US 20120194390A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0194390 A1

(43) Pub. Date: Aug. 2, 2012

ENDO et al.

(54) MULTIPLY RESONANT ANTENNA DEVICE AND ELECTRONIC DEVICE INCLUDING SUCH AND ANTENNA DEVICE

(76) Inventors: **Natsumi ENDO**, Sagamihara-shi (JP); **Hiroyuki Hotta**, Hamura-shi (JP); **Koichi Sato**, Tachikawa-shi (JP)

(21) Appl. No.: **13/279,890**

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

(30) **Foreign Application Priority Data**

Feb. 1, 2011 (JP) 2011-019881

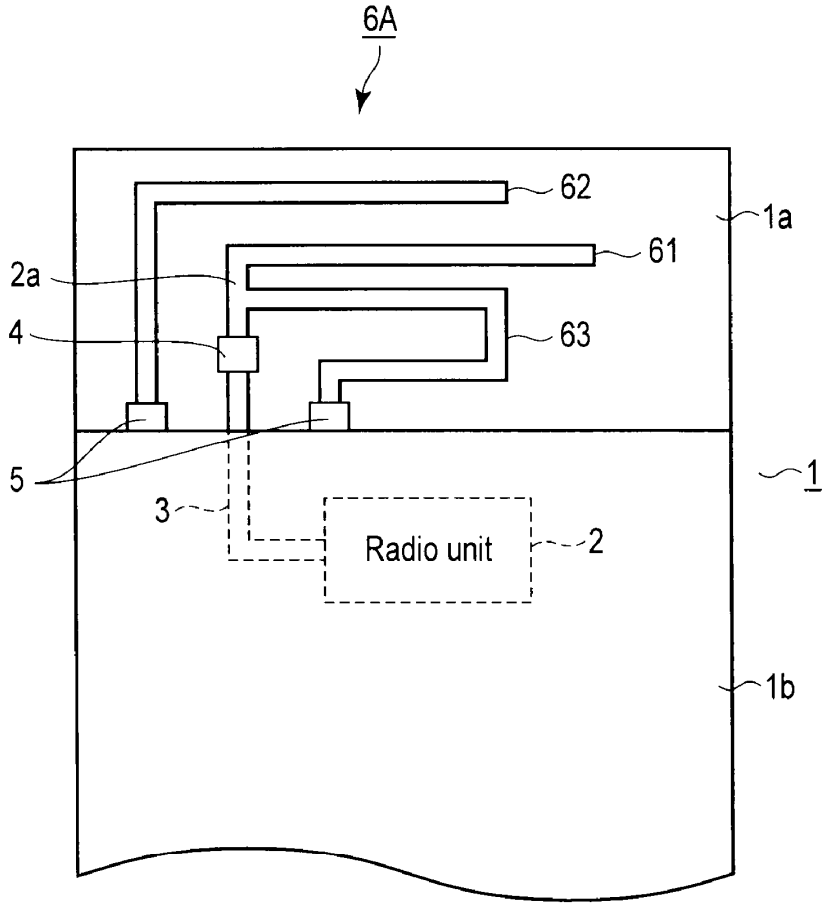
Publication Classification

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

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

(57) **ABSTRACT**

According to one embodiment, a multiply resonant antenna device according to the embodiment includes a first antenna element formed from a monopole element, a second antenna element formed from a parasitic element placed at a position where it can be current-coupled to the first antenna element, and a third antenna element formed from a folded monopole element. The length of the first antenna element is set to nearly a ¼ of wavelength corresponding to the first resonant frequency. The length of the second antenna element is set to nearly a ¼ of wavelength corresponding to the second resonant frequency. The electrical length of the third antenna element from the feed point to a ground point through a folding end is set to nearly a ½ of wavelength corresponding to the third resonant frequency higher than the first and second resonant frequencies.



US 20120194391A1

(19) **United States**

(12) **Patent Application Publication**

LIU et al.

(10) **Pub. No.: US 2012/0194391 A1**

(43) **Pub. Date: Aug. 2, 2012**

(54) **MIMO ANTENNA SYSTEM**

(76) Inventors: **Ming-Yen LIU**, Taipei (TW); **Hsiao-Ming Tsai**, Taipei (TW); **Ching-Ming Chen**, Taipei (TW); **Jung-Huang Chiang**, Taipei (TW); **Shih-Chieh Chen**, Taipei (TW)

(21) Appl. No.: **13/354,948**

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

(30) **Foreign Application Priority Data**

Feb. 1, 2011 (CN) 201110034412.3

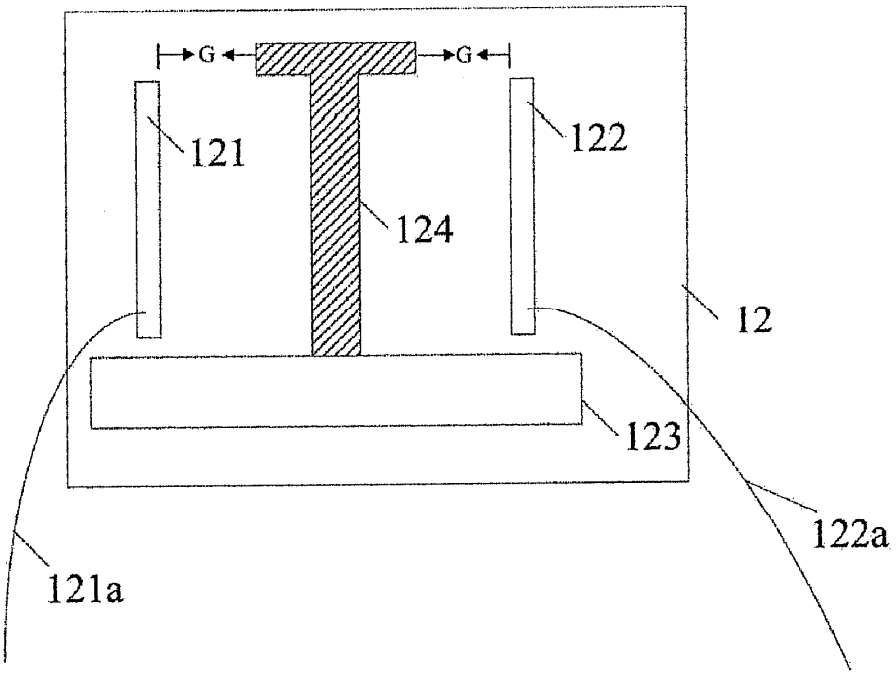
Publication Classification

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

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

(57) **ABSTRACT**

A multi-input multi-output (MIMO) antenna system includes multiple antennas, a ground part and an isolating part. The isolating part is disposed between each two adjacent antennas. The isolating part is electrically connected to the ground part. A distance exists between an end of the antenna and an end of the isolating part. A circuit board applying the MIMO antenna system is also disclosed. Since the isolating part is disposed between each two adjacent antennas, signal interference between the antennas can be prevented, and the MIMO antenna system and the circuit board applying the same have better isolation.



US 20120194392A1

(19) **United States**

(12) **Patent Application Publication**

INOUE et al.

(10) **Pub. No.: US 2012/0194392 A1**

(43) **Pub. Date: Aug. 2, 2012**

(54) **ANTENNA AND INFORMATION TERMINAL APPARATUS**

(75) Inventors: **Kazuhiro INOUE**, Tokyo (JP); **Makoto HIGAKI**, Kawasaki-shi (JP); **Akiko YAMADA**, Yokohama-shi (JP); **Shuichi OBAYASHI**, Yokohama-shi (JP)

(73) Assignee: **Kabushiki Kaisha Toshiba**, Minato-ku (JP)

(21) Appl. No.: **13/398,013**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP09/03953, filed on Aug. 19, 2009.

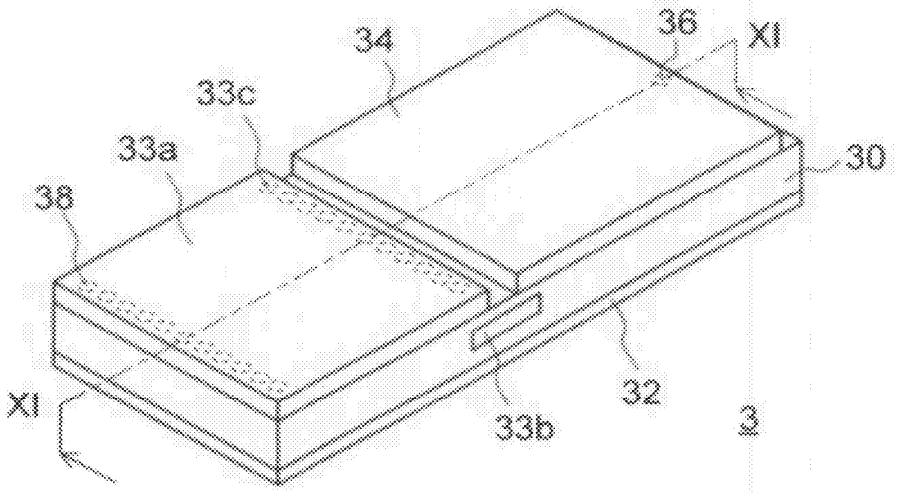
Publication Classification

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

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

(57) **ABSTRACT**

This antenna includes: a ground conductor part; and a radiation conductor part that is disposed substantially parallel to and a predetermined distance apart from the ground conductor part and has a feeding point to which a high-frequency signal is fed, in which surface roughness of a predetermined region of at least one of the ground conductor part and the radiation conductor part is equal to or less than twice skin depth at an operating frequency.



US 20120194393A1

(19) **United States**

(12) **Patent Application Publication**

Uttermann et al.

