US 20170338545A1

(19) **United States**

(12) **Patent Application Publication**

GUO

(10) **Pub. No.: US 2017/0338545 A1**

(43) **Pub. Date: Nov. 23, 2017**

(54) **MOBILE TERMINAL AND ANTENNA OF MOBILE TERMINAL**

(71) Applicant: **BYD COMPANY LIMITED**, Shenzhen, Guangdong (CN)

(72) Inventor: **Qingyu GUO**, Shenzhen (CN)

(73) Assignee: **BYD COMPANY LIMITED**, Shenzhen, Guangdong (CN)

(21) Appl. No.: **15/531,074**

(22) PCT Filed: **Dec. 22, 2015**

(86) PCT No.: **PCT/CN2015/098286**

§ 371 (c)(1),
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(30) **Foreign Application Priority Data**

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Dec. 26, 2014 (CN) 201420840199.4

Publication Classification

(51) **Int. Cl.**

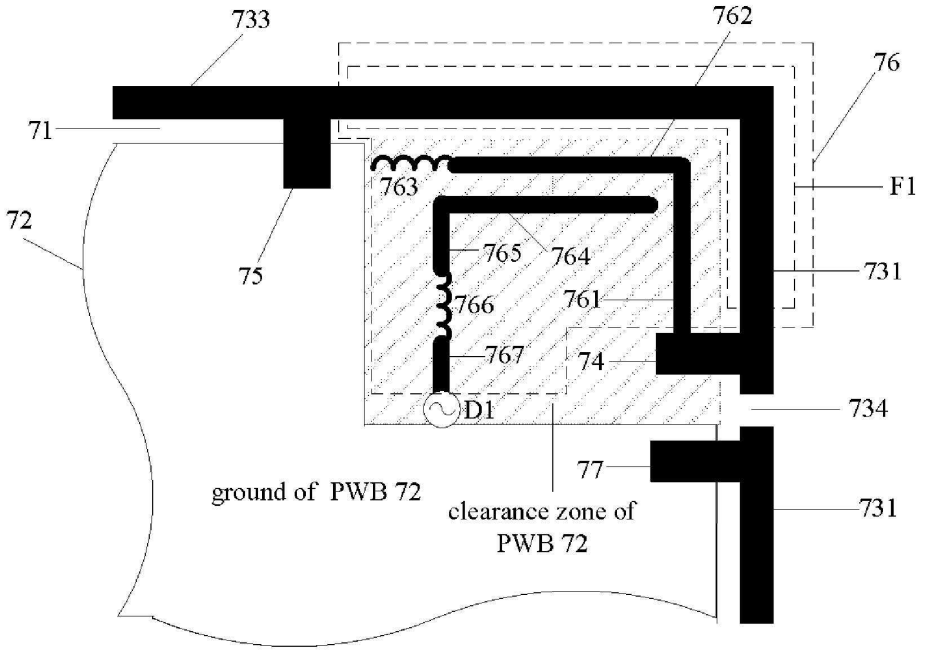
H01Q 1/24	(2006.01)
H01Q 1/38	(2006.01)
H01Q 7/00	(2006.01)
H04M 1/02	(2006.01)

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

CPC ***H01Q 1/242*** (2013.01); ***H04M 1/0283*** (2013.01); ***H01Q 1/38*** (2013.01); ***H01Q 7/00*** (2013.01)

(57) **ABSTRACT**

A mobile terminal and an antenna of a mobile terminal are provided. The mobile terminal includes: a printed wiring board; a housing; a metal frame surrounding the housing, having a first frame, a second frame and a third frame, the first frame having a first gap; a first connector connected with a part of the first frame; a second connector connected with the third frame and a ground of the printed wiring board; and a first antenna, including: a main radiator; a first part; a second part; a first inductor; a third part; a fourth part a second inductor connected with the fourth part and a fifth part connected with the second inductor and a first feed terminal of the printed wiring board.



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(19) **United States**

(12) **Patent Application Publication**

Wong et al.

(10) **Pub. No.: US 2017/0338546 A1**

(43) **Pub. Date: Nov. 23, 2017**

(54) **COMMUNICATION DEVICE WITH METAL-FRAME HALF-LOOP ANTENNA ELEMENT**

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

(72) Inventors: **Kin-Lu Wong**, New Taipei City (TW); **Hsuan-Jui Chang**, New Taipei City (TW)

(21) Appl. No.: **15/216,424**

(22) Filed: **Jul. 21, 2016**

(30) **Foreign Application Priority Data**

May 23, 2016 (TW) 105115954

Publication Classification

(51) **Int. Cl.**

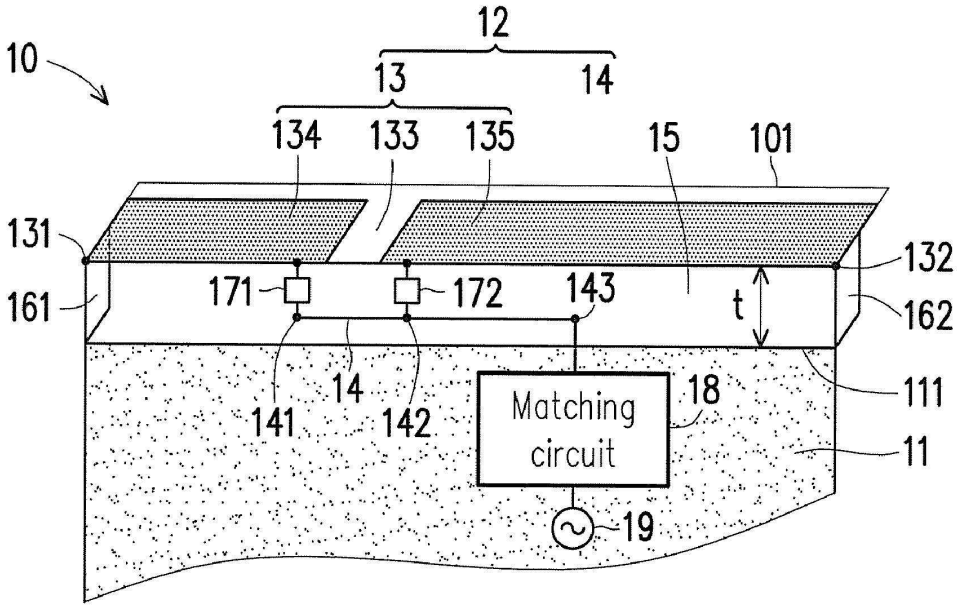
H01Q 1/24	(2006.01)
H01Q 7/00	(2006.01)
H01Q 1/48	(2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 7/00*** (2013.01)

(57) **ABSTRACT**

A communication device includes a ground plane and an antenna element. The antenna element includes a radiation metal strip and a feed metal line. The feed metal line is disposed between the radiation metal strip and the ground plane. A first metal strip of the radiation metal strip has a first end electrically connected to the ground plane by a first metal section. A second metal strip of the radiation metal strip has a second end electrically connected to the ground plane by a second metal section. The first metal strip is coupled to a first connection point on the feed metal line through a first capacitive element. The second metal strip is coupled to a second connection point on the feed metal line through a second capacitive element. The feed metal line has a third connection point as a feeding point of the antenna element.



