Revision History

Version	Date	Author	Note
1.0	2025-06-16	Weston.Zhang	Libris Aura and Charging Cradle Antenna Debug Report

Project Overview

- Project Name: Libris Aura
- Device Dimensions: 62 mm x 34 mm x 12 mm
- Antenna Number: 4

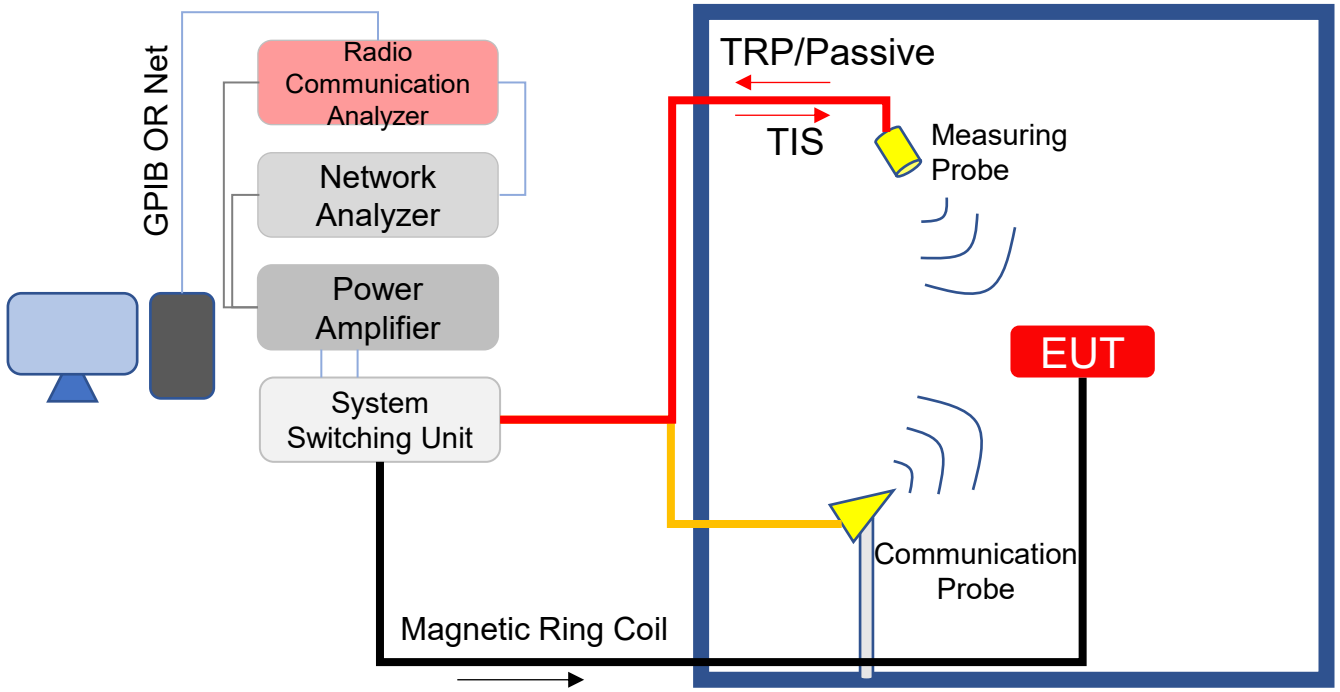
- Antenna Network Type & Frequency Band：
  - LTE*1: 699-746MHz & 1710-2180MHz (LDS)
  - WiFi*1: 2400-2500MHz (LDS)
  - GPS&BT *1 : 1575.42MHz & 2400-2500MHz (LDS)
  - BLE *1 : 2400-2500MHz (Metal Antenna)
- Requirement: AT&T

Antenna Test

- Network Analyzer: Keysight E5071C (Device number: QTB6331E; Calibration date: 2023-12-27; Due date: 2025-06-26)
- Chamber: OTA RayZone 2800 GTS (Device number: QTA0709; Calibration date: 2024-07-14; Due date: 2025-07-13)
- Testing Software: Libra
- Product Name: LTE & WiFi & BT&GNSS Antenna
- Test Engineer: Weston Zhang

