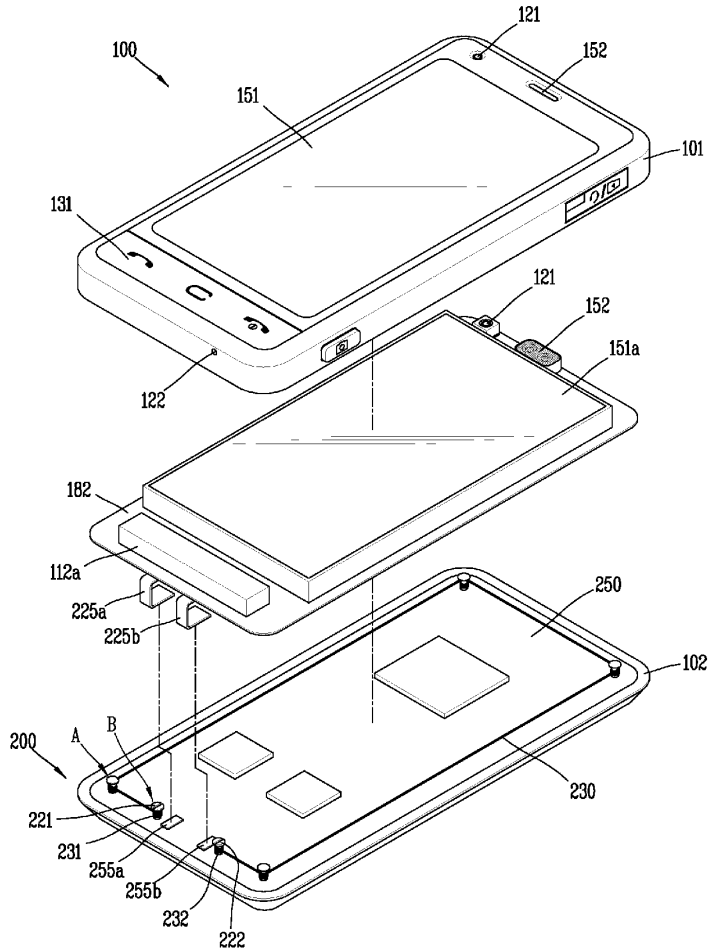
H01Q 13/00 (2006.01)

(52) **U.S. Cl.**

USPC **336/67**; 29/600

(57) **ABSTRACT**

A mobile terminal includes a terminal body comprising a base having a defined region on a first surface of the base and a plurality of protrusions protruding from the first surface, wherein the plurality of protrusions are spaced apart from each other along an edge of the defined region; and an antenna coil wound around each protrusion of the plurality of protrusions and extending from each protrusion to at least one adjacent protrusion of the plurality of protrusions along the edge of the defined region to form a loop along the edge of the defined region, wherein the antenna coil is configured to transmit or receive a radio signal for near field communication.



US 20130063306A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2013/0063306 A1**

(43) **Pub. Date: Mar. 14, 2013**

Yang

(54) **COMPACT MULTI-ELEMENT ANTENNA WITH PHASE SHIFT**

(71) Applicant: **Airgain, Inc.**, Carlsbad, CA (US)

(72) Inventor: **Xiao Ping Yang**, Carlsbad, CA (US)

(73) Assignee: **AIRGAIN, INC.**, Carlsbad, CA (US)

(21) Appl. No.: **13/674,928**

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

Related U.S. Application Data

(63) Continuation of application No. 13/329,895, filed on Dec. 19, 2011, now Pat. No. 8,310,402, which is a continuation of application No. 11/866,354, filed on Oct. 2, 2007, now Pat. No. 8,081,123.

(60) Provisional application No. 60/827,846, filed on Oct. 2, 2006.

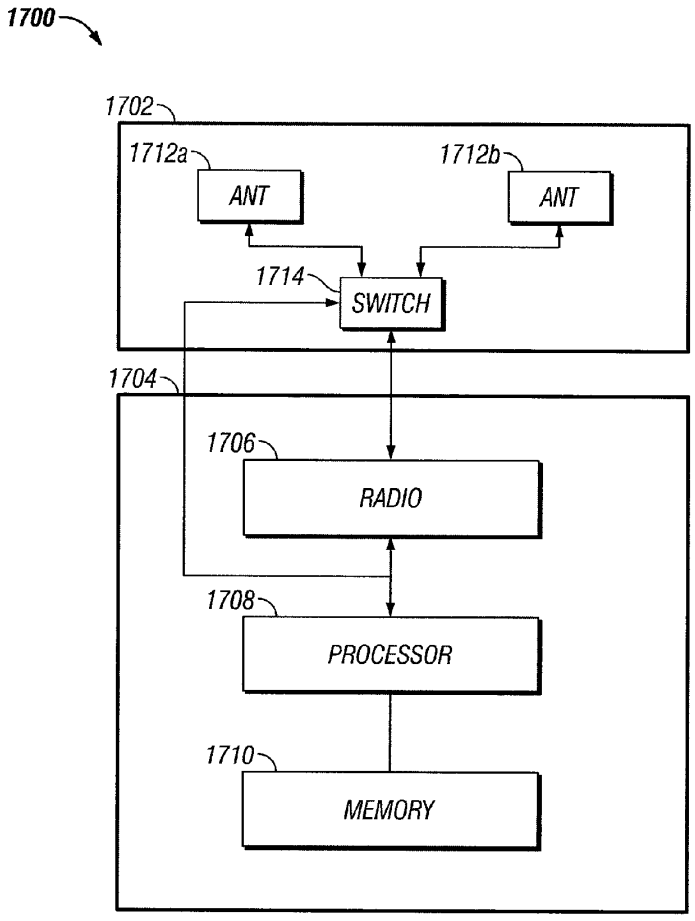
Publication Classification

(51) **Int. Cl.**
H01Q 3/12 (2006.01)

(52) **U.S. Cl.**
USPC **342/374**

(57) **ABSTRACT**

A phased array antenna system includes a first radiation element that is made of a material and has a length selected to resonate at a desired frequency. A phase-shift element is coupled to one end of the first radiation element. A second radiation element is coupled to the end of the phase-shift element opposite the first radiation element, so that a radio signal passes through the first radiation element through the phase-shift element and through the second radiation element, the second radiation element is made of a material and has a length selected to resonate such that the first and second radiation elements cooperate to form a desired beam pattern from the antenna system.



US 20130063310A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0063310 A1

(43) Pub. Date: Mar. 14, 2013

Mak et al.

(54) SYMMETRICAL PARTIALLY COUPLED MICROSTRIP SLOT FEED PATCH ANTENNA ELEMENT

(75) Inventors: **Angus C. K. Mak**, Shatin (CN); **Corbett R. Rowell**, Mongkok (CN); **Hau Wah Lai**, Shatin (HK)

(73) Assignee: **Hong Kong Applied Science and Technology Research Institute Co., Ltd.**, New Territories (CN)

(21) Appl. No.: **13/229,274**

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

Publication Classification

(51) **Int. Cl.**

H01Q 1/38 (2006.01)

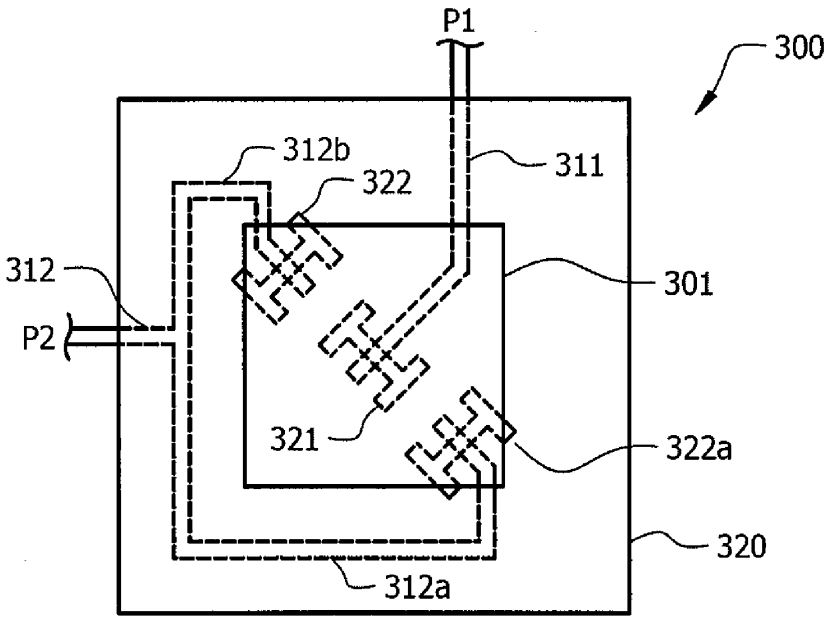
H01Q 5/00 (2006.01)

(52) **U.S. Cl.**

USPC ..... **343/700 MS**

(57) **ABSTRACT**

Systems and methods which utilize a symmetrical partially coupled microstrip slot feed patch antenna element configuration to provide highly decoupled dual-polarized wideband patch antenna elements are shown. Embodiments provide a microstrip slot feed configuration in which a slot of a first signal feed is centered with respect to the patch and further provide a microstrip slot feed configuration in which slots of a second signal feed are symmetrically disposed with respect to the center of the patch and at positions near the edges of the patch. The microstrip feed utilized in communicating signals with respect to the slots of the second signal feed is adapted to provide signals of substantially equal amplitude and 180° out of phase with respect to each other according to embodiments. The second signal feed configuration utilized according to embodiments provides partial coupling between the patch and the second signal feed.



US 20130063311A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2013/0063311 A1**

(43) **Pub. Date: Mar. 14, 2013**

Huang et al.

