



AUGi Extend

ANTENNA TEST REPORT

Product Name	AUGi Extend
Applicant	Innocomm
Manufacturer	Innocomm
Test site	Innocomm
Model	Ext_LoRa、Ext_BLE、Ext_WIFI1、Ext_WIFI2
Antenna type	LoRa: IFA; BLE: Loop; WiFi(1/2): Monopole
Address	1F, No.6, Hsin Ann Rd., Hsinchu Science Park, Hsinchu 30078, Taiwan

Approved by	Reviewed by	Issued by
Taka Wei	Taka Wei	Ella Lin

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● INTRODUCTION

.1 TEST EQUIPMENT

Passive Test:

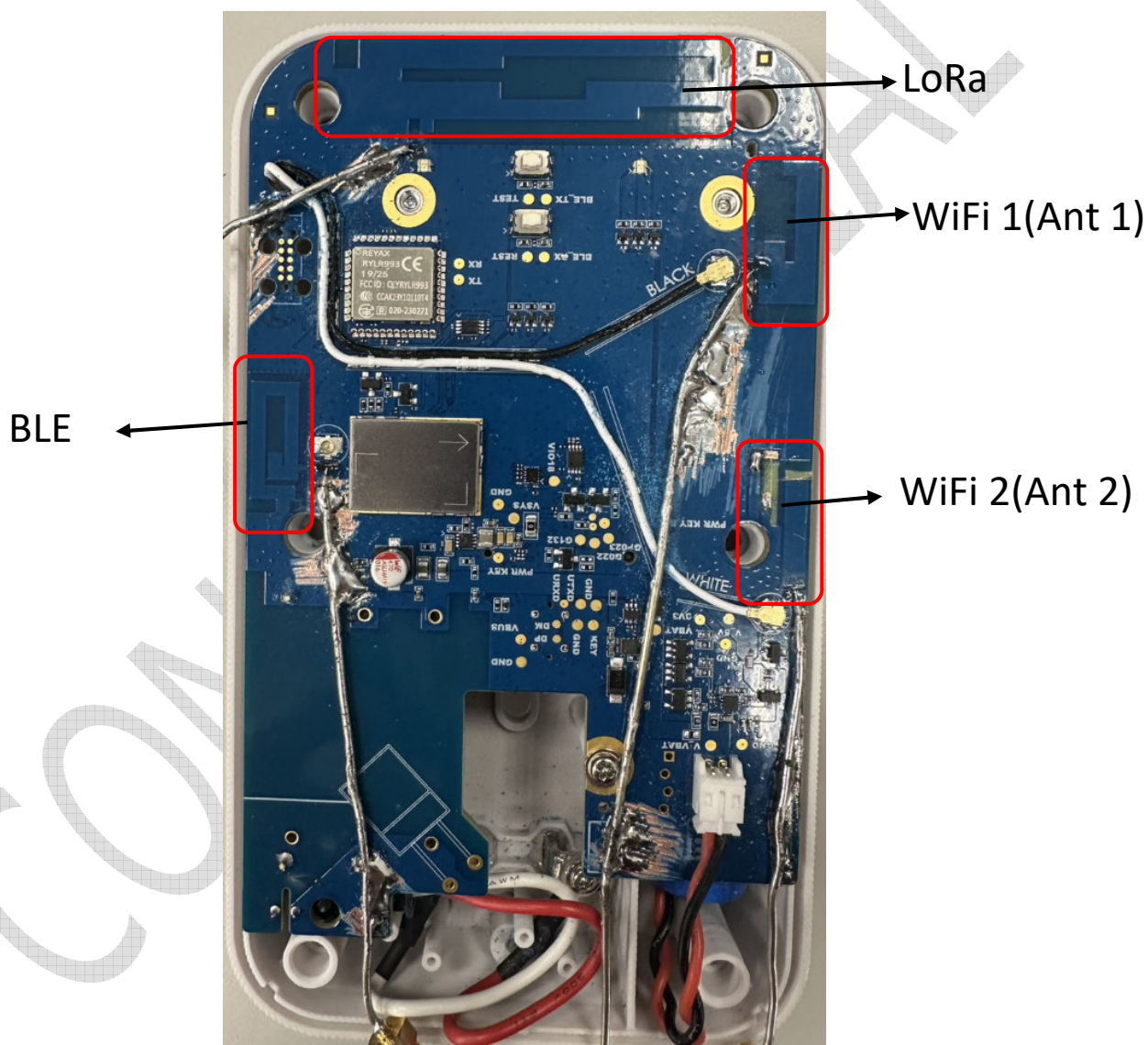
Network Analyzer: R/S ZVB8 (9KHz ~ 8.5GHz)

3D Passive Chamber: Atenlab OTA 200

.2 TEST SAMPLE

Quantity: 1

EVT 2



.3 TEST CONDITION

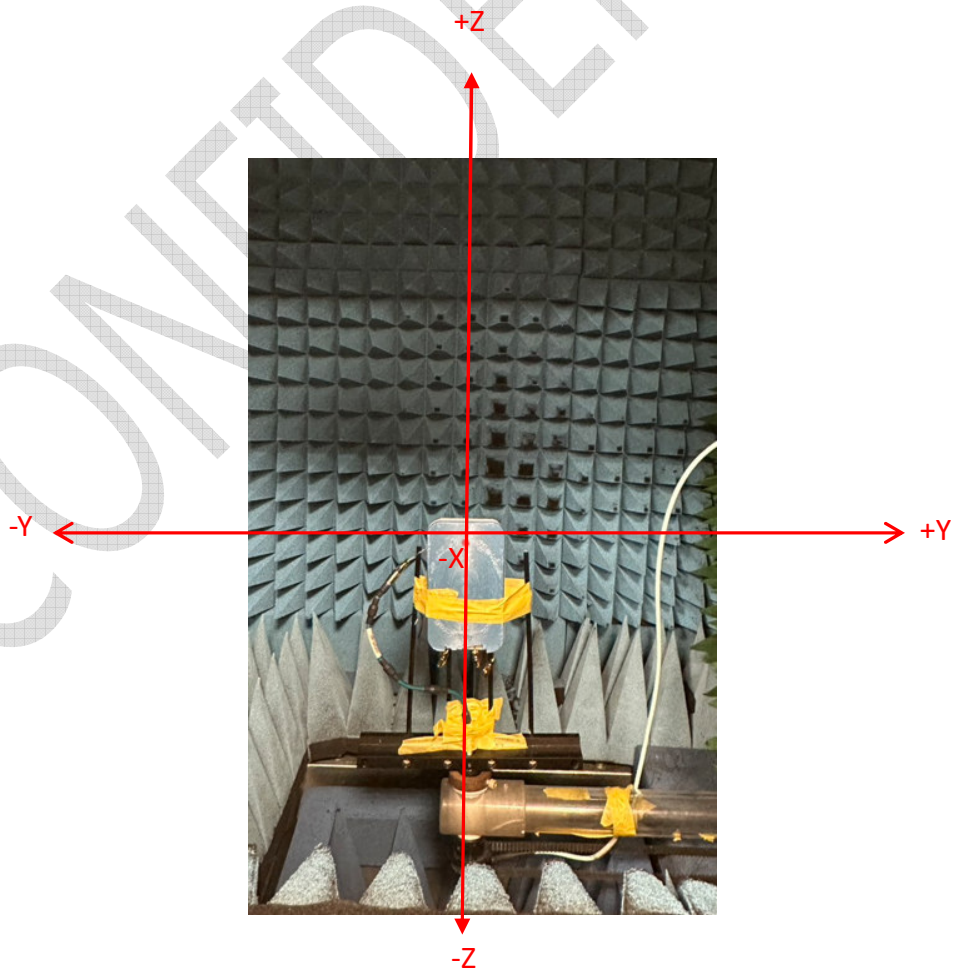
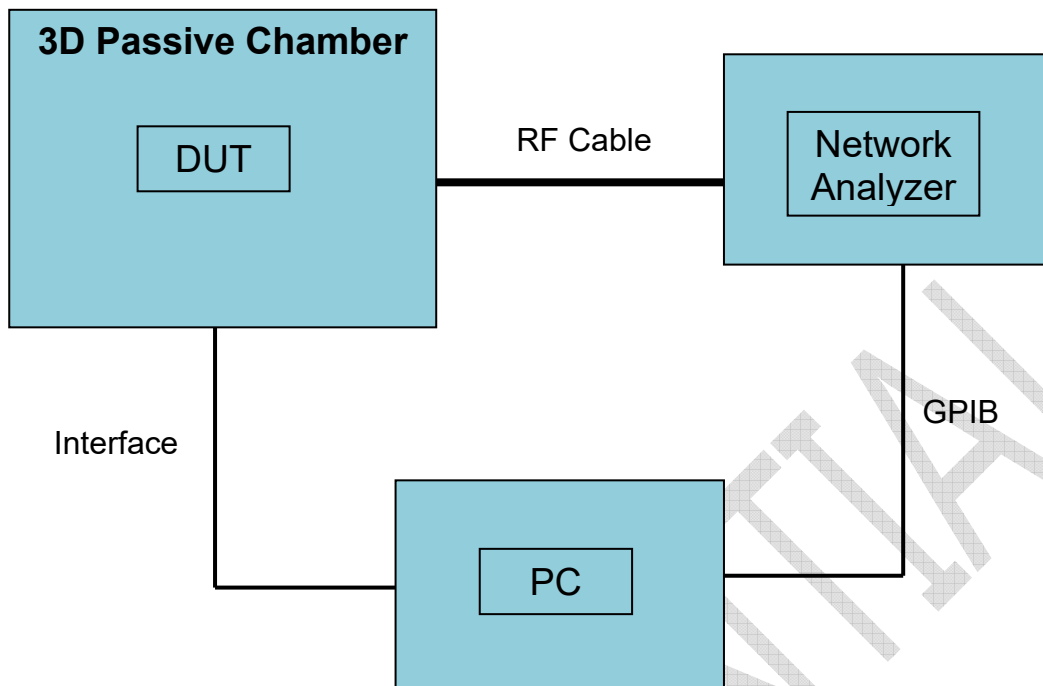
Support Band: LoRa: 915 MHz

