



FEV-511G

Antenna Test Report

Senao Networks, Inc.

**Project
Description**

**Sub6G antenna
GPS antenna**

Date

2025/04/08

Prepared by

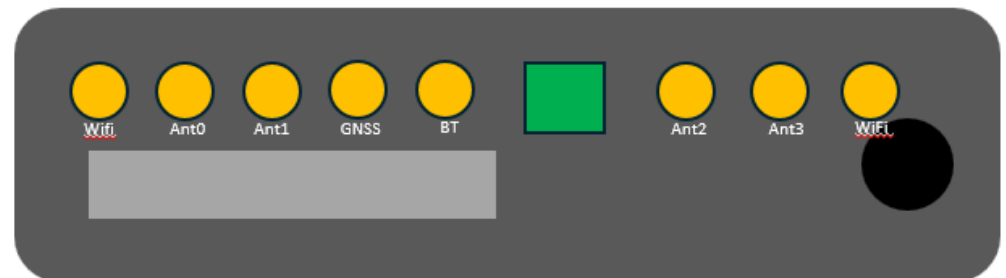
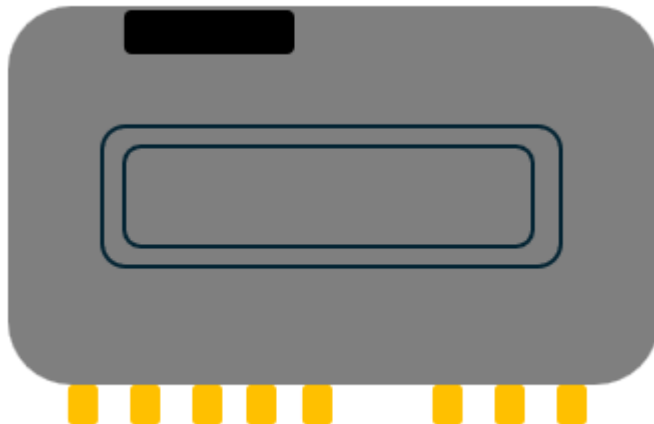
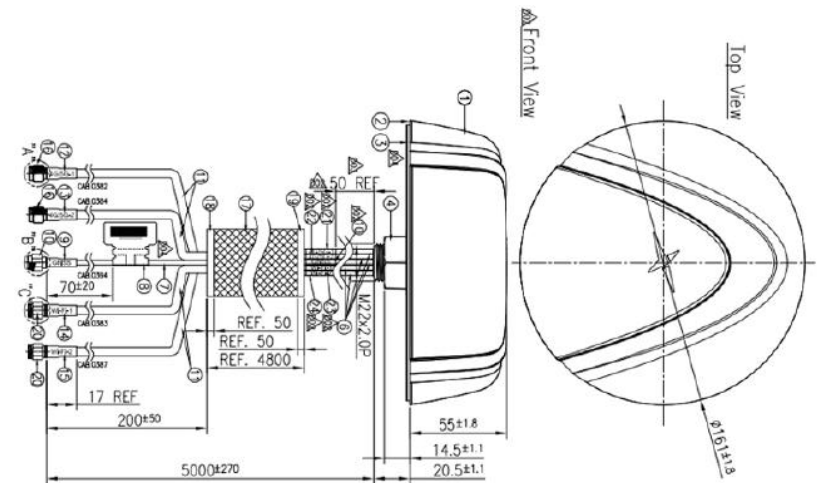
Daniel

Report Version

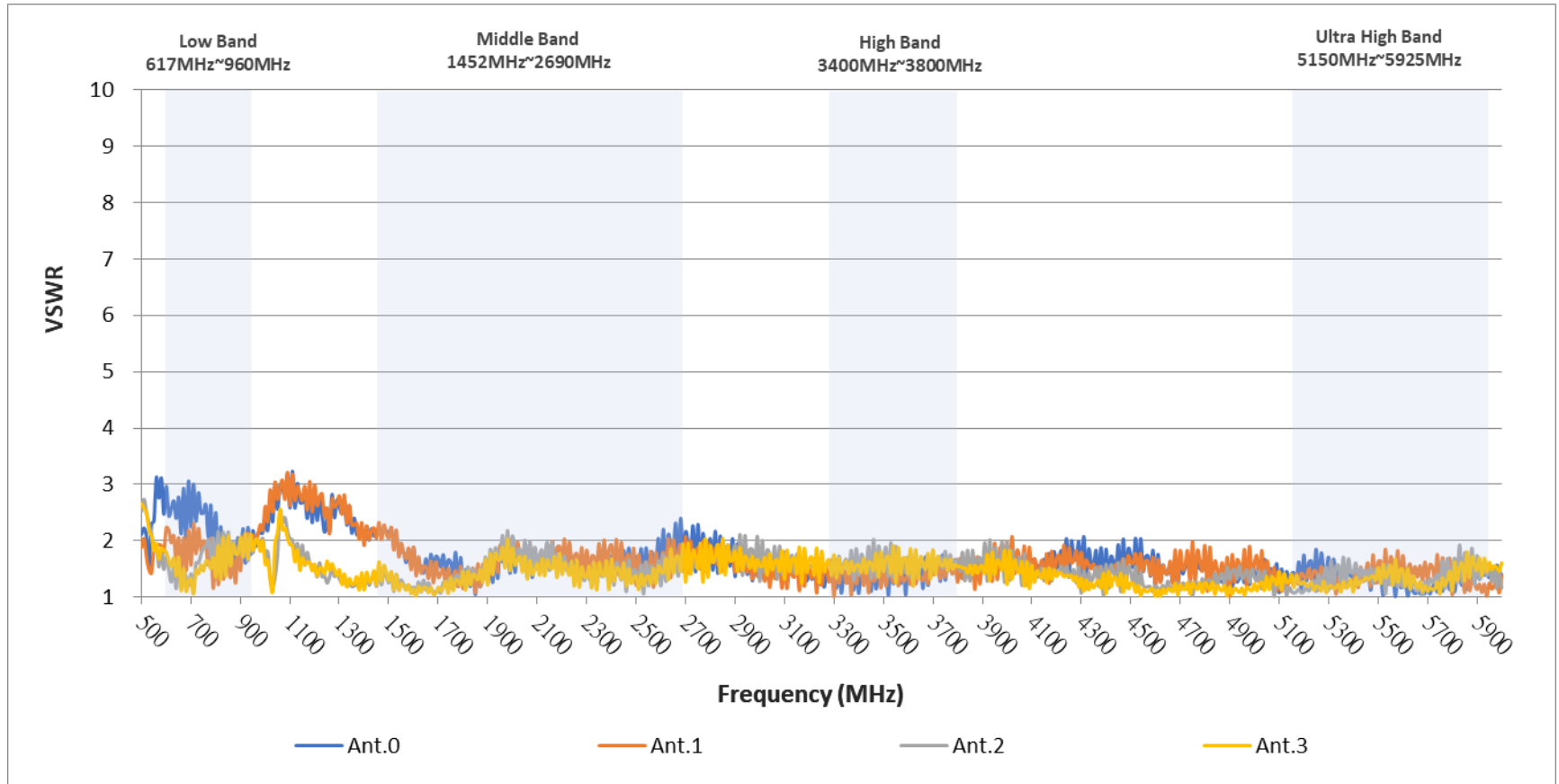
A01

5G NR antenna

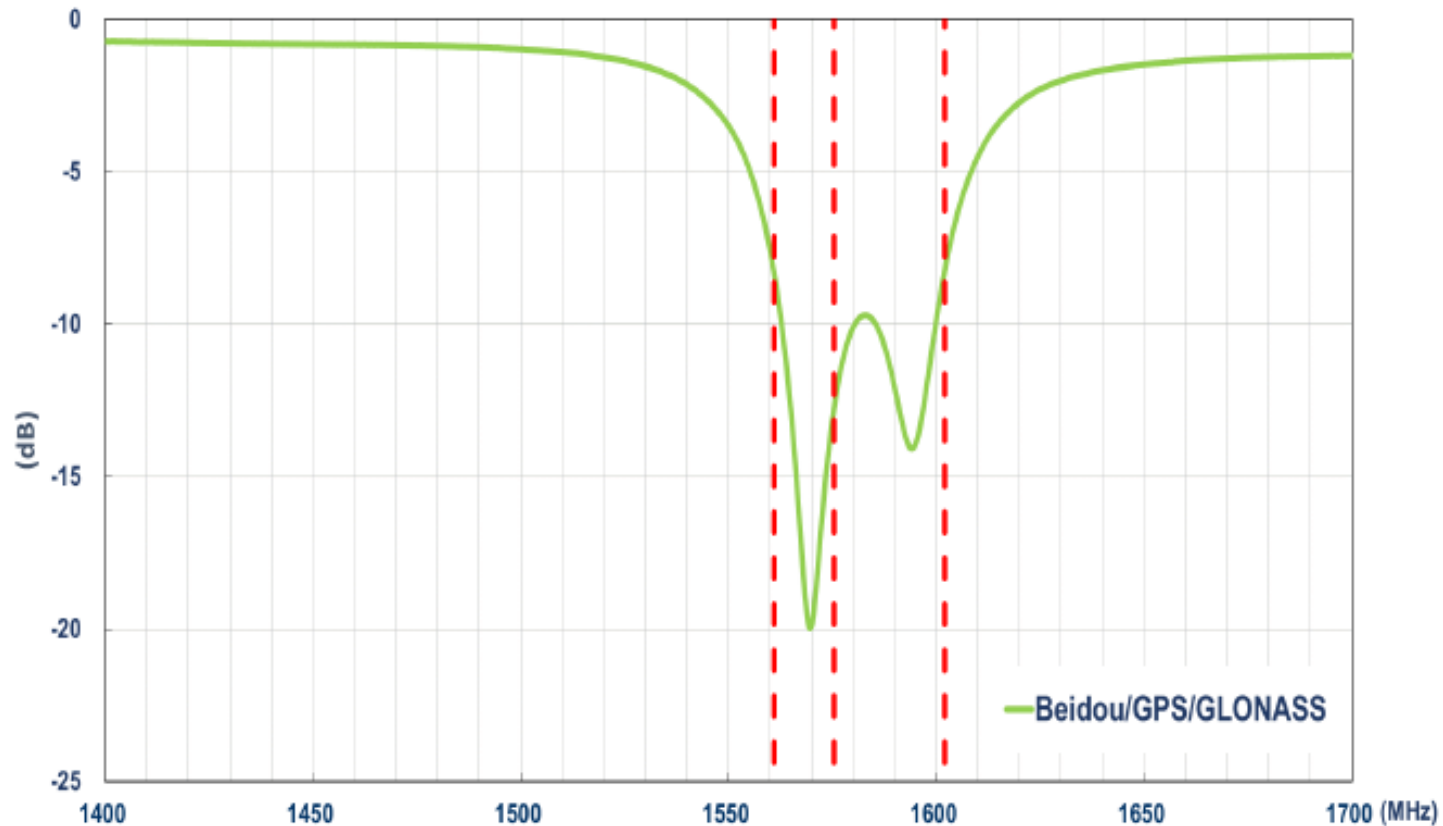
- LTE/ 5G NR antenna *4
- GNSS *1
- Cable length : 5M
- Brand Name : TAOGLAS
- Model name : MA1505.AK.001