(10) **Pub. No.: US 2012/0194393 A1**

(43) **Pub. Date: Aug. 2, 2012**

(54) **ANTENNA, SHIELDING AND GROUNDING**

(75) Inventors: **Erik A. Uttermann**, Cupertino, CA (US); **Jeremy C. Franklin**, San Francisco, CA (US); **Stephen R. McClure**, San Francisco, CA (US); **Sean S. Corbin**, San Jose, CA (US); **Qingxiang Li**, Mountain View, CA (US); **Rodney A. Gomez Angulo**, Sunnyvale, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(21) Appl. No.: **13/018,184**

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

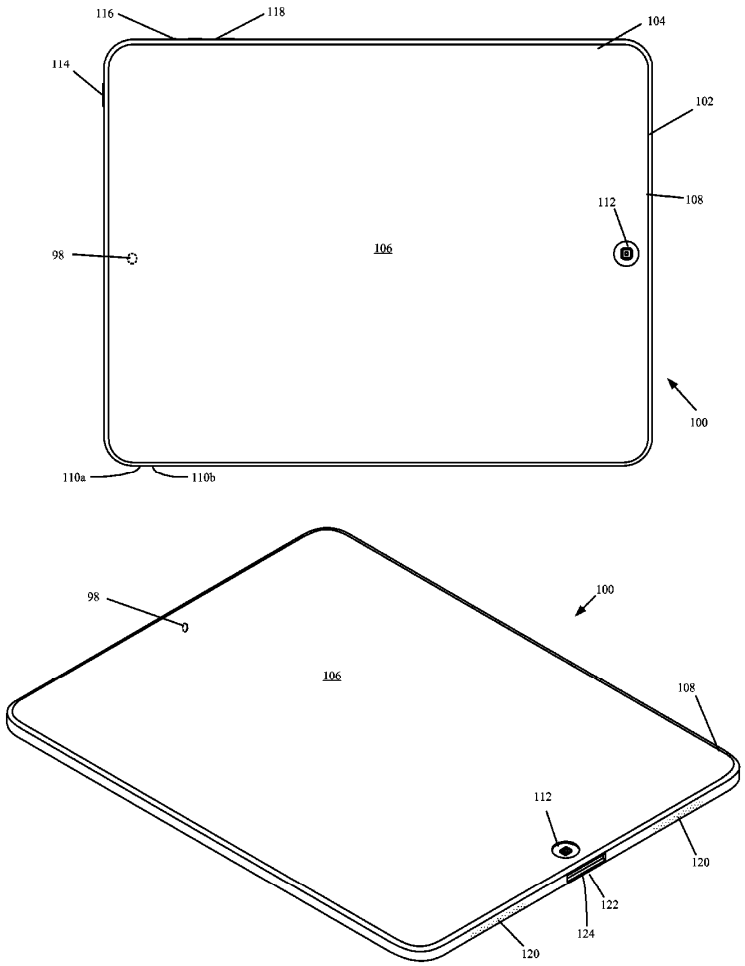
Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
B29C 65/52 (2006.01)

(52) **U.S. Cl.** **343/702**; 156/297

(57) **ABSTRACT**

A portable computing device is disclosed. The portable computing device can take many forms such as a laptop computer, a tablet computer, and so on. The portable computing device can include a single piece housing formed from a radio opaque material with a cover formed from a radio transparent material. To implement a wireless interface, an antenna stack-up can be provided that allows an antenna to be mounted to a bottom of the cover. Methods and apparatus are provided for improving wireless performance. For instance, in one embodiment, a metal housing can be thinned to improve antenna performance. As another example, a faraday cage can be formed around speaker drivers to improve antenna performance.



US 20120194394A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0194394 A1

(43) Pub. Date: Aug. 2, 2012

TOGASHI et al.

(54) **PORTABLE ELECTRONIC DEVICE**

(75) Inventors: **Daisuke TOGASHI**, Kanagawa (JP); **Akiyoshi NODA**, Kanagawa (JP); **Yoshiaki HIRAOKA**, Kanagawa (JP); **Ting LU**, Kanagawa (JP)

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

(21) Appl. No.: **13/360,361**

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

(30) **Foreign Application Priority Data**

Jan. 27, 2011 (JP) 2011-015008
Jan. 27, 2011 (JP) 2011-015270
Jan. 27, 2011 (JP) 2011-015271
Jan. 27, 2011 (JP) 2011-015311
Jun. 27, 2011 (JP) 2011-141397

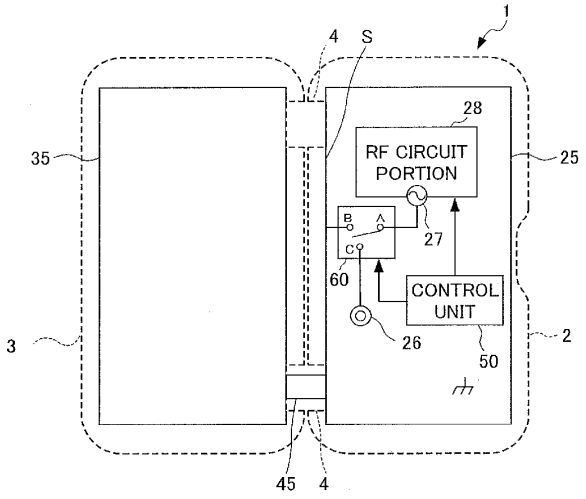
Publication Classification

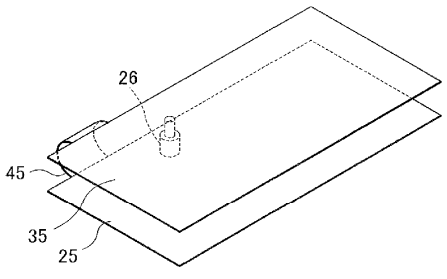
(51) **Int. Cl.**
H01Q 1/24 (2006.01)

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

(57) **ABSTRACT**

To provide a portable electronic device that includes an antenna that has a novel configuration that uses a conductive portion. The portable electronic device includes an operation unit side body that has a first conductive portion; a display unit side body that has a second conductive portion; a connecting portion that has a third conductive portion, and connects the operation unit side body and the display unit side body to enable transition between a closed state and an opened state; and a power feed unit. The cellular telephone device enables operation as a magnetic current antenna by power supply from a power feed unit to an opposed region that is formed by enclosure of at least three sides by the first conductive portion, the second conductive portion, and the third conductive portion.





US 20120194401A1

(19) **United States**

(12) **Patent Application Publication**

McLean et al.

(10) **Pub. No.: US 2012/0194401 A1**

(43) **Pub. Date: Aug. 2, 2012**

(54) **END-FED SLEEVE DIPOLE ANTENNA COMPRISING A 3/4-WAVE TRANSFORMER**

(75) Inventors: **James McLean**, Austin, TX (US); **Kunio Yata**, Tokyo (JP); **Robert Sutton**, Austin, TX (US); **Hidetsugu Sakou**, Tokyo (JP); **Nobutaka Misawa**, Tokyo (JP)

(73) Assignee: **TDK CORPORATION**, Ichikawa-shi (JP)

(21) Appl. No.: **13/015,280**

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

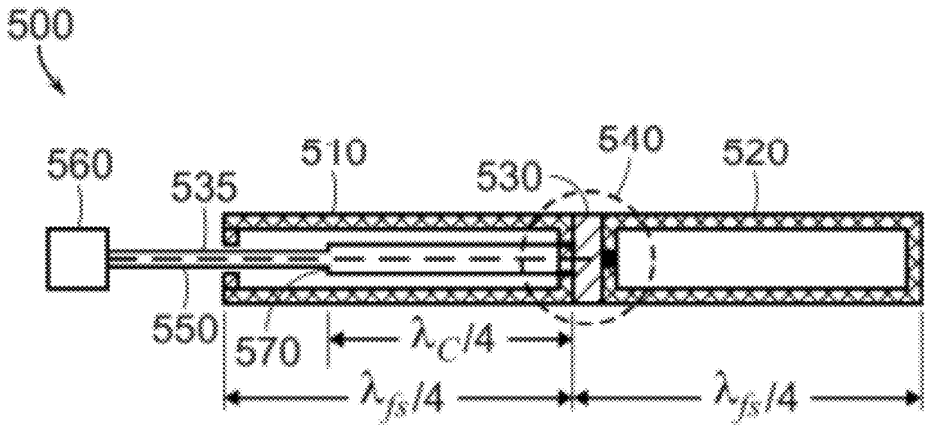
Publication Classification

(51) **Int. Cl.**
H01Q 9/22 (2006.01)

(52) **U.S. Cl.** **343/792**

(57) **ABSTRACT**

An end-fed sleeve dipole is provided herein with improved impedance match and increased bandwidth by incorporating a ¾-wavelength transformer in the antenna design. The ¾-wavelength transformer is compatible with a number of different choking schemes, including but not limited to, a single ¼-wave choke sleeve, a single ¼-wave choke sleeve with additional ferrite beads, and two or more ¼-wave choke sleeves with or without ferrite beads. In some embodiments, one or more shunt resonators may be used to provide additional impedance compensation.



