

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

Recognition book SPECIFICATION FOR APPROVAL

Name: 4G(LTE)+ WIFI/BT+GPS Antenna

temNo:4G-TYY-TX4509-6;4G-TYY-TX2010-1;WIFI-TYY-TX2808;GPS-TYY-TX3508-GPS

Custoer name: Hangzhou Rongmeng Intelligent Technology Co. LTD

Company stamp:_____

A sample signature

ENGINEERING DEPARTMENT	Q C DEPARTMENT	SALES DEPARTMEN T
Miketang	jake	fanny

Customer acknowledges the signature

ENGINEERING DEPARTMENT	Q C DEPARTMENT	PURCHASING DEPARTMENT

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

1、Specifications

The report provides a test of the electrical performance parameters of the antenna, which is a science and technology model.

4G-TYY-TX4509-6;4G-TYY-TX2010-1;WIFI-TYY-TX2808;GPS-TYY-TX3508-GPS

WIFI Built in antenna,WIFIAntenna is made bycopper pipe+RF Line composition。

(As follows 1 Shown)

TYY-TX2008 The antenna characteristics

The finished product features

电 性 能 指 标		Electrical Specifications	
频率范围	2400-2500MHZ	Frequency Range	2400-2500MHZ
电压驻波比	≤2.0	VSWR	≤2.0
增益	3.01DBI	GAIN	3.01DBI
输入阻抗	50 Ω	Input Impedance	50 Ω
机 械 指 标		Mechanical Specifications	
天线颜色	黑色	Antenna Color	BLACK
接口形式	IPEX-3	Input connector	IPEX-3
线长度	70mm	Cable length	70mm
工作温度	-40℃~+85℃	Working Temperature	-40℃~+85℃
工作湿度	20~80%	Working Humidity	20~80%

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

Chart 1 TYY-TX4509-6 Product size

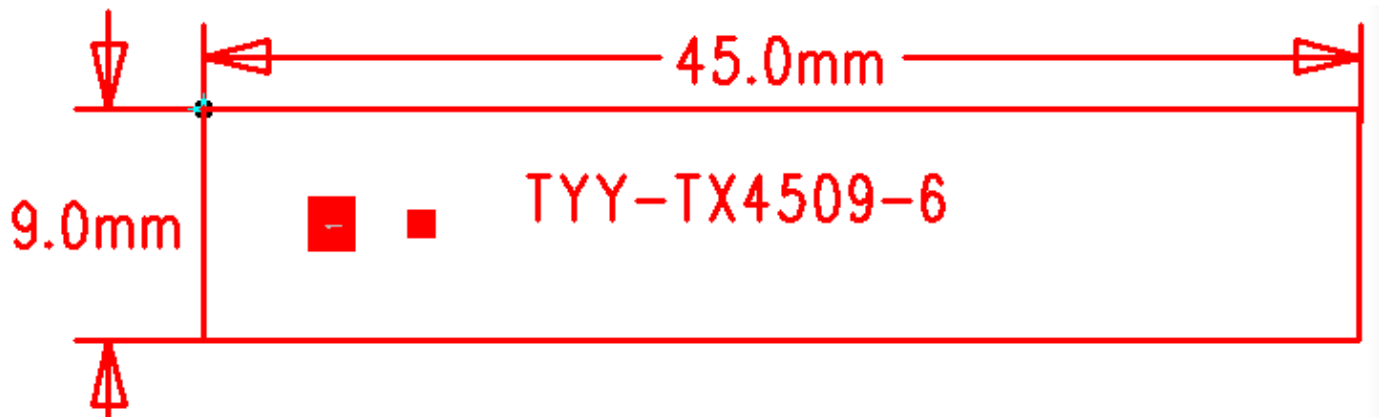
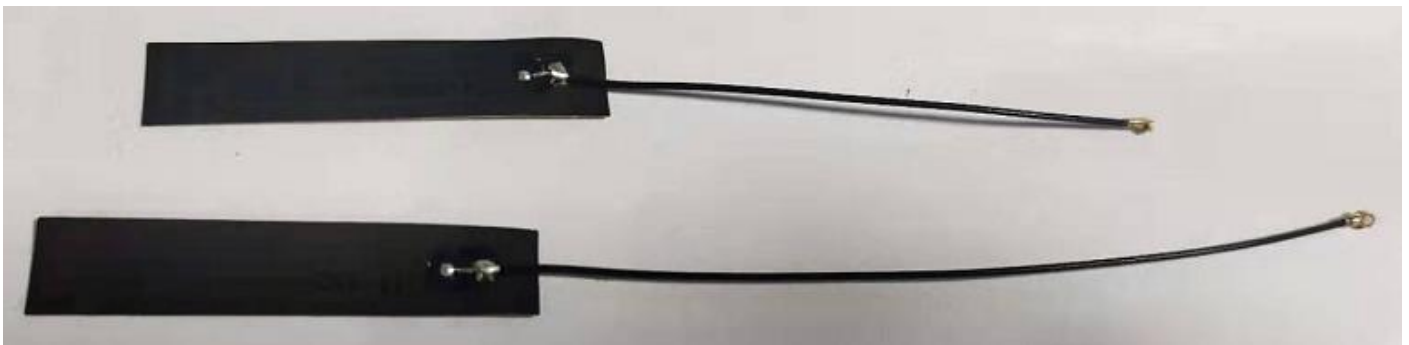


Chart 2 TYY-TX4509-6 Antenna finished



(Total length is 60mm and 90mm/+2mm, 4 IPEX)

