

QW-BG03

Antenna Test Report

深圳市和鸣微科技有限公司

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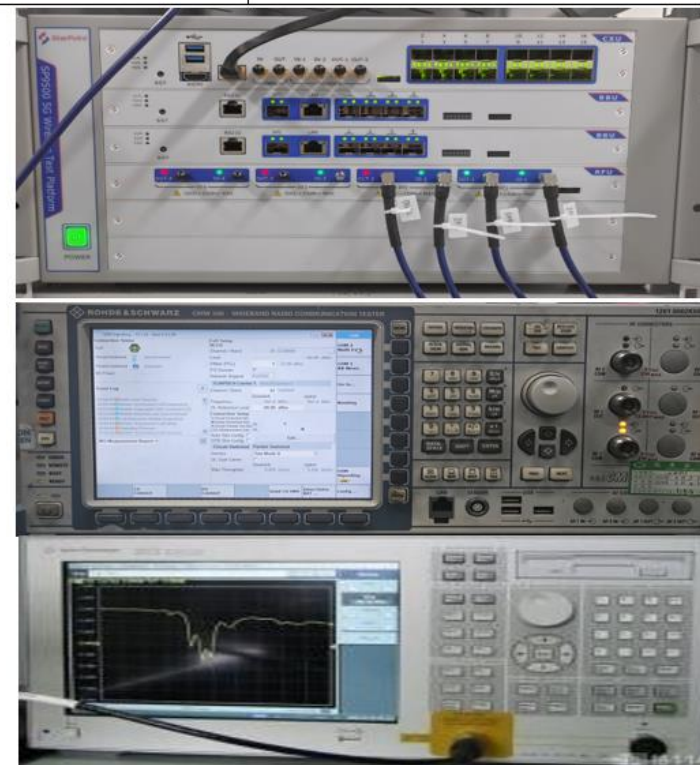
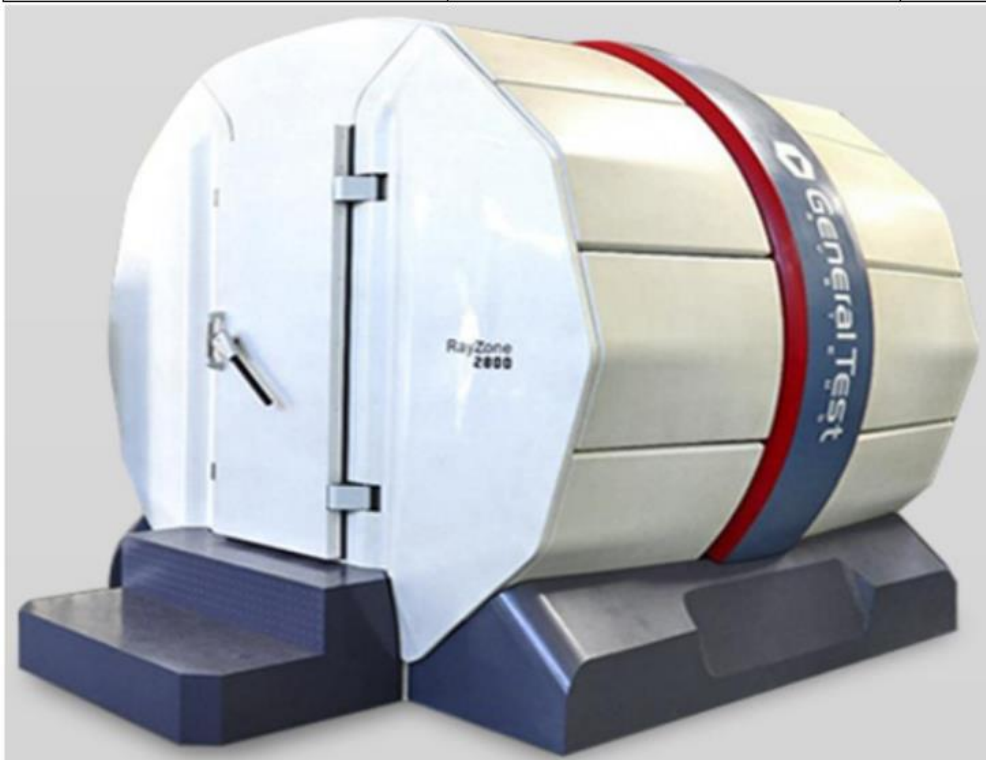


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- 07 | Overall machine environment handling

>>> Testing equipment

无源及有源测试—5G微波暗室 Passive and Active Testing - 5G Microwave Chamber

◆ 测试系统	◆ 测试环境	◆ 有源测试	◆ 无源测试
GTS2800	温度: $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 湿度: $50\% \pm 15\%$	支持5G/4G/3G/2G 支持BT/WIFI/GPS	600MHZ—6G



>>> Version Record



Version	Date	Content summary
V1.0	2025/08/07	Initial testing of passive components by hand (materials not available)
V2.0	2025/08/23	Passive optimization + GNSS measurement (with addition of LCD and shielding cover)
V3.0	2025/09/11	FPC sample optimization + GNSS measurement
V4.0	2025/12/05	Third Edition FPC Sample Passive Testing + GNSS Measurement

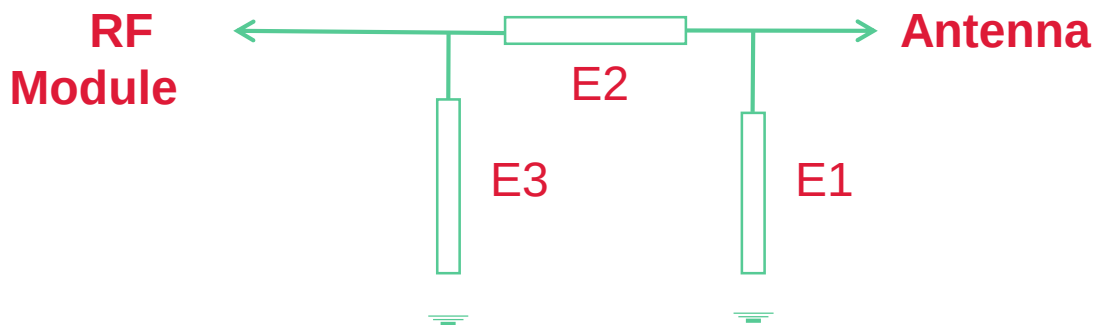
>>> Project Description



Overall machine type	Bike Navigator	
Overall layout of the machine and antenna	 	
Antenna-related information	Antenna types and materials	Built-in FPC antenna
	Debugging frequency band	GPS L1/BD B1C:1575.42MHz GPS L5/BD B2a:1176.45MHz BD B1I:1561.098MHz GLONASS:1602MHz BT&ANT+:2.4~2.5GHz
	Antenna form	GPS L1&BT&ANT+:IFA GPS L5:Monopole

>>> Antenna matching (GPS L1)

- Matched circuit schematic diagram



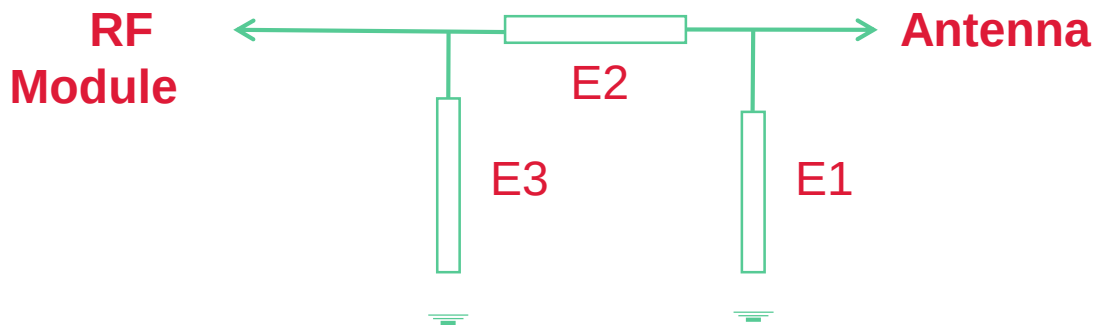
Has the matching circuit been modified?
Yes, it has been modified.

