

Product specification acknowledgment.**Shenzhen SUNSHOW antenna lab****R&D center in ShenZhen****The mobile communication terminal antenna****PRODUCT NAME** SX-2208**CUSTOMER NAME** 派勤电子

account party	Development party		
Customer acknowledges	Quality Department	R&D Department	approved by
	夏兵	ME: 黎文明 RF: 陈家庆	冯国军
Date: 年 月 日	Date: 2022 年 9 月 21 日		

1. aim

For the Production from shenzhen SUNSHOW communication equipment co., LTD. That mobile communication terminal antenna product specifications and test methods for specification, avoid the test conditions, the error caused by different methods

2. Antenna debug design requirement frequency band.

frequency	frequency band
WIFI	2. 4GHZ/5. 8GHZ
other	/

3. Product cell phone and sky chart.



The antenna

4.electrical

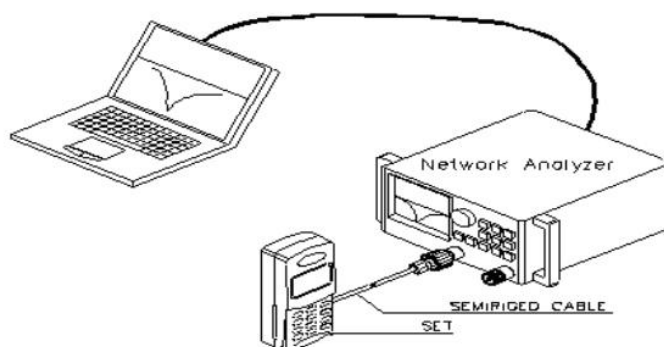
4.1 Test method description and data.

Device name	use
Vector Network Analyzer	S11/Impedance/ Passive Test
Agilent 8960 SP6010 R&S CMU200	GSM, GPRS, EDGE, CDMA2000, 1xev-do, td-scdma, WCDMA, HSDPA mobile phone mobile communication equipment test.
R&S CMW500 MT8820C	Including td-scdma, WCDMA, HSDPA, LTE, WIFI, GPS mobile phone mobile communication equipment test.
SP9500E	Contains 5G, SA, NSA
Agilent E4438C	Test active GPS
MVG Chamber	Passive Test / OTA active Test / Efficiency/Gain

4.2 Passive Test Report

Test equipment: network analyzer.

Test method: with a 50 ohm CABLE CABLE from the instrument test port is derived, using the calibration after a calibration mechanism of SMA connector, connecting hand records related to the frequency points corresponding return loss and standing wave ratio data.



