

Antenna Specifications

CUSTOMER		英卡	
CS P/N		CS6501-E3	
HX P/N		<u>A62-001-CS6501-E3</u>	
Checked by(RF)	Checked by(ME)	Checked by(QA)	Approval led by
Customer Approval			



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1. General Description

This document provides the antenna specifications on electric, mechanic and reliability. The testing conditions and related pictures are also included.

1.1 Print Acceptance

Samples and Antenna Specifications are to be sent to customer. When they are approved, the approval form should be completed, signed, and sent back to HX before further mass production batches can be delivered.

1.2 Coordinate System

The coordinate system for the phone is defined as follows:

- Origin in center of gravity.
- Positive X axis is perpendicular to, and directed from, front plane.
- Positive Y axis is perpendicular to, and directed from, right side plane (as seen from front).
- Positive Z axis is perpendicular to, and directed from, top plane.

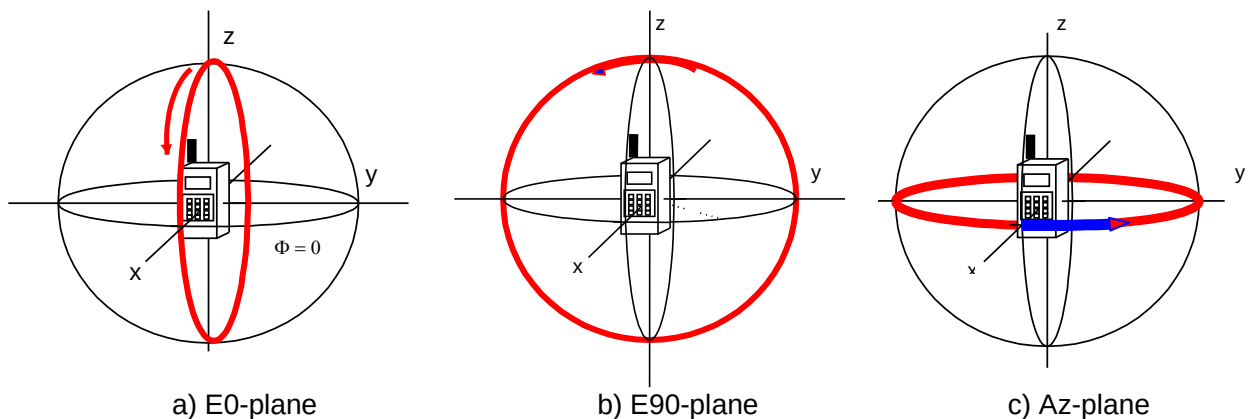


Figure 1-1 The coordinate system for the phone



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2. Specifications

This report mainly provides the testing conditions of various electric and structural performance parameters for cell phone antenna ---CS6501-E3 Figure 2-1 shows the antenna designed by HX & The fixturing of CS6501-E3

Figure 2-1 The antenna designed by HX & The fixturing ofCS6501-E3

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2.1 Frequency Band

	Band	
Main antenna	GSM	B2/3/5/8
	WCDMA	B1/2/4/5/8
	LTE	B1/2/3/4/5/7/8/12/17/20/28/40/41/66
DRX antenna	LTE	B1/2/3/4/5/7/8/12/17/20/28/40/41/66
GPS/WIFI/BT antenna	GPS L1/2.4G WIFI/5G WIFI	

2.2 Impedance

2.2.1 Nominal

Nominal Impedance(including matching circuit) : 50 ohms

2.2.2 Matching Circuit

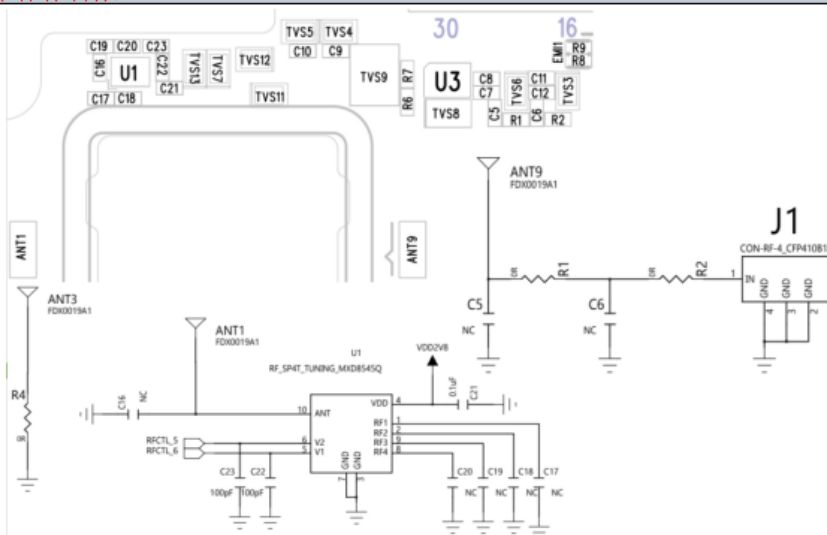
The matching circuit is as Figure 2-2.

Main(下)天线匹配 (红色字体有改动)

主射频匹配	
位号	匹配值更改
C5	8.2nH
R1	0Ω
C6	NC
R2	0Ω

地馈脚	
R4	0Ω

开关匹配	
位号	匹配值更改
C16	10nH
C17	15pF
C18	0Ω
C19	10nH
C20	NC



开关逻辑 (下天线)	RF1: GSM900+W8+LTE8
	RF2: G850+W5+LTE5/20/辅助中高频接收(DCS1800/PCS1900+W1/2/4+LTE1/2/3/4/7/66/40/41)
	RF3: LTE12/17/28
	RF4: NC

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Antenna Specifications

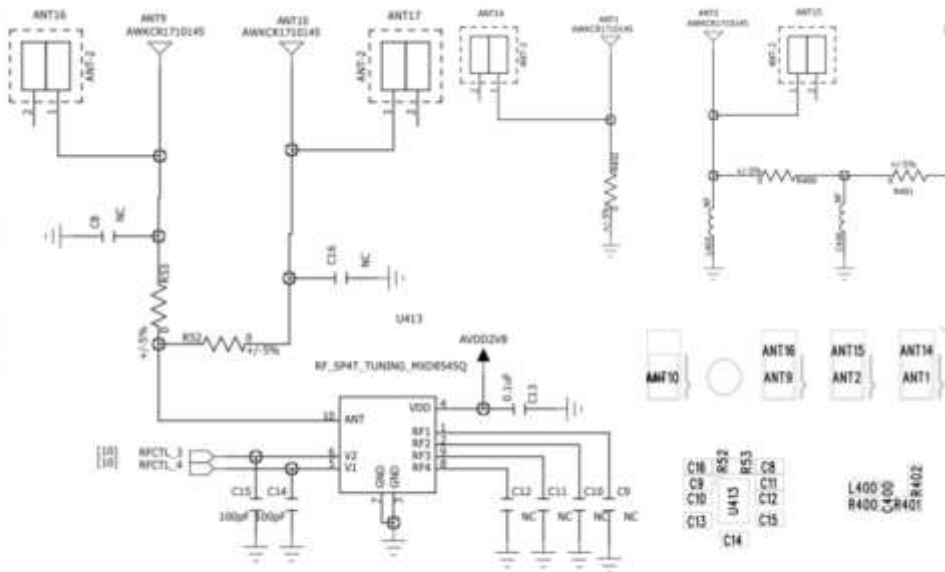
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AUX (上)天线匹配 (红色字体有改动)

主射频匹配	
位号	匹配值更改
L400	NC
R400	0Ω
C400	NC
R401	0Ω

地馈脚	
R402	0Ω

开关匹配	
位号	匹配值更改
C8	0Ω
C16	NC
R52	NC
R53	NC
C9	NC
C10	NC
C11	NC
C12	NC



开关逻辑	RF1: DCS1800/PCS1900/W1/2/4+LTE1/2/3/4/7/66/40/41
(上天线)	RF2:
	RF3:
	RF4:

三合一天线匹配

主射频匹配	
位号	匹配值更改
E1 (0201)	未做更改
E2 (0201)	
E3 (0201)	
E4 (0201)	

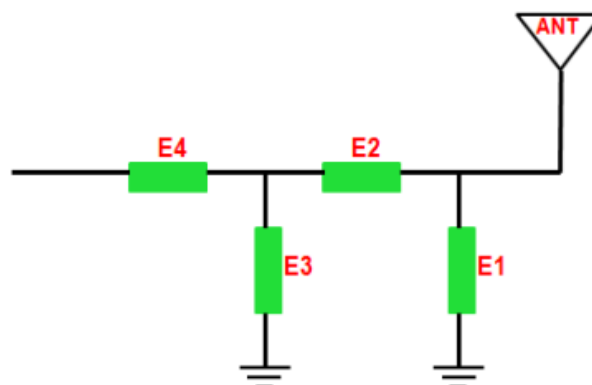


Figure 2-2: Matching circuit

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2.2.3 Passive efficiency of antenna Main antenna

