



US 20070229358A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229358 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **MULTIPLE FREQUENCY BAND PLANAR ANTENNA**

Publication Classification

(51) **Int. Cl.**

H01Q 1/38 (2006.01)

H01Q 1/24 (2006.01)

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

(76) Inventors: **Sheng-Yuan Chi**, Banciao City (TW);
Chia-Bin Yang, Taipei (TW); **Shiwei Wang**, Taipei (TW)

(57) **ABSTRACT**

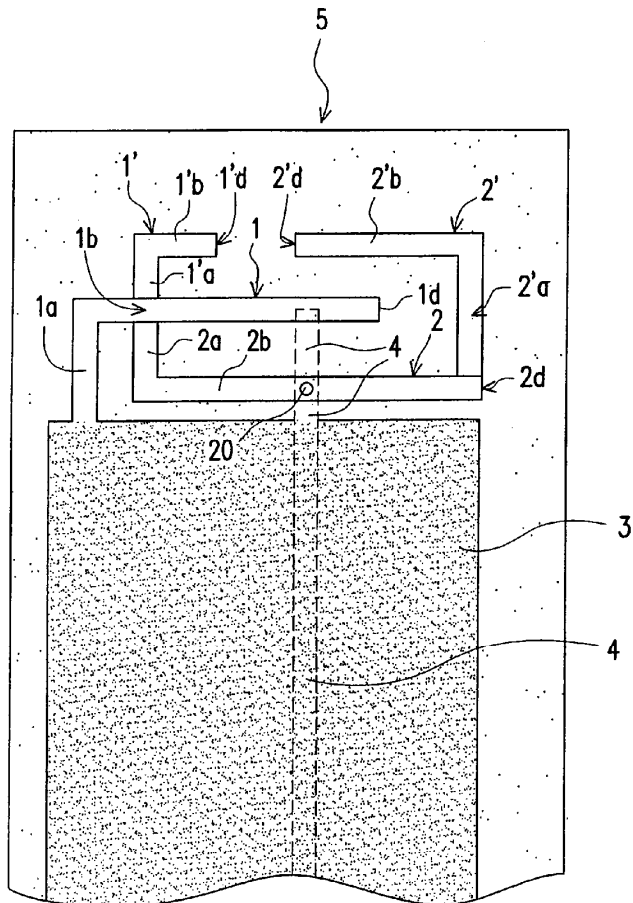
A multiple frequency band planar antenna formed on one-side surface of a circuit board comprises: a first antenna pattern, a second antenna pattern, a third antenna pattern and a fourth antenna pattern, each antenna pattern further comprising an elongated portion and a conductor portion; wherein the second elongated portion at a point between its two ends is short-circuited to a feeding transmission line formed on another-side surface of the circuit board through a via. Thus, the multiple frequency band planar antenna can operate at three frequency bands with their central frequencies at 2.4 GHz, 3.5 GHz and 5.8 GHz, respectively, suitable for both WiFi LAN and WiMAX MAN applications.

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(21) Appl. No.: **11/394,962**

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





US 20070229359A1

(19) **United States**

(12) **Patent Application Publication**
Heyde

(10) **Pub. No.: US 2007/0229359 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **BROADBAND PATCH ANTENNA**

Publication Classification

(75) Inventor: **Wolfgang Heyde**, Herisau (CH)

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

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

(57) **ABSTRACT**

(73) Assignee: **Huber+Suhner AG**, Herisau (CH)

A broadband patch antenna including a planar metallic patch sheet that is provided with right-angled edges and is disposed at a predetermined first height above and parallel to the planar base area of an electrically conducting reflector, and a device for feeding an RF signal into the metallic patch sheet. The feeding device encompasses a conductor which is guided in a vertical direction and is insulated through the base area of the reflector and terminates at a feeding point on the metallic patch sheet. To significantly improve the broadband range while keeping the structure of the antenna simple, the metallic patch sheet has the shape of a cross and the conductor of the feeding device is an inner conductor of a coaxial conductor that is positioned between the base area of the reflector and the metallic patch sheet.

(21) Appl. No.: **11/566,265**

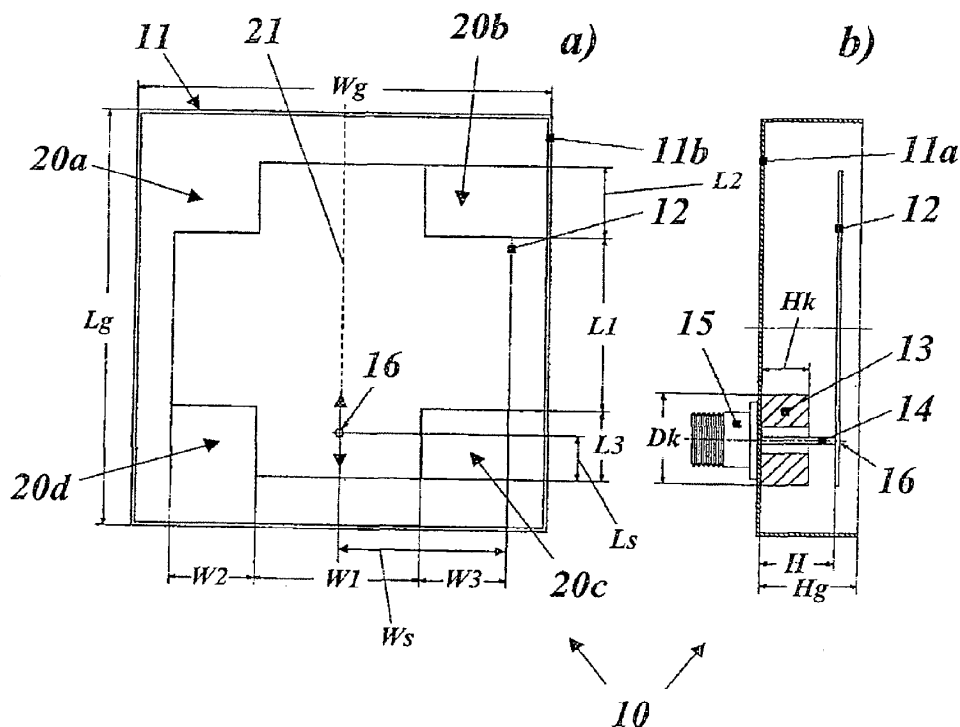
(22) Filed: **Dec. 4, 2006**

Related U.S. Application Data

(63) Continuation of application No. PCT/CH05/00319, filed on Jun. 7, 2005.

(30) **Foreign Application Priority Data**

Jun. 23, 2004 (CH) 1060/04





US 20070229360A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229360 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA APPARATUS AND MANUFACTURING METHOD THEREOF**

(21) Appl. No.: **11/581,376**

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

(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**, Iiyama (JP)

(30) **Foreign Application Priority Data**

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

Publication Classification

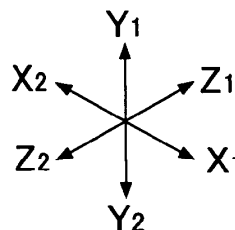
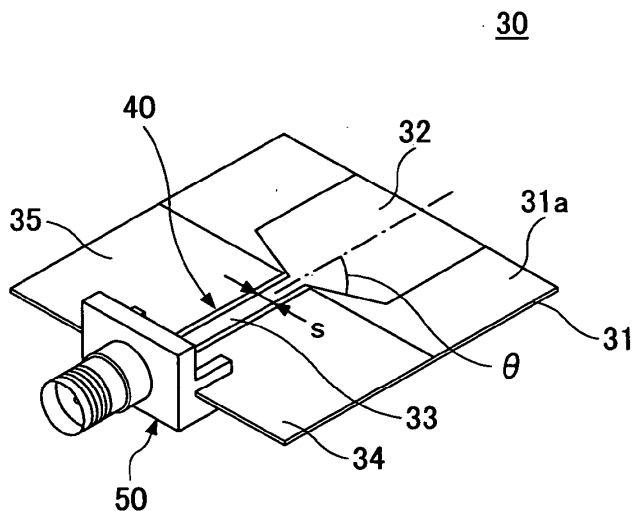
(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.** **343/700 MS; 343/846**

(57) **ABSTRACT**

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.

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





US 20070229361A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229361 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA APPARATUS**

(30) **Foreign Application Priority Data**

(75) Inventors: **Masahiro Yanagi**, Shinagawa (JP);
Shigemi Kurashima, Shinagawa (JP);
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Mar. 29, 2006 (JP) 2006-091602

Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.** **343/700 MS; 343/846**

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(57) **ABSTRACT**

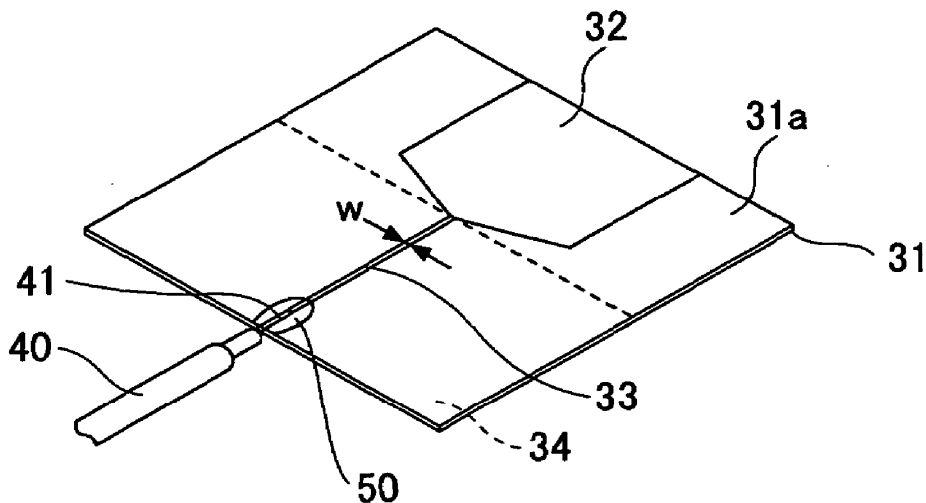
An antenna apparatus is disclosed that includes a dielectric substrate, an antenna element pattern that is formed on an upper face of the dielectric substrate, a strip line that is formed on the upper face of the dielectric substrate and extends from the antenna element pattern, and a ground pattern that is formed on the upper face of the dielectric substrate and is arranged on either side of the strip line. The strip line, the ground pattern, and the substrate form a coplanar microwave transmission line.

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

(21) Appl. No.: **11/583,931**

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

30





US 20070229362A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229362 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Shigemi Kurashima**, Shinagawa (JP); **Masahiro Yanagi**, Shinagawa (JP); **Hideki Iwata**, Shinagawa (JP); **Takashi Yuba**, Shinagawa (JP); **Masahiro Kaneko**, Shinagawa (JP); **Yuriko Segawa**, Shinagawa (JP); **Takashi Arita**, Shinagawa (JP)

Mar. 30, 2006 (JP) 2006-094428

Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.** **343/700 MS; 343/846**

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WASHINGTON, DC 20005

(57) **ABSTRACT**

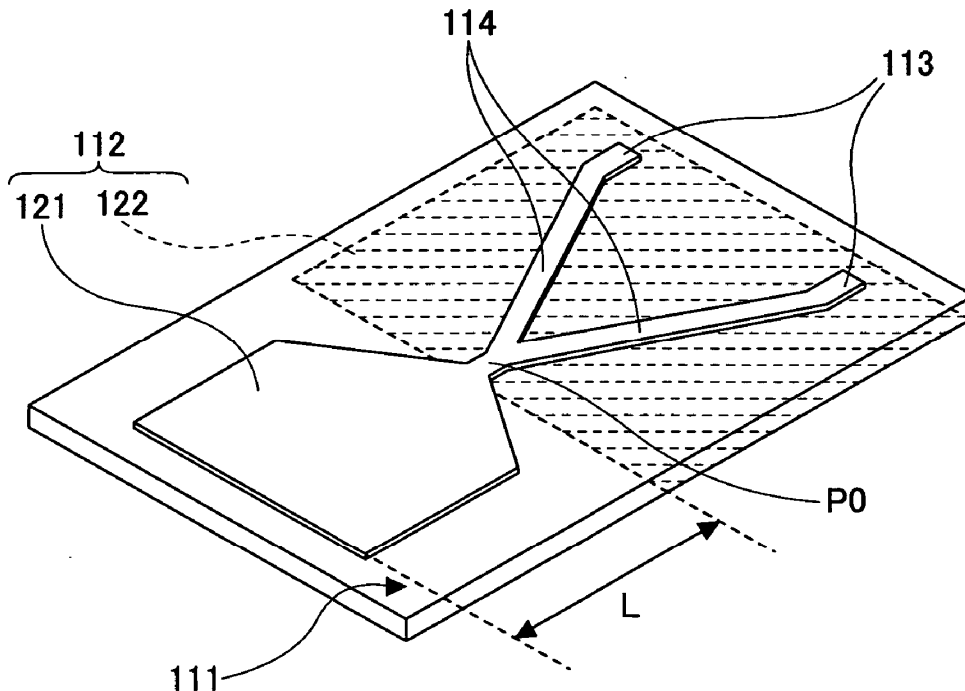
An antenna which can be used in different communication standards with a simple structure is disclosed. The antenna includes an antenna section which receives/transmits radio waves, input/output ports to which a signal to be input to the antenna section is input and from which a signal output from the antenna section is output, and transmission lines each of which connects the antenna section to a corresponding input/output port.

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

(21) Appl. No.: **11/584,574**

(22) Filed: **Oct. 23, 2006**

100





US 20070229363A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229363 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA DEVICE**

(75) Inventors: **Shigemi Kurashima**, Shinagawa (JP); **Masahiro Yanagi**, Shinagawa (JP); **Hideki Iwata**, Shinagawa (JP); **Takashi Yuba**, Shinagawa (JP); **Masahiro Kaneko**, Shinagawa (JP); **Yuriko Segawa**, Shinagawa (JP); **Takashi Arita**, Shinagawa (JP)

(21) Appl. No.: **11/585,902**

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

(30) **Foreign Application Priority Data**

Mar. 29, 2006 (JP) 2006-091605

Publication Classification

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

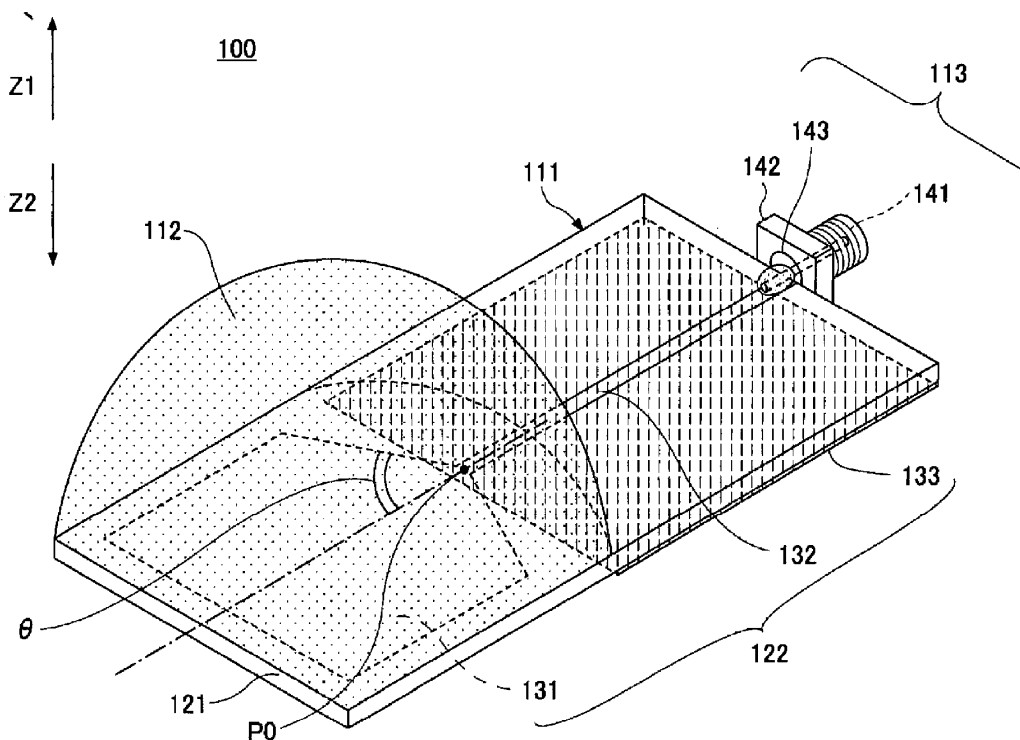
(52) **U.S. Cl.** **343/700 MS; 343/702**

(57) **ABSTRACT**

An antenna device includes an antenna part and a dielectric formed on the antenna part. The dielectric is formed to be thicker in a direction of directivity that the antenna part is to be made to have, than in another direction.

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





US 20070229366A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229366 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **MODIFIED INVERTED-F ANTENNA FOR WIRELESS COMMUNICATION**

(75) Inventors: **Je Woo Kim**, San Jose, CA (US);
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Oleksandr Sulima, Toronto (CA)

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(73) Assignee: **TeleCIS Wireless, Inc.**

(21) Appl. No.: **11/729,126**

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

Related U.S. Application Data

(60) Provisional application No. 60/786,896, filed on Mar. 28, 2006.

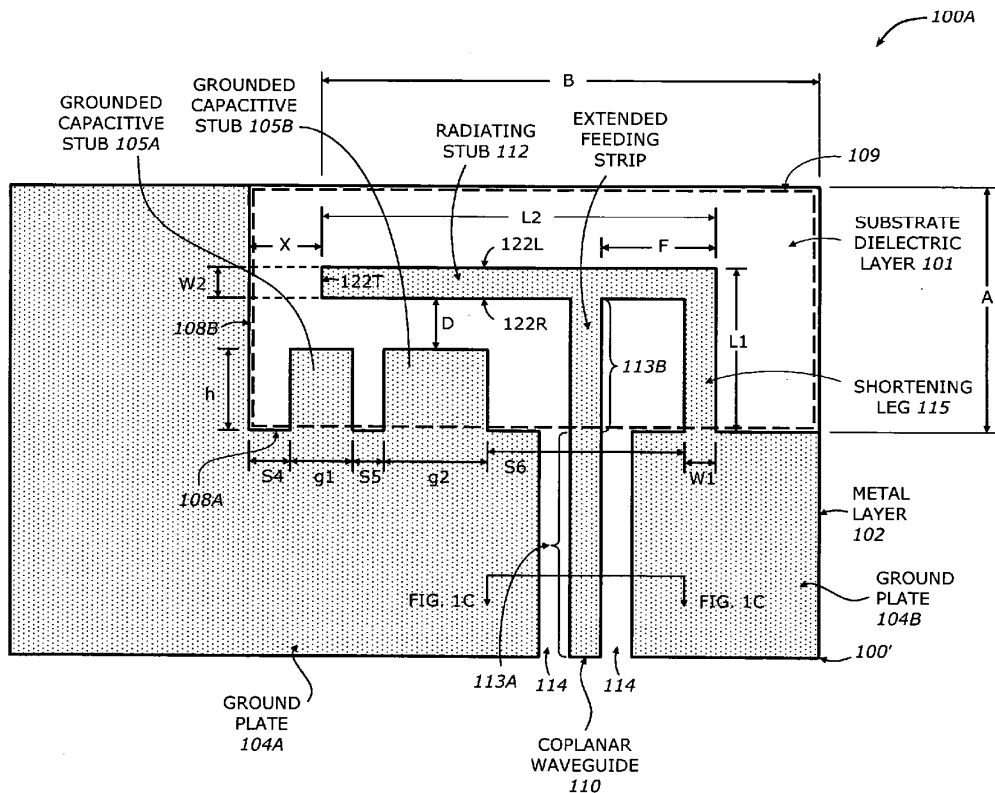
Publication Classification

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

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

(57) **ABSTRACT**

An embodiment of the present invention is a modified inverted-F antenna for wireless communication. The antenna circuit includes a dielectric substrate having a first surface, a radiating stub on the first surface of the dielectric substrate, and a first ground plate on the first surface of the dielectric substrate to couple to ground. The first ground plate includes one or more grounded capacitive stubs spaced apart from the radiating stub. The one or more grounded capacitive stubs tune performance parameters for the antenna circuit.





US 20070229367A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229367 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA APPARATUS**

Publication Classification

(75) Inventors: **Shinji Fukui**, Okazaki-city (JP);
Yuzi Sugimoto, Kariya-city (JP);
Taizou Mizutani, Nagoya-city (JP)

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

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

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(57) **ABSTRACT**

An antenna apparatus has a ground and an antenna element. The antenna element includes a feeding portion and two turnback portions. The two turnback portions are on different radial lines, which originate from the feeding point to depart from each other on a surface of the antenna element. The two turnback portions are individually coupled with the ground via connection portions to thereby form two loops starting from the feeding portion and returning to the ground. A high dielectric member is provided as having a predetermined thickness and a surface identical to the surface of the ground and opposing the ground face-to-face. Therefore, the high frequency electric current applied to the feeding portion turns back at the turnback portions to return to the ground via the connection portions while forming two current loops.

