



SGS-CSTC Standards Technical Services Co., Ltd Shenzhen Branch

Report No.: SZOA2503000045AT01
Rev.: 01
Page: 1 of 29

ANTENNA PASSIVE TEST REPORT

Application No. SZOA2503000045AT
Applicant SKULLCANDY, INC.
Manufacturer SKULLCANDY, INC.
Product Name CRUSHER PLYR 720 Wireless Transmitter
Model No. SMDGZ
Standards ANSI/IEEE Std 149-2021
Date Initial Sample(s) Received Mar. 03, 2025
Testing Start Date Mar. 03, 2025
Testing Finish Date Mar. 12, 2025
Report Issue Date May 15, 2025

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

Turner He

Prepared by:
Turner He/ Test Engineer

Ervin Li

Approved by:
Ervin Li/ Technical Manager



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Report No.: SZA2503000045AT01
Rev.: 01
Page: 2 of 29

Revision History

| Revision | Issue Date | Description |
|----------|--------------|----------------------------|
| 01 | May 15, 2025 | Initial creation of report |



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TABLE OF CONTENTS

| | | |
|----------|--|-----------|
| 1 | GENERAL INFORMATION | 4 |
| 1.1 | Testing Laboratory..... | 4 |
| 1.2 | Details of Applicant | 4 |
| 1.3 | Details of Manufacturer | 4 |
| 1.4 | General Description of EUT..... | 5 |
| 1.5 | Test Procedure | 5 |
| 1.6 | Test Specification | 6 |
| 1.7 | Laboratory Environment..... | 6 |
| 2 | OTA MEASUREMENTS SYSTEM CONFIGURATION | 7 |
| 2.1 | Test Configuration | 7 |
| 3 | TEST EQUIPMENT LIST..... | 8 |
| 4 | MEASUREMENT UNCERTAINTY | 9 |
| 5 | TEST RESULTS..... | 10 |
| 6 | PATTERN PLOTS | 16 |
| 6.1 | Return Loss..... | 16 |
| 6.2 | VSWR | 18 |
| 6.3 | Stimulus | 20 |
| 7 | 2-D ANTENNA PATTERN(THETA=90°) | 22 |
| 8 | 3-D ANTENNA PATTERN | 24 |
| 9 | THE EUT AND TEST CONFIGURATION..... | 27 |



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Report No.: SZOA2503000045AT01

Rev.: 01

Page: 4 of 29

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 | SKULLCANDY, INC. |
| Applicant's Address | 6301 N Landmark Dr Park City, UT 84098, United States of America |
| Contact | ANDREW CARTER |
| Tel. | 404-561-0830 |
| Fax | N/A |
| E-mail | andrew.carter@skullcandy.com |

1.3 Details of Manufacturer

| | |
|------------------------|--|
| Manufacturer's Name | SKULLCANDY, INC. |
| Manufacturer's Address | 6301 N Landmark Dr Park City, UT 84098, United States of America |
| Contact | ANDREW CARTER |
| Tel. | 404-561-0830 |
| Fax | N/A |
| E-mail | andrew.carter@skullcandy.com |



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1.4 General Description of EUT

| | |
|-------------------------|---------------------------------------|
| Device Description: | SMDGZ |
| Device Manufacturer: | SKULLCANDY, INC. |
| Device Model: | CRUSHER PLYR 720 Wireless Transmitter |
| Hardware Version: | REV_1C |
| Software Version: | 1.0.0.25 |
| Air Interface Supported | 2.4G proprietary |
| Antenna Dimension: | 3.20 mm*1.60 mm*1.30 mm |

1.5 Test Procedure

Testing is performed according to the **ANSI/IEEE Std 149-2021**.



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Report No.: SZOA2503000045AT01

Rev.: 01

Page: 6 of 29

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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2 OTA Measurements System Configuration

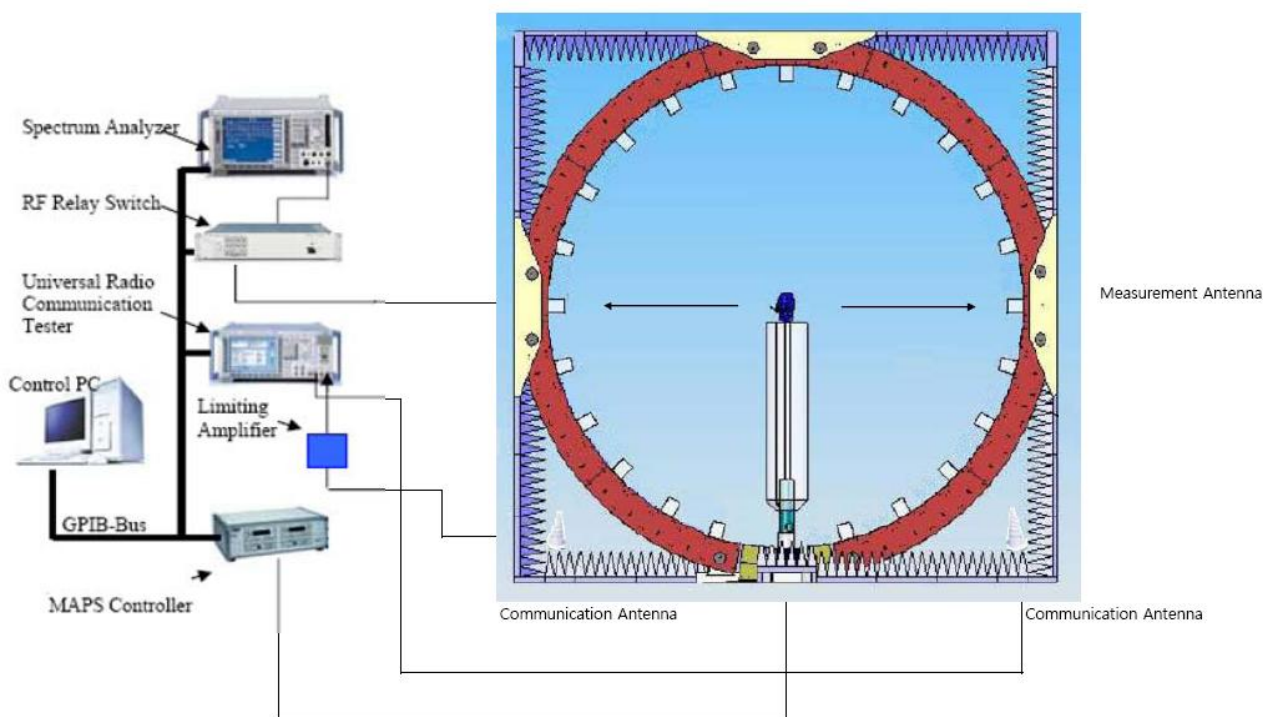
2.1 Test Configuration

Testing Condition:

- Temperature: $22 \pm 3^{\circ}\text{C}$
- Humidity: $< 80\%$

Measurement Facility:

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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Report No.: SZOA2503000045AT01
Rev.: 01
Page: 8 of 29

3 Test Equipment List

| Type of Equipment | Model Number | Manufacture | Calibration Date | Valid Period |
|---|----------------------------|-------------------|------------------|--------------|
| Network Analyzer | E5071C S/N MY46523591 | Keysight | 2024/12/19 | 2025/12/18 |
| 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 |
| SAM V4.5BS Head Phantom | Head Phantom S/N 3609 | SPEAG | NCR | NCR |

Definition of Acronyms:
NCR: No Calibration Requirement.



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 Rev.: 01
 Page: 9 of 29

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

| Free Space #1 | | | |
|-----------------|-----------------|----------------|------------|
| Frequency (MHz) | Efficiency (dB) | Efficiency (%) | Gain (dBi) |
| 2350 | -2.67 | 54.08 | 1.60 |
| 2355 | -2.87 | 51.69 | 1.19 |
| 2360 | -2.64 | 54.48 | 1.46 |
| 2365 | -2.82 | 52.27 | 1.18 |
| 2370 | -3.11 | 48.84 | 1.00 |
| 2375 | -3.14 | 48.56 | 1.13 |
| 2380 | -3.31 | 46.66 | 0.89 |
| 2385 | -3.04 | 49.62 | 1.23 |
| 2390 | -3.11 | 48.89 | 1.10 |
| 2395 | -2.86 | 51.75 | 1.42 |
| 2400 | -3.05 | 49.54 | 1.33 |
| 2402 | -3.25 | 47.32 | 1.12 |
| 2405 | -3.31 | 46.69 | 0.99 |
| 2410 | -3.23 | 47.48 | 1.20 |
| 2415 | -3.43 | 45.41 | 0.93 |
| 2420 | -3.28 | 46.98 | 1.14 |
| 2425 | -3.40 | 45.71 | 1.08 |
| 2430 | -3.56 | 44.03 | 1.06 |
| 2435 | -3.58 | 43.81 | 1.02 |
| 2440 | -3.74 | 42.23 | 0.97 |
| 2441 | -3.73 | 42.35 | 1.00 |
| 2445 | -3.57 | 43.98 | 1.10 |



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Report No.: SZOA2503000045AT01

Rev.: 01

Page: 11 of 29

| | | | |
|------|-------|-------|-------|
| 2450 | -3.55 | 44.11 | 1.21 |
| 2455 | -3.47 | 44.98 | 1.28 |
| 2460 | -3.62 | 43.41 | 1.20 |
| 2465 | -3.75 | 42.14 | 1.06 |
| 2470 | -3.90 | 40.75 | 1.03 |
| 2475 | -4.01 | 39.69 | 1.01 |
| 2480 | -4.14 | 38.59 | 0.96 |
| 2485 | -4.24 | 37.69 | 0.85 |
| 2490 | -4.28 | 37.30 | 0.80 |
| 2495 | -4.19 | 38.12 | 0.85 |
| 2500 | -4.20 | 38.06 | 0.79 |
| 2505 | -4.09 | 38.98 | 0.90 |
| 2510 | -4.15 | 38.48 | 0.78 |
| 2515 | -4.39 | 36.37 | 0.56 |
| 2520 | -4.73 | 33.68 | 0.19 |
| 2525 | -5.04 | 31.35 | -0.08 |
| 2530 | -5.32 | 29.39 | -0.39 |
| 2535 | -5.51 | 28.10 | -0.60 |
| 2540 | -5.59 | 27.62 | -0.80 |
| 2545 | -5.55 | 27.89 | -0.85 |
| 2550 | -5.61 | 27.49 | -0.98 |
| 2555 | -5.70 | 26.91 | -1.06 |
| 2560 | -5.91 | 25.64 | -1.22 |
| 2565 | -6.07 | 24.73 | -1.27 |
| 2570 | -6.20 | 23.98 | -1.47 |
| 2575 | -6.32 | 23.32 | -1.62 |
| 2580 | -6.27 | 23.63 | -1.59 |



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Report No.: SZOA2503000045AT01

Rev.: 01

Page: 12 of 29

| Free Space #2 | | | |
|-----------------|-----------------|----------------|------------|
| Frequency (MHz) | Efficiency (dB) | Efficiency (%) | Gain (dBi) |
| 2350 | -3.29 | 46.83 | 0.84 |
| 2355 | -3.48 | 44.83 | 0.47 |
| 2360 | -3.26 | 47.19 | 0.75 |
| 2365 | -3.45 | 45.21 | 0.68 |
| 2370 | -3.72 | 42.43 | 0.41 |
| 2375 | -3.74 | 42.24 | 0.47 |
| 2380 | -3.91 | 40.64 | 0.29 |
| 2385 | -3.65 | 43.16 | 0.50 |
| 2390 | -3.71 | 42.58 | 0.35 |
| 2395 | -3.44 | 45.30 | 0.58 |
| 2400 | -3.59 | 43.76 | 0.54 |
| 2402 | -3.77 | 41.97 | 0.32 |
| 2405 | -3.81 | 41.55 | 0.25 |
| 2410 | -3.73 | 42.40 | 0.60 |
| 2415 | -3.92 | 40.60 | 0.32 |
| 2420 | -3.76 | 42.12 | 0.59 |
| 2425 | -3.85 | 41.19 | 0.39 |
| 2430 | -4.00 | 39.77 | 0.24 |
| 2435 | -4.02 | 39.65 | 0.43 |
| 2440 | -4.14 | 38.53 | 0.26 |
| 2441 | -4.12 | 38.72 | 0.34 |
| 2445 | -3.91 | 40.62 | 0.74 |
| 2450 | -3.85 | 41.20 | 0.83 |



