US 20100194642A1

(19) **United States**

(12) **Patent Application Publication**

Rao et al.

(10) **Pub. No.: US 2010/0194642 A1**

(43) **Pub. Date: Aug. 5, 2010**

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

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(21) Appl. No.: **12/364,932**

(22) Filed: **Feb. 3, 2009**

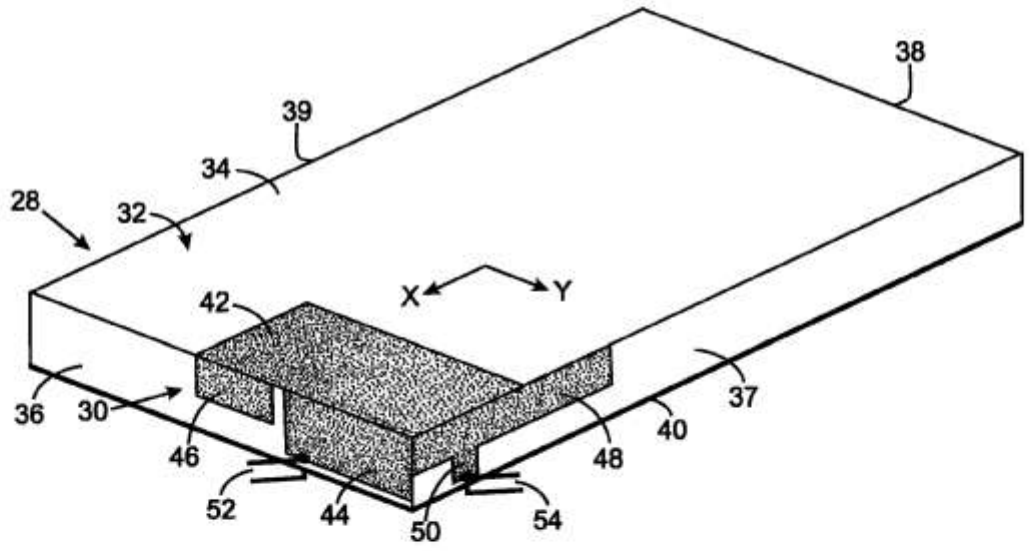
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)
H01Q 21/00 (2006.01)

(52) **U.S. Cl.** ..... **343/700 MS**; 343/893; 343/848

(57) **ABSTRACT**

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



US 20100194651A1

(19) **United States**

(12) **Patent Application Publication**

Huang

(10) **Pub. No.: US 2010/0194651 A1**

(43) **Pub. Date: Aug. 5, 2010**

(54) **MULTI-INPUT MULTI-OUTPUT ANTENNA**

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(21) Appl. No.: **12/149,689**

(22) Filed: **May 6, 2008**

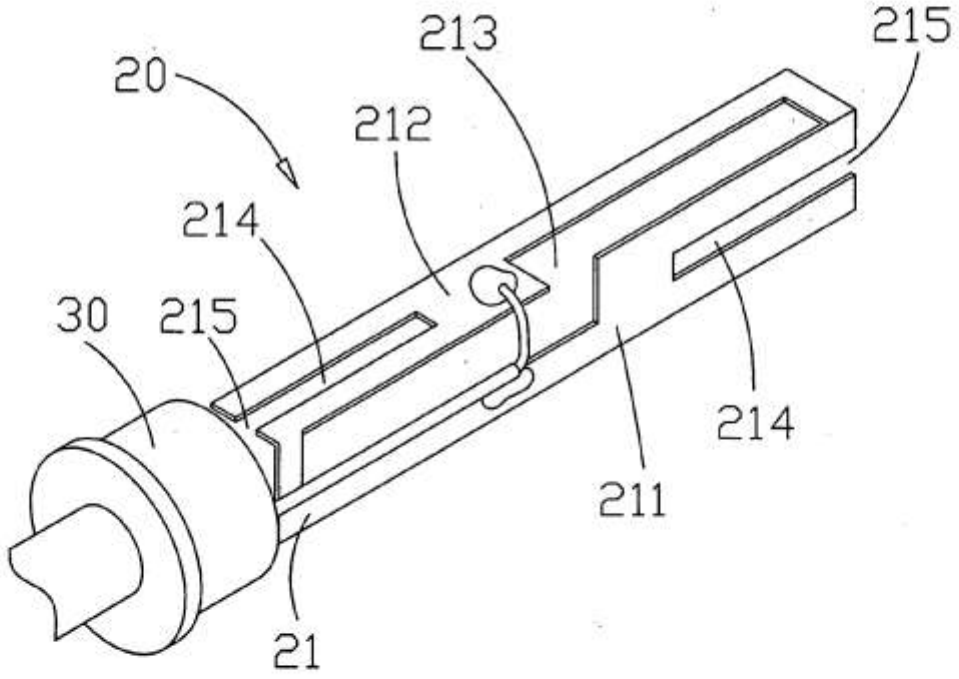
Publication Classification

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

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

(57) **ABSTRACT**

A multi-input multi-output antenna according to the present invention comprises a dipole antenna and a multi-slot antenna for inputting and outputting signals; wherein the multi-slot antenna has at least one metal sheet having an L-shaped section, which has a bend formed in the middle part thereof and has a vertical section and a horizontal section provided on the both sides respectively, and a slot which connects the vertical section and the horizontal section is disposed on the metal sheet, and the vertical section and the horizontal section have a notch having an opening formed therein respectively; thereby to make up an antenna capable of effectively isolating an input frequency from an output frequency without interfering with signals.



US 20100194652A1

(19) **United States**

(12) **Patent Application Publication**

CHIANG

(10) **Pub. No.: US 2010/0194652 A1**

(43) **Pub. Date: Aug. 5, 2010**

(54) **ANTENNA STRUCTURE WITH AN EFFECT OF SERIALLY CONNECTING CAPACITANCES**

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(21) Appl. No.: **12/364,681**

(22) Filed: **Feb. 3, 2009**

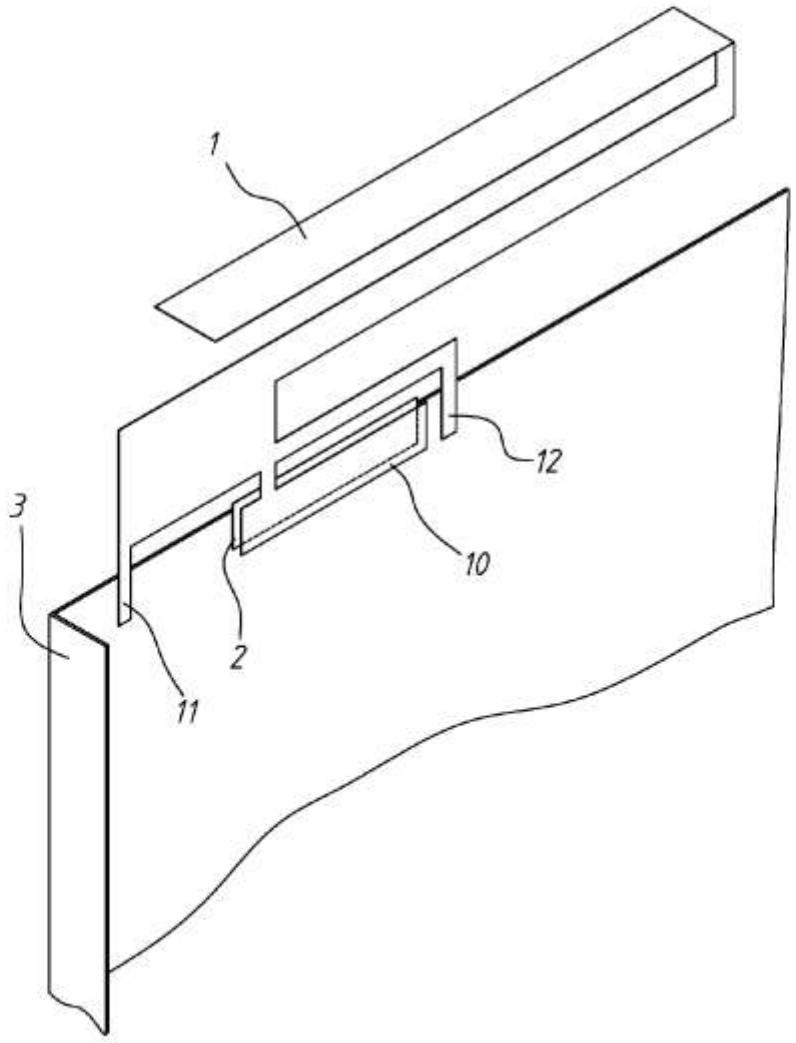
Publication Classification

(51) **Int. Cl.**
H01Q 9/00 (2006.01)
H01Q 1/50 (2006.01)
H01Q 1/38 (2006.01)

(52) **U.S. Cl.** ..... **343/745**; 343/861; 343/700 MS

(57) **ABSTRACT**

In an antenna structure having an effect of serially connecting capacitances, mainly a metallic planar antenna is provided thereon at least with a first metallic plane board, and a second metallic plane board being close to but not connected to the first metallic plane board to form the effect of serially connecting capacitances. And more, the antenna structure further has an extension arm extended from the antenna or the second metallic plane board made from a microstrip, and can be optionally grounded or not grounded, for the purpose of adjusting the impedance value of the antenna structure.



US 20100194654A1

(19) **United States**

(12) **Patent Application Publication**

Chiang

(10) **Pub. No.: US 2010/0194654 A1**

(43) **Pub. Date: Aug. 5, 2010**

(54) **ANTENNA STRUCTURE WITH AN EFFECT OF CAPACITANCE IN SERIAL CONNECTING**

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(21) Appl. No.: **12/510,380**

(22) Filed: **Jul. 28, 2009**

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/364,681, filed on Feb. 3, 2009.

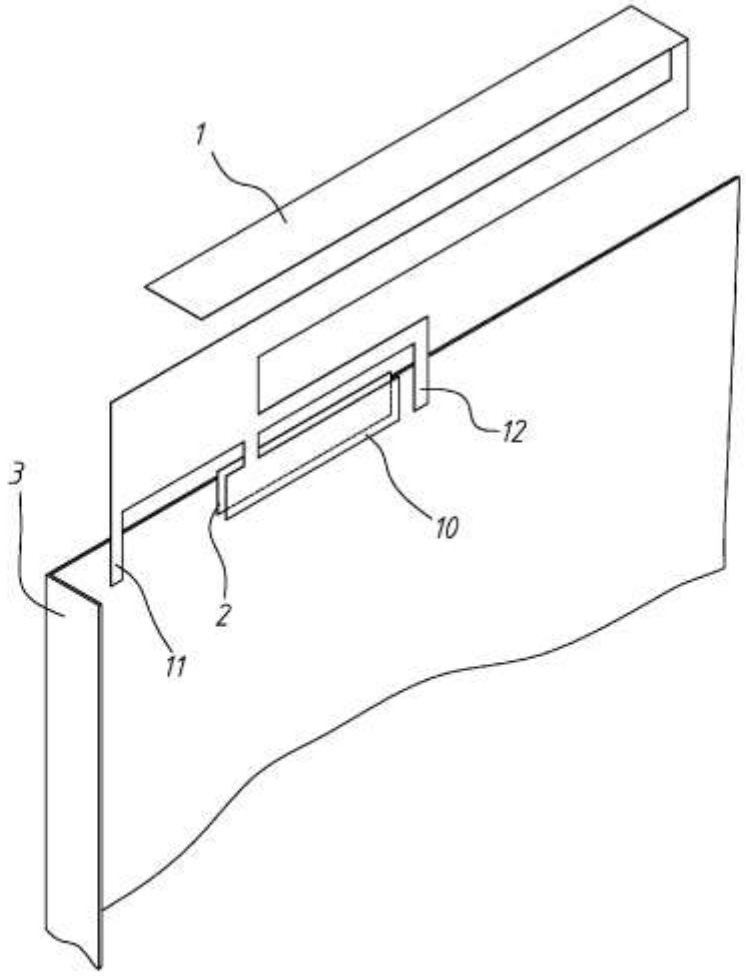
Publication Classification

(51) **Int. Cl.**
H01Q 9/00 (2006.01)
H01Q 1/38 (2006.01)

(52) **U.S. Cl.** ..... **343/750**; 343/749; 343/700 MS

(57) **ABSTRACT**

In an antenna structure having an effect of capacitance in serial connecting, mainly a metallic planar antenna is provided thereon at least with a first metallic plane board, and a second metallic plane board being close to but not connected to the first metallic plane board to form the effect of capacitance in serial connecting. And more, the antenna structure further has an extension arm made from a microstrip extended from the antenna or the second metallic plane board, and can be optionally grounded or not grounded, for the purpose of adjusting the impedance value of the antenna structure.



US 20100194659A1

(19) **United States**

(12) **Patent Application Publication**

Chakam et al.

