

# ANT Datasheet



# **HL GLOBAL**

## **PRELIMINARY ENGINEERING DATASHEET**

### **SA06LWEG01RA**

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## Datasheet Revision History

Revision	Date	Change Log
SA06LWEG01RA/ Rev.1	28 <sup>th</sup> /Apr /2022	Preliminary Datasheet 1.0
SA06LWEG01RA/ Rev.2	18 <sup>th</sup> /May /2022	Update Product Photographs and Principal Dimensions and Assembly Drawing

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## 1. Antenna Product Description

SA06LWEG01RA Embedded Antenna features provides a high performance, off-board and cable feeding antenna solution. It was designed for 2x LTE antenna (700—960MHz, 1710—1990 MHz, 2110—2200 MHz, 2500-2700 MHz) , 2x 2.4/5G WIFI (2400-2490 MHz,5150-5850 MHz) , 1 x BLE(2400-2490 MHz),1x GNSS (GPS L1 1575.42 ±2 MHz, GLONASS L1 1602.5625±4 MHz) .

## 2. Features Overview

SA06LWEG01RA Embedded Antenna features

- Covering 2x LTE antenna (700—960MHz, 1710—1990 MHz, 2110—2200 MHz, 2500-2700 MHz) , 2x 2.4/5G WIFI (2400-2490 MHz,5150-5850 MHz) , 1 x BLE(2400-2490 MHz),1x GNSS (GPS L1 1575.42 ±2 MHz, GLONASS L1 1602.5625±4 MHz) freq
- 1.0dBi@LTE-B\_0.746GHz; 3.5dBi@ LTE-B\_1.745GHz; 4.2dBi@ LTE-B\_2.11GHz; 5.1dBi@ LTE-B\_2.69GHz;
- 1.1dBi@LTE-W\_0.769GHz; 3.8dBi@ LTE-W\_1.95GHz; 2.9dBi@ LTE-W\_2.17GHz;4.3 dBi@ LTE-W\_2.55GHz;
- 4.5dBi@WIFI-W\_2.47GHz; 6.4dBi@WIFI-W\_5.75GHz;
- 4.5dBi@WIFI-G\_2.49GHz; 7.2dBi@WIFI-G\_5.55GHz;
- 3.4dBi@BLE\_2.48GHz;
- 28.74dBi@GNSS\_1.575GHz ;30.34dBi@GNSS\_1.602GHz.
- Superior performance
- Off-board, low profile design
- Low Cost, High performance



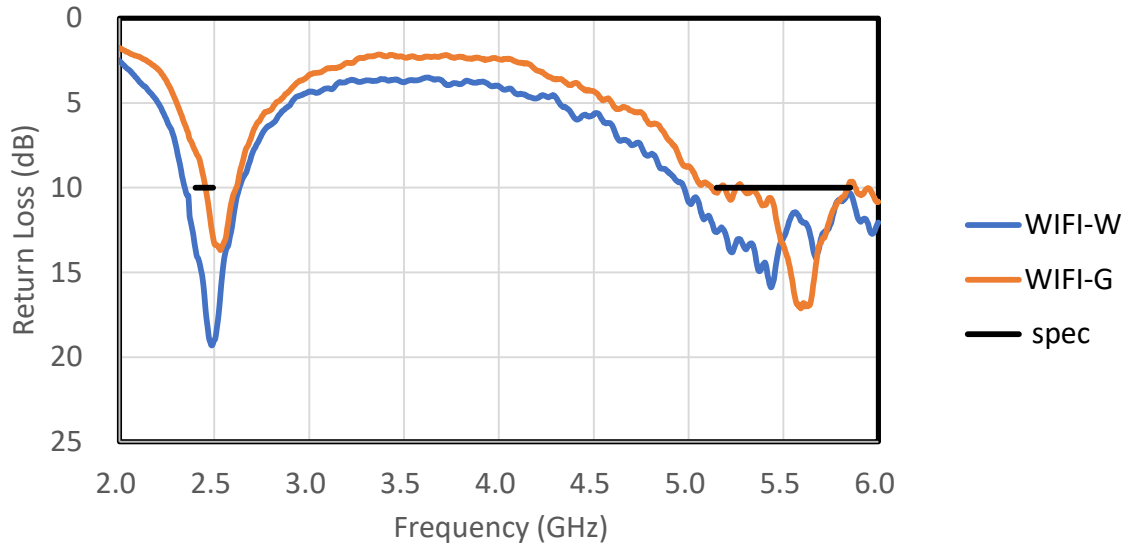
## 4. Antenna Specification Summary

Wireless Standard	LTE,WIFI,BLE,GNSS
Frequency Range	2x LTE antenna (700—960MHz, 1710—1990 MHz, 2110—2200 MHz, 2500-2700 MHz) , 2x 2.4/5G WiFi (2400-2490MHz,5150-5850 MHz) ,1 x BLE(2400-2490 MHz),1x GNSS (GPS L1 1575.42 ±2 MHz, GLONASS L1 1602.5625±4 MHz)
Peak Realized Gain	1.0dBi@LTE-B_0.746GHz; 3.5dBi@ LTE-B_1.745GHz; 4.2dBi@ LTE-B_2.11GHz; 5.1dBi@ LTE-B_2.69GHz; 1.1dBi@LTE-W_0.769GHz; 3.8dBi@ LTE-W_1.95GHz; 2.9dBi@ LTE-W_2.17GHz;4.3 dBi@ LTE-W_2.55GHz; 4.5dBi@WIFI-W_2.47GHz; 6.4dBi@WIFI-W_5.75GHz; 4.5dBi@WIFI-G_2.49GHz; 7.2dBi@WIFI-G_5.55GHz; 3.4dBi@BLE_2.48GHz; 28.74dBi@GNSS_1.575GHz ;30.34dBi@GNSS_1.602GHz.
Realized Efficiency	62%@LTE-B_0.746GHz; 48%@ LTE-B_1.745GHz;46 %@ LTE-B_2.11GHz; 51%@ LTE-B_2.69GHz; 55%@LTE-W_0.769GHz; 50%@ LTE-W_1.95GHz; 42%@ LTE-W_2.17GHz;38%@ LTE-W_2.55GHz; 63%@WIFI-W_2.47GHz;68%@WIFI-W_5.75GHz; 65%@WIFI-G_2.49GHz;68%@WIFI-G_5.55GHz; 47%@BLE_2.48GHz
Return Loss	LTE>3dB;WIFI>7dB;BLE>10dB;GNSS>10dB.
Polarization	Linear Polarization
Radiation Pattern	Omni-directional
Feed Impedance	50Ω
Power Handling	30dBm
Antenna Structure	Metal
Feeding Description	Cable Feeding
Antenna Dimensions	210.2*210.2*24.11(mm)
Weight	210.0g
Temperature Range	Operating temperature: -40° C to +75° C (-40° F to +167° F) Storage temperature: -40° C to +85° C (-40° F to +185° F)

