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(54) **RADOME AND ANTENNA DEVICE**

(57) This application provides an antenna radome and an antenna apparatus. A space for accommodating an antenna is formed in the antenna radome. In a cross section perpendicular to the length direction of the antenna radome, at least a part of an antenna radome body of the antenna radome has the following section shape: the section shape is formed as a closed shape, the section shape includes a linear segment, and the section shape is symmetric with respect to a reference line that passes through the midpoint of the linear segment and that is perpendicular to the linear segment; and on each side of the reference line, the section shape includes a plurality of arc segments that are connected to the end, on the side, of the linear segment, all circle centers corresponding to the arc segments are in the closed shape, and curvature radii of the plurality of arc segments sequentially increase from the end on the side. In this way, the antenna radome that is of this application and that has the foregoing section shape can optimize a wind load imposed on the antenna radome by wind from various directions, thereby decreasing wind resistance.

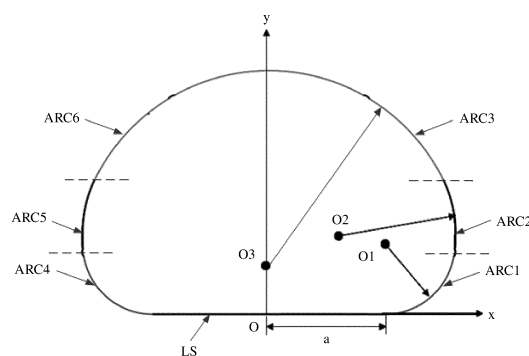


FIG. 3

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Description

[0001] This application claims priority to Chinese Patent Application No. 202111068308.6, filed with the China National Intellectual Property Administration on September 13, 2021 and entitled "ANTENNA RADOME AND ANTENNA APPARATUS", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] This application relates to the field of antennas, and specifically, to an antenna radome and an antenna apparatus including the antenna radome.

BACKGROUND

[0003] With the development of technologies, a bearing capacity of an antenna apparatus approaches a limit, and a wind load of an antenna radome of an antenna apparatus becomes a key technical indicator that affects product performance of the antenna apparatus. Therefore, low-wind-load designs for antenna radomes become one of main development directions in the industry. Among antenna radomes in the conventional technology, low-wind-load designs for antenna radomes have been implemented by means such as additionally disposing a vortex generator and constructing an antenna radome having a special structure. However, these designs can only optimize a wind load of an antenna radome in a specific wind direction (windward angle).

[0004] For example, the antenna radome disclosed in the patent literature whose publication number is DE202018006123U1 can decrease only a wind load in a specific direction, but increases wind loads in other directions. In the patent literature whose publication number is US9979079B2, a peak value of a wind load is decreased by disposing a tripwire on an antenna radome. However, the solution optimizes only a wind load of side wind on an antenna apparatus, but causes an adverse impact on wind loads of wind from other directions.

SUMMARY

[0005] In view of the foregoing problems in the background, this application provides an antenna radome, which can greatly optimize an omni-directional wind load when compared with an existing antenna radome. In addition, this application further provides an antenna apparatus including the foregoing antenna radome. The antenna apparatus has an effect the same as that described above.

[0006] Therefore, the following technical solutions are used in this application.

[0007] According to a first aspect, an embodiment of this application provides an antenna radome. A space for accommodating an antenna is formed in the antenna radome; and in a cross section perpendicular to the length direction of the antenna radome, at least a part of an antenna radome body of the antenna radome has the following section shape:

[0008] The section shape is formed as a closed shape, where the section shape includes a linear segment, and the section shape is symmetric with respect to a reference line that passes through the midpoint of the linear segment and that is perpendicular to the linear segment; and

on each side of the reference line, the section shape includes a plurality of arc segments that are connected to the end, on the side, of the linear segment, all circle centers corresponding to the arc segments are in the closed shape, and curvature radii of the plurality of arc segments sequentially increase from the end on the side.

[0009] According to the foregoing technical solution, compared with an antenna radome in the prior art, the antenna radome that is of this application and that has the foregoing section shape can optimize a wind load imposed on the antenna radome by wind from various directions, thereby decreasing wind resistance.

[0010] In a possible implementation of the first aspect, a chamfer is formed at the joint between two adjacent arc segments.

[0011] Adjacent arc segments can be connected smoothly according to the foregoing technical solution, so that the wind load imposed on the antenna radome by the wind from various directions can be further optimized, thereby decreasing the wind resistance.

[0012] In a possible implementation of the first aspect, on one side of the reference line, the section shape includes a first arc segment, a second arc segment, and a third arc segment; one end of the first arc segment is connected to the end, on the one side, of the linear segment; the other end of the first arc segment is connected to one end of the second arc segment; and the other end of the second arc segment is connected to one end of the third arc segment.

