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(19) **United States**

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

(10) **Pub. No.: US 2024/0128645 A1**

(43) **Pub. Date: Apr. 18, 2024**

(54) **ANTENNA DEVICE**

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

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

CPC **H01Q 5/335** (2015.01); **H01Q 1/50**
(2013.01)

(72) Inventors: **Chin-Ting Huang**, Taipei City (TW);
Hsi-Kai Hung, Taipei City (TW); **Sony**
Chayadi, Taipei City (TW)

(57) **ABSTRACT**

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

An antenna device includes a body and at least one external antenna. The body includes a processor and a sensor electrically connected to the processor. The processor is configured to receive a sensing signal from the sensor. The external antenna is externally connected to the body at an adjustable angle, and includes a first antenna, a second antenna, and a switch. The switch is electrically connected to the processor, and is switchably electrically connected to the first antenna and the second antenna. When the sensor senses that the external antenna is at a first angle or a second angle relative to the body, the processor switches the switch electrically connected to the first antenna or the second antenna according to the sensing signal, so that the external antenna has a first radiation pattern or a second radiation pattern.

(21) Appl. No.: **18/462,047**

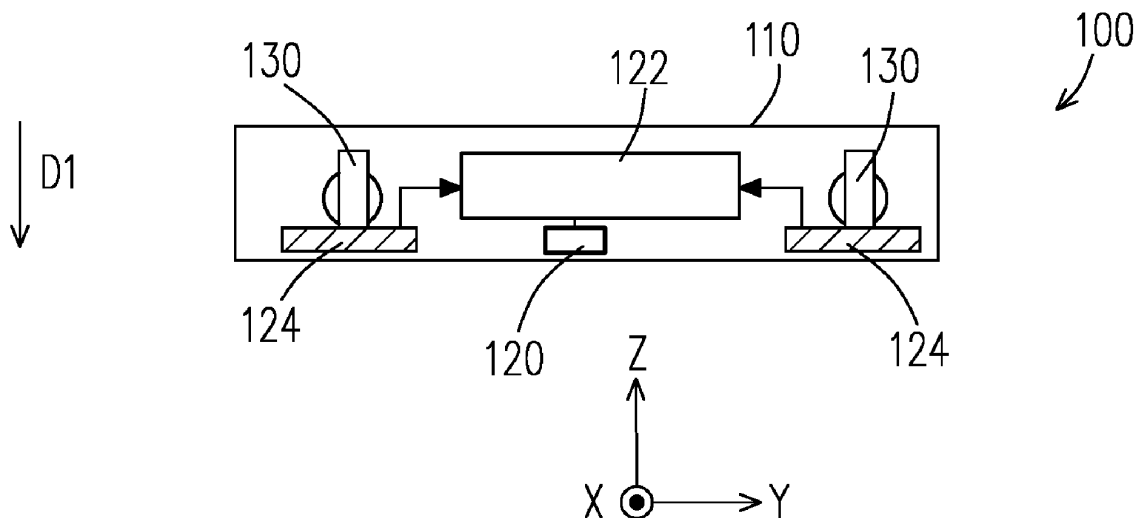
(22) Filed: **Sep. 6, 2023**

(30) **Foreign Application Priority Data**

Oct. 18, 2022 (TW) 111139504

Publication Classification

(51) **Int. Cl.**
H01Q 5/335 (2006.01)
H01Q 1/50 (2006.01)





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(19) **United States**

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

(10) **Pub. No.: US 2024/0128646 A1**

(43) **Pub. Date: Apr. 18, 2024**

(54) **LOW-SAR ANTENNA AND ELECTRONIC
DEVICE**

(52) **U.S. Cl.**
CPC **H01Q 9/0421** (2013.01); **H01Q 1/243**
(2013.01); **H01Q 1/48** (2013.01)

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

(72) Inventors: **Yiwu Hu**, Shenzhen (CN); **Aofang
Zhang**, Shenzhen (CN); **Kunpeng Wei**,
Shenzhen (CN)

(57) **ABSTRACT**

(21) Appl. No.: **17/908,153**

(22) PCT Filed: **Mar. 30, 2022**

(86) PCT No.: **PCT/CN2022/084112**

§ 371 (c)(1),

(2) Date: **Aug. 30, 2022**

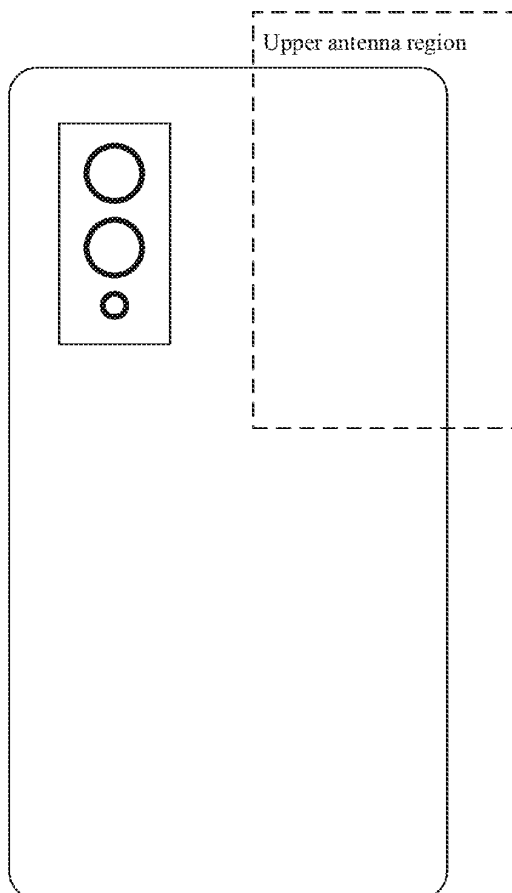
(30) **Foreign Application Priority Data**

Jun. 25, 2021 (CN) 202110711505.9

Publication Classification

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

Embodiments of this application provide a low-SAR antenna and an electronic device, which relates to the field of electronic devices and can provide good radiation performance at middle/high frequencies and have a low SAR value. The specific solution is as follows. A first radiation structure includes a first radiator, and a second radiation structure includes a second radiator. A first end of the first radiator and a first end of the second radiator form a first gap. A second end of the first radiator is free, and a second end of the second radiator is grounded. A feed point of the antenna is coupled to the first radiator, and the first radiator is divided into a first portion and a second portion that are delimited by the feed point. In a case that the antenna is in operation, the first portion of the first radiator and the second radiator work together in a first frequency band and a second frequency band, and a frequency of the first frequency band is less than a frequency of the second frequency band.



