

深圳市玛雅通讯设备有限公司

Shenzhen Maya Communication Equipment Co., Ltd.



Antenna Specification

Material Name: M93-5G-PDA5

Material Color: natural color

Material species: DLS

Material Model: M93-5G-PDA5

Confidentiality Requirements

Shen zhen Maya Communication Equipment Co.,Ltd. Has proprietary technology related materials. Without the prior written consent of Shen zhen Maya Communication Equipment Co.,Ltd.,such materials shall not be disclosed to any individual or company.

QP02-08A

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1. The frequency band

	Frequency
5G	N2/5/12/13/25/26/30/66/38/41/77/78
4G	LTE B2/4/5/7/12/13/17/19/25/26/66/41
3G	WCDMA B2/4/5/8
2G	GSM 850/900/1800/1900
others	GPS/WIFI/BT/NFC

2. Photo



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3. Electrical performance

3.1 Test method description and data

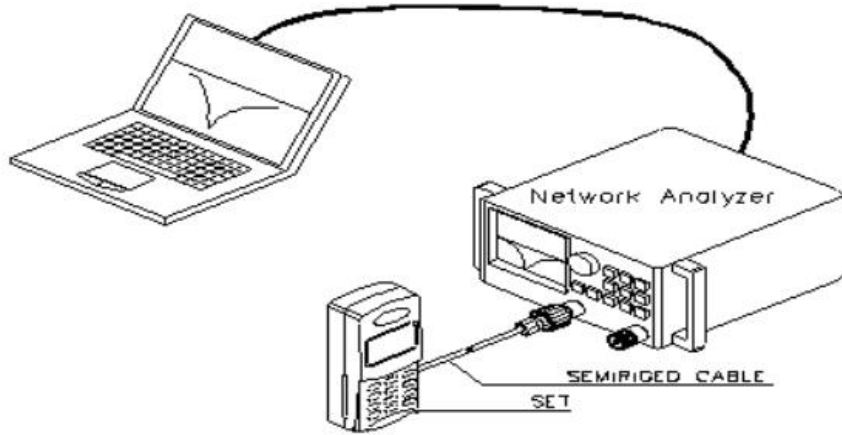
Device name	Purpose
Vector Network Analyzer	S11/Impedance/ Passive Test
Agilent 8960 SP6010 R&S CMU200	Testing of mobile communication devices for mobile phones,including GSM,GPRS,EDGE,CDMA2000,1xEV-DO, TD-SCDMA,WCDMA and HSDPA
R&S CMW500 MT8820C	Testing of mobile communication devices including TD-SCDMA, WCDMA, HSDPA, LTE, WIFI and GPS
SP9500E	Include 5G、SA、NSA
Agilent E4438C	Test activeGPS
MVG Chamber	Passive Test / OTA active Test / Efficiency/Gain

3.2 Passive Test Report

Test equipment: Network analyzer

Test method:

Connect a 50-ohm CABLE cable from the instrument's test port. After calibration with a calibration piece, connect the SMA connector of the mobile phone fixture. Record the data such as the return loss or standing wave ratio corresponding to the relevant frequency points.



测试示意图

3.3 Active Test Report

TRP/TIS

Test tools: Comprehensive tester, Network analyzer, Full-wave Field ETS, French MVG SG24LT (Satmio) Near-field 3D microwave anechoic 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: Using the test method and calculation of EST or Satimo 24LT system software TRP when conducting TRP test, the DUT (Device Under Test) is in the maximum transmission power state. Select three channels (high, medium, and low) for testing. Control the position of DUT through the positioning system, measure the effective radiation power (EIRP) at each point in the three-dimensional space with a step of 15 degrees, calculate the average value on the spherical surface by integration, and the calculation formula is as follows:

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

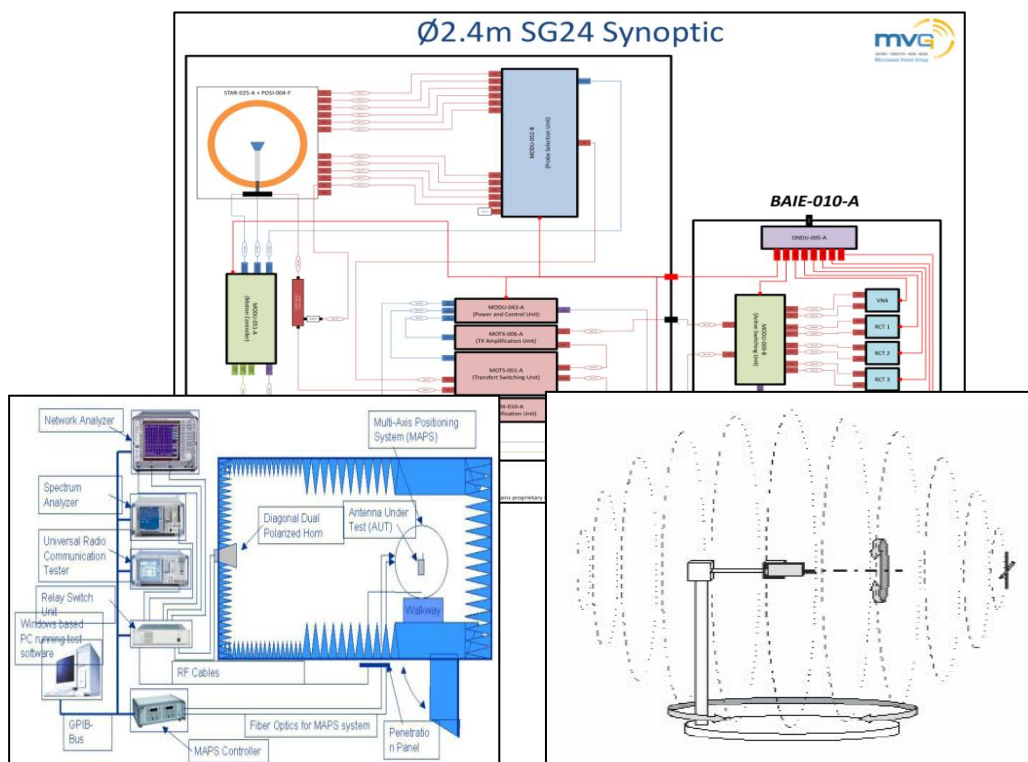
During the TIS test, the DUT is set to the maximum transmission power state. Three channels, namely high, medium and low, are selected for the test. By controlling the position of the DUT and taking a step size of 30 degrees, the receiving sensitivity at each point in the three-dimensional space is measured. The average value on the spherical surface is calculated through integration. The calculation formula is as follows:

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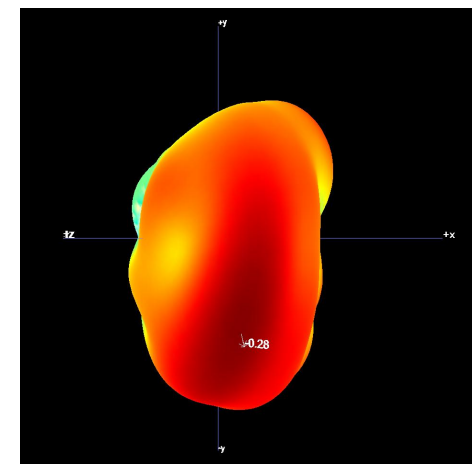
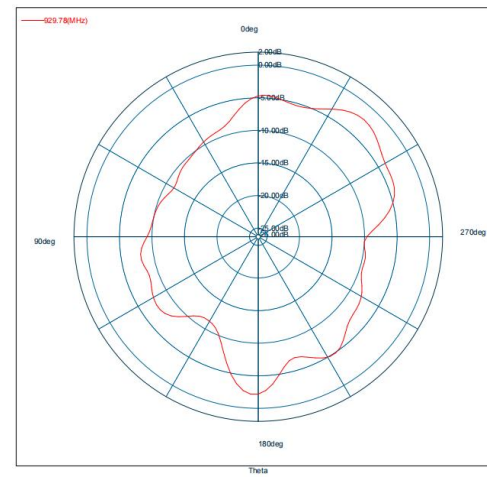
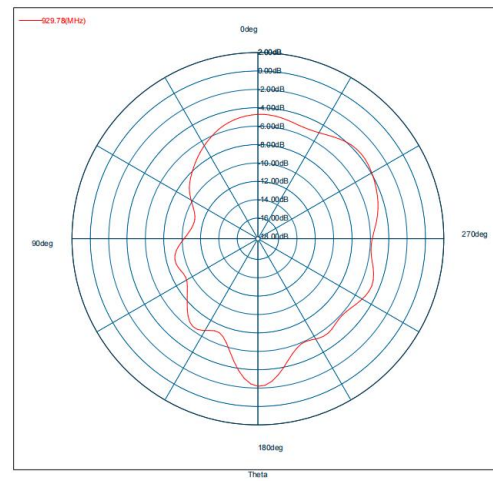
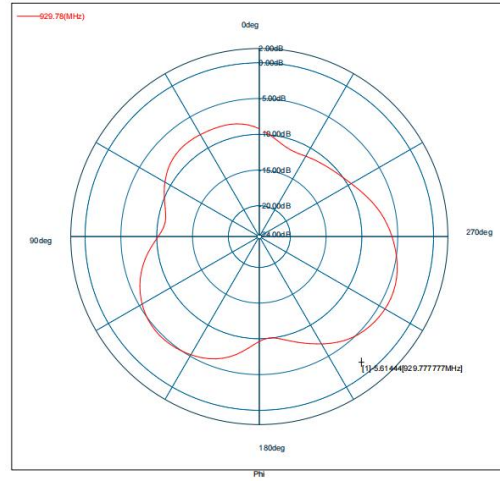
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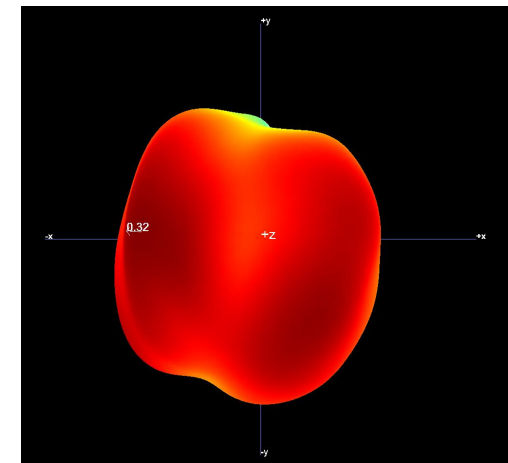
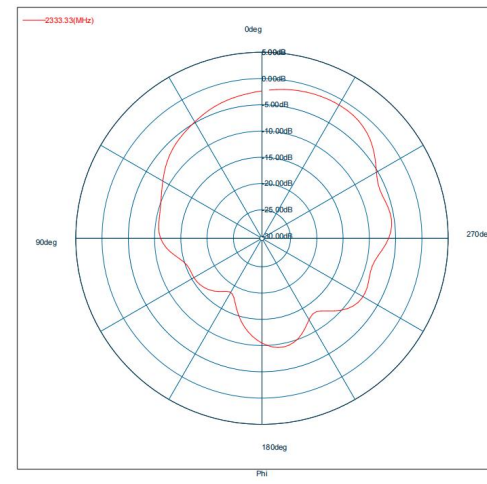
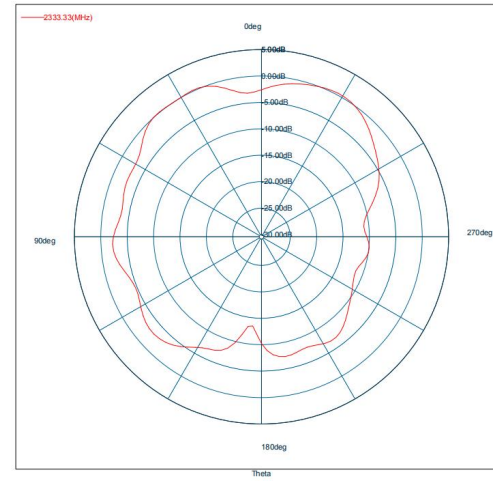
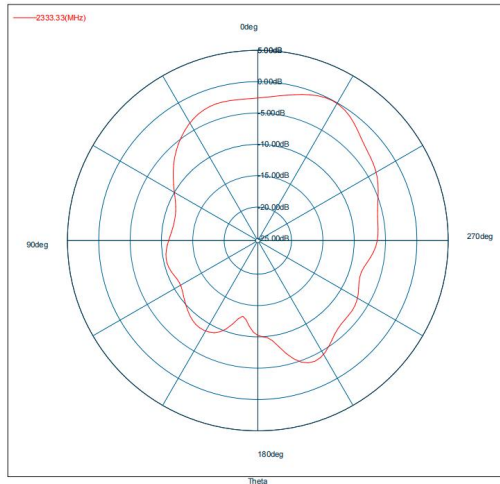
$$TIS \cong \frac{2NM}{\pi \sum_{i=1}^{N-1} \sum_{j=0}^{M-1} \left[\frac{1}{EIS_{\theta}(\theta_i, \phi_j)} + \frac{1}{EIS_{\phi}(\theta_i, \phi_j)} \right] \sin(\theta_i)}$$



