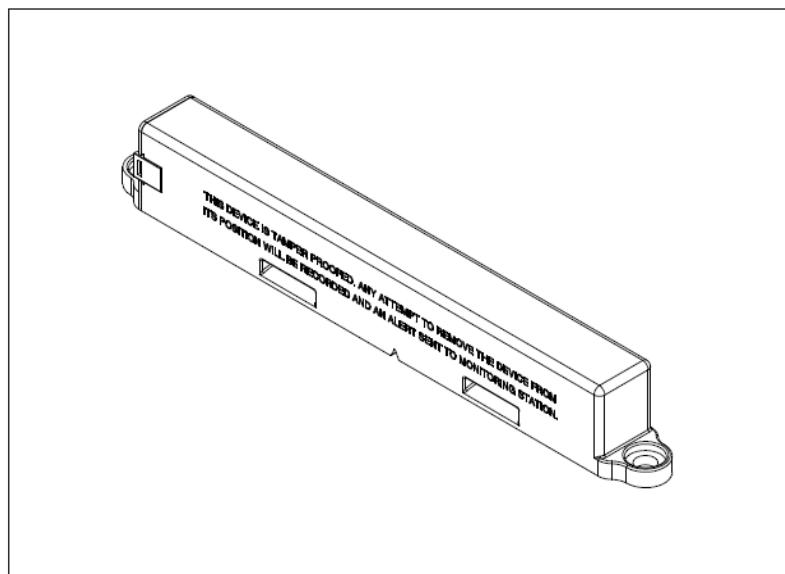


Antenna specification of IET10N



2024-06-12

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1. Revision History

Date	Rev.	Editor	Description
Feb. 28, 2024	1.0	SW Moon	First release
Jun. 12 2024	1.1	SW Moon	Add Sigfox zone & Ant. gain

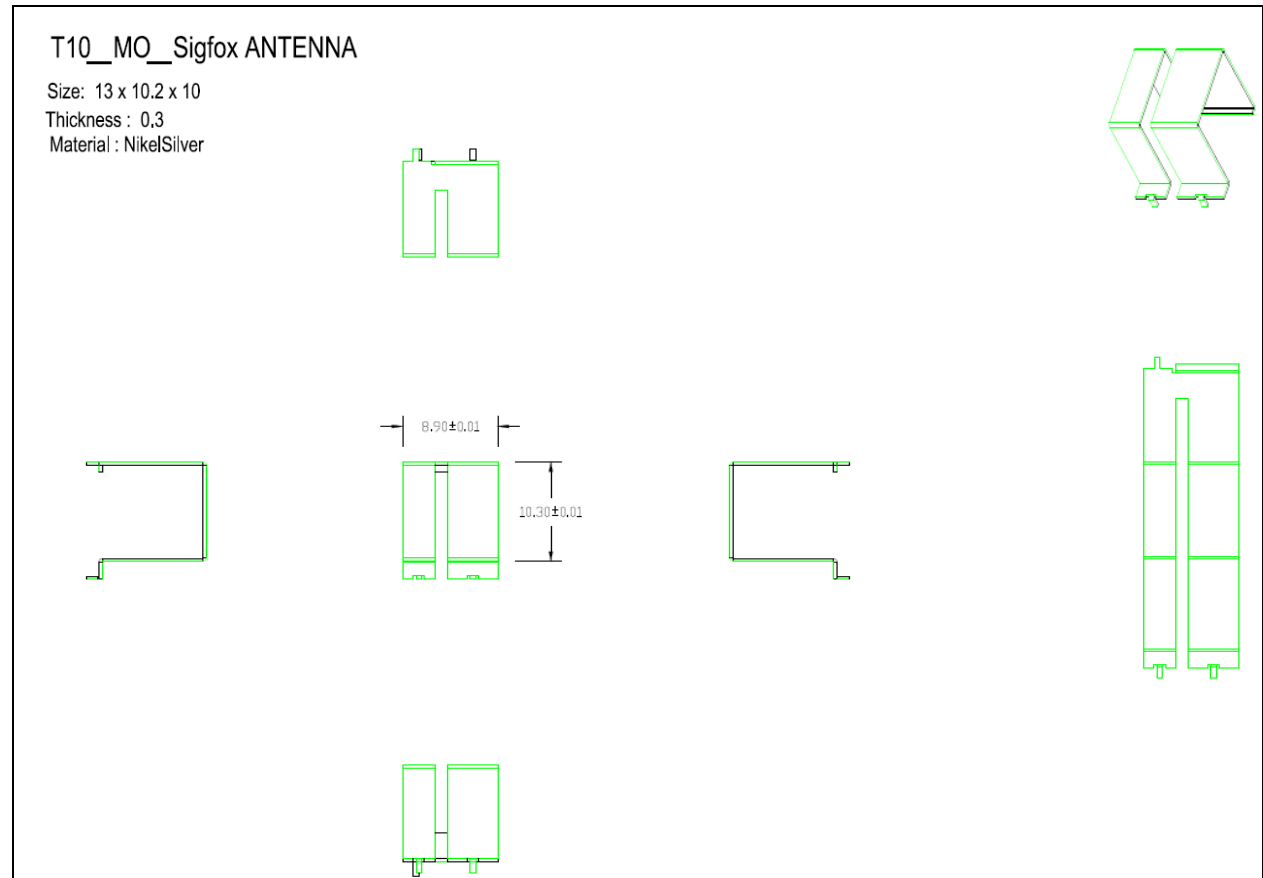
2. Antenna List

No.	Purpose	Frequency	Part Number	Vendor	Type
1	SIGFOX	RC1 868.13MHz RC2 902.2MHz RC3 923.2MHz RC4 920.8MHz RC5 923.1MHz	WSANT900M01	Rongcheng	Metal ANT
2	BLE	2400MHz	ACA-2012-A1-CC-S	INPAQ	Chip ANT
3	WIFI	2400MHz	ACA-2012-A1-CC-S	INPAQ	Chip ANT
4	GPS	1575MHz	KSA-A1575MS18T2.5A	SANGSHIN	Patch ANT