- Matching value:

Element	Value
E1(0201)	1.2pF
E2(0201)	0Ω
E3(0201)	NC

>>> Antenna matching (GPS L5)

- Matched circuit schematic diagram



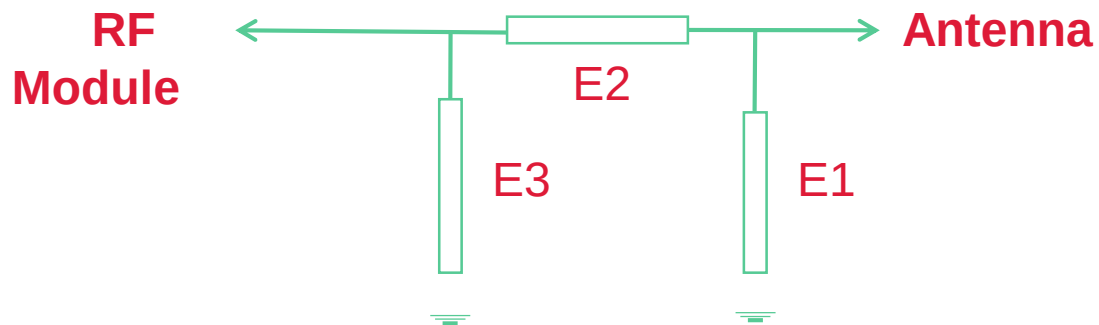
Has the matching circuit been modified?
Yes, it has been modified.

- Matching value:

Element	Value
E1(0201)	4.7nH
E2(0201)	0Ω
E3(0201)	NC

>>> Antenna matching (BT1)

- Matched circuit schematic diagram



Has the matching circuit been modified?
No modification.

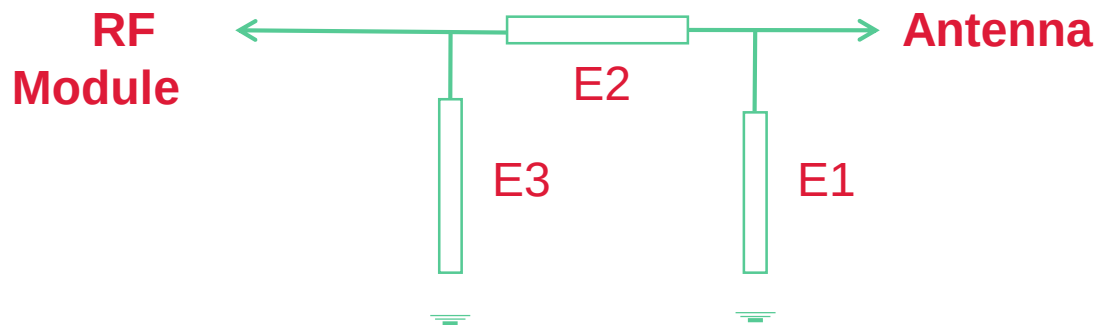
- Matching value:

Element	Value
E1(0201)	NC
E2(0201)	0Ω
E3(0201)	NC

>>> Antenna matching (ANT+)



- Matched circuit schematic diagram



Has the matching circuit been modified?
No modification.

- Matching value:

Element	Value
E1(0201)	NC
E2(0201)	0Ω
E3(0201)	NC

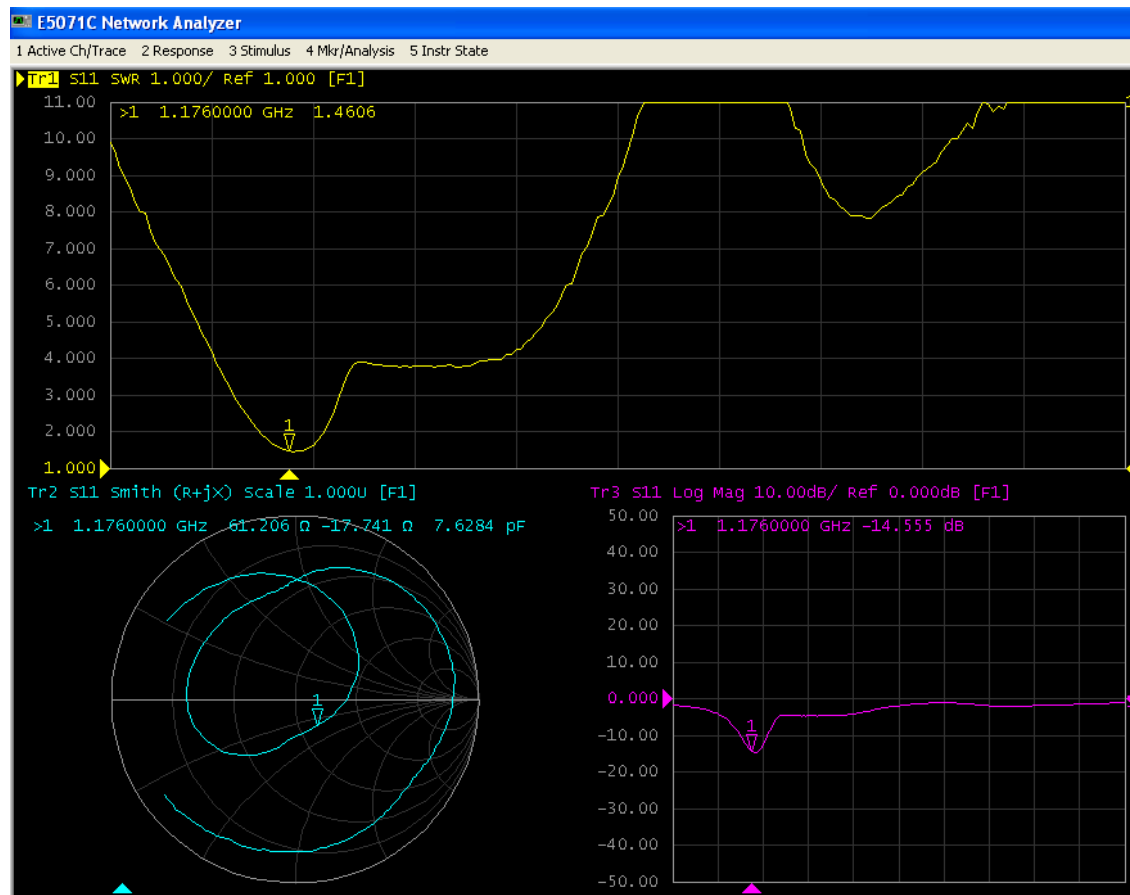
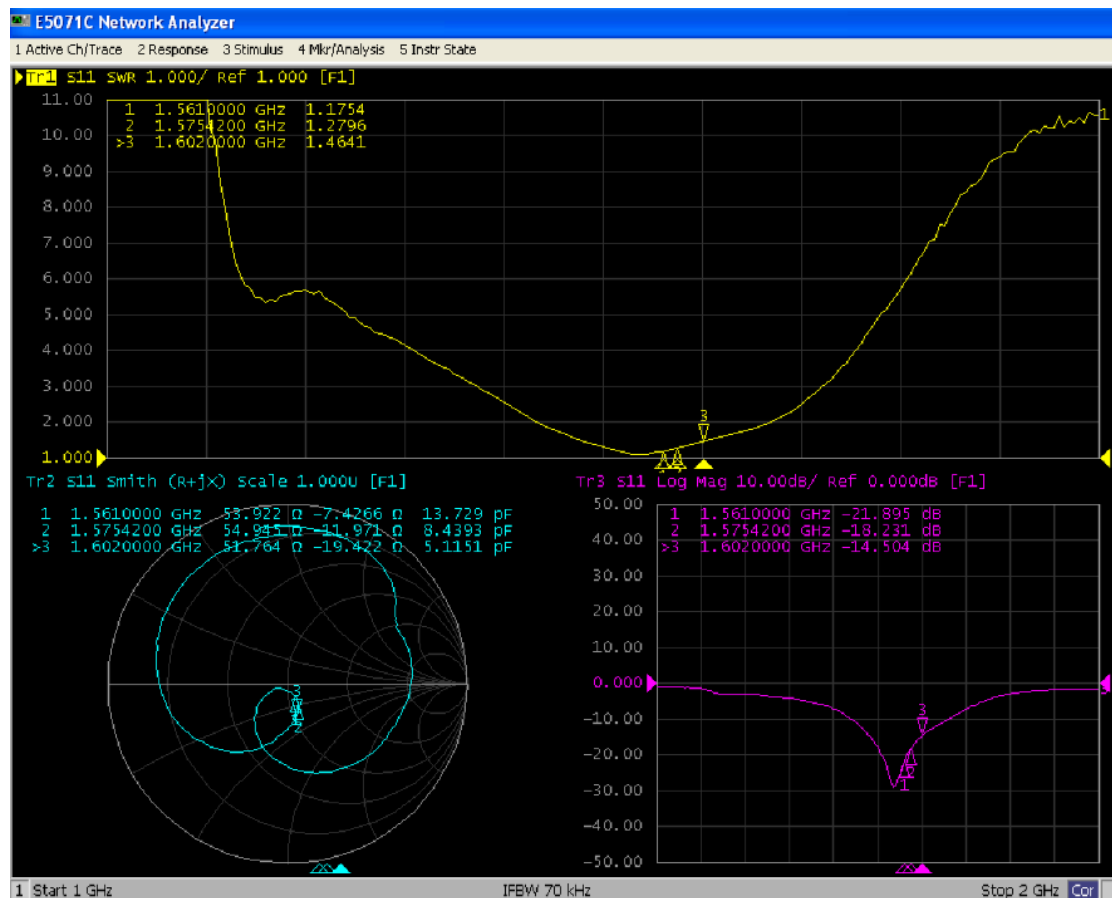


