SUNNYWAY TECHNOLOGY(CHINA)

ANTENNA SPEC

Company name：Tianbo (Shenzhen) Co., Ltd	Entry name：T20
Working band: GSM 850/E-GSM 900/DCS 1800/PCS 1900+WCDMA 1/8+LTE Band1/3/5/8/40/41	
Motherboard version：	

Sunnyway Material specification

Specification type	Sunnyway number	Customer number
MAIN Antenna	SZ22060IB77	

Revision history

Date of preparation/change	Change content	Altered person	Edition
2023.06.08	New issue	Chen min	A

Sunnyway Countersign column

R&D	ME：	To examine：	QE：	Approval：
	RF：	To examine：		

Customer will sign the column

Electronic Engineer	Project manager	Structural Engineer	Quality Engineer

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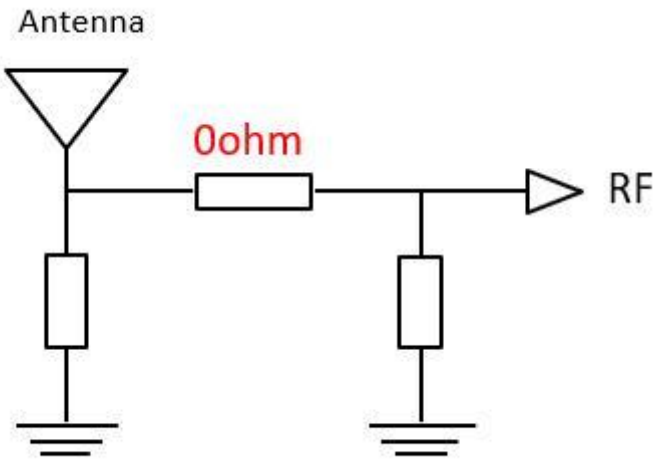
Directory

1. Project information

1.1 Mockup picture

2. Matching circuit



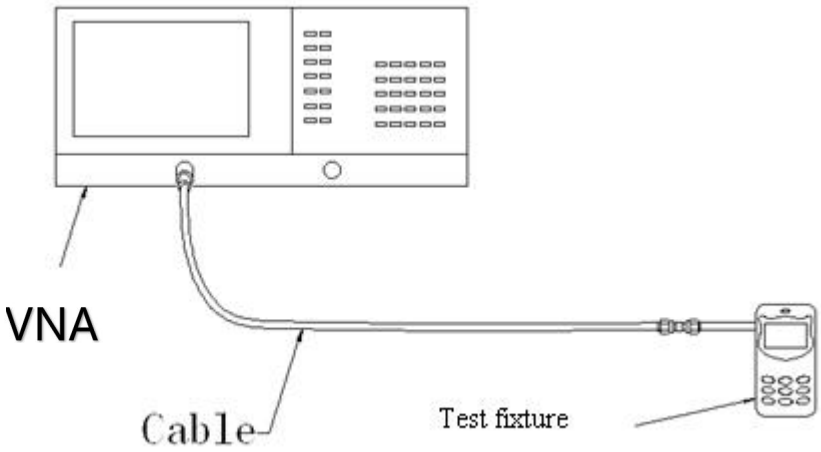
3. Antenna passive testing data

3.1 S11 Description of the test method

Test the equipment：Vector network analyzer (Agilent E5071C)

Test methodology：Use a 50 ohm CABLE cable to export from the instrument test port, use the calibration piece to calibrate and connect the SMA connector of the test fixture, and record the return loss and standing wave ratio corresponding to the relevant frequency point.