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Rev.: 01

Page: 13 of 29

| | | | |
|------|-------|-------|-------|
| 2455 | -3.73 | 42.37 | 1.00 |
| 2460 | -3.85 | 41.17 | 0.91 |
| 2465 | -3.95 | 40.24 | 0.78 |
| 2470 | -4.07 | 39.14 | 0.72 |
| 2475 | -4.16 | 38.36 | 0.47 |
| 2480 | -4.25 | 37.62 | 0.28 |
| 2485 | -4.28 | 37.34 | 0.30 |
| 2490 | -4.24 | 37.67 | 0.51 |
| 2495 | -4.05 | 39.33 | 0.83 |
| 2500 | -3.98 | 39.96 | 1.05 |
| 2505 | -3.82 | 41.48 | 1.36 |
| 2510 | -3.83 | 41.36 | 1.25 |
| 2515 | -4.06 | 39.31 | 0.99 |
| 2520 | -4.35 | 36.69 | 0.73 |
| 2525 | -4.62 | 34.53 | 0.58 |
| 2530 | -4.83 | 32.90 | 0.40 |
| 2535 | -4.95 | 31.99 | 0.33 |
| 2540 | -4.95 | 31.97 | 0.35 |
| 2545 | -4.84 | 32.77 | 0.41 |
| 2550 | -4.86 | 32.63 | 0.38 |
| 2555 | -4.93 | 32.17 | 0.27 |
| 2560 | -5.11 | 30.81 | 0.10 |
| 2565 | -5.24 | 29.90 | 0.05 |
| 2570 | -5.35 | 29.16 | -0.08 |
| 2575 | -5.44 | 28.59 | -0.13 |
| 2580 | -5.35 | 29.15 | -0.01 |



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| Free Space #3 | | | |
|-----------------|-----------------|----------------|------------|
| Frequency (MHz) | Efficiency (dB) | Efficiency (%) | Gain (dBi) |
| 2350 | -3.70 | 42.63 | 0.96 |
| 2355 | -3.85 | 41.22 | 0.49 |
| 2360 | -3.58 | 43.82 | 0.75 |
| 2365 | -3.75 | 42.13 | 0.53 |
| 2370 | -4.01 | 39.70 | 0.38 |
| 2375 | -4.02 | 39.65 | 0.43 |
| 2380 | -4.16 | 38.39 | 0.36 |
| 2385 | -3.87 | 41.01 | 0.82 |
| 2390 | -3.90 | 40.76 | 0.72 |
| 2395 | -3.63 | 43.39 | 1.06 |
| 2400 | -3.76 | 42.04 | 0.93 |
| 2402 | -3.94 | 40.39 | 0.63 |
| 2405 | -3.96 | 40.20 | 0.63 |
| 2410 | -3.87 | 40.99 | 0.62 |
| 2415 | -4.06 | 39.26 | 0.46 |
| 2420 | -3.93 | 40.50 | 0.40 |
| 2425 | -4.03 | 39.55 | 0.39 |
| 2430 | -4.17 | 38.24 | 0.28 |
| 2435 | -4.20 | 38.06 | 0.37 |
| 2440 | -4.34 | 36.78 | 0.33 |
| 2441 | -4.34 | 36.83 | 0.22 |
| 2445 | -4.13 | 38.64 | 0.58 |



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Report No.: SZOA2503000045AT01

Rev.: 01

Page: 15 of 29

| | | | |
|------|-------|-------|-------|
| 2450 | -4.08 | 39.06 | 0.69 |
| 2455 | -3.96 | 40.17 | 0.41 |
| 2460 | -4.08 | 39.12 | 0.33 |
| 2465 | -4.20 | 38.06 | 0.09 |
| 2470 | -4.31 | 37.09 | 0.10 |
| 2475 | -4.41 | 36.22 | -0.04 |
| 2480 | -4.50 | 35.49 | -0.15 |
| 2485 | -4.59 | 34.73 | -0.19 |
| 2490 | -4.60 | 34.71 | -0.19 |
| 2495 | -4.46 | 35.80 | -0.03 |
| 2500 | -4.40 | 36.32 | 0.07 |
| 2505 | -4.25 | 37.60 | 0.32 |
| 2510 | -4.23 | 37.78 | 0.27 |
| 2515 | -4.43 | 36.04 | 0.11 |
| 2520 | -4.73 | 33.65 | -0.12 |
| 2525 | -5.03 | 31.41 | -0.20 |
| 2530 | -5.27 | 29.74 | -0.42 |
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| 2545 | -5.31 | 29.42 | -0.48 |
| 2550 | -5.33 | 29.33 | -0.52 |
| 2555 | -5.34 | 29.23 | -0.57 |
| 2560 | -5.51 | 28.11 | -0.64 |
| 2565 | -5.63 | 27.38 | -0.71 |
| 2570 | -5.73 | 26.74 | -0.74 |
| 2575 | -5.82 | 26.15 | -0.80 |
| 2580 | -5.76 | 26.54 | -0.58 |



