



US 20100253579A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0253579 A1**

(43) **Pub. Date: Oct. 7, 2010**

(54) **ANTENNA WITH 3-D CONFIGURATION**

(30) **Foreign Application Priority Data**

(76) Inventors: **Byung Hoon Ryou**, Seoul (KR);  
**Won Mo Sung**, Gyeonggi-do (KR);  
**Gi Seck Seung**, Gyeonggi-do (KR)

Jun. 30, 2006 (KR) ..... 10-2006-0060320

**Publication Classification**

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

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

(57) **ABSTRACT**

Disclosed herein is an antenna comprising: a first dielectric element having a first slit formed thereon; a first radiator formed on the first dielectric element; a second dielectric element coupled to the first dielectric element in such a fashion as to be fit into the first slit of the first dielectric element; and a second radiator formed on the second dielectric element and coupled electrically with the first radiator through the coupling between the first dielectric element and the second dielectric element. The present invention provides an antenna which can maximize an electrical length thereof in a limited space, can be designed even in a three-dimensional space, and can be fabricated simply at low cost.

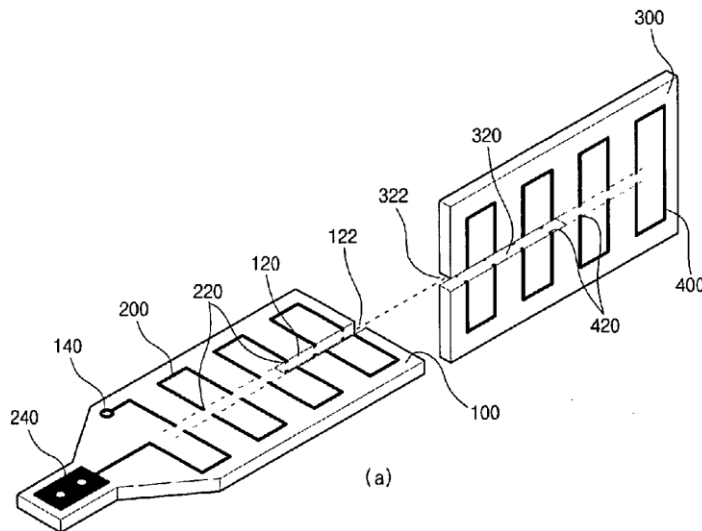
Correspondence Address:  
**BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP**  
**1279 OAKMEAD PARKWAY**  
**SUNNYVALE, CA 94085-4040 (US)**

(21) Appl. No.: **12/308,652**

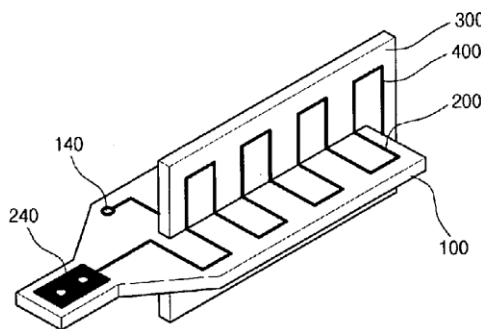
(22) PCT Filed: **Jun. 27, 2007**

(86) PCT No.: **PCT/KR2007/003106**

§ 371 (c)(1),  
(2), (4) Date: **Jun. 15, 2010**



(a)



(b)



US 20100253580A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0253580 A1**

(43) **Pub. Date: Oct. 7, 2010**

(54) **PRINTED ANTENNA AND ELECTRONIC DEVICE EMPLOYING THE SAME**

(30) **Foreign Application Priority Data**

Apr. 2, 2009 (CN) ..... 200920301870.7

(75) Inventors: **Tao YAN**, Shenzhen City (CN);  
**Dong WEI**, Shenzhen City (CN)

**Publication Classification**

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

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

(57) **ABSTRACT**

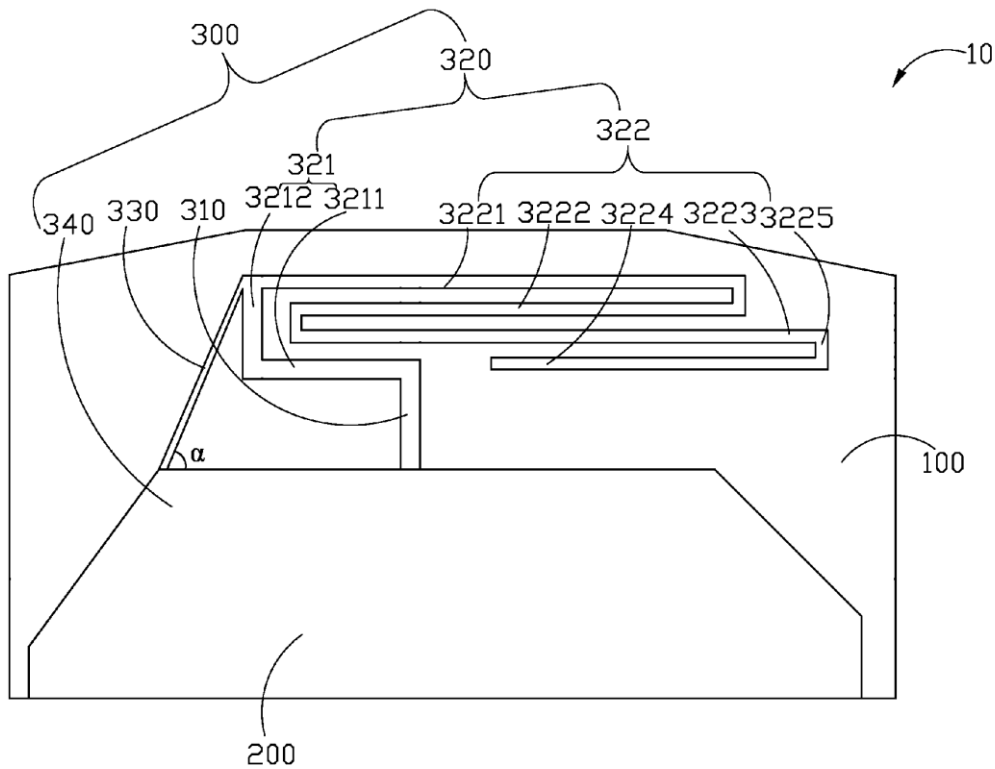
Correspondence Address:  
**Altis Law Group, Inc.**  
**ATTN: Steven Reiss**  
**288 SOUTH MAYO AVENUE**  
**CITY OF INDUSTRY, CA 91789 (US)**

A printed antenna includes a feeding portion, a radiating portion, a grounding portion, and a short portion. The feeding portion is operable to feed electromagnetic signals. The radiating portion is connected to the feeding portion, to radiate the electromagnetic signals. The radiating portion includes a first radiator and a second radiator. The first radiator is "L" shape, with a first end electrically connected to the feeding portion. The second radiator is formed by a plurality of radiating sections connected one by one. A first end of the second radiator is connected to a second end of the first radiator, a second end of the second radiator is floating and facing the feeding portion. A first end of the short portion is connected to a common node of the first radiator and the second radiator, and a second end of the short portion is connected to the grounding portion.

(73) Assignees: **HONG FU JIN PRECISION INDUSTRY (ShenZhen) CO., LTD.**, Tu-Cheng (CN); **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW)

(21) Appl. No.: **12/430,109**

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





US 20100253581A1

(19) **United States**

(12) **Patent Application Publication**  
**TSOU**

(10) **Pub. No.: US 2010/0253581 A1**

(43) **Pub. Date: Oct. 7, 2010**

(54) **MULTIBAND ANTENNA AND PORTABLE WIRELESS COMMUNICATION DEVICE USING THE SAME**

(30) **Foreign Application Priority Data**

Apr. 3, 2009 (CN) ..... 200910301353.4

(75) Inventor: **TUN-YUAN TSOU, Tu-Cheng (TW)**

**Publication Classification**

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

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

Correspondence Address:

**Altis Law Group, Inc.**  
**ATTN: Steven Reiss**  
**288 SOUTH MAYO AVENUE**  
**CITY OF INDUSTRY, CA 91789 (US)**

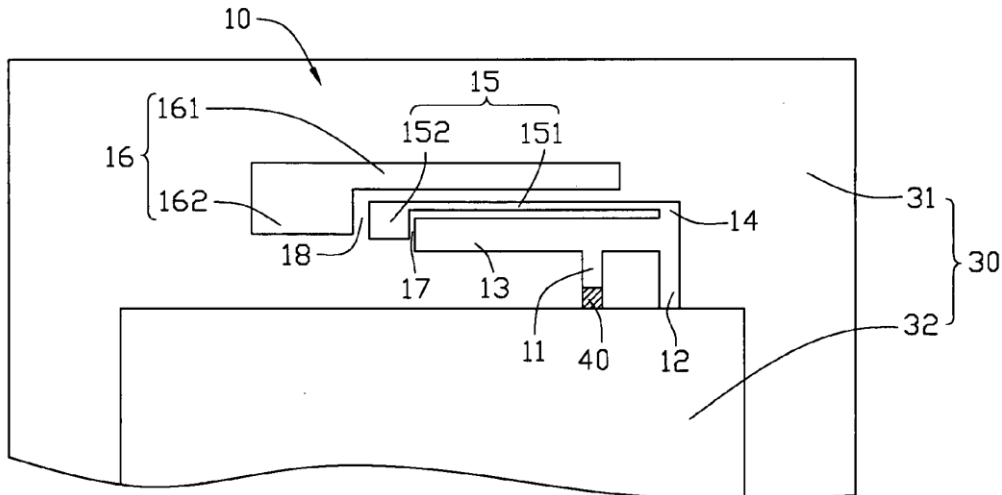
(57) **ABSTRACT**

A multiband antenna includes a feed end, a grounding end, a first radiating arm, a connecting portion, a second radiating arm and a third radiating arm. The feed end and the grounding end are connected to the first radiating arm to form an F-shaped antenna, and obtain a first resonance frequency. The second radiating arm generates a coupling effect with the first radiating arm, and obtains a second resonance frequency. The third radiating arm generates a coupling effect with the second radiating arm, and obtains a third resonance frequency.

