US 20070075902A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0075902 A1

Tai et al. (43) Pub. Date: Apr. 5, 2007

(54) INVERTED-F ANTENNA AND METHOD OF MODULATING IMPEDANCE OF THE SAME

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(21) Appl. No.: **11/487,867**

(22) Filed: **Jul. 17, 2006**

(30) **Foreign Application Priority Data**

Jul. 15, 2005 (TW)..... 94124101

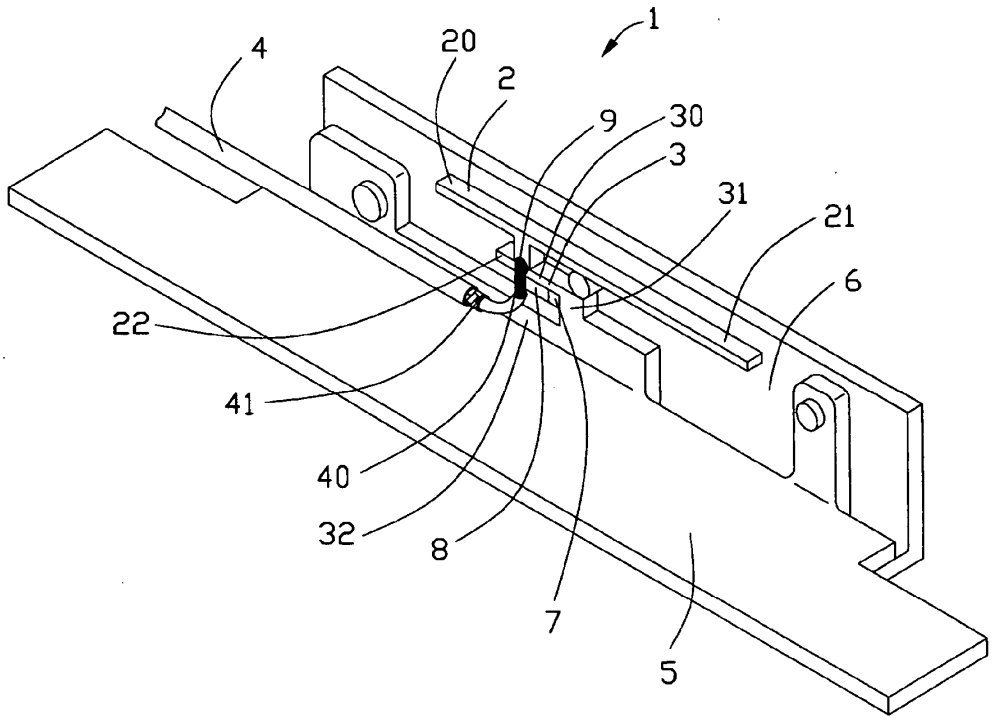
Publication Classification

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

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

(57) **ABSTRACT**

An inverted-F antenna (**1**) used in a portable electrical device formed in a metal patch and includes a radiating element (**2**), a grounding element (**5**), and an impedance matching element (**3**) with an impedance matching space (**8**). The impedance matching element (**3**) connects the radiating element (**2**) and the grounding element (**5**). A metal foil (**7**) locates in the impedance matching space and connects to the impedance matching element (**3**) for modulating impedance matching of the inverted-F antenna. A feeding line (**4**) includes an inner conductor (**40**) soldered with the impedance element (**3**) and a braiding layer (**41**) soldered with the grounding element (**5**).



US 20070075903A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0075903 A1

Matsugatani et al. (43) Pub. Date: Apr. 5, 2007

(54) ANTENNA, RADIO DEVICE, METHOD OF DESIGNING ANTENNA, AND NETHOD OF MEASURING OPERATING FREQUENCY OF ANTENNA

(75) Inventors: **Kazuoki Matsugatani**, Kariya-city (JP); **Makoto Tanaka**, Obu-city (JP); **Dowon Kim**, Seoul (KR); **Moonil Kim**, Seoul (KR)

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(21) Appl. No.: **11/528,614**

(22) Filed: **Sep. 28, 2006**

(30) **Foreign Application Priority Data**

Oct. 3, 2005 (JP) 2005-290312

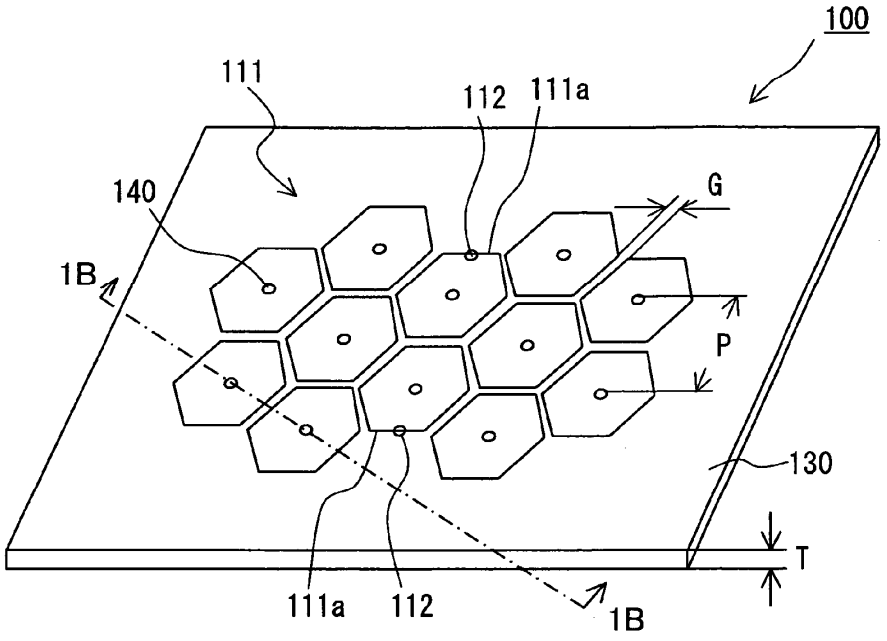
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 15/24 (2006.01)

(52) **U.S. Cl.** ..... **343/700 MS**; 343/909

(57) **ABSTRACT**

An antenna comprises a first conductive layer, a second conductive layer and an LC resonance circuit. The first conductive layer has plural elements and is disposed adjacently to each other. The second conductive layer is disposed at a predetermined distance from the first conductive layer via a dielectric substrate. The LC resonance circuit comprises connection for electrically connecting the elements and the second conductive layer. The LC resonance circuit takes a resonance state in which impedance becomes high in the operating frequency of the antenna. Of the plural elements, a power feeding section is provided in each of any two adjacent elements. Power is fed to the power feeding sections during transmission so that signals of the operating frequency are opposite in phase, and signals of the operating frequency inputted to the antenna are outputted in opposite phase from the power feeding sections during reception.



US 20070075906A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0075906 A1

Forster et al. (43) Pub. Date: Apr. 5, 2007

(54) MULTIPLE FEED POINT SLOT ANTENNA

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(21) Appl. No.: **11/469,360**

(22) Filed: **Aug. 31, 2006**

Related U.S. Application Data

(63) Continuation of application No. 11/318,339, filed on Dec. 23, 2005, which is a continuation of application No. 10/356,815, filed on Feb. 3, 2003, which is a continuation-in-part of application No. 10/228,180, filed on Aug. 26, 2002, now Pat. No. 6,903,704. Said application No. 11/318,339 is a continuation of application No. 10/125,783, filed on Apr. 18, 2002, now Pat. No. 6,985,119, which is a continuation-in-part of application No. 09/536,334, filed on Mar. 25, 2000, now Pat. No. 6,628,237.

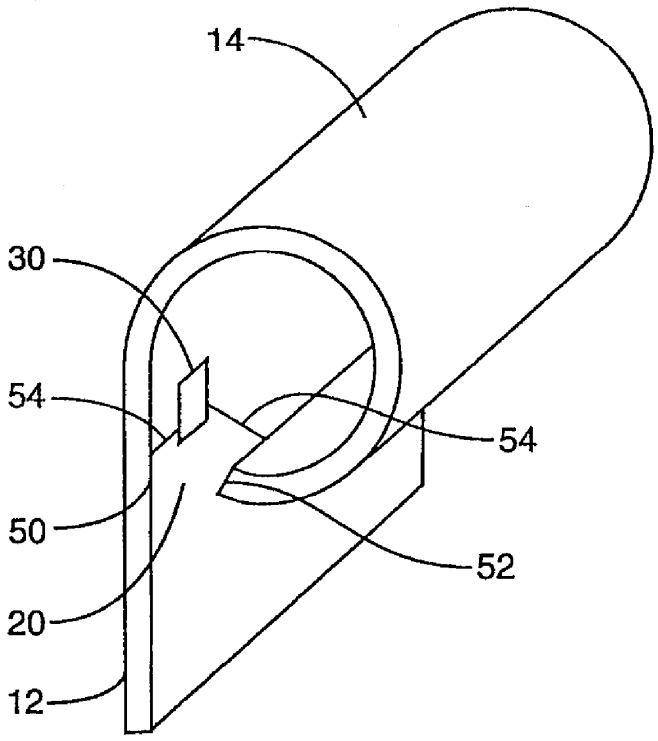
Publication Classification

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

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

(57) **ABSTRACT**

A wireless communication device and method for identifying a container, or communication information about a container using a slot in the container as an antenna. The device includes a wireless communication device for transmitting information regarding the container. The container includes an outer wall forming rim and a slot between the rim edge and the outer wall that is circular and continues without boundaries. The wireless communication device is coupled to the slot to provide the slot antenna for communications. An impedance matching network is additionally provided to make the operating frequency of the slot substantially the same as the operating frequency of the wireless communication device. Alternatively, shorting posts may be placed in the slot to define boundaries of the slot to match the operating frequency of the slot to the operating frequency of the antenna. Multiple feed points may be provided between the wireless communication device and the slot.



US 20070077973A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0077973 A1

Wu et al. (43) Pub. Date: Apr. 5, 2007

(54) ELECTRONIC DEVICE WITH HIGH EFFICIENCY AND WIDE BANDWIDTH INTERNAL ANTENNA

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(21) Appl. No.: **11/498,088**

(22) Filed: **Aug. 3, 2006**

(30) **Foreign Application Priority Data**

Oct. 4, 2005 (TW)..... 094134649

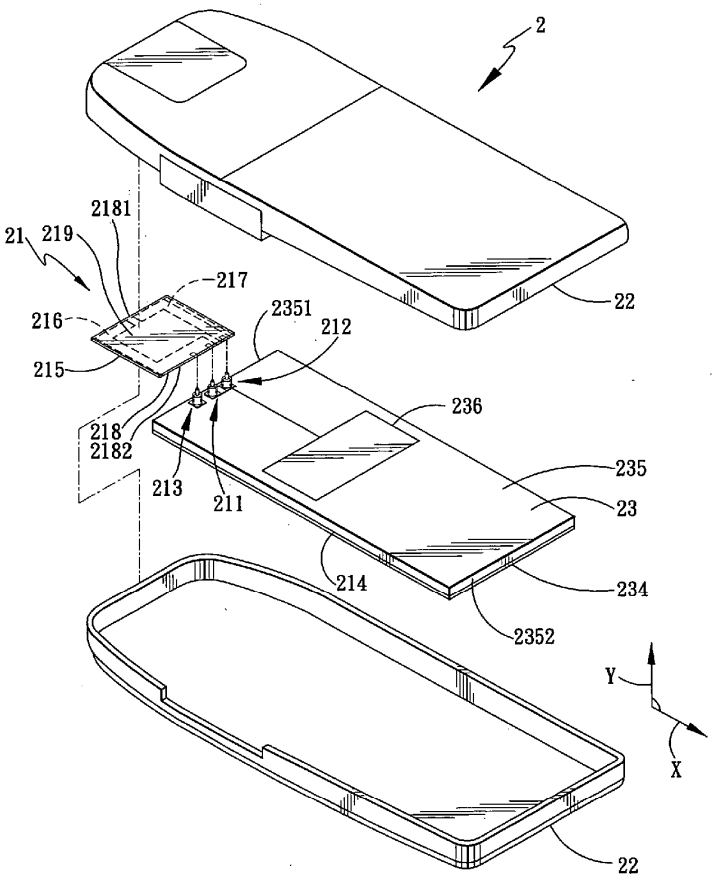
Publication Classification

(51) **Int. Cl.**
H04M 1/00 (2006.01)

(52) **U.S. Cl.** **455/575.7**

(57) **ABSTRACT**

An electronic device includes a circuit board and an antenna. The circuit board has opposite first and second edges. The antenna includes a grounding element, a substrate, feeding and grounding ports, and first and second radiating elements. The grounding element is formed on the circuit board. The substrate has opposite first and second edges that are respectively distal from and proximate to the first edge of the circuit board. The feeding and grounding ports are provided along the first edge of the circuit board. The first radiating element has a first feeding point and a grounding point that are disposed along the second edge of the substrate and that are connected respectively to the first feeding port and the grounding port. The second radiating element has a second feeding point that is disposed on the second edge of the substrate and that is connected to the second feeding port.