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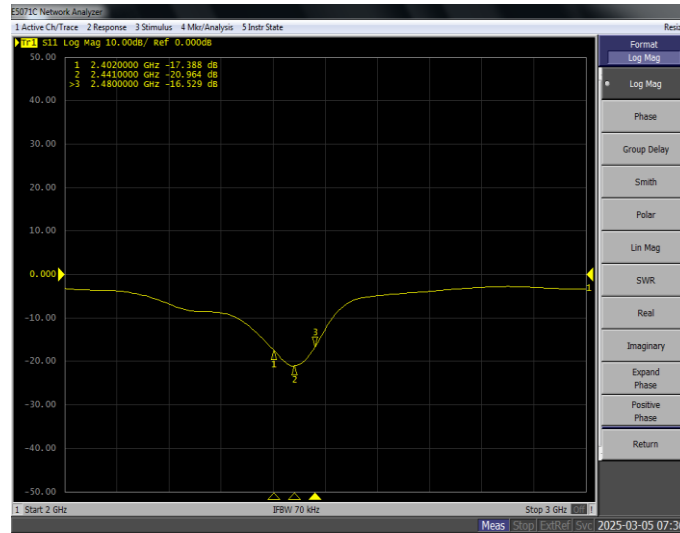
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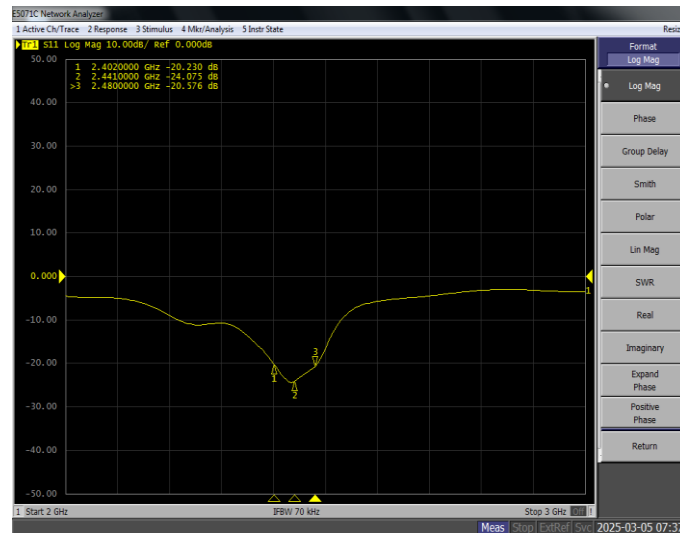
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6 Pattern Plots

6.1 Return Loss



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Free Space #2



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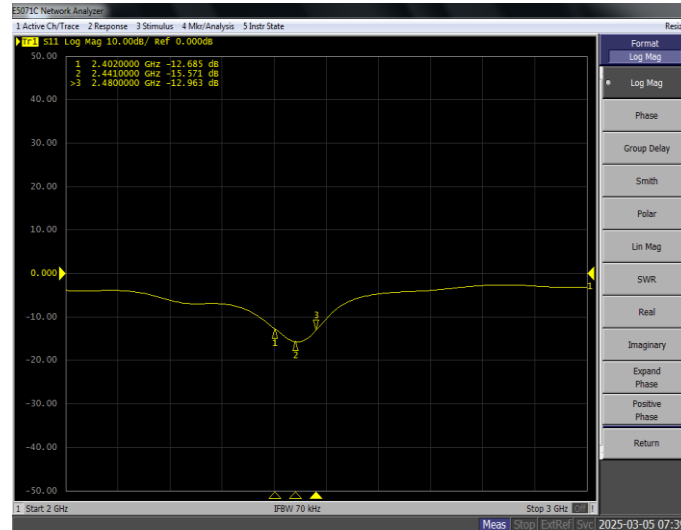
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Rev.: 01

Page: 17 of 29



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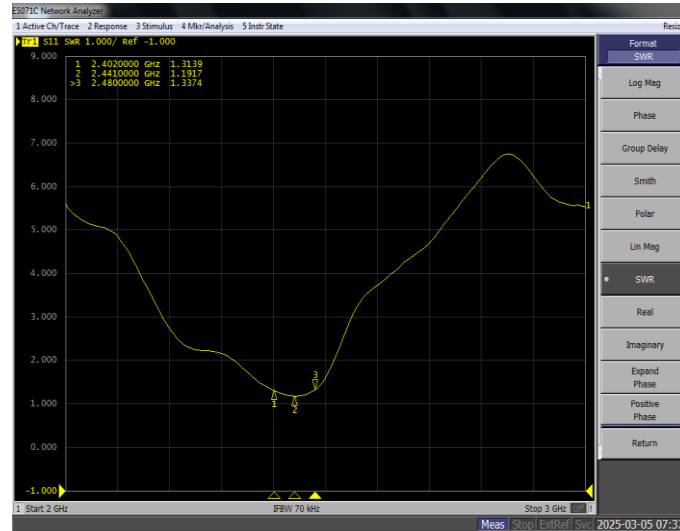
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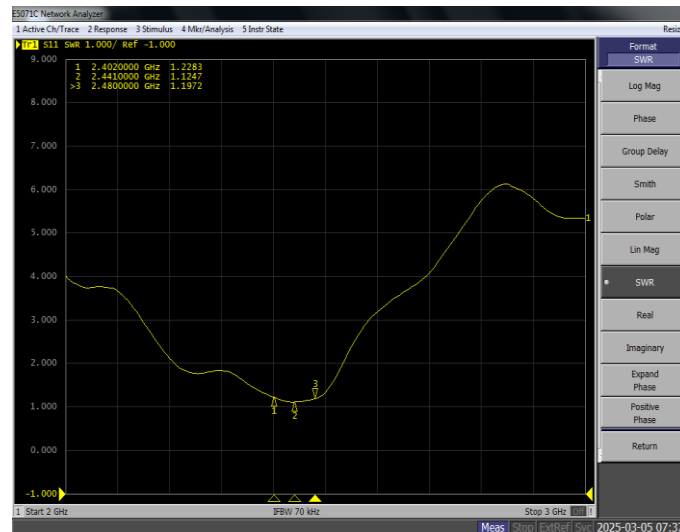
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6.2 VSWR



