



US 20120249376A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249376 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **MULTIPLE-BAND ANTENNA WITH PATCH AND SLOT STRUCTURES**

(75) Inventors: **GEYI WEN**, Waterloo (CA);
PERRY JARMUSZEWSKI,
Waterloo (CA); **ADAM D.**
STEVENSON, Waterloo (CA)

(73) Assignee: **RESEARCH IN MOTION LIMITED, WATERLOO (CA)**

(21) Appl. No.: **13/488,101**

(22) Filed: **Jun. 4, 2012**

Related U.S. Application Data

(63) Continuation of application No. 13/038,540, filed on Mar. 2, 2011, now Pat. No. 8,207,896, which is a continuation of application No. 12/331,518, filed on Dec. 10, 2008, now Pat. No. 7,916,087, which is a continuation of application No. 11/838,751, filed on Aug. 14, 2007, now Pat. No. 7,466,271, which is a continuation of application No. 11/456,025, filed on Jul. 6, 2006, now Pat. No. 7,283,097, which is a continuation of application No. 10/723,840, filed on Nov. 26, 2003, now Pat. No. 7,224,312.

(30) **Foreign Application Priority Data**

Nov. 28, 2002 (CA) PCT/CA02/01842

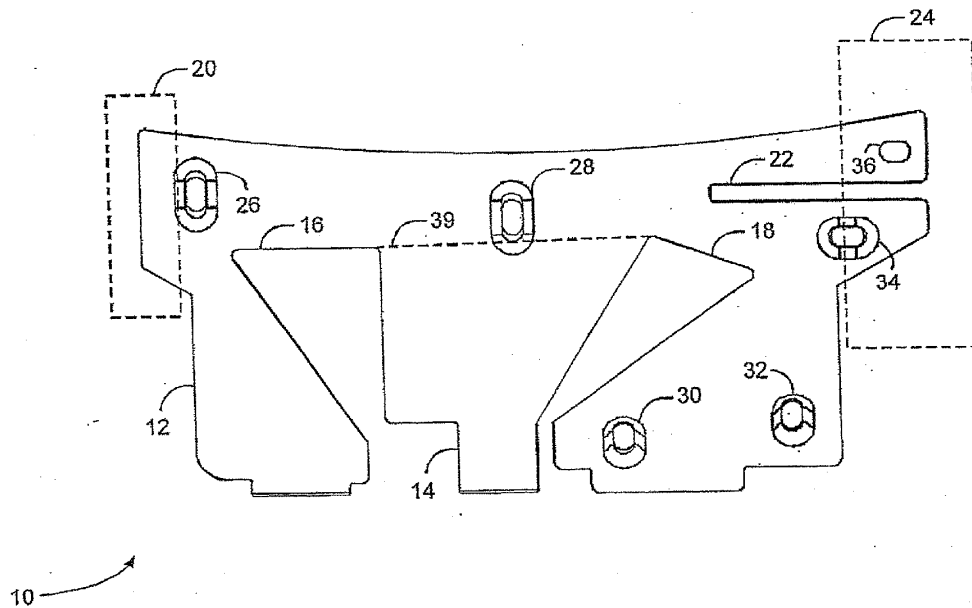
Publication Classification

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

(52) **U.S. Cl.** **343/700 MS; 29/600**

(57) **ABSTRACT**

A multiple-band antenna having first and second operating frequency bands is provided. The antenna includes a first patch structure associated primarily with the first operating frequency band, a second patch structure electrically coupled to the first patch structure and associated primarily with the second operating frequency band, a first slot structure disposed between a first portion of the first patch structure and the second patch structure and associated primarily with the first operating frequency band, and a second slot structure disposed between a second portion of the first patch structure and the second patch structure and associated primarily with the second operating frequency band. A mounting structure for the multiple-band antenna is also provided. The mounting structure includes a first surface and a second surface opposite to and overlapping the first surface.





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(19) **United States**

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

(10) **Pub. No.: US 2012/0249377 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **ANTENNA AND THE METHOD FOR ADJUSTING THE OPERATION BANDWIDTH THEREOF**

Publication Classification

(75) Inventors: **CHIH-YUNG HUANG**, Taichung County (TW); **Kuo-Chang Lo**, Miaoli County (TW)

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01P 11/00 (2006.01)

(52) **U.S. Cl.** **343/702; 29/600**

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

(57) **ABSTRACT**

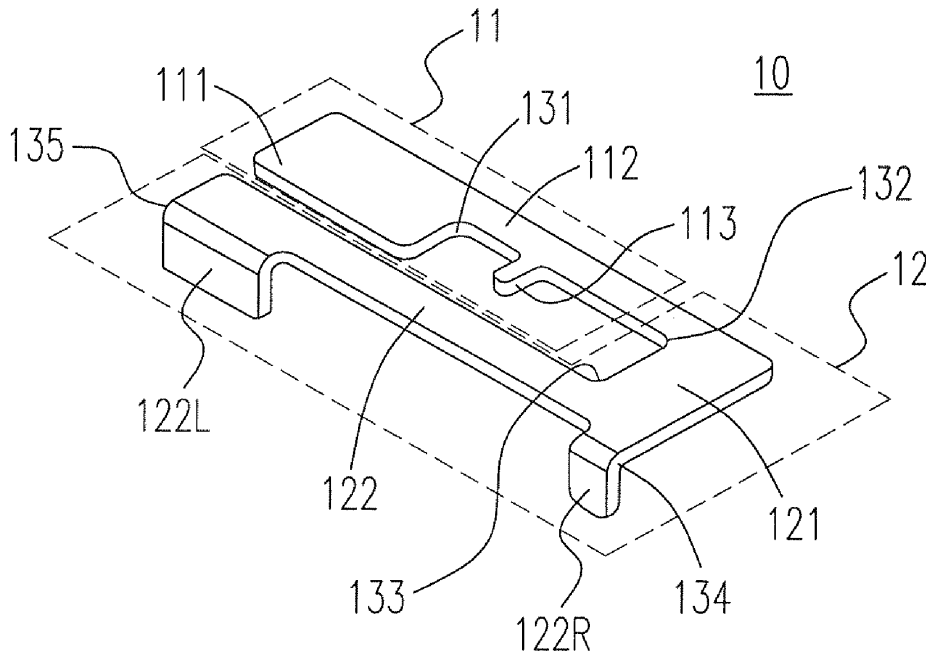
(21) Appl. No.: **13/184,826**

(22) Filed: **Jul. 18, 2011**

A method for adjusting an operation bandwidth of an antenna is provided. The antenna includes a radiation element, and the radiation element includes a first adjusting portion having a first width and a second adjusting portion having a second width. The method includes steps of seeking an operation frequency of the antenna; and adjusting the operation bandwidth of the antenna by adjusting the second width based on the operation frequency.

(30) **Foreign Application Priority Data**

Apr. 1, 2011 (TW) 100111698





US 20120249378A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249378 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **HOUSING COMBINATION OF ELECTRONIC DEVICE AND METHOD**

(30) **Foreign Application Priority Data**

Mar. 31, 2011 (CN) 201110080079.X

(75) Inventors: **QI-YUAN LI**, Shenzhen City (CN);
YONG YAN, Shenzhen City (CN);
YONG-FA FAN, Shenzhen City (CN);
XUE-LI ZHANG, Shenzhen City (CN);
ZHAO-YI WU, Shenzhen City (CN);
LI LIU, Shenzhen City (CN)

Publication Classification

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

(52) **U.S. Cl.** **343/702; 264/272.14**

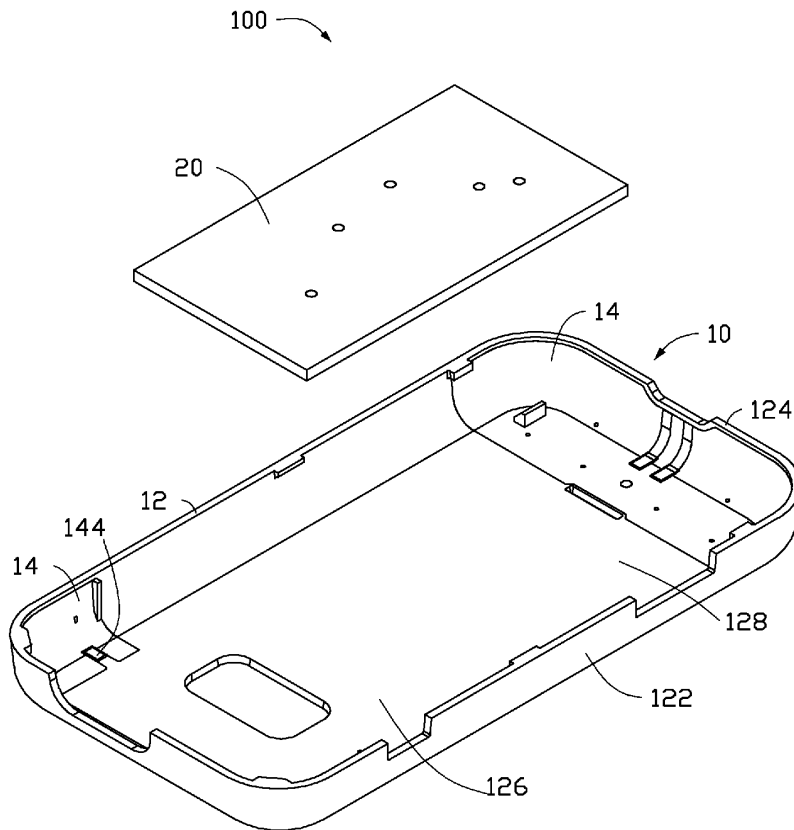
(57) **ABSTRACT**

(73) Assignees: **FIH (HONG KONG) LIMITED**,
Kowloon (HK); **SHENZHEN FUTAIHONG PRECISION INDUSTRY CO., LTD.**,
ShenZhen City (CN)

A housing combination includes a housing, and at least two antenna modules embedded at corners of the housing. Each antenna module includes an antenna carrier and an antenna radiator. The antenna carrier defines a first receiving groove and a second receiving groove opposite to each other. The antenna radiator includes a main portion and a conductive contact. The main portion is received in the first receiving groove, and the conductive contact is received in the second receiving groove. The main portion is embedded in the housing, and the conductive contact is exposed from the housing.

