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(19) **United States**

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

(10) **Pub. No.: US 2026/0018779 A1**

(43) **Pub. Date: Jan. 15, 2026**

(54) **ELECTRONIC DEVICE INCLUDING ANTENNA**

(71) Applicant: **Samsung Electronics Co., Ltd.**,
Suwon-si (KR)

(72) Inventors: **Huiwon CHO**, Suwon-si (KR);
Myeongkoo KANG, Suwon-si (KR);
Gyubok PARK, Suwon-si (KR);
Youngjun CHO, Suwon-si (KR)

(21) Appl. No.: **19/337,155**

(22) Filed: **Sep. 23, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/KR2024/
003521, filed on Mar. 20, 2024.

(30) **Foreign Application Priority Data**

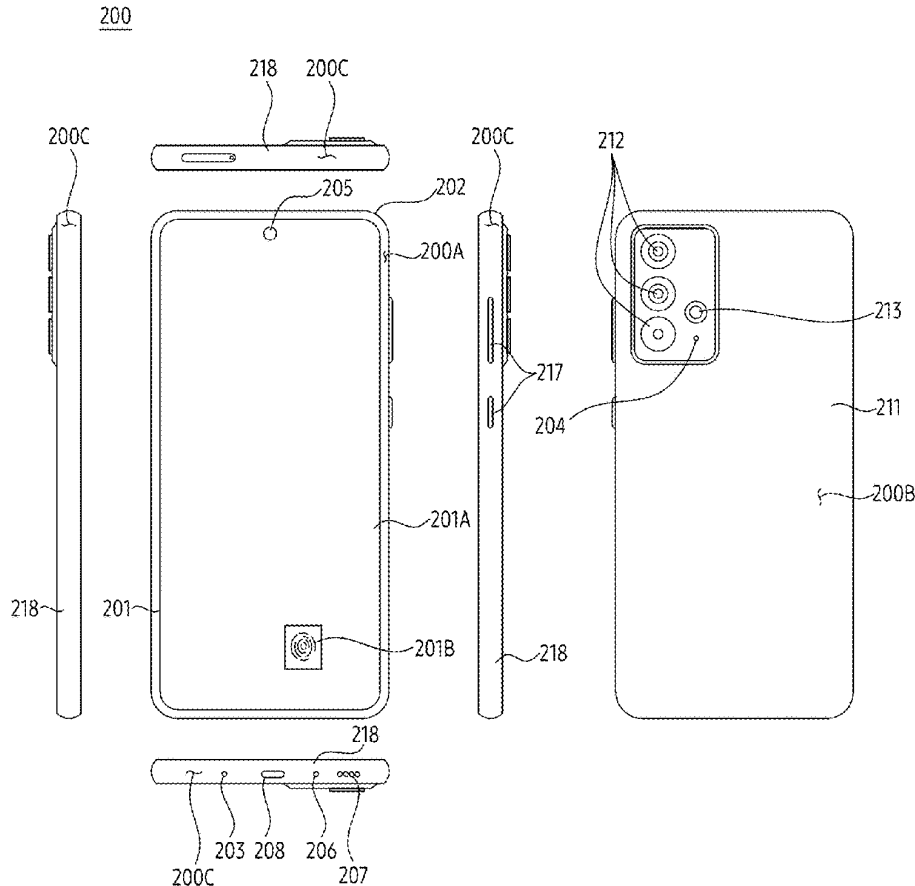
Mar. 24, 2023 (KR) 10-2023-0038898
Apr. 6, 2023 (KR) 10-2023-0045263

Publication Classification

(51) **Int. Cl.**
H01Q 1/22 (2006.01)
H01Q 5/30 (2015.01)
(52) **U.S. Cl.**
CPC **H01Q 1/22** (2013.01); **H01Q 5/30**
(2015.01)

(57) **ABSTRACT**

An electronic device is provided. The electronic device includes a housing including a frame at least partially surrounding an internal volume of the electronic device, a support disposed in the internal volume, and a non-conductive structure in contact with the frame and the support, a printed circuit board (PCB) disposed on the support, a conductive portion, defining a portion of the frame, including at least one protruding portion protruding toward the internal volume, a conductive pattern, in contact with the at least one protruding portion, extending along an outer surface of the non-conductive structure, a connection portion electrically connecting the PCB and the conductive pattern, respectively, and wireless communication circuitry electrically connected to the PCB, configured to communicate with an external electronic device via at least a portion of the conductive pattern.



210: 200A, 200B, 200C



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(19) **United States**

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

(10) **Pub. No.: US 2026/0019487 A1**

(43) **Pub. Date: Jan. 15, 2026**

(54) **FOLDABLE-SCREEN ELECTRONIC DEVICE
AND ANTENNA APPARATUS THEREOF**

Publication Classification

(51) **Int. Cl.**
H04M 1/02 (2006.01)
(52) **U.S. Cl.**
CPC **H04M 1/026** (2013.01); **H04M 1/0214**
(2013.01)

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

(72) Inventors: **Shichao Li**, Shenzhen (CN); **Tiezhu**
Liang, Shenzhen (CN)

(21) Appl. No.: **19/338,310**

(22) Filed: **Sep. 24, 2025**

Related U.S. Application Data

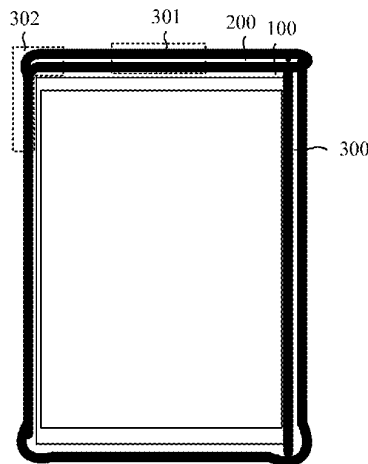
(63) Continuation of application No. PCT/CN2023/
133256, filed on Nov. 22, 2023.