Below is a schematic picture of the test：

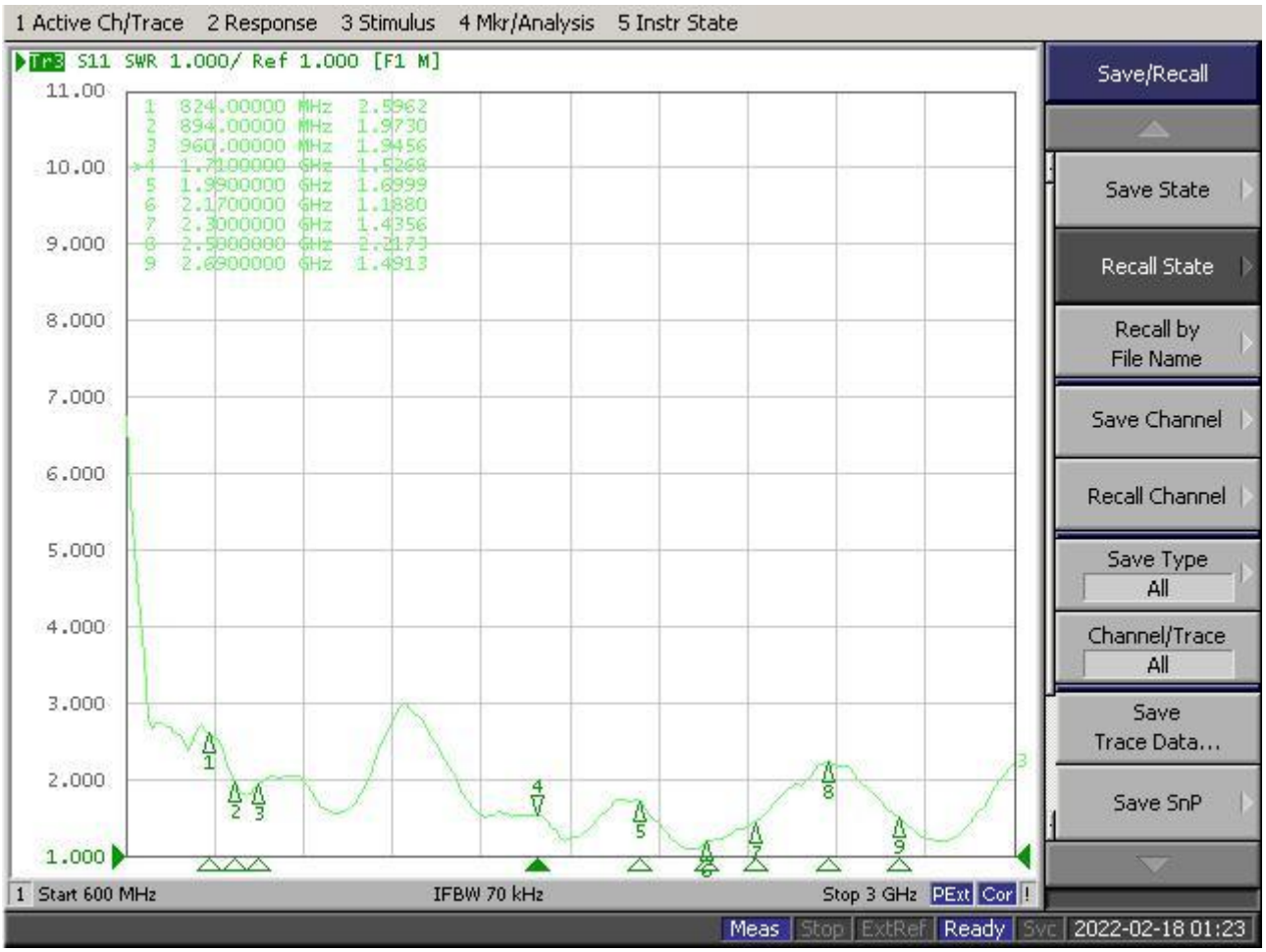


Test schematic diagram

3.2 S11 Test parameters

（ Freq. ） MHz	824	894	960	1710	2170	2300	2690
VSWR	2.5	1.9	1.9	1.5	1.1	1.4	1.4

驻波比 VSWR

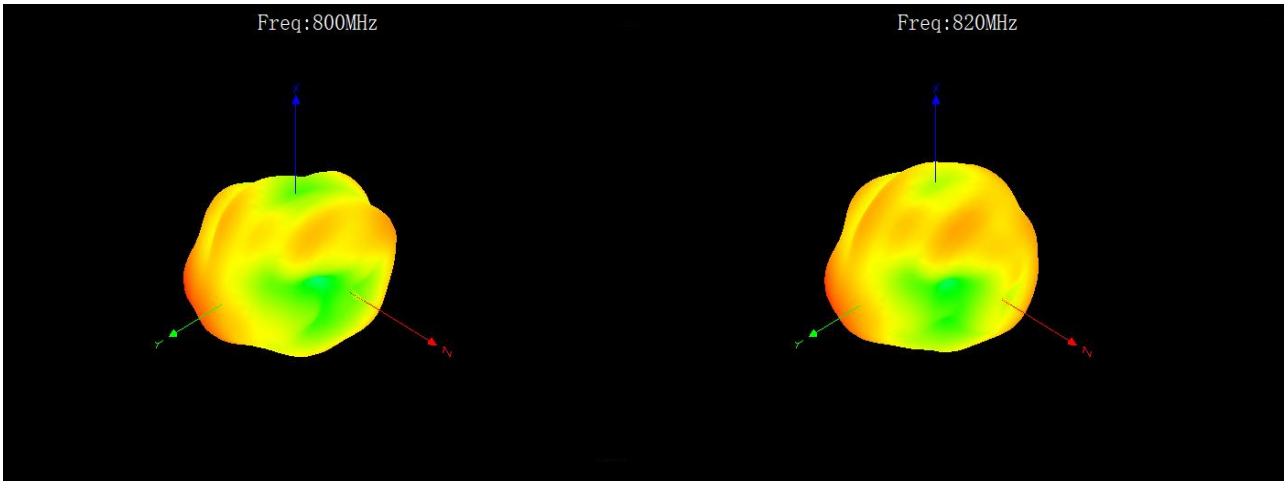


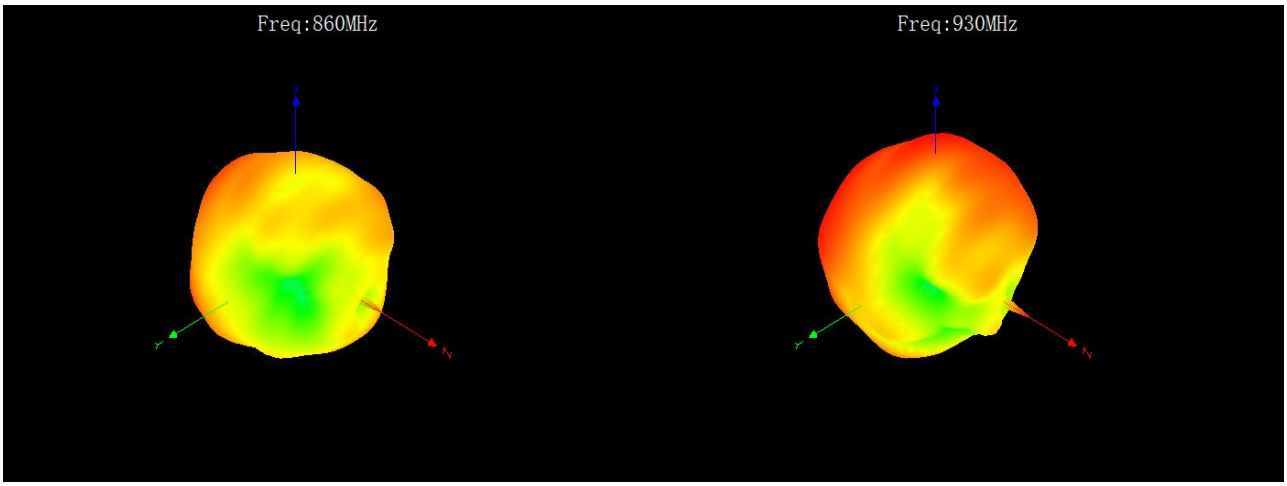
3.3.1 Antenna Efficiency

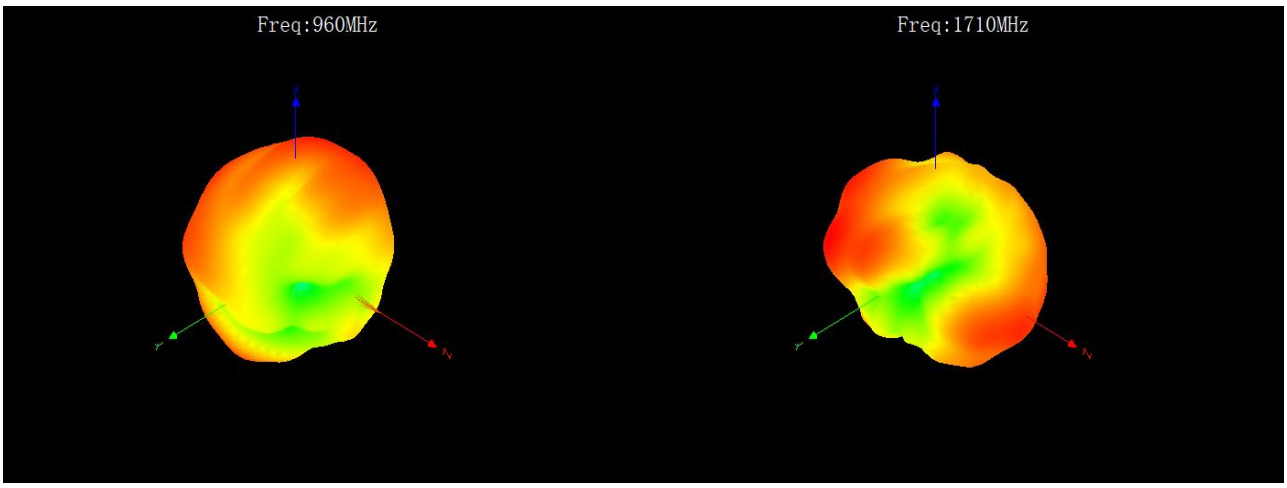
Frequency/Mhz	MaxGain/dBi	Efficiency / %	Frequency/Mhz	MaxGain/dBi	Efficiency / %
700	-2.24	8.57	2070	4.42	52.48
710	-2.27	9.23	2080	4.66	52.48
720	-2.97	9.73	2090	4.7	52.36
730	-4.06	10.05	2100	5.05	53.95
740	-4.06	10.19	2110	4.94	53.21
750	-3.46	10.96	2120	5.17	55.46
760	-2.75	11.35	2130	5.06	55.21
770	-2.54	10.86	2140	4.75	52
780	-2.28	10.57	2150	4.63	53.09
790	-1.95	10.33	2160	4.59	52.48
800	-4.24	8.43	2170	4.58	52.24
810	0.8	7.6	2180	4.62	50.82
820	0.9	8.28	2190	4.64	49.43
830	0.9	9.04	2200	4.85	49.43
840	-0.18	9.46	2210	4.96	48.75
850	-0.01	10.45	2220	5	47.75