3. Antenna Specification

3.1 SIGFOX : WSANT900M01

3.1.1 Appearance

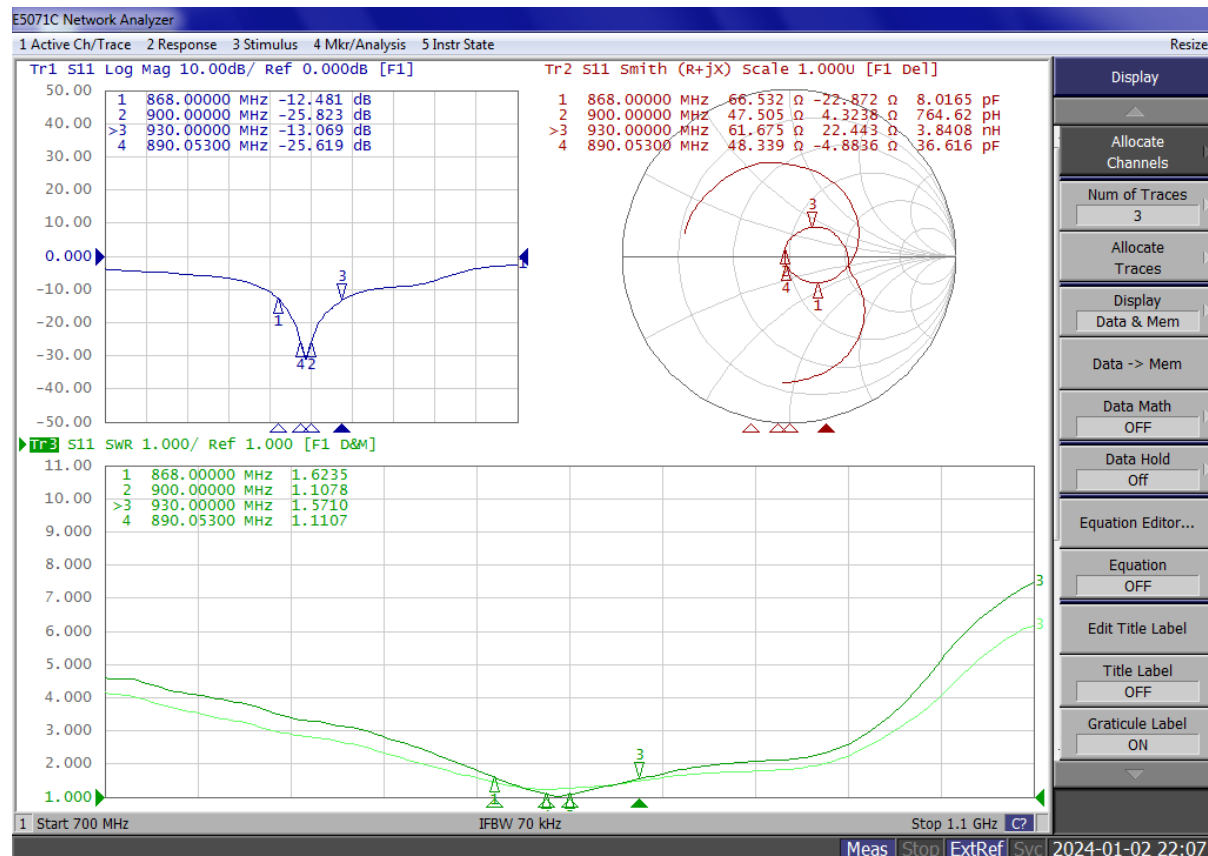


3.1.2 General Specification

Characteristics	Specification
Frequency	860 ~ 930 MHz
Return Loss	-13.0dB
Average Gain	-1.5 dBi
Efficiency	60.0 %
Peak Gain	2.5 dBi
Impedance	50 ohm
Polarization	Linear
Size	13mm x 10.2mm x10 mm

3.1.3 Return Loss Graph

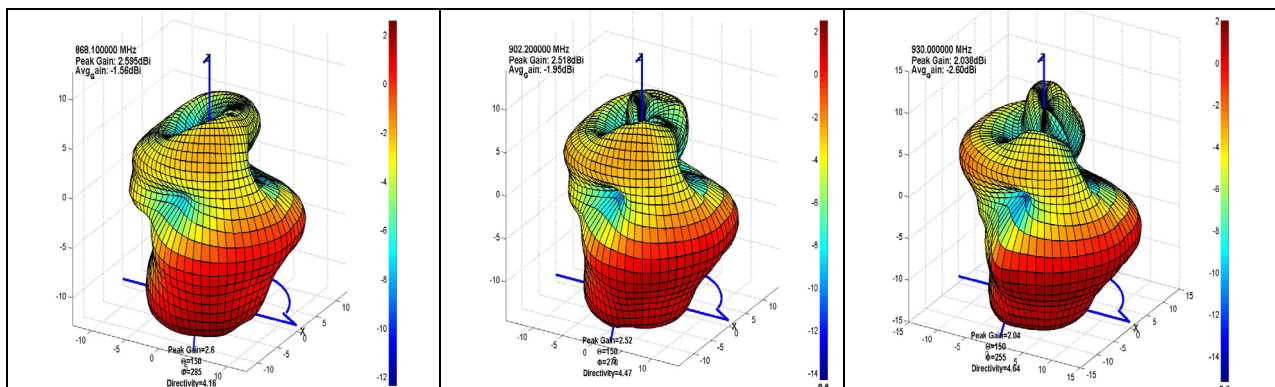
Frequency	Return Loss
868.0 MHz	-12.481 dB
900.0 MHz	-25.800 dB
930.0 MHz	-13.069 dB