Chart 3 Tx2010-1 ANTENNA 4G sub-antenna sizediagram

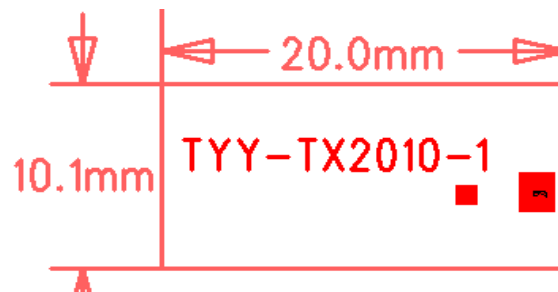


Chart 4 TYY-TX2010-1 Antenna finished

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609



(Total length is 60mm and 90mm/+2mm, 4 IPEX)

Chart 5 TYY-TX2808 Product size

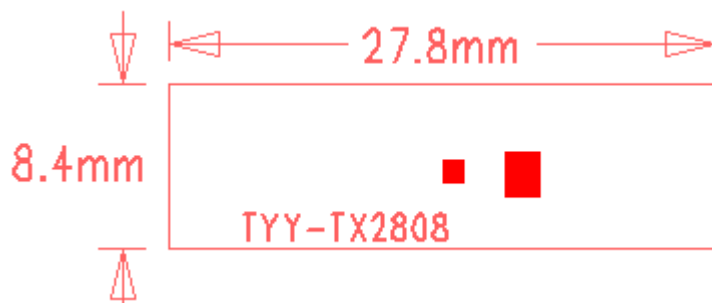


Chart 6 TYY-TX2808 Antenna finished



(Line length 90+/-2mm, The other end with the 4 IPEX)

Chart 7 TYY-TX3508-GPS Product size

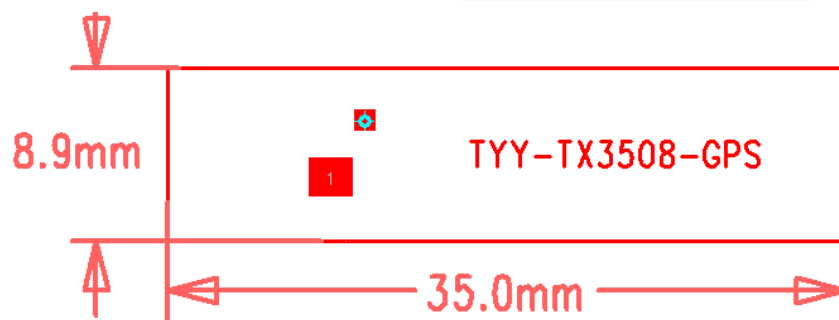


Chart 8 TYY- TX3508-GPS Antenna finished

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

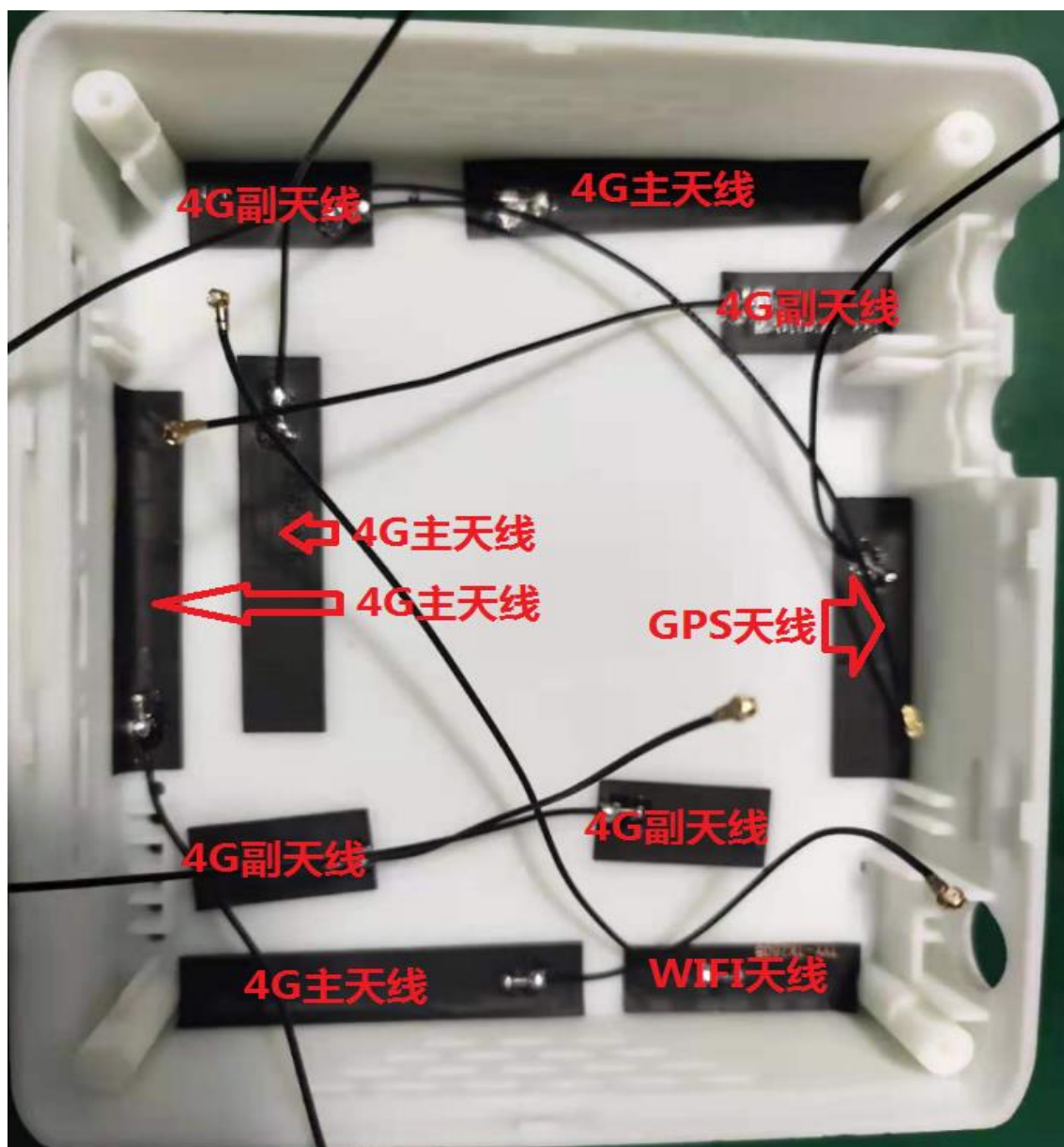
Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609