Passive S-parameters-GPS L1&L5



GPS L1+BD B1I+GLONASS

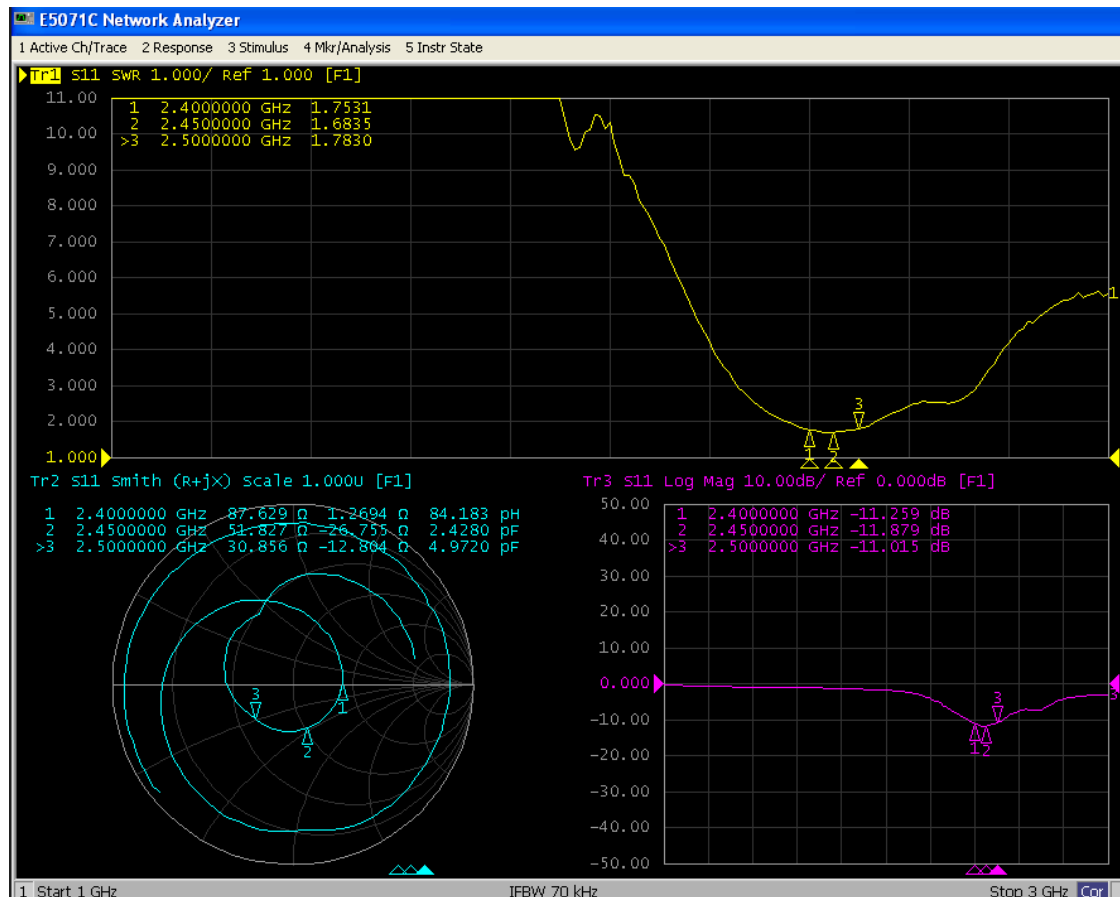
GPS L5/BD B2a



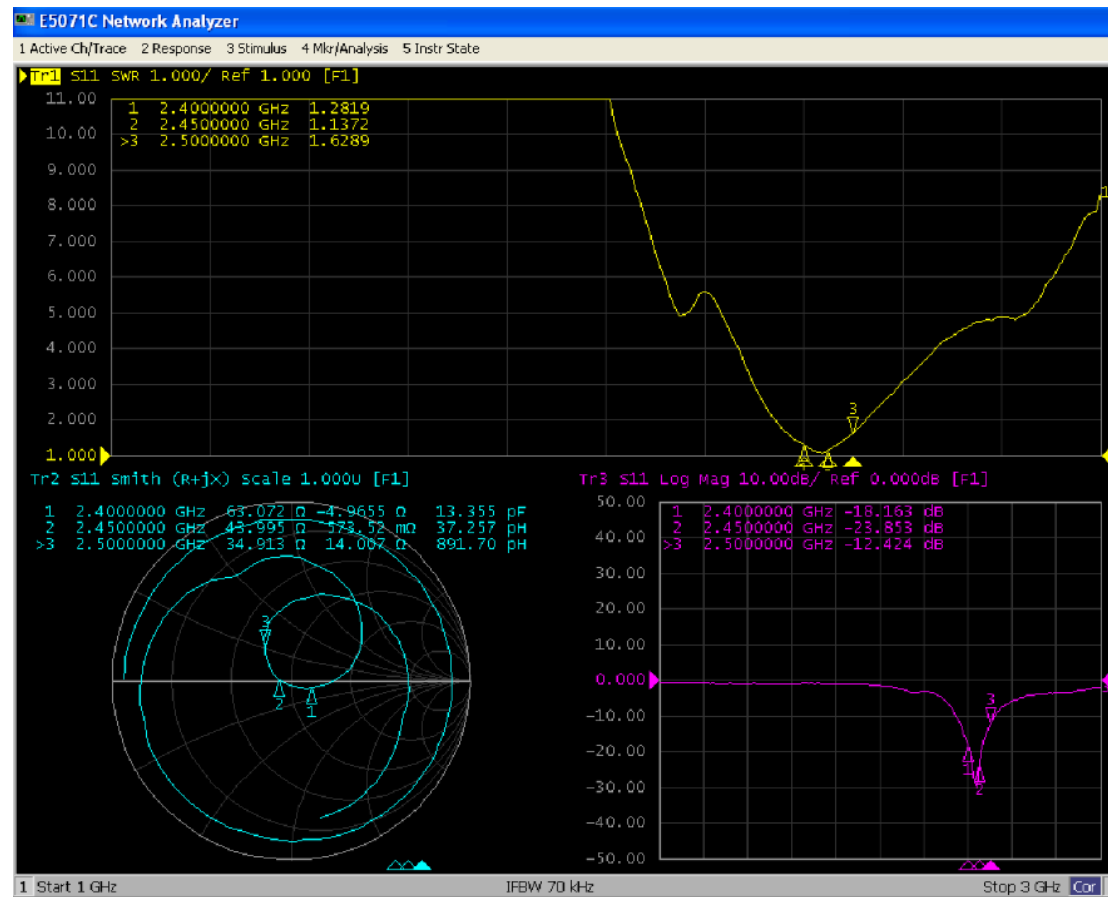


Passive S-parameters-BT1&ANT+

BT1

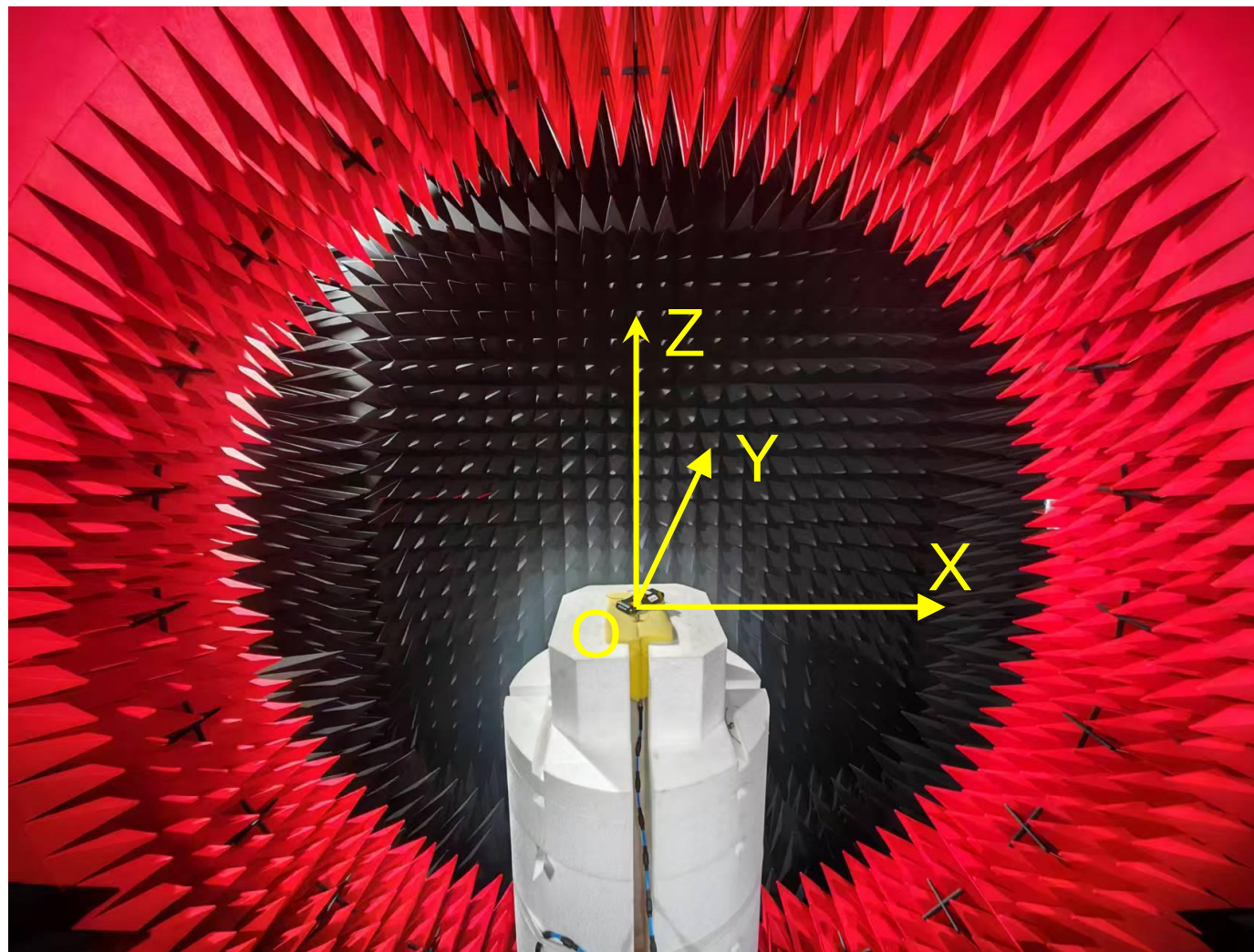


ANT+





Passive test placement status

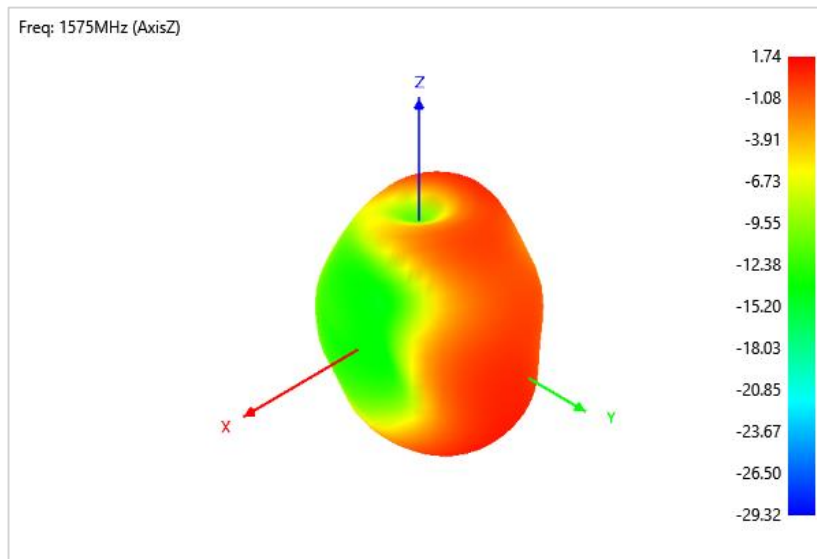
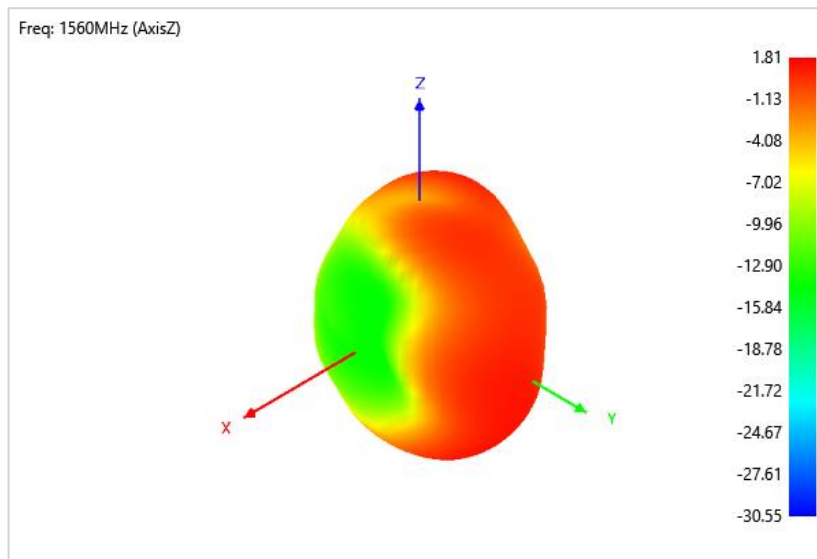




Passive gain, efficiency and pattern- GPS L1



Frequency(MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
1500	2.67	-3.35	46.21
1505	2.8	-3.26	47.26
1510	2.64	-3.35	46.2
1515	2.56	-3.28	46.99
1520	2.35	-3.4	45.66
1525	2.22	-3.35	46.24
1530	2.06	-3.34	46.39
1535	1.93	-3.28	47.01
1540	1.95	-3.17	48.18