3.1.4 Antenna Gain

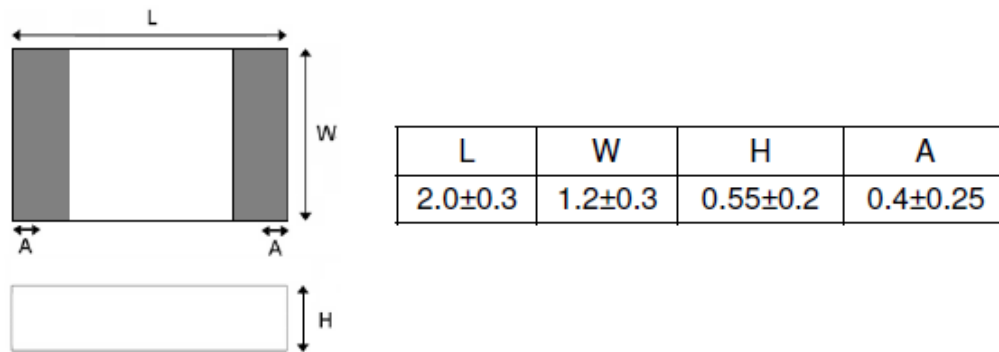
Antenna Pattern & Gain Report									
Manufacturer	Company Name							Photo	
Model Name	Filename								
Tester Name	Airlink								
Test Date	2024-01-02 오후 5:48:54								
IF BW	100 Hz								
Port Power	0.00 dBm								
Meas Step	15 `								
Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
810.000000 MHz	54.2 %	-10.1 dBi	-3.5 dBi	-2.7 dBi	-3.7 dBi	2.0 dBi	2.0 dBi	Theta150/Pie240	4.71 dB
820.000000 MHz	60.5 %	-9.6 dBi	-3.1 dBi	-2.2 dBi	-3.3 dBi	2.3 dBi	2.3 dBi	Theta150/Pie240	4.49 dB
830.000000 MHz	58.0 %	-9.6 dBi	-3.3 dBi	-2.4 dBi	-3.5 dBi	1.8 dBi	1.9 dBi	Theta150/Pie240	4.24 dB
840.000000 MHz	64.3 %	-9.0 dBi	-2.9 dBi	-1.9 dBi	-2.9 dBi	2.1 dBi	2.2 dBi	Theta135/Pie285	4.13 dB
850.000000 MHz	65.4 %	-8.6 dBi	-2.9 dBi	-1.8 dBi	-2.6 dBi	2.1 dBi	2.2 dBi	Theta135/Pie300	4.05 dB
863.000000 MHz	74.6 %	-7.6 dBi	-2.4 dBi	-1.3 dBi	-1.6 dBi	2.6 dBi	2.8 dBi	Theta150/Pie270	4.03 dB
865.000000 MHz	73.4 %	-7.6 dBi	-2.5 dBi	-1.3 dBi	-1.6 dBi	2.6 dBi	2.7 dBi	Theta150/Pie285	4.08 dB
868.100000 MHz	69.7 %	-7.7 dBi	-2.8 dBi	-1.6 dBi	-1.7 dBi	2.4 dBi	2.6 dBi	Theta150/Pie285	4.16 dB
868.130000 MHz	69.5 %	-7.7 dBi	-2.8 dBi	-1.6 dBi	-1.7 dBi	2.4 dBi	2.6 dBi	Theta150/Pie285	4.20 dB
870.000000 MHz	66.8 %	-7.9 dBi	-3.0 dBi	-1.8 dBi	-1.8 dBi	2.2 dBi	2.5 dBi	Theta150/Pie300	4.27 dB
880.000000 MHz	67.4 %	-7.6 dBi	-3.0 dBi	-1.7 dBi	-1.2 dBi	2.3 dBi	2.6 dBi	Theta150/Pie285	4.36 dB
890.000000 MHz	68.9 %	-7.4 dBi	-3.0 dBi	-1.6 dBi	-0.8 dBi	2.4 dBi	2.8 dBi	Theta150/Pie285	4.46 dB
902.200000 MHz	63.8 %	-7.7 dBi	-3.3 dBi	-2.0 dBi	-0.9 dBi	2.3 dBi	2.5 dBi	Theta150/Pie270	4.47 dB
910.000000 MHz	54.5 %	-8.4 dBi	-4.0 dBi	-2.6 dBi	-1.5 dBi	1.7 dBi	1.9 dBi	Theta150/Pie270	4.57 dB
920.800000 MHz	59.2 %	-8.1 dBi	-3.6 dBi	-2.3 dBi	-1.3 dBi	2.1 dBi	2.4 dBi	Theta150/Pie270	4.69 dB
923.300000 MHz	60.3 %	-8.1 dBi	-3.5 dBi	-2.2 dBi	-1.2 dBi	2.3 dBi	2.4 dBi	Theta150/Pie255	4.55 dB
930.000000 MHz	54.9 %	-8.6 dBi	-3.9 dBi	-2.6 dBi	-1.7 dBi	1.9 dBi	2.0 dBi	Theta150/Pie255	4.64 dB
940.000000 MHz	54.6 %	-8.8 dBi	-3.8 dBi	-2.6 dBi	-1.6 dBi	1.9 dBi	2.1 dBi	Theta150/Pie270	4.73 dB
955.000000 MHz	49.7 %	-9.5 dBi	-4.1 dBi	-3.0 dBi	-1.5 dBi	1.6 dBi	1.9 dBi	Theta150/Pie285	4.89 dB
970.000000 MHz	49.1 %	-9.8 dBi	-4.1 dBi	-3.1 dBi	-1.2 dBi	1.6 dBi	1.9 dBi	Theta150/Pie285	5.04 dB
985.000000 MHz	48.3 %	-10.0 dBi	-4.2 dBi	-3.2 dBi	-1.2 dBi	1.6 dBi	1.9 dBi	Theta150/Pie270	5.06 dB
1000.000000 MHz	37.6 %	-11.1 dBi	-5.2 dBi	-4.2 dBi	-2.3 dBi	0.6 dBi	1.2 dBi	Theta165/Pie180	5.47 dB
1010.000000 MHz	30.3 %	-11.9 dBi	-6.2 dBi	-5.2 dBi	-3.3 dBi	-0.4 dBi	0.4 dBi	Theta165/Pie180	5.54 dB
1020.000000 MHz	26.5 %	-12.4 dBi	-6.9 dBi	-5.8 dBi	-3.9 dBi	-1.1 dBi	-0.2 dBi	Theta165/Pie180	5.57 dB
Zone	Freq.		Average gain		Peak gain				
RC1	868.13MHz		1.6dBi		2.6dBi				
RC2	902.2MHz		2.0dBi		2.5dBi				
RC3	923.2MHz		2.2dBi		2.4dBi				
RC4	920.8MHz		2.3dBi		2.4dBi				
RC5	923.3MHz		2.2dBi		2.4dBi				

