

R213F RF Radiated data

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1. Frequency Band

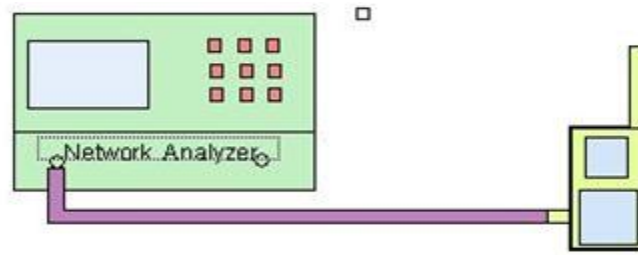
Mode	Frequency Band (MHz)
Zigbee	2,400 ~ 2,500

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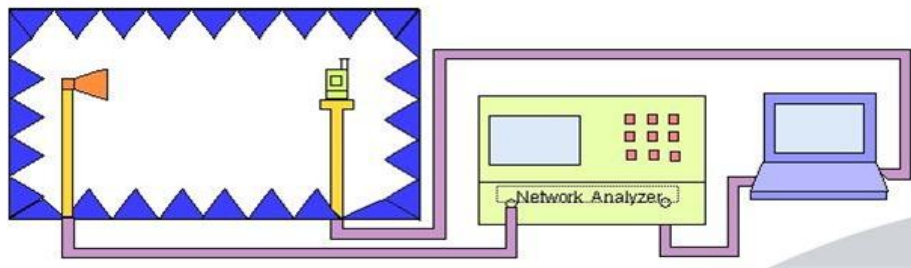
1-1. Measurement Engineer

- Connect the device under test and required test equipment (Network analyzer). Measuring VSWR and frequency. Measurements include the magnitude and phase of both the vertical and horizontal components of the 3-D antenna pattern of actual hardware in an anechoic chamber (Partron). all measurements are made with antennas installed.

- Frequency, VSWR measurement



- Gain measurement

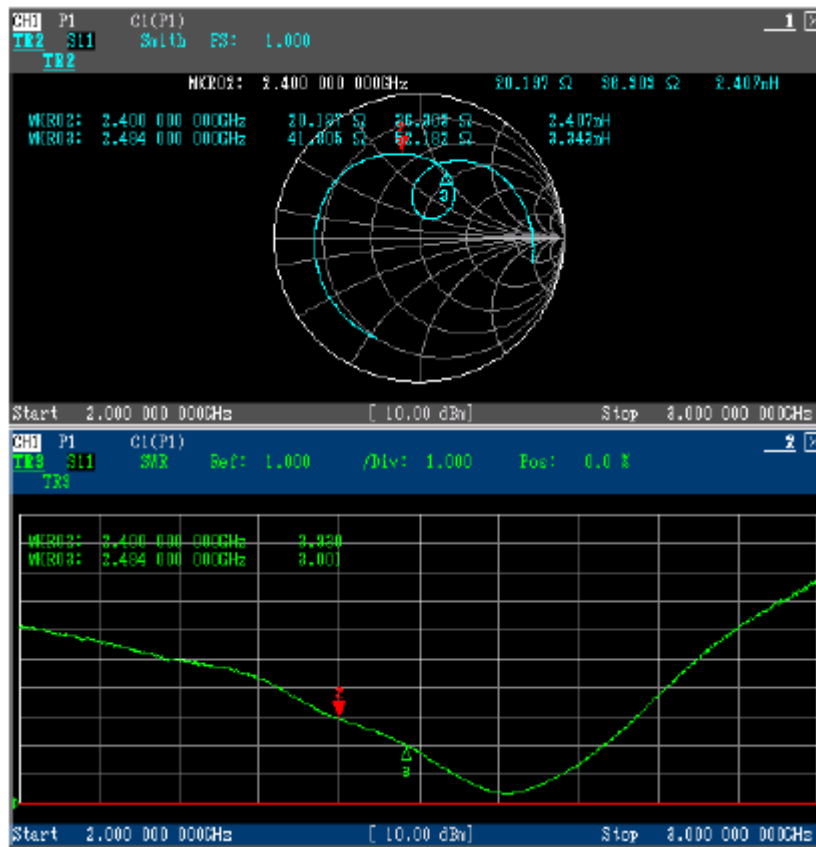


- Co-Polarization, Cross-Polarization Meaning
- Co-Polarization : When Radiated Vertical and Horizontal Polarization in Source Ant.
Co-Polarization is Higher Polarization that is Ave. Gain Value
- Cross-Polarization : When Radiated Vertical and Horizontal Polarization in Source Ant.

Co-Polarization is Lower Polarization that is Ave. Gain Value

Antenna gain measurements were performed in a full anechoic chamber. The EUT was placed on a turntable of the chamber. During the test, the EUT was rotated through 360° and the measurement antenna height and polarization were varied to maximize the received emission level. The chamber walls, ceiling, and floor were lined with RF absorbing material to minimize reflections and simulate free-space conditions.