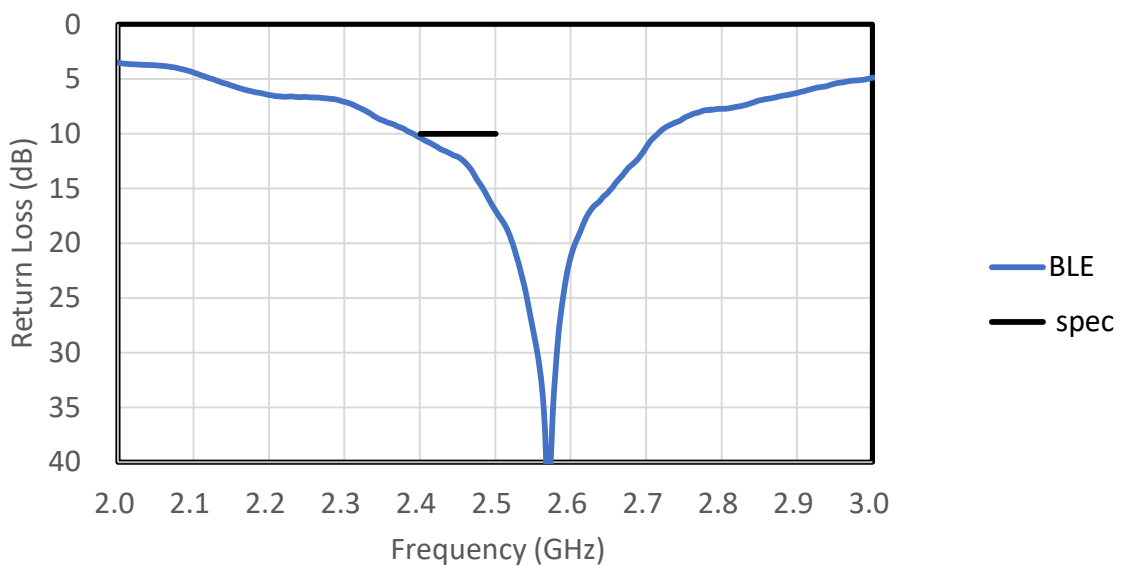
**Table 1.** SA06LWEG01RA antenna specification summary.



Frequency (GHz)	Return Loss(dB)- LTE-B	Return Loss(dB) - LTE-W
0.8	5.6	6.1
1.9	6.3	6.4
2.2	6.2	5.9
2.6	8.1	8.4



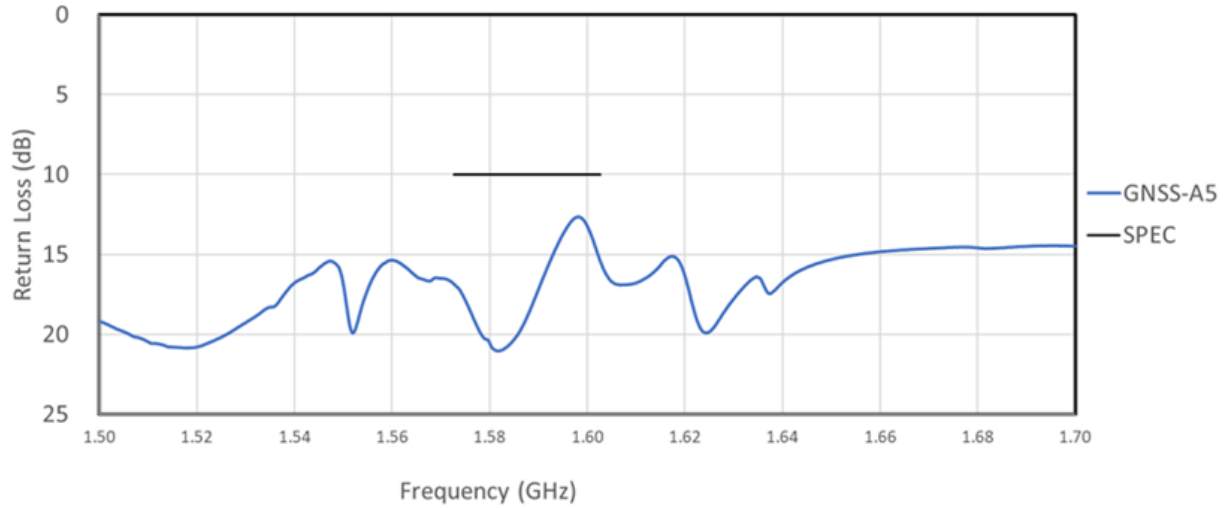
Frequency (GHz)	Return Loss(dB)- WIFI-W	Return Loss(dB) -WIFI-G
2.4	13.6	7.8
2.49	19.3	12.7
5.15	12.6	10.3
5.85	10.3	9.6







Frequency (GHz)	Return Loss(dB)-BLE
2.4	10.4
2.49	15.8



Frequency (GHz)	Return Loss(dB)-GNSS
1.575	16.5
1.605	13.5

Figure 3. Measured Return Loss of SA06LWEG01RA.





## 7. Radiation Pattern Characteristics

Radiation characteristics for SA06LWEG01RA were measured in Satimo SG24L anechoic chamber.

