US 20070001906A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0001906 A1

Pelzer et al. (43) Pub. Date: Jan. 4, 2007

(54) SWITCHABLE MULTIBAND ANTENNA FOR THE HIGH-FREQUENCY AND MICROWAVE RANGE

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(21) Appl. No.: **10/556,448**

(22) PCT Filed: **May 5, 2004**

(86) PCT No.: **PCT/IB04/50594**

§ 371(c)(1),
(2), (4) Date: **Nov. 10, 2005**

(30) **Foreign Application Priority Data**

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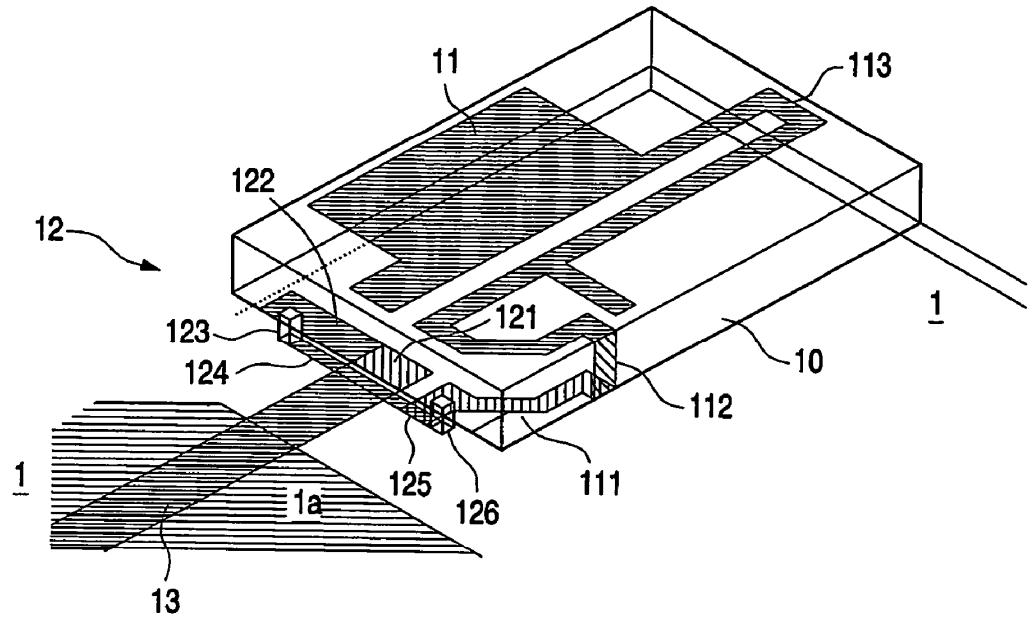
Publication Classification

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

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

(57) **ABSTRACT**

A description is given of a switchable multiband antenna for the highfrequency and microwave range, which can be operated in a relatively large number of frequency bands without significant restriction of performance in each individual frequency band. This is essentially achieved by a switchable input structure (**24**) by means of which resonant printed line structures (**21; 22**) of the antenna that are not required can be isolated from an HF or ground supply line (**242**). In particular, in one embodiment, a number of resonant printed line structures are applied to a substrate (**10**), which printed line structures are connected to the corresponding HF or ground supply line or isolated from the latter, in a targeted manner, by means of one or more switching devices.



US 20070001908A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0001908 A1

Fager et al. (43) Pub. Date: Jan. 4, 2007

(54) CROSS-POLARIZED ANTENNA

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(21) Appl. No.: **11/172,654**

(22) Filed: **Jun. 30, 2005**

Related U.S. Application Data

(60) Provisional application No. 60/695,788, filed on Jun. 29, 2005.

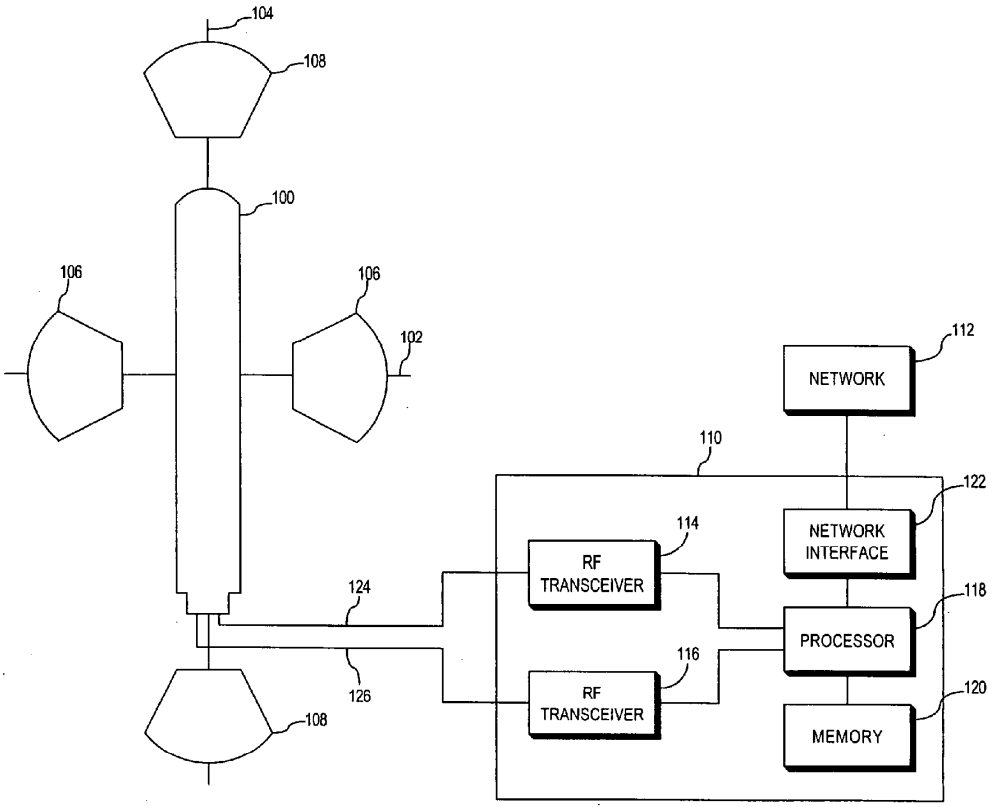
Publication Classification

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

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

(57) **ABSTRACT**

Briefly, in accordance with one embodiment of the invention, an antenna may comprise a first radiating element to provide a first axis of polarization, and a second radiating element to provide a second axis of polarization. The first axis of polarization may be orthogonal or orthogonal at least in part, to the second axis of polarization. The first and second axes together may result in an omnidirectional, or at least partially omnidirectional, gain pattern for the antenna. RF signals may be propagated on the first and second axes using the same communication standard on both axes, and/or using a different communication standard on each of the axes. In accordance with one or more embodiments, the first axis of polarization may be utilized for a first MIMO communication channel, and the second axis of polarization may be utilized for a second MIMO communication channel.



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0001911 A1

Fujio et al. (43) Pub. Date: Jan. 4, 2007

(54) PLANAR ANTENNA WITH MULTIPLE RADIATORS AND NOTCHED GROUND PATTERN

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(21) Appl. No.: **11/475,658**

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

(30) **Foreign Application Priority Data**

Jun. 30, 2005 (JP) 2005-192363

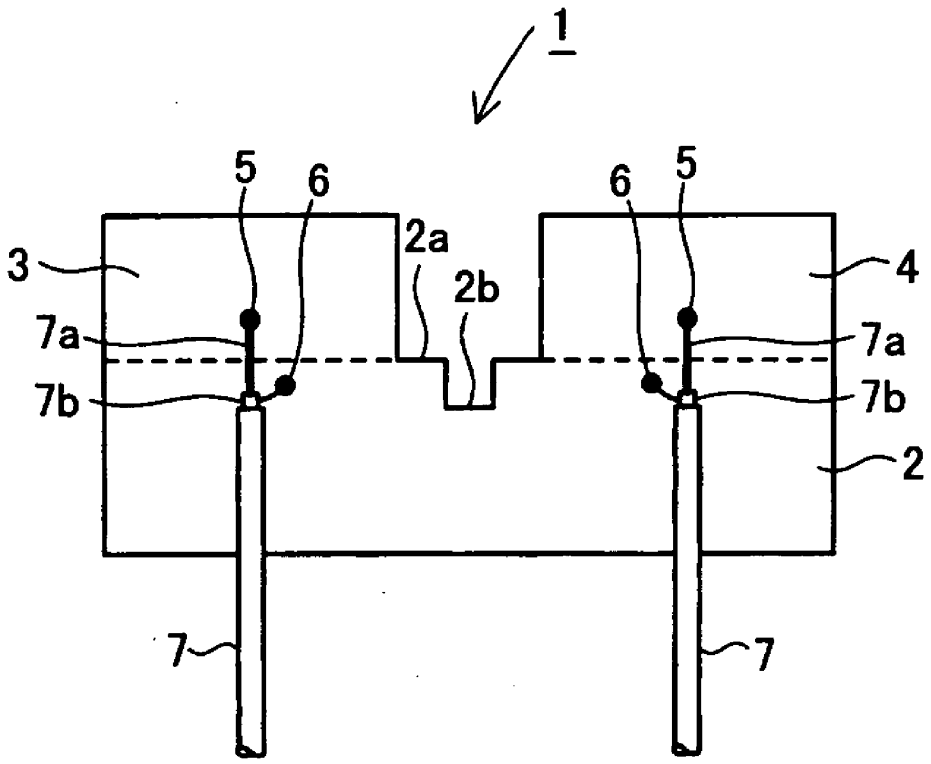
Publication Classification

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

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

(57) **ABSTRACT**

An antenna consisting of a single small and lightweight package, where each radiating element operates independently with reduced interference among the radiating elements. An integrated multi-element planar antenna includes a ground pattern **2** with a notch **2***b* formed at an end **2***a*, first radiating element **3** placed on one side of the notch **2***b* and equipped with a feeder **5**, and second radiating element **4** placed on the other side of the notch **2***b* and equipped with a feeder **5**. For example, inverted F antennas are used as the first radiating element **3** and second radiating element **4**. The first radiating element **3** and second radiating element **4** are placed symmetrically about the notch **2***b* such that separation distance will be the largest at locations where their radiation fields are the highest.



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(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0001912 A1**

Ji (43) **Pub. Date: Jan. 4, 2007**

(54) **EMBEDDED TYPE ANTENNA PATTERN FOR PORTABLE TERMINAL AND METHOD FOR MANUFACTURING THE SAME**

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(21) Appl. No.: **11/479,828**

(22) Filed: **Jun. 30, 2006**

(30) **Foreign Application Priority Data**

Jul. 4, 2005 (KR) 2005-59903

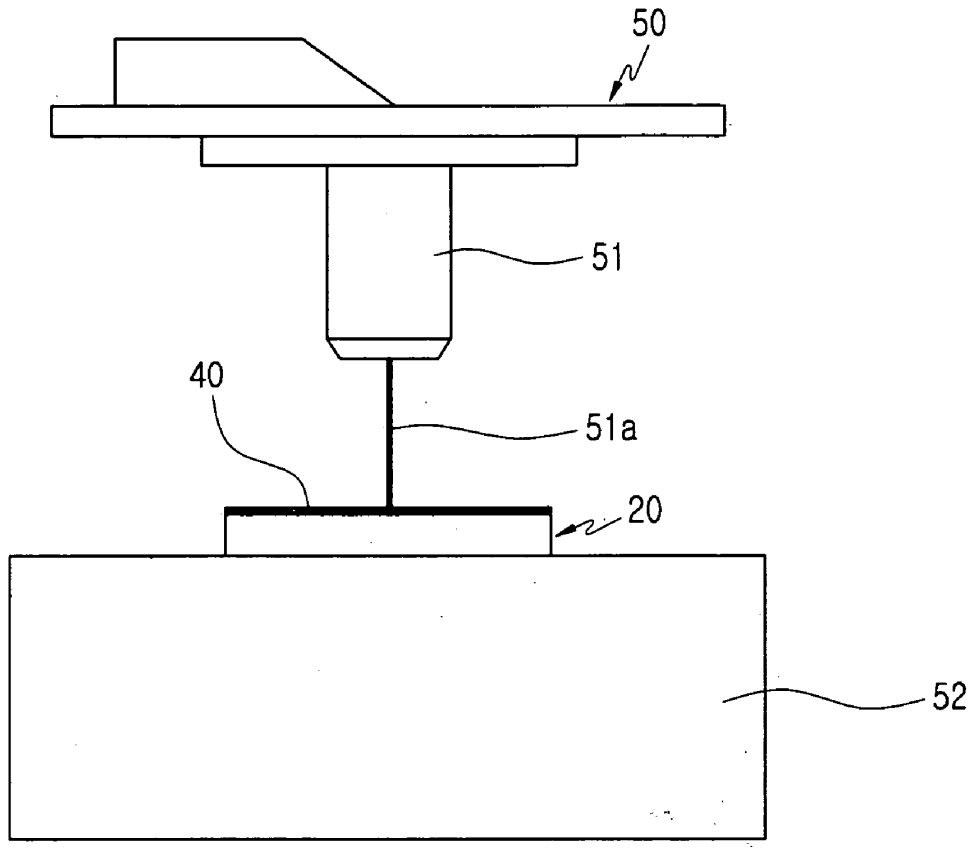
Publication Classification

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

(52) **U.S. Cl.** ..... **343/700 MS**; 343/702; 343/876; 29/600; 257/700

(57) **ABSTRACT**

Disclosed is an embedded type antenna pattern for a portable terminal and a method for manufacturing the same in which a metal film plated on an antenna is removed by using a laser beam and an antenna slot pattern is formed at the same time. The embedded type antenna pattern for a portable terminal includes an antenna plate plated with a metal film; and at least one antenna slot pattern formed by mounting the antenna plate to a laser cutting device, positioning the upper end surface of the plated metal film of the antenna plate and a head of the laser cutting device so that they are opposite to each other, and heating the surface of the metal film and then removing the plated metal film by using the laser beam launched from the head of the laser cutting device.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0001913 A1**

Tsai et al. (43) **Pub. Date: Jan. 4, 2007**

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

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(21) Appl. No.: **11/247,524**

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

(30) **Foreign Application Priority Data**

Jul. 4, 2005 (TW)..... 094122535

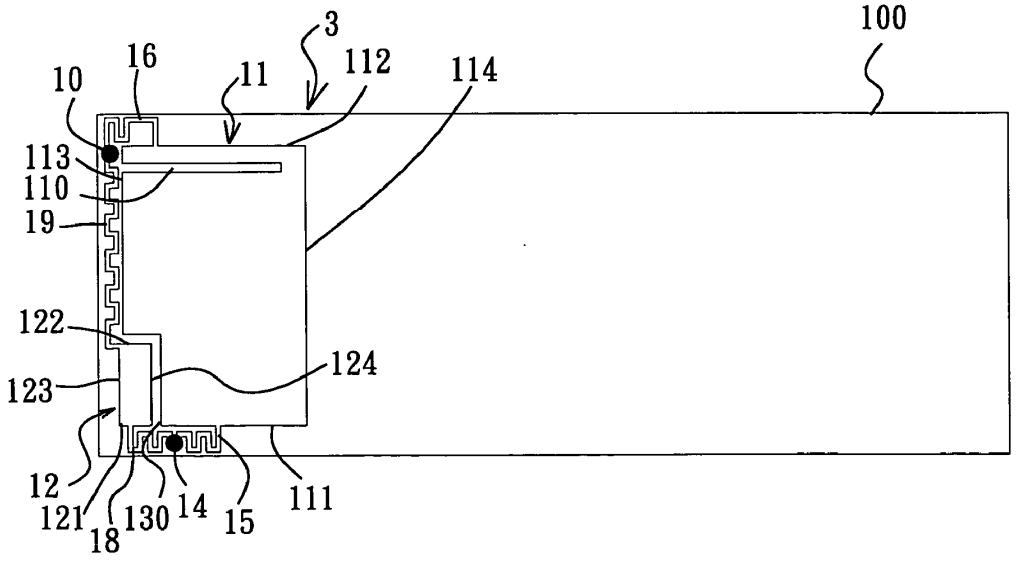
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band planar antenna includes first and second radiating elements. The first radiating element is operable within a first frequency bandwidth. The second radiating element is operable within a second frequency bandwidth. The first radiating element is formed with a slot that generates resonance within the second frequency bandwidth, thereby lowering the VSWR, widening the bandwidth, and increasing the antenna gain of the planar antenna in the second frequency bandwidth.



US 20070001915A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0001915 A1

Kono et al. (43) Pub. Date: Jan. 4, 2007

(54) ON-VEHICLE FILM ANTENNA

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(21) Appl. No.: **11/475,536**

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

(30) **Foreign Application Priority Data**

Jul. 4, 2005 (JP) 2005-194931

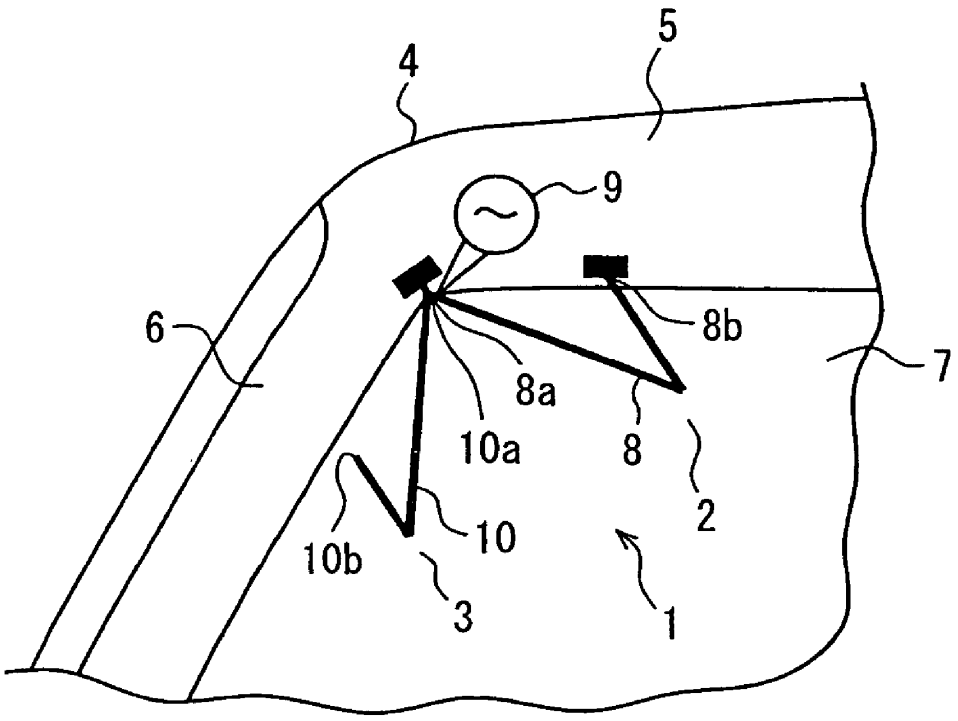
Publication Classification

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

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

(57) **ABSTRACT**

An on-vehicle film antenna is constructed with a loop antenna and a monopole antenna and attached to a vehicle windshield. The loop antenna has a first element set in length to correspond to a first radio wave of a first frequency band. One end of the first element is connected to a power supply near a border section between a vehicle chassis and the vehicle windshield, and the other end of the first element is connected to the vehicle chassis. The monopole antenna has a second element set in length to correspond to a second radio wave of a second frequency band. One end of the second element is connected to the power supply near the border section in common with the one end of the first element, and the other end of the second element is disconnected from the vehicle chassis.



US 20070001922A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0001922 A1

Song et al. (43) Pub. Date: Jan. 4, 2007

(54) BI-FREQUENCY SYMMETRICAL PATCH ANTENNA

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(21) Appl. No.: **11/168,391**

(22) Filed: **Jun. 29, 2005**

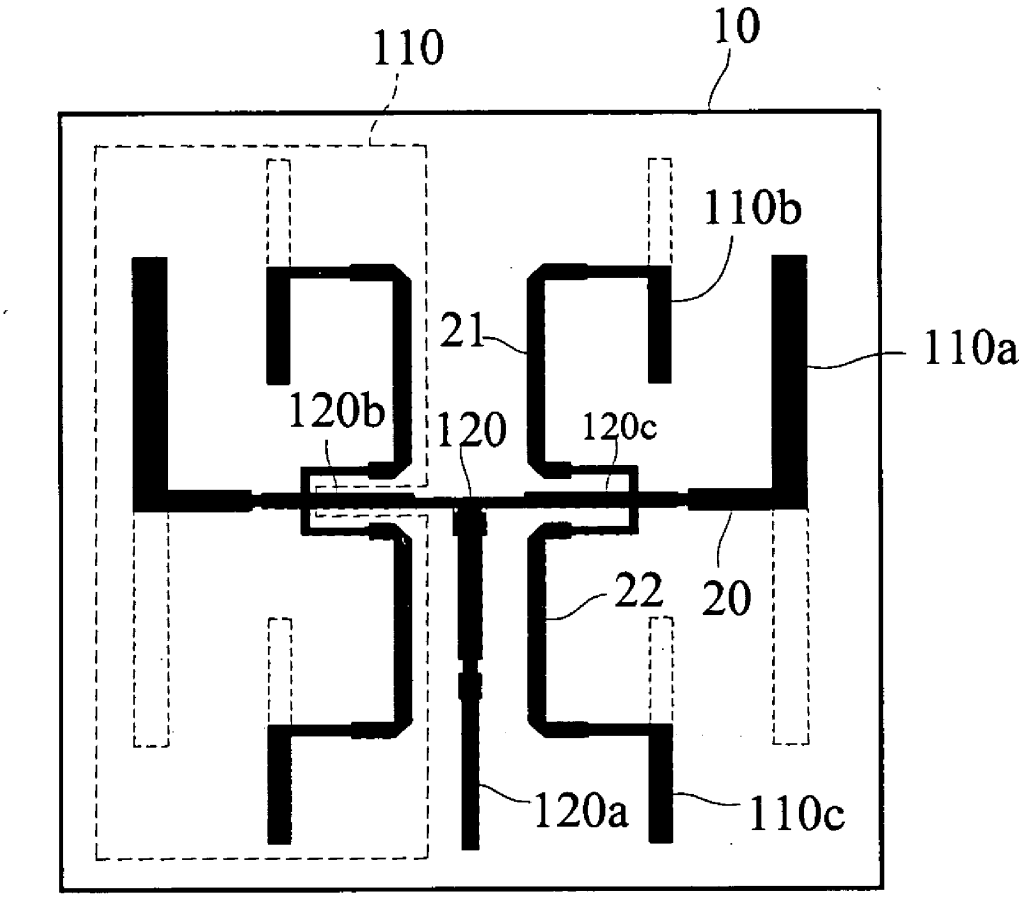
Publication Classification

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

(52) **U.S. Cl.** ..... **343/795**; 343/700 MS; 343/853

(57) **ABSTRACT**

A bi-frequency symmetrical patch antenna includes two bi-frequency symmetrical radiation units, each having a first band radiation section and two second band radiation sections, to radiate a feed-in signal in a selected direction. Further, the antenna has a power distribution unit, to evenly distribute the feed-in power, corresponding to the feed-in signal, to each bi-frequency symmetrical radiation unit. The power distribution unit has two side arms connecting respectively to each bi-frequency symmetrical radiation unit to increase the bandwidth range of the bi-frequency antenna.