(Line length 90+/-2mm, The other end with the 4 IPEX)

Chart 9 Assembly drawing (4G primary and secondary antenna and WIFI+GPS antenna)



Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

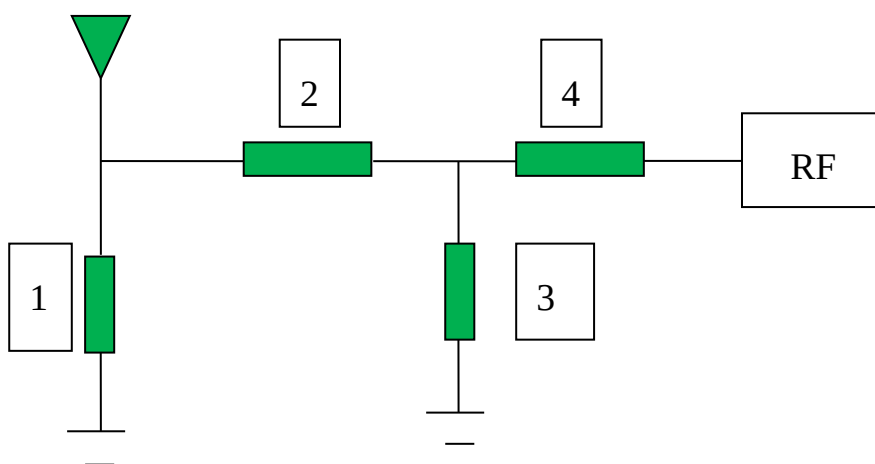
Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

2. Electrical properties

2.1WIFI Antenna matching circuit

This item matching circuit is provided by the customer.



Element number	1	2	3	4
WIFI optimum	NC	2.2nH	NC	
Original (spare)	50 ohm matching (inductance capacitance / sunlord Darfon)			

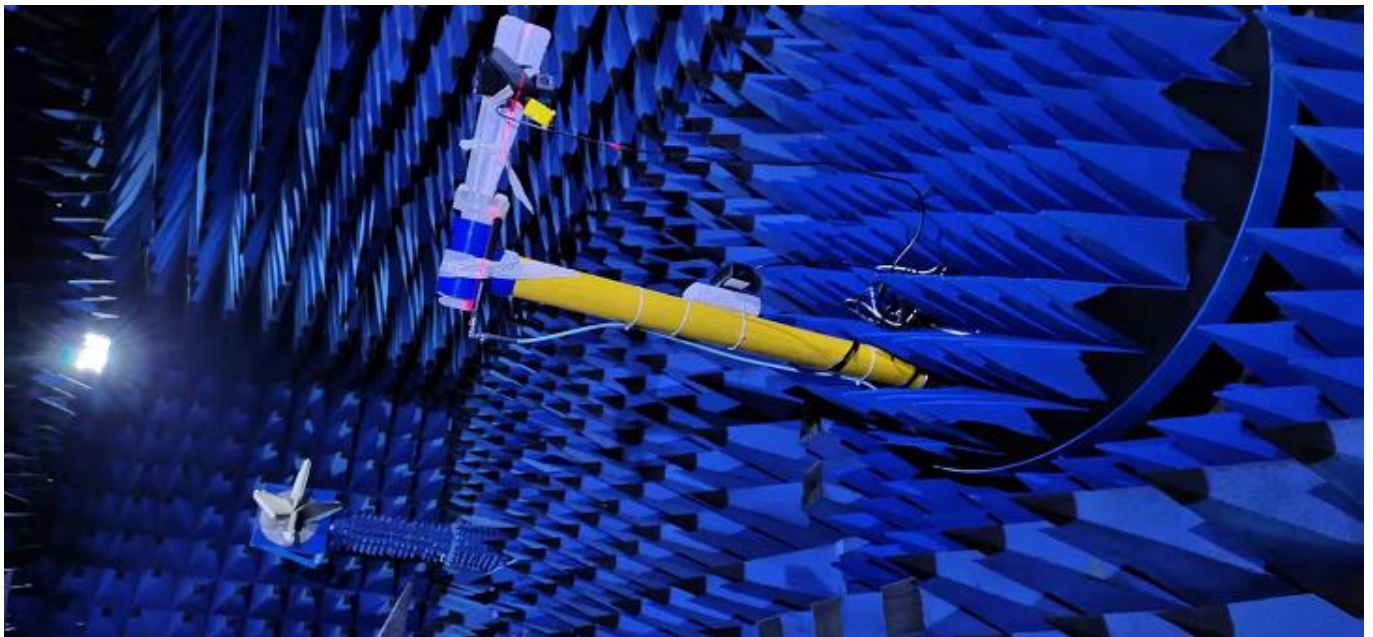
Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