US 20120194402A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0194402 A1

(43) Pub. Date: Aug. 2, 2012

Kim

(54) **SHIELD CASE AND ANTENNA SET COMPRISING IT**

(75) Inventor: **Jongguk Kim**, Seoul (KR)

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

(21) Appl. No.: **13/380,748**

(22) PCT Filed: **Jun. 25, 2010**

(86) PCT No.: **PCT/KR2010/004161**

§ 371 (c)(1), (2), (4) Date: **Apr. 18, 2012**

(30) **Foreign Application Priority Data**

Jun. 26, 2009 (KR) 10-2009-0057587

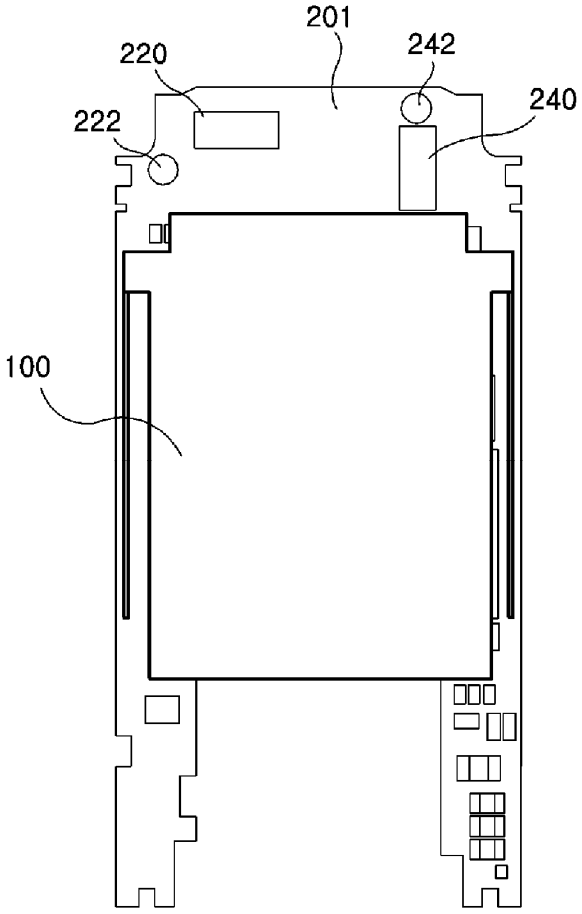
Publication Classification

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

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

(57) **ABSTRACT**

The present invention relates to a shield case and an antenna set comprising the same, wherein the shield case includes a shield surface for shielding embedded electronic elements against electromagnetic wave, a fixing unit coupled with a substrate mounted with the electronic elements, signal receivers for receiving a signal of desired frequency, and two strip antennas connected to a border of the shield surface, each antenna facing the other across the shield surface.



US 20120194404A1

(19) **United States**

(12) **Patent Application Publication**

Arkko et al.

(10) **Pub. No.: US 2012/0194404 A1**

(43) **Pub. Date: Aug. 2, 2012**

(54) **APPARATUS FOR WIRELESS COMMUNICATION COMPRISING A LOOP LIKE ANTENNA**

(75) Inventors: **Aimo Arkko**, Ruutana (FI); **Jens Troelsen**, Copenhagen (DK); **Rune So**, Copenhagen (DK)

(73) Assignee: **Nokia Corporation**, Espoo (FI)

(21) Appl. No.: **13/381,854**

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

(86) PCT No.: **PCT/EP2009/058209**

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

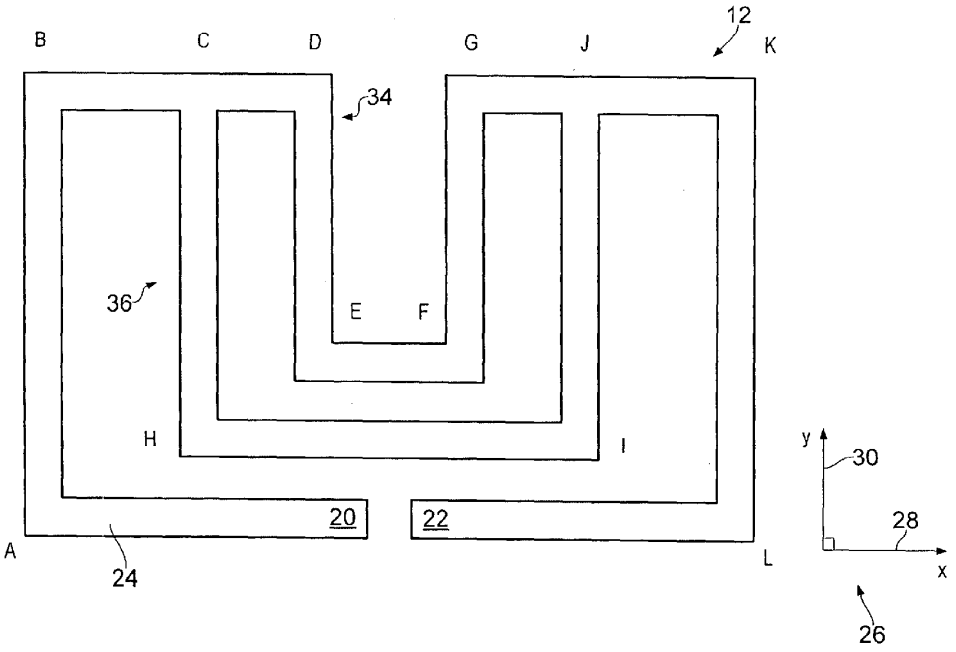
Publication Classification

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

(52) **U.S. Cl.** **343/867**

(57) **ABSTRACT**

Apparatus (**20**) comprising: an antenna (**12**) connectable to a first terminal (**38**) and to a second terminal (**40**) and comprising a first conductive part (**34**) and a second conductive part (**36**), the first conductive part being configured electrically in parallel with the second conductive part, the first conductive part (**34**) being configured to have a first electrical length and the second conductive part (**36**) being configured to have a second electrical length together providing a common resonant mode having a first operational frequency band, the second conductive part (**36**) substantially providing a common resonant mode having a second operational frequency band and the first conductive part (**34**) substantially providing a differential resonant mode having a third operational frequency band.



US 20120198689A1

(19) **United States**

(12) **Patent Application Publication**

Schlub et al.

(10) **Pub. No.: US 2012/0198689 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **ANTENNAS WITH TUNING STRUCTURE FOR HANDHELD DEVICES**

(76) Inventors: **Robert W. Schlub**, Campbell, CA (US); **Dean F. Darnell**, Santa Clara, CA (US); **Robert J. Hill**, Salinas, CA (US); **Teodor Dabov**, Mountain View, CA (US); **Hui Leng Lim**, San Jose, CA (US)

(21) Appl. No.: **13/447,200**

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

Related U.S. Application Data

(62) Division of application No. 12/205,829, filed on Sep. 5, 2008, now Pat. No. 8,169,373.

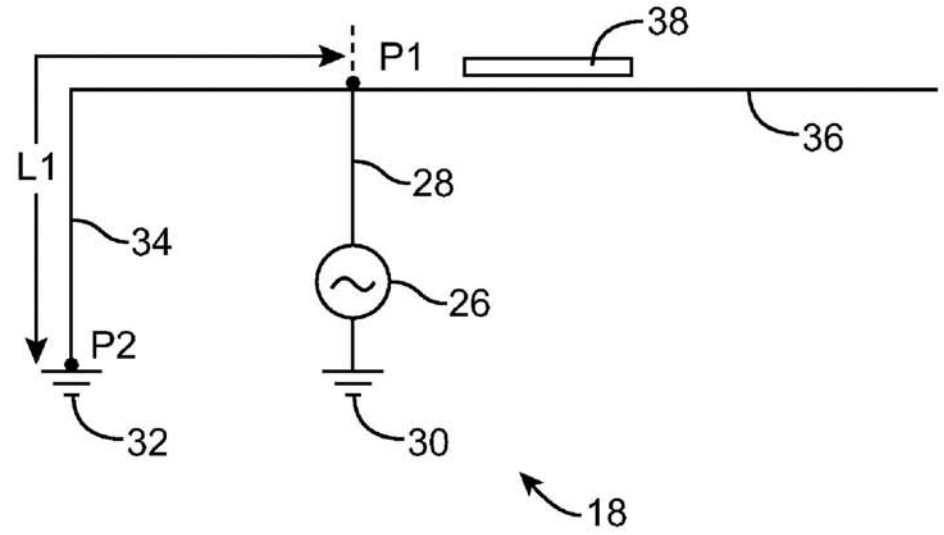
Publication Classification

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

(52) **U.S. Cl.** **29/600**

(57) **ABSTRACT**

Handheld electronic devices are provided that contain wireless communications circuitry. The wireless communications circuitry may include antenna structures. To accommodate manufacturing variations, the antenna structures and handheld electronic devices may be characterized by performing measurements such as antenna performance measurements. Appropriate antenna adjustments may be made during manufacturing of a handheld electronic device based on the characterizing measurements. An antenna may be formed using an inverted-F design in which an antenna flex circuit is mounted to a dielectric antenna support structure. Cavities in the support may be selectively filled with dielectric material and dielectric patches may be added to the antenna flex circuit to adjust the dielectric loading of the antenna. The length of a ground return path in the antenna may be adjusted by appropriate positioning of an electrical connector within the ground return path.



US 20120200167A1

(19) **United States**

(12) **Patent Application Publication**

Orihara et al.

(10) **Pub. No.: US 2012/0200167 A1**

(43) **Pub. Date: Aug. 9, 2012**

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

(75) Inventors: **Katsuhisa Orihara**, Tokyo (JP); **Satoru Sugita**, Tokyo (JP); **Norio Saito**, Tokyo (JP); **Masayoshi Kanno**, Tokyo (JP)

(73) Assignee: **Sony Chemical & Information Device Corporation**, Tokyo (JP)

(21) Appl. No.: **13/361,435**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2010/062618, filed on Jul. 27, 2010.

