



US 20080129602A1

(19) **United States**(12) **Patent Application Publication****Qin et al.**(10) **Pub. No.: US 2008/0129602 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **PLANAR ANTENNA**(30) **Foreign Application Priority Data**(75) Inventors: **Xiang-Hong Qin**, Shenzhen (CN);
Jia-Lin Teng, Tu-Cheng (TW)

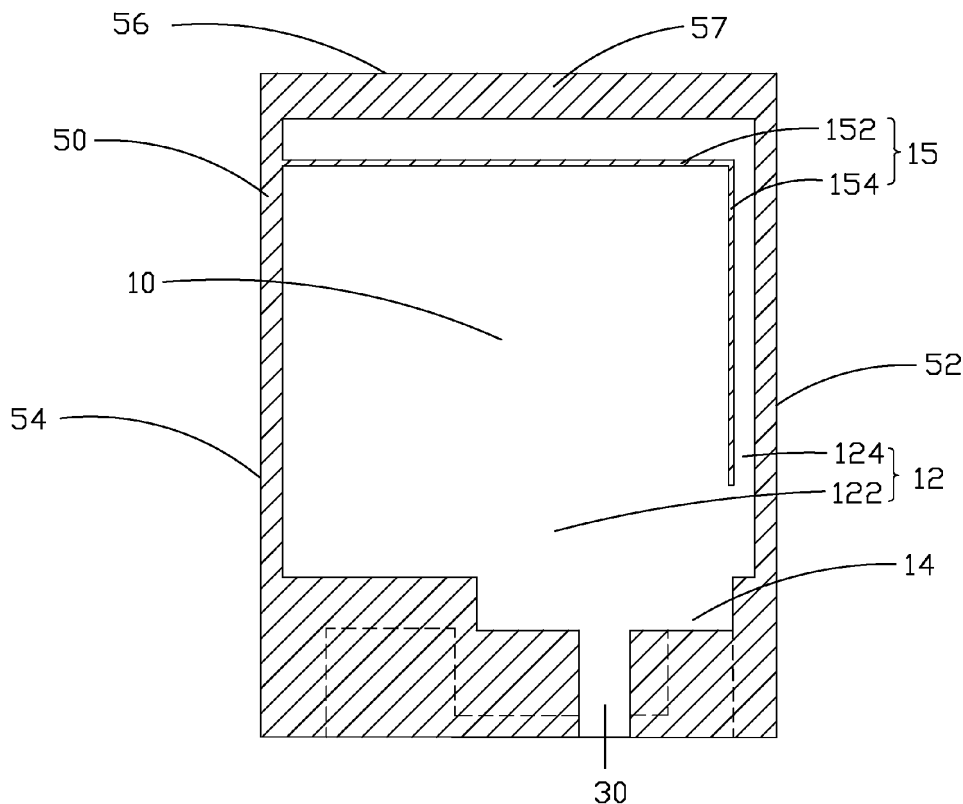
Dec. 1, 2006 (TW) 95144722

Publication Classification(51) **Int. Cl.**
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**

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Hsien (TW)(21) Appl. No.: **11/625,289**(22) Filed: **Jan. 20, 2007**

A planar antenna disposed on a substrate (50) including a first surface (57) and a second surface (58). The planar antenna includes a radiating body (10) for transmitting and receiving radio frequency (RF) signals, a feeding portion (30) for feeding signals, and a metallic ground plane (50). The radiating body includes an angled gap (15) formed therein. The feeding portion is electrically connected to the radiating body. The radiating body and the feeding portion are laid on the first surface of the substrate. The ground plane is laid on the second surface of the substrate.



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US 20080129603A1

(19) **United States**

(12) **Patent Application Publication**
Wei

(10) **Pub. No.: US 2008/0129603 A1**

(43) **Pub. Date: Jun. 5, 2008**

(54) **MULTI-FREQUENCY ANTENNA**

Publication Classification

(76) Inventor: **Shen-Pin Wei, Taipei Hsien (TW)**

(51) **Int. Cl.**
H01Q 1/36 (2006.01)
H01Q 5/00 (2006.01)

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

(57) **ABSTRACT**

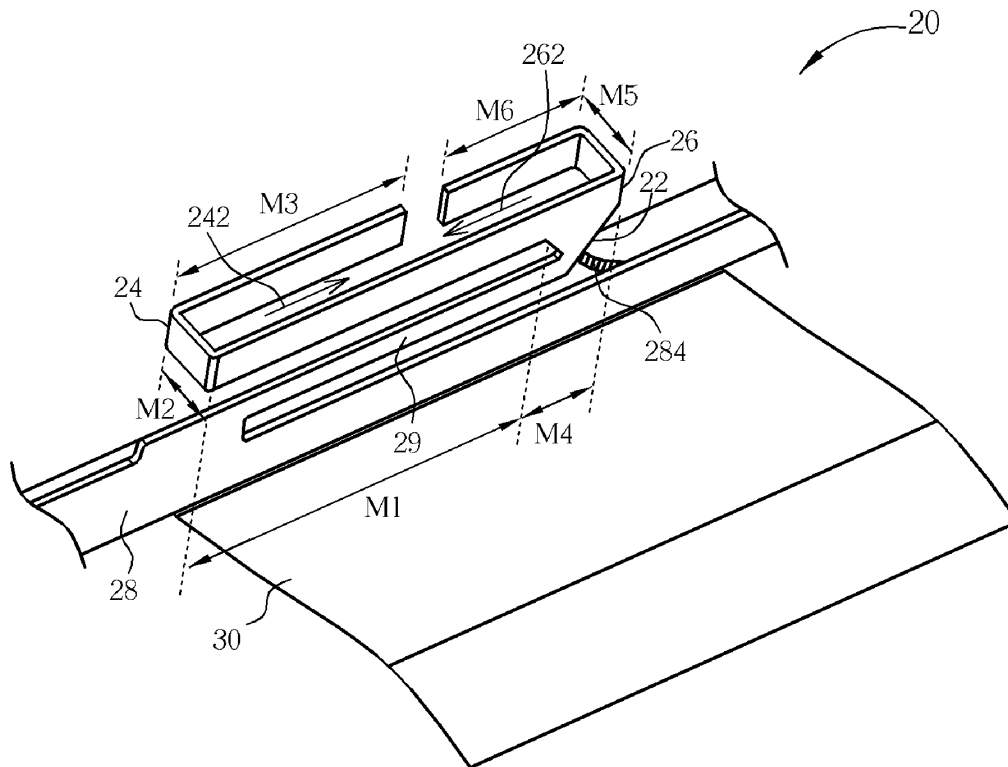
(21) Appl. No.: **11/770,728**

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

(30) **Foreign Application Priority Data**

Dec. 4, 2006 (TW) 095145044

A multi-frequency antenna includes a feeding element, a first U-shaped radiator, a second U-shaped radiator, a grounding element and a coupling element. The first U-shaped radiator is coupled to the feeding element and forms a first gap toward the feeding element. The second U-shaped radiator is coupled to the feeding element and forms a second gap toward the first U-shaped radiator. The grounding element is coupled to a ground end. The coupling element is coupled between the feeding element and the grounding element.



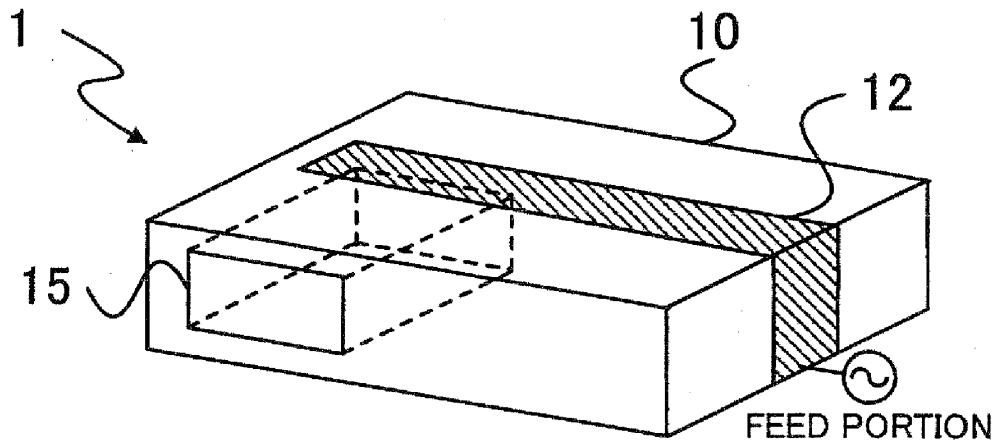
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US 20080129605A1

(19) **United States**(12) **Patent Application Publication**
SAKURAI et al.(10) **Pub. No.: US 2008/0129605 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA DEVICE INCLUDING
SURFACE-MOUNTED ELEMENT**(75) Inventors: **Minoru SAKURAI**, Tokyo (JP);
Yusuke Miura, Tokyo (JP);
Hirotake Sumi, Kanagawa-ken (JP)Correspondence Address:
FRISHAUF, HOLTZ, GOODMAN & CHICK, PC
220 Fifth Avenue, 16TH Floor
NEW YORK, NY 10001-7708(73) Assignee: **KABUSHIKI KAISHA
TOSHIBA**, Tokyo (JP)(21) Appl. No.: **11/949,866**(22) Filed: **Dec. 4, 2007**(30) **Foreign Application Priority Data**Dec. 4, 2006 (JP) 2006-326854
Jun. 28, 2007 (JP) 2007-170761**Publication Classification**(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 9/04 (2006.01)
(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**

An antenna device having a first material base and a second material base is provided. The first material base is three-dimensionally formed by first dielectric material. The first material base forms an opening inside, and has an antenna element arranged on a surface of the first material base. The second material base is formed by second dielectric material of relative permittivity higher than relative permittivity of the first dielectric material. The second material base is arranged in the opening of the first material base.



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(19) **United States**(12) **Patent Application Publication**
Yanagisawa et al.(10) **Pub. No.: US 2008/0129606 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA AND SEMICONDUCTOR DEVICE
HAVING THE SAME****Publication Classification**(75) Inventors: **Makoto Yanagisawa, Ebina (JP);
Takaaki Koen, Atsugi (JP)**(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/700 MS**

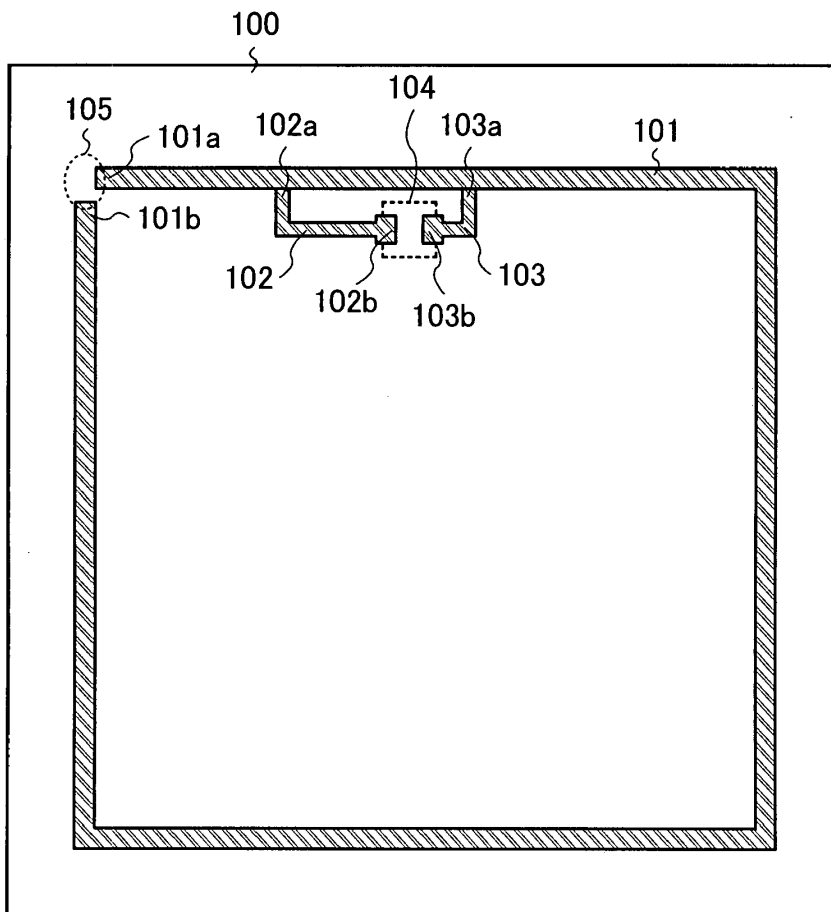
Correspondence Address:

ERIC ROBINSON
PMB 955, 21010 SOUTHBANK ST.
POTOMAC FALLS, VA 20165(73) Assignee: **Semiconductor Energy
Laboratory Co., Ltd., Atsugi-shi
(JP)**(21) Appl. No.: **11/979,990**(22) Filed: **Nov. 13, 2007**(30) **Foreign Application Priority Data**

Nov. 30, 2006 (JP) 2006-324370

ABSTRACT

An antenna capable of receiving circularly polarized waves and performing impedance matching between the antenna and an IC (integrated circuit) of a semiconductor device, and a semiconductor device having such an antenna. The antenna has a first conductor pattern with a loop configuration having a cut section, a second conductor pattern, a third conductor pattern, and a feeding section. A first end portion of the second conductor pattern and a first end portion of the third conductor pattern are connected to the first conductor pattern. A second end portion of the second conductor pattern and a second end portion of the third conductor pattern are connected to the feeding section. The total length of the second conductor pattern is longer than the total length of the third conductor pattern, and the second conductor pattern is placed closer to the cut section than the third conductor pattern is.



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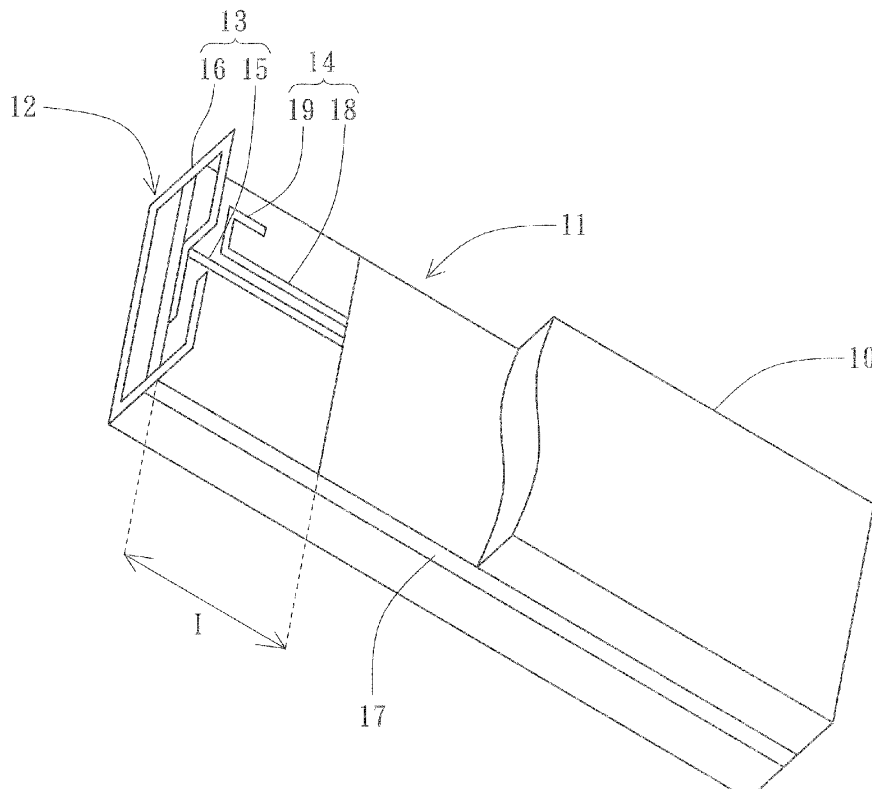
US 20080129611A1

(19) **United States**(12) **Patent Application Publication**
Jiang(10) **Pub. No.: US 2008/0129611 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA MODULE AND ELECTRONIC
DEVICE USING THE SAME**(75) Inventor: **Kai-Li Jiang**, Jiangsu Province
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**THOMAS, KAYDEN, HORSTEMEYER & RIS-
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600 GALLERIA PARKWAY, S.E., STE 1500
ATLANTA, GA 30339-5994(73) Assignee: **QISDA CORPORATION**,
Taoyuan Shien (TW)(21) Appl. No.: **11/945,303**(22) Filed: **Nov. 27, 2007**(30) **Foreign Application Priority Data**

Dec. 4, 2006 (TW) 95145026

Publication Classification(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/22 (2006.01)(52) **U.S. Cl.** **343/702; 343/700 MS**(57) **ABSTRACT**

An antenna module and an electronic device using the same are provided. The antenna module includes an antenna component and a parasitic element. The antenna component includes a feeding portion used for being electrically connected to a circuit board of the electronic device. The parasitic element is disposed adjacent to the feeding portion of the antenna component and substantially parallel to the feeding portion, wherein the parasitic element is coupled with the electromagnetic field of the feeding portion for causing a resonance in the antenna component, such that the antenna component produces a signal having multiple frequency bands.



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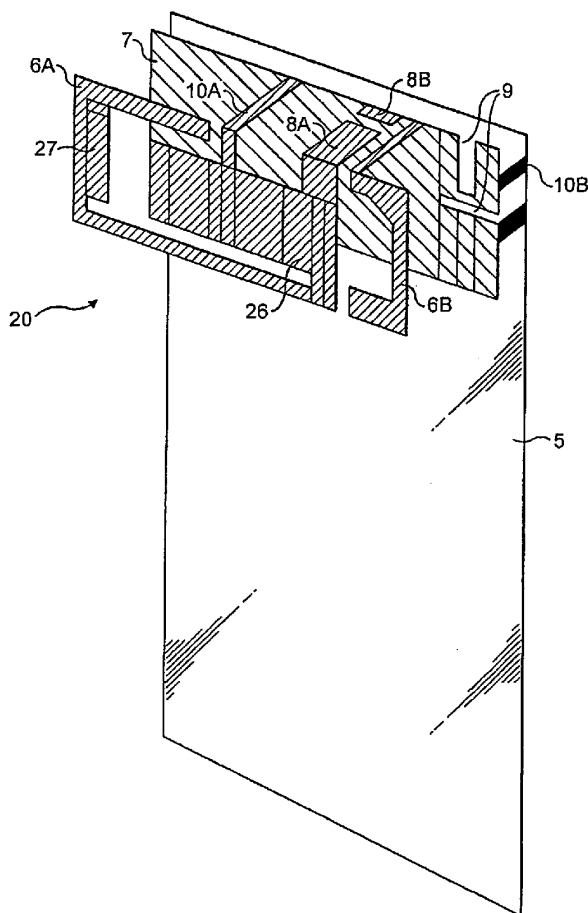
(19) **United States**(12) **Patent Application Publication**
Wang et al.(10) **Pub. No.: US 2008/0129612 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA FOR MOBILE COMMUNICATION
TERMINALS**(30) **Foreign Application Priority Data**

Dec. 24, 2003 (GB) 0330052.2

(75) Inventors: **Hanyang Wang, Witney (GB);
Stuart Williams, Fleet (GB)****Publication Classification**(51) **Int. Cl.**
H01Q 1/48 (2006.01)
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702; 343/848**(57) **ABSTRACT**

An antenna comprising: a first substantially planar ground plate; a first substantially planar resonator positioned in a plane substantially parallel to the first ground plate; a second substantially planar ground plate positioned in a plane substantially parallel to the first ground plate; two or more connectors for electrically connecting the second ground plate to ground; and one or more connectors for electrically connecting the first resonator to the second ground plate; wherein the first resonator and the second ground plate are connected to at least one of receiver means and transmitter means by antenna feeding means.