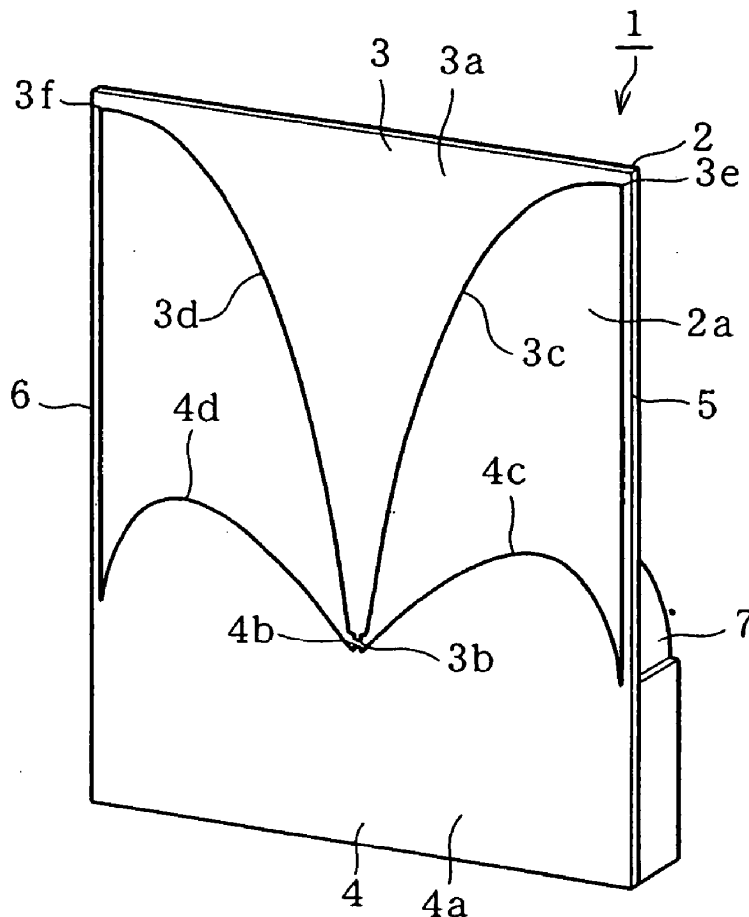
(73) Assignees: **DENSO Corporation**, Kariya-city (JP); **Nippon Soken, Inc.**, Nishio-city (JP)

(21) Appl. No.: **11/729,433**

(22) Filed: **Mar. 28, 2007**

(30) **Foreign Application Priority Data**

Mar. 31, 2006 (JP) 2006-098547





US 20070229370A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229370 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA RADIATOR ASSEMBLY AND RADIO COMMUNICATIONS ASSEMBLY**

(57) **ABSTRACT**

(76) Inventors: **Yu Chee Tan**, Singapore (SG); **Yew Siew Tay**, Singapore (SG)

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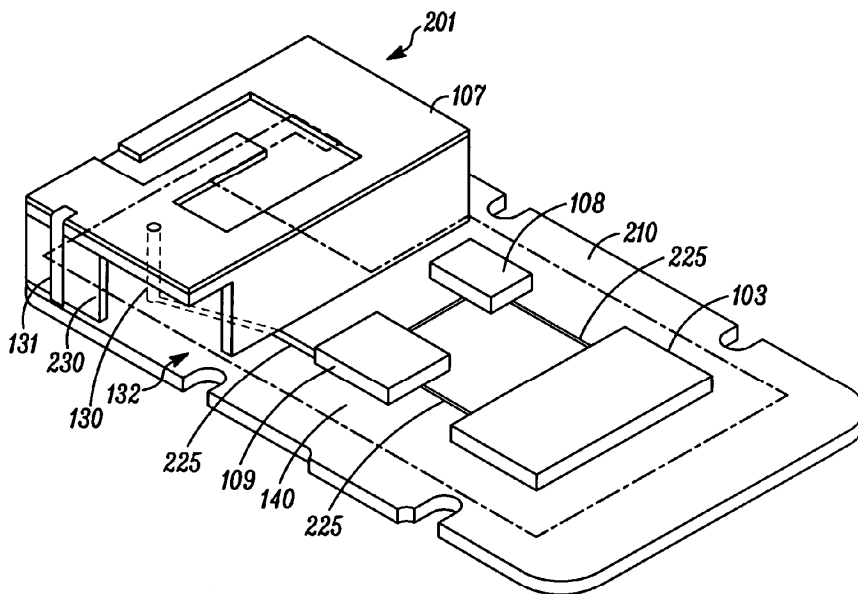
(21) Appl. No.: **11/390,873**

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

Publication Classification

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

An antenna radiator assembly (200) and radio communications assembly (1) comprising a circuit board (210) supporting electrical conductors (225), one of the electrical conductors (225) being coupled to a feed point (130), and the circuit board (210) having a ground plane (140) formed from at least one conductive sheet. There is a tuning resonator (132) comprising a tuning plate (310) operatively coupled to a tuning line (320), the tuning plate (310) being formed from part of the conductive sheet. An antenna radiator element (107) is spaced from said circuit board (210) and coupled to the feed point (130), and when viewed in plan view there is an overlapping area where an overlapping surface area of the antenna radiator element overlaps an overlapping surface area of the circuit board thereby forming a sandwiched dielectric region therebetween. A ground connector inductively couples the antenna radiator element (220) to the ground plane (140), wherein the tuning resonator (132) is disposed in the overlapping surface area.



200



US 20070229371A1

(19) **United States**

(12) **Patent Application Publication**
Rowell

(10) **Pub. No.: US 2007/0229371 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **MEANDER FEED STRUCTURE ANTENNA SYSTEMS AND METHODS**

Publication Classification

(75) Inventor: **Corbett Rowell, Sha Tin (HK)**

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

(52) **U.S. Cl.** **343/702; 343/803**

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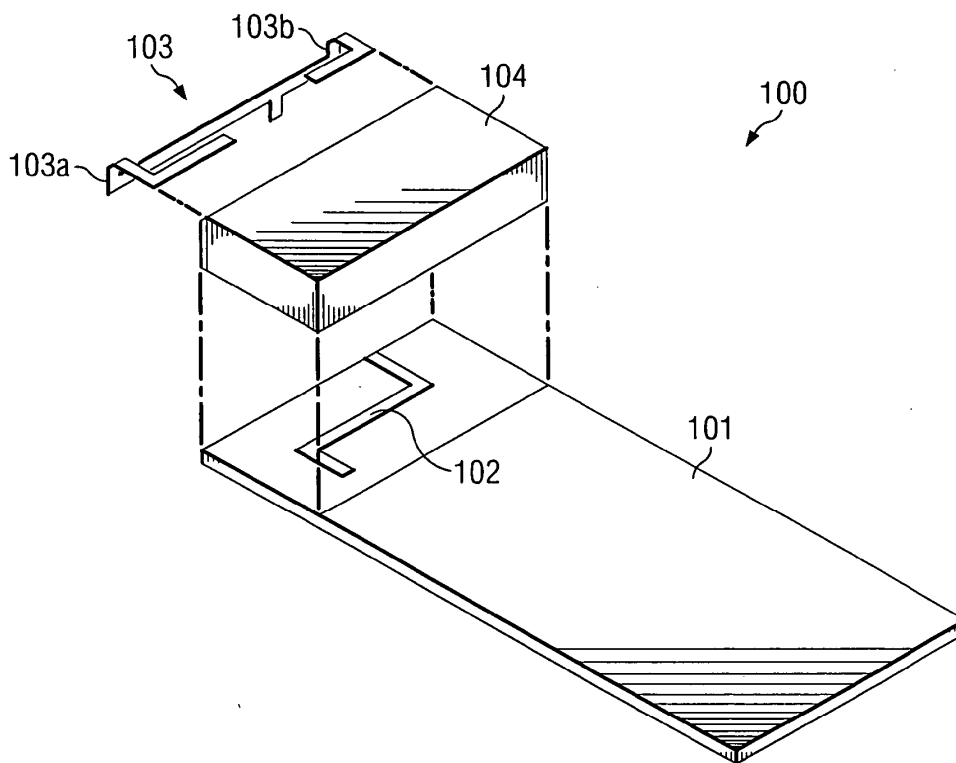
(57) **ABSTRACT**

(73) Assignee: **Hong Kong Applied Science and Technology Research Institute Co., Ltd., Sha Tin (HK)**

A transmitting and receiving system including an antenna element having first and second current paths, and a meander feed line connected to said first and second current paths, the meander feed line including a radiating portion parallel to the first current path, wherein a current in the radiating portion is in a direction opposite of a current in the first current path, and wherein a current in the second current path is in a direction the same as the current in said radiating portion.

(21) Appl. No.: **11/392,234**

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





US 20070229372A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229372 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA CONFIGURED FOR LOW FREQUENCY APPLICATION**

Publication Classification

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

(52) **U.S. Cl.** 343/702; 343/700 MS; 343/873

(75) Inventors: **Laurent Desclos**, San Diego, CA (US);
Sebastian Rowson, San Diego, CA (US);
Rowland Jones, Carlsbad, CA (US)

(57) **ABSTRACT**

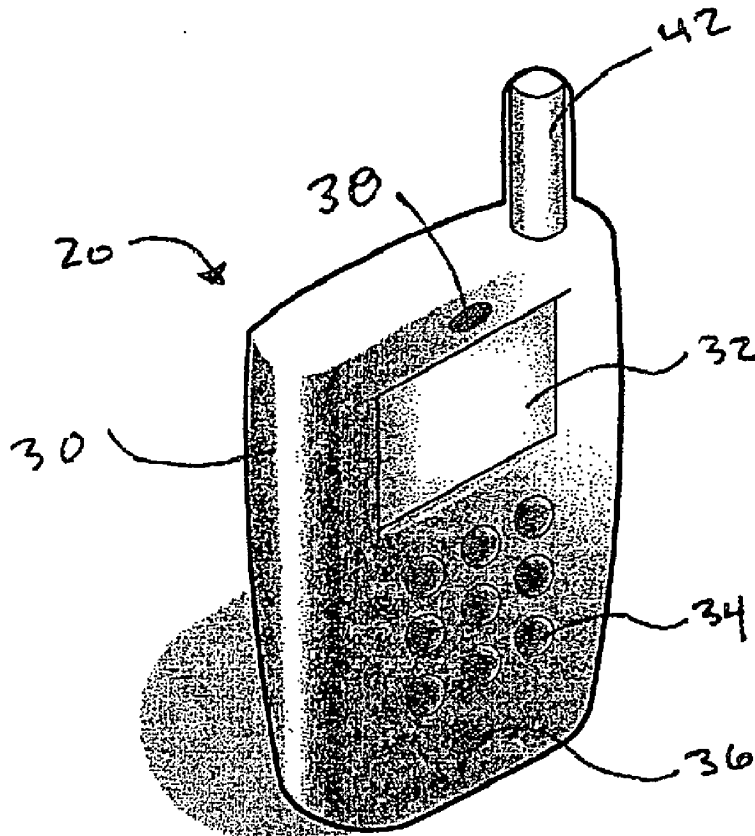
An antenna configured for low frequency applications on a mobile device includes an antenna element coupled to a conductive structure which, in turn, is coupled to the user of the mobile device such that the user of the mobile device effectively becomes part of the antenna. The conductive structure can include, for example, the device housing being made from a conductive material, a conductive structure embedded inside the device housing, or conductive pads exposed in the device housing. The antenna element is electrically connected to the conductive structure and the user can be coupled to the conductive structure either through direct contact or through capacitive coupling.

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(73) Assignee: **Ethertronics**

(21) Appl. No.: **11/396,442**

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





US 20070229381A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229381 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **FREQUENCY TUNABLE PLANAR
INTERNAL ANTENNA**

Publication Classification

(75) Inventors: **Mika Piisila, Kempele (FI); Mauri
Suvanto, Oulu (FI)**

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/24 (2006.01)
(52) **U.S. Cl.** **343/770; 343/702**

Correspondence Address:
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(57) **ABSTRACT**

A frequency tunable internal antenna includes a substantially planar radiating element with a feed point and a switching element all coupled to the radiating element. The radiating element includes a plurality of slots configured to form a first branch and a second branch within the radiating element. The plurality of slots are configured relative to the feed point such that in operation the first branch acts as a first resonator having a first native electrical length and the second branch acts as a second resonator having a second native electrical length. The switching element is configurable in a first position and a second position, where in the first position the switching element connects to a portion of the first branch to decrease the electrical length of the first resonator, and in the second position the switching element connects to a portion of the second branch to decrease the electrical length of the second resonator. In some embodiments the antenna is a PIFA antenna and further includes a short point.

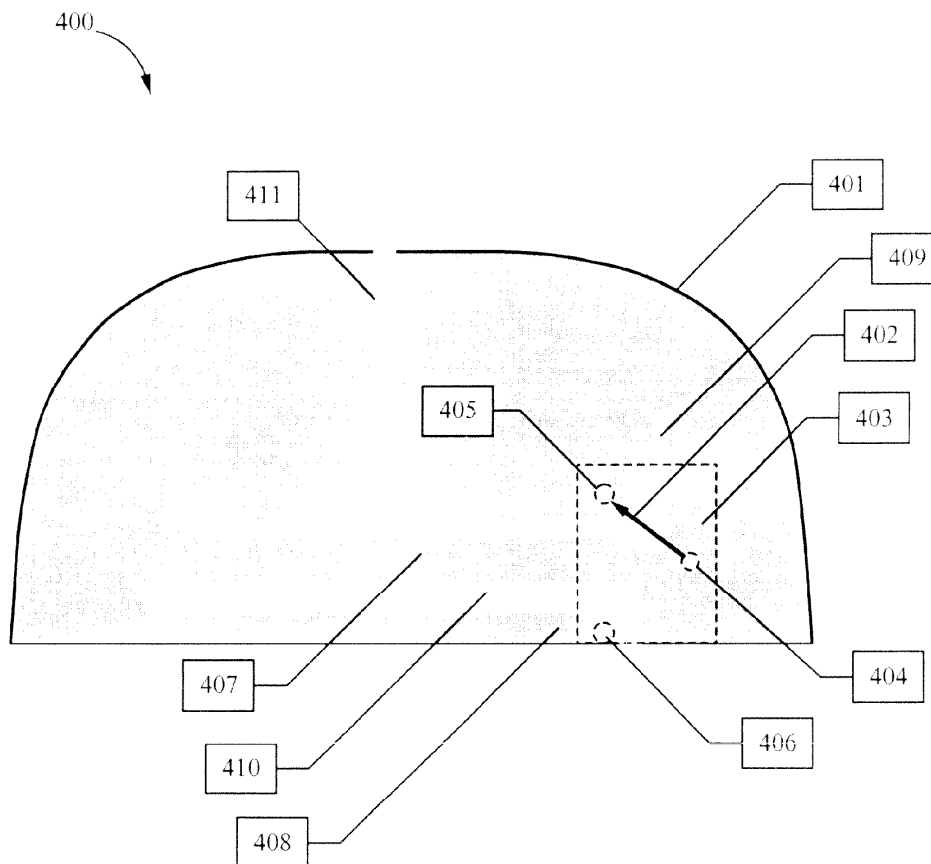
(73) Assignee: **Flextronics AP, LLC**

(21) Appl. No.: **11/729,499**

(22) Filed: **Mar. 28, 2007**

Related U.S. Application Data

(60) Provisional application No. 60/787,449, filed on Mar. 29, 2006.





US 20070229384A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0229384 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **PLANE ANTENNA**

Publication Classification

(75) Inventors: **Takashi Yamagajo**, Kawasaki (JP); **Toru Maniwa**, Kawasaki (JP); **Andrey Andrenko**, Kawasaki (JP)

(51) **Int. Cl.**
H01Q 9/28 (2006.01)
H01Q 1/38 (2006.01)

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

Correspondence Address:
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(57) **ABSTRACT**

A plane antenna comprises a substrate having a first surface and a second surface, a first radiating element, a first power feeding pattern connected to the radiating element, and a first non-power feeding loop type radiating element provided adjacent to the first radiating element, all disposed on the first surface of the substrate, and a second radiating element, a second power feeding pattern connected to the radiating element, and a second non-power feeding loop type radiating element provided adjacent to the second radiating element, all disposed on the second surface of the substrate.

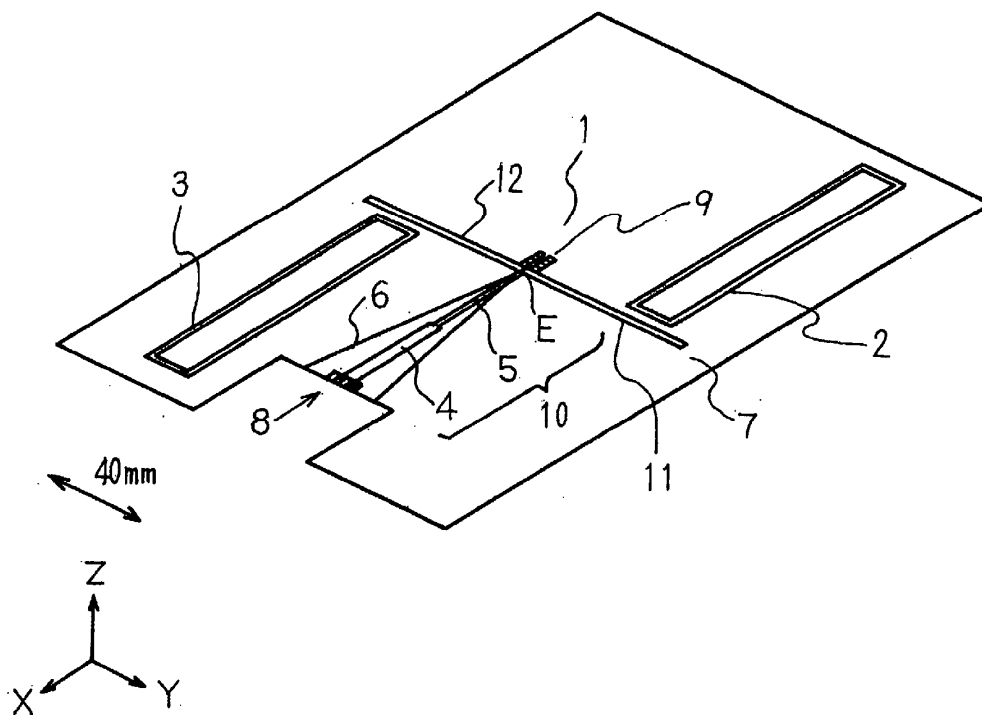
(73) Assignee: **FUJITSU LIMITED**

(21) Appl. No.: **11/589,914**

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

(30) **Foreign Application Priority Data**

Mar. 28, 2006 (JP) 2006-089168





US 20070229387A1

(19) **United States**

(12) **Patent Application Publication**
Pelzer

(10) **Pub. No.: US 2007/0229387 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **ANTENNA CONFIGURATION**

(30) **Foreign Application Priority Data**

(75) Inventor: **Heiko Pelzer**, Erkelenz (DE)

Mar. 25, 2004 (EP) 04101236.0

Publication Classification

(51) **Int. Cl.**
H01Q 3/24 (2006.01)

(52) **U.S. Cl.** **343/876**

(57) **ABSTRACT**

Regarding an antenna configuration (1) preferably provided for a telecommunication device and comprising a first resonator structure (6) and second resonator structure (RS) being capacitive coupled with the first resonator structure (6) it is suggested to provide the antenna configuration (1) with a control electrode (2) and a switching stage (3), said control electrode (2) by means of the switching stage (3) being switchably connected to ground (G) and said switching stage (3) enabling to change capacitive coupling of the two resonator structures (6, RS) and thus to change the resonance frequency of the antenna configuration (1) and making possible to switch between a first frequency range and a second frequency range for enhancing the bandwidth and achieving improved matching of the antenna configuration (1).

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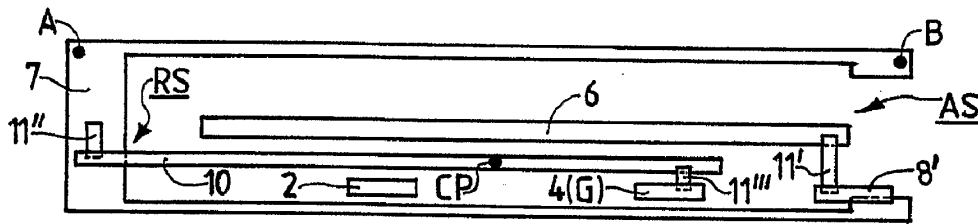
(73) Assignee: **KONINKLIJKE PHILIPS ELEC-**
TRONICS N.V., Eindhoven (NL)

(21) Appl. No.: **10/594,021**

(22) PCT Filed: **Mar. 3, 2005**

(86) PCT No.: **PCT/IB05/50788**

§ 371(c)(1),
(2), (4) Date: **Apr. 24, 2007**





US 20070229389A1

(19) **United States**

(12) **Patent Application Publication**
Seybold

(10) **Pub. No.: US 2007/0229389 A1**

(43) **Pub. Date: Oct. 4, 2007**

(54) **DUAL GAIN HANDHELD RADIO ANTENNA**

(52) **U.S. Cl. 343/900; 343/895; 343/702**

(75) Inventor: **John S. Seybold**, Malabar, FL (US)

(57) **ABSTRACT**

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(73) Assignee: **HARRIS CORPORATION**, Melbourne, FL

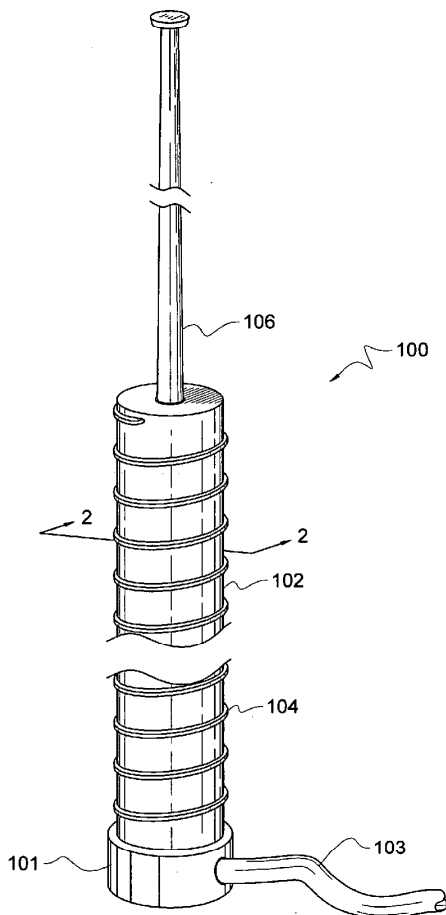
(21) Appl. No.: **11/397,280**

(22) Filed: **Apr. 4, 2006**

Publication Classification

(51) **Int. Cl.**
H01Q 9/30 (2006.01)
H01Q 1/36 (2006.01)

The present invention concerns a dual gain antenna system **100** with an integrated system to control a matching network **214**. The dual gain antenna system **100** comprises an antenna that includes a first helically shaped antenna element **104**, a second vertical antenna element **106**, and a base portion **101**. The first antenna element **104** is disposed around a longitudinal axis of a dielectric rod **102** that contains a bore **205**. The second antenna element **106** is disposed within the longitudinal axis of the dielectric rod bore **205**. A sensor **215** detects when the second antenna element **106** is in the extended position and transmits a control signal to a matching system **214** that selectively controls the impedance matching network **214** between the antenna and the RF feed line **103**.