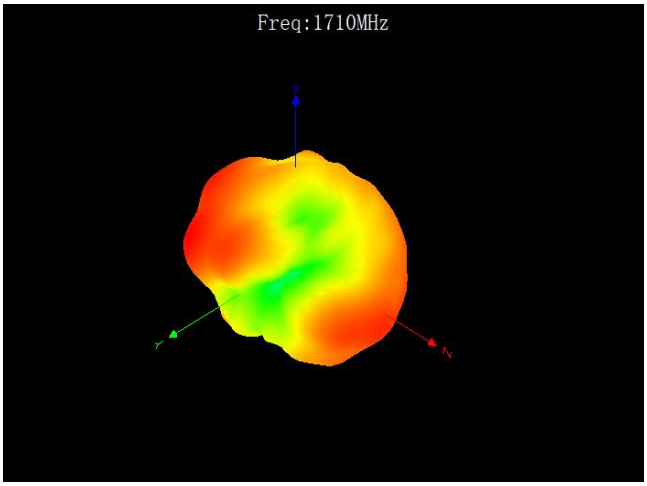
860	-4.71	11.51	2230	4.84	45.92
870	-4.47	12.13	2240	4.75	46.03
880	-4.67	11.91	2250	4.5	44.98
890	-5.01	12.25	2260	4.18	43.75
900	-4.95	12.79	2270	4.02	43.85
910	-5.25	12.11	2280	4.03	43.85
920	-5.86	11.38	2290	3.89	42.27
930	-5.99	11.25	2300	3.86	42.07
940	-5.5	11.4	2310	3.87	41.59
950	-4.89	11.78	2320	3.71	41.4
960	-4.44	12.13	2330	3.51	39.99
1700	2.26	40.27	2340	3.41	40.46
1710	2.2	41.59	2350	3.49	40.83
1720	1.51	42.17	2360	3.44	41.59
1730	1.22	42.46	2370	3.36	39.81
1740	1.03	42.07	2380	3.28	38.99
1750	0.78	41.4	2390	3.48	39.63
1760	1.03	41.78	2400	3.17	38.9
1770	1.2	41.4	2410	2.81	36.22
1780	1.22	40.83	2420	2.76	37.5
1790	1.16	40.27	2430	2.81	36.81
1800	0.81	39.72	2440	2.66	35.97
1810	0.79	38.9	2450	2.76	36.31
1820	1.54	39.17	2460	2.32	34.43
1830	2.01	38.37	2470	2.9	36.56
1840	2.33	38.37	2480	2.83	36.22
1850	2.3	37.67	2490	3.01	35.89
1860	2.29	36.64	2500	2.69	34.43
1870	2.2	35.08	2510	2.69	34.12
1880	2.2	35.81	2520	2.48	33.88
1890	2.06	36.39	2530	2.69	33.96
1900	2.03	37.07	2540	2.63	33.88
1910	1.92	38.64	2550	2.78	33.57
1920	1.51	38.11	2560	2.8	32.81
1930	1.33	38.64	2570	2.95	32.66
1940	1.41	40.18	2580	2.98	33.04
1950	1.58	41.5	2590	2.96	32.58
1960	1.8	41.4	2600	3.18	33.65
1970	2.26	43.95	2610	3.31	34.36
1980	2.31	44.46	2620	3.34	33.81
1990	2.4	44.06	2630	3.39	34.04
2000	2.69	44.77	2640	3.55	34.59
2010	2.86	45.39	2650	3.55	34.83
2020	3.11	45.39	2660	3.68	35.48

2030	3.42	47.1	2670	3.61	35.73
2040	3.94	49.77	2680	3.59	34.99
2050	4.17	50.93	2690	3.46	34.67
2060	4.28	51.17	2700	3.63	35.65