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(73) Assignee: **Nokia Corporation**(21) Appl. No.: **12/004,991**(22) Filed: **Dec. 21, 2007****Related U.S. Application Data**(63) Continuation of application No. 11/019,412, filed on
Dec. 21, 2004, now Pat. No. 7,339,528.

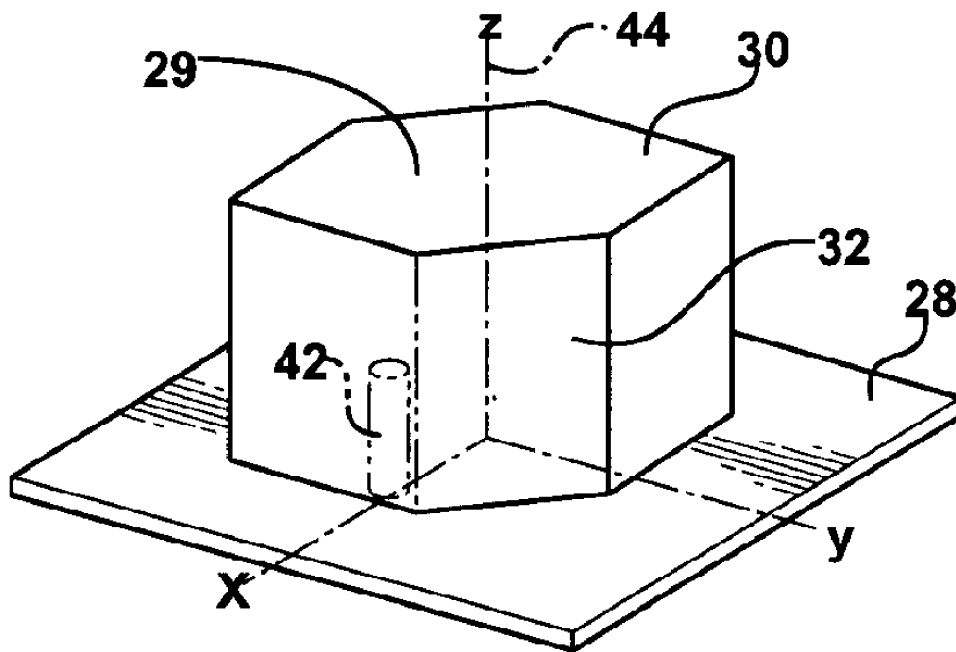
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US 20080129616A1

(19) **United States**(12) **Patent Application Publication****Li et al.**(10) **Pub. No.: US 2008/0129616 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **CIRCULARLY POLARIZED DIELECTRIC ANTENNA**(22) Filed: **Dec. 4, 2006****Publication Classification**(75) Inventors: **Qian Li**, Ann Arbor, MI (US);
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Worthington, OH (US)(51) **Int. Cl.**
H01Q 1/40 (2006.01)
H01Q 1/38 (2006.01)
H01Q 1/27 (2006.01)Correspondence Address:
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BLOOMFIELD HILLS, MI 48304-5151(52) **U.S. CL.** **343/713; 343/873; 343/700 MS**(57) **ABSTRACT**

An antenna for radiating an electromagnetic field includes a ground plane, a feeding probe, and a dielectric layer. The dielectric layer is disposed on the ground plane and has a radiating surface. The feeding probe electrically is embedded in the dielectric layer, and the feeding probe excites the dielectric layer such that the electromagnetic field radiates from the radiating surface and achieves circular polarization radiation.

(73) Assignee: **AGC AUTOMOTIVE**
AMERICAS R&D, INC.,
Ypsilanti, MI (US)(21) Appl. No.: **11/566,327**

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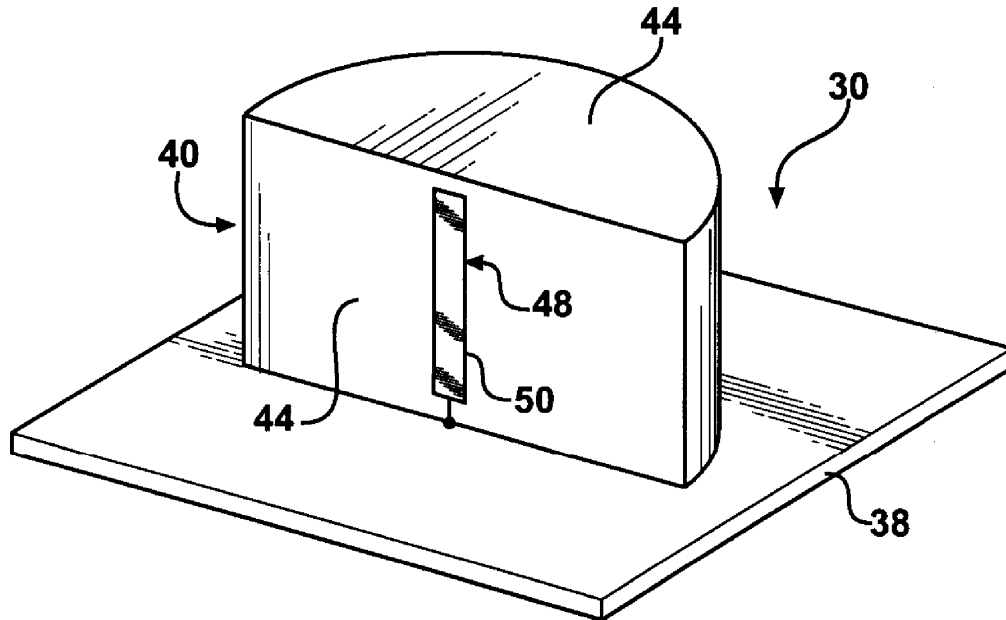
US 20080129617A1

(19) **United States**(12) **Patent Application Publication**
Li et al.(10) **Pub. No.: US 2008/0129617 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **WIDEBAND DIELECTRIC ANTENNA****Publication Classification**(75) Inventors: **Qian Li**, Ann Arbor, MI (US);
Wladimiro Villarroel,
Worthington, OH (US)(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/32 (2006.01)
(52) **U.S. Cl.** **343/713; 343/700 MS**
(57) **ABSTRACT**

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AMERICAS R&D, INC.,
Ypsilanti, MI (US)(21) Appl. No.: **11/566,341**(22) Filed: **Dec. 4, 2006**

An antenna for radiating an electromagnetic field includes a ground plane and a dielectric layer disposed on the ground plane. The dielectric layer has at least one exposed surface that radiates the electromagnetic field. The antenna includes at least one feeding element, such as a feeding strip or a feeding wire, that is disposed on one of the exposed surfaces of the dielectric layer. The feeding element electrically excites the dielectric layer. As such, the electromagnetic field radiates from the exposed surface and achieves a desired polarization radiation. Any exposed surface may radiate. Specifically, when multiple feeding elements are used, the exposed surface may radiate right hand circular polarization, left hand circular polarization, and/or linear polarization.



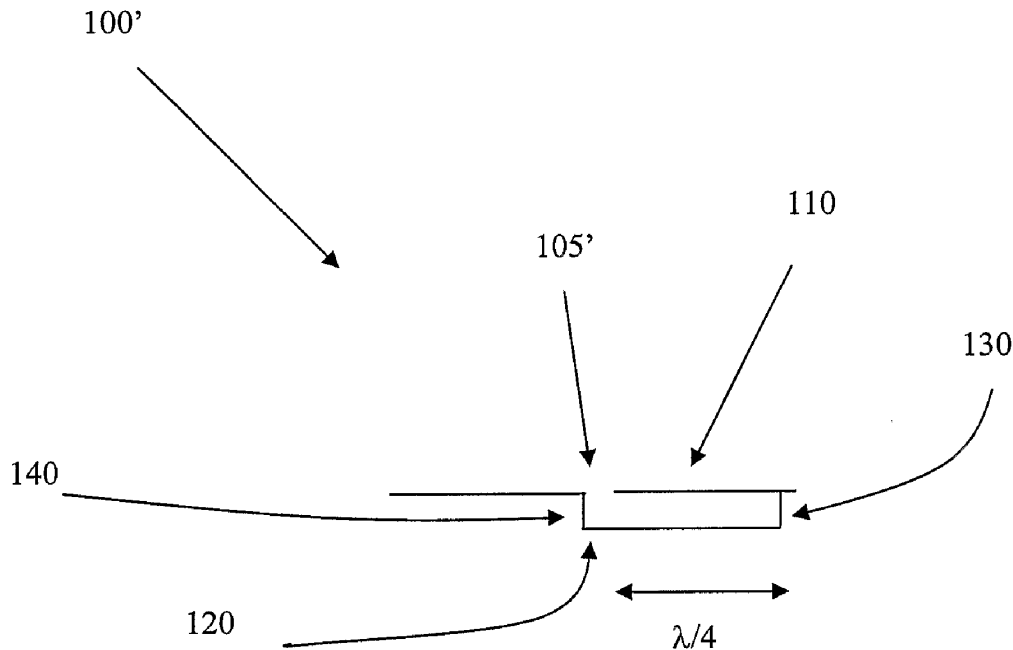
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US 20080129625A1

(19) **United States**(12) **Patent Application Publication**
Svensson et al.(10) **Pub. No.: US 2008/0129625 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **LOW PROFILE ANTENNA****Publication Classification**(76) Inventors: **Bengt Inge Svensson**, Molndal
(SE); **Anders Hook**, Hindas (SE);
Martin Nils Johansson, Molndal
(SE); **Joakim Johansson**, Tollsjo
(SE)(51) **Int. Cl.**
H01Q 13/18 (2006.01)(52) **U.S. Cl.** **343/767**(57) **ABSTRACT**Correspondence Address:
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The invention discloses an antenna (100, 100', 400, 500) comprising walls in a conducting material: first (110, 410, 510) and second (120, 420, 520) main walls, a first end wall (130, 530) and a first and a second side wall. The first (110, 510) and second (120, 520) main walls extend in parallel to each other, and are joined by the first end wall (130, 530). The side walls also join the first and second main walls, so that a cavity with only one opening (105, 205, 505) is formed, a rectangular aperture which can be brought to radiate by a feed connection (207). Suitably, the antenna can also comprise a second end wall (140, 540) which extends from the second main wall (120) towards the first main wall (110), with the length of extension of the first main wall being such that the second end wall and the first main wall do not meet.

(21) Appl. No.: **11/573,604**
(22) PCT Filed: **Jul. 13, 2004**
(86) PCT No.: **PCT/SE2004/001130**
§ 371 (c)(1),
(2), (4) Date: **Feb. 12, 2007**

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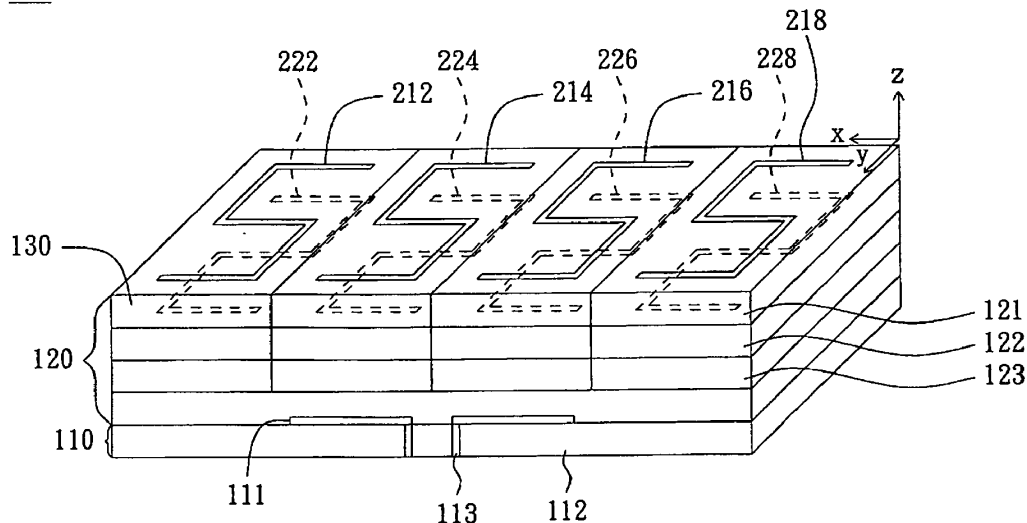
US 20080129626A1

(19) **United States**(12) **Patent Application Publication**
Wu et al.(10) **Pub. No.: US 2008/0129626 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA STRUCTURE WITH ANTENNA
RADOME AND METHOD FOR RISING GAIN
THEREOF**(75) Inventors: **Chun Yih Wu**, Taichung City
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County (TW); **Hung Hsuan Lin**,
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IRVINE, CA 92614(73) Assignee: **INDUSTRIAL TECHNOLOGY
RESEARCH INSTITUTE**,
Hsinchu County (TW)(21) Appl. No.: **11/931,251**(22) Filed: **Oct. 31, 2007****Related U.S. Application Data**(63) Continuation-in-part of application No. 11/606,893,
filed on Dec. 1, 2006.**Publication Classification**(51) **Int. Cl.**
H01Q 1/42 (2006.01)
H01Q 1/38 (2006.01)
H01Q 13/10 (2006.01)(52) **U.S. Cl.** **343/767; 343/700 MS; 343/872**(57) **ABSTRACT**

An antenna structure includes a radiating element and an antenna radome. The antenna radome has at least one dielectric layer, which has an upper surface having many S-shaped metal patterns and a lower surface having many inverse S-shaped metal patterns corresponding to the S-shaped metal patterns. The S-shaped metal patterns are respectively coupled to the corresponding inverse S-shaped metal patterns to converge radiating beams outputted from the radiating element.

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(19) **United States**

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

(10) **Pub. No.: US 2008/0129627 A1**

(43) **Pub. Date: Jun. 5, 2008**

(54) **NOTCHED-FED ANTENNA**

Publication Classification

(76) Inventors: **Jordi Soler Castany**, San Cugat Del Valles (ES); **Carles Puente Baliarda**, San Cugat Del Valles (ES)

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

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

(21) Appl. No.: **11/796,368**

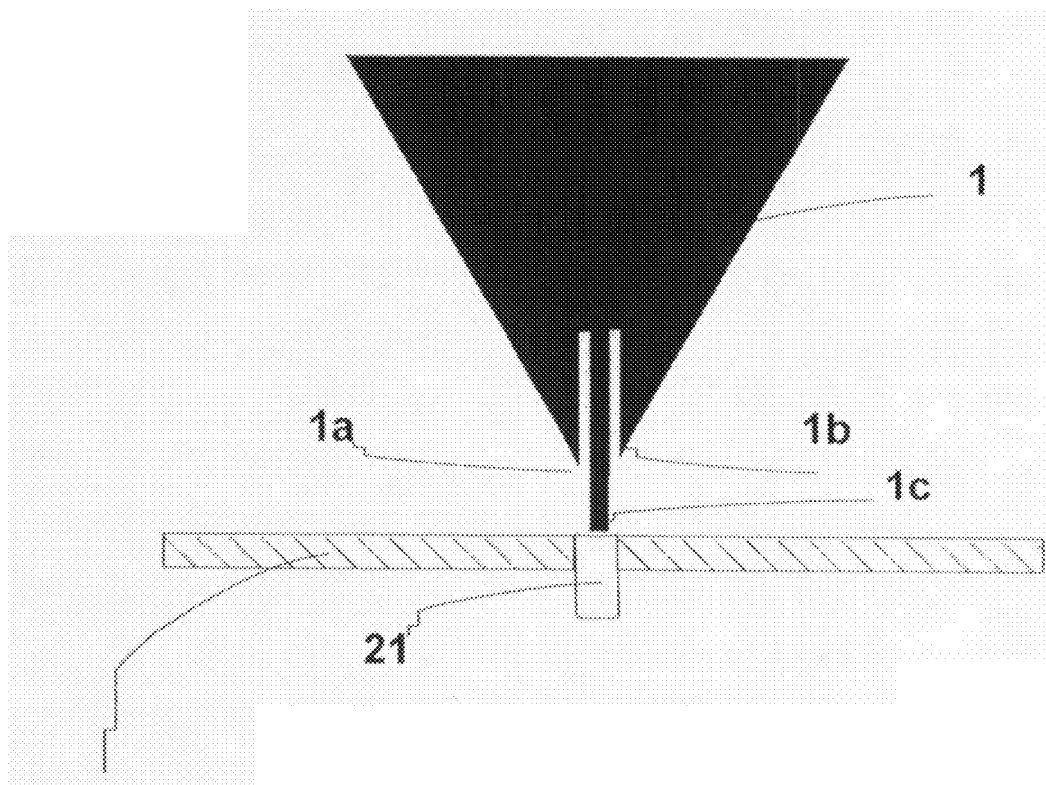
(22) Filed: **Apr. 27, 2007**

Related U.S. Application Data

(63) Continuation of application No. 11/033,788, filed on Jan. 12, 2005, now Pat. No. 7,342,553, which is a continuation of application No. PCT/EP02/07837, filed on Jul. 15, 2002.

(57) **ABSTRACT**

A monopole or dipole antenna includes a radiating element having at least one notch. The at least one notch intersects at least at one point on an edge of the radiating element wherein the intersecting point is located at a distance to a feeding point. The distance being shorter than half a length of a longest edge of the radiating element. A maximum width of the at least one notch is narrower than a half of a longest length of the at least one notch.



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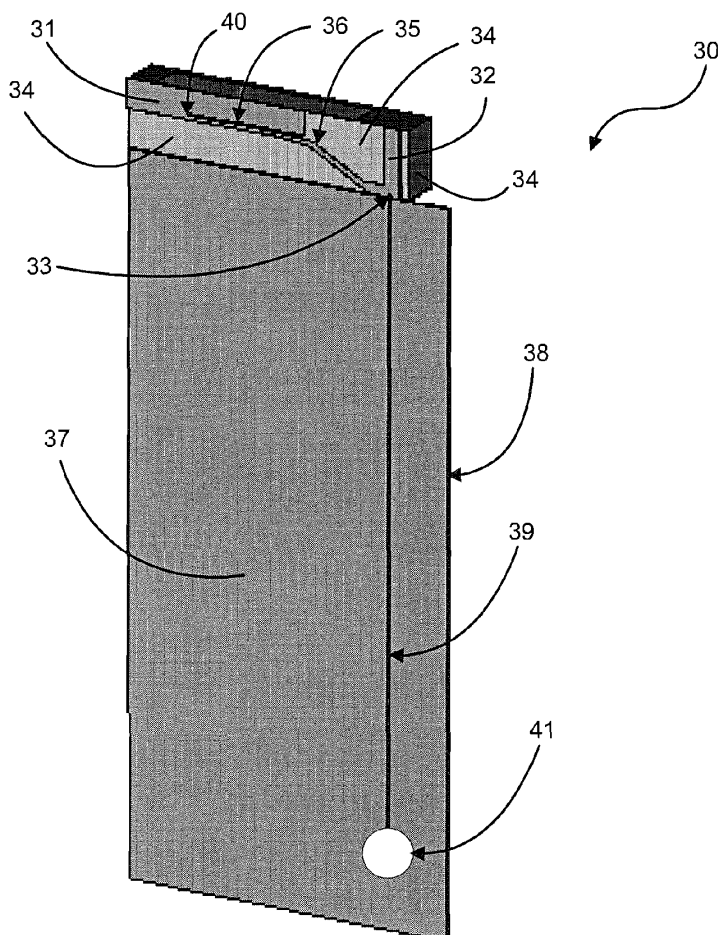
US 20080129628A1

(19) **United States**(12) **Patent Application Publication****Rosengren et al.**(10) **Pub. No.: US 2008/0129628 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **WIDEBAND ANTENNA FOR MOBILE DEVICES**(52) **U.S. CL. 343/785**(57) **ABSTRACT**(76) Inventors: **Kent Rosengren**, Kalmar (SE);
Hakan Karlsson, Kalmar (SE)

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3151 SOUTH VAUGHN WAY, SUITE 411
AURORA, CO 80014(21) Appl. No.: **11/565,906**(22) Filed: **Dec. 1, 2006****Publication Classification**(51) **Int. Cl.**
H01Q 15/08 (2006.01)

A dielectric based antenna provides for relatively wide band communications. In this regard, the dielectric based antenna may provide communications across a variety of mobile telephone communication types and frequencies, such as GSM850, EGSM900, DCS1800, PCS1900, and UMTS. In one embodiment, the dielectric based antenna includes a dielectric element and at least first and second antenna elements. The dielectric element may be configured into a volumetric shape from a material with a relatively high permittivity. The first and second antenna elements are respectively wrapped about first and second portions of the dielectric element and may provide for respective first and second frequency bands of the dielectric based antenna. An antenna feed port couples the dielectric based antenna to a communication module via an antenna feed such that radio signals may be transmitted and/or received through the dielectric based antenna.