(30) **Foreign Application Priority Data**

Jul. 28, 2009 (JP) 2009-175751

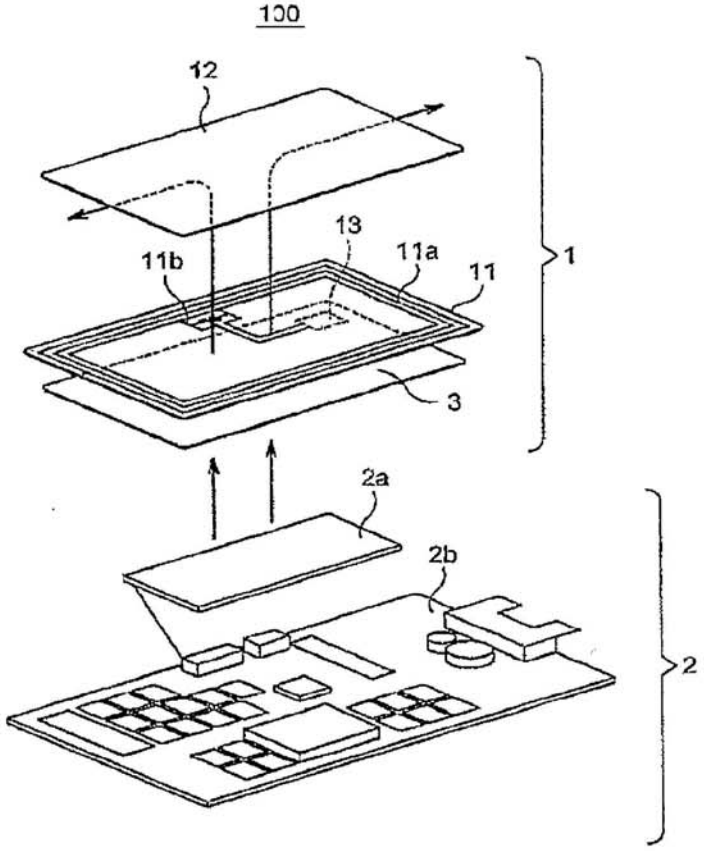
Publication Classification

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

(52) **U.S. Cl.** **307/104**

(57) **ABSTRACT**

An antenna device that is able to maintain the resonance frequency approximately constant despite changes in temperature to provide for stabilized communication is provided. The antenna device includes an antenna coil that receives a magnetic field transmitted from a reader/writer and a capacitor. The antenna device also includes a magnetic sheet formed at a face-to-face position with respect to the antenna coil and configured for changing the inductance of the antenna coil. The capacitor has a temperature characteristic in which the capacitance of the capacitor is changed with changes in temperature. The magnetic sheet is formed of a magnetic material having a temperature characteristic in which the inductance of the antenna coil is made to be changed with an opposite sign of change to that of the capacitance of the capacitor that is changed with changes in temperature in the working temperature range.



US 20120200294A1

(19) **United States**

(12) **Patent Application Publication**

Lazar

(10) **Pub. No.: US 2012/0200294 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **MAGNETIC RESONANCE ANTENNA ARRANGEMENT**

(76) Inventor: **Razvan Lazar**, Erlangen (DE)

(21) Appl. No.: **13/197,636**

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

(30) **Foreign Application Priority Data**

Aug. 4, 2010 (DE) ..... DE 102010033330.1

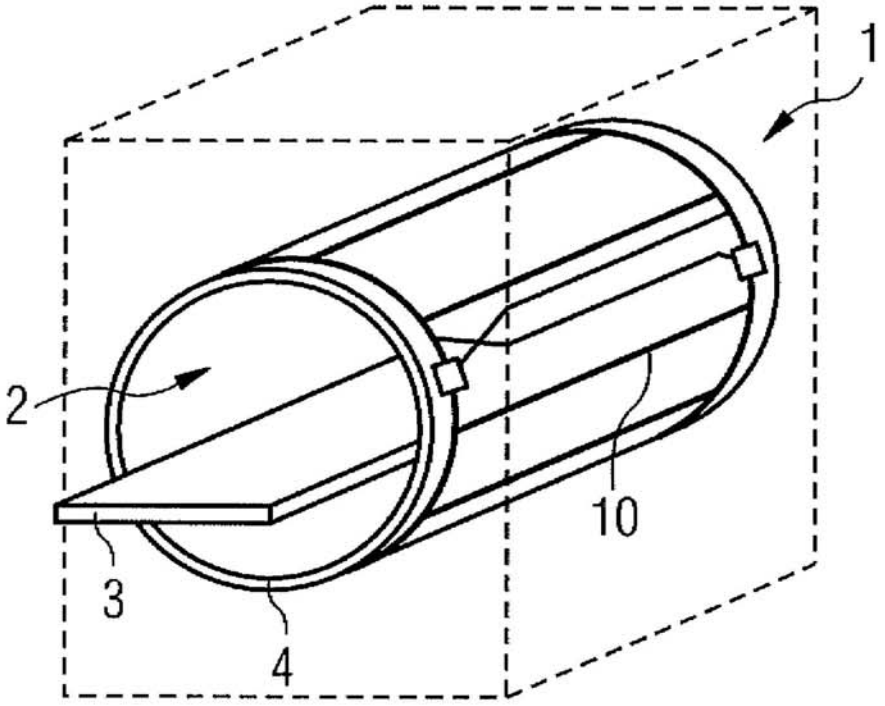
Publication Classification

(51) **Int. Cl.**
G01R 33/36 (2006.01)
G01R 33/34 (2006.01)

(52) **U.S. Cl.** **324/318**

(57) **ABSTRACT**

A magnetic resonance antenna arrangement having a plurality of antenna elements disposed around a measurement chamber and a plurality of switching elements is provided. The antenna elements and the switching elements are disposed and interconnected such that in a first switching configuration of the switching elements, the antenna elements form a first antenna architecture, and in a second switching configuration of the switching elements, the antenna elements form a second antenna architecture.



US 20120200461A1

(19) **United States**

(12) **Patent Application Publication**

Lee

(10) **Pub. No.: US 2012/0200461 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **DUAL BAND ANTENNA**

(75) Inventor: **Sunggyoo Lee**, Machida-shi (JP)

(73) Assignee: **LENOVO (SINGAPORE) PTE. LTD.**, Singapore (SG)

(21) Appl. No.: **13/367,625**

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

(30) **Foreign Application Priority Data**

Feb. 8, 2011 (JP) 2011-024597

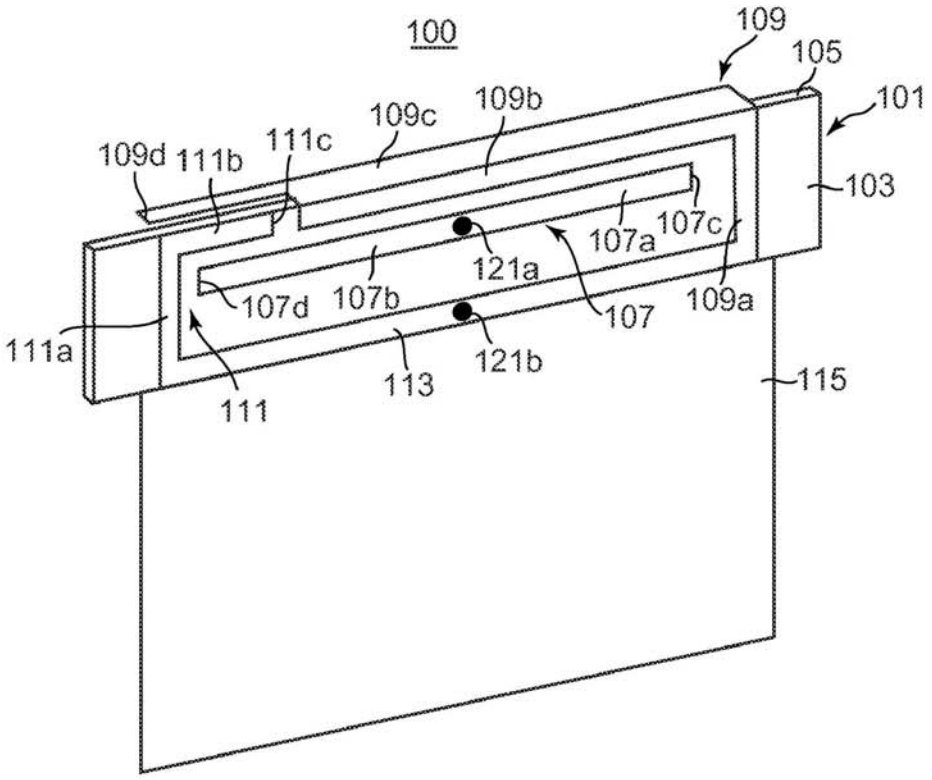
Publication Classification

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

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

(57) **ABSTRACT**

There is provided an apparatus comprising: a first radiation element having a horizontal pattern extending in parallel with a ground element and having a first open end; a second radiation element having a horizontal pattern extending in parallel with the ground element and having a second open end; wherein each of said first radiation element and second radiation element connects to the ground element; wherein said second open end of the second radiation element occupies an area surrounded by a horizontal pattern of the first radiation element and the ground element; and a driven element including a first excitation pattern extending along the horizontal pattern of the first radiation element and a second excitation pattern extending along the horizontal pattern of the second radiation element. Other embodiments are disclosed.



US 20120200462A1

(19) **United States**

(12) **Patent Application Publication**

Rao et al.

(10) **Pub. No.: US 2012/0200462 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **MULTIPLE INPUT, MULTIPLE OUTPUT ANTENNA FOR HANDHELD COMMUNICATION DEVICES**

(75) Inventors: **Qinjiang Rao**, Waterloo (CA); **Dong Wang**, Waterloo (CA)

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

(21) Appl. No.: **13/447,418**

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

Related U.S. Application Data

(63) Continuation of application No. 12/364,932, filed on Feb. 3, 2009, now Pat. No. 8,179,324.

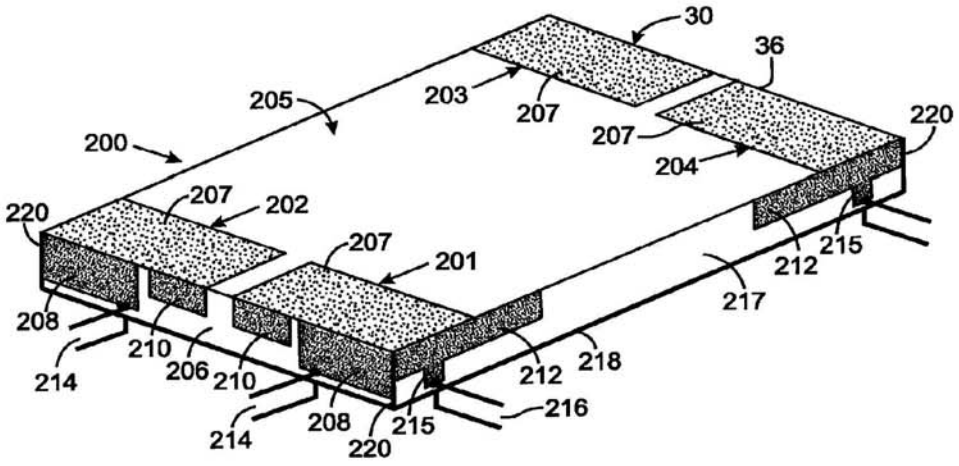
Publication Classification

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

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

(57) **ABSTRACT**

An antenna assembly for a mobile wireless communication device has a support with a first surface and a second surface between which a third surface and a fourth surface extend. A conductive ground plane is formed on the second surface. An antenna includes an electrically conductive patch located on the first surface, and first and second electrically conductive legs and an electrically conductive stripe all abutting the patch. In one version the first and second legs and the strip are all on the third surface. In another version the first and second legs are on the third surface and the strip is on the fourth surface that is orthogonal to the third surface. A first signal port is adapted to apply a first signal to the first leg and a second signal port is adapted to apply a second signal to the third leg.



