



US 20070152830A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0152830 A1**  
Burr (43) **Pub. Date: Jul. 5, 2007**

(54) **USING ORTHOGONAL ANTENNAS WITH RFID DEVICES**

**Publication Classification**

(75) Inventor: **Jeremy Burr**, Portland, OR (US)

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

(52) **U.S. Cl.** ..... **340/572.7**

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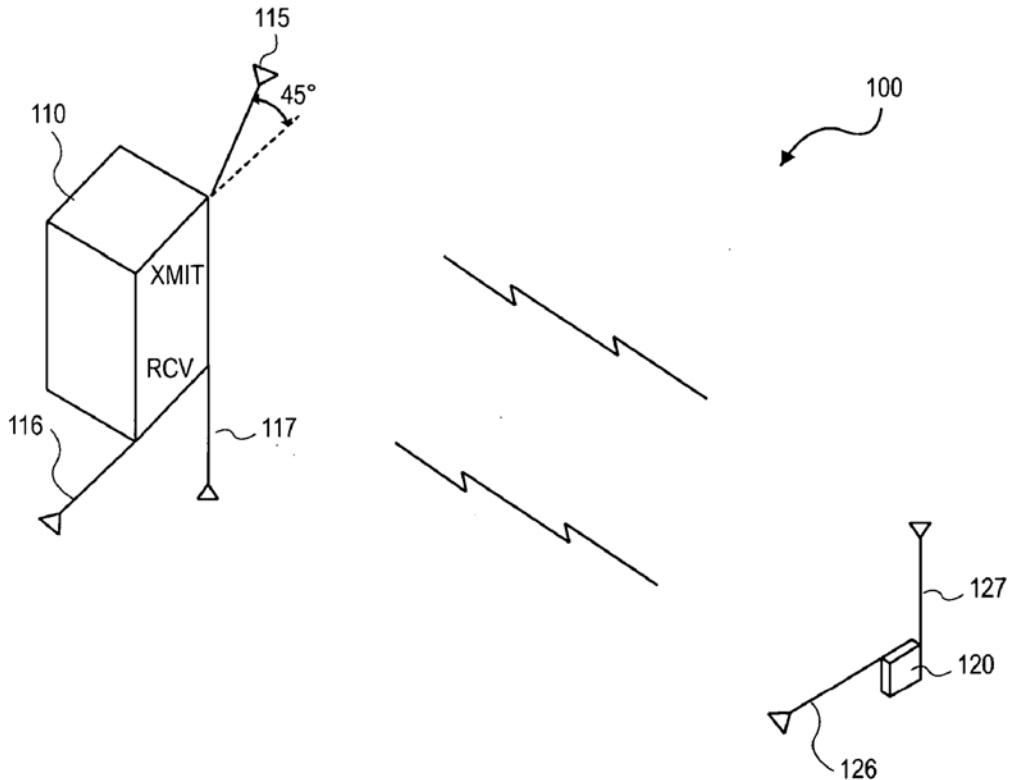
(57) **ABSTRACT**

Some embodiments of the invention may include two orthogonally polarized antennas on a radio frequency identification (RFID) tag and/or on an RFID reader. The antennas may be used in various ways, such as but not limited to improving reliability through transmit and/or receive diversity, full duplex operation, doubling the data rate, etc., in communications between and RFID reader and an RFID tag.

(73) Assignee: **Intel Corporation**

(21) Appl. No.: **11/327,126**

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





US 20070152832A1

(19) **United States**

(12) **Patent Application Publication**  
**Crowley**

(10) **Pub. No.: US 2007/0152832 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **OPTICAL ANTENNA ARRAY FOR HARMONIC GENERATION, MIXING AND SIGNAL AMPLIFICATION**

09/523,626, filed on Mar. 13, 2000, now Pat. No. 6,258,401, which is a division of application No. 08/988,801, filed on Dec. 11, 1997, now Pat. No. 6,038,060.

(76) Inventor: **Robert Joseph Crowley**, Sudbury, MA (US)

(60) Provisional application No. 60/036,085, filed on Jan. 16, 1997.

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**Publication Classification**

(21) Appl. No.: **11/648,025**

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

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

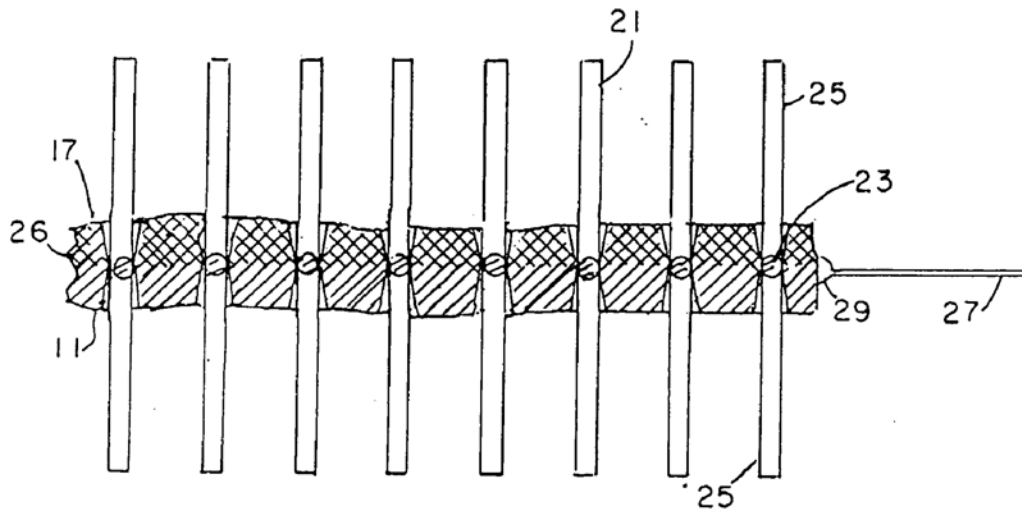
(52) **U.S. Cl.** ..... **340/572.7**

(57) **ABSTRACT**

**Related U.S. Application Data**

(62) Division of application No. 11/509,833, filed on Aug. 24, 2006, which is a division of application No. 10/789,390, filed on Feb. 27, 2004, now Pat. No. 7,099,071, which is a division of application No. 10/646,945, filed on Aug. 22, 2003, now Pat. No. 7,205,021, which is a division of application No. 09/901,309, filed on Jul. 9, 2001, now Pat. No. 6,700,550, which is a division of application No.

An optical antenna collects, modifies and emits energy at light wavelengths. Linear conductors sized to correspond to the light wavelengths are used. Nonlinear junctions of small dimension are used to rectify an alternating waveform induced upon the conductors by the lightwave electromagnetic energy. The optical antenna and junctions are effective to produce harmonic energy at light wavelengths. The linear conductors may be comprised of carbon nanotubes that are attached to a substrate material, which may then be connected to an electrical port.





US 20070152881A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0152881 A1**

**Chan**

(43) **Pub. Date:**

**Jul. 5, 2007**

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

(57)

**ABSTRACT**

(76) Inventor: **Yiu K. Chan**, Vernon Hills, IL (US)

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**LIBERTYVILLE, IL 60048-5343 (US)**

(21) Appl. No.: **11/322,139**

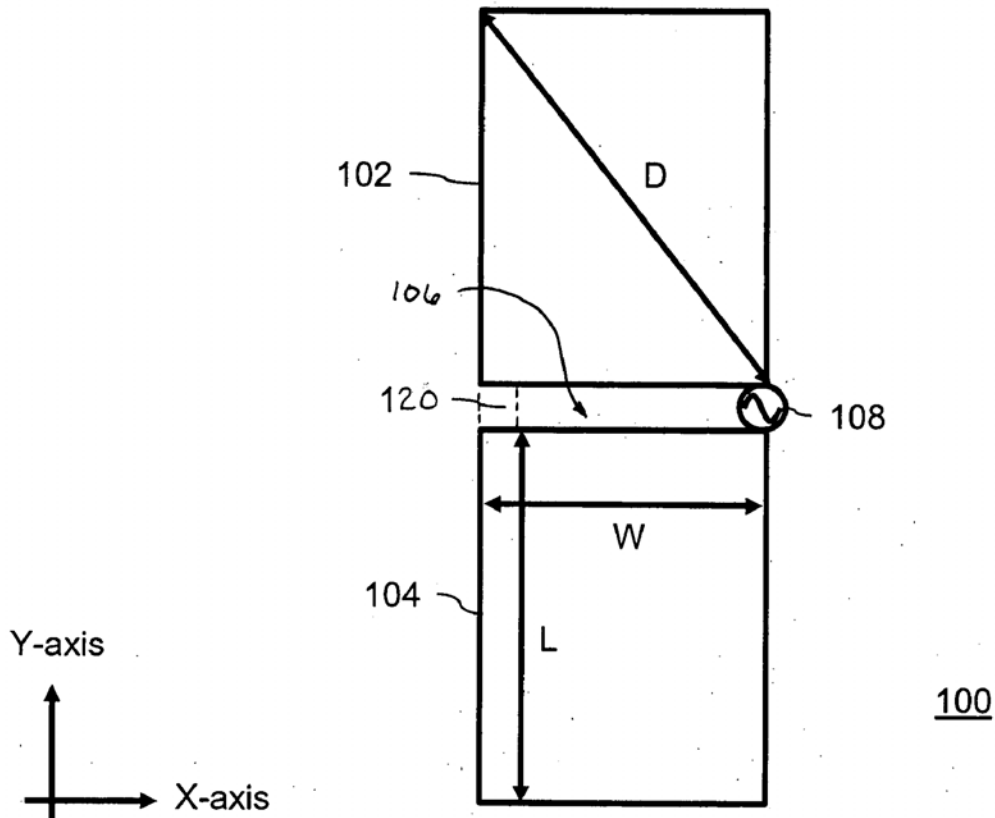
(22) Filed: **Dec. 29, 2005**

**Publication Classification**

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

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

An antenna (100) is provided, which can be used in a wireless communication device or a base transceiver station forming part of the infrastructure of a wireless communication system. The antenna includes a first plate conductor (102) and a second plate conductor (104), which are substantially symmetric. The first plate conductor and the second plate conductor are separated by a central slot (106) and include respective primary feed points proximate the central slot, which are adapted for receiving a differential signal from a differential signal source (108). The first plate conductor and the second plate conductor exhibit at least a first frequency response (F1) and a second frequency response (F2) dependent on various dimensions of both the first plate conductor and the second plate conductor, relative to their respective primary feed point.





US 20070152883A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152883 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **HIGH DIELECTRIC ANTENNA SUBSTRATE AND ANTENNA THEREOF**

(75) Inventors: **Uei-Ming Jow**, Hsinchu (TW);  
**Chang-Sheng Chen**, Hsinchu (TW)

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(73) Assignee: **INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE**,  
Hsinchu (TW)

(21) Appl. No.: **11/555,107**

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

(30) **Foreign Application Priority Data**

Dec. 30, 2005 (TW) ..... 094147751

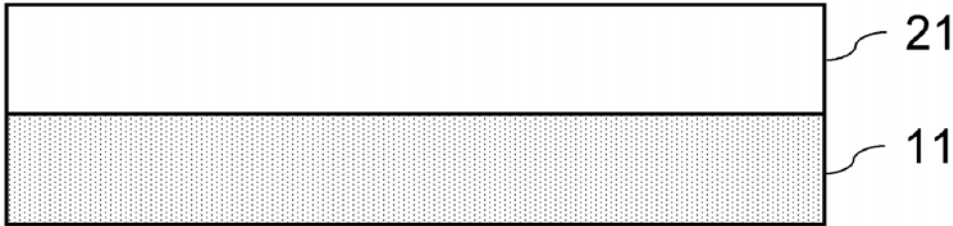
**Publication Classification**

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

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

(57) **ABSTRACT**

A high dielectric antenna substrate and antenna thereof are provided. The substrate includes a first dielectric layer having a first dielectric constant, and a second dielectric layer having a second dielectric constant. The second dielectric layer is formed on one surface of the first dielectric layer. The second dielectric constant is lower than the first dielectric constant. Furthermore, a first metal layer and a second metal layer are optionally formed on the same surface or two surfaces of the first dielectric layer to compose a capacitor.





US 20070152884A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152884 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **ANTENNA HAVING A DIELECTRIC STRUCTURE FOR A SIMPLIFIED FABRICATION PROCESS**

(30) **Foreign Application Priority Data**

Dec. 15, 2005 (FR)..... 05 12768

(75) Inventors: **Guillaume Bouche**, Grenoble (FR);  
**Sebastien Montusclat**, Meylan (FR);  
**Daniel Gloria**, Detrier (FR)

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/38** (2006.01)  
**H01Q 13/00** (2006.01)

(52) **U.S. Cl.** ..... **343/700 MS; 343/786**

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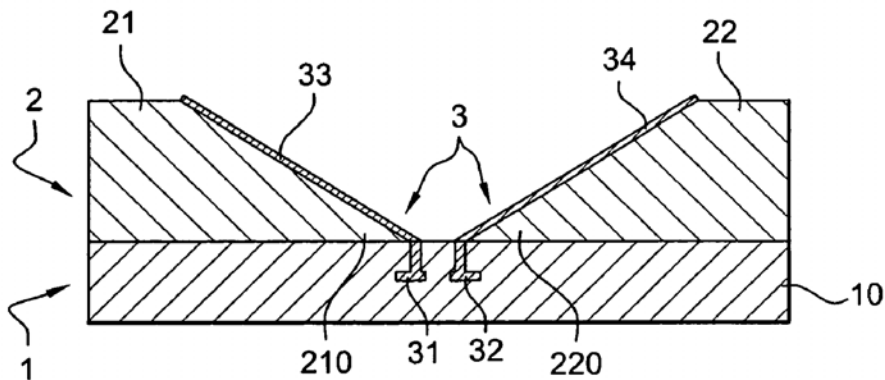
(57) **ABSTRACT**

An antenna is formed with a self-supporting structure (1), a dielectric structure (2), and a conducting structure (3), each structure being formed from at least one structural element (10; 21, 22; 31-34). The structural elements of the different structures (1, 2, 3) constitute a stack in which these elements (10; 21, 22; 31-34) are connected to each other, and the dielectric structure (2) is formed in the stack by nano-imprinting.

(73) Assignee: **STMicroelectronics S.A.**, Montrouge (FR)

(21) Appl. No.: **11/640,108**

(22) Filed: **Dec. 14, 2006**





US 20070152885A1

(19) **United States**

(12) **Patent Application Publication**  
**Sorvala**

(10) **Pub. No.: US 2007/0152885 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **CHIP ANTENNA APPARATUS AND METHODS**

**Publication Classification**

(76) Inventor: **Juha Sorvala, Oulu (FI)**

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

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

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(57) **ABSTRACT**

A chip component with dielectric substrate and plurality of radiating antenna elements on the surface thereof. In one embodiment, two (2) substantially symmetric elements are used, each covering an opposite head and upper surface portion of the device. The surface between the elements comprises a slot. The chip is mounted on a circuit board (e.g., PCB) whose conductor pattern is part of the antenna. No ground plane is used under the chip or its sides to a certain distance. One of the antenna elements is coupled to the feed conductor on the PCB and to the ground plane, while the parasitic element is coupled only to the ground plane. The parasitic element is fed through coupling over the slot, and both elements resonate at the operating frequency. The antenna can be tuned and matched without discrete components, is substantially omni-directional, and has low substrate losses due to simple field image.

(21) Appl. No.: **11/648,431**

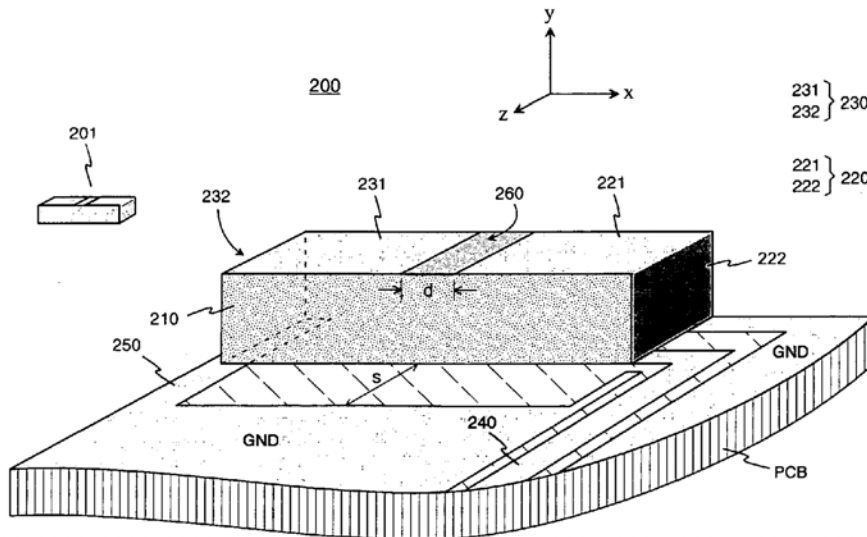
(22) Filed: **Dec. 28, 2006**

**Related U.S. Application Data**

(63) Continuation of application No. PCT/FI05/50089, filed on Mar. 16, 2005.

(30) **Foreign Application Priority Data**

Jun. 28, 2004 (FI)..... 20040892





US 20070152886A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152886 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **SPACE-FILLING MINIATURE ANTENNAS**

(75) Inventors: **CARLES PUENTE BALIARDA**,  
BARCELONA (ES); **EDOUARD**  
**JEAN LOUIS ROZAN**, BARCELONA  
(ES); **JAIME ANGUERA PROS**,  
BARCELONA (ES)

Continuation of application No. 11/110,052, filed on Apr. 20, 2005, now Pat. No. 7,148,850, which is a continuation of application No. 10/182,635, filed on Nov. 1, 2002, now abandoned, filed as 371 of international application No. PCT/EP00/00411, filed on Jan. 19, 2000.

**Publication Classification**

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

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(73) Assignee: **FRACTUS, S.A.**, BARCELONA (ES)

(21) Appl. No.: **11/686,804**

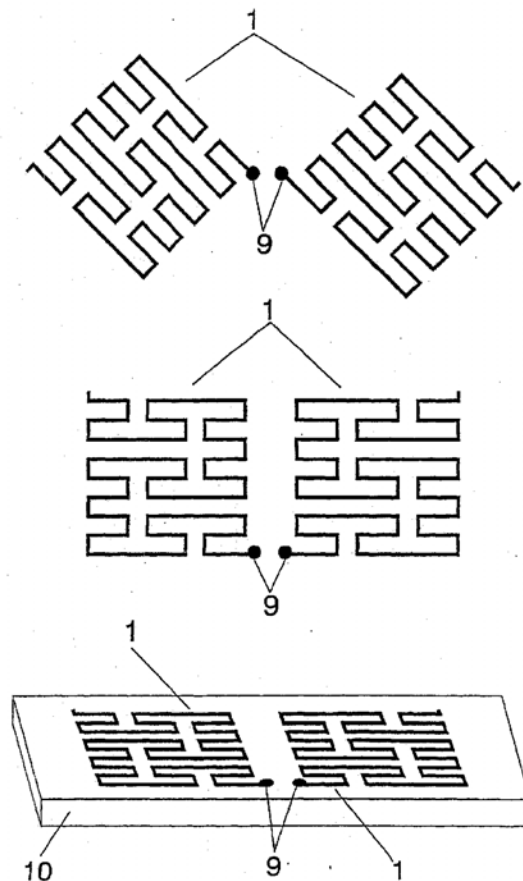
(22) Filed: **Mar. 15, 2007**

(57) **ABSTRACT**

A novel geometry, the geometry of Space-Filling Curves (SFC) is defined in the present invention and it is used to shape a part of an antenna. By means of this novel technique, the size of the antenna can be reduced with respect to prior art, or alternatively, given a fixed size the antenna can operate at a lower frequency with respect to a conventional antenna of the same size.

**Related U.S. Application Data**

(60) Division of application No. 11/179,250, filed on Jul. 12, 2005, now Pat. No. 7,202,822, which is a con-





US 20070152887A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152887 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **MULTI-BAND MONOPOLE ANTENNAS FOR MOBILE NETWORK COMMUNICATIONS DEVICES**

**Publication Classification**

(76) Inventors: **Jordi Soler Castany**, Mataro (ES);  
**Carles Puente Baliarda**, Barcelona (ES);  
**Carmen Borja Borau**, Barcelona (ES)

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

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

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(57) **ABSTRACT**

(21) Appl. No.: **10/587,119**

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

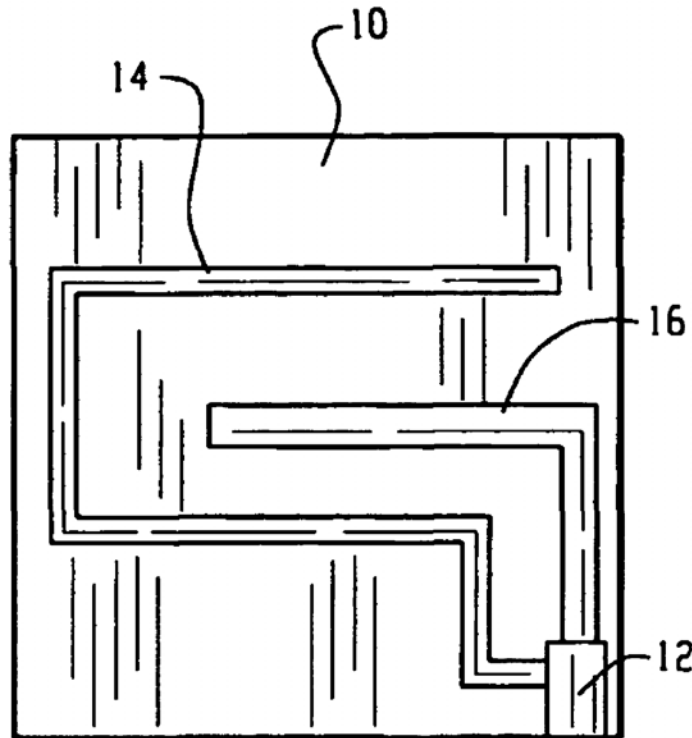
(86) PCT No.: **PCT/EP05/00879**

§ 371(c)(1),  
(2), (4) Date: **Aug. 29, 2006**

**Related U.S. Application Data**

(60) Provisional application No. 60/540,448, filed on Jan. 30, 2004.

Multiband monopole antennas are disclosed. The antennas disclosed can include a substrate for mounting conductors, one or more conductors for receiving networking signals mainly in a first frequency band, and one or more conductors for receiving networking signals mainly in a second frequency band. The conductors can have a polygonal shape or the conductors can have a linear, space-filling, or grid dimension shape. The conductors can be connected at a feed point. One or more antenna can be incorporated into a single printed circuit board. When multiple antennas are used with the same printed circuit board, the conducting material of the printed circuit board located between the antenna attachment points can be interrupted to improve the isolation of each antenna.