US 20070080233A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0080233 A1**

Forster et al. (43) **Pub. Date: Apr. 12, 2007**

(54) **RFID TAG USING A SURFACE INSENSITIVE ANTENNA STRUCTURE**

(76) Inventors: **Ian J. Forster**, Chelmsford (GB); **Adrian N. Farr**, Dunmow (GB); **Norman A. Howard**, Ilford (GB); **Andrew W. Holman**, West Hills, CA (US)

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(21) Appl. No.: **11/636,091**

(22) Filed: **Dec. 8, 2006**

Related U.S. Application Data

(60) Division of application No. 11/245,152, filed on Oct. 6, 2005, which is a continuation of application No. PCT/US04/11218, filed on Apr. 12, 2004, and which is a continuation-in-part of application No. 10/410,252, filed on Apr. 10, 2003, now Pat. No. 6,914,562.

(60) Provisional application No. 60/517,156, filed on Nov. 4, 2003.

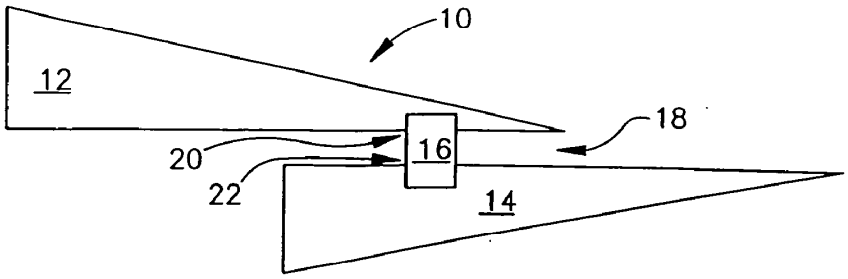
Publication Classification

(51) **Int. Cl.**
G06K 19/06 (2006.01)
G08B 13/14 (2006.01)

(52) **U.S. Cl.** **235/492**; 340/572.8

(57) **ABSTRACT**

An RFID device includes conductive tabs, and a conductive structure, with a dielectric layer between the conductive tabs and the conductive structure. The conductive structure overlaps the conductive tabs and acts as a shield, allowing the device to be at least somewhat insensitive to the surface upon which it is mounted, or to the presence of nearby objects, such as goods in a carton or other container that includes the device. The dielectric layer may be a portion of the container, such as an overlapped portion of the container. Alternatively, the dielectric layer may be a separate layer, which may vary in thickness, allowing one of the conductive tabs to be capacitively coupled to the conductive structure. As another alternative, the dielectric layer may be an expandable substrate that may be expanded after fabrication operations, such as printing.



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080864 A1

Channabasappa (43) Pub. Date: Apr. 12, 2007

(54) **BROADBAND PROXIMITY-COUPLED CAVITY BACKED PATCH ANTENNA**

(75) Inventor: **Eswarappa Channabasappa**, Acton, MA (US)

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(73) Assignee: **M/A-Com, Inc.**, Lowell, MA

(21) Appl. No.: **11/247,540**

(22) Filed: **Oct. 11, 2005**

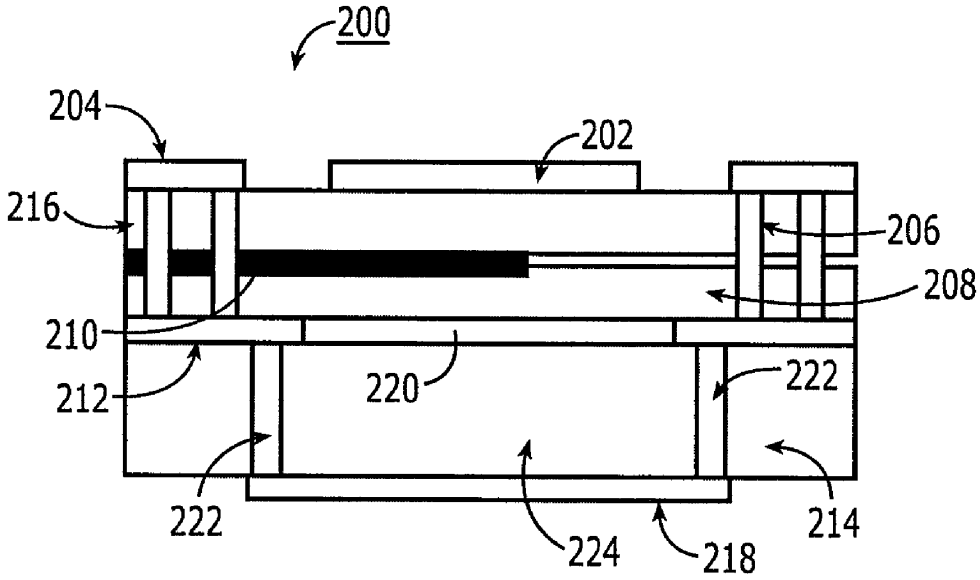
Publication Classification

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

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

(57) **ABSTRACT**

A patch antenna in accordance with the present invention comprises a patch optionally surrounded by a top ground plane, a feed line disposed beneath the patch and separated therefrom by a thin substrate, a middle ground plane separated from the feed line by another thin substrate, and a bottom ground plane disposed beneath the middle ground plane and preferably separated therefrom by foam or another lightweight dielectric layer. Conductive vias run between the top ground plane and the middle ground plane as well as from the middle ground plane to the bottom ground plane. The middle ground plane is essentially annular, defining an opening in the middle thereof, such that there is a dielectric cavity beneath the patch and the feed line in the space defined by the bottom ground plane, the middle ground plane and the vias that run between the middle ground plane and the bottom ground plane. This cavity can be filled with low cost, low weight foam, rather than the heavier, more costly conventional substrates.



US 20070080866A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080866 A1

Hayakawa et al. (43) Pub. Date: Apr. 12, 2007

(54) ANTENNA

(76) Inventors: **Masatoshi Hayakawa**, Kanagawa (JP); **Kiyotada Yokogi**, Tokyo (JP); **Yoshimi Takahashi**, Miyagi (JP); **Kenji Asakura**, Fukui (JP); **Shuichi Goto**, Miyagi (JP)

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(21) Appl. No.: **11/511,621**

(22) Filed: **Aug. 29, 2006**

(30) **Foreign Application Priority Data**

Sep. 1, 2005 (JP) 2005-253801

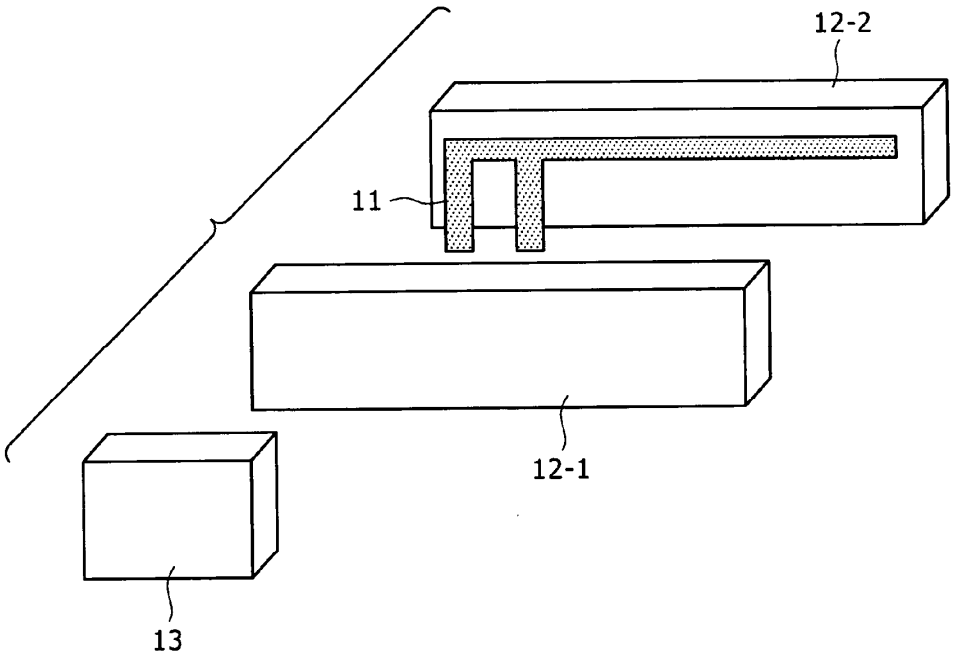
Publication Classification

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

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

(57) **ABSTRACT**

An antenna for receiving electromagnetic waves in a desired frequency band, includes a radiating conductor and a ground conductor, a feeder part, a wavelength-shortening section, and a magnetic field applying section. The radiating conductor and a ground conductor resonate at a resonance point frequency. The feeder part is configured to feed the radiating conductor with electricity. The wavelength-shortening section in which a magnetic body having both a dielectric property and a magnetic property is disposed close to the radiating conductor shifts the resonance point frequency into a band lower than the desired frequency band by a wavelength-shortening effect obtained based on the dielectric property and the magnetic property. The magnetic field applying section is configured to apply a magnetic field to the magnetic body so as to reduce a magnetic loss due to the magnetic body.



US 20070080867A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080867 A1

Son et al. (43) Pub. Date: Apr. 12, 2007

(54) ANTENNA USING PROXIMITY-COUPLED FEED METHOD, RFID TAG HAVING THE SAME, AND ANTENNA IMPEDANCE MATCHING METHOD THEREOF

(76) Inventors: **Hae-Won Son**, Daejon (KR); **Won-Kyu Choi**, Daejon (KR); **Chan-Soo Shin**, Daejon (KR); **Gil-Young Choi**, Daejon (KR); **Cheol-Sig Pyo**, Daejon (KR)

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(21) Appl. No.: **11/526,457**

(22) Filed: **Sep. 25, 2006**

(30) **Foreign Application Priority Data**

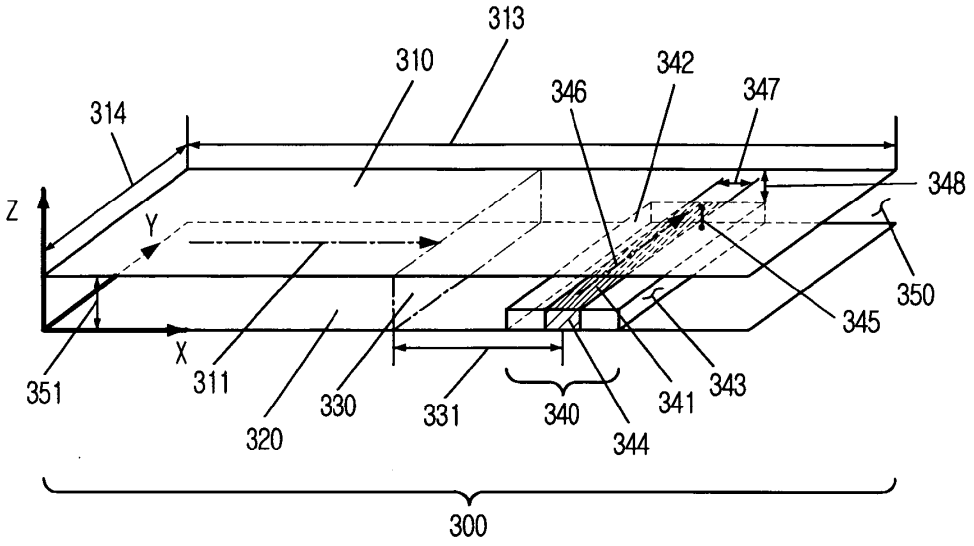
Sep. 26, 2005 (KR) 10-2005-0089522
Mar. 16, 2006 (KR) 10-2006-0024514

Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
(52) **U.S. Cl.** ..... **343/700 MS**

(57) **ABSTRACT**

An antenna, a RFID tag using the same, and an antenna impedance matching method thereof are provided. The antenna includes: a radiation patch for deciding a resonant frequency of the antenna; a ground plate disposed in parallel to the radiation patch; and a feeder disposed between the radiation patch and the ground plate in parallel for providing a RF signal to an element connected to the antenna, wherein the feeder includes a microstrip feed line proximately coupled to the radiation patch by being formed perpendicularly to the resonant length direction of the radiation patch.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0080869 A1**

Chen et al. (43) **Pub. Date: Apr. 12, 2007**

(54) **ANTENNA STRUCTURE ON CIRCUIT BOARD**

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(73) Assignee: **BENQ CORPORATION**, TAOYUAN (TW)

(21) Appl. No.: **11/544,255**

(22) Filed: **Oct. 6, 2006**

(30) **Foreign Application Priority Data**

Oct. 12, 2005 (TW)..... 94135482

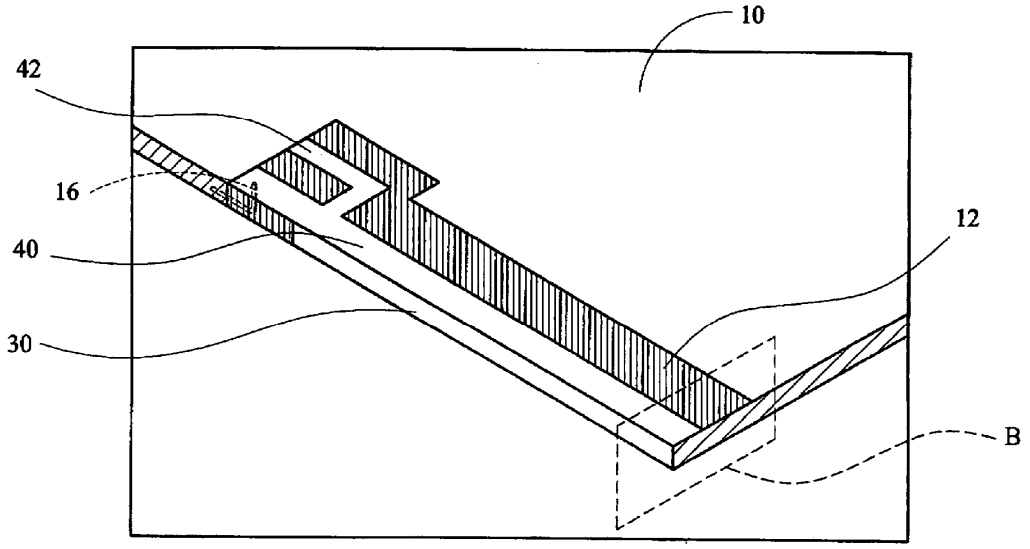
Publication Classification

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

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

(57) **ABSTRACT**

An antenna structure formed on a circuit board includes a first main body formed on the lateral side of the circuit board and a feed line connecting the circuit board and the first main body. The first main body is formed on the lateral side of the circuit board by edge-plating.



