

ANTENNA PASSIVE TEST REPORT

Application No.	ZEWM2308001289OA
Applicant	Minut AB
Manufacturer	Minut AB
Product Name	Minut Eureka wireless module
Model No.	Eureka_2.4GHz_Left/Right
Standards	ANSI/IEEE Std 149-2008
Date Initial Sample(s) Received	2023.08.31
Testing Start Date	2023.08.31
Testing Finish Date	2023.08.31
Report Issue Date	2023.09.11

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Turner He

Prepared by

Max. Huang

Reviewed By

Ervin Li

Approved by



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Revision Version

Report No.	Version	Date	Memo
ZEWM2308001289OA	00	2023.09.11	Initial creation of report



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1 General Information

1.1 Testing Laboratory

Test Lab	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057
Contact	Ervin Li
Tel.	+86 18823369694
Fax	+86-755-25328600
E-mail	Ervin.Li@sgs.com

1.2 Details of Applicant

Applicant's Name	Minut AB
Applicant's Address	Baltzarsgatan 23, 211 36 Malmö, Sweden
Contact	HW Design Group
Tel.	N/A
Fax	N/A
E-mail	hardware@minut.com

1.3 Details of Manufacturer

Manufacturer's Name	Minut AB
Manufacturer's Address	Baltzarsgatan 23, 211 36 Malmö, Sweden
Contact	HW Design Group
Tel.	N/A
Fax	N/A
E-mail	hardware@minut.com



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1.4 General Description of EUT

Device Description:	Minut Eureka wireless module
Device Manufacturer:	Minut AB
Device Model:	Eureka_2.4GHz_Left/Right
Hardware Version:	N/A
Software Version:	N/A
Antenna Dimensions:	Left : 14.40 x 4.90 x 0.68 mm Right: 14.45 x 4.88 x 0.68 mm

1.5 Test Procedure

Testing is performed according to the **ANSI/IEEE Std 149-2008**.



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1.6 Test Specification

Identity	Document Title
ANSI/IEEE Std 149-2008	IEEE Standard Test Procedures for Antennas

1.7 Laboratory Environment

Temperature	Min. =19°C , Max. = 25°C	
Relative humidity	Min. =40% , Max. =72%	
Shield effect	0.7-6GHz	> 100dB
Ground resistance	<0.5Ω	



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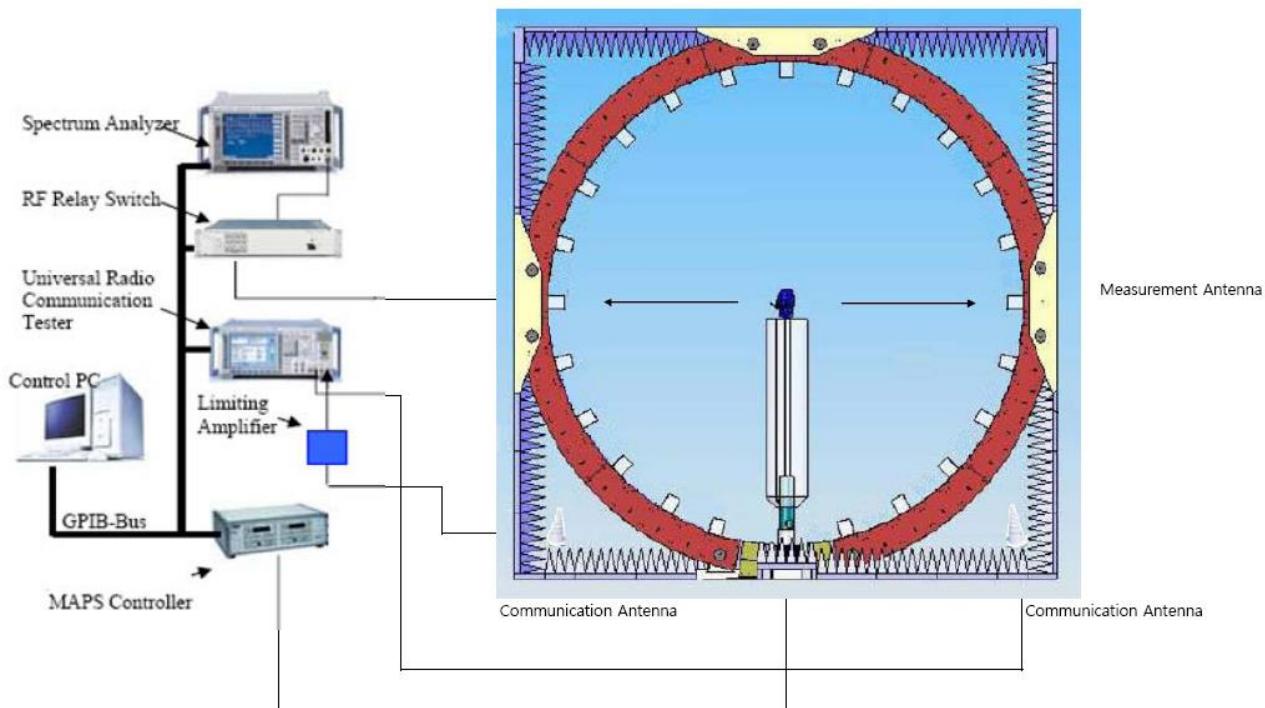
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2 OTA Measurements System Configuration

2.1 Test Configuration

Great-Circle-Cut method is used to measure the antenna 3D GAIN of EUT in OTA qualified anechoic chamber. Equipment Under Test (EUT) geometry centre vertical projection at the centre of platform, the distance from EUT to measurement antenna is 5m