5G NR VSWR – with device

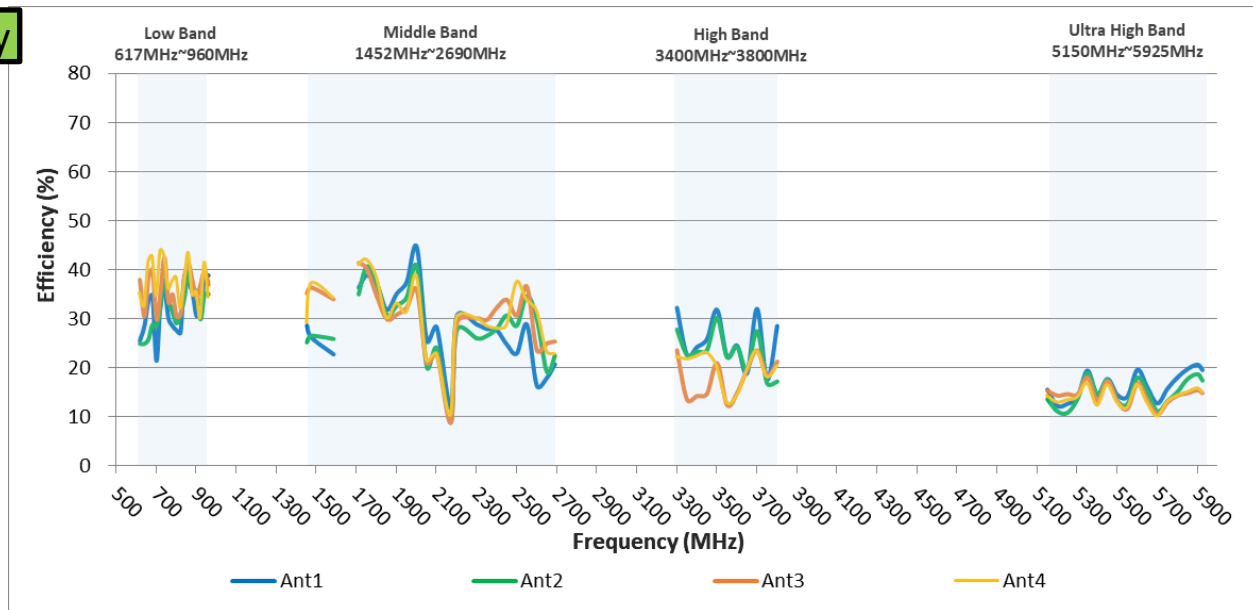


- This is the data within the datasheet.

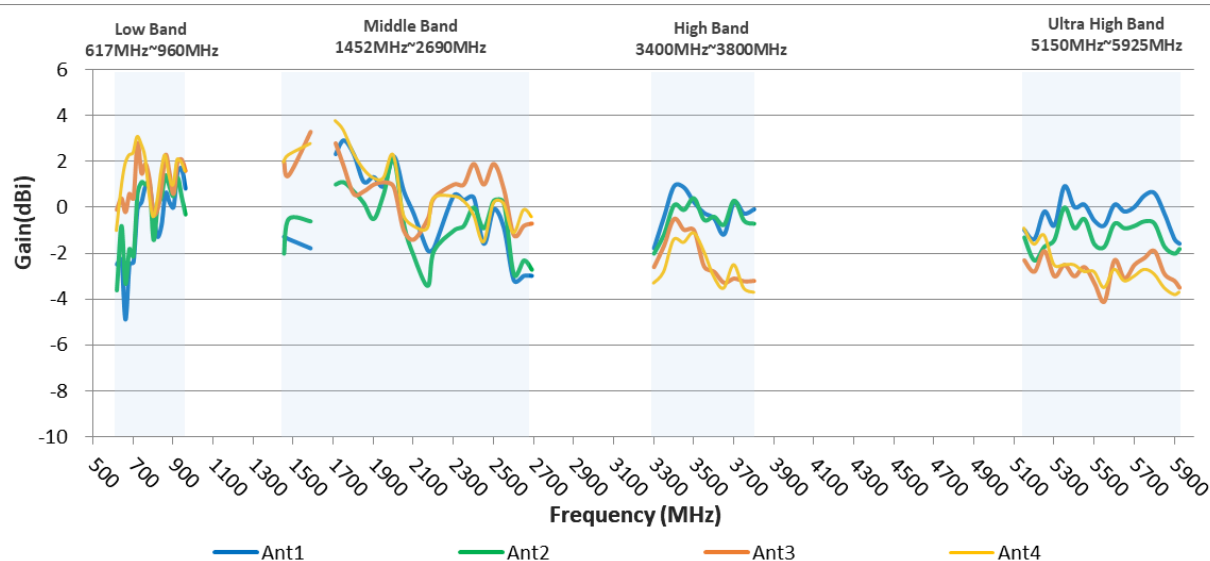


Antenna Efficiency and Gain – with device

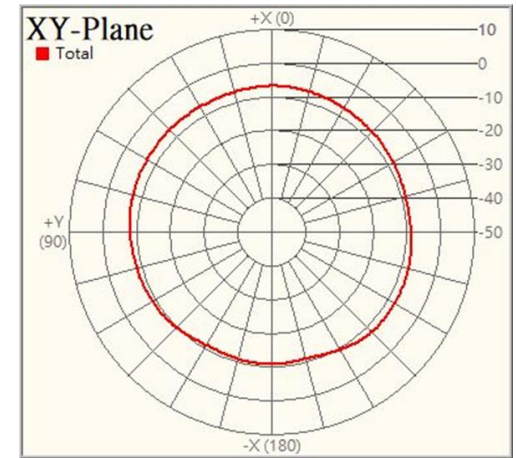
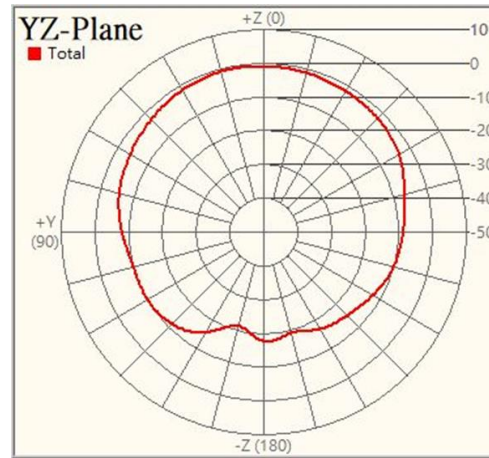
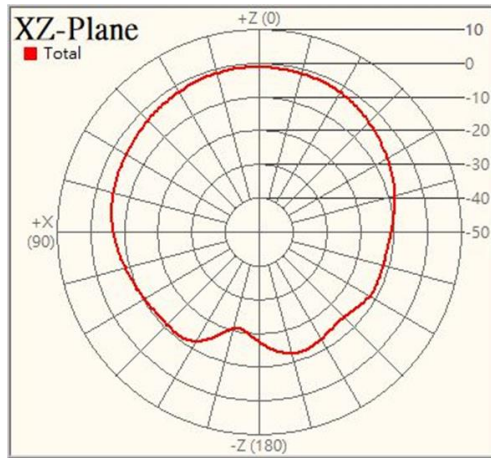
Efficiency



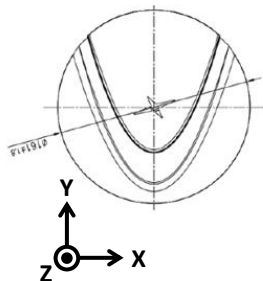
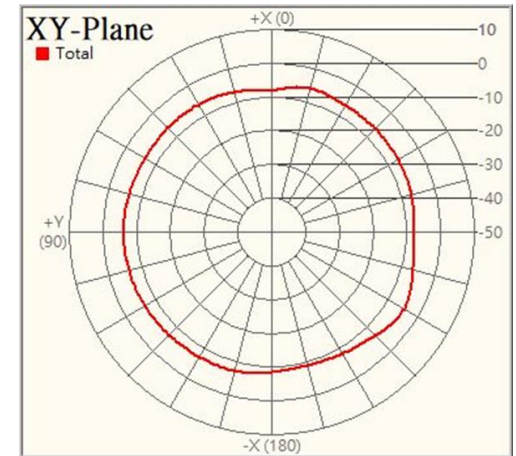
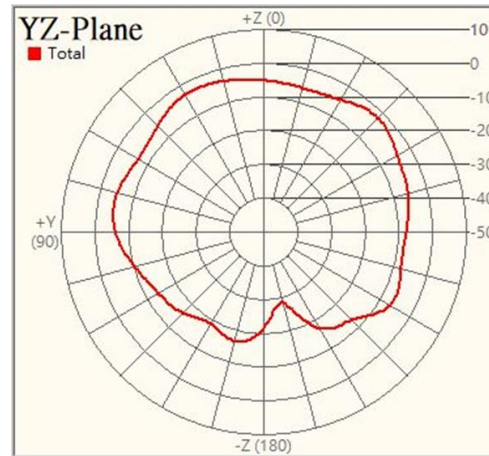
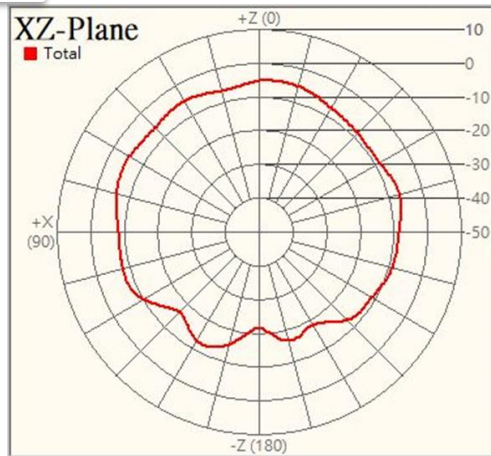
Gain