下天线 RF1				上天线			
(MHz)	Effi (dB)	Effi (dBi)	Effi (%)	(MHz)	Effi (dB)	Effi (dBi)	Effi (%)
880	-6.91	-3.16	20.39	1700	-4.4	-0.23	36.33
890	-6.76	-2.92	21.1	1720	-4.5	-0.59	35.52
900	-6.28	-2.38	23.56	1740	-4.36	-0.49	36.65
910	-6.39	-2.63	22.94	1760	-4.27	-0.4	37.44
920	-6.66	-2.76	21.56	1780	-4.4	-0.53	36.29
930	-7.34	-3.39	18.44	1800	-4.54	-0.58	35.16
940	-7.8	-3.77	16.61	1820	-4.56	-0.36	35.02
950	-8.34	-4.31	14.65	1840	-4.62	-0.06	34.52
960	-8.85	-4.72	13.05	1860	-4.63	-0.52	34.46
				1880	-4.83	-0.99	32.89
				1900	-4.71	-1.07	33.82
				1920	-4.64	-1.12	34.34
				1940	-4.36	-0.61	36.63
				1960	-4.47	-0.59	35.69
				1980	-4.29	-0.42	37.26
				2000	-4.18	-0.38	38.16
				2020	-4.24	-0.49	37.63
				2040	-4.03	-0.22	39.51
				2060	-3.82	-0.06	41.49
				2080	-3.98	-0.39	40.04
				2100	-4.19	-0.75	38.06
				2120	-4.24	-0.87	37.63
				2140	-4.25	-0.99	37.63
				2160	-4.22	-0.74	37.85
				2180	-4.23	-0.43	37.75
				2300	-4.3	-0.61	37.19
				2320	-4.42	-0.85	36.16
				2340	-4.38	-0.8	36.52
				2360	-4.17	-0.7	38.25
				2380	-4.12	-0.61	38.76
				2400	-4.18	-0.44	38.21
				2500	-3.5	0.83	44.64
				2520	-3.73	0.8	42.38
				2540	-3.78	0.5	41.83
				2560	-3.96	0.23	40.17
				2580	-4.04	0.27	39.48
				2600	-4.25	0.17	37.61
				2620	-4.45	0.06	35.86
				2640	-5.11	-0.77	30.86
				2660	-5.66	-1.45	27.16
				2680	-6.09	-1.99	24.59
				2700	-6.35	-2.31	23.19

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2.2.4 Passive efficiency of antenna

Triad

GPS

(MHz)	Effi (dB)	Effi (dBi)	Effi (%)
1545	-5.33	-2.39	29.3
1550	-5.22	-2.43	30.08
1555	-5.05	-2.06	31.28
1560	-4.96	-1.94	31.89
1565	-4.84	-2.04	32.81
1570	-4.65	-1.73	34.31
1575	-4.44	-1.6	35.95
1580	-4.33	-1.36	36.88
1585	-4.21	-1.24	37.96
1590	-4.06	-1.02	39.29
1595	-3.8	-0.76	41.66
1600	-3.65	-0.61	43.18

2.4WIFI/BT

(MHz)	Effi (dB)	Effi (dBi)	Effi (%)
2400	-5.43	1.13	28.66
2410	-5.29	1.22	29.6
2420	-5.04	1.55	31.33
2430	-4.74	1.88	33.61
2440	-4.6	2.1	34.66
2450	-4.3	2.53	37.17
2460	-4.24	2.6	37.66
2470	-4.16	2.79	38.39
2480	-4.03	2.8	39.51
2490	-4	2.79	39.81
2500	-4.05	2.54	39.34

5G WIFI

(MHz)	Effi (dB)	Effi (dBi)	Effi (%)
5100	-4.66	0.1	34.23
5120	-4.77	-0.06	33.34
5140	-4.63	0.29	34.42
5160	-4.95	0.19	32
5180	-4.87	0.25	32.59
5200	-4.65	0.29	34.31
5220	-4.55	0.23	35.05
5240	-4.49	0.51	35.53
5260	-4.78	-0.1	33.23
5280	-4.58	0.18	34.86
5300	-4.81	-0.07	33
5320	-4.67	-0.04	34.12
5340	-4.64	0.14	34.34
5360	-4.89	-0.06	32.46
5380	-4.39	0.57	36.39
5400	-4.34	0.48	36.8
5420	-4.47	0.43	35.71
5440	-4.73	0.13	33.65
5460	-4.77	0.18	33.35
5480	-4.79	0.27	33.17
5500	-4.46	0.66	35.83
5520	-4.75	0.33	33.52
5540	-4.75	0.8	33.48
5560	-5.09	0.75	31.01
5580	-4.71	0.8	33.79
5600	-4.84	0.72	32.8
5620	-4.71	1.2	33.78
5640	-4.86	1	32.66
5660	-4.77	1.3	33.34
5680	-4.92	1.02	32.23
5700	-5.01	0.74	31.57
5720	-4.84	0.94	32.8
5740	-4.58	0.87	34.86
5760	-4.87	0.89	32.55
5780	-4.96	0.6	31.9
5800	-4.83	0.8	32.9

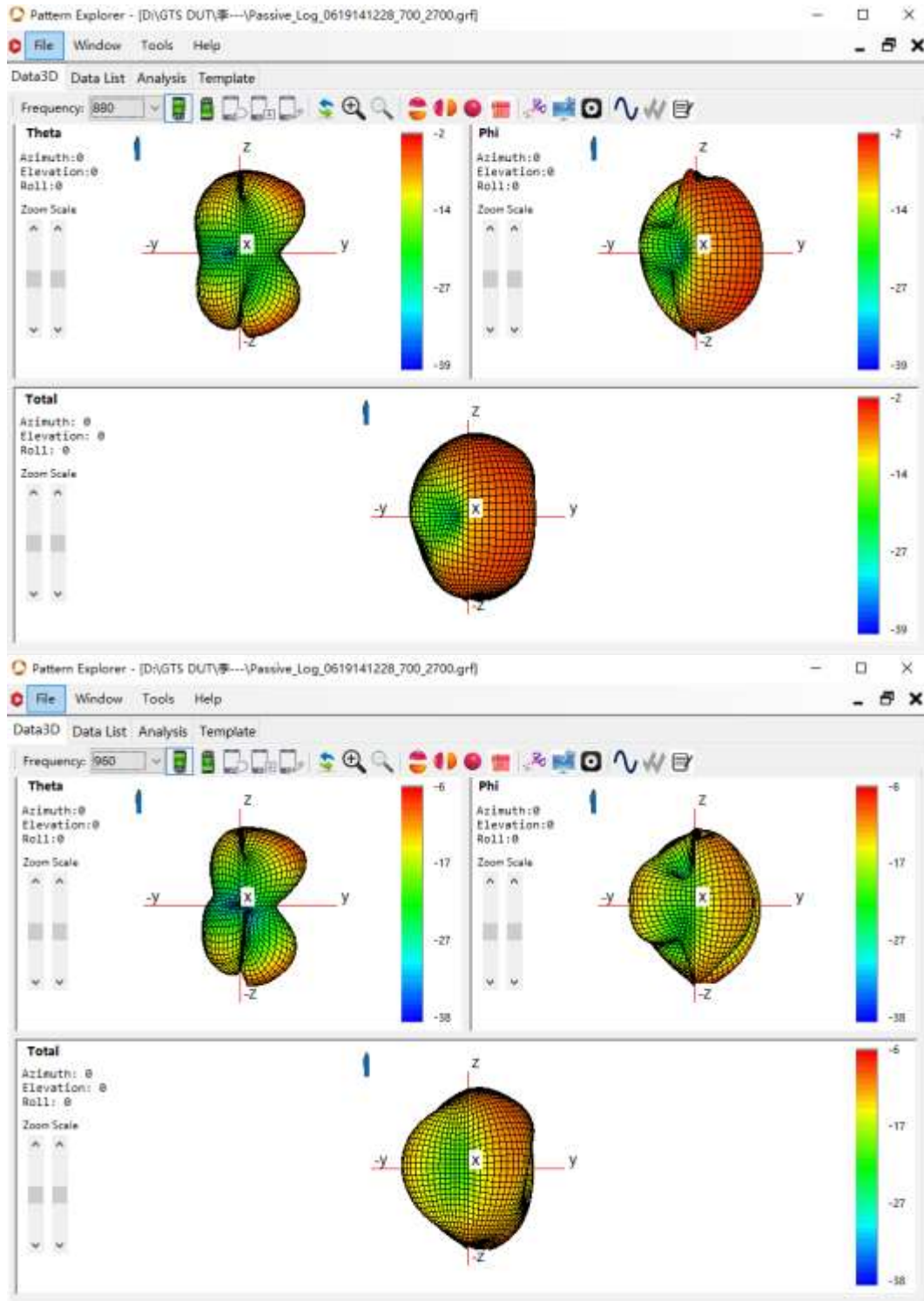
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2.2.5 Apple chart

