US 20250283734A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0283734 A1**

OZAKI (43) **Pub. Date: Sep. 11, 2025**

(54) **POSITION DETECTION DEVICE AND ACTUATOR**

(71) Applicant: **SMC CORPORATION**, Tokyo (JP)

(72) Inventor: **Norimasa OZAKI**, Tsukubamirai-shi (JP)

(73) Assignee: **SMC CORPORATION**, Tokyo (JP)

(21) Appl. No.: **19/068,269**

(22) Filed: **Mar. 3, 2025**

(30) **Foreign Application Priority Data**

Mar. 8, 2024 (JP) 2024-036084

Publication Classification

(51) **Int. Cl.**

G01D 5/14 (2006.01)

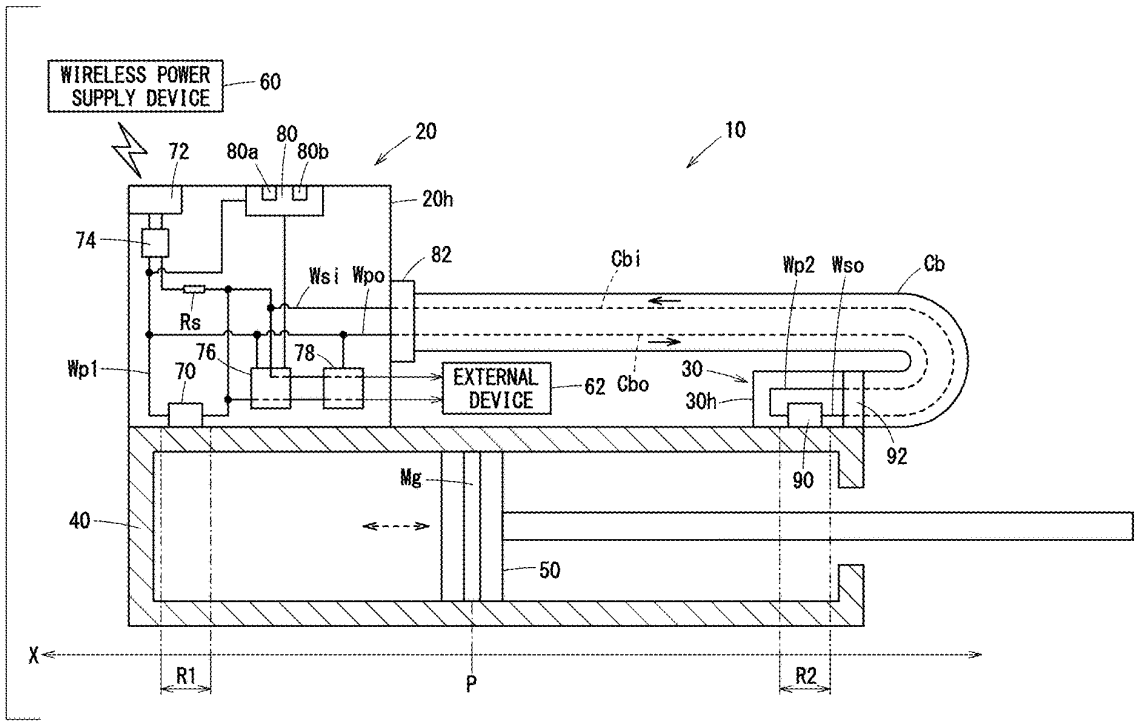
H02J 50/00 (2016.01)

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

CPC ***G01D 5/14*** (2013.01); ***H02J 50/00*** (2016.02)

(57) **ABSTRACT**

A position detection device includes a first sensor that outputs a first detection signal when a piston is located within a first detection range, a detection unit that detects the piston position based on the first detection signal, an antenna that receives power wirelessly, a power supply line through which the power is supplied from the antenna to the first sensor when the piston is located within the first detection range, and a power output line configured to output, when the piston is located outside the first detection range, the power to a sensor module used for detecting the piston position.



US 20250285838A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0285838 A1**

(43) **Pub. Date: Sep. 11, 2025**

IKEDA et al.

(54) **FILTER CIRCUIT AND PLASMA PROCESSING APPARATUS**

(71) Applicant: **Tokyo Electron Limited**, Tokyo (JP)

(72) Inventors: **Taro IKEDA**, Nirasaki City (JP); **Shuto WATANABE**, Nirasaki City (JP); **Yuki OSADA**, Nirasaki City (JP)

(21) Appl. No.: **19/061,185**

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

(30) **Foreign Application Priority Data**

Mar. 5, 2024 (JP) 2024-033211

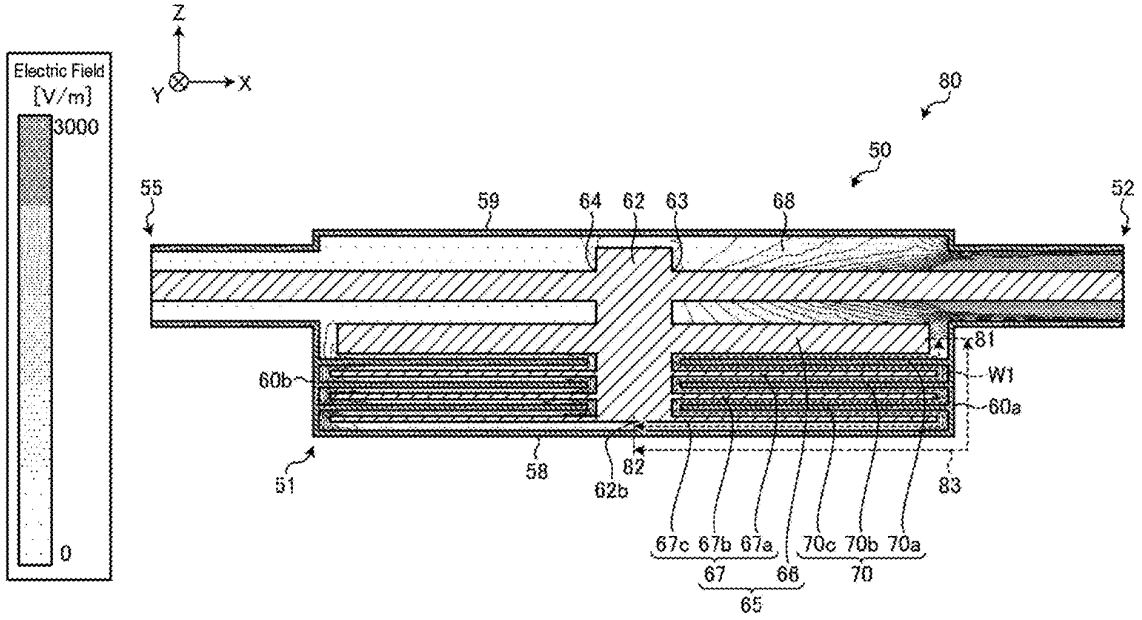
Publication Classification

(51) **Int. Cl.**
H01J 37/32 (2006.01)

(52) **U.S. Cl.**
CPC ***H01J 37/32174*** (2013.01); ***H01J 37/3211*** (2013.01); *H01J 2237/334* (2013.01)

(57) **ABSTRACT**

A filter circuit, includes: a housing made of a conductor and including an input port and an output port, formed with outer and inner conductors, wherein the housing is at ground potential with the outer conductors and includes an internal space having an area extending in first and second directions orthogonal to each other in a plane view; a partition portion made of a conductor and connected to the housing to partition the internal space; and a power feed line that is provided within the housing while insulated from the housing and includes input-side and output-side conductors, which are the inner conductors of the input and output ports, an antenna portion connected to the input-side and output-side conductors and extending in the internal space to be stacked with the partition portion, and an antenna base connecting the input-side and output-side conductors and the antenna portion.



US 20250286262A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0286262 A1**

(43) **Pub. Date: Sep. 11, 2025**

CHOI et al.

(54) **DISPLAY DEVICE**

(71) Applicants: **Samsung Display Co., LTD.**, Yongin-si (KR); **UNIST (ULSAN NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY)**, Ulsan (KR)

(72) Inventors: **Jae Uk CHOI**, Yongin-si (KR); **Gangil BYUN**, Ulsan (KR); **Kyuho LEE**, Ulsan (KR); **Ki Seo KIM**, Yongin-si (KR); **Young Sik KIM**, Yongin-si (KR); **In Nam LEE**, Yongin-si (KR); **Seungbin KIM**, Ulsan (KR); **Jin Myeong HEO**, Ulsan (KR)

(21) Appl. No.: **18/944,179**

(22) Filed: **Nov. 12, 2024**

(30) **Foreign Application Priority Data**

Mar. 5, 2024 (KR) 10-2024-0031157

Publication Classification

(51) **Int. Cl.**

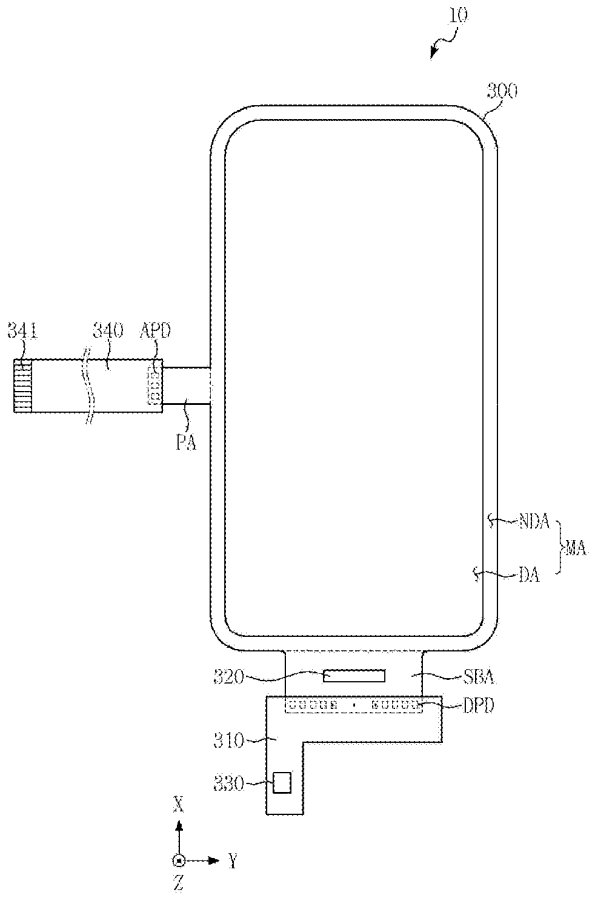
H01Q 1/22 (2006.01)
G01S 13/89 (2006.01)
H01Q 1/48 (2006.01)
H01Q 21/06 (2006.01)

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

CPC ***H01Q 1/22*** (2013.01); ***G01S 13/89*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 21/06*** (2013.01)

(57) **ABSTRACT**

According to an embodiment, a display device may include a display panel including a display area and a non-display region disposed outside the display area, and including a flexible substrate including a protruded area extended from a portion of the non-display area, and an antenna circuit board connected to the protruded area. The non-display region includes a first non-display area positioned on a long side of the display panel, a second non-display area positioned on a short side of the display panel and a third non-display area positioned on a corner of the display panel, connecting the first non-display area with the second non-display area, and the display panel includes at least one transmitting antenna disposed at least partially in, or adjacent to, the first non-display area, adjacent first receiving antennas and a second receiving antenna disposed in the third non-display area.



US 20250286263A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0286263 A1**

CHEN (43) **Pub. Date: Sep. 11, 2025**

(54) **ANTENNA MODULE AND FIXED BRACKET THEREOF**

(71) Applicant: **WISTRON NEWEB CORPORATION**, HSINCHU (TW)

(72) Inventor: **YUAN-YU CHEN**, HSINCHU (TW)

(21) Appl. No.: **19/007,692**

(22) Filed: **Jan. 2, 2025**

(30) **Foreign Application Priority Data**

Mar. 7, 2024 (TW) 113108261

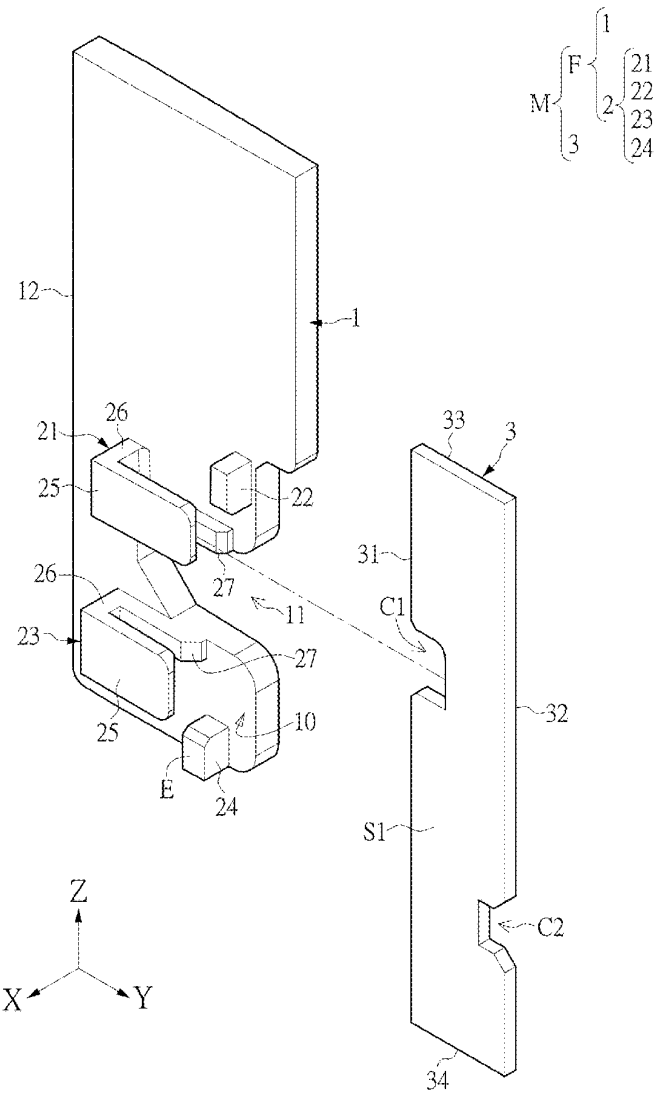
Publication Classification

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

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

(57) **ABSTRACT**

An antenna module includes a fixed bracket and an antenna element. The fixed bracket includes a base and a clamping structure disposed on the base. The clamping structure includes a first clamping part, a first retaining wall, a second clamping part, and a second retaining wall. The first clamping part and the second clamping part are arranged along a straight line. A horizontal distance between the first clamping part and the straight line is not equal to a horizontal distance between the second clamping part and the straight line. A horizontal distance between the first retaining wall and the straight line is not equal to a horizontal distance between the second retaining wall and the straight line. The antenna element is detachably engaged with the first clamping part and the second clamping part.



US 20250286266A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0286266 A1**

(43) **Pub. Date: Sep. 11, 2025**

ZHU et al.