(10) **Pub. No.: US 2010/0194659 A1**

(43) **Pub. Date: Aug. 5, 2010**

(54) **MULTIPART ANTENNA WITH CIRCULAR POLARIZATION**

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(21) Appl. No.: **12/672,716**

(22) PCT Filed: **Jul. 30, 2008**

(86) PCT No.: **PCT/EP2008/059987**

§ 371 (c)(1),
(2), (4) Date: **Mar. 12, 2010**

(30) **Foreign Application Priority Data**

Aug. 9, 2007 (DE) 10 2007 037 614.8

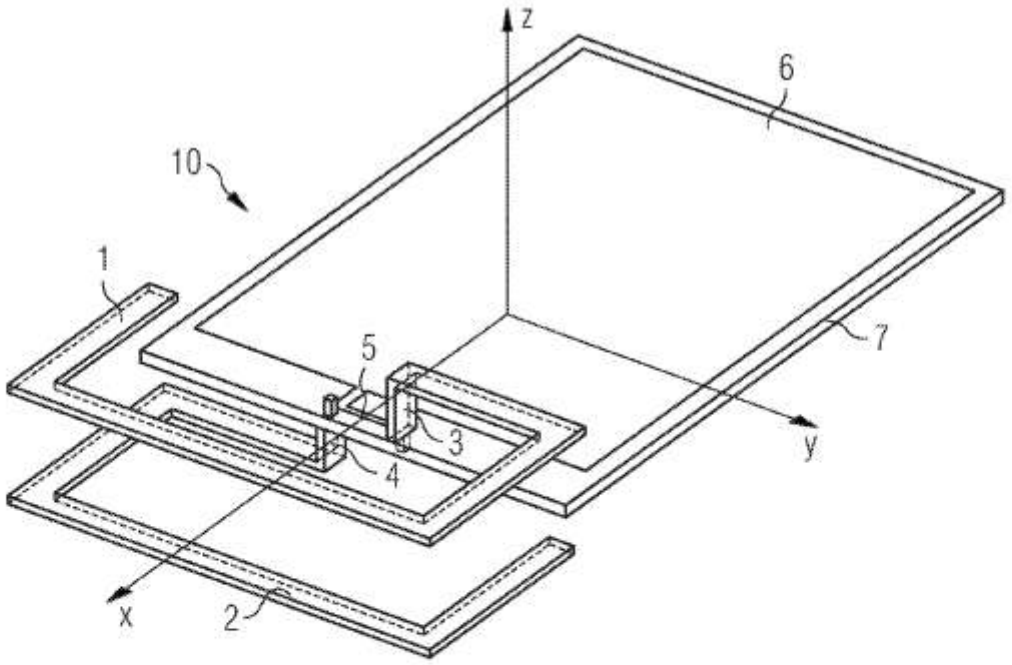
Publication Classification

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

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

(57) **ABSTRACT**

An antenna apparatus has a first antenna branch and a second antenna branch. Both the first and the second antenna branch are in the form of a conductor loop which is not closed, and the first antenna branch is arranged at a distance from the second antenna branch in a direction which is substantially at right angles to the surface bounded by the respective conductor loop, such that the first loop direction, which is defined from the foot point to the free end of the first antenna branch, is arranged in the opposite direction to the second loop direction, which is defined from the foot point to the free end of the second antenna branch.



US 20100194660A1

(19) **United States**

(12) **Patent Application Publication**

Yoneda et al.

(10) **Pub. No.: US 2010/0194660 A1**

(43) **Pub. Date: Aug. 5, 2010**

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

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(21) Appl. No.: **12/697,591**

(22) Filed: **Feb. 1, 2010**

(30) **Foreign Application Priority Data**

Jan. 30, 2009 (JP) 2009-019410
Jan. 13, 2010 (JP) 2010-005243

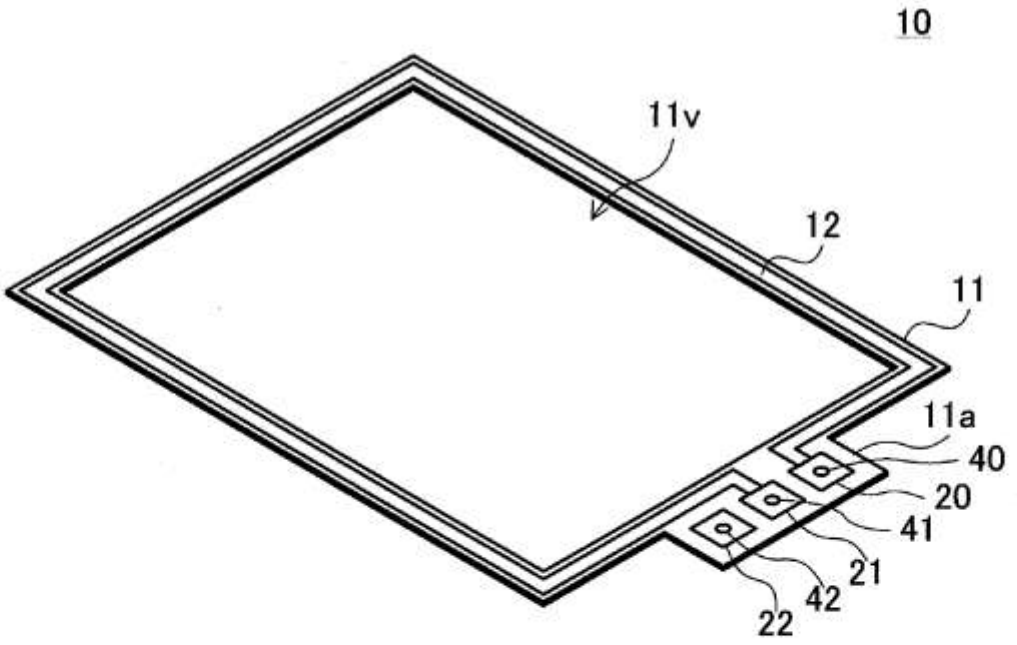
Publication Classification

(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 21/00 (2006.01)

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

(57) **ABSTRACT**

A proximity antenna includes a wiring pattern wound in a predetermined direction in a horizontal plane from a signal end to a ground end and a wiring pattern wound in a direction opposite to the predetermined direction in a horizontal plane from a signal end to a ground end, in which the wiring pattern and the wiring pattern are apposed in a vertical direction. The characteristics of a spiral coil having several turns can be thus obtained by a one-turn wiring width, and an installation space for other components, larger than a conventional installation space, can be therefore secured.



US 20100195854A1

(19) **United States**

(12) **Patent Application Publication**

Qi et al.

(10) **Pub. No.: US 2010/0195854 A1**

(43) **Pub. Date: Aug. 5, 2010**

(54) **MOBILE WIRELESS COMMUNICATIONS DEVICE WITH SLIDABLE CONFIGURATION PROVIDING HEARING AID COMPATIBILITY FEATURES AND RELATED METHODS**

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(21) Appl. No.: **12/758,478**

(22) Filed: **Apr. 12, 2010**

Related U.S. Application Data

(63) Continuation of application No. 11/025,752, filed on Dec. 29, 2004, now Pat. No. 7,706,556.

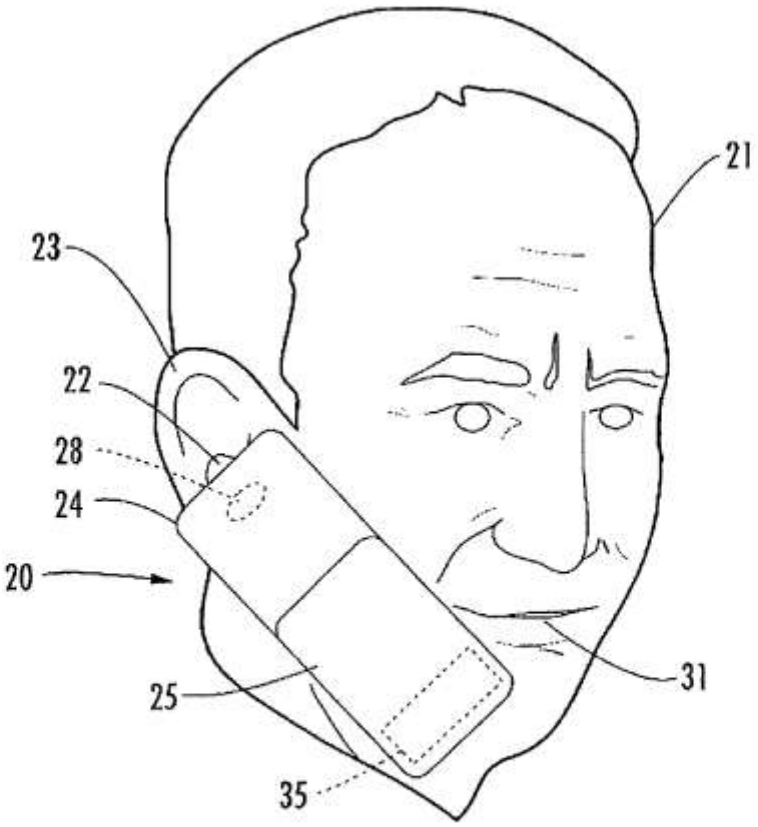
Publication Classification

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

(52) **U.S. Cl.** **381/315**; 381/322

(57) **ABSTRACT**

A mobile wireless communications device is for a user wearing an electronic hearing aid adjacent an ear of the user and may include an upper housing and a lower housing being slidably connected together for sliding between a retracted position and an extended use position. An audio output transducer may be carried by the upper housing and accessible to the hearing aid of the user adjacent a top end of the upper housing, and an audio input transducer may be carried by the lower housing and accessible to a mouth of the user adjacent a bottom end of the lower housing. An antenna may be carried by the lower housing adjacent the bottom end thereof so that the hearing aid is further separated from the antenna when the upper and lower housings are in the extended use position to reduce undesired coupling from the antenna to the hearing aid.



US 20100201577A1

(19) **United States**

(12) **Patent Application Publication**

CHANG

(10) **Pub. No.: US 2010/0201577 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **CHIP ANTENNA**

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(21) Appl. No.: **12/368,310**

(22) Filed: **Feb. 10, 2009**

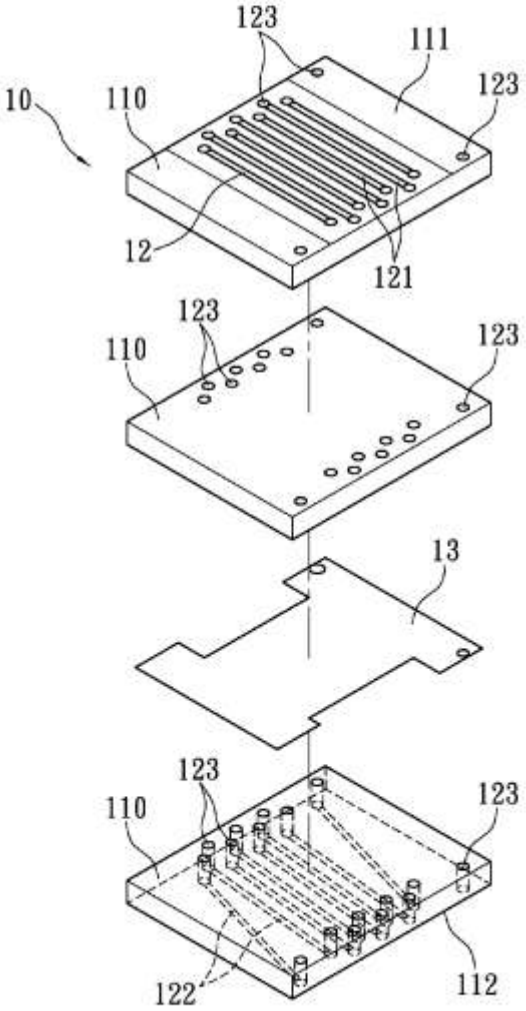
Publication Classification

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

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

(57) **ABSTRACT**

A chip antenna includes a main body having a first surface and a second surface; a microstrip structure disposed on the first surface and the second surface of the main body; and at least one metal piece which is disposed in the main body and located between the first surface and the second surface, the metal piece is electrically connected with the microstrip structure. Since the area of the metal piece is almost equal to that of the first surface or the second surface of the main body, therefore the metal piece can increase the radiation area of the chip antenna greatly so that the chip antenna have greater bandwidth and better electrical characteristics.