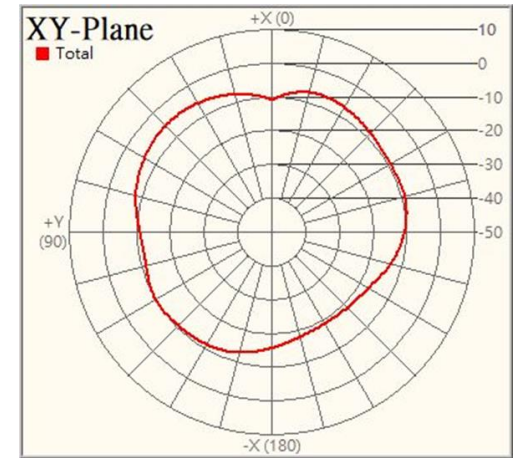
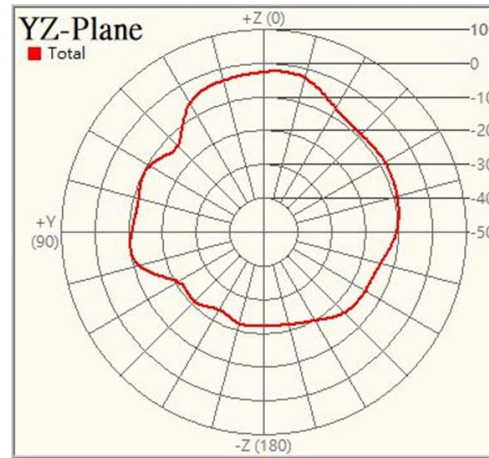
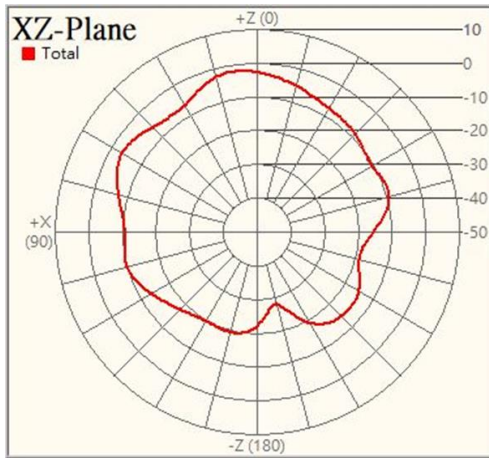
Low Band



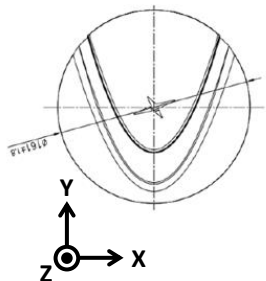
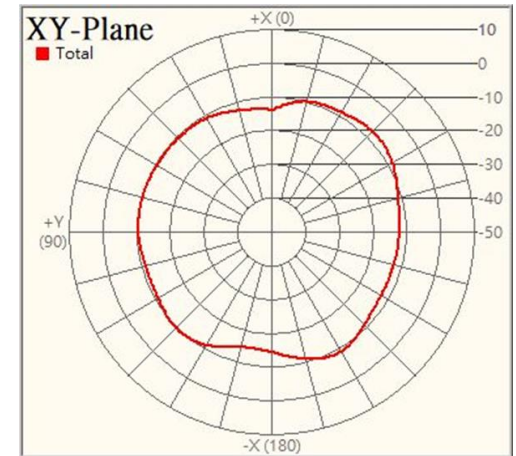
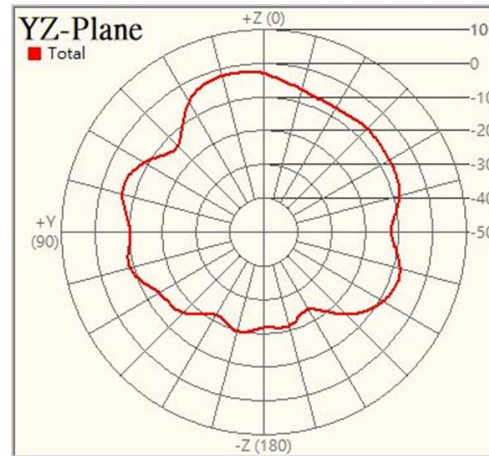
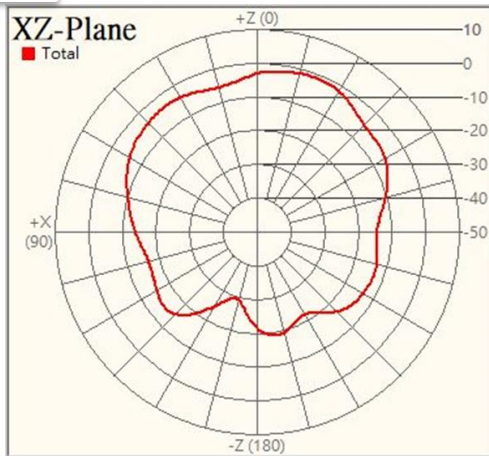
Middle Band



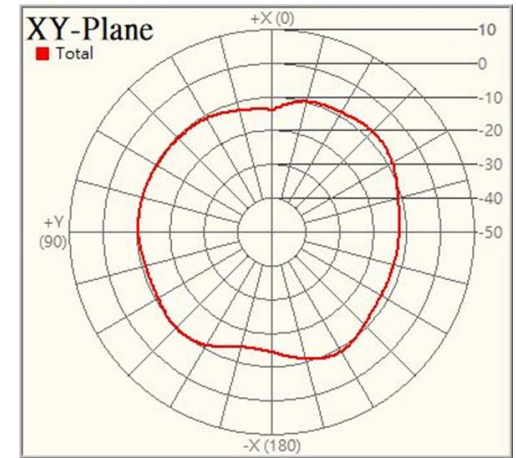
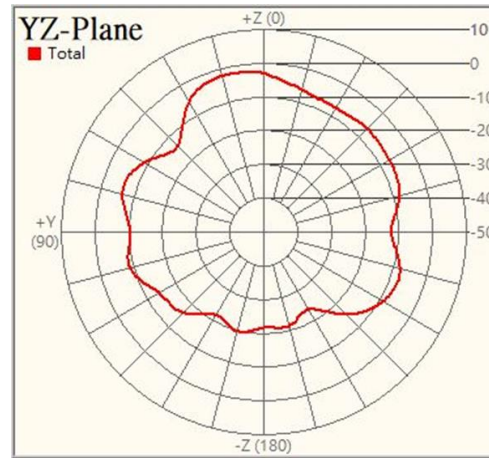
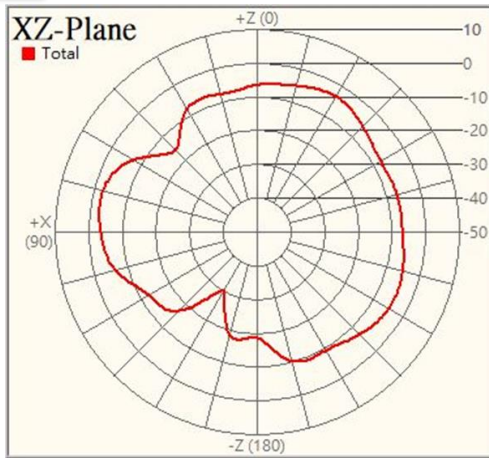
High Band



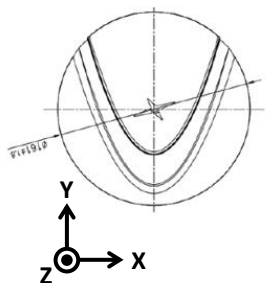
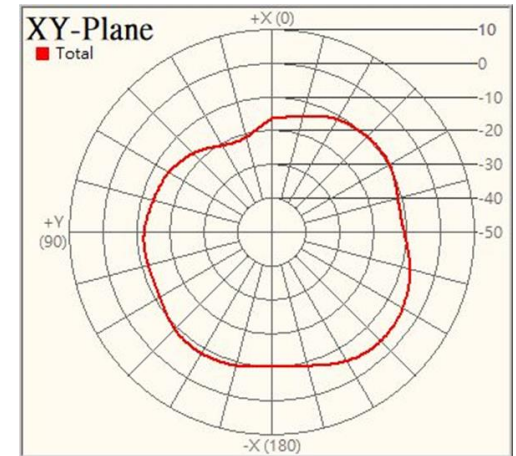
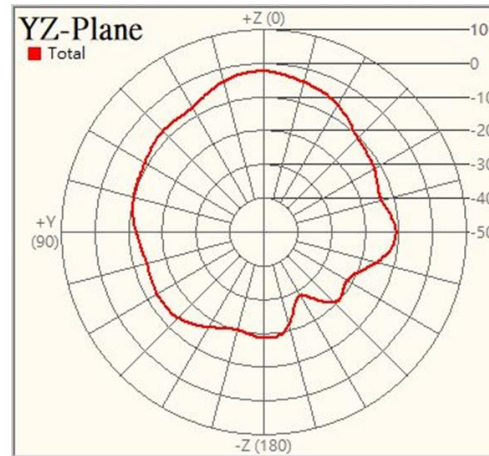
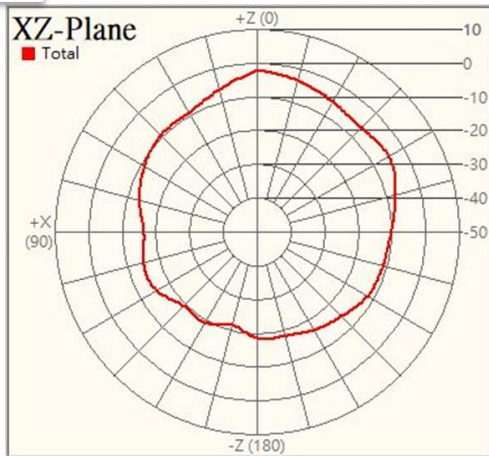
Ultra High Band



