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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0126620 A1**

Channabasappa et al. (43) **Pub. Date: Jun. 7, 2007**

(54) **SYSTEM AND METHOD OF USING ABSORBER-WALLS FOR MUTUAL COUPLING REDUCTION BETWEEN MICROSTRIP ANTENNAS OR BRICK**

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(21) Appl. No.: **11/294,172**

(22) Filed: **Dec. 5, 2005**

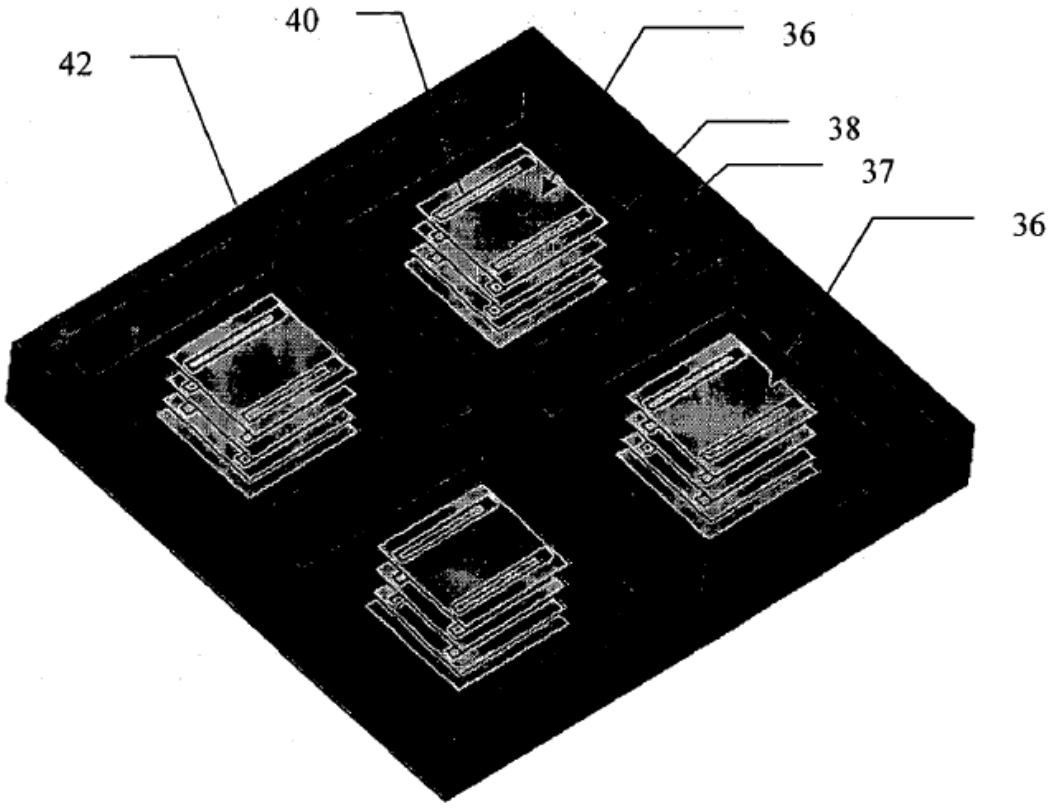
Publication Classification

(51) **Int. Cl.**
H01Q 17/00 (2006.01)

(52) **U.S. Cl.** **342/1**; 342/198; 342/4

(57) **ABSTRACT**

A multi-element antenna with sufficiently small return loss and mutual coupling signals to allow the simultaneous transmission of powerful radar signals and the reception of faint target return signals. The microstrip patch antenna has radio frequency absorbing material place between neighboring antenna elements to reduce the mutual coupling leakage signals.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0126637 A1**

Habib et al. (43) **Pub. Date: Jun. 7, 2007**

(54) **FRACTAL MONOPOLE ANTENNA**

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(21) Appl. No.: **11/293,369**

(22) Filed: **Dec. 5, 2005**

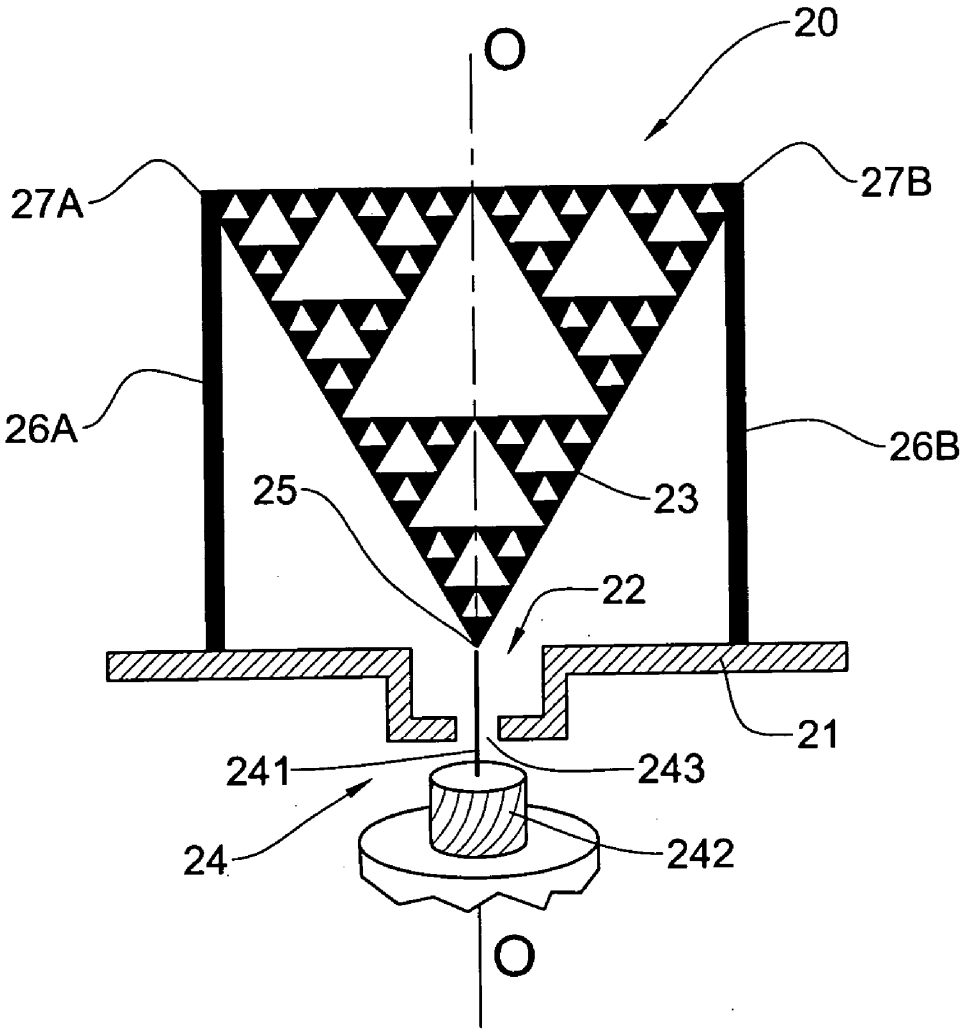
Publication Classification

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

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

(57) **ABSTRACT**

A monopole fractal antenna and a method of manufacturing thereof are described. The antenna includes a ground plane having a cavity recessed therein, a radiating arm backed by the cavity and coupled to a feeding line arranged at the cavity, and at least one pair of electrical shunts configured for connecting at least two points selected within the fractal portion of the radiating arm to the ground plane. At least a portion of the radiating arm has a fractal geometric shape. The radiating arm is extended from the cavity along an axis disposed in relation to the ground plane.



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Channabasappa (43) **Pub. Date: Jun. 7, 2007**

(54) **COMPACT BROADBAND PATCH ANTENNA**

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(21) Appl. No.: **11/293,558**

(22) Filed: **Dec. 2, 2005**

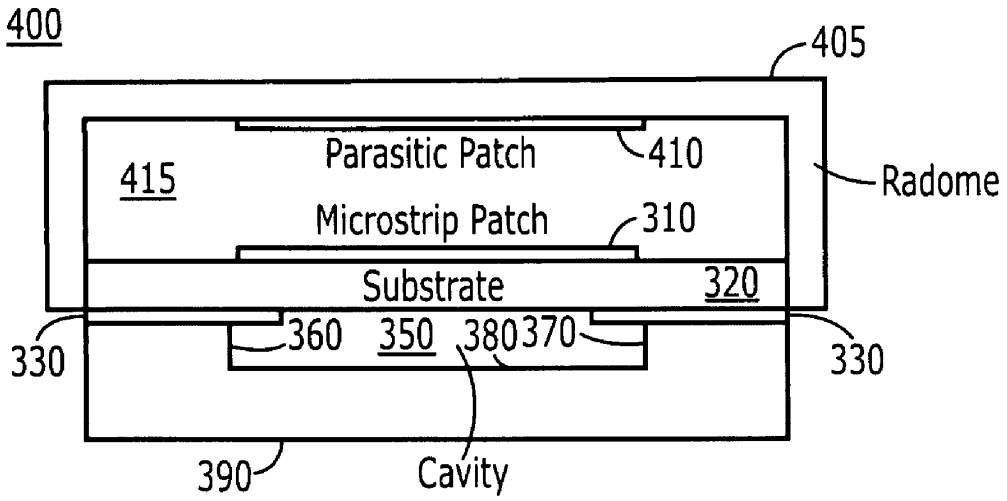
Publication Classification

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

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

(57) **ABSTRACT**

The invention provides a compact patch antenna having a cavity underneath the driver patch, so that the electromagnetic volume of the antenna is expanded without increasing the overall area of the antenna. More specifically, the compact patch antenna comprises a base layer having a cavity, a ground plane located on the base layer, and having an opening over at least a portion of the cavity, a substrate located on the ground plane, and a driver patch located on the substrate. The invention further provides a method for constructing a compact patch antenna, comprising the steps of providing a base layer having a cavity, providing a ground plane located on the base layer, and having an opening over at least a portion of the cavity, providing a substrate located on the ground plane, and providing a driver patch located on the substrate.



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(12) Patent Application Publication (10) Pub. No.: US 2007/0126639 A1

Lee (43) Pub. Date: Jun. 7, 2007

(54) THREE-DIMENSIONAL ANTENNA STRUCTURE

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(21) Appl. No.: **11/309,198**

(22) Filed: **Jul. 13, 2006**

(30) **Foreign Application Priority Data**

Dec. 7, 2005 (TW)..... 94143092

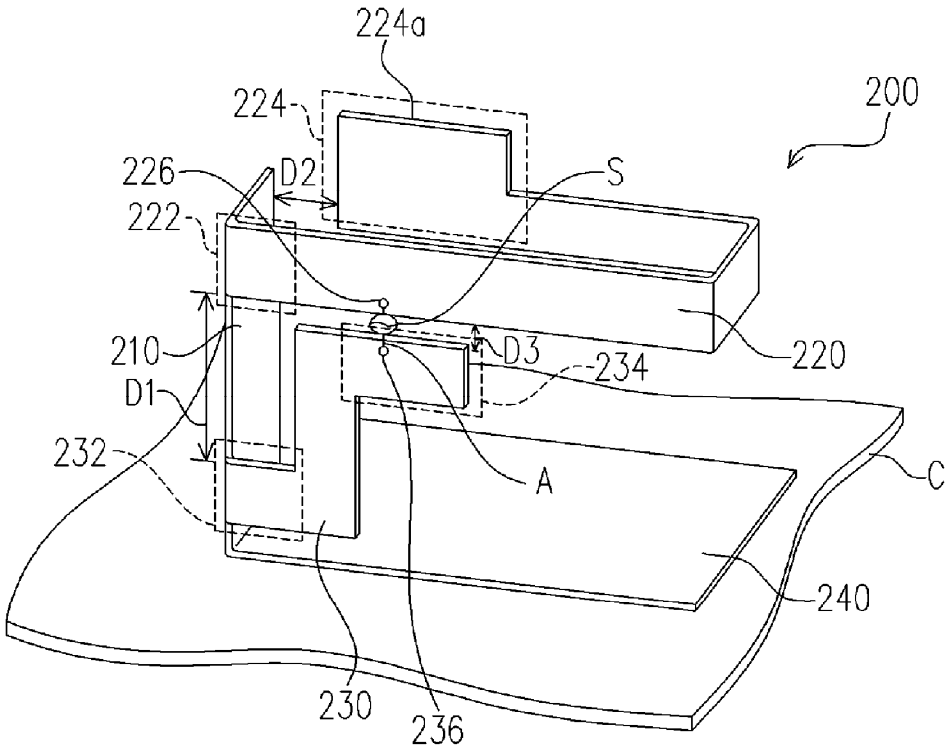
Publication Classification

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

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

(57) **ABSTRACT**

A three-dimensional antenna structure suitable for being built in an electronic device includes a vertical patch, an annular patch and a ground patch. The vertical patch is suitable for generating a vertical current. One end of the annular patch is connected to the vertical patch, and the annular patch surrounds one side of the vertical patch for generating an annular current. An omni-directional radiation field is generated by the annular current and the vertical current. The annular patch has a feed point for electrically connecting to a signal source. One end of the ground patch is connected to the vertical patch. A distance exists between the end of the annular patch and the end of the ground patch. The other end of the ground patch has a shorting point next to the feed point and is suitable for electrically connecting to a ground.