US 20100201578A1

(19) **United States**

(12) **Patent Application Publication**

Parsche

(10) **Pub. No.: US 2010/0201578 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **HALF-LOOP CHIP ANTENNA AND ASSOCIATED METHODS**

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(21) Appl. No.: **12/369,975**

(22) Filed: **Feb. 12, 2009**

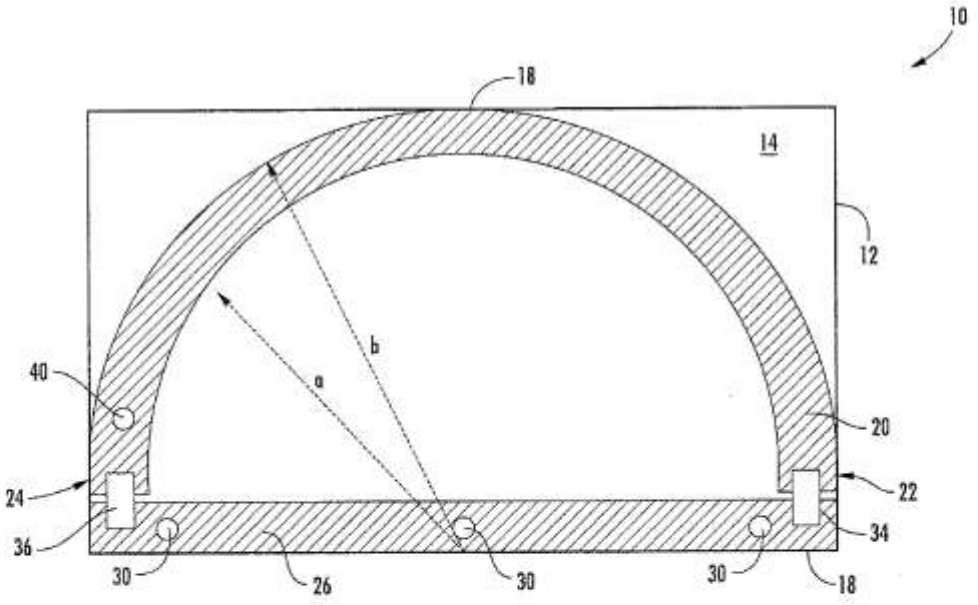
Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01P 11/00 (2006.01)
H01Q 7/00 (2006.01)

(52) **U.S. Cl.** ..... **343/700 MS**; 29/601; 343/866; 343/749

(57) **ABSTRACT**

The planar or printed chip antenna is configured to enhance the gain relative to its area. The antenna includes a dielectric substrate having first and second opposing sides and a plurality of electrically conductive traces thereon configured to define a half-loop antenna element extending along an arcuate path on a first side of the dielectric substrate and having spaced apart first and second ends. First and second base strips are electrically connected together and aligned on the respective first and second opposing sides of the dielectric substrate adjacent the spaced apart first and second ends of the half-loop antenna element. A feed strip is on the second side of the dielectric substrate and aligned with the first end of the half-loop antenna element and electrically connected thereto. At least one capacitive element is associated with the half-loop antenna element.



US 20100201581A1

(19) **United States**

(12) **Patent Application Publication**

Moon et al.

(10) **Pub. No.: US 2010/0201581 A1**

(43) **Pub. Date: Aug. 12, 2010**

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

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(73) Assignee: **Samsung Electronics Co., Ltd.**, Suwon-si (KR)

(21) Appl. No.: **12/764,562**

(22) Filed: **Apr. 21, 2010**

Related U.S. Application Data

(63) Continuation of application No. 11/347,217, filed on Feb. 6, 2006, now Pat. No. 7,733,271.

(30) **Foreign Application Priority Data**

Feb. 4, 2005 (KR) 10-2005-0010759

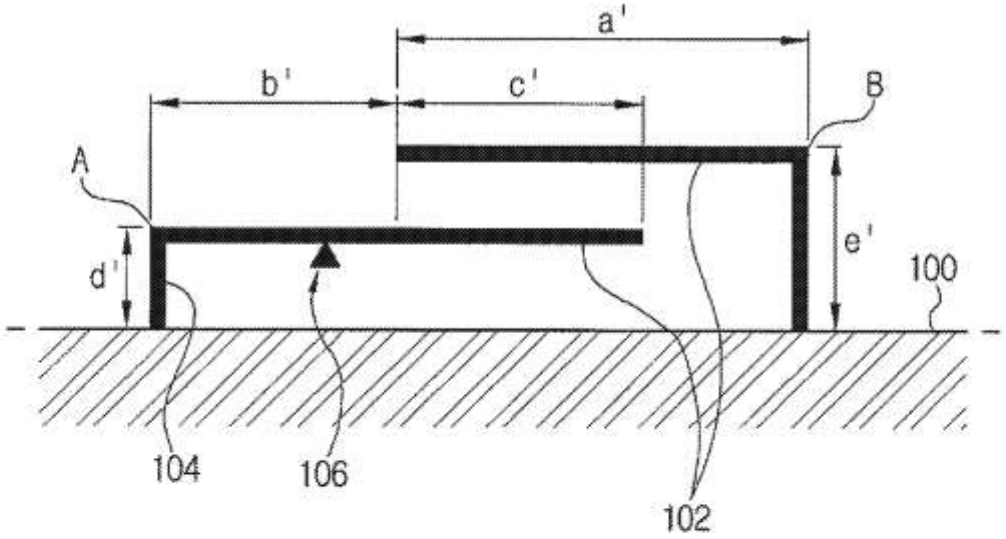
Publication Classification

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

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

(57) **ABSTRACT**

An improved and more compact structure of a built-in antenna for handheld terminals, improving radiation pattern and efficiency. Provided is a planar inverted-F antenna having a radiation part having an inductive radiation portion and a parasitic radiation portion which are spaced in a certain distance apart from a ground surface, a power-supply part horizontally spaced apart from the ground surface and for directly supplying currents to the connected inductive radiation portion, and connection parts for connecting the radiation portions to the ground. The planar inverted-F antenna has an inductive antenna portion and a parasitic antenna portion, thereby reducing its volume compared to the conventional inverted-F antenna. Complicated manufacturing and processing procedures are simplified by connecting the power-supplying part and a PCB.



US 20100201583A1

(19) **United States**

(12) **Patent Application Publication**

Wang

(10) **Pub. No.: US 2010/0201583 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **ANTENNA SYSTEM**

(76) Inventor: **Shu-Li Wang**, Santa Clara, CA (US)

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(21) Appl. No.: **12/764,788**

(22) Filed: **Apr. 21, 2010**

Related U.S. Application Data

(62) Division of application No. 11/486,223, filed on Jul. 12, 2006.

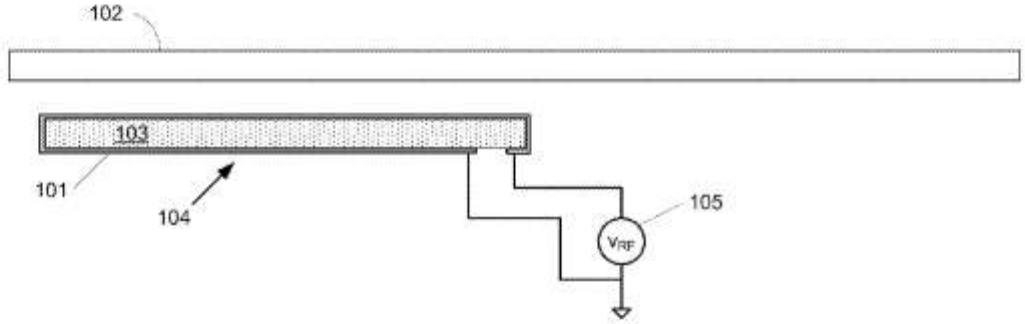
Publication Classification

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

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

(57) **ABSTRACT**

An antenna system includes a dielectrically-loaded loop element electromagnetically coupled to a planar element. The antenna system exhibits uniform, broadband radiation and reception patterns.



US 20100201588A1

(19) **United States**

(12) **Patent Application Publication**

Chen et al.

(10) **Pub. No.: US 2010/0201588 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **ANTENNA STRUCTURE**

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(21) Appl. No.: **12/407,764**

(22) Filed: **Mar. 19, 2009**

(30) **Foreign Application Priority Data**

Feb. 9, 2009 (TW) 098201842

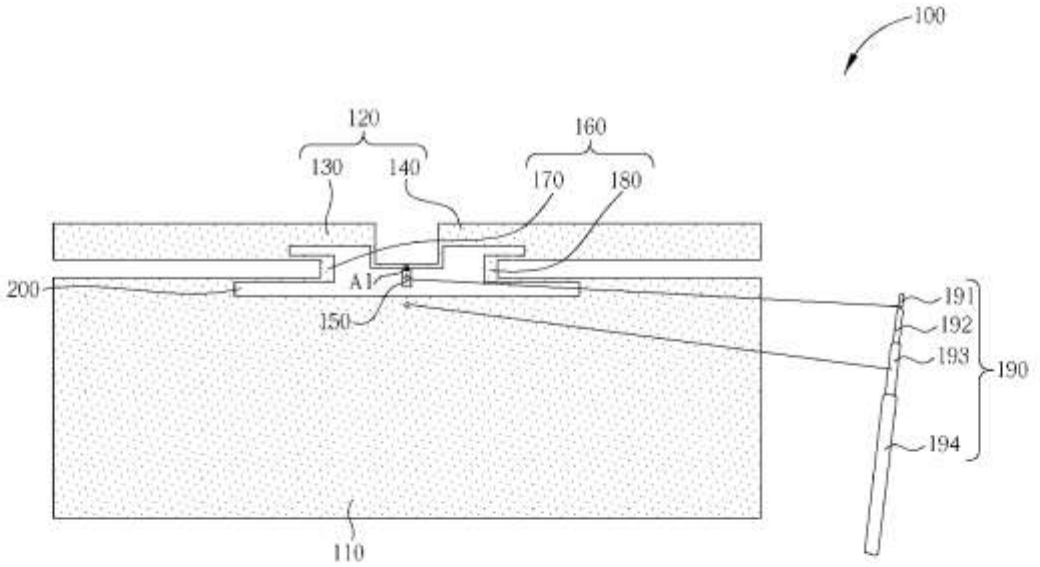
Publication Classification

(51) **Int. Cl.**
H01Q 21/24 (2006.01)

(52) **U.S. Cl.** ..... **343/756**; 343/700 MS

(57) **ABSTRACT**

An antenna structure consists of a substrate, a radiation element, a signal feeding element, and a grounding element. The radiation element includes a first radiator and a second radiator coupled to the first radiator, wherein the first radiator is identical to the second radiator. The signal feeding element is coupled to a joint of the first radiator and the second radiator, wherein the first radiator and the second radiator are symmetrically disposed in the left and right sides of the signal feeding element to permute an array. The grounding element includes a first grounding sub-element and a second grounding sub-element, wherein the first grounding sub-element is coupled between the first radiator and the substrate and the second grounding sub-element is coupled between the second radiator and the substrate. The first grounding sub-element is identical to the second grounding sub-element.



US 20100201592A1

(19) **United States**

(12) **Patent Application Publication**

Das

(10) **Pub. No.: US 2010/0201592 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **SLOTTED ANTENNA INCLUDING AN ARTIFICIAL DIELECTRIC SUBSTRATE WITH EMBEDDED PERIODIC CONDUCTING RINGS, FOR ACHIEVING AN IDEALLY-UNIFORM, HEMISPHERICAL RADIATION/RECEPTION WHEN USED AS A SINGLE ANTENNA ELEMENT, OR FOR AZIMUTH(PHI)-INDEPENDENT IMPEDANCE-MATCHED ELECTRONIC BEAM SCANNING WHEN USED AS A LARGE ANTENNA ARRAY**

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(21) Appl. No.: **12/649,077**

(22) Filed: **Dec. 29, 2009**

Related U.S. Application Data

(60) Provisional application No. 61/142,301, filed on Jan. 2, 2009.

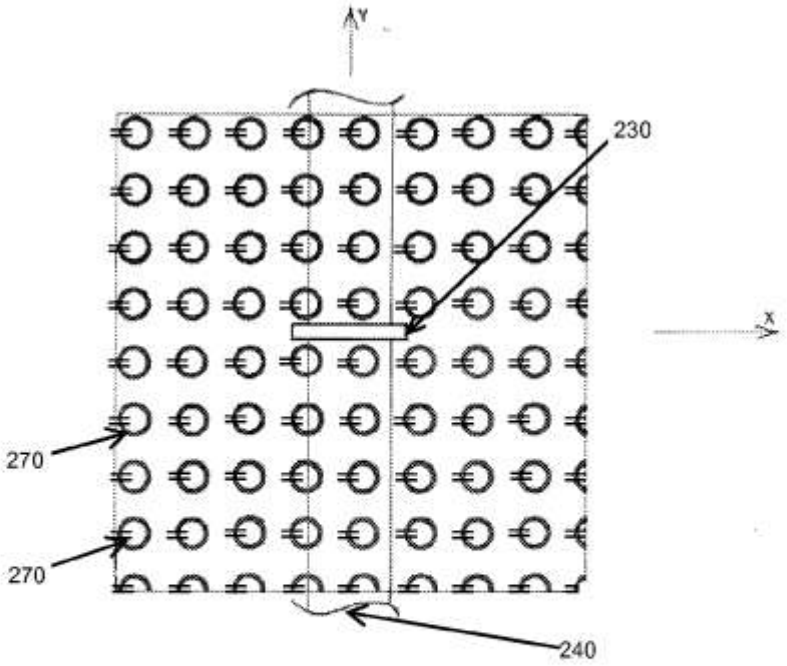
Publication Classification

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

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

(57) **ABSTRACT**

A new antenna includes a rectangular slot element provided on a conducting plate and covered by a special substrate portion. The substrate portion includes stacked layers of capacitively-loaded conducting ring elements, arranged in the form of an (e.g., periodic) array in each layer. The slot antenna element is excited by a parallel-plate waveguide, which is fabricated below the conducting plate on which the slot antenna is made. The antenna design, when used in the form of a single antenna element, would produce ideally uniform power radiation over all directions in the upper hemispherical space. A large periodic array of such ideally isotropic antenna elements permits electronic beam scanning and has a performance of power coupling from signal sources at the antenna inputs which is independent of the azimuth (Φ) scanning direction, dependent only on one spatial variable (elevation angle, θ) of scanning. Such performance from an antenna array normally can not be achieved using conventional designs. Such an antenna array may be used in communications and radars.



