



Product Performance and Specification Book

Mars Tianxian Research and Development Department

name of material : EthOS

Sample color:

Sample type: LDS+FPC

Customer model:

Start with a sample Other Start with a sample Other

Supplier: Shenzhen Maya Communication Equipment Co., LTD. Version: R.A

Supplier: Shenzhen Maya Communication Equipment Co., LTD. Version: R.A

fiction	structure	character	ratify	Date of sample delivery

Client: Heng Yue

department	affirm	date	state	sign and seal
electron				
structure				
character				
project				

1. Confidentiality requirements: Shenzhen Maya Communication Equipment Co., Ltd. has the proprietary technology of this product, which shall not be disclosed to any company or individual without the written consent of Shenzhen Maya Communication Equipment Co., Ltd.
2. Special Notice: Before signing this document, all parties shall carefully read the "Special Terms" and the contents contained in the catalogue. After being signed by the representatives of

both parties, it shall be deemed that both parties have reached consensus and have no objection to the contents of this document, and both parties shall abide by it.



special clause

1. About performance and structure confirmation section

- ★ Please confirm the appearance and performance of the product before signing the confirmation letter.
- ★ Please provide the final trial production machine to our company or take it back to our company for verification before mass production.
- ★ As the products of this letter of recognition are highly sensitive objects, please be sure to keep the test gold machine for subsequent traceability.
- ★ As this product is a custom-made item with specific application requirements, customers must return any modified materials or non-designated equipment to our company for RF performance verification when making material changes or using them in unauthorized projects. Failure to comply may result in serious risks of operational discrepancies from actual usage. We will seal and test the prototype devices to confirm their full functionality, thereby preventing potential performance errors caused by improper operation affecting antenna accuracy.

2. About product storage

- ★ Because the surface printing ink of this product, the back side is bonded with back glue, and there are electroplated objects, please make sure that the temperature is between 23°C and 27°C during storage or transportation, the relative humidity is below 60%, and the environment is free from strong acid, sulfur and oxygen.
- ★ Because the back glue of this product has strict environmental requirements, customers must assemble the product within the optimal use period after receiving the product to ensure the reliability of the product.

3. Agreement on product use

- ★ Due to the unique design of this product, ensure full contact with the surface being bonded during use. The bonded surface must be completely free of chemical residues (such as release agents) or avoid using materials containing release agents. To maintain optimal performance, clean the surface thoroughly before application to remove any residual chemicals.

4. Quality statement of this product

- ★ Due to the above factors, it is recommended that the optimal use period of this product is 12 months. Overdue will affect the use effect of the product. Our company provides lifetime consultation and paid replacement service for this product.
- ★ This product is a special customized device. Please check the appearance, quantity and performance of the product against the standards agreed in this "Product Performance and Specifications Acknowledgment Letter" within 7 days after receiving the product. If not, it shall be deemed that the quality of the product meets the agreed standards of both parties.
- ★ Verification method: check the engineering seal of the letter of acknowledgment.



catalogue

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1. Frequency band required by customer antenna debugging design

frequency	frequency range
2G	850/900/1800/1900
3G	WCDMA1 2 4 5 8
4G	LTE-1/2/3/4/5/7/8/12/13/20/25/26/28/38/39/40/41/48/66/71
triangle	GPS/WIFI/BT

2. Phone and antenna diagram



Mobile Phone Graphics



GPS/WIFI antenna



NFC antenna



3. Electrical properties

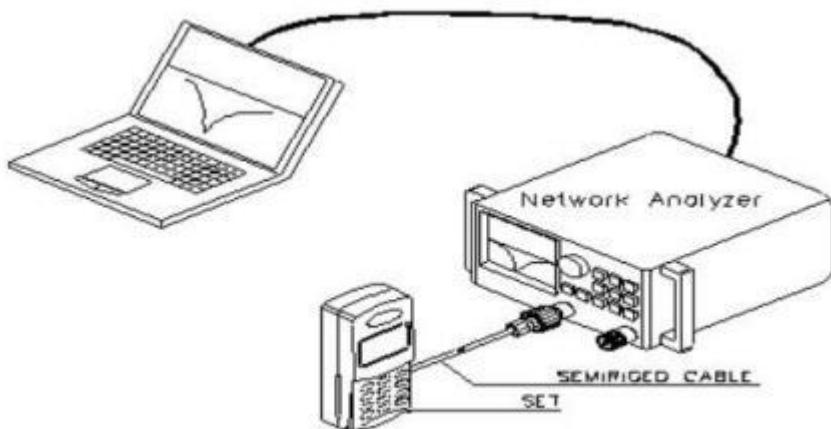
3.1 Test method description and data

implementor name	use
Vector Network Analyzer	S11/Impedance/ Passive Test
Agilent 8960 SP6010 R&S CMU200	Mobile communication equipment test including GSM, GPRS, EDGE, CDMA2000, 1xEV-DO, TD-SCDMA, WCDMA, HSDPA
R&S CMW500 MT8820C	Including TD-SCDMA, WCDMA, Mobile communication equipment testing for HSDPA, LTE, WIFI and GPS
SP9500E	Includes 5G, SA, NSA
Agilent E4438C	Test active GPS
MVG Chamber	Passive Test / OTA active Test / Efficiency/Gain