US 20070001925A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0001925 A1

BAE et al. (43) Pub. Date: Jan. 4, 2007

(54) INTERNAL CHIP ANTENNA

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(21) Appl. No.: **11/427,776**

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

(30) **Foreign Application Priority Data**

Jun. 30, 2005 (KR) 10-2005-58272

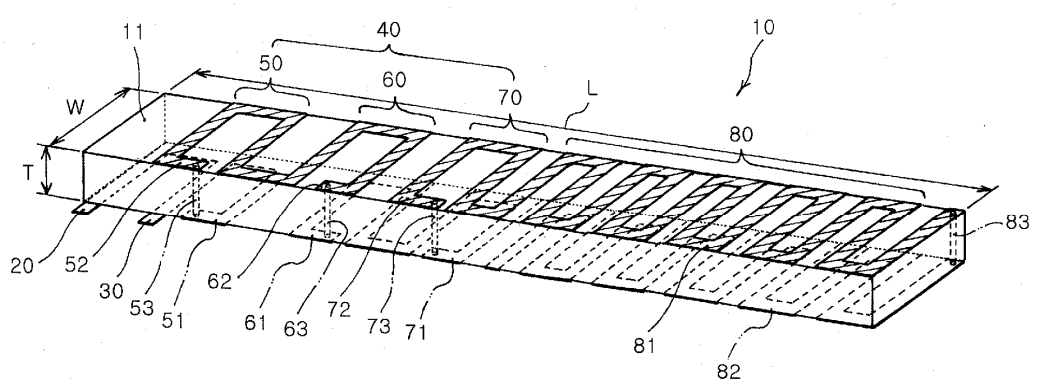
Publication Classification

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

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

(57) **ABSTRACT**

The invention provides a chip antenna installed inside a mobile telecommunication terminal, which can process a low band signal. In the chip antenna, a substrate is prepared. A first radiator is formed in a spiral shape inside or on the substrate, and includes at least one spiral radiating part. The first radiator controls inductance of the antenna. Also, a second radiator is connected to the first radiator, and includes an upper meander radiating part disposed in a length direction of the substrate and a lower meander radiating part overlapping and opposing the upper meander in a lower part of the upper meander part. The second radiator controls capacitance of the antenna. In addition, a feeding part is connected to the first radiator, and receives a high frequency current of a given band.



US 20070008212A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008212 A1**

Serban et al. (43) **Pub. Date: Jan. 11, 2007**

(54) **HORN ANTENNA WITH A COMPOSITE EMITTER FOR A RADAR-BASED LEVEL MEASUREMENT SYSTEM**

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(21) Appl. No.: **11/453,351**

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

(30) **Foreign Application Priority Data**

Jun. 13, 2005 (EP) 05012669.7

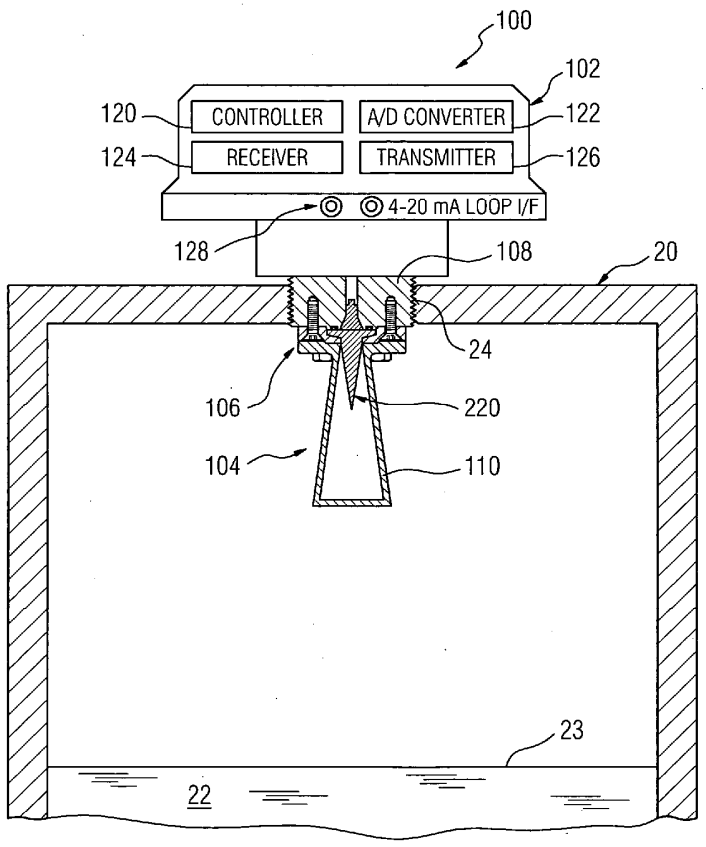
Publication Classification

(51) **Int. Cl.**
G01S 13/08 (2006.01)

(52) **U.S. Cl.** **342/124**; 342/175

(57) **ABSTRACT**

A horn antenna suitable for use with a level measurement device and having a composite emitter structure. The emitter structure or assembly comprises an emitter and a plug. The emitter provides the process interface and is formed from a material having properties which include microwave transparency, chemical resistance and/or mechanical strength. The plug is isolated or partitioned from the process interface. The plug is formed from a material different from the emitter and exhibits the properties of microwave transparency and/or mechanical strength. According to another aspect, the level measurement device includes a coupling mechanism which allows the removal of the horn antenna independently of the emitter.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008221 A1**

Tseng (43) **Pub. Date: Jan. 11, 2007**

(54) **PLANAR INVERTED-F ANTENNA**

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(21) Appl. No.: **11/176,317**

(22) Filed: **Jul. 8, 2005**

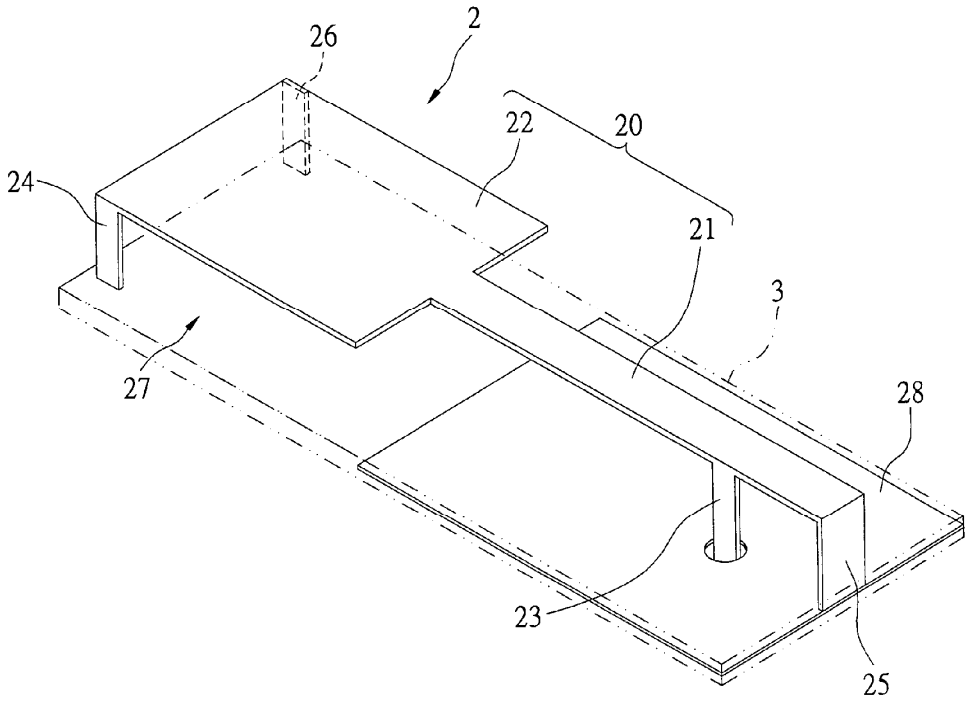
Publication Classification

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

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

(57) **ABSTRACT**

A planar inverted-F antenna has advantages of easy manufacture, a stable structure and automatic assembly. The antenna is fixed onto a PCB and has a grounding element that is made of conductive material and is plate-shaped, a radiation element formed from a plate-shaped metal plate, a signal link element and at least one supporting leg. The radiation element has a grounding leg that electrically connects with the grounding element. The signal link element electrically connects with the radiation element to a circuit for wireless signal transmission and reception. The at least one supporting leg is downwardly bent from an edge of the radiation element far from the grounding leg and is fixed onto the PCB. The supporting leg and the grounding leg support the radiation element together.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008222 A1**

Wang et al. (43) **Pub. Date: Jan. 11, 2007**

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

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(21) Appl. No.: **11/176,628**

(22) Filed: **Jul. 6, 2005**

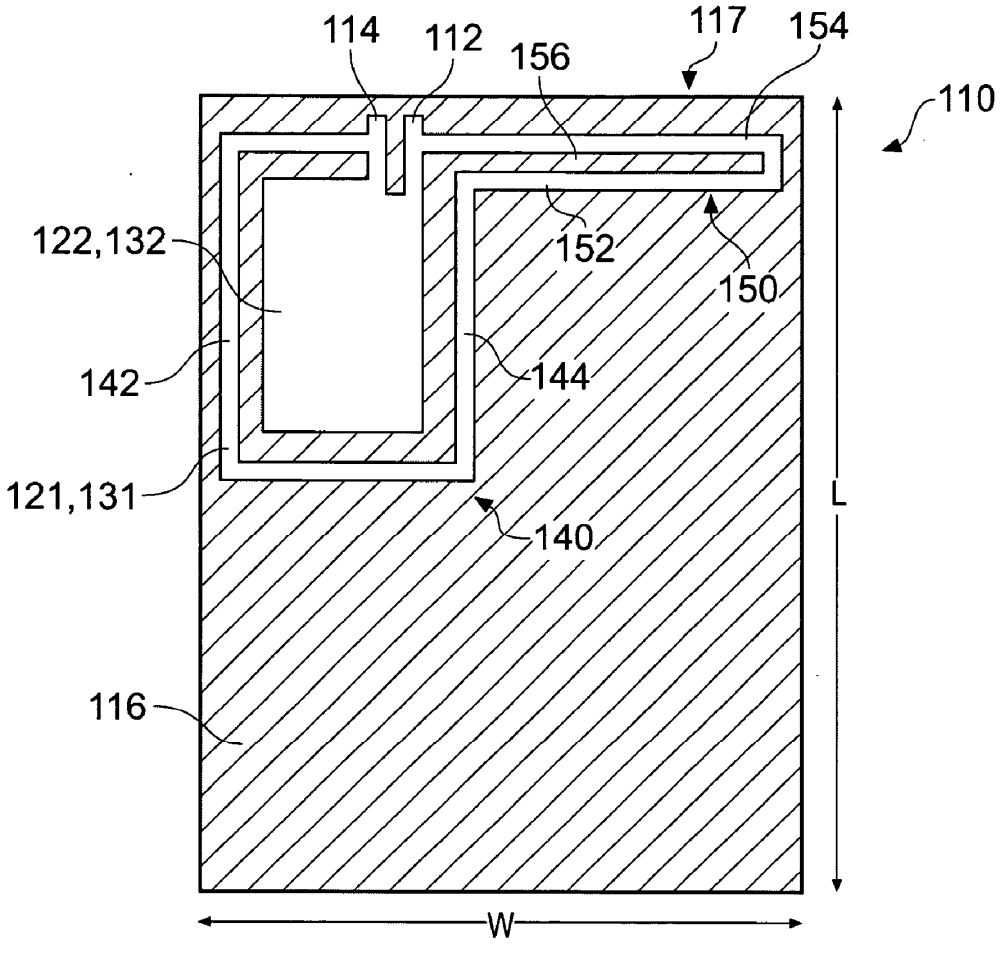
Publication Classification

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

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

(57) **ABSTRACT**

An antenna arrangement comprising: a ground plane; a ground point connected to the ground plane; a feed point; a λ/2 antenna element connected to the ground point and to the feed point and extending between the ground point and the feed point as a loop that defines an area; and a λ/4 antenna element located within the area.



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(19) United States

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Chen et al. (43) Pub. Date: Jan. 11, 2007

(54) HIGH-GAIN LOOP ANTENNA

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(21) Appl. No.: **11/222,347**

(22) Filed: **Sep. 8, 2005**

(30) **Foreign Application Priority Data**

Jul. 8, 2005 (TW)..... 094123212

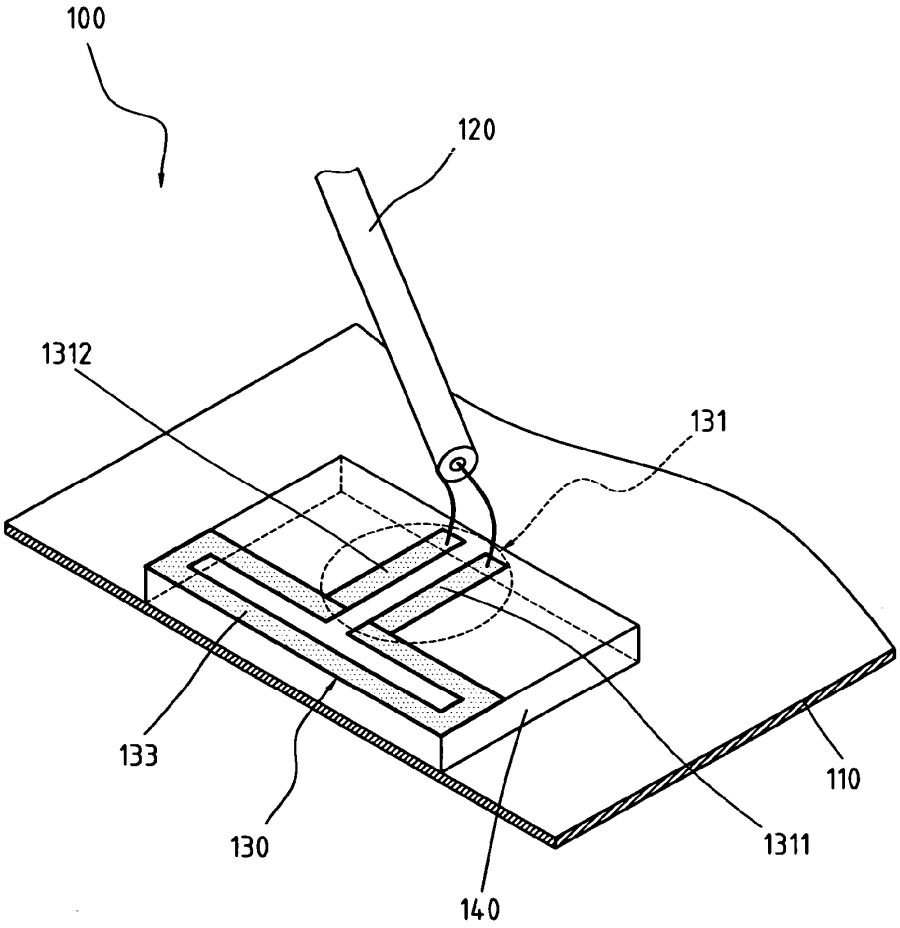
Publication Classification

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

(52) **U.S. Cl.** ..... **343/700 MS**; 343/702; 343/741

(57) **ABSTRACT**

A high gain loop antenna comprises a conductor ground plane, a feeding signal line, a radiation element including two matching sections and a conductor loop, and a dielectric element formed between the conductor ground plane and the radiation element. Both the two matching sections connect to the feeding signal line and radiation element for matching the input impedance. The input impedance can be changed by adjusting the distance between the two matching sections or the lengths of the two matching sections. The conductor loop is to activate the operating mode of the antenna when the current component flows through the loop antenna.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008224 A1**

Chung et al. (43) **Pub. Date: Jan. 11, 2007**

(54) **ANTENNA**

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(21) Appl. No.: **11/251,459**

(22) Filed: **Oct. 13, 2005**

(30) **Foreign Application Priority Data**

Jul. 11, 2005 (TW)..... TW94123342

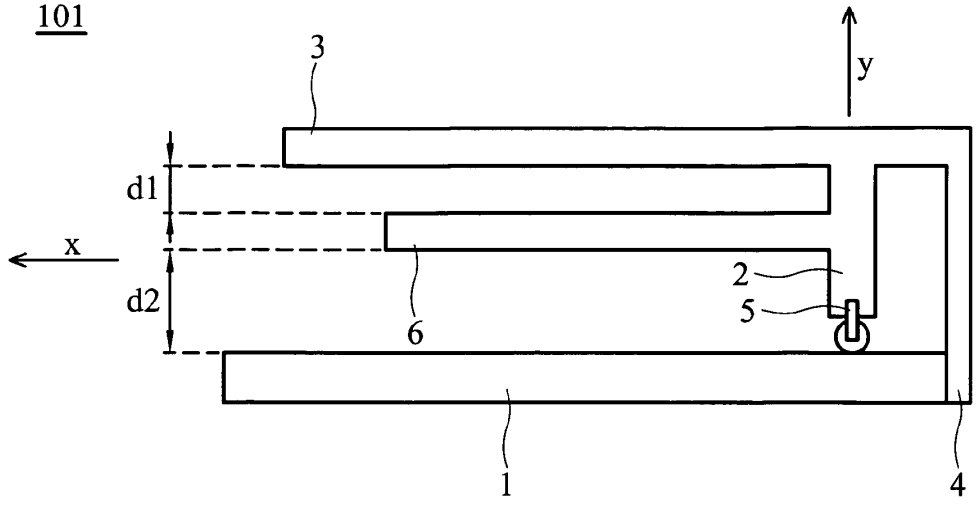
Publication Classification

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

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

(57) **ABSTRACT**

An antenna comprises a signal line, a conductive element, a receiving element, a ground element, a short element and a bandwidth modifying element. The conductive element is coupled to the signal line. The receiving element is connected to the conductive element. The short element is coupled to the ground element and the conductive element. The bandwidth modifying element is connected to the conductive element and located between the receiving element and the ground element. The antenna receives a plurality of wireless signals comprising a center signal with a center frequency, and the center signal comprises a center wavelength λ.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008225 A1**

Kuroda et al. (43) **Pub. Date: Jan. 11, 2007**

(54) **WIDE BAND ANTENNA**

(75) Inventors: **Shinichi Kuroda**, Tokyo (JP); **Tomoya Yamaura**, Tokyo (JP)

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

(21) Appl. No.: **11/475,218**

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

Related U.S. Application Data

(63) Continuation of application No. 11/125,268, filed on May 10, 2005, now Pat. No. 7,123,195, which is a continuation of application No. 10/395,078, filed on Mar. 25, 2003, now Pat. No. 6,914,561.

(30) **Foreign Application Priority Data**

Apr. 9, 2002 (JP) 2002-106417

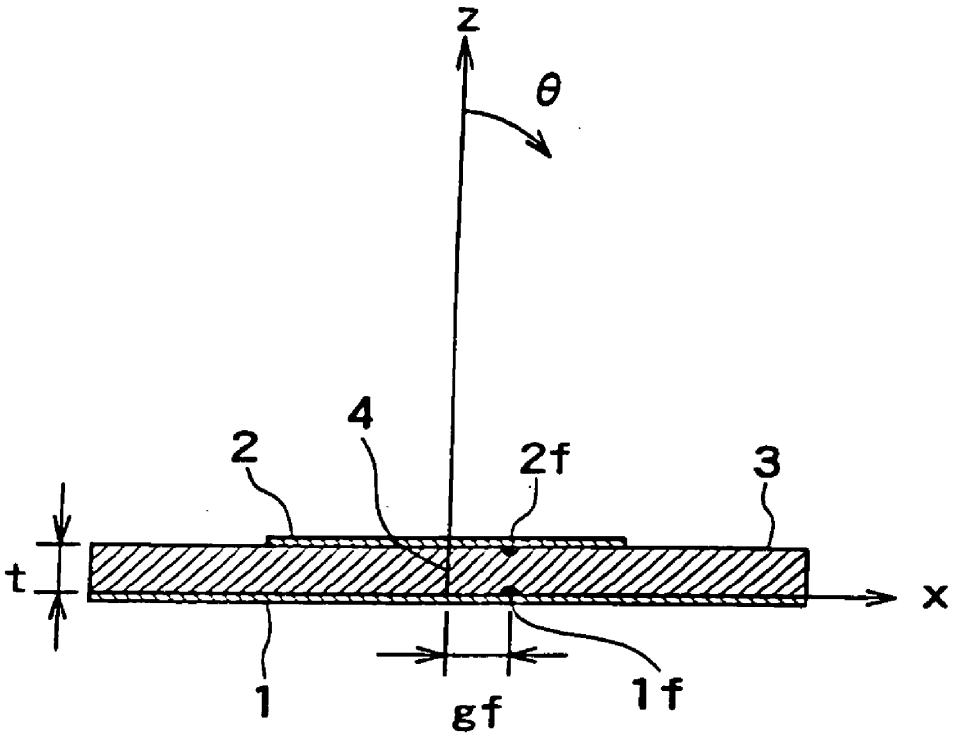
Publication Classification

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

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

(57) **ABSTRACT**

Disclosed is a wideband antenna having a reference conductor and radiation conductor, which are disposed so as to face one another. A substance whose relative permeability is in a range of about 1 though 8 in an operational radio frequency is interposed between the portions of the reference conductor and radiation conductor that face one another. A feed is operatively coupled to the radiation conductor and provides a radio frequency transmission signal thereto. The feed has a tapered shape, which progressively widens as the feed approaches the radiation conductor.



