



US 20070052587A1

(19) **United States**

(12) **Patent Application Publication**  
**Cheng**

(10) **Pub. No.: US 2007/0052587 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **COMPACT MULTI-BAND, MULTI-PORT ANTENNA**

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

(75) Inventor: **Dajun Cheng**, Marlborough, MA (US)

**Publication Classification**

Correspondence Address:  
**THE LAW OFFICES OF JOHN C. SCOTT,  
LLC  
C/O INTELLEVELE  
P. O. BOX 52050  
MINNEAPOLIS, MN 55402 (US)**

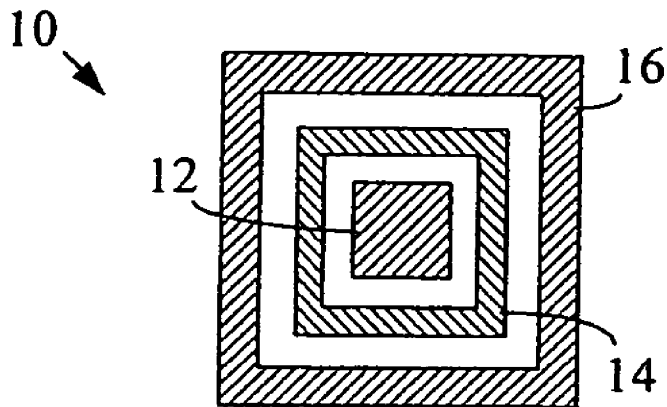
(51) **Int. Cl.**  
**H01Q 1/38** (2006.01)  
(52) **U.S. Cl.** ..... **343/700 MS**

(57) **ABSTRACT**

(73) Assignee: **Intel Corporation**

A multi-band, multi-port antenna includes at least one patch radiating element and at least one ring radiating element, that are operative within different frequency bands, on a common conductive layer.

(21) Appl. No.: **11/209,218**



**LAYER 1**



US 20070052588A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2007/0052588 A1**

**Liu et al.**

(43) **Pub. Date:**

**Mar. 8, 2007**

(54) **DUAL-BAND PATCH ANTENNA WITH SLOT STRUCTURE**

**Publication Classification**

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

(75) Inventors: **I-Ru Liu**, Taipei City (TW); **Kong-Kun Tyan**, Ta Hsi Town (TW)

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

(57) **ABSTRACT**

Correspondence Address:

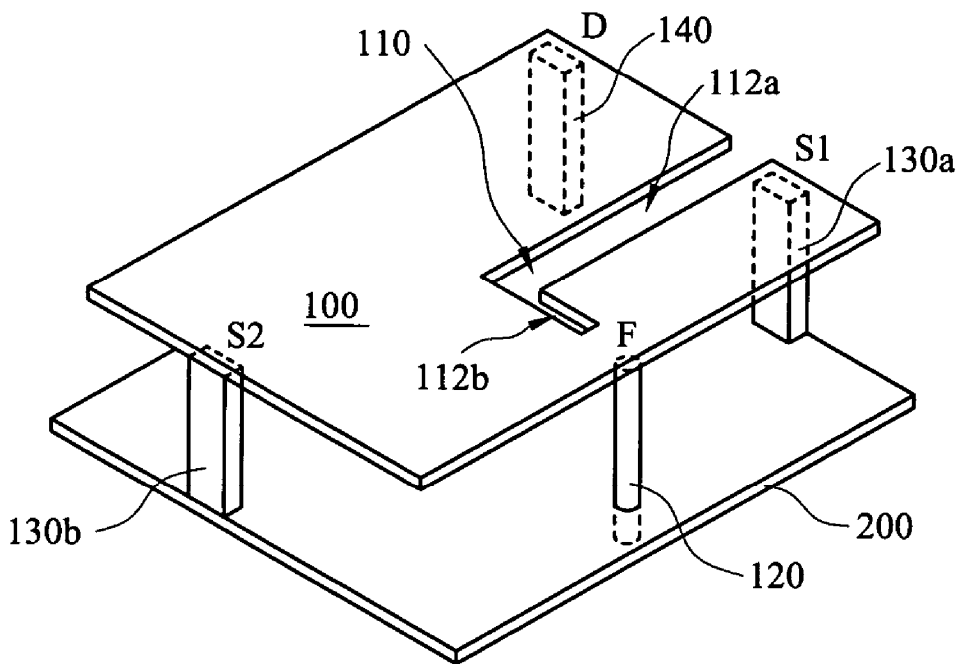
**BIRCH STEWART KOLASCH & BIRCH**  
**PO BOX 747**  
**FALLS CHURCH, VA 22040-0747 (US)**

A dual-band patch antenna with a slot structure is disclosed. The dual-band patch antenna comprises a metal-work antenna including a rectangular (patch) radiator on which an L-shaped slot structure is formed; two shorting strips and vertically shorted to a conductive ground plane formed on a base board; and a feeding means inserted into the base board. When the dual-band patch antenna is operated at about 2.45 GHz and about 5.4 GHz, good radiation pattern and antenna gain are obtained for being applicable to IEEE802.11b/g/alj or Bluetooth specifications.

(73) Assignee: **ACCTON TECHNOLOGY CORPORATION**

(21) Appl. No.: **11/209,813**

(22) Filed: **Aug. 24, 2005**





US 20070052589A1

(19) **United States**

(12) **Patent Application Publication**  
**Liu**

(10) **Pub. No.: US 2007/0052589 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **ANTENNA MODULE**

**Publication Classification**

(76) Inventor: **I-Ru Liu, Taipei City (TW)**

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

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

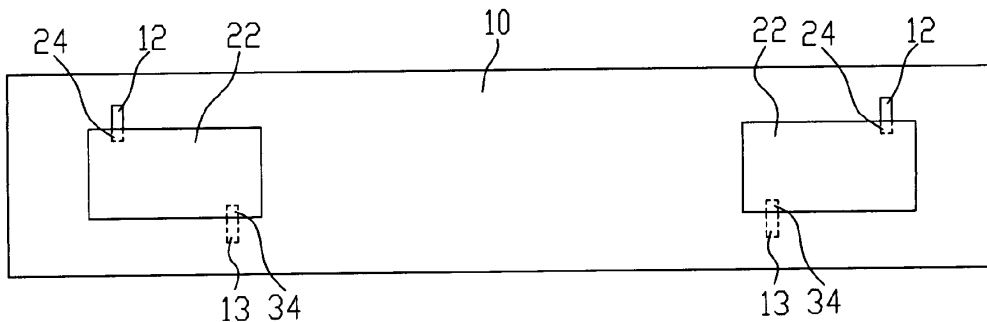
Correspondence Address:  
**ROSENBERG, KLEIN & LEE**  
**3458 ELLICOTT CENTER DRIVE-SUITE 101**  
**ELLICOTT CITY, MD 21043 (US)**

(57) **ABSTRACT**

An antenna module includes a substrate with at least a first antenna on one side while at least a second antenna on the other side of the substrate so that both sides of the antenna module are able to radiate signals. Therefore, the effective angular coverage of the antenna module is enlarged and the performance of the embedded wireless network device is improved.

(21) Appl. No.: **11/209,832**

(22) Filed: **Aug. 24, 2005**





US 20070052591A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0052591 A1**  
**Chao** (43) **Pub. Date: Mar. 8, 2007**

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

(76) Inventor: **Wen-Shin Chao**, Taichung City (TW)

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

(57) **ABSTRACT**

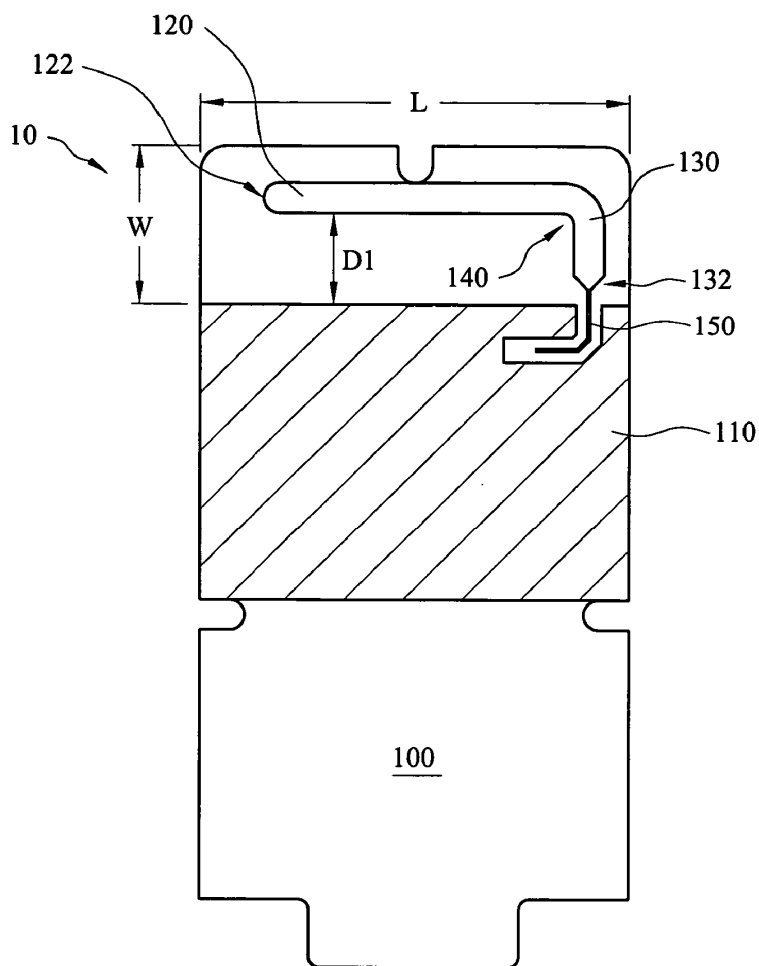
A monopole antenna is disclosed. The monopole antenna comprises a base board, a first substantially L-shaped conductor, a first ground plane, a second substantially L-shaped conductor, a second ground plane and a feeding strip, and the monopole antenna further has a plurality of evenly-distributed through holes penetrating the base board from the first substantially L-shaped conductor to the second substantially L-shaped conductor. When the monopole antenna is operated at about 2.4-2.5 GHz, good radiation patterns and antenna gain are obtained for being applicable to IEEE802.11b/g specifications.

(21) Appl. No.: 11/217,372

(22) Filed: Sep. 2, 2005

**Publication Classification**

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





US 20070052595A1

(19) **United States**

(12) **Patent Application Publication**  
**Harano**

(10) **Pub. No.: US 2007/0052595 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **ANTENNA DEVICE FOR PORTABLE  
TERMINALS AND RADIO UNIT FOR  
RECEIVING BROADCAST WAVES**

**Publication Classification**

(76) Inventor: **Nobuya Harano**, Kakegawa-shi (JP)

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

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

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

(57) **ABSTRACT**

There is provided an antenna device for use with a portable terminal, which can be used in different frequency bands by combining antenna characteristics.

Whip antenna **1** is electrically connected to power feeder **3** through contact member **5**, and resonates in a UHF band or higher when extended. Coiled antenna **2** is electrically connected to power feeder **3** through frequency filter **4** mounted on device board **10**. Frequency filter **4** is set to a low impedance in a VHF band to supply electric power to coiled antenna **2**. With this arrangement, external whip antenna **1** is excited in the UHF band or higher, and built-in coiled antenna **2** is mainly excited in the VHF band. The antenna device is thus capable of sending or receiving radio waves in a wide frequency band.

(21) Appl. No.: **10/573,080**

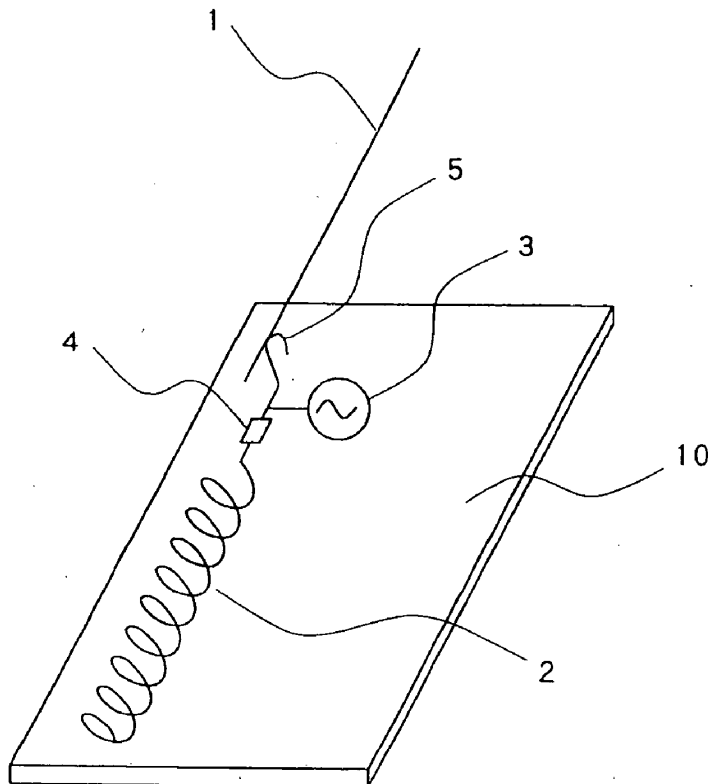
(22) PCT Filed: **Sep. 17, 2004**

(86) PCT No.: **PCT/JP04/13638**

§ 371(c)(1),  
(2), (4) Date: **Mar. 23, 2006**

(30) **Foreign Application Priority Data**

Sep. 26, 2003 (JP) ..... 2003-335972  
Nov. 21, 2003 (JP) ..... 2003-392271





US 20070052599A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0052599 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **ANTENNA DEVICE AND RADIO COMMUNICATION TERMINAL**

(30) **Foreign Application Priority Data**

Sep. 8, 2005 (JP) ..... 2005-260650

Jul. 19, 2006 (JP) ..... 2006-196877

(75) Inventors: **Takayuki Shimizu**, Higashiyamato-shi (JP); **Ryouichi Enoshima**, Higashiyamato-shi (JP)

**Publication Classification**

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

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

Correspondence Address:

**COHEN, PONTANI, LIEBERMAN & PAVANE**  
**551 FIFTH AVENUE**  
**SUITE 1210**  
**NEW YORK, NY 10176 (US)**

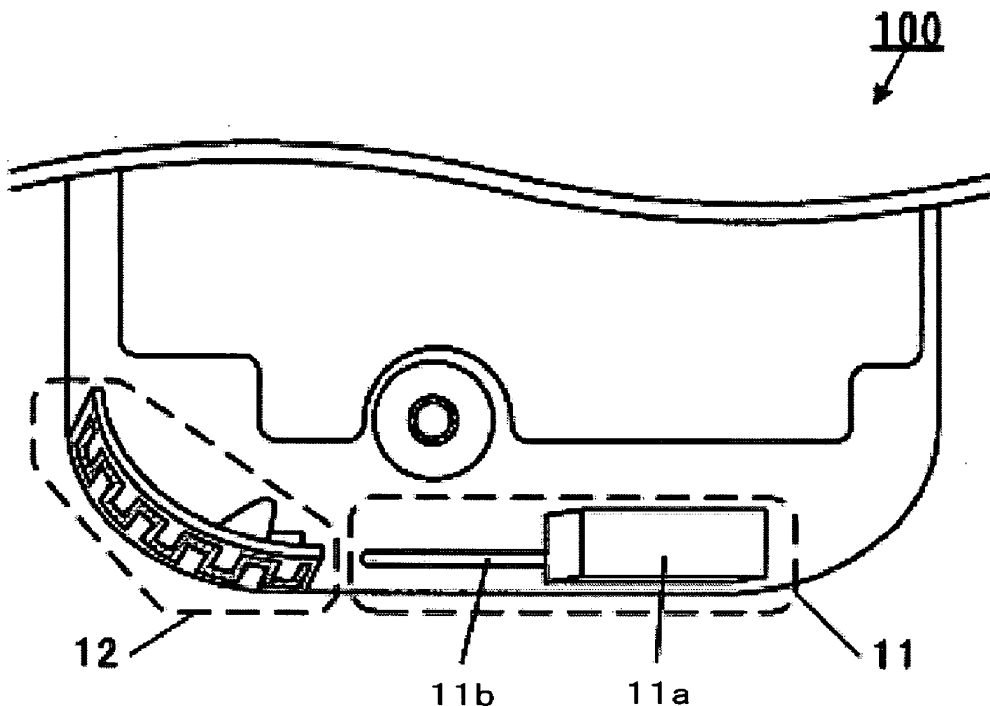
(57) **ABSTRACT**

A switching unit which switches the sub antenna, which is for performing diversity reception in cooperation with the main antenna for transmission and reception, from functioning as an antenna to functioning as a parasitic element, or from functioning as a parasitic element to functioning as an antenna, is provided; the main antenna and the sub antenna are provided to be spaced a predetermined distance apart so that multiple resonance can be generated by electromagnetic coupling, and the sub antenna is made to function as a parasitic element to generate multiple resonance, widening the frequency band width within which the main antenna can transmit and receive a radio wave.