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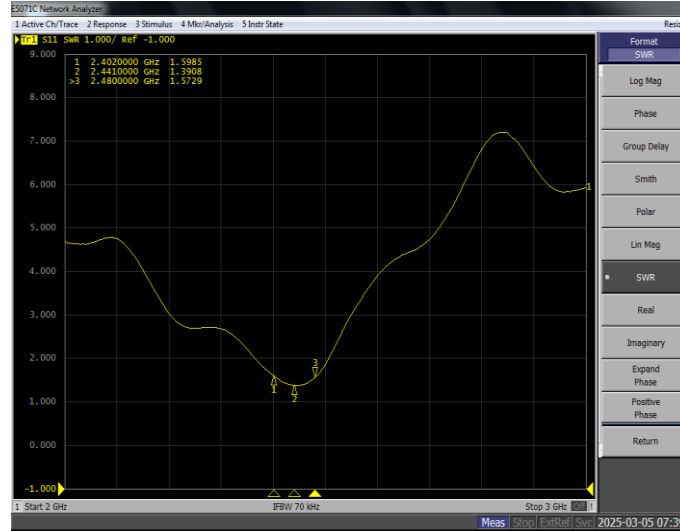
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Rev.: 01

Page: 19 of 29



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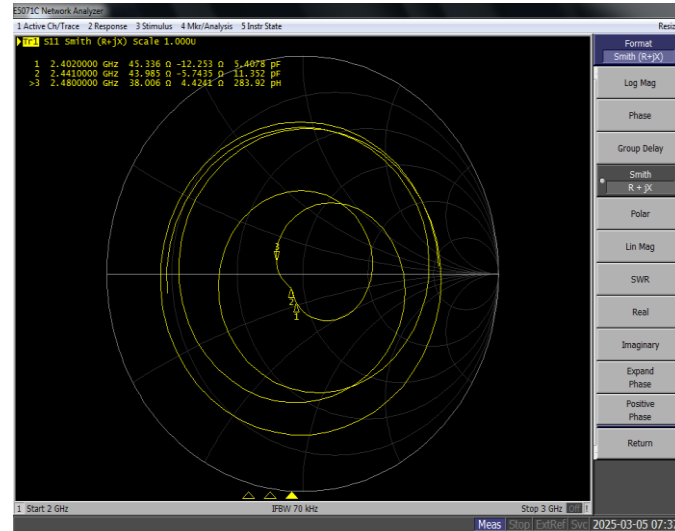
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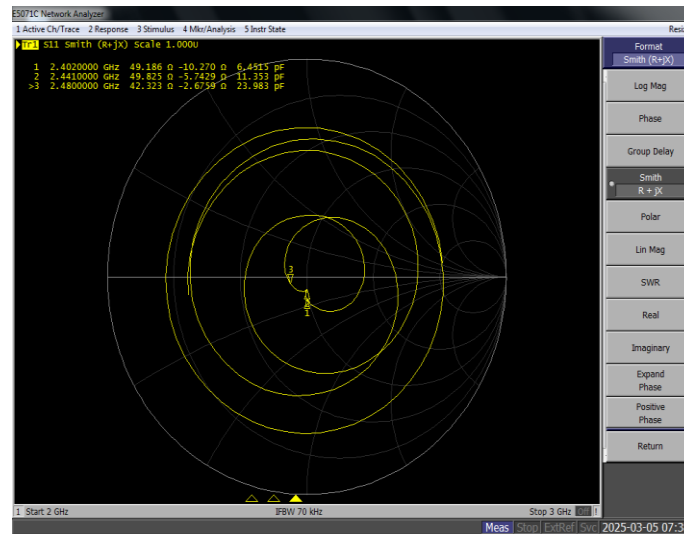
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6.3 Stimulus