(54) **MULTIBAND PRINTED ANTENNA**

(75) Inventors: **Yi-feng Huang**, New Taipei (TW); **Jia-hung Su**, New Taipei (TW); **Kai Shih**, New Taipei (TW); **Ching-feng Tseng**, New Taipei (TW)

(73) Assignee: **Cheng Uei Precision Industry Co., LTD.**, New Taipei City (TW)

(21) Appl. No.: **13/229,638**

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

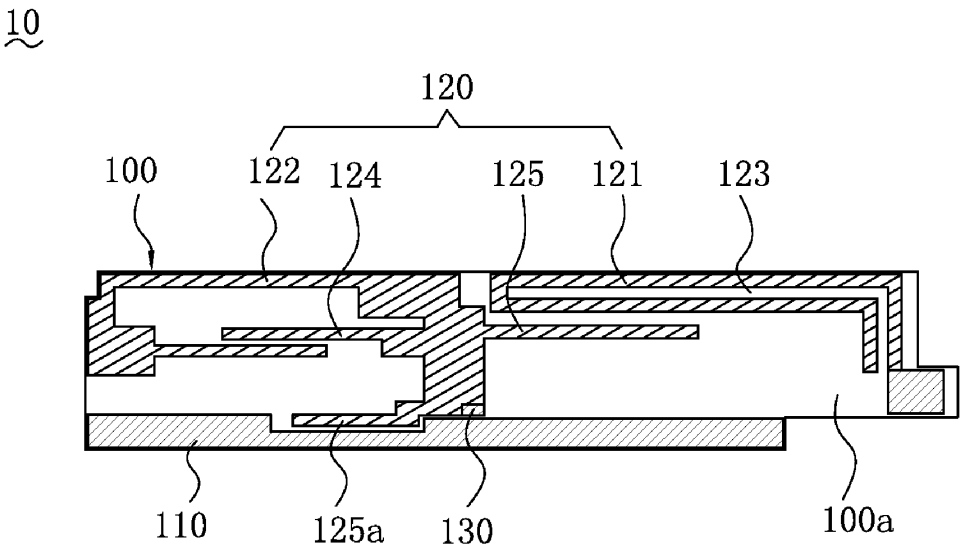
Publication Classification

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

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

(57) **ABSTRACT**

Provided is a multiband printed antenna for receiving and emitting multiple electromagnetic wave signals of different bands. The multiband printed antenna includes a substrate and a conductive layer formed on a positive surface of the substrate. The conductive layer includes a grounding portion, a plurality of radiating portions controlling different bands and a single feeder point used to transmit electromagnetic wave signals. The multiband printed antenna of the present invention can separately control multiple radiating portions, which have different bands and are together formed on one same substrate, to emit the electromagnetic wave signals at one same feeder point, thereby realizing the object of the single printed antenna controlling multiple bands and greatly reducing the manufacture cost to satisfy the demand of 4G communication industry.



US 20130063312A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2013/0063312 A1**

(43) **Pub. Date: Mar. 14, 2013**

Chou et al.

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

(76) Inventors: **Chen-Yu Chou**, New Taipei City (TW); **Chih-Wei Lee**, New Taipei City (TW); **Chang-Hsin Lai**, New Taipei City (TW)

(21) Appl. No.: **13/314,150**

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

(30) **Foreign Application Priority Data**

Sep. 14, 2011 (TW) 100217190

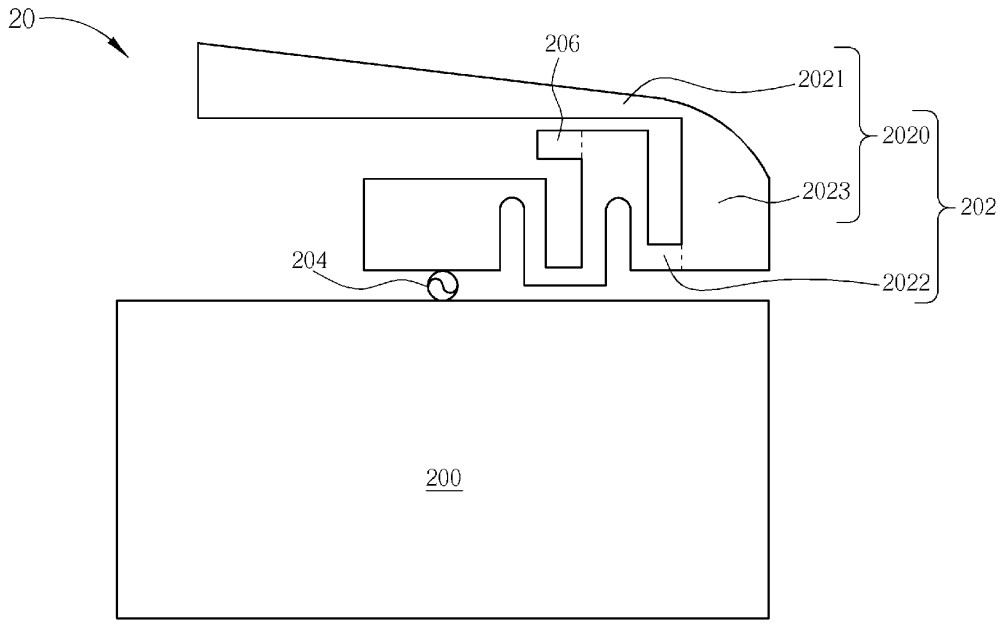
Publication Classification

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

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

(57) **ABSTRACT**

A monopole antenna for an electronic device includes a grounding element electrically connected to a ground, a radiating element including a first radiator and a second radiator for transmitting and receiving a wireless signal of a first frequency band, a coupling element electrically connected to the second radiator for transmitting and receiving a wireless signal of a second frequency band, and a feed-in element electrically connected between the second radiator of the radiating element and the grounding element for transmitting the wireless signals of the first frequency band and the second frequency band.



US 20130063313A1

(19) **United States**

(12) **Patent Application Publication**

BAN et al.

(10) **Pub. No.: US 2013/0063313 A1**

(43) **Pub. Date: Mar. 14, 2013**

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

(75) Inventors: **Yasumitsu BAN**, Yokosuka (JP); **Takashi YAMAGAJO**, Yokosuka (JP); **Kouji SOEKAWA**, Kawasaki (JP)

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

(21) Appl. No.: **13/599,273**

(22) Filed: **Aug. 30, 2012**

(30) **Foreign Application Priority Data**

Sep. 9, 2011 (JP) 2011-197582
Aug. 22, 2012 (JP) 2012-183650

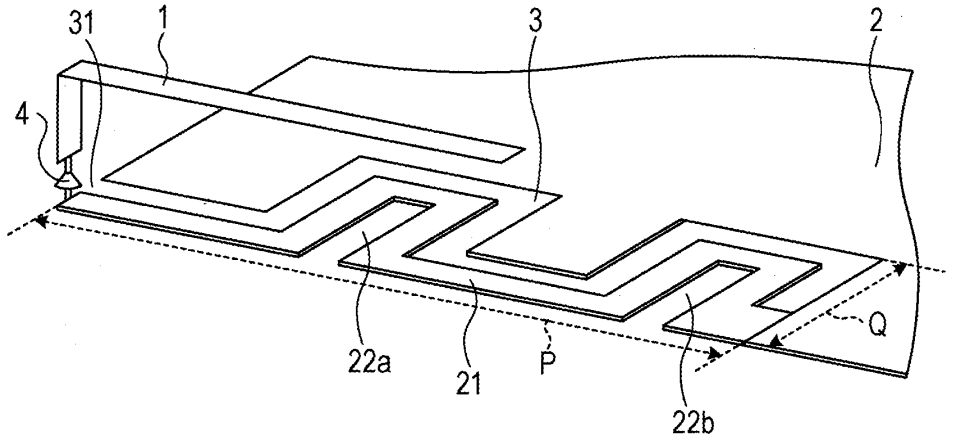
Publication Classification

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

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

(57) **ABSTRACT**

There is provided an antenna device that includes a substrate, a slot provided in the substrate so that the slot includes a cut opening that is close to an edge of the substrate and the slot includes a crooked portion, a conductor section configured to include a slit in an area of the substrate, the area being sandwiched by the slot in the crooked portion, and an antenna that is placed close to the conductor section and is side by side with a surface of the substrate.



US 20130063314A1

(19) **United States**

(12) **Patent Application Publication**

Whitmore et al.

(10) **Pub. No.: US 2013/0063314 A1**

(43) **Pub. Date: Mar. 14, 2013**

(54) **MOBILE WIRELESS COMMUNICATIONS DEVICE INCLUDING A SLOT ANTENNA AND RELATED METHODS**

(75) Inventors: **John Alfred Whitmore**, Heidelberg (CA); **Ying Tong Man**, Waterloo (CA)

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

(21) Appl. No.: **13/229,231**

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

Publication Classification

(51) **Int. Cl.**

H01Q 1/24 (2006.01)