200

US 20100201594A1

(19) **United States**

(12) **Patent Application Publication**

Engel

(10) **Pub. No.: US 2010/0201594 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **DUAL POLARIZATION PLANAR ARRAY ANTENNA AND CELL ELEMENTS THEREFOR**

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(73) Assignee: **STARLING ADVANCED COMMUNICATIONS LTD.**, Yoqneam (IL)

(21) Appl. No.: **12/654,953**

(22) Filed: **Jan. 11, 2010**

Related U.S. Application Data

(62) Division of application No. 11/440,054, filed on May 25, 2006, now Pat. No. 7,663,566.

(30) **Foreign Application Priority Data**

Oct. 16, 2005 (IL) 171450
Mar. 26, 2006 (IL) 174549

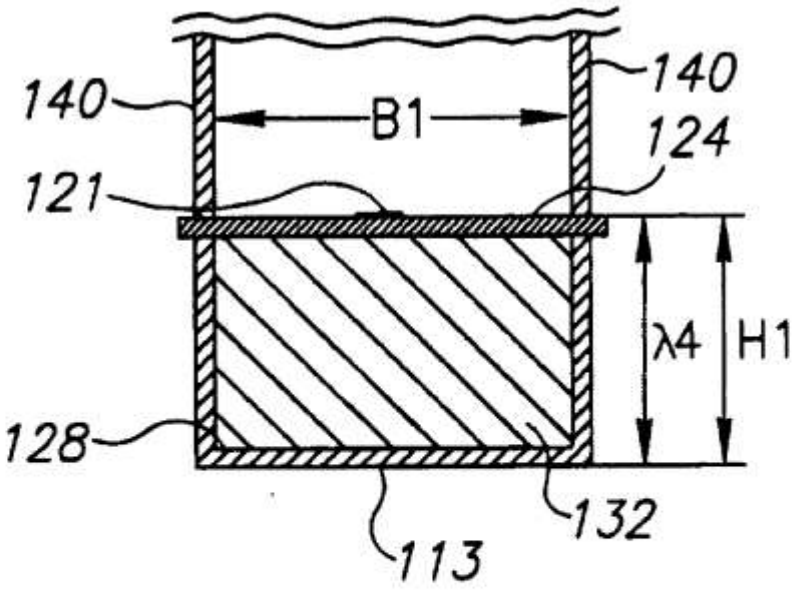
Publication Classification

(51) **Int. Cl.**
H01Q 19/10 (2006.01)

(52) **U.S. Cl.** **343/834**

(57) **ABSTRACT**

An RF antenna structure (e.g., a planar array) includes at least one radiation cell (and typically many, e.g., 16 or 32 or 64, etc.) having a conductive enclosure and an upper probe and a lower probe located at different heights within the enclosure. The enclosure between the upper probe and a bottom of the cell has at least two different cross-sectional areas. The upper and lower probes are preferably oriented at substantially 90° relative to each other. An upper portion of the enclosure beneath the upper probe may have a larger dimension than a lower portion such that the upper portion allows propagation of waves generated by the upper probe in a predetermined frequency band while the lower portion (e.g., above the lower probe) does not substantially allow propagation of waves generated by the upper probe, in the predetermined frequency band.



US 20100201596A1

(19) **United States**

(12) **Patent Application Publication**

Mieslinger et al.

(10) **Pub. No.: US 2010/0201596 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **APPARATUS, METHOD AND USE FOR SCREENING THE MAGNETIC FIELD OF AN RFID TRANSPONDER**

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(21) Appl. No.: **12/669,149**

(22) PCT Filed: **Jul. 17, 2008**

(86) PCT No.: **PCT/EP2008/005869**

§ 371 (c)(1),
(2), (4) Date: **Jan. 14, 2010**

(30) **Foreign Application Priority Data**

Jul. 17, 2007 (DE) 10 2007 033 280.9
Aug. 7, 2007 (DE) 10 2007 037 293.2

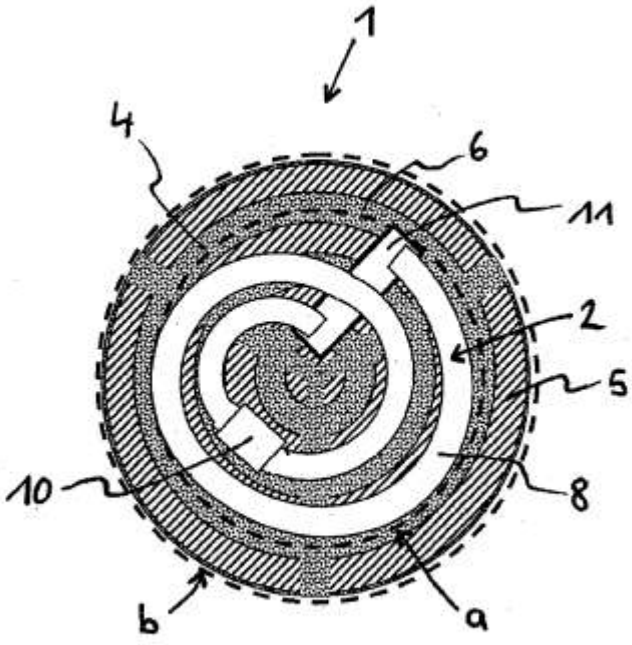
Publication Classification

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

(52) **U.S. Cl.** **343/841**; 29/600

(57) **ABSTRACT**

An apparatus for screening the magnetic field of a transponder is described, which apparatus comprises, in a first area section, at least one flat antenna structure which comprises conductor tracks for conducting current in a direction of current flow and has an application-specific extent, wherein the apparatus comprises a second area section or carrier to which strips of a highly permeable screening material are applied such that they are oriented with respect to one another in a predetermined manner, wherein the second area section is arranged parallel to the first area section. In order to effectively screen the magnetic field which is beamed in from the outside, for instance by a reader, and in order to effectively screen the magnetic field which is generated by the antenna structure of the transponder itself following excitation, and in order to reduce eddy current losses in a metal area arranged underneath, the highly permeable screening material has either anisotropic permeability, wherein increased permeability is provided in the direction of current flow, in particular in the direction of the conductor tracks of important sections of the antenna structure, or else provides for the strips to be oriented parallel to one another in important sections, wherein the longitudinal edges of the strips are provided in the direction of current flow, in particular in the direction of the conductor tracks of important sections of the antenna structure.



US 20100201597A1

(19) **United States**

(12) **Patent Application Publication**

Okui et al.

(10) **Pub. No.: US 2010/0201597 A1**

(43) **Pub. Date: Aug. 12, 2010**

(54) **GLASS ANTENNA FOR VEHICLE**

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(21) Appl. No.: **12/650,711**

(22) Filed: **Dec. 31, 2009**

(30) **Foreign Application Priority Data**

Feb. 6, 2009 (JP) 2009-025857
Nov. 18, 2009 (JP) 2009-262964

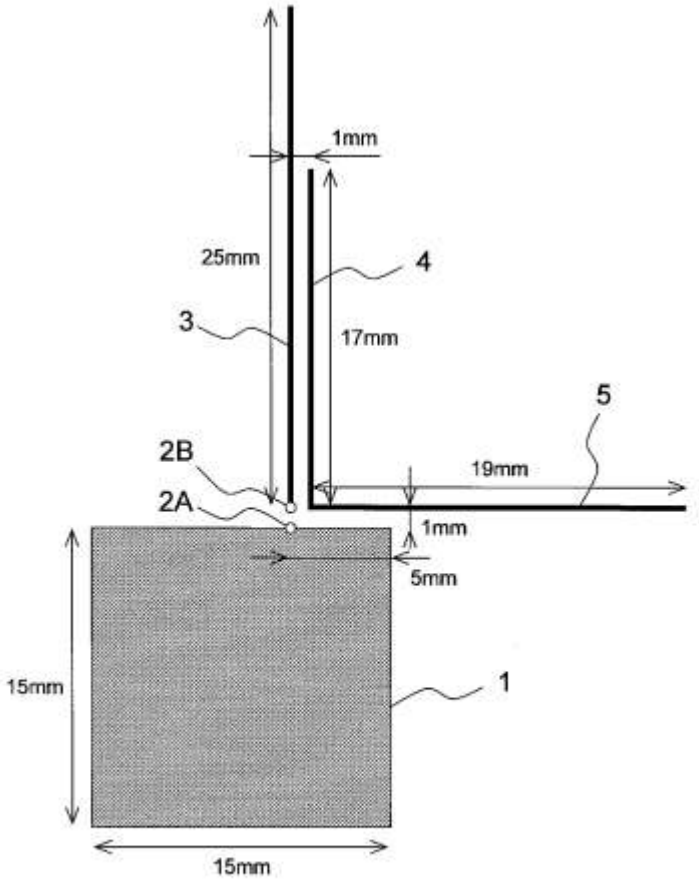
Publication Classification

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/48 (2006.01)

(52) **U.S. Cl.** ..... **343/843**; 343/846; 343/700 MS

(57) **ABSTRACT**

To receiving satellite broadcasting waves, it is provided an antenna comprising: a first element connected to a first feed point of a hot side; a ground element connected to a second feed point of a ground side; a second element; and a third element. The second element is arranged substantially in parallel with the first element so as to be coupled to the first element. The third element is arranged to define a predetermined angle with the first element, with a vertex of the predetermined angle set to a vicinity of the first feed point and the second feed point. The first element has a linear shape so as to have an inductive property at a resonance frequency. The third element has a linear shape so as to have a capacitive property at the resonance frequency. The third element is connected to a ground-side end portion of the second element.



US 20100207821A1

(19) **United States**

(12) **Patent Application Publication**

KIM et al.

(10) **Pub. No.: US 2010/0207821 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **MULTI-RESONANT BROADBAND ANTENNA**

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(21) Appl. No.: **12/533,122**

(22) Filed: **Jul. 31, 2009**

(30) **Foreign Application Priority Data**

Feb. 18, 2009 (KR) 10-2009-0013502

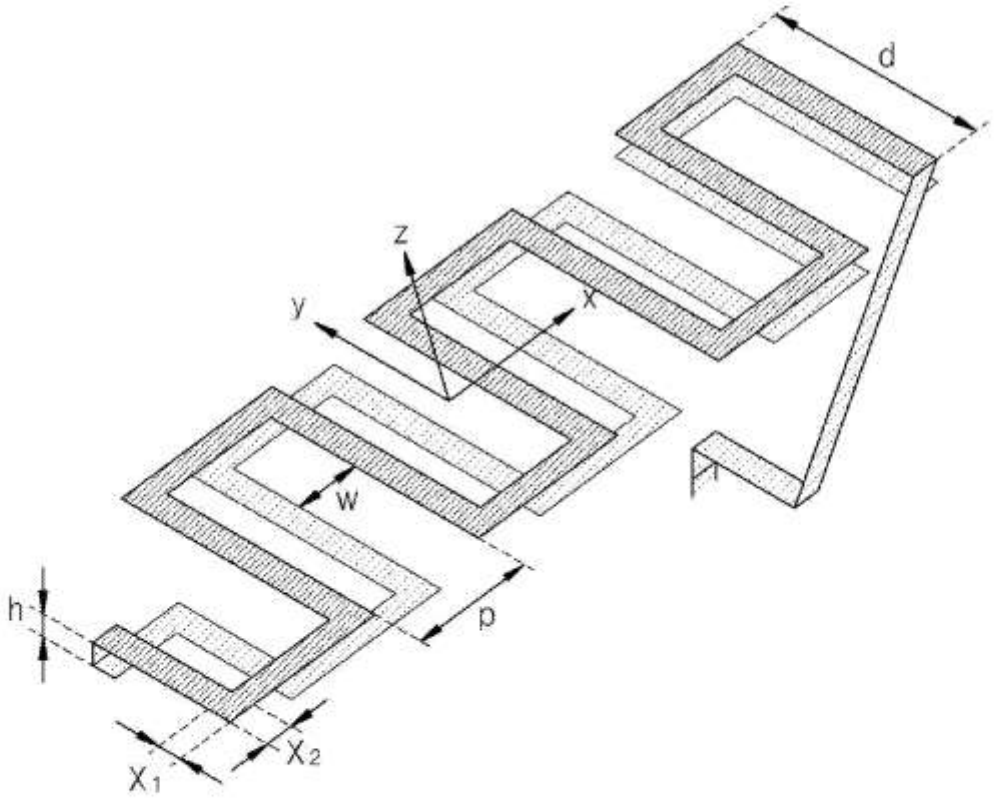
Publication Classification

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

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

(57) **ABSTRACT**

An antenna including: a conducting wire part which includes a first part extending in a first direction, a second part extending from an end of the first part in a direction crossing the first direction, and a third part extending from an end of the second part to face the first part, wherein lengths of the first and third parts are different from each other.