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

(71) Applicant: **Wistron NeWeb Corporation**, Hsinchu (TW)

(72) Inventors: **Jia-Le ZHU**, Hsinchu (TW); **Hong-Jun JIAN**, Hsinchu (TW); **Chia-Hao CHANG**, Hsinchu (TW)

(21) Appl. No.: **19/070,601**

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

(30) **Foreign Application Priority Data**

Mar. 11, 2024 (TW) 113108884

Publication Classification

(51) **Int. Cl.**

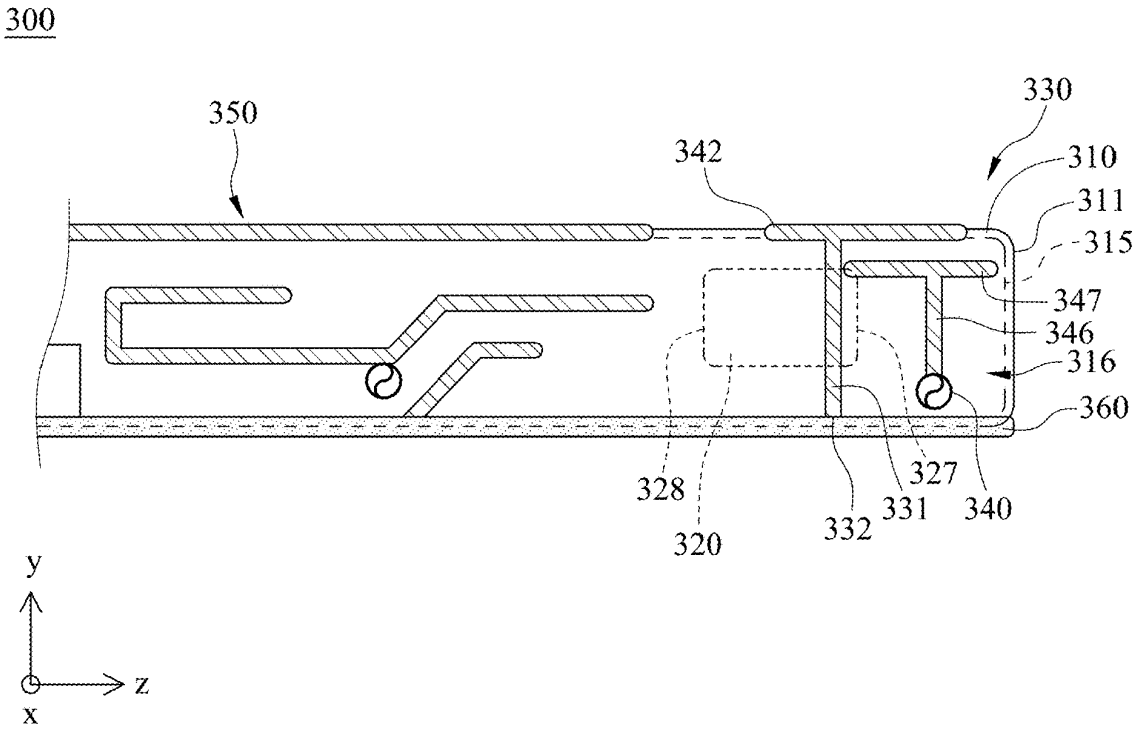
H01Q 1/22 (2006.01)
H01Q 9/04 (2006.01)
H01Q 9/30 (2006.01)

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

CPC ***H01Q 1/2266*** (2013.01); ***H01Q 9/0421*** (2013.01); ***H01Q 9/30*** (2013.01)

(57) **ABSTRACT**

A speaker module includes a cavity body, a speaker element and a first antenna. The cavity body includes an outer surface, an inner surface and an accommodation space. The inner surface forms the accommodation space. The speaker element is disposed in the accommodation space. The first antenna is disposed on and extended along the outer surface.



US 20250286277A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0286277 A1**

TAI et al. (43) **Pub. Date: Sep. 11, 2025**

(54) **HYBRID ANTENNA STRUCTURE**

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

(72) Inventors: **Chih-Feng TAI**, Hsinchu (TW); **Kuei-Cheng WANG**, Hsinchu (TW); **Ting-Yu ZHANG**, Hsinchu (TW)

(21) Appl. No.: **19/009,133**

(22) Filed: **Jan. 3, 2025**

(30) **Foreign Application Priority Data**

Mar. 6, 2024 (TW) 113108136

Publication Classification

(51) **Int. Cl.**

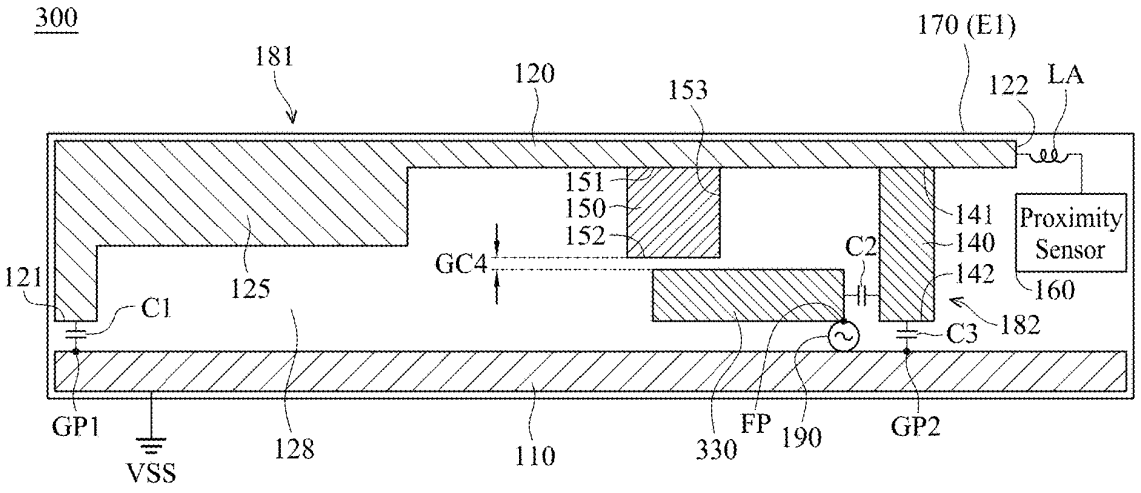
H01Q 5/20	(2015.01)
H01Q 1/48	(2006.01)
H01Q 9/04	(2006.01)

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

CPC ***H01Q 5/20*** (2015.01); ***H01Q 1/48*** (2013.01); ***H01Q 9/0421*** (2013.01); ***H01Q 9/0485*** (2013.01)

(57) **ABSTRACT**

A hybrid antenna structure includes a ground element, a main radiation element, a feeding radiation element, a shorting radiation element, an auxiliary radiation element, a proximity sensor, a dielectric substrate, an inductor, a first capacitor, a second capacitor, and a third capacitor. The main radiation element is coupled through the first capacitor to a first grounding point on the ground element. The feeding radiation element has a feeding point. The shorting radiation element is coupled to the main radiation element, and is coupled through the second capacitor to the feeding radiation element. The shorting radiation element is further coupled through the third capacitor to a second grounding point on the ground element. The auxiliary radiation element is coupled to the main radiation element. The auxiliary radiation element is adjacent to the feeding radiation element. The proximity sensor is coupled through the inductor to the main radiation element.



US 20250273846A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0273846 A1**

Chan et al. (43) **Pub. Date: Aug. 28, 2025**

(54) **PARASITIC SLOTS FOR ANTENNA ENHANCEMENT**

(71) Applicant: **Google LLC**, Mountain View, CA (US)

(72) Inventors: **Yun-Ying Chan**, New Taipei City (TW); **Cheng-Jung Lee**, San Jose, CA (US); **Chia-cheng Lin**, New Taipei City (TW); **Cheng-Han Lee**, New Taipei City (TW); **Huanyu Chen**, Fremont, CA (US); **Peter Bevelacqua**, Sunnyvale, CA (US); **Josh Tu**, Sunnyvale, CA (US); **Mitchell Hoertz**, San Francisco, CA (US); **Brian Huynh**, San Jose, CA (US)

(73) Assignee: **Google LLC**, Mountain View, CA (US)

(21) Appl. No.: **18/587,458**

(22) Filed: **Feb. 26, 2024**

Publication Classification

(51) **Int. Cl.**

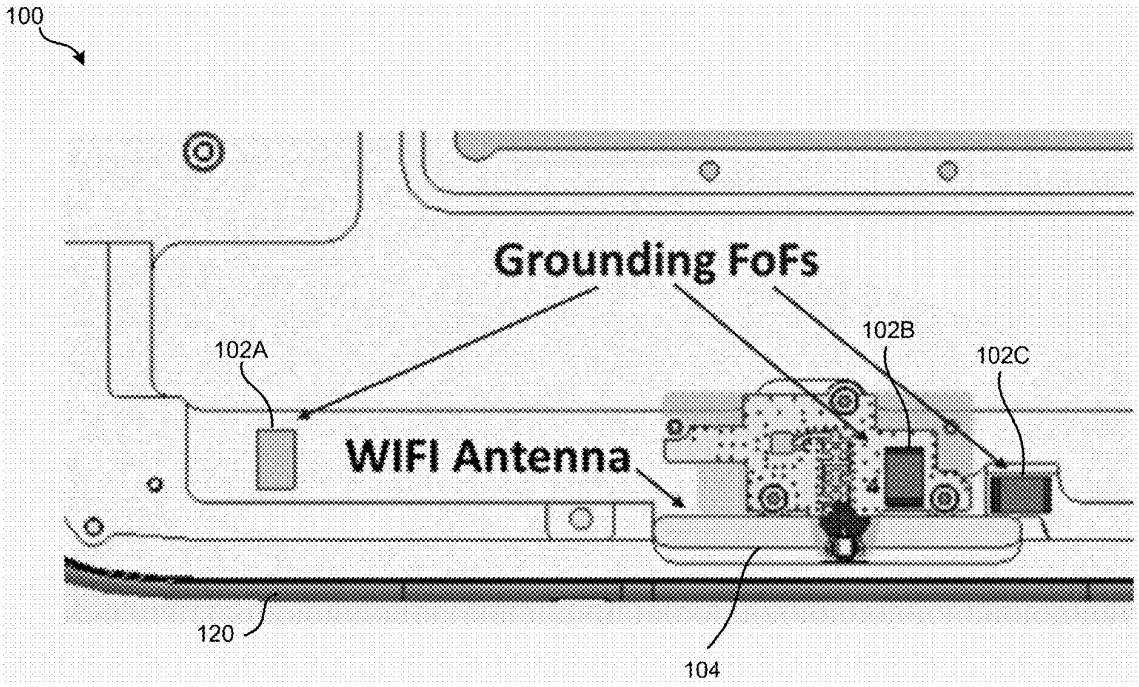
H01Q 1/22	(2006.01)
H01Q 1/48	(2006.01)
H01Q 13/10	(2006.01)

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

CPC ***H01Q 1/2291*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 13/10*** (2013.01)

(57) **ABSTRACT**

Various arrangements for including a parasitic slot are described herein. A wireless fidelity (WIFI) slot antenna is mounted within a first area of an electronic device that includes a metal enclosure, wherein the antenna includes a primary slot. A parasitic slot is formed within a second area of the electronic device, wherein the parasitic slot is positioned within the second area and has a size configured to increase an efficiency of a frequency range of the WIFI slot antenna.



US 20250274151A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0274151 A1**

(43) **Pub. Date: Aug. 28, 2025**

CHIEN et al.

(54) **ANTENNA DEVICE AND ELECTRONIC APPARATUS USING THE SAME**

(71) Applicant: **Universal Global Technology (Kunshan) Co.,Ltd**, KUNSHAN (CN)

(72) Inventors: **JUI-CHIH CHIEN**, KUNSHAN (CN); **CHANG-WEI LIN**, KUNSHAN (CN); **YANG-KAI CHOU**, KUNSHAN (CN); **YONG-TING LEE**, KUNSHAN (CN); **CHIH-SEN HSIEH**, KUNSHAN (CN)

(21) Appl. No.: **18/964,882**

(22) Filed: **Dec. 2, 2024**

(30) **Foreign Application Priority Data**

Feb. 26, 2024 (CN) 202410208378.4

Publication Classification

(51) **Int. Cl.**

H04B 1/10 (2006.01)

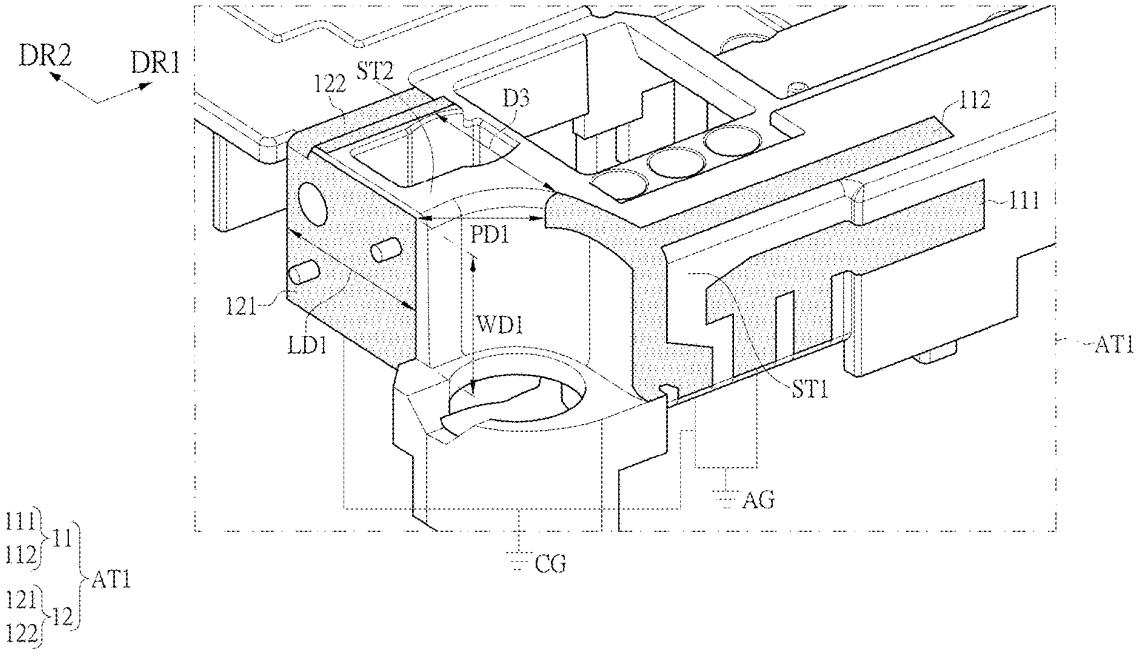
H01Q 9/04 (2006.01)

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

CPC ***H04B 1/1018*** (2013.01); ***H01Q 9/0414*** (2013.01)

(57) **ABSTRACT**

An antenna device and an electronic apparatus are provided. An antenna device includes an antenna structure and a noise suppression part. The noise suppression part is disposed at one side of the antenna structure. The noise suppression part and the antenna structure have a predetermined distance therebetween. The noise suppression part is connected to the antenna structure through a common grounding part. The noise suppression part and the antenna structure are separately disposed.