Chart 10 OTA Microwave dark room



Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

Chart 11 The test environment

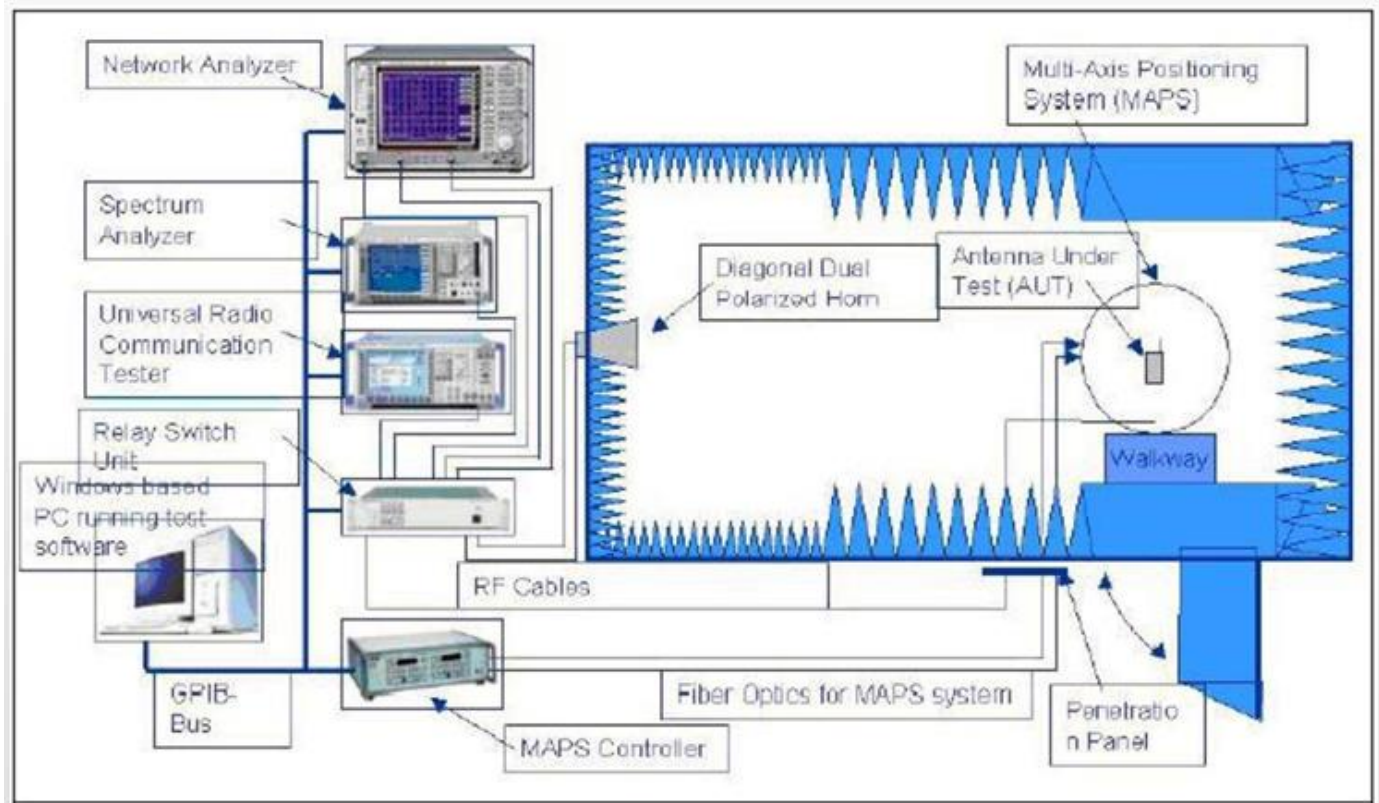
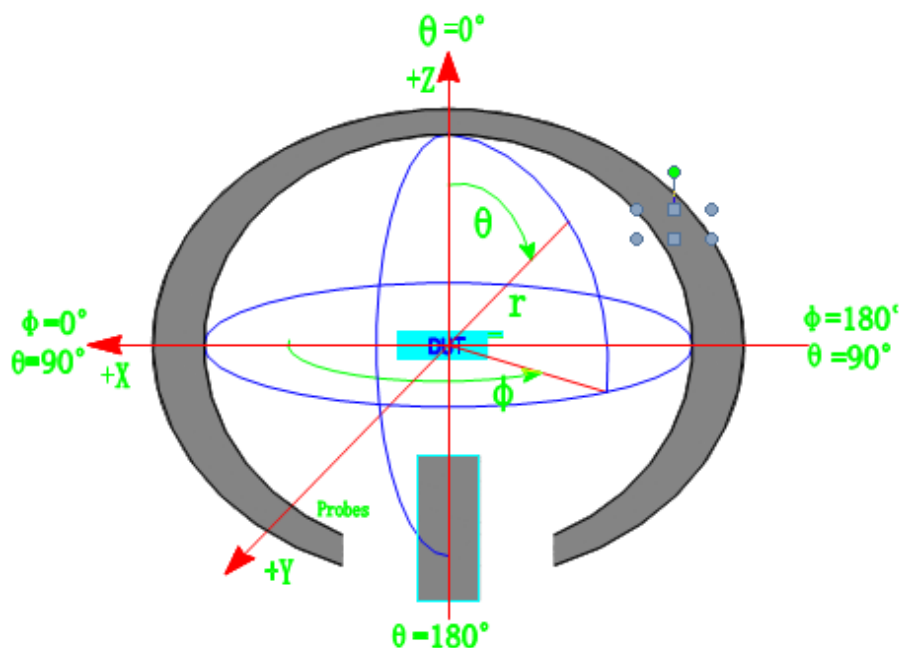