US 20070152890A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152890 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **RF TEST ACCESS FOR TESTING ANTENNA  
IN MOBILE COMMUNICATION DEVICE**

**Publication Classification**

(76) Inventors: **John A. Holmes**, Waterloo (CA);  
**Yihong Qi**, Waterloo (CA)

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

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(57) **ABSTRACT**

(21) Appl. No.: **11/684,822**

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

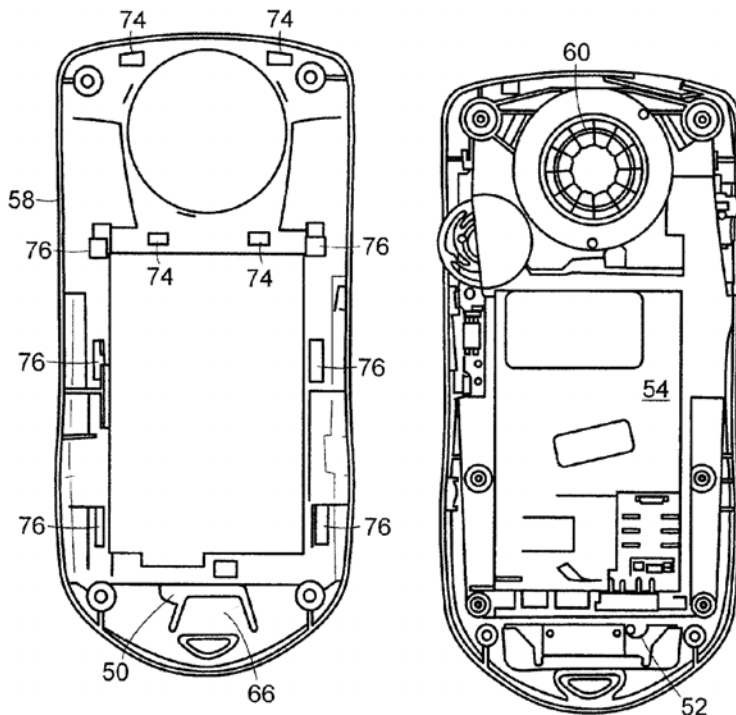
**Related U.S. Application Data**

(63) Continuation of application No. 11/046,716, filed on  
Jan. 31, 2005, now Pat. No. 7,190,312.

(60) Provisional application No. 60/585,126, filed on Jul.  
2, 2004.

A housing for a mobile communication device includes a housing member that encloses the mobile communication device. An opening is positioned in the housing member for accepting a battery. A door is positioned over the opening in the housing member, with an access port defined through the housing member positioned under the door for contacting an internal element of a mobile communication device, such as an antenna. A method for testing an antenna in a mobile communication device having a housing with an antenna access port defined therethrough, an antenna, a battery compartment, and a removable cover positioned over at least part of the housing is also described.

10





US 20070152891A1

(19) **United States**

(12) **Patent Application Publication**  
**Fabrega-Sanchez et al.**

(10) **Pub. No.: US 2007/0152891 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **MODEM CARD WITH BALANCED ANTENNA**

Continuation-in-part of application No. 11/339,926, filed on Jan. 25, 2006, which is a continuation-in-part of application No. 10/940,935, filed on Sep. 14, 2004.

(76) Inventors: **Jorge Fabrega-Sanchez**, San Diego, CA (US); **Gregory Poilasne**, San Diego, CA (US); **Mete Ozkar**, Raleigh, NC (US); **Vaneet Pathak**, San Diego, CA (US)

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/24** (2006.01)  
(52) **U.S. Cl.** ..... **343/702; 343/795**

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(57) **ABSTRACT**

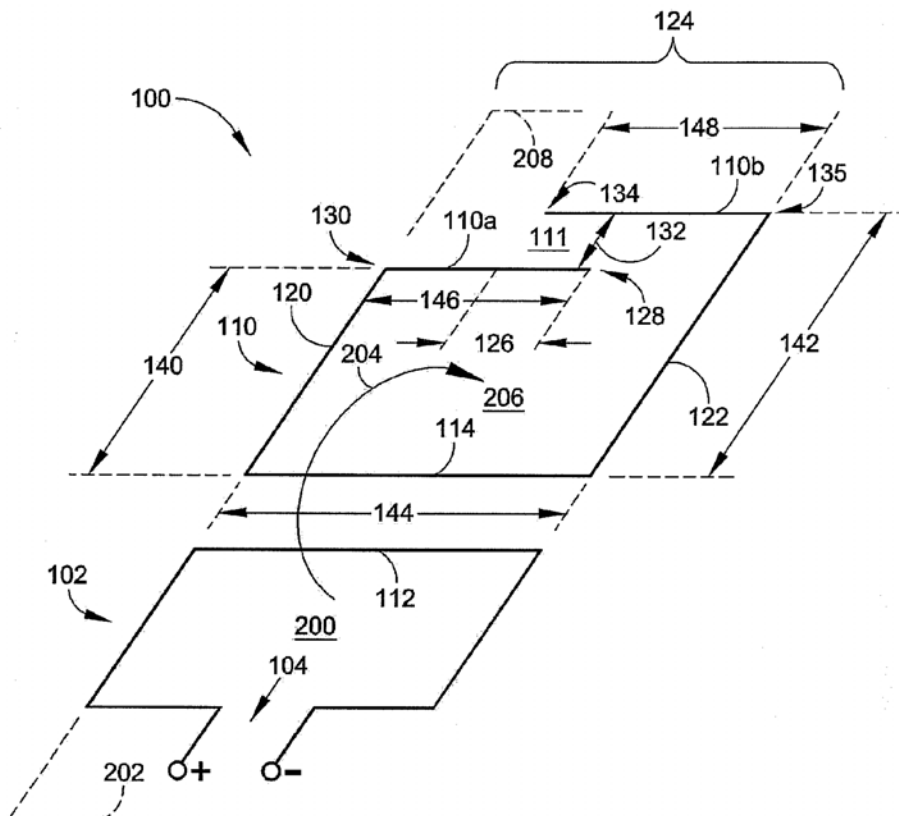
(21) Appl. No.: **11/686,720**

A cellular modem card that conforms to a PCMCIA standard includes a balanced antenna. The balanced antenna minimizes susceptibility to limited available ground plane and limited ground connections between the modem card and a host device, such as laptop computer. The balanced antenna may be a dipole antenna, loop antenna, capacitively loaded antenna, or any other suitable balanced antenna.

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

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 10/940,935, filed on Sep. 14, 2004.





US 20070152892A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152892 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **MOBILE COMMUNICATION HANDSET WITH ADAPTIVE ANTENNA ARRAY**

**Related U.S. Application Data**

(75) Inventors: **Bing Chiang**, Melbourne, FL (US);  
**Christopher A. Snyder**, Melbourne, FL (US);  
**Griffin K. Gothard**, Satellite Beach, FL (US);  
**David C. Jorgenson**, Melbourne, FL (US)

(63) Continuation of application No. 11/079,811, filed on Mar. 14, 2005, now Pat. No. 7,190,313, which is a continuation of application No. 10/390,531, filed on Mar. 14, 2003, now Pat. No. 6,876,331.

(60) Provisional application No. 60/365,140, filed on Mar. 14, 2002.

**Publication Classification**

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

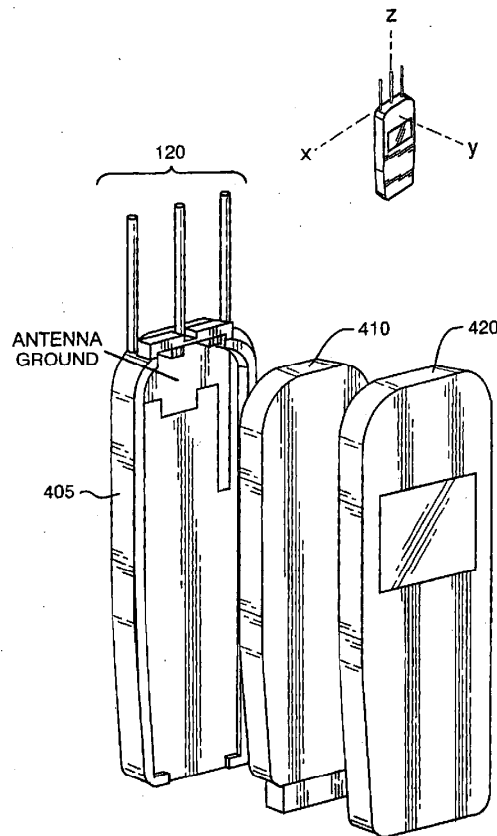
(57) **ABSTRACT**

A wireless mobile handset includes an antenna array. The antenna array includes a passive element disposed on a first portion of a dielectric substrate and an active element disposed on a second portion of the dielectric substrate. The passive element is configured to operate in a reflective mode to produce a bi-directional radiation pattern.

(73) Assignee: **IPR Licensing, Inc.**, Wilmington, DE

(21) Appl. No.: **11/706,538**

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





US 20070152894A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0152894 A1**  
Sanz et al. (43) **Pub. Date: Jul. 5, 2007**

(54) **MULTI-BAND MONOPOLE ANTENNA FOR A MOBILE COMMUNICATIONS DEVICE**

**Publication Classification**

(75) Inventors: **Alfonso Sanz**, Barcelona (ES); **Carles Puente Baliarda**, Barcelona (ES)

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

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

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(57) **ABSTRACT**

(73) Assignee: **Fractus, S.A.**

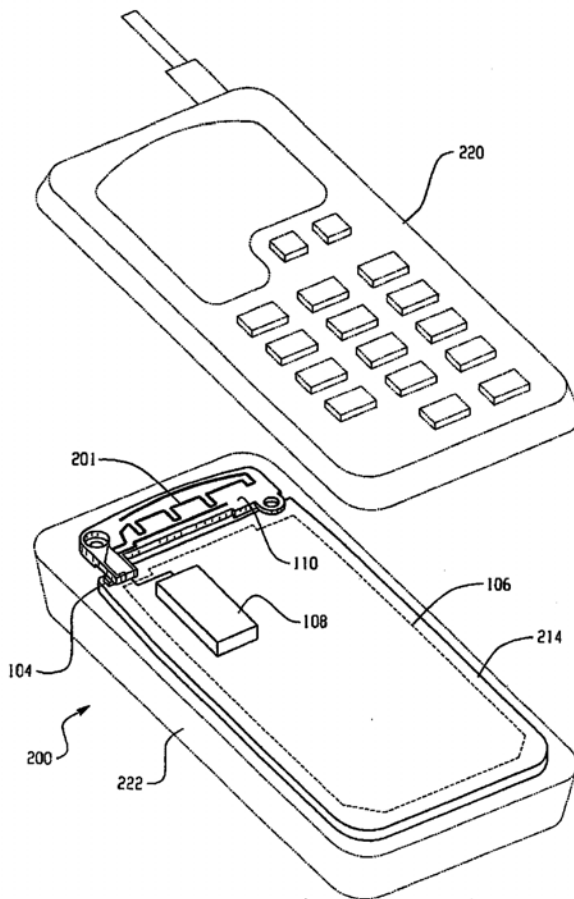
(21) Appl. No.: **11/713,324**

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

**Related U.S. Application Data**

(63) Continuation of application No. 11/124,768, filed on May 9, 2005, which is a continuation of application No. PCT/EP02/14706, filed on Dec. 22, 2002.

A multi-band monopole antenna for a mobile communications device includes a common conductor coupled to both a first radiating arm and a second radiating arm. The common conductor includes a feeding port for coupling the antenna to communications circuitry in a mobile communications device. In one embodiment, the first radiating arm includes a space-filling curve. In another embodiment, the first radiating arm includes a meandering section extending from the common conductor in a first direction and a contiguous extended section extending from the meandering section in a second direction.





US 20070152898A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152898 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **BROAD-BAND FERMI ANTENNA DESIGN METHOD, DESIGN PROGRAM, AND RECORDING MEDIUM CONTAINING THE DESIGN PROGRAM**

(30) **Foreign Application Priority Data**

Mar. 2, 2004 (JP) ..... 2004-058031

**Publication Classification**

(76) Inventors: **Koji Mizuno**, Miyagi (JP); **Kunio Sawaya**, Miyagi (JP); **Hiroyasu Sato**, Miyagi (JP); **Yoshihiko Wagatsuma**, Miyagi (JP)

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

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

(57) **ABSTRACT**

There is provided a method for designing a corrugated Fermi antenna having a broad-band and circular directivity required for receiving an image by using a wave of millimeter order. As a first step, an inflection point of the Fermi-Dirac function as a taper function of the Fermi antenna is changed so as to set the beam width of plane H to a beam width having a target directivity. After the beam width of the plane H is set to the target value, the aperture width of the Fermi antenna is changed so as to set the beam width of the plane E to a beam width having a target directivity. Thus, by adjusting the beam width values of the planes H and E independently from each other and matching them with the target values, it is possible to design a Fermi-antenna having a broad-band and circular directivity in a short time.

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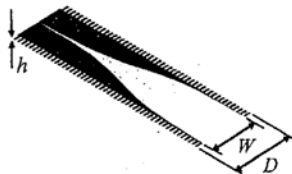
(21) Appl. No.: **11/514,642**

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

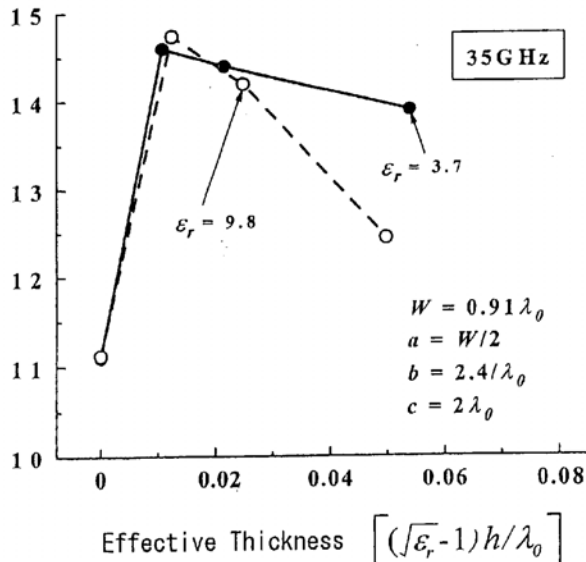
**Related U.S. Application Data**

(63) Continuation-in-part of application No. PCT/JP05/03825, filed on Mar. 1, 2005.

$\epsilon_r = 3.7$                        $\epsilon_r = 9.8$   
 $h = 0.1, 0.2, 0.5\text{mm}$        $h = 0.05, 0.1, 0.2\text{mm}$



Operating Gain  
[dBi]





US 20070152901A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152901 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **ANTENNA DESIGNS FOR RADIO  
FREQUENCY IDENTIFICATION (RFID)  
TAGS**

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

**Related U.S. Application Data**

(75) Inventors: **Theodore Hockey**, Mount Airy, MD (US); **Joseph White**, Woodbine, MD (US); **Michael Sloan**, Ellicott City, MD (US); **Hai Tran**, Aldie, VA (US); **Wayne Shanks**, Baltimore, MD (US)

(60) Provisional application No. 60/722,471, filed on Oct. 3, 2005. Provisional application No. 60/776,208, filed on Feb. 24, 2006.

**Publication Classification**

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WASHINGTON, DC 20005 (US)

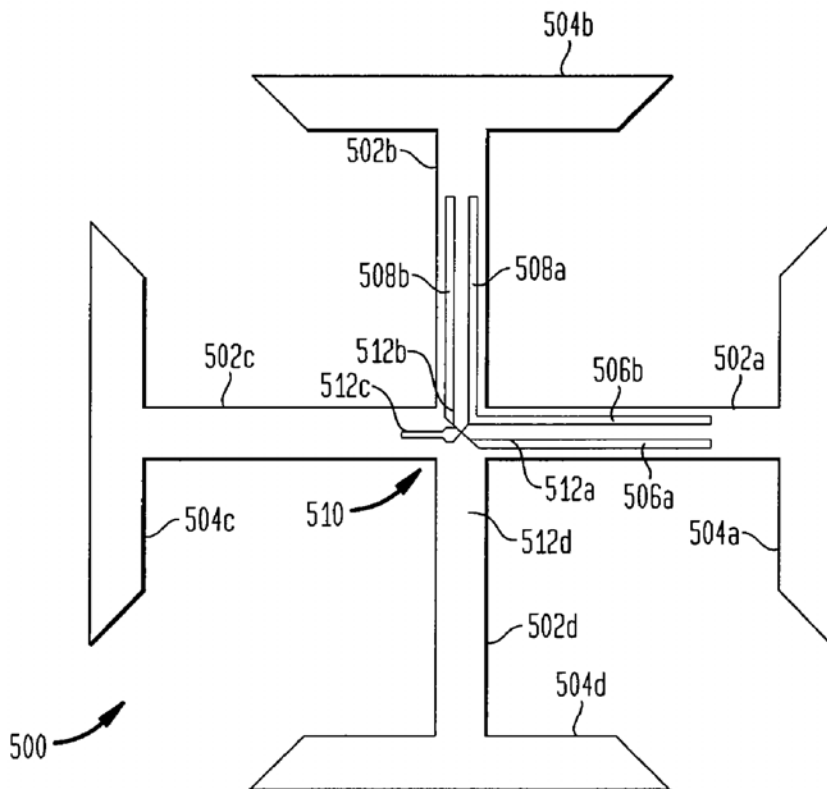
(51) **Int. Cl.**  
**H01Q 9/16** (2006.01)  
**G08B 13/14** (2006.01)  
(52) **U.S. Cl.** ..... **343/793; 340/572.7**

(73) Assignee: **Symbol Technologies, Inc.**, Holtsville, NY

(57) **ABSTRACT**

Methods, systems, and apparatuses for antenna designs for radio frequency identification (RFID) tags are described.

(21) Appl. No.: **11/529,608**





US 20070152902A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0152902 A1**

(43) **Pub. Date: Jul. 5, 2007**

(54) **DIRECTIVE, BROADBAND, HIGH GAIN,  
ACTIVE ANTENNA SYSTEM**

**Related U.S. Application Data**

(60) Provisional application No. 60/629,688, filed on Nov. 19, 2004.

(76) Inventors: **Andrew Rowser**, Kent, WA (US);  
**Christopher D. Long**, Maple Valley,  
WA (US); **Glenn Borland**, Escondido,  
CA (US); **W. Leo Hoarty**, Morgan Hill,  
CA (US)

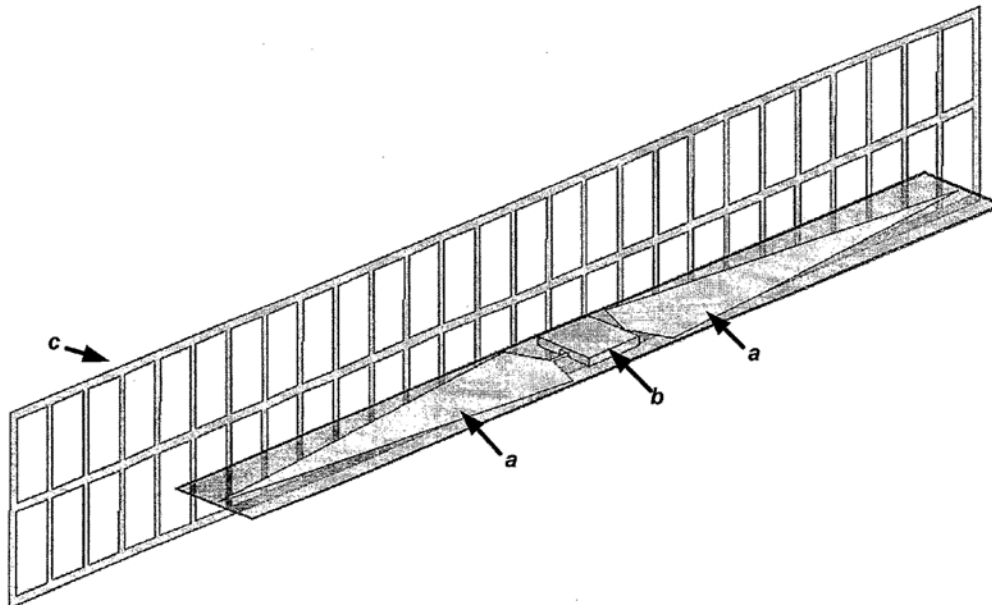
**Publication Classification**

(51) **Int. Cl.**  
**H01Q 9/28** (2006.01)  
(52) **U.S. Cl.** ..... **343/795; 343/908**

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

(57) **ABSTRACT**  
A broadband, high-gain, active antenna system is disclosed, which operates with a bi-directional reception pattern while in its standard configuration and with a directive reception pattern over several octaves of Radio Frequency (RF) spectrum when affixed with a tuned scatter-plate. As a standalone active antenna system the disclosed antenna probe element and the amplifier subassembly exhibit the bi-directional directive properties of a standard fixed length dipole, while the addition of a scatter-plate makes the antenna directive with separate frequency-dependant directive modes. The scatter-plate can be tuned such that these separate directive modes occur at convenient areas of the RF frequency spectrum. Other means of achieving directivity are disclosed using the antenna probe element and the amplifier subassembly.

(21) Appl. No.: **10/590,604**  
(22) PCT Filed: **Nov. 21, 2005**  
(86) PCT No.: **PCT/US05/41981**  
§ 371(c)(1),  
(2), (4) Date: **Aug. 24, 2006**







US 20070152903A1

(19) **United States**

(12) **Patent Application Publication**

Lin et al.

