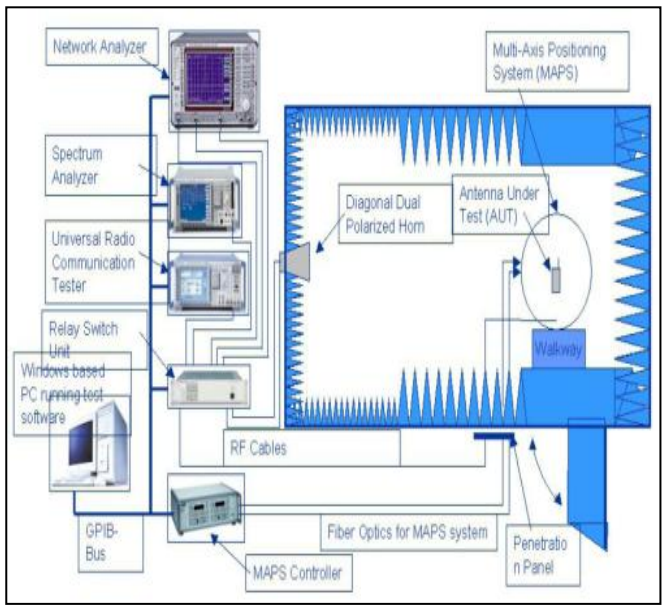
shen zhen mayaant technology limited

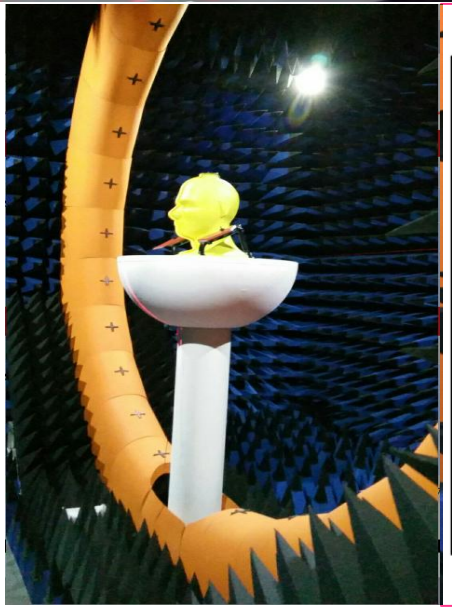
Antenna Test Report

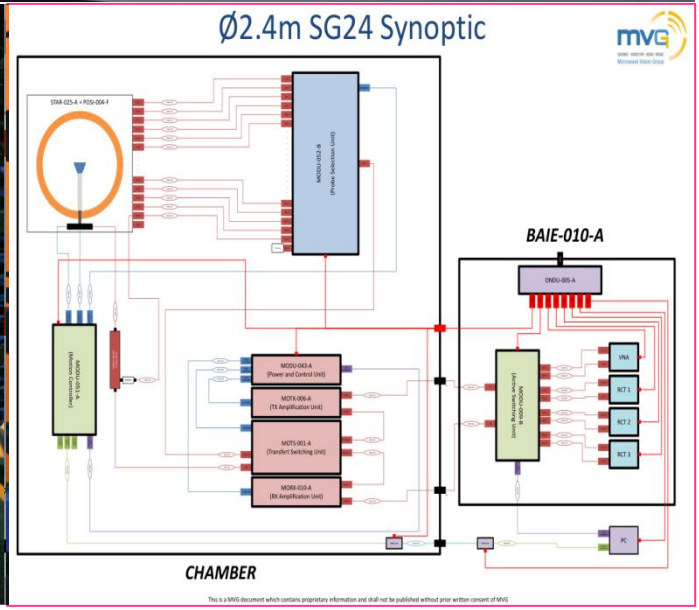
报告日期：2023年7月6日星期四

天线设计频段: antenna design spectrum	5G
天线类型: Type of antenna	PIFA

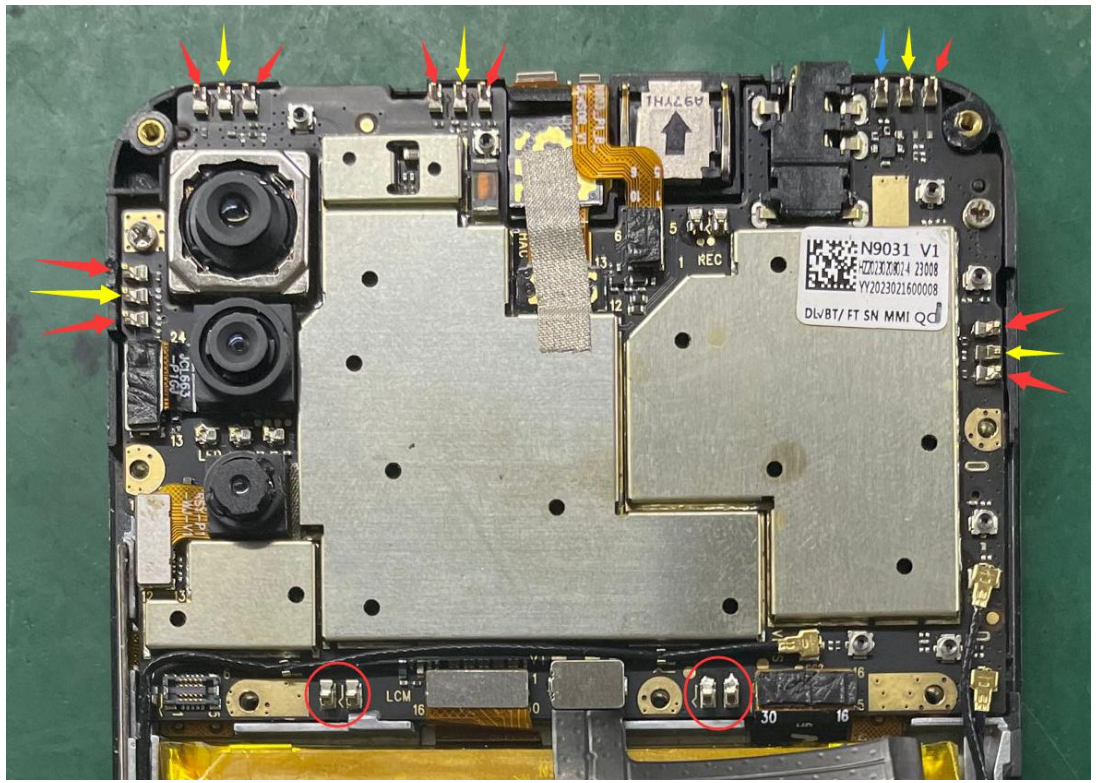
报告版本: Report version	日期 Date	内容 Content
V1.0	2023.03.25	天线有源测试报告
V2.0	2023.05.06	试产机天线有源测试报告
V3.0	2023.05.22	换屏-天线有源测试报告
V4.0	2023.05.26	换屏-天线测试报告(更新最终匹配)
V5.0	2023.07.06	天线有源测试报告(增加无源)