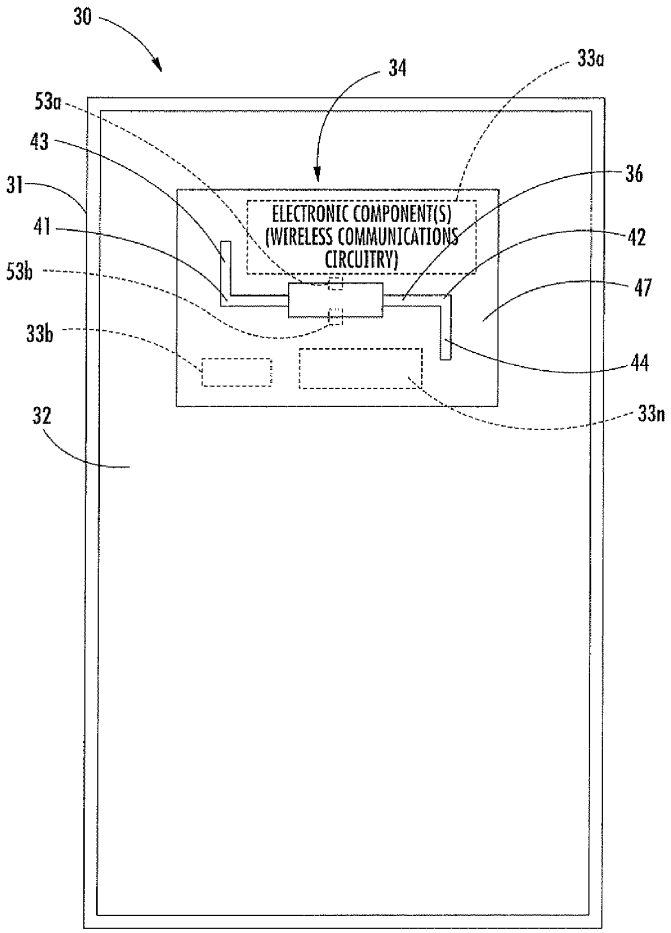
H05K 3/00 (2006.01)

(52) **U.S. Cl.**

USPC **343/702**; 29/829

(57) **ABSTRACT**

A mobile wireless communications device may include a portable housing and a printed circuit board (PCB) carried by the portable housing. The mobile wireless communications device may also include at least one electronic component carried by the PCB and an electrically conductive enclosure coupled to the PCB and having a top spaced above the PCB over the at least one electronic component. The top of the electrically conductive enclosure may have a slot therein defining a slot antenna.



US 20130063316A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0063316 A1

(43) Pub. Date: Mar. 14, 2013

Moiraghi et al.

(54) COMPACTED PATCH ANTENNA

(76) Inventors: **Guido Moiraghi**, Milano (IT); **Luca Moiraghi**, Milano (IT); **Paolo Moiraghi**, Marcignago (PV) (IT)

(21) Appl. No.: **13/699,133**

(22) PCT Filed: **May 20, 2011**

(86) PCT No.: **PCT/EP11/58253**

§ 371 (c)(1),
(2), (4) Date: **Nov. 20, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/350,968, filed on Jun. 3, 2010.

(30) **Foreign Application Priority Data**

May 21, 2010 (IT) MI2010A 000914

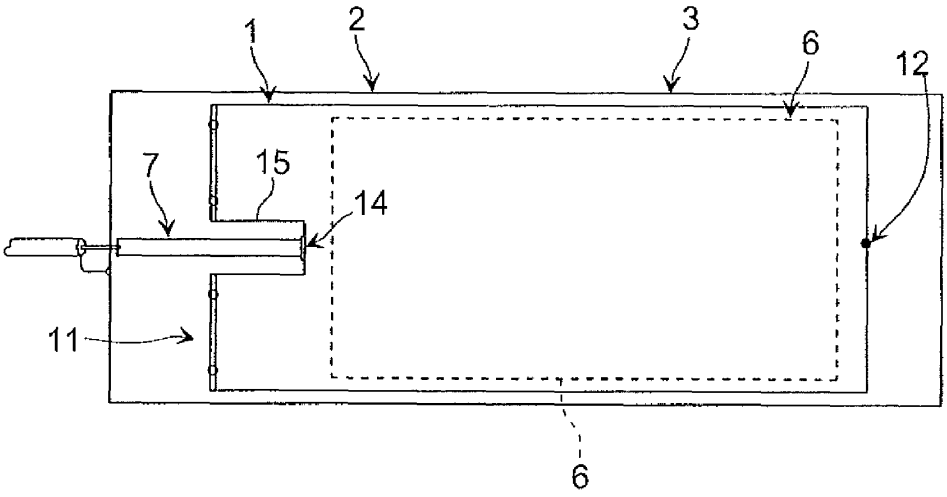
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/50 (2006.01)
H01Q 1/32 (2006.01)

(52) **U.S. Cl.**
USPC ..... **343/713**; 343/700 MS; 343/717; 343/860

(57) **ABSTRACT**

A compacted patch antenna is described, particularly for installation in a vehicle, comprising an electrically supplied strip radiating element and a ground plane. The strip radiating element is connected to the ground plane at a first end by means of a metal link and at a second end, opposite to the first end, by means of a variable capacitor. The compacted patch antenna comprises a printed circuit, the bottom surface of which is integral with the ground plane, a dielectric material layer arranged between the strip radiating element and the printed circuit; the strip radiating element is substantially parallel to the ground mass. The dielectric material layer has a relative dielectric constant ranging between 3 to 6 with a loss factor ranging between 0.03 to 0.1.



US 20130063317A1

(19) **United States**

(12) **Patent Application Publication**

Jonsson et al.

(10) **Pub. No.: US 2013/0063317 A1**

(43) **Pub. Date: Mar. 14, 2013**

(54) **ANTENNA INTEGRATED INTO OPTICAL ELEMENT**

(75) Inventors: **Karl Jonsson**, Rancho Santa Margarita, CA (US); **Martin Manniche**, Laguna Hills, CA (US)

(73) Assignee: **GREENWAVE REALITY, PTE LTD.**, Singapore (SG)

(21) Appl. No.: **13/414,615**

(22) Filed: **Mar. 7, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/451,269, filed on Mar. 10, 2011.

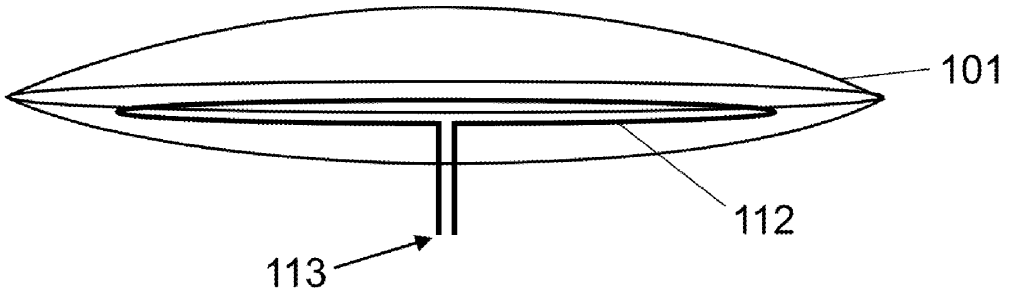
Publication Classification

(51) **Int. Cl.**
H01Q 1/44 (2006.01)

(52) **U.S. Cl.**
USPC **343/721**; 343/720

(57) **ABSTRACT**

An antenna is integrated with an optical element, such as a lens, a collimator, a diffuser, a reflector, or some other part that allows at least some light to pass through or reflects light. In some embodiments, the antenna is molded into the optical element. In other embodiments, the antenna is printed on, or attached to, the surface of the optical element. The antenna may be formed from a transparent or a non-transparent conductor, depending on the embodiment.



US 20130063318A1

(19) **United States**

(12) **Patent Application Publication**

YURUGI et al.

(10) **Pub. No.: US 2013/0063318 A1**

(43) **Pub. Date: Mar. 14, 2013**

(54) **DUAL-BAND INVERTED-F ANTENNA APPARATUS PROVIDED WITH AT LEAST ONE ANTENNA ELEMENT HAVING ELEMENT PORTION OF HEIGHT FROM DIELECTRIC SUBSTRATE**

(71) Applicant: **PANASONIC CORPORATION**, Osaka (JP)

(72) Inventors: **Hiroyuki YURUGI**, Osaka (JP); **Wataru NOGUCHI**, Osaka (JP); **Masahiko NAGOSHI**, Osaka (JP)

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

(21) Appl. No.: **13/669,829**

(22) Filed: **Nov. 6, 2012**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2012/001500, filed on Mar. 5, 2012.

(30) **Foreign Application Priority Data**

Jun. 2, 2011 (JP) 2011-123933

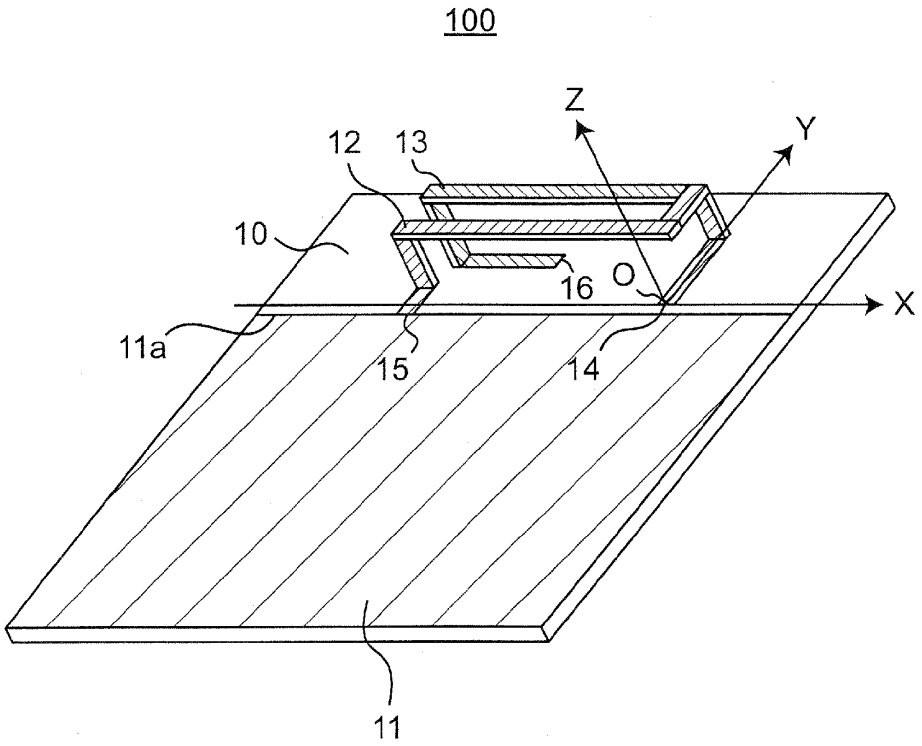
Publication Classification

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

(52) **U.S. Cl.**
USPC **343/729**

(57) **ABSTRACT**

An antenna apparatus includes firs and second antenna elements. The first antenna element operates as a loop antenna that resonates at a first wavelength, and the antenna apparatus operates as an inverted-F antenna that resonates at a second wavelength. The first antenna elements includes a first element portion formed to have a predetermined height from a surface of a dielectric substrate, and the second antenna element includes a second element portion which is formed to be substantially parallel to the first element portion at least at a predetermined distance apart from the first antenna element.