测试示意图

4.3 Active Test Report

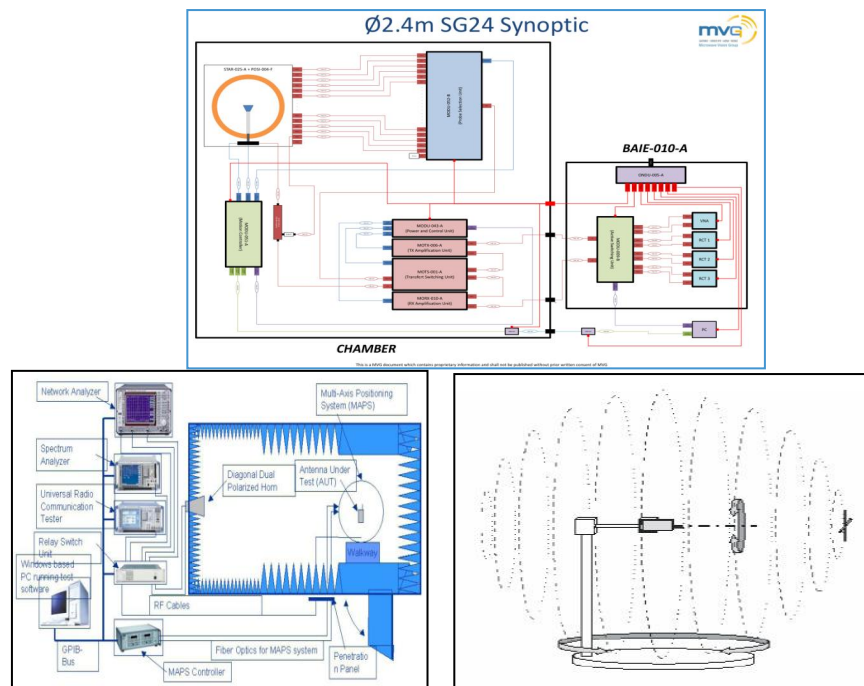
TRP/TIS

From testing tools, measuring, network analyzer, full waves far field ETS, French MVG SG24LT (Satmio) near field 3 d microwave dark room, the high precision positioning system and its controller and the computer with automatic test procedure test environment: the temperature of $22^{\circ}\text{C} + 3^{\circ}\text{C}$, humidity 60% plus or minus 60% test methods: Using EST or 24 It Satimo system software Test method and calculation of TRP when tested TRP, DUT (Device Under Test) is in a state of maximum transmitted power, including three to choose channel Test, by positioning system control the location of the DUT, with 15 degrees for step length, measuring three dimensional space, the effective radiated power (EIRP) at various points through the average of the integral sphere, computation formula is as follows

$$TRP \cong \frac{\pi}{2NM} \sum_{i=1}^{N-1} \sum_{j=0}^{M-1} [EiRP_{\theta}(\theta_i, \phi_j) + EiRP(\theta_i, \phi_j)] \sin(\theta_i)$$

In TIS test, the DUT at the maximum transmission power of the state, including three to choose channel test, by controlling the location of the DUT, at 30 degrees for the step length, measuring the three dimensional space each point receiving sensitivity, the average of the sphere by integral calculation, calculation formula is as follows:

$$TIS \cong \frac{2NM}{\pi \sum_{i=1}^{N-1} \sum_{j=0}^{M-1} \left[\frac{1}{EIS_{\theta}(\theta_i, \phi_j)} + \frac{1}{EIS_{\phi}(\theta_i, \phi_j)} \right] \sin(\theta_i)}$$



4.4 Passive Test Report

Efficiency gain

Antenna one

一号天线

Frequency	Efficiency	Efficiency .	Gain . dB
2400000000.00	30%	-6.07219	2.12551
2410000000.00	30%	-5.95913	2.182673
2420000000.00	31%	-5.84583	2.270612
2430000000.00	34%	-5.41613	2.452995
2440000000.00	30%	-5.2116	2.396358
2450000000.00	31%	-5.03642	2.559767
2460000000.00	33%	-4.84776	2.698237
2470000000.00	35%	-4.58892	2.800048
2480000000.00	35%	-4.54513	2.833669
2490000000.00	36%	-4.48936	2.948656
2500000000.00	37%	-4.35674	3.228133

Frequency	Efficiency	Efficiency .	Gain . dB
5200000000.00	44%	-3.57683	6.409585
5230000000.00	39%	-4.06216	6.031338
5260000000.00	41%	-3.88747	6.458805
5290000000.00	41%	-3.86268	6.426367
5320000000.00	39%	-4.05673	6.156322
5350000000.00	38%	-4.14826	5.903022
5380000000.00	42%	-3.79492	6.01037
5410000000.00	47%	-3.27849	6.426237
5440000000.00	52%	-2.83255	6.764669
5470000000.00	52%	-2.87901	6.691636
5500000000.00	60%	-2.22058	7.635392
5530000000.00	65%	-1.89433	8.377883
5560000000.00	57%	-2.44184	7.941912
5590000000.00	53%	-2.75546	7.932101
5620000000.00	52%	-2.82184	8.027897
5650000000.00	52%	-2.83721	7.801403
5680000000.00	52%	-2.86674	7.180264
5710000000.00	50%	-2.99428	6.709658
5740000000.00	52%	-2.8025	6.598921
5770000000.00	56%	-2.48664	6.774961
5800000000.00	55%	-2.62446	6.48783

无源效率增益

Antenna two

二号天线

Frequency	Efficiency	Efficiency .	Gain . dB
2.4E+09	34%	-3.52648	2.088043
2.41E+09	35%	-3.50548	2.045146
2.42E+09	36%	-3.41628	2.290503
2.43E+09	37%	-3.3247	2.531779
2.44E+09	36%	-3.33289	2.758882
2.45E+09	37%	-3.31914	2.982131
2.46E+09	37%	-3.23396	3.186566
2.47E+09	38%	-3.1911	3.412233
2.48E+09	38%	-3.21432	3.62153
2.49E+09	38%	-3.20671	3.705886
2.5E+09	39%	-3.08883	3.78135