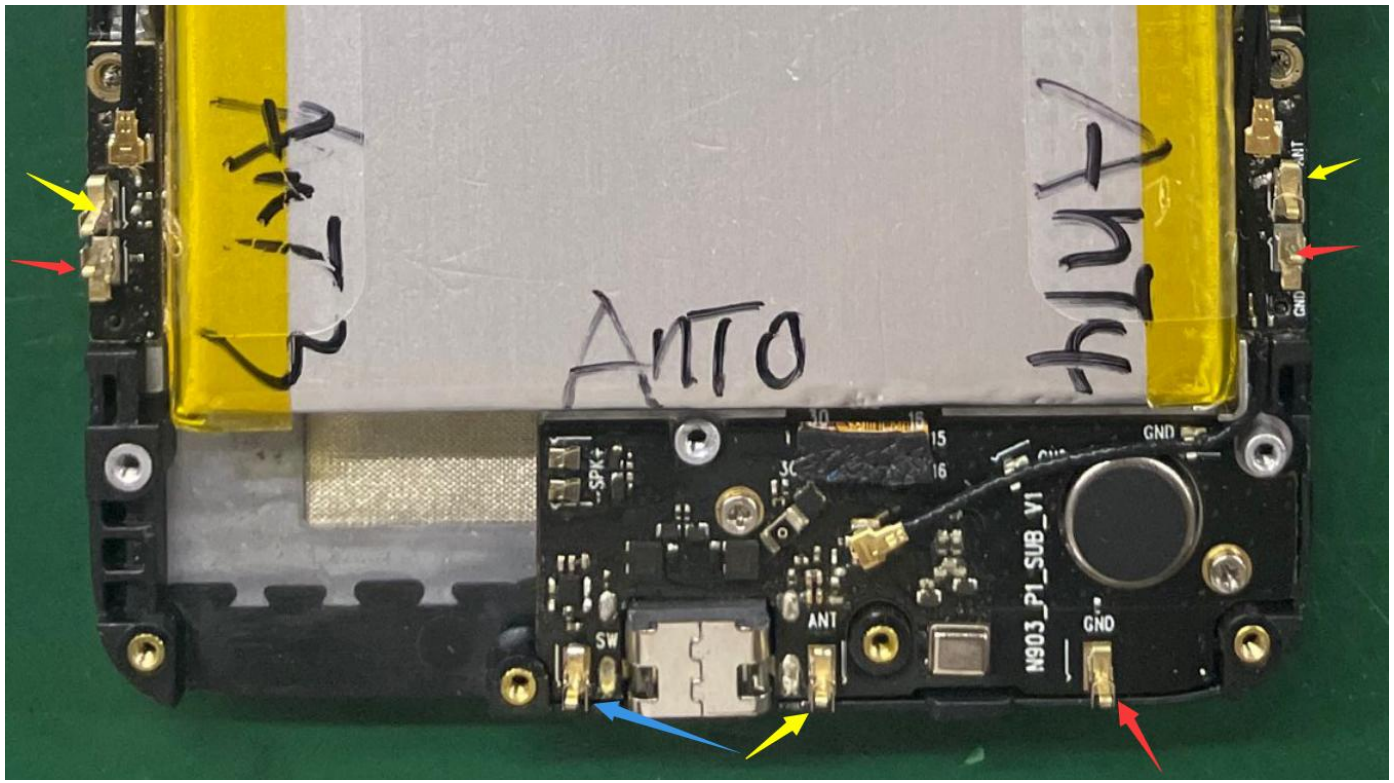






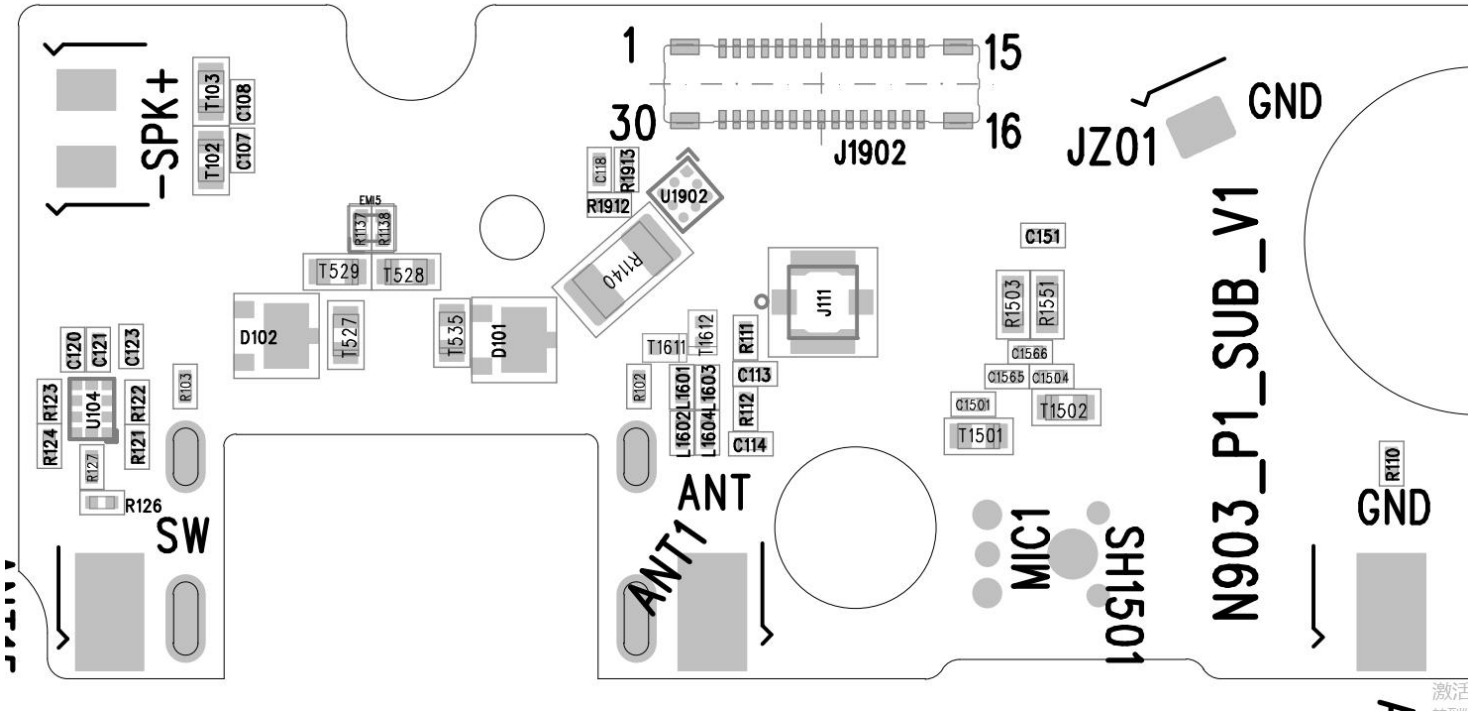
3座远场3D全电波微波暗室实验室系统，1座MVG SG24LT（Satmio）近场3D微波暗室实验室系统（与国家相关实验室同步）


N9031 V1
DIVBT/ FT SN MMI QC
LCM
REC


ANT
GND
SPK+
SW
ANT
GND
N903_P1_SUB_V1

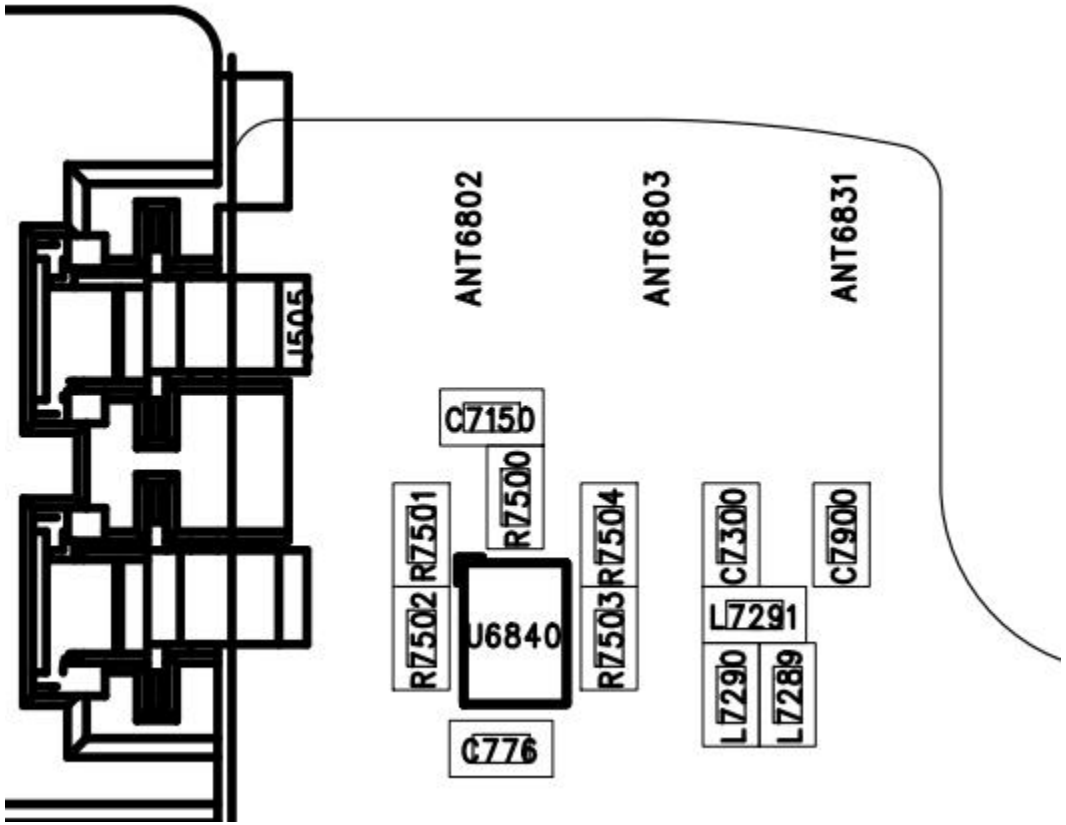
ANT0

位号	匹配值
C114	1.0pF
C113	6.8nH
R111	2.7nH
R110/R112/R121/R127	0Ω
R122	18nH
R124	5.1nH
R123	18nH
R126	NC

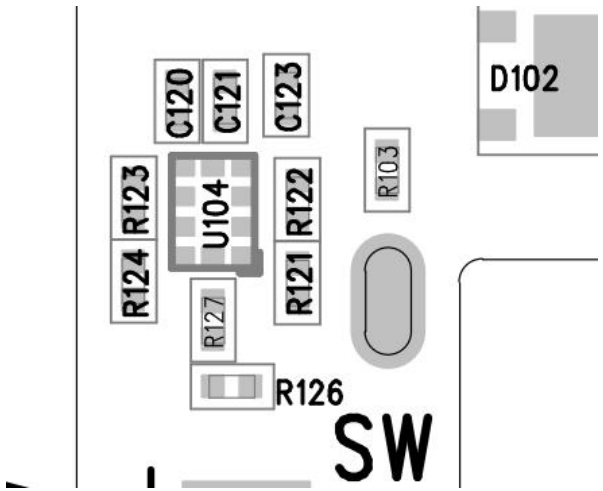


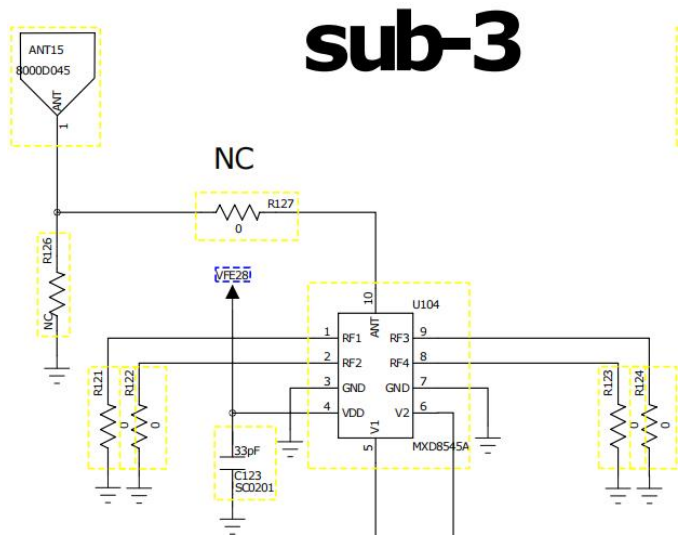
ANT1

位号	匹配值
C7300	原匹配
L7291/C7150	NC
L7289	9.1nH
R7500/R7501/L7290/C7900	0Ω
R7502	18nH
R7504	5.1nH
R7503	18nH



