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(19) **United States**

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

(10) **Pub. No.: US 2025/0385425 A1**
(43) **Pub. Date: Dec. 18, 2025**

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

Publication Classification

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

(72) Inventors: **Haobo Wu**, Xi'an (CN); **Shuming Yang**, Xi'an (CN); **Bing Liu**, Xi'an (CN); **Wei Zheng**, Xi'an (CN); **Qiao Sun**, Xi'an (CN); **Chi Fan**, Xi'an (CN); **Kun Li**, Xi'an (CN); **Jianming Gao**, Xi'an (CN)

(51) **Int. Cl.**
H01Q 1/27 (2006.01)
G04G 17/04 (2006.01)
G04G 21/04 (2013.01)
H01Q 1/36 (2006.01)
H01Q 1/48 (2006.01)
(52) **U.S. Cl.**
CPC **H01Q 1/273** (2013.01); **G04G 17/04** (2013.01); **G04G 21/04** (2013.01); **H01Q 1/36** (2013.01); **H01Q 1/48** (2013.01)

(73) Assignee: **HUAWEI TECHNOLOGIES CO., LTD.**, Shenzhen (CN)

(21) Appl. No.: **19/246,709**

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

Related U.S. Application Data

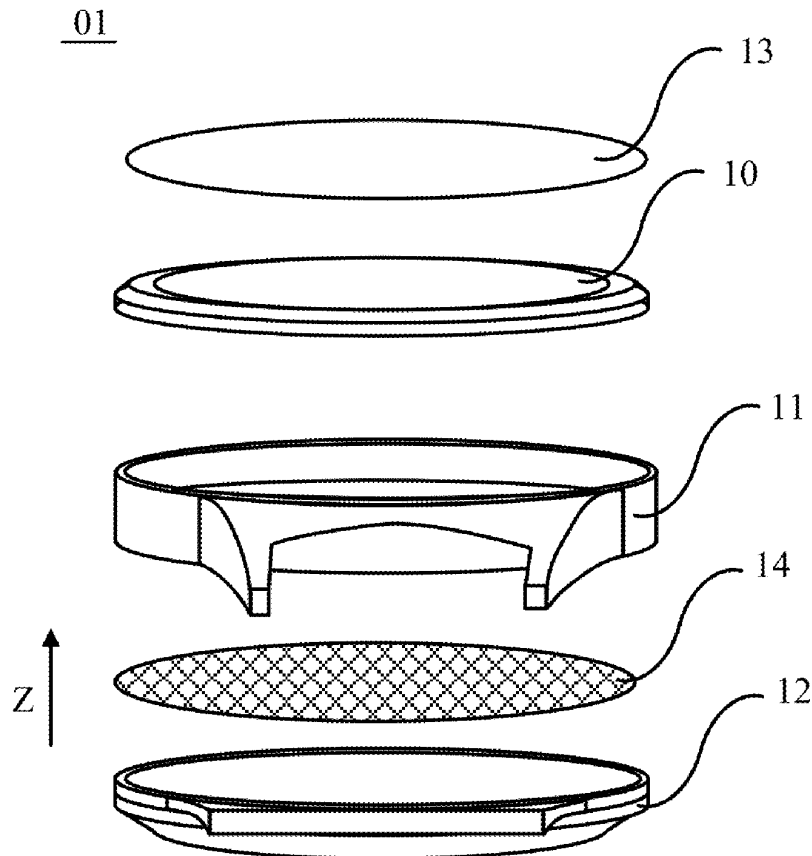
(63) Continuation of application No. PCT/CN2024/073526, filed on Jan. 22, 2024.

(30) **Foreign Application Priority Data**

Mar. 27, 2023 (CN) 202310344745.9
Jun. 14, 2023 (CN) 202310706987.8

(57) **ABSTRACT**

An antenna structure and an electronic device is provided. In the antenna structure, when a switch assembly is in a second state, at a target frequency, at least one of a second ground end and a third ground end may be electrically isolated from a ground plate, and a feeding end and a first ground end may excite a ring-shaped radiator to operate mainly in an anti-symmetry mode. When the switch assembly is in a first state, the first ground end and at least one of the second ground end and the third ground end are electrically connected to the ground plate, and at least one of the second ground end and the third ground end, the feeding end, and the first ground end may excite the ring-shaped radiator to operate mainly in a symmetry mode.





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(19) **United States**

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

(10) **Pub. No.: US 2025/0385427 A1**

(43) **Pub. Date: Dec. 18, 2025**

(54) **ANTENNA AND ELECTRONIC DEVICE**

Publication Classification

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

(72) Inventors: **Pengfei Wu**, Shanghai (CN); **Hanyang Wang**, Reading (GB); **Meng Hou**,
Shanghai (CN)

(21) Appl. No.: **18/832,333**

(22) PCT Filed: **Dec. 14, 2022**

(86) PCT No.: **PCT/CN2022/139115**

§ 371 (c)(1),

(2) Date: **Jan. 31, 2025**

(30) **Foreign Application Priority Data**

Jan. 28, 2022 (CN) 202210108537.4

Aug. 4, 2022 (CN) 202210932953.6

(51) **Int. Cl.**

H01Q 1/52 (2006.01)

H01Q 1/24 (2006.01)

H01Q 1/48 (2006.01)

H01Q 5/10 (2015.01)

H01Q 5/335 (2015.01)

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

CPC **H01Q 1/521** (2013.01); **H01Q 1/242**

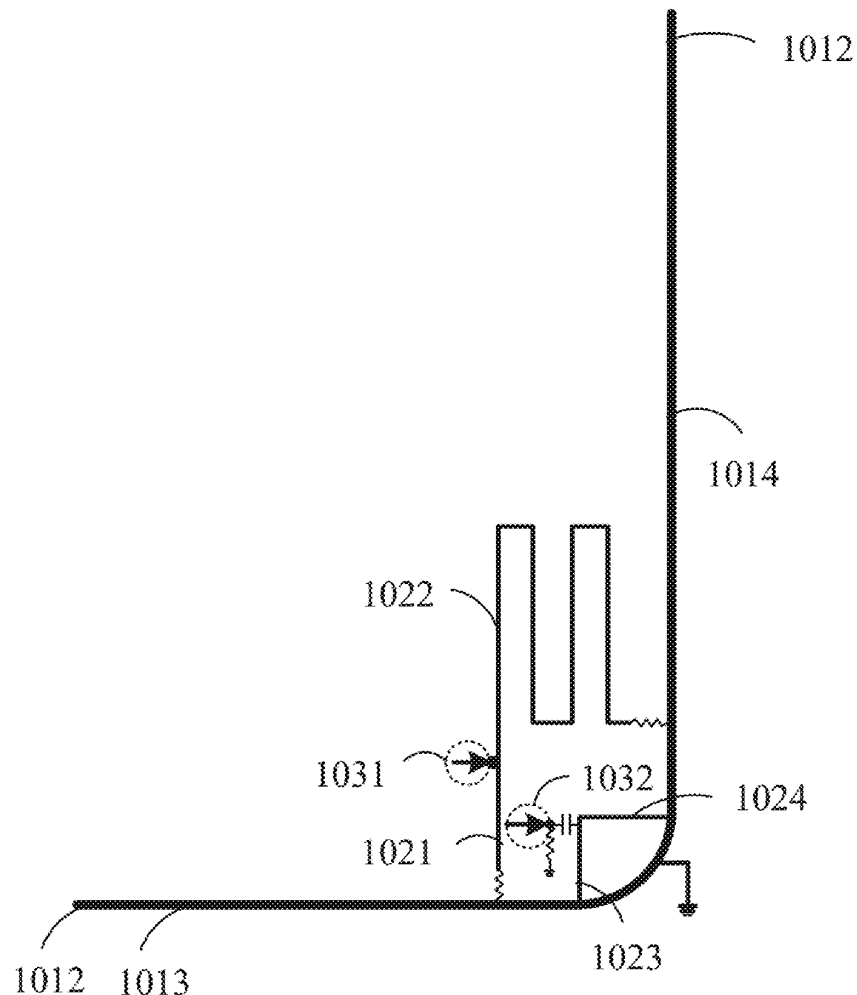
(2013.01); **H01Q 1/48** (2013.01); **H01Q 5/10**

(2015.01); **H01Q 5/335** (2015.01)

(57)

ABSTRACT

An antenna includes a first radiator and a transmission line having a first end and a second end. The first end is coupled proximate to a ground end or an open end of the first radiator, and a length T of the transmission line is set to satisfy $T=1/4\lambda$ or $T=1/2\lambda$, where λ is a dielectric wavelength corresponding to one of resonances generated by the antenna when the antenna is fed. A feeding circuit is coupled to a coupling point of the transmission line in a configuration for feeding the first radiator through the transmission line.