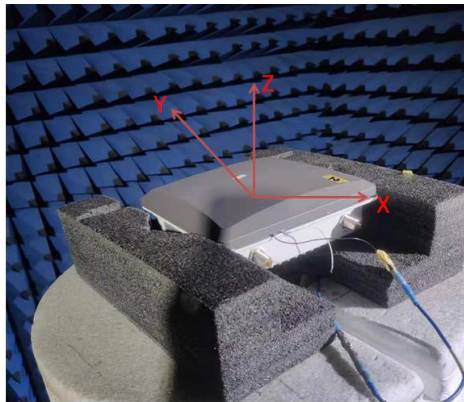


Figure 4.SA06LWEG01RA antenna for radiation pattern measurements. Coordinate system used for radiation pattern visualization.

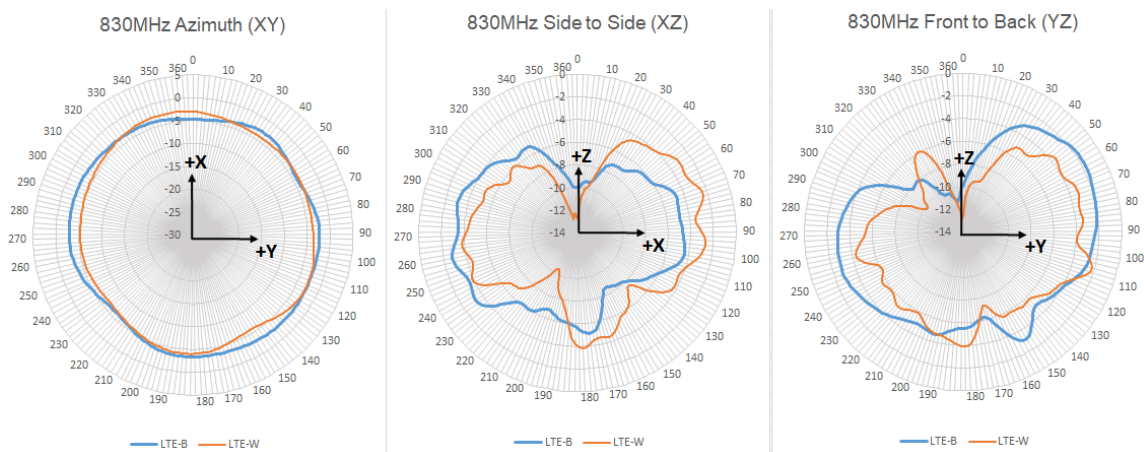


Figure 5.Measured radiation pattern characteristics in principal planes at LTE@ 830MHz .

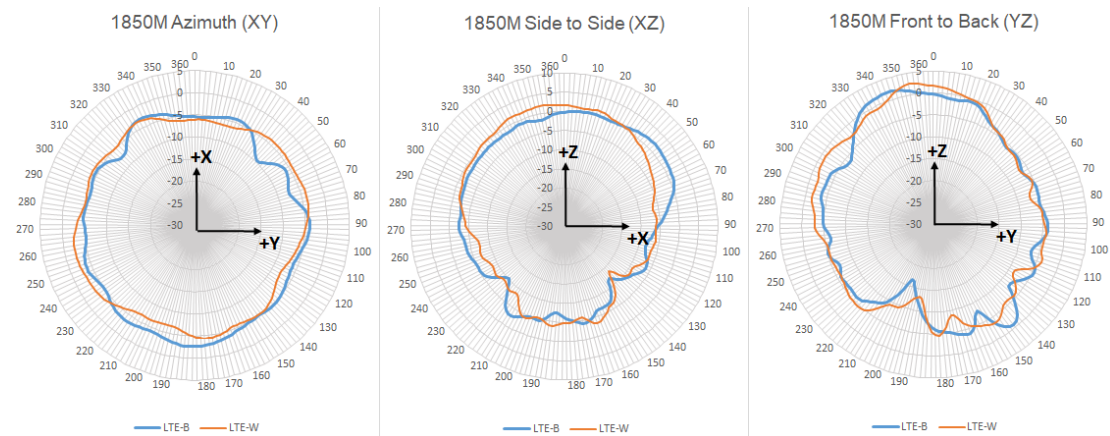


Figure 6.Measured radiation pattern characteristics in principal planes at LTE@1850MHz .

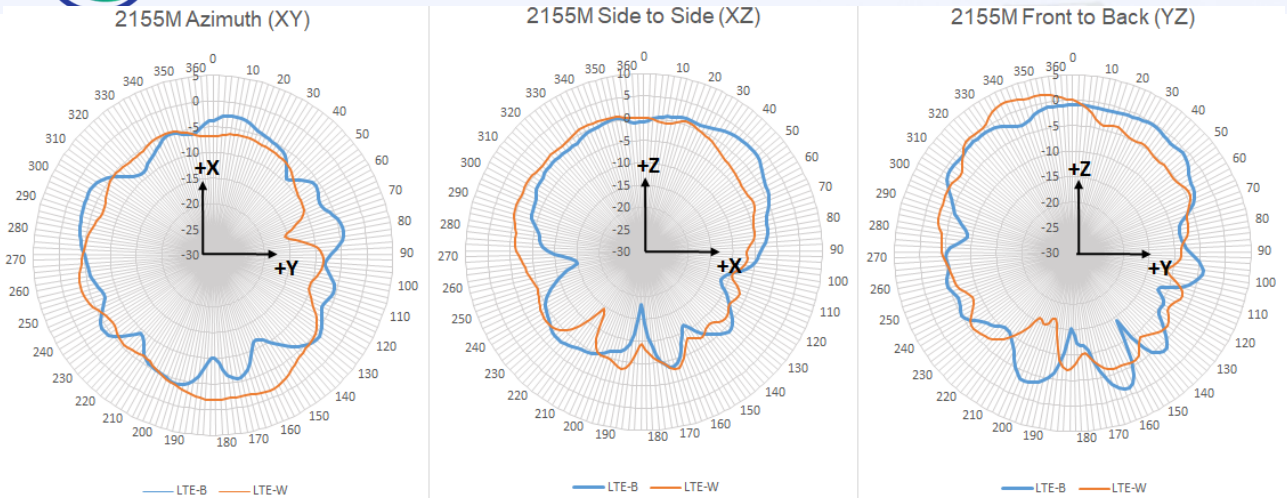


Figure 7. Measured radiation pattern characteristics in principal planes at LTE@2155MHz .