US 20100207822A1

(19) **United States**

(12) **Patent Application Publication**

SOTOUDEH

(10) **Pub. No.: US 2010/0207822 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **ANTENNA ARRANGEMENT FOR HIGH SPEED DATA TRANSFER AND WIRELESS ENERGY TRANSFER**

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(21) Appl. No.: **12/371,781**

(22) Filed: **Feb. 16, 2009**

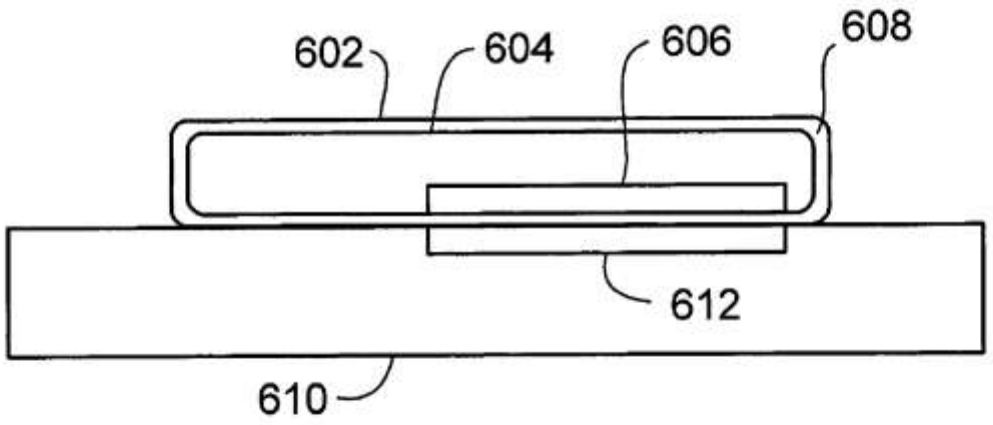
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/24 (2006.01)

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

(57) **ABSTRACT**

The present invention relates to an antenna arrangement, an electronic communication device and an electronic communication set. By using a parallel plate type antenna for coupling between two electronic communication devices, high speed data transfer between the electronic communication devices as well as wireless energy charging of at least one of the two electronic communication devices, can be provided.



US 20100207824A1

(19) **United States**

(12) **Patent Application Publication**

Ide

(10) **Pub. No.: US 2010/0207824 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **FOLDABLE PORTABLE RADIO DEVICE**

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(21) Appl. No.: **12/670,463**

(22) PCT Filed: **Jul. 22, 2008**

(86) PCT No.: **PCT/JP2008/063103**

§ 371 (c)(1),
(2), (4) Date: **Jan. 25, 2010**

(30) **Foreign Application Priority Data**

Aug. 9, 2007 (JP) 2007-208270

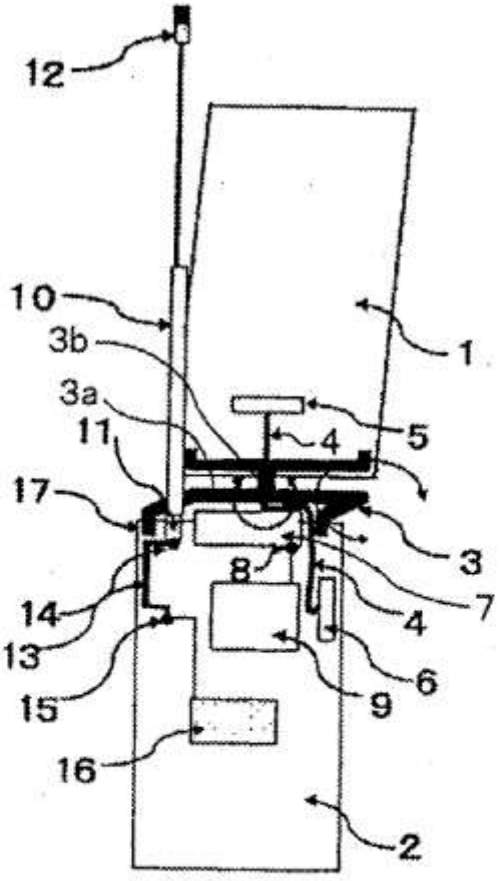
Publication Classification

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

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

(57) **ABSTRACT**

A foldable portable radio device comprises a first housing, a second housing, a hinge section for coupling the first and second housings such that the radio device is foldable, a radio communication antenna built in a region of the first or second housing near the hinge section, and a digital television reception whip antenna which can be retracted into and drawn out from the region near the hinge section where the radio communication antenna is built in. The foldable portable radio device also comprises a function for powering the digital television reception whip antenna through an electric connection pattern, wherein the electric connection pattern is formed in a direction away from the region near the hinge section where the radio communication antenna is built in.



US 20100207825A1

(19) **United States**

(12) **Patent Application Publication**

Yan et al.

(10) **Pub. No.: US 2010/0207825 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **MOBILE TERMINAL AND ANTENNA APPARATUS THEREFOR**

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(73) Assignee: **Lenovo (Beijing) Limited**, Beijing (CN)

(21) Appl. No.: **12/703,852**

(22) Filed: **Feb. 11, 2010**

(30) **Foreign Application Priority Data**

Feb. 13, 2009 (CN) 200910077483.4

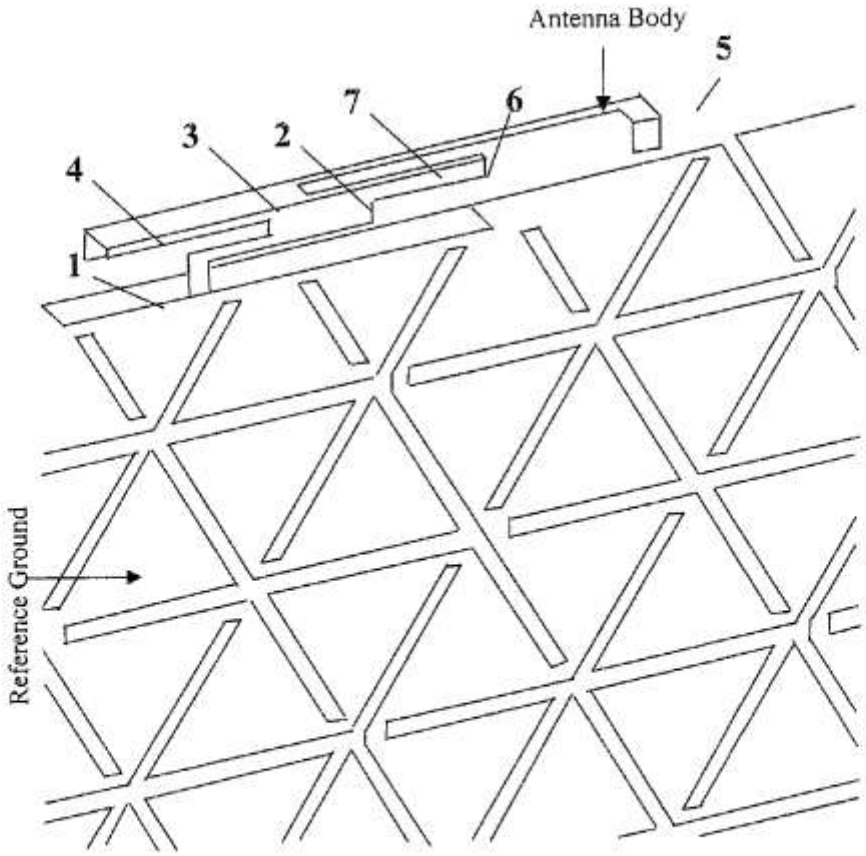
Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/24 (2006.01)

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

(57) **ABSTRACT**

A mobile terminal and an antenna apparatus therefor are provided. The antenna apparatus comprises an antenna body arranged at a first position in a space between the display case and the display screen; and a reference ground connected to the antenna body and arranged at a second position in the space, the reference ground having an electromagnetic band gap structure. With such a structure, it is possible to effectively improve the radiation efficiency of the antenna without increasing the size of the antenna apparatus. Thus, the antenna apparatus can satisfy the design requirement on portability of the mobile terminal.



US 20100207831A1

(19) **United States**

(12) **Patent Application Publication**

Wu

(10) **Pub. No.: US 2010/0207831 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **LOOP DIPOLE ANTENNA MODULE**

(76) Inventor: **Huei-chi Wu**, Jhongli City (TW)

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(21) Appl. No.: **12/372,835**

(22) Filed: **Feb. 18, 2009**

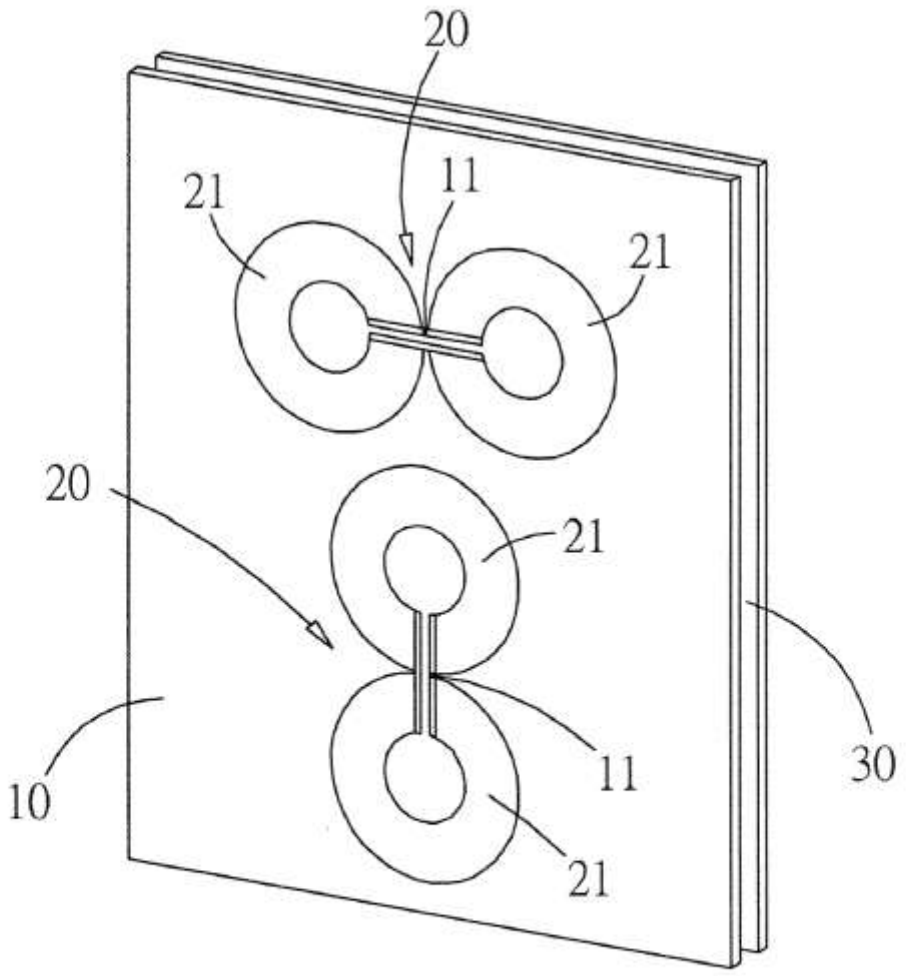
Publication Classification

(51) **Int. Cl.**
H01Q 11/12 (2006.01)
H01Q 7/00 (2006.01)

(52) **U.S. Cl.** **343/742**

(57) **ABSTRACT**

The present invention discloses an antenna module including two double-ring antennas installed at an angle of 90° with respect to a surface of the panel which is comprised of a printed circuit board, two feedback nodes disposed on the panel and at positions corresponding to the two double-ring antennas respectively, and a metal reflecting plate installed on a backside of the panel. The whole antenna module can receive vertical and horizontal signals on the surface of the metal reflecting plate by using the double-ring antennas with the two feedback nodes respectively to achieve the expected bandwidth and the required bidipolarization effects and accomplish a better gain.



US 20100207832A1

(19) **United States**

(12) **Patent Application Publication**

YING et al.

(10) **Pub. No.: US 2010/0207832 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **ANTENNA ARRANGEMENT, PRINTED CIRCUIT BOARD, PORTABLE ELECTRONIC DEVICE & CONVERSION KIT**

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(21) Appl. No.: **12/428,160**

(22) Filed: **Apr. 22, 2009**

Related U.S. Application Data

(60) Provisional application No. 61/153,153, filed on Feb. 17, 2009.

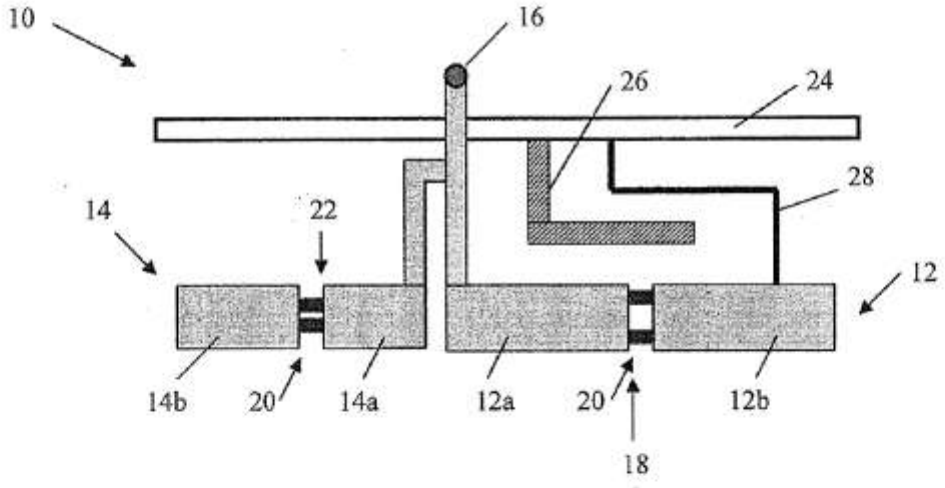
Publication Classification

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

(52) **U.S. Cl.** ..... **343/749**; 343/700 MS

(57) **ABSTRACT**

An antenna arrangement including a first antenna branch and a second antenna branch having a common feed point is provided. The first antenna branch includes a first conducting portion, a second conducting portion, and a first gap between the first and second conducting portions, and a plurality of inductor elements is connected in parallel across the first gap.