Chart 12 Return loss



Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

2.3 Bobbi (VSWR) test

2.3.1. Test setup

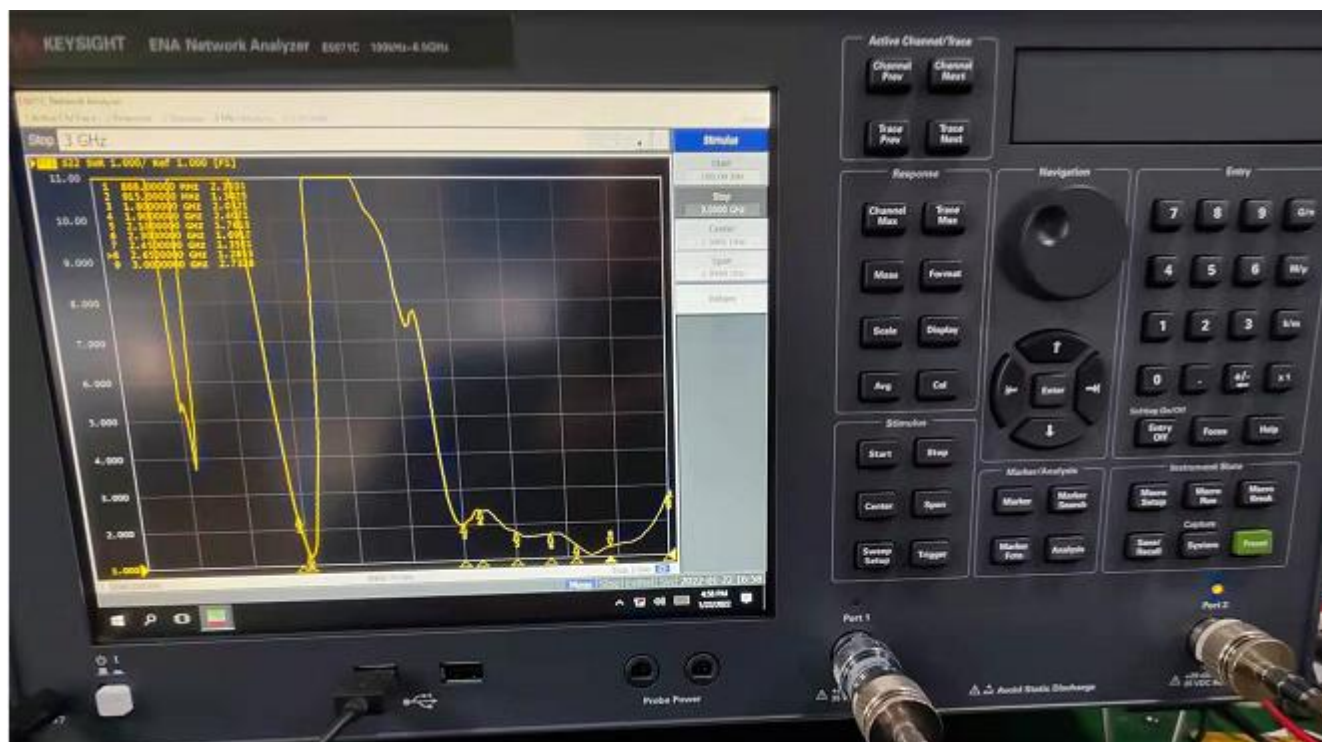
Connect the VSWR test device are: Agilent E5071B network analyzer from 50 ohm coaxial Cable 120mm long

Brass & test fixture

Processing test fixture: 50 ohm antenna leads to SMA-J connector from the test point on the plate PCB with a rigid cable, and a

Connect the choke tube, and then sequentially connected with other devices.

Chart 13. 2/3/3/LTE VSWR



4G passive test report

FETUKEJI															
Frequency ID	1	6	11	29	40	42	63	73	74	79	80	81	82	83	84
Frequency (MHz)	800.0	850.0	900.0	1800.0	1900.0	2010.0	2300.0	2400.0	2550.0	2600.0	2610.0	2620.0	2630.0	2640.0	2650.0
Efficiency (dBi)	-7.04	-6.46	-6.27	-6.03	-3.88	-3.16	-2.15	-2.20	-2.77	-2.62	-2.88	-3.29	-3.17	-3.78	-4.55
Gain (dBi)	-3.05	-2.30	-3.12	-0.50	-0.03	1.07	1.16	1.48	0.97	1.07	1.09	0.80	0.42	-0.04	-0.99
Efficiency (%)	19.77	22.61	23.60	24.93	40.90	48.33	60.91	60.30	52.85	54.72	51.48	46.86	48.21	41.91	35.04
Directivity (dB)	3.99	4.16	3.15	5.53	3.85	4.22	3.32	3.67	3.74	3.69	3.97	4.09	3.59	3.74	3.56
Peak Gain Position (Theta)	142.00	148.00	148.00	171.00	171.00	99.00	107.00	106.00	106.00	106.00	106.00	106.00	106.00	106.00	106.00
Peak Gain Position (Phi)	210.00	180.00	180.00	180.00	120.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
Efficiency ThetaPol (%)	15.47	17.12	16.52	12.14	24.17	29.73	43.54	43.06	38.18	38.25	36.96	33.25	33.29	30.09	25.40
Efficiency PhiPol (%)	4.29	5.48	7.09	12.78	16.73	18.60	17.37	17.24	14.67	16.47	14.52	13.62	14.92	11.82	9.64
Upper Hem. Efficiency (%)	6.41	8.30	9.96	11.27	20.80	24.65	31.71	31.32	26.03	26.77	24.90	22.39	22.81	20.06	16.84
Lower Hem. Efficiency (%)	13.36	14.31	13.64	13.66	20.10	23.68	29.20	28.97	26.82	27.96	26.58	24.47	25.40	21.86	18.20