(73) Assignee: **Casio Hitachi Mobile Communications Co., Ltd.**, Tokyo (JP)

(21) Appl. No.: **11/517,936**

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





US 20070052600A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0052600 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **COIL ANTENNA STRUCTURE AND PORTABLE ELECTRONIC APPARATUS**

(30) **Foreign Application Priority Data**

Jun. 14, 2005 (JP) ..... 2005-174099

Aug. 26, 2005 (JP) ..... 2005-245541

Oct. 12, 2005 (JP) ..... 2005-297223

(75) Inventors: **Gaku KAMITANI**, Kyoto-shi (JP);  
**Hirosi MARUSAWA**, Moriyama-shi (JP);  
**Takehiro KONOIKE**, Yasu-shi (JP);  
**Kazunari KAWAHATA**, Machida-shi (JP)

**Publication Classification**

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

(52) **U.S. Cl.** ..... **343/702; 343/787; 343/788**

Correspondence Address:  
**MURATA MANUFACTURING COMPANY, LTD.**  
**C/O KEATING & BENNETT, LLP**  
**8180 GREENSBORO DRIVE**  
**SUITE 850**  
**MCLEAN, VA 22102 (US)**

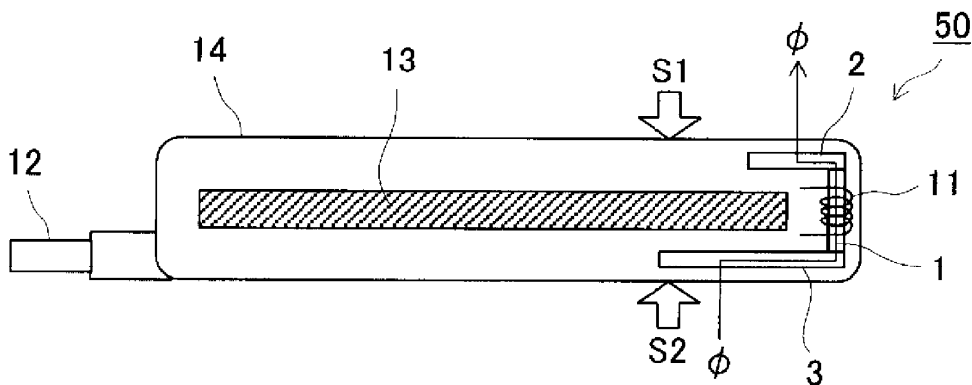
(57) **ABSTRACT**

A coil antenna structure includes a first magnetic component extending in the thickness direction of a tabular primary casing. A second magnetic component and a third magnetic component, which are magnetically connected to the first magnetic component, are disposed on the first principal surface side and the second principal surface side of the primary casing, respectively. The first magnetic component is provided with a coil component surrounding it. In this manner, a U-shaped magnetic path is provided at an end portion of the primary casing so as to detour around a substrate defining an internal conductor. Likewise, a U-shaped magnetic path including fourth to sixth magnetic components is provided in a secondary casing defining a clamshell type casing together with the primary casing so as to detour around a substrate defining as an internal conductor.

(73) Assignee: **MURATA MANUFACTURING CO., LTD.**, Nagaokakyo-shi (JP)

(21) Appl. No.: **11/553,029**

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





US 20070052601A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0052601 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **VEHICLE ANTENNA DEVICE HAVING  
HIGH POWER FEEDING RELIABILITY**

**Publication Classification**

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

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

(75) Inventors: **Tadaaki Onishi**, Fukushima-ken (JP);  
**Tomotaka Suzuki**, Fukushima-ken (JP);  
**Tomoki Ikeda**, Fukushima-ken (JP)

(57) **ABSTRACT**

There is provided a vehicle antenna device having a high connection reliability and mounted simply. A vehicle antenna device comprise a film antenna unit 1 in which an emission conductor pattern 3 is formed on a resin film 2 and a power feeding terminal 4 is exposed to a tongue part 2a; an insulating casing 6 having slits 6a and 6b for inserting the tongue part 2a and an opening 6c for inserting a coaxial cable 20, and installed in the vicinity of the film antenna unit 1; and a circuit substrate 7 which is housed and retained within the casing 6, and connected to the power feeding terminal 4 and the coaxial cable 20, wherein the tongue part is loaded within the casing 6 by passing the tongue part 2a through any one of both slits 6a and 6b, and an electrode pin 9 connected electro-mechanically to the circuit substrate 7 is pressure-contacted to the power feeding terminal 4 within the casing 6.

Correspondence Address:

**BEYER WEAVER & THOMAS, LLP**  
**P.O. BOX 70250**  
**OAKLAND, CA 94612-0250 (US)**

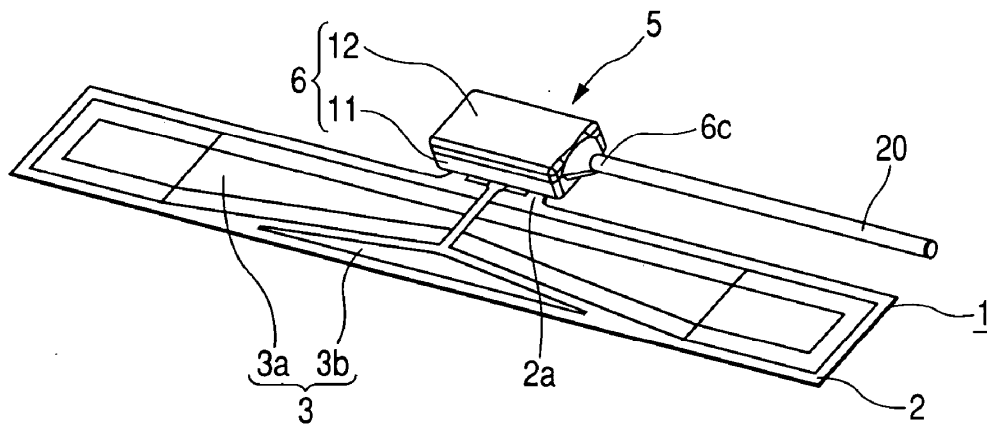
(73) Assignee: **ALPS ELECTRIC CO., LTD.**

(21) Appl. No.: **11/451,733**

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

(30) **Foreign Application Priority Data**

Sep. 6, 2005 (JP) ..... 2005-257860







US 20070052609A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2007/0052609 A1**

**Lee**

(43) **Pub. Date:**

**Mar. 8, 2007**

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

**Publication Classification**

(51) **Int. Cl.**

**H01Q 9/16** (2006.01)

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

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

(57) **ABSTRACT**

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

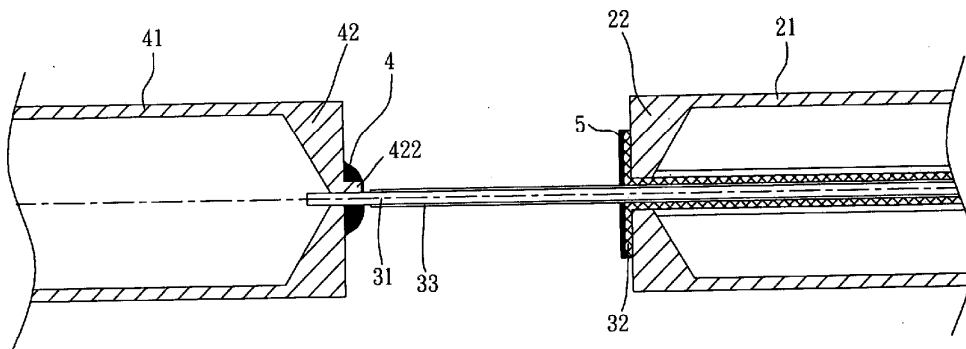
A dual-band or single-band dipole antenna comprises a first radiating unit, a second radiating unit, and a coaxial cable. The first radiating unit includes a first hollow cylinder and a first side wall. In this case, the first side wall, which is disposed on one end of the first hollow cylinder, has a protrusion portion, a first hole, and at least one groove. The first hole is disposed in the protrusion portion, and the groove is disposed on the protrusion portion. The second radiating unit includes a second hollow cylinder and a second side wall. The second side wall is disposed on one end of the second hollow cylinder. The coaxial cable includes a central conductor and an outer conductor. The central conductor is electrically connected to the first radiating unit through the first hole, and the outer conductor is electrically connected to the second radiating unit.

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

(21) Appl. No.: **11/209,812**

(22) Filed: **Aug. 24, 2005**

2



40 { 41 42 } 20 { 21 22 } 30 { 31 32 33 }



US 20070052610A1

(19) **United States**

(12) **Patent Application Publication**  
**Lee**

(10) **Pub. No.: US 2007/0052610 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **TRIANGULAR DIPOLE ANTENNA**

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

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

(57) **ABSTRACT**

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

A triangle dipole antenna includes a first substrate, a first radiating part, and a second radiating part. The first substrate has a first surface and a second surface, which is opposite to the first surface. In this case, the first surface has a first feeding point and the second surface has a first grounding. The first radiating part is triangular and disposed on the first surface of the first substrate. The first radiating part has a first interior angle electrically connected to the first feeding point. The second radiating part is triangular and disposed on the second surface of the first substrate. The second radiating part has a second interior angle electrically connected to the first grounding.

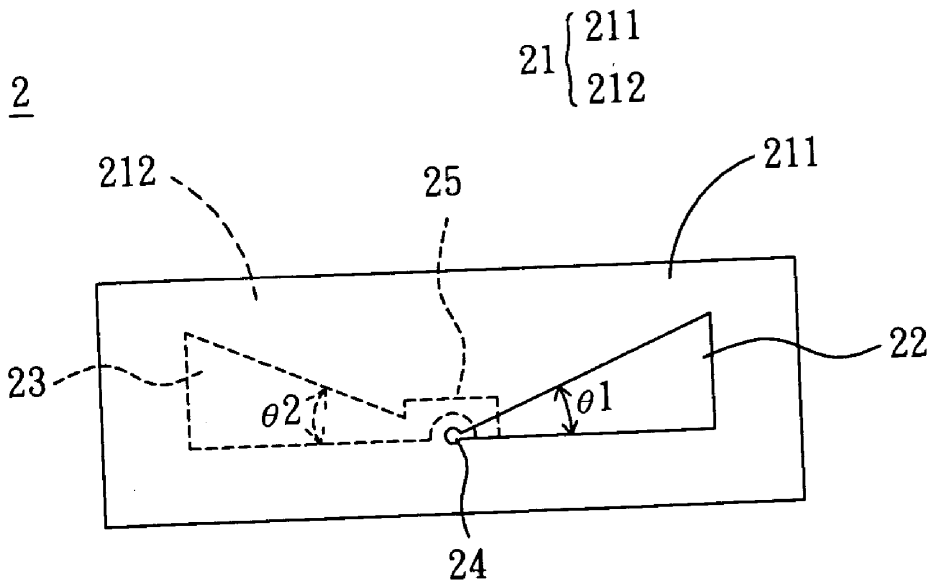
(73) Assignee: **Arcadyan Technology Corporation**

(21) Appl. No.: **11/209,807**

(22) Filed: **Aug. 24, 2005**

**Publication Classification**

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





US 20070052611A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2007/0052611 A1**

**Lee**

(43) **Pub. Date:**

**Mar. 8, 2007**

(54) **DIPOLE ANTENNA**

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

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

(57) **ABSTRACT**

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

A dipole antenna includes a substrate, a first radiating member and a second radiating member. The substrate has a first surface and a second surface opposite to the first surface. The first radiating member and the second radiating member are symmetrically disposed on the first surface and the second surface of the substrate, and electrically connected to a grounding point and a feeding point, respectively. The first radiating member has a first radiating part, a second radiating part and a third radiating part, which are respectively disposed on the first surface and the second surface of the substrate and electrically connected to one another. The second radiating member has a fourth radiating part, a fifth radiating part and a sixth radiating part, which are respectively disposed on the first surface and the second surface of the substrate and are electrically connected to one another.

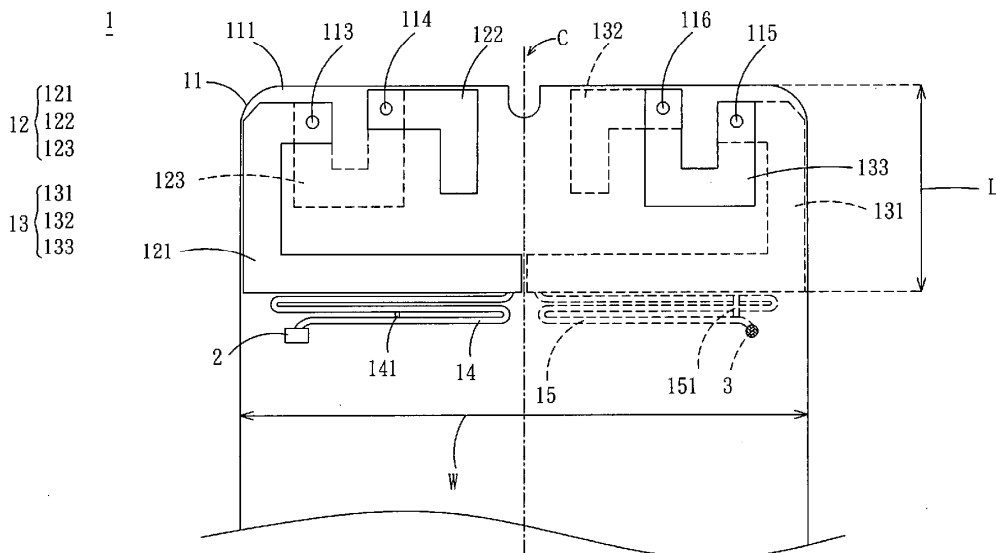
(73) Assignee: **Arcadyan Technology Corporation**

(21) Appl. No.: **11/209,811**

(22) Filed: **Aug. 24, 2005**

**Publication Classification**

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





US 20070052613A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0052613 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **RADIO FREQUENCY IDENTIFICATION  
TRANSPONDER ANTENNA**

(30) **Foreign Application Priority Data**

Sep. 6, 2005 (DE)..... 10 2005 042 444

(76) Inventors: **Sebastian Gallschuetz**, Dresden (DE);  
**Harald Ruprecht**, Erfstadt (DE)

**Publication Classification**

Correspondence Address:  
**Law Offices of Karl Hormann**  
**P.O. Box 381516**  
**Cambridge, MA 02238-1516 (US)**

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

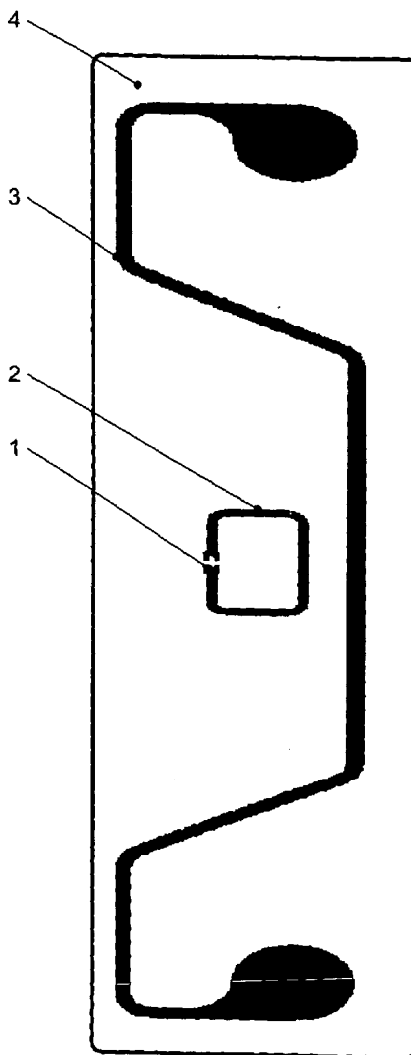
(52) **U.S. Cl.** ..... **343/860**

(57) **ABSTRACT**

A RFID transponder having a microchip or integrated circuit, an impedance-matching structure and a resonant structure mounted on at least one substrate and connected to each other by an electric field.