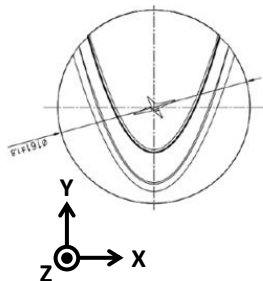
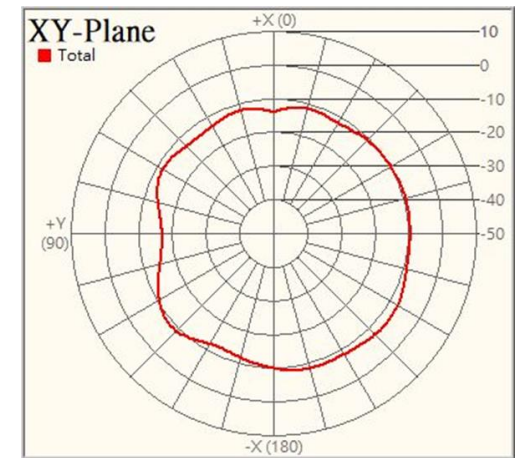
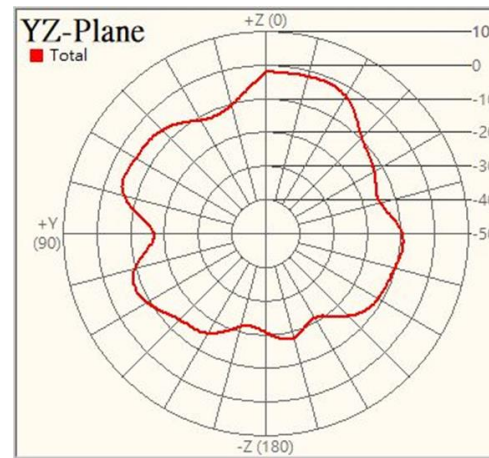
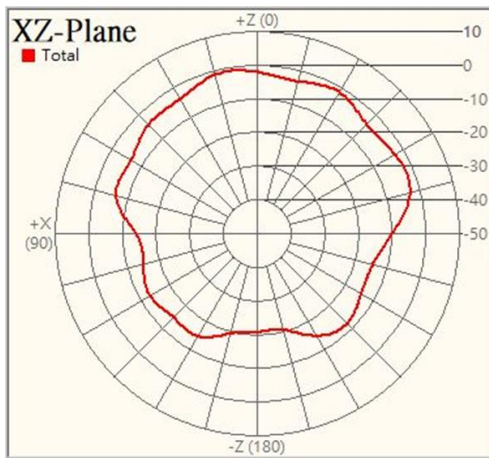
Middle Band



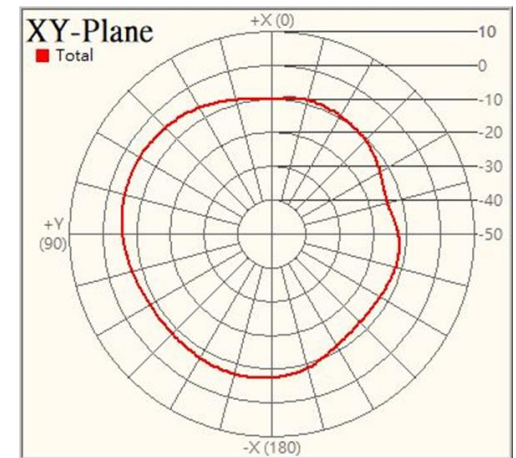
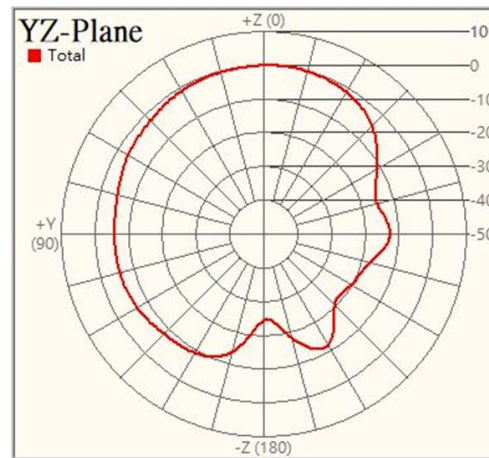
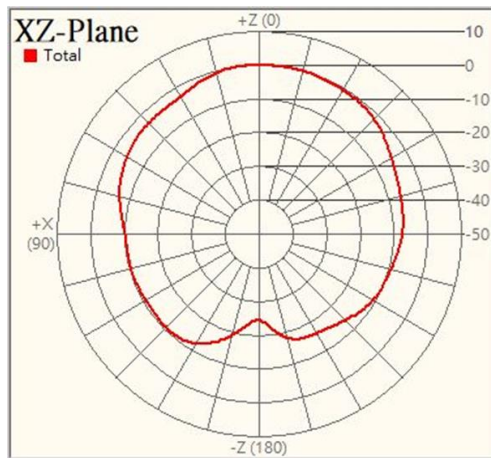
High Band



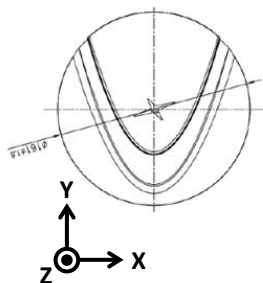
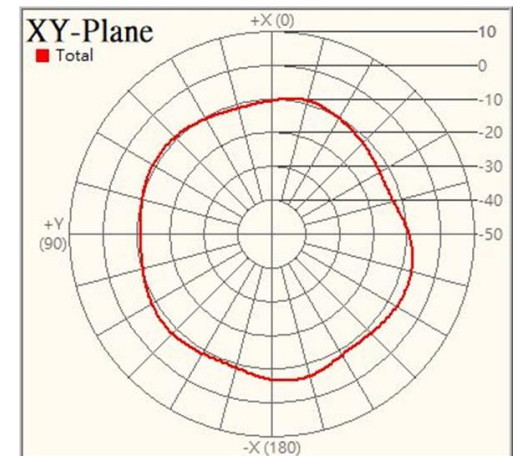
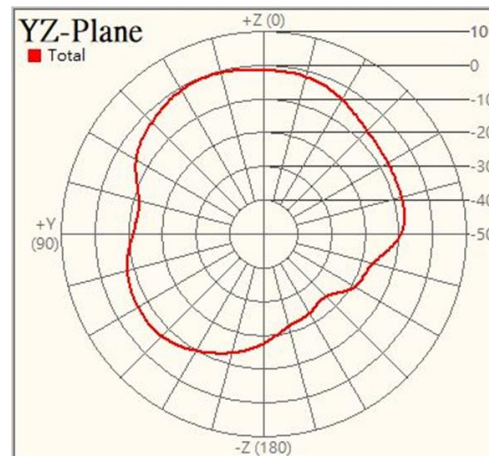
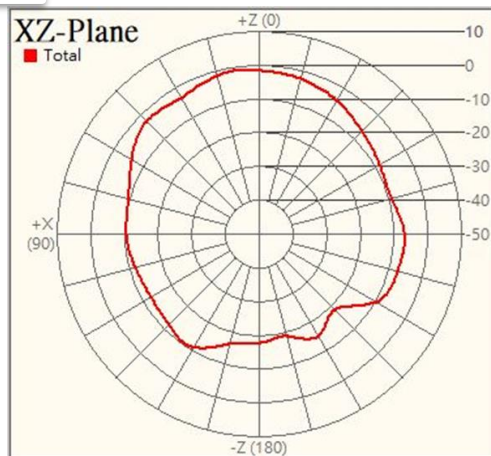
Ultra High Band



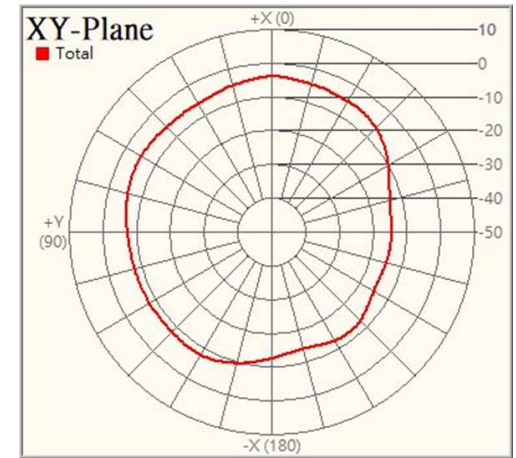
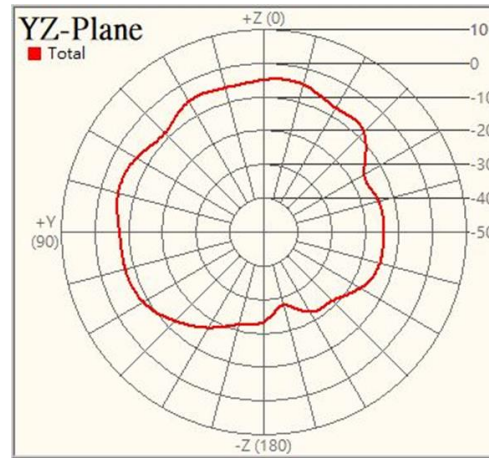
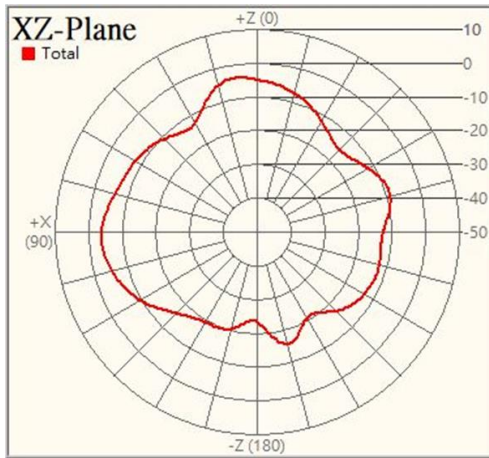
Low Band



