



US 20150180113A1

(19) **United States**

(12) **Patent Application Publication**
LIN

(10) **Pub. No.: US 2015/0180113 A1**

(43) **Pub. Date: Jun. 25, 2015**

(54) **ANTENNA STRUCTURE AND WIRELESS COMMUNICATION DEVICE USING SAME**

Publication Classification

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H04M 1/02 (2006.01)

(72) Inventor: **YEN-HUI LIN**, Tu-Cheng (TW)

(52) **U.S. Cl.**
CPC *H01Q 1/243* (2013.01); *H04M 1/026* (2013.01)

(21) Appl. No.: **14/566,948**

(57) **ABSTRACT**

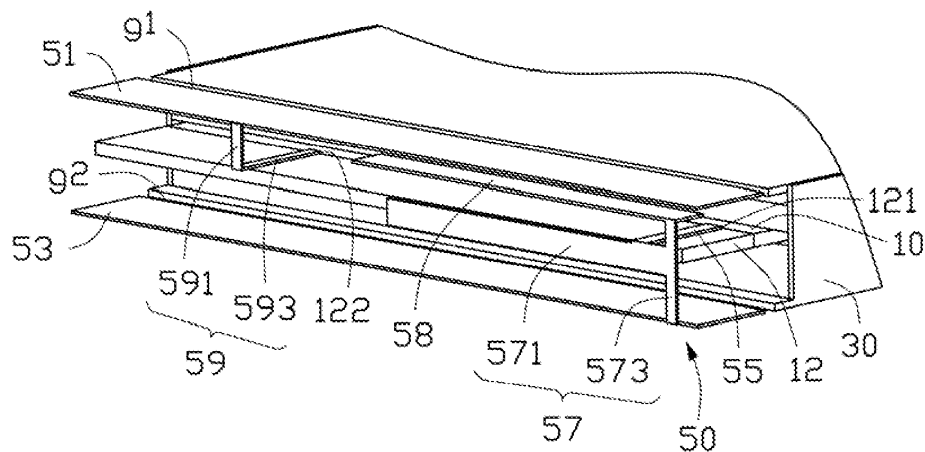
(22) Filed: **Dec. 11, 2014**

An antenna structure includes a feed portion, a ground portion, a connecting portion, a first metallic sheet, a second metallic sheet, and a coupling portion. The connecting portion is electrically connected to the feed portion. The first metallic sheet is electrically connected to the ground portion. The second metallic sheet is spaced apart from the first metallic sheet and is electrically connected to the connecting portion. The coupling portion is coupled to the connecting portion and spaced apart from the first metallic sheet.

(30) **Foreign Application Priority Data**

Dec. 23, 2013 (CN) 201310713082.X

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US 20150180115A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0180115 A1**

(43) **Pub. Date: Jun. 25, 2015**

(54) **RADIO-FREQUENCY DEVICE AND WIRELESS COMMUNICATION DEVICE FOR ENHANCING ANTENNA ISOLATION**

(52) **U.S. CL.**
CPC **H01Q 1/523** (2013.01)

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

(57) **ABSTRACT**

(72) Inventors: **Chia-Hsing Hsieh**, Hsinchu (TW);
Chung-Hung Chen, Hsinchu (TW)

A radio-frequency device for a wireless communication device includes an antenna disposition area, a grounding unit, a first antenna and a second antenna. The first antenna includes a feed-in plate; a first radiating element, coupled to the feed-in plate and electrically connected to the grounding unit; and a metal branch, electrically connected to the grounding unit; wherein the grounding unit is shared by the first antenna and the second antenna, the feed-in plate is disposed in-between the metal branch and the first radiating element, and the metal branch is used for guiding a reflected signal generated from the second antenna to the metal branch so as to enhance isolations of the first antenna and the second antenna.

(21) Appl. No.: **14/555,590**

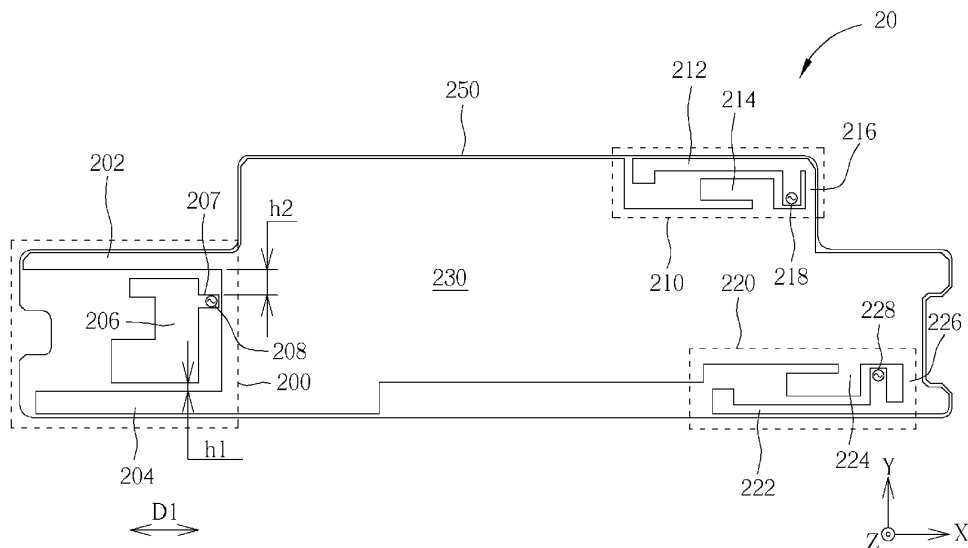
(22) Filed: **Nov. 27, 2014**

(30) **Foreign Application Priority Data**

Dec. 24, 2013 (TW) 102148007

Publication Classification

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





US 20150180117A1

(19) **United States**

(12) **Patent Application Publication**
RUAN

(10) **Pub. No.: US 2015/0180117 A1**

(43) **Pub. Date: Jun. 25, 2015**

(54) **INVERTED-F ANTENNA PROVIDED WITH AN ISOLATION UNIT**

Publication Classification

(71) Applicant: **Taiwan Tongda Communication Co., Ltd.**, Kaohsiung City (TW)

(51) **Int. Cl.**
H01Q 1/52 (2006.01)
H01Q 9/04 (2006.01)

(72) Inventor: **Wei-Hung RUAN**, Kaohsiung City (TW)

(52) **U.S. Cl.**
CPC *H01Q 1/526* (2013.01); *H01Q 9/0421* (2013.01)

(73) Assignee: **Taiwan Tongda Communication Co., Ltd.**, Kaohsiung City (TW)

(57) **ABSTRACT**

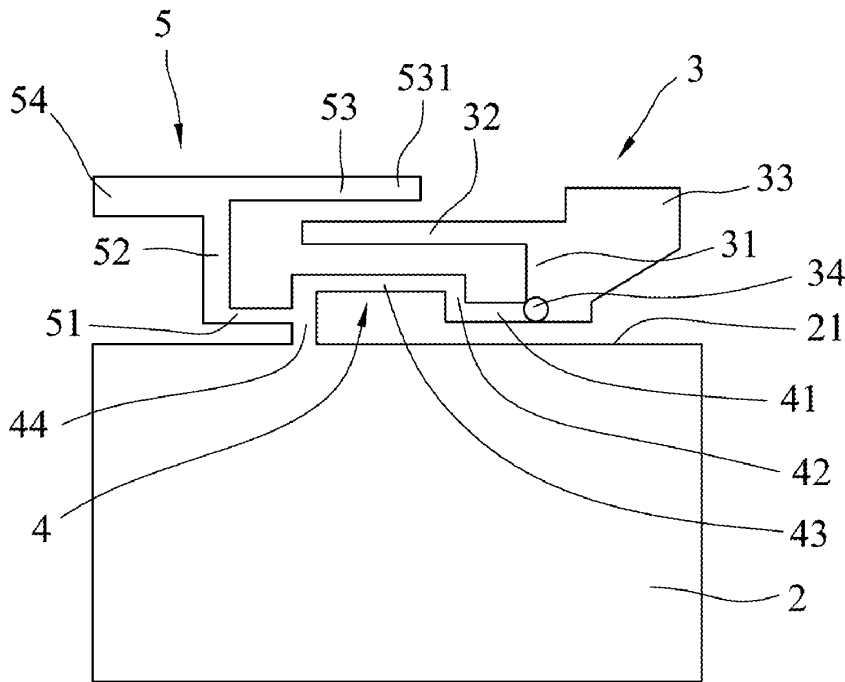
(21) Appl. No.: **14/272,137**

An inverted-F antenna includes a ground unit, a radiating unit, a short circuit unit, and an isolation unit. The radiating unit is spaced apart from the ground unit, and includes a feed-in point that is configured to be fed with a radio frequency signal. The short circuit unit is coupled between the ground unit and the radiating unit. The isolation unit is spaced apart from the ground unit and the radiating unit, is coupled to the short circuit unit, and includes a portion that is adjacent to the radiating unit and that projectively overlaps a portion of the radiating unit in a direction toward the ground unit.