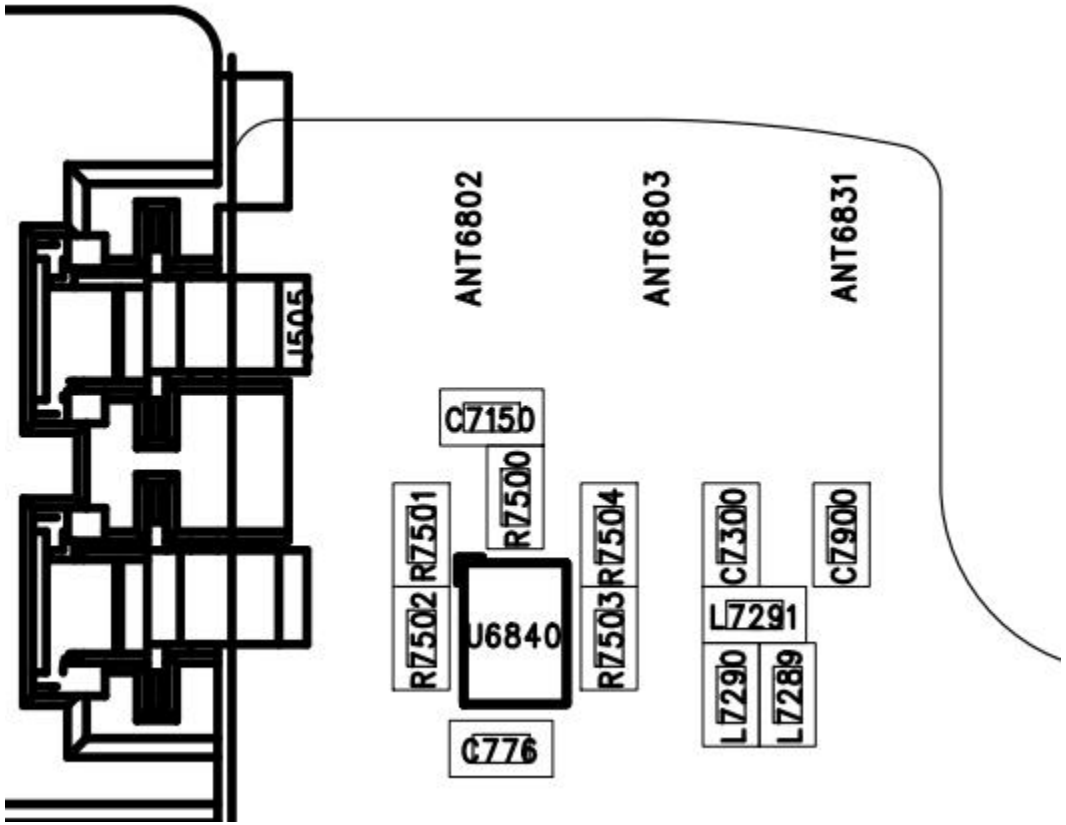
RF开关通路	匹配	控制频段
RF1(R121)	0欧姆	GSM:900/1800/1900 WCDMA:B2/4 LTE:B2/4/30/66 NR:N41
RF2(R122)	18nH	LTE:B12/17
RF3(R124)	5.1nH	GSM:850 BC0 WCDMA:B5 LTE : B5 NR:N5
RF4(R123)	18nH	LTE:B71 NR: N71



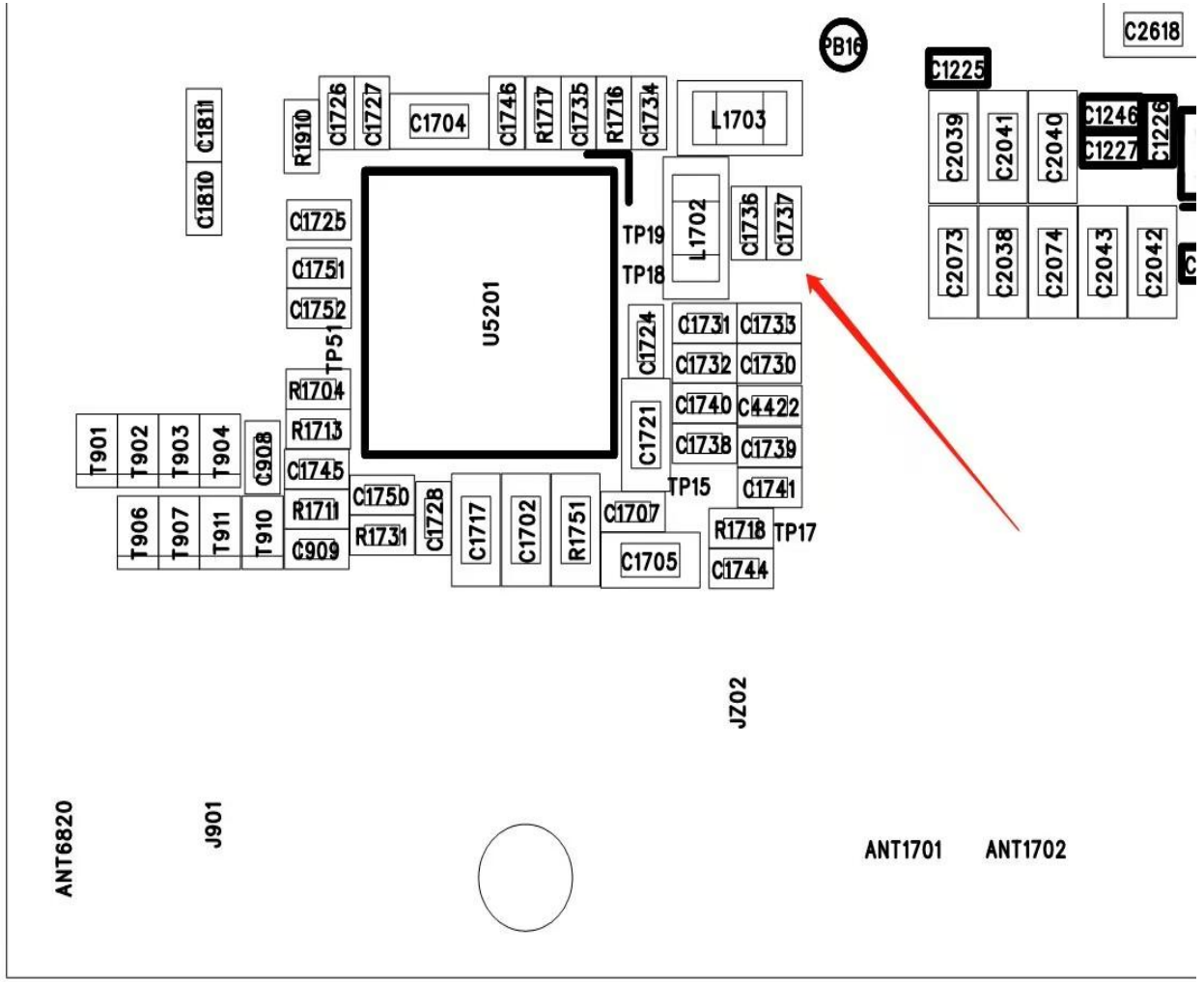


ANT1

RF开关通路	匹配	控制频段
RF1(R7501)	0欧姆	GSM:900/1800/1900 WCDMA:B2/4 LTE:B2/4/30/66 NR:N41
RF2(R7502)	18nH	LTE:B12/17
RF3(R7504)	5.1nH	GSM:850 BC0 WCDMA:B5 LTE : B5 NR:N5
RF4(R7503)	18nH	LTE:B71 NR: N71



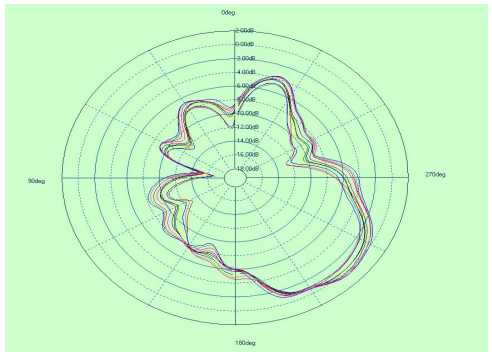
元件 Element	更改前	更改后
C1738/C1739(0201):	270pF	5. 6pF
C1744(0201):	39pF	27pF



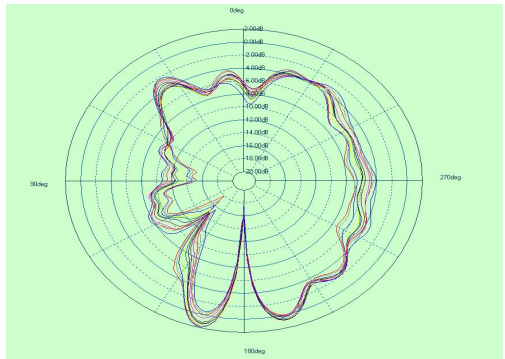
无源报告

WIFI 2.4G & BT		
Frequency	Efficiency	Gain . dB
2400000000	34.95%	2.043975173
2410000000	35.01%	2.257372696
2420000000	34.84%	2.23302284
2430000000	35.78%	2.102894401
2440000000	35.80%	1.793614268
2450000000	36.09%	1.929650744
2460000000	36.59%	1.700964431
2470000000	36.86%	1.135437588
2480000000	36.39%	0.670971248
2490000000	36.42%	0.552660158
2500000000	37.54%	0.729623465

