



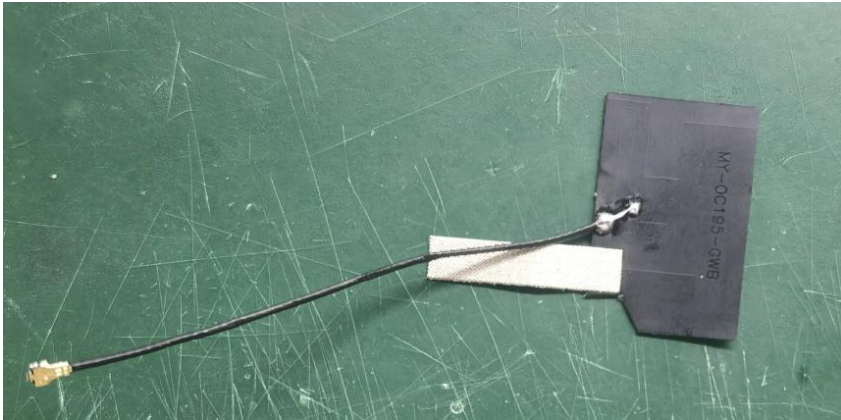
1.Customer antenna debugging design requirements frequency band

Frequency	Frequency Range
GWB	GPS/WIFI/BT

2.Product mobile phone and antenna diagram



drawing of complete machine



GWB antenna drawing

3. Electric performance

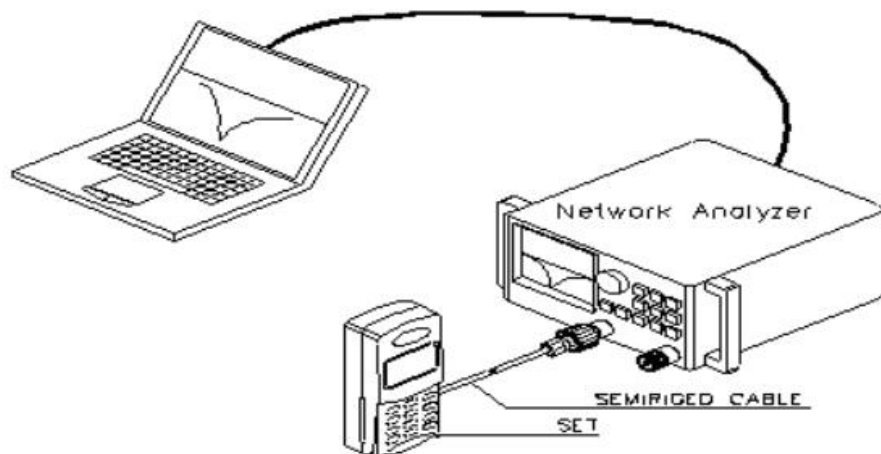
3.1 Description of the test method and the data

equipment name	Usage
Vector Network Analyzer	S11/Impedance/ Passive Test
Agilent 8960 SP6010 R&S CMU200	include GSM、 GPRS、 EDGE、 CDMA2000、 1xEV-DO、 TD-SCDMA、 WCDMA、 HSDPA Mobile phone mobile communication equipment test
R&S CMW500 MT8820C	TD-SCDMA、 WCDMA、 HSDPA、 LTE、 WIFI、 GPS Mobile phone mobile communication equipment test
SP9500E	included 5G、 SA、 NSA
Agilent E4438C	active Test GPS
MVG Chamber	Passive Test / OTA active Test / Efficiency/Gain

3.2 Passive Test Report (Passive Test)

Test equipment: network analyzer

Test method: use a 50 ohm CABLE cable for the export of the instrument test port, use the SMA connector of the hand mechanism, and record the data such as echo loss or standing wave ratio corresponding to the relevant frequency point.