US 20070080870A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080870 A1

Takei et al. (43) Pub. Date: Apr. 12, 2007

(54) ANTENNA MODULE, RADIO DEVICE AND MOBILE RADIO TERMINAL

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(73) Assignee: **Hitachi Cable, LTD.**, Tokyo (JP)

(21) Appl. No.: **11/544,279**

(22) Filed: **Oct. 6, 2006**

(30) **Foreign Application Priority Data**

Oct. 6, 2005 (JP) 2005-293903

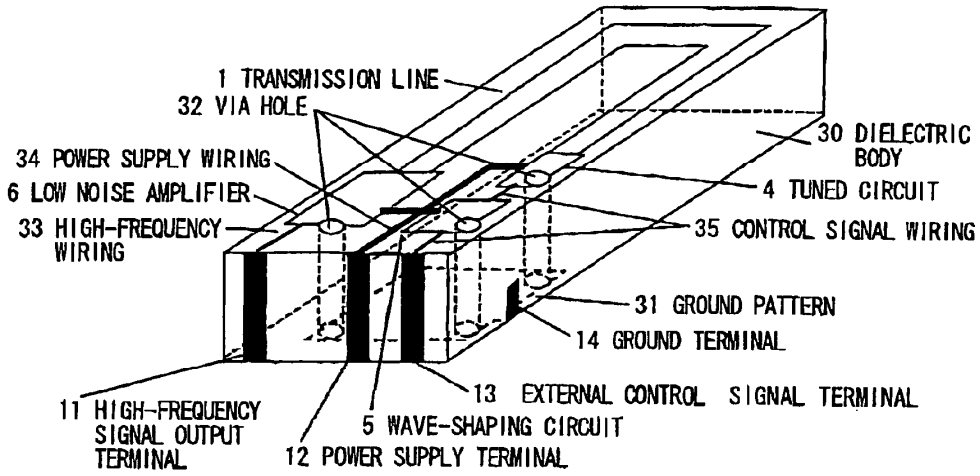
Publication Classification

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

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

(57) **ABSTRACT**

An antenna module formed with an integrated multilayer substrate having: an antenna with a transmission line; a tuned circuit with a variable capacitance means; a low noise amplifier; and a wave-shaping circuit. The variable capacitance means in the tuned circuit controls a resonance frequency of the antenna by an external control signal being wave-shaped by the wave-shaping circuit, and the antenna outputs a high-frequency output tuned to the controlled resonance frequency to the low noise amplifier directly and then the low noise amplifier outputs the amplified high-frequency output to outside.



US 20070080871A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080871 A1

Ying (43) Pub. Date: Apr. 12, 2007

(54) ANTENNA DEVICE FOR COMMUNICATION EQUIPMENT

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(21) Appl. No.: **10/554,016**

(22) PCT Filed: **Mar. 4, 2004**

(86) PCT No.: **PCT/EP04/02188**

§ 371(c)(1),
(2), (4) Date: **Oct. 2, 2006**

Related U.S. Application Data

(60) Provisional application No. 60/466,309, filed on Apr. 29, 2003.

(30) **Foreign Application Priority Data**

Apr. 26, 2003 (EP) 03009488.2

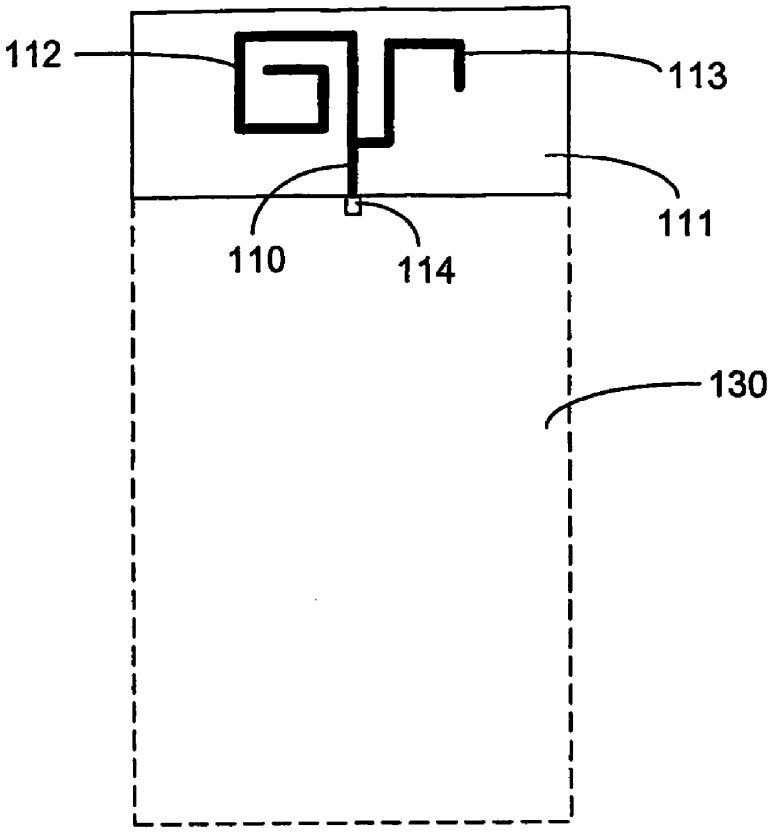
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device for a computer card device, such as a PCMCIA type card, includes at least a first antenna including a trace on a support element, antenna output means, and a protruding member extending from a housing of the card. The support element, which may include a flexible dielectric film, has a geometric shape that is conformed to the geometric shape of the protruding member.



US 20070080874A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080874 A1

Jeon et al. (43) Pub. Date: Apr. 12, 2007

(54) ANTENNA DEVICE FOR PORTABLE TERMINAL

(75) Inventors: **Hyu-Myung Jeon**, Seongnam-si (KR); **Dae-Chul Kang**, Suwon-si (KR); **Yong-Jin Kim**, Seoul (KR); **Yu-Jin Chung**, Suwon-si (KR); **Tae-Hui Cho**, Gunpo-si (KR)

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

(21) Appl. No.: **11/482,409**

(22) Filed: **Jul. 7, 2006**

(30) **Foreign Application Priority Data**

Sep. 23, 2005 (KR) 2005-88788

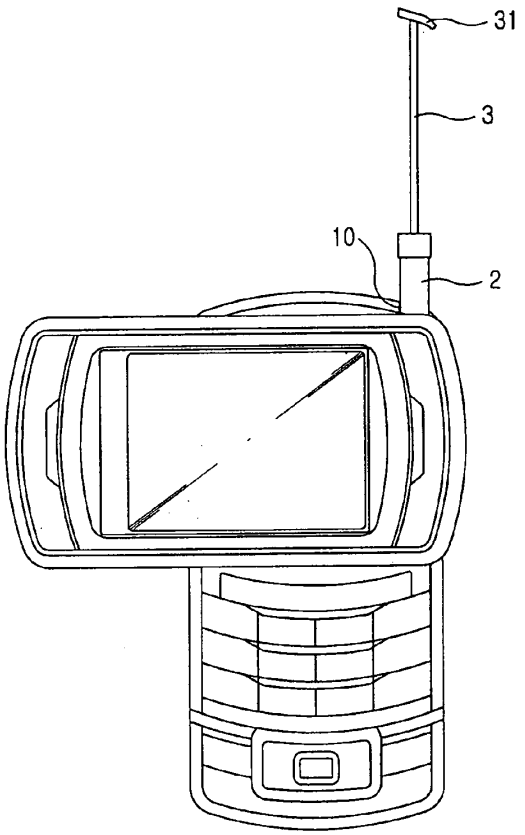
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device for a portable terminal, which allows a whip antenna and helical antenna of a terminal to be retracted and withdrawn along an extension from the terminal, while not causing them to protrude out of the terminal. The antenna device provided with a whip antenna and helical antenna further includes an antenna housing disposed at a desired position in the main body, which permits the whip antenna to be retracted and withdrawn through the helical antenna, while causing the helical antenna to be withdrawn along an extension from the main body at the same time, and permits the helical antenna to be retracted, so that it can be inserted into the main body; and a housing coupling portion disposed in the main body for supporting the antenna housing.



US 20070080875A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080875 A1

Liao et al. (43) Pub. Date: Apr. 12, 2007

(54) HAND-HELD COMMUNICATION DEVICE WITH A ROTATABLE ANTENNA

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

(21) Appl. No.: **11/527,673**

(22) Filed: **Sep. 27, 2006**

(30) **Foreign Application Priority Data**

Sep. 29, 2005 (TW)..... 094133985.5

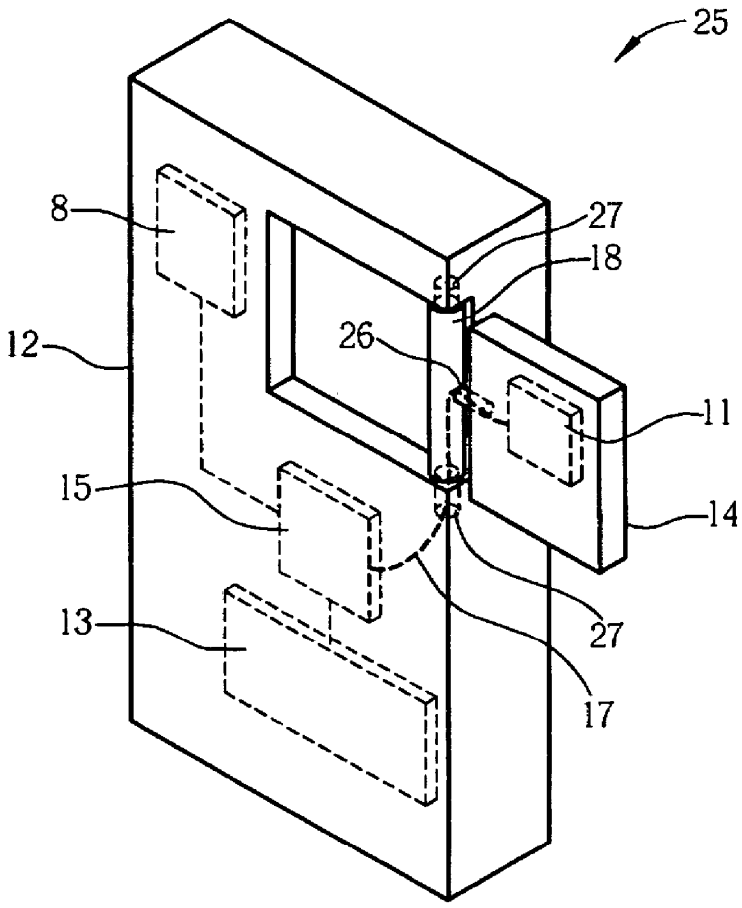
Publication Classification

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

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

(57) **ABSTRACT**

Hand-held communication device includes a first housing, a rotation axle connected to the first housing in a rotatable manner, a second housing, an antenna installed inside the second housing, and a rod with one end connected to the rotation axle in a rotatable manner and the other end connected to the second housing. The antenna can be positioned to optimize radio frequency signal reception by rotating the rotation axle with respect to the first housing and rotating the rod with respect to the rotation axle.