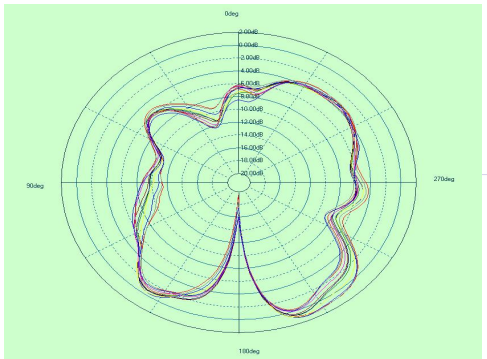
Azimuth 0°



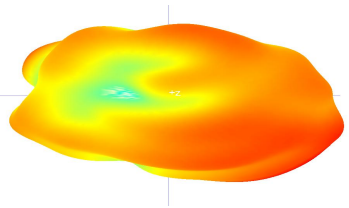
Azimuth 90°



H-Plane (Elevation 90°)



3D view Frequency
2450MHz

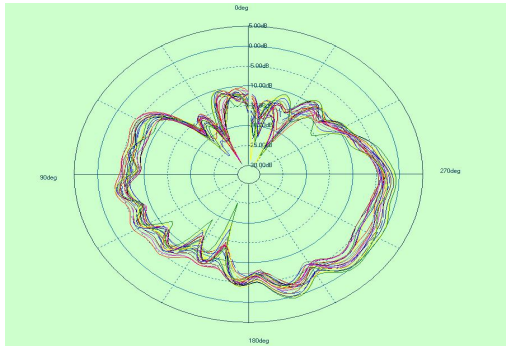


无源报告 测量仪器：Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统：MVG SG24LT（Satmio）

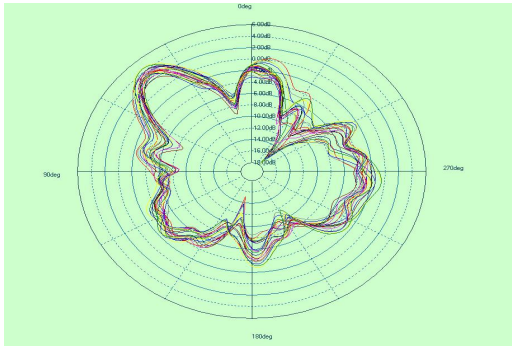
无源报告

WIFI 5.8G		
Frequency	Efficiency	Gain . dB
5200000000	31.75%	3.648863419
5230000000	28.82%	3.638832221
5260000000	29.69%	4.020822769
5290000000	30.41%	3.741754436
5320000000	28.32%	3.152520518
5350000000	26.66%	2.612760759
5380000000	27.57%	2.303713842
5410000000	31.43%	3.078250828
5440000000	36.16%	3.995589818
5470000000	35.15%	4.003581412
5500000000	37.26%	4.143868646
5530000000	39.28%	4.667514407
5560000000	38.10%	4.523487773
5590000000	33.67%	3.94397269
5620000000	31.07%	3.848357347
5650000000	29.57%	3.603095448
5680000000	29.48%	3.151019505
5710000000	28.29%	2.994373767
5740000000	29.45%	3.135990755
5770000000	32.52%	3.232664567
5800000000	31.44%	2.937241718

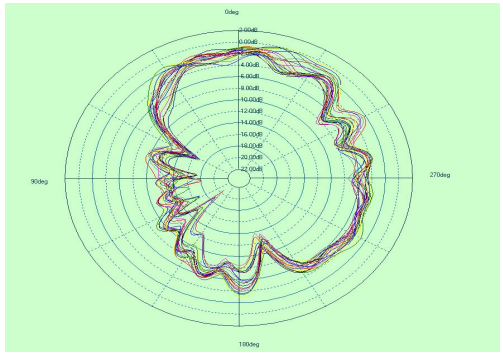
Azimuth 0°



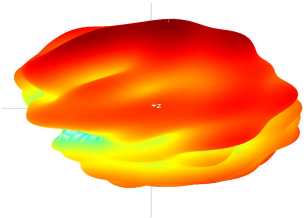
Azimuth 90°



H-Plane (Elevation 90°)



3D view Frequency
5500MHz

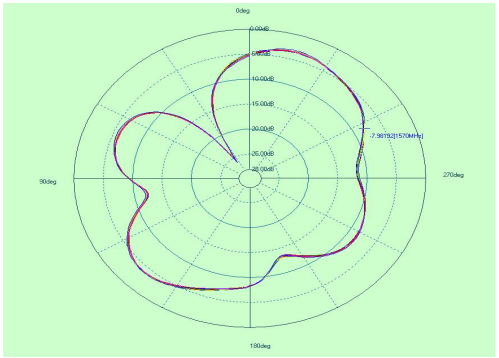


无源报告 测量仪器：Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统：MVG SG24LT（Satmio）

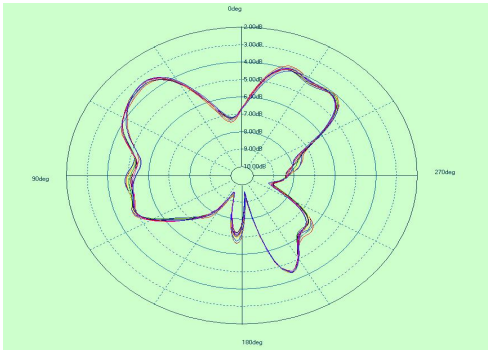
无源报告

GPS		
Frequency	Efficiency	Gain . dB
1570000000	37%	0.189429322
1571000000	37%	0.180822403
1572000000	37%	0.112399886
1573000000	37%	-0.012709776
1574000000	36%	-0.119282869
1575000000	36%	-0.167184585
1576000000	36%	-0.131928106
1577000000	37%	-0.046984858
1578000000	37%	0.055082552
1579000000	37%	0.084686039
1580000000	37%	0.070163101

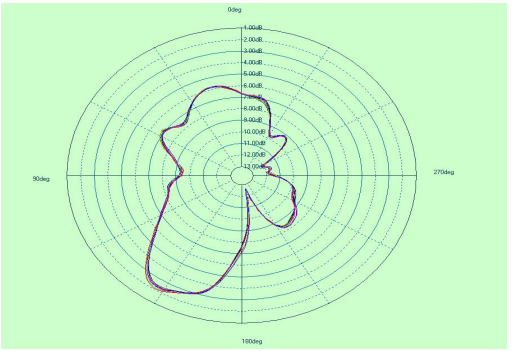
Azimuth 0°



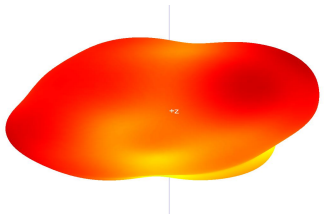
Azimuth 90°



H-Plane (Elevation 90°)



3D view Frequency
1575MHz

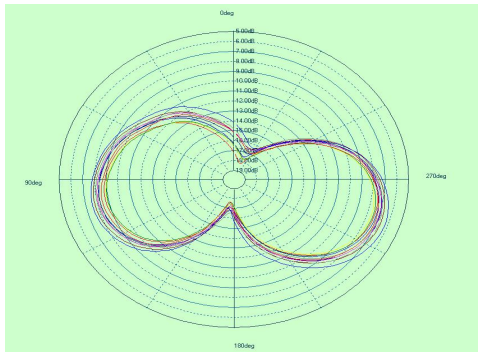


无源报告 测量仪器：Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统：MVG SG24LT（Satmio）

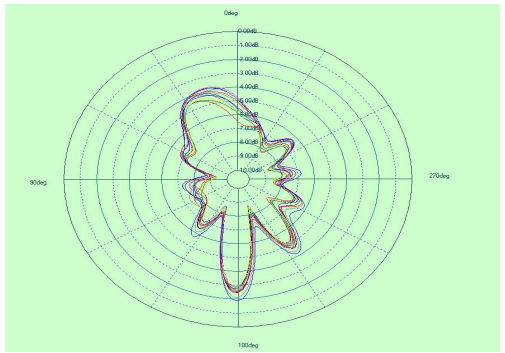
无源报告

700-960MHz		
Frequency	Efficiency	Gain . dB
700000000	14.68%	-2.506812792
800000000	14.38%	-2.591025496
820000000	15.61%	-1.883060703
880000000	18.53%	-2.409810833
888000000	19.76%	-1.599351153
896000000	20.97%	-0.948340281
904000000	21.43%	-1.724331808
912000000	21.19%	-1.346434496
920000000	21.62%	-0.882695804
928000000	22.30%	-1.033760318
936000000	21.87%	-1.37423822
944000000	20.74%	-1.994837263
952000000	20.20%	-2.092949472
960000000	19.46%	-1.723853447