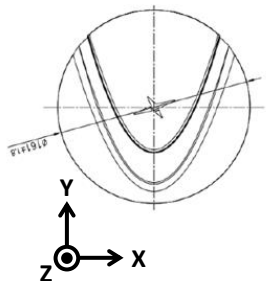
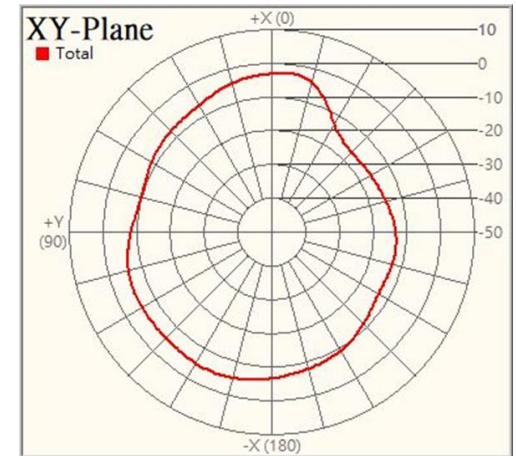
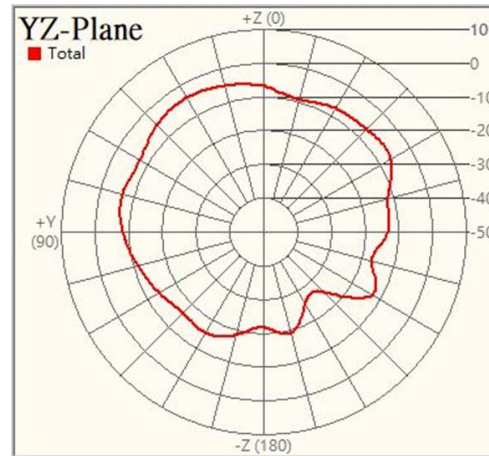
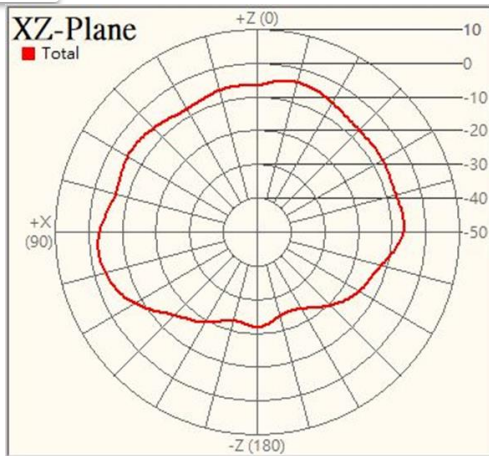
Middle Band



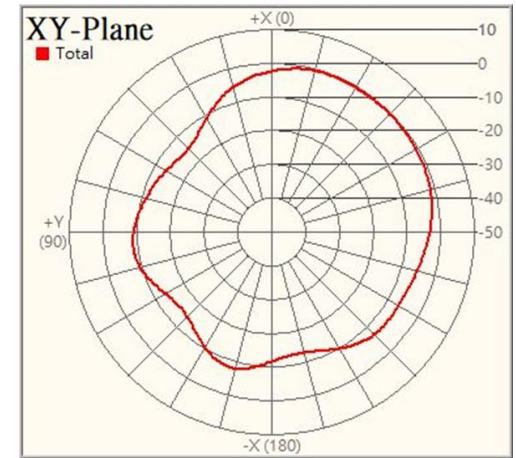
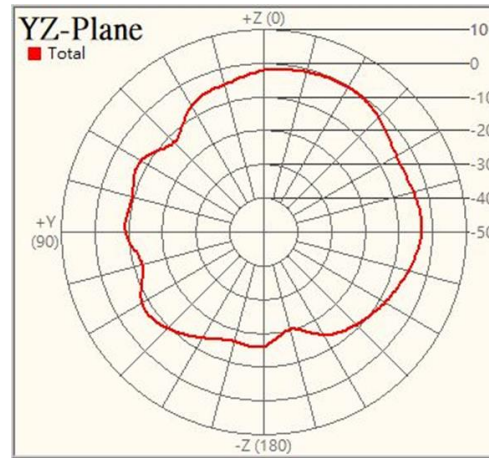
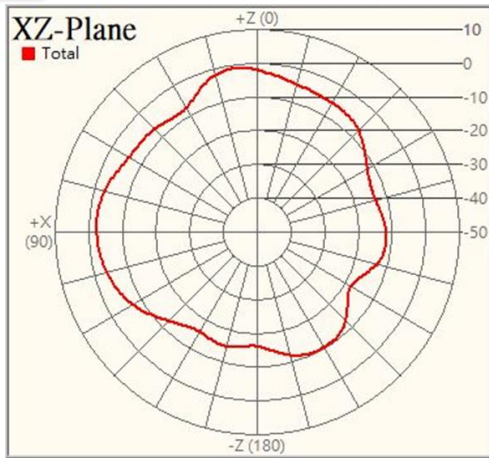
High Band



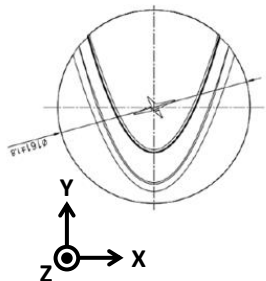
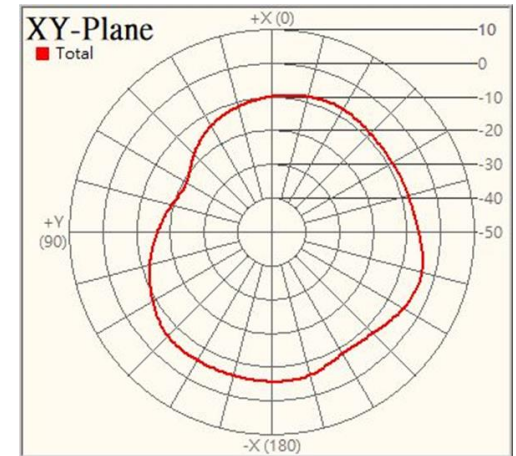
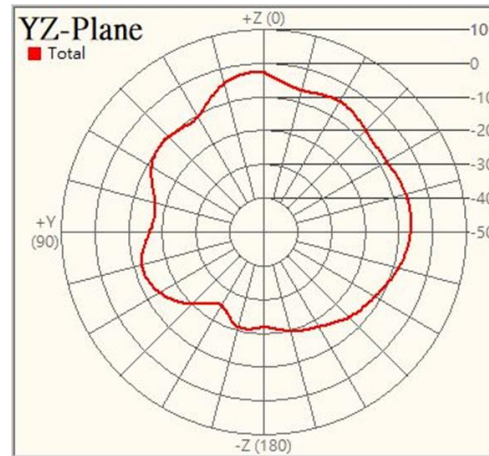
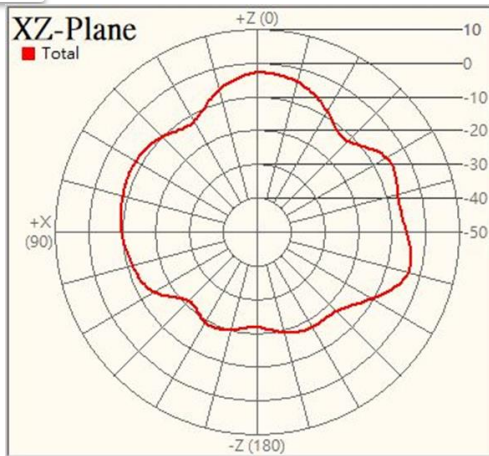
Ultra High Band



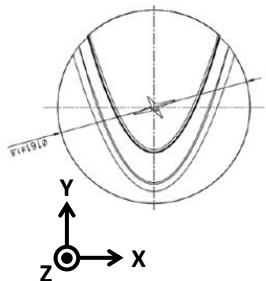
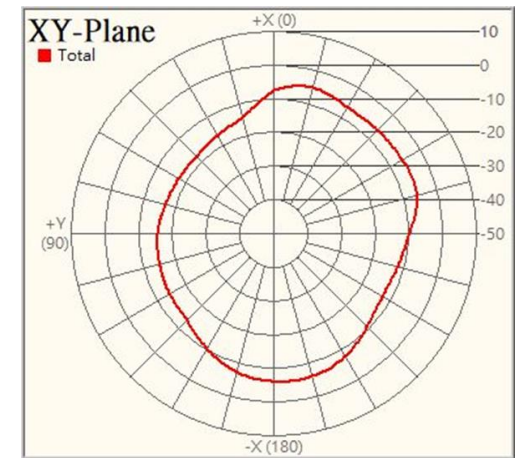
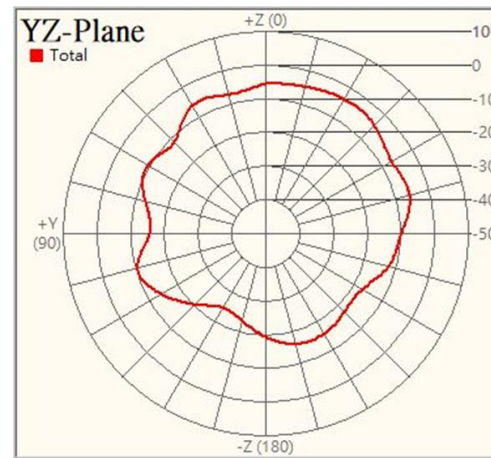
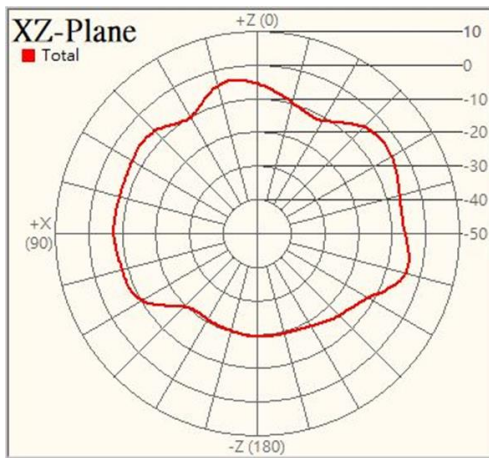
Middle Band