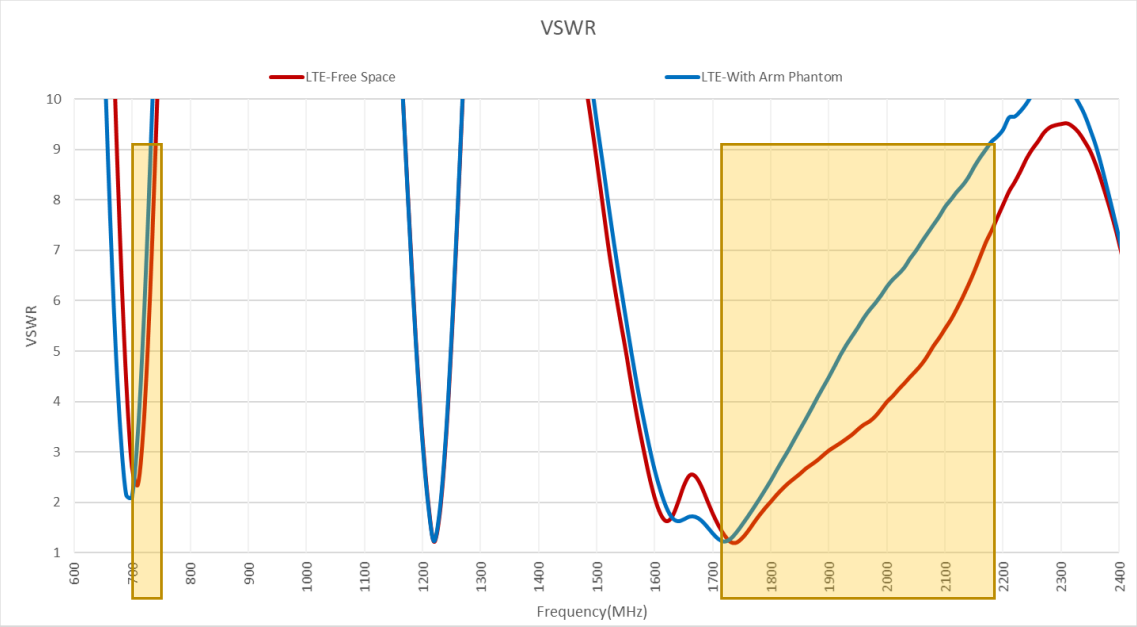
Antenna Test

- Chamber Coordinate System GL-G-1

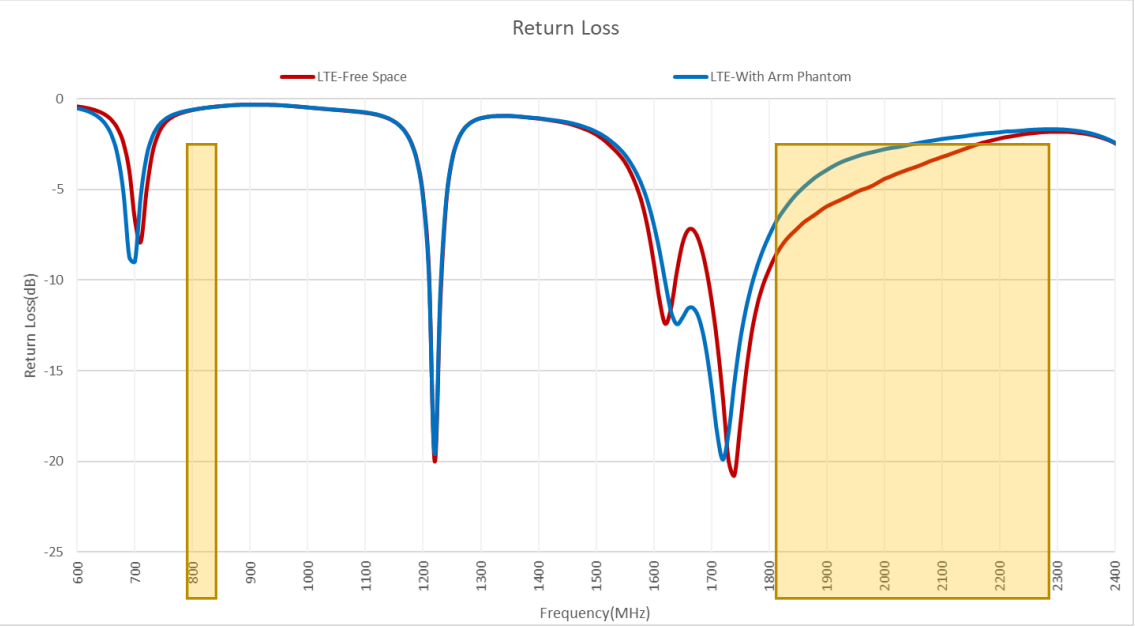


Antenna Passive Performance—LTE ANT

VSWR



S11



Antenna Passive Performance—LTE ANT

Efficiency & Gain

Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
700	-8.0	-3.0	15.8
710	-8.0	-3.0	15.8
720	-8.7	-3.7	13.4
730	-10.0	-5.0	10.1
740	-11.7	-6.7	6.7
750	-13.4	-8.3	4.6
1710	-4.0	0.2	40.0
1720	-3.6	0.4	44.1
1730	-3.3	0.6	47.3
1740	-3.1	0.5	48.6
1750	-3.1	0.5	49.2
1760	-3.1	0.3	48.5
1770	-3.2	0.3	47.5
1780	-3.3	0.3	46.6
1790	-3.4	0.4	46.0
1800	-3.6	0.3	44.0
1810	-3.7	0.3	43.2
1820	-3.6	0.4	43.7
1830	-3.6	0.6	43.3
1840	-3.7	0.6	42.3
1850	-3.8	0.6	42.1
1860	-3.8	0.7	42.1
1870	-3.9	0.7	41.2
1880	-3.9	0.7	40.9
1890	-3.9	0.4	40.6
1900	-3.8	0.4	41.6

Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
1910	-3.68	0.54	42.84
1920	-3.73	0.67	42.33
1930	-3.87	0.57	41
1940	-4.03	0.45	39.58
1950	-4.14	0.45	38.57
1960	-4.28	0.39	37.36
1970	-4.41	0.28	36.25
1980	-4.62	-0.08	34.55
1990	-4.66	-0.38	34.19
2000	-4.66	-0.49	34.16
2010	-4.83	-0.68	32.87
2020	-4.98	-0.87	31.77
2030	-5.11	-1.03	30.81
2040	-5.26	-1.23	29.77
2050	-5.47	-1.45	28.4
2060	-5.54	-1.66	27.92
2070	-5.59	-1.71	27.62
2080	-5.66	-1.85	27.17
2090	-5.79	-1.91	26.35
2100	-6.01	-2.07	25.03
2110	-6.29	-2.37	23.48
2120	-6.49	-2.67	22.44
2130	-6.63	-2.75	21.73
2140	-6.84	-2.94	20.7