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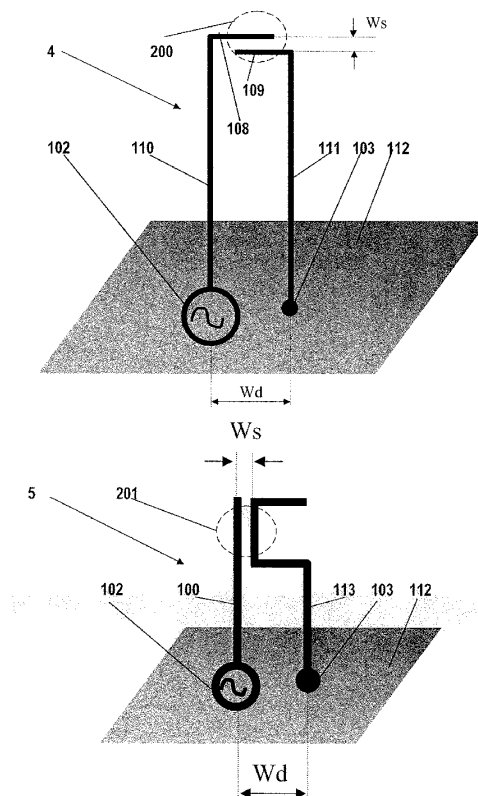


US 20080129630A1

(19) **United States**(12) **Patent Application Publication**
Baliarda et al.(10) **Pub. No.: US 2008/0129630 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **COUPLED MULTIBAND ANTENNAS****Publication Classification**(76) Inventors: **Carles Puente Baliarda**, San Cugat del Valles (Barcelona) (ES); **Jaume Anguera Pros**, Vinaros (Castellon) (ES); **Jordi Soler Castany**, Mataro (Barcelona) (ES); **Antonio Condes Martinez**, Esplugues de Llobregat (Barcelona) (ES)(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/40 (2006.01)
H01Q 9/16 (2006.01)
(52) **U.S. Cl.** **343/793; 343/700 MS; 343/873**
(57) **ABSTRACT**Correspondence Address:
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1445 ROSS AVENUE, SUITE 3200
DALLAS, TX 75202(21) Appl. No.: **11/950,835**(22) Filed: **Dec. 5, 2007****Related U.S. Application Data**

(63) Continuation of application No. 11/075,980, filed on Mar. 9, 2005, now Pat. No. 7,315,289, which is a continuation of application No. PCT/EP02/11355, filed on Sep. 10, 2002.

The present invention consists of an antenna comprising at least two radiating structures, said radiating structures taking the form of two arms, said arms being made of or limited by a conductor, superconductor or semiconductor material, said two arms being coupled to each other through a region on first and second superconducting arms such that the combined structure of the coupled two-arms forms a small antenna with a broadband behavior, a multiband behavior or a combination of both effects. According to the present invention, the coupling between the two radiating arms is obtained by means of the shape and spatial arrangement of said two arms, in which at least one portion on each arm is placed in close proximity to each other (for instance, at a distance smaller than a tenth of the longest free-space operating wavelength) to allow electromagnetic fields in one arm being transferred to the other through said specific close proximity regions. Said proximity regions are located at a distance from the feeding port of the antenna (for instance a distance larger than $\frac{1}{40}$ of the free-space longest operating wavelength) and specifically exclude said feeding port of the antenna.



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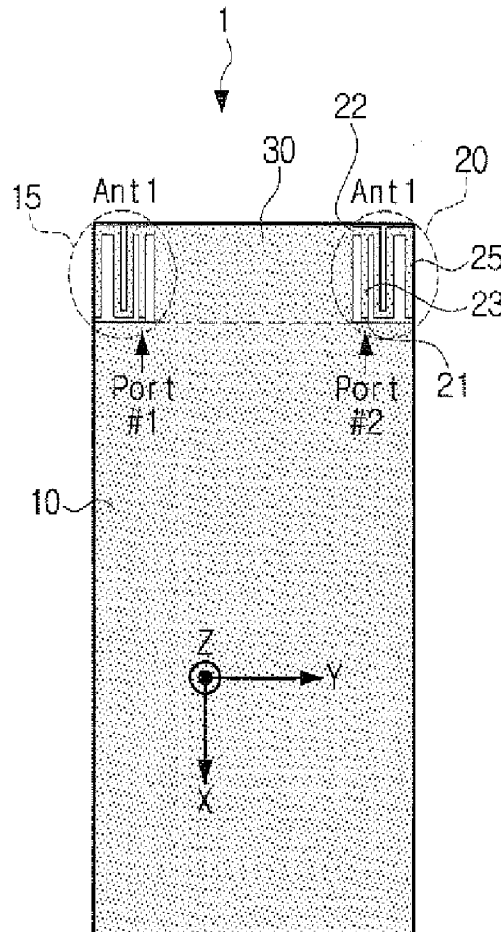
US 20080129632A1

(19) **United States**(12) **Patent Application Publication**
MOON et al.(10) **Pub. No.: US 2008/0129632 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA HAVING ADDITIONAL GROUND**(30) **Foreign Application Priority Data**(75) Inventors: **Young-min MOON**, Seoul (KR);
Young-eil KIM, Suwon-si (KR);
Se-hyun PARK, Suwon-si (KR);
Kyeong-sik MIN, Suwon-si (KR)

Dec. 5, 2006 (KR) 10-2006-0122156

Publication Classification(51) **Int. Cl.**
H01Q 1/48 (2006.01)(52) **U.S. Cl.** **343/848**(57) **ABSTRACT**Correspondence Address:
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WASHINGTON, DC 20037(73) Assignee: **SAMSUNG ELECTRONICS**
CO., LTD., Suwon-si (KR)(21) Appl. No.: **11/741,784**(22) Filed: **Apr. 30, 2007**

An antenna having an additional ground, includes a first ground which is formed in one side of a substrate; a plurality of antenna elements which are formed symmetrically with respect to each other and spaced apart from one end of the first ground; and a second ground which is interposed between the plurality of the antenna elements and integrally formed with the first ground. Accordingly, the deterioration of the antenna characteristics can be minimized even after the arrangement of the antenna elements with the ground, and the antenna can be miniaturized and easily fabricated in a two-dimensional structure. Furthermore, the electromagnetic wave interference can be minimized between the antenna elements.



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US 20080129633A1

(19) **United States**(12) **Patent Application Publication**
NORO et al.(10) **Pub. No.: US 2008/0129633 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **ANTENNA UNIT AND FEEDING COMPONENT**(75) Inventors: **Junichi NORO**, Akita (JP);
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220 Fifth Avenue, 16TH Floor
NEW YORK, NY 10001-7708(73) Assignee: **Mitsumi Electric Co. Ltd.**, Tokyo (JP)(21) Appl. No.: **11/960,362**(22) Filed: **Dec. 19, 2007****Related U.S. Application Data**

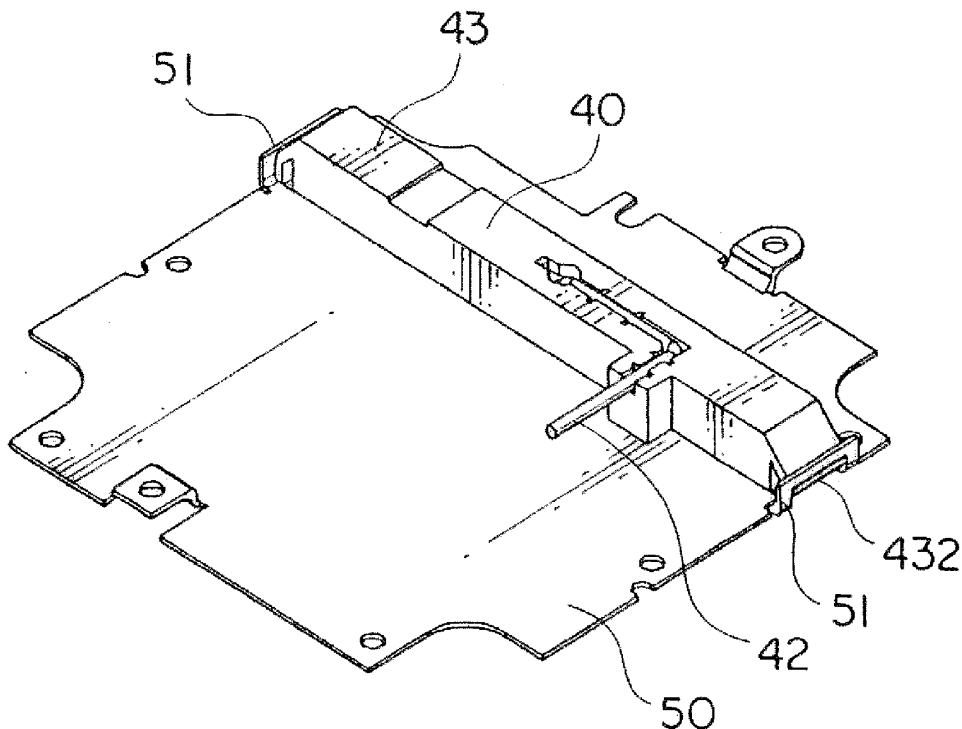
(62) Division of application No. 11/320,081, filed on Dec. 28, 2005, now Pat. No. 7,348,925.

(30) **Foreign Application Priority Data**

Mar. 28, 2005 (JP) 2005-91304

Publication Classification(51) **Int. Cl.**
H01Q 1/50 (2006.01)(52) **U.S. Cl.** **343/850**(57) **ABSTRACT**

An antenna unit includes a feeding component 40 and a metal plate 50 on which the feeding component 40 is mounted. The feeding component 40 has an attaching member 43 made of resin to support a feeding line against the metal plate. The metal plate 50 has a pair of cut and raised parts 51 at both ends thereof while the attaching member 43 has a pair of locking hooks 432 at both ends thereof. The locking hooks are partly inserted into the cut and raised parts and thereby the feeding component is attached to the metal plate without projecting any parts of the attaching member from a rear surface of the metal plate.



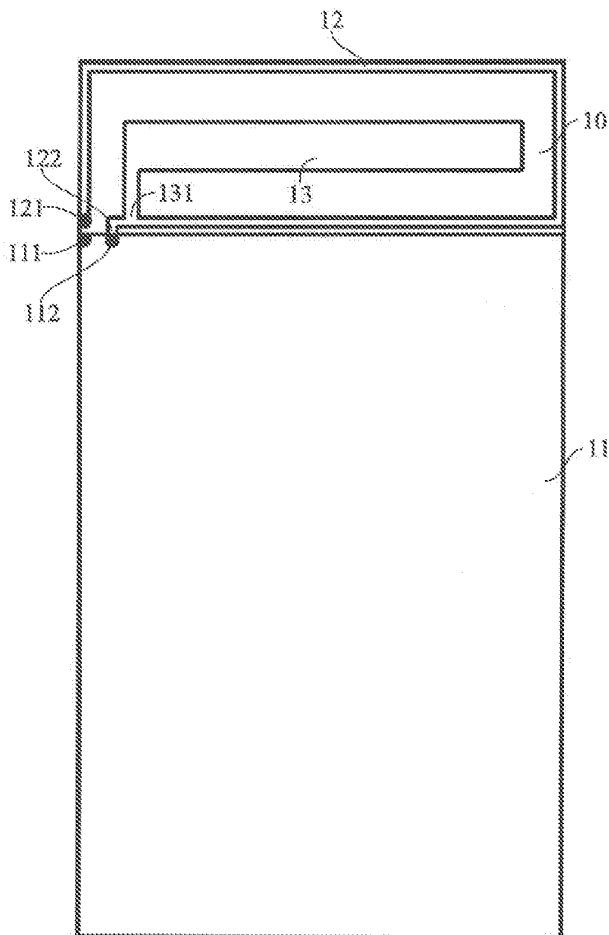
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US 20080129637A1

(19) **United States**(12) **Patent Application Publication**
CHI et al.(10) **Pub. No.: US 2008/0129637 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **DUAL-BAND LOOP ANTENNA**(52) **U.S. CL.** **343/866; 343/700 MS**(76) **Inventors:** **Yun-Wen CHI**, Sinjhuang City
(TW); **Kin-Lu Wong**, Kaohsiung
City (TW)**Correspondence Address:**
SINORICA, LLC
528 FALLSGROVE DRIVE
ROCKVILLE, MD 20850(21) **Appl. No.: 11/564,893**(22) **Filed: Nov. 30, 2006****Publication Classification**(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 7/00 (2006.01)(57) **ABSTRACT**

A dual-band loop antenna comprising: a grounding plane, a radiation metallic loop and a radiation metallic plate, the shape of the grounding plane is generally rectangular having a grounding point and a shorting point; the radiation metallic loop has a feeding end and a shorting end, the shorting end is electrically connected to the shorting point on the grounding plane; while the radiation metallic plate is encircled by the radiation metallic loop, and one terminal point of the radiation metallic plate is electrically connected to the vicinity of the shorting end of the radiation metallic loop. The embodiments of antennas of the present invention suit designing of antennas for mobile phones using the bands of GSM (890~960 MHz)/DCS (1710~1880 MHz).



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US 20080129638A1

(19) **United States**

(12) **Patent Application Publication**
ONG

(10) **Pub. No.: US 2008/0129638 A1**

(43) **Pub. Date: Jun. 5, 2008**

(54) **COMPOSITE STRUCTURE FOR AN
ANTENNA AND A SHELL**

Publication Classification

(76) Inventor: **Ching-Long ONG**, Taichung
County (TW)

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

(52) **U.S. Cl.** **343/873**

Correspondence Address:
Dr. BANGER SHIA
102 Lindencrest Ct.
Sugar Land, TX 77479-5201

(57) **ABSTRACT**

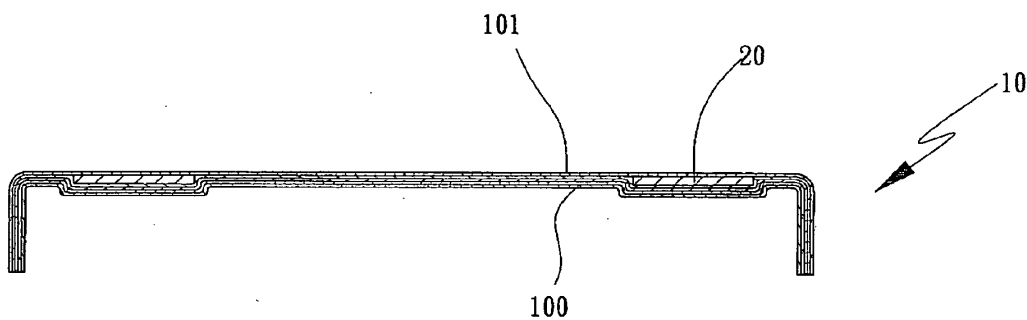
(21) Appl. No.: **11/874,193**

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

(30) **Foreign Application Priority Data**

Nov. 30, 2006 (TW) 095221173

A composite structure for an antenna and a shell, wherein the antenna mode is pre-set on the surface of the shell of the computer or the electric appliances before the shell is formed. The main layers are preimpregnated with resin and then are subjected to integral forming process, so that the antenna is laminated on shell to improve the stability of the whole structure. Further, on the shell surface can be disposed a plurality of antenna modes. And since the shell is a main layer which naturally can acts as a conductive shield to improve the function and efficiency of the antenna mode.



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US 20080129639A1

(19) **United States**(12) **Patent Application Publication**
Mitsugi(10) **Pub. No.: US 2008/0129639 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **MULTI-BAND ANTENNA, CIRCUIT BOARD
AND COMMUNICATION DEVICE****Publication Classification**(76) Inventor: **Kenichi Mitsugi, Tokyo (JP)**

Correspondence Address:

**PAUL, HASTINGS, JANOFSKY & WALKER
LLP
875 15th Street, NW
Washington, DC 20005**(51) **Int. Cl.****H01Q 3/24** (2006.01)**H01Q 9/04** (2006.01)(52) **U.S. Cl.** **343/876; 343/700 MS**

(57)

ABSTRACT

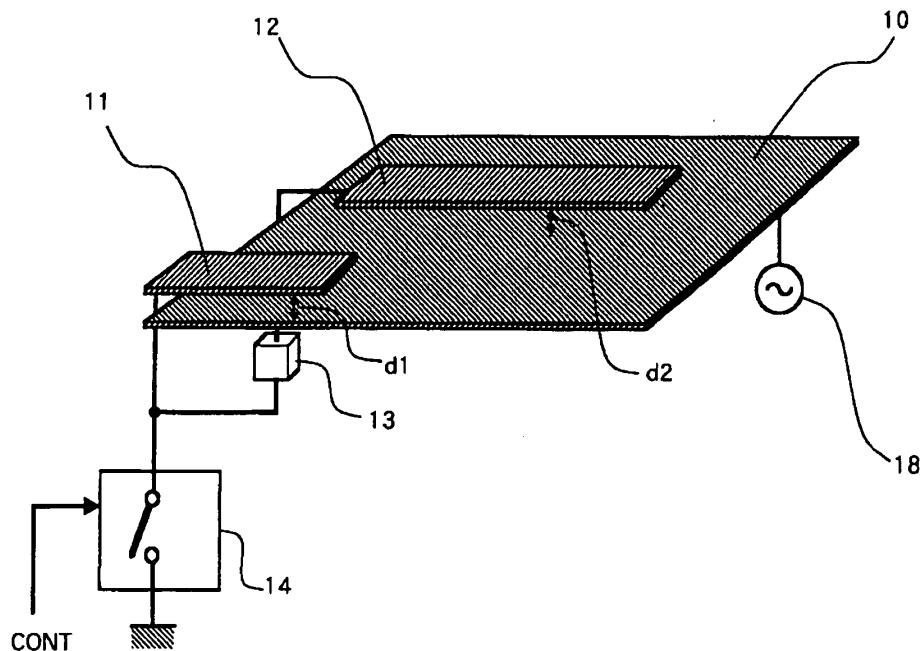
There is provided a small multi-band antenna that is capable of supporting multiple bands. A first sub-element (11) is disposed at a region where strength of electric field becomes relatively large while power is being fed on a main element (10) capable of irradiating a high-frequency signal of a plurality of frequency bands, and a second sub-element (12) is disposed at a region in which strength of electric field becomes relatively small while power is being fed on the main element (10). Then, the first and second sub-elements (11) and (12) are operated as passive reflective elements by putting one end portions of the first and second sub-elements (11) and (12) into an electrically open state by inputting a control signal of a first level to a switching mechanism (14), and are operated as electrically short-circuit elements that couple in high frequency with the main element (10) by grounding one end portions directly or via a predetermined resonance circuit by inputting the control signal of a second level. Thus, the high-frequency signal irradiated from the main element (10) is switched to any one of the plurality of frequency bands.

