



US 20090115664A1

(19) **United States**

(12) **Patent Application Publication**
Chung et al.

(10) **Pub. No.: US 2009/0115664 A1**
(43) **Pub. Date: May 7, 2009**

(54) **PLANAR INVERTED-F ANTENNA WITH
EXTENDED GROUNDING PLANE**

Publication Classification

(76) Inventors: **Shyh-Jong Chung**, Hsinchu City
(TW); **Ching-Wei Ling**, Sinhua
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Cheng**, Taipei City (TW)

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.** **343/700 MS; 343/848**
(57) **ABSTRACT**

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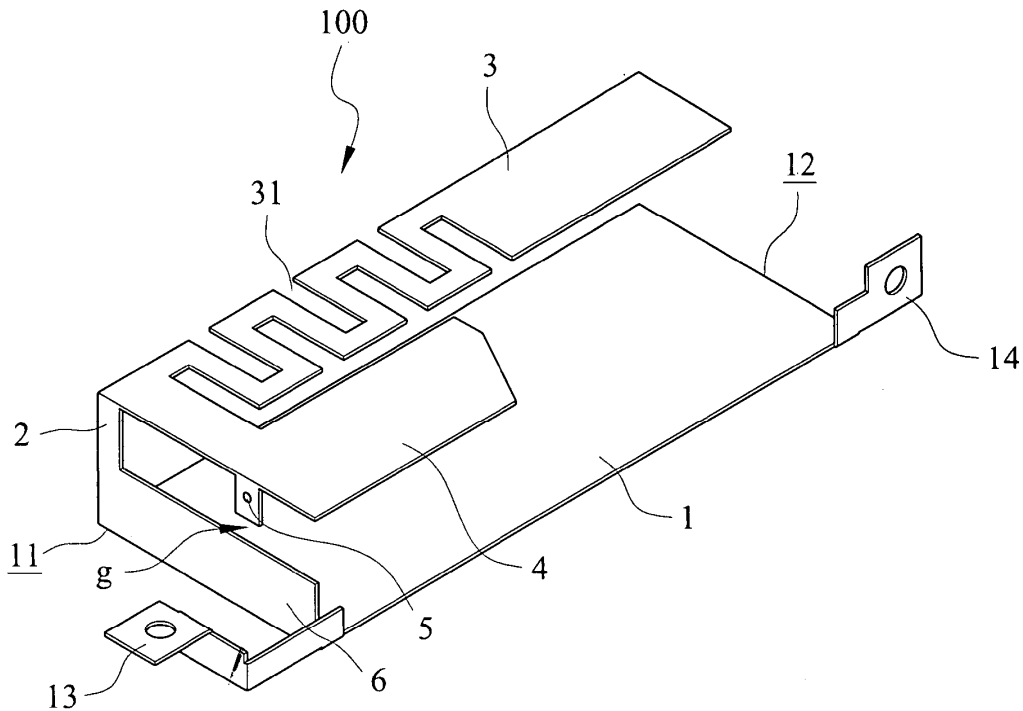
Disclosed is a planar inverted-F antenna with an extended grounding plane. The planar inverted-F antenna has a grounding metal plate having a selected side edge on which the extended grounding plane is formed and has a predetermined height. At least one antenna signal radiating plate is connected to the grounding metal plate by a short-circuit piece and is substantially parallel to and spaced from the grounding metal plate by a distance. A feeding point extends from the antenna signal radiating plate in a direction toward the grounding metal plate and corresponds to the extended grounding plane with a predetermined gap therebetween. With the arrangement of the extended grounding plane, the impedance matching of the antenna is improved and the impedance bandwidth of the antenna is increased.

(21) Appl. No.: **12/153,738**

(22) Filed: **May 23, 2008**

(30) **Foreign Application Priority Data**

Nov. 5, 2007 (TW) 96141721





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(19) **United States**

(12) **Patent Application Publication**
Hung et al.

(10) **Pub. No.: US 2009/0115665 A1**

(43) **Pub. Date: May 7, 2009**

(54) **MULTI-BAND ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Chen-Ta Hung**, Tu-cheng (TW);
Yun-Lung Ke, Tu-cheng (TW);
Po-Kang Ku, Tu-cheng (TW)

Nov. 5, 2007 (TW) 96141630

Publication Classification

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

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

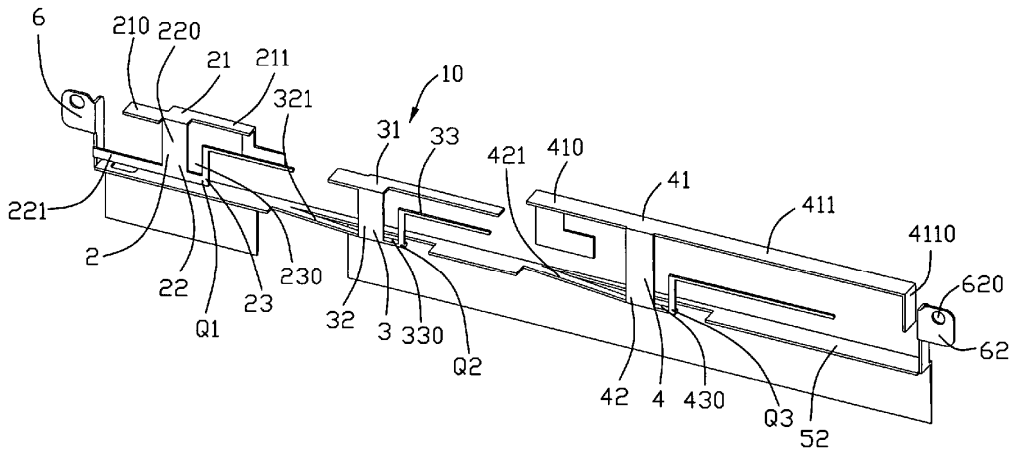
(57) **ABSTRACT**

A multi-band antenna, being made from an integrated metal patch, includes a grounding element, a first antenna and a second antenna, both of which are works in wireless local area net, and a third antenna working in wireless wide area net. The first, second, and third antennas extends from the grounding element and substantially along a lengthwise direction.

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

(21) Appl. No.: **12/291,139**

(22) Filed: **Nov. 5, 2008**





US 20090115668A1

(19) **United States**

(12) **Patent Application Publication**
Abe

(10) **Pub. No.: US 2009/0115668 A1**

(43) **Pub. Date: May 7, 2009**

(54) **WIRELESS COMMUNICATION TERMINAL**

(30) **Foreign Application Priority Data**

(75) Inventor: **Yasuhiro Abe, Kanagawa (JP)**

Oct. 28, 2005 (JP) 2005-314318

Publication Classification

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LOS ANGELES, CA 90067 (US)

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

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

(57) **ABSTRACT**

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

A wireless communication terminal comprises: a first circuit board 22 to which a reference potential pattern 32 is provided and an electric component is arranged; a case body 24 attached to the first circuit board 22 and including a conducting portion 38 which is electrically conducted to the reference potential pattern and covers the electronic component in a state where the case body is attached and a non-conducting portion 40 including no electric conductivity; and a housing 8 which houses therein the first circuit board 22 and the case body 24. An antenna 50 is formed on the non-conducting portion 40 and the antenna 50 is insulated from the conducting portion 38 and electric power is supplied to the antenna 50 from the first circuit board 22.

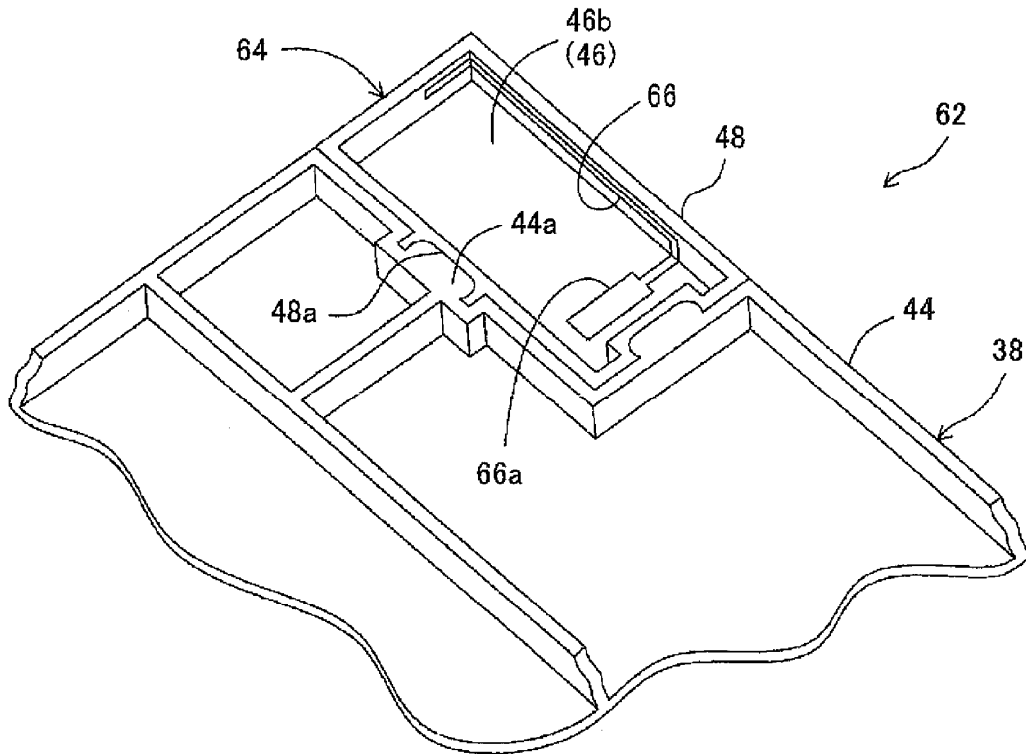
(21) Appl. No.: **12/091,873**

(22) PCT Filed: **Oct. 25, 2006**

(86) PCT No.: **PCT/JP2006/321281**

§ 371 (c)(1),
(2), (4) Date:

Apr. 28, 2008





US 20090115669A1

(19) **United States**

(12) **Patent Application Publication**
CHENG

(10) **Pub. No.: US 2009/0115669 A1**

(43) **Pub. Date: May 7, 2009**

(54) **WIRELESS COMMUNICATION DEVICE**

Publication Classification

(75) Inventor: **Mei-Lan CHENG**, Taoyuan Hsien
(TW)

(51) **Int. Cl.**
H01Q 1/40 (2006.01)
H01Q 1/24 (2006.01)

Correspondence Address:
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(52) **U.S. Cl.** **343/702; 343/873**

(57) **ABSTRACT**

A wireless communication device includes a housing and an antenna unit. The antenna unit is disposed on the outer or inner surface of the housing. A protective layer is optionally disposed to cover the outer surface of the antenna unit and, even more, at least a portion of the housing. Thus, the antenna unit separated from the circuit board does not occupy the layout region of the circuit board, so that the layout region of the circuit board can be used for other purposes. Moreover, the antenna unit formed on the housing can enhance the performance of the wireless communication device for transceiving signals.

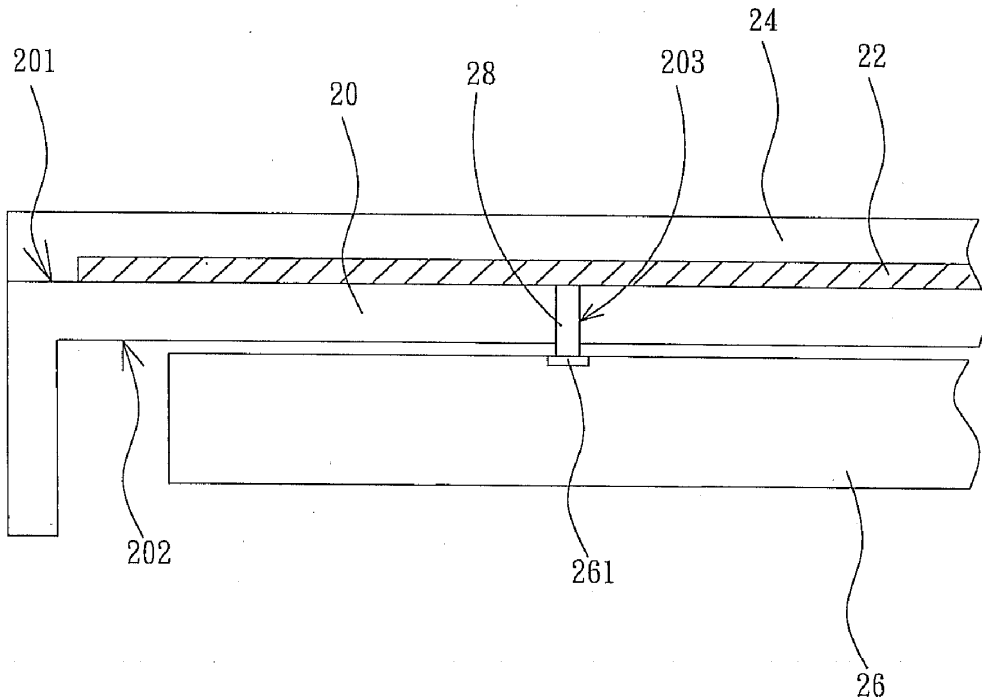
(73) Assignee: **DELTA ELECTRONICS, INC.**

(21) Appl. No.: **12/140,552**

(22) Filed: **Jun. 17, 2008**

(30) **Foreign Application Priority Data**

Nov. 2, 2007 (TW) 096141539





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(19) **United States**

(12) **Patent Application Publication**
Nysen

(10) **Pub. No.: US 2009/0115670 A1**

(43) **Pub. Date: May 7, 2009**

(54) **ANTENNA CONFIGURATIONS FOR
COMPACT DEVICE WIRELESS
COMMUNICATION**

Publication Classification

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

(75) **Inventor: Paul A. Nysen, Pala, CA (US)**

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

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(57) **ABSTRACT**

(73) **Assignee: SIERRA WIRELESS, INC.,
Richmond (CA)**

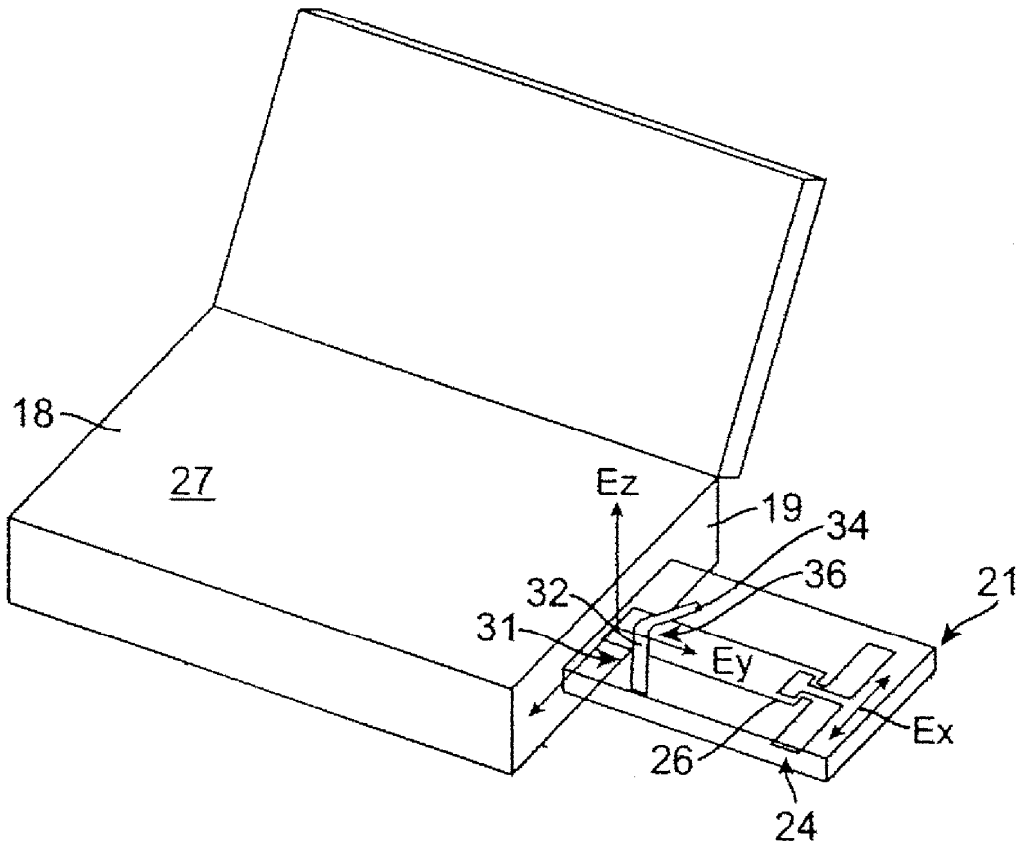
A wireless communication device is configured to provide wireless communication to a host device when disposed in a mated position with the host device such that a housing of the wireless communication device extends a distance L_{id} from a face of the host device. The wireless communication device includes a transceiver, a controller in communication with the transceiver, and a modem in communication with the controller. The wireless communication device also includes a dipole antenna having a dipole effective current axis I_x for a selected wavelength λ in the mated position that is at a distance from the face of the host device that is in the range of about 0.09λ to about 0.25λ .

(21) **Appl. No.: 12/203,892**

(22) **Filed: Sep. 3, 2008**

Related U.S. Application Data

(60) **Provisional application No. 60/967,449, filed on Sep. 4, 2007.**





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(19) **United States**

(12) **Patent Application Publication**
Ishihara et al.

(10) **Pub. No.: US 2009/0115671 A1**

(43) **Pub. Date: May 7, 2009**

(54) **ANTENNA DEVICE AND WIRELESS COMMUNICATION APPARATUS INCLUDING THE SAME**

Publication Classification

(76) Inventors: **Takashi Ishihara**, Ishikawa-ken (JP); **Jin Sato**, Beijing (CN); **Yuji Kaminishi**, Ishikawa-ken (JP); **Shigekazu Ito**, Hakusan-shi (JP)

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/24 (2006.01)
(52) **U.S. Cl.** **343/702; 343/700 MS**

(57) **ABSTRACT**

A non-feeding element is provided with a proximity-providing gap from a feeding element that receives RF power from a feeding point on a circuit board, and a resonant state is generated there by capacitive coupling. The non-feeding element is formed so as to resonate at a frequency different from a resonant frequency of the feeding element. The feeding element and the non-feeding element have alongside-ground-terminal extending portions formed so as to be spaced from an edge surface (a ground terminal) at one end of a ground surface formed on the circuit board and to extend in a direction along the edge surface at the one end of the ground surface. At least one of the feeding element and the non-feeding element is formed three-dimensionally with a plurality of bending portions so that at least parts of the alongside-ground-terminal extending portion of the feeding element and the ground-terminal extending portion of the non-feeding element have substantially the same amount of spacing from the ground surface, with a mutual gap in a thickness direction of the circuit board.