US 20070236390A1

(19) **United States**

(12) **Patent Application Publication**
Chang

(10) **Pub. No.: US 2007/0236390 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **DUAL-BAND CIRCULARLY POLARIZED ANTENNA**

Publication Classification

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

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

(75) Inventor: **The-Nan Chang**, Taipei City (TW)

(57) **ABSTRACT**

Correspondence Address:
BACON & THOMAS, PLLC
625 SLATERS LANE
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ALEXANDRIA, VA 22314

A dual-band circularly polarized antenna is disclosed, more particularly a dual-band circularly polarized antenna being able to transmit and receive circularly polarized signals at two different frequency bands, simultaneously. The dual-band circularly polarized antenna of the present invention comprises a first polarized radiating element with at least one corner being chamfered, a plurality of second polarized radiating elements with each of the second polarized radiating elements having at least one corner being chamfered, a signal distributor for distributing an electrical signal, a signal coupling unit electrically connecting with the first polarized radiating unit and the signal distributor, and a ground plate. The dual-band circularly polarized antenna of the present invention not only can be manufactured with a low cost, but also has a simpler structure. As a result, the dual-band circularly polarized antenna of the present invention can be easily integrated into the antenna module of an RFID system.

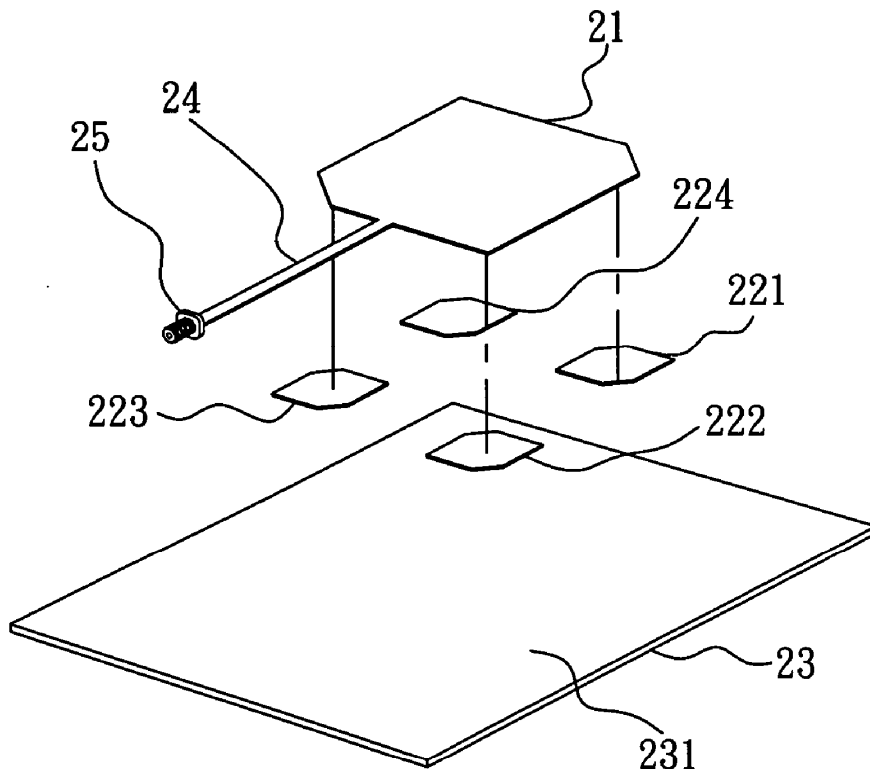
(73) Assignee: **Tatung Company**, Taipei City (TW)

(21) Appl. No.: **11/487,377**

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

(30) **Foreign Application Priority Data**

Apr. 6, 2006 (TW)..... 095112155





US 20070236391A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0236391 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **MULTI-BAND BUILT-IN ANTENNA FOR INDEPENDENTLY ADJUSTING RESONANT FREQUENCIES AND METHOD FOR ADJUSTING RESONANT FREQUENCIES**

(86) PCT No.: **PCT/KR05/01947**

§ 371(c)(1),
(2), (4) Date: **Dec. 16, 2006**

(75) Inventors: **Byung-Hoon Ryou**, Seoul (KR);
Won-Mo Sung, Gyeonggi-do (KR);
Jeong-Pyo Kim, Seoul (KR)

(30) **Foreign Application Priority Data**

Jun. 26, 2004 (KR) 10-2004-0048671

Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)

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

Correspondence Address:
PATENTTM.US
P. O. BOX 82788
PORTLAND, OR 97282-0788 (US)

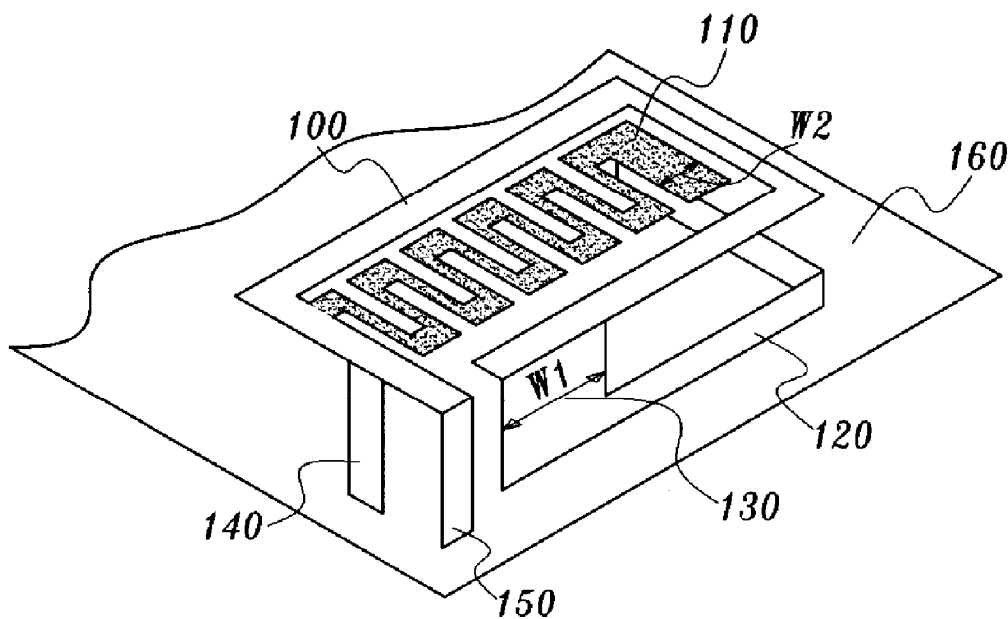
(57) **ABSTRACT**

The invention relates to built-in antenna. Specifically, a multi-band built-in antenna having plurality of resonant frequencies and a method for adjusting resonant frequencies are provided, wherein resonant frequencies are able to be adjusted independently without affecting one another, for each resonant frequencies are adjusted separately through separate radiating elements.

(73) Assignee: **E.M.W. ANTENNA CO., LTD.**, Seoul (KR)

(21) Appl. No.: **11/570,769**

(22) PCT Filed: **Jun. 23, 2005**





US 20070236392A1

(19) **United States**

(12) **Patent Application Publication**
Lee

(10) **Pub. No.: US 2007/0236392 A1**

(43) **Pub. Date: Oct. 11, 2007**

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

Publication Classification

(75) Inventor: **Chang-Jung Lee**, Taoyuan County
(TW)

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

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

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

(57) **ABSTRACT**

A dual-band inverted-F antenna includes a first radiating unit, a second radiating unit and a third radiating unit. The first radiating unit has a first long side and a first short side. The second radiating unit has a second long side and a second short side. The second long side is disposed opposite the first short side of the first radiating unit. The third radiating unit has a first radiating part, a second radiating part and a third radiating part. The second radiating part and the third radiating part are respectively extended from one side of the first radiating part. There is a gap between the third radiating unit and the first radiating unit.

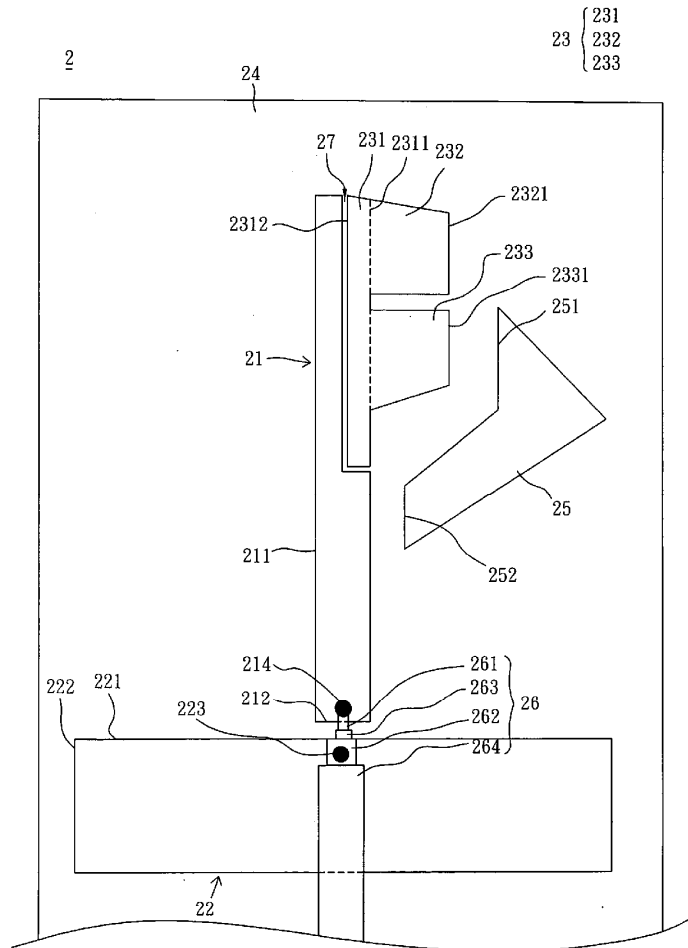
(73) Assignee: **Arcadyan Technology Corporation**

(21) Appl. No.: **11/593,107**

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

(30) **Foreign Application Priority Data**

Apr. 7, 2006 (TW)..... 095112306





US 20070236394A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0236394 A1**

(43) **Pub. Date: Oct. 11, 2007**

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

Publication Classification

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 5/00 (2006.01)

(75) Inventors: **Hiroyuki Aoyama**, Saitama (JP);
Kazuo Kazama, Saitama (JP)

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

(57) **ABSTRACT**

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VIENNA, VA 22182-3817 (US)

An antenna device is provided which is capable of operating in a wider band of frequencies (in a plurality of transmitting and receiving frequency bands), achieving an excellent gain, maintaining non-directivity of vertically polarized waves in each of the transmitting and receiving frequency bands, and saving space. The antenna device includes the first antenna **101** being a chip-type antenna operating in a GSM band, second antenna **102** being a pattern antenna operating in DCS and PCS bands, third antenna **103** being a layer-stacked antenna operating in an UMTS band, all being mounted on a substrate **100**. The second antenna **102** is connected to a line **105** extending from a power feeding port **104** connected to the first antenna **101**. A gap is interposed between the second antenna **102** and third antenna **103** wherein the second antenna **102** is capacitively coupled to the third antenna **103** on the substrate **100** with no antenna switch being provided.

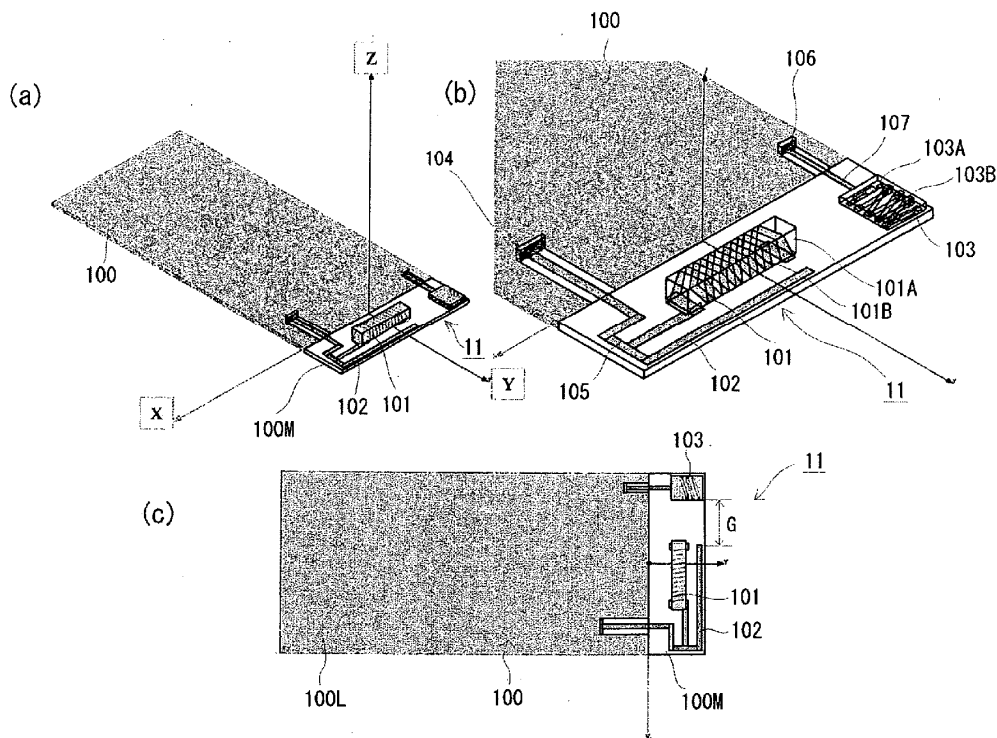
(73) Assignee: **HITACHI METALS, LTD.**, Tokyo (JP)

(21) Appl. No.: **11/723,388**

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

(30) **Foreign Application Priority Data**

Apr. 10, 2006 (JP) 2006-107178





US 20070236395A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0236395 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **NANO ANTENNA**

Publication Classification

(75) Inventors: **Jonathan L. Sullivan**, Lincoln, NE (US); **Robert Slawinski**, Lincoln, NE (US); **Edward Carter**, Lincoln, NE (US)

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

(57) **ABSTRACT**

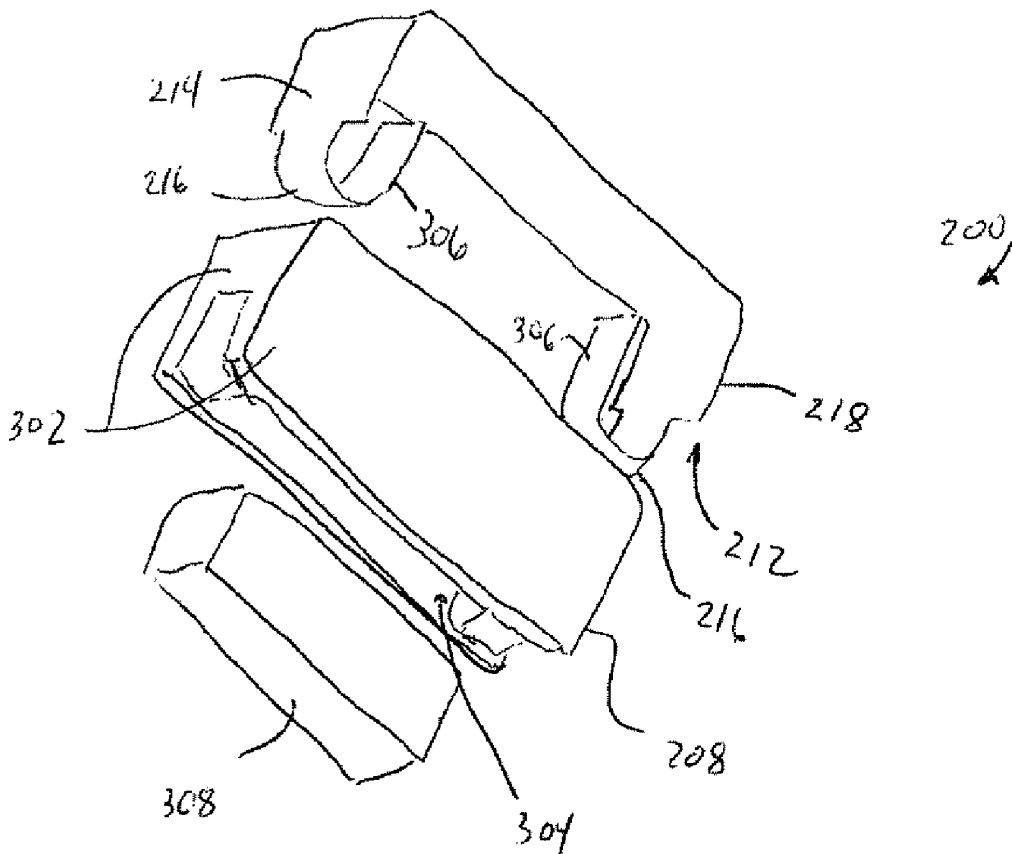
An antenna for a wireless device is provided. The antenna mounts on a substrate such as a printed circuit board. The antenna includes a carrier having sidewalls with inside surfaces defining an internal recess. A conductive trace resides on the carrier. The conductive trace having a first end and a second end opposite the first end with at least one lead extending from an end and extending the sidewall. The lead terminates in a hook that traversing the sidewall and has a portion extending along the inside surface of the internal recess. A locking clip is sized to fit in the internal recess and frictionally lock the portion between an outside surface of the locking clip and the inside surface of the internal recess such that the locking clip locks the portion, the at least one hook, the at least one lead, and the conductive trace in position on the carrier.

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HOLLAND & HART, LLP
P.O. BOX 8749
DENVER, CO 80201

(73) Assignee: **Centurion Wireless Technologies, Inc.**, Lincoln, NE (US)

(21) Appl. No.: **11/278,707**

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





US 20070236396A1

(19) **United States**

(12) **Patent Application Publication**
Gao

(10) **Pub. No.: US 2007/0236396 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **ANTENNA STRUCTURE**

Publication Classification

(75) Inventor: **Yan-Ping Gao**, Shanghai City (CN)

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

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

Correspondence Address:
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ALEXANDRIA, VA 22314

(57) **ABSTRACT**

The present invention is to provide an antenna structure comprising a dielectric substrate and a transmitting portion provided on one surface of the dielectric substrate, wherein the transmitting portion has one end formed with first and second radiators and the other end bent toward the other surface of the dielectric substrate, the first radiator has one end coupled to the transmitting portion and the other end extended away from the transmitting portion for receiving signals of a first operating frequency, and the second radiator has one end coupled to a joining portion of the first radiator and the transmitting portion and the other end extended around one end of the first radiator and is spaced from the first radiator by a gap for receiving signals of a second operating frequency. Thus, the antenna structure is capable of receiving signals of two different operating frequencies.

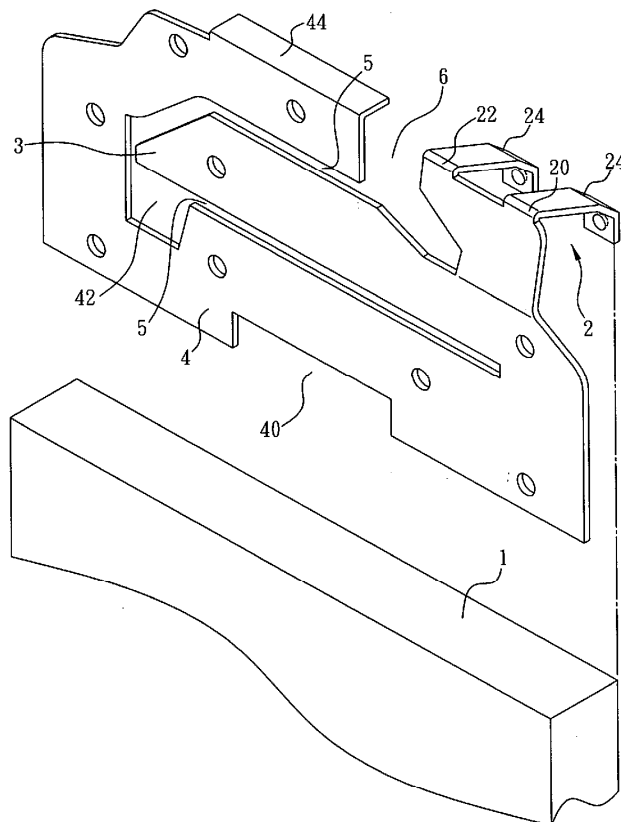
(73) Assignee: **Inventec Appliances Corp.**, Taipei (TW)

(21) Appl. No.: **11/599,989**

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

(30) **Foreign Application Priority Data**

Apr. 6, 2006 (TW)..... 095205751





US 20070236398A1

(19) **United States**

(12) **Patent Application Publication**
Nam

(10) **Pub. No.: US 2007/0236398 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **MOBILE COMMUNICATION TERMINAL
INCORPORATING INTERNAL ANTENNA**

(30) **Foreign Application Priority Data**

Apr. 6, 2006 (KR) 10-2006-0031383

Nov. 23, 2006 (KR) 10-2006-0116279

(75) Inventor: **Soo Hyun Nam**, Gyeonggi-do
(KR)

Publication Classification

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

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

(57) **ABSTRACT**

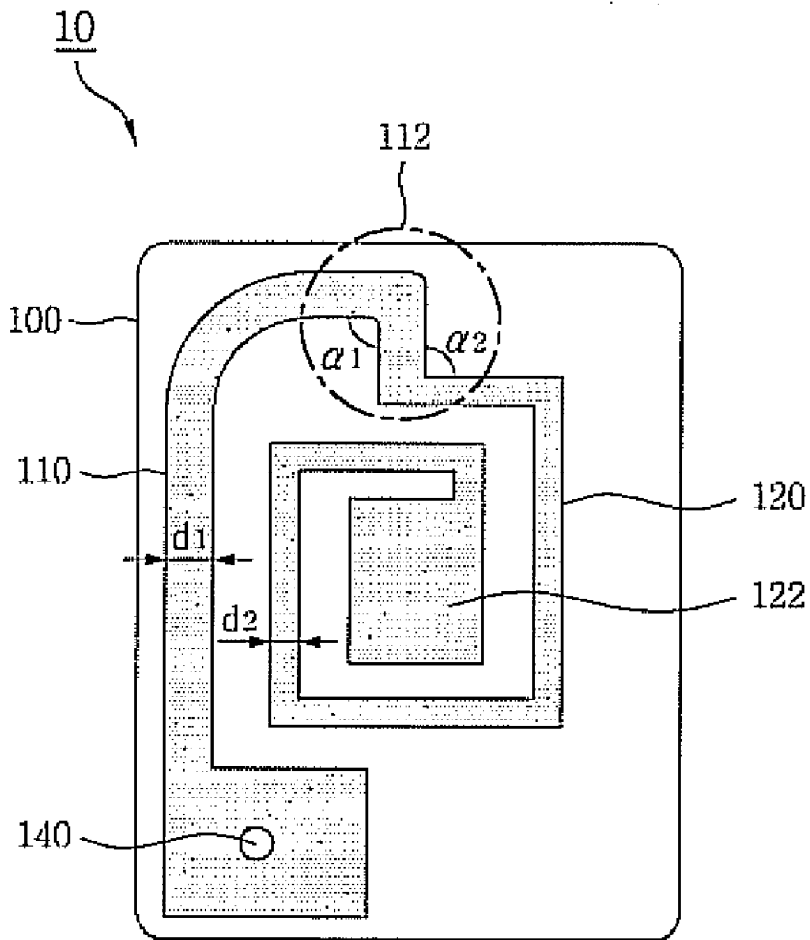
A mobile communication terminal and an internal multi-band antenna are described. The internal antenna is formed on a substrate and has a first pattern and a second pattern. Both patterns may be formed on one side of the substrate, or one pattern may be formed on each side of the substrate. The first pattern and the second pattern have different widths. The terminal may be of any type such as a folding type terminal, a slider-type terminal, or a bar type terminal.