ANT0 (Radiation pattern/3D Radiation pattern)

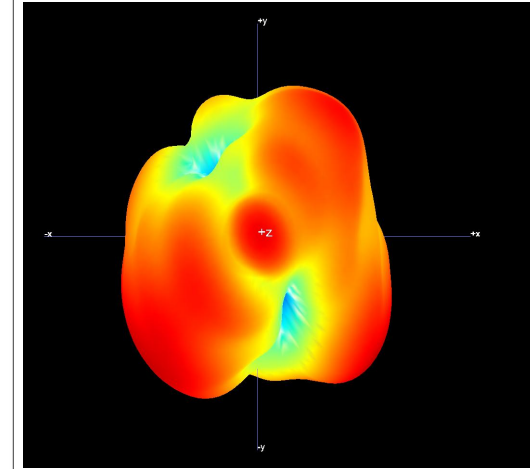
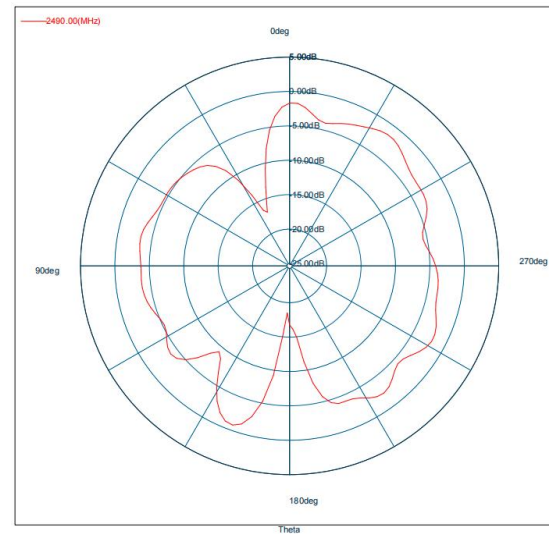
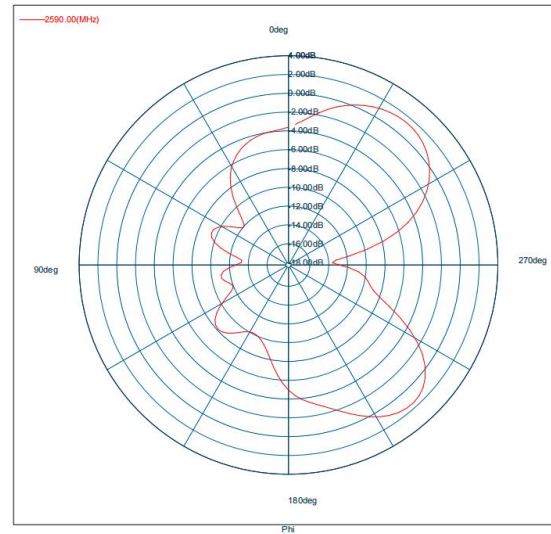
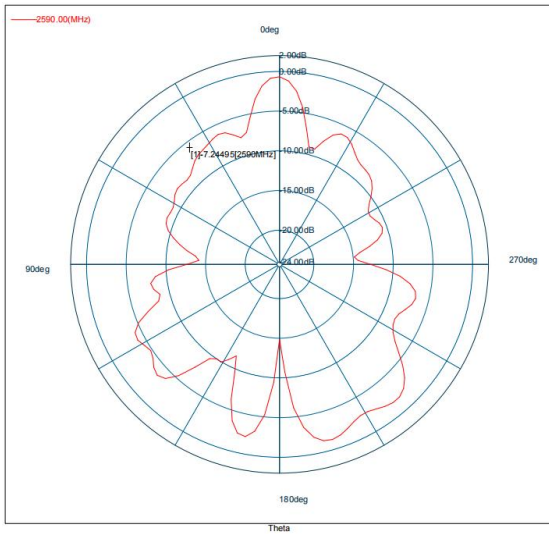


824-960

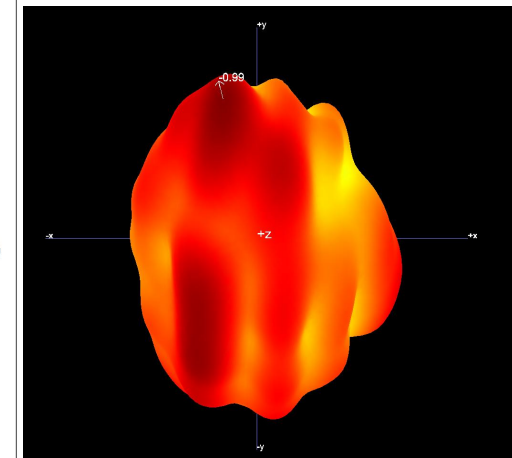
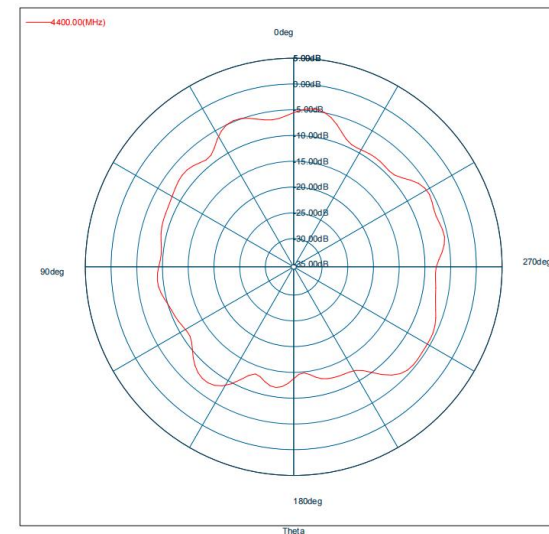
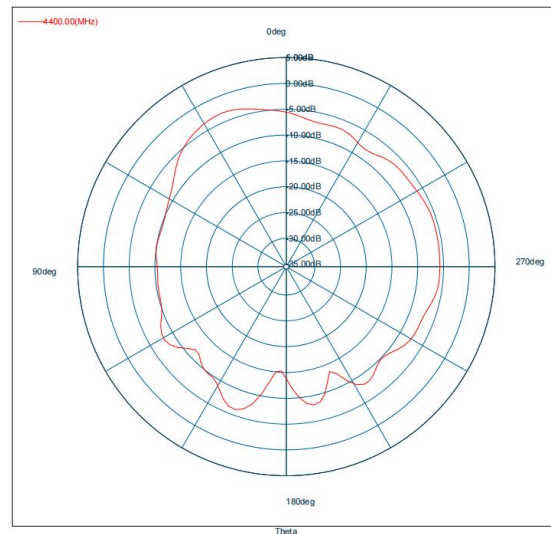
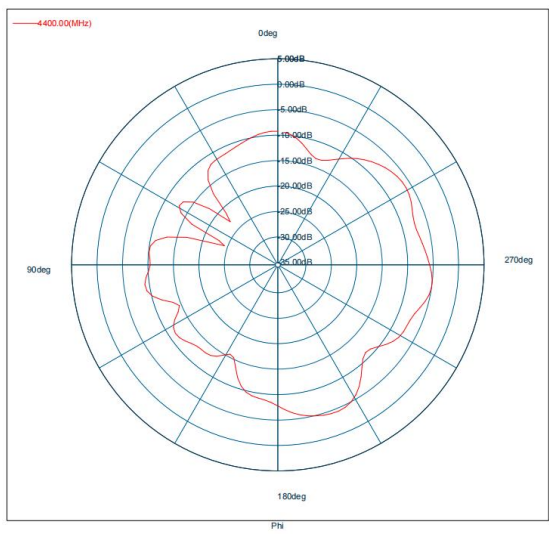


