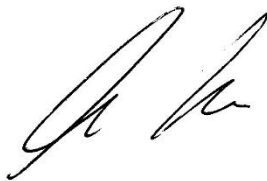


Antenna Under Test (AUT)

Report

Product Type: LTE Antenna
Company Name: Omni-ID.
Model Number: Sense asset+ CP16640-03
Report No: RL/2023/100
Tested By: Andy Knowles
Prepared By: Andy Knowles
Test Date: October 23. 2023
Test location: Radtenna Ltd. 26 Merley Lane, Wimborne,
Dorset, BH21 1RY, UK

Signature:



REPORT RELEASE HISTORY

Report version	Description	Issue date
R1	Original Release	25/10/2023

TABLE 1 RELEASE HISTORY

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1. EUT Antenna Information

1. Antenna Material: PCB on board
2. Antenna Type: Printed Inverted F Antenna
3. Antenna Dimensions: 10mm x 5mm
4. Operation frequency: 2.4GHz 0 2.48GHz
5. Input Impedance: 50Ω
6. Standing Wave ratio: 2:1

2. 2D pattern Measurement

2.1. Test Equipment

Radiated Tests			
Equipment	Manufacturer	Model	Serial No
VNA	Anritsu	MS46122A	1511303
Ref Antenna	RF Echo	OBH - 690	D20-4005901
Calibration Antenna	Schwarzbeck	SBA 9133 Mini	2086
Positioner	Dimond Engineering	DAMS 6000	N/A
Software	Dimond Engineering	Version 5.9-6e 1-2-2020	N/A