测试示意图

3.3 Active Test Report

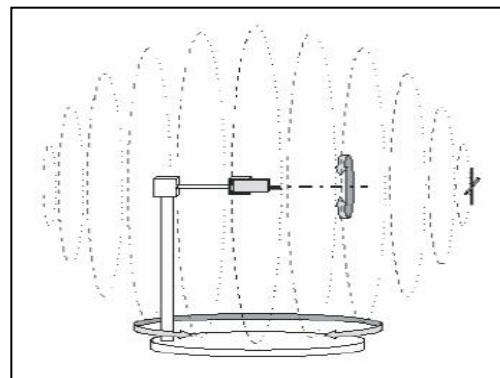
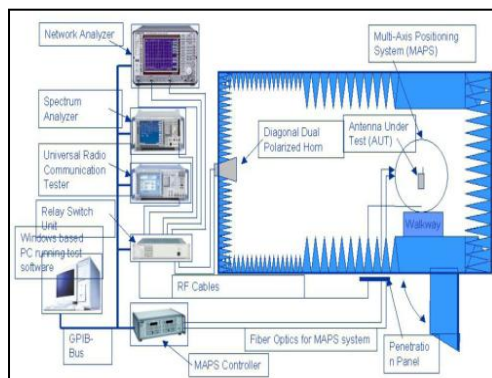
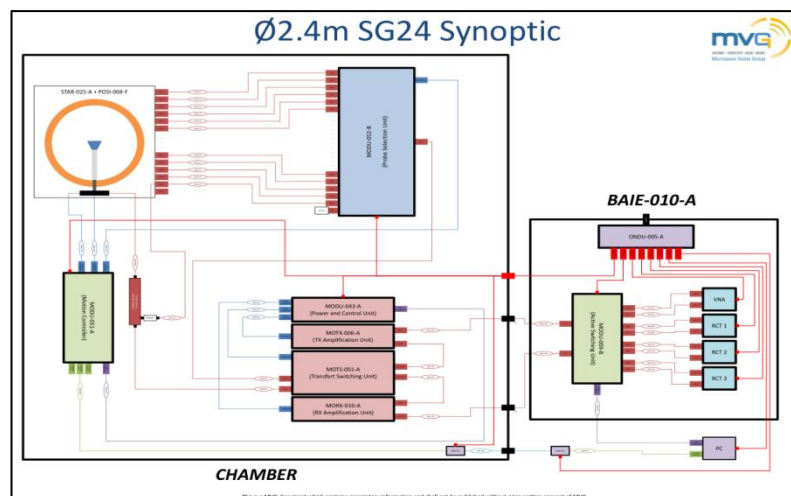
TRP/TIS

Test tools: comprehensive tester, network analyzer, full radio far field ETS, The French MVG SG24LT (Satmio) near-field 3D microwave dark chamber, High-precision positioning system and its controller and computer test environment with automatic test program: temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$, Humidity $60\% \pm 15\%$ Test method: test method and calculation of TRP of system software during the TRP test, The DUT (Device Under Test) is in the maximum transmitting power state, High and low channels were selected for testing, Controlling the position of the DUT through the positioning system, With 15 degrees as the step length, Measure the effective radiation power (EIRP) at each point in the three-dimensional space, By integrating the average over the sphere, The calculation 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 the TIS test, DUT is in the maximum transmitting power state, and three channels, high and low, are selected for the test. By controlling the position of DUT, measure the receiving sensitivity of each point in 3-dimensional space and calculate the average value on the sphere by integrating. The calculation formula is as follows:

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

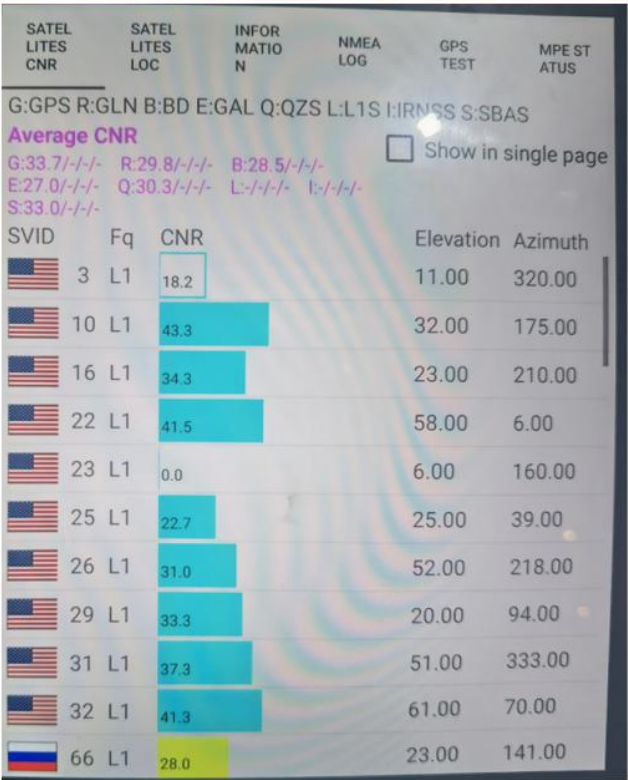




3.4 active OTA TRP/TIS data

标准	BAND	2.4G-WIFI-B			2.4G-WIFI-G		
WIFI	CHANNAL	1	6	11	1	6	11
	TRP	12.27	12.41	12.63	10.03	10.74	11.03
	TIS			-81.33	--	--	-68.09
	BAND	5.8G-WIFI-AC					
	CHANNAL	36	149	161			
	TRP	9.84	10.95	10.03			
	TIS			-66.46			

