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SVENDSEN et al. (43) Pub. Date: Mar. 18, 2021

(54) **ANTENNA**

(71) Applicant: **NOKIA SOLUTIONS AND NETWORKS OY**, Espoo (FI)

(72) Inventors: **Simon SVENDSEN**, Aalborg (DK); **Christian ROM**, Aalborg (DK); **Poul OLESEN**, Støvring (DK)

(73) Assignee: **NOKIA SOLUTIONS AND NETWORKS OY**, Espoo (FI)

(21) Appl. No.: **17/018,900**

(22) Filed: **Sep. 11, 2020**

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

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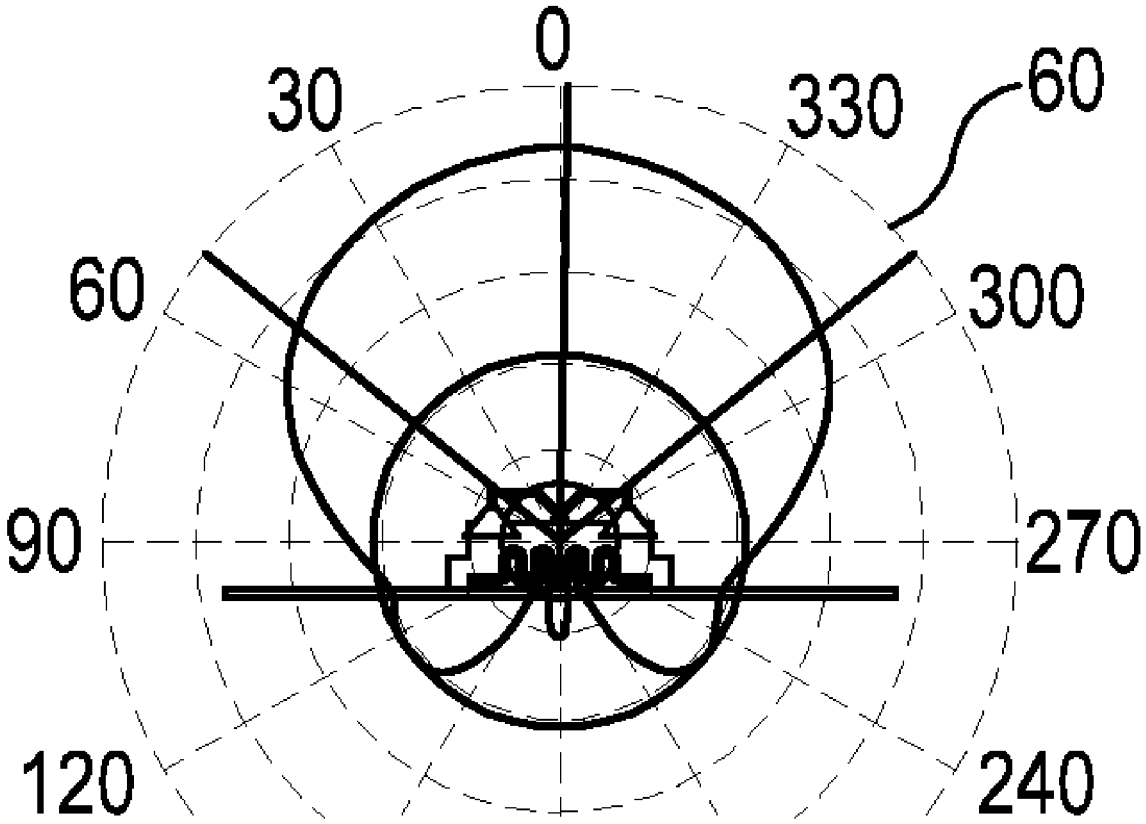
H01Q 1/48	(2006.01)
H01Q 13/16	(2006.01)
H01Q 21/00	(2006.01)
H01Q 1/52	(2006.01)
H01Q 25/00	(2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 13/16*** (2013.01); *G16Y 10/75* (2020.01); ***H01Q 1/521*** (2013.01); ***H01Q 25/00*** (2013.01); ***H01Q 21/0025*** (2013.01)

(57) **ABSTRACT**

An apparatus is provided that includes a ground plane having a perimeter, at least one support positioned within the perimeter of the ground plane and extending outwardly from the ground plane and at least one multi-port antenna supported by the support at a distance from the ground plane. The multi-port antenna has a different radiation pattern associated with each port. The multi-port antenna operates with a first radiation pattern when a first port is used and operates with a second radiation pattern, different to the first radiation pattern, when a second port, different to the first port, is used. The at least one support defines a slot positioned between the multi-port antenna and the ground plane and/or the ground plane defines a slot.



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SVENDSEN et al.

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(43) **Pub. Date: Mar. 18, 2021**

(54) **ANTENNA**

(71) Applicant: **NOKIA SOLUTIONS AND NETWORKS OY**, Espoo (FI)

(72) Inventors: **Simon SVENDSEN**, Aalborg (DK); **Poul OLESEN**, Støvring (DK)

(73) Assignee: **NOKIA SOLUTIONS AND NETWORKS OY**, Espoo (FI)

(21) Appl. No.: **17/018,967**

(22) Filed: **Sep. 11, 2020**

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

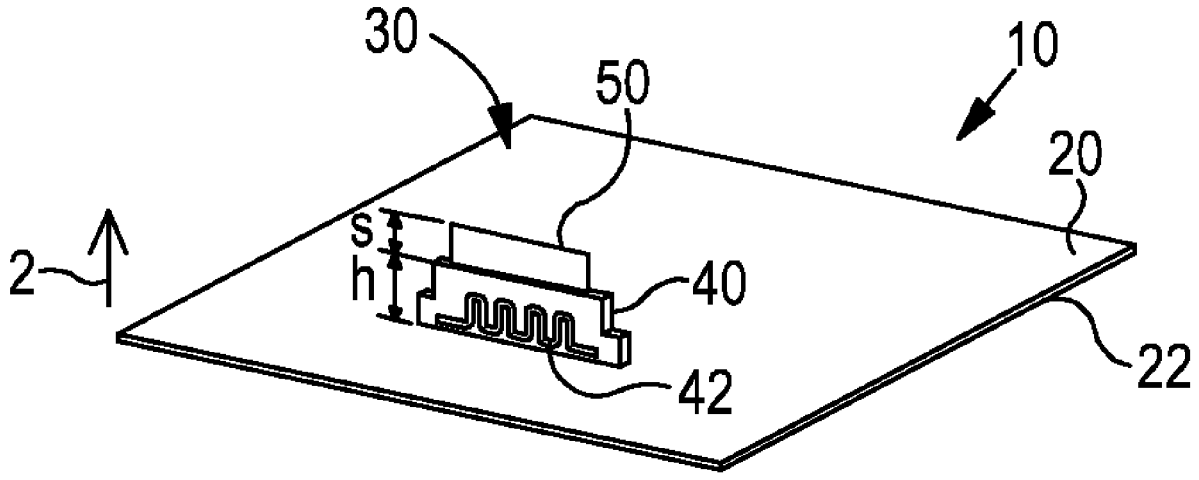
H01Q 5/35 (2006.01)
H01Q 21/06 (2006.01)
H01Q 13/08 (2006.01)

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

CPC ***H01Q 5/35*** (2015.01); ***H01Q 13/08*** (2013.01); ***H01Q 21/068*** (2013.01)

(57) **ABSTRACT**

An apparatus is provided that includes a first multi-port antenna that operates with a first radiation pattern when a first port is used and operates with a second radiation pattern, different to the first radiation pattern, when a second port, different to the first port, is used. The apparatus also includes a second multi-port antenna that operates with a third radiation pattern when a third port is used and operates with a fourth radiation pattern, different to the third radiation pattern, when a fourth port, different to the third port, is used. The apparatus further includes at least one switch for selecting one of multiple paths between a node and each port of a pair of ports.



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(19) **United States**

(12) **Patent Application Publication**

ZHOU et al.

