



US 20150029059A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0029059 A1**

(43) **Pub. Date: Jan. 29, 2015**

(54) **SYSTEM AND METHOD FOR SHORT UHF ANTENNA WITH FLOATING TRANSMISSION LINE**

(52) **U.S. Cl.**
CPC . **H01Q 9/06** (2013.01); **H01Q 1/243** (2013.01)
USPC **343/702; 343/843; 29/600**

(71) Applicant: **MOTOROLA SOLUTIONS, INC,**
SCHAUMBURG, IL (US)

(57) **ABSTRACT**

(72) Inventors: **OVADIA GROSSMAN,** TEL AVIV-YAFFO (IL); **ANTONIO FARAONE,** FORT LAUDERDALE, FL (US); **ALEXANDER OON,** BAYAN LEPAS (MY); **MARK ROZENTAL,** GEDERA (IL)

(73) Assignee: **MOTOROLA SOLUTIONS, INC,**
SCHAUMBURG, IL (US)

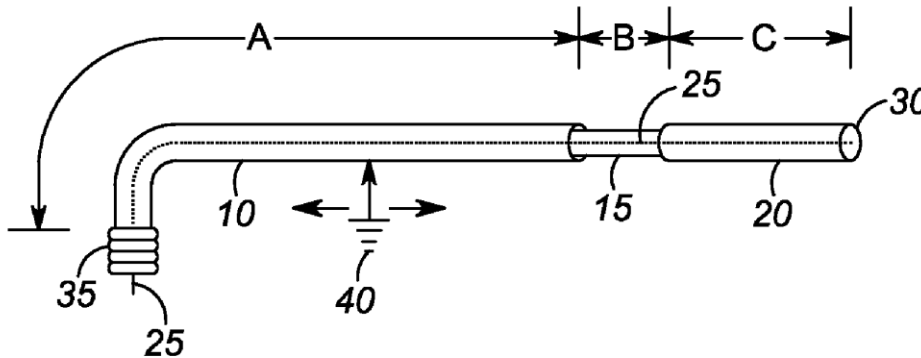
(21) Appl. No.: **13/948,709**

(22) Filed: **Jul. 23, 2013**

Publication Classification

(51) **Int. Cl.**
H01Q 9/06 (2006.01)
H01Q 1/24 (2006.01)

A short, efficient antenna utilizing a floating coax transmission line over ground or overlapping wire feed structure for reduced antenna size for use in handheld radios. An asymmetric transmission line radiator having a length (L_{TL}) is oriented substantially planar to and proximal to a truncated ground plane, and having at one end an input/output connector, and at an other end a feed point at least one of above a ground plane and proximal to its edge. An exciter antenna in a form of a plate or bent wire is coupled to the feed point and is exterior to the edge of the ground plane and oriented substantially orthogonal to the ground plane, the exciter antenna having a larger dimension length (L_{Ea}) that is at least 50% smaller than the length L_{TL} . The overall length of a perimeter of the antenna is approximately $\frac{1}{2}$ a wavelength of a center frequency of the antenna.





US 20150029061A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0029061 A1**

(43) **Pub. Date: Jan. 29, 2015**

(54) **ANTENNA**

Publication Classification

(71) Applicant: **Nokia Corporation**, Espoo (FI)
(72) Inventors: **Niels B. Larsen**, Encinitas, CA (US);
Ping Hui, San Diego, CA (US);
Yonghua Wei, San Diego, CA (US);
Francis McGaffigan, Escondido, CA (US);
Nan Xu, San Diego, CA (US);
Kiril Stoyanov, San Diego, CA (US)

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 19/00 (2006.01)
(52) **U.S. Cl.**
CPC **H01Q 1/243** (2013.01); **H01Q 19/005** (2013.01)
USPC **343/702**

(73) Assignee: **Nokia Corporation**

(57) **ABSTRACT**

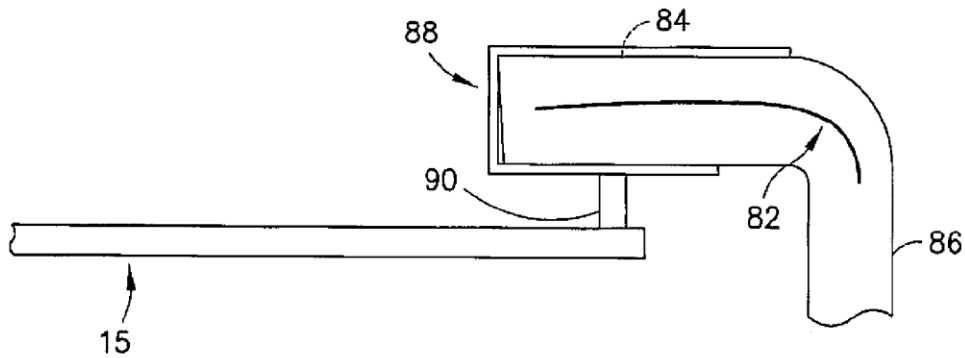
(21) Appl. No.: **14/513,687**

An apparatus including an antenna having an active element and a parasitic element; and at least one support, where the antenna is at least partially on the at least one support, where the at least one support includes a first section coupled to a second different section, where the active element is at least partially on the first section, and where the first section is at least partially formed with a first manufacturing process and a first material. The parasitic element is at least partially on the second section, and the second section is at least partially formed with a second different manufacturing process and a second different material.

(22) Filed: **Oct. 14, 2014**

Related U.S. Application Data

(63) Continuation of application No. 13/475,345, filed on May 18, 2012, now Pat. No. 8,896,489.





US 20150029068A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0029068 A1**

(43) **Pub. Date: Jan. 29, 2015**

(54) **ANTENNA DEVICE**

Publication Classification

(75) Inventors: **Hiroshi Toyao**, Tokyo (JP); **Toru Taura**, Tokyo (JP)

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

(73) Assignee: **NEC CORPORATION**, Minato-ku, Tokyo (JP)

(52) **U.S. Cl.**
CPC **H01Q 13/106** (2013.01)
USPC **343/770; 343/767**

(21) Appl. No.: **14/379,543**

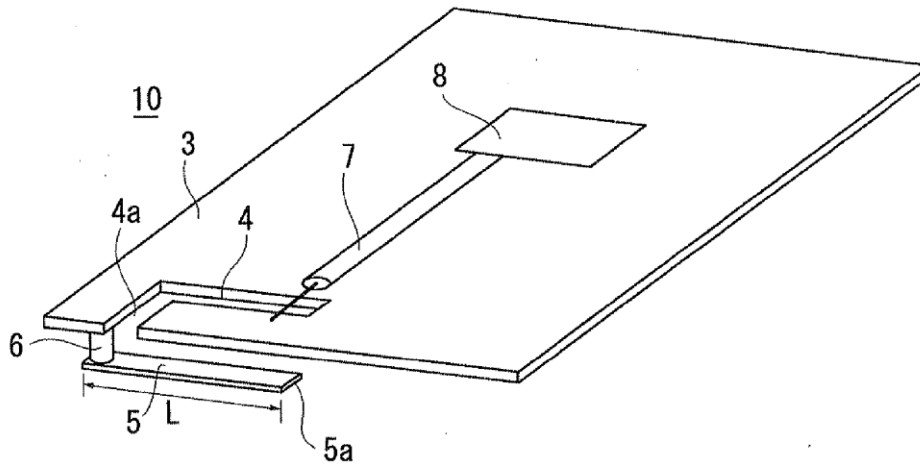
(22) PCT Filed: **Feb. 23, 2012**

(86) PCT No.: **PCT/JP2012/001243**

§ 371 (c)(1),
(2), (4) Date: **Aug. 19, 2014**

(57) **ABSTRACT**

An antenna device **10** includes at least one dielectric substrate **2**, a conductor plate **3** arranged in the dielectric substrate **2**, at least one slot **4** formed in the conductor plate **3**, at least one stub **5**, and at least one via **6**. The stub **5** is formed on a surface of the dielectric substrate **2** different from a surface where the slot is formed, the stub **5** being formed to cross the slot **4**. The via **6** has one end connected to a periphery of the slot **4** of the conductor plate **3** and another end connected to the stub **5**.