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(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2017/0338548 A1**

(43) **Pub. Date: Nov. 23, 2017**

XIONG et al.

(54) **TERMINAL HOUSING AND TERMINAL**

(71) Applicant: **Beijing Xiaomi Mobile Software Co., Ltd.**, Beijing (CN)

(72) Inventors: **Xiaofeng XIONG**, Beijing (CN); **Zonglin XUE**, Beijing (CN); **Linchuan WANG**, Beijing (CN)

(21) Appl. No.: **15/597,121**

(22) Filed: **May 16, 2017**

(30) **Foreign Application Priority Data**

May 17, 2016 (CN) 201610326989.4

Publication Classification

(51) **Int. Cl.**

H01Q 1/24	(2006.01)
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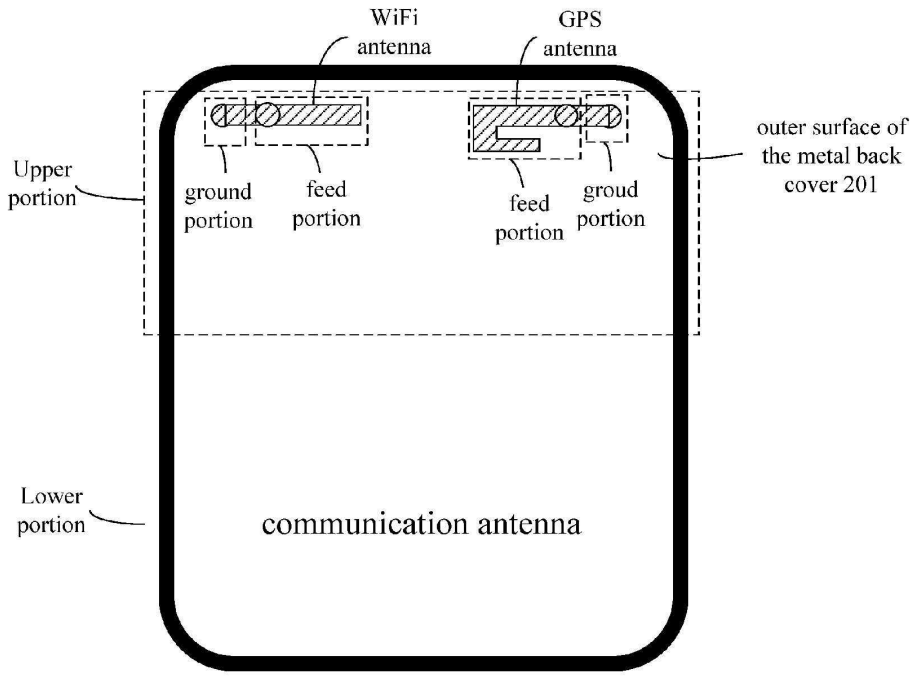
H01Q 1/38	(2006.01)
H01Q 9/04	(2006.01)
H04M 1/02	(2006.01)
H01Q 1/48	(2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H04M 1/0277*** (2013.01); ***H01Q 1/48*** (2013.01); ***H04M 1/0283*** (2013.01); ***H01Q 1/38*** (2013.01); ***H01Q 9/0421*** (2013.01); ***H01Q 1/526*** (2013.01); *H04M 2250/06* (2013.01); *H04M 2250/10* (2013.01)

(57) **ABSTRACT**

A terminal housing and a terminal are provided. The terminal housing includes: a metal back cover, the metal back cover including an opening and the outer surface of the metal back cover being overlaid with a nonconductive material; a printed circuit board (PCB) arranged on the inner surface of the metal back cover; a plurality of antenna units arranged on the nonconductive material, each of the plurality of antenna units including: a ground portion, the ground portion passing through the nonconductive material and being connected with the outer surface of the metal back cover; and a feed portion, the feed portion being connected with a radio frequency (RF) front-end of the PCB via a shield wire, the shield wire passing through the nonconductive material and entering into the terminal housing via the opening.



US 20170338549A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2017/0338549 A1**

(43) **Pub. Date: Nov. 23, 2017**

YOO et al.

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

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

(72) Inventors: **Chae-Up YOO**, Seoul (KR); **Jung-Kyu LEE**, Gyeonggi-do (KR); **Byung-Man LIM**, Seoul (KR)

(21) Appl. No.: **15/669,376**

(22) Filed: **Aug. 4, 2017**

Related U.S. Application Data

(63) Continuation of application No. 15/055,096, filed on Feb. 26, 2016, now Pat. No. 9,755,684.

(30) **Foreign Application Priority Data**

Feb. 26, 2015 (KR) 10-2015-0027594

Publication Classification

(51) **Int. Cl.**

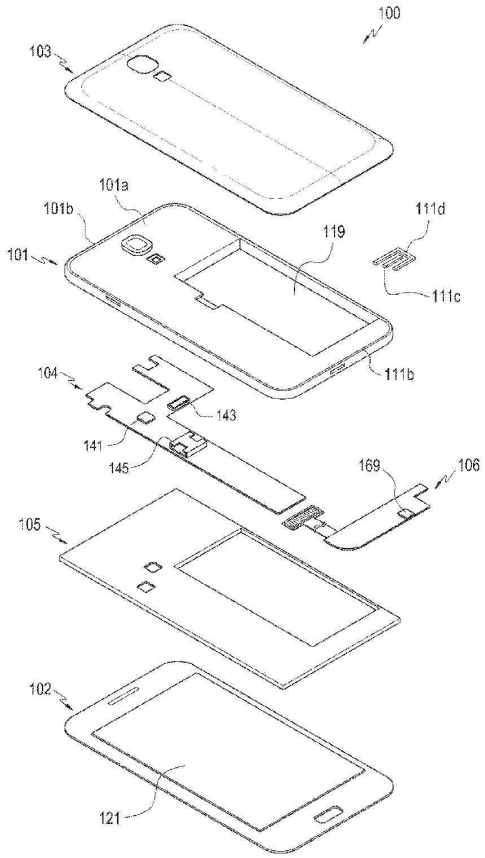
H01Q 1/24 (2006.01)
H04B 1/3827 (2006.01)
H01Q 13/10 (2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 13/10*** (2013.01); ***H04B 1/3833*** (2013.01)

(57) **ABSTRACT**

An electronic device including an antenna device is provided. The electronic device includes a case member, a frame disposed around a periphery of one surface of the case member, forming sidewalls, and an antenna device for transmitting and receiving wireless signals. The antenna device includes a first radiation conductor forming a first part of the frame, a second radiation conductor disposed in a vicinity of the first radiation conductor, forming a second part of the frame, a third radiation conductor provided on the case member and connected to a first power supply of the electronic device, together with the first radiation conductor, and a fourth radiation conductor provided on the case member and connected to a ground of the electronic device. At least a part of the fourth radiation conductor is disposed in a vicinity of the second radiation conductor.