F-1. OTA Measurement System Configuration



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3 Test Equipment List

Type of Equipment	Model Number	Manufacture	Calibration Date	Valid Period
Network Analyzer	E5071C S/N MY46523591	Keysight	2023/2/16	2024/2/15
Quad-Ridge Horn Antenna 700 MHz-10 GHz	EMCO 3164-08 S/N 161915	ETS-Lindgren L.P.	N/A	N/A
MAPS Controller	EMCENTER S/N 160485	ETS-Lindgren L.P.	N/A	N/A



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4 Measurement Uncertainty

Item	2400-2500 MHz (dB)
Gain	0.88
Efficiency	0.88

Measurement Uncertainty (95% CONFIDENCE INTERVAL) K=2



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5 Test Results

Eureka_2.4GHz_Right			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-5.39	28.94	-1.10
2355	-5.55	27.88	-1.57
2360	-5.22	30.08	-1.30
2365	-5.30	29.53	-1.62
2370	-5.60	27.52	-1.99
2375	-5.85	26.03	-2.25
2380	-6.32	23.36	-2.81
2385	-6.34	23.25	-2.75
2390	-6.59	21.93	-3.09
2395	-6.44	22.68	-2.73
2400	-6.54	22.18	-2.75
2402	-6.69	21.44	-2.96
2405	-6.66	21.59	-2.80
2410	-6.43	22.73	-2.30
2415	-6.51	22.33	-2.29
2420	-6.33	23.31	-2.19
2425	-6.51	22.35	-2.21
2430	-6.74	21.16	-2.60
2435	-6.66	21.58	-2.44
2440	-6.54	22.16	-2.52
2441	-6.46	22.59	-2.49
2445	-5.96	25.36	-1.89
2450	-5.58	27.67	-1.63
2455	-5.08	31.04	-1.22
2460	-4.83	32.91	-1.11

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2465	-4.67	34.13	-0.93
2470	-4.69	34.00	-1.03
2475	-4.70	33.86	-1.05
2480	-4.65	34.29	-1.14
2482	-4.58	34.87	-1.23
2485	-4.49	35.54	-1.20
2490	-4.19	38.15	-0.94
2495	-3.77	41.99	-0.56
2500	-3.37	45.99	-0.24
2505	-2.99	50.23	0.26
2510	-2.80	52.50	0.56
2515	-2.88	51.56	0.52
2520	-3.07	49.32	0.40
2525	-3.23	47.56	0.16
2530	-3.33	46.41	0.16
2535	-3.32	46.52	0.13
2540	-3.21	47.73	0.07
2545	-2.94	50.86	0.24
2550	-2.80	52.44	0.25
2555	-2.68	53.96	0.29
2560	-2.72	53.48	0.36
2565	-2.69	53.77	0.54
2570	-2.69	53.83	0.66
2575	-2.65	54.38	0.92
2580	-2.45	56.89	0.93



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Eureka_2.4GHz_Left			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-7.32	18.55	-2.74
2355	-7.62	17.31	-3.13
2360	-7.38	18.28	-2.86
2365	-7.53	17.68	-3.02
2370	-7.85	16.40	-3.29
2375	-8.14	15.34	-3.61
2380	-8.69	13.53	-4.10
2385	-8.77	13.27	-4.14
2390	-9.07	12.38	-4.25
2395	-8.88	12.93	-3.82
2400	-8.88	12.95	-3.57
2402	-8.96	12.69	-3.60
2405	-8.82	13.12	-3.38
2410	-8.38	14.51	-2.80
2415	-8.21	15.10	-2.56
2420	-7.81	16.55	-2.10
2425	-7.86	16.36	-2.05
2430	-8.03	15.74	-2.28
2435	-8.01	15.82	-2.01
2440	-7.95	16.05	-1.92
2441	-7.88	16.29	-1.95
2445	-7.47	17.90	-1.30
2450	-7.15	19.26	-0.91
2455	-6.70	21.39	-0.51
2460	-6.49	22.46	-0.25
2465	-6.29	23.52	-0.26

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2470	-6.33	23.29	-0.30
2475	-6.35	23.16	-0.39
2480	-6.36	23.14	-0.42
2482	-6.32	23.31	-0.49
2485	-6.28	23.56	-0.36
2490	-6.05	24.84	-0.16
2495	-5.69	26.96	0.37
2500	-5.32	29.40	0.84
2505	-4.90	32.32	1.28
2510	-4.62	34.53	1.45
2515	-4.62	34.49	1.38
2520	-4.76	33.43	1.06
2525	-4.93	32.12	0.84
2530	-5.08	31.06	0.61
2535	-5.13	30.68	0.56
2540	-5.06	31.21	0.71
2545	-4.77	33.37	1.04
2550	-4.57	34.92	1.36
2555	-4.33	36.91	1.55
2560	-4.26	37.49	1.59
2565	-4.18	38.17	1.52
2570	-4.16	38.37	1.60
2575	-4.15	38.48	1.71
2580	-4.02	39.64	1.96