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(19) **United States**

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

(10) **Pub. No.: US 2025/0385430 A1**

(43) **Pub. Date: Dec. 18, 2025**

(54) **MULTI-BAND RESONANCE ANTENNA AND
DEVICE INCLUDING THE MULTI-BAND
RESONANCE ANTENNA**

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

(72) Inventors: **Jayprakash THAKUR**, Bangalore
(IN); **Prathibha PEDDIREDDY**,
Bangalore (IN); **Jay Vishnu GUPTA**,
Bangalore (IN); **Praveen KUMAR**,
Bangalore (IN)

(21) Appl. No.: **18/743,181**

(22) Filed: **Jun. 14, 2024**

Publication Classification

(51) **Int. Cl.**
H01Q 9/04 (2006.01)
H01Q 5/328 (2015.01)

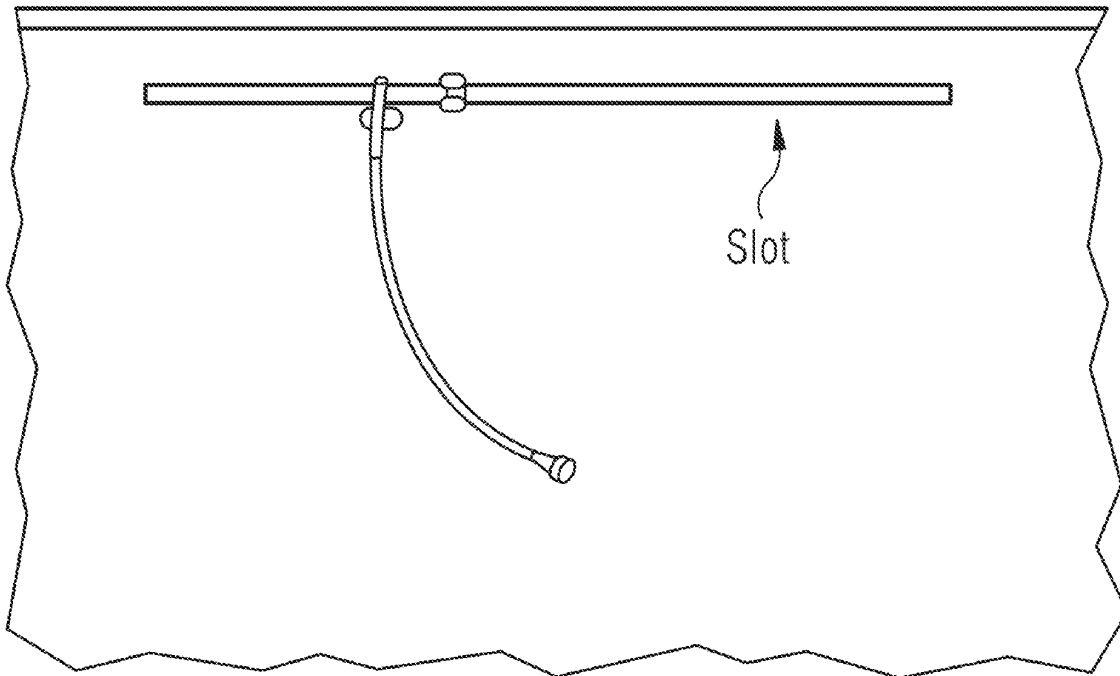
H01Q 13/10 (2006.01)

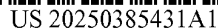
H01Q 13/18 (2006.01)

(52) **U.S. Cl.**
CPC **H01Q 9/0421** (2013.01); **H01Q 5/328**
(2015.01); **H01Q 13/103** (2013.01); **H01Q**
13/106 (2013.01); **H01Q 13/18** (2013.01)

(57) **ABSTRACT**

A multi-band resonance antenna. A multi-band resonance slot antenna includes a slot formed in a conductive plate, an exciting trace configured to excite the slot, and a tuning stub within an area of the slot. The length of the slot is less than a half wavelength of a desired resonance frequency. The tuning stub is an electric trace in an elongated shape along the slot and connected to a ground plane of the slot antenna. Another multi-band resonance antenna includes an electric trace on a printed circuit board, a control line configured to transfer a control signal, and a tuner circuit configured to tap at one or more points of the electric trace to ground based on the control signal. The antenna may be included in a device having a continual metal rim.





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CHENG

(43) **Pub. Date:** **Dec. 18, 2025**

(52) **U.S. Cl.**
CPC **H01Q 9/22** (2013.01); **H01Q 5/50**
(2015.01)

(57) **ABSTRACT**

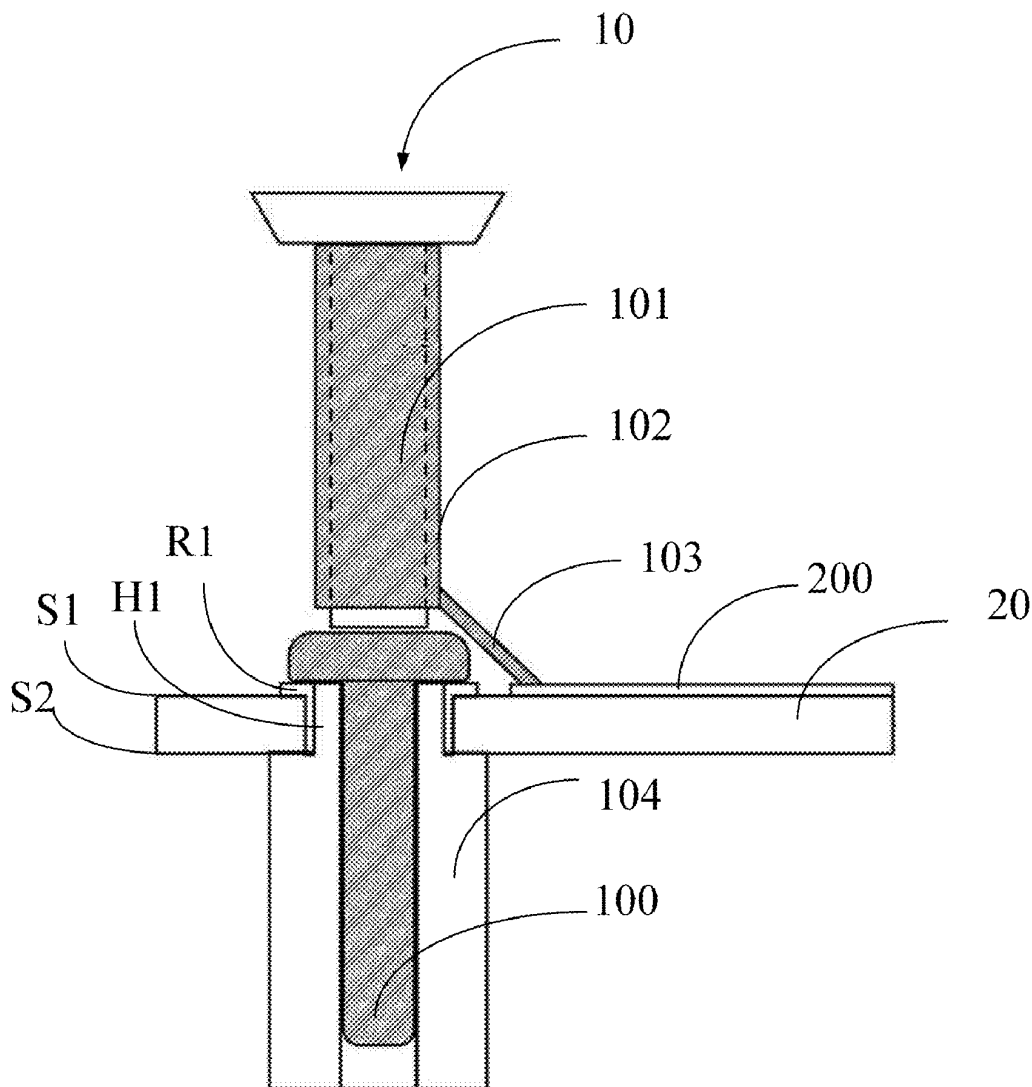
A antenna structure is arranged on a circuit board, a first surface of the circuit board includes an RF circuit, and the antenna structure includes: a metal screw, fixed on the first surface through a metal hole; the metal hole forms a metal ring; a plastic column, set above the metal screw; a metal tube, embedded with the plastic column, wherein there is a first predetermined distance between the metal tube and the metal screw; a metal shrapnel, extending from a bottom of the metal tube, wherein the metal screw is electrically connected to the RF circuit or the metal tube is electrically connected to the RF circuit to enable the metal screw and the metal tube to transmit or receive signals. The present disclosure also provides an electronic device, and the metal screw also uses to fix the circuit board to the housing of the electronic device.

(21) Appl. No.: 18/744,757

(22) Filed: **Jun. 17, 2024**

Publication Classification

(51) **Int. Cl.**
H01Q 5/55 (2015.01)
H01Q 5/335 (2015.01)





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(19) **United States**

(12) **Patent Application Publication**
LI

(10) **Pub. No.: US 2025/0385434 A1**

(43) **Pub. Date: Dec. 18, 2025**

(54) **SLOT ANTENNA DEVICE**

Publication Classification

(71) Applicants: **INVENTEC (PUDONG)**
TECHNOLOGY CORPORATION,
Shanghai (CN); **INVENTEC**
CORPORATION, Taipei City (TW)

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

(52) **U.S. Cl.**
CPC **H01Q 13/10** (2013.01)

(72) Inventor: **Chih-Cheng LI,** Taipei City (TW)

(57) **ABSTRACT**

(73) Assignees: **INVENTEC (PUDONG)**
TECHNOLOGY CORPORATION,
Shanghai (CN); **INVENTEC**
CORPORATION, Taipei City (TW)

A slot antenna device, including: a conductive shell, having an inner surface and an outer surface facing away from each other and having a slot, penetrating through the conductive shell from the inner surface to the outer surface, and a chamfer structure, formed at an intersection of the slot and the inner surface; an inner frame, disposed on the inner surface of the conductive shell, wherein the inner frame has an overflow groove, an opening of the overflow groove faces the inner surface, and a distance from the overflow groove to the chamfer structure is ≥ 0 mm and ≤ 2.0 mm; an adhesive glue, disposed between the conductive shell and the inner frame, wherein a part of the adhesive glue is located in the overflow groove; and a circuit board, disposed on the inner frame, wherein the circuit board and the slot form an antenna radiator.