BLE: 2402 MHz~2480 MHz

WiFi 1/WiFi 2: 2412 MHz~2472 MHz/ 5150 MHz~5850 MHz

Temperature: 25°C

.4 TEST SETUP



● PASSIVE PERFORMANCE TEST

.1 AVERAGE/PEAK PERFORMANCE

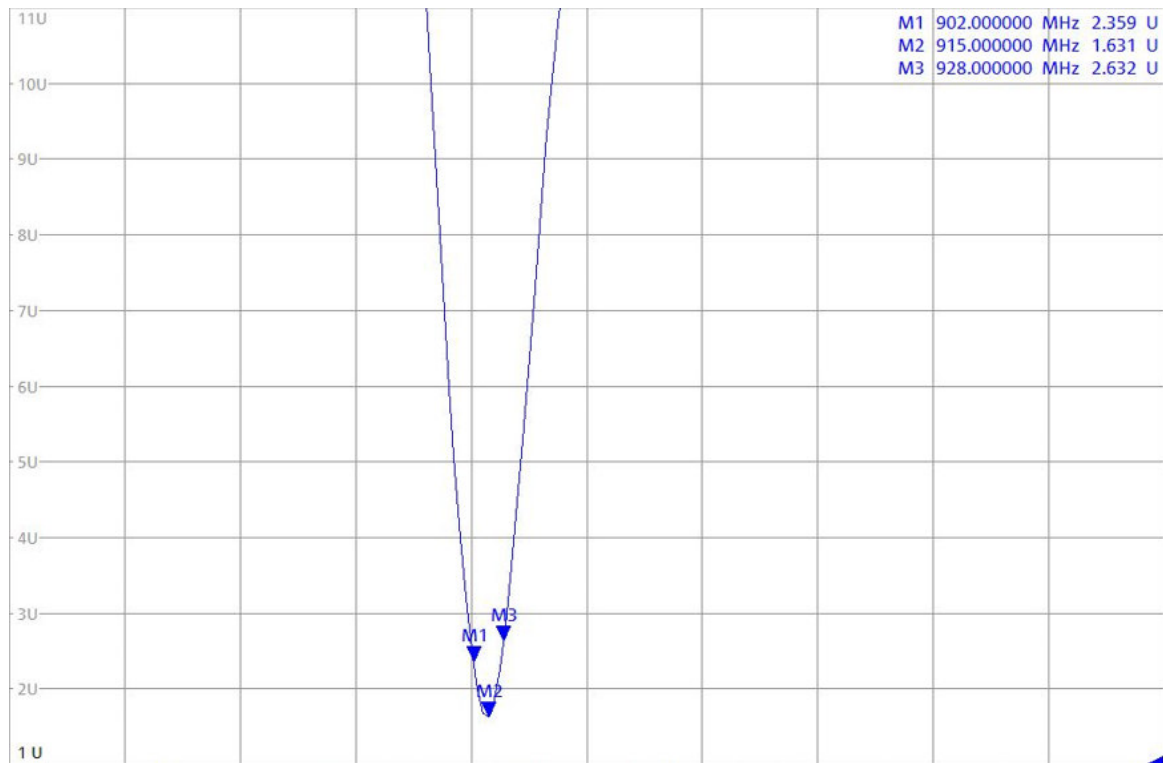
Frequency (MHz)	Average efficiency (%)	Average Gain (dBi)	Peak Gain (dBi)
LoRa	67.88	-1.69	3
BLE	67.05	-1.73	3.31
WiFi 1 - 2.4G	58.73	-2.31	2.38
WiFi 1 - 5G	55	-2.6	3.15
WiFi 2 - 2.4G	61.18	-2.14	2.74
WiFi 2 - 5G	55.82	-2.54	3.33

.2 DETAIL AVERAGE PERFORMANCE

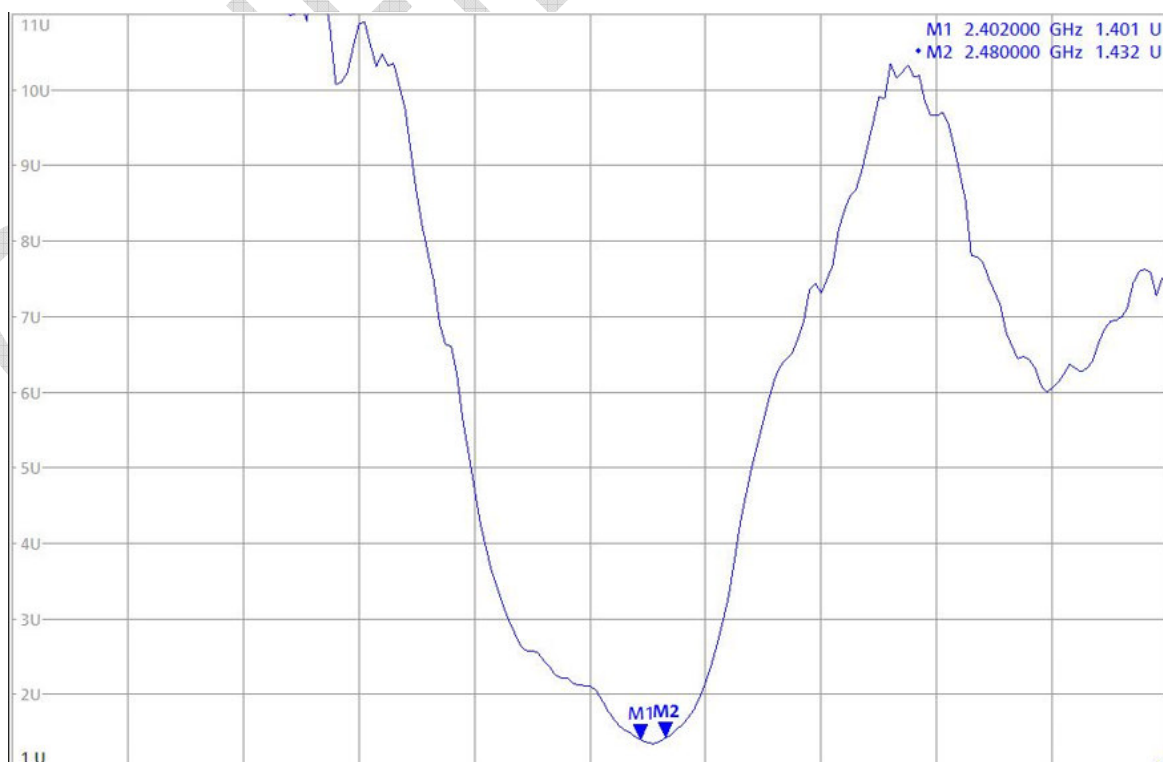
Frequency (MHz)	AUGi Extend		
	Frequency (MHz)	Gain (dBi)	Efficiency %
LoRa	902MHz	-1.85	65.31
	915MHz	-1.23	75.34
	928MHz	-2.0	63
BLE	2402MHz	-1.74	66.99
	2441MHz	-1.63	68.71
	2480MHz	-1.84	65.46
WiFi 1(Ant 1)	2412 MHz	-2.57	55.34
	2442 MHz	-2.33	58.48
	2472 MHz	-2.05	62.37
	5150 MHz	-2.39	57.68
	5250 MHz	-2.29	59.02
	5350 MHz	-2.22	59.98
	5470 MHz	-2.67	54.08
	5725 MHz	-3.09	49.09
	5850 MHz	-3.16	48.31
WiFi 2(Ant 2)	2412 MHz	-2.43	57.15
	2442 MHz	-2.13	61.24
	2472 MHz	-1.86	65.16
	5150 MHz	-2.24	59.7
	5250 MHz	-2.36	58.08
	5350 MHz	-2.23	59.84
	5470 MHz	-2.47	56.62
	5725 MHz	-2.79	52.6
	5850 MHz	-3.18	48.08