(21) Appl. No.: **11/234,427**

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





US 20070054693A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0054693 A1**

(43) **Pub. Date: Mar. 8, 2007**

(54) **MOBILE PHONE WITH FM ANTENNA**

**Publication Classification**

(76) Inventors: **Jia-Hung Su**, Chung Ho City (TW);  
**Hong-Ren Chen**, Chung Ho City (TW);  
**Huang-Tse Peng**, Chung Ho City (TW);  
**Yu-Yuan Wu**, Chung Ho City (TW)

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

(52) **U.S. Cl.** ..... **455/550.1; 455/575.7**

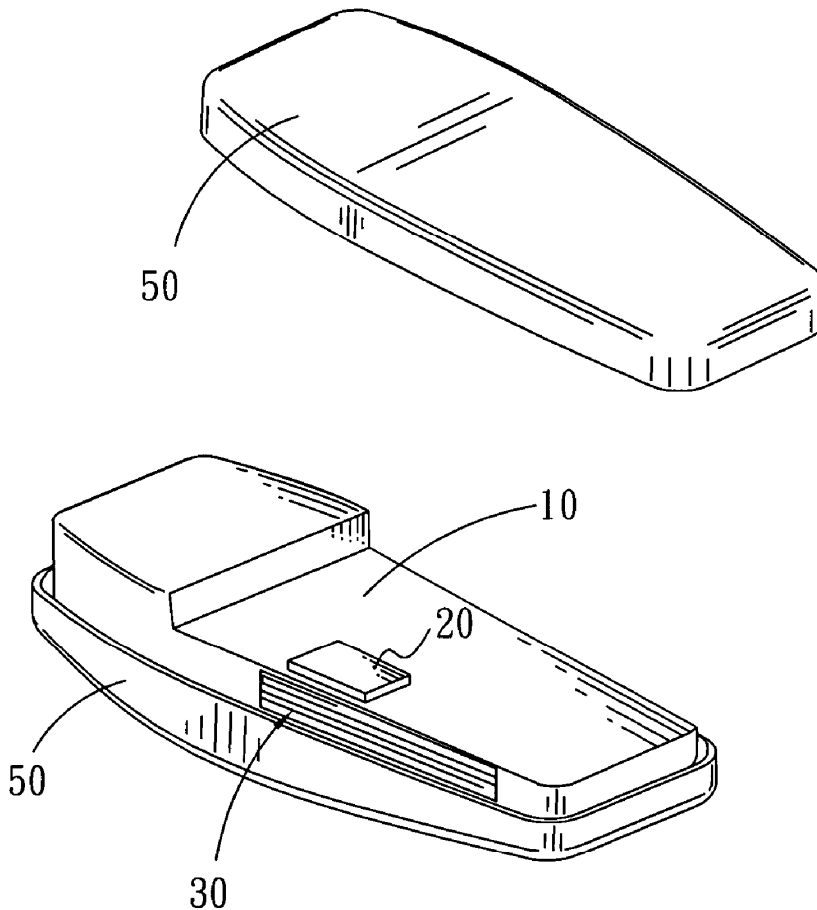
(57) **ABSTRACT**

A mobile phone with FM antenna includes a mobile phone body, an FM antenna, an FM microchip and a phone case. The FM antenna is fixed to an outer side of the mobile phone body. One end of the FM antenna has a feed point, and the other end of the FM antenna is an opening end. The FM antenna resonates at FM radio frequencies so as to receive FM radio signals. The FM microchip is disposed on the mobile phone body and coupled with the feed point of the FM antenna for processing the FM radio signals. The phone case encloses the mobile phone body, the FM antenna and the FM microchip. Thus the FM antenna is embedded in the mobile phone to enable the mobile phone to receive FM radio without extra external earphones.

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

(21) Appl. No.: **11/220,775**

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





US 20070057846A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0057846 A1**

(43) **Pub. Date: Mar. 15, 2007**

(54) **SYMMETRIC-SLOT MONOPOLE ANTENNA**

**Publication Classification**

(76) Inventors: **Jia-Jiu Song**, Taipei County (TW);  
**Jr-Ren Jeng**, Taipei City (TW)

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

(52) **U.S. Cl.** ..... **343/700 MS; 343/860**

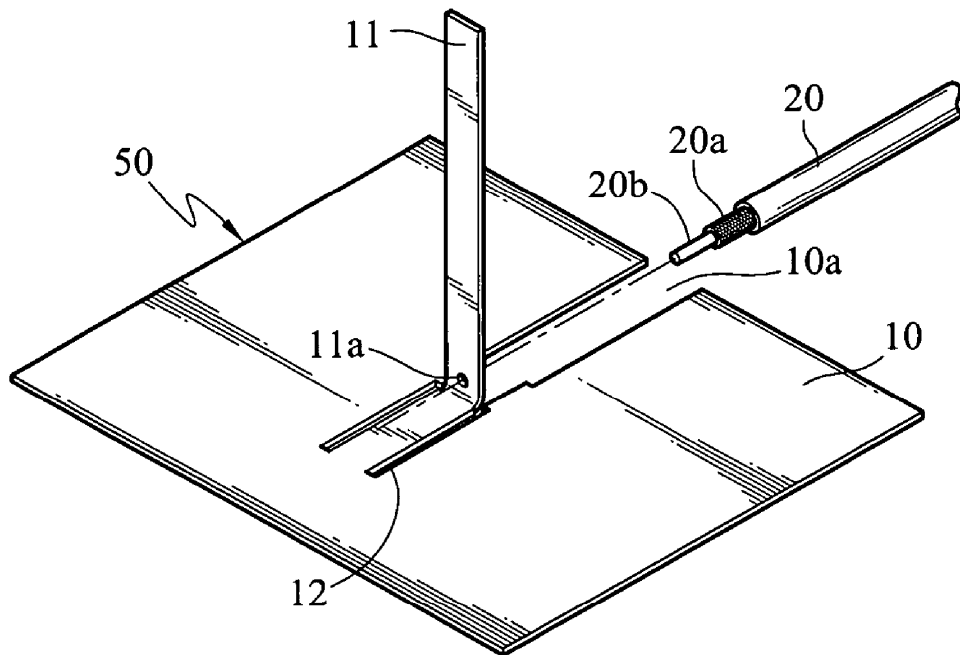
Correspondence Address:  
**HARNESS, DICKEY & PIERCE, P.L.C.**  
**P.O. BOX 8910**  
**RESTON, VA 20195 (US)**

(57) **ABSTRACT**

A symmetric-slot monopole antenna is provided, including a metallic board. Formed on the metallic board are a ground connection part to provide a ground circuit for the monopole antenna and a radiation part formed integrally on the ground connection part to receive and radiate signals transmitted through a signal cable.

(21) Appl. No.: **11/225,182**

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





US 20070057847A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0057847 A1**  
**Tsai et al.** (43) **Pub. Date: Mar. 15, 2007**

(54) **ANTENNA WITH OVERLAPPING FIRST AND SECOND RADIATING ELEMENTS** (52) **U.S. Cl. .... 343/700 MS**

(75) Inventors: **Tiao-Hsing Tsai**, Yungho City (TW);  
**Chieh-Ping Chiu**, Yunlin Shien (TW)

(57) **ABSTRACT**

Correspondence Address:  
**Ladas & Parry**  
**Suite 2100**  
**5670 Wilshire Boulevard**  
**Los Angeles, CA 90036-5679 (US)**

An antenna includes a first radiating element, a feeding point, a grounding point, a second radiating element, and first and second conductive elements. The first radiating element has opposite first and second sides. The feeding point is provided on the first radiating element, and is disposed adjacent to the first side of the first radiating element. The grounding point is provided on the first radiating element, and is disposed adjacent to the second side of the first radiating element. The second radiating element is spaced apart from and overlaps the first radiating element. The first conductive element is disposed adjacent to the feeding point, and interconnects the first and second radiating elements. The second conductive element is disposed adjacent to the grounding point, and interconnects the first and second radiating elements.

(73) Assignee: **Quanta Computer Inc.**

(21) Appl. No.: **11/304,252**

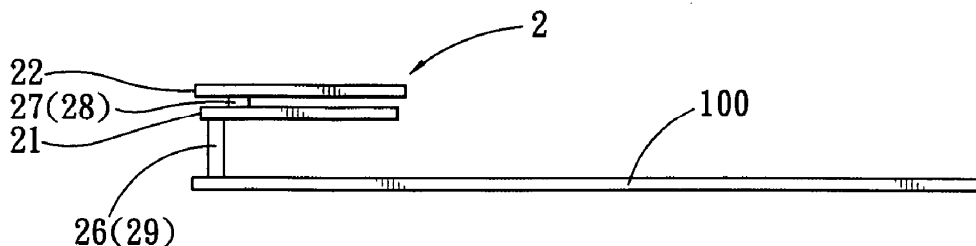
(22) Filed: **Dec. 14, 2005**

(30) **Foreign Application Priority Data**

Sep. 9, 2005 (TW)..... 094131136

**Publication Classification**

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





US 20070057848A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0057848 A1**

(43) **Pub. Date: Mar. 15, 2007**

(54) **GLASS ANTENNA AND MANUFACTURING METHOD FOR THE SAME**

(76) Inventors: **Toru Maniwa**, Kawasaki (JP); **Andrey Andrenko**, Kawasaki (JP); **Shigekazu Kimura**, Kawasaki (JP); **Shigeru Hashimoto**, Inagi (JP); **Toshiaki Ibi**, Inagi (JP); **Akihide Sano**, Tokyo (JP)

Correspondence Address:  
**BINGHAM MCCUTCHEN LLP**  
**3000 K STREET, NW**  
**BOX 1P**  
**WASHINGTON, DC 20007 (US)**

(21) Appl. No.: **11/342,669**

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

(30) **Foreign Application Priority Data**

Sep. 12, 2005 (JP) ..... 2005-263996

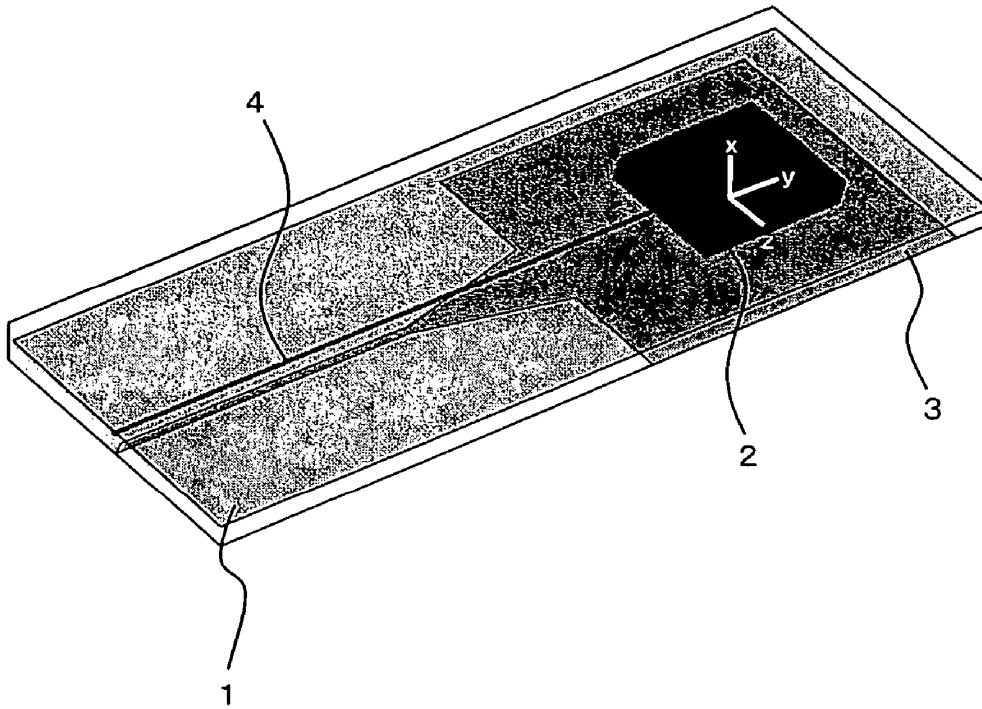
**Publication Classification**

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

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

(57) **ABSTRACT**

Either one or both of the antenna pattern and a ground pattern, which reflects a radiated radio wave radiated from the antenna pattern, are buried inside the glass substrate. As a result, it is possible to provide high-gain, low-loss glass antennas in which glass is used as their substrates.







US 20070057849A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0057849 A1**

(43) **Pub. Date: Mar. 15, 2007**

(54) **ANTENNA FOR DUAL BAND OPERATION**

**Publication Classification**

(75) Inventors: **Young-min Moon**, Seoul (KR);  
**Young-eil Kim**, Suwon-si (KR);  
**Gyoo-soo Chae**, Cheonan-si (KR)

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

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

(57) **ABSTRACT**

(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**

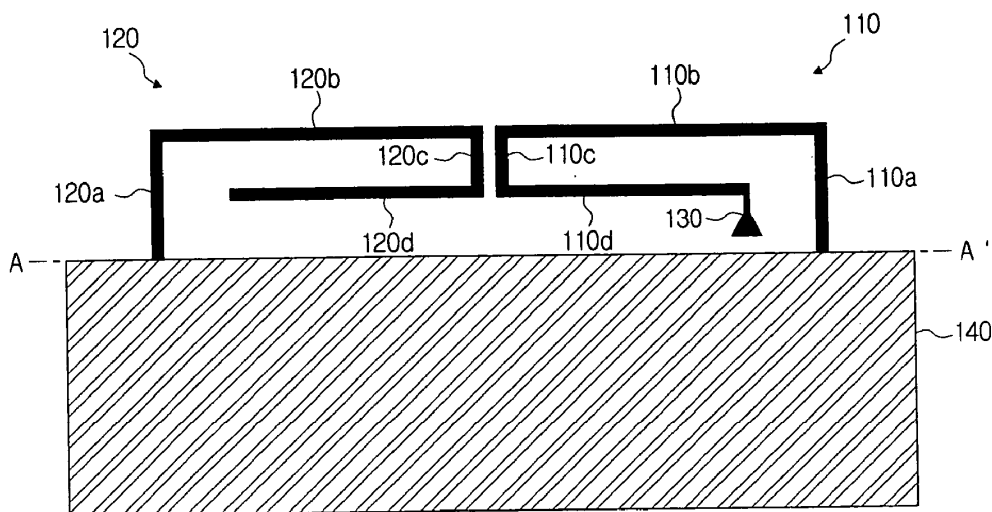
Provided is a dual band antenna including: a ground surface; a feeder feeding a predetermined current; an induction radiator including one end connected to the ground surface and the other end connected to the feeder; and a parasitic radiator including an end connected to the ground surface and the other end opened. An antenna having a smaller size than an existing IFA mainly used as an internal antenna in a portable terminal can be provided through the dual band antenna including the induction radiator and the parasitic radiator.