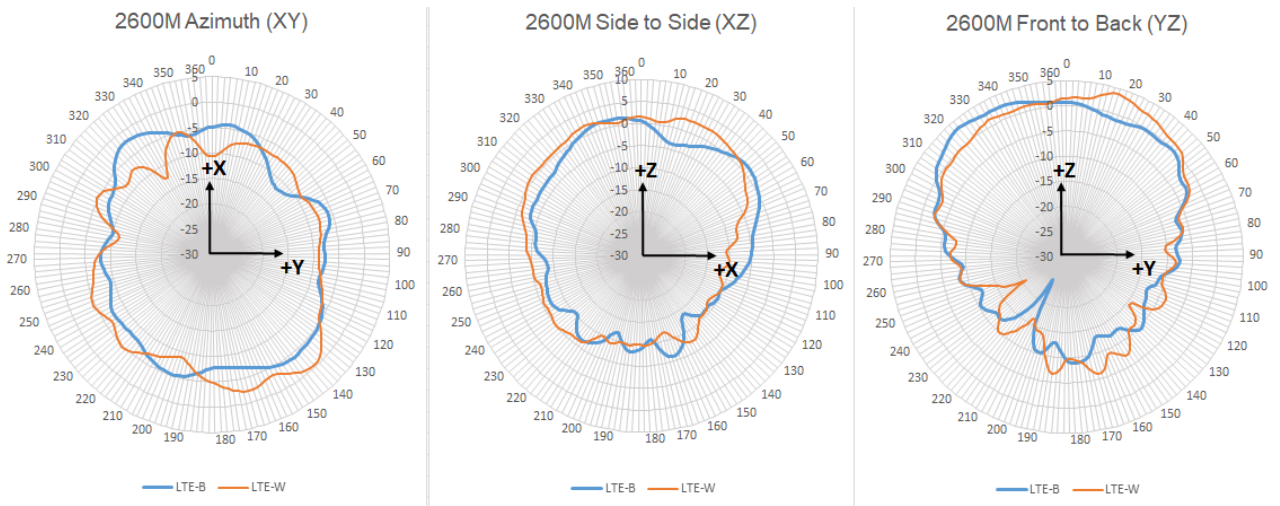


Figure 8. Measured radiation pattern characteristics in principal planes at LTE@2600MHz .

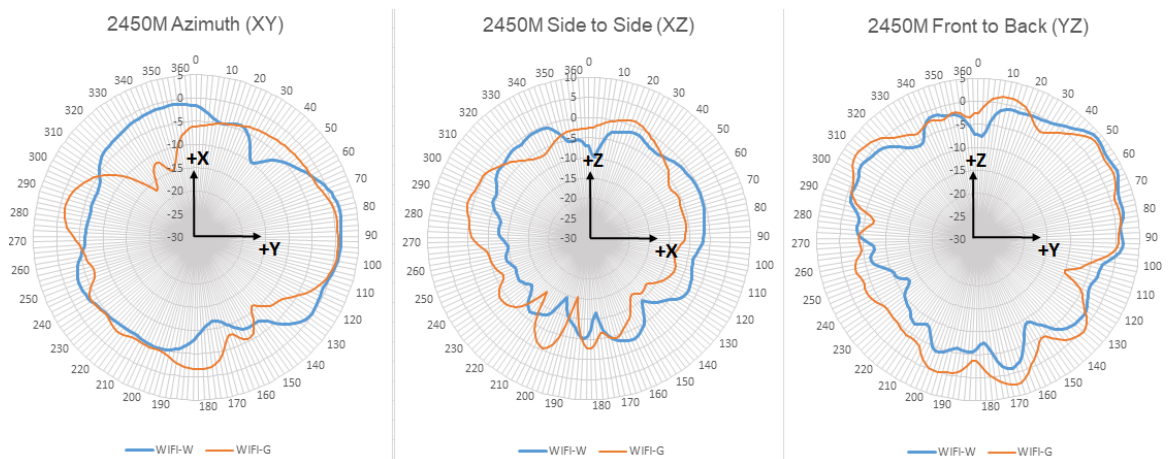


Figure 9. Measured radiation pattern characteristics in principal planes at WIFI@2450MHz .



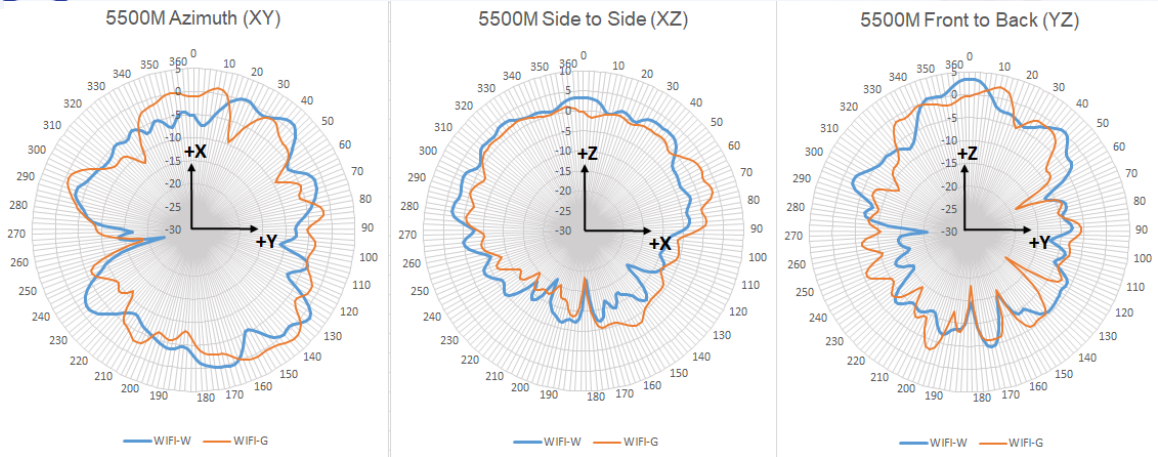


Figure 10. Measured radiation pattern characteristics in principal planes at WiFi@5500MHz .