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0126640 A1

Lee (43) Pub. Date: Jun. 7, 2007

(54) PLANAR ANTENNA STRUCTURE

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(21) Appl. No.: **11/309,199**

(22) Filed: **Jul. 13, 2006**

(30) **Foreign Application Priority Data**

Dec. 7, 2005 (TW)..... 94143096

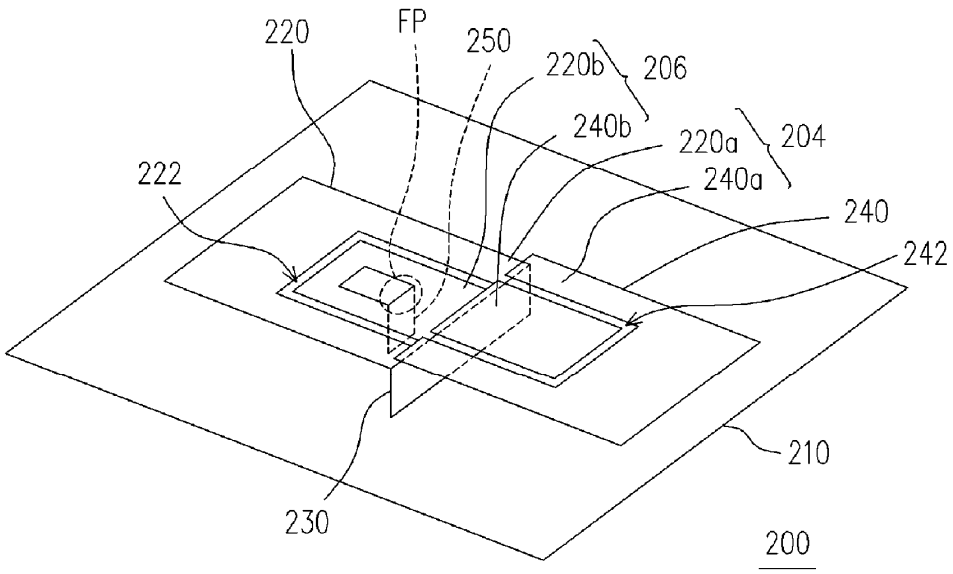
Publication Classification

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

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

(57) **ABSTRACT**

A planar antenna structure including a ground conductor, a first radiating patch, a shorting patch and a second radiating patch is provided. The first radiating patch is disposed above the ground conductor. One end of the shorting patch is connected with the ground conductor, and the other end thereof is connected with one side of the first radiating patch. A projection of the first radiating patch on the ground conductor is located on one side of a projection of the shorting patch on the ground conductor. The second radiating patch is disposed above the ground conductor and the first radiating. A projection of the second radiating patch on the ground conductor traverses both sides of the projection of the shorting patch on the ground conductor. The projection of the second radiating patch on the ground conductor partially overlaps with the projection of the first radiating patch on the ground conductor.



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(19) **United States**

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Saily (43) **Pub. Date: Jun. 7, 2007**

(54) **DUAL-POLARIZED MICROSTRIP PATCH ANTENNA STRUCTURE**

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(21) Appl. No.: **11/600,142**

(22) Filed: **Nov. 16, 2006**

(30) **Foreign Application Priority Data**

Dec. 2, 2005 (FI)..... 20055637

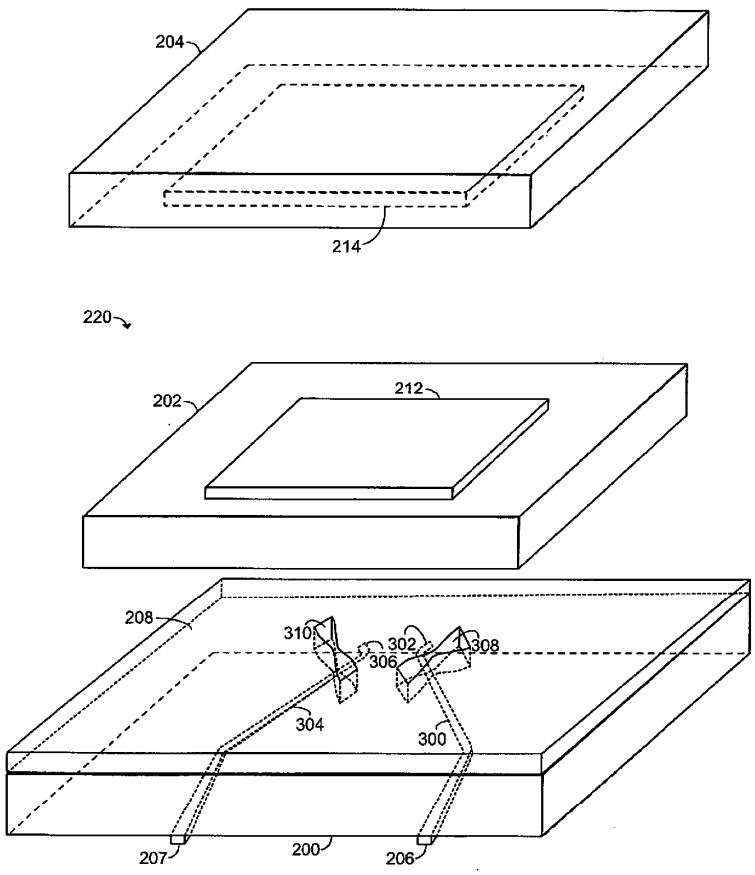
Publication Classification

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

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

(57) **ABSTRACT**

A dual-polarized microstrip patch antenna structure comprising: a dual microstrip feed line circuitry underneath a bottom dielectric substrate; a ground plane layer overlying the bottom dielectric substrate, the ground plane layer having coupling apertures etched to the ground plane layer; a middle metallized patch layer stacked over a middle dielectric substrate; a top metallized patch layer stacked underneath a top dielectric substrate; and an air layer between the middle dielectric substrate and the top dielectric substrate separating the middle metallized patch layer and the top metallized patch layer. The microstrip feed line circuitry is configured to utilize corner-feeding techniques for enabling diagonal modes of the patch layers, and the coupling apertures of the ground plane layer are provided with a non-resonant bow-tie shape for enabling aperture coupling between the microstrip feed line circuitry and the patch layers.



US 20070126644A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0126644 A1

Kim et al. (43) Pub. Date: Jun. 7, 2007

(54) ANTENNA APPLIED TO SLIDE TYPE MOBILE COMMUNICATION TERMINAL

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(21) Appl. No.: **11/486,280**

(22) Filed: **Jul. 14, 2006**

(30) **Foreign Application Priority Data**

Dec. 5, 2005 (KR) 2005-117554

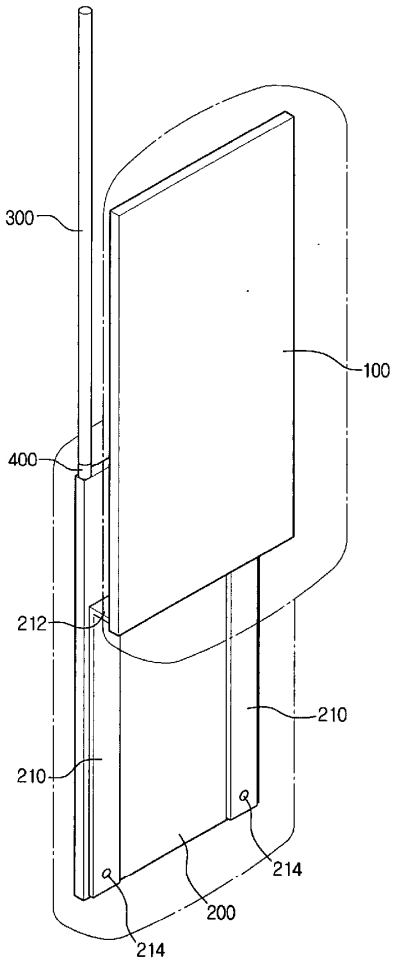
Publication Classification

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

(52) **U.S. Cl.** **343/702**; 343/757

(57) **ABSTRACT**

An antenna applied to a slide type mobile communication terminal includes a first board mounted in a first body; a second board mounted in a second body; a radiating element mounted to the second body; and a first contact formed to connect to the second board at one end and contact with the first board at the other end when the first body slides. Accordingly, an antenna with directionality can be realized for applications to short range communication systems.



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0126648 A1

Svensson et al. (43) Pub. Date: Jun. 7, 2007

(54) ANTENNA DEVICE AND ARRAY ANTENNA

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(21) Appl. No.: **10/584,907**

(22) PCT Filed: **Dec. 27, 2004**

(86) PCT No.: **PCT/SE04/02011**

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(2), (4) Date: **Jun. 29, 2006**

(30) **Foreign Application Priority Data**

Dec. 30, 2003 (SE) PCT/SE03/02102

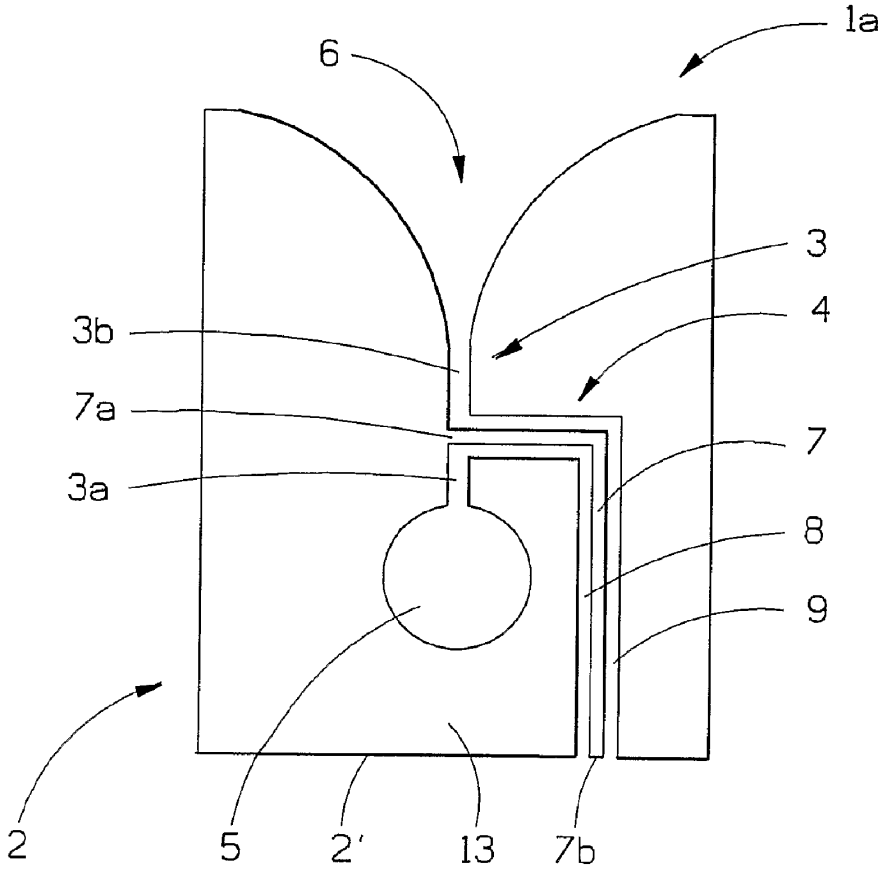
Publication Classification

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

(52) **U.S. Cl.** **343/767**; 343/770

(57) **ABSTRACT**

The present invention relates to a broadband non-resonant antenna device for wireless transmission of information using electromagnetic signals, comprising a metal sheet layer, forming a plane, with a slotline that comprises a first part and a second part. The side of the second part that is the most distant from the first part transcends into a widening open-ended tapered slot in the metal sheet layer. The device additionally comprises a feeding line in the metal sheet layer. The feeding line comprises a feeding part, with a first end and a second end, and gaps separating the feeding part from the surrounding metal sheet layer by a certain distance, where the slotline is intersected by the feeding line.



US 20070132640A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0132640 A1

Kim et al. (43) Pub. Date: Jun. 14, 2007

(54) PLANAR INVERTED F ANTENNA TAPERED TYPE PIFA WITH CORRUGATION

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(21) Appl. No.: **10/575,347**

(22) PCT Filed: **Oct. 15, 2004**

(86) PCT No.: **PCT/KR04/02654**

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(2), (4) Date: **Apr. 11, 2006**

(30) **Foreign Application Priority Data**

Oct. 16, 2003 (KR) 10-2003-0072082

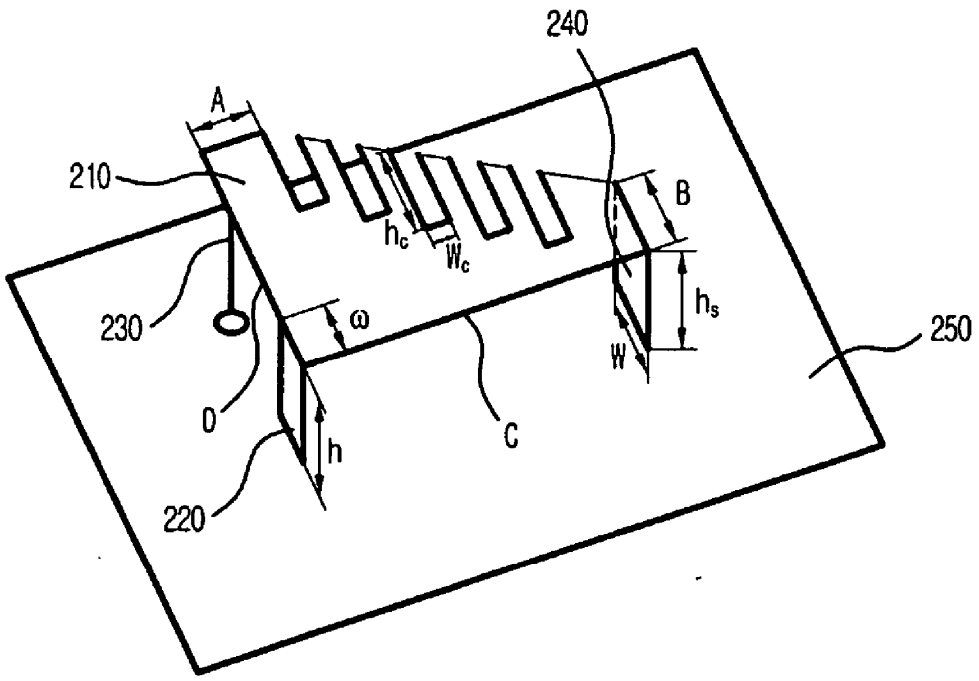
Publication Classification

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

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

(57) **ABSTRACT**

A planar inverted F antenna having a radiation patch having an asymmetric shape of linearly-tapered rectangle with a plurality of corrugated hollows is disclosed. The planar inverted F antenna having a radiation patch, includes: a first radiation patch for radiating a signal; a ground plate for grounding the first radiation patch; a feeding line for supplying an electric power to the first radiation patch; a short plate having one side coupled to the first radiation patch and other side coupled to the ground plate for shorting the first radiation patch, wherein the first radiation patch having an asymmetrical shape of linearly tapered rectangle and has one or more corrugated hollows.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0132641 A1**

Korva et al. (43) **Pub. Date: Jun. 14, 2007**

(54) **MULTIBAND PLANAR ANTENNA**

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(21) Appl. No.: **10/595,607**