US 20170338566A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2017/0338566 A1**

(43) **Pub. Date: Nov. 23, 2017**

Shiba

(54) **WIRELESS COMMUNICATION MODULE AND METHOD OF MANUFACTURING WIRELESS COMMUNICATION MODULE**

(71) Applicant: **FUJITSU LIMITED**, Kawasaki-shi (JP)

(72) Inventor: **Shoichi Shiba**, Atsugi (JP)

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

(21) Appl. No.: **15/454,367**

(22) Filed: **Mar. 9, 2017**

(30) **Foreign Application Priority Data**

May 19, 2016 (JP) 2016-100428

Publication Classification

(51) **Int. Cl.**

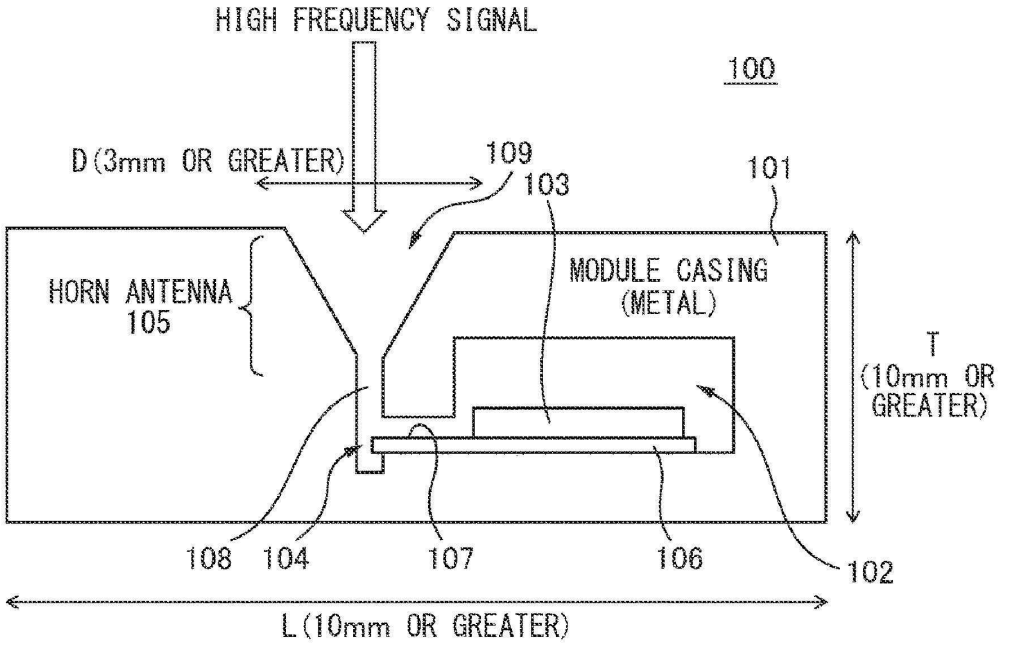
H01Q 13/02 (2006.01)
H01Q 1/22 (2006.01)
H01Q 1/48 (2006.01)
H01Q 9/04 (2006.01)

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

CPC ***H01Q 13/02*** (2013.01); ***H01Q 9/0485*** (2013.01); ***H01Q 1/2283*** (2013.01); ***H01Q 1/48*** (2013.01)

(57) **ABSTRACT**

A wireless communication module includes a horn antenna and a semiconductor chip, and the horn antenna and the semiconductor chip are integrally formed by a mold resin and are connected through a transmission line. The horn antenna includes an open end provided on a longitudinal end face of the wireless communication module; an antenna conversion unit located on an opposite side of the open end and connected with the semiconductor chip through the transmission line; and a side face part whose shape is varied in a thickness direction of the wireless communication module in a manner such that an opening area is widened from the antenna conversion unit toward the open end.



US 20170338864A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2017/0338864 A1**

Rolsted et al. (43) **Pub. Date: Nov. 23, 2017**

(54) **A WIRELESS DATA COMMUNICATION MODULE FOR DRUG INJECTION DEVICES**

(71) Applicant: **Novo Nordisk A/S**, Bagsvaerd (DK)

(72) Inventors: **Niels Pryds Rolsted**, Vaerloese (DK); **Kim Ejholm Hansen**, Alleroed (DK); **Tommaso Borghi**, Milan (IT); **Bennie Pedersen**, Haslev (DK); **Sune Pelle Borregaard**, Helsinge (DK); **Luca Valsecchi**, Milan (IT); **Paolo Soro**, Milan (IT); **Lorenzo Bernardini**, Milan (IT)

(21) Appl. No.: **15/536,031**

(22) PCT Filed: **Jan. 8, 2016**

(86) PCT No.: **PCT/EP2016/050320**

§ 371 (c)(1),
(2) Date: **Jun. 14, 2017**

(30) **Foreign Application Priority Data**

Jan. 8, 2015 (EP) 15150512.0

Publication Classification

(51) **Int. Cl.**

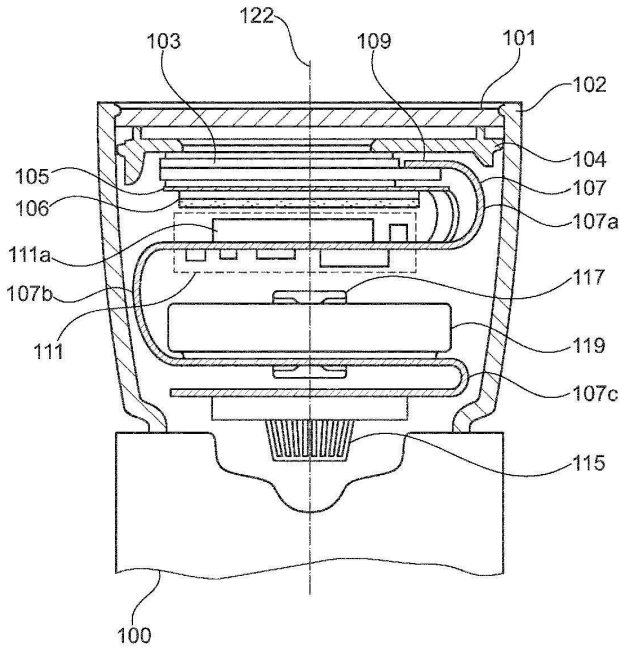
H04B 5/00	(2006.01)
A61M 5/315	(2006.01)
H01Q 1/52	(2006.01)

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

CPC ***H04B 5/0081*** (2013.01); ***A61M 5/31568*** (2013.01); *A61M 2205/52* (2013.01); *A61M 2205/50* (2013.01); *A61M 2205/3561* (2013.01); *H01Q 1/52* (2013.01); *A61M 2205/502* (2013.01)

(57) **ABSTRACT**

The present invention relates to a wireless data communication module (**100**) for a drug injection device. The wireless data communication module (**100**) comprises a folded flexible carrier member (**107**) comprising a plurality of stacked component support regions (**203**, **205**, **207**, **209**, **211**) and a display (**103**), such as a LCD or OLED display, electrically connected to a first component support region (**203**) of the folded flexible carrier member (**107**) via a first set of electrical connection terminals. The display (**103**) comprises an outwardly facing readable display and an opposing, downwardly facing, optical reflector (**319**). The wireless data communication module (**100**) additionally comprises a NFC antenna (**105**) attached to a second component support region (**205**) of the folded flexible carrier member (**107**) situated below the first component mounting region (**203**). The optical reflector (**319**) of the display comprises an optically reflective and non-magnetically permeable material.