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

Chart 14 WIFI VSWR



frequency (MHz)	2412	2442	5700	5800	
VSWR	1.5	1.3	1.5	1.3	

Elevation map coverage

FEITUKEJI											
Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
Efficiency (dBi)	-1.72	-1.68	-1.52	-1.25	-1.06	-0.83	-0.61	-0.47	-0.64	-0.87	-1.04
Gain (dBi)	2.04	2.10	2.26	2.72	2.68	2.94	3.01	2.88	2.20	1.68	1.56
Efficiency (%)	67.32	67.94	70.50	75.01	78.27	82.59	86.95	89.83	86.21	81.78	78.67
Directivity (dB)	3.76	3.78	3.78	3.97	3.75	3.77	3.62	3.34	2.85	2.55	2.60
Peak Gain Position (Theta)	83.00	82.00	83.00	85.00	88.00	92.00	88.00	93.00	97.00	73.00	75.00
Peak Gain Position (Phi)	30.00	30.00	30.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00
Efficiency ThetaPol (%)	65.57	66.34	69.10	73.67	76.99	81.33	85.58	88.35	84.69	80.22	77.04
Efficiency PhiPol (%)	1.75	1.60	1.40	1.35	1.28	1.26	1.37	1.49	1.51	1.57	1.63
Upper Hem. Efficiency (%)	41.71	41.72	42.46	44.27	45.34	47.06	48.83	50.02	47.88	45.34	43.58
Lower Hem. Efficiency (%)	25.61	26.22	28.05	30.74	32.93	35.53	38.13	39.81	38.33	36.45	35.08

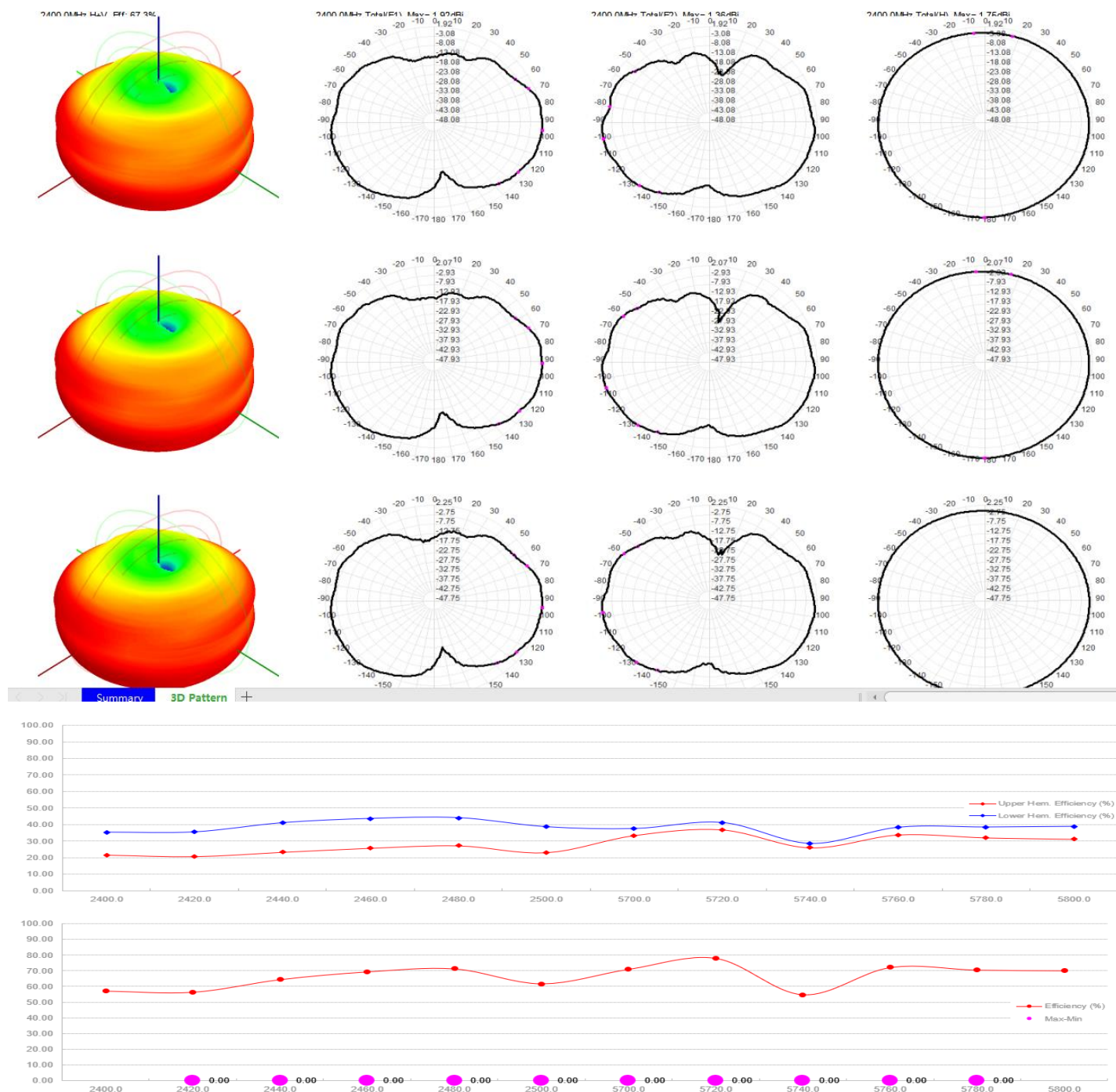
Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

