

Outline

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- 2. Relevant Information**
- 3. S-Parameters(VSWR&Isolation)**
- 4. Antenna Efficiency& Peak Gain**
- 5. Radiation patterns**
- 6. Summary**

Customer: Barking Labs Corporation

Project Name: FC3

**Manufacture: KUNSHAN HUBBLE ELECTRONICS
TECHNOLOGY CO.,LTD**

The Test Equipment List:CMW500 E5071B Antenna

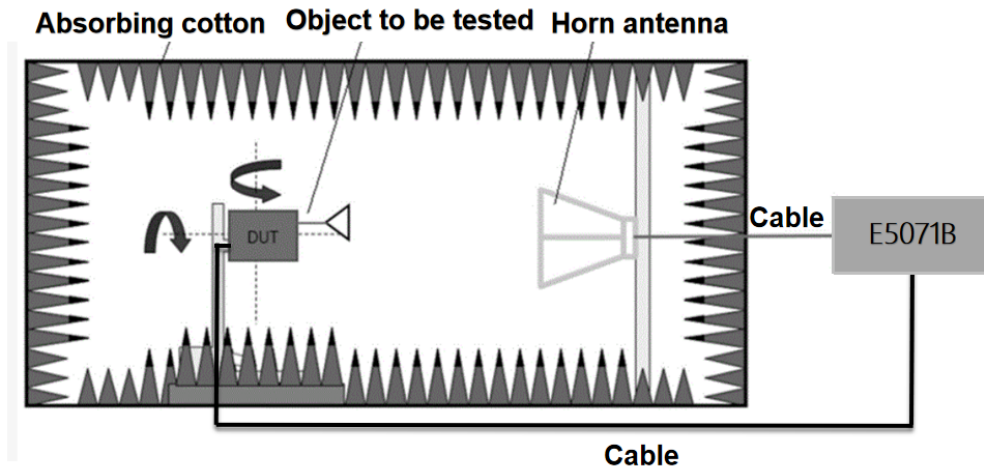
Type: CAT-M1(PIFA) BLE/WIFI(PIFA) GPS(PIFA)

Designer:Liming Liu

Date:2022.09.21

Relevant Information

Frequency	Average efficiency	Spec
Cat-M1-B12	-7.44dB	-12.5dB
Cat-M1-B4	-3.84dB	-12dB
Cat-M1-B2	-3.88dB	-12dB

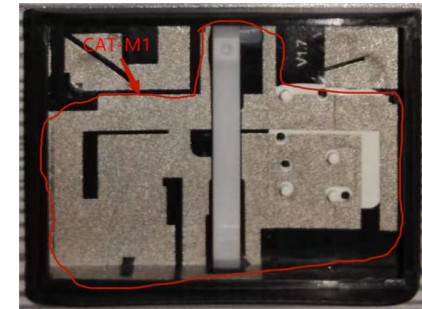
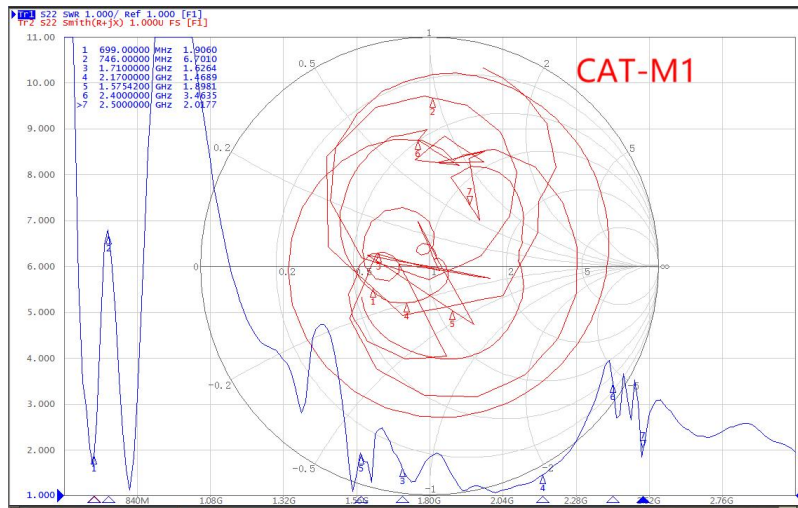


Test Date	Test Personnel	Test Software	Table of Calibrated Equipment	
2022.09.20	Wayne.Zhang	AnTestPro99	CMW500	E5071B

Test Method:

The product was placed on the turntable in the chamber and connected with the transmission line. The software was used to set the frequency range and control the rotation of the turntable. The system collected and calculated the data in all directions and finally summarized the data in all frequency bands.