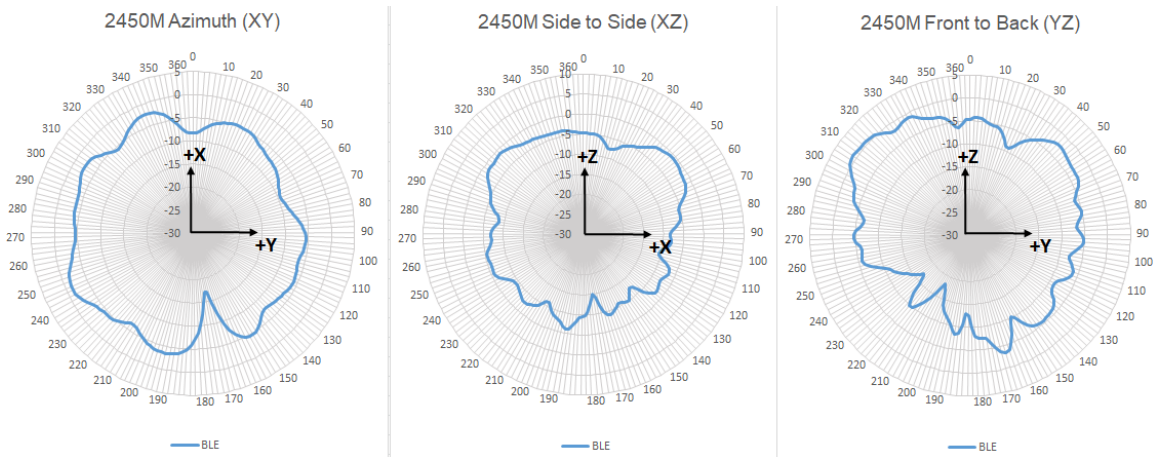


Figure 11. Measured radiation pattern characteristics in principal planes at BLE@2450MHz .

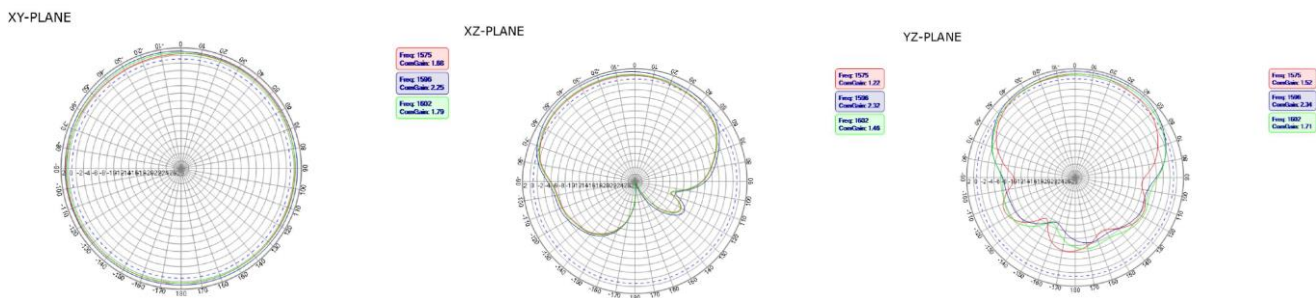
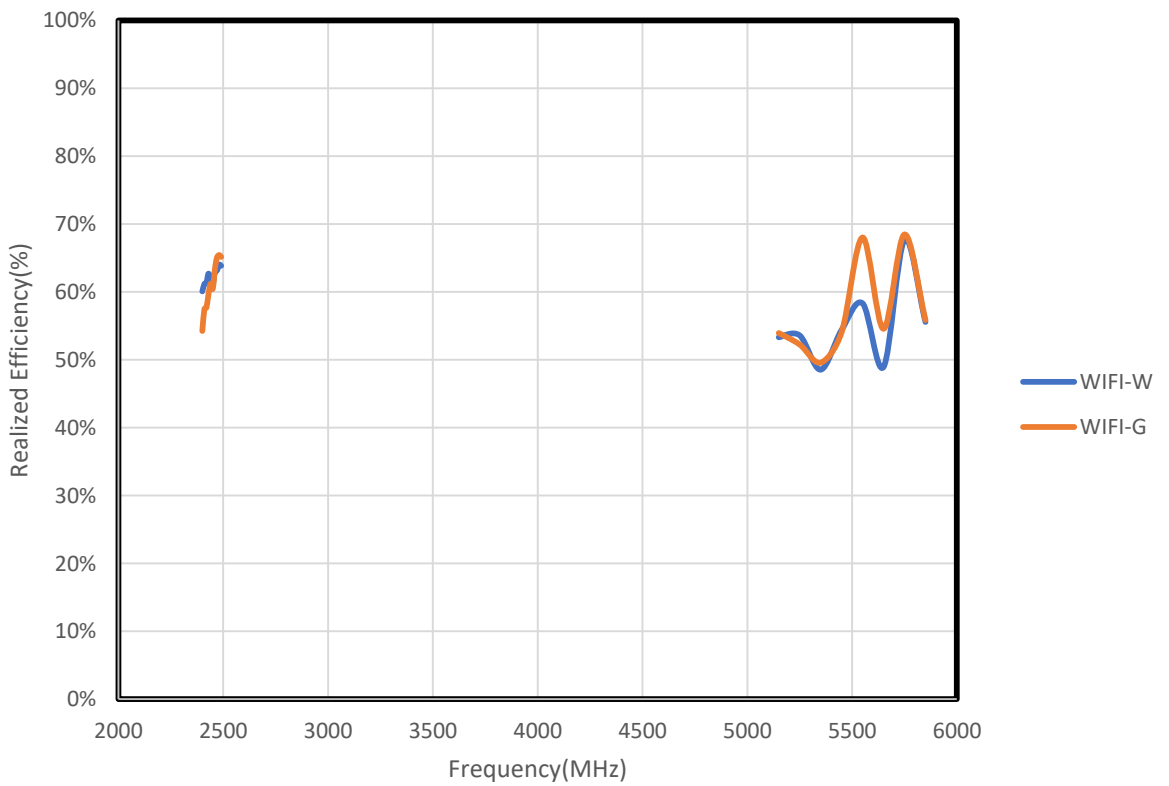
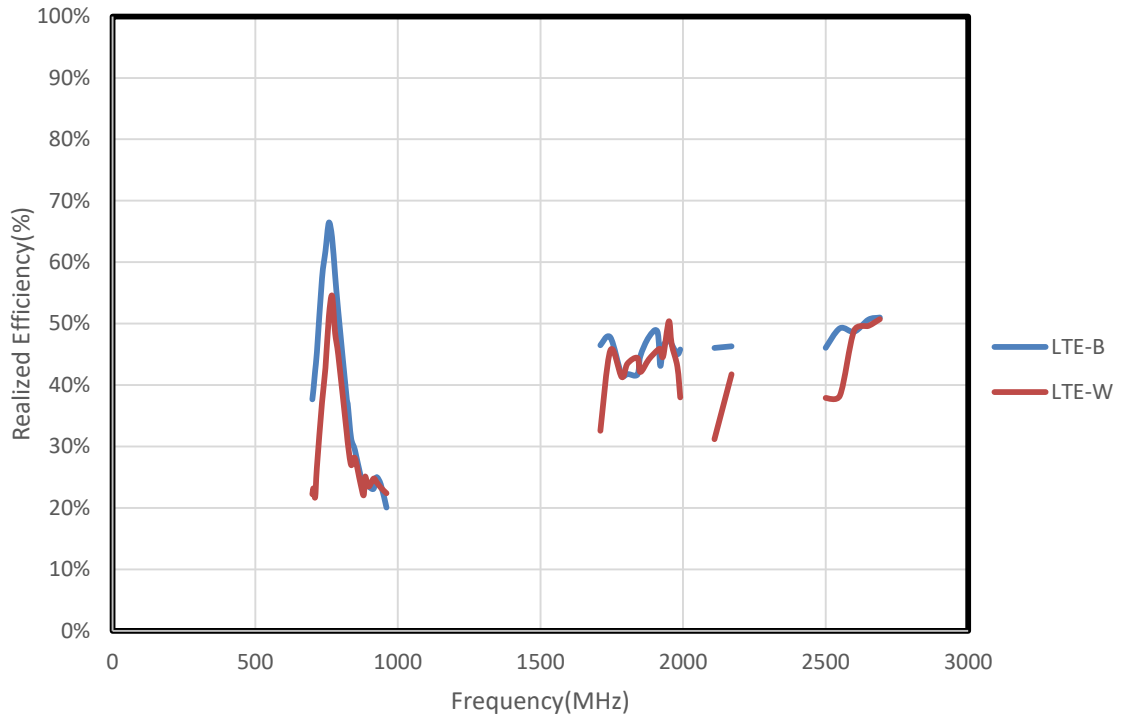