US 20130063321A1

(19) **United States**

(12) **Patent Application Publication**

Ruvinsky et al.

(10) **Pub. No.: US 2013/0063321 A1**

(43) **Pub. Date: Mar. 14, 2013**

(54) **MULTI-ARM CONFORMAL SLOT ANTENNA**

(76) Inventors: **Leonard Ruvinsky**, Merrimack, NH (US); **Zane Lo**, Merrimack, NH (US); **Mark W. Reed**, Manchester, NH (US); **Patrick McKivergan**, Londonderry, NH (US)

(21) Appl. No.: **13/595,470**

(22) Filed: **Aug. 27, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/527,760, filed on Aug. 26, 2011.

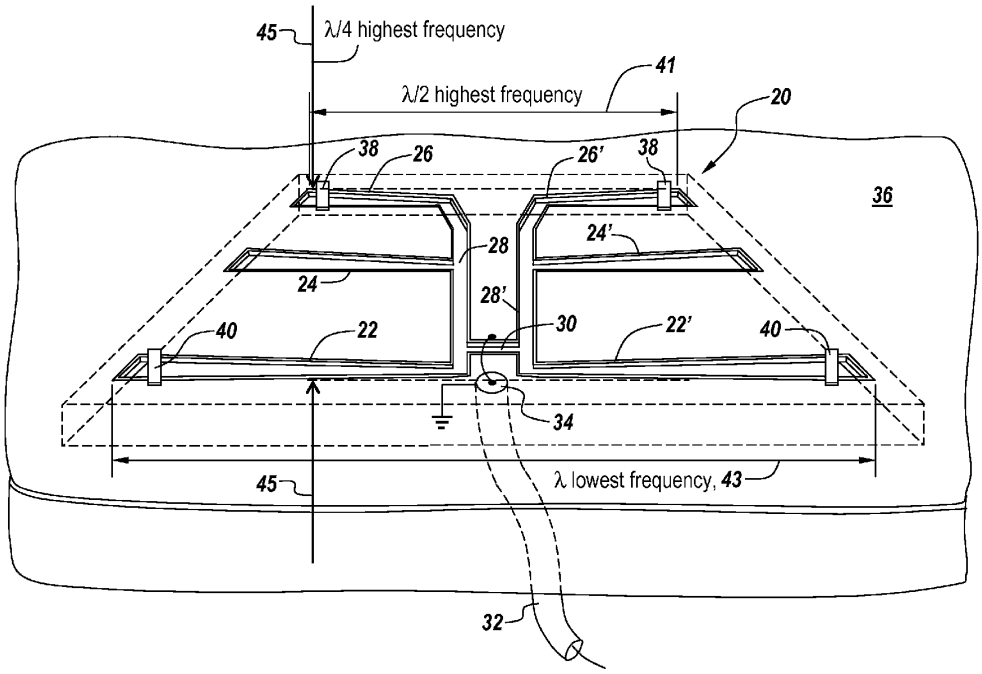
Publication Classification

(51) **Int. Cl.**
H01Q 13/18 (2006.01)

(52) **U.S. Cl.**
USPC **343/771**

(57) **ABSTRACT**

An octave bandwidth conformal cavity-backed slot antenna includes a ground plane with a number of different length slits that come together at the central feedpoint. The slit length varies from one-half a wavelength at the highest frequency at which the antenna is to operate for the short side to one wavelength at the highest frequency for the long side, with the proximal ends of the slits having a common feedpoint. Such slot antennas may be arrayed in a quad configuration. Because the trapezoidal envelope of the antenna induces the phase-center to shift with frequency, when two are arrayed with short sides adjacent, the spacing between them results in a phase center from one antenna to the next that is effectively within half a wavelength at all frequencies.



US 20130065543A1

(19) **United States**

(12) **Patent Application Publication**

AYATOLLAHI

(10) **Pub. No.: US 2013/0065543 A1**

(43) **Pub. Date: Mar. 14, 2013**

(54) **MOBILE DEVICE HAVING RECONFIGURABLE ANTENNA AND ASSOCIATED METHODS**

(75) Inventor: **Mina AYATOLLAHI**, Waterloo (CA)

(73) Assignee: **Research In Motion Limited (a corporation organize under the laws of the Province of Ontario, Canada**, Waterloo (CA)

(21) Appl. No.: **13/227,968**

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

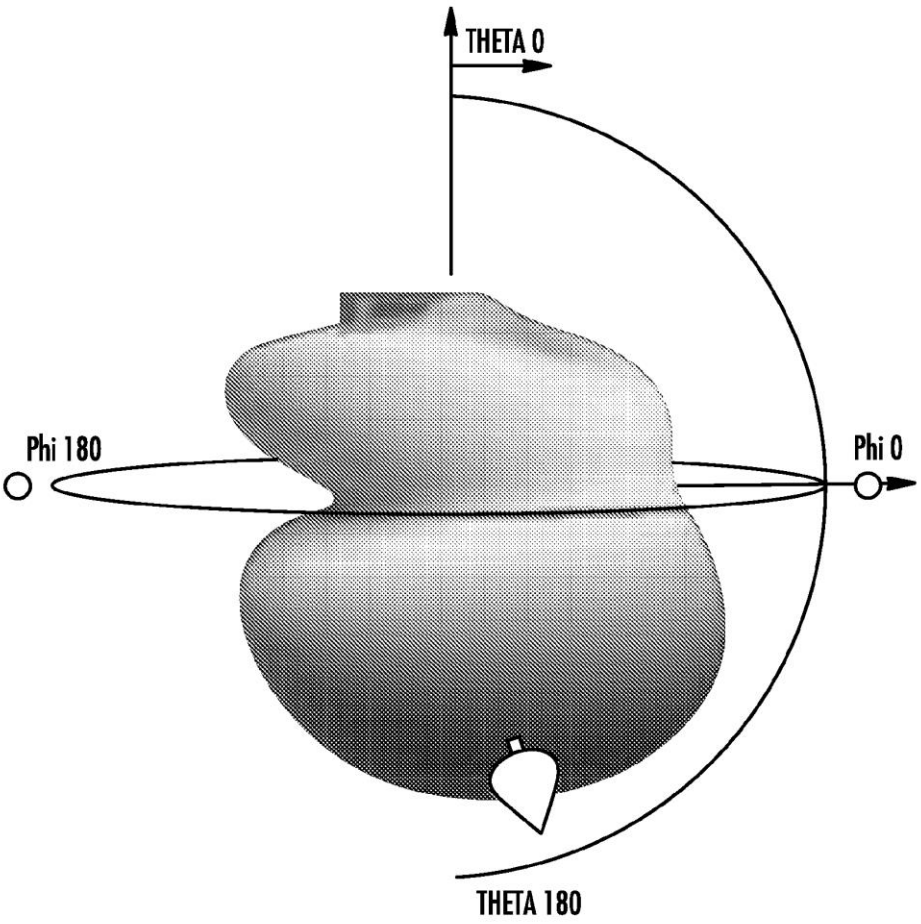
Publication Classification

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

(52) **U.S. Cl.**
USPC **455/90.3**

(57) **ABSTRACT**

A mobile wireless communications device includes a wireless transceiver, and a reconfigurable antenna coupled to the wireless transceiver. The reconfigurable antenna has a dielectric substrate, with a plurality of electrical conductors on the dielectric substrate laterally adjacent the ground plane and arranged in a series of spaced apart antenna loops with each successive outer antenna loop surrounding an adjacent inner loop, each antenna loop having a pair of endpoints. A plurality of switches are associated with respective endpoints of the antenna loops. A processor is adapted to reconfigure the reconfigurable antenna and couple the wireless transceiver thereto via the plurality of switches.



US 20130069830A1

(19) **United States**

(12) **Patent Application Publication**

CHEN et al.

(10) **Pub. No.: US 2013/0069830 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **QUASI-BALANCED FED ANTENNA STRUCTURE FOR REDUCING SAR AND HAC**

(76) Inventors: **I-Fong CHEN**, Taoyuan City (TW); **Chia-Mei Peng**, Ping-Chen City (TW)

(21) Appl. No.: **13/235,690**

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

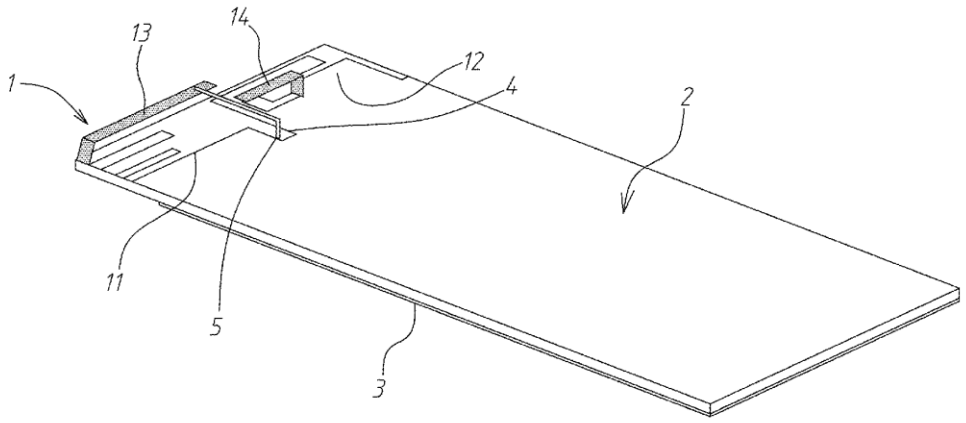
Publication Classification

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

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

(57) **ABSTRACT**

The proposed antenna structure has first and second asymmetric radiated-strip structures developed by modifying the structure of a printed T-type monopole. Specifically, by combining the radiated-strip and the shorting-line, the proposed antenna structure is similar to modified Type III balun and dipole fed by microstrip-line structure. Hence, the proposed antenna structure can also be regarded as a "quasi-balanced" antenna structure.