TABLE 2 RADIATED MEASUREMENT EQUIPMENT

2.2. Anechoic Chamber Configuration

Length: 4m

Width: 2m

Height: 1.5m

Measurement antenna Height 1m

Turntable/UUT Height 1m

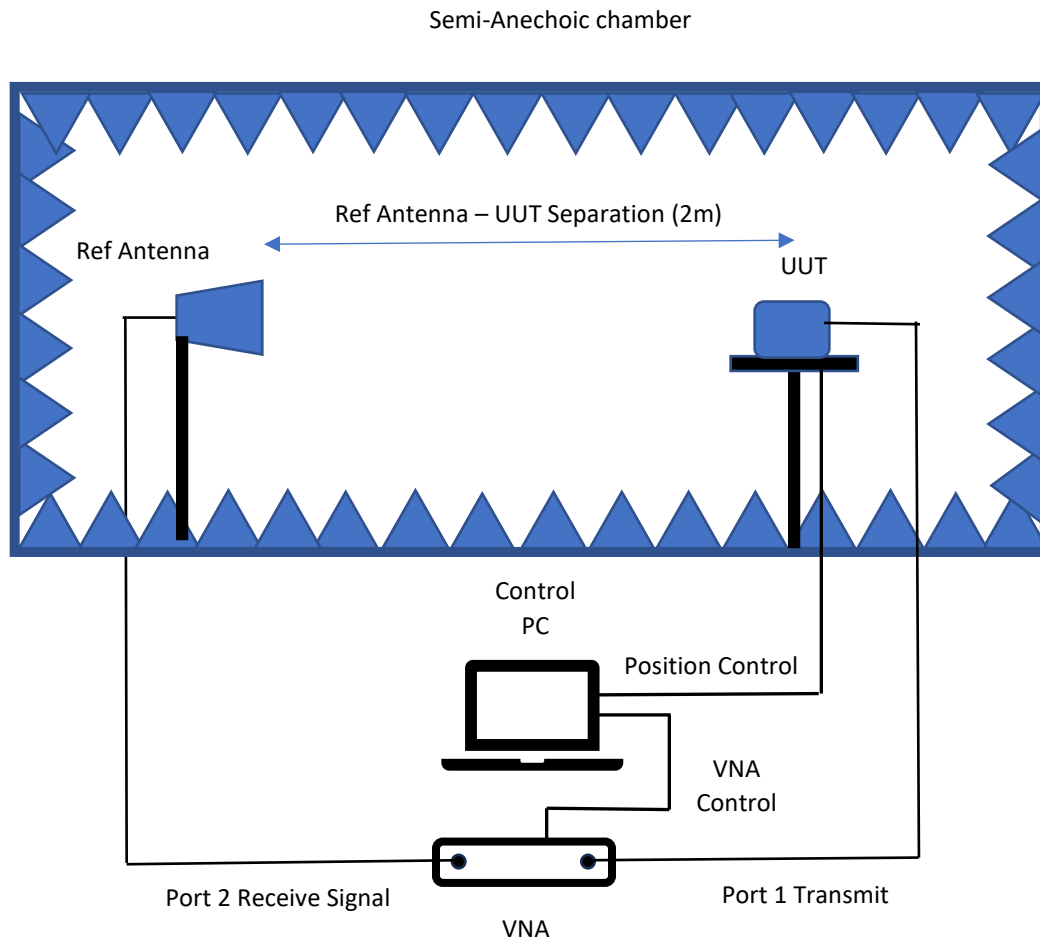


FIGURE 1 CHAMBER CONFIGURATION

2.3. Test procedure

- 1) Calibrate VNA including all test cables.
- 2) Connect Calibration antenna (SBA 9133) to center of turntable and perform VNA S21 calibration Scan.
- 3) Store site calibration results
- 4) Connect UUT and position in center of turntable.
- 5) The turntable is stepped between 0° to 360° in 10° steps in each plane (X-Y, X-Z and Y-Z)
- 6) A VNA S21 gain measurement is recorded at each step for each test frequency (2402 MHz, 2440MHz and 2480MHz)
- 7) The Antenna gain is calculated for each position using measurement data, Site Calibration data and theoretical path loss figures.

2.4. UUT test configuration

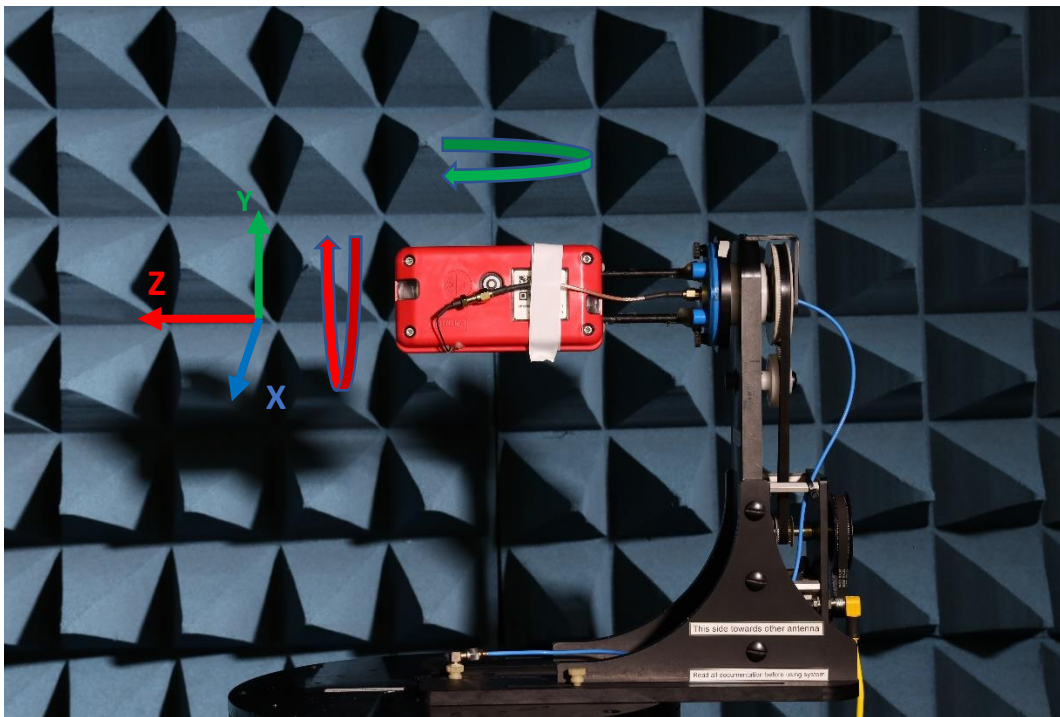


FIGURE 2 TEST CONFIGURATION FOR UUT SHOWN IN POSITION FOR 0° EL, 0° DEGREES AZ

With reference to Figure 2, the green arrow shows the direction for rotation in the Elevation plane and the red arrow shows the direction for rotation in the Azimuth plane. The image above was taken from the perspective of the measurement antenna.

3. Measured Values

3.1. Peak Gains

Frequency (MHz)	X-Y Plane		X-Z plane		Y-Z Plane		Antenna Peak Gain (dBi)
	Vert Peak Gain (dBi)	Hor Peak Gain (dBi)	Vert Peak Gain (dBi)	Hor Peak Gain (dBi)	Vert Peak Gain (dBi)	Hor Peak Gain (dBi)	
2402	-3.7	-4.1	-6.5	-2.4	-0.6	-12.8	-0.6
2440	-3.4	-3.4	-7.3	-1.7	0.3	-12.2	0.3
2480	-4.3	-2.8	-6.6	-1.8	1.0	-9.2	1.0