US 20120200463A1

(19) **United States**

(12) **Patent Application Publication**

Kim et al.

(10) **Pub. No.: US 2012/0200463 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **BROADBAND BUILT-IN ANTENNA USING A DOUBLE ELECTROMAGNETIC COUPLING**

(75) Inventors: **Byoung-Nam Kim**, Gyeonggi-do (KR); **Jong-Ho Jung**, Gyeonggi-do (KR); **Seung-Cheol Lee**, Incheon-si (KR)

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

(21) Appl. No.: **13/501,859**

(22) PCT Filed: **Oct. 13, 2010**

(86) PCT No.: **PCT/KR10/07010**

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

(30) **Foreign Application Priority Data**

Oct. 13, 2009 (KR) 10-2009-0097275
Feb. 10, 2010 (KR) 10-2010-0012529

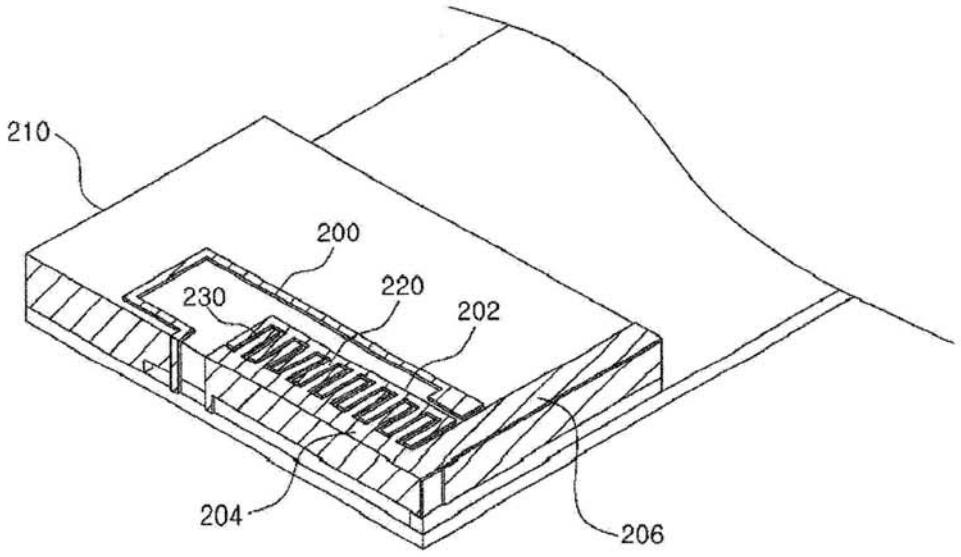
Publication Classification

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

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

(57) **ABSTRACT**

A broadband internal antenna using double electromagnetic coupling is disclosed. The disclosed antenna may include: a first conducting member electrically connected to a feeding point; a second conducting member placed at a designated distance from at least a portion of the first conducting member so as to allow a first electromagnetic coupling with at least a portion of the first conducting member, and remaining in a floating state without being coupled to a ground and the feeding point; a third conducting member placed at a designated distance from the second conducting member so as to allow a second electromagnetic coupling with the second conducting member, and electrically connected to the ground; and a fourth conducting member extending from the third conducting member, for radiating RF signals. The disclosed antenna has the advantage of providing broadband characteristics within a limited size.



US 20120200464A1

(19) **United States**

(12) **Patent Application Publication**

Nielsen et al.

(10) **Pub. No.: US 2012/0200464 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **APPARATUS, METHODS AND COMPUTER PROGRAMS FOR WIRELESS COMMUNICATION**

(75) Inventors: **Bjarne Nielsen**, Copenhagen (DK); **Richard Breiter**, Fredriksberg (DK); **Jens Troelsen**, Copenhagen (DK); **Alexandre Pinto**, KBHS (DK)

(73) Assignee: **Nokia Corporation**

(21) Appl. No.: **13/449,814**

(22) Filed: **Apr. 18, 2012**

Related U.S. Application Data

(63) Continuation of application No. 12/157,549, filed on Jun. 10, 2008, which is a continuation-in-part of application No. 12/004,744, filed on Dec. 21, 2007, now Pat. No. 7,876,273.

Publication Classification

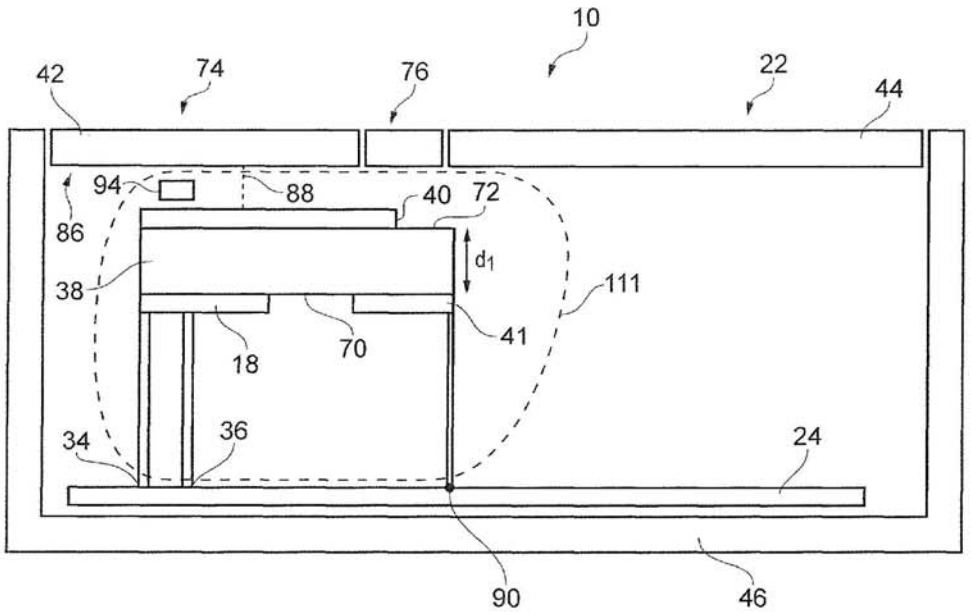
(51) **Int. Cl.**

H01Q 1/24	(2006.01)
H01Q 9/04	(2006.01)
H01Q 1/50	(2006.01)

(52) **U.S. Cl.** ..... **343/702**; 343/860; 343/700 MS

(57) **ABSTRACT**

An apparatus including a cover defining an exterior surface of the apparatus and including a first conductive cover portion; an antenna, connected to a feed point and configured to operate in at least a first resonant frequency band; a first conductive member; a second conductive member; and wherein the first and second conductive members are configured to couple with the first conductive cover portion, the combination of the first and second conductive members and the first conductive cover portion are operable in a second resonant frequency band, different to the first resonant frequency band and are configured to be contactlessly fed by the antenna.



US 20120201414A1

(19) **United States**

(12) **Patent Application Publication**

MOON et al.

(10) **Pub. No.: US 2012/0201414 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **SLIM-TYPE PORTABLE DEVICE**

(75) Inventors: **Jung-Nam MOON**, Incheon (KR); **Sang-In BAEK**, Gyeonggi-do (KR)

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

(21) Appl. No.: **13/367,627**

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

(30) **Foreign Application Priority Data**

Feb. 8, 2011 (KR) 10-2011-0011270
Apr. 11, 2011 (KR) 10-2011-0033215

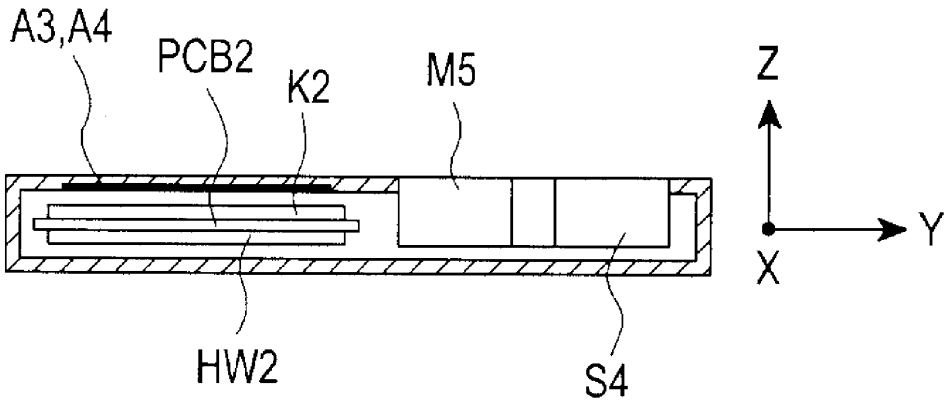
Publication Classification

(51) **Int. Cl.**
H04R 1/02 (2006.01)
H05K 7/02 (2006.01)

(52) **U.S. Cl.** **381/387**; 361/748

(57) **ABSTRACT**

A slim portable device is provided in which a main body includes a main Printed Circuit Board (PCB), an information Input/Output (I/O) device disposed on the main PCB in parallel relation with the main PCB, an antenna disposed along a partial frontal periphery of the information I/O device, and at least one battery disposed substantially co-planar with the main PCB.