(22) PCT Filed: **Sep. 21, 2004**

(86) PCT No.: **PCT/FI04/00554**

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(2), (4) Date: **Apr. 28, 2006**

(30) **Foreign Application Priority Data**

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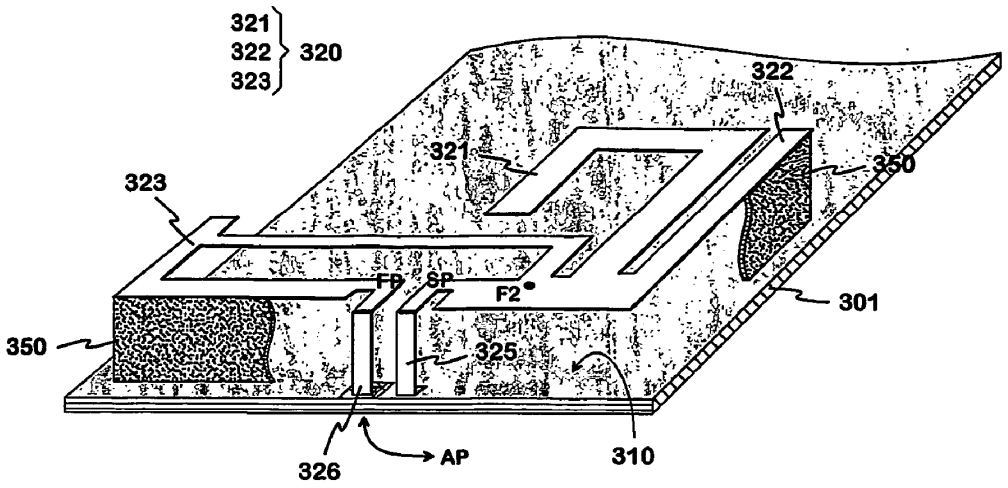
Publication Classification

(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 multiband planar antenna intended for small-sized radio devices and a radio device. The basic structure of the antenna is a two-resonance PIFA, the radiating plane (**320**) of which has a structural part (**321**) corresponding to the lowest operating band and a structural part (**322**) corresponding to the upper operating band. In addition, a loop resonator (**323**) operating as a radiator is formed in the radiating plane. The ground conductor (**325**) of the feed line of the loop is at the same time the short-circuit conductor of the PIFA. The second conductor (**326**) of the feed line is connected to the opposite end of the loop, and it operates as the feed conductor of the PIFA. At the same time the structural part (**321**) of the radiating plane that corresponds to the lowest operating band is located between the loop and the structural part of the PIFA that corresponds to the upper operating band, in order to reduce the interference between them. The resonance frequency of the loop radiator is arranged on the upper operating band of the antenna, for example. Thus the loop improves the matching of the antenna on the upper operating band and the matching and efficiency on the lowest operating band as well. This is based on additional inductance caused by the loop conductor (**323**) that functions as a part of the feed conductor of the PIFA.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0132644 A1**

Chen et al. (43) **Pub. Date: Jun. 14, 2007**

(54) **ANTENNA STRUCTURE FOR MULTIPLE INPUT AND OUTPUT SIGNALS**

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(21) Appl. No.: **11/362,575**

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

(30) **Foreign Application Priority Data**

Dec. 9, 2005 (TW)..... 094221582

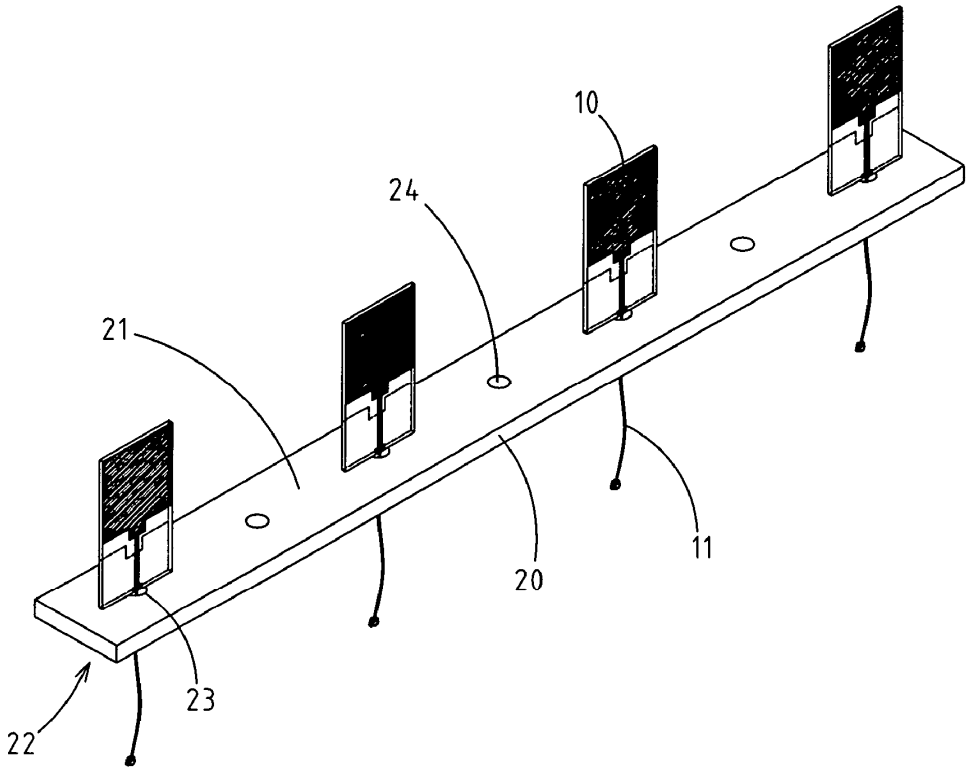
Publication Classification

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

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

(57) **ABSTRACT**

The present invention provides an antenna structure for input and output signals, which includes multiple antenna units and a carrier. The carrier has a first and second bearing surface, the first bearing surface of the carrier having multiple antenna units placed on it separately, so that the loading structure of the antenna units goes through the first bearing surface to the second bearing surface. A boring hole is placed on the carrier, and the boring hole is used to secure the carrier with antenna units on a object. Through this invention, the antenna uses the carrier to integrate the module and makes the antenna structure for multiple input and output signals.



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(19) **United States**

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Hung et al. (43) **Pub. Date: Jun. 14, 2007**

(54) **MULTI-BAND ANTENNA**

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(21) Appl. No.: **11/638,597**

(22) Filed: **Dec. 12, 2006**

(30) **Foreign Application Priority Data**

Dec. 12, 2005 (TW)..... 94143788

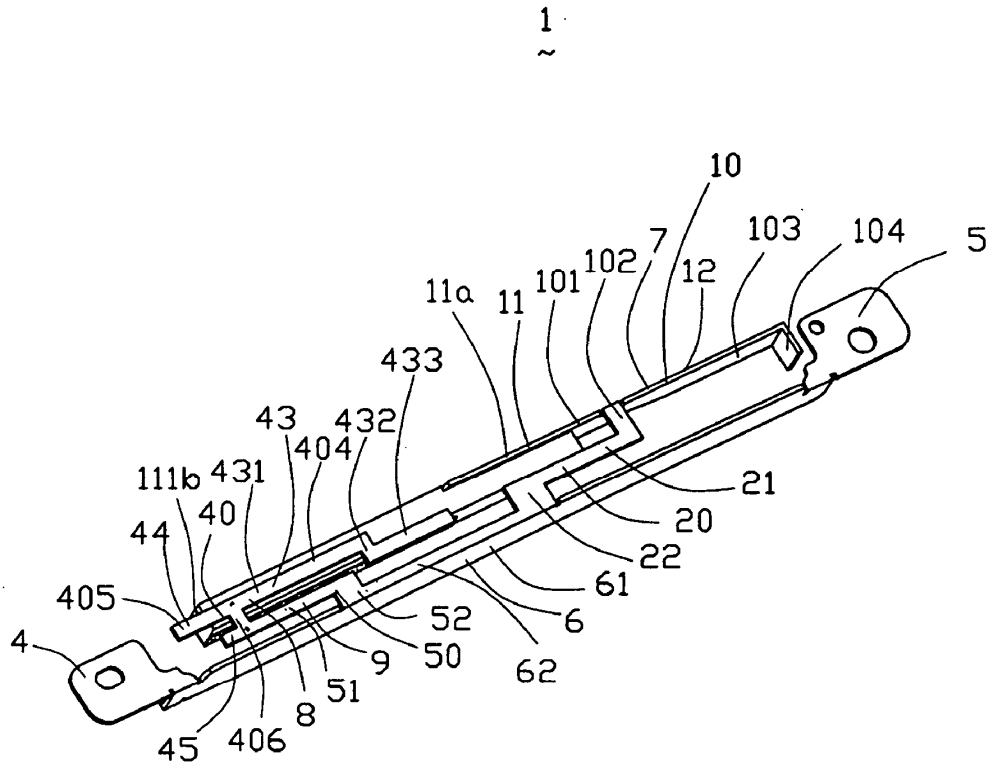
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band antenna includes a first antenna operating at wireless wide area network and having a first radiating arm, a second antenna operating at wireless local area network and a grounding portion employed by the first antenna and the second antenna. Wherein the first radiating arm of the first antenna further includes a metallic sheet, an insulative member affixed to the metallic sheet and a metal foil affixed to the insulative member.



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0132647 A1

Kezys et al. (43) Pub. Date: Jun. 14, 2007

(54) MOBILE WIRELESS COMMUNICATIONS DEVICE WITH HUMAN INTERFACE DIVERSITY ANTENNA AND RELATED METHODS

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

(21) Appl. No.: **11/616,405**

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

Related U.S. Application Data

(63) Continuation of application No. 11/067,935, filed on Feb. 28, 2005, now Pat. No. 7,187,332.

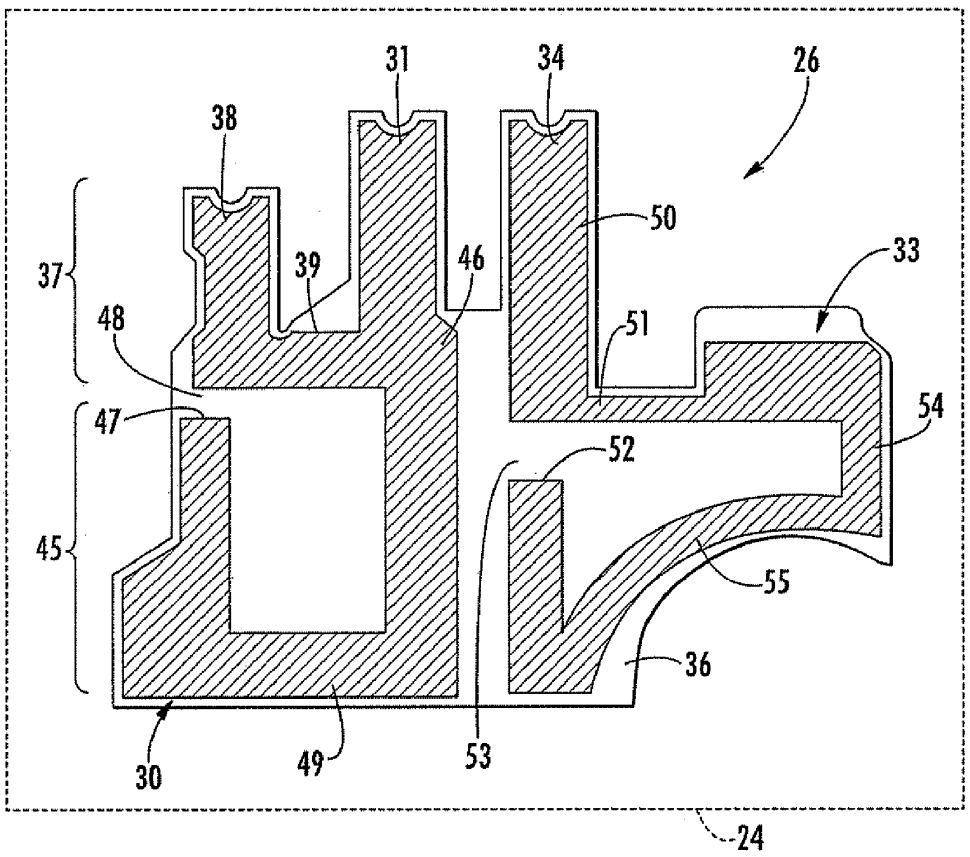
Publication Classification

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

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

(57) **ABSTRACT**

A mobile wireless communications device may include a portable handheld housing, and a wireless transceiver carried by the housing. A pair of an antennas are positioned in side-by-side relation preferably in the upper portion of the portable handheld housing. A human interface diversity controller is connected to the wireless transceiver to preferentially operate with the plurality of antennas based upon a relative position of the portable handheld housing with respect to a hand of a human user. The device can select or weight the antennas based upon the position of the device when being held by a user.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0132648 A1**

Abe (43) **Pub. Date: Jun. 14, 2007**

(54) **ANTENNA DEVICE AND ELECTRONIC EQUIPMENT COMPRISING THE ANTENNA DEVICE**

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(21) Appl. No.: **11/634,463**

(22) Filed: **Dec. 5, 2006**

(30) **Foreign Application Priority Data**

Dec. 8, 2005 (JP) 2005-354239
Sep. 29, 2006 (JP) 2006-268049

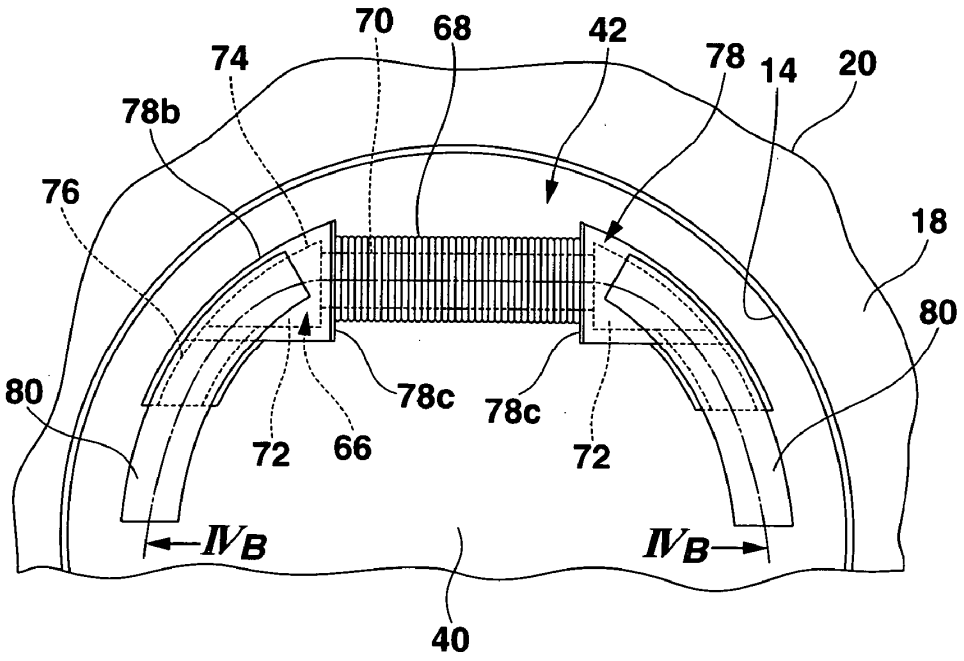
Publication Classification

(51) **Int. Cl.**
H01Q 1/12 (2006.01)

(52) **U.S. Cl.** **343/718**

(57) **ABSTRACT**

An antenna device, housed in a space of a case of an electronic equipment, the case having a surface in which an aperture is formed, includes a magnetic substance and a coil wound around the substance. The substance includes a coil winding portion and a pair of coil non-winding portions protruding from both ends of the winding portion and magnetically coupled with the winding portion. At least one of the coil non-winding portions is curved in an arc shape toward a distal end thereof from a base thereof so as to extend along an inner periphery of the space when the device is housed in the space and is viewed from the surface. The equipment further includes a circuit unit housed in the space, electrically connected to the device, and controlled on a basis of a signal inputted from the device, and a decorative plate closing the aperture.