(10) **Pub. No.: US 2021/0083384 A1**

(43) **Pub. Date: Mar. 18, 2021**

(54) **ANTENNA AND TERMINAL DEVICE**

(71) Applicant: **BEIJING XIAOMI MOBILE SOFTWARE CO., LTD.**, BEIJING (CN)

(72) Inventors: **Mingming ZHOU**, Beijing (CN); **Min LI**, Beijing (CN); **yu chuan Su**, Beijing (CN)

(73) Assignee: **BEIJING XIAOMI MOBILE SOFTWARE CO., LTD.**, BEIJING (CN)

(21) Appl. No.: **16/745,437**

(22) Filed: **Jan. 17, 2020**

(30) **Foreign Application Priority Data**

Sep. 17, 2019 (CN) 201910877627.8

Publication Classification

(51) **Int. Cl.**

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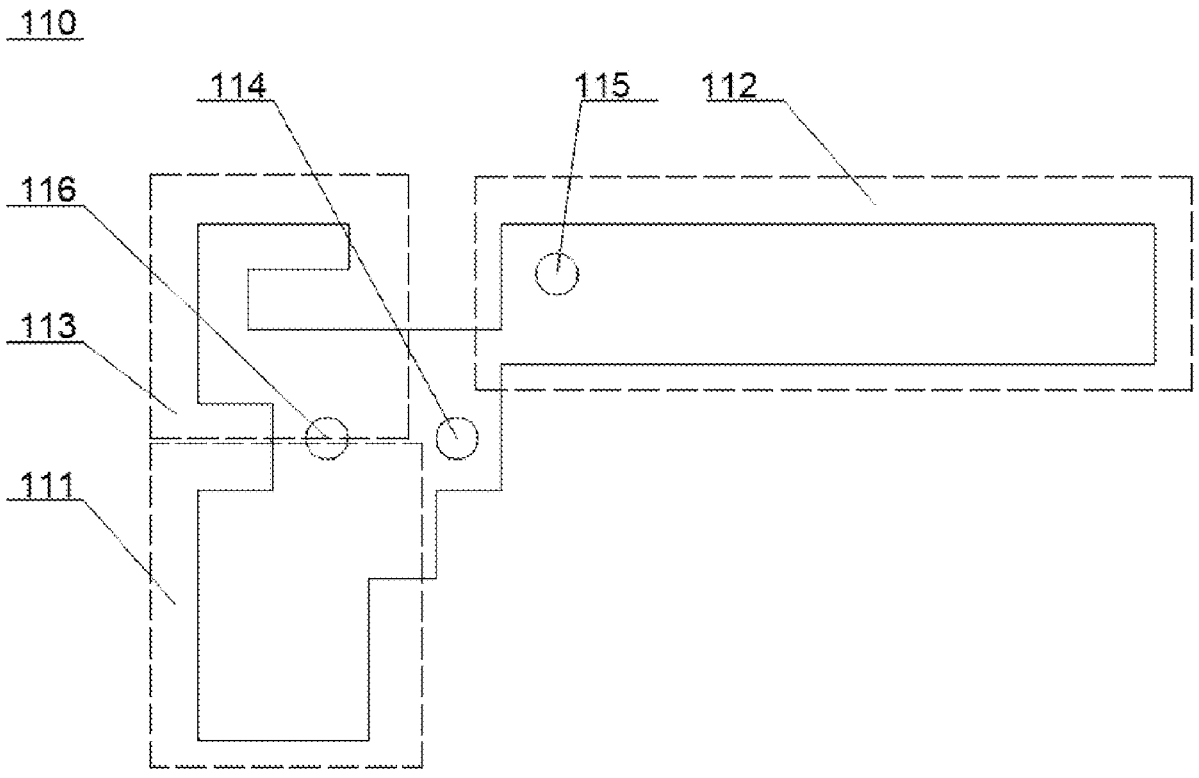
H01Q 1/24	(2006.01)
H04M 1/02	(2006.01)
H01Q 1/52	(2006.01)
H01Q 1/48	(2006.01)

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

CPC ***H01Q 5/371*** (2015.01); ***H01Q 1/243*** (2013.01); *H04W 84/12* (2013.01); ***H01Q 1/52*** (2013.01); ***H01Q 1/48*** (2013.01); ***H04M 1/0264*** (2013.01)

(57) **ABSTRACT**

An antenna includes a feed contact, a first antenna branch and a second antenna branch, wherein the first antenna branch and the second antenna branch are respectively electrically connected with the feed contact, forming electromagnetic coupling; the first antenna branch has a specified length for sending and receiving signals in a first frequency band; and the second antenna branch has a specified length for sending and receiving signals in a second frequency band. A terminal device including such an antenna can have improved appearance, improved effect of receiving communication signals in different frequency bands, reduced RF loss, and improved the utilization of the internal space.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0083391 A1**

Ueki (43) **Pub. Date: Mar. 18, 2021**

(54) **WIRELESS COMMUNICATION DEVICE**

(71) Applicant: **Murata Manufacturing Co., Ltd.**, Nagaokakyo-shi (JP)

(72) Inventor: **Noriyuki Ueki**, Nagaokakyo-shi (JP)

(21) Appl. No.: **17/108,130**

(22) Filed: **Dec. 1, 2020**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2019/012076, filed on Mar. 22, 2019.

(30) **Foreign Application Priority Data**

Jul. 13, 2018 (JP) 2018-133176

Publication Classification

(51) **Int. Cl.**

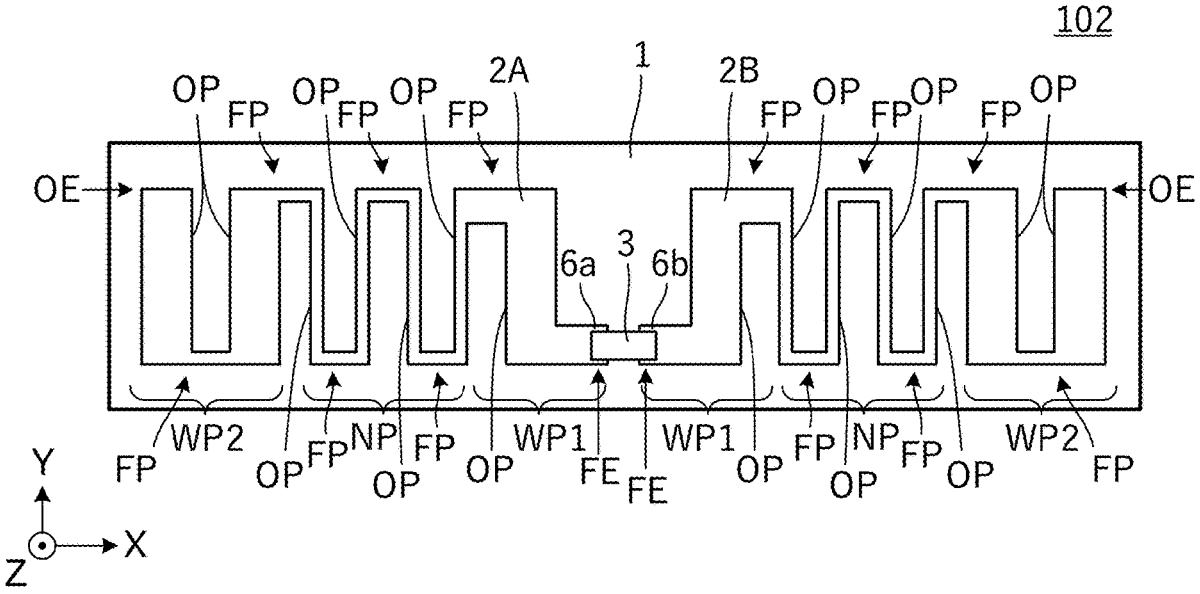
H01Q 9/26	(2006.01)
H01Q 1/38	(2006.01)
G06K 19/077	(2006.01)

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

CPC ***H01Q 9/26*** (2013.01); ***G06K 19/0773*** (2013.01); ***H01Q 1/38*** (2013.01)

(57) **ABSTRACT**

An RFID tag is provided as a wireless communication device for transmitting and receiving a communication signal. The RFID tag includes a base material, antenna patterns formed on the base material, and an RFIC package that is a feeder circuit connected to the antenna patterns. In the antenna patterns, a line width at a harmonic current concentration portion where a current is strong at a frequency of harmonic resonance higher than a resonance frequency at a frequency of the communication signal is narrower than a line width at another portion of the antenna pattern.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0091466 A1**

Wu et al. (43) **Pub. Date: Mar. 25, 2021**

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

(71) Applicant: **PEGATRON CORPORATION**, TAIPEI CITY (TW)

(72) Inventors: **Chien-Yi Wu**, Taipei City (TW); **Cheng-Hsiung Wu**, Taipei City (TW); **Chao-Hsu Wu**, Taipei City (TW); **Ching-Hsiang Ko**, Taipei City (TW); **Tse-Hsuan Wang**, Taipei City (TW); **Shih-Keng Huang**, Taipei City (TW); **Yi-Ru Yang**, Taipei City (TW); **Sheng-Chin Hsu**, Taipei City (TW)

(73) Assignee: **PEGATRON CORPORATION**, TAIPEI CITY (TW)