US 20250279571A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0279571 A1**

(43) **Pub. Date: Sep. 4, 2025**

KANEKO et al.

(54) **WINDOW GLASS FOR VEHICLE**

(71) Applicant: **AGC Inc.**, Tokyo (JP)

(72) Inventors: **Satoshi KANEKO**, Tokyo (JP); **Hideaki Shoji**, Tokyo (JP); **Shoichi Takeuchi**, Tokyo (JP)

(73) Assignee: **AGC Inc.**, Tokyo (JP)

(21) Appl. No.: **19/210,084**

(22) Filed: **May 16, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/JP2023/040907, filed on Nov. 14, 2023.

(30) **Foreign Application Priority Data**

Nov. 22, 2022 (JP) 2022-186874

Publication Classification

(51) **Int. Cl.**

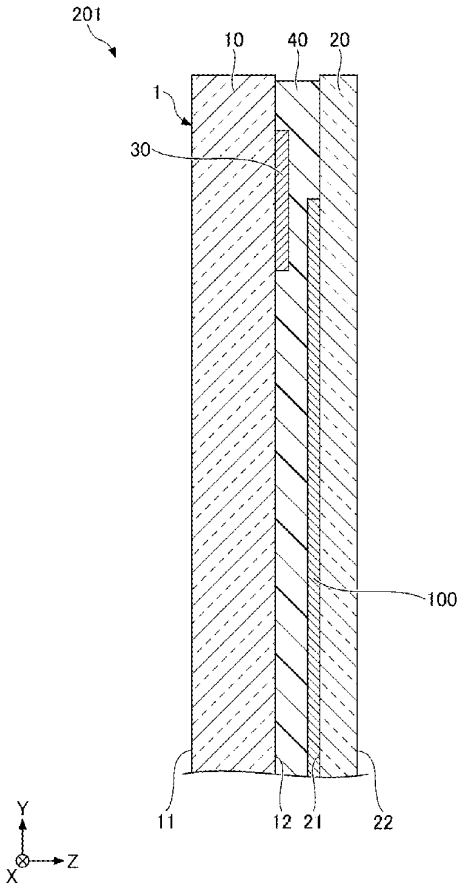
H01Q 1/12	(2006.01)
B32B 17/10	(2006.01)
H05B 3/86	(2006.01)

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

CPC ***H01Q 1/1278*** (2013.01); ***B32B 17/10036*** (2013.01); ***B32B 17/10385*** (2013.01); ***B32B 17/10495*** (2013.01); ***H05B 3/86*** (2013.01); *B32B 2307/202* (2013.01); *B32B 2605/00* (2013.01); *H05B 2203/013* (2013.01)

(57) **ABSTRACT**

A window glass for a vehicle comprises a laminated glass for a vehicle including a first glass plate having a first main surface and a second main surface opposite to the first main surface, a second glass plate having a third main surface facing the second main surface and a fourth main surface opposite to the third main surface, and an interlayer film disposed between the second main surface and the third main surface, a planar antenna disposed between the second main surface and the third main surface, and a conductive member that is separated from the antenna in a direction from the first glass plate toward the second glass plate and overlaps at least a part of the antenna in a plan view of the laminated glass.



US 20250279582A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0279582 A1**

(43) **Pub. Date: Sep. 4, 2025**

TEZUKA

(54) **ANTENNA DEVICE**

(71) Applicant: **TDK Corporation**, Tokyo (JP)

(72) Inventor: **Kenichi TEZUKA**, Tokyo (JP)

(73) Assignee: **TDK Corporation**, Tokyo (JP)

(21) Appl. No.: **19/069,378**

(22) Filed: **Mar. 4, 2025**

(30) **Foreign Application Priority Data**

Mar. 4, 2024 (JP) 2024-032005

Publication Classification

(51) **Int. Cl.**

H01Q 5/307 (2015.01)

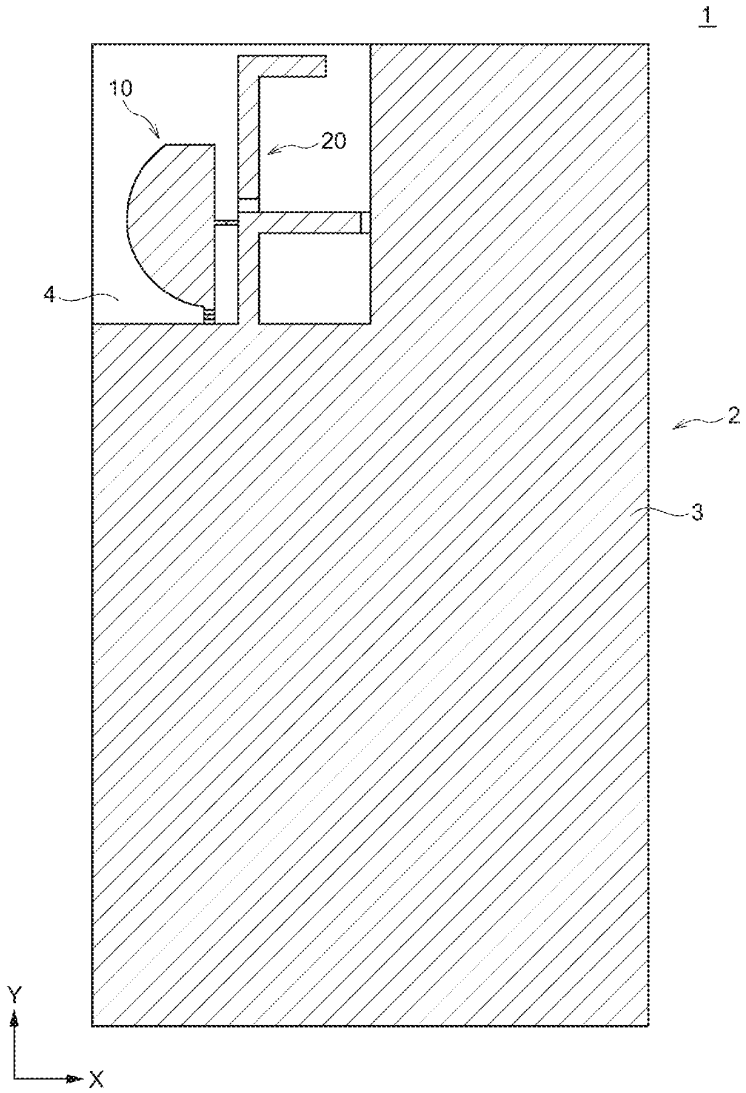
H01Q 9/28 (2006.01)

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

CPC ***H01Q 5/307*** (2015.01); ***H01Q 9/28*** (2013.01)

(57) **ABSTRACT**

Disclosed herein is an antenna device that includes a substrate, a ground conductor formed on the substrate, first and second antenna conductor patterns arranged in a ground clearance area on the substrate, and a capacitive element connecting the first and second antenna conductor patterns. The first antenna conductor pattern includes a first radiation pattern extending in a first direction from a first feed point. When a wavelength with respect to a center frequency of an electromagnetic wave in wireless communication using the first antenna conductor pattern is λ, the capacitive element is connected within a range between +λ/20 from a center position of the first radiation pattern in the first direction.



US 20250279584A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0279584 A1**

SHI (43) **Pub. Date: Sep. 4, 2025**

(54) **CIRCULARLY POLARIZED ANTENNA AND INTELLIGENT TERMINAL**

(71) Applicant: **GUANGDONG COROS SPORTS TECHNOLOGY CO., LTD**, Dongguan (CN)

(72) Inventor: **Xianwei SHI**, Dongguan (CN)

(21) Appl. No.: **19/209,999**

(22) Filed: **May 16, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/CN2022/139995, filed on Dec. 19, 2022.

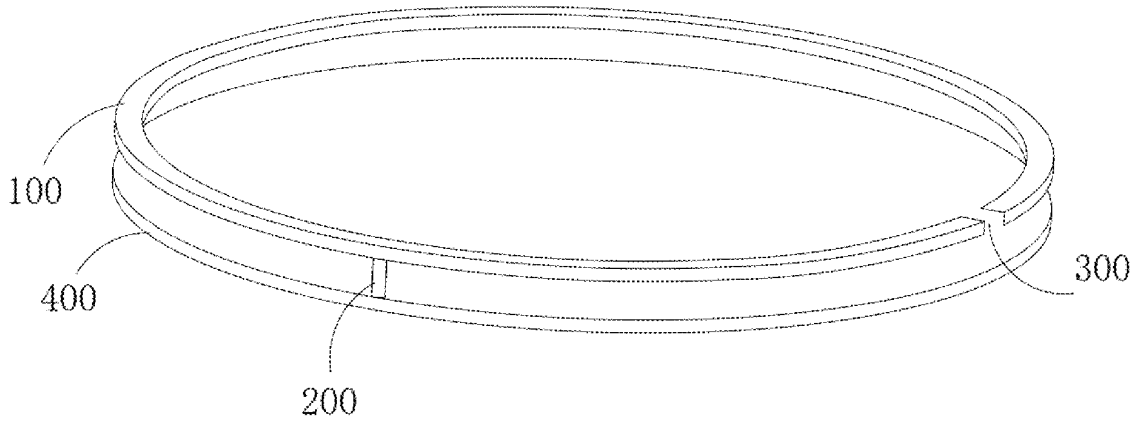
Publication Classification

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

(52) **U.S. Cl.**
CPC ***H01Q 9/0428*** (2013.01); ***H01Q 9/045*** (2013.01)

(57) **ABSTRACT**

Provided are a circularly polarized antenna and an intelligent terminal. The circularly polarized antenna includes an annular radiator and a first feed terminal. A first breakpoint is provided on the radiator, and a first capacitor or a first inductor is connected in series with the radiator at the first breakpoint. One end of the first feed terminal is electrically connected to the radiator, and another end of the first feed terminal is electrically connected to a first feed module of a mainboard. When a capacitor or inductor is connected in series with the radiator at the first breakpoint, the resonance frequencies of a first mode and a second mode excited on the radiator which are mutually perpendicular will both change, so that the difference between the resonance phase of the first mode and the resonance phase of the second mode reaches 90°, thereby the circular polarization is realized.



US 20250279590A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0279590 A1**

LIN et al. (43) **Pub. Date: Sep. 4, 2025**

(54) **ANTENNA DEVICE**

(71) Applicants: **Inventec (Pudong) Technology Corporation**, Shanghai (CN); **INVENTEC CORPORATION**, Taipei City (TW)

(72) Inventors: **Hsin-Hung LIN**, Taipei City (TW); **Yu Shu TAI**, Taipei City (TW); **Wei-Chen CHENG**, Taipei City (TW)

(73) Assignees: **Inventec (Pudong) Technology Corporation**, Shanghai (CN); **INVENTEC CORPORATION**, Taipei City (TW)

(21) Appl. No.: **18/602,918**

(22) Filed: **Mar. 12, 2024**

(30) **Foreign Application Priority Data**

Mar. 1, 2024 (CN) 202410238917.9

Publication Classification

(51) **Int. Cl.**

H01Q 21/06 (2006.01)

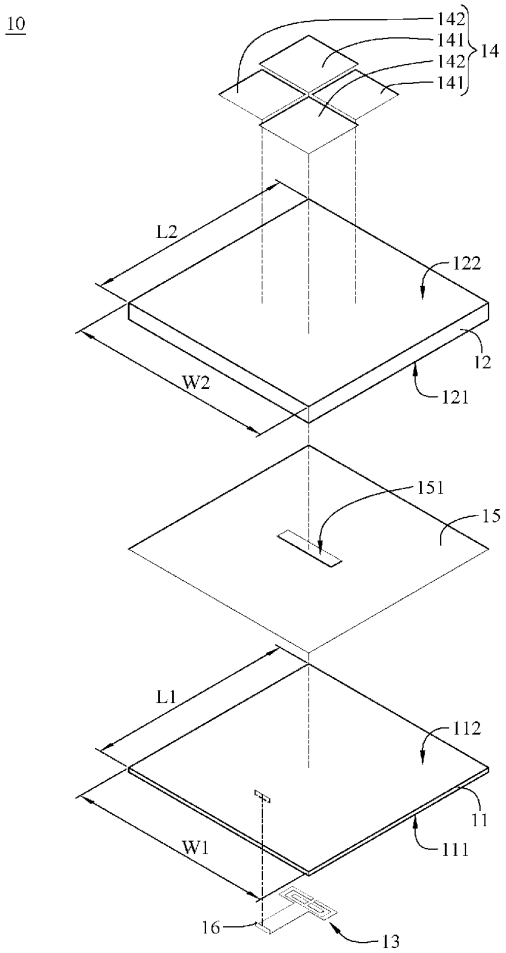
H01Q 21/00 (2006.01)

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

CPC ***H01Q 21/065*** (2013.01); ***H01Q 21/0025*** (2013.01)

(57) **ABSTRACT**

An antenna device includes a first substrate, a second substrate, a T-shaped exciter and a radiator. The first substrate has a first bottom surface and a first top surface opposite to each other. The second substrate is stacked on the first substrate, and has a second bottom surface and a second top surface opposite to each other. The second bottom surface faces the first top surface. The T-shaped exciter is disposed on the first bottom surface, and includes a head portion and an extending portion. The extending portion is connected to a side of the head portion. The radiator is disposed on the second top surface, and includes two first radiation components and two second radiation components arranged along two diagonals of the radiator, respectively. A size of each of the two first radiation components is different from a size of each of the two second radiation components.