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NEW YORK, NY 100368403

(21) Appl. No.: **12/266,099**

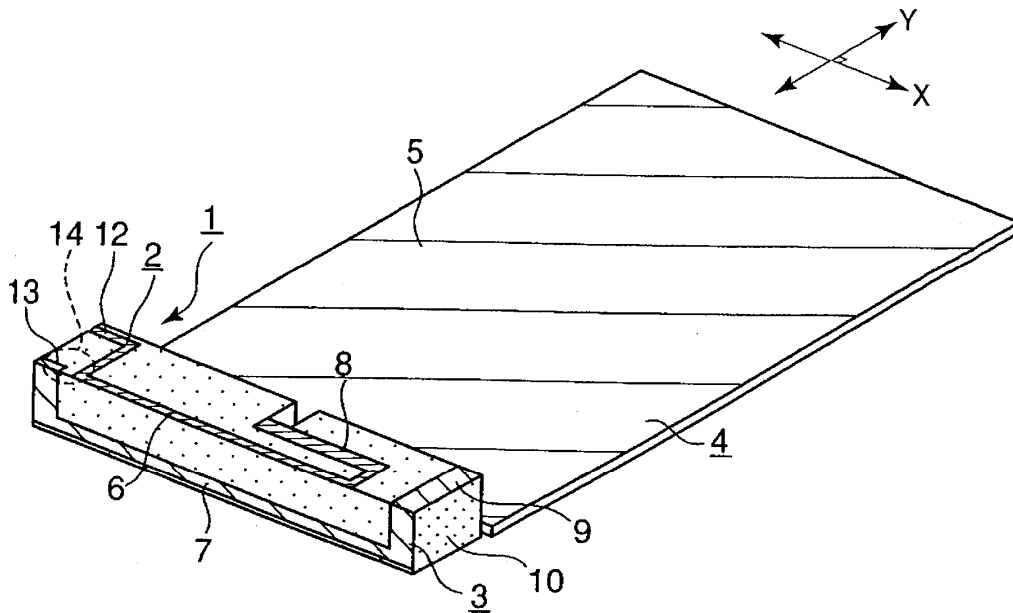
(22) Filed: **Nov. 6, 2008**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2007/056068, filed on Mar. 23, 2007.

Foreign Application Priority Data

(30) May 11, 2006 (JP) 2006-132803





US 20090115672A1

(19) **United States**

(12) **Patent Application Publication**
Nysen

(10) **Pub. No.: US 2009/0115672 A1**

(43) **Pub. Date: May 7, 2009**

(54) **ANTENNA CONFIGURATIONS FOR
COMPACT DEVICE WIRELESS
COMMUNICATION**

Publication Classification

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

(75) Inventor: **Paul A. Nysen, Pala, CA (US)**

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

Correspondence Address:
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200 Page Mill Road
Palo Alto, CA 94306 (US)

(57) **ABSTRACT**

(73) Assignee: **SIERRA WIRELESS, INC.,**
Richmond (CA)

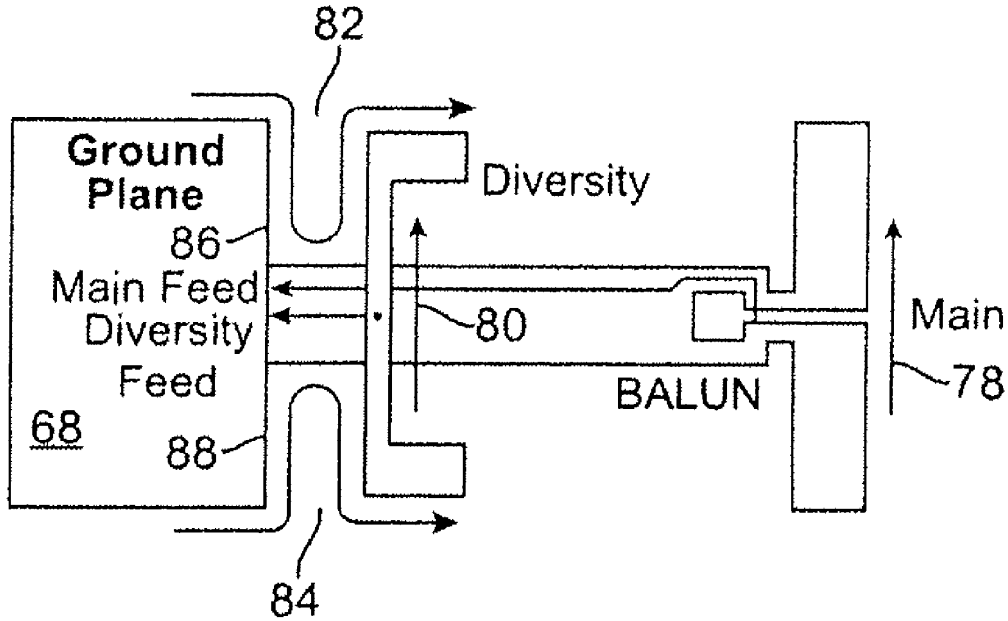
A diversity antenna for use with a portable host device such as a laptop computer, for example as part of a PCMCIA card pluggable into the laptop computer to enable wireless computer by the laptop computer, includes a main antenna and a diversity antenna. Various configurations for these antennas are possible, including the use of a balanced dipole as the main antenna element and a split diversity antenna for the diversity antenna element. The diversity antenna provides high isolation between the antenna elements and isolation from interfering self-noise generated by the host device.

(21) Appl. No.: **12/203,875**

(22) Filed: **Sep. 3, 2008**

Related U.S. Application Data

(60) Provisional application No. 60/967,449, filed on Sep. 4, 2007.





US 20090115673A1

(19) **United States**

(12) **Patent Application Publication**
Nysen

(10) **Pub. No.: US 2009/0115673 A1**

(43) **Pub. Date: May 7, 2009**

(54) **ANTENNA CONFIGURATIONS FOR
COMPACT DEVICE WIRELESS
COMMUNICATION**

Publication Classification

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

(75) **Inventor: Paul A. Nysen, Pala, CA (US)**

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

Correspondence Address:
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(57) **ABSTRACT**

(73) **Assignee: SIERRA WIRELESS, INC.,
Richmond (CA)**

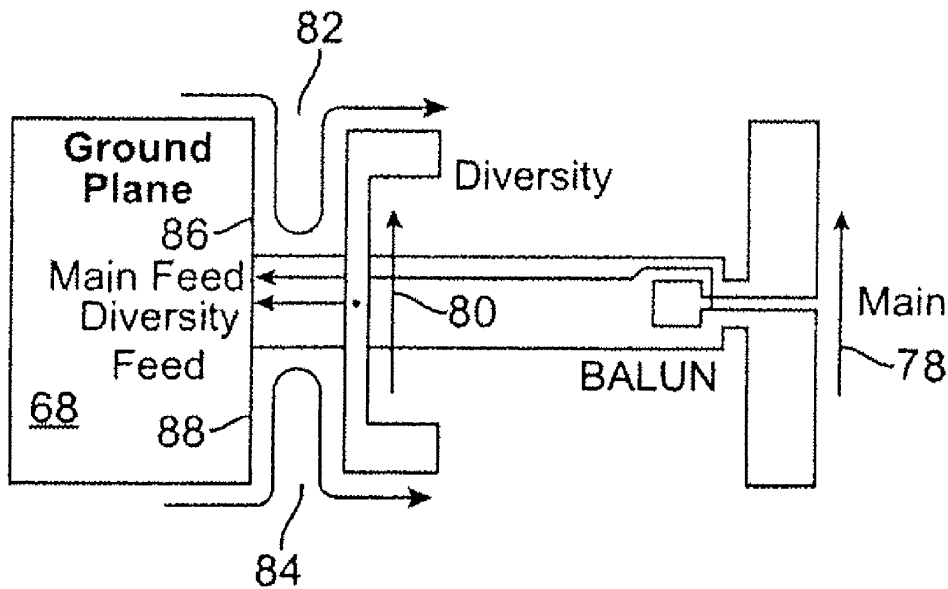
A diversity antenna for use with a portable host device such as a laptop computer, for example as part of a PCMCIA card pluggable into the laptop computer to enable wireless computer by the laptop computer, includes a main antenna and a diversity antenna. Various configurations for these antennas are possible, including the use of a balanced dipole as the main antenna element and a split diversity antenna for the diversity antenna element. The diversity antenna provides high isolation between the antenna elements and isolation from interfering self-noise generated by the host device.

(21) **Appl. No.: 12/203,882**

(22) **Filed: Sep. 3, 2008**

Related U.S. Application Data

(60) **Provisional application No. 60/967,449, filed on Sep. 4, 2007.**





US 20090115674A1

(19) **United States**

(12) **Patent Application Publication**
Fujieda et al.

(10) **Pub. No.: US 2009/0115674 A1**

(43) **Pub. Date: May 7, 2009**

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

Publication Classification

(76) Inventors: **Shigeyuki Fujieda**, Hakusan-shi (JP); **Kazunari Kawahata**, Yokohama-shi (JP); **Kenichi Ishizuka**, Yokohama-shi (JP)

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

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

(57) **ABSTRACT**

An antenna device and a wireless communication apparatus that are capable of obtaining a plurality of resonant frequencies and varying the plurality of resonant frequencies over a wide range are provided. A first antenna unit of an antenna device includes a feed electrode, a first radiation electrode, and a first frequency-variable circuit. The first frequency-variable circuit includes first and second reactance circuits each including a variable-capacitance diode. A control voltage is applied to the first frequency-variable circuit, and the resonant frequency of the first antenna unit can thus be varied. A second antenna unit includes the feed electrode, a second radiation electrode, and a second frequency-variable circuit. The second frequency-variable circuit includes first and third reactance circuits each including a variable-capacitance diode. A control voltage is applied to the second frequency-variable circuit, and the resonant frequency of the second antenna unit can thus be varied.

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(21) Appl. No.: **12/352,888**

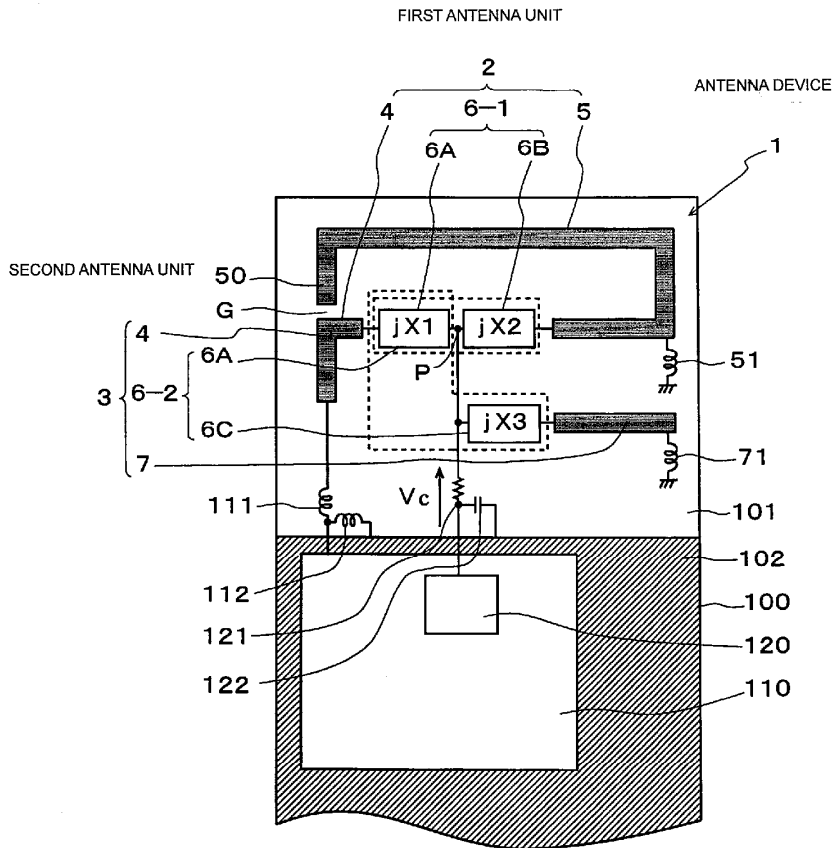
(22) Filed: **Jan. 13, 2009**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2007/058312, filed on Apr. 17, 2007.

(30) **Foreign Application Priority Data**

Jul. 13, 2006 (JP) JP2006-192433





US 20090115679A1

(19) **United States**

(12) **Patent Application Publication**
Chou et al.

(10) **Pub. No.: US 2009/0115679 A1**

(43) **Pub. Date: May 7, 2009**

(54) **DUAL-BAND DIPOLE ANTENNA**

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

(76) **Inventors:** Jui-Hung Chou, Taichung City (TW); Saou-Wen Su, Hsinchu (TW)

(57) **ABSTRACT**

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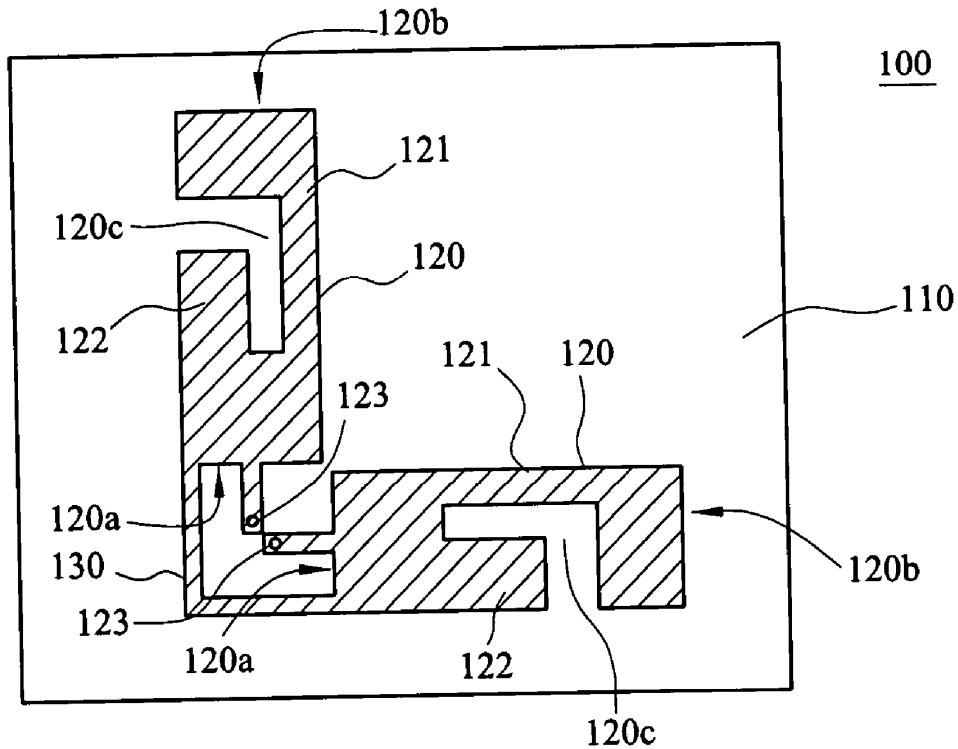
A dual-band dipole antenna includes two radiating arms and a short-circuited element. The two radiating arms and the short-circuited element are formed monolithically. Each radiating arm has a feed-in end and a radiating end. Each radiating arm has a slot that divides the radiating arm into a first radiating portion and a second radiating portion. The resonant frequencies of the first radiating portion and the second radiating portion are different to radiate/receive wireless signals in two frequencies respectively. The short-circuited element is connected to the feed-in end of each radiating arm, so as to electrically connect the two radiating arms. The short-circuited element also makes an included angle formed between the two radiating arms, so as to obtain the effect of dipole gains of the radio waves transferred or received by the two radiating arms.

(21) **Appl. No.:** 11/979,649

(22) **Filed:** Nov. 7, 2007

Publication Classification

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





US 20090115683A1

(19) **United States**

(12) **Patent Application Publication**
Kurashima et al.

(10) **Pub. No.: US 2009/0115683 A1**

(43) **Pub. Date: May 7, 2009**

(54) **MOUNTING STRUCTURE OF ANTENNA DEVICE**

(22) Filed: **Apr. 18, 2008**

(75) Inventors: **Shigemi Kurashima**, Shinagawa (JP); **Masahiro Yanagi**, Shinagawa (JP); **Takashi Yuba**, Shinagawa (JP); **Satoshi Sakurai**, Shinagawa (JP); **Takashi Arita**, Shinagawa (JP)

(30) **Foreign Application Priority Data**

Nov. 5, 2007 (JP) 2007-286944

Publication Classification

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

(52) **U.S. Cl.** **343/878**

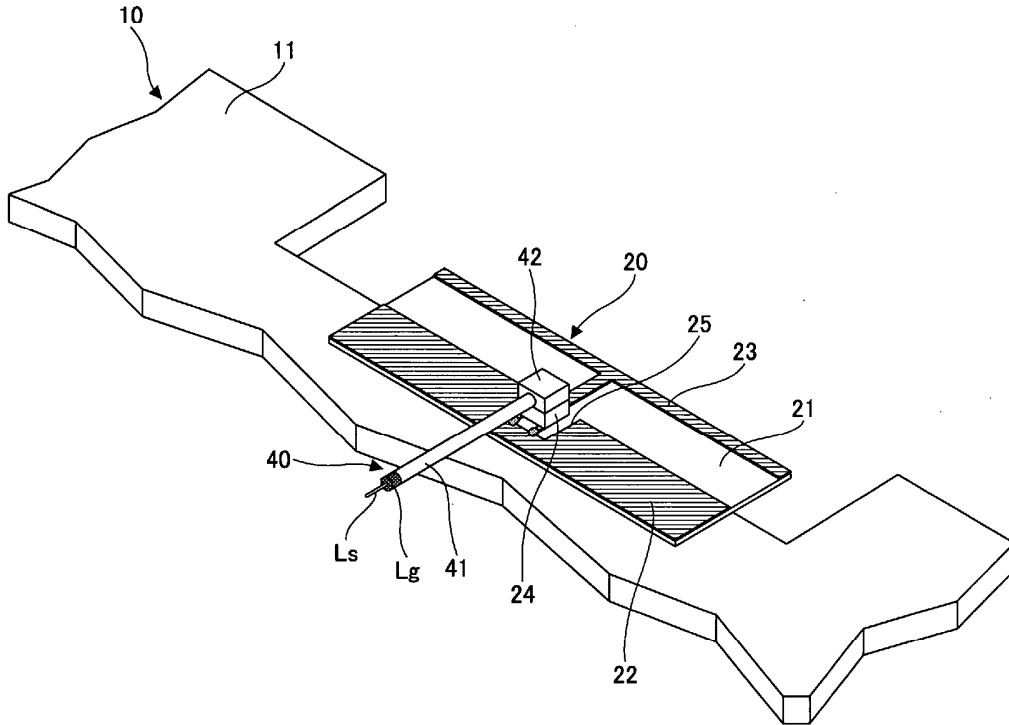
Correspondence Address:
STAAS & HALSEY LLP
SUITE 700, 1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005 (US)

(57) **ABSTRACT**

A mounting structure of an antenna device for mounting the antenna device composed of a ground part and an element part on an electronic apparatus is disclosed. The ground part is mounted on the electronic apparatus so as to be substantially overlapped with a conductive part of the electronic apparatus.

(73) Assignee: **FUJITSU COMPONENT LIMITED**, Tokyo (JP)

(21) Appl. No.: **12/081,685**





US 20090115685A1

(19) **United States**

(12) **Patent Application Publication**
Chung et al.