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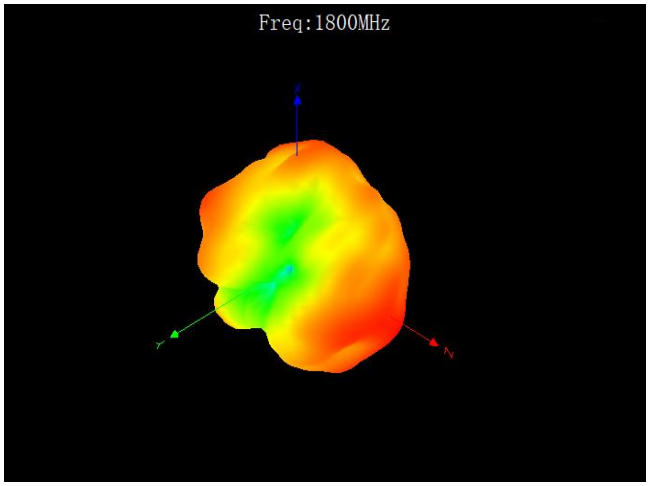
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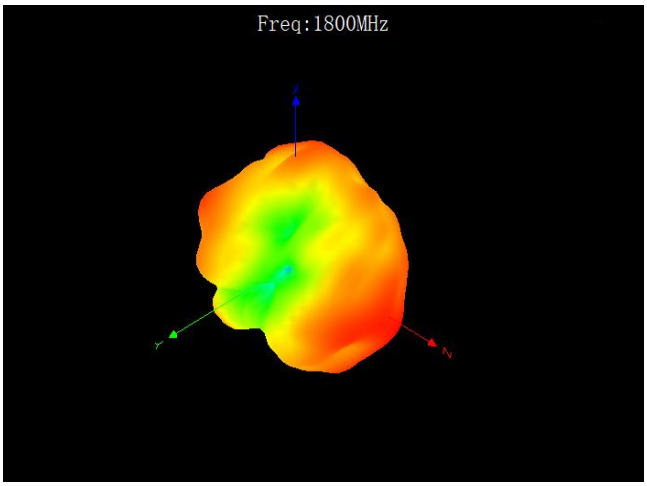