1545	1.7	-3.31	46.64
1550	1.64	-3.32	46.56
1555	1.63	-3.49	44.81
1560	1.81	-3.41	45.59
1565	1.74	-3.56	44.09
1570	1.84	-3.56	44.04
1575	1.74	-3.79	41.77
1580	1.65	-3.98	39.98
1585	1.6	-4.18	38.22
1590	1.54	-4.3	37.15
1595	1.56	-4.32	37.02
1600	0.57	-4.28	37.34
1605	0.57	-4.31	37.04
1610	0.65	-4.26	37.5



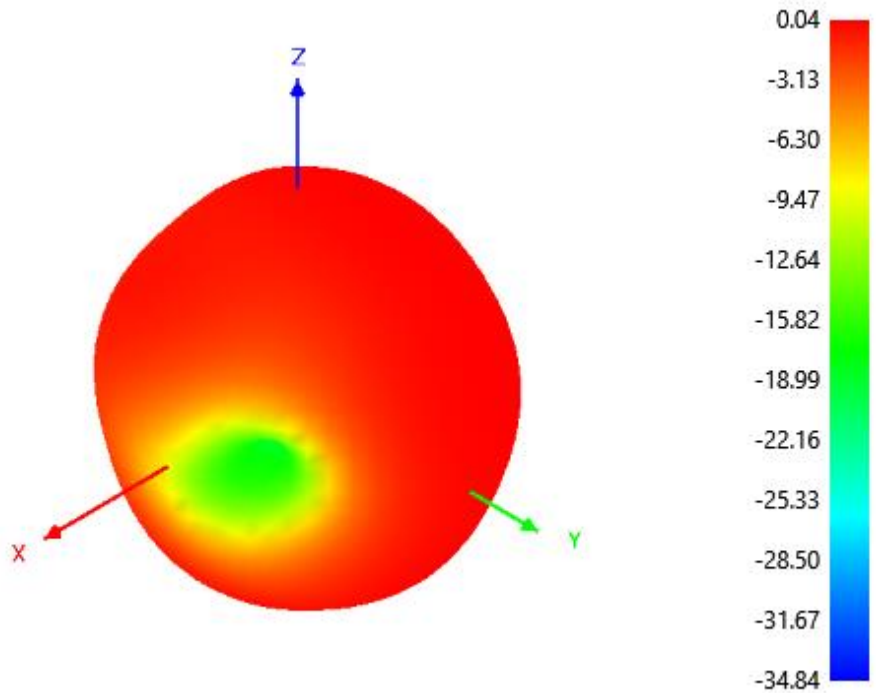


Passive gain, efficiency and pattern- GPS L5



1156	-0.17	-3.22	47.64
1160	0.02	-3.18	48.09
1164	-0.1	-3.19	47.93
1168	-0.03	-3.19	47.97
1172	0.06	-3.14	48.58
1176	0.04	-3.21	47.8
1180	0.14	-3.1	49
1184	0.08	-3.13	48.65
1188	-0.06	-3.21	47.73
1192	-0.01	-3.11	48.88
1196	-0.34	-3.42	45.48
1200	-0.23	-3.3	46.75