(30) **Foreign Application Priority Data**

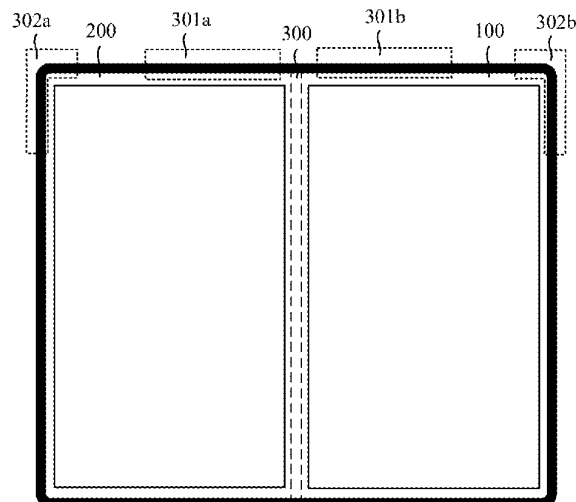
Apr. 3, 2023 (CN) 202310389830.7

(57) **ABSTRACT**

This application provides a foldable-screen electronic device and an antenna apparatus thereof. When the foldable-screen electronic device is in a folded state, parasitic radiators of each primary radiator in an antenna may be divided based on a communication scenario, and an operating frequency of each radiator in the antenna (including the primary radiator) may be adjusted according to a preset frequency adjustment rule, to enable a current direction of each parasitic radiator of the primary radiator in the antenna and a current direction of the primary radiator to meet an expected target current direction, to improve performance of the antenna (including the primary radiator).



(1)



(2)



US 20260024918A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0024918 A1**

(43) **Pub. Date: Jan. 22, 2026**

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

Publication Classification

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

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 1/22 (2006.01)
H01Q 1/48 (2006.01)

(72) Inventors: **Ben LAI**, Wuhan (CN); **Bo HE**, Wuhan
(CN); **Siting LI**, Wuhan (CN); **Jun
YOU**, Wuhan (CN); **Yuzhen ZHANG**,
Wuhan (CN); **Yunpeng SHEN**, Wuhan
(CN)

(52) **U.S. Cl.**
CPC *H01Q 9/0421* (2013.01); *H01Q 1/2266*
(2013.01); *H01Q 1/48* (2013.01)

(21) Appl. No.: **18/995,508**

(22) PCT Filed: **Jan. 4, 2024**

(86) PCT No.: **PCT/CN2024/070638**

§ 371 (c)(1),

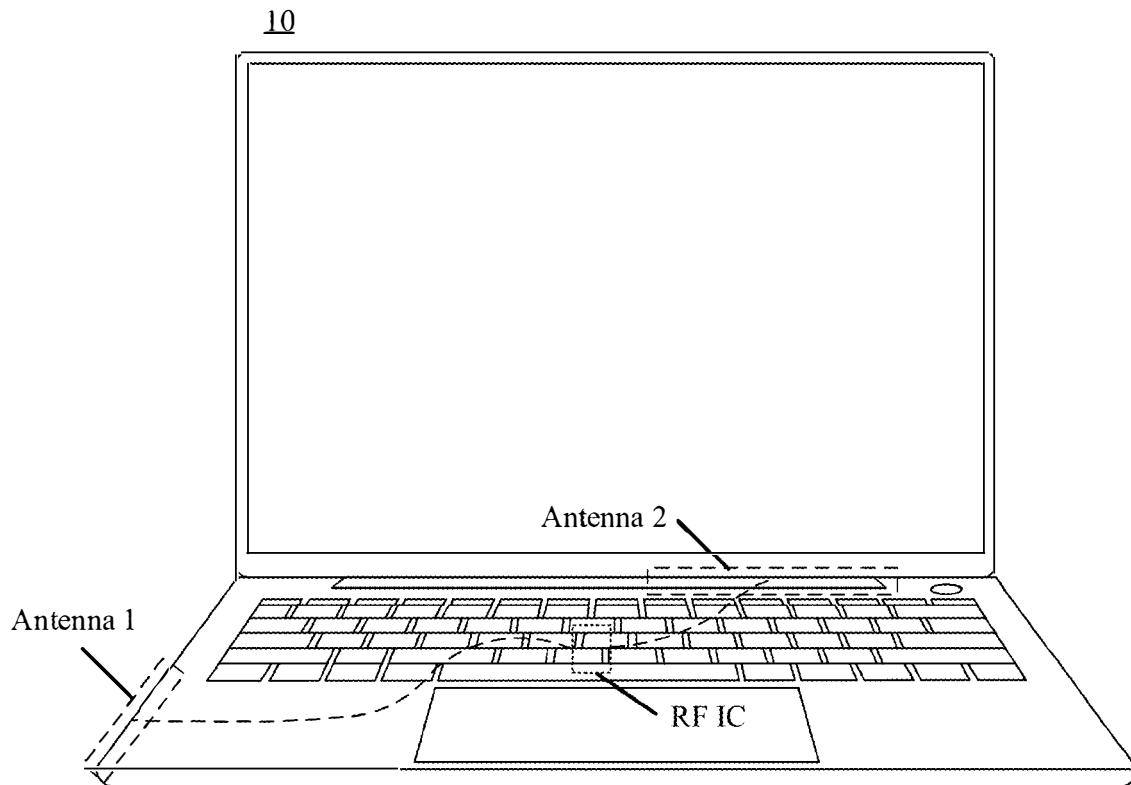
(2) Date: **Jan. 16, 2025**

(30) **Foreign Application Priority Data**

Jan. 20, 2023 (CN) 202310104601.6

(57) **ABSTRACT**

Embodiments of this application provide an antenna structure and an electronic device. The antenna structure may include a ground plane, a first radiator, and a first grounding member connected to the first radiator. The antenna structure may further include a second radiator, a third radiator, a second grounding member connected to the second radiator, and a third grounding member connected to the third radiator. A first slot is formed between a first end of the first radiator and a first end of the second radiator, and a second slot is formed between a second end of the second radiator and a second end of the third radiator.

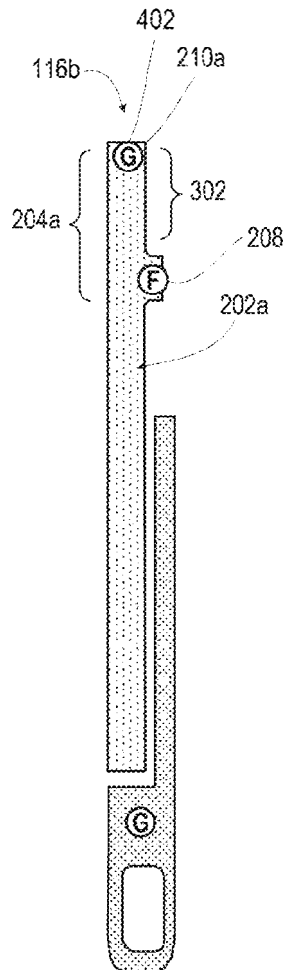




US 20260031523A1

(19) **United States**(12) **Patent Application Publication**
ZHAO et al.(10) **Pub. No.: US 2026/0031523 A1**(43) **Pub. Date: Jan. 29, 2026**(54) **LOW BAND ANTENNA ASSEMBLY FOR A
ROLLABLE DISPLAY COMMUNICATION
DEVICE**(52) **U.S. Cl.**
CPC **H01Q 1/243** (2013.01); **H01Q 9/0421**
(2013.01); **H05K 5/0217** (2013.01)(71) Applicant: **MOTOROLA MOBILITY LLC,**
WILMINGTON, DE (US)(57) **ABSTRACT**(72) Inventors: **JUNSHENG ZHAO,** VERNON
HILLS, IL (US); **XUYUAN PAN,**
CHICAGO, IL (US); **MD FAISAL**
ABEDIN, LAKE BLUFF, IL (US);
MOHAMMED ABDUL-GAFFOOR,
PALATINE, IL (US)