(22) Filed: **May 7, 2014**

(30) **Foreign Application Priority Data**

Dec. 19, 2013 (TW) 102223983





US 20150180118A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0180118 A1**

(43) **Pub. Date: Jun. 25, 2015**

(54) **ANTENNA SYSTEM WITH HIGH ISOLATION CHARACTERISTICS**

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

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

(71) Applicant: **Wistron NeWeb Corp.**, Hsinchu (TW)

(72) Inventors: **Yu-Tsung HUANG**, Hsinchu (TW);
Cheng-Da YANG, Hsinchu (TW)

(57) **ABSTRACT**

(21) Appl. No.: **14/339,996**

(22) Filed: **Jul. 24, 2014**

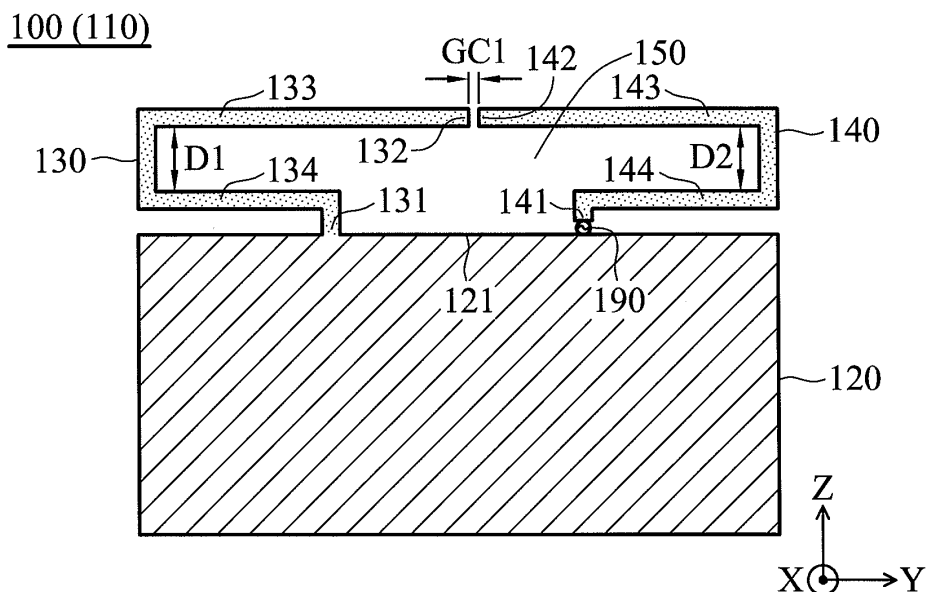
(30) **Foreign Application Priority Data**

Dec. 23, 2013 (TW) 102147704

Publication Classification

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

An antenna system includes at least one antenna element. The antenna element includes a ground plane, a grounding isolation element, and a feeding element. The grounding isolation element has a bending structure. A grounding end of the grounding isolation element is coupled to an edge of the ground plane. A feeding end of the feeding element is coupled to a signal source, and an open end of the feeding element is adjacent to an open end of the grounding isolation element, such that a resonant path is formed by the feeding element and the grounding isolation element. The grounding isolation element is configured to reduce radiation of the antenna element in a specific direction.





US 20150180123A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0180123 A1**

(43) **Pub. Date: Jun. 25, 2015**

(54) **PLATFORM INDEPENDENT ANTENNA**

Pelosi, Aalborg (DK); Samantha Caporal Del Barrio, Aalborg (DK)

(71) Applicants: **Alexandru Daniel Tatomirescu, Aalborg (DK); Poul Olesen, Stoevring (DK); Peter Bundgaard, Aalborg (DK); Pevand Bahramzy, Norresundby (DK); Mikael Knudsen, Gistrup (DK); Gert Pedersen, Storvorde (DK); Emil Buskgaard, Aalborg (DK); Mauro Pelosi, Aalborg (DK); Samantha Caporal Del Barrio, Aalborg (DK)**

(21) Appl. No.: **14/134,632**

(22) Filed: **Dec. 19, 2013**

Publication Classification

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

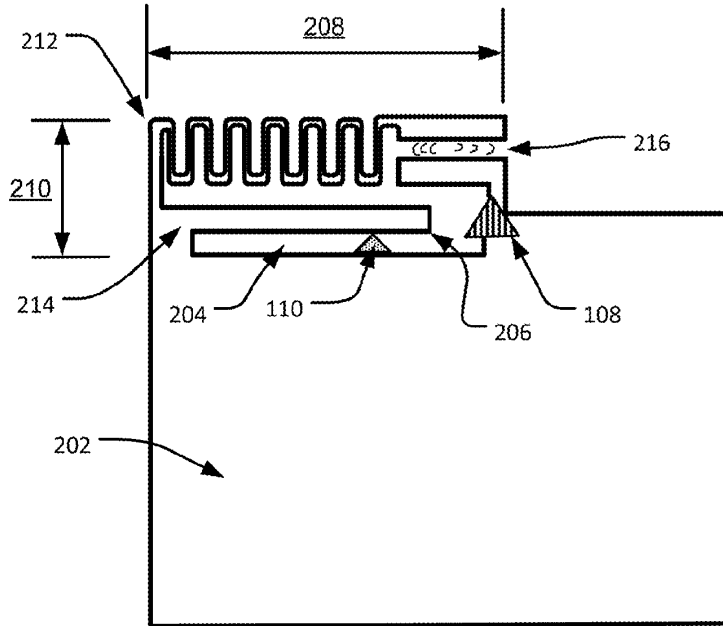
(52) **U.S. Cl.**
CPC **H01Q 5/0034** (2013.01)

(72) Inventors: **Alexandru Daniel Tatomirescu, Aalborg (DK); Poul Olesen, Stoevring (DK); Peter Bundgaard, Aalborg (DK); Pevand Bahramzy, Norresundby (DK); Mikael Knudsen, Gistrup (DK); Gert Pedersen, Storvorde (DK); Emil Buskgaard, Aalborg (DK); Mauro**

(57) **ABSTRACT**

Described herein are architectures, platforms and methods for electrically tuning radiators in a portable device. The electrical tuning implements platform independent radiating elements or antennas in a portable device.

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US 20150180124A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0180124 A1**

(43) **Pub. Date: Jun. 25, 2015**

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

(52) **U.S. Cl.**
CPC **H01Q 5/335** (2015.01); **H01Q 5/378** (2015.01); **H01Q 9/0442** (2013.01)

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

(57) **ABSTRACT**

(72) Inventors: **JIN-BO CHEN**, New Taipei (TW);
CHO-KANG HSU, New Taipei (TW)

An antenna structure includes a main antenna, a parasitic antenna, a matching circuit and a switching circuit. The main antenna includes a feeding strip and a first radiating strip coupled to the feeding strip. The parasitic antenna includes a grounding strip and a second radiating strip coupled to the grounding strip. The second radiating strip is positioned adjacent to and apart from the first radiating strip, and further configured to electromagnetically couple to and be parasitically fed by the first radiating strip. The parasitic antenna and main antenna cooperatively generate at least one high-frequency resonate mode and a low-frequency resonate mode. The matching circuit is electronically coupled to the feeding strip. The switching circuit is electronically coupled to the matching circuit, and configured to regulate an inductance value of the matching circuit output to the feeding strip, thereby regulating a central frequency of the low-frequency resonate mode.

(21) Appl. No.: **14/569,999**

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

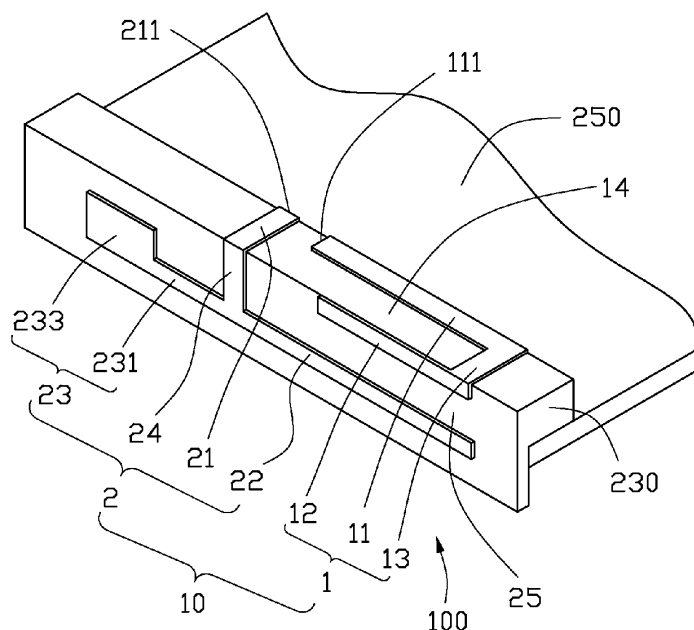
(30) **Foreign Application Priority Data**

Dec. 20, 2013 (CN) 201310707368.7

Publication Classification

(51) **Int. Cl.**
H01Q 5/335 (2006.01)
H01Q 9/04 (2006.01)
H01Q 5/378 (2006.01)

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US 20150180131A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0180131 A1**

(43) **Pub. Date: Jun. 25, 2015**

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

Publication Classification

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

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

(72) Inventors: **GENG-HONG LIOU**, Tu-Cheng (TW);
YEN-HUI LIN, Tu-Cheng (TW)

(52) **U.S. Cl.**
CPC **H01Q 9/0414** (2013.01); **H01Q 9/045** (2013.01)

(21) Appl. No.: **14/523,379**

(57) **ABSTRACT**

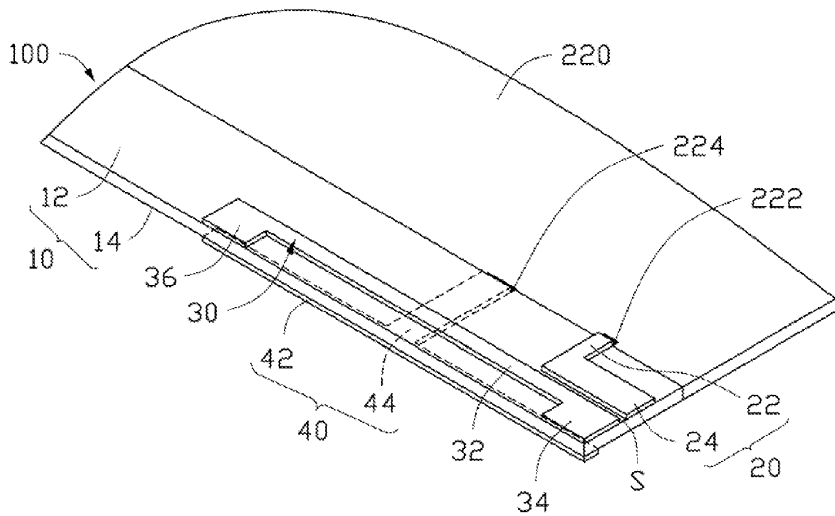
(22) Filed: **Oct. 24, 2014**

An antenna structure includes a baseplate, a first radiator plate, a second radiator plate, and a third radiator plate. The baseplate has a first surface and a second surface opposite to the first surface. The first radiator plate is disposed on the first surface. The second radiator plate is disposed on the first surface. The third radiator plate is disposed on the second surface. A slot is defined between the first radiator plate and the second radiator plate, and the second radiator plate is coupled to the first radiator plate and the third radiator plate.