US 20070080878A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080878 A1

McLean (43) Pub. Date: Apr. 12, 2007

(54) PXM ANTENNA WITH IMPROVED RADIATION CHARACTERISTICS OVER A BROAD FREQUENCY RANGE

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(21) Appl. No.: **11/247,944**

(22) Filed: **Oct. 11, 2005**

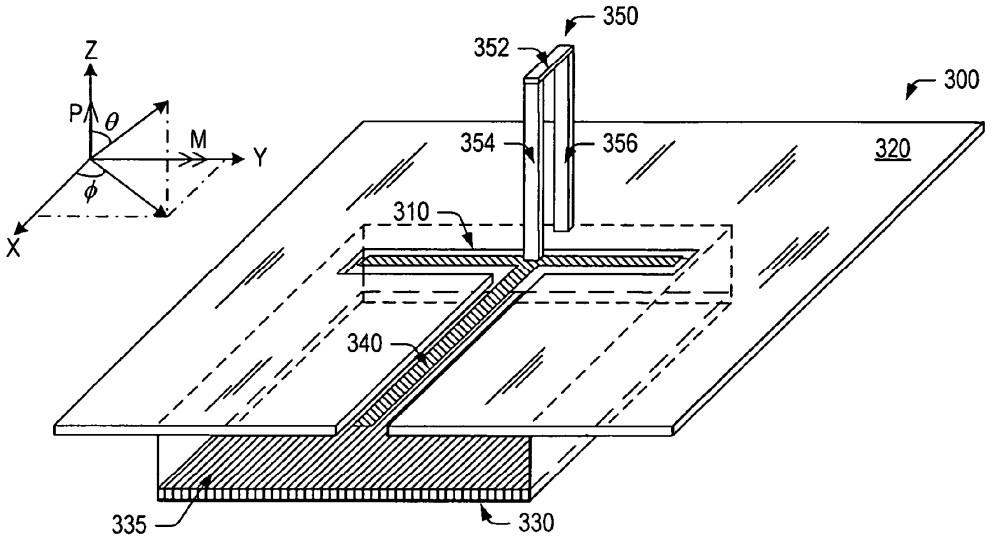
Publication Classification

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

(52) **U.S. Cl.** **343/725**; 343/767; 343/729

(57) **ABSTRACT**

A low-loss, high-efficiency, broadband antenna including both electric and magnetic dipole radiators is provided herein. The broadband antenna may be referred to as a "P×M antenna" and may generally include a ground plane; a magnetic radiator formed within the ground plane; a conductive feed arranged within a first plane, which is parallel to the ground plane; and an electric radiator arranged within a second plane, which is perpendicular to the ground plane and coupled at one end to the conductive feed. According to a particular aspect of the invention, the electric and magnetic radiators are substantially complementary to one another and are coupled for producing a P×M radiation pattern over a broad range of operating frequencies. One advantage of the P×M antenna described herein is that the complementary antenna elements are combined without the use of a lossy, resistive matching network, thereby increasing the efficiency with which the P×M radiation pattern is produced.



US 20070080879A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080879 A1

Shin et al. (43) Pub. Date: Apr. 12, 2007

(54) **ELECTRICAL LOOP ANTENNA WITH UNIDIRECTIONAL AND UNIFORM CURRENT RADIATION SOURCE**

(76) Inventors: **Chan-Soo Shin**, Daejon (KR); **Won-Kyu Choi**, Daejon (KR); **Hae-Won Son**, Daejon (KR); **Gil-Young Choi**, Daejon (KR); **Cheol-Sig Pyo**, Daejon (KR); **Jong-Suk Chae**, Daejon (KR); **Han-Phil Rhyu**, Seoul (KR); **Sung-Jun Heo**, Seoul (KR); **Byung-Je Lee**, Seoul (KR)

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(21) Appl. No.: **11/526,374**

(22) Filed: **Sep. 25, 2006**

(30) **Foreign Application Priority Data**

Sep. 26, 2005 (KR) 10-2005-0089535

May 3, 2006 (KR) 10-2006-0040102

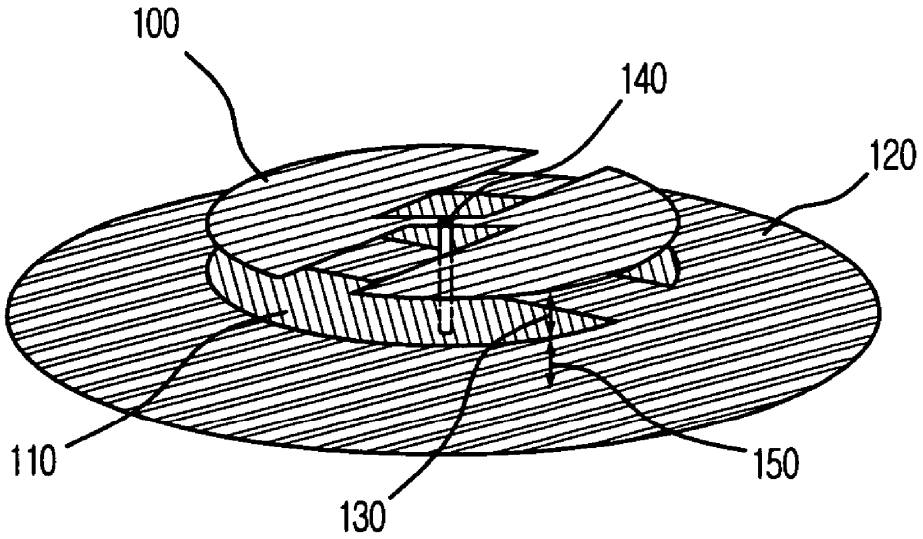
Publication Classification

(51) **Int. Cl.**
H01Q 11/12 (2006.01)

(52) **U.S. Cl.** **343/741**; 343/866

(57) **ABSTRACT**

Provided is an antenna for a Radio Frequency Identification (RFID) reader using an electrical loop. It includes an upper metal plate which functions as a radiator; a lower metal plate which is disposed apart from the upper metal plate by a predetermined distance and functions as a radiator; a ground plate disposed apart from the lower metal plate by a predetermined distance; and a feeding probe disposed at the center of the upper and lower metal plates. The antenna can perform radiation parallel to the earth's surface including other directions. Therefore, it is suitable for an RFID reader which recognizes an RFID tag attached in parallel to the earth's surface. The electrical loop antenna can control impedance matching, resonance frequency, antenna gain, and radiation pattern according to the distance between metal plates, size of the metal plates, thickness of a feeding probe, and how the metal plates are arranged.



US 20070080882A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0080882 A1**

Ohara (43) **Pub. Date: Apr. 12, 2007**

(54) **ANTENNA DEVICE AND COMMUNICATION SYSTEM USING IT**

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(21) Appl. No.: **10/555,136**

(22) PCT Filed: **Feb. 28, 2005**

(86) PCT No.: **PCT/JP05/03298**

§ 371(c)(1),
(2), (4) Date: **Oct. 31, 2005**

(30) **Foreign Application Priority Data**

Mar. 4, 2004 (JP) 2004-060366
Jun. 11, 2004 (JP) 2004-173509

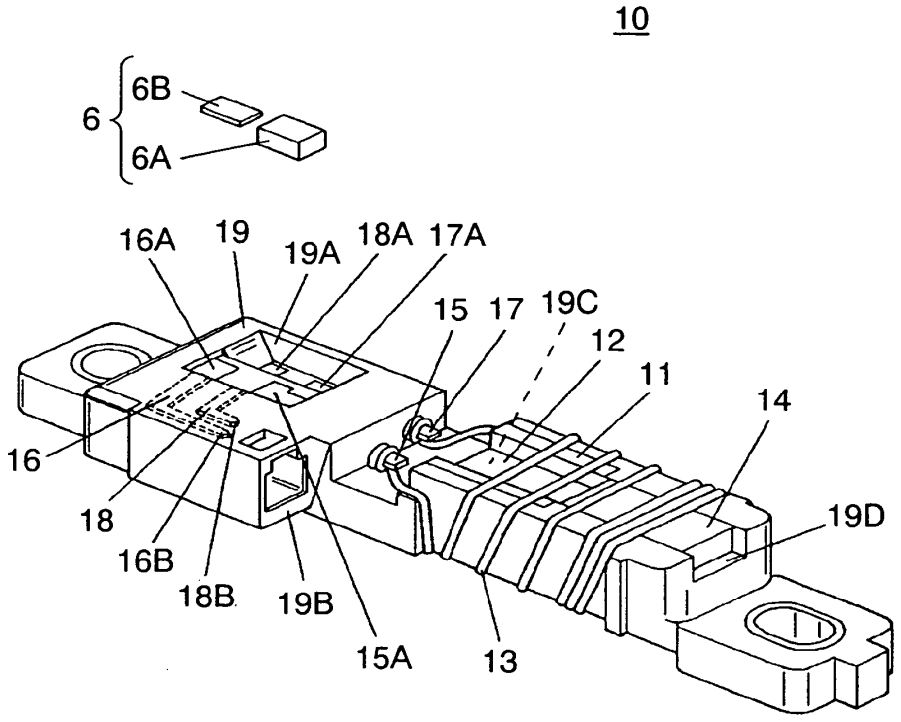
Publication Classification

(51) **Int. Cl.**
H01Q 7/08 (2006.01)

(52) **U.S. Cl.** **343/788**; 343/713

(57) **ABSTRACT**

An antenna device has a core made of a magnetic material, a coil formed by winding a conducting wire on a predetermined range including the core and the outer region of the core, and a sub-core that adjusts the resonance frequency by moving in the inner peripheral region of the coil and in the direction orthogonal to the winding direction of the coil. A communication system of the present invention is a combination of an external communication device, the antenna device, and an internal communication device that is connected to the antenna device and is disposed in a cabin.



US 20070080885A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080885 A1

Ozkar et al. (43) Pub. Date: Apr. 12, 2007

(54) MEANDER LINE CAPACITIVELY-LOADED MAGNETIC DIPOLE ANTENNA

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(21) Appl. No.: 11/248,665

(22) Filed: Oct. 12, 2005

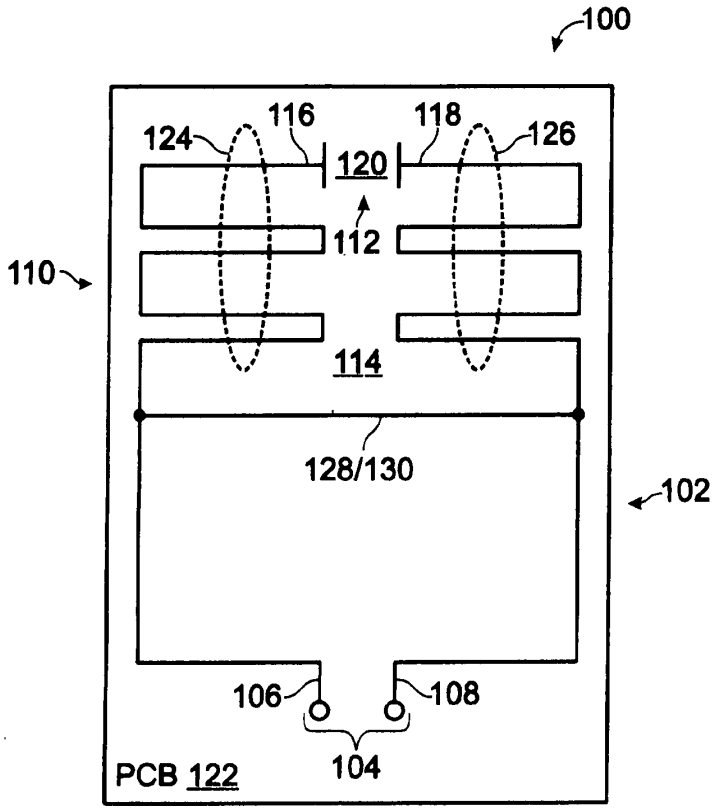
Publication Classification

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

(52) U.S. Cl. 343/806; 343/820

(57) ABSTRACT

A meander line capacitively-loaded magnetic dipole antenna is disclosed. The antenna includes a transformer loop having a balanced feed interface, and a meander line capacitively-loaded magnetic dipole radiator. The meander line capacitively-loaded magnetic dipole radiator also includes an electric field bridge. For example, the meander line capacitively-loaded magnetic dipole radiator may include a quasi loop with a first end and a second end, with the electric field bridge interposed between the quasi loop first and second ends. The electric field bridge may be an element such as a dielectric gap, lumped element, circuit board surface-mounted, ferroelectric tunable, or a microelectromechanical system (MEMS) capacitor. The transformer loop has a radiator interface coupled to a quasi loop transformer interface. In one aspect, the coupled interfaces are a shared perimeter portion shared by both loops.