2150	-6.99	-2.87	19.99
2160	-7.19	-2.9	19.12
2170	-7.44	-3.17	18.01
2180	-7.67	-3.32	17.1

Test in free space

Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
700	-10.3	-7.5	9.4
710	-10.7	-7.6	8.6
720	-11.7	-8.5	6.8
730	-12.3	-8.8	5.8
740	-13.1	-9.4	4.9
750	-14.2	-10.4	3.8
1710	-9.7	-5.3	10.8
1720	-9.7	-5.1	10.8
1730	-9.4	-4.7	11.4
1740	-9.1	-4.7	12.2
1750	-8.8	-4.6	13.3
1760	-8.4	-4.5	14.5
1770	-8.1	-4.4	15.6
1780	-7.8	-4.4	16.8
1790	-7.5	-4.3	18.0
1800	-7.3	-4.4	18.7
1810	-7.1	-4.2	19.5
1820	-6.9	-4.1	20.4
1830	-6.9	-3.8	20.5
1840	-6.9	-3.6	20.5
1850	-6.9	-3.4	20.5
1860	-6.9	-3.4	20.4
1870	-7.1	-3.7	19.7
1880	-7.2	-3.7	19.1
1890	-7.4	-3.8	18.1
1900	-7.6	-3.8	17.5

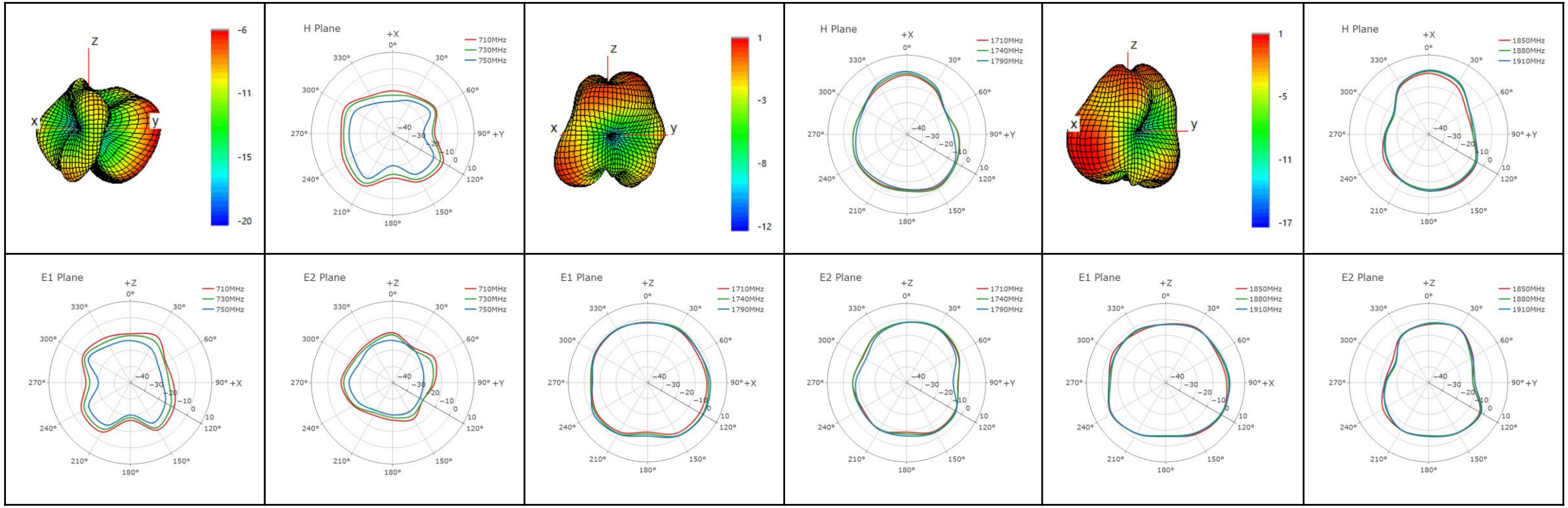
Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
1910	-7.66	-4.12	17.14
1920	-7.78	-4.7	16.66
1930	-7.94	-4.96	16.09
1940	-8.12	-5.22	15.42
1950	-8.2	-5.28	15.13
1960	-8.32	-5.33	14.71
1970	-8.51	-5.67	14.1
1980	-8.78	-6.28	13.26
1990	-8.81	-6.2	13.16
2000	-8.82	-6.15	13.11
2010	-9	-6.23	12.6
2020	-9.11	-6.21	12.27
2030	-9.25	-6.3	11.88
2040	-9.37	-6.28	11.56
2050	-9.57	-6.36	11.05
2060	-9.65	-6.24	10.83
2070	-9.72	-6.25	10.66
2080	-9.75	-6.13	10.6
2090	-9.78	-5.97	10.51
2100	-9.91	-6.03	10.2
2110	-10	-6.18	10
2120	-9.99	-6.29	10.03
2130	-9.89	-6.25	10.25
2140	-9.84	-6.41	10.37
2150	-9.76	-6.36	10.58
2160	-9.75	-6.38	10.58
2170	-9.82	-6.45	10.41
2180	-9.9	-6.49	10.23

