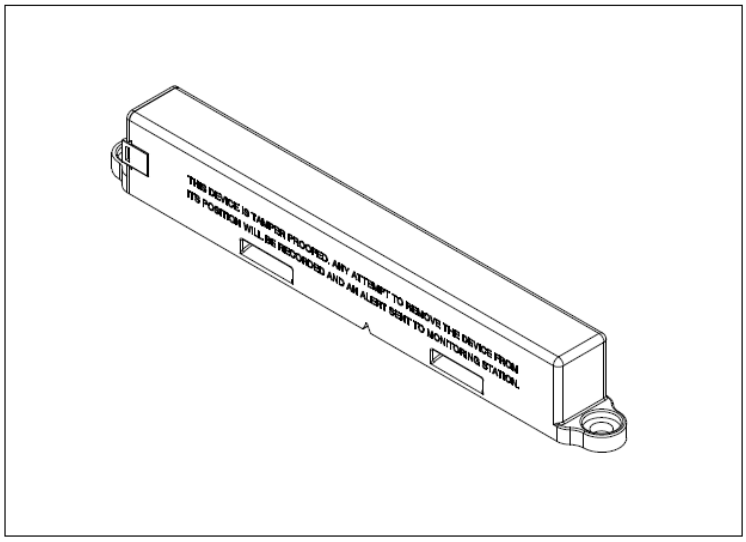
Antenna Specification of IET10RC5



JUNE 2023

SJI Co., Ltd.

Contents

1. Revision History

Date	Version	Name	Description
JUNE. 12, 2019	1.0		First release product description