US 20150029071A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0029071 A1**

(43) **Pub. Date: Jan. 29, 2015**

(54) **ANTENNA WITH MULTIPLE FEED POINTS**

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

(71) Applicant: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW)

CPC **H01Q 5/0093** (2013.01); **H01Q 9/045** (2013.01)

USPC **343/845**

(72) Inventors: **TZU-YAO HWANG**, New Taipei (TW);
LUNG-SHENG TAI, New Taipei (TW)

(57)

ABSTRACT

(21) Appl. No.: **14/337,188**

An antenna includes a grounding portion extending in a longitudinal direction, a radiating portion extending in the longitudinal direction and parallel with the grounding portion, a connecting portion connecting the grounding portion and the radiating portion in a transverse direction perpendicular to the longitudinal direction and a coaxial cable. The coaxial cable comprises an inner conductor and an outer conductor surrounding the inner conductor, wherein the inner conductor comprises a first feed point connecting the connecting portion and a second feed point connecting the radiating portion, one part of the connecting portion is shortened serving as a shortened section between the first and second feed points.

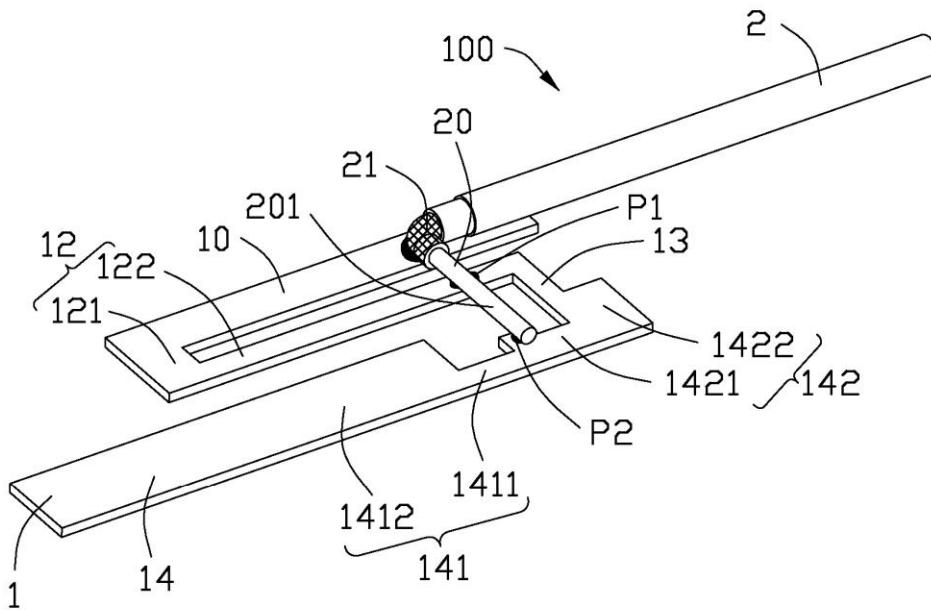
(22) Filed: **Jul. 21, 2014**

(30) **Foreign Application Priority Data**

Jul. 24, 2013 (TW) 102126390

Publication Classification

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





US 20150035706A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0035706 A1**

(43) **Pub. Date: Feb. 5, 2015**

(54) **ANTENNA HAVING FLEXIBLE FEED STRUCTURE WITH COMPONENTS**

H01Q 1/48 (2006.01)
H01Q 1/50 (2006.01)

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(52) **U.S. Cl.**
CPC *H01Q 1/243* (2013.01); *H01Q 1/48* (2013.01); *H01Q 1/50* (2013.01); *H05K 1/028* (2013.01); *H05K 1/189* (2013.01); *H05K 1/181* (2013.01)
USPC **343/702**; 174/254

(72) Inventors: **Dean F. Darnell**, San Jose, CA (US);
William J. Noellert, Sunnyvale, CA (US);
Mattia Pascolini, San Francisco, CA (US)

(21) Appl. No.: **14/486,602**

(22) Filed: **Sep. 15, 2014**

Related U.S. Application Data

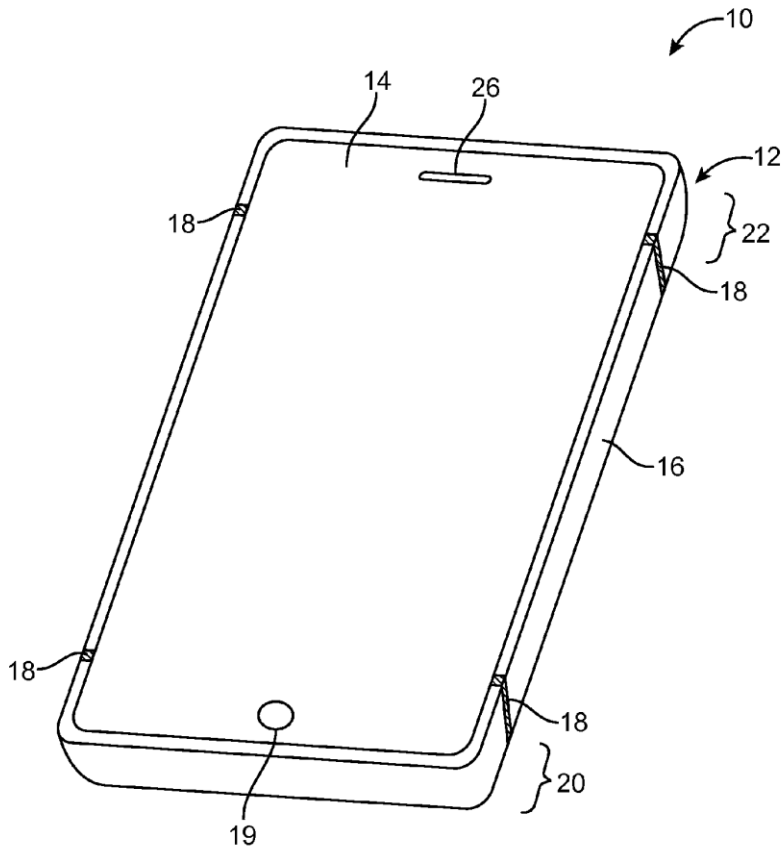
(63) Continuation of application No. 13/435,351, filed on Mar. 30, 2012, now Pat. No. 8,836,587.

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H05K 1/18 (2006.01)
H05K 1/02 (2006.01)

(57) **ABSTRACT**

Electronic devices may include antenna structures. The antenna structures may form an antenna having first and second feeds at different locations. Transceiver circuitry for transmitting and receiving radio-frequency antenna signals may be mounted on one end of a printed circuit board. Transmission line structures may be used to convey signals between an opposing end of the printed circuit board and the transceiver circuitry. The printed circuit board may be coupled to an antenna feed structure formed from a flexible printed circuit using solder connections. The flexible printed circuit may have a bend and may be screwed to conductive electronic device housing structures using one or more screws at one or more respective antenna feed terminals. Electrical components such as an amplifier circuit and filter circuitry may be mounted on the flexible printed circuit.