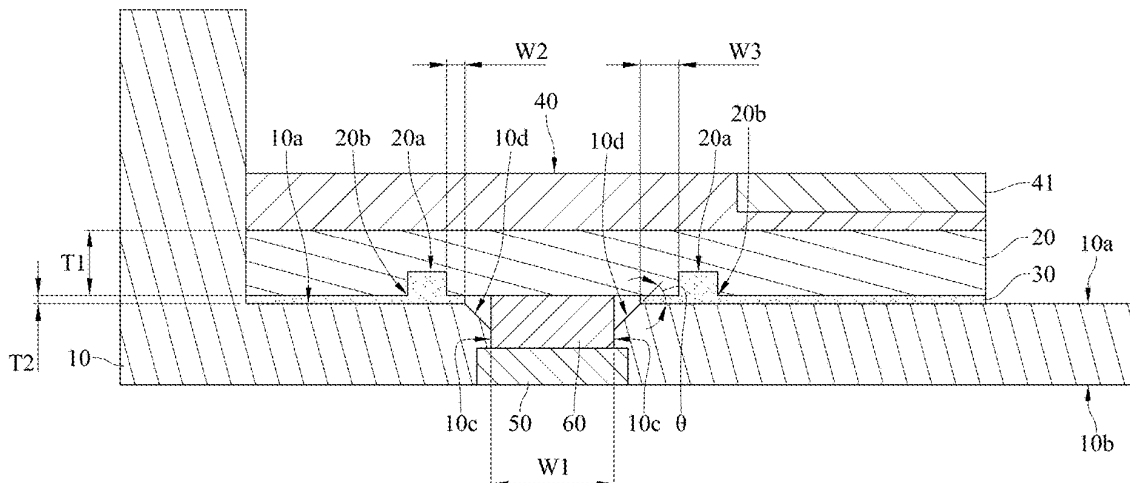
(21) Appl. No.: **18/972,186**

(22) Filed: **Dec. 6, 2024**

(30) **Foreign Application Priority Data**

Jun. 12, 2024 (CN) 202410758223.8

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(19) **United States**

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

(10) **Pub. No.: US 2025/0385435 A1**

(43) **Pub. Date: Dec. 18, 2025**

(54) **PLANAR ANTENNA**

(71) Applicant: **ALPHA NETWORKS INC.**, Hsinchu (TW)

(72) Inventors: **CHIH-YEN LIN**, Hsinchu (TW);
JIA-YAN LIN, Hsinchu (TW)

(73) Assignee: **ALPHA NETWORKS INC.**, Hsinchu (TW)

(21) Appl. No.: **18/928,914**

(22) Filed: **Oct. 28, 2024**

(30) **Foreign Application Priority Data**

Jun. 17, 2024 (TW) 113122332

Publication Classification

(51) **Int. Cl.**
H01Q 13/10 (2006.01)
H01Q 1/48 (2006.01)

H01Q 5/30 (2015.01)

H01Q 9/04 (2006.01)

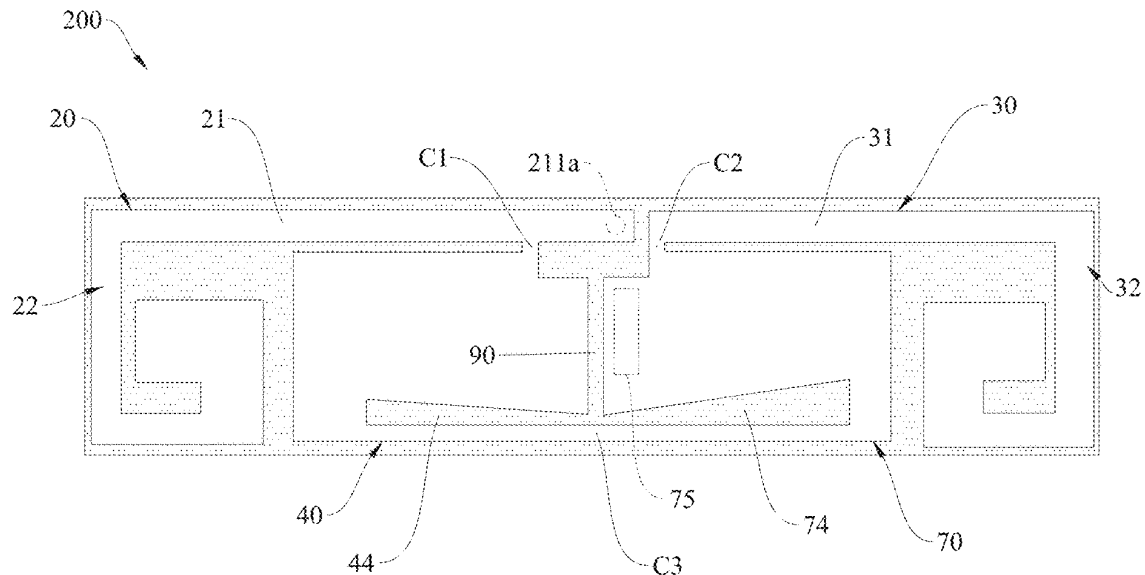
(52) **U.S. Cl.**

CPC **H01Q 13/106** (2013.01); **H01Q 1/48** (2013.01); **H01Q 5/30** (2015.01); **H01Q 9/0407** (2013.01)

(57)

ABSTRACT

A planar antenna is defined with a first axis having a first direction and a second direction opposite to the first direction and a second axis having a third direction and a fourth direction opposite to the third direction and includes a substrate having a surface on which a first radiation element, a first ground element, a second radiation element, and a second ground element are disposed. An end of a first main section of the first radiation element is for being fed with a signal. The first ground element is on a side of the first radiation element in the second direction. The second radiation element is on a side of the first main section in the third direction. The second ground element is on a side of a second main section of the first ground element in the third direction.





US 20250385711A1

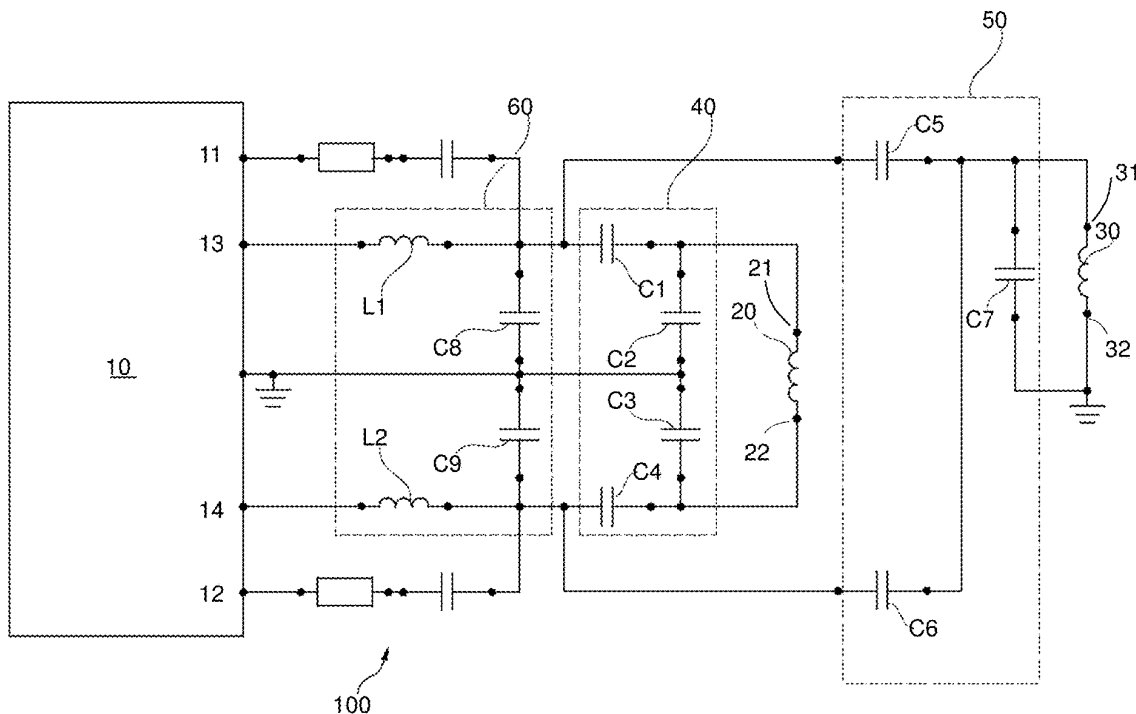
(19) **United States**(12) **Patent Application Publication**
Merlin et al.(10) **Pub. No.: US 2025/0385711 A1**(43) **Pub. Date: Dec. 18, 2025**(54) **DUAL-ANTENNA COMMUNICATION
DEVICE**(71) Applicant: **NXP B.V.**, Eindhoven (NL)(72) Inventors: **Erich Merlin**, Gratkorn (AT); **Manoj Kurvathodil**, Graz (AT); **Olivier Claude Moreau**, Cahagnes (FR); **Claude Caron**, Cormelles le Royal (FR); **Eric Maurice**, Amayé Sur Orne (FR); **Ayush Raj**, Caen (FR)(21) Appl. No.: **19/222,145**(22) Filed: **May 29, 2025**(30) **Foreign Application Priority Data**Jun. 14, 2024 (EP) 24305931.8
Jan. 31, 2025 (EP) 25305136.1**Publication Classification**(51) **Int. Cl.**
H04B 5/48 (2024.01)
H01Q 5/50 (2015.01)**H01Q 7/00** (2006.01)**H04B 5/43** (2024.01)(52) **U.S. Cl.**CPC **H04B 5/48** (2024.01); **H01Q 5/50**
(2015.01); **H01Q 7/00** (2013.01); **H04B 5/43**
(2024.01)