US 20070080889A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0080889 A1**

Zhang (43) **Pub. Date: Apr. 12, 2007**

(54) **ELECTRICALLY SMALL MULTI-LEVEL LOOP ANTENNA ON FLEX FOR LOW POWER WIRELESS HEARING AID SYSTEM**

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(73) Assignee: **Gennum Corporation**

(21) Appl. No.: **11/247,530**

(22) Filed: **Oct. 11, 2005**

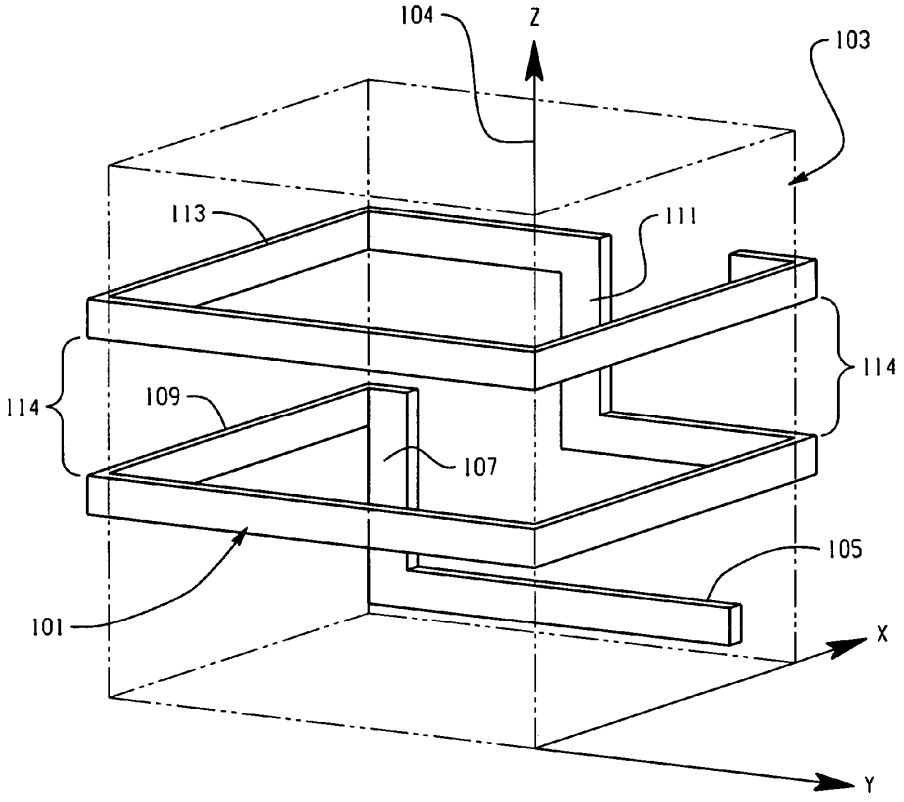
Publication Classification

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

(52) **U.S. Cl.** **343/895**; 343/718; 343/702

(57) **ABSTRACT**

A hearing device having a multiple-level loop antenna is provided. The hearing device includes a housing structure and a communication system for receiving wireless signals. The antenna is configured to make more than one revolution around a center point and to be on multiple levels. A first part of the antenna is on a first level and one or more parts of the antenna are on one or more levels above the first part. The loop antenna may be affixed to a flexible dielectric substrate, along with at least a portion of a matching network for coupling the loop antenna to the communication system.



US 20070080890A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080890 A1

Yang et al. (43) Pub. Date: Apr. 12, 2007

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(21) Appl. No.: **11/543,808**

(22) Filed: **Oct. 6, 2006**

(30) **Foreign Application Priority Data**

Oct. 7, 2005 (TW)..... 94135268

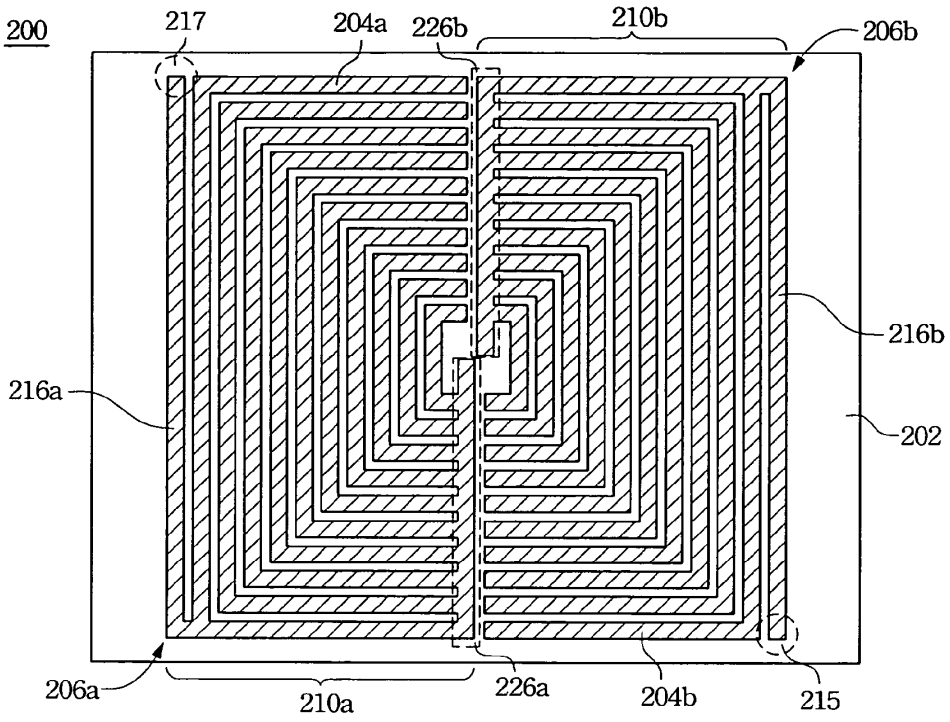
Publication Classification

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

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

(57) **ABSTRACT**

An antenna apparatus has a substrate, a plurality of meandered conductive strips and a feeding conductive strip disposed on the substrate. The meandered conductive strips have different sizes, and are spaced at intervals and arranged in parallel according to their sizes in order. The feeding conductive strip is electrically connected to the meandered conductive strips. Therefore, a radiating structure having multiple meandered conductive strips can generate electromagnetic mutual coupling, thus obtaining the resonance of multiple and wide-frequency bands.



US 20070080891A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0080891 A1

De Lustrac et al. (43) Pub. Date: Apr. 12, 2007

(54) **CONFIGURABLE AND ORIENTABLE ANTENNA AND CORRESPONDING BASE STATION**

(76) Inventors: **Andre De Lustrac**, Sceaux (FR); **Kouroch Mahdjoubi**, Noyal Sur Vilaine (FR); **Anne-Claude Tarot**, Etrelles (FR); **Halim Boutayeb**, Quebec (CA); **Claude Terret**, Anglet (FR)

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(21) Appl. No.: **10/580,338**

(22) PCT Filed: **Nov. 26, 2004**

(86) PCT No.: **PCT/FR04/50622**

§ 371(c)(1),
(2), (4) Date: **Jul. 25, 2006**

(30) **Foreign Application Priority Data**

Nov. 27, 2003 (FR) 0350925

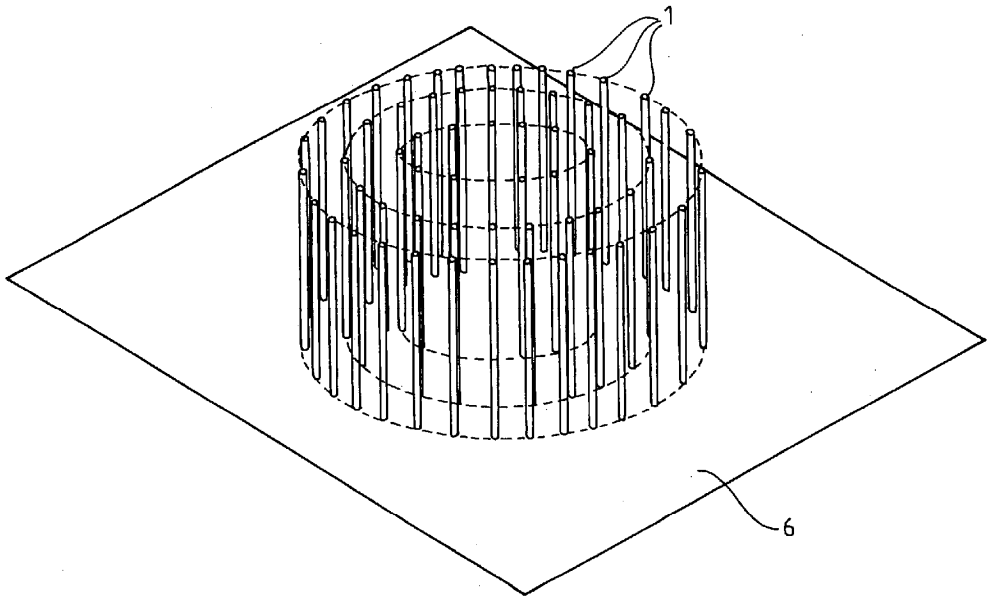
Publication Classification

(51) **Int. Cl.**
H01Q 15/24 (2006.01)

(52) **U.S. Cl.** **343/909**

(57) **ABSTRACT**

An antenna, permitting the configuration of at least one radioelectric wave beam of at least one fixed wavelength, of the type including at least one transmitting element, preferably of the passive type, arranged in a set of essentially parallel, wave-reflecting wires or bars, made from a photonic band gap (BIP) material and forming a given structure. The given structure includes faults for shaping the at least one beam in a direction as a function of the position and/or the configuration of the faults. The wires or bars and the faults are arranged on a set of N curves which are closed and concentric on a plane, N being greater than or equal to 1 and the transmitting element is arranged within the innermost curve. The curves are preferably circular and the wires/bars can be controlled to pass from a wave-conducting/reflecting state to a transparent state.



US 20070085646A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0085646 A1

Bilyeu et al. (43) Pub. Date: Apr. 19, 2007

(54) **HOUSING MOUNTED Z-AXIS ANTENNA COIL**

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(21) Appl. No.: **11/524,226**

(22) Filed: **Sep. 20, 2006**

Related U.S. Application Data

(60) Provisional application No. 60/728,006, filed on Oct. 18, 2005. Provisional application No. 60/728,007, filed on Oct. 18, 2005.

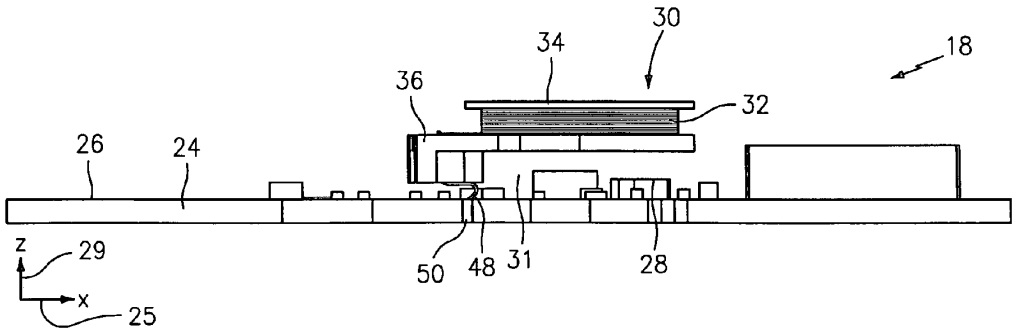
Publication Classification

(51) **Int. Cl.**
H01F 27/06 (2006.01)

(52) **U.S. Cl.** **336/65**

(57) **ABSTRACT**

A fob for a remote keyless entry system includes a printed circuit board (PCB) located within a housing. The PCB includes a surface on which circuitry is printed and components are mounted. A coil is mounted to the surface and provides an antenna for the fob. The coil includes a frame spaced apart from the PCB to provide room for other components on the PCB. Coil mounts extend from the frame and are received by the PCB at coil mount locations. The coil mounts contact the surface of the PCB to form an electrical connection.



US 20070085741A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0085741 A1

Rafi et al. (43) Pub. Date: Apr. 19, 2007

(54) MULTI-BAND ANTENNA

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(21) Appl. No.: **11/252,162**

(22) Filed: **Oct. 17, 2005**

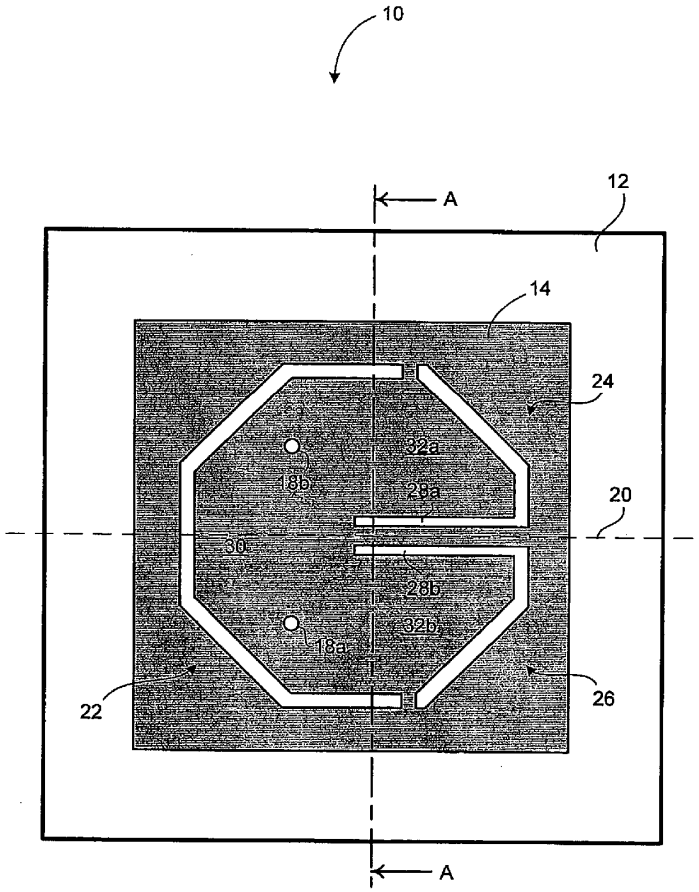
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band antenna for multi-band radio frequency telecommunications. The multi-band antenna includes a conductive patch separated from a ground plane by a dielectric material. A slot pattern formed in the conductive patch defines a perimeter substantially surrounding two feed pins and arranged symmetrically about a center line. The slot pattern includes one or more inwardly extending arms projected along axes that pass between the two feed pins. The axes may be parallel to the center line. The slot pattern may be arranged using folded slots. In one embodiment, circular polarization is realized at GPS frequency by using one feed pin and linear or circular polarization is realized by using one or two feed pins for other bands. The feed pins may be controlled independently without a fixed phase and amplitude arrangement necessary to achieve a fixed polarization (linear, circular, or elliptical), which allows for adaptive pattern and polarization agility.