(30) **Foreign Application Priority Data**

Dec. 23, 2013 (CN) 201310715661.8

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US 20150188212A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188212 A1**

(43) **Pub. Date: Jul. 2, 2015**

(54) **ANTENNA STRUCTURE AND WIRELESS COMMUNICATION DEVICE USING THE ANTENNA STRUCTURE**

(52) **U.S. Cl.**
CPC *H01Q 1/243* (2013.01); *H01Q 21/0006* (2013.01)

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

(57) **ABSTRACT**

(72) Inventors: **YEN-JUNG TSENG**, New Taipei (TW);
YI-TING CHEN, New Taipei (TW);
CHO-KANG HSU, New Taipei (TW)

(21) Appl. No.: **14/522,077**

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

(30) **Foreign Application Priority Data**

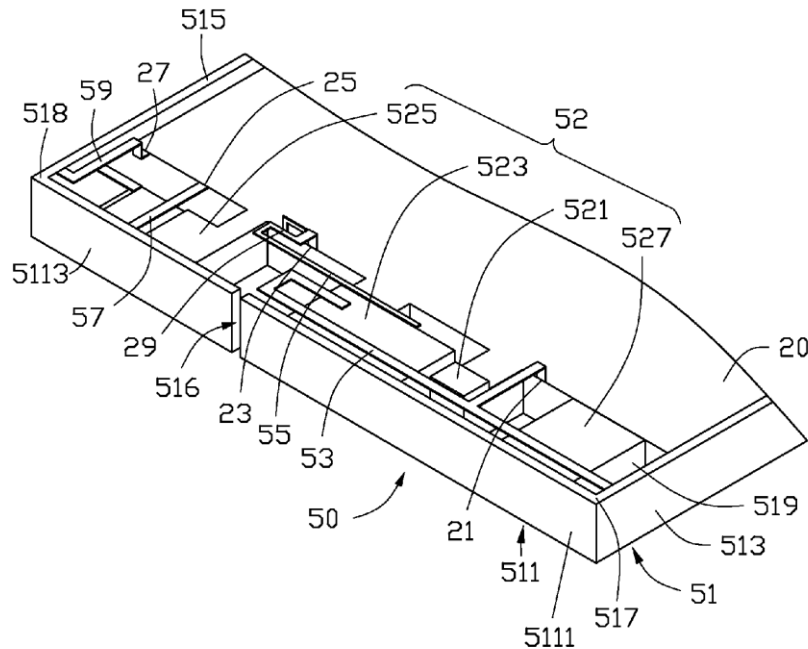
Dec. 31, 2013 (CN) 201310749270.8

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 21/00 (2006.01)

An antenna structure includes a metal member, a first antenna, a second antenna, a third antenna, and a fourth antenna. A gap is defined on the metal member to divide the metal member into a first frame assembly and a second frame assembly. The first frame assembly and the second frame assembly cooperatively form a receiving space for accommodating at least one electronic element. The first antenna, the second antenna, the third antenna, and the fourth antenna are received in the receiving space. The first antenna is electronically connected to the first frame assembly of the metal member. The third antenna and the fourth antenna are both electronically connected to the second frame assembly of the metal member.

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(19) **United States**

(12) **Patent Application Publication**
LIN

(10) **Pub. No.: US 2015/0188213 A1**

(43) **Pub. Date: Jul. 2, 2015**

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

Publication Classification

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

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

(72) Inventor: **YEN-HUI LIN**, New Taipei (TW)

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

(21) Appl. No.: **14/524,444**

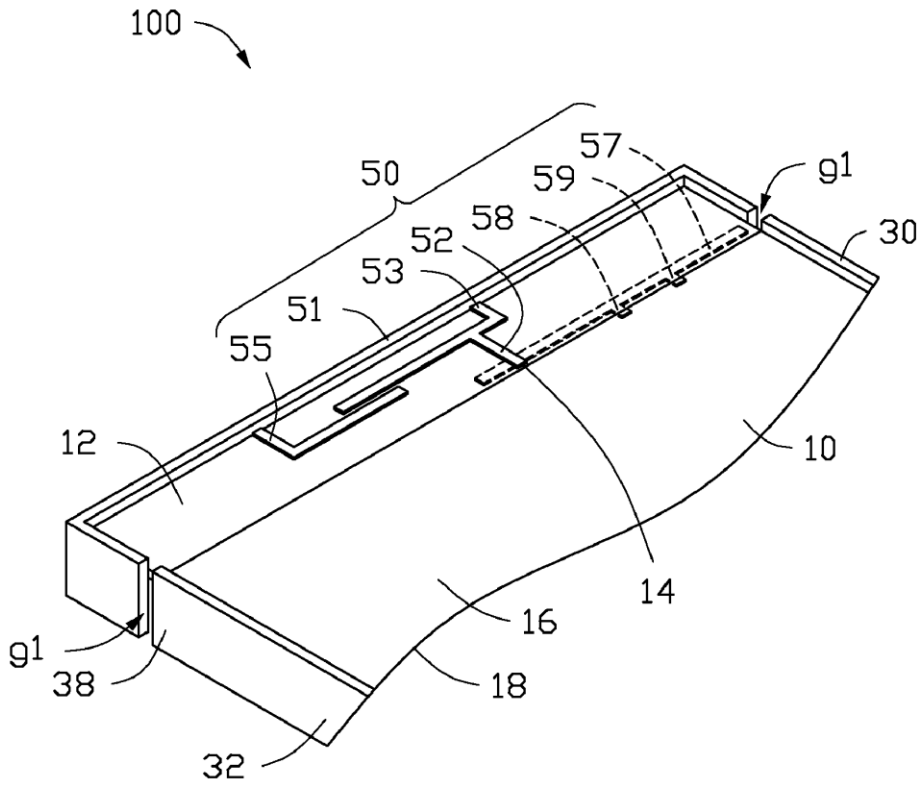
(57) **ABSTRACT**

(22) Filed: **Oct. 27, 2014**

An antenna structure includes a feed end, a first radiator plate, a second radiator plate, a third radiator plate, a first ground end, and a second ground end. The first radiator plate and the third radiator plate are coupled to the feed end. The second radiator plate is coupled to the first radiator plate. The first ground end and the second ground end are disposed on the third radiator plate and are spaced from the first ground end. The first ring portion is coupled to the first radiator plate, the second radiator plate, and the third radiator plate.

(30) **Foreign Application Priority Data**

Dec. 30, 2013 (CN) 201310742071.4





US 20150188214A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188214 A1**

(43) **Pub. Date: Jul. 2, 2015**

(54) **ANTENNA STRUCTURE AND WIRELESS COMMUNICATION DEVICE USING THE ANTENNA STRUCTURE**

Publication Classification

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 7/00 (2006.01)

(72) Inventors: **TZE-HSUAN CHANG**, New Taipei (TW); **CHO-KANG HSU**, New Taipei (TW)

(52) **U.S. Cl.**
CPC . **H01Q 1/243** (2013.01); **H01Q 7/00** (2013.01)

(21) Appl. No.: **14/524,469**

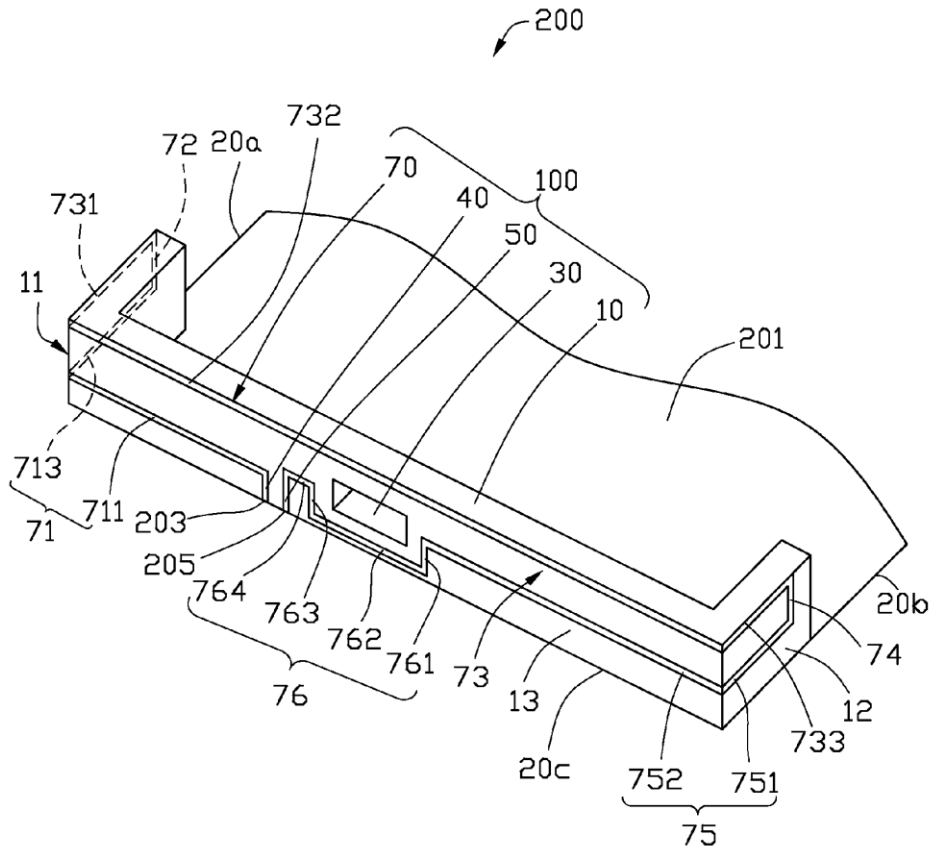
(57) **ABSTRACT**

(22) Filed: **Oct. 27, 2014**

An antenna structure includes an antenna holder, a radiating body, a feed portion, and a grounding portion. The antenna holder includes a plurality of surfaces. The feed portion is positioned on one surface of the antenna holder and electronically connected to a first end of the radiating body. The ground portion is positioned on one surface of the antenna holder and electronically connected to a second end of the radiating body so as to form a loop antenna. An electronic element is surrounded by the loop antenna.