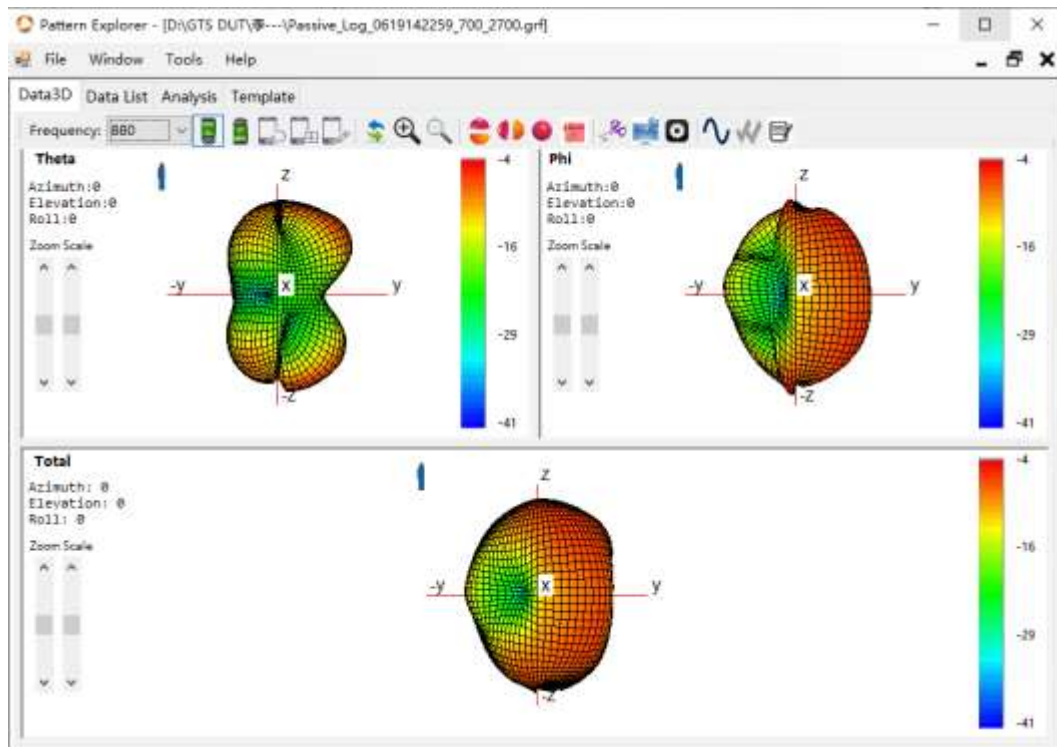
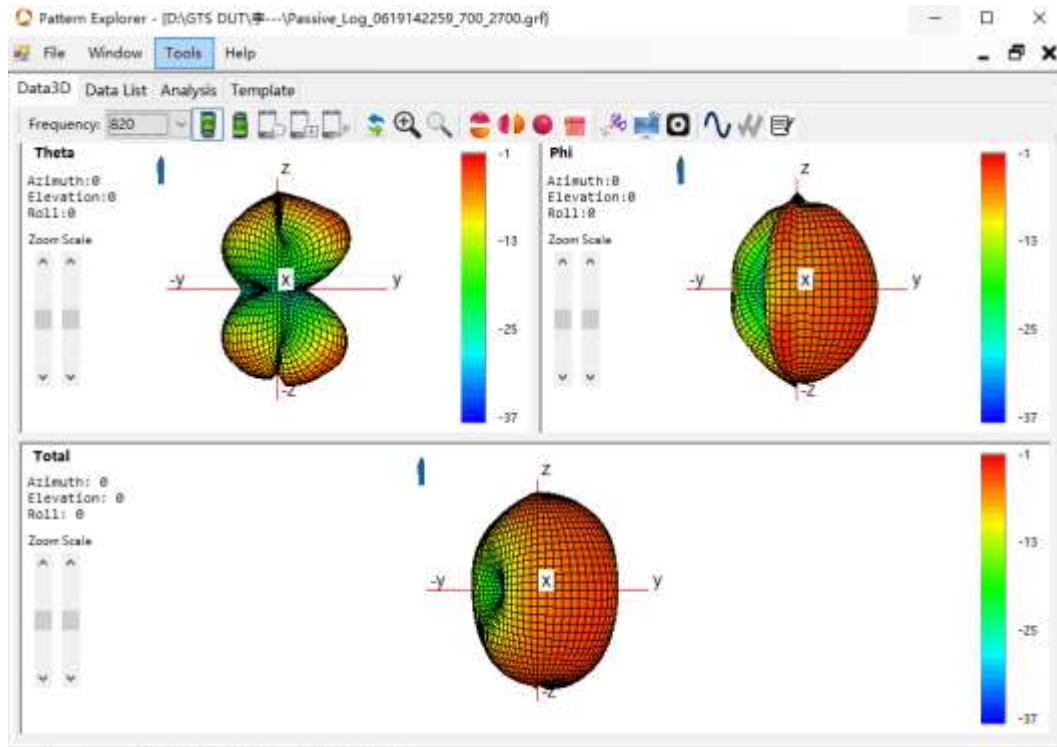
Main antenna

下天线 **RF1**



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下天线 RF2

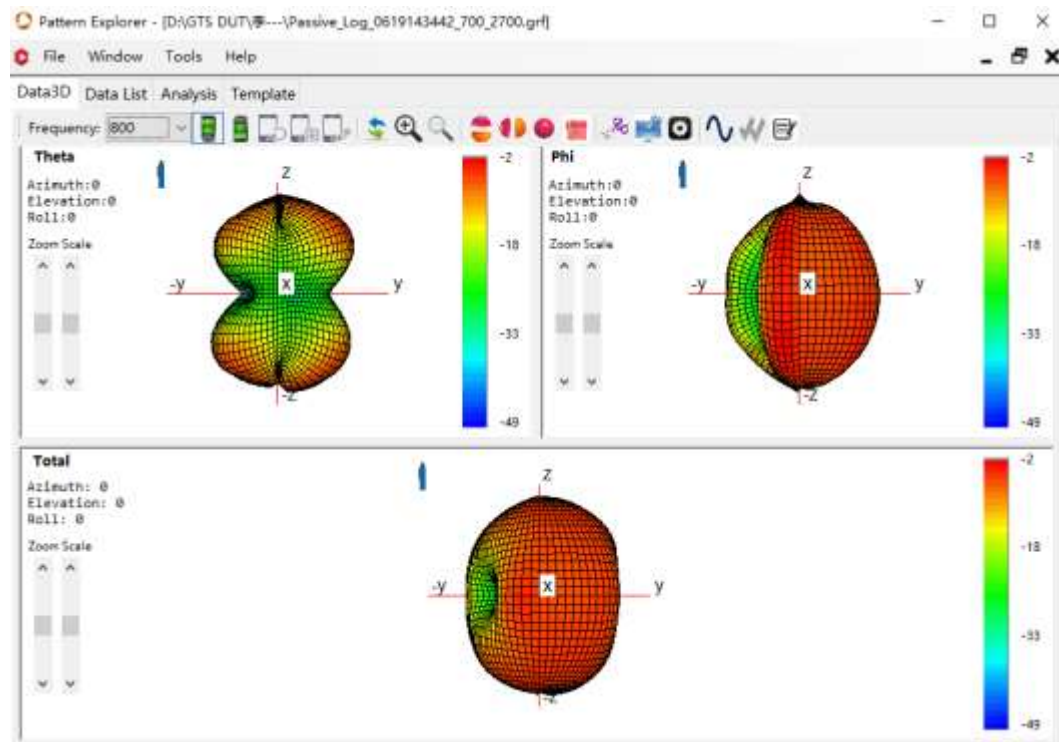
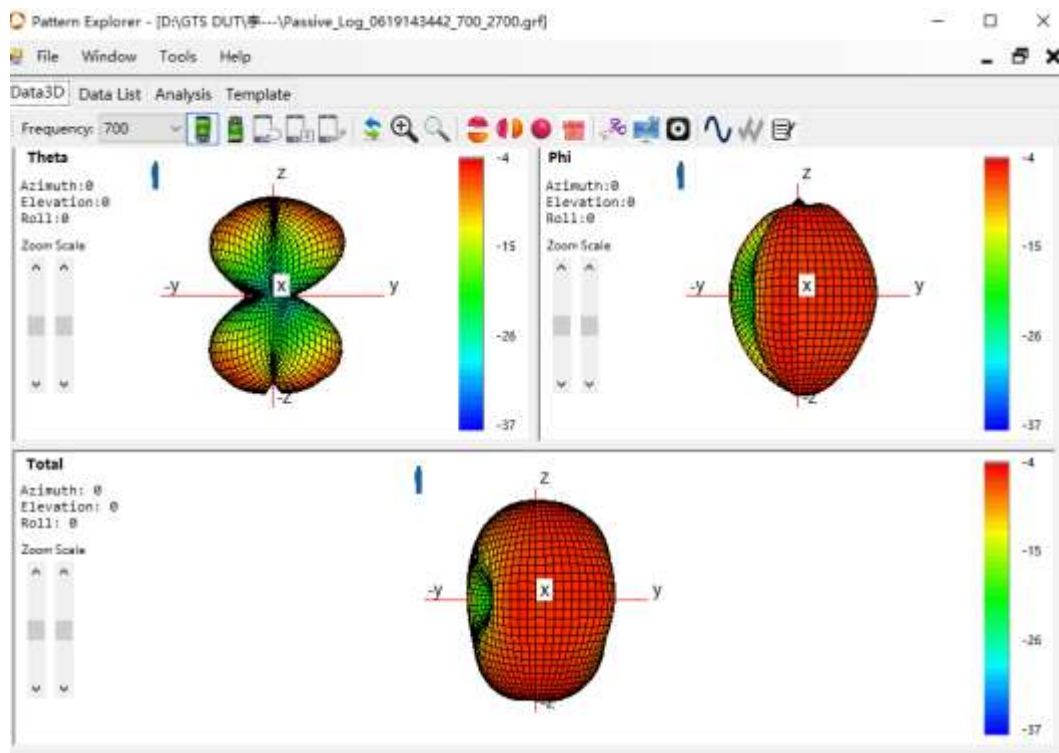