(10) **Pub. No.: US 2009/0115685 A1**

(43) **Pub. Date: May 7, 2009**

(54) **DUAL BAND HELICAL ANTENNA WITH WIDE BANDWIDTH**

Publication Classification

(76) Inventors: **Shyh-Jong Chung**, Hsinchu City (TW); **Yu-Hsin Wang**, Taichung City (TW); **Yu-Chiang Cheng**, Taipei City (TW)

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

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

(57) **ABSTRACT**

Correspondence Address:
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3458 ELLICOTT CENTER DRIVE-SUITE 101
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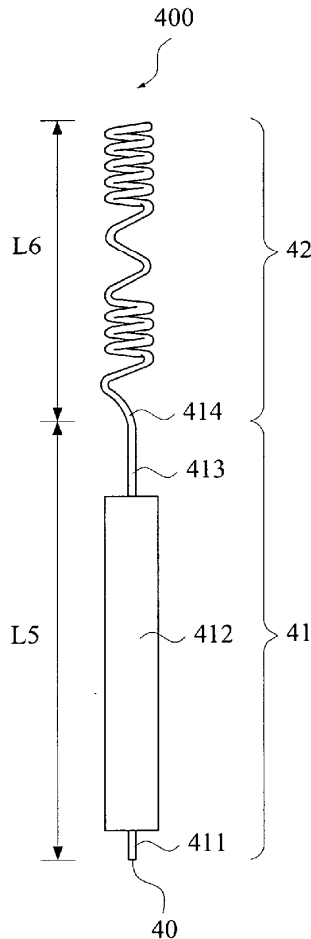
A dual band helical antenna with wide bandwidth includes a straight section and a helical tail section having a first and a second coil length, respectively. The straight section has a signal feed point located at a lower end thereof being connected to a signal source for feeding in an antenna signal. The first coil length determines a high-frequency resonant frequency of the dual band helical antenna, and a total length of the first and the second coil length determines a low-frequency resonant frequency of the dual band helical antenna. The straight section includes a diametrically expanded section to increase a high-frequency bandwidth of the dual band helical antenna.

(21) Appl. No.: **12/155,022**

(22) Filed: **May 29, 2008**

(30) **Foreign Application Priority Data**

Nov. 5, 2007 (TW) 96141720





US 20090121941A1

(19) **United States**

(12) **Patent Application Publication**
Tsai et al.

(10) **Pub. No.: US 2009/0121941 A1**

(43) **Pub. Date: May 14, 2009**

(54) **ANTENNA STRUCTURE**

Publication Classification

(76) Inventors: **Feng-Chi Eddie Tsai**, Taipei Hsien (TW); **Yu-Chuan Su**, Taipei Hsien (TW); **Yuan-Li Chang**, Taipei Hsien (TW)

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

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

Correspondence Address:
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION
P.O. BOX 506
MERRIFIELD, VA 22116 (US)

(57) **ABSTRACT**

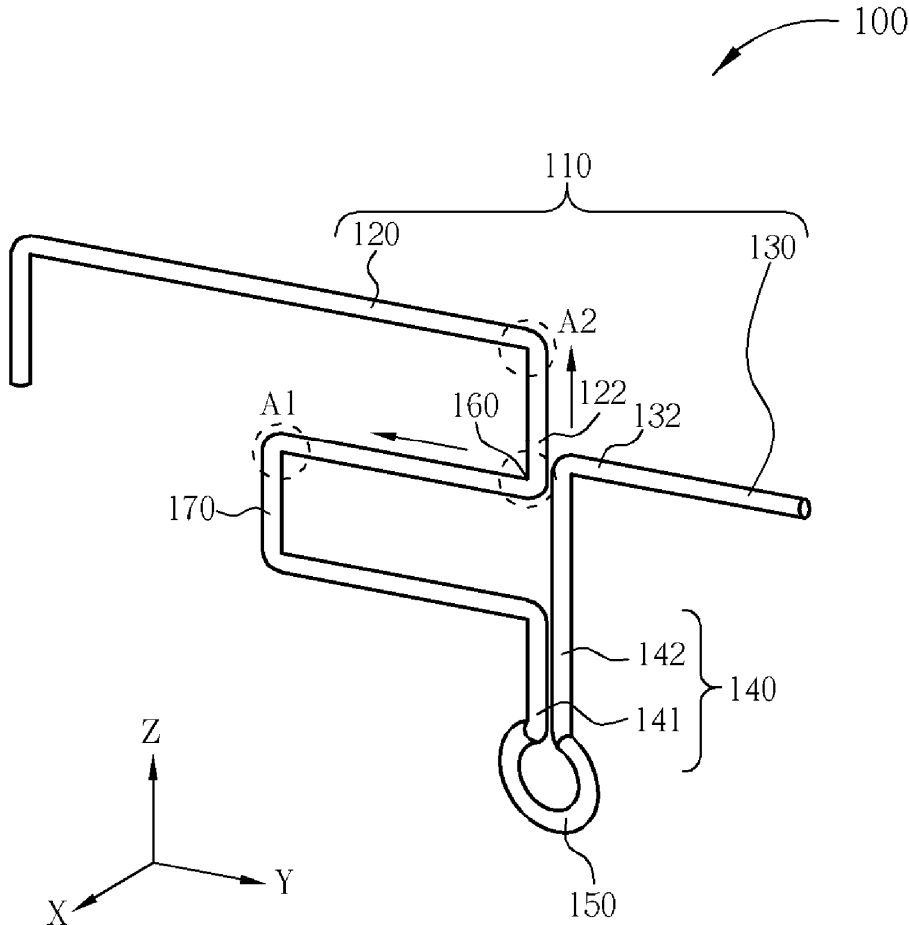
An antenna structure includes a radiation element, a grounding element, a feeding point, and a connection element. The radiation element includes a first radiator and a second radiator. The second radiator includes a first end close to a first end of the first radiator. The grounding element is coupled to the first end of the second radiator. The feeding point is coupled to the first end of the first radiator and is close to the first end of the second radiator. The connection element is coupled between the feeding point and the grounding element. The radiation element, the grounding element, the feeding point, and the connection element are constructed by metal wire.

(21) Appl. No.: **12/018,803**

(22) Filed: **Jan. 24, 2008**

(30) **Foreign Application Priority Data**

Nov. 14, 2007 (TW) 096142995





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(19) **United States**

(12) **Patent Application Publication**
SOTOUDEH

(10) **Pub. No.: US 2009/0121944 A1**

(43) **Pub. Date: May 14, 2009**

(54) **WIDEBAND ANTENNA**

Publication Classification

(75) Inventor: **Omid SOTOUDEH**, Upplands
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(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 1/24 (2006.01)
(52) **U.S. Cl.** **343/702; 343/867**

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HARRITY & HARRITY, LLP
11350 RANDOM HILLS ROAD, SUITE 600
FAIRFAX, VA 22030 (US)

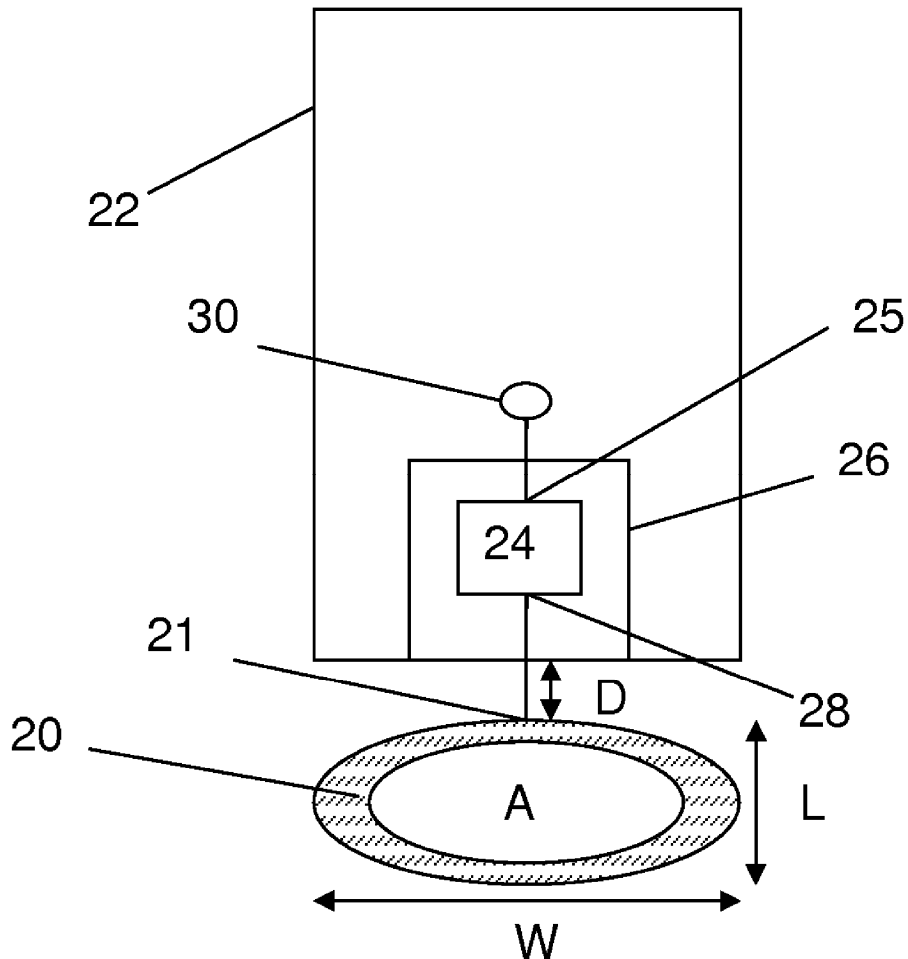
(57) **ABSTRACT**

The present invention relates to an antenna arrangement for a portable communication device as well as to such a portable communication device comprising such an antenna arrangement. The antenna arrangement includes at least one first loop antenna element provided in a loop structure. The loop structure includes at least one section shaped as a loop and each loop antenna element in the loop structure has only one connection point to be connected to a signal connection point of a radio circuit. The antenna arrangement also includes a planar antenna element for connection to a grounding connection point of the radio circuit. The loop structure is displaced from the planar antenna element in the plane in which this planar antenna element is provided.

(73) Assignee: **SONY ERICSSON MOBILE COMMUNICATIONS AB**, Lund (SE)

(21) Appl. No.: **11/936,975**

(22) Filed: **Nov. 8, 2007**





US 20090121952A1

(19) **United States**

(12) **Patent Application Publication**
Shibuya et al.

(10) **Pub. No.: US 2009/0121952 A1**

(43) **Pub. Date: May 14, 2009**

(54) **SLOT ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Yuzo Shibuya**, Kanagawa (JP);
Masayuki Sugano, Tokyo (JP)

Apr. 12, 2006 (JP) 2006-110265

Publication Classification

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

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

(73) Assignee: **JAPAN RADIO CO., LTD.**, Tokyo (JP)

(57) **ABSTRACT**

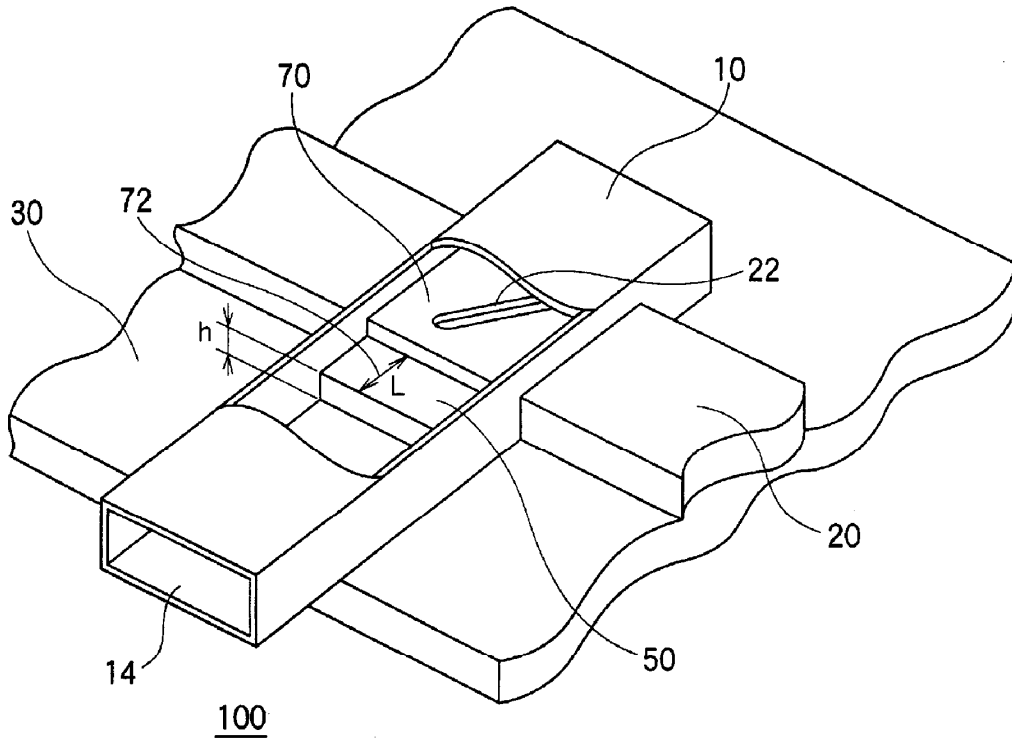
(21) Appl. No.: **12/296,763**

(22) PCT Filed: **Mar. 6, 2007**

(86) PCT No.: **PCT/JP2007/000172**

§ 371 (c)(1),
(2), (4) Date: **Dec. 5, 2008**

Impedance matching is achieved in a waveguide of a slot antenna, which is provided with an input waveguide that is fed power via an aperture plane; a stairway structure is provided in the input waveguide; the structure creates a step going upward toward a surface provided with a slot; the step difference and height of the step going upward are adjusted so that the impedance at a plane above the step and the impedance at the aperture plane match.





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(19) **United States**

(12) **Patent Application Publication**
Kaneko et al.

(10) **Pub. No.: US 2009/0121957 A1**

(43) **Pub. Date: May 14, 2009**

(54) **ANTENNA**

Jul. 5, 2005 (JP) 2005-196436
Sep. 26, 2005 (JP) 2005-277923

(75) Inventors: **Atsushi Kaneko, Saitama (JP);
Shuji Hagiwara, Saitama (JP)**

Publication Classification

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**SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213 (US)**

(51) **Int. Cl.**
H01Q 9/16 (2006.01)
H01Q 1/42 (2006.01)

(52) **U.S. Cl.** **343/795; 343/872**

(73) Assignee: **YAGI ANTENNA INC.,
Saitama-shi (JP)**

(57) **ABSTRACT**

(21) Appl. No.: **11/994,190**

(22) PCT Filed: **Mar. 15, 2006**

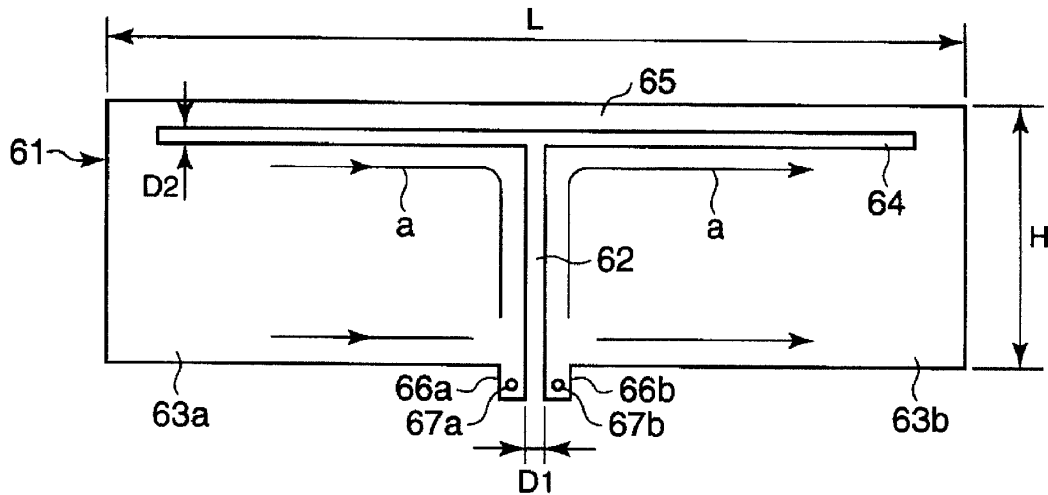
(86) PCT No.: **PCT/JP2006/305160**

§ 371 (c)(1),
(2), (4) Date: **Dec. 28, 2007**

A plate-shaped radiating element of a shape having at least three planes is formed by bending a metal plate having a substantially rectangular shape. A first slit is provided from a lower edge of the plate-shaped radiating element up to a portion in the vicinity of an upper edge of the plate-shaped radiating element while passing through a center point of the plate-shaped radiating element, and forms plate-shaped dipole elements on both sides thereof. A second slit is provided parallel to the upper edge of the plate-shaped radiating element and forms a folded element on an upper side thereof. Feeding points are provided on both sides of the first slit at the lower edge of the plate-shaped radiating element.

(30) **Foreign Application Priority Data**

Jun. 30, 2005 (JP) 2005-192060





US 20090121964A1

(19) **United States**

(12) **Patent Application Publication**
YAMADA et al.

(10) **Pub. No.: US 2009/0121964 A1**

(43) **Pub. Date: May 14, 2009**

(54) **ANTENNA DEVICE, RADIO TAG READER
AND ARTICLE MANAGEMENT SYSTEM**

(75) Inventors: **Akiko YAMADA**, Yokohama-Shi
(JP); **Shuichi SEKINE**, Tokyo (JP)

Correspondence Address:
**OBLON, SPIVAK, MCCLELLAND MAIER &
NEUSTADT, P.C.**
1940 DUKE STREET
ALEXANDRIA, VA 22314 (US)

(73) Assignee: **Kabushiki Kaisha Toshiba**, Tokyo
(JP)

(21) Appl. No.: **12/233,923**

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

(30) **Foreign Application Priority Data**

Nov. 9, 2007 (JP) 2007-292121

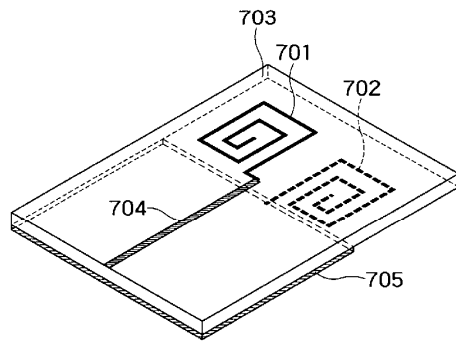
Publication Classification

(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 1/36 (2006.01)
G06K 7/00 (2006.01)

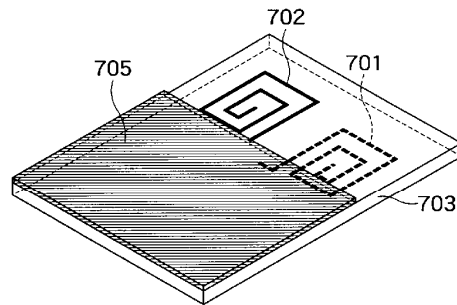
(52) **U.S. Cl. 343/866; 343/895; 235/439; 235/375**

(57) **ABSTRACT**

There is provided with an antenna device includes; a first antenna element which is either a spiral antenna element or a loop-like antenna element; and a first feed point provided at a first end of the first antenna element, the first end being an outer end of the spiral antenna element or an one end of the loop-like antenna element, wherein a length from an second end of the first antenna element to the first end of the first antenna element along the first antenna element is about one half wavelength of operating frequency, the second end being an inner end of the spiral antenna element or the other end of the loop-like antenna element.



(A) PERSPECTIVE VIEW (FRONT)



(B) PERSPECTIVE VIEW (REAR)



US 20090121966A1

(19) **United States**

(12) **Patent Application Publication**
Song et al.