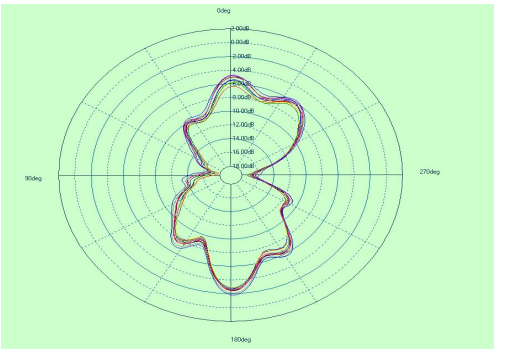
Azimuth 0°



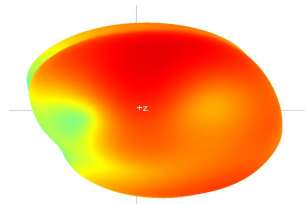
Azimuth 90°



H-Plane (Elevation 90°)



3D view Frequency
900MHz

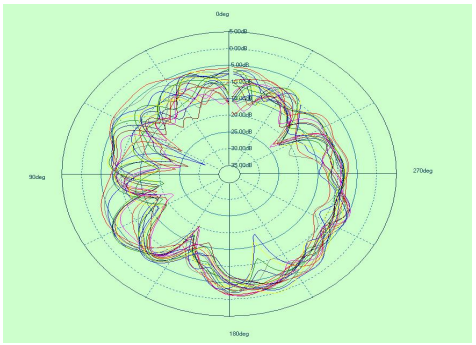


无源报告 测量仪器：Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统：MVG SG24LT（Satmio）

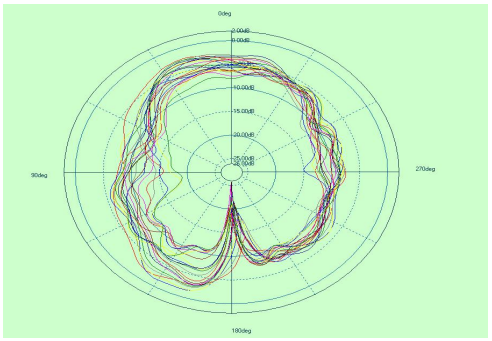
无源报告

1710-2700MHz		
Frequency	Efficiency	Gain . dB
1710000000	31.26%	0.243460851
1759500000	25.64%	-0.715088582
1809000000	23.42%	-0.262057618
1858500000	23.10%	0.405349055
1908000000	24.72%	0.161876675
1957500000	24.63%	0.130720934
2007000000	21.31%	0.194871442
2056500000	20.90%	0.424945009
2106000000	19.54%	0.194574504
2155500000	19.13%	-0.340086202
2205000000	21.09%	0.42105476
2254500000	21.21%	0.503550901
2304000000	18.40%	-0.693432065
2353500000	15.49%	-2.223655457
2403000000	13.35%	-2.055457236
2452500000	13.18%	-1.714419878
2502000000	15.40%	-1.411508961
2551500000	17.02%	-0.568127151
2601000000	16.29%	-0.815657108
2650500000	15.61%	-1.184298686
2700000000	14.86%	-1.428485799

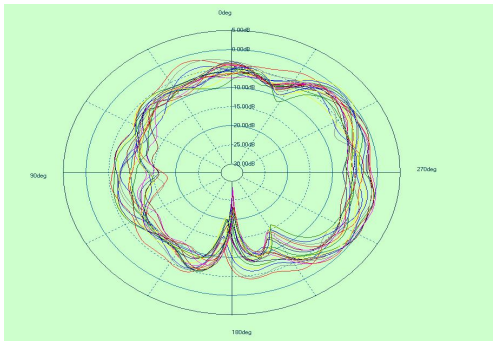
Azimuth 0°



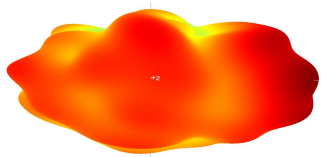
Azimuth 90°



H-Plane (Elevation 90°)



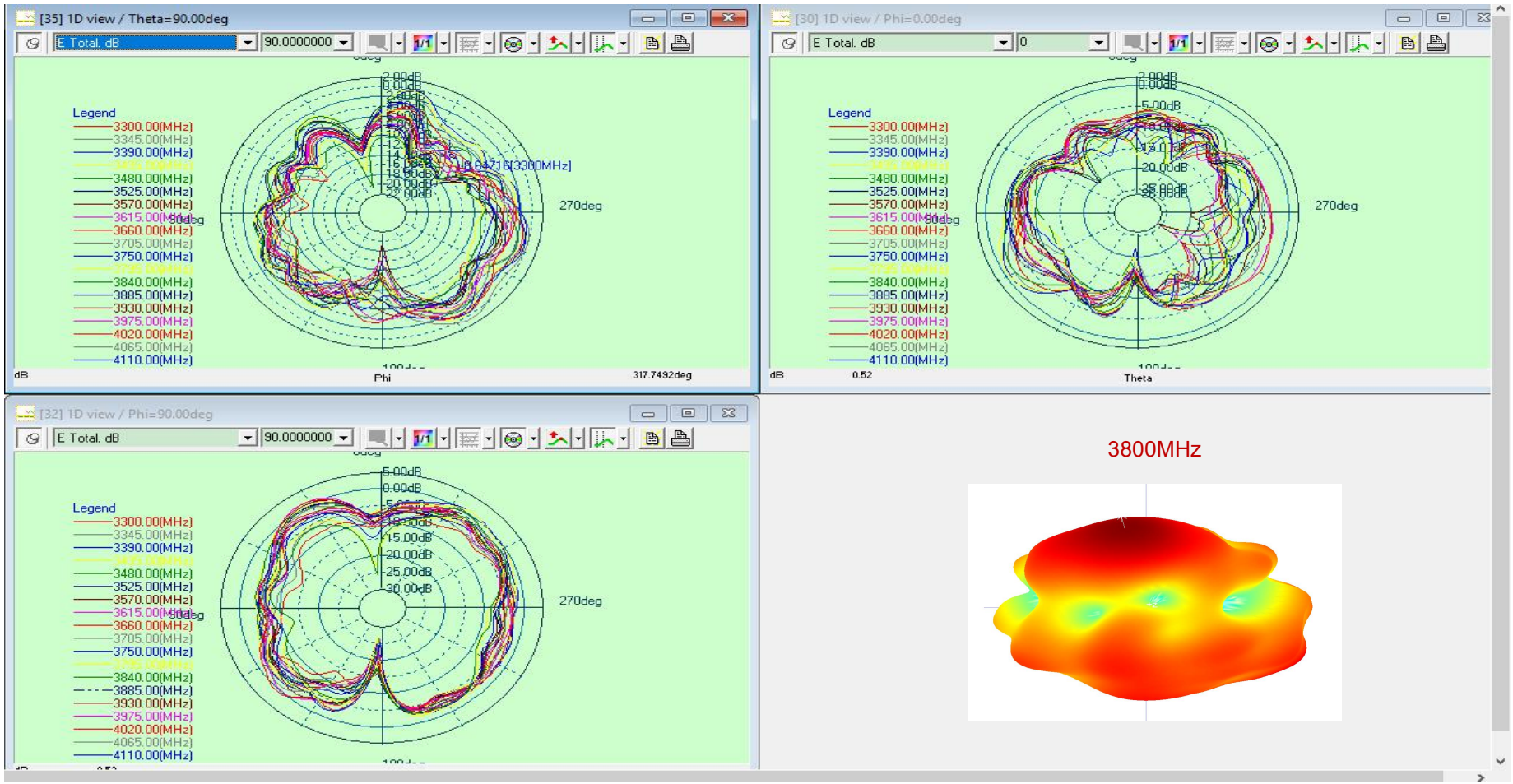
3D view Frequency
2200MHz



无源报告 测量仪器：Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统：MVG SG24LT（Satmio）

无源报告

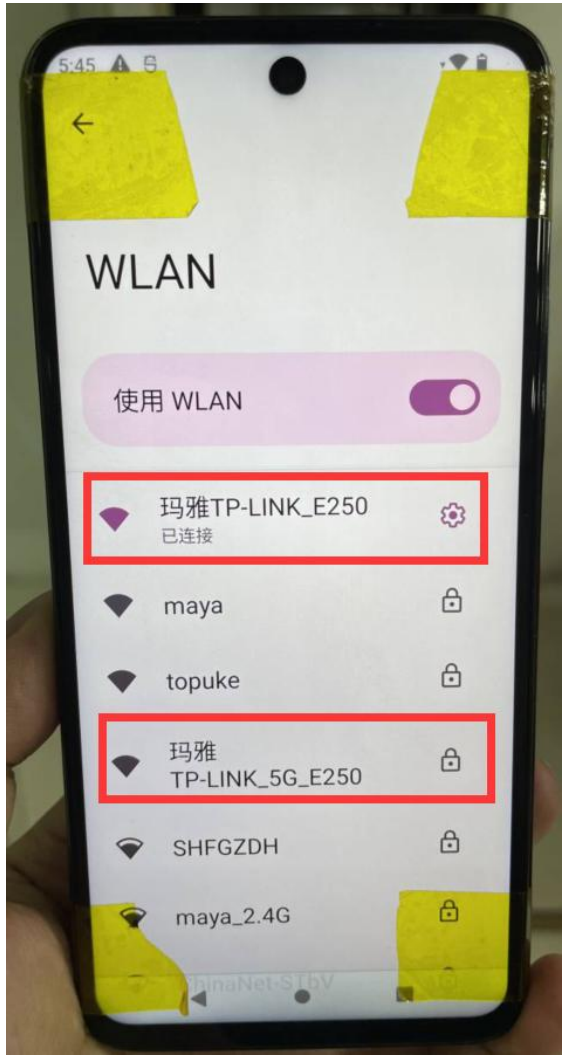
3300-4200MHz		
Frequency	Efficiency	Gain . dB
3300000000	18.89%	-2.048674801
3345000000	24.86%	-0.475895641
3390000000	32.22%	0.8166508
3435000000	35.90%	0.829489895
3480000000	34.46%	-0.590567914
3525000000	29.61%	-0.735782592
3570000000	24.82%	-1.402672164
3615000000	23.99%	-1.444187343
3660000000	29.34%	-0.488278913
3705000000	37.21%	0.805818897
3750000000	39.03%	0.777607078
3795000000	35.70%	0.687180919
3840000000	31.77%	-0.304370274
3885000000	27.19%	0.078795231
3930000000	27.60%	0.764902858
3975000000	32.56%	1.443771676
4020000000	36.07%	1.302405332
4065000000	30.55%	-0.61752775
4110000000	24.04%	-1.503724389
4155000000	20.33%	-1.582146927
4200000000	17.67%	-1.706242368