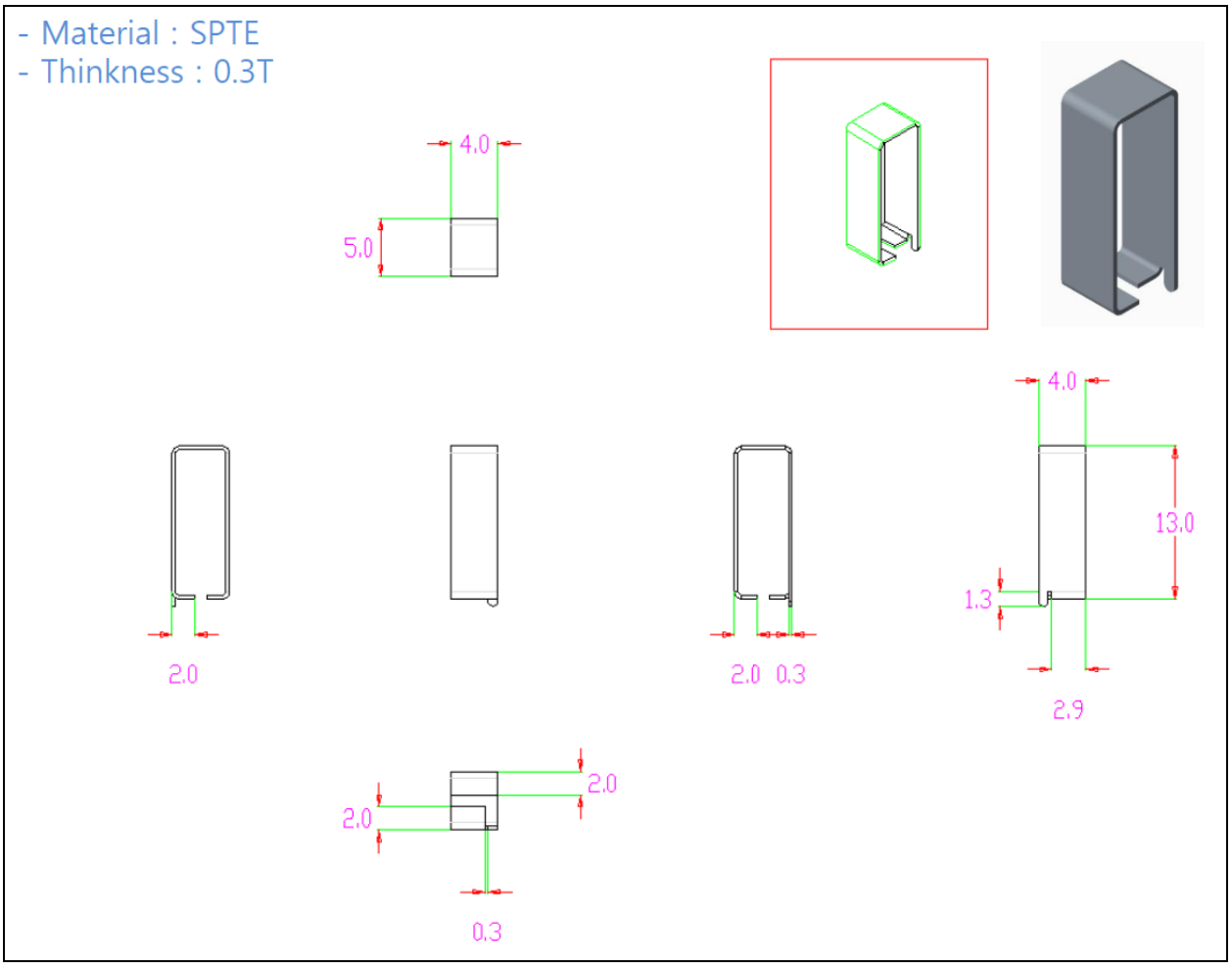
2. Antenna List

No.	Purpose	Frequency	Part Number	Vendor
1	SIGFOX	923.3MHz	WSANT2G01	WISOL
2	BLE	2400MHz	AA055	INNO-LINK
3	WIFI	2400MHz	AA055	INNO-LINK
4	GPS	1575MHz	T10SA01	WISOL

3. Antenna Specification

3.1 SIGFOX Metal Antenna(WSANT2G01)

3.1.1 Appearance



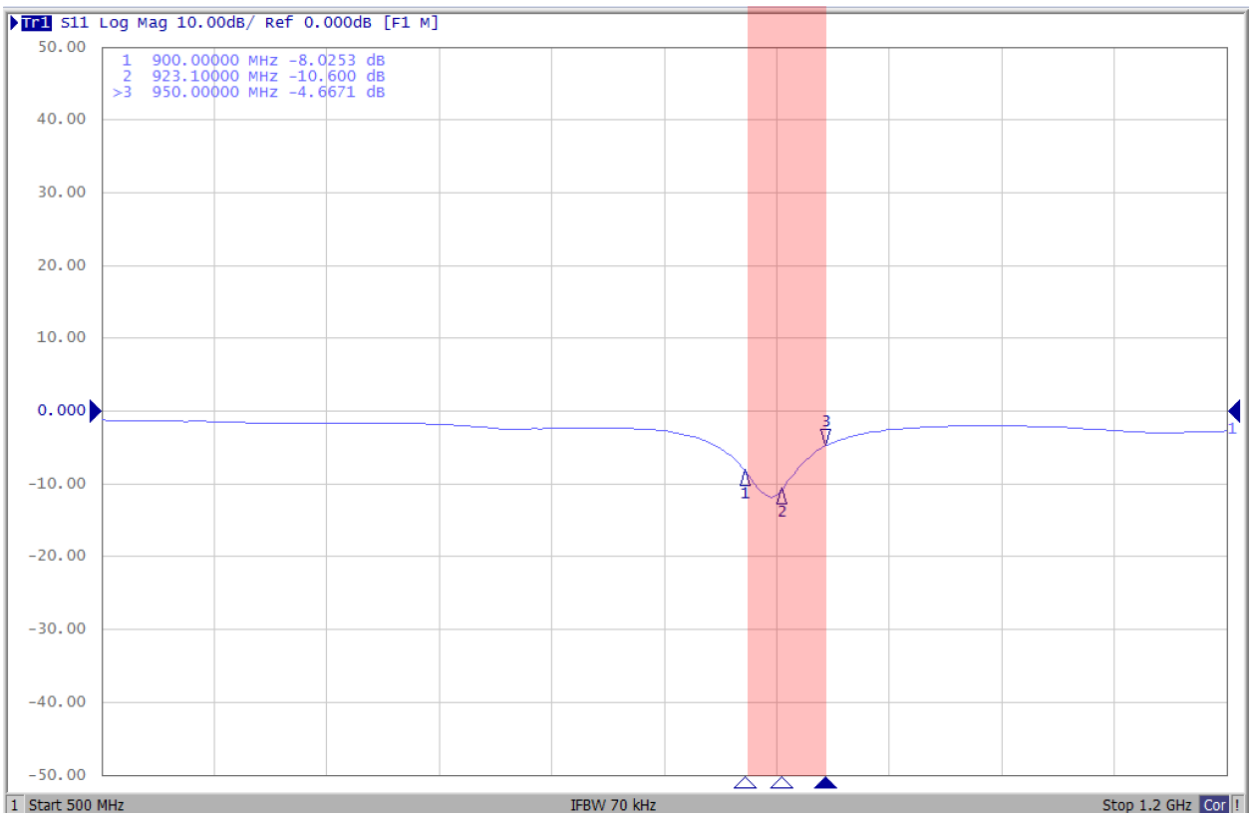
- SPTE = TIN plate

3.1.2 General Specification

Characteristics	Specification
Frequency	923.3 MHz
Return Loss	-10.60 dB
Average Gain	-5.6 dBi
Efficiency	38.6 %
Peak Gain	1.3 dBi
Impedance	50 ohm
Polarization	Linear
Size	4mm x 5mm x13 mm

3.1.3 Return Loss Graph

Frequency	Return Loss
950.0 MHz	-8.025 dB
923.1 MHz	-10.600 dB
900.0 MHz	-4.667 dB