(57)

ABSTRACT

Dual-antenna communication devices and methods are disclosed. The device comprises: a controller, having a first, output, interface, comprising a first connector and a second connector; a first antenna coupled between the first connector and a ground; and

a second antenna, coupled between the first connector and the second connector; wherein the controller is configured to: transmit an output signal from the first antenna by providing a signal at the first connector and an in-phase copy of the signal at the second connector, and transmit the output signal from the second antenna by providing the signal at the first connector and an opposite-phase copy of the signal at the second connector.





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(19) **United States**

(12) **Patent Application Publication**
CHOI

(10) **Pub. No.: US 2025/0392031 A1**

(43) **Pub. Date: Dec. 25, 2025**

(54) **ELECTRONIC DEVICE COMPRISING ANTENNA**

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

(72) Inventor: **Youngbaek CHOI**, Suwon-si,
Gyeonggi-do (KR)

(21) Appl. No.: **19/305,314**

(22) Filed: **Aug. 20, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/KR2023/
021956, filed on Dec. 28, 2023.

(30) Foreign Application Priority Data

Feb. 20, 2023 (KR) 10-2023-0022494
Mar. 28, 2023 (KR) 10-2023-0040808

Publication Classification

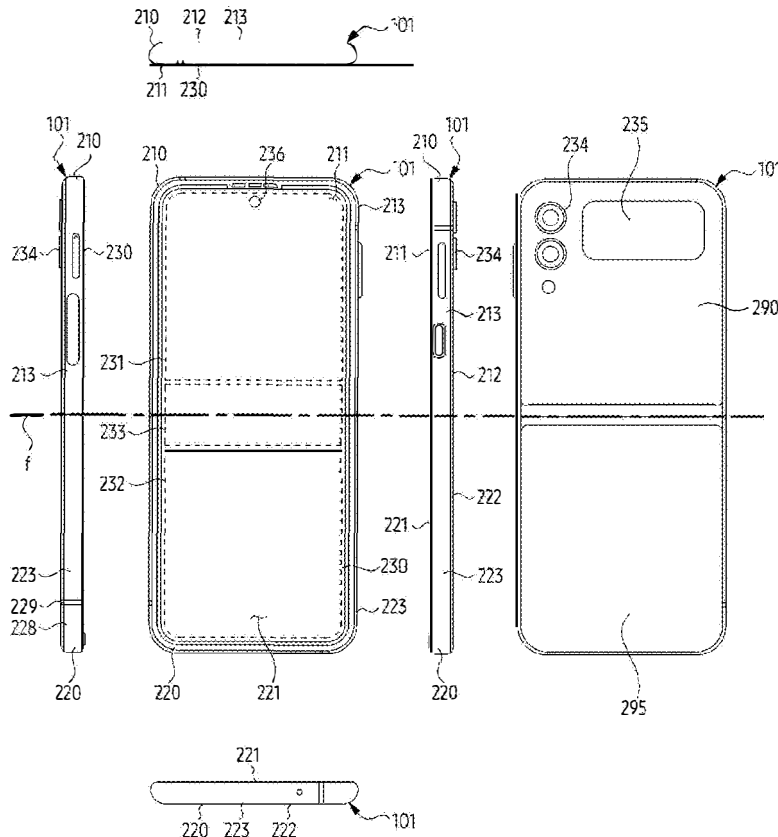
(51) **Int. Cl.**
H01Q 1/22 (2006.01)
H01Q 5/20 (2015.01)
H03H 7/42 (2006.01)
H04M 1/02 (2006.01)

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

CPC **H01Q 1/22** (2013.01); **H01Q 5/20**
(2015.01); **H03H 7/42** (2013.01); **H04M**
1/0218 (2013.01); **H04M 1/0241** (2013.01);
H04M 1/0268 (2013.01); **H04M 2250/12**
(2013.01)

(57) **ABSTRACT**

An electronic device may include a processor, a wireless communication circuit configured to provide a signal of a specified frequency band, a switching circuit, a first housing including a first conductive portion, and a second housing which includes a second conductive portion and is rotatable relative to the first housing, and may be configured to control the switching circuit such that the signal is transmitted through the second conductive portion, in an unfolded state where the distance between the first conductive portion and the second conductive portion is a predetermined distance or more. The electronic device may be configured to control, in a folded state where the distance between the first conductive portion and the second conductive portion is less than the predetermined distance, the switching circuit to transmit the signal through each of the second conductive portion and a third conductive portion, and in the folded state, the second conductive portion may be arranged to face at least a portion of the first conductive portion. In the folded state, the third conductive portion may be disposed at a position spaced apart from the second conductive portion by a specified distance or more.





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Wu et al.(10) **Pub. No.: US 2026/0005427 A1**(43) **Pub. Date: Jan. 1, 2026**(54) **ELECTRONIC DEVICE**(71) Applicant: **HUAWEI TECHNOLOGIES CO., LTD.**, Shenzhen (CN)(72) Inventors: **Pengfei Wu**, Shanghai (CN); **Hanyang Wang**, Reading (GB); **Meng Hou**, Shanghai (CN); **Chien-Ming Lee**, Shenzhen (CN)(73) Assignee: **HUAWEI TECHNOLOGIES CO., LTD.**, Shenzhen (CN)(21) Appl. No.: **19/317,982**(22) Filed: **Sep. 3, 2025****Related U.S. Application Data**

(63) Continuation of application No. 18/259,190, filed on Jun. 23, 2023, filed as application No. PCT/CN2021/136349 on Dec. 8, 2021, now Pat. No. 12,438,254.

(30) **Foreign Application Priority Data**

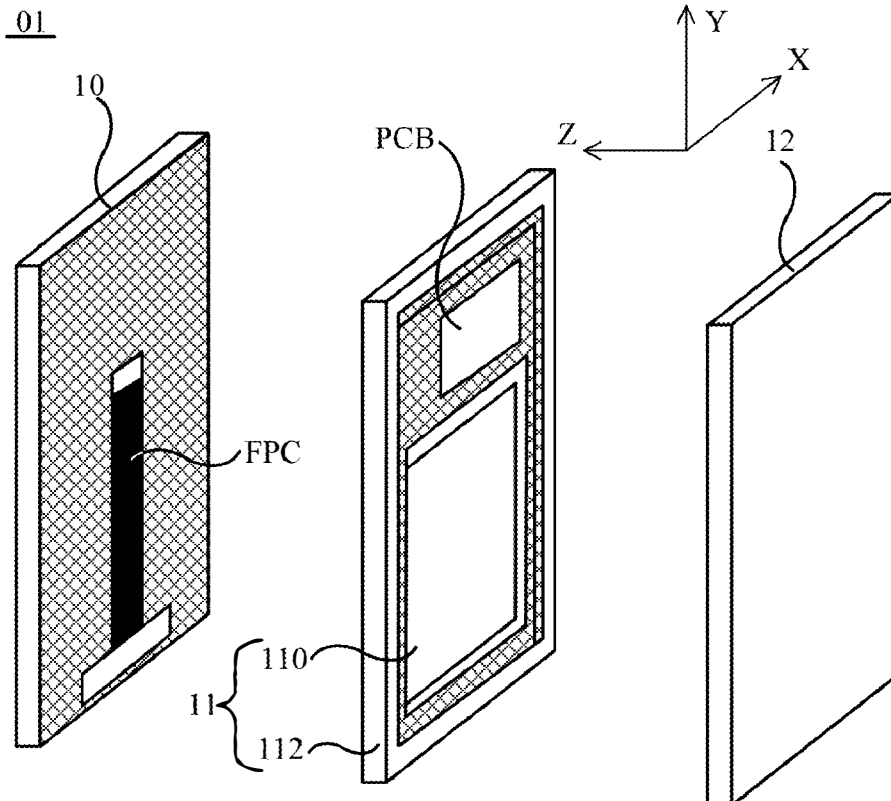
Dec. 25, 2020 (CN) 202011564230.2

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H01Q 1/24 (2006.01)
H01Q 1/38 (2006.01)**H01Q 1/48** (2006.01)**H01Q 1/50** (2006.01)**H01Q 1/52** (2006.01)**H01Q 5/378** (2015.01)**H01Q 13/18** (2006.01)**H01Q 21/28** (2006.01)(52) **U.S. Cl.**CPC **H01Q 1/243** (2013.01); **H01Q 1/38**(2013.01); **H01Q 1/48** (2013.01); **H01Q 1/50**(2013.01); **H01Q 1/523** (2013.01); **H01Q****13/18** (2013.01); **H01Q 21/28** (2013.01);**H01Q 5/378** (2015.01)

(57)

ABSTRACT

An electronic device includes a conductive frame and a first antenna unit. The conductive frame is disposed around a periphery of the electronic device. The first antenna unit includes a first conductive layer and a second conductive layer spaced apart in a thickness direction of the electronic device; a conductive connection portion is configured to connect the first conductive layer and the second conductive layer; and a conductive frame portion is a part of the conductive frame. The conductive connection portion, the conductive frame portion, the first conductive layer, and the second conductive layer enclose a first cavity, and the first conductive layer and the conductive frame portion are spaced apart to form a first slot of the first cavity.