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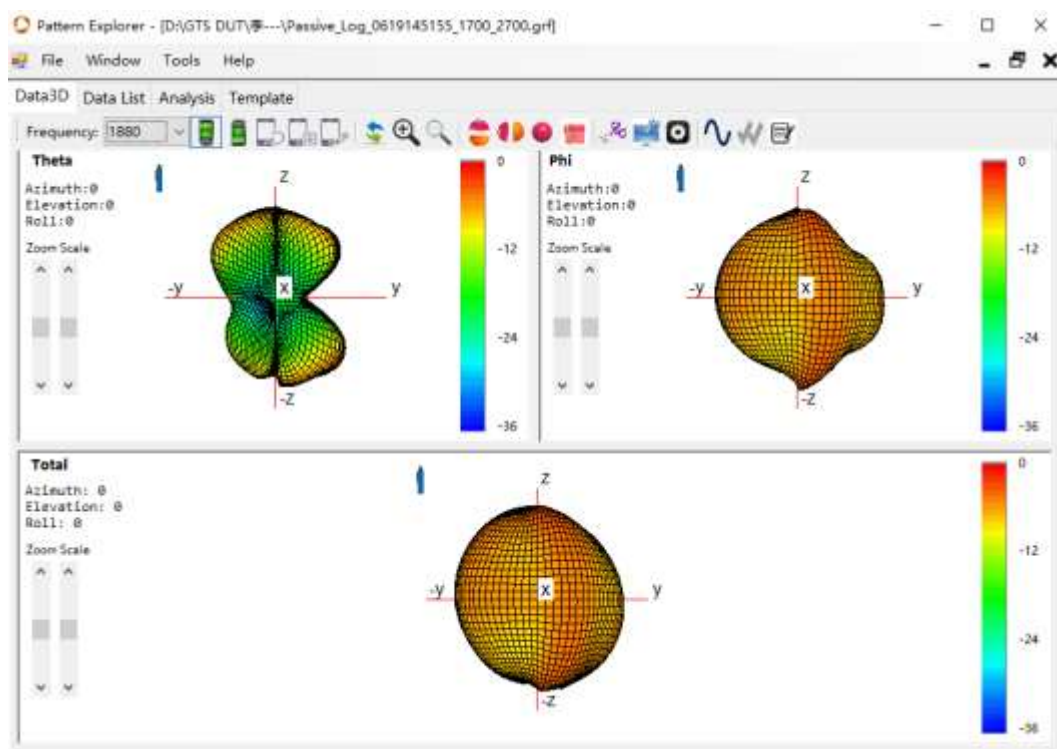
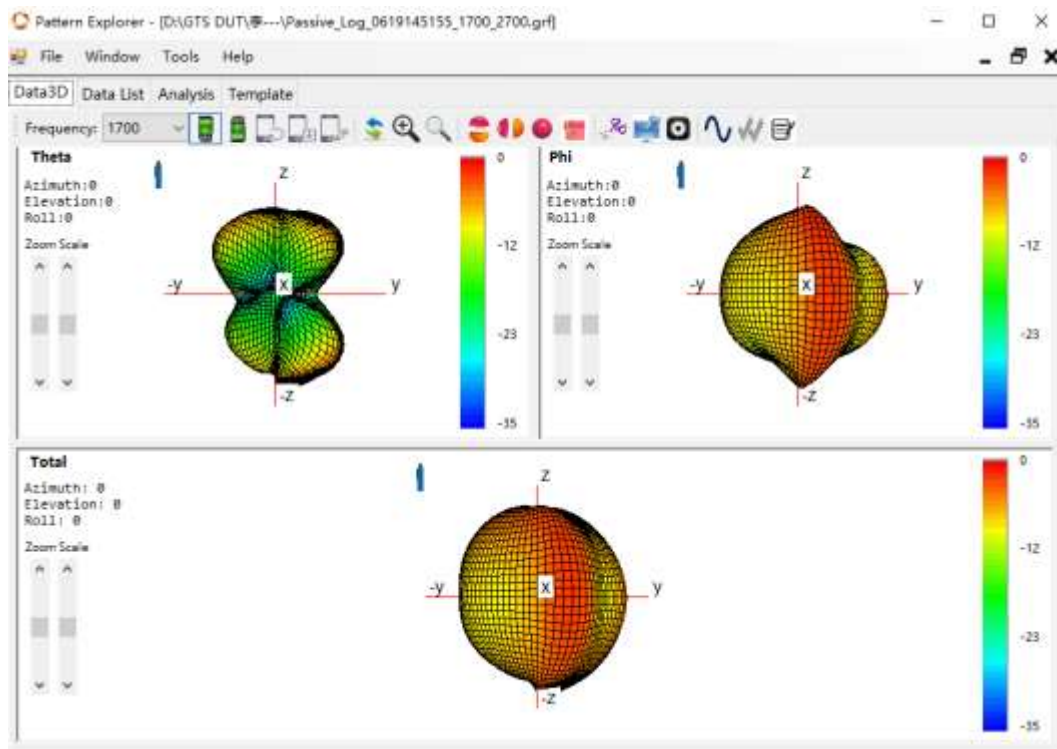
下天线 RF3



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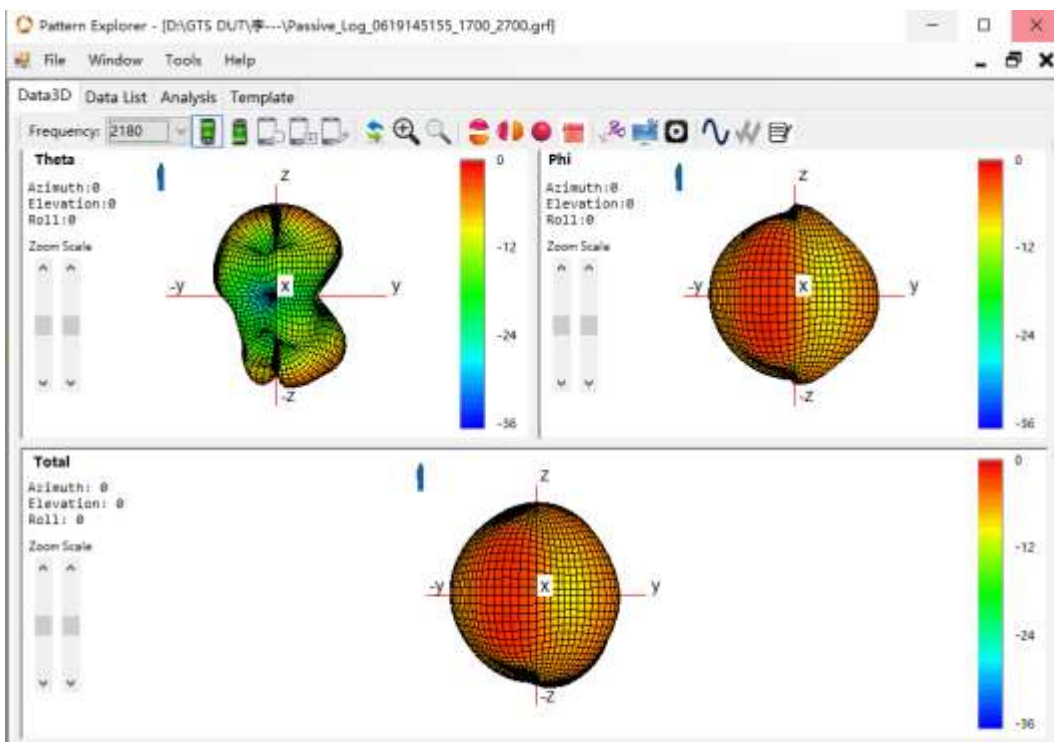
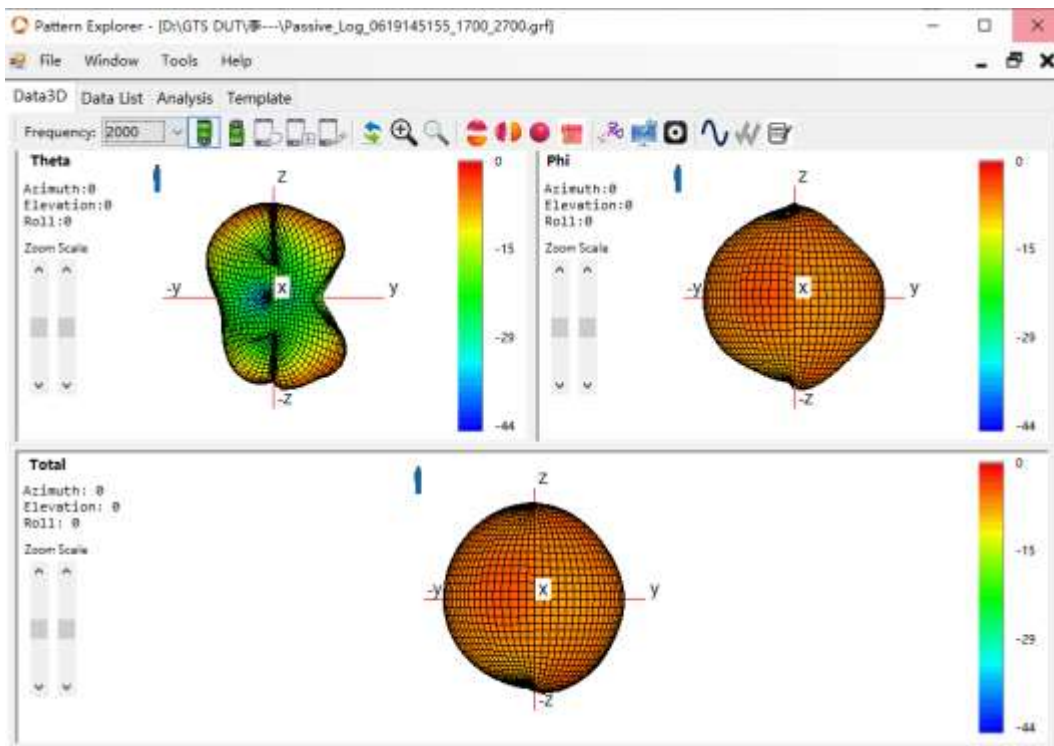
上天线 中频