US 20250280063A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0280063 A1**

Bevelacqua et al. (43) **Pub. Date: Sep. 4, 2025**

(54) **DISPLAY CHASSIS GROUNDING**

(71) Applicant: **Google LLC**, Mountain View, CA (US)

(72) Inventors: **Peter Bevelacqua**, Sunnyvale, CA (US); **Huanyu Chen**, Fremont, CA (US); **Cheng-Jung Lee**, San Jose, CA (US); **Sunny Kung**, Taipei (TW); **Daniel Lin**, Taipei (TW)

(73) Assignee: **Google LLC**, Mountain View, CA (US)

(21) Appl. No.: **18/592,109**

(22) Filed: **Feb. 29, 2024**

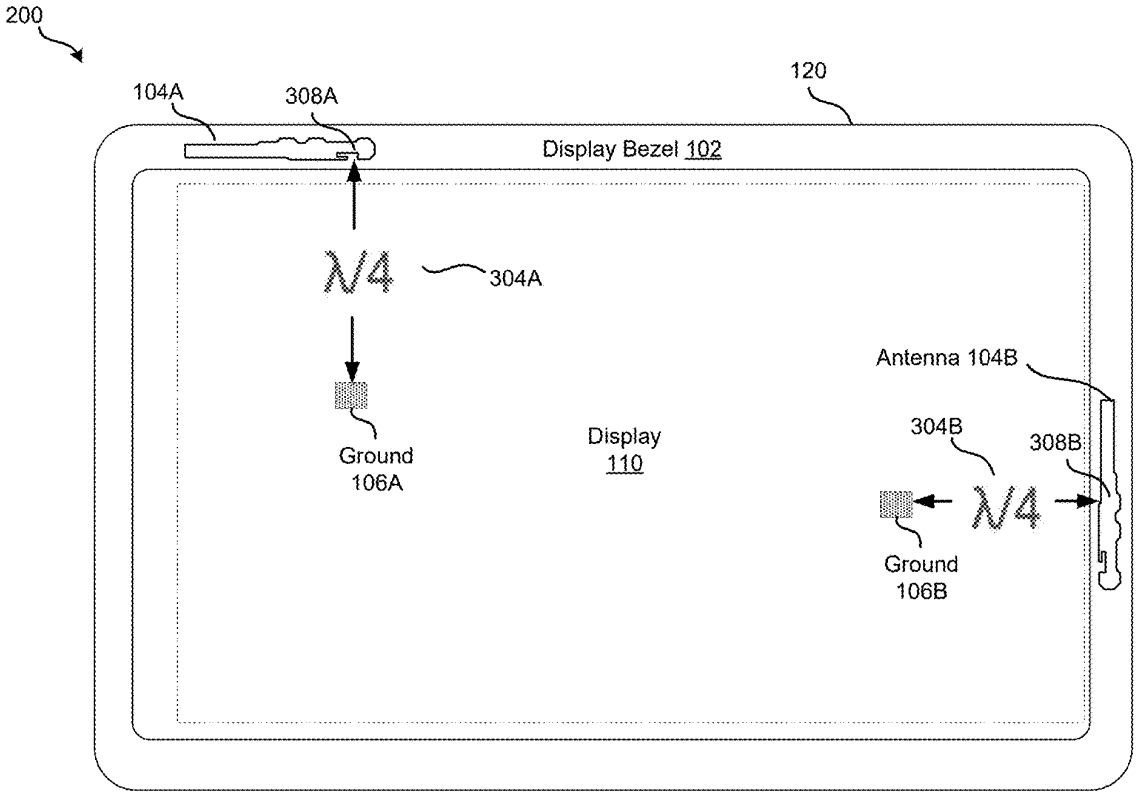
Publication Classification

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

(52) **U.S. Cl.**
CPC ***H04M 1/0266*** (2013.01)

(57) **ABSTRACT**

Various arrangements for positioning a ground are described herein. A display is mounted within a first area of an enclosure of the electronic device. An antenna, configured to operate at one or more frequency bands, mounted within a second area of the enclosure that is outside of the first area; and one or more grounds positioned beneath the display and within the first area of the electronic device, wherein the one or more grounds are configured to provide grounding for the display and are positioned at or near a distance that is a quarter-wavelength associated with one or more wavelengths of the one or more of the frequency bands of the antenna.



US 20250286264A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0286264 A1**

(43) **Pub. Date: Sep. 11, 2025**

XU et al.

(54) **ELECTRONIC DEVICE AND CONFIGURING METHOD THEREOF**

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

(72) Inventors: **Yuling XU**, Beijing (CN); **Dafei MO**, Beijing (CN)

(21) Appl. No.: **19/059,231**

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

(30) **Foreign Application Priority Data**

Mar. 5, 2024 (CN) 202410251711.X

Publication Classification

(51) **Int. Cl.**

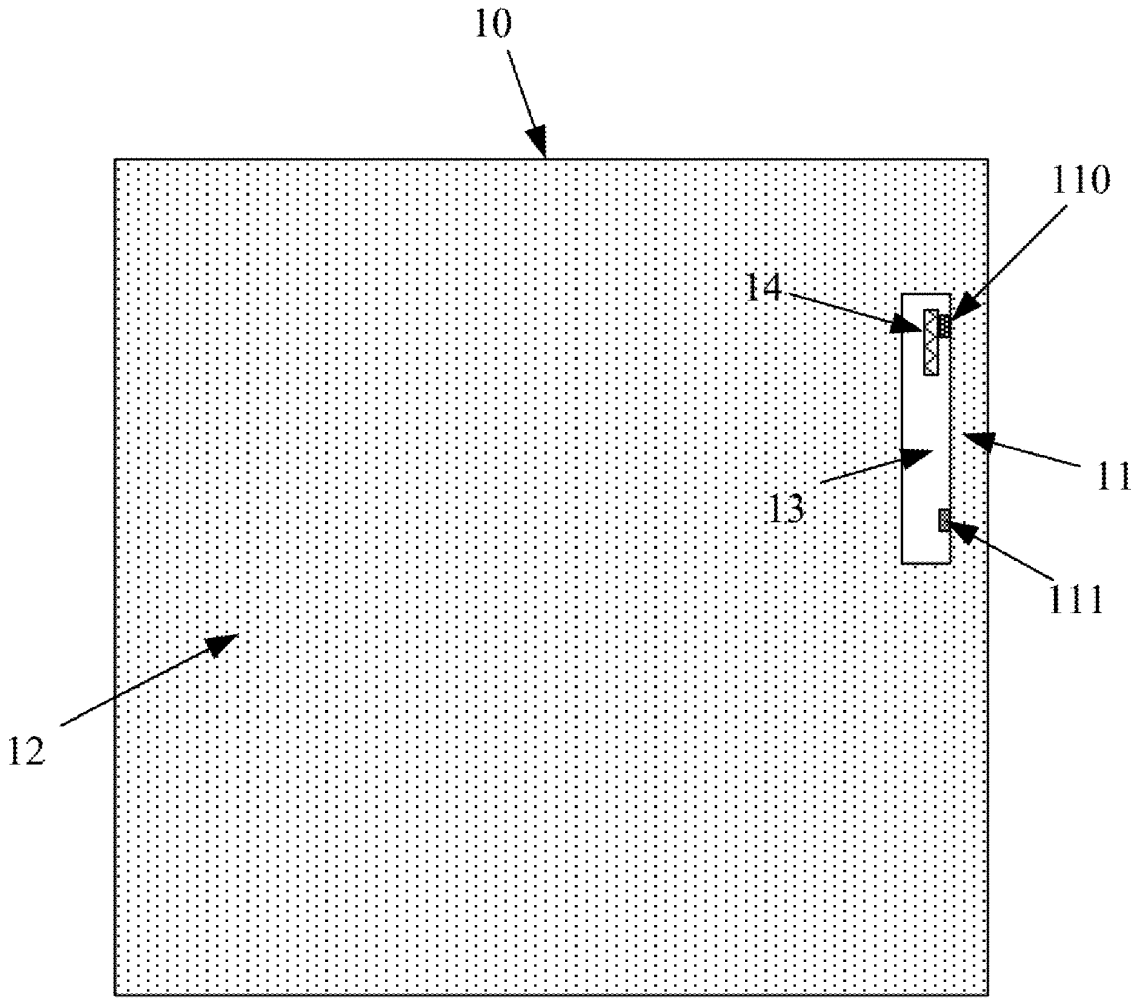
H01Q 1/22 (2006.01)
H01Q 1/48 (2006.01)
H01Q 1/50 (2006.01)

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

CPC ***H01Q 1/22*** (2013.01); ***H01Q 1/48*** (2013.01); ***H01Q 1/50*** (2013.01)

(57) **ABSTRACT**

An electronic device includes a first conductor and a second conductor, where the first conductor is a part of a housing of the electronic device, and the second conductor is another part of the housing of the electronic device; and a closed-loop gap is between the first conductor and at least a part of the second conductor, and the first conductor includes a feeding point and a first grounding point; and includes an antenna feeder, coupled with the closed-loop gap for feeding or in a direct contact with the feeding point for feeding, where the closed-loop gap is configured to radiate a radio frequency signal, and at least a part of the first conductor is configured to radiate a radio frequency signal.



US 20250286265A1

(19) **United States**

(12) **Patent Application Publication**

PARK et al.

(10) **Pub. No.: US 2025/0286265 A1**

(43) **Pub. Date: Sep. 11, 2025**

(54) **ELECTRONIC DEVICE COMPRISING ANTENNA**

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

(72) Inventors: **Seongjin PARK**, Suwon-si (KR); **Hosaeng KIM**, Suwon-si (KR); **Sumin YUN**, Suwon-si (KR); **Jaehoon JO**, Suwon-si (KR)

(21) Appl. No.: **19/091,167**

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

Related U.S. Application Data

(63) Continuation of application No. PCT/KR2023/015068, filed on Sep. 27, 2023.

(30) **Foreign Application Priority Data**

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Oct. 28, 2022 (KR) 10-2022-0141805

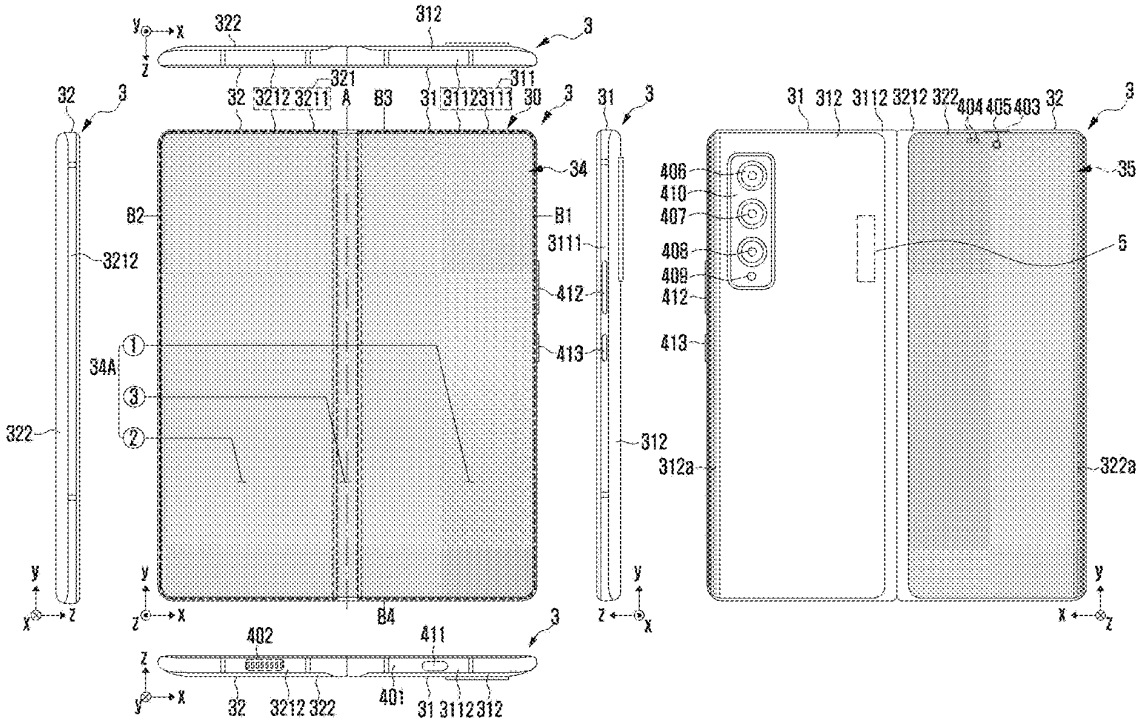
Publication Classification

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

(52) **U.S. Cl.**
CPC ***H01Q 1/22*** (2013.01); ***H01Q 9/0414*** (2013.01)

(57) **ABSTRACT**

An electronic device is provided. The electronic device includes a wireless communication circuit, an antenna structure including a printed circuit board electrically connected to the wireless communication circuit, wherein the printed circuit board includes a first surface, a second surface facing an opposite direction from the first surface, and an antenna element disposed on the first surface or disposed inside the printed circuit board closer to the first surface than the second surface, a non-conductive dielectric facing the first surface and overlapping with the antenna element when viewed from above the first surface, and a conductive path at least a portion of which is disposed on the printed circuit board and which is electrically connected to the wireless communication circuit, wherein the conductive path is in physical contact with the non-conductive dielectric.



US 20250286268A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0286268 A1**

(43) **Pub. Date: Sep. 11, 2025**

OH et al.

(54) **ANTENNA AND ELECTRONIC DEVICE COMPRISING SAME**

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

(72) Inventors: **Dongjun OH**, Suwon-si (KR); **Taeik KIM**, Suwon-si (KR); **Haeyeon KIM**, Suwon-si (KR); **Sehyun PARK**, Suwon-si (KR); **Shinho YOON**, Suwon-si (KR); **Jonghyuck LEE**, Suwon-si (KR)

(21) Appl. No.: **19/220,809**

(22) Filed: **May 28, 2025**

Related U.S. Application Data

(63) Continuation of application No. 18/609,428, filed on Mar. 19, 2024, now Pat. No. 12,327,911, which is a continuation of application No. 17/431,861, filed on Aug. 18, 2021, filed as application No. PCT/KR2020/002374 on Feb. 19, 2020, now Pat. No. 11,962,068.