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

(10) **Pub. No.: US 2026/0005428 A1**

(43) **Pub. Date: Jan. 1, 2026**

(54) **FOLDABLE ELECTRONIC DEVICE**

Publication Classification

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

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

(72) Inventors: **Lijun Ying**, Shanghai (CN); **Dong Yu**, Shanghai (CN); **Deyong Ge**, Shanghai (CN); **Zhangfei Yin**, Shanghai (CN); **Fangchao Zhao**, Shanghai (CN)

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

(73) Assignee: **HUAWEI TECHNOLOGIES CO., LTD.**, Shenzhen (CN)

(57) **ABSTRACT**

(21) Appl. No.: **19/320,473**

(22) Filed: **Sep. 5, 2025**

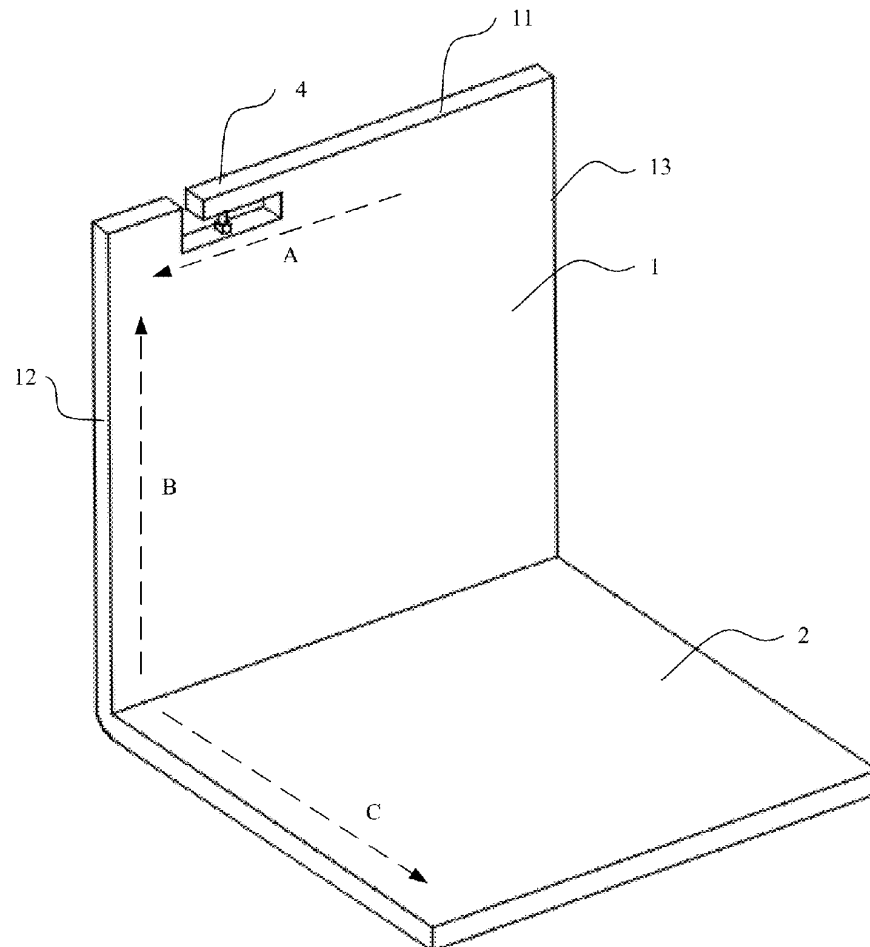
Related U.S. Application Data

(63) Continuation of application No. PCT/CN2024/086649, filed on Apr. 8, 2024.

(30) **Foreign Application Priority Data**

Apr. 28, 2023 (CN) 202310487175.9

A foldable electronic device includes an antenna, a hinge component, a first housing, and a second housing. The first housing includes a second side frame and a third side frame that are respectively located at two ends of the hinge component, and a first side frame that is connected to ends of the second side frame and the third side frame. When the antenna is located on the first side frame, a distance between a feed point and an edge that is of the ground plane and that faces the second or the third side frame is $\frac{1}{8}$ to $\frac{3}{8}$ of an operating wavelength of the antenna; or when the antenna is located on the second or the third side frame, a distance between the feed point and the hinge component is $\frac{1}{8}$ to $\frac{3}{8}$ of the operating wavelength of the antenna.





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(19) **United States**

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

(10) **Pub. No.: US 2026/0005431 A1**

(43) **Pub. Date: Jan. 1, 2026**

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

H01Q 5/314 (2015.01)

H01Q 9/04 (2006.01)

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

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

CPC **H01Q 1/52** (2013.01); **H01Q 1/22**
(2013.01); **H01Q 5/314** (2015.01); **H01Q**
9/0421 (2013.01); **H01Q 9/0457** (2013.01)

(72) Inventors: **Lijun Ying**, Shanghai (CN); **Dong Yu**,
Shanghai (CN); **Yiwen Gong**, Shanghai
(CN); **Hanyang Wang**, Reading (GB)

(21) Appl. No.: **18/880,785**

(57)

ABSTRACT

(22) PCT Filed: **Aug. 7, 2023**

(86) PCT No.: **PCT/CN2023/111416**

§ 371 (c)(1),

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

(30) **Foreign Application Priority Data**

Aug. 23, 2022 (CN) 202211014485.0

Jan. 20, 2023 (CN) 202310143745.2

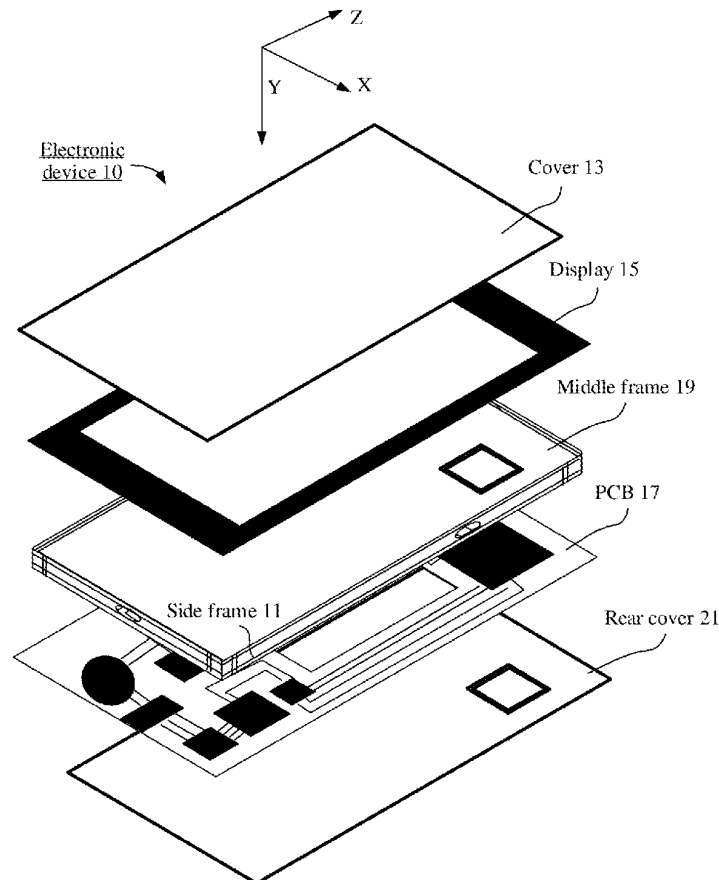
Publication Classification

(51) **Int. Cl.**

H01Q 1/52 (2006.01)

H01Q 1/22 (2006.01)

An antenna system is provided, including a first antenna and a ground. The first antenna includes a first feed circuit, an electrical component, a first stub, and a second stub. The second stub is coupled to the first stub at a first connection point, and the first stub is coupled to the ground, to form a ground stub of the first antenna. The second stub includes a first sub stub and a second sub stub, and the first sub stub and the second sub stub are located on two sides of the first connection point. The first sub stub is coupled to the first feed circuit, and is configured to perform feeding on the first antenna. In addition, a length of the second sub stub is different from a length of the first sub stub, and the second sub stub is coupled to the ground through the electrical component.