(10) **Pub. No.: US 2007/0152903 A1**

(43) **Pub. Date:**

**Jul. 5, 2007**

(54) **PRINTED CIRCUIT BOARD BASED SMART ANTENNA**

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

**Publication Classification**

(75) Inventors: **Teng-Chi Lin**, Keelung (TW); **Ikuroh Ichitsubo**, Sagamihara (JP); **Guan-Wu Wang**, Palo Alto, CA (US); **Weiping Wang**, Palo Alto, CA (US)

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

(52) **U.S. Cl.** ..... **343/795; 343/818**

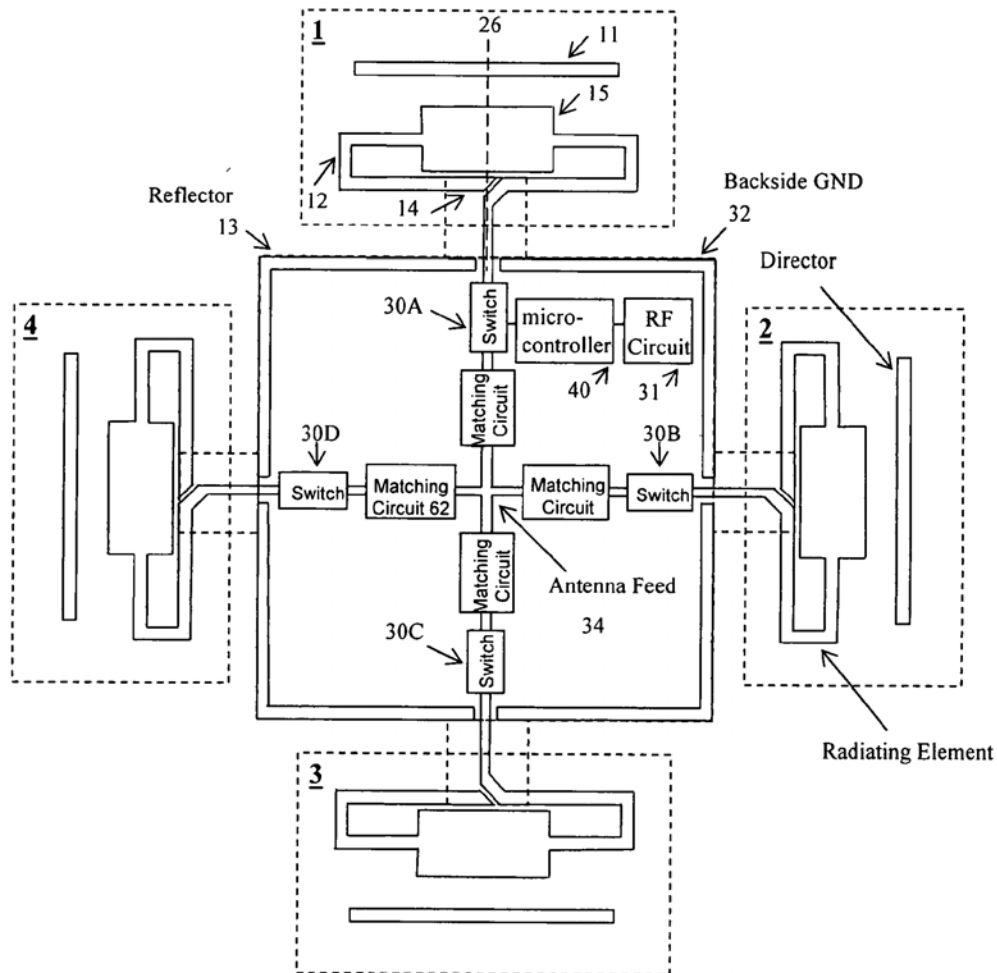
(57) **ABSTRACT**

Systems and methods are disclosed to transmit and receive radio frequency (RF) signals by providing a plurality of high gain, highly directional antennas on a multi-layer printed circuit board; using a processor to gate RF signals from each antenna and to select an antenna transmission pattern based on antenna turned on or the combination of a number of antennas turned on, among others.

Correspondence Address:  
**TRAN & ASSOCIATES**  
**6768 MEADOW VISTA CT.**  
**SAN JOSE, CA 95135 (US)**

(73) Assignee: **MICRO MOBIO**

(21) Appl. No.: **11/323,776**





US 20070159395A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0159395 A1**

(43) **Pub. Date: Jul. 12, 2007**

(54) **METHOD FOR FABRICATING ANTENNA STRUCTURES HAVING ADJUSTABLE RADIATION CHARACTERISTICS**

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/38** (2006.01)  
(52) **U.S. Cl.** ..... **343/700 MS; 343/909**

(76) Inventors: **Daniel F. Sievenpiper**, Santa Monica, CA (US); **Hui-Pin Hsu**, Northridge, CA (US)

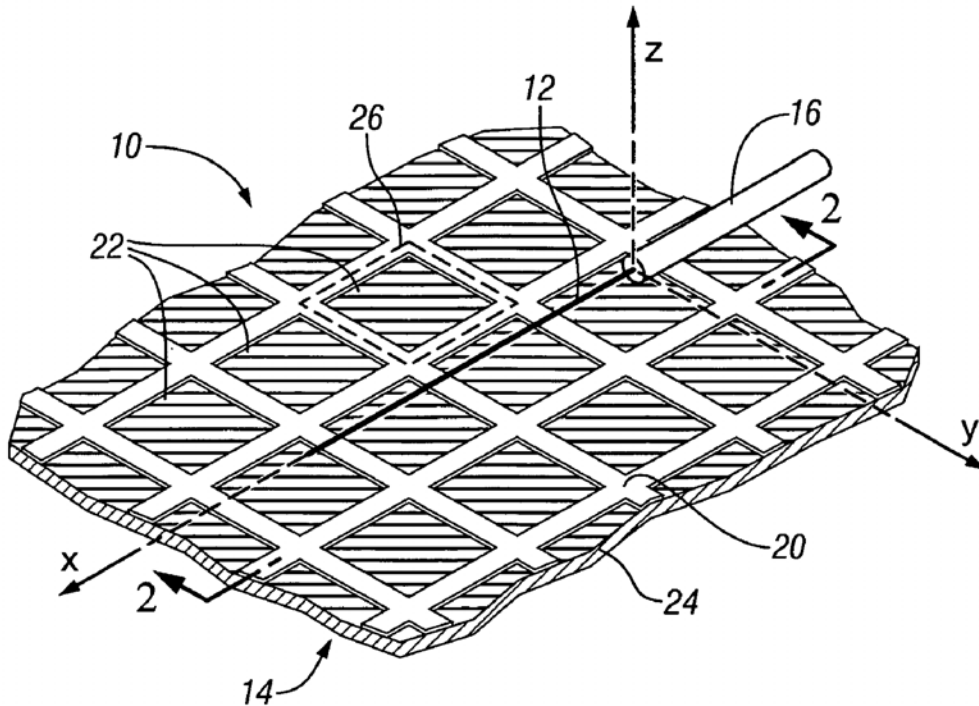
(57) **ABSTRACT**

The radiation properties and wave guiding properties of frequency selective surfaces are used in conjunction with closely spaced antenna elements to fabricate antenna structures having adjustable radiation characteristics. The direction, magnitude, and polarization of radiation patterns for such antenna structures can be adjusted by varying the texture or patterning of layers of conducting material forming the frequency selective surfaces. The invention enables the fabrication of low profile antenna structures that can easily be conformed or integrated into complex surfaces without sacrificing antenna performance.

Correspondence Address:  
**GENERAL MOTORS CORPORATION**  
**LEGAL STAFF**  
**MAIL CODE 482-C23-B21**  
**P O BOX 300**  
**DETROIT, MI 48265-3000 (US)**

(21) Appl. No.: **11/326,881**

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





US 20070159398A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0159398 A1**

**Tsai et al.**

(43) **Pub. Date: Jul. 12, 2007**

(54) **ANTENNA**

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

(75) Inventors: **Feng-Chi Eddie Tsai, Taipei (TW);  
Kuan Hsueh Tseng, Taipei (TW)**

(57) **ABSTRACT**

Correspondence Address:  
**QUINTERO LAW OFFICE, PC  
2210 MAIN STREET, SUITE 200  
SANTA MONICA, CA 90405 (US)**

An antenna comprises a ground element, a first transmission element, a feed element, a second transmission element and a third transmission element. The first transmission element is electrically connected to the ground element, wherein the first transmission element comprises at least one coupling portion, a first side and a second side. The feed element corresponds to the coupling portion. The second transmission element corresponds to the first side and is electrically connected to the ground element. The third transmission element corresponds to the second side and is electrically connected to the ground element. When a first wireless signal is transmitted, the feed element couples to the first transmission element to transmit the first wireless signal. When a second wireless signal is transmitted, the feed element couples to the first transmission element, and the second and third transmission elements couple to the first transmission element to transmit the second wireless signal.

(73) Assignee: **WISTRON NEWEB CORP., TAIPEI  
HSIEN (TW)**

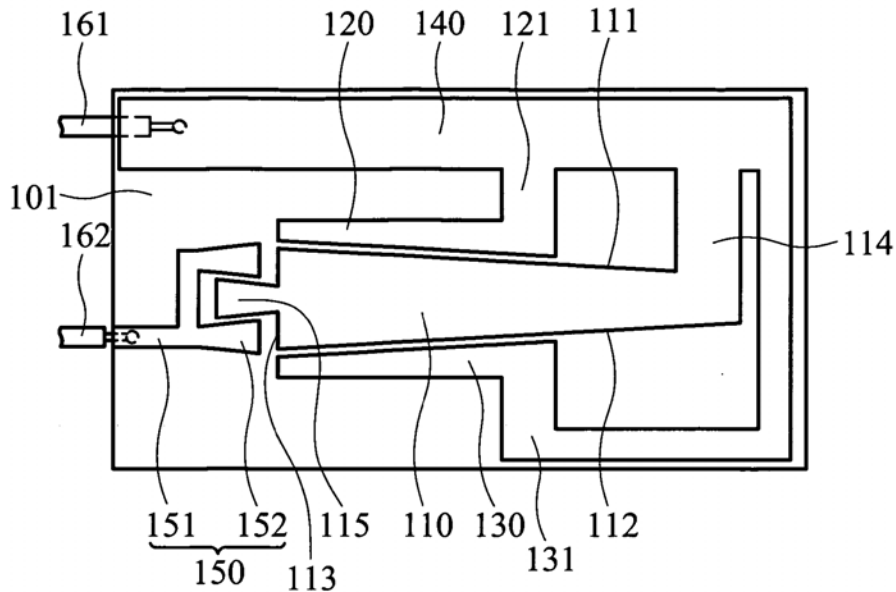
(21) Appl. No.: **11/328,888**

(22) Filed: **Jan. 9, 2006**

**Publication Classification**

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

100





US 20070159399A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0159399 A1**

(43) **Pub. Date: Jul. 12, 2007**

(54) **MULTI-BAND ANTENNA WITH A COMMON  
RESONANT FEED STRUCTURE AND  
METHODS**

**Publication Classification**

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

(76) Inventors: **Jari Perunka**, Tupos (FI); **Kimmo  
Koskiniemi**, Oulu (FI)

(57) **ABSTRACT**

A multi-band antenna and associated apparatus for communication systems and other applications. In one embodiment, a common junction network is provided having a first and a second radiator. The first radiator resonates in a first frequency band. The second radiator resonates in a second frequency band. The first and second frequency bands are different from one another (yet may overlap). A first electrical component is coupled to the common junction network and proximately located to the first radiator. The first electrical component creates a resonance with the common junction network to create a third frequency band proximate to the first frequency band. The first radiator is capable of communicating RF energy in the first frequency band and the third frequency band.

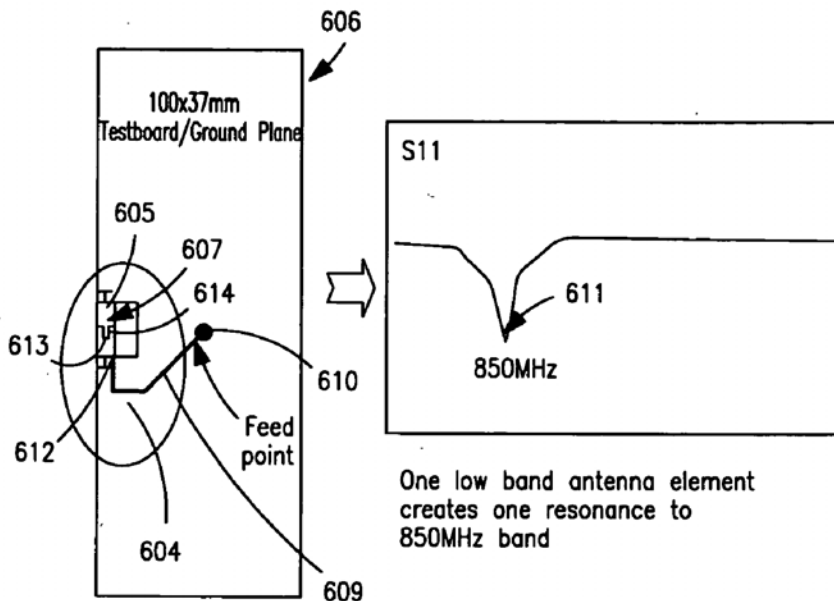
Correspondence Address:  
**GAZDZINSKI & ASSOCIATES**  
**Suite 375**  
**11440 West Bernardo Court**  
**San Diego, CA 92127 (US)**

(21) Appl. No.: **11/544,173**

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

(30) **Foreign Application Priority Data**

Oct. 10, 2005 (FI)..... 20055527





US 20070159403A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2007/0159403 A1**

**Chan et al.**

(43) **Pub. Date:**

**Jul. 12, 2007**

(54) **ANTENNA DEVICE HAVING COMPACT COVERING**

**Publication Classification**

(51) **Int. Cl.**

**H01Q 1/24** (2006.01)

(52) **U.S. Cl.** ..... **343/702; 343/872; 343/906**

(75) Inventors: **Yat To Chan**, Taoyuan Hsien (TW);  
**Yuh Ching Tsen**, Taoyuan Hsien (TW)

(57)

**ABSTRACT**

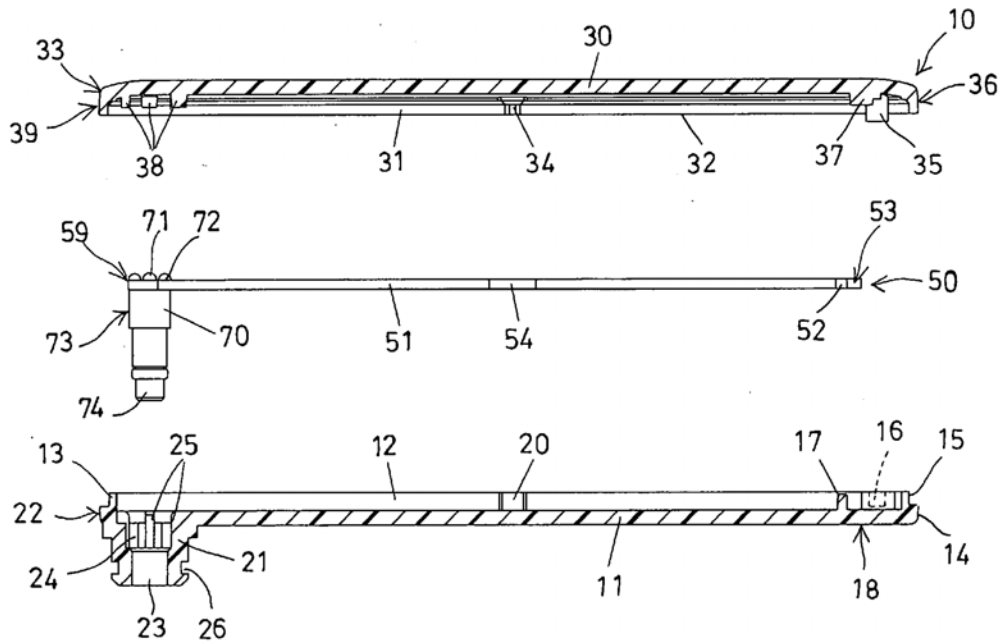
Correspondence Address:  
**CHARLES E. BAXLEY, ESQ.**  
**90 JOHN STREET**  
**THIRD FLOOR**  
**NEW YORK, NY 10038 (US)**

An antenna device includes an antenna member having a plate, a conductor member disposed on one side of the plate, and another conductor member disposed on the other side of the plate, the plate includes one or more orifices and one or more apertures, and a coupler includes one or more positive electrodes and one or more negative electrodes engaged through the orifices and the apertures of the antenna member and electrically coupled to the conductor members respectively. A housing includes a chamber for receiving the plate of the antenna member, and a cylindrical member having a bore for receiving the coupler. The housing includes two housing members having a chamber for receiving the plate.

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

(21) Appl. No.: **11/329,517**

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





US 20070159408A1

(19) **United States**

(12) **Patent Application Publication**  
**Parsche**

(10) **Pub. No.: US 2007/0159408 A1**

(43) **Pub. Date: Jul. 12, 2007**

(54) **BROADBAND OMNIDIRECTIONAL LOOP ANTENNA AND ASSOCIATED METHODS**

**Publication Classification**

(75) Inventor: **Francis Eugene Parsche**, Palm Bay, FL (US)

(51) **Int. Cl.**  
**H01Q 7/00** (2006.01)  
(52) **U.S. Cl.** ..... **343/866; 343/867; 343/741**

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)**

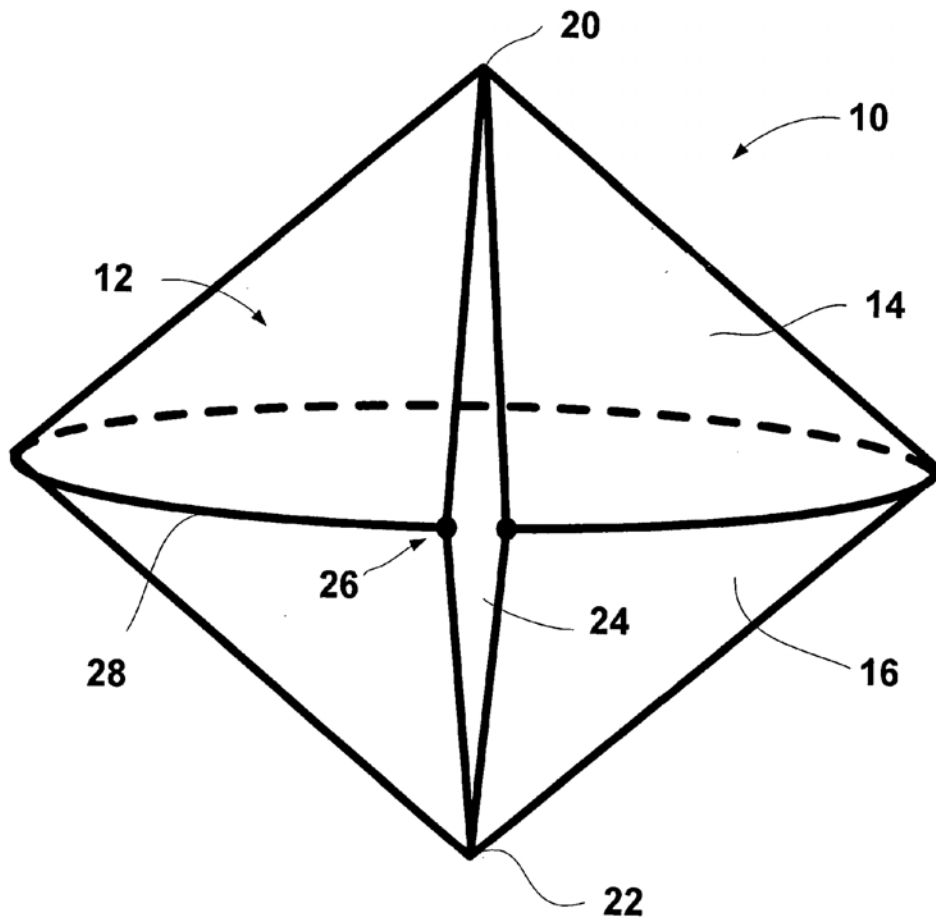
(57) **ABSTRACT**

The biconical loop antenna is the dual and compliment to the biconical dipole antenna, and has broadband omnidirectional horizontally polarized radiation. The antenna includes a conductive antenna body having first and second opposing ends with a medial portion therebetween. The antenna body has a slot extending from at least adjacent the first end to at least adjacent the second end, and the medial portion of the antenna body is wider than the opposing ends. First and second body portions may be conical antenna elements connected together at their respective bases. Antenna feed points are at the medial and chine portion of the antenna body adjacent the slot.

(73) Assignee: **Harris Corporation**, Melbourne, FL

(21) Appl. No.: **11/330,642**

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





US 20070164868A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0164868 A1**  
**DEAVOURS et al.** (43) **Pub. Date: Jul. 19, 2007**

(54) **MICROSTRIP ANTENNA FOR RFID DEVICE** (52) **U.S. Cl.** ..... 340/572.7; 343/700 MS

(76) Inventors: **Daniel D. DEAVOURS**, Lawrence, KS  
(US); **Mutharasu Sivakumar**,  
Lawrence, KS (US)

(57) **ABSTRACT**

Correspondence Address:  
**SPENCER, FANE, BRITT & BROWNE**  
1000 WALNUT STREET  
SUITE 1400  
KANSAS CITY, MO 64106-2140 (US)

Microstrip patch antenna (46), feed structure (48), and matching circuit (50) designs for an RFID tag (10). A balanced feed design using balanced feeds coupled by a shorting stub (56) to create a virtual short between the two feeds so as to eliminate the need for physically connecting substrate to the ground plane. A dual feed structure design using a four-terminal IC can be connected to two antennas (46a, 46b) resonating at different frequencies so as to provide directional and polarization diversity. A combined near/field-far/field design using a microstrip antenna providing electromagnetic coupling for far-field operation, and a looping matching circuit providing inductive coupling for near-field operation. A dual-antenna design using first and second microstrip antennas providing directional diversity when affixed to a cylindrical or conical object, and a protective superstrate (66). An antenna (46c) design for application to the top of a metal cylinder around a stem.

(21) Appl. No.: 11/610,048

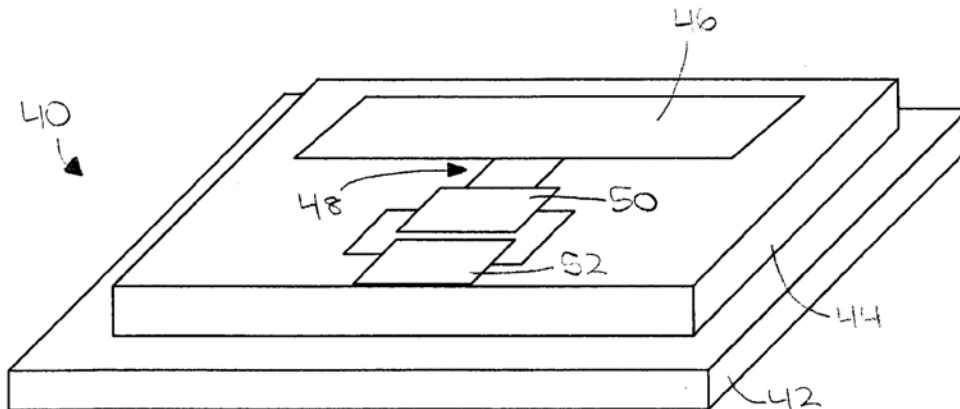
(22) Filed: Dec. 13, 2006

**Related U.S. Application Data**

(60) Provisional application No. 60/750,182, filed on Dec. 14, 2005.