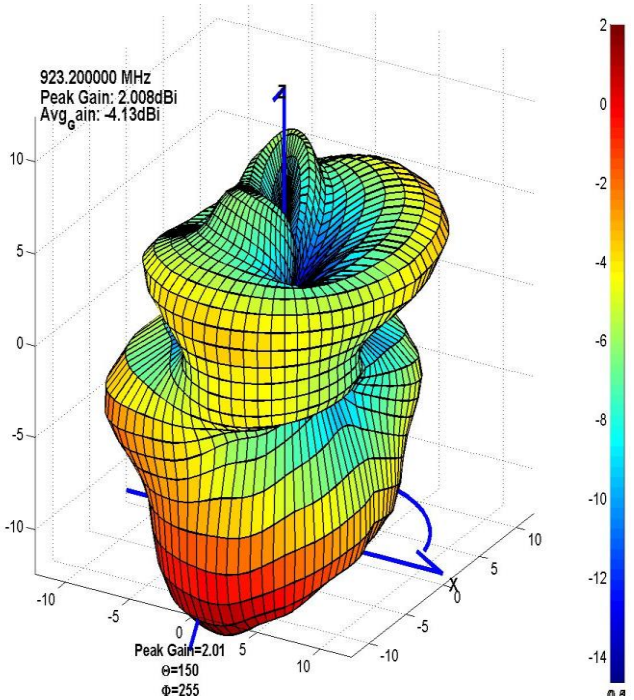


3.1.4 Antenna Gain

Antenna Pattern & Gain Report

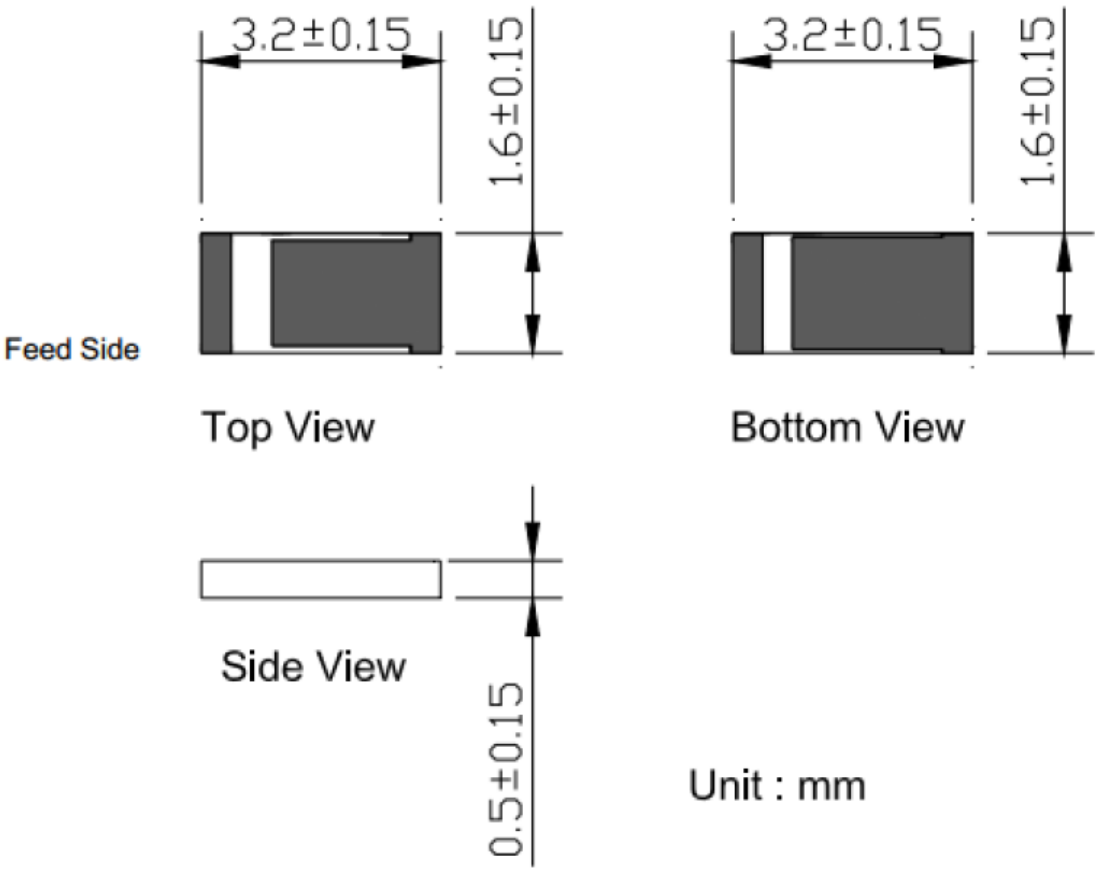
Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
810.000000 MHz	40.5 %	-10.0 dBi	-5.2 dBi	-3.9 dBi	-4.5 dBi	0.6 dBi	1.3 dBi	Theta150/Pie270	5.26 dB
820.000000 MHz	39.6 %	-10.1 dBi	-5.2 dBi	-4.0 dBi	-4.7 dBi	0.5 dBi	1.3 dBi	Theta150/Pie270	5.27 dB
830.000000 MHz	33.3 %	-10.9 dBi	-6.0 dBi	-4.8 dBi	-5.6 dBi	-0.2 dBi	0.5 dBi	Theta150/Pie270	5.28 dB
840.000000 MHz	35.5 %	-10.5 dBi	-5.7 dBi	-4.5 dBi	-5.4 dBi	0.1 dBi	0.9 dBi	Theta150/Pie270	5.35 dB
850.000000 MHz	38.8 %	-10.0 dBi	-5.4 dBi	-4.1 dBi	-5.0 dBi	0.5 dBi	1.3 dBi	Theta150/Pie270	5.44 dB
863.000000 MHz	30.7 %	-10.8 dBi	-6.5 dBi	-5.1 dBi	-5.7 dBi	-0.4 dBi	0.4 dBi	Theta150/Pie270	5.54 dB
865.000000 MHz	29.4 %	-11.0 dBi	-6.7 dBi	-5.3 dBi	-5.8 dBi	-0.6 dBi	0.2 dBi	Theta150/Pie270	5.56 dB
868.100000 MHz	27.5 %	-11.2 dBi	-7.0 dBi	-5.6 dBi	-6.0 dBi	-0.8 dBi	0.0 dBi	Theta150/Pie270	5.61 dB
868.130000 MHz	27.5 %	-11.3 dBi	-7.0 dBi	-5.6 dBi	-6.0 dBi	-0.8 dBi	0.0 dBi	Theta150/Pie270	5.62 dB
902.200000 MHz	35.9 %	-9.7 dBi	-6.0 dBi	-4.5 dBi	-3.8 dBi	0.5 dBi	1.5 dBi	Theta150/Pie255	5.91 dB
908.700000 MHz	31.7 %	-10.2 dBi	-6.5 dBi	-5.0 dBi	-4.3 dBi	0.1 dBi	1.0 dBi	Theta150/Pie255	5.98 dB