Chart 15 Elevation map coverage



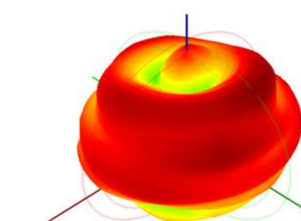
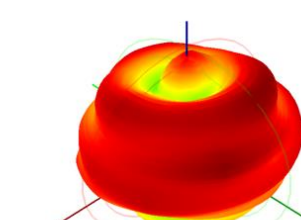
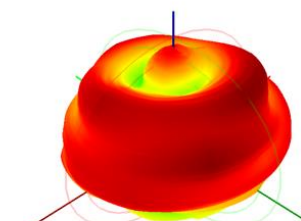
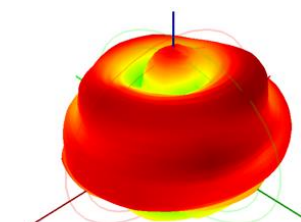
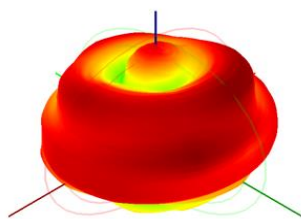
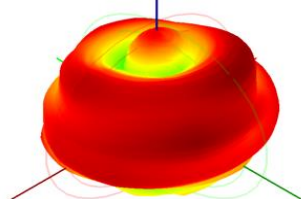
Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

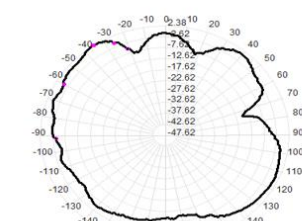
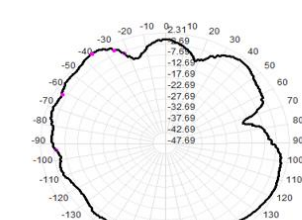
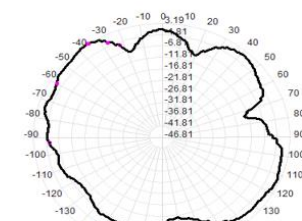
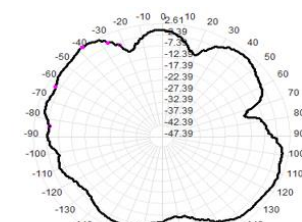
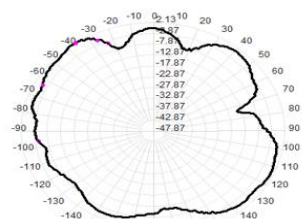
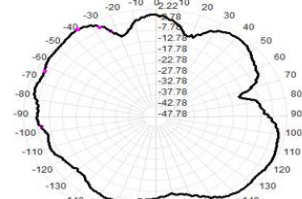
Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

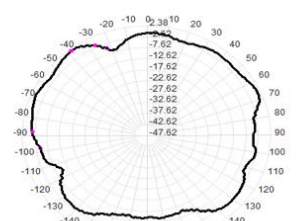
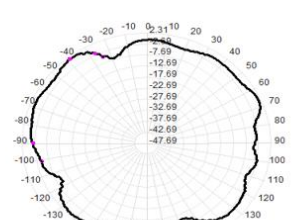
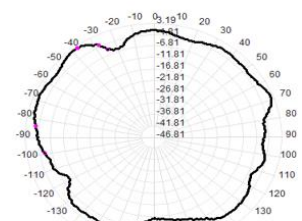
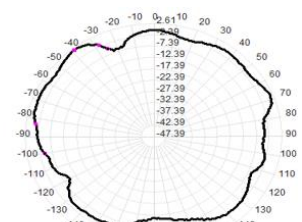
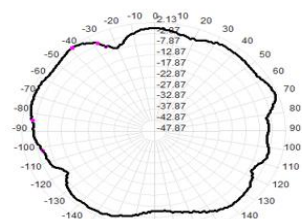
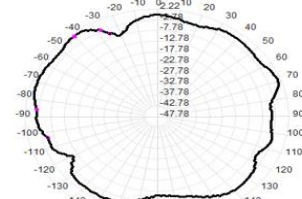
2400.0MHz H+V, Eff: 57.0%