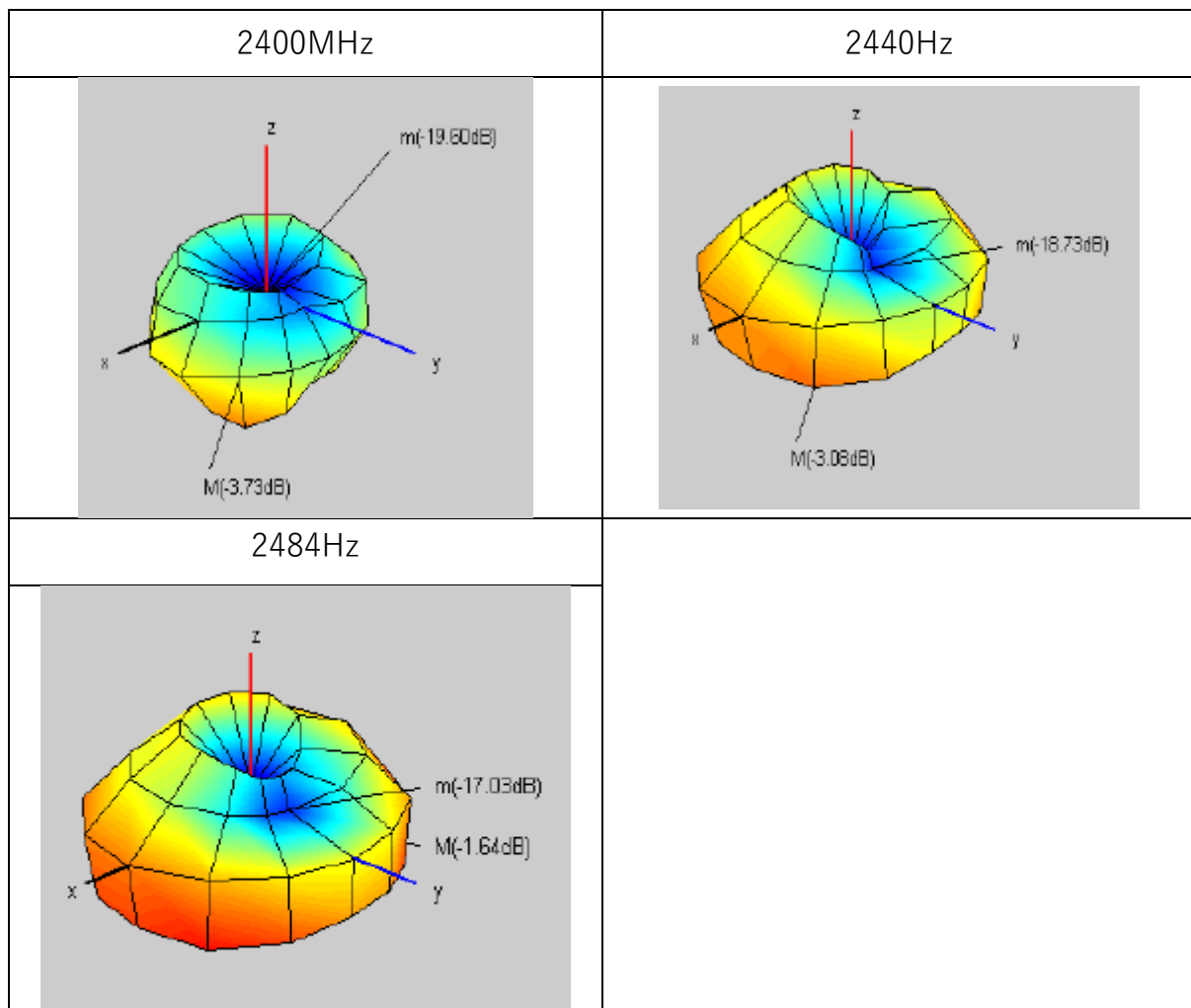
1-2. VSWR



1-3. Efficiency & Gain

	1	2	3	4	5	6	7	8	9
Frequency(MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2484
Efficiency(dB)	-8.09	-7.80	-7.63	-7.32	-6.46	-6.36	-6.05	-5.99	-5.49
Efficiency(%)	15.54	16.59	17.25	18.53	22.59	23.10	24.84	25.19	28.22
TRG(dB)	-8.09	-7.80	-7.63	-7.32	-6.46	-6.36	-6.05	-5.99	-5.49
TRG _{Theta} (dB)	-9.39	-9.08	-9.07	-8.91	-7.90	-7.48	-7.30	-7.26	-6.60
TRG _{Phi} (dB)	-13.96	-13.73	-13.12	-12.47	-11.95	-12.83	-12.05	-11.95	-11.97
UHRG(dB)	-12.56	-12.30	-11.89	-11.38	-10.66	-10.83	-10.52	-10.43	-10.13
UHRG/TRG(%)	35.68	35.53	37.55	39.24	38.03	35.79	35.70	35.95	34.35
H-Plane	-8.04	-7.67	-7.54	-7.21	-6.11	-5.72	-5.64	-5.67	-5.11
E1-Plane, AVG(dB)	-10.25	-9.98	-10.09	-10.01	-9.00	-8.53	-8.32	-8.32	-7.63
E2-Plane, AVG(dB)	-10.54	-10.18	-10.08	-9.88	-8.93	-8.49	-8.28	-8.17	-7.55
Peak Gain(dBi)	-3.73	-3.51	-3.66	-3.79	-3.08	-2.88	-2.56	-2.28	-1.65
Directivity(dB)	4.36	4.29	3.98	3.53	3.38	3.49	3.49	3.71	3.85
Minimum Gain(dBi)	-19.61	-18.10	-18.18	-18.95	-18.73	-18.14	-16.87	-17.66	-17.04
Test Condition	FS								
Antenna Type									
Average Efficiency	-6.71 dB, 21.32 %								