(73) Assignee: **CHI MEI COMMUNICATION SYSTEMS, INC., Tu-Cheng City (TW)**

(21) Appl. No.: **12/485,127**

(22) Filed: **Jun. 16, 2009**





US 20100254482A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0254482 A1**

(43) **Pub. Date: Oct. 7, 2010**

(54) **DIGITAL BROADCASTING ANTENNA STRUCTURE**

**Publication Classification**

(51) **Int. Cl.**  
**H04L 27/00** (2006.01)

(76) Inventor: **Gary WANG**, Taoyuan County (TW)

(52) **U.S. Cl.** ..... 375/295

(57) **ABSTRACT**

Correspondence Address:  
**Muncy, Geissler, Olds & Lowe, PLLC**  
**4000 Legato Road, Suite 310**  
**FAIRFAX, VA 22033 (US)**

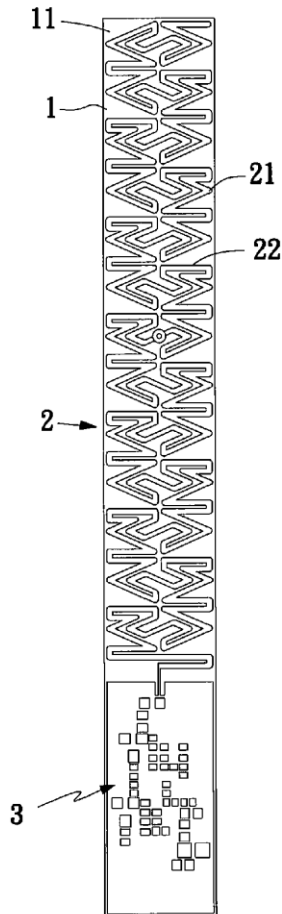
A digital broadcasting antenna structure includes a substrate having at least a first and a second face; a main antenna arranged on the first face; an amplifier arranged on the first face and electrically connected to the main antenna; a compensating unit arranged on the second face and electrically connected to the main antenna; a bandwidth modulating unit arranged on the second face and electrically connected to the compensating unit; and a grounding section arranged on the second face and electrically connected to the bandwidth modulating unit. The digital broadcasting antenna structure can receive digital broadcasting signals without being restricted to any specific receiving direction, and is applicable to low, intermediate and high frequency bands to therefore achieve the effects of miniaturization, high bandwidth and low return loss.

(21) Appl. No.: **12/724,017**

(22) Filed: **Mar. 15, 2010**

(30) **Foreign Application Priority Data**

Apr. 3, 2009 (TW) ..... 0982005406





US 20100258919A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0258919 A1**

(43) **Pub. Date: Oct. 14, 2010**

(54) **SEMICONDUCTOR PATCH ANTENNA**

**Related U.S. Application Data**

(75) Inventors: **Sergey N. Makarov**, Holden, MA (US); **Reinhold Ludwig**, Paxton, MA (US); **Francesca Scire-Scappuzzo**, Lexington, MA (US); **John McNeill**, Stow, MA (US)

(60) Provisional application No. 61/168,119, filed on Apr. 9, 2009.

**Publication Classification**

(51) **Int. Cl.**  
*H01L 29/868* (2006.01)  
*H01L 21/329* (2006.01)  
(52) **U.S. Cl.** ..... **257/656**; 438/478; 257/E29.336; 257/E21.352

Correspondence Address:  
**BURNS & LEVINSON, LLP**  
**125 SUMMER STREET**  
**BOSTON, MA 02110 (US)**

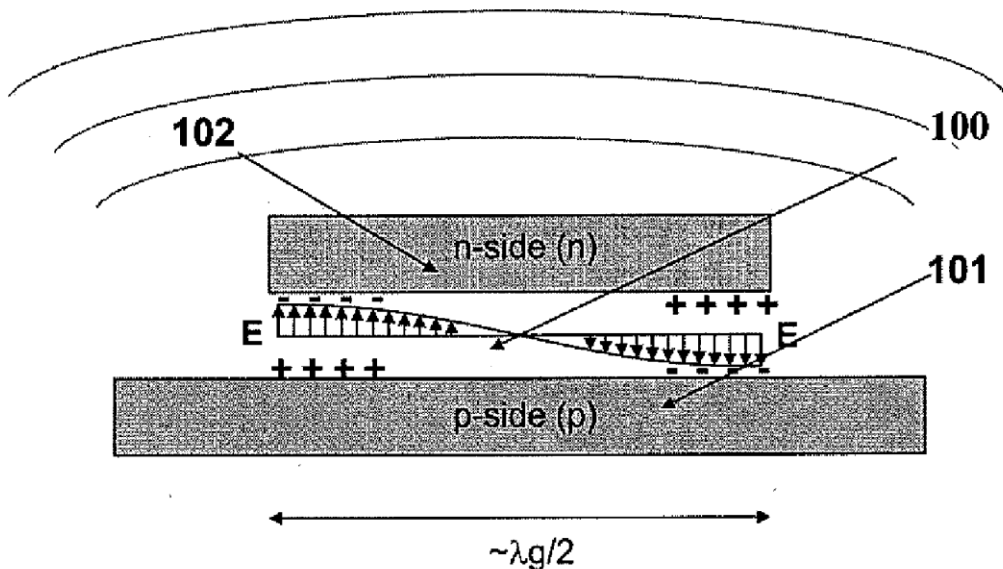
(57) **ABSTRACT**

(73) Assignee: **Worcester Polytechnic Institute**, Worcester, MA (US)

A semiconductor patch antenna for microwave radiation having a wide pin-junction or pn-junction with the depletion region or embodiments having a separating buried oxide (SiO<sub>2</sub>) layer between p- and n-doped regions as the natural resonator volume. Embodiments that do not include a metal ground plane and/or a metal patch are disclosed.

(21) Appl. No.: **12/757,506**

(22) Filed: **Apr. 9, 2010**





US 20100259454A1

(19) **United States**

(12) **Patent Application Publication**

**Rahola et al.**

(10) **Pub. No.: US 2010/0259454 A1**

(43) **Pub. Date: Oct. 14, 2010**

(54) **MECHANICALLY TUNABLE ANTENNA FOR COMMUNICATION DEVICES**

**Publication Classification**

(76) Inventors: **Jussi Rahola**, Espoo (FI); **Jani Ollikainen**, Helsinki (FI); **Keniche Hashizume**, Kitagunma-gun (JP); **Matti Ryyanen**, Helsinki (FI)

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

(57) **ABSTRACT**

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

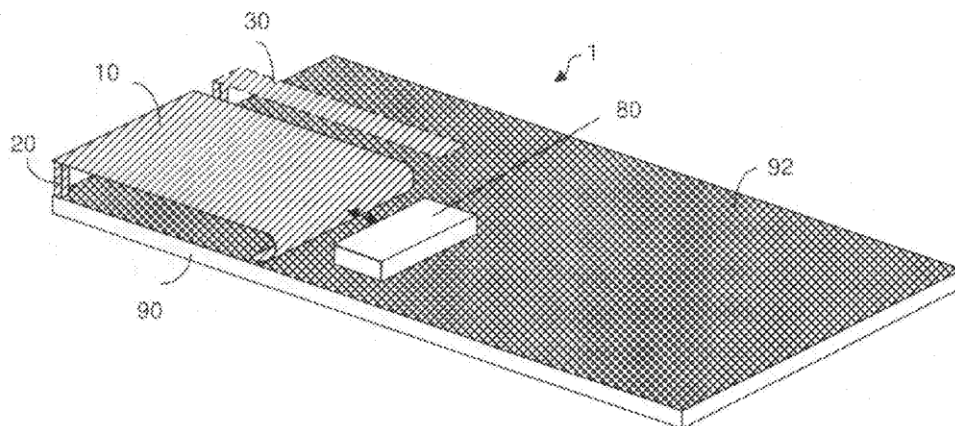
A radio antenna assembly for use in a communication device has an antenna element disposed adjacent to a ground plane to form a physical relationship with the ground plane. A mechanical device is used to change the physical relationship for changing the operating impedance of the antenna element or shifting the frequency band of the antenna assembly. The physical relationship can be changed by mechanically changing the shape of the antenna element. When the antenna element comprises a first radiating element and a second radiating element disposed at a lateral distance from the first radiating element, the physical relationship can be changed by changing the distance. When a physical object is disposed between the antenna element and the ground plane, the physical relationship can be changed by moving or twisting the physical object. The object can be electrically conducting, dielectric or magnetic.

(21) Appl. No.: **12/803,094**

(22) Filed: **Jun. 18, 2010**

**Related U.S. Application Data**

(62) Division of application No. 11/478,839, filed on Jun. 30, 2006, now Pat. No. 7,755,547.





US 20100259456A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0259456 A1**

(43) **Pub. Date: Oct. 14, 2010**

(54) **MULTI-LAYER REACTIVELY LOADED ISOLATED MAGNETIC DIPOLE ANTENNA**

in-part of application No. 12/059,346, filed on Mar. 31, 2008, now Pat. No. 7,777,686.