(21) Appl. No.: **11/387,924**

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

(30) **Foreign Application Priority Data**

Sep. 13, 2005 (KR) ..... 2005-85120





US 20070057850A1

(19) **United States**

(12) **Patent Application Publication**  
**Yang**

(10) **Pub. No.: US 2007/0057850 A1**

(43) **Pub. Date: Mar. 15, 2007**

(54) **DIRECTIONAL ANTENNA STRUCTURE**

**Publication Classification**

(75) Inventor: **Sheng-Hsiung Yang**, Hsinchu 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**

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

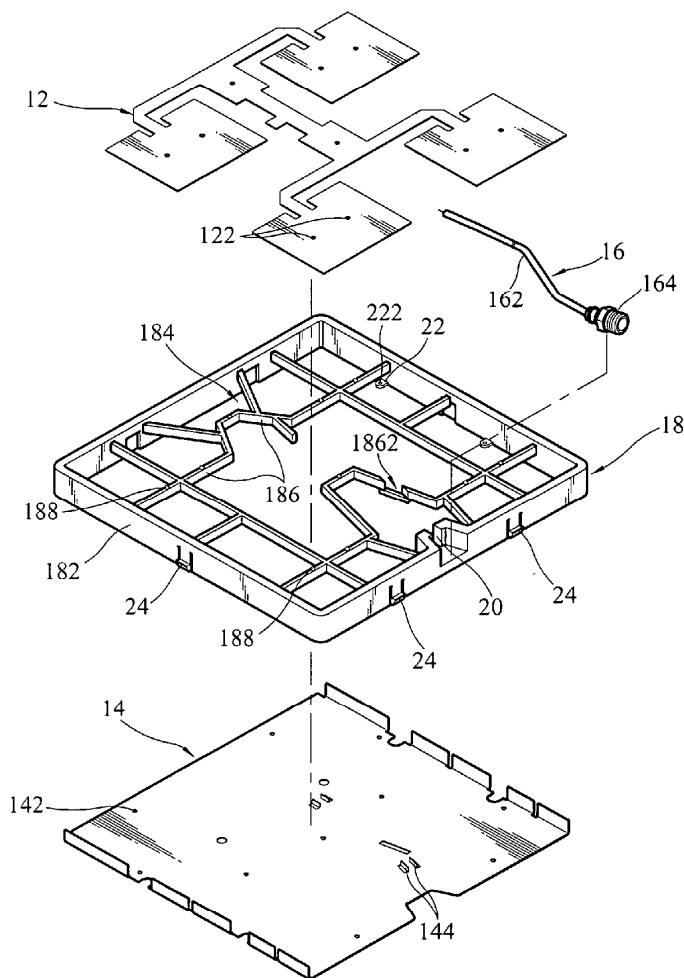
A directional antenna structure is provided, which includes a patch antenna, a reflection plate, a cable connector, and a frame for the patch antenna, the reflection plate, and the cable connector to be fixed and assembled thereon. Through such a modular design, the antenna structure is manufactured and assembled through a simplified process, and besides this advantage, the antenna structure is further selectively integrated with a housing having the same assembly interface, and thus becoming a modular antenna structure integrated with various housings.

(21) Appl. No.: **11/513,306**

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

(30) **Foreign Application Priority Data**

Sep. 9, 2005 (TW)..... 094215623





US 20070060221A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0060221 A1**

(43) **Pub. Date: Mar. 15, 2007**

(54) **SPEAKER VOICE COIL ANTENNA**

(52) **U.S. Cl.** ..... 455/575.7; 455/274

(75) Inventors: **John M. Burgan**, North Palm Beach, FL (US); **Joseph Patino**, Pembroke Pines, FL (US); **Russell L. Simpson**, Miami, FL (US); **Jason T. Young**, Palm City, FL (US)

(57) **ABSTRACT**

Correspondence Address:  
**AKERMAN SENTERFITT**  
**P.O. BOX 3188**  
**WEST PALM BEACH, FL 33402-3188 (US)**

A wireless communication device (50) can include a radio frequency transceiver (52), an audio drive circuit (58) coupled to the transceiver, a speaker (10) having a voice coil (16) coupled to the audio drive circuit, and an antenna feed or radiating circuit (20) such as an RFID or NFID circuit coupled to the voice coil for at least radiating or receiving an electromagnetic signal via the voice coil. Such radiating circuits can be coupled to the voice coil using a band pass circuit designed to substantially prevent a radiating signal from the radiating circuit from interfering with audio drive circuit driving the speaker. The wireless communication device can further include an antenna (54) coupled to the radio frequency transceiver. Note, this arrangement can be designed to avoid problems involving electrostatic discharge sensitivity, electromagnetic interference coupling between the antenna and the voice coil, total radiated power, and specific absorption rate.

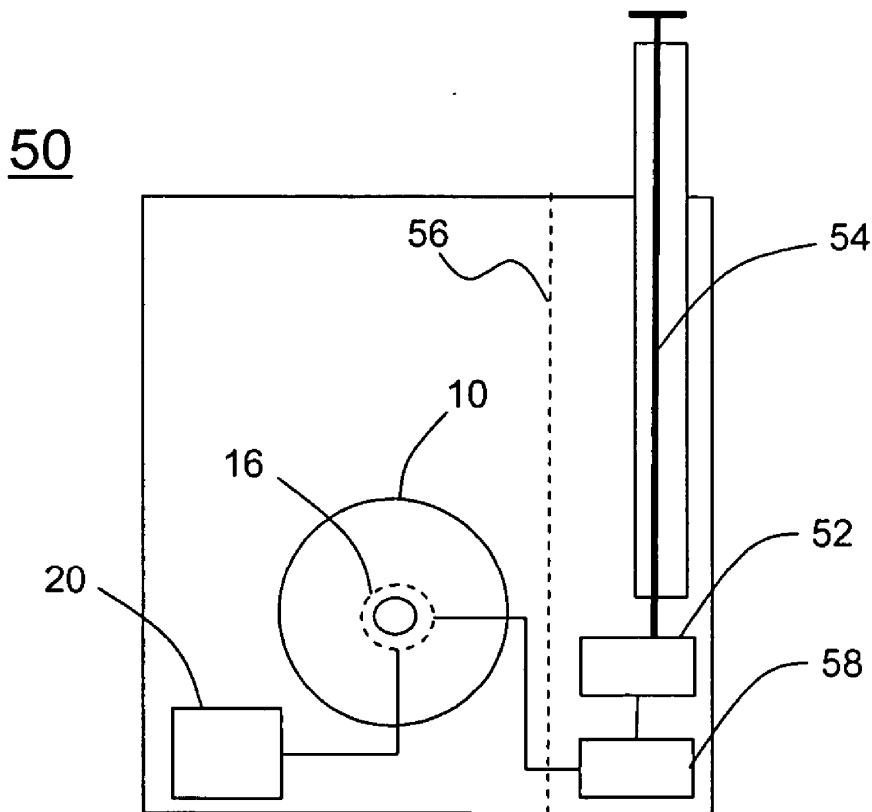
(73) Assignee: **Motorola, Inc.**, Schaumburg, IL

(21) Appl. No.: **11/224,251**

(22) Filed: **Sep. 12, 2005**

**Publication Classification**

(51) **Int. Cl.**  
**H04B 1/06** (2006.01)  
**H04M 1/00** (2006.01)





US 20070063899A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0063899 A1**

**Geoca et al.** (43) **Pub. Date: Mar. 22, 2007**

(54) **EMBEDDED PLANAR INVERTED F ANTENNA (PIFA) TUNED WITH VARIABLE GROUNDING POINT**

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

**Publication Classification**

(75) Inventors: **Eric Peter Geoca**, Penfield, NY (US);  
**Thomas R. Schleef**, Palm Bay, FL (US)

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

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

Correspondence Address:

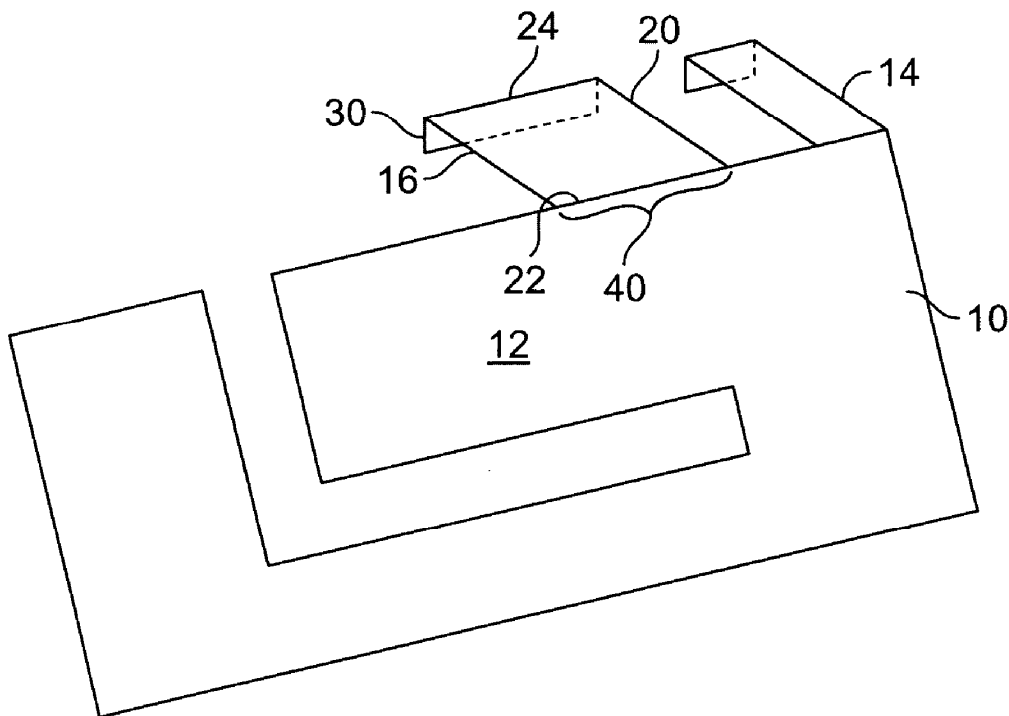
**Robert J. Kapalka**  
**Tyco Electronics Corporation**  
**Suite 140**  
**4550 New Linden Hill Road**  
**Wilmington, DE 19808-2952 (US)**

(57) **ABSTRACT**

An antenna system is described that includes a radiating element, a feed point configured for electrical connection to the radiating element, and a grounding point configured for electrical connection to the radiating element. At least one of the feed point and the grounding point are configured to accommodate a range of distances between the electrical connections to the radiating element.

(73) Assignee: **Tyco Electronics Corporation**

(21) Appl. No.: **11/229,879**





US 20070063901A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0063901 A1**  
**Tang et al.** (43) **Pub. Date: Mar. 22, 2007**

(54) **MOBILE PHONE ANTENNA**

**Publication Classification**

(76) Inventors: **Chia-Lun Tang**, Miao-Li Hsien (TW);  
**Kin-Lu Wong**, Kao-Hsiung City (TW);  
**Saou-Wen Su**, Taipei (TW)

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

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

(57) **ABSTRACT**

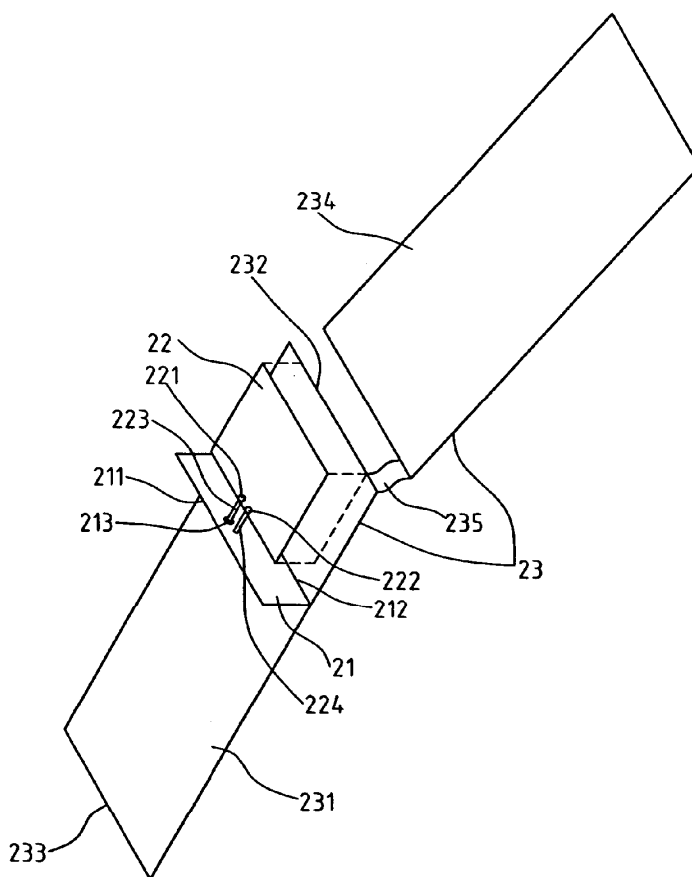
The present invention provides a mobile phone antenna, which comprises an antenna ground plane, a radiating conducting plate, a feeding conducting strip, a shorting conducting strip, and a system ground plane. Using the antenna ground plane as a shielding metal wall, the present invention advantages itself of making the antenna and a shielding metal box easier to be integrated without a need for an isolation distance. The present invention thus makes the best use of the internal spacing of a mobile phone. This antenna is suitable for application as an embedded antenna for both folded-type and bar-type mobile phones. The operating bandwidth of this antenna can cover the required bandwidth for a Universal Mobile Telecommunication System operation.

(21) Appl. No.: **11/258,762**

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

(30) **Foreign Application Priority Data**

Sep. 22, 2005 (TW)..... 094132804





US 20070063902A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2007/0063902 A1**

**Leisten**

(43) **Pub. Date:**

**Mar. 22, 2007**

(54) **MOBILE COMMUNICATION DEVICE AND AN ANTENNA ASSEMBLY FOR THE DEVICE**

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

(76) Inventor: **Oliver Paul Leisten**, Northampton (GB)

(57) **ABSTRACT**

Correspondence Address:  
**JOHN BRUCKNER, P.C.**  
**P.O. BOX 490**  
**FLAGSTAFF, AZ 86002 (US)**

A mobile communication device has an antenna assembly comprising the combination of an inverted-F antenna and a dielectrically-loaded quadrifilar helical antenna, the latter mounted on the distal end of an elongate radiator element of the inverted-F antenna. The dielectrically-loaded antenna has an integral balun on a ceramic antenna core, the balun providing a balanced feed for the radiating elements of the antenna. The elongate radiator structure of the inverted-F antenna acts as a feed path for the dielectrically-loaded antenna, the feed path extending along the elongate radiator structure from the balun to a ground connection element of the inverted-F antenna and, thence, to a signal port associated with a grounding connection of the inverted-F antenna. Placing the dielectrically-loaded quadrifilar antenna at the end of the radiator structure of the inverted-F antenna rather than alongside the latter substantially reduces breakthrough from a transmitter coupled to the inverted-F antenna to receiving circuitry coupled to the dielectrically-loaded antenna.