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0008226 A1

Kushihi (43) Pub. Date: Jan. 11, 2007

(54) CIRCULARLY POLARIZED MICROSTRIP ANTENNA AND RADIO COMMUNICATION APPARATUS INCLUDING THE SAME

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(21) Appl. No.: **11/519,040**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP05/05550, filed on Mar. 25, 2005.

(30) **Foreign Application Priority Data**

May 27, 2004 (JP) 2004-157983

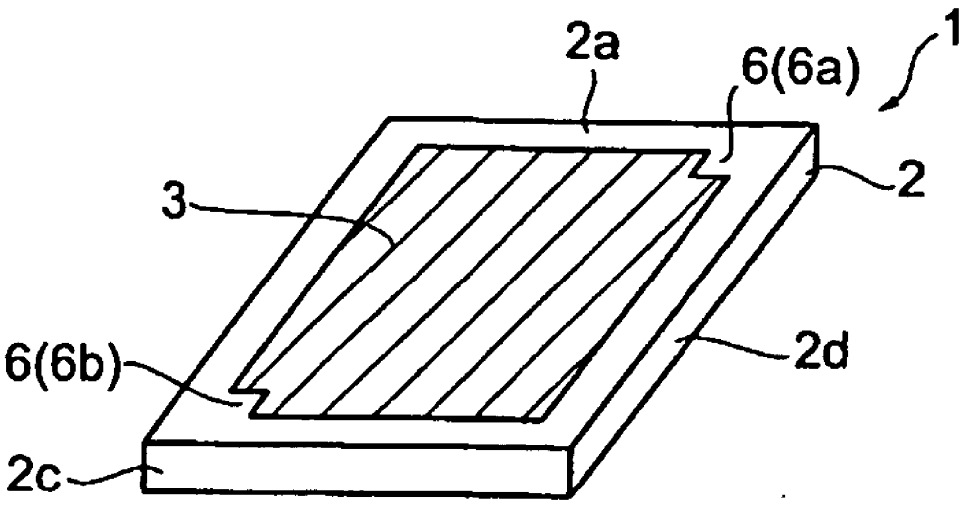
Publication Classification

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

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

(57) **ABSTRACT**

A circularly polarized microstrip antenna includes a dielectric substrate having only an emitting electrode for generating circularly polarized waves on a front surface of the dielectric substrate and a coplanar signal line for feeding the emitting electrode and a ground electrode on a back surface of the dielectric substrate. The ground electrode covers the entire area of the back surface of the dielectric substrate excluding a region in which the signal line is provided. The signal line extends from an edge of the back surface of the dielectric substrate to an intermediate position between the edge of the back surface of the dielectric substrate and a center position O of the emitting electrode on the back surface of the dielectric substrate. Thus, a circularly polarized microstrip antenna whose circular polarization characteristic can be easily improved and whose manufacturing cost and size can be easily reduced is provided.



US 20070008228A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0008228 A1

Yamada et al. (43) Pub. Date: Jan. 11, 2007

(54) ANTENNA DEVICE, MOBILE TERMINAL AND RFID TAG

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(21) Appl. No.: **11/451,487**

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

(30) **Foreign Application Priority Data**

Jul. 11, 2005 (JP) 2005-201915

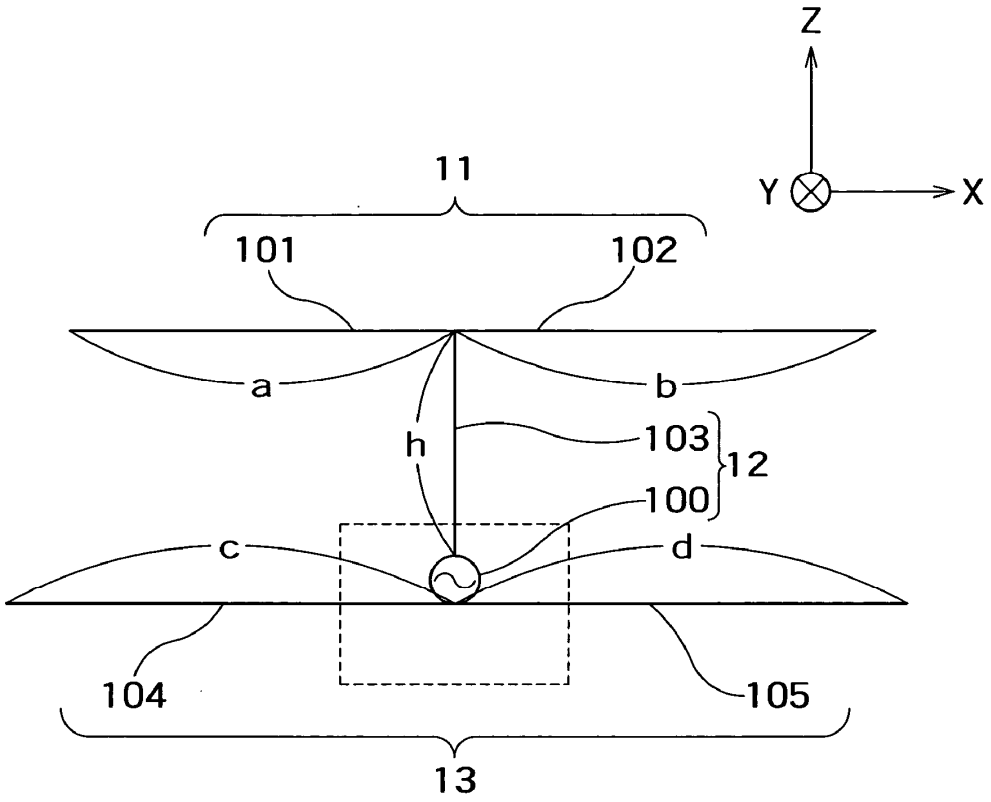
Publication Classification

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

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

(57) **ABSTRACT**

There is provided with an antenna device including: a first wire antenna element having a length about half a wavelength of a radio wave in use; a second wire antenna element which is in a same plane as the first wire antenna element and substantially perpendicular to the first wire antenna element, and which is connected to the first wire antenna element at one end; a third wire antenna element which is in the same plane as the first wire antenna element and substantially in parallel with the first wire antenna element, and which is connected to the second wire antenna element; and a feed point provided on the second wire antenna element.



US 20070008231A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008231 A1**

Jeon et al. (43) **Pub. Date: Jan. 11, 2007**

(54) **ANTENNA DEVICE USING SUPPORT FOR PORTABLE TERMINAL**

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(21) Appl. No.: **11/483,884**

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

(30) **Foreign Application Priority Data**

Jul. 8, 2005 (KR) 2005-61640

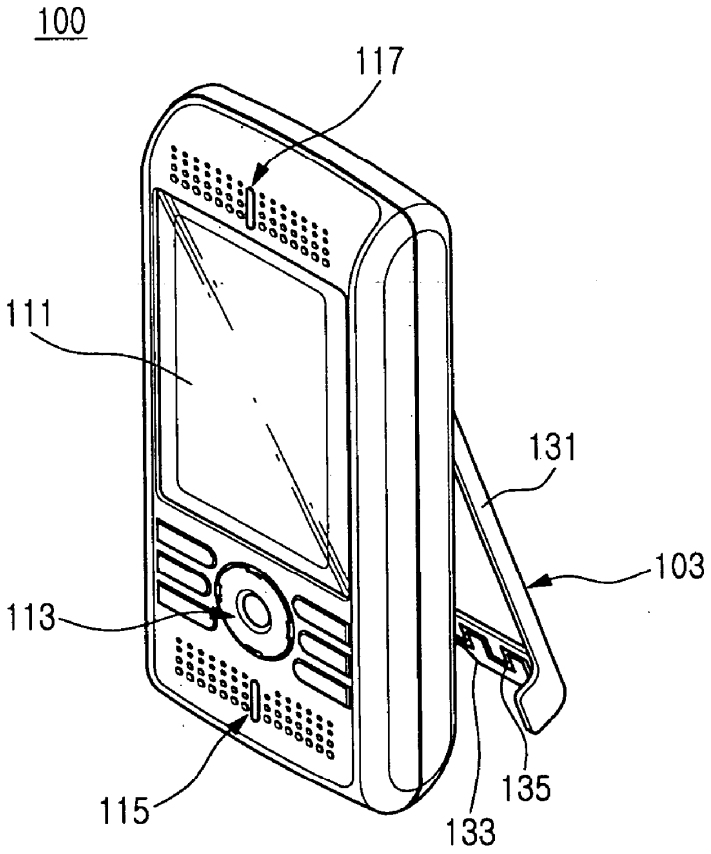
Publication Classification

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

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

(57) **ABSTRACT**

An antenna device for a portable terminal, including a support pivotably disposed on the terminal, which is unfolded from the terminal and rests at an angle for supporting the terminal on a planar surface; and an antenna module disposed on the support. The antenna device is disposed on the support or is formed by the support itself, and receives signals through the support when a user wants to enjoy DMB service. The support is provided in the terminal to avoid a need of a separate portable antenna for DMB service, thereby improving convenience of use. Further, when the support is unfolded from the terminal, the terminal can be placed on the planar surface at a convenient angle for viewing, so that users can enjoy DMB service from a comfortable position.



US 20070008233A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0008233 A1

Strauss et al. (43) Pub. Date: Jan. 11, 2007

(54) ANTENNA COUPLER AND MOUNT FOR MOBILE RADIO TERMINALS

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(21) Appl. No.: **10/550,138**

(22) PCT Filed: **Nov. 11, 2003**

(86) PCT No.: **PCT/DE03/03766**

§ 371(c)(1),
(2), (4) Date: **Sep. 21, 2005**

(30) **Foreign Application Priority Data**

Mar. 25, 2003 (DE)..... 103 13 498.0

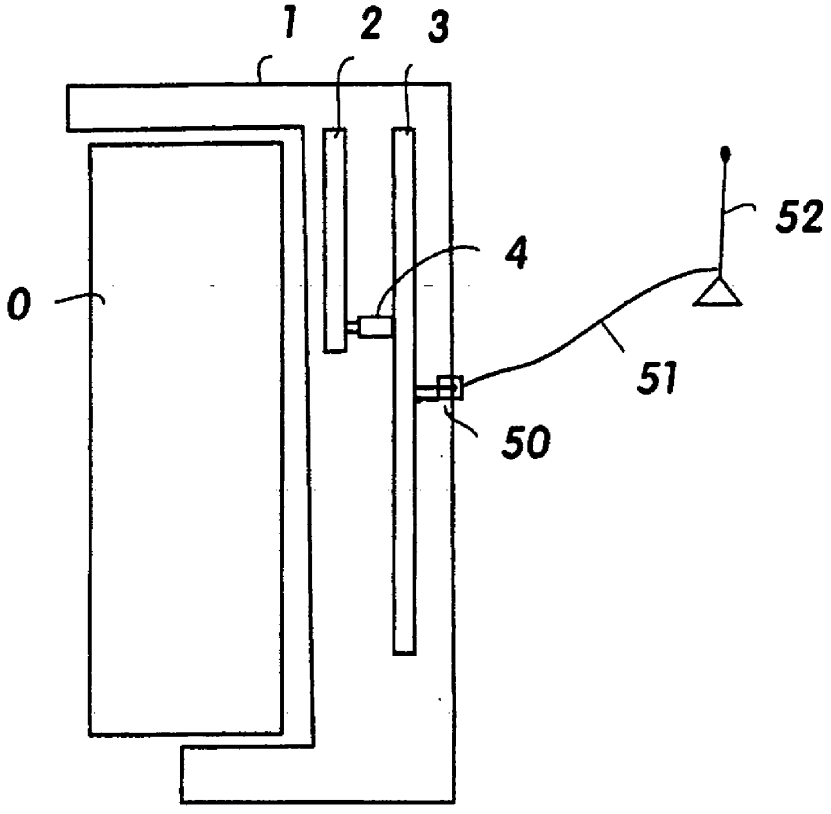
Publication Classification

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

(52) **U.S. Cl.** **343/713**; 343/906; 343/702

(57) **ABSTRACT**

The invention relates to a holder (**1**) for a mobile radio terminal (**0**) and an antenna coupler for a mobile radio terminal. The holder is provided with an interface (**50**) for connection of an external antenna, in particular of a motor vehicle antenna, and with a coupling structure for electromagnetic coupling of RF signals between the holder (**1**) and the antenna of a mobile radio terminal (**0**) which is located in the holder. The coupling structure is arranged in the holder (**1**) in such a way that, when the mobile radio terminal (**0**) is inserted, the coupling structure is positioned in the vicinity of the mobile radio terminal (**0**). The coupling structure is in the form of a two-layer or multilayer coupling structure with two or more coupling structure elements (**2, 3**) arranged one above the other.



US 20070008237A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0008237 A1**

Mehta et al. (43) **Pub. Date: Jan. 11, 2007**

(54) **ANTENNA HAVING CONTROLLABLE EMISSION OF RADIATION**

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(21) Appl. No.: **11/472,589**

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

(30) **Foreign Application Priority Data**

Dec. 24, 2003 (GB) 0329934.4

Sep. 22, 2004 (GB) 0421002.7

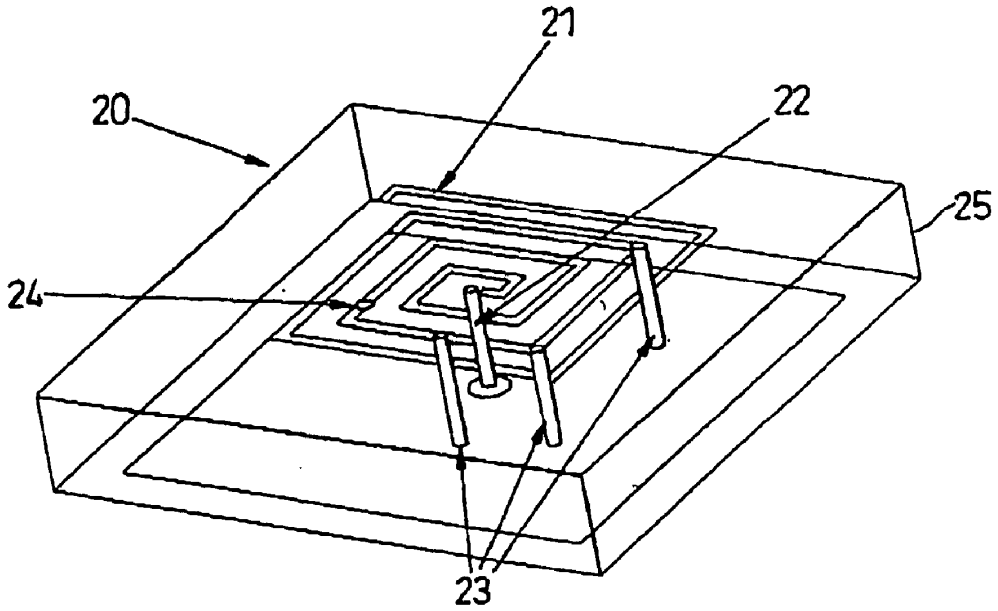
Publication Classification

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

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

(57) **ABSTRACT**

An antenna (**10**) suitable for a mobile telephone or other such communication device has a transmission element (**21**) to transmit and receive an electromagnetic radiation pattern. The transmission element (**21**) is supported on a layer or layers (**25**) of dielectric material, control over the orientation of a radiation pattern to be transmitted or received being maintained electronically. The transmission element (**21**) includes at least one loop and is often in a spiral configuration. Switches (**23, 24**) in the form of a microelectromechanical switch or a PIN diode, capable of short or open circuiting the element (**21**), allow the orientation of the radiation pattern to be altered. The dielectric constant of the dielectric material (**25**) is variable, again affecting the orientation.



US 20070010302A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0010302 A1**

Timms (43) **Pub. Date: Jan. 11, 2007**

(54) **EXTENDABLE ANTENNA AND SPEAKER BOX**

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(21) Appl. No.: **11/176,501**

(22) Filed: **Jul. 6, 2005**

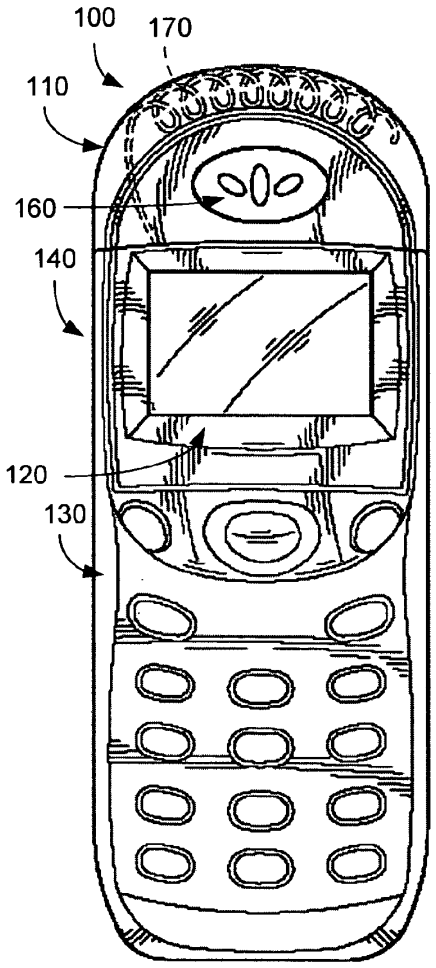
Publication Classification

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

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

(57) **ABSTRACT**

A wireless communication device includes a housing, and a retractable combination speaker box and antenna mechanism operably coupled with the housing. The retractable combination speaker box and antenna mechanism includes a speaker box with an enclosed acoustic volume, and an antenna. The retractable combination speaker box and antenna mechanism is movable between at least a retracted position where the retractable combination speaker box and antenna mechanism is adjacent with the housing, the antenna is in a retracted condition, and the speaker box includes a retracted enclosed acoustic volume, and a deployed position where the retractable combination speaker box and antenna mechanism is moved away from the housing, the antenna is in a deployed condition farther away from the housing than the retracted condition, and the speaker box includes a deployed enclosed acoustic volume that is greater than the retracted enclosed acoustic volume.



US 20070013585A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0013585 A1

Wang et al. (43) Pub. Date: Jan. 18, 2007

(54) DUAL-FREQUENCY DIRECTIONAL ANTENNA AND HIGH/LOW FREQUENCY RATIO ADJUSTING METHOD THEREOF

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(21) Appl. No.: **11/436,224**

(22) Filed: **May 17, 2006**

(30) **Foreign Application Priority Data**

Jul. 13, 2005 (TW)..... 94123683

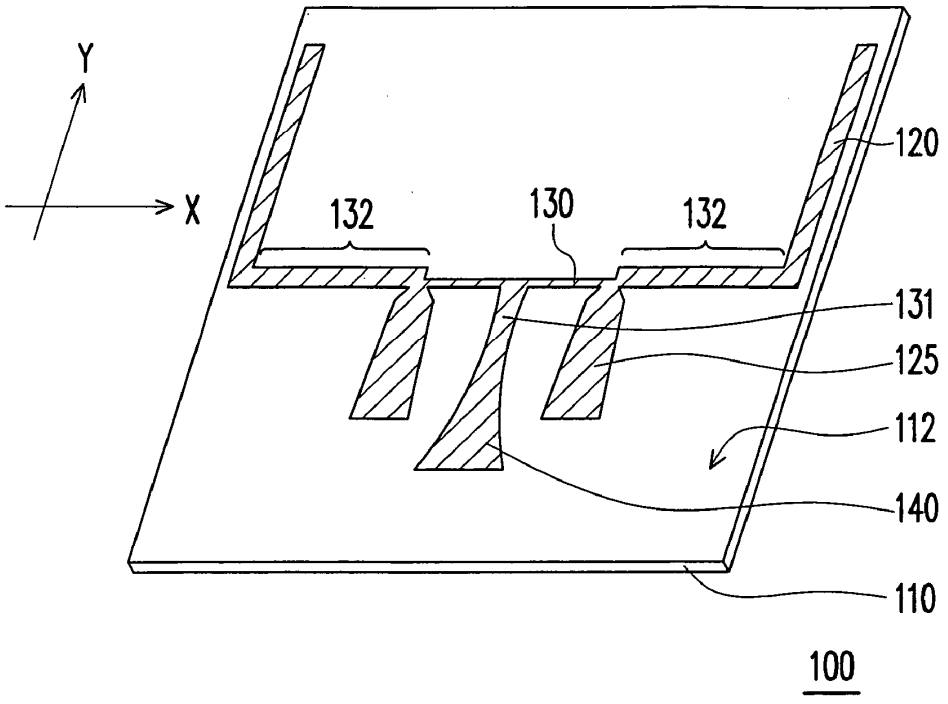
Publication Classification

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

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

(57) **ABSTRACT**

A dual-frequency directional antenna includes a dielectric substrate, high frequency antenna elements, low frequency antenna elements, symmetrical micro-strip Lines and baluns respectively disposed on a front surface and a rear surface of the dielectric substrate. Two ends of a symmetrical micro-strip line are respectively connected to two low frequency antenna elements. The high frequency antenna elements are disposed between two low frequency antenna elements and connected to a symmetric micro-strip line. Each balun is disposed between two high frequency antenna elements, one end of the balun is connected to a middle segment of a symmetrical micro-strip line and the other end is connected to an antenna feeding port. The dual-frequency directional antenna according to the present invention with thin and compact size has dual operating frequency bands property and is applicable for indoor environment.