(21) Appl. No.: **17/006,546**

(22) Filed: **Aug. 28, 2020**

(30) **Foreign Application Priority Data**

Sep. 24, 2019 (TW) 108134438

Publication Classification

(51) **Int. Cl.**

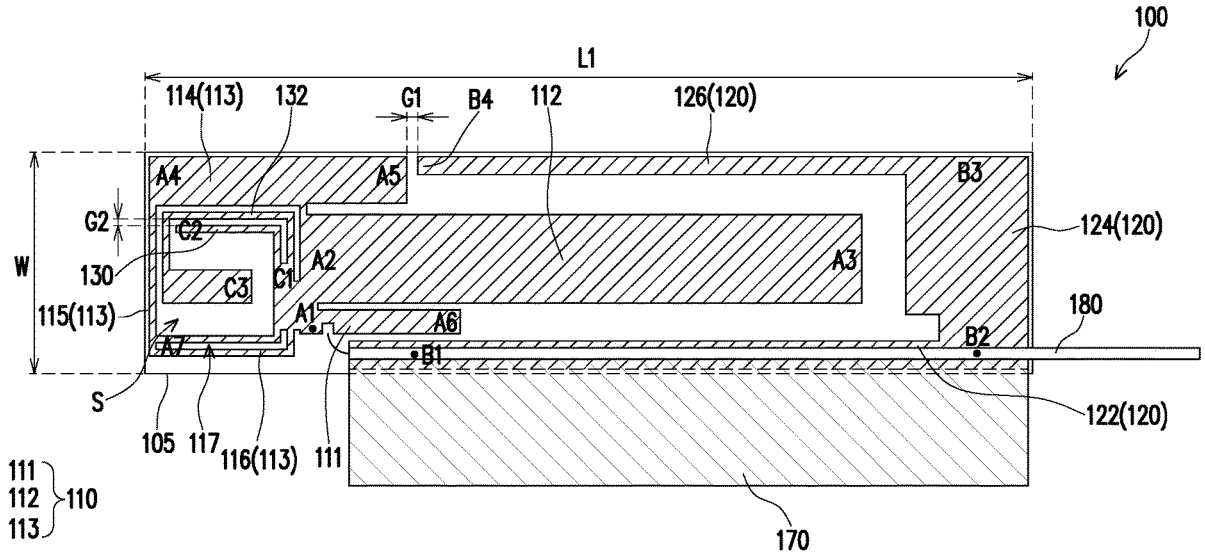
H01Q 5/307	(2006.01)
H01Q 5/10	(2006.01)
H01Q 1/48	(2006.01)

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

CPC ***H01Q 5/307*** (2015.01); ***H01Q 1/48*** (2013.01); ***H01Q 5/10*** (2015.01)

(57) **ABSTRACT**

An antenna structure including a first radiator and a second radiator is provided. The first radiator includes a first section, a second section, and a third section. The first section has a feed-in end. The second section is adjacent to the first section and connected to a position of the first section close to the feed-in end. The third section is connected to the second section and the feed-in end to encircle a space. The second radiator is disposed around the first section and the second section. The second radiator includes a first end and a second end opposite to each other. The first end is a ground end. A coupling interval is formed between the second end and the third section. A first frequency band, a second frequency band, and a third frequency band are resonated by the first radiator and the second radiator.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0091467 A1**

LU et al. (43) **Pub. Date: Mar. 25, 2021**

(54) **COMMUNICATION DEVICE**

(71) Applicant: **Quanta Computer Inc.**, Taoyuan City (TW)

(72) Inventors: **Jun-Yu LU**, Taoyuan City (TW); **Chun-I LIN**, Taoyuan City (TW); **Hui LIN**, Taoyuan City (TW)

(21) Appl. No.: **16/710,398**

(22) Filed: **Dec. 11, 2019**

(30) **Foreign Application Priority Data**

Sep. 25, 2019 (TW) 108134511

Publication Classification

(51) **Int. Cl.**

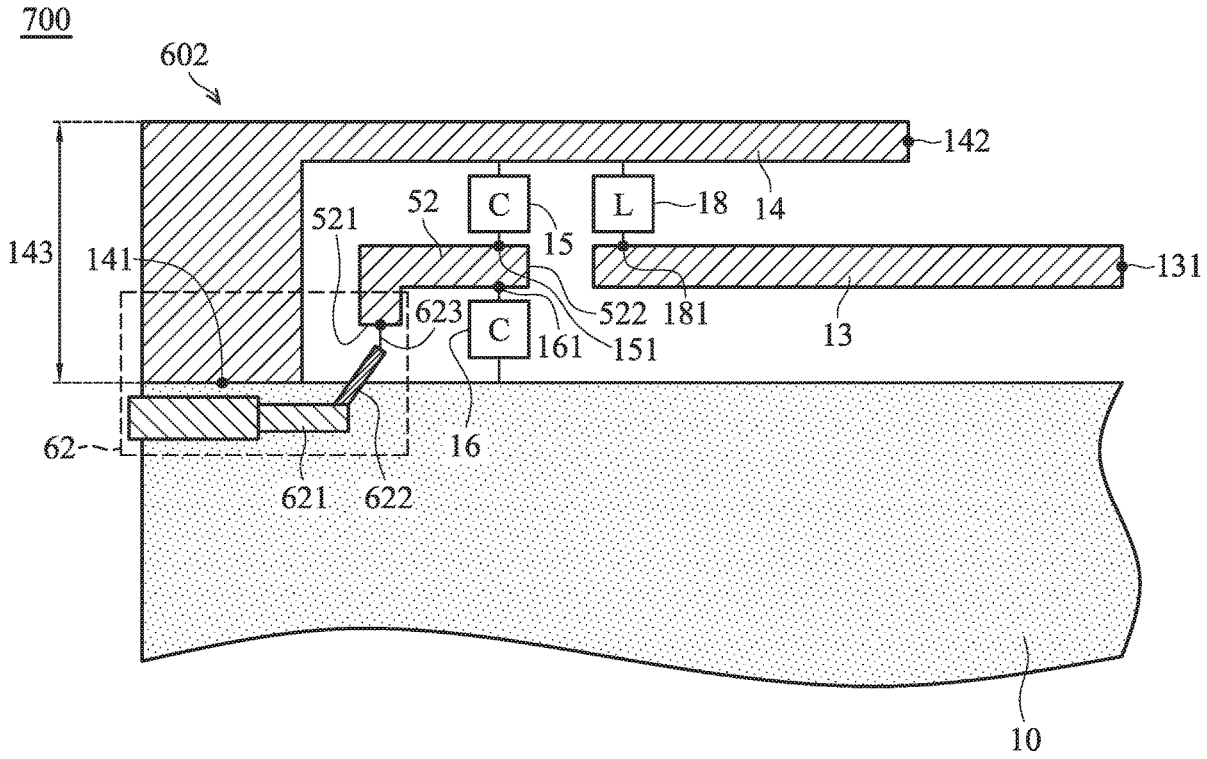
H01Q 5/328	(2006.01)
H01Q 9/04	(2006.01)
H01Q 1/48	(2006.01)

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

CPC ***H01Q 5/328*** (2015.01); ***H01Q 9/045*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 9/0421*** (2013.01)

(57) **ABSTRACT**

A communication device includes a ground metal element and an antenna element. The antenna element includes a first metal element, a second metal element, a third metal element, a first capacitive element, a second capacitive element, an inductive element, and a signal feeding source. A first connection point of the first metal element is coupled through the first capacitive element to the third metal element. A second connection point of the first metal element is coupled through the second capacitive element to the ground metal element. A third connection point of the second metal element is coupled through the inductive element to the third metal element. A shorting end of the third metal element is coupled to the ground metal element. The signal feeding source is coupled between the first metal element and the third metal element or the ground metal element.



US 20210091476A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0091476 A1**

Judd (43) **Pub. Date: Mar. 25, 2021**

(54) **COMPACT WIDEBAND SLOT ANTENNA DESIGN WITH INVERTED CO-PLANAR WAVEGUIDE FEED**

(71) Applicant: **Mano D. Judd**, Heath, TX (US)

(72) Inventor: **Mano D. Judd**, Heath, TX (US)

(21) Appl. No.: **16/582,061**

(22) Filed: **Sep. 25, 2019**

Publication Classification

(51) **Int. Cl.**

H01Q 13/10	(2006.01)
H01Q 1/52	(2006.01)
H01Q 1/48	(2006.01)

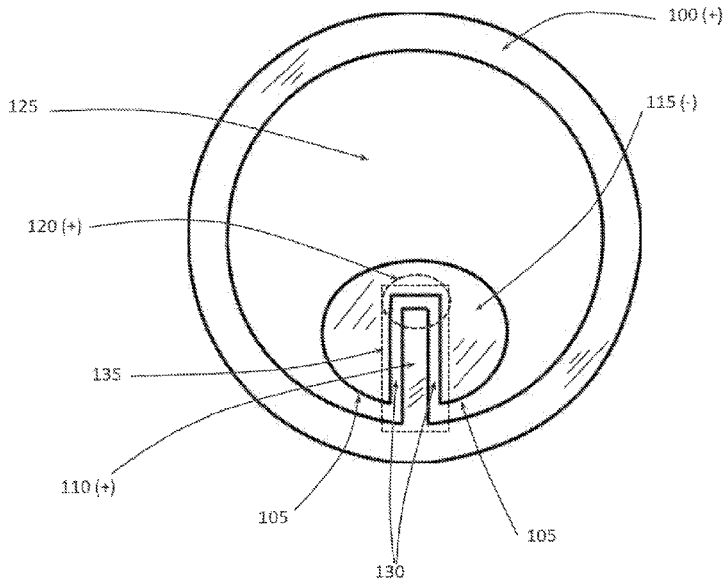
(52) **U.S. Cl.**

CPC ***H01Q 13/10*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 1/52*** (2013.01)

(57) **ABSTRACT**

A slot antenna where the inner CPW trace is migrated to the inside of the slot, rather than being external to the slot, and thus inverts the polarity of the center trace and puts the CPW feed section inside (within) the slot structure itself. Therefore, in this novel embodiment, the CPW feed does not increase the net size of the antenna, and results in a much smaller and/or compact design. In this fashion, now both the outer conducting surface and the CPW trace are connected and both negative (ground) polarity, whereas the tuning element is positive polarity. Thus the inner CPW trace becomes the same polarity as the outer ground conducting surface. This design is compact, without compromising an excessive amount of ground plane structure.