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上天线 中频



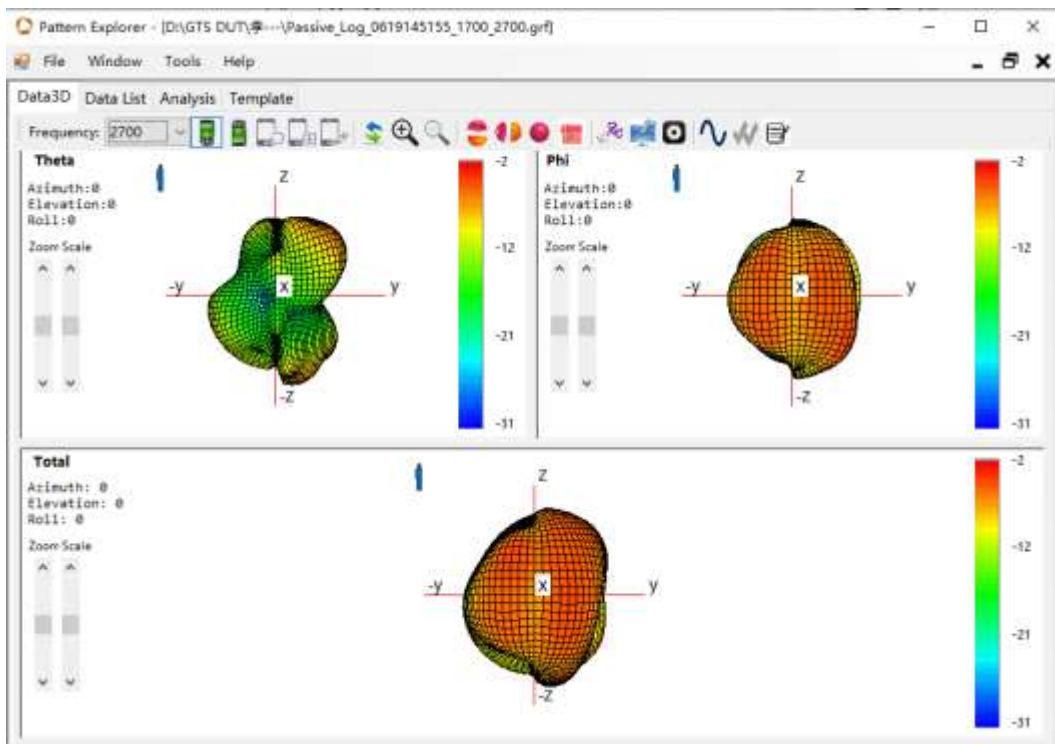
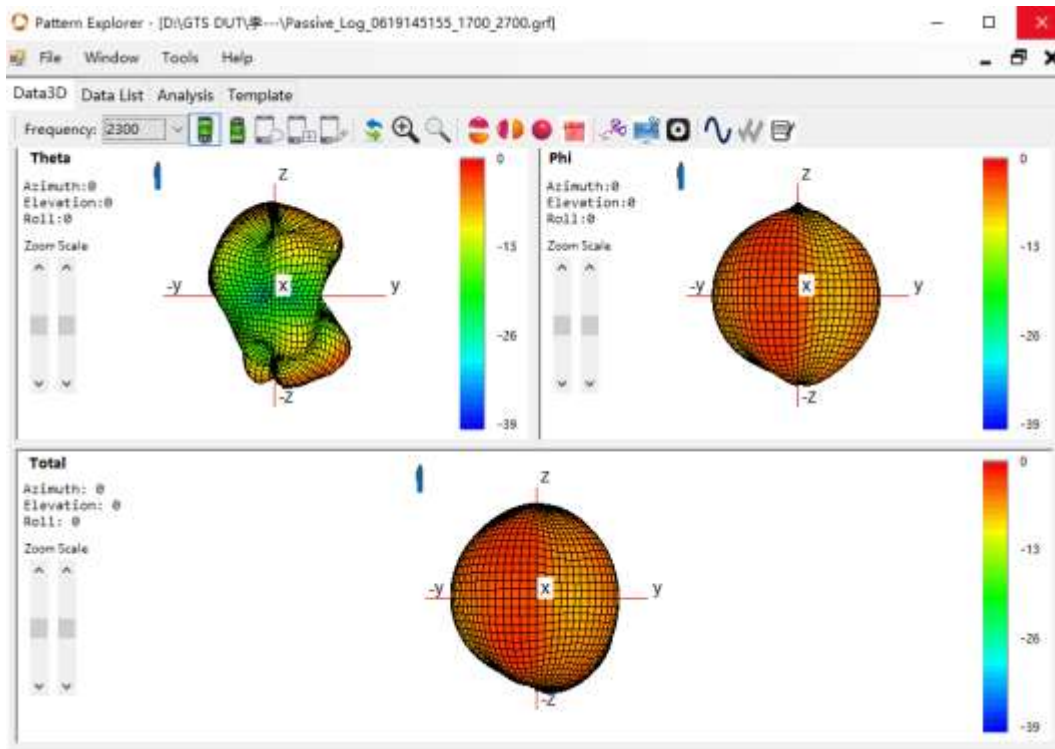
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上天线 高频