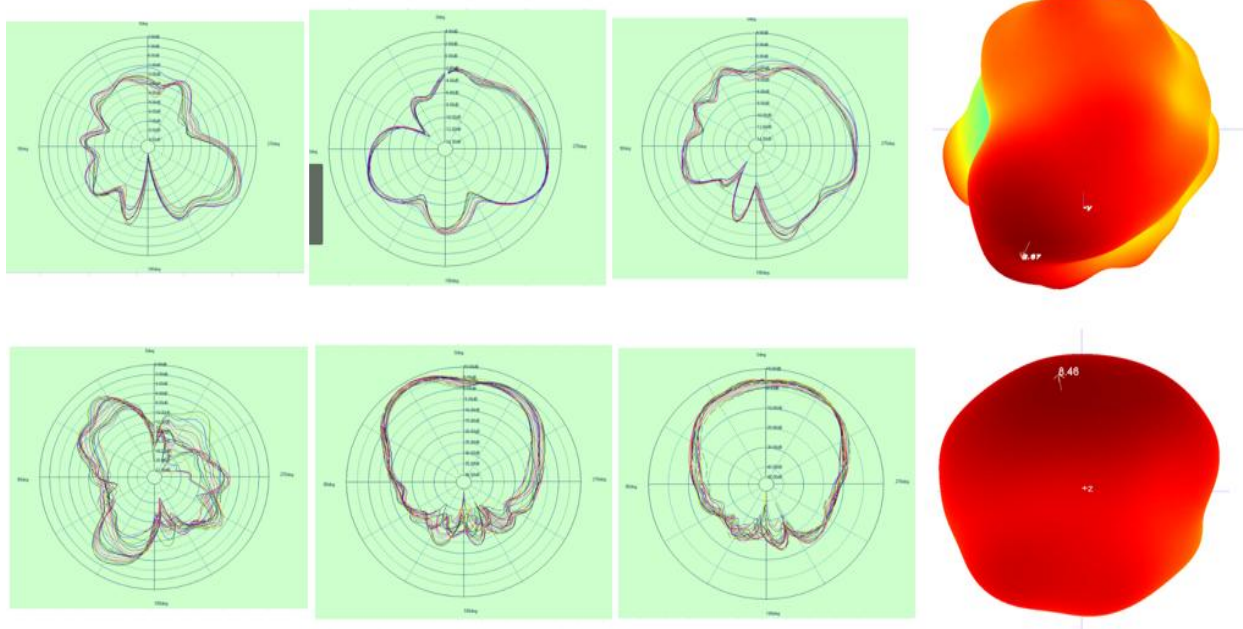
Frequency	Efficiency	Efficiency .	Gain . dB
5200000000.00	55%	-2.57726	8.331721
5230000000.00	51%	-2.90606	8.148038
5260000000.00	59%	-2.30566	8.910453
5290000000.00	61%	-2.17977	8.779021
5320000000.00	58%	-2.40155	8.155696
5350000000.00	55%	-2.62564	7.549188
5380000000.00	59%	-2.31928	7.445523
5410000000.00	55%	-1.87865	7.719186
5440000000.00	57%	-1.74048	7.767867
5470000000.00	54%	-1.96206	7.619055
5500000000.00	58%	-1.66651	8.151613
5530000000.00	59%	-1.59259	8.255835
5560000000.00	50%	-2.18338	7.609106
5590000000.00	54%	-2.66494	7.045362
5620000000.00	51%	-2.90424	6.279389
5650000000.00	51%	-2.95773	5.514858
5680000000.00	50%	-3.0041	5.377958
5710000000.00	49%	-3.09413	5.459222
5740000000.00	51%	-2.94682	5.793351
5770000000.00	54%	-2.67328	6.02
5800000000.00	47%	-3.25188	5.403903