TABLE 3 MEASURED PEAK GAINS

3.2. 2D plots

X-Y Vertical- 2402,2426,2480 MHz

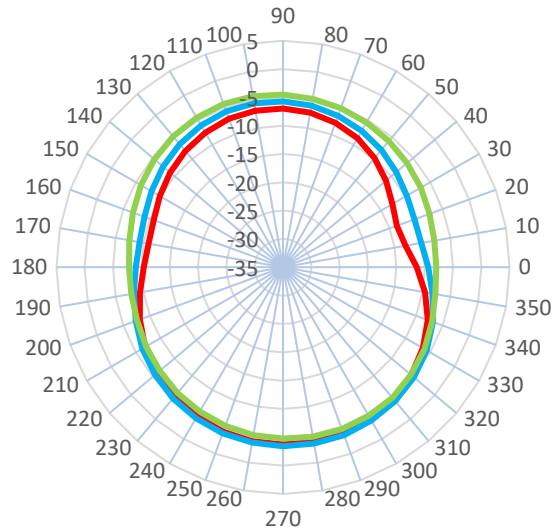


FIGURE 3

X-Y Horizontal- 2402,2426,2480 MHz

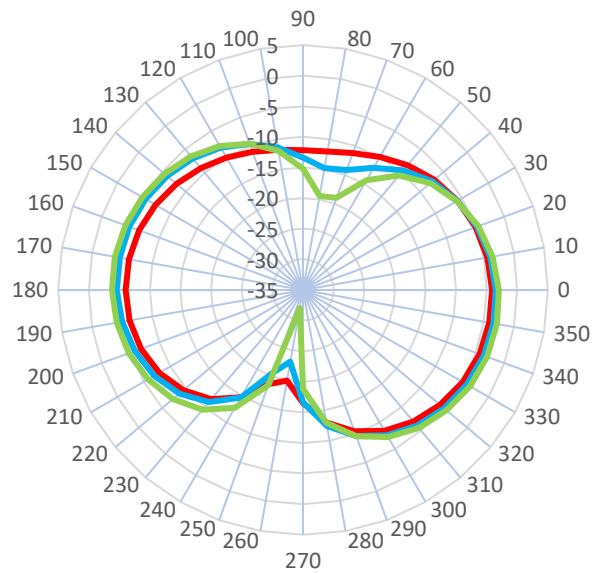


FIGURE 4

X-Z Vertical - 2402,2426,2480 MHz

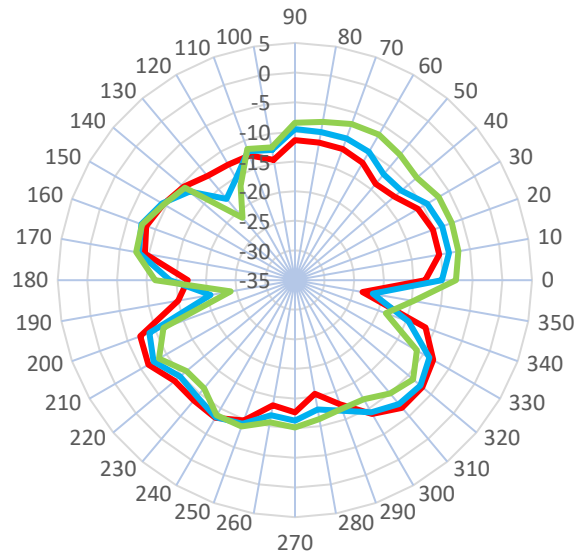


FIGURE 5

X-Z Horizontal - 2402,2426,2480 MHz