US 20120202560A1

(19) **United States**

(12) **Patent Application Publication**

Donaldson

(10) **Pub. No.: US 2012/0202560 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **ANTENNA OPTIMIZATION DEPENDENT ON USER CONTEXT**

(75) Inventor: **Thomas A. Donaldson**, London (GB)

(73) Assignee: **AliphCom**, San Francisco, CA (US)

(21) Appl. No.: **13/364,781**

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

Related U.S. Application Data

(60) Provisional application No. 61/439,742, filed on Feb. 4, 2011.

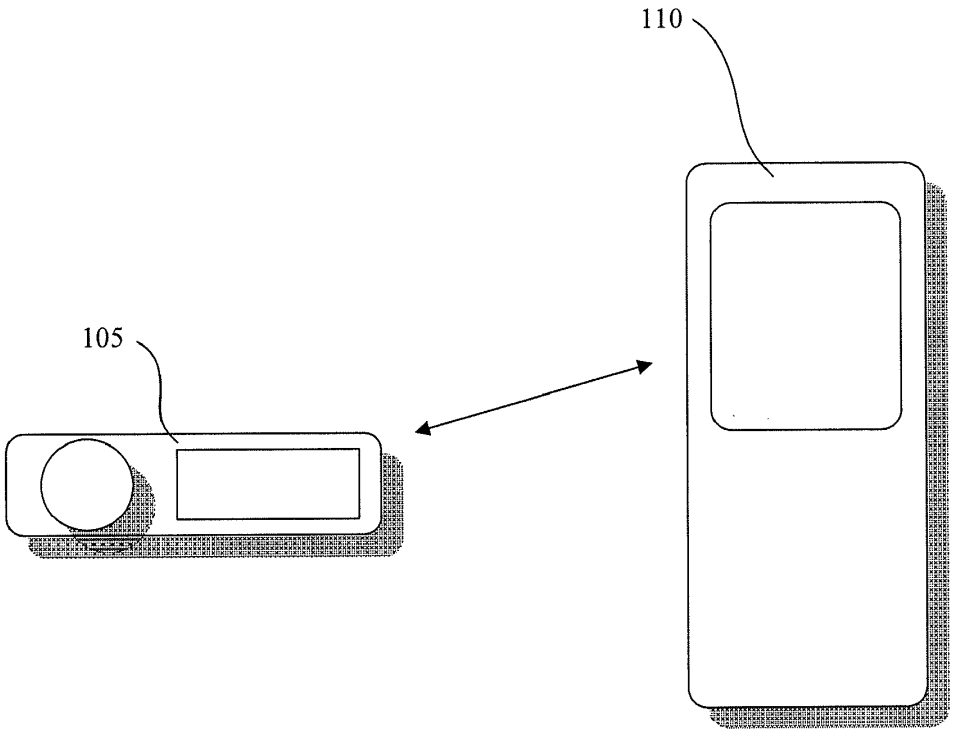
Publication Classification

(51) **Int. Cl.**
H04W 88/04 (2009.01)
H04M 1/00 (2006.01)

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

(57) **ABSTRACT**

Systems, apparatuses, devices, and methods for wireless communications are disclosed. A detection system is used to detect a usage mode or orientation of a wireless communication device. The usage mode or orientation is used to vary the radiation pattern of the antenna of the wireless communication device. By varying the radiation pattern based on the usage mode or orientation, battery life and the quality of transmission and reception can be increased, while the size and cost of the device can be reduced. Embodiments of the invention may be used in numerous applications, such as mobile phones, PDA's, and laptops.



US 20120202564A1

(19) **United States**

(12) **Patent Application Publication**

WAGNER et al.

(10) **Pub. No.: US 2012/0202564 A1**

(43) **Pub. Date: Aug. 9, 2012**

(54) **WIRELESS COMMUNICATION SYSTEM INTEGRATED INTO A COMPUTER DISPLAY**

(75) Inventors: **Matthew J. WAGNER**, Houston, TX (US); **Robin T. CASTELL**, Spring, TX (US); **Timothy NEILL**, Houston, TX (US)

(73) Assignee: **HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.**, Houston, TX (US)

(21) Appl. No.: **13/448,114**

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

Related U.S. Application Data

(63) Continuation of application No. 10/034,224, filed on Dec. 28, 2001, now Pat. No. 8,185,147.

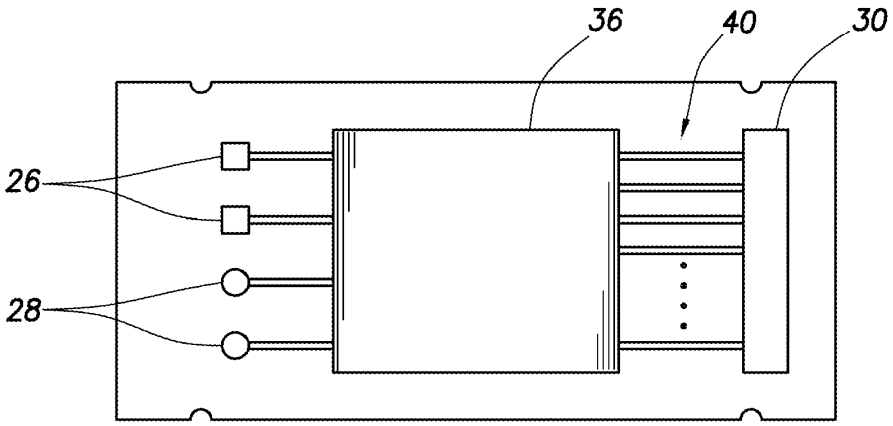
Publication Classification

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

(52) **U.S. Cl.** **455/556.1**

(57) **ABSTRACT**

An electronic device has a display in which the casing of the display includes a plurality of recessed cavities into which radio and antenna modules can be inserted to provide the electronic device with a wireless communication capability. The display can have cavities for one or more radios and one or more antenna modules. A radio electrically connects to one or more antenna modules via conductor(s) contained within the display and connects to the host electronic device via a serial bus (e.g., USB). Accordingly, the display can have a plurality of radio/antenna combinations thereby concurrently providing the electronic device with multiple wireless communication capabilities.



US 20120204414A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0204414 A1

(43) Pub. Date: Aug. 16, 2012

Orihara et al.

(54) METHOD FOR PRODUCING ANTENNA DEVICE

(75) Inventors: **Katsuhisa Orihara**, Tokyo (JP); **Satoru Sugita**, Toyko (JP); **Norio Saito**, Tokyo (JP); **Masayoshi Kanno**, Tokyo (JP)

(73) Assignee: **Sony Chemical & Information Device Corporation**, Tokyo (JP)

(21) Appl. No.: **13/361,392**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2010/062617, filed on Jul. 27, 2010.

(30) **Foreign Application Priority Data**

Jul. 28, 2009 (JP) 2009-175750

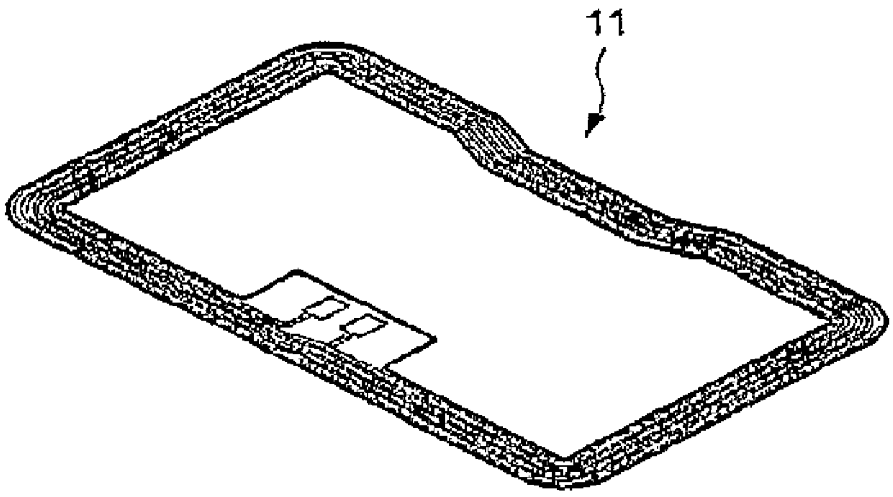
Publication Classification

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

(52) **U.S. Cl.** **29/593**; 29/600

(57) **ABSTRACT**

A method for manufacturing an antenna device is provided. The manufacturing method includes forming an antenna circuit so that the resonance frequency of the antenna circuit will be lower than an oscillation frequency of the reader/writer and affixing a magnetic sheet to an antenna coil via an adhesive. The antenna circuit includes the antenna coil that receives the magnetic field transmitted from the reader/writer and a capacitor electrically connected to the antenna coil. The magnetic sheet is at a face-to-face position with respect to the antenna coil and is configured to change the inductance of the antenna coil. The adhesive is of a film thickness to change the inductance so that the resonance frequency of the resonance circuit will be coincident with the oscillation frequency depending on the spacing between the antenna coil and the magnetic sheet.



US 20120206239A1

(19) **United States**

(12) **Patent Application Publication**

IKEMOTO

(10) **Pub. No.: US 2012/0206239 A1**

(43) **Pub. Date: Aug. 16, 2012**

(54) **RFID SYSTEM**

(75) Inventor: **Nobuo IKEMOTO**, Nagaokakyo-shi (JP)

(73) Assignee: **MURATA MANUFACTURING CO., LTD.**, Nagaokakyo-shi (JP)

(21) Appl. No.: **13/457,525**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2011/055344, filed on Mar. 8, 2011.