US 20150035712A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0035712 A1**

(43) **Pub. Date: Feb. 5, 2015**

(54) **COMMUNICATION DEVICE AND ANTENNA ELEMENT THEREIN**

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

CPC *H01Q 5/001* (2013.01); *H01Q 7/00* (2013.01); *H01Q 5/0027* (2013.01)

USPC **343/749**

(71) Applicant: **Acer Incorporated**, New Taipei City (TW)

(72) Inventors: **Kin-Lu WONG**, New Taipei City (TW);
Meng-Ting CHEN, New Taipei City (TW)

(57)

ABSTRACT

(73) Assignee: **Acer Incorporated**, New Taipei City (TW)

A communication device includes a ground element and an antenna element. The antenna element includes a loop metal element and a branch metal element. The loop metal element is adjacent to an edge of the ground element. The loop metal element has a feeding end and a grounding end. The grounding end is coupled to the ground element. The feeding end is coupled through a capacitive element and a first inductive element to a signal source. A closed region is enclosed by the loop metal element and the edge of the ground element. The branch metal element is coupled through a second inductive element to a connection point on the loop metal element. The connection point is at the front-half portion of the loop metal element. The front-half portion includes the feeding end. The branch metal element substantially extends along an outer periphery of the loop metal element.

(21) Appl. No.: **14/060,869**

(22) Filed: **Oct. 23, 2013**

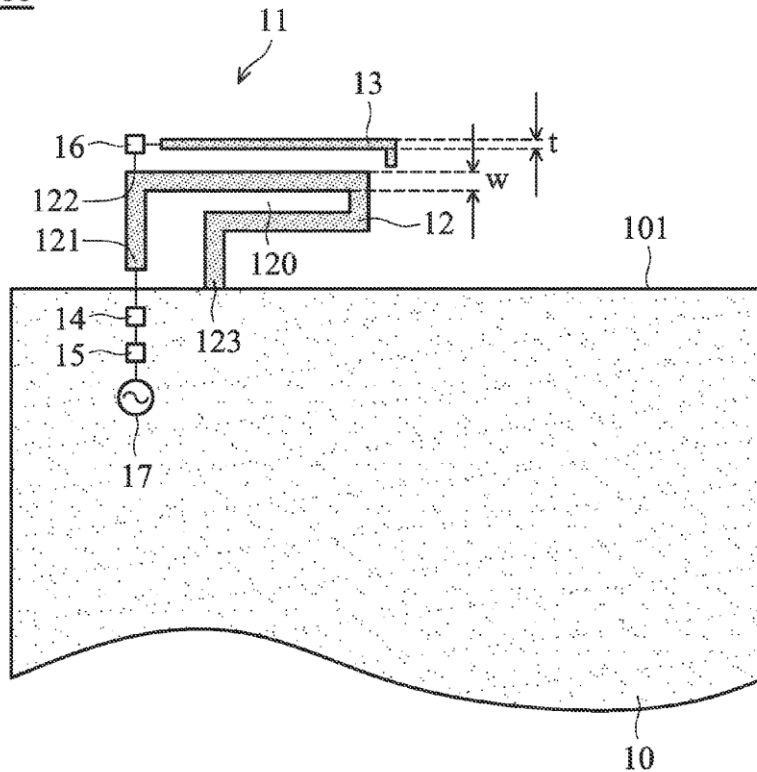
(30) **Foreign Application Priority Data**

Jul. 30, 2013 (TW) 102127223

Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 7/00 (2006.01)

100





US 20150042514A1

(19) **United States**

(12) **Patent Application Publication**

Nysen et al.

(10) **Pub. No.: US 2015/0042514 A1**

(43) **Pub. Date: Feb. 12, 2015**

(54) **APPARATUS AND METHOD FOR OPERATION OF AN ANTENNA SYSTEM ENABLING CONTROL OF RADIATION CHARACTERISTICS**

(52) **U.S. Cl.**
CPC *H01Q 3/247* (2013.01)
USPC **342/368**

(71) Applicant: **NETGEAR, Inc.**, San Jose, CA (US)
(72) Inventors: **Paul A. Nysen**, Carlsbad, CA (US);
Todd Van Cleave, San Marcos, CA (US)

(57) **ABSTRACT**

(21) Appl. No.: **14/492,233**
(22) Filed: **Sep. 22, 2014**

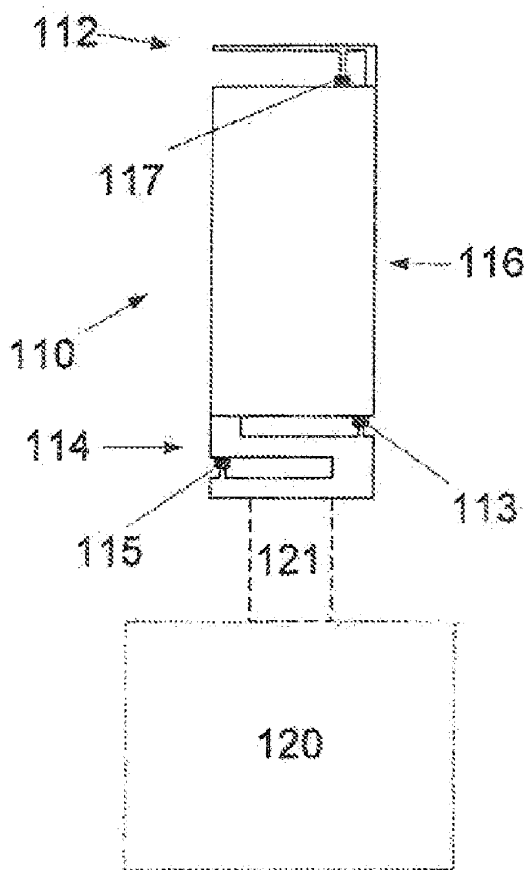
A method of operating an antenna system for a wireless device is provided for controlling radiation characteristics of the antenna system. The antenna system includes first and second sets of feed points disposed so that first and second radiation pattern are generated by the antenna system when drive currents are provided at the first and second set of feed points, respectively. The second radiation pattern is different from the first radiation pattern. The first and second drive currents are supplied such that a predetermined overall radiation pattern is generated. The predetermined overall radiation pattern is at least in part a combination of the first radiation pattern and the second radiation pattern. The system and method may be directed toward SAR mitigation.

Related U.S. Application Data

(62) Division of application No. 12/870,378, filed on Aug. 27, 2010, now Pat. No. 8,842,044.

Publication Classification

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





US 20150042517A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0042517 A1**

(43) **Pub. Date: Feb. 12, 2015**

(54) **MULTI-BAND ANTENNA**

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

(71) Applicant: **Acer Incorporated**, New Taipei City (TW)

CPC **H01Q 9/04** (2013.01)

USPC **343/700 MS**

(72) Inventors: **Kun-Sheng Chang**, New Taipei City (TW); **Ching-Chi Lin**, New Taipei City (TW); **Ming-Yu Chou**, New Taipei City (TW)

(57) **ABSTRACT**

(73) Assignee: **Acer Incorporated**, New Taipei City (TW)

A multi-band antenna including a ground plane, a radiation element, a first extension element and a second extension element is provided. The radiation element includes a first portion and a second portion electrically connected with each other. The first portion has a feeding point. The first and the second extension elements are extended from the ground plane. The first extension element and the first portion are spaced by a first coupling distance. The second extension element and the second portion are spaced by a second coupling distance. The multi-band antenna is operated in a first band through the radiation element. A feeding signal from the radiation element excites the first and the second extension elements through the first and the second coupling distances so that the multi-band antenna is operated further in a second band and a third band.