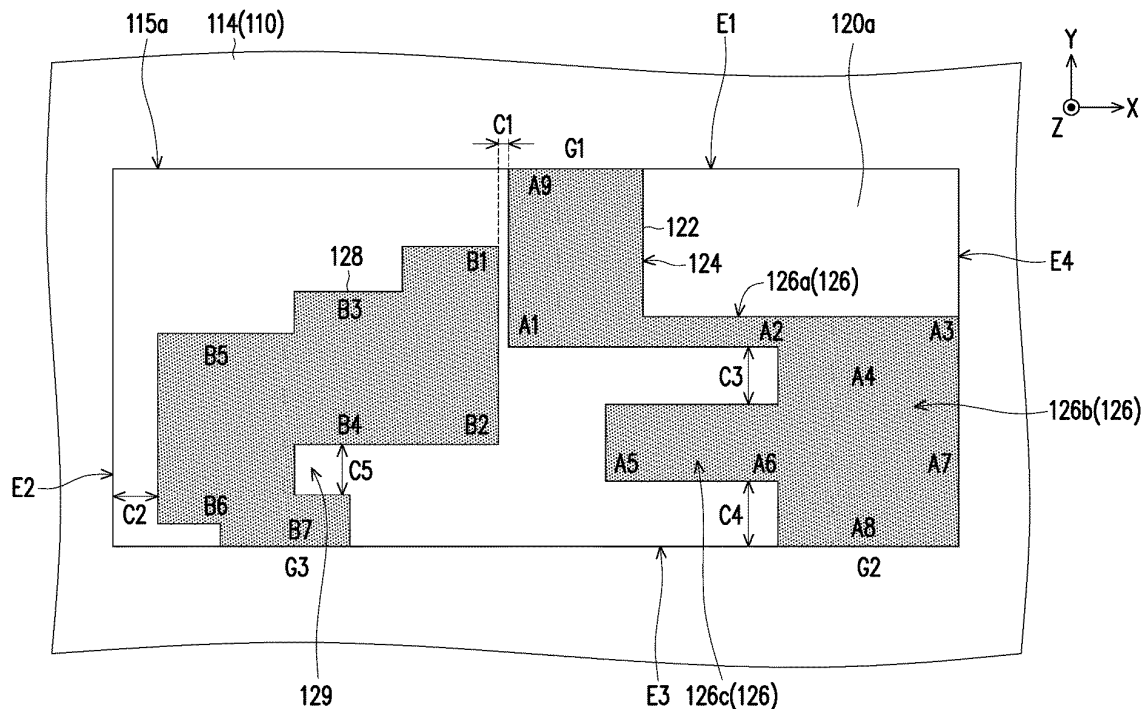


US 20240145898A1

(19) **United States**(12) **Patent Application Publication**
Wu et al.(10) **Pub. No.: US 2024/0145898 A1**(43) **Pub. Date: May 2, 2024**(54) **ELECTRONIC DEVICE****Publication Classification**(71) Applicant: **PEGATRON CORPORATION**, Taipei
City (TW)(51) **Int. Cl.**
H01Q 1/22 (2006.01)
H01Q 1/48 (2006.01)
H01Q 5/40 (2006.01)(72) Inventors: **Chien-Yi Wu**, Taipei City (TW);
Chao-Hsu Wu, Taipei City (TW);
Sheng-Chin Hsu, Taipei City (TW);
Chih-Wei Liao, Taipei City (TW); **Hau**
Yuen Tan, Taipei City (TW);
Cheng-Hsiung Wu, Taipei City (TW);
Shih-Keng Huang, Taipei City (TW)(52) **U.S. Cl.**
CPC **H01Q 1/22** (2013.01); **H01Q 1/48**
(2013.01); **H01Q 5/40** (2015.01)(73) Assignee: **PEGATRON CORPORATION**, Taipei
City (TW)(57) **ABSTRACT**(21) Appl. No.: **18/464,184**(22) Filed: **Sep. 8, 2023**(30) **Foreign Application Priority Data**

Oct. 26, 2022 (TW) 111140661

An electronic device including a metal casing and at least one antenna module is provided. The metal casing includes at least one window. The at least one antenna module is disposed in the at least one window. The at least one antenna module includes a first radiator and a second radiator. The first radiator includes a feeding end, a first ground end joined to the metal casing, a second ground end, a first portion extending from the feeding end to the first ground end, and a second portion extending from the feeding end to the second ground end. A first coupling gap is between the second radiator and the first portion. A second coupling gap is between at least part of the second radiator and the metal casing, and the second radiator includes a third ground end joined to the metal casing.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0145902 A1**

(43) **Pub. Date: May 2, 2024**

(54) **WI-FI AND BLUETOOTH COMBINED
ANTENNA APPARATUS AND
CONFIGURATION METHOD THEREFOR,
AND TERMINAL DEVICE**

Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 1/36 (2006.01)
H01Q 1/48 (2006.01)
H01Q 21/28 (2006.01)
(52) **U.S. Cl.**
CPC *H01Q 1/243* (2013.01); *H01Q 1/36*
(2013.01); *H01Q 1/48* (2013.01); *H01Q 21/28*
(2013.01)

(71) Applicant: **HONOR DEVICE CO., LTD.,**
Shenzhen (CN)

(72) Inventors: **Qiao GUAN**, Shenzhen (CN); **Yi**
WANG, Shenzhen (CN); **Kunpeng**
WEI, Shenzhen (CN)

(21) Appl. No.: **18/279,301**

(22) PCT Filed: **Aug. 23, 2022**

(86) PCT No.: **PCT/CN2022/114297**

§ 371 (c)(1),

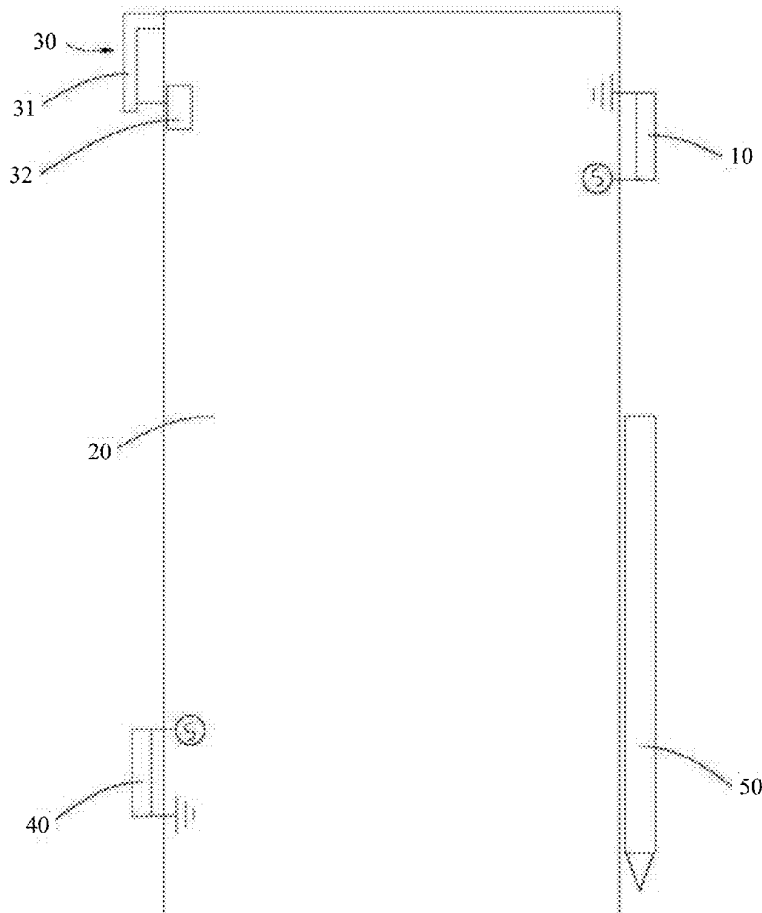
(2) Date: **Aug. 29, 2023**

(30) **Foreign Application Priority Data**

Sep. 17, 2021 (CN) 202111091425.4

(57) **ABSTRACT**

A Wi-Fi and Bluetooth combined antenna apparatus and a configuration method therefor, and a terminal device. The Wi-Fi and Bluetooth combined antenna apparatus includes a Wi-Fi antenna, a ground plate, a perturbation unit, and a Bluetooth antenna. The Wi-Fi antenna generates a ground plate current on the ground plate; the perturbation unit is configured to generate a reverse current after being excited by the ground plate current, and a current zero point area is formed on the ground plate after the reverse current is superimposed with the ground plate current; and the Bluetooth antenna is disposed at a position of an edge of the ground plate corresponding to the current zero point area. In this way, isolation between the Bluetooth antenna and the Wi-Fi antenna is better improved.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0145910 A1**

(43) **Pub. Date: May 2, 2024**

(54) **ANTENNA COMBINATION SYSTEM AND
TERMINAL DEVICE**

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

(72) Inventors: **Aofang Zhang**, Shenzhen (CN);
Shaojie Chu, Shenzhen (CN); **Lei Li**,
Shenzhen (CN); **Kunpeng Wei**,
Shenzhen (CN)

H01Q 1/48 (2006.01)

H04B 1/00 (2006.01)

H04B 1/3827 (2015.01)

H04B 7/0404 (2017.01)

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

CPC **H01Q 1/523** (2013.01); **H01Q 1/243**
(2013.01); **H01Q 1/48** (2013.01); **H04B**
1/0064 (2013.01); **H04B 1/3838** (2013.01);
H04B 7/0404 (2013.01)