Freq: 1176MHz (AxisZ)

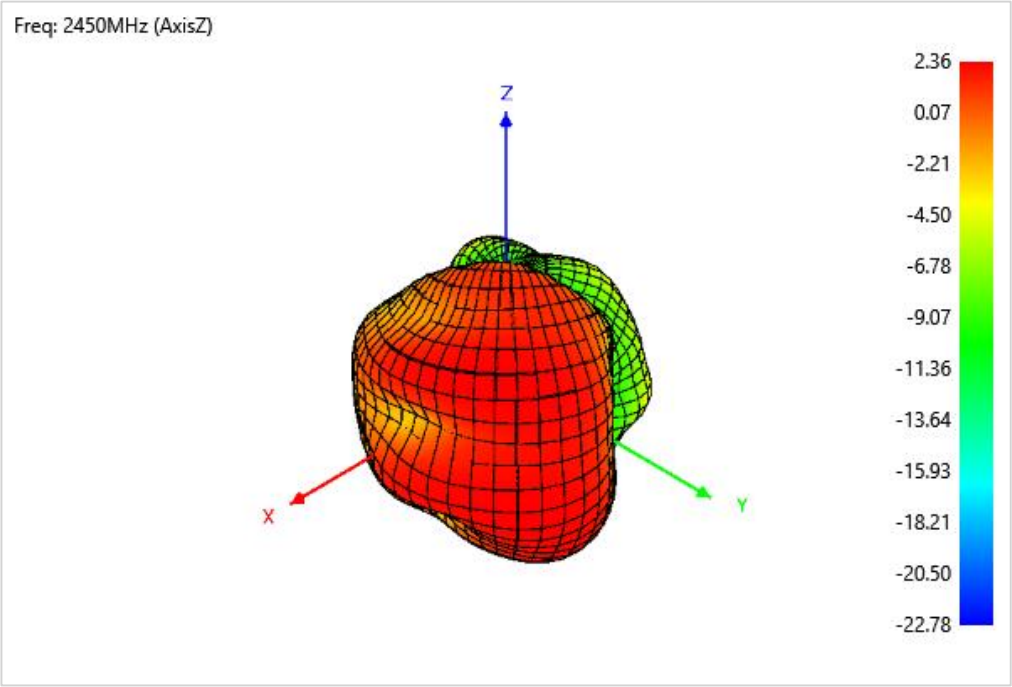




Passive gain, efficiency and pattern-BT1



Frequency(MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
2400	2.02	-3.61	43.6
2410	2.07	-3.48	44.86
2420	1.92	-3.36	46.15
2430	2.14	-3.09	49.11
2440	2.55	-2.98	50.4
2450	2.36	-2.94	50.87
2460	2.32	-3.07	49.31
2470	1.84	-3.33	46.48
2480	1.25	-3.63	43.32
2490	0.48	-4.04	39.48
2500	-0.18	-4.36	36.65

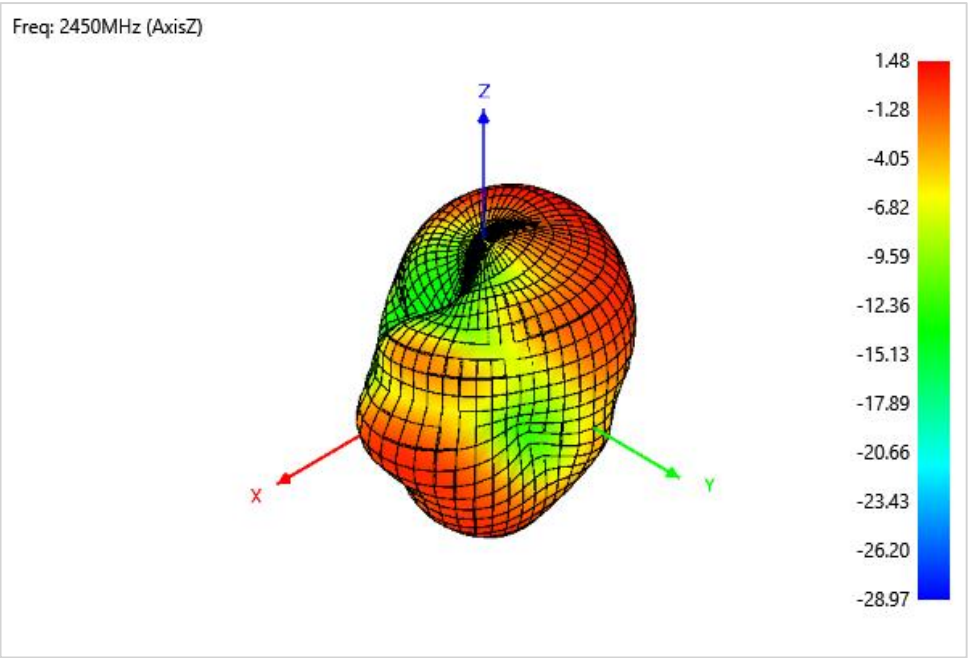




Passive gain, efficiency and pattern- ANT+

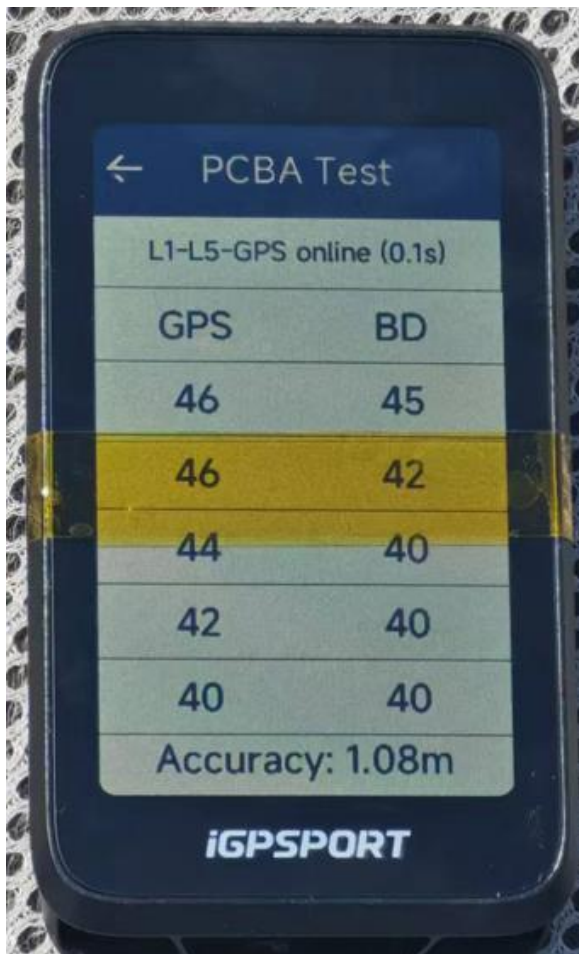


Frequency(MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
2400	0.4	-4.07	39.15
2410	0.48	-3.94	40.39
2420	0.47	-3.79	41.8
2430	0.87	-3.51	44.57
2440	1.36	-3.37	45.98
2450	1.48	-3.22	47.7
2460	1.58	-3.28	47.03
2470	1.32	-3.47	44.99
2480	0.84	-3.72	42.5
2490	0.6	-4.09	39.02
2500	0.42	-4.47	35.69



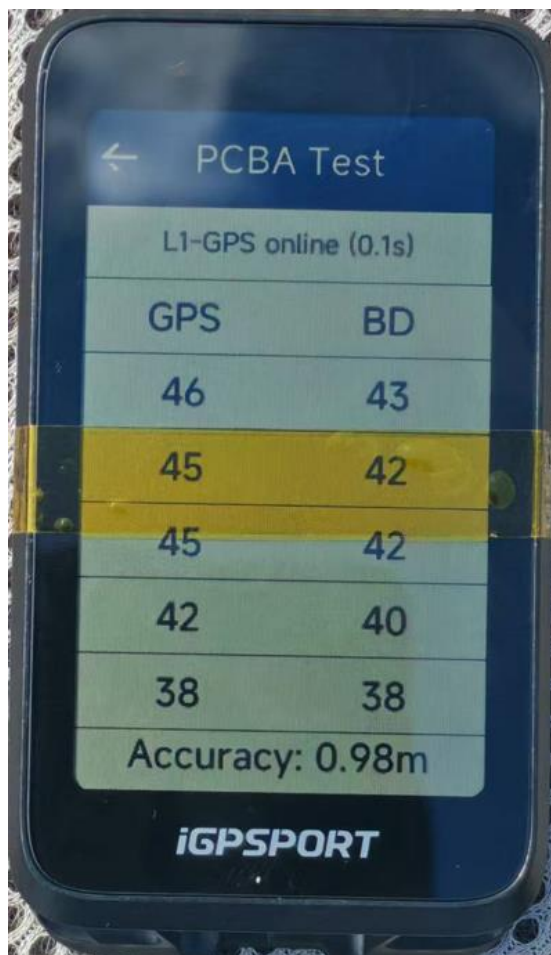
>>> GNSS actual measurement results

Test location: Roof of Building D, Ameite Electrical Appliance Company, Jianxing Road, Bao'an District, Shenzhen (on a stool)