US 20130069836A1

(19) **United States**

(12) **Patent Application Publication**

BUNGO

(10) **Pub. No.: US 2013/0069836 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **WIRELESS COMMUNICATION APPARATUS**

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

(73) Assignee: **Sony Mobile Communications Japan, Inc.**, Minato-ku (JP)

(21) Appl. No.: **13/541,162**

(22) Filed: **Jul. 3, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/537,109, filed on Sep. 21, 2011.

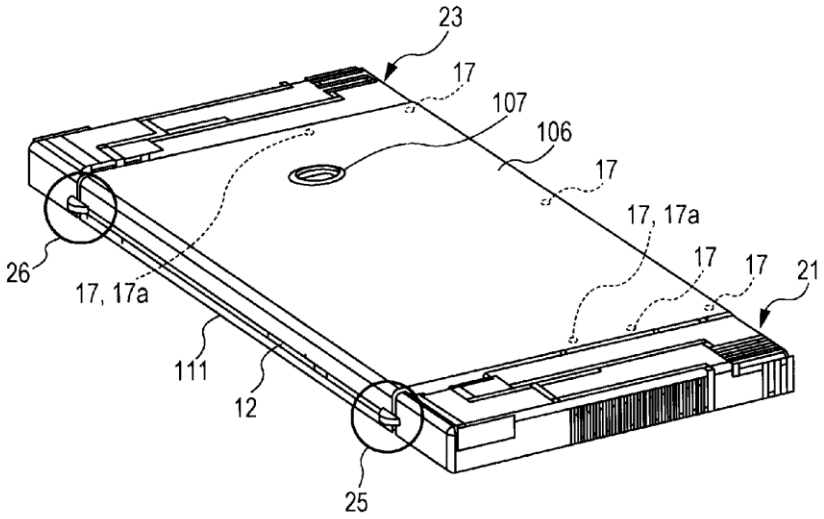
Publication Classification

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

(52) **U.S. Cl.**
USPC **343/724**

(57) **ABSTRACT**

A wireless communication apparatus that includes a first antenna section having a first power feed point; a second antenna section having a second power feed point; a first electrically conductive plate extending between the first antenna section and the second antenna section; a second electrically conductive plate disposed substantially in parallel with the first electrically conductive plate and extending between the first antenna section and the second antenna section; and a short-circuiting member that electrically short-circuits the first electrically conductive plate and the second electrically conductive plate to each other such that a slit is formed by a part of a periphery of the first electrically conductive plate and a part of a periphery of the second electrically conductive plate.



US 20130069837A1

(19) **United States**

(12) **Patent Application Publication**

Cozzolino et al.

(10) **Pub. No.: US 2013/0069837 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **DIRECTIVE ANTENNA WITH ISOLATION FEATURE**

(75) Inventors: **Randell Cozzolino**, Phoenix, AZ (US); **Ricky Chair**, Phoenix, AZ (US)

(73) Assignee: **GALTRONICS CORPORATION LTD.**, Tiberias (IL)

(21) Appl. No.: **13/699,384**

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

(86) PCT No.: **PCT/IL11/00459**

§ 371 (c)(1),
(2), (4) Date: **Nov. 21, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/352,968, filed on Jun. 9, 2010.

Publication Classification

(51) **Int. Cl.**

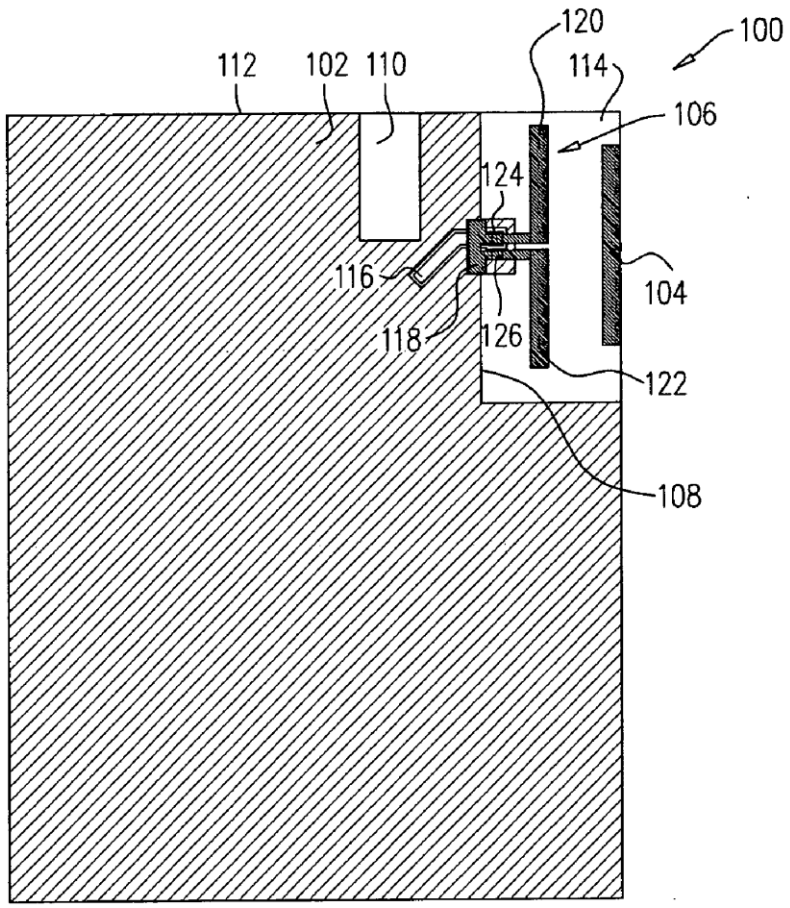
H01Q 9/16	(2006.01)
H01Q 21/00	(2006.01)
H01Q 13/10	(2006.01)

(52) **U.S. Cl.**

USPC **343/727**

(57) **ABSTRACT**

An antenna including a reflector formed by a ground plane, the ground plane having a notch therein, at least one parasitic director offset from the ground plane and a driven element formed by a dipole antenna coupled to the ground plane in proximity to the notch and located between the at least one parasitic director and an edge of the ground plane.



US 20130069838A1

(19) **United States**

(12) **Patent Application Publication**

Grandfield et al.

(10) **Pub. No.: US 2013/0069838 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **DUAL BAND ELECTRICALLY SMALL TUNABLE ANTENNA**

(75) Inventors: **John E. Grandfield**, Bristol, RI (US); **Michael P. Abban**, Weymouth, MA (US); **Brad D. Gaynor**, Newton, MA (US)

(73) Assignee: **THE CHARLES STARK DRAPER LABORATORY**, Cambridge, MA (US)

(21) Appl. No.: **13/233,411**

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

Publication Classification

(51) **Int. Cl.**

H01Q 21/30 (2006.01)

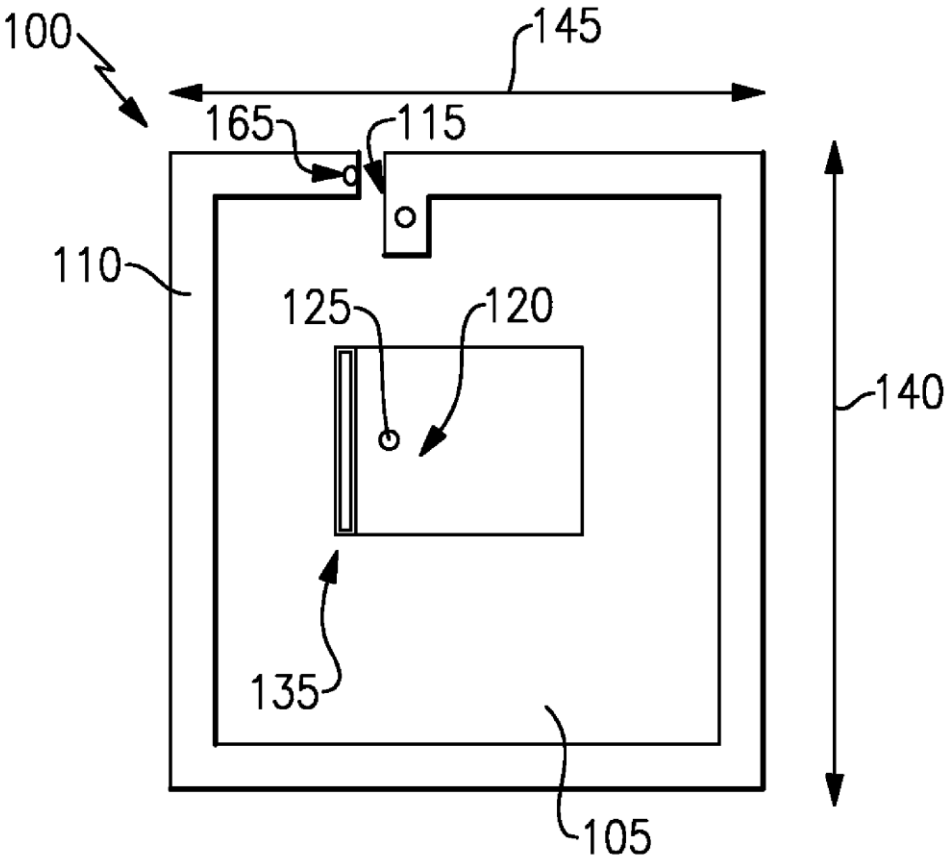
H01Q 3/01 (2006.01)

(52) **U.S. Cl.**

USPC **343/729**

(57) **ABSTRACT**

An electrically small dual-band planar tunable UHF/L-Band antenna. In one example, the dual-band antenna includes a combination of a semi-spiral antenna for the UHF frequencies and a microstrip patch antenna for the L-band frequencies.