冷启动定位时间54S

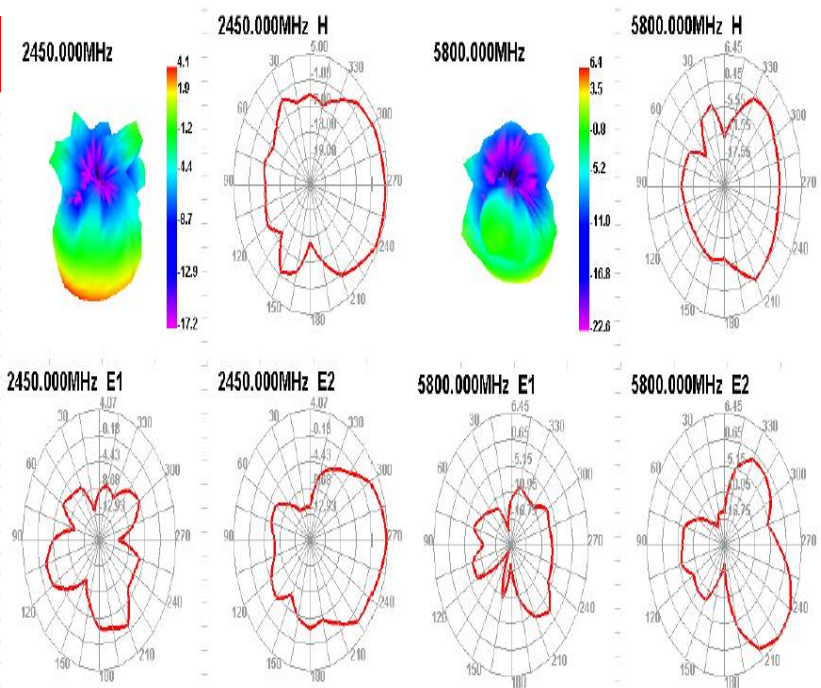


距离路由器12米

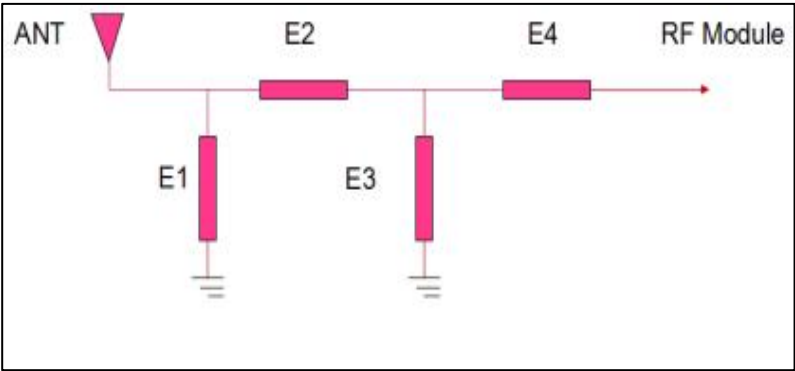


3.5 Passive Test Data

Frequency (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400.00	20.13	-6.52	2.52
2410.00	21.52	-6.75	2.63
2420.00	22.35	-6.53	3.00
2430.00	19.85	-6.37	2.35
2440.00	21.32	-6.52	2.84
2450.00	21.56	-6.45	2.63
2460.00	21.52	-6.21	2.68
2470.00	21.62	-6.13	2.93
2480.00	20.36	-6.52	2.68
2490.00	22.58	-6.39	2.96
2500.00	19.85	-6.85	2.95
5100.00	35.21	-4.65	2.39
5150.00	34.25	-4.23	3.00
5200.00	36.52	-4.36	2.45
5250.00	38.54	-4.56	2.85
5300.00	37.85	-4.26	2.63
5350.00	36.52	-4.35	2.85
5400.00	38.95	-4.52	2.82
5450.00	39.45	-4.21	2.93
5500.00	38.23	-4.32	2.63
5550.00	40.23	-4.18	2.85
5600.00	41.35	-4.85	2.82
5650.00	37.52	-4.23	2.61
5700.00	35.23	-4.56	2.95
5750.00	38.52	-4.13	2.68
5800.00	38.25	-4.52	3.00
5850.00	35.53	-4.39	2.36