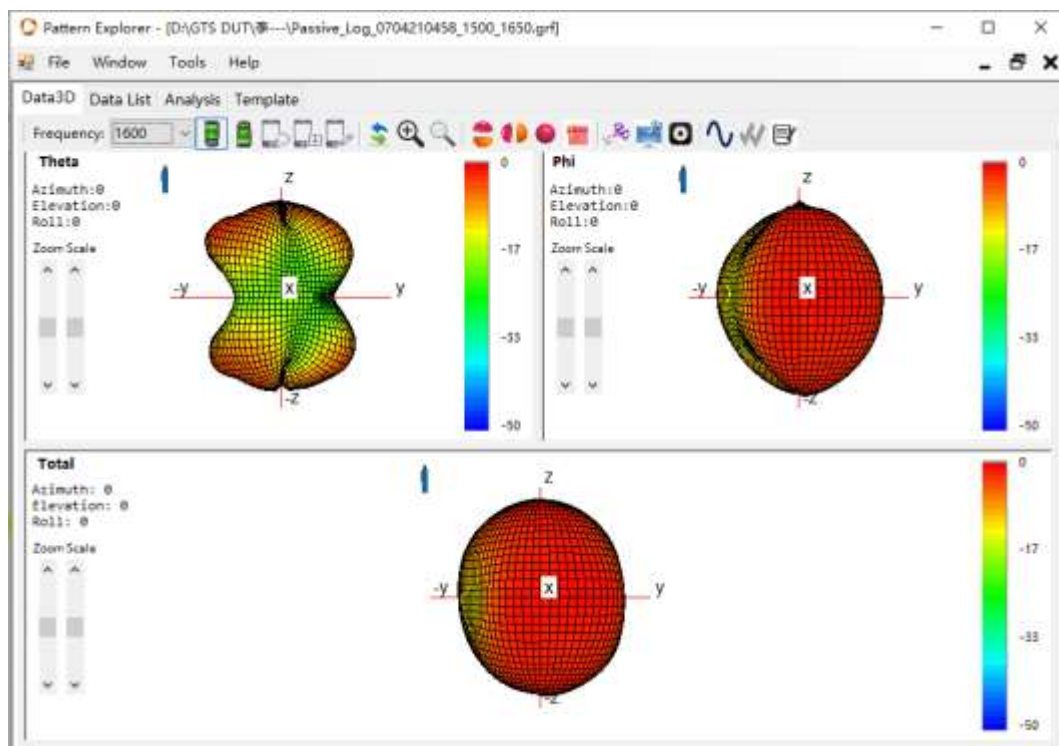
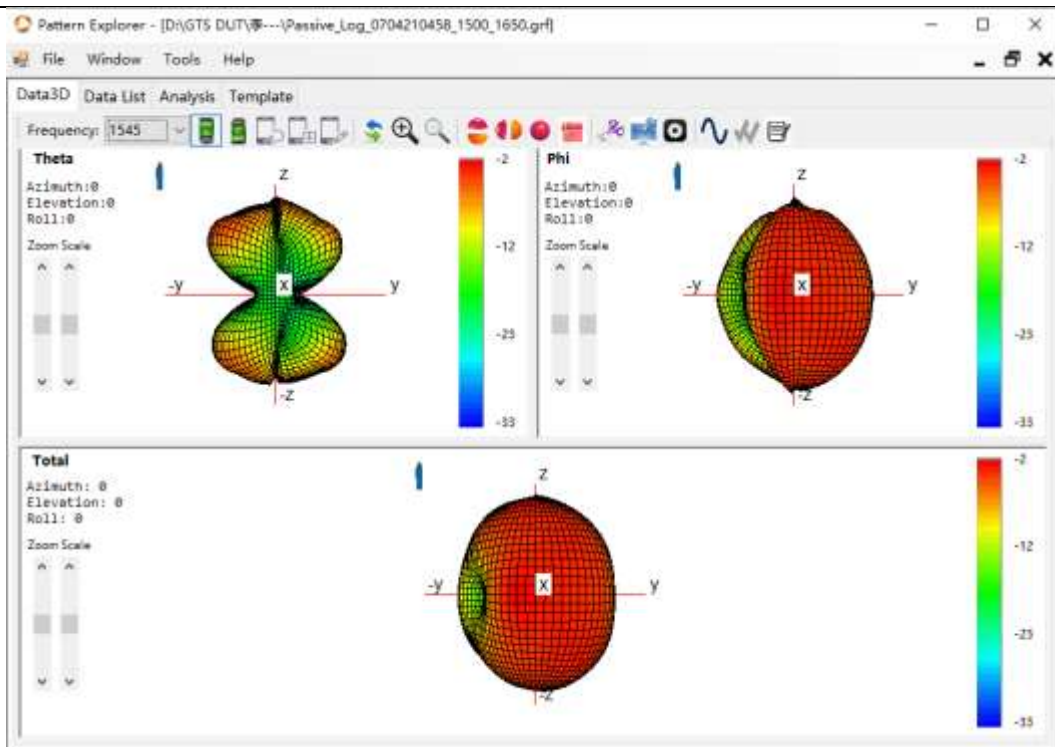


GPS

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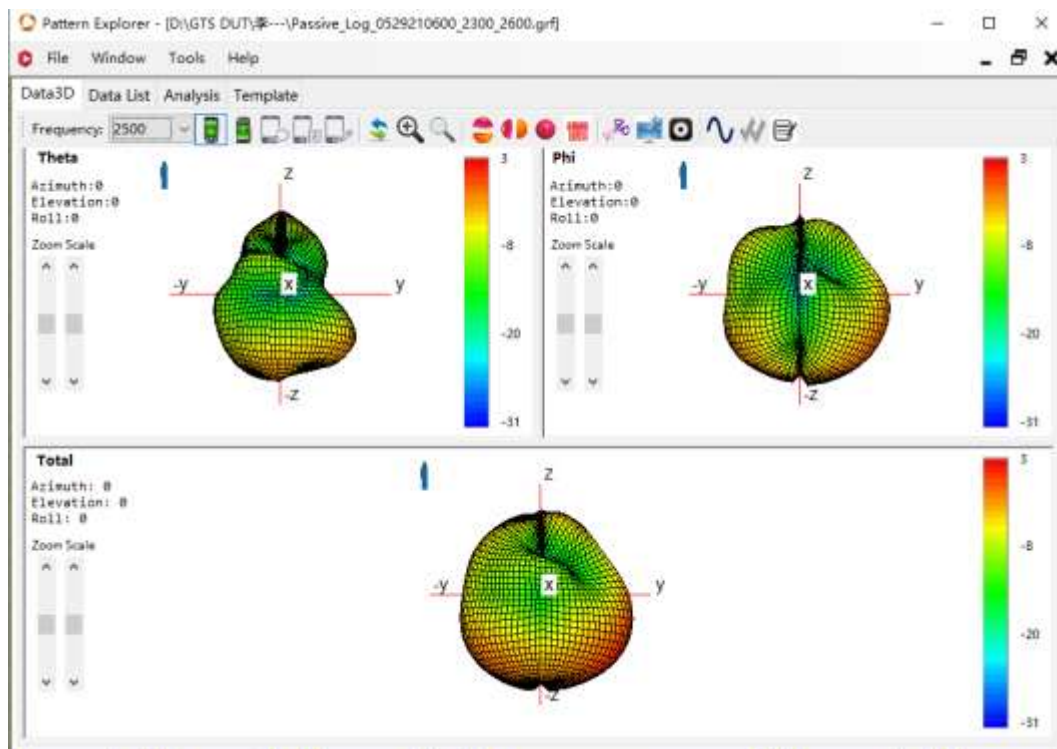
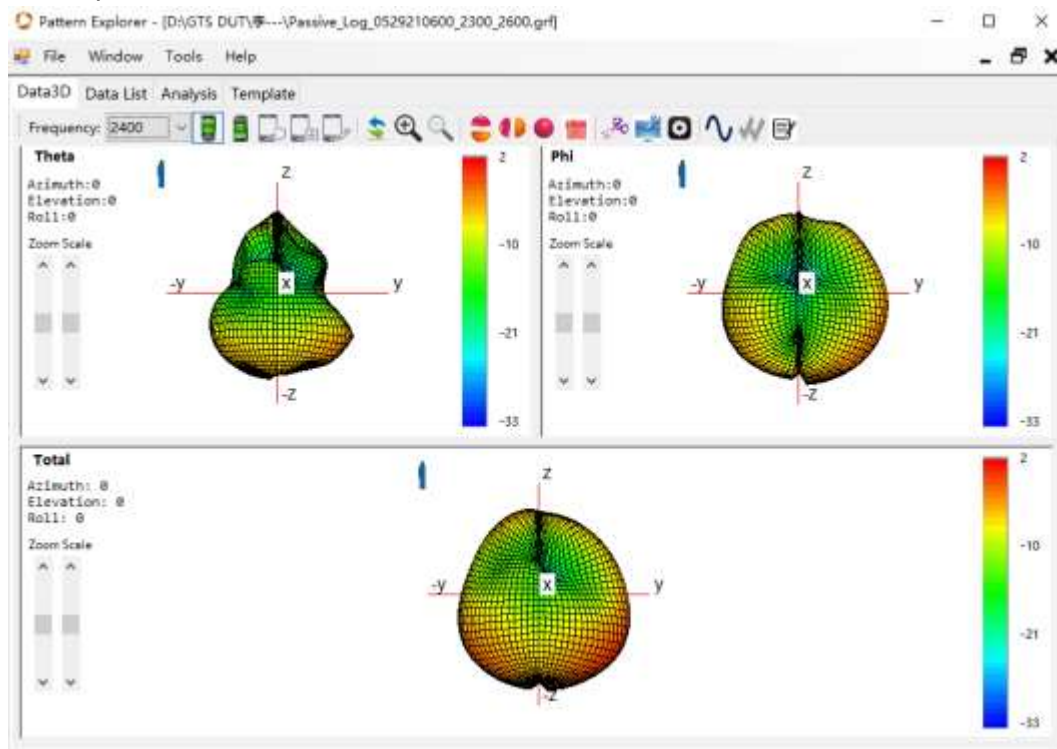
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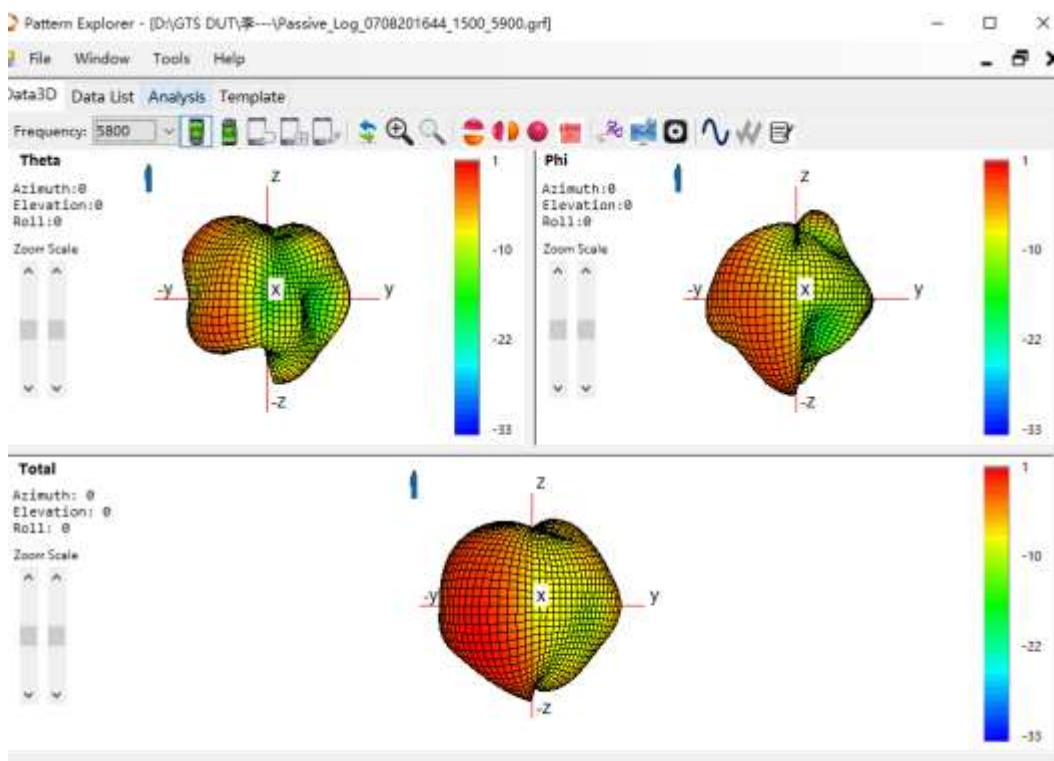
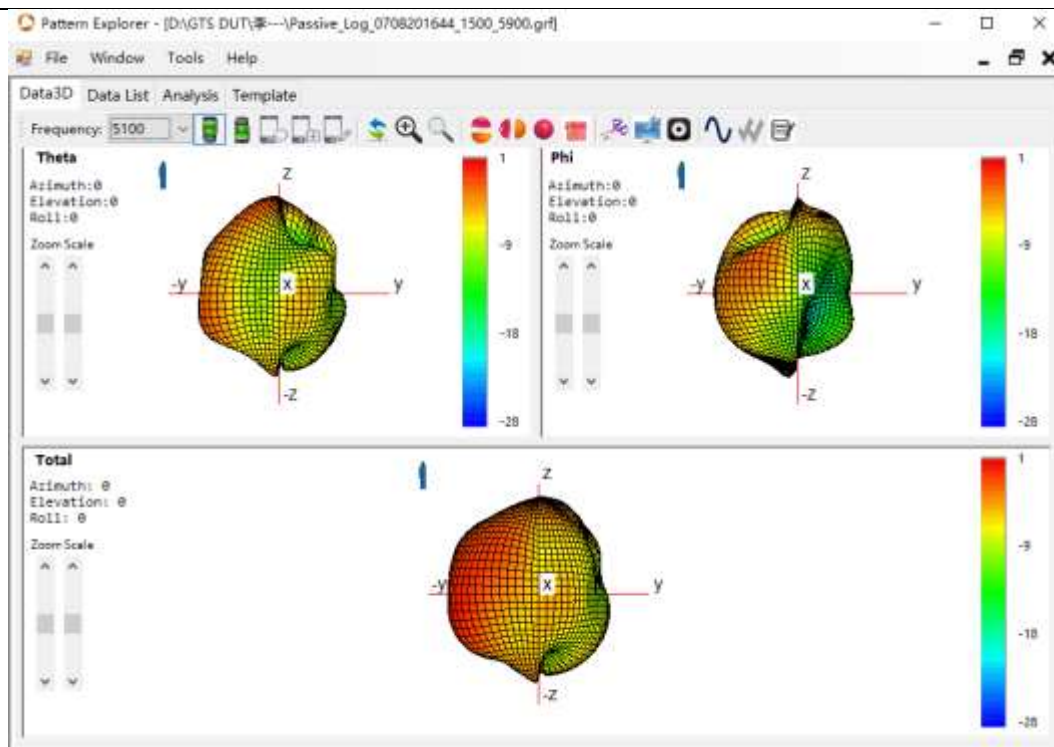
2.4 WIFI/BT