无源报告 测量仪器：Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统：MVG SG24LT（Satmio）

有源报告

WIFI距路由器12M信号强度

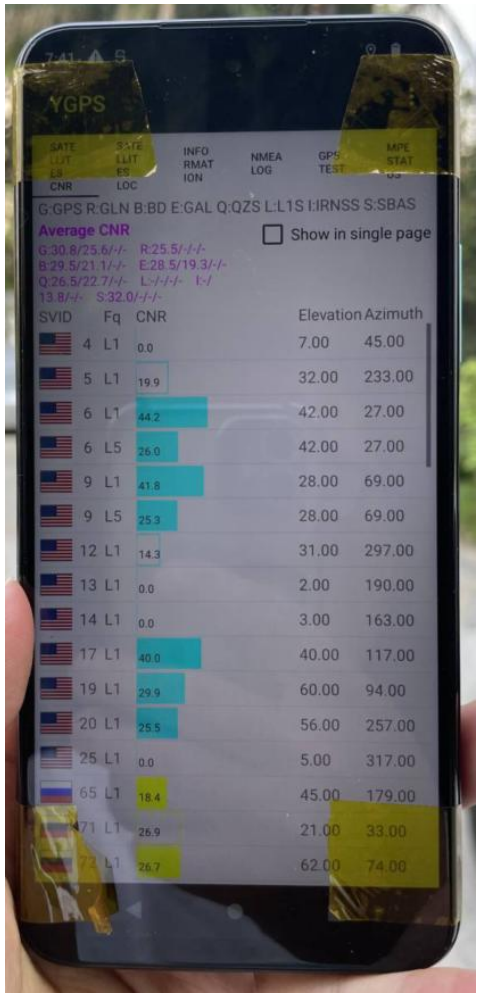


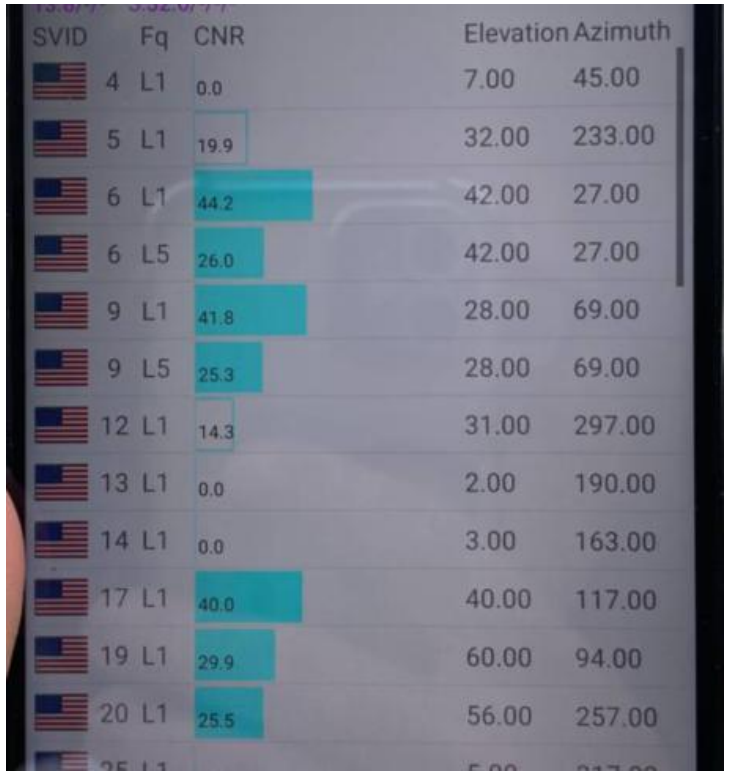
BT实测
正面无障碍距离：8米
隔人体距离5米
通话3分钟无杂音流畅。

有源报告

GPS实测：

白天在公司楼下实测两分钟内定位，最大星值44.2。



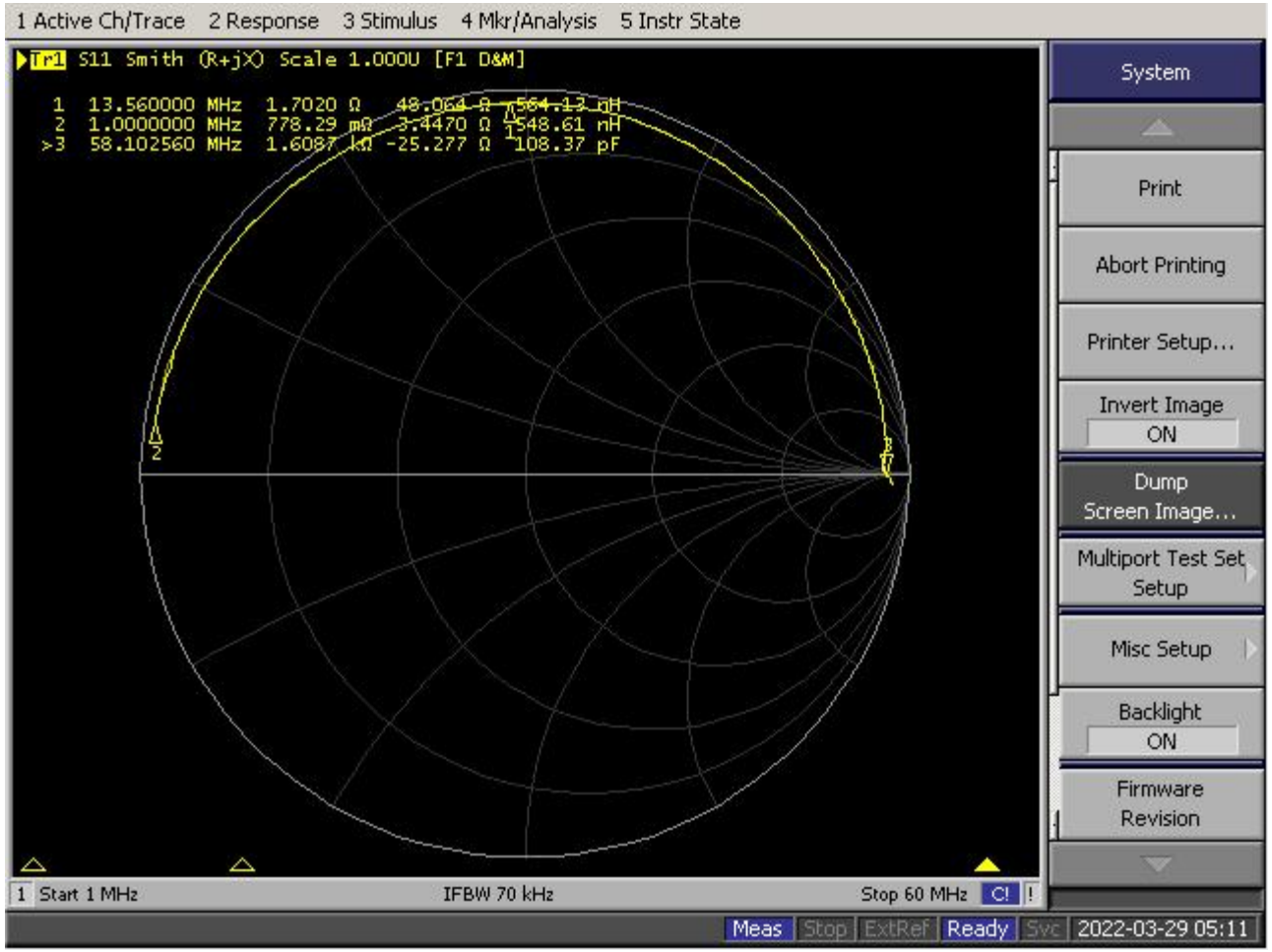


NFC通讯距离

	距离
Type1	4.5cm
Type2	4.0cm
Type3	3.5cm
Type4	2.5cm
公交卡	3.5cm
身份证	2.5cm

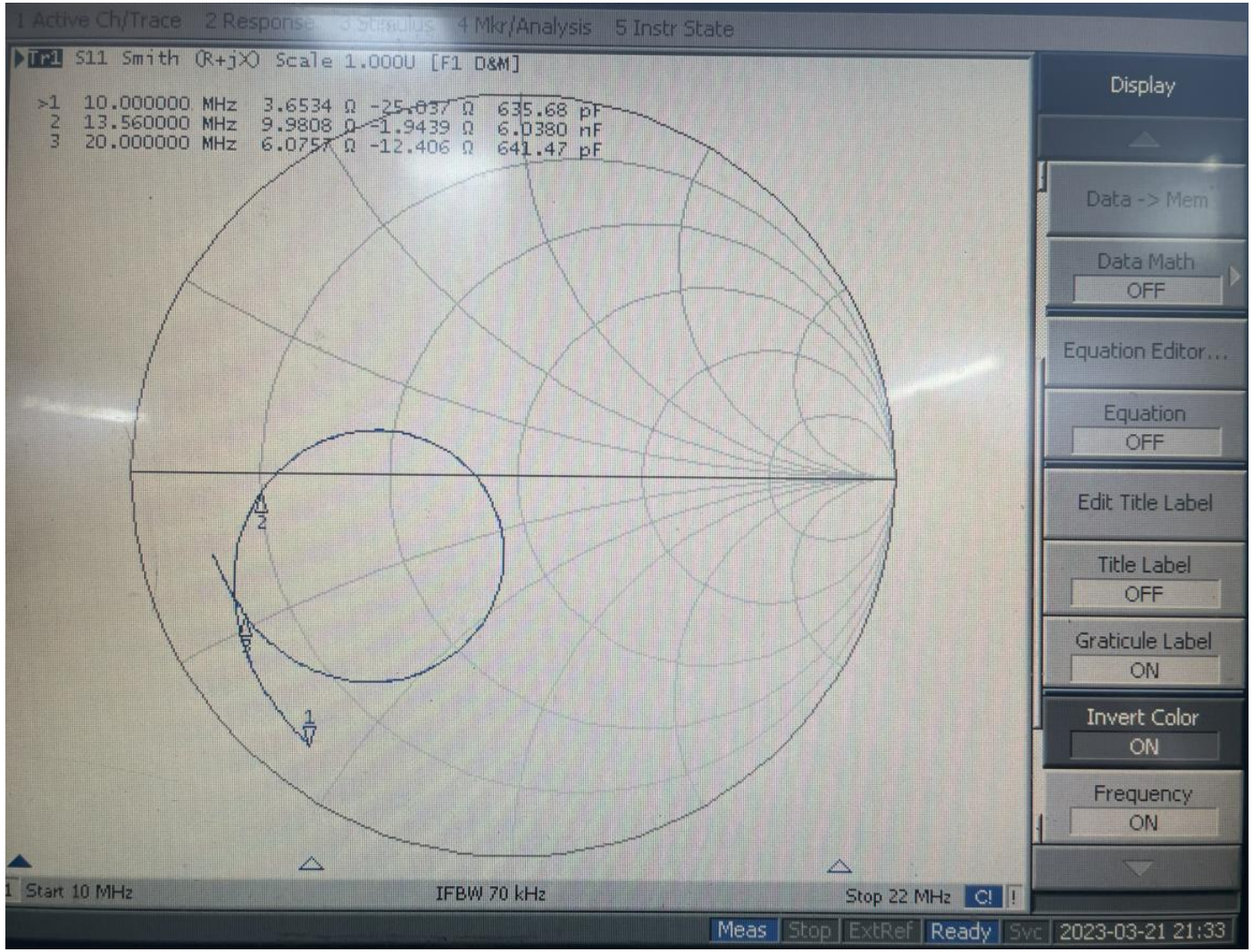
测试距离用的垫片

本体参数

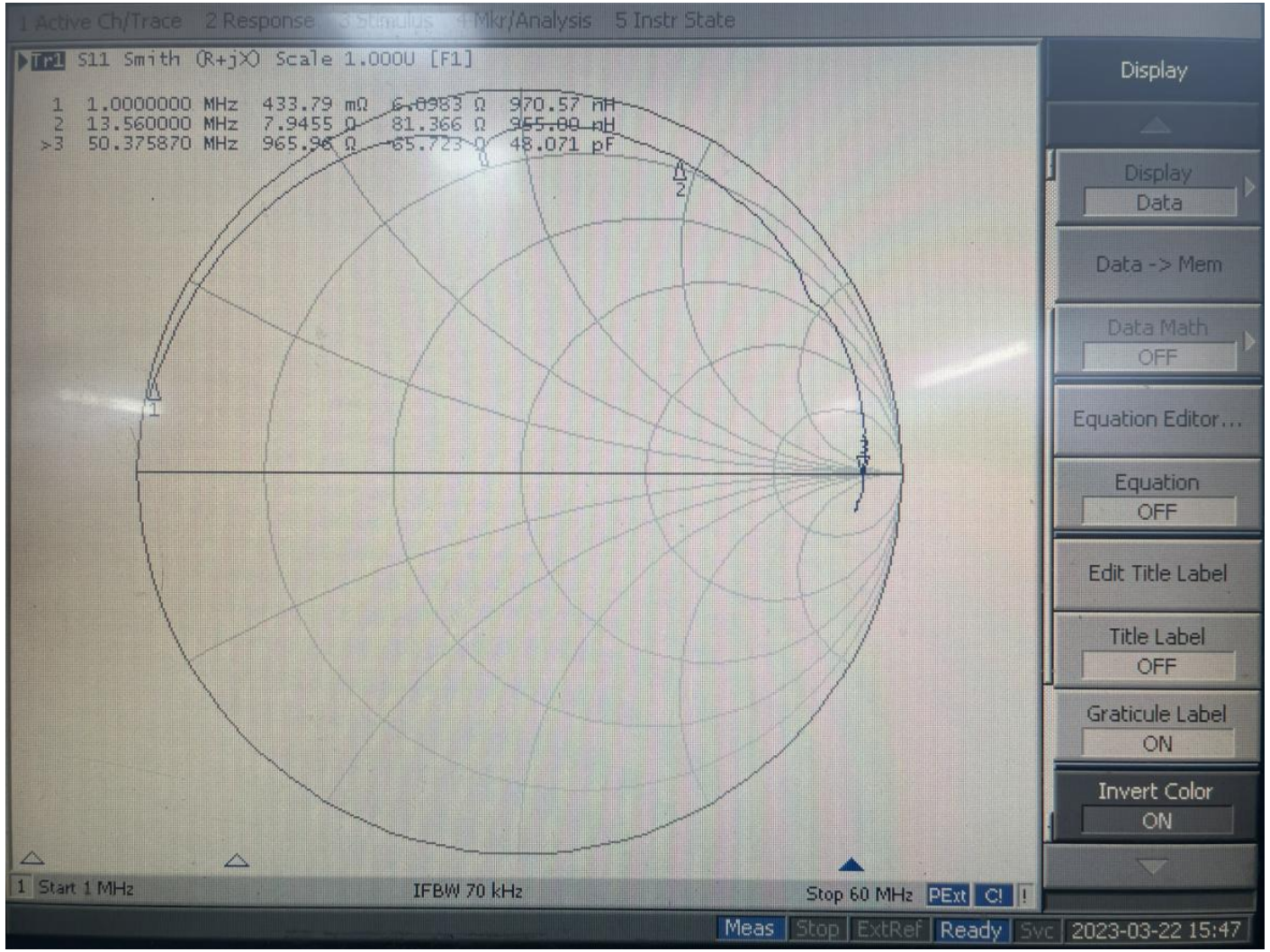


R@13.56MHz（Ω）	1.70
Lant@1MHz（μH）	0.54
Frequency（MHz）	58.1
Q	17

阻抗


1 Active Ch/Trace