(21) Appl. No.: **14/295,357**

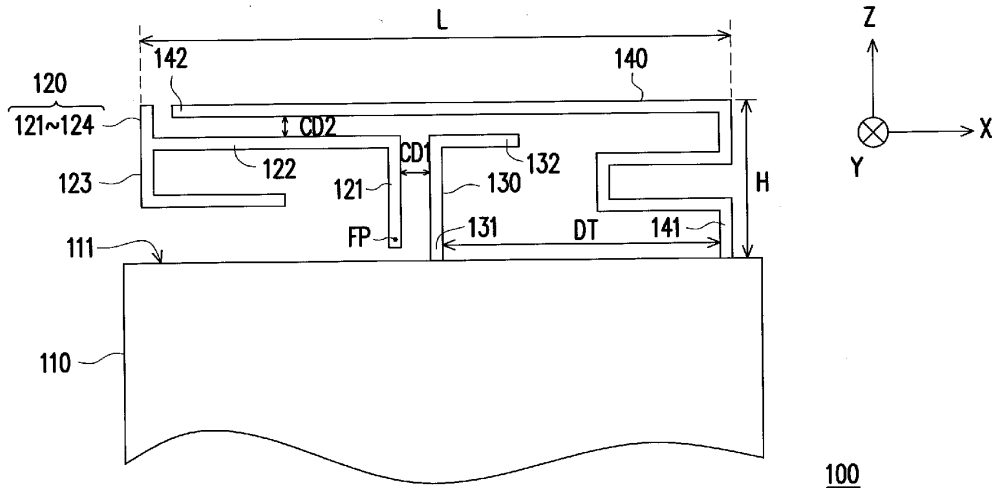
(22) Filed: **Jun. 4, 2014**

(30) **Foreign Application Priority Data**

Aug. 6, 2013 (TW) 102128118

Publication Classification

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



100



US 20150042520A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0042520 A1**

(43) **Pub. Date: Feb. 12, 2015**

(54) **WIRELESS TERMINAL**

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

(71) Applicant: **Huawei Device Co., Ltd.**, Shenzhen (CN)

CPC **H01Q 1/243** (2013.01); **H01Q 1/48** (2013.01); **H01Q 1/521** (2013.01); **H01Q 1/526** (2013.01)

(72) Inventors: **Liang Zhao**, Shenzhen (CN); **Hanyang Wang**, Shenzhen (CN); **Qing Liu**, Shenzhen (CN); **Huiliang Xu**, Shenzhen (CN); **Yi Fan**, Shenzhen (CN); **Yao Lan**, Shenzhen (CN); **Zhongying Long**, Shenzhen (CN); **Dongxing Tu**, Shenzhen (CN)

USPC **343/702**

(57) **ABSTRACT**

(21) Appl. No.: **14/522,109**

(22) Filed: **Oct. 23, 2014**

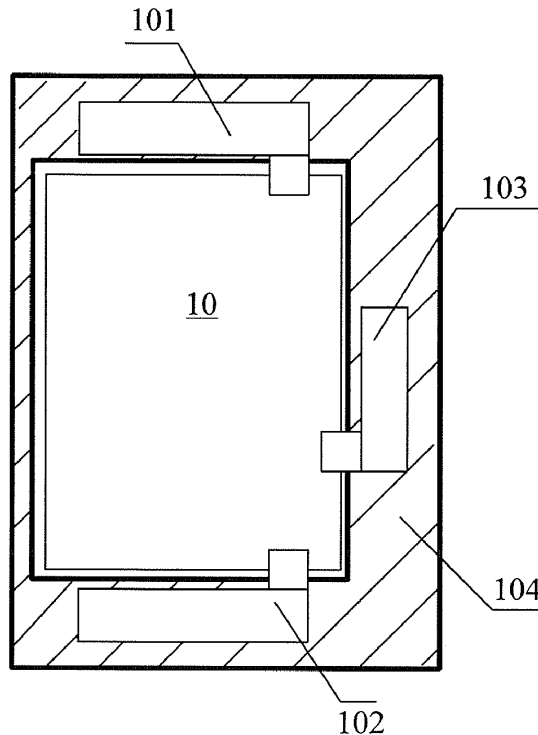
Related U.S. Application Data

(63) Continuation of application No. PCT/CN2013/080395, filed on Jul. 30, 2013.

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/52 (2006.01)
H01Q 1/48 (2006.01)

A wireless terminal is disclosed. The wireless terminal includes a first antenna, a second antenna, a printed circuit board, a bracket, and a resonator, where the first antenna is located at one side of the printed circuit board, the second antenna is located at another side of the printed circuit board, the printed circuit board functions as a metal ground of the first antenna and the second antenna, the resonator is located on the bracket, a ground point of the resonator is located on the printed circuit board, and a clearance exists between the resonator and the printed circuit board. Not only does the wireless terminal improve isolation between multiple antennas, but also the resonator can better radiate energy of the antennas because a clearance exists between the resonator and the PCB.





US 20150042525A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0042525 A1**

(43) **Pub. Date: Feb. 12, 2015**

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

(30) **Foreign Application Priority Data**

Mar. 15, 2012 (JP) 2012-058957

(71) Applicants: **NEC CASIO MOBILE COMMUNICATIONS, LTD.**,
Kawasaki-shi, Kanagawa (JP); **NTT DOCOMO, INC.**, Chiyoda-ku, Tokyo (JP)

Publication Classification

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

(72) Inventors: **Takahiro Yoshida**, Kanagawa (JP); **Masanori Sakurai**, Kanagawa (JP); **Shinichiro Kitano**, Kanagawa (JP); **Daisuke Kurita**, Tokyo (JP); **Takashi Ueda**, Tokyo (JP)

(52) **U.S. Cl.**
CPC **H01Q 9/0442** (2013.01); **H01Q 9/0414** (2013.01)
USPC **343/745**

(73) Assignees: **NTT DOCOMO, INC.**, Tokyo (JP); **NEC CASIO MOBILE COMMUNICATIONS, LTD.**, Kanagawa (JP)

(57) **ABSTRACT**

An antenna device (10) includes a first antenna pattern (100), a second antenna pattern (200), and a frequency characteristic adjustment unit (400). The first antenna pattern (100) includes a feeding point (14). The second antenna pattern (200) is fed from the feeding point (14) similarly to the first antenna pattern (100). The frequency characteristic adjustment unit (400) is connected to the feeding point (14). The frequency characteristic adjustment unit (400) changes a frequency characteristic of at least one of the first antenna pattern (100) and the second antenna pattern (200).