(21) Appl. No.: **13/220,873**

(22) Filed: **Aug. 30, 2011**





US 20120249379A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249379 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **PORTABLE DEVICE**

Publication Classification

(75) Inventors: **Shinya MATSUSHITA**, Yokohama (JP); **Daisuke MIHARA**, Kawasaki (JP); **Takashi ABE**, Kawasaki (JP)

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

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

(73) Assignee: **FUJITSU LIMITED**,
Kawasaki-shi (JP)

(57) **ABSTRACT**

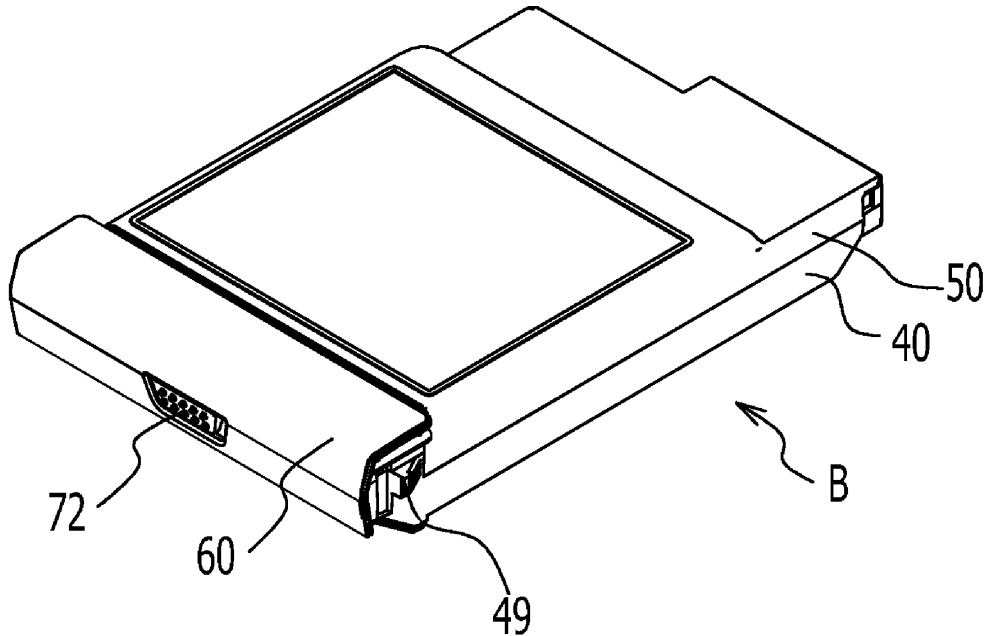
There is provided a portable device which includes a first housing, a housing member removable from the first housing, where the housing member includes an exposed portion, the exposed portion projecting from the first housing when the housing member is inserted in the first housing, a second housing coupled with the first housing so as to be allowed to be folded on the first housing, the second housing including a wall made of electrical insulating material, and an antenna disposed in the second housing and surrounded partially with the wall, a part of the antenna and the exposed portion facing each other via the wall when the first and second housings are folded on each other.

(21) Appl. No.: **13/426,798**

(22) Filed: **Mar. 22, 2012**

(30) **Foreign Application Priority Data**

Mar. 30, 2011 (JP) 2011-076337





US 20120249383A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249383 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **ANTENNA ASSEMBLY AND WIRELESS COMMUNICATION DEVICE EMPLOYING THE SAME**

Publication Classification

(75) Inventors: **CHO-KANG HSU**, Tu-Cheng (TW); **YI-TING CHEN**, Tu-Cheng (TW); **MEI-TSU TSAO**, Tu-Cheng (TW)

(51) **Int. Cl.**
H01Q 1/22 (2006.01)
H01Q 1/12 (2006.01)
H01Q 1/38 (2006.01)

(52) **U.S. Cl.** **343/720; 343/700 MS; 343/892**

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

(57) **ABSTRACT**

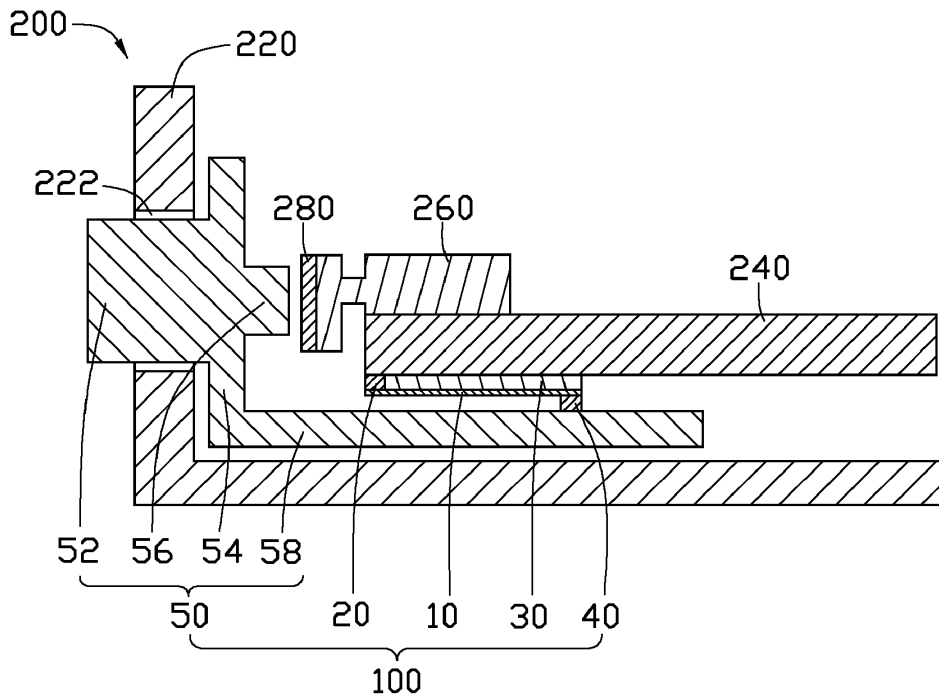
(21) Appl. No.: **13/298,399**

An antenna assembly is used in a wireless communication device, the wireless communication device includes a main body and a circuit board received within the main body. The antenna assembly includes a first antenna unit located in the main body, a feed point and a second antenna unit. The feed point is electrically connected to the circuit board and the first antenna unit. One part of the second antenna unit is exposed from the main body, the other part of the second antenna unit is located within the main body and produces resonance with the first antenna unit to receive and transmit radio signals. The antenna assembly can occupy small space in the wireless communication device and reduce coupled interference of other electronic components on the antenna assembly.

(22) Filed: **Nov. 17, 2011**

(30) **Foreign Application Priority Data**

Mar. 29, 2011 (TW) 100110673





US 20120249386A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249386 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **ANTENNA DEVICE, CIRCUIT BOARD AND MEMORY CARD**

(30) **Foreign Application Priority Data**

Mar. 29, 2011 (JP) 2011-073642

(75) Inventors: **Masahiro Yanagi**, Tokyo (JP);
Shigemi Kurashima, Tokyo (JP);
Hideaki Yoda, Tokyo (JP)

Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/38 (2006.01)

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

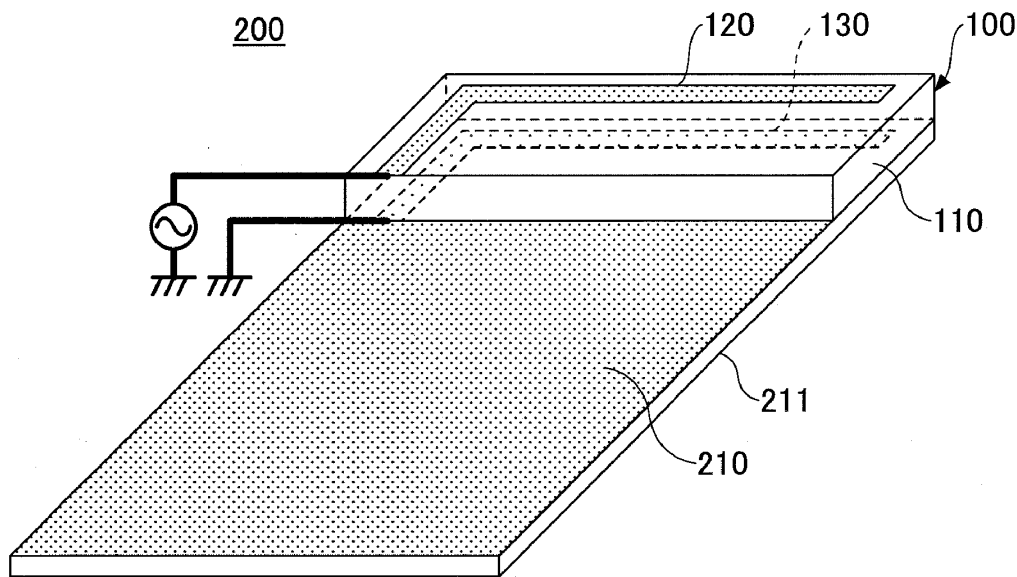
(52) **U.S. Cl.** **343/749; 343/700 MS**

(21) Appl. No.: **13/417,513**

(57) **ABSTRACT**

(22) Filed: **Mar. 12, 2012**

A disclosed antenna device includes a substrate made of a dielectric material, an antenna element formed on one side of the substrate, and a ground element formed on another side of the substrate.