(30) **Foreign Application Priority Data**

Dec. 31, 2013 (CN) 201310747898.4





US 20150188223A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188223 A1**

(43) **Pub. Date: Jul. 2, 2015**

(54) **WIRELESS COMMUNICATION DEVICE**

Publication Classification

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

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

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

(52) **U.S. Cl.**
CPC **H01Q 5/0034** (2013.01)

(57) **ABSTRACT**

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

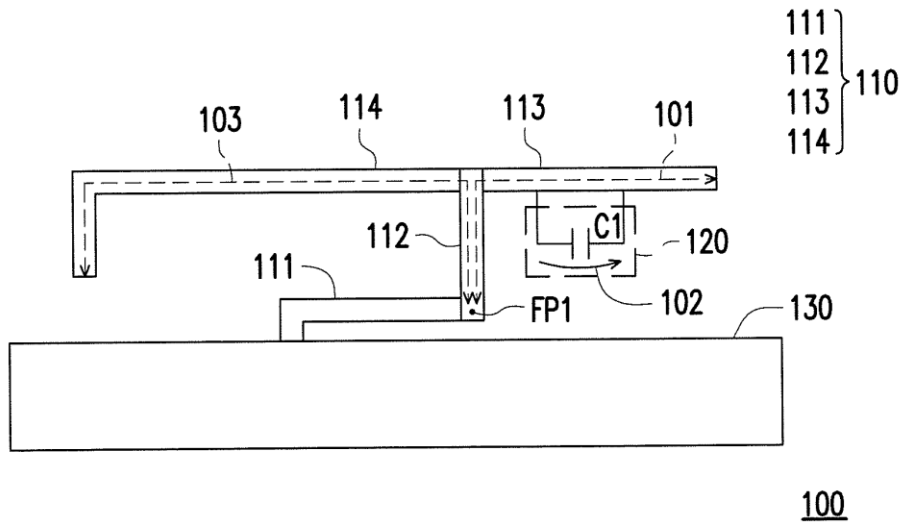
A wireless communication device including an antenna element and a resonant divider is provided. The antenna element has a resonant path so that an operation frequency of the antenna element covers a first band and a second band. The resonant divider is electrically connected to the antenna element and provides a current path connected in parallel with a part of the resonant path. The resonant divider delays a current flowing through the current path so that the antenna element is incapable of covering an interval band between the first band and the second band.

(21) Appl. No.: **14/195,861**

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

(30) **Foreign Application Priority Data**

Dec. 31, 2013 (TW) 102149314



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US 20150188224A1

(19) **United States**

(12) **Patent Application Publication**
Chang

(10) **Pub. No.: US 2015/0188224 A1**

(43) **Pub. Date: Jul. 2, 2015**

(54) **MOBILE COMMUNICATION DEVICE**

Publication Classification

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

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

(72) Inventor: **Chih-Hua Chang**, New Taipei City (TW)

(52) **U.S. Cl.**
CPC **H01Q 5/0055** (2013.01)

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

(57) **ABSTRACT**

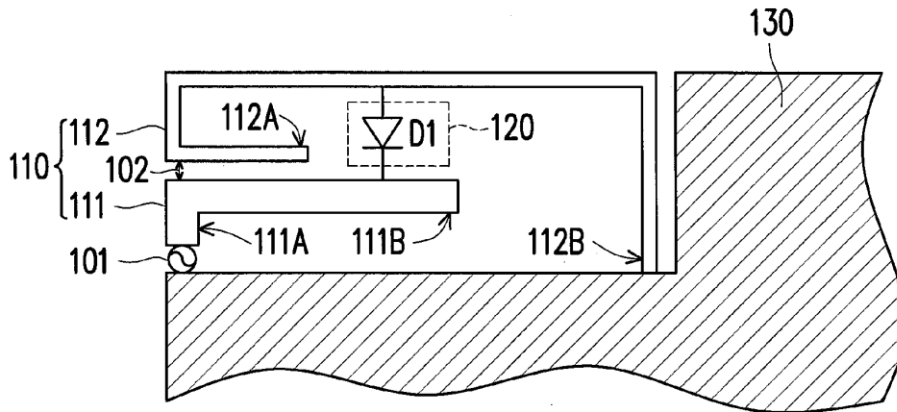
A mobile communication device is provided and includes an antenna element and a switching element. The antenna element converts a radio-frequency signal into an electromagnetic wave and includes an excitation portion and a shorting portion. The excitation portion receives the radio-frequency signal and a direct-current signal. The shorting portion is electrically connected to a ground element. The shorting portion and the excitation portion are spaced by a coupling gap. The switching element is electrically connected between the excitation portion and the shorting portion, and switches the structure of the antenna element according to the direct-current signal.

(21) Appl. No.: **14/253,877**

(22) Filed: **Apr. 16, 2014**

(30) **Foreign Application Priority Data**

Dec. 26, 2013 (TW) 102148492



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US 20150188225A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188225 A1**

(43) **Pub. Date: Jul. 2, 2015**

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

Publication Classification

(51) **Int. Cl.**
H01Q 5/335 (2006.01)
H01Q 1/24 (2006.01)
H01Q 1/22 (2006.01)
(52) **U.S. Cl.**
CPC *H01Q 5/335* (2015.01); *H01Q 1/2291* (2013.01); *H01Q 1/243* (2013.01)

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

(72) Inventors: **TZE-HSUAN CHANG**, New Taipei (TW); **CHO-KANG HSU**, New Taipei (TW)

(57) **ABSTRACT**
An antenna assembly includes a radiator, a first feed end, a second feed end, a ground end, and a matching network. The first feed end is connected to the radiator. The second feed end is connected to the radiator and is spaced from the first feed end. The ground end is connected to the radiator. The matching network has a first matching unit coupled to the first feed end and a second matching unit coupled to the second feed end. The first matching unit matches an impedance of the antenna assembly resonating a first frequency mode, and the second matching unit matches an impedance of the antenna assembly resonating a second frequency mode.

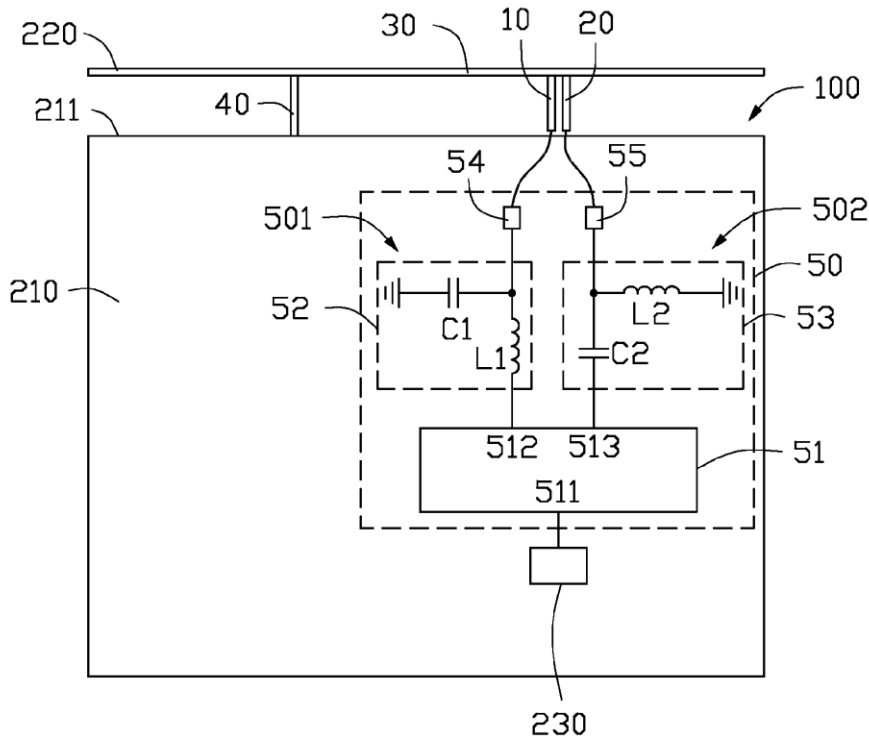
(21) Appl. No.: **14/570,013**

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

(30) **Foreign Application Priority Data**

Dec. 31, 2013 (CN) 201310749002.6

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US 20150188230A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188230 A1**

(43) **Pub. Date: Jul. 2, 2015**

(54) **ANTENNA DEVICE AND ELECTRICAL
DEVICE INCLUDING THE SAME**

Publication Classification

(71) Applicant: **Samsung Electronics Co., Ltd.**,
Gyeonggi-do (KR)

(72) Inventors: **Tae Gyu KIM**, Gyeonggi-do (KR); **Jin
Kyu Bang**, Gyeonggi-do (KR); **Hae
Yeon Kim**, Gyeonggi-do (KR); **Chong
O Yoon**, Gyeonggi-do (KR); **Dong
Hwan Kim**, Gyeonggi-do (KR)

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 5/50 (2006.01)
H04B 1/40 (2006.01)
H01Q 1/24 (2006.01)

(52) **U.S. Cl.**
CPC *H01Q 9/045* (2013.01); *H01Q 1/243*
(2013.01); *H01Q 5/50* (2015.01); *H04B 1/40*
(2013.01)

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

(57) **ABSTRACT**

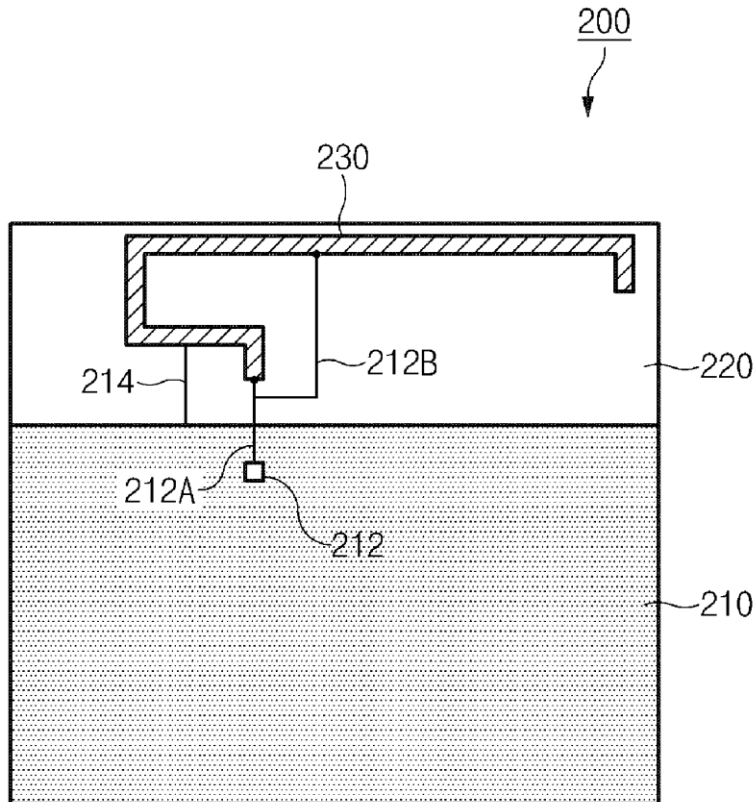
(21) Appl. No.: **14/577,365**

An antenna device for an electronic device for wireless communication is provided. The antenna device includes an antenna area connected to a feeding line and a ground line, such that the antenna area is configured to transmit/receive a signal of a first frequency band; and a branching feeding pattern branching from the feeding line and connected to one side of the antenna area, such that the branching feeding pattern is configured to enable the antenna area to transmit/receive a signal of a second frequency band.

