

ANTENNA PASSIVE TEST REPORT

Application No.	ZEWM2204000331OA
Applicant	Razer Inc.
Manufacturer	Razer (Asia-Pacific) Pte., Ltd.
Product Name	Soundbar
Model No.	RZ05-0428/ RZ05-0428XXXX-XXXX
Standards	ANSI/IEEE Std 149-2008
Date Initial Sample(s) Received	2022.03.13
Testing Start Date	2022.04.21
Testing Finish Date	2022.04.21
Report Issue Date	2022.05.18

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

YUANYU LUO

Prepared by

Max. Huang

Reviewed By

Ervin Li

Approved by



Revision Version

Report No.	Version	Date	Memo
ZEWM2204000331OA02	00	2022/05/18	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	Panta Sun
Tel.	+86 (0) 755 2601 2053
Fax	+86 (0) 755 2671 0594
E-mail	Panta.Sun@sgs.com

1.2 Details of Applicant

Applicant's Name	Razer Inc.
Applicant's Address	9 Pasteur, Suite 100, Irvine, CA92618, USA
Contact	Sim Lee Fong
Tel.	N/