(21) Appl. No.: 11/263,643

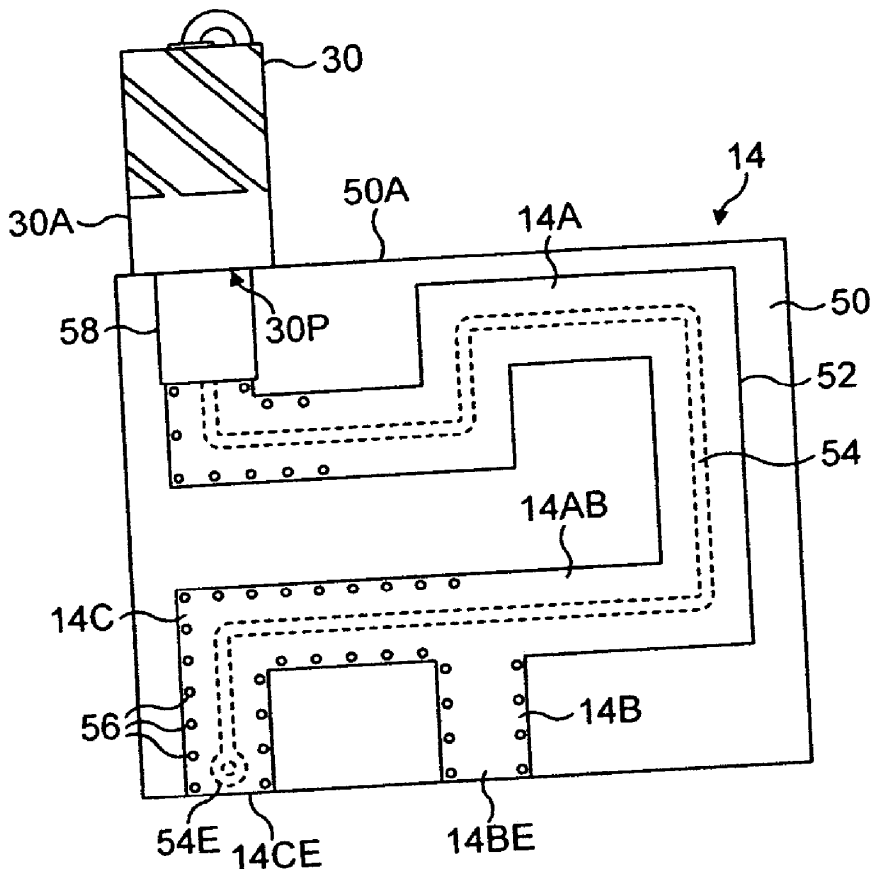
(22) Filed: Oct. 31, 2005

(30) **Foreign Application Priority Data**

Sep. 22, 2005 (GB) ..... 0519371.9

**Publication Classification**

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





US 20070063903A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063903 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **BUILT-IN ANTENNA MODULE OF WIRELESS COMMUNICATION TERMINAL**

**Publication Classification**

(75) Inventors: **Ung Han MUN, SUWON (KR); Jae Suk SUNG, YONGIN (KR)**

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

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

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

(57) **ABSTRACT**

The invention relates to a built-in antenna for a wireless communication terminal. The built-in antenna includes at least one first radiator for base station and at least one second radiator for Bluetooth. The built-in antenna also includes a base having the first and second radiators mounted on an outer surface thereof. The base is mounted on a board such that each end of the first and second radiators is electrically connected to the board of a terminal body. The built-in antenna further includes a Bluetooth chip set fixed to the base and electrically connected to the second radiator. The invention efficiently utilizes limited space in a terminal body to miniaturize the product, attaining RF capabilities with high reception sensitivity.

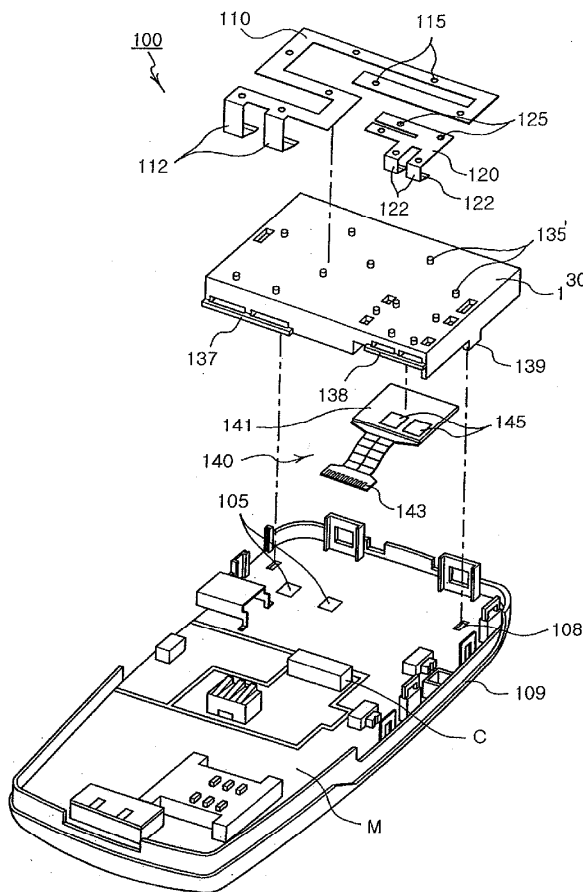
(73) Assignee: **SAMSUNG ELECTRO-MECHANICS CO., LTD., KYUNGKI-DO (KR)**

(21) Appl. No.: **11/464,949**

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

(30) **Foreign Application Priority Data**

Sep. 16, 2005 (KR) ..... 10-2005-86876





US 20070063904A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063904 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **ANTENNA COMBINING EXTERNAL  
HIGH-BAND PORTION AND INTERNAL  
LOW-BAND PORTION**

(30) **Foreign Application Priority Data**

Sep. 19, 2005 (TW)..... 94132321

(75) Inventors: **Kuo-Cheng Chen**, Taoyuan City (TW);  
**Chung-I Chou**, Taoyuan City (TW);  
**Kuei-Chiang Huang**, Taoyuan City  
(TW)

**Publication Classification**

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

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

Correspondence Address:

**FISH & RICHARDSON PC**  
**P.O. BOX 1022**

**MINNEAPOLIS, MN 55440-1022 (US)**

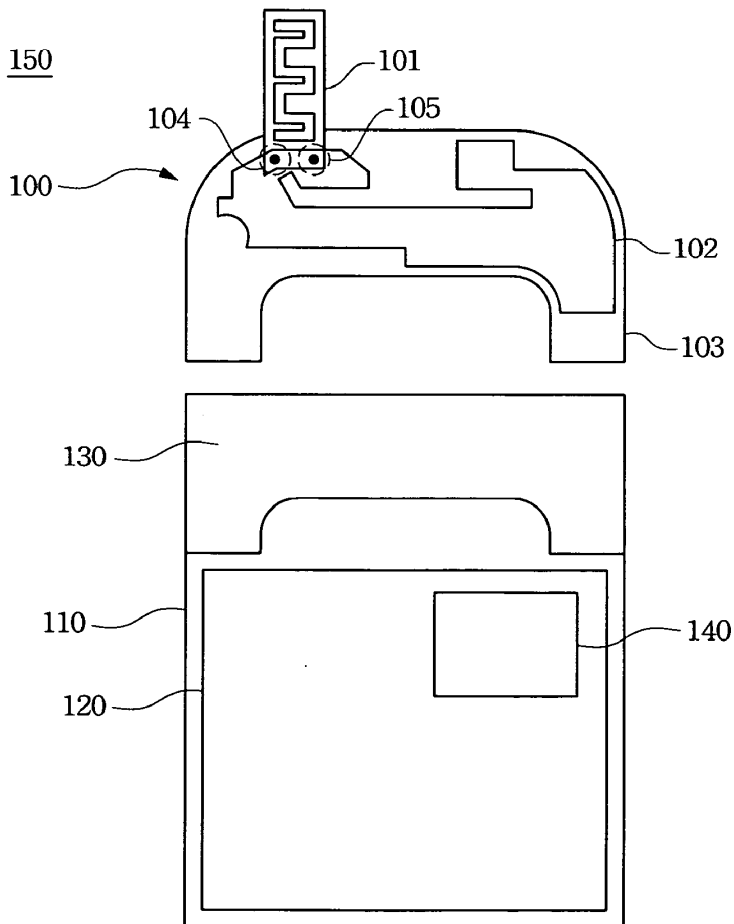
(57) **ABSTRACT**

An antenna comprises an external high-band portion and an internal low-band portion. The external high-band portion reduces energy dissipation from nearby components, and the internal low-band portion reduces the phantom head effect. The antenna combines the external high-band portion and the internal low-band portion, utilizing the advantages of the two portions to benefit the receiving efficiency of the antenna.

(73) Assignee: **HIGH TECH COMPUTER CORPO-  
RATION**

(21) Appl. No.: **11/511,579**

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







US 20070063906A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0063906 A1**  
**Langley** (43) **Pub. Date: Mar. 22, 2007**

(54) **INTEGRATED ANTENNA WITH COUPLED GROUND** (52) **U.S. Cl. .... 343/713; 343/711**

(76) Inventor: **Richard Langley, Kent (GB)**

(57) **ABSTRACT**

Correspondence Address:  
**DICKSTEIN SHAPIRO LLP**  
**1177 AVENUE OF THE AMERICAS (6TH AVENUE)**  
**NEW YORK, NY 10036-2714 (US)**

An integrated antenna includes a dielectric on which is patterned an antenna element and on which, close to an edge of the dielectric, is also patterned a conductive ground coupling member. The ground coupling member is capable of electrical coupling with a grounded body surrounding the dielectric to provide a ground for an unbalanced transmission line whose live is connected to the antenna element. The length of the ground coupling member is made such that an integral odd number of quarterwavelengths of signals at each operating frequency are adapted to extend either side of a signal-ground connection point; the length approximates one-half wavelength at the primary operating frequency. By including a second signal feedline to extend in parallel with the ground coupling member and connect with another antenna element, it is possible for the integrated antenna to receive/transmit on at least two frequencies. The invention finds application in integrated antenna structures in which a local ground connection is not readily possible. For instance, the dielectric and grounded body may be a respective window and chassis of a car. Another automotive application involves forming the integrated antenna on a plastic boot lid.

(21) Appl. No.: **10/571,843**

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

(86) PCT No.: **PCT/GB04/03933**

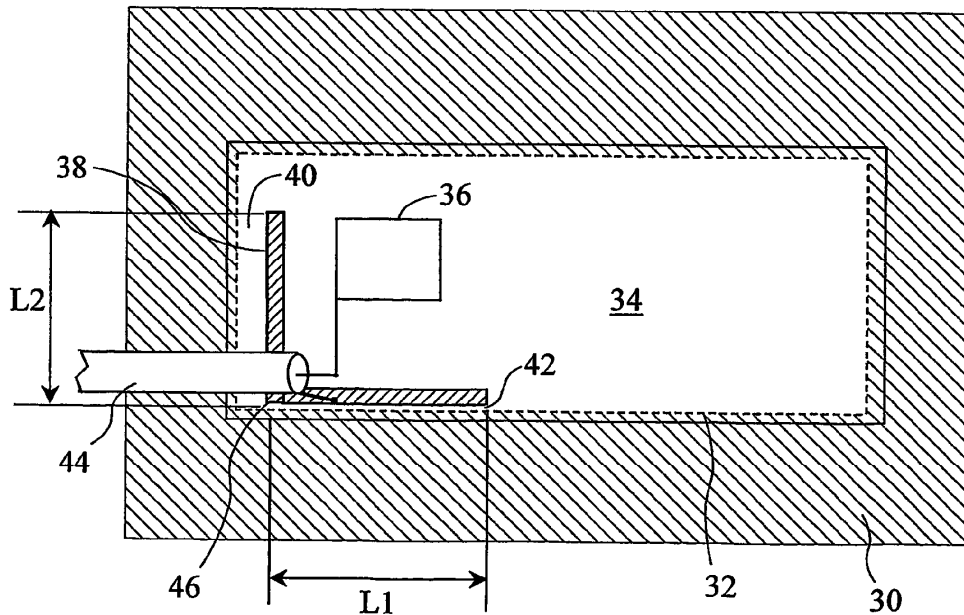
§ 371(c)(1),  
 (2), (4) Date: **Nov. 27, 2006**

(30) **Foreign Application Priority Data**

Sep. 15, 2003 (GB)..... 0321625.6

**Publication Classification**

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





US 20070063909A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063909 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **ANTENNA**

**Publication Classification**

(75) Inventors: **Toshio Fujita**, Kobe-shi (JP); **Shingo Fujisawa**, Kobe-shi (JP)

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

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

Correspondence Address:

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

(57) **ABSTRACT**

A radiator includes two dipole elements as plate-shaped conductors. The radiator further includes two conductive line portions provided on opposite sides of a prescribed axis, sandwiching both of the two dipole elements, each having one end connected to one dipole element and the other end connected to the other dipole element. The two conductive line portions are formed to conform to the shapes of the dipole elements. As the conductive line portions having such shapes are connected to the dipole elements, better characteristics can be attained over wide frequency range and the size can be made smaller than the conventional radiator. Thus, an antenna having smaller size and improved characteristics can be provided.