Test with arm phantom

Antenna Performance—LTE ANT

- Radiation Pattern

Test in free space

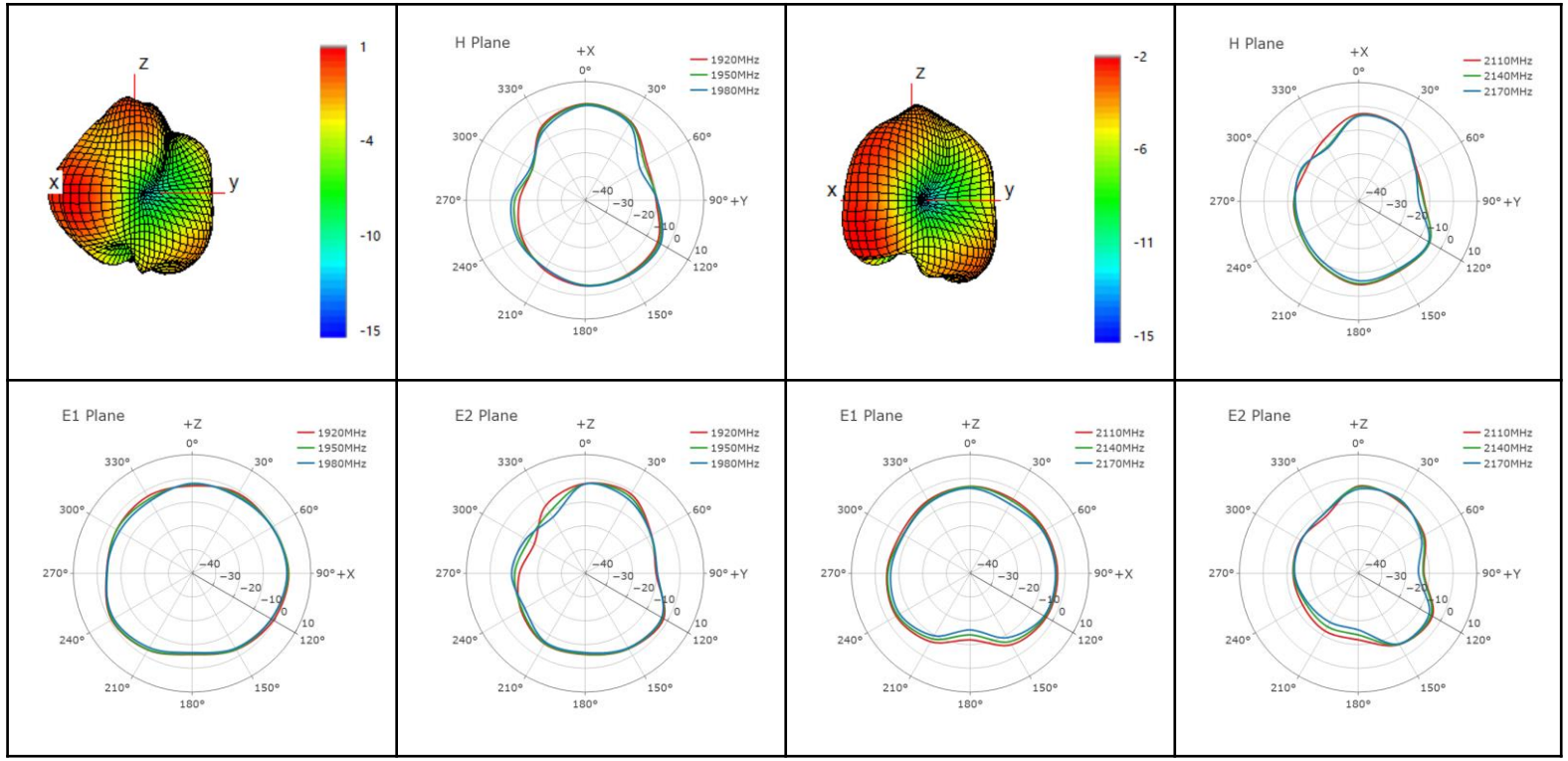


730MHz **1740MHz** **1880MHz**

Antenna Performance—LTE ANT

- Radiation Pattern

Test in free space



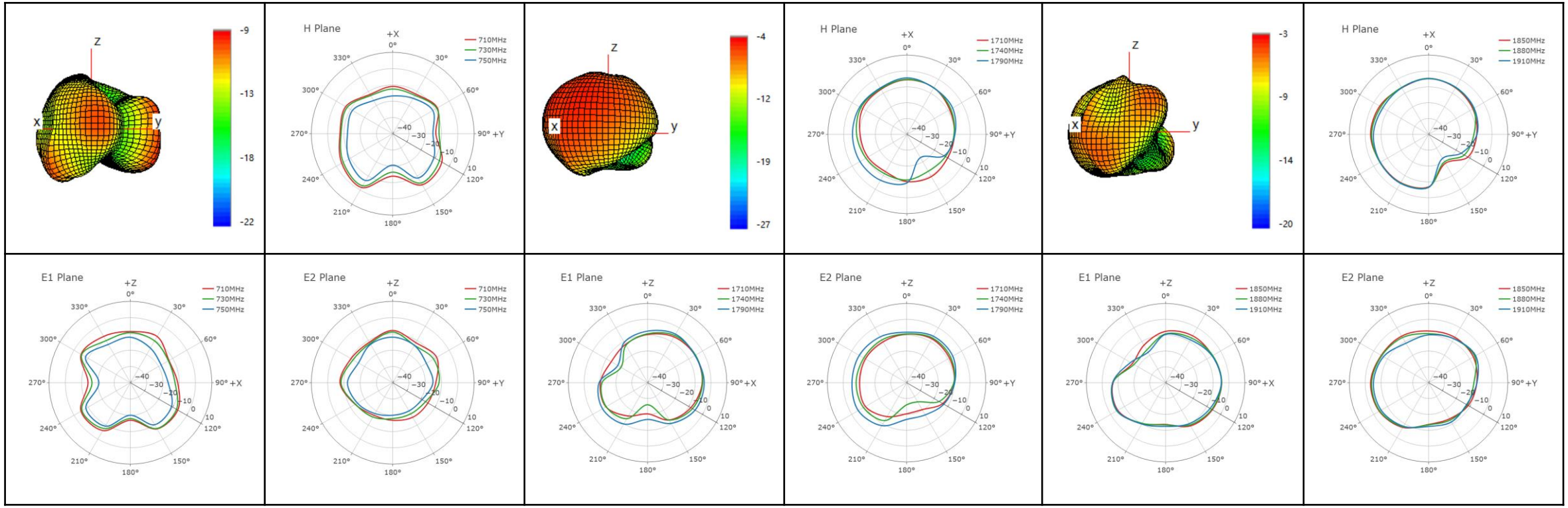
1950MHz

2140MHz

Antenna Performance—LTE ANT

- Radiation Pattern

Test with arm phantom

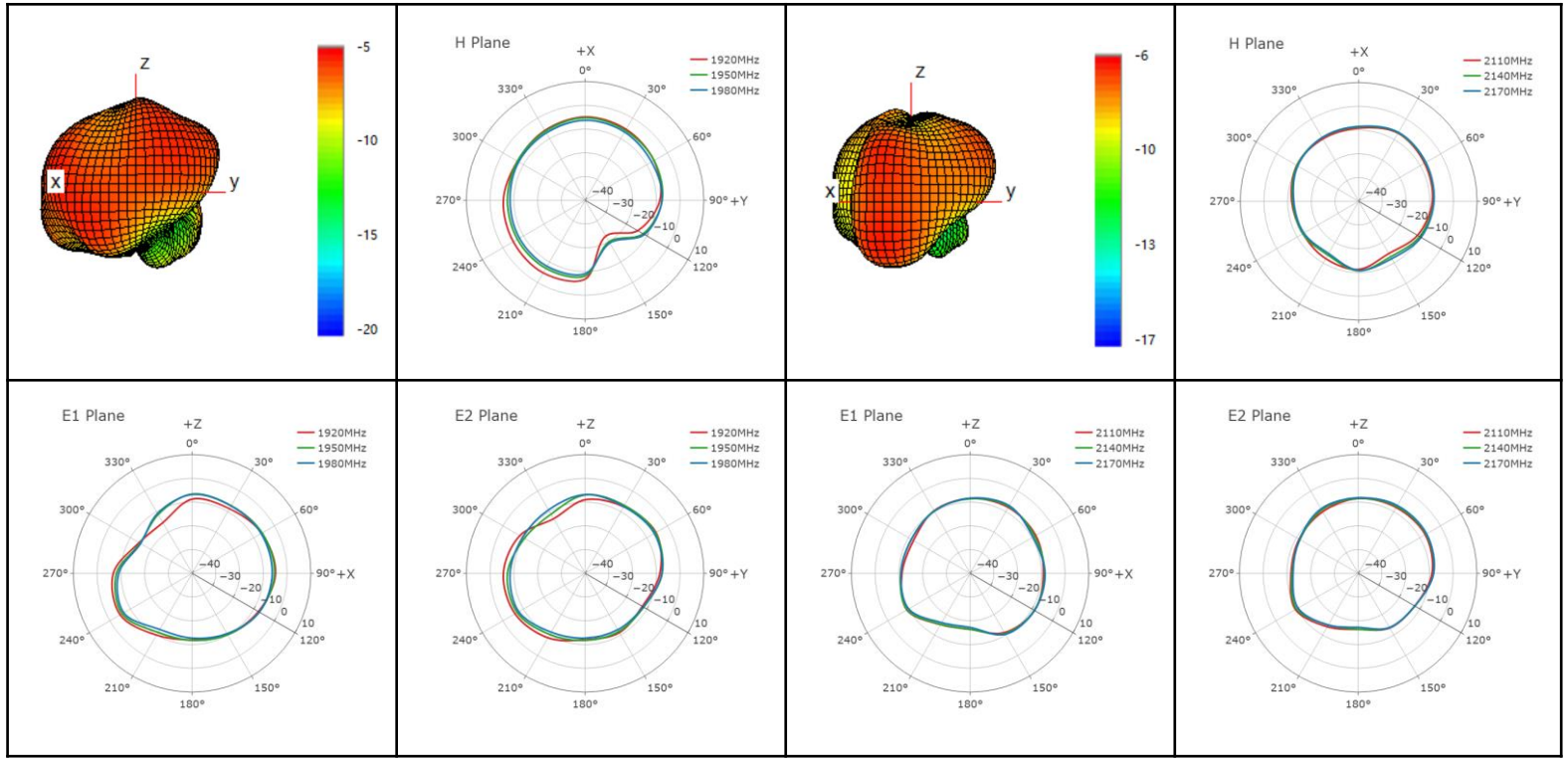


730MHz **1740MHz** **1880MHz**

Antenna Performance—LTE ANT

- Radiation Pattern

Test with arm phantom



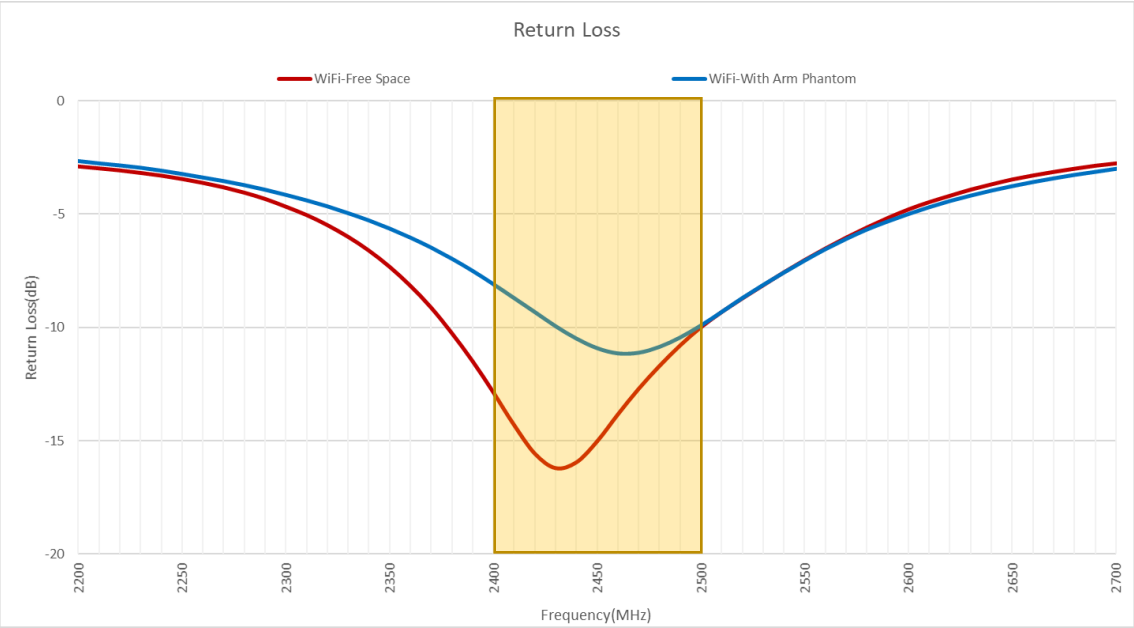
1950MHz

2140MHz

Antenna Passive Performance—WiFi ANT

VSWR

S11