1710-2700

ANT1 (Radiation pattern/3D Radiation pattern)



2490-2690



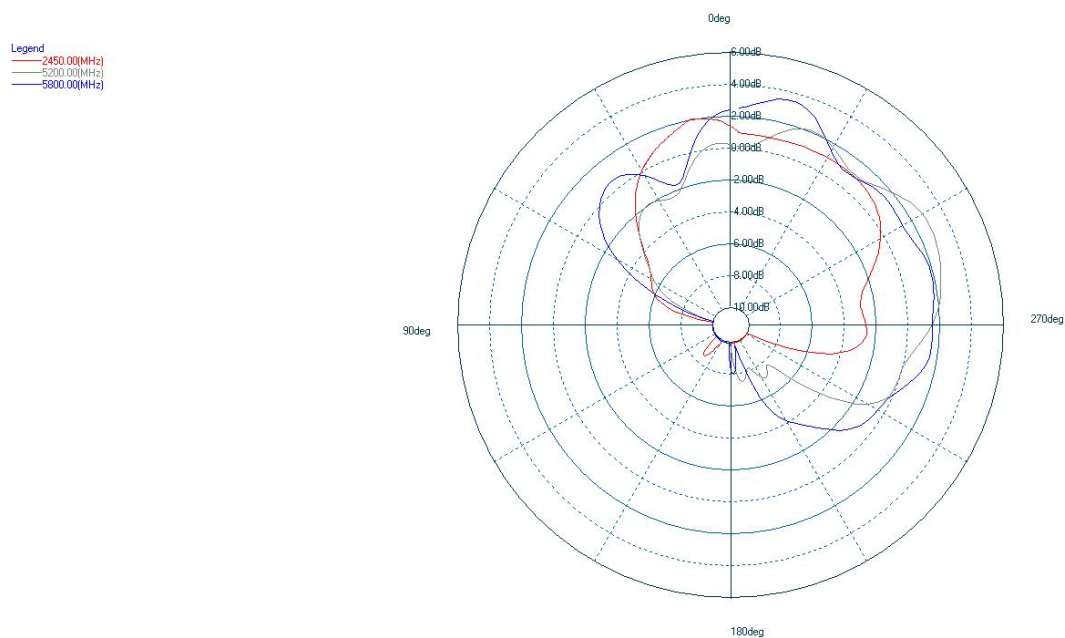
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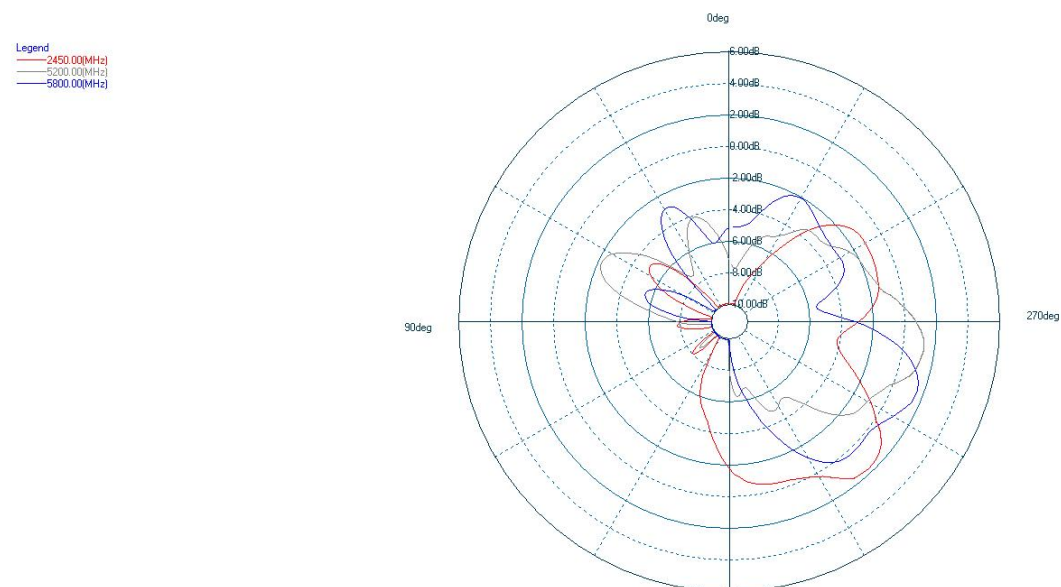
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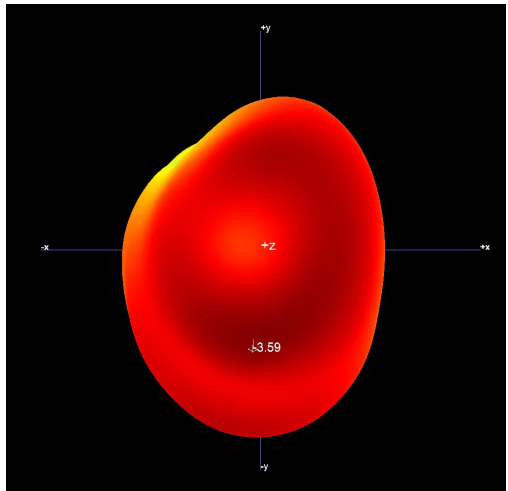
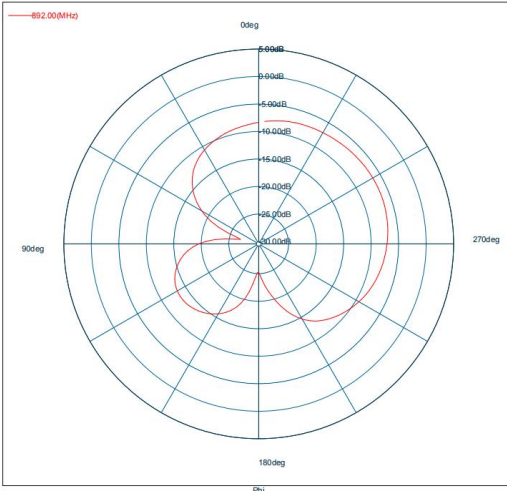
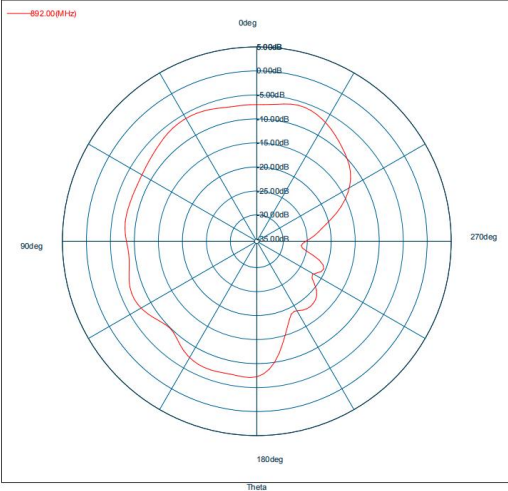
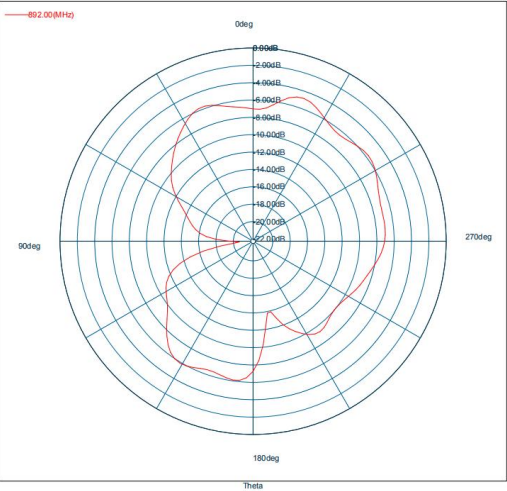
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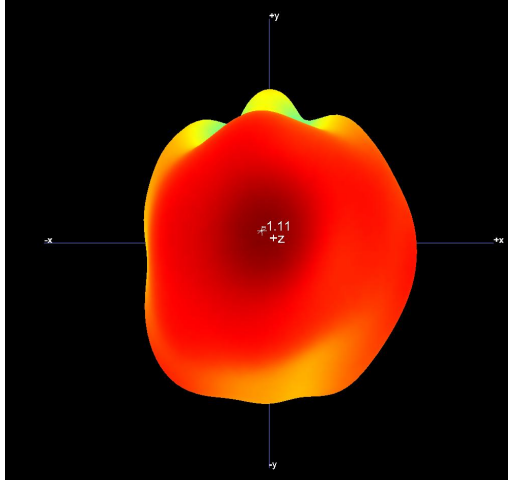
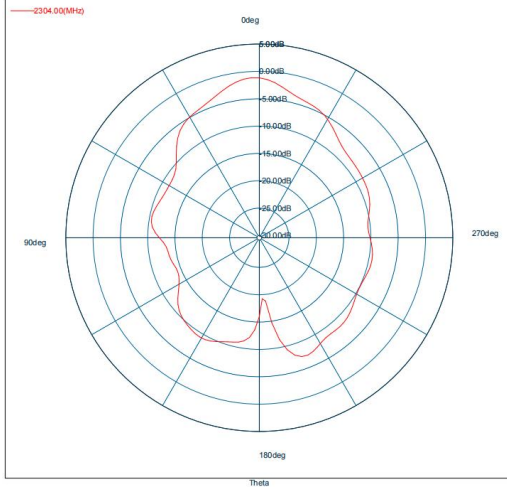
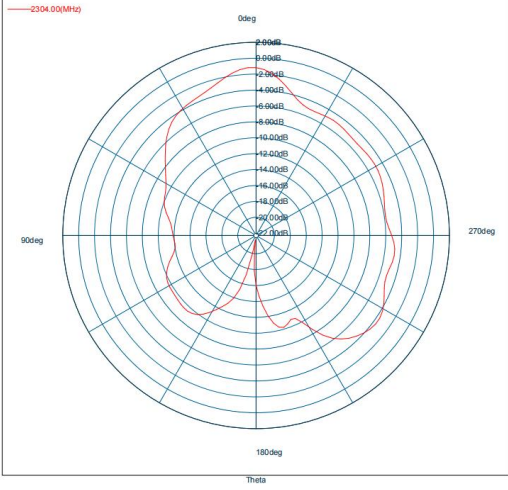
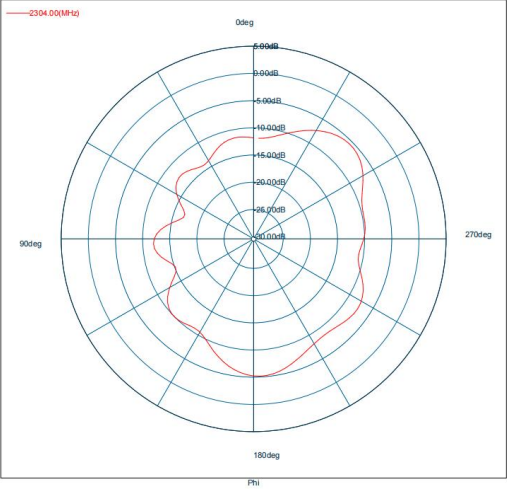
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ANT4 (Radiation pattern/3D Radiation pattern)