S-Parameters、Antenna Efficiency& Peak Gain-CAT-M1



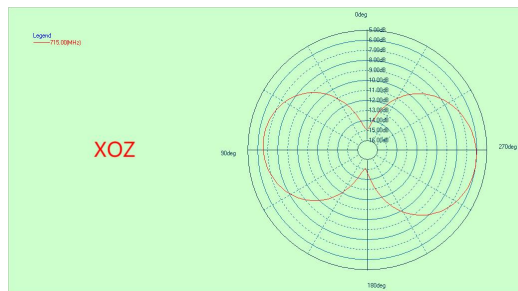
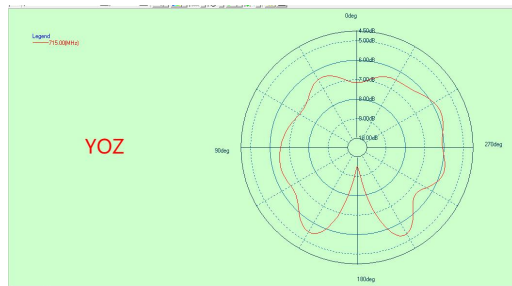
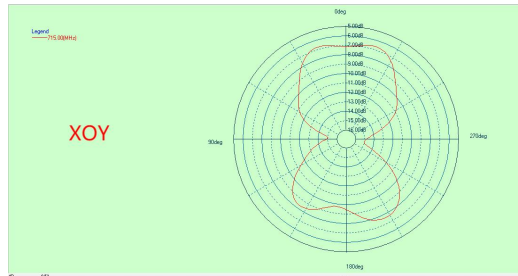
Band	Efficiency	Peak Gain
CAT-M1 B2	28.18%-47.86%	-1.70dBi
CAT-M1 B4	25.12%-50.12%	-0.09dBi
CAT-M1 B12	15.07%-19.28%	-2.99dBi

Frequency	Efficiency	Efficiency (%)	E Total.
695MHz	-8.73	13.40	-3.35
700MHz	-7.60	17.38	-2.99
705MHz	-7.29	18.66	-3.51
710MHz	-7.15	19.28	-4.17
715MHz	-7.73	16.87	-5.30
720MHz	-8.46	14.26	-5.92
725MHz	-8.59	13.84	-5.83
730MHz	-8.22	15.07	-5.19
735MHz	-8.20	15.14	-4.98
740MHz	-7.85	16.41	-4.61
745MHz	-7.56	17.54	-4.34
750MHz	-7.43	18.07	-4.12
AVE	-7.90	16.32	-4.53