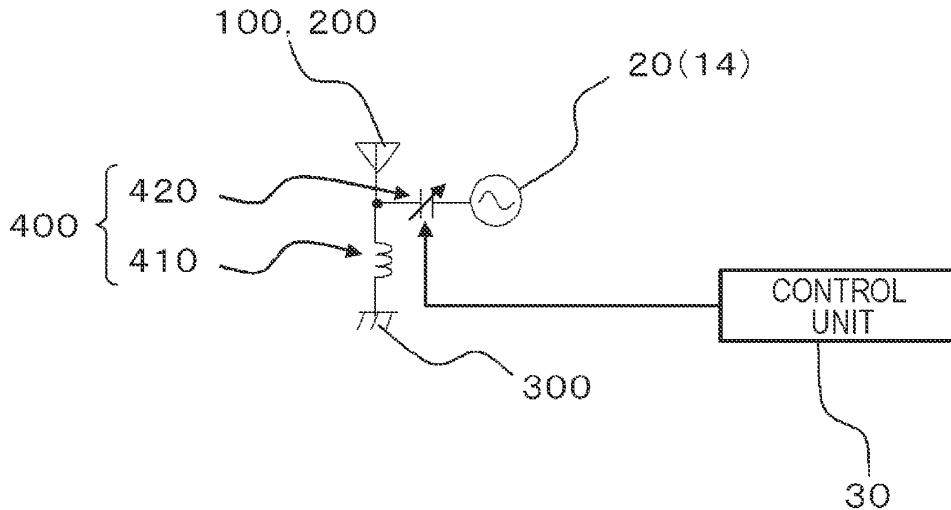
(21) Appl. No.: **14/384,736**

(22) PCT Filed: **Mar. 8, 2013**

(86) PCT No.: **PCT/JP2013/001527**

§ 371 (c)(1),

(2) Date: **Sep. 12, 2014**





US 20150048858A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0048858 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **NON-CONTACT TEST SYSTEM**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Joshua G. Nickel**, San Jose, CA (US);
Jonathan P.G. Gavin, Pleasanton, CA (US)

(21) Appl. No.: **14/500,418**

(22) Filed: **Sep. 29, 2014**

Related U.S. Application Data

(63) Continuation of application No. 13/092,808, filed on Apr. 22, 2011, now Pat. No. 8,847,617.

Publication Classification

(51) **Int. Cl.**
G01R 31/302 (2006.01)

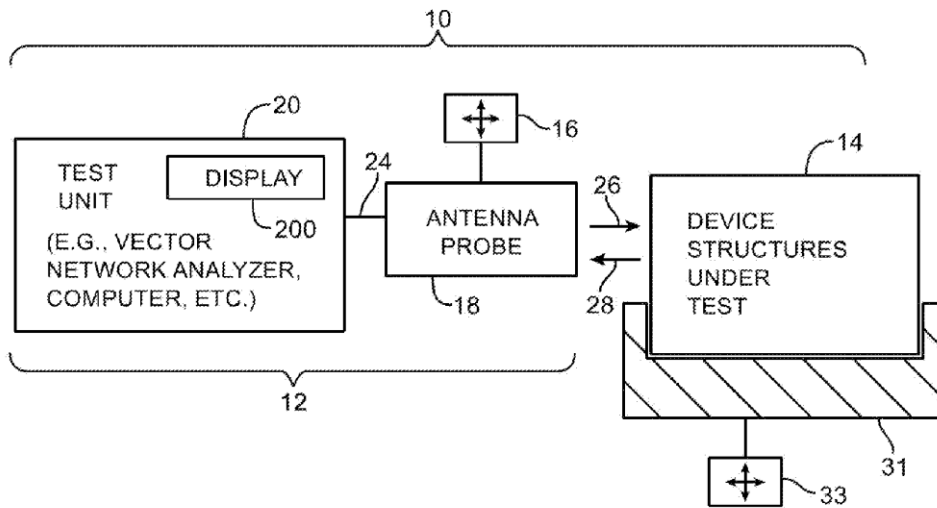
(52) **U.S. Cl.**

CPC **G01R 31/3025** (2013.01)

USPC **324/754.31**

(57) **ABSTRACT**

Electronic device structures such as structures containing antennas, connectors, welds, electronic device components, conductive housing structures, and other structures can be tested for faults using a non-contact test system. The test system may include a vector network analyzer or other test unit that generates radio-frequency tests signals in a range of frequencies. The radio-frequency test signals may be transmitted to electronic device structures under test using an antenna probe that has one or more test antennas. The antenna probe may receive corresponding radio-frequency signals. The transmitted and received radio-frequency test signals may be analyzed to determine whether the electronic device structures under test contain a fault.





US 20150048979A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0048979 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **ANTENNA SYSTEM FOR A SMART PORTABLE DEVICE USING A CONTINUOUS METAL BAND**

(52) **U.S. Cl.**
CPC **H01Q 5/0093** (2013.01); **H01Q 1/243** (2013.01)

USPC **343/702**

(71) Applicant: **MOTOROLA MOBILITY LLC**,
Libertyville, IL (US)

(72) Inventors: **Vijay L. Asrani**, Round Lake, IL (US);
Hardik D. Shah, Hoffman Estates, IL (US);
Khan Mohammed Z Shams,
Lindenhurst, IL (US)

(73) Assignee: **MOTOROLA MOBILITY LLC**,
Libertyville, IL (US)

(21) Appl. No.: **14/056,200**

(22) Filed: **Oct. 17, 2013**

Related U.S. Application Data

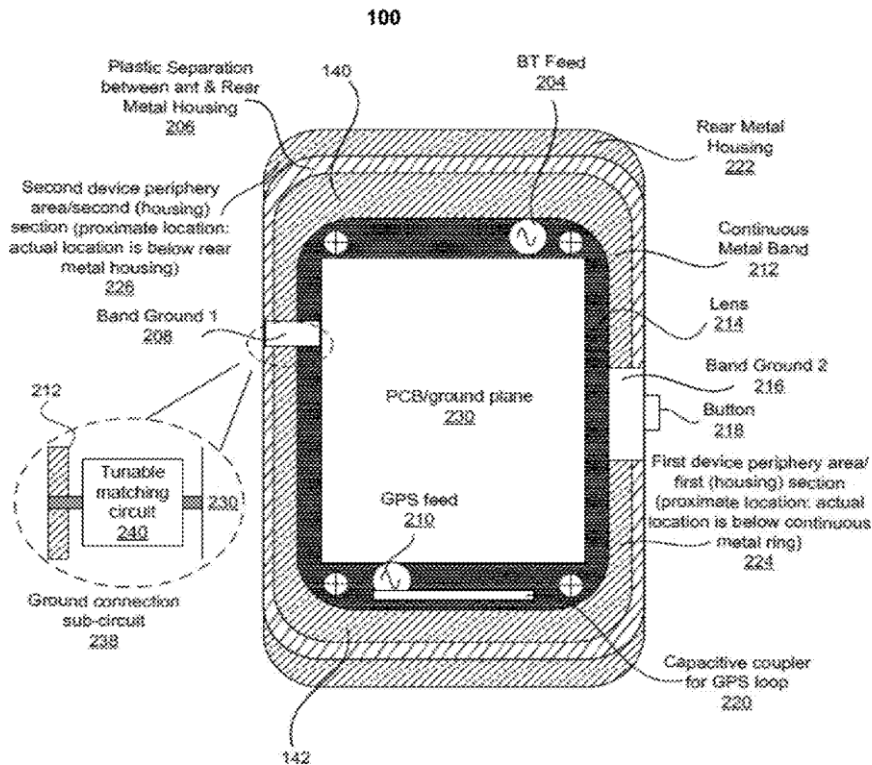
(60) Provisional application No. 61/867,331, filed on Aug. 19, 2013.

Publication Classification

(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 1/24 (2006.01)

(57) **ABSTRACT**

A method and portable device provide multi-band, multi-antenna signal communication in a portable device having wireless communication capability. A portable device comprises a single loop multi-feed (SLM) antenna system which includes a continuous conductive ring located along and adjacent to a first device periphery area. The SLM antenna system also comprises multiple communication feeds each respectively coupled to one of multiple transceivers and to the conductive ring. The SLM antenna system includes multiple ground connection points each of which is coupled to a ground plane. Each ground connection point is selectively positioned at a corresponding location on the continuous conductive ring in order to configure, within the SLM antenna system, multiple corresponding antenna elements. The SLM antenna system enables frequency tuning associated with a first antenna element to be performed independently of frequency tuning associated with a second antenna element and supports signal propagation via the multiple antennas using respective frequency bands.