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Free Space #2



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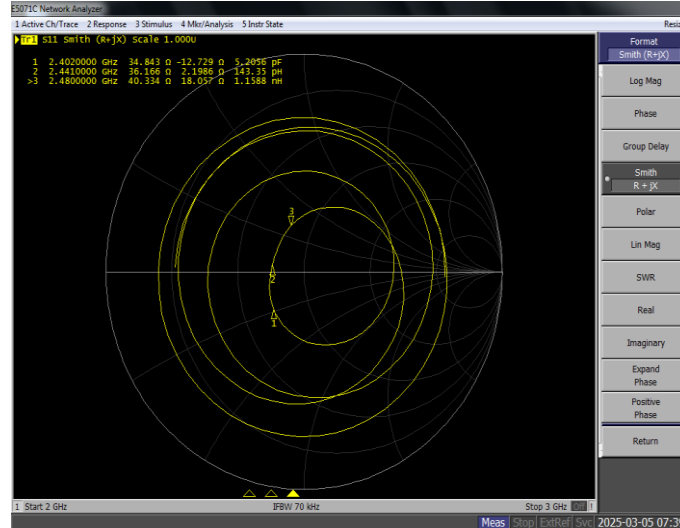
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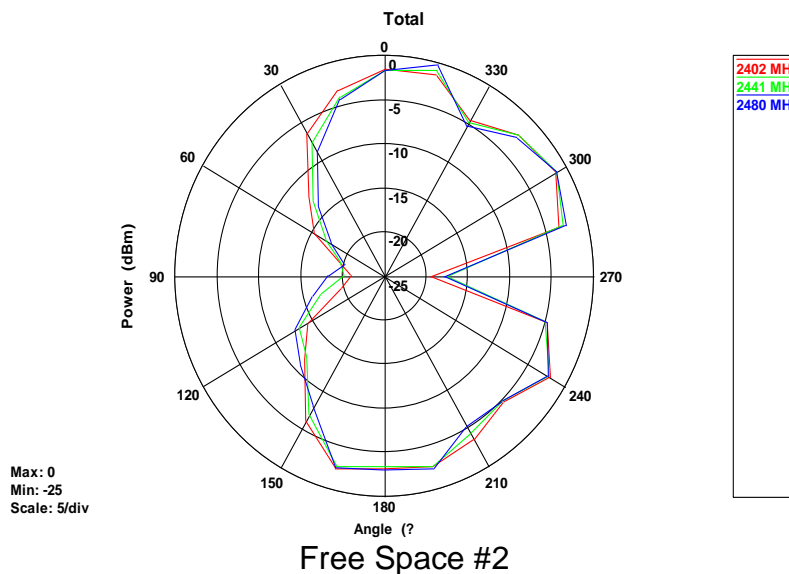
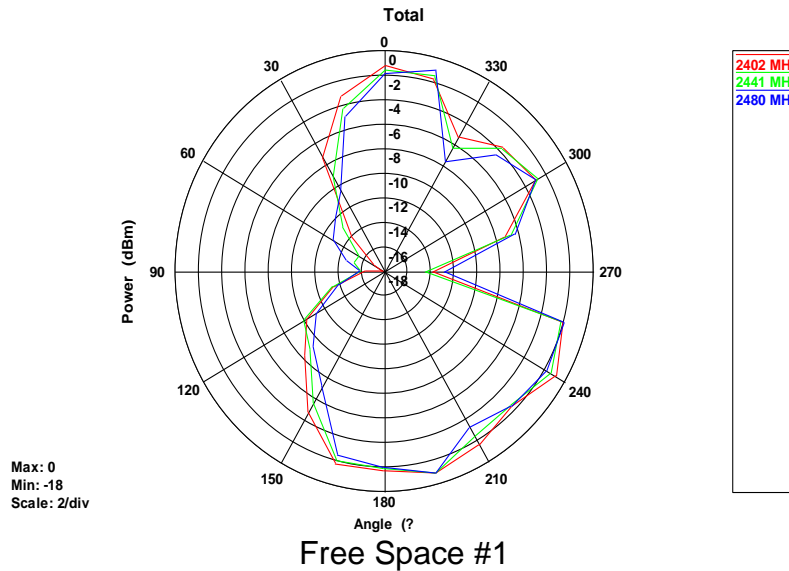
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7 2-D Antenna Pattern(Theta=90°)



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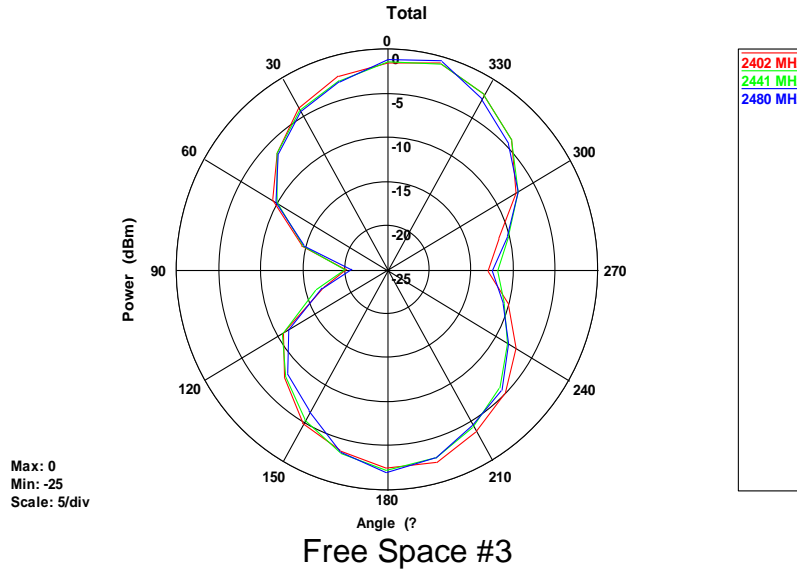
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Page: 23 of 29



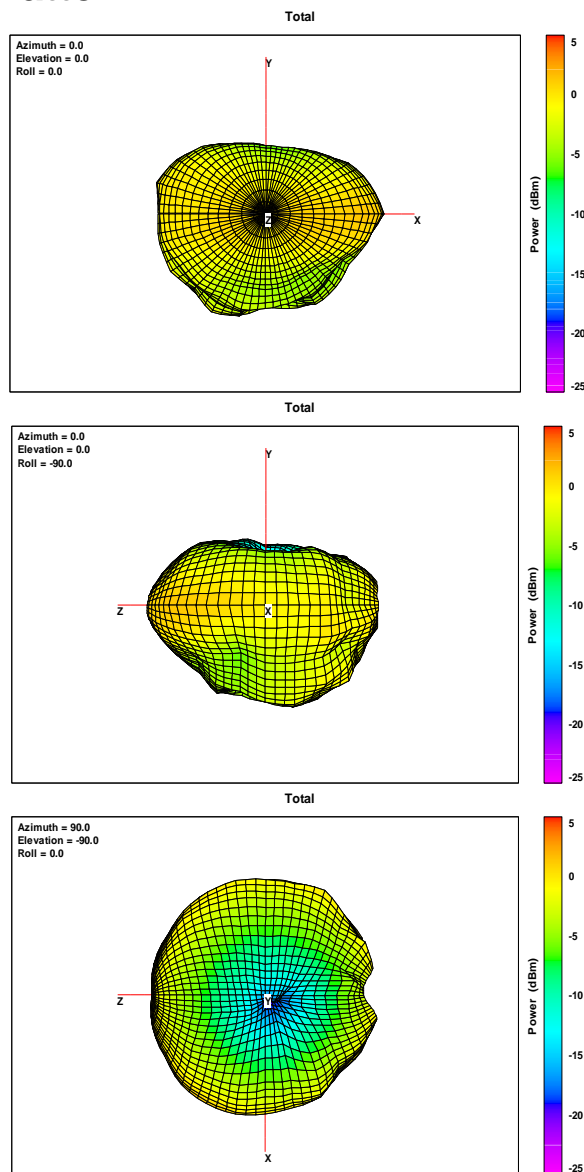
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8 3-D Antenna Pattern