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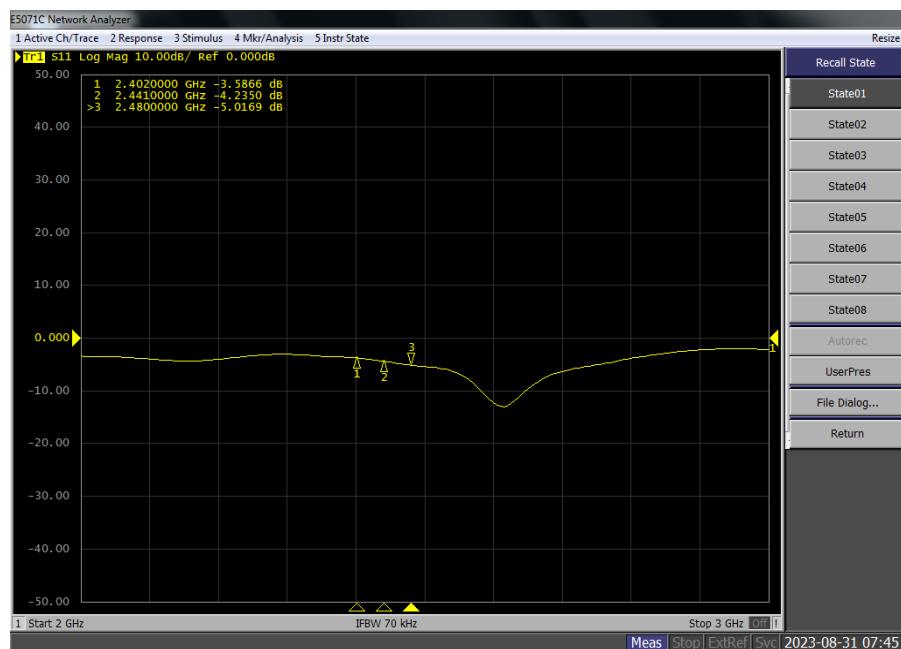
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6 Pattern Plots

6.1 Return Loss



Eureka_2.4GHz_Right



Eureka_2.4GHz_Left

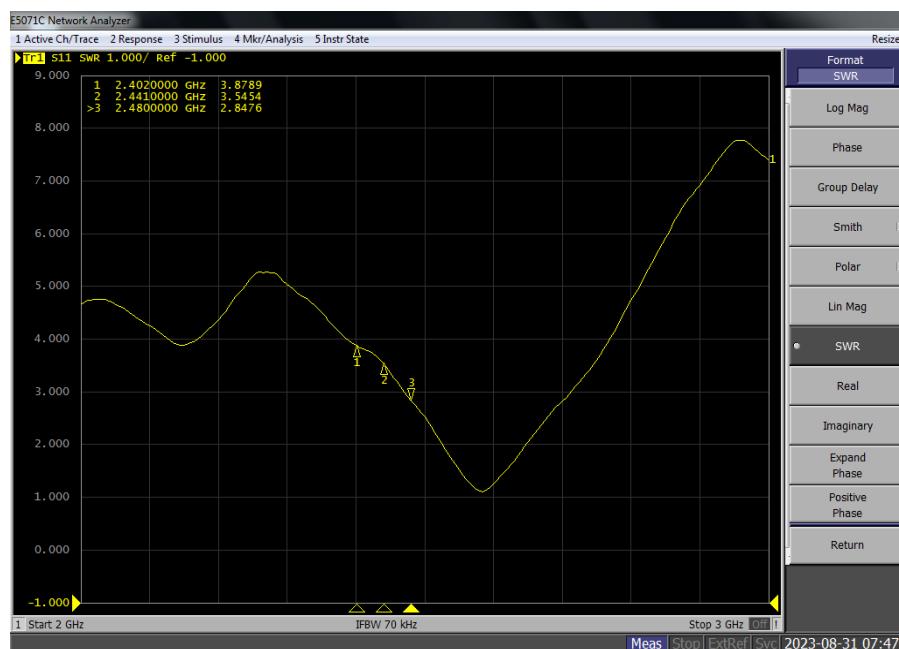


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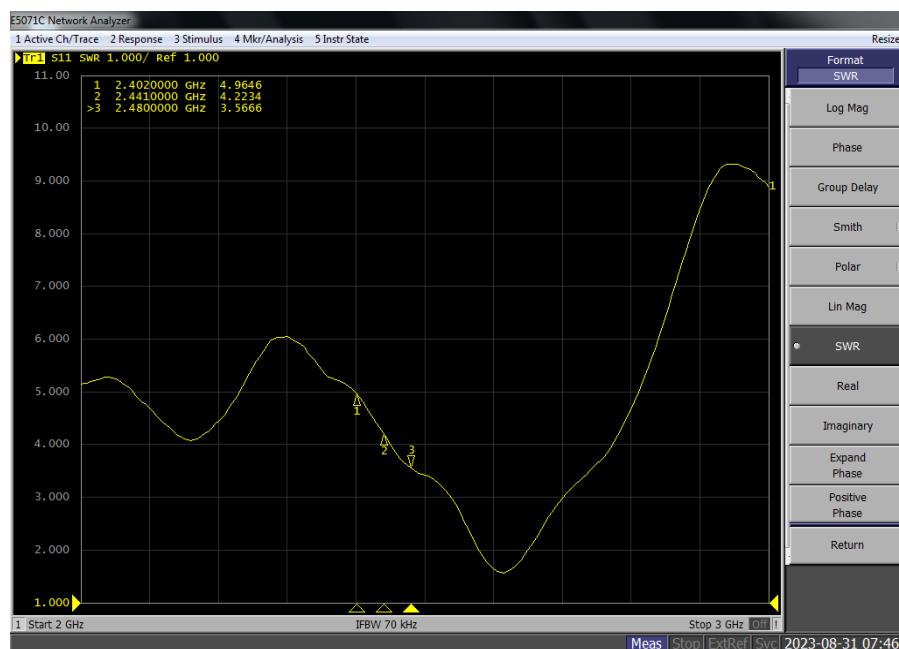
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6.2 VSWR