An antenna assembly, communication device and method provide incorporating low band radio frequency communication transmission and reception antenna elements within a narrow and small spatial footprint. The antenna assembly has a first planar antenna element that includes a radiating end portion extending in a first direction and electrically connectable to an antenna feed and a radiating arm extending in an opposite second direction opposite. The antenna assembly has a second planar antenna element that includes a coupling arm extending in the second direction parallel to and spaced by a slit from the radiating arm with a coupling end portion extending in the second direction from the coupling arm and electrically connectable to an antenna ground. The communication includes a support structure having a rectangular prismatic shape with a front side and back side that are larger than left, right, top, and bottom sides. Antenna assembly(ies) are positioned on narrow edge (s).

(21) Appl. No.: **18/782,736**(22) Filed: **Jul. 24, 2024****Publication Classification**(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 9/04 (2006.01)
H05K 5/02 (2006.01)



US 20260031524A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0031524 A1**

(43) **Pub. Date: Jan. 29, 2026**

(54) **ELECTRONIC DEVICE**

Publication Classification

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

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

(72) Inventors: **Yu Wang**, Shenzhen (CN); **Wenlong Hu**, Shenzhen (CN); **Yan Lv**, Shenzhen (CN); **Yawei Zhao**, Shenzhen (CN)

(52) **U.S. Cl.**
CPC **H01Q 1/243** (2013.01); **H04M 1/0216** (2013.01); **H04M 1/0268** (2013.01)

(21) Appl. No.: **19/343,237**

(57) **ABSTRACT**

(22) Filed: **Sep. 29, 2025**

Embodiments of this application provide an electronic device. Adjacent end portions of the first radiator and the second radiator are spaced apart to form an antenna gap. In a thickness direction of the middle frame, the display screen and the back cover are disposed on two opposite sides of the middle frame. The reinforcement body is located between the display screen and the back cover. Both the first conductive support leg and the second conductive support leg are spaced from the reinforcement body, and the reinforcement body is disposed opposite to the antenna gap. In the thickness direction of the middle frame, at least one of the first conductive support leg and the second conductive support leg is located on one side that is of the reinforcement body and that faces away from the display screen.

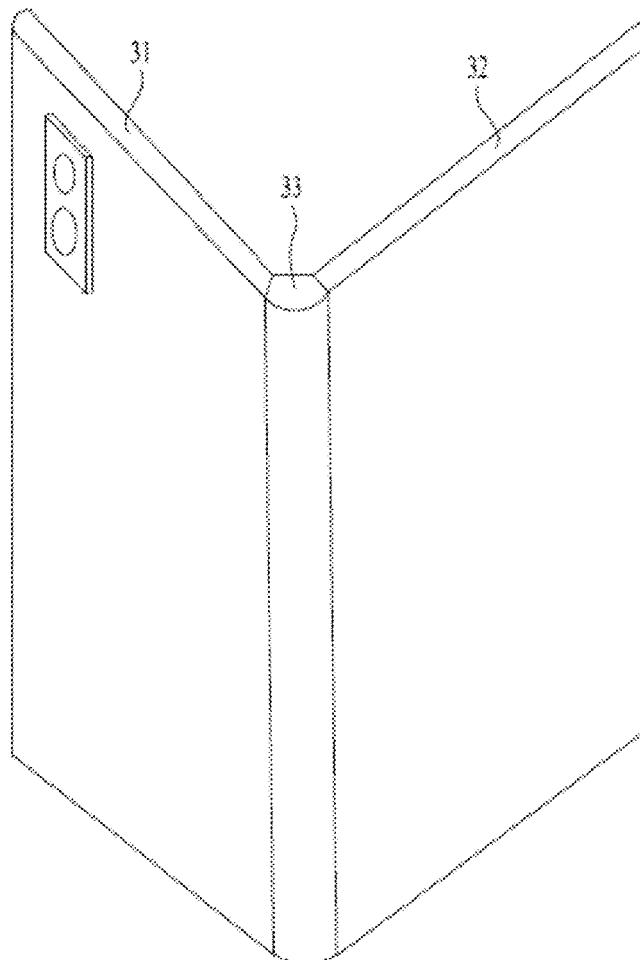
Related U.S. Application Data

(63) Continuation of application No. PCT/CN2024/078603, filed on Feb. 26, 2024.

(30) **Foreign Application Priority Data**

Jun. 25, 2023 (CN) 202310756770.8

10





US 20260031540A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0031540 A1**

(43) **Pub. Date: Jan. 29, 2026**

(54) **ANTENNA, ANTENNA ARRAY, AND
ELECTRONIC DEVICE**

(30) **Foreign Application Priority Data**

Oct. 21, 2022 (CN) 202211290494.2

(71) Applicants: **HUAWEI TECHNOLOGIES CO.,
LTD.**, Shenzhen (CN); **TSINGHUA
UNIVERSITY**, Beijing (CN)

Publication Classification

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

H01Q 21/06 (2006.01)

(52) **U.S. Cl.**
CPC **H01Q 9/0428** (2013.01); **H01Q 9/0414**
(2013.01); **H01Q 21/065** (2013.01)

(72) Inventors: **Yue Li**, Beijing (CN); **Yongjian Zhang**,
Beijing (CN); **Pengfei Wu**, Shanghai
(CN); **Hanyang Wang**, Reading (GB);
Mingzhe Hu, Beijing (CN)

(73) Assignees: **HUAWEI TECHNOLOGIES CO.,
LTD.**, Shenzhen (CN); **TSINGHUA
UNIVERSITY**, Beijing (CN)