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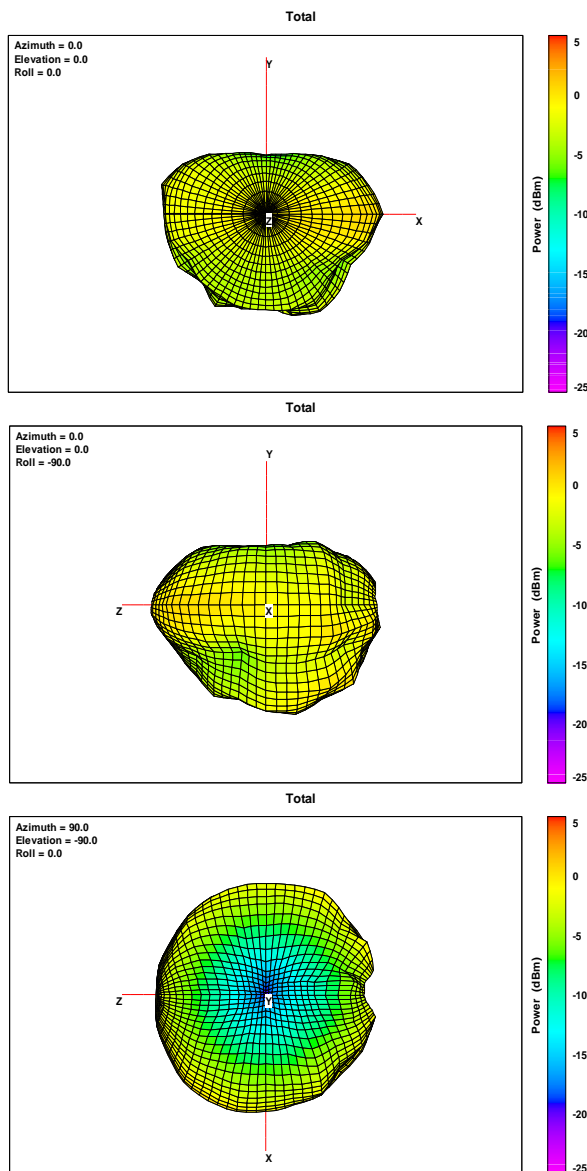


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Report No.: SZA02503000045AT01

Rev.: 01

Page: 25 of 29



Free Space #2



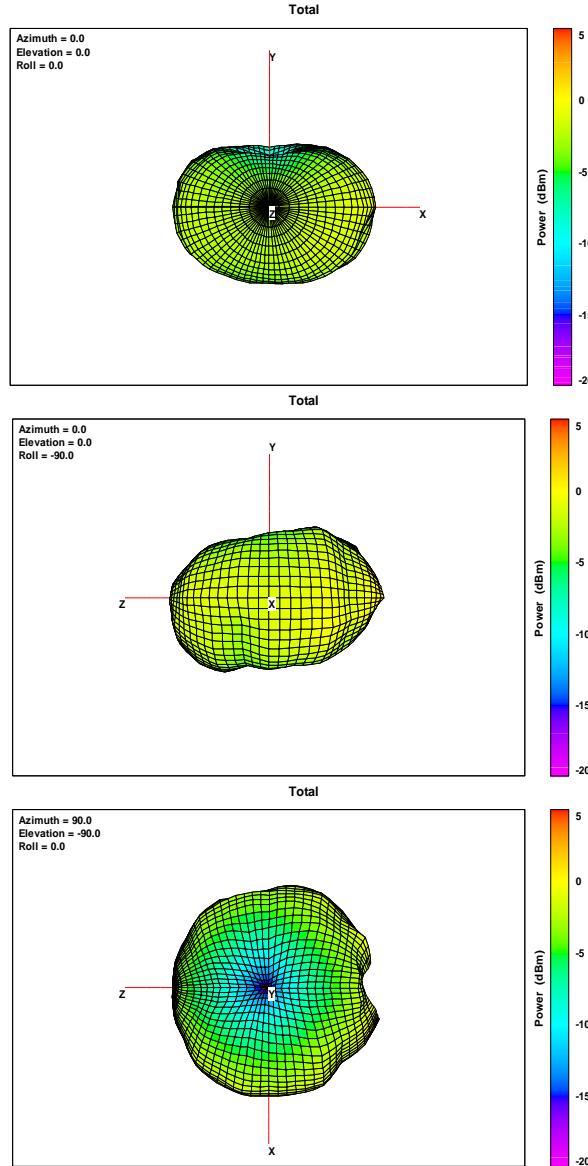
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9 The EUT and Test Configuration