Antenna Passive Performance—WiFi ANT

Efficiency & Gain

Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
2400	-4.6	1.3	35.1
2410	-4.5	1.3	35.2
2420	-4.5	1.4	35.8
2430	-4.4	1.3	36.0
2440	-4.5	1.2	35.8
2450	-4.4	1.2	36.1
2460	-4.5	0.9	35.6
2470	-4.5	0.7	35.8
2480	-4.7	0.3	34.3
2490	-4.7	0.1	34.0
2500	-4.7	-0.2	33.8

Test in free space

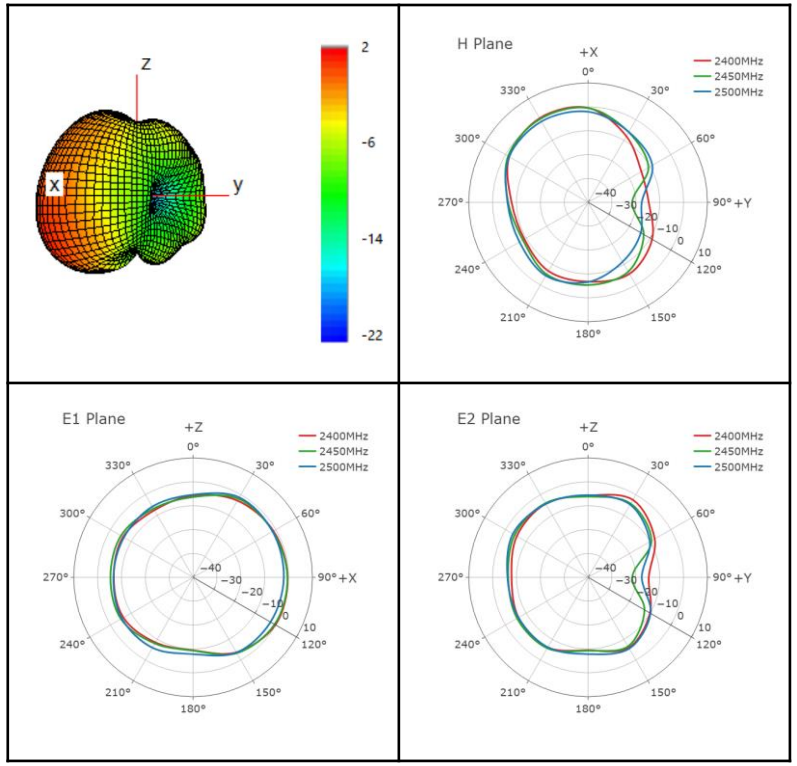
Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
2400	-7.2	-1.9	19.0
2410	-7.2	-1.8	19.3
2420	-7.0	-1.6	19.8
2430	-7.1	-1.5	19.7
2440	-7.1	-1.4	19.7
2450	-7.0	-1.5	19.8
2460	-7.0	-1.5	20.0
2470	-7.0	-1.5	20.2
2480	-7.1	-1.8	19.6
2490	-7.2	-2.1	19.2
2500	-7.2	-2.2	19.1