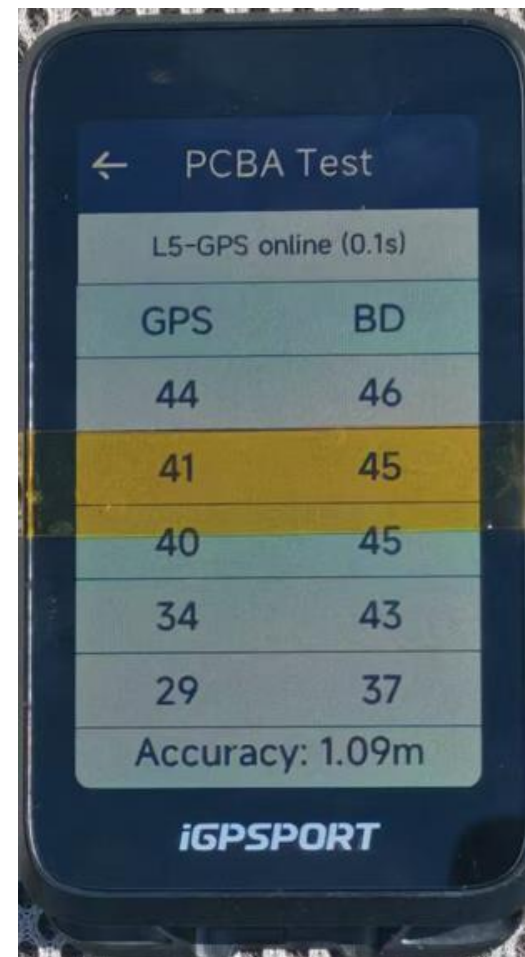
← PCBA Test	
L1-L5-GPS online (0.1s)	
GPS	BD
46	45
46	42
44	40
42	40
40	40
Accuracy: 1.08m	

iGPSport



← PCBA Test	
L1-GPS online (0.1s)	
GPS	BD
46	43
45	42
45	42
42	40
38	38
Accuracy: 0.98m	

iGPSport

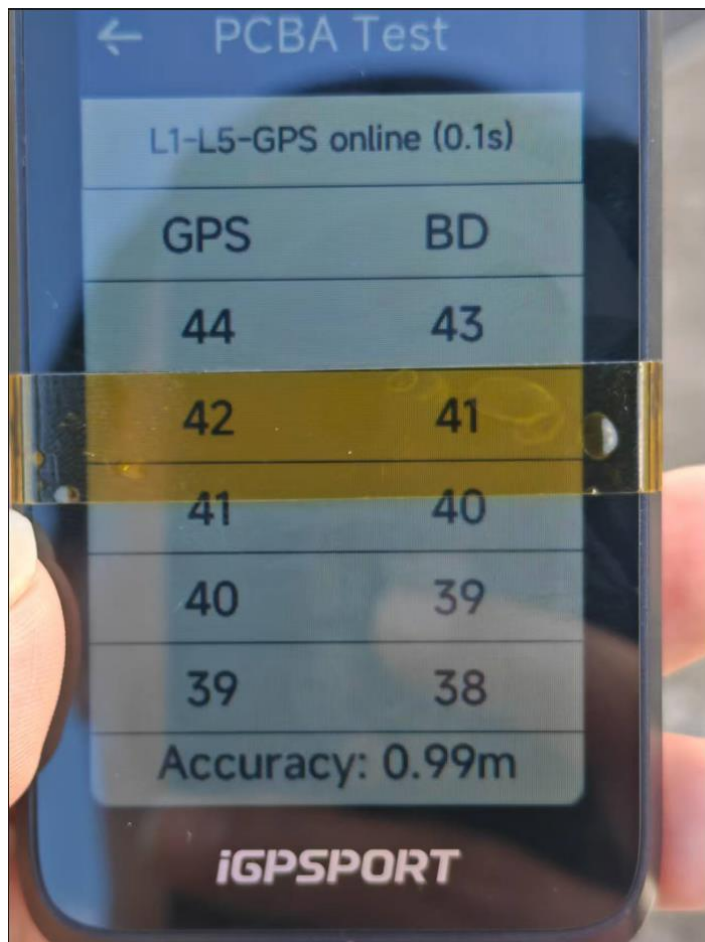


← PCBA Test	
L5-GPS online (0.1s)	
GPS	BD
44	46
41	45
40	45
34	43
29	37
Accuracy: 1.09m	

iGPSport

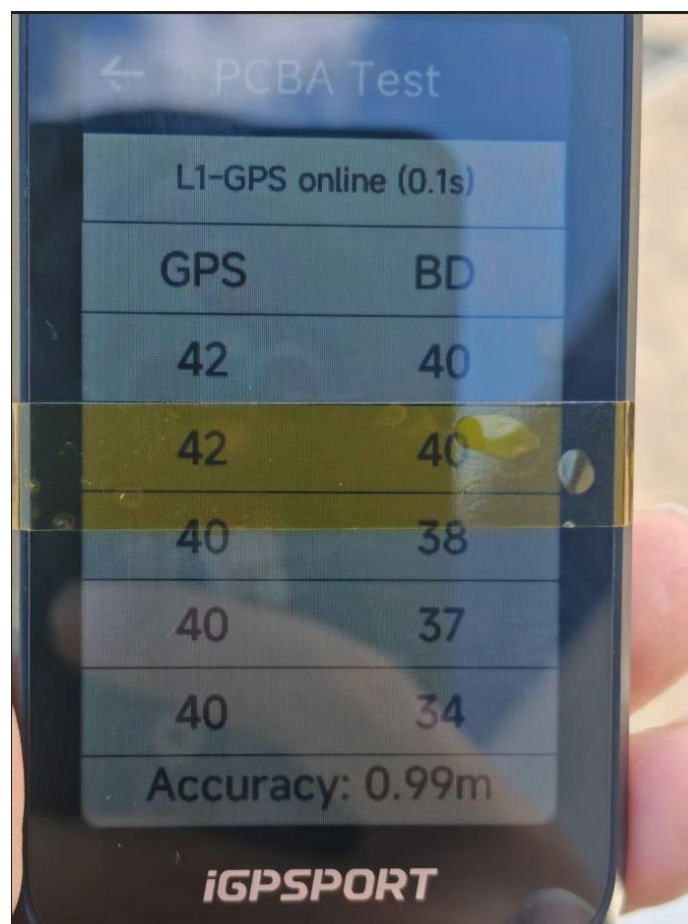
>>> GNSS actual measurement results

Test location: Roof of Building D, Ameite Electrical Appliance Company, Jianxing Road, Bao'an District, Shenzhen (in a hand-held state)