Single Pole Circular Wideband Antenna with Reduced Ground Plane Design



+	Positive
-	Negative
100	Ground (conductor)
105	Slot Gap
110	Co-Planar Waveguide Feed
115	Tuning Element
120	RF Connector
125	Slot (hole)
130	CPW Gap
135	CPW Feed Structure

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(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0091477 A1**

YUE et al. (43) **Pub. Date: Mar. 25, 2021**

(54) **ANTENNA AND MOBILE TERMINAL**

(71) Applicant: **BEIJING XIAOMI MOBILE SOFTWARE CO., LTD.**, BEIJING (JP)

(72) Inventors: **Yongbo YUE**, Beijing (CN); **Zonglin XUE**, Beijing (CN); **Jie ZHANG**, Beijing (CN)

(73) Assignee: **BEIJING XIAOMI MOBILE SOFTWARE CO., LTD.**, BEIJING (JP)

(21) Appl. No.: **16/743,201**

(22) Filed: **Jan. 15, 2020**

(30) **Foreign Application Priority Data**

Sep. 24, 2019 (CN) 201910904947.8

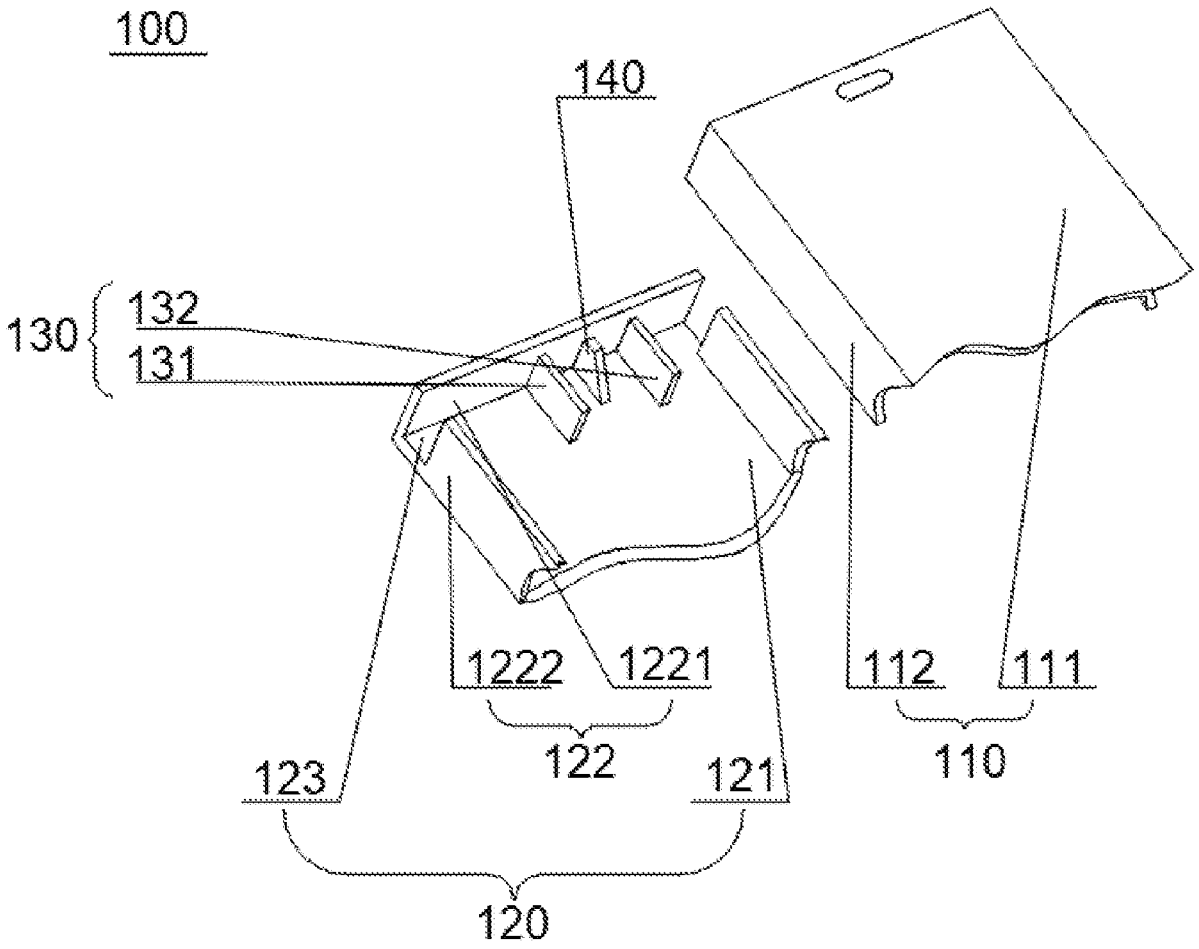
Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/24 (2006.01)

(52) **U.S. Cl.**
CPC ***H01Q 13/10*** (2013.01); *H01Q 1/48* (2013.01); ***H01Q 1/243*** (2013.01)

(57) **ABSTRACT**

An antenna includes a feed; a first member being made of metallic materials and including an end plate and side wall plates disposed on both sides of the end plate, in which the feed is disposed on the end plate of the first member, and slots are respectively formed on the side wall plates of the first member; and second members made of non-metallic materials and bonded to the first member to shield the slots. The antenna and a mobile terminal including the antenna can achieve an aesthetically pleasing appearance and improve user experience, as the slots cannot be observed when viewed from outside the mobile terminal.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0098869 A1**

Ruaro et al. (43) **Pub. Date: Apr. 1, 2021**

(54) **ELECTRONIC DEVICE WIDE BAND ANTENNAS**

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

(72) Inventors: **Andrea Ruaro**, Campbell, CA (US); **Eduardo Jorge Da Costa Bras Lima**, Sunnyvale, CA (US); **Mario Martinis**, Cupertino, CA (US); **Dimitrios Papantonis**, Cupertino, CA (US); **Jayesh Nath**, Milpitas, CA (US); **Mattia Pascolini**, San Francisco, CA (US)