(30) **Foreign Application Priority Data**

Feb. 19, 2019 (KR) 10-2019-0019038

Publication Classification

(51) **Int. Cl.**

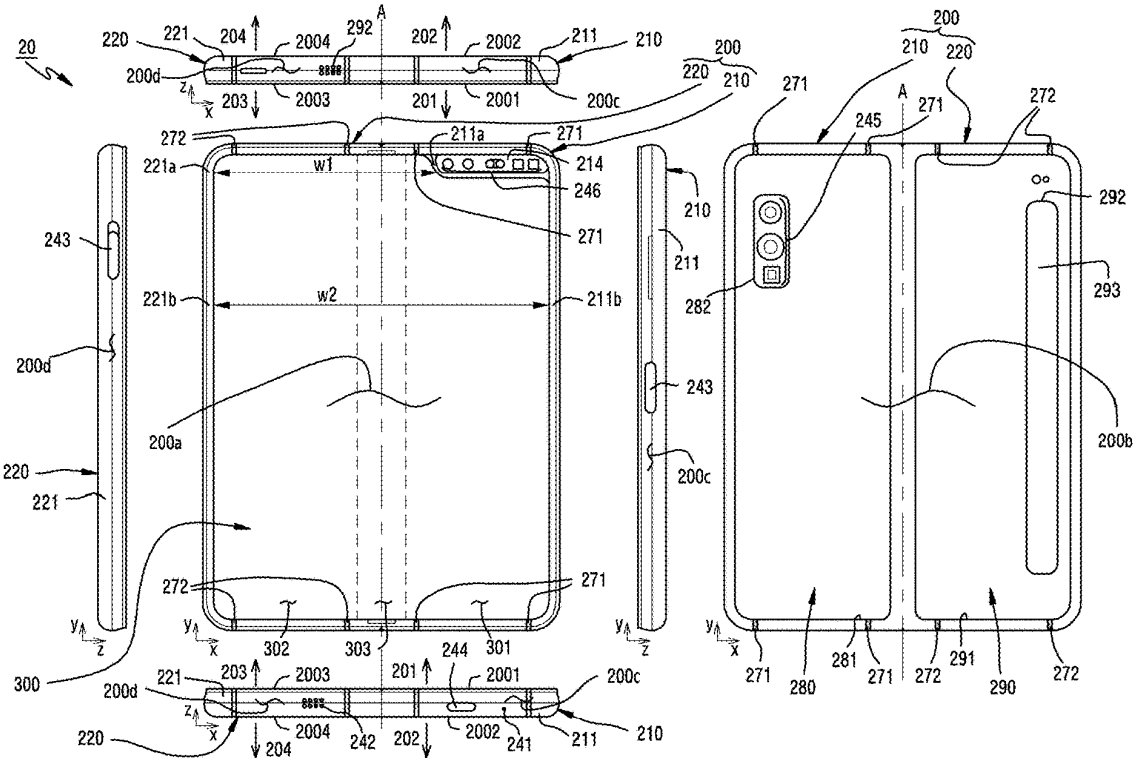
H01Q 1/24	(2006.01)
H01Q 5/328	(2015.01)
H01Q 5/385	(2015.01)
H01Q 21/28	(2006.01)
H04B 1/40	(2015.01)
H04M 1/02	(2006.01)

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

CPC ***H01Q 1/243*** (2013.01); ***H01Q 5/328*** (2015.01); ***H01Q 5/385*** (2015.01); ***H01Q 21/28*** (2013.01); ***H04B 1/40*** (2013.01); ***H04M 1/0216*** (2013.01); ***H04M 1/0268*** (2013.01); ***H04M 1/0277*** (2013.01)

(57) **ABSTRACT**

An electronic device according to an embodiment may include a first housing structure, a second housing structure, and a foldable housing structure for connecting the first housing structure and the second housing structure. The first housing structure and the second housing structure may include a front plate for interconnecting front surfaces with a flexible display, a rear plate which is an opposite surface to the front plate, a side member which surrounds a space between the front plate and the rear plate, and includes at least in part a conductive portion and an insulating portion, a communication circuit and at least one switch electrically connected to the communication circuit. Other various embodiments are possible.



US 20250286269A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0286269 A1**

(43) **Pub. Date: Sep. 11, 2025**

LEE et al.

(54) **ARRANGEMENT STRUCTURE FOR COMMUNICATION DEVICE AND ELECTRONIC DEVICE INCLUDING THE SAME**

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

(72) Inventors: **Jong Hyuck LEE**, Seongnam-si (KR); **Sehyun PARK**, Suwon-si (KR); **Jae-Bong CHUN**, Suwon-si (KR)

(21) Appl. No.: **19/218,452**

(22) Filed: **May 26, 2025**

Related U.S. Application Data

(63) Continuation of application No. 18/464,971, filed on Sep. 11, 2023, now Pat. No. 12,315,988, which is a continuation of application No. 17/099,615, filed on Nov. 16, 2020, now Pat. No. 11,757,174, which is a continuation of application No. 16/201,500, filed on Nov. 27, 2018, now Pat. No. 10,840,583.

(30) **Foreign Application Priority Data**

Nov. 27, 2017 (KR) 10-2017-0159219

Publication Classification

(51) **Int. Cl.**

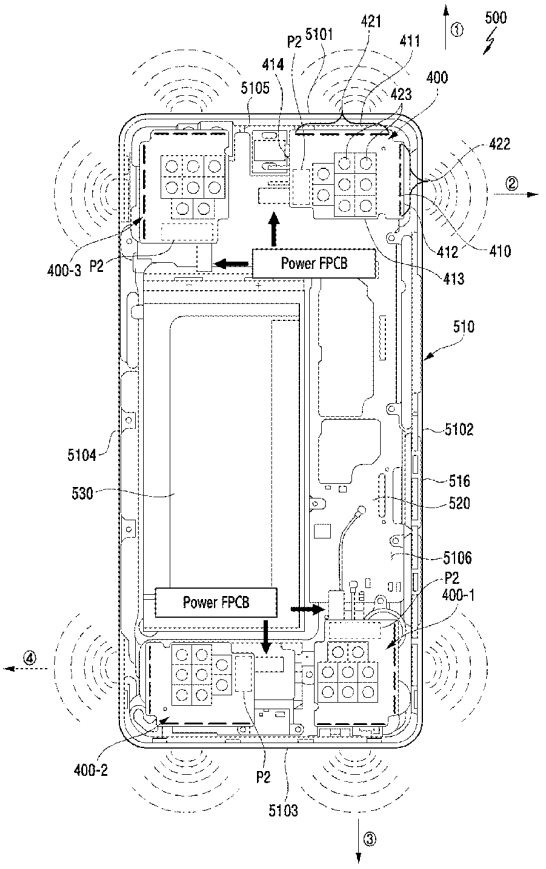
H01Q 1/24	(2006.01)
H01Q 9/04	(2006.01)
H01Q 21/06	(2006.01)
H01Q 21/28	(2006.01)

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

CPC ***H01Q 1/245*** (2013.01); ***H01Q 1/243*** (2013.01); ***H01Q 9/0407*** (2013.01); ***H01Q 21/062*** (2013.01); ***H01Q 21/065*** (2013.01); ***H01Q 21/067*** (2013.01); ***H01Q 21/28*** (2013.01)

(57) **ABSTRACT**

According to various embodiments, an electronic device includes a housing including a front surface plate; a rear surface plate facing toward the opposite direction of the front surface plate; and a side surface member surrounding a space between the front surface plate and the rear surface plate, the side surface member having a substantially rectangular shape when viewed above the front surface plate; a first PCB arranged in the space; a first wireless communication circuit; a substrate; a first antenna array protruding from the first side of the substrate toward the first portion; a second antenna array protruding from the second side of the substrate toward the second portion; and a second wireless communication circuit.



US 20250286277A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0286277 A1**

TAI et al. (43) **Pub. Date: Sep. 11, 2025**

(54) **HYBRID ANTENNA STRUCTURE**

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

(72) Inventors: **Chih-Feng TAI**, Hsinchu (TW); **Kuei-Cheng WANG**, Hsinchu (TW); **Ting-Yu ZHANG**, Hsinchu (TW)

(21) Appl. No.: **19/009,133**

(22) Filed: **Jan. 3, 2025**

(30) **Foreign Application Priority Data**

Mar. 6, 2024 (TW) 113108136

Publication Classification

(51) **Int. Cl.**

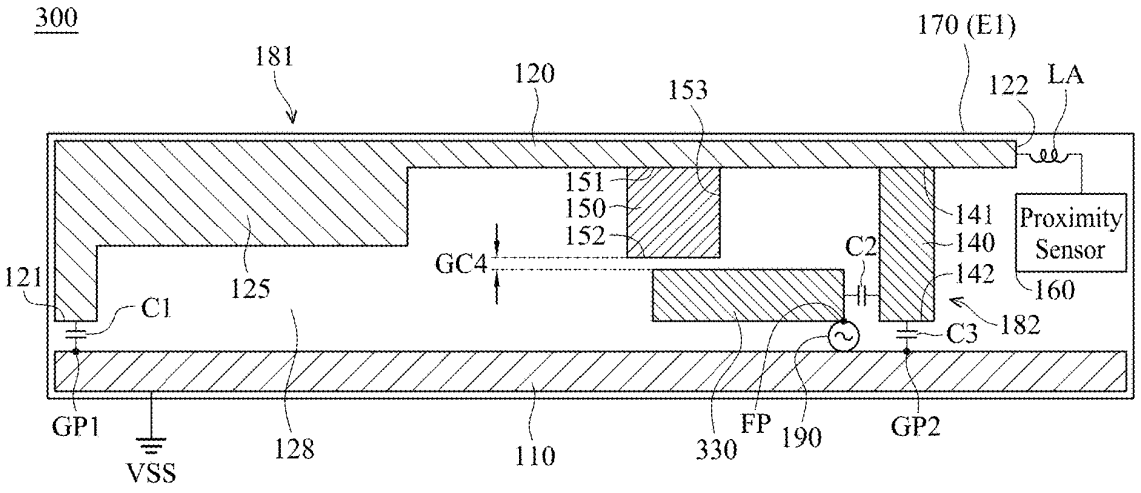
H01Q 5/20	(2015.01)
H01Q 1/48	(2006.01)
H01Q 9/04	(2006.01)

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

CPC ***H01Q 5/20*** (2015.01); ***H01Q 1/48*** (2013.01); ***H01Q 9/0421*** (2013.01); ***H01Q 9/0485*** (2013.01)

(57) **ABSTRACT**

A hybrid antenna structure includes a ground element, a main radiation element, a feeding radiation element, a shorting radiation element, an auxiliary radiation element, a proximity sensor, a dielectric substrate, an inductor, a first capacitor, a second capacitor, and a third capacitor. The main radiation element is coupled through the first capacitor to a first grounding point on the ground element. The feeding radiation element has a feeding point. The shorting radiation element is coupled to the main radiation element, and is coupled through the second capacitor to the feeding radiation element. The shorting radiation element is further coupled through the third capacitor to a second grounding point on the ground element. The auxiliary radiation element is coupled to the main radiation element. The auxiliary radiation element is adjacent to the feeding radiation element. The proximity sensor is coupled through the inductor to the main radiation element.



US 20250286940A1

(19) **United States**

(12) **Patent Application Publication**

CHOI et al.

(10) **Pub. No.: US 2025/0286940 A1**

(43) **Pub. Date: Sep. 11, 2025**

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

(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR)

(72) Inventors: **Taihwan CHOI**, Suwon-si (KR); **Dokyun KIM**, Suwon-si (KR); **Jongdoo KIM**, Suwon-si (KR); **Hyoseok NA**, Suwon-si (KR); **Kwangseok AHN**, Suwon-si (KR); **Wongi HWANG**, Suwon-si (KR)

(21) Appl. No.: **19/215,302**

(22) Filed: **May 21, 2025**

Related U.S. Application Data

(63) Continuation of application No. 17/866,101, filed on Jul. 15, 2022, now Pat. No. 12,316,792, which is a continuation of application No. PCT/KR2022/009182, filed on Jun. 28, 2022.

(30) **Foreign Application Priority Data**

Jul. 20, 2021 (KR) 10-2021-0094997

Publication Classification

(51) **Int. Cl.**

H04M 1/02 (2006.01)

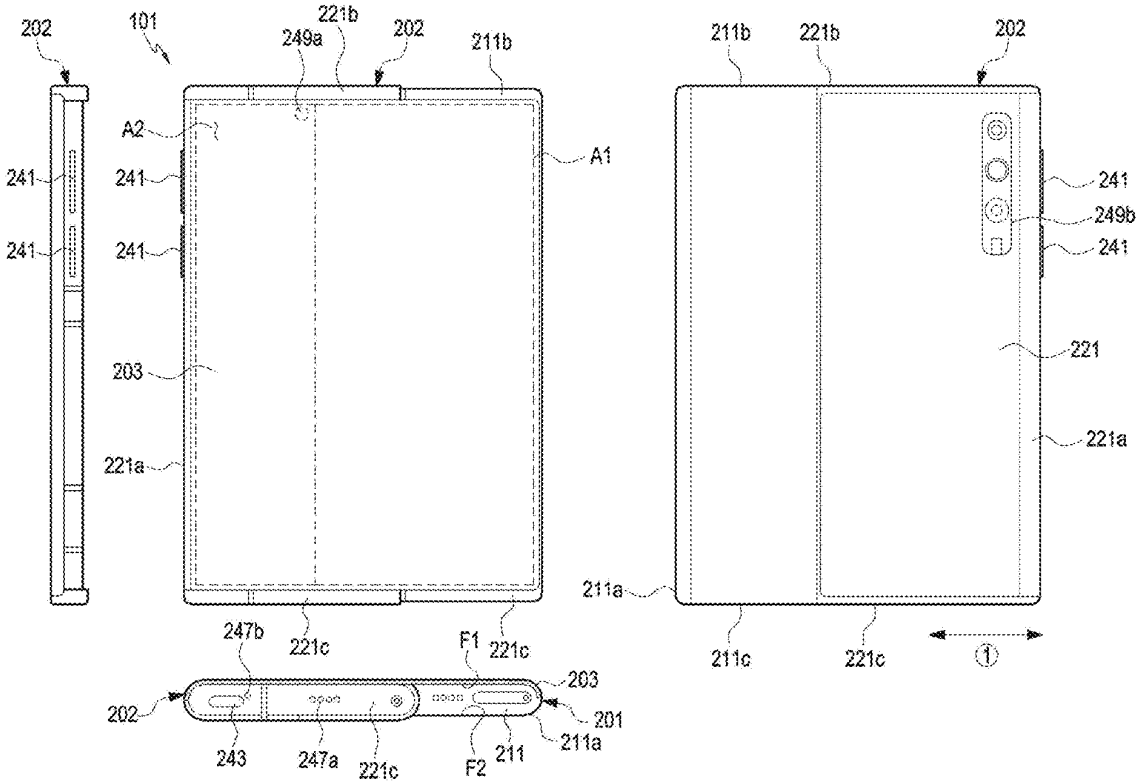
H01Q 1/24 (2006.01)

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

CPC ***H04M 1/0237*** (2013.01); ***H01Q 1/243*** (2013.01); ***H04M 1/0268*** (2013.01)

(57) **ABSTRACT**

An example electronic device may include: a first housing including a first conductive portion, a first non-conductive portion, and a first segmented portion extending from the first conductive portion, a second housing configured to accommodate at least a portion of the first housing and to guide a slide movement of the first housing, the second housing including a second conductive portion, and a flexible display including a first area connected to the first housing and a second area extending from the first area and configured to be bendable or rollable, wherein, from a slide-in state to a slide-out state of the first housing with respect to the second housing, the first conductive portion and the second conductive portion may be spaced apart from each other, and in the slide-in state of the first housing with respect to the second housing, at least a portion of the first non-conductive portion may overlap the second conductive portion.



US 20250286943A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0286943 A1**

(43) **Pub. Date: Sep. 11, 2025**

HEO et al.

(54) **STRUCTURE FOR APPLYING MILLIMETER WAVE ANTENNA MODULE TO FOLDABLE ELECTRONIC DEVICE**

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

(72) Inventors: **Joon HEO**, Suwon-si (KR); **Sungsoo KIM**, Suwon-si (KR); **Seyoon BAE**, Suwon-si (KR)

(21) Appl. No.: **19/219,365**

(22) Filed: **May 27, 2025**

Related U.S. Application Data

(63) Continuation of application No. 17/860,836, filed on Jul. 8, 2022, now Pat. No. 12,316,796, which is a continuation of application No. PCT/KR2021/010814, filed on Aug. 13, 2021.