Correspondence Address:
**LEE, HONG, DEGERMAN, KANG &
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660 S. FIGUEROA STREET, Suite 2300
LOS ANGELES, CA 90017

(73) Assignee: **LG Electronics Inc.**

(21) Appl. No.: **11/695,543**

(22) Filed: **Apr. 2, 2007**





US 20070236399A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0236399 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **ANTENNA DEVICE WITH ANTENNA
ELEMENT MATCHED BY RESONANCE
CIRCUIT**

(30) **Foreign Application Priority Data**

Apr. 7, 2006 (TW)..... 95112537

Publication Classification

(76) Inventors: **Yu-Chiang Cheng**, Taipei City (TW);
Ping-Cheng Chang, Chaozhou Town
(TW); **Cheng-Zing Chou**, Xinying City
(TW)

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

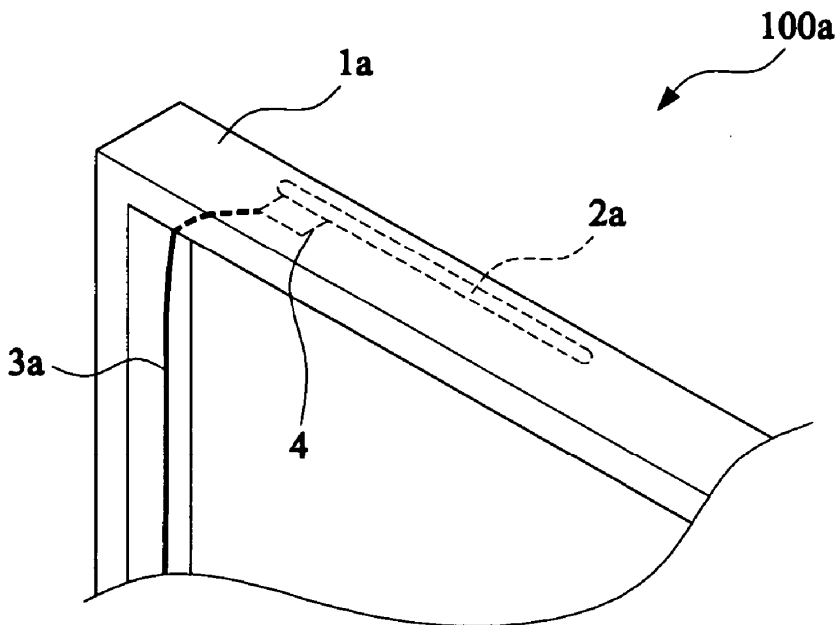
Correspondence Address:
ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043 (US)

(57) **ABSTRACT**

Disclosed is an antenna device with an antenna element with a predetermined shorten length, and a resonance circuit coupled to the antenna element, having a predetermined resonance frequency for matching the shorten length of the antenna element to adaptively make the antenna element in response to and transceive a wireless signal with a predetermined frequency.

(21) Appl. No.: **11/474,935**

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





US 20070236401A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0236401 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **WIRELESS APPARATUS CAPABLE OF CONTROLLING RADIATION PATTERNS OF ANTENNA**

Publication Classification

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

(76) Inventors: **Shih-Huang Yeh**, Tou-Liu City (TW);
Zih-Hao Lu, Taichung Hsien (TW);
Chia-Lun Tang, Miao-Li Hsien (TW)

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

Correspondence Address:
LIN & ASSOCIATES INTELLECTUAL PROPERTY
P.O. BOX 2339
SARATOGA, CA 95070-0339 (US)

(57) **ABSTRACT**

A wireless apparatus capable of controlling radiation patterns and directions of antenna is provided. It comprises an antenna element, a ground plane, an antenna feed-point, and at least one slot or slit formed on the ground plane. The inclusion of such slots or slits in the wireless apparatus improves the radiation directivity of antenna, and greatly enhances the antenna gain on the horizontal plane. It also resolves the problems caused by shift of radiation patterns of antenna and the poor antenna gains for a conventional antenna apparatus. The wireless apparatus of the present invention has the advantages of simple structure and easy fabrication. The invention can be applied to various kinds of antennas, such as monopole antenna, shorted-monopole antenna, dipole antenna, loop antenna, and planar inverted-F antenna, etc.

(21) Appl. No.: **11/762,763**

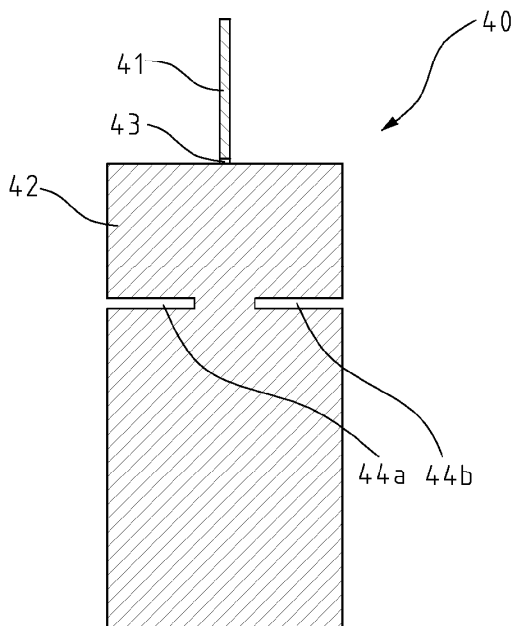
(22) Filed: **Jun. 13, 2007**

Related U.S. Application Data

(62) Division of application No. 11/221,148, filed on Sep. 7, 2005.

(30) **Foreign Application Priority Data**

May 5, 2005 (TW)..... 94114506





US 20070236405A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0236405 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **ANTENNA WHICH IS MADE FROM A
PHOTONIC BAND-GAP (PBG) MATERIAL
AND WHICH COMPRISES A LATERAL
WALL SURROUNDING AN AXIS**

(30) **Foreign Application Priority Data**

May 19, 2004 (FR)..... 0405485

Publication Classification

(76) Inventors: **Bernard Jecko**, Rilhac Rancon (FR);
Laure Freytag, Lasserre (FR); **Elisa
Pointereau**, Limoges (FR)

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

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

Correspondence Address:
YOUNG & THOMPSON
745 SOUTH 23RD STREET
2ND FLOOR
ARLINGTON, VA 22202 (US)

(57) **ABSTRACT**

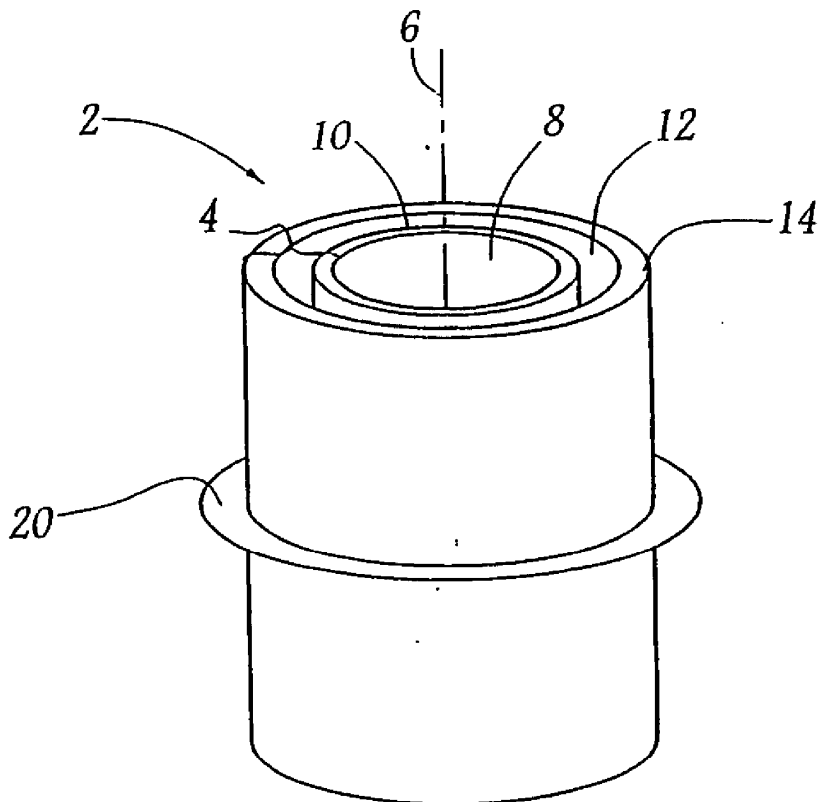
A antenna made from a photonic band-gap (PBG) material, includes: a lateral wall (4) which is made from a PBG material and which completely surrounds a central axis (6), the wall being disposed at a distance from the central axis such as to form a central resonant cavity; and at least one radiating element (34) which is placed inside the cavity. Each radiating element is positioned inside the cavity in order to excite an electromagnetic field parallel to the central axis and the radiating element(s) can excite the modes of the central cavity having a radial resonance more strongly than the other modes of the cavity.

(21) Appl. No.: **11/579,317**

(22) PCT Filed: **Apr. 29, 2005**

(86) PCT No.: **PCT/FR05/01087**

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





US 20070240297A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0240297 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **CHIP ANTENNA**

(30) **Foreign Application Priority Data**

(76) Inventors: **Chang-Fa YANG**, Taipei City (TW);
Jen-Hsun Li, Taipei City (TW);
Jing-Ming Chen, Taichung Hsien
(TW); **Jun-Hong Lin**, San Chung City
(TW); **Shun-Tian Lin**, Hsi Chih City
(TW)

Nov. 19, 2003 (TW)..... 92132453

Publication Classification

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

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

Correspondence Address:
GLENN PATENT GROUP
Suite L
3475 Edison Way
Menlo Park, CA 94025 (US)

(57) **ABSTRACT**

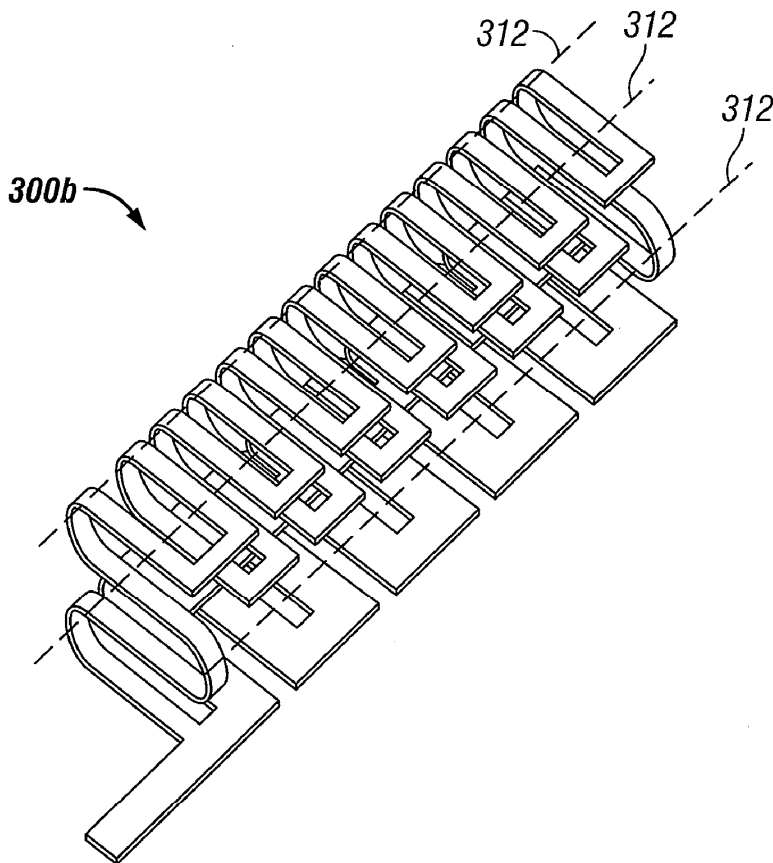
(21) Appl. No.: **11/733,123**

(22) Filed: **Apr. 9, 2007**

Related U.S. Application Data

(62) Division of application No. 10/960,310, filed on Oct. 6, 2004, now Pat. No. 7,212,165.

A chip antenna has an antenna body and a package. The antenna body has multiple meandered metal lines and is encapsulated with the package. The material of the package is a dielectric composite formed with polymers and ceramic powders, which has a dielectric constant designed for the antenna. The characteristics of the chip antenna are determined by the structures of the antenna body and the dielectric constant of the package. Thus, a requirement for tiny structures in antenna applications can be satisfied.





US 20070241200A1

(19) **United States**

(12) **Patent Application Publication**
Sawachi

(10) **Pub. No.: US 2007/0241200 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **ANTENNA-CONTAINING SUBSTRATE**

Publication Classification

(75) Inventor: **Youichi Sawachi**, Asaka-shi (JP)

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

Correspondence Address:
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W., SUITE
800
WASHINGTON, DC 20037

(52) **U.S. Cl.** **235/492**

(57) **ABSTRACT**

(73) Assignee: **FUJIFILM Corporation**,
Minato-ku (JP)

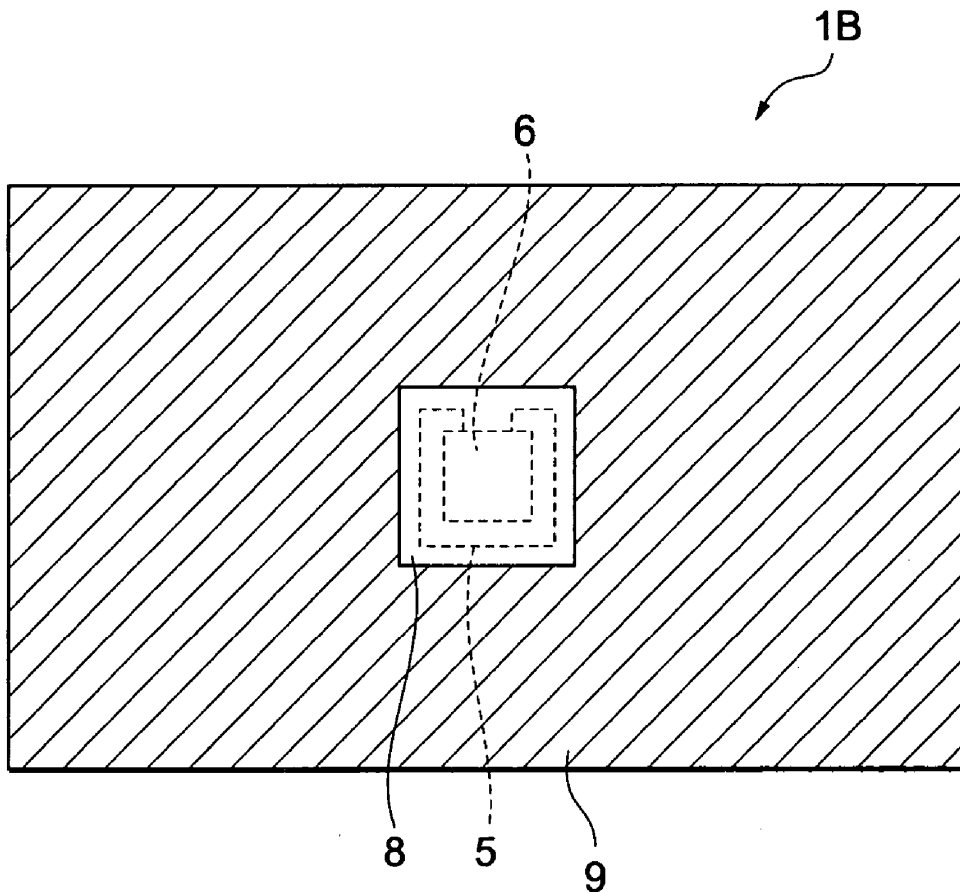
To increase an area in which a component can be mounted in a substrate including an IC chip to which an antenna is connected. For this purpose, an opening at the center of a center substrate is provided with an IC chip. An antenna is wired to an upper surface of the center substrate so as to enclose the IC chip. A top substrate is laminated and fixed on the upper surface of the center substrate. A bottom substrate is laminated and fixed on a lower surface of the center substrate. Since the antenna is not wired to an upper surface of the top substrate and a lower surface of the bottom substrate, a component can be mounted on the entire upper and lower surfaces. This allows a large number of components to be mounted.

(21) Appl. No.: **11/785,338**

(22) Filed: **Apr. 17, 2007**

(30) **Foreign Application Priority Data**

Apr. 17, 2006 (JP) 2006-112836
Feb. 23, 2007 (JP) 2007-043069





US 20070241967A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0241967 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **PORTABLE DEVICE AND ANTENNA THEREOF**

(30) **Foreign Application Priority Data**

Apr. 17, 2006 (TW) 095113671

(76) Inventors: **CHIEH-SHENG HSU**, Taipei Hsien (TW); **CHANG-HSIU HUANG**, Taipei Hsien (TW)

Publication Classification

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

(52) **U.S. Cl.** **343/700 MS; 343/702; 343/846**

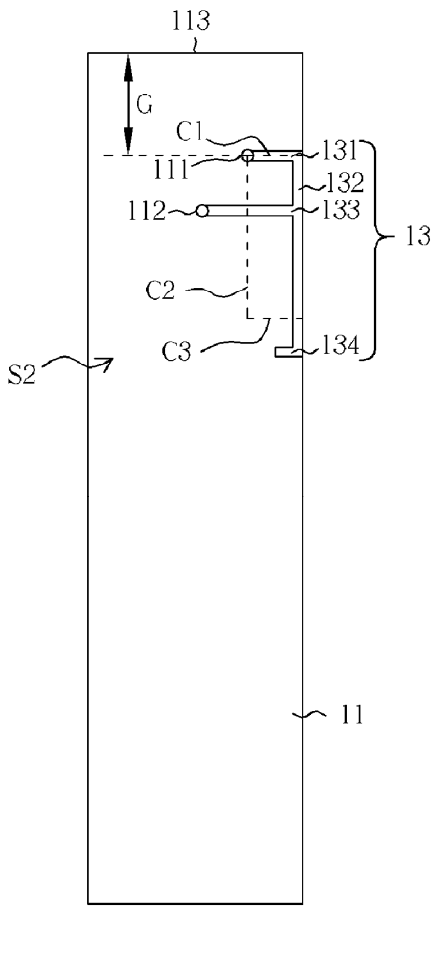
(57) **ABSTRACT**

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

An antenna comprises a substrate, a grounding element and a radiating element. The grounding element has an opening and is disposed on a first surface of the substrate. The radiating element is disposed on a second surface and electrically connects to the grounding element. A projection on the first surface of the radiating element partially covers the opening.

(21) Appl. No.: **11/534,209**

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





US 20070241968A1

(19) **United States**

(12) **Patent Application Publication**
SHIH

(10) **Pub. No.: US 2007/0241968 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **PRINTED ANTENNA**

Publication Classification

(75) Inventor: **YEN-YI SHIH**, Tu-Cheng (TW)

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

Correspondence Address:
PCE INDUSTRY, INC.
ATT. CHENG-JU CHIANG JEFFREY T. KNAPP
458 E. LAMBERT ROAD
FULLERTON, CA 92835

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

(57) **ABSTRACT**

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

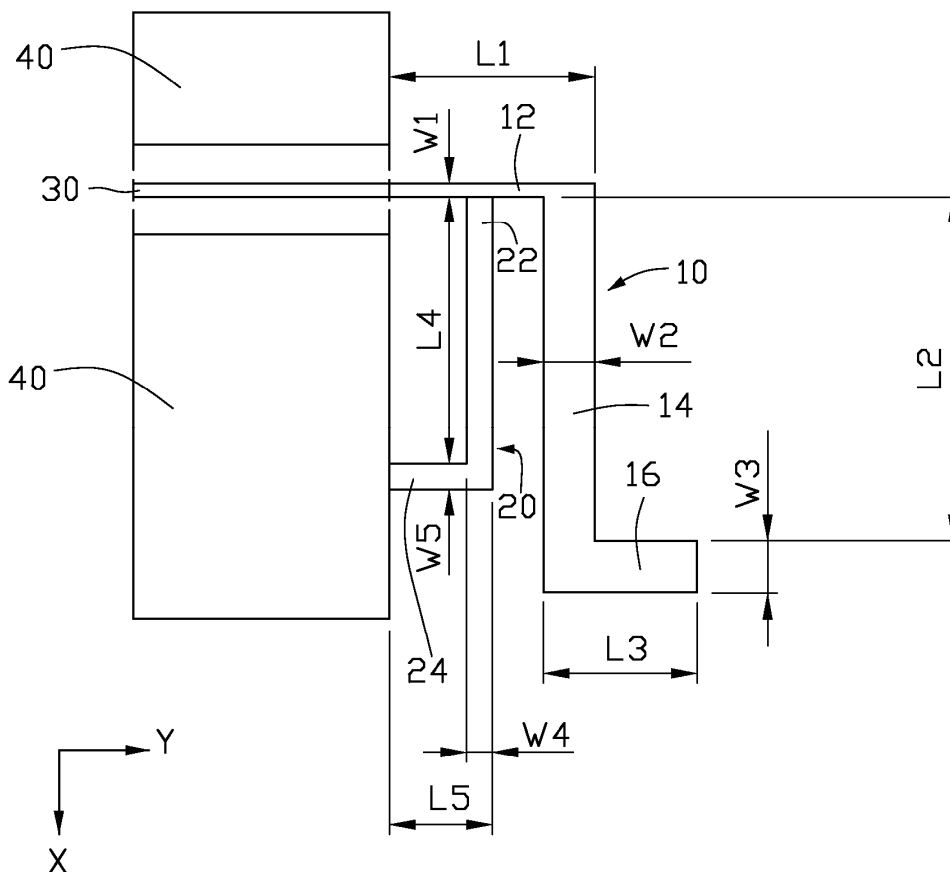
A printed antenna includes a radiation part (10) for radiating and receiving electromagnetic signals, a feed wire (30) for feeding the electromagnetic signals to the radiation part, a matching part (20) for impedance matching, and a ground plane (40). The radiation part includes a first radiation segment (12), a second radiation segment (14), and a third radiation segment (16). The second radiation segment is electrically connected to the first radiation segment and the third radiation segment. The feed wire is electrically connected to the radiation part. The matching part is electrically connected to the radiation part and the ground plane. The second radiation segment and the matching part extend from the first radiation segment to a same side of the first radiation segment.