(57) **ABSTRACT**

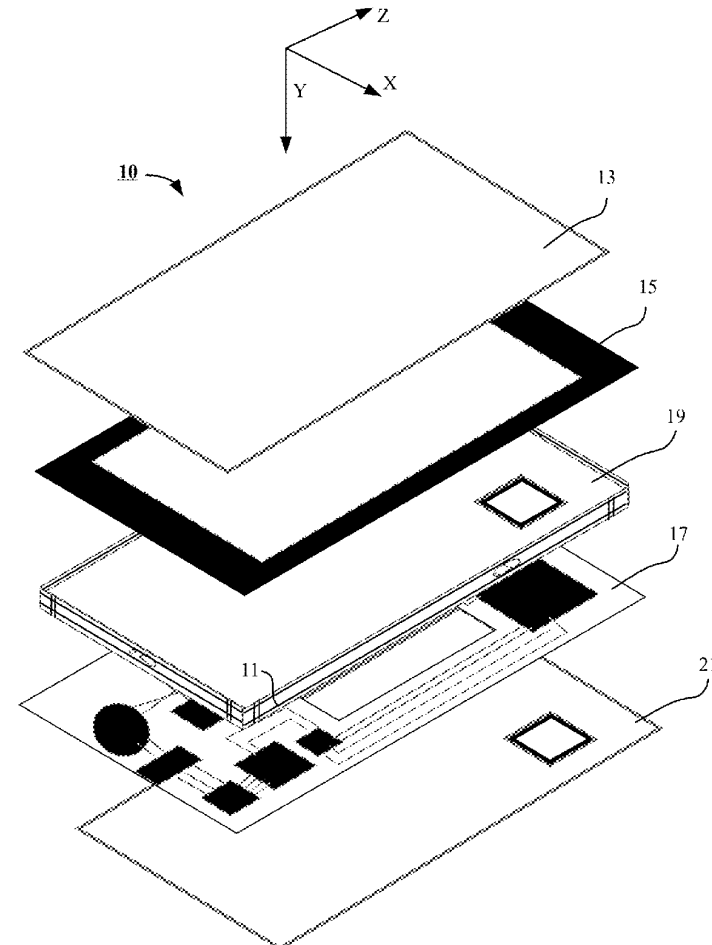
Embodiments of this application provide an antenna, and an electronic device. The antenna includes a radiating patch layer, a ring-shaped metal layer, a first metal layer, and a feed element. The radiating patch layer includes four radiating patches that are distributed in a 2x2 array. The ring-shaped metal layer is disposed in correspondence with a peripheral edge part of the radiating patch layer, and is coupled and connected to the radiating patch layer. A plurality of metal columns are disposed on the first metal layer. The plurality of metal columns are electrically connected to the ring-shaped metal layer.

(21) Appl. No.: **18/996,844**

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

(86) PCT No.: **PCT/CN2023/123681**

§ 371 (c)(1),
(2) Date:



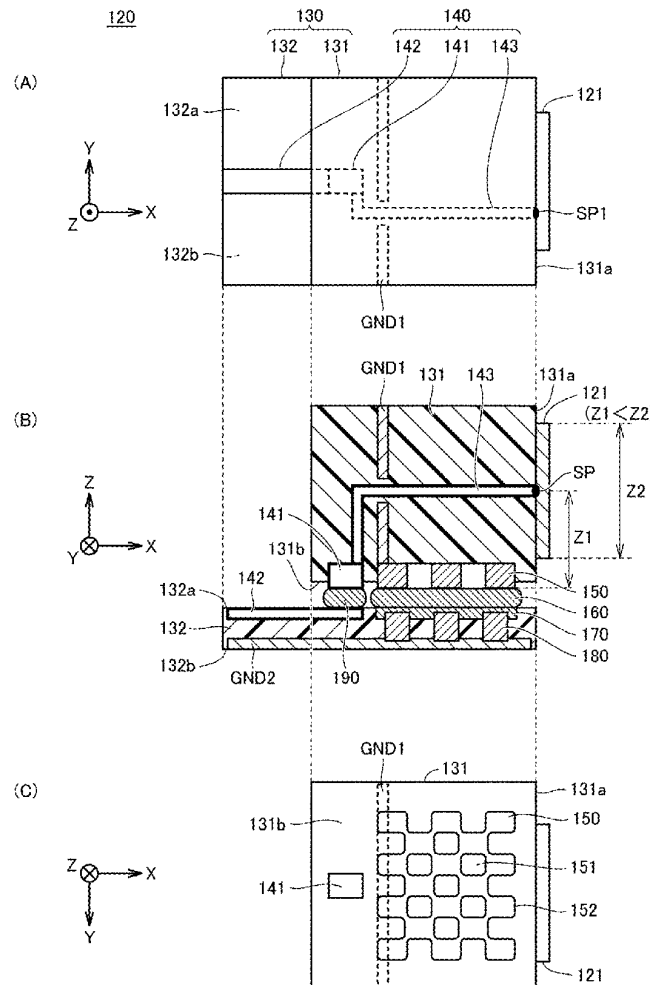


US 20260031542A1

(19) **United States**(12) **Patent Application Publication**
SUDO et al.(10) **Pub. No.: US 2026/0031542 A1**(43) **Pub. Date: Jan. 29, 2026**(54) **ANTENNA DEVICE AND COMMUNICATION
DEVICE INCLUDING SAME****Publication Classification**(51) **Int. Cl.**
H01Q 9/04 (2006.01)(52) **U.S. Cl.**
CPC **H01Q 9/0485** (2013.01)(71) Applicant: **Murata Manufacturing Co., Ltd.,**
Nagaokakyo-shi (JP)(72) Inventors: **Kaoru SUDO**, Nagaokakyo-shi (JP);
Yosuke SATO, Nagaokakyo-shi (JP)(73) Assignee: **Murata Manufacturing Co., Ltd.,**
Nagaokakyo-shi (JP)(57) **ABSTRACT**(21) Appl. No.: **19/348,824**(22) Filed: **Oct. 3, 2025****Related U.S. Application Data**(63) Continuation of application No. PCT/JP2024/
020144, filed on Jun. 3, 2024.(30) **Foreign Application Priority Data**

Jul. 19, 2023 (JP) 2023-117736

An antenna device includes a first substrate and a second substrate. The first substrate includes a ground electrode having a flat plate-like shape, a radiating element having a flat plate-like shape, and a peripheral electrode electrically connected to the ground electrode. The second substrate includes a first main surface facing the first substrate, a second main surface (opposite to the first main surface), a ground electrode disposed on or in the second main surface, and a ground pad disposed on or in the first main surface. The peripheral electrode and the ground pad are connected to each other.