(21) Appl. No.: **18/547,455**

(22) PCT Filed: **May 6, 2022**

(86) PCT No.: **PCT/CN2022/091177**

§ 371 (c)(1),

(2) Date: **Aug. 22, 2023**

(30) **Foreign Application Priority Data**

Aug. 9, 2021 (CN) 202110909423.5

Publication Classification

(51) **Int. Cl.**

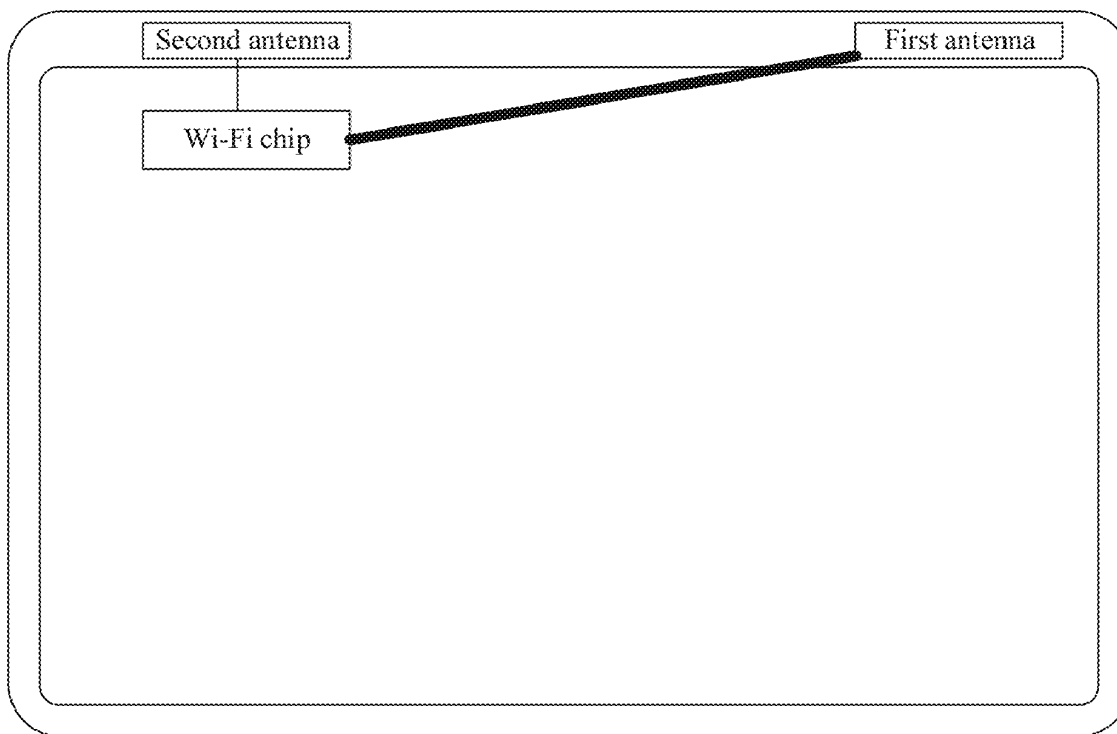
H01Q 1/52 (2006.01)

H01Q 1/24 (2006.01)

(57)

ABSTRACT

An antenna combination system and a terminal device. The antenna combination system includes a first antenna and a second antenna having a distance less than a first preset threshold. The first antenna includes a first radiation branch and a first feed point, a feed point of the second antenna is arranged on a side away from the first feed point, and a side of the first radiation branch away from the first feed point is grounded. The first feed point is arranged on a side close to the second antenna, and the length of the first radiation branch is an odd multiple of $(\frac{1}{2})\lambda$. In a case that the second antenna transmits a signal in a first frequency band, a first signal and a second signal that cancel each other are coupled from the second antenna to the first antenna.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0145918 A1**

(43) **Pub. Date: May 2, 2024**

(54) **ANTENNA STRUCTURE**

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

(72) Inventors: **De-Shao YAO**, Hsinchu (TW);
Chih-Feng TAI, Hsinchu (TW);
Kuan-Hsun LAI, Hsinchu (TW)

(21) Appl. No.: **18/480,648**

(22) Filed: **Oct. 4, 2023**

(30) **Foreign Application Priority Data**

Oct. 26, 2022 (TW) 111140540

Publication Classification

(51) **Int. Cl.**
H01Q 5/378 (2006.01)
H01Q 1/48 (2006.01)
H01Q 9/04 (2006.01)

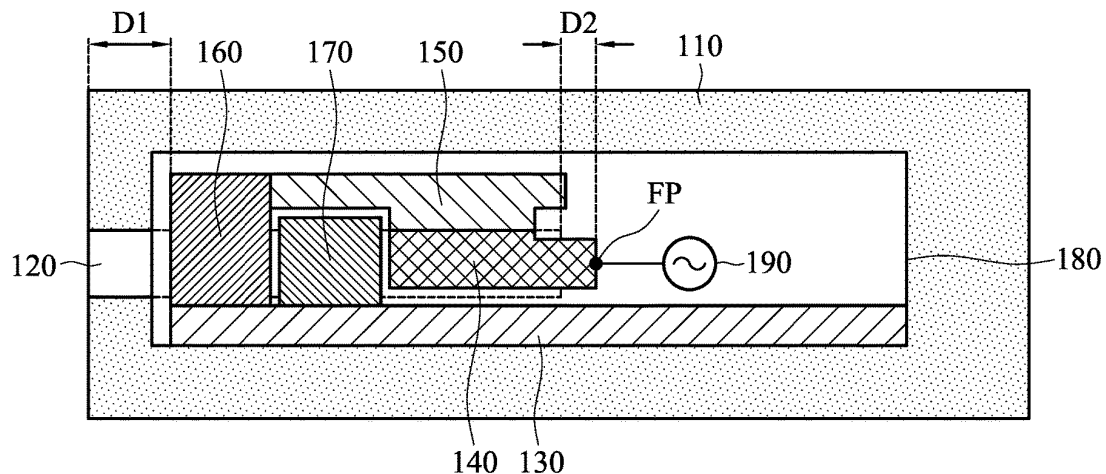
(52) **U.S. Cl.**

CPC **H01Q 5/378** (2015.01); **H01Q 1/48**
(2013.01); **H01Q 9/0421** (2013.01)

(57) **ABSTRACT**

An antenna structure includes a metal mechanism element, a ground element, a feeding radiation element, a connection radiation element, a shorting radiation element, a parasitic radiation element, and a dielectric substrate. The metal mechanism element has a slot. The feeding radiation element has a feeding point. The connection radiation element is coupled to the feeding radiation element. The connection radiation element is further coupled through the shorting radiation element to the ground element. The parasitic radiation element is coupled to the ground element. The parasitic radiation element is disposed between the feeding radiation element and the shorting radiation element. The dielectric substrate is adjacent to the slot of the metal mechanism element. The feeding radiation element, the connection radiation element, the shorting radiation element, and the parasitic radiation element are all disposed on the dielectric substrate.

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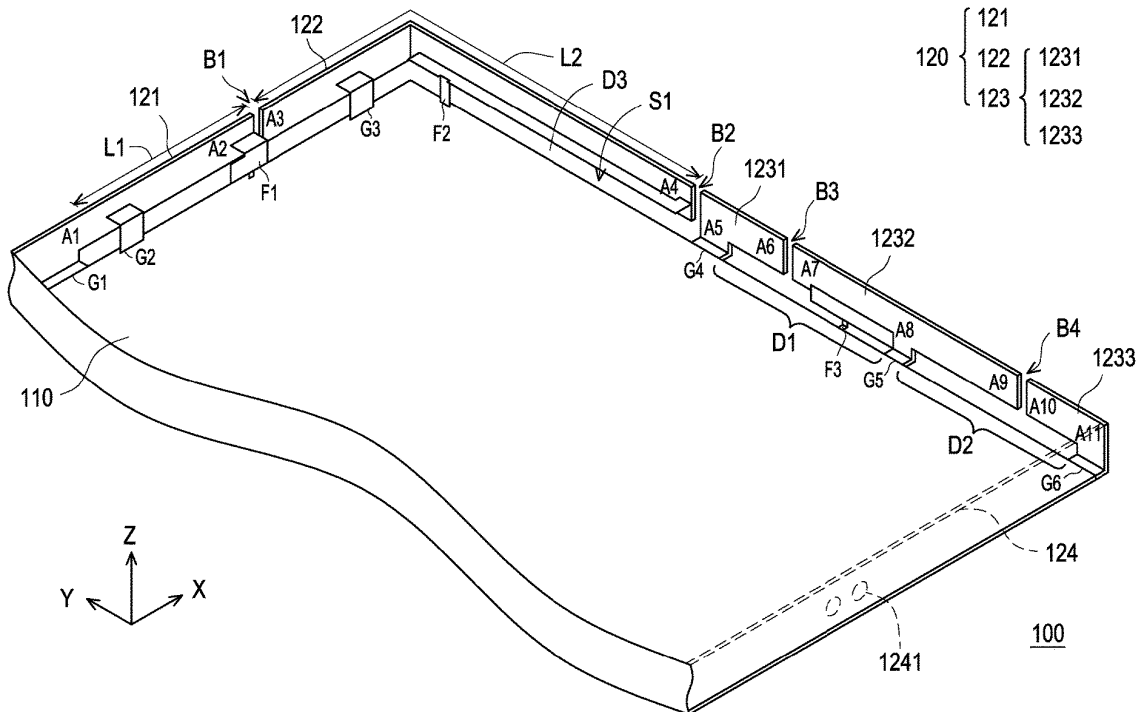
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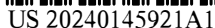
(19) **United States**(12) **Patent Application Publication**
Wu et al.(10) **Pub. No.: US 2024/0145919 A1**(43) **Pub. Date: May 2, 2024**(54) **ANTENNA MODULE AND ELECTRONIC
DEVICE**(71) Applicant: **PEGATRON CORPORATION,**
TAIPEI CITY (TW)(72) Inventors: **Chien-Yi Wu**, Taipei City (TW);
Shih-Keng Huang, Taipei City (TW);
Chao-Hsu Wu, Taipei City (TW);
Chih-Wei Liao, Taipei City (TW);
Sheng-Chin Hsu, Taipei City (TW);
Hao-Hsiang Yang, Taipei City (TW);
Tse-Hsuan Wang, Taipei (TW)(73) Assignee: **PEGATRON CORPORATION,**
TAIPEI CITY (TW)(21) Appl. No.: **18/462,099**(22) Filed: **Sep. 6, 2023**(30) **Foreign Application Priority Data**