(75) Inventors: **Laurent Desclos**, San Diego, CA (US); **Sebastian Rowson**, San Diego, CA (US); **Jeffrey Shamblin**, San Diego, CA (US); **Young Cha**, San Diego, CA (US); **Chulmin Han**, San Diego, CA (US); **Byoeng Sug Kwak**, Gunpo-si (KR)

(60) Provisional application No. 61/168,550, filed on Apr. 10, 2009.

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 9/28** (2006.01)  
**H01Q 1/00** (2006.01)

(52) **U.S. Cl.** ..... **343/730; 343/795**

(57) **ABSTRACT**

A multi-layer reactively loaded isolated magnetic (IMD) dipole with improved bandwidth and efficiency characteristics to be used in wireless communications and other applicable systems. The multi-layer IMD antenna comprises a first element positioned above a ground plane, a second element positioned above a ground plane and coupled to the first portion. Reactive components are integrated into one or both elements to optimize the frequency response of the antenna. The range of frequencies covered to be determined by the shape, size, and number of elements in the physical configuration of the components. Portions of or the entire ground plane can be removed beneath the elements.

Correspondence Address:

**Coastal Patent, LLC**  
**P.O.BOX 232340**  
**San Diego, CA 92193 (US)**

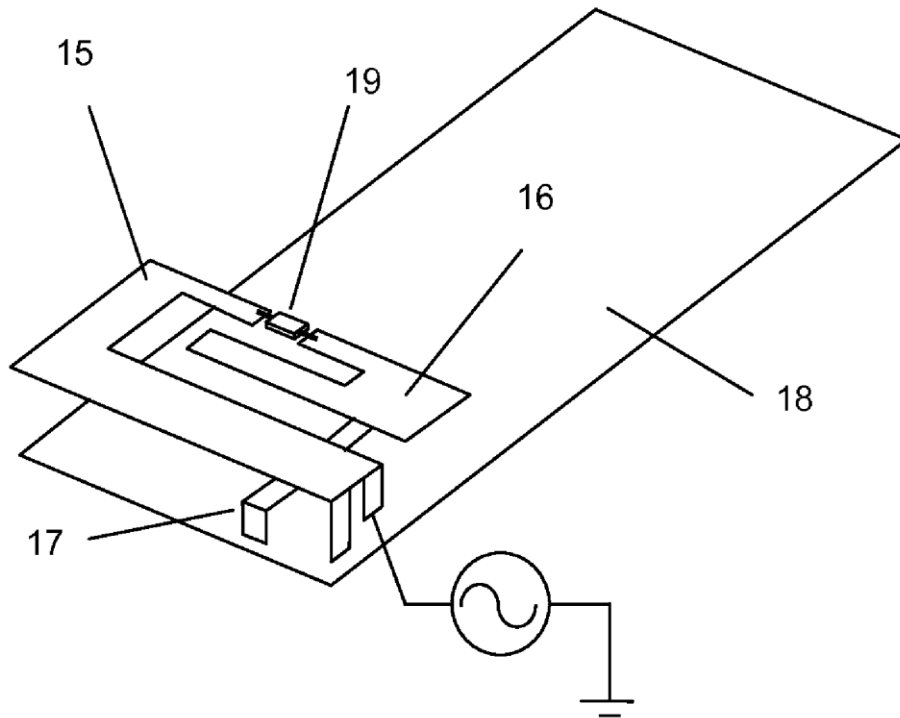
(73) Assignee: **ETHERTRONICS, INC.**, San Diego, CA (US)

(21) Appl. No.: **12/758,725**

(22) Filed: **Apr. 12, 2010**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 11/847,207, filed on Aug. 29, 2007, now abandoned, Continuation-





US 20100259461A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0259461 A1**

(43) **Pub. Date: Oct. 14, 2010**

(54) **ANTENNA APPARATUS FOR EXPLOSIVE ENVIRONMENTS**

**Publication Classification**

(76) Inventors: **Clyde Thomas Eisenbeis,**  
Marshalltown, IA (US); **Scott R. Kratzer,**  
Marshalltown, IA (US)

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

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

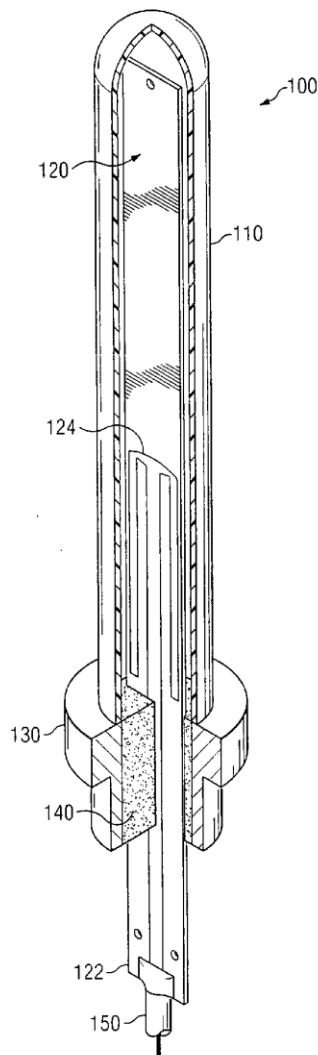
Correspondence Address:  
**HANLEY, FLIGHT & ZIMMERMAN, LLC**  
**150 S. WACKER DRIVE, SUITE 2100**  
**CHICAGO, IL 60606 (US)**

(57) **ABSTRACT**

Antenna assemblies for wireless communications in explosive environments are described. An example antenna assembly has a housing, a base member at one end of the housing, and an antenna extending through the base member and into the housing. A sealing compound within the base member encapsulates the antenna to seal the antenna at the base member.

(21) Appl. No.: **11/804,189**

(22) Filed: **May 17, 2007**







US 20100265141A1

(19) **United States**

(12) **Patent Application Publication**  
**Hsu**

(10) **Pub. No.: US 2010/0265141 A1**

(43) **Pub. Date: Oct. 21, 2010**

(54) **ANTENNA AND WIRELESS TRANSCEIVER USING THE SAME**

**Publication Classification**

(75) Inventor: **Chia-Jui Hsu**, Hsinchu (TW)

(51) **Int. Cl.**  
*H01Q 1/52* (2006.01)  
*H01Q 1/24* (2006.01)  
(52) **U.S. Cl.** ..... **343/702; 343/841**

Correspondence Address:  
**EDWARDS ANGELL PALMER & DODGE LLP**  
**P.O. BOX 55874**  
**BOSTON, MA 02205 (US)**

(57) **ABSTRACT**

An antenna and a wireless transceiver are provided. The antenna includes: a substrate having first and second surfaces with circuits thereon; and two shield boxes located on the first and second surfaces for covering the circuits thereon. The shield boxes each comprise an antenna section and a shield section. The antenna sections are disposed at one side of the shield section and aligned with a margin of the substrate, and include signal ends electrically connected to the circuits and grounding ends electrically connected to the shield sections. The first antenna section is disposed on a diagonal opposite of the second antenna section flush with substrate margin or aligned with the substrate margin, thereby maximizing the distance between the two antennas disposed on the substrate, and preventing the two antennas from electromagnetic interference. The antennas are disposed on sides of the shield sections flush with substrate margins and thereby are space-saving.

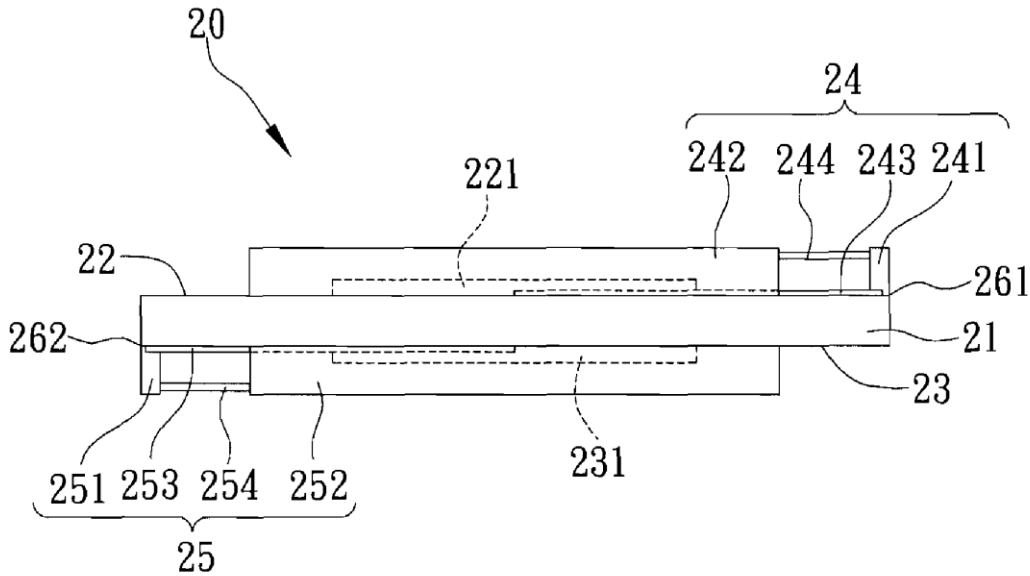
(73) Assignee: **RALINK TECHNOLOGY CORPORATION**, Hsinchu (TW)

(21) Appl. No.: **12/427,120**

(22) Filed: **Apr. 21, 2009**

(30) **Foreign Application Priority Data**

Apr. 21, 2009 (TW) ..... 097114435





US 20100265142A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0265142 A1**

(43) **Pub. Date: Oct. 21, 2010**

(54) **DUAL-BAND ANTENNA AND ELECTRONIC DEVICE EMPLOYING THE SAME**

**Publication Classification**

(75) Inventors: **CHO-JU CHUNG**, Tu-Cheng (TW); **TENG-HUEI CHU**, Tu-Cheng (TW)

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

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

Correspondence Address:  
**Altis Law Group, Inc.**  
**ATTN: Steven Reiss**  
**288 SOUTH MAYO AVENUE**  
**CITY OF INDUSTRY, CA 91789 (US)**

(57) **ABSTRACT**

A dual-band antenna includes a feed portion, a ground portion, a radiating portion and a fine-tuning portion. The feed portion is operable to feed electromagnetic signals. The radiating portion includes a first radiator, a second radiator and a connecting portion. The first radiator is elongated and has a first end electrically connected to the ground portion, and a second end of the first radiator is floating. The second radiator is U shaped, with two open ends floating. The connecting portion is connected to the first radiator, the second radiator and the feed portion. The feed portion feeds electromagnetic signal to the first radiator and the second radiator via the connecting portion. The fine-tuning portion is arranged around the second radiator, operable to control operating frequency bands of the second radiator.