US 20170346159A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2017/0346159 A1

XUE et al. (43) Pub. Date: Nov. 30, 2017

(54) **COMMUNICATION ANTENNA, METHOD FOR CONTROLLING THE SAME AND TERMINAL**

(71) Applicant: **Beijing Xiaomi Mobile Software Co., Ltd.**, Beijing (CN)

(72) Inventors: **Zonglin XUE**, Beijing (CN); **Linchuan WANG**, Beijing (CN); **Xiaofeng XIONG**, Beijing (CN)

(73) Assignee: **Beijing Xiaomi Mobile Software Co., Ltd.**, Beijing (CN)

(21) Appl. No.: **15/378,635**

(22) Filed: **Dec. 14, 2016**

(30) **Foreign Application Priority Data**

May 30, 2016 (CN) 201610371760.2

Publication Classification

(51) **Int. Cl.**

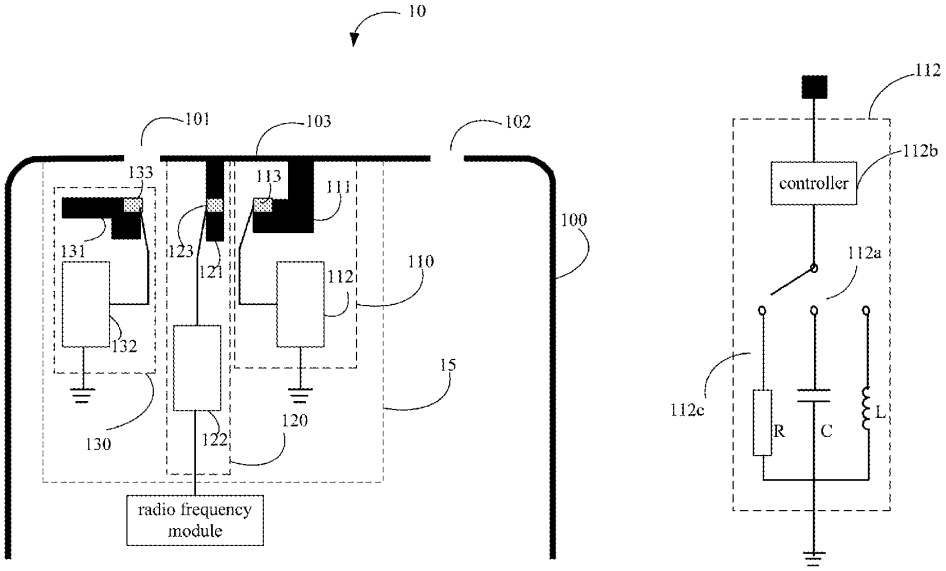
H01Q 1/24	(2006.01)
H01Q 1/48	(2006.01)
H01Q 5/314	(2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 5/314*** (2015.01); ***H01Q 1/48*** (2013.01)

(57) **ABSTRACT**

A communication antenna, a method for controlling a communication antenna and a terminal are provided. The communication antenna includes a first passive unit, a stimulation receiving unit, and a second passive unit. The first passive unit and the second passive unit are respectively coupled to ground. The stimulation receiving unit is electrically coupled to a radio frequency module so as to receive an electrical signal transmitted by the radio frequency module. The first passive unit includes a regulating circuit that includes a switch, a controller, and a regulating assembly. The regulating assembly includes a plurality of electronic components. The controller is configured to control the switch to connect one or more electronic components of the regulating assembly to the circuit. The connected electronic components make the communication antenna resonate in one of a plurality of frequency ranges.



US 20170346160A1

(19) **United States**

(12) **Patent Application Publication**

LI et al.

(10) **Pub. No.: US 2017/0346160 A1**

(43) **Pub. Date: Nov. 30, 2017**

(54) **ANTENNA USING CONDUCTOR AND ELECTRONIC DEVICE THEREFOR**

(71) Applicants: **ShuMing LI**, Shenzhen (CN); **YueHua YUE**, Shenzhen (CN)

(72) Inventors: **ShuMing LI**, Shenzhen (CN); **YueHua YUE**, Shenzhen (CN)

(73) Assignee: **AAC Technologies Pte. Ltd.**, Singapore (SG)

(21) Appl. No.: **15/416,225**

(22) Filed: **Jan. 26, 2017**

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

H01Q 1/24 (2006.01)

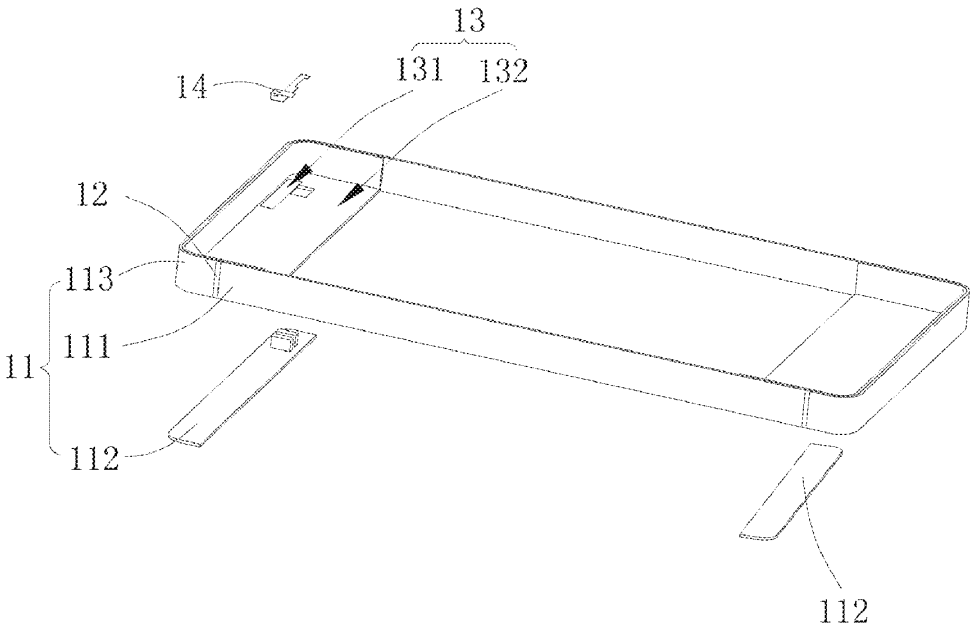
H01Q 1/40 (2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 1/40*** (2013.01)

(57) **ABSTRACT**

The present disclosure provides an antenna device. The antenna device includes a metal housing having accommodating space and a LDS antenna accommodated in the metal hosing, the metal housing includes a metal shell, a metal cover and a metal ring which cooperate and are spaced with each other, inner wall surfaces of the metal shell, the metal cover and the metal ring are respectively provided with an adhesive coated layer, the LDS antenna is laser etched on a surface of the adhesive coated layer and is coupled with the metal cover. The antenna device of the present disclosure avoids frequency offset caused by gap size difference due to assembling errors between coupled antennas, so that the coupled antennas show better performance and consistency.