**Publication Classification**

(51) **Int. Cl.**  
**G08B** 13/14 (2006.01)  
**H01Q** 9/04 (2006.01)





US 20070164904A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0164904 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **DUAL BAND DIVERSITY WLAN ANTENNA SYSTEM FOR LAPTOP COMPUTERS, PRINTERS AND SIMILAR DEVICES**

**Publication Classification**

(75) Inventors: **Vijay Nahar**, Cambridge (GB); **Brian Collins**, Cambridge (GB)

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

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

(57) **ABSTRACT**

(73) Assignee: **Antenova Limited Corporaation**

There is disclosed a dual band antenna device including a dielectric substrate (6) having opposed first and second surfaces and a groundplane (7) on the second surface. A microstrip transmission line (4) is provided on the first surface, and a dielectric pellet (5) is mounted on the first surface on the microstrip transmission line (4). A bifurcated planar inverted-L antenna (PILA) component (1) is also mounted on the first surface, the PILA component (1) having first (2) and second (3) arms which extend over and contact a surface of the dielectric pellet (5). The first arm (3) contacts a different area of the surface of the dielectric pellet (5) than the second arm (2). The antenna device provides good operation at both 2.4GHz and 5.5GHz frequency bands.

(21) Appl. No.: **10/586,155**

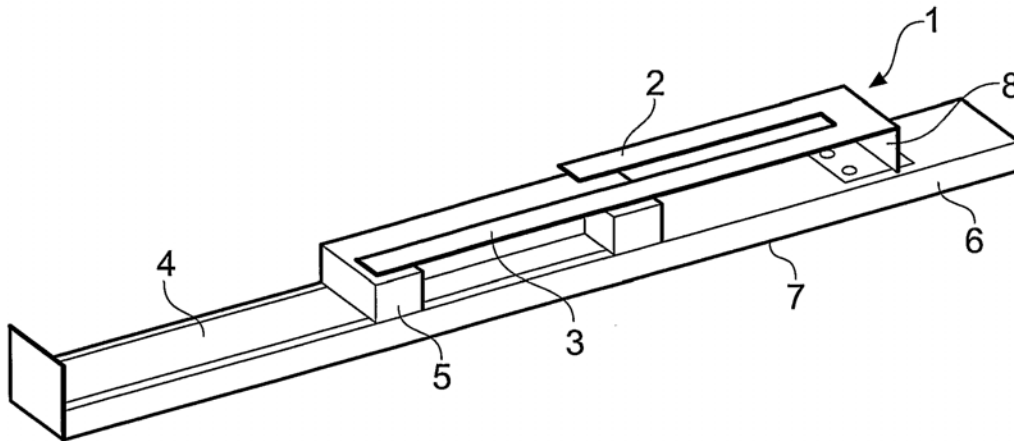
(22) PCT Filed: **Jan. 14, 2005**

(86) PCT No.: **PCT/GB05/00105**

§ 371(c)(1),  
(2), (4) Date: **Jul. 14, 2006**

(30) **Foreign Application Priority Data**

Jan. 16, 2004 (GB) ..... 0400925.4







US 20070164905A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0164905 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **EMBEDDED ASSEMBLY INCLUDING  
MOVEABLE ELEMENT AND ANTENNA  
ELEMENT**

**Publication Classification**

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

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

(75) **Inventors: Robert B. Lempkowski**, Elk Grove  
Village, IL (US); **Manes Eliacin**,  
Buffalo Grove, IL (US); **Keryn Ke  
Lian**, Palatine, IL (US)

(57) **ABSTRACT**

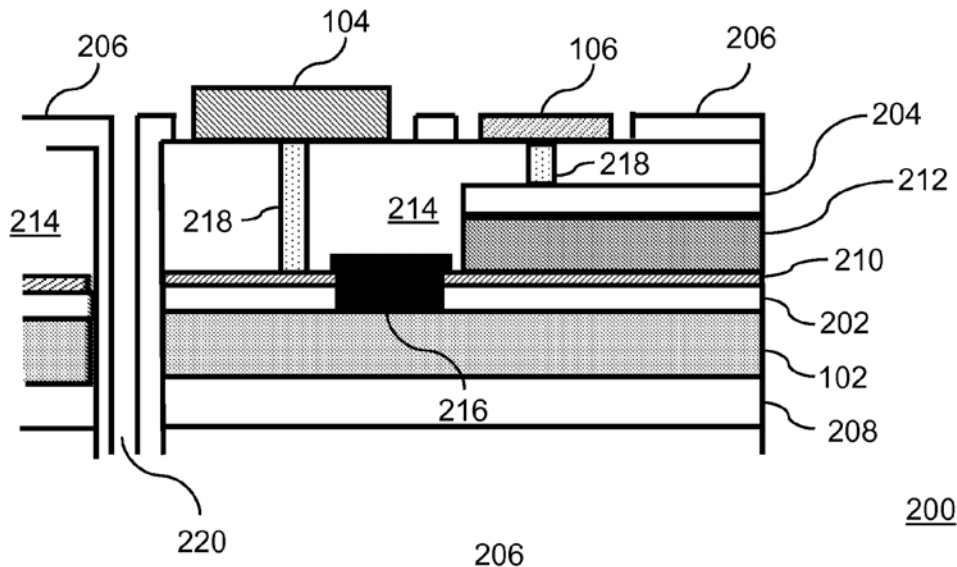
Correspondence Address:  
**MOTOROLA, INC.**  
**1303 EAST ALGONQUIN ROAD**  
**IL01/3RD**  
**SCHAUMBURG, IL 60196**

An embedded assembly (200) and method for fabricating the same is provided. The embedded assembly includes an organic substrate (102) and at least one movable element (104). The embedded assembly also includes at least one antenna element (106). The method includes providing (502) the organic substrate, and embedding (504) the at least one moveable element on the organic substrate. The method also includes embedding (506) the at least one antenna element on the organic substrate.

(73) **Assignee: MOTOROLA, INC.**, Schaumburg, IL  
(US)

(21) **Appl. No.: 11/275,589**

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



200



US 20070164906A1

(19) **United States**

(12) **Patent Application Publication**  
**Tsai**

(10) **Pub. No.: US 2007/0164906 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **COMPACT MULTIPLE-FREQUENCY Z-TYPE  
INVERTED-F ANTENNA**

**Publication Classification**

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

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

(76) Inventor: **Feng-Chi Eddie Tsai, Taipei Hsien**  
**(TW)**

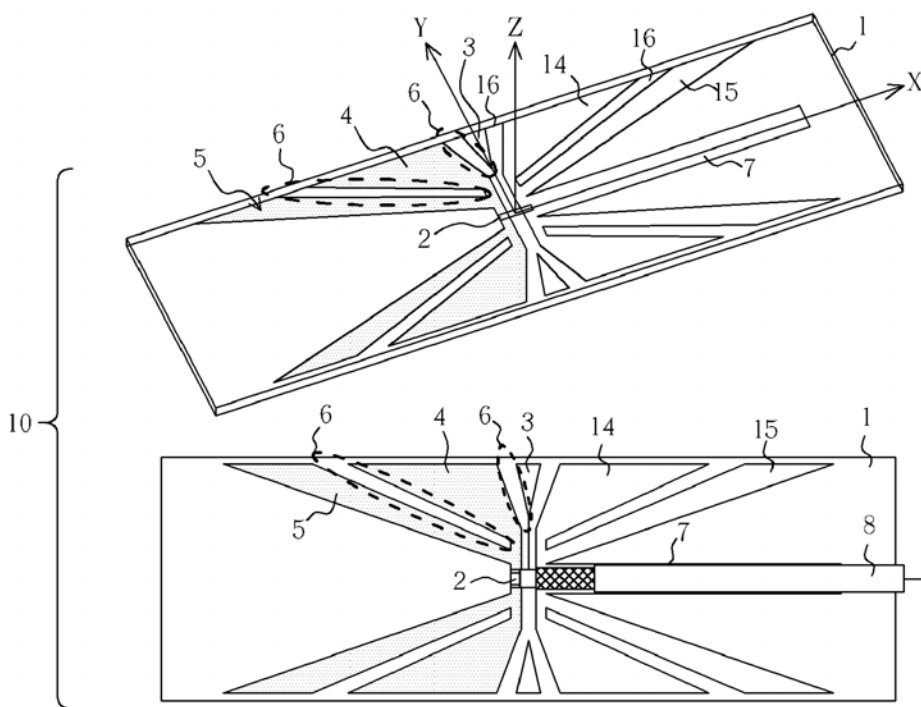
(57) **ABSTRACT**

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

A compact multiple-frequency Z-type Inverted-F antenna includes a dielectric substrate having a horizontal axis and a vertical axis perpendicular to the horizontal axis. A feed point is disposed along the horizontal axis on a first side of the vertical axis and a ground strip is disposed along the horizontal axis on a second side of the vertical axis opposite the feed point. A plurality of wedge-shaped radiating traces is arranged symmetrically with respect to the horizontal axis and disposed on the first side of the vertical axis. A plurality of wedge-shaped ground traces symmetrical to the plurality of radiating traces with respect to the vertical axis are disposed on the second side of the vertical axis.

(21) Appl. No.: **11/306,918**

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





US 20070164907A1

(19) **United States**

(12) **Patent Application Publication**

**Gaucher et al.**

(10) **Pub. No.: US 2007/0164907 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **APPARATUS AND METHODS FOR PACKAGING INTEGRATED CIRCUIT CHIPS WITH ANTENNA MODULES PROVIDING CLOSED ELECTROMAGNETIC ENVIRONMENT FOR INTEGRATED ANTENNAS**

(21) Appl. No.: 11/332,737

(22) Filed: Jan. 13, 2006

**Publication Classification**

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

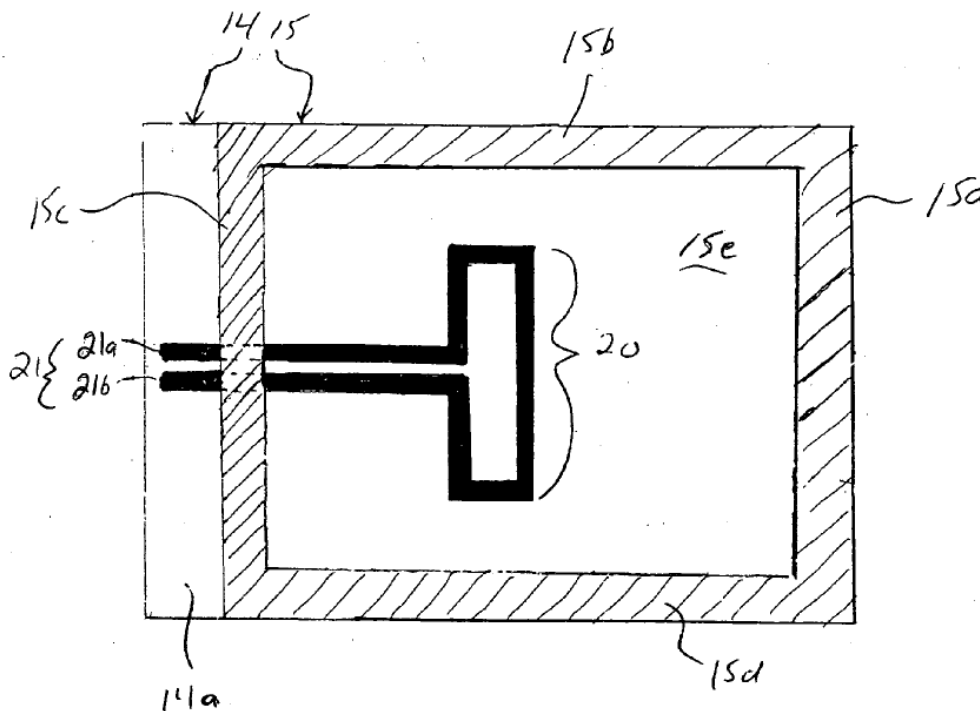
(52) **U.S. Cl.** ..... 343/700 MS

(76) Inventors: **Brian P. Gaucher**, Brookfield, CT (US); **Janusz Grzyb**, Ossining, NY (US); **Duixian Liu**, Scarsdale, NY (US); **Ullrich R. Pfeiffer**, Yorktown Heights, NY (US)

(57) **ABSTRACT**

Apparatus and methods are provided for packaging IC chips together with integrated antenna modules designed to provide a closed EM (electromagnetic) environment for antenna radiators, thereby allowing antennas to be designed independent from the packaging technology.

Correspondence Address:  
**F. CHAU & ASSOCIATES, LLC**  
130 WOODBURY ROAD  
WOODBURY, NY 11797 (US)





US 20070164909A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0164909 A1**  
**Ogawa et al.** (43) **Pub. Date: Jul. 19, 2007**

(54) **EMBEDDED ANTENNA OF A MOBILE DEVICE**

**Publication Classification**

(51) **Int. Cl.**  
*H01Q 1/24* (2006.01)  
 (52) **U.S. Cl.** ..... 343/702; 343/873

(76) Inventors: **Harry K. Ogawa**, Surrey (CA); **Robert F. Wilson**, Vancouver (CA)

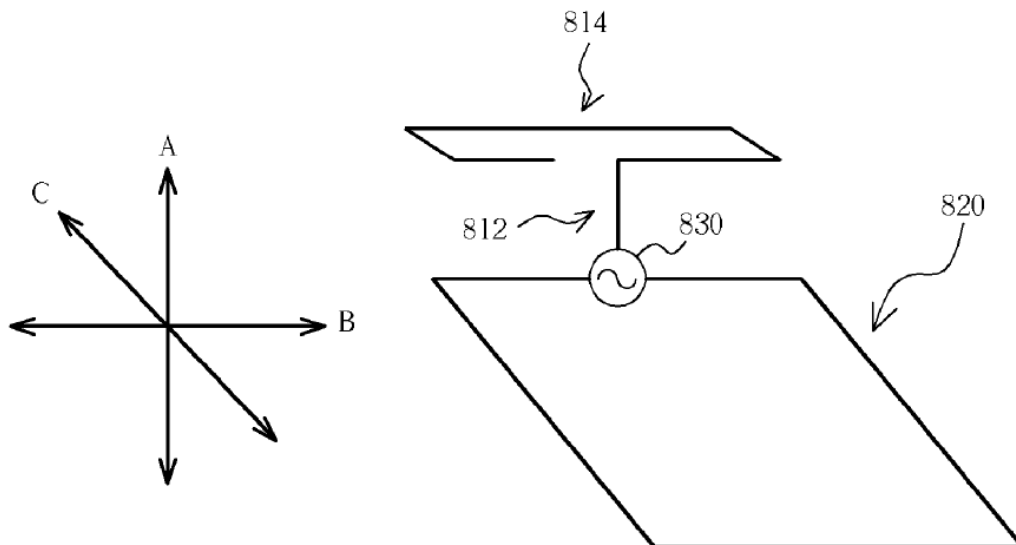
(57) **ABSTRACT**

An embedded antenna of a mobile device includes a substrate plate, a straight conductive trace installed on the substrate plate along a first direction, and a rectilinear folded conductive trace electrically connected to an end of the straight conductive trace. The rectilinear folded conductive trace comprises a longest portion installed on the substrate plate along a second direction perpendicular to the first direction, and a shortest portion installed on the substrate plate along a third direction perpendicular to the second direction. A length of the straight conductive trace is longer than a dimension of the rectilinear folded conductive trace in the first direction.

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

(21) Appl. No.: **11/306,856**

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





US 20070164911A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0164911 A1**  
**Locke** (43) **Pub. Date: Jul. 19, 2007**

(54) **METHOD AND APPARATUS FOR ORIENTING A DIRECTIONAL ANTENNA**

**Publication Classification**

(75) Inventor: **Clarence R. Locke**, Seminole, FL (US)

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

Correspondence Address:  
**HONEYWELL INTERNATIONAL INC.**  
**101 COLUMBIA ROAD**  
**P O BOX 2245**  
**MORRISTOWN, NJ 07962-2245 (US)**

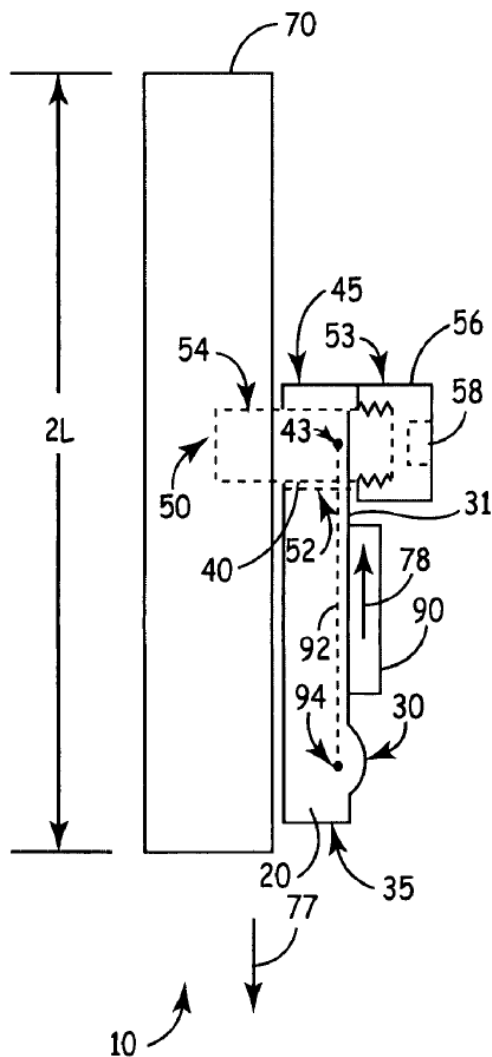
(57) **ABSTRACT**

(73) Assignee: **Honeywell International Inc.**, Morristown, NJ

A device orienting apparatus includes a device-attachment structure having a non-uniform mass distribution, a post, and a base structure. The device-attachment structure includes a pivot hole and the post has a first-end section surrounded by the pivot hole. A second-end section of the post is secured so that a directional antenna is held in a preferred orientation when the post is perpendicular to a gravitational field.

(21) Appl. No.: **11/331,923**

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





US 20070164914A1

(19) **United States**

(12) **Patent Application Publication**

**Minard et al.**

(10) **Pub. No.: US 2007/0164914 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **PORTABLE DEVICE COMPACT ANTENNA**

**Publication Classification**

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

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

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

Correspondence Address:  
**JOSEPH J. LAKS, VICE PRESIDENT**  
**THOMSON LICENSING LLC**  
**PATENT OPERATIONS, PO BOX 5312**  
**PRINCETON, NJ 08543-5312**

(57) **ABSTRACT**

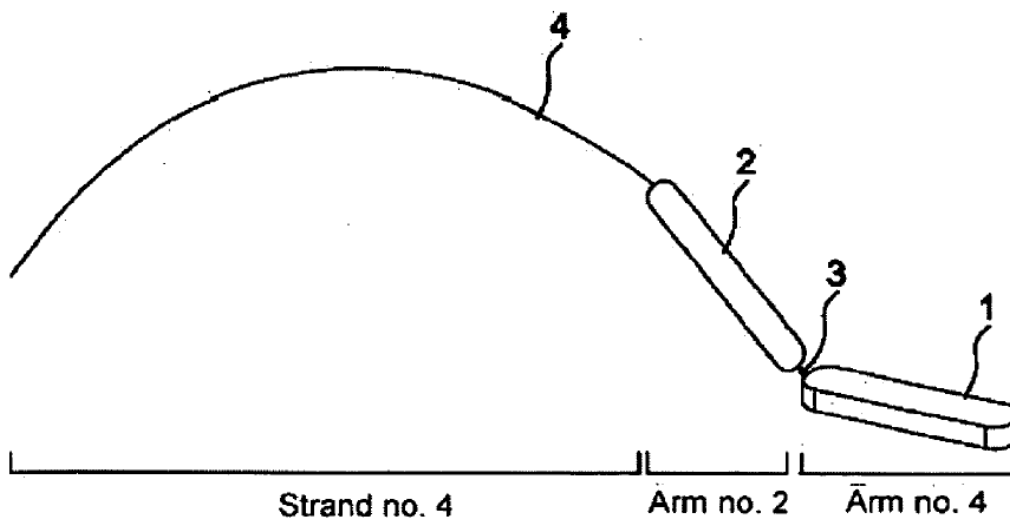
The present invention relates to a portable compact antenna comprising a first radiating element of the dipole type, operating in a first frequency band and formed by a first and at least one second conductive arm supplied differentially, the first arm, called cold arm, forming at least one cover for an electronic card wherein the second arm, called hot arm, is extended by a conductive wire element, the length of the assembly formed by the first arm, the second arm and the wire element being chosen to provide an operation in a second frequency band.

(21) Appl. No.: **11/653,612**

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

(30) **Foreign Application Priority Data**

Jan. 17, 2006 (FR) ..... 6050153





US 20070164915A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0164915 A1**  
**Nevermann** (43) **Pub. Date: Jul. 19, 2007**

(54) **TELECOMMUNICATION ANTENNA**

**Publication Classification**

(75) Inventor: **Peter Nevermann, Langenfeld (DE)**

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

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

Correspondence Address:

**K.F. ROSS P.C.**  
**5683 RIVERDALE AVENUE, SUITE 203 BOX 900**  
**BRONX, NY 10471-0900**

(57) **ABSTRACT**

A telecommunication device has a permanently mounted antenna tuned to a predetermined resonant frequency and a housing formed of a plurality of parts one of which is removable. The one removable part, which may be an original element or an aftermarket add-on, changes the resonant frequency of the antenna when fitted to the housing. An electrically conductive passive correction element fixed in the one removable housing part is positioned therein and dimensioned such that when the one removable housing part is fitted to the housing the passive correction element cancels out the effect on the resonant frequency of the antenna by the one removable housing part.