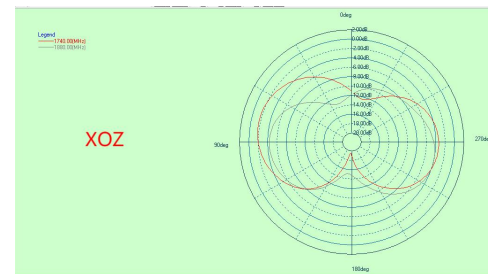
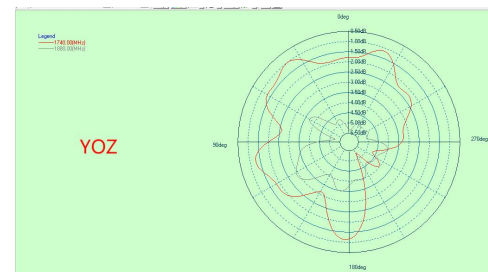
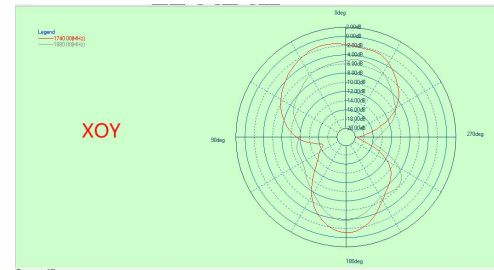
Frequency	Efficiency	Efficiency (%)	E Total.	1960MHz	-3.42	45.50	-0.45
1700MHz	-4.33	36.90	-0.23	1980MHz	-3.20	47.86	0.16
1720MHz	-4.38	36.48	-0.09	2000MHz	-2.95	50.70	0.97
1740MHz	-4.76	33.42	-0.87	2020MHz	-3.29	46.88	1.48
1760MHz	-6.00	25.12	-1.63	2040MHz	-3.20	47.86	1.46
1780MHz	-6.69	21.43	-2.99	2060MHz	-3.45	45.19	0.41
1800MHz	-6.78	20.99	-2.79	2080MHz	-3.84	41.30	0.25
1820MHz	-6.15	24.27	-2.06	2100MHz	-3.22	47.64	0.86
1840MHz	-5.50	28.18	-1.70	2120MHz	-3.26	47.21	0.82
1860MHz	-4.88	32.51	-2.55	2140MHz	-3.07	49.32	0.98
1880MHz	-4.92	32.21	-2.60	2160MHz	-3.00	50.12	1.15
1900MHz	-4.75	33.50	-2.98	2180MHz	-3.14	48.53	1.03
1920MHz	-4.00	39.81	-2.07	2200MHz	-3.94	40.36	0.15
1940MHz	-3.65	43.15	-1.23	AVE	-4.22	39.09	-0.56