US 20130069839A1

(19) **United States**

(12) **Patent Application Publication**

Ash, JR. et al.

(10) **Pub. No.: US 2013/0069839 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **ISOLATION ENHANCEMENT BETWEEN PLANAR ANTENNA ELEMENTS**

(75) Inventors: **Daniel R. Ash, JR.**, Laguna Nigel, CA (US); **Daniel R. Ash, SR.**, Drain, OR (US); **Jeremy Monroe**, Trabuco Canyon, CA (US)

(73) Assignee: **Mobile Joose, Inc**, Lake Forest, CA (US)

(21) Appl. No.: **13/591,171**

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

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/238,894, filed on Sep. 21, 2011, now Pat. No. 8,248,314, Continuation-in-part of application No. 13/590,053, filed on Aug. 20, 2012, Continuation-in-part of application No. 13/591,152, filed on Aug. 21, 2012.

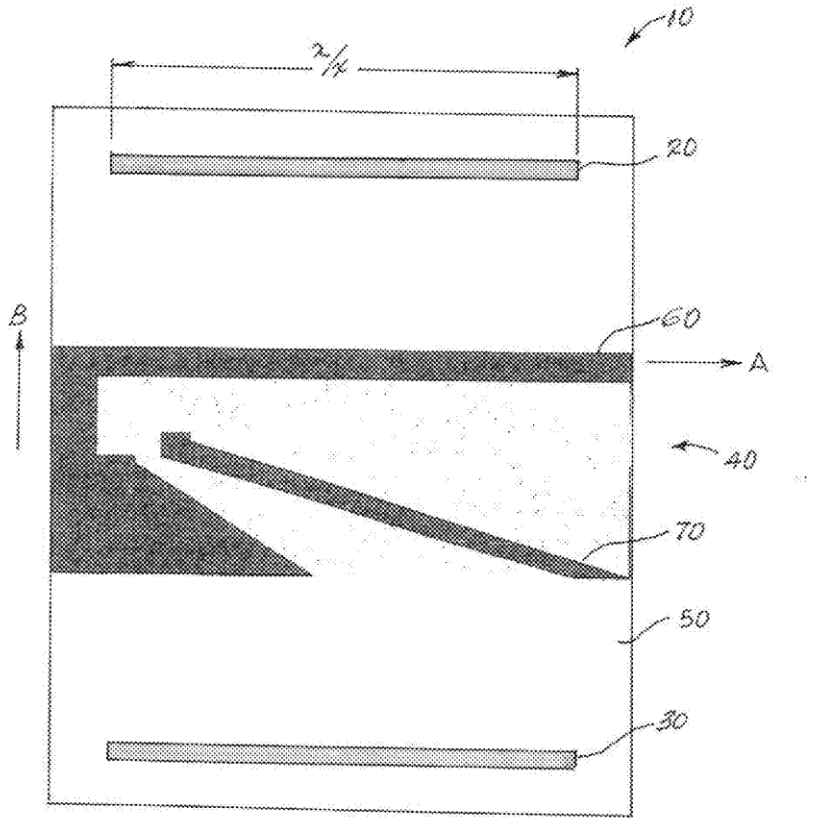
Publication Classification

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

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

(57) **ABSTRACT**

An antenna system for creating mutual radiation isolation between planar antenna elements over a narrow band uses field cancellation. Adjacent planar antenna elements are positioned in a common ground plane within a mobile phone repeater station, A tuned slot element is positioned between the antenna elements and coupled to share ground plane current in. order to maximize cancellation and minimize degradation of the radiation of the antenna elements. The dimensions of the toned slot element are adjusted to obtain lambda/2 resonance, whereby, isolation of more than 10 dB is attained between the antenna elements.



US 20130069841A1

(19) **United States**

(12) **Patent Application Publication**

Lee et al.

(10) **Pub. No.: US 2013/0069841 A1**

(43) **Pub. Date: Mar. 21, 2013**

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

(75) Inventors: **Seung-Jun Lee**, Seongnam-si (KR); **Sung-Won Park**, Suwon-si (KR); **Jae-Sun Park**, Suwon-si (KR); **Jae-Min Seo**, Suwon-si (KR)

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

(21) Appl. No.: **13/619,150**

(22) Filed: **Sep. 14, 2012**

(30) **Foreign Application Priority Data**

Sep. 20, 2011 (KR) 10-2011-0094633

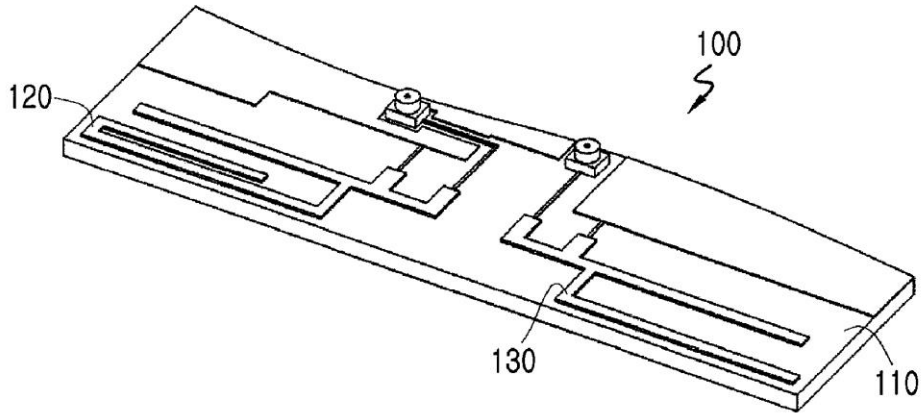
Publication Classification

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

(52) **U.S. Cl.**
USPC **343/846**; 343/893

(57) **ABSTRACT**

According to one embodiment, an antenna apparatus for a portable terminal includes a main board, a first antenna and a second antenna electrically coupled to the main board and spaced apart from each other on the main board, and a ground body protruding from a top surface or a bottom surface of the main board.



US 20130069842A1

(19) **United States**

(12) **Patent Application Publication**

Lee et al.

(10) **Pub. No.: US 2013/0069842 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **ANTENNA APPARATUS FOR PORTABLE TERMINAL**

(75) Inventors: **Seung-Jun Lee**, Seongnam-si (KR); **Jae-Min Seo**, Suwon-si (KR); **Sung-Won Park**, Suwon-si (KR); **Jae-Sun Park**, Suwon-si (KR)

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

(21) Appl. No.: **13/615,219**

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

(30) **Foreign Application Priority Data**

Sep. 20, 2011 (KR) 10-2011-0094642

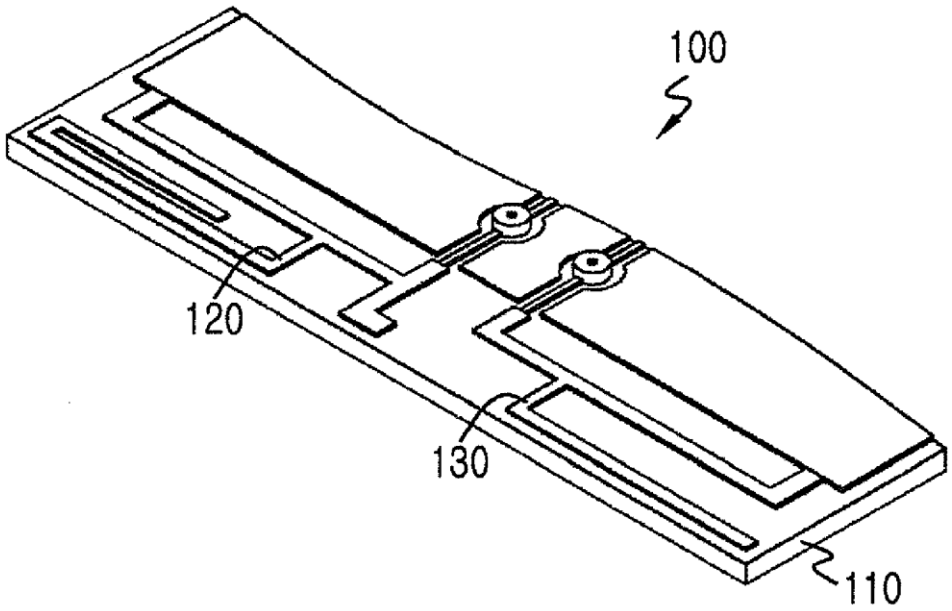
Publication Classification

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

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

(57) **ABSTRACT**

An antenna apparatus for a portable terminal is configured to reduce interference. The antenna apparatus includes a first antenna and a second antenna spaced apart from the first antenna. The antenna apparatus also includes a filter coupled to the first antenna and the second antenna, and configured to increase an isolation between the first antenna and the second antenna by filtering signals transmitted through the first antenna and the second antenna. The antenna apparatus further includes a main board configured to process the filtered signals.



US 20130069844A1

(19) **United States**

(12) **Patent Application Publication**

Levionnais et al.