3.2 Passive Test Report (passive test report)

Test equipment: network analyzer

Test method: A 50 ohm CABLE cable is exported from the test port of the instrument, and the SMA connector of the hand tool is connected after calibration with a calibrator, and the data such as return loss or VSWR corresponding to relevant frequency points are recorded.



测试示意图



3.3 Active Test Report (Active test report)

TRP/TIS

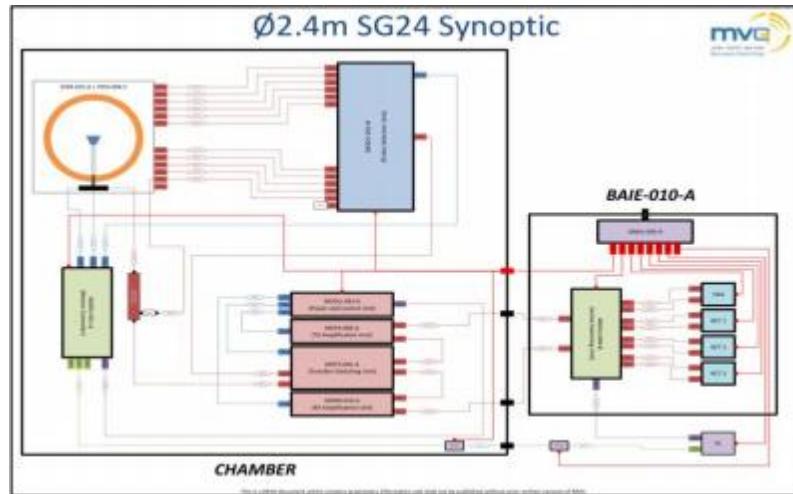
Testing Equipment: Comprehensive tester, network analyzer, full-wave far-field ETS, French MVG SG24LT (Satmio) near-field 3D microwave anechoic chamber, high-precision positioning system with controller, and computer test environment with automated testing programs. Operating conditions: Temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$, humidity $60\% \pm 15\%$. Testing

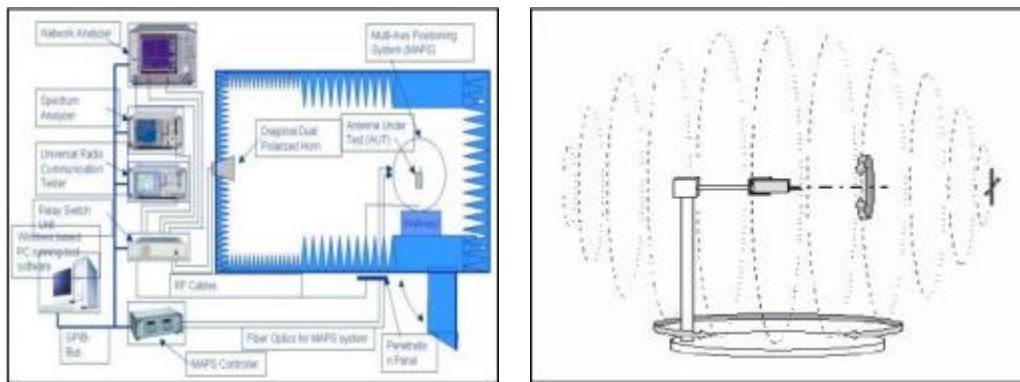
Method: Utilizing EST or Satimo 24LT system software TRP. During TRP testing, the DUT (Device Under Test) operates at maximum transmission power. Three channels (high, medium, low) are selected for measurement. The positioning system controls the DUT's position with 15-degree increments to measure effective radiated power (EIRP) at various three-dimensional points. The average spherical surface value is calculated through integration using the following formula:

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

During the TIS test, the DUT is in the state of maximum transmission power. Three channels are selected for testing, and the receiving sensitivity at each point in three-dimensional space is measured by controlling the position of DUT with a step of 30 degrees. The average value on the sphere is calculated by integral calculation, and the calculation formula is as follows:

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







3.4 Active OTA TRP/TIS data

GSM	TRP	TIS(天)	TIS(英)
GSM900	26.01		
	26.27		
	26.26	-102.62	-98.59
GMS850	26.62		
	27.18		
	27.27	-101.69	-100.43
DCS1800	24.15		
	24.37		
	24.62	-104.45	-103.37
PCS1900	25.49		
	25.46		
	25.01	-102.75	-102.08

WCDMA	TRP	TIS(灭)	TIS(亮)
W1	18.47		
	18.29		
	18.01	-103.53	-102.07
W2	18.51		
	18.63		
	18.67	-104.15	-103.01
W4	16.75		
	17.17		
	17.69	-105.12	-104.51
W5	16.12		
	16.27		
	16.32	-104.63	-102.47

LTE	TRP	TIS(灭)	TIS(亮)
B1 (10M)	19.01		
	18.82		
	18.72	-91.02	-90.13
B2 (10M)	18.63		
	18.75		
	18.56	-90.78	-89.27
B3 (10M)	16.57		
	17.62		
	18.12	-92.12	-90.42
B4 (10M)	16.81		
	17.61		
	18.39	-92.27	-91.68
B5 (10M)	16.24		
	16.61		
	18.57	-91.67	-88.93
B7 (10M)	16.92		
	16.57		
	17.67	-90.07	-88.62
B8 (10M)	15.89		
	16.27		
	16.52	-91.72	-87.15

LTE	TRP	TIS(灭)	TIS(亮)
B12 (10M)	15.83		
	16.31		
	16.42	-90.57	-85.92
B13 (10M)			
	13.17	-87.12	-84.53
B20 (10M)	16.23		
	16.56		
	16.47	-89.65	-87.07
B25 (10M)	18.75		
	18.74		
	18.91	-91.72	-90.82
B26 (10M)	16.22		
	16.31		
	16.52	-92.01	-89.78
B28 (10M)	15.92		
	16.42		
	15.73	-90.19	-87.21
B06 (10M)	16.27		
	16.68		
	17.32	-91.21	-90.1

LTE	TRP	TIS(瓦)	TIS(瓦)
B71 (10M)	13.53	-89.24	-85.02
	14.42		
	14.37		
B36 (20M)	17.42	-92.15	-91.41
	17.63		
	17.57		
B39 (20M)	18.12	-91.27	-90.12
	18.61		
	18.73		
B40 (20M)	16.68	-90.23	-89.16
	17.15		
	17.13		
B41 (20M)	17.75	-91.75	-91.14
	18.12		
	17.65		
B48 (20M)	13.71	-83.72	-82.07
	13.53		
	13.42		



Shenzhen Maya Communication Equipment Co., LTD



3.5 Passive (Test) data

4G主集天线

1				1				1			
Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB	Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB
800000000	21.57%	-6.66214	800000000	-0.72553		1700000000	26.24%	-5.81	1700000000	-0.16	
816000000	21.80%	-6.61641	816000000	-0.18645		1750000000	23.72%	-6.24866	1750000000	-0.72005	
832000000	26.82%	-5.71505	832000000	0.607815		1800000000	26.90%	-5.70291	1800000000	0.06267	
848000000	33.16%	-4.79381	848000000	2.120709		1850000000	31.43%	-5.02607	1850000000	0.919938	
864000000	32.42%	-4.89245	864000000	2.014738		1900000000	32.96%	-4.82031	1900000000	1.149644	
880000000	33.57%	-4.7408	880000000	1.183868		1950000000	34.95%	-4.56546	1950000000	1.275446	
896000000	39.06%	-4.08272	896000000	1.824826		2000000000	29.32%	-5.32766	2000000000	0.364897	
912000000	37.07%	-4.31031	912000000	2.742335		2050000000	27.93%	-5.53918	2050000000	0.450085	
928000000	35.48%	-4.5004	928000000	2.418497		2100000000	28.52%	-5.44797	2100000000	0.879824	
944000000	36.83%	-4.33816	944000000	1.584637		2150000000	27.98%	-5.53196	2150000000	0.7632	
960000000	30.71%	-5.1274	960000000	0.194934		2200000000	27.13%	-5.66625	2200000000	0.11474	
						2250000000	25.75%	-5.89191	2250000000	-0.53822	
						2300000000	22.60%	-6.45965	2300000000	-0.90282	
						2350000000	23.32%	-6.32253	2350000000	0.137591	
						2400000000	25.48%	-5.93764	2400000000	0.654739	
						2450000000	26.74%	-5.72908	2450000000	0.35487	
						2500000000	29.51%	-5.30018	2500000000	-0.12003	
						2550000000	28.48%	-5.45509	2550000000	-0.62996	
						2600000000	29.68%	-5.27608	2600000000	0.329997	
						2650000000	33.22%	-4.78649	2650000000	0.999292	
						2700000000	39.13%	-4.07499	2700000000	2.270101	