无源效率增益

Directional pattern

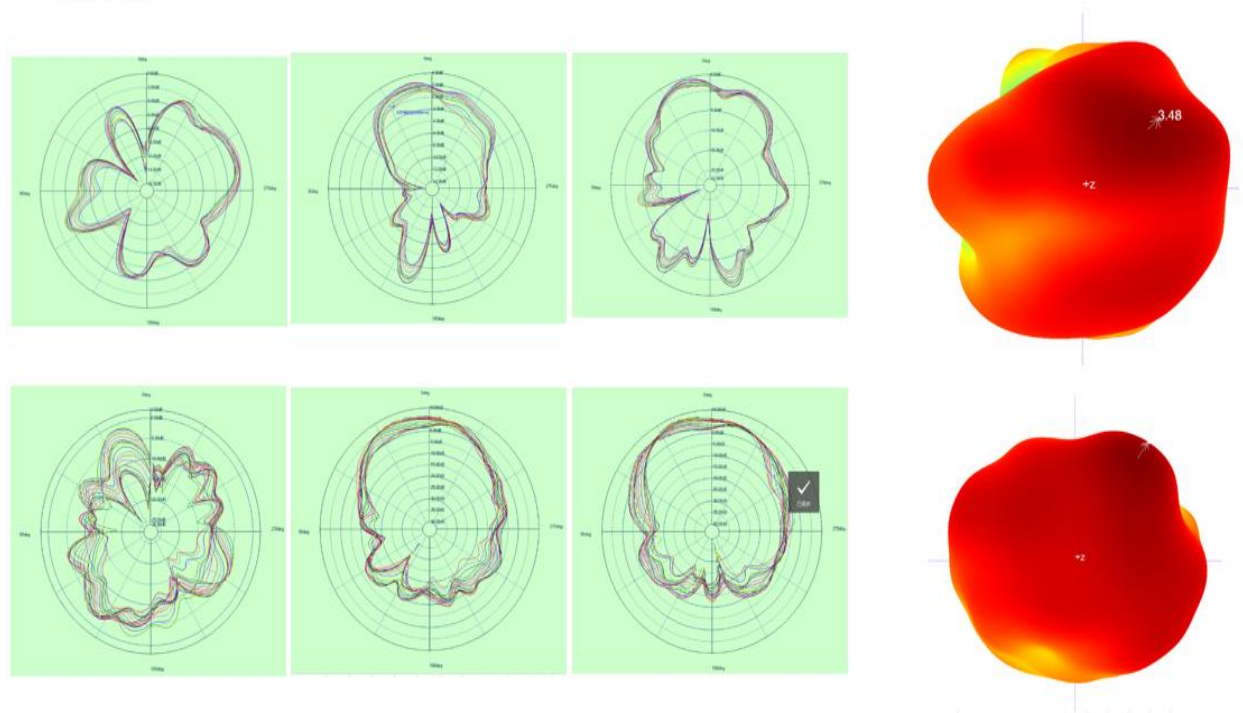
Antenna one

一号天线



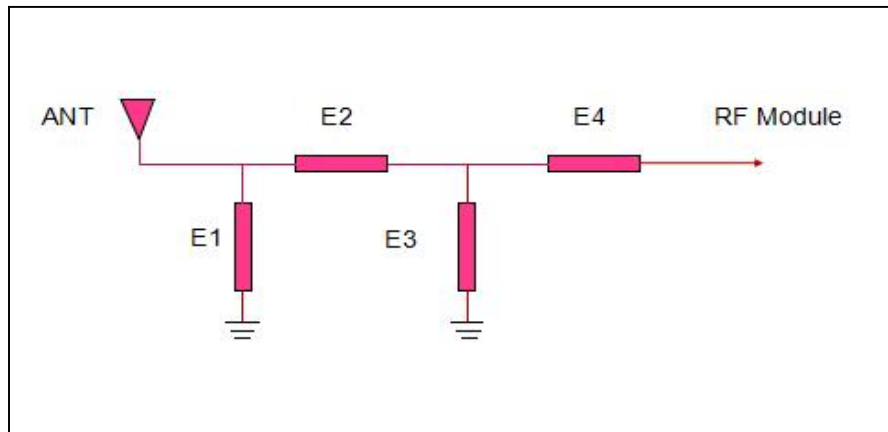
Antenna two

二号天线



Antenna No. 1 and Antenna No. 2 are the same antenna

5. Matching circuit description

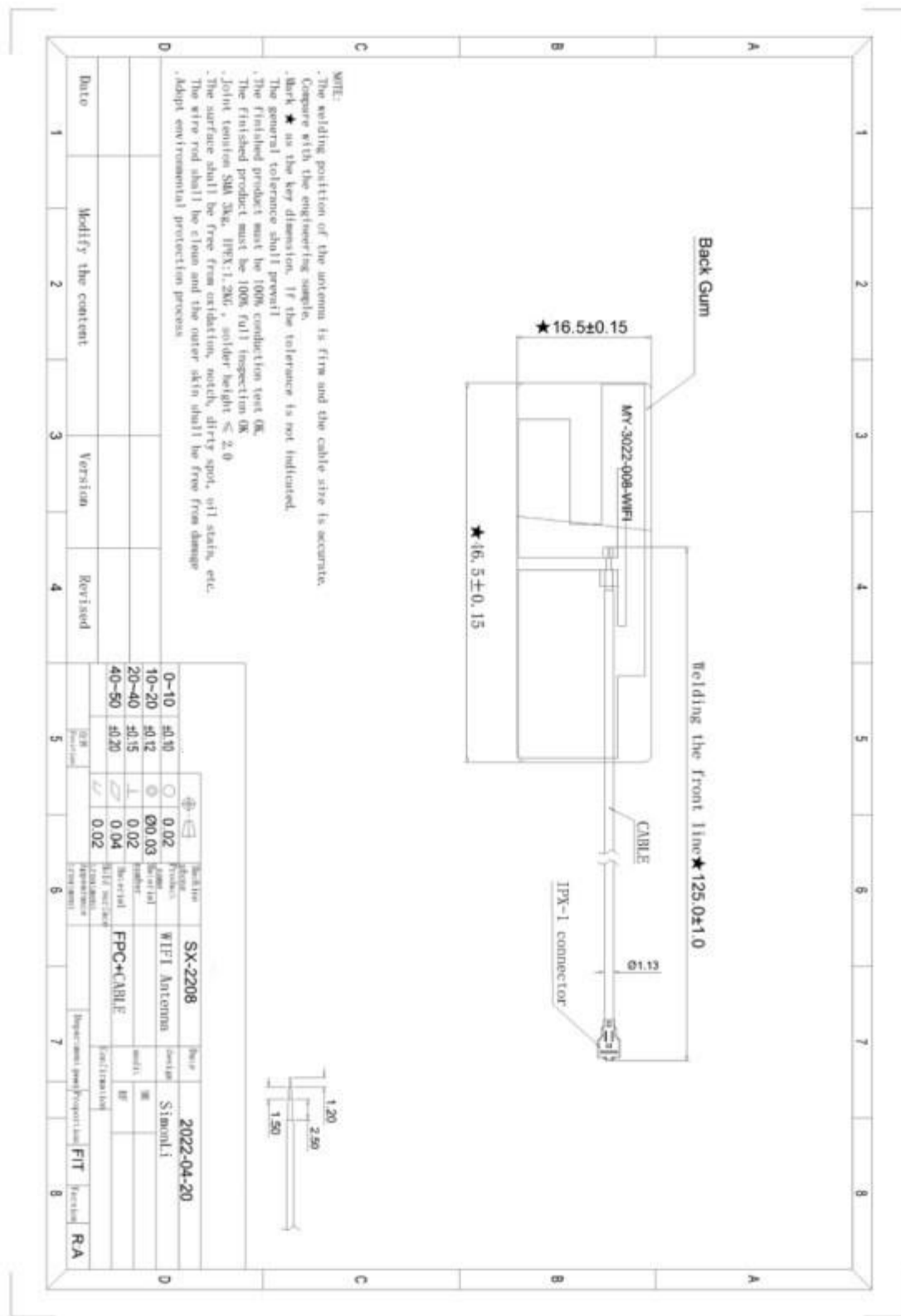


Note: we do not debug the antenna matching circuit.

6. Environmental treatment

The original environment processing, no change

7. structural drawings



8.Warning Sign

1. The section on performance and structure validation

★Please confirm the appearance and performance of the product before you sign the acknowledgement.

★Please be sure to provide the final mass production trial production machine to our company or take back our company verification before mass production

★As the product of this acknowledgement is a highly sensitive object, please be sure to keep the testing machine for follow-up

★As this product is a custom-made object, the use of the targeted, customers in material replacement or for non-designated items, please be sure to change the material or non-designated items of the machine sent to our company to verify the radio-frequency performance, otherwise, may cause the use state and the design state inconsistent serious hidden danger, to our company sealed debugging sample function confirmation, ensure our company debugging sample function completely normal, prevent function abnormal to the antenna performance error caused by the antenna performance

2. About product storage

★As this product has printing ink on the surface, adhesive on the back and electroplate, please make sure the temperature is between 23 ° c-27 ° C and the relative humidity is below 60% during storage or transportation, no strong acid, no sulfur, no oxygen storage or transport environment

★As the product back glue on the environment requirements are more stringent, please customers must be received after the product, in the product quality guarantee period to ensure the reliability of the product

3. Tips for using the product

★Due to the special structure of this product, please use this product must be in full contact with the pasted objects, and pasted objects must not be residual chemicals (release agent, etc.) or as far as possible do not use the raw materials with release agent, to ensure that the product is in good working condition, please clean the surface of the pasted article before using the product to ensure that there is no chemical residue on the surface of the pasted article

4. Statement of Quality Assurance for this product

★This product quality guarantee period is 12 months, if your use and storage environment to meet the above requirements, in the valid guarantee period of any quality problems, and determined that our products are abnormal, our company can provide free replacement services, after 12 months, our products provide life-long consultation and paid replacement services

★This product is a special custom device, please receive the product must within 3 working days of the product quantity confirmation