US 20260033311A1

(19) **United States**

(12) **Patent Application Publication**
Riley

(10) **Pub. No.: US 2026/0033311 A1**

(43) **Pub. Date: Jan. 29, 2026**

(54) **TRANSCEIVER WITH ON-PACKAGE
ANTENNA**

H04B 1/00 (2006.01)

H04B 1/40 (2015.01)

(71) Applicant: **Texas Instruments Incorporated,**
Dallas, TX (US)

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

CPC **H01L 23/485** (2013.01); **H01L 24/08**
(2013.01); **H01L 24/16** (2013.01); **H01Q**

1/2283 (2013.01); **H01Q 21/0006** (2013.01);

H04B 1/0003 (2013.01); **H04B 1/40**

(2013.01); **H01L 2224/08112** (2013.01); **H01L**

2224/16257 (2013.01); **H01L 2924/14215**
(2013.01)

(72) Inventor: **Nolan Riley, ALLEN, TX (US)**

(21) Appl. No.: **18/780,484**

(22) Filed: **Jul. 23, 2024**

Publication Classification

(51) **Int. Cl.**

H01L 23/485 (2006.01)

H01L 23/00 (2006.01)

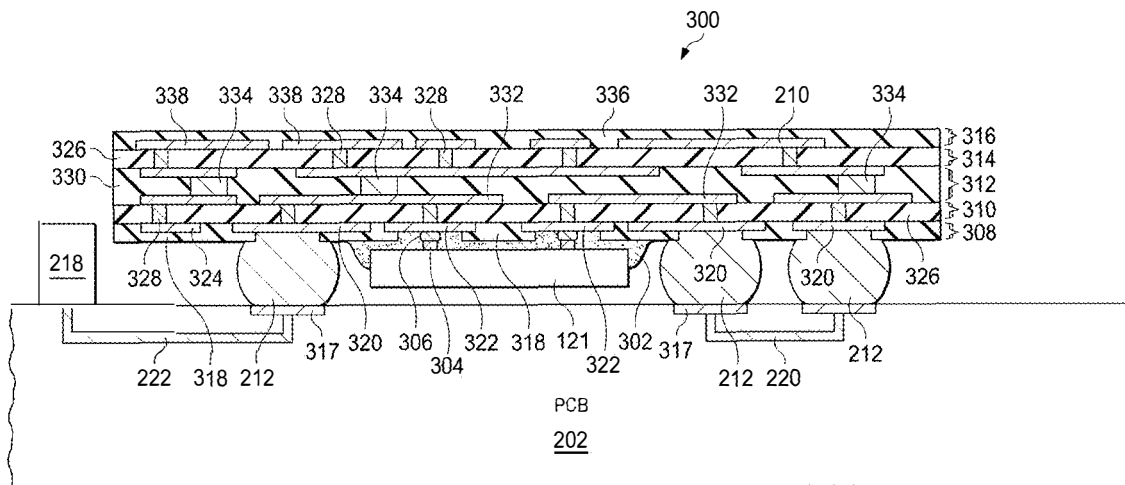
H01Q 1/22 (2006.01)

H01Q 21/00 (2006.01)

(57)

ABSTRACT

In described examples, an integrated circuit (IC) package includes first and second external connectors at an external surface of the IC package, an IC die, and an antenna. The IC die is coupled to the first external connector. The antenna is coupled to the second external connector. The IC die and the antenna are not coupled within the IC package.





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(19) **United States**

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

(10) **Pub. No.: US 2026/0039009 A1**

(43) **Pub. Date: Feb. 5, 2026**

(54) **ELECTRONIC DEVICE**

Publication Classification

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

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 5/335 (2015.01)

(72) Inventors: **Baokun Xi**, Shenzhen (CN); **Jiaming Wang**, Shanghai (CN); **Fangchao Zhao**, Shanghai (CN)

(52) **U.S. Cl.**
CPC **H01Q 1/242** (2013.01); **H01Q 5/335** (2015.01)

(21) Appl. No.: **19/356,518**

(22) Filed: **Oct. 13, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/CN2024/086527, filed on Apr. 8, 2024.

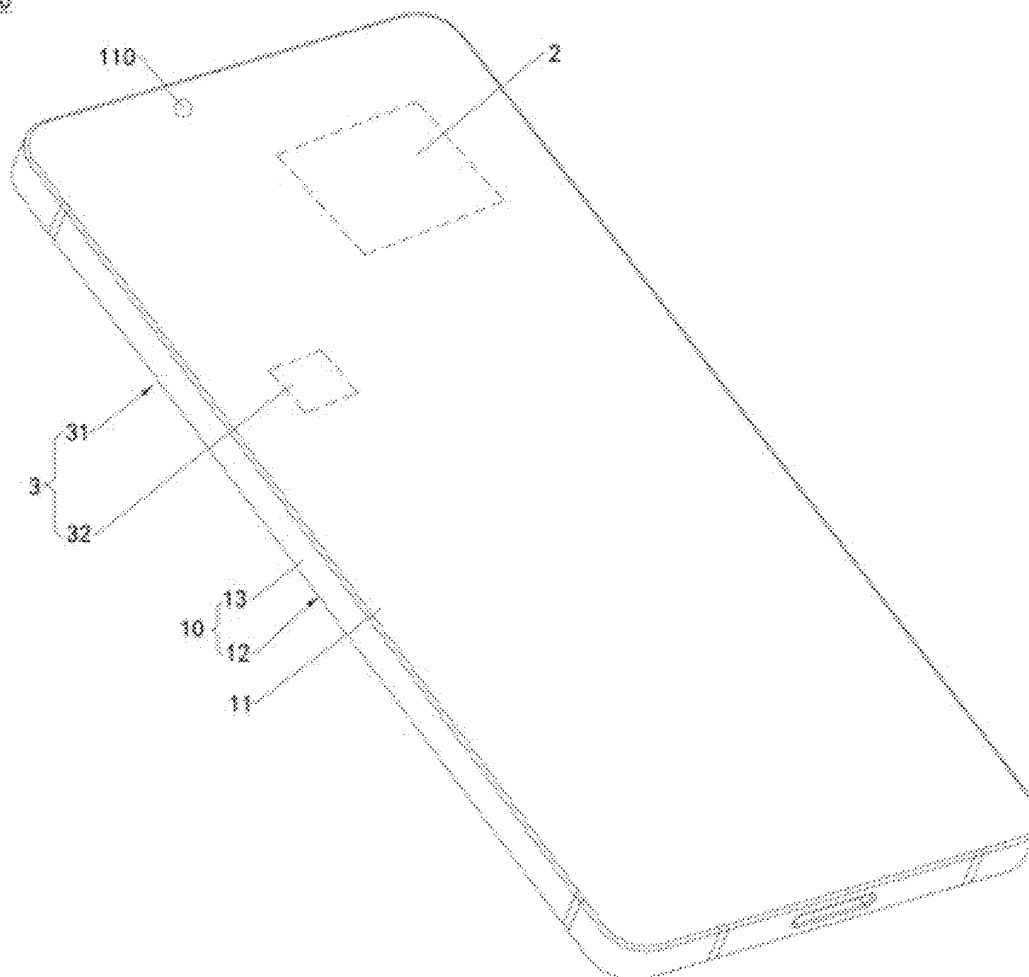
(30) **Foreign Application Priority Data**

Apr. 14, 2023 (CN) 202310417083.3

(57) **ABSTRACT**

An electronic device includes a radiator of a first antenna and a radiator of a second antenna, the radiator of the first antenna includes a first branch and a second branch, and the second branch is disposed between the first branch and the radiator of the second antenna. A gap is between the first branch and the second branch, and a gap is between the second branch and the radiator of the second antenna. Also included is a first matching module, a first capacitor, and a feeding portion. A first end of the first matching module is connected to the second branch, a second end of the first matching module is connected to the feeding portion, a first end of the first capacitor is connected to the first branch, and a second end of the first capacitor is connected between the first matching module and the feeding portion.