916.000000 MHz	32.5 %	-10.1 dBi	-6.4 dBi	-4.9 dBi	-4.2 dBi	0.4 dBi	1.2 dBi	Theta150/Pie255	6.07 dB
920.800000 MHz	37.7 %	-9.5 dBi	-5.7 dBi	-4.2 dBi	-3.5 dBi	1.1 dBi	1.9 dBi	Theta150/Pie255	6.09 dB
921.600000 MHz	38.2 %	-9.5 dBi	-5.7 dBi	-4.2 dBi	-3.5 dBi	1.2 dBi	1.9 dBi	Theta150/Pie255	6.12 dB
923.200000 MHz	38.6 %	-9.5 dBi	-5.6 dBi	-4.1 dBi	-3.4 dBi	1.3 dBi	2.0 dBi	Theta150/Pie255	6.14 dB
923.300000 MHz	38.6 %	-9.5 dBi	-5.6 dBi	-4.1 dBi	-3.4 dBi	1.3 dBi	2.0 dBi	Theta150/Pie255	6.16 dB
927.500000 MHz	37.7 %	-9.6 dBi	-5.7 dBi	-4.2 dBi	-3.4 dBi	1.3 dBi	2.0 dBi	Theta150/Pie255	6.21 dB
936.000000 MHz	36.2 %	-9.8 dBi	-5.9 dBi	-4.4 dBi	-3.6 dBi	1.2 dBi	1.8 dBi	Theta150/Pie255	6.19 dB
950.000000 MHz	36.0 %	-10.0 dBi	-5.8 dBi	-4.4 dBi	-3.8 dBi	1.2 dBi	1.7 dBi	Theta150/Pie240	6.12 dB
960.000000 MHz	42.8 %	-9.3 dBi	-5.1 dBi	-3.7 dBi	-3.2 dBi	2.0 dBi	2.4 dBi	Theta150/Pie240	6.08 dB
970.000000 MHz	39.3 %	-9.7 dBi	-5.4 dBi	-4.1 dBi	-3.6 dBi	1.7 dBi	2.0 dBi	Theta150/Pie240	6.11 dB
980.000000 MHz	37.6 %	-9.8 dBi	-5.7 dBi	-4.2 dBi	-3.6 dBi	1.6 dBi	1.7 dBi	Theta150/Pie225	5.96 dB
990.000000 MHz	46.0 %	-8.8 dBi	-4.8 dBi	-3.4 dBi	-2.6 dBi	2.5 dBi	2.7 dBi	Theta150/Pie225	6.03 dB
1000.000000 MHz	51.1 %	-8.2 dBi	-4.4 dBi	-2.9 dBi	-2.0 dBi	3.0 dBi	3.2 dBi	Theta150/Pie225	6.07 dB