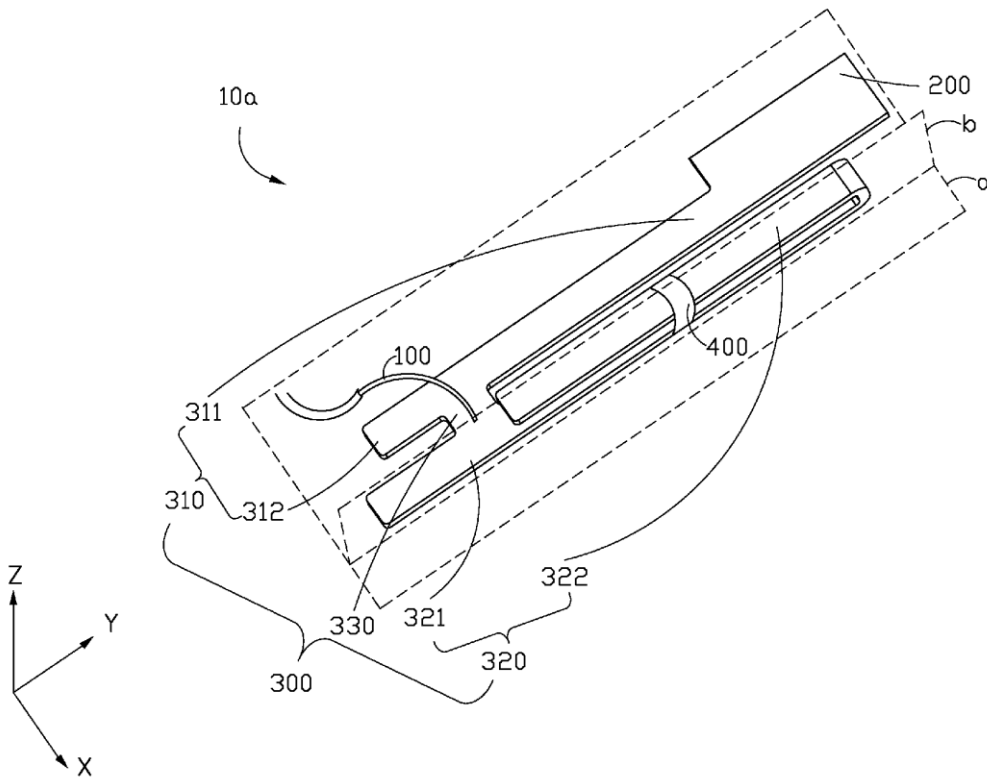
(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW)

(21) Appl. No.: **12/471,392**

(22) Filed: **May 24, 2009**

(30) **Foreign Application Priority Data**

Apr. 16, 2009 (CN) ..... 200920302267.0





(19) **United States**

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

(10) **Pub. No.: US 2010/0265151 A1**

(43) **Pub. Date: Oct. 21, 2010**

(54) **DUAL-FEED ANTENNA**

**Publication Classification**

(73) Inventors: **Jui-Hung CHOU**, Taichung City (TW); **Saou-Wen Su**, Taipei City (TW)

(51) **Int. Cl.**  
**H01Q 5/00** (2006.01)  
**H01Q 21/00** (2006.01)  
**H01Q 1/48** (2006.01)  
**H01Q 1/36** (2006.01)

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

(52) **U.S. Cl. .... 343/843; 343/893; 343/846; 343/700 MS**

(57) **ABSTRACT**

(73) Assignees: **SILITEK ELECTRONIC (GUANGZHOU) CO., LTD.**, Guangzhou (CN); **LITE-ON TECHNOLOGY CORPORATION**, Taipei City (TW)

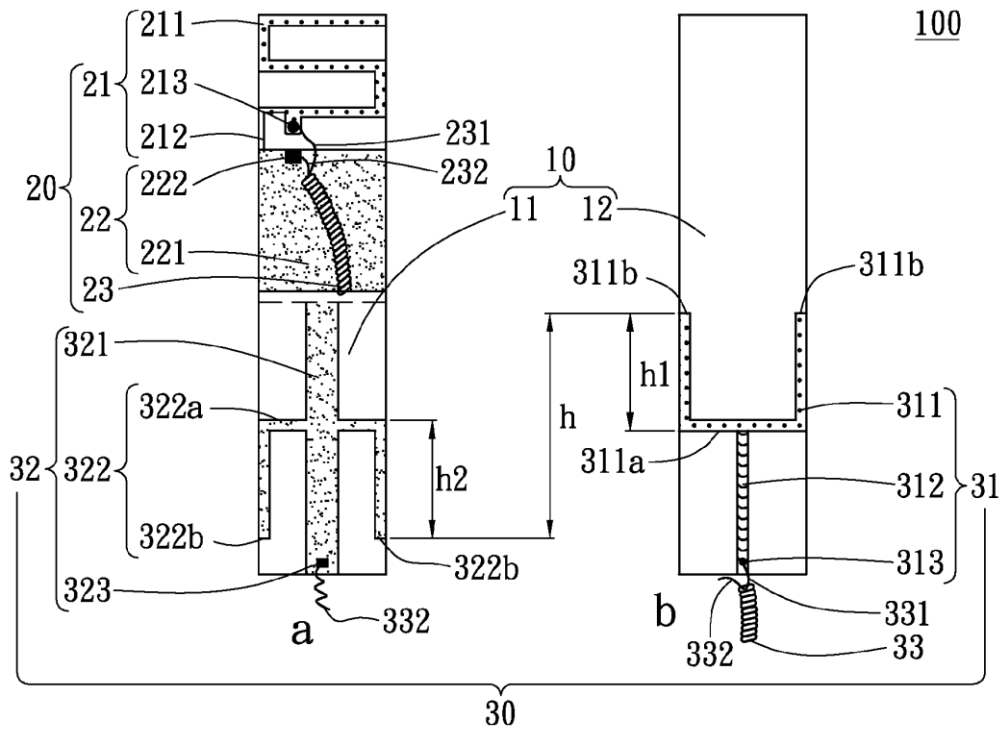
The invention relates to a dual-feed antenna. The dual-feed antenna includes a substrate, a first antenna unit and a second antenna unit. The second antenna unit includes a second radiating unit and a second grounding unit. The second radiating unit includes a second radiator which has a first groove. The first groove has a first bottom and a pair of first arms. The second grounding unit includes a first sub-grounding-area and a second sub-grounding-area. The second sub-grounding-area has a second groove which includes a second bottom and a pair of second arms. The first sub-grounding-area is cross-wise connected with the second sub-grounding-area at the bottom of the groove, and the second arms symmetrically distribute to both sides of the first sub-grounding-area, and the first groove has an opening direction opposite to the opening direction of the second groove.

(21) Appl. No.: **12/574,034**

(22) Filed: **Oct. 6, 2009**

(30) **Foreign Application Priority Data**

Apr. 16, 2009 (CN) ..... 200910038776.1





US 20100265152A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0265152 A1**

(43) **Pub. Date: Oct. 21, 2010**

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

**Publication Classification**

(75) Inventors: **Yong Soo KWAK**, Suwon-si (KR);  
**Bum Jin CHO**, Hwaseong-si (KR);  
**Joon Ho BYUN**, Yongin-si (KR);  
**Seong Tae JEONG**, Yongin-si (KR);  
**Austin KIM**, Seongnam-si (KR);  
**Sung Koo PARK**, Suwon-si (KR)

(51) **Int. Cl.**  
**H01Q 1/38** (2006.01)  
**H01Q 1/48** (2006.01)

(52) **U.S. Cl.** ..... **343/848; 343/700 MS**

(57) **ABSTRACT**

A multi-band antenna apparatus using a multiple frequency band is provided. The apparatus includes a substrate body formed in a flat plate structure having a preset thickness and in which at least one dielectric plate is stacked, a power supply line, disposed at the substrate body and connected to an external power source, for forming an electromagnetic field when power is supplied from the external power source, a radiation line, separated from the power supply line using the dielectric plate as the boundary in the substrate body, for forming an overlapping area overlapped with the power supply line along one axis through at least a portion, and for resonating in a frequency band determined according to the overlapping area when the electromagnetic field is formed, and a ground plate disposed in at least one an upper ground area and a lower ground area of the substrate body, for grounding the radiation line by contacting with the radiation line.