US 20070085742A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0085742 A1**

Kikin (43) **Pub. Date: Apr. 19, 2007**

(54) **COMPACT CIRCULAR POLARIZED ANTENNA**

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(73) Assignee: **Applied Wireless Identification Group, Inc.**

(21) Appl. No.: **11/253,099**

(22) Filed: **Oct. 18, 2005**

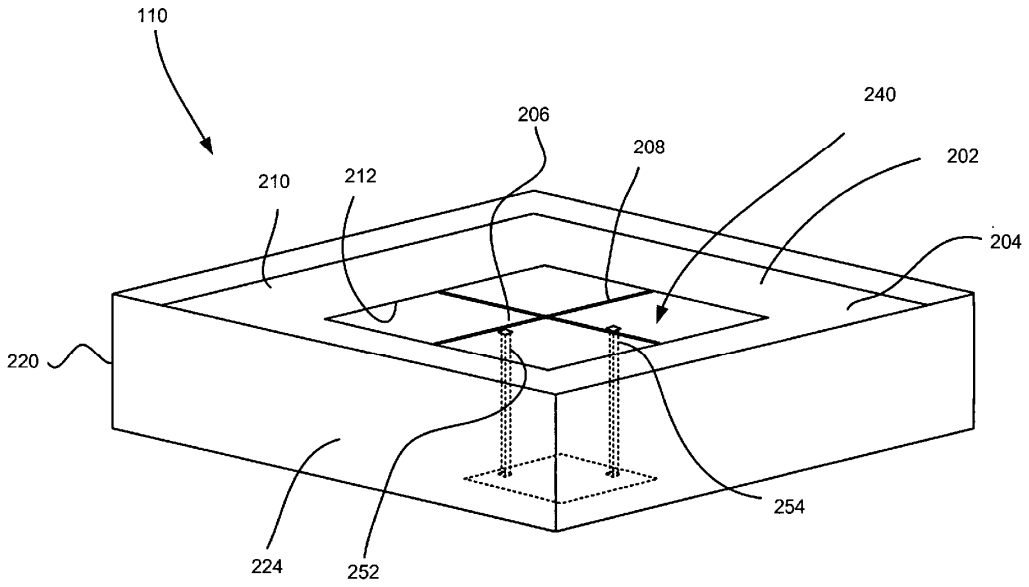
Publication Classification

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

(52) **U.S. Cl.** ..... **343/700 MS**; 343/795

(57) **ABSTRACT**

A circular polarized antenna having an electrically conductive element having a generally annular outer portion and first and second inner members coupled to the outer portion. A ground shield is spaced from the element, the ground shield providing an effective ground plane. A dielectric material is positioned between the element and at least a portion of the ground shield.



US 20070085743A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0085743 A1**

Eberhardt et al. (43) **Pub. Date: Apr. 19, 2007**

(54) **ANTENNA SYSTEM AND APPARATUS**

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(21) Appl. No.: **11/254,148**

(22) Filed: **Oct. 18, 2005**

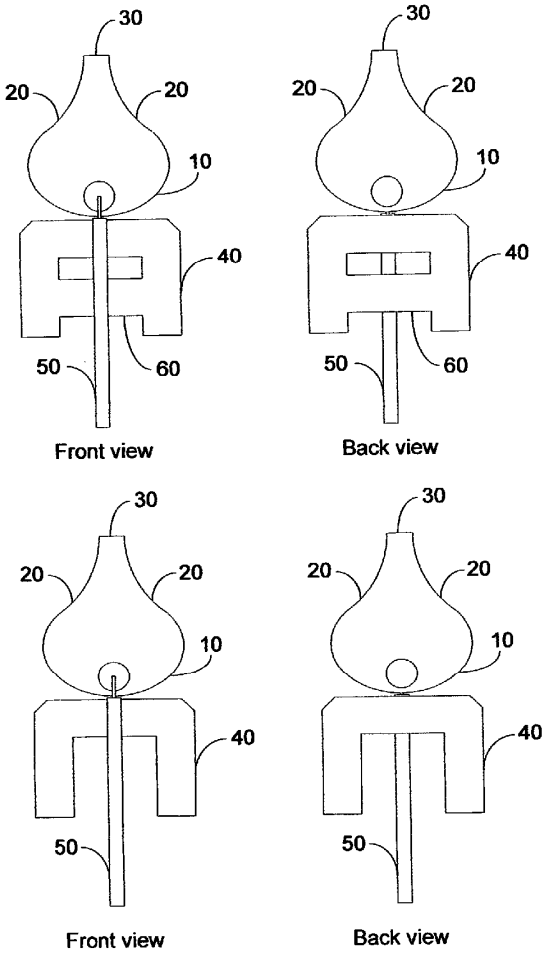
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)

(52) **U.S. Cl.** ..... **343/700 MS**; 343/846

(57) **ABSTRACT**

An antenna design is provided. In one embodiment, the antenna is a planar element with a radiating element containing an elliptical curved portion connected to two curved regions, the curved regions meeting at a geometric construct. Another embodiment provides an antenna constructed with intersecting planar elements. A third embodiment is an antenna that is a solid of revolution of a planar element. Some antenna embodiments include ground plane elements to shape the radiation patterns. This Abstract is provided for the sole purpose of complying with the Abstract requirement rules that allow a reader to quickly ascertain the subject matter of the disclosure contained herein. This Abstract is submitted with the explicit understanding that it will not be used to interpret or to limit the scope or the meaning of the claims.



US 20070085745A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0085745 A1

Su et al. (43) Pub. Date: Apr. 19, 2007

(54) ANTENNA FREQUENCY MODULATING EQUIPMENT

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(73) Assignee: **HON HAI PRECISION IND. CO., LTD.**

(21) Appl. No.: **11/582,221**

(22) Filed: **Oct. 17, 2006**

(30) **Foreign Application Priority Data**

Oct. 17, 2005 (TW)..... 94136102

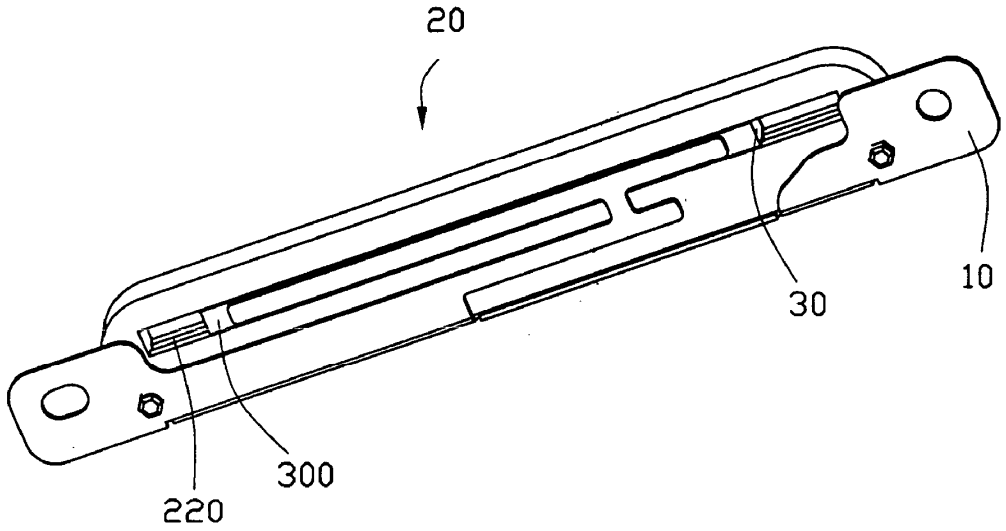
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/24 (2006.01)

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

(57) **ABSTRACT**

A frequency modulating equipment (**20**) for being used in an antenna (**10**) for modulating frequency of the antenna (**10**) to achieve a desired operating frequency, comprises a slide block (**30**) attached to a radiating element (**11**) of the antenna (**10**) and being capable of moving freely and a plastic element (**21**). The slide block (**30**) comprises a contact portion (**300**) contacting a free end of the radiating element (**11**) of the antenna (**10**). The plastic element (**21**) is fixed onto the antenna (**10**). The slide block (**30**) is installed on the plastic element (**21**). The antenna (**10**) can achieve a desired operating frequency by moving the modulating befittingly the slide block (**30**).



US 20070085747A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0085747 A1**

DiNallo et al. (43) **Pub. Date: Apr. 19, 2007**

(54) **MULTIBAND ANTENNA IN A COMMUNICATION DEVICE**

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(73) Assignee: **Motorola, Inc.**, Schaumburg, IL

(21) Appl. No.: **11/250,339**

(22) Filed: **Oct. 14, 2005**

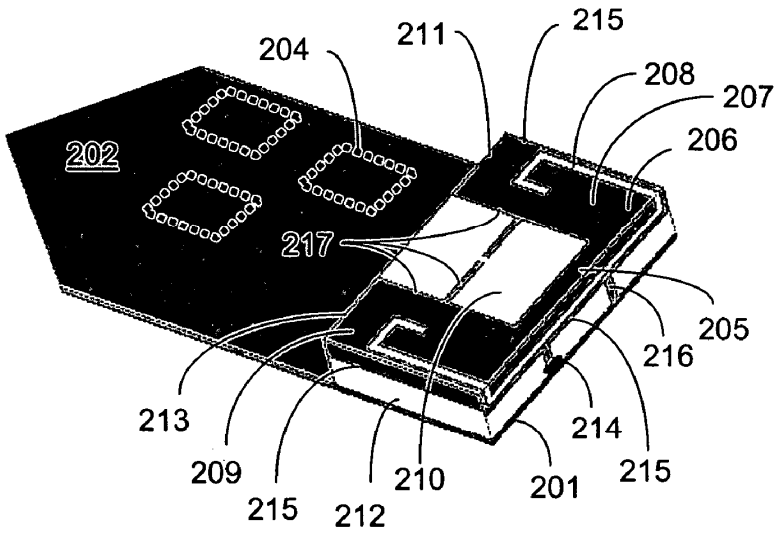
Publication Classification

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

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

(57) **ABSTRACT**

An apparatus is disclosed for a multiband antenna (**102**) in a communication device (**100**). An apparatus that incorporates teachings of the present invention may include, for example, an antenna having a finite ground surface (**201, 401**), and an elongated conductor (**206, 406**) that is characterized by a length and is spaced from the finite ground surface. The elongated conductor has a first slot (**208, 408**) extending through a substantial portion of the length of the elongated conductor, and a second slot (**210, 410**) having a shorter length than the first slot. The antenna further has a grounding conductor (**216, 416**) coupling the finite ground surface to the elongated conductor, and a signal feed conductor (**214, 414**) coupling to the elongated conductor.