High Band



Ultra High Band



	Band	Frequency (MHz)	Ant.0	Ant.1	Ant.2	Ant.3	Max Peak Gain (dBi)	FCC Max Gain Allowed (dBi)
			Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)		
LTE	2	1850	1.1	0.2	0.7	1.7	1.7	5.9
	4	1710	2.3	1.0	2.8	3.8	3.8	5.5
	5	824	-0.8	0.5	0.9	1.6	1.6	3.5
	7	2500	-0.1	0.3	1.9	0.2	1.9	3.8
	12	699	-2.4	-2.1	0.4	2.4	2.4	3.6
	13	777	0.9	1.1	1.2	0.6	1.2	3.9
	14	788	-0.3	-1.4	-0.3	-0.4	-0.3	3.9
	17	704	-2.4	-2.1	0.4	2.4	2.4	3.6
	25	1850	1.1	0.2	0.7	1.7	1.7	5.9
	26	814	-1.3	0.0	-0.1	0.3	0.3	3.5
	30	2305	0.5	-1.0	1.0	0.5	1.0	1.0
	38	2570	-3.2	-2.9	-1.2	0.8	0.8	3.8
	41	2496	-0.1	0.3	1.9	0.2	1.9	3.8
	42 For FCC	3550	0.2	0.4	-1.0	-1.1	0.4	0.5
	43 For FCC	3600	-0.5	-0.4	-2.8	-3.0	-0.4	0.5
	48 For FCC	3550	0.2	0.4	-1.0	-1.1	0.4	0.5
	42 For ISSED	3450	0.9	0.1	-0.5	-1.4	0.9	6.0
	43 For ISSED	3600	-0.5	-0.4	-2.8	-3.0	-0.4	6.0
	48 For ISSED	3550	0.2	0.4	-1.0	-1.1	0.4	6.5
	66	1710	2.3	1.0	2.8	3.8	3.8	5.5
	71	663	-4.9	-3.3	-0.2	1.9	1.9	2.9

	Band	Frequency (MHz)	Ant.0	Ant.1	Ant.2	Ant.3	Max Peak Gain (dBi)	FCC Max Gain Allowed (dBi)
			Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)		
5G NR	n2	1850	1.1	0.2	0.7	1.7	1.7	5.9
	n5	824	-0.8	0.5	0.9	1.6	1.6	3.5
	n7	2500	-0.1	0.3	1.9	0.2	1.9	3.8
	n12	699	-2.4	-2.1	0.4	2.4	2.4	3.6
	n13	777	0.9	1.1	1.2	0.6	1.2	3.9
	n14	788	-0.3	-1.4	-0.3	-0.4	-0.3	3.9
	n25	1850	1.1	0.2	0.7	1.7	1.7	5.9
	n26	814	-1.3	0.0	-0.1	0.3	0.3	3.5
	n30	2305	0.5	-1.0	1.0	0.5	1.0	1.0
	n38	2570	-3.2	-2.9	-1.2	0.8	0.8	3.8
	n41	2496	-0.1	0.3	1.9	0.2	1.9	3.8
	n41_PC1.5	2496	-0.1	0.3	1.9	0.2	1.9	2.3
	n48 For FCC	3550	0.2	0.4	-1.0	-1.1	0.4	0.5
	n48 For ISED	3550	0.2	0.4	-1.0	-1.1	0.4	0.5
	n66	1710	2.3	1.0	2.8	3.8	3.8	7.5
	n71	663	-4.9	-3.3	-0.2	1.9	1.9	5.5

Antenna Gain – With cable loss

5G NR	Band	Frequency (MHz)	Ant.0	Ant.1	Ant.2	Ant.3	Max Peak Gain (dBi)	FCC Max Gain Allowed (dBi)
			Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)		
5G NR	n77 For FCC	3450	0.9	0.1	-0.5	-1.4	0.9	2.5
	n77_pc1.5 For FCC	3450	0.9	0.1	-0.5	-1.4	0.9	1.0
	n78 For FCC	3450	0.9	0.1	-0.5	-1.4	0.9	2.5
	n78_pc1.5 For FCC	3450	0.9	0.1	-0.5	-1.4	0.9	1.0
	n77 For ISED	3450	0.9	0.1	-0.5	-1.4	0.9	3.0
	n77_pc1.5 For ISED	3450	0.9	0.1	-0.5	-1.4	0.9	1.0
	n78 For ISED	3450	0.9	0.1	-0.5	-1.4	0.9	3.0
	n78_pc1.5 For ISED	3450	0.9	0.1	-0.5	-1.4	0.9	1.0

UMTS	Band	Frequency (MHz)	Ant.0	Ant.1	Ant.2	Ant.3	Max Peak Gain (dBi)	FCC Max Gain Allowed (dBi)
			Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)		
UMTS	2	1850	1.1	0.2	0.7	1.7	1.7	5.9
	4	1710	2.3	1.0	2.8	3.8	3.8	5.5
	5	824	-0.8	0.5	0.9	1.6	1.6	3.5

Antenna Efficiency and Gain – With cable loss

Freq. (MHz)	Ant.0		Ant.1		Ant.2		Ant.3	
	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)
617	25.6	-2.5	24.9	-3.6	37.9	-0.1	35.4	-1.0
640	28.6	-2.3	24.9	-0.8	30.4	0.4	32.8	0.8
660	33.8	-4.9	25.8	-3.3	38.4	-0.2	41.6	1.9
680	34.8	-2.5	28.8	-1.8	39.8	0.6	42.9	2.3
700	21.5	-2.4	28.5	-2.1	29.8	0.4	34.9	2.4
720	33.6	-0.1	32.3	0.6	35.4	2.8	44.0	3.1
740	36.2	0.2	37.9	1.1	42.3	1.5	43.0	2.8
760	30.1	0.9	33.9	1.0	33.3	1.9	36.4	2.2
780	28.6	0.9	31.3	1.1	34.9	1.2	37.8	0.6
800	27.7	-0.3	29.1	-1.4	30.4	-0.3	38.6	-0.4
820	27.2	-1.3	30.9	0.0	30.7	-0.1	32.3	0.3
840	38.7	-0.8	34.5	0.5	38.8	0.9	37.4	1.6
860	37.4	0.6	39.8	1.4	41.1	2.3	43.6	2.3
880	35.3	0.2	36.3	0.9	37.6	1.5	35.0	1.4
900	30.6	0.0	35.5	0.5	34.3	0.6	35.7	1.0
920	31.3	1.5	29.9	1.3	36.9	2.0	30.3	2.1
940	38.8	1.7	35.1	0.5	39.7	2.1	41.6	2.0
960	38.9	0.8	35.0	-0.3	36.9	1.6	34.5	1.6
1452	28.7	-1.3	25.2	-2.0	35.1	2.0	29.4	2.0
1475	30.5	-1.1	27.3	-1.8	35.1	2.3	40.5	1.9
1496	17.2	-0.8	18.3	-1.0	31.2	2.5	31.4	2.0
1565	29.8	-0.1	31.5	0.1	39.9	1.9	38.5	2.6
1575	26.2	-1.4	26.5	-0.5	36.3	1.4	37.4	2.3
1585	22.8	-1.8	25.9	-0.6	33.9	3.3	34.4	2.8

Antenna Efficiency and Gain – With cable loss

Freq. (MHz)	Ant.0		Ant.1		Ant.2		Ant.3	
	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)
1710	36.4	2.3	35.0	1.0	41.3	2.8	41.1	3.8
1750	38.9	2.9	40.7	1.1	40.2	1.8	42.2	3.4
1800	37.2	2.3	37.3	0.7	34.6	0.6	38.7	2.4
1850	31.9	1.1	30.8	0.2	29.9	0.7	30.4	1.7
1900	35.2	1.3	32.7	-0.5	30.8	1.0	33.3	1.3
1950	37.6	0.9	34.4	0.6	32.2	1.1	31.5	1.3
2000	44.7	2.2	40.6	2.1	35.8	0.9	38.9	2.3
2050	25.6	0.7	20.2	-0.7	21.0	-1.0	21.7	-0.3
2100	28.3	-0.3	24.0	-2.1	22.7	-1.4	23.0	-0.8
2170	11.9	-1.9	8.8	-3.4	8.8	-0.5	10.5	-0.9
2200	30.6	-1.8	27.7	-1.9	29.1	0.4	30.3	0.4
2300	28.9	0.5	26.0	-1.0	30.0	1.0	30.2	0.5
2350	28.0	0.3	26.5	-0.8	29.7	1.0	28.7	0.3
2400	27.7	0.4	28.0	0.0	32.2	1.9	28.2	-0.3
2450	24.8	-1.6	30.7	-0.9	33.8	1.0	28.8	-1.5
2500	23.0	-0.1	28.6	0.3	30.6	1.9	37.6	0.2
2550	28.9	-0.9	34.7	0.2	36.5	0.8	34.0	0.2
2600	16.4	-3.2	30.0	-2.9	23.5	-1.2	31.8	0.8
2650	18.0	-3.0	19.2	-2.3	24.9	-0.8	23.5	-0.1
2690	20.8	-3.0	22.5	-2.7	25.3	-0.7	23.0	-0.4

Antenna Efficiency and Gain – With cable loss

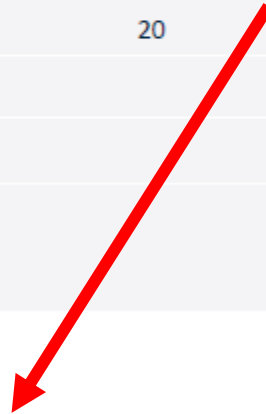
Freq. (MHz)	Ant.0		Ant.1		Ant.2		Ant.3	
	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)
3300	32.3	-1.8	27.8	-2.0	23.5	-2.6	22.4	-3.3
3400	24.3	0.9	23.3	0.1	14.2	-0.5	22.5	-1.4
3500	31.9	0.2	30.2	0.4	20.9	-1.0	20.4	-1.1
3600	24.6	-0.5	24.3	-0.4	14.8	-2.8	14.5	-3.0
3700	32.1	0.2	27.5	0.3	23.5	-3.1	23.6	-2.5
3800	28.6	-0.1	17.2	-0.7	21.2	-3.2	20.5	-3.7
3900	16.4	-0.2	15.7	-0.2	14.9	-3.8	11.7	-3.0
4000	11.5	-2.7	10.1	-2.8	15.6	-4.9	11.8	-3.1
4100	24.0	-1.2	24.2	-1.0	24.1	-2.6	24.0	-1.5
4200	22.9	-2.4	22.2	-2.0	25.5	-2.3	25.0	-2.9
4400	15.9	-2.0	16.2	-2.1	12.8	-1.9	12.7	-1.9
4500	20.8	-3.0	20.8	-3.1	18.7	-3.1	19.6	-2.9
4600	21.1	-2.3	21.8	-1.5	16.2	-3.0	15.3	-2.7
4700	18.8	-2.3	17.5	-2.2	15.4	-2.5	15.5	-2.7
4800	11.6	-0.5	10.8	-1.1	18.0	-2.2	17.8	-2.1
4900	11.4	0.5	12.5	-0.1	13.2	-1.7	12.9	-1.6
5000	13.5	-2.0	11.3	-2.0	15.8	-2.5	15.5	-1.8