(21) Appl. No.: **11/558,476**

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

(30) **Foreign Application Priority Data**

Apr. 14, 2006 (TW) 95113396





US 20070241969A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0241969 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **ANTENNA**

Publication Classification

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

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

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

Correspondence Address:
BINGHAM MCCUTCHEN LLP
2020 K Street, N.W.
Intellectual Property Department
WASHINGTON, DC 20006 (US)

(57) **ABSTRACT**

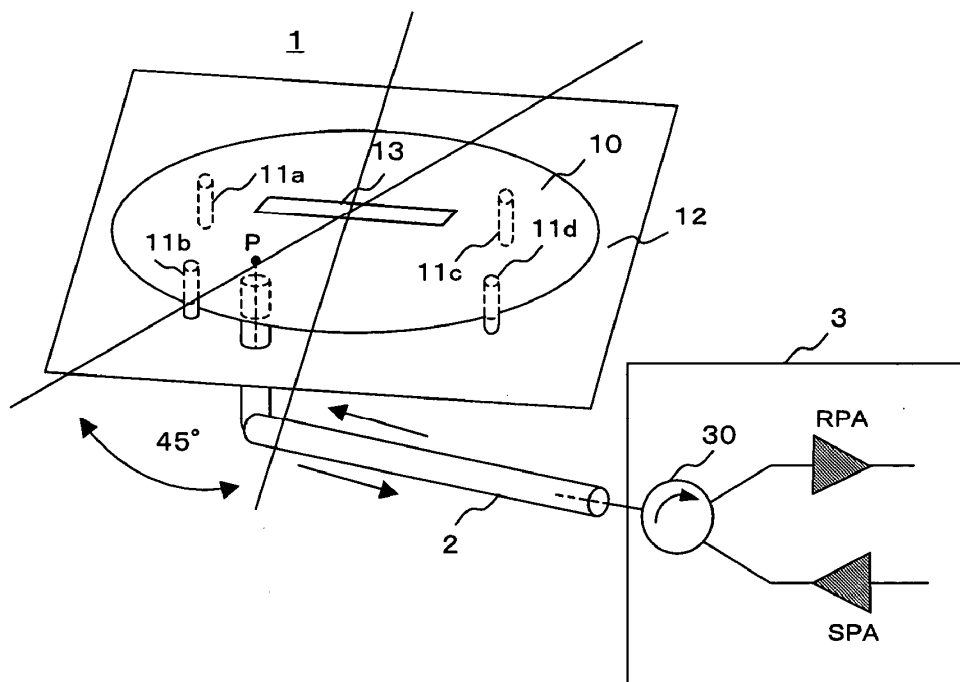
An antenna having a construction enabling simple adjustment of impedance at the antenna connection terminal has a grounded plate; a plate-shape radiating conductor, positioned parallel to the grounded plate; a feed line conductor, one end of which is connected to a feed point of the plate-shape radiating conductor, the other end of which is connected, as an antenna terminal, to an inner conductor of a coaxial cable, and which is perpendicular to the plate-shape radiating conductor; and a conductor disc, electrically connected to the feed line conductor, and positioned parallel to the ground plate, the distance from the conductor disc to the grounded plate being adjustable.

(21) Appl. No.: **11/808,984**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2004/018655, filed on Dec. 14, 2004.





US 20070241973A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0241973 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **MULTIBAND ANTENNA FOR VEHICLES**

(30) **Foreign Application Priority Data**

(75) Inventors: **Tae-Kwan Cho**, Suwon-si (KR);
Young-Sup Bang, Suwon-si (KR);
Jin-Ho Kim, Bucheon-si (KR)

Apr. 13, 2006 (KR) KR10-2006-33444

Publication Classification

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

(52) **U.S. Cl.** **343/713; 343/711; 343/700 MS**

(57) **ABSTRACT**

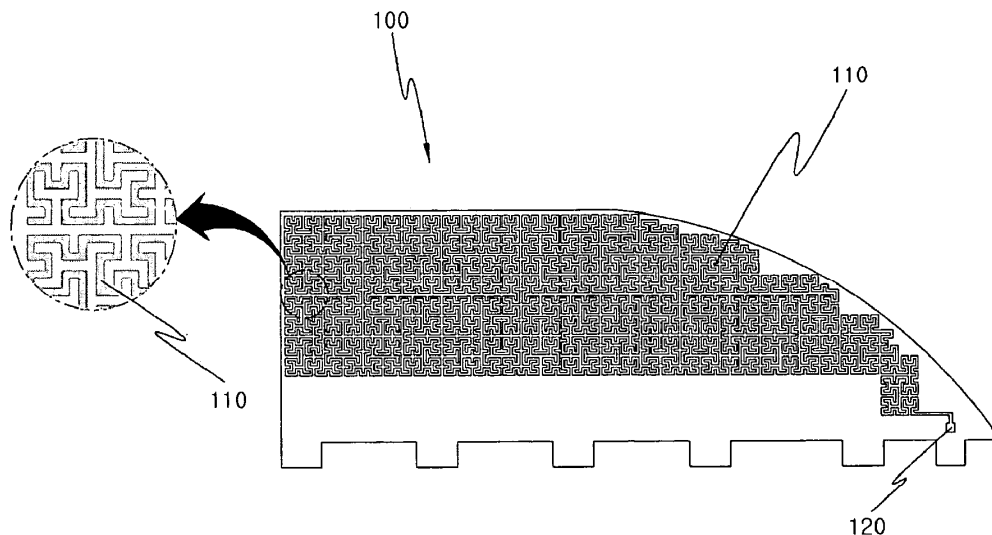
Correspondence Address:
DITTHAVONG MORI & STEINER, P.C.
918 Prince St.
Alexandria, VA 22314

Disclosed herein is a multiband antenna for vehicles. The multiband antenna includes a Printed Circuit Board (PCB), at least one radiation unit, and a feeding unit. The PCB is formed within a radome that protects the antenna. The at least one radiation unit is formed on the PCB to be optimized as a Hilbert type meander line composed of a single pattern, and is configured to generate multiband resonant frequencies. The feeding unit is configured to apply signals to the radiation unit.

(73) Assignee: **Motonix Co., Ltd.**, Hwaseong-si (KR)

(21) Appl. No.: **11/515,106**

(22) Filed: **Sep. 1, 2006**





US 20070241982A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0241982 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **CONTOURED TRIANGULAR DIPOLE ANTENNA**

Publication Classification

(76) Inventors: **Alan Stigliani**, Hopewell Junction, NY (US); **Daniel H. Schaubert**, Amherst, MA (US)

(51) **Int. Cl.**
H01Q 9/28 (2006.01)
H01Q 1/38 (2006.01)
(52) **U.S. Cl.** **343/795; 343/700 MS; 343/846**

Correspondence Address:
WEINGARTEN, SCHURGIN, GAGNEBIN & LEBOVICI LLP
TEN POST OFFICE SQUARE
BOSTON, MA 02109 (US)

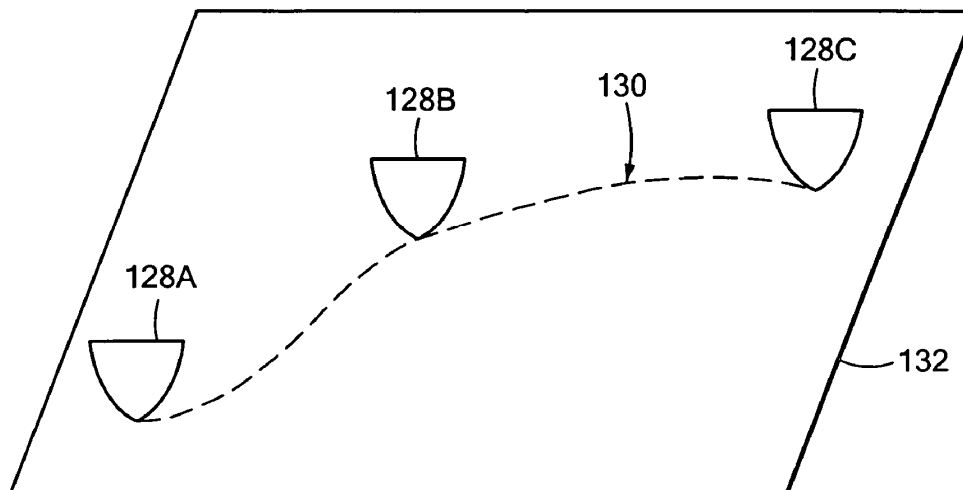
(57) **ABSTRACT**

(21) Appl. No.: **11/230,936**
(22) Filed: **Sep. 20, 2005**

The present invention relates to a contoured dipole antenna. The antenna is suitable for ultra wide band (UWB) radio communications, and in particular UWB applications requiring antennas of small size. Elements of the dipole antenna have a curvature designed to make the antenna UWB over a desired range. Embodiments of the antenna may take the form of balanced dipole arrangements, unbalanced half-dipole arrangements, geometric arrays, and arrays distributed over a contour. In addition, embodiments of the invention may be used with or without ground planes.

Related U.S. Application Data

(60) Provisional application No. 60/614,865, filed on Sep. 30, 2004.





US 20070241983A1

(19) **United States**

(12) **Patent Application Publication**

Cao et al.

(10) **Pub. No.: US 2007/0241983 A1**

(43) **Pub. Date: Oct. 18, 2007**

(54) **DIPOLE ANTENNA**

(52) **U.S. Cl. 343/797**

(76) Inventors: **Huy T. Cao**, Dallas, TX (US); **Kevin Eldon Linehan**, Rowlett, TX (US); **Martin L. Zimmerman**, Chicago, IL (US); **Xiangyang Ai**, Richardson, TX (US)

(57) **ABSTRACT**

Correspondence Address:
Eric D. Cohen
22nd Floor
120 South Riverside Plaza
Chicago, IL 60606-3945 (US)

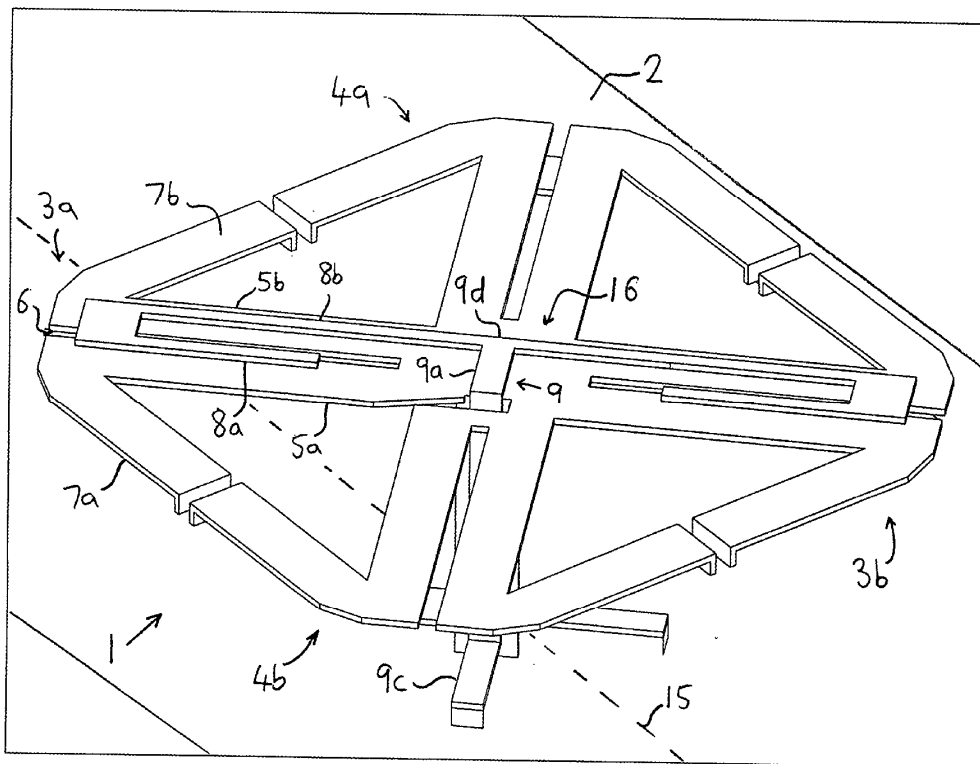
A dipole antenna comprising a base; first and second pairs of dipoles positioned in front of the base and arranged around a central region; a first feed line which extends from the base towards the dipoles and splits at a first junction positioned in front of the base into a first pair of feed probes each of which is coupled to a respective one of the first pair of dipoles; and a second feed line which extends from the base towards the dipoles and splits at a second junction positioned in front of the base into a second pair of feed probes each of which is coupled to a respective one of the second pair of dipoles. The feed probes are spaced from the dipoles so as to field-couple with the dipoles. In one embodiment, the first pair of feed probes is positioned on a first side of the dipoles and the second pair of feed probes is positioned on a second side of the dipoles opposite to the first side. In another embodiment, the dipoles are printed on a PCB.

(21) Appl. No.: **11/405,814**

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

Publication Classification

(51) **Int. Cl.**
H01Q 21/26 (2006.01)





US 20070241986A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0241986 A1**

Lee et al. (43) **Pub. Date: Oct. 18, 2007**

(54) **WINDMILL-SHAPED LOOP ANTENNA
HAVING PARASITIC LOOP ANTENNA**

(30) **Foreign Application Priority Data**

Apr. 13, 2006 (KR)..... 10-2006-0033770
Nov. 29, 2006 (KR)..... 10-2006-0119015

(75) Inventors: **Sung-Jun Lee**, Goyang-si (KR);
Kwang-Chun Lee, Daejon (KR);
Chi-Hyung Ahn, Goyang-si (KR);
Doo-Soo Kim, Gwangju (KR);
Wee-Sang Park, Pohang-si (KR)

Publication Classification

(51) **Int. Cl.**
H01Q 21/00 (2006.01)
H01Q 11/12 (2006.01)
(52) **U.S. Cl.** **343/867; 343/742; 343/700 MS**

Correspondence Address:
CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

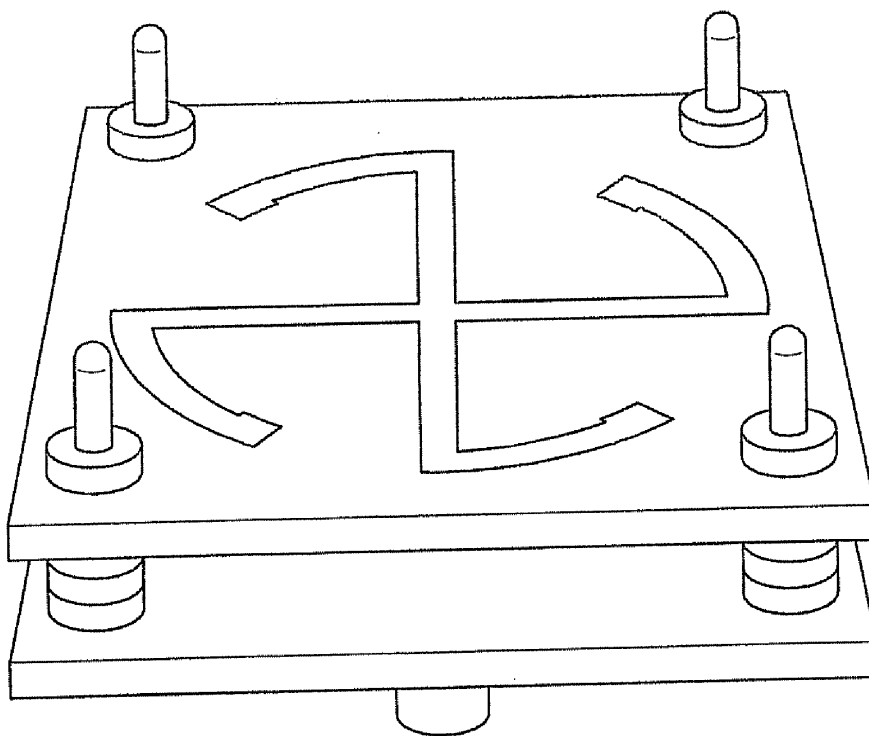
(57) **ABSTRACT**

There is provided a windmill-shaped loop antenna including: a dielectric substrate; a first radiation unit disposed on a top surface of the dielectric substrate and including a metal pattern having loop pieces; a second radiation unit disposed at a bottom surface of the dielectric substrate and including a metal pattern having loop pieces arranged not to face the loop pieces of the first radiation unit; and a plurality of identical transmission line from a center of the top and bottom surfaces of the dielectric substrate to the first and second radiation units, which form windmill-shaped metal pattern with the first and second radiation unit.

(73) Assignees: **Electronics and Telecommunications
Research Institute**, Daejon (KR);
**Postech Academy-Industry Founda-
tion**, Pohang-si (KR)

(21) Appl. No.: **11/735,169**

(22) Filed: **Apr. 13, 2007**





US 20070247158A1

(19) **United States**

(12) **Patent Application Publication**

Nistler et al.

(10) **Pub. No.: US 2007/0247158 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **CYLINDRICAL MAGNETIC RESONANCE ANTENNA**

(57) **ABSTRACT**

(76) Inventors: **Juergen Nistler**, Erlangen (DE);
Wolfgang Renz, Erlangen (DE);
Markus Vester, Nurnberg (DE)

Correspondence Address:
SCHIFF HARDIN, LLP
PATENT DEPARTMENT
6600 SEARS TOWER
CHICAGO, IL 60606-6473 (US)

(21) Appl. No.: **11/737,214**

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

(30) **Foreign Application Priority Data**

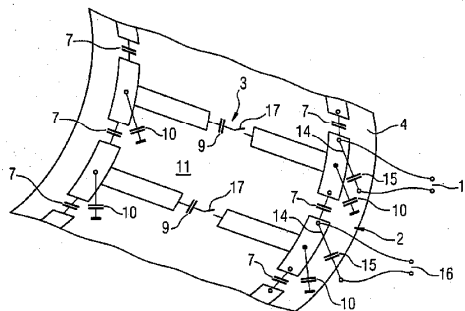
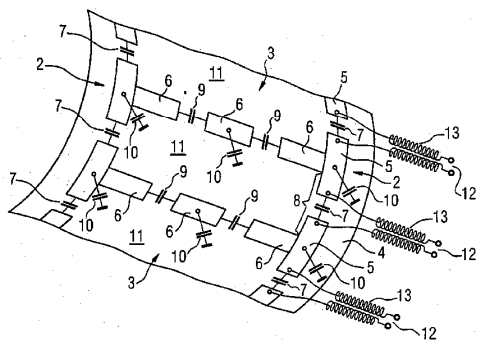
Apr. 19, 2006 (DE)..... 10 2006 018 158.1

Publication Classification

(51) **Int. Cl.**
G01V 3/00 (2006.01)

(52) **U.S. Cl.** **324/318**

A cylindrical magnetic resonance antenna suitable for use as a local antenna for the reception or transmission of magnetic resonance signals, has an antenna arrangement, such as a birdcage antenna arrangement with longitudinal conductors connected at their opposite ends by end rings. In each case, two adjacent longitudinal conductors and the end ring segments therebetween form a network. In each case, the end ring segments connecting two of the adjacent longitudinal conductors are formed as end ring sections, with an end ring capacitance connected therebetween, which is the same for all of the end ring segments. A grounded screen externally encompasses the antenna arrangement. The grounded screen is composed of electrically conductive material and is coupled through a screen capacitance to the longitudinal conductors and the end rings. The longitudinal conductors are each formed by conductor sections connected with a longitudinal capacitance therebetween, which is the same for all of the longitudinal conductors. The longitudinal capacitance, the end ring capacitance, and the screen capacitance are dimensioned so that the magnetic resonance antenna always has the same resonance frequency regardless of the type of activation thereof.





US 20070247369A1

(19) **United States**

(12) **Patent Application Publication**
SHIH

(10) **Pub. No.: US 2007/0247369 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **DUAL-BAND 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; 343/767**

(57) **ABSTRACT**

Correspondence Address:
PCE INDUSTRY, INC.
ATT. CHENG-JU CHIANG JEFFREY T. KNAPP
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FULLERTON, CA 92835

A dual-band antenna (10) is provided. The dual-band antenna printed on a substrate (30) includes a transmission portion (120), a first radiator (140), a second radiator (160), a first grounded portion (180), and a second grounded portion (190). The transmission portion is used for feeding electromagnetic signals. The first radiator is electronically connected to the transmission portion for transceiving electromagnetic signals with a first frequency. The second radiator is electronically connected to the transmission portion for transceiving electromagnetic signals with a second frequency. The first grounded portion is disposed on a first surface of the substrate. The second grounded portion is disposed on a second surface of the substrate. A length of the second grounded portion is greater than that of the first grounded portion. An antenna assembly is also provided in the present invention.