(21) Appl. No.: **11/596,284**(22) PCT Filed: **May 10, 2005**(86) PCT No.: **PCT/JP05/08830**

§ 371 (c)(1),

(2), (4) Date: **Aug. 22, 2007**(30) **Foreign Application Priority Data**

May 12, 2004 (JP) 2004-142558



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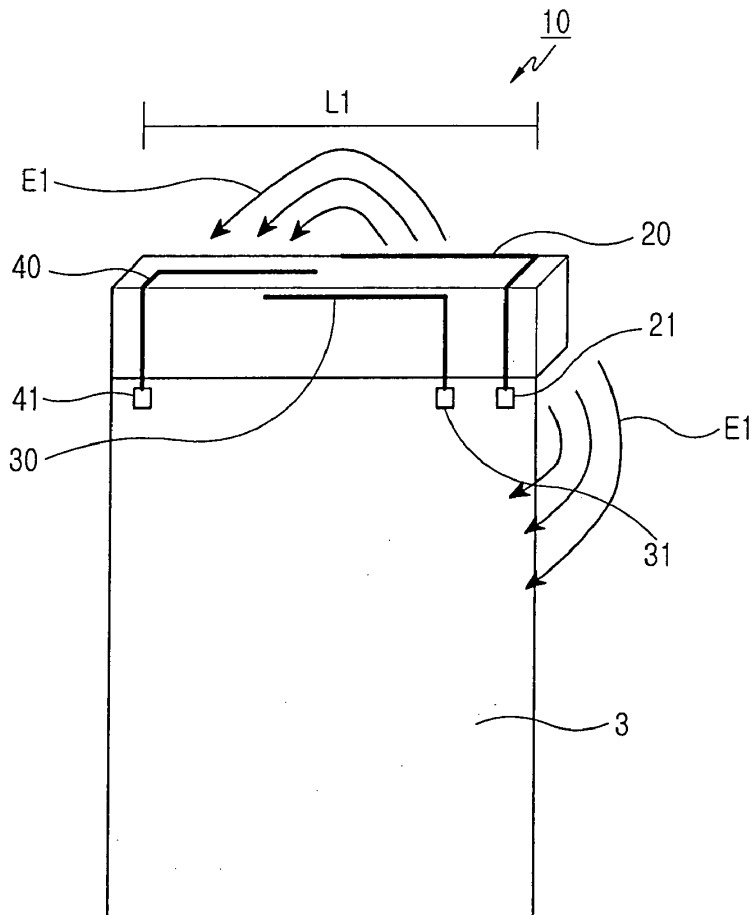
US 20080129644A1

(19) **United States**(12) **Patent Application Publication**
SEO et al.(10) **Pub. No.: US 2008/0129644 A1**(43) **Pub. Date: Jun. 5, 2008**(54) **BUILT-IN TYPE ANTENNA APPARATUS FOR
MOBILE TERMINAL**(30) **Foreign Application Priority Data**

Dec. 5, 2006 (KR) 122431/2006

(75) Inventors: **Jeong-Ah SEO**, Gumi-si (KR);
Jae-Ho Lee, Yongin-si (KR);
Jeong-Wan Park, Gumi-si (KR);
Young-Hwan Kim, Daegu (KR)**Publication Classification**(51) **Int. Cl.**
H01Q 21/00 (2006.01)(52) **U.S. Cl.** **343/893**Correspondence Address:
Jefferson IP Law, LLP
1730 M Street, NW, Suite 807
Washington, DC 20036(57) **ABSTRACT**

A built-in antenna apparatus for a mobile terminal is provided. The built-in antenna apparatus includes a first planar antenna having a first feeding point for providing a first radiation pattern, a second planar antenna having a second feeding point for providing a second radiation pattern, the second planar antenna being located adjacent to the first planar antenna, and a ground stub having a ground point for providing a ground pattern, the ground stub placed a distance apart from the first and the second planar antennas.

(73) Assignee: **Samsung Electronics Co., LTD.**,
Suwon-city (KR)(21) Appl. No.: **11/773,563**(22) Filed: **Jul. 5, 2007**

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US 20080136597A1

(19) **United States**(12) **Patent Application Publication**
CHOI et al.(10) **Pub. No.: US 2008/0136597 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **RFID SENSOR TAG ANTENNA USING
COUPLING FEEDING METHOD**(30) **Foreign Application Priority Data**

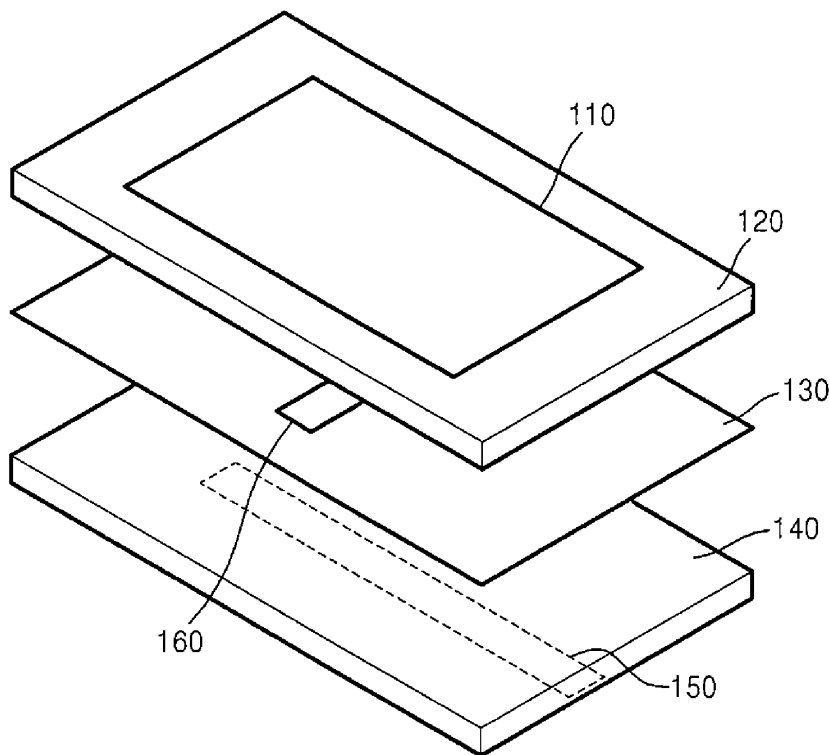
Dec. 8, 2006 (KR) 10-2006-0125036

(75) Inventors: **Won Kyu CHOI**, Daejeon-city
(KR); **Hae Won Son**, Daejeon-city
(KR); **Jae-Young Jung**,
Daejeon-city (KR); **Junho Yeo**,
Daejeon-city (KR); **Gil Young**
Choi, Daejeon-city (KR); **Cheol Sig**
Pyo, Daejeon-city (KR)**Publication Classification**(51) **Int. Cl.**
H04B 7/00 (2006.01)(52) **U.S. Cl.** **340/10.1**(57) **ABSTRACT**

Correspondence Address:

**TOWNSEND AND TOWNSEND AND CREW,
LLP****TWO EMBARCADERO CENTER, EIGHTH
FLOOR
SAN FRANCISCO, CA 94111-3834**(73) Assignee: **Electronics and
Telecommunications Research
Institute**, Daejeon-city (KR)(21) Appl. No.: **11/936,022**(22) Filed: **Nov. 6, 2007**

Provided is a radio frequency identification (RFID) sensor tag antenna using an aperture coupling feeding method, including: a radiation patch for determining a resonance frequency of the RFID sensor tag antenna, which is disposed in an uppermost portion of the RFID sensor tag antenna; a first dielectric layer disposed on a bottom surface of the radiation patch and interposed between the radiation patch and a ground layer disposed to be parallel with the radiation patch; and a slot formed in a side of the ground layer and coupling RF signals to the RFID sensor tag antenna. Thus, the RFID sensor tag antenna can separately adjust resistance and reactance components of input impedance. As a result, the RFID sensor tag antenna can be matched with an RFID sensor tag board without an additional matching circuit.



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US 20080136711A1

(19) **United States**(12) **Patent Application Publication****Lai et al.**(10) **Pub. No.: US 2008/0136711 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **MULTI-FREQUENCY ANTENNA**(30) **Foreign Application Priority Data**

(75) Inventors: **Ying-Jiunn Lai**, Taipei Hsien (TW); **Jiunn-Ming Huang**, Taipei Hsien (TW); **Kuan-Hsueh Tseng**, Taipei Hsien (TW)

Dec. 7, 2006 (TW) 95145782

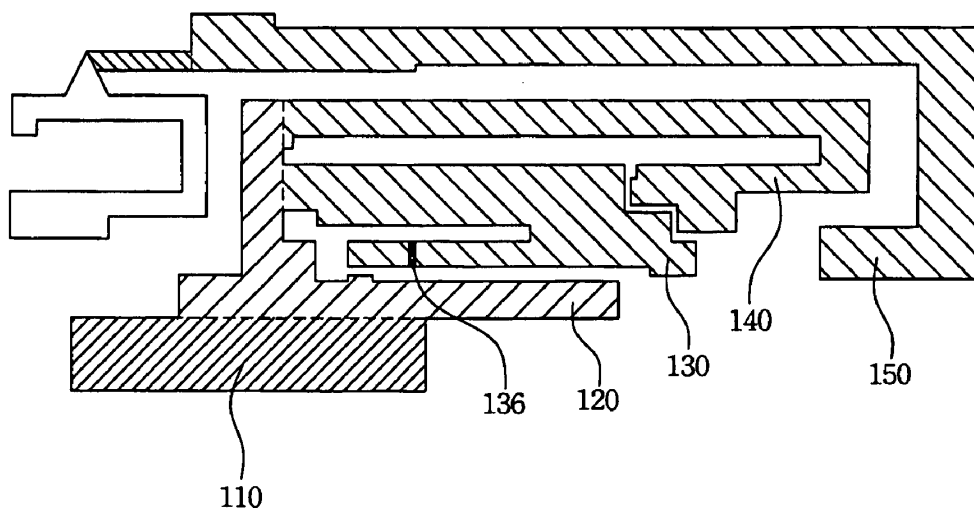
Publication Classification(51) **Int. Cl.**
H01Q 9/04 (2006.01)(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**

Correspondence Address:
PAI PATENT & TRADEMARK LAW FIRM
1001 FOURTH AVENUE, SUITE 3200
SEATTLE, WA 98154

(73) Assignee: **WISTRON NEWEB CORP.**,
Taipei Hsien (TW)

(21) Appl. No.: **11/853,020**(22) Filed: **Sep. 11, 2007**

A multi-frequency antenna for receiving a first frequency and second frequency signals comprises a grounding element, a first conductive member, a first radiation member, and a second radiation member. The first conductive member connects to the grounding element. The first radiation member and the second radiation member connect to the first conductive member separately. The multi-frequency antenna further comprises a parasitic structure. The parasitic structure structurally encircles the second radiation member and the encirclement is a partial encirclement. Moreover, the parasitic structure connects to the grounding element.

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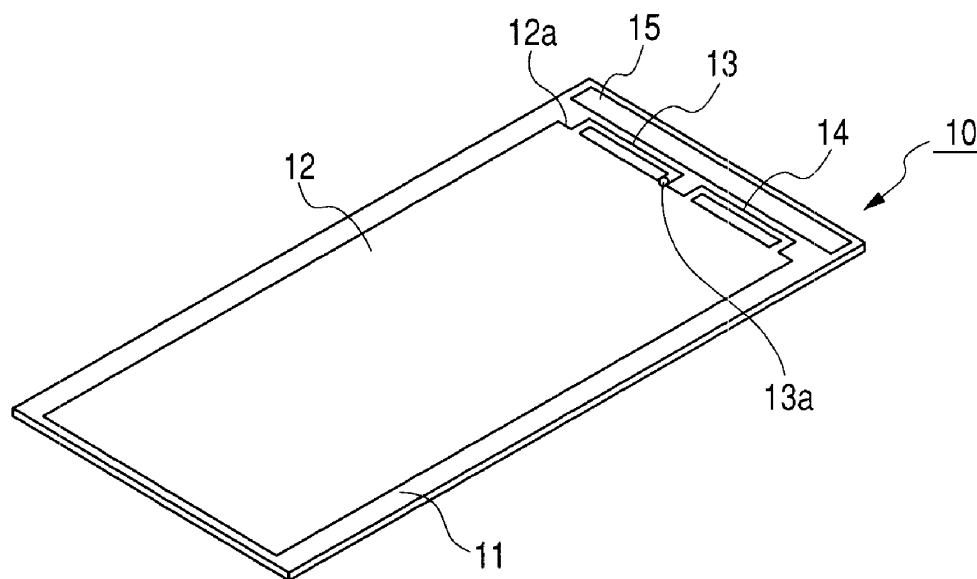
US 20080136712A1

(19) **United States**(12) **Patent Application Publication**
SUZUKI(10) **Pub. No.: US 2008/0136712 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **ANTENNA DEVICE HAVING GOOD
SYMMETRY OF DIRECTIONAL
CHARACTERISTICS**(75) Inventor: **Tomotaka SUZUKI,**
Fukushima-ken (JP)Correspondence Address:
BEYER WEAVER LLP
P.O. BOX 70250
OAKLAND, CA 94612-0250(73) Assignee: **ALPS ELECTRIC CO., LTD.,**
Tokyo (JP)(21) Appl. No.: **11/943,524**(22) Filed: **Nov. 20, 2007**(30) **Foreign Application Priority Data**

Dec. 12, 2006 (JP) 2006-334886

Publication Classification(51) **Int. Cl.**
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**

An antenna device suitable for short distance wireless communication is provided which can have a good symmetry of directional characteristics and increase a gain at both end sides in a longitudinal direction of a ground pattern. An antenna device is formed by patterning a metal conductor on a printed substrate. The antenna device is provided with a ground pattern of a rectangular shape, a power feed element arranged adjacent to one short side portion of the ground pattern, a correction pattern that projects from the short side portion and is located lateral to the power feed element, and a parasitic radiation element extending along the short side portion at a separation position facing the short side portion of the ground pattern through the power feed element and the correction pattern. An electrical length of the parasitic radiation element is set to be approximately $\frac{1}{2}$ of a resonant length. When power is feed, the power feed element is excited to radiate electric waves.



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US 20080136726A1

(19) **United States**(12) **Patent Application Publication****Hsu et al.**(10) **Pub. No.: US 2008/0136726 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **ANTENNA**(30) **Foreign Application Priority Data**

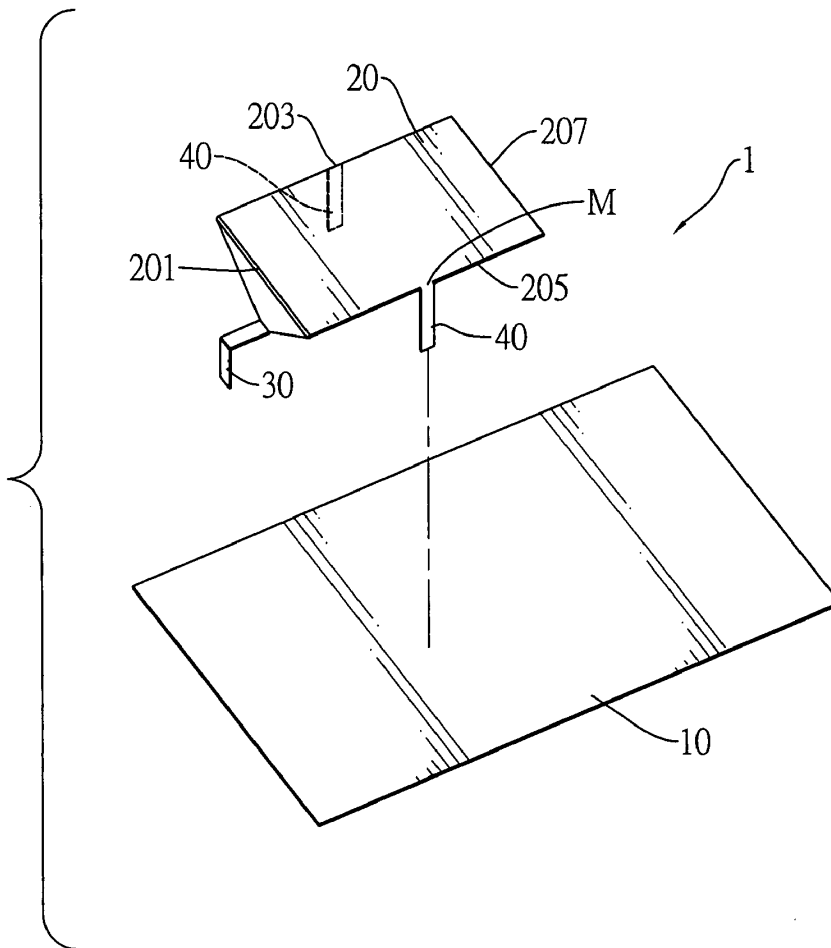
Dec. 8, 2006 (TW) 095221693

Publication Classification(51) **Int. Cl.**
H01Q 1/48 (2006.01)
H01Q 9/04 (2006.01)(52) **U.S. Cl.** 343/846; 343/700 MS(57) **ABSTRACT**

An antenna has a ground plane, a radiating member, a signal-feeding member and two grounding supports. The radiating member is suspended over and separated from the ground plane and has two opposite non-radiating edges. Each non-radiating edge has a middle section. Each grounding support is connected perpendicularly to the middle section of one non-radiating edge of the radiating member and the ground plane. The grounding supports connected between the radiating member and the ground plane excellently improve the combination of the radiating member and the ground plane to prevent the antenna from inadvertently disassembling.