3.1.5 Antenna Pattern



3.2 BLE, WIFI : ACA-2012-A1-CC-S

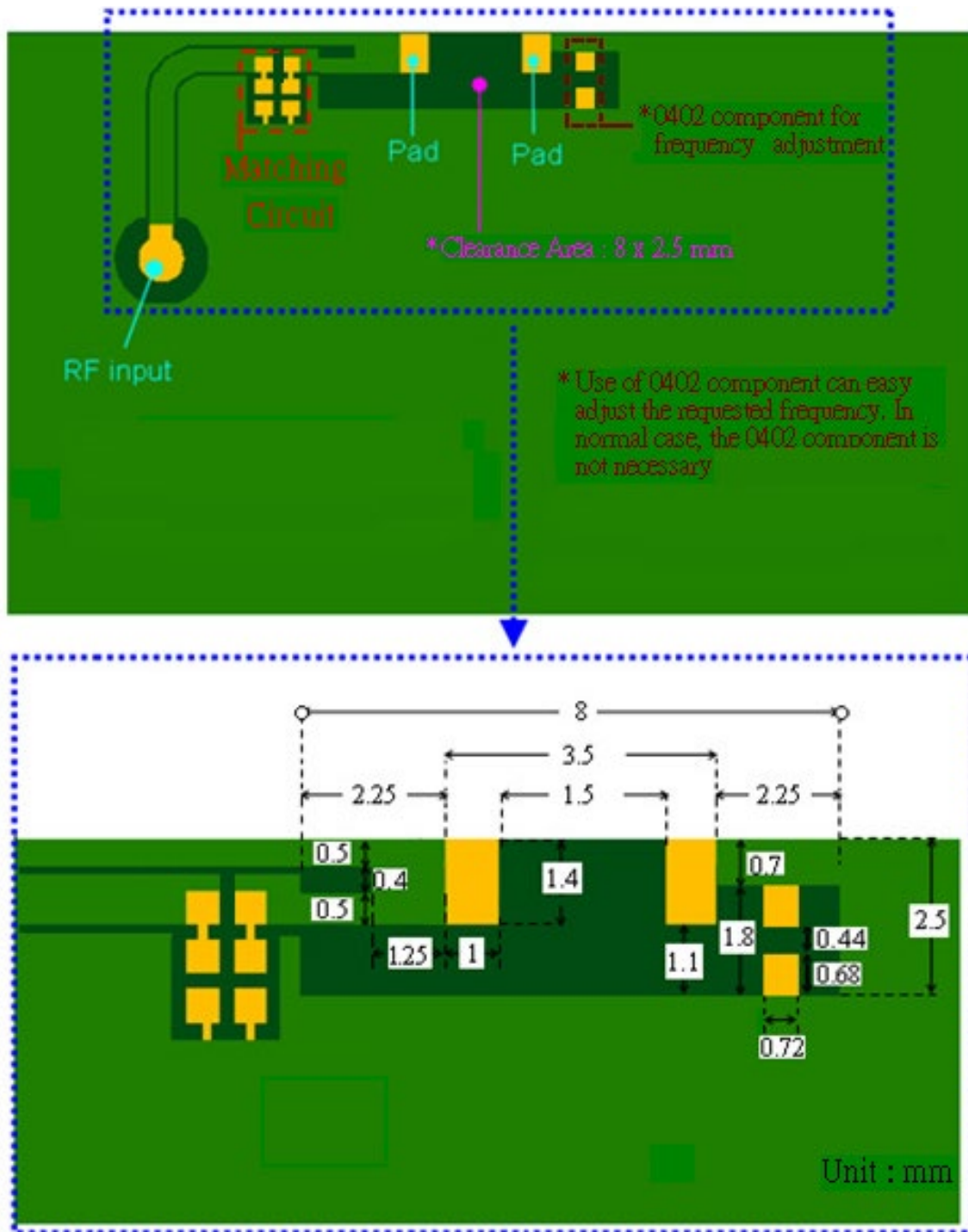
3.2.1 Appearance



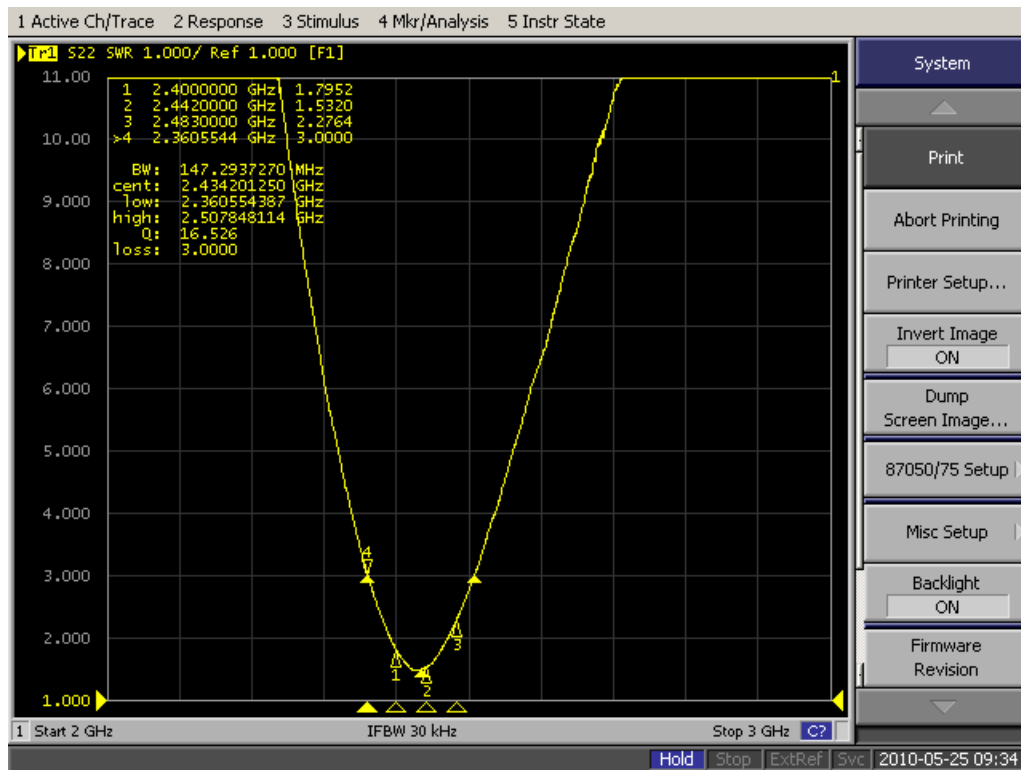
3.2.2 General Specification

Characteristics	Specification
Frequency Band	2400MHz ~ 2483MHz
VSWR	Less than 3
Polarization	Linear
Peak Gain	3.01 dBi Typ.(2460MHz)