Eureka_2.4GHz_Right



Eureka_2.4GHz_Left



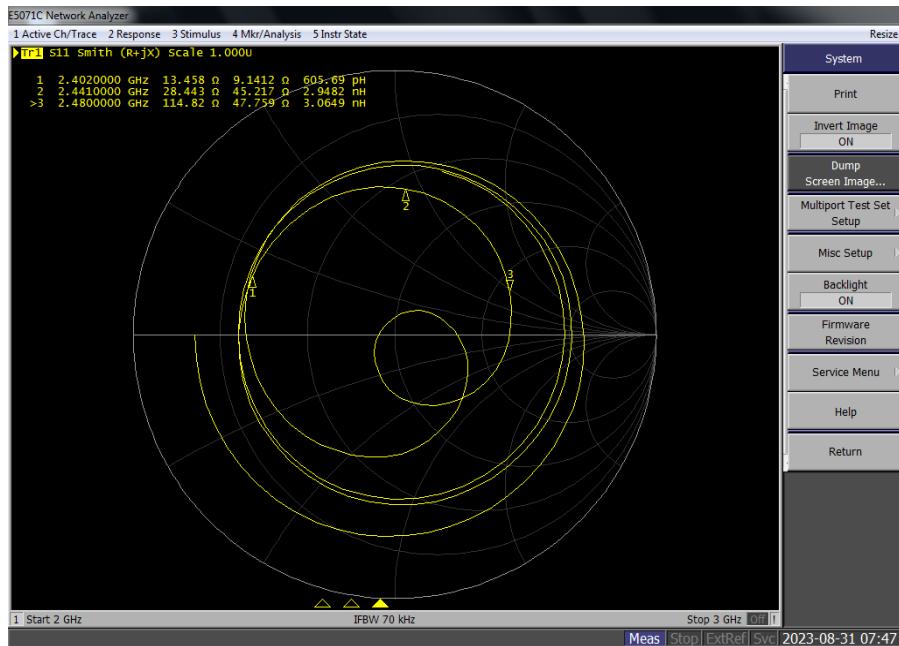
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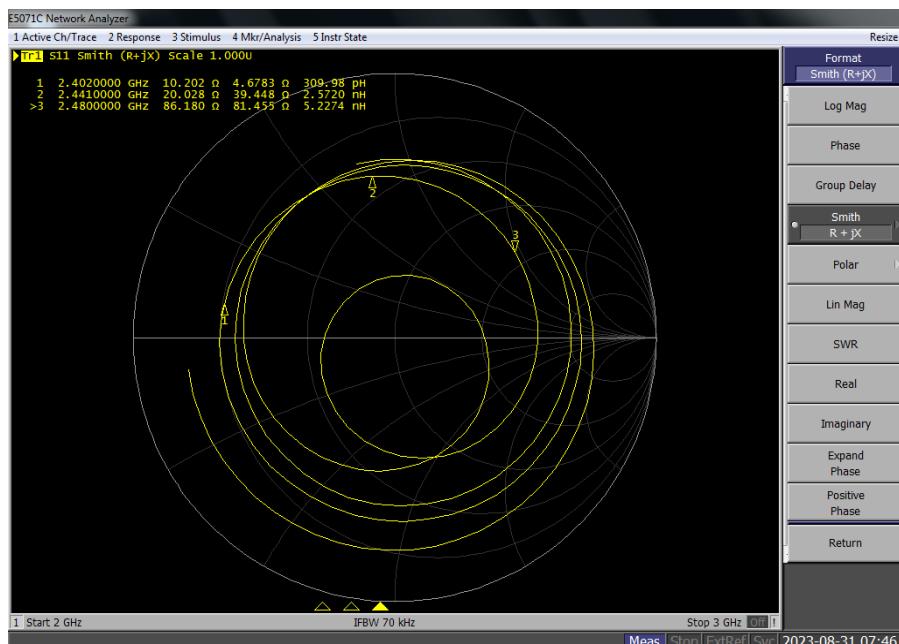
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6.3 Stimulus