(75) Inventors: **Chen-Hsuan Hsu**, Hsin-Tien City (TW); **Po-Sheng Chen**, Hsin-Tien City (TW); **Fu-Ren Hsiao**, Hsin-Tien City (TW); **Tsung-Wen Chiu**, Hsin-Tien City (TW)

Correspondence Address:
JACKSON WALKER, L.L.P.
112 E. PECAN, SUITE 2400
SAN ANTONIO, TX 78205

(73) Assignee: **Advanced Connectek Inc.**(21) Appl. No.: **11/999,115**(22) Filed: **Dec. 4, 2007**

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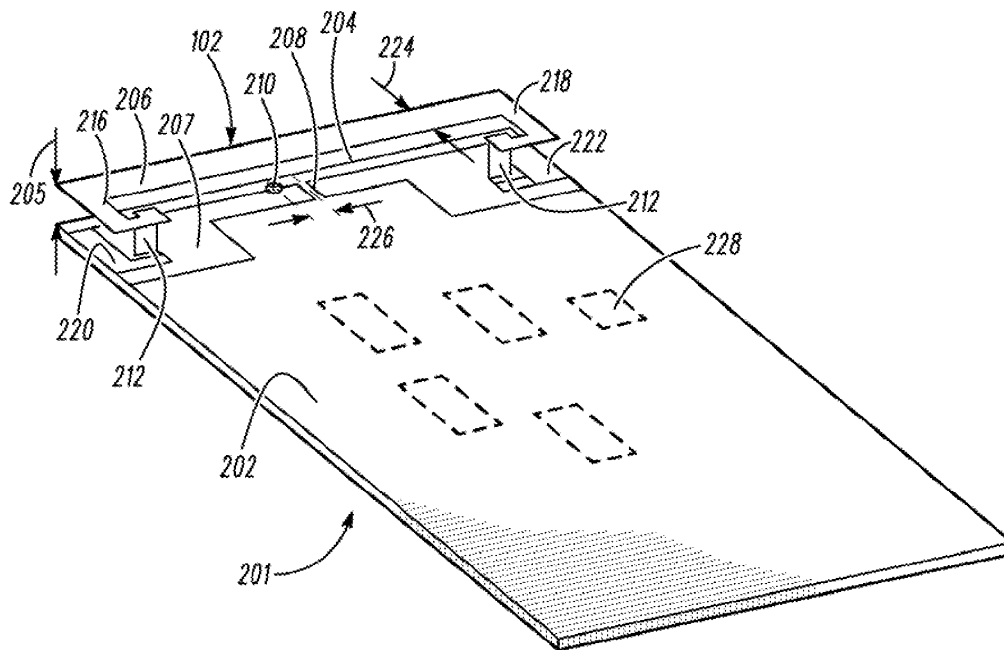
US 20080136727A1

(19) **United States**(12) **Patent Application Publication****Bit-Babik et al.**(10) **Pub. No.: US 2008/0136727 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **COMMUNICATION DEVICE WITH A
WIDEBAND ANTENNA**(52) **U.S. CL. 343/848; 343/846**(75) **Inventors:** **Giorgi G. Bit-Babik**, Sunrise, FL
(US); **Carlo Dinallo**, Plantation, FL
(US); **Antonio Faraone**, Plantation,
FL (US)

Correspondence Address:

MOTOROLA, INC.**1303 EAST ALGONQUIN ROAD, IL01/3RD
SCHAUMBURG, IL 60196**(73) **Assignee:** **MOTOROLA, INC.**, Schaumburg,
IL (US)(21) **Appl. No.:** **11/567,430**(22) **Filed:** **Dec. 6, 2006****Publication Classification**(51) **Int. Cl.**
H01Q 1/48 (2006.01)(57) **ABSTRACT**

An apparatus is disclosed for a communication device (100) with a wideband antenna (102) supporting at least two common and one differential resonant modes. An apparatus that incorporates teachings of the present invention may include, for example, the communication device having an antenna (102) that includes a ground structure (202), a first elongated conductor (204) spaced from the ground structure, a second elongated conductor (206) separated from the first elongated conductor, third and fourth conductors (212) each coupled to the first and second elongated conductors forming a gap (205), a ground conductor (208) coupling the ground structure to one among the first and second elongated conductors, and a signal feed conductor (210) coupling to one among the first and second elongated conductors spaced from the ground conductor. Additional embodiments are disclosed. A -10 dB bandwidth of at least 0.5 can be realized using electrical non-congruence.

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US 20080136730A1

(19) **United States**(12) **Patent Application Publication**
Chen(10) **Pub. No.: US 2008/0136730 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **ANTENNAS FOR ULTRA-WIDEBAND APPLICATIONS**(75) Inventor: **Zhining Chen, Singapore (SG)**

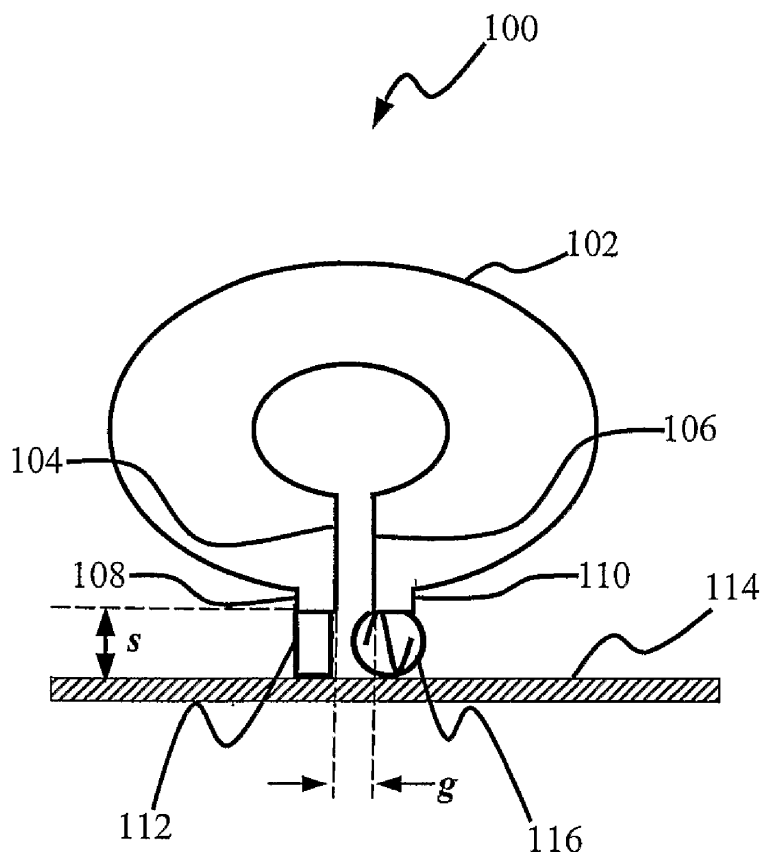
Correspondence Address:
**MCDONNELL BOEHNEN HULBERT & BERG-
HOFF LLP**
300 S. WACKER DRIVE, 32ND FLOOR
CHICAGO, IL 60606

(73) Assignee: **Agency for Science, Technology
and Research, Singapore (SG)**(21) Appl. No.: **11/791,300**(22) PCT Filed: **Nov. 22, 2004**(86) PCT No.: **PCT/SG2004/000381**

§ 371 (c)(1),
(2), (4) Date: **Dec. 18, 2007**

Publication Classification(51) **Int. Cl.**
H01Q 7/00 (2006.01)(52) **U.S. Cl.** **343/867; 343/866**(57) **ABSTRACT**

An antenna comprising a radiating element for transmitting and receiving communication signals is disclosed. A load and a feed are connectable to the radiating element and that the feed is spaced apart from the load. The radiating element is a planar loop having two free ends to which the load and the feed are connected. The load has two distal terminals, one of which is connected to one of the two free ends and the other is provided for connecting to one of grounding and another radiating element.



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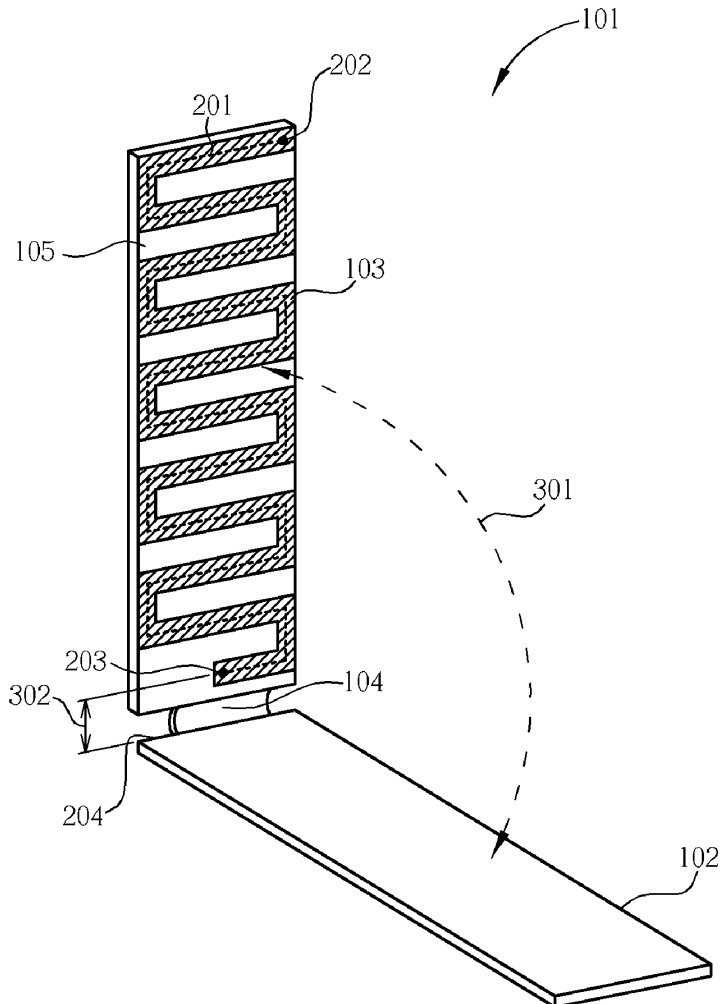
US 20080136739A1

(19) **United States**(12) **Patent Application Publication**
Wong et al.(10) **Pub. No.: US 2008/0136739 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **DIGITAL TELEVISION RECEIVING
ANTENNA FOR PLUG-AND-PLAY DEVICE**(30) **Foreign Application Priority Data**

Dec. 6, 2006 (TW) 095145467

Publication Classification(76) Inventors: **Kin-Lu Wong**, Kao-Hsiung City
(TW); **Wei-Yu Li**, I-Lan City (TW);
Saou-Wen Su, Taipei City (TW)(51) **Int. Cl.**
H01Q 9/30 (2006.01)(52) **U.S. Cl.** **343/900**(57) **ABSTRACT**Correspondence Address:
**NORTH AMERICA INTELLECTUAL PROP-
ERTY CORPORATION**
P.O. BOX 506
MERRIFIELD, VA 22116

The present invention provides a digital television receiving antenna for a plug-and-play device. The digital television receiving antenna includes a first conducting portion; and a second conducting portion, coupled to the first conducting portion and having a resonance path, wherein the second conducting portion is position-adjustable relatively to the first conducting portion, and an effective length of the resonance path is greater than a straight-line distance between two end points of the resonance path.

(21) Appl. No.: **11/688,241**(22) Filed: **Mar. 19, 2007**

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US 20080143535A1

(19) **United States**(12) **Patent Application Publication****Fischer**(10) **Pub. No.: US 2008/0143535 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA FOR A BACKSCATTER-BASED
RFID TRANSPONDER****Publication Classification**(76) Inventor: **Martin Fischer**, Pfedelbach (DE)(51) **Int. Cl.**
G08B 13/14 (2006.01)(52) **U.S. Cl.** **340/572.7**

Correspondence Address:

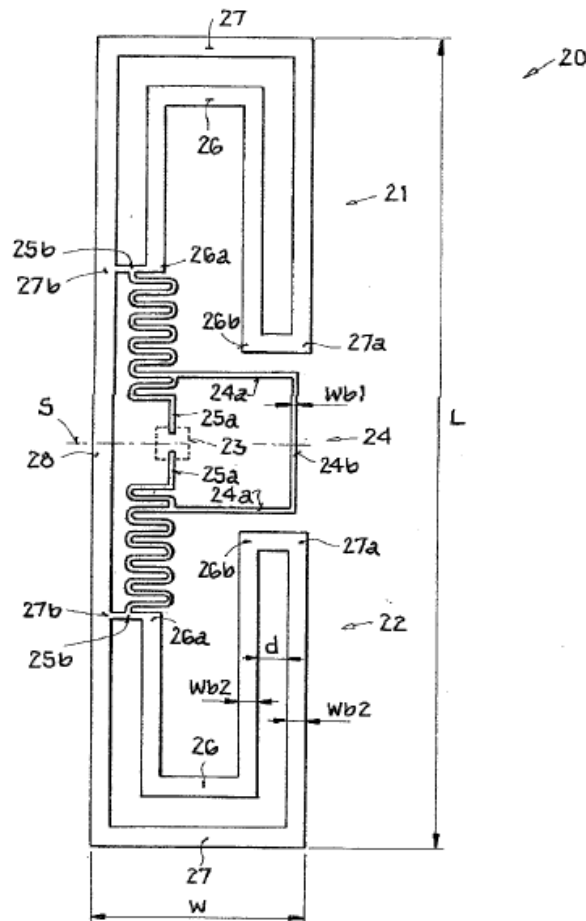
Muncy, Geissler, Olds & Lowe, PLLC**P.O. BOX 1364****FAIRFAX, VA 22038-1364**(57) **ABSTRACT**(21) Appl. No.: **11/945,257**(22) Filed: **Nov. 26, 2007****Related U.S. Application Data**

(60) Provisional application No. 60/860,792, filed on Nov. 24, 2006.

(30) **Foreign Application Priority Data**

Nov. 25, 2006 (DE) DE 102006055744

An antenna for a backscatter-based RFID transponder is provided that has an integrated receive circuit having a capacitive input impedance for receiving a radio signal spectrally located in an operating frequency range. The antenna includes two antenna branches that extend outward from a connecting region in which the antenna branches can be connected to the integrated receive circuit, and a yoke-shaped first trace segment that is designed to connect the two antenna branches together. Each antenna branch can have a U-shaped second trace segment connected to the connecting region, and a U-shaped third trace segment connected to the second trace segment and extending parallel to the second trace segment. The invention further relates to a backscatter-based RFID transponder with such an antenna.



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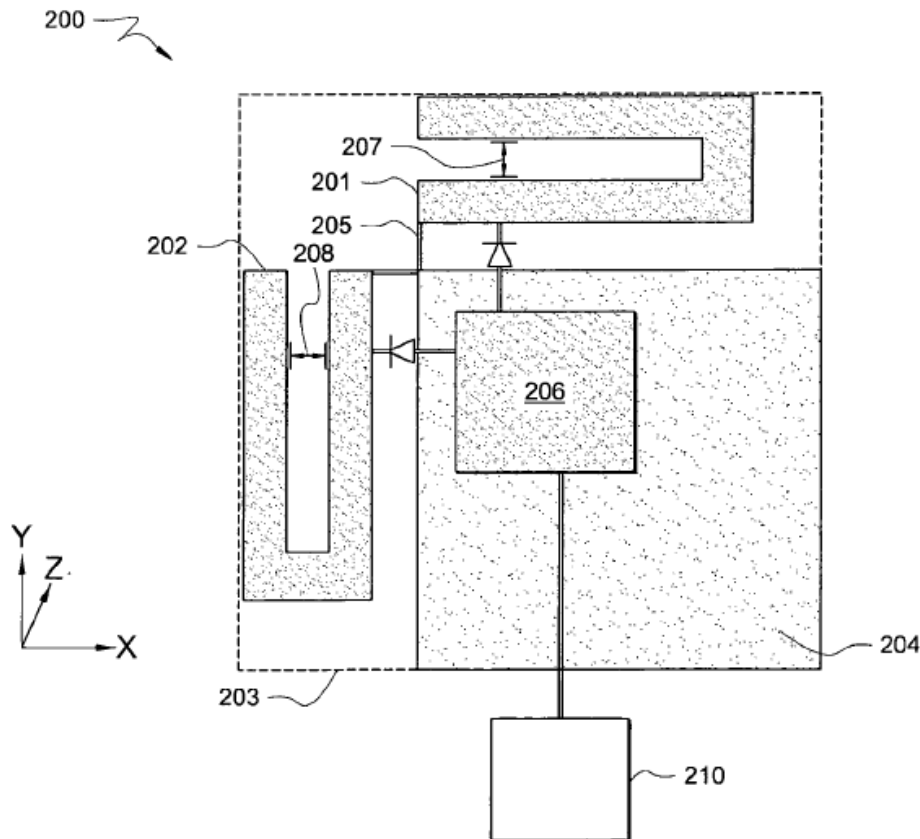
US 20080143602A1

(19) **United States**(12) **Patent Application Publication****Mak et al.**(10) **Pub. No.: US 2008/0143602 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **MINIATURIZED ORTHOGONAL ANTENNA SYSTEM**(22) Filed: **Dec. 18, 2006****Publication Classification**(75) Inventors: **Chi Lun Mak, Shatin (HK);
Corbett R. Rowell, Shatin (HK)**(51) **Int. Cl.**
H01Q 3/12 (2006.01)
H01Q 9/04 (2006.01)(52) **U.S. Cl.** **342/374; 343/700 MS**

Correspondence Address:

FULBRIGHT & JAWORSKI L.L.P
2200 ROSS AVENUE, SUITE 2800
DALLAS, TX 75201-2784(73) Assignee: **Hong Kong Applied Science and
Technology Research Institute
Co., Ltd., Shatin (HK)**(57) **ABSTRACT**

A system for providing multiple antenna patterns comprises a first antenna element, a second antenna element, wherein the first and second antenna elements are coplanar and arranged orthogonally with respect to each other in the plane, and a feed circuit in communication with a signal feed line alternately connecting the signal feed line to each of the first and second antenna elements.

(21) Appl. No.: **11/612,315**

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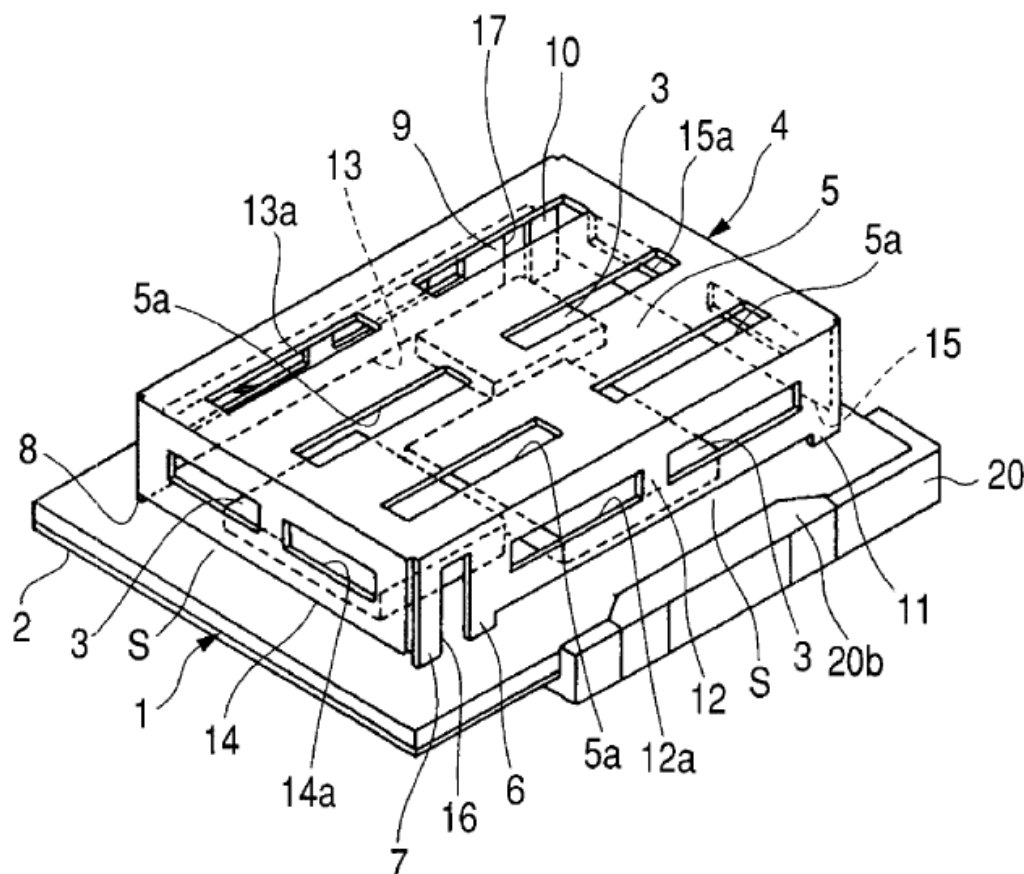
US 20080143608A1

(19) **United States**(12) **Patent Application Publication**
WATANABE et al.(10) **Pub. No.: US 2008/0143608 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA-INTEGRATED MODULE**(30) **Foreign Application Priority Data**

Dec. 13, 2006 (JP) 2006-335856

(75) Inventors: **Hirokazu WATANABE**,
Fukushima-ken (JP); **Tomotaka**
SUZUKI, Fukushima-ken (JP);
Atsushi MURATA, Fukushima-ken
(JP); **Yoshikiyo WATANABE**,
Fukushima-ken (JP)**Publication Classification**(51) **Int. Cl.**
H01Q 1/38 (2006.01)(52) **U.S. Cl.** **343/700 MS**(57) **ABSTRACT**Correspondence Address:
BEYER WEAVER LLP
P.O. BOX 70250
OAKLAND, CA 94612-0250(73) Assignee: **ALPS ELECTRIC CO., LTD.**,
Tokyo (JP)(21) Appl. No.: **11/944,278**(22) Filed: **Nov. 21, 2007**

The present invention provides an antenna-integrated module capable of decreasing the size thereof, facilitating prevention of arbitrary alternation to the circuit, effectively performing a reflow process, and being manufactured at low cost. Circuit elements 3 are mounted on a circuit board 1 with a wiring pattern and a ground conductive layer 2 and a sheet-metal covering antenna element 4 mounted on the circuit board 1 covers the circuit elements 3. The covering antenna element 4 includes a rectangular top plate 5 with openings 5a, a power feeding leg piece 6 connected to a feeding line of the wiring pattern, short-circuited leg pieces 7 and 8 connected to the ground conductive layer 2, support leg pieces 9 to 11 electrically opened, side plates 12 to 15 with openings 12a to 15a and the pieces 6 to 11 are soldered on the circuit board 1.