US 20070132650A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0132650 A1

Lalezari (43) Pub. Date: Jun. 14, 2007

(54) **ULTRA-BROADBAND ANTENNA SYSTEM COMBINING AN ASYMMETRICAL DIPOLE AND A BICONICAL DIPOLE TO FORM A MONOPOLE**

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(21) Appl. No.: **11/298,482**

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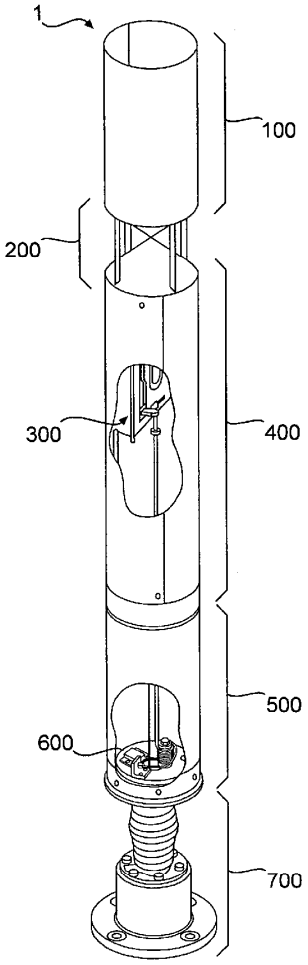
Publication Classification

(51) **Int. Cl.**
H01Q 13/00 (2006.01)

(52) **U.S. Cl.** **343/773**; 343/792; 343/730

(57) **ABSTRACT**

An ultra-broadband antenna system is disclosed. The antenna system is a single tubular antenna structure comprising an asymmetrical dipole fed with a biconical dipole. The biconical dipole covers the high frequency spectrum, while the asymmetrical dipole covers intermediate frequencies. The invention further relates to a combination of the two dipole structures such that together they act as a monopole to cover the low frequency spectrum. A first RF connector attaches to the asymmetrical dipole and the biconical dipole, and a second RF connector excites the combination of the two dipoles as one large monopole. A choke minimizes interference between the asymmetrical/biconical dipoles and the monopole. The resulting frequency span is greater than 500:1, providing operation over the range of 20 MHz to 10 GHz.



US 20070132654A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0132654 A1**

Ozkar (43) **Pub. Date: Jun. 14, 2007**

(54) **TUNING ANTENNAS WITH FINITE GROUND PLANE**

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(21) Appl. No.: **11/297,337**

(22) Filed: **Dec. 9, 2005**

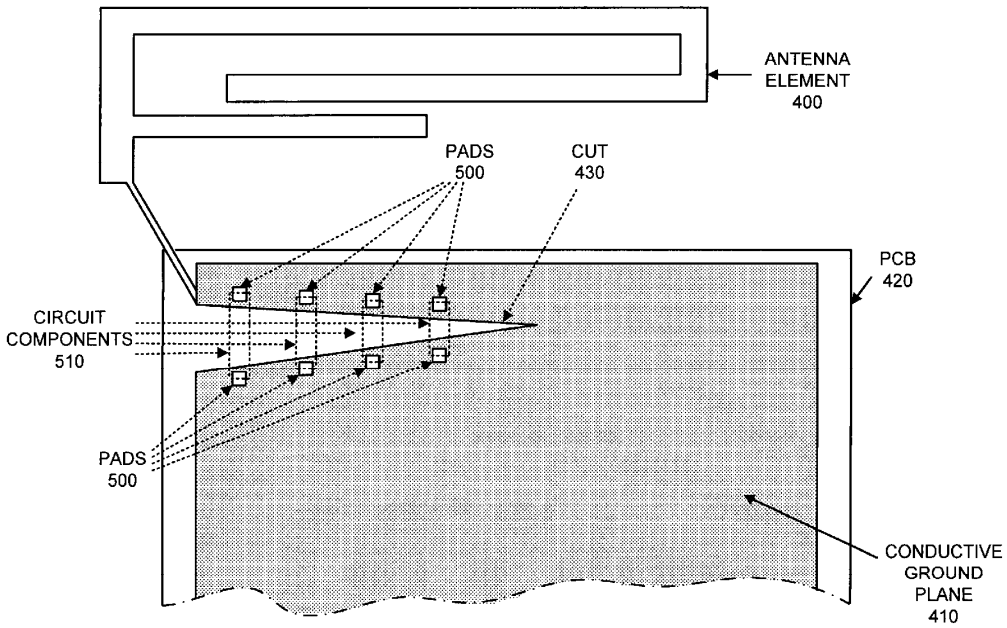
Publication Classification

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

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

(57) **ABSTRACT**

A method of changing a resonant frequency of an antenna includes coupling the antenna to a ground plane of a circuit board, where the ground plane includes conductive material. The method further includes removing a section of conductive material from a first location of the ground plane, where the shape of the removed section and the first location determine the resonant frequency of the antenna.



US 20070132656A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0132656 A1**

KIM et al. (43) **Pub. Date: Jun. 14, 2007**

(54) **ANTENNA INCORPORATING POLAR LIQUID**

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(21) Appl. No.: **11/456,515**

(22) Filed: **Jul. 10, 2006**

(30) **Foreign Application Priority Data**

Jul. 11, 2005 (KR) 10-2005-62352
Aug. 2, 2005 (KR) 10-2005-70730

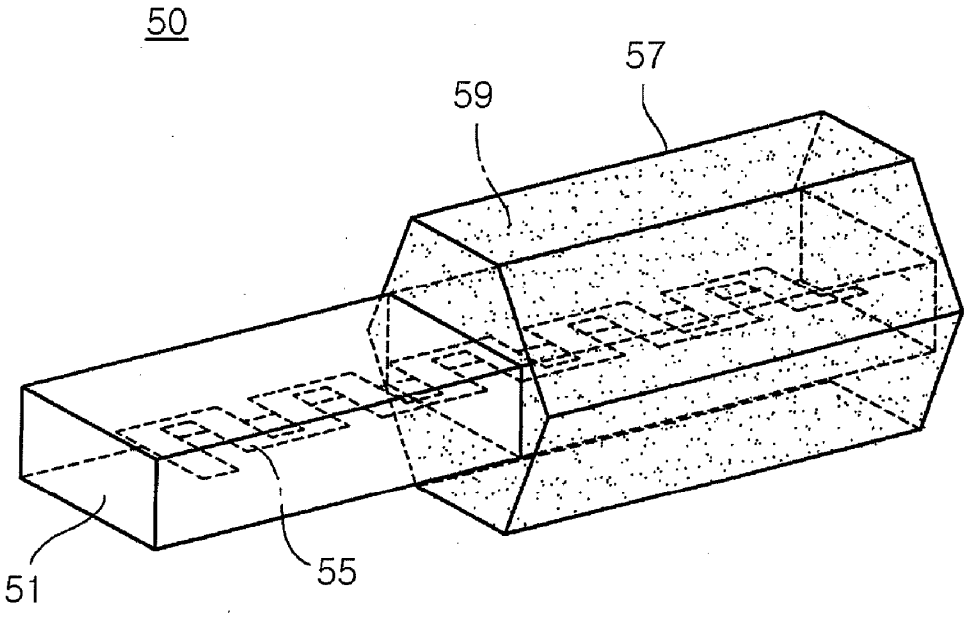
Publication Classification

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

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

(57) **ABSTRACT**

A novel structure of antenna includes a polar liquid, a container made of an insulating material and containing the polar liquid, and a feeder connected to the polar liquid contained in the container. Then, the polar liquid acts as a radiator. A wideband antenna includes a radiator constructed of a conductor having an electrical resonant length corresponding to a unique resonant frequency. The radiator having a feeder at one end connected to an outer circuit. A container made of an insulating material contains at least a portion of the radiator therein or disposed adjacent to a portion of the radiator, and a polar liquid contained inside the container affects electromagnetic flow of the radiator in order to change the unique resonant frequency of the radiator.



US 20070132658A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0132658 A1**

Quintero Illera et al. (43) **Pub. Date: Jun. 14, 2007**

(54) **MULTIBAND ANTENNA**

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(21) Appl. No.: **11/702,791**

(22) Filed: **Feb. 6, 2007**

Related U.S. Application Data

(63) Continuation of application No. 10/823,257, filed on Apr. 13, 2004.

(30) **Foreign Application Priority Data**

Oct. 16, 2001 (EP) PCT/EP01/11912

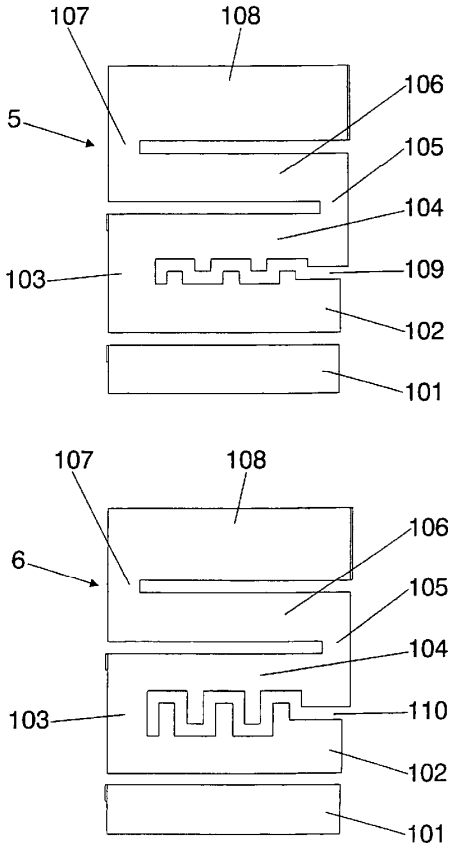
Publication Classification

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

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

(57) **ABSTRACT**

The present invention relates generally to a new family of antennas with a multiband behaviour, so that the frequency bands of the antenna can be tuned simultaneously to the main existing wireless services. In particular, the invention consists of shaping at least one of the gaps between some of the polygons of the multilevel structure in the form of a non-straight curve, shaped in such a way that the whole gap length is increased yet keeping its size and the same overall antenna size. Such a configuration allows an effective tuning of the frequency bands of the antenna, such that with the same overall antenna size, said antenna can be effectively tuned simultaneously to some specific services, such as for instance the five frequency bands that cover the services AMPS, GSM900, GSM1800, PCS1900, UMTS, Bluetooth™, IEEE802.11b, or HyperLAN.