Eureka_2.4GHz_Right



Eureka_2.4GHz_Left

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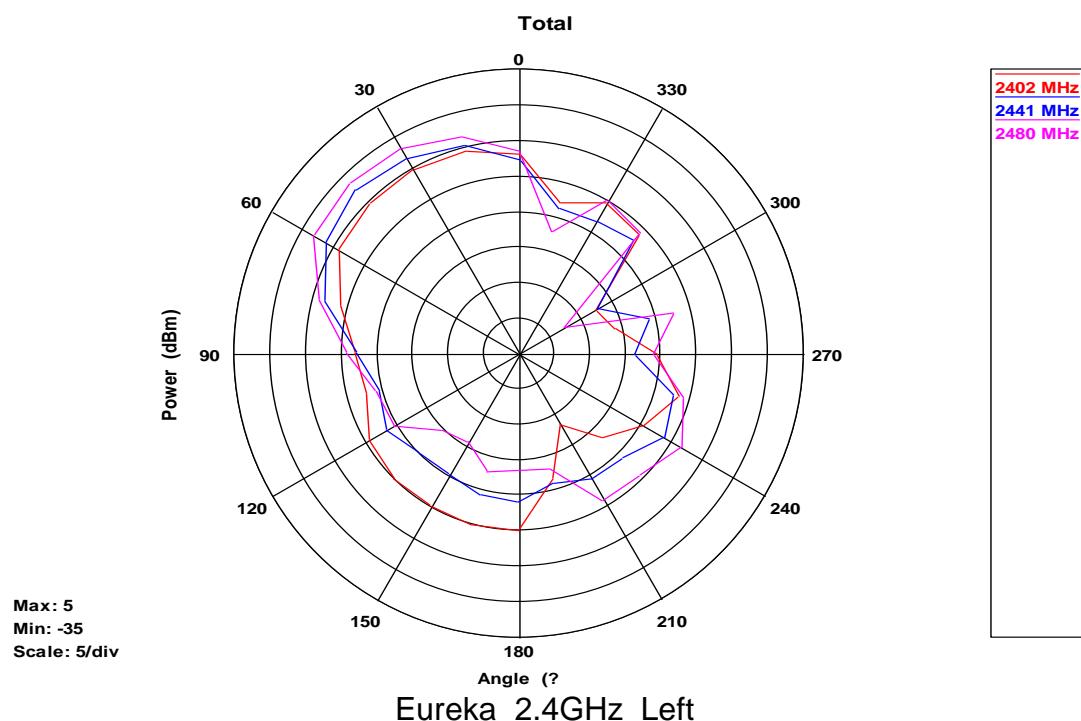
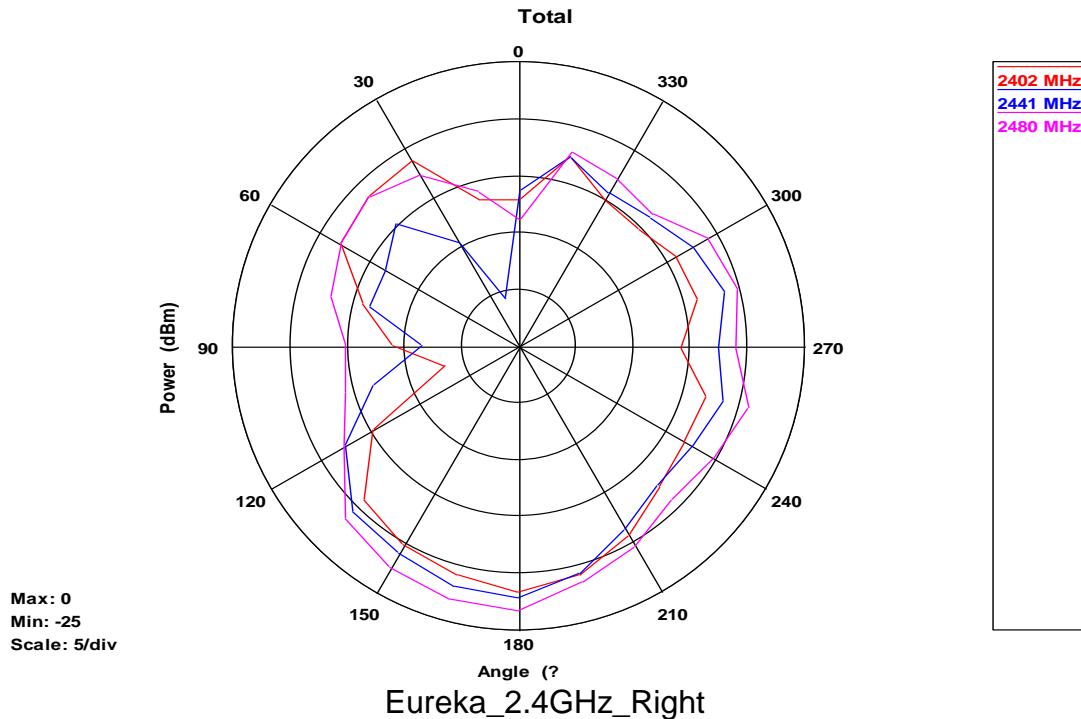
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7 2-D Antenna Pattern(Theta=90°)