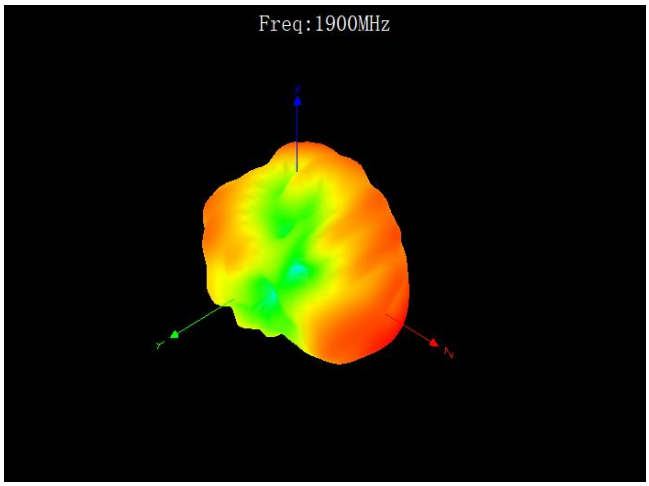
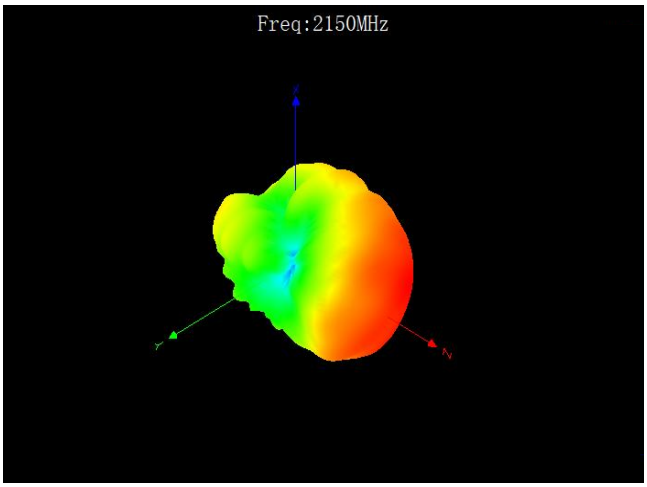
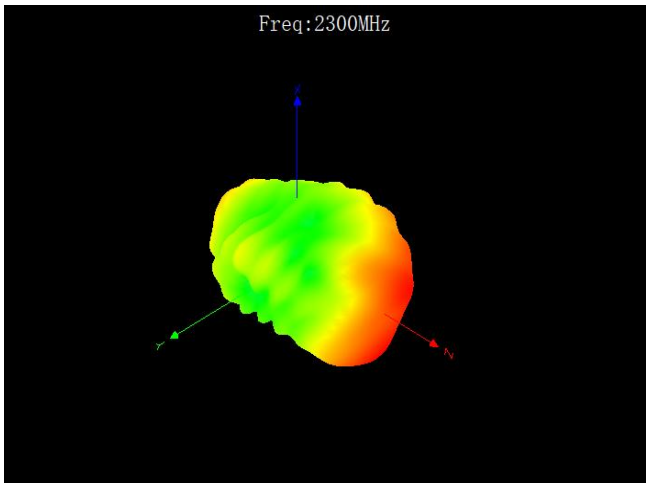
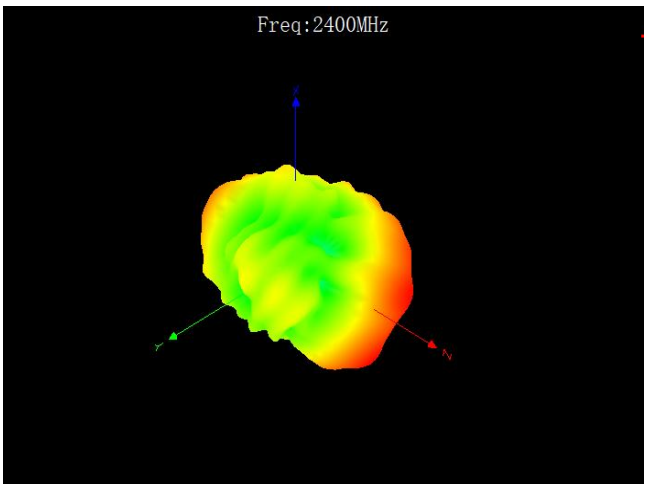
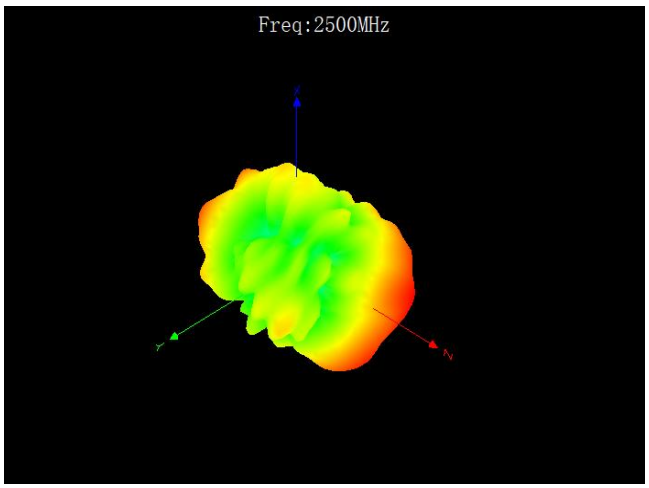

