Pledge

Customer name: Hunan Zoomlion Intelligent Technology Co., Ltd

Customer part number: 026800502ADZ0075Z

Customer Name: 915MHz glue rod antenna (SMA male inner hole).

KX part number KX-053-2

Specification description: GSM hexagon antenna/SMA male inner hole

Date of production: 22 August 2024

Factory Confirmation:

Sector	Audit	Ratification
Radiofrequency Department	Liu Xiaoxiong	Liu Xiao
Department of Constructions	Li Zhixiao	Li Bin
Quality Department	Liu Chunyu	Zeng Pengfei

The Client acknowledges that:

Check	Audit	Ratification

△ **Document development, modification, and abolition recording**

File naming	Date	Control the edition	Associated content	formulated	Ratification
Sample Acknowledgment	2024. 08. 22	V1	First production	Li Zhixiao	Li Bin

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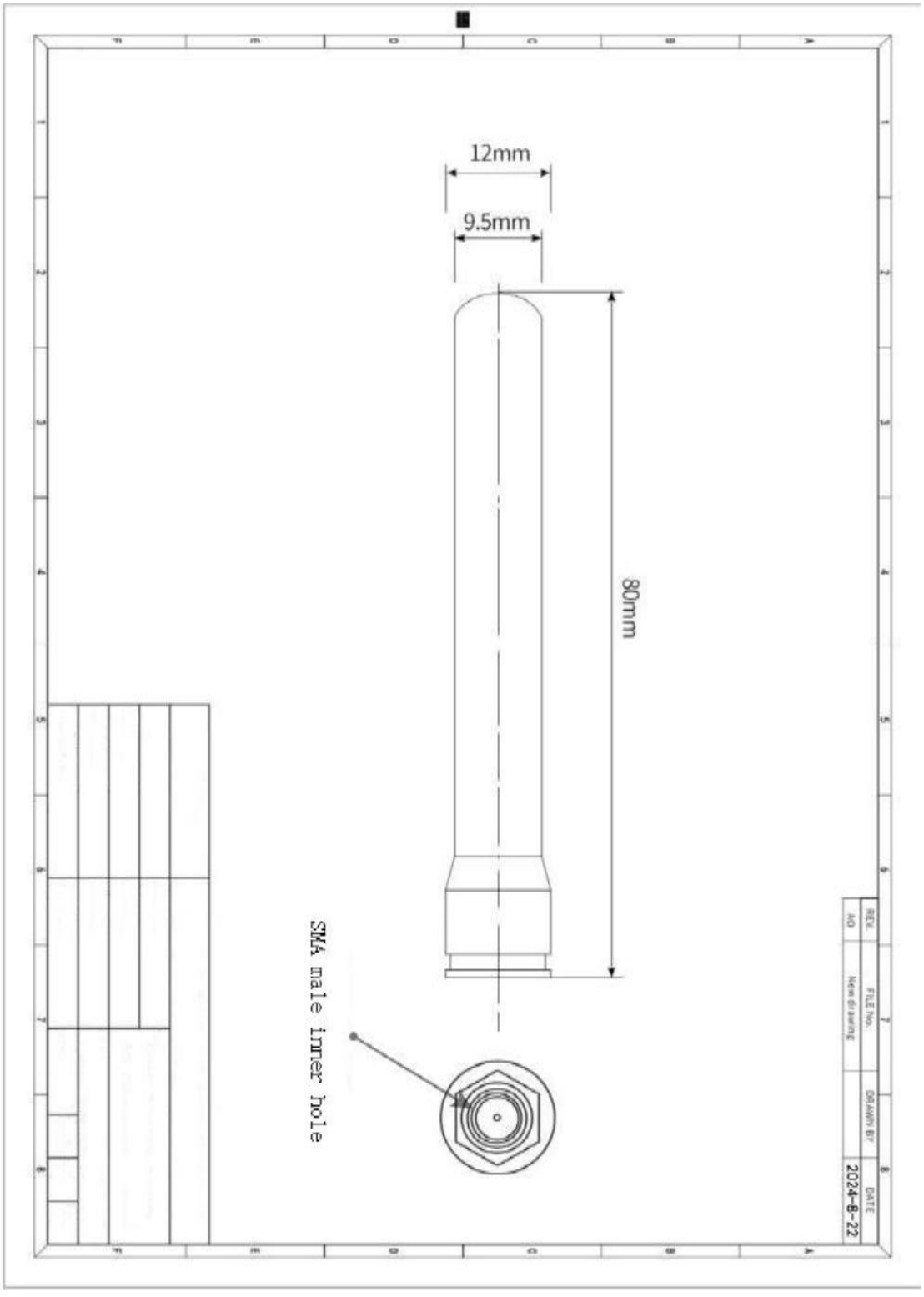
4. production Performance parameter:

Electrical Specifications	
frequency area Frequency Range (MHz)	824-960/1710-1880MHz
input impedance Input Impendence (Ω).	50
Voltage VSWR V.S.W.R	⩽ 2.0 (unmatched equipment reference only)
Reference Gain (dbi).	3.0 (not matched equipment for reference only)
Polarization Type	Vertical polarization
radiation direction Radiation Direction	Omni-Directional
Continuity Test	Access roads
machine Mechanical Specifications	
Conjunction Model Connect Type	RP-SMA-J(MALE BORE)
Material	ABS
Color	black
antenna weld size Size	80MM
Working temperature Operating Temp	-30 ~ +80 ˚C
stocking temperature Storage	-30 ~ +80 ˚C

Temp	

5. production design drawing paper:

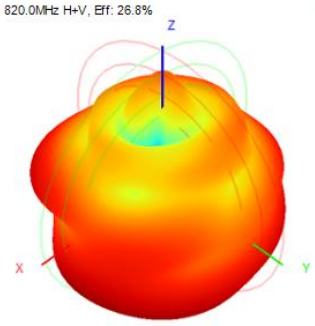


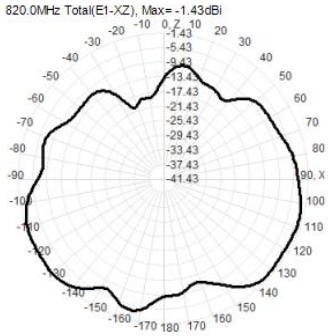
6.Electrical prop erties test report: VSWR:

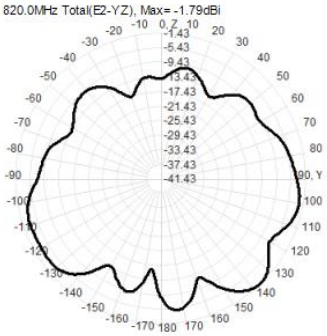
antenna efficiency & Gain:

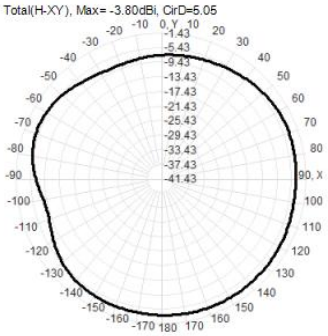
Freq (MHz)	Effi (%)	Gain (dBi)
820	26.75%	-0.71
960	32.53%	0.36
1710	16.63%	0.89
1880	46.17%	3.44

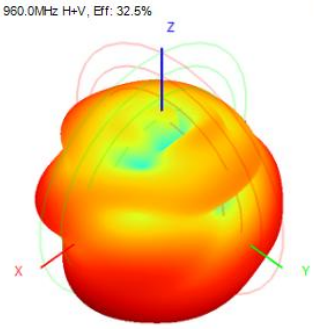
2.4G-3D&2D directions:

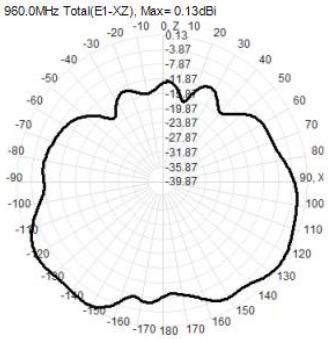


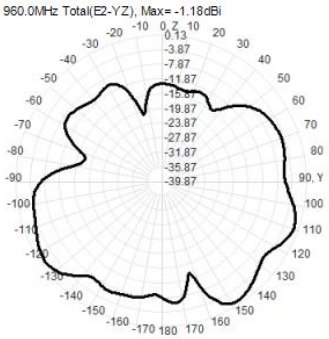


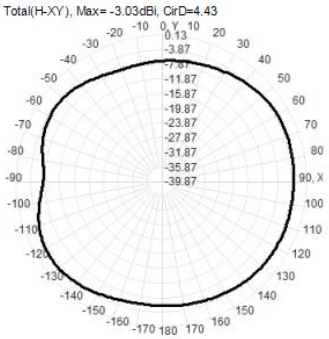


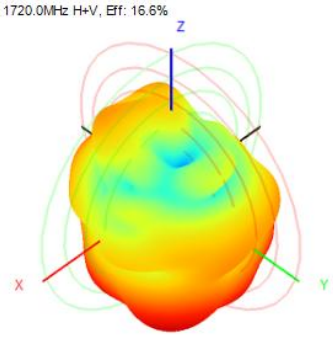


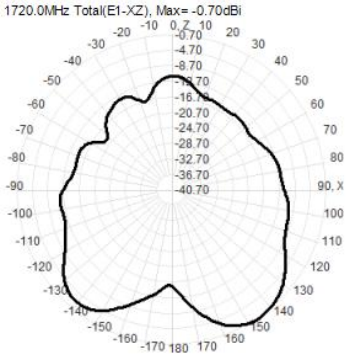


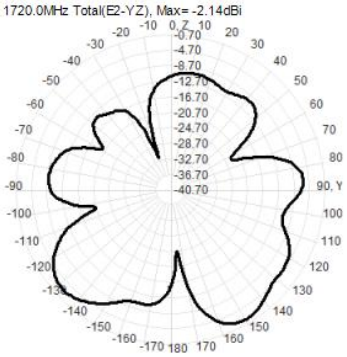


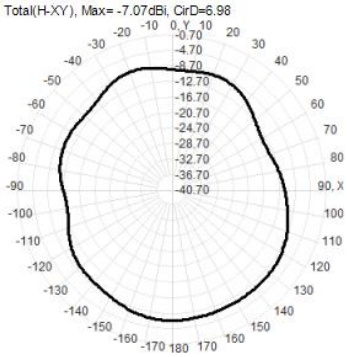


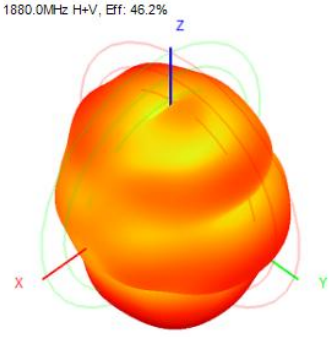


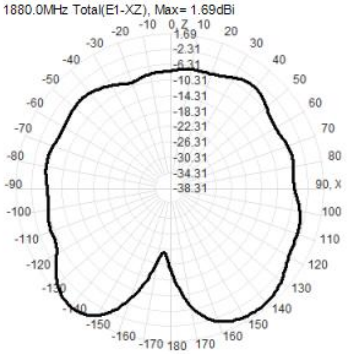


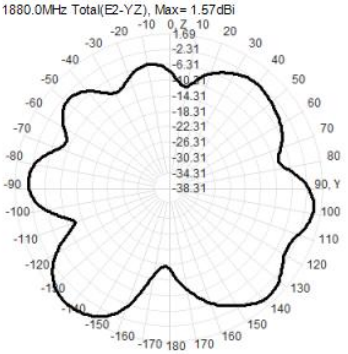


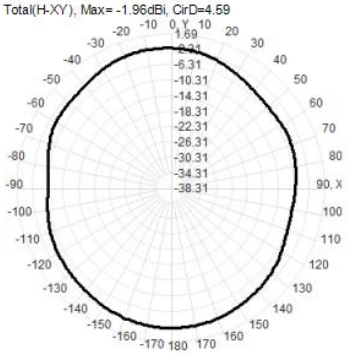












7. Product productions

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8.reliability experiment Requirements:

	Test items	Be specific
1.	Bending durability test	Test purpose: to verify that having a hogging functional antenna elbow can meet the long-term requirementsdurability of services; Preset condition: 1) The electrical performance of the measured specimen meets the requirements, and the appearance of the sample has no cracking, tear and other deficiency; 2) Minimum sample quantity: 3pcs. Test processes: 1. check antenna machine and electricity before the testwhether the functions is normal; Place the entire antenna horizontally and fastening the antenna binding; 2. turn antenna foot to and, manually or mechanicalBinding the head to a position of 90 degrees, and then turning to the original position, a reciprocating count once, test frequency: 30~40 times per minute, totalHogging 500 times, 5min blocking every 100 times; 3. After testing, check antenna appearance and machine performance. Criterion: 1. After the completion of the test, the antenna must not have cleared physical damage, and the antenna should be folded verticallyDo not slide when the directions is 30 degrees. 2. There is no transformation in electrical performance before and after the test;
2.	Antenna side pressure test	Test purpose: to verify the production external antenna after the integration of the anti-side pressure capability, testantenna strength and production with equipment touch of themselvesThe strength of the part, such as shel strength, stop rotation limit bars strength etc. Preset condition: 1） The electrical performance of the measured specimen meets the requirements, and the appearance of the sample has no cracking, tear and other deficiency. 2） The antenna is assembled on the productions in a normal state and the productions will be placedFastening well. 3) Each test specimen is at least 3pcs; Test Steps: 1. Before testing, check the appearance and functions of the sample to be tested; 2. Carry out the following two tests, and the two tests service two sets of materials respectively: Test 1: Make the antenna in a opening straightened state, facing inward, outward, and upward at a position of 5mm at the antenna bottom, Apply 20N force downwards and retaining for 5S, repeat this working 10 times in each directions.

		Test 2: Make the antenna in a 90-degree bending state, torsion antenna to the stop stop bar when it comes into play, at the antennaApply 20N force at the 5mm position at the bottom and repeat this working 10 times retaining 5S. Completion of the test of the two limit positions on the front and back. 3. In the above two sets of tests, if it is found that when the antenna is stressed, the antenna deformation angle is greater than 30° , If the external force is still less than 20N, the retaining deformation angle is 30° , and the external force is withdrawn after 5s for 5s, and the above is repeatedworking 10 times; Completion of 4 directions tests for a total of 40 times; 4. After the completion of the test, check the sample machine, Electrical prop erties. 5. If there are multiple antennas on the same productions, each antenna on the productionsThe erection posi tion is tested. Criterion: 1. The machine and electricity of the antenna after the completion of the testNormal functions; 2. The antenna can be hogged handed and recovered. The enclosure is not allowed to breakdown, and the core is not allowed to rupture. 3. The limit bar of the main equipment is cracked, and the enclosure buckle cannot be loosened or ruptured; 4. There is no transformation in the electrical performance of the antenna before and after the test;
3.	antenna turn durabil ity test	Purpose of the test: to verify that there is a free turn functional between the antenna fastening head and the antenna bodyThe antenna can meet the durability performance requirements of long-term services; Preset condition: The electrical performance of the measured specimen meets the requirements, and the appearance of the sample has no cracking, tear and other deficiency; Test processes: 180 degree turn antenna: 1. Ensure that the antenna machine and electricity function are normal before the test, and there is no physical damage; 2. Bend the antenna foot into a vertical with the bindingDirections 3. antenna assemble on the fastening table of the corresponding model and bend the antennafoot make it direction perpendicular to the binding. 4. turn antenna foot to the left to the horizontal position (90 degrees) manually or mechanical, and thenturn to the original position, then turn antenna foot to the right to the horizontal position (90 degrees) and turnTo the original position, the entire reciprocating count is 1 time. 5. The test frequency is 30~40 times per minute, and the total turns is 1000