(22) Filed: **Dec. 19, 2014**

(30) **Foreign Application Priority Data**

Dec. 26, 2013 (KR) 10-2013-0163926





US 20150188234A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188234 A1**

(43) **Pub. Date: Jul. 2, 2015**

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

Publication Classification

(71) Applicant: **Chiun Mai Communication Systems, Inc.**, New Taipei (TW)

(51) **Int. Cl.**
H01Q 19/00 (2006.01)
H01Q 1/24 (2006.01)

(72) Inventors: **TZE-HSUAN CHANG**, New Taipei (TW); **CHO-KANG HSU**, New Taipei (TW)

(52) **U.S. Cl.**
CPC **H01Q 19/005** (2013.01); **H01Q 1/243** (2013.01)

(21) Appl. No.: **14/582,645**

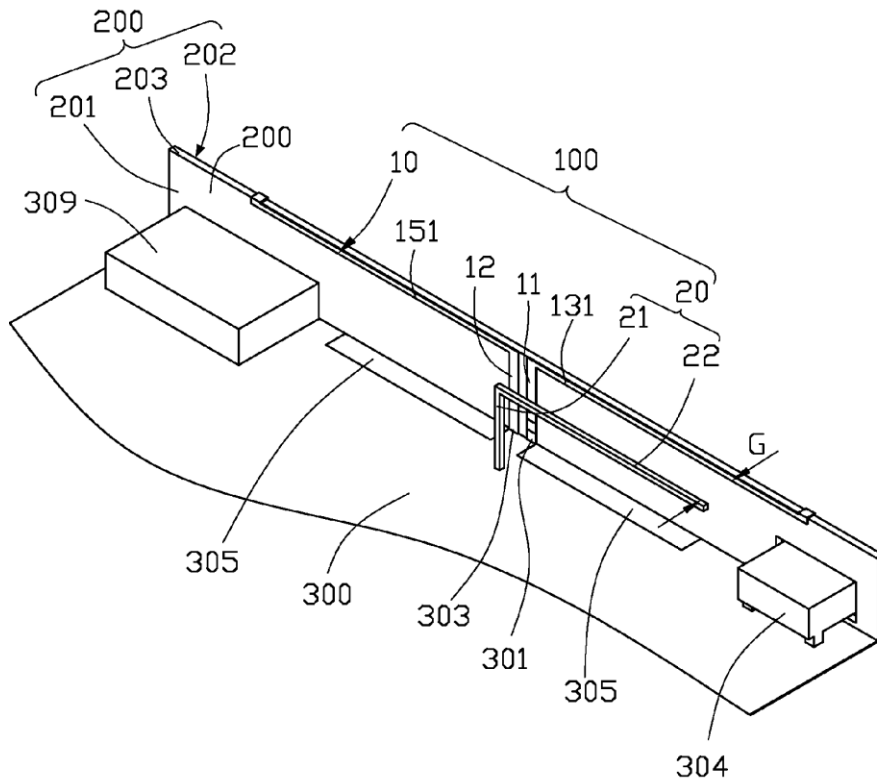
(57) **ABSTRACT**

(22) Filed: **Dec. 24, 2014**

An antenna module includes a main antenna and a parasitic resonator. The main antenna includes a feed arm, a ground arm, a first radiating body connected to one end of the feed arm, a second radiating body, and a third radiating body connected to one end of the ground arm. The first radiating body and the third radiating body are connected to the second radiating body and positioned at two sides of the second radiating body. The parasitic resonator is resonated with the main antenna and configured for widening a high frequency bandwidth of the main antenna.

(30) **Foreign Application Priority Data**

Dec. 31, 2013 (CN) 201310748988.5





US 20150188581A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0188581 A1**

(43) **Pub. Date: Jul. 2, 2015**

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

Publication Classification

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

(51) **Int. Cl.**
H04B 1/00 (2006.01)

(72) Inventors: **Kin-Lu Wong**, New Taipei City (TW);
Ya-Jyun Li, New Taipei City (TW)

(52) **U.S. Cl.**
CPC **H04B 1/006** (2013.01)

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

(57) **ABSTRACT**

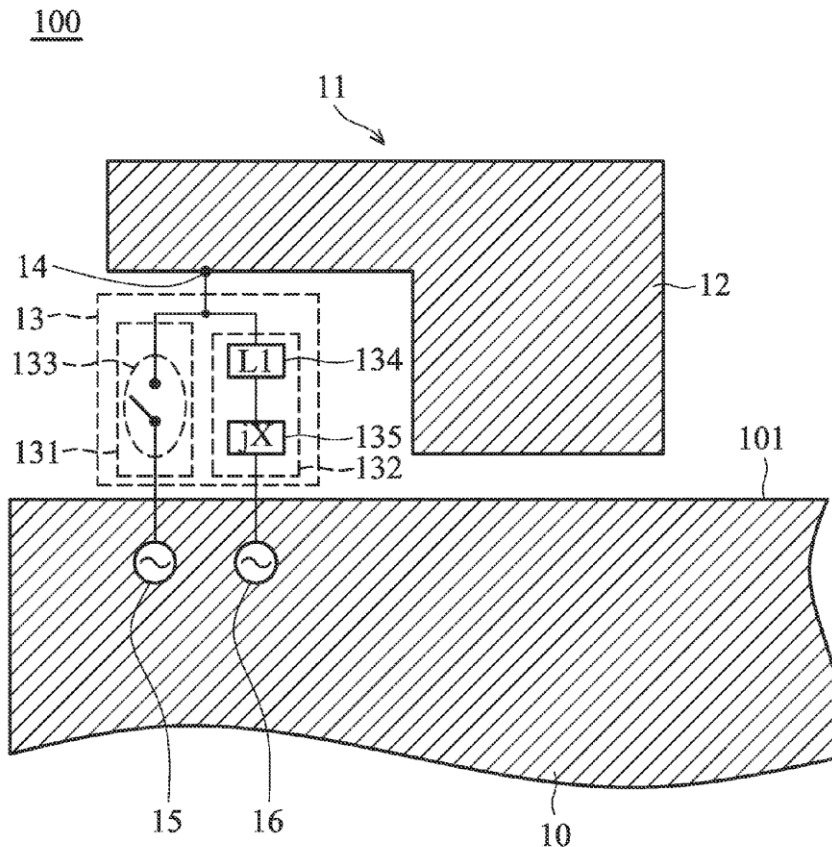
(21) Appl. No.: **14/215,451**

A communication device including a ground element and an antenna element is provided. The antenna element includes a metal element and a circuit element assembly. The metal element is adjacent to an edge of the ground element and does not overlap with the ground element. The circuit element assembly includes a first circuit and a second circuit, and is substantially surrounded by the metal element and the edge of the ground element. The first circuit includes a switch element, and the second circuit is a reactance circuit. The metal element is coupled through the first circuit to a first signal source. The metal element is further coupled through the second circuit to a second signal source.

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

(30) **Foreign Application Priority Data**

Dec. 26, 2013 (TW) 102148374





US 20150189049A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0189049 A1**

(43) **Pub. Date: Jul. 2, 2015**

(54) **DEVICE HOUSING AND PORTABLE ELECTRONIC DEVICE USING SAME**

Publication Classification

(71) Applicants: **SHENZHEN FUTAIHONG PRECISION INDUSTRY CO., LTD.**,
Shenzhen (CN); **FIH (Hong Kong) Limited**, Kowloon (HK)

(51) **Int. Cl.**
H04M 1/02 (2006.01)
H05K 5/04 (2006.01)
H05K 5/02 (2006.01)
H01Q 1/24 (2006.01)

(72) Inventors: **XU LIU**, Shenzhen (CN); **YI YANG**, Shenzhen (CN)

(52) **U.S. Cl.**
CPC **H04M 1/026** (2013.01); **H01Q 1/243** (2013.01); **H05K 5/04** (2013.01); **H05K 5/0221** (2013.01)

(21) Appl. No.: **14/522,108**

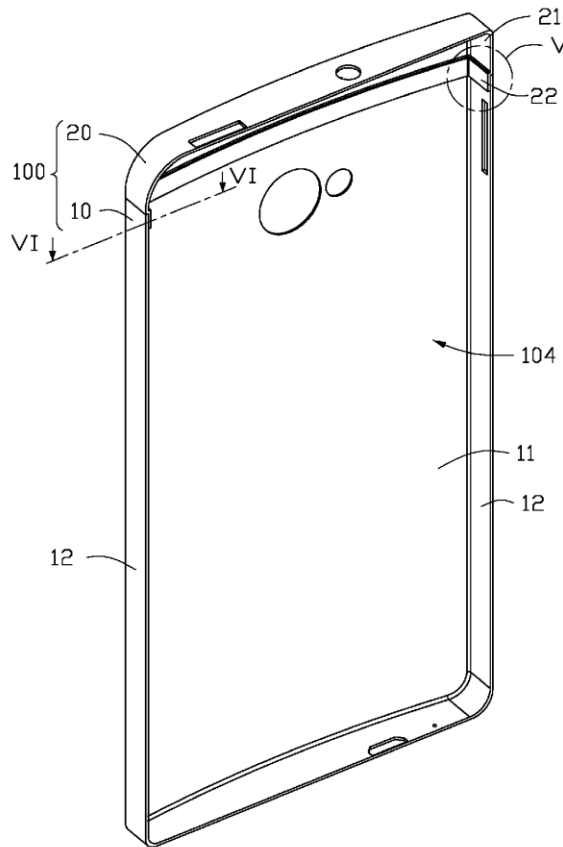
(57) **ABSTRACT**

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

A housing for a portable electronic device is provided. The housing includes a first section made of metal and a second section made of dielectric ceramic. The second section is coupled to the first section to cooperatively define an accommodating space. When an antenna is coupled to an inner surface of the second section facing the accommodating space, the antenna can transmit and receive signals through the second section. A portable electronic device incorporating the housing is also provided.