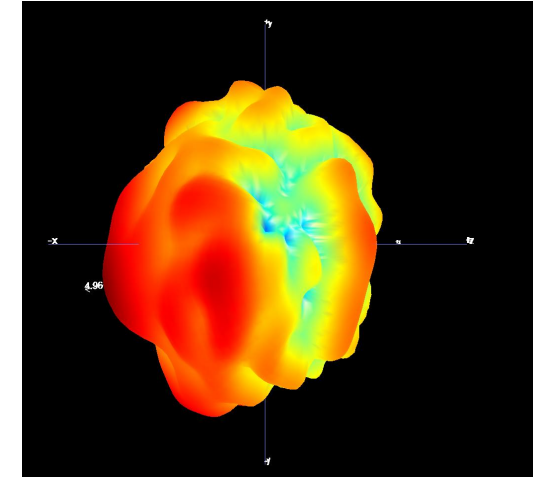
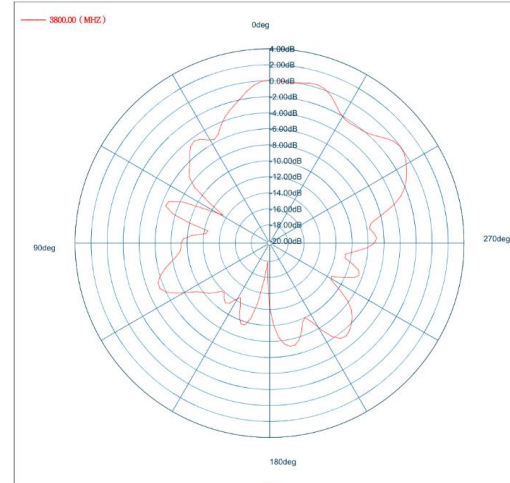
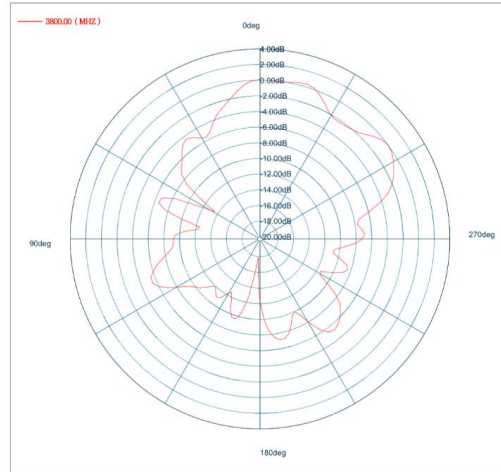
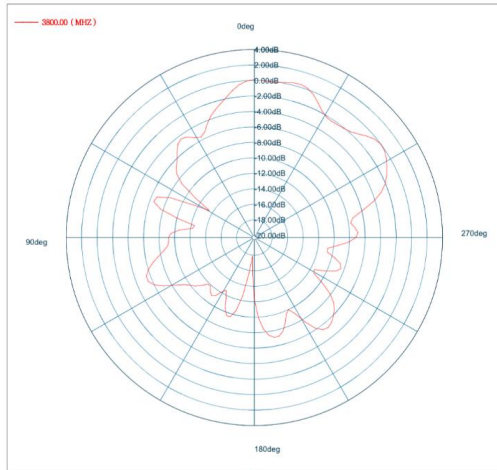


824-960



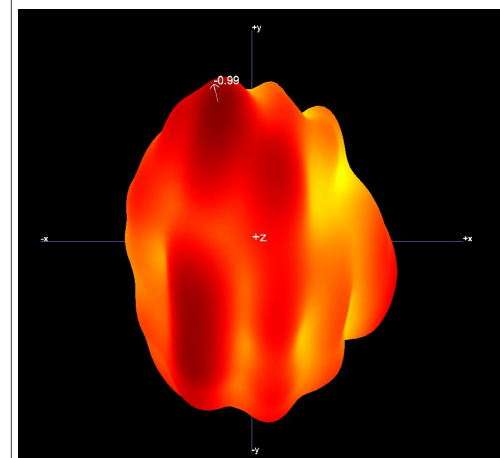
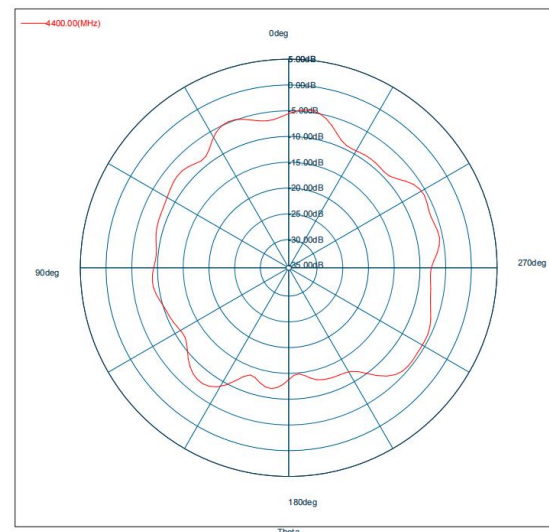
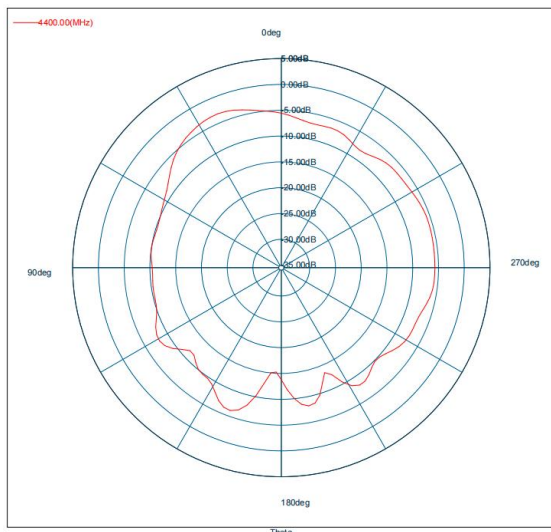
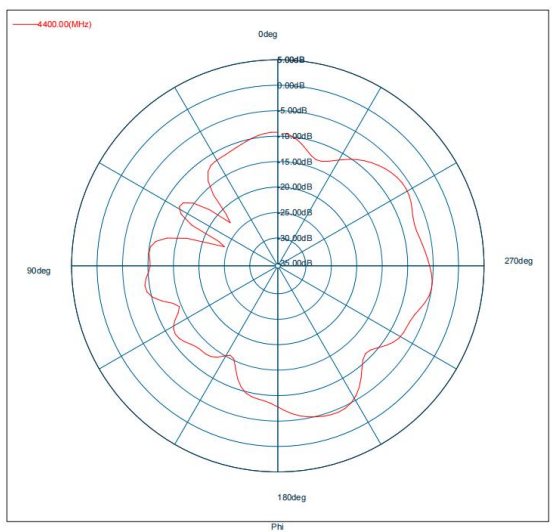
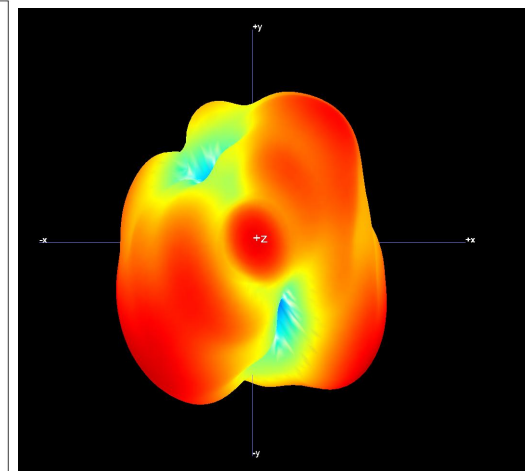
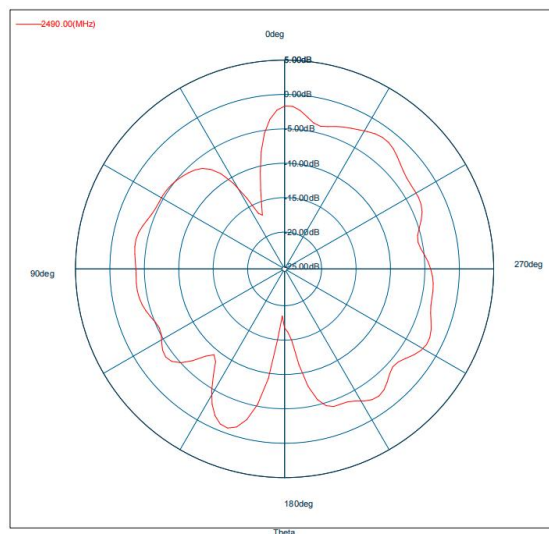
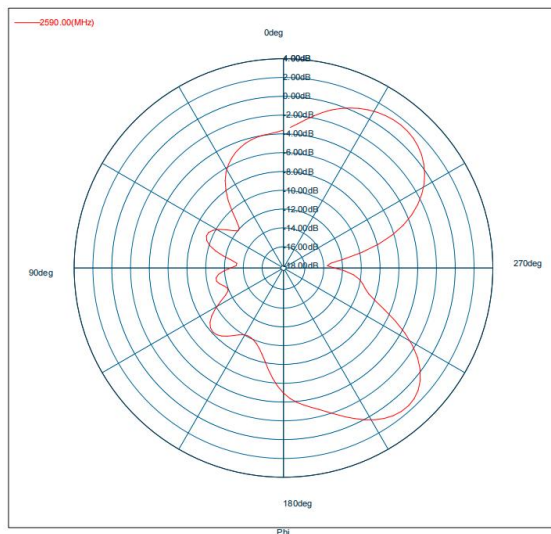
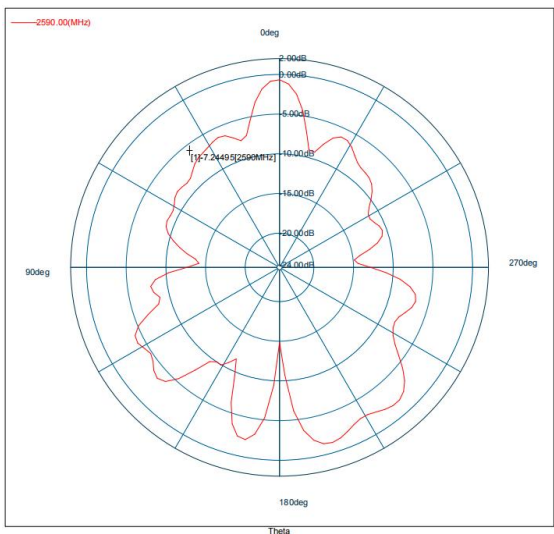
1710-2700