Nov. 2, 2022 (TW) 111141799

Publication Classification(51) **Int. Cl.**
H01Q 5/40 (2006.01)
H01Q 1/02 (2006.01)
H01Q 1/22 (2006.01)
H01Q 1/48 (2006.01)
H01Q 9/04 (2006.01)
(52) **U.S. Cl.**
CPC **H01Q 5/40** (2015.01); **H01Q 1/02**
(2013.01); **H01Q 1/2266** (2013.01); **H01Q**
1/48 (2013.01); **H01Q 9/0407** (2013.01)(57) **ABSTRACT**

An antenna module includes a first metal plate and a frame body. The frame body surrounds the first metal plate. The frame body includes a first antenna radiator, a second antenna radiator, a third antenna radiator, a first breakpoint and a second breakpoint. The first antenna radiator includes a first feeding end and excites a first frequency band. The second antenna radiator includes a second feeding end and excites a second frequency band. The third antenna radiator includes a third feeding end and excites a third frequency band. The first breakpoint is located between the first antenna radiator and the second antenna radiator. The second breakpoint is located between the second antenna radiator and the third antenna radiator. An electronic device including the above-mentioned antenna module is also provided.





(12) **Patent Application Publication**
Kim

(43) **Pub. Date:** **May 2, 2024**

CPC *H01Q 9/0407* (2013.01); *H01Q 1/2283*
(2013.01)

(72) Inventor: **Young Shin Kim**, Cincinnati, OH (US)

(57) **ABSTRACT**

(22) Filed: **Oct. 10, 2023**

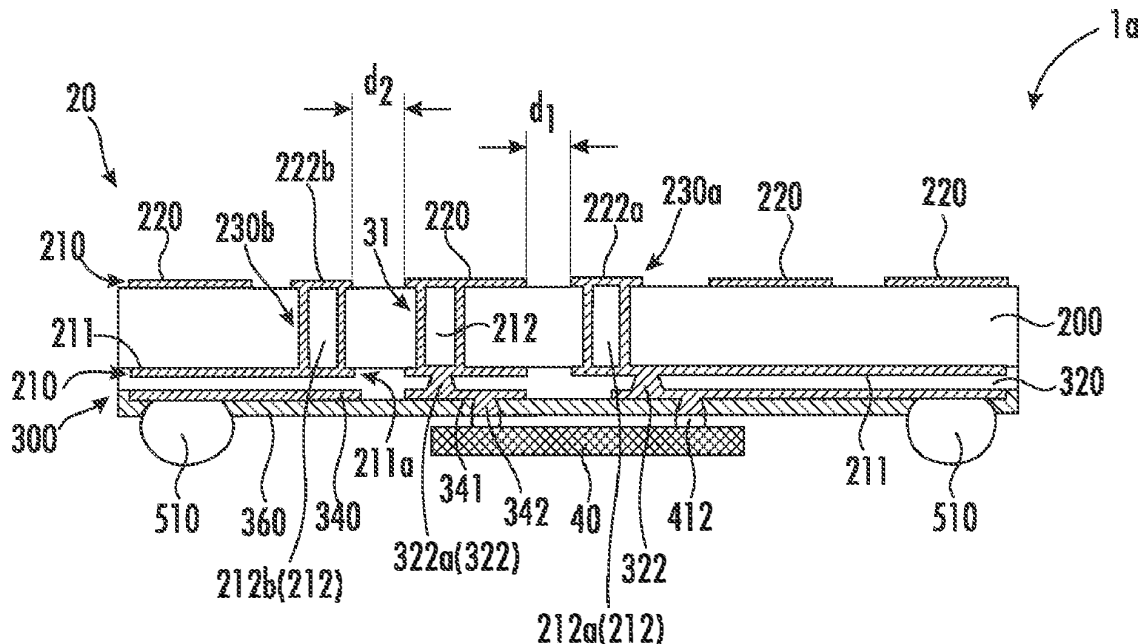
Related U.S. Application Data

(60) Provisional application No. 63/415,788, filed on Oct. 13, 2022.

Publication Classification

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

constant of about 4 more as determined at a frequency of 17 GHz.





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(19) **United States**(12) **Patent Application Publication**
CARATELLI et al.(10) **Pub. No.: US 2024/0145925 A1**(43) **Pub. Date: May 2, 2024**

(54) **ANTENNA MODULE WHICH IS MOUNTABLE ON A SURFACE OF A PRINTED CIRCUIT BOARD, SET OF TWO ANTENNA MODULES COMPRISING THE ANTENNA MODULE AND AN AUXILIARY ANTENNA MODULE, PRINTED CIRCUIT BOARD ON WHICH THE ANTENNA MODULE IS MOUNTED**

(71) Applicant: **THE ANTENNA COMPANY INTERNATIONAL N.V.**, Willemstad (CW)

(72) Inventors: **Diego CARATELLI**, Eersel (NL);
Sung Bin MUN, Eindhoven (NL);
Javier Armando ARRINCON RODRIGUEZ, Eindhoven (NL)

(21) Appl. No.: **18/495,319**

(22) Filed: **Oct. 26, 2023**

(30) **Foreign Application Priority Data**

Oct. 27, 2022 (NL) 2033403

Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/22 (2006.01)

(52) **U.S. Cl.**
CPC **H01Q 9/045** (2013.01); **H01Q 1/22** (2013.01)

(57) **ABSTRACT**

Antenna module which is mountable on a surface of a printed circuit board which contains an electrically conductive layer that constitutes a ground plane for the antenna module,

wherein the antenna module is embodied as a planar body having a top surface and a bottom surface, wherein the bottom surface is configured to be mounted on the printed circuit board and the top surface is facing away from the bottom surface, wherein the planar body is a layered structure comprising:

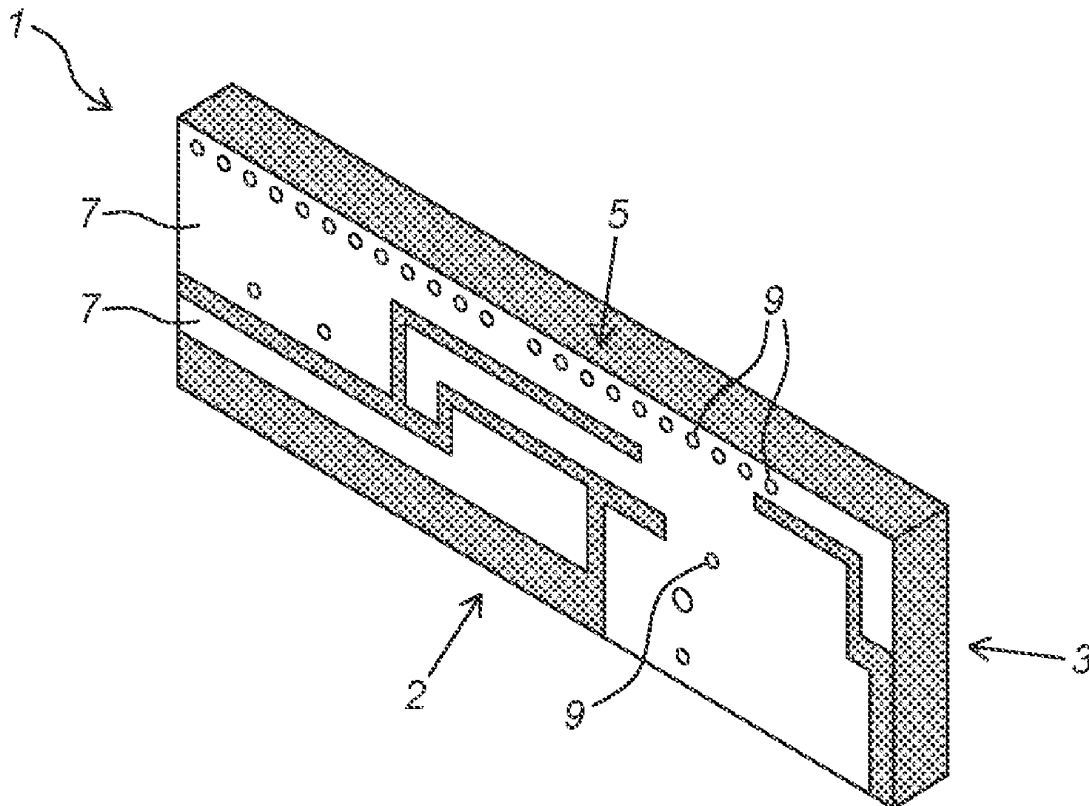
a central planar layer of dielectric material;