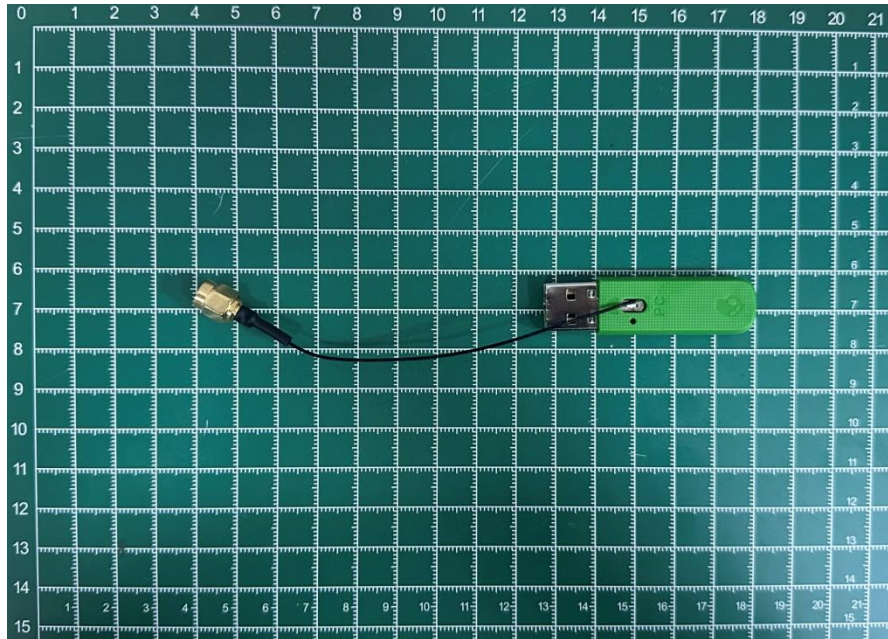


Photo of EUT

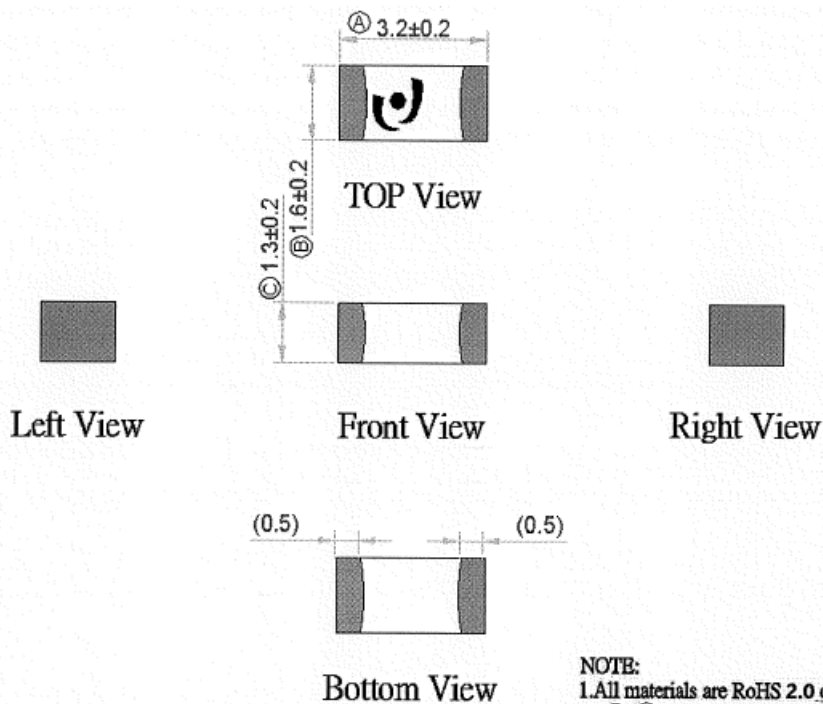


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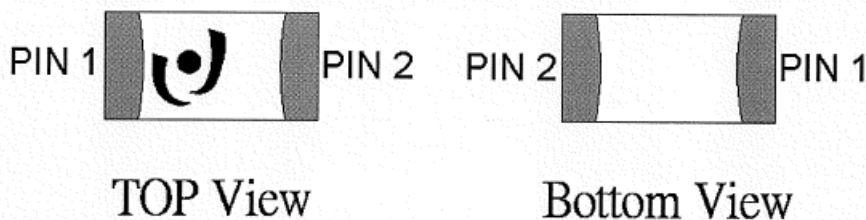
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NOTE:
 1. All materials are RoHS 2.0 compliant.
 2. "A~C" Critical Dimensions.
 3. "()" Reference Dimensions.

PIN Definitions



Antenna Dimensions



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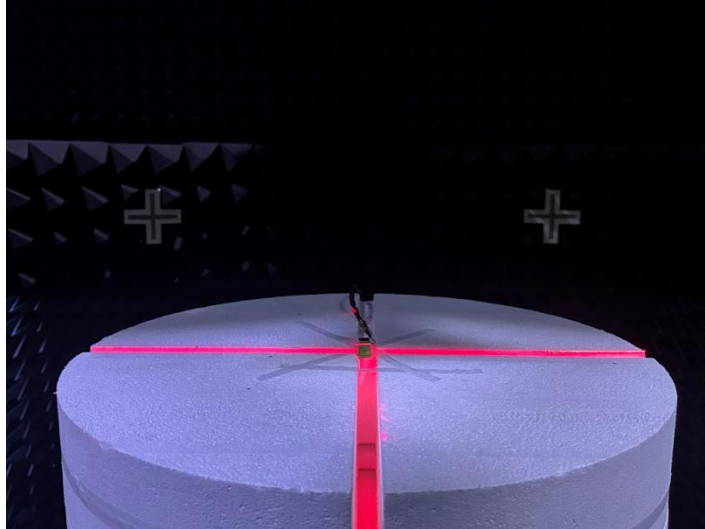
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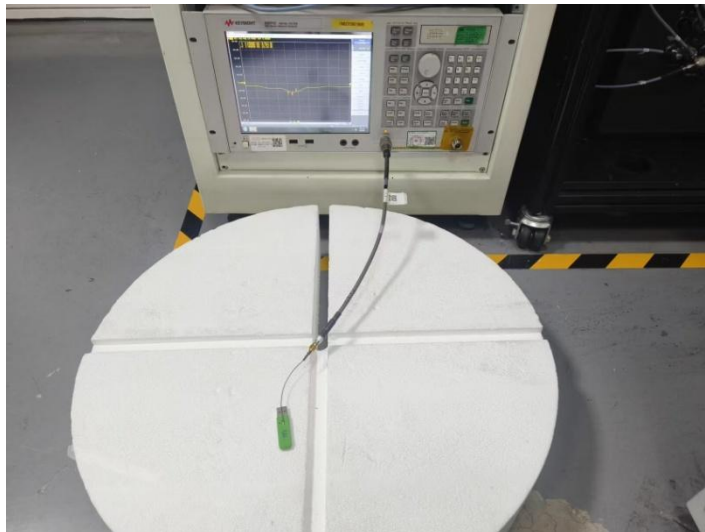
Report No.: SZOA2503000045AT01

Rev.: 01

Page: 29 of 29



Free Space View



Free Space Setup

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