ANT5 (Radiation pattern/3D Radiation pattern)



3600-4200

ANT6/7 (Radiation pattern/3D Radiation pattern)



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3.4 Active OTA TRP/TIS data

1# MAIN ANT TRP (dBm)						MAIN+DIVERSITY ANT TIS (dBm)					
Band	BW (MHz)	FS (EU)	AVE	SPEC	GAP	Band	BW (MHz)	FS (EU)	AVE	SPEC	GAP
GSM850	128	25.71	26.19	24	#REF!	GSM850	128		-101.66	-100	#REF!
	192	26.36					192				
	250	26.5					250	-101.66			
GSM900	1	25.89	26.04	26	#REF!	GSM900	1		-100.65	-100.5	#REF!
	62	26.36					62				
	124	25.88					124	-100.56			
DCS1800	512	24.32	24.59	24.5	#REF!	DCS1800	512		-103.12	-101.5	#REF!
	696	24.58					696				
	885	24.88					885	-103.12			
PCS1900	512	24.33	24.57	24	#REF!	PCS1900	512		-104.40	-101	#REF!
	661	24.60					661				
	810	24.78					810	-104.4			
WCDMA-B1	L	18.32	18.09	18	#REF!	WCDMA-B1	L		-106.21	-104.5	#REF!
	M	18.30					M				
	H	17.66					H	-106.21			
WCDMA-B2	L	17.70	18.05	17.5	#REF!	WCDMA-B2	L		-107.11	-104	#REF!
	M	18.12					M				
	H	18.32					H	-107.11			
WCDMA-B4	L	17.66	17.59	17	#REF!	WCDMA-B4	L		-104.69	-104.5	#REF!
	M	17.54					M				
	H	17.56					H	-104.69			
WCDMA-B5	L	17.10	17.06	17	#REF!	WCDMA-B5	L		-104.50	-102	#REF!
	M	16.87					M				
	H	17.22					H	-104.5			
WCDMA-B8	L	16.54	16.84	17	#REF!	WCDMA-B8	L		-102.12	-102	#REF!
	M	17.20					M				
	H	16.79					H	-102.12			
FDD LTE-B1	L	19.03	18.65	17.5	#REF!	FDD LTE-B1	10MHz		-93.22	-91.5	#REF!
	M	18.8					10MHz				
	H	18.11					10MHz	-93.22			
FDD LTE-B2	L	17.36	17.52	17	#REF!	FDD LTE-B2	10MHz		-94.50	-91	#REF!
	M	17.4					10MHz				
	H	17.79					10MHz	-94.5			
FDD LTE-B3	L	17.33	17.56	17	#REF!	FDD LTE-B3	10MHz		-94.99	-91	#REF!
	M	17.69					10MHz				
	H	17.66					10MHz	-94.99			
FDD LTE-B4	L	17.22	17.53	17	#REF!	FDD LTE-B4	10MHz		-91.66	-91.5	#REF!
	M	17.69					10MHz				
	H	17.69					10MHz	-91.66			
FDD LTE-B5	L	16.56	16.69	17	#REF!	FDD LTE-B5	10MHz		-92.32	-89	#REF!
	M	16.63					10MHz				
	H	16.87					10MHz	-92.32			
FDD LTE-B7	L	18.22	18.59	17.5	#REF!	FDD LTE-B7	10MHz		-93.26	-91.5	#REF!
	M	18.56					10MHz				
	H	18.99					10MHz	-93.26			
FDD LTE-B8	L	16.30	16.64	17	#REF!	FDD LTE-B8	10MHz		-90.89	-89	#REF!
	M	16.99					10MHz				
	H	16.62					10MHz	-90.89			
FDD LTE-B12	L	16.70	16.79	17	#REF!	FDD LTE-B12	10MHz		-93.44	-88	#REF!
	M	16.88					10MHz				
	H	16.79					10MHz	-93.44			
FDD LTE-B13	L		16.60	17	#REF!	FDD LTE-B13	10MHz		-91.50	-88	#REF!
	M						10MHz				
	H						10MHz	-91.5			
FDD LTE-B17	L	17.12	16.76	17	#REF!	FDD LTE-B17	10MHz		-93.48	-88	#REF!
	M	16.49					10MHz				
	H	16.68					10MHz	-93.48			

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FDD LTE-B17	L	17.12	16.76	17	#REF!		FDD LTE-B17	10MHz		-93.48	-88	#REF!
	M	16.49						10MHz				
	H	16.68						10MHz	-93.48			
FDD LTE-B19	L	16.5	16.56	17	#REF!		FDD LTE-B19	10MHz		-93.22	-89	#REF!
	M	16.59						10MHz				
	H	16.6						10MHz	-93.22			
FDD LTE-B20	L	16.56	16.45	17	#REF!		FDD LTE-B20	10MHz		-92.03	-88	#REF!
	M	16.69						10MHz				
	H	16.1						10MHz	-92.03			
FDD LTE-B25	L	17.66	18.14	17	#REF!	同B2	FDD LTE-B25	10MHz			-91	
	M	18.21						10MHz				
	H	18.56						10MHz	-94.44			
FDD LTE-B26	L	15.7	16.47	17	#REF!		FDD LTE-B26	10MHz			-89	
	M	16.69						10MHz				
	H	17.03						10MHz	-93.32			
FDD LTE-B28	L	16.5	16.62	17	#REF!		FDD LTE-B28	10MHz		-92.89	-88	#REF!
	M	16.81						10MHz				
	H	16.56						10MHz	-92.89			
FDD LTE-B66	L	17.1	17.30	17	#REF!	B4	FDD LTE-B66	10MHz			-91.5	
	M	17.31						10MHz				
	H	17.5						10MHz	-93.88			
TDD LTE-B34	L	16.66	16.77	17	#REF!		TDD LTE-B34	10MHz		-93.21	-91	#REF!
	M	16.78						10MHz				
	H	16.87						10MHz	-93.21			
TDD LTE-B38	L	18.33	17.92	17	#REF!		TDD LTE-B38	20MHz		-92.10	-88	#REF!
	M	18.12						20MHz				
	H	17.32						20MHz	-92.1			
TDD LTE-B39	L	17.88	17.99	17	#REF!		TDD LTE-B39	20MHz		-92.13	-88	#REF!
	M	17.86						20MHz				
	H	18.22						20MHz	-92.13			
TDD LTE-B40	L	16.89	17.24	17	#REF!		TDD LTE-B40	20MHz		-92.01	-88	#REF!
	M	17.39						20MHz				
	H	17.45						20MHz	-92.01			
TDD LTE-B41	L	18.66	18.07	17	#REF!		TDD LTE-B41	20MHz		-92.11	-88	#REF!
	M	18.35						20MHz				
	H	17.21						20MHz	-92.11			