US 20100207835A1

(19) **United States**

(12) **Patent Application Publication**

Taura

(10) **Pub. No.: US 2010/0207835 A1**

(43) **Pub. Date: Aug. 19, 2010**

(54) **SLOT ANTENNA**

(76) Inventor: **Toru Taura**, Tokyo (JP)

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(21) Appl. No.: **12/600,222**

(22) PCT Filed: **Apr. 17, 2008**

(86) PCT No.: **PCT/JP2008/057495**

§ 371 (c)(1),
(2), (4) Date: **Nov. 13, 2009**

(30) **Foreign Application Priority Data**

May 16, 2007 (JP) 2007-130850

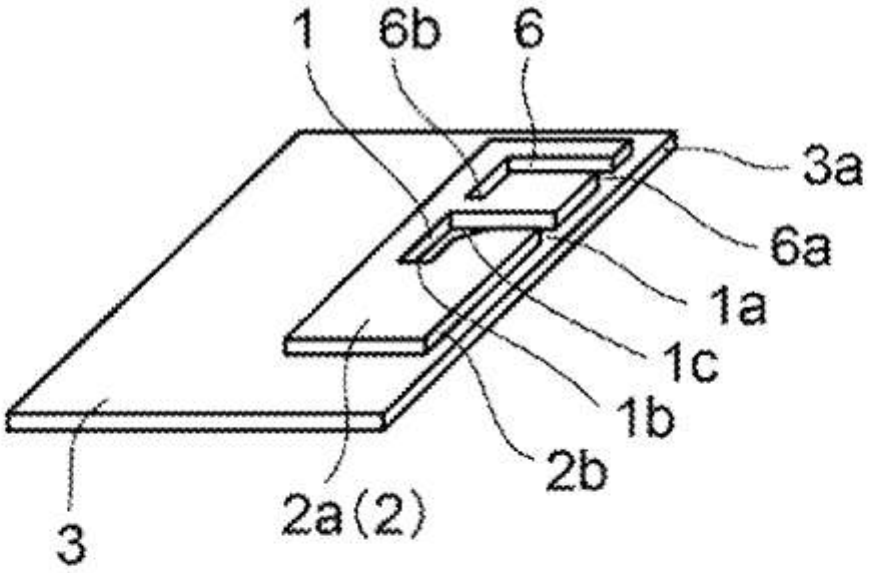
Publication Classification

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

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

(57) **ABSTRACT**

To make an antenna wideband under thin state. The slot antenna includes an antenna element having an aperture type slot, a reflector disposed by opposing to the antenna element, a feeding device which is electrically and physically connected to the antenna element and the reflector, a short-circuiting device which electrically short-circuits the antenna element and the reflector, and a reducing device which reduces the reactance component of the antenna. Since the reducing device for reducing the reactance component of the antenna is provided, the reactance component of the antenna can be reduced even if the antenna is formed thin and the antenna can be made wideband regardless of its thinness.



US 20100212142A1

(19) **United States**

(12) **Patent Application Publication**

Yanagi et al.

(10) **Pub. No.: US 2010/0212142 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA APPARATUS**

(75) Inventors: **Masahiro Yanagi**, Shinagawa (JP); **Shigemi Kurashima**, Shinagawa (JP); **Hideki Iwata**, Shinagawa (JP); **Takashi Yuba**, Shinagawa (JP); **Masahiro Kaneko**, Shinagawa (JP); **Yuriko Segawa**, Shinagawa (JP); **Takashi Arita**, Shinagawa (JP); **Toshihiro Kusagaya**, Shinagawa (JP); **Kazuhiko Ikeda**, Iiyama (JP); **Hiroshi Matsumiya**, Iiyama (JP); **Kazuo Nomura**, Iiayama (JP)

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(21) Appl. No.: **12/662,691**

(22) Filed: **Apr. 28, 2010**

Related U.S. Application Data

(62) Division of application No. 11/581,376, filed on Oct. 17, 2006, now Pat. No. 7,737,908.

(30) **Foreign Application Priority Data**

Mar. 30, 2006 (JP) 2006-094429
Sep. 6, 2006 (JP) 2006-242016

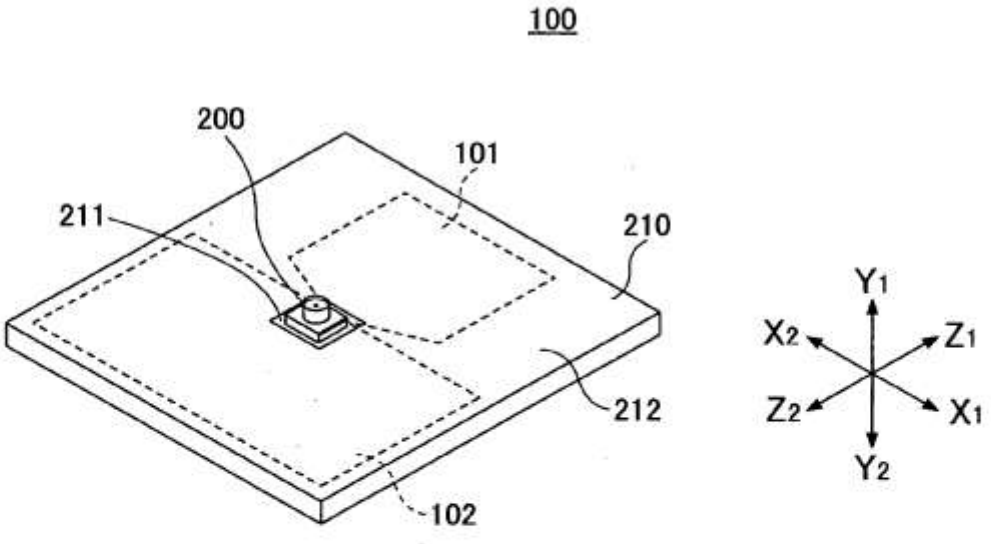
Publication Classification

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

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

(57) **ABSTRACT**

A disclosed antenna apparatus includes: a punched out antenna element made of a sheet metal; a punched out ground element made of a sheet metal, the ground element facing the antenna element; and a surface mount type coaxial connector mounted across the antenna element and the ground element.



US 20100214173A1

(19) **United States**

(12) **Patent Application Publication**

Harihara

(10) **Pub. No.: US 2010/0214173 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **CHIP ANTENNA**

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(21) Appl. No.: **12/280,233**

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

(86) PCT No.: **PCT/JP2007/053569**

§ 371 (c)(1),
(2), (4) Date: **Aug. 21, 2008**

(30) **Foreign Application Priority Data**

Feb. 28, 2006 (JP) 2006-052917

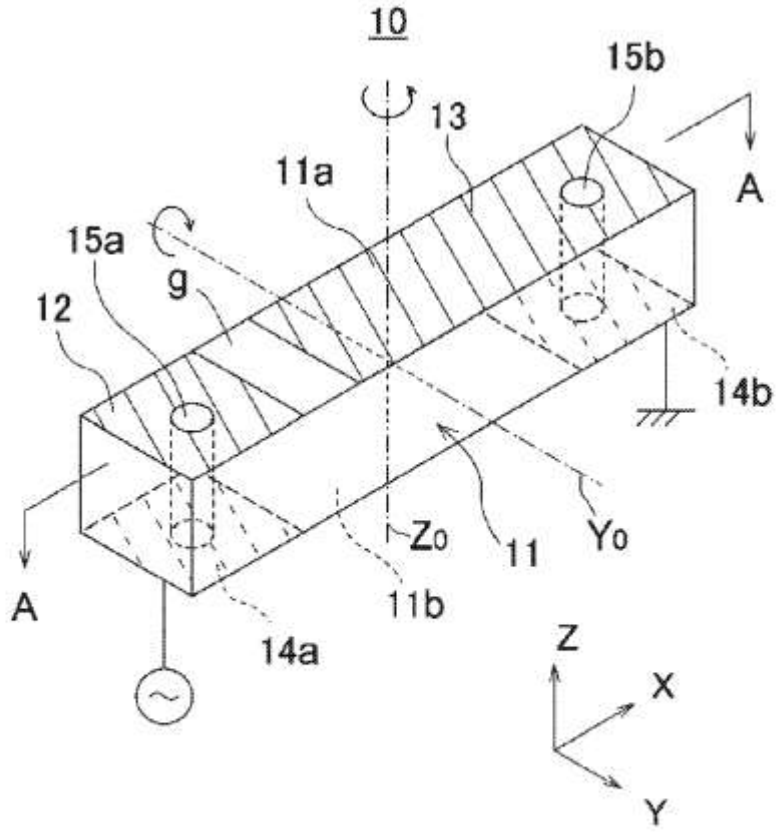
Publication Classification

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

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

(57) **ABSTRACT**

The present invention provides a chip antenna of which chip size can be smaller and a mounting area can be also reduced by increasing an effective specific inductive capacity. A chip antenna **10** according to the present invention includes a rectangular base substance **11** made of dielectric, a feeding electrode **12** formed on one main surface **11***a* of the base substance **11**, a strip-line-shaped emission electrode **13** having an approximate length λ/4 formed on the main surface **11***a* of the base substance **11** to face the feeding electrode **12** via a gap g, fixing electrodes **14***a* and **14***b* formed on the other main surface **11***b* of the base substance **11**, and through-holes **15***a* and **15***b* piercing through the inside of the base substance **11**. The feeding electrode **12** and the emission electrode **13** are not connected to the fixing electrodes **14***a* and **14***b* via a side surface of the base substance **11**. Electrodes on upper and lower surfaces are electrically connected to each other via through-holes piercing through the base substance from the one main surface **11***a* to the other main surface **11***b* of the base substance **11**.



US 20100214174A1

(19) **United States**

(12) **Patent Application Publication**

Guan et al.

(10) **Pub. No.: US 2010/0214174 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA AND WIRELESS COMMUNICATION APPARATUS**

(75) Inventors: **Ning Guan**, Chiba (JP); **Koichi Ito**, Chiba (JP)

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(73) Assignees: **FUJIKURA LTD.**, Tokyo (JP); **CHIBA UNIVERSITY**, Chiba-shi (JP)

(21) Appl. No.: **12/551,800**

(22) Filed: **Sep. 1, 2009**

(30) **Foreign Application Priority Data**

Feb. 24, 2009 (JP) 2009-041279

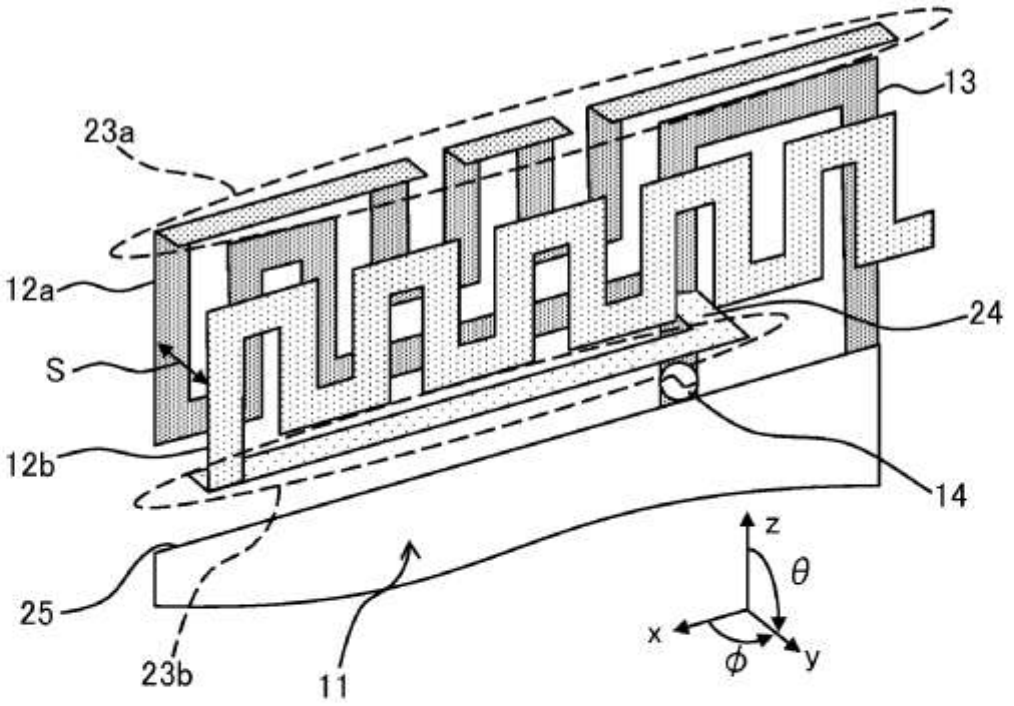
Publication Classification

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

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

(57) **ABSTRACT**

The present invention provides an antenna that is small in size and has band frequencies corresponding to multibands, and a wireless communication apparatus including the antenna. The antenna according to the present invention has two radiation elements **12***a* and **12***b* connected to a ground plate **11** via a shorting pin. The two radiation elements **12***a* and **12***b* each have a lower arm and an upper arm that are formed through bending. The lower arm is connected to the shorting pin and is located closer to the ground plate **11** than the upper arm is. At least one of the lower arm and the upper arm has a meandered structure.