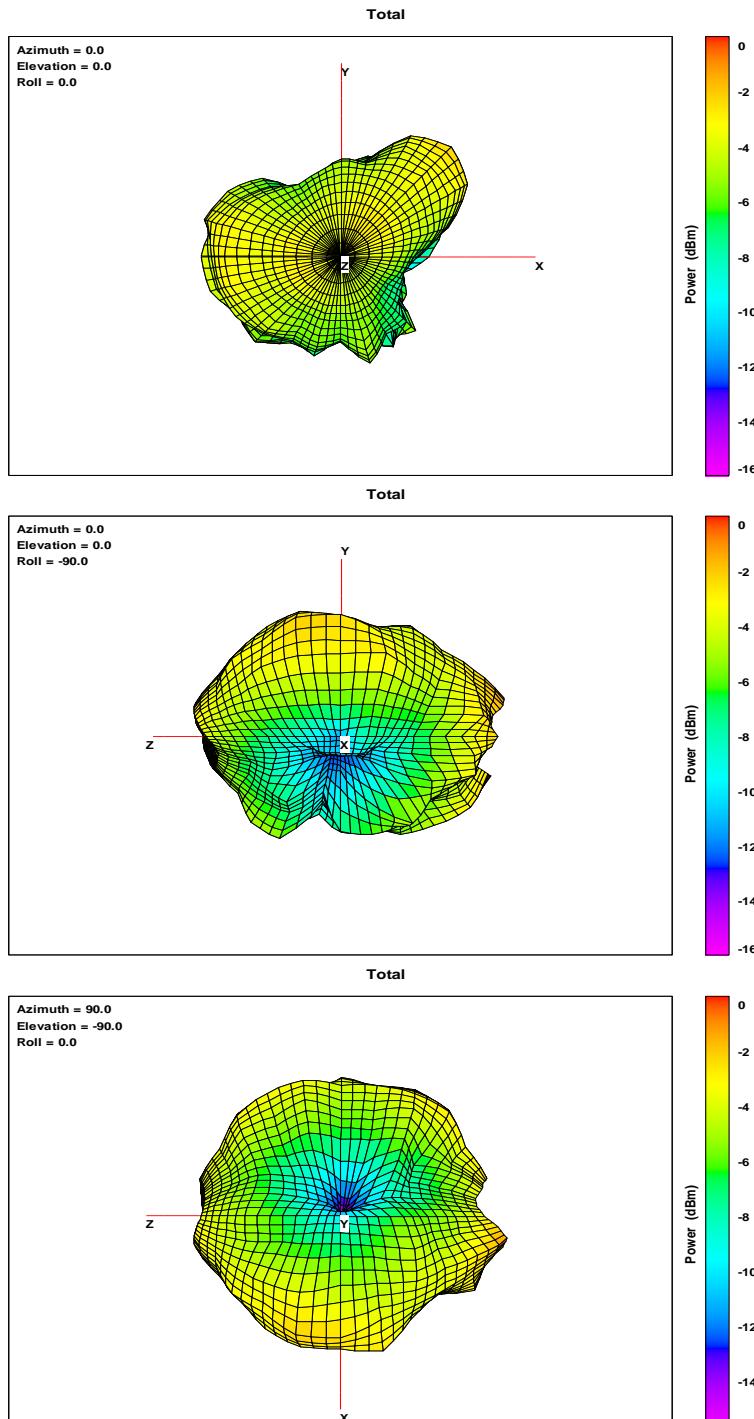


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8 3-D Antenna Pattern



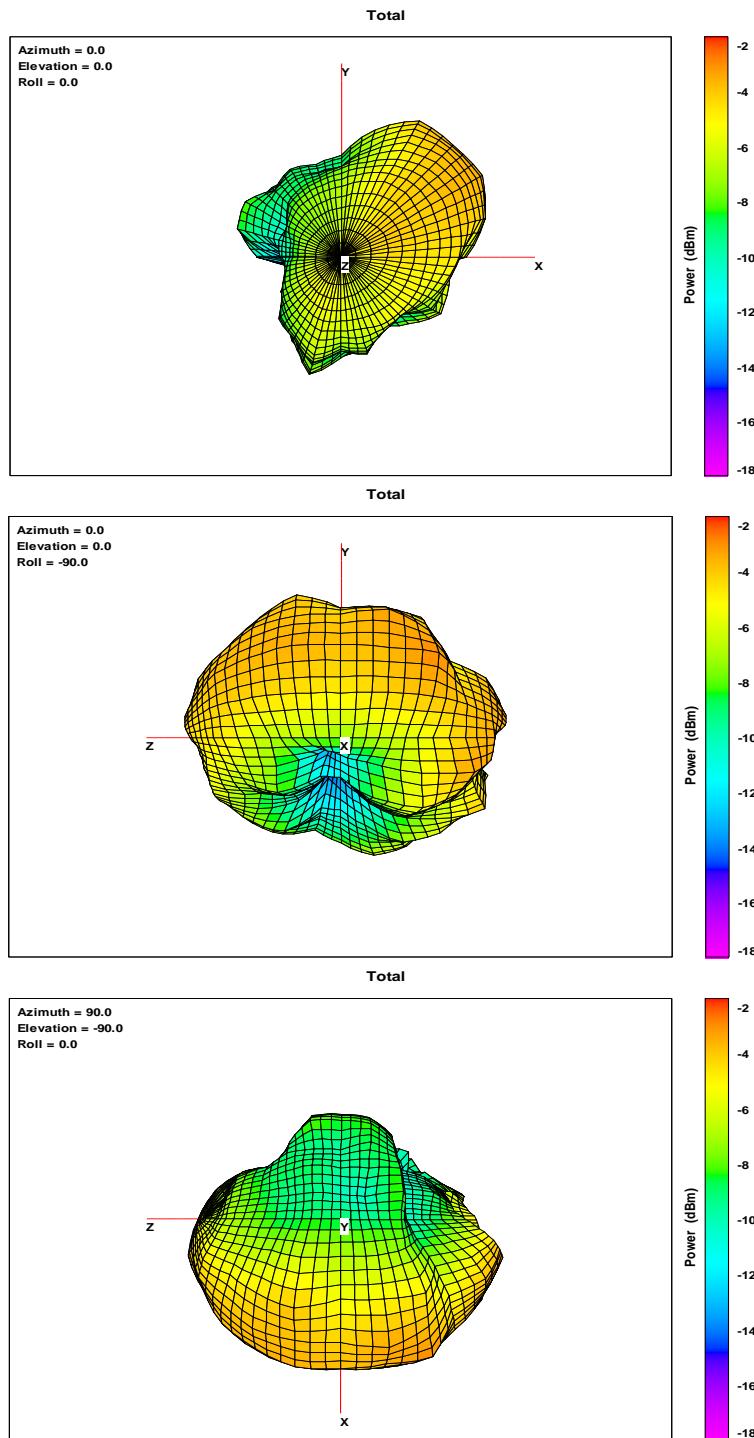
Eureka_2.4GHz_Right



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Eureka_2.4GHz_Left



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9 The EUT and Test Configuration