US 20150048982A1

(19) **United States**

(12) **Patent Application Publication**
Wang

(10) **Pub. No.: US 2015/0048982 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **PRINTED CIRCUIT BOARD ANTENNA AND TERMINAL**

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

CPC *H01Q 13/106* (2013.01); *H01Q 21/30* (2013.01)

USPC **343/751**; 343/770

(71) Applicant: **Huawei Device Co., LTD**, Shenzhen (CN)

(72) Inventor: **Hanyang Wang**, Shenzhen (CN)

(57) **ABSTRACT**

(21) Appl. No.: **14/517,418**

(22) Filed: **Oct. 17, 2014**

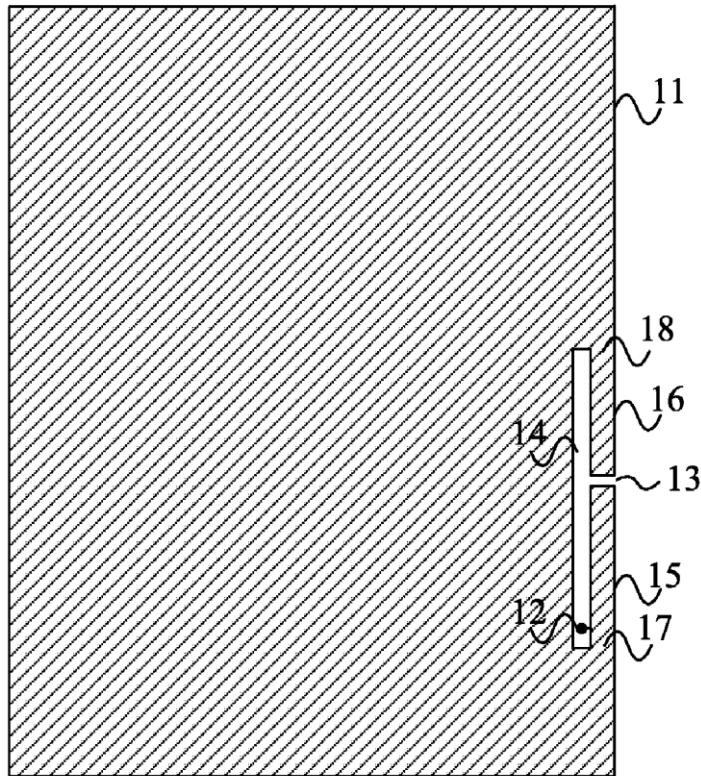
A printed circuit board antenna includes a printed circuit board and a feedpoint that is disposed on the printed circuit board. A copper coating is disposed on the printed circuit board. A split is disposed on the copper coating on the printed circuit board. The split is connected to a board edge of the printed circuit board. A slot perpendicular to the split is disposed on the copper coating on the printed circuit board. The slot is connected to the split. The copper coating at two sides of the split forms a first antenna and a second antenna. The feedpoint is configured to, together with the first antenna and the second antenna, form a first resonance loop and a second resonance loop. Resonance frequencies of the first resonance loop and the second resonance loop are different.

Related U.S. Application Data

(63) Continuation of application No. PCT/CN2013/081193, filed on Aug. 9, 2013.

Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 21/30 (2006.01)





US 20150048989A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0048989 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **MULTIBAND ANTENNA**

Publication Classification

(71) Applicant: **Wistron NeWeb Corporation**, Hsinchu (TW)

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

(72) Inventors: **I-Shan Chen**, Hsinchu (TW);
Chia-Hong Lin, Hsinchu (TW);
Yu-Chun Huang, Hsinchu (TW);
Hsin-Lung Hsiao, Hsinchu (TW)

(52) **U.S. Cl.**
CPC **H01Q 5/001** (2013.01)
USPC **343/843**

(73) Assignee: **Wistron NeWeb Corporation**, Hsinchu (TW)

(57) **ABSTRACT**

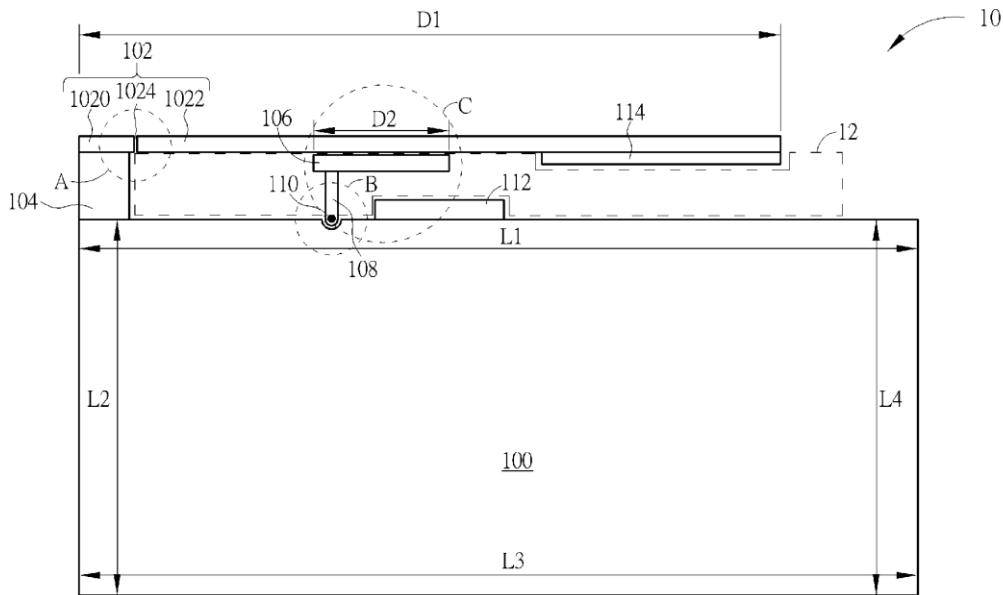
A multiband antenna for receiving or transmitting wireless signals of a plurality of frequency bands includes a grounding sheet, formed with a hole at a first side, for providing grounding, a first micro-strip line, substantially parallel to the first side of the grounding sheet, a connecting unit, connecting to the first side of the grounding sheet and the first micro-strip line, for forming a resonant cavity with the first side of the grounding sheet and the first micro-strip line, a second micro-strip line, formed in the resonant cavity and substantially parallel to the first micro-strip line, a third micro-strip line, extending from the hole of the grounding sheet to the second micro-strip line, and a feed-in terminal, formed on the third micro-strip line within the hole, for transmitting the wireless signals.

(21) Appl. No.: **14/155,383**

(22) Filed: **Jan. 15, 2014**

(30) **Foreign Application Priority Data**

Aug. 19, 2013 (TW) 102129691





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(19) **United States**

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

(10) **Pub. No.: US 2015/0048991 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **MULTI-FEED LOOP ANTENNA**

(60) Provisional application No. 61/636,553, filed on Apr. 20, 2012.