(10) **Pub. No.: US 2009/0121966 A1**

(43) **Pub. Date: May 14, 2009**

(54) **MULTIMODE ANTENNA**

Publication Classification

(75) Inventors: **Jia-Jiu Song**, Taipei County (TW);
Mu-Kun Hsueh, Kaohsiung City (TW)

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 21/00 (2006.01)
(52) **U.S. Cl.** **343/893; 343/700 MS**

Correspondence Address:
APEX JURIS, PLLC
12733 LAKE CITY WAY NORTHEAST
SEATTLE, WA 98125 (US)

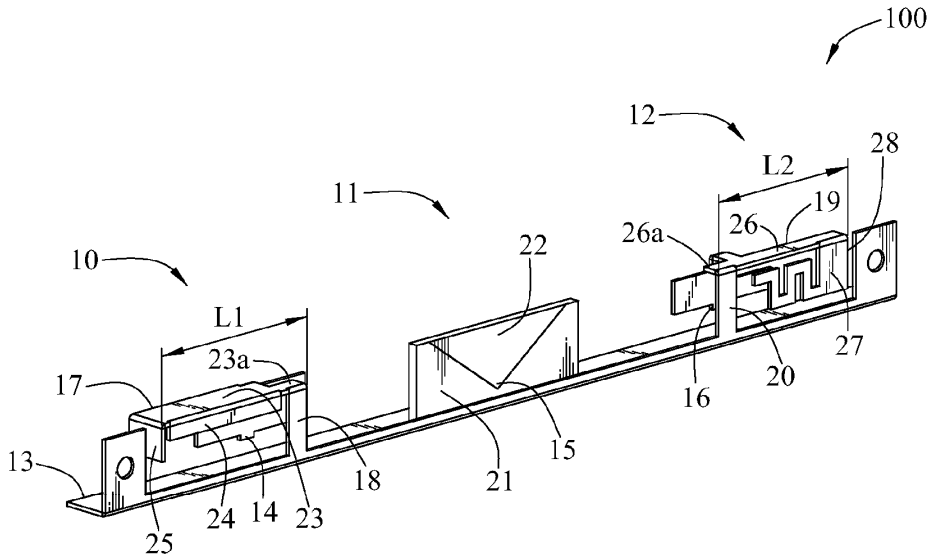
(57) **ABSTRACT**

A multimode antenna that integrates antennae of at least three modes includes antenna radiation elements of at least three modes and a common ground element. In conventional wireless communication devices, in order to achieve the multiplexing effect, a plurality of antennae is built therein, which cannot meet the requirements for both multiplexing and small size. The multimode antenna integrates antennae of a plurality of modes together and shares one ground element, which not only reduces the volume of the antenna, but also achieves a multimode antenna for a multiplex device.

(73) Assignee: **SmartAnt Telecom Co., Ltd.**,
Hsinchu County (TW)

(21) Appl. No.: **11/939,759**

(22) Filed: **Nov. 14, 2007**





US 20090122847A1

(19) **United States**

(12) **Patent Application Publication**
Nysen

(10) **Pub. No.: US 2009/0122847 A1**

(43) **Pub. Date: May 14, 2009**

(54) **ANTENNA CONFIGURATIONS FOR
COMPACT DEVICE WIRELESS
COMMUNICATION**

Related U.S. Application Data

(60) Provisional application No. 60/967,449, filed on Sep. 4, 2007.

(75) Inventor: **Paul A. Nysen, Pala, CA (US)**

Publication Classification

(51) **Int. Cl.**
H04B 1/38 (2006.01)
(52) **U.S. Cl.** 375/222

Correspondence Address:
Nixon Peabody LLP
200 Page Mill Road
Palo Alto, CA 94306 (US)

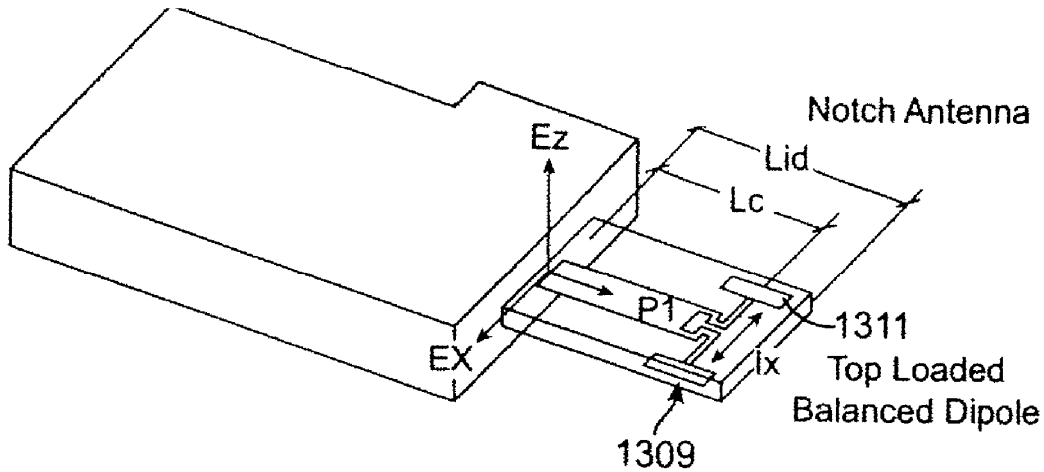
(57) **ABSTRACT**

A wireless communication device is configured to provide wireless communication to a host device when disposed in a mated position with the host device. The wireless communication device includes a transceiver, a controller in communication with the transceiver, and a modem in communication with the controller. The wireless communication device further includes a printed circuit board (PCB) having a first inductor loop, and an antenna having second inductor loop inductively coupled with the first inductor loop.

(73) Assignee: **SIERRA WIRELESS, INC.,
Richmond (CA)**

(21) Appl. No.: **12/203,898**

(22) Filed: **Sep. 3, 2008**





US 20090124215A1

(19) **United States**

(12) **Patent Application Publication**
Nysen

(10) **Pub. No.: US 2009/0124215 A1**

(43) **Pub. Date: May 14, 2009**

(54) **ANTENNA CONFIGURATIONS FOR
COMPACT DEVICE WIRELESS
COMMUNICATION**

Related U.S. Application Data

(60) Provisional application No. 60/967,449, filed on Sep. 4, 2007.

(75) Inventor: **Paul A. Nysen, Pala, CA (US)**

Publication Classification

(51) **Int. Cl.**
H04B 1/38 (2006.01)
(52) **U.S. Cl.** **455/90.1**

Correspondence Address:
Nixon Peabody LLP
200 Page Mill Road
Palo Alto, CA 94306 (US)

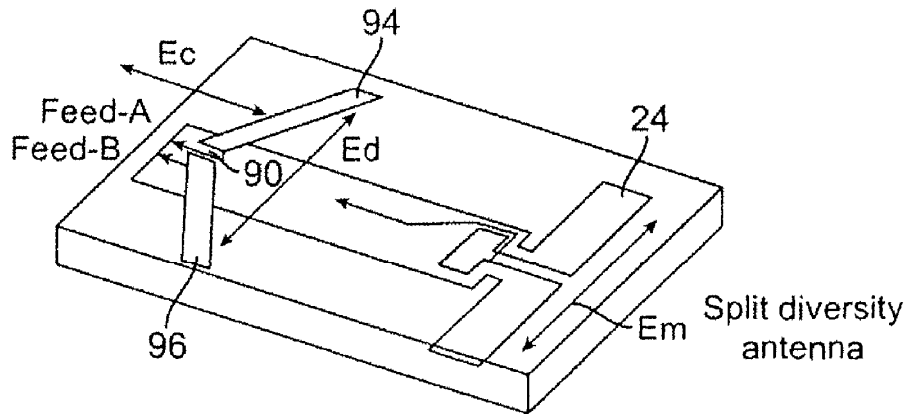
(57) **ABSTRACT**

(73) Assignee: **SIERRA WIRELESS, INC.,**
Richmond (CA)

A PC card is configured to provide wireless communication to a host device when disposed in a mated position with the host device, the PC card having an enclosure with a bottom surface. The PC card includes a transceiver, a controller in communication with the transceiver, and a modem in communication with the controller. The PC card also includes an antenna in which a high current region is established during communication, the high current region being raised above a feed plane coupled to the antenna.

(21) Appl. No.: **12/203,895**

(22) Filed: **Sep. 3, 2008**





US 20090128414A1

(19) **United States**

(12) **Patent Application Publication**
JENG

(10) **Pub. No.: US 2009/0128414 A1**

(43) **Pub. Date: May 21, 2009**

(54) **HIGH GAIN OMNI-DIRECTIONAL ANTENNA**

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

(75) **Inventor: Jr-Ren JENG, Taipei (TW)**

(57) **ABSTRACT**

Correspondence Address:

Workman Nydegger
1000 Eagle Gate Tower
60 East South Temple
Salt Lake City, UT 84111 (US)

(73) **Assignee: SMARTANT TELECOM CO., LTD., Jhudong Township (TW)**

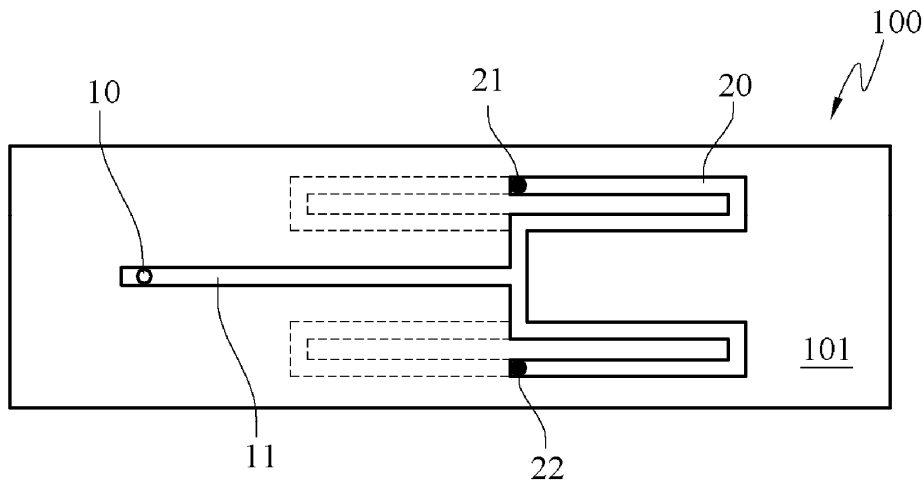
(21) **Appl. No.: 11/941,225**

(22) **Filed: Nov. 16, 2007**

Publication Classification

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

A high gain omni-directional antenna includes a substrate, a signal feed-in portion, a first radiating unit, and a second radiating unit. The first radiating unit and second radiating unit respectively have a first radiation contact and a second radiation contact, for connecting the first radiating unit and the second radiating unit in series so as to form a circular closed loop. The high gain omni-directional antenna avoids the coupling effect between the signal line and the radiating end of the conventional high gain omni-directional antenna, and further solves the problem of excessively high directivity caused by the distance between the signal line and the radiating end. The design of the ring antenna of the high gain omni-directional antenna can raise the impedance and also realize a broader bandwidth.





US 20090128415A1

(19) **United States**

(12) **Patent Application Publication**
SONG et al.

(10) **Pub. No.: US 2009/0128415 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ULTRA-WIDE-BAND ANTENNA**

Publication Classification

(75) Inventors: **Jia-Jiu SONG**, Jhonghe City (TW);
Mu-Kun HSUEH, Kaohsiung City (TW)

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

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

(57) **ABSTRACT**

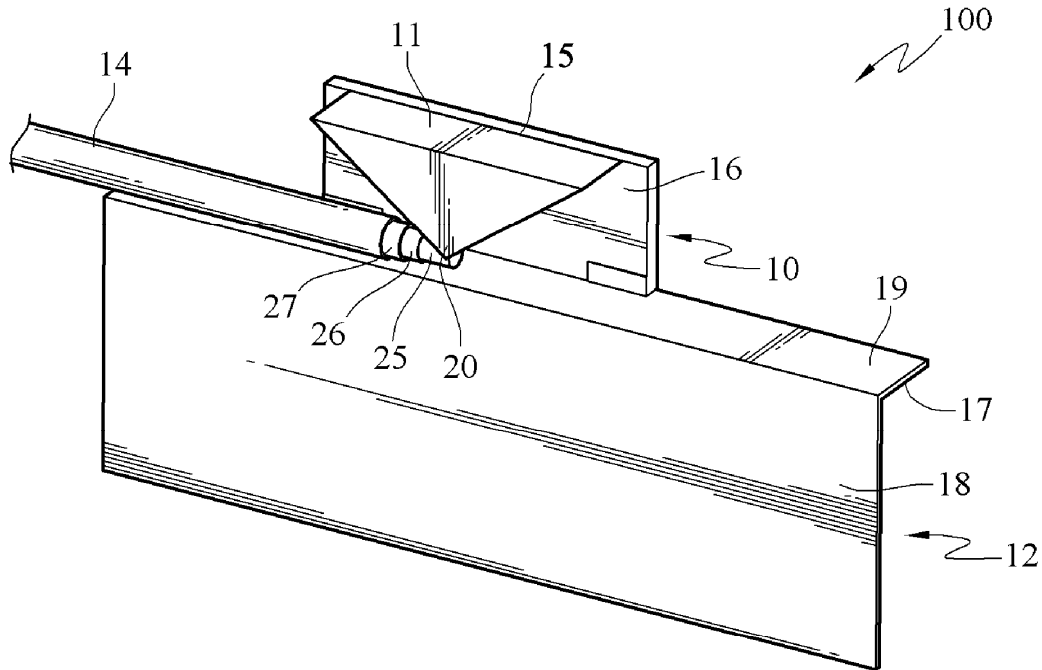
Correspondence Address:
Workman Nydegger
1000 Eagle Gate Tower
60 East South Temple
Salt Lake City, UT 84111 (US)

An ultra-wide-band antenna includes a radiation element, an insulating substrate, a ground element, and a signal line. The insulating substrate is fixed on the ground element, the radiation element is disposed on the insulating substrate for receiving and transmitting a radio signal; the signal line is connected to the radiation element and contacting the ground element for feeding a signal to the radiation element and receiving the radio signal received by the radiation element. The ground element is used to replace a large-area conductive plate of a conventional ultra-wide-band antenna, so as to reduce the volume of the ultra-wide-band antenna, and thus the ultra-wide-band antenna can be placed into an electronic device while occupying smaller space and capable of being miniaturized, thereby realizing a miniaturized ultra-wide-band electronic device.

(73) Assignee: **SMARTANT TELECOM CO., LTD.**, Jhudong Township (TW)

(21) Appl. No.: **11/941,245**

(22) Filed: **Nov. 16, 2007**





US 20090128416A1

(19) **United States**

(12) **Patent Application Publication**
CHENG

(10) **Pub. No.: US 2009/0128416 A1**

(43) **Pub. Date: May 21, 2009**

(54) **DUAL-BAND ANTENNA**

Publication Classification

(76) Inventor: **Pi-Hsi CHENG**, Hsinchu County
(TW)

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

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

(57) **ABSTRACT**

Correspondence Address:
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747 (US)

A dual-band antenna includes a first radiating unit, a second radiating unit, a micro-line unit and a grounding unit. The first radiating unit has a zigzag portion. The second radiating unit is connected with the first radiating unit and has a gap. The micro-line unit includes a first terminal, a second terminal and a feeding point. The first terminal is respectively connected with the first radiating unit and the second radiating unit. An acute angle is formed between the first radiating unit and the micro-line unit. The grounding unit is connected with the second terminal of the micro-line unit and has a grounding point.

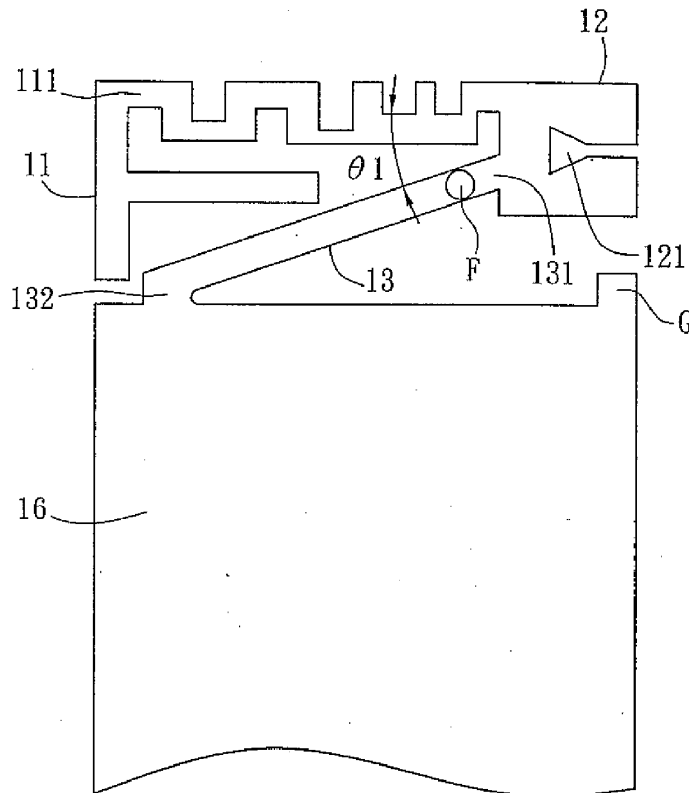
(21) Appl. No.: **12/058,237**

(22) Filed: **Mar. 28, 2008**

(30) **Foreign Application Priority Data**

Nov. 21, 2007 (TW) 096144185

1





US 20090128418A1

(19) **United States**

(12) **Patent Application Publication**
Shih

(10) **Pub. No.: US 2009/0128418 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ANTENNA**

Publication Classification

(75) Inventor: **Yen-Yi Shih, Tu-Cheng (TW)**

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

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

(57) **ABSTRACT**

Correspondence Address:
PCE INDUSTRY, INC.
ATT. Steven Reiss
458 E. LAMBERT ROAD
FULLERTON, CA 92835 (US)

An antenna (100) disposed on a first substrate (10) and a second substrate (20) includes a feeding portion (110) and a radiating portion (120). The feeding portion (110) is disposed on a first surface of the first substrate (10), for feeding electromagnetic signals. The radiating portion (120) connected to the feeding portion (110) for transceiving electromagnetic signals includes a first radiator (121), a second radiator (122) and a third radiator (123). The first radiator (121) is disposed on the first surface and connected to the feeding portion (110). The second radiator (122) is disposed on a second surface of the second substrate (20). The third radiator (123) includes a first cylinder portion (1231) and a second cylinder portion (1232) connected to the first cylinder portion (1231). The first cylinder portion (1231) and the second cylinder portion (1232) are connected to the first radiator (121) and the second radiator (122), respectively.