US 20070085749A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0085749 A1

Liang et al. (43) Pub. Date: Apr. 19, 2007

(54) **ELECTRONIC APPARATUS HAVING ANTENNA DEVICE**

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(21) Appl. No.: **11/537,666**

(22) Filed: **Oct. 2, 2006**

(30) **Foreign Application Priority Data**

Oct. 14, 2005 (TW)..... 94135944

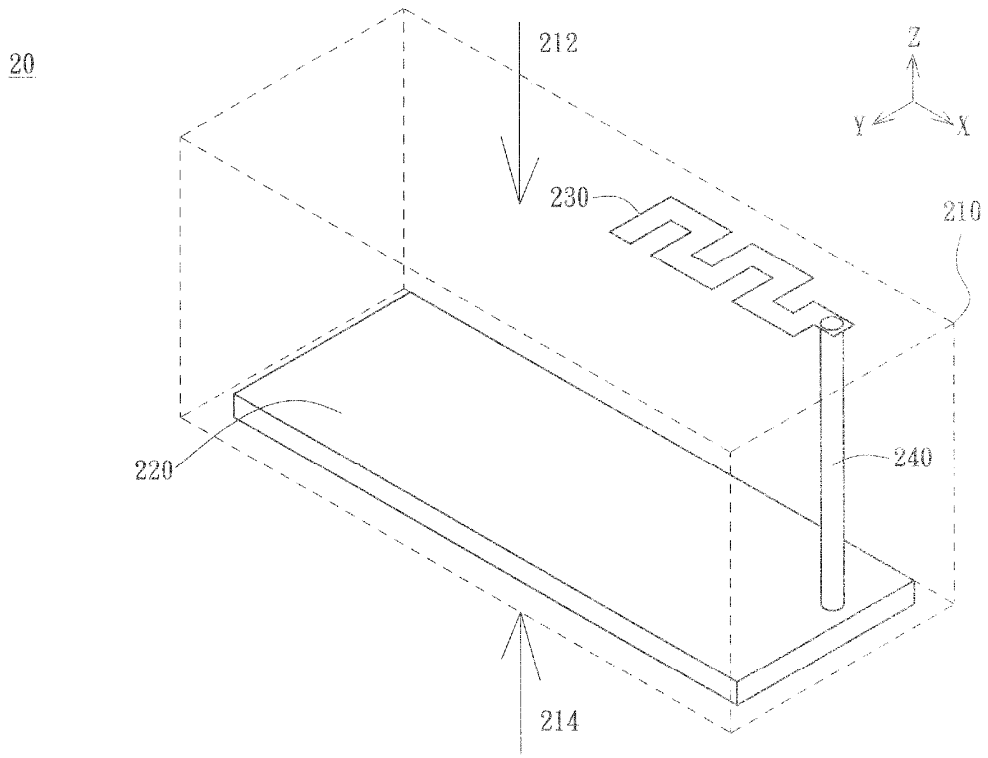
Publication Classification

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

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

(57) **ABSTRACT**

An electronic apparatus having an antenna device. The electronic apparatus includes a housing, a circuit board, an antenna device and a feeding device. The circuit board is placed inside the housing. The antenna device disposed on a surface of the housing transmits and receives a wireless signal. The feeding device has one end electrically connected to the circuit board and the other end electrically connected to the antenna device.



US 20070085750A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0085750 A1**

De Angelis (43) **Pub. Date: Apr. 19, 2007**

(54) **METER ANTENNA**

(76) Inventor: **Robert Hugo De Angelis**, Burnaby (CA)

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(21) Appl. No.: **11/529,251**

(22) Filed: **Sep. 29, 2006**

Related U.S. Application Data

(63) Continuation of application No. 10/656,279, filed on Sep. 8, 2003, now Pat. No. 7,129,900.

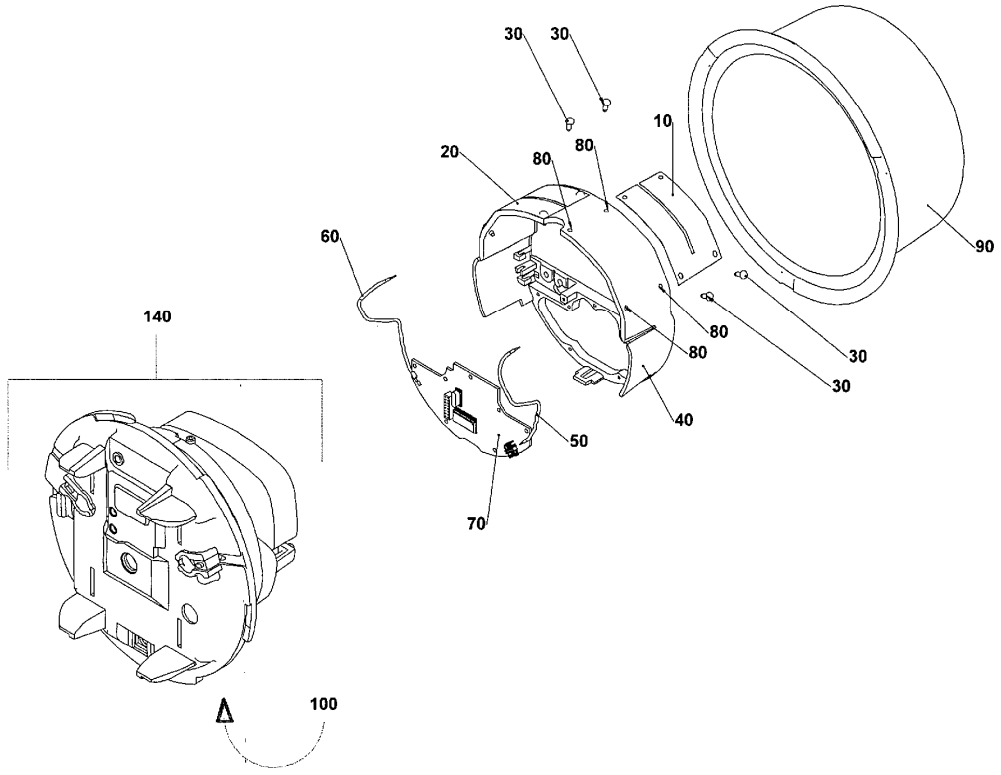
Publication Classification

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

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

(57) **ABSTRACT**

The antenna configuration presented is an integral component of a retrofit module designed to incorporate a data telemetry transceiver within the confines of a utility meter.



US 20070085751A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0085751 A1

Kai et al. (43) Pub. Date: Apr. 19, 2007

(54) TAG ANTENNA, TAG AND RFID SYSTEM USING THE SAME

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(21) Appl. No.: **11/349,179**

(22) Filed: **Feb. 8, 2006**

(30) **Foreign Application Priority Data**

Oct. 19, 2005 (JP) 2005-303886

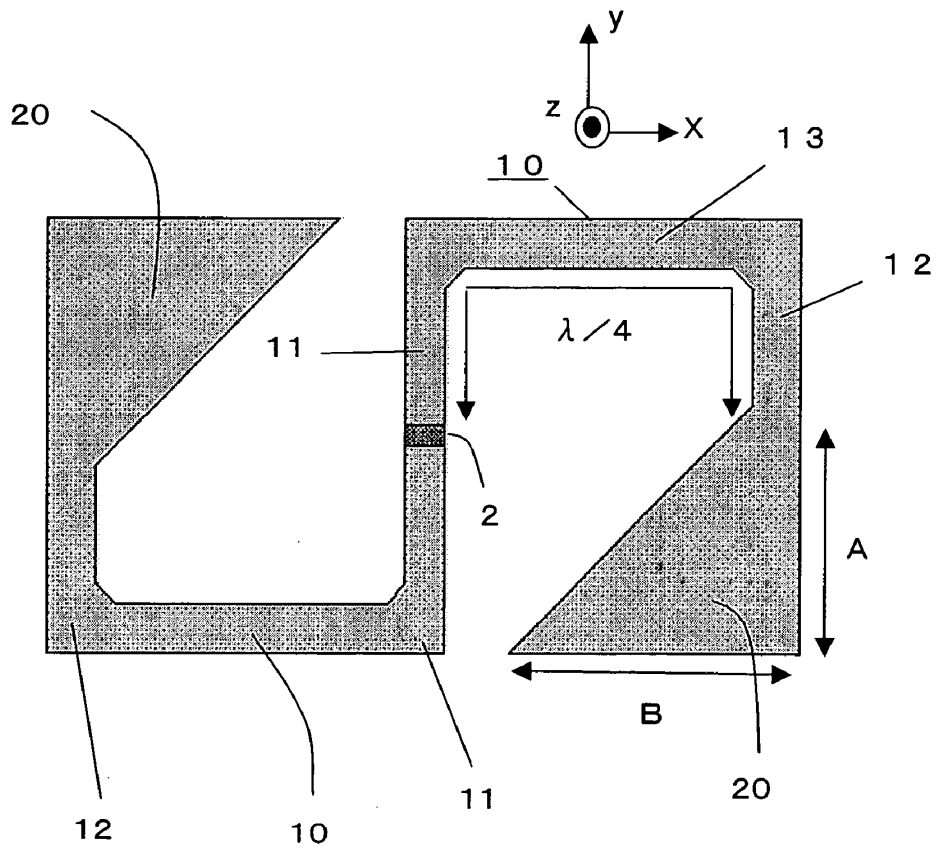
Publication Classification

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

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

(57) **ABSTRACT**

A communication distance difference due to an attached object can be canceled, and an RFID system can be provided which has approximately the same communication distance regardless of an attached position (surface) of a tag. A tag antenna used for such the RFID system is for transmitting/receiving a radio signal to/from an RFID reader/writer in an RFID system has a pair of antenna elements centered on a feeding point and when a carrier wavelength of the radio signal is λ, each of the pair of the antenna elements includes a dipole portion which has a length from the feeding point of approximate λ/4 and a plurality of bending portions as well as a circular polarized wave generation portion linked to an end of the dipole portion.



US 20070086610A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0086610 A1**

Niederdrank (43) **Pub. Date: Apr. 19, 2007**

(54) **HEARING AID DEVICE WITH AN ANTENNA**

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(21) Appl. No.: **11/527,885**

(22) Filed: **Sep. 27, 2006**

(30) **Foreign Application Priority Data**

Sep. 27, 2005 (DE)..... 10 2005 046 169.7

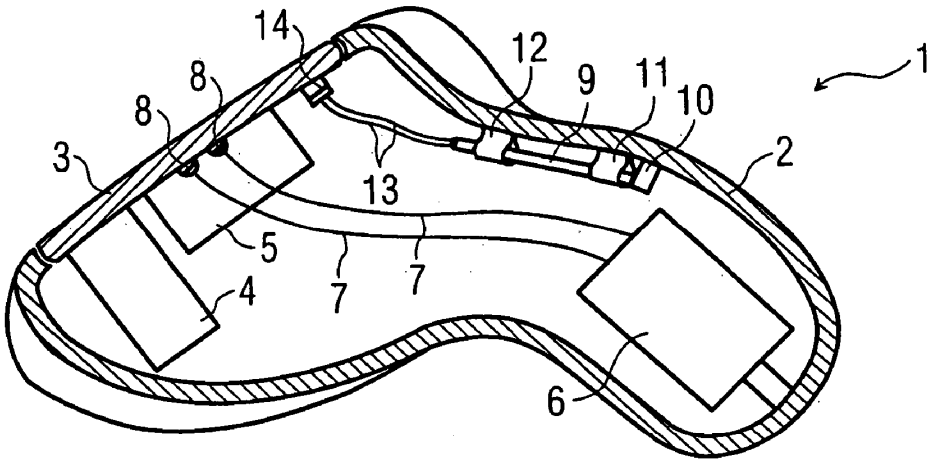
Publication Classification

(51) **Int. Cl.**
H04R 25/00 (2006.01)
B29C 33/40 (2006.01)

(52) **U.S. Cl.** **381/312**; 381/315; 264/222

(57) **ABSTRACT**

The production of a hearing aid device suitable for wireless signal transmission is simplified by providing fastening elements connected as one piece with the housing shell. The fastening elements serve for placement and fastening of an antenna or coil in the housing shell of the appertaining hearing aid device. The production of a hearing aid device with a corresponding antenna or coil is thereby simplified. The alignment of the antenna or coil in the housing shell can also already be optimized using a computer model of the housing shell.