US 20120249387A1

(19) **United States**

(12) **Patent Application Publication**
Krupa

(10) **Pub. No.: US 2012/0249387 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **DISTRIBUTED REACTANCE ANTENNA**

Publication Classification

(75) Inventor: **Steve Krupa, Haifa (IL)**

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

(73) Assignee: **GALTRONICS CORPORATION LTD., Tiberias (IL)**

(52) **U.S. Cl.** **343/750; 343/749**

(21) Appl. No.: **13/505,322**

(57) **ABSTRACT**

(22) PCT Filed: **Nov. 2, 2010**

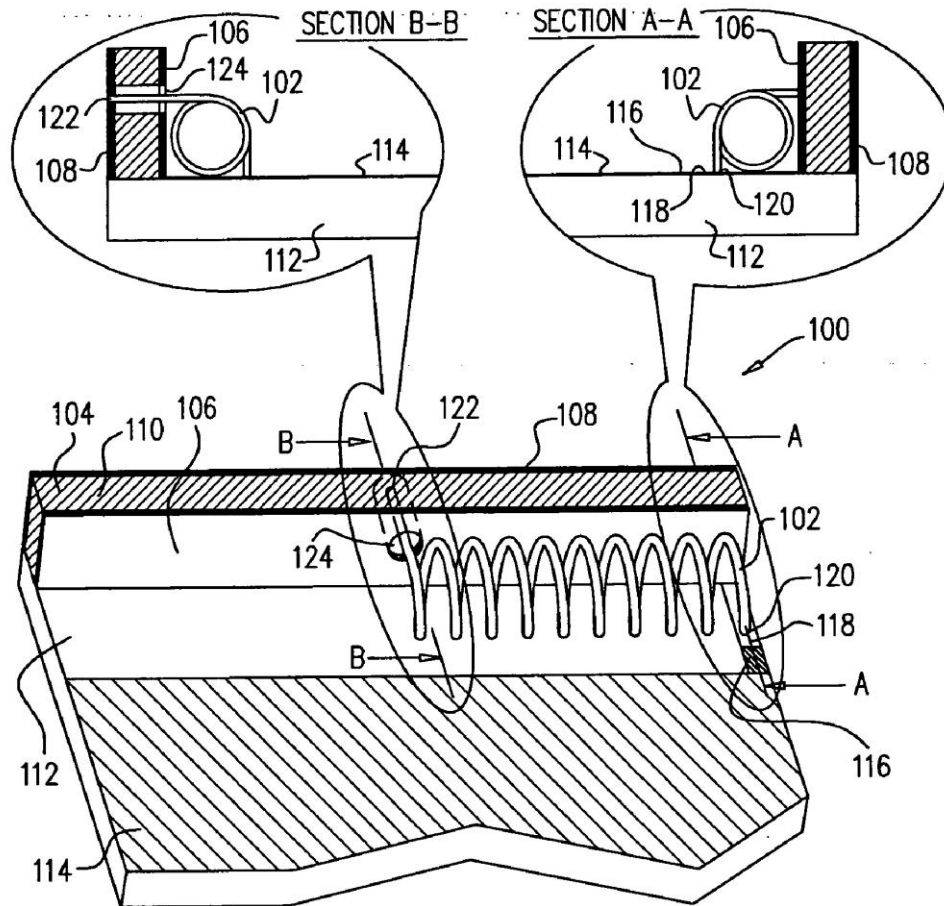
(86) PCT No.: **PCT/IL10/00911**

§ 371 (c)(1),
(2), (4) Date: **Jun. 12, 2012**

An antenna including a capacitive element and an inductive element having first and second ends, the first end of the inductive element being galvanically connected both to a feed point and to the capacitive element at a first connection point, the second end of the inductive element being galvanically connected to the capacitive element at a second connection point, the second connection point being spatially displaced from the first connection point, wherein electrical signals at the first and second connection points are mutually out of phase.

Related U.S. Application Data

(60) Provisional application No. 61/280,366, filed on Nov. 2, 2009.





US 20120249388A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249388 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **PLATFORM ENHANCEMENTS FOR PLANAR ARRAY ANTENNAS**

Publication Classification

(51) **Int. Cl.**
H01Q 19/06 (2006.01)
H01Q 19/10 (2006.01)
(52) **U.S. Cl.** **343/753; 343/835**

(75) Inventors: **Christopher Hansen**, Sunnyvale, CA (US); **Vadim Piskun**, San Jose, CA (US)

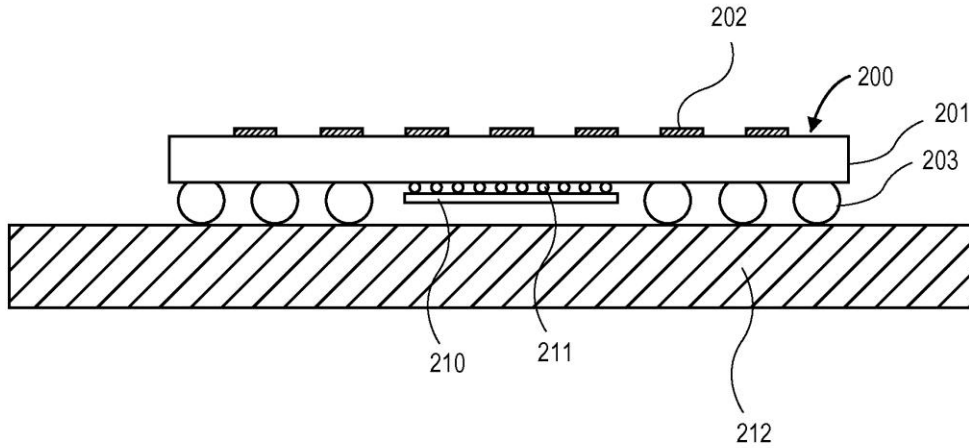
(57) **ABSTRACT**

(73) Assignee: **Broadcom Corporation**, Irvine, CA (US)

A technique to extend antenna coverage pattern of a planar antenna array. In one instance a reflector is disposed above the planar antenna array and in another instance a lens element is disposed above the planar antenna array. The reflection or refraction of RF signals allows antenna coverage pattern to be extended in a horizontal direction parallel to the planar surface of the antenna array and beyond a coverage pattern that is typically not available, without such reflection or refraction of the RF signal.

(21) Appl. No.: **13/077,210**

(22) Filed: **Mar. 31, 2011**





US 20120249390A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249390 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **ANTENNA AND WIRELESS DEVICE PROVIDED WITH SAME**

(52) **U.S. CL. 343/790**

(75) **Inventors:** Yohei Shirakawa, Hitachi (JP);
Kazuhiro Fujimoto, Hitachi (JP);
Masamichi Kishi, Hitachinaka (JP);
Naoto Teraki, Takahagi (JP);
Yoshitake Ageishi, Hitachi (JP)

(57) **ABSTRACT**

There is provided an antenna comprising: a ground conductor; and an antenna element portion for sending and receiving electromagnetic wave signals, the antenna element portion comprising: a coaxial cable including a center conductor and an outer conductor; a feeding point connected to a feeding system and disposed between the ground conductor and a first end of one of the center and outer conductors; a short-circuit portion electrically connecting the ground conductor and a first end of the other one of the center and outer conductors; and a conductor connection portion electrically connecting second ends of the center and outer conductors each other. In addition, an overall length of the coaxial cable is not more than $\frac{1}{2}$ of a wavelength corresponding to the minimum series resonance frequency; and a distance between the center and outer conductors is not more than $\frac{1}{100}$ of a wavelength corresponding to the minimum operation frequency.

(73) **Assignee:** Hitachi Cable Fine-Tech, Ltd.

(21) **Appl. No.:** 13/432,198

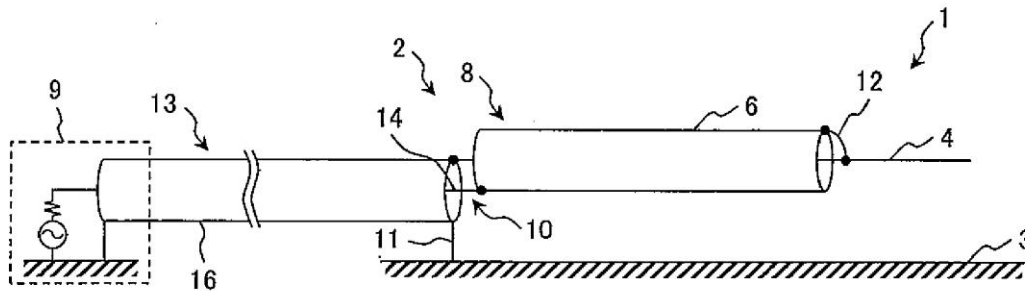
(22) **Filed:** Mar. 28, 2012

(30) **Foreign Application Priority Data**

Mar. 28, 2011 (JP) 2011-070250

Publication Classification

(51) **Int. Cl.**
H01Q 9/06 (2006.01)





US 20120249392A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249392 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **DUAL-POLARIZATION OMNIDIRECTIONAL ANTENNA**

Publication Classification

(76) Inventors: **Zhuopeng Wang**, Qingdao (CN);
Hongquan Fu, Qingdao (CN);
Xiao Changhong, Qingdao (CN)

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

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

(57) **ABSTRACT**

(21) Appl. No.: **13/390,333**

A dual-polarization omnidirectional antenna includes a reflecting base plate, a radiating oscillator, outputting coaxial cables, RF connectors, a metallic supporting pillar and a T-shaped probe. The radiating oscillator has an upper layer provided with a one-to-two feed dividing network and a lower layer provided with a round patch; the T-shaped probe is welded with the round patch. A mixing ring is arranged on the reflecting base plate; two RF connectors are respectively connected with a first port and a second port of the mixing ring; an inner conductor of a first outputting coaxial cable has a first end connected with the feed dividing network and a second end connected with a third port of the mixing ring; an inner conductor of another outputting coaxial cable has a first end connected with the T-shaped probe and a second end connected with a fourth port of the mixing ring.