(71) Applicants: **Olivier Pajona**, Nice (FR); **Laurent Desclos**, San Diego, CA (US); **Seng Thail**, Nice (FR)

Publication Classification

(72) Inventors: **Olivier Pajona**, Nice (FR); **Laurent Desclos**, San Diego, CA (US); **Seng Thail**, Nice (FR)

(51) **Int. Cl.**
H01Q 7/00 (2006.01)
H01Q 1/50 (2006.01)

(73) Assignee: **Ethertronics, Inc.**, San Diego, CA (US)

(52) **U.S. Cl.**
CPC ... **H01Q 7/00** (2013.01); **H01Q 1/50** (2013.01)
USPC **343/852**; 343/866

(21) Appl. No.: **14/145,769**

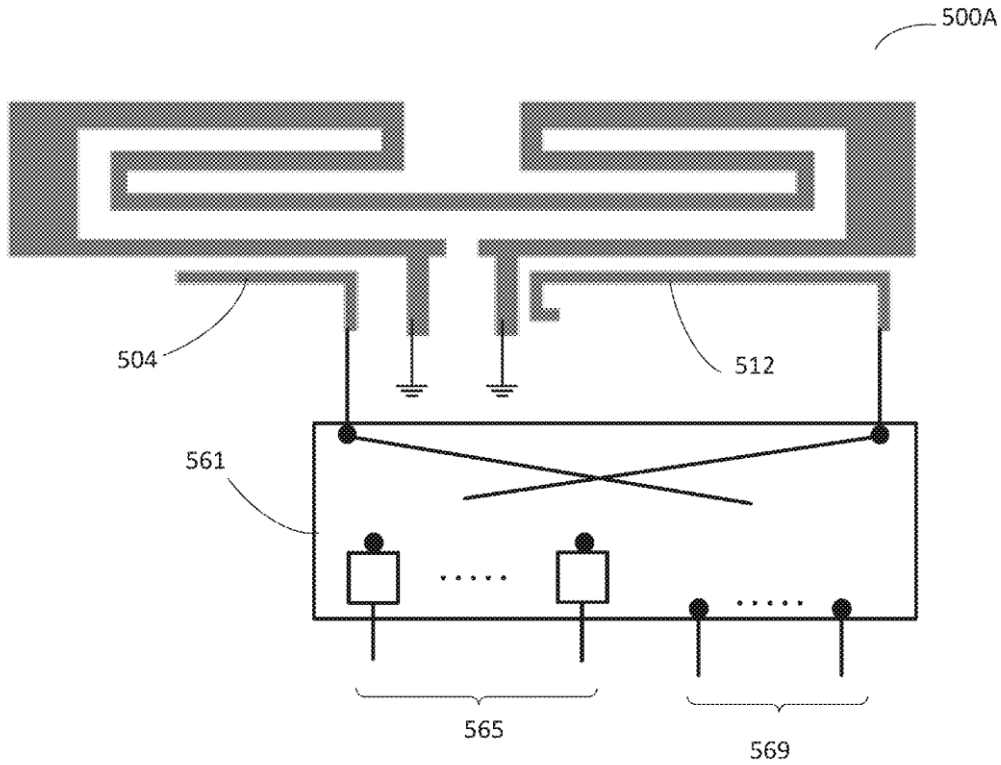
(57) **ABSTRACT**

(22) Filed: **Dec. 31, 2013**

A multi-feed antenna in provided, including multiple feed elements associated with multiple frequency regions, respectively, and a folded loop element for radiating energy. Each of the multiple feed elements is capacitively coupled to the folded loop element.

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/868,093, filed on Apr. 22, 2013.





US 20150048994A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0048994 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **ANTENNA MODULE AND MANUFACTURING METHOD THEREOF**

Publication Classification

(71) Applicant: **DAE SAN ELECTRONICS CO., LTD.**, Hwaseong-si (KR)

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

(72) Inventors: **Sang Young MA**, Ansan-si (KR); **Ju Young MA**, Ansan-si (KR)

(52) **U.S. Cl.**
CPC **H01Q 1/40** (2013.01)
USPC **343/873; 29/600**

(73) Assignee: **DAE SAN ELECTRONICS CO., LTD.**, Hwaseong-si (KR)

(57) **ABSTRACT**

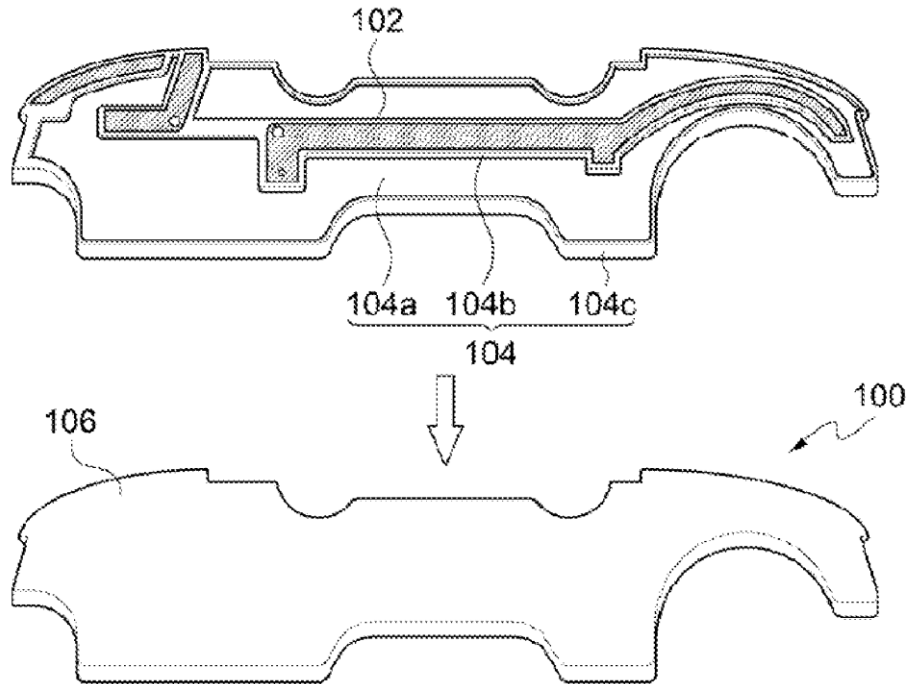
(21) Appl. No.: **14/461,785**

An antenna module includes: a first injection-molded part which is formed to have a base portion and a protrusion portion to be protruded from the base portion by an injection molding; an antenna pattern which is positioned on the protrusion portion; and a second injection-molded part which is formed to cover the antenna pattern by an injection molding. Since the antenna pattern is formed on the protrusion portion of the first injection-molded part, the thickness of a portion of the second injection-molded part on the antenna pattern can be minimized, and accordingly the antenna module and the mobile terminal case can be formed to be thin, light-weight and slim while the transmitting/receiving efficiency of the antenna can be maximized.

(22) Filed: **Aug. 18, 2014**

(30) **Foreign Application Priority Data**

Aug. 19, 2013	(KR)	10-2013-0097801
Aug. 19, 2013	(KR)	10-2013-0097810
Feb. 24, 2014	(KR)	10-2014-0021345
Apr. 17, 2014	(KR)	10-2014-0045837





US 20150048998A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0048998 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **METAL PLATE ANTENNA**

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

(71) Applicant: **AUDEN TECHNO CORP.**, TAOYUAN COUNTY (TW)

CPC **H01Q 1/36** (2013.01)

USPC **343/906**

(72) Inventors: **SHIH-CHI LAI**, MIAOLI COUNTY (TW); **PENG-HAO JUAN**, TAIPEI CITY (TW); **CHENG-MIN YANG**, KAOHSIUNG CITY (TW)

(57) **ABSTRACT**

(73) Assignee: **AUDEN TECHNO CORP.**, TAOYUAN COUNTY (TW)

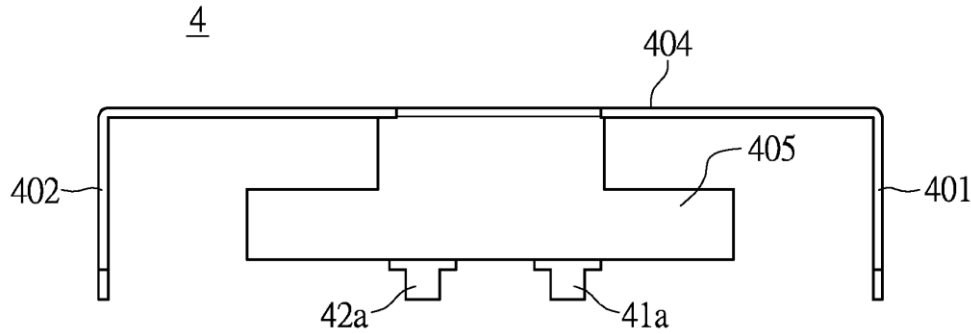
The present disclosure provides a metal plate antenna comprising a radiating portion and at least two grounding pins. The radiating portion is a metal plate and the two ends of the radiating portion are a first end and a second end respectively. The first end and the second end are bended towards the same direction and are perpendicular to the radiating portion. One of the first end and the second end is for the feeding end. At least one of the first end and the second end has at least a plug-foot. The plug-foot is used for plugging into the inserting hole of a circuit board. At least two grounding pins are vertical connected to the radiating portion and one of the grounding pins is used to be connected with the grounding of the circuit board.