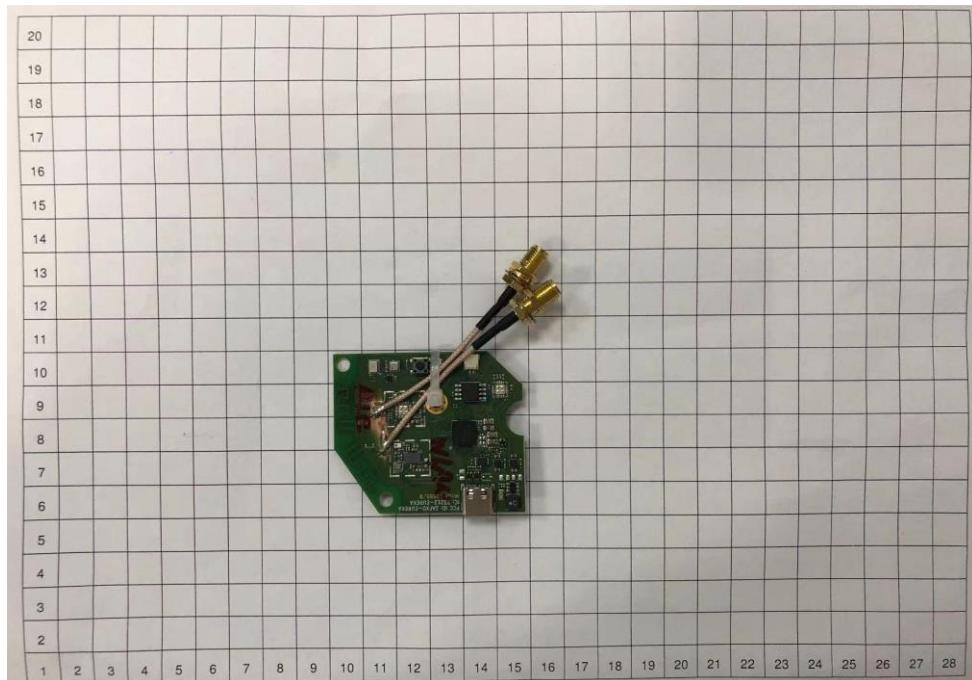


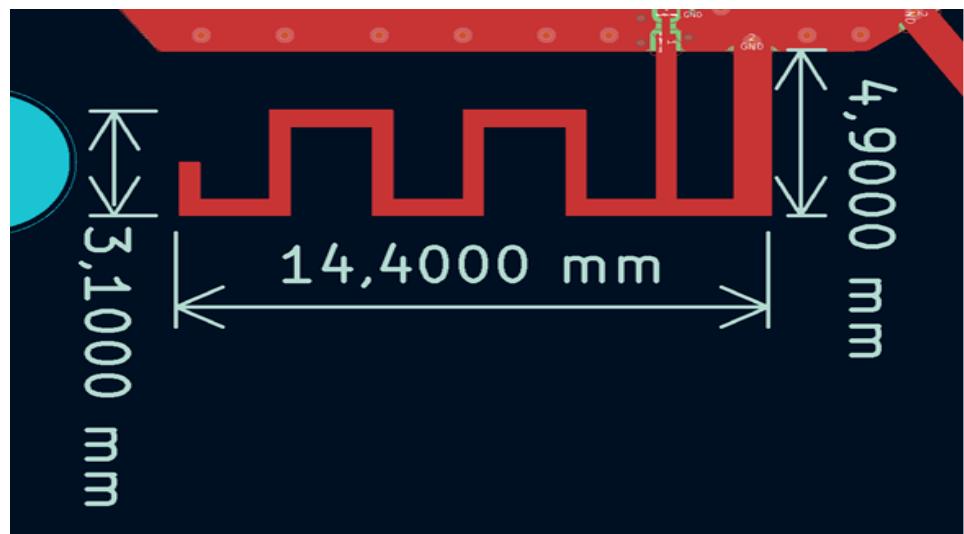
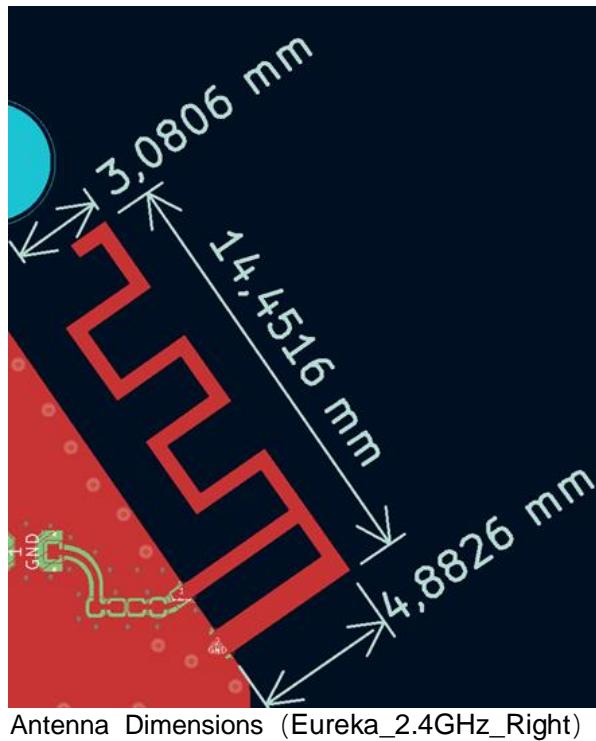
Photo of EUT



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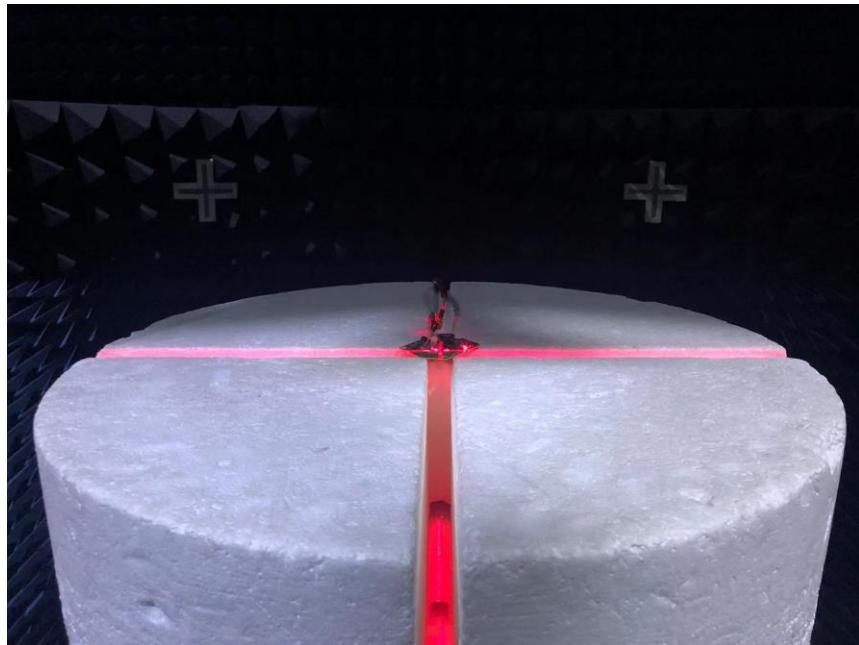