(30) **Foreign Application Priority Data**

Aug. 14, 2020 (KR) 10-2020-0102656

Publication Classification

(51) **Int. Cl.**

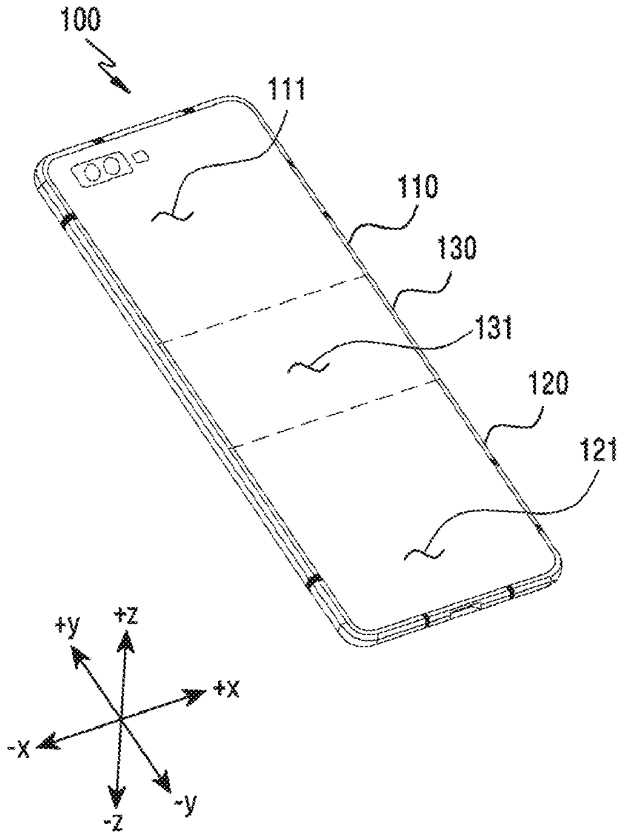
H04M 1/02	(2006.01)
G06F 1/16	(2006.01)
G06F 1/20	(2006.01)
H01Q 1/24	(2006.01)
H01Q 21/06	(2006.01)

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

CPC ***H04M 1/0277*** (2013.01); ***G06F 1/1652*** (2013.01); ***G06F 1/1681*** (2013.01); ***G06F 1/1698*** (2013.01); ***G06F 1/203*** (2013.01); ***H01Q 1/243*** (2013.01); ***H01Q 21/065*** (2013.01); ***H04M 1/0216*** (2013.01); ***H04M 1/0268*** (2013.01)

(57) **ABSTRACT**

A portable communication device is provided. The portable communication device includes a foldable housing including a first housing and a second housing, a hinge structure coupled with the first housing and the second housing, a flexible display accommodated in the first housing and the second housing, a communication processor accommodated in the foldable housing, and an antenna module electrically connected with the communication processor and configured to transmit and/or receive a millimeter wave signal, wherein the antenna module is disposed in a peripheral portion of the first housing such that, when the foldable housing is fully unfolded, at least a portion of the antenna module is overlapped with the hinge structure when viewed from above the hinge structure.



US 20250272524A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0272524 A1**

LIPPARINI et al. (43) **Pub. Date: Aug. 28, 2025**

(54) **MOBILE COMPUTER WITH SCAN ENGINE AND NFC BOOSTER COIL**

(71) Applicant: **Datalogic IP Tech S.r.l.**, Calderara Di Reno (IT)

(72) Inventors: **Valerio LIPPARINI**, Anzola dell'Emilia (IT); **Daniele FIORINI**, Casalecchio di Reno (IT); **Marco D'ULISSE**, Bologna (IT); **Alessandro CHIARINI**, Castel Maggiore (IT)

(21) Appl. No.: **18/586,333**

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

Publication Classification

(51) **Int. Cl.**

G06K 7/14 (2006.01)

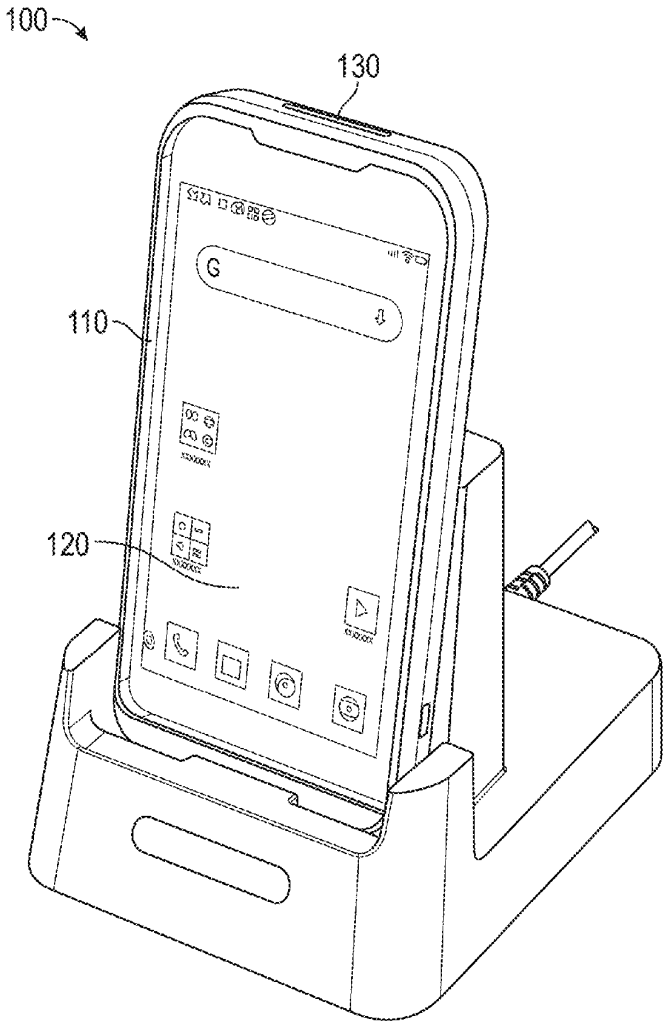
G06K 7/10 (2006.01)

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

CPC ***G06K 7/1413*** (2013.01); ***G06K 7/10297*** (2013.01)

(57) **ABSTRACT**

A mobile barcode reader may include a housing having a defined exit window, a scan engine, a primary NFC antenna, and a secondary NFC antenna. The scan engine may be configured to read barcodes and positioned within a front portion of the housing with one or more imagers having a field-of-view extending out of the exit window. The primary NFC antenna may be disposed in a first plane extending in a longitudinal direction of the housing, the primary NFC antenna operably coupled with electronics of the mobile barcode reader to facilitate NFC reading. The secondary NFC antenna may be disposed proximate the front portion and extending in a second plane transverse to the longitudinal of the housing, and configured as a boosting antenna for the primary NFC antenna without being electrically coupled with the electronics of the mobile barcode reader. Related methods of operating and manufacturing are also disclosed.



US 20250273843A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0273843 A1**

(43) **Pub. Date: Aug. 28, 2025**

JO et al.

(54) **ANTENNA INCLUDED IN DISPLAY MODULE AND ELECTRONIC DEVICE INCLUDING SAME**

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

(72) Inventors: **Jaehoon JO**, Suwon-si (KR); **Hosaeng KIM**, Suwon-si (KR); **Seongjin PARK**, Suwon-si (KR); **Sumin YUN**, Suwon-si (KR)

(21) Appl. No.: **19/207,837**

(22) Filed: **May 14, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/KR2023/016210, filed on Oct. 19, 2023.

(30) **Foreign Application Priority Data**

Nov. 14, 2022 (KR) 10-2022-0151805
Jan. 5, 2023 (KR) 10-2023-0001826

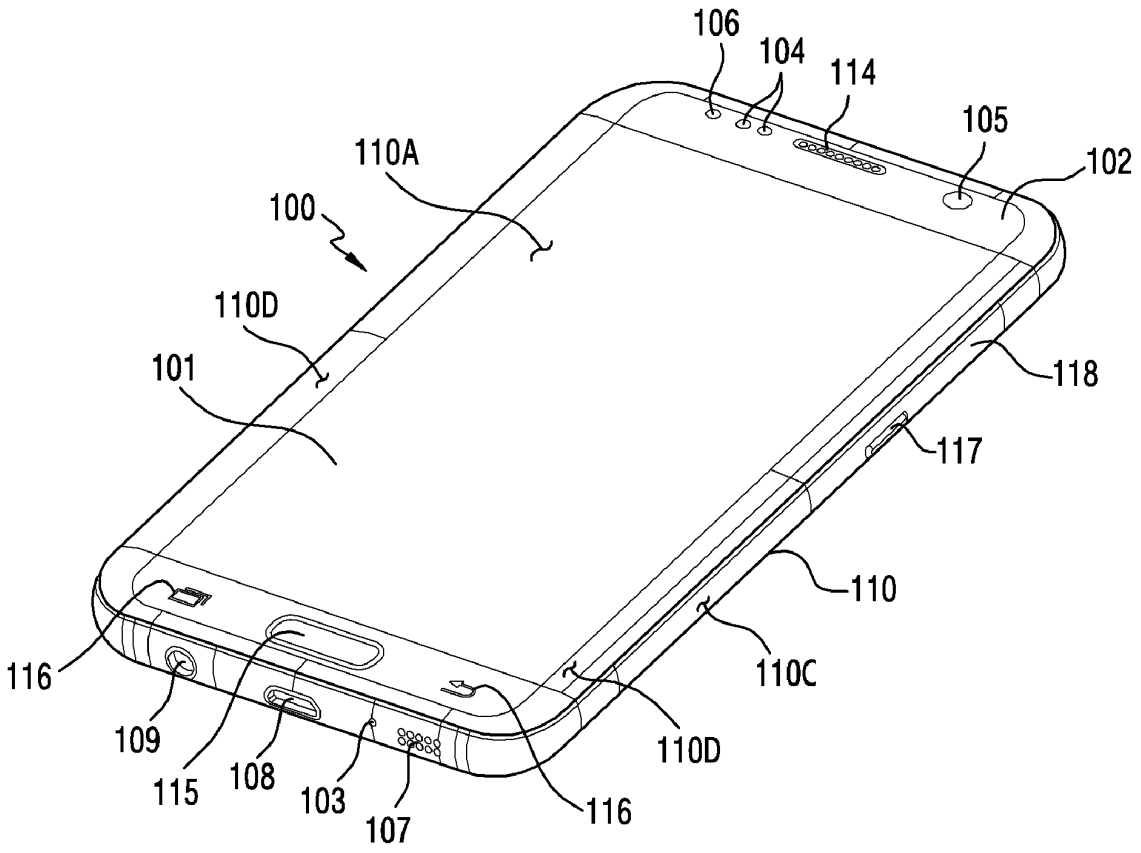
Publication Classification

(51) **Int. Cl.**
H01Q 1/12 (2006.01)
H01Q 1/48 (2006.01)

(52) **U.S. Cl.**
CPC ***H01Q 1/1271*** (2013.01); ***H01Q 1/48*** (2013.01)

(57) **ABSTRACT**

An electronic device comprises: a housing comprising a first plate arranged in a first direction, a second plate arranged in a second direction opposite to the first direction, and a side-surface bezel surrounding at least a portion of a space between the first and second plates; a display module comprising at least one dielectric layer arranged in the second direction in at least a partial area of the first plate; and an antenna arranged on the dielectric layer. The antenna may comprise: an antenna member including an array of a plurality of mesh-shaped conductive patterns; at least one antenna pattern formed on the antenna member; and at least one first dummy pattern arranged symmetrically in the vertical direction of the polarization generated from the antenna pattern and arranged to be spaced apart from the antenna pattern.



US 20250273845A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0273845 A1**

(43) **Pub. Date: Aug. 28, 2025**

Ghajar et al.

(54) **MESHED PATCH ANTENNA ARRAY**

(71) Applicant: **Google LLC**, Mountain View, CA (US)

(72) Inventors: **Mohammad Reza Ghajar**, Redwood City, CA (US); **Eddie Charles Burgess**, Chicago, IL (US); **Ali Molaei**, Chicago, IL (US)

(21) Appl. No.: **18/851,997**

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

(86) PCT No.: **PCT/US2023/078054**

§ 371 (c)(1),
(2) Date: **Sep. 27, 2024**

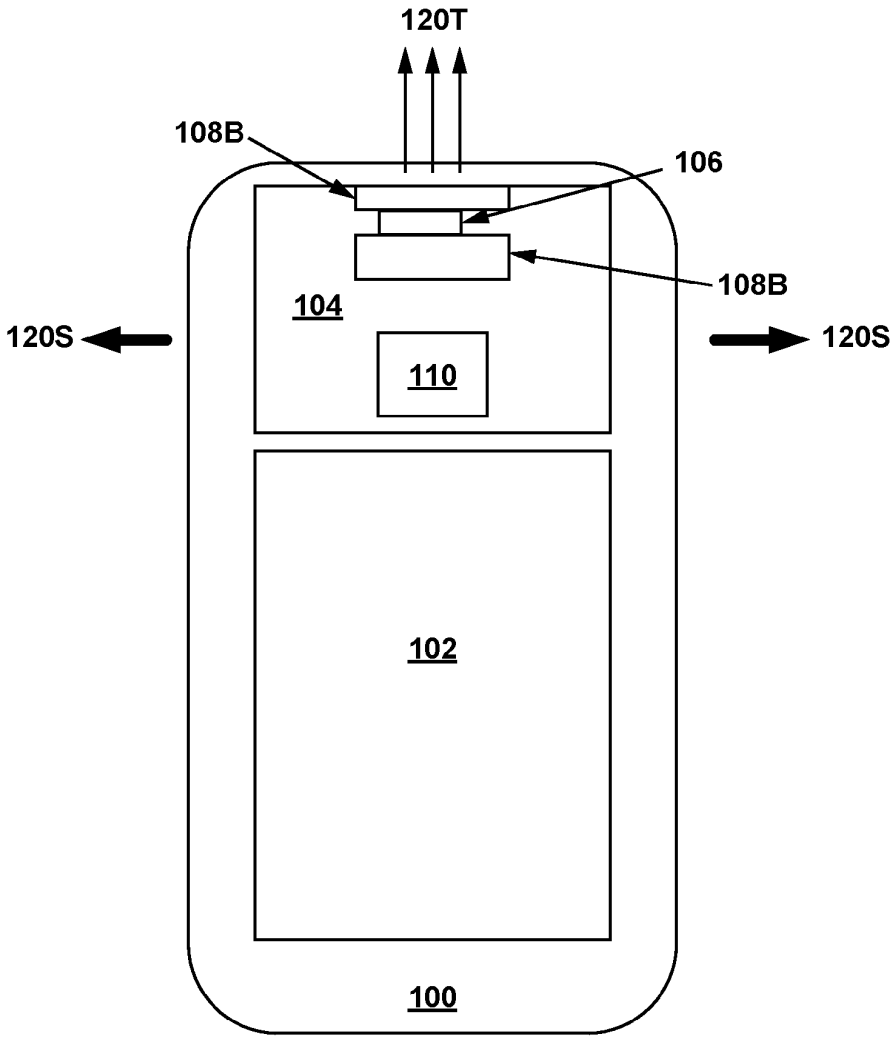
Publication Classification

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

(52) **U.S. Cl.**
CPC ***H01Q 1/2266*** (2013.01); ***H01Q 9/0407*** (2013.01)

(57) **ABSTRACT**

An example mobile computing device includes a main logic board (MLB); a first antenna array positioned on the MLB and configured to transmit signals in a first direction, the first antenna array comprising one or more planes; and a second antenna array positioned on the MLB and configured to transmit signals in a second direction, the second, direction being different than the first direction, the second antenna array comprising one or more planes and the second direction being different than the first direction, wherein at least one of the one or more of the planes in the first antenna array or at least one of the one or more of the pianos in the second antenna array comprises a meshed patch structure.