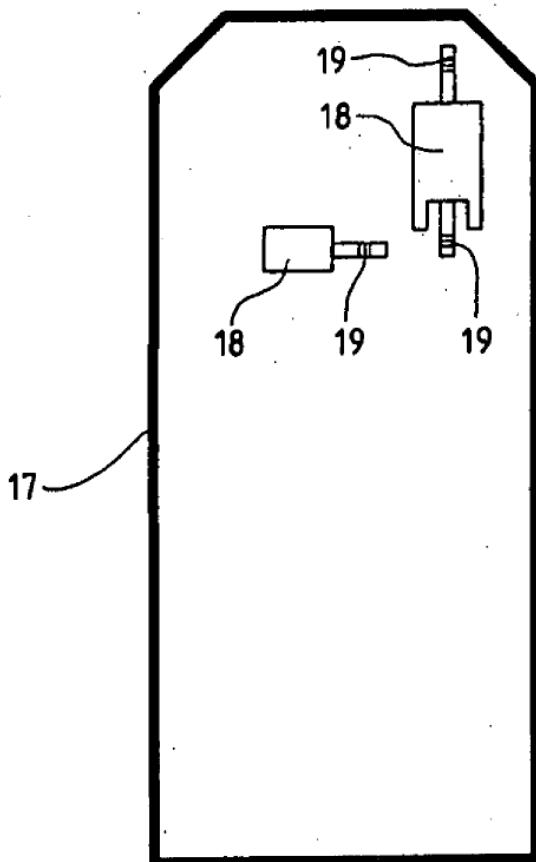
(73) Assignee: **LUMBERG CONNECT GMBH**

(21) Appl. No.: **11/655,045**

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

(30) **Foreign Application Priority Data**

Jan. 19, 2006 (DE) ..... 102006002817.1





US 20070164916A1

(19) **United States**

(12) **Patent Application Publication**

**Zafar et al.**

(10) **Pub. No.: US 2007/0164916 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **METALLIZED GLASS GROUNDING FOR ANTENNA**

**Publication Classification**

(76) Inventors: **Imtiaz Zafar**, Sterling Heights, MI (US); **Joseph R. Dockemeyer JR.**, Kokomo, IN (US); **Ahmad B. Pakray**, Rochester Hills, MI (US); **Kenneth P. Lee**, Bingham Farms, MI (US)

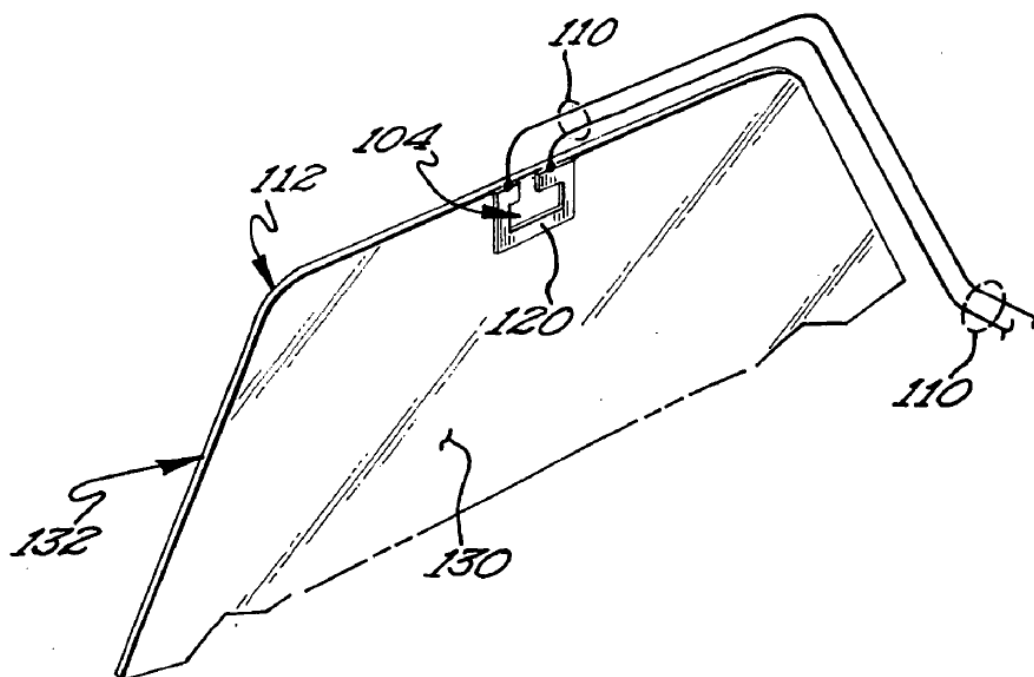
(51) **Int. Cl.**  
*H01Q 1/32* (2006.01)  
(52) **U.S. Cl.** ..... 343/713; 343/711

Correspondence Address:  
**DELPHI TECHNOLOGIES, INC.**  
M/C 480-410-202  
PO BOX 5052  
TROY, MI 48007 (US)

(57) **ABSTRACT**

A satellite antenna is mounted on one side of a window. The window is made of metallized glass or has an electrically conductive print applied to the side opposite the satellite antenna. The electrically conductive print or metallized glass serves as a ground connection for the satellite antenna.

(21) Appl. No.: **11/333,160**  
(22) Filed: **Jan. 17, 2006**







US 20070164917A1

(19) **United States**

(12) **Patent Application Publication**

**Takisawa et al.**

(10) **Pub. No.: US 2007/0164917 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **ANTENNA DEVICE**

**Publication Classification**

(76) Inventors: **Hisashi Takisawa**, Akita (JP); **Junichi Noro**, Akita (JP); **Kyuichi Sato**, Akita (JP); **Takao Kato**, Akita (JP); **Arata Togashi**, Akita (JP)

(51) **Int. Cl.**  
*H01Q 1/32* (2006.01)  
*H01Q 3/02* (2006.01)  
(52) **U.S. Cl.** ..... **343/713; 343/882**

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11491 SUNSET HILLS ROAD  
SUITE 340  
RESTON, VA 20190 (US)

(57) **ABSTRACT**

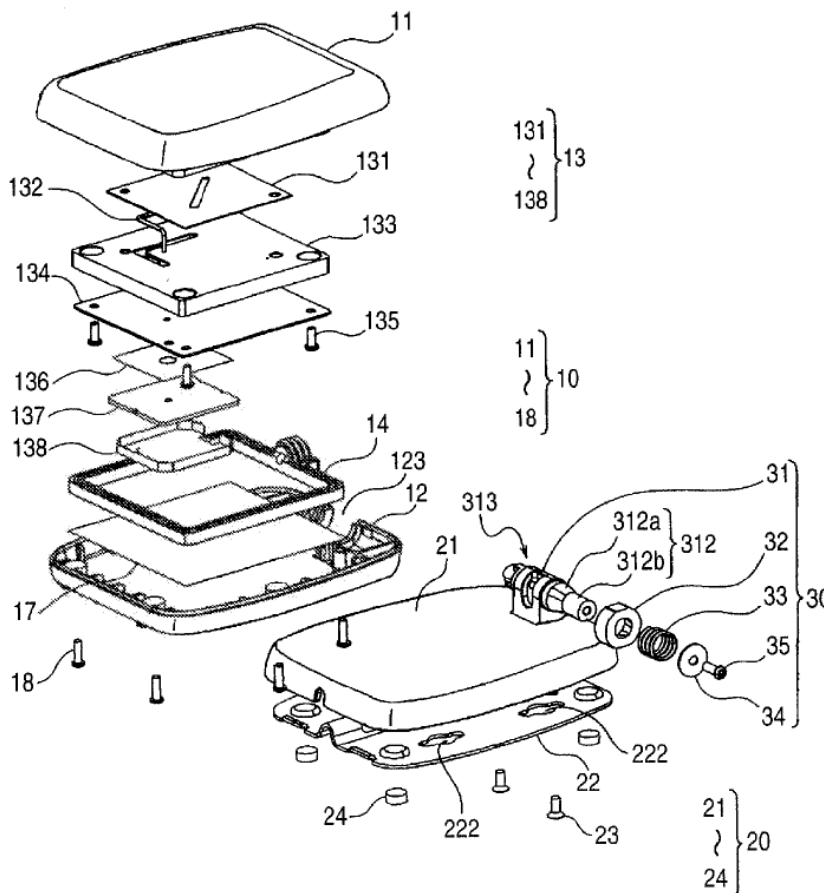
A hinge portion is formed on the base portion. An antenna portion is attached to the hinge portion so as to be pivotable thereabout. The hinge portion includes a hinge base having a first shaft formed on one end thereof, a second shaft formed on the other end thereof, and a first protrusion formed on an outer periphery of the second shaft, and a hinge bush rotatably mounted on the first shaft and engaged with the antenna portion. The antenna portion is formed with a hole surrounding the outer periphery of the second shaft. A projection is formed on an inner periphery of the hole. The first protrusion is brought into contact with the projection when the antenna portion is pivoted so as to define a predetermined angle with respect to the base portion.

(21) Appl. No.: **11/617,222**

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

(30) **Foreign Application Priority Data**

Jan. 18, 2006 (JP) ..... P2006-009382  
Jan. 18, 2006 (JP) ..... P2006-009434  
Jan. 18, 2006 (JP) ..... P2006-009362





US 20070164918A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0164918 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **SLOT ANTENNA**

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

(75) **Inventors: Hiroshi Kanno, Osaka (JP); Kazuyuki Sakiyama, Osaka (JP); Ushio Sangawa, Nara (JP)**

(57) **ABSTRACT**

Correspondence Address:  
**McDERMOTT WILL & EMERY LLP**  
600 13th Street, N.W.  
Washington, DC 20005-3096 (US)

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

A slot antenna according to the present invention includes: a ground conductor 12 provided on a rear face side of a dielectric substrate 101, the ground conductor having a finite area; a slot 14 which recesses into the ground conductor 12, beginning from an open-end point on a side edge of the ground conductor 12; and a feed line 261 for supplying a high-frequency signal to the slot 14, the feed line 261 intersecting the slot 14. At a first point near the slot, the feed line 261 branches into a group of branch lines including at least two branch lines, such that at least two branch lines in the group of branch lines are connected to each other at a second point near the slot to form at least one loop line 209. A maximum value of a loop length of each loop line 209 is prescribed to be less than 1×effective wavelength at an upper limit frequency of an operating band of the slot antenna. In the group of branch lines, any branch line that does not constitute a part of the loop line 209 but terminates with a leading open-end point has a branch length which is less than a ¼ effective wavelength at the upper limit frequency of the operating band.

(21) **Appl. No.: 11/723,786**

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

**Related U.S. Application Data**

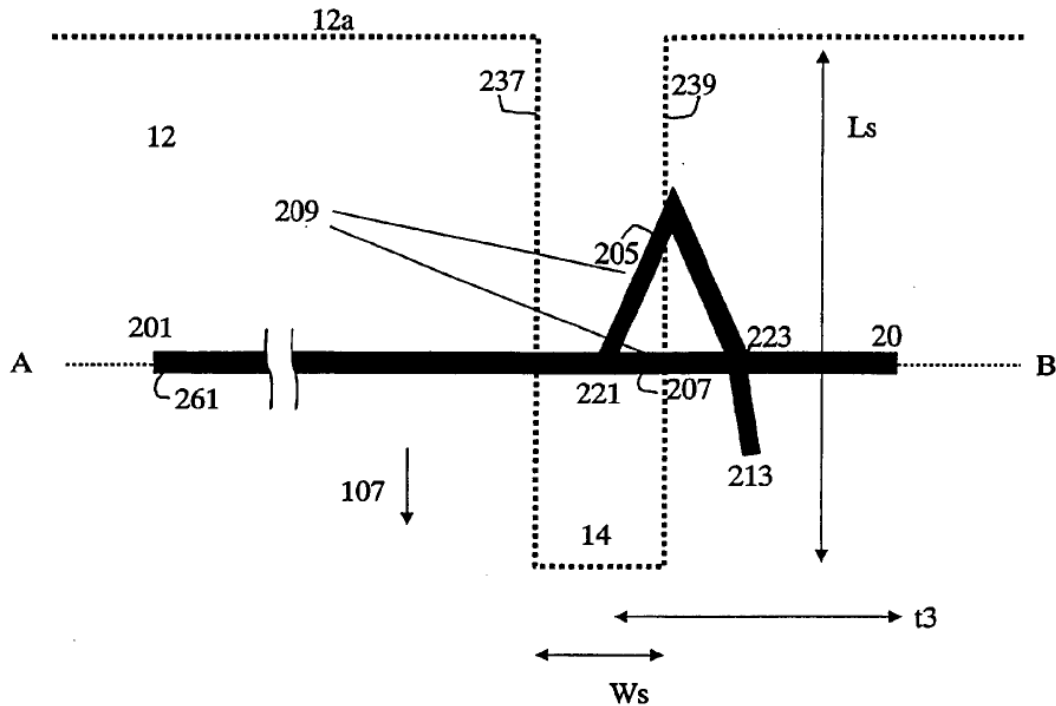
(63) **Continuation-in-part of application No. PCT/JP06/21541, filed on Oct. 27, 2006.**

**Foreign Application Priority Data**

Nov. 10, 2005 (JP) ..... 2005-325674

**Publication Classification**

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





US 20070164919A1

(19) **United States**

(12) **Patent Application Publication**

Lee et al.

(10) **Pub. No.: US 2007/0164919 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **WIDEBAND CHIP ANTENNA**

**Publication Classification**

(75) Inventors: **Jae Chan Lee**, Suwon (KR);  
**Hyun Hak Kim**, Osan (KR)

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

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

Correspondence Address:  
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**ALEXANDRIA, VA 22314**

(57) **ABSTRACT**

Provided a wideband chip antenna in which the outer surface of a dielectric or magnetic body block is surrounded by a conductor. The wideband chip antenna comprises one or more slots or slits that are formed on the top surface of the wideband chip antenna and of which predetermined portions are opened; one or more slits that are formed on the bottom surface of the wideband chip antenna and of which predetermined portions are opened; and one or more windows that are formed on one or more side surfaces of the wideband chip antenna by opening predetermined portions thereof. The wideband chip antenna can simultaneously transmit and receive signals at various bands, and the size thereof can be reduced. Further, the resonance property of the antenna can be easily adjusted, and a wider bandwidth can be secured.

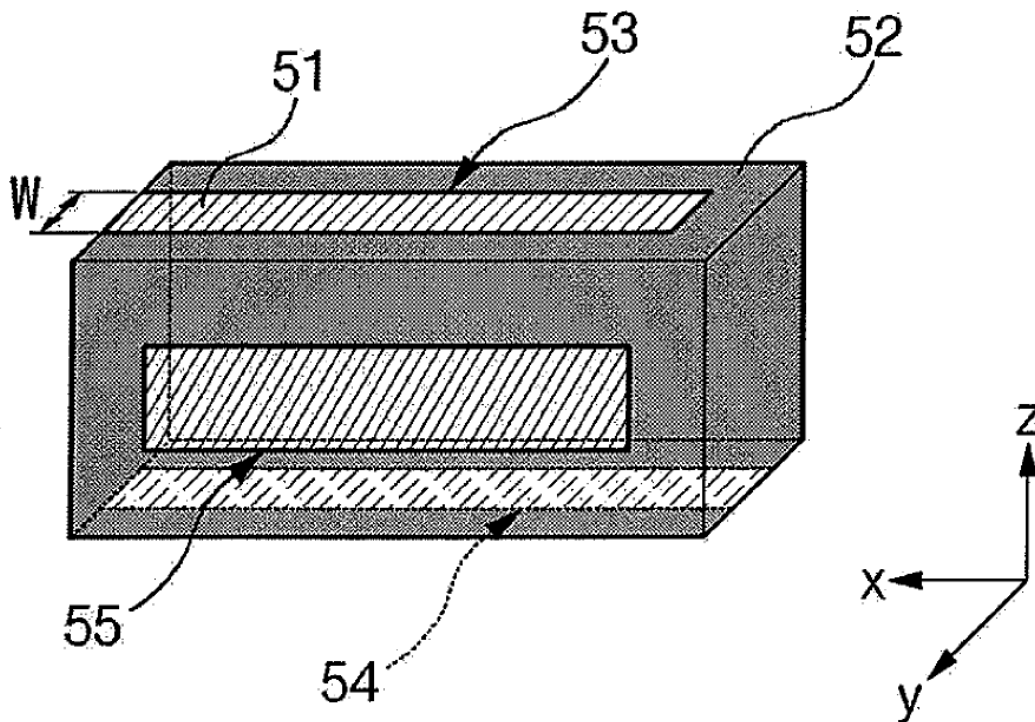
(73) Assignee: **SAMSUNG**  
**ELECTRO-MECHANICS CO.,**  
**LTD.**, GYUNGGI-DO (KR)

(21) Appl. No.: **11/565,488**

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

(30) **Foreign Application Priority Data**

Jan. 16, 2006 (KR) ..... 10-2006-0004600





US 20070164920A1

(19) **United States**

(12) **Patent Application Publication**

**Chen**

(10) **Pub. No.: US 2007/0164920 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **PRINTED ANTENNA AND A WIRELESS NETWORK DEVICE HAVING THE ANTENNA**

**Publication Classification**

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

(75) Inventor: **Yu Ren Chen**, Luodong Township (TW)

(57) **ABSTRACT**

Correspondence Address:  
**TROXELL LAW OFFICE PLLC**  
**SUITE 1404**  
**5205 LEESBURG PIKE**  
**FALLS CHURCH, VA 22041 (US)**

A printed antenna suitable for wireless networking device comprising a base plate, a grounding member, a first antenna, a second antenna and a third antenna is disclosed. The base plate is made of dielectric material where on a surface of which a first direction and a second direction perpendicular to each other are defined. The grounding member is electrically grounded and covers at least a partial area of the base plate surface. The first antenna is a dipole antenna extending from the grounding member generally towards the first direction. The second antenna is a monopole antenna extending from the grounding member generally towards the second direction. The third antenna is a monopole antenna extending from the grounding member generally towards the second direction. The second antenna and the third antenna are substantially disposed on the two opposing sides of first antenna.

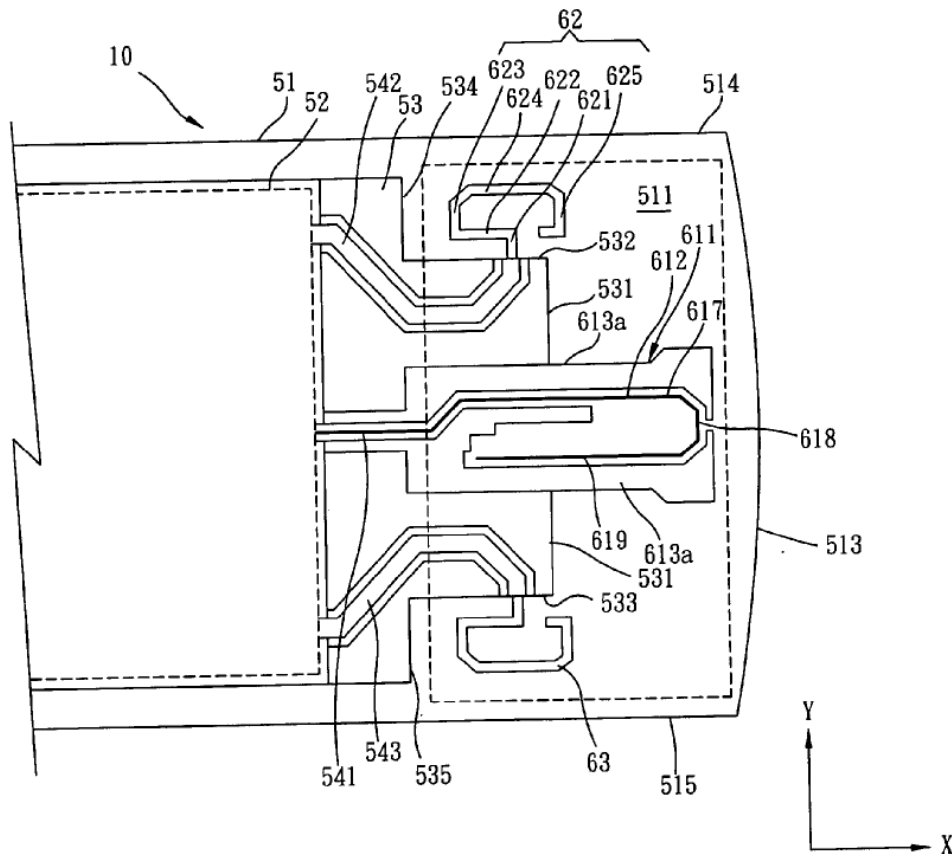
(73) Assignee: **CAMEO COMMUNICATIONS, INC.**

(21) Appl. No.: **11/415,248**

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

(30) **Foreign Application Priority Data**

Jan. 13, 2006 (TW)..... 095200898





US 20070164921A1

(19) **United States**

(12) **Patent Application Publication**

**Hu et al.**

(10) **Pub. No.: US 2007/0164921 A1**

(43) **Pub. Date: Jul. 19, 2007**

(54) **BROADBAND ANTENNA APPARATUS**

(30) **Foreign Application Priority Data**

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

Nov. 1, 2005 (TW)..... 94138314

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/36** (2006.01)  
(52) **U.S. Cl.** ..... **343/895**

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

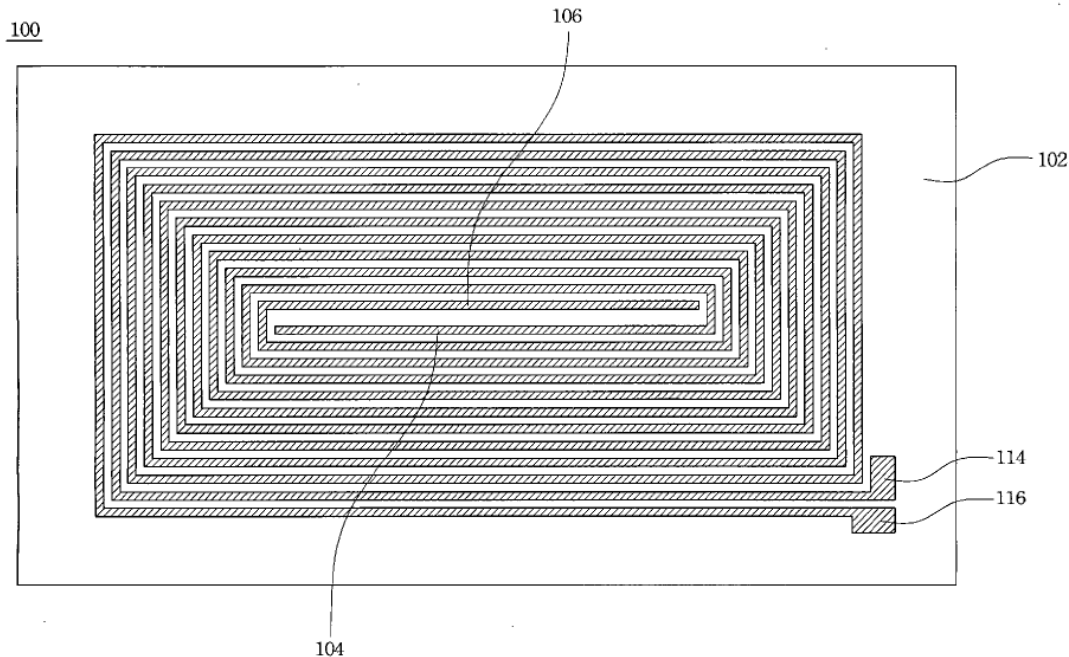
(57) **ABSTRACT**

This disclosure relates to a broadband antenna apparatus having single or multiple winding strips. The broadband antenna apparatus has a dielectric material layer, and the single or multiple winding strips surround one another over the dielectric material layer. An antenna feed is located on the single or multiple winding strips, and ground terminals can be added.