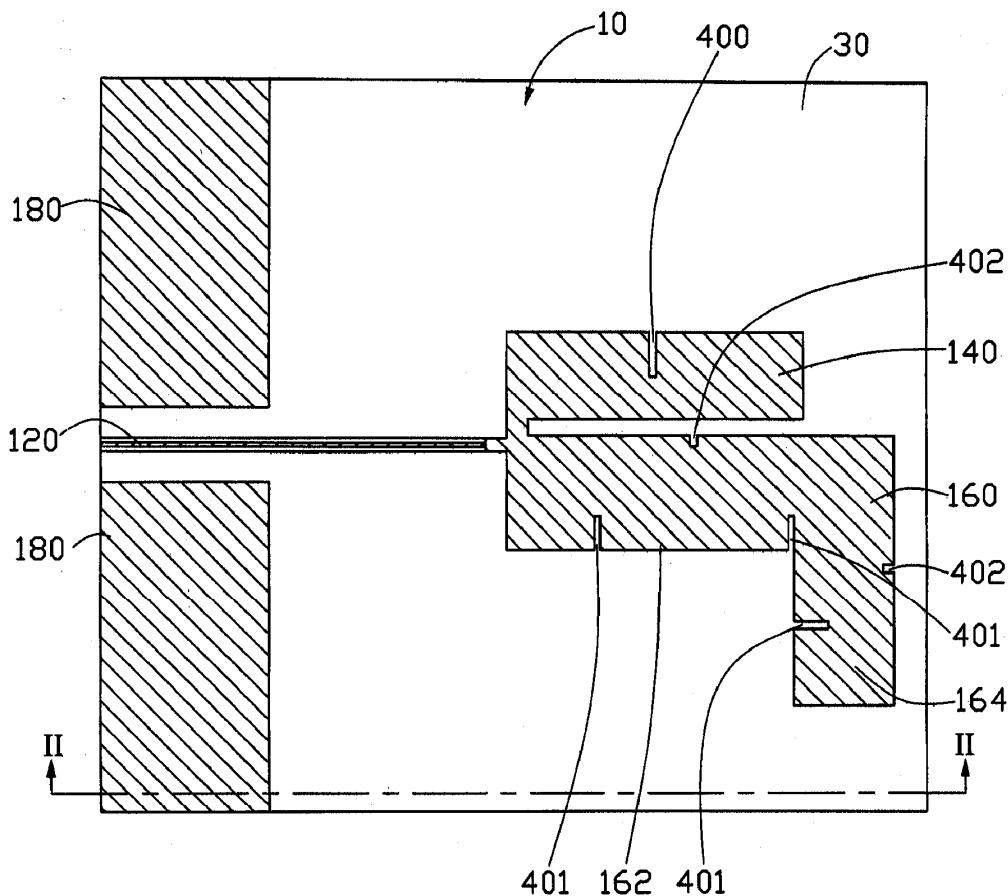
(73) Assignee: **HON HAI PRECISION**
INDUSTRY CO., LTD., Tu-Cheng (TW)

(21) Appl. No.: **11/560,859**

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

(30) **Foreign Application Priority Data**

Apr. 21, 2006 (TW) 095114366





US 20070247370A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0247370 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **CHIP ANTENNA APPARATUS FOR RECEIVING GLOBAL POSITIONING SYSTEM SIGNALS**

(21) Appl. No.: **11/564,067**

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

(75) Inventors: **Chuan-Lin Hu**, Sijhih City (TW); **Yu-Wei Chen**, Sijhih City (TW); **Chang-Lun Liao**, Sijhih City (TW); **Shun-Tian Lin**, Taipei City (TW); **Chang-Fa Yang**, Taipei City (TW); **Yen-Ming Chen**, Taipei City (TW); **Chao-Wei Wang**, Taipei City (TW)

(30) **Foreign Application Priority Data**

Apr. 20, 2006 (TW) 95114172

Publication Classification

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

(52) **U.S. Cl.** **343/700 MS; 343/702; 343/846**

(57) **ABSTRACT**

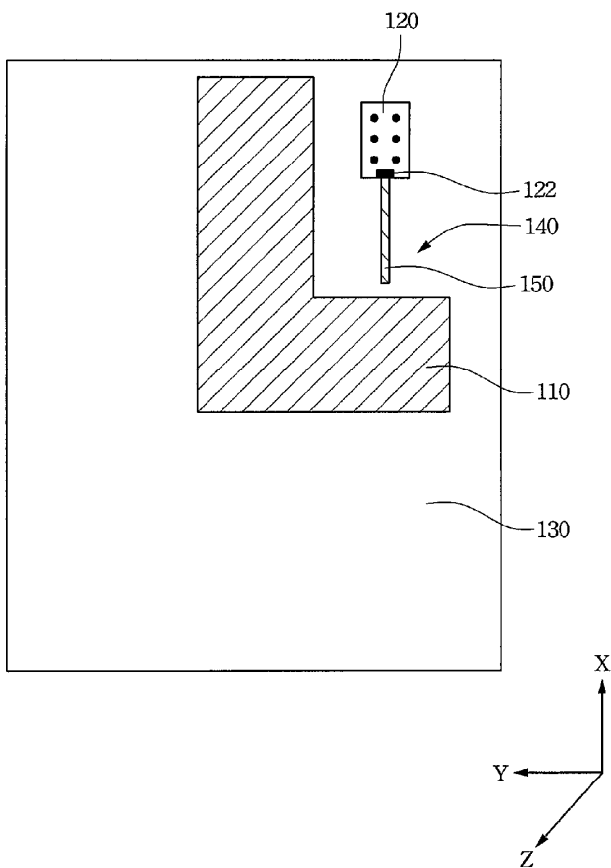
A chip antenna apparatus for receiving global positioning system signals, includes a L-shaped ground area and an omni-directional chip antenna. The L-shaped ground area is disposed on a circuit board. The omni-directional chip antenna is disposed in a gap of the L-shaped ground area on the circuit board and electrically connected to the L-shaped ground area.

Correspondence Address:

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
100 GALLERIA PARKWAY, NW, STE 1750
ATLANTA, GA 30339-5948

(73) Assignee: **CHANT SINCERE CO., LTD.**,
Hsi Chih City (TW)

100





US 20070247371A1

(19) **United States**

(12) **Patent Application Publication**
Kunysz

(10) **Pub. No.: US 2007/0247371 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **DUAL SPHERE UWB ANTENNA**

Publication Classification

(76) Inventor: **Waldemar Kunysz, Calgary (CA)**

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

Correspondence Address:
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

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

(21) Appl. No.: **11/693,880**

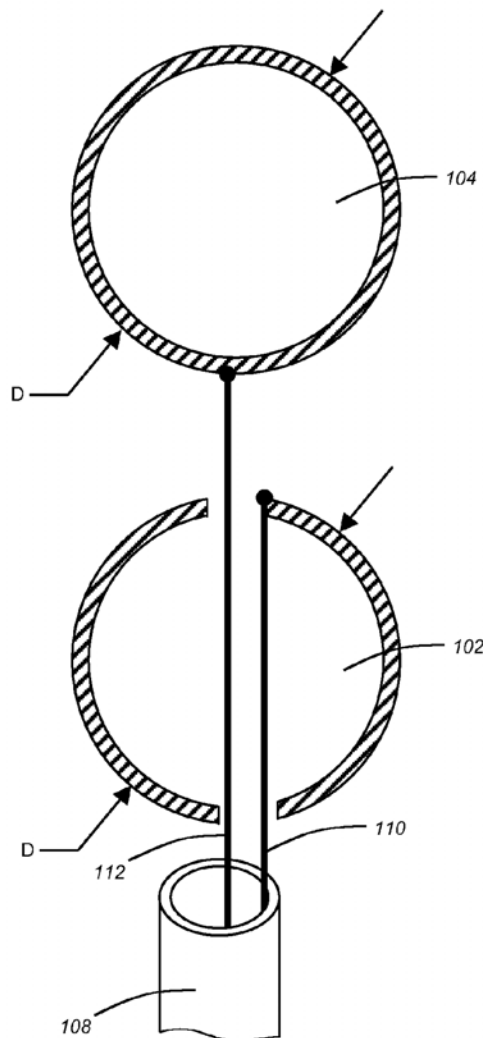
(57) **ABSTRACT**

(22) Filed: **Mar. 30, 2007**

An antenna that is suitable for transmission and reception of UWB signals is provided. The antenna includes a pair of conducting spheres separated by an air gap. A first conducting sphere is connected to a first conductor of a transmission line and a second conducting sphere is connected to a second conductor of the transmission line. The dual sphere antenna provides consistent performance in the azimuth plane and across the frequency band for UWB applications.

Related U.S. Application Data

(60) Provisional application No. 60/794,706, filed on Apr. 25, 2006.





US 20070247372A1

(19) **United States**

(12) **Patent Application Publication**
Huang

(10) **Pub. No.: US 2007/0247372 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **MULTI-BAND INVERTED-F ANTENNA**

(57) **ABSTRACT**

(76) Inventor: **Tommy Huang, Taipei (TW)**

Correspondence Address:
Barley Snyder, LLC
Suite 275, 1000 Westlakes Drive
Berwyn, PA 19312

A multi-band inverted-F antenna includes a first high frequency leg; a low frequency leg; a feed, from which the first high frequency leg and the low part are extending; a second high frequency leg, extending along a lengthwise direction of the first high frequency leg from one end of the feed pin a plane orthogonal to that of the first high frequency leg; a regulating part; and a ground, having one end coupled to the feed and a further end coupled to the regulating part. From the surface currents flowing from the feed through the first high frequency leg and the second high frequency leg, the antenna is provided with a multiply widened high-frequency band. Moreover, from the surface currents flowing from the feed, through the regulating part, the lower surface of the regulating part, the lower surface of the first high frequency leg, and the lower surface of the second frequency part, the resistances of the respective first and second high frequency legs of the antenna are regulated to be matched to each other, so that the high frequency leg as a whole of the antenna is operable in a wide-area band.

(21) Appl. No.: **11/737,558**

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

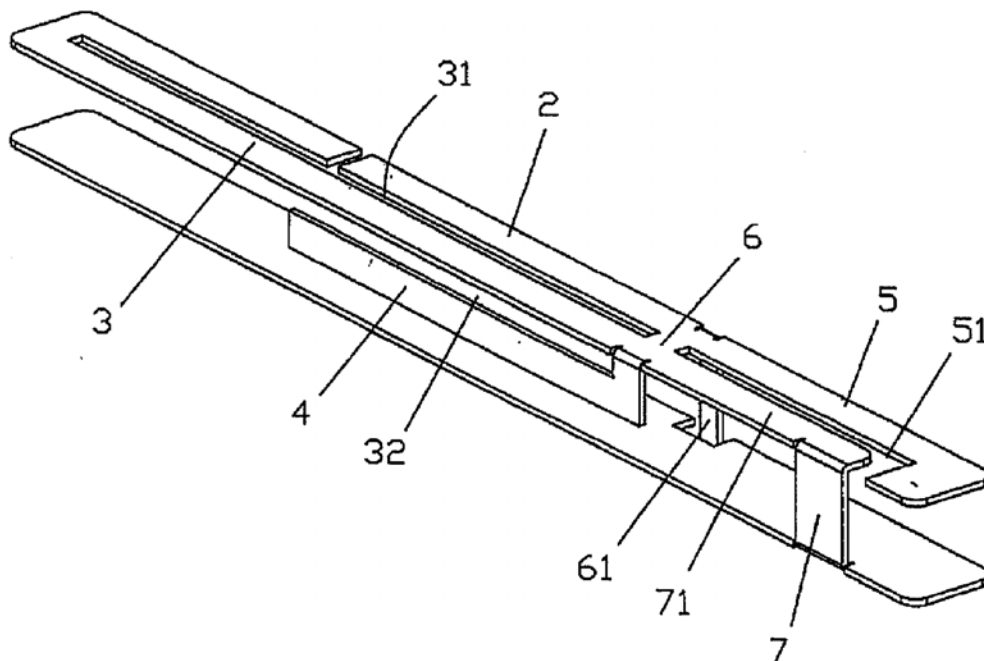
(30) **Foreign Application Priority Data**

Apr. 19, 2006 (TW) 95206655

Publication Classification

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

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





US 20070247373A1

(19) **United States**

(12) **Patent Application Publication**
EGOROV

(10) **Pub. No.: US 2007/0247373 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **ANTENNA CONFIGURATION CHANGE**

Publication Classification

(75) Inventor: **Igor EGOROV, Lund (SE)**

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

(52) **U.S. Cl.** **343/702; 343/876**

Correspondence Address:
HARRITY SNYDER, L.L.P.
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FAIRFAX, VA 22030

(57) **ABSTRACT**

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

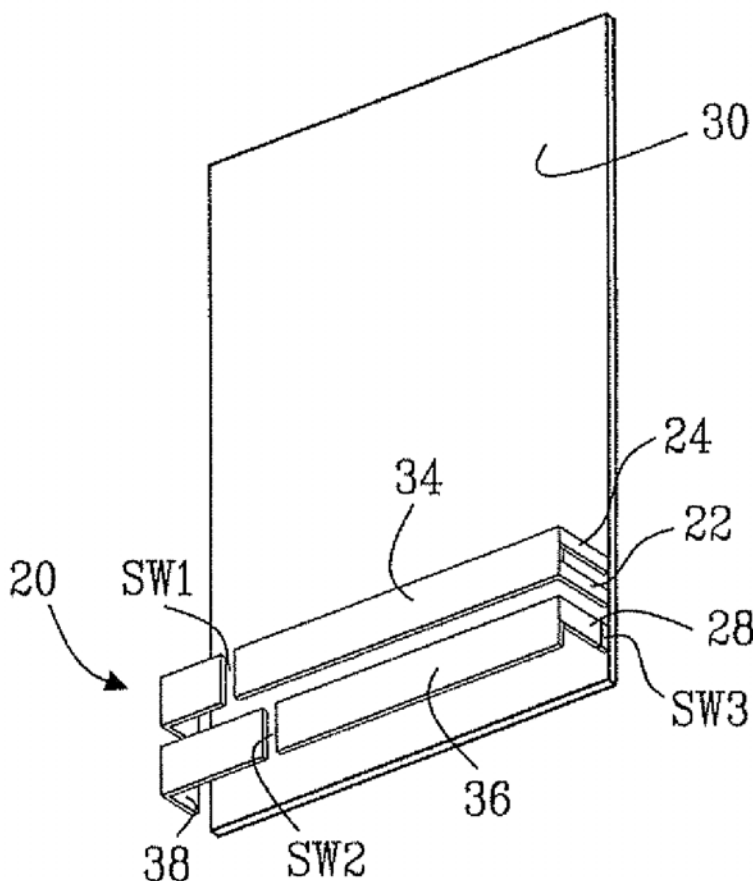
A Portable communication device includes in an interior of the portable communication device a ground plane and an antenna arrangement. The antenna arrangement includes an antenna element combination including a first radiating antenna element to be connected to a feeding potential and dimensioned for resonating in a first frequency band, and a second radiating antenna element dimensioned for resonating in a second frequency band. The antenna arrangement further includes at least one first element joining switch that in a closed position interconnects elements of the antenna element combination for dimensioning the antenna element combination for resonating in a third frequency band and in an open position separates these elements from each other, and a grounding switch which in a closed position joins the second radiating antenna element to a ground plane and in an open position separates the second radiating antenna element from the ground plane.

(21) Appl. No.: **11/530,331**

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

Related U.S. Application Data

(60) Provisional application No. 60/745,328, filed on Apr. 21, 2006.





US 20070247376A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0247376 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **ANTENNA AND PORTABLE TERMINAL HAVING THE SAME**

Apr. 21, 2006 (KR) 10-2006-0036433

(75) Inventors: **Mun-Gyu KIM**, Gyeonggi-Do (KR); **Jong-Hyun Park**, Seoul (KR)

Publication Classification

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

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

Correspondence Address:
LEE, HONG, DEGERMAN, KANG & SCHMADEKA
660 S. FIGUEROA STREET, Suite 2300
LOS ANGELES, CA 90017

(57) **ABSTRACT**

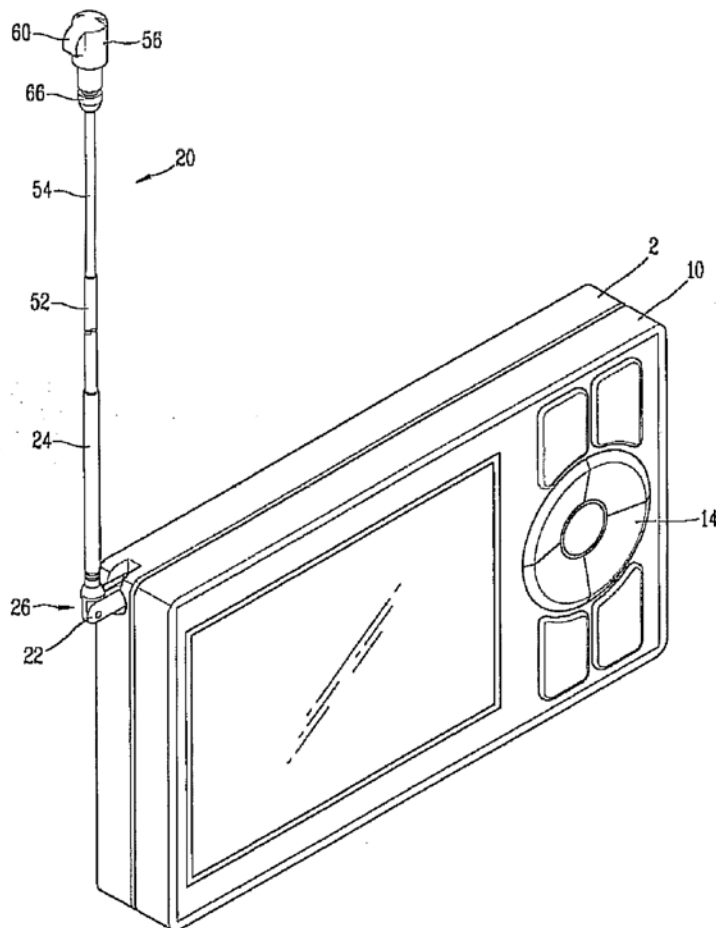
The present invention relates to a portable terminal including a terminal body and a retractable antenna operatively connected to the terminal body and capable of being retractably housed into and withdrawn out of the terminal body. The retractable antenna includes a base rotatably supported at the terminal body, an antenna rod connected with the base and including at least one telescoping member of extending a length of the antenna rod, and a pivot connection unit connecting the base to the antenna rod and allowing the antenna rod to pivot with respect to the base.

(73) Assignee: **LG Electronics Inc.**

(21) Appl. No.: **11/737,645**

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

(30) **Foreign Application Priority Data**





US 20070247382A1

(19) **United States**

(12) **Patent Application Publication**
Wan

(10) **Pub. No.: US 2007/0247382 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **ANTENNA HAVING WIDE TRANSMITTING ANGLE**

Publication Classification

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

(75) **Inventor: Tze Chung Wan, Chongli Gonyeh Chu**
(TW)

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

(57) **ABSTRACT**

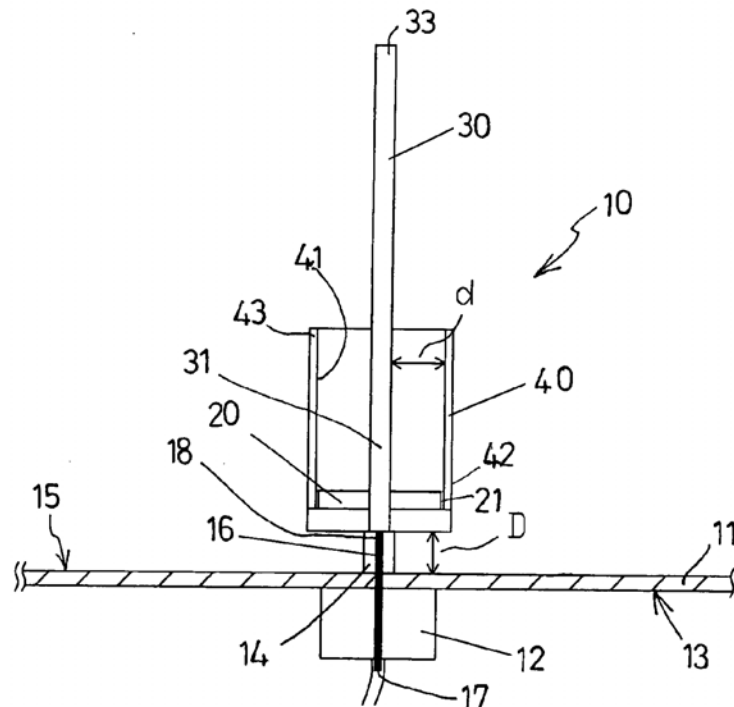
Correspondence Address:
CHARLES E. BAXLEY, ESQ.
90 JOHN STREET
THIRD FLOOR
NEW YORK, NY 10038 (US)

An antenna device includes a seat, a longitudinal antenna member having a lower portion disposed on the seat, and a cylindrical antenna member having a lower portion disposed on the seat and having a chamber formed by an outer peripheral wall, and the longitudinal antenna member is disposed in the chamber of the cylindrical antenna member and spaced from the outer peripheral wall of the cylindrical antenna member for a distance, and the longitudinal antenna member includes an upper portion extended outwardly beyond the cylindrical antenna member. The antenna members may be used for receiving and transmitting signal of different frequencies.

(73) **Assignee: Joymax Electronics Co., Ltd.**

(21) **Appl. No.: 11/410,464**

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





US 20070247383A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0247383 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **TWIN GROUND ANTENNA**

Related U.S. Application Data

(75) Inventors: **Steve Krupa**, Tempe, AZ (US); **Stefan Quantz**, Tianjin (CN); **Snir Azulay**, Tiberias (IL)

(60) Provisional application No. 60/794,278, filed on Apr. 21, 2006.