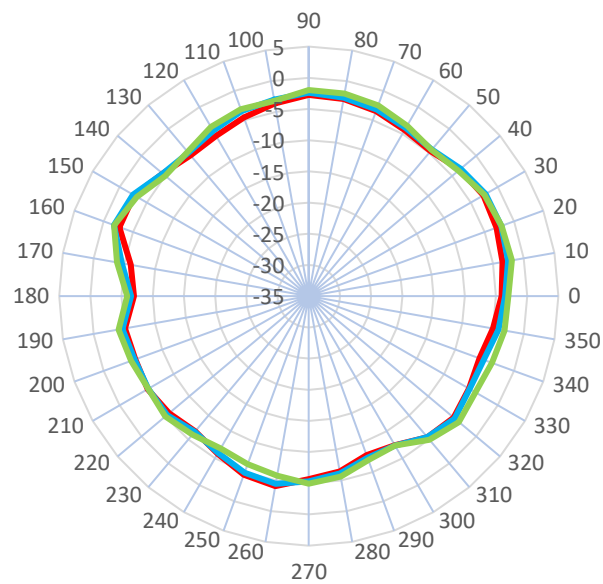


FIGURE 6

Y-Z Vertical - 2402,2426,2480 MHz

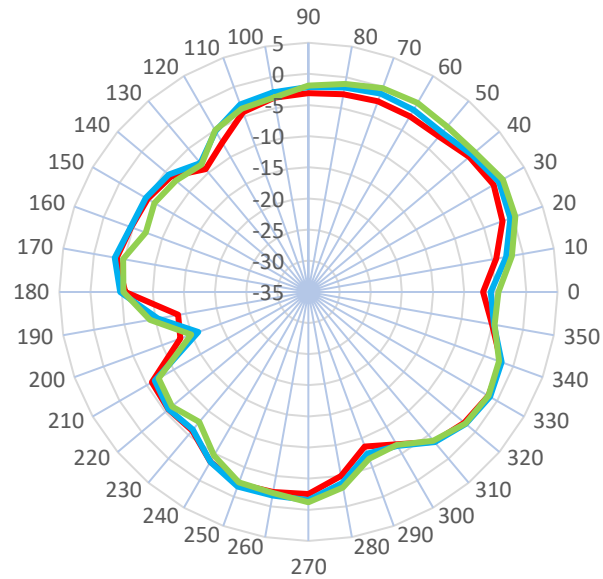


FIGURE 7

Y-Z Horizontal - 2402,2426,2480 MHz

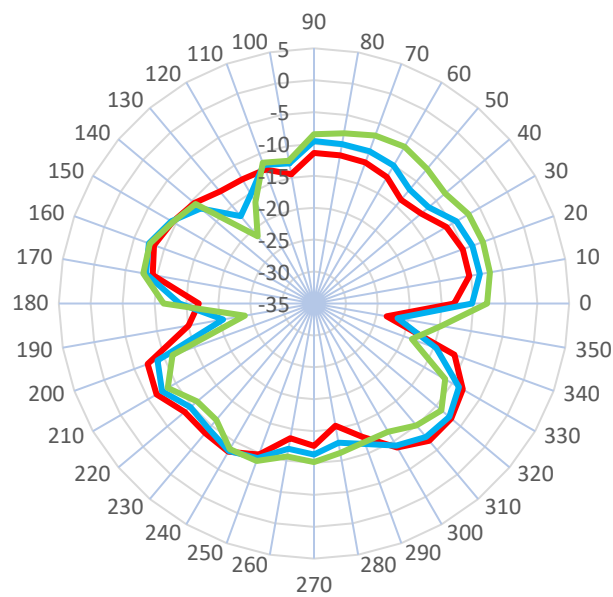


FIGURE 8

4. Internal pictures

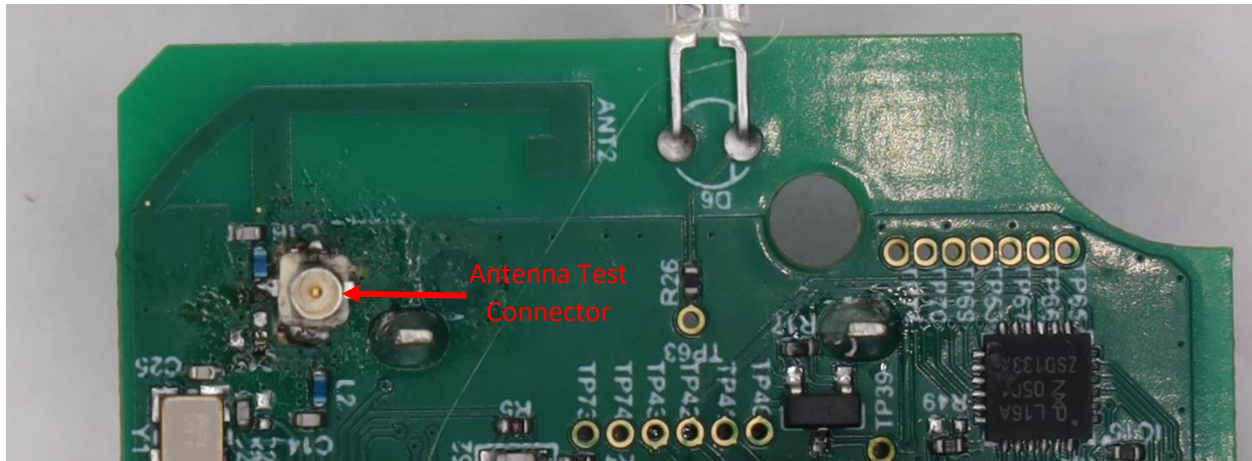


FIGURE 9 ANTENNA TEST CONNECTOR