US 20070139270A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139270 A1

Takei et al. (43) Pub. Date: Jun. 21, 2007

(54) ANTENNA AND METHOD OF MANUFACTURING THE SAME, AND PORTABLE WIRELESS TERMINAL USING THE SAME

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(21) Appl. No.: **10/578,769**

(22) PCT Filed: **Jul. 29, 2004**

(86) PCT No.: **PCT/JP04/11193**

§ 371(c)(1),
(2), (4) Date: **Jan. 29, 2007**

(30) **Foreign Application Priority Data**

Nov. 13, 2003 (JP) 2003-383647

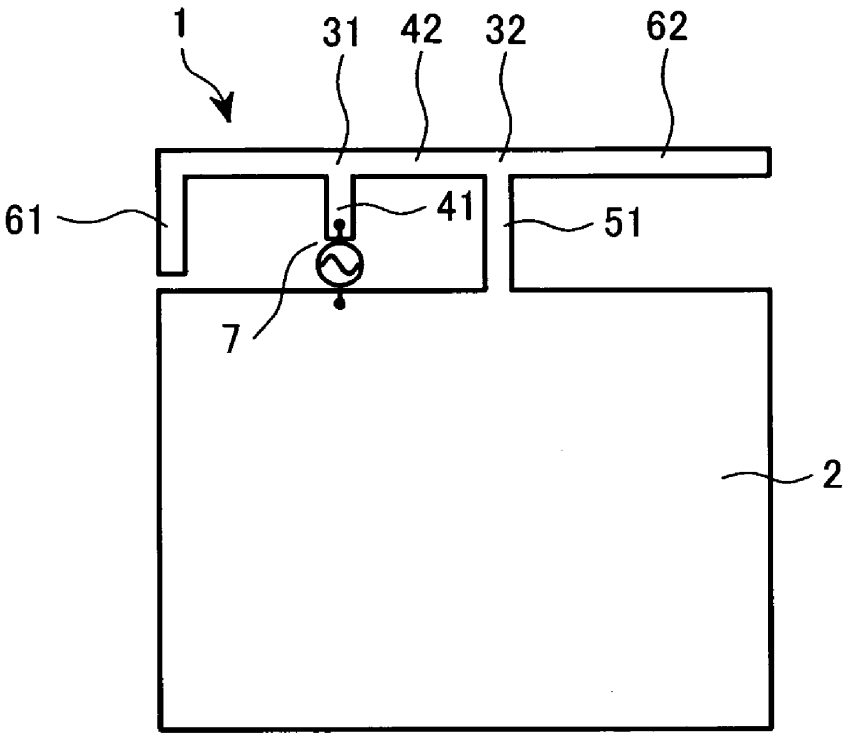
Publication Classification

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

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

(57) **ABSTRACT**

A small antenna operating in multiple modes including three or more modes. There are provided an antenna that includes a ground conductor having a ground potential, a single feeding point whose one end is formed by a part of the ground conductor, and a plurality of transmission lines to which RF power supplied to the feeding point is input, the transmission lines each radiating electromagnetic waves of three frequencies of three modes into space. These transmission lines comprises a transmission line **41** that is connected to the feeding point at one end and to a branching point at the other end, a transmission line connected between branching points, and transmission lines connected to the branching points. The lengths of the respective transmission lines are set so that impedance matching is performed at the feeding point with respect to a plurality of frequencies. The antenna is formed from an integrated metal plate.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0139275 A1**

Deaett et al. (43) **Pub. Date: Jun. 21, 2007**

(54) **NON-WOVEN TEXTILE MICROWAVE ANTENNAS AND COMPONENTS**

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(21) Appl. No.: **11/305,677**

(22) Filed: **Dec. 16, 2005**

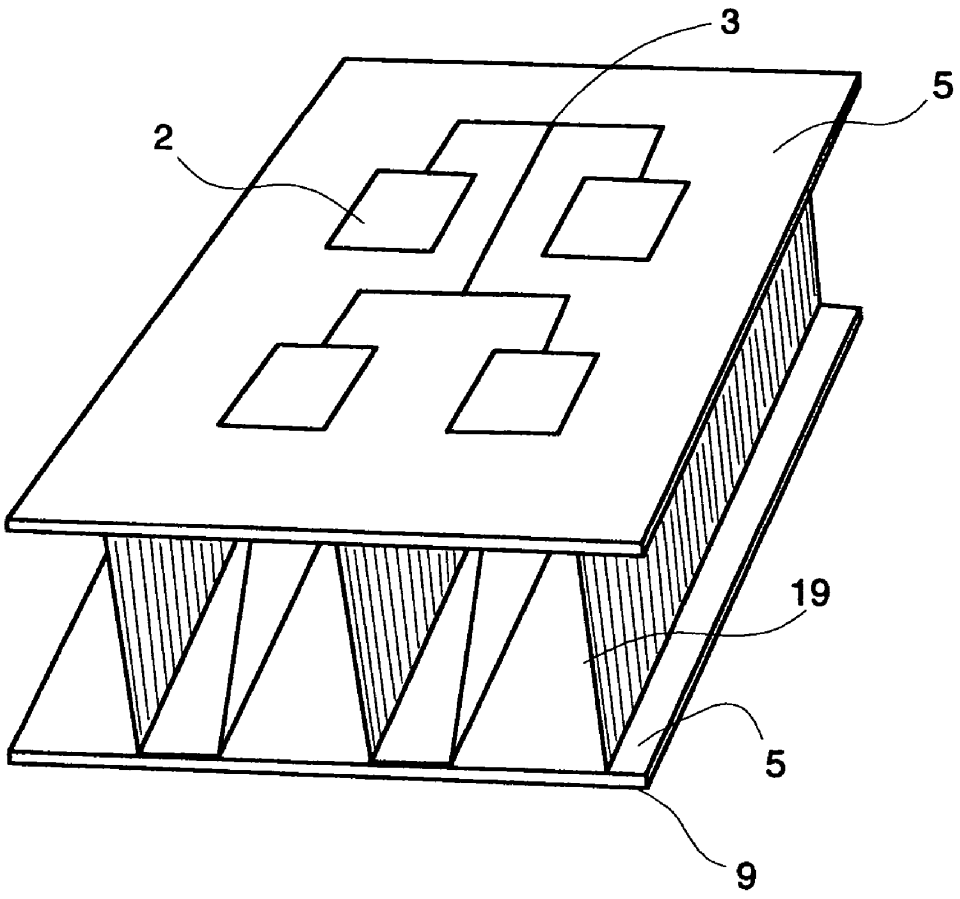
Publication Classification

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

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

(57) **ABSTRACT**

An Antenna comprising a ground layer, a feed layer, an antennal layer and a corrugated or dimpled non-woven fabric dielectric substrate interposed between two of the layers. The use of said non-woven corrugated fabric is to provide differing distances between the ground layer and the antenna layer as well as to provide both light weight construction and flexibility.



US 20070139276A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139276 A1

Svigelj et al. (43) Pub. Date: Jun. 21, 2007

(54) **ELECTRICALLY SMALL LOW PROFILE SWITCHED MULTIBAND ANTENNA**

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(21) Appl. No.: **11/313,087**

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

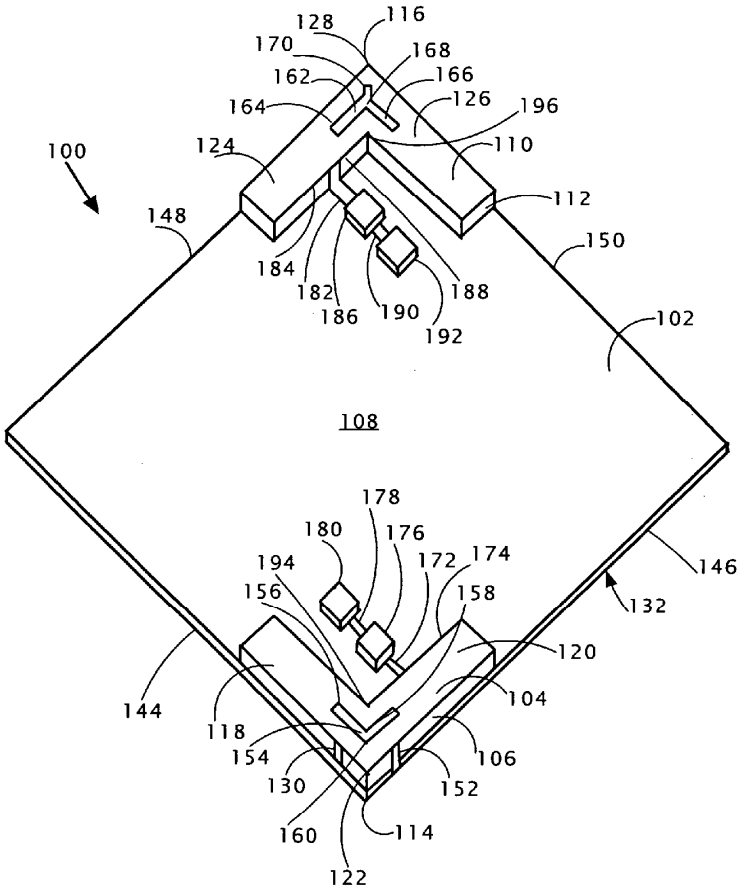
Publication Classification

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

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

(57) **ABSTRACT**

A small volume antenna (**100**) has the form of a polygonal (e.g., square) board with multiple antenna elements (**104, 110**) located at vertices (**114, 116**) (e.g., opposite vertices). The antenna elements (**104, 110**) include two segments (**118, 120, 124, 126**) that meet at corners (**122, 128**) that are located at the vertices (**114, 116**). Peripheral portions (**134, 136, 138, 140**) of a ground plane (**132**) that underlie the segments (**118, 120, 124, 126**) of the antenna elements are deleted, and slots (**154, 162**) that have two joined segments (**156, 158, 164, 166**) that parallel the segments (**118, 120, 124, 126**) of the antenna elements (**104, 110**) are formed in the antenna elements. The antenna elements (**104, 110**) are selectively loaded by switched impedance (e.g., capacitance) networks (**172, 176, 178, 180, 182, 186, 190, 192**). The antenna (**100**) is able to support operation in at least two broad operating bands.



US 20070139277A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0139277 A1**

Nissinen et al. (43) **Pub. Date: Jun. 21, 2007**

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

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(21) Appl. No.: **11/603,511**

(22) Filed: **Nov. 22, 2006**

(30) **Foreign Application Priority Data**

Nov. 24, 2005 (FI)..... 20055621

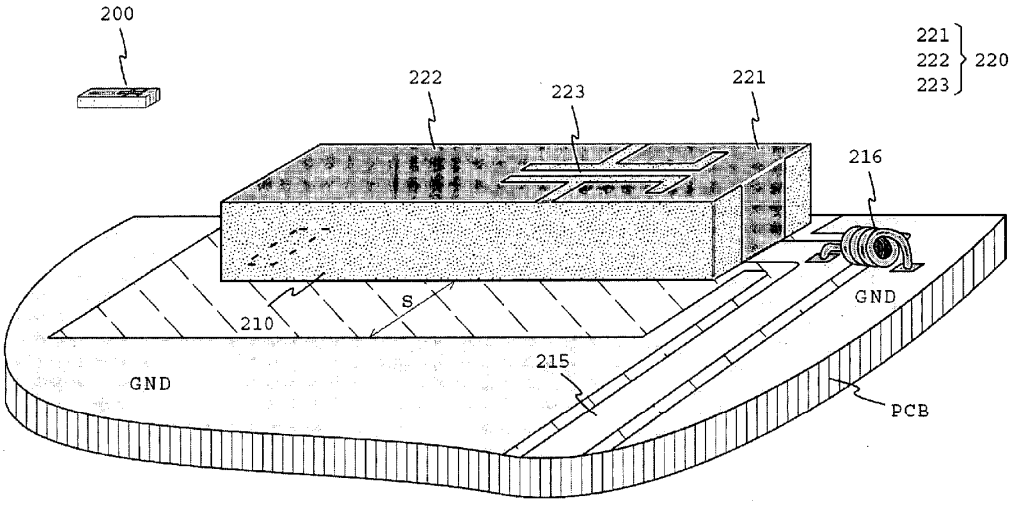
Publication Classification

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

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

(57) **ABSTRACT**

A multiband antenna, and component for implementing a multiband antenna for, e.g., a small-sized radio device. In one embodiment, the antenna component comprises a simple and reliable dielectric substrate, the conductive coating of which forms a radiating element. This has a plurality (e.g., two) resonances for forming separate operating bands. The lower resonance is based on the entire element, and the upper resonance on the head part of the element. The conductive coating has a pattern, which functions as a parallel resonance circuit between the head part and the tail part of the element. The natural frequency of this parallel resonance circuit is in the range of the upper operating band of the antenna. The resonance frequencies of the antenna and thus its operating bands can be tuned independently of each other so that the tuning cycle need not be repeated.



US 20070139280A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0139280 A1**

Vance (43) **Pub. Date: Jun. 21, 2007**

(54) **SWITCHABLE PLANAR ANTENNA APPARATUS FOR QUAD-BAND GSM APPLICATIONS**

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(21) Appl. No.: **11/359,896**

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

Related U.S. Application Data

(60) Provisional application No. 60/750,863, filed on Dec. 16, 2005.

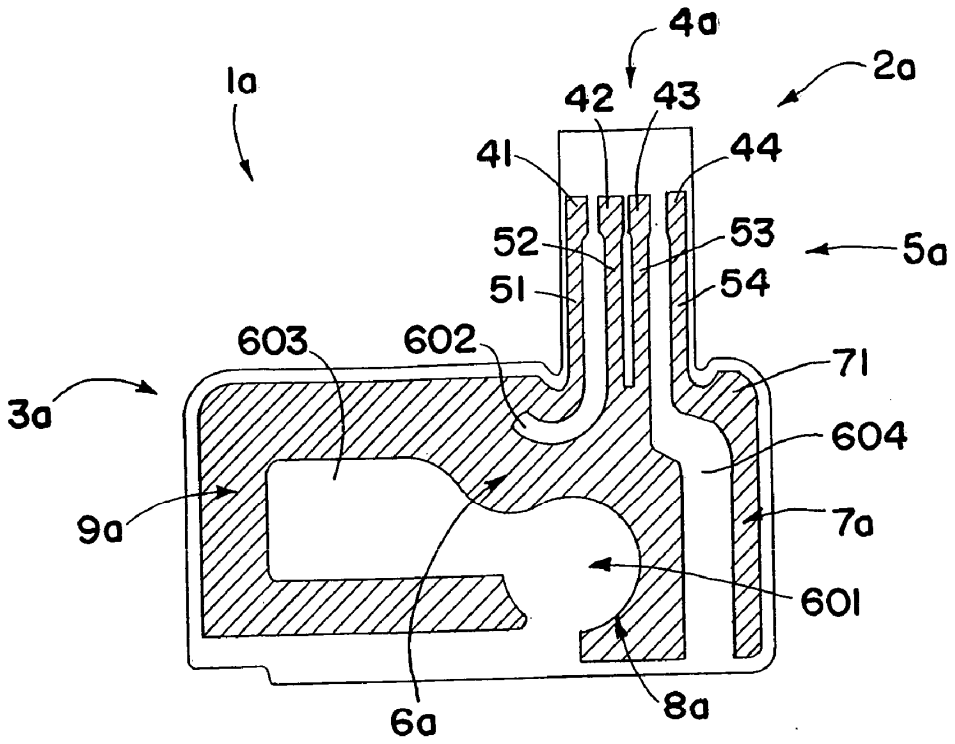
Publication Classification

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

(52) **U.S. Cl.** **343/702**; 343/906

(57) **ABSTRACT**

An antenna apparatus for a wireless electronic device includes an antenna radiation device that is operable to transmit and/or receive electromagnetic waves in one or more frequency bands concurrently, and an antenna feeding device which is operable to transmit and/or receive electrical data from and/or to the antenna radiation device. Furthermore, the antenna radiation device includes a joint antenna device, wherein the joint antenna device comprises a high-band antenna device and a low-band antenna device and is operable to transmit and/or receive electromagnetic waves in a low- and a high-frequency band concurrently and to switch to different predetermined frequency bands of the high-band antenna device and/or low-band antenna device. Furthermore, the antenna feeding device includes at least three contacts operable for connecting one radio frequency source, at least one ground contact and at least one impedance matching. Favorably this antenna apparatus is operable for quad-band GSM (Global Systems of Mobile Communications) applications.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0139281 A1**