US 20250273847A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0273847 A1**

(43) **Pub. Date: Aug. 28, 2025**

ATSUTA et al.

(54) **WIRELESS COMMUNICATION APPARATUS AND WIRELESS COMMUNICATION METHOD**

(71) Applicant: **SONY GROUP CORPORATION**, TOKYO (JP)

(72) Inventors: **KAZUKI ATSUTA**, TOKYO (JP); **TADASHI SASAKI**, TOKYO (JP)

(21) Appl. No.: **18/859,684**

(22) PCT Filed: **May 1, 2023**

(86) PCT No.: **PCT/JP2023/017015**

§ 371 (c)(1),
(2) Date: **Oct. 24, 2024**

(30) **Foreign Application Priority Data**

May 2, 2022 (JP) 2022-076256

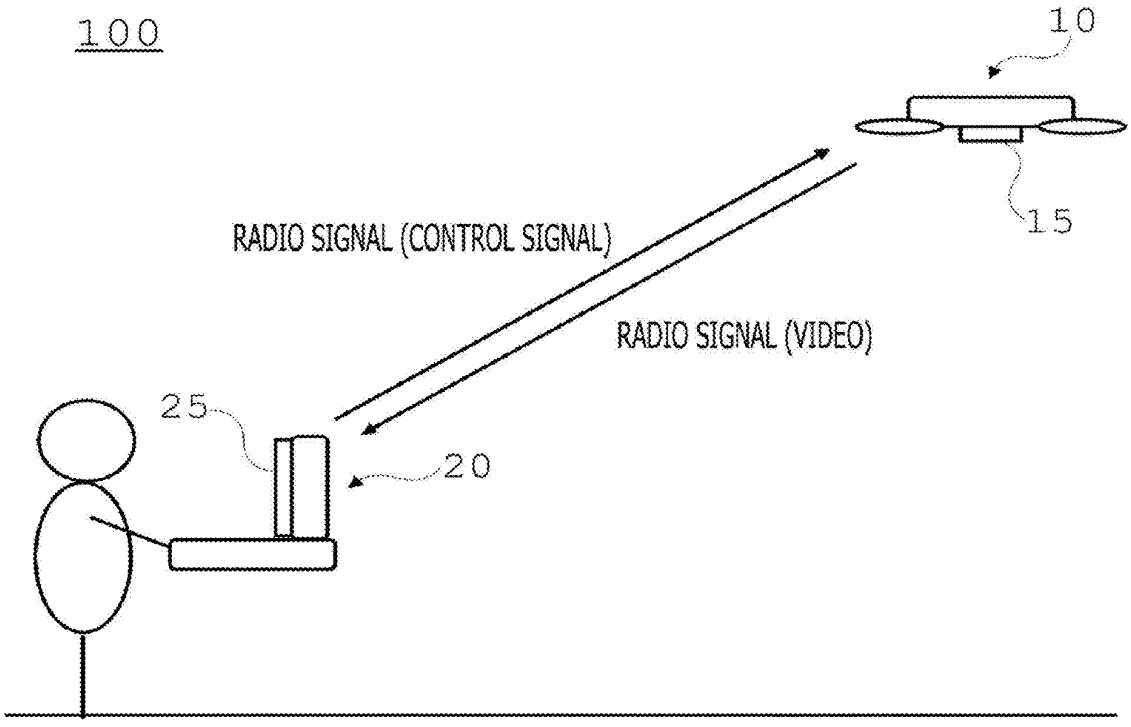
Publication Classification

(51) **Int. Cl.**
H01Q 1/24 (2006.01)
H01Q 21/28 (2006.01)

(52) **U.S. Cl.**
CPC ***H01Q 1/24*** (2013.01); ***H01Q 21/28*** (2013.01)

(57) **ABSTRACT**

There is provided a wireless communication apparatus including multiple antennas, multiple reception sections each connected to a corresponding one of the multiple antennas and configured to receive a radio signal through the corresponding one of the multiple antennas, and an adjustment section configured to generate a received signal by performing a reception process in reference to the radio signal received in plural number by the multiple reception sections, in which a first antenna and a second antenna included in the multiple antennas are a predetermined length apart in a vertical direction.



US 20250273866A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0273866 A1**

FRIMAN (43) **Pub. Date: Aug. 28, 2025**

(54) **ANTENNA ARRANGEMENT COMPRISING A PLURALITY OF INTEGRATED ANTENNAS**

(71) Applicant: **Shortlink Resources AB**, Karlstad (SE)

(72) Inventor: **Alf FRIMAN**, Växjö (SE)

(21) Appl. No.: **18/857,887**

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

(86) PCT No.: **PCT/EP2023/060119**

§ 371 (c)(1),
(2) Date: **Oct. 18, 2024**

(30) **Foreign Application Priority Data**

Apr. 19, 2022 (SE) 2250474-0

Publication Classification

(51) **Int. Cl.**

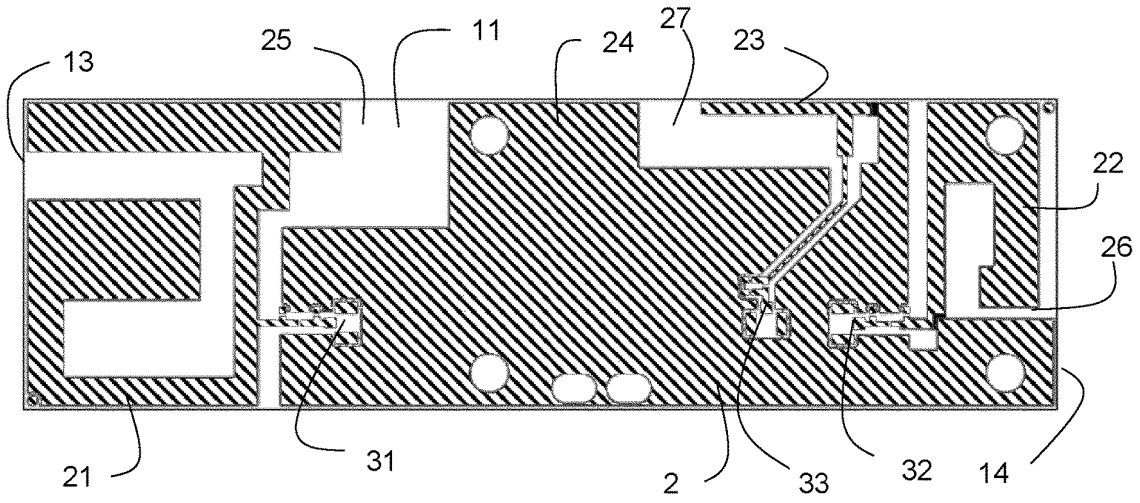
H01Q 9/42	(2006.01)
H01Q 1/22	(2006.01)
H01Q 1/24	(2006.01)
H01Q 1/52	(2006.01)
H01Q 5/35	(2015.01)
H01Q 21/28	(2006.01)

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

CPC ***H01Q 9/42*** (2013.01); ***H01Q 1/2283*** (2013.01); ***H01Q 1/521*** (2013.01); ***H01Q 5/35*** (2015.01); ***H01Q 21/28*** (2013.01); *H01Q 1/2291* (2013.01); *H01Q 1/243* (2013.01)

(57) **ABSTRACT**

An antenna arrangement comprises a dielectric substrate with a first surface and second surface extending between a first edge and second edge of the substrate. A conductive pattern is arranged on the first surface that forms first, second, and third antenna elements. The first antenna element is arranged in the vicinity of the first edge and connected to a first antenna feed. The second antenna element is arranged in the vicinity of the second edge and connected to a second antenna feed. The third antenna element is arranged between the first and second antenna elements and connected to a third antenna feed. An intermediate element, at least partly functioning as a ground layer, is arranged between the first, second and third antenna elements. A non-conductive zone separates the first antenna element and the intermediate element. The second antenna element and the intermediate element are in conductive contact with each other.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0274170 A1**

Yang et al. (43) **Pub. Date: Aug. 28, 2025**

(54) **WIRELESS COMMUNICATION METHOD, RELATED APPARATUS, AND DEVICE**

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(72) Inventors: **Zhongjie Yang**, Shanghai (CN); **Huaijie Xue**, Shanghai (CN); **Yi Wang**, Shanghai (CN)

(21) Appl. No.: **18/585,462**

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

Related U.S. Application Data

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(30) **Foreign Application Priority Data**

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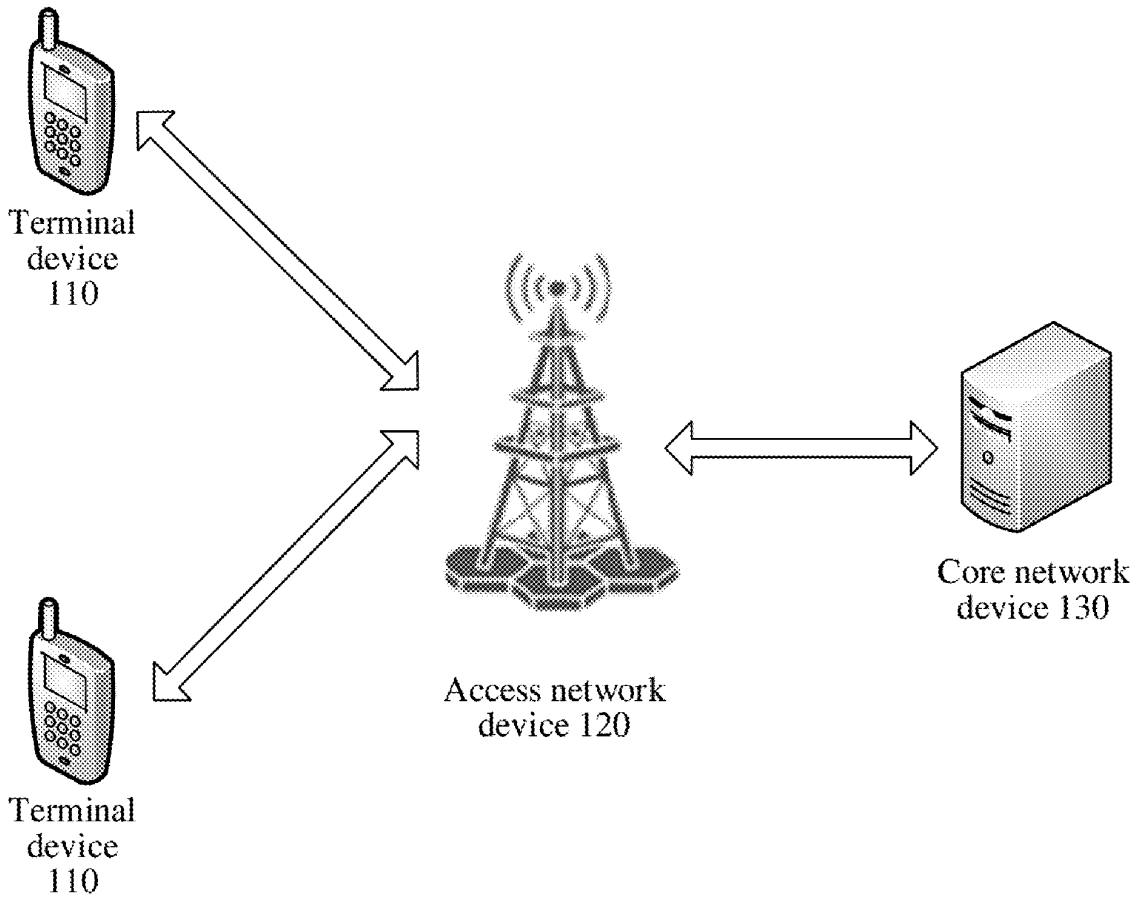
Publication Classification

(51) **Int. Cl.**
H04B 7/0456 (2017.01)
H04B 7/06 (2006.01)

(52) **U.S. Cl.**
CPC ***H04B 7/0456*** (2013.01); ***H04B 7/0626*** (2013.01)

(57) **ABSTRACT**

Embodiments of this application disclose a wireless communication method, a related apparatus, and a device. Configuring at least two virtual antenna mapping matrices, where each of the at least two virtual antenna mapping matrices indicates a mapping relationship between four antenna ports and N physical channels, and N is an integer greater than 4; obtaining channel state information of a target terminal device in a target cell; and then determining, based on the channel state information, that the mapping relationship between the four antenna ports and the N physical channels is a mapping relationship indicated by a target virtual antenna mapping matrix in the at least two virtual antenna mapping matrices, and performing wireless communication with the target terminal device by using the target virtual antenna mapping matrix.