Radiation patterns(2D)-CAT-M1

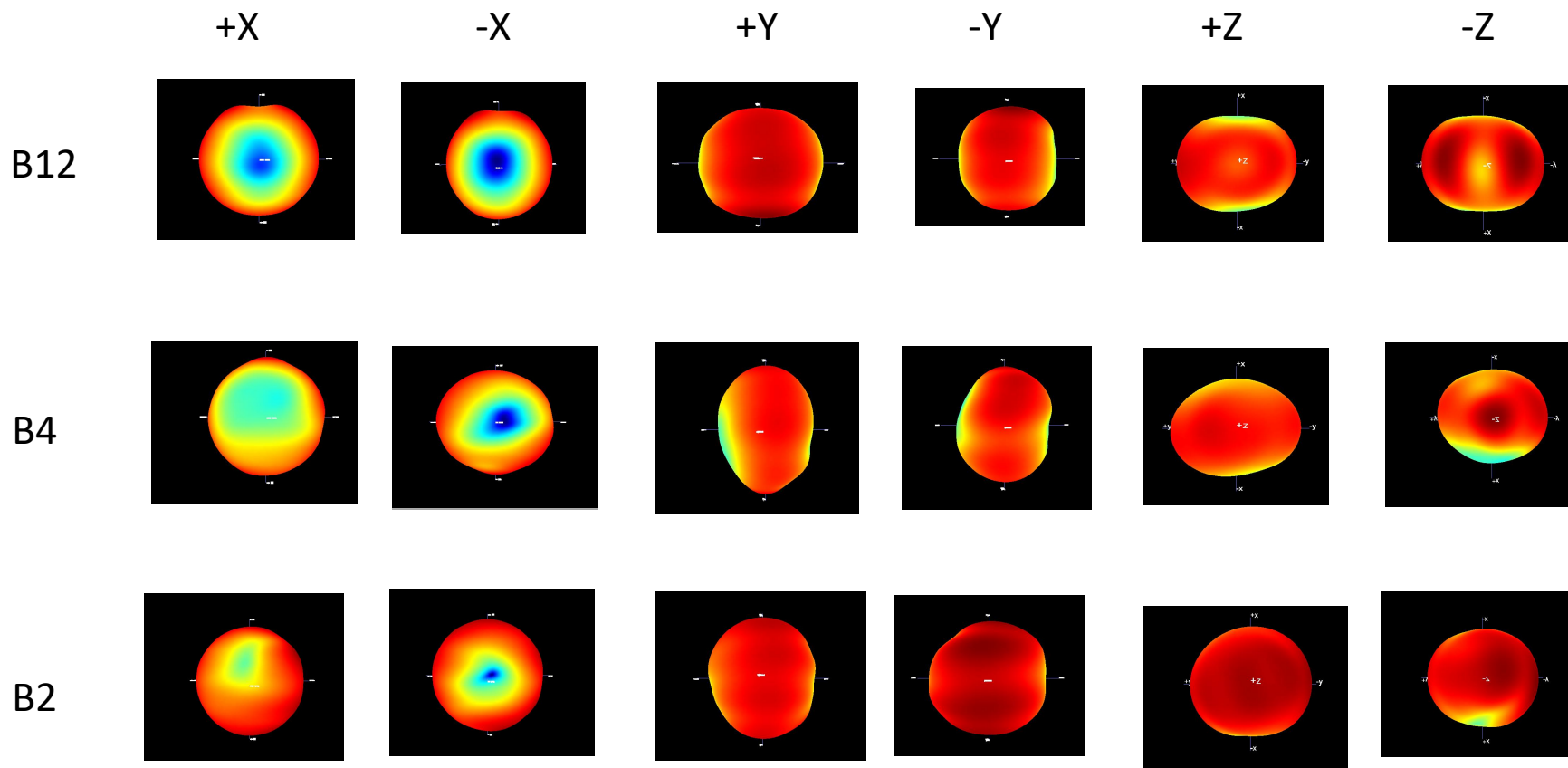
B12



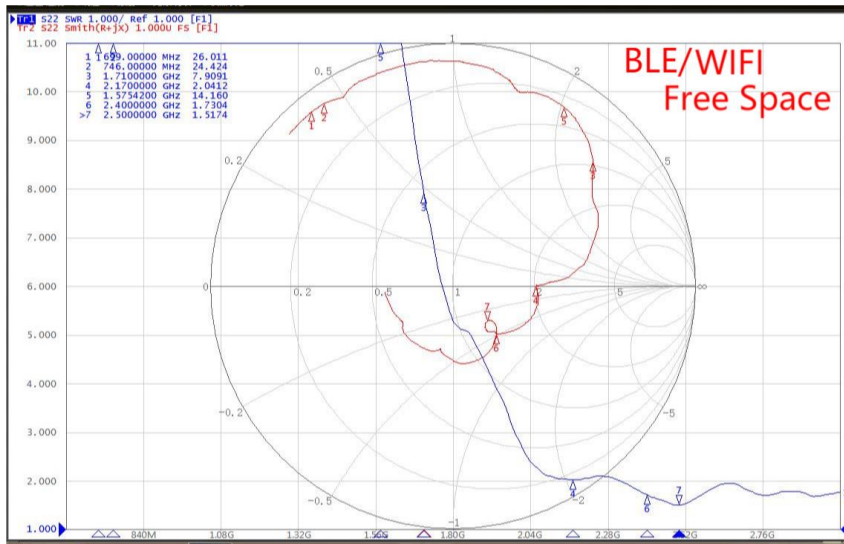
B4&B2



Radiation patterns(3D)-CAT-M1

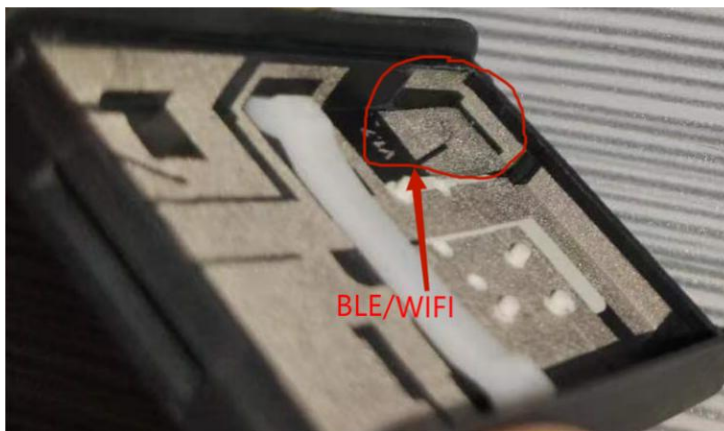


S-Parameters、Antenna Efficiency& Peak Gain-BLE/WIFI

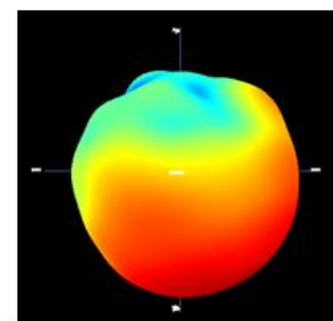
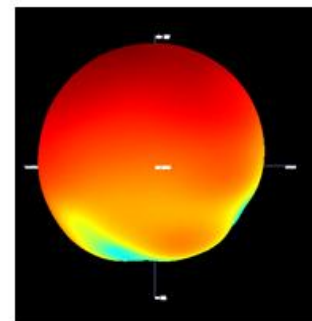
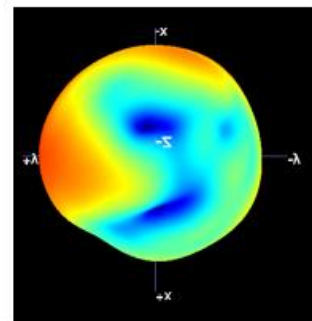
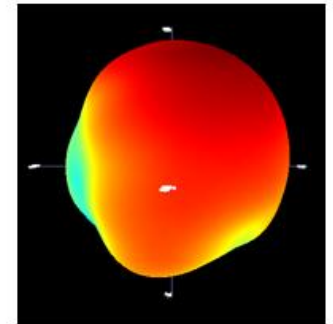
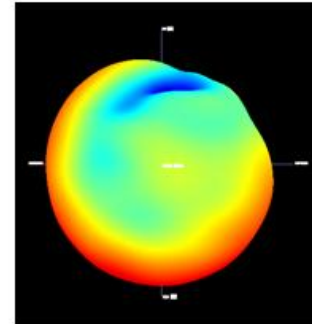
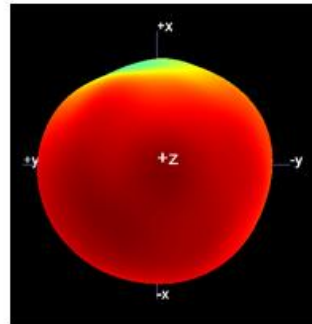