100





US 20260039013A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0039013 A1**

(43) **Pub. Date: Feb. 5, 2026**

(54) **ANTENNA DEVICE**

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

(71) Applicant: **DENSO CORPORATION**, Kariya-city
(JP)

CPC **H01Q 1/3283** (2013.01); **H01Q 9/0421**
(2013.01); **H01Q 9/26** (2013.01)

(72) Inventors: **Youhei SEKIYA**, Nisshin-city (JP);
Yuuji KAKUYA, Kariya-city (JP)

(57) **ABSTRACT**

(21) Appl. No.: **19/358,109**

(22) Filed: **Oct. 14, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2024/
012212, filed on Mar. 27, 2024.

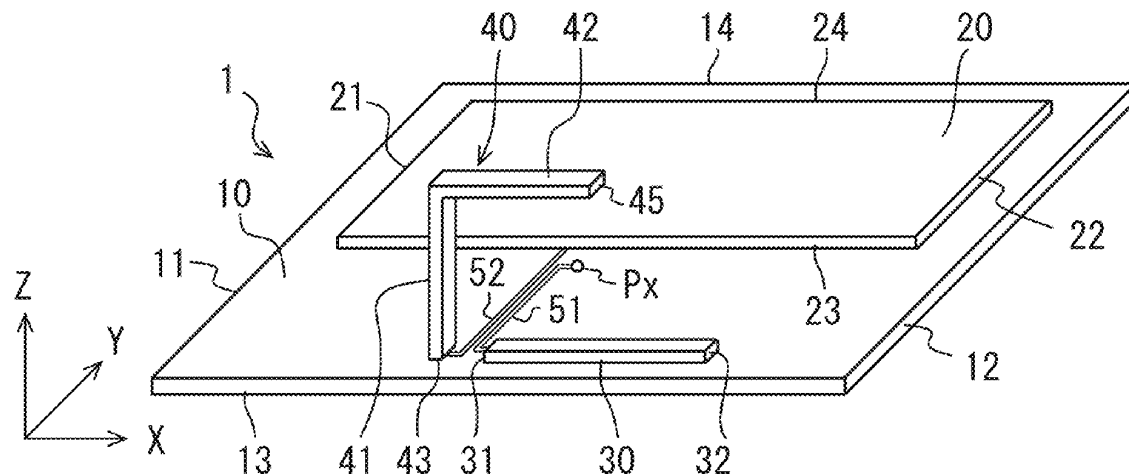
(30) **Foreign Application Priority Data**

Apr. 24, 2023 (JP) 2023-071011

Publication Classification

(51) **Int. Cl.**
H01Q 1/32 (2006.01)
H01Q 9/04 (2006.01)
H01Q 9/26 (2006.01)

An antenna device includes a substrate, a ground plate, a first element, and a second element. The substrate is a plate-shaped dielectric. The ground plate is a plate-shaped conductor provided on or inside the substrate. The first element is a liner conductive element extending along the surface of the substrate. The second element is a liner conductive element having a three-dimensional shape. The second element includes a standing portion perpendicular to the substrate and a substrate parallel portion extending from an upper end of the standing portion in a direction parallel to the substrate. The substrate parallel portion includes a portion that is parallel to a part of the first element. One of ends: a lower end of the standing portion and an end of the first element, is connected to a feed line, and another of the ends is electrically connected to the ground plate.





US 20260039017A1

(19) **United States**(12) **Patent Application Publication**
XUE et al.(10) **Pub. No.: US 2026/0039017 A1**(43) **Pub. Date: Feb. 5, 2026**(54) **BASE STATION ANTENNA****Publication Classification**(71) Applicant: **Outdoor Wireless Networks LLC**,
Claremont, NC (US)(72) Inventors: **Cheng XUE**, Suzhou, Jiangsu (CN);
Changfu CHEN, Suzhou, Jiangsu
(CN); **Jian ZHANG**, Suzhou, Jiangsu
(CN); **Bin SUN**, Suzhou, Jiangsu (CN);
Xun ZHANG, Suzhou, Jiangsu (CN);
Pengfei GUO, Suzhou, Jiangsu (CN)(51) **Int. Cl.**
H01Q 5/335 (2015.01)
H01Q 1/24 (2006.01)
H01Q 1/48 (2006.01)
H01Q 19/10 (2006.01)(52) **U.S. Cl.**
CPC **H01Q 5/335** (2015.01); **H01Q 1/246**
(2013.01); **H01Q 1/48** (2013.01); **H01Q**
19/108 (2013.01)(21) Appl. No.: **19/100,061**(22) PCT Filed: **Sep. 1, 2023**(86) PCT No.: **PCT/US2023/073265**