(73) Assignee: **Chant Sincere Co., Ltd.**

(21) Appl. No.: **11/588,251**

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





US 20070169336A1

(19) **United States**

(12) **Patent Application Publication**

**Luch**

(10) **Pub. No.: US 2007/0169336 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **ELECTRICALLY CONDUCTIVE PATTERNS, ANTENNAS AND METHODS OF MANUFACTURE**

(76) Inventor: **Daniel Luch**, Morgan Hill, CA (US)

Correspondence Address:

**Daniel Luch**  
**Ertek, Inc.**  
**5985 Obata Way, Unit A**  
**Gilroy, CA 95020 (US)**

(21) Appl. No.: **11/726,795**

(22) Filed: **Mar. 23, 2007**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 10/472,875, filed on Sep. 23, 2003, now abandoned, filed as 371 of international application No. PCT/US02/09408, filed on Mar. 25, 2002.  
Continuation-in-part of application No. 11/223,482, filed on Sep. 8, 2005, which is a continuation-in-part

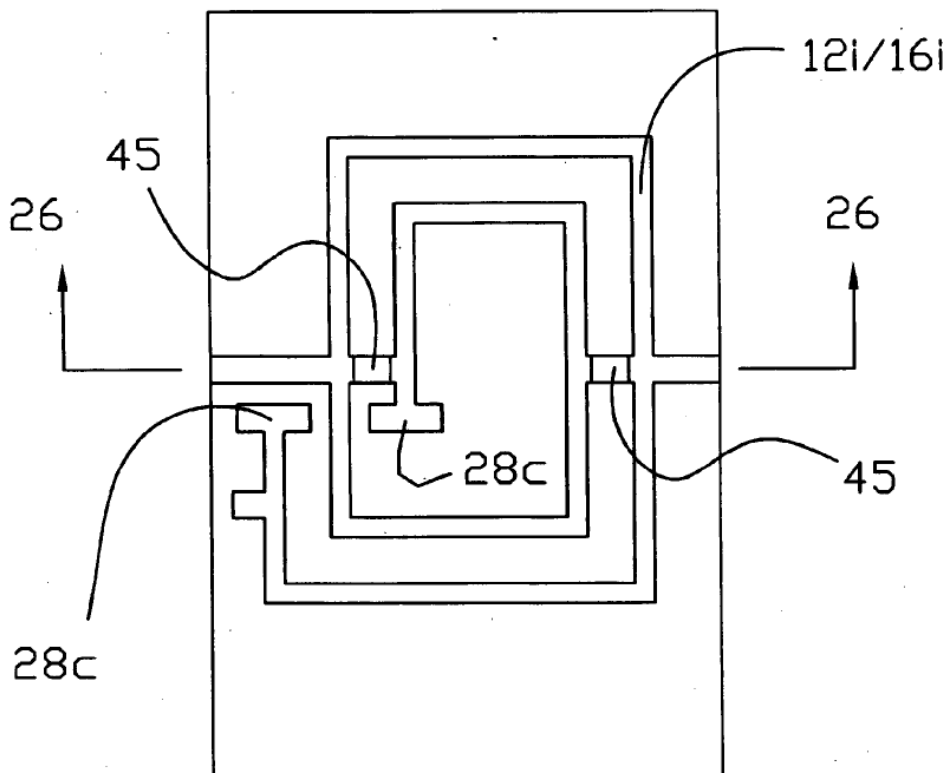
of application No. 10/988,044, filed on Nov. 12, 2004, which is a continuation-in-part of application No. 10/408,532, filed on Apr. 7, 2003, now abandoned, which is a continuation-in-part of application No. 09/818,128, filed on Mar. 26, 2001, now Pat. No. 6,582,887.

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 17/00** (2006.01)  
(52) **U.S. Cl.** ..... **29/601; 29/600; 29/846**

(57) **ABSTRACT**

The invention is to novel electrical connections between an electrical device such as a chip and an antenna. The connections are achieved by electrodeposition of metals to achieve electrical communication between the leads of the device and the antenna. The antenna can be formed by electrodeposition simultaneously with creation of the electrical connection. The connection technology is very suitable for continuous production of components for wireless applications such as RFID labels and tags.





US 20070171074A1

(19) **United States**

(12) **Patent Application Publication**

**Camp et al.**

(10) **Pub. No.: US 2007/0171074 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **ANTENNA FOR A BACKSCATTER-BASED  
RFID TRANSPONDER**

**Publication Classification**

(75) Inventors: **Michael Camp**, Celle (DE);  
**Martin Fischer**, Pfedelbach (DE)

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

(52) **U.S. Cl.** ..... **340/572.7**

Correspondence Address:  
**MCGRATH, GEISSLER, OLDS & RICHARD-  
SON, PLLC**  
**P.O. BOX 1364**  
**FAIRFAX, VA 22038-1364**

(57) **ABSTRACT**

An antenna is provided for a backscatter-based RFID transponder with an integrated receiving circuit, having a capacitive input impedance, for receiving a radio signal lying spectrally within an operating frequency range, whereby the antenna has two antenna arms, which extend outwardly in a spiral from a central area, in which the antenna arms can be connected to the integrated receiving circuit. According to the invention, each antenna arm has an arm length along the arm, which is selected so that one of the series resonance frequencies of the antenna is below the operating frequency range and the next higher parallel resonance frequency of the antenna is above the operating frequency range. The invention relates furthermore to a backscatter-based RFID transponder with an antenna of this type.

(73) Assignee: **ATMEL Germany GmbH**

(21) Appl. No.: **11/698,148**

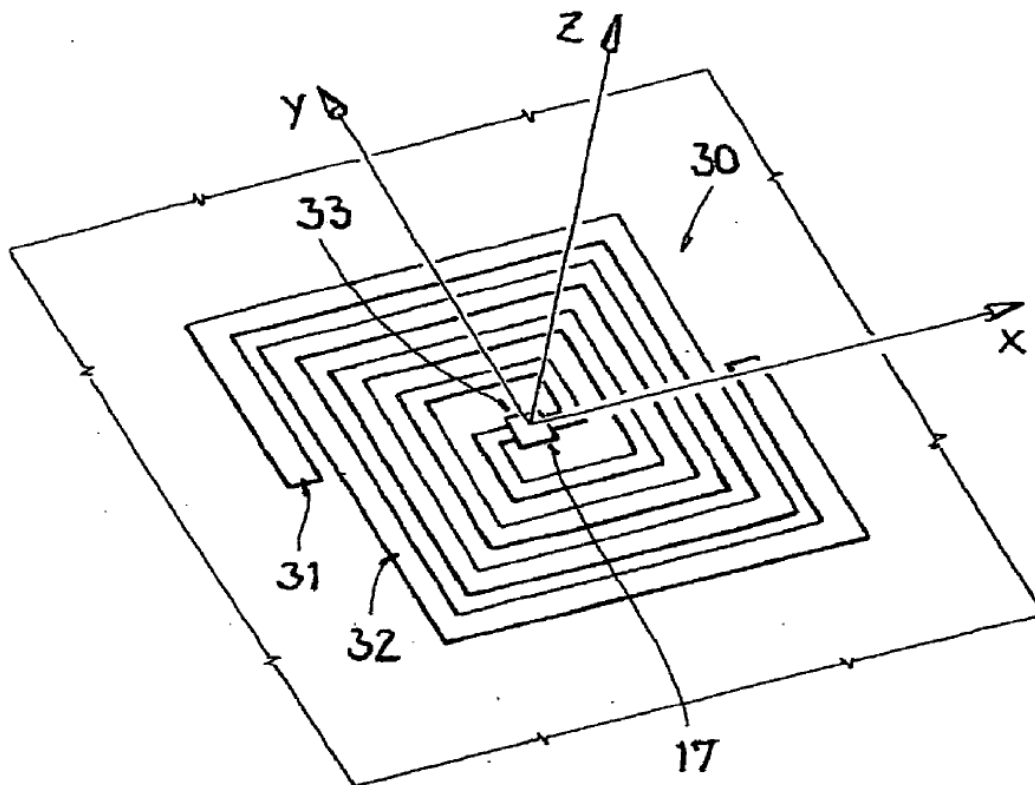
(22) Filed: **Jan. 26, 2007**

**Related U.S. Application Data**

(60) Provisional application No. 60/839,421, filed on Aug. 23, 2006.

(30) **Foreign Application Priority Data**

Jan. 26, 2006 (DE) ... DE 102006003717.0





US 20070171079A1

(19) **United States**

(12) **Patent Application Publication**

**Saito et al.**

(10) **Pub. No.: US 2007/0171079 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **DEVICE WITH COIL ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **Yoshitaka Saito**, Sendai-shi (JP);  
**Shigeyoshi Yoshida**, Sendai-shi (JP)

Jan. 16, 2006 (JP) ..... 2006-007552

**Publication Classification**

Correspondence Address:  
**FRISHAUF, HOLTZ, GOODMAN & CHICK, PC**  
220 Fifth Avenue, 16TH Floor  
NEW YORK, NY 10001-7708

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

(52) **U.S. Cl.** ..... 340/572.8; 340/572.7

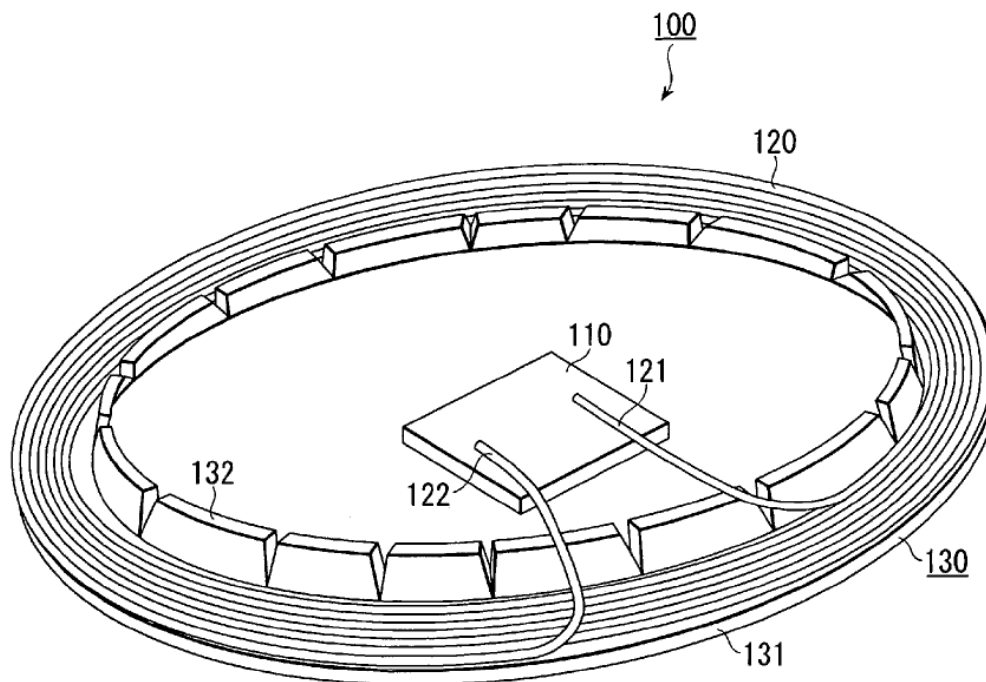
(57) **ABSTRACT**

A device with a coil antenna is disclosed. The coil antenna defines an aperture. The device further comprises a magnetic flux guide adapted to guide magnetic fluxes so that the guided magnetic fluxes pass through the aperture of the coil antenna. For example, the magnetic flux guide is made of a sheet-shaped magnetic material such as a complex magnetic sheet, which comprises soft magnetic powder particles and a binder agent binding them.

(73) Assignee: **NEC TOKIN Corporation**,  
Sendai-shi (JP)

(21) Appl. No.: **11/653,885**

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







US 20070171127A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0171127 A1**

**Mizugaki et al.** (43) **Pub. Date: Jul. 26, 2007**

(54) **TRIPLATE-TYPE PLANAR ARRAY ANTENNA**

(30) **Foreign Application Priority Data**

Mar. 2, 2004 (JP) ..... 2004-057872

(76) Inventors: **Hisayoshi Mizugaki**, Chikusei-shi (JP);  
**Masahiko Oota**, Oyama-shi (JP)

**Publication Classification**

Correspondence Address:  
**ANTONELLI, TERRY, STOUT & KRAUS,  
LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
ARLINGTON, VA 22209-3873 (US)**

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

(57) **ABSTRACT**

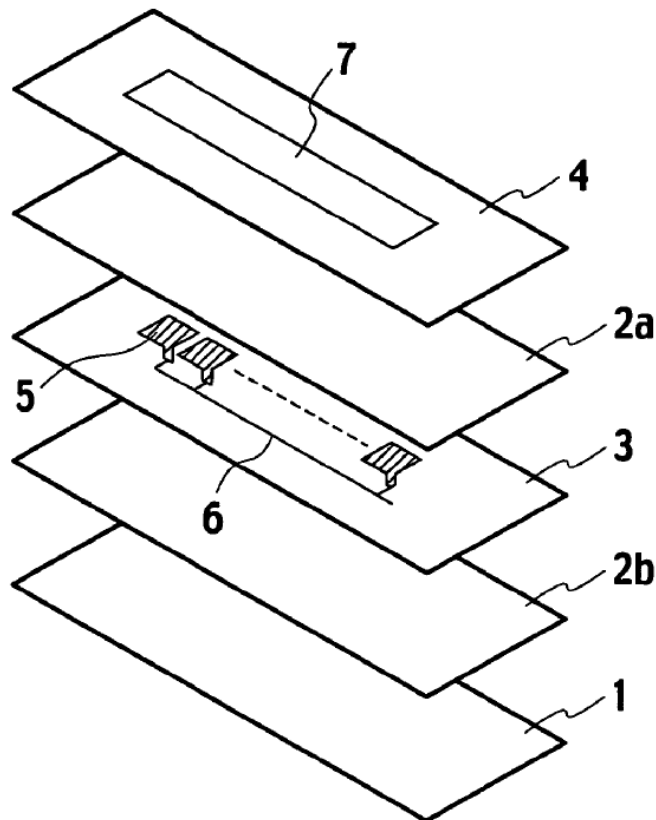
A triplate-type planar array antenna is provided with an antenna circuit board (3) on which an antenna circuit including a plurality of radiating elements (5), which are vertically and horizontally arrayed in a two-dimensional manner, and feedlines (6) is formed; two pieces of dielectric substances (2a, 2b) between which the antenna circuit board (3) is sandwiched at the both sides; a ground conductor (1) laminated on one dielectric substance (2b); and a slot board (4) laminated on the other dielectric substance (2a). One or more slot openings (7) corresponding to the plurality of radiating elements (5) with a linear arrangement are formed on the slot board (4).

(21) Appl. No.: **10/587,906**

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

(86) PCT No.: **PCT/JP05/03265**

§ 371(c)(1),  
(2), (4) Date: **Jul. 31, 2006**





US 20070171128A1

(19) **United States**

(12) **Patent Application Publication**  
**Chen**

(10) **Pub. No.: US 2007/0171128 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **PLANAR ANTENNA WITH SHORT-TRACE**

**Publication Classification**

(75) Inventor: **I-Fong Chen**, Tao-Yuan City (TW)

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

Correspondence Address:  
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**SUITE 1404**  
**5205 LEESBURG PIKE**  
**FALLS CHURCH, VA 22041 (US)**

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

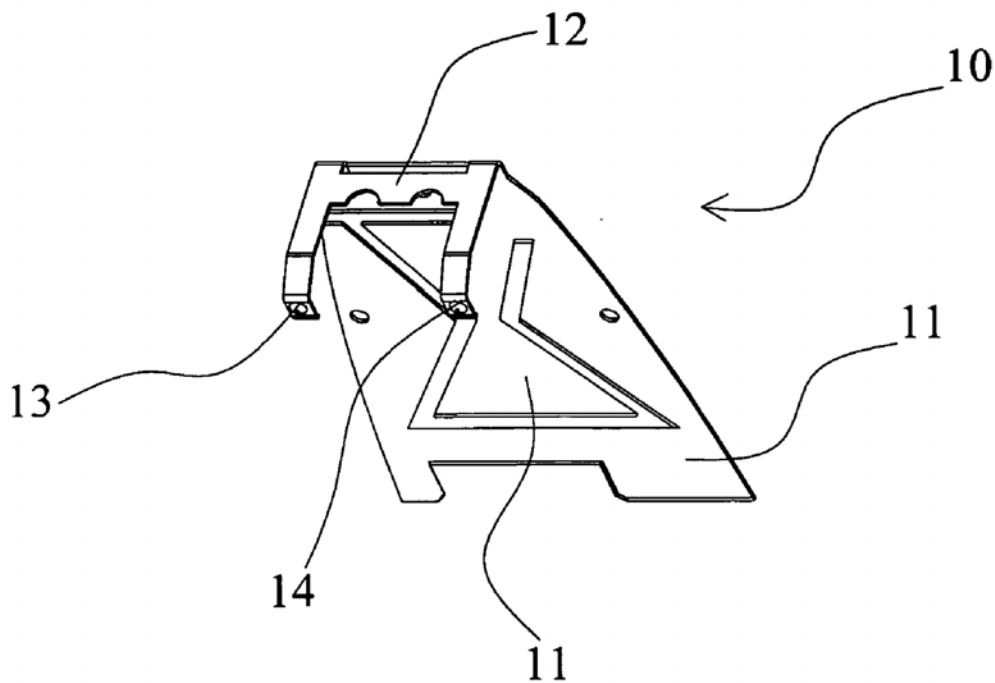
(57) **ABSTRACT**

A planar antenna with a short-trace applied to multi-band mobile handset electronic devices, the structure includes two main resonant elements that are bent around each other and the short-trace, the short-trace is connected between a feed-point and a ground-point; by influence of a loop surface current induced by the short-trace, the antenna gets a broad-band effect at multi-frequencies.

(73) Assignee: **Auden Techno Corp.**

(21) Appl. No.: **11/335,554**

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





US 20070171130A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0171130 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **MULTI-BAND ANTENNA WITH BROADBAND FUNCTION**

(30) **Foreign Application Priority Data**

Jan. 20, 2006 (TW) ..... 095102140

(75) Inventors: **Ming-Hsun Chung**, Hsin-Tien City (TW); **Tsung-Wen Chiu**, Hsin-Tien City (TW); **Ching-Feng Tseng**, Hsin-Tien City (TW); **Yun-Fan Bai**, Hsin-Tien City (TW); **An-Chia Chen**, Hsin-Tien City (TW); **Fu-Ren Hsiao**, Hsin-Tien City (TW)

**Publication Classification**

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

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

(57) **ABSTRACT**

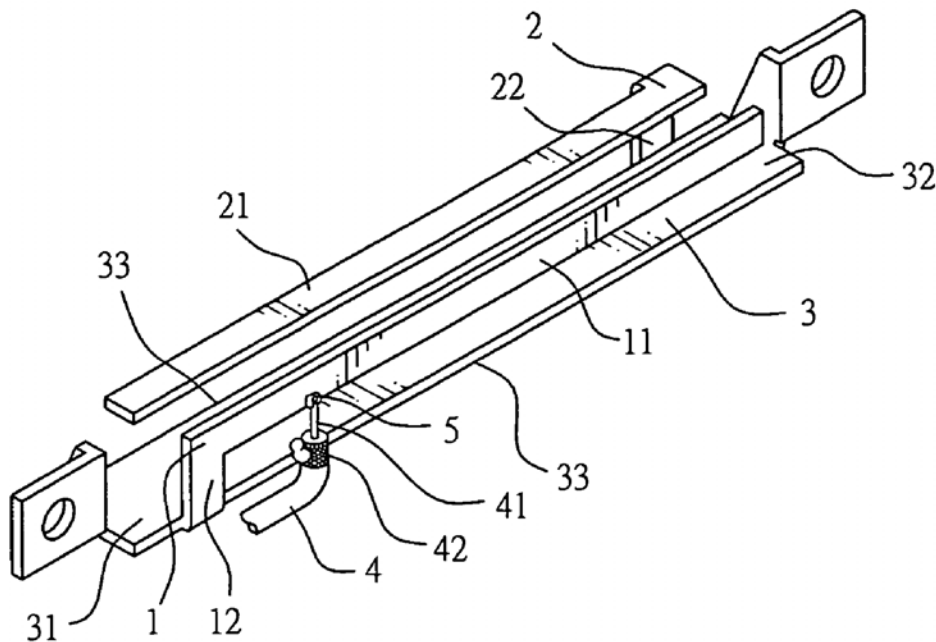
A multi-band antenna with the broadband function is based upon a planar inverted-F antenna with two conductive arms and a ground. The two conductive arms extend from the ground near the two opposite ends of the ground. Two radiation plates of the two conductive arms extend toward each other. The multi-band antenna has a sufficient large band at high frequencies. Since the conductive arms are disposed close to the two ends of the ground, operations of bending the two conductive arms or soldering a feed wires are simpler and have a higher yield.

Correspondence Address:  
**Thomas E. Sisson**  
**Jackson Walker, LLP**  
**Suite 2400, 112 E. Pecan**  
**San Antonio, TX 78205**

(73) Assignee: **Advance Connectek Inc.**

(21) Appl. No.: **11/604,617**

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





US 20070171131A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0171131 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **ANTENNA, COMPONENT AND METHODS**

**Publication Classification**

(76) Inventors: **Juha Sorvala**, Oulu (FI); **Petteri Annamaa**, Oulunsalo (FI); **Kimmo Koskiniemi**, Oulu (FI)

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

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

Correspondence Address:  
**GAZDZINSKI & ASSOCIATES**  
**Suite 375**  
**11440 West Bernardo Court**  
**San Diego, CA 92127 (US)**

(57) **ABSTRACT**

An antenna component (and antenna) with a dielectric substrate and a plurality of radiating antenna elements on the surface of the substrate. In one embodiment, the plurality comprises two (2) elements, each of them covering one of the opposite heads and part of the upper surface of the device. The upper surface between the elements comprises a slot. The lower edge of one of the antenna elements is galvanically coupled to the antenna feed conductor on a circuit board, and at another point to the ground plane, while the lower edge of the opposite antenna element, or the parasitic element, is galvanically coupled only to the ground plane. The parasitic element obtains its feed through the electromagnetic coupling over the slot, and both elements resonate at the operating frequency. Omni-directionality is also achieved. Losses associated with the substrate are low due to the simple field image in the substrate.