Correspondence Address:

**Jefferson IP Law, LLP**  
**1130 Connecticut Ave., NW, Suite 420**  
**Washington, DC 20036 (US)**

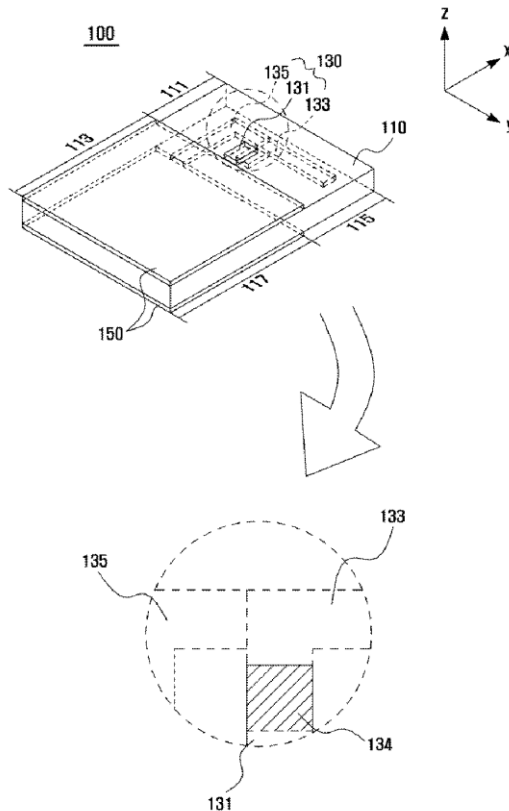
(73) Assignee: **Samsung Electronics Co. Ltd.**,  
Suwon-si (KR)

(21) Appl. No.: **12/755,780**

(22) Filed: **Apr. 7, 2010**

(30) **Foreign Application Priority Data**

Apr. 15, 2009 (KR) ..... 10-2009-0032766





US 20100265157A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0265157 A1**

(43) **Pub. Date: Oct. 21, 2010**

(54) **MULTI-BAND ANTENNA**

(52) **U.S. CL. .... 343/908**

(76) Inventors: **Wen-Chieh Yang**, Tu-Cheng City (TW); **Kai Shih**, Tu-Cheng City (TW); **Yu-Yuan Wu**, Tu-Cheng City (TW)

(57) **ABSTRACT**

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

A multi-band antenna includes a base plate having two opposite transverse edges and two opposite longitudinal edges respectively connected to the two transverse edges. A high frequency radiating element and a capacitance element are respectively bent downward from the two transverse edges of the base plate and then extend in a transverse direction. A feeding point is defined at one end of the capacitance element adjacent to the base plate. A low frequency radiating element extends from one longitudinal edge of the base plate. An inductance element extends from the other longitudinal edge of the base plate and has a transverse border exceeding the base plate in a longitudinal direction. A grounding element is bent downward from the transverse border of the inductance element and then extends in the same direction as the high frequency radiating element to be spaced from the capacitance element.

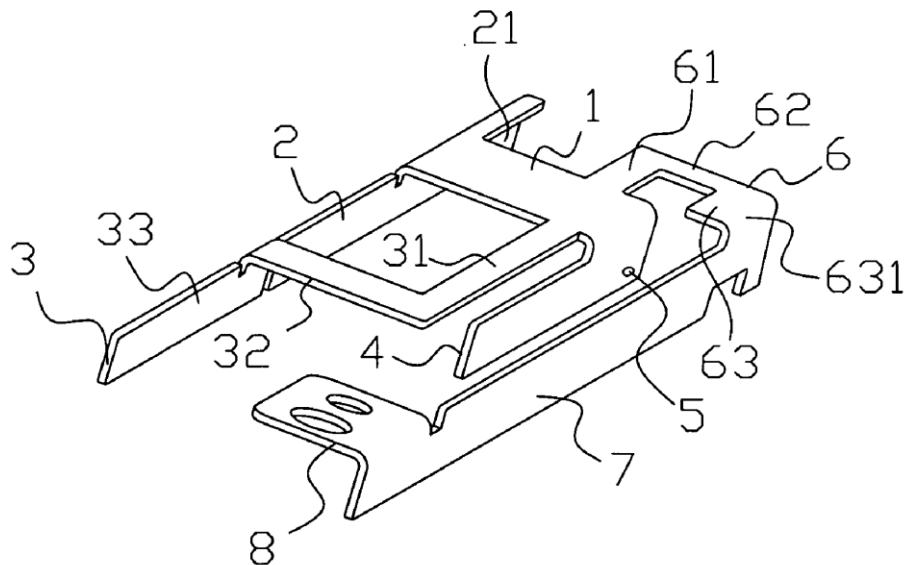
(21) Appl. No.: **12/385,773**

(22) Filed: **Apr. 20, 2009**

**Publication Classification**

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

100  
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US 20100271264A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271264 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **DUAL-BAND ANTENNA**

**Publication Classification**

(75) Inventors: **Chia-Tien Li**, Hsichih (TW);  
**Li-Jean Yen**, Hsichih (TW)

(51) **Int. Cl.**  
*H01Q 5/00* (2006.01)  
*H01Q 9/04* (2006.01)

Correspondence Address:  
**MERCHANT & GOULD PC**  
**P.O. BOX 2903**  
**MINNEAPOLIS, MN 55402-0903 (US)**

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

(57) **ABSTRACT**

(73) Assignee: **Wistron NeWeb Corp.**, Hsichih (TW)

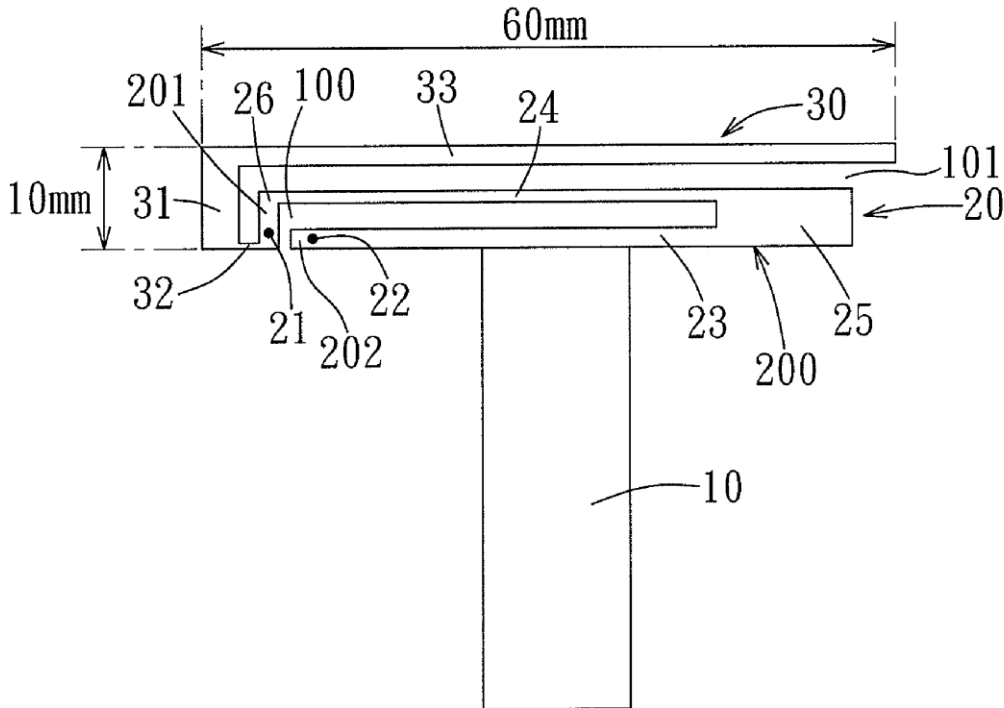
A dual-band antenna includes a ground plane, a loop antenna, and a monopole antenna. The loop antenna is connected to the ground plane, and has a radiator that forms a loop. The radiator has a first end and a second end adjacent to the first end, and is capable of resonating at a first frequency band. The monopole antenna has one end connected to the first end of the radiator of the loop antenna, and is capable of resonating at a second frequency band. A feed point is disposed at a connection between the first end of the radiator of the loop antenna and the monopole antenna. A ground point is disposed at the radiator of the loop antenna proximate to the second end of the radiator.

(21) Appl. No.: **12/579,041**

(22) Filed: **Oct. 14, 2009**

(30) **Foreign Application Priority Data**

Apr. 22, 2009 (TW) ..... 098206683





US 20100271265A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271265 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **ANTENNA PATTERN FRAME AND METHOD AND MOLD FOR MANUFACTURING THE SAME**

(30) **Foreign Application Priority Data**

Apr. 23, 2009 (KR) ..... 10-2009-0035633

(75) Inventors: **Jae Suk SUNG**, Yongin (KR); **Ha Ryong HONG**, Hwaseong (KR); **Yong Shik NA**, Hwaseong (KR); **Dae Seong JEON**, Suwon (KR); **Duk Woo LEE**, Suwon (KR); **Dae Kyu LEE**, Suwon (KR); **Sang Woo BAE**, Suwon (KR); **Dae Ki LIM**, Seongnam (KR); **Sung Eun CHO**, Suwon (KR); **Nam Il SEO**, Seoul (KR)

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/38** (2006.01)  
**B29C 45/14** (2006.01)