Peak Efficiency	36.21% Typ.(2460MHz)
Impedance	50Ω Typ.

Test board with Antenna



3.2.3 VSWR



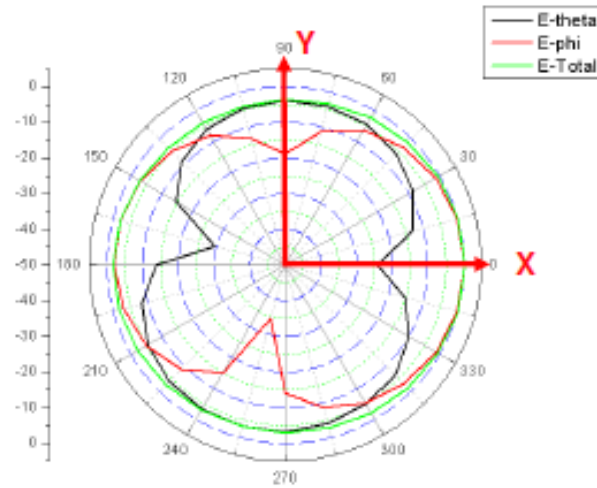
3.2.4 Antenna Characteristics

Frequency	VSWR
2400 MHz	1.8
2442 MHz	1.53
2483 MHz	2.28

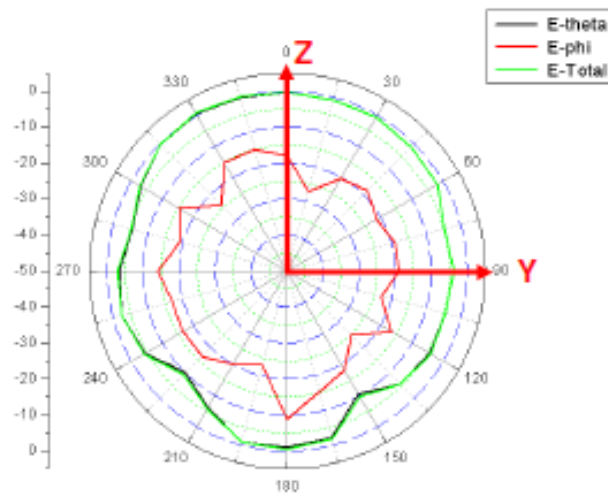
3.2.5 2D Gain Pattern (2442 MHz)

© 2D Gain Pattern (2442 MHz)