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(19) **United States**(12) **Patent Application Publication**
FUJIEDA(10) **Pub. No.: US 2026/0005438 A1**(43) **Pub. Date: Jan. 1, 2026**(54) **ANTENNA DEVICE AND COMMUNICATION
TERMINAL DEVICE****Publication Classification**

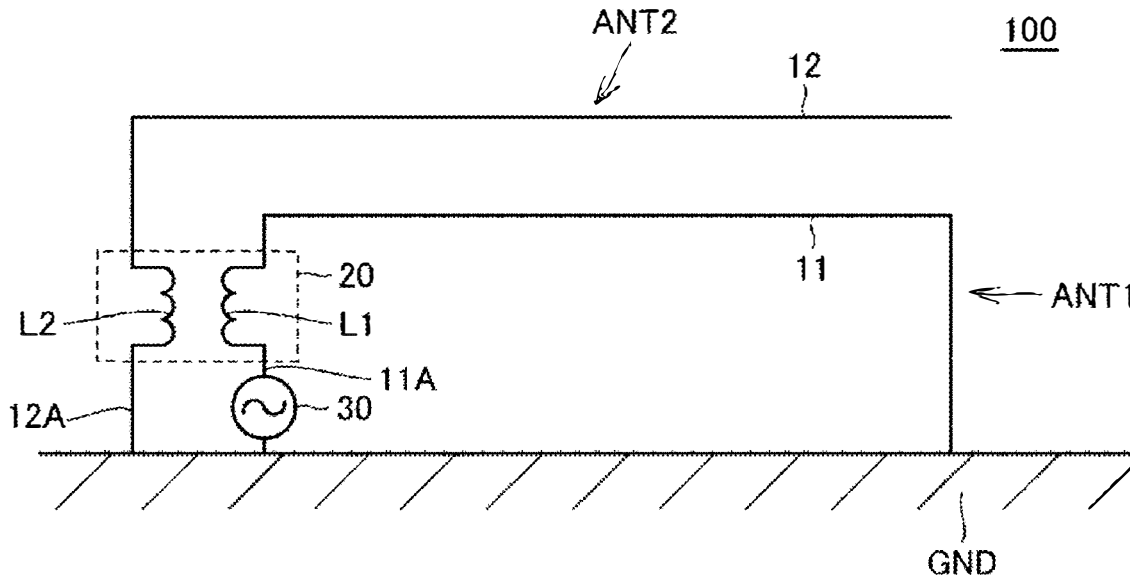
(51) **Int. Cl.**
H01Q 5/30 (2015.01)
H01Q 7/00 (2006.01)
(52) **U.S. Cl.**
CPC *H01Q 5/30* (2015.01); *H01Q 7/00*
(2013.01)

(71) Applicant: **Murata Manufacturing Co., Ltd.**,
Nagaokakyo-shi (JP)(72) Inventor: **Shigeyuki FUJIEDA**, Nagaokakyo-shi
(JP)(73) Assignee: **Murata Manufacturing Co., Ltd.**,
Nagaokakyo-shi (JP)(21) Appl. No.: **19/319,791**(22) Filed: **Sep. 5, 2025****Related U.S. Application Data**(63) Continuation of application No. PCT/JP2024/
002354, filed on Jan. 26, 2024.(30) **Foreign Application Priority Data**

Apr. 24, 2023 (JP) 2023-070812

(57) **ABSTRACT**

An antenna device and a communication terminal device that offer broader frequency bands or compatibility with a plurality of frequency bands without degrading an antenna characteristic are provided. An antenna device of the includes a first antenna including a loop structure and a second antenna of open type. The first antenna includes a first radiating element, a first coil connected in series to the first radiating element, and a first conductor. The second antenna includes a second radiating element, a second coil connected in series to the second radiating element and magnetically coupled with the first coil, and a second conductor. A feed circuit that transmits and receives a radio frequency signal is connected in series with the first radiating element or the second radiating element. The second radiating element is arranged outside the loop structure of the first antenna.





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Xu et al.

(10) **Pub. No.: US 2026/0005439 A1**
(43) **Pub. Date: Jan. 1, 2026**

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

Publication Classification

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

(51) **Int. Cl.**
H01Q 5/50 (2015.01)
H01Q 1/24 (2006.01)
H01Q 5/20 (2015.01)
H01Q 7/00 (2006.01)

(72) Inventors: **Bingbo Xu**, Shenzhen (CN); **Liwan
Zhang**, Xi'an (CN); **Liang Lu**, Xi'an
(CN); **Pengfei Wu**, Shanghai (CN);
Kun Feng, Shanghai (CN); **Xinpeng
Chen**, Xi'an (CN)

(52) **U.S. Cl.**
CPC **H01Q 5/50** (2015.01); **H01Q 1/243**
(2013.01); **H01Q 7/00** (2013.01); **H01Q 5/20**
(2015.01)

(73) Assignee: **Huawei Technologies Co., Ltd.**,
Shenzhen, Guangdong (CN)

(57) **ABSTRACT**

(21) Appl. No.: **19/322,136**

(22) Filed: **Sep. 8, 2025**

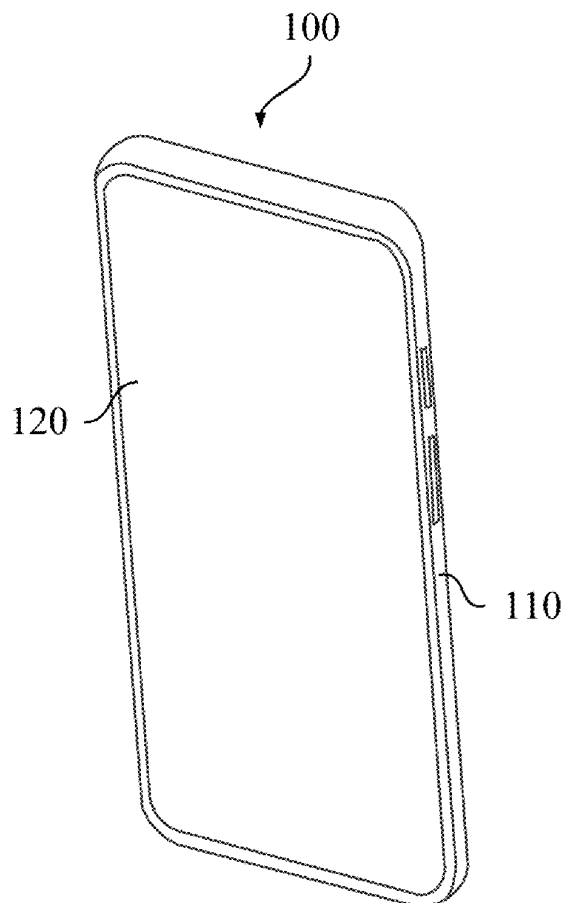
Related U.S. Application Data

(63) Continuation of application No. PCT/CN2024/
078013, filed on Feb. 22, 2024.

(30) **Foreign Application Priority Data**

Mar. 31, 2023 (CN) 202310380813.7

An antenna structure includes a first radiator, a second radiator, a transmission line, a feed point, and a ground point. A first end of the transmission line is electrically connected to the feed point, a second end of the transmission line is electrically connected to both the first radiator and the second radiator, and the first radiator is electrically connected to the ground point. In addition, an impedance of the first radiator in a first state and an impedance of the second radiator in a second state are conjugated, the transmission line separately transmits electromagnetic energy to the first radiator in the first state, and the transmission line separately transmits electromagnetic energy to the second radiator in the second state.





US 20260005442A1

(19) **United States**

(12) **Patent Application Publication**
GUO

(10) **Pub. No.: US 2026/0005442 A1**

(43) **Pub. Date: Jan. 1, 2026**

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

H01Q 1/24 (2006.01)

H01Q 1/38 (2006.01)

H01Q 1/52 (2006.01)

(71) Applicant: **Lenovo (Beijing) Limited**, Beijing
(CN)

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

CPC *H01Q 15/0086* (2013.01); *H01Q 1/2258*

(2013.01); *H01Q 1/241* (2013.01); *H01Q 1/38*

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

(72) Inventor: **Meijin GUO**, Beijing (CN)

(21) Appl. No.: **19/251,753**

(22) Filed: **Jun. 26, 2025**

(57)

ABSTRACT

(30) **Foreign Application Priority Data**

Jun. 28, 2024 (CN) 202410867231.6

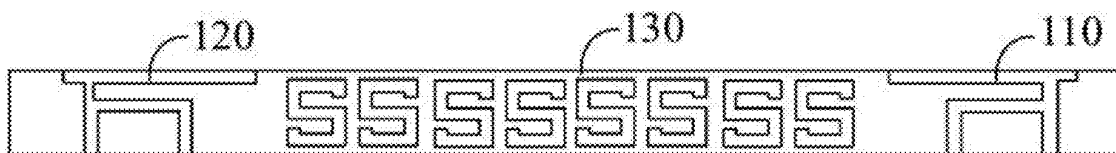
Publication Classification

(51) **Int. Cl.**

H01Q 15/00 (2006.01)

H01Q 1/22 (2006.01)

An antenna module includes an antenna unit and a first isolation unit. The antenna unit includes a first antenna and a second antenna arranged at an interval. The first isolation unit is arranged between the first antenna and the second antenna and configured to convert a transmission form of an electromagnetic wave coupled into the first isolation unit from the first antenna and/or the second antenna into an evanescent wave, to isolate a target signal between the first antenna and the second antenna.