(10) **Pub. No.: US 2013/0069844 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **ANTENNA FOR AN NFC DEVICE**

(75) Inventors: **Philippe Levionnais**, Caen (FR); **David Picquenot**, Authie (FR)

(73) Assignee: **France Telecom**, Paris (FR)

(21) Appl. No.: **13/700,168**

(22) PCT Filed: **May 23, 2011**

(86) PCT No.: **PCT/FR2011/051162**

§ 371 (c)(1),
(2), (4) Date: **Nov. 27, 2012**

(30) **Foreign Application Priority Data**

May 27, 2010 (FR) 1054118

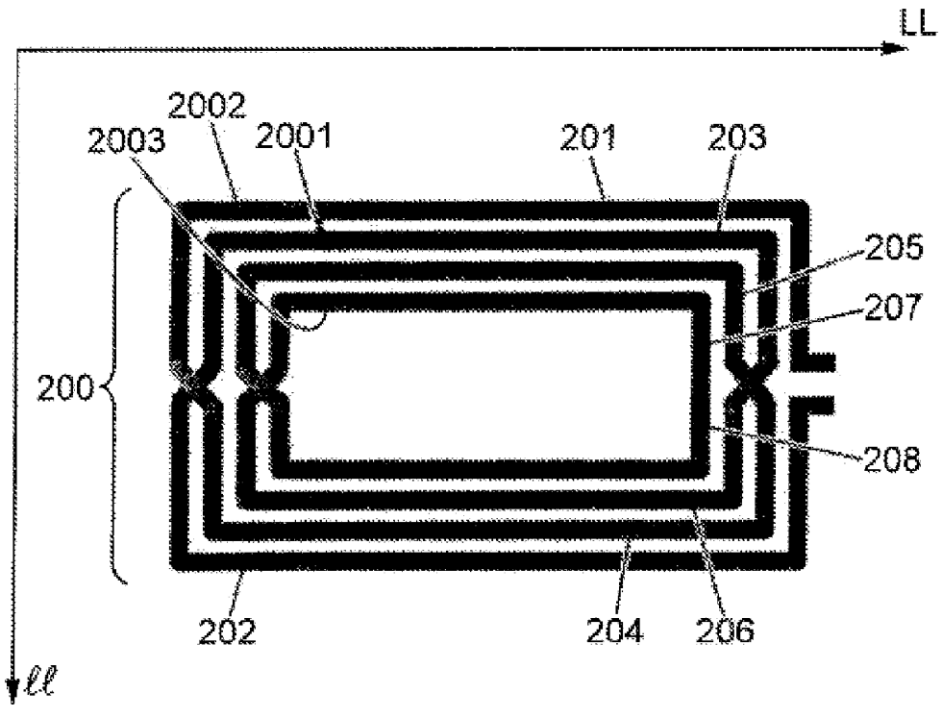
Publication Classification

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

(52) **U.S. Cl.**
CPC ***H01Q 7/00*** (2013.01)
USPC **343/866**

(57) **ABSTRACT**

An antenna for near-field communication, comprising at least four turns and having an outside periphery and an inside periphery both of substantially rectangular shape. An inter-turn distance separates two adjacent turns. Each turn has a width substantially equal to the inter-turn distance. In addition, the inside periphery has: (i) a length less than 7 times the distance between the outside periphery and the inside periphery along a longitudinal axis of said antenna, and (ii) a width less than 4 times the distance between the outside periphery and the inside periphery along a lateral axis of said antenna.



US 20130069846A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2013/0069846 A1**

(43) **Pub. Date: Mar. 21, 2013**

CHANG

(54) **ANTENNA STRUCTURE FOR REDUCING THE SAR VALUE**

(75) Inventor: **CHUN-CHUAN CHANG**, KEELUNG CITY (TW)

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

(21) Appl. No.: **13/238,232**

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

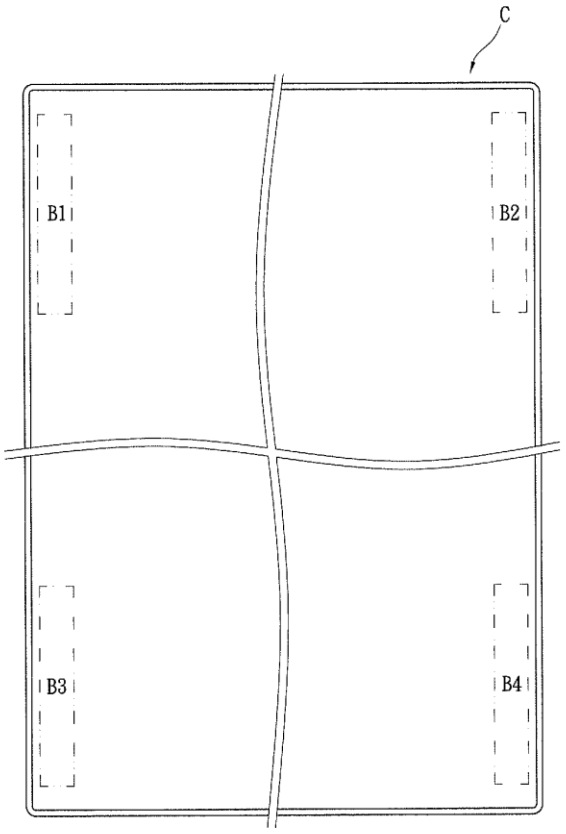
Publication Classification

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

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

(57) **ABSTRACT**

An antenna structure disposed inside an external casing according to an optimum separation distance for reducing the SAR value includes a substrate unit and an antenna unit. The substrate unit includes at least one substrate body. The antenna unit includes at least one antenna layer disposed on the substrate body. The antenna layer is extended along an X-axis direction to form an X-axis distance and is extended along a Y-axis direction to form a Y-axis distance, the X-axis direction is vertical to the Y-axis direction, and the X-axis distance of the antenna layer is larger than the Y-axis distance of the antenna layer. In addition, the optimum separation distance is defined from one end of the antenna layer to the external surface of the external casing along the X-axis direction, and the optimum separation distance is substantially between 5 mm and 20 mm.



US 20130069847A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2013/0069847 A1**

(43) **Pub. Date: Mar. 21, 2013**

CHIANG

(54) **ANTENNA STRUCTURE USED TO SEPARATE HOT SPOTS FOR DECREASING THE SAR VALUE**

(75) Inventor: **CHI-MING CHIANG**, TAOYUAN COUNTY (TW)

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

(21) Appl. No.: **13/238,203**

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

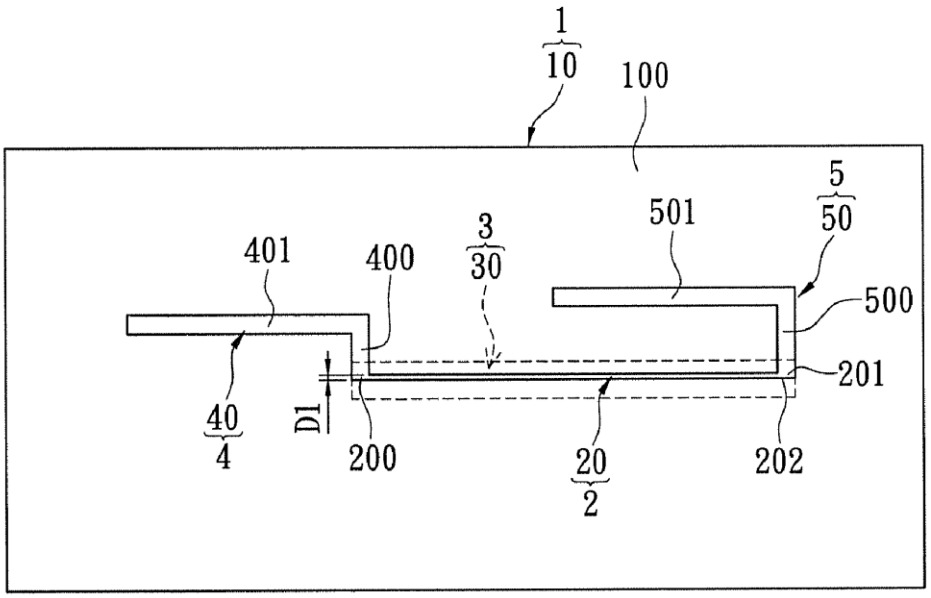
Publication Classification

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

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

(57) **ABSTRACT**

An antenna structure used to separate hot spots for decreasing the SAR value includes a substrate unit, a microstrip line unit, a grounding unit, a first radiation unit, and a second radiation unit. The substrate unit includes a substrate body having a first surface and a second surface. The microstrip line unit includes a microstrip line disposed on the first surface of the substrate body and the microstrip line has a first end and a second end. The grounding unit includes a grounding line disposed on the second surface of the substrate body. The first radiation unit includes a first radiation line disposed on the first surface of the substrate body and extended from the first end of the microstrip line. The second radiation unit includes a second radiation line disposed on the first surface of the substrate body and extended from the second end of the microstrip line.



US 20130072258A1

(19) **United States**

(12) **Patent Application Publication**

Levionnais et al.