(21) Appl. No.: **16/584,159**

(22) Filed: **Sep. 26, 2019**

Publication Classification

(51) **Int. Cl.**

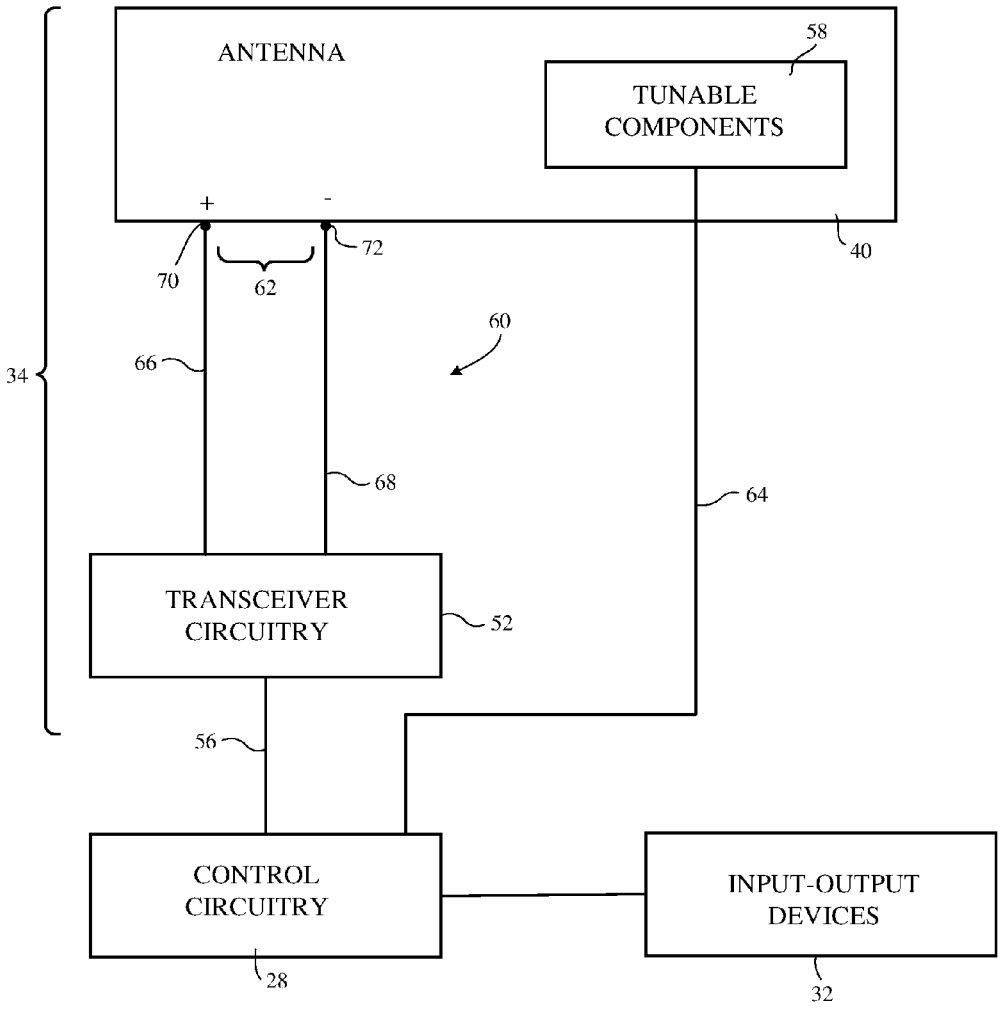
H01Q 1/52	(2006.01)
H01Q 13/10	(2006.01)
H01Q 1/48	(2006.01)
H04B 1/3827	(2006.01)
H01Q 1/27	(2006.01)
H04R 1/02	(2006.01)

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

CPC ***H01Q 1/521*** (2013.01); ***H01Q 13/10*** (2013.01); ***H04R 1/025*** (2013.01); ***H04B 1/385*** (2013.01); ***H01Q 1/273*** (2013.01); ***H01Q 1/48*** (2013.01)

(57) **ABSTRACT**

An electronic device may have a housing with metal sidewalls. One of the metal sidewalls may have an opening. The electronic device may have a speaker module that has a speaker housing member. Conductive structures on the speaker housing member may have an opening that forms a slot element. The opening of the metal sidewall may be aligned with slot element. The slot element and an interior cavity of the speaker housing member may form a cavity-backed slot antenna. An antenna feed structure may be disposed at the opening of the speaker housing member. An antenna feed may be directly coupled to the antenna feed structure. The antenna feed structure may indirectly feed the slot antenna resonating element by capacitive coupling. A sealing member may be disposed at the opening of the metal sidewall.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0098878 A1**

Wu et al. (43) **Pub. Date: Apr. 1, 2021**

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

(71) Applicant: **PEGATRON CORPORATION**, Taipei City (TW)

(72) Inventors: **Chien-Yi Wu**, Taipei City (TW); **Hau Yuen Tan**, Taipei City (TW); **Chao-Hsu Wu**, Taipei City (TW); **Yi-Ru Yang**, Taipei City (TW); **Shih-Keng Huang**, Taipei City (TW); **I-Shu Lee**, Taipei City (TW)

(73) Assignee: **PEGATRON CORPORATION**, Taipei City (TW)

(21) Appl. No.: **16/994,402**

(22) Filed: **Aug. 14, 2020**

(30) **Foreign Application Priority Data**

Oct. 1, 2019 (TW) 108135553

Publication Classification

(51) **Int. Cl.**

H01Q 5/357	(2006.01)
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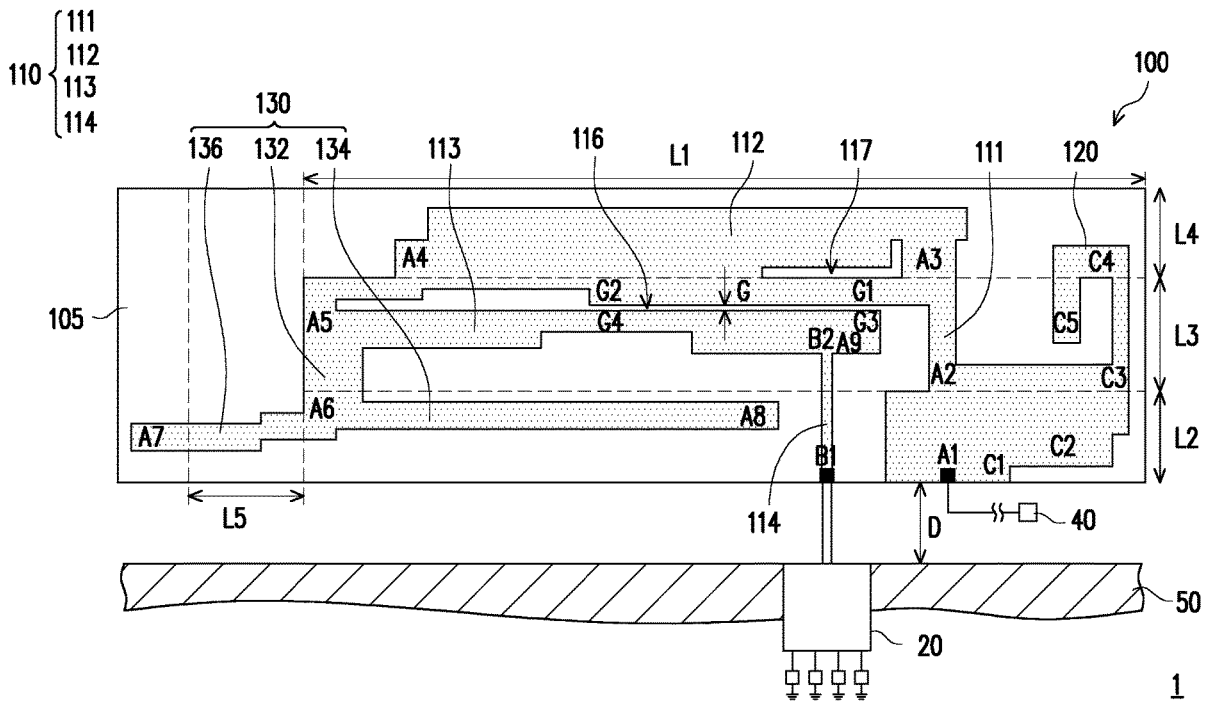
H01Q 13/10	(2006.01)

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

CPC ***H01Q 5/357*** (2015.01); ***H01Q 13/106*** (2013.01); ***H01Q 11/14*** (2013.01)

(57) **ABSTRACT**

An antenna structure includes a first main radiator, a second main radiator and a frequency adjustment radiator. The first main radiator is adapted to resonate in a first frequency band and a second frequency band, and includes a first section, a second section, a third section and a fourth section sequentially connected. The first section has a feed-in end, and the fourth section has a grounding end. The second section and the third section is connected in bent manner, a first slit is provided between the second section and the third section for adjusting impedance matching of the second frequency band. The second main radiator extending from the feed-in end is adapted to resonate in third frequency band and a fourth frequency band. The frequency adjustment radiator is connected to the third section and is adapted to adjust a resonant frequency point of the first frequency band.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0098882 A1**

Paulotto et al. (43) **Pub. Date: Apr. 1, 2021**

(54) **MILLIMETER WAVE ANTENNAS HAVING CONTINUOUSLY STACKED RADIATING ELEMENTS**

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

(72) Inventors: **Simone Paulotto**, Redwood City, CA (US); **Jennifer M. Edwards**, San Francisco, CA (US); **Harish Rajagopalan**, San Jose, CA (US); **Bilgehan Avser**, Mountain View, CA (US)