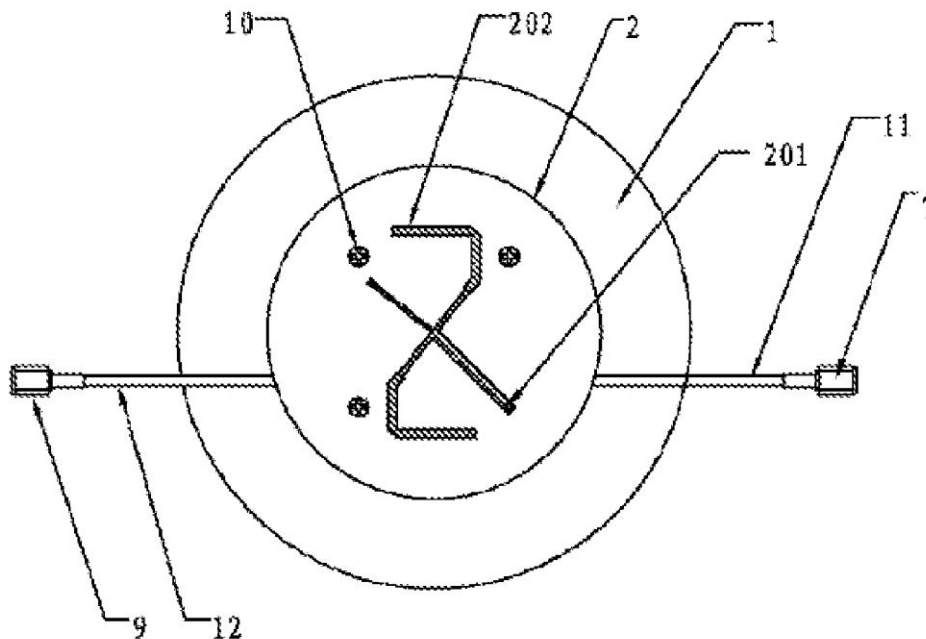
(22) PCT Filed: **Dec. 23, 2010**

(86) PCT No.: **PCT/CN2010/080188**

§ 371 (c)(1),
(2), (4) Date: **Feb. 13, 2012**

(30) **Foreign Application Priority Data**

Dec. 25, 2009 (CN) 200910249562.9





US 20120249393A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0249393 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **ANTENNA DEVICE AND ELECTRONIC
DEVICE INCLUDING ANTENNA DEVICE**

(52) **U.S. CL. 343/843**

(57) **ABSTRACT**

(76) Inventors: **Hiroyuki Hotta**, Hamura-shi (JP);
Koichi Sato, Tachikawa-shi (JP)

According to one embodiment, a first antenna element is formed from a folded monopole element having one end connected to a feeding terminal, and the other end connected to a first ground terminal, with a stub being provided between a forward portion and a backward portion formed by folding a middle portion. A second antenna element is formed from a monopole element having one end connected to the feeding terminal directly or indirectly through part of the first antenna element. A third antenna element is formed from a parasitic element having one end connected to a second ground terminal provided at a position opposite to the first ground terminal through the feeding terminal, and the other end open, with at least part of the parasitic element being placed parallel to the second antenna element so as to be configured to be capacitively coupled to the second antenna element.

(21) Appl. No.: **13/345,283**

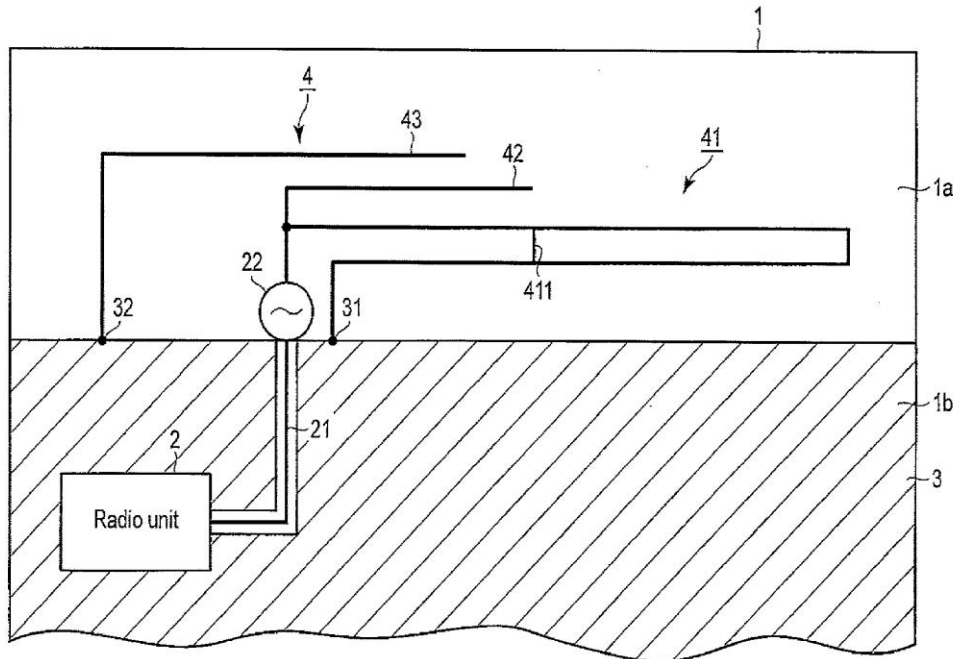
(22) Filed: **Jan. 6, 2012**

(30) **Foreign Application Priority Data**

Mar. 30, 2011 (JP) 2011-076288

Publication Classification

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





US 20120250228A1

(19) **United States**

(12) **Patent Application Publication**
Tseng

(10) **Pub. No.: US 2012/0250228 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **PORTABLE ELECTRONIC APPARATUS**

(52) **U.S. CL.** 361/679.01

(76) **Inventor:** **Kuan-Hsueh Tseng, Hsinchu (TW)**

(57) **ABSTRACT**

(21) **Appl. No.:** **13/115,998**

A portable electronic apparatus includes a host, a pivotal connection device, a display, and an antenna. The host includes a base casing and an electronic device. The base casing has a side portion. The display is pivotally connected to the side portion through the pivotal connection device. The base casing thereon defines an antenna radiation reference surface. The side portion has a first accommodating space and a second accommodating space adjacent to each other. The projections of the first and second accommodating spaces on the antenna radiation reference are non-overlapped. The electronic device is disposed in the first accommodating space, the antenna in the second accommodating space. Thereby, the antenna is not influenced by the material of the casing of the display and still can perform wireless communication, which solves the plight of having to cut a metal upper casing in the prior art where an antenna is disposed.

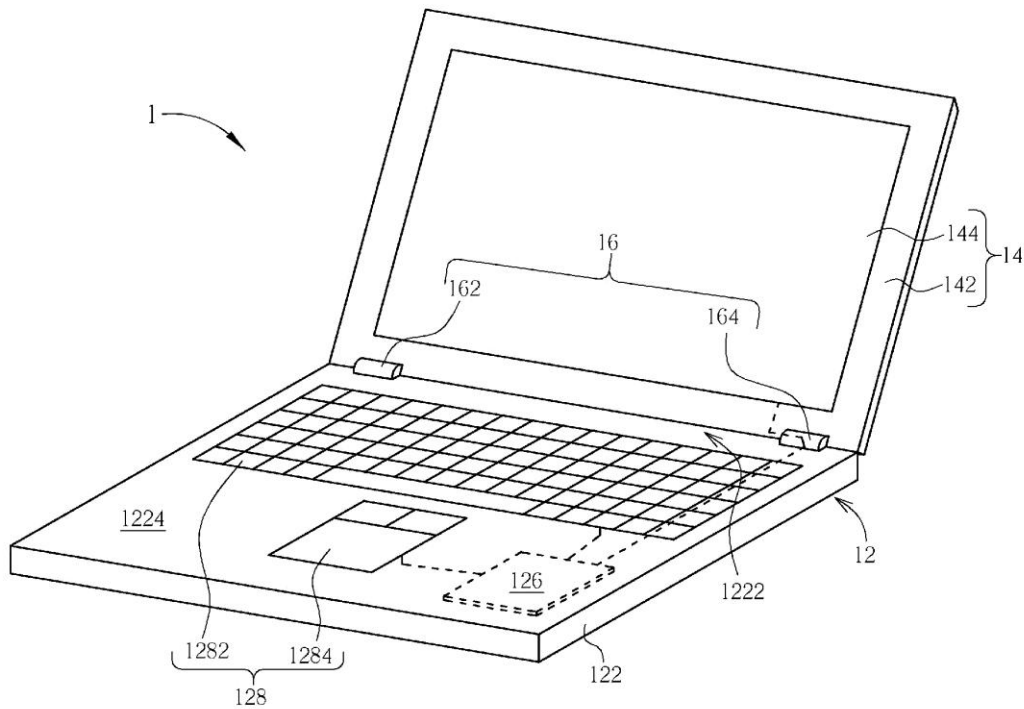
(22) **Filed:** **May 26, 2011**

(30) **Foreign Application Priority Data**

Mar. 28, 2011 (TW) 100110576

Publication Classification

(51) **Int. Cl.**
H05K 5/04 (2006.01)