3.1.5 3D Antenna Pattern

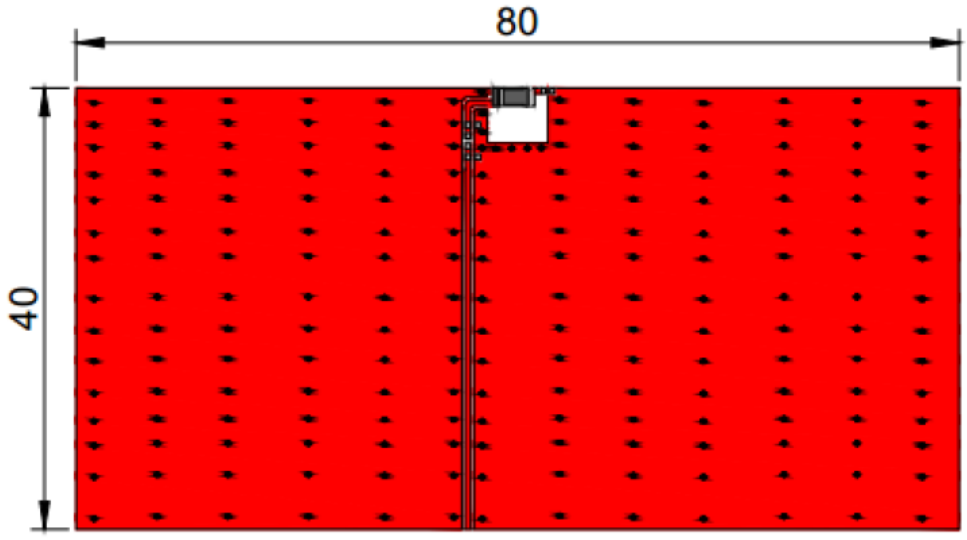


3.2 WIFI / BLE Chip Antenna(AA055)

3.2.1 Appearance



Test board with Antenna



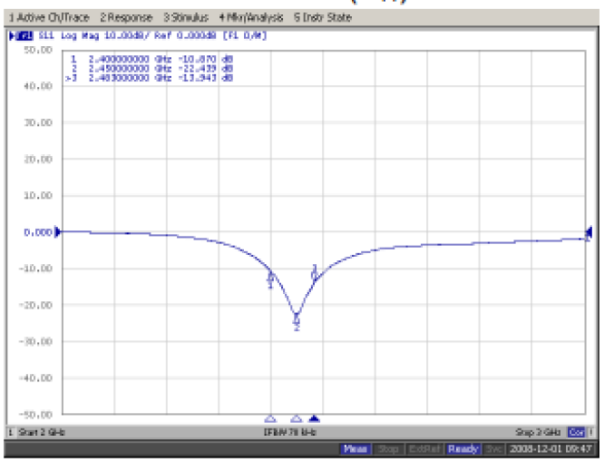
Unit : mm

3.2.2 General Specification

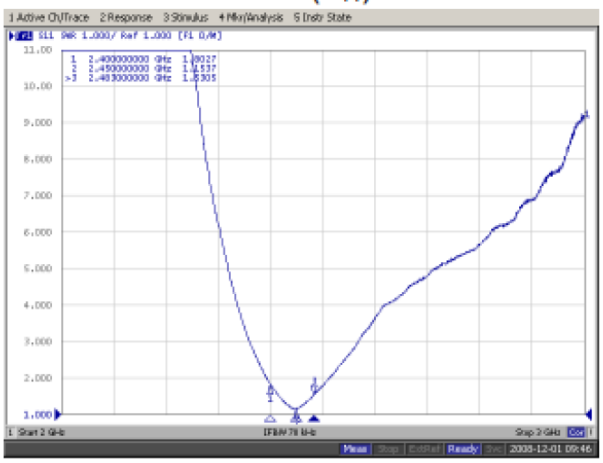
Characteristics	Specification
Frequency	2400 ~ 2500 MHz
Return Loss	-22 dB
Efficiency	84.0 %
Peak Gain	2.5 dBi
Impedance	50 ohm
Polarization	Linear
Size	4mm x 5mm x13 mm

3.2.3 Return Loss Graph

Return Loss (S_{11})



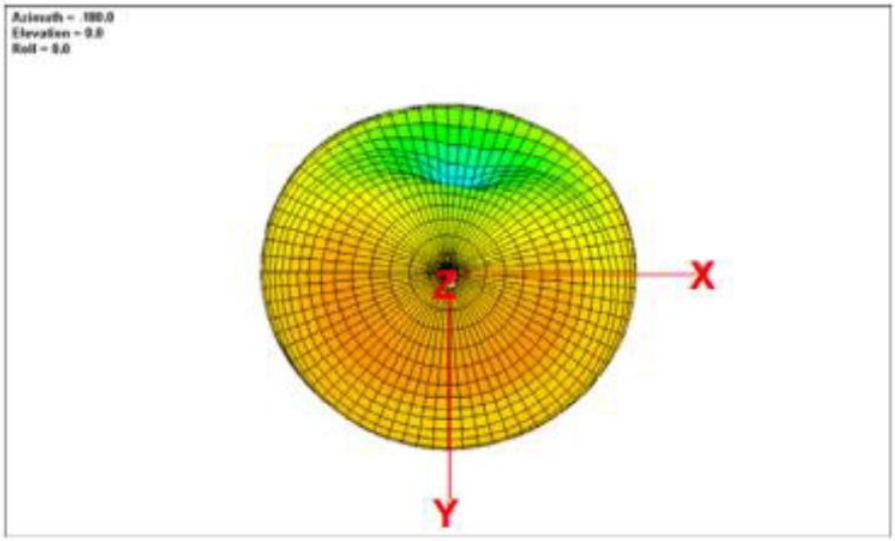
VSWR(S_{11})