1	1				
Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB
3500000000	32.11%	-4.93388	3500000000	0.145337	
3530000000	28.51%	-5.44967	3530000000	0.121172	
3560000000	24.31%	-6.1426	3560000000	-0.38047	
3590000000	23.76%	-6.24158	3590000000	-0.01598	
3620000000	22.74%	-6.43141	3620000000	0.054318	
3650000000	24.57%	-6.0953	3650000000	-0.27914	
3680000000	28.30%	-5.48159	3680000000	-0.34628	
3710000000	31.07%	-5.07679	3710000000	-0.12397	
3740000000	31.42%	-5.02737	3740000000	-0.34538	
3770000000	31.11%	-5.07041	3770000000	-0.14287	
3800000000	29.11%	-5.36	3800000000	0.080691	

4G分集天线

Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB	Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB	Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB
70000000.0	4.96	-13.0421	70000000.0	-8.8346	80000000.0	9.016	-10.9655	90000000.0	-5.8292	170000000.0	13.739	-8.62304	170000000.0	-2.8739			
71200000.0	7.95	-10.9964	71200000.0	-11.5842	82000000.0	7.548	-11.2286	92000000.0	-5.2303	175000000.0	14.515	-8.38338	175000000.0	-1.4066			
72400000.0	12.96	-8.1313	72400000.0	-8.4561	84000000.0	7.041	-11.2287	94000000.0	-5.0881	180000000.0	14.78	-8.30846	180000000.0	-1.0660			
72800000.0	12.25	-8.1582	72800000.0	-5.6468	86000000.0	7.515	-11.2445	96000000.0	-4.9961	185000000.0	15.644	-6.0571	185000000.0	-1.8736			
73200000.0	14.49	-7.5548	73200000.0	-3.8625	88000000.0	8.879	-10.4048	98000000.0	-4.1529	185000000.0	15.644	-6.0571	185000000.0	-1.8736			
76520000.0	23.33	-8.32134	76520000.0	-2.51572	90000000.0	11.381	-9.4074	90000000.0	-3.01481	190000000.0	13.399	-8.73156	190000000.0	-3.87976			
77820000.0	21.71	-6.63506	77820000.0	-2.47207	92000000.0	11.876	-7.92028	92000000.0	-3.11021	195000000.0	13.459	-8.71211	195000000.0	-4.0546			
79120000.0	25.29	-5.97112	79120000.0	-1.79756	94000000.0	10.091	-7.1982	94000000.0	-3.0281	200000000.0	11.369	-9.44605	200000000.0	-3.63606			
80420000.0	18.89	-7.79226	80420000.0	-2.78918	96000000.0	18.23	-7.39191	96000000.0	-1.72782	205000000.0	11.429	-9.42252	205000000.0	-2.8740			
81720000.0	14.47	-8.39239	81720000.0	-3.02034	98000000.0	20.828	-6.87876	98000000.0	-3.08685	205000000.0	11.349	-8.7494	210000000.0	-2.1673			
83020000.0	12.58	-9.00583	83000000.0	-1.98268	1E-09	22.828	-6.45289	1E-09	0.0241212	210000000.0	13.349	-8.7494	210000000.0	-2.1673			
84320000.0	8.27	-10.3272	84300000.0	-4.1153	86000000.0	18.398				215000000.0	12.159	-9.15394	215000000.0	-2.8505			
85620000.0	8.76	-10.5747	85600000.0	-4.18298	88000000.0	18.398				220000000.0	13.649	-8.65282	220000000.0	-2.0847			
86920000.0	8.28	-10.8171	86900000.0	-4.78414	90000000.0	18.398				225000000.0	19.429	-7.11743	225000000.0	-1.10816			
88220000.0	7.93	-11.0284	88200000.0	-4.4709	92000000.0	18.398				230000000.0	21.669	-6.64323	230000000.0	-0.1910			
89520000.0	9.19	-10.3658	89500000.0	-3.9907	98000000.0	4.1023				235000000.0	23.379	-6.31273	235000000.0	0.80803			
90820000.0	9.94	-10.2052	90800000.0	-4.1023	92000000.0	12.2318				240000000.0	24.349	-6.1365	240000000.0	0.58762			
92120000.0	11.26	-8.52283	92100000.0	-3.9402	94000000.0	2.6729				245000000.0	21.219	-6.73433	245000000.0	0.65617			
93420000.0	11.87	-8.90423	94700000.0	-3.4691	96000000.0	3.37818				250000000.0	19.119	-7.18772	250000000.0	-0.7773			
94720000.0	12.28	-9.14406	94700000.0	-3.4691	98000000.0	3.37818				255000000.0	18.909	-7.23449	255000000.0	-1.59523			
96020000.0	12.27	-8.11609	96000000.0	-3.37818						260000000.0	17.909	-7.47242	260000000.0	-2.32548			
										265000000.0	12.069	-9.18699	265000000.0	-3.29847			
										270000000.0	8.329	-10.7981	270000000.0	-6.0068			