[0013] According to the foregoing technical solution, the antenna radome in this application can be constructed easily.

[0014] In a possible implementation of the first aspect, the length of the third arc segment is greater than the length of the first arc segment, and the length of the first arc segment is greater than the length of the second arc segment.

[0015] A length relationship between different arc segments is set according to the foregoing technical solution. This

helps further optimize the wind load imposed on the antenna radome by the wind from various directions.

[0016] In a possible implementation of the first aspect, when the midpoint of the linear segment is an origin of coordinates, an x-axis is along a straight line on which the linear segment is located, a forward direction of the x-axis faces the one side, a y-axis is along the reference line, and a forward direction of the y-axis faces the third arc segment;

the first arc segment satisfies the following relational expression: $(x - a)^2 + (y - 0.6a)^2 = 0.36a^2$, $x \in (a, 1.6a)$; the second arc segment satisfies the following relational expression: $(x - 0.6a)^2 + (y - 0.7a)^2 = a^2$, $x \in (1.5a, 1.6a)$; and the third arc segment satisfies the following relational expression: $x^2 + (y - 0.4a)^2 = 2.78a^2$, $x \in (0, 1.5a)$, where a is a dimensionless reference value and is any real number.

[0017] A dimensionless function relationship among the arc segments is set according to the foregoing technical solution. This helps construct an optimal section shape. In addition, the section shape in this application can be applied to antennas of different sizes.

[0018] In a possible implementation of the first aspect, the length of the linear segment is $2a$.

[0019] A length relationship between the linear segment and the arc segment connected to the linear segment is further defined according to the foregoing technical solution.

[0020] In a possible implementation of the first aspect, the antenna radome further includes a tripwire secured to the antenna radome body; the tripwire extends in the length direction of the antenna radome body; and the tripwire forms a structure protruding from the outer surface of the antenna radome body.

[0021] According to the foregoing technical solution, the tripwire is disposed to separate airflow at an expected position on the antenna radome, so that the wind load imposed on the antenna radome by the wind from various directions can be further optimized.

[0022] In a possible implementation of the first aspect, the antenna radome further includes a tripwire secured to the antenna radome body; the tripwire extends in the length direction of the antenna radome body; the tripwire forms a structure protruding from the outer surface of the antenna radome body; and the tripwire is disposed at the midpoint of the third arc segment and/or disposed at the joint between the first arc segment and the second arc segment.

[0023] According to the foregoing technical solution, the tripwire is disposed to separate airflow at an expected position on the antenna radome, so that the wind load imposed on the antenna radome by the wind from various directions can be further optimized.

[0024] In a possible implementation of the first aspect, the length of the tripwire is equal to the length of the antenna radome body.

[0025] The foregoing technical solution helps the tripwire give full play to a capability of separating the airflow at the expected position on the antenna radome.

[0026] In a possible implementation of the first aspect, the shape, in the cross section, of the tripwire is a rectangle, a trapezoid, or a triangle.

[0027] The foregoing technical solution helps manufacture the tripwire.

[0028] According to a second aspect, an embodiment of this application provides an antenna apparatus. The antenna apparatus includes the antenna radome according to any one of the foregoing technical solutions.

[0029] According to the foregoing technical solution, the antenna apparatus including the antenna radome in this application can play the functions of the antenna radome described above.

[0030] In a possible implementation of the second aspect, the antenna apparatus includes a plurality of antenna radomes; and the plurality of antenna radomes are arranged in a circular array.

[0031] The foregoing technical solution is an advantageous arrangement solution for the antenna radome in this application.

[0032] In a possible implementation of the second aspect, the antenna apparatus is an antenna apparatus used in a wireless base station of a communication network.

[0033] The foregoing technical solution provides an optional application scenario for the antenna radome.

[0034] These aspects and other aspects of this application are more concise and more comprehensive in descriptions of the following (a plurality of) embodiments.

BRIEF DESCRIPTION OF DRAWINGS

[0035] The accompanying drawings included in this specification and constituting a part of this specification and this specification jointly show example embodiments, features, and aspects of this application, and are intended to explain the principles of this application.

FIG. 1 is a three-dimensional schematic diagram of a structure of an antenna radome according to an embodiment of this application;

FIG. 2 is a schematic side view of a structure of the antenna radome in FIG. 1;

FIG. 3 is a cross-sectional view of a section shape of the antenna radome in FIG. 1; and

FIG. 4A to FIG. 4C are schematic diagrams of section shapes of a tripwire of the antenna radome in FIG. 1.