US 20120252535A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0252535 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **ELECTRONIC APPARATUS AND FLEXIBLE SUBSTRATE**

Publication Classification

(75) Inventors: **Yoshifumi KAJIWARA**, Kawasaki (JP); **Hiroyuki TAKITA**, Kawasaki (JP); **Takashi SUZUKI**, Kawasaki (JP); **Kazuhiro TADA**, Kawasaki (JP); **Hiroshi KUBO**, Kawasaki (JP)

(51) **Int. Cl.**
H04R 1/02 (2006.01)
H04W 88/02 (2009.01)
H04M 1/02 (2006.01)

(52) **U.S. Cl.** **455/566; 381/369**

(73) Assignee: **FUJITSU LIMITED**, Kawasaki-shi (JP)

(57) **ABSTRACT**

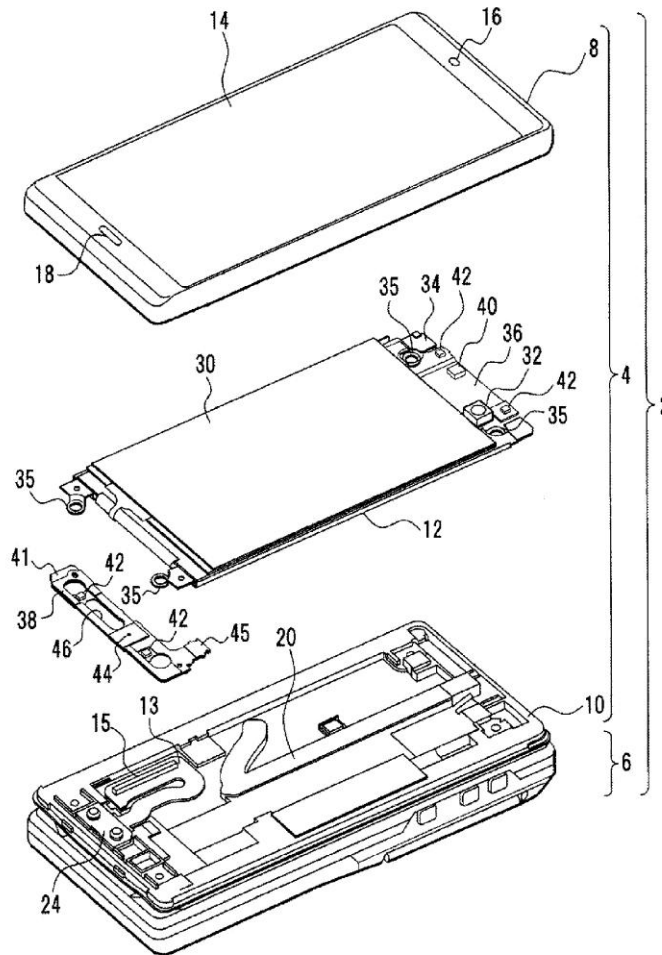
(21) Appl. No.: **13/417,640**

(22) Filed: **Mar. 12, 2012**

(30) **Foreign Application Priority Data**

Mar. 31, 2011 (JP) 2011-077401

An electronic apparatus includes: a housing having a liquid crystal display section mounted in the housing; a space section formed between an end side in the housing and the liquid crystal display section; and a circuit unit having an antenna pattern, a microphone, and one or plurality of mounting components being mounted on one or both of the front and rear surface sides of the circuit unit arranged in the space section.





US 20120252542A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0252542 A1**

(43) **Pub. Date: Oct. 4, 2012**

(54) **PORTABLE TERMINAL**

(30) **Foreign Application Priority Data**

(75) Inventors: **Michiaki HIRAOKA**, Kanagawa (JP); **Hiroshi TSUKIJI**, Kanagawa (JP)

Sep. 29, 2005 (JP) 2005-285663

Publication Classification

(73) Assignee: **KYOCERA CORPORATION**, Kyoto-shi (JP)

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

(52) **U.S. Cl.** 455/575.4

(57) **ABSTRACT**

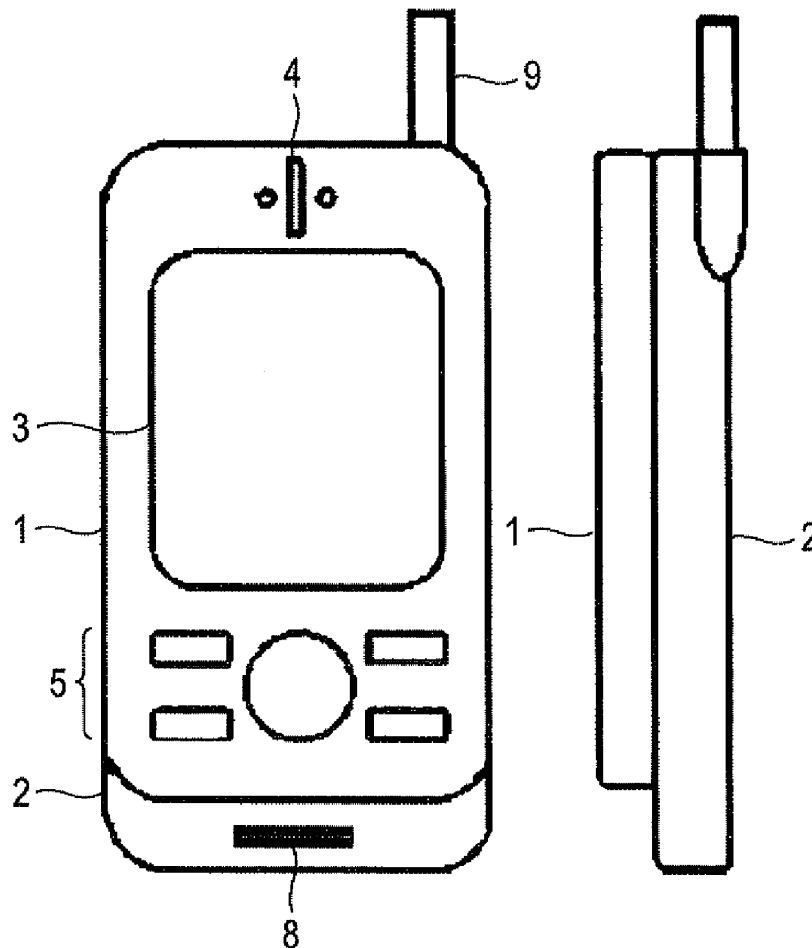
(21) Appl. No.: **13/495,911**

(22) Filed: **Jun. 13, 2012**

A portable terminal, which is small sized, excellent in portability, and having high operability for various functions other than a call function, is provided. Two housings are connected such that they can be extended in directions different from each other. The housings have a retraction state, a first extension state, a second extension state, and a third extension state that is a state achieved by further sliding the housings from the second extension into another state. Broadcast receiving conditions are improved by changing the length of an antenna for receiving digital broadcast reception in the second extension state and the third extension state.

Related U.S. Application Data

(63) Continuation of application No. 12/088,675, filed on Sep. 30, 2009, now Pat. No. 8,219,161, filed as application No. PCT/JP2006/319521 on Sep. 29, 2006.





US 20120256800A1

(19) **United States**

(12) **Patent Application Publication**
Kuonanoja

(10) **Pub. No.: US 2012/0256800 A1**

(43) **Pub. Date: Oct. 11, 2012**

(54) **MULTIBAND ANTENNA STRUCTURE AND METHODS**

Publication Classification

(76) Inventor: **Reetta Kuonanoja, Oulu (FI)**

(51) **Int. Cl.**
H01Q 5/01 (2006.01)

(52) **U.S. Cl.** **343/749; 343/860; 343/852; 343/850; 343/700 MS**

(21) Appl. No.: **13/514,939**

(57) **ABSTRACT**

(22) PCT Filed: **Dec. 8, 2010**

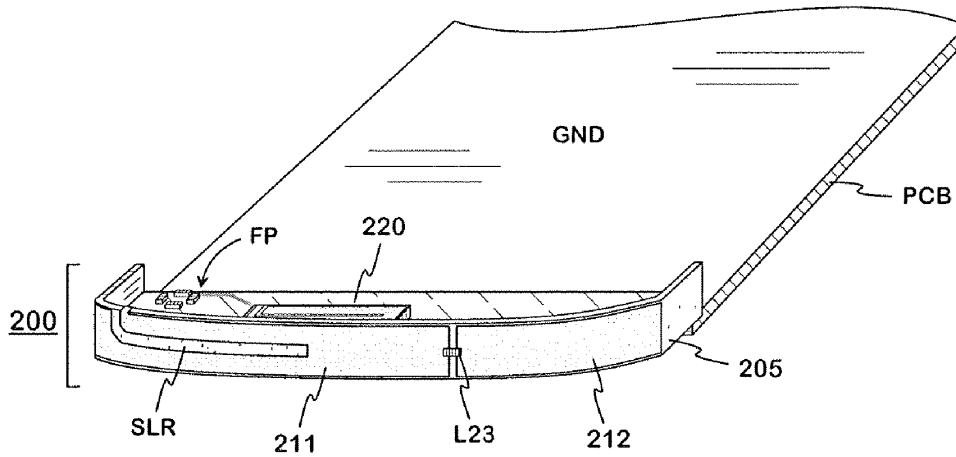
An antenna structure intended for small-sized mobile terminals. In one embodiment, the antenna structure comprises a main radiator for implementing the lowest operating band and other radiators for implementing at least one operating band in the high band. The structure also comprises a matching circuit, by which a plural (e.g., double) resonance is implemented for the main radiator in the range of the lowest operating band and the isolation is improved between the main radiator and another radiator. A reactive element is joined to the main radiator so that its electric size decreases in the high band and increases in the low band. The former strengthens the resonances in the high band, and thus results in rise in the efficiency in the high band.