Park et al. (43) **Pub. Date: Jun. 21, 2007**

(54) **MOBILE TERMINAL WITH PLURAL ANTENNAS**

(75) Inventors: **Se-hyun Park**, Suwon-si (KR); **Byung-tae Yoon**, Suwon-si (KR); **Young-eil Kim**, Suwon-si (KR); **Seong-soo Lee**, Suwon-si (KR)

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(21) Appl. No.: **11/522,966**

(22) Filed: **Sep. 19, 2006**

(30) **Foreign Application Priority Data**

Dec. 16, 2005 (KR) 2005-124851

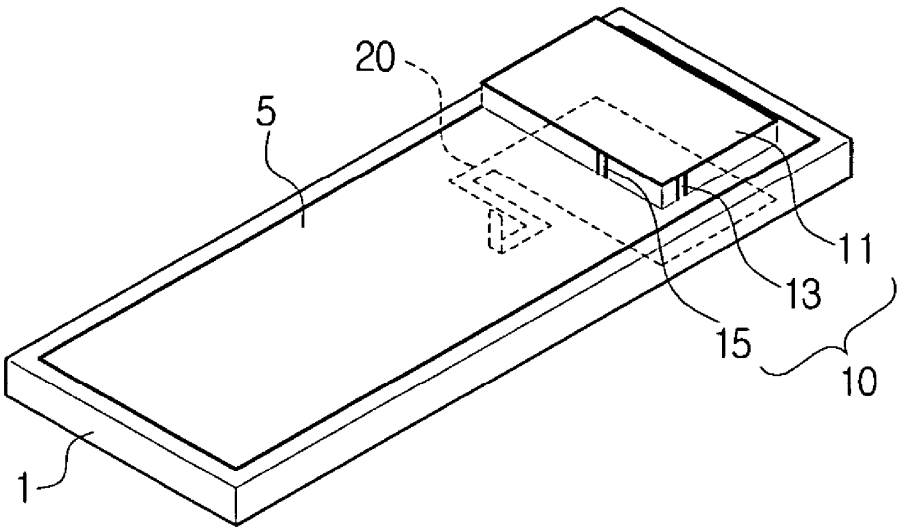
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed is a mobile terminal with plural antennas. The mobile terminal with plural antennas, comprising a circuit board formed with a variety of elements, at least one first antenna formed on one surface of the circuit board to transmit and receive a radio signal for mobile communications, and at least one second antenna formed on the other surface of the circuit board to transmit and receive a radio signal for additional services. Accordingly, as the size of the mobile terminal does not necessarily increase to have plural antennas, the mobile terminal can be miniaturized.



US 20070139285A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139285 A1

Maruyama et al. (43) Pub. Date: Jun. 21, 2007

(54) LOOP ANTENNA UNIT AND RADIO COMMUNICATION MEDIUM PROCESSOR

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(21) Appl. No.: **10/590,964**

(22) PCT Filed: **Sep. 22, 2005**

(86) PCT No.: **PCT/JP05/17516**

§ 371(c)(1),
(2), (4) Date: **Aug. 29, 2006**

(30) **Foreign Application Priority Data**

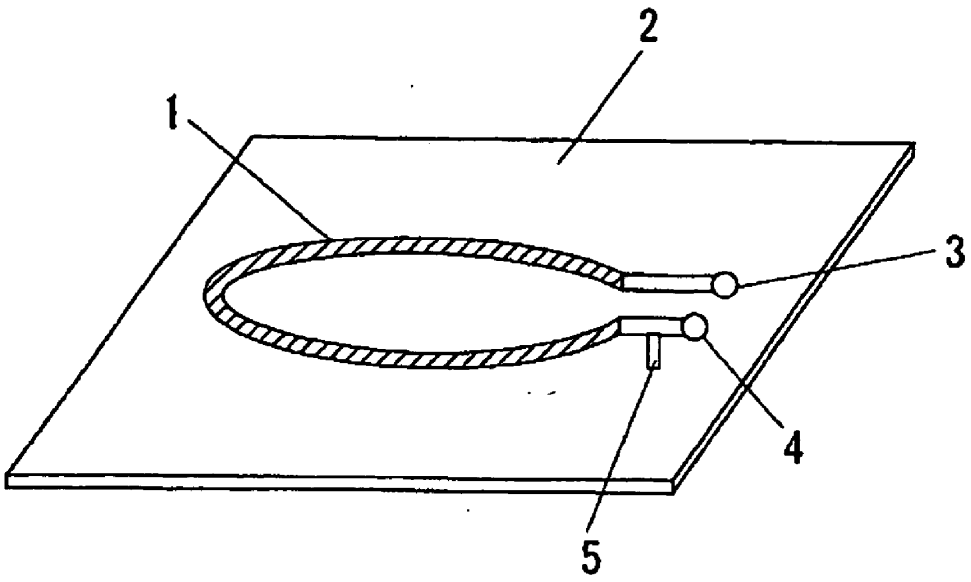
Sep. 22, 2004 (JP) 2004-275318
Sep. 30, 2004 (JP) 2004-287051
May 12, 2005 (JP) 2005-139545

Publication Classification

(51) **Int. Cl.**
H01Q 11/12 (2006.01)
(52) **U.S. Cl.** **343/741**; 343/742; 343/866

(57) **ABSTRACT**

It is an object of the present invention to provide a radio communication medium processor having a stable performance that does not receive a limitation for an installed place, especially, the influence of a metallic structure, does not need to adjust the resonance frequency of an antenna or an impedance, is excellent in its convenience and extensibility upon installation and strong for unnecessary noise from a periphery. In electric current fed loop antenna units, non-electric current fed loop antenna are arranged in doughnut shapes outside the substantially same planes of electric current fed loop antennas so as to surround the electric current fed loop antennas. Thus, when non-electric current fed loop antenna units are installed linearly, in radial directions and in arrays adjacently to electric current fed loop antenna units, the influence of the non-electric current fed loop antenna units to the antenna characteristics of the electric current fed loop antenna units can be suppressed. When the non-electric current fed loop antenna units are extended and increased, the antennas of the electric current fed loop antenna units do not need to be adjusted.



US 20070139286A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139286 A1

Navsariwala et al. (43) Pub. Date: Jun. 21, 2007

(54) ANTENNA FOR WIRELESS DEVICES

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(21) Appl. No.: **11/314,215**

(22) Filed: **Dec. 21, 2005**

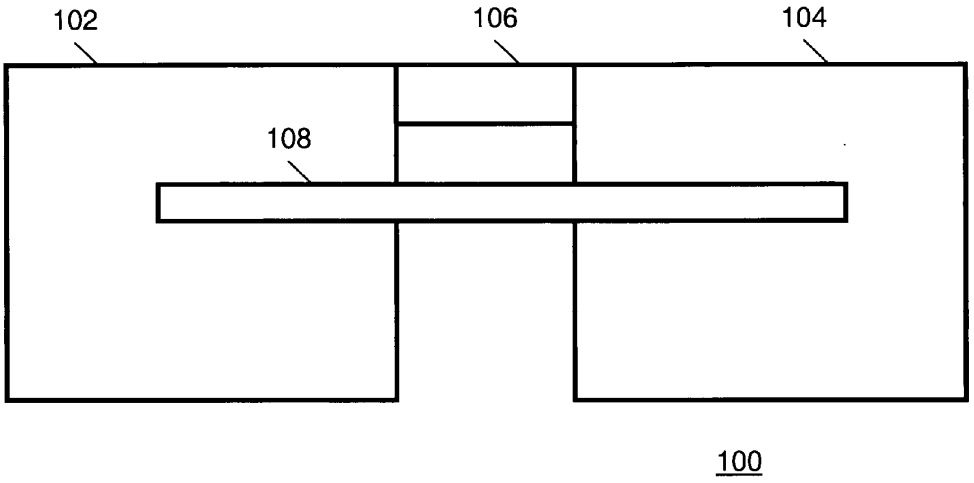
Publication Classification

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

(52) **U.S. Cl.** ..... **343/767**; 343/700 MS

(57) **ABSTRACT**

A wireless device (**102**) having a slot antenna (**104**) is disclosed. The slot antenna includes at least one conducting element. Examples of the at least one conducting element include a Printed Circuit Board (PCB) ground, a metallized battery housing, a metallized frame of a display screen, a metallized housing of a keypad frame, and a metallized housing of the wireless device.



US 20070139287A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139287 A1

Inomata et al. (43) Pub. Date: Jun. 21, 2007

(54) RADAR APPARATUS HAVING ARRAYED HORN ANTENNA PARTS COMMUNICATED WITH WAVEGUIDE

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(21) Appl. No.: **11/605,255**

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

(30) **Foreign Application Priority Data**

Dec. 20, 2005 (JP) 2005-366547

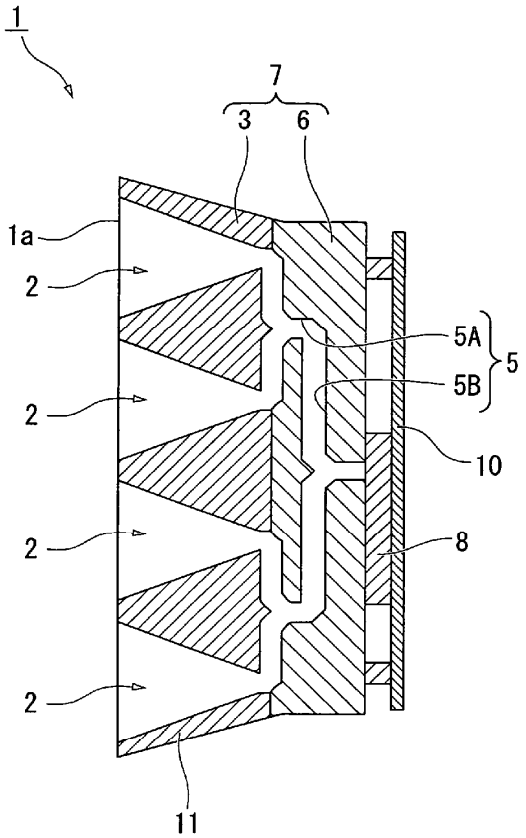
Publication Classification

(51) **Int. Cl.**
H01Q 13/00 (2006.01)

(52) **U.S. Cl.** **343/786**; 343/776

(57) **ABSTRACT**

A horn antenna part of a radar apparatus is made of a heat emitting material and includes: an antenna body part having a plurality of horn parts arranged in an array form, wherein each horn part is open toward a front surface of the apparatus, and has a diameter which gradually increases toward the front surface; and a feeder part including a waveguide which communicates with the horn parts, wherein the feeder part is connected to the antenna body part. The radar apparatus also includes: a wireless part for generating a high-frequency signal supplied to the feeder part, and converting a reflected high-frequency signal to a medium-frequency signal; and a circuit part for controlling the high-frequency signal and processing the medium-frequency signal. At least one of the wireless part and the circuit part is arranged in a manner such that it contacts the feeder part.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0139288 A1**

SHIGEMOTO (43) **Pub. Date: Jun. 21, 2007**

(54) **ANTENNA DEVICE**

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(21) Appl. No.: **11/612,086**

(22) Filed: **Dec. 18, 2006**

(30) **Foreign Application Priority Data**

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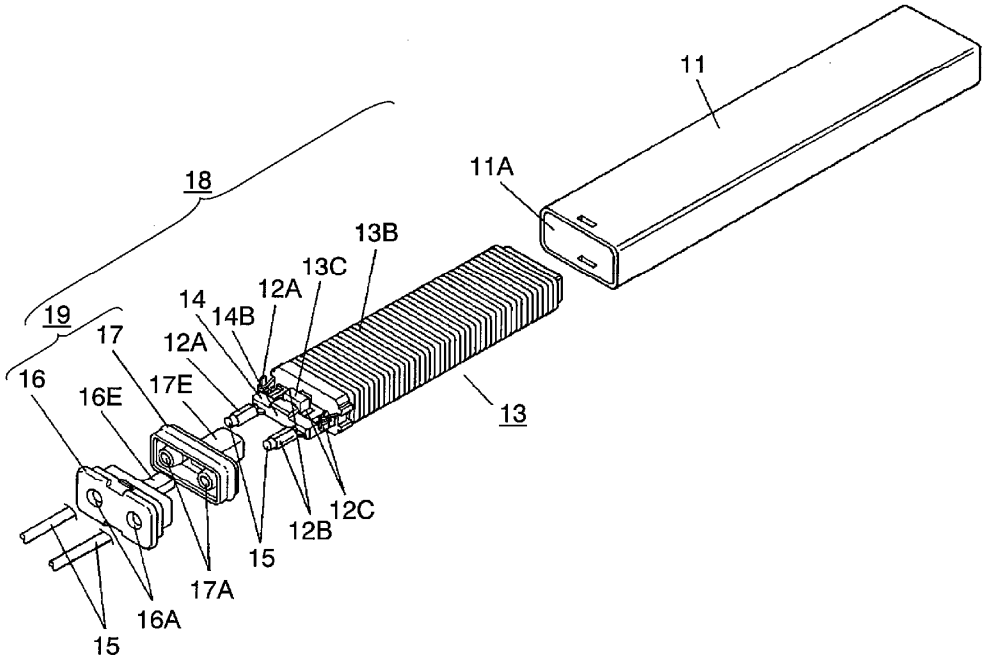
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device having a substantially cylindrical shaped case to house the antenna part and a stopper to seal a case opening tightly, wherein the stopper has the first waterproof on the outer periphery to contact the case and the second waterproof on the inner periphery to contact the lead wires. The first waterproof and the second waterproof are disposed on a same location. The present invention can provide the antenna device capable of preventing water immersion into the case simply and reliably without using any filler.