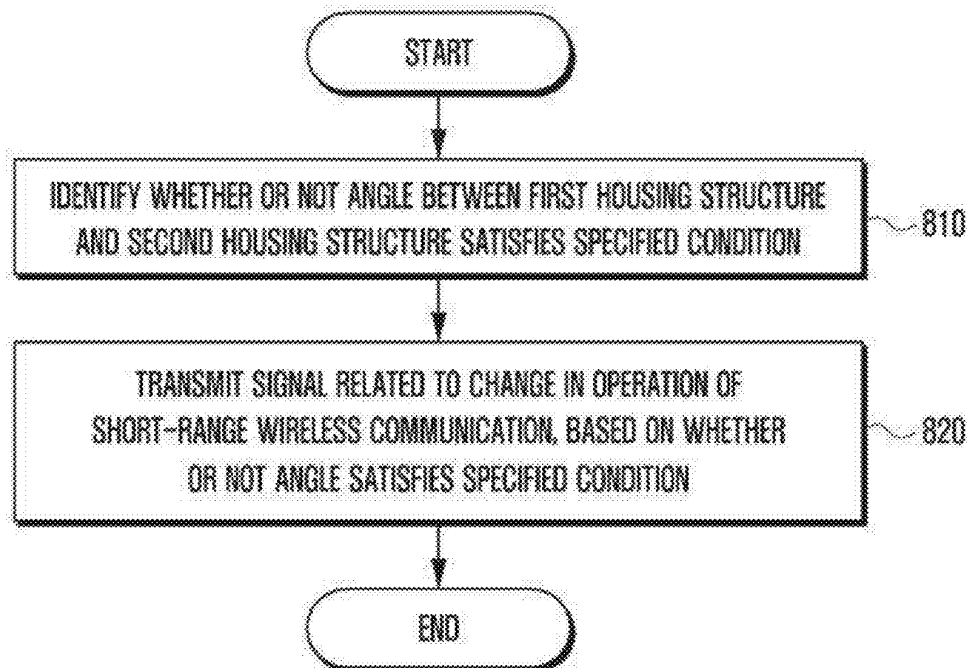




US 20260006121A1

(19) **United States**(12) **Patent Application Publication**
CHOI et al.(10) **Pub. No.: US 2026/0006121 A1**(43) **Pub. Date: Jan. 1, 2026**(54) **ELECTRONIC DEVICE FOR CHANGING
OPERATION OF WIRELESS
COMMUNICATION BASED ON CHANGE OF
ANGLE OF HOUSING AND METHOD
THEREFOR**(71) Applicant: **SAMSUNG ELECTRONICS CO.,
LTD.**, Suwon-si (KR)(72) Inventors: **Junsu CHOI**, Suwon-si (KR); **Hyeonu
Choi**, Suwon-si (KR); **Sunghwan Kim**,
Suwon-si (KR); **Hyunkee Min**,
Suwon-si (KR); **Junhak Lim**, Suwon-si
(KR); **Kiyeong Jeong**, Suwon-si (KR)(73) Assignee: **SAMSUNG ELECTRONICS CO.,
LTD.**, Suwon-si (KR)(21) Appl. No.: **19/320,571**(22) Filed: **Sep. 5, 2025****Related U.S. Application Data**(63) Continuation of application No. 18/071,927, filed on
Nov. 30, 2022, now Pat. No. 12,418,612, which is a
continuation of application No. PCT/KR2022/
015891, filed on Oct. 18, 2022.(30) **Foreign Application Priority Data**Oct. 22, 2021 (KR) 10-2021-0141553
Oct. 18, 2022 (KR) 10-2022-0134245**Publication Classification**(51) **Int. Cl.**
H04M 1/72454 (2021.01)
H04M 1/02 (2006.01)
(52) **U.S. Cl.**
CPC **H04M 1/72454** (2021.01); **H04M 1/0216**
(2013.01)(57) **ABSTRACT**

An electronic device includes: a hinge structure; a foldable housing including a first housing structure and a second housing structure that are configured to be foldable relative to each other around the hinge structure; a first antenna provided in the first housing structure; a second antenna provided in the second housing structure; a communication circuit electrically connected to the first antenna and the second antenna, and configured to transmit and receive data through a first link and a second link established between an external electronic device and the electronic device; and a processor operatively connected to the communication circuit, wherein the processor is configured to: identify whether an angle between the first housing structure and the second housing structure satisfies a specified condition; and control the communication circuit to transmit, through at least one of the first link and the second link, a signal related to a change in an operation of short-range wireless communication, based on whether the angle satisfies the specified condition.

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US 20260011908A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0011908 A1**

(43) **Pub. Date: Jan. 8, 2026**

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

Publication Classification

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

(51) **Int. Cl.**
H01Q 1/22 (2006.01)
H01Q 5/20 (2015.01)
H01Q 5/30 (2015.01)

(72) Inventors: **Xiaoyong DONG**, Shenzhen (CN); **Jin
DONG**, Shenzhen (CN); **Hui YU**,
Shenzhen (CN); **Yuzhan LI**, Shenzhen
(CN)

(52) **U.S. Cl.**
CPC **H01Q 1/2291** (2013.01); **H01Q 1/22**
(2013.01); **H01Q 5/20** (2015.01); **H01Q 5/30**
(2015.01)

(73) Assignee: **Honor Device Co., Ltd.**, Shenzhen
(CN)

(21) Appl. No.: **18/992,865**

(22) PCT Filed: **Nov. 27, 2023**

(86) PCT No.: **PCT/CN2023/134361**

§ 371 (c)(1),

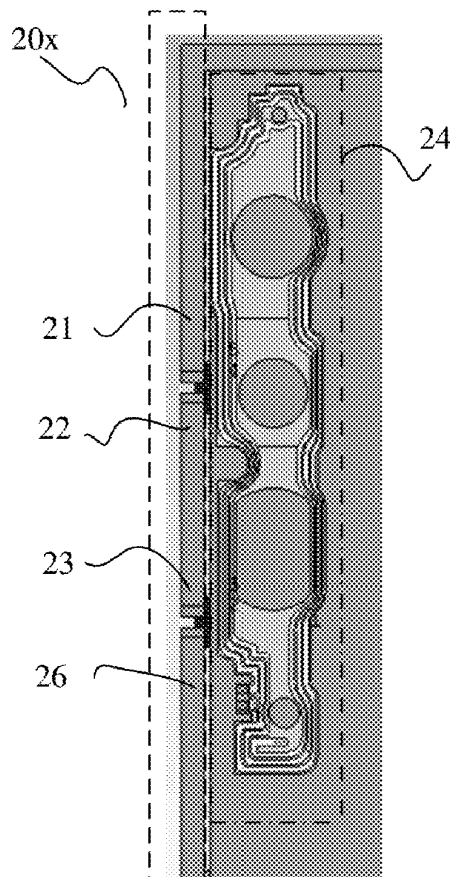
(2) Date: **Jan. 9, 2025**

(30) **Foreign Application Priority Data**

Feb. 16, 2023 (CN) 202310144912.5

(57) **ABSTRACT**

Embodiments of this application disclose an antenna system and an electronic device. The antenna system includes one NFC antenna and N conventional antennas, and each of the N conventional antennas includes a feed point, a grounding point, and a radiating branch. M conventional antennas in the N conventional antennas include blocking devices. An i^{th} antenna includes an i^{th} radiating branch, an i^{th} feed point, an i^{th} blocking device, and an i^{th} grounding point, the i^{th} radiating branch is coupled to the i^{th} feed point, and the i^{th} radiating branch is coupled to the i^{th} grounding point through the i^{th} blocking device. The blocking device is configured to block a radio frequency signal in a frequency band of the NFC antenna in the M conventional antennas. The M conventional antennas are within a field strength range of radiation of the NFC antenna. Radiation performance of the NFC antenna is improved.