.3 VSWR MEASUREMENT

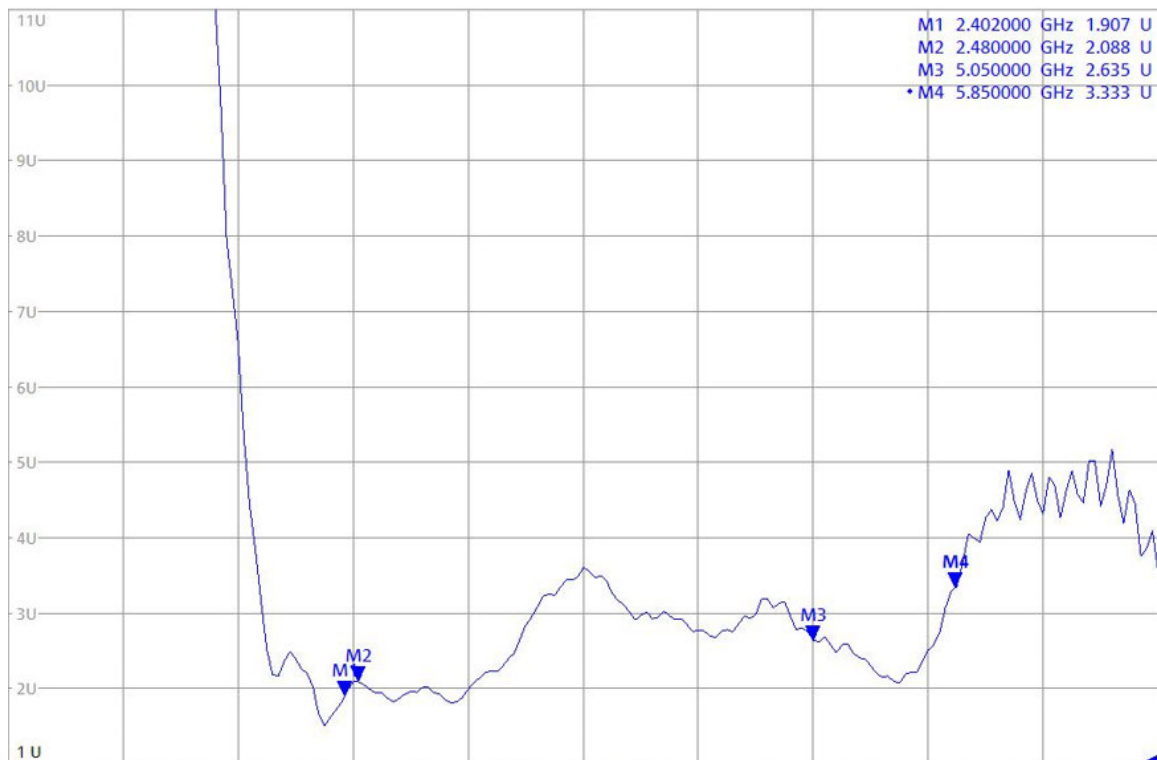
LoRa



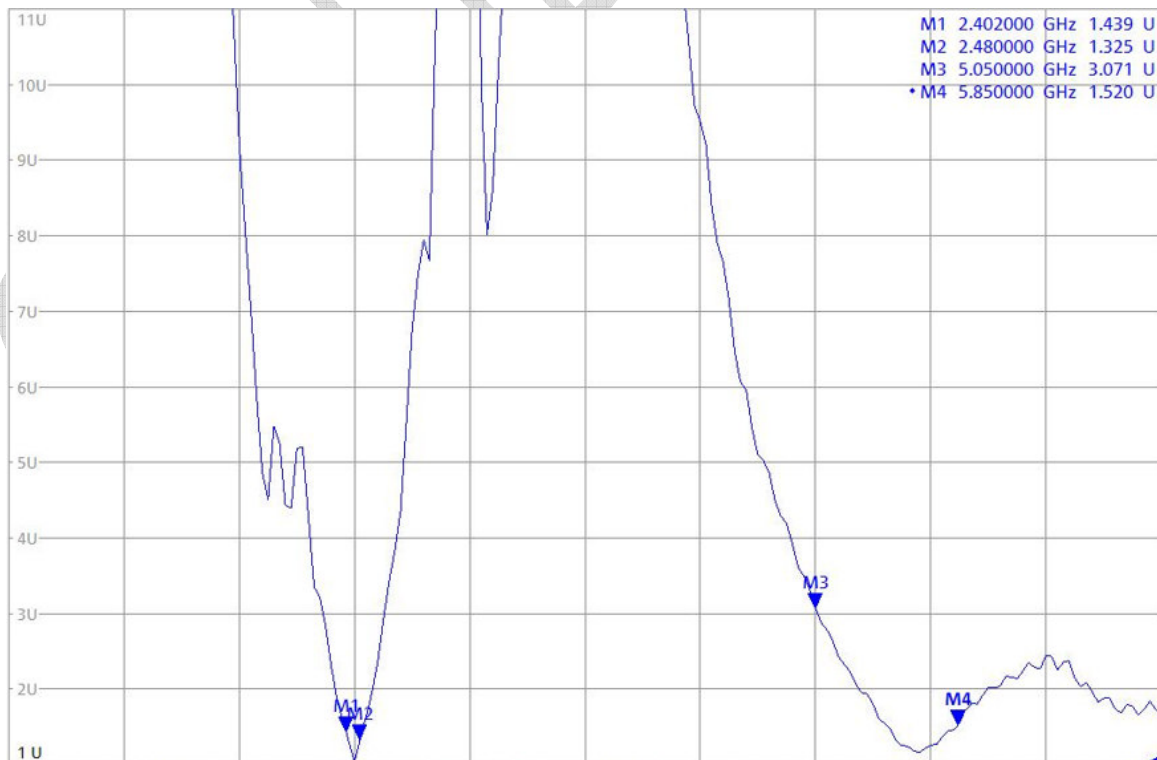
BLE



WiFi 1

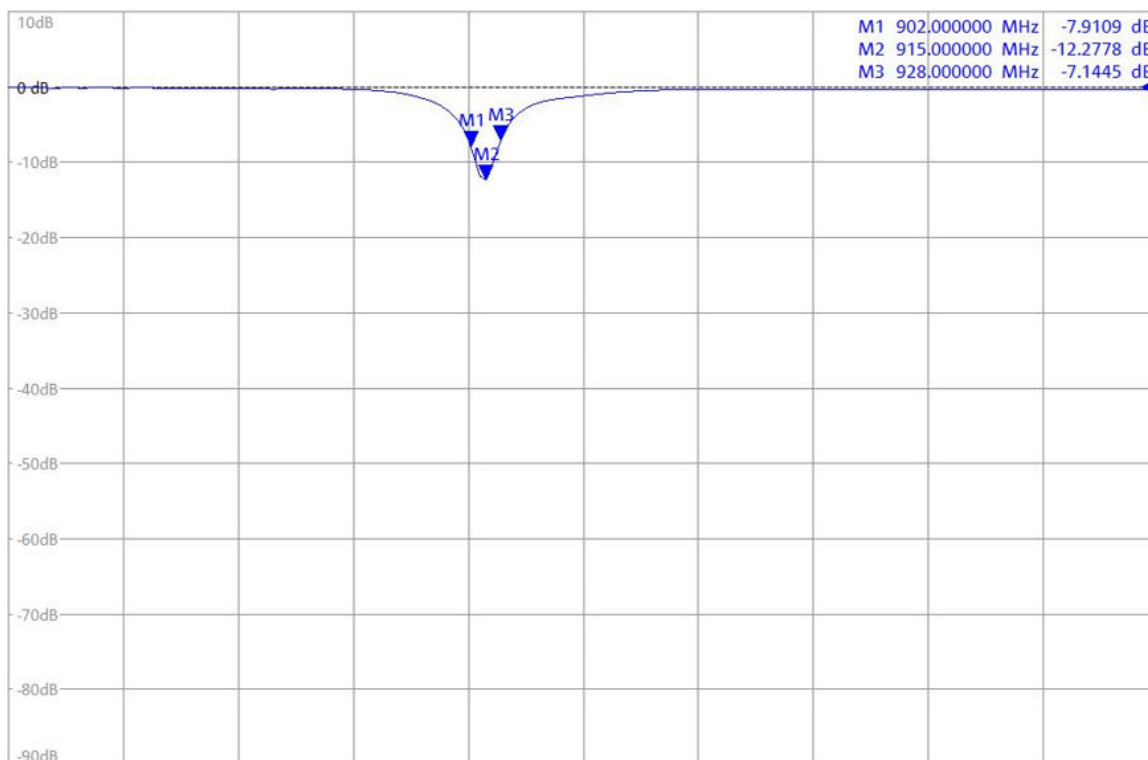


WiFi 2