(30) **Foreign Application Priority Data**

Dec. 31, 2013 (CN) 201310747943.6





US 20150194725A1

(19) **United States**

(12) **Patent Application Publication**
Lin

(10) **Pub. No.: US 2015/0194725 A1**

(43) **Pub. Date: Jul. 9, 2015**

(54) **INTERNAL LC ANTENNA FOR WIRELESS COMMUNICATION DEVICE**

Publication Classification

(71) Applicant: **Ethertronics, Inc.**, San Diego, CA (US)

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 9/04 (2006.01)
H01Q 1/48 (2006.01)

(72) Inventor: **Weichun Lin**, San Diego, CA (US)

(52) **U.S. Cl.**
CPC *H01Q 1/243* (2013.01); *H01Q 1/48* (2013.01); *H01Q 9/0407* (2013.01)

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

(21) Appl. No.: **14/595,155**

(57) **ABSTRACT**

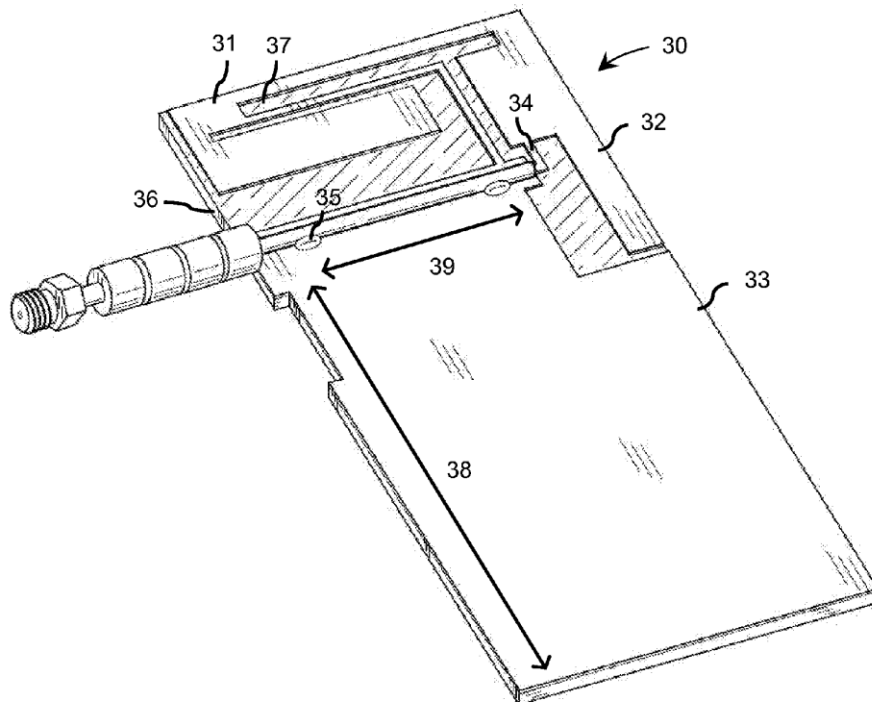
(22) Filed: **Jan. 12, 2015**

An L-shape Corner (LC) Antenna uses an L shaped antenna on the corner of a circuit board of a wireless device. A low band element is positioned and designed to resonate along the long dimension of the adjacent ground plane while a high band element is positioned and designed to resonate along the short dimension of the adjacent ground plane. The single antenna element provides two separate radiating sections that allow for optimization of low and high band resonances that are often required to service the cellular and other wireless frequency bands. The two radiating sections of the antenna provide different polarizations for the two resonances that assist in de-coupling the two resonances from each other.

Related U.S. Application Data

(63) Continuation of application No. 12/883,610, filed on Sep. 16, 2010, now abandoned, which is a continuation of application No. 12/776,333, filed on May 7, 2010, now abandoned.

(60) Provisional application No. 61/176,438, filed on May 7, 2009.





US 20150194729A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0194729 A1**

(43) **Pub. Date: Jul. 9, 2015**

(54) **DUAL-BAND PRINTED MONOPOLE ANTENNA**

(52) **U.S. CL.**
CPC **H01Q 5/0027** (2013.01); **H01Q 9/0407** (2013.01)

(71) Applicant: **Arcadyan Technology Corporation,**
Hsinchu (TW)

(57) **ABSTRACT**

(72) Inventors: **CHIH-YUNG HUANG,** Hsinchu (TW);
KUO-CHANG LO, Hsinchu (TW)

(21) Appl. No.: **14/333,023**

(22) Filed: **Jul. 16, 2014**

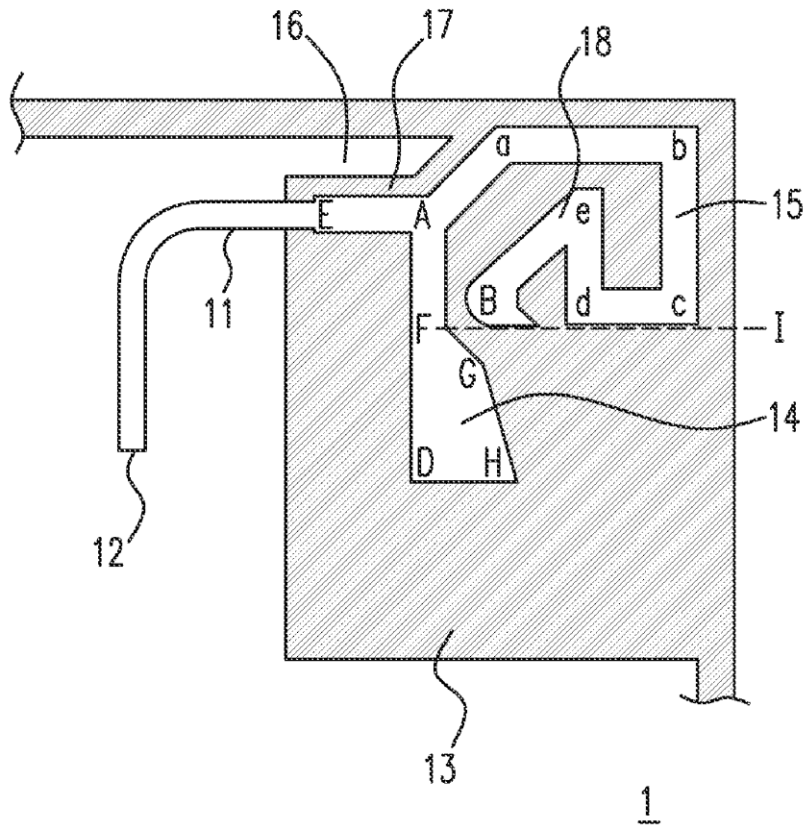
(30) **Foreign Application Priority Data**

Jan. 8, 2014 (TW) 103100729

Publication Classification

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

A monopole antenna is disclosed. The monopole antenna includes a grounding terminal and a transmission line extending along a first direction and including a first terminal. The feeding terminal adjacent to the grounding terminal. The monopole antenna further includes a first radiator connected to the first terminal, extending along a second direction perpendicular to the first direction and operating within a first frequency range. The first radiator has a portion with a width increasing gradually along the second direction. The monopole antenna further includes a second radiator connected to the first terminal, extending along a third direction far away from the grounding terminal, having a first included angle with the transmission line, including a plurality of turns, and operating within a second frequency range.





US 20150194738A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0194738 A1**

(43) **Pub. Date: Jul. 9, 2015**

(54) **RECONFIGURABLE ANTENNA**

Publication Classification

(71) Applicant: **The University of Birmingham,**
Birmingham (GB)

(51) **Int. Cl.**
H01Q 21/00 (2006.01)
H01Q 9/16 (2006.01)

(72) Inventors: **Zhen Hua Hu,** Birmingham (GB); **Peter Hall,** Birmingham (GB)

(52) **U.S. Cl.**
CPC **H01Q 21/0006** (2013.01); **H01Q 9/16** (2013.01)

(21) Appl. No.: **14/417,481**

(22) PCT Filed: **Jul. 12, 2013**

(57) **ABSTRACT**

(86) PCT No.: **PCT/GB2013/051855**

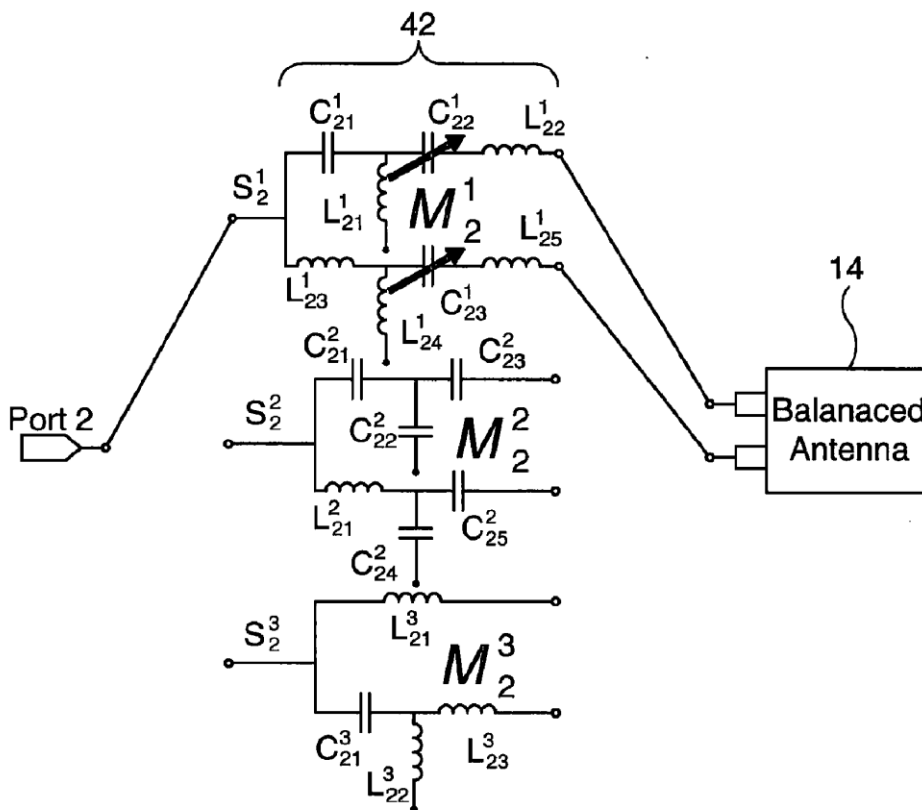
§ 371 (c)(1),

(2) Date: **Jan. 26, 2015**

The present invention resides in a reconfigurable antenna. The antenna comprises a balanced antenna and an unbalanced antenna mounted on a supporting substrate, with both the balanced antenna and the unbalanced antenna located at the same end of the substrate. The antenna may be configured as a chassis antenna for use in a portable device or configured for Multiple-Input-Multiple-Output (MIMO) applications.

(30) **Foreign Application Priority Data**

Jul. 31, 2012 (GB) 1213558.8





US 20150200441A1

(19) **United States**
(12) **Patent Application Publication**
Rivera et al.