Freq:1800MHz

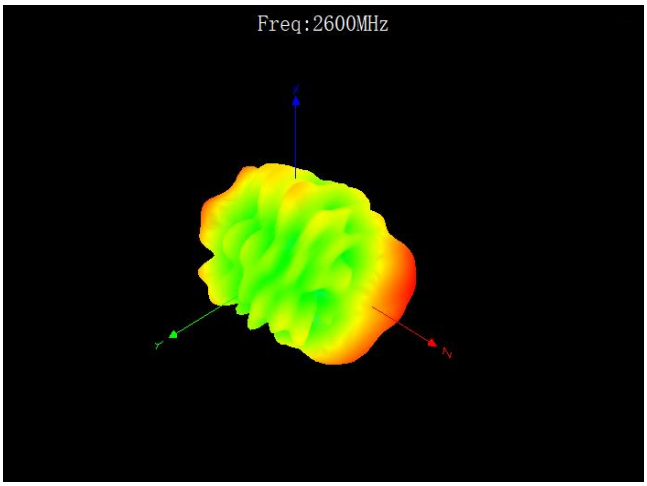

Freq:1900MHz

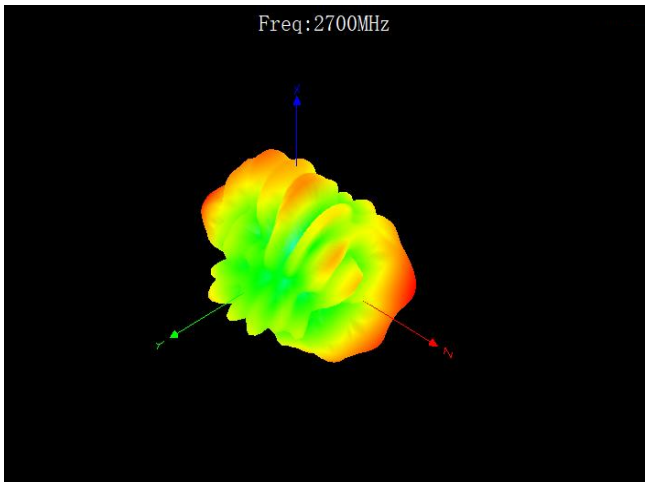

Freq:2150MHz


Freq:2300MHz









active testing data

4.1 Test the environment

Test the system：Multi-probe OTA measurement system（XH-IoT）

Test the environment：Temperature 22°C±3°C, humidity 50%±15%

Test the equipment : When testing passive data, use the network analyzer R&S ZND/ Agilent E5071C