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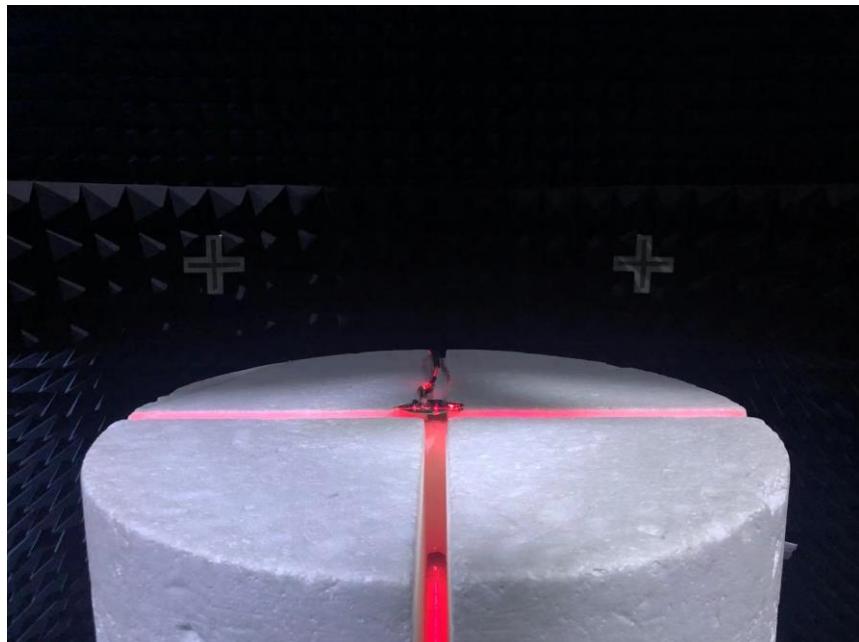
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Eureka_2.4GHz_Right Free Space View



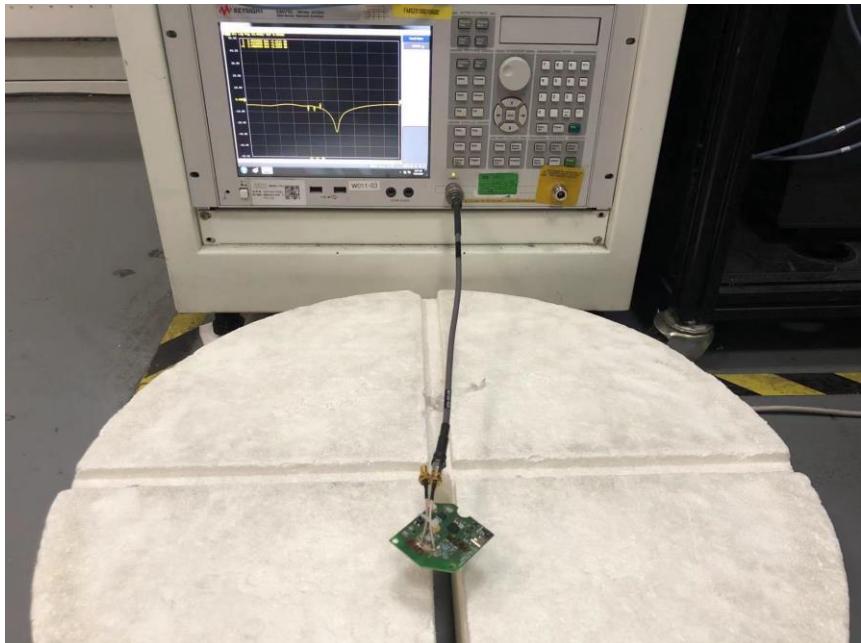
Eureka_2.4GHz_Left Free Space View



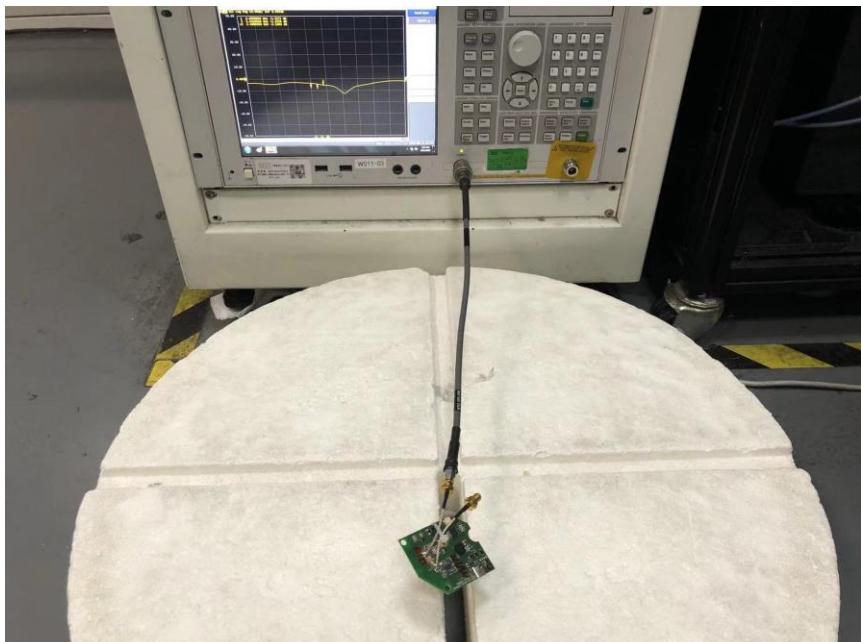
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Eureka_2.4GHz_Right Impedance Setup



Eureka_2.4GHz_Left Impedance Setup

---END---



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