Figure 12. Measured radiation pattern characteristics in principal planes at GNSS@1575MHz/1596MHz/1602MHz.



## 8. Realized Efficiency and Peak Realized Gain



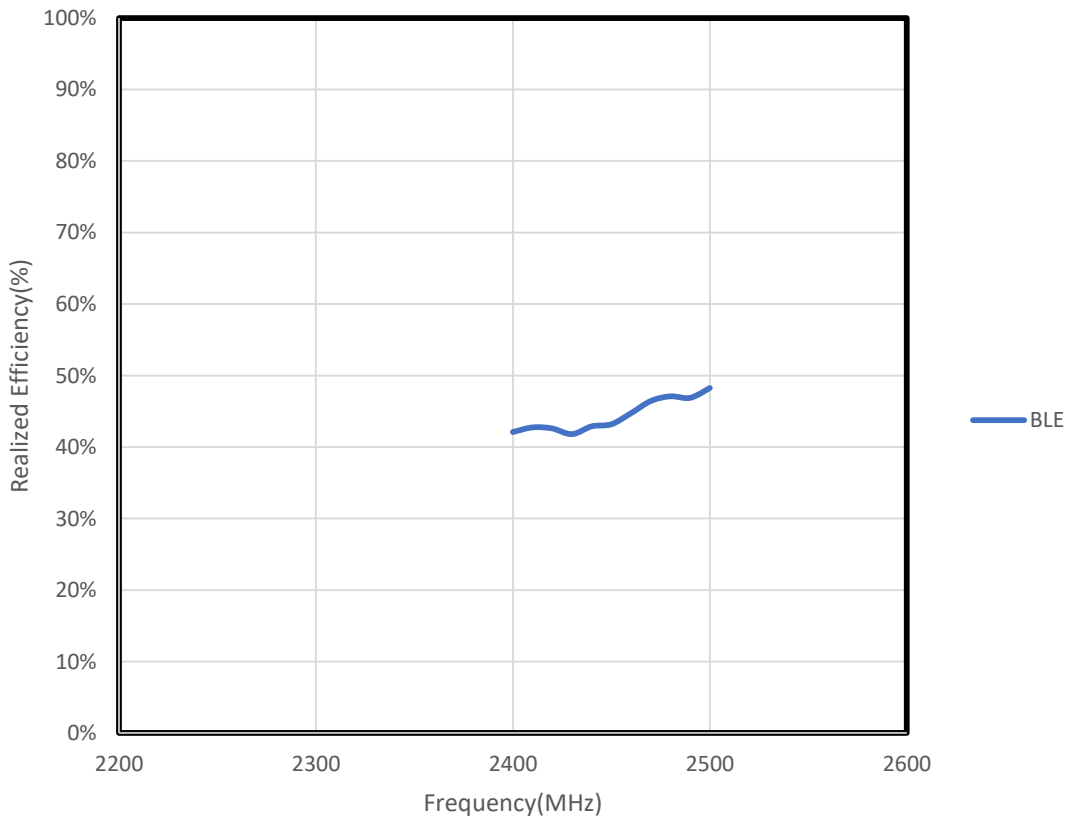