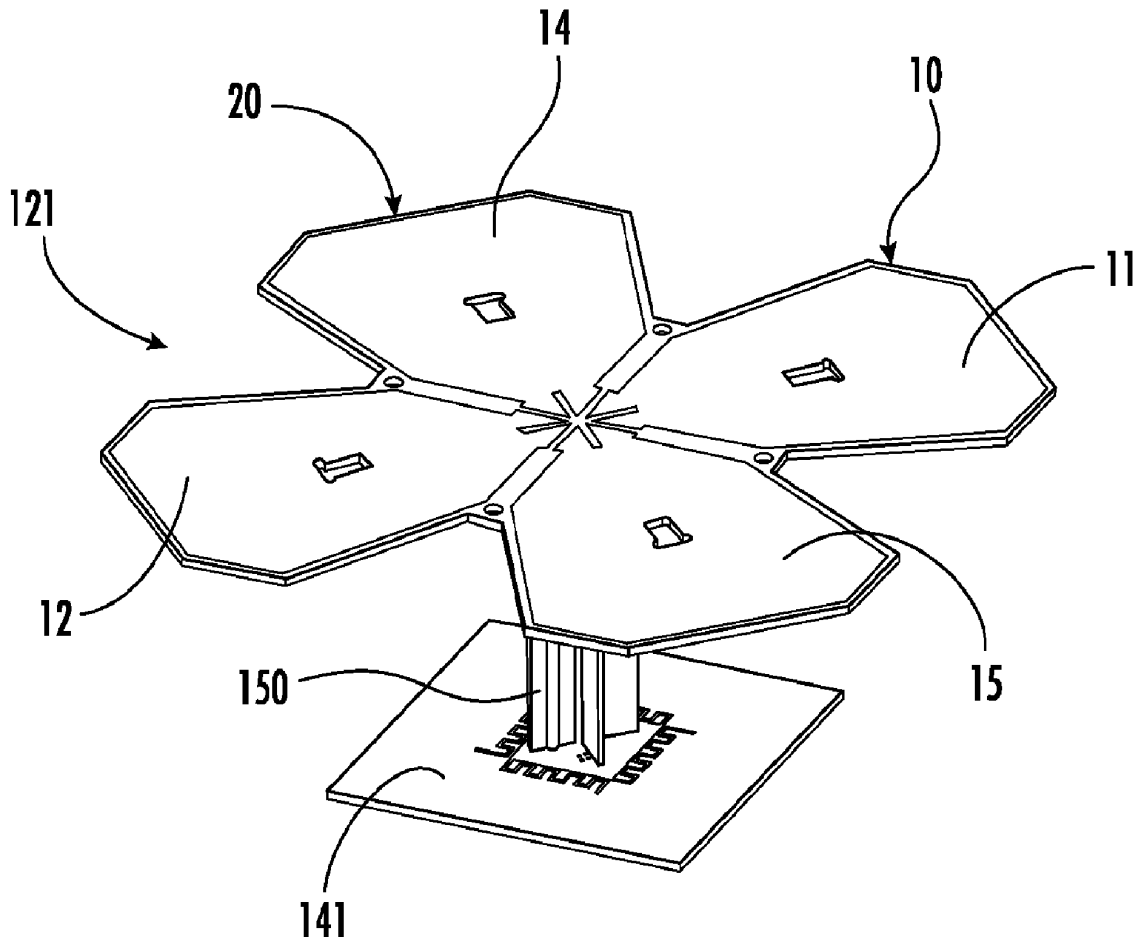
§ 371 (c)(1),

(2) Date: **Jan. 30, 2025**(30) **Foreign Application Priority Data**

Oct. 10, 2022 (CN) 202211232611.X

(57) **ABSTRACT**

The present disclosure relates to a base station antenna comprising: a reflector; a first frequency band radiating element located on the front side of the reflector; and a feed board located on the front side of the reflector, the feed board being configured to feed the first frequency band radiating element, in which, a resonant circuit in a grounding path of the first frequency band radiating element is formed on the feed board, and the resonant circuit is configured to at least suppress current within a second frequency band different from the first frequency band (FIG. 2a).





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(19) **United States**

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

(10) **Pub. No.: US 2026/0045679 A1**

(43) **Pub. Date: Feb. 12, 2026**

(54) **ELECTRONIC DEVICE**

Publication Classification

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

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

(72) Inventors: **Xiaoyong Dong**, Shenzhen (CN); **Hui Yu**, Shenzhen (CN)

(52) **U.S. Cl.**
CPC **H01Q 1/241** (2013.01); **H01Q 9/0414** (2013.01)

(21) Appl. No.: **19/364,643**

(57) **ABSTRACT**

(22) Filed: **Oct. 21, 2025**

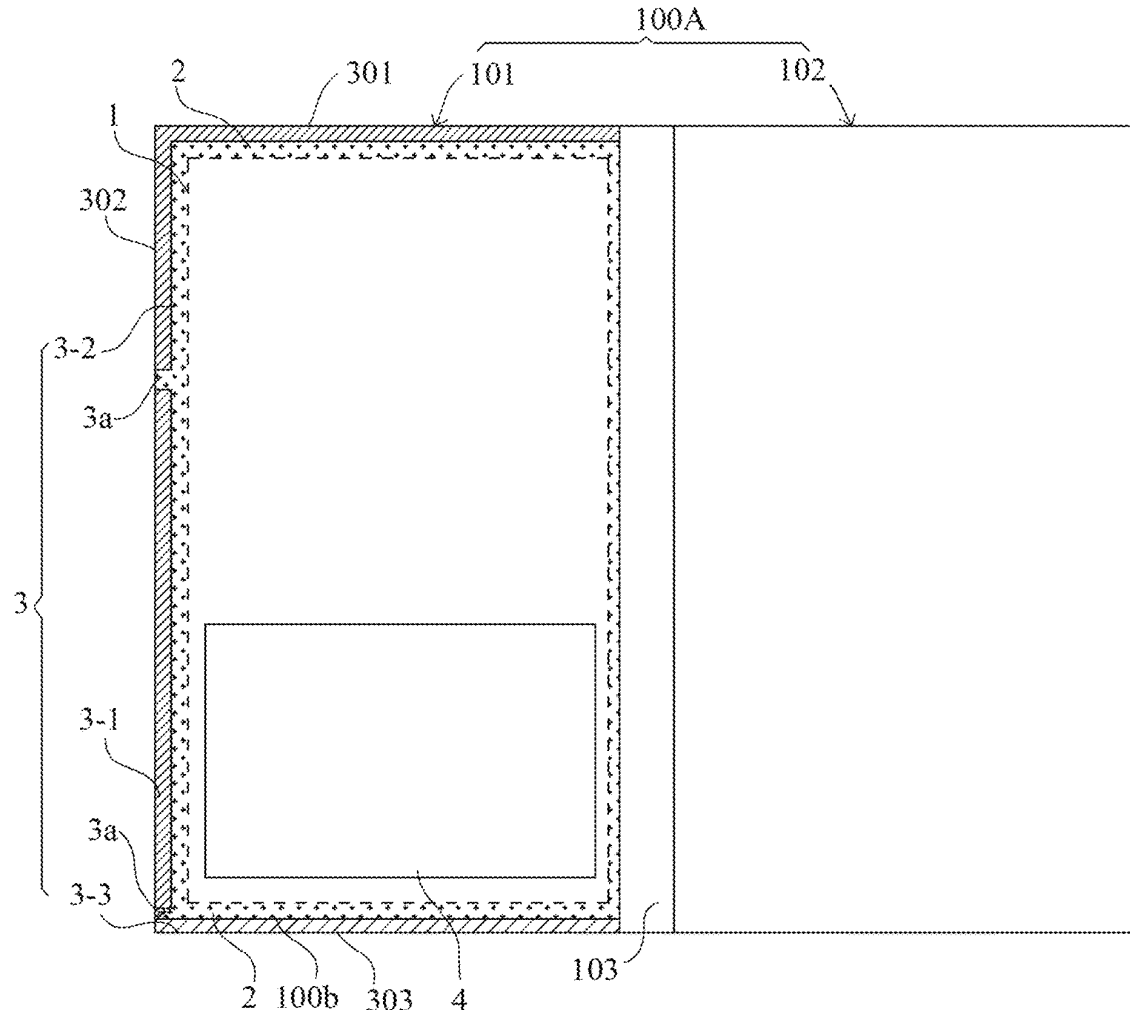
Disclosed is an electronic device. In embodiments of the disclosure, in a case that positions of a first feed terminal and a ground terminal are not changed, a first metal connection arm in embodiments of the disclosure has a middle section arranged with a clearance, and a length of an electric circuit of an antenna formed by a metal frame radiation section is equal to a sum of a length of a section located between a first connection position and a second connection position of the metal frame radiation section and a length of the middle section. By the middle section, a total length of the antenna is increased to a specific extent, and a length of an antenna between the first feed terminal and the ground terminal is increased.