US 20260011909A1

(19) **United States**(12) **Patent Application Publication**
AN et al.(10) **Pub. No.: US 2026/0011909 A1**(43) **Pub. Date: Jan. 8, 2026**(54) **ANTENNA AND ELECTRONIC DEVICE
INCLUDING THE SAME****Publication Classification**(51) **Int. Cl.****H01Q 1/24**

(2006.01)

H01Q 1/38

(2006.01)

H04B 1/38

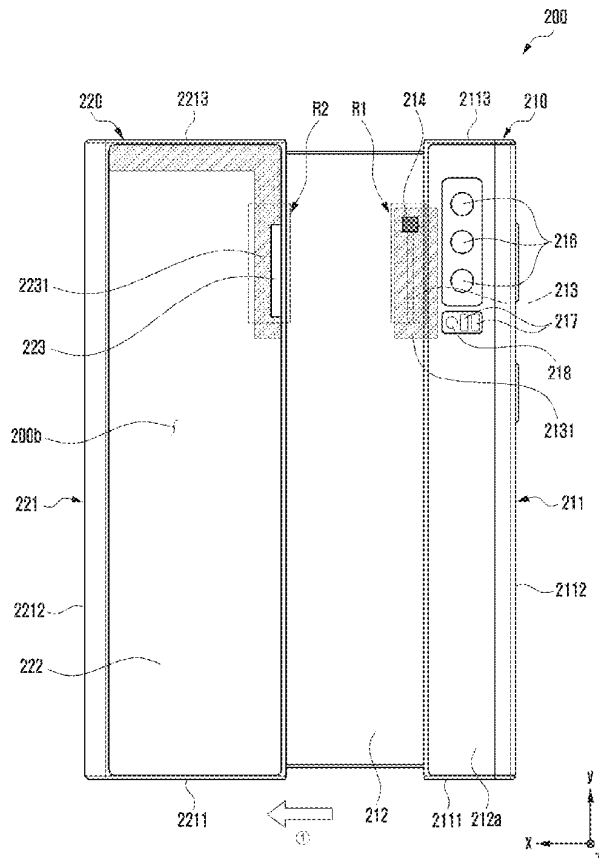
(2015.01)

(52) **U.S. Cl.**CPC **H01Q 1/24** (2013.01); **H01Q 1/38**
(2013.01); **H04B 1/38** (2013.01)(71) Applicant: **Samsung Electronics Co., Ltd.**,
Suwon-si (KR)(72) Inventors: **Seongyong AN**, Suwon-si (KR);
Hyeonuk Kang, Suwon-si (KR); **Jiho Kim**,
Suwon-si (KR); **Kyungmoon Seol**, Suwon-si (KR); **Kyihyun Jang**,
Suwon-si (KR); **Jaebong Chun**,
Suwon-si (KR)(21) Appl. No.: **19/328,383**(22) Filed: **Sep. 15, 2025****Related U.S. Application Data**(63) Continuation of application No. 18/624,302, filed on
Apr. 2, 2024, now Pat. No. 12,418,098, which is a
continuation of application No. 17/511,910, filed on
Oct. 27, 2021, now Pat. No. 11,949,149, which is a
continuation of application No. PCT/KR2021/
014098, filed on Oct. 13, 2021.(30) **Foreign Application Priority Data**

Oct. 30, 2020 (KR) 10-2020-0143807

(57) **ABSTRACT**

According to various embodiments, an electronic device includes: a first housing including a first area, a second housing coupled to be slidable in a first direction from the first housing and including a second area overlapping the first area in a slide-in state, an antenna structure disposed in the first housing to overlap the first area when the first housing is viewed from the top, a conductive part disposed in the second area and electromagnetically connected to the antenna structure in the slide-in state, and wireless communication circuitry electrically connected to the antenna structure. The wireless communication circuitry may be configured to transmit and/or receive radio signals in at least one designated frequency band through the antenna structure and the conductive part in the slide-in state.





US 20260011911A1

(19) **United States**

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

(10) **Pub. No.: US 2026/0011911 A1**

(43) **Pub. Date: Jan. 8, 2026**

(54) **ELECTRONIC DEVICE INCLUDING ANTENNA**

Publication Classification

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

(51) **Int. Cl.**
H01Q 1/42 (2006.01)
G06F 1/16 (2006.01)
H01Q 1/24 (2006.01)
H01Q 3/12 (2006.01)

(72) Inventors: **Namwoo KIM**, Suwon-si (KR);
Jeongho KANG, Suwon-si (KR);
Sunglak KIM, Suwon-si (KR);
Yoonjung KIM, Suwon-si (KR);
Changi PARK, Suwon-si (KR);
Kyungmoon SEOL, Suwon-si (KR);
Junyoung CHOI, Suwon-si (KR);
Hyunchul HONG, Suwon-si (KR);
Minho KIM, Suwon-si (KR); **Kyihyun JANG**, Suwon-si (KR); **Byounguk YOON**, Suwon-si (KR)

(52) **U.S. Cl.**
CPC **H01Q 1/42** (2013.01); **G06F 1/1652** (2013.01); **H01Q 1/243** (2013.01); **H01Q 3/12** (2013.01)

(57) **ABSTRACT**

The disclosure relates to an electronic device. An electronic device according to an embodiment of the disclosure may comprise a first housing; a second housing rotatably connected to one side of the first housing and including a first conductive portion; a third housing rotatably connected to another side of the first housing; a first hinge member disposed between the first housing and the second housing; a second hinge member disposed between the first housing and the third housing; and a flexible display disposed on front surfaces of the first, second and the third housings and configured to be at least partially folded or unfolded, in a state where the second housing and the third housing are folded toward a portion of the flexible display disposed on the first housing, the first conductive portion of the second housing and a side portion of the third housing may be spaced apart from each other.

(21) Appl. No.: **19/324,721**

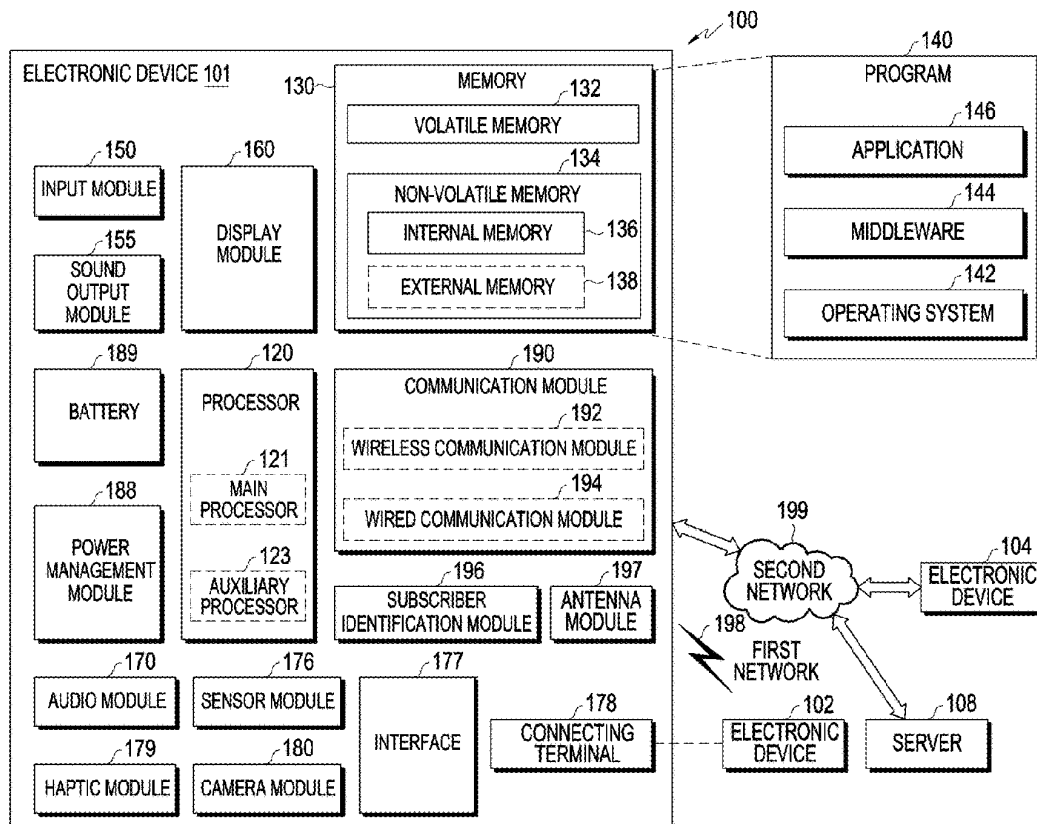
(22) Filed: **Sep. 10, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/KR2024/008560, filed on Jun. 20, 2024.

(30) **Foreign Application Priority Data**

Jul. 10, 2023 (KR) 10-2023-0089228
Aug. 24, 2023 (KR) 10-2023-0111416





US 20260011918A1

(19) **United States**(12) **Patent Application Publication**
Liu et al.(10) **Pub. No.: US 2026/0011918 A1**(43) **Pub. Date: Jan. 8, 2026**(54) **COMPACT DUAL BAND ANTENNA**(71) Applicant: **Honeywell International Inc.,**
Charlotte, NC (US)(72) Inventors: **Zhong Liu**, Doylestown, PA (US);
Amit B. Kulkarni, Duluth, GA (US);
Justin Jose, Muvattupuzha (IN)(21) Appl. No.: **19/324,839**(22) Filed: **Sep. 10, 2025****Related U.S. Application Data**(63) Continuation of application No. 18/160,065, filed on
Jan. 26, 2023, now Pat. No. 12,431,621.**Publication Classification**(51) **Int. Cl.**
H01Q 5/307 (2015.01)
H01Q 1/48 (2006.01)
H01Q 9/04 (2006.01)(52) **U.S. Cl.**CPC **H01Q 5/307** (2015.01); **H01Q 1/48**
(2013.01); **H01Q 9/0407** (2013.01)(57) **ABSTRACT**

An antenna system formed by one or more layers of a Printed Circuit Board (PCB). The antenna system includes a first antenna element configured to resonate in a first frequency band centered at about 5.4 GHz and a second antenna element configured to resonate in a second frequency band centered at about 2.4 GHz. The first antenna element and the second antenna element fit within a rectangular area of less than about 100 square millimeters on the PCB. The first antenna element has a bandwidth of at least 2 GHz and the second antenna element has a bandwidth of at least 100 MHz, wherein the bandwidth is defined as having less than a -10 dB return loss within the band. The first antenna element and the second antenna element may be formed on a common conductive layer of a PCB.