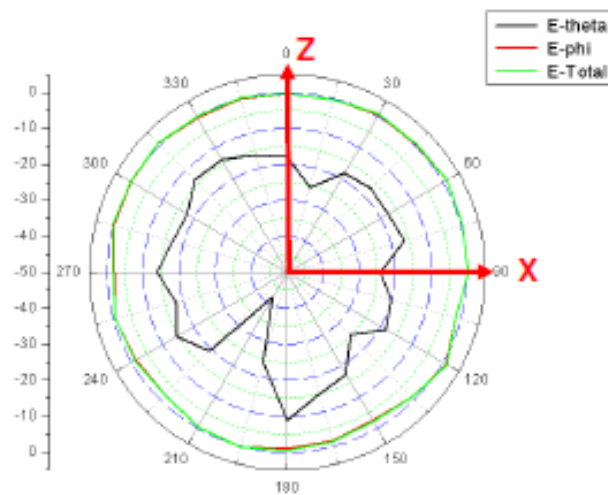
X-Y Plane



Y-Z Plane

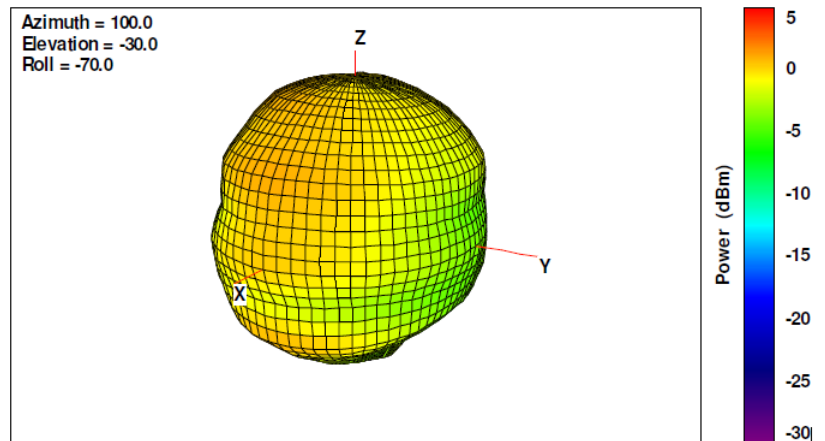


X-Z Plane



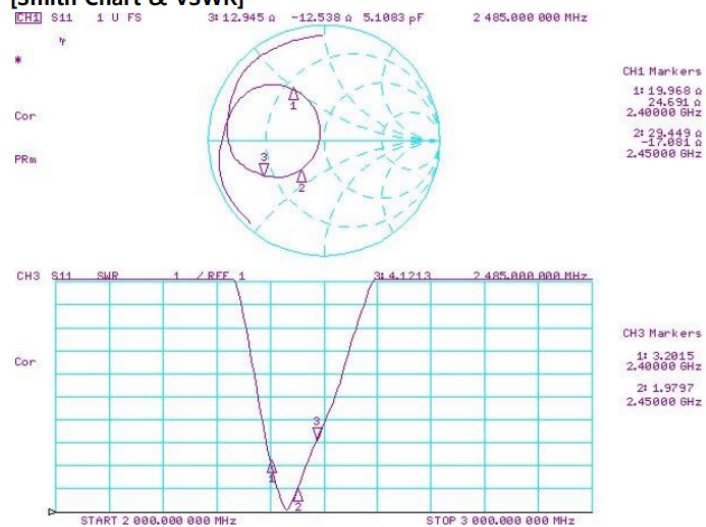
3.2.6 3D Gain Pattern (2442 MHz)

◎ 3D Gain Pattern (2442 MHz)



VSWR & Smith Chart / 3D Gain data

[Smith Chart & VSWR]

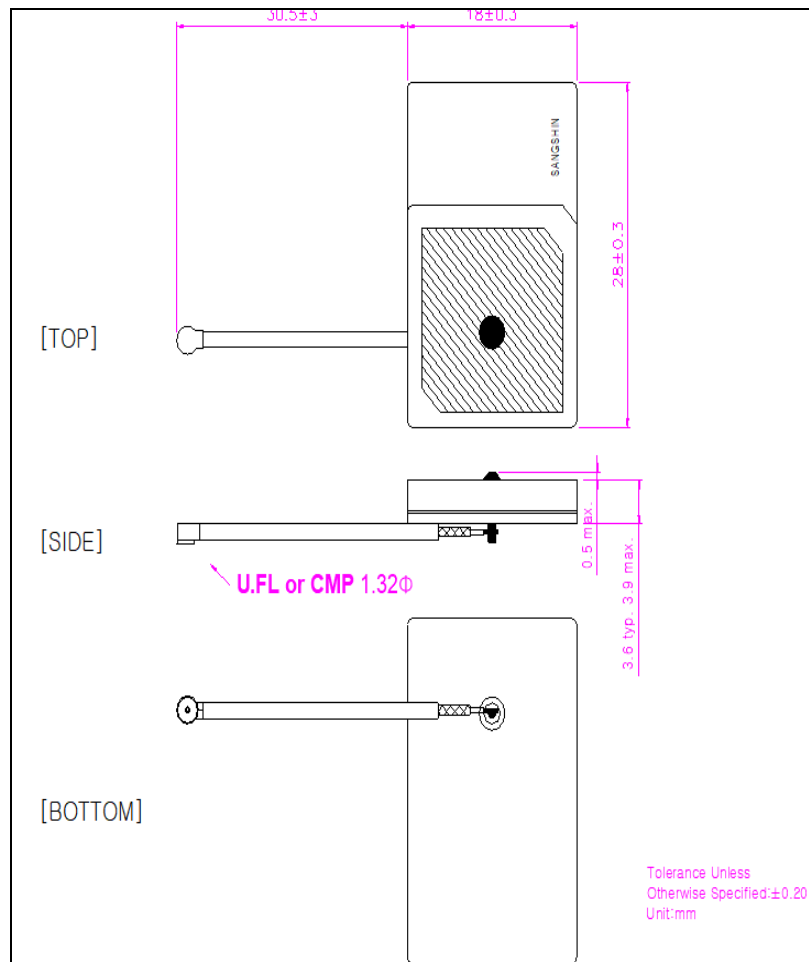


[3D Gain data]

Freq.[MHz]	Eff.[%]	Avg.[dBi]	Peak[dBi]
2400	24.81	-6.05	0.83
2415	30.11	-5.21	1.8
2430	31.74	-4.98	2.25
2450	34.94	-4.57	2.88
2460	36.21	-4.41	3.01
2480	28.28	-5.49	1.69
2485	29.6	-5.29	1.82