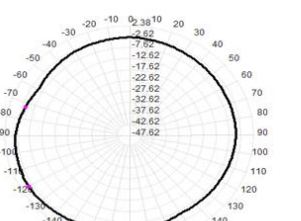
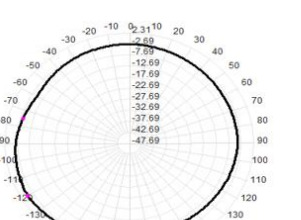
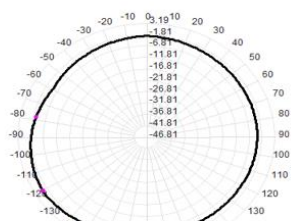
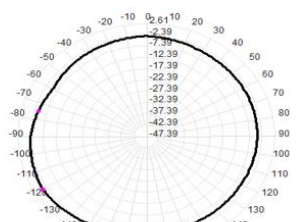
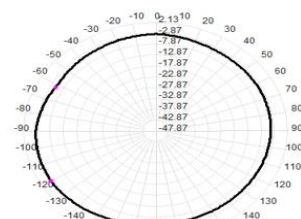
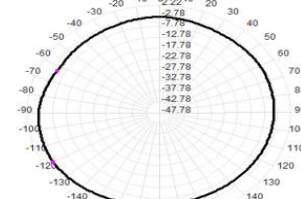
2400.0MHz Total(E1), Max= 2.22dBi



2400.0MHz Total(E2), Max= 1.02dBi



2400.0MHz Total(H), Max= -1.62dBi

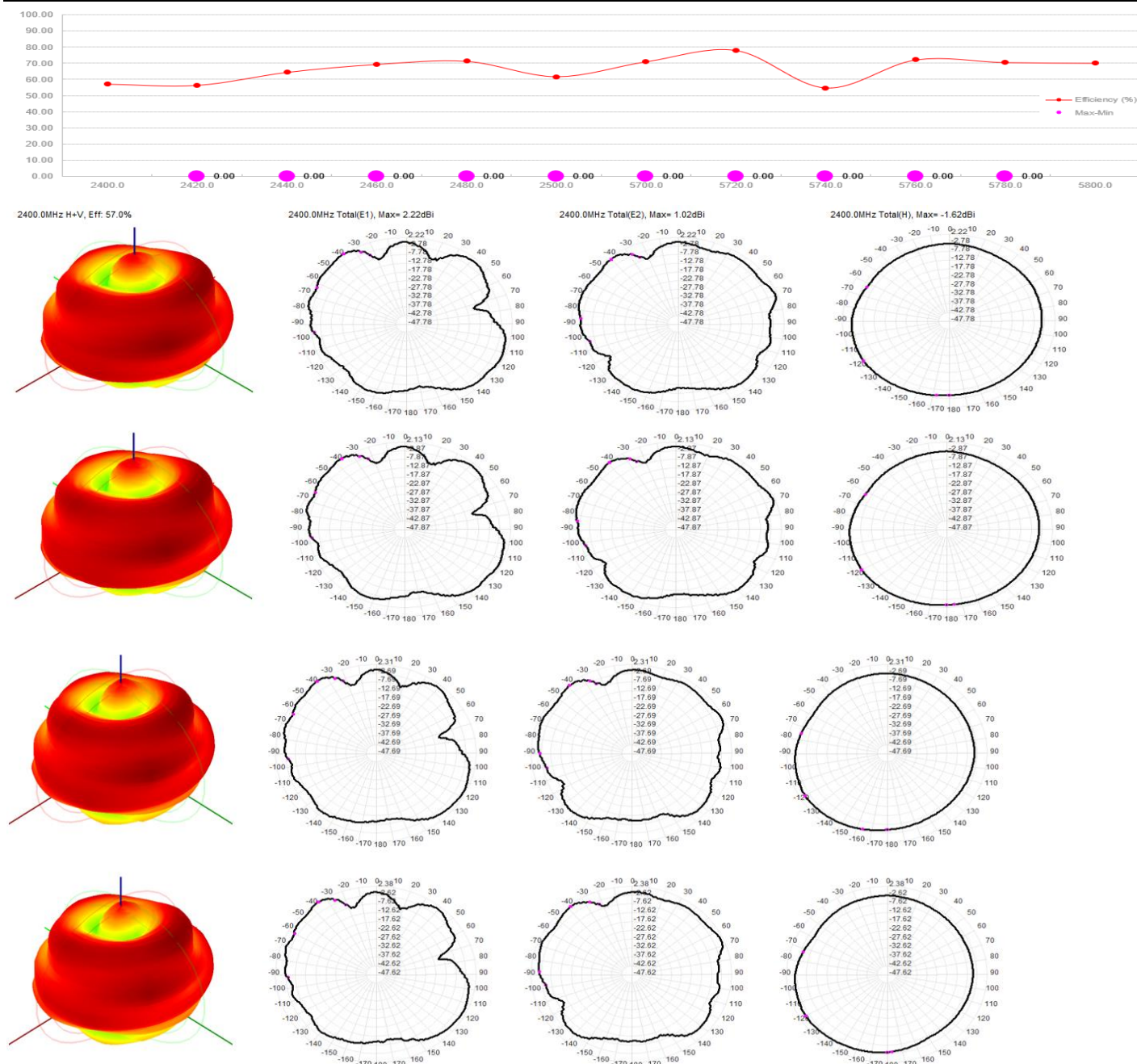


Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609



3, recommendations and conclusions

Shenzhen Tianyiyuan Elec&Technology CO.,Ltd

Telephone: 13538032086

Fax: 0755-27673866

address: Baoan District, Xixiang, Shenzhen Hua Feng Po source building 609

This report is based on the antenna electrical performance measured by the customer based on the final version of the model project of Hangzhou Rongmeng Intelligent Technology Co., LTD.

As can be seen from the above test data, the antenna provides good electrical performance.

Tianyiyuan is looking forward to your confirmation. Thank you for your cooperation!