5G WIFI

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2.3 Active Measurement

2.3.1 OTA data of LTE antenna

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Antenna Specifications

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机器编号		OTA		
试产机				
2G	CH	TRP	TIS(灭)	TIS(亮)
GSM850	128	25.88	-103.99	-101.86
	190	26.35	-103.21	-101.51
	251	26.87	-102.76	-100.58
EGSM900	1	25.81	-101.56	-100.21
	62	26.18	-101.34	-99.73
	124	25.4	-101.2	-99.23
DCS1800	512	24.52	-104.19	-103.18
	698	24.68	-103.73	-102.84
	885	24.94	-104.07	-102.72
PCS1900	512	25.42	-103.2	-102.52
	661	25.53	-103.05	-102.81
	810	25.98	-103.12	-103.28

3G	CH	TRP	TIS(灭)
WCDMA1	9612	18.8	-104.79
	9750	18.62	-104.52
	9888	18.24	-104.16
WCDMA2	9262	18.88	-104.27
	9400	18.91	-103.81
	9538	18.87	-103.59
WCDMA4	1312	16.83	-105.18
	1450	17.45	-104.65
	1513	17.92	-104.24
WCDMA5	4132	17.75	-104.72
	4183	17.26	-104.46
	4233	17.11	-104.54
WCDMA8	2712	16.67	-102.73
	2787	16.48	-102.51
	2863	16.56	-101.95

4G	CH	TRP	TIS(灭)
FDD-B1 (10M)	18050	19.42	-94.28
	18300	18.88	-93.85
	18550	18.26	-93.67
FDD-B2 (10M)	18650	19.59	-92.88
	18900	19.95	-93.17
	19150	19.68	-93.44
FDD-B3 (10M)	19250	19.14	-93.86
	19900	19.47	-94.19
	18550	18.24	-94.5
FDD-B4 (10M)	2000	18.66	-93.86
	20175	18.96	-94.51
	20350	19.65	-94.8
FDD-B5 (10M)	20450	17.61	-92.76
	20525	17.15	-92.42
	20600	17.24	-91.78
FDD-B7 (10M)	20800	17.89	-90.76
	21100	19.22	-90.41
	21400	18.06	-89.22
FDD-B8 (10M)	21500	16.82	-87.75
	21625	17.11	-87.41
	21750	17.76	-86.92
FDD-B12 (10M)	23060	16.27	-92.68
	23095	16.29	-91.74
	23130	16.65	-91.43
FDD-B17 (10M)	23780	16.34	-91.24
	23790	16.85	-90.16
	23800	17.13	-89.61
FDD-B20 (10M)	24200	17.27	-91.27
	24300	17.16	-92.18
	24400	16.67	-92.65
FDD-B28 (10M)	27260	16.41	-92.08
	27435	16.64	-91.42
	27610	16.98	-91.7
FDD-B66 (10M)	27260	19.4	-91.89
	27435	20.28	-92.35
	27610	20.56	-92.54
TDD-B40 (20M)	38750	16.54	-88.87
	39150	17.77	-89.15
	39550	18.47	-89.46
TDD-B41 (20M)	40340	18.7	-90.95
	40620	19.05	-91.23
	41140	17.6	-91.49

2.3.2 OTA data of GPS/WiFi/bt antenna

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Antenna Specifications

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	WIFI (亮)		OTA	
	测试带宽	channel	TRP	TIS
2.4G	11b 11M	1	13.46	-80.25
		7	14.7	-81.45
		13	15.77	-81.36
5G	11a 54Mbps	36	10.22	-69.68
		64	11.16	-70.87
		165	12.37	-71.15