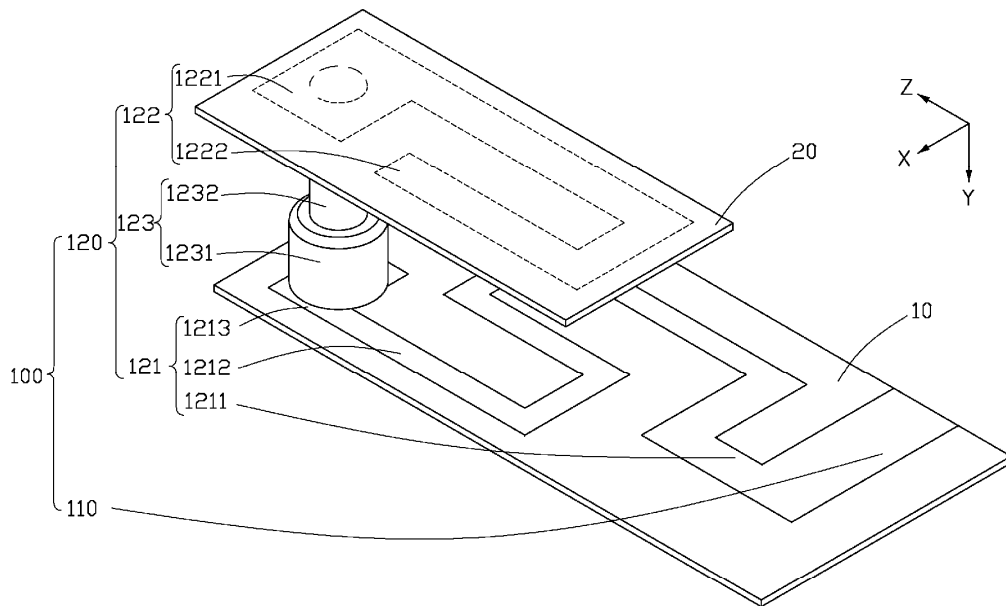
(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD., Tu-Cheng (TW)**

(21) Appl. No.: **12/164,129**

(22) Filed: **Jun. 30, 2008**

(30) **Foreign Application Priority Data**

Nov. 16, 2007 (CN) 200710202575.1





US 20090128419A1

(19) **United States**

(12) **Patent Application Publication**
Tseng et al.

(10) **Pub. No.: US 2009/0128419 A1**

(43) **Pub. Date: May 21, 2009**

(54) **MULTI-FREQUENCY ANTENNA**

Publication Classification

(75) Inventors: **Yi-Wei Tseng**, Taipei County (TW);
Tsung-Wen Chiu, Taipei County
(TW); **Fu-Ren Hsiao**, Taipei
County (TW); **Sheng-Chih Lin**,
Taipei County (TW)

(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 9/04 (2006.01)
(52) **U.S. Cl.** **343/700 MS**

(57) **ABSTRACT**

Correspondence Address:
SCHMEISER OLSEN & WATTS
18 E UNIVERSITY DRIVE, SUITE # 101
MESA, AZ 85201

The present invention discloses a multi-frequency antenna, which comprises a radiation conductor, a parasitic conductor, a feeder cable and a ground plane. The radiation conductor comprises a feeder member, a first radiation arm and a second radiation arm. The feeder cable comprises a central cable and an outer cable. The feeder member has a coupling side. The parasitic conductor is connected with the ground plane and has a coupling side arranged along the contour of the coupling side of the feeder member. The coupling side of the parasitic conductor and the coupling side of the feeder member have a gap there between. The first and second radiation arms excite a low-frequency resonant mode, and the parasitic conductor excites a high-frequency mode. Therefore, the multi-frequency antenna of the present invention not only covers several operational frequency bands and has a UWB feature, but also has a simplified structure.

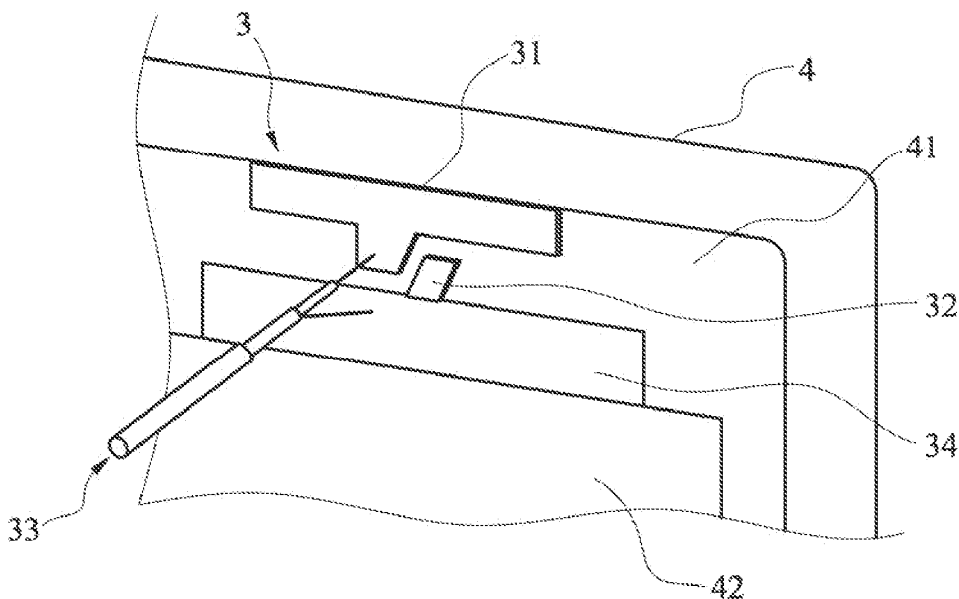
(73) Assignee: **ADVANCED CONNECTEK INC.**, Taipei County (TW)

(21) Appl. No.: **12/192,545**

(22) Filed: **Aug. 15, 2008**

(30) **Foreign Application Priority Data**

Nov. 16, 2007 (TW) 096143413





US 20090128420A1

(19) **United States**

(12) **Patent Application Publication**
Cheng et al.

(10) **Pub. No.: US 2009/0128420 A1**

(43) **Pub. Date: May 21, 2009**

(54) **DUAL BAND ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Pi-Hsi Cheng**, Hsinchu County (TW); **Chang-Jung Lee**, Taoyuan County (TW)

Nov. 16, 2007 (TW) 96143571

Publication Classification

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

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

(57) **ABSTRACT**

An antenna applied in a communication device is provided. The antenna includes a conductive supporting portion, a radiator and a grounding portion. The radiator operates in a first frequency band. The grounding portion is connected to the radiator through the conductive supporting portion. The grounding portion includes a cavity extended from a top surface of the grounding portion into the interior of the grounding portion. A resonant cavity operating in a second frequency band is formed between the radiator and the cavity.

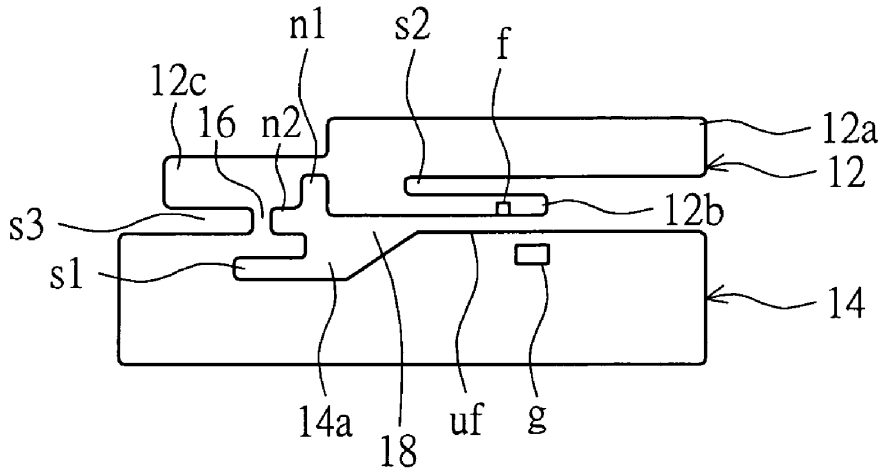
Correspondence Address:
BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314-1176 (US)

(73) Assignee: **Arcadyan Technology Corporation**, Hsinchu (TW)

(21) Appl. No.: **12/289,933**

(22) Filed: **Nov. 7, 2008**

10





US 20090128421A1

(19) **United States**

(12) **Patent Application Publication**
Su et al.

(10) **Pub. No.: US 2009/0128421 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ANTENNA DEVICE AND ANTENNA SYSTEM UTILIZING SAID ANTENNA DEVICE**

(30) **Foreign Application Priority Data**

Nov. 15, 2007 (TW) 096143256

(76) Inventors: **Saou-Wen Su**, Taipei City (TW);
Jui-Hung Chou, Tai-Chung City (TW)

Publication Classification

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

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

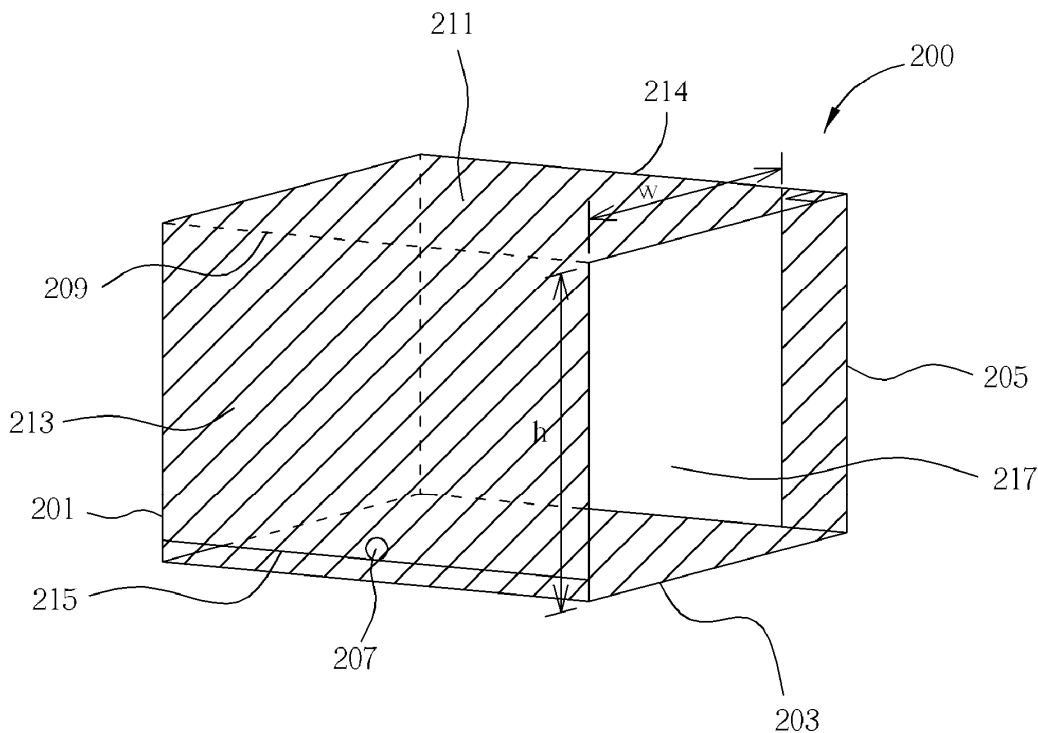
Correspondence Address:
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION
P.O. BOX 506
MERRIFIELD, VA 22116 (US)

(57) **ABSTRACT**

An antenna device includes a first conductive piece, a second conductive piece, a third conductive piece and a feeding point. The second conductive piece is electrically coupled to a predetermined voltage level. The third conductive piece is electrically connected to the first conductive piece and the second conductive piece. The feeding point is located on the first conductive piece.

(21) Appl. No.: **12/042,336**

(22) Filed: **Mar. 5, 2008**





US 20090128423A1

(19) **United States**

(12) **Patent Application Publication**
MORI

(10) **Pub. No.: US 2009/0128423 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ANTENNA AND WIRELESS TERMINAL**

(30) **Foreign Application Priority Data**

(75) Inventor: **Masatomo MORI**, Kawasaki (JP)

Dec. 15, 2006 (JP) 2006-337744

Publication Classification

Correspondence Address:

**WESTERMAN, HATTORI, DANIELS &
ADRIAN, LLP**
1250 CONNECTICUT AVENUE, NW, SUITE 700
WASHINGTON, DC 20036 (US)

(51) **Int. Cl.**
H01Q 21/00 (2006.01)
H01Q 1/22 (2006.01)

(52) **U.S. Cl.** **343/702; 343/893**

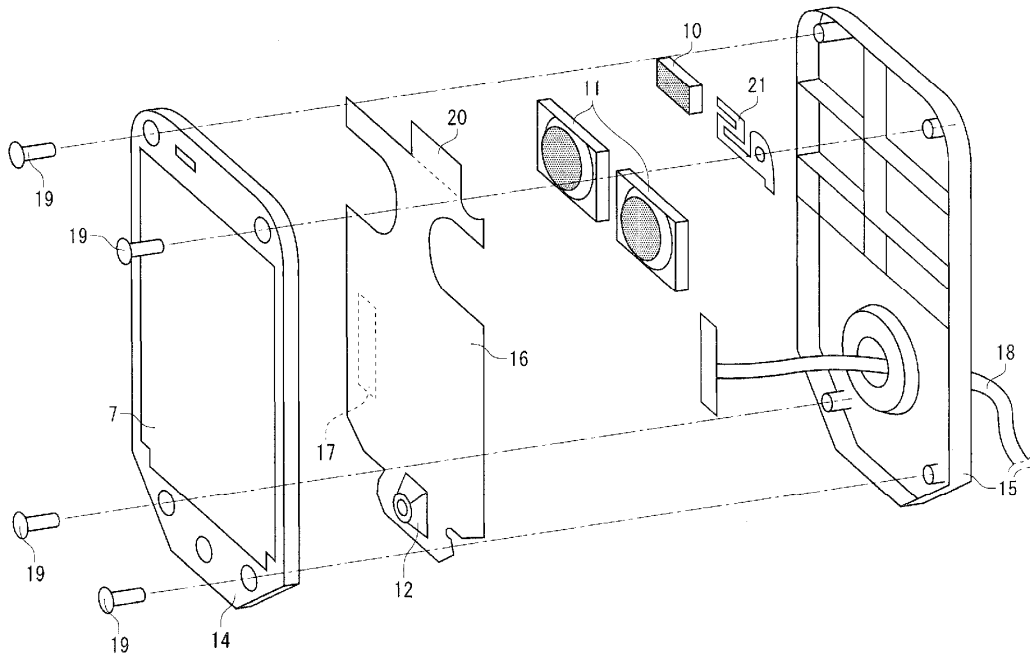
(57) **ABSTRACT**

To effectively accommodate a low frequency antenna within various apparatuses, such as a mobile phone, an antenna of a wireless apparatus utilizes a conductor pattern formed on at least one surface of a printed circuit board of the wireless apparatus, a chip antenna mounted on one surface of the printed circuit board connected with the conductor pattern, and a metal plate antenna allocated within an enclosure of the wireless apparatus making a contact with one end of the conductor pattern.

(73) Assignee: **FUJITSU LIMITED**,
Kawasaki-shi (JP)

(21) Appl. No.: **11/956,463**

(22) Filed: **Dec. 14, 2007**





US 20090128424A1

(19) **United States**

(12) **Patent Application Publication**
Suzuki et al.

(10) **Pub. No.: US 2009/0128424 A1**

(43) **Pub. Date: May 21, 2009**

(54) **PORTABLE WIRELESS DEVICE**

(30) **Foreign Application Priority Data**

(75) Inventors: **Yuichiro Suzuki**, Shizuoka (JP);
Seiichi Nakanishi, Ishikawa (JP);
Masanori Kubota, Kanagawa (JP);
Masayoshi Hirai, Kanagawa (JP);
Kouta Aoki, Kanagawa (JP);
Yutaka Saitoh, Ishikawa (JP)

Sep. 14, 2005 (JP) 2005-267024

Publication Classification

(51) **Int. Cl.**
H04M 1/02 (2006.01)
H01Q 1/24 (2006.01)

(52) **U.S. Cl.** **343/702; 455/575.3**

(57) **ABSTRACT**

Herein disclosed is a portable wireless device, comprising: a first case **11** having a metal portion; a second case **12**; a hinge portion **13** operative to rotatably connect the first case with the second case; a circuit board **18** having a ground pattern, the circuit board accommodated in the second case; and a feed portion connected to the circuit board, the hinge portion **13** having a rotating shaft **23** formed by a conductive metal, and the first case, the rotating shaft **23** and the ground pattern collectively function as an antenna element, wherein the portable wireless device further comprises a first conductor element **25** accommodated in the first case **11** in spaced-apart relationship with the rotating shaft **23** with a predetermined gap, the first conductor element having an electrical length substantially equal to a half wavelength of a wireless frequency.

Correspondence Address:
PEARNE & GORDON LLP
1801 EAST 9TH STREET, SUITE 1200
CLEVELAND, OH 44114-3108 (US)

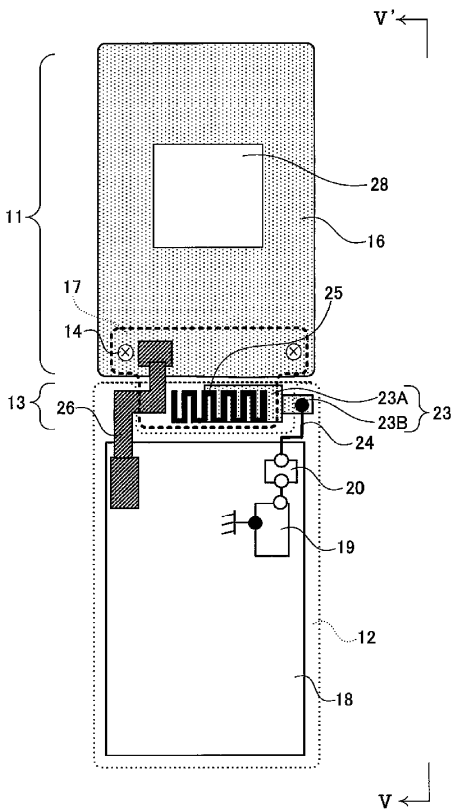
(73) Assignee: **MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**, Osaka (JP)

(21) Appl. No.: **12/066,432**

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

(86) PCT No.: **PCT/JP2006/318027**

§ 371 (c)(1),
(2), (4) Date: **Mar. 11, 2008**





US 20090128425A1

(19) **United States**

(12) **Patent Application Publication**
KIM et al.