[0036] Reference numerals:

1: antenna radome body; LS: linear segment; ARC1: first arc segment; ARC2: second arc segment; ARC3: third arc segment; ARC4: fourth arc segment; ARC5: fifth arc segment; ARC6: sixth arc segment; 2: tripwire;
L: length direction.

DESCRIPTION OF EMBODIMENTS

[0037] The following describes various example embodiments, features, and aspects of this application in detail with reference to the accompanying drawings. Identical reference signs in the accompanying drawings indicate elements that have same or similar functions. Although various aspects of embodiments are shown in the accompanying drawings, unless otherwise specified, the accompanying drawings do not need to be drawn to scale.

[0038] The specific term "example" herein means "used as an example, embodiment or illustration". Any embodiment described as an "example" is not necessarily explained as being superior or better than other embodiments.

[0039] In addition, to better describe this application, numerous specific details are given in the following specific embodiments. A person skilled in the art should understand that this application can also be implemented without some specific details. In some embodiments, methods, means, and elements that are well-known to a person skilled in the art are not described in detail, so that the subject matter of this application is highlighted.

[0040] In this application, unless otherwise specified, "length direction" is the length direction of an antenna radome (an antenna radome body).

[0041] First, an overall technical concept of the antenna radome according to this application is described. According to the antenna radome in this application, a section shape of the antenna radome body is changed, and a tripwire is further disposed at a specific position of the antenna radome body based on a transition position and a separation position that are of airflow and that are obtained via experiments, so that the antenna radome in this application achieves omni-directional wind load optimization when compared with an existing antenna radome.

[0042] A structure of an antenna radome according to an embodiment of this application is described below with reference to accompanying drawings in this specification.

[0043] As shown in FIG. 1 to FIG. 3, the entire antenna radome according to this embodiment of this application has a structure of a long rod that extends linearly. The antenna radome includes an antenna radome body 1 and a tripwire 2 secured to the outer surface of the antenna radome body 1.

[0044] As shown in FIG. 1 and FIG. 3, a space for accommodating a component that implements an antenna function is formed in the antenna radome body 1. In this embodiment, the antenna radome body 1 has a cross section perpendicular to the length direction L of the antenna radome. Section shapes of all portions of the antenna radome body 1 are the same. In this application, omni-directional wind load optimization is implemented by optimizing the section shape of the antenna radome body 1 of the antenna radome.

[0045] Specifically, as shown in FIG. 3, the section shape of the antenna radome body 1 is formed as a closed shape. The section shape includes a linear segment LS and a plurality of arc segments ARC1 to ARC6. The section shape is symmetric with respect to a reference line that passes through the midpoint of the linear segment LS and that is perpendicular to the linear segment LS. On one side (the right side in FIG. 3) of the reference line, the section shape includes a first arc segment ARC1 that is connected to the end, on the one side, of the linear segment LS, a second arc segment ARC2, and a third arc segment ARC3. One end of the first arc segment ARC 1 is connected to the end, on the one side, of the linear segment LS. The other end of the first arc segment ARC1 is connected to one end of the second arc segment ARC2. The other end of the second arc segment ARC2 is connected to one end of the third arc segment ARC3. As described above, the section shape of the cross section of the antenna radome body 1 is symmetric with respect to the reference line. On the other side (the left side in FIG. 3) of the reference line, the section shape includes a fourth arc segment ARC4 that is connected to the end, on the other side, of the linear segment LS, a fifth arc segment ARC5, and a sixth arc segment ARC6. The fourth arc segment ARC4 and the first arc segment ARC1 are symmetric to each other with respect to the reference line. The fifth arc segment ARC5 and the second arc segment ARC2 are symmetric to each other with respect to the reference line. The sixth arc segment ARC6 and the third arc segment ARC3 are symmetric to each other with respect to the reference line. One end of the fourth arc segment ARC4 is connected to the end, on the other side, of the linear segment LS. The other end of the fourth arc segment ARC4 is connected to one end of the fifth arc segment ARC5. The other end of the fifth arc segment ARC5 is connected to one end of the sixth arc segment ARC6. The other end of the sixth arc segment ARC6 is connected to the other end of the third arc segment ARC3. Actually, the other ends of the sixth arc segment ARC6 and the third arc segment ARC3 overlap and are both on the

reference line. In addition, the sixth arc segment ARC6 and the third arc segment ARC3 may be considered as a same arc segment.