a first circuitry of electrically conductive material on a bottom side of the central planar layer;

a second circuitry of electrically conductive material on a top side of the central planar layer;

a multitude of vias of electrically conductive material that extend through the central planar layer from the bottom side to the top side thereof;

wherein the antenna module is an electrically active component and the first circuitry includes a feeding strip of electrically conductive material that is connected to at least some of the vias.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0145939 A1**

(43) **Pub. Date: May 2, 2024**

(54) **DUAL POLARIZATION ANTENNA AND
DUAL POLARIZATION ANTENNA
ASSEMBLY COMPRISING SAME**

(71) Applicant: **KMW INC.**, Hwaseong-si (KR)

(72) Inventors: **Sung Hwan SO**, Hwaseong-si (KR);
Oh Seog CHOI, Hwaseong-si (KR);
Seong Man KANG, Hwaseong-si
(KR); **Yong Won SEO**, Hwaseong-si
(KR); **Myung Hwa KIM**, Hwaseong-si
(KR); **Su Yong LEE**, Seoul (KR)

(73) Assignee: **KMW INC.**, Hwaseong-si (KR)

(21) Appl. No.: **18/540,910**

(22) Filed: **Dec. 15, 2023**

Related U.S. Application Data

(63) Continuation of application No. PCT/KR2022/
008201, filed on Jun. 10, 2022.

Foreign Application Priority Data

Jun. 16, 2021 (KR) 10-2021-0078330

Publication Classification

(51) **Int. Cl.**

H01Q 21/24 (2006.01)

H01Q 21/00 (2006.01)

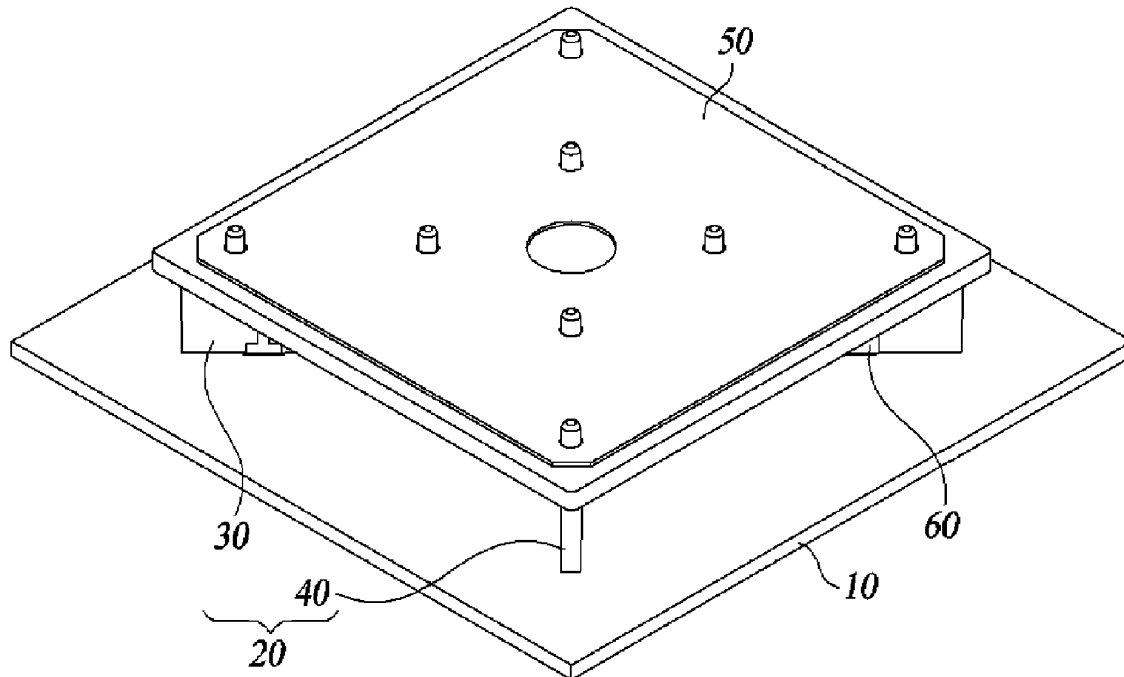
(52) **U.S. Cl.**

CPC **H01Q 21/24** (2013.01); **H01Q 21/0087**
(2013.01); **H01Q 1/42** (2013.01)

(57)

ABSTRACT

A dual polarization antenna is disclosed in at least one embodiment of the present disclosure, including a base substrate, a power feeding unit supported on the base substrate, and a radiating plate supported on the power feeding unit, the power feeding unit includes a first feeding substrate and a second feeding substrate arranged to cross each other on the base substrate, the first feeding substrate includes a first feed line configured to supply a first reference phase signal to a first point on the radiating plate and to supply a first reverse phase signal having a reverse phase relative to the first reference phase signal, to a second point on the radiating plate, the second feeding substrate includes a second feed line configured to supply a second reference phase signal to a third point on the radiating plate and to supply a second reverse phase signal having a reverse phase relative to the second reference phase signal, to a fourth point on the radiating plate, and wherein the first feeding substrate and the first feed line as well as the second feeding substrate and the second feed line are integrally molded by means of multi-component injection molding.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0154295 A1**

(43) **Pub. Date: May 9, 2024**

(54) **ANTENNA AND COMMUNICATION DEVICE**

Publication Classification

(71) Applicant: **HUAWEI TECHNOLOGIES CO., LTD.**, Shenzhen, Guangdong (CN)

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

(72) Inventors: **Xiaotao CAI**, Shenzhen (CN); **Dawei ZHOU**, Shenzhen (CN); **Hanyang WANG**, Reading (GB)

(52) **U.S. Cl.**
CPC **H01Q 1/243** (2013.01); **H01Q 9/0421** (2013.01); **H01Q 9/0442** (2013.01); **H01Q 9/045** (2013.01)