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NR -N1	L	18.69	18.23	17.5	#REF!	NR -N1	10MHz		-92.89	-91.5	#REF!
	M	18.33					10MHz				
	H	17.66					10MHz	-92.89			
NR -N2	L	18.59	18.56	17	#REF!	NR -N2	10MHz		-93.87	-91	#REF!
	M	18.69					10MHz				
	H	18.40					10MHz	-93.87			
NR -N3	L	17.10	17.41	17	#REF!	NR -N3	10MHz		-94.55	-91	#REF!
	M	17.46					10MHz				
	H	17.66					10MHz	-94.55			
NR -N5	L	17.03	17.09	17	#REF!	NR -N5	10MHz		-92.03	-89	#REF!
	M	17.22					10MHz				
	H	17.02					10MHz	-92.03			
NR -N8	L	16.87	16.95	17	#REF!	NR -N8	10MHz		-90.99	-89	#REF!
	M	17.10					10MHz				
	H	16.89					10MHz	-90.99			
NR -N12	L	16.88	16.92	17	#REF!	NR -N12	10MHz		-92.78	-88	#REF!
	M	17.01					10MHz				
	H	16.88					10MHz	-92.78			
NR -N13	L	16.78	16.78	17	#REF!	NR -N13	10MHz		-91.13	-88	#REF!
	M	16.78					10MHz				
	H	16.78					10MHz				
NR -N25	L	18.33	17.97	17	#REF!	NR -N25	10MHz		-94.22	-91	#REF!
	M	17.69					10MHz				
	H	17.88					10MHz	-94.22			
NR -N26	L	16.6	16.99	17	#REF!	NR -N26	10MHz		-93.41	-89	#REF!
	M	17.23					10MHz				
	H	17.15					10MHz	-93.41			
NR -N28	L	16.56	16.82	17	#REF!	NR -N28	10MHz		-92.89	-88	#REF!
	M	17.12					10MHz				
	H	16.78					10MHz	-92.89			
NR -N30	L	17.12	17.30	17	#REF!	NR -N30	10MHz		-92.46	-88	#REF!
	M	17.32					10MHz				
	H	17.45					10MHz	-92.46			
NR -N66	L	18.12	18.29	17	#REF!	NR -N66	10MHz		#DIV/0!	-91.5	#REF!
	M	18.32					10MHz				
	H	18.44					10MHz				
NR -N38	L	18.45	17.88	18	#REF!	NR -N38	20MHz		#DIV/0!	-88	#REF!
	M	17.98					20MHz				
	H	17.22					20MHz	-92.33			
NR -N41	L	21.33	21.17	18	#REF!	NR -N41	100MHz		-87.02	-88	#REF!
	M	21.40					100MHz				
	H	20.79					100MHz	-87.02			
NR -N77	L	19.66	19.87	18	#REF!	NR -N77	100MHz		-87.21	-88	#REF!
	M	20.31					100MHz				
	H	19.65					100MHz	-87.21			
NR -N78	L	20.03	20.38	18	#REF!	NR -N78	100MHz		-88.10	-88	#REF!
	M	21.10					100MHz				
	H	20.01					100MHz	-88.1			

		1#	
WIFI2.4	CH	TRP	TIS
B	1	14.88	
	7	14.75	
	11	14.32	-82.54
WIFI5.8	CH	TRP	TIS
A	36	13.05	
	149	15.22	
	165	15.64	-72.55
GPS	cn	40.66	
	tis	-154.25	

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4. Antenna Gain

			Wifi0	Band	Gain
GSM	Band	Gain	Wifi0	2400~2483.5	2.1
	850	-3.66		5150~5250	3
	900	-2.22		5250~5350	2.94
	1800	0.8		5470~5725	2.53
	1900	1.1		5725~5850	3
WCDMA	B1	0.9	Wifi1	2400~2483.5	1.9
	B2	1.1		5150~5250	1.8
	B4	0.8		5250~5350	1.32
	B5	-3.66		5470~5725	1.54
	B8	2.22		5725~5850	1.85
LTE	B1	0.9	LTE	B26	-3.46
	B2	1.1		B28	-4.03
	B3	0.8		B66	0.75
	B4	0.8		B34	0.8
	B5	-3.66		B38	2.2
	B7	1.63		B39	0.9
	B8	2.22		B40	0.88
	B12	-4.22		B41	2.2
	B13	-4.01			
	B17	-4.26			
	B19	-3.58			
	B20	-3.30			
	B25	1.08			
5G	N1	0.9	5G	N28	-4.03
	N2	1.1		N30	0.88
	N3	0.8		N66	0.75
	N5	-3.66		N38	2.2
	N8	-3.66			
	N12	-4.22		N41	2.2
	N13	-4.01		N77	1.8
	N25	1.08		N78	1.82
	N26	-3.46			

ANT

E2

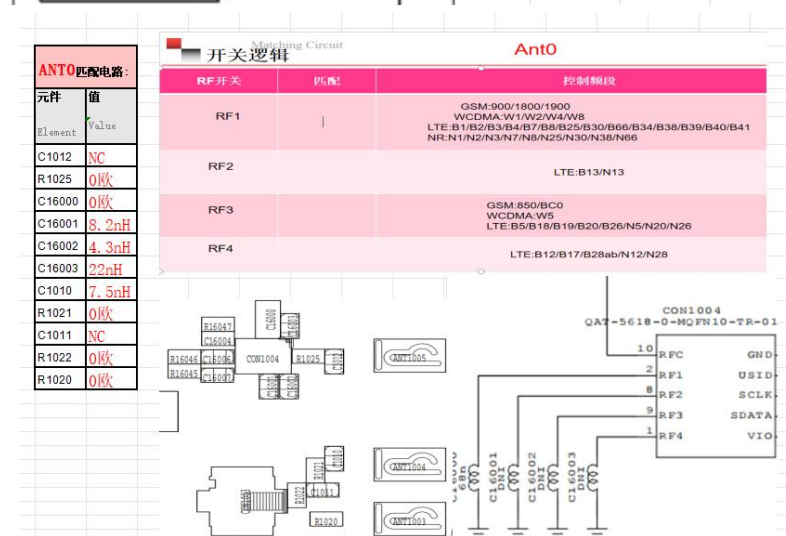
E1

E3

E4

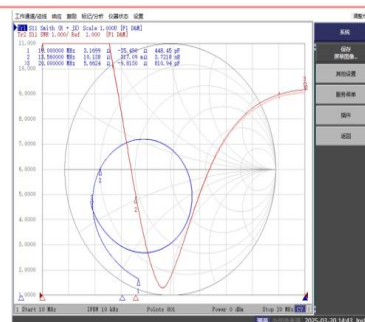
RF Module

ANT3 匹配电路:	
元件	值
Element	Value
R17025	1.5nH



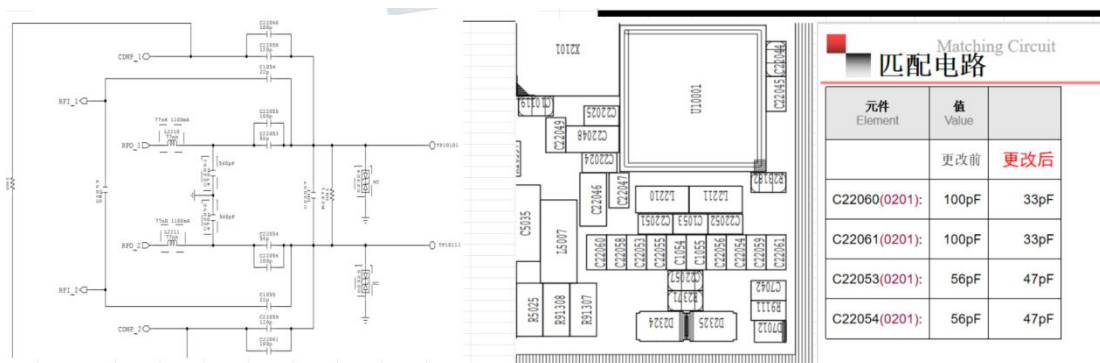
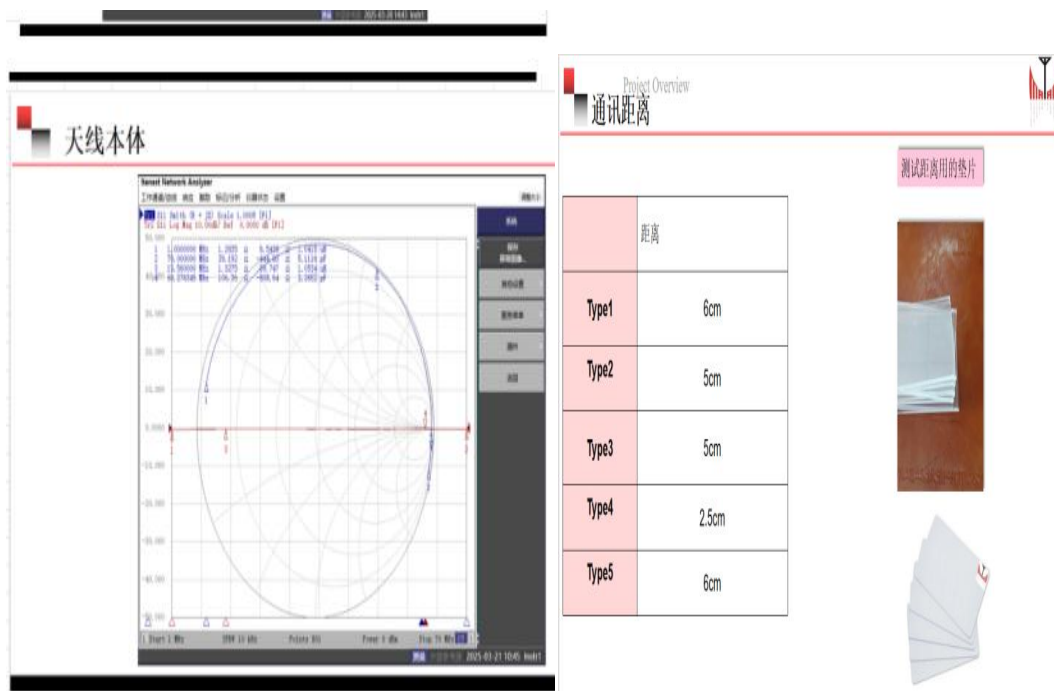


Reading Distance	(Measurement Tolerance-0.2)
C Forum Type 1 (*)	3.0~2.8 cm
C Forum Type 2 (*)	3.0~2.8 cm
C Forum Type 3 (*)	1.5~1.3 cm
C Forum Type 4 (*)	1.5~1.3 cm