[0046] All circle centers corresponding to the arc segments (the first arc segment ARC1 to the sixth arc segment ARC6) are in the closed shape. On the one side of the reference line, the curvature radii of the arc segments ARC1 to ARC3 sequentially increase from the end, on the one side, of the linear segment LS, that is, the curvature radius of the first arc segment ARC1 is less than the curvature radius of the second arc segment ARC2, and the curvature radius of the second arc segment ARC2 is less than the curvature radius of the third arc segment. Further, the length of the third arc segment ARC3 is greater than the length of the first arc segment ARC1, and the length of the first arc segment ARC1 is greater than the length of the second arc segment ARC2. On the other side of the reference line, the curvature radii of the arc segments ARC4 to ARC6 sequentially increase from the end, on the other side, of the linear segment LS, that is, the curvature radius of the fourth arc segment ARC4 is less than the curvature radius of the fifth arc segment ARC5, and the curvature radius of the fifth arc segment ARC5 is less than the curvature radius of the sixth arc segment. Further, the length of the sixth arc segment ARC6 is greater than the length of the fourth arc segment ARC4, and the length of the fourth arc segment ARC4 is greater than the length of the fifth arc segment ARC5.

[0047] Further, except the joint between the third arc segment ARC3 and the sixth arc segment ARC6, a chamfer, especially a round chamfer, is formed on the outer surface of the joint between two adjacent arc segments, so that all the arc segments are connected smoothly.

[0048] In this way, the antenna radome body 1 having the foregoing section shape is constructed. This helps optimize the wind load imposed on the antenna radome by the wind from various directions, thereby decreasing the wind resistance.

[0049] In this embodiment, experiments show that the arc segments in the cross section of the antenna radome body 1 in this application can better achieve the objective, in this application, of optimizing an omni-directional wind load in a case that the following relational expression is satisfied.

[0050] When the midpoint of the linear segment LS is an origin of coordinates, an x-axis is along a straight line on which the linear segment LS is located, a forward direction of the x-axis faces the one side of the reference line, a y-axis is along the reference line, and a forward direction of the y-axis faces the third arc segment ARC3 and the sixth arc segment ARC6.

[0051] In this case, the three arc segments on the one side of the reference line satisfy the following relational expressions:

[0052] The first arc segment ARC1 satisfies the following relational expression: $(x - a)^2 + (y - 0.6a)^2 = 0.36a^2$, $x \in (a, 1.6a)$, where coordinates of a circle center O1 corresponding to the first arc segment ARC1 are $(a, 0.6a)$.

[0053] The second arc segment ARC2 satisfies the following relational expression: $(x - 0.6a)^2 + (y - 0.7a)^2 = a^2$, $x \in (1.5a, 1.6a)$, where coordinates of a circle center O2 corresponding to the second arc segment ARC2 are $(0.6a, 0.7a)$.

[0054] The third arc segment ARC3 satisfies the following relational expression: $x^2 + (y - 0.4a)^2 = 2.78a^2$, $x \in (0, 1.5a)$, where coordinates of a circle center O3 corresponding to the second arc segment ARC2 are $(0, 0.4a)$.

[0055] As described above, the section shape of the cross section of the antenna radome body 1 is symmetric with respect to the reference line. Therefore, the three arc segments on the other side of the reference line satisfy the following relational expressions:

[0056] The fourth arc segment ARC4 satisfies the following relational expression: $(x + a)^2 + (y - 0.6a)^2 = 0.36a^2$, $x \in (-1.6a, -a)$, where coordinates of a circle center corresponding to the fourth arc segment ARC4 are $(-a, 0.6a)$.

[0057] The fifth arc segment ARC5 satisfies the following relational expression: $(x + 0.6a)^2 + (y - 0.7a)^2 = a^2$, $x \in (-1.6a, -1.5a)$, where coordinates of a circle center corresponding to the fifth arc segment ARC5 are $(-0.6a, 0.7a)$.

[0058] The sixth arc segment ARC6 satisfies the following relational expression: $x^2 + (y - 0.4a)^2 = 2.78a^2$, $x \in (-1.5a, 0)$, where coordinates of a circle center corresponding to the sixth arc segment ARC6 are $(0, 0.4a)$, and the circle center corresponding to the sixth arc segment ARC6 and the circle center corresponding to the third arc segment ARC3 are at a same coordinate point.

[0059] Further, the length of the linear segment LS is $2a$.

[0060] In the foregoing relational expression, a is a dimensionless constant and may be any real number. Setting of the foregoing dimensionless function relationships helps apply the section shape in this application to antennas of different sizes.