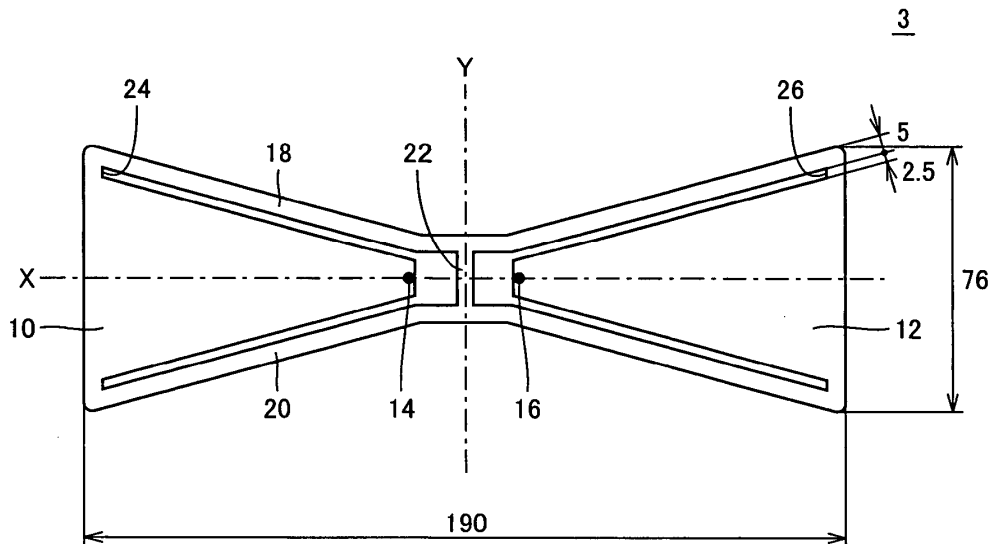
(73) Assignee: **DX Antenna Company, Limited**

(21) Appl. No.: **11/602,352**

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

(30) **Foreign Application Priority Data**

Nov. 26, 2004 (JP) ..... 2004-341748(P)





US 20070063910A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063910 A1**

(43) **Pub. Date: Mar. 22, 2007**

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

**Publication Classification**

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

(75) Inventors: **Huei Chi Wu**, Taoyuan Hsien (TW);  
**Jui Hsueh Chou**, Taoyuan Hsien (TW)

(52) **U.S. Cl.** ..... **343/798; 343/700 MS**

(57) **ABSTRACT**

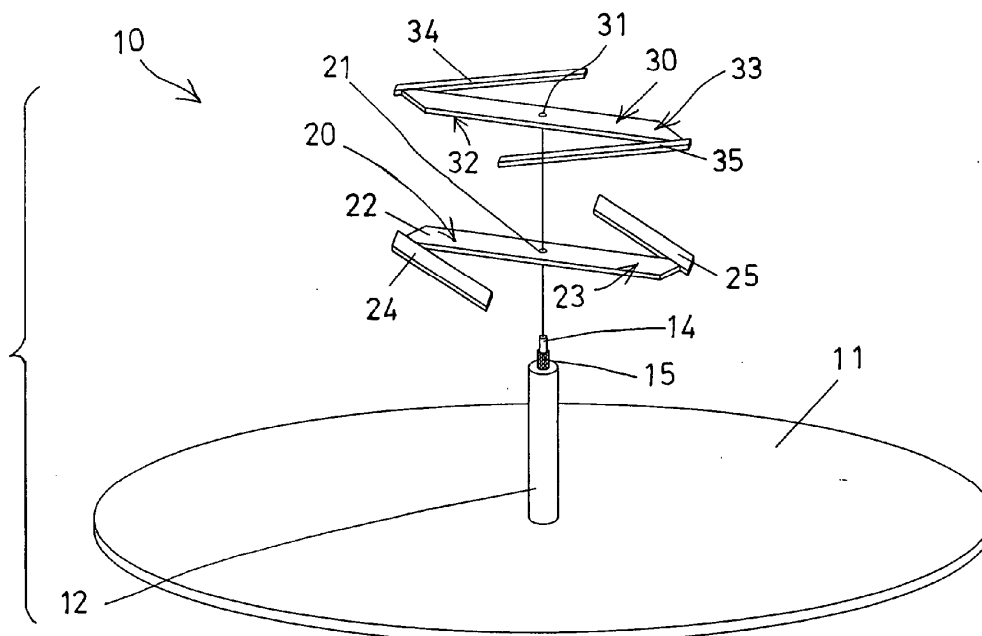
Correspondence Address:  
**CHARLES E. BAXLEY, ESQ.**  
**90 JOHN STREET**  
**THIRD FLOOR**  
**NEW YORK, NY 10038 (US)**

An antenna assembly includes two antenna devices disposed one above the other and each having two end portions for signal transmitting purposes. The antenna devices each includes two antenna members attached to the end portions, and the antenna members of the antenna devices are preferably inclined relative to the antenna devices or extended oppositely relative to each other, for increasing the signal emitting and/or receiving or transmitting angles or ranges. A base board may include an extension to support the antenna devices, and having a positive terminal and a negative terminal coupling to the antenna devices.

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

(21) Appl. No.: **11/231,608**

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





US 20070063913A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063913 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **DUAL-BAND MULTI-MODE ARRAY ANTENNA**

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 21/08** (2006.01)

(52) **U.S. Cl.** ..... **343/824; 343/700 MS; 343/795**

(76) Inventors: **Chung-Han Wu**, Tainan (TW); **Jia-Jiu Song**, Taipei (TW)

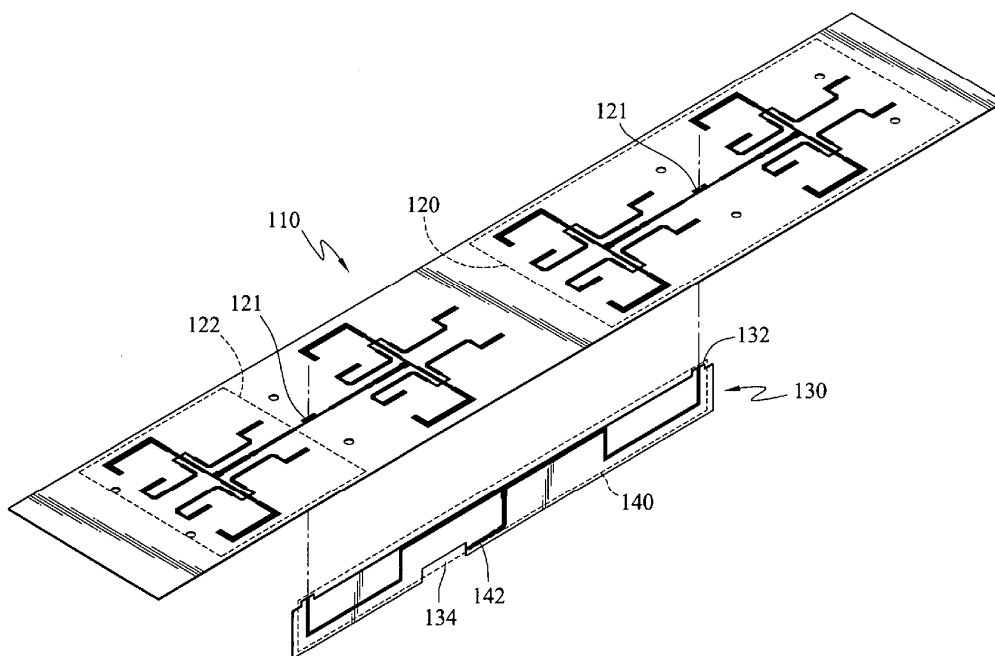
(57) **ABSTRACT**

A dual-band multi-mode array antenna is provided, including an antenna substrate with antenna units each of which having a feeding via; and a conductive substrate connected to the antenna substrate to form an angle in between. The conductive substrate has a symmetric feeding network disposed on a surface of the conductive substrate; and a first ground portion disposed on another surface of the conductive substrate. The symmetric feeding network and the first ground portion are electrically coupled to each of the antenna units through the feeding vias. Moreover, the antenna units are electrically coupled in parallel.

Correspondence Address:  
**HARNESS, DICKEY & PIERCE, P.L.C.**  
**P.O. BOX 8910**  
**RESTON, VA 20195 (US)**

(21) Appl. No.: **11/227,201**

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





US 20070063915A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063915 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **EMBEDDED ANTENNA APPARATUS FOR UTILITY METERING APPLICATIONS**

(60) Provisional application No. 60/333,878, filed on Nov. 26, 2001.

(76) Inventors: **Larry L. Savage**, Central, SC (US);  
**Kirby K. Nelson III**, Seneca, SC (US);  
**Michael D. Rock**, Seneca, SC (US)

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/40** (2006.01)  
(52) **U.S. Cl.** ..... **343/873; 343/702**

Correspondence Address:  
**PERKINS COIE LLP**  
**PATENT-SEA**  
**P.O. BOX 1247**  
**SEATTLE, WA 98111-1247 (US)**

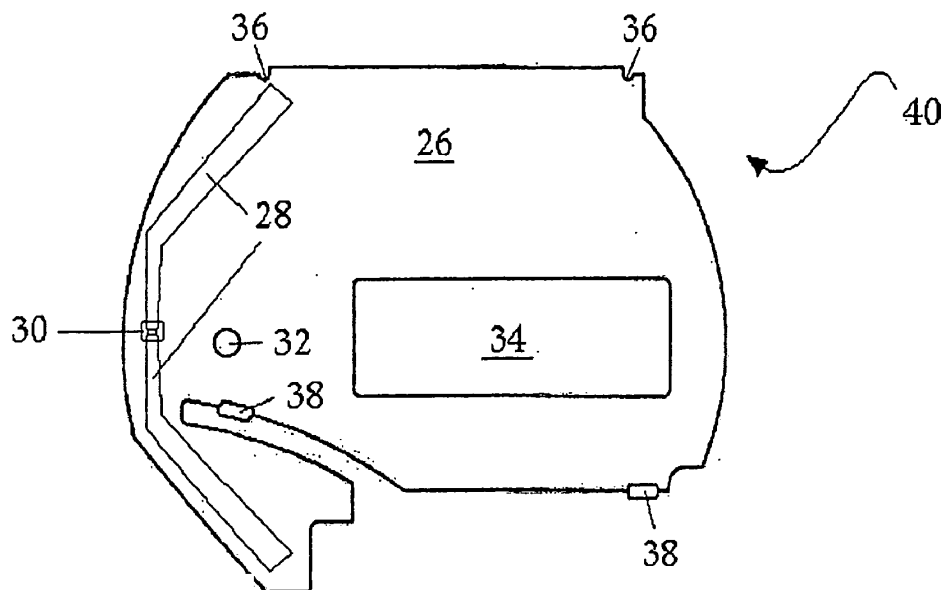
(57) **ABSTRACT**

(21) Appl. No.: **11/542,757**  
(22) Filed: **Oct. 3, 2006**

An embedded antenna for facilitating wireless transmission of utility meter data is disclosed, where in one embodiment an RF antenna is a part of the faceplate of the utility meter. In another embodiment the utility meter faceplate is a single-layer or a multi-layer printed circuit board (PCB) with the RF antenna printed on any desired layer. Such faceplates may be labeled to be viewable from outside of the meter housing and/or have openings to accommodate visual access to an output display of the meter consumption information.

**Related U.S. Application Data**

(63) Continuation of application No. 10/985,267, filed on Nov. 10, 2004, which is a continuation of application No. 10/303,673, filed on Nov. 25, 2002, now abandoned.





US 20070063919A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0063919 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **ANTENNA AND AN ANTENNA FEED STRUCTURE**

(30) **Foreign Application Priority Data**

Jun. 21, 2005 (GB)..... GB0512652.9

Jun. 1, 2006 (GB)..... GB0610823.7

(76) Inventors: **Oliver Paul Leisten**, Northampton (GB); **Andrew Robert Christie**, Northampton (GB); **Thomas Alan Clupper**, Landenberg, PA (US); **John J. Squires**, Elkton, MA (US)

**Publication Classification**

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

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

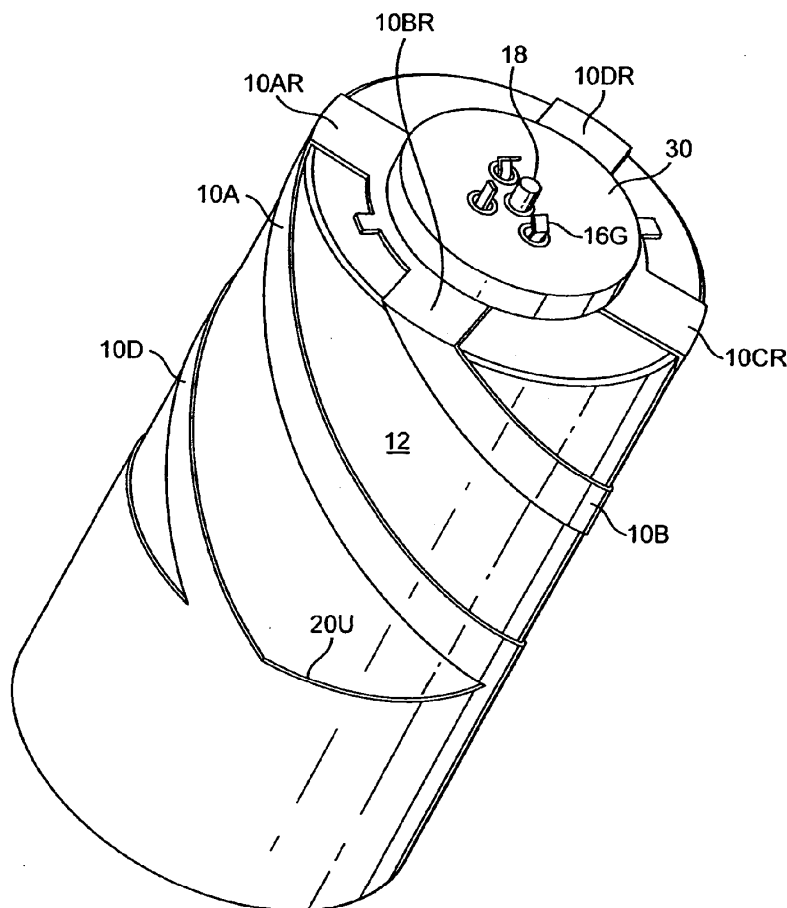
(57) **ABSTRACT**

A dielectrically-loaded helical antenna has a cylindrical ceramic core bearing metallised helical antenna elements which are coupled to a coaxial feeder structure passing axially through the core. Secured to the end face of the core is an impedance matching section in the form of a laminate board. The matching section embodies a shunt capacitance and a series inductance.

Correspondence Address:  
**JOHN BRUCKNER, P.C.**  
**P.O. BOX 490**  
**FLAGSTAFF, AZ 86002 (US)**

(21) Appl. No.: **11/472,587**

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





US 20070066263A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0066263 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **DIGITAL SIGNAL RECEIVER WITH A BUILT-IN ANTENNA**

**Publication Classification**

(76) Inventors: **Chia-Yu Wu**, Taipei City (TW);  
**Tzu-Chiang Chu**, Taipei County (TW);  
**Ying-Hua Huang**, Taipei Hsien (TW)

(51) **Int. Cl.**  
**H04B 1/06** (2006.01)  
**H04M 1/00** (2006.01)

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

(52) **U.S. Cl.** ..... **455/269; 455/575.7**

(57) **ABSTRACT**

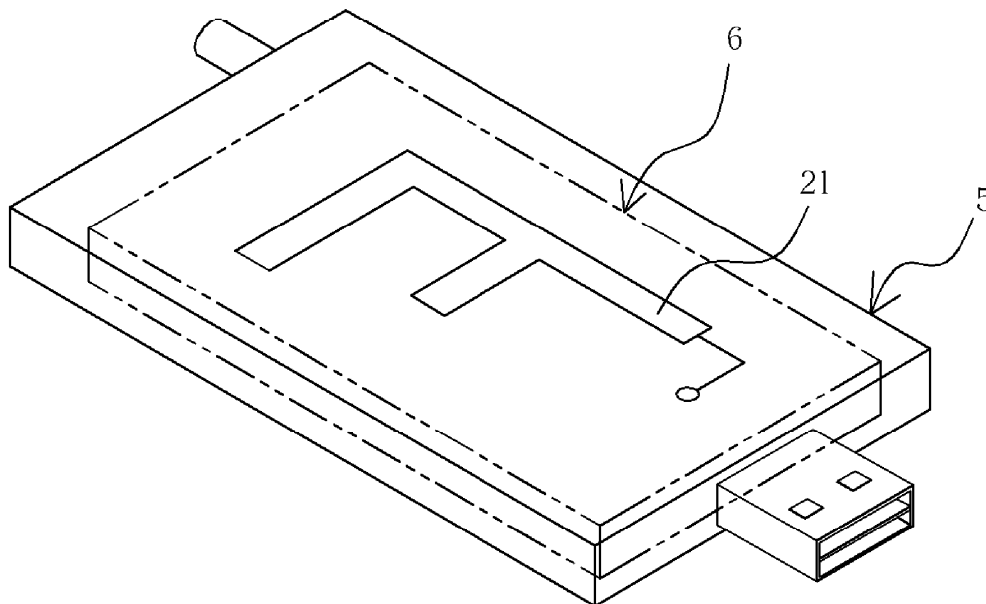
(21) Appl. No.: **11/465,456**

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

(30) **Foreign Application Priority Data**

Sep. 21, 2005 (TW)..... 094216251

An antenna unit, a receiver, and an interface controller are positioned in a case. The antenna unit is for receiving digital television signals and digital broadcasting signals. The receiver is coupled to the antenna unit and includes at least a tuner for processing signals from the antenna unit. The interface controller is coupled to the receiver for conversion of communicating data.