		times; 6. After the test, check antenna machine and reachElectrical prop erties. 360-degree turn antenna: 1. Ensure that the antenna machine and electricity function are normal before the test, and there is no physical damage; 2. Bend the antenna foot into a vertical with the bindingDirections 2. antenna assemble on the fastening table of the corresponding model and bend the antennafoot make it direction perpendicular to the binding 3. Return to the original position by manual or mechanical turn 360 degrees to the left, and then turn antenna to the rightThe foot 360 returns to its original position, and the entire reciprocating count 2 times. 4. The test frequency is 30~40 times per minute, and the total turns is 1000 times; 5. After the test, check antenna machine andElectrical prop erties. Criterion: 1. After the completion of the test, the antenna must not have clearer physical damage, and the antenna after the testThe turn also has a function in fastening antenna turn position, the limiting constructions of the main equipment has no injuries; 2. There is no transformation in electrical performance before and after the test.
4.	Free drop test of the whole machine	Verify whether the desktop, handheld terminal falls in service/hauling process strength meets the requirements. Test processes: experiment condition: (1) The antenna opening state together with the whole machine drops elevation 0.8 m, 6 sides, 1 pieceCycle, a total of 6 times, marble plain stage, controlled fall; (2) Minimum sample quantity: 3pcs 2. Processes (1) Ensure that the mechanical work and electricity function of the sample are normal; (2) Each sample is subjected to a controlled drop corresponding to the required elevation and number of drops; (3) In the test process, it is required that the appearance and function of each surface check tested, and if the defect caused by the next surface test is carried out, it can be handrecovery, test after hand recovery. Criterion: After the completion of 1 cycle test, the mechanical work of the sample is normalelectricity function is normal, allowing hand recovery machineFailure occurs. Minor machine defect that does not affect user normal service and safe

		is allowed.
5.	Antenna tensile test	The purpose of the test is to verify whether the strength at the antenna binding meets the requirements; Preset condition: The electrical performance of the measured specimen meets the requirements, and the appearance of the sample has no cracking, tear and other deficiency; Test processes: 1. Initial inspection before the test to ensure that the prototype accessories are function normal before the test; 2. Fastening the fastening head and applying a pull force of 5kgf to the rotating shaft of the antenna, Retaining 2S when the strength reaches 5kgf; 3. Repeat the working step (2) 20 times; 4. fastening antenna the rotating shaft, apply a pull force of 5kgf to the antenna end, and the force reaches 5kgfRetaining 2S; 5. Repeat step (4) of working 20 times. Criterion: 1. After the completion of the test, the antenna must not have clearer physical damage. 2. There is no transformation in electrical performance before and after the test.
6.	antenna assembl e force	The purpose of the test: to verify whether the antenna meets the requirements of human comfort assembling assemble production; Preset condition: ONT and antenna must be brand new samples and assembled for the first time; second times assemble due to construction tear, The assembling force will be significantly reduced, resulting in invalid test data; Test processes: 1. Initial inspection before the test to ensure that the ONT encloser and antenna are brand new prototypes and have not been antenna assemble; 2. fastening the ONT encloser and press the antenna into the ONT encloser antennamounting holes; It can be done service pressure the machine and recording antennaAssemble force. 3. Prototype quantity: 3pcs Check points, requirements to be met, metrics and expected results: 1. The antenna assemble force is less than 30N;
7.	Antenna squeak test	Test purpose: to verify that the antenna has no abnormal noise during the shaking processes; Test criterion: hands shaking of the single antenna, no abnormal noise;