(10) **Pub. No.: US 2015/0200441 A1**
(43) **Pub. Date: Jul. 16, 2015**

(54) **WIRELESS COMMUNICATION ANTENNAS
IN COMPUTER DISPLAYS**

G02F 1/1368 (2006.01)
H01J 9/20 (2006.01)
G02F 1/133 (2006.01)

(75) Inventors: **Felix Jose Alvarez Rivera**, San Jose, CA (US); **Ken Foo**, Sunnyvale, CA (US)

(52) **U.S. Cl.**
CPC *H01Q 1/22* (2013.01); *G02F 1/13306* (2013.01); *G02F 1/1368* (2013.01); *G02F 1/133308* (2013.01)

(73) Assignee: **GOOGLE INC.**, Mountain View, CA (US)

(21) Appl. No.: **13/585,360**

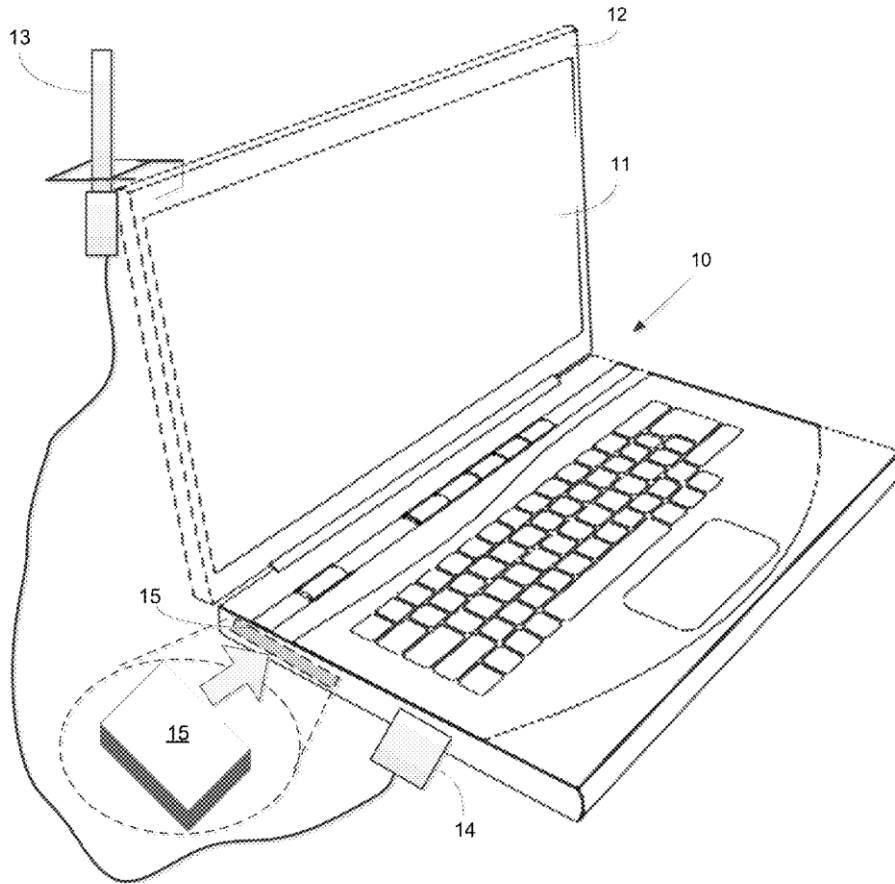
(57) **ABSTRACT**

(22) Filed: **Aug. 14, 2012**

A liquid crystal display screen of an electronic device is formed on a glass substrate. The glass substrate has an active display area with liquid crystal display elements disposed thereon. The active display area is bordered by an edge area of the glass substrate. Antenna elements are disposed in the edge area of the substrate. The antenna elements are coupled to wireless communications circuitry in the electronic device.

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
G02F 1/1333 (2006.01)





US 20150200448A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0200448 A1**

(43) **Pub. Date: Jul. 16, 2015**

(54) **MOBILE DEVICE AND MULTI-BAND ANTENNA STRUCTURE THEREIN**

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

CPC *H01Q 1/243* (2013.01); *H01Q 5/35* (2015.01); *H05K 3/30* (2013.01)

(71) Applicant: **HTC Corporation**, Taoyuan City (TW)

(72) Inventors: **Tiao-Hsing TSAI**, Taoyuan City (TW);
Chien-Pin CHIU, Taoyuan City (TW);
Hsiao-Wei WU, Taoyuan City (TW);
Ying-Chih WANG, Taoyuan City (TW)

(57) **ABSTRACT**

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

(21) Appl. No.: **14/157,126**

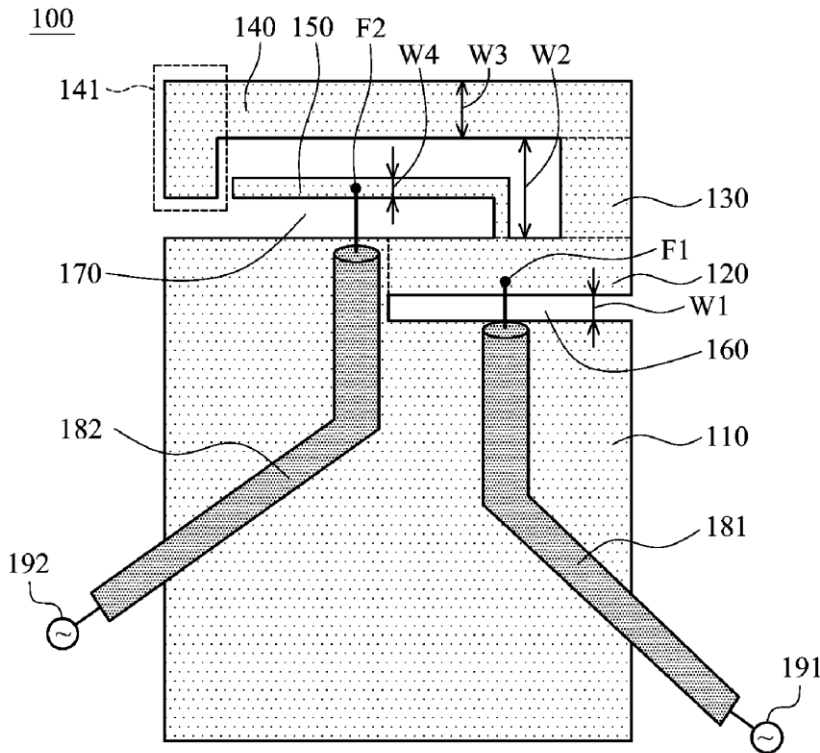
(22) Filed: **Jan. 16, 2014**

Publication Classification

(51) **Int. Cl.**

H01Q 1/24 (2006.01)
H05K 3/30 (2006.01)
H01Q 5/35 (2006.01)

A mobile device includes a ground plane, a grounding branch, a connection element, a first radiation branch, and a second radiation branch. The grounding branch is coupled to the ground plane. A first open slot is formed and substantially surrounded by the grounding branch and the ground plane. A first radiation branch is coupled through the connection element to the grounding branch. A second open slot is formed and is substantially surrounded by the first radiation branch and the grounding branch. The second radiation branch is disposed in the second open slot and is coupled to the grounding branch. A multi-band antenna structure is formed by the grounding branch, the connection element, the first radiation branch, and the second radiation branch.





US 20150200456A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0200456 A1**

(43) **Pub. Date: Jul. 16, 2015**

(54) **BROADBAND ANTENNA**

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

(72) Inventors: **Shang-Sian You**, Hsinchu (TW);
Chien-Ting Huang, Hsinchu (TW)

(21) Appl. No.: **14/463,669**

(22) Filed: **Aug. 20, 2014**

(30) **Foreign Application Priority Data**

Jan. 14, 2014 (TW) 103200771

Publication Classification

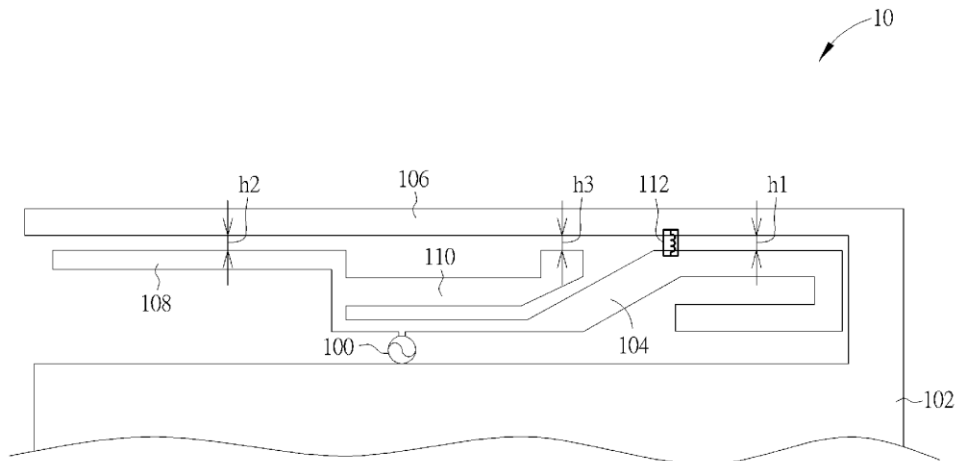
(51) **Int. Cl.**
H01Q 5/00 (2006.01)
H01Q 7/00 (2006.01)

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

CPC **H01Q 5/0034** (2013.01); **H01Q 7/00** (2013.01); **H01Q 7/005** (2013.01)

(57) **ABSTRACT**

A broadband antenna for a wireless communication device includes a grounding unit for grounding; a first radiating element; a second radiating element electrically connected to the grounding unit; a signal feed-in element for transmitting a radio signal to the first radiating element in order to emit the radio signal via the first radiating element; and a passive component comprising an inductor, where the passive component is electrically connected between the first and the second radiating elements to work in conjunction with the first radiating element, the second radiating element and the grounding unit to form a loop antenna effect.