Correspondence Address:
DARBY & DARBY P.C.
P.O. BOX 770
Church Street Station
New York, NY 10008-0770 (US)

Publication Classification

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

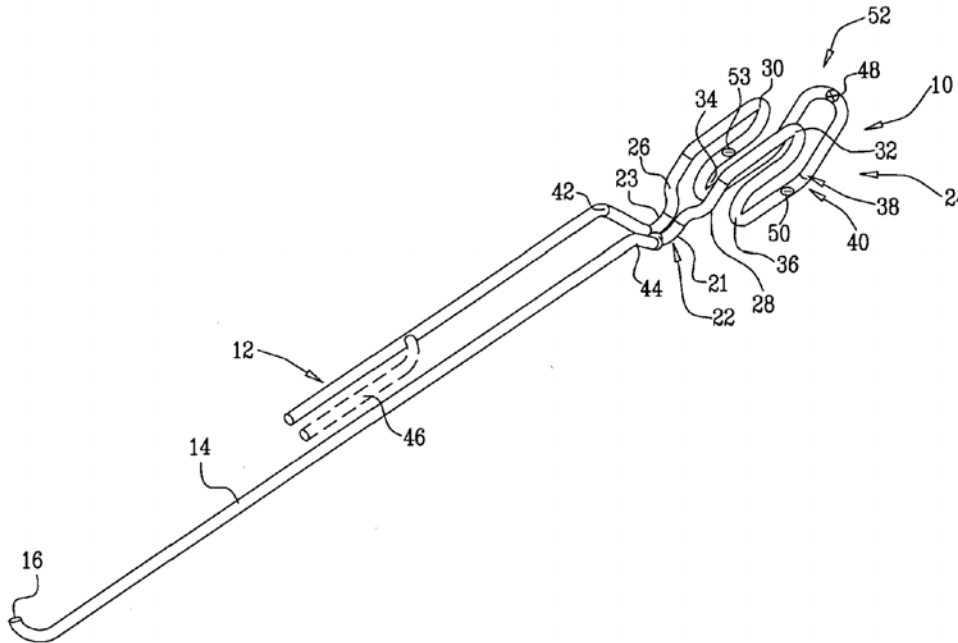
(73) Assignee: **Galtronics Ltd.**, Tiberias (IL)

(57) **ABSTRACT**

(21) Appl. No.: **11/737,494**

An antenna, consisting of a folded looped conductor closed at a feedpoint. The antenna has at least two conductive arms extending from the feedpoint.

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





US 20070247384A1

(19) **United States**

(12) **Patent Application Publication**
Fukuchi

(10) **Pub. No.: US 2007/0247384 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **WIDEBAND ANTENNA**

(30) **Foreign Application Priority Data**

Aug. 31, 2005 (JP) 2005-252142

(75) Inventor: **Keisuke Fukuchi**, Tokyo (JP)

Publication Classification

Correspondence Address:
FOLEY AND LARDNER LLP
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007 (US)

(51) **Int. Cl.**

H01Q 13/10 (2006.01)

(52) **U.S. Cl.**

..... **343/767**

(57)

ABSTRACT

A wideband antenna has: a rectangular conductor sheet; a bow-tie-shaped slit formed in the rectangular conductor sheet, the rectangular conductor sheet having two apex portions defined by the bow-tie-shaped slit, the two apex portions being opposite to each other in the middle of the bow-tie-shaped slit; an auxiliary antenna element formed to extend along the bow-tie-shaped slit on both sides of one of the two apex portions; a power-feeding portion formed at the one of the two apex portions; and a grounding portion formed at an other of the two apex portions.

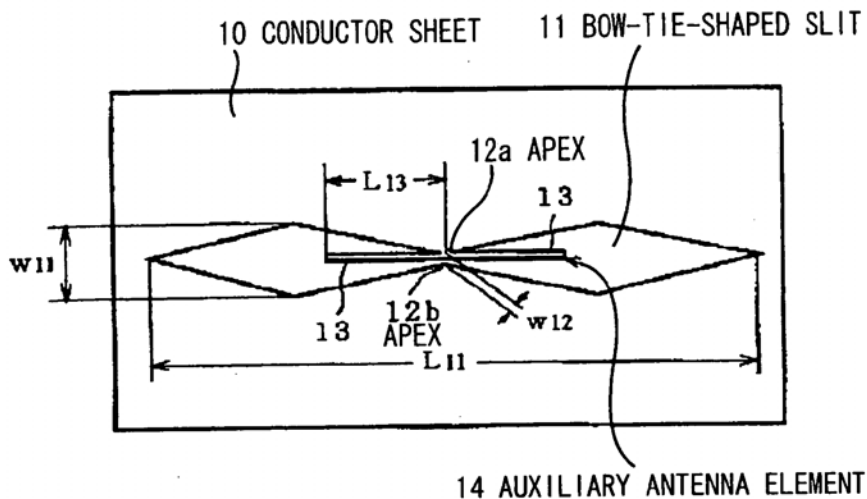
(73) Assignee: **HITACHI CABLE, LTD.**

(21) Appl. No.: **11/812,929**

(22) Filed: **Jun. 22, 2007**

Related U.S. Application Data

(62) Division of application No. 11/444,538, filed on Jun. 1, 2006.





US 20070247385A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0247385 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **HIGH GAIN STEERABLE PHASED-ARRAY ANTENNA**

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/055,490, filed on Feb. 9, 2005, now Pat. No. 7,202,830.

(75) Inventors: **Forrest J. Brown**, Carson City, NV (US); **Forrest Wolf**, Reno, NV (US)

Publication Classification

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

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

Correspondence Address:
JACKSON & CO., LLP
6114 LA SALLE AVENUE
#507
OAKLAND, CA 94611-2802 (US)

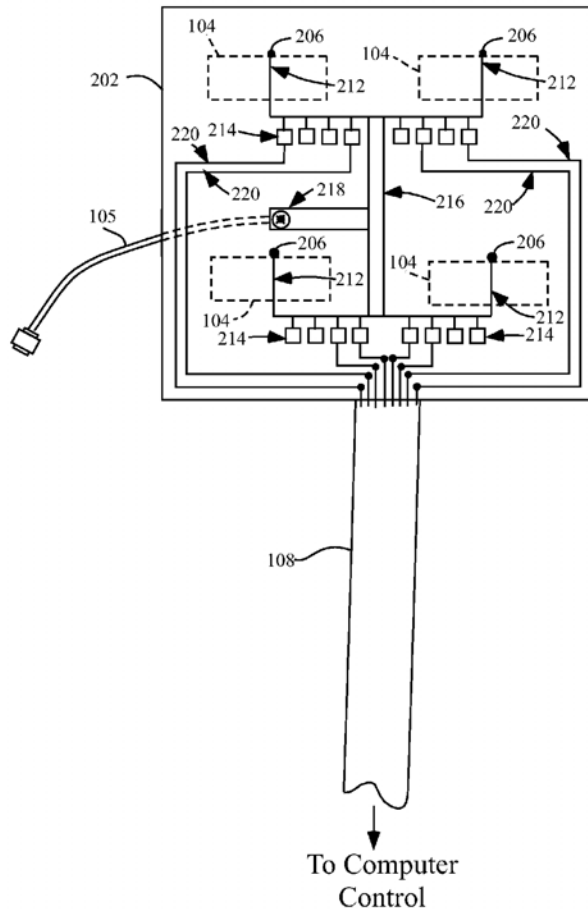
(57) **ABSTRACT**

A high gain, phased array antenna includes a conducting sheet having a number of one or more slots defined therein. For each slot, an electrical microstrip feed line is electronically coupled with a corresponding slot to form a magnetically-coupled LC resonance element. A main feed line couples with the one or more microstrip feed lines. At least one slot and/or microstrip feed line includes at least one segment with greater width than other segments.

(73) Assignee: **PINYON TECHNOLOGIES, INC.**, Reno, NV (US)

(21) Appl. No.: **11/694,916**

(22) Filed: **Mar. 30, 2007**





US 20070247386A1

(19) **United States**

(12) **Patent Application Publication**

Lee et al.

(10) **Pub. No.: US 2007/0247386 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **MULTI-BAND U-SLOT ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Jae Chan Lee**, Gyeonggi-Do (KR);
Jong Won Yu, Daejeon (KR);
Wang Sang Lee, Daejeon (KR);
Hyun Hak Kim, Gyeonggi-Do (KR)

Apr. 19, 2006 (KR) 10-2006-35340

Publication Classification

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

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

(57) **ABSTRACT**

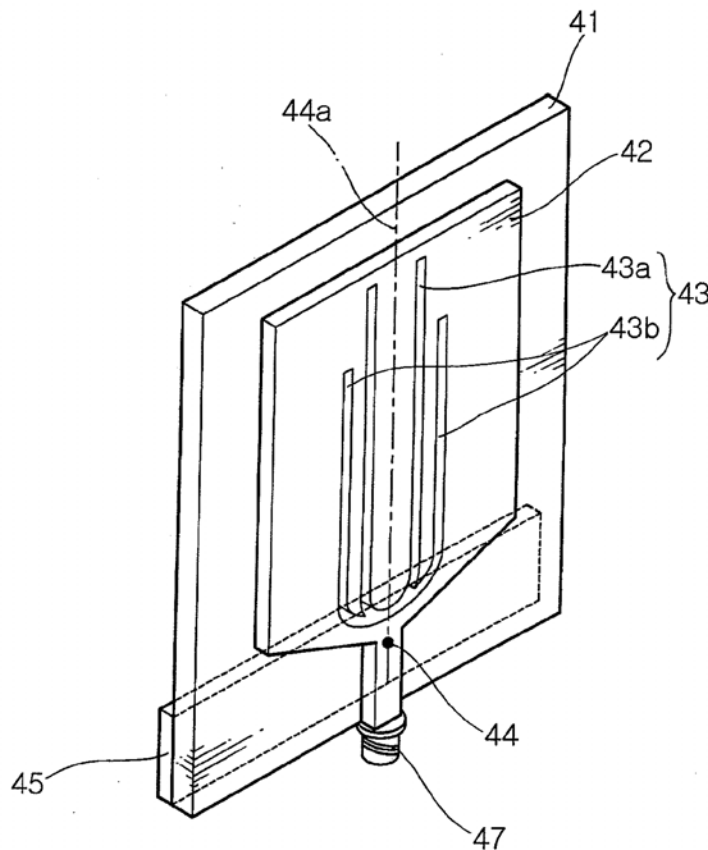
Correspondence Address:
LOWE HAUPTMAN HAM & BERNER, LLP
1700 DIAGONAL ROAD, SUITE 300
ALEXANDRIA, VA 22314

In a multi-band U-slot planar antenna, a limited ground plane is provided. A connector includes a ground terminal connected to the ground plane and a feeding terminal for feeding a signal. A planar radiation device includes a feeding point connected to the feeding terminal, a central U-slot having a symmetrical configuration about a central axis thereof, the central axis extending vertically from the feeding point, and at least one pair of auxiliary U-slots symmetrical with each other about the central axis. In the multi-band U-slot planar antenna, alternatively, at least one auxiliary U-slot may have a symmetrical configuration about the central axis.

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

(21) Appl. No.: **11/735,868**

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





US 20070247388A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0247388 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **ANTENNA DEVICE, ANTENNA REFLECTOR,
AND WIRELESS COMMUNICATION UNIT
INCORPORATING ANTENNA**

(30) **Foreign Application Priority Data**

Jan. 19, 2006 (JP) JP 2006-011175

(76) Inventors: **Kenji Asakura**, Fukui (JP); **Kiyotada**
Yokogi, Tokyo (JP)

Publication Classification

Correspondence Address:

ROBERT J. DEPKE
LEWIS T. STEADMAN
ROCKEY, DEPKE & LYONS, LLC
SUITE 5450 SEARS TOWER
CHICAGO, IL 60606-6306 (US)

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

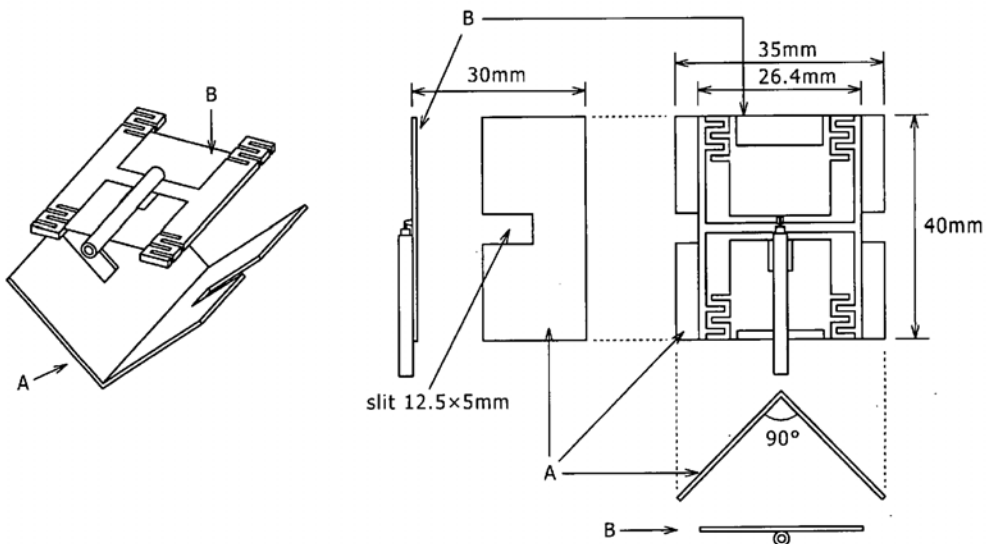
(52) **U.S. Cl.** **343/834**

(57) **ABSTRACT**

Disclosed herein is an antenna device including, a radiator having a feeder, and a planar reflector spaced from the radiator in a radio wave incoming direction, the reflector having at least one slit defined in a side edge thereof.

(21) Appl. No.: **11/652,952**

(22) Filed: **Jan. 12, 2007**





US 20070247389A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0247389 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **MOBILE WIRELESS COMMUNICATIONS DEVICE COMPRISING NON-PLANAR INTERNAL ANTENNA WITHOUT GROUND PLANE OVERLAP**

continuation of application No. 11/042,890, filed on Jan. 25, 2005, now Pat. No. 7,091,911.

(75) Inventors: **Yihong Qi**, Waterloo (CA); **Ying Tong Man**, Kitchener (CA); **Perry Jarmuszewski**, Waterloo (CA)

(60) Provisional application No. 60/576,159, filed on Jun. 2, 2004. Provisional application No. 60/576,637, filed on Jun. 3, 2004.

Publication Classification

Correspondence Address:
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST P.A.
1401 CITRUS CENTER 255 SOUTH ORANGE AVENUE
P.O. BOX 3791
ORLANDO, FL 32802-3791 (US)

(51) **Int. Cl.**
H01Q 7/04 (2006.01)
(52) **U.S. Cl.** **343/842**

(57) **ABSTRACT**

A mobile wireless communications device may include a housing, a main dielectric substrate carried by the housing, circuitry carried by the main dielectric substrate, and a ground plane conductor on the main dielectric substrate. The mobile wireless communications device may further include an L-shaped dielectric extension comprising a vertical portion extending outwardly from the main dielectric substrate and an overhang portion extending outwardly from the vertical portion and above an adjacent portion of the main dielectric layer. A main loop antenna conductor comprising at least one conductive trace may be relatively positioned on the overhang portion of the L-shaped dielectric extension so as not to overlap the ground plane conductor.

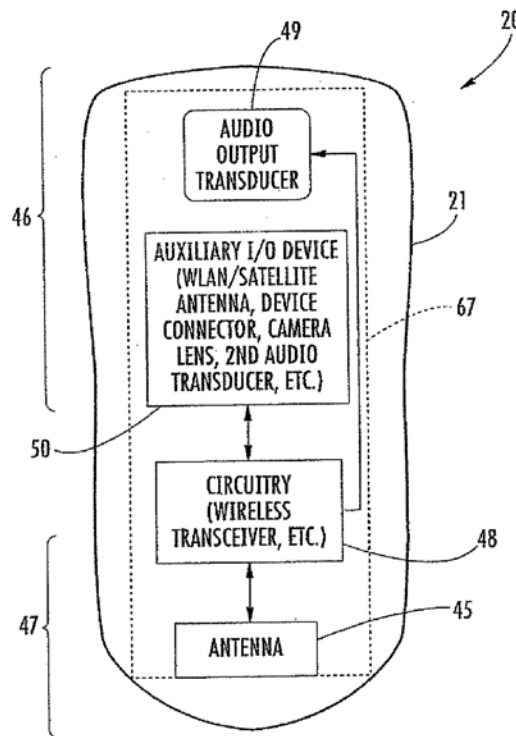
(73) Assignee: **Research In Motion Limited**, Waterloo (CA)

(21) Appl. No.: **11/769,825**

(22) Filed: **Jun. 28, 2007**

Related U.S. Application Data

(63) Continuation of application No. 11/422,170, filed on Jun. 5, 2006, now Pat. No. 7,256,744, which is a





US 20070249313A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0249313 A1**

(43) **Pub. Date: Oct. 25, 2007**

(54) **MULTI-BAND ANTENNA**

Publication Classification

(75) Inventors: **Tadashi Oshiyama**, Gunma (JP);
Hirotohi Mizuno, Gunma (JP);
Yusuke Suzuki, Gunma (JP)

(51) **Int. Cl.**
H04B 1/18 (2006.01)
H04B 1/06 (2006.01)
H04M 1/00 (2006.01)
(52) **U.S. Cl.** **455/272**; 455/193.1; 455/575.7

Correspondence Address:
MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004 (US)

(57) **ABSTRACT**

A multi-band antenna is adapted to operate in a first frequency band and a second frequency band which is higher than the first frequency band. A first antenna element is adapted to operate in the first frequency band, and has a first end which is electrically connected to the power feeding point and a second end which is electrically made open. A second antenna element is adapted to operate in the second frequency band, and has a third end which is electrically connected to the power feeding point and a fourth end which is electrically connected to the ground conductor. An electrical length of the first antenna element is set to $\frac{1}{2}$ wavelength of the second frequency band, and an electrical length of the second antenna element is set to $\frac{1}{4}$ wavelength of the first frequency band.

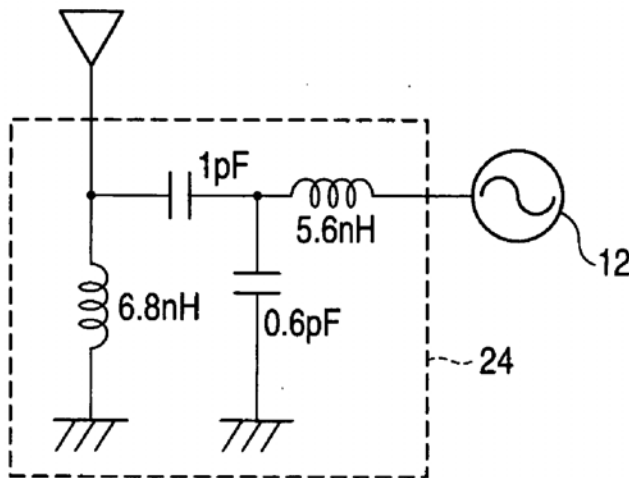
(73) Assignee: **Yokowo Co., Ltd.**

(21) Appl. No.: **11/785,492**

(22) Filed: **Apr. 18, 2007**

(30) **Foreign Application Priority Data**

Apr. 19, 2006 (JP) P. 2006-115489





US 20070252762A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0252762 A1**

(43) **Pub. Date: Nov. 1, 2007**

(54) **ANTENNA FOR SENDING AND RECEIVING SIGNALS IN A PLURALITY OF FREQUENCY BANDS**

Publication Classification

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

(75) Inventors: **Robert Kenoun**, Palatine, IL (US);
McKay R. Johnson, Chicago, IL (US)

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

Correspondence Address:

MOTOROLA INC
600 NORTH US HIGHWAY 45
ROOM AS437
LIBERTYVILLE, IL 60048-5343 (US)

(57) **ABSTRACT**

(73) Assignee: **MOTOROLA, INC.**, LIBERTYVILLE, IL

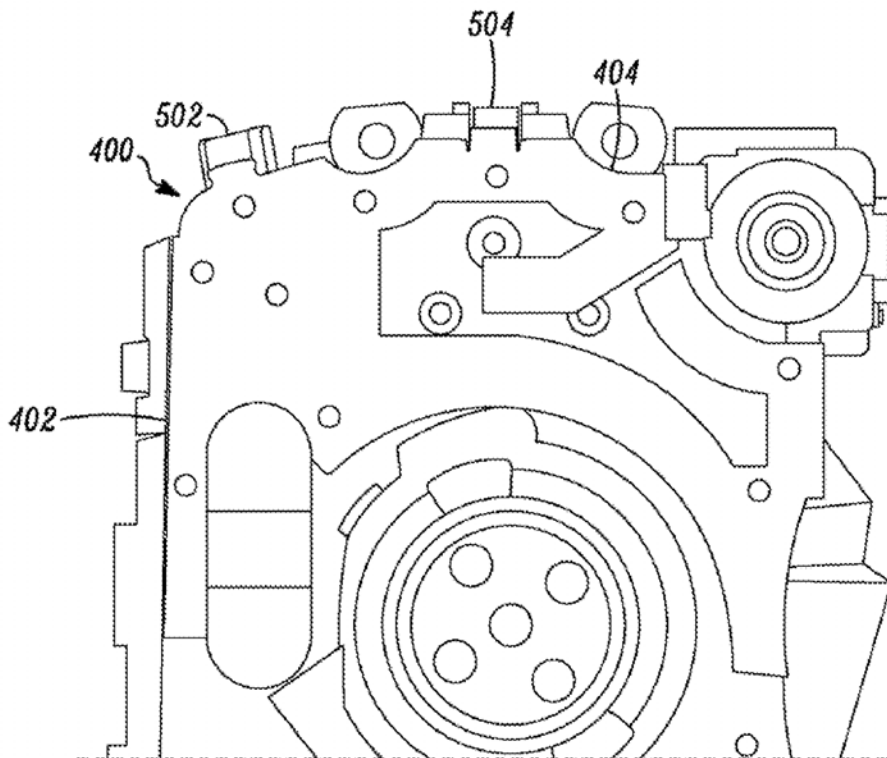
An antenna for sending and receiving signals in a plurality of frequency bands generates a plurality of resonances in the plurality of frequency bands and includes a first set of radiating elements (302) that generates at least one resonance in a first frequency band, and a second set of radiating elements (304) that generates at least one resonance in a second frequency band. At least one resonance is generated in a capacitive loop that exists at certain frequencies between at least two radiating elements belonging to a combination of the first set and the second set of radiating elements.