(21) Appl. No.: **18/550,574**

(22) PCT Filed: **Mar. 15, 2022**

(86) PCT No.: **PCT/CN2022/080969**

§ 371 (c)(1),

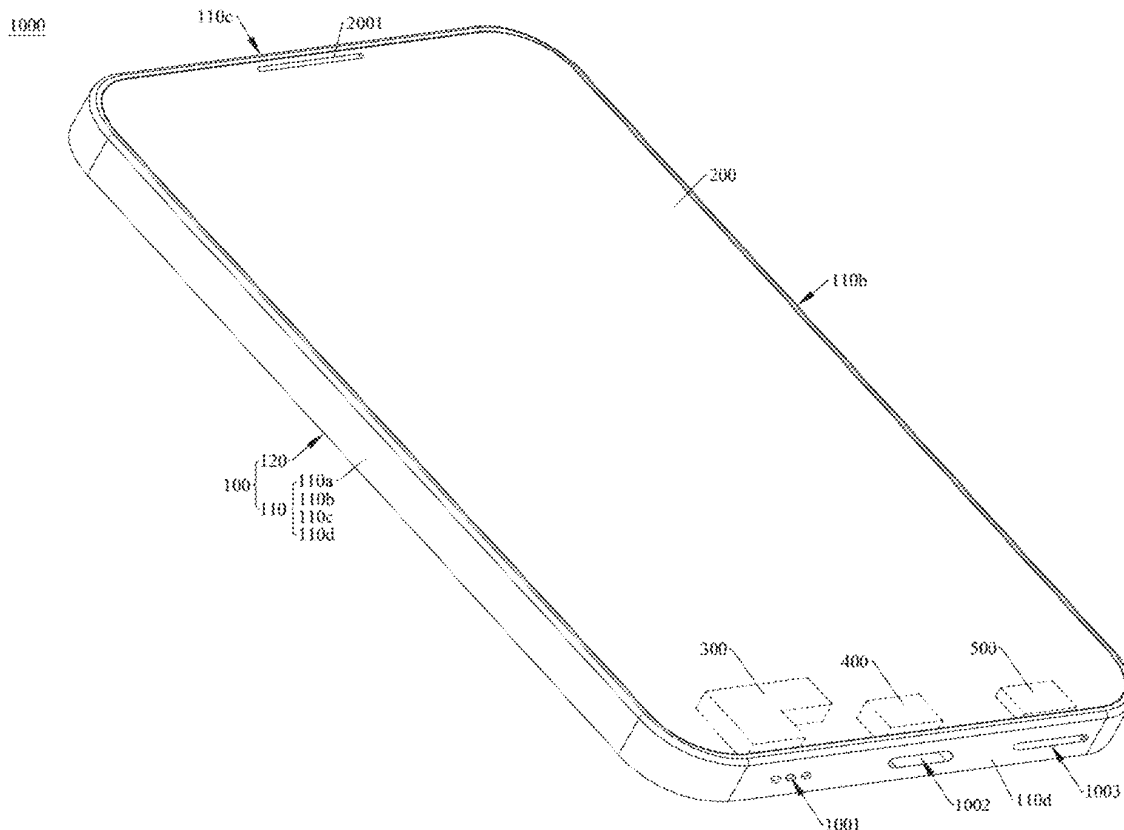
(2) Date: **Sep. 14, 2023**

(30) **Foreign Application Priority Data**

Mar. 16, 2021 (CN) 202110283470.3

(57) **ABSTRACT**

In an example, an antenna includes a first radiator, a second radiator, a first feed, a first feeder, and a second feeder. The first feed is configured to connect to a radio frequency front-end, is electrically connected to the first radiator through the first feeder, and is electrically connected to the second radiator through the second feeder. When the antenna is in a first operating mode, the first feed feeds a first radio frequency signal into the first radiator and the second radiator, the first radiator and the second radiator receive second radio frequency signals of a same frequency, and the first radiator and the second radiator are coupled to each other and are configured to generate a first resonance.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0154303 A1**

(43) **Pub. Date: May 9, 2024**

(54) **ANTENNA**

(71) Applicant: **Shanghai Tianma Microelectronics Co., Ltd.**, Shanghai (CN)

(72) Inventors: **Yifan XING**, Shanghai (CN); **Zhenyu JIA**, Shanghai (CN); **Xiaonan HAN**, Shanghai (CN); **Baiquan LIN**, Shanghai (CN); **Kerui XI**, Shanghai (CN); **Xiaojun CHEN**, Shanghai (CN); **Yingru HU**, Shanghai (CN); **Shengwei DAI**, Shanghai (CN)

(73) Assignee: **Shanghai Tianma Microelectronics Co., Ltd.**, Shanghai (CN)

(21) Appl. No.: **18/406,402**

(22) Filed: **Jan. 8, 2024**

(30) **Foreign Application Priority Data**

Apr. 17, 2023 (CN) 202310410534.0

Publication Classification

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

H01Q 1/50 (2006.01)

H01Q 3/36 (2006.01)

H01Q 21/00 (2006.01)

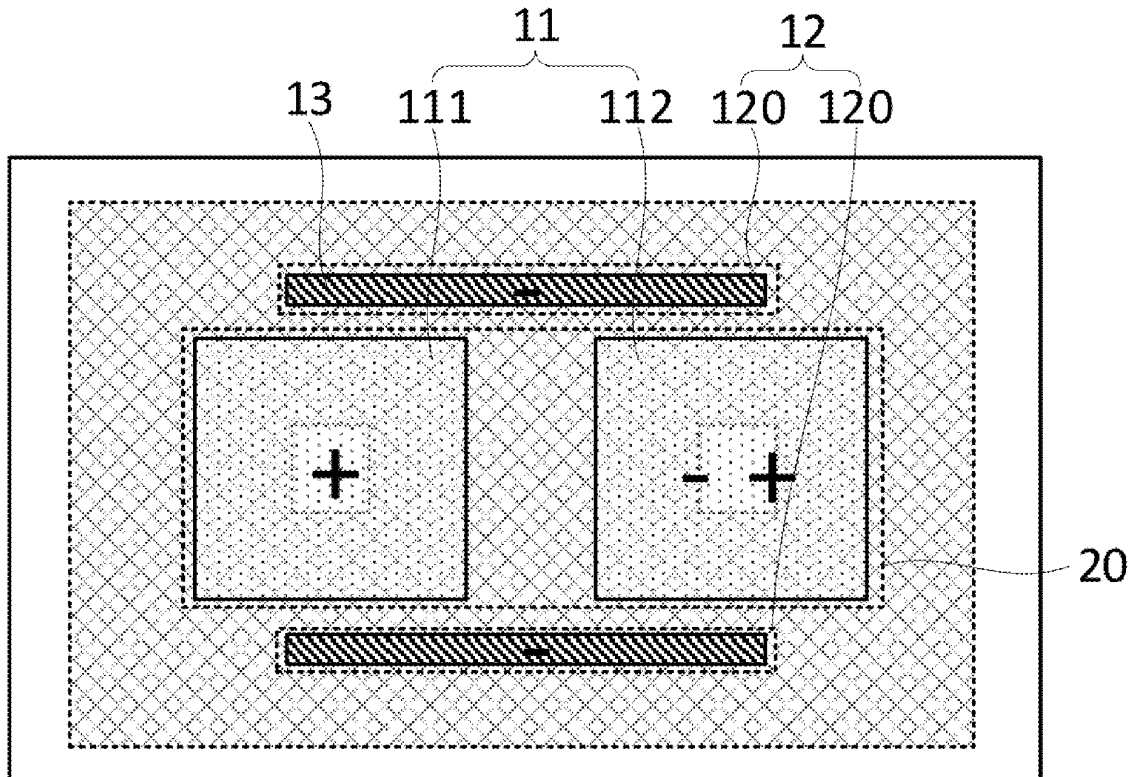
(52) **U.S. Cl.**

CPC **H01Q 1/523** (2013.01); **H01Q 1/48** (2013.01); **H01Q 1/50** (2013.01); **H01Q 3/36** (2013.01); **H01Q 21/0037** (2013.01); **H01Q 21/0075** (2013.01)

(57)

ABSTRACT

An antenna is provided in this application. The antenna includes multiple radiating units, at least two adjacent radiating units are correspondingly provided with a respective decoupling structure, the decoupling structure includes two microstrip line units, one microstrip line unit of the two microstrip line units includes at least one microstrip line, and the two microstrip line units are located on two opposite sides of two radiating units in a direction perpendicular to an arrangement direction of two adjacent radiating units. According to the antenna provided in the embodiments of the present disclosure, the decoupling structure composed of the microstrip line are disposed on two sides of the at least two adjacent radiating units, so that an indirect coupling field is formed by the decoupling structure, and the indirect coupling field counteracts a direct coupling field between adjacent radiating units.





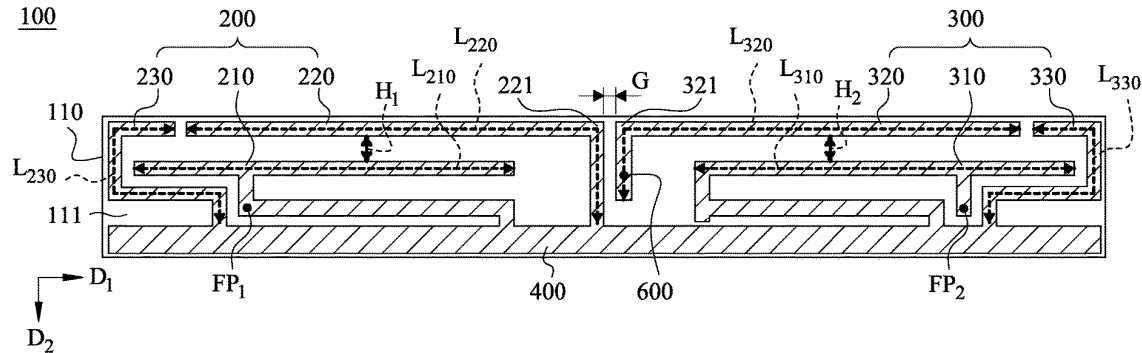
US 20240154309A1

(19) **United States**(12) **Patent Application Publication**
LIN et al.(10) **Pub. No.: US 2024/0154309 A1**(43) **Pub. Date: May 9, 2024**(54) **MULTI-BAND ANTENNA AND ELECTRONIC
DEVICE**(71) Applicant: **Wistron NeWeb Corporation**, Hsinchu
(TW)(72) Inventors: **Hung-Ying LIN**, Hsinchu (TW); **Wen
Tai TSENG**, Hsinchu (TW); **Kuo Jen
LAI**, Hsinchu (TW)(21) Appl. No.: **18/500,268**(22) Filed: **Nov. 2, 2023**(30) **Foreign Application Priority Data**