Antenna Efficiency and Gain – With cable loss

Freq. (MHz)	Ant.0		Ant.1		Ant.2		Ant.3	
	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)	Efficiency (%)	Gain (dBi)
5150	15.6	-1.0	13.6	-1.3	15.3	-2.3	14.5	-0.9
5200	12.3	-1.4	11.1	-2.3	14.3	-2.8	13.1	-1.6
5250	12.7	-0.2	10.8	-1.7	14.6	-1.9	13.6	-1.2
5300	14.0	-0.8	13.6	-1.4	14.5	-3.0	14.1	-2.5
5350	19.5	0.9	18.9	0.0	18.0	-2.5	17.0	-2.5
5400	14.5	0.0	14.6	-0.9	13.2	-3.0	12.5	-2.5
5450	17.8	0.1	17.5	-0.5	17.3	-2.6	16.7	-2.8
5500	14.5	-0.6	13.2	-1.6	13.1	-3.3	13.1	-2.8
5550	14.2	-0.8	12.6	-1.7	11.6	-4.1	12.0	-3.5
5600	19.7	0.1	18.0	-0.7	16.8	-2.3	16.7	-2.7
5650	16.0	-0.2	15.0	-0.9	13.3	-3.1	13.0	-3.2
5700	12.8	0.0	11.1	-0.8	10.5	-2.5	10.3	-3.0
5750	15.8	0.5	13.2	-0.6	12.9	-2.2	13.2	-2.7
5800	18.1	0.6	15.1	-0.7	14.3	-1.9	14.5	-2.9
5850	19.8	-0.3	17.7	-1.7	14.8	-2.9	15.2	-3.5
5900	20.7	-1.4	18.7	-2.0	15.4	-3.2	16.0	-3.8
5925	19.6	-1.6	17.4	-1.8	14.8	-3.5	15.2	-3.7

Antenna Efficiency and Gain

GNSS Electrical			
Frequency (MHz)	1561	1575.42	1602
VSWR (max.)	2.5	2.5	2.5
Passive Antenna Efficiency (%) (Without cable loss)	40.02	48.39	44.29
Passive Antenna Gain at Zenith (dBic) (Without cable loss)	3.75	4.44	4.54
Axial Ratio (dB)	20	11	15
Polarization	RHCP		
Impedance	50Ω		
Cable	RG-174		
Connector	SMA(M)		



GNSS peak gain with cable loss			
Frequency(MHz)	1561	1575.42	1602
peak gain+cable loss	3.25	3.95	4.04

Radio_1 Wi-Fi 1~2
 Wi-Fi Frequency 2400~2500MHz
 Return Loss -10dB
 Antenna Type Dipole
 Material FR4
 Feeding Cable

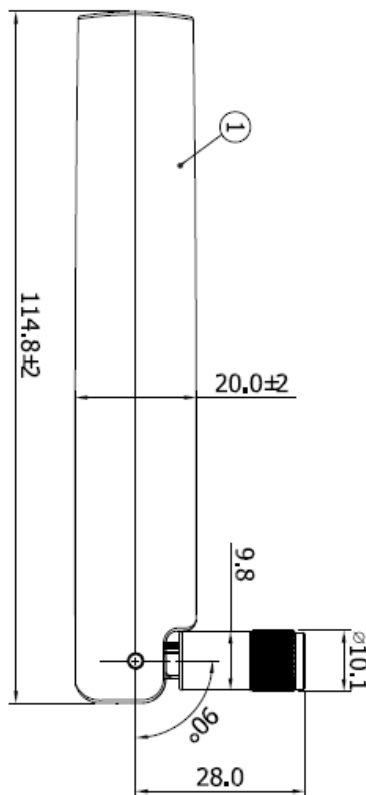
Radio_2 Wi-Fi 1~2
 Wi-Fi Frequency 5150~5895MHz
 Return Loss -10dB
 Antenna Type Dipole
 Material FR4
 Feeding Cable

BLE
 BLE Frequency 2400~2500MHz
 Return Loss -10dB
 Antenna Type Dipole
 Material Metal
 Feeding Cable

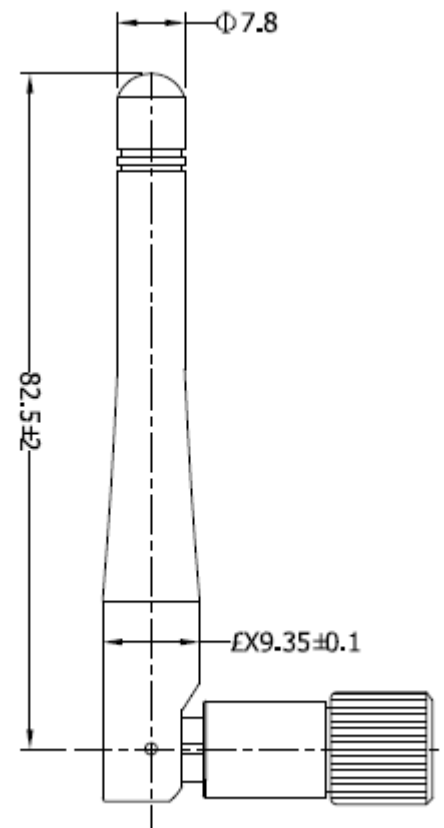
Wi-Fi 1
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Wi-Fi 2
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 P/N 7102A1318000
 Model Name :
 ANT DIPOLE 2/5/6GHz C496-510189-A BLACK

BLE
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 Model Name :
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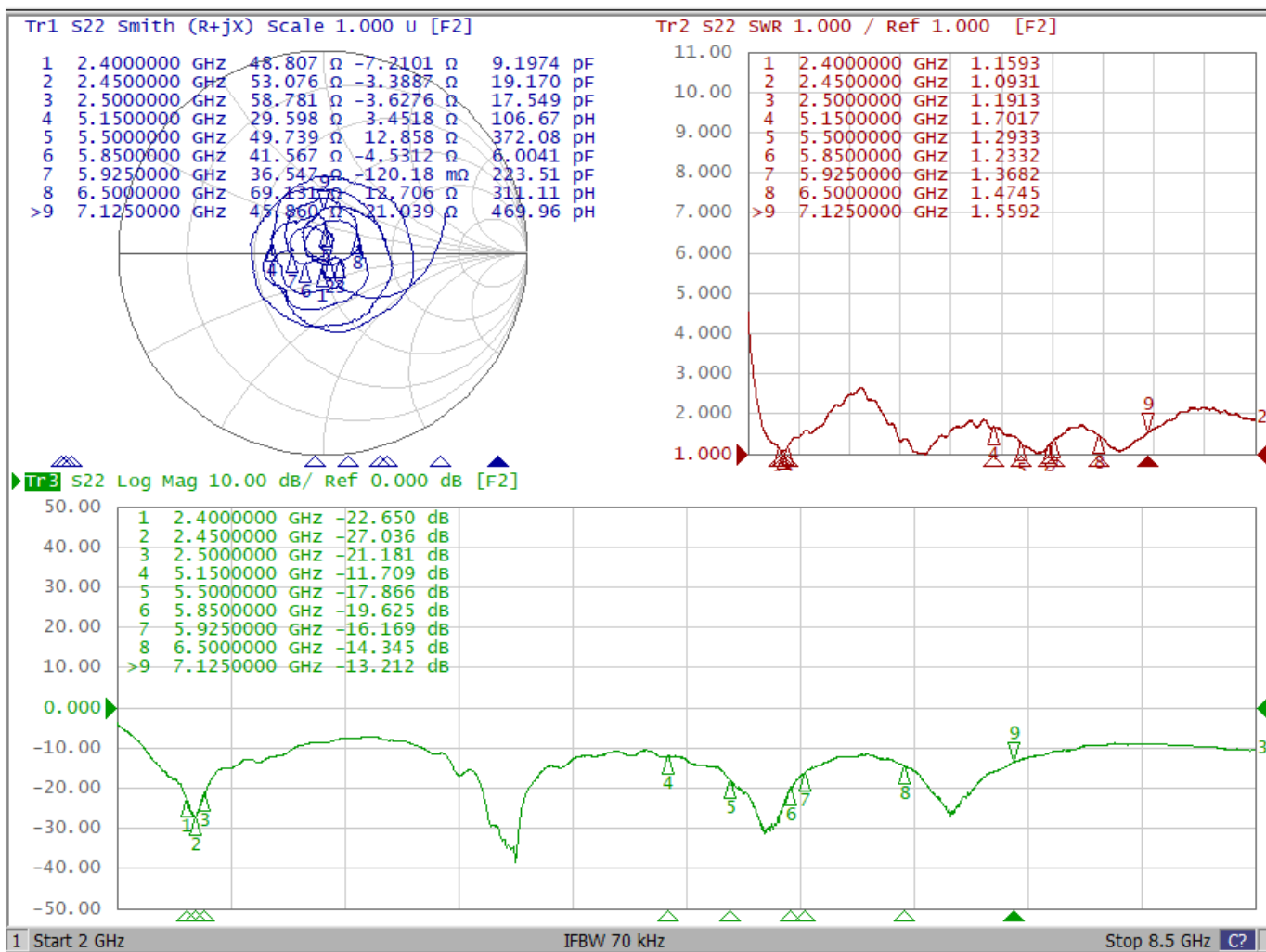