2 Response
3 Stimulus
4 Mkr/Analysis
5 Instr State
Tr1 S11 Smith (R+jX) Scale 1.000U [F1 D&M]
>1 10.000000 MHz 3.6534 Ω -25.037 Ω 635.68 pF
2 13.560000 MHz 9.9808 Ω -1.9439 Ω 6.0380 nF
3 20.000000 MHz 6.0757 Ω -12.406 Ω 641.47 pF
Display
Data -> Mem
Data Math
OFF
Equation Editor...
Equation
OFF
Edit Title Label
Title Label
OFF
Graticule Label
ON
Invert Color
ON
Frequency
ON
1 Start 10 MHz
IFBW 70 kHz
Stop 22 MHz
Meas
Stop
ExtRef
Ready
Svc
2023-03-21 21:33

本体参数



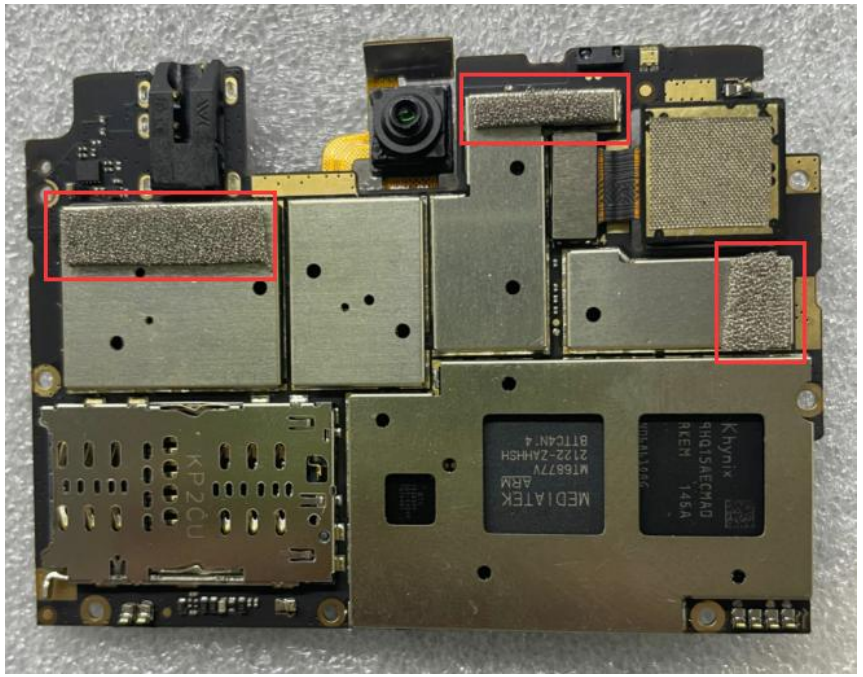
Rs@1MHz（Ω）	0.43
Lant@1MHz（uH）	0.97
Frequency（MHz）	50.37
Rp（KΩ）	0.96