US 20170346161A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2017/0346161 A1**

(43) **Pub. Date: Nov. 30, 2017**

Wu

(54) **ANTENNA MODULE**

(71) Applicant: **Jing Wu**, Shenzhen (CN)

(72) Inventor: **Jing Wu**, Shenzhen (CN)

(73) Assignee: **AAC Technologies Pte. Ltd.**, Singapore City (SG)

(21) Appl. No.: **15/417,118**

(22) Filed: **Jan. 26, 2017**

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

H01Q 1/24 (2006.01)

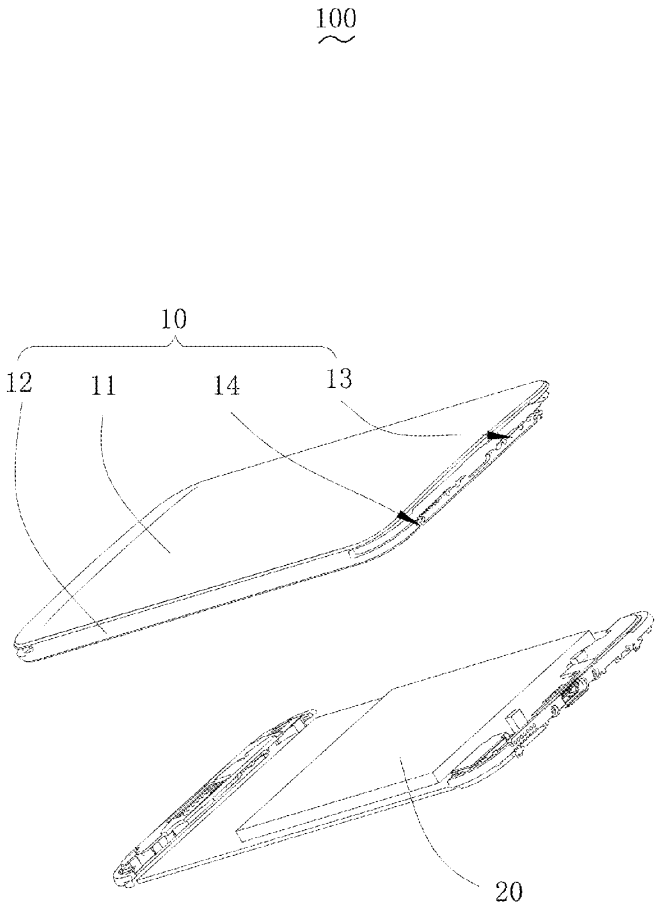
H01Q 1/48 (2006.01)

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

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

(57) **ABSTRACT**

The present disclosure provides an antenna module, including a metal housing having accommodating space and a circuit board accommodated in the accommodating space, the metal housing includes a metal back cover and a metal side wall, the metal side wall includes a side wall main body and a first radiator extending from an end of the side wall main body, a second radiator extending from another end of the side wall main body which is spaced with and arranged opposite to the first radiator, and a third radiator provided between the first radiator and the second radiator, a headroom region is formed between the third radiator and the circuit board. The present disclosure provides an antenna module having frequency bands of wireless signal and a good overall appearance.



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(19) **United States**

(12) **Patent Application Publication**

HAN et al.

(10) **Pub. No.: US 2017/0346162 A1**

(43) **Pub. Date: Nov. 30, 2017**

(54) **ANTENNA USING CONDUCTOR AND ELECTRONIC DEVICE THEREFOR**

(71) Applicants: **HongJuan HAN**, Shenzhen (CN); **YueHua YUE**, Shenzhen (CN)

(72) Inventors: **HongJuan HAN**, Shenzhen (CN); **YueHua YUE**, Shenzhen (CN)

(73) Assignee: **AAC Technologies Pte. Ltd.**, Singapore (SG)

(21) Appl. No.: **15/417,129**

(22) Filed: **Jan. 26, 2017**

(30) **Foreign Application Priority Data**

May 27, 2016 (CN) 201620505748.1

Publication Classification

(51) **Int. Cl.**

H01Q 1/24 (2006.01)

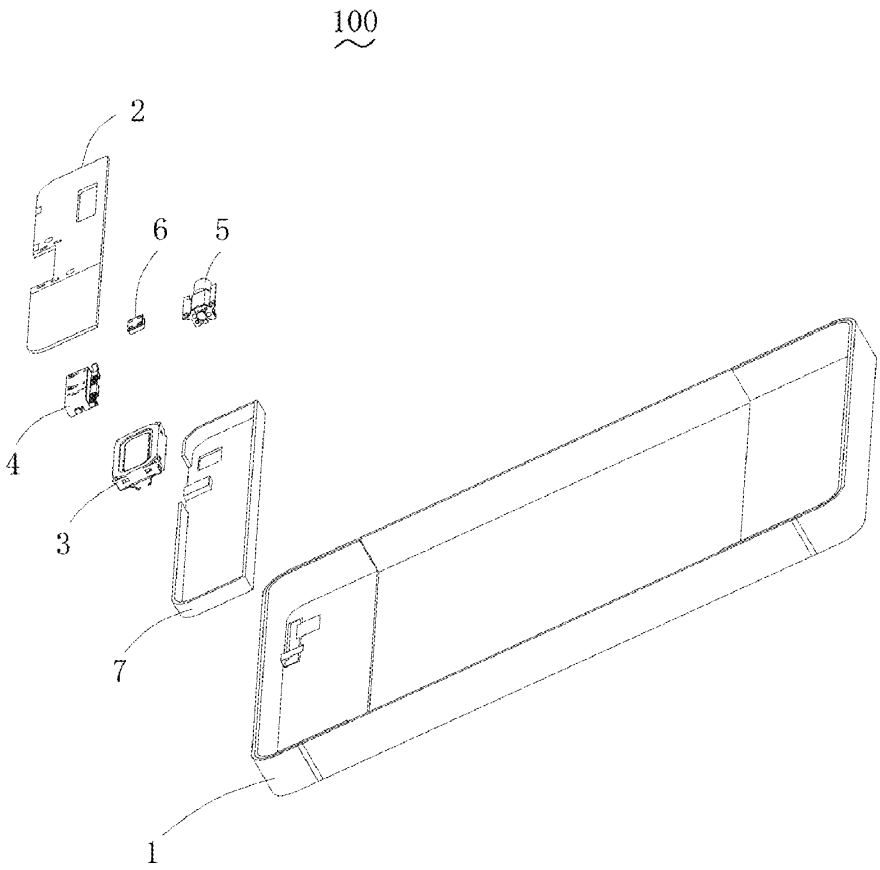
H01Q 1/40 (2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 1/40*** (2013.01)