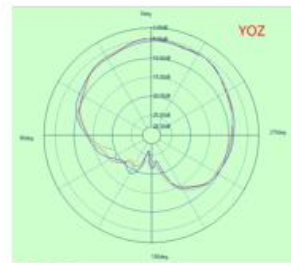


Band	Efficiency	Peak Gain
BLE/WIFI	31.19%-34.83%	-0.10dBi

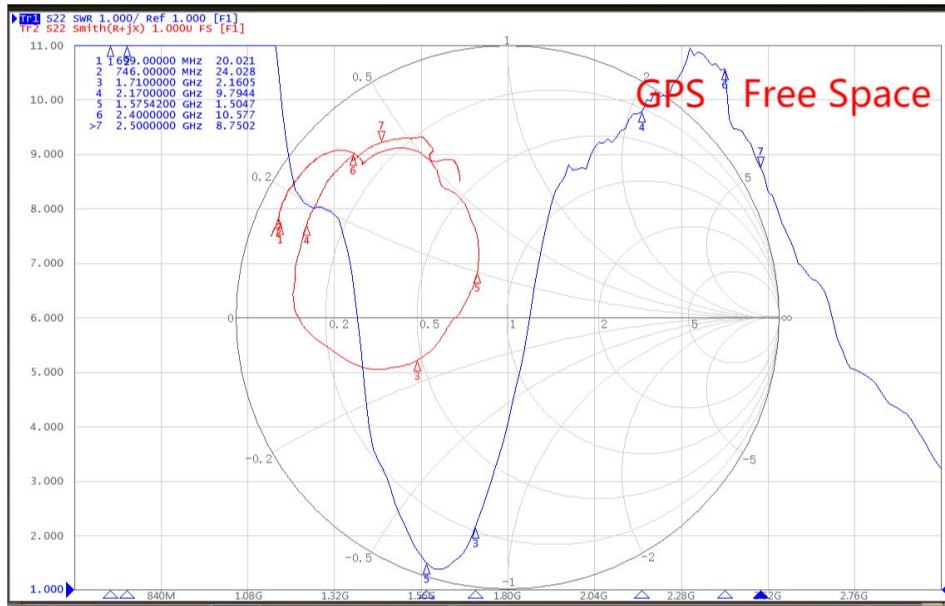
Frequency	Efficiency .	Efficiency (%)	E Total.
2400MHz	-4.61	34.59	-0.43
2410MHz	-4.84	32.81	-0.52
2420MHz	-4.92	32.21	-0.73
2430MHz	-5.06	31.19	-1.01
2440MHz	-4.82	32.96	-0.73
2450MHz	-4.65	34.28	-0.46
2460MHz	-4.68	34.04	-0.27
2470MHz	-4.66	34.20	-0.12
2480MHz	-4.58	34.83	-0.10
2490MHz	-4.61	34.59	-0.22
2500MHz	-4.59	34.75	-0.26
AVE	-4.73	33.68	-0.44