US 20100214175A1

(19) **United States**

(12) **Patent Application Publication**

Hui et al.

(10) **Pub. No.: US 2010/0214175 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA ARRANGEMENT, A METHOD FOR MANUFACTURING AN ANTENNA ARRANGEMENT AND A PRINTED WIRING BOARD FOR USE IN AN ANTENNA ARRANGEMENT**

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(21) Appl. No.: **12/678,332**

(22) PCT Filed: **Sep. 19, 2008**

(86) PCT No.: **PCT/EP08/62582**

§ 371 (c)(1),
(2), (4) Date: **May 4, 2010**

(30) **Foreign Application Priority Data**

Sep. 20, 2007 (IB) PCT/IB2007/003652

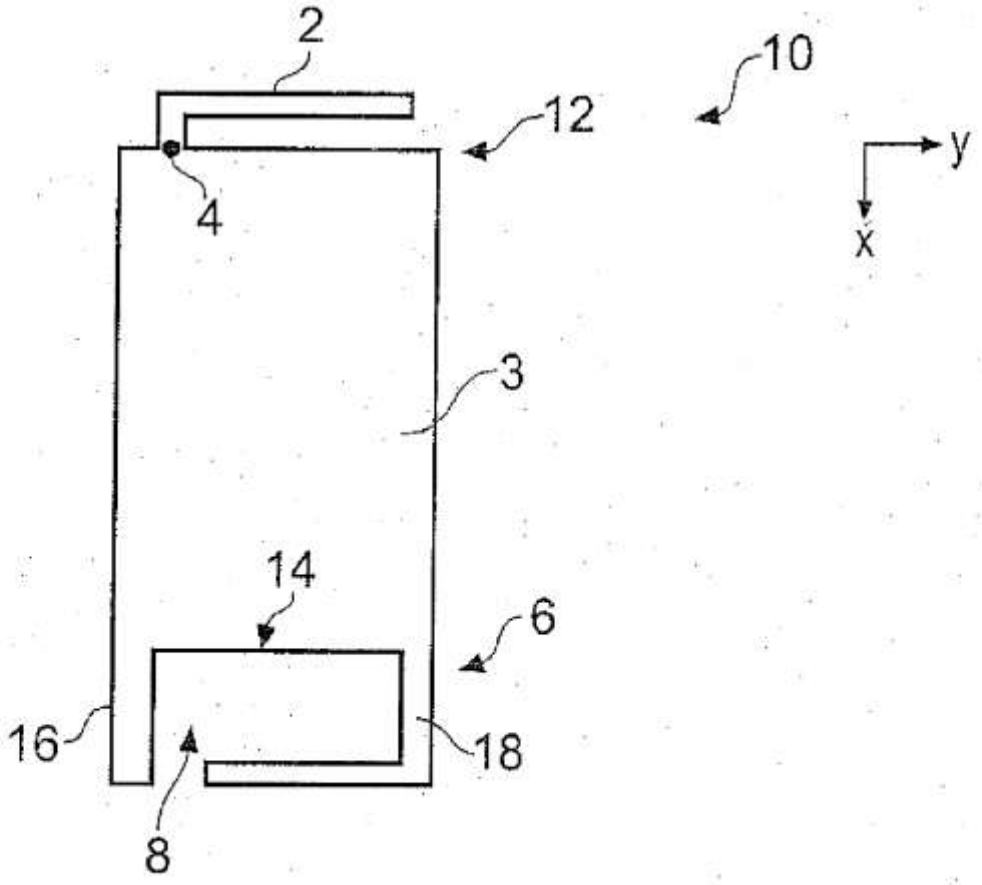
Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 9/04 (2006.01)
H01P 11/00 (2006.01)

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

(57) **ABSTRACT**

An antenna arrangement including: a conductive ground element having a first end and a second end; an antenna element at a first end; a first conductive part extending from the conductive ground element and a second conductive part extending from conductive ground element and separated from the first conductive part by a gap.



US 20100214179A1

(19) **United States**

(12) **Patent Application Publication**

WONG et al.

(10) **Pub. No.: US 2010/0214179 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **MULTIBAND ANTENNA AND COMMUNICATION DEVICE HAVING THE SAME**

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(21) Appl. No.: **12/468,933**

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Publication Classification

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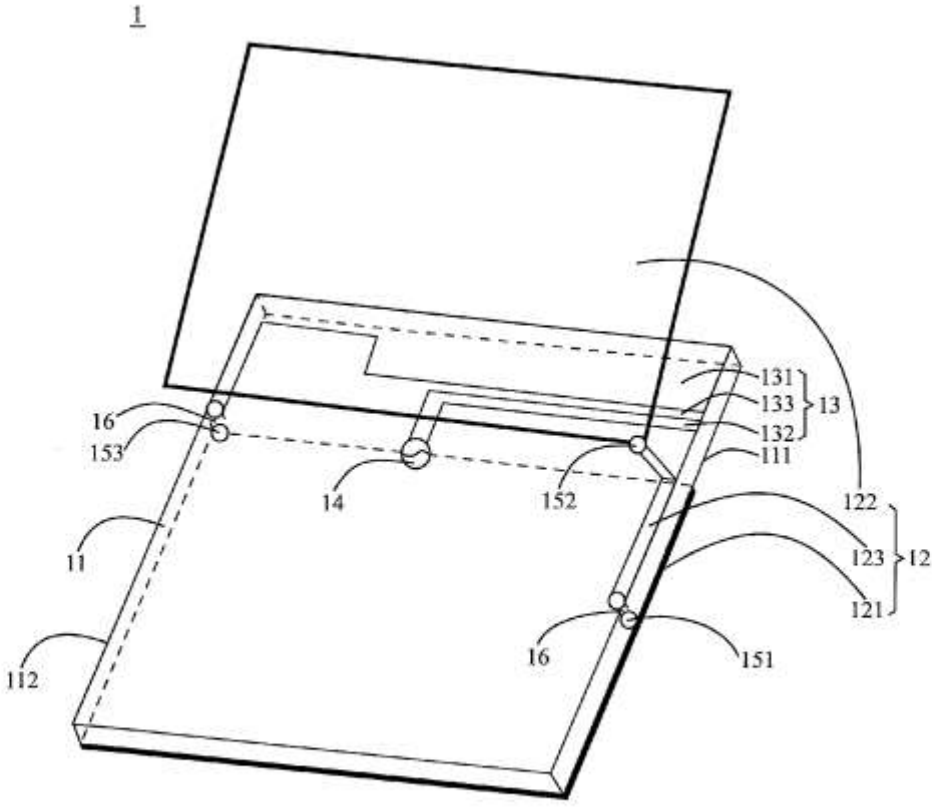
H01Q 1/24 (2006.01)

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

(57) **ABSTRACT**

A multiband antenna for a communication device is disclosed. The multiband antenna comprises a dielectric substrate, a ground portion, and a radiating metal portion. The dielectric substrate comprises two surfaces. The ground portion comprises a first ground plane, a second ground plane, and a connecting metal strip. The first ground plane is on one of the surfaces of the dielectric substrate and has a first connecting point and a shorting point. The second ground plane is near the first ground plane and has a second connecting point. At least one part of the connecting metal strip is on one surface of the dielectric substrate. The connecting metal strip has one end connected to the first connecting point and the other end connected to the second connecting point. The radiating metal portion is connected to the dielectric substrate, without overlapping the first ground plane. The radiating metal portion comprises a radiating section having one end connected to the shorting point and the other end as an open end; and a feeding section having one end connected to a signal source and the other end as an open end, wherein the open end of the feeding section has a spacing of less than 3 mm to the radiating portion.



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(19) **United States**

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Krogerus

(10) **Pub. No.: US 2010/0214180 A1**

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(54) **ANTENNA DEVICE**

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(21) Appl. No.: **12/520,719**

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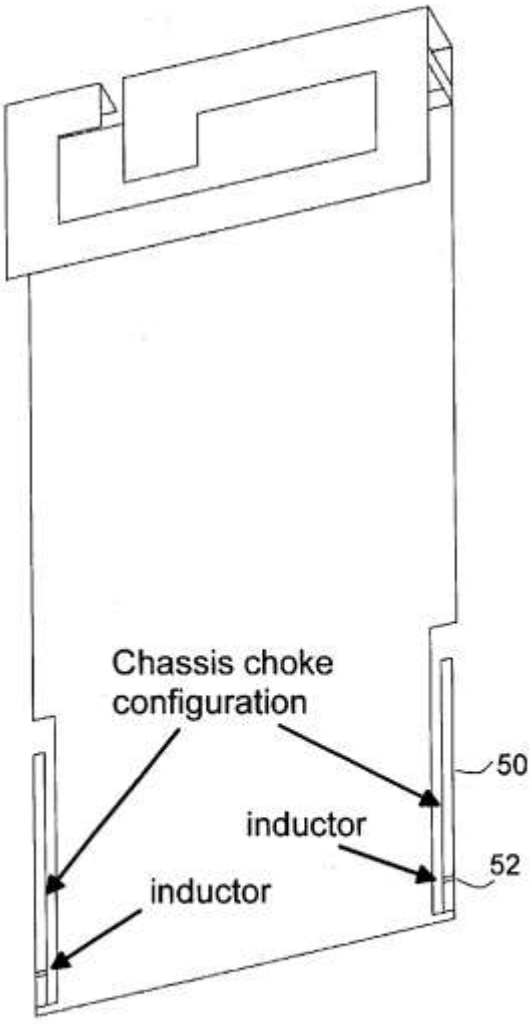
H01Q 9/00 (2006.01)
H01Q 1/24 (2006.01)

(52) **U.S. Cl.** **343/702**; 343/749

(57) **ABSTRACT**

An antenna device for a portable electronic device and an electronic device provided with such an antenna are disclosed. The antenna device is configured to provide in a combination a tuning element for tuning at least one electrical dimension of the portable electronic device and an antenna radiator element of the portable electronic device.



US 20100214181A1

(19) **United States**

(12) **Patent Application Publication**

Ryou et al.

(10) **Pub. No.: US 2010/0214181 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **MULTI-BAND ANTENNA AND WIRELESS COMMUNICATION DEVICE INCLUDING THE SAME**

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(21) Appl. No.: **12/598,596**

(22) PCT Filed: **Apr. 29, 2008**

(86) PCT No.: **PCT/KR08/02409**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**

H01Q 5/00	(2006.01)
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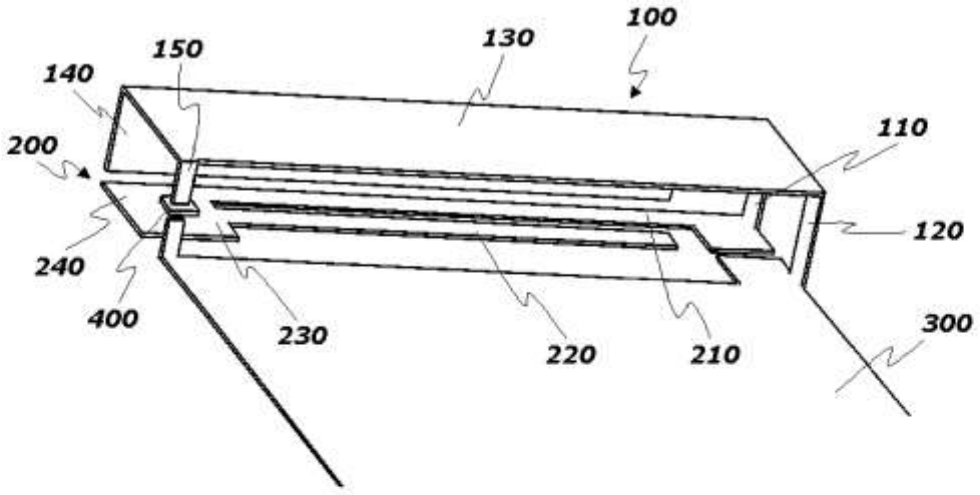
H01Q 1/24	(2006.01)

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

(57) **ABSTRACT**

There is herein disclosed a multi-band antenna which can adjust respective frequency bands independently. The multi-band antenna comprises a first radiation element having a PIFA structure and a second radiation element having a monopole structure. Also, a second ground terminal is disposed at one end of the first radiation element so as to be connected to a ground plane through a capacitor. The adjustment of the capacitance enables an independent adjustment of a first frequency band. The second radiation element includes a stub so as to allow the second frequency band to be independently adjusted, and a first sub-element and a second sub-element which defines a slit therebetween so as to allow the third frequency band to be independently adjusted. According to the present invention, it is possible to provide a multi-band antenna which can easily adjust respective frequency bands using multi-bands.