(57) **ABSTRACT**

The present disclosure provides an antenna device, including a housing having accommodating space and an LDS antenna accommodated in the hosing, the housing includes a metal shell, a metal cover and a metal ring which cooperate and are spaced with each other, wherein inner walls of the metal shell, the metal cover and the metal ring are respectively provided with an adhesive coated layer, the adhesive coated layer includes an adhesive coated layer body, a groove provided at a side of the adhesive coated layer body far away from the metal cover, and a modified layer assembled in the groove, the LDS antenna is laser etched on the modified layer and is coupled with the metal cover. The antenna device of the present disclosure avoids frequency offset caused by gap size difference due to assembling errors between coupled antennas, so that the coupled antennas show better performance and consistency.



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(19) **United States**

(12) **Patent Application Publication**

KIM et al.

(10) **Pub. No.: US 2017/0346164 A1**

(43) **Pub. Date: Nov. 30, 2017**

(54) **ELECTRONIC DEVICE WITH MULTI-SLOT ANTENNA**

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

(72) Inventors: **Hosaeng KIM**, Gyeonggi-do (KR); **Hongil KWON**, Gyeonggi-do (KR); **Seonil KIM**, Gyeonggi-do (KR); **Jae-Ho LIM**, Gyeonggi-do (KR); **Seongeun KIM**, Gyeonggi-do (KR); **Seunghwan KIM**, Seoul (KR); **Younghoon KIM**, Gyeonggi-do (KR); **Kicheol SUNG**, Seoul (KR); **Kyung-Jong LEE**, Gyeonggi-do (KR); **Young-Min JOO**, Seoul (KR)

(21) Appl. No.: **15/585,550**

(22) Filed: **May 3, 2017**

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

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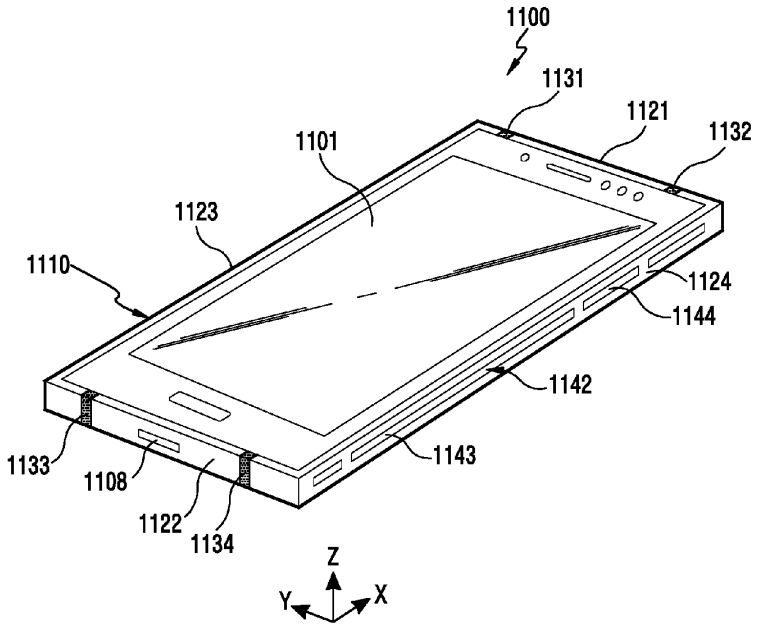
H04B 1/3888	(2006.01)
H01Q 13/10	(2006.01)
H04M 1/02	(2006.01)
H01Q 1/48	(2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H04M 1/0266*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 13/10*** (2013.01); ***H04B 1/3888*** (2013.01)

(57) **ABSTRACT**

An electronic device with a multi-slot antenna is provided. The electronic device includes a first housing including a first side, a second side facing in a second direction opposite to the first direction, and a first lateral side surrounded by a portion of a space between the first and second sides, a second housing including a third side facing in a third direction and a fourth side facing in a fourth direction opposite to the third direction, a first conductive member forming at least a portion of the first lateral side and including a slot, an intermediate plate located inside the first housing and including a portion adjacent to a slot of the first conductive member, wherein the portion comprises or forms an opening facing in the first or second direction, and a wireless communication circuit electrically coupled to a portion of the first conductive member around the slot.



US 20170352944A1

(19) **United States**

(12) **Patent Application Publication**

KOMULAINEN et al.

(10) **Pub. No.: US 2017/0352944 A1**

(43) **Pub. Date: Dec. 7, 2017**

(54) **APPARATUS AND METHOD FOR TRANSMISSION OF MILLIMETER WAVE SIGNALS**

(71) Applicant: **Intel Corporation**, Santa Clara, CA (US)

(72) Inventors: **MIKKO S. KOMULAINEN**, Tampere (FI); **MIKKO M. LAMPINEN**, Nokia (FI); **PETRI T. MUSTONEN**, Tampere (FI); **SAKU LAHTI**, Tampere (FI)

(21) Appl. No.: **15/174,786**

(22) Filed: **Jun. 6, 2016**

Publication Classification

(51) **Int. Cl.**

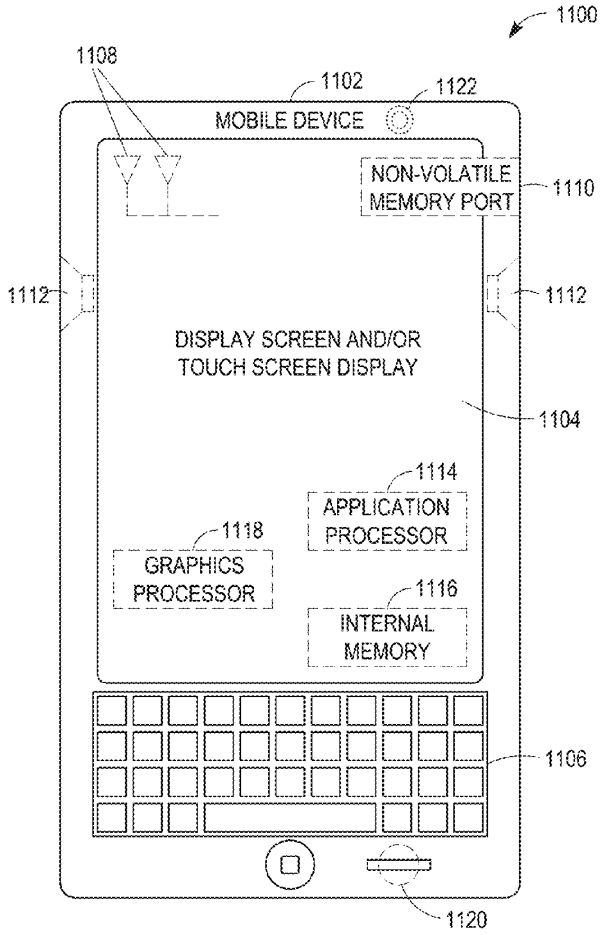
H01Q 1/24 (2006.01)
H01Q 1/22 (2006.01)
H01Q 1/38 (2006.01)
H01Q 9/04 (2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 9/0407*** (2013.01); ***H01Q 1/2208*** (2013.01); ***H01Q 1/38*** (2013.01)