Radiation patterns-BLE/WIFI

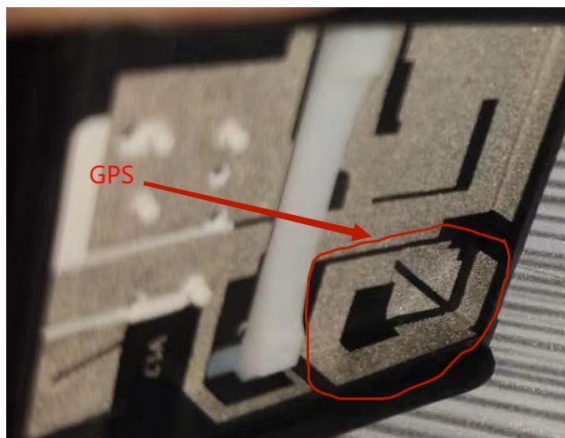


S-Parameters、Antenna Efficiency& Peak Gain-GPS



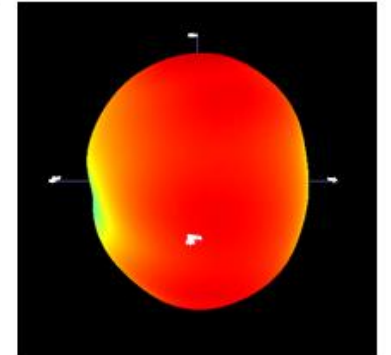
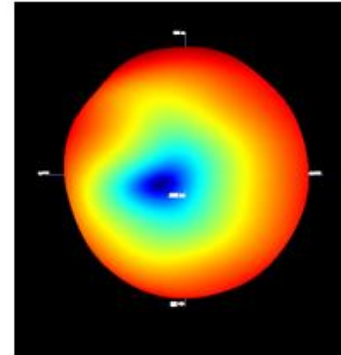
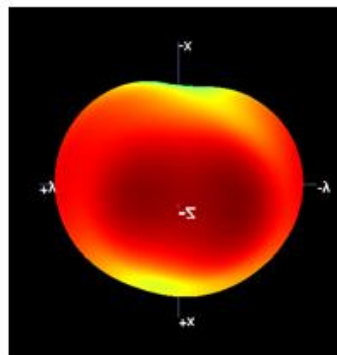
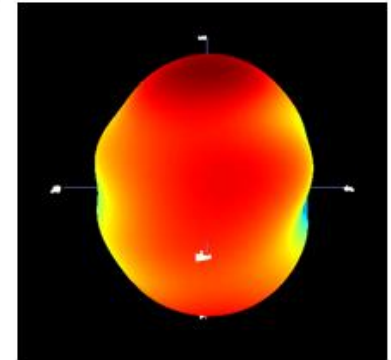
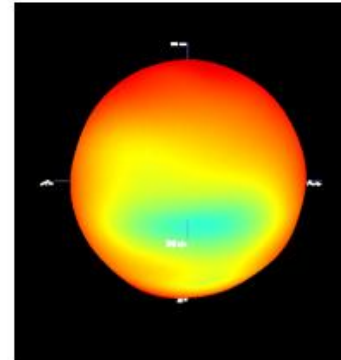
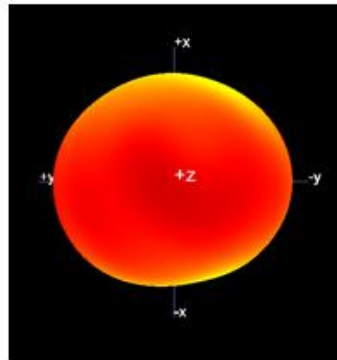
Band	Efficiency	Peak Gain
GPS	25.41%	-2.85dBi