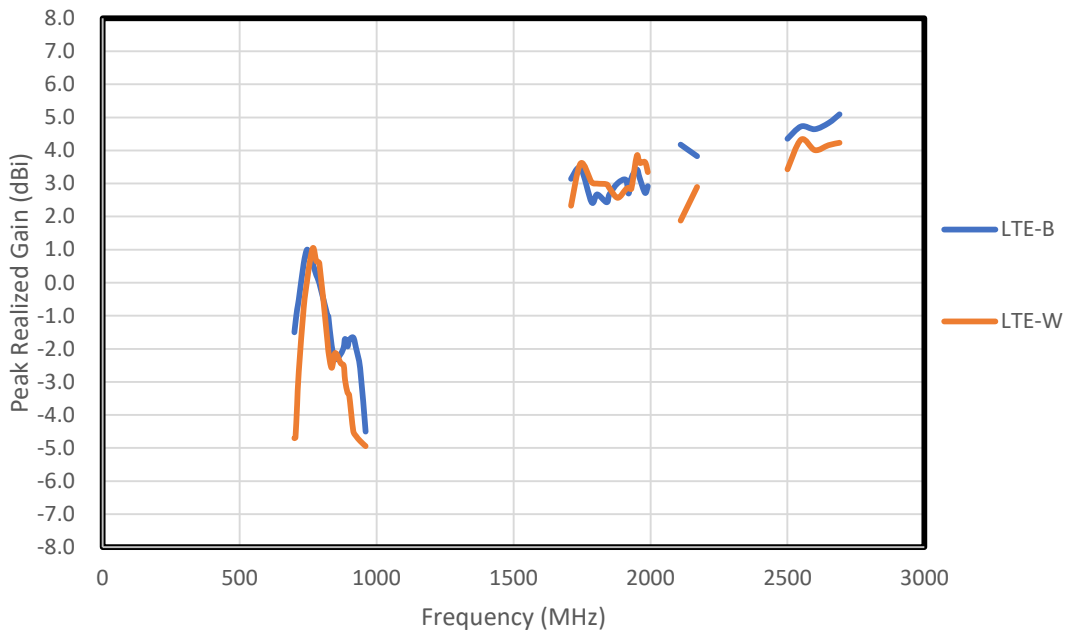
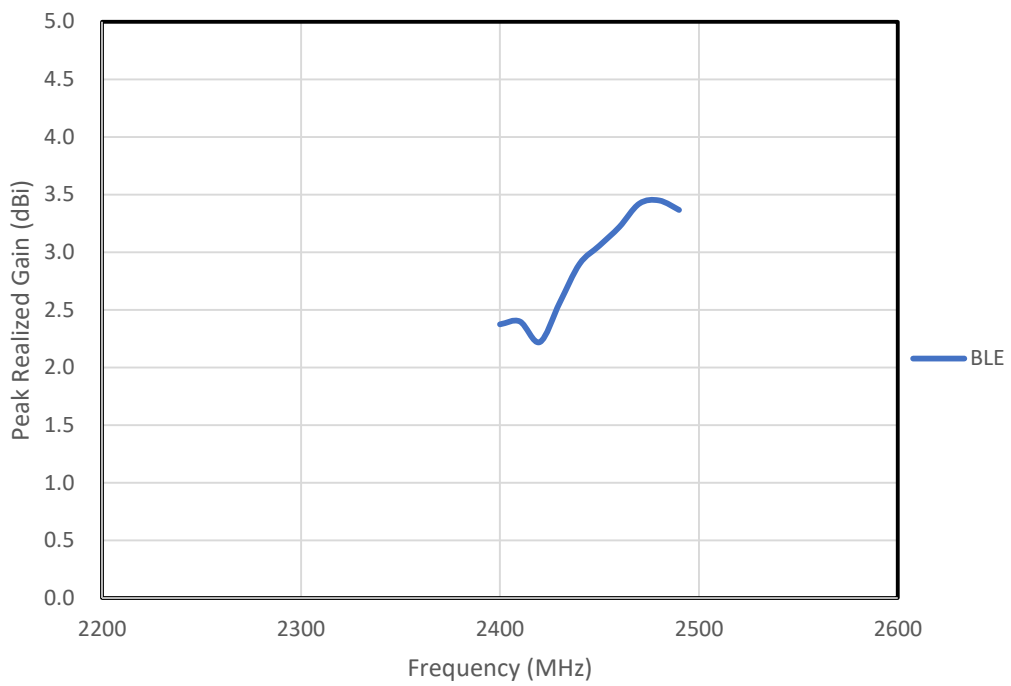
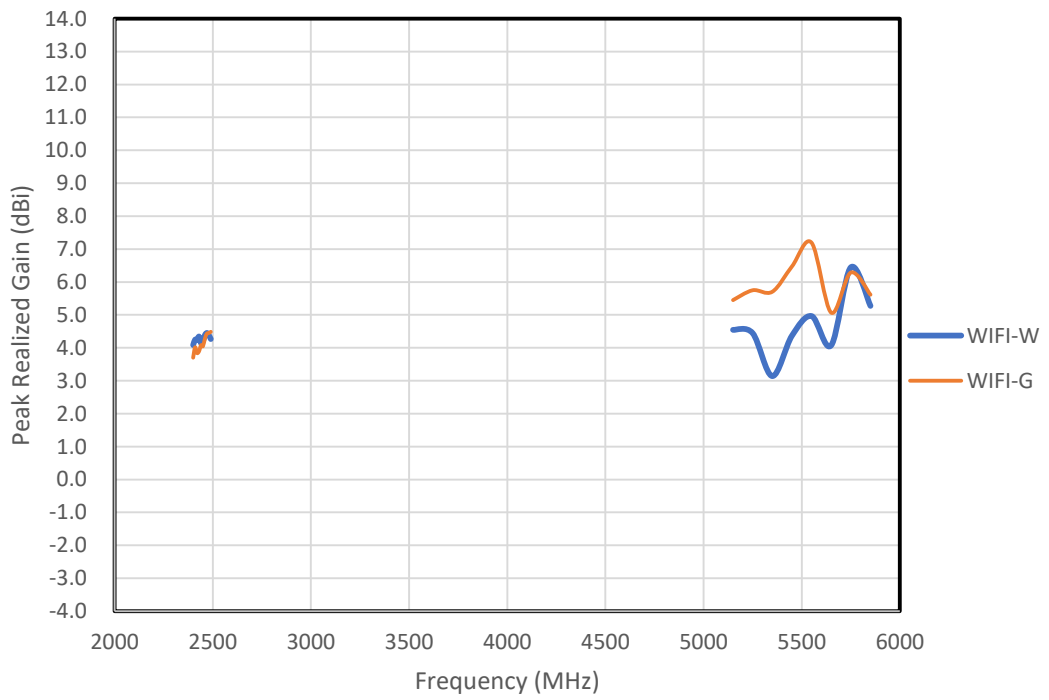
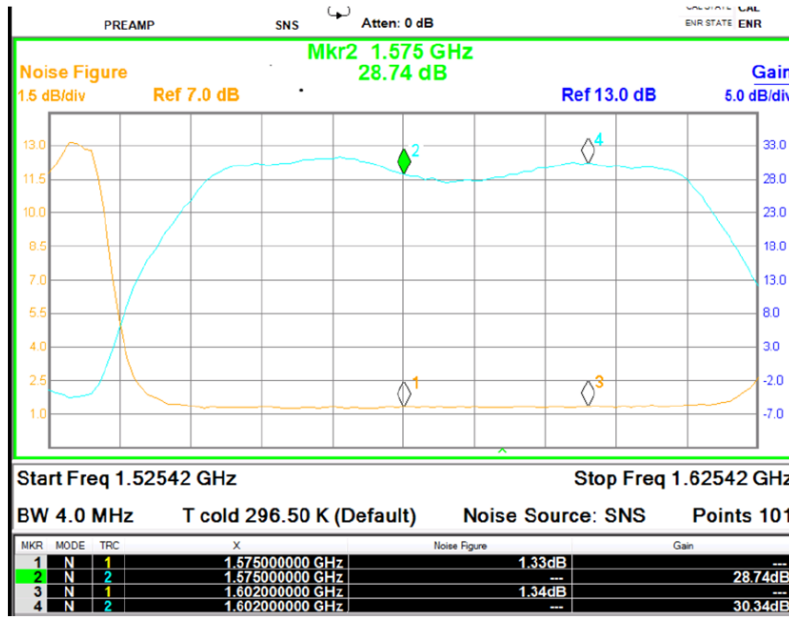