(52) **U.S. Cl.** ..... **343/700 MS; 264/272.15; 425/577**

(57) **ABSTRACT**

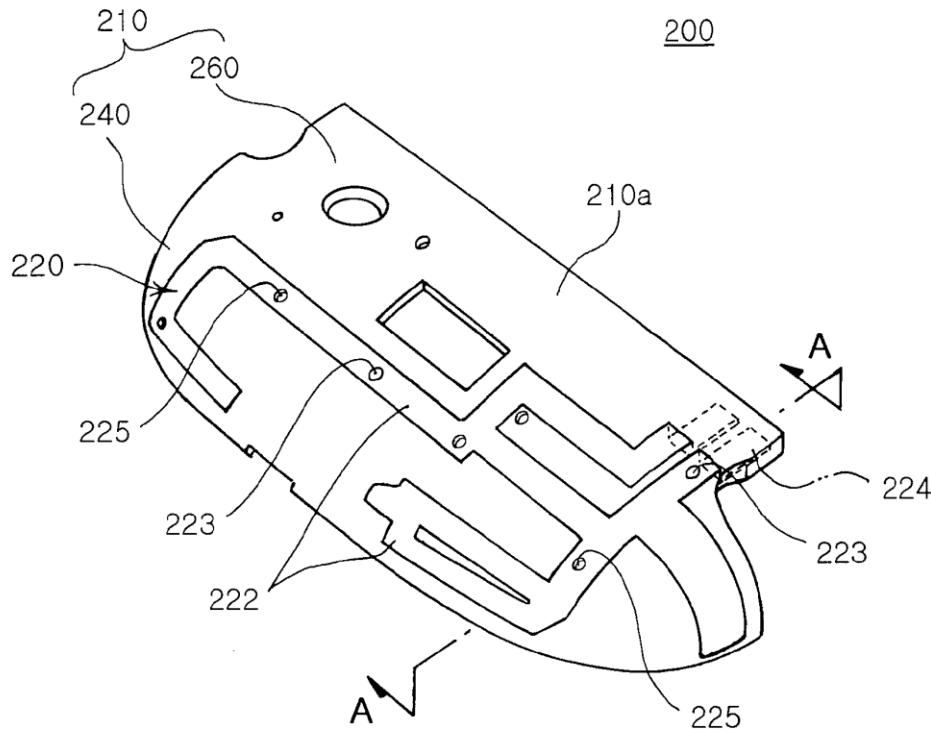
An antenna pattern frame according to an aspect of the invention may include: a radiator having an antenna pattern portion transmitting and receiving a signal and a connection terminal portion allowing the signal to be transmitted to and received from a circuit board of an electronic device; a connection portion partially forming the radiator and connecting the antenna pattern portion and the connection terminal portion to be arranged in different planes; and a radiator frame manufactured by injection molding on the radiator so that the antenna pattern portion is provided on one side of the radiator frame and the connection terminal portion is provided on the other side thereof while the antenna pattern portion is embedded in the electronic device case.

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

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

(21) Appl. No.: **12/649,912**

(22) Filed: **Dec. 30, 2009**





US 20100271266A1

(19) **United States**

(12) **Patent Application Publication**

**Lai et al.**

(10) **Pub. No.: US 2010/0271266 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **MINIATURE WIRE ANTENNA**

**Publication Classification**

(75) Inventors: **Ming-Iu Lai**, Taipei (TW);  
**Chun-Hsiung Wang**, Taipei (TW)

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

Correspondence Address:  
**WPAT, PC**  
**INTELLECTUAL PROPERTY ATTORNEYS**  
**7225 BEVERLY ST.**  
**ANNANDALE, VA 22003 (US)**

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

(73) Assignee: **ASUSTeK COMPUTER INC.,**  
**TAIPEI (TW)**

(57) **ABSTRACT**

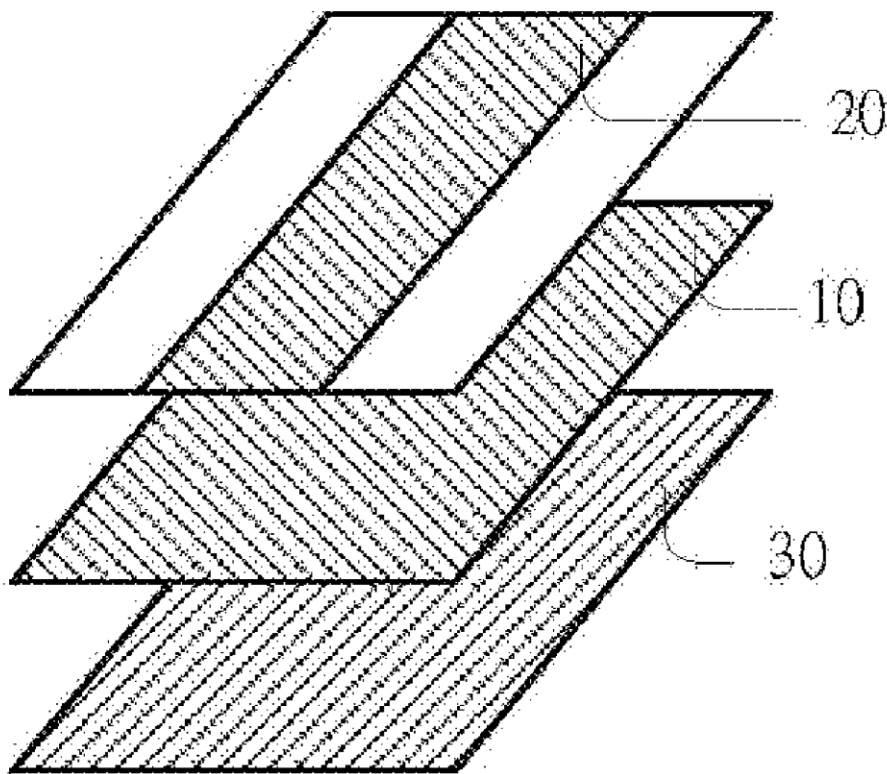
A miniature wire antenna includes N rectangular metal plates located at a first layer of a PCB, a tunable metal plate located at the first layer of the PCB and N serpentine lines located at a second layer of the PCB. The positions of the N serpentine lines correspond to the positions of the rectangular metal plates. A first end of each of the serpentine lines is connected to the corresponding rectangular metal plate, and a second end of each of the serpentine lines is connected to the next rectangular metal plate. A first end of the last serpentine line is connected to the corresponding rectangular metal plate, and a second end of the last serpentine line is connected to the tunable metal plate.

(21) Appl. No.: **12/725,750**

(22) Filed: **Mar. 17, 2010**

(30) **Foreign Application Priority Data**

Apr. 24, 2009 (TW) ..... 098113697







US 20100271270A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271270 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **ELECTRONIC DEVICE CASE, METHOD AND MOLD FOR MANUFACTURING THE SAME, AND MOBILE COMMUNICATIONS TERMINAL**

(30) **Foreign Application Priority Data**

Apr. 23, 2009 (KR) ..... 10-2009-0035635

**Publication Classification**

(75) Inventors: **Jae Suk SUNG**, Yongin (KR); **Sung Eun Cho**, Suwon (KR); **Ha Ryong Hong**, Hwaseong (KR); **Dae Kyu Lee**, Suwon (KR); **Dae Seong Jeon**, Suwon (KR); **Ki Won Chang**, Suwon (KR); **Tae Sung Kim**, Seoul (KR); **Dae Ki Lim**, Seongnam (KR); **Hyun Do Park**, Yongin (KR); **Nam H Seo**, Seoul (KR)

(51) **Int. Cl.**

**H01Q 1/40** (2006.01)

**H01Q 1/24** (2006.01)

**B29C 45/14** (2006.01)

**B29C 45/00** (2006.01)

(52) **U.S. Cl.** ..... **343/702**; 343/873; 264/272.11; 425/542

(57) **ABSTRACT**

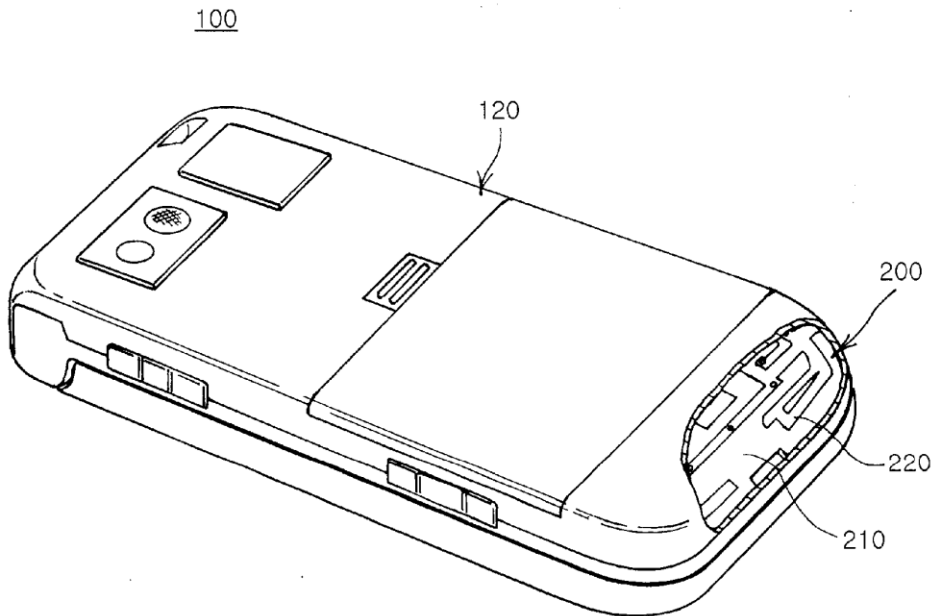
An electronic device case having an antenna pattern embedded therein according to an aspect of the invention may include: a radiator having an antenna pattern portion transmitting and receiving a signal and a connection terminal portion allowing the signal to be transmitted to and received from a circuit board of an electronic device; a connection portion partially forming the radiator and connecting the antenna pattern portion and the connection terminal portion to be arranged in different planes; a radiator frame manufactured by injection molding on the radiator so that the antenna pattern portion of the radiator is provided on one side of the radiator frame and the connection terminal portion is provided on the other side thereof; and a case frame covering the one side of the radiator frame on which the antenna pattern portion is provided so that the antenna pattern portion is embedded between the case frame and the radiator frame.