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(19) **United States**

(12) **Patent Application Publication**

Cornwell

(10) **Pub. No.: US 2010/0214182 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA SYSTEM**

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(21) Appl. No.: **12/775,203**

(22) Filed: **May 6, 2010**

Related U.S. Application Data

(63) Continuation of application No. 11/882,211, filed on Jul. 31, 2007, now Pat. No. 7,733,280, which is a continuation of application No. PCT/US2006/004779, filed on Feb. 13, 2006.

(60) Provisional application No. 60/651,627, filed on Feb. 11, 2005.

Publication Classification

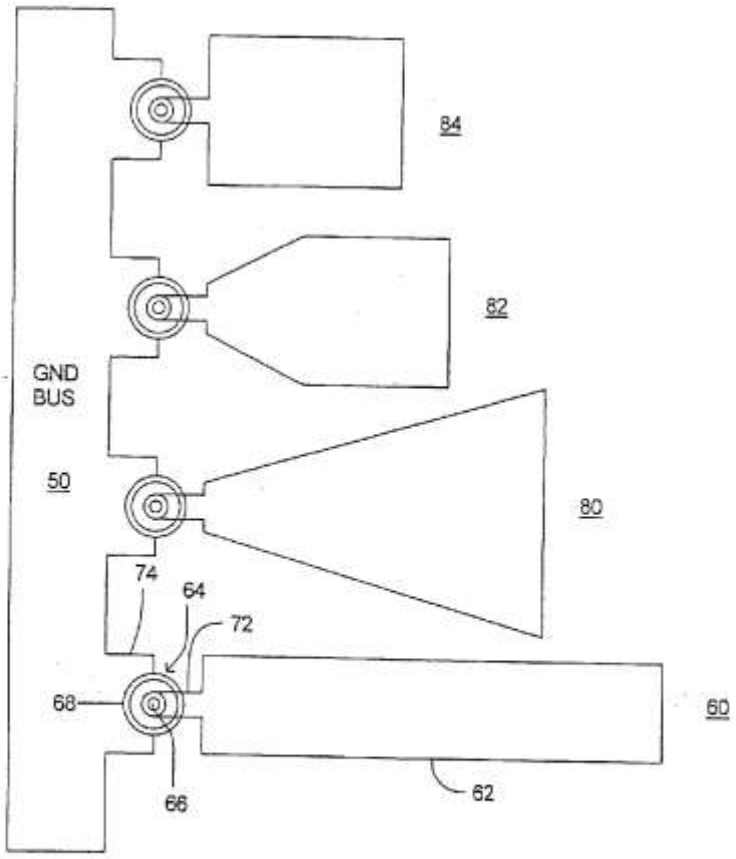
(51) **Int. Cl.**

H01Q 1/38	(2006.01)
G01R 29/08	(2006.01)
H01Q 1/48	(2006.01)

(52) **U.S. Cl.** ..... **343/703**; 343/848; 343/700 MS

(57) **ABSTRACT**

An antenna system includes plural antennas. Each antenna is different than every other antenna. Each antenna is characterized by a principal plane. A principal plane of a first antenna is oblique to a principal plane of a second antenna. The first antenna includes a first insulating substrate extending in the principal plane of the first antenna. The first antenna further includes a first radiating element and a connected first conductor and includes a second radiating element and a connected second conductor. The first antenna further includes a coupling conductor coupling the second radiating element and the first conductor. The first antenna further includes a first coupler having a first signal conductor and a second signal conductor. The first signal conductor is coupled to the second conductor, and the second signal conductor is coupled to the first radiating element.



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(19) **United States**

(12) **Patent Application Publication**

Choudhury

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(43) **Pub. Date: Aug. 26, 2010**

(54) **CMOS IC AND HIGH-GAIN ANTENNA INTEGRATION FOR POINT-TO-POINT WIRELESS COMMUNICATION**

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(21) Appl. No.: **12/775,137**

(22) Filed: **May 6, 2010**

Related U.S. Application Data

(62) Division of application No. 11/807,987, filed on May 31, 2007, now Pat. No. 7,737,894.

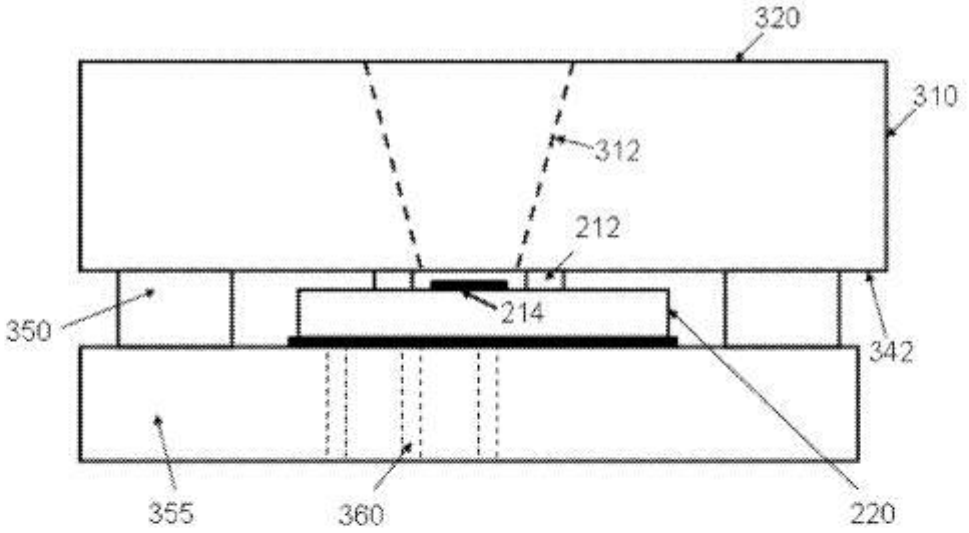
Publication Classification

(51) **Int. Cl.**
H01Q 13/02 (2006.01)

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

(57) **ABSTRACT**

A point-to-point radio communications device, with an integrated antenna-IC module, includes highly-directional antenna elements and silicon CMOS-based ICs in plastic packaging material. The high-gain horn-type antenna includes two sections made of molded plastic and covered in a metallic coating. When combined, the two sections form an aperture and an opening on a face. The face of the antenna element can be mounted directly to an integrated circuit with an antenna coupling element, such that the aperture forms a horn-IC module. The module can be completely enclosed in a plastic-packaging environment using low-cost approach. The antenna-IC module can be manufactured as an integral part of a case for a point-to-point wireless electronic device such as a mobile video phone or a set-top box with tens of gigabits of video downloading capability.



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(19) **United States**

(12) **Patent Application Publication**

Furutani et al.

(10) **Pub. No.: US 2010/0214188 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA AND ELECTRONIC DEVICE EQUIPPED WITH THE SAME**

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(21) Appl. No.: **12/696,527**

(22) Filed: **Jan. 29, 2010**

(30) **Foreign Application Priority Data**

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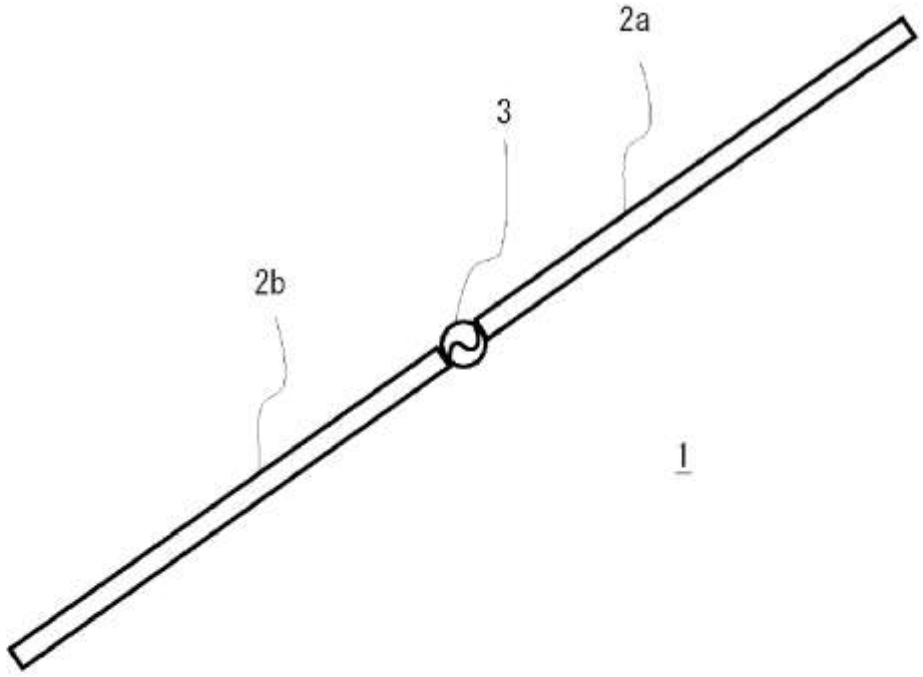
Publication Classification

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

(52) **U.S. Cl.** **343/793**

(57) **ABSTRACT**

An antenna includes a dielectric substrate, a ground electrode provided on a first surface of the dielectric substrate, a first antenna element and a second antenna elements provided to a second surface of the dielectric substrate, the first and second antenna elements having an identical resonance frequency and an identical Q value, a transmission line connecting the first and second antenna elements, and a feed part provided in the transmission line.



US 20100214190A1

(19) **United States**

(12) **Patent Application Publication**

Shin et al.

(10) **Pub. No.: US 2010/0214190 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA HAVING A CHOKE MEMBER**

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(21) Appl. No.: **12/681,595**

(22) PCT Filed: **Oct. 19, 2007**

(86) PCT No.: **PCT/KR07/05139**

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(2), (4) Date: **Apr. 2, 2010**

(30) **Foreign Application Priority Data**

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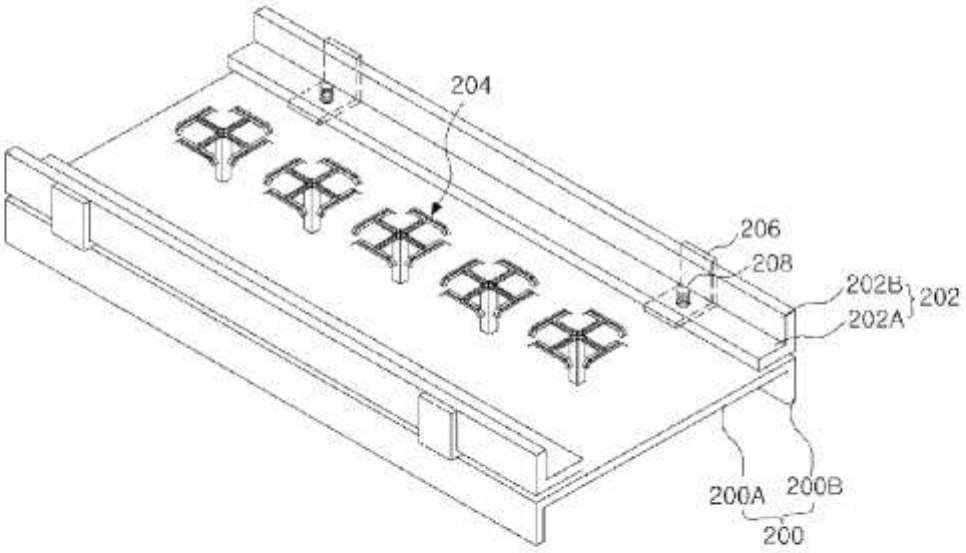
Publication Classification

(51) **Int. Cl.**
H01Q 19/10 (2006.01)

(52) **U.S. Cl.** **343/834**

(57) **ABSTRACT**

An antenna for enhancing characteristic of a beam with reducing PIMD is disclosed. The antenna includes a reflection plate, at least one first choke member disposed on one side of the reflection plate, an insulated member disposed between the reflection plate and the first choke member, thereby separating the first choke member from the reflection plate, wherein the insulated member is an insulator, and a connection member configured to connect electrically the first choke member to the reflection plate through the insulated member, wherein the connection member is a conductor.



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(19) **United States**

(12) **Patent Application Publication**

Teng et al.

(10) **Pub. No.: US 2010/0214191 A1**

(43) **Pub. Date: Aug. 26, 2010**

(54) **ANTENNA WITH DOUBLE GROUNDINGS**

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(21) Appl. No.: **12/484,252**

(22) Filed: **Jun. 15, 2009**

(30) **Foreign Application Priority Data**

Feb. 23, 2009 (TW) 98105651

Publication Classification

(51) **Int. Cl.**
H01Q 1/48 (2006.01)
H01Q 9/00 (2006.01)

(52) **U.S. Cl.** **343/843**; 343/845

(57) **ABSTRACT**

An antenna with double groundings, including a body part, a feeding part, a first grounding part, and a second grounding part, is provided. The body part is electrically connected to the feeding part, the first grounding part, and the second grounding part respectively. The body part is corresponding to a resonance length to transmit and receive a radiation wave with a wavelength at an operating frequency. Wherein, a current path from the first grounding part to the feeding part along the body part is ½ times of the wavelength at the operating frequency, and a relative distance between the second grounding part and the first grounding part is ¼ times of the wavelength at the operating frequency.