(57) **ABSTRACT**

Embodiments relate to systems, methods, and computer-readable media to enable a wireless communication device. In one embodiment a wireless communication device is configured to radiate a millimeter wave signal through a circular waveguide. A patch antenna is resonated in a Transverse Magnetic 1-0 (TM10) operating mode and electrically couples to an open end of the circular waveguide. The electric field pattern of the patch antenna is such that the millimeter wave signal is launched into the waveguide propagating in a Transverse Electric 1-1 (TE11) mode. In other embodiments, various other configurations may be used as described herein.



US 20170352945A1

(19) **United States**

(12) **Patent Application Publication**

CHANG et al.

(10) **Pub. No.: US 2017/0352945 A1**

(43) **Pub. Date: Dec. 7, 2017**

(54) **COMMUNICATION DEVICE**

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

(72) Inventors: **Wei-Shan CHANG**, Hsinchu (TW); **Tsun-Che HUANG**, Hsinchu (TW)

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H01Q 1/36	(2006.01)

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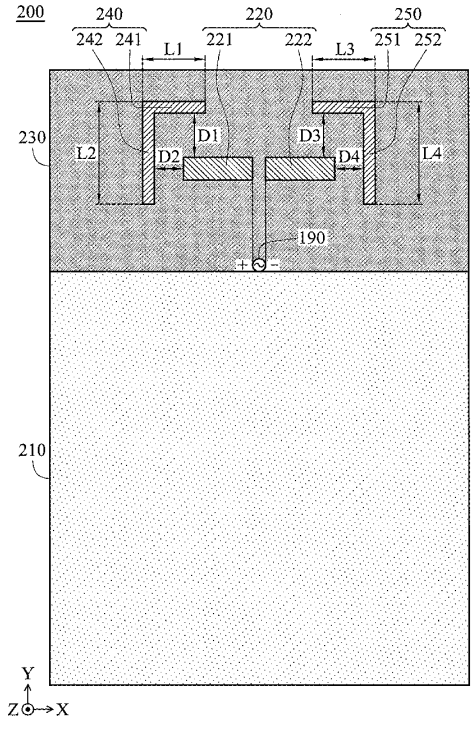
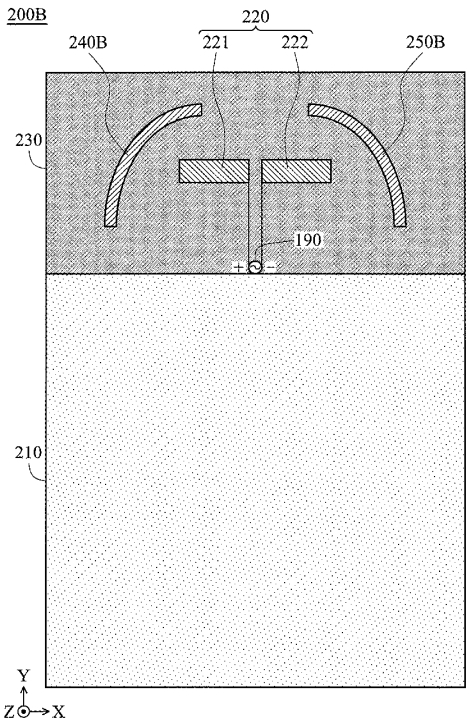
(57) **ABSTRACT**

A communication device includes a system ground plane, a signal source, an antenna structure, a radiation adjustment plane, and at least one tuning metal element. The signal source is coupled to the system ground plane. The antenna structure is coupled to the signal source. The radiation adjustment plane is configured to adjust the radiation of the antenna structure. The tuning metal element is disposed adjacent to the antenna structure, and is configured to modify the radiation pattern of the antenna structure.





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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2017/0358838 A1**

Huang et al. (43) **Pub. Date: Dec. 14, 2017**

(54) **LOAD-ADAPTIVE APERTURE TUNABLE ANTENNA**

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(21) Appl. No.: **15/178,491**

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H01Q 9/04	(2006.01)

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

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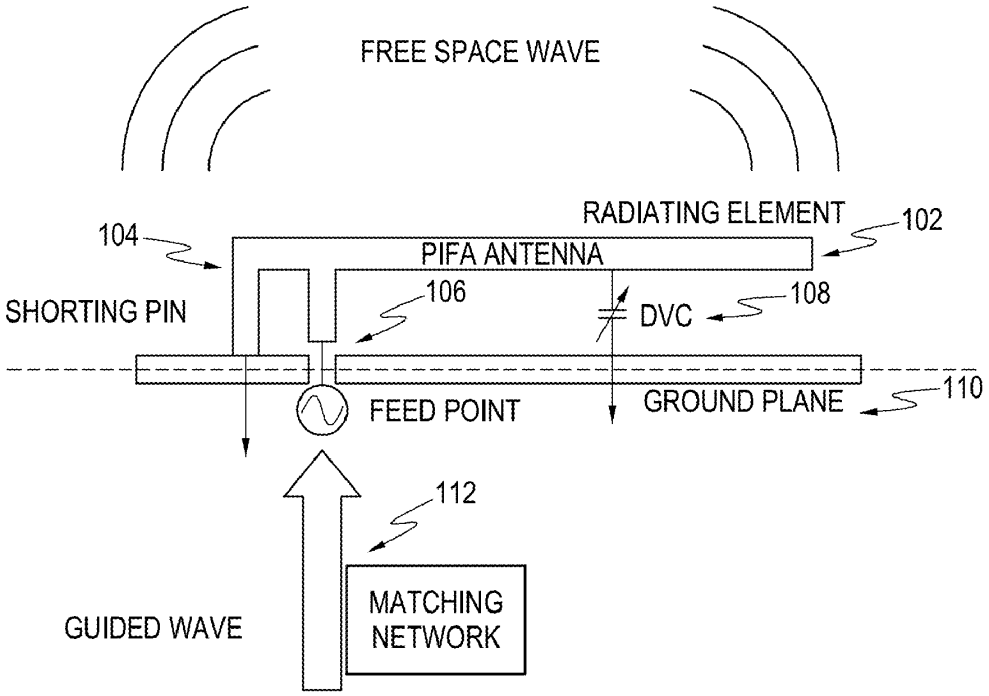
(57) **ABSTRACT**

Methods, apparatus and systems are provided including a load-adaptive antenna for mobile communication devices. One aspect provides a method of using an antenna within a handheld wireless communication device. The method includes monitoring antenna performance using information received from a sensor within the device. When antenna performance drops below a programmable threshold, such as due to proximity or contact with a user, a signal from a processor is used to actuate a circuit component to change a location of a high impedance portion of the antenna to reduce the effects of the proximity or contact with the user, in various embodiments.