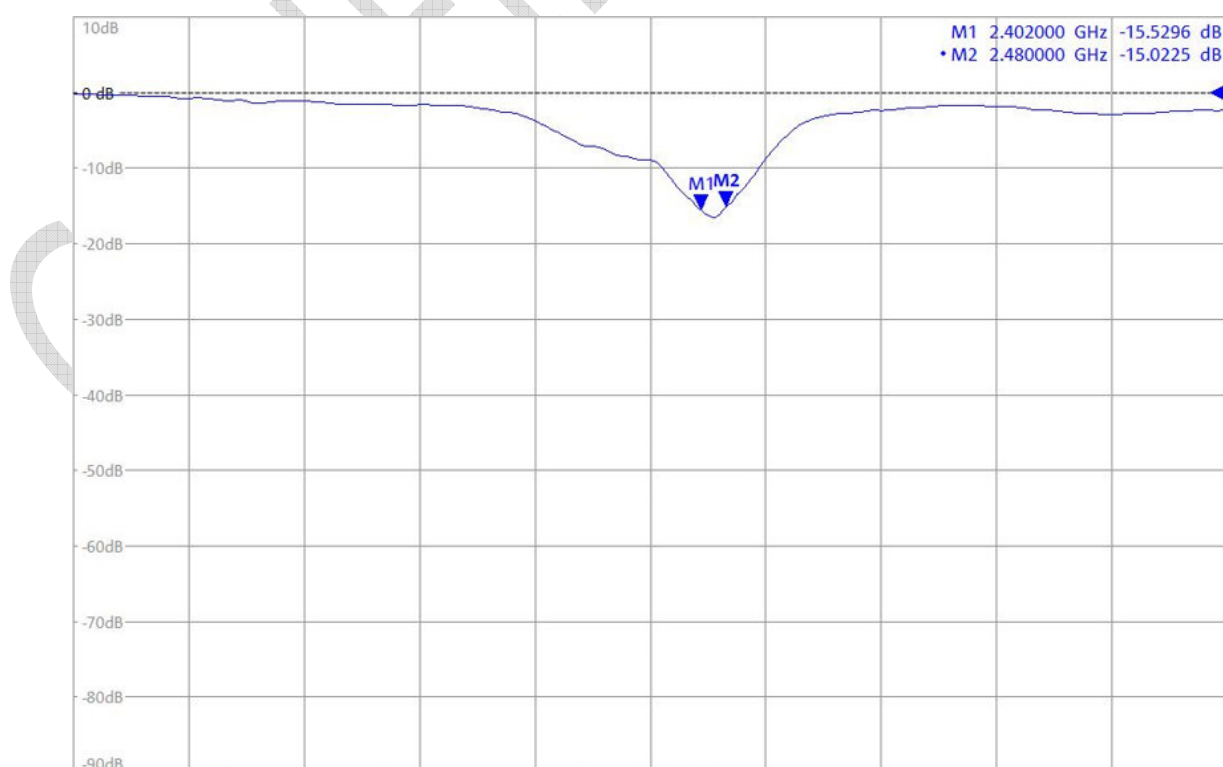


.4 RETURN LOSS

LoRa



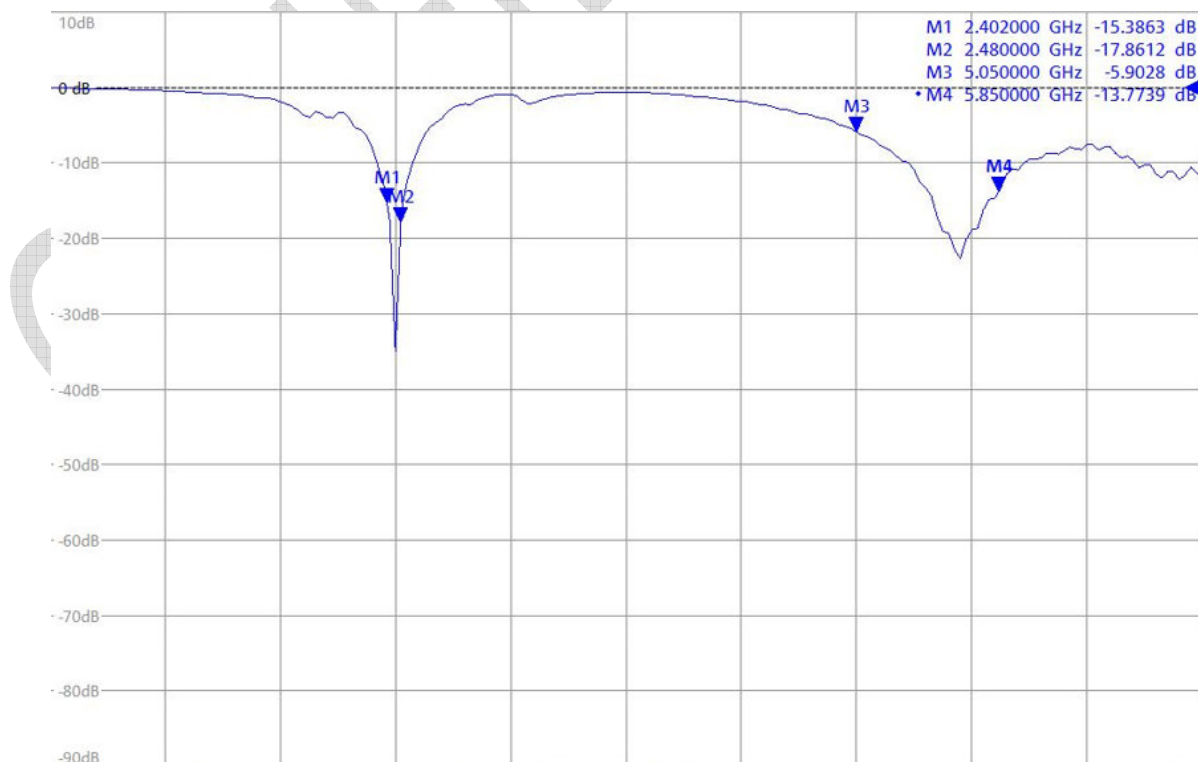
BLE



WiFi 1

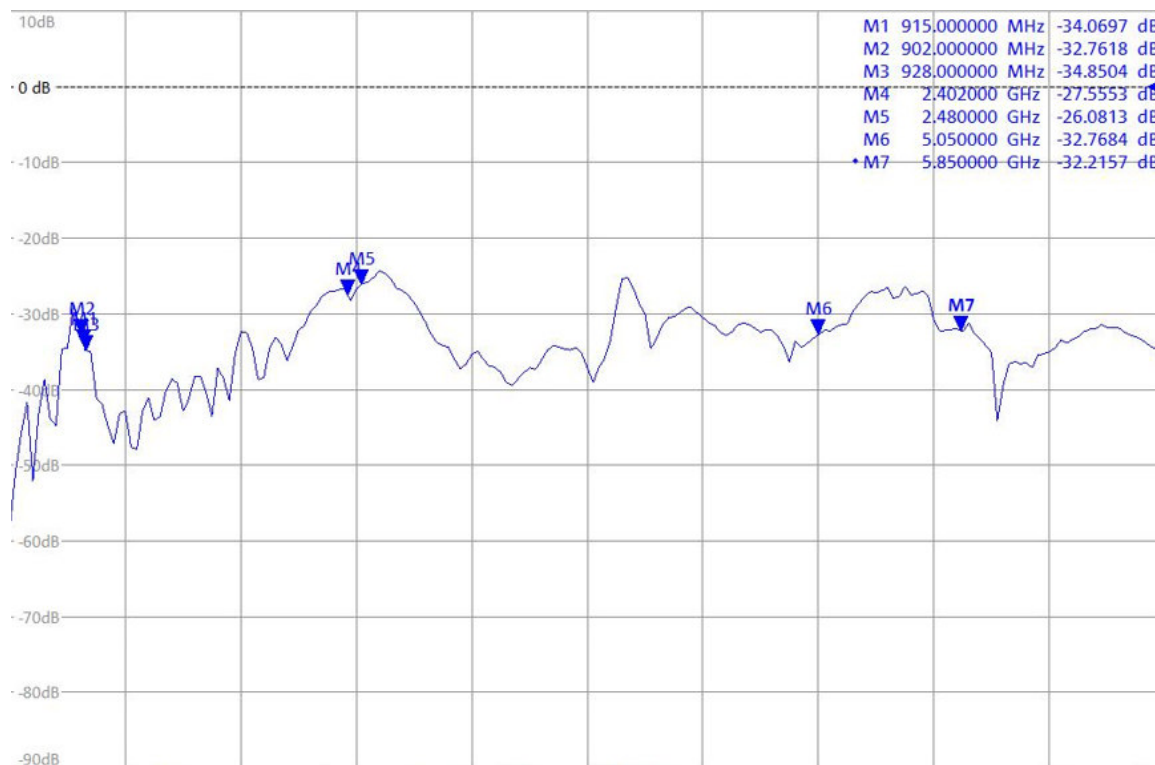


WiFi 2

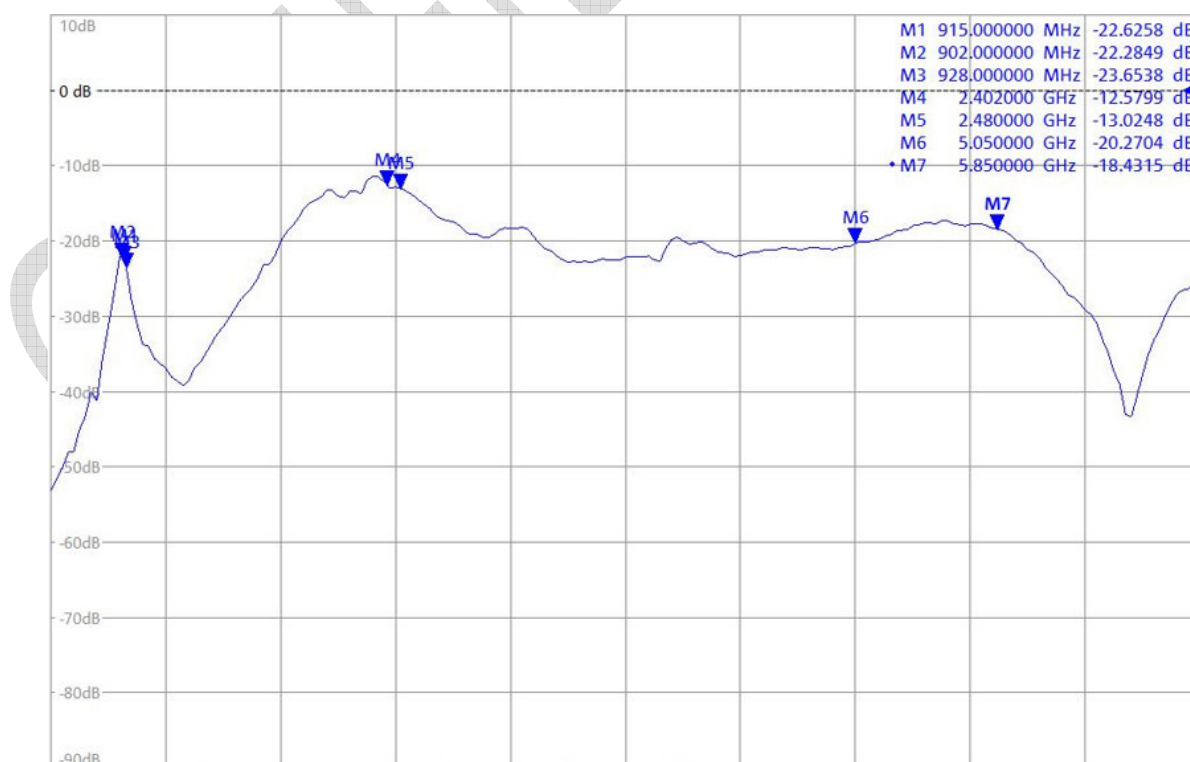