GPS/WIFI/BT天线

1	1	1	1	1	1				
Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB				
2400000000	16.06%	-7.942526361	2400000000	-0.891943541	5120000000	11.50%	-9.392176591	5120000000	-2.206432384
2410000000	16.25%	-7.89240782	2410000000	-0.734775669	5155000000	10.93%	-9.613303378	5155000000	-3.067433371
2420000000	16.05%	-7.944161581	2420000000	-0.744798722	5190000000	12.23%	-9.127169436	5190000000	-2.256818261
2430000000	16.60%	-7.79907291	2430000000	-0.654177756	5225000000	13.06%	-8.840106357	5225000000	-1.079549375
2440000000	17.11%	-7.868732668	2440000000	-0.537794062	5260000000	13.62%	-8.657649043	5260000000	-0.527651482
2450000000	17.06%	-7.681050789	2450000000	-0.610625776	5295000000	14.11%	-8.504535147	5295000000	0.158062436
2460000000	17.20%	-7.843708662	2460000000	-0.788097054	5330000000	14.09%	-8.511970338	5330000000	0.038553279
2470000000	17.14%	-7.661102761	2470000000	-0.823358074	5365000000	15.84%	-8.002574051	5365000000	0.30061726
2480000000	16.72%	-7.768078487	2480000000	-0.673536673	5400000000	18.64%	-7.296028529	5400000000	0.945882536
2490000000	15.98%	-7.964681497	2490000000	-0.814651741	5435000000	20.96%	-6.785983075	5435000000	1.324056373
2500000000	15.75%	-8.027634363	2500000000	-0.986298291	5470000000	21.31%	-6.713257773	5470000000	1.358702648
1	1	1	1	1	1				
Frequency	Efficiency	Efficiency dB	Frequency	Gain	dB				
1570000000	37.99%	-4.202841675	1570000000	-0.124693795	5505000000	20.40%	-6.90445641	5505000000	0.90041123
1571000000	37.92%	-4.211306427	1571000000	-0.162536558	5540000000	19.27%	-7.151706477	5540000000	0.847997623
1572000000	37.78%	-4.227571787	1572000000	-0.230740801	5575000000	16.91%	-7.718717014	5575000000	-0.155062244
1573000000	37.56%	-4.2531693	1573000000	-0.181000057	5610000000	14.46%	-8.398199419	5610000000	-0.901562444
1574000000	37.35%	-4.277642354	1574000000	-0.116806311	5645000000	12.48%	-9.038079731	5645000000	-1.423246293
1575000000	37.22%	-4.292480147	1575000000	-0.096686637	5680000000	11.74%	-9.304268339	5680000000	-2.308966022
1576000000	37.21%	-4.293811853	1576000000	0.018266809	5715000000	10.68%	-9.714041821	5715000000	-3.014224499
1577000000	37.29%	-4.283653199	1577000000	0.073173776	5750000000	11.00%	-9.585430228	5750000000	-2.879663728
1578000000	37.42%	-4.269418974	1578000000	0.090254071	5785000000	11.05%	-9.564469472	5785000000	-2.44260547
1579000000	37.47%	-4.263260613	1579000000	0.093432798	5820000000	11.46%	-9.40932156	5820000000	-2.119247868
1580000000	37.32%	-4.280035699	1580000000	0.086705405					



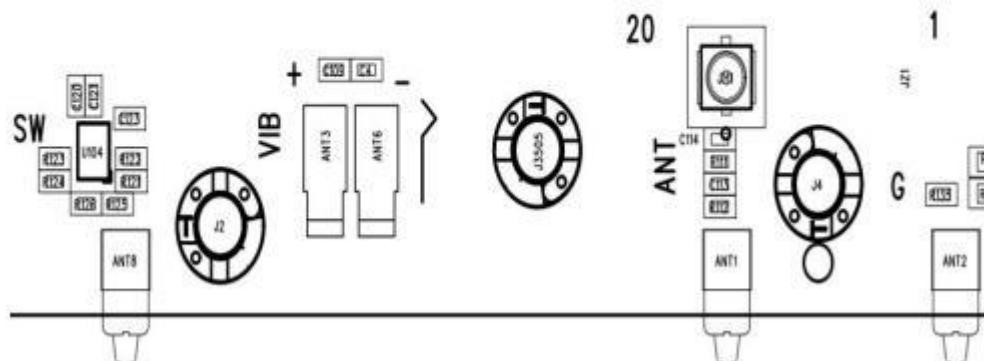
4. Description of matching circuit

4G主集天线匹配电路有更改。

C114-5.1nH, R111/R112/R135-0欧姆, C113-NC.