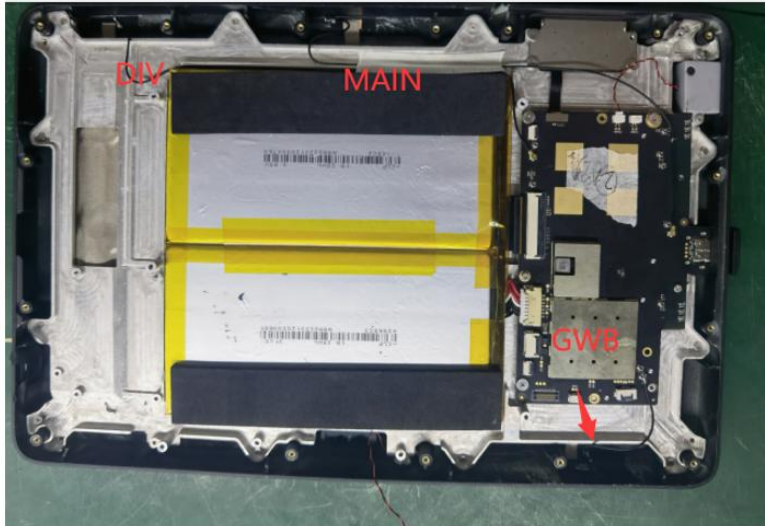


4.Description of the matching circuit

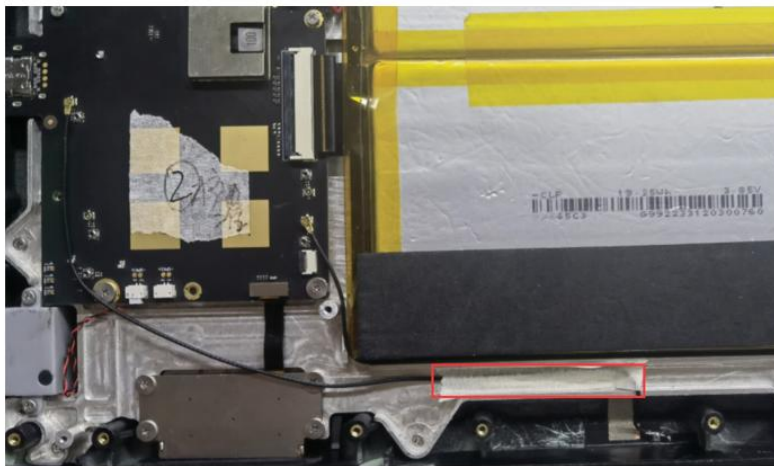


BAND	MAIN ANT	Three in one	DIV ANT
Element	Value	Value	Value
E1(0402)			
E2(0402)			
E3(0402)			
E4(0402)			

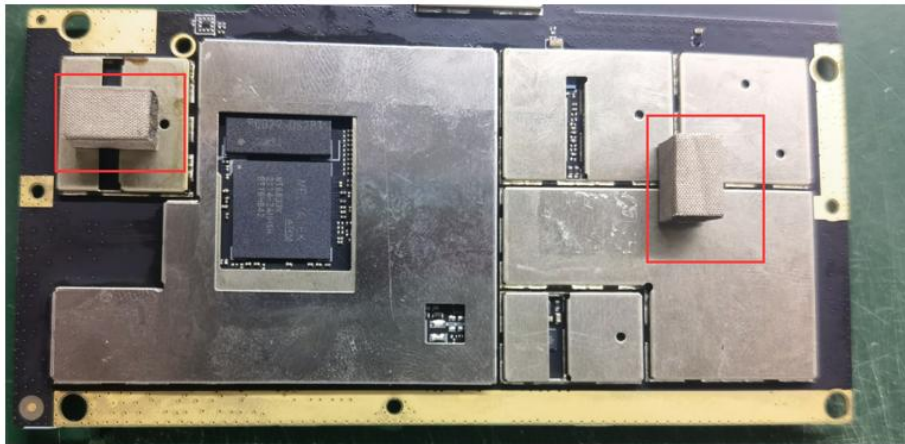
5.Environmental treatment



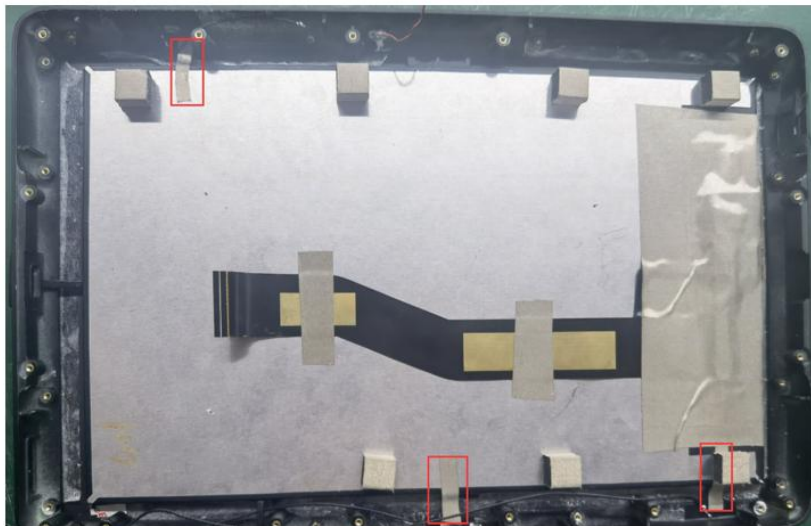
如图，天线位置



如图，主天线同轴线如图摆放，并用胶布固定



如图，主板接地



如图，红色框位置天线漏铜处贴导电布接地。屏排线屏蔽接地，减小亮屏干扰，屏上贴导电泡棉，使锌合金充分接地。

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