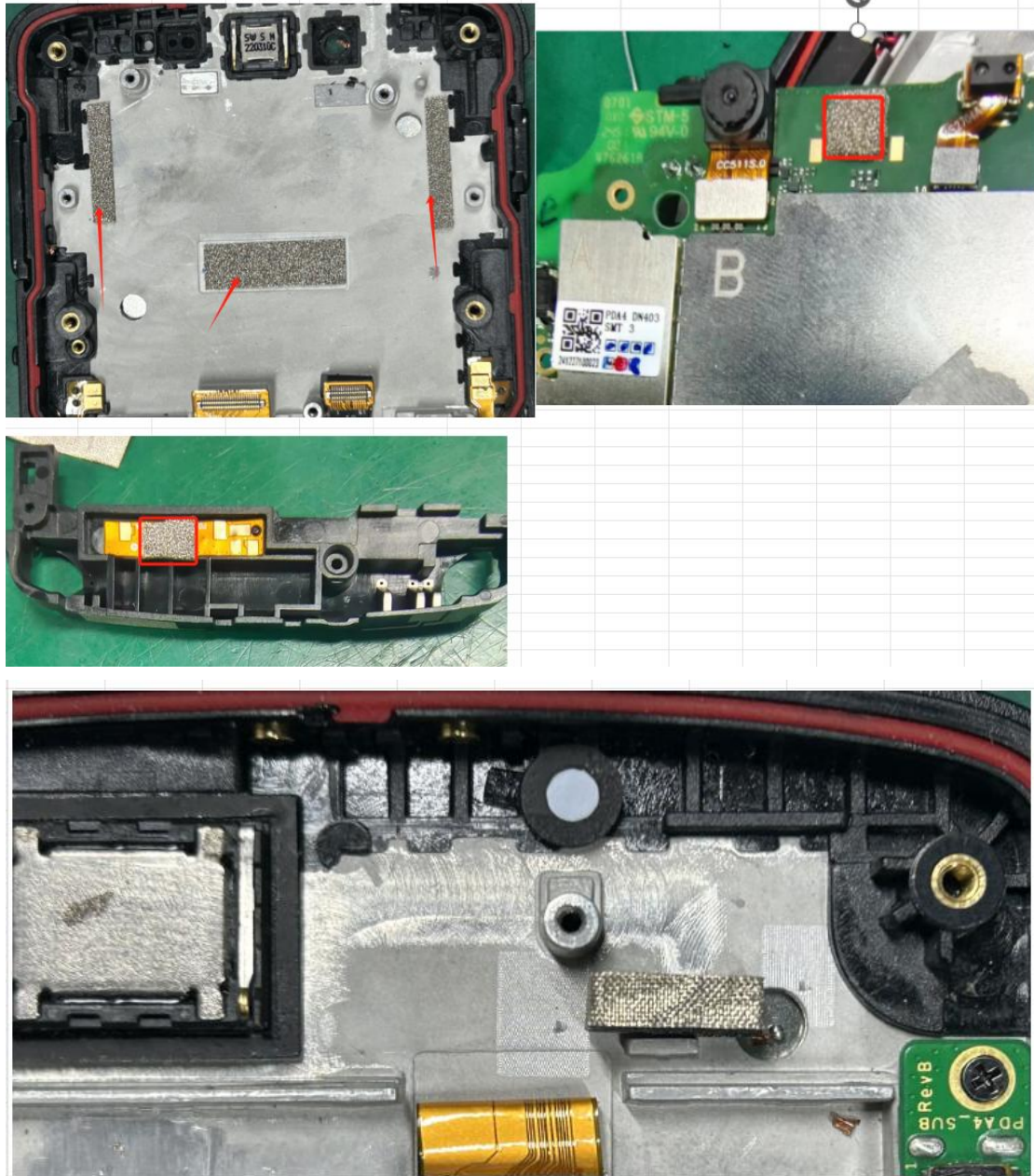
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Shenzhen Maya Communication Equipment Co., Ltd.