US 20070066274A1

(19) **United States**

(12) **Patent Application Publication**  
**Kim**

(10) **Pub. No.: US 2007/0066274 A1**

(43) **Pub. Date: Mar. 22, 2007**

(54) **ANTENNA INTEGRATED SPEAKER ASSEMBLY, MANUFACTURING METHOD THEREOF, AND WIRELESS COMMUNICATION DEVICE HAVING THE SAME**

(75) Inventor: **Hyun-Jun Kim**, Gyeonggi-do (KR)

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

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

(21) Appl. No.: **11/521,450**

(22) Filed: **Sep. 15, 2006**

(30) **Foreign Application Priority Data**

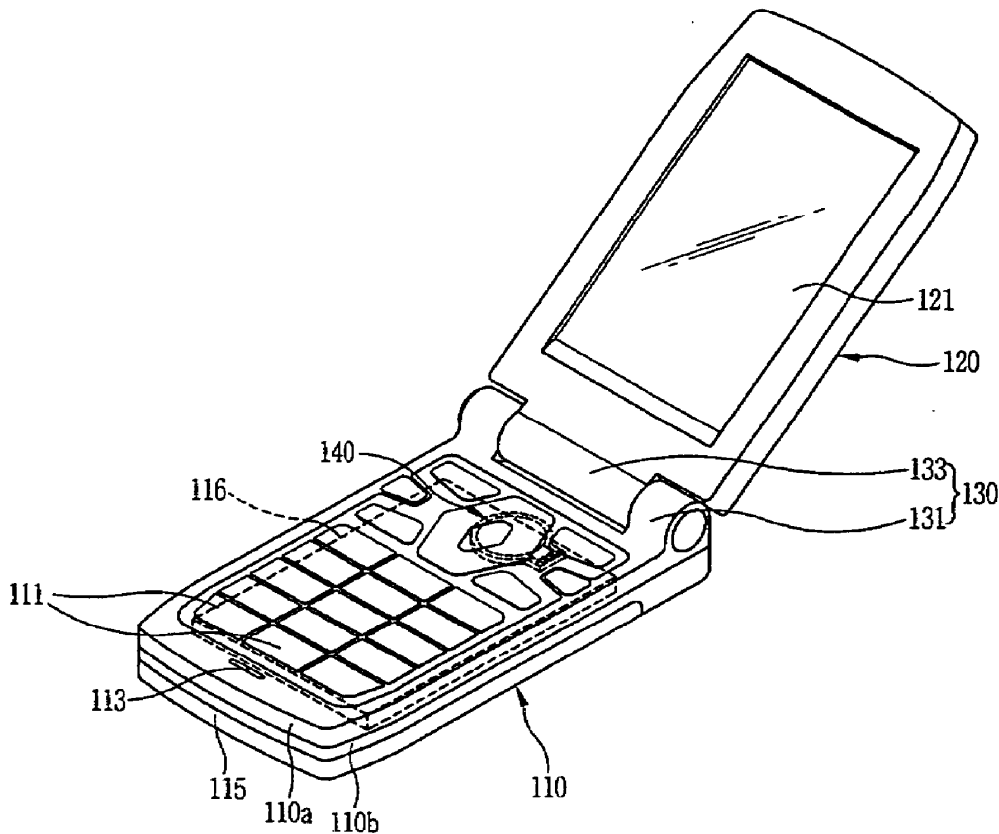
Sep. 16, 2005 (KR) ..... 87119/2005  
Sep. 16, 2005 (KR) ..... 87120/2005

**Publication Classification**

(51) **Int. Cl.**  
**H04B 1/08** (2006.01)  
**H04M 1/00** (2006.01)  
(52) **U.S. Cl.** ..... **455/350; 455/575.7**

(57) **ABSTRACT**

An antenna integrated speaker assembly, a manufacturing method thereof, and a wireless communication device having the same. The antenna integrated speaker assembly comprises a speaker unit for outputting sound corresponding to an electric signal of a controller; and an antenna unit formed at the speaker unit, for transceiving an electric signal by an interwork with the controller. Accordingly, an installation space for an antenna and a speaker is minimized.







US 20070069954A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0069954 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **MULTI-BAND ANTENNA**

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

(76) Inventors: **Robert Kenoun**, Palatine, IL (US);  
**Donald L. Cantrell JR.**, Chicago, IL (US)

(57) **ABSTRACT**

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

A multi band antenna system (100) and a wireless communication device are disclosed. The multi band antenna system provides coverage over multiple frequency bands. The multi band antenna system comprises a ground surface, a first conductor (102), a second conductor (104), a common feed conductor (106) coupled to the first conductor and the second conductor, and a ground conductor (108) coupled to the first conductor and the second conductor. The first conductor has a first physical length operationally equal to a half wavelength in a first RF band and operationally equal to a full wavelength in a second RF band. The second conductor has a second physical length operationally equal to a half wavelength in a third RF band.

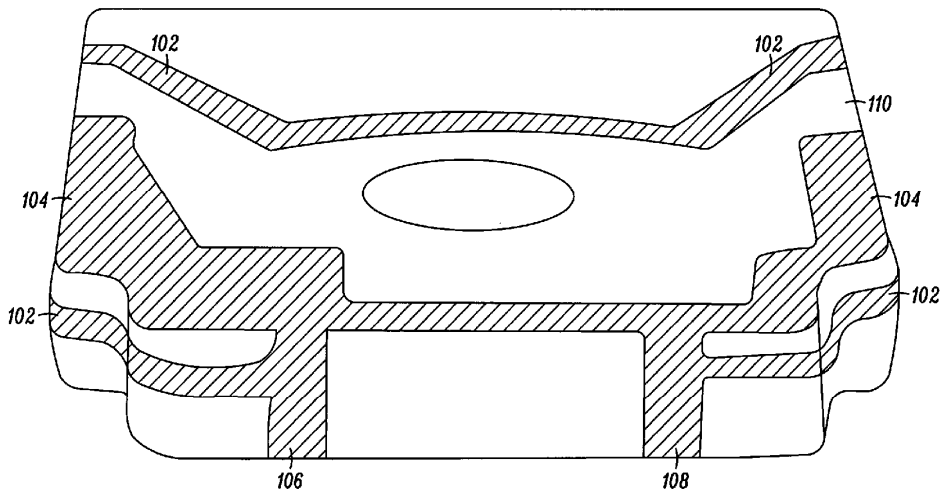
(21) Appl. No.: **11/235,283**

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

**Publication Classification**

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

100





US 20070069955A1

(19) **United States**

(12) **Patent Application Publication**  
**McCorkle**

(10) **Pub. No.: US 2007/0069955 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **FREQUENCY-NOTCHING ANTENNA**

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

(75) Inventor: **John W. McCorkle**, Vienna, VA (US)

(57) **ABSTRACT**

Correspondence Address:  
**POSZ LAW GROUP, PLC**  
**12040 SOUTH LAKES DRIVE, SUITE 101**  
**RESTON, VA 20191 (US)**

(73) Assignee: **FREESCALE SEMICONDUCTOR, Inc.**

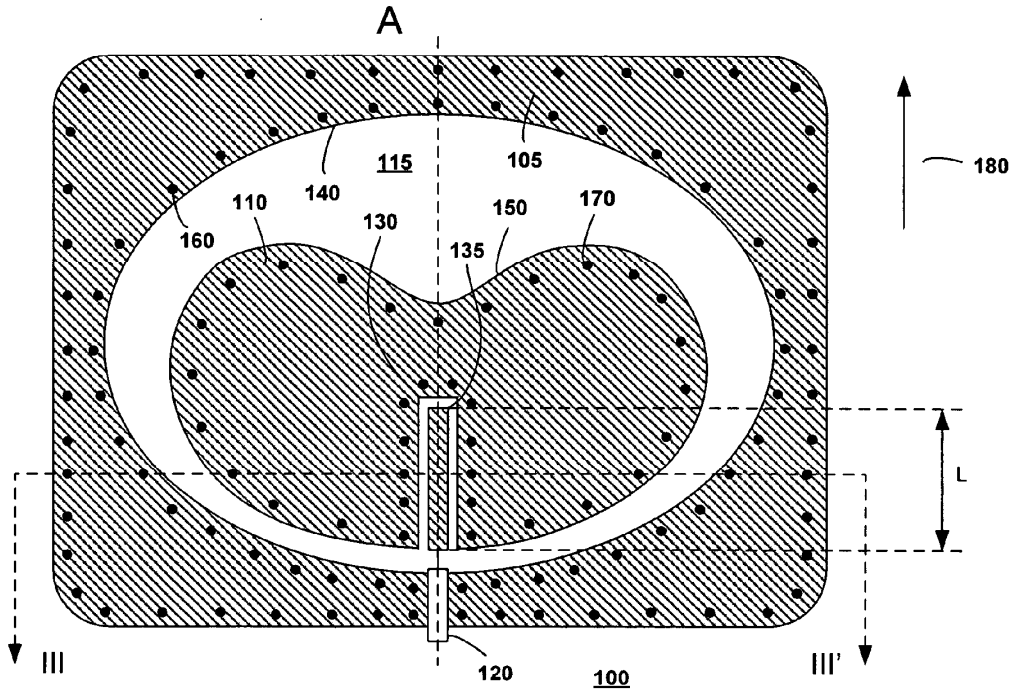
An antenna (100) is provided. The antenna includes: a first ground element (105); a first driven element (110) formed from a planar piece of conductive material, the first driven element being configured to transmit and receive wireless signals, the first driven element including a physical slot (130); a conductive line (135) formed in the physical slot such that the conductive line is separated from the first driven element by a gap (G) filled with non-conductive material, the conductive line having a line impedance that is a function of an effective line width of the conductive line, and an effective gap width of a gap between the conductive line and the first driven element; and a signal line (120) configured to send and receive signals to and from the conductive line.

(21) Appl. No.: **11/237,751**

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

**Publication Classification**

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





US 20070069957A1

(19) **United States**

(12) **Patent Application Publication**  
**Ranta**

(10) **Pub. No.: US 2007/0069957 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **DUAL-RESONANT ANTENNA**

(52) **U.S. Cl. .... 343/700 MS; 343/850**

(75) Inventor: **Tero Ranta**, Turku (FI)

(57) **ABSTRACT**

Correspondence Address:

**WARE FRESSOLA VAN DER SLUYS &  
ADOLPHSON, LLP  
BRADFORD GREEN, BUILDING 5  
755 MAIN STREET, P O BOX 224  
MONROE, CT 06468 (US)**

(73) Assignee: **Nokia Corporation**

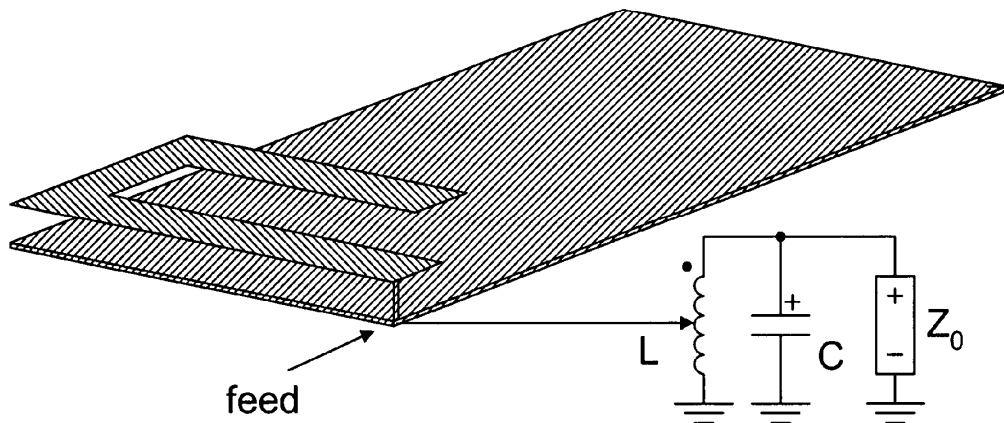
(21) Appl. No.: **11/238,438**

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

**Publication Classification**

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

A wide-band antenna comprises a series-resonant antenna and a resonant circuit. The antenna has a radiative element and a feed pin. The resonant circuit comprises an inductive element connected to the feed pin and a capacitor connected in parallel to the inductive element, which has a center tap for adjusting the impedance of the resonant circuit relative to the antenna impedance. The antenna can be a low-impedance PILA, a helix, monopole, whip, stub or loop antenna. The wide-band antenna can be used for the low (1 GHz range) or high (2 GHz range) band. The antenna can be made to simultaneously cover both 850 & 900 bands with the ground plane small enough to be implemented in a mobile phone or the like. The center tap is either connected to the feed of the antenna or connected to an RF front-end dependent upon the impedance level of the antenna element.





US 20070069958A1

(19) **United States**

(12) **Patent Application Publication**  
**Ozkar**

(10) **Pub. No.: US 2007/0069958 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **MULTI-BAND BENT MONOPOLE ANTENNA**

(57)

**ABSTRACT**

(75) Inventor: **Mete Ozkar**, Raleigh, NC (US)

Correspondence Address:  
**COATS & BENNETT/SONY ERICSSON**  
**1400 CRESCENT GREEN**  
**SUITE 300**  
**CARY, NC 27511 (US)**

(73) Assignee: **Sony Ericsson Mobile Communications**  
**AB**

(21) Appl. No.: **11/239,589**

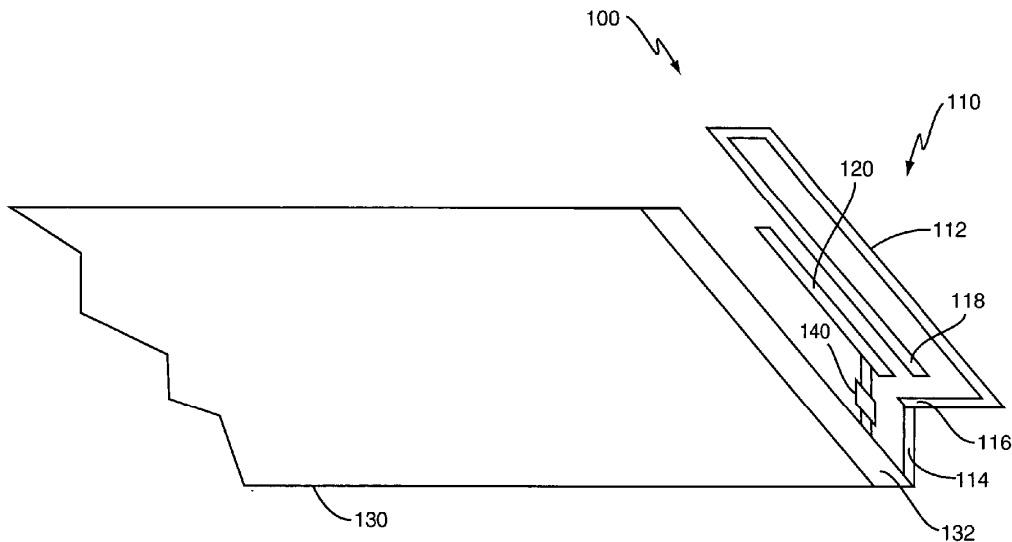
(22) Filed: **Sep. 29, 2005**

**Publication Classification**

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

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

The method and apparatus described herein improves the bandwidth of a selected frequency band of a multi-band antenna. In particular, a selection circuit selectively applies capacitive coupling to the multi-band antenna to improve the bandwidth of a first frequency band without adversely affecting the bandwidth of a second frequency band. To that end, the multi-band antenna of the present invention comprises a main antenna element and a parasitic element disposed proximate the main antenna element. When the multi-band antenna operates in the first frequency band, the main antenna element capacitively couples to the parasitic element. However, when the multi-band antenna operates in the second frequency band, the selection circuit disables the capacitive coupling. By applying the capacitive coupling only when the multi-band antenna operates in the first frequency band, the present invention increases the bandwidth of the first frequency band without adversely affecting the bandwidth of the second frequency band.