.5 ISOLATION

LoRa/BLE



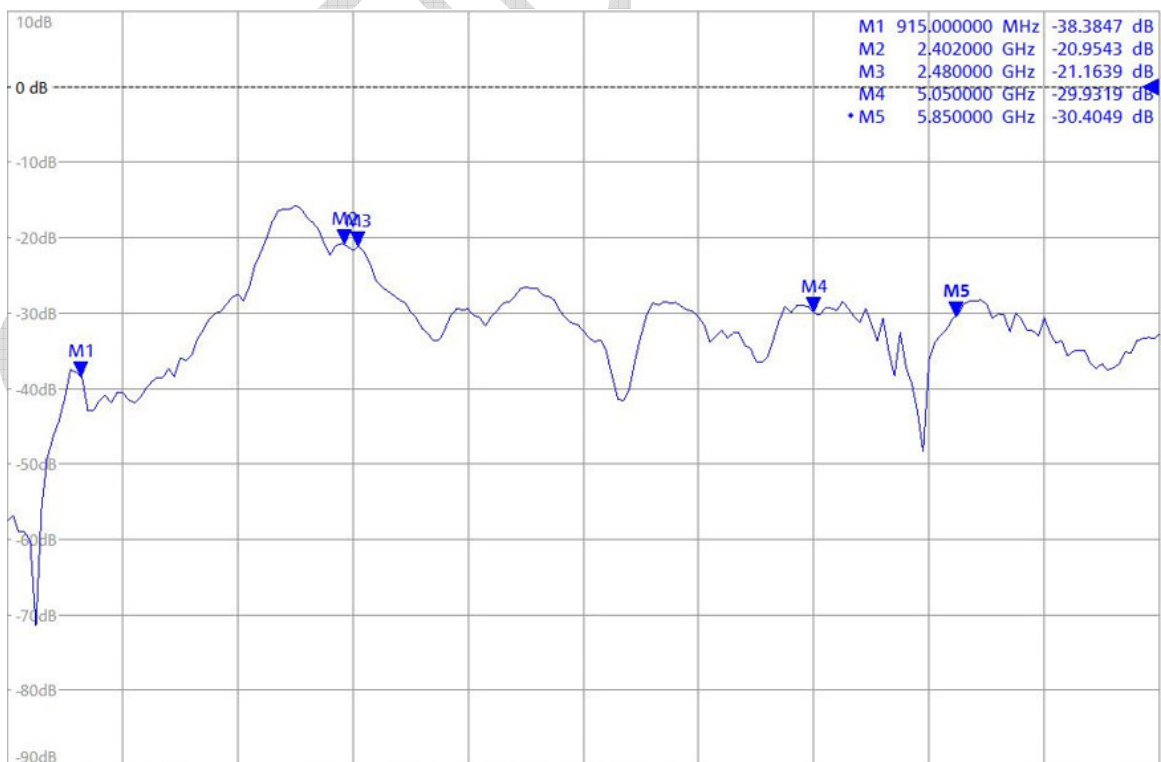
LoRa/WiFi 1



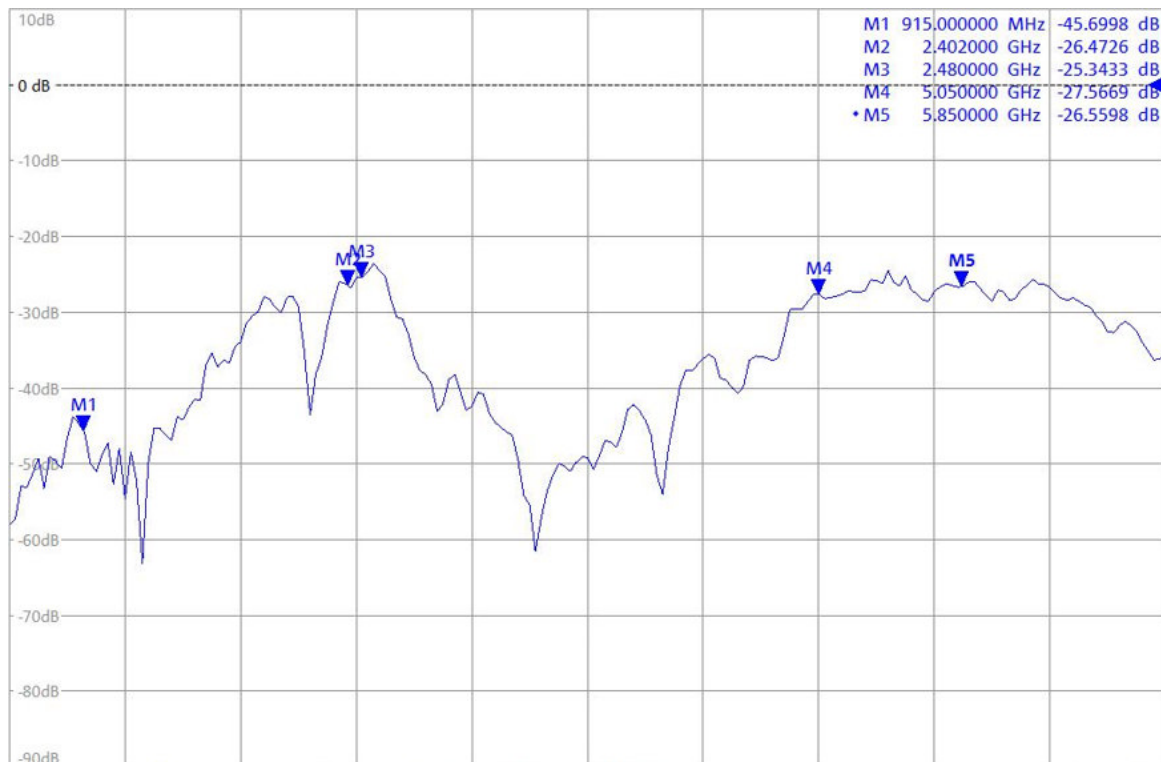
LoRa/WiFi 2



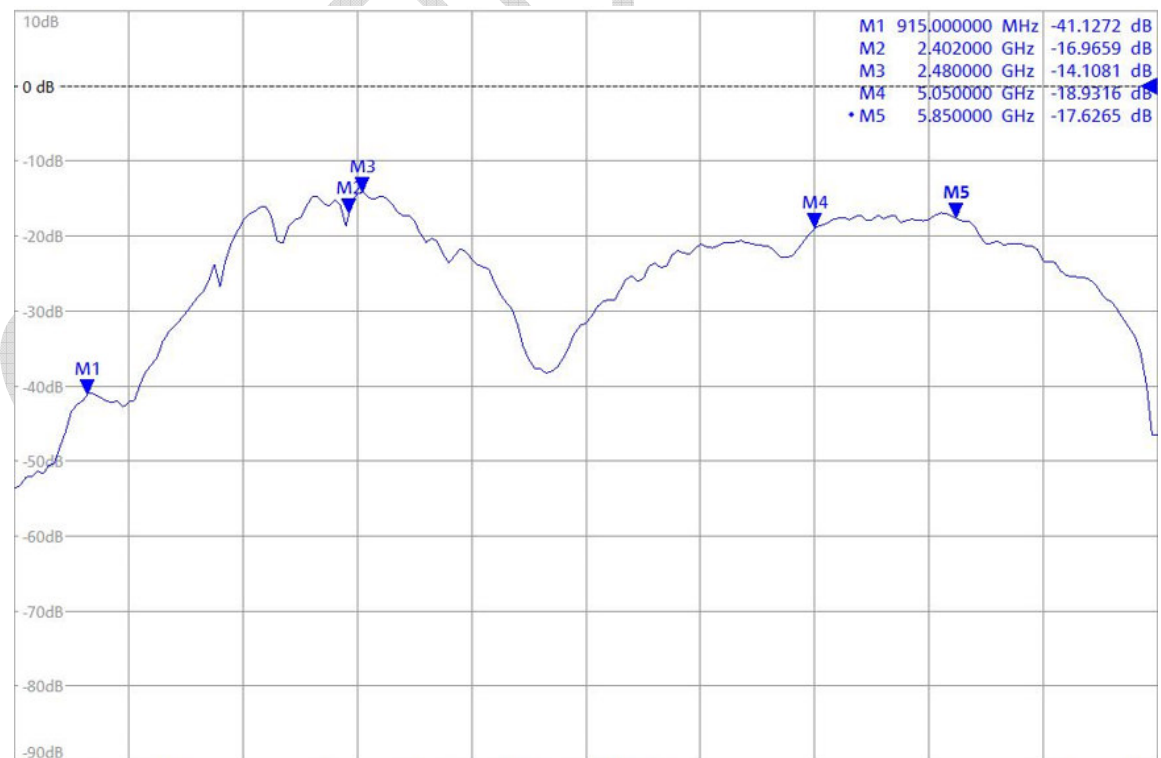
BLE/WiFi 1



BLE/WiFi 2



WiFi 1/WiFi 2

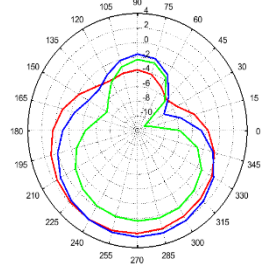


.6 2D PLOTS

LoRa

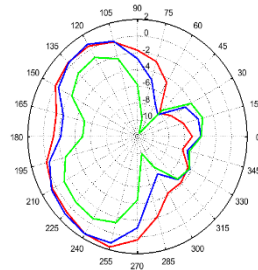
	Color	Freq./Chan.
1	Red	903MHz
2	Blue	915MHz
3	Green	928MHz