(10) **Pub. No.: US 2009/0128425 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ANTENNA AND MOBILE COMMUNICATION
DEVICE USING THE SAME**

(30) **Foreign Application Priority Data**

Nov. 20, 2007 (KE) 10-2007-118445

(75) Inventors: **Hyun-Hak KIM**, Osan (KR);
Jong-Kweon Park, Daejeon (KR);
Jung-Nam Lee, Daejeon (KR);
Jin-Hee Ru, Daejeon (KR);
Nam-Heung Kim, Suwon (KR);
Seok-Min Woo, Suwon (KR)

Publication Classification

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

(52) **U.S. Cl.** **343/702; 343/722**

(57) **ABSTRACT**

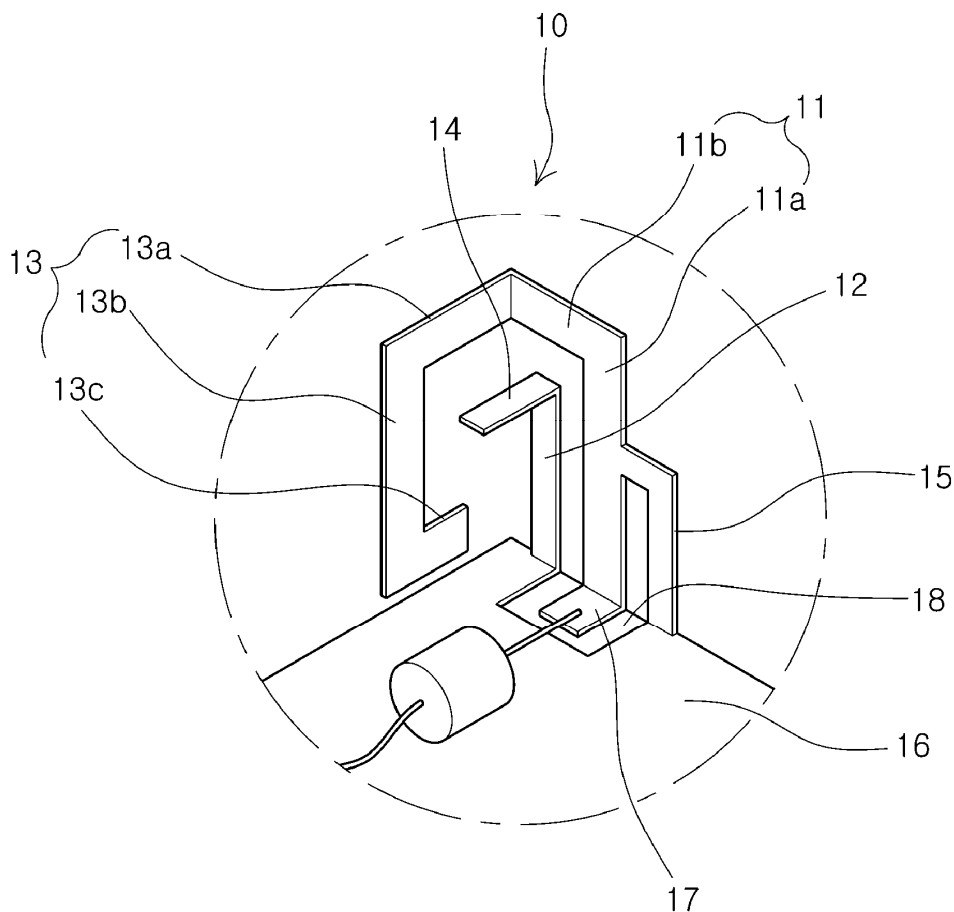
Correspondence Address:
LOWE HAUPTMAN HAM & BERNER, LLP
1700 DIAGONAL ROAD, SUITE 300
ALEXANDRIA, VA 22314 (US)

There is provided a an antenna including: a first radiator having one end connected to a power feeding unit and receiving a signal within a first frequency band; a second radiator having one end connected to a ground surface and receiving a signal within a second frequency band; a first stub extending from the other end of the first radiator and finely adjusting the signal received by the first radiator; a second stub extending from the other end of the second radiator and finely adjusting the signal received by the second radiator; and a short-circuit unit electrically connecting the first radiator to the ground surface.

(73) Assignee: **Samsung Electro-Mechanics Co.,
Ltd.**, Suwon (KR)

(21) Appl. No.: **12/191,205**

(22) Filed: **Aug. 13, 2008**





US 20090128426A1

(19) **United States**

(12) **Patent Application Publication**
Wang et al.

(10) **Pub. No.: US 2009/0128426 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ANTENNA FOR THIN COMMUNICATION APPARATUS**

(30) **Foreign Application Priority Data**

Nov. 15, 2007 (TW) 96143267

(75) Inventors: **Ching-Sung Wang**, Taoyuan County (TW); **Min-Che Chen**, Taoyuan County (TW)

Publication Classification

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

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

Correspondence Address:
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100, ROOSEVELT ROAD, SECTION 2
TAIPEI 100 (TW)

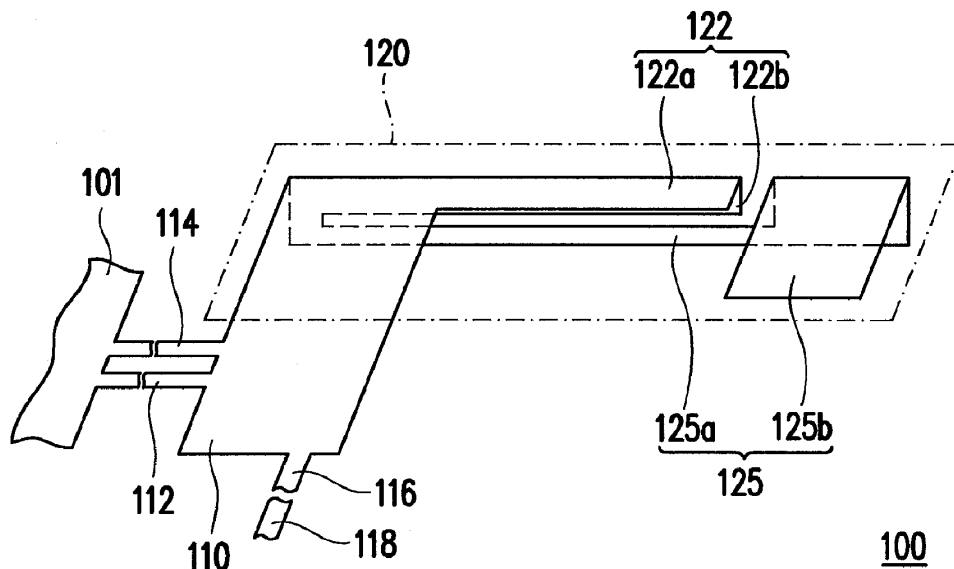
(57) **ABSTRACT**

A PIFA for a thin communication apparatus is provided. The PIFA includes a main body, a ground area and two ground segments, wherein the ground segments are adjacent with each other and extending out from a same side of the ground area. The SAR value and a required height for setting the antenna can be reduced through the design of two grounding paths on the antenna.

(73) Assignee: **HTC Corporation**, Taoyuan County (TW)

(21) Appl. No.: **12/269,888**

(22) Filed: **Nov. 13, 2008**



100



US 20090128428A1

(19) **United States**

(12) **Patent Application Publication**
Ishizuka et al.

(10) **Pub. No.: US 2009/0128428 A1**

(43) **Pub. Date: May 21, 2009**

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

Publication Classification

(75) Inventors: **Kenichi Ishizuka**, Yokohama-shi (JP); **Kazunari Kawahata**, Yokohama-shi (JP); **Nobuhito Tsubaki**, Sagamihara-shi (JP)

(51) **Int. Cl.**
H01Q 9/00 (2006.01)
H01Q 1/24 (2006.01)
(52) **U.S. Cl.** **343/702**; 343/745; 343/749
(57) **ABSTRACT**

Correspondence Address:
OSTROLENK FABER GERB & SOFFEN
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NEW YORK, NY 100368403

(73) Assignee: **Murata Manufacturing Co., Ltd.**

(21) Appl. No.: **12/360,527**

(22) Filed: **Jan. 27, 2009**

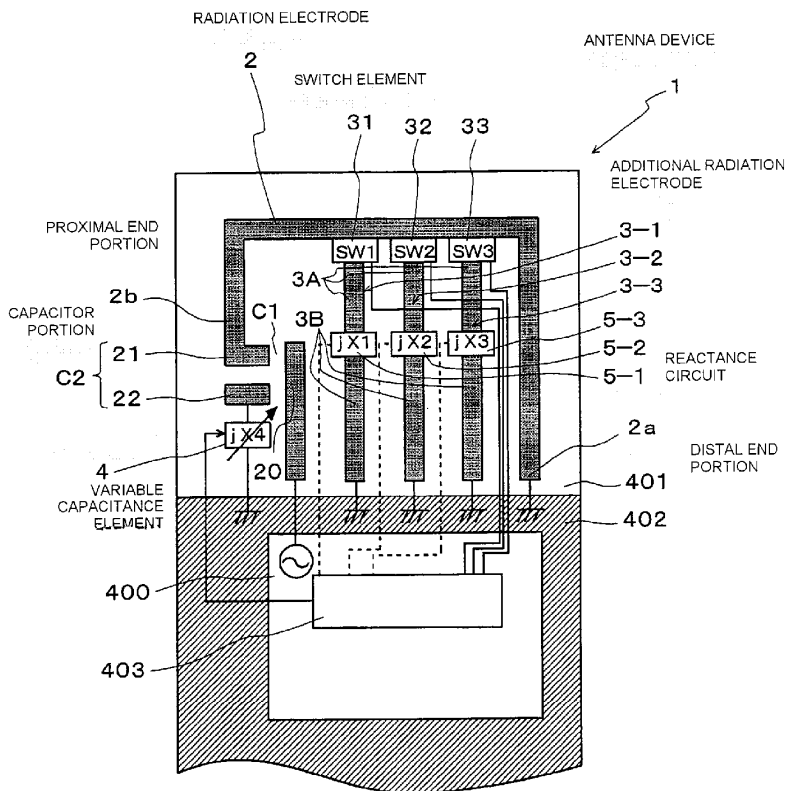
Related U.S. Application Data

(63) Continuation of application No. PCT/JP2007/062891, filed on Jun. 27, 2007.

(30) **Foreign Application Priority Data**

Jul. 28, 2006 (JP) 2006-206983

An antenna device capable of not only achieving multiple resonances and wideband characteristics but also achieving improvement of antenna efficiency and accurate matching at all resonant frequencies, and a wireless communication apparatus. In one example, an antenna device 1 includes a radiation electrode 2 to which power is capacitively fed through a capacitor portion C1, and additional radiation electrodes 3-1 to 3-3 branched from the radiation electrode 2. A distal end portion 2a of the radiation electrode 2 is grounded to a ground region 402, and is a portion at which a minimum voltage is obtained when power is fed. A capacitor portion C2 that is a portion at which a maximum voltage is obtained when power is fed is disposed in a proximal end portion 2b of the radiation electrode 2, and a variable capacitance element 4 which is grounded is connected in series with the capacitor portion C2. The additional radiation electrodes 3-1 to 3-3 are connected to the radiation electrode 2 through switch elements 31 to 33, and include reactance circuits 5-1 to 5-3 in a middle thereof. Distal end portions of the additional radiation electrodes 3-1 to 3-3 are grounded to the ground region 402.





US 20090128434A1

(19) **United States**

(12) **Patent Application Publication**
CHANG et al.

(10) **Pub. No.: US 2009/0128434 A1**

(43) **Pub. Date: May 21, 2009**

(54) **CIRCULARLY-POLARIZED DIELECTRIC
RESONATOR ANTENNA**

Publication Classification

(76) Inventors: **Tze-Hsuan CHANG**, Taipei (TW);
Jean-Fu Kiang, Taipei (TW)

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/38 (2006.01)
(52) **U.S. Cl.** **343/767; 343/700 MS**

Correspondence Address:
RABIN & Berdo, PC
1101 14TH STREET, NW, SUITE 500
WASHINGTON, DC 20005 (US)

(57) **ABSTRACT**

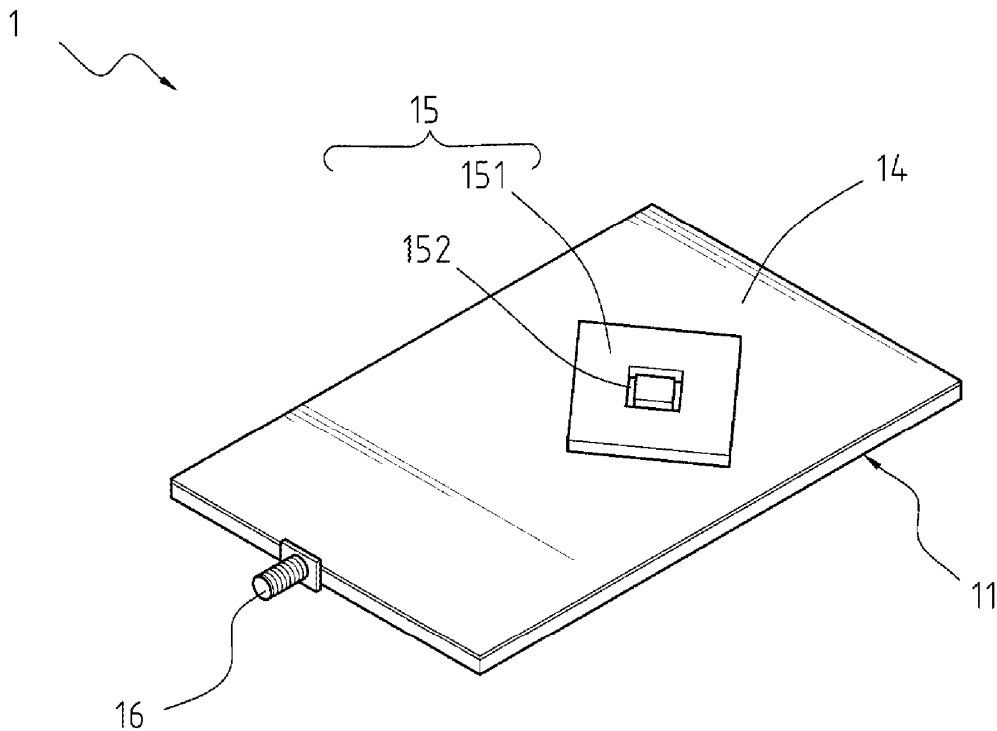
The present invention relates to a circularly-polarized dielectric resonator antenna (DRA). The antenna comprises a substrate, a Wilkinson power divider, a phase shifter, a ground plane and a dielectric resonator, wherein the phase shifter is connected to the Wilkinson power divider. Besides, the dielectric resonator is disposed on the ground plane, and includes a dielectric main body and a slot disposed above the substrate. Additionally, the antenna is adopted to increase the linear radiation bandwidth by utilizing the slot, and transmits a circularly-polarized electromagnetic wave by utilizing the Wilkinson power divider. Consequently, the circularly-polarized dielectric resonator antenna can be applied in the fields of satellite communication, Worldwide Interoperability for Microwave Access (WiMAX), and wireless communication.

(21) Appl. No.: **11/959,695**

(22) Filed: **Dec. 19, 2007**

(30) **Foreign Application Priority Data**

Nov. 20, 2007 (TW) 096143885





US 20090128438A1

(19) **United States**

(12) **Patent Application Publication**
Chantz

(10) **Pub. No.: US 2009/0128438 A1**

(43) **Pub. Date: May 21, 2009**

(54) **BALANCED AND SHORTENED ANTENNAS**

(52) **U.S. CL.** 343/793; 343/895

(76) **Inventor:** **Hyman D. Chantz**, Scarsdale, NY
(US)

(57) **ABSTRACT**

Correspondence Address:
SCHMEISER, OLSEN & WATTS
22 CENTURY HILL DRIVE, SUITE 302
LATHAM, NY 12110 (US)

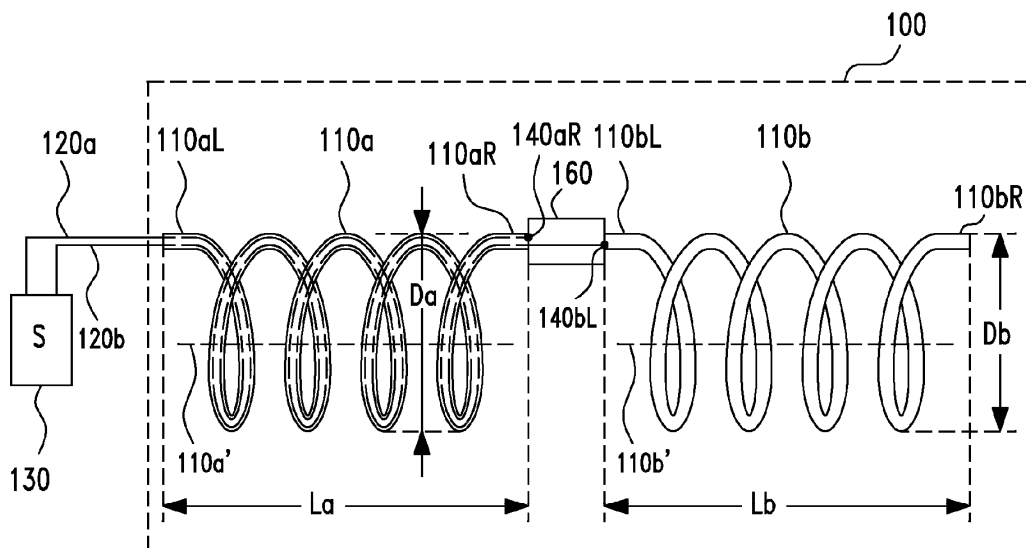
An antenna for radiating and/or receiving signals. The antenna includes (i) a first hollow and helical pipe, (ii) a second hollow and helical pipe, (iii) a first transmission wire, (iv) a second transmission wire, and (v) a dielectric connector. The dielectric connector physically couples to the first hollow and helical pipe and the second hollow and helical pipe. The first hollow and helical pipe and the second hollow and helical pipe comprise an electrically conductive material. The first transmission wire comprises a first portion and a second portion. The second transmission wire comprises a third portion and a fourth portion. The first portion of the first transmission wire and the third portion of the second transmission wire are inside the first hollow and helical pipe.

(21) **Appl. No.:** **11/940,391**

(22) **Filed:** **Nov. 15, 2007**

Publication Classification

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 9/16 (2006.01)





US 20090128439A1

(19) **United States**

(12) **Patent Application Publication**
Su et al.

(10) **Pub. No.: US 2009/0128439 A1**

(43) **Pub. Date: May 21, 2009**

(54) **DIPOLE ANTENNA DEVICE AND DIPOLE ANTENNA SYSTEM**

Publication Classification

(76) Inventors: **Saou-Wen Su**, Taipei City (TW);
Jui-Hung Chou, Tai-Chung City (TW)

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

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

Correspondence Address:
**NORTH AMERICA INTELLECTUAL PROP-
ERTY CORPORATION**
P.O. BOX 506
MERRIFIELD, VA 22116 (US)

(57) **ABSTRACT**

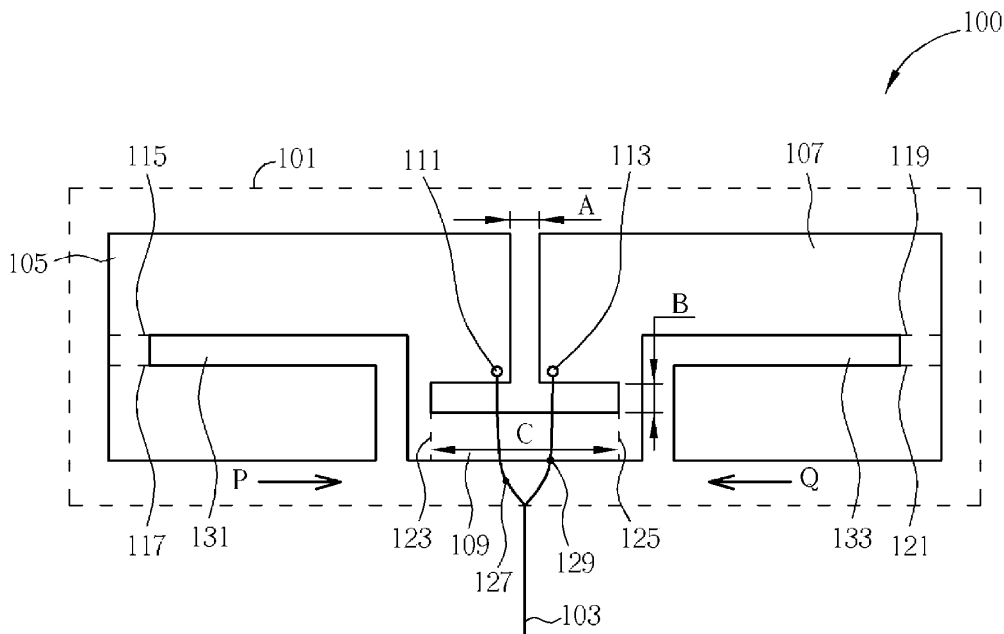
A dipole antenna device includes a first metal piece including at least one bending part and a first feeding point; a second metal piece including a second bending part and a second feeding point; and a third metal piece electrically connected to a first connection point of the first metal piece and a second connection point of the second metal piece; wherein the first metal piece and the second metal piece are not electrically connected to each other except the first connection point and the second connection point.