US 20070013587A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013587 A1**

Liu et al. (43) **Pub. Date: Jan. 18, 2007**

(54) **ANTENNA AND NOTEBOOK UTILIZING THE SAME**

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(21) Appl. No.: **11/233,781**

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

(30) **Foreign Application Priority Data**

Jul. 14, 2005 (TW)..... TW94123889

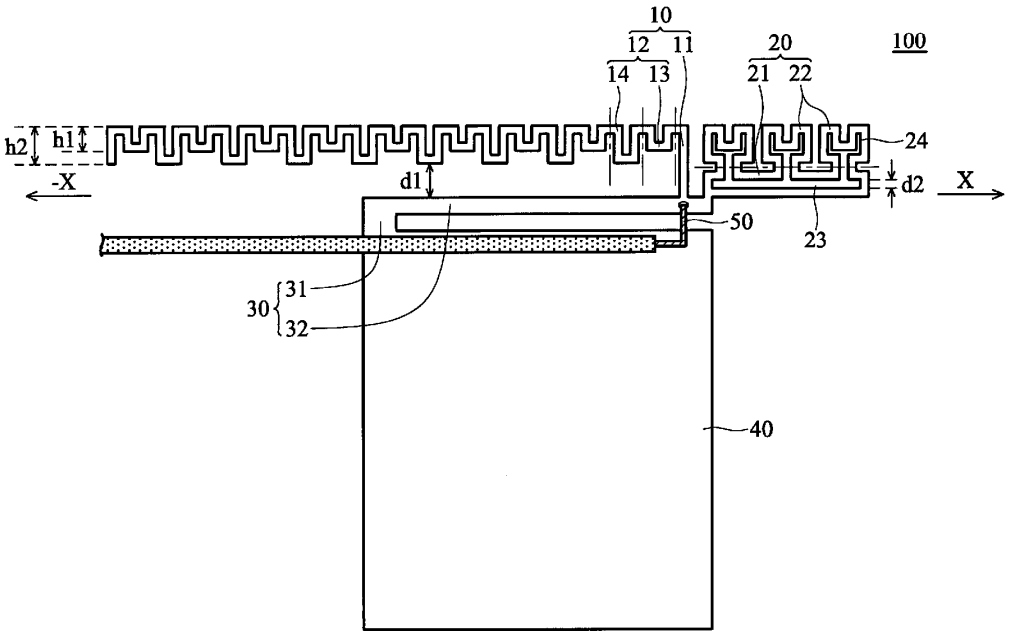
Publication Classification

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

(52) **U.S. Cl.** ..... **343/702**; 343/700 MS; 343/895

(57) **ABSTRACT**

An antenna comprises a ground element, a conductive element, a signal line, a first transmitting element, a second transmitting element. The conductive element is L-shaped and connected to the ground element. The signal line is coupled to the conductive element. The first transmitting element is connected to the conductive element for transmitting a first signal. The second transmitting element is connected to the conductive element for transmitting a second signal. The first signal is a GSM900 signal and the second signal is a DCS1800 signal.



US 20070013588A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013588 A1**

Chen et al. (43) **Pub. Date: Jan. 18, 2007**

(54) **BROADBAND ANTENNA**

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

(21) Appl. No.: **11/257,317**

(22) Filed: **Oct. 25, 2005**

(30) **Foreign Application Priority Data**

Jul. 13, 2005 (TW)..... 094211912

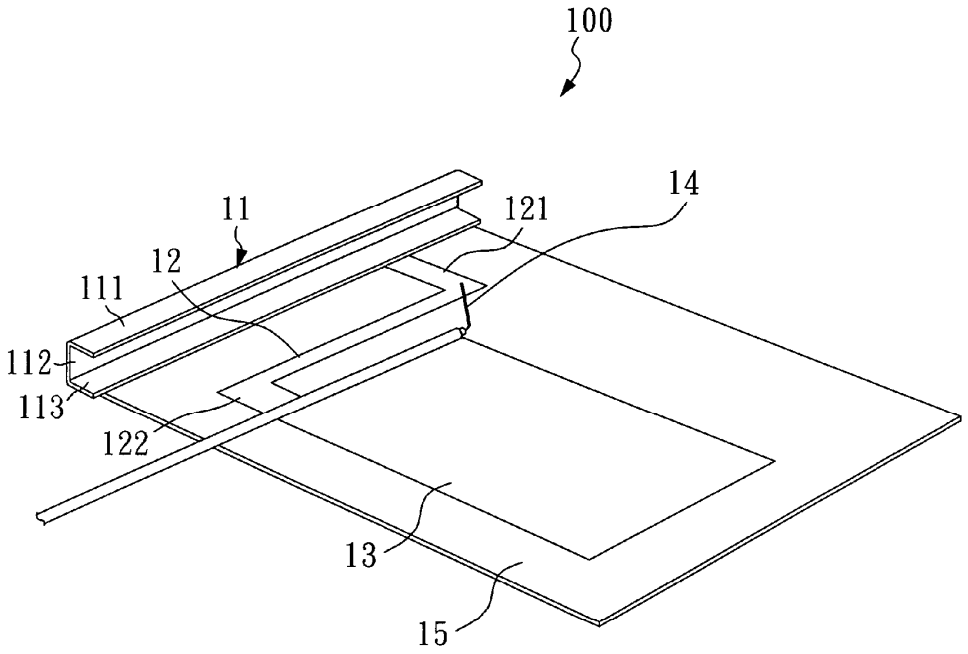
Publication Classification

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

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

(57) **ABSTRACT**

A broadband antenna for wireless communication system, the broadband antenna includes a radiating element, a grounding element and a connecting element for connecting the radiating element and the grounding element. The radiating element has a U-shaped structure, a V-shaped structure or an L-shaped structure. The broadband antenna of the present invention has wider frequency bandwidth and higher antenna efficiency.



US 20070013589A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013589 A1**

PARK et al. (43) **Pub. Date: Jan. 18, 2007**

(54) **INTERNAL ANTENNA HAVING PERPENDICULAR ARRANGEMENT**

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

(21) Appl. No.: **11/457,393**

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

(30) **Foreign Application Priority Data**

Jul. 15, 2005 (KR) 10-2005-64291

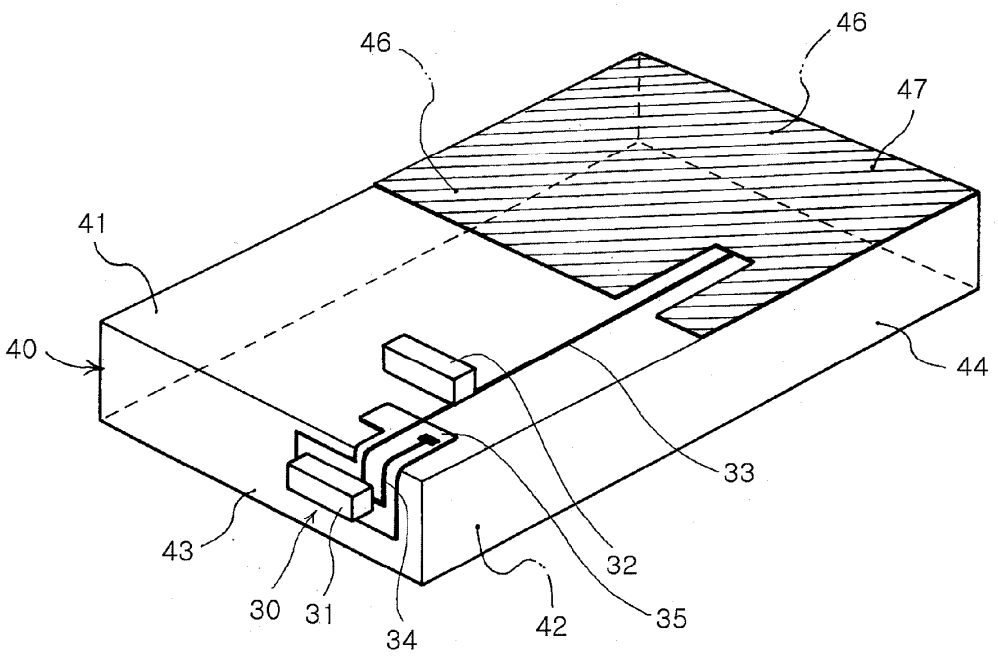
Publication Classification

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

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

(57) **ABSTRACT**

The invention provides an internal antenna capable of processing a wide-band or a multi-band while occupying a minimum space in a mobile telecommunication terminal. In the internal antenna, a first antenna part is disposed on a side of a mobile telecommunication terminal body having at least first and second peripheral surfaces and sides. The first antenna part processes a signal of a first band. Also a second antenna part is disposed on one of the peripheral surfaces of the mobile telecommunication body. The second antenna part processes a signal of a second band.



US 20070013590A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013590 A1**

Shinkai (43) **Pub. Date: Jan. 18, 2007**

(54) **WIDE-BAND ANTENNA, AND WIDE-BAND ANTENNA MOUNTING SUBSTRATE**

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(73) Assignee: **OMRON Corporation**, Kyoto (JP)

(21) Appl. No.: **11/484,181**

(22) Filed: **Jul. 11, 2006**

(30) **Foreign Application Priority Data**

Jul. 12, 2005 (JP) 2005-203539

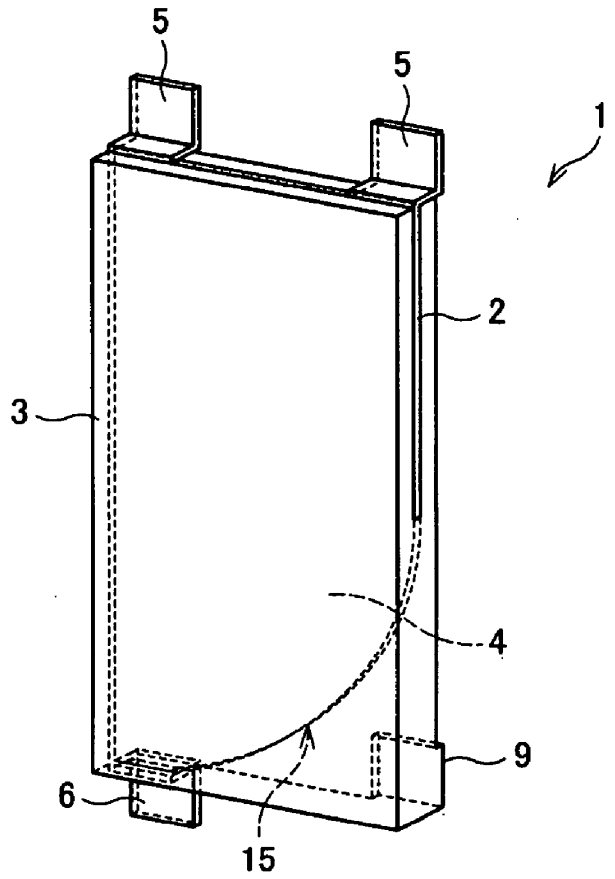
Publication Classification

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

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

(57) **ABSTRACT**

An antenna which can be reduced in size and which can widen the band of a VSWR without changing the shape of a ground pattern but while retaining a wide space for electronic parts to be mounted. The antenna **1** has a feeding electrode portion **4**. This feeding electrode portion **4** includes a conductive flat plate, which is cut away at its one corner of a rectangle such that the cut-away portion **15** is defined by an arc joining two sides making a corner and bulging inward.



US 20070013596A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0013596 A1

Fukuchi (43) Pub. Date: Jan. 18, 2007

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(76) Inventor: Keisuke Fukuchi, Hitachi (JP)

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(21) Appl. No.: 11/484,609

(22) Filed: Jul. 12, 2006

(30) Foreign Application Priority Data

Jul. 12, 2005 (JP) 2005-203265

Feb. 13, 2006 (JP) 2006-035327

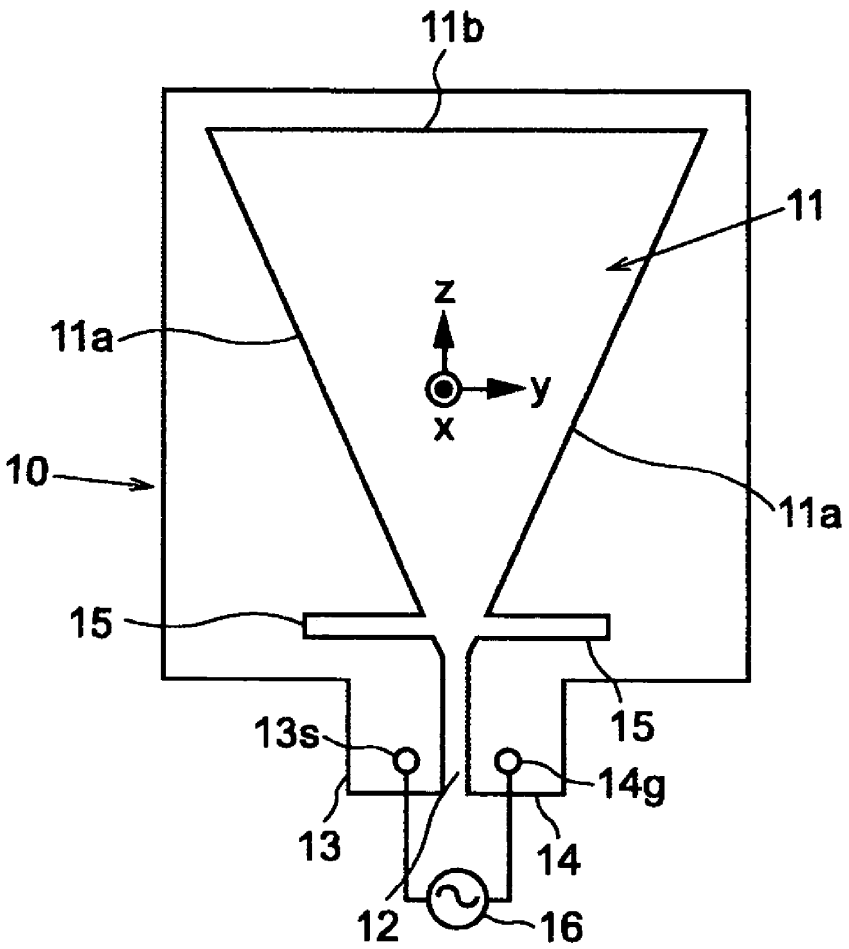
Publication Classification

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

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

(57) ABSTRACT

In an antenna to be used for UWB communication, a taper slot is formed in a rectangular conductive plate, a vertical slit for separating the conductive pate is formed at the top of the taper slot, a feeding point part and a grounding point part are formed at the conductive plate and on both sides of the vertical slit, and the lower slits are formed on the oblique sides of the taper slot near the feeding point part and the grounding point part.



US 20070013597A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013597 A1**

Sugawara (43) **Pub. Date: Jan. 18, 2007**

(54) **ANTENNA DEVICE HAVING WIDE OPERATION RANGE WITH A COMPACT SIZE**

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(21) Appl. No.: **11/486,231**

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

(30) **Foreign Application Priority Data**

Jul. 13, 2005 (JP) 2005-204642
Jul. 19, 2005 (JP) 2005-209267

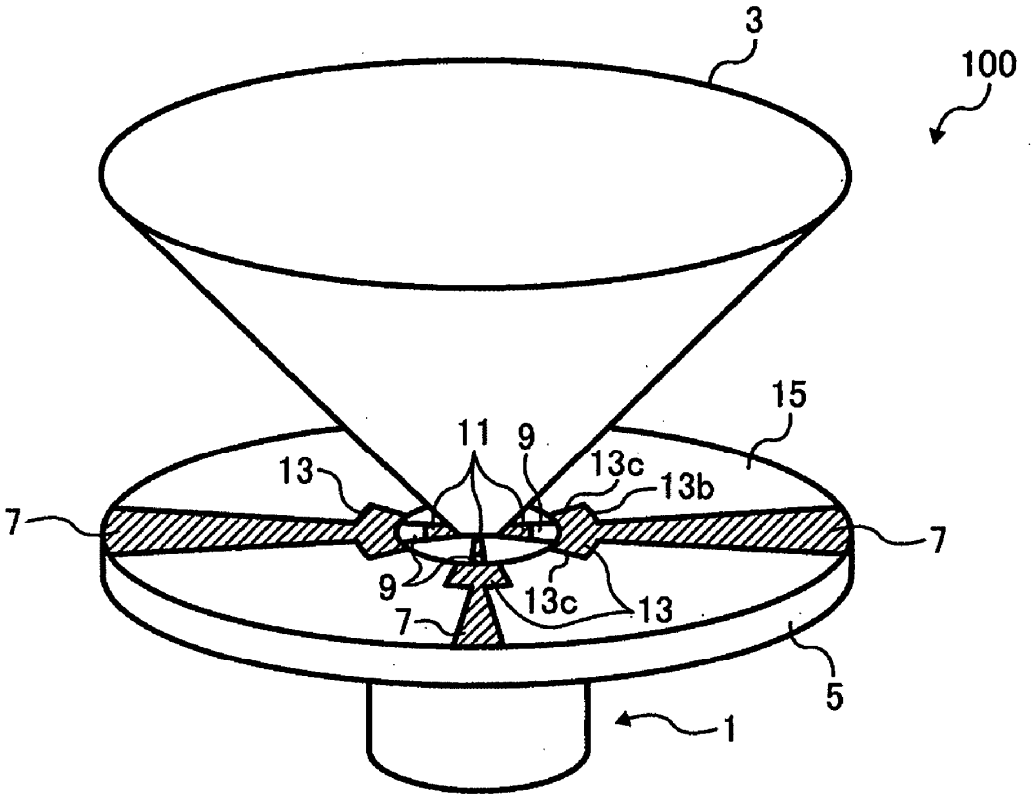
Publication Classification

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

(52) **U.S. Cl.** ..... **343/773**; 343/700 MS

(57) **ABSTRACT**

This patent specification describes an antenna device which includes a non-directional antenna having a radiating element and a ground plate, a coaxial line configured to feed an electromagnetic power to the non-directional antenna, a dielectric film arranged on the ground plate, including a dielectric material, a short circuit line arranged on the dielectric film, formed of a conductive pattern and configured to connect an inner conductor of the coaxial line to an outer conductor of the coaxial line and a switch arranged at a portion of the short circuit line to switch a state between a non-shorted state and a shorted state.



US 20070013598A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0013598 A1

Artis et al. (43) Pub. Date: Jan. 18, 2007

(54) FREQUENCY DISPERSIVE ANTENNA APPLIED IN PARTICULAR TO A METEOROLOGICAL RADAR

(76) Inventors: **Jean-Paul Artis**, Plouzane (FR); **Gerard Debionne**, Mery Sur Oise (FR); **Georges Guillaumot**, Tigery (FR); **Maxence Marcant**, Milizac (FR)

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(21) Appl. No.: **11/445,461**

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

(30) **Foreign Application Priority Data**

Jun. 3, 2005 (FR) 05 05649

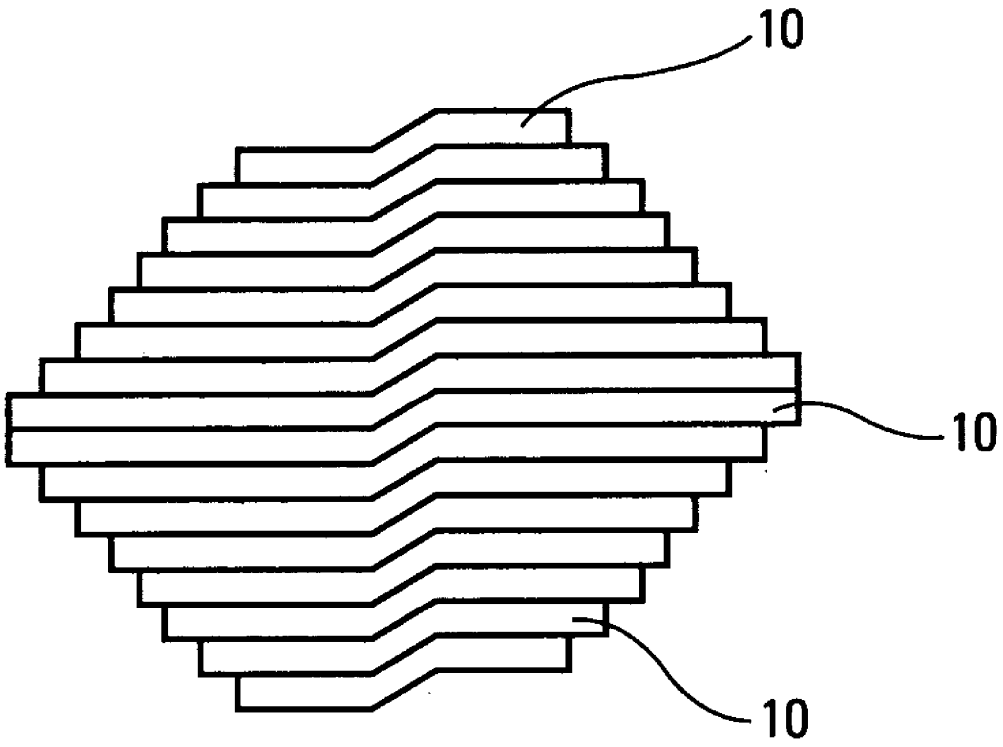
Publication Classification

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

(52) **U.S. Cl.** **343/776**; 343/772

(57) **ABSTRACT**

The invention relates to a frequency dispersive antenna comprising radiating waveguides divided into three legs. The indirect angle between the first and the second leg is greater than or equal to 90 degrees and less than 180 degrees, the direct angle between the second and third leg being greater than or equal to 90 degrees and less than 180 degrees. The antenna comprises a feed waveguide comprising a stack of elements divided into three adjacent legs, the direct angle between the first and the second leg being greater than or equal to 90 degrees and less than 180 degrees, the indirect angle between the second and the third leg being greater than or equal to 90 degrees and less than 180 degrees. In particular, the invention applies to an airborne antenna suitable for the detection and for the pinpointing of meteorological phenomena.