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

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

(21) Appl. No.: **12/608,818**

(22) Filed: **Oct. 29, 2009**





US 20100271271A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271271 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **MULTI-LOOP ANTENNA STRUCTURE AND HAND-HELD ELECTRONIC DEVICE USING THE SAME**

**Publication Classification**

(51) **Int. Cl.**  
*H01Q 11/12* (2006.01)  
*H01Q 1/24* (2006.01)

(75) Inventor: **Wei-Yang Wu**, Taoyuan (TW)

(52) **U.S. Cl.** ..... **343/702; 343/742**

(57) **ABSTRACT**

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

A multi-loop antenna structure and a hand-held electronic device using the same are provided. The multi-loop antenna structure includes a high-frequency radiating body, a low-frequency radiating body, a feeding connecting part and a grounding connecting part. The feeding connecting part electrically connects one terminal of the high-frequency and the low-frequency radiating body to a feeding point. The grounding connecting part grounds the other terminal of the high-frequency and the low-frequency radiating body. The feeding connecting part forms a first folded loop antenna with the high-frequency radiating body and the grounding connecting part for resonating at a first frequency band. The feeding connecting part forms a second folded loop antenna with the low-frequency radiating body and the grounding connecting part for resonating at a second, a third and a fourth frequency band. The first folded loop antenna and the second folded loop antenna are folded for forming a three-dimensional structure.

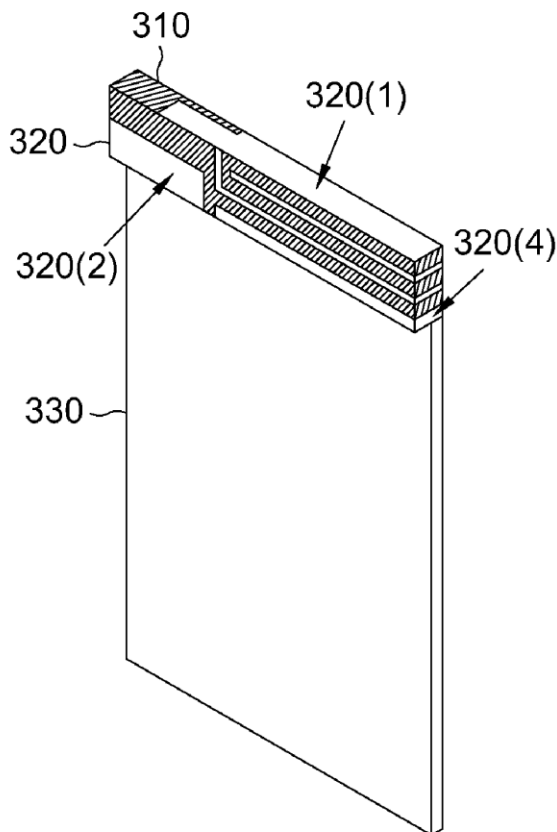
(73) Assignee: **HTC Corporation**, Taoyuan County (TW)

(21) Appl. No.: **12/634,704**

(22) Filed: **Dec. 10, 2009**

(30) **Foreign Application Priority Data**

Apr. 27, 2009 (TW) ..... 098113943





US 20100271272A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271272 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **ANTENNA PATTERN FRAME, METHOD AND MOLD FOR MANUFACTURING THE SAME, AND ELECTRONIC DEVICE**

(30) **Foreign Application Priority Data**

Apr. 23, 2009 (KR) ..... 10-2009-0035637

(75) Inventors: **Jae Suk Sung**, Yongin (KR); **Ki Won Chang**, Suwon (KR); **Ha Ryong Hong**, Hwaseong (KR); **Chang Mok Han**, Chungcheongnam-do (KR); **Chan Gwang An**, Suwon (KR); **Duk Woo Lee**, Suwon (KR); **Hyun Kil Nam**, Suwon (KR); **Dae Kyu Lee**, Suwon (KR); **Sang Woo Bae**, Suwon (KR); **Byung Hwa Lee**, Suwon (KR)

**Publication Classification**

(51) **Int. Cl.**  
**H01Q 1/40** (2006.01)  
**H01Q 1/24** (2006.01)  
**B29C 45/14** (2006.01)  
**B29C 45/00** (2006.01)

(52) **U.S. Cl.** ..... **343/702**; 343/873; 264/261; 425/542; 343/700 MS

(57) **ABSTRACT**

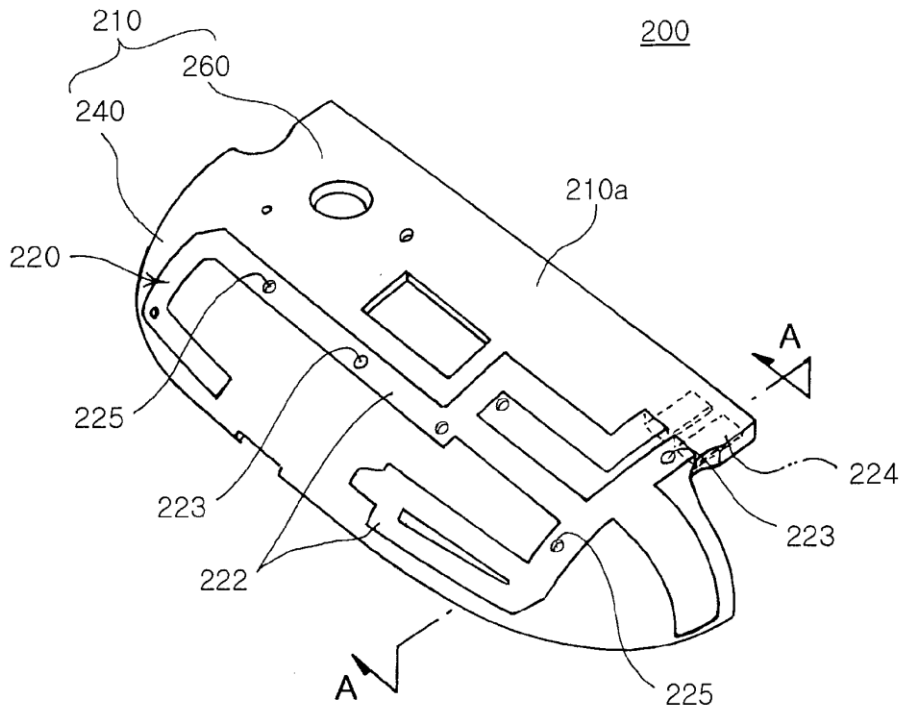
An antenna pattern frame according to an aspect of the invention may include: a radiator having an antenna pattern portion transmitting and receiving a signal; a ground portion extending from the antenna pattern portion; a connection portion connecting the antenna pattern portion and the ground portion to be arranged in different planes; and a radiator frame manufactured by injection molding on the radiator so that the antenna pattern portion may be provided on one side of the radiator frame and the connection terminal portion may be provided on the other side thereof, the radiator frame allowing the antenna pattern portion to be embedded in the electronic device case.

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

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

(21) Appl. No.: **12/649,820**

(22) Filed: **Dec. 30, 2009**





US 20100271277A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271277 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **SLOT ANTENNA**

(22) Filed: **Aug. 25, 2009**

(75) Inventors: **Yu-Chang Kao**, Taipei County (TW); **Hua-Ming Chen**, Taipei County (TW); **Yang-Kai Wang**, Taipei County (TW); **Yi-Fang Lin**, Taipei County (TW); **Chien-Hung Chen**, Taipei County (TW); **Ya-Ping Chen**, Taipei County (TW)

(30) **Foreign Application Priority Data**

Apr. 28, 2009 (TW) ..... 098114018

**Publication Classification**

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

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

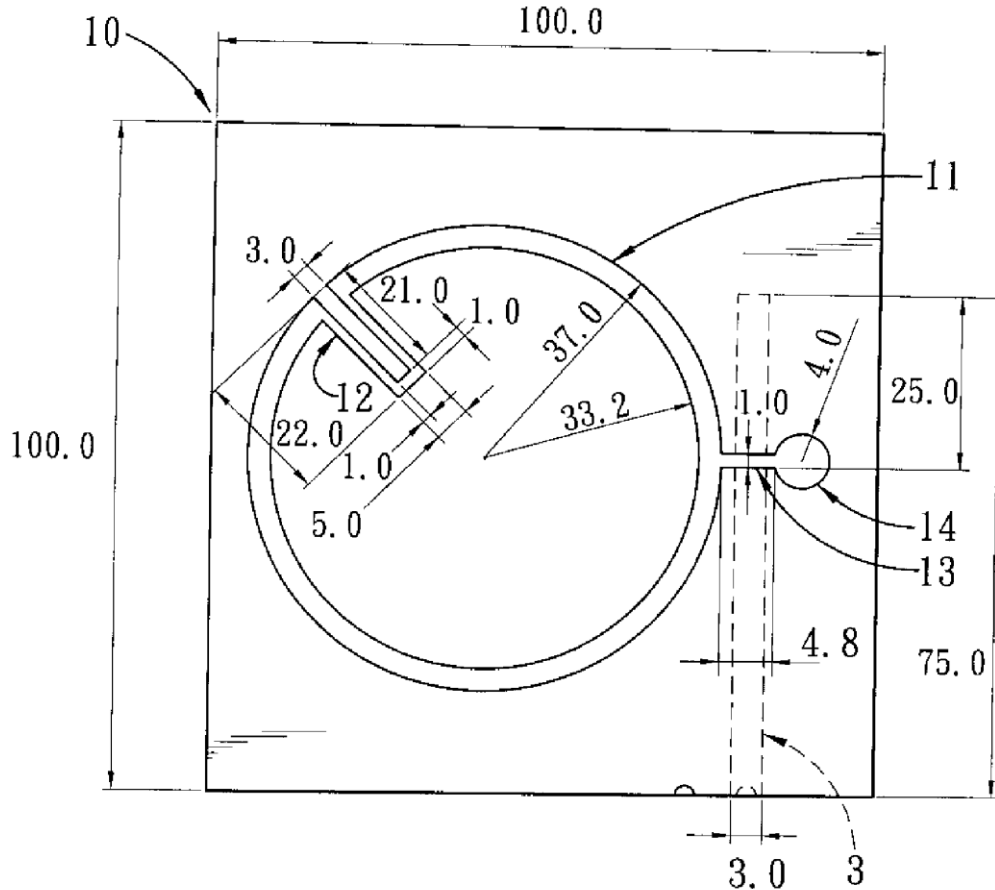
(57) **ABSTRACT**

A slot antenna includes a dielectric substrate, and an antenna body that is formed on the dielectric substrate. The antenna body defines an open loop antenna slot that has first and second ends, and an open loop perturbation slot that extends inwardly from the open loop antenna slot, and that has first and second ends, each of which is connected to a respective one of the first and second ends of the open loop antenna slot.