(21) Appl. No.: **12/050,940**

(22) Filed: **Mar. 19, 2008**

(30) **Foreign Application Priority Data**

Nov. 16, 2007 (TW) 096143526





US 20090128440A1

(19) **United States**
(12) **Patent Application Publication**
Tavassoli Hozouri

(10) **Pub. No.: US 2009/0128440 A1**
(43) **Pub. Date: May 21, 2009**

(54) **BALANCED ANTENNA**

Publication Classification

(75) Inventor: **Behzad Tavassoli Hozouri**, Santa Clara, CA (US)

(51) **Int. Cl.**
H01Q 9/16 (2006.01)
H01Q 1/50 (2006.01)

Correspondence Address:
Patent Venture Group
10788 Civic Center Drive, Suite 215
Rancho Cucamonga, CA 91730-3805 (US)

(52) **U.S. Cl.** **343/821**

(73) Assignee: **X-ETHER, INC.**, Santa Clara, CA (US)

(57) **ABSTRACT**

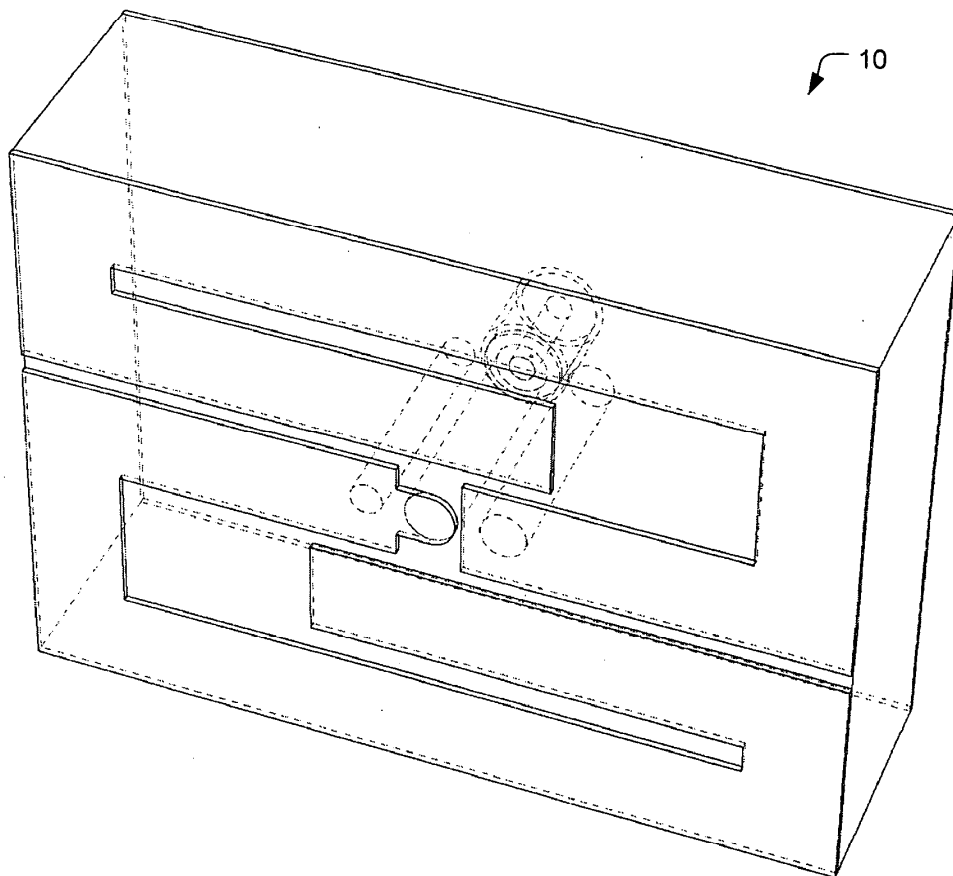
(21) Appl. No.: **12/273,369**

(22) Filed: **Nov. 18, 2008**

An antenna. A base body made of a dielectric material is provide, wherein the base body has a bottom surface and an opposed top surface. A conductive layer of a conductive material is provided on the bottom surface of the base body. Two dipole conductors are provided that form a dipole on the top surface of the base body, wherein the dipole conductors are at least partially spiral shaped and have opposite directions. A balun is provided that has a feed conductor section and two ground conductor sections that are all substantially parallel. The balun receives an unbalanced signal from a feed line, transforms this signal, and provides it to the dipole conductors via the feed and ground conductor sections.

Related U.S. Application Data

(60) Provisional application No. 60/988,868, filed on Nov. 19, 2007.





US 20090128442A1

(19) **United States**

(12) **Patent Application Publication**
Fujita et al.

(10) **Pub. No.: US 2009/0128442 A1**

(43) **Pub. Date: May 21, 2009**

(54) **ANTENNA APPARATUS**

(30) **Foreign Application Priority Data**

(76) Inventors: **Seiken Fujita**, Saitama-shi (JP);
Hisamatsu Nakano, Kodaira-shi (JP);
Iichi Wako, Saitama-shi (JP);
Ken Tanaka, Saitama-shi (JP);
Toshihito Umegaki, Inagi-shi (JP)

Aug. 24, 2006 (JP) 2006-228197
Feb. 8, 2007 (JP) 2007-029438

Publication Classification

(51) **Int. Cl.**
H01Q 1/50 (2006.01)
H01Q 1/00 (2006.01)
(52) **U.S. Cl.** **343/860; 343/907**

Correspondence Address:
BACON & THOMAS, PLLC
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ALEXANDRIA, VA 22314-1176 (US)

(57) **ABSTRACT**

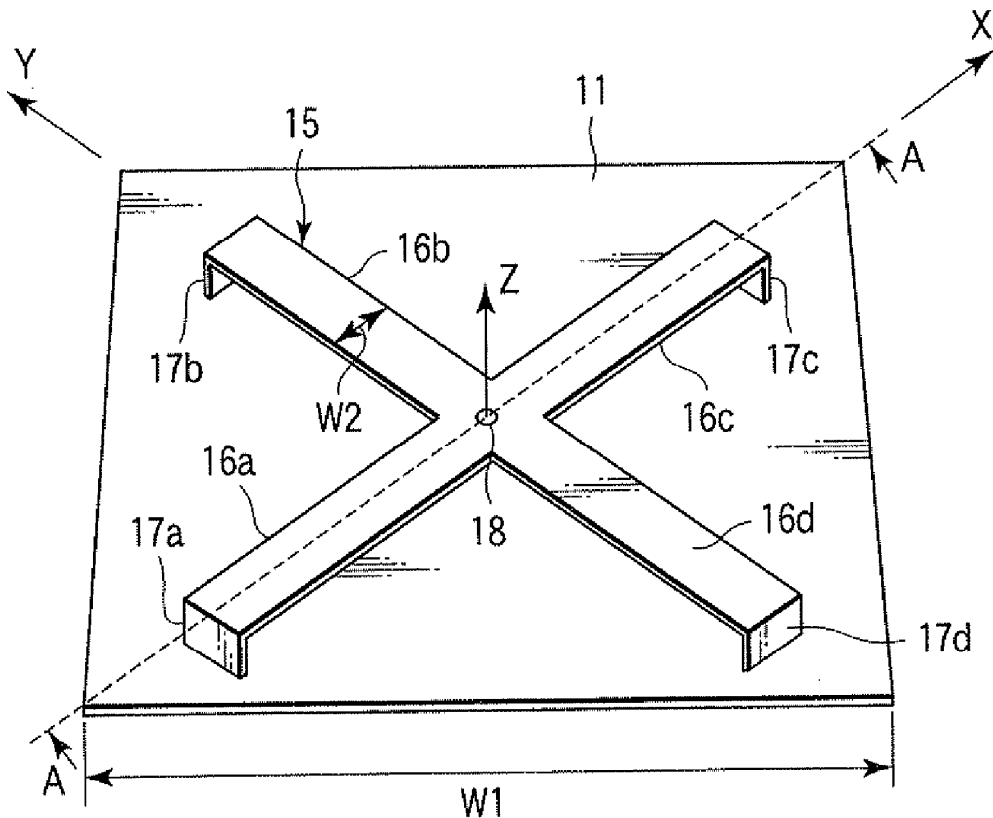
An aspect of an antenna apparatus according to the present invention is provided with a conductor plate, radiating elements disposed to face the conductor plate and partially short-circuited to the conductor plate, a feeding terminal provided on the conductor plate, and a feeding path connecting the feeding terminal and a feeding portion of the radiating elements to each other.

(21) Appl. No.: **12/354,227**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2007/066480, filed on Aug. 24, 2007.





US 20090130995A1

(19) **United States**

(12) **Patent Application Publication**
WANG CHEN

(10) **Pub. No.: US 2009/0130995 A1**

(43) **Pub. Date: May 21, 2009**

(54) **MOBILE COMMUNICATION DEVICE,
HOUSING STRUCTURE AND
MANUFACTURING METHOD OF HOUSING
STRUCTURE**

Publication Classification

(51) **Int. Cl.**
H04B 1/38 (2006.01)
G06F 1/16 (2006.01)
B23P 17/04 (2006.01)

(76) **Inventor: Sheng WANG CHEN, Taipei (TW)**

(52) **U.S. Cl. 455/90.3; 29/592.1; 29/600**

Correspondence Address:
Muncy, Geissler, Olds & Lowe, PLLC
P.O. BOX 1364
FAIRFAX, VA 22038-1364 (US)

(57) **ABSTRACT**

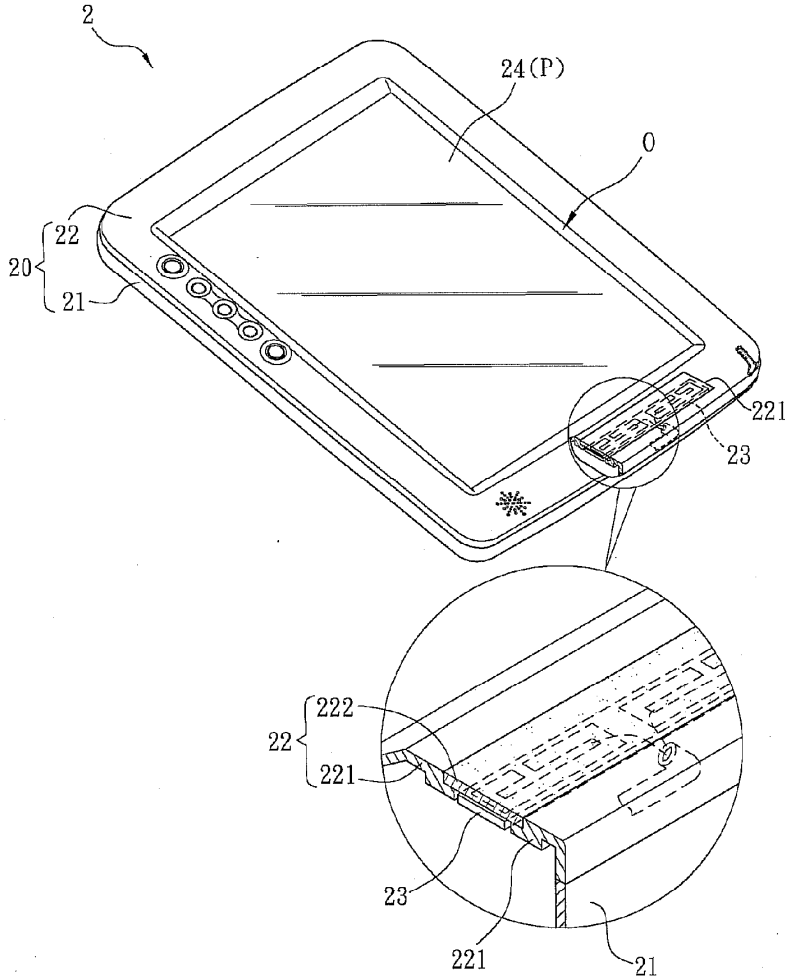
A mobile communication device includes a housing structure and an antenna. The housing structure has a carbon fiber housing portion and a non-conductive fiber housing portion. The antenna is disposed in the housing structure. The signal transceiving portion of the antenna is disposed corresponding to the non-conductive fiber housing portion. A housing structure and a manufacturing method thereof applied to the mobile communication device are also disclosed.

(21) **Appl. No.: 12/233,290**

(22) **Filed: Sep. 18, 2008**

(30) **Foreign Application Priority Data**

Nov. 16, 2007 (TW) 096143614





US 20090135066A1

(19) **United States**

(12) **Patent Application Publication**
Raappana et al.

(10) **Pub. No.: US 2009/0135066 A1**

(43) **Pub. Date: May 28, 2009**

(54) **INTERNAL MONOPOLE ANTENNA**

(30) **Foreign Application Priority Data**

(76) Inventors: **Ari Raappana**, Kello (FI); **Marko Kupari**, Kempele (FI); **Anne Isohatala Lehmikangas**, Kello (FI); **Petteri Annamaa**, Oulunsalo (FI); **Jyrki Mikkola**, Kaustinen (FI); **Pasi Keskitalo**, Oulu (FI); **Sami Kyllonen**, Helsinki (FI)

Feb. 8, 2005 (FI) 20050146

Publication Classification

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

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

(57) **ABSTRACT**

The invention relates in one aspect to antenna useful with for example a flat a radio device. In one embodiment, the antenna comprises an internal monopole antenna that has an arrangement for improving its characteristics, including a planar monopole radiator and an auxiliary element. The auxiliary element can be a mere conductor strip, or a ceramic plate partly coated with a conductor for example. The conductor of the auxiliary element is connected to the ground at a point (SP), which is relatively close to the feed point (FP) of the planar element. The planar element can be shaped to form two operating bands for the antenna. The auxiliary element can be used to increase the bandwidth of the internal monopole antenna and/or to improve the omnidirectional radiation of the antenna.

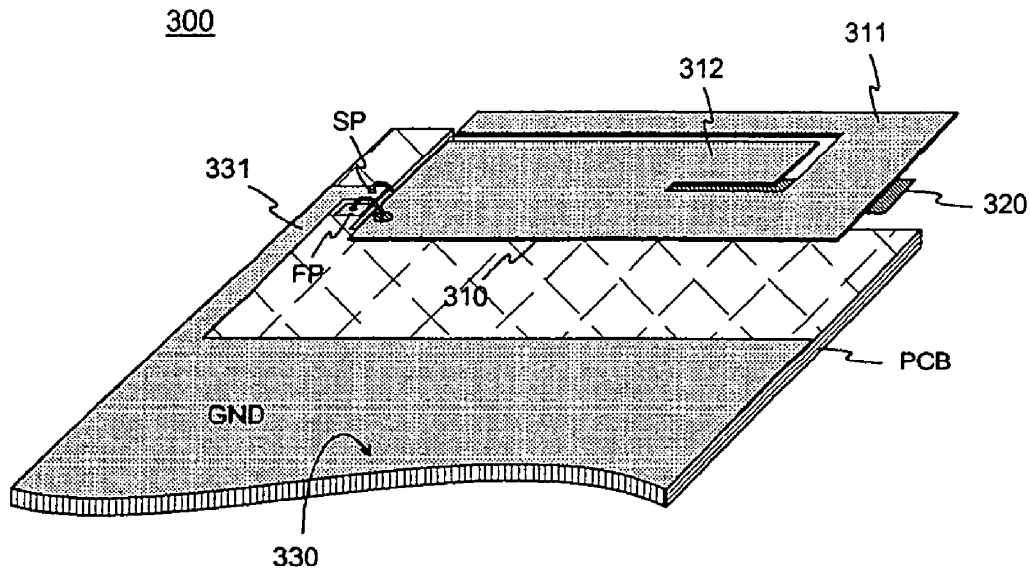
Correspondence Address:
GAZDZINSKI & ASSOCIATES
11440 WEST BERNARDO COURT, SUITE 375
SAN DIEGO, CA 92127 (US)

(21) Appl. No.: **11/883,945**

(22) PCT Filed: **Jan. 11, 2006**

(86) PCT No.: **PCT/FI06/50017**

§ 371 (c)(1),
(2), (4) Date: **Jun. 23, 2008**





US 20090135067A1

(19) **United States**

(12) **Patent Application Publication**
Chen et al.

(10) **Pub. No.: US 2009/0135067 A1**

(43) **Pub. Date: May 28, 2009**

(54) **ANTENNA DEVICE**

(30) **Foreign Application Priority Data**

(75) Inventors: **Min-Che Chen**, Tao Yuan (TW);
Kuo-Cheng Chen, Tao Yuan (TW);
Ching-Sung Wang, Tao Yuan (TW)

Nov. 22, 2007 (TW) 96144308

Publication Classification

Correspondence Address:
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7 FLOOR-1, NO. 100, ROOSEVELT ROAD, SEC-
TION 2
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(51) **Int. Cl.**
H01Q 1/38 (2006.01)

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

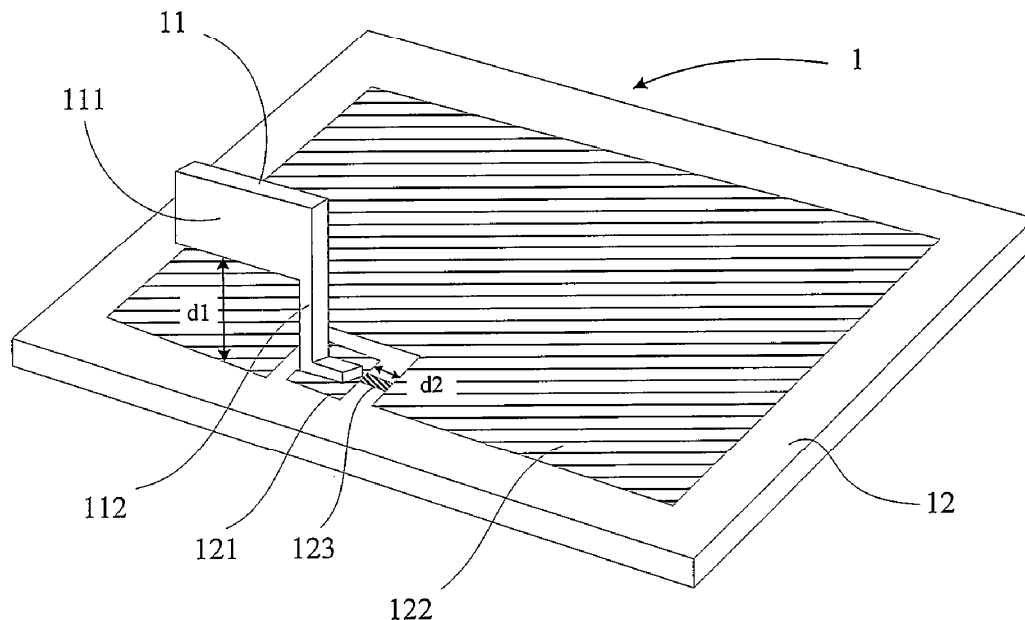
(57) **ABSTRACT**

An antenna device including a ground plane, a circuit board, an antenna, and a conductive wire is provided. The circuit board includes a signal feed point, and the antenna includes a radiation portion and a feed portion extending externally from the radiation portion. The feed portion is electrically connected to the signal feed point, and the conductive wire is disposed on the circuit board and electrically connected to the ground plane and the signal feed point. The conductive wire is, for example, a printed trace formed on the circuit board.