3.3 GPS : KSA-A1575MS18T2.5A

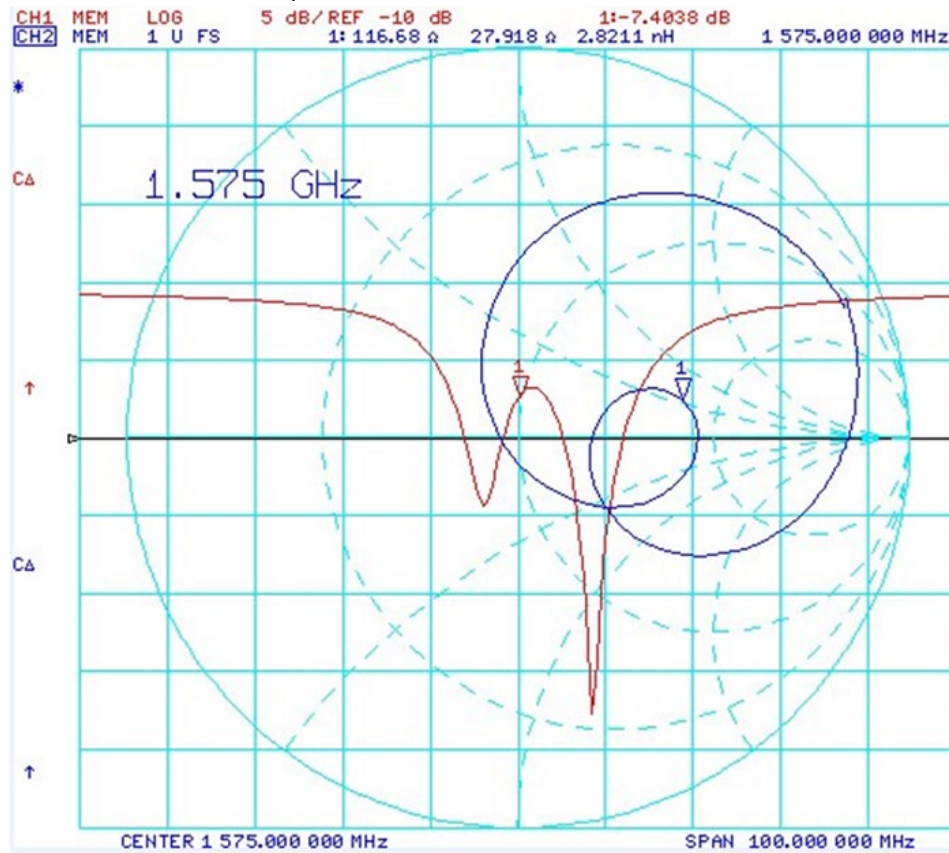
3.3.1 Appearance



3.3.2 General Specification

Characteristics	Specification
Antenna type	Ceramic Patch Antenna
Center Frequency(=Fc)	1575 ± 3 MHz
Return Loss @ Fc	5 dB min.
Average Gain	-1.8 dBi
Impedance	50 ohm
Polarization	R.H.C.P
Size	28.0mm x 18.0mm x3.6 mm