Total_Polar Graph_H_XY Plane



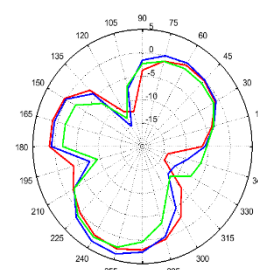
H plane

Total_Polar Graph_E1_XZ Plane

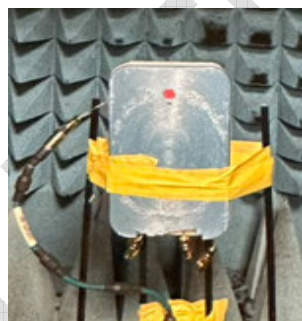


E1 plane

Total_Polar Graph_E2_YZ Plane



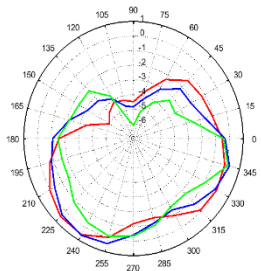
E2 plane



BLE

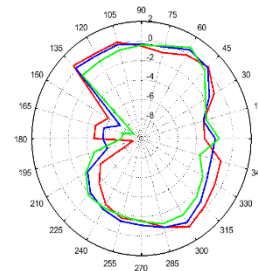
	Color	Freq./Chan.
1	Red	2.402GHz
2	Blue	2.441GHz
3	Green	2.480GHz

Total_Polar Graph_H_XY Plane



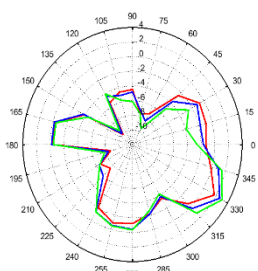
H plane

Total_Polar Graph_E1_XZ Plane

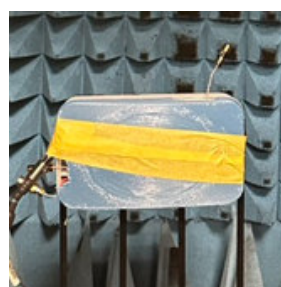


E1 plane

Total_Polar Graph_E2_YZ Plane



E2 plane

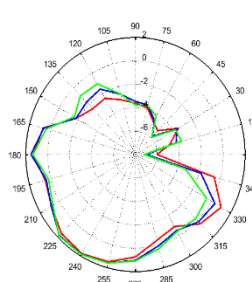


WiFi 1

2.4G

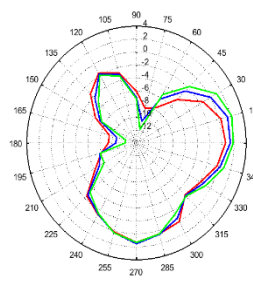
	Color	Freq./Chan.
1	Red	2.412GHz
2	Blue	2.442GHz
3	Green	2.472GHz

Total_Polar Graph_H_XY Plane



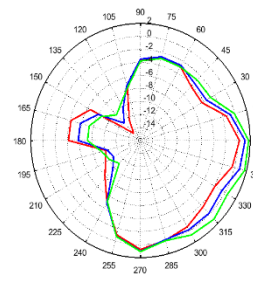
H plane

Total_Polar Graph_E1_XZ Plane



E1 plane

Total_Polar Graph_E2_YZ Plane

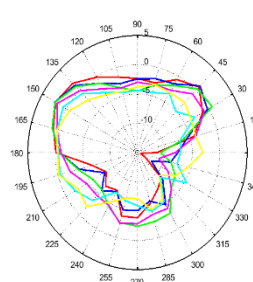


E2 plane

5G

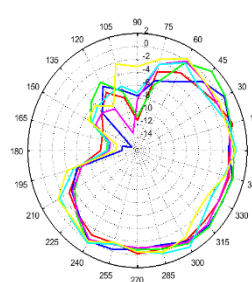
	Color	Freq./Chan.
1	Red	5.15GHz
2	Blue	5.25GHz
3	Green	5.35GHz
4	Cyan	5.47GHz
5	Magenta	5.725GHz
6	Yellow	5.85GHz

Total_Polar Graph_H_XY Plane



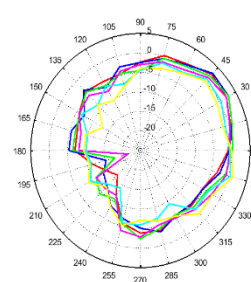
H plane

Total_Polar Graph_E1_XZ Plane

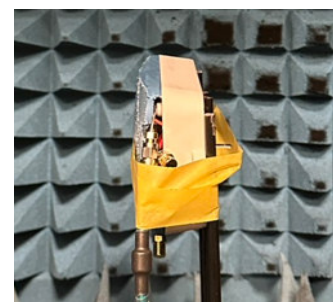


E1 plane

Total_Polar Graph_E2_YZ Plane



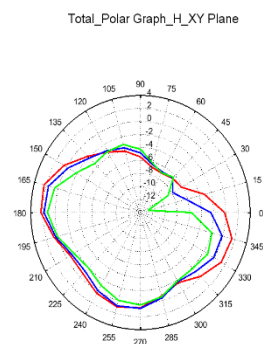
E2 plane



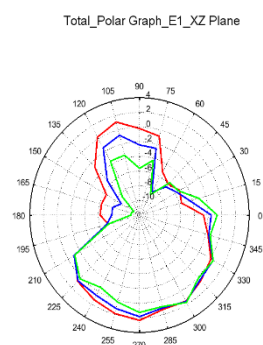
WiFi 2

2.4G

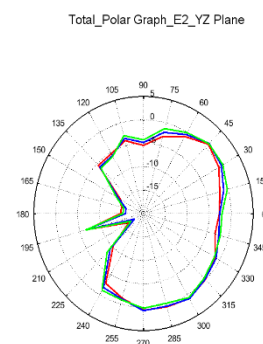
	Color	Freq./Chan.
1	Red	2.412GHz
2	Blue	2.442GHz
3	Green	2.472GHz



H plane



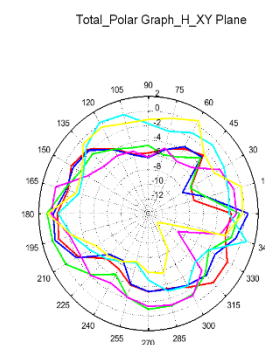
E1 plane



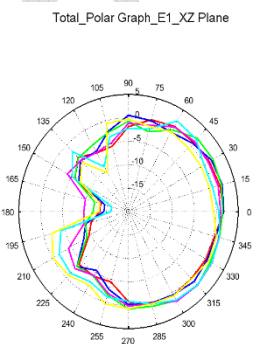
E2 plane

5G

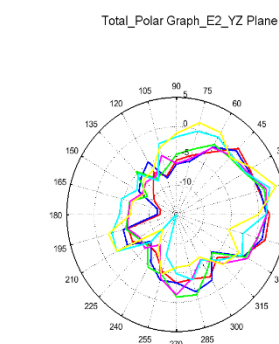
	Color	Freq./Chan.
1	Red	5.15GHz
2	Blue	5.25GHz
3	Green	5.35GHz
4	Cyan	5.47GHz
5	Magenta	5.725GHz
6	Yellow	5.85GHz



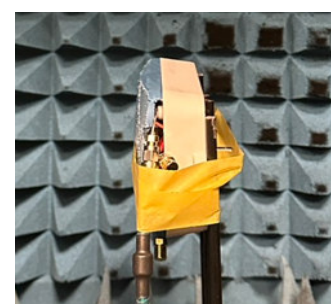
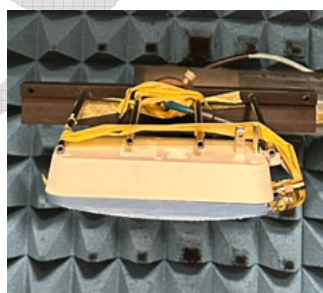
H plane