9. Environmental requirements

	Environmental parameters	index	Reference standards
1	storage temperature area (° C)	-35～+80	Reference standard: IEC 60068-2-1/2/6/ 14/30/31/78 ETSI EN 300 019-2-1/2/3 GR-63-CORE
2	Operating temperature area (° C)	-35～+80	
3	storage dampness area	40° C, 95% dampness, 96 hours	
4	Work dampness area	5%～95%	
5	Alternating damp heat	1) retaining temperature +25° C to raise dampness to 95% RH in 1 hour 2) 95% RH for retaining dampness; Temperature rise to +55° C in 3 hours; 3) Retaining at +55° C, 95%RH for 9 h 4) 95% RH for retaining dampness; Cooled to +25° C within 3 hours; 5) Retaining at +25° C, 95%RH for 9 hours 6) Repeat steps 2) to 5) 5 times (6 cycles in total); 7) temperature retaining at +25° C, lowering dampness to 50% in 1 hour; 8) Retaining at +25° C, 50%RH for 2 h The required indicators and expected results that should be achieved by the check point: 1. The antenna should not be discolored, cracked, degummed, curling deformation, loss of function, etc. 2. There is no obvious transformation between the damping force of the antenna and the ONT, and it is antennaThe damping force of the production fit can be retaining antenna at any angleretaining;	

6	temperature cycle	1) High temperature limiting value: 1) 80° C; 2) low temperature limiting value: -35° C; 3) Temperature change and retaining time: at high low temperatureThe extreme value is retaining for at least 2h, from high temperature to low temperature or fromlow temperature to high temperatures time do not oven for 4 hours; 4) cycle quantity: A total of 6 cycle will be conducted 5) recovery time: 24h 6) Minimum sample quantity: 3pcs The required indicators and expected results that should be achieved by the check point: 1. The antenna should not be discolored, cracked, degummed, curling deformation, etcloss of functions, etc. 2. There is no obvious transformation between the damping force of the antenna and the ONT, and it is antennaThe damping force of the production fit can be retaining antenna at any angleretaining;
7	High-temperature storage	Warm to 80° C at a rate of 1° C/min for retaining 2 hours at 80° C; Cool down to -35° C rate at 1° C/min for 2 hours retaining 6 cycle. Minimum sample quantity: 3pcs The required indicators and expected results that should be achieved by the check point: 1. The antenna should not be discolored, cracked, degummed, curling deformation, etcloss of functions, etc. 2. There is no obvious transformation between the damping force of the antenna and the ONT, and it is antennaThe damping force of the production fit can be retaining antenna at any angleretaining;
8	low temperature storage	Cool down to -35° C at a rates of 1° C/min and retaining at -35° C for 2 hours; Raise the temperature to +80° C at a rate of 1° C/min for retaining 2 hours and cycle 6 times. The required indicators and expected results that should be achieved by the check point: 1. The antenna should not be discolored, cracked, degummed, curling deformation, etcloss of functions, etc. 2. There is no obvious transformation between the damping force of the antenna and the ONT, and it is antennaThe damping force of the production fit can be retaining antenna at any angleretaining;

9	Constancy salt spray	After 12 hours of salt spray experiment, after experiment, the index was production at room temperature, function and machine performance in block normal.	
10	illumination	/	
11	Bare metal vibrating	Request; 1. frequency: 10~30Hz, place distance: 0.38mm, 3 cycle, 5 minutes each cycle; 2. frequency: 30~60Hz, place distance: 0.38mm, 3 cycle, 5 minutes each cycle; 3. Repeat once in 3 axis directions; After testing, production metrics, function, and machine performance in block normal.	
12	With packaging vibrating	No test is done, but it is required to go to the Huawei warehouse, and the antenna performance and appearance are OK	
13	With packaging static pressure		
14	With packaging dump		
15	With packaging collision shock		
16	Free fall with packaging		
17	Appearance and qualities requirements of antenna injection molded parts	/	In the General quality Requirements for DKBA04000193 plastic and rubber Parts, Chapters 1, 2, 3, 5 and 6 require
18	Spraying qualities requirements	Not involved	"ATOM antenna spraying quality requirements"
19	Environment Comply with	yes	

	al requirements	European RHOS\REACH requirements		
20		Comply with China's RHOS\REACH requirements	yes	
21		Lead-free requirements for galvanized	yes	