US 20070069959A1

(19) **United States**

(12) **Patent Application Publication**  
**Wu**

(10) **Pub. No.: US 2007/0069959 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **SMALL SIZE ULTRA-WIDEBAND ANTENNA**

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

(76) **Inventor: Chun-Yi Wu, Taichung City (TW)**

(57) **ABSTRACT**

Correspondence Address:

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

(21) **Appl. No.: 11/258,805**

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

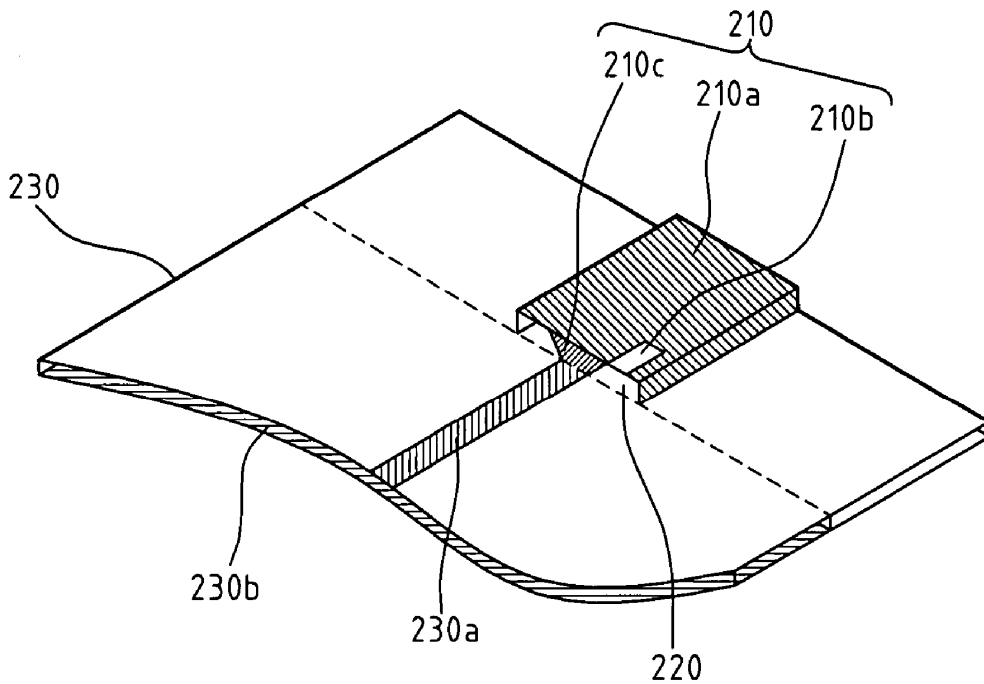
(30) **Foreign Application Priority Data**

Sep. 23, 2005 (TW)..... 09413194

**Publication Classification**

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

A small size ultra-wideband (UWB) antenna comprises a radiation element, a dielectric substrate, and a dielectric element. The radiation element includes a radiation conductor, a matching element, and an antenna feeding element. A signal feeding element and a conductor plane are formed on the upper and lower surfaces of the dielectric substrate, respectively. With the matching element on the radiation conductor, the current distribution on the conductor plane is changed so that the antenna achieves a sufficient extension for both high and low impedance bandwidths. The UWB antenna is also suitable for surface-mountable fabrication process, and which effectively reduce the manufacturing cost. The antenna has the advantages of small size, simple structure, and an impedance bandwidth of 7.97 GHz.





US 20070069960A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0069960 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **FLAT-PLATE MIMO ARRAY ANTENNA WITH ISOLATION ELEMENT**

**Publication Classification**

(75) Inventors: **Young-min Moon**, Seoul (KR);  
**Young-eil Kim**, Suwon-si (KR);  
**Se-hyun Park**, Suwon-si (KR);  
**Kyeong-sik Min**, Busan (KR)

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

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

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

(57) **ABSTRACT**

(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR)

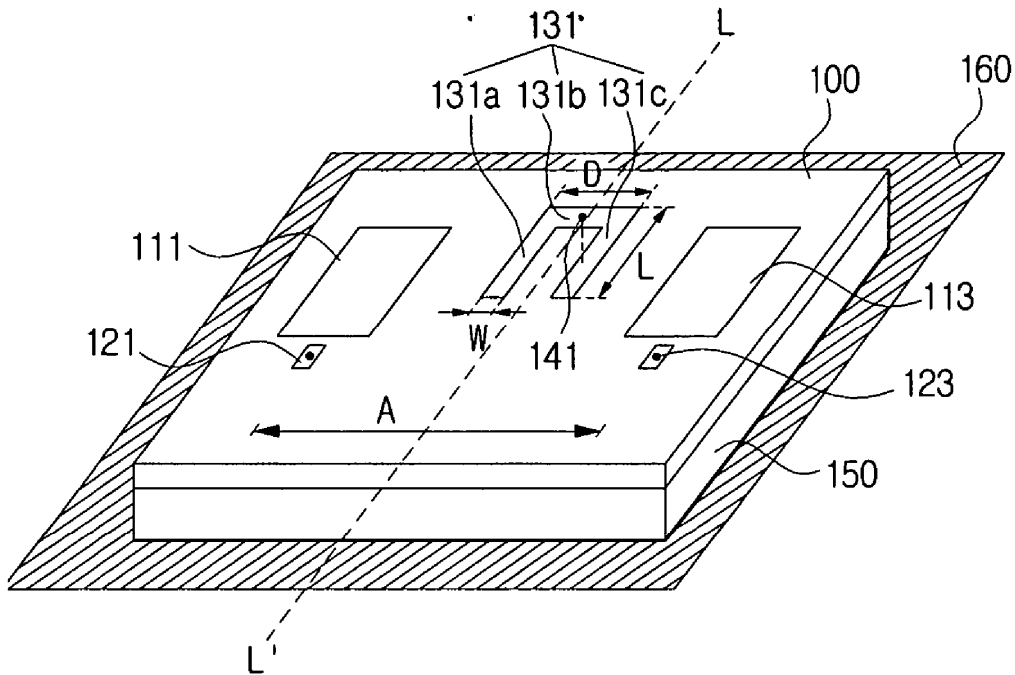
A flat-plate MIMO array antenna includes a substrate, a plurality of antenna elements disposed on the substrate, and at least one isolation element interposed between a plurality of antenna elements on the substrate and connected to a ground. Mutual interference between the antenna elements is prevented by the isolation element formed between the antenna elements, thereby preventing the distortion of the radiation pattern. Also, since the isolation element is grounded to the ground surface, the isolation element operates as a parasitic antenna, thereby increasing the output gain.

(21) Appl. No.: **11/441,206**

(22) Filed: **May 26, 2006**

(30) **Foreign Application Priority Data**

Sep. 27, 2005 (KR) ..... 10-2005-0089925





US 20070069964A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0069964 A1**  
(43) **Pub. Date: Mar. 29, 2007**

(54) **ANTENNA DEVICE, ELECTRONIC APPARATUS AND VEHICLE USING THE SAME ANTENNA DEVICE**

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/32** (2006.01)  
(52) **U.S. Cl.** ..... **343/713; 343/700 MS**

(76) Inventors: **Akihiro Hoshiai**, Osaka (JP); **Susumu Fukushima**, Osaka (JP); **Yosuke Wada**, Nara (JP)

(57) **ABSTRACT**

Correspondence Address:  
**RATNERPRESTIA**  
**P.O. BOX 980**  
**VALLEY FORGE, PA 19482 (US)**

An antenna device includes a grounding subject, a feeder insulated from the grounding subject, a first conductor shaping like substantially a looped triangle and coupled to the feeder at a first feeder top, and a second conductor symmetric to the first conductor with respect to a phantom line extending through the feeder and coupled to the feeder at a second feeder top. The first feeder top is placed closest to the grounding subject among other elements of the first conductor, and the second feeder top is placed closest to the grounding subject among other elements of the second conductor. The foregoing structure allows a high electrical field section of a first side of the first conductor and that of a first side of the second conductor to leave further away from the grounding subject.

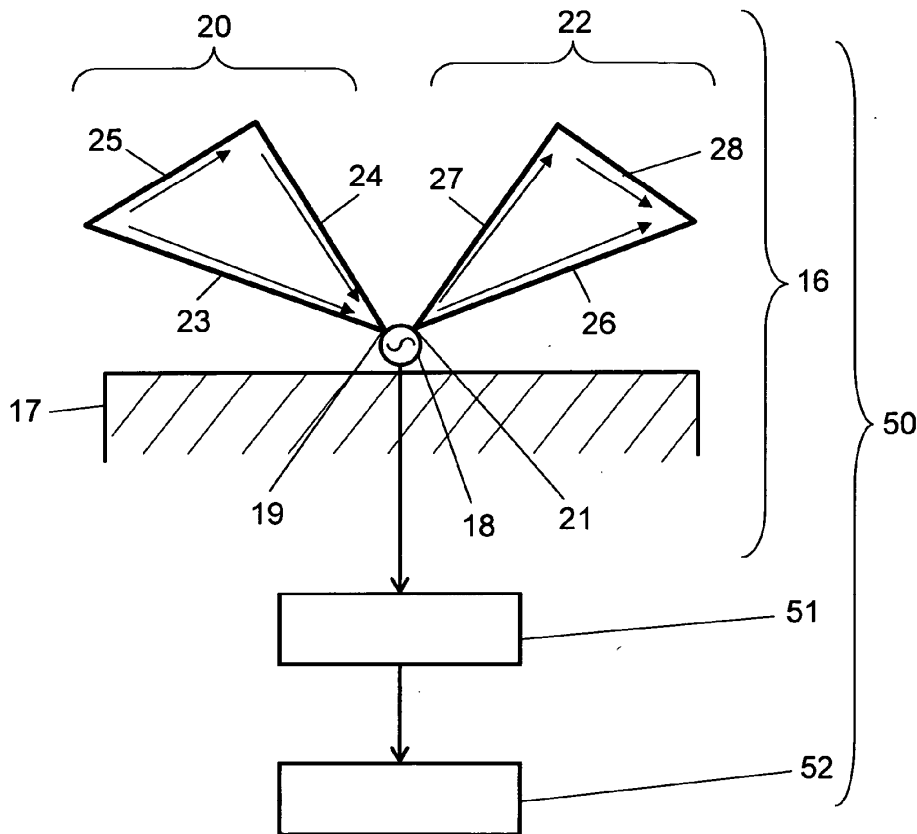
(21) Appl. No.: **11/528,038**

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

(30) **Foreign Application Priority Data**

Sep. 29, 2005 (JP) ..... 2005-284337

Feb. 7, 2006 (JP) ..... 2006-029363





US 20070069968A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0069968 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **HIGH FREQUENCY OMNI-DIRECTIONAL LOOP ANTENNA INCLUDING THREE OR MORE RADIATING DIPOLES**

**Publication Classification**

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

(52) **U.S. Cl.** ..... **343/795; 343/798**

(76) Inventors: **Paul J. Moller**, Lake Zurich, IL (US);  
**Boris M. Rubinstein**, Deer Park, IL (US)

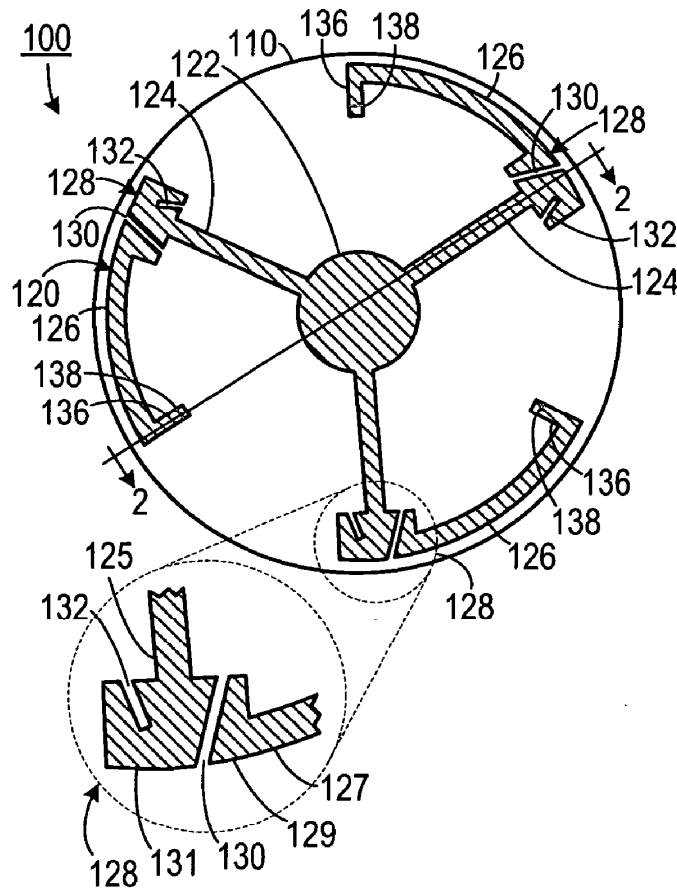
(57) **ABSTRACT**

An omni-directional loop antenna for radiating an electromagnetic signal from a signal source includes a differential feed and at least six radiating elements. The differential feed generates a first signal feed and a second signal feed. The radiating elements include at least three even-numbered radiating elements and at least three oddly-numbered elements. Each of the even-numbered radiating elements is coupled to the first signal feed and each of the oddly-numbered radiating elements is coupled to the second signal feed. Each of the oddly-numbered radiating elements is reactively coupled to two different ones of the even-numbered radiating elements. No two of the first radiating elements are reactively coupled a same pair of second radiating elements.

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

(21) Appl. No.: **11/238,945**

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







US 20070069971A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0069971 A1**

(43) **Pub. Date: Mar. 29, 2007**

(54) **ANTENNA AND METHOD OF MAKING THE SAME**

(30) **Foreign Application Priority Data**

Sep. 21, 2005 (JP) ..... 2005-274011

(75) Inventors: **Toshiyuki Horikoshi**, Hitachi (JP);  
**Masahiko Kobayashi**, Hitachi (JP);  
**Seigi Aoyama**, Kitaibaraki (JP);  
**Hiroshi Yamanobe**, Hitachi (JP);  
**Shinsuke Murano**, Kasama (JP)

**Publication Classification**

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

(52) **U.S. Cl.** ..... **343/897**

(57) **ABSTRACT**

An antenna having an antenna element bent in a predetermined shape. The antenna element has a plurality of line conductors that are arranged in parallel and are sandwiched by two insulation films. A method of making an antenna has the steps of: arranging in parallel a plurality of line conductors, each of which having a width of 0.04 mm or less, at intervals of 10 times or more the width of each of the line conductors; discharging continuously the plurality of line conductors such that visibility of the line conductors is reduced; and sandwiching continuously the discharged line conductors by planar transparent insulation films with a sticking or adhesion layer to have an antenna element.

Correspondence Address:  
**MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC**  
**8321 OLD COURTHOUSE ROAD**  
**SUITE 200**  
**VIENNA, VA 22182-3817 (US)**

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

(21) Appl. No.: **11/523,734**

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