(30) **Foreign Application Priority Data**

Mar. 24, 2010 (JP) 2010-068247

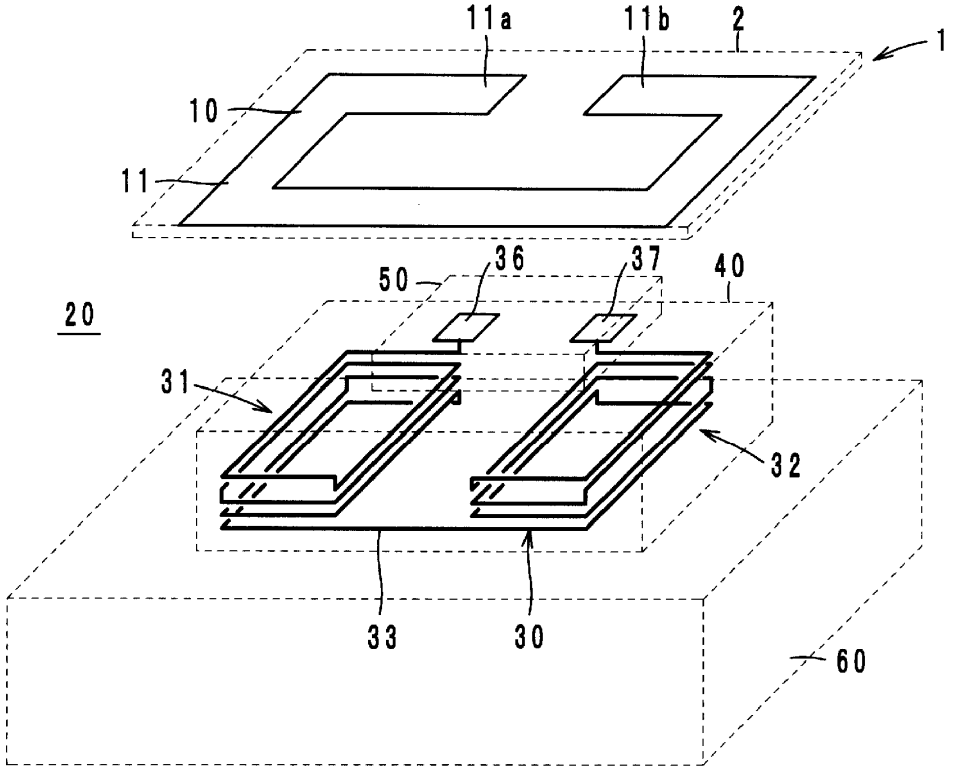
Publication Classification

(51) **Int. Cl.**
G06K 7/01 (2006.01)

(52) **U.S. Cl.** **340/10.1**

(57) **ABSTRACT**

An RFID system includes an antenna of a reader/writer and an antenna of an RFID tag. Transmission and reception of a high-frequency signal of a UHF band is performed between the antenna of the reader/writer and the antenna of the RFID tag that are arranged so as to be adjacent to each other. A loop antenna including a loop conductor is used as the antenna of the reader/writer, and coil antennas including a plurality of laminated coil conductors are used as the antenna of an RFID tag. In addition, the conductor width of the loop conductor in the loop antenna is greater than the conductor widths of the coil conductors in the coil antennas.



US 20120206301A1

(19) **United States**

(12) **Patent Application Publication**

Flores-Cuadras et al.

(10) **Pub. No.: US 2012/0206301 A1**

(43) **Pub. Date: Aug. 16, 2012**

(54) **MULTI-ANGLE ULTRA WIDEBAND ANTENNA WITH SURFACE MOUNT TECHNOLOGY METHODS OF ASSEMBLY AND KITS THEREFOR**

(75) Inventors: **Javier Ruben Flores-Cuadras**, Tijuana (MX); **Ronan Quinlan**, Taoyuan City (TW); **Dermot O'Shea**, La Jolla, CA (US)

(73) Assignee: **Taoglas Group Holdings**, La Jolla, CA (US)

(21) Appl. No.: **13/399,044**

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

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/566,199, filed on Sep. 24, 2009.

Publication Classification

(51) **Int. Cl.**

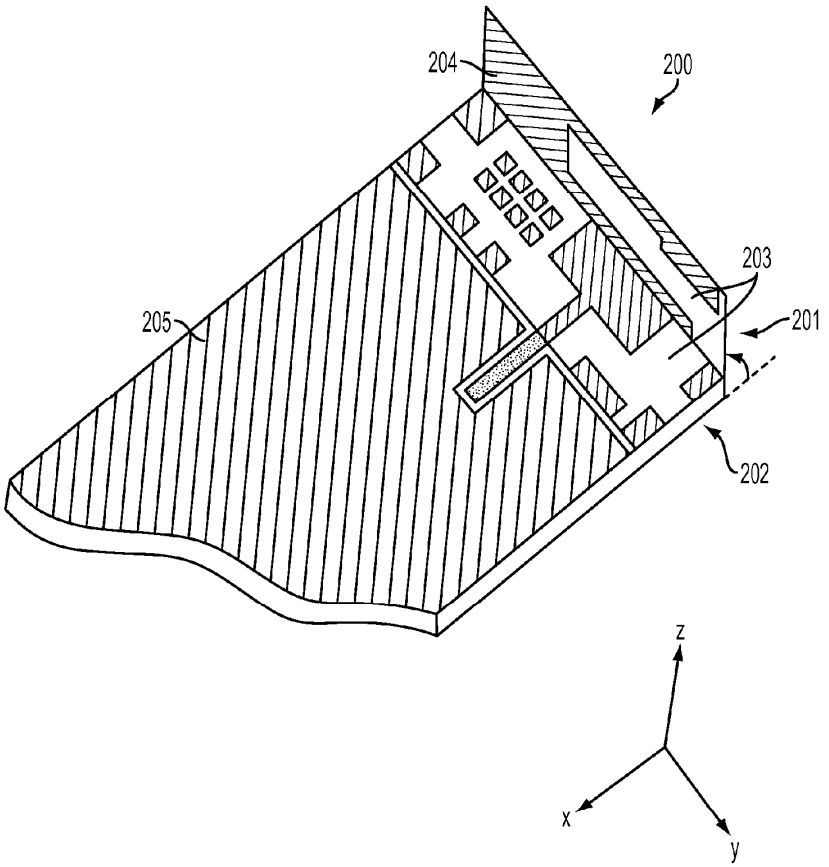
H01Q 1/38 (2006.01)

H01P 11/00 (2006.01)

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

(57) **ABSTRACT**

The disclosure provides a multi-angle flexible antenna for electronic device comprising an antenna expand having the radiated elements supported by a first substrate and expanding into a spatial geometry for transmission and reception of radio signal; and an antenna base having a plurality of first solder pads on a second substrate for physical attachment to the printed circuit board and a second solder pad electrically connected to a terminal of the radiated elements for connection to an antenna feed point of a radio circuitry on the printed circuit board; wherein the first and second substrates are joined at a bending line as a single substrate for the flexible antenna and the first substrate allowed to be bent relative to the plane of the second substrate for spatial deployment of the radiated elements.



US 20120206303A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0206303 A1

(43) Pub. Date: Aug. 16, 2012

Desclos et al.

(54) **ANTENNA SYSTEM COUPLED TO AN EXTERNAL DEVICE**

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

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

(21) Appl. No.: **13/295,979**

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

Related U.S. Application Data

(60) Provisional application No. 61/412,473, filed on Nov. 11, 2010.

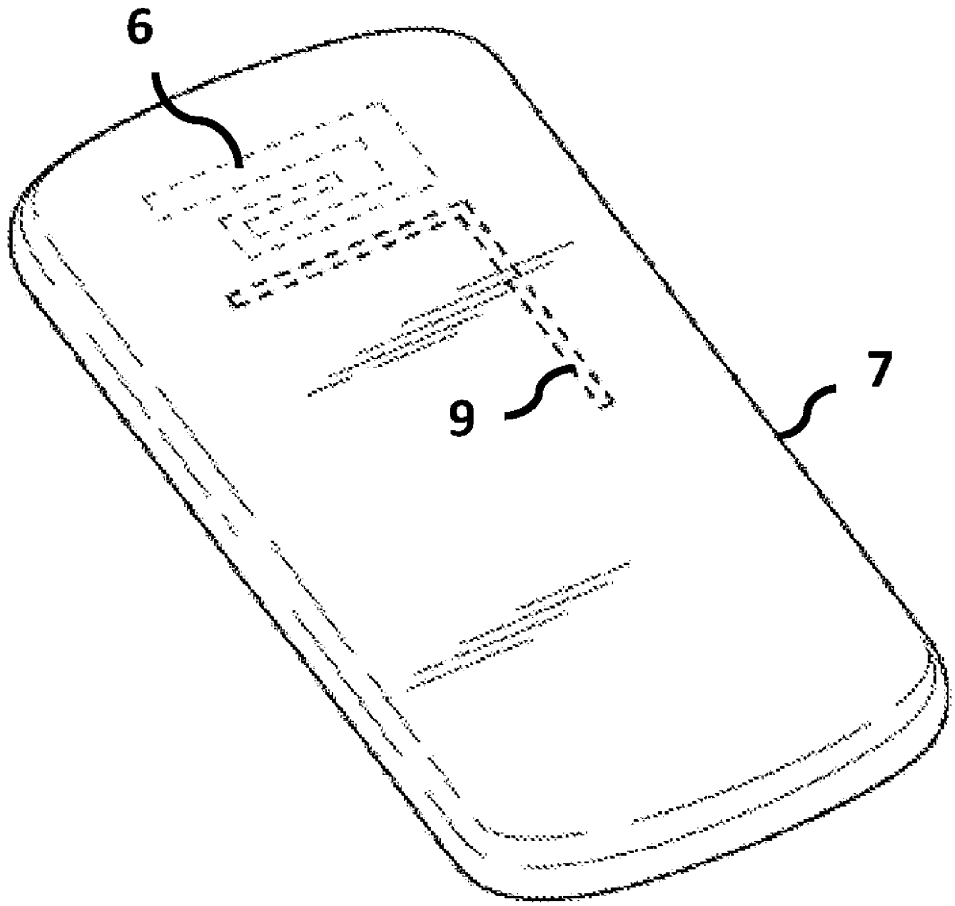
Publication Classification

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

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

(57) **ABSTRACT**

An antenna system is integrated into a cover or accessory and adapted to couple to an antenna in a host device to improve transmission and reception of signals. The antenna system can be passive or active, with the active antenna system designed to amplify coupled signals on the integrated antenna elements in the cover or accessory. Single or multiple frequency bands can be improved with the integrated antenna system, and multiple antennas in the host device can be coupled to and improved. The antenna system can couple to the existing antennas in the host device by capacitive coupling, i.e. no physical contact required, or a connector can be designed into the cover or accessory containing the integrated antenna system that makes contact to electrical ground of the host device or power supply signals or other control signals.