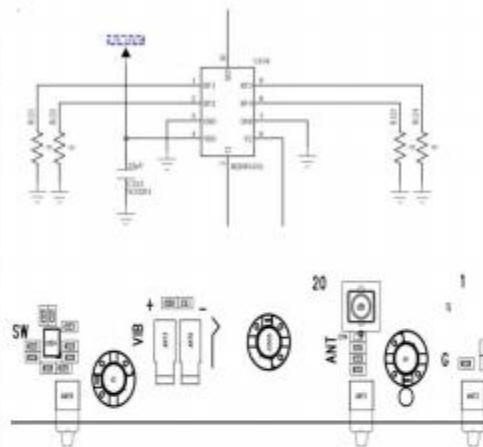
R125-0欧姆, R121-0欧姆, R122-12nH, R124-2.7nH, R123-18nH, R126-NC.

ANT1/2/8天线侧顶弹片保留。



4G主集开关逻辑

RF开关通路	匹配	控制频段
RF1 (R121)	0欧姆	GSM:900/1800/1900 WCDMA:B1/2/4/8 LTE:B1/2/3/4/8/25/39/40/48/66
RF2 (R122)	12nH	LTE:B12/13/28
RF3 (R124)	2.7nH	GSM:850 BCO WCDMA:B5 LTE : B5/20/26
RF4 (R123)	18nH	LTE:B7/38/41/71

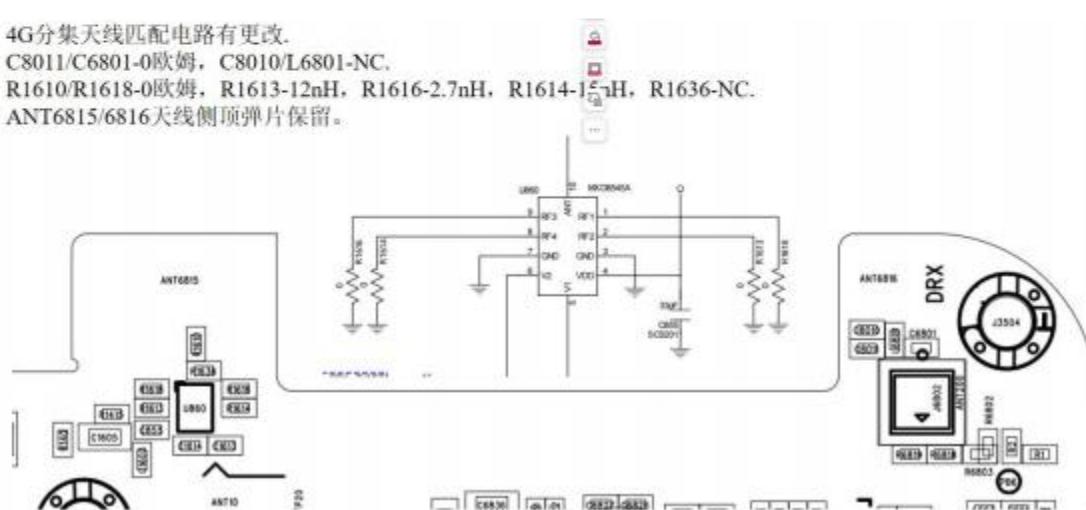


4G分集天线匹配电路有更改。

C8011/C6801-0欧姆, C8010/L6801-NC.

R1610/R1618-0欧姆, R1613-12nH, R1616-2.7nH, R1614-18nH, R1636-NC.

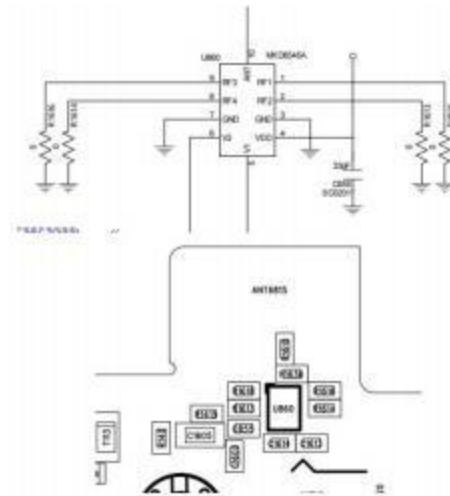
ANT6815/6816天线侧顶弹片保留。





4G分集开关逻辑

RF开关通路	匹配	控制频段
RF1 (R1618)	0欧姆	GSM:900/1800/1900 WCDMA:B1/2/4/8 LTE:B1/2/3/4/7/8/25/38/39/40/ 41/48/66
RF2 (R1613)	12nH	LTE:B12/13/28
RF3 (R1616)	2.7nH	GSM:850 BC0 WCDMA:B5 LTE : B5/20/26
RF4 (R1614)	15nH	LTE:B71