(21) Appl. No.: **16/584,067**

(22) Filed: **Sep. 26, 2019**

Publication Classification

(51) **Int. Cl.**

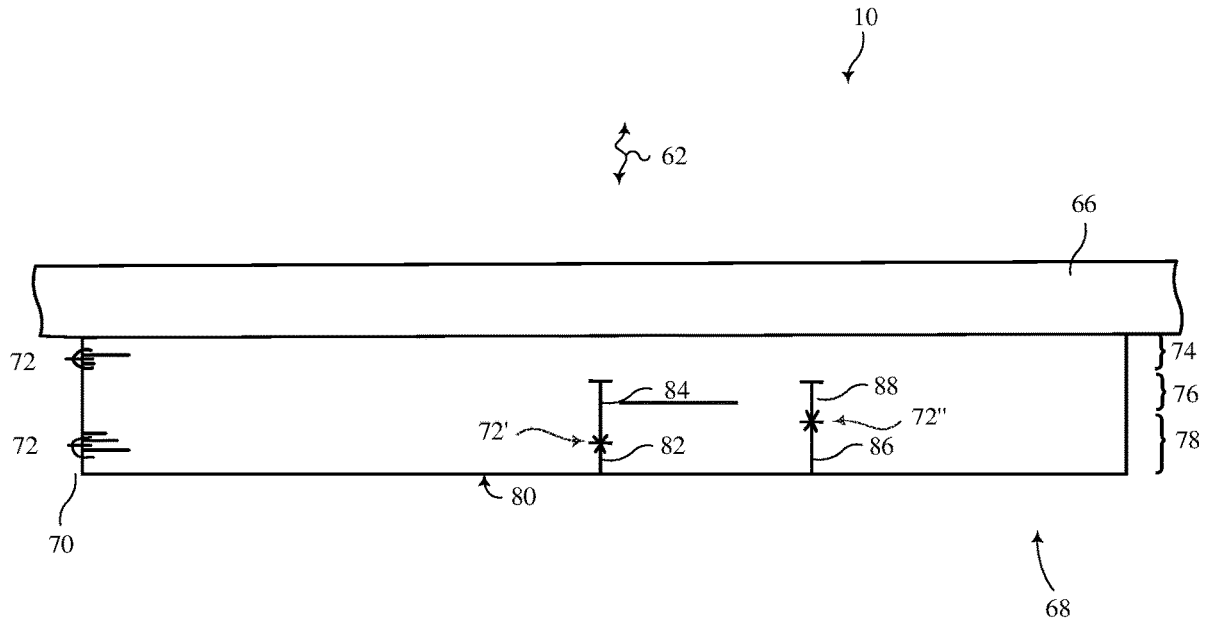
H01Q 9/04	(2006.01)
H01Q 21/22	(2006.01)
H01Q 21/06	(2006.01)
H01Q 1/48	(2006.01)
H01Q 1/24	(2006.01)

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

CPC ***H01Q 9/0414*** (2013.01); ***H01Q 21/22*** (2013.01); ***H01Q 1/243*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 21/065*** (2013.01)

(57) **ABSTRACT**

An electronic device may be provided with a phased antenna array. The array may convey signals greater than 10 GHz and may be formed on a substrate having transmission line layers and antenna layers. An antenna in the array may have a radiating element that includes first, second, and third overlapping patch elements on the antenna layers. The antenna may be fed using a differential transmission line coupled to a differential feed on the first patch element. The differential transmission line may include first and second signal traces. A first via may couple the first signal trace to the first, second, and third patch elements. A second via may couple the second signal trace to the first, second, and third patch elements. The patch elements may introduce capacitances to the radiating element that help to compensate for inductances associated with the distance between the radiating element and the signal traces.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0098891 A1**

HAVIV et al. (43) **Pub. Date: Apr. 1, 2021**

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

(71) Applicant: **QUALCOMM Incorporated**, San Diego, CA (US)

(72) Inventors: **Assaf HAVIV**, Petch-Tikwa (IL); **Elimelech GANCHROW**, Zichron Yaakov (IL); **Robert GILMORE**, Poway, CA (US); **Ernest OZAKI**, Poway, CA (US)

(21) Appl. No.: **17/009,845**

(22) Filed: **Sep. 2, 2020**

Related U.S. Application Data

(60) Provisional application No. 62/908,205, filed on Sep. 30, 2019.

Publication Classification

(51) **Int. Cl.**

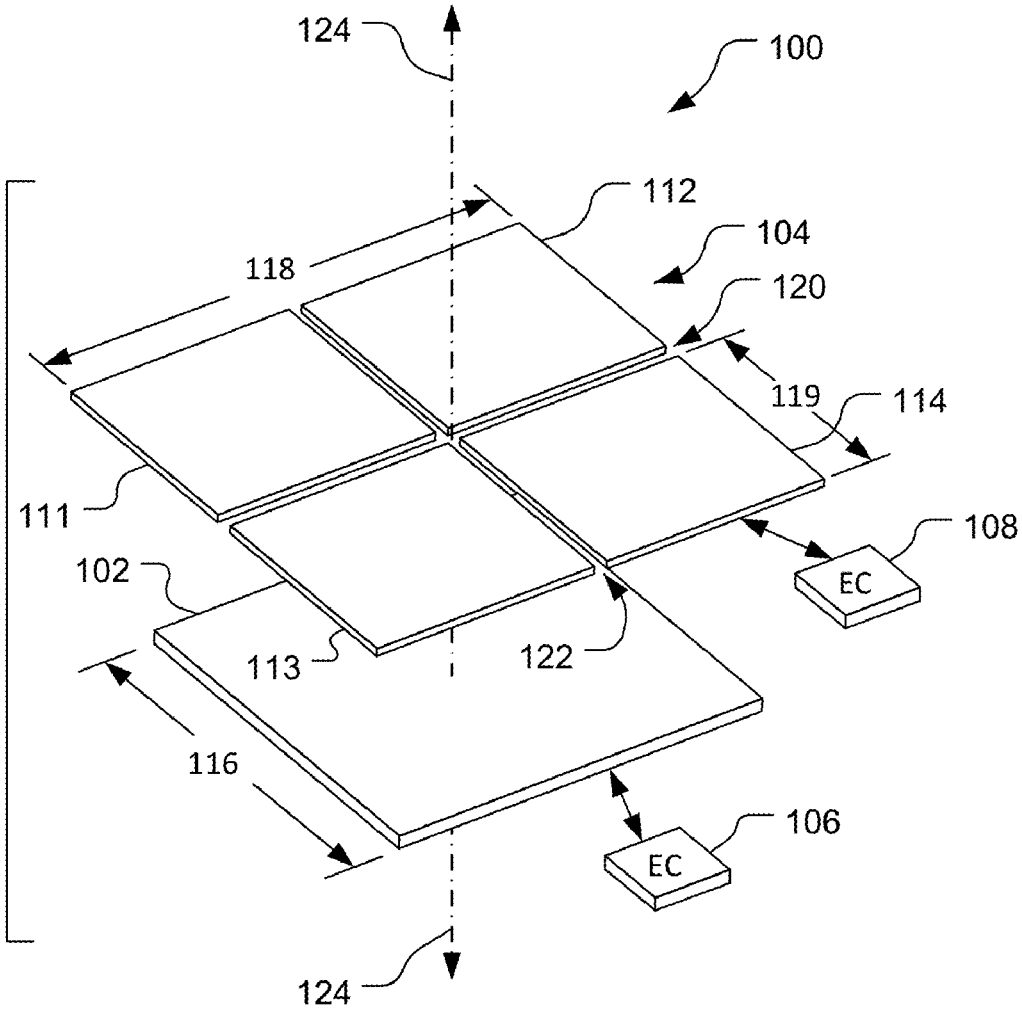
H01Q 21/06	(2006.01)
H01Q 9/04	(2006.01)
H01Q 9/06	(2006.01)
H01Q 21/28	(2006.01)

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

CPC ***H01Q 21/065*** (2013.01); ***H01Q 21/28*** (2013.01); ***H01Q 9/065*** (2013.01); ***H01Q 9/0414*** (2013.01)

(57) **ABSTRACT**

An antenna system includes: a first patch antenna element that is electrically conductive; a first energy coupler configured to convey first energy to, or receive the first energy from, the first patch antenna element, the first energy being in a first frequency band; a second patch antenna element at least partially overlapping the first patch antenna element, the second patch antenna element comprising a plurality of physically separate portions that are each electrically conductive; and a second energy coupler connected to a first subset of the plurality of physically separate portions, the first subset comprising less than all of the plurality of physically separate portions, the second energy coupler configured to convey second energy to, or receive the second energy from, the first subset, the second energy being in a second frequency band that is higher than the first frequency band.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0098894 A1**

HAVIV et al. (43) **Pub. Date: Apr. 1, 2021**

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

(71) Applicant: **QUALCOMM Incorporated**, San Diego, CA (US)