US 20120206307A1

(19) **United States**

(12) **Patent Application Publication**

Orihara et al.

(10) **Pub. No.: US 2012/0206307 A1**

(43) **Pub. Date: Aug. 16, 2012**

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

(75) Inventors: **Katsuhisa Orihara**, Tokyo (JP); **Satoru Sugita**, Tokyo (JP); **Norio Saito**, Tokyo (JP); **Masayoshi Kanno**, Tokyo (JP)

(73) Assignee: **Sony Chemical & Information Device Corporation**, Tokyo (JP)

(21) Appl. No.: **13/365,773**

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

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/361,435, filed on Jan. 30, 2012, which is a continuation of application No. PCT/JP2010/062618, filed on Jul. 27, 2010.

(30) **Foreign Application Priority Data**

Jul. 28, 2009 (JP) 2009-175751

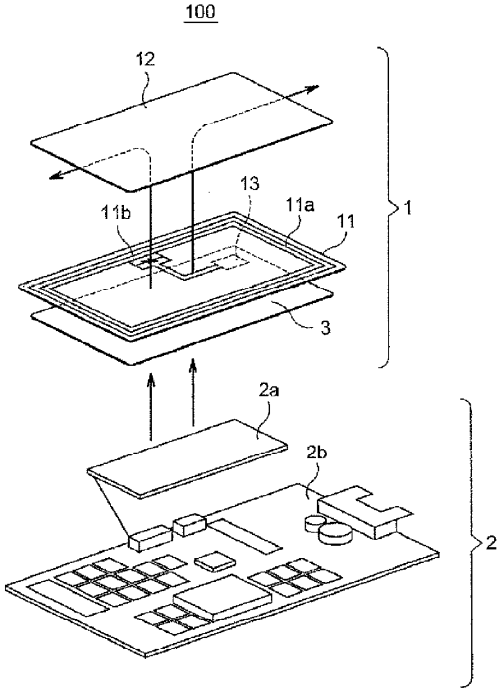
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device includes an antenna coil that receives a magnetic field transmitted from a reader/writer and a capacitor. The antenna device also includes a magnetic sheet formed at a face-to-face position with respect to the antenna coil and configured for changing the inductance of the antenna coil. The capacitor has a temperature characteristic in which the capacitance of the capacitor is changed with changes in temperature. The magnetic sheet is formed of a magnetic material having a temperature characteristic in which the inductance of the antenna coil is made to be changed with an opposite sign of change to that of the capacitance of the capacitor that is changed with changes in temperature in the working temperature range. In this manner, the resonance frequency of the antenna circuit in the working temperature range may be brought approximately into coincidence with the oscillation frequency of the reader/writer.



US 20120206315A1

(19) **United States**

(12) **Patent Application Publication**

Iwata et al.

(10) **Pub. No.: US 2012/0206315 A1**

(43) **Pub. Date: Aug. 16, 2012**

(54) **VEHICLE POLE ANTENNA**

(75) Inventors: **Toshihiro Iwata**, Tokyo (JP); **Yuya Fukasawa**, Tokyo (JP); **Toshiro Yokoyama**, Tokyo (JP)

(73) Assignee: **HARADA INDUSTRY CO., LTD**, Tokyo (JP)

(21) Appl. No.: **13/397,521**

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

(30) **Foreign Application Priority Data**

Feb. 15, 2011 (JP) 2011-029508

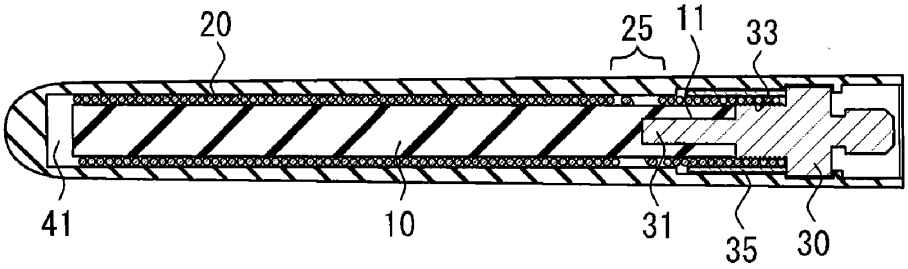
Publication Classification

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

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

(57) **ABSTRACT**

A vehicle pole antenna fixed to an antenna support base includes: a rod **10**, a helical antenna element **20**, a joint **30**, and a mast cover **40**. The rod **10** has flexibility and insulation property and has a concave portion **11** at its base end surface. The helical antenna element **20** has a coated wire wound around the rod **10**. A winding density of the helical antenna element **10** adjacent to a bending start point of the rod is lower than that at the other portions. The joint **30** has a convex portion **31** to be fitted to the concave portion **11** formed at the base end surface of the rod **10**. The joint **30** is electrically connected with the helical antenna element **20** and connected to the antenna support base.



US 20120208459A1

(19) **United States**

(12) **Patent Application Publication**

Burtt

(10) **Pub. No.: US 2012/0208459 A1**

(43) **Pub. Date: Aug. 16, 2012**

(54) **NEAR FIELD COMMUNICATION DEVICE**

(75) Inventor: **Andrew Burtt**, Rodhill (GB)

(73) Assignee: **NXP B.V.**, Eindhoven (NL)

(21) Appl. No.: **13/358,419**

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

(30) **Foreign Application Priority Data**

Feb. 16, 2011 (EP) 11154629.7

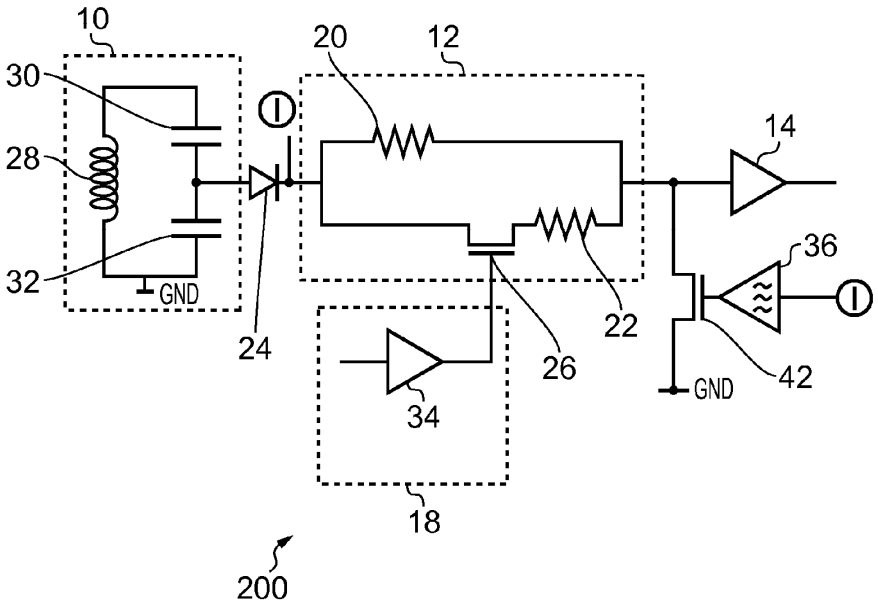
Publication Classification

(51) **Int. Cl.**
H04B 5/00 (2006.01)

(52) **U.S. Cl.** **455/41.1**

(57) **ABSTRACT**

Near field communication (NFC) devices may be required to operate at low power and so process small signals which are more susceptible to corruption by noise. An NFC device **100** is described having an antenna **10** which can be adapted to receive signal from a further NFC device. When a signal is received by the antenna, an input voltage is generated. A variable resistance element **12** is connected in series between the antenna **10** and an amplifier **14**, which is adapted to increase the input resistance with increasing input voltage. By increasing the resistance when the input voltage is increased, the current drawn from the coil is reduced. This results in a lower overall power consumption of the device while maintaining reliable performance, because the higher input signal level is less susceptible to corruption by the noise generated by the variable resistance element **12**, and the amplifier **14**.



US 20120208606A1

(19) **United States**

(12) **Patent Application Publication**

KUBO et al.

(10) **Pub. No.: US 2012/0208606 A1**

(43) **Pub. Date: Aug. 16, 2012**

(54) **ANTENNA AND MOBILE TERMINAL**

(75) Inventors: **Hiroyuki KUBO**, Nagaokakyo-shi (JP); **Hiromitsu ITO**, Nagaokakyo-shi (JP); **Kuniaki YOSUI**, Nagaokakyo-shi (JP)

(73) Assignee: **MURATA MANUFACTURING CO., LTD.**, Nagaokakyo-shi (JP)

(21) Appl. No.: **13/452,972**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2010/070767, filed on Nov. 22, 2010.

(30) **Foreign Application Priority Data**

Dec. 24, 2009 (JP) 2009-291873

Publication Classification

(51) **Int. Cl.**
H04W 88/02 (2009.01)
H01F 38/14 (2006.01)

(52) **U.S. Cl.** **455/575.7**; 336/119

(57) **ABSTRACT**

An antenna that suppresses deterioration of communication performance depending on an angle with respect to a reading surface of a reader/writer includes a rectangular spiral coil conductor provided on a flexible substrate. The flexible substrate includes an aperture in a winding center portion of the coil conductor. A magnetic sheet penetrates the aperture of the flexible substrate. An antenna coil is provided near an end of a circuit board. A first conductor portion and a second conductor portion of the coil conductor are provided at positions opposing each other across the aperture. A portion of the magnetic sheet close to the second conductor portion is bent in a direction to get close to the circuit board.