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Wu et al.

(10) **Pub. No.: US 2017/0358844 A1**

(43) **Pub. Date: Dec. 14, 2017**

(54) **MOBILE TERMINAL**

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(73) Assignee: **AAC Technologies Pte. Ltd.**, Singapore city (SG)

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H01Q 1/50 (2006.01)

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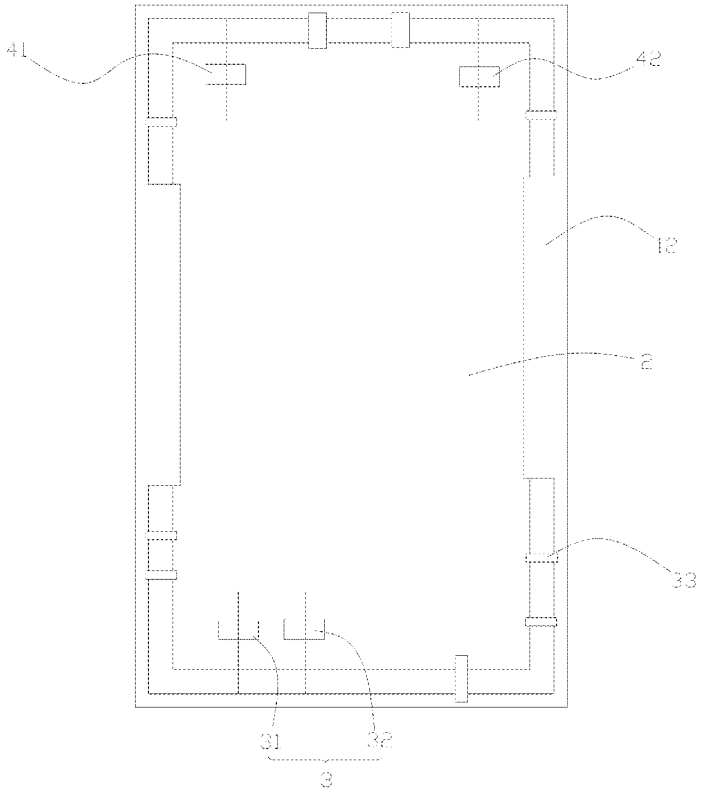
(57) **ABSTRACT**

A mobile terminal is disclosed. The mobile terminal includes a housing having an accommodation space, the housing including a metal frame; a mainboard received in the accommodation space and including a ground point provided on a surface thereof; an antenna system grounded through the mainboard. The antenna system includes a main antenna including a low-frequency feeding portion and a high-frequency feeding portion both of which are respectively connected to the metal frame; and a matching system configured on the metal frame for adjusting the frequency band of the antenna system. The high-frequency feeding portion is isolated from the low-frequency feeding portion through a LC filtering system.



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(19) **United States**

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(10) **Pub. No.: US 2017/0358848 A1**

(43) **Pub. Date: Dec. 14, 2017**

ANDUJAR LINARES et al.

(54) **WIRELESS DEVICE AND ANTENNA SYSTEM WITH EXTENDED BANDWIDTH**

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(72) Inventors: **Aurora ANDUJAR LINARES**, Barcelona (ES); **Jaume ANGUERA PROS**, Vinaros (ES)

(21) Appl. No.: **15/621,792**

(22) Filed: **Jun. 13, 2017**

Related U.S. Application Data

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H01Q 5/40	(2006.01)

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

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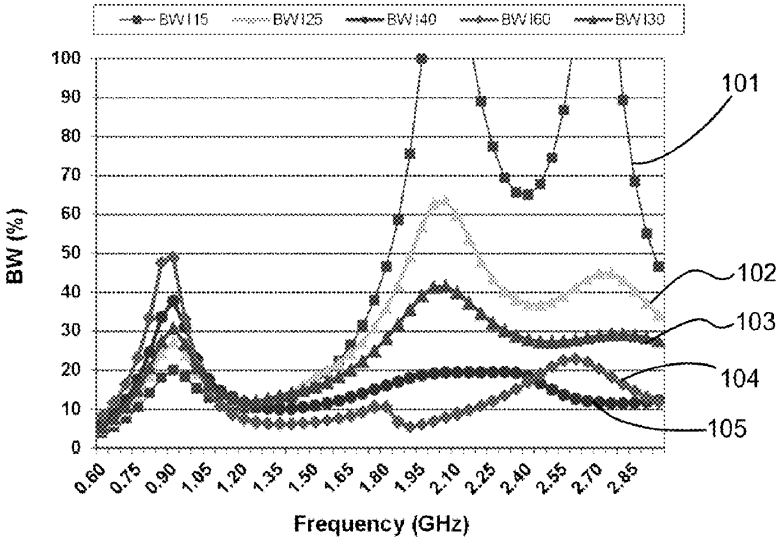
(57) **ABSTRACT**

A wireless device comprises a radiating structure that comprises a ground plane layer etched on a PCB, including a clearance area nearby one edge of the PCB, and an antenna element mounted on the clearance area. The radiating structure is included in a radiating system that also includes a radiofrequency system comprising at least a matching network, including more than three components. The radiofrequency system connects the antenna element to a feeding line connected at its end to an external port. The antenna element features a maximum length within the 22-30 mm range to match the radiating system in the multiple frequency bands of operation. In general, a radiating system features extended bandwidth, typically including LTE700 bands or below. The antenna element may include two conductive adjacent surfaces with a convex shape connected between them.



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(43) **Pub. Date: Dec. 14, 2017**

LEE et al.

(54) **METHOD FOR CONTROLLING ANTENNA AND ELECTRONIC DEVICE USING THE SAME**

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H04B 17/318	(2006.01)
H04B 17/15	(2006.01)
H04B 17/29	(2006.01)

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(57) **ABSTRACT**

Various embodiments of the present disclosure relate to a device and a method for controlling a plurality of antennas in an electronic device. The electronic device may include: a plurality of antennas; a communication circuit configured to be connected with the plurality of antennas; and at least one processor, wherein the processor may be configured to: transmit a signal to an external device through one antenna among the plurality of antennas; detect a difference in reception performance between the antenna and each of at least one remaining antenna in response to occurrence of an event; and set one among the plurality of antennas as a transmitting antenna for the electronic device based on a threshold corresponding to an antenna characteristic of each of the at least one remaining antenna and the difference in reception performance. Other embodiments are possible.