(73) Assignee: **HIGH TECH COMPUTER,**
CORP., Taoyuan County (TW)

(21) Appl. No.: **11/969,227**

(22) Filed: **Jan. 4, 2008**





US 20090135069A1

(19) **United States**

(12) **Patent Application Publication**
Tsai et al.

(10) **Pub. No.: US 2009/0135069 A1**

(43) **Pub. Date: May 28, 2009**

(54) **ANTENNA WITH SYMMETRICAL FIRST AND SECOND MONOPOLE RADIATING ELEMENTS**

(22) Filed: **May 15, 2008**

(30) **Foreign Application Priority Data**

(75) Inventors: **Tiao-Hsing Tsai**, Tao Yuan Shien (TW); **Chao-Hsu Wu**, Tao Yuan Shien (TW); **Chieh-Ping Chiu**, Tao Yuan Shien (TW)

Nov. 22, 2007 (TW) 096144237

Publication Classification

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

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

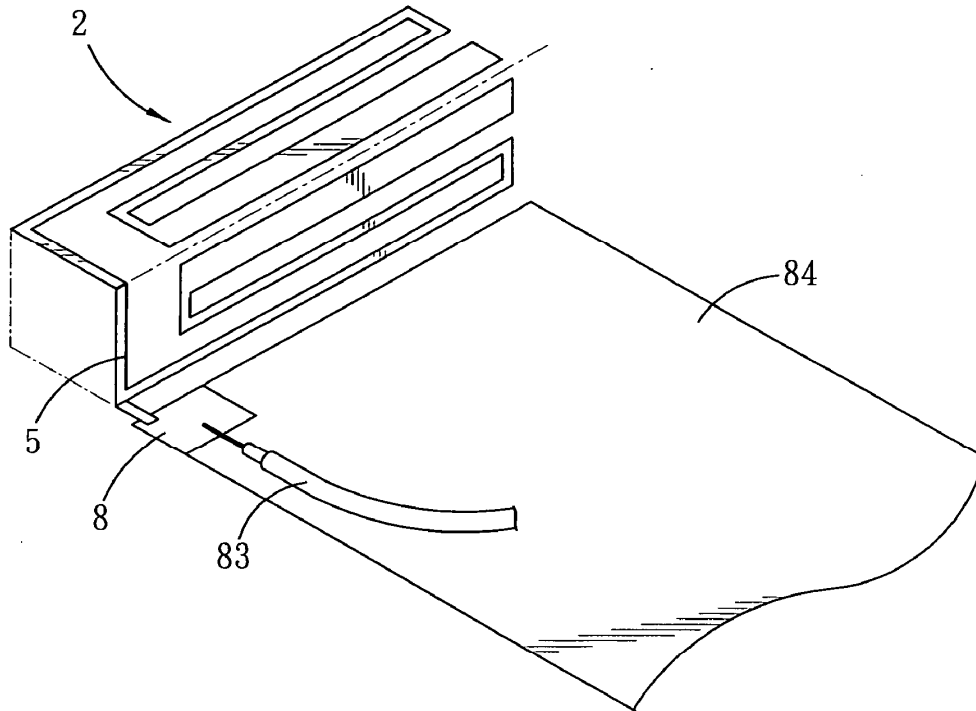
(57) **ABSTRACT**

An antenna, which is operable in a digital video broadcasting for handhelds (DVB-H) frequency range, includes first and second monopole radiating elements and a feeding element. The first and second monopole radiating elements are symmetrical about an axis of symmetry and have a meandering shape. The feeding element interconnects the first and second monopole radiating elements.

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GALLAGHER & LATHROP, A PROFESSIONAL CORPORATION
601 CALIFORNIA ST, SUITE 1111
SAN FRANCISCO, CA 94108 (US)

(73) Assignee: **Quanta Computer Inc.**, Tao Yuan Shien (TW)

(21) Appl. No.: **12/152,696**





US 20090135070A1

(19) **United States**

(12) **Patent Application Publication**
Hung et al.

(10) **Pub. No.: US 2009/0135070 A1**

(43) **Pub. Date: May 28, 2009**

(54) **COMPLEX ANTENNA**

Publication Classification

(75) Inventors: **Chen-Ta Hung**, Tu-cheng (TW);
Po-Kang Ku, Tu-cheng (TW);
Shu-Yean Wang, Tu-cheng (TW)

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

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

Correspondence Address:
WEI TE CHUNG
FOXCONN INTERNATIONAL, INC.
1650 MEMOREX DRIVE
SANTA CLARA, CA 95050 (US)

(57) **ABSTRACT**

A complex antenna (100) comprises a grounding patch (3) extending in a longitudinal direction and having opposite first and second sides; a first antenna (1) comprising a first radiating element (11), a second radiating element (12), a third radiating element (13), and a first connecting element (14); a second antenna (2) comprising a fourth radiating element (21), a fifth radiating element (22), and a second connecting element (23). A gap is formed in the middle portion of the second side of the grounding patch. The first connecting element extends from an end of the gap and comprises a first connecting arm coplanar with the grounding patch and a second connecting arm vertical to the grounding patch. The first connecting arm and the grounding patch is formed a slot. The second connecting element extends from an end of the grounding patch.

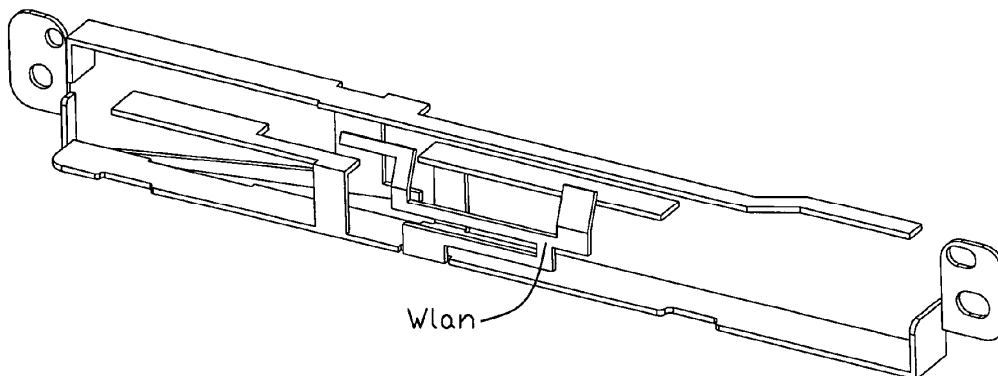
(73) Assignee: **HON HAI PRECISION IND. CO., LTD.**

(21) Appl. No.: **12/287,932**

(22) Filed: **Oct. 14, 2008**

(30) **Foreign Application Priority Data**

Nov. 26, 2007 (TW) 96144713





US 20090135071A1

(19) **United States**

(12) **Patent Application Publication**
Huang et al.

(10) **Pub. No.: US 2009/0135071 A1**

(43) **Pub. Date: May 28, 2009**

(54) **DUAL BAND ANTENNA**

Publication Classification

(75) Inventors: **Chih-Yung Huang**, Taichung County (TW); **Pi-Hsi Cheng**, Jhubei City (TW); **Chang-Jung Lee**, Longtan Township (TW)

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

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

(57) **ABSTRACT**

Correspondence Address:
BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314-1176 (US)

An antenna set on a circuit board is provided. The circuit board includes a signal transmitting unit and a grounding unit. The antenna includes a conductive supporting portion, a radiator and a grounding portion. The radiator operating in a first frequency band includes a feeding branch coupled to the signal transmitting unit for receiving a feeding signal. The grounding portion is connected to the radiator through the conductive supporting portion. The grounding portion includes a slot cavity and a grounding branch. The slot cavity is extended from a top surface of the grounding portion into the interior of the grounding portion. The grounding branch is coupled to the grounding unit. A resonant cavity is formed between the radiator and the slot cavity. The resonance of the resonant cavity operates in a second frequency band.

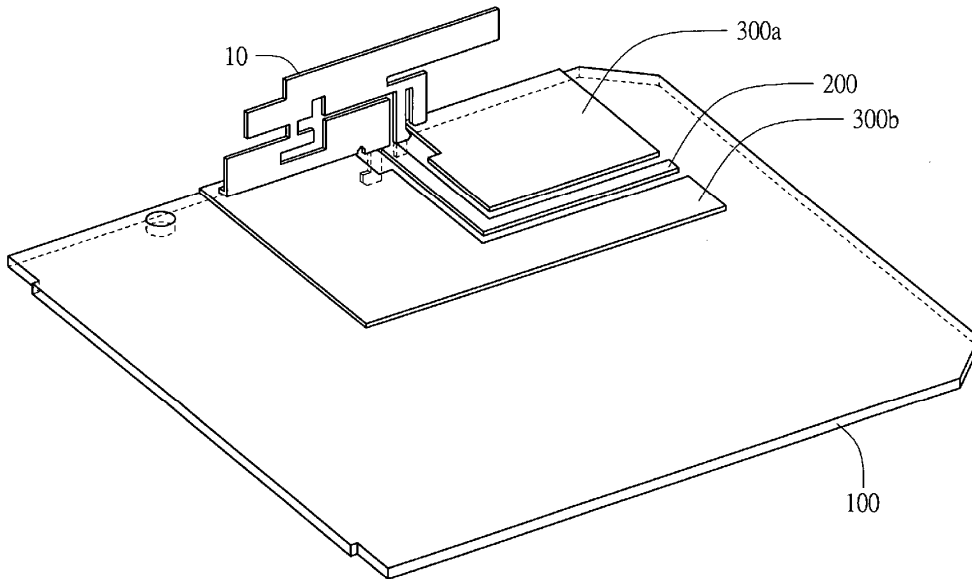
(73) Assignee: **Arcadyan Technology Corporation**, Hsinchu (TW)

(21) Appl. No.: **12/292,157**

(22) Filed: **Nov. 13, 2008**

(30) **Foreign Application Priority Data**

Nov. 22, 2007 (TW) 96144318





US 20090135072A1

(19) **United States**

(12) **Patent Application Publication**
Ke et al.

(10) **Pub. No.: US 2009/0135072 A1**

(43) **Pub. Date: May 28, 2009**

(54) **MULTI-BAND ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Yun-Lung Ke**, Tu-cheng (TW);
Chen-Ta Hung, Tu-cheng (TW);
Shu-Yean Wang, Tu-Cheng (TW);
Chun-Ming Chiu, Tu-Cheng (TW)

Nov. 26, 2007 (TW) 96144716

Publication Classification

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

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

(57) **ABSTRACT**

Correspondence Address:

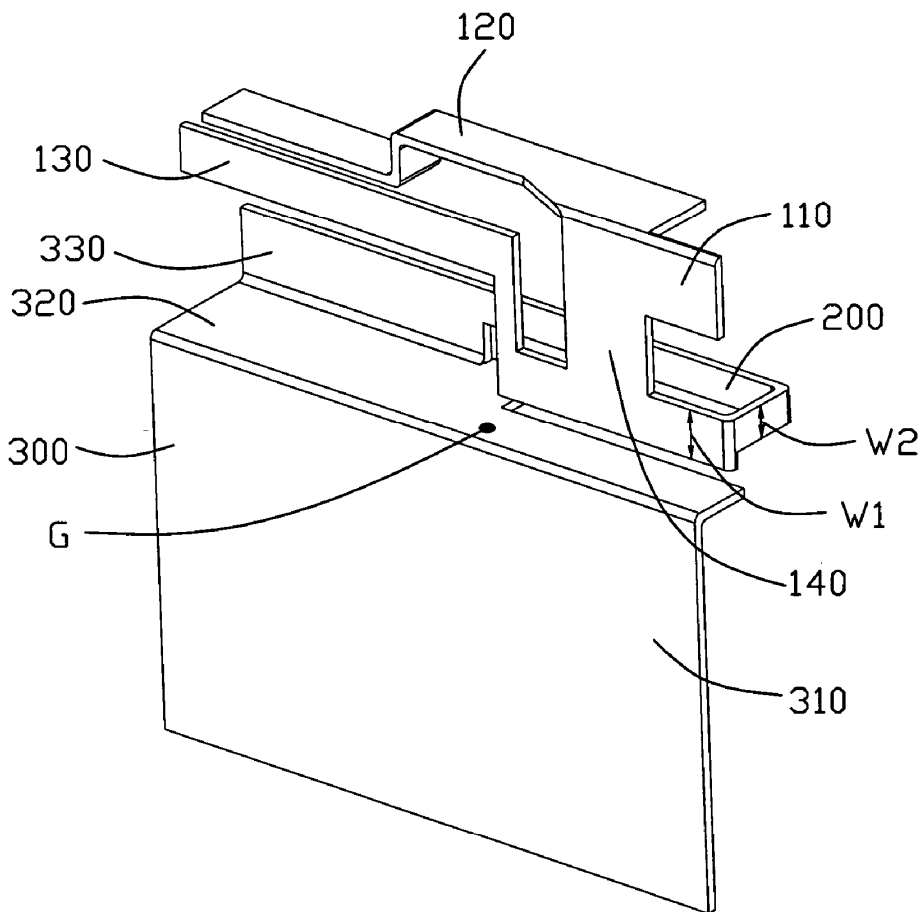
WEI TE CHUNG
FOXCONN INTERNATIONAL, INC.
1650 MEMOREX DRIVE
SANTA CLARA, CA 95050 (US)

A multi-band antenna includes a grounding portion (300), a number of radiating members and a short-circuit portion (200). The short-circuit portion comprises a first short-circuit piece (210) connecting with the grounding portion and located in a first plane, a third short-circuit piece (230) located in a third plane and connecting with the radiating members, and a second short-circuit piece (220) connecting the first short-circuit piece with the third short-circuit piece and located in a second plane, with the first and third short-circuit pieces disposed on the same side of the second short-circuit piece. The radiating members comprises a first radiating member (110, 140) in the third plane and a second radiating member (120, 140) extending towards the first plane.

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

(21) Appl. No.: **12/313,951**

(22) Filed: **Nov. 26, 2008**





US 20090135075A1

(19) **United States**

(12) **Patent Application Publication**
Minard et al.

(10) **Pub. No.: US 2009/0135075 A1**

(43) **Pub. Date: May 28, 2009**

(54) **COMPACT MULTIBAND ANTENNA**

(30) **Foreign Application Priority Data**

(76) Inventors: **Philippe Minard**, Saint Medard Sur
Ille (FR); **Jean-Francois Pintos**,
Bourbarre (FR); **Ali Louzir**,
Rennes (FR); **Philippe Gilberton**,
Geveze (FR)

Sep. 7, 2005 (FR) 0552697
Oct. 3, 2005 (FR) 0552987

Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 9/16 (2006.01)

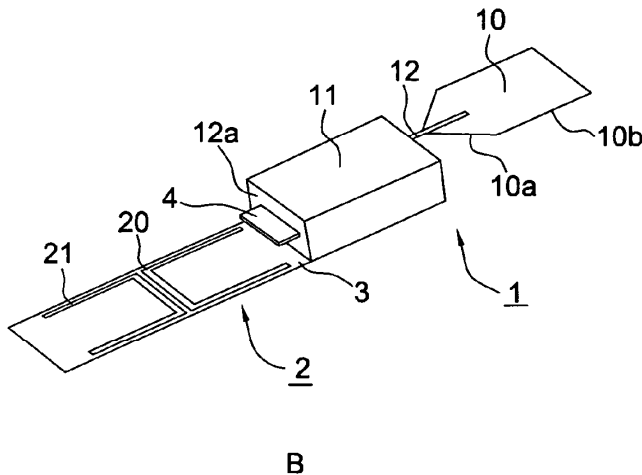
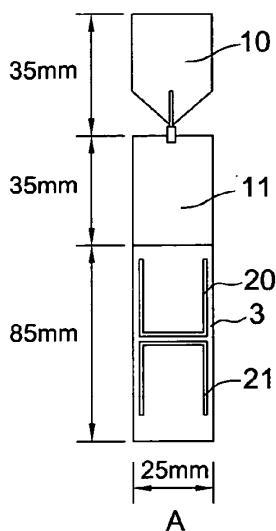
(52) **U.S. Cl.** **343/767**

Correspondence Address:
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(57) **ABSTRACT**

The present invention relates to a compact multiband antenna constituted by a first dipole type element comprising a first conductive arm connected to a second conductive arm having the shape of a box, mounted on a ground plane, the first and the second arms being supplied differentially and a second element of the slot type realized on said ground plane in the extension of said second arm.

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§ 371 (c)(1),
(2), (4) Date: **Mar. 5, 2008**





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(54) **MULTI-BAND INTERNAL ANTENNA OF SYMMETRY STRUCTURE HAVING STUB**

Publication Classification

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(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 9/00 (2006.01)

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(57) **ABSTRACT**

Provided is a multi-band internal antenna of a symmetry structure having stub, in which a size of the internal antenna can be reduced by stacking loop antennas, a broadband characteristic can be obtained in a high frequency band by connecting the stub to a top patch of the antenna, and a reduced SAR and an omni-directional radiation pattern can be obtained by configuring an antenna patch in a symmetry structure. The multi-band internal antenna includes: a top patch disposed in an upper portion of the antenna, the top patch being formed in a loop shape of which one end is opened; a stub connected to the top patch to expand a bandwidth of a high frequency band in an operating frequency of the antenna; a bottom patch connected to a ground part through a feeder part and a shorting part, the bottom patch being formed in a loop shape of which one end and another end are opened; a connecting part connecting the top patch to the bottom patch to transmit a signal from the bottom patch to the top patch; an intermediate part formed between the top patch and the bottom patch to a predetermined thickness; the feeder part for feeding power to the bottom patch; and the shorting part for grounding the bottom patch. The multi-band internal antenna is used in wireless communication fields.

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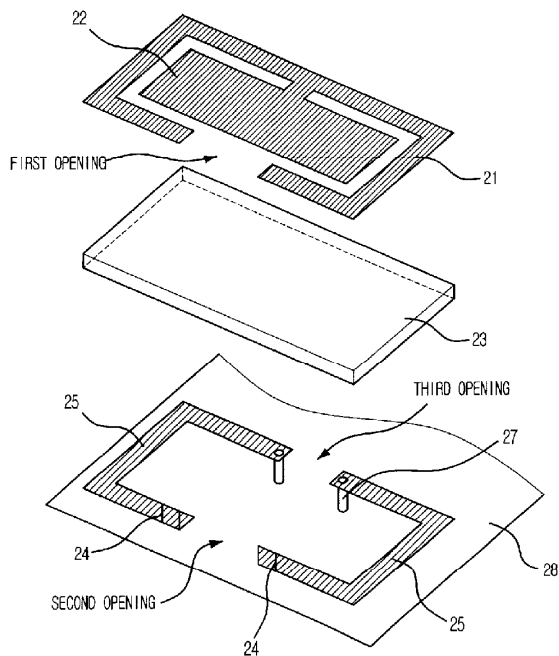
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(54) **STRUCTURE OF DUAL SYMMETRICAL ANTENNAS**

Publication Classification

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(57) **ABSTRACT**

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A structure of dual symmetrical antennas adopted on a broadband product to operate within 2.0 GHz~5.8 GHz, comprises a PCB, two first trapezoid antennas symmetrically aligned with one of parallel sides thereof on a surface of a PCB, and two second trapezoid antennas symmetrically aligned with each other with one of parallel sides thereof on another surface of the PCB opposite to the first trapezoid antennas, wherein the first trapezoid antennas and the second trapezoid antennas simultaneously enable the broadband product to operate at both a first frequency band and a second frequency band, and the second frequency band overlaps a part of the first frequency band.

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