Nov. 4, 2022 (TW) 111142265

Publication Classification(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 5/28 (2006.01)(52) **U.S. Cl.**CPC **H01Q 9/0414** (2013.01); **H01Q 5/28**
(2015.01); **H01Q 1/2283** (2013.01)(57) **ABSTRACT**

A multi-band antenna includes a substrate with a first surface and a second surface, a first antenna structure with a first antenna coupling segment, a second antenna structure with a second antenna coupling segment, a first grounding section, a coupling section, a via hole, and a second grounding section. Both of the first antenna structure and the second antenna structure are disposed on the first surface. The first grounding section is connected to the first antenna coupling segment. The coupling section is disposed on the second surface and projected onto the first surface to form a coupling region. Both of the first antenna coupling segment and the second antenna coupling segment at least partially overlap the coupling region. The via hole penetrates through the substrate and is connected between the coupling section and the second antenna coupling segment. The second grounding section is connected to the coupling section.





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(19) **United States**

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

(10) **Pub. No.: US 2024/0154311 A1**

(43) **Pub. Date: May 9, 2024**

(54) **TERMINAL MONOPOLE ANTENNA BASED
ON COUPLED FEEDING**

Publication Classification

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

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

(72) Inventors: **Dawei Zhou**, Shenzhen (CN);
Yuanpeng Li, Shenzhen (CN)

(52) **U.S. Cl.**
CPC **H01Q 9/0421** (2013.01); **H01Q 1/243**
(2013.01); **H01Q 9/0442** (2013.01); **H01Q**
9/0457 (2013.01)

(21) Appl. No.: **18/550,035**

(57) **ABSTRACT**

(22) PCT Filed: **May 5, 2022**

(86) PCT No.: **PCT/CN2022/091007**

§ 371 (c)(1),

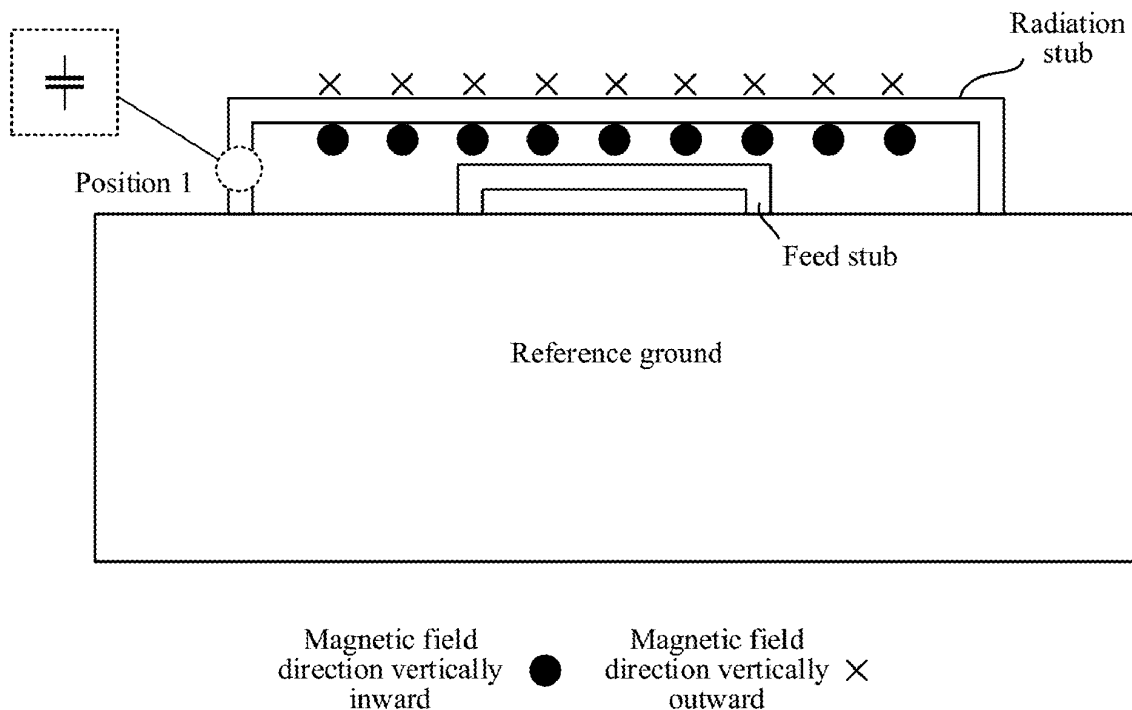
(2) Date: **Sep. 11, 2023**

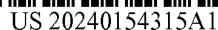
Embodiments of this application disclose a terminal monopole antenna based on coupled feeding, relate to the technical field of antennas. The antenna includes a feed stub and a radiation stub. The radiation stub includes at least one radiator. Ends on two sides of the radiator are coupled to a reference ground through a first capacitor and a second capacitor. The feed stub is not connected to the radiation stub. The feed stub is arranged between the radiation stub and the reference ground. A feed point is provided on the feed stub. The feed stub is used to perform coupled feeding on the radiation stub.

(30) **Foreign Application Priority Data**

Aug. 20, 2021 (CN) 202110961752.4

Current loop antenna based on coupled feeding





(12) **Patent Application Publication**
NEMOTO

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Publication Classification

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

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

(57) **ABSTRACT**

An antenna device includes a ground plane, a flat-plate-shaped first feed element, a flat-plate-shaped second feed element, a first feed line connected to the first feed element, and a second feed line connected to the second feed element. The ground plane, the first feed element, and the second feed element are stacked respective order and spaced apart from each other. At least part of the second feed line is disposed in a same conductor layer as the ground plane and is disposed at a position that overlaps the first feed element as the ground plane is viewed from a plan view.

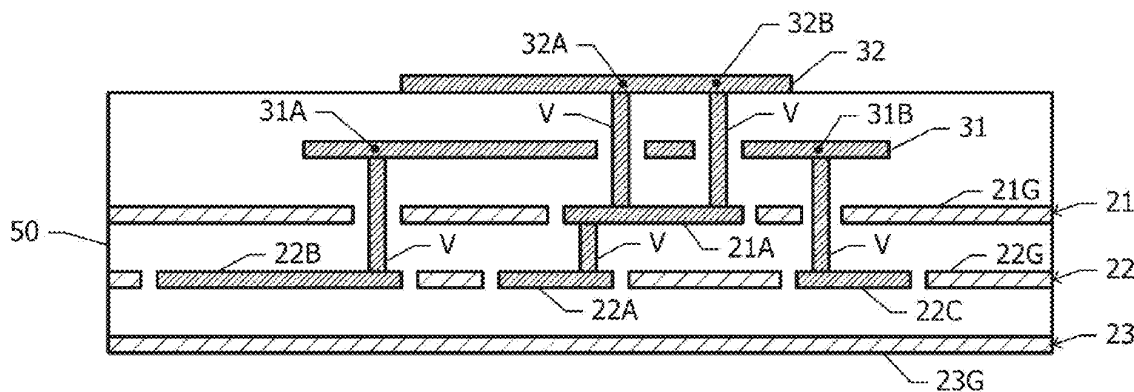
(22) Filed: **Jan. 5, 2024**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2022/024160, filed on Jun. 16, 2022.

(30) **Foreign Application Priority Data**

Jul. 6, 2021 (JP) 2021-112219





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(19) **United States**

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

(10) **Pub. No.: US 2024/0154631 A1**

(43) **Pub. Date: May 9, 2024**

(54) **ANTENNA BANDWIDTH ENHANCEMENT
FOR AN ELECTRONIC DEVICE**

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

(72) Inventors: **Simon Svendsen**, Aalborg (DK); **Ole Jagielski**, Viborg (DK)

(21) Appl. No.: **18/492,951**

(22) Filed: **Oct. 24, 2023**

Related U.S. Application Data

(63) Continuation of application No. 16/926,971, filed on Jul. 13, 2020, now Pat. No. 11,799,505, which is a continuation of application No. 15/719,781, filed on Sep. 29, 2017, now Pat. No. 10,715,187.