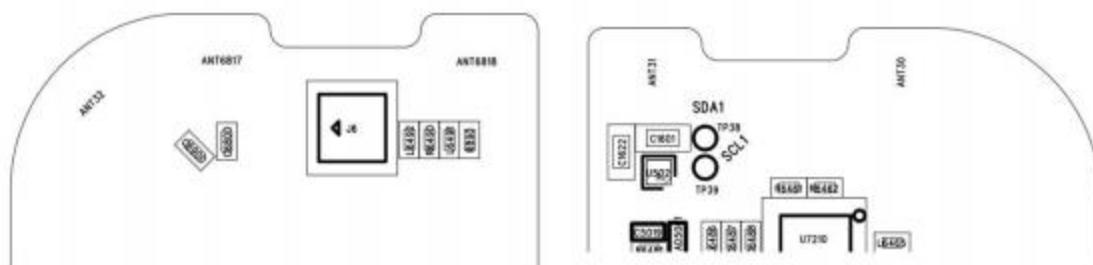


WIFI/GPS天线匹配电路有更改。

C6900-NC, C6800-0欧姆。

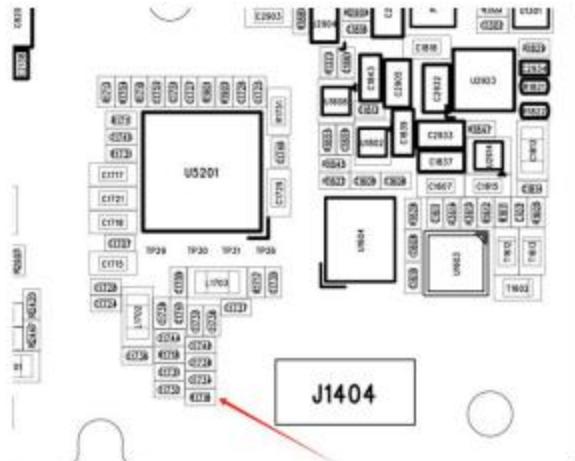
R890-0欧姆, L6491-NC, R6490-1.5pF。

ANT32/6818/31/30天线弹片保留。ANT6817天线弹片取消。



NFC匹配电路

元件 Element	更改前	更改后
C1732/C1733(0201):	180pF	270pF
C1730/C1731(0201):	22pF	180pF
C1738/C1739(0201):	270pF	330pF
C1740/C1741(0201):	NC	330pF
C1744(0201):	39pF	39pF





5. GPS/WIFI/BT NFC Measurement Report

GPS actual measurement

During the day, on the company's balcony, positioning was achieved within 120 seconds after cold start, the maximum star value detected was 40.4, and there were two stars with values above 40.



The WIFI signal strength is 10 meters away from the router

The actual measured unobstructed distance from the front of BT is 10 meters, with a distance of 5 meters from a person. The call lasts for 3 minutes without any noise and is smooth.



NFC 通讯距离 NFC Communication distance

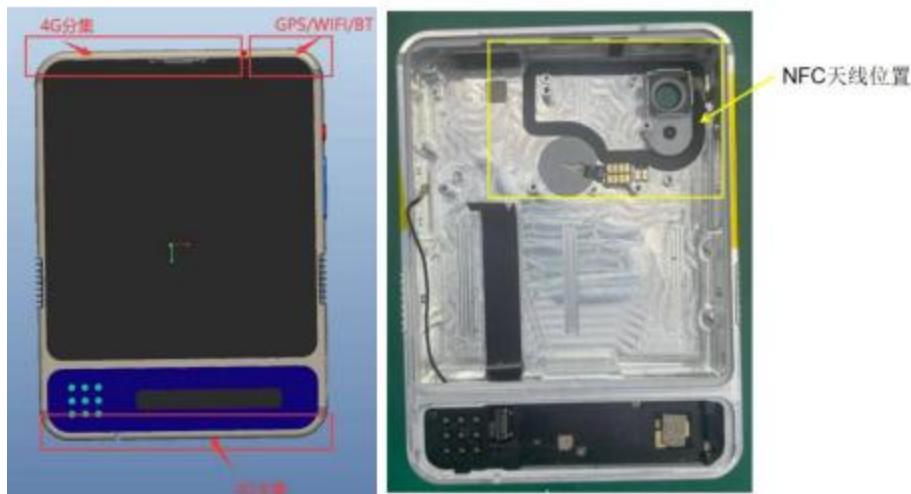
	距离 Distance
Type1	4.5cm
Type2	4.0cm
Type3	3.5cm
Type4	1.5cm
Type5	5.0cm