US 20070139289A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139289 A1

Lee et al. (43) Pub. Date: Jun. 21, 2007

(54) DIPOLE ANTENNA

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(73) Assignee: **Arcadyan Technology Corporation**

(21) Appl. No.: **11/311,538**

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

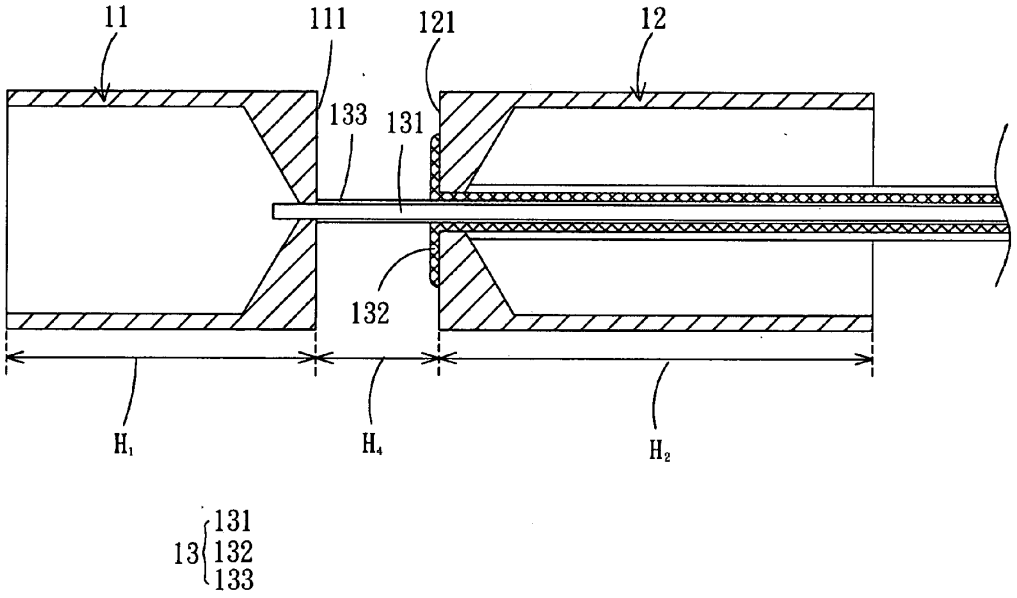
Publication Classification

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

(52) **U.S. Cl.** **343/792**; 343/791

(57) **ABSTRACT**

A dipole antenna includes a first radiating unit, a second radiating unit and a coaxial transmission line. The first radiating unit, which is hollow tubular, has a first length and a first covering portion. The first covering portion is located at one end of the first radiating unit. The second radiating unit, which is hollow tubular, has a second length greater than the first length, and a second covering portion. The second covering portion is located at one end of the second radiating unit. The coaxial transmission line has a central conductor and an outer grounding conductor. The central conductor is electrically connected to the first radiating unit, and the outer grounding conductor is electrically connected to the second radiating unit.



US 20070139291A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139291 A1

Sabet et al. (43) Pub. Date: Jun. 21, 2007

(54) ANTENNA SYSTEM POSITIONED WITHIN A SUPPORT STRUCTURE

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(21) Appl. No.: **11/679,774**

(22) Filed: **Feb. 27, 2007**

Related U.S. Application Data

(63) Continuation of application No. 10/954,555, filed on Sep. 30, 2004, now Pat. No. 7,196,637.

(60) Provisional application No. 60/508,251, filed on Oct. 2, 2003.

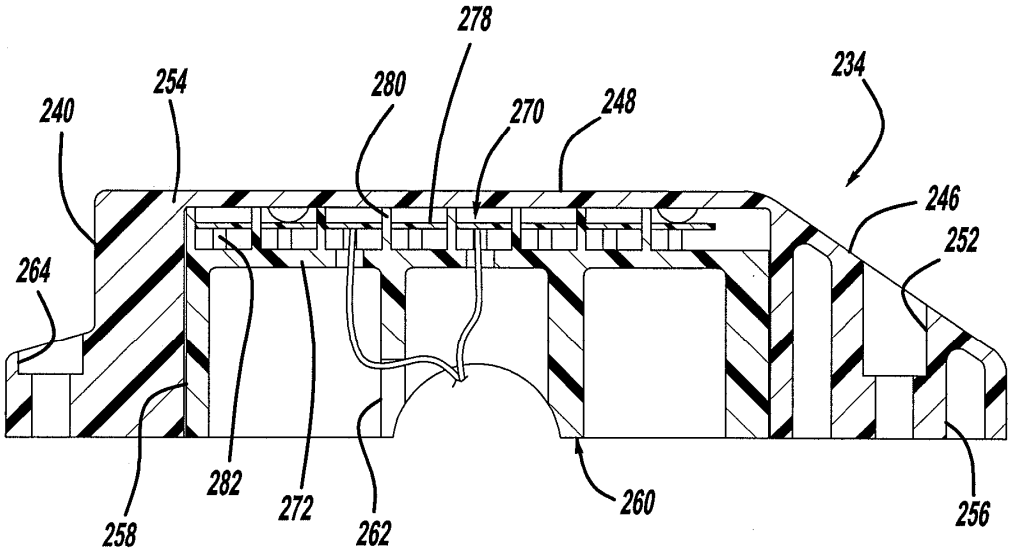
Publication Classification

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

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

(57) **ABSTRACT**

An antenna system that is positioned within a support structure. The antenna system includes at least one antenna that may have one or more antenna elements formed on a substrate. The support structure encloses the antenna and includes an outer support portion defining a cavity and an inner support portion positioned within the cavity. The antenna is positioned within the cavity between the outer support portion and the inner support portion so that the antenna is substantially surrounded by air.



US 20070139293A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0139293 A1

Hasegawa et al. (43) Pub. Date: Jun. 21, 2007

(54) COMPLEX ANTENNA

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(21) Appl. No.: **11/641,157**

(22) Filed: **Dec. 19, 2006**

(30) **Foreign Application Priority Data**

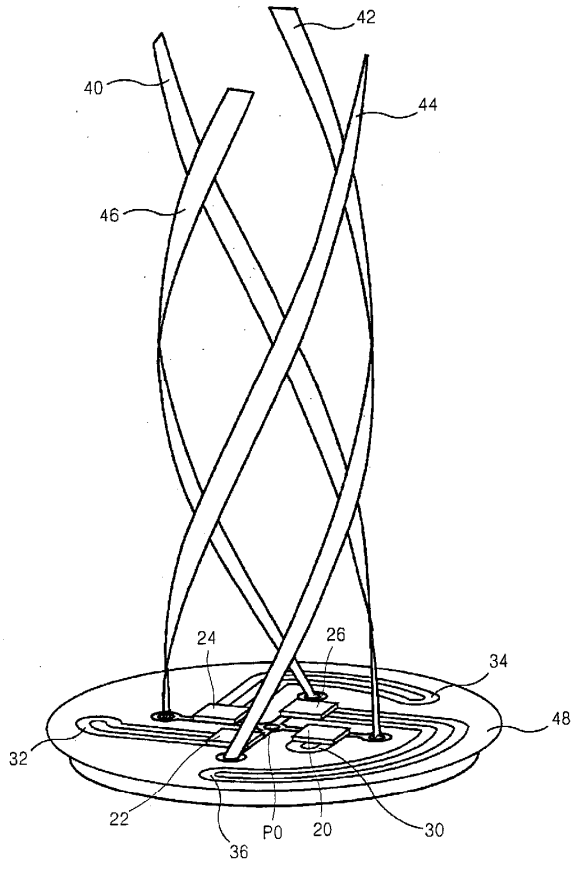
Dec. 19, 2005 (JP) 2005-364743
Aug. 21, 2006 (JP) 2006-78912

Publication Classification

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
(52) **U.S. Cl.** **343/895**

(57) **ABSTRACT**

Provided is a complex antenna which corresponds to both a circularly polarized wave and a linearly polarized wave. The complex antenna includes a substrate, a power feed terminal, four helical antenna devices disposed on the substrate at intervals of 90 degrees, four delay lines having different lengths by a quarter wavelength, and four switch modules which are connected to the power feed terminal in common and each of which is connected to each helical antenna device and each delay line. Each switch module selects one of a first mode in which the power feed terminal and each helical antenna device are directly connected and a second mode in which each delay line is connected to each helical antenna device so that a power feed phase feed from the power feed terminal and propagated to each delay line can be sequentially shifted by 90 degrees.



US 20070142829A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0142829 A1

Ahn et al. (43) Pub. Date: Jun. 21, 2007

(54) IN-VIVO INTERSTITIAL ANTENNAS

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(21) Appl. No.: **11/311,152**

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

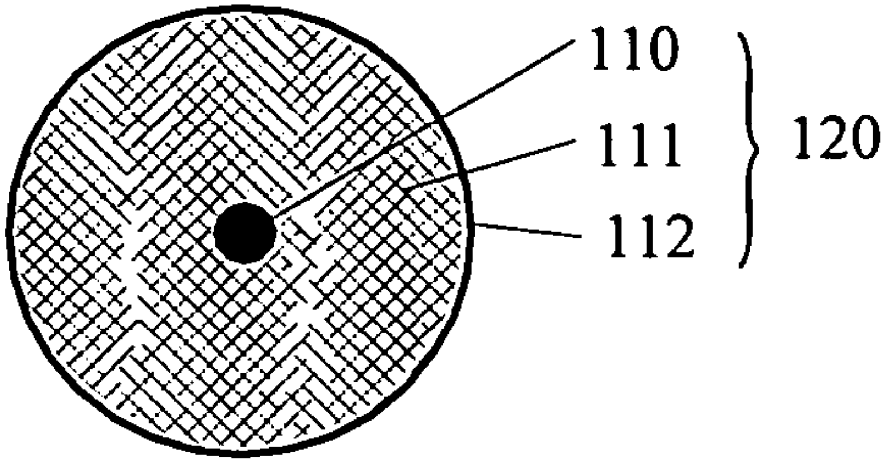
Publication Classification

(51) **Int. Cl.**
A61B 18/04 (2006.01)
A61N 1/00 (2006.01)

(52) **U.S. Cl.** **606/33**; 607/156

(57) **ABSTRACT**

Disclosed are in-vivo interstitial antennas (IVIAs) for thermal treatment and deactivation of tumors by means of microwaves. An IVIA comprises a microwave monopole antenna (MMA) and a medical catheter, and the MMA is inserted into the medical catheter to form the IVIA. The MMA comprises coaxial cable and three types of capacitors. The coaxial cable consists of first and second conductors and a first insulator, and only the first conductor extends less than a quarter wavelength. The first capacitor is located around the end of the extended first conductor and includes the second insulator and the third conductor. The second and third capacitors are located between the first capacitor and the apertures of the MMAs and have about same function. Because of arbitrarily changed input impedance of the first capacitor, almost perfect matching can be achieved and desirable temperature distributions can be obtained due to the second and third capacitors.



US 20070146206A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0146206 A1

Sun (43) Pub. Date: Jun. 28, 2007

(54) BROADBAND APERTURE COUPLED GNSS MICROSTRIP PATCH ANTENNA

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(21) Appl. No.: **11/316,854**

(22) Filed: **Dec. 23, 2005**

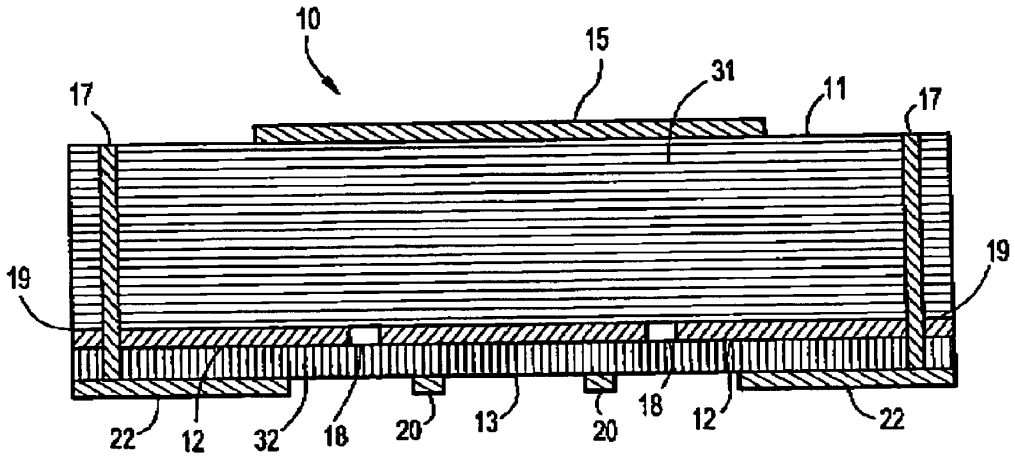
Publication Classification

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

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

(57) **ABSTRACT**

A multilayer antenna structure configured to receive Global Navigation Satellite System (GNSS) and augmentation signals. The antenna includes a microstrip patch radiation element disposed at a top layer and a ground plane forming a first interior layer, the ground plane including at least two coupling apertures, and the ground plane isolated from said radiation element by a low loss dielectric. The antenna structure also includes a bottom layer, the bottom layer is isolated from the ground plane by another dielectric; at least two feed lines operably connected to a hybrid coupler disposed on the bottom layer; and an active circuit on the bottom layer, a first port of said active circuit operably connected to the hybrid coupler.