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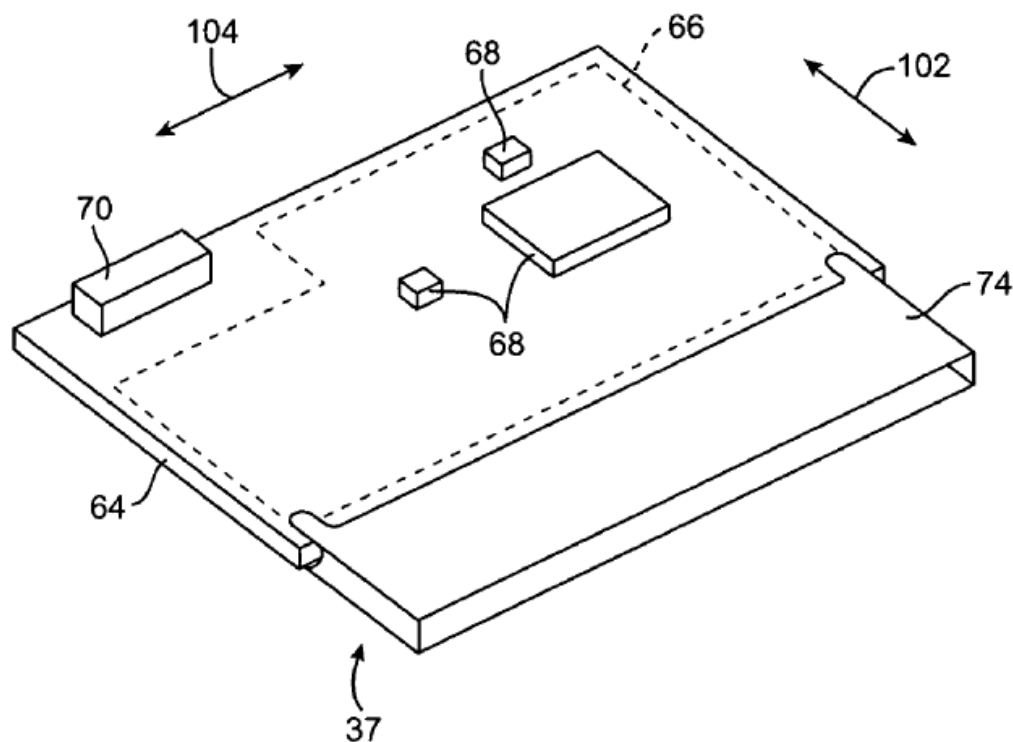
US 20080143611A1

(19) **United States**(12) **Patent Application Publication**
Wang(10) **Pub. No.: US 2008/0143611 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA FOR PORTABLE ELECTRONIC
DEVICE WIRELESS COMMUNICATIONS
ADAPTER**(52) **U.S. CL. 343/702; 343/841**(76) **Inventor: Shu-Li Wang, Santa Clara, CA
(US)**(57) **ABSTRACT**

Correspondence Address:

G. VICTOR TREYZ**870 MARKET STREET, FLOOD BUILDING,
SUITE 984
SAN FRANCISCO, CA 94102**(21) **Appl. No.: 11/639,905**(22) **Filed: Dec. 15, 2006****Publication Classification**(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/52 (2006.01)

Antennas are provided for portable electronic devices. A portable electronic device may have a port that receives a wireless communications adapter. The adapter may be used to provide wireless functionality for the portable electronic device. The adapter may contain a chip antenna that serves as an antenna resonating element. A printed circuit board within the adapter may contain conductor that has been patterned to form a ground plane for the antenna. The portable electronic device may have a conductive structure such as a housing portion. The conductive structure of the portable electronic device serves as a parasitic antenna element that improves antenna efficiency. The portable electronic device may be a handheld electronic device with music player functionality that communicates with a compact portable wireless device in a piece of sports equipment.



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US 20080143612A1

(19) **United States**(12) **Patent Application Publication**
IWAI et al.(10) **Pub. No.: US 2008/0143612 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA APPARATUS PROVIDED WITH
ANTENNA ELEMENT EXCITED THROUGH
MULTIPLE FEEDING POINTS**(30) **Foreign Application Priority Data**

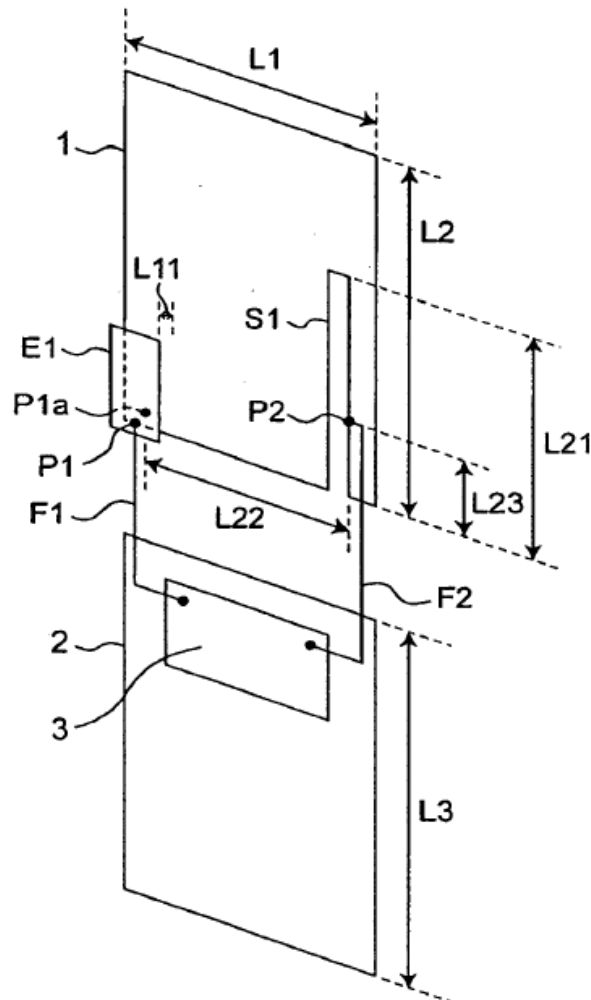
Dec. 5, 2006 (JP) P2006-328194

Publication Classification(76) **Inventors:** Hiroshi IWAI, Osaka (JP); Atsushi
Yamamoto, Kyoto (JP); Tsutomu
Sakata, Osaka (JP); Yoshio
Koyanagi, Ishikawa (JP)(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/24 (2006.01)(52) **U.S. Cl.** 343/702; 343/767(57) **ABSTRACT**

Correspondence Address:

WENDEROTH, LIND & PONACK L.L.P.
2033 K. STREET, NW, SUITE 800
WASHINGTON, DC 20006

An antenna apparatus includes an antenna element having at least one slit, a first feeding point provided at a position on the antenna element, and a second feeding point provided along the slit. The antenna element is excited as an electric current antenna through the first feeding point, and at the same time, the slit is excited as a magnetic current antenna through the second feeding point.

(21) **Appl. No.: 11/951,141**(22) **Filed: Dec. 5, 2007**

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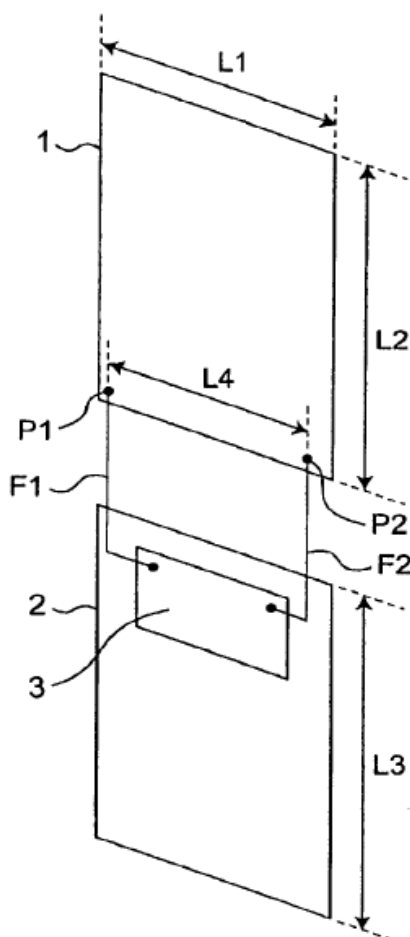
US 20080143613A1

(19) **United States**(12) **Patent Application Publication**
IWAI et al.(10) **Pub. No.: US 2008/0143613 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA APPARATUS PROVIDED WITH
ELECTROMAGNETIC COUPLING
ADJUSTER AND ANTENNA ELEMENT
EXCITED THROUGH MULTIPLE FEEDING
POINTS**(76) Inventors: **Hiroshi IWAI**, Osaka (JP); **Atsushi
Yamamoto**, Kyoto (JP); **Tsutomu
Sakata**, Osaka (JP); **Satoru Amari**,
Osaka (JP)Correspondence Address:
WENDEROTH, LIND & PONACK L.L.P.
2033 K. STREET, NW, SUITE 800
WASHINGTON, DC 20006(21) Appl. No.: **11/951,153**(22) Filed: **Dec. 5, 2007**(30) **Foreign Application Priority Data**

Dec. 5, 2006 (JP) 2006-328198

Publication Classification(51) **Int. Cl.**
H01P 5/18 (2006.01)
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702; 333/111**(57) **ABSTRACT**

An antenna apparatus includes a first feeding point and a second feeding point provided at respective positions on an antenna element. The antenna element is excited through the first and second feeding points simultaneously so as to operate as a first antenna portion and a second antenna portion simultaneously, the first antenna portion and the second antenna portion correspond to the first and second feeding points, respectively. The antenna element further includes, between the first and second feeding points, an electromagnetic coupling adjuster for making an amount of isolation between the first and second antenna portions.



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US 20080143615A1

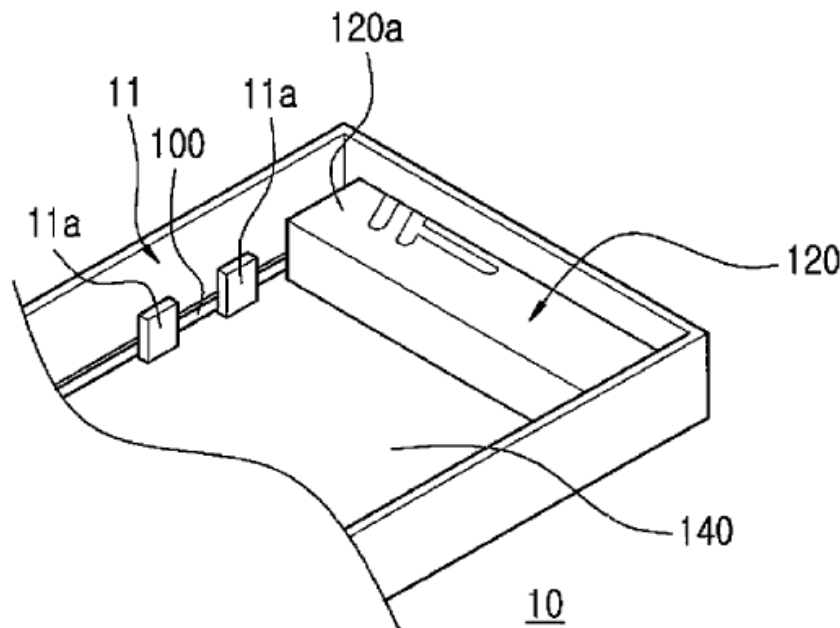
(19) **United States**(12) **Patent Application Publication**
PARK et al.(10) **Pub. No.: US 2008/0143615 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA FEED LINE FOR PORTABLE
TERMINAL**(30) **Foreign Application Priority Data**

Dec. 14, 2006 (KR) 127696/2006

(75) Inventors: **Jung-Min PARK**, Suwon-si (KR);
Soon-Ho Hwang, Seoul (KR);
Tae-Sik Yun, Suwon-si (KR);
Kwang-Mo Yang, Suwon-si (KR);
Nam-Ung Kim, Seoul (KR)**Publication Classification**(51) **Int. Cl.**
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702**(57) **ABSTRACT**

An antenna feed line for a portable terminal is provided that includes first films in which shielding lines are formed lengthwise and a second film disposed between the first films and having at least one pair of signal lines formed lengthwise. The antenna feed line is a flexible printed circuit having a layered structure of the first films and the second film, while the signal lines are shielded by the shielding lines. Use of the antenna feed line allows a stable connection to be maintained in spite of external shock, and signal loss during transmission/reception can be reduced. Moreover, the antenna feed line can be easily fixed inside the portable terminal.

Correspondence Address:

THE FARRELL LAW FIRM, P.C.**333 EARLE OVINGTON BOULEVARD, SUITE
701
UNIONDALE, NY 11553**(73) Assignee: **SAMSUNG ELECTRONICS
CO., LTD.**, Suwon-si (KR)(21) Appl. No.: **11/956,590**(22) Filed: **Dec. 14, 2007**

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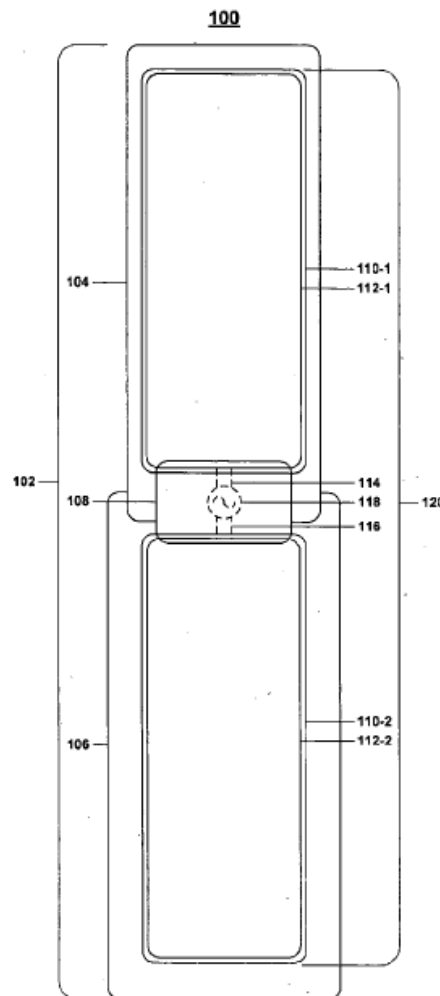
US 20080143616A1

(19) **United States**(12) **Patent Application Publication****Tu et al.**(10) **Pub. No.: US 2008/0143616 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **INTERNAL ANTENNA AND MOTHERBOARD ARCHITECTURE**(75) Inventors: **Jerome Tu**, Saratoga, CA (US);
Weiping Dou, San Jose, CA (US)Correspondence Address:
KACVINSKY LLC
C/O INTELLEVATE
P.O. BOX 52050
MINNEAPOLIS, MN 55402(73) Assignee: **PALM, INC.**, Sunnyvale, CA (US)(21) Appl. No.: **12/038,901**(22) Filed: **Feb. 28, 2008****Related U.S. Application Data**

(63) Continuation of application No. 11/355,159, filed on Feb. 14, 2006, now Pat. No. 7,362,275.

Publication Classification(51) **Int. Cl.**
H01Q 1/24 (2006.01)(52) **U.S. Cl.** **343/702; 343/872**(57) **ABSTRACT**

Various embodiments of an internal antenna and motherboard architecture are described. In one embodiment, a wireless device may include a housing enclosing a first motherboard and a second motherboard. The ground plane of the first motherboard may be coupled to the ground plane of the second motherboard within the housing. The first motherboard and the second motherboard may act as an internal antenna system for the wireless device. Other embodiments are described and claimed.



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US 20080143625A1

(19) **United States**(12) **Patent Application Publication**
Mizushima et al.(10) **Pub. No.: US 2008/0143625 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA SHEET AND MANUFACTURING METHOD THEREFOR**(30) **Foreign Application Priority Data**

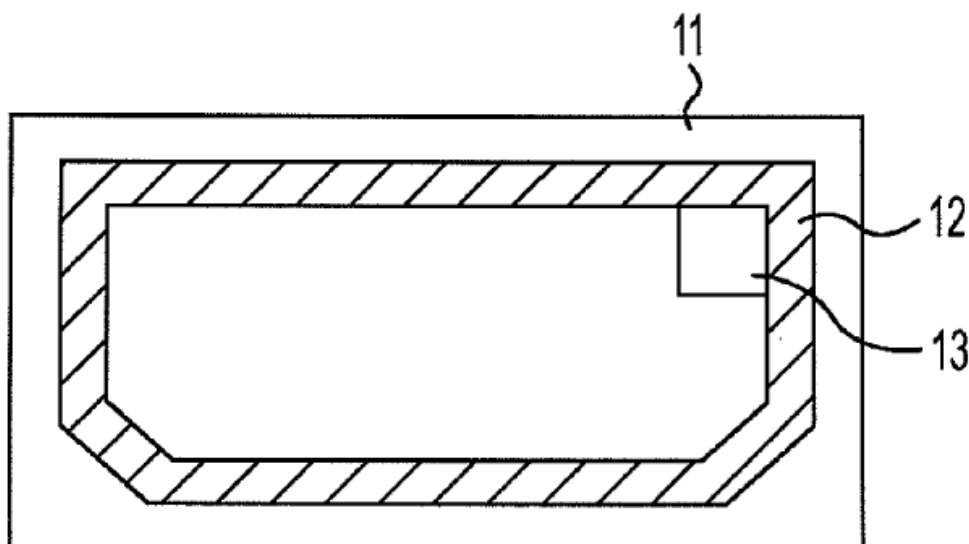
Dec. 18, 2006 (JP) 2006-339690

Publication Classification(76) Inventors: **Takao Mizushima**, Niigata-ken (JP); **Hideyuki Takahashi**, Niigata-ken (JP); **Akira Sakai**, Niigata-ken (JP)(51) **Int. Cl.**
H01Q 1/00 (2006.01)
H01P 11/00 (2006.01)(52) **U.S. Cl.** **343/787; 29/600; 977/773**(57) **ABSTRACT**

Correspondence Address:

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

An antenna sheet includes a magnetic sheet composed of a resin matrix and an Fe-based amorphous alloy contained in the resin matrix, and an antenna pattern disposed directly on the magnetic sheet, the antenna pattern being composed of nanoparticles. The antenna sheet can be manufactured by forming the antenna pattern directly on the magnetic sheet using a material containing nanoparticles, and then by sintering the nanoparticles by subjecting the magnetic sheet having the antenna pattern to heat treatment.