测试距离用的垫片 The gasket used for the test distance





6. Environmental treatment



红框区域屏排线贴导电布屏蔽接地，小板和主板贴导电海绵接地。



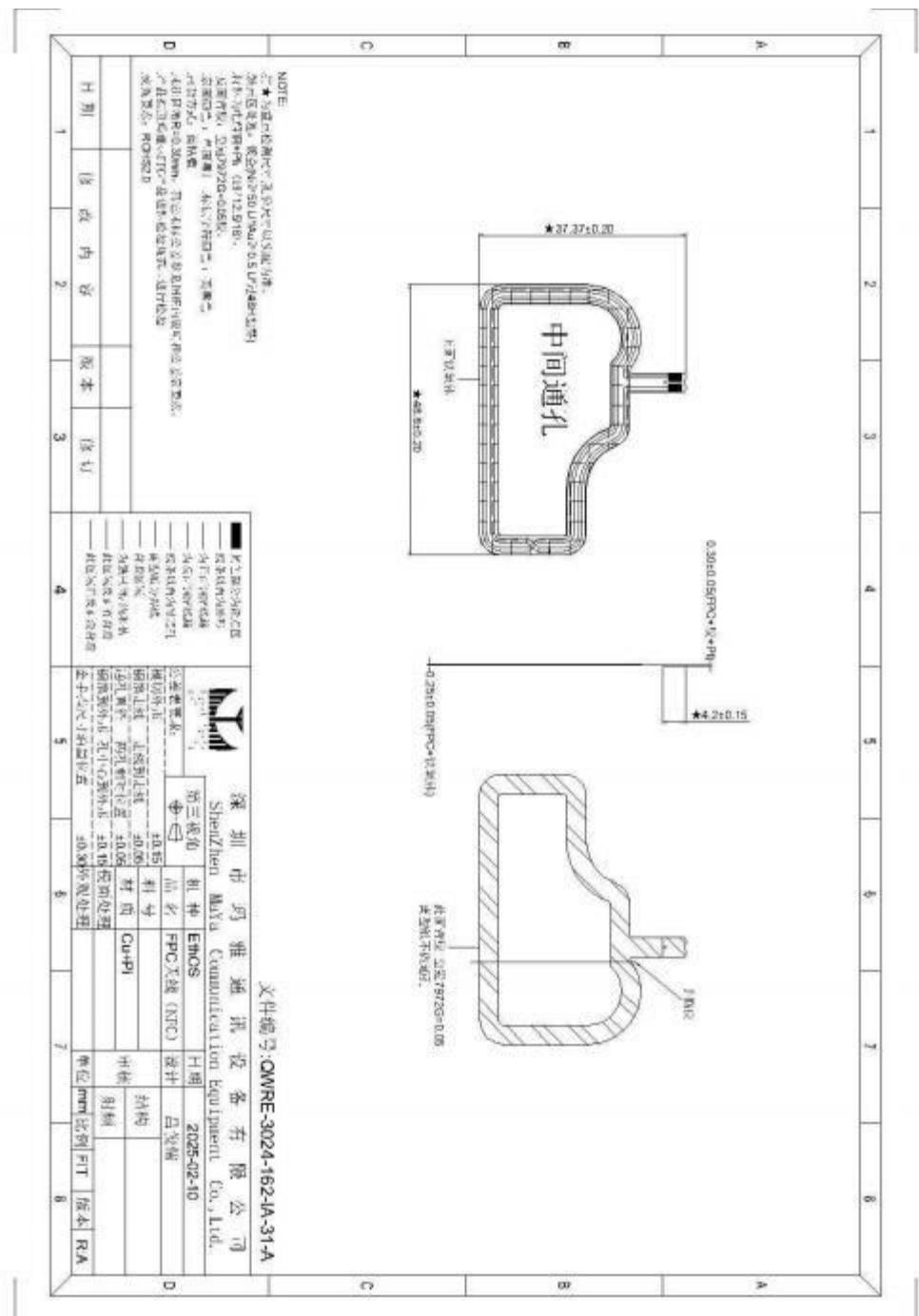
红框处喇叭、马达需接地，主板贴导电泡棉和导电布接地。





摄像头接地.





Shenzhen Maya Communication Equipment Co., LTD