US 20070146212A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0146212 A1**

Ozden et al. (43) **Pub. Date: Jun. 28, 2007**

(54) **QUAD-BAND COUPLING ELEMENT ANTENNA STRUCTURE**

(75) Inventors: **Sinasi Ozden**, Copenhagen (DK); **Bjarne K. Nielsen**, Denmark (DK); **Claus H. Jorgensen**, Kobenhavn (DK); **Juha Tapio Villanen**, Espoo (FI); **Clemens Icheln**, Espoo (FI); **Pertti Vainikainen**, Helsinki (FI)

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(21) Appl. No.: **11/321,016**

(22) Filed: **Dec. 28, 2005**

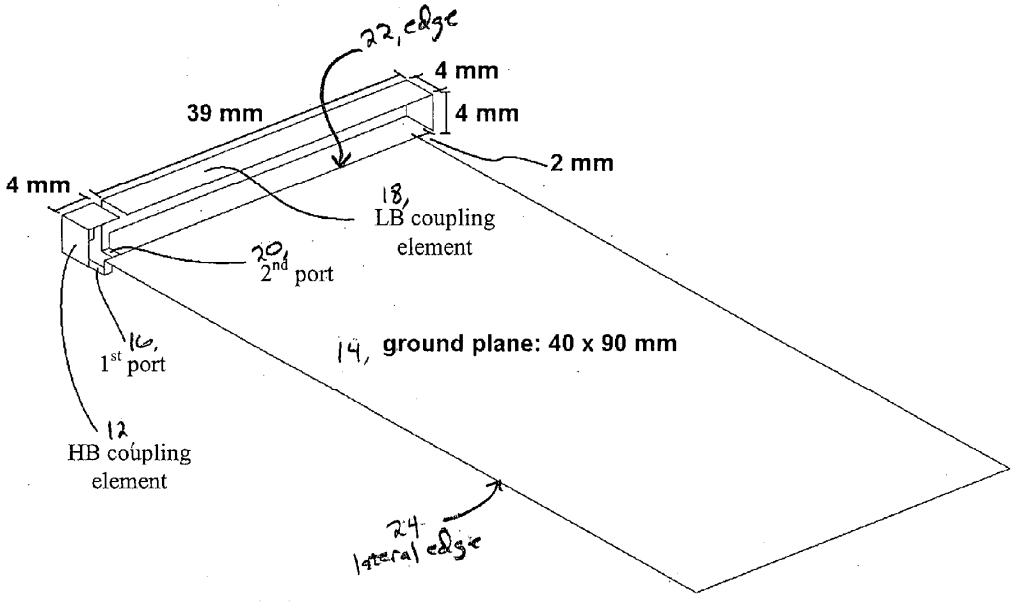
Publication Classification

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

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

(57) **ABSTRACT**

An antenna module has a substrate, first and second coupling elements, and first and second resonant circuits disposed on the substrate. The first and second coupling elements are mounted to the substrate and particularly adapted to couple respective first and second frequency bands to a ground plane through respective first and second ports. The first resonant circuit has a plurality of components having electrical values selected so as to function as a band-pass filter within the first frequency band and to present a high impedance at least in the second frequency band. The second resonant circuit is coupled to the second port and has a plurality of components that have electrical values selected so as to function as a band-pass filter within the second frequency band and to present a high impedance at least in the first frequency band.



US 20070146216A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0146216 A1**

Wang et al. (43) **Pub. Date: Jun. 28, 2007**

(54) **MULTI-BAND ANTENNA**

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(21) Appl. No.: **11/645,481**

(22) Filed: **Dec. 26, 2006**

(30) **Foreign Application Priority Data**

Dec. 26, 2005 (TW)..... 94222625

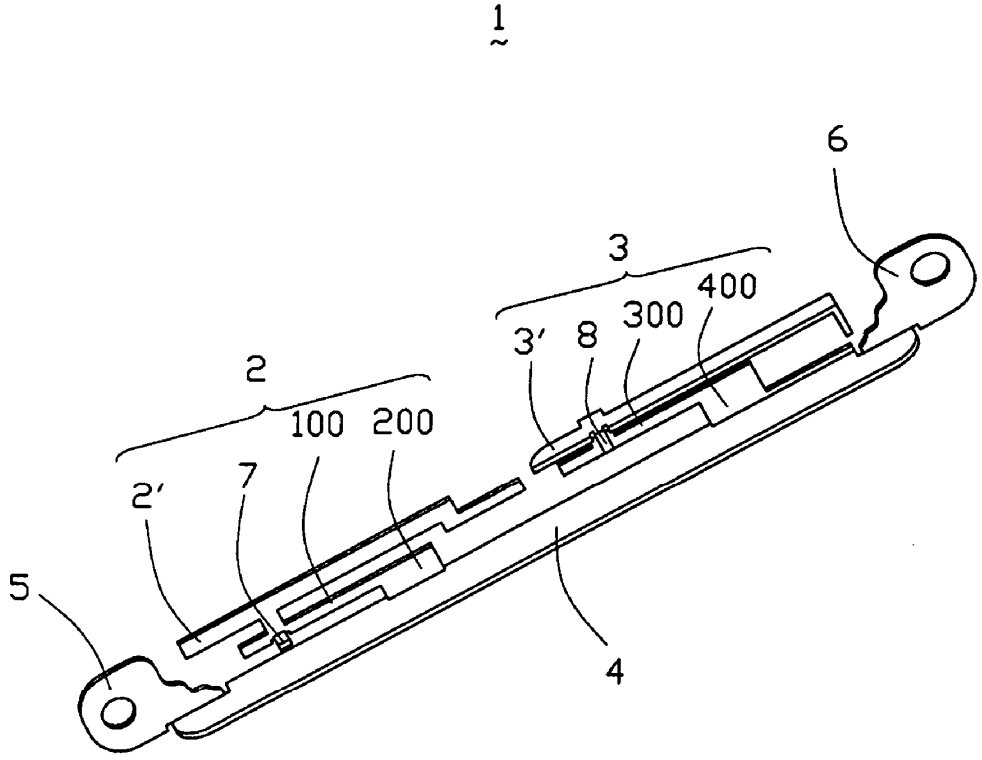
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band antenna (**1**) includes a first antenna (**2**), a second antenna (**3**) and a common grounding element (**4**). Both of the first antenna and the second antenna include a radiating element (**2'**, **3'**), a connecting element (**100**, **300**) respectively connecting the radiating element (**2'**, **3'**) and a grounding portion (**200**, **400**).



US 20070146217A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0146217 A1

Stricker (43) Pub. Date: Jun. 28, 2007

(54) ANTENNA AND REMOTE LOCKING/UNLOCKING SYSTEM INCLUDING SUCH AN ANTENNA

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(21) Appl. No.: **11/635,326**

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

(30) **Foreign Application Priority Data**

Dec. 23, 2005 (EP) 05360056.5

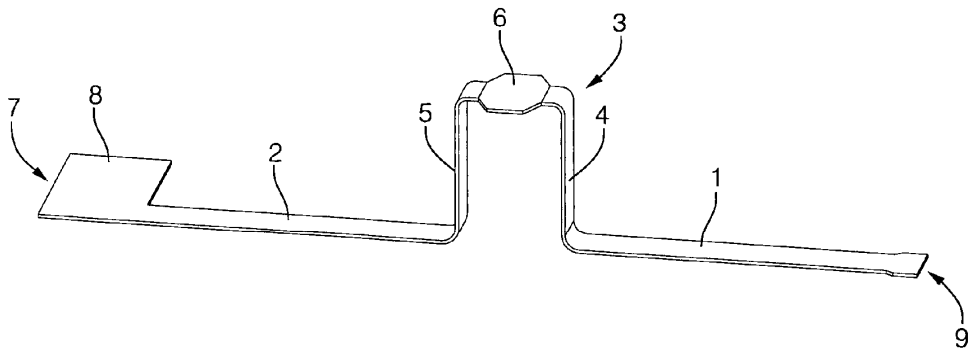
Publication Classification

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

(52) **U.S. Cl.** **343/713**; 343/702

(57) **ABSTRACT**

The invention relates to an antenna, of the type comprising an elongate conductive piece, intended for radio-communications, including a free end a base intended to be connected to a receiver and/or transmitter and at least one conductive track extending between the base and the free end and attached to a printed circuit support. The antenna includes two unconnected conductive tracks extending in the extension one of the other, and a metal structure attached to the printed circuit support and forming a bridge between the adjacent ends of the two conductive tracks, the metal structure at least partially extending projecting from the plane of extension of the support.



US 20070146218A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0146218 A1**

Turner et al. (43) **Pub. Date: Jun. 28, 2007**

(54) **DIPOLE ANTENNA FOR A WATCHBAND**

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(21) Appl. No.: **11/315,543**

(22) Filed: **Dec. 22, 2005**

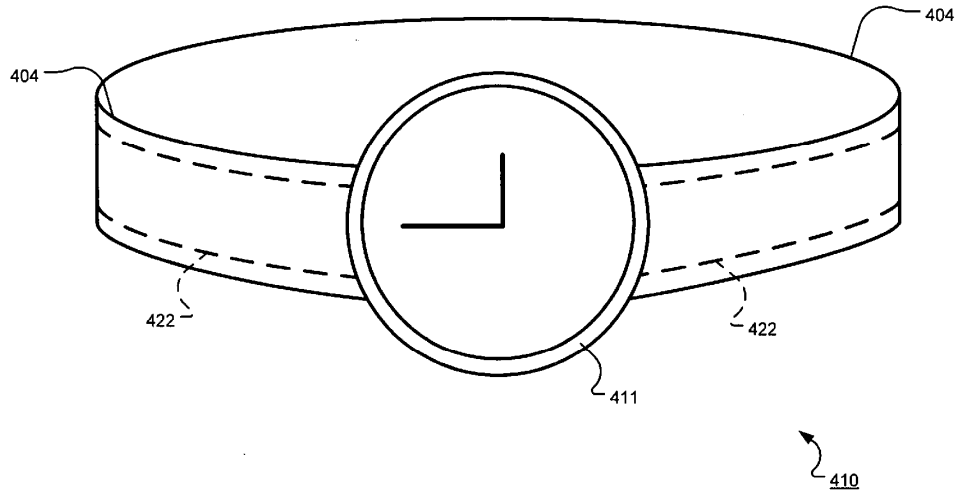
Publication Classification

(51) **Int. Cl.**
H01Q 1/12 (2006.01)

(52) **U.S. Cl.** **343/718**

(57) **ABSTRACT**

An electronic device such as watch adapted for wireless communication, the electronic device using a dipole antenna, the dipole antenna having two component parts, each of which being disposed in respective parts of a two-part connecting band, such as a watchband of the electronic device.



US 20070146221A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0146221 A1

Oshiyama et al. (43) Pub. Date: Jun. 28, 2007

(54) MULTI-BAND ANTENNA

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(21) Appl. No.: **11/645,012**

(22) Filed: **Dec. 26, 2006**

(30) **Foreign Application Priority Data**

Dec. 27, 2005 (JP) P2005-375101

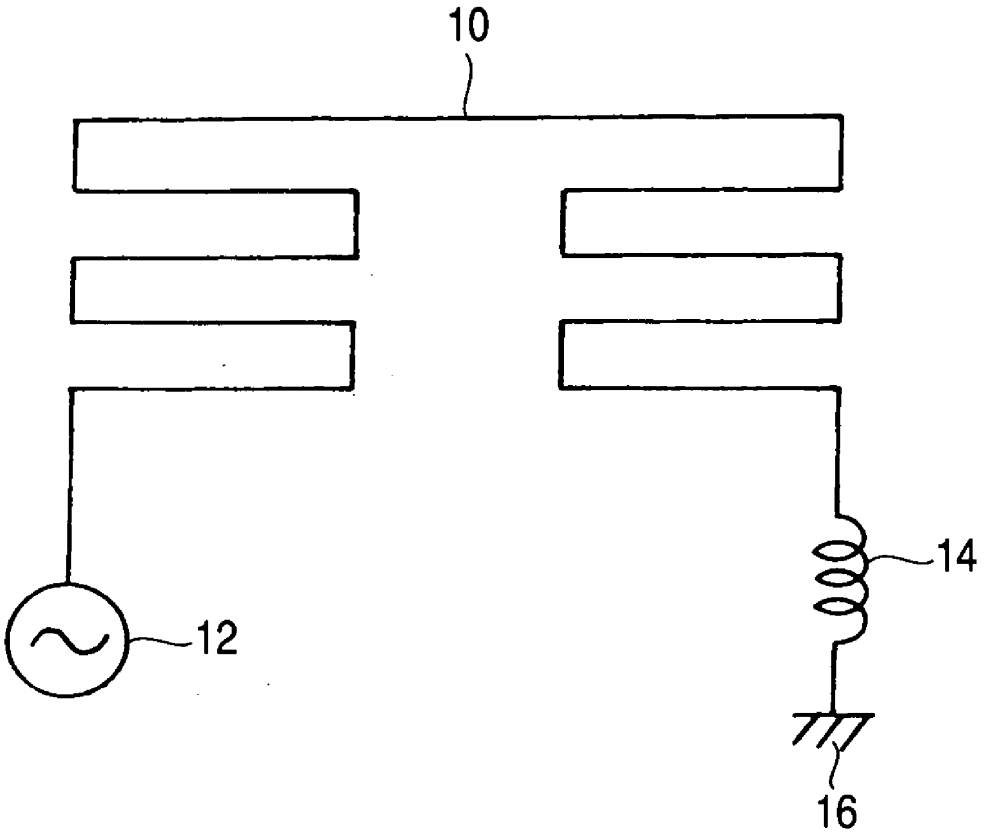
Publication Classification

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

(52) **U.S. Cl.** **343/749**; 343/895

(57) **ABSTRACT**

A multi-band antenna is adapted to operate in a first frequency band and a second frequency band which is lower than the first frequency band. In the multi-band antenna, an antenna element has an electrical length of ¾ wavelength of the first frequency band. The antenna element has a first end adapted to be electrically connected to a power feeding point, and a second end. An inductor is electrically connected between the second end of the antenna element and a ground in a serial manner. The inductor has such an inductance that an electrical length of the antenna element and the inductor corresponds to ½ wavelength of the second frequency band.



US 20070146226A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0146226 A1

Oh et al. (43) Pub. Date: Jun. 28, 2007

(54) **EMBEDDED CHIP ANTENNA HAVING COMPLEMENTARY RADIATOR STRUCTURE**

(75) Inventors: **Jeong-Kun Oh**, Shiheung-shi (KR); **Young-Sang Yoon**, Sungnam-shi (JP); **Byung-Nam Kim**, Pucheon-shi (KR); **Seung-Yong Lee**, Pucheon-shi (KR)

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(21) Appl. No.: **11/555,960**

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

(30) **Foreign Application Priority Data**

Dec. 26, 2005 (KR) 10-2005-0129539

Publication Classification

(51) **Int. Cl.**
H01Q 1/40 (2006.01)

(52) **U.S. Cl.** **343/873**; 343/895

(57) **ABSTRACT**

Disclosed herein is an embedded chip antenna. The embedded chip antenna having a complementary radiator structure includes two radiators that have identical radiation characteristics and are respectively arranged on both sides of a feed point. According to the present invention, the radiator of a chip antenna has a single physical radiator structure, but is electrically formed of a plurality of partial radiators symmetrical with respect to a feed point, and radiation operations in high and low frequency bands are separately performed. Therefore, complementary operational characteristics that counteract external effects are implemented, so that, when part of a human body, such as the hand, affects one partial radiator on one side of the chip antenna, the other partial radiator on the other side thereof independently operates, thereby minimizing performance degradation originating from the outside of the antenna.