[0061] Further, as shown in FIG. 1 and FIG. 2, the tripwire 2 extends in the length direction L of the antenna radome body 1; and the length of the tripwire 2 is equal to the length of the antenna radome body 1. The tripwire 2 is formed as a structure protruding from the outer surface of the antenna radome body 1. In this embodiment, the tripwire 2 is disposed at the midpoint portion of the third arc segment ARC3, the midpoint portion of the sixth arc segment, the joint between the first arc segment ARC1 and the second arc segment ARC2, and the joint between the fourth arc segment and the fifth arc segment. Due to disposing of the tripwire 2, airflow formed by wind can be separated at an expected position on the antenna radome, so that the wind load imposed on the antenna radome by the wind from various directions can be further optimized.

[0062] As shown in FIG. 4A to FIG. 4C, the shape, in the cross section, of the tripwire 2 may be a rectangle, a trapezoid

(for example, an isosceles trapezoid), or a triangle (for example, an equilateral triangle). The maximum height by which the tripwire 2 protrudes from the outer surface of the antenna radome body 1 may be about 1 mm. In other words, when the cross section of the tripwire 2 is a rectangle, and a long edge of the rectangle is connected to the outer surface of the antenna radome body 1, the length of the short edge of the rectangle is about 1 mm. When the cross section of the tripwire 2 is an isosceles trapezoid, and the long bottom edge of the isosceles trapezoid is connected to the outer surface of the antenna radome body 1, the height of the isosceles trapezoid is about 1 mm. When the cross section of the tripwire 2 is an equilateral triangle, and one edge of the equilateral triangle is connected to the outer surface of the antenna radome body 1, the height of the equilateral triangle is about 1 mm. In addition, another dimension of the cross section of the tripwire 2 may be set as required. For example, when the cross section of the tripwire 2 is an isosceles trapezoid, the dimension of the long bottom edge of the isosceles trapezoid may be 5 mm, and the dimension of the short bottom edge may be 4 mm.

[0063] Experiments show that when compared with an existing antenna radome, the antenna radome having the foregoing section dimension has the following advantage: Wind resistance in most directions can be optimized. Data in the following Table 1 shows actually measured parameters of wind tunnel experiments performed on an existing antenna radome (whose section shape has a flat structure) and the antenna radome (whose section shape has the shape described above, namely, a shape similar to a mushroom) in this application.

Table 1

Windward angle	Wind resistance of an existing antenna radome	Wind resistance of the antenna radome in this application	Increased by
0°	1088	651	-67.3%
10°	1060	677	-56.4%
20°	1256	636	-97.6%
30°	1139	623	-82.9%
40°	1050	720	-45.8%
50°	940	844	-11.3%
60°	946	933	-1.4%
70°	927	871	-6.5%
80°	647	877	26.2%
90°	753	897	16.1%
100°	977	853	-14.5%
110°	851	890	4.4%
120°	1058	970	-9.1%
130°	1135	877	-29.4%
140°	1139	798	-42.8%
150°	1083	800	-35.5%
160°	933	803	-16.2%
170°	823	760	-8.3%
180°	633	695	9.0%

[0064] In the foregoing Table 1, when the windward angle is 0°, the antenna radome in the wind tunnel is in the following first state: The wind direction in the wind tunnel directly faces a protruding peak portion of the antenna radome in this application (that is, the wind direction faces a portion formed by the other ends of the third arc segment ARC3 and the sixth arc segment ARC6 of each section of the antenna radome, and the wind direction is an extending direction of the reference line). When the windward angle is 180°, the antenna radome in the wind tunnel is in the following second state: The wind direction in the wind tunnel directly faces a flat portion of the antenna radome in this application (that is, the wind direction faces a portion formed by the linear segment LS of each section of the antenna radome, and the wind direction is the extending direction of the reference line). The other windward angles are angles by which the antenna

radome turns about the central axis of the antenna radome from the first state to the second state.

[0065] Further, this application further provides an antenna apparatus. The antenna apparatus may be an antenna apparatus used in a wireless base station of a communication network. Based on a condition of a component that implements an antenna function, the antenna apparatus may include one or more antenna radomes. When the antenna apparatus includes a plurality of antenna radomes, these antenna radomes are arranged in a circular array, and a protruding portion of each antenna radome faces the outer side of the circular array.

[0066] The foregoing describes example embodiments of specific implementations of this application and related variations. The following provides supplementary descriptions.

i: Although it is described in the foregoing embodiment that the antenna apparatus is an antenna apparatus used in a wireless base station of a communication network, this application is not limited thereto. The antenna apparatus in this application may be used for another purpose.

ii: It may be understood that a plurality of parallel tripwires may be disposed on the antenna radome, and that the shape and dimension of the section of the tripwire are also not limited to the shape and dimension described in the foregoing embodiment, but may be adjusted as required.