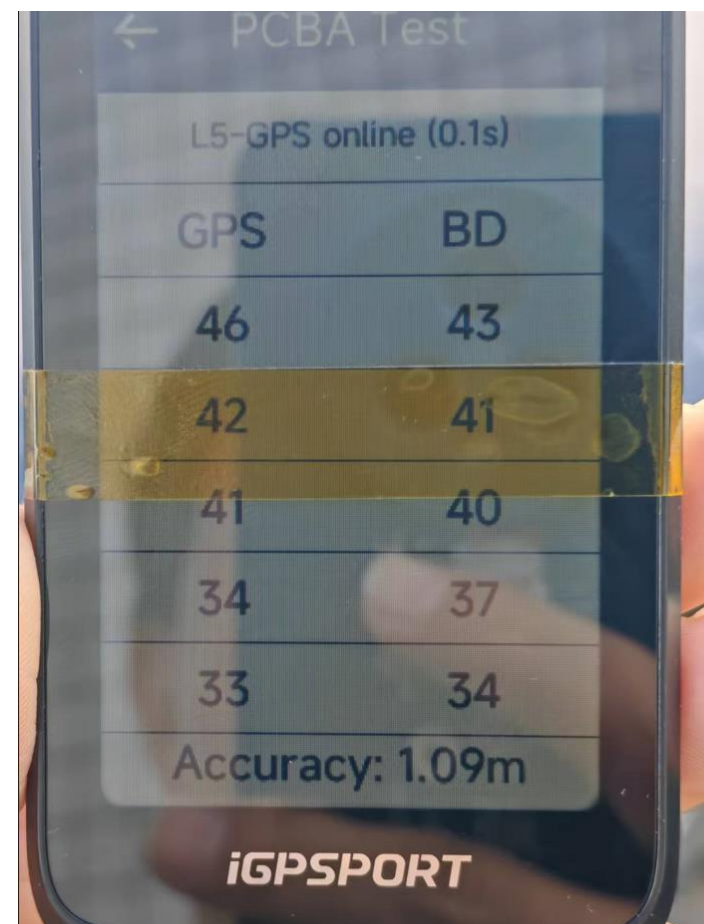
L1-L5-GPS online (0.1s)	
GPS	BD
44	43
42	41
41	40
40	39
39	38
Accuracy: 0.99m	

iGPSport



L1-GPS online (0.1s)	
GPS	BD
42	40
42	40
40	38
40	37
40	34
Accuracy: 0.99m	

iGPSport



L5-GPS online (0.1s)	
GPS	BD
46	43
42	41
41	40
34	37
33	34
Accuracy: 1.09m	

iGPSport



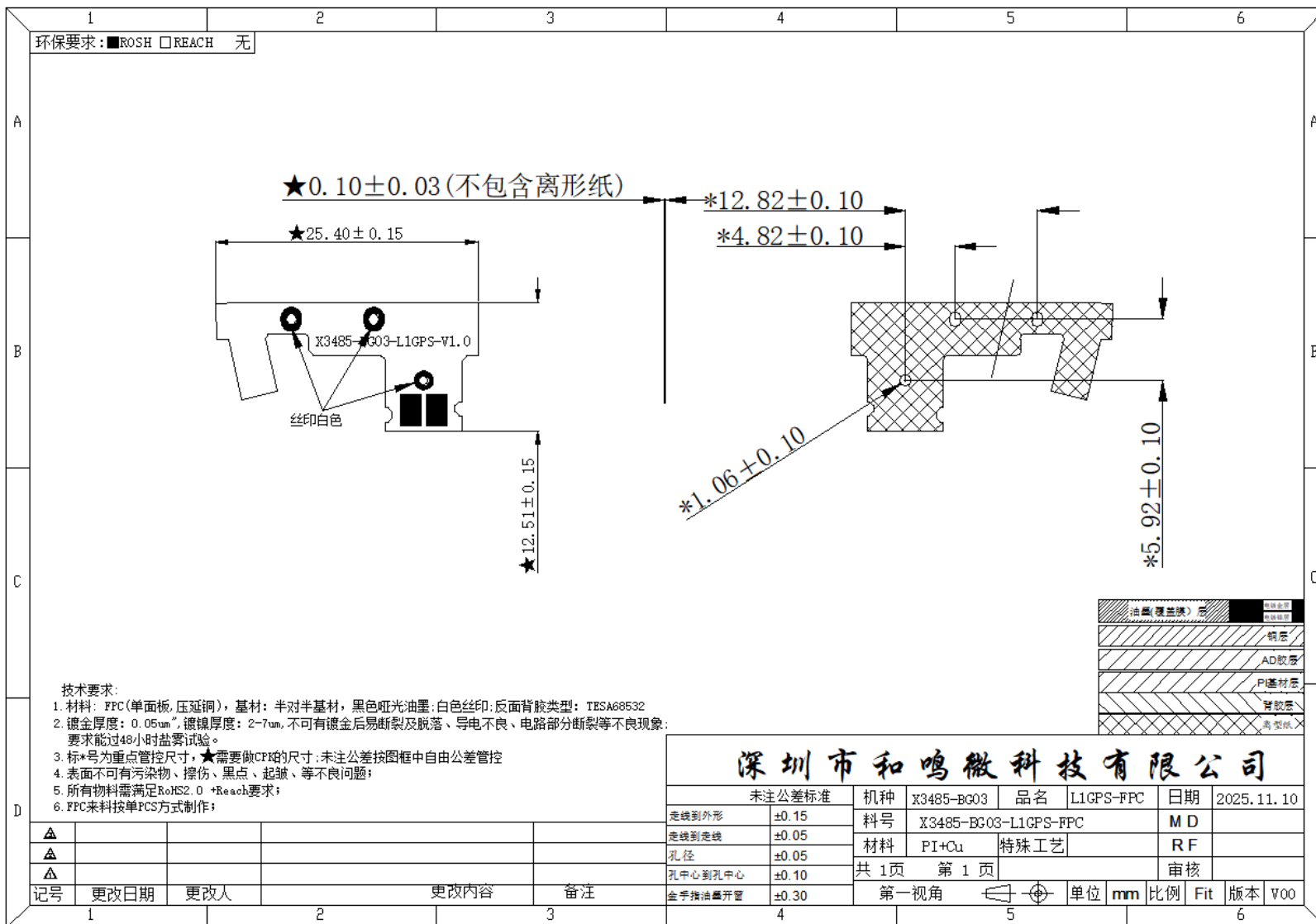
Overall machine environment processing diagram



According to the status of the DVT trial production machine, apply conductive foam in both the upper and lower areas of the shielding cover to ensure good grounding between the steel plate on the LCD backside and the mainboard.