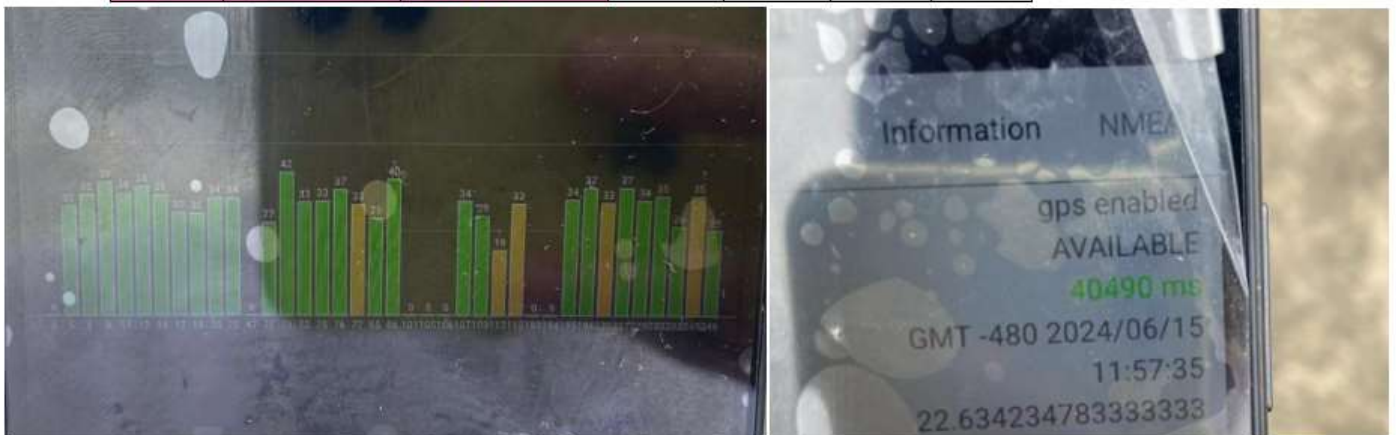
GPS有源测试数据 (亮)		
机器编号	Frequency (MHz)	Rssiave
标准	1575.42	37
调试机	1575.42	37.21

亮		量产机	
	channel	TRP	TIS
BT	0	5.68	-87.57
	39	6.15	-87.16
	78	6.33	-86.45

3. GPS/WiFi measured pictures

GPS 楼顶空旷地搜星效果如下图(天气: 白天晴)
WiFi 距离路由器约14米

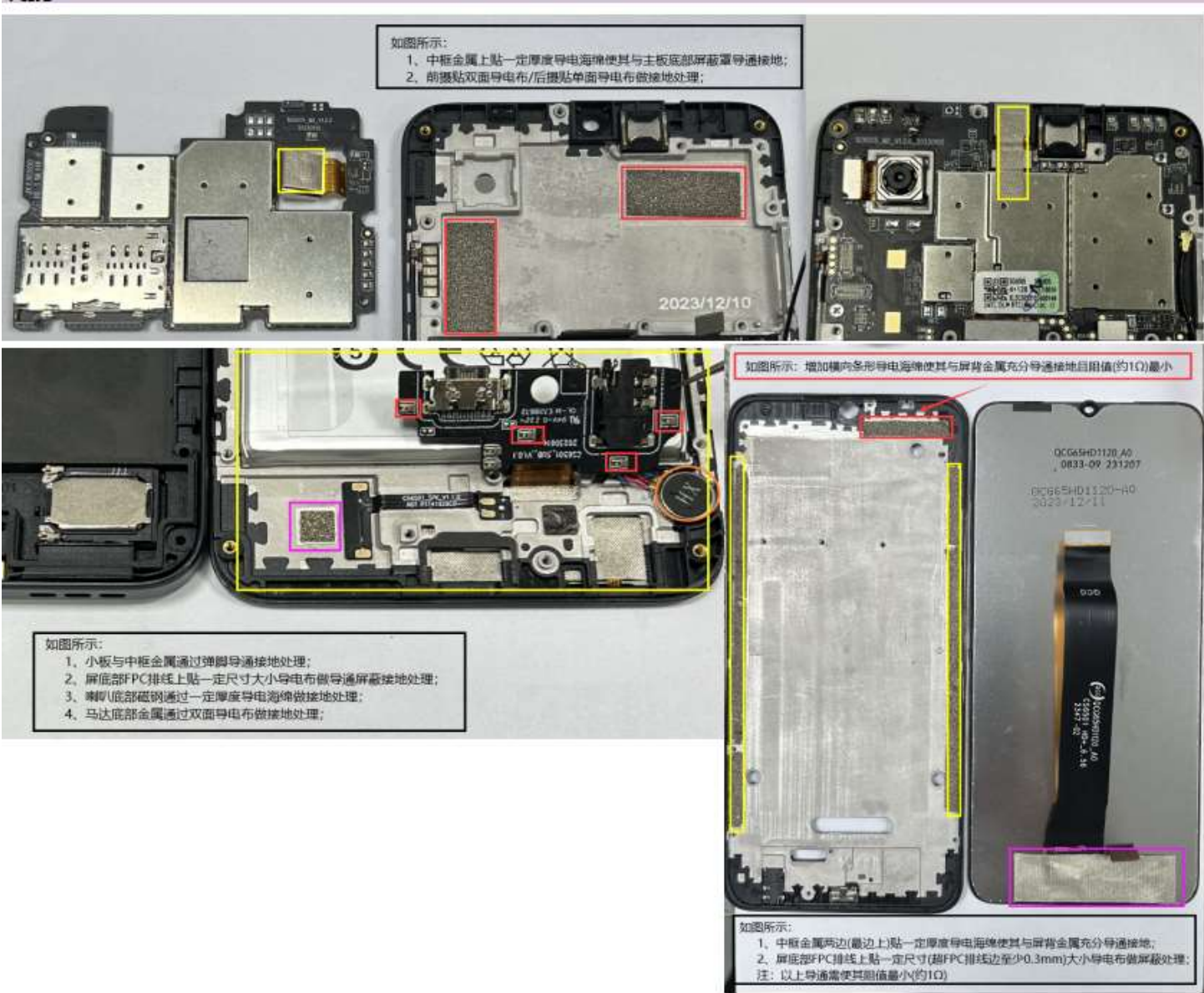
序 号	测试地点	测试项目	参考标准	样机编号		备 注
				试产机		
1	空旷场地	开机首次定位时间	≤60S	40S		搜星数量仅为定位时状态切图, 星数随时间拉长而变多
2		冷启动定位时间	≤60S	40S		
3		热启动定位时间	≤5S			
4		有效定位后卫星总数	≥8颗	26		
5		≥40的星数	≥3颗	3		
6		卫星SNR最大值	≥40dB	42		



4.Environmental treatment of the whole machine

Add: 606, Building E, Enterprise Aviation Technology Innovation Research and Development Industrial Park, No. 1008, Songbai Road, Sunshine Community, Xili Street, Nanshan District, Shenzhen

Tel. +86-755-27657751 Fax +86-755-27599500



5.Specifications Drawings

Development District,		25	
1		2	
A			
B			
C			
NOTE			
1. 材质: 各组成部分材质规格如图			
2. 尺寸及公差: 标“*”的为重点			
外型尺寸公差不得超过±0.1, 未注			
3. 镀层: 镀层H(≥60μm)金层H(≥0.0			
4. 可靠性测试: 盐水喷雾试验(橡皮			
5. 所用物料满足环保要求			
6. 商型纸需加一个手撕位。			
Rev		New Part	
1		2	

Add: 60
Industria
Shenzh
Tel. +86



Antenna Specifications

SHENZHEN HENGXIANGTONG ANTENNA TECHNOLOGY CO., LTD.

1		2	
A		B	
C		D	
NOTE			
1. 材质：各组成部分材质规格如图面右端表			
2. 尺寸及公差：标“*”的为重点尺寸，精确			
外型尺寸公差不得超过±0.1，未注尺寸以图			
3. 镀层：镀层H(2-6um)≥金层Au(0.0125um)			
4. 可靠性测试：盐水喷雾试验、橡皮摩擦测试			
5. 所用物料满足环保要求			
6. 原型纸需加一个手撕位。			
D			
		新图纸	
Rev		Description	
1		2	

partment
district,

5

Add: 60
Industri
Shenzh
Tel. +86



SHENZHEN HENGXIANGTONG ANTENNA TECHNOLOGY CO., LTD.

[illegible]

lopment
District,

25

Add: 6
Indust
Shenz
Tel. +8



Antenna Specifications

SHENZHEN HENGXIANGTONG ANTENNA TECHNOLOGY CO., LTD.

nent
trict,

1

2

□

注意事项:

1. 材料: XXX;

2. 零件外形, 未注尺寸, 以提供

3. 未注公差均按右侧尺寸公差

4. 标注“*”为富控尺寸;

5. 付品 KOHS 环保要求；

6. 产品无划痕、擦伤和剥边等

西曆

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42

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6.Environmental Characteristic

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Antenna Specifications

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Test Item	Test description
1. Low Temperature	Temp.: -20 °C Time: 24 hours
2. High Temperature	Temp.: 80°C Time: 24 hours
3. Salt Fog	5±0.1% Nad salt fog PH Value: 6.5-7.2 Temp: 35±1°C Time:24 hours