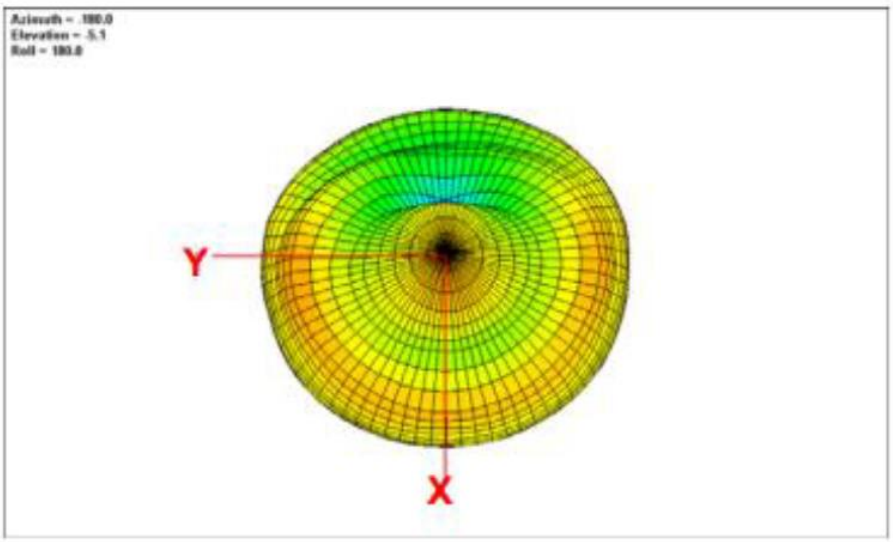


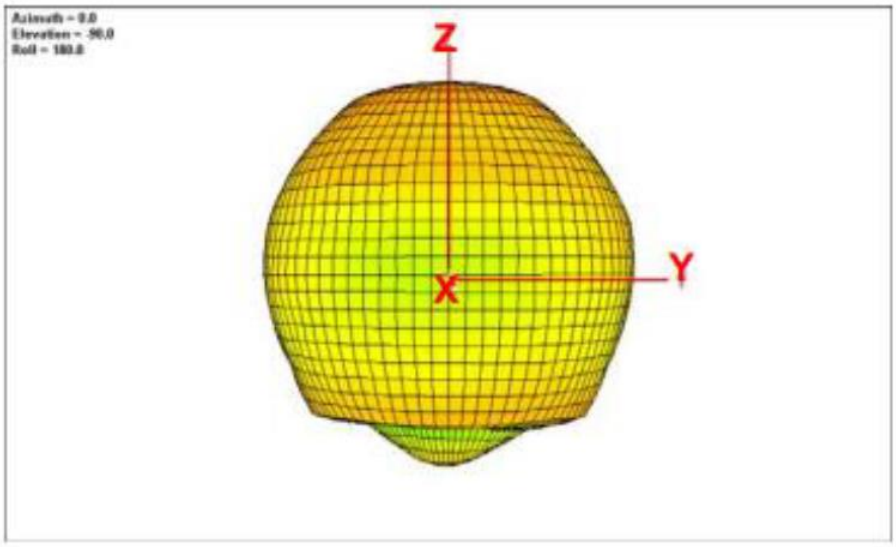
3.2.4 Antenna Gain

Frequency(MHz)	2400	2410	2420	2430	2442	2450	2460	2470	2480	2490	2500
Efficiency(dB)	-1.38	-1.04	-0.85	-0.74	-0.73	-0.76	-0.86	-1.05	-1.18	-1.27	-1.40
Efficiency(%)	72.83	78.71	82.27	84.39	84.53	84.04	82.00	78.60	76.14	74.64	72.50
Gain(dBi)	1.47	1.81	2.10	2.40	2.50	2.50	2.37	2.10	1.90	1.87	1.75