(21) Appl. No.: **11/771,017**

(22) Filed: **Jun. 29, 2007**

Related U.S. Application Data

(62) Division of application No. 11/013,008, filed on Dec. 15, 2004.





US 20070252764A1

(19) **United States**

(12) **Patent Application Publication**
Keski-Opas

(10) **Pub. No.: US 2007/0252764 A1**

(43) **Pub. Date: Nov. 1, 2007**

(54) **ANTENNA**

Publication Classification

(75) Inventor: **Petri Keski-Opas**, Tampere (FI)

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

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

Correspondence Address:
HARRINGTON & SMITH, PC
4 RESEARCH DRIVE
SHELTON, CT 06484-6212 (US)

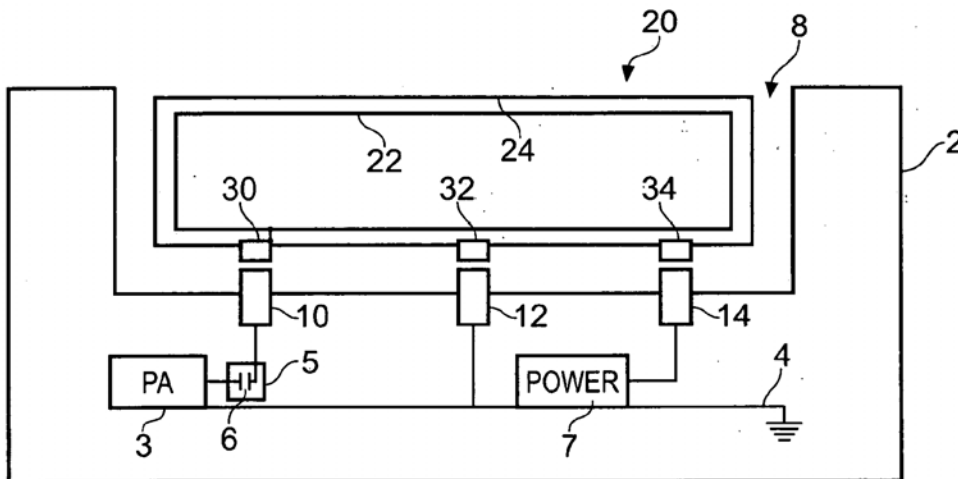
(57) **ABSTRACT**

A method including: optimizing space within a device by having a feed element for an antenna as an integral part of the device but not having the antenna as an integral part of the device; and providing the antenna as a part of a battery for the device. A radio communications device including: a battery comprising: a metal housing element; and an accessible conductive contact electrically connected to the metal housing; and a RF feed element for connection to the external conductive contact.

(73) Assignee: **Nokia Corporation**

(21) Appl. No.: **11/412,623**

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





US 20070252769A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0252769 A1**

(43) **Pub. Date: Nov. 1, 2007**

(54) **LOG-PERIODIC ANTENNA**

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

(75) Inventors: **Yasutaka Horiki**, Ypsilanti, MI (US);
Charles Reimer, Adrian, MI (US)

(57) **ABSTRACT**

Correspondence Address:
HOWARD & HOWARD ATTORNEYS, P.C.
THE PINEHURST OFFICE CENTER, SUITE
#101
39400 WOODWARD AVENUE
BLOOMFIELD HILLS, MI 48304-5151 (US)

The subject invention provides a log-periodic antenna and method for controlling multiple polarizations of the antenna per a given frequency or frequencies. The antenna includes a boom and a plurality of pairs of elements where each element of each pair of elements extends laterally from the boom in opposite directions. The plurality of pairs of elements includes a first pair of elements disposed in a first plane with the boom and a second pair of elements disposed in a second plane with the boom. The first plane extends radially from the boom at a first radial angle and the second plane extends radially from the boom at a second radial angle. The first radial angle is offset to the second radial angle. The antenna may include at least one adjustment mechanism. Each adjustment mechanism allows angular adjustment of at least one of the elements for controlling the multiple polarizations of the antenna.

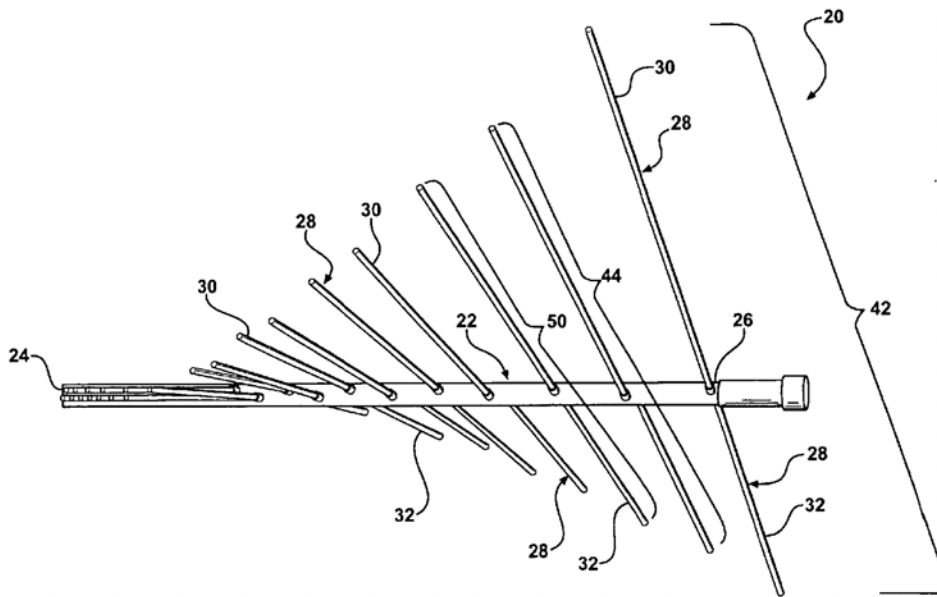
(73) Assignee: **AGC Automotive Americas R&D**

(21) Appl. No.: **11/412,572**

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

Publication Classification

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





US 20070252770A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0252770 A1**

(43) **Pub. Date: Nov. 1, 2007**

(54) **TAG-USE ANTENNA AND TAG USING THE SAME**

Publication Classification

(75) Inventors: **Manabu Kai**, Kawasaki (JP); **Toru Maniwa**, Kawasaki (JP); **Takashi Yamagajo**, Kawasaki (JP)

(51) **Int. Cl.**
H01Q 9/26 (2006.01)
(52) **U.S. Cl.** **343/795; 343/803**

(57) **ABSTRACT**

Correspondence Address:
BINGHAM MCCUTCHEN LLP
2020 K Street, N.W., Intellectual Property Department
WASHINGTON, DC 20006

The present invention relates to a tag-use antenna allowing a miniaturization while maintaining a constant minimal change of a communication distance. The tag-use antenna has a feed part of a folded dipole antenna of a size of 53 mm long and 7 mm wide being connected to, and equipped with, an LSI chip of $R_c=500$ ohms and $C_c=1.4$ pF and is covered with plastic resin 13 of the dielectric constant $\epsilon_r=3$ and thickness of $t=0.75$ mm on both sides of the antenna. The dipole part of 1 mm wire path width of the tag-use antenna is formed in a rectangular spiral by being bent inward from both ends at bending parts at four places. The entire length of the dipole antenna when extending the four bending parts straight is featured so as to be shorter than one half of a resonance wavelength of the antenna. An inductance part is featured in the intermediate part of the both dipole parts in the neighborhood of the center of the antenna. The inductance part is connected to the chip equipment part in parallel with the both dipole parts.

(73) Assignee: **FUJITSU LIMITED**

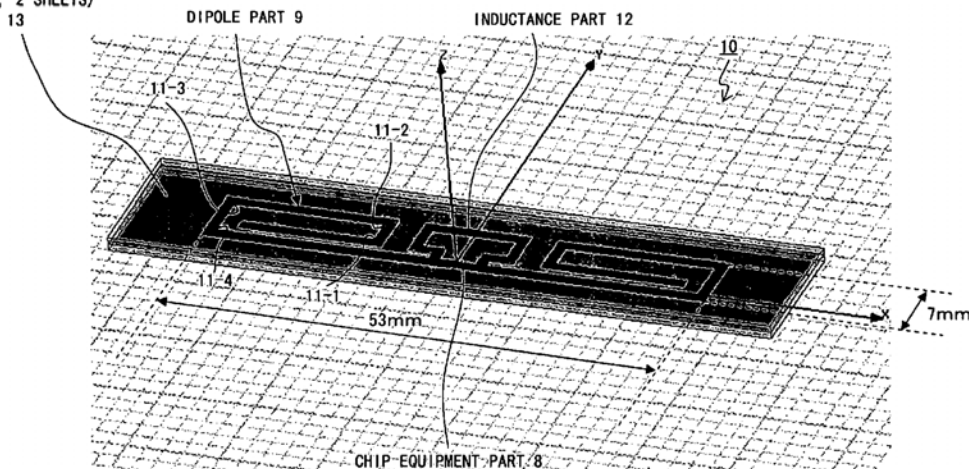
(21) Appl. No.: **11/513,188**

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

(30) **Foreign Application Priority Data**

Apr. 26, 2006 (JP) 2006-122459

PLASTIC RESIN
($\epsilon_r=3$, $t=0.75$ mm
× UPPER AND
LOWER, 2 SHEETS)
13





US 20070252772A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0252772 A1**

Yun et al.

(43) **Pub. Date: Nov. 1, 2007**

(54) **INVERTED L-SHAPED ANTENNA**

(30) **Foreign Application Priority Data**

(76) Inventors: **Je-Hoon Yun**, Daejon (KR); **Jae-Wook Lee**, Daejon (KR); **Hyung-Soo Lee**, Daejon (KR); **Chang-Joo Kim**, Daejon (KR)

Dec. 24, 2003 (KR) 10-2003-0096884

Publication Classification

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

(52) **U.S. Cl.** **343/846**; 343/700 MS; 343/893;
343/907

Correspondence Address:

LADAS & PARRY LLP
224 SOUTH MICHIGAN AVENUE
SUITE 1600
CHICAGO, IL 60604 (US)

(57) **ABSTRACT**

(21) Appl. No.: **10/584,009**

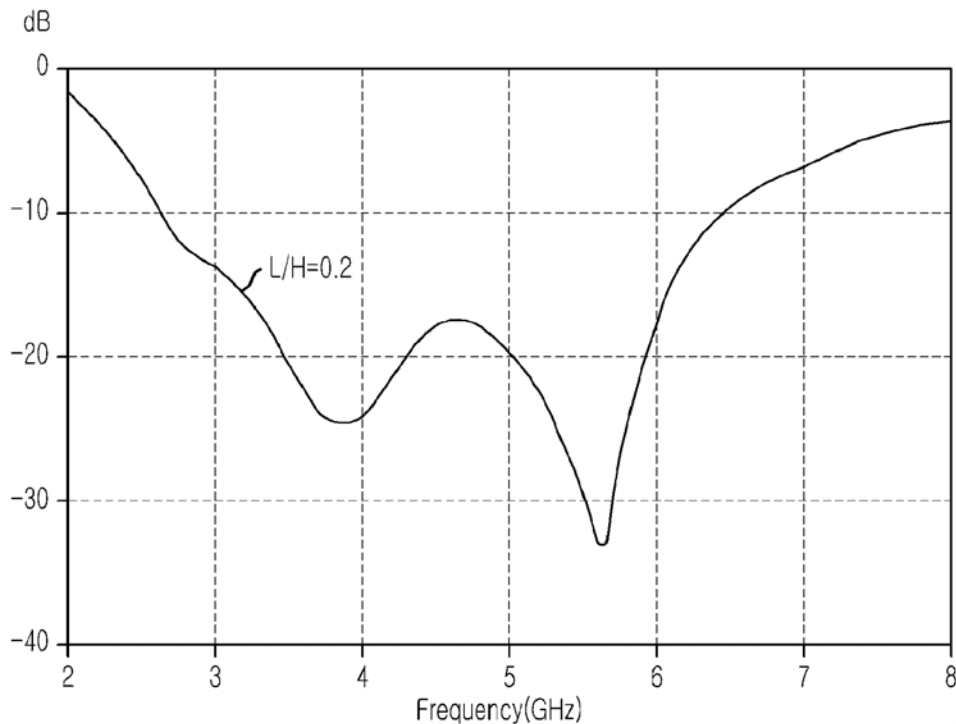
The inverted L antenna with fixed polarization is disclosed. The inverted L antenna with fixed polarization includes: a printed circuit board (PCB) including an metal layer, a dielectric layer and a ground layer; and an antenna element coupled to a predetermined shaped of one side of the PCB, wherein the predetermined shape is a form for directing an electric field excited at edge of PCB to match with a direction of the antenna element.

(22) PCT Filed: **May 29, 2004**

(86) PCT No.: **PCT/KR04/01282**

§ 371(c)(1),

(2), (4) Date: **Jun. 22, 2006**





US 20070252773A1

(19) **United States**

(12) **Patent Application Publication**
Soler Castany et al.

(10) **Pub. No.: US 2007/0252773 A1**

(43) **Pub. Date: Nov. 1, 2007**

(54) **ANTENNA STRUCTURE FOR A WIRELESS DEVICE WITH A GROUND PLANE SHAPED AS A LOOP**

Related U.S. Application Data

(60) Provisional application No. 60/627,653, filed on Nov. 12, 2004.

(75) Inventors: **Jordi Soler Castany**, Barcelona (ES);
Carles Puente Baliarda, Barcelona (ES)

Publication Classification

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.** **343/846**

Correspondence Address:
KENYON & KENYON LLP
1500 K STREET N.W.
SUITE 700
WASHINGTON, DC 20005 (US)

(57) **ABSTRACT**

This invention refers to an antenna structure for a wireless device comprising a ground plane and an antenna element, wherein the ground plane has the shape of an open loop. The invention further refers to an antenna structure for a wireless device, such as a light switch or a wrist sensor or wristwatch, comprising an open loop ground plane having a first end portion and a second end portion, the open loop ground plane defining an opening between the first end portion and the second end portion; and an antenna component positioned within the opening defined between the first end portion and the second end portion and overlapping at least one of the first end portion or the second end portion. Further the invention refers to a corresponding wireless device and to a method for integrating such an antenna structure in a wireless device.

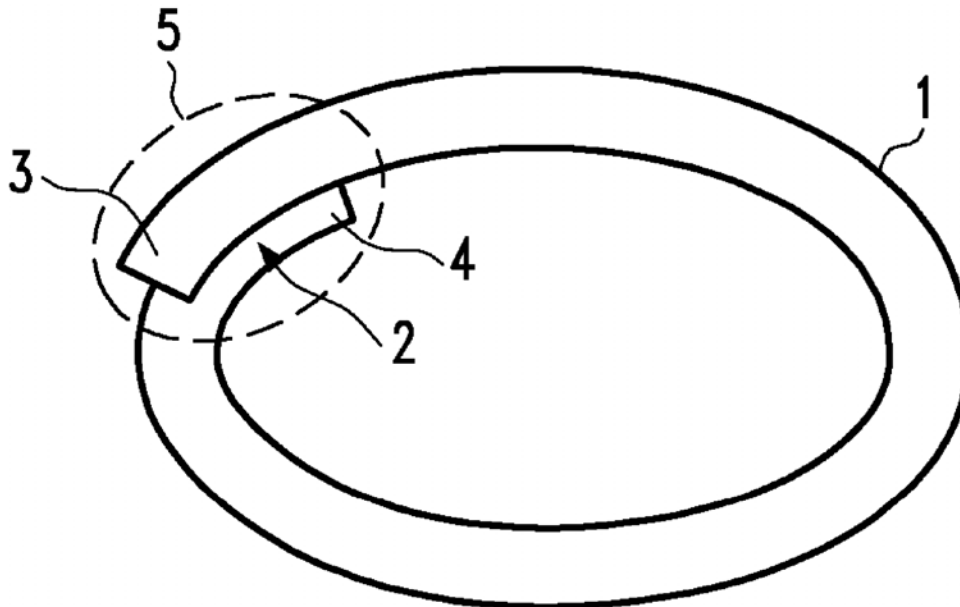
(73) Assignee: **FRACTUS, S.A.**, Sant Cugat del Vallés, B (ES)

(21) Appl. No.: **11/719,151**

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

(86) PCT No.: **PCT/EP05/55959**

§ 371(c)(1),
(2), (4) Date: **Jun. 13, 2007**





US 20070252774A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0252774 A1**

(43) **Pub. Date: Nov. 1, 2007**

(54) **MOBILE WIRELESS COMMUNICATIONS
DEVICE COMPRISING MULTI-FREQUENCY
BAND ANTENNA AND RELATED METHODS**

continuation of application No. 11/042,693, filed on
Jan. 25, 2005, now Pat. No. 7,068,230.

(75) Inventors: **Yihong QI**, Waterloo (CA); **Ying Tong
Man**, Kitchener (CA); **Perry
Jarmuszewski**, Waterloo (CA)

(60) Provisional application No. 60/576,159, filed on Jun.
2, 2004. Provisional application No. 60/576,637, filed
on Jun. 3, 2004.

Publication Classification

Correspondence Address:

**ALLEN, DYER, DOPPELT, MILBRATH &
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1401 CITRUS CENTER 255 SOUTH ORANGE
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ORLANDO, FL 32802-3791 (US)

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

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

(57) **ABSTRACT**

A mobile wireless communications device may include a housing and a multi-frequency band antenna carried within the housing. The multi-frequency band antenna may include a main loop conductor having a gap therein defining first and second ends of the main loop conductor, a first branch conductor having a first end connected adjacent the first end of the main loop conductor and having a second end defining a first feed point, and a second branch conductor having a first end connected adjacent the second end of the main loop conductor and a second end defining a second feed point. The antenna may further include a tuning branch conductor having a first end connected to the main loop conductor between the respective first ends of the first and second branches.

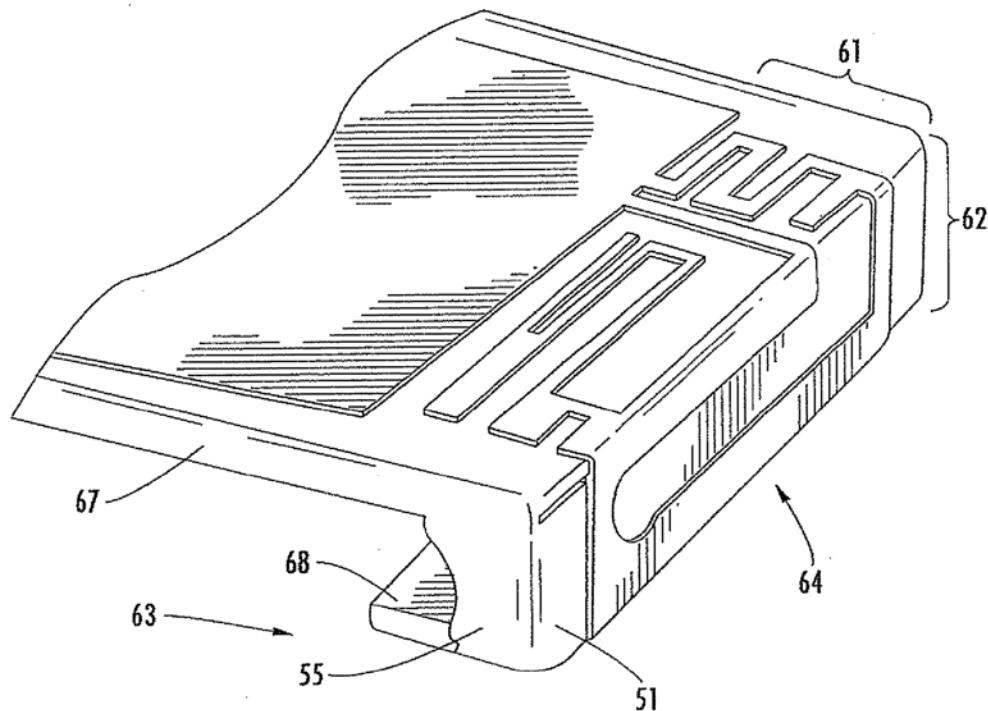
(73) Assignee: **Research In Motion Limited**, Waterloo
(CA)

(21) Appl. No.: **11/769,844**

(22) Filed: **Jun. 28, 2007**

Related U.S. Application Data

(63) Continuation of application No. 11/422,158, filed on
Jun. 5, 2006, now Pat. No. 7,271,772, which is a





US 20070252778A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0252778 A1**

Ide et al. (43) **Pub. Date: Nov. 1, 2007**

(54) **PURE DIELECTRIC ANTENNAS AND RELATED DEVICES**

(30) **Foreign Application Priority Data**

Jan. 17, 2005 (GB)..... 0500856.0

(76) Inventors: **Jonathan Ide**, Cambridge (GB); **Simon Philip Kingsley**, Cambridge (GB); **Steven Gregory O'Keefe**, Queensland (AU); **Seppo Saario**, Cambridge (GB)

Publication Classification

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

(52) **U.S. Cl.** **343/907**

Correspondence Address:
PEARL COHEN ZEDEK LATZER, LLP
1500 BROADWAY 12TH FLOOR
NEW YORK, NY 10036 (US)

(57) **ABSTRACT**

(21) Appl. No.: **11/792,079**

There is disclosed an antenna device comprising an elongate dielectric radiating element having a longitudinal axis and a feeding mechanism for generating displacement currents in the dielectric radiating element. The radiating element is configured to support displacement current resonance modes parallel to the longitudinal axis but to inhibit displacement current resonance modes transverse to the longitudinal axis.

(22) PCT Filed: **Jan. 17, 2006**

(86) PCT No.: **PCT/GB06/00144**

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