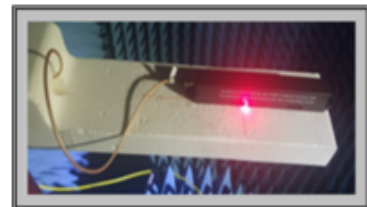
3.3.3 Return Loss Graph



3.3.4 Antenna Gain

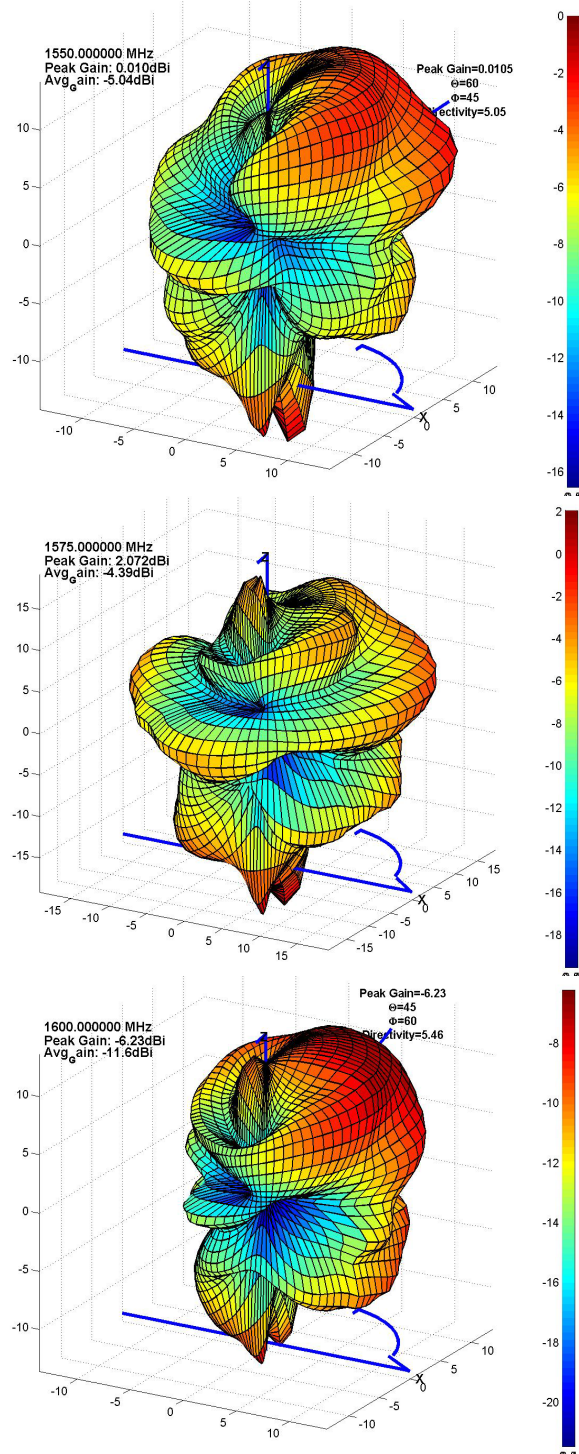
Antenna Pattern & Gain Report

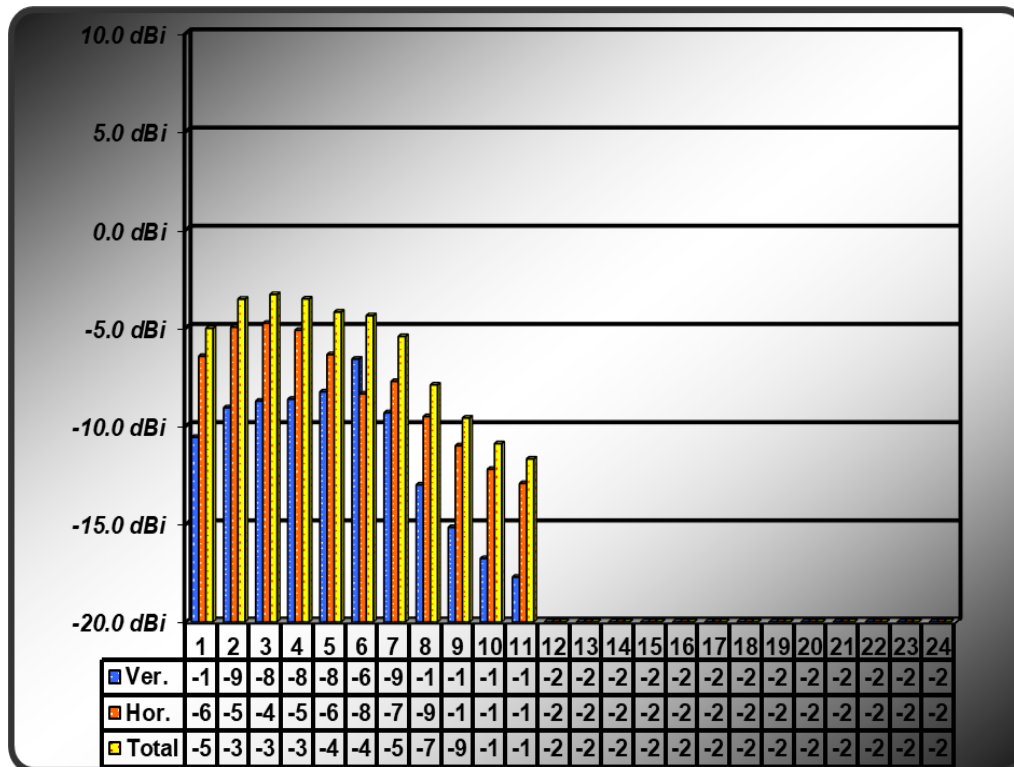
Manufacturer	Company Name
Model Name	Filename
Tester Name	Airlink
Test Date	2024-06-12 오후 3:01:05
IF BW	100 Hz
Port Power	0.00 dBm
Meas Step	15 °



Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
1550.000000 MHz	31.3 %	-10.6 dBi	-6.5 dBi	-5.0 dBi	-2.3 dBi	-0.2 dBi	0.0 dBi	Theta60/Pie45	5.05 dB
1555.000000 MHz	44.1 %	-9.1 dBi	-5.0 dBi	-3.6 dBi	-0.8 dBi	1.3 dBi	1.5 dBi	Theta60/Pie45	5.01 dB
1560.000000 MHz	46.6 %	-8.7 dBi	-4.8 dBi	-3.3 dBi	-0.4 dBi	1.4 dBi	1.6 dBi	Theta60/Pie45	4.91 dB
1565.000000 MHz	44.3 %	-8.6 dBi	-5.1 dBi	-3.5 dBi	-0.1 dBi	1.0 dBi	1.2 dBi	Theta60/Pie45	4.73 dB
1570.000000 MHz	37.9 %	-8.3 dBi	-6.4 dBi	-4.2 dBi	0.6 dBi	-0.5 dBi	0.9 dBi	Theta135/Pie135	5.11 dB
1575.000000 MHz	36.4 %	-6.6 dBi	-8.4 dBi	-4.4 dBi	2.0 dBi	-1.3 dBi	2.1 dBi	Theta135/Pie120	6.47 dB
1580.000000 MHz	28.5 %	-9.3 dBi	-7.7 dBi	-5.5 dBi	-1.3 dBi	-1.6 dBi	-0.6 dBi	Theta135/Pie120	4.84 dB
1585.000000 MHz	16.1 %	-13.0 dBi	-9.5 dBi	-7.9 dBi	-5.3 dBi	-3.2 dBi	-3.0 dBi	Theta45/Pie60	4.97 dB
1590.000000 MHz	11.0 %	-15.2 dBi	-11.0 dBi	-9.6 dBi	-7.8 dBi	-4.6 dBi	-4.4 dBi	Theta45/Pie60	5.20 dB
1595.000000 MHz	8.1 %	-16.8 dBi	-12.2 dBi	-10.9 dBi	-9.7 dBi	-5.8 dBi	-5.6 dBi	Theta45/Pie60	5.33 dB
1600.000000 MHz	6.8 %	-17.7 dBi	-12.9 dBi	-11.7 dBi	-10.7 dBi	-6.4 dBi	-6.2 dBi	Theta45/Pie60	5.46 dB

3.3.5 Antenna Pattern





- End of document -