US 20070013599A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0013599 A1

Gaucher et al. (43) Pub. Date: Jan. 18, 2007

(54) APPARATUS AND METHODS FOR CONSTRUCTING AND PACKAGING PRINTED ANTENNA DEVICES

(76) Inventors: **Brian Paul Gaucher**, Brookfield, CT (US); **Duixian Liu**, Yorktown Heights, NY (US); **Ullrich Richard Rudolf Pfeiffer**, Carmel, NY (US); **Thomas Martin Zwick**, West Harrison, NY (US)

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(21) Appl. No.: **11/524,599**

(22) Filed: **Sep. 21, 2006**

Related U.S. Application Data

(63) Continuation of application No. 10/881,104, filed on Jun. 30, 2004, now Pat. No. 7,119,745.

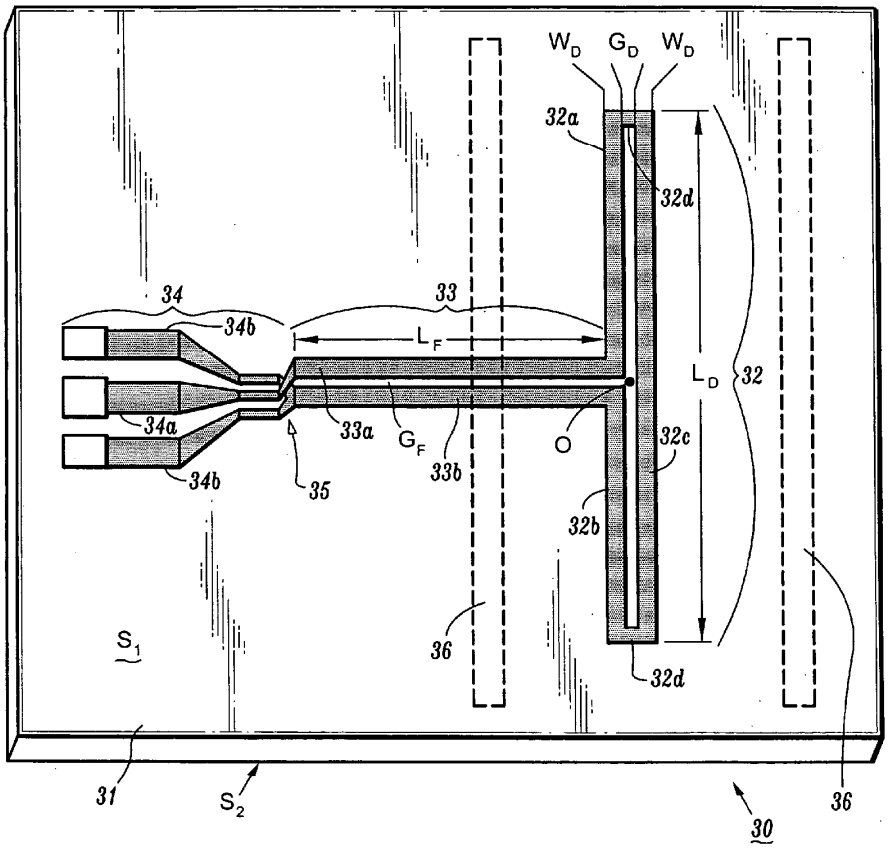
Publication Classification

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

(52) **U.S. Cl.** **343/795**; 343/803

(57) **ABSTRACT**

Printed antenna devices are provided, which can operate at RF and microwave frequencies, for example, while simultaneously providing antenna performance characteristics such as high gain/directivity/radiation efficiency, high bandwidth, hemispherical radiation patterns, impedance, etc., that render the antennas suitable for voice communication, data communication or radar applications, for example. Further, apparatus are provided for integrally packaging such printed antenna devices with IC (integrated circuit) chips (e.g., transceiver) to construct IC packages for, e.g., wireless communications applications.



US 20070013603A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013603 A1**

Atkinson et al. (43) **Pub. Date: Jan. 18, 2007**

(54) **ANTENNA DEVICES AND PROCESSES FOR IMPROVED RF COMMUNICATION WITH TARGET DEVICES**

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(21) Appl. No.: **11/457,431**

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

Related U.S. Application Data

(60) Provisional application No. 60/699,411, filed on Jul. 13, 2005.

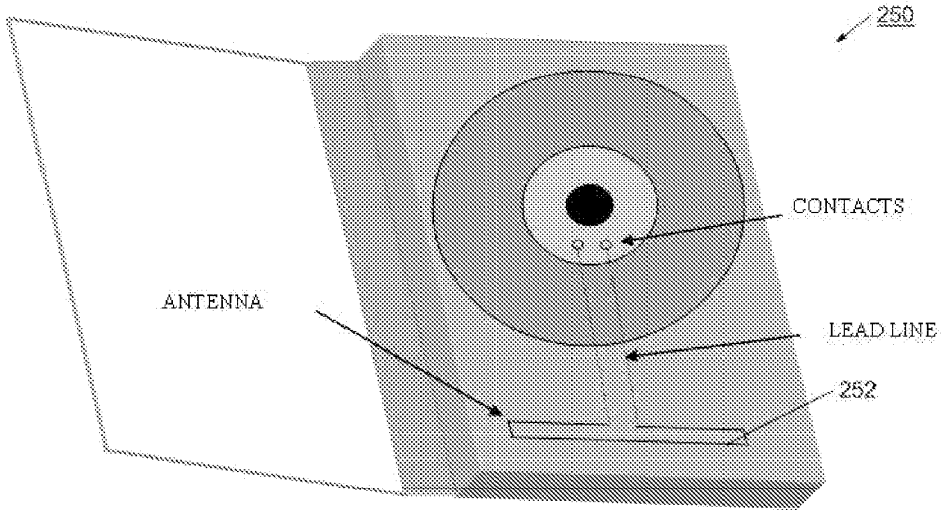
Publication Classification

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

(52) **U.S. Cl.** **343/873**; 343/872; 343/702

(57) **ABSTRACT**

Devices and methods are provided for wireless communication with a target, such as an optical disc or an electronic device. The devices include an integrated processor and an antenna that are connected to the target, which enable a wireless communication with an associated reader or scanning system. The integrated circuit may be embedded in the target attached to the surface of the target, or in a label attached to the target. In a similar manner, the antenna may be embedded in the target, attached to the surface of the target, or in a label attached to the target. Interconnection lines may be used connect the integrated processor to the antenna, and may include a feedthrough arrangement for passing electrical signals between the surface and the interior of the target. A demodulator may also be positioned adjacent or on the antenna, allowing a long lead line to pass demodulated data to the integrated circuit. In one example, the antenna is positioned in or on a case that holds the target, with lead lines connecting the antenna to the target's integrated circuit. One, two, or three antennas may be used, with the multi-antenna arrangements preferably arranging the antennas orthogonally.



US 20070013605A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0013605 A1**

Preble (43) **Pub. Date: Jan. 18, 2007**

(54) **SPIRAL ANTENNA**

(76) Inventor: **Duane Preble**, White Hall, MD (US)

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(21) Appl. No.: **11/180,337**

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

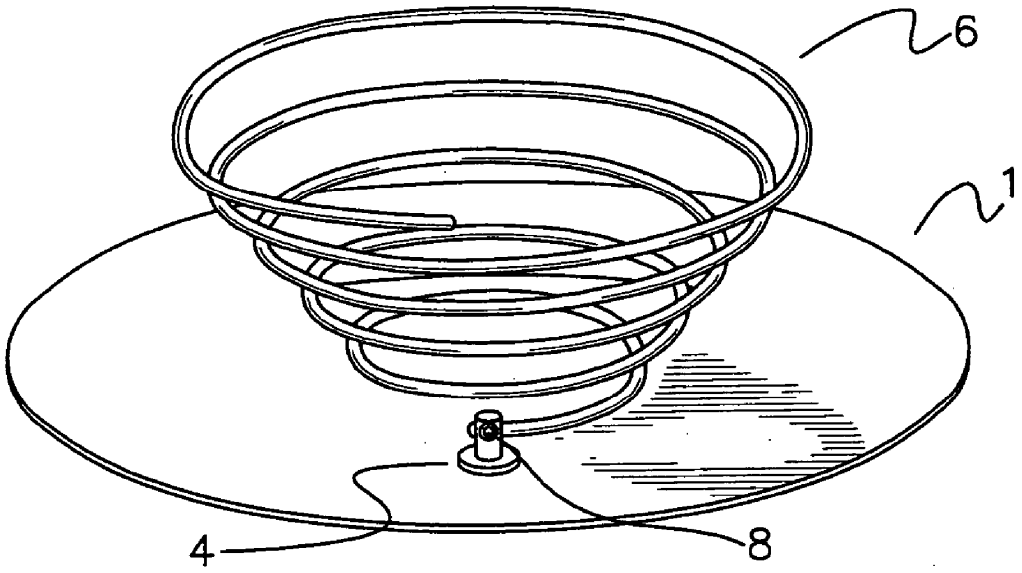
Publication Classification

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

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

(57) **ABSTRACT**

An antenna is described, which is comprised of copper tubing formed into a three-dimensional Archimedes spiral, extending above and supported by a back plate.



US 20070013606A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0013606 A1

Yang et al. (43) Pub. Date: Jan. 18, 2007

(54) COAXIAL CABLE FREE QUADRI-FILAR HELICAL ANTENNA STRUCTURE

(75) Inventors: **Pei-Lin Yang**, Hsinchu (TW); **Chia-Chun Hung**, Hsinchu (TW)

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(73) Assignee: **Jabil Circuit Taiwan Limited**, Hsinchu (TW)

(21) Appl. No.: **11/274,418**

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

(30) **Foreign Application Priority Data**

Jul. 13, 2005 (TW)..... 094123696

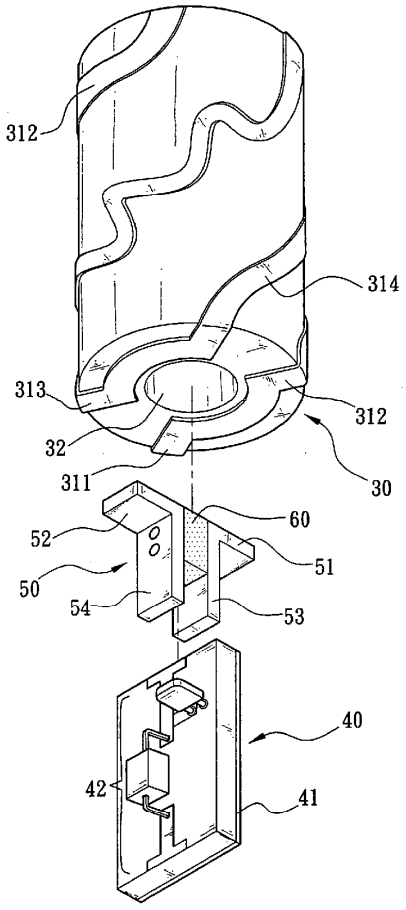
Publication Classification

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

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

(57) **ABSTRACT**

A quadri-filar helical antenna structure includes a cylindrical body having a relative dielectric constant greater than 4, and four radial metal plates on a distal end of the cylindrical body, and each radial metal plate is extended along the cylindrical body. The ends of every two adjacent radial metal plates are connected to form two antenna structures, and a circuit board is fixed. A ground surface is installed on one side of the circuit board and coupled to one of the antennas. An impedance matching circuit is installed on another side of the circuit board, and one end of the impedance matching circuit is coupled to another antenna. A feeder is installed at another end of the impedance matching circuit. Four radial metal plates having an electric length about odd multiples of a quarter of wavelength of the cylindrical body can receive satellite signals.



US 20070015555A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0015555 A1

Bogner (43) Pub. Date: Jan. 18, 2007

(54) **PORTABLE EXTERNAL CELL PHONE ANTENNA**

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(73) Assignee: **BRUCEMARV LLC**

(21) Appl. No.: **11/523,913**

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

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/233,908, filed on Sep. 23, 2005.

(60) Provisional application No. 60/643,377, filed on Jan. 13, 2005. Provisional application No. 60/650,581, filed on Feb. 7, 2005. Provisional application No. 60/654,880, filed on Feb. 22, 2005.

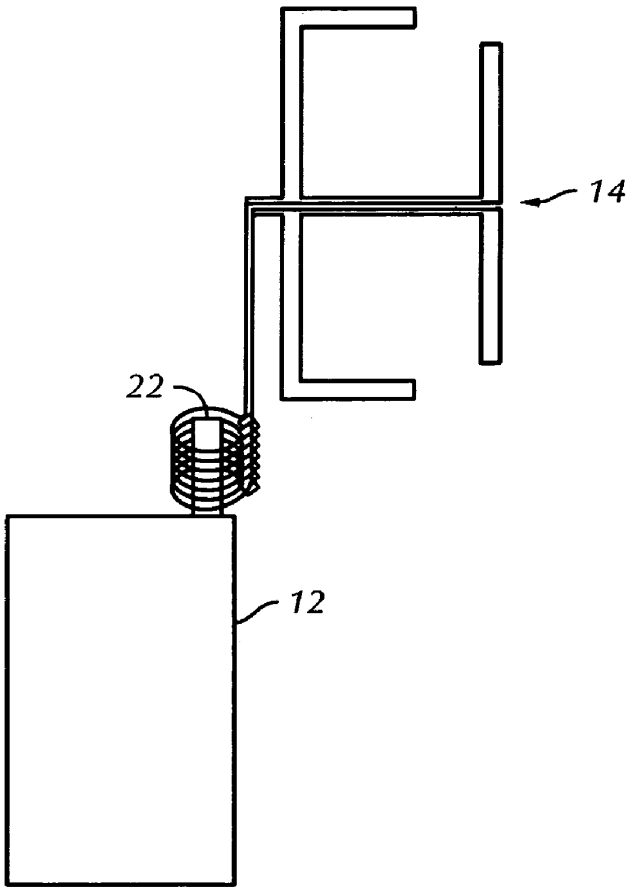
Publication Classification

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

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

(57) **ABSTRACT**

A portable, self contained, dual frequency external antenna configuration is provided for use with a phone, such as a cell phone having either an outwardly extending antenna or an internal antenna to enhance cell phone operation. The antenna configuration comprises a first antenna tuned to a first cell phone operating frequency and a second antenna tuned to a second cell phone operating frequency. A connector is provided, the connector adapted for making a connection to the cell phone and at least one transmission line connects the first and second antennas to the connector.



US 20070017986A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0017986 A1**

Carrender et al. (43) **Pub. Date: Jan. 25, 2007**

(54) **RADIO FREQUENCY IDENTIFICATION WITH A SLOT ANTENNA**

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(21) Appl. No.: **11/489,149**

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

Related U.S. Application Data

(60) Provisional application No. 60/700,851, filed on Jul. 19, 2005.

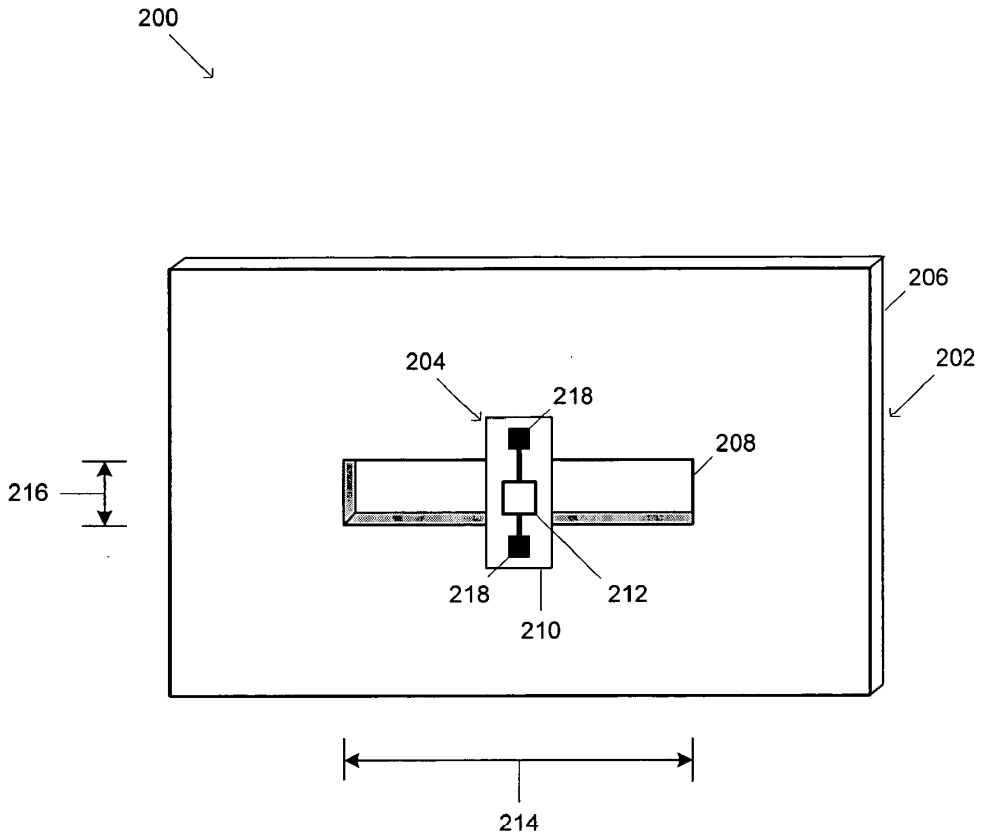
Publication Classification

(51) **Int. Cl.**
G06K 7/00 (2006.01)

(52) **U.S. Cl.** **235/435**; 340/572.7

(57) **ABSTRACT**

Techniques for a radio frequency identification (RFID) device are provided. The device includes a slot antenna having at least one slot disposed in a first substrate. A strap is disposed across the slot. The strap includes a second substrate and an integrated circuit. The integrated circuit is electrically coupled to the slot antenna. In a specific embodiment, a thickness of a metal slot antenna is at least $\frac{1}{4}^{th}$ an inch. The RFID device can also be associated with a location, and be attached to a pallet rack.



US 20070018892A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0018892 A1**

Ku et al. (43) **Pub. Date: Jan. 25, 2007**

(54) **PLANAR INVERTED F ANTENNA AND METHOD OF MAKING THE SAME**

(75) Inventors: **Po-Kang Ku**, Tu-Cheng (TW); **Lung-Sheng Tai**, Tu-Cheng (TW); **Chen-Ta Hung**, Tu-Cheng (TW); **Yun-Long Ke**, Tu-Cheng (TW); **Yao-Shien Huang**, Tu-Cheng (TW)

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(21) Appl. No.: **11/491,602**

(22) Filed: **Jul. 24, 2006**

(30) **Foreign Application Priority Data**

Jul. 22, 2005 (CN) 200510041153.1

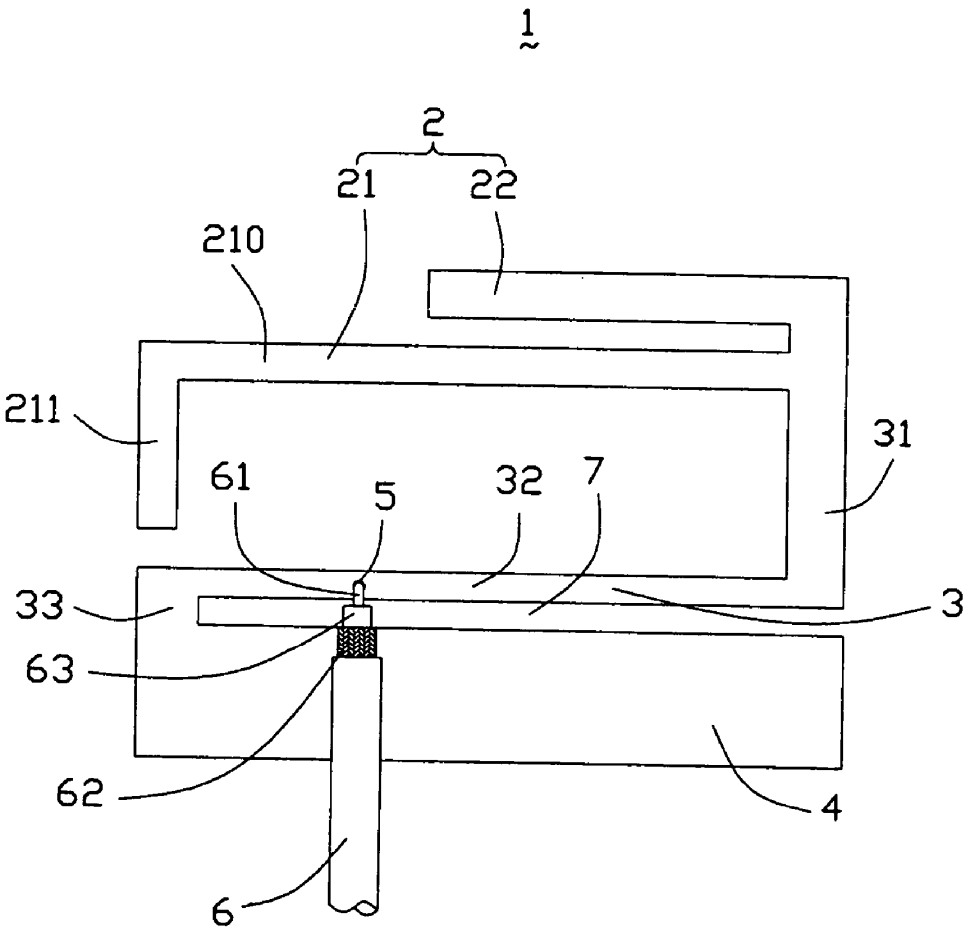
Publication Classification

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

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

(57) **ABSTRACT**

A multi-band antenna (**1**) used in wireless communications includes a radiating portion (**2**), a grounding portion (**4**), and a connecting portion (**3**). The radiating portion (**2**) includes a first radiating element (**21**) operating at 900 MHz frequency band and a second radiating element (**22**) operating at 1800 MHz frequency band. The connecting portion (**3**) connects the radiating portion (**2**) and the grounding portion (**4**). The grounding portion (**4**), the radiating portion (**2**), and the connecting portion (**3**) locate in the same plane.