(21) Appl. No.: **11/648,429**

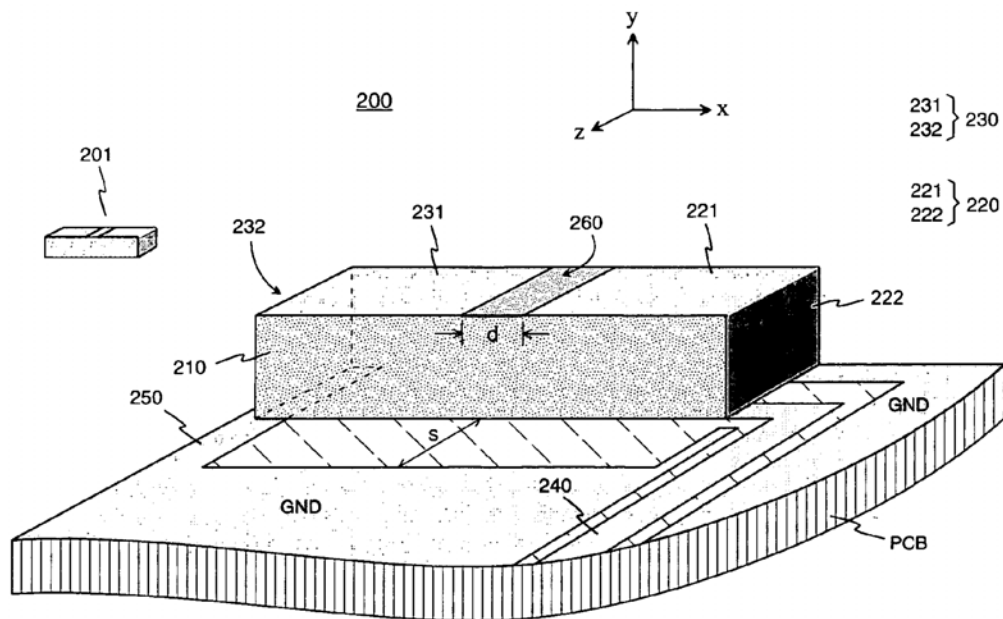
(22) Filed: **Dec. 28, 2006**

**Related U.S. Application Data**

(63) Continuation of application No. PCT/FI05/50247, filed on Jun. 28, 2005.

(30) **Foreign Application Priority Data**

Jun. 28, 2004 (FI)..... 20040892  
Aug. 18, 2004 (FI)..... 20041088  
Mar. 16, 2005 (FI)..... PCT/FI05/50089





US 20070171132A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0171132 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **PLANAR ANTENNA**

**Publication Classification**

(75) Inventors: **Naoaki Utagawa**, Gunma (JP);  
**Katsumi Chigira**, Gunma (JP);  
**Takeshi Sampo**, Gunma (JP);  
**Takashi Nozaki**, Gunma (JP)

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

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

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

(57) **ABSTRACT**

In a planar antenna, a plate member is adapted to be electrically grounded. A radiating electrode is opposing the plate member with a gap and extending parallel to the plate member. A feeding pin is disposed at a center part of the radiating electrode, and adapted to feed power to the radiating electrode. At least one pair of short pins is electrically connecting the plate member and an outer edge of the radiating electrode at symmetrical positions relative to the feeding pin. The radiating electrode is formed with blank portions which are located at such positions that are on hypothetical straight lines connecting the feeding pin and the short pins.

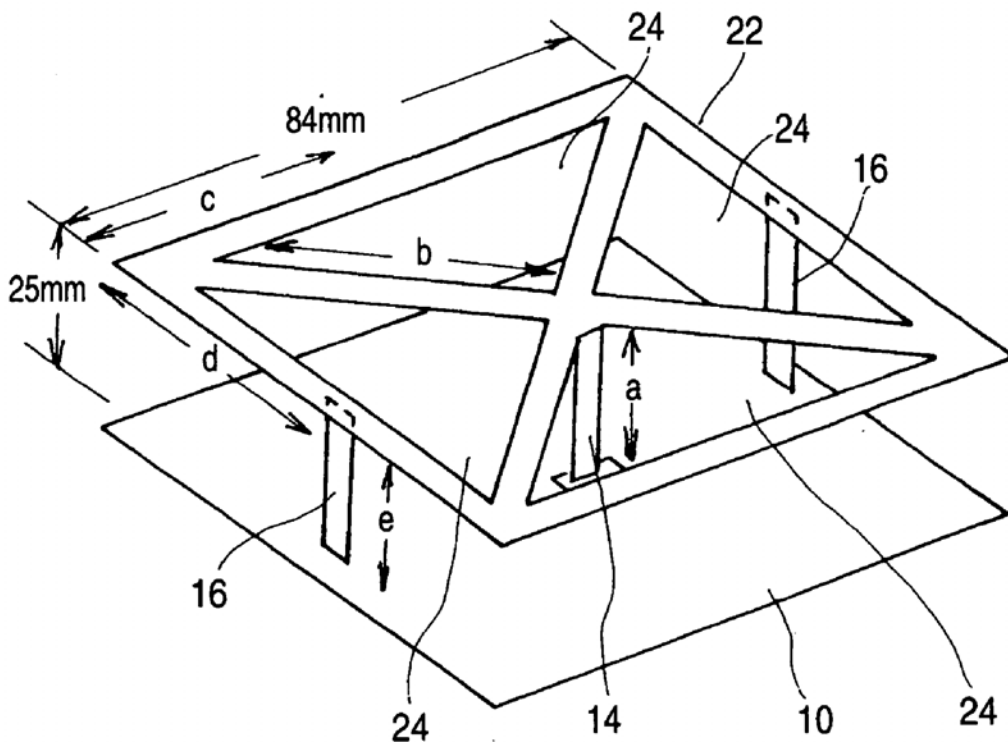
(73) Assignee: **Yokowo Co., Ltd.**

(21) Appl. No.: **11/655,891**

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

(30) **Foreign Application Priority Data**

Jan. 23, 2006 (JP) ..... 2006-013684  
Jan. 19, 2007 (JP) ..... 2007-010047





US 20070171133A1

(19) **United States**

(12) **Patent Application Publication**  
**Cohen**

(10) **Pub. No.: US 2007/0171133 A1**

(43) **Pub. Date: Jul. 26, 2007**

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

(60) Provisional application No. 60/458,333, filed on Mar. 29, 2003.

(76) Inventor: **Nathan Cohen**, Belmont, MA (US)

**Publication Classification**

Correspondence Address:

**MCDERMOTT WILL & EMERY LLP**  
**28 STATE STREET**  
**BOSTON, MA 02109-1775 (US)**

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

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

(21) Appl. No.: **11/716,909**

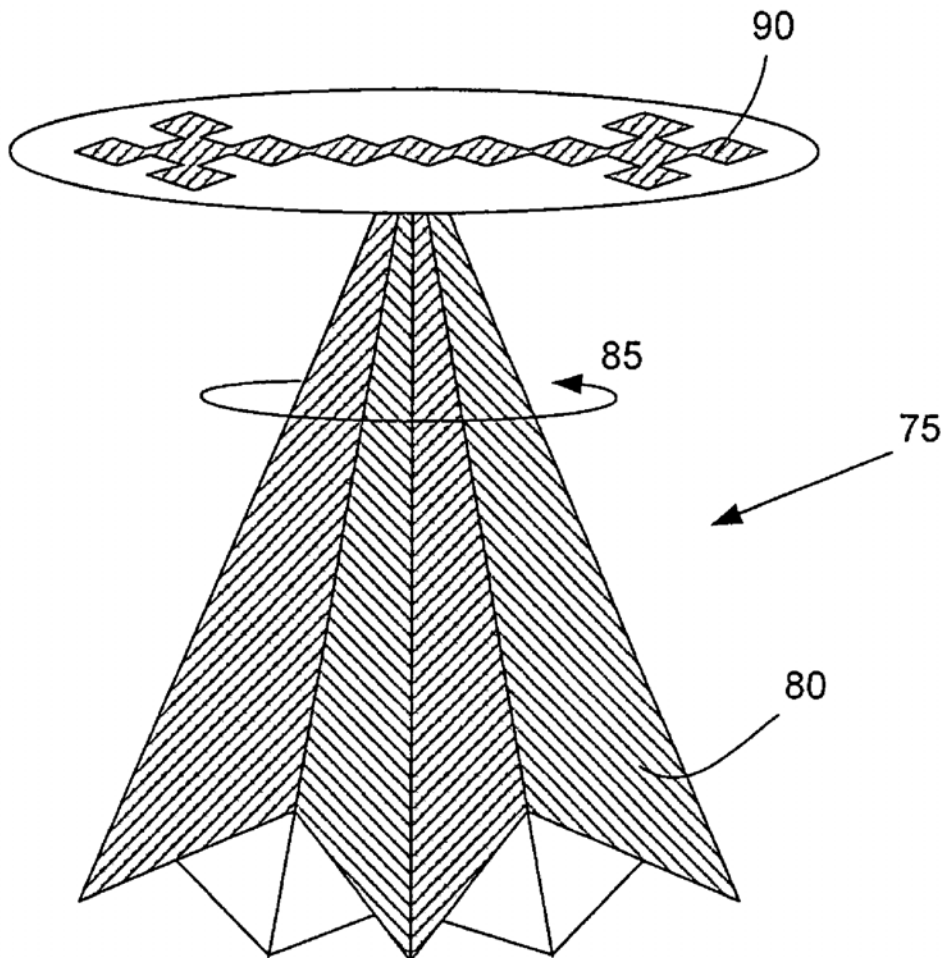
(22) Filed: **Mar. 12, 2007**

(57) **ABSTRACT**

**Related U.S. Application Data**

(63) Continuation of application No. 10/812,276, filed on Mar. 29, 2004, now Pat. No. 7,190,318.

An apparatus includes a disccone antenna including a cone-shaped element whose physical shape is at least partially defined by at least one pleat.





US 20070171135A1

(19) **United States**  
 (12) **Patent Application Publication** (10) **Pub. No.: US 2007/0171135 A1**  
 Mellage et al. (43) **Pub. Date: Jul. 26, 2007**

(54) **CUSTOMIZABLE ANTENNA STRUCTURE**

**Publication Classification**

(75) Inventors: **Brian Francis Mellage**, Raleigh, NC (US); **Curtis Wayne Thornton**, Raleigh, NC (US); **Gerard James Hayes**, Wake Forest, NC (US)

(51) **Int. Cl.**  
*H01Q 1/24* (2006.01)  
 (52) **U.S. Cl.** ..... **343/702; 343/795**

Correspondence Address:  
**MOORE AND VAN ALLEN PLLC FOR SEMC**  
**P.O. BOX 13706**  
**430 DAVIS DRIVE, SUITE 500**  
**RESEARCH TRIANGLE PARK, NC 27709**  
**(US)**

(57) **ABSTRACT**

An antenna structure is comprised of a body, an antenna element coupled with the body, and an arm support coupled with the body and the antenna element. The arm support also includes a recessed portion on one side adapted to receive a two-sided customizable plate. The customizable plate is made of a non-metallic material. The customizable plate is further adapted to fit within the recess and can be adhered to the recessed portion of the arm support. The customizable plate can also be graphically customized to display a viewable image. In addition, the customizable plate can be imprinted with a metallized pattern on the side that faces the recessed portion when seated in the arm support. The imprinted metallized pattern can beneficially affect the performance characteristics of the antenna element.

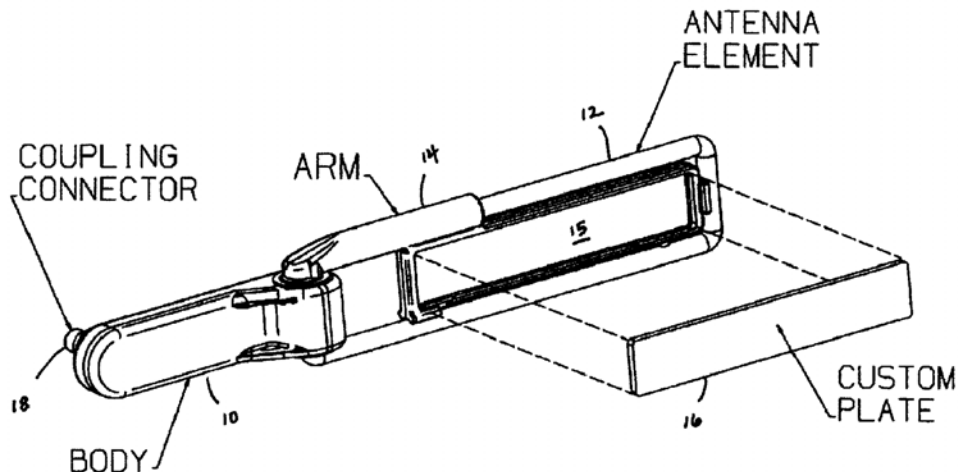
(73) Assignee: **SONY ERICSSON MOBILE COMMUNICATIONS AB**, Lund (SE)

(21) Appl. No.: **11/307,833**

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

**Related U.S. Application Data**

(60) Provisional application No. 60/766,456, filed on Jan. 20, 2006.





US 20070171140A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0171140 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **RADIATING SLIT ANTENNA SYSTEM**

(30) **Foreign Application Priority Data**

(76) Inventors: **Philippe Minard**, Saint Medard Sur Ille (FR); **Ali Louzir**, Rennes (FR); **Bernard Denis**, Saint Senoux (FR)

Apr. 15, 2003 (FR)..... 0304682

**Publication Classification**

Correspondence Address:  
**JOSEPH J. LAKS, VICE PRESIDENT**  
**THOMSON LICENSING LLC**  
**PATENT OPERATIONS**  
**PO BOX 5312**  
**PRINCETON, NJ 08543-5312 (US)**

(51) **Int. Cl.**

**H01Q 13/10** (2006.01)

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

..... **343/770; 343/729**

(57)

**ABSTRACT**

(21) Appl. No.: **10/552,834**

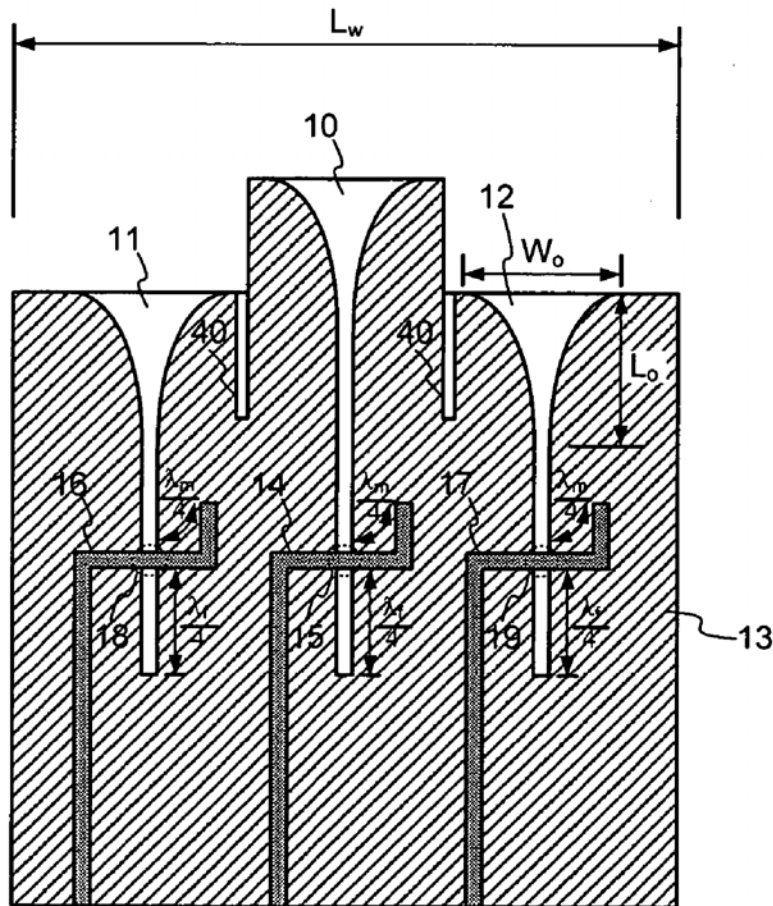
(22) PCT Filed: **Apr. 1, 2004**

(86) PCT No.: **PCT/EP04/03468**

§ 371(c)(1),

(2), (4) Date: **Sep. 18, 2006**

The invention relates to an antenna system comprising a first type of antenna and second and third antennas of a second type. The first to third antennas are slots which are excited by longitudinal radiation and are placed on the same edge of the same substrate. The first antenna is placed between the second and third antennas. This system is particularly suitable for integration in a PCMCIA card.







US 20070173123A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0173123 A1**

(43) **Pub. Date: Jul. 26, 2007**

(54) **COMBINATION ANTENNA AND SIM CARD SUPPORT STRUCTURE**

**Publication Classification**

(75) Inventors: **Curtis W. Thornton**, Raleigh, NC (US); **Brian Francis Melage**, Raleigh, NC (US)

(51) **Int. Cl.**  
**H01R 24/00** (2006.01)

(52) **U.S. Cl.** ..... **439/630**

**Correspondence Address:**

**MOORE AND VAN ALLEN PLLC FOR SEMC**  
**P.O. BOX 13706, 430 DAVIS DRIVE, SUITE 500**  
**RESEARCH TRIANGLE PARK, NC 27709**

(57) **ABSTRACT**

An express card adapted to receive and utilize a SIM card that can be electrically coupled with a computer is disclosed. The express card includes an extended portion with a printed circuit board (PCB) and a SIM card connector for coupling a SIM card with the PCB. An external antenna jack is electrically coupled with the PCB extended portion. An antenna/SIM card support structure is mounted on the PCB extended portion covering the SIM card connector. The antenna/SIM card support structure forms a slot adapted to receive and seat a SIM card and form an electrical connection between the SIM card and the SIM card connector. A metallic flex antenna can be affixed to the antenna/SIM card support structure such that the antenna characteristics of an external antenna can be affected based on the metallization pattern and placement of the metallic flex antenna.

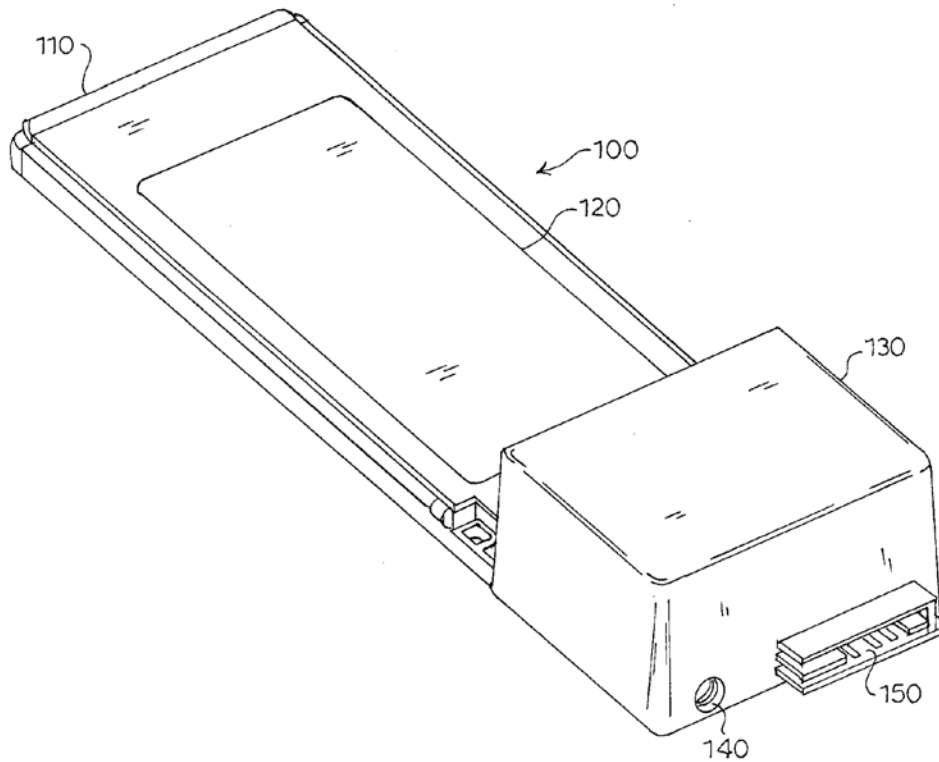
(73) Assignee: **SONY ERICSSON MOBILE COMMUNICATIONS AB**, Lund (SE)

(21) Appl. No.: **11/465,829**

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

**Related U.S. Application Data**

(60) Provisional application No. 60/761,290, filed on Jan. 23, 2006.