Publication Classification

(51) **Int. Cl.**
H04B 1/00 (2006.01)
H01Q 1/24 (2006.01)
H01Q 1/38 (2006.01)
H01Q 5/321 (2006.01)
H01Q 5/335 (2006.01)
H01Q 5/50 (2006.01)

H01Q 9/30 (2006.01)

H01Q 21/28 (2006.01)

H04B 1/3888 (2006.01)

H04B 1/401 (2006.01)

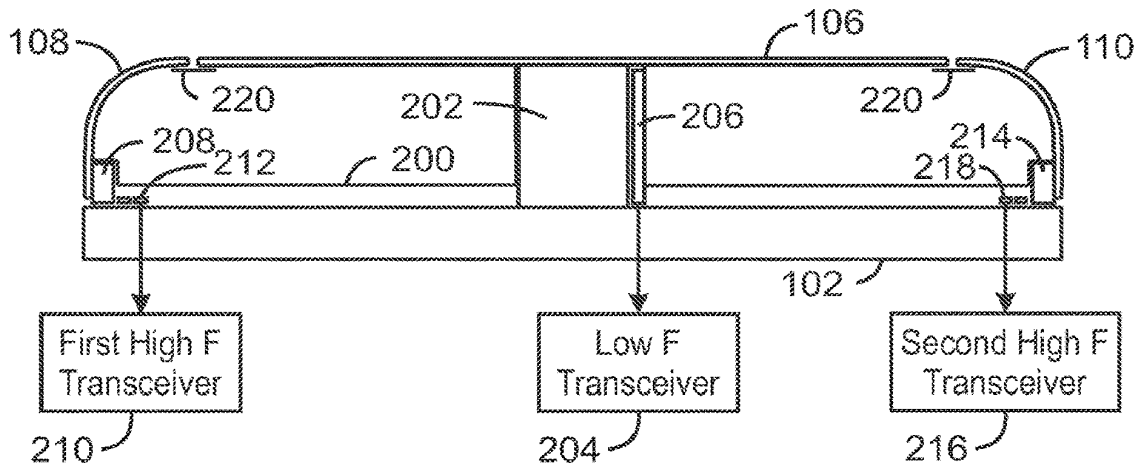
(52) **U.S. Cl.**

CPC **H04B 1/0064** (2013.01); **H01Q 1/243**
(2013.01); **H01Q 1/38** (2013.01); **H01Q 5/321**
(2015.01); **H01Q 5/335** (2015.01); **H01Q 5/50**
(2015.01); **H01Q 9/30** (2013.01); **H01Q 21/28**
(2013.01); **H04B 1/3888** (2013.01); **H04B**
1/401 (2013.01)

(57)

ABSTRACT

Techniques are disclosed for configuring a broadband antenna system. An example electronic device includes a first antenna operating at a first frequency range and coupled to a first transceiver via a first signal path comprising a first indirect feed. The electronic device also includes a second antenna operating at a second frequency range and coupled to a second transceiver via a second signal path comprising a second indirect feed, wherein the first frequency range is lower than the first frequency range. The electronic device also includes a third antenna operating at the second frequency range and coupled to a third transceiver via a second signal path comprising a third indirect feed. Additionally, the first antenna is coupled to the first antenna and the second antenna by a capacitive coupling element.





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(19) **United States**

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BATRA et al.

(10) **Pub. No.: US 2024/0162617 A1**

(43) **Pub. Date: May 16, 2024**

(54) **STACKED PATCH ANTENNA DEVICE**

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

(71) Applicant: **HUAWEI TECHNOLOGIES CO., LTD.**, Shenzhen (CN)

CPC **H01Q 9/0414** (2013.01); **H01Q 1/38** (2013.01); **H01Q 1/48** (2013.01)

(72) Inventors: **Rahul BATRA**, Munich (DE); **Simon TEJERO ALFAGEME**, Munich (DE); **Jordi BALCELLS VENTURA**, Munich (DE); **Sebastian ILSANKER**, Munich (DE)

(57) **ABSTRACT**

(21) Appl. No.: **18/513,237**

(22) Filed: **Nov. 17, 2023**

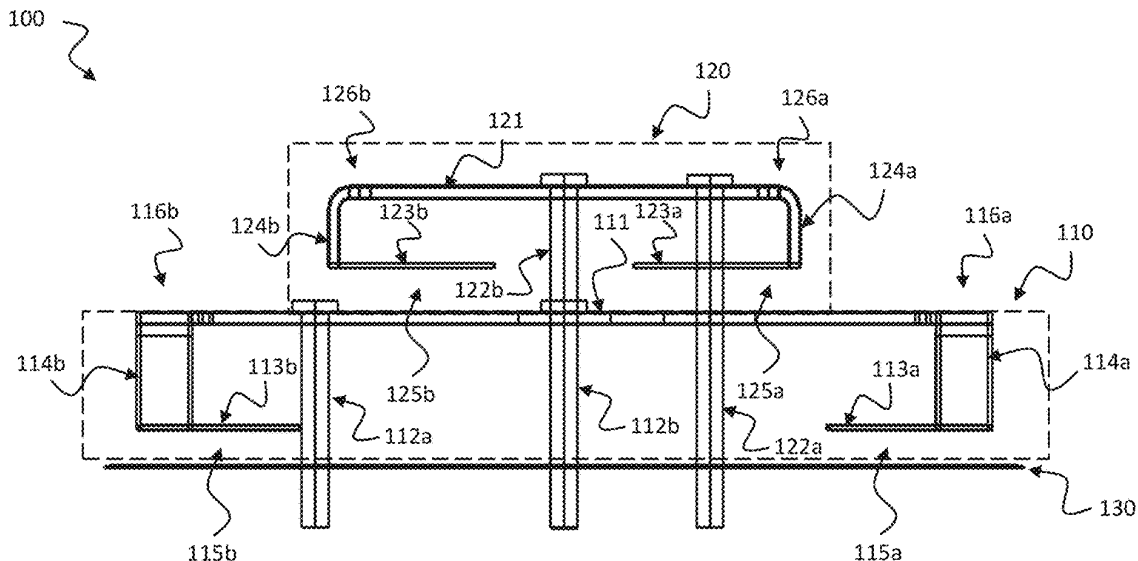
Related U.S. Application Data

(63) Continuation of application No. PCT/EP2021/078554, filed on Oct. 15, 2021.

Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/38 (2006.01)
H01Q 1/48 (2006.01)

A stacked patch antenna device is provided which comprises: a ground layer and a stack of patch antenna elements being mounted over each other and over the ground layer. Each patch antenna element comprises: a metal sheet having a plurality of peripheral areas; at least one feeding pin configured to connect the patch antenna element to a feeding circuit for inductively feeding the patch antenna element. Each patch antenna element comprises a plurality of capacitive pads for capacitively coupling the patch antenna element with another patch antenna element underneath the patch antenna element or with the ground layer. Each capacitive pad is mounted below a respective peripheral area of the metal sheet and attached to the respective peripheral area of the metal sheet by a metal connector.





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(19) **United States**

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CHANG et al.

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(43) **Pub. Date: May 16, 2024**

(54) **ANTENNA STRUCTURE**

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

(72) Inventors: **Wei-Chung CHANG**, Hsinchu (TW);
Shang-Ching TSENG, Hsinchu (TW)

(21) Appl. No.: **18/489,072**

(22) Filed: **Oct. 18, 2023**

(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**
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H01Q 5/20 (2006.01)
H01Q 5/314 (2006.01)
H01Q 23/00 (2006.01)

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

CPC **H01Q 9/0442** (2013.01); **H01Q 5/20**
(2015.01); **H01Q 5/314** (2015.01); **H01Q**
23/00 (2013.01)

(57) **ABSTRACT**

An antenna structure includes a metal mechanism element, a ground element, a feeding radiation element, a first radiation element, a second radiation element, a parasitic radiation element, a tuning circuit, and a nonconductive support element. The metal mechanism element has a slot. The metal mechanism element includes a first grounding portion and a second grounding portion. The slot is positioned between the first grounding portion and the second grounding portion. The feeding radiation element has a feeding point. The first radiation element is coupled to the feeding radiation element. The second radiation element is coupled to the feeding radiation element. The parasitic radiation element is coupled to the ground element. The parasitic radiation element is adjacent to the first radiation element and the second radiation element. The tuning circuit is coupled between the first grounding portion and the second grounding portion of the metal mechanism element.

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