US 20070018893A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0018893 A1

Kai et al. (43) Pub. Date: Jan. 25, 2007

(54) **RADIO TAG ANTENNA STRUCTURE FOR AN OPTICAL RECORDING MEDIUM AND A CASE FOR AN OPTICAL RECORDING MEDIUM WITH A RADIO TAG ANTENNA**

(76) Inventors: **Manabu Kai**, Kawasaki (JP); **Yasuyuki Oishi**, Kawasaki (JP); **Toru Maniwa**, Kawasaki (JP); **Hiroyuki Hayashi**, Kawasaki (JP); **Andrey Andrenko**, Kawasaki (JP)

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(21) Appl. No.: **11/528,916**

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

Related U.S. Application Data

(62) Division of application No. 10/999,690, filed on Nov. 30, 2004.

(30) **Foreign Application Priority Data**

Jul. 13, 2004 (JP) 2004-205829

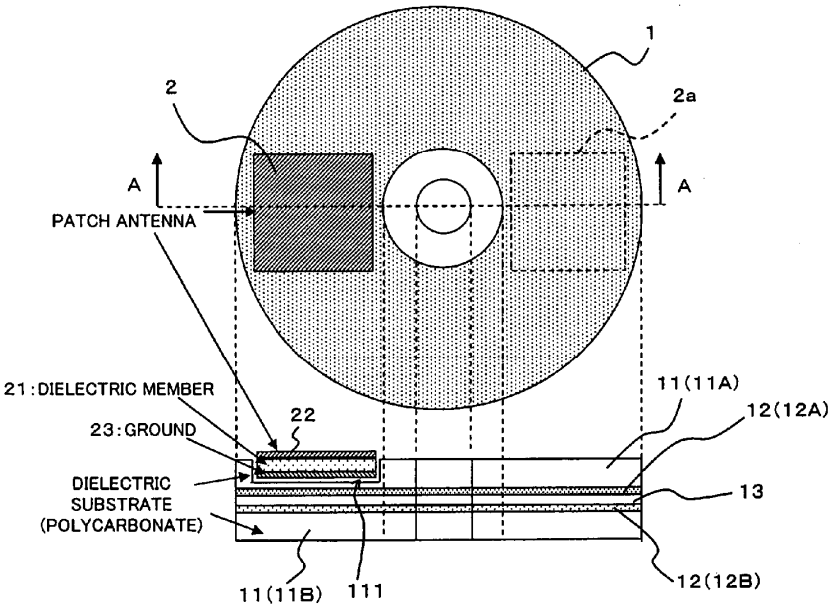
Publication Classification

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

(52) **U.S. Cl.** ..... **343/700 MS**; 343/873

(57) **ABSTRACT**

An antenna comprises a dielectric member, an antenna pattern formed on one surface of the dielectric member, and a ground pattern formed on the other surface of the dielectric member. A part or the whole of the antenna is implanted in a dielectric layer on the side from which a laser beam does not come in of an optical recording medium symmetrically having a metal layer reflecting the laser beam and the dielectric layer, thereby to provide a radio tag antenna structure for an optical recording medium which is simple, is small-sized, and can secure necessary reading performance.



US 20070018896A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0018896 A1

Chen et al. (43) Pub. Date: Jan. 25, 2007

(54) **BROADBAND ANTENNA AND ELECTRONIC DEVICE HAVING THE BROADBAND ANTENNA**

(75) Inventors: **Chih Lung Chen**, Taipei Hsien (TW); **Chih Kai Liu**, Taipei Hsien (TW)

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

(21) Appl. No.: **11/257,010**

(22) Filed: **Oct. 25, 2005**

(30) **Foreign Application Priority Data**

Jul. 21, 2005 (TW)..... 094212355

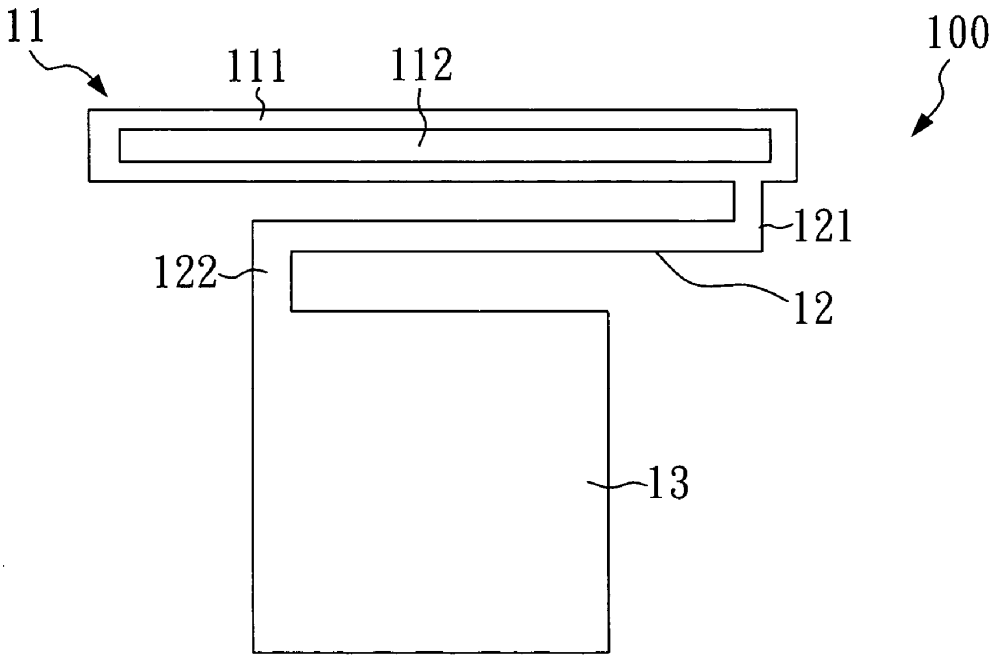
Publication Classification

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

(52) **U.S. Cl.** ..... **343/702**; 343/700 MS; 343/866

(57) **ABSTRACT**

The present invention provides a broadband antenna that is used in wireless communication systems. The broadband antenna includes a closed looped radiating element having a body section and a hollow section formed by closed compassing by the body section; a grounding element; and a connecting element having a first end electrically connected to the closed looped radiating element and a second end electrically connected to the grounding element. The antenna of the present invention can provide a wider frequency bandwidth and better antenna efficiency.



US 20070018898A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0018898 A1**

Orr (43) **Pub. Date: Jan. 25, 2007**

(54) **SMALL HIGH FREQUENCY MULTIBAND ANTENNA**

(76) Inventor: **Alan Ridgeway Orr**, San Diego, CA (US)

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(21) Appl. No.: **11/485,608**

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

Related U.S. Application Data

(60) Provisional application No. 60/698,148, filed on Jul. 12, 2005.

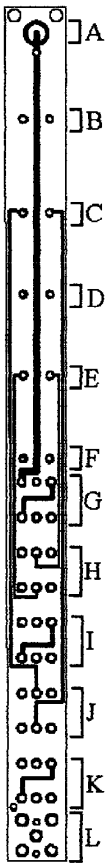
Publication Classification

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

(52) **U.S. Cl.** **343/745**; 343/900

(57) **ABSTRACT**

A novel antenna system that uses tuned components in different unique combinations in order to tune an antenna system to frequency bands of interest. Compared to using unique components for each tuned frequency band this approach requires fewer components and consequently reduces cost for the antenna system, minimizes space requirements for the antenna system and greatly improves the number of tuned frequency bands possible. In addition, the resulting system can provide the tuned frequencies or bands through discrete means, such as push button, versus commonly used analog methods as employed in antenna tuners/systems (known to those skilled in the art). Furthermore, this antenna system provides the basis for a specific antenna system solution when connected to a handie talkie, HT or handheld scanner suitable for handheld use in the frequency bands between 3 MHz and 30 MHz, although easily extended by a person skilled in the art.



US 20070018899A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0018899 A1

Kunysz et al. (43) Pub. Date: Jan. 25, 2007

(54) LEAKY WAVE ANTENNA WITH RADIATING STRUCTURE INCLUDING FRACTAL LOOPS

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(21) Appl. No.: **11/184,676**

(22) Filed: **Jul. 19, 2005**

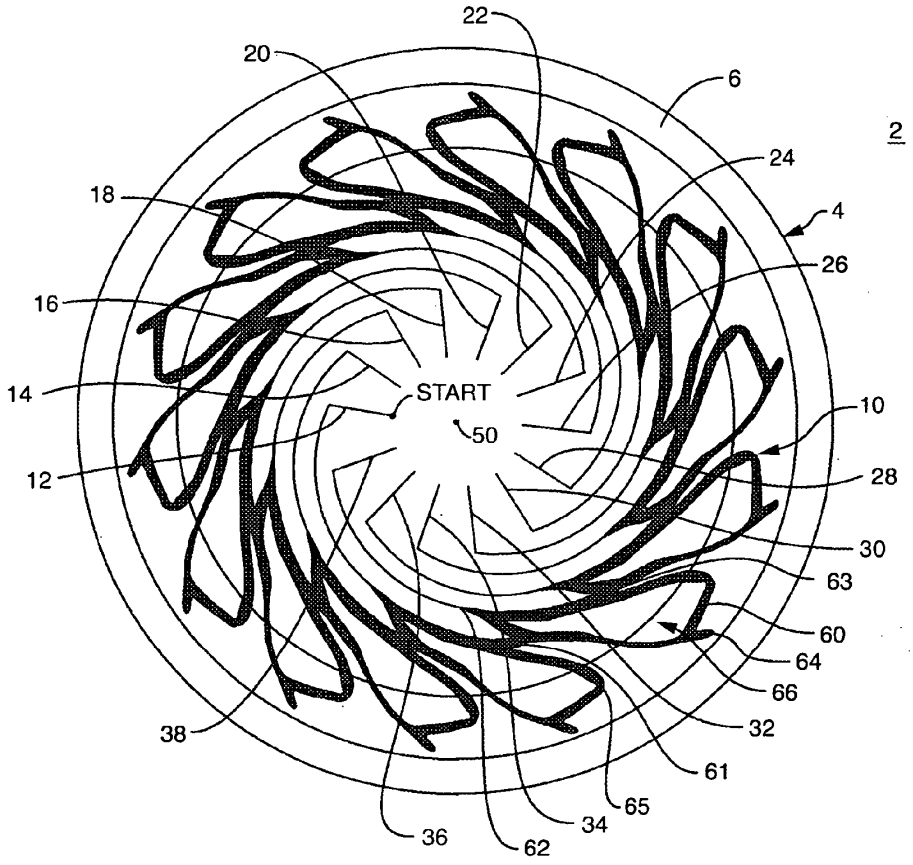
Publication Classification

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

(52) **U.S. Cl.** ..... **343/770**; 343/700 MS

(57) **ABSTRACT**

An antenna is provided for acquiring RF signals from various satellite ranging systems including GPS, GLONASS, GALILEO and OmniSTAR®. The antenna configuration includes a radiating structure of multi-arm spiral slots terminated with fractal loops. A leaky wave microstrip spiral feed network is used to excite the radiating structure of the antenna. The fixed beam phased array of aperture coupled slots is optimized to receive a right hand polarized signal. The proposed antenna is made out of a single PCB board. The antenna has a very uniform phase and amplitude pattern in the azimuth plane from 1.15 to 1.65 GHz, therefore providing consistent performance at GPS, GLONASS, GALILEO and OmniSTAR® frequencies. The antenna also has a common phase center at the various frequencies from 1175 MHz to 1610 MHz and substantially the same radiation pattern and axial ratio characteristics.



US 20070018901A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0018901 A1**

Wang et al. (43) **Pub. Date: Jan. 25, 2007**

(54) **LOG-PERIODIC DIPOLE ARRAY ANTENNA**

(76) Inventors: **Wei-Jen Wang**, Miao-Li County (TW); **Jo-Wang Fu**, Miao-Li County (TW)

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(21) Appl. No.: **11/454,729**

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

(30) **Foreign Application Priority Data**

Jul. 19, 2005 (TW)..... 94124258

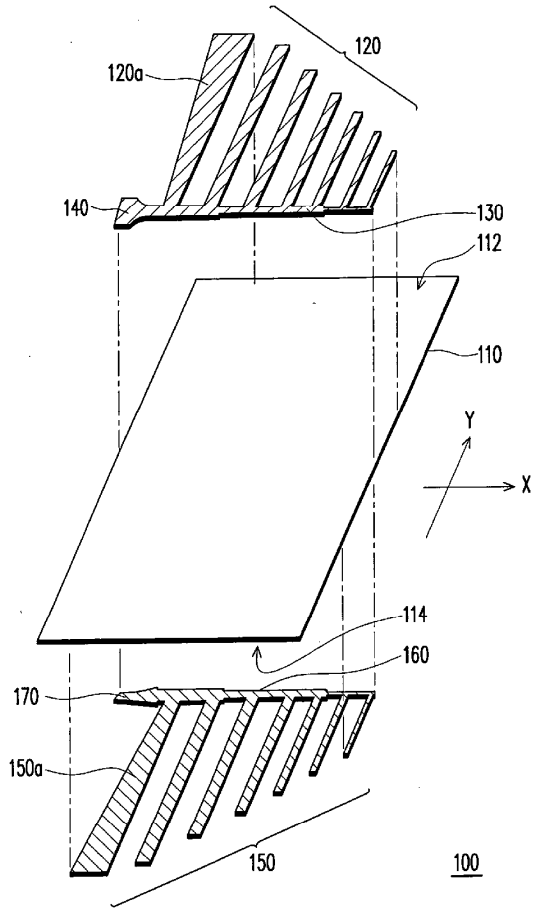
Publication Classification

(51) **Int. Cl.**
H01Q 11/10 (2006.01)

(52) **U.S. Cl.** **343/792.5**

(57) **ABSTRACT**

A log-periodic dipole array antenna including a dielectric substrate, and antenna elements, symmetrical microstrip lines and baluns disposed on two corresponding surfaces of the substrate is provided. The antenna elements on each surface are connected to one side of the corresponding symmetrical microstrip line, respectively. The width of at least one antenna element on each surface is broadened gradually outwards from the side of the antenna element, which is connected to the corresponding symmetrical microstrip line. In addition, the baluns are connected to the ends of the corresponding symmetrical microstrip lines, respectively. The antenna elements on one surface are in a mirror-image relation to those on the other surfaces. The log-periodic dipole array antenna features increased broadband with a thin and compact-size, better margin in design to meet different bandwidth requirements.



US 20070018902A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0018902 A1

Tsai et al. (43) Pub. Date: Jan. 25, 2007

(54) ELECTRONIC DEVICE AND ANTENNA STRUCTURE THEREOF

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(21) Appl. No.: **11/273,867**

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

(30) **Foreign Application Priority Data**

Jul. 22, 2005 (TW)..... TW94212492

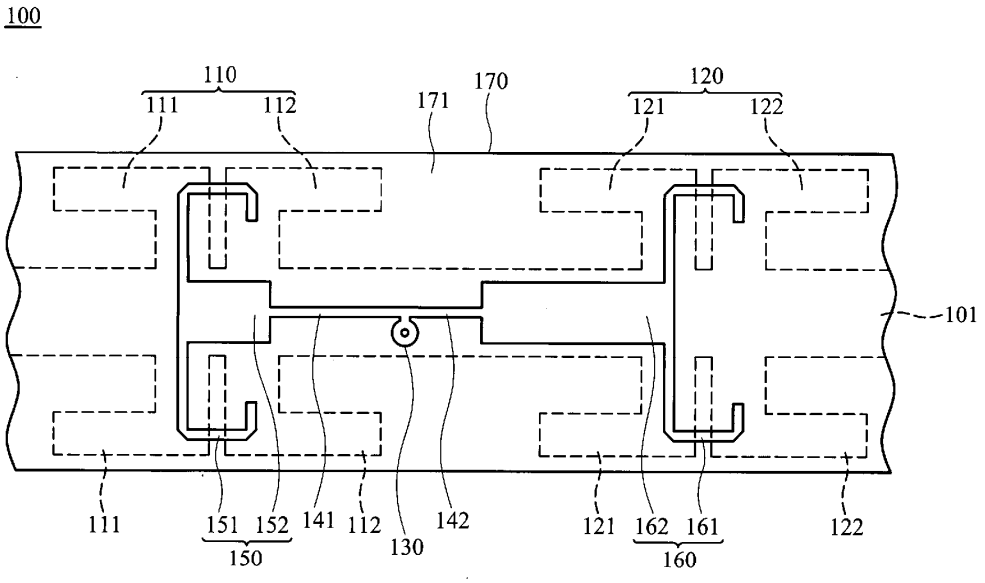
Publication Classification

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

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

(57) **ABSTRACT**

An antenna structure comprises a substrate, a reflective element, a first radiation unit, a second radiation unit, a first impedance matching unit, a second impedance matching unit, a feed point, a first conductive line and a second conductive line. The substrate comprises a first surface and a second surface. The reflective element is disposed on the second surface. The first and the second radiation units are disposed on both sides of the reflective element. The first impedance matching unit is disposed on the first surface corresponding to the first radiation unit. The second impedance matching unit is disposed on the first surface corresponding to the second radiation unit. The feed point is coupled between the first impedance matching unit and the second impedance matching unit. The first conductive line is coupled to the feed point. The second conductive line is coupled to the reflective element.



US 20070020969A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0020969 A1

Yungers (43) Pub. Date: Jan. 25, 2007

(54) **SOLENOID ANTENNA**

(75) Inventor: **Christopher R. Yungers**, St. Paul, MN (US)

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(73) Assignee: **3M Innovative Properties Company**, St. Paul, MN

(21) Appl. No.: **11/184,633**

(22) Filed: **Jul. 19, 2005**

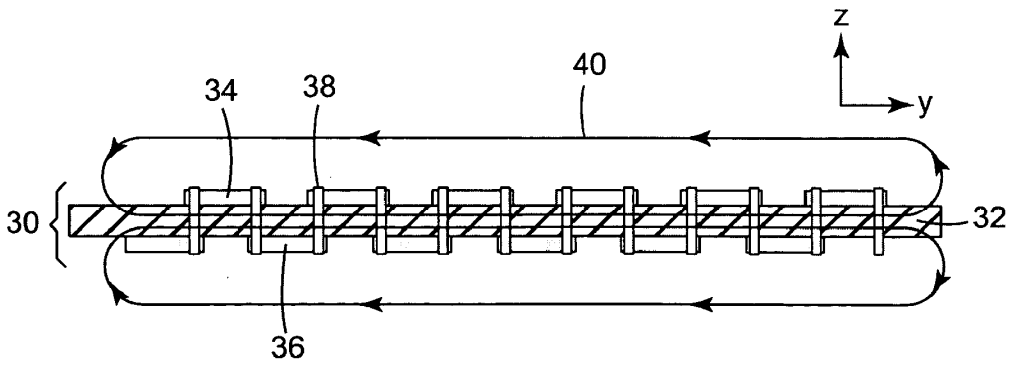
Publication Classification

(51) **Int. Cl.**
H05K 1/00 (2006.01)
G08B 13/14 (2006.01)

(52) **U.S. Cl.** **439/77**; 340/572.7

(57) **ABSTRACT**

The invention relates to a volumetrically efficient solenoid antenna fabricated on or within a substrate, such as a printed circuit board. The antenna may be used in many applications requiring a short-range wireless communication or sensing link, such as RFID systems, badge readers, contactless connectors, proximity sensors, and short-range data links. The antenna may be, for example, fabricated on or within a printed circuit board of an RFID reader, thereby enabling a perpendicular orientation of the RFID reader with respect to the z-axis of an RFID tag, where the x-y axes are the length and width of the tag. This perpendicular orientation enables the user to point or aim the RFID reader directly at the RFID tag for efficient information transfer between the reader and a single tag in a multiple tag environment.



US 20070023525A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0023525 A1**

Son et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **OPEN-ENDED TWO-STRIP MEANDER LINE ANTENNA, RFID TAG USING THE ANTENNA, AND ANTENNA IMPEDANCE MATCHING METHOD THEREOF**

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

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(21) Appl. No.: **11/494,260**

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

(30) **Foreign Application Priority Data**

Jul. 27, 2005 (KR) 10-2005-0068549
Feb. 10, 2006 (KR) 10-2005-0012796

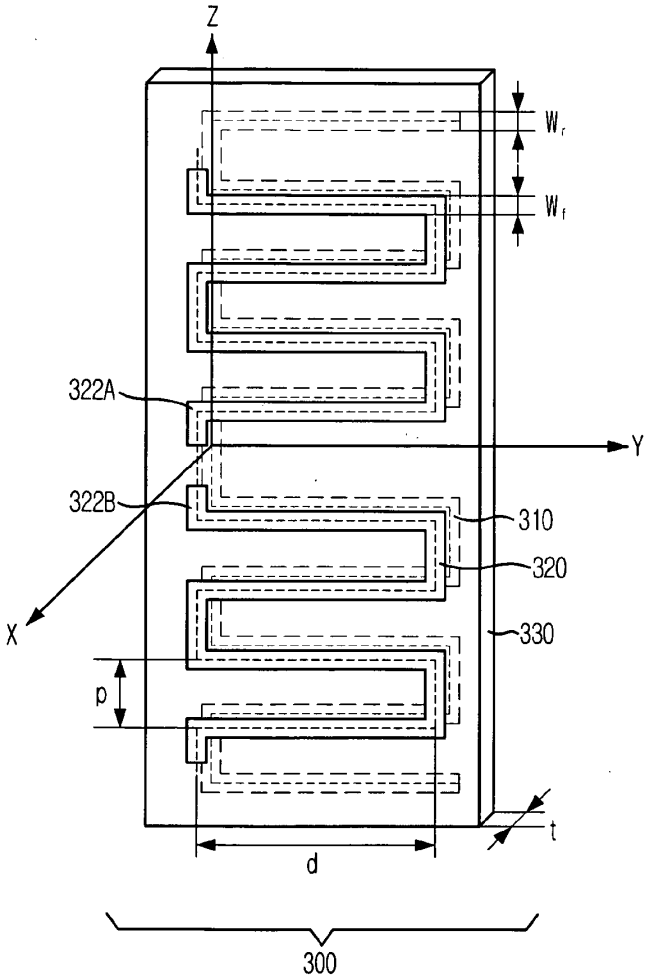
Publication Classification

(51) **Int. Cl.**
G06K 7/10 (2006.01)

(52) **U.S. Cl.** **235/454**; 340/572.7; 340/10.1

(57) **ABSTRACT**

An open-ended two-strip meander line antenna, an RFID tag using the same and an antenna impedance matching method thereof are provided. The antenna includes: a radiating strip line for deciding a resonant frequency of the antenna; and a feeding strip line for providing a radio frequency (RF) signal to an element connected to the antenna, wherein ends of the radiating strip line and the feeding strip line are open.