US 20250274172A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0274172 A1**

GAO et al. (43) **Pub. Date: Aug. 28, 2025**

(54) **METHODS, DEVICES, AND COMPUTER READABLE MEDIUM FOR COMMUNICATION**

(71) Applicant: **NEC Corporation**, Tokyo (JP)

(72) Inventors: **Yukai GAO**, Beijing (CN); **Peng GUAN**, Beijing (CN); **Gang WANG**, Beijing (CN)

(73) Assignee: **NEC Corporation**, Tokyo (JP)

(21) Appl. No.: **18/859,275**

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Publication Classification

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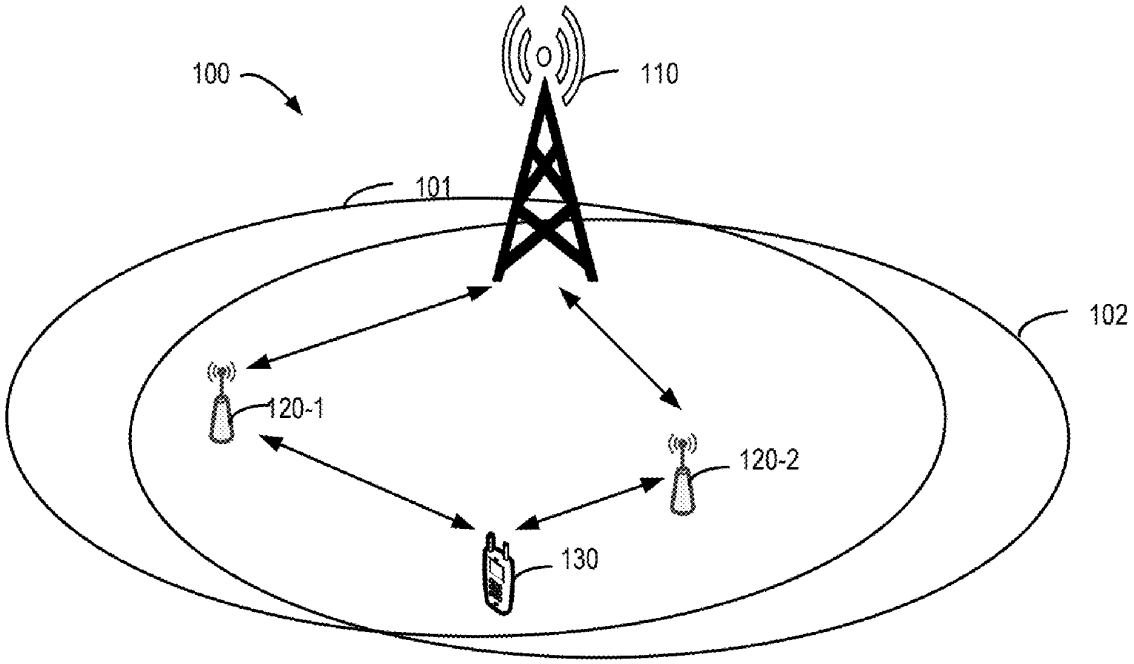
H04L 5/00	(2006.01)

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

CPC ***H04B 7/0469*** (2013.01); ***H04B 7/0691*** (2013.01); ***H04L 5/0023*** (2013.01); ***H04L 5/0048*** (2013.01); ***H04L 5/0091*** (2013.01)

(57) **ABSTRACT**

According to exemplary embodiments, a terminal device receives, from a network device, at least one configuration for codebook, wherein the at least one configuration for codebook includes: a first plurality of antenna port groups and a plurality of antenna ports in one antenna port group. The terminal device transmits, to the network device, a number of layers and at least one codebook indicator based on the at least one configuration for codebook, wherein the at least one codebook indicator includes: one or more indicators for a second plurality of antenna port groups, one or more indicators for a plurality of first vectors, wherein at least one of a length of one first vector, a number of the plurality of first vectors and a size of the one or more indicators for the plurality of first vectors is based on a number of the second plurality of antenna port groups.



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(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0274199 A1**

(43) **Pub. Date: Aug. 28, 2025**

Frank

(54) **MULTI-ANTENNA PANEL TESTING EFFICIENCY**

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(73) Assignee: **Lenovo (Singapore) Pte. Limited**, Singapore (SG)

(21) Appl. No.: **18/859,747**

(22) PCT Filed: **Apr. 25, 2023**

(86) PCT No.: **PCT/IB2023/054233**

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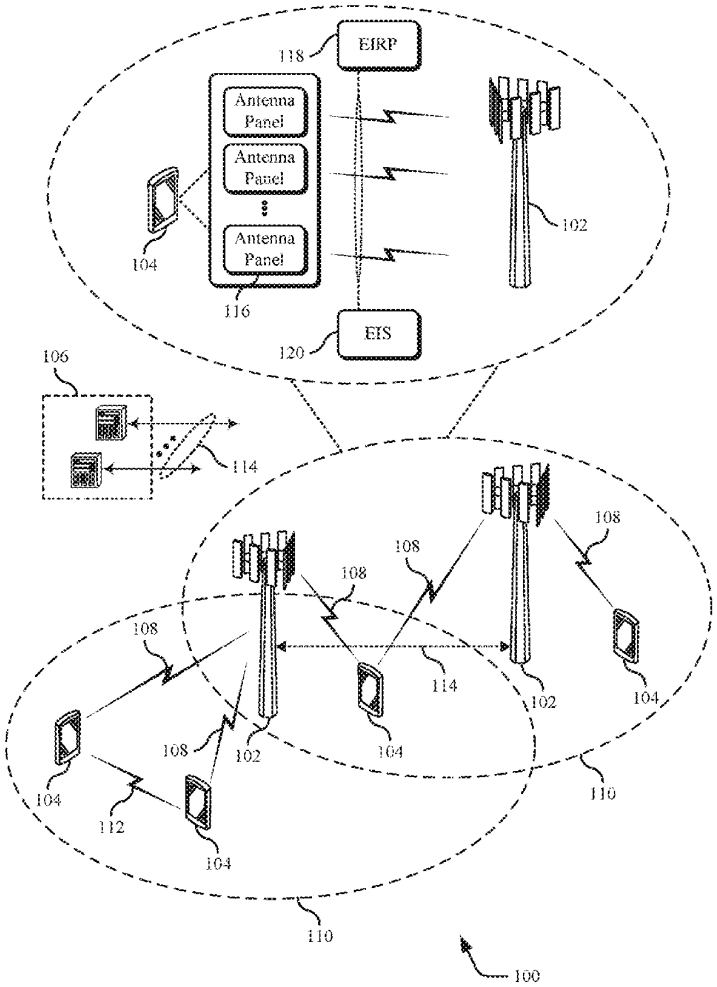
H01Q 1/24 (2006.01)

(52) **U.S. Cl.**
CPC ***H04B 17/102*** (2015.01); ***H01Q 1/246*** (2013.01)

(57) **ABSTRACT**

Various aspects of the present disclosure relate to a communication device (e.g., a user equipment (UE)) that has a transceiver and a set of antenna panels. The communication device transmits a signal from the transceiver, where the signal is transmitted simultaneously as a maximum power reference signal from a best beam in each antenna panel of the set of antenna panels for a measurement of effective isotropic radiated power (EIRP) in a transmission direction. Additionally, the communication device receives a reference signal, and demodulates the reference signal independently for each antenna panel of the set of antenna panels for a measurement of effective isotropic sensitivity (EIS) in a reception direction.



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(19) **United States**

(12) **Patent Application Publication**

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(43) **Pub. Date: Aug. 28, 2025**

LEPPÄNEN et al.

(54) **METHOD AND ARRANGEMENT FOR DETERMINING AT LEAST ONE DISTANCE BETWEEN ANTENNAS**

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(72) Inventors: **Kari LEPPÄNEN**, Helsinki (FI); **Jussi SALMI**, Haarajoki (FI); **Niko VÄISÄNEN**, Kerava (FI)

(73) Assignee: **KOHERENT OY**, Vantaa (FI)

(21) Appl. No.: **18/855,442**

(22) PCT Filed: **May 22, 2023**

(86) PCT No.: **PCT/FI2023/050284**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**

H04B 17/19 (2015.01)
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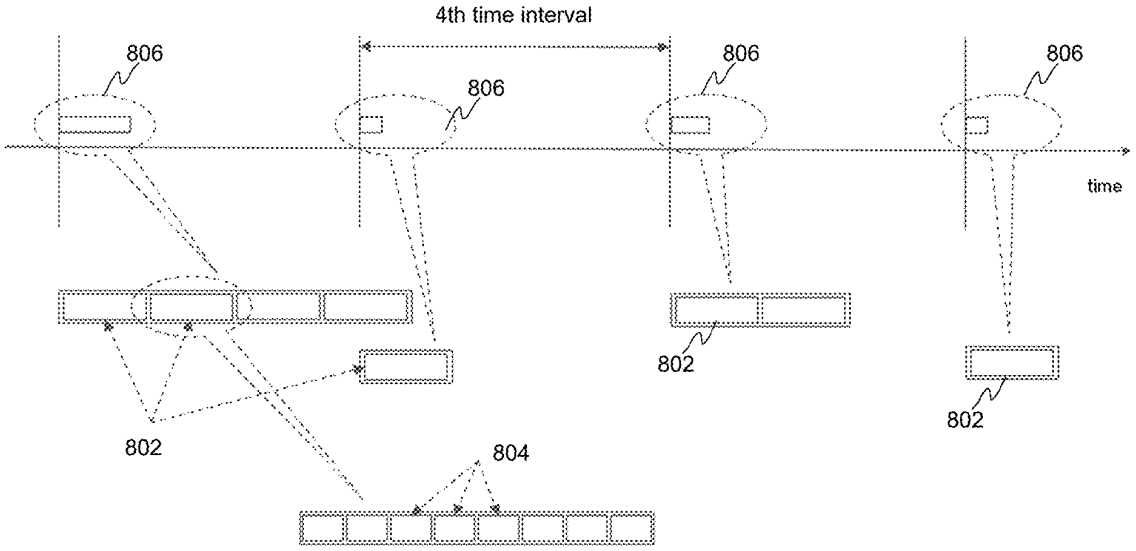
H04W 64/00 (2009.01)

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

CPC ***H04B 17/19*** (2015.01); ***H04B 17/104*** (2015.01); ***H04W 64/003*** (2013.01)

(57) **ABSTRACT**

A method for determining at least one distance between pairs of antennas, the method including performing self-measurements and first two-way transmissions at first time intervals, first one-way transmissions at second time intervals, second two-way transmissions at third time intervals, and second one-way transmissions at fourth time intervals. The method also includes determining phase information based on the performed transmissions and determining distance information regarding the at least one distance.



US 20250266616A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0266616 A1**

YANG (43) **Pub. Date: Aug. 21, 2025**

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

(71) Applicant: **GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP., LTD.**, Dongguan (CN)

(72) Inventor: **Shengjie YANG**, Dongguan (CN)

(21) Appl. No.: **19/189,658**

(22) Filed: **Apr. 25, 2025**

Related U.S. Application Data

(63) Continuation of application No. PCT/CN2023/124180, filed on Oct. 12, 2023.

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**

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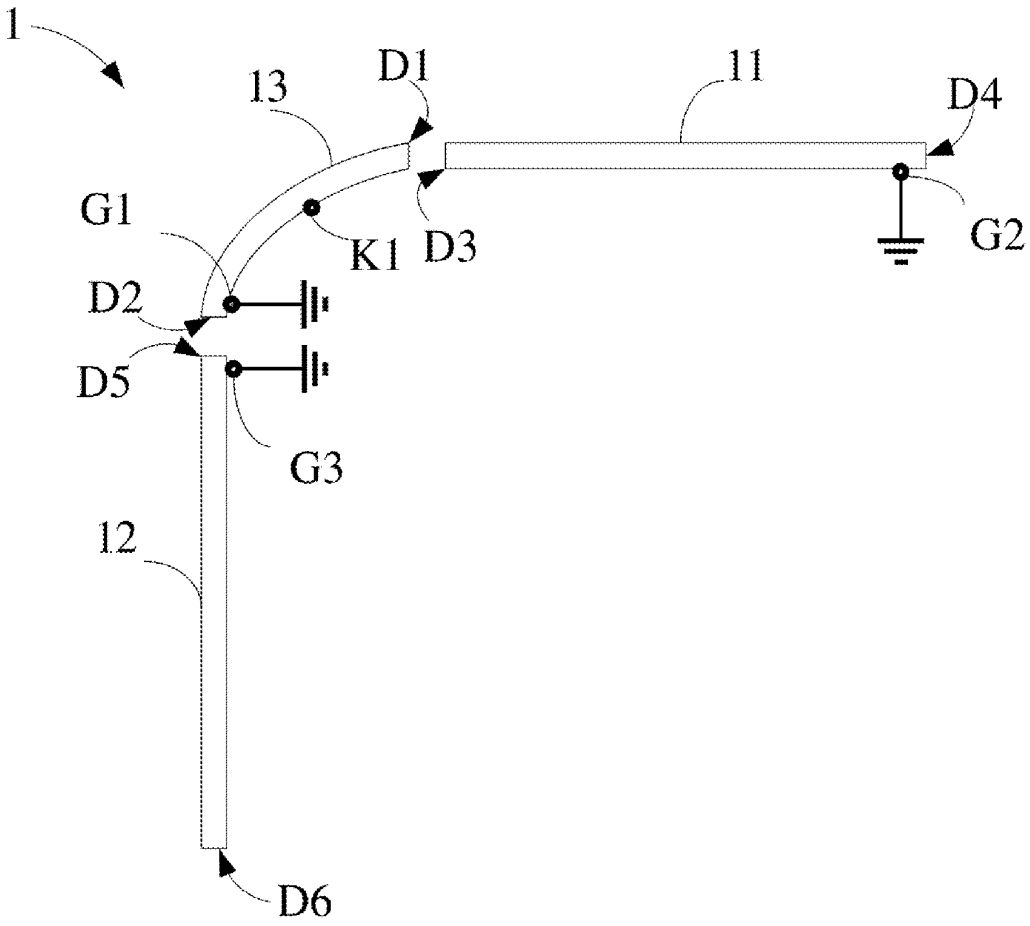
H01Q 1/24	(2006.01)
H01Q 5/50	(2015.01)

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

CPC ***H01Q 5/371*** (2015.01); ***H01Q 1/243*** (2013.01); ***H01Q 5/50*** (2015.01)

(57) **ABSTRACT**

Provided are an antenna assembly and an electronic device including the same. The antenna assembly includes a first radiation branch and a second radiation branch at an angle relative to each other, and a feeding excitation branch located between the first and second radiation branches. The feeding excitation branch includes a feeding point configured to receive a feeding signal. The feeding excitation branch is electrically coupled with the first radiation branch to couple the feeding signal to the first radiation branch and provide a first coupled feeding signal, and it is further magnetically coupled with the second radiation branch to couple the feeding signal to the second radiation branch and provide a second coupled feeding signal. The phase difference between the first and second coupled feeding signals is 90°, so that the first and second radiation branches have circular polarization or elliptical polarization radiation characteristics, for supporting satellite communication.



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(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0266619 A1**

SHIH et al. (43) **Pub. Date: Aug. 21, 2025**

(54) **ANTENNA STRUCTURE AND BLUETOOTH ANTENNA**

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(72) Inventors: **Shih-Ping SHIH**, Hsinchu (TW); **Tzu-Hsuan HSU**, Hsinchu (TW)

(21) Appl. No.: **19/009,156**

(22) Filed: **Jan. 3, 2025**

(30) **Foreign Application Priority Data**

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Publication Classification

(51) **Int. Cl.**
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(52) **U.S. Cl.**
CPC ***H01Q 13/20*** (2013.01); *H01Q 1/24* (2013.01)

(57) **ABSTRACT**

An antenna structure includes a main radiation element, a first ground element, a second ground element, a carrier element, a metal cavity, a first capacitor, and a second capacitor. The first ground element includes a first connection segment, a first protruding segment, and a second protruding segment. The second ground element includes a second connection segment, a third protruding segment, and a fourth protruding segment. The main radiation element is surrounded by the first ground element and the second ground element. The first capacitor is coupled between the first protruding segment and the third protruding segment. The second capacitor is coupled between the second protruding segment and the fourth protruding segment. The metal cavity is coupled to the first connection segment and the second connection segment. The carrier element is disposed in the metal cavity.