Wi-Fi

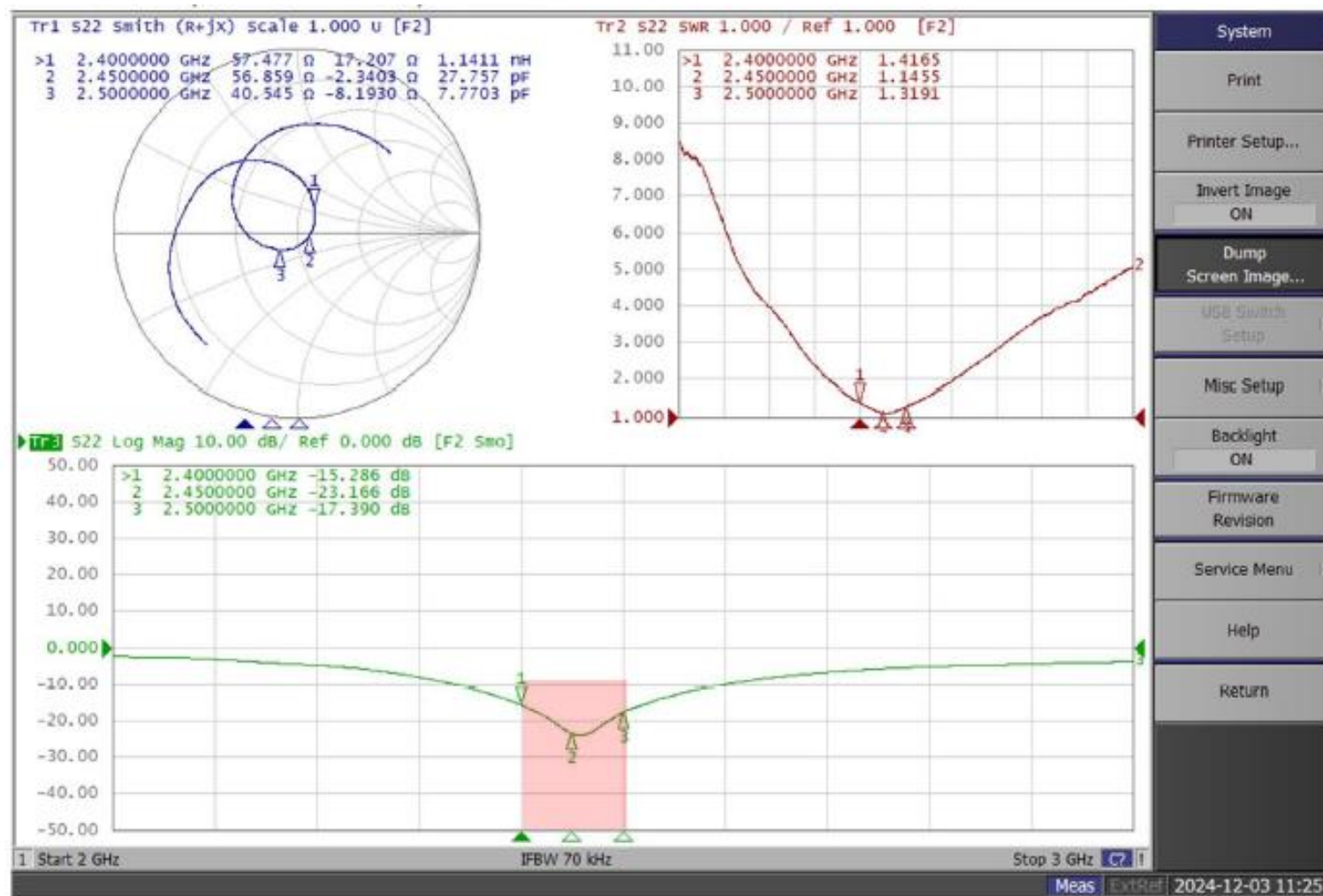


BLE

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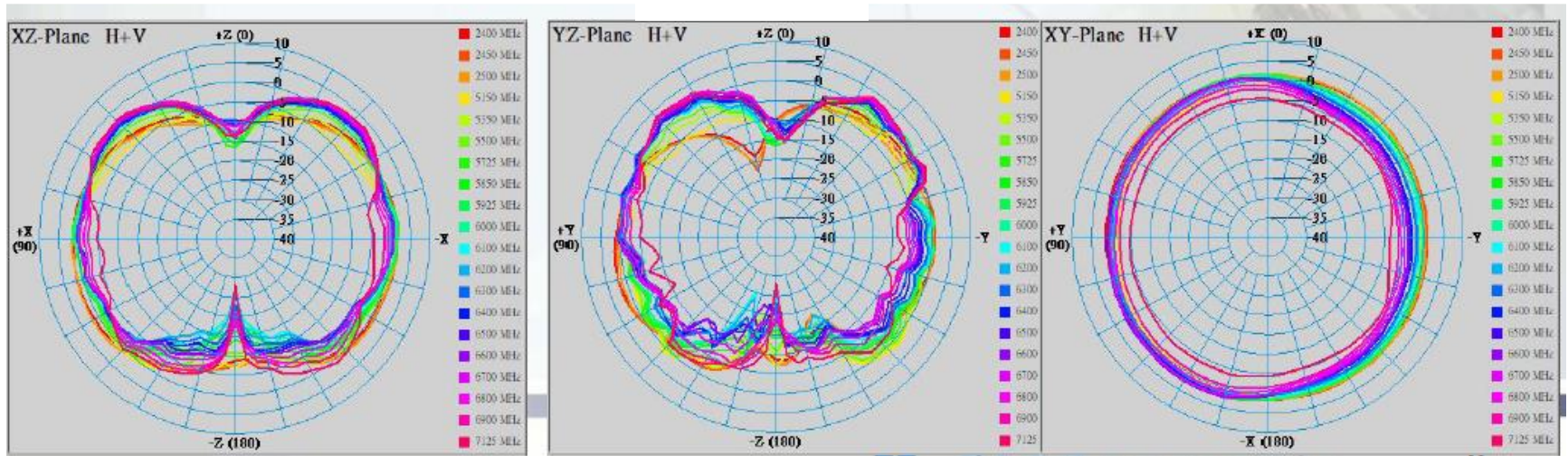
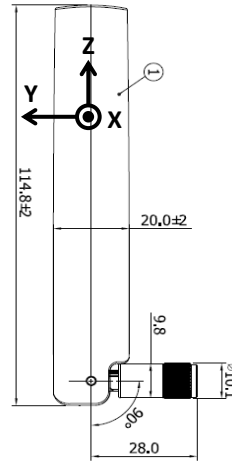


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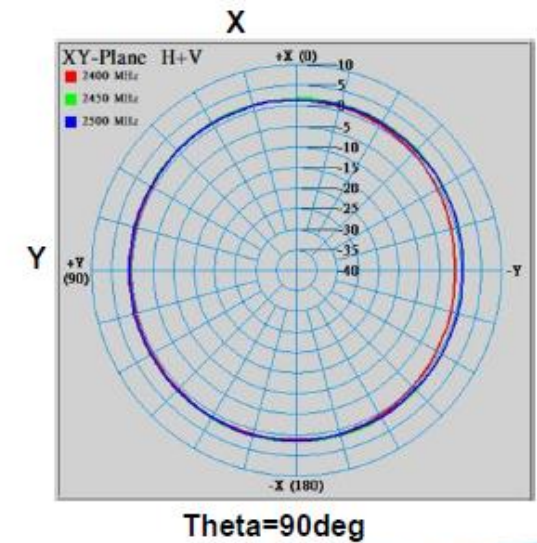
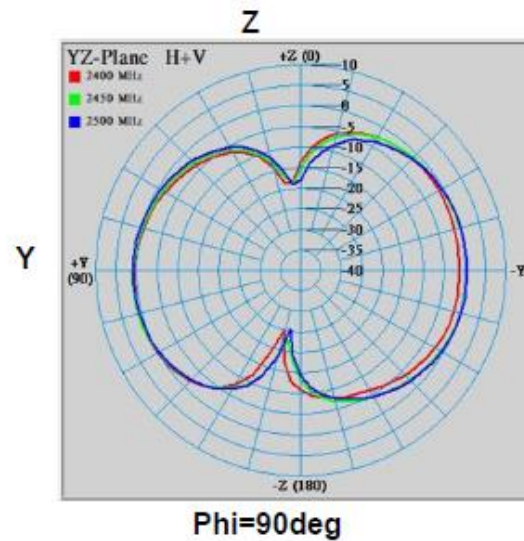
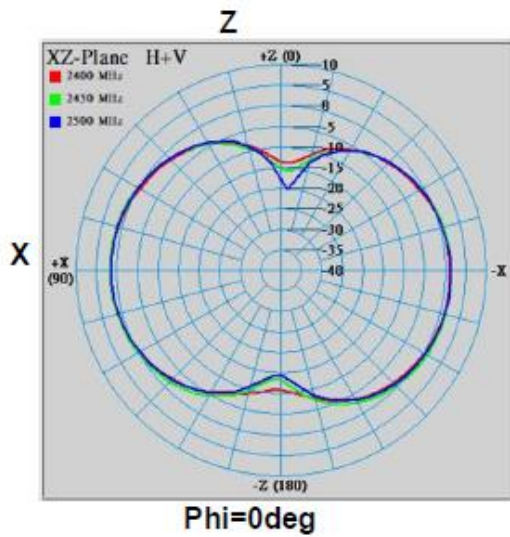
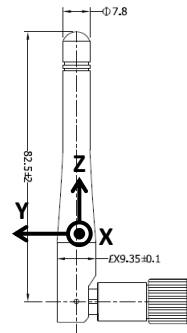


2D Radiation Pattern – Wi-Fi

- This is the data within the datasheet.



- This is the data within the datasheet.



Antenna Efficiency and Gain

Frequency (MHz)	Ant1	
	Gain(dB)	Efficiency (%)
2400	2.00	83.05
2450	2.08	84.48
2500	2.04	84.69
5150	1.95	72.28
5350	1.48	73.73
5500	2.02	82.36
5725	2.41	87.00
5850	2.17	83.31
5925	2.20	83.59
6000	2.37	81.87

Wi-Fi

Frequency (MHz)	Antenna	
	Peak Gain (dBi)	Efficiency (%)
2400	1.46	77
2450	1.80	84
2500	1.51	81

BLE

Need to be deducted cable loss
0.5dB

Need to be deducted cable loss
2.4G : 0.8dBi
5G : 1.4dBi