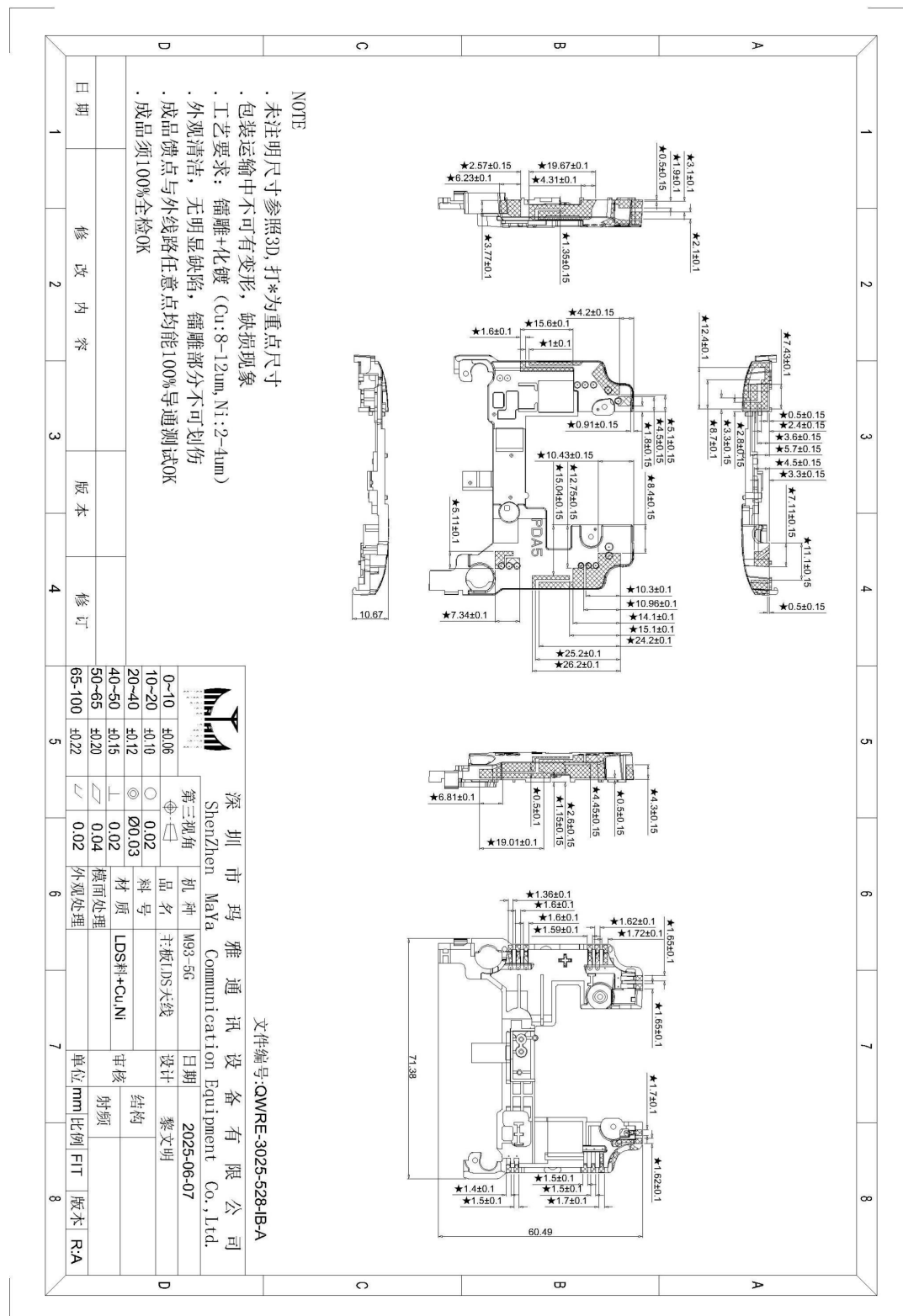




6. Environment Treatment

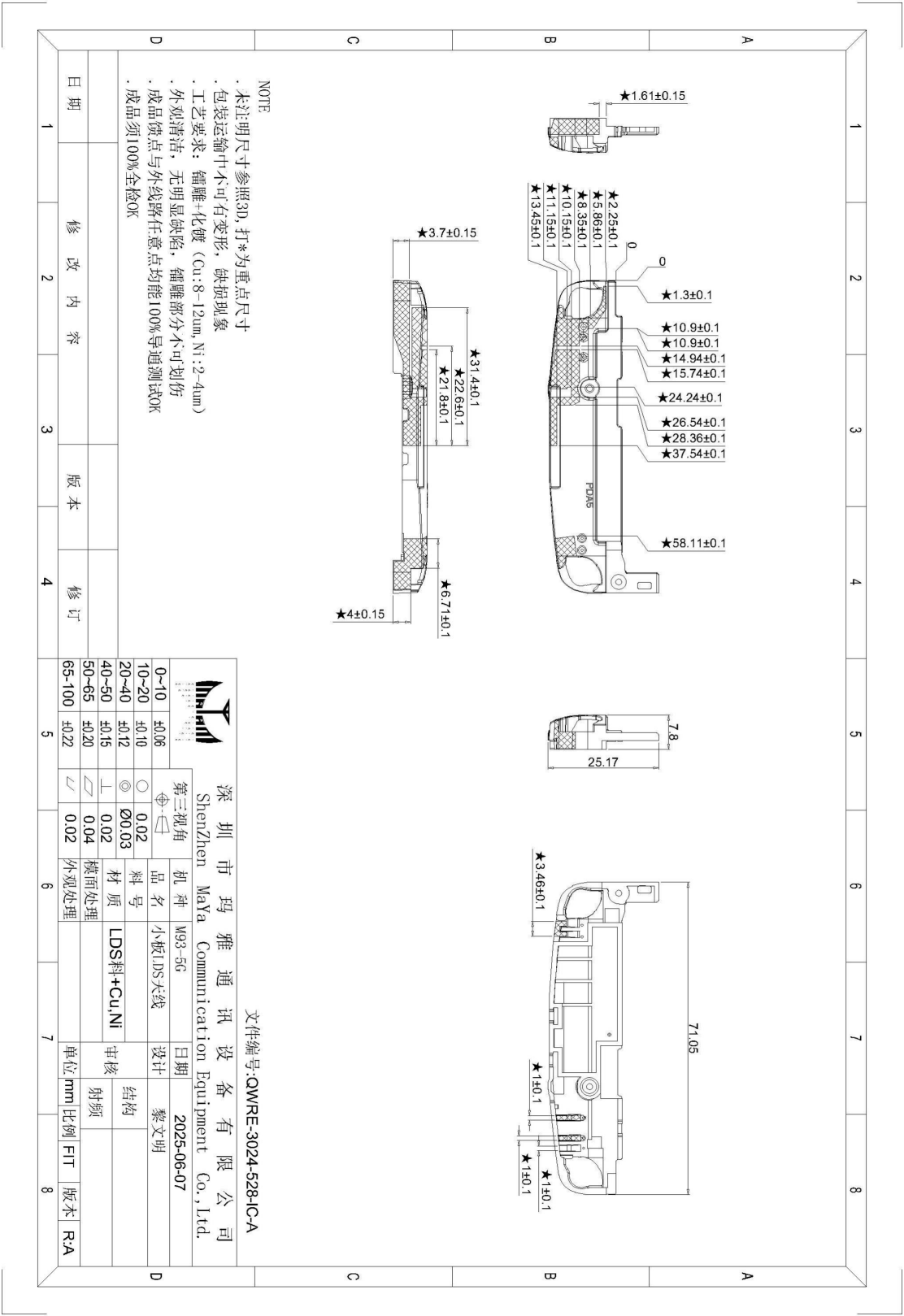


17



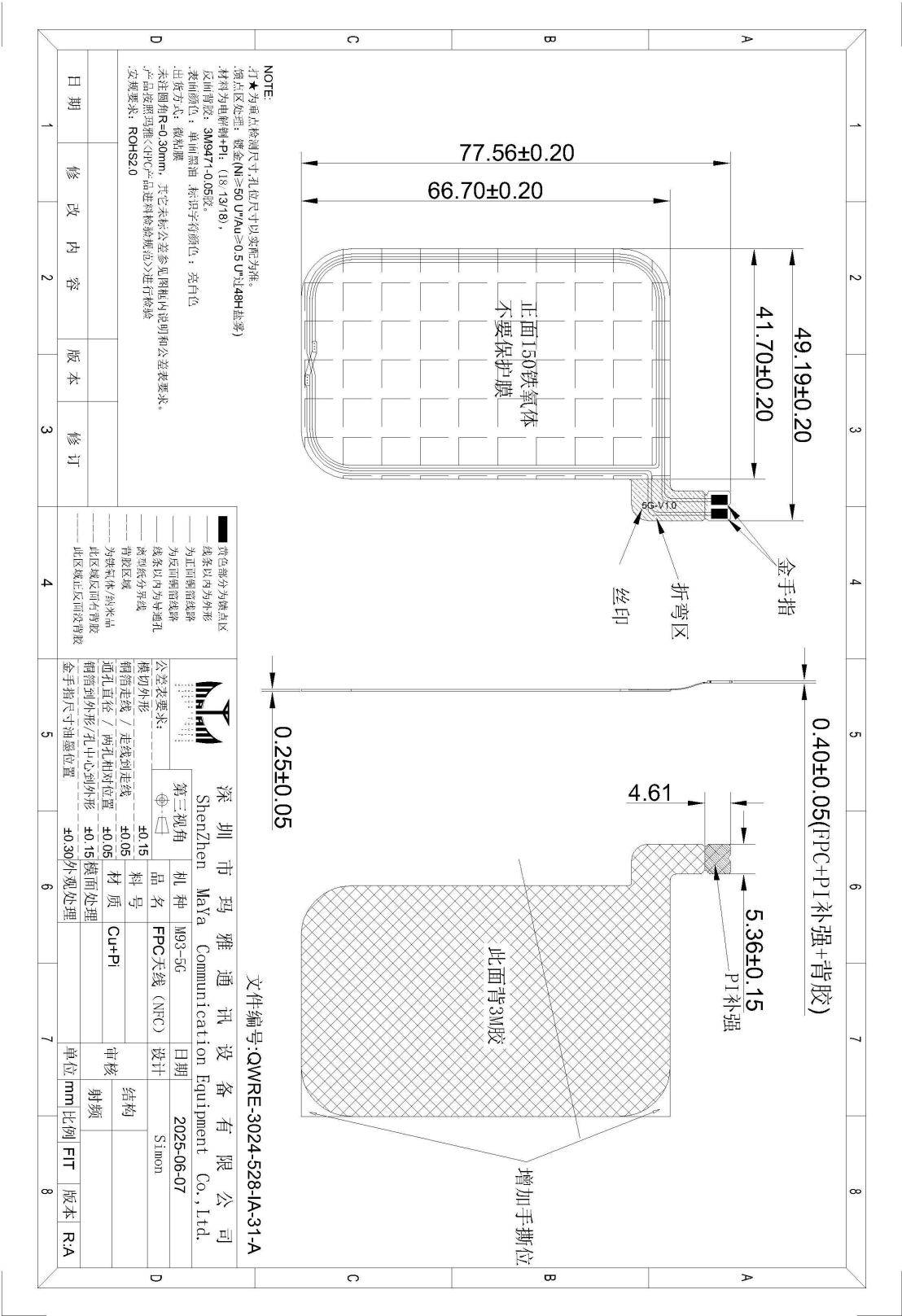
深圳市玛雅通讯设备有限公司

ShenzhenMayaCommunicationEquipmentCo.,Ltd.



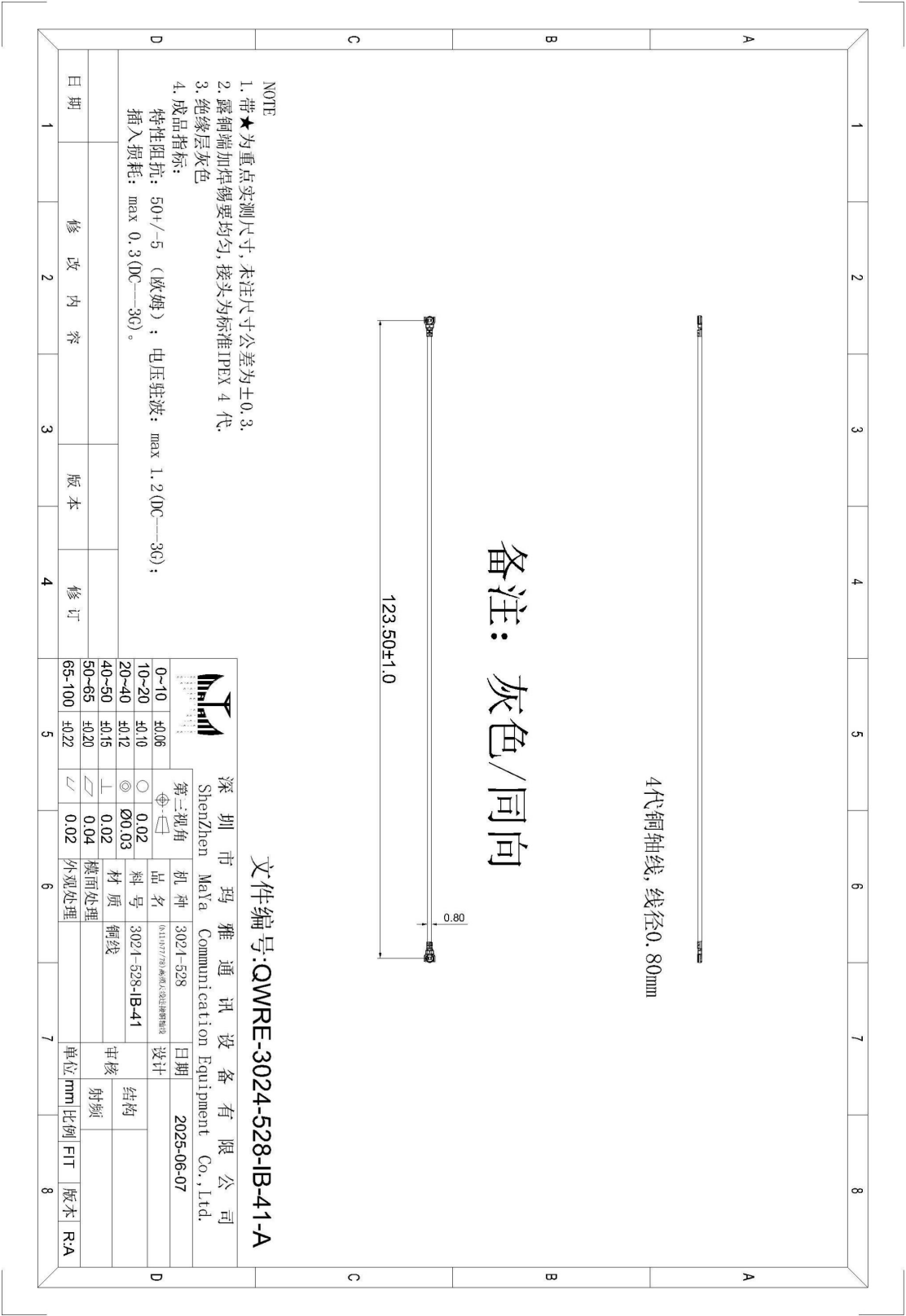
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8. NFC



天线参数

Antenna parameters

Antenna parameters Value

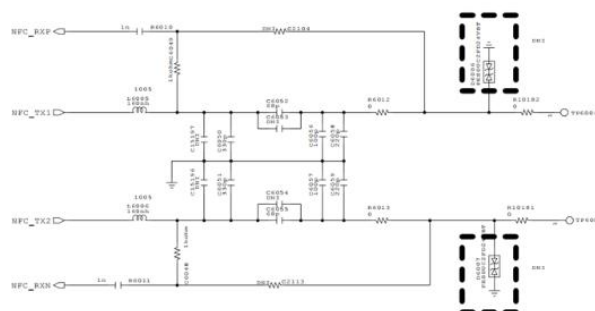
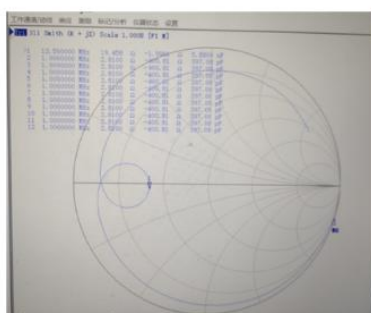
天线参数	值
length 长	66.5mm
Width 宽	41.5mm
铁氧体厚度 The thickness of ferrite	0.12mm



Active Report

电路/无源驻波

Circuit / Passive Standing Wave



深圳市玛雅通讯设备有限公司

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Active Report

NFC

位号 Element	值 Value	值 Value
0402	更改前	更改后
C6051/C6050	330PF	680pF
C6052/C6055	68PF	39pF
C6053/C6054	68PF	NC
C6057/C6056	NC	18pF
C6059/C6058	220PF	47PF

Project Overview

通讯距离 communication distance

目前测不了卡距。

测试距离用的垫片

The gasket used for communication distance

	距离 distance
Type1	4.5cm
Type2	4.5cm
Type3	4cm
Type4	2.2cm
Type5	4.5cm