(86) PCT No.: **PCT/FI2010/051003**

§ 371 (c)(1),
(2), (4) Date: **Jun. 8, 2012**

(30) **Foreign Application Priority Data**

Dec. 14, 2009 (FI) 20096320



211 }
212 } 210



US 20120256802A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0256802 A1**

(43) **Pub. Date: Oct. 11, 2012**

(54) **COMMUNICATION ELECTRONIC DEVICE
AND ANTENNA STRUCTURE THEREOF**

(52) **U.S. CL. 343/771**

(76) **Inventors:** **Kin-Lu Wong**, New Taipei City
(TW); **Wun-Jian Lin**, New Taipei
City (TW)

(57) **ABSTRACT**

(21) **Appl. No.: 13/115,999**

A communication electronic device which comprises a grounding element and a slot antenna is provided. The slot antenna is formed by a feeding element, a first slot, a second slot, and a third slot. The first slot is an open slot, which has an open end at the first side edge and a closed end extended toward the interior of the electrical conductor. The second slot is an open slot, which also has an open end at the first side edge and a closed end extended toward the interior of the electrical conductor. The second slot is substantially parallel to the first slot and is closer than the first slot to the grounding element. The third slot is a closed slot, whose two closed ends are all in the interior of the electrical conductor. The third slot is aligned between the first slot and the second slot.

(22) **Filed: May 26, 2011**

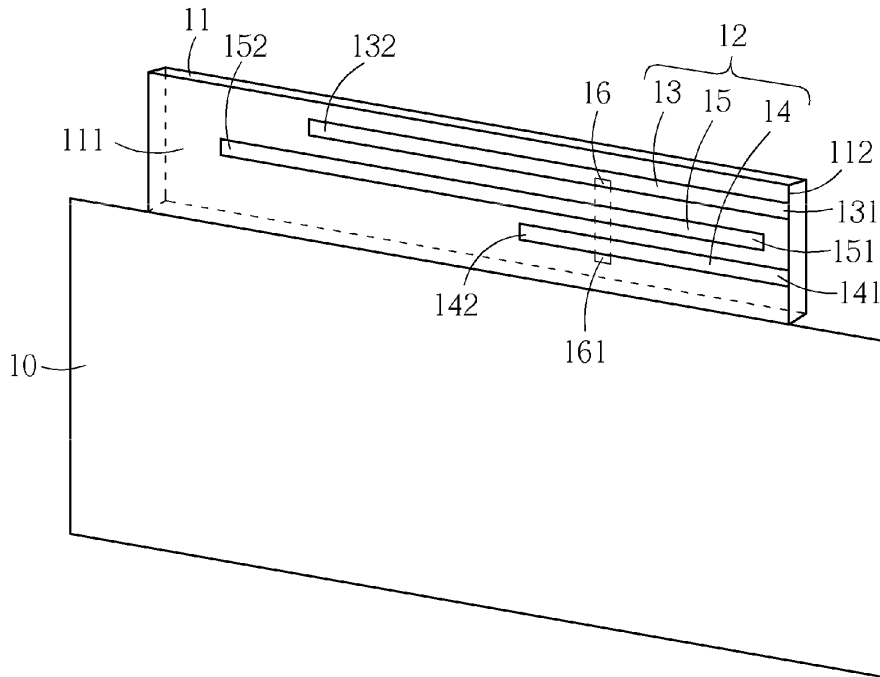
(30) **Foreign Application Priority Data**

Apr. 8, 2011 (TW) 100112294

Publication Classification

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

1





US 20120256803A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0256803 A1**

(43) **Pub. Date: Oct. 11, 2012**

(54) **CONFORMABLE ANTENNA**

Publication Classification

(75) Inventors: **Randell COZZOLINO**, Phoenix, AZ (US); **Gary WANNAGOT**, Gilbert, AZ (US); **Snir AZULAY**, Tiberias (IL)

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

(52) **U.S. Cl.** **343/821**

(73) Assignee: **GALTRONICS CORPORATION LTD.**, Tiberias (IL)

(57) **ABSTRACT**

(21) Appl. No.: **13/526,737**

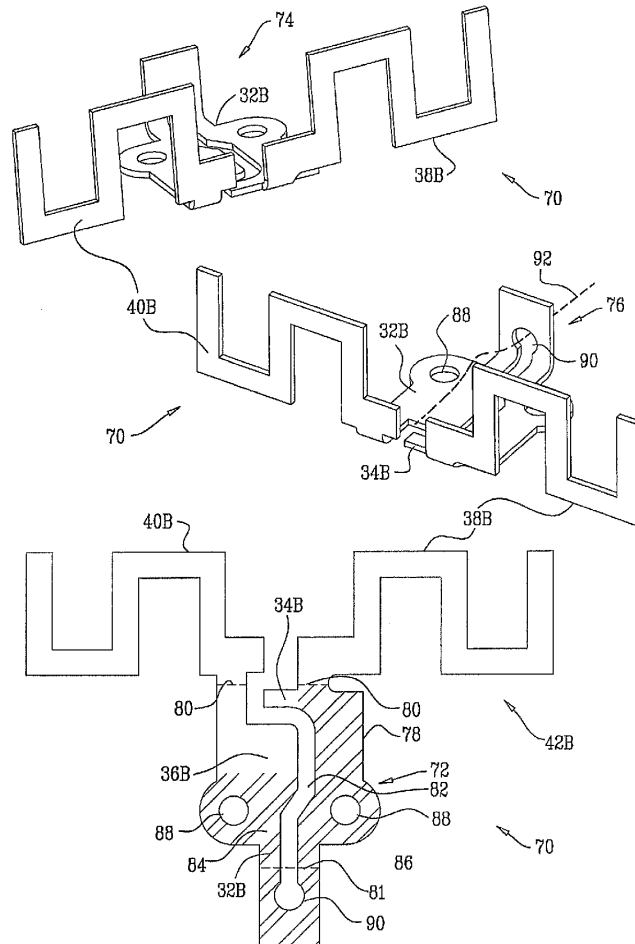
(22) Filed: **Jun. 19, 2012**

Related U.S. Application Data

(63) Continuation of application No. 12/468,579, filed on May 19, 2009, now Pat. No. 8,203,499.

(60) Provisional application No. 61/128,284, filed on May 19, 2008.

A polymorphic antenna, including a metallic template configurable in at least first and second possible different three-dimensional shapes, the antenna, when configured in the at least first and second different three-dimensional shapes, having a common antenna feed point, a common balun coupled to the common antenna feed point; and a common dipole coupled to the common antenna feed point and to the common balun. The antenna operates in a common frequency band when configured in either of the at least first and second different three-dimensional shapes when fed via the common antenna feed point.





US 20120256804A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0256804 A1**

(43) **Pub. Date: Oct. 11, 2012**

(54) **RECONFIGURABLE MOBILE PHONE
BUILT-IN ANTENNA AND
IMPLEMENTATION METHOD THEREOF**

Publication Classification

(51) **Int. Cl.**
H01Q 5/01 (2006.01)

(52) **U.S. Cl.** **343/848**

(75) Inventors: **Yongling Ban**, Shenzhen (CN);
Peihua Shuai, Shenzhen (CN);
Ping Lei, Shenzhen (CN); **Hengyi
Duan**, Shenzhen (CN)

(57) **ABSTRACT**

A reconfigurable mobile phone built-in antenna and its implementation method are disclosed. The antenna comprises an antenna main structure, an additional ground area, a ground area printed on one surface of a printed board, an electronic switch and an antenna feeding point and a grounding point printed on the other surface of the printed board, the antenna main structure comprises a wiring structure of the antenna, a feeding spring piece in contact with the antenna feeding point and a grounding spring piece in contact with the grounding point, and the additional ground area is positioned under the wiring structure; the electronic switch is used for disconnecting the additional ground area with the ground area on one surface of the printed board when the antenna works at low-frequency frequency band and connecting the additional ground area with the ground area on when the antenna works at high-frequency frequency band.

(73) Assignee: **Huawei Device Co., Ltd.**,
Shenzhen (CN)

(21) Appl. No.: **13/529,422**

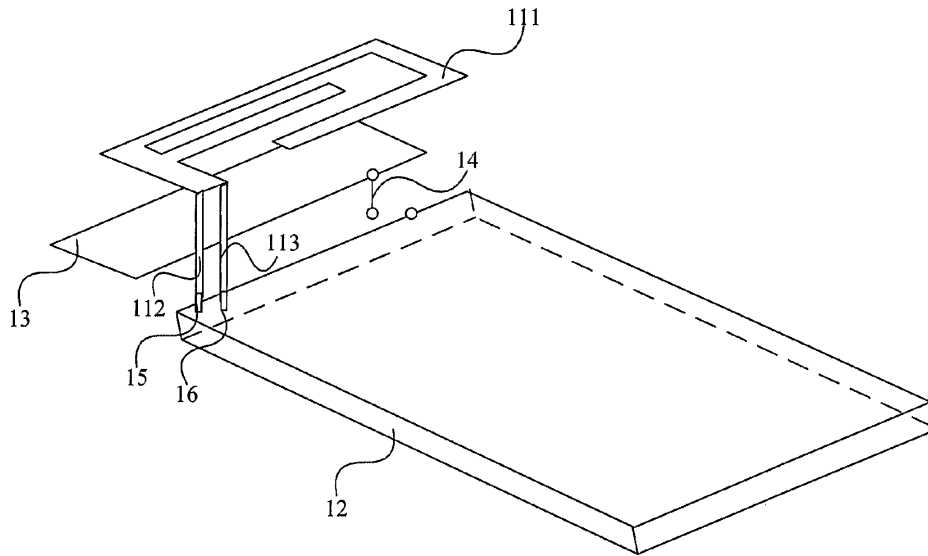
(22) Filed: **Jun. 21, 2012**

Related U.S. Application Data

(63) Continuation of application No. PCT/CN2010/
079820, filed on Dec. 15, 2010.