Figure 13. Measured Realized Efficiency over frequency.







— GNSS

Figure 14. Measured Peak Realized gain over frequency.





Frequency (MHz)	Realized Efficiency		Peak Realized Gain(dBi)	
	LTE-B	LTE-W	LTE-B	LTE-W
700	38%	22%	-1.5	-4.7
704	39%	23%	-1.2	-4.7
710	42%	22%	-0.8	-3.7
716	45%	27%	-0.5	-2.7
734	57%	37%	0.6	-0.8
746	62%	43%	1.0	0.0
758	66%	51%	0.8	0.7
769	64%	55%	0.5	1.1
780	58%	48%	0.2	0.7
791	52%	45%	0.0	0.6
821	38%	32%	-1.0	-1.8
824	37%	31%	-1.0	-2.1
836	31%	27%	-1.9	-2.6
849	29%	28%	-2.3	-2.1
869	25%	24%	-2.2	-2.4
880	24%	22%	-2.0	-2.5
885	25%	25%	-1.7	-2.9
894	24%	24%	-1.9	-3.3
900	23%	24%	-1.7	-3.4
915	23%	25%	-1.7	-4.5
925	25%	24%	-2.0	-4.6
940	24%	23%	-2.6	-4.8
960	20%	22%	-4.5	-4.9
1710	46%	33%	3.1	2.3
1745	48%	46%	3.5	3.6
1785	42%	41%	2.4	3.0
1805	42%	43%	2.7	3.0
1840	42%	44%	2.4	3.0
1850	45%	42%	2.7	2.9
1880	48%	44%	3.0	2.6
1910	49%	46%	3.1	2.8
1920	43%	46%	2.7	2.9
1930	46%	45%	3.2	2.8
1950	47%	50%	3.4	3.8
1960	47%	47%	3.2	3.6
1980	45%	43%	2.7	3.6
1990	46%	38%	2.9	3.3
2110	46%	31%	4.2	1.9
2170	46%	42%	3.8	2.9
2500	46%	38%	4.4	3.4
2550	49%	38%	4.7	4.3
2600	49%	49%	4.6	4.0
2650	51%	50%	4.8	4.2
2690	51%	51%	5.1	4.2



Frequency (MHz)	Realized Efficiency		Peak Realized Gain(dBi)	
	WIFI-W	WIFI-G	WIFI-W	WIFI-G
2400	60%	54%	4.1	3.7
2410	61%	57%	4.2	4
2420	61%	58%	4.2	3.8
2430	63%	60%	4.3	3.9
2440	61%	61%	4.1	4.1
2450	61%	60%	4.2	4
2460	63%	63%	4.4	4.3
2470	63%	65%	4.5	4.4
2480	64%	65%	4.4	4.4
2490	64%	65%	4.3	4.5
5150	53%	54%	4.5	5.4
5250	54%	52%	4.4	5.7
5350	49%	50%	3.1	5.7
5450	54%	54%	4.4	6.5
5550	58%	68%	5	7.2
5650	49%	55%	4.1	5.1
5750	68%	68%	6.4	6.3
5850	56%	56%	5.3	5.6

Frequency (MHz)	Realized Efficiency-BLE	Peak Realized Gain(dBi) -BLE
2400	42%	2.4
2410	43%	2.4
2420	43%	2.2
2430	42%	2.6
2440	43%	2.9
2450	43%	3.1
2460	45%	3.2
2470	46%	3.4
2480	47%	3.4
2490	47%	3.4

**Table 2.**Summary of peak realized gain and realized efficiency results.