3.2.5 Antenna Pattern (@80mm x 40mm ground plane)



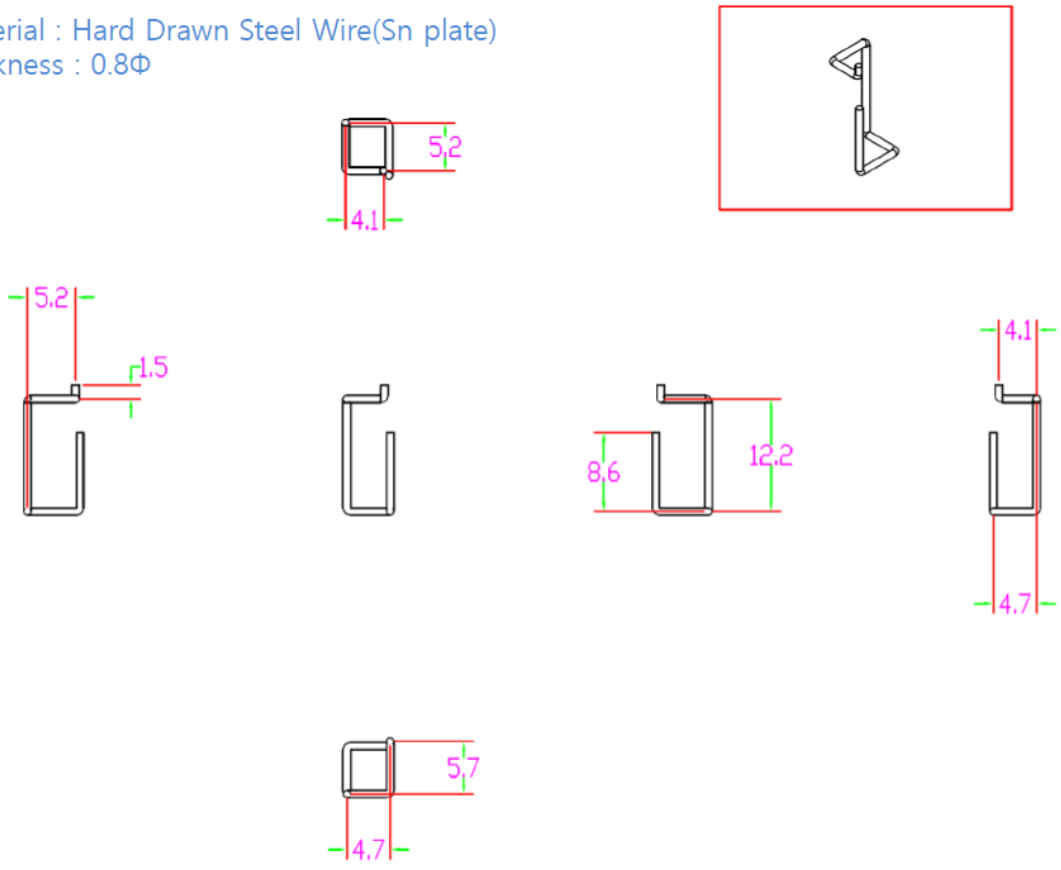




3.3 GPS Metal Antenna (T10SA01)

3.3.1 Appearance

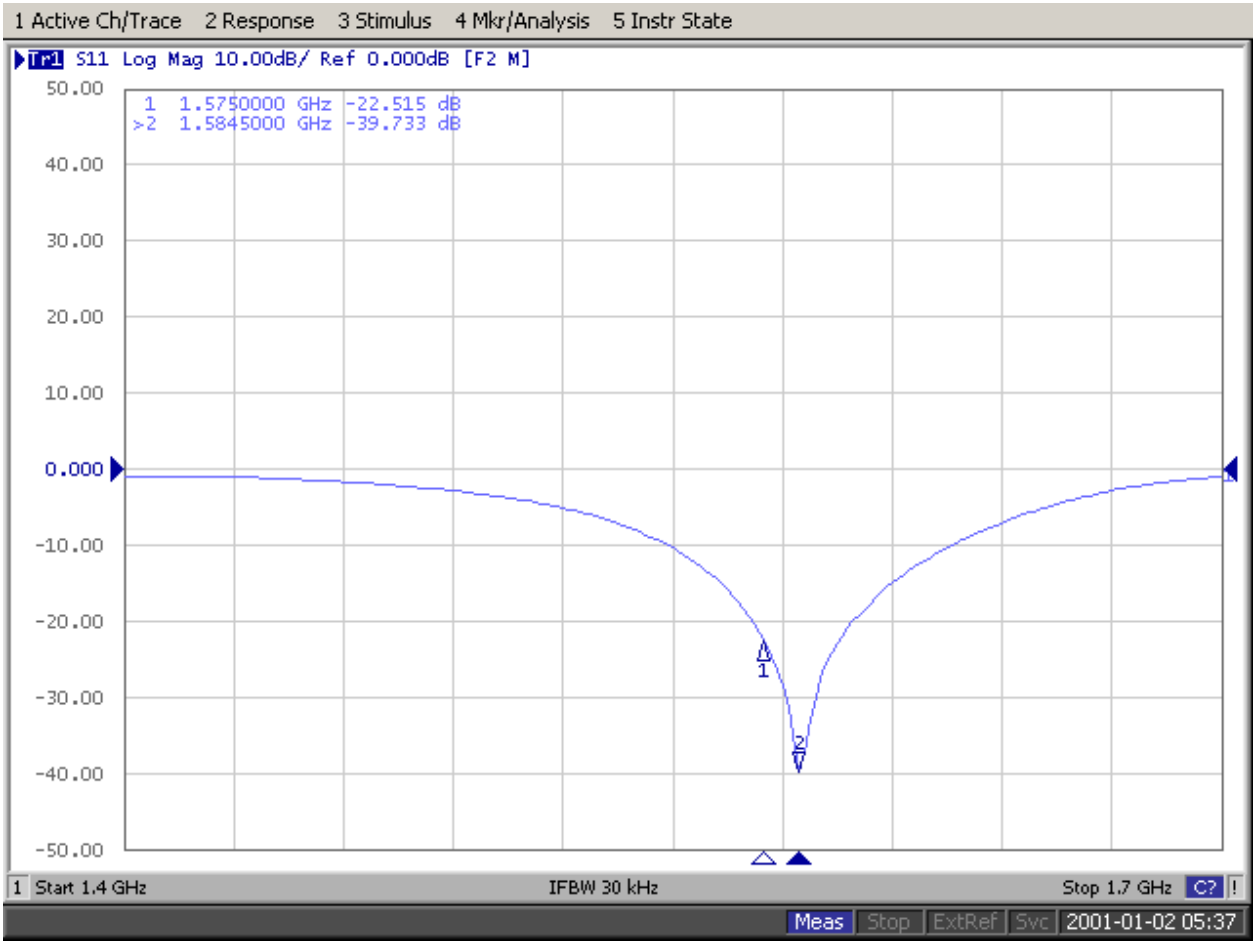
- Material : Hard Drawn Steel Wire(Sn plate)
- Thickness : 0.8Φ