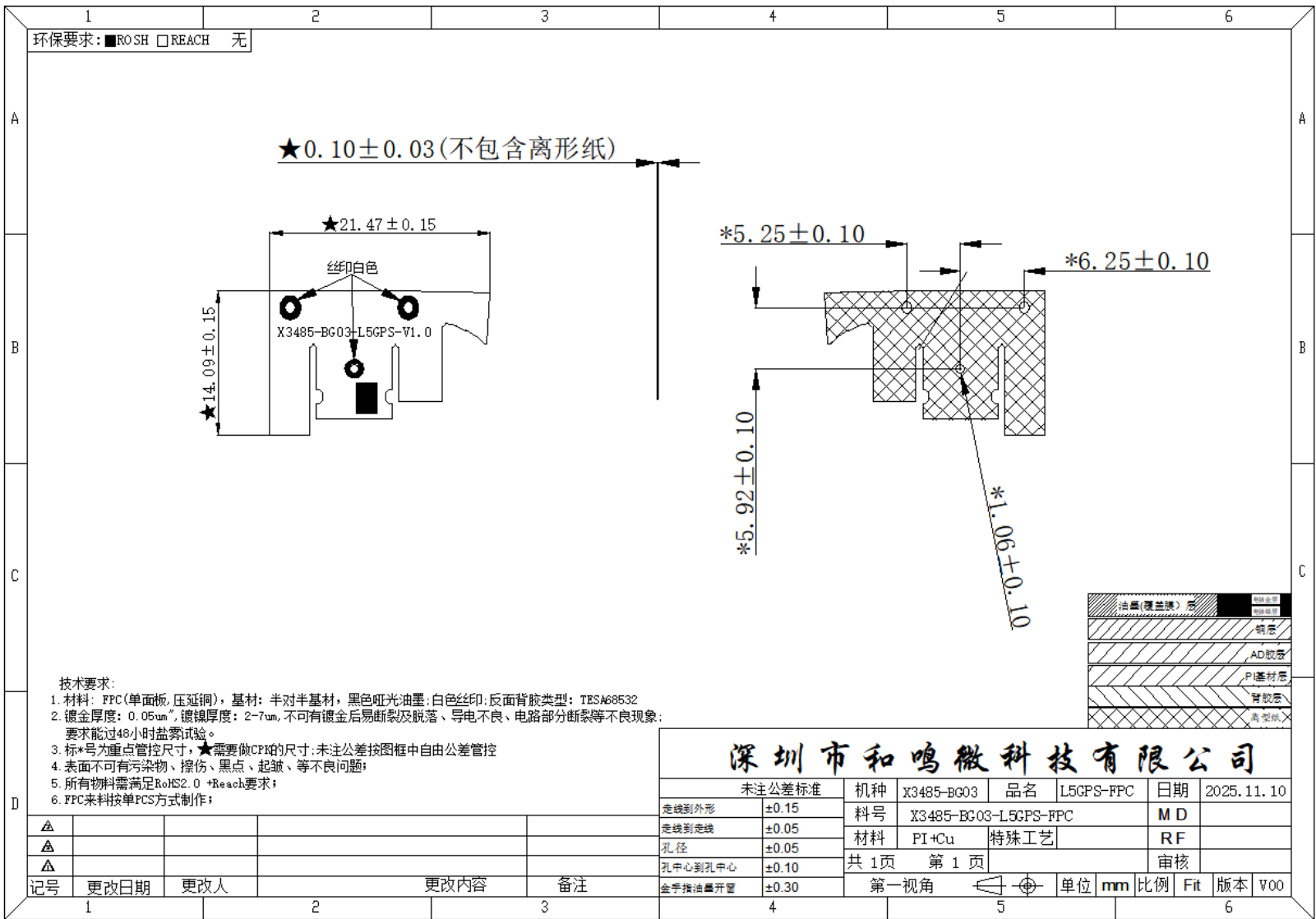


GPS L1 Antenna dimension diagram



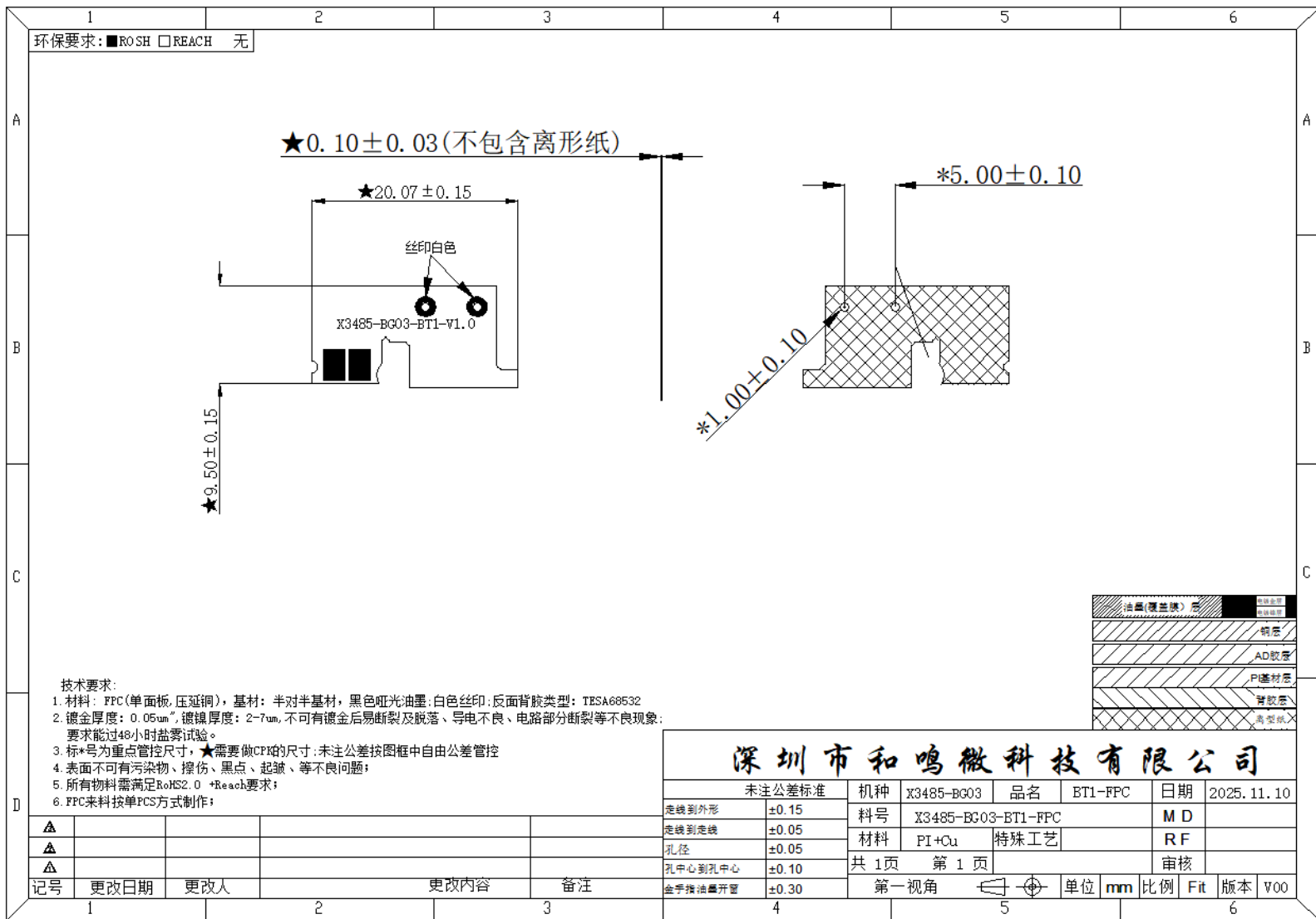


GPS L5 Antenna dimension diagram



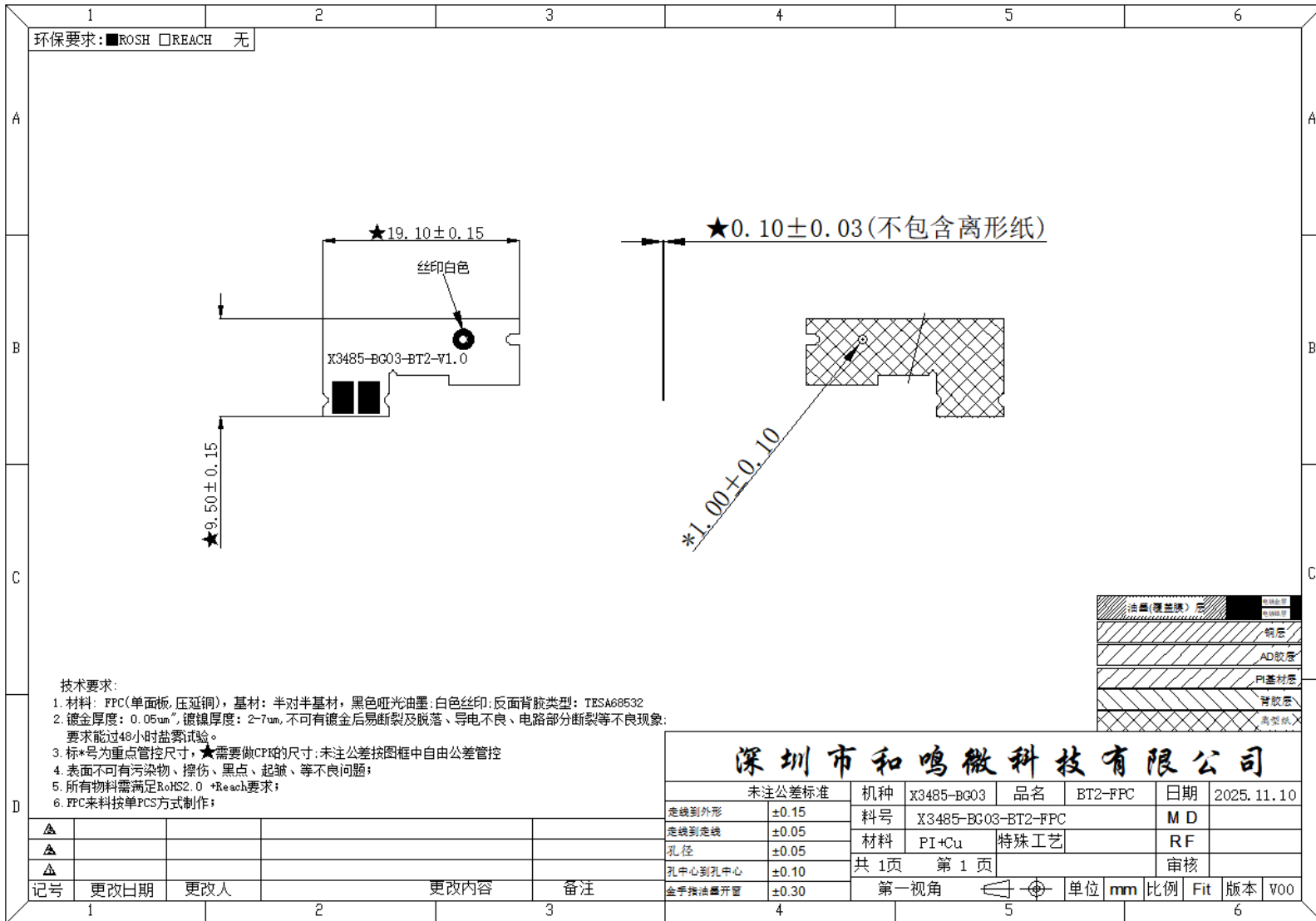


BT1 Antenna dimension diagram





ANT+ Antenna dimension diagram





Thank you for watching.

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