E1 plane

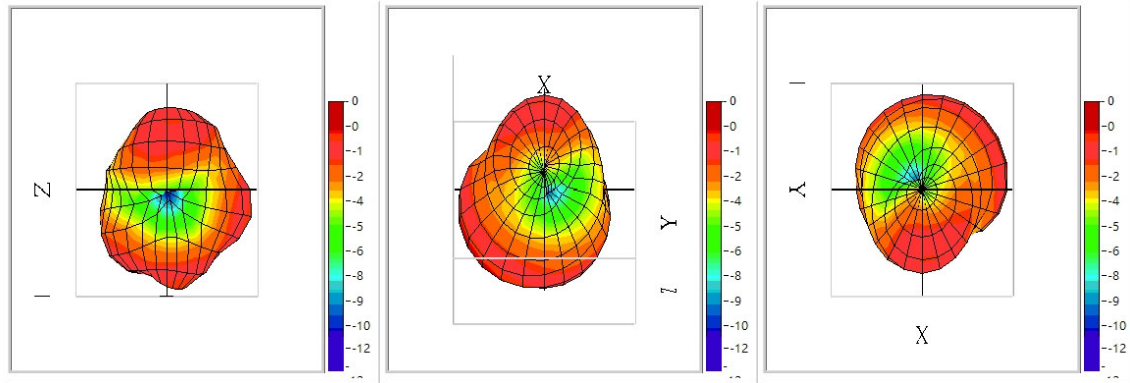


E2 plane

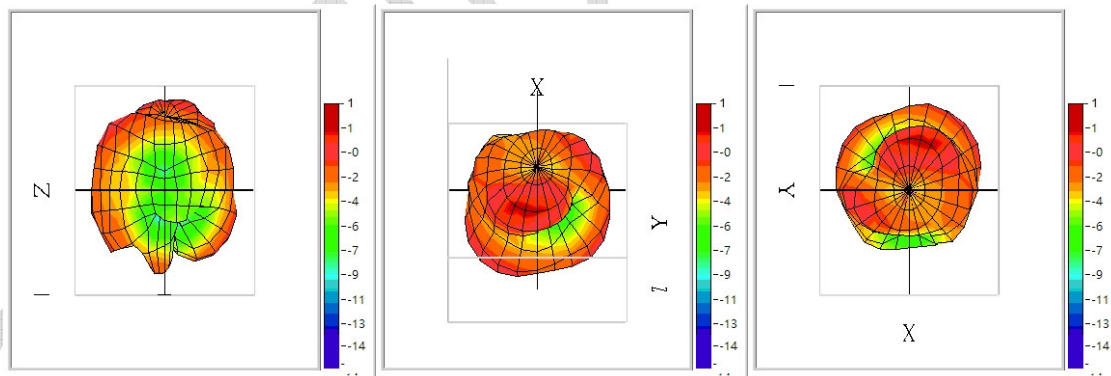


.7 3D Graph

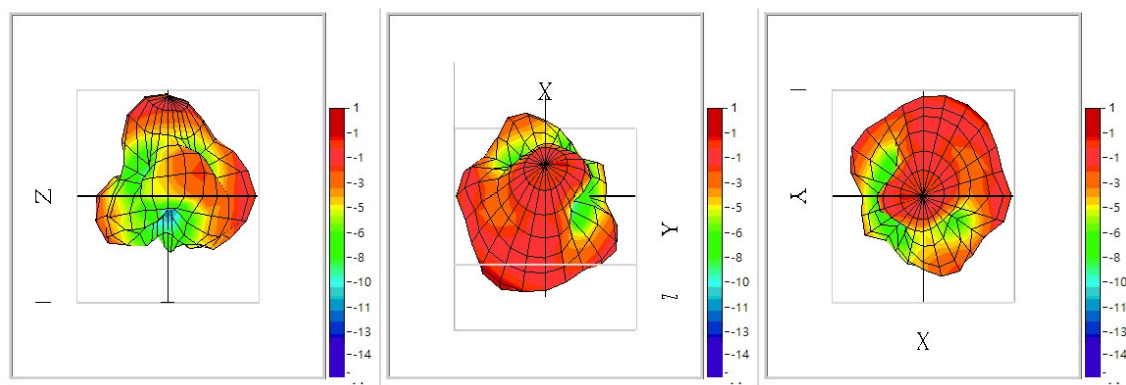
LoRa_915MHz



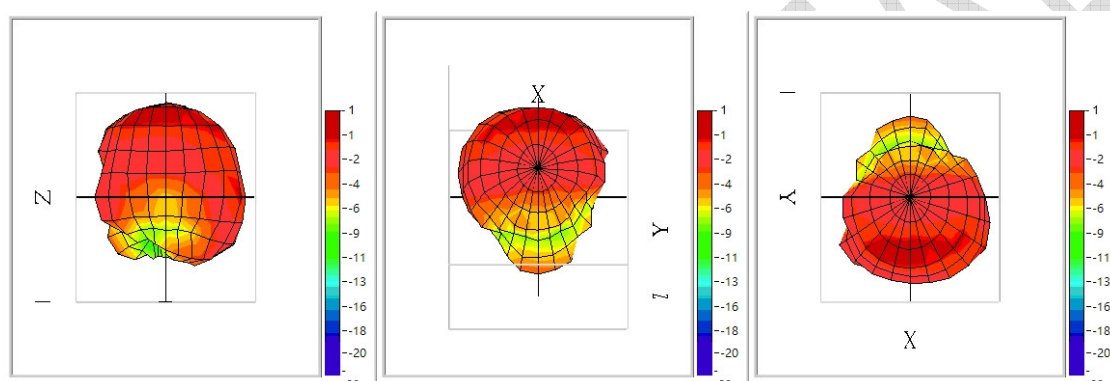
BLE_2441MHz



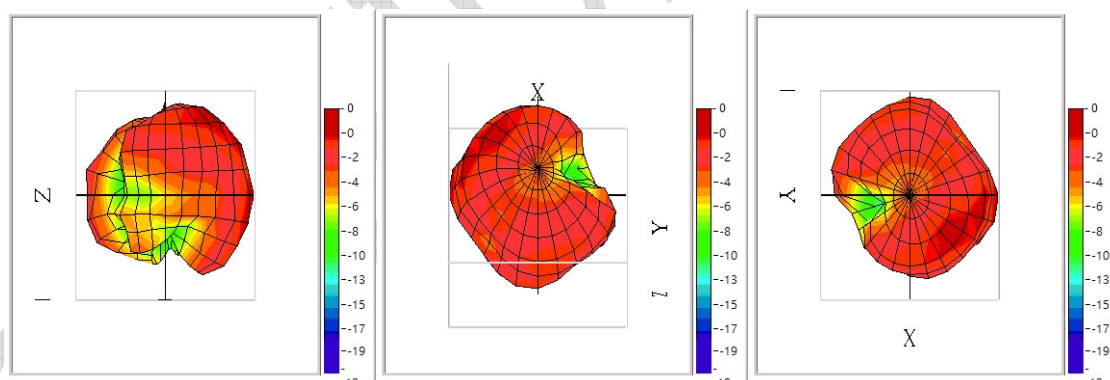
WiFi 1_2442MHz



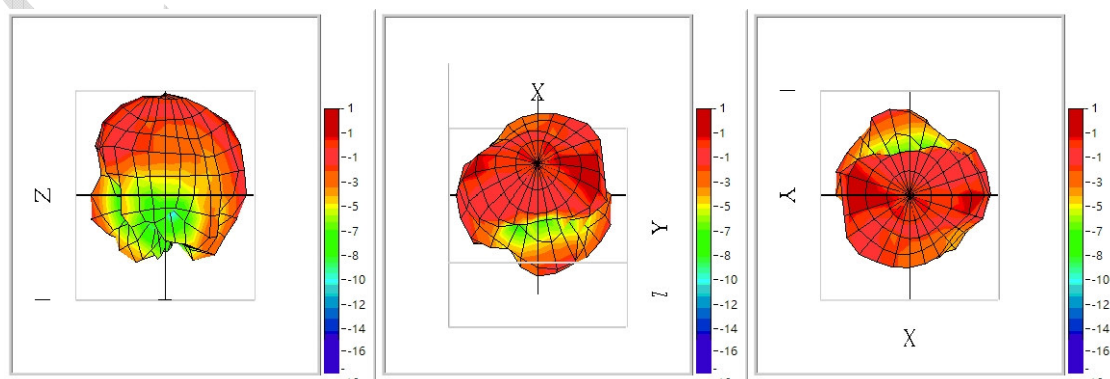
WiFi 1_5350MHz



WiFi 2_2442MHz



WiFi 2_5350MHz



3. CONCLUSION

- There are 4 antennas for LoRa, BLE, WiFi 1 and WiFi 2. Each antenna average efficiency is over 55% and meet product requirement(> 40%).

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