(30) **Foreign Application Priority Data**

Dec. 24, 2009 (CN) 200910215550.4





US 20120256850A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0256850 A1**

(43) **Pub. Date: Oct. 11, 2012**

(54) **TOUCH PANEL WITH BUILT-IN ANTENNA**

(30) **Foreign Application Priority Data**

(75) Inventors: **HSIN-NAN HU**, Tu-Cheng (TW);
WEN-LONG LI, Shenzhen City (CN);
KAI-KUEI WU, Tu-Cheng (TW);
HE-HUI YANG, Shenzhen City (CN);
XIAO-BING GAO, Shenzhen City (CN)

Apr. 7, 2011 (CN) 201110086271.X

Publication Classification

(51) **Int. Cl.**
G06F 3/041 (2006.01)

(52) **U.S. Cl.** **345/173**

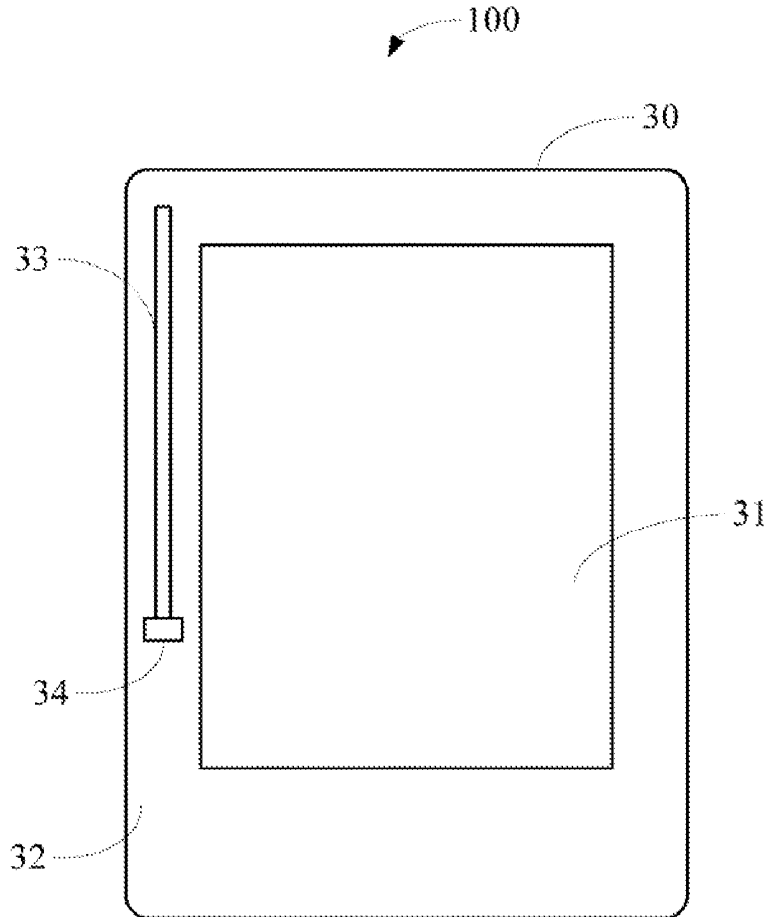
(73) Assignees: **HON HAI PRECISION INDUSTRY CO., LTD.**, Tu-Cheng (TW);
HONG FU JIN PRECISION INDUSTRY (ShenZhen) CO., LTD., Shenzhen City (CN)

(57) **ABSTRACT**

A touch panel includes a touch sensitive layer, a substrate opposite to the touch sensitive layer, a conductive layer arranged between the touch sensitive layer and the substrate, and an antenna. The substrate includes a central display area and a marginal bezel area surrounding the display area. The antenna is disposed at one side of the substrate that faces away from the conductive layer. The antenna is formed on the bezel area by spraying.

(21) Appl. No.: **13/158,472**

(22) Filed: **Jun. 13, 2011**





US 20120262342A1

(19) **United States**

(12) **Patent Application Publication**
LEE

(10) **Pub. No.: US 2012/0262342 A1**

(43) **Pub. Date: Oct. 18, 2012**

(54) **MULTIBAND ANTENNA**

Publication Classification

(75) Inventor: **YI-CHIEH LEE, Tu-Cheng (TW)**

(51) **Int. Cl.**
H01Q 5/01 (2006.01)

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

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

(21) Appl. No.: **13/181,653**

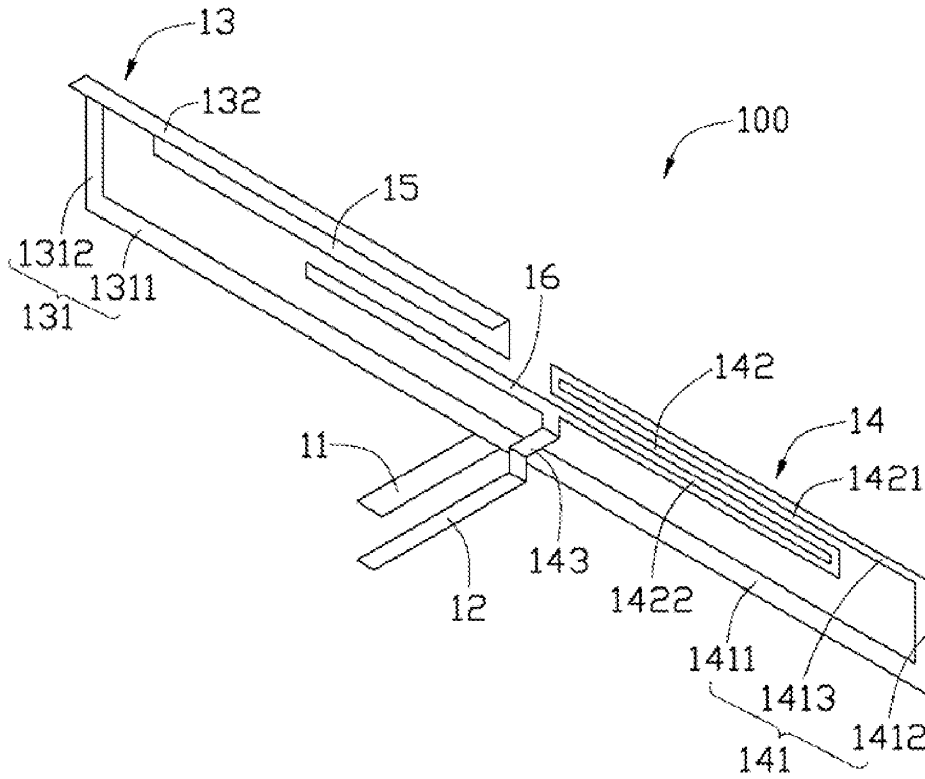
(57) **ABSTRACT**

(22) Filed: **Jul. 13, 2011**

A multiband antenna includes a feed unit, a ground unit, a first radiator unit, a second radiator unit, a first resonance unit, and a second resonance unit. When feed signals are input to the feed unit, the feed signals are transmitted to the first radiator unit and the second radiator to form current paths of different lengths, and the first resonance unit and the second resonance unit are driven to resonate and respectively generate additional current paths of different lengths. In this way, the first radiator unit, the second radiator unit, the first resonance unit, and the second resonance unit are enabled to receive and send wireless signals of different frequencies.

(30) **Foreign Application Priority Data**

Apr. 18, 2011 (TW) 100113418





US 20120262343A1

(19) **United States**

(12) **Patent Application Publication**
Radojkovic

(10) **Pub. No.: US 2012/0262343 A1**

(43) **Pub. Date: Oct. 18, 2012**

(54) **WIDEBAND ANTENNA AND METHODS**

(52) **U.S. Cl. 343/702; 343/848**

(76) **Inventor: Vesna Radojkovic, Suzhou (CN)**

(57) **ABSTRACT**

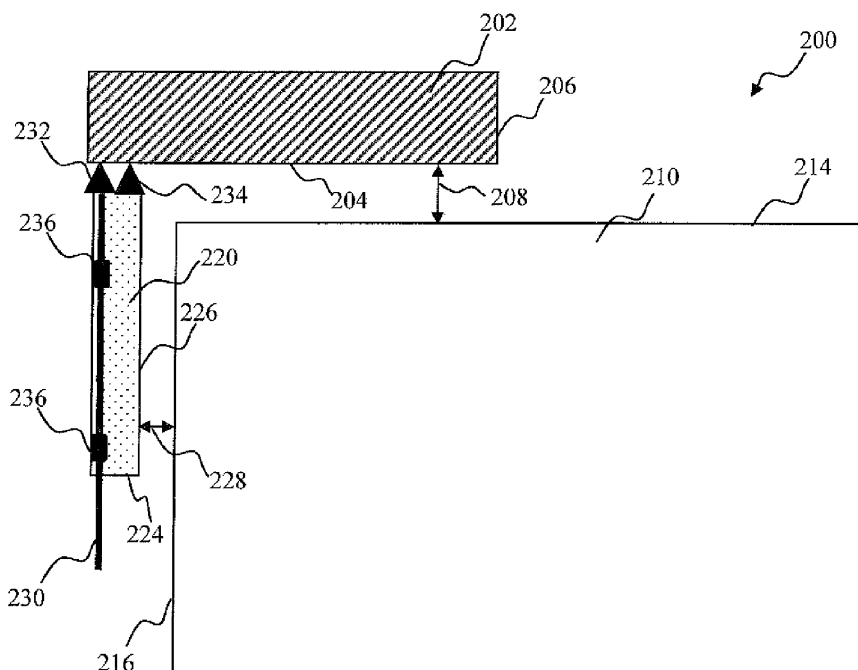
(21) **Appl. No.: 13/086,319**

A wideband antenna for use portable radio devices, and methods for operating the same. In one embodiment, a monopole antenna is used within a laptop computing device. The antenna comprises a monopole radiator coupled to an auxiliary ground plane element, and is placed substantially outside of the footprint of the computer display ground plane. In one implementation, the auxiliary ground element is configured not to have electrical connections to the ground plane of the laptop. In another implementation, a solid state switch selectively connects an antenna parasitic element to the main ground thus enabling selective control of the antenna lower frequency operating band.