US 20070176827A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176827 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **COMPOSITE RIGHT/LEFT-HANDED  
TRANSMISSION LINE BASED COMPACT  
RESONANT ANTENNA FOR RF MODULE  
INTEGRATION**

**Publication Classification**

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

(75) Inventors: **Tatsuo Itoh**, Rolling Hills, CA (US);  
**Cheng-Jung Lee**, Los Angeles, CA  
(US); **Kevin M. Leong**, Los Angeles,  
CA (US)

(57) **ABSTRACT**

Correspondence Address:

**JOHN P. O'BANION**  
**O'BANION & RITCHEY LLP**  
**400 CAPITOL MALL SUITE 1550**  
**SACRAMENTO, CA 95814 (US)**

(73) Assignee: **THE REGENTS OF THE UNIVER-**  
**SITY OF CALIFORNIA**, Oakland, CA  
(US)

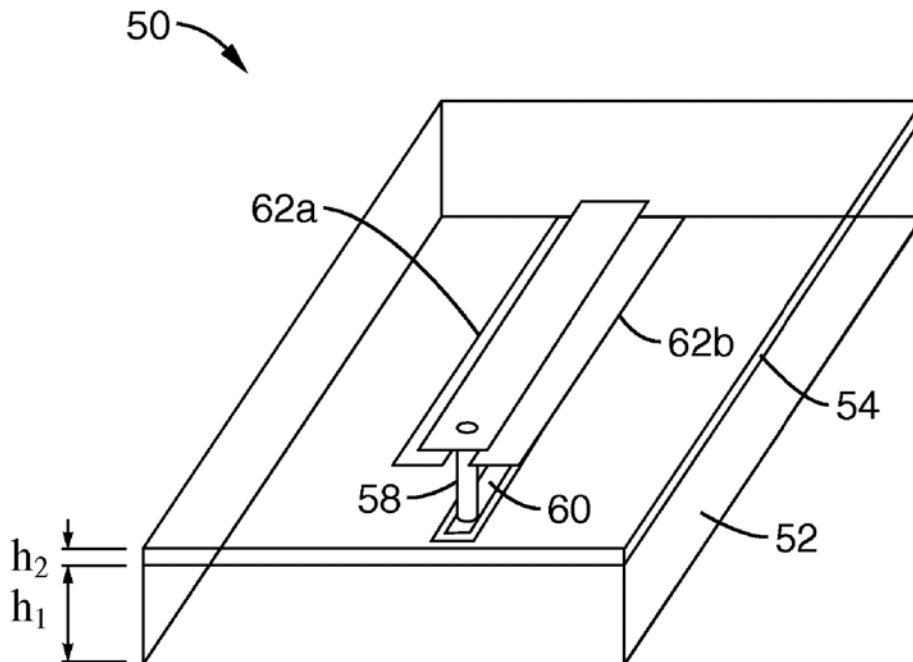
An apparatus based on composite right-handed or left-handed (CRLH) principles to provide a transmission line or antenna structure having a plurality of cells to which one or more feed ports are attached. The apparatus is based on an equivalent circuit Right-Hand (RH) series inductor ( $L_R$ ) and shunt capacitor ( $C_R$ ), and Left-Hand (LH) series capacitor ( $C_L$ ) and inductor ( $L_L$ ), in which effective permittivity ( $\epsilon$ ) and permeability ( $\mu$ ) of the structure are manipulated by the choice of  $C_R$ ,  $L_R$ ,  $C_L$ , and  $L_L$ . One embodiment describes mushroom antenna cells (1D or 2D array) in which vias extend up from a feed network on a ground plane through at least one dielectric region to each of a first plurality of conductive elements (plates or strips). Optionally, a second plurality of conductive elements are disposed between first and second dielectric layers to form metal-insulator-metal (MIM) capacitors to lower resonance frequency.

(21) Appl. No.: **11/614,017**

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

**Related U.S. Application Data**

(60) Provisional application No. 60/752,810, filed on Dec. 21, 2005.





US 20070176828A1

(19) **United States**

(12) **Patent Application Publication**  
**KURODA**

(10) **Pub. No.: US 2007/0176828 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **UNBALANCED ANTENNA**

**Publication Classification**

(75) Inventor: **Shinichi KURODA**, Tokyo (JP)

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

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

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

(57) **ABSTRACT**

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

An unbalanced antenna having a radiation conductor and a ground conductor provided with a predetermined gap therebetween is provided. At least a predetermined part of the ground conductor, the predetermined part being opposed to the radiation conductor, is left so that it keeps functioning as a pole for forming a near electromagnetic-field distribution together with the radiation conductor opposed to the ground conductor. Further, a part of the reduced ground conductor, the part being near an end at a predetermined distance from the feed section, includes a conductor having low conductivity for obtaining impedance matching. Where the ground conductor is significantly reduced, mode mismatch inevitably occurs. Therefore, at least one part of an external conductor of a coaxial feed line connected to the feed section is covered by a current absorber, so as to forcefully reduce a leakage current. Subsequently, the ground conductor can be reduced and the antenna characteristic can be maintained.

(21) Appl. No.: **11/616,230**

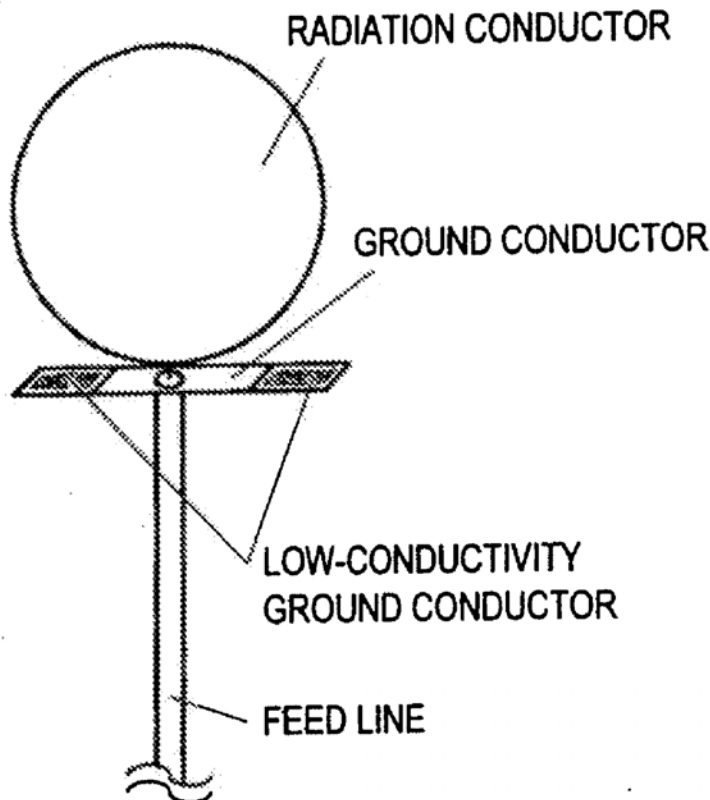
(22) Filed: **Dec. 26, 2006**

**Related U.S. Application Data**

(63) Continuation of application No. 10/498,518, filed on Jan. 24, 2005, now Pat. No. 7,180,466, filed as 371 of international application No. PCT/JP03/13185, filed on Oct. 15, 2003.

(30) **Foreign Application Priority Data**

Oct. 23, 2002 (JP) ..... 2002-307910





US 20070176829A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176829 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **MIMO ANTENNA CONFIGURATION**

**Publication Classification**

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

(51) **Int. Cl.**

**H01Q 1/24** (2006.01)

(52) **U.S. Cl.** ..... **343/702; 343/727; 343/730**

Correspondence Address:

**BIRCH STEWART KOLASCH & BIRCH**

**PO BOX 747**

**FALLS CHURCH, VA 22040-0747 (US)**

(57)

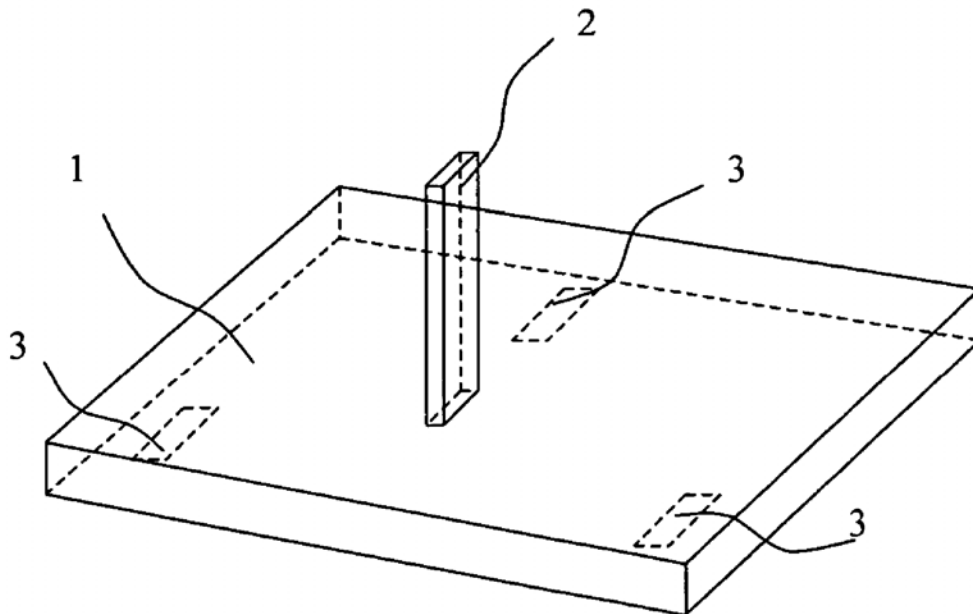
**ABSTRACT**

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

The present invention provides a MIMO antenna structure and design. A single dipole antenna stands at the center of a triangle which is formed by three PIFAs antennas, and the three PIFA antennas has equal squint angle relative to the neighbors, that is there is 120° sector angle between any two PIFA axes of three such that the dipole and the other PIFAs forms a tetrahedron. The MIMO antenna structure of the present invention is simpler in mechanics but high efficiency in performance.

(21) Appl. No.: **11/342,708**

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



**Convex Cubical antenna Structure**  
**( $0^\circ \leq \phi \leq 360^\circ$ ,  $0^\circ \leq \theta \leq 90^\circ$  symmetrically)**



US 20070176830A1

(19) **United States**

(12) **Patent Application Publication**  
**Winter**

(10) **Pub. No.: US 2007/0176830 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **INTERNAL ANTENNA FOR HANDHELD  
MOBILE PHONES AND WIRELESS DEVICES**

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

(75) Inventor: **James Blake Winter**, Lincoln, NE  
(US)

(57) **ABSTRACT**

Correspondence Address:  
**HOLLAND & HART, LLP**  
**P.O. BOX 8749**  
**DENVER, CO 80201 (US)**

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

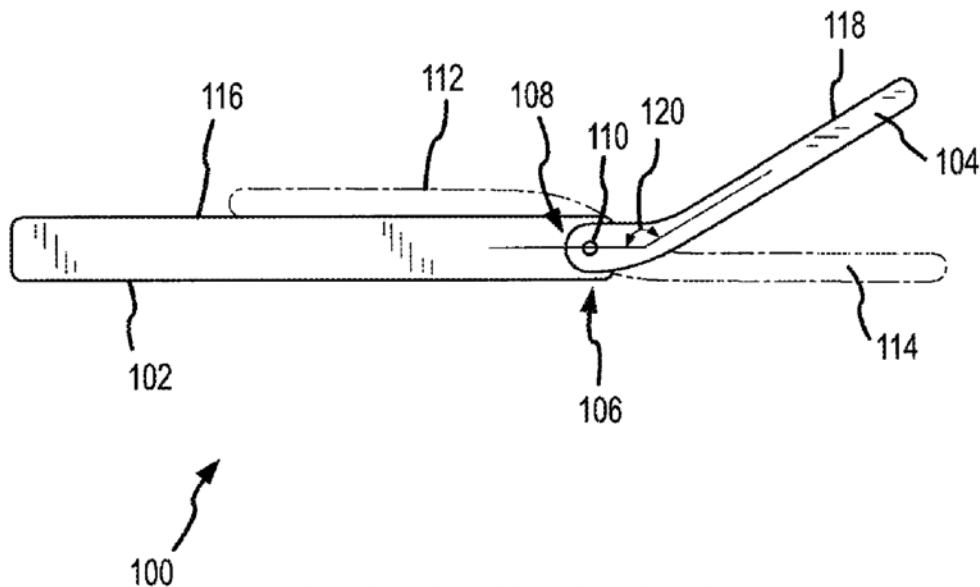
An antenna for a foldable wireless device is provided. The foldable wireless device and antenna include a first housing and a second housing pivotally connected. A printed circuit board associated with the wireless device comprises a first PCB in the first housing and a second PCB in the second housing. The first and second PCB function as first and second radiating plates respectively. A gap, generally aligned with the pivotal connection separates the first and second PCBs. A short is provided that traverses the gap and connects the first and second PCBs. Radio frequency power is connected to the first and second PCB to supply radio frequency power.

(21) Appl. No.: **11/343,167**

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

**Publication Classification**

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





US 20070176832A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176832 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **NANOSTRUCTURED TUNABLE ANTENNAS FOR COMMUNICATION DEVICES**

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

(76) Inventors: **Zhengfang Qian**, Rolling Meadows, IL (US); **Robert B. Lempkowski**, Elk Grove Village, IL (US)

(57) **ABSTRACT**

Correspondence Address:  
**INGRASSIA FISHER & LORENZ, P.C.**  
**7150 E. CAMELBACK, STE. 325**  
**SCOTTSDALE, AZ 85251 (US)**

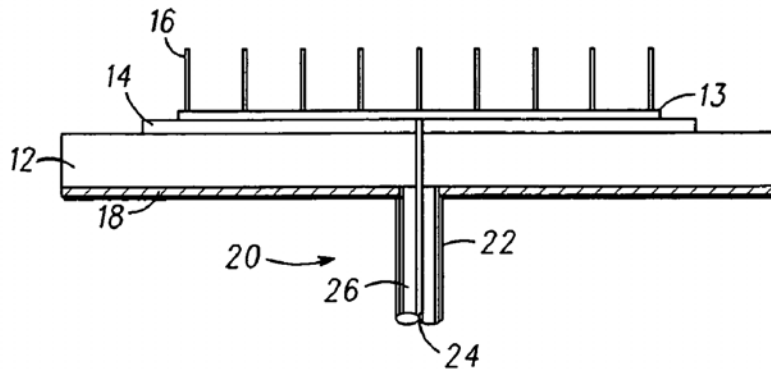
An apparatus (10, 30, 40, 50) is provided that relates to nanotubes as radiation elements for antennas and phased arrays, and more particularly to a macro-sized RF antenna for mobile devices. The antenna comprises a plurality of nanostructures (16), e.g., carbon nanotubes, forming an antenna structure on a substrate (12), and a radio frequency signal apparatus formed within the substrate (12) and coupled to the plurality of nanostructures (16). The radiation element length of a nested multiwall nanotube (161) of an exemplary embodiment may be tuned to a desirable frequency by an electromagnetic force (163).

(21) Appl. No.: **11/344,638**

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

**Publication Classification**

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



10



US 20070176835A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176835 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **MULTIPLE-ELEMENT ANTENNA WITH  
FLOATING ANTENNA ELEMENT**

**Publication Classification**

(76) Inventors: **Yihong Qi**, Waterloo (CA); **Ying Tong  
Man**, Kitchener (CA); **Michael E.  
Certain**, Kitchener (CA); **Perry  
Jarmuszewski**, Waterloo (CA)

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

Correspondence Address:  
**David B. Cochran, Esq.**  
**Jones Day**  
**901 Lakeside Avenue (North Point)**  
**Cleveland, OH 44114 (US)**

(57) **ABSTRACT**

A multiple-element antenna for a wireless communication device is provided. The antenna comprises a first antenna element having a first operating frequency band and a floating antenna element positioned adjacent the first antenna element to electromagnetically couple to the first antenna element. The floating antenna element is configured to operate in conjunction with the first antenna element within a second operating frequency band. A feeding port connected to the first antenna element connects the first antenna element to communications circuitry and exchanges communication signals in both the first operating frequency band and the second operating frequency band between the multiple-element antenna and the communications circuitry. In a wireless mobile communication device having a transceiver and a receiver, the feeding port is connected to both the transceiver and the receiver.

(21) Appl. No.: **11/590,200**

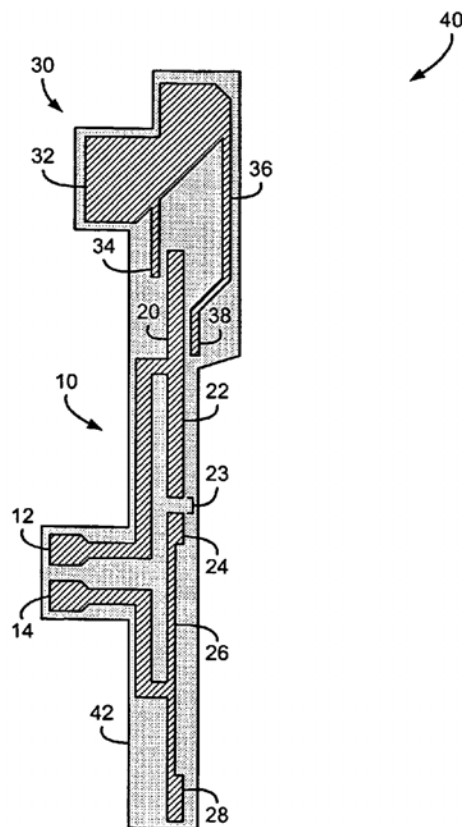
(22) Filed: **Oct. 31, 2006**

**Related U.S. Application Data**

(63) Continuation of application No. 10/864,145, filed on Jun. 9, 2004, now Pat. No. 7,148,846.

(30) **Foreign Application Priority Data**

Jun. 12, 2003 (EP) ..... 03253713.6





US 20070176836A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176836 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **U-ANTENNA**

**Publication Classification**

(76) Inventors: **Oleg Jurievich Abramov**, St. Petersburg (RU); **Farid Ibragimovich Nagaev**, St. Petersburg (RU); **Randy Salo**, San Diego, CA (US)

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

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

Correspondence Address:  
**PROCOPIO, CORY, HARGREAVES & SAV-ITCH LLP**  
**530 B STREET, SUITE 2100**  
**SAN DIEGO, CA 92101**

(57) **ABSTRACT**

Systems and methods for a directional antenna and methods for manufacturing the same are described. One system and method includes a plurality of antenna elements. Groups of the antenna elements cooperate to form a directional antennas. In one configuration, a first element is configured as a driven element and a second element is configured as a delayed element. The elements are separated by a distance such that an RF signal radiated from the driven element constructively combines with a delayed RF signal radiated by the delay element. In another configuration, the second element can be configured as the driven element and the first element configured as the delayed element.

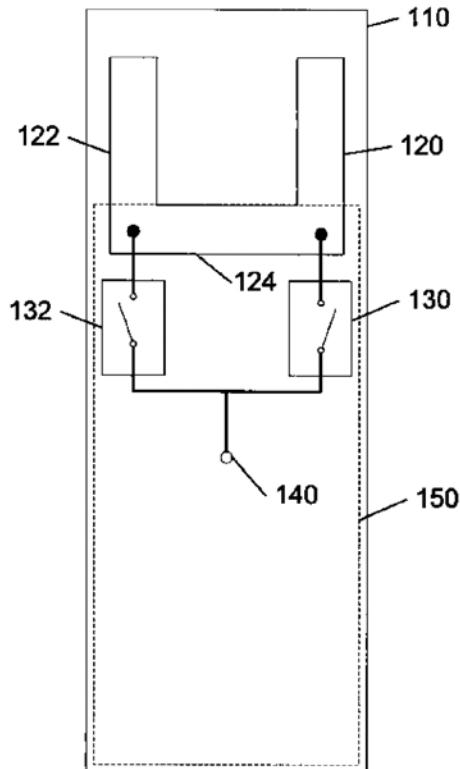
(21) Appl. No.: **11/627,826**

(22) Filed: **Jan. 26, 2007**

**Related U.S. Application Data**

(60) Provisional application No. 60/763,096, filed on Jan. 27, 2006.

↙ 102







US 20070176838A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176838 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **BROADBAND STRUCTURALLY-EMBEDDED CONFORMAL ANTENNA**

(76) Inventors: **Katherine Zink**, Bedford, NH (US);  
**Court Rossman**, Merrimack, NH (US);  
**Zane Lo**, Merrimack, NH (US)

Correspondence Address:  
**BAE SYSTEMS INFORMATION AND ELECTRONIC SYSTEMS INTEGRATION INC.**  
**65 SPIT BROOK ROAD**  
**P.O. BOX 868 NHQ1-719**  
**NASHUA, NH 03061-0868 (US)**

(21) Appl. No.: **10/589,526**  
(22) PCT Filed: **Mar. 3, 2005**  
(86) PCT No.: **PCT/US05/07400**  
§ 371(c)(1),  
(2), (4) Date: **Aug. 15, 2006**

**Related U.S. Application Data**

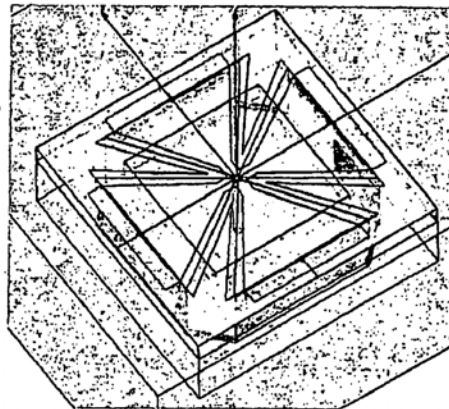
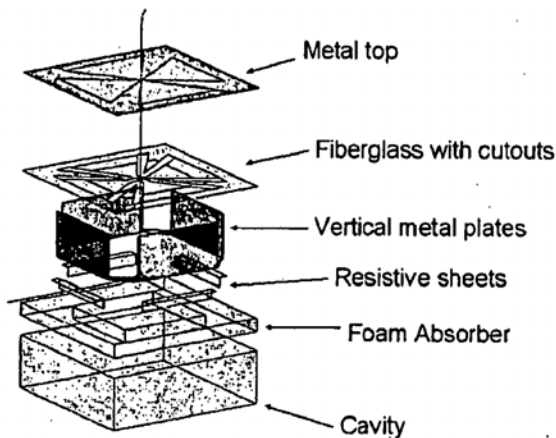
(60) Provisional application No. 60/549,633, filed on Mar. 3, 2004.

**Publication Classification**

(51) **Int. Cl.**  
*H01Q 21/26* (2006.01)  
*H01Q 9/28* (2006.01)  
(52) **U.S. Cl.** ..... **343/797; 343/795**

(57) **ABSTRACT**

An antenna comprising a crossed pair of center-fed end-loaded bent-dipole radiators which are structurally embedded into a properly loaded cavity. Broadband, dual independent polarized, and hemisphere field-of-view coverage with low RCS characteristics is provided with this antenna.





US 20070176839A1

(19) **United States**

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

(10) **Pub. No.: US 2007/0176839 A1**

(43) **Pub. Date: Aug. 2, 2007**

(54) **FOLDING DIPOLE ANTENNA AND TAG USING THE SAME**

(30) **Foreign Application Priority Data**

Jan. 31, 2006 (JP)..... 2006-023646

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

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 9/26** (2006.01)

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

Correspondence Address:  
**KATTEN MUCHIN ROSENMAN LLP**  
**575 MADISON AVENUE**  
**NEW YORK, NY 10022-2585 (US)**

(57) **ABSTRACT**

In a folded dipole antenna, both ends of a first dipole portion with a feeding portion are connected to both ends of a second dipole portion so that a slot portion may be formed, and the first and the second dipole portion have a width for generating a linearly-polarized wave in a slot mode (in a longitudinal direction) when an RFID chip is mounted on the feeding portion. A terminal of a chip is actually connected to an antenna terminal of the feeding portion of the folded dipole antenna to realize a tag.

(73) Assignee: **FUJITSU LIMITED**

(21) Appl. No.: **11/411,498**

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