(21) Appl. No.: **11/950,019**(22) Filed: **Dec. 4, 2007**

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US 20080143627A1

(19) **United States**(12) **Patent Application Publication****Ohba et al.**(10) **Pub. No.: US 2008/0143627 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA DEVICE ADAPTED FOR
PORTABLE RADIO APPARATUS**(30) **Foreign Application Priority Data**

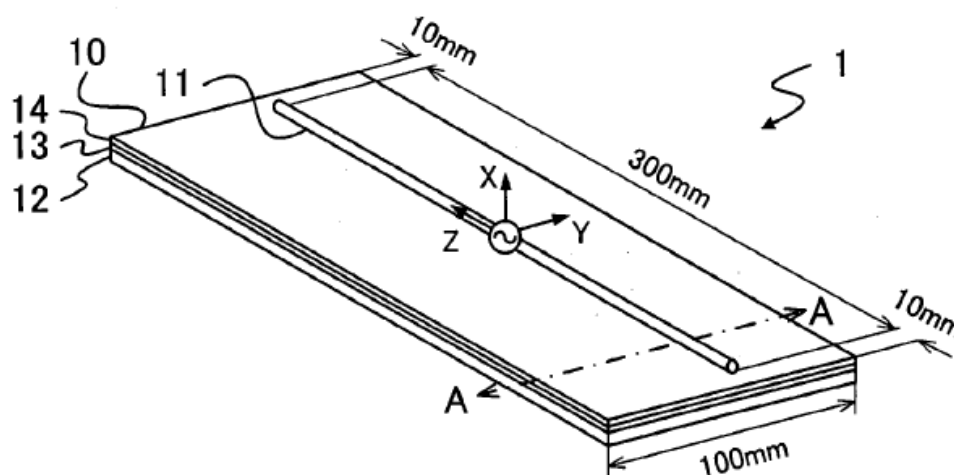
Dec. 15, 2006 (JP) 2006-338273

(75) Inventors: **Isao Ohba**, Tokyo (JP); **Takashi
Amano**, Saitama-ken (JP); **Akihiro
Tsujimura**, Tokyo (JP); **Satoshi
Mizoguchi**, Tokyo (JP); **Koichi
Sato**, Tokyo (JP)**Publication Classification**(51) **Int. Cl.**
H01Q 19/09 (2006.01)(52) **U.S. Cl.** **343/787**(57) **ABSTRACT**

Correspondence Address:

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

An antenna device includes a printed circuit board and an antenna element. The printed circuit board has a face a portion of which is formed by a conductive layer overlaid with a magnetic material layer made of anisotropic magnetic material. The magnetic material layer is arranged in such a way that a hard magnetization axis of the anisotropic magnetic material is directed almost parallel to the face. The antenna element is arranged almost parallel to the printed circuit board on a side of the face. The antenna element is arranged in such a way that an antenna current distributed on the antenna element if the antenna element is excited is directed almost perpendicular to the hard magnetization axis.

(73) Assignee: **KABUSHIKI KAISHA
TOSHIBA**, Tokyo (JP)(21) Appl. No.: **11/973,807**(22) Filed: **Oct. 10, 2007**

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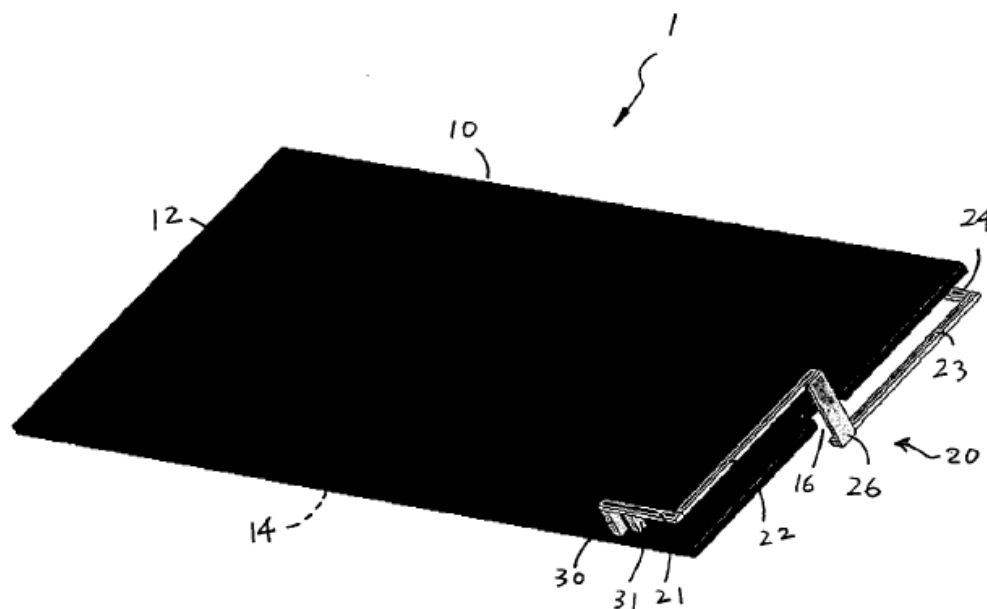
US 20080143631A1

(19) **United States**(12) **Patent Application Publication****Autti**(10) **Pub. No.: US 2008/0143631 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **ANTENNA FOR A PORTABLE DEVICE****Publication Classification**(75) Inventor: **Marko Autti, Oulu (FI)**(51) **Int. Cl.****H01Q 1/48** (2006.01)**H01P 11/00** (2006.01)(52) **U.S. Cl.** **343/845; 29/600**(57) **ABSTRACT**

Correspondence Address:

WARE FRESSOLA VAN DER SLUYS & ADOLPHSON, LLP**BRADFORD GREEN, BUILDING 5, 755 MAIN STREET, P O BOX 224
MONROE, CT 06468**(73) Assignee: **Nokia Corporation**(21) Appl. No.: **11/641,561**(22) Filed: **Dec. 19, 2006**

A GPS antenna has two electrically connected L-sections disposed on opposite sides of a circuit board. The L-sections lie on two separate planes parallel to the circuit board surface. One L-section is connected to a feeding point located at one edge area of the circuit board and the other L-section is connected to a grounding point located at an opposite edge area of the circuit board. Optionally, a second grounding point is connected to the antenna element adjacent to the feeding point for impedance matching purposes. The antenna is configured for use in an electronic device such as a mobile phone.



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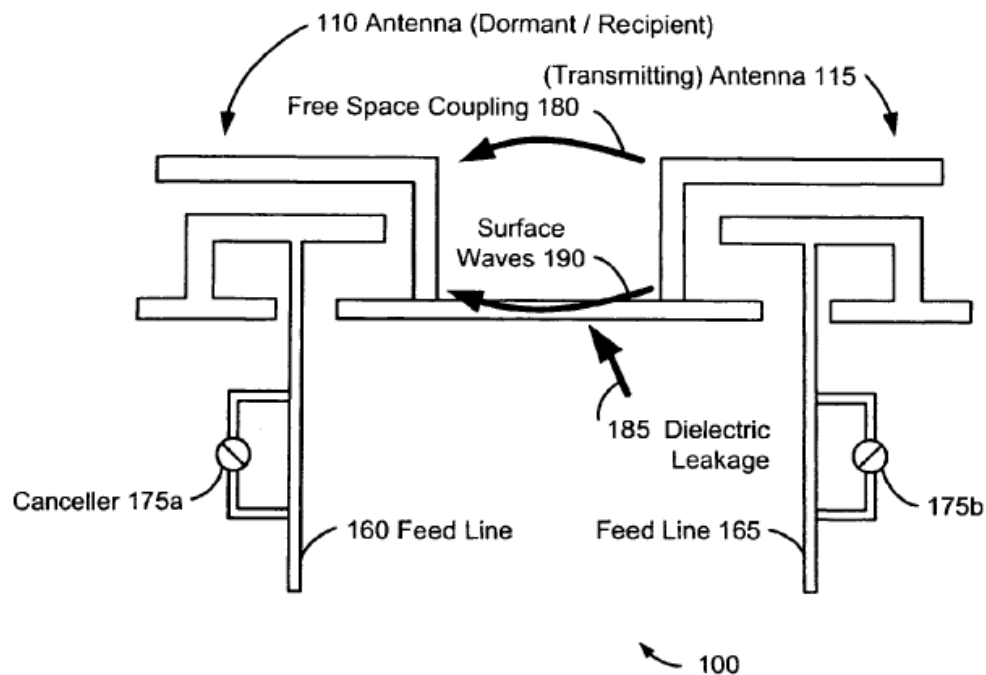
US 20080146183A1

(19) **United States**(12) **Patent Application Publication**
Gebara et al.(10) **Pub. No.: US 2008/0146183 A1**(43) **Pub. Date: Jun. 19, 2008**(54) **METHOD AND SYSTEM FOR ANTENNA
INTERFERENCE CANCELLATION**(60) Provisional application No. 60/520,592, filed on Nov.
17, 2003.(75) Inventors: **Edward Gebara**, Atlanta, GA
(US); **Joy Laskar**, Marietta, GA
(US); **Emmanouil M. Tentzeris**,
Atlanta, GA (US); **Andrew Joo**
Kim, Atlanta, GA (US)**Publication Classification**(51) **Int. Cl.**
H04B 1/10

(2006.01)

(52) **U.S. Cl.** **455/295**Correspondence Address:
KING & SPALDING LLP
1180 PEACHTREE STREET
ATLANTA, GA 30309-3521(57) **ABSTRACT**

A wireless communication system can comprise two or more antennas that interfere with one another via free space coupling, surface wave crosstalk, dielectric leakage, or other interference effect. The interference effect can produce an interference signal on one of the antennas. A cancellation device can suppress antenna interference by generating an estimate of the interference signal and subtracting the estimate from the interference signal. The cancellation device can generate the estimate based on sampling signals on an antenna that generates the interference or on an antenna that receives the interference. The cancellation device can comprise a model of the crosstalk effect. Transmitting test signals on the communication system can define or refine the model.

(73) Assignee: **Quellan, Inc.**, Atlanta, GA (US)(21) Appl. No.: **12/069,236**(22) Filed: **Feb. 8, 2008****Related U.S. Application Data**(63) Continuation of application No. 11/512,674, filed on
Aug. 30, 2006, now Pat. No. 7,366,244, which is a
continuation of application No. 10/991,009, filed on
Nov. 17, 2004, now Pat. No. 7,123,676.

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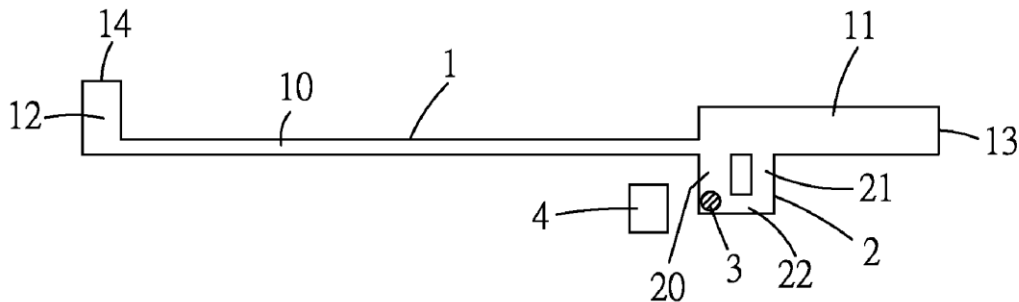
US 20080150807A1

(19) **United States**(12) **Patent Application Publication**
Lin et al.(10) **Pub. No.: US 2008/0150807 A1**(43) **Pub. Date: Jun. 26, 2008**(54) **MULTI-BAND ANTENNA****Publication Classification**(75) Inventors: **Ching-Chi Lin**, Taipei Hsien (TW);
Kai Shih, Taipei Hsien (TW);
Yu-Yuan Wu, Taipei Hsien (TW)(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/24 (2006.01)
H01Q 1/38 (2006.01)
(52) **U.S. Cl.** **343/702; 343/700 MS**
(57) **ABSTRACT**

Correspondence Address:

WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
2030 MAIN STREET, SUITE 1300
IRVINE, CA 92614(73) Assignee: **CHENG UEI PRECISION**
INDUSTRY CO., LTD., Taipei
Hsien (TW)(21) Appl. No.: **11/613,260**(22) Filed: **Dec. 20, 2006**

A multi-band antenna configured in a portable electrical device capable of operating in a low frequency bandwidth and a high frequency bandwidth has an elongated radiating body and a feeding conductor connecting the elongated radiating body and a connecting portion connecting the side arms. A feeding point is arranged at a corner where one of the side arms connects to the connecting portion. The elongated radiating body and the feeding conductor are located on different planes of the portable electronic device. According to the position where the feeding conductor connects to the elongated radiating body and the position where the feeding point is arranged at, the multi-band antenna has a preferred low frequency bandwidth and a preferred high frequency bandwidth. Therefore, the portable electrical device can operate at different wireless bandwidths.

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(19) **United States**

(12) Patent Application Publication
Asrani et al.

(10) **Pub. No.: US 2008/0150808 A1**

(43) **Pub. Date:** **Jun. 26, 2008**

(54) **SWITCHED CAPACITIVE PATCH FOR RADIO FREQUENCY ANTENNAS**

(76) Inventors: **Vijay L. Asrani**, Round Lake, IL (US); **Adrian Napoles**, Lake Villa, IL (US)

Correspondence Address:
INGRASSIA FISHER & LORENZ, P.C. (MOT)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

(21) Appl. No.: **11/613,354**

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

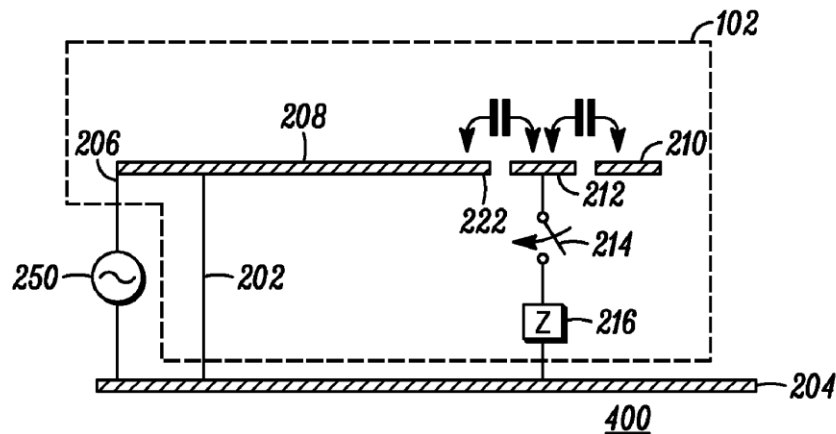
Publication Classification

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

(52) **U.S. Cl.** **343/702**; 343/700 MS; 343/860

(57) **ABSTRACT**

An antenna system (102) for receiving and transmitting radio frequency (RF) signals within a plurality of predetermined RF bands includes a ground leg (202), a feed leg (206), one or more capacitive patches (212) and one or more switching devices (214). The feed leg (206) is coupled to the ground leg (202) at one portion thereof. Each of the one or more switching devices (214) is associated with one capacitive patch (212) and selectively couples its associated capacitive patch (212) to a ground plane (204) in order to receive and transmit RF signals within an associated predetermined RF band.



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US 20080150809A1

(19) **United States**

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

(10) **Pub. No.: US 2008/0150809 A1**

(43) **Pub. Date: Jun. 26, 2008**

(54) **HOOP ANTENNA**

Publication Classification

(75) Inventors: **Kent Rosengren, (US); Joacim Rylander, (US)**

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

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

(57) **ABSTRACT**

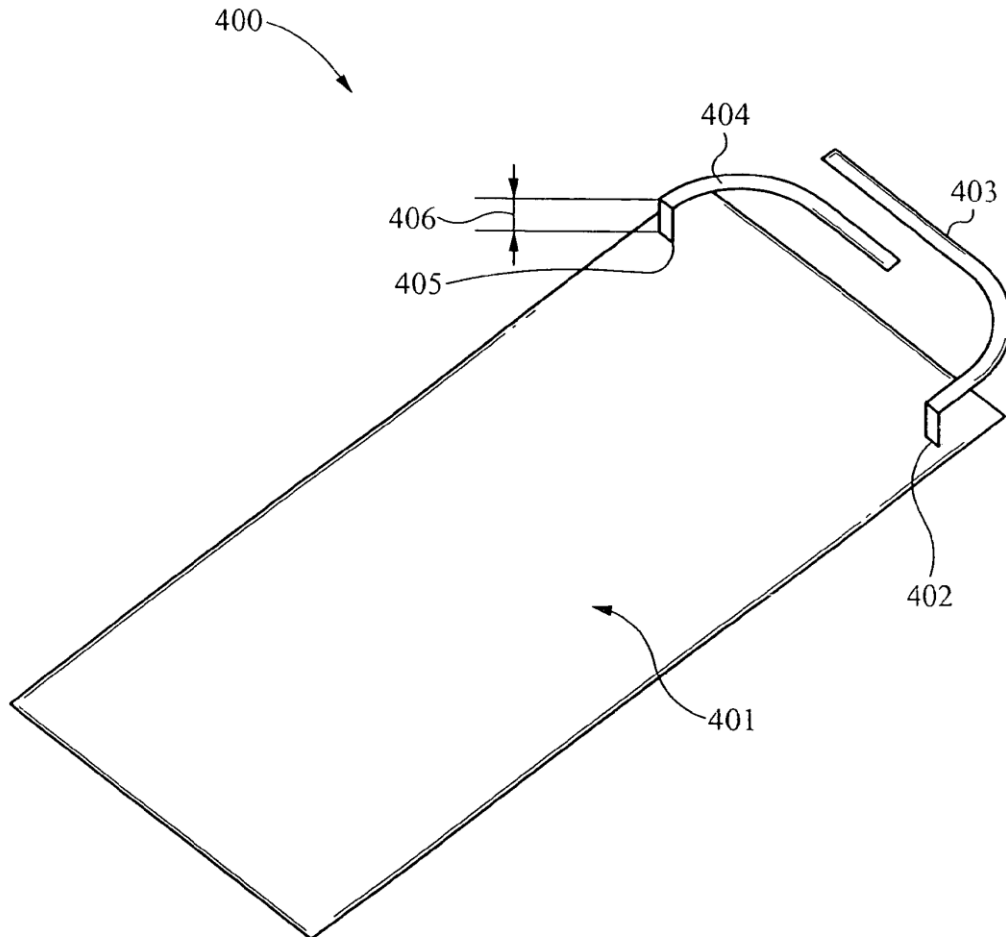
Correspondence Address:
HAVERSTOCK & OWENS LLP
162 N WOLFE ROAD
SUNNYVALE, CA 94086

An antenna for use in a relatively small confined space, such as a mobile phone, is provided. In one example, the antenna includes a feeding arm having an end coupled to a feeding contact; and a grounded arm having an end coupled to a ground contact, wherein the feeding arm and the grounded arm are bent to conform to the relatively small confined volume. The relatively small confined volume can be internal space of a mobile communication device. The mobile communication device can be a mobile phone, for example.