(22) **Filed: Apr. 13, 2011**

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/48 (2006.01)





US 20120262350A1

(19) **United States**

(12) **Patent Application Publication**

Tesh et al.

(10) **Pub. No.: US 2012/0262350 A1**

(43) **Pub. Date: Oct. 18, 2012**

(54) **ACCESSORY SYSTEM WITH INTEGRATED MULTIBAND ANTENNA**

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 21/30 (2006.01)
(52) **U.S. Cl.** **343/720**

(75) **Inventors:** **Mark A. Tesh**, Forest, VA (US);
Brian D. Justin, JR., Forest, VA (US)

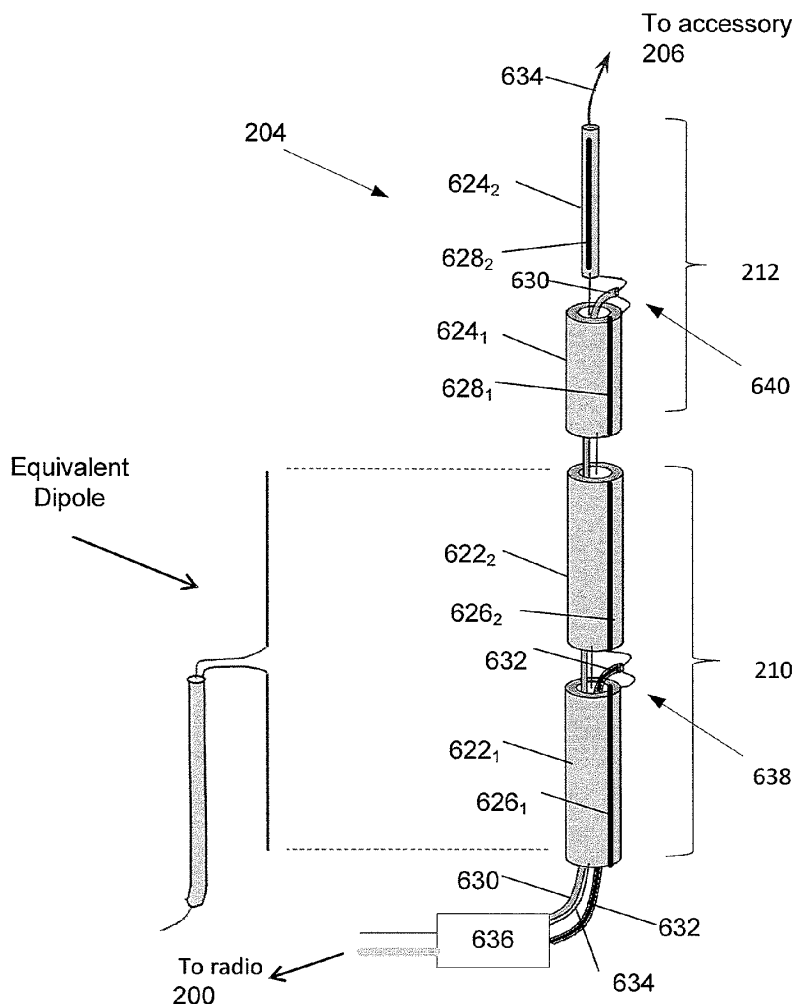
(57) **ABSTRACT**

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

An accessory system (202, 402, 502) for a portable radio transceiver (200) includes an accessory device (206) which includes a speaker and/or a microphone disposed external of the portable radio transceiver. A cable (204) containing two or more conductors is provided for operatively connecting the accessory device to the portable radio transceiver. At least one antenna (210, 212) for the portable radio transceiver is integrated within the cable. When the accessory system is used with a multi-band portable radio transceiver, two or more antennas can be included in the cable, each optimized for operation on a particular RF frequency band.

(21) **Appl. No.:** **13/088,658**

(22) **Filed:** **Apr. 18, 2011**





US 20120262355A1

(19) **United States**

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

(10) **Pub. No.: US 2012/0262355 A1**

(43) **Pub. Date: Oct. 18, 2012**

(54) **HIGH GAIN LOW PROFILE MULTI-BAND ANTENNA FOR WIRELESS COMMUNICATIONS**

(52) **U.S. CL. 343/767; 343/872**

(76) Inventors: **Ziming He**, Irvine, CA (US); **Ping Peng**, Irvine, CA (US)

(57) **ABSTRACT**

(21) Appl. No.: **13/450,454**

The present invention is a low profile, wideband, high gain and high efficiency multi-band antenna with good return loss for wireless applications such as WLAN Access Point, Zig-Bee or WiMAX module, notebook computer, tablet computer and other mobile and portable devices applications and it can be used with any RF-front end circuitry that is working at 2.4-2.5 GHz, 3.1-3.4 GHz and 4.9-5.9 GHz frequency band. Moreover, the antenna assembly comprises a planar body sealed in a plastic housing with the feed pin and ground pin exposed for soldering onto a printed circuit board and thus it is easy for customers to assemble; they just need to solder the antenna pins on a printed circuit board and it will be operational. The flat structure and the plastic housing make the antenna to be low profile and compact in size so it can be easily fabricated and embedded into a notebook computer and tablet computer.

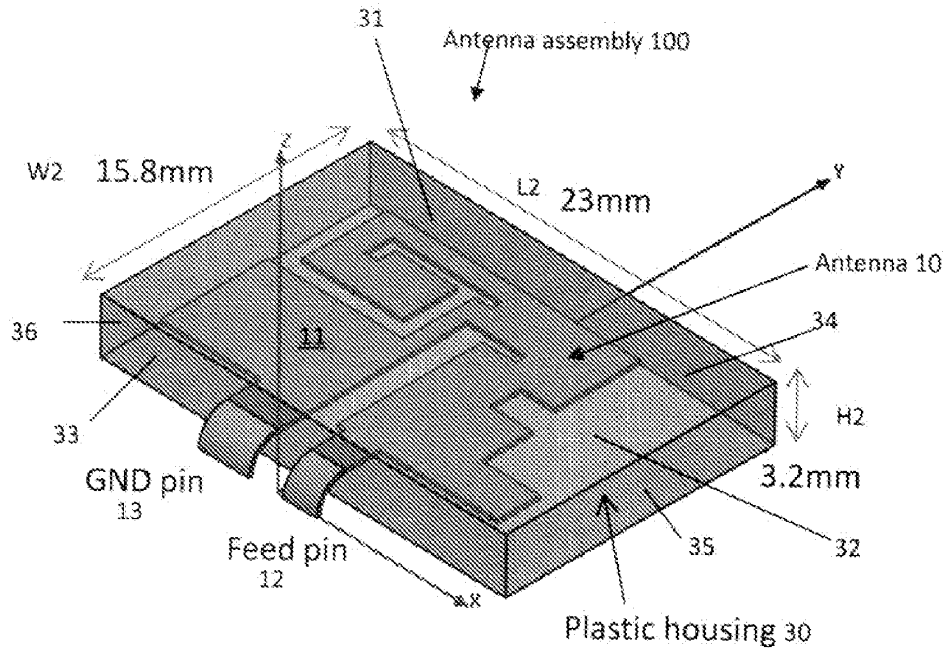
(22) Filed: **Apr. 18, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/476,710, filed on Apr. 18, 2011.

Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 5/01 (2006.01)
H01Q 1/42 (2006.01)





US 20120262358A1

(19) **United States**

(12) **Patent Application Publication**
WALLNER

(10) **Pub. No.: US 2012/0262358 A1**

(43) **Pub. Date: Oct. 18, 2012**

(54) **BEAM FORMING ANTENNA**

Publication Classification

(76) Inventor: **GEORGE WALLNER, MIAMI BEACH, FL (US)**

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

(52) **U.S. Cl.** **343/833; 343/837**

(21) Appl. No.: **13/443,977**

(57) **ABSTRACT**

(22) Filed: **Apr. 11, 2012**

A high frequency (HF) beam antenna includes a set of radiating vertical monopole elements and a set of horizontal dipole elements. The horizontal dipole elements are parasitically coupled to corresponding radiating vertical monopole elements and are configured to counterpoise radiation from the radiating vertical monopole elements and to effectively isolate the vertical monopole elements from the underlying ground. The HF beam antenna has a high performance gain and low angles of radiation when installed at a height of 0.1 to 0.2 wavelength above ground. The HF beam antenna eliminates the need for a tower in the HF service range.

Related U.S. Application Data

(60) Provisional application No. 61/474,787, filed on Apr. 13, 2011.