3.3.2 General Specification

Characteristics	Specification
Frequency	1575 MHz
Return Loss	-22.515 dB
Average Gain	-1.8 dBi
Efficiency	66.1 %
Peak Gain	4.0 dBi
Impedance	50 ohm
Polarization	Linear
Size	4.7mm x 5.7mm x13.7 mm

3.3.3 Return Loss Graph



3.3.4 Antenna Gain

Antenna Pattern & Gain Report

Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
1500.000000 MHz	32.3 %	-8.6 dBi	-7.3 dBi	-4.9 dBi	-0.3 dBi	0.0 dBi	1.9 dBi	Theta180/Pie0	6.84 dB
1512.500000 MHz	39.7 %	-7.8 dBi	-6.4 dBi	-4.0 dBi	0.4 dBi	0.7 dBi	2.8 dBi	Theta180/Pie0	6.82 dB
1520.000000 MHz	39.8 %	-7.8 dBi	-6.3 dBi	-4.0 dBi	0.3 dBi	0.6 dBi	2.8 dBi	Theta180/Pie0	6.78 dB
1525.000000 MHz	42.8 %	-7.5 dBi	-6.0 dBi	-3.7 dBi	0.5 dBi	0.9 dBi	3.0 dBi	Theta180/Pie0	6.73 dB
1537.500000 MHz	51.0 %	-6.8 dBi	-5.2 dBi	-2.9 dBi	1.2 dBi	1.3 dBi	3.7 dBi	Theta180/Pie0	6.59 dB
1540.000000 MHz	53.5 %	-6.6 dBi	-5.0 dBi	-2.7 dBi	1.4 dBi	1.5 dBi	3.8 dBi	Theta180/Pie0	6.53 dB
1550.000000 MHz	55.5 %	-6.6 dBi	-4.8 dBi	-2.6 dBi	1.5 dBi	1.6 dBi	3.8 dBi	Theta180/Pie0	6.37 dB
1560.000000 MHz	60.1 %	-6.3 dBi	-4.4 dBi	-2.2 dBi	1.8 dBi	1.8 dBi	3.9 dBi	Theta180/Pie0	6.14 dB
1562.500000 MHz	58.9 %	-6.4 dBi	-4.5 dBi	-2.3 dBi	1.6 dBi	1.6 dBi	3.8 dBi	Theta180/Pie0	6.06 dB
1575.000000 MHz	66.1 %	-5.9 dBi	-3.9 dBi	-1.8 dBi	1.8 dBi	2.1 dBi	4.0 dBi	Theta180/Pie0	5.82 dB
1580.000000 MHz	65.3 %	-6.0 dBi	-4.0 dBi	-1.9 dBi	1.6 dBi	2.0 dBi	3.8 dBi	Theta180/Pie0	5.67 dB
1587.500000 MHz	66.5 %	-5.9 dBi	-3.9 dBi	-1.8 dBi	1.4 dBi	2.2 dBi	4.1 dBi	Theta180/Pie0	5.88 dB
1600.000000 MHz	63.6 %	-6.1 dBi	-4.1 dBi	-2.0 dBi	0.9 dBi	2.1 dBi	4.1 dBi	Theta165/Pie150	6.08 dB

3.3.5 Antenna Pattern