When testing active data, use the Agilent 8960/CMW500/SP9500E/SP8315

4.2 OTA Active test data

Measurement	Azimuths	Band	Channel	Total
TRP	Every30	FDD_B1(10MHz)	18050	17.88
TRP	Every30	FDD_B1(10MHz)	18300	18.37
TRP	Every30	FDD_B1(10MHz)	18550	21.6
TIS(RSSI)	Every30	FDD_B1(10MHz)	50	-93.41
TIS(RSSI)	Every30	FDD_B1(10MHz)	300	-91
TIS(RSSI)	Every30	FDD_B1(10MHz)	550	-93.05
TRP	Every30	FDD_B3(10MHz)	19250	20.13
TRP	Every30	FDD_B3(10MHz)	19575	20.6
TRP	Every30	FDD_B3(10MHz)	19900	20.14
TIS(RSSI)	Every30	FDD_B3(10MHz)	1250	-89.3
TIS(RSSI)	Every30	FDD_B3(10MHz)	1575	-90.89
TIS(RSSI)	Every30	FDD_B3(10MHz)	1900	-91.64
TRP	Every30	FDD_B5(10MHz)	20450	16.71
TRP	Every30	FDD_B5(10MHz)	20525	16.26
TRP	Every30	FDD_B5(10MHz)	20600	15.73
TIS(RSSI)	Every30	FDD_B5(10MHz)	2450	-85.15
TIS(RSSI)	Every30	FDD_B5(10MHz)	2525	-84.87
TIS(RSSI)	Every30	FDD_B5(10MHz)	2600	-86.82
TRP	Every30	FDD_B8(10MHz)	21500	19.12
TRP	Every30	FDD_B8(10MHz)	21625	15.45
TRP	Every30	FDD_B8(10MHz)	21750	15.46
TIS(RSSI)	Every30	FDD_B8(10MHz)	3500	-90.25
TIS(RSSI)	Every30	FDD_B8(10MHz)	3625	-90.77

Measurement	Azimuths	Band	Channel	Total
TRP	Every30	TDD_B38(20MHz)	37850	22.11
TRP	Every30	TDD_B38(20MHz)	38000	22.86
TRP	Every30	TDD_B38(20MHz)	38150	22.56
TIS(RSSI)	Every30	TDD_B38(20MHz)	37850	-90.56
TIS(RSSI)	Every30	TDD_B38(20MHz)	38000	-91.19
TIS(RSSI)	Every30	TDD_B38(20MHz)	38150	-90.53
TRP	Every30	TDD_B40(20MHz)	38750	18.2
TRP	Every30	TDD_B40(20MHz)	39150	18.73
TRP	Every30	TDD_B40(20MHz)	39550	18.22
TIS(RSSI)	Every30	TDD_B40(20MHz)	38750	-92.59
TIS(RSSI)	Every30	TDD_B40(20MHz)	39150	-90.86
TIS(RSSI)	Every30	TDD_B40(20MHz)	39550	-92.2
TRP	Every30	TDD_B39(20MHz)	38350	14.46
TRP	Every30	TDD_B39(20MHz)	38450	15.84
TRP	Every30	TDD_B39(20MHz)	38550	17.23
TIS(RSSI)	Every30	TDD_B39(20MHz)	38350	-90.26
TIS(RSSI)	Every30	TDD_B39(20MHz)	38450	-86.98
TIS(RSSI)	Every30	TDD_B39(20MHz)	38550	-90.28
TRP	Every30	TDD_B41(20MHz)	40340	22.37
TRP	Every30	TDD_B41(20MHz)	40620	23.56
TRP	Every30	TDD_B41(20MHz)	41140	23.77
TIS(RSSI)	Every30	TDD_B41(20MHz)	40340	-92.14
TIS(RSSI)	Every30	TDD_B41(20MHz)	40620	-90.57

4. Environmental treatment methods

5. Standard for mass production antennas

When the antenna is mass-produced, the VSWR is used as the mass production test standard.

According to the differences in the project itself, the following criteria are given:

Freq. (MHz)	Mass production standards
824-960	VSWR (Production performance)<VSWR(Confirmed performance)+0.5
1710-2690	VSWR (Production performance)<VSWR(Confirmed performance)+0.5

6. Engineering drawings