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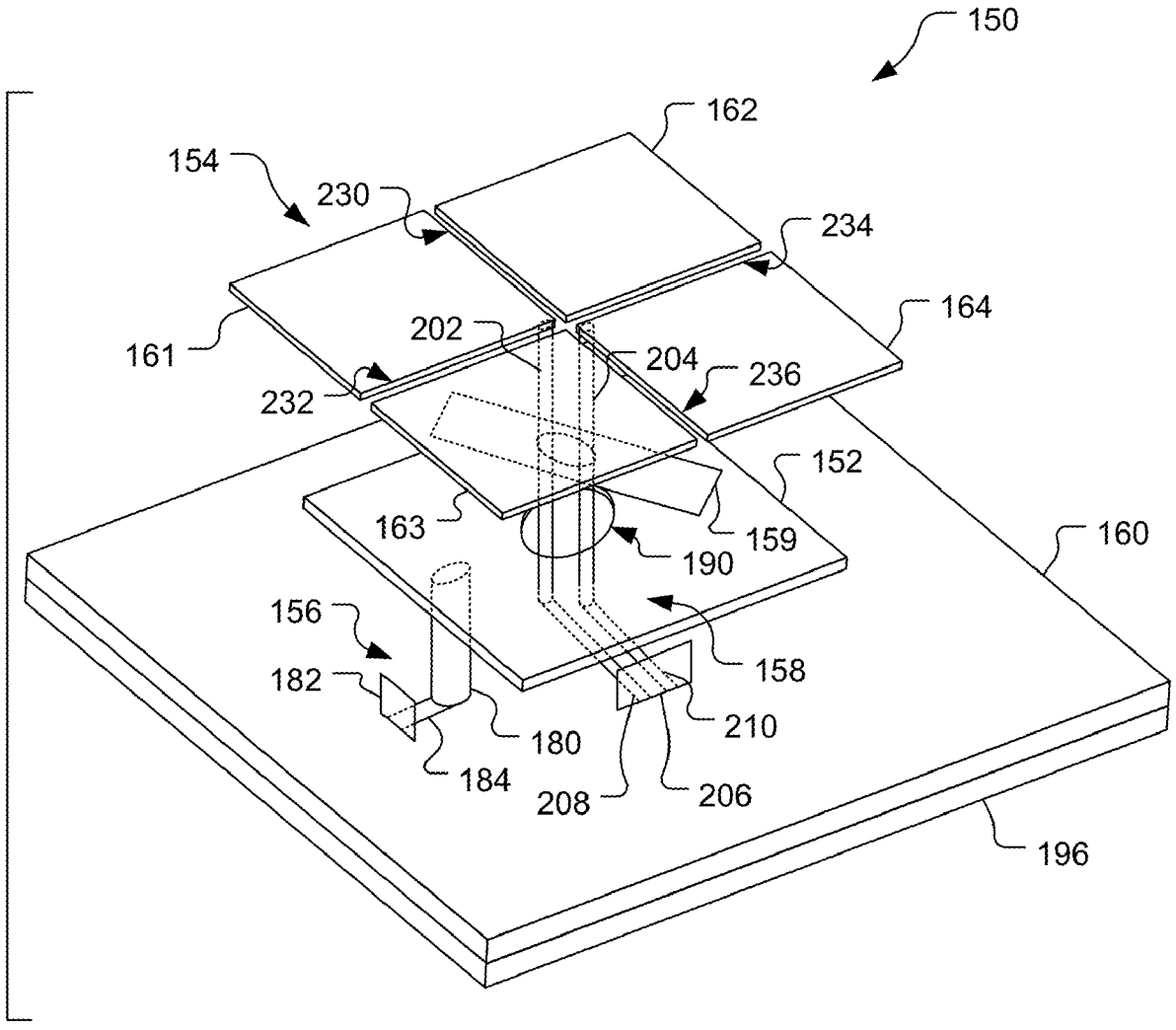
(57) **ABSTRACT**

An antenna system includes: a first patch antenna element that is electrically conductive; a first energy coupler configured to convey first energy to or from the first patch antenna element; a second patch antenna element at least partially overlapping the first patch antenna element, the second patch antenna element defining a first slot through the second patch antenna element; and a second energy coupler configured to convey second energy to, or receive the second energy from, the first slot or a first dipole at least partially overlapping the first slot.



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Rogers (43) Pub. Date: Apr. 8, 2021

(54) **WAVEGUIDE TO PLANAR SURFACE INTEGRATED WAVEGUIDE AND PLANAR STRIPLINE TRANSITIONS**

(71) Applicant: **The Boeing Company**, Chicago, IL (US)

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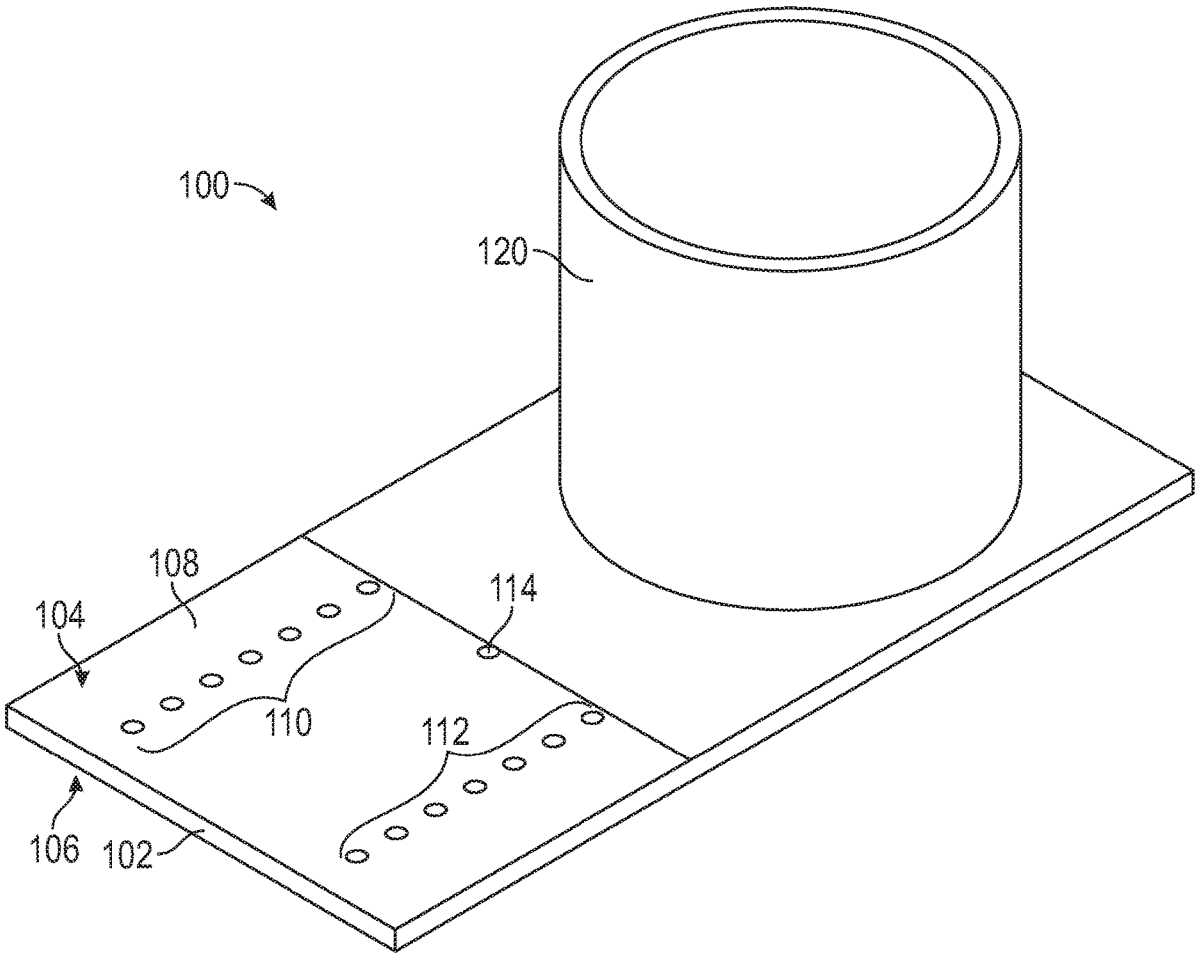
(57) **ABSTRACT**

An apparatus may include a substrate assembly having a first side and a second side. The apparatus may further include a waveguide antenna element positioned on the first side of the substrate assembly. The apparatus may also include a microstrip line positioned within the substrate assembly, where the waveguide antenna element overlaps the microstrip line. The apparatus may include a first conductive plane positioned on the first side of the substrate assembly. The apparatus may further include a second conductive plane positioned on the second side of the substrate assembly. The first conductive plane and the second conductive plane may define at least a portion of a planar surface integrated waveguide or a planar stripline.



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Huang et al.