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

(21) Appl. No.: **11/644,728**

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



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US 20080150810A1

(19) **United States**(12) **Patent Application Publication**
SUGIYAMA et al.(10) **Pub. No.: US 2008/0150810 A1**(43) **Pub. Date: Jun. 26, 2008**(54) **ANTENNA APPARATUS AND RADIO
COMMUNICATING APPARATUS**(75) Inventors: **Yuichi SUGIYAMA**, Kawasaki
(JP); **Kouji SOEKAWA**, Kawasaki
(JP)

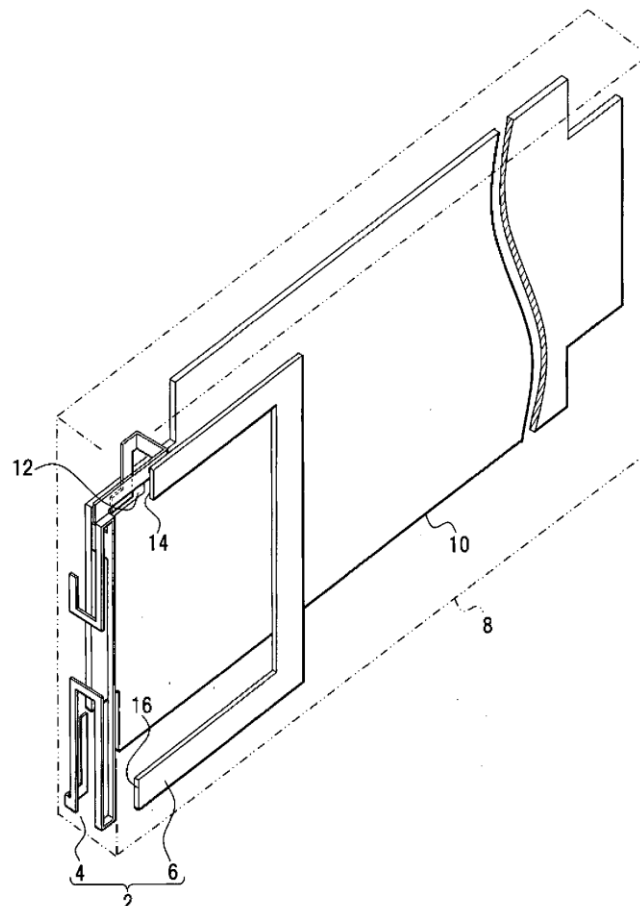
Correspondence Address:

**WESTERMAN, HATTORI, DANIELS &
ADRIAN, LLP**
1250 CONNECTICUT AVENUE, NW, SUITE 700
WASHINGTON, DC 20036(73) Assignee: **FUJITSU LIMITED**,
Kawasaki-shi (JP)(21) Appl. No.: **11/864,462**(22) Filed: **Sep. 28, 2007**(30) **Foreign Application Priority Data**

Dec. 21, 2006 (JP) 2006-344795

Publication Classification(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/22 (2006.01)(52) **U.S. Cl.** **343/702; 343/700 MS**(57) **ABSTRACT**

The present invention relates to an antenna apparatus capable of multifrequency resonance and realizes downsizing and multifrequency resonance. The present invention relates to an antenna apparatus capable of multifrequency resonance or a radio communicating apparatus (e.g., portable phone) including the antenna apparatus; toward a feed element connected to and supplied with electricity from a feeding unit of a circuit substrate (printed circuit substrate), a non-feed element is disposed with over the circuit substrate or outside the circuit substrate; and the feed side or the open side of the feed element is electromagnetically coupled to the non-feed element to enable resonance in the frequency band of the non-feed element in addition to resonance in the frequency band of the feed element.



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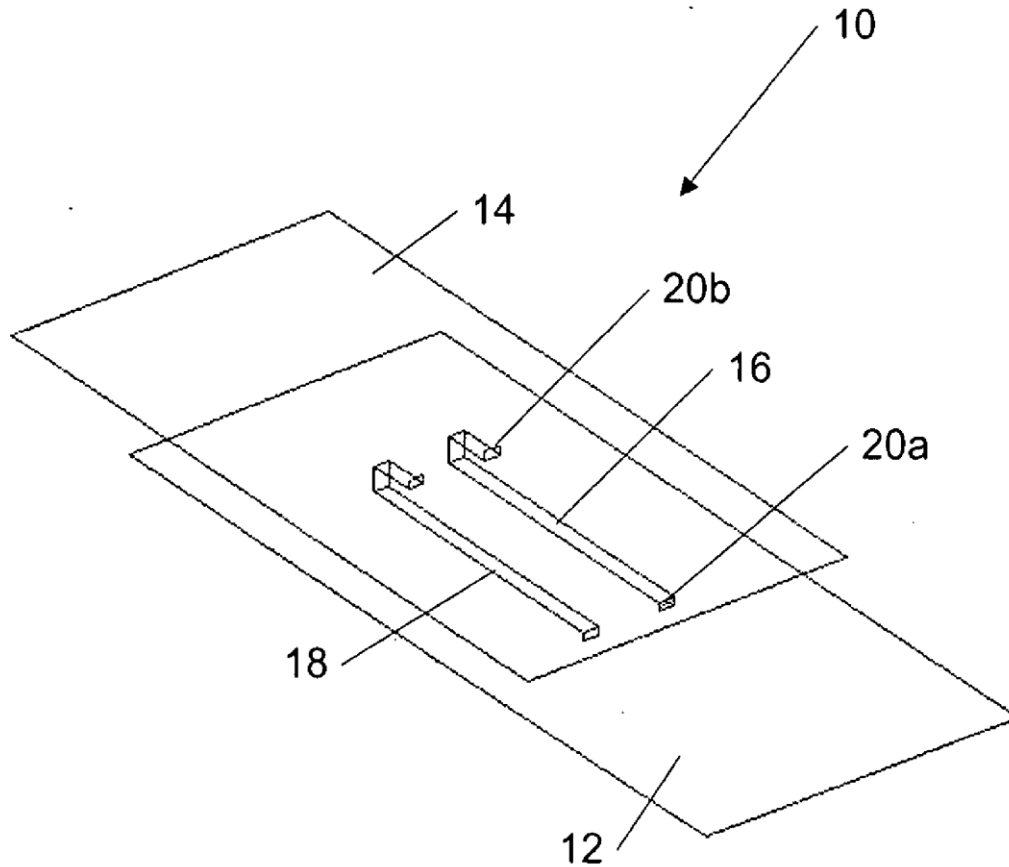
US 20080150816A1

(19) **United States**(12) **Patent Application Publication****Rahola et al.**(10) **Pub. No.: US 2008/0150816 A1**(43) **Pub. Date: Jun. 26, 2008**(54) **ANTENNA FEED ARRANGEMENT****Publication Classification**(75) Inventors: **Jussi Rahola, Espoo (FI); Jani Ollikainen, Helsinki (FI)**(51) **Int. Cl.**
H01Q 1/00 (2006.01)
H01Q 1/50 (2006.01)(52) **U.S. Cl.** **343/720; 343/859**(57) **ABSTRACT**

Correspondence Address:

**WARE FRESSOLA VAN DER SLUYS & ADOL-
PHSON, LLP
BRADFORD GREEN, BUILDING 5, 755 MAIN
STREET, P O BOX 224
MONROE, CT 06468**(73) Assignee: **Nokia Corporation**(21) Appl. No.: **11/645,117**(22) Filed: **Dec. 21, 2006**

The specification and drawings present a new apparatus and method for antenna arrangement by providing a feed arrangement through a flex connection for radiating elements of a first part and a second part (e.g., lower and upper parts, respectively) of a mobile terminal (e.g., a slide-type terminal), wherein the first and second parts are configured to move relative to each other during operation of the mobile terminal. For a slide-type terminal, the first and the second parts can be sliding relative to each other during said operation. This antenna arrangement can be used by any of the cellular or non-cellular wireless systems.



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US 20080150823A1

(19) **United States**

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

(10) **Pub. No.: US 2008/0150823 A1**

(43) **Pub. Date: Jun. 26, 2008**

(54) **COMPACT ANTENNAS FOR ULTRA WIDE
BAND APPLICATIONS**

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

Publication Classification

(76) Inventors: **Alireza Hormoz Mohammadian**,
San Diego, CA (US); **Joseph**
Patrick Burke, Carlsbad, CA (US);
Samir S. Soliman, San Diego, CA
(US)

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

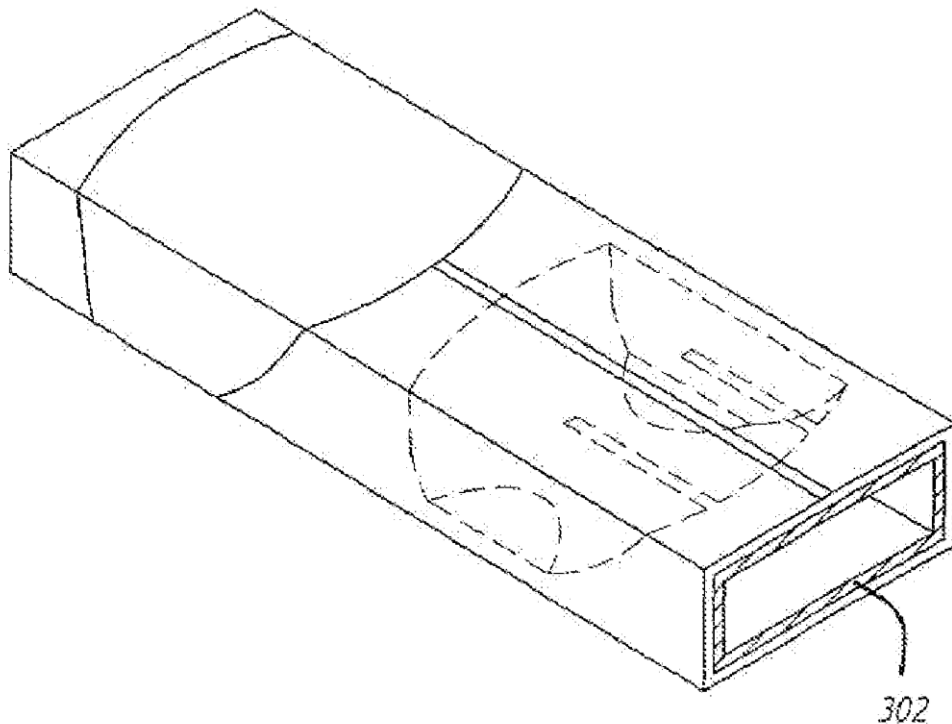
(52) **U.S. Cl.** **343/795; 343/700 MS**

(57) **ABSTRACT**

Correspondence Address:
QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO, CA 92121

Compact antennas for ultra wide band applications are disclosed. The compact antenna may be an elliptic dipole antenna with a poise and counterpoise both having an elliptical shape. A substrate may be used to support the poise and counterpoise with the substrate having a closed three-dimensional shape.

(21) Appl. No.: **11/615,802**



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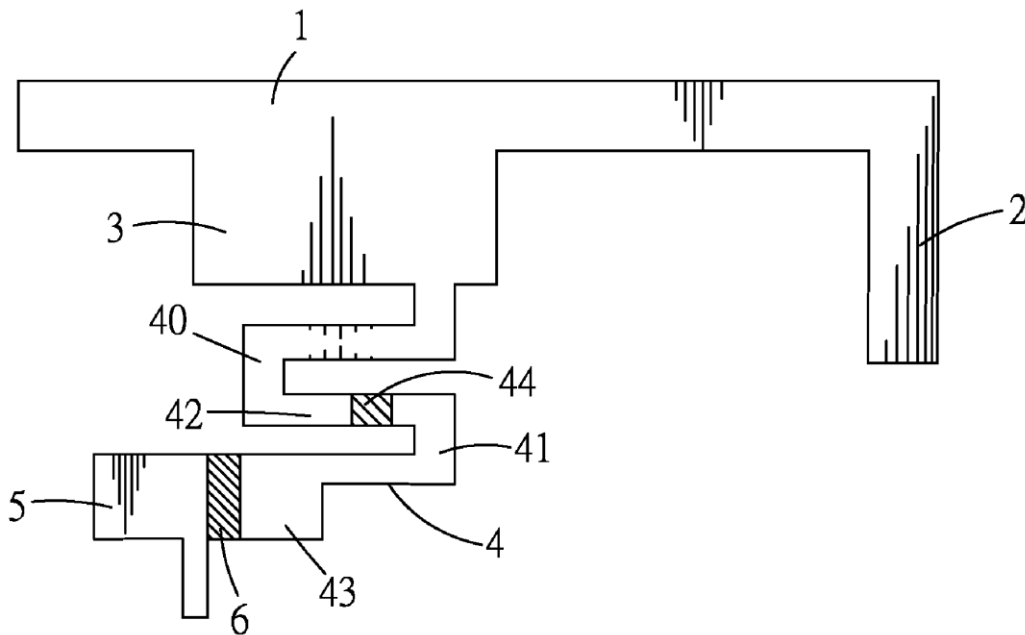
US 20080150829A1

(19) **United States**(12) **Patent Application Publication**
Lin et al.(10) **Pub. No.: US 2008/0150829 A1**(43) **Pub. Date: Jun. 26, 2008**(54) **MULTI-BAND ANTENNA****Publication Classification**(75) Inventors: **Ching-Chi Lin**, Taipei Hsien (TW);
Kai Shih, Taipei Hsien (TW);
Yu-Yuan Wu, Taipei Hsien (TW)(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/50 (2006.01)
(52) **U.S. Cl.** **343/860; 343/700 MS**(57) **ABSTRACT**

Correspondence Address:

WPAT, PC**INTELLECTUAL PROPERTY ATTORNEYS**
2030 MAIN STREET, SUITE 1300
IRVINE, CA 92614(73) Assignee: **CHENG UEI PRECISION**
INDUSTRY CO., LTD., Taipei
Hsien (TW)(21) Appl. No.: **11/613,248**(22) Filed: **Dec. 20, 2006**

A multi-band antenna adapted to a portable electrical device capable of operating in various wireless communication bands includes a first radiating conductor having opposite elongated sides, a second radiating conductor extending from one end of the first radiating conductor, a third radiating conductor arranged about a central area of the first radiating conductor. Both the second radiating conductor and the third radiating conductor extend from the same elongated side of the first radiating conductor. A feeding body is curved and extended from the third radiating conductor. According to a position that the feeding body connecting to the third radiating conductor and designed the feeding body, operation of the multi-band antenna has a preferred range of a low frequency bandwidth and a high frequency harmonic bandwidth.

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US 20080150830A1

(19) **United States**

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

(10) **Pub. No.: US 2008/0150830 A1**

(43) **Pub. Date: Jun. 26, 2008**

(54) **MULTI-BAND TUNABLE FREQUENCY
RECONFIGURABLE ANTENNAS USING
HIGHER ORDER RESONANCES**

(21) Appl. No.: **11/644,741**

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

Publication Classification

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

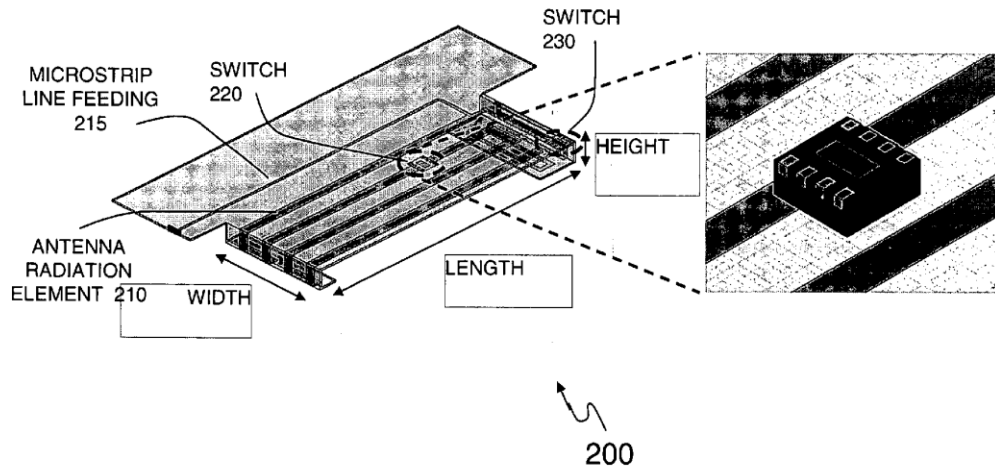
(52) **U.S. Cl.** **343/876**

(76) Inventors: **Helen K. Pan**, Portland, OR (US);
Songnan Yang, Knoxville, TN
(US); **Debabani Choudhury**,
Thousand Oaks, CA (US); **Vijay K.**
Nair, Mesa, AZ (US)

Correspondence Address:
INTEL CORPORATION
c/o INTELLEVATE, LLC
P.O. BOX 52050
MINNEAPOLIS, MN 55402

(57) **ABSTRACT**

A wireless device using natural higher order harmonics on multi-band reconfigurable antenna designs where the antenna higher order resonance is used to build a multi-band to multi-band frequency reconfigurable antenna.



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US 20080153329A1

(19) **United States**(12) **Patent Application Publication****Lin et al.**(10) **Pub. No.: US 2008/0153329 A1**(43) **Pub. Date: Jun. 26, 2008**

(54) **ELECTRICAL CONNECTOR FOR
CONNECTING ELECTRICALLY AN
ANTENNA MODULE TO A GROUNDING
PLATE**

(76) Inventors: **Sheng-Chih Lin**, Taipei (TW);
Tsung-Wen Chiu, Taipei (TW);
Fu-Ren Hsiao, Taipei (TW); **Sih-Ji
Wang**, Taipei (TW)

Correspondence Address:
FROMMER LAWRENCE & HAUG
745 FIFTH AVENUE- 10TH FL.
NEW YORK, NY 10151

(21) Appl. No.: **11/960,947**

(22) Filed: **Dec. 20, 2007**

(30) **Foreign Application Priority Data**

Dec. 22, 2006 (TW) 095148401

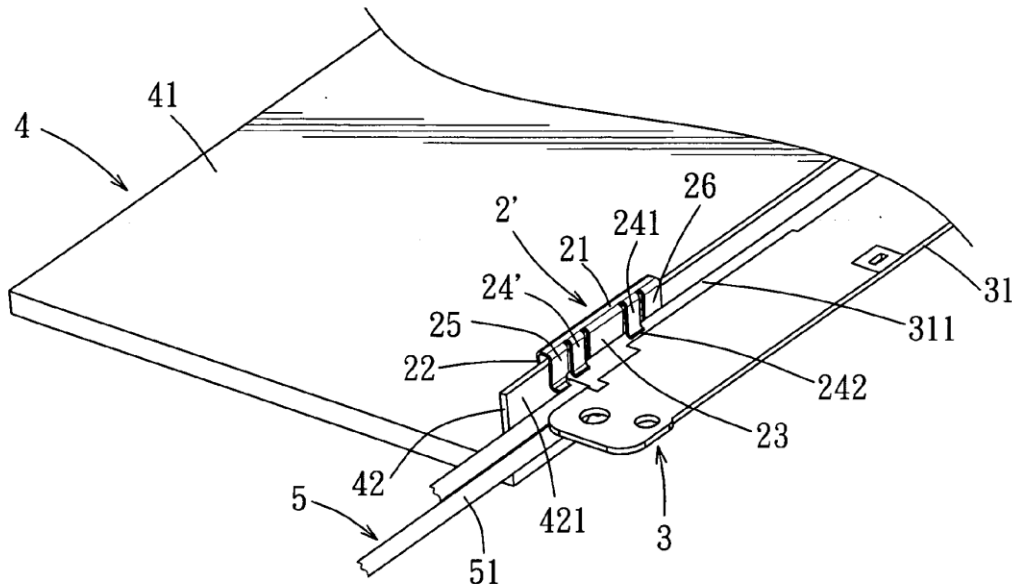
Publication Classification

(51) **Int. Cl.**
H01R 4/66 (2006.01)
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(57) **ABSTRACT**

An electrical connector includes a top plate, a first clamping plate extending integrally and downwardly from a first side of the top plate, and a second clamping plate extending integrally and downwardly from a second side of the top plate, and cooperating with the top plate and the first clamping plate to define a clamp for clamping a grounding plate. A connecting member extends integrally from the second side of the top plate and is connected electrically to a ground pattern provided on a circuit board of an antenna module.



Acrobat 文件