[0067] Although this application is described with reference to embodiments, in a process of implementing this application that claims protection, a person skilled in the art may understand and implement another variation of the disclosed embodiments by viewing the accompanying drawings, disclosed content, and the appended claims. In the claims, "comprising" does not exclude another component or another step, and "a" or "one" does not exclude a meaning of plurality. Some measures are recorded in dependent claims that are different from each other, but this does not mean that these measures cannot be combined to produce a better effect.

[0068] Embodiments of this application have been described above. The foregoing descriptions are examples, not exhaustive, and are not limited to the disclosed embodiments. Many modifications and variations are apparent to a person of ordinary skill in the art without departing from the scope and spirit of the described embodiments. Selection of terms used in this specification is intended to best explain principles of embodiments, actual application, or improvements to technologies in the market, or to enable another person of ordinary skill in the art to understand embodiments disclosed in this specification.

Claims

1. An antenna radome, wherein a space for accommodating an antenna is formed in the antenna radome, and in a cross section perpendicular to a length direction of the antenna radome, at least a part of an antenna radome body of the antenna radome has the following section shape:

the section shape is formed as a closed shape, wherein the section shape comprises a linear segment, and the section shape is symmetric with respect to a reference line that passes through a midpoint of the linear segment and that is perpendicular to the linear segment; and

on each side of the reference line, the section shape comprises a plurality of arc segments that are connected to an end, on the side, of the linear segment, all circle centers corresponding to the arc segments are in the closed shape, and curvature radii of the plurality of arc segments sequentially increase from the end on the side.

2. The antenna radome according to claim 1, wherein a chamfer is formed at a joint between two adjacent arc segments.

3. The antenna radome according to claim 1 or 2, wherein on one side of the reference line, the section shape comprises a first arc segment, a second arc segment, and a third arc segment, one end of the first arc segment is connected to an end, on the one side, of the linear segment, the other end of the first arc segment is connected to one end of the second arc segment, and the other end of the second arc segment is connected to one end of the third arc segment.

4. The antenna radome according to claim 3, wherein a length of the third arc segment is greater than a length of the first arc segment, and the length of the first arc segment is greater than a length of the second arc segment.

5. The antenna radome according to claim 3, wherein when the midpoint of the linear segment is an origin of coordinates, an x-axis is along a straight line on which the linear segment is located, a forward direction of the x-axis faces the one side, a y-axis is along the reference line, and a forward direction of the y-axis faces the third arc segment;

the first arc segment satisfies the following relational expression: $(x - a)^2 + (y - 0.6a)^2 = 0.36a^2$, $x \in (a, 1.6a)$;

the second arc segment satisfies the following relational expression: $(x - 0.6a)^2 + (y - 0.7a)^2 = a^2$, $x \in (1.5a, 1.6a)$; and
the third arc segment satisfies the following relational expression: $x^2 + (y - 0.4a)^2 = 2.78a^2$, $x \in (0, 1.5a)$, wherein a is a dimensionless reference value and is any real number.

- 5 6. The antenna radome according to claim 5, wherein a length of the linear segment is $2a$.
7. The antenna radome according to claim 1 or 2, wherein the antenna radome further comprises a tripwire secured to the antenna radome body, the tripwire extends in a length direction of the antenna radome body, and the tripwire forms a structure protruding from an outer surface of the antenna radome body.
- 10 8. The antenna radome according to claim 3, wherein the antenna radome further comprises a tripwire secured to the antenna radome body, the tripwire extends in a length direction of the antenna radome body, the tripwire forms a structure protruding from an outer surface of the antenna radome body, and the tripwire is disposed at a midpoint of the third arc segment and/or disposed at a joint between the first arc segment and the second arc segment.
- 15 9. The antenna radome according to claim 8, wherein a length of the tripwire is equal to a length of the antenna radome body.
- 20 10. The antenna radome according to claim 8, wherein a shape, in the cross section, of the tripwire is a rectangle, a trapezoid, or a triangle.
11. An antenna apparatus, wherein the antenna apparatus comprises the antenna radome according to any one of claims 1 to 9.
- 25 12. The antenna apparatus according to claim 11, wherein the antenna apparatus comprises a plurality of antenna radomes, and the plurality of antenna radomes are arranged in a circular array.
- 30 13. The antenna apparatus according to claim 11 or 12, wherein the antenna apparatus is an antenna apparatus used in a wireless base station of a communication network.