US 20150200457A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0200457 A1**

(43) **Pub. Date: Jul. 16, 2015**

(54) **ANTENNA**

Publication Classification

(71) Applicants: **Yun Ghit Chan**, Shenzhen (CN); **Ng Guan Hong**, Shenzhen (CN); **Yew Siow Tay**, Shenzhen (CN)

(51) **Int. Cl.**
H01Q 5/307 (2006.01)
H01Q 9/04 (2006.01)

(72) Inventors: **Yun Ghit Chan**, Shenzhen (CN); **Ng Guan Hong**, Shenzhen (CN); **Yew Siow Tay**, Shenzhen (CN)

(52) **U.S. Cl.**
CPC **H01Q 5/307** (2015.01); **H01Q 9/0407** (2013.01)

(73) Assignee: **AAC TECHNOLOGIES PTE. LTD.**, Singapore city (SG)

(57) **ABSTRACT**

An antenna is disclosed. The antenna includes a coupling portion, a ground connection portion corresponding to the coupling portion, and a radiation body. The a radiation body further includes a first antenna portion extending from a first end of the coupling portion in a direction, a second antenna portion extending from the first end in a direction opposite to that of the first antenna portion, and a third antenna portion extending from an end of the ground connection portion in a direction surrounding the first antenna portion, wherein two gaps are provided for separating the third antenna portion from the first antenna portion and the second antenna portion respectively.

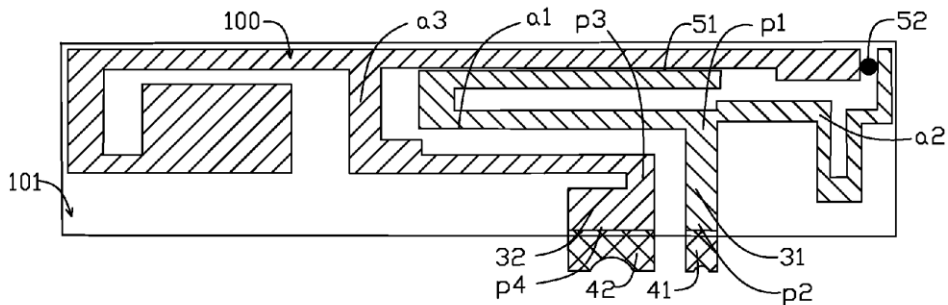
(21) Appl. No.: **14/592,076**

(22) Filed: **Jan. 8, 2015**

(30) **Foreign Application Priority Data**

Jan. 10, 2014 (CN) 201410013088.0

10





US 20150200462A1

(19) **United States**

(12) **Patent Application Publication**
Leppaluoto

(10) **Pub. No.: US 2015/0200462 A1**

(43) **Pub. Date: Jul. 16, 2015**

(54) **REDUCED SURFACE AREA ANTENNA APPARATUS AND MOBILE COMMUNICATIONS DEVICES INCORPORATING THE SAME**

(52) **U.S. Cl.**
CPC **H01Q 9/0414** (2013.01); **H01Q 1/243** (2013.01)

(71) Applicant: **Pulse Electronics, Inc.**, San Diego, CA (US)

(57) **ABSTRACT**

(72) Inventor: **Timo Leppaluoto**, Suzhou (CN)

Space- and cost-efficient antenna apparatus and methods of making and using the same. Antenna may comprise one or more planar radiator elements fabricated from an electrically conductive material. Surface area of the antenna radiator metallized portion may be reduced by utilizing a crosshatch pattern. The pattern may comprise of one or more metal-free elements disposed within the outline of the radiator. The elements may be interconnected by conductive crosslinks. The antenna may be coupled to radio electronics at one or more connection points. At least one of a size and/or a placement of the crosslinks may be configured based on distance from the connecting points. Crosslink size and/or placement may be configured to provide a prescribed current flow within the antenna. Reducing surface area of the antenna radiator may reduce manufacturing time and/or cost compared with prior art antenna design approaches.

(21) Appl. No.: **14/558,562**

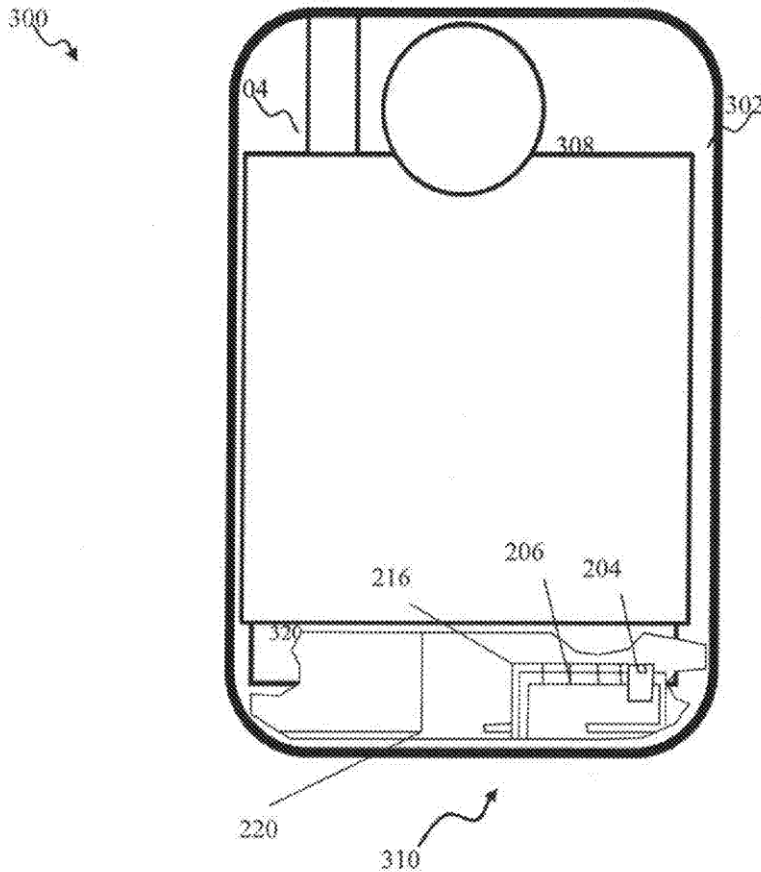
(22) Filed: **Dec. 2, 2014**

Related U.S. Application Data

(60) Provisional application No. 61/911,418, filed on Dec. 3, 2013.

Publication Classification

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





US 20150200463A1

(19) **United States**

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

(10) **Pub. No.: US 2015/0200463 A1**

(43) **Pub. Date: Jul. 16, 2015**

(54) **SWITCHABLE MULTI-RADIATOR HIGH BAND ANTENNA APPARATUS AND METHODS**

(52) **U.S. Cl.**
CPC *H01Q 9/0442* (2013.01); *H01Q 1/243* (2013.01); *H04B 1/40* (2013.01)

(71) Applicant: **PULSE FINLAND OY, KEMPELE (FI)**

(57) **ABSTRACT**

(72) Inventors: **ILKKA HEIKURA, KEMPELE (FI);
PETTERI ANNAMAA, OULUNSALO (FI)**

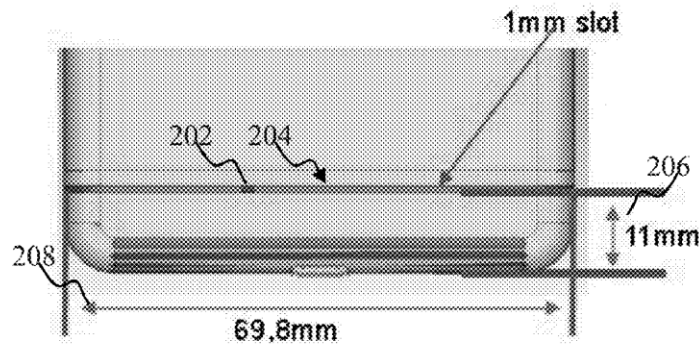
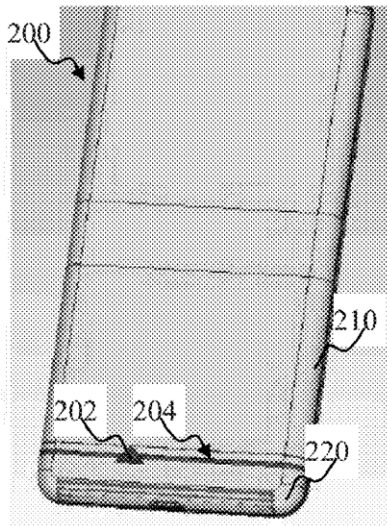
Switchable multi-radiator high band antenna apparatus, and methods of tuning and utilizing the same. In one embodiment, the antenna apparatus is configured to operate in lower and upper frequency bands, for use within a handheld mobile device (e.g., cellular telephone or smartphone). In one variant, the antenna apparatus includes a metal cup, two feeding elements, and a ground element. One feeding element is used to tune the antenna in both the lower and the upper bands. The other feed element is used to tune the antenna in the upper band. A switching element is configured to change the signal routing for the feed elements. During device operation, a user's body (e.g., hand) may cover or obstruct one of the antenna elements. Responsive to a determination of reduced performance associated with covered/obstructed antenna element, the signal route may be automatically switched to the other element, thereby improving robustness of mobile device communications.

(21) Appl. No.: **14/155,000**

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

Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H04B 1/40 (2006.01)
H01Q 1/24 (2006.01)





US 20150200466A1

(19) **United States**

(12) **Patent Application Publication**
Yoon

(10) **Pub. No.: US 2015/0200466 A1**

(43) **Pub. Date: Jul. 16, 2015**

(54) **HIGH ISOLATION ANTENNA STRUCTURE ON A GROUND PLANE**

Publication Classification

(71) Applicant: **BROADCOM CORPORATION**,
Irvine, CA (US)

(51) **Int. Cl.**
H01Q 21/28 (2006.01)
H04B 1/40 (2006.01)
H01Q 1/24 (2006.01)
H01Q 9/28 (2006.01)
H01Q 1/48 (2006.01)

(72) Inventor: **Seunghwan Yoon**, Irvine, CA (US)

(73) Assignee: **BROADCOM CORPORATION**,
IRVINE, CA (US)

(52) **U.S. Cl.**
CPC *H01Q 21/28* (2013.01); *H01Q 9/28*
(2013.01); *H01Q 1/48* (2013.01); *H01Q 1/24*
(2013.01); *H04B 1/40* (2013.01)

(21) Appl. No.: **14/568,865**

(57) **ABSTRACT**

(22) Filed: **Dec. 12, 2014**

In accordance with one example, an antenna structure includes a three-dimensional dipole antenna having a first arm and a second arm that are suspended above a ground plane. One or more three-dimensional monopole antennas have corresponding monopole elements positioned in a plane of symmetry between the arms of the dipole. Other examples are disclosed.

Related U.S. Application Data

(60) Provisional application No. 61/927,611, filed on Jan. 15, 2014, provisional application No. 62/087,069, filed on Dec. 3, 2014.