Test with arm phantom

Antenna Performance—WiFi ANT

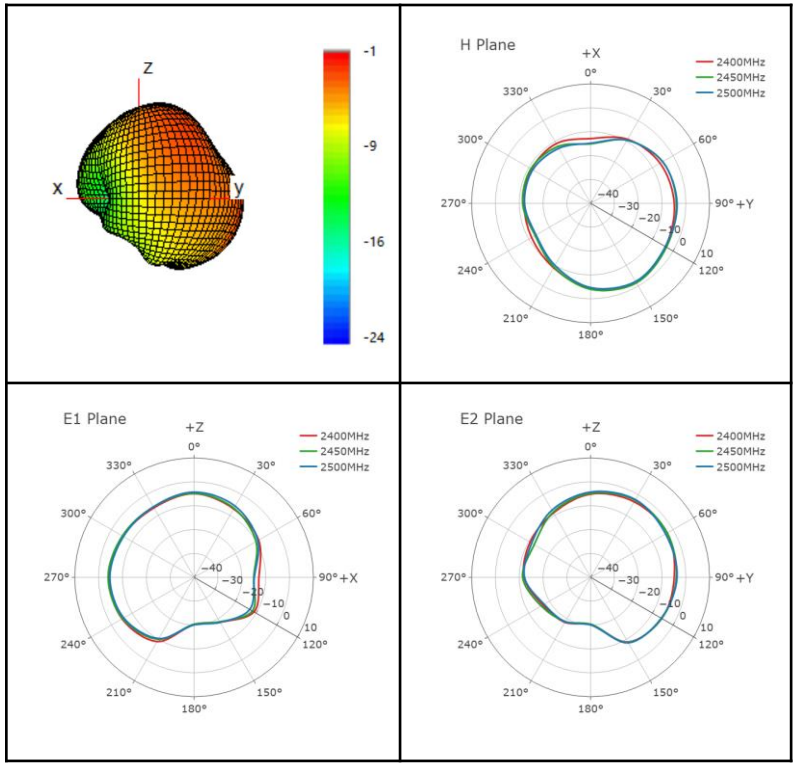
- Radiation Pattern

Test in free space



2450MHz

Test with arm phantom

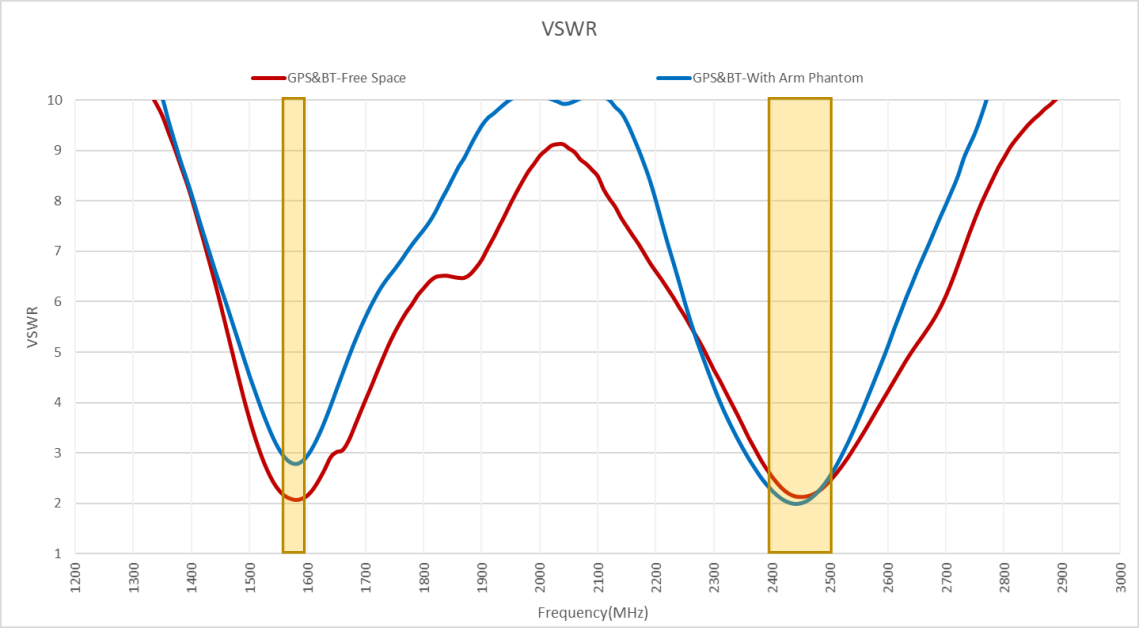


2450MHz

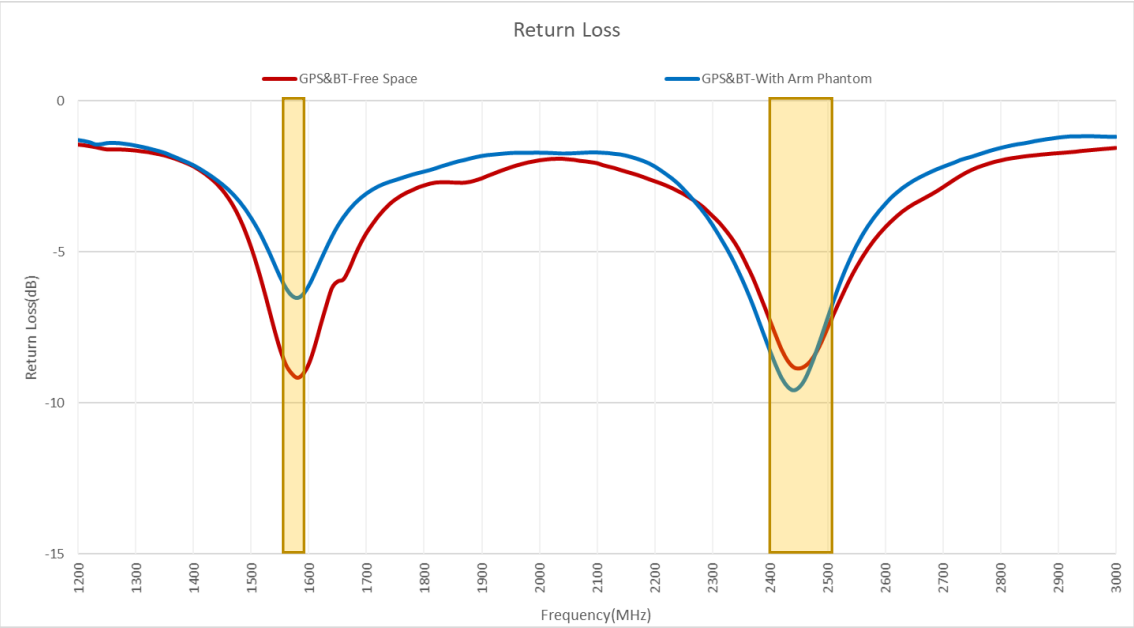
ikotek

Antenna Passive Performance—GPS&BT ANT

VSWR



S11



Antenna Passive Performance—GPS&BT ANT

Efficiency & Gain

Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
1560	-3.4	0.2	46.0
1570	-3.4	0.4	45.9
1580	-3.5	0.4	44.3
2400	-6.0	-3.7	25.3
2410	-5.9	-3.7	25.5
2420	-5.9	-3.4	25.8
2430	-6.0	-3.4	25.2
2440	-6.1	-3.5	24.3
2450	-6.2	-3.5	23.9
2460	-6.3	-3.5	23.4
2470	-6.4	-3.6	23.0
2480	-6.7	-3.7	21.6
2490	-6.9	-3.6	20.5
2500	-7.0	-3.5	19.9

Test in free space

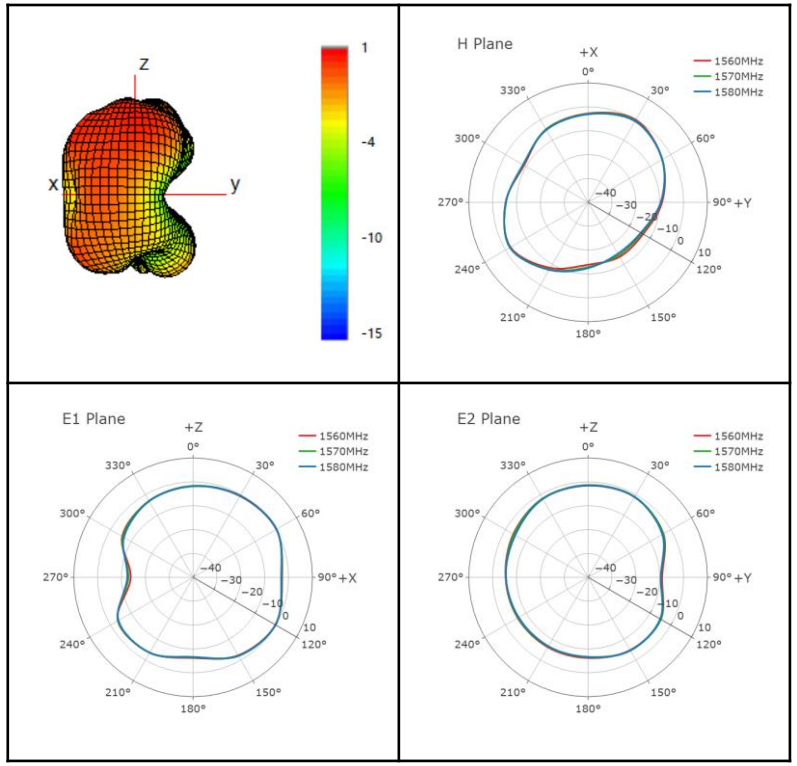
Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
1560	-7.2	-4.9	19.0
1570	-7.1	-5.1	19.3
1580	-7.1	-5.4	19.3
2400	-7.7	-4.4	17.1
2410	-7.8	-4.5	16.7
2420	-7.9	-4.3	16.4
2430	-8.0	-4.3	15.9
2440	-8.1	-4.4	15.4
2450	-8.2	-4.5	15.3
2460	-8.3	-4.5	14.9
2470	-8.3	-4.5	14.7
2480	-8.6	-4.4	13.8
2490	-8.8	-4.3	13.2
2500	-8.9	-4.0	13.0