FIG. 1

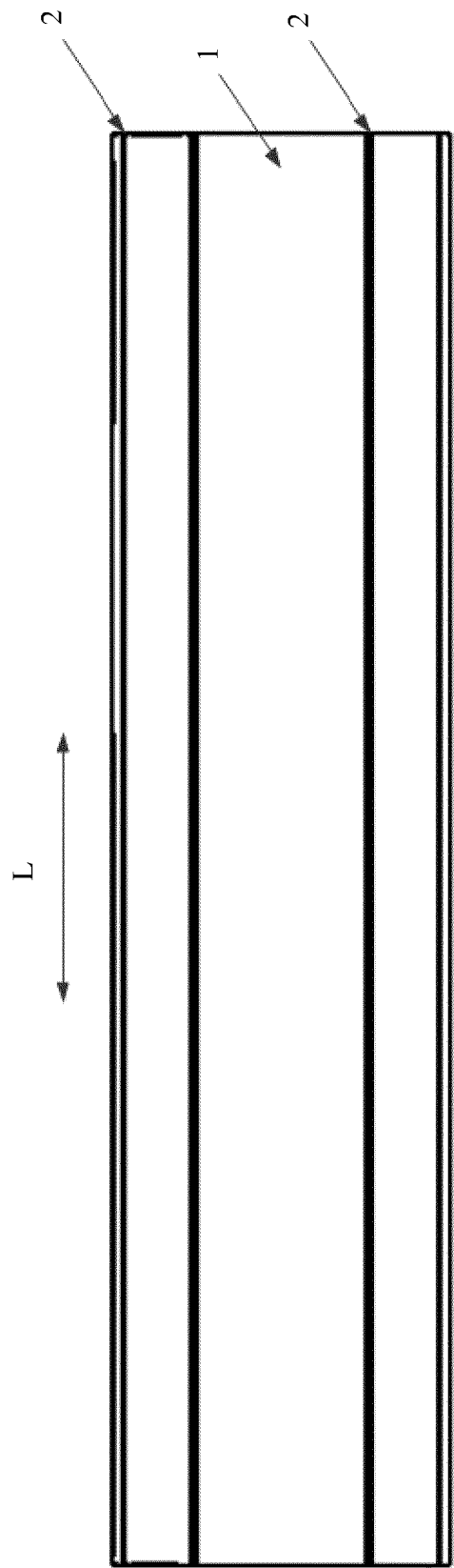


FIG. 2

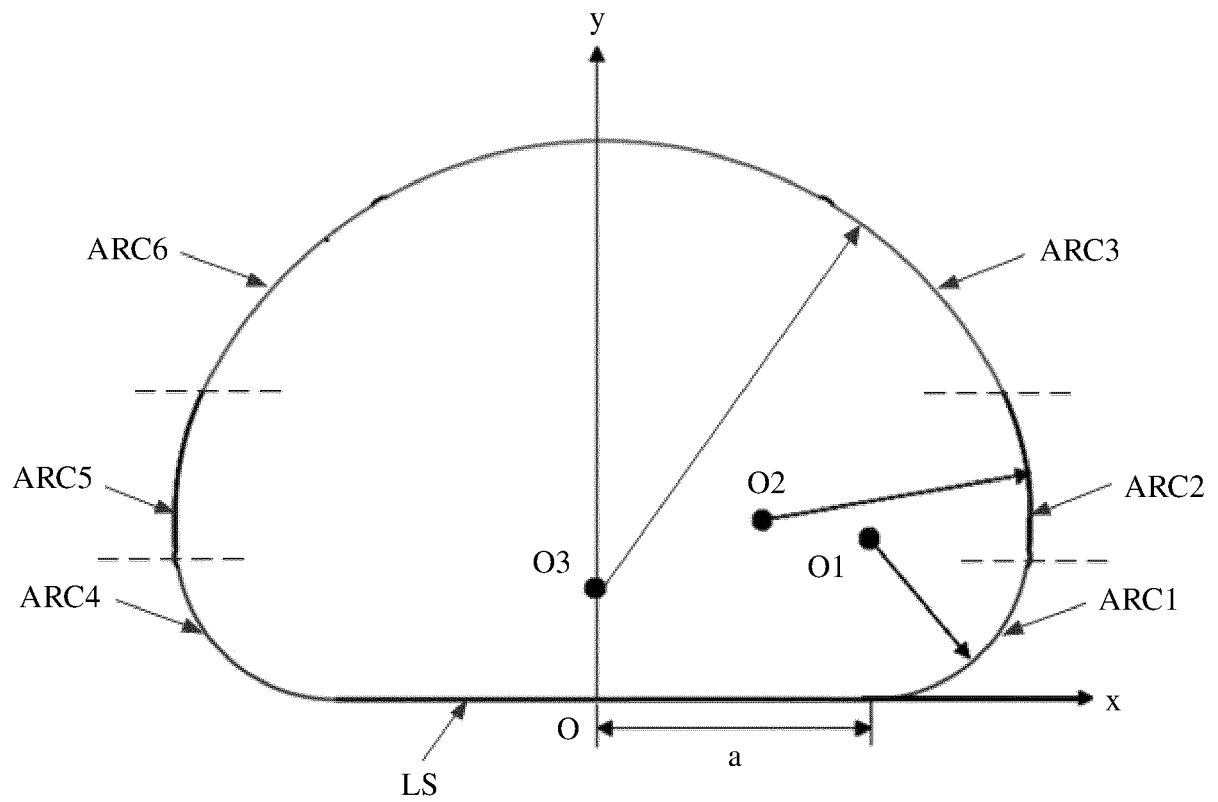


FIG. 3

2



FIG. 4A

2

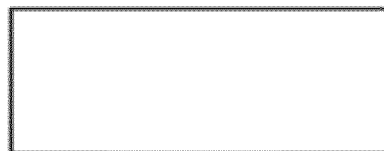


FIG. 4B

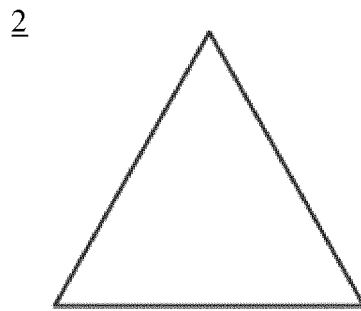


FIG. 4C

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/117609

A. CLASSIFICATION OF SUBJECT MATTER H01Q 1/42(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC																		
B. FIELDS SEARCHED																		
Minimum documentation searched (classification system followed by classification symbols) H01Q																		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS, CNTXT, VEN, USTXT, EPTXT, WOTXT, CNKI, IEEE: 天线罩, 圆弧, 曲率, 防风, 风阻, 绊线, 脊, Radome, arc, curvature, windproof, wind resistance, trip wire, ridge																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT																		
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>CN 208272135 U (JIANGSU HENGXIN TECHNOLOGY CO., LTD. et al.) 21 December 2018 (2018-12-21) description, paragraphs [0018]-[0024], and figures 1-3</td> <td>1-4, 11-13</td> </tr> <tr> <td>Y</td> <td>CN 208272135 U (JIANGSU HENGXIN TECHNOLOGY CO., LTD. et al.) 21 December 2018 (2018-12-21) description, paragraphs [0018]-[0024], and figures 1-3</td> <td>7-10</td> </tr> <tr> <td>Y</td> <td>CN 107534222 A (QUINTEL TECHNOLOGY LTD.) 02 January 2018 (2018-01-02) description, paragraphs [0007]-[0030], and figures 1-14</td> <td>7-10</td> </tr> <tr> <td>A</td> <td>CN 