US 20070024399A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0024399 A1

Martin Antolin et al. (43) Pub. Date: Feb. 1, 2007

(54) **FILTERS AND ANTENNAS FOR MICROWAVES AND MILLIMETRE WAVES, BASED ON OPEN-LOOP RESONATORS AND PLANAR TRANSMISSION LINES**

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(21) Appl. No.: **10/573,426**

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

(86) PCT No.: **PCT/ES04/00414**

§ 371(c)(1),
(2), (4) Date: **Mar. 24, 2006**

(30) **Foreign Application Priority Data**

Sep. 25, 2003 (ES) P-200302282

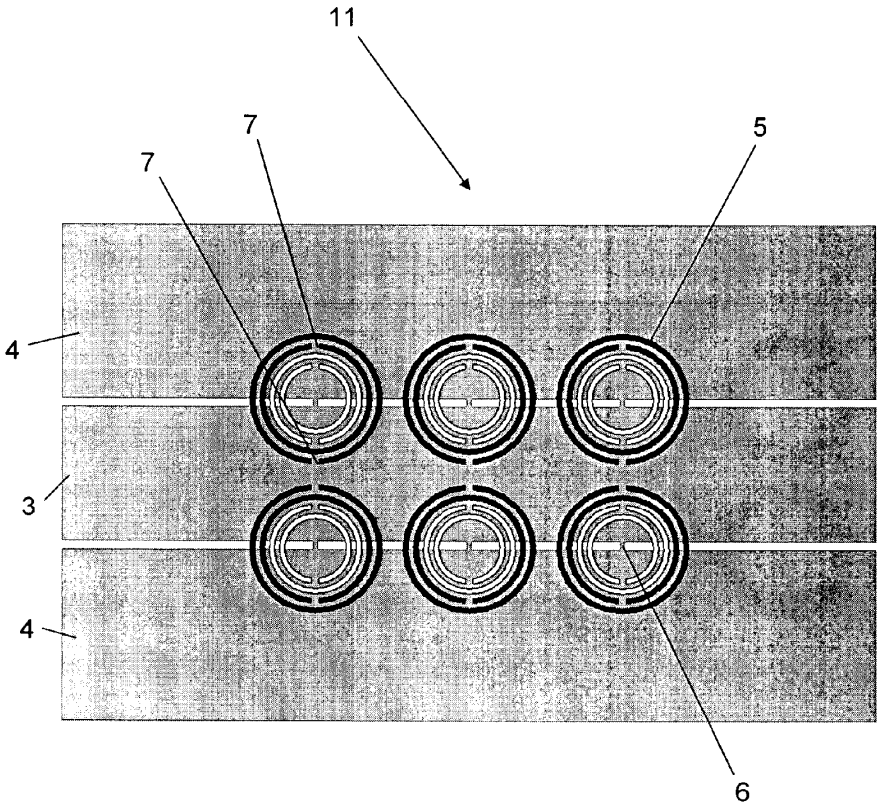
Publication Classification

(51) **Int. Cl.**
H01P 1/203 (2007.01)

(52) **U.S. Cl.** **333/205**; 333/219

(57) **ABSTRACT**

Filter for microwaves and millimetER waves, characterised in that it comprises a planar transmission medium (**1**) that it includes a conductor strip (**3**), metallic ground plane (**4**) and dielectric substrate (**2**) and in that it includes at least one split rings resonator (**5***a*, **5***b*, **5***c*, **5***d*, **5***e* and **5***f*)



US 20070024503A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024503 A1**

Tsai et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **ANTENNA STRUCTURE**

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(21) Appl. No.: **11/273,855**

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

(30) **Foreign Application Priority Data**

Jul. 29, 2005 (TW)..... TW94212968

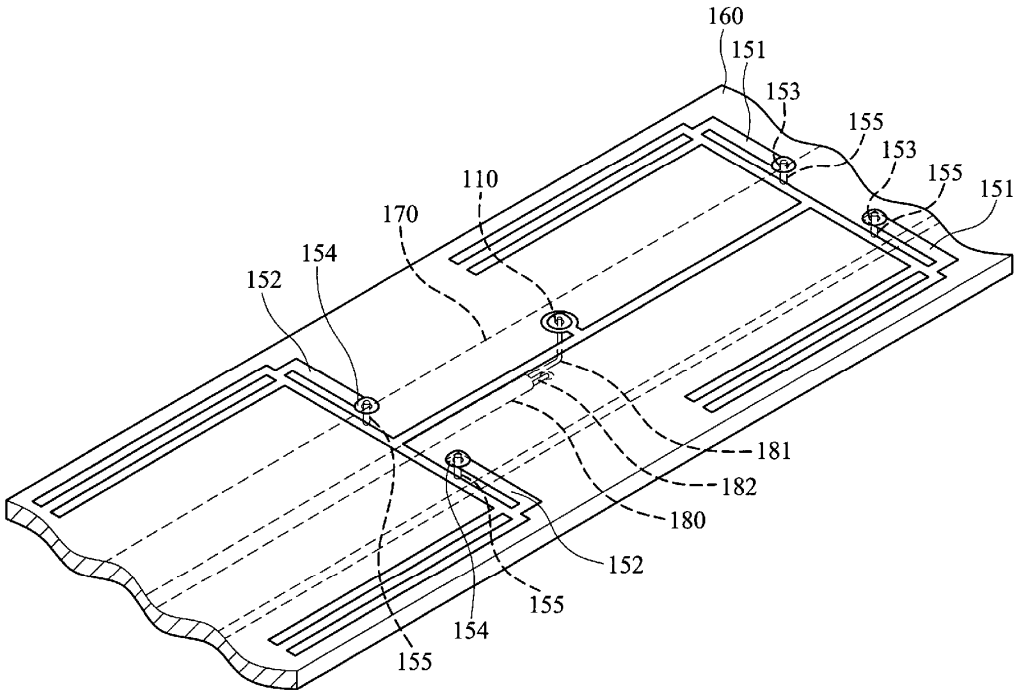
Publication Classification

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

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

(57) **ABSTRACT**

An antenna structure comprises a substrate, a first conductive element, a feed point, a first extending element, two first radiation elements, two second radiation elements, a ground element, a signal line, and a ground line. The first conductive element is disposed on the substrate and extends in a first direction. The feed point is connected to an end of the first conductive element. The first extending element is connected to another end of the first conductive element opposite to the feed point and extends in the second direction. The first radiation elements are connected to two ends of the first extending element and extend in the first direction. The second radiation elements are connected to the first extending element, near the first radiation elements and extend in the first direction. The ground element is disposed on the substrate. The signal line is coupled to the feed point. The ground line is coupled to the ground element.



US 20070024505A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0024505 A1

Geisheimer et al. (43) Pub. Date: Feb. 1, 2007

(54) MICROSTRIP PATCH ANTENNA FOR HIGH TEMPERATURE ENVIRONMENTS

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(21) Appl. No.: **11/351,422**

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

Related U.S. Application Data

(60) Provisional application No. 60/652,231, filed on Feb. 11, 2005.

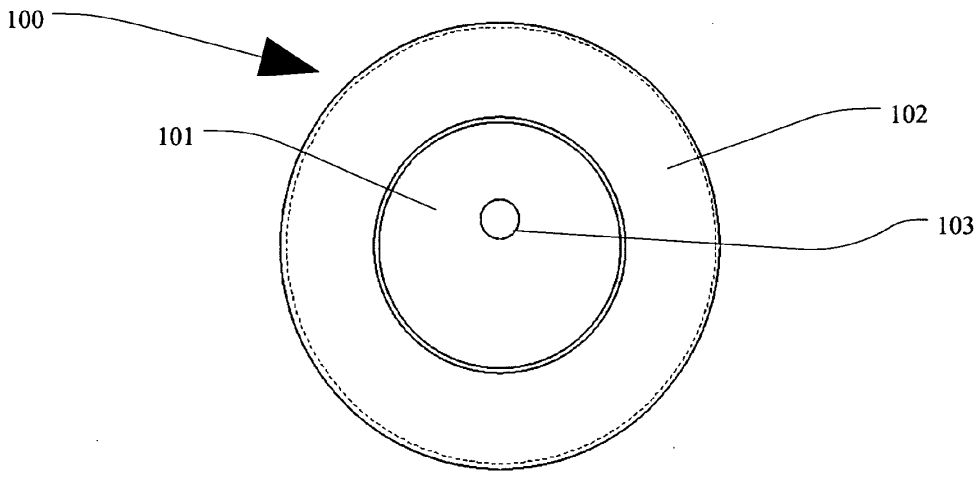
Publication Classification

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

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

(57) **ABSTRACT**

A patch antenna for operation within a high temperature environment. The patent antenna typically includes an antenna radiating element, a housing and a microwave transmission medium, such as a high temperature microwave cable. The antenna radiating element typically comprises a metallization (or solid metal) element in contact with a dielectric element. The antenna radiating element can include a dielectric window comprising a flame spray coating or a solid dielectric material placed in front of the radiating element. The antenna element is typically inserted into a housing that mechanically captures the antenna and provides a ground plane for the antenna. Orifices or passages can be added to the housing to improve high temperature performance and may direct cooling air for cooling the antenna. The high temperature microwave cable is typically inserted into the housing and attached to the antenna radiator to support the communication of electromagnetic signals between the radiator element and a receiver or transmitter device.



US 20070024507A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024507 A1**

Kasamatsu et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **ANTENNA DEVICE**

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(21) Appl. No.: **10/558,756**

(22) PCT Filed: **May 28, 2004**

(86) PCT No.: **PCT/JP04/07804**

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

(30) **Foreign Application Priority Data**

Jun. 2, 2003 (JP) 2003-157068

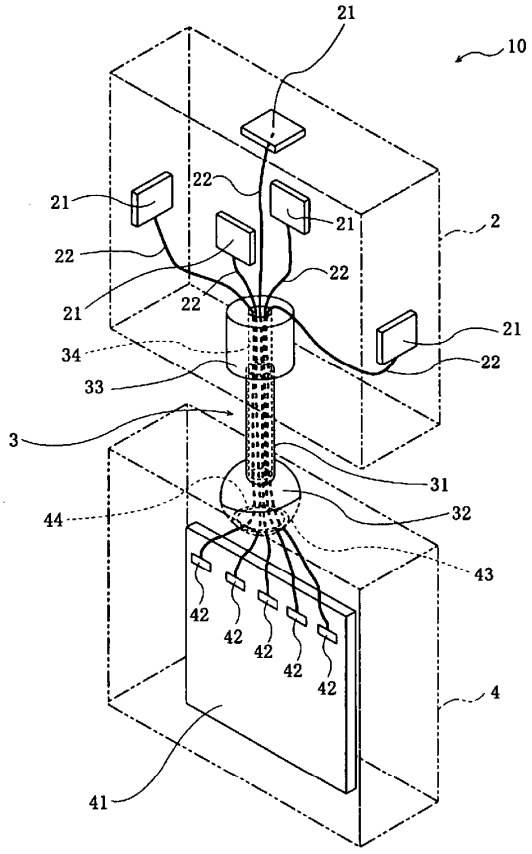
Publication Classification

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

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

(57) **ABSTRACT**

In an antenna device of the present invention, a plurality of antennas **21** are connected to a radio module **41** through respective coaxial cables **22**, and one or more of the antennas **21** in good communication conditions can be selected by the radio module **41**. An upper cabinet **2** is pivoted to a lower cabinet **4** through a three-dimensional joint **3**. The radio module **41** is contained in the lower cabinet **4**, while the plurality of antennas **21** are contained in the upper cabinet **2**. The plurality of coaxial cables **22** extending from the plurality of antennas **21** are tied in a bundle to pass through a through hole **34** provided in the three-dimensional joint **3**, and are connected to the radio module **41**.



US 20070024508A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0024508 A1

Lee (43) Pub. Date: Feb. 1, 2007

(54) PORTABLE TERMINAL HAVING ANTENNA APPARATUS

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(21) Appl. No.: 11/460,214

(22) Filed: Jul. 26, 2006

(30) Foreign Application Priority Data

Jul. 26, 2005 (KR) 68081/2005

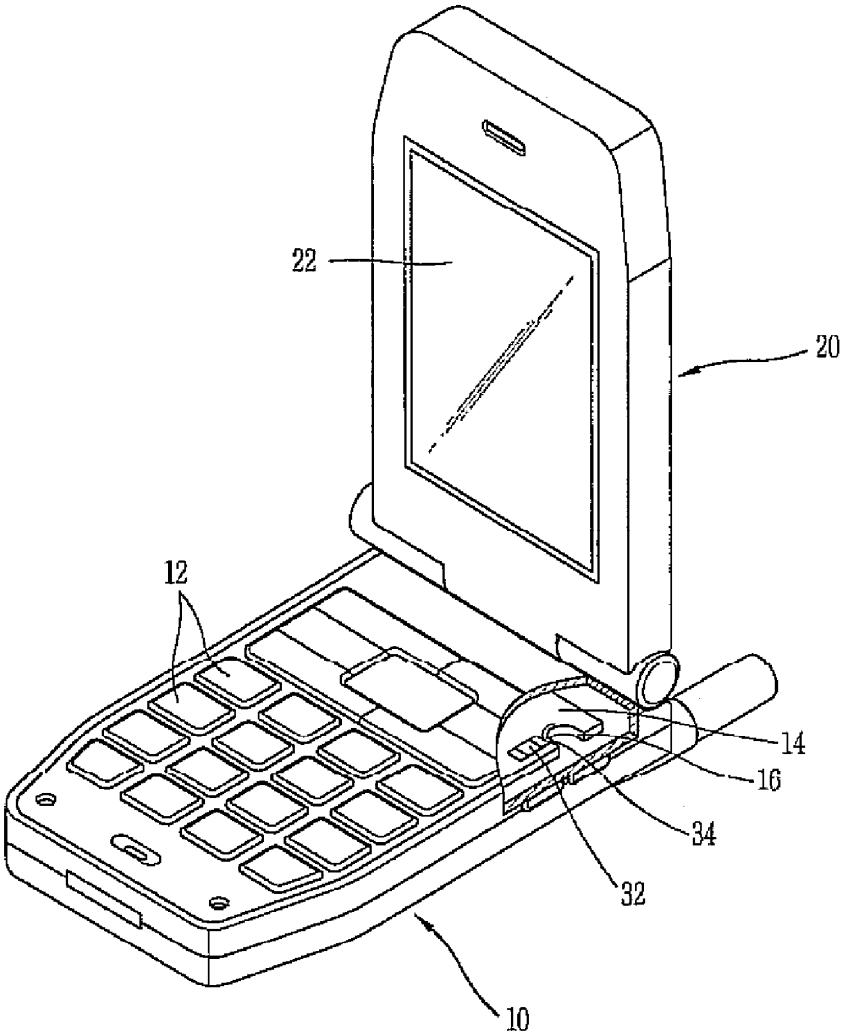
Publication Classification

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

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

(57) ABSTRACT

A wireless communication device comprising a substrate, an antenna unit mounted on the substrate, and multiple conductive pads at one or more periphery regions of the substrate, one conductive pad among the multiple conductive pads being connected with and providing impedance matching to the antenna unit.



US 20070024509A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024509 A1**

Lee (43) **Pub. Date: Feb. 1, 2007**

(54) **ANTENNA FOR PORTABLE TERMINAL**

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(21) Appl. No.: **11/493,508**

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

(30) **Foreign Application Priority Data**

Jul. 26, 2005 (KR) 2005-0067609

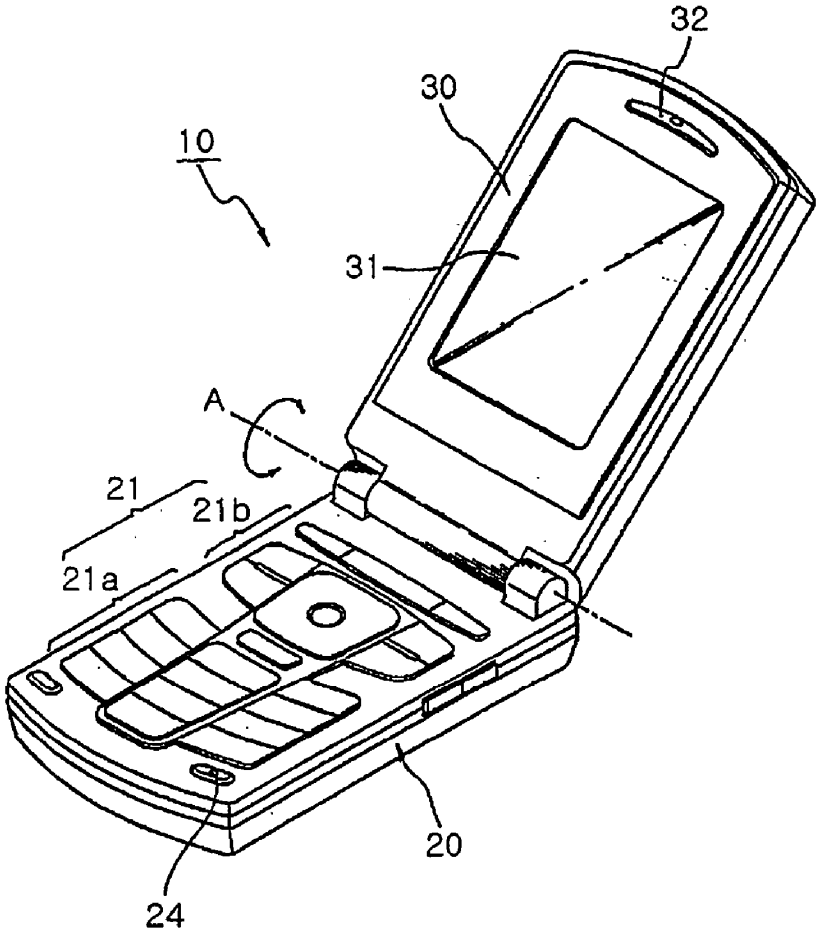
Publication Classification

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

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

(57) **ABSTRACT**

An antenna includes a keypad assembly having a plurality of key buttons, a main antenna unit, and a second antenna unit where a predetermined pattern is formed. The second antenna unit is interposed between components of the keypad assembly. Accordingly, a separate installation space for the antenna radiator is not required in the main board, thus contributing to volume reduction of the terminal. Also, since an installation area corresponding to the total area of the keypad assembly is available, antennas for different bands may be installed.



US 20070024511A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024511 A1**

Li et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **COMPACT CIRCULARLY-POLARIZED PATCH ANTENNA**

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(21) Appl. No.: **11/190,445**

(22) Filed: **Jul. 27, 2005**

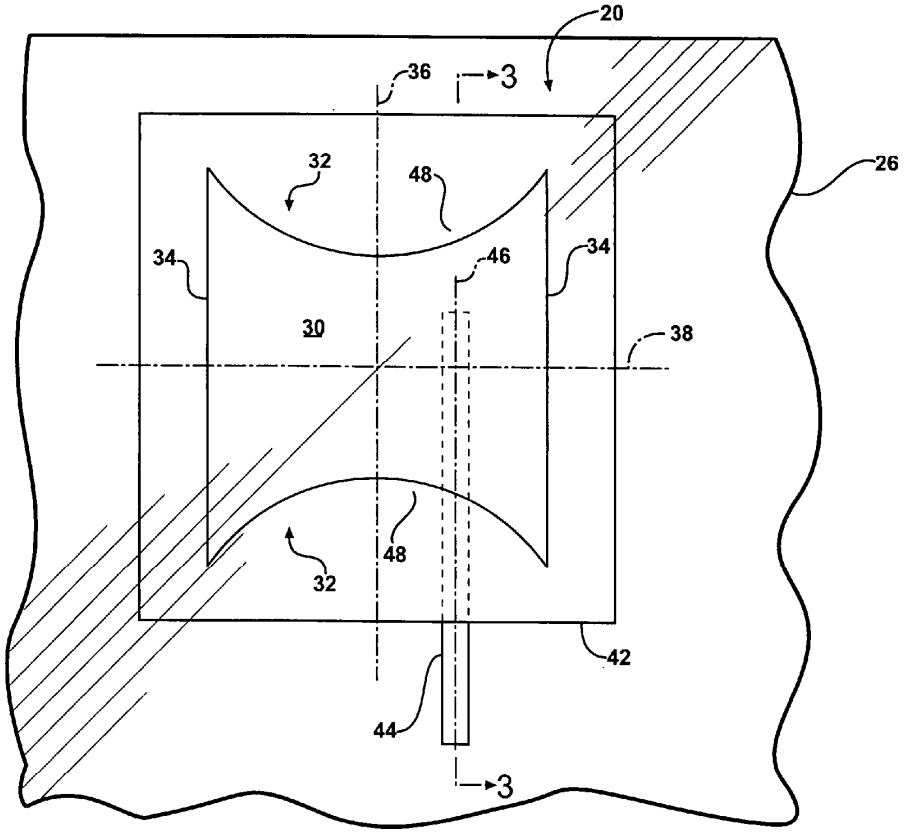
Publication Classification

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

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

(57) **ABSTRACT**

An antenna for receiving and/or transmitting circularly polarized RF signals includes a patch element, a ground plane, a dielectric, and a feed line. The patch element is disposed on a pane of glass and includes a pair of radiating sides disposed opposite each other and a pair of spacer sides disposed opposite each other. The radiating sides form an angle less than 90 degrees with the spacer sides. A first axis is defined through a center of the radiating sides and a second axis defined though a center of the spacer sides. The ground plane is disposed substantially parallel to and spaced from the patch element. The dielectric substrate is sandwiched between the patch element and the ground plane. The feed line is disposed substantially parallel to and offset from the first axis for providing the antenna with a circular polarization radiation characteristic. The antenna is compact in size and generally conformal to the pane of glass.