Related U.S. Application Data

(63) Continuation of application No. PCT/CN2024/081907, filed on Mar. 15, 2024.

(30) **Foreign Application Priority Data**

Jun. 20, 2023 (CN) 202310740807.8





US 20260045694A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0045694 A1**

(43) **Pub. Date: Feb. 12, 2026**

(54) **METAL FRAME ANTENNA**

Publication Classification

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

(51) **Int. Cl.**
H01Q 5/328 (2015.01)
H01Q 1/24 (2006.01)

(72) Inventors: **Cong LI**, Shanghai (CN); **Min HUI**, Shanghai (CN); **Huajun JIANG**, Shanghai (CN); **Wei TANG**, Shanghai (CN)

(52) **U.S. Cl.**
CPC **H01Q 5/328** (2015.01); **H01Q 1/241** (2013.01)

(21) Appl. No.: **19/101,435**

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

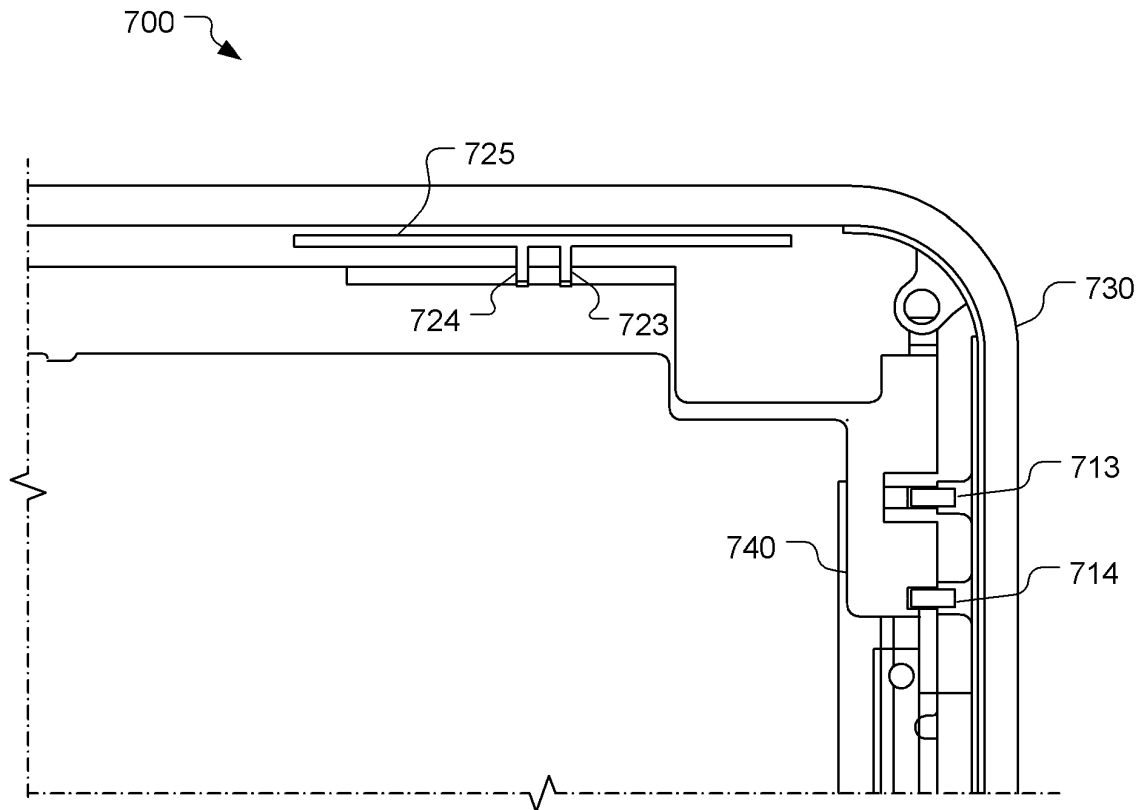
(86) PCT No.: **PCT/CN2022/120810**

§ 371 (c)(1),

(2) Date: **Feb. 5, 2025**

(57) **ABSTRACT**

A signal transfer method includes: transferring a first signal in a first frequency band between a metal frame member and a first front-end circuit, the metal frame member extending along a portion of a periphery of an apparatus; and transferring a second signal in a second frequency band between the metal frame member and a second front-end circuit by reactively coupling the metal frame member and a coupling element that is electrically connected to the second front-end circuit.





US 20260051668A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0051668 A1**

(43) **Pub. Date: Feb. 19, 2026**

(54) **ANTENNA**

Publication Classification

(71) Applicant: **Chelton Limited**, Marlow (GB)

(51) **Int. Cl.**
H01Q 21/06 (2006.01)
H01Q 1/52 (2006.01)

(72) Inventors: **Michael Philippakis**, Marlow (GB);
Peter Talbot, Marlow (GB); **George Woodbridge**, Marlow (GB)

(52) **U.S. Cl.**
CPC **H01Q 21/065** (2013.01); **H01Q 1/521** (2013.01)

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(57) **ABSTRACT**

A stacked patch array antenna (10) comprises a first substrate (12), a first array of patch radiators (16a) arranged on the first substrate (12), and a second array of patch radiators (16b). Each radiator (16b) of the second array is stacked with a respective radiator (16a) of the first array, so that each radiator (16a) of the first array is disposed between the first substrate (12) and a respective radiator (16b) of the second array.