201383537 Y (YANTAI HIRAY MICROWAVE TECHNOLOGY CO., LTD.) 13 January 2010 (2010-01-13) entire document</td> <td>1-13</td> </tr> <tr> <td>A</td> <td>CN 208460979 U (DONGGUAN DONGSHI NEW MATERIAL DEVELOP CO., LTD.) 01 February 2019 (2019-02-01) entire document</td> <td>1-13</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	CN 208272135 U (JIANGSU HENGXIN TECHNOLOGY CO., LTD. et al.) 21 December 2018 (2018-12-21) description, paragraphs [0018]-[0024], and figures 1-3	1-4, 11-13	Y	CN 208272135 U (JIANGSU HENGXIN TECHNOLOGY CO., LTD. et al.) 21 December 2018 (2018-12-21) description, paragraphs [0018]-[0024], and figures 1-3	7-10	Y	CN 107534222 A (QUINTEL TECHNOLOGY LTD.) 02 January 2018 (2018-01-02) description, paragraphs [0007]-[0030], and figures 1-14	7-10	A	CN 201383537 Y (YANTAI HIRAY MICROWAVE TECHNOLOGY CO., LTD.) 13 January 2010 (2010-01-13) entire document	1-13	A	CN 208460979 U (DONGGUAN DONGSHI NEW MATERIAL DEVELOP CO., LTD.) 01 February 2019 (2019-02-01) entire document	1-13
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/117609

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		JP 2018507665 W	15 March 2018
		US 9979079 B2	22 May 2018
		CN 107534222 B	22 September 2020
CN 201383537 Y	13 January 2010	None	
CN 208460979 U	01 February 2019	None	

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REFERENCES CITED IN THE DESCRIPTION

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