US 20070089286A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0089286 A1**

Cheng et al. (43) **Pub. Date: Apr. 26, 2007**

(54) **RFID ANTENNA WITH PRE-APPLIED ADHESIVES**

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(21) Appl. No.: **11/255,117**

(22) Filed: **Oct. 20, 2005**

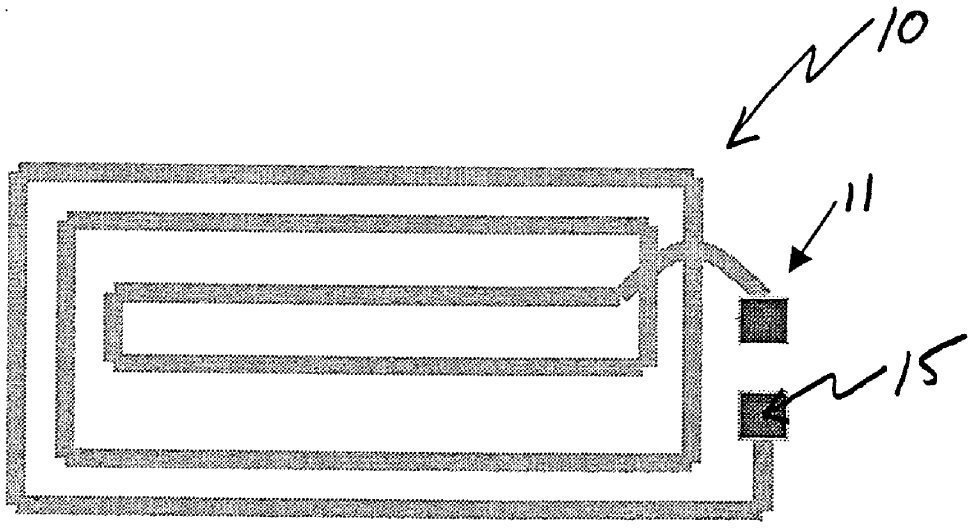
Publication Classification

(51) **Int. Cl.**
H01Q 17/00 (2006.01)
B31B 1/60 (2006.01)
G08B 13/14 (2006.01)

(52) **U.S. Cl.** **29/601**; 156/60; 340/572.7

(57) **ABSTRACT**

A radio frequency identification ("RFID") system antenna having adhesive pre-applied to one or more of its contact pads to allow for high speed attachment of the antenna to the RFID die or die strap. Also disclosed is a method for attaching an RFID antenna having pre-applied adhesive to a die or die strap



US 20070090998A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0090998 A1**

Chang et al. (43) **Pub. Date: Apr. 26, 2007**

(54) **PARTIALLY REFLECTIVE SURFACE ANTENNA**

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(21) Appl. No.: **11/322,406**

(22) Filed: **Jan. 3, 2006**

(30) **Foreign Application Priority Data**

Oct. 25, 2005 (TW)..... 094137287

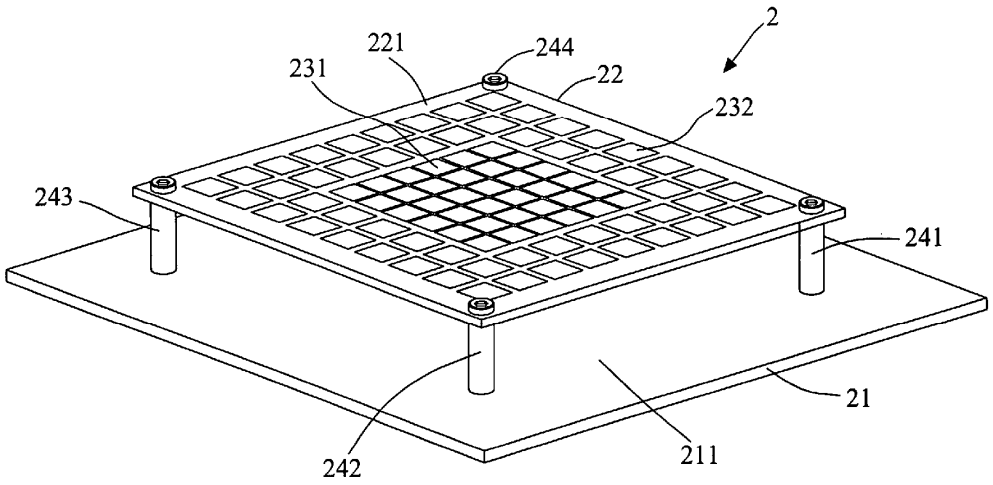
Publication Classification

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

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

(57) **ABSTRACT**

The present invention relates to a partially reflective surface antenna and, more particularly, to a partially reflective surface antenna including a reflective board composed of arrays of microstrip antennas, and has advantages of low side lobe and high gain. It comprises: a substrate with an upper surface having a signal transmitting notch for transmitting and receiving a high frequency signal; a reflective board for partially reflecting the high frequency signal; and a plurality of supporting elements for supporting the reflective board on the substrate. The reflective board has a second antenna array and a first antenna array surrounded by the second antenna array, wherein the first and the second antenna array are composed of a plurality of first microstrip reflective units and a plurality of second microstrip reflective units, respectively. Besides, the distance between the first microstrip reflective units is smaller than the distance between the second microstrip reflective units.



US 20070091000A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0091000 A1

Kim et al. (43) Pub. Date: Apr. 26, 2007

(54) IMPEDANCE TRANSFORMATION TYPE WIDE BAND ANTENNA

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(21) Appl. No.: **11/551,398**

(22) Filed: **Oct. 20, 2006**

(30) **Foreign Application Priority Data**

Oct. 20, 2005 (KR) 10-2005-0099343

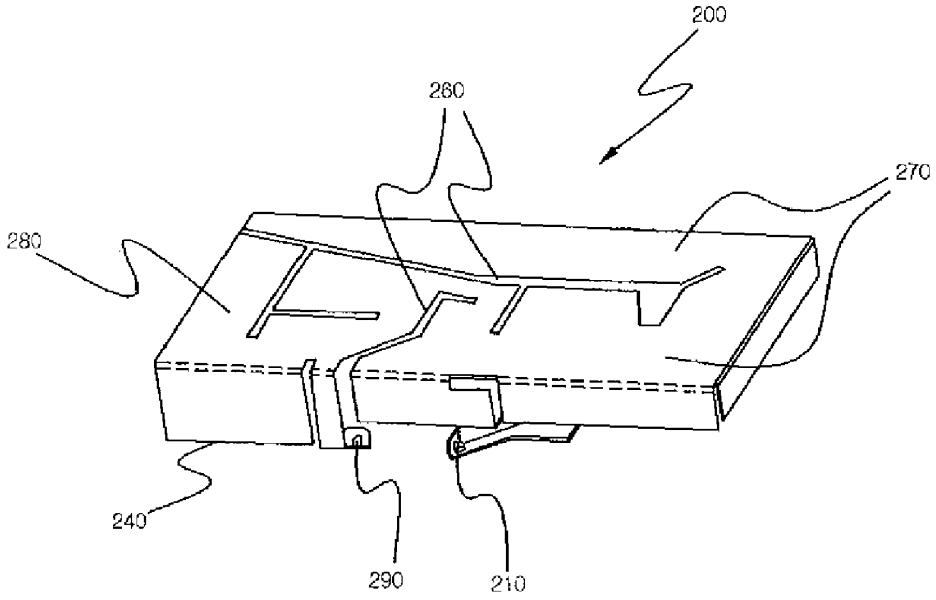
Publication Classification

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

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

(57) **ABSTRACT**

The present invention relates to an impedance transformation-type wide band internal antenna. The wide band antenna includes a radiation part, a short circuit part, a feeding part, and a feeding pin. The radiation part is formed to have a predetermined length and width according to an operating frequency, the radiation part including a plurality of stubs formed in arbitrary shapes according to location of a plurality of slots. The short circuit part causes part of a side surface of the radiation part to be connected to an external ground. The feeding part is extended from the stubs, formed on the side surface of the radiation part to be adjacent to the short circuit part, and is bent multiple times, the feeding part being formed on a bottom surface of the radiation part to have a predetermined length and width. The feeding pin is formed on an end of the feeding part and is fed with current. Accordingly, the present invention is advantageous in that impedances are matched using the length and interval of the feeding part, which is bent multiple times, and the size of a through hole formed in the feeding part, so that a plurality of wide band resonant frequencies is formed, thus enabling the wide band antenna to be simultaneously used for different frequency bands in a wireless communication system that uses different frequency bands.



US 20070091001A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0091001 A1**

Hunsberger (43) **Pub. Date: Apr. 26, 2007**

(54) **CAPACITIVE DRIVE ANTENNA AND AN AIR VEHICLE SO EQUIPPED**

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(21) Appl. No.: **11/163,271**

(22) Filed: **Oct. 12, 2005**

Related U.S. Application Data

(60) Provisional application No. 60/623,336, filed on Oct. 28, 2004.

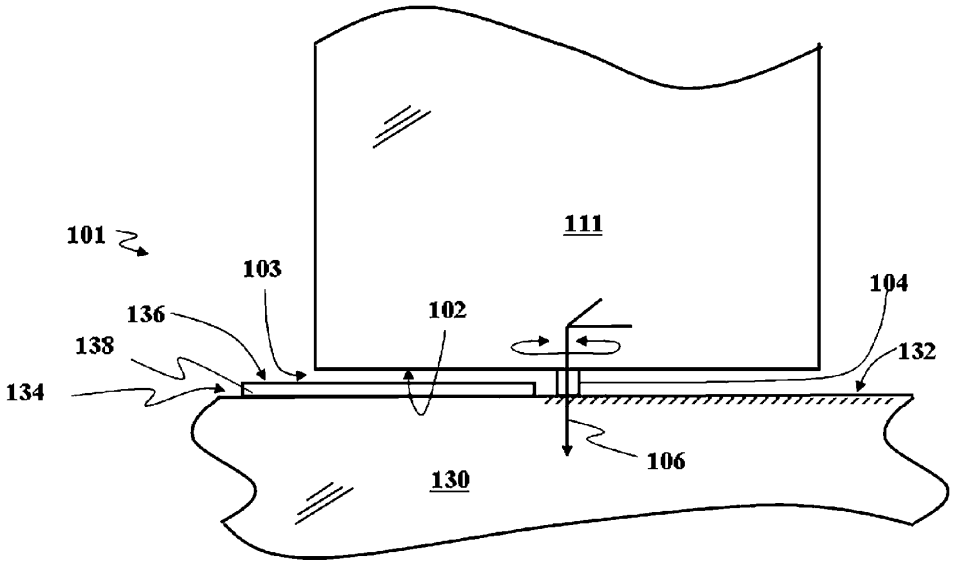
Publication Classification

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

(52) **U.S. Cl.** **343/708**; 343/705

(57) **ABSTRACT**

Disclosed are antenna embodiments and air vehicles so equipped that include a first antenna component, and a second antenna component, separated by a free space gap, where the antenna embodiments are adapted to capacitively couple the first antenna component and the second antenna component across one or more portions of the free space gap and where the first antenna component member has a degree or axis of rotation, relative to the second antenna component.



US 20070091002A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0091002 A1

Noh (43) Pub. Date: Apr. 26, 2007

(54) WIDEBAND GLASS ANTENNA FOR VEHICLE

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(21) Appl. No.: 11/299,367

(22) Filed: Dec. 8, 2005

(30) Foreign Application Priority Data

Oct. 26, 2005 (KR) 10-2005-0101196

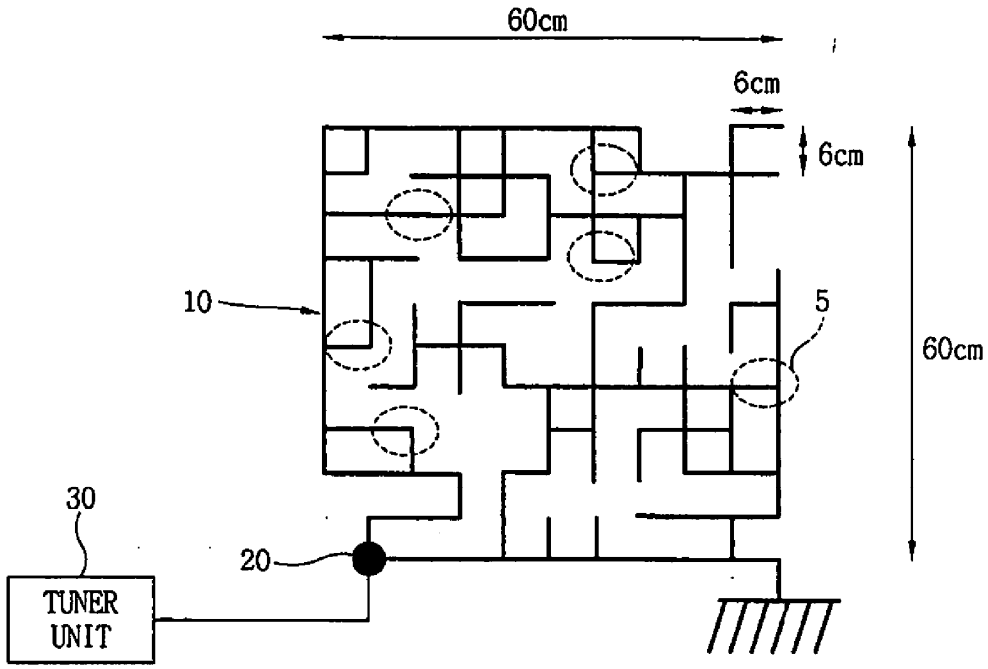
Publication Classification

(51) Int. Cl.
H01Q 1/32 (2006.01)

(52) U.S. Cl. 343/713

(57) ABSTRACT

Disclosed herein is a wideband glass antenna for a vehicle. The wideband glass antenna includes a loop antenna and a pattern. The loop antenna has a loop antenna pattern, in which a first side is connected to a feeding point, a second side is connected to a ground, and the two sides are connected to each other. The loop antenna pattern forms a predetermined space in the loop antenna. The pattern is formed in the loop antenna and is connected by a plurality of tuning arms for expanding a frequency band of the antenna.



US 20070091007A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0091007 A1

SAKO (43) Pub. Date: Apr. 26, 2007

(54) COIL ANTENNA

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(21) Appl. No.: 11/566,264

(22) Filed: Dec. 4, 2006

(30) Foreign Application Priority Data

Aug. 4, 2005 (JP) 2005-227153

Publication Classification

(51) Int. Cl.
H01Q 7/08 (2006.01)

(52) U.S. Cl. 343/788; 343/872

(57) ABSTRACT

A coil antenna includes a magnetic core and a coil wound around a bobbin which are accommodated within a case. The magnetic core and an end of the bobbin are connected to a cap. The magnetic core and an end portion of the bobbin are covered with a foamed component, and are further covered with a gel component. The foamed component is formed by a forming process, and an adhesive compound is provided between the magnetic core and the foamed component.