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

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

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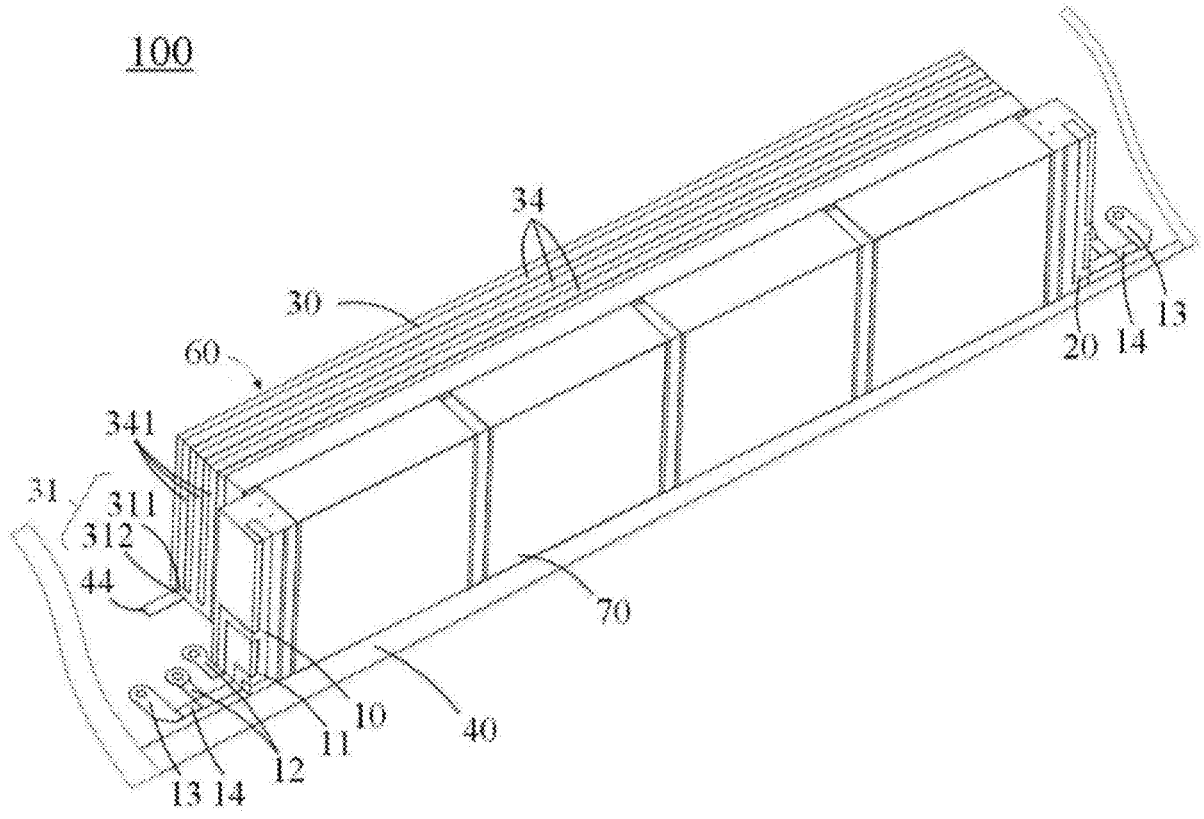
(57) **ABSTRACT**

The present disclosure discloses an antenna structure and an electronic device having the same. The antenna structure comprises a first antenna, a second antenna and a three-dimensional decoupling structure located on at least two planes, wherein the three-dimensional decoupling structure comprises a conductor, and at least part of the three-dimensional decoupling structure is located in a space between the first antenna and the second antenna. Compared with the prior art, the antenna structure and the electronic device having the same disclosed by the present disclosure can effectively achieve the antenna decoupling effect through the three-dimensional decoupling structure, so that the degradation degree of antenna performance due to coupling can be reduced, and meanwhile, the three-dimensional space of the system can be better utilized.



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LIN et al. (43) **Pub. Date: Apr. 8, 2021**

(54) **LOOP ANTENNA**

(71) Applicant: **MERRY ELECTRONICS (SHENZHEN) CO., LTD.**, GUANGDONG (CN)

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(30) **Foreign Application Priority Data**

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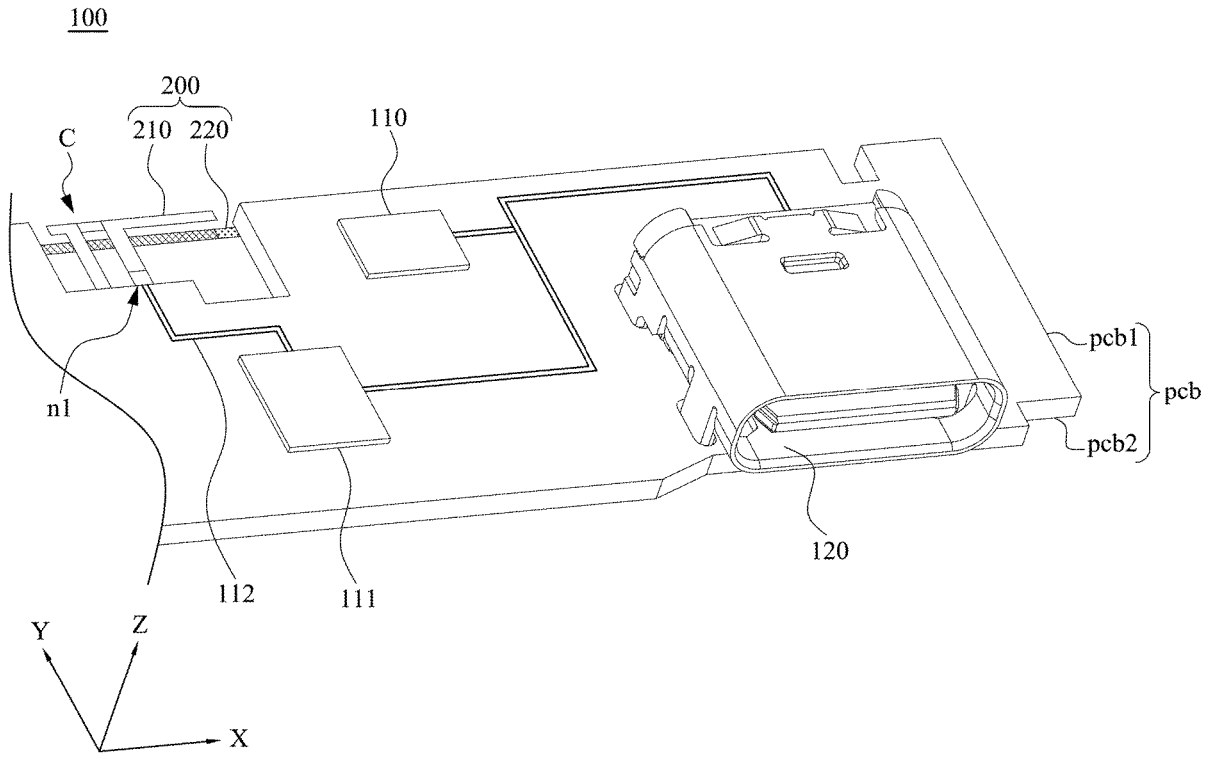
(57) **ABSTRACT**

A loop antenna includes a printed circuit board (PCB), a first antenna structure and a second antenna structure. The PCB includes a first surface and a second surface relative to the first surface, and the PCB includes a clear region and a ground region, wherein the clear region is adjacent to the ground region. The first antenna structure is disposed in the clear region at the first surface. The first antenna structure includes a feed structure and a first ground end. The feed structure is coupled to a power feed end which is disposed in the ground region. The first ground end is coupled to the ground region. The second antenna structure is disposed relative to the first antenna structure at the second surface. The second antenna structure includes a second ground end. The second ground end is coupled to the ground region.



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(19) **United States**

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ZHONG et al. (43) **Pub. Date: Apr. 15, 2021**

(54) **ELECTRONIC DEVICE**

(71) Applicant: **Molex, LLC**, Lisle, IL (US)

(72) Inventors: **Guang-Yong ZHONG**, Shanghai (CN); **Soon-Kuan TAN**, Jurong Town (SG)

(73) Assignee: **Molex, LLC**, Lisle, IL (US)

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(57) **ABSTRACT**

The present disclosure provides an electronic device. The electronic device comprises a metal case, a slot antenna, a first dielectric material and a second dielectric material. The slot antenna is provided in the metal case and generates a signal. A dielectric constant of the second dielectric material is greater than a dielectric constant of the first dielectric material. The slot antenna comprises an electrical conductive member. The electrical conductive member is configured to define a slot which is closed at two ends thereof, the first dielectric material and the second dielectric material is provided in the slot, wherein the slot has a length, the length and the first dielectric material together determine that a high frequency band of the signal conforms to a high frequency band of a WIFI protocol, and the length and the first dielectric material together determine that a low frequency band of the signal is greater than a low frequency band of the WIFI protocol. The second dielectric material lowers the low frequency band of the signal to be within the low frequency band of the WIFI protocol. Because the second dielectric material is used, even if the slot antenna is positioned in the metal case, the slot antenna is still capable of generating a WIFI signal having two frequency bands.