1-4. 3D Radiated Pattern



2. TEST METHOD

2-1. Measurement information

Description	Manufacturer	Model	Calibration date
Network Analyzer	Anritsu	ME7848A	25.09.20
Horn Antenna	SCHWARZBECK	BBHA 9120 LF	25.07.21

2-2. 3D Chamber

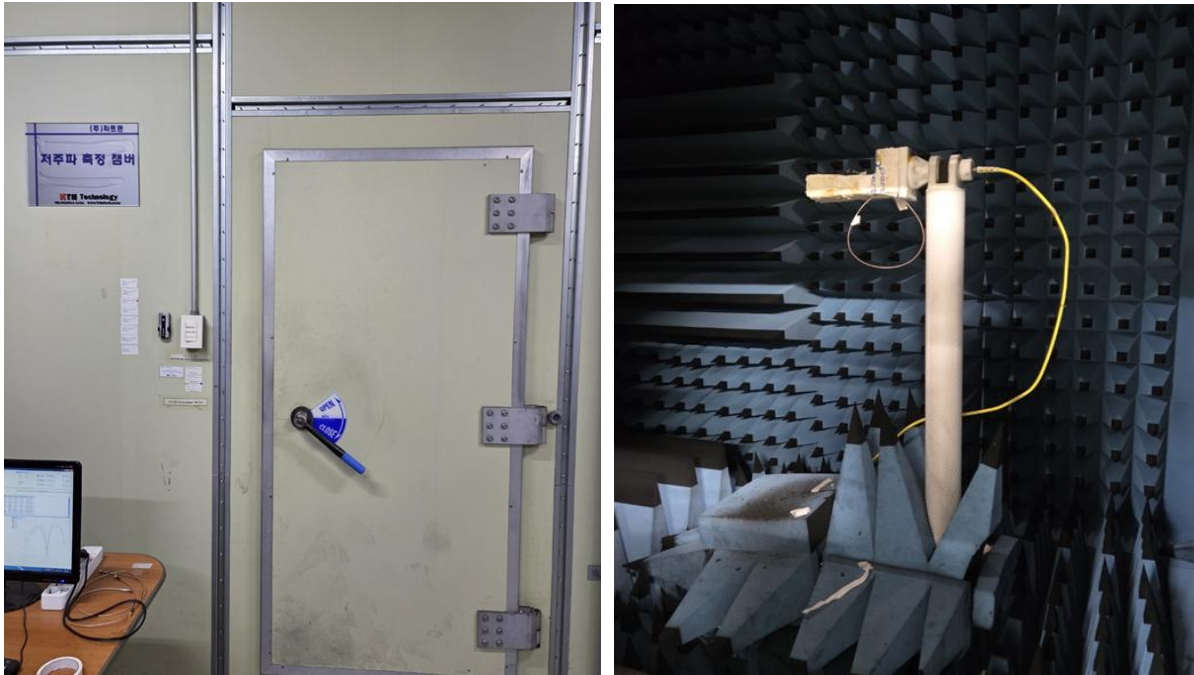
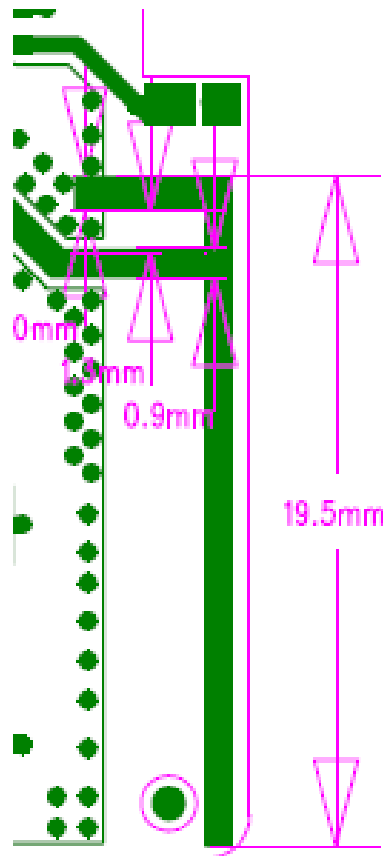


Figure 1: Testing with RF Chamber

Measurement facility: Partron ESL, 3D Chamber

3. Antenna Dimension



Manufacturer : Partron ESL

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