Correspondence Address:  
**THE MUELLER LAW OFFICE, P.C.**  
12951 Harwick Lane  
San Diego, CA 92130 (US)

(73) Assignee: **Advanced Connection Technology Inc.**, Taipei County (TW)

(21) Appl. No.: **12/546,685**





US 20100271279A1

(19) **United States**

(12) **Patent Application Publication**  
**Johnson**

(10) **Pub. No.: US 2010/0271279 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **ANTENNA SYSTEM HAVING COMPACT PIFA  
RESONATOR WITH OPEN SECTIONS**

**Publication Classification**

(76) Inventor: **Greg F. Johnson, Aptos, CA (US)**

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

(52) **U.S. Cl.** ..... **343/845**

Correspondence Address:  
**BRIGGS AND MORGAN P.A.**  
**2200 IDS CENTER, 80 SOUTH 8TH ST**  
**MINNEAPOLIS, MN 55402 (US)**

(57) **ABSTRACT**

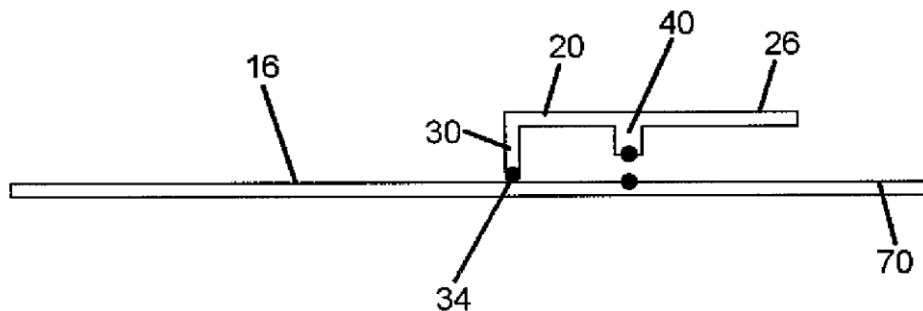
A low-height PIFA-fed antenna system having high gain, wide bandwidth and wide beamwidth for applications on wireless communications devices. The antenna is suitable for internal installation within a handset, such as a cellphone. The antenna includes a ground plane conductor, such as the ground plane of a wireless device, and a resonator element having a top portion with a split free end defining an open space. The antenna is well adapted for high volume manufacturing processes using conventional fabrication techniques such as metal stamping or selectively plated plastic.

(21) Appl. No.: **12/576,908**

(22) Filed: **Oct. 9, 2009**

**Related U.S. Application Data**

(60) Provisional application No. 61/104,255, filed on Oct. 9, 2008.





US 20100271282A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271282 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **EMBEDDED ANTENNA APPARATUS**

**Publication Classification**

(75) Inventors: **Sang Jin EOM**, Gyeyang-gu (KR);  
**Austin Kim**, Seongnam-si (KR);  
**Young Eil Kim**, Suwon-si (KR);  
**Jun Seok Yang**, Seoul (KR)

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

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

Correspondence Address:  
**THE FARRELL LAW FIRM, LLP**  
**290 Broadhollow Road, Suite 210E**  
**Melville, NY 11747 (US)**

(57) **ABSTRACT**

An embedded antenna apparatus of a communication terminal is provided. The antenna apparatus includes a plate board having a feeding pad disposed on a side of the board; a device carrier mounted on a side of the board to expose the feeding pad; a radiation device including at least two radiation lines extending from the feeding pad to a surface of the device carrier along different paths, the at least two radiation lines radiating at a preset frequency band when electric power is fed through the feeding pad; and a ground plate having a flat plate shape mounted in an edge of the side of the board and disposed perpendicular to the side of the board, and contacting one end each of the at least two radiation lines to ground the radiation device.

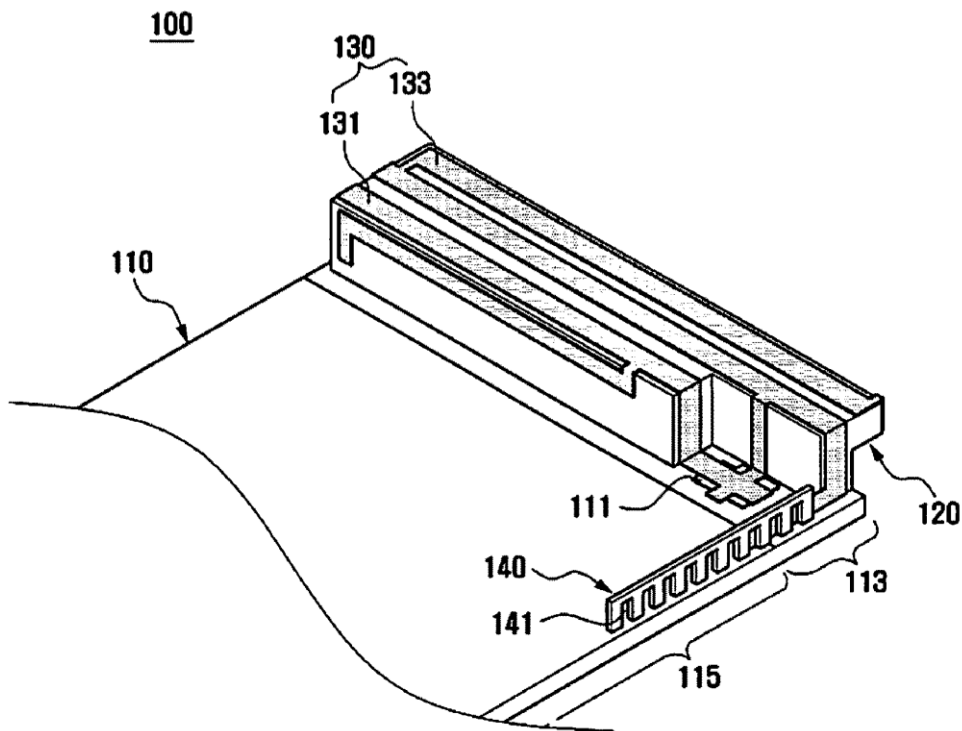
(73) Assignee: **Samsung Electronics Co., Ltd.**,  
Gyeonggi-do (KR)

(21) Appl. No.: **12/765,392**

(22) Filed: **Apr. 22, 2010**

(30) **Foreign Application Priority Data**

Apr. 22, 2009 (KR) ..... 10-2009-0035085





US 20100271283A1

(19) **United States**

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

(10) **Pub. No.: US 2010/0271283 A1**

(43) **Pub. Date: Oct. 28, 2010**

(54) **ANTENNA PATTERN FRAME AND METHOD OF MANUFACTURING THE SAME**

**Publication Classification**

(75) Inventors: **Jae Suk SUNG, YONGIN (KR);**  
**Dae Seong JEON, SUWON (KR);**  
**Hyun Kil NAM, SUWON (KR);**  
**Sung Eun CHO, SUWON (KR);**  
**Tae Sung KIM, SEOUL (KR);**  
**Chan Gwang AN, SUWON (KR);**  
**Hyun Do PARK, YONGIN (KR);**  
**Chang Mok HAN,**  
**CHUNGCHEONGNAM-DO (KR);**  
**Byung Hwa LEE, SUWON (KR);**  
**Jung Eun NOH, HANAM (KR)**

(51) **Int. Cl.**  
**H01Q 1/36** (2006.01)  
**H01Q 1/50** (2006.01)  
**H01P 11/00** (2006.01)

(52) **U.S. Cl.** ..... **343/906; 343/700 MS; 29/601;**  
**343/702**

Correspondence Address:

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

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

(21) Appl. No.: **12/645,992**

(22) Filed: **Dec. 23, 2009**

(30) **Foreign Application Priority Data**

Apr. 23, 2009 (KR) ..... 10-2009-0035636

(57) **ABSTRACT**

An antenna pattern frame according to an aspect of the invention may include: a radiator having an antenna pattern portion transmitting and receiving a signal and a connection terminal portion allowing the signal to be transmitted to and received from a circuit board of an electronic device; a connection portion partially forming the radiator and connecting the antenna pattern portion and the connection terminal portion to be arranged in different planes; a radiator frame manufactured by injection molding on the radiator so that the antenna pattern portion may be provided on one side of the radiator frame and the connection terminal portion may be provided on the other side thereof, while the antenna pattern portion is embedded in the electronic device case; and a contact surface extension provided on the radiator to prevent the radiator from being loosened from the radiator frame during injection molding of the radiator frame, and increasing a contact area with respect to the radiator frame.