无线充

Ls(uH）	8.7
Rs(mΩ）	398
线圈数	13

环境处理

如图：1.贴导电布、导电海绵使屏与金属框并接地,屏正面不贴导电布。
2.贴导电海绵使主板接地。



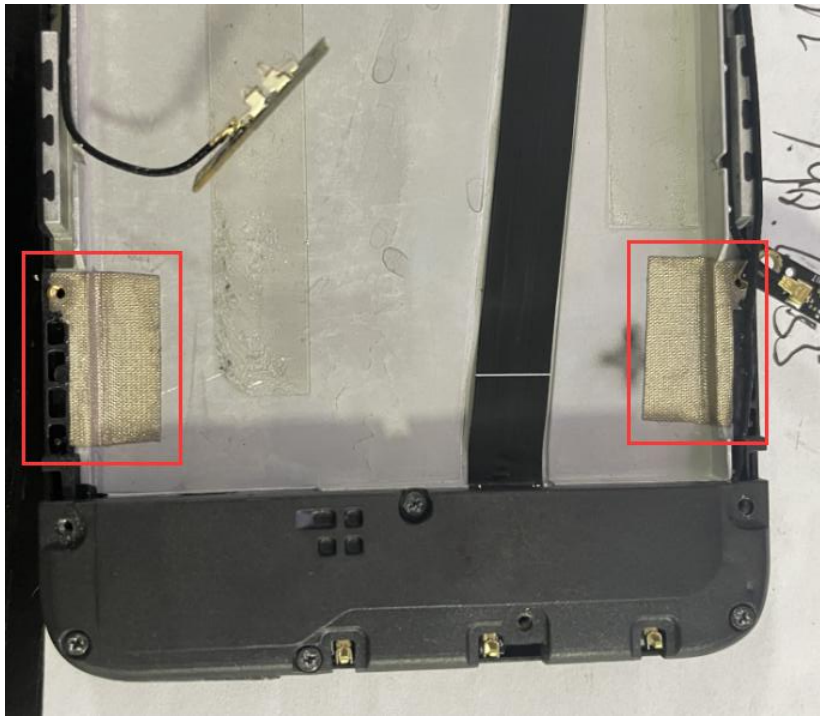
环境处理

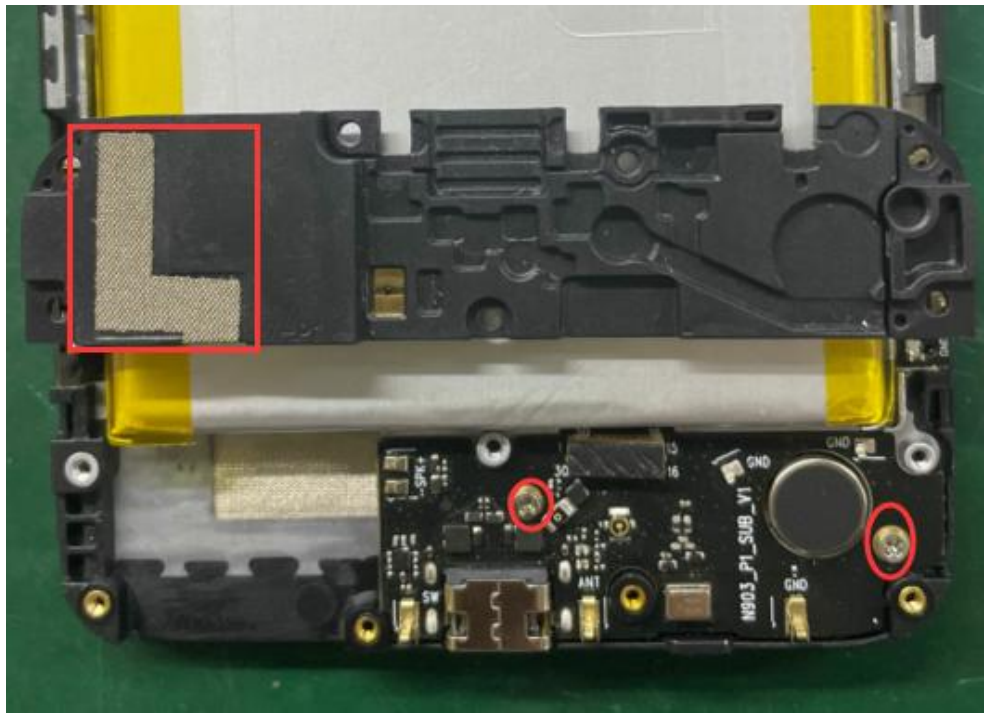
如图：

1.电池左右两侧小板背面露铜区贴双面导电胶使小板充分接地，导电布不能盖住小板净空区。

2.喇叭贴导电布接地、马达贴导电双面胶接地。

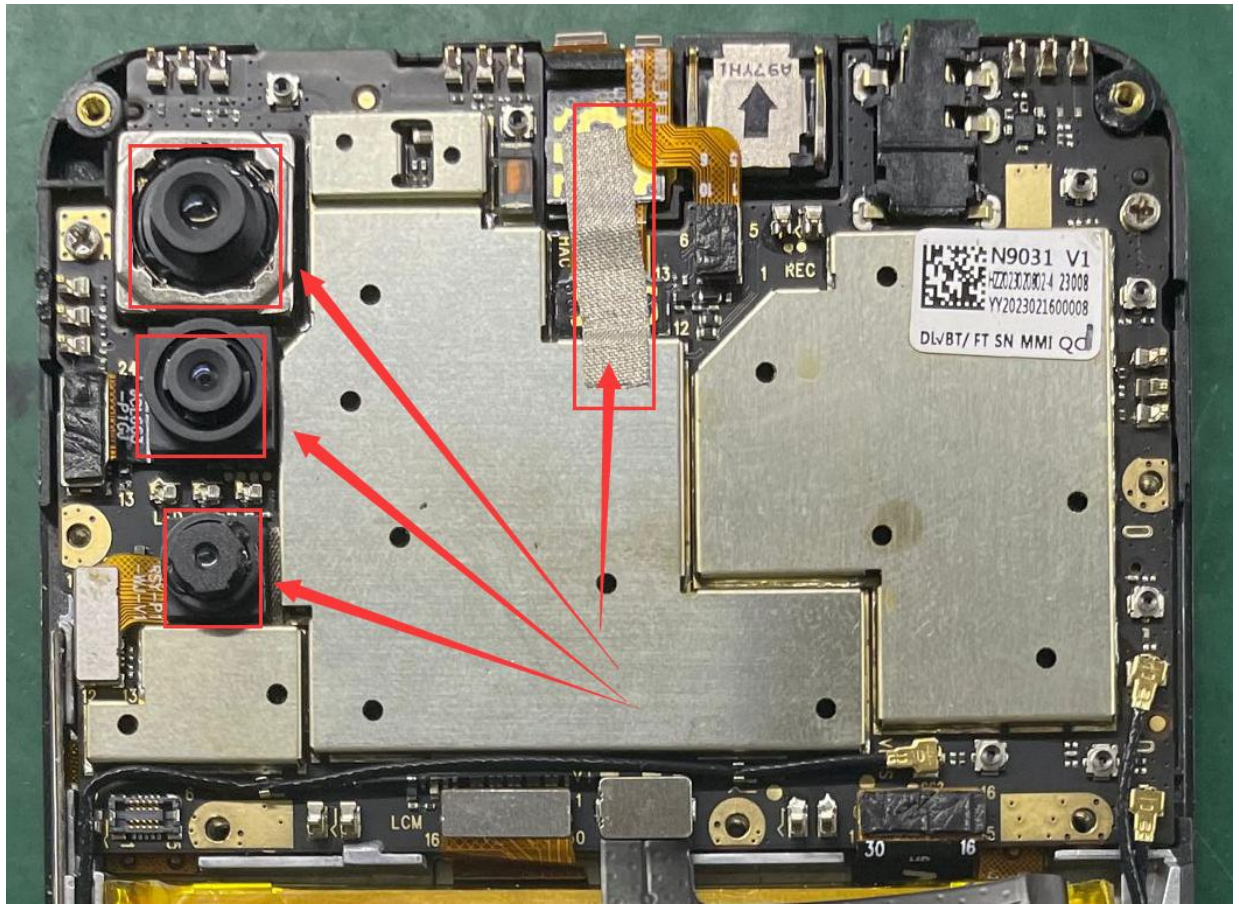
3.ANT0天线小板背面弹片和两处螺丝位接地。





环境处理

如图：所有摄像头需接地。前摄贴导电布接地，后摄贴双面导电胶接地。



总结

Conclusion

1.以上是暗室有源天线3D测试报告。

2.如有疑问，请电话联系。

Additional Notes

附加说明

01

报告中天线匹配电路是否改动，天线有关的环境处理是否增加，将直接影响天线性能，请仔细确认查看。

02

贵司如有最新试产或更新产品（如软件，**ESD**，物料等）请尽快提供我司进行验证，以确认天线性能是否有变化影响。

03

倘若贵司需要送第三方检测机构复测或客户测试，请务必先与我司进行天线相关测试确认，因主板•装配的一致性，以及天线组装的差异等因素，均可能导致天线参数的偏差。

谢谢

THANK YOU

如有疑问 请联系我们
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网址：www.mayaant.com