(10) **Pub. No.: US 2013/0072258 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **SHELL FOR MOBILE TELEPHONE WITH NFC FUNCTIONALITY**

(75) Inventors: **Philippe Levionnais**, Caen (FR); **David Picquenot**, Authie (FR)

(73) Assignee: **France Telecom**, Paris (FR)

(21) Appl. No.: **13/699,909**

(22) PCT Filed: **May 23, 2011**

(86) PCT No.: **PCT/FR2011/051161**

§ 371 (c)(1),
(2), (4) Date: **Nov. 26, 2012**

(30) **Foreign Application Priority Data**

May 27, 2010 (FR) 1054117

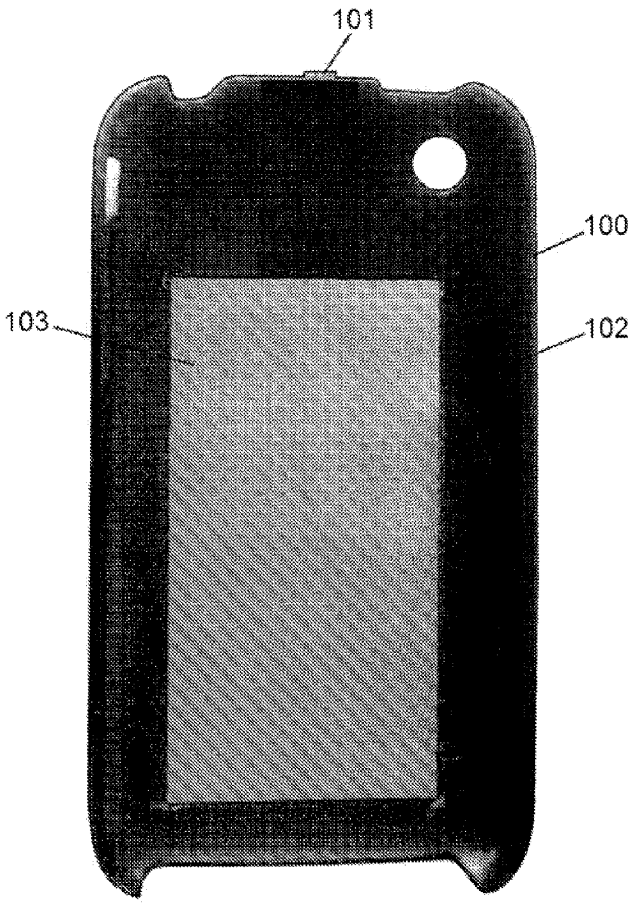
Publication Classification

(51) **Int. Cl.**
H04W 88/02 (2009.01)

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

(57) **ABSTRACT**

A shell for a mobile telephone able to comprise a subscriber identity card. The mobile telephone has, on the one hand, a front face exhibiting a user interface and, on the other hand, a rear face. The shell has an internal surface and an external surface. This shell has a suitable shape adapted for removably receiving the mobile telephone so that the rear face of the mobile telephone is held along the internal surface of the shell. The internal surface comprises: a first means adapted for holding a near-field communication device and an antenna associated therewith; and a second means adapted for guiding at least a portion of a wire-based interface intended to link the near-field communication device to the subscriber identity card.



US 20130072117A1

(19) **United States**

(12) **Patent Application Publication**

Bourdage

(10) **Pub. No.: US 2013/0072117 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **DECOUPLED MULTI-LOOP WIDEBAND ANTENNAS FOR MAGNETIC COMMUNICATION**

(76) Inventor: **Sébastien Roland Bourdage**, Dartmouth (CA)

(21) Appl. No.: **13/608,611**

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

Related U.S. Application Data

(60) Provisional application No. 61/535,044, filed on Sep. 15, 2011.

Publication Classification

(51) **Int. Cl.**

H01F 38/00 (2006.01)

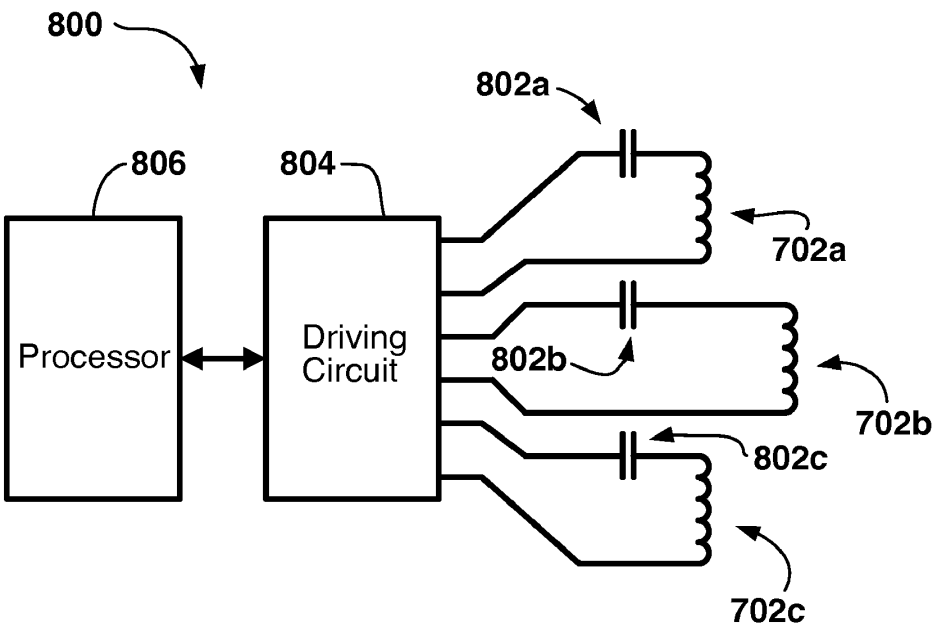
H04B 5/00 (2006.01)

(52) **U.S. Cl.**

USPC **455/41.1**; 307/104

(57) **ABSTRACT**

An antenna for magnetic communications and magnetic communications devices incorporating the antenna. The antenna includes two or more loops physically overlapping, wherein each loop is configured to be connected to one or more driving circuits, wherein the overlapping loops are symmetrically arranged around and overlap an antenna central point, each loop having a center point, wherein the center point of each loop is spaced apart by a distance from the center point of each adjacent loop, and wherein a distance of the loops from each other and from the antenna central point is selected to realize a local minimal mutual coupling



US 20130072135A1

(19) **United States**

(12) **Patent Application Publication**

Banerjea et al.

(10) **Pub. No.: US 2013/0072135 A1**

(43) **Pub. Date: Mar. 21, 2013**

(54) **WIRELESS COEXISTENCE THROUGH ANTENNA SWITCHING**

(76) Inventors: **Raja Banerjea**, Sunnyvale, CA (US); **Josselin de la Broise**, Palo Alto, CA (US); **Harish Ramamurthy**, Cupertino, CA (US)

(21) Appl. No.: **13/615,845**

(22) Filed: **Sep. 14, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/535,230, filed on Sep. 15, 2011, provisional application No. 61/576,294, filed on Dec. 15, 2011.

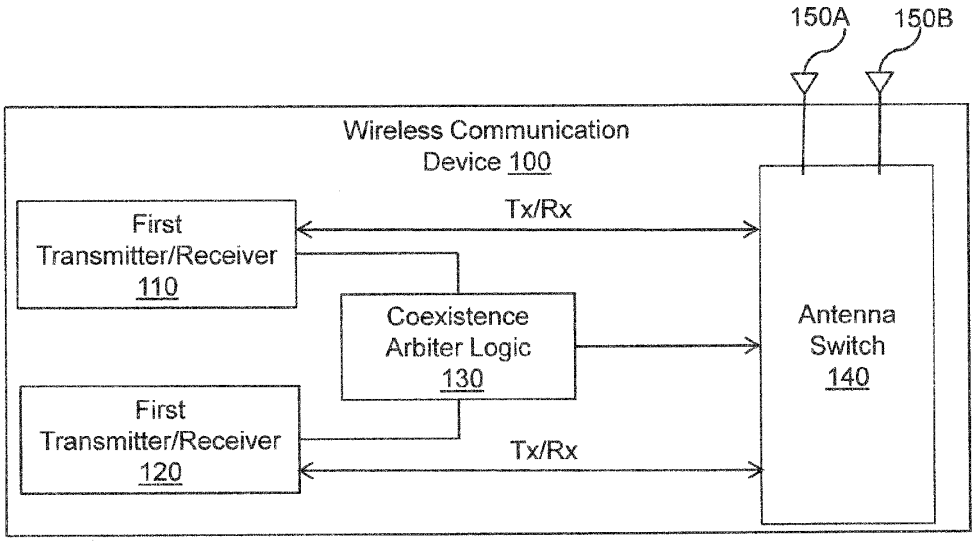
Publication Classification

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

(52) **U.S. Cl.**
USPC **455/83**; 455/78

(57) **ABSTRACT**

Systems, methods, and other embodiments associated with wireless coexistence through antenna switching are described. According to one embodiment, a method includes selecting one or both of a first transceiver and a second transceiver for connection to an antenna, based, at least in part, on the operating mode of the first transceiver and the second transceiver. The method includes connecting the selected transceiver(s) to the antenna, such that the selected transceiver(s) is enabled to communicate on the antenna and any transceiver(s) not selected is not able to communicate on the antenna.



US 20130072924A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0072924 A1

(43) Pub. Date: Mar. 21, 2013

Burgener et al.

(54) **ABLATION ANTENNA**

(75) Inventors: **Robert H. Burgener**, Park City, UT (US); **Todd H. Turnlund**, Park City, UT (US); **Chet M. Crump**, South Jordan, UT (US); **Kent Moore**, Bountiful, UT (US)

(73) Assignee: **BSD MEDICAL CORPORATION**, Salt Lake City, UT (US)

(21) Appl. No.: **13/615,017**

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

Related U.S. Application Data

(60) Provisional application No. 61/536,680, filed on Sep. 20, 2011.

Publication Classification

(51) **Int. Cl.**

A61B 18/18 (2006.01)

H01P 11/00 (2006.01)

(52) **U.S. Cl.**

USPC **606/33**; 29/600

(57) **ABSTRACT**

A radio frequency ablation antenna is disclosed. The microstrip ablation antenna has a dielectric member having a substantially tubular shape. A first conductor is disposed within the dielectric member, and a second conductor is disposed on an outer surface of the dielectric member. The first conductor is configured to be electrically connected to a radio frequency source or ground, and the second conductor is configured to be electrically connected to the other of the radio frequency source or the ground.