(21) Appl. No.: **13/969,028**

(22) Filed: **Aug. 16, 2013**

Publication Classification

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





US 20150049054A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0049054 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **INPUT DEVICE AND ELECTRONIC EQUIPMENT**

(71) Applicant: **Sony Computer Entertainment Inc.**,
Tokyo (JP)

(72) Inventors: **Minoru Wakabayashi**, Tokyo (JP);
Kenichiro Kodama, Tokyo (JP)

(21) Appl. No.: **14/452,797**

(22) Filed: **Aug. 6, 2014**

(30) **Foreign Application Priority Data**

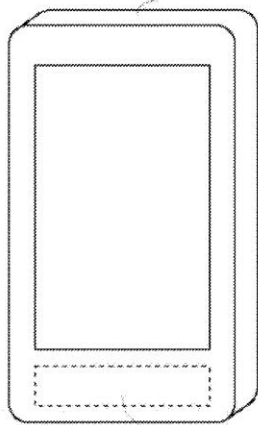
Aug. 19, 2013 (JP) 2013-169839

Publication Classification

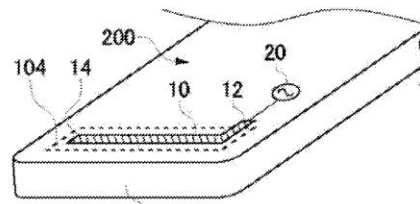
(51) **Int. Cl.**
G06F 3/041 (2006.01)
G06F 3/044 (2006.01)
(52) **U.S. Cl.**
CPC **G06F 3/041** (2013.01); **G06F 3/044**
(2013.01); **G06F 2203/04101** (2013.01)
USPC **345/174**; 345/173

(57) **ABSTRACT**

Disclosed herein is electronic equipment having a wireless communication function. The electronic equipment includes: an antenna element arranged in such a manner that at least part of the antenna element overlaps an input area used as an input interface on an enclosure of the electronic equipment; a wireless section adapted to perform wireless communication using the antenna element; and an input detection section adapted to detect user input to the input area based on the state of the antenna element.



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102
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US 20150050964A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0050964 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **LOW RADIATION DOSE RATE MOBILE PHONE**

Publication Classification

(71) Applicant: **YOTA DEVICES IPR LTD**, Tortola (VG)

(51) **Int. Cl.**
H04M 1/02 (2006.01)
H04B 1/38 (2006.01)

(72) Inventors: **Dmitry GORILOVSKY**, Numberg (DE); **Dennis SVERDLOV**, St.-Petersburg (RU)

(52) **U.S. Cl.**
CPC **H04M 1/026** (2013.01); **H04B 1/3833** (2013.01)
USPC **455/566**

(21) Appl. No.: **14/497,965**

(57) **ABSTRACT**

(22) Filed: **Sep. 26, 2014**

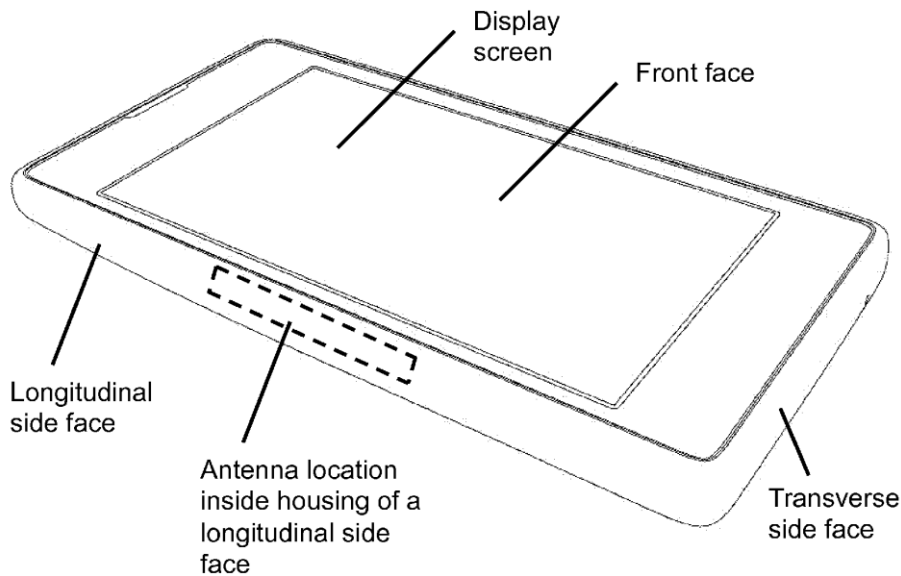
The field of the invention relates to mobile phones arranged to reduce a specific absorption rate of mobile phone radiation into the body of a user. There is provided a bar form factor mobile phone device comprising front and back major faces, the front major face arranged to present a first display screen and the back major face arranged to present a second display screen, wherein the device comprises an antenna operable to receive radio frequency transmissions, wherein the first and second displays have low transmission at the radio frequency transmissions, and wherein the antenna is arranged near to a side face of the device.

Related U.S. Application Data

(63) Continuation of application No. PCT/EP2013/056705, filed on Mar. 28, 2013.

Foreign Application Priority Data

(30) Mar. 28, 2012 (GB) 1205431.8





US 20150050968A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0050968 A1**

(43) **Pub. Date: Feb. 19, 2015**

(54) **COVER FOR ELECTRONIC DEVICE, ANTENNA ASSEMBLY, ELECTRONIC DEVICE, AND METHOD FOR MANUFACTURING THE SAME**

Publication Classification

(51) **Int. Cl.**
H04M 1/02 (2006.01)
C25D 5/02 (2006.01)
(52) **U.S. Cl.**
CPC *H04M 1/0202* (2013.01); *C25D 5/022* (2013.01)
USPC **455/575.1**; 205/122

(71) Applicant: **SAMSUNG ELECTRO-MECHANICS CO., LTD.**, Suwon-Si (KR)

(72) Inventors: **Dae Seong JEON**, Suwon-Si (KR); **Jong Lae KIM**, Suwon-Si (KR); **Kang Ryong CHOI**, Suwon-Si (KR)

(21) Appl. No.: **14/459,194**

(22) Filed: **Aug. 13, 2014**

(30) **Foreign Application Priority Data**

Aug. 14, 2013 (KR) 10-2013-0096933
Jan. 29, 2014 (KR) 10-2014-0011684

(57) **ABSTRACT**

A cover for an electronic device may include a metal plate having a first metal region formed of a metal; a through-hole formed in a portion of the first metal region of the metal plate; and an electrical open path extending from the through-hole to an end portion on one side of the first metal region through metal oxidation.