Frequen cy	Efficien cy .	Efficien cy (%)	E Total. dB (dB)
1550MHz	-6.04	24.89	-1.82
1555MHz	-6.01	25.06	-2.09
1560MHz	-6.07	24.72	-2.36
1565MHz	-6.14	24.32	-2.66
1570MHz	-6.10	24.55	-2.74
1575MHz	-5.95	25.41	-2.85
1580MHz	-6.14	24.32	-2.75
1585MHz	-6.15	24.27	-2.64
1590MHz	-6.06	24.77	-2.40
1595MHz	-6.04	24.89	-2.34
1600MHz	-6.16	24.21	-2.20

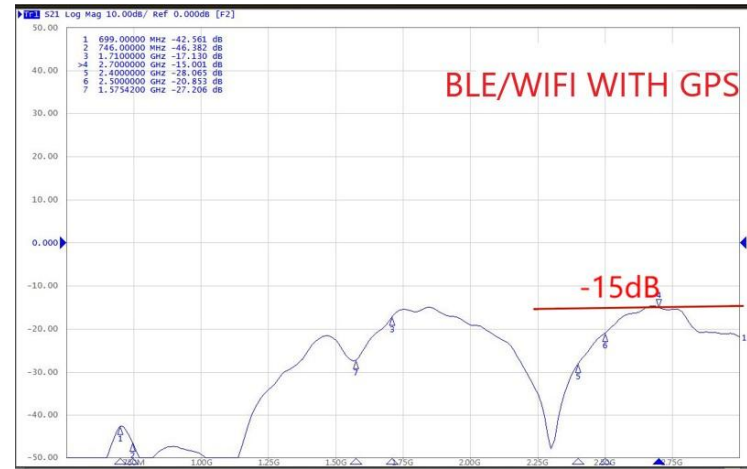
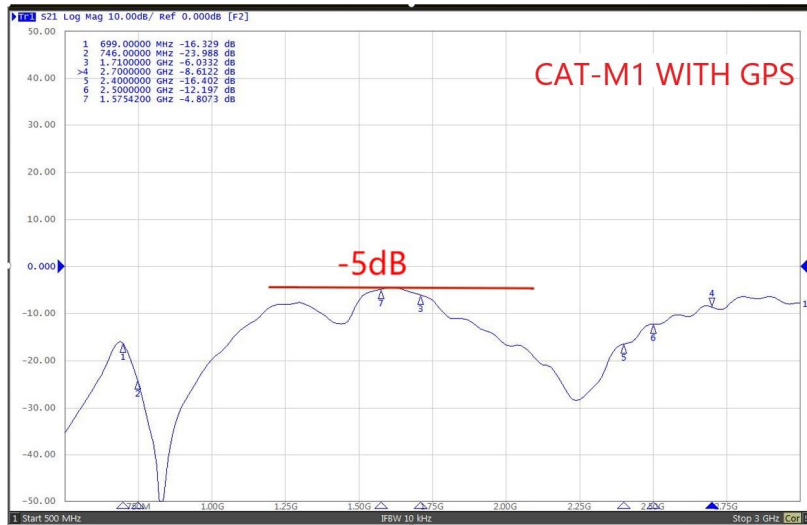


Radiation patterns-GPS

Legend
—1575.00(MHz)



Isolation



Summary

1.CAT-M1 Average Passive Efficiency:

B2: -3.88dB(40.93%) B4:-3.84dB(41.30%) B12:-7.44dB(18.05%)

2.BLE/WIFI Average Passive Efficiency:

-4.73dB(34%)

3.GPS Average Passive Efficiency:

-5.95dB(25.41%)

4.Isolation:

-5dB(CAT-M1&GPS) -6.5dB(CAT-M1&BLE/WIFI) -15dB(BLE/WIFI&GPS)