US 20070024512A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024512 A1**

Muramatsu et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **MIRROR DEVICE WITH ANTENNA**

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(73) Assignees: **MURAKAMI CORPORATION**, Shizuoka-shi (JP); **NIPPON ANTENNA CO., LTD.**, Tokyo (JP)

(21) Appl. No.: **11/415,213**

(22) Filed: **May 2, 2006**

(30) **Foreign Application Priority Data**

Jul. 29, 2005 (JP) 2005-220666

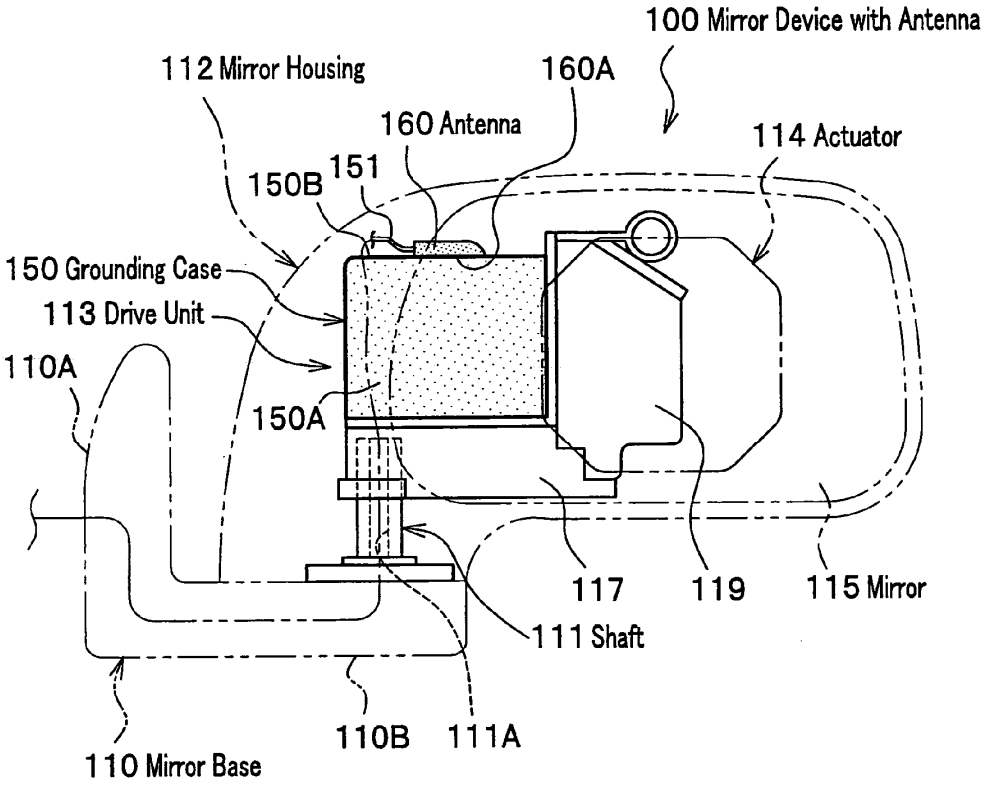
Publication Classification

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

(52) **U.S. Cl.** **343/713**; 343/711

(57) **ABSTRACT**

In a mirror device with an antenna of the present invention the antenna is placed in a mirror housing where a mirror configured to reflect a rear of a vehicle is attached, a grounding portion at least part of which is composed of a conductive material is provided in the mirror housing, and the antenna is electrically connected to the conductive material of the grounding portion.



US 20070024513A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024513 A1**

Sako (43) **Pub. Date: Feb. 1, 2007**

(54) **COMPOSITE ANTENNA DEVICE**

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(21) Appl. No.: **10/574,596**

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

(86) PCT No.: **PCT/JP05/14243**

§ 371(c)(1),
(2), (4) Date: **Apr. 5, 2006**

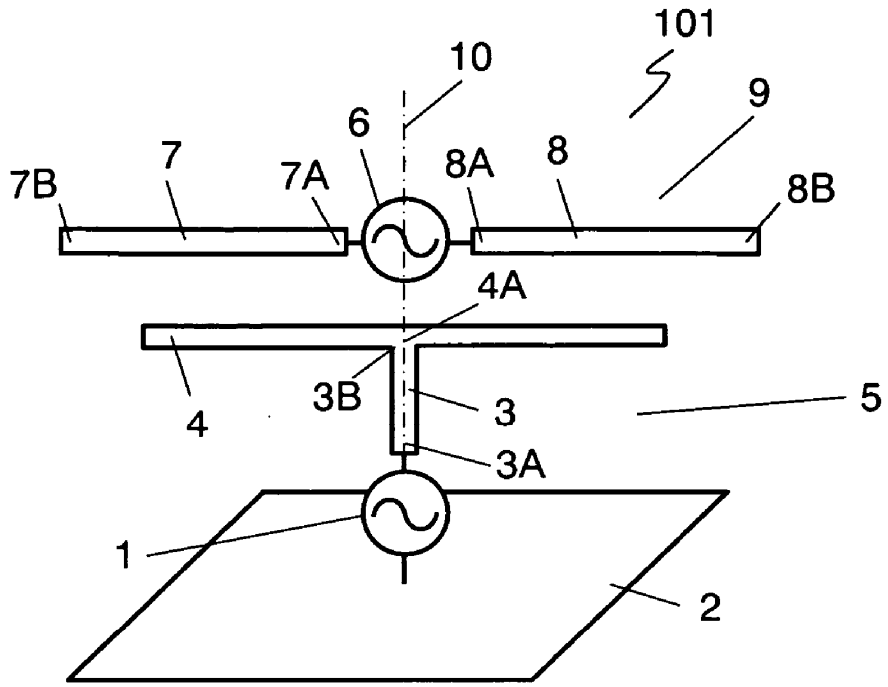
Publication Classification

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

(52) **U.S. Cl.** **343/727**; 343/730

(57) **ABSTRACT**

A composite antenna device includes a ground board, an unbalanced antenna, a balanced antenna. The unbalanced antenna includes a first feeding point coupled with the ground board, a first radiator having a second end and a first end connected with the first feeding point, and a load conductor connected with the second end. The balanced antenna includes a second feeding point, a second radiator connected with the second feeding point, and a third radiator connected with the second feeding point. The load conductor has a shape symmetrical about a straight line which passes through the first feeding point and which is perpendicular to the ground board. The second radiator and the third radiator are placed at positions symmetrical to each other about the straight line, respectively, and have shapes symmetrical to each other about the straight line. The composite antenna has a large isolation between the unbalanced antenna and the balanced antenna, accordingly having a small size.



US 20070024514A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024514 A1**

Phillips et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **ENERGY DIVERSITY ANTENNA AND SYSTEM**

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(21) Appl. No.: **11/189,689**

(22) Filed: **Jul. 26, 2005**

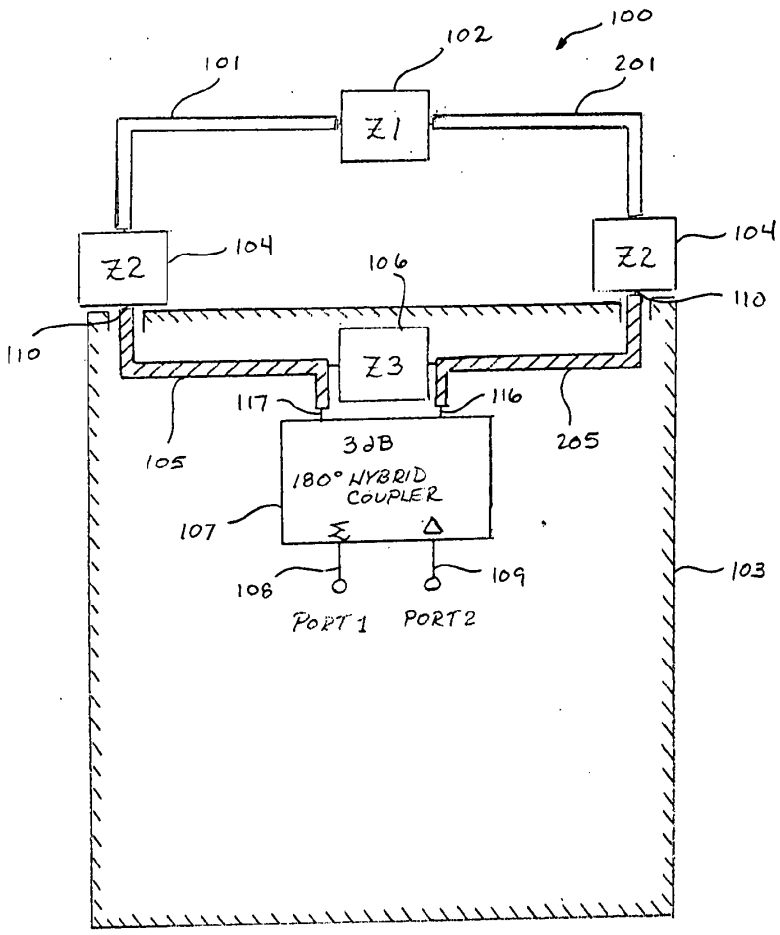
Publication Classification

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

(52) **U.S. Cl.** **343/744**; 343/741

(57) **ABSTRACT**

An energy density diversity antenna (EDA) has a least a pair of antenna elements, whose feeding points are connected to outputs of a hybrid coupler configured such that a sum and a difference signal may exist at the feed points of the antenna elements. First reactive elements are respectively inserted in the antenna elements proximal the respective feed points. The antenna elements are joined at a point distal from the feed points by a second reactive element, and a third reactive element is coupled between feed lines coupled to the feed points at a location between the feed points and the outputs of the hybrid coupler.



US 20070024515A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024515 A1**

Suh (43) **Pub. Date: Feb. 1, 2007**

(54) **COPLANAR WAVEGUIDE FED DUAL-BAND SLOT ANTENNA AND METHOD OF OPERATURE THEREFORE**

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(21) Appl. No.: **11/193,047**

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

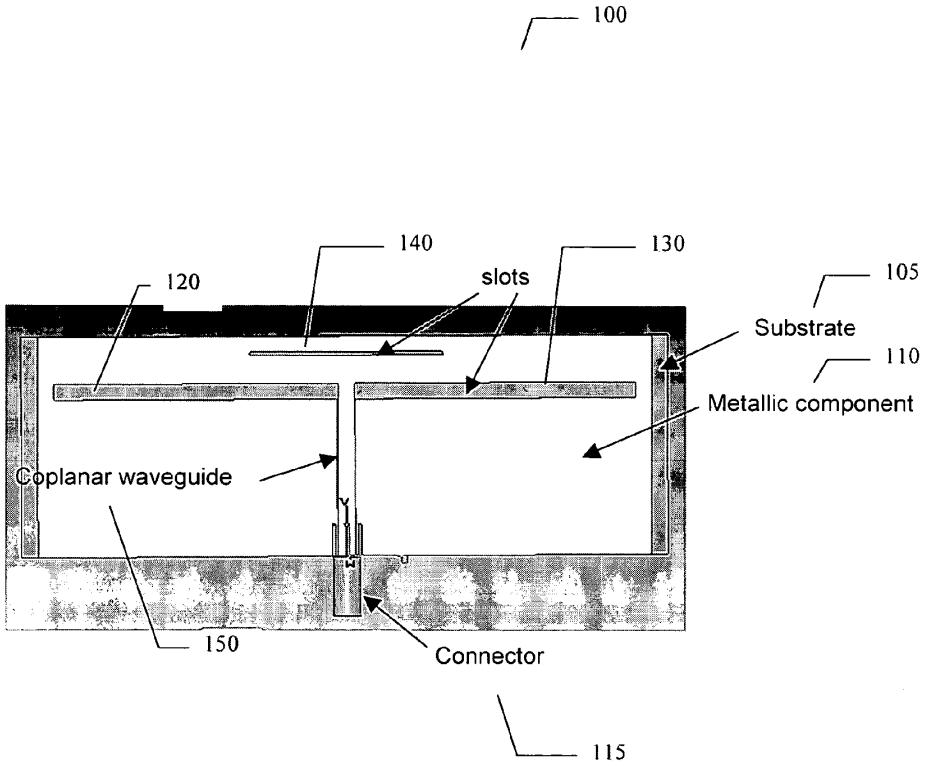
Publication Classification

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

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

(57) **ABSTRACT**

An embodiment of the present invention provides an antenna, comprising a substrate, a metallic component printed on the substrate, a main radiating slot etched into the metallic component, the main radiating slot fed by a coplanar waveguide, and at least one additional slot etched next to the main radiating slot. An embodiment of the present invention further provides a method of manufacturing an antenna, comprising printing a metallic component on a substrate, etching a main radiating slot into the metallic component, the main radiating slot fed by a coplanar waveguide, and etching at least one additional slot in proximity to the main radiating slot.



US 20070024517A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024517 A1**

Shimoda (43) **Pub. Date: Feb. 1, 2007**

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

(21) Appl. No.: **11/490,121**

(22) Filed: **Jul. 21, 2006**

(30) **Foreign Application Priority Data**

Jul. 26, 2005 (JP) P2005-216410

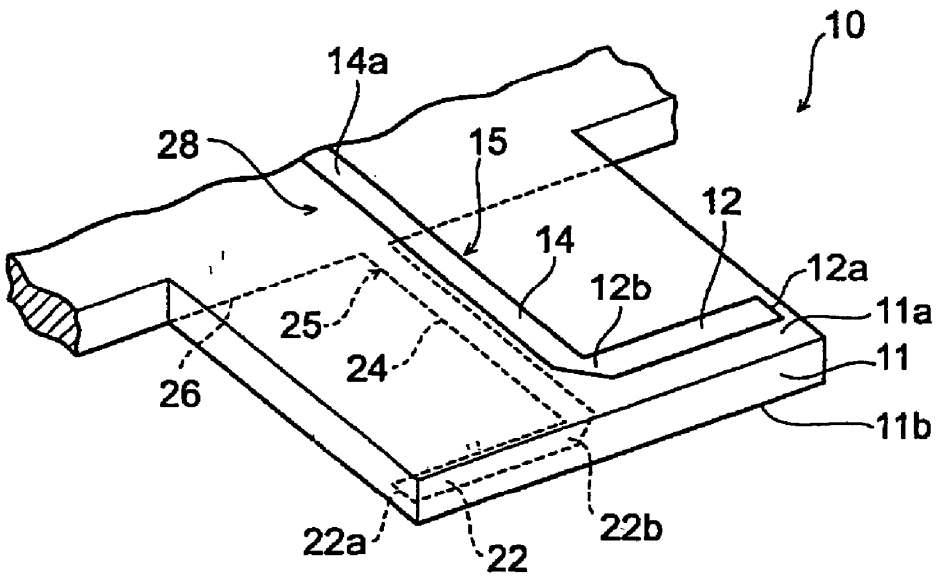
Publication Classification

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

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

(57) **ABSTRACT**

An antenna has a base and an antenna element in contact with the base. The product of the relative permittivity of the base and the relative permeability of the base varies with a negative gradient with respect to the frequency of the radio waves transmitted by the antenna element or received by the antenna element. The negative-gradient variation of the product acts to offset the frequency-dependent variation in the wavelength.



US 20070024518A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024518 A1**

Miyoshi et al. (43) **Pub. Date: Feb. 1, 2007**

(54) **ANTENNA UNIT HAVING IMPROVED ANTENNA RADIATION CHARACTERISTICS**

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(21) Appl. No.: **11/412,547**

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

(30) **Foreign Application Priority Data**

Jul. 28, 2005 (JP) 2005-219018
Dec. 22, 2005 (JP) 2005-369430

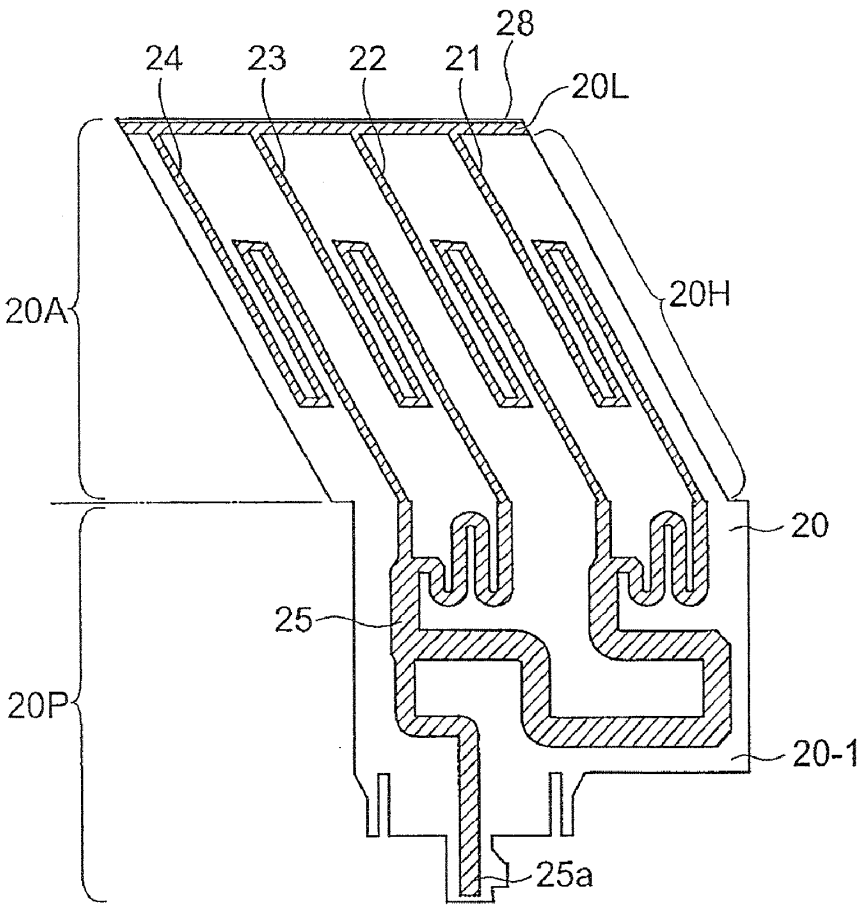
Publication Classification

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

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

(57) **ABSTRACT**

An antenna unit comprises a hollow cylindrical member obtained by forming a flexible insulating film member into a hollow cylinder about a center axis and an antenna pattern composed of a plurality of conductors formed on a peripheral surface of the hollow cylindrical member. The antenna pattern comprises a helical pattern extending helically in a direction of the center axis and a loop pattern connected to an end portion of the helical pattern at an upper end portion of the hollow cylindrical member.



US 20070024520A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0024520 A1**

Preble (43) **Pub. Date: Feb. 1, 2007**

(54) **SPIRAL ANTENNA**

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(21) Appl. No.: **11/542,015**

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

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/180,337, filed on Jul. 14, 2005.

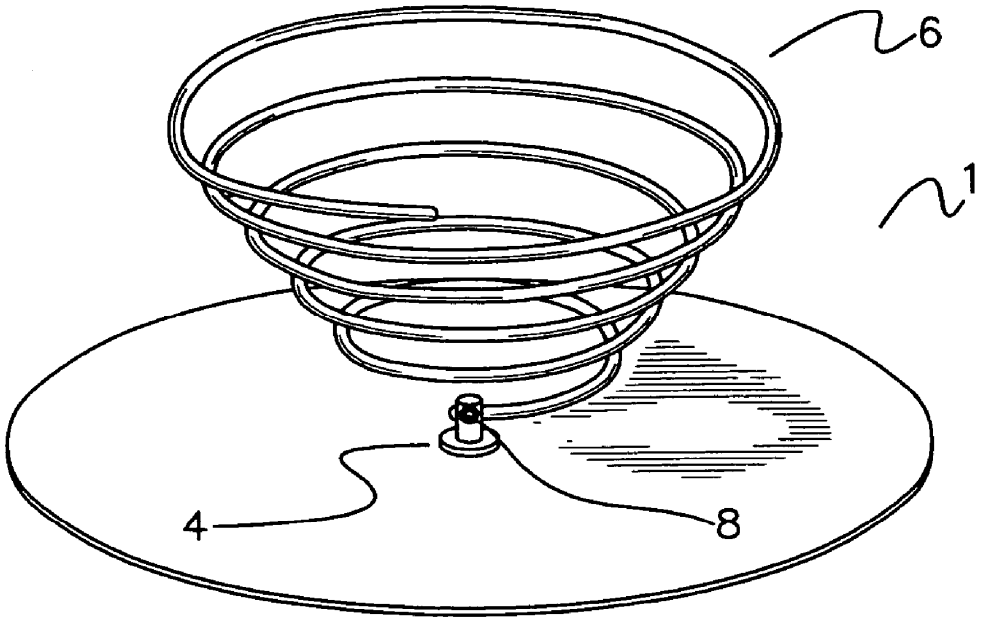
Publication Classification

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

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

(57) **ABSTRACT**

An antenna is described, which is comprised of copper tubing formed into a three-dimensional spiral, extending above and supported by a back plate.



US 20070024521A1

(19) **United States**

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(54) **MONOPOLE ANTENNA**

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(57) **ABSTRACT**

A monopole antenna is formed of a ground plane, a flat conductor faced to the ground plane and separated from it by a clearance "H", and a linear conductor that is connected to the flat conductor, extended on the ground plane side in an insulated state from the ground plane, and connected to a signal source. The flat conductor is formed of an inner conductor, and outer conductors disposed on the outer periphery of the inner conductor at a predetermined interval. Set regions of the outer edge of the inner conductor and the inner edges of the outer conductors are interconnected through one or more coupling conductors.