Test with arm phantom

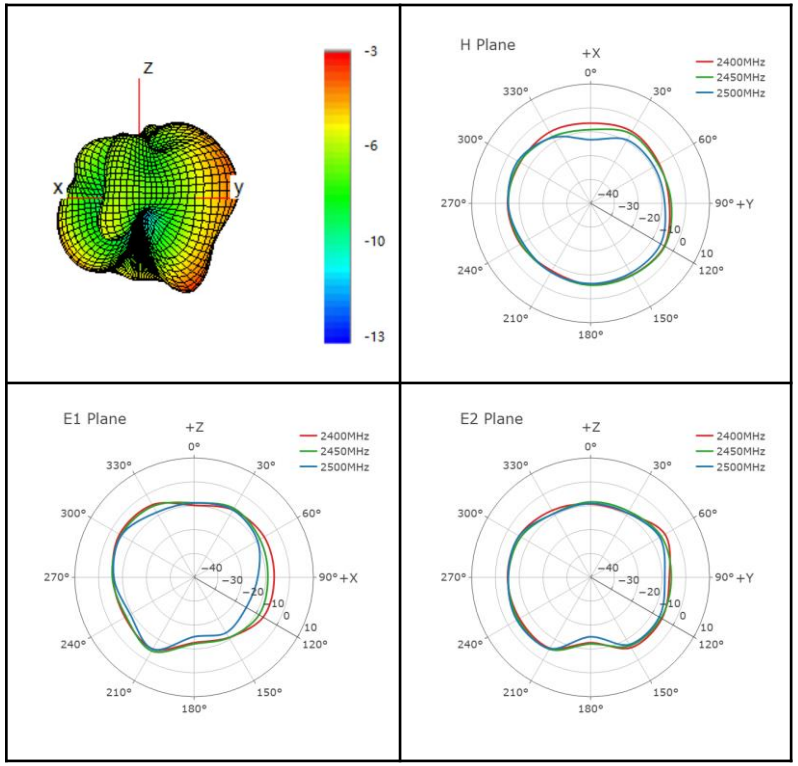
Antenna Performance—GPS&BT ANT

- Radiation Pattern

Test in free space



1570MHz

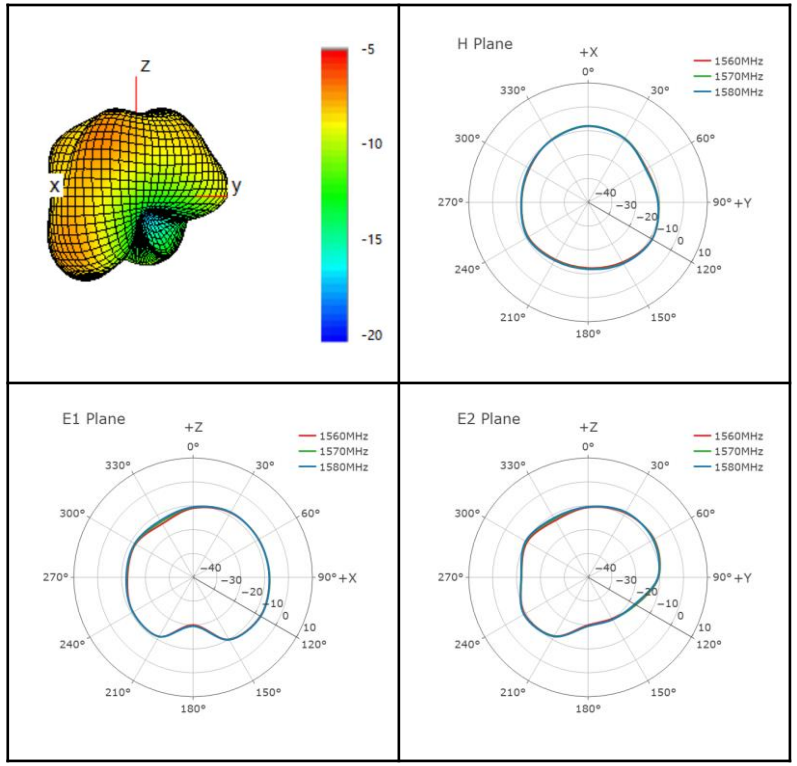


2450MHz

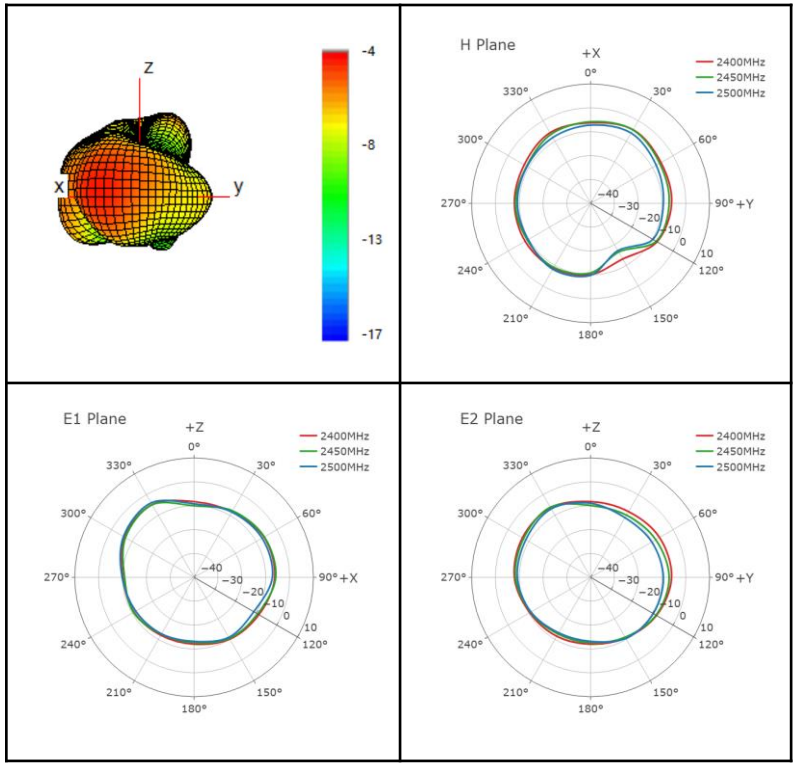
Antenna Performance—GPS&BT ANT

- Radiation Pattern

Test with arm phantom



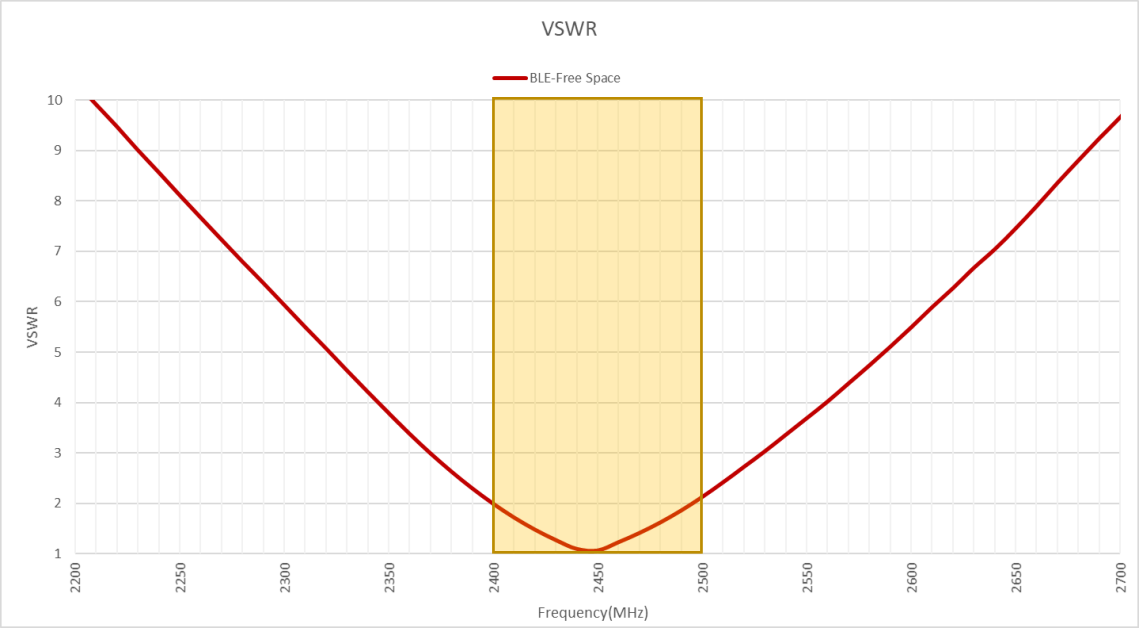
1570MHz



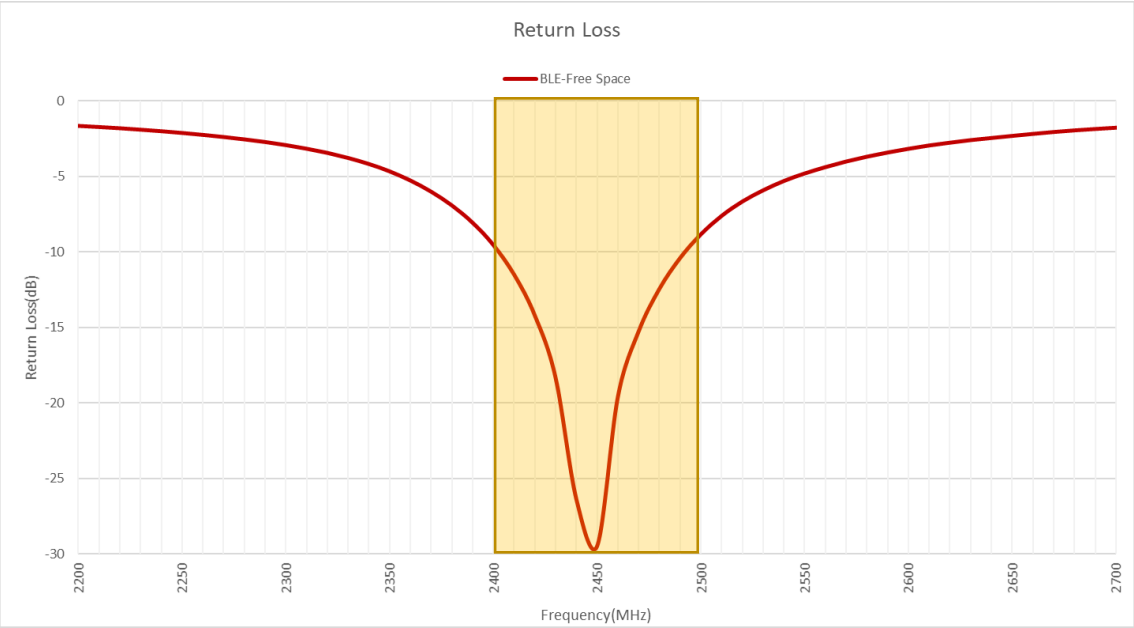
2450MHz

Antenna Passive Performance—BLE ANT (Charging Cradle)

VSWR



S11



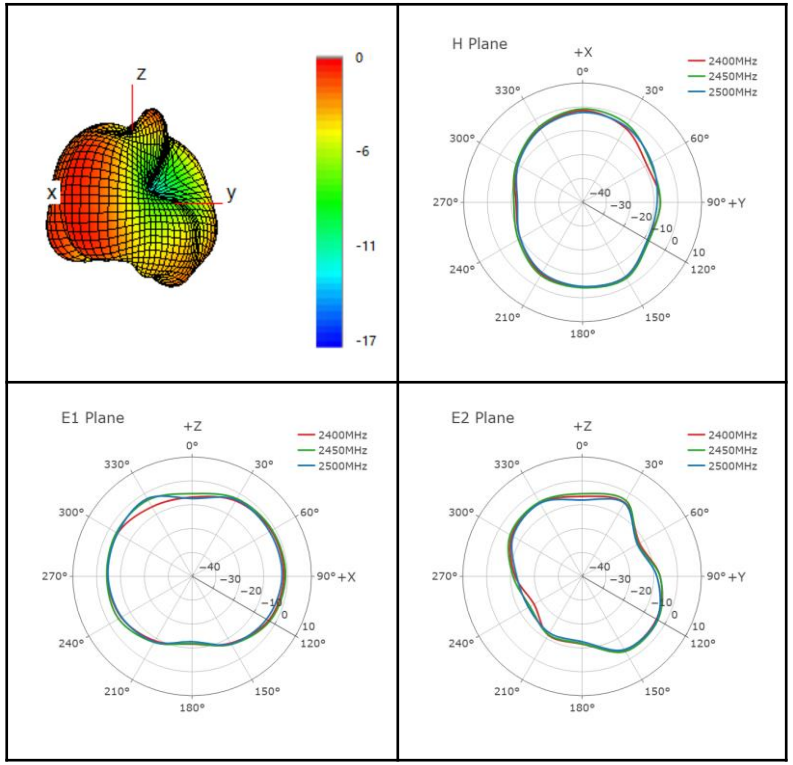
Antenna Passive Performance—BLE ANT

Efficiency & Gain

Frequency (MHz)	Efficiency (dB)	Gain (dBi)	Efficiency (%)
2400	-5.5	-1.6	28.2
2410	-5.2	-1.4	30.0
2420	-4.9	-1.0	32.3
2430	-4.8	-0.9	33.3
2440	-4.7	-0.8	33.9
2450	-4.6	-0.9	34.4
2460	-4.7	-1.0	34.0
2470	-4.7	-1.2	33.7
2480	-5.0	-1.6	31.5
2490	-5.2	-1.8	30.1
2500	-5.3	-1.9	29.4

Antenna Performance—BLE ANT

- Radiation Pattern



2450MHz

Antenna Active Performance

OTA: B2 & B4 & B12

BAND	Channel	Frequency	TRP	Channel	Frequency	TIS
2 (10MHz)	18650	1855	19.53			
	18900	1880	18.94			
	19150	1905	18.88	1150	1985	-92.43
4 (10MHz)	20000	1715	16.36			
	20175	1732.5	18.01			
	20350	1750	19.46	2350	2150	-90.74
12 (5MHz)	23035	701.5	12.55			
	23095	707.5	13.45			
	23155	713.5	14.39	5155	743.5	-86.83

BAND	Channel	Frequency	TRP	Channel	Frequency	TIS
2 (10MHz)	18650	1855	14.13			
	18900	1880	13.42			
	19150	1905	12.97	1150	1985	-86.73
4 (10MHz)	20000	1715	12.17			
	20175	1732.5	13.09			
	20350	1750	14.12	2350	2150	-85.53
12 (5MHz)	23035	701.5	12.06			
	23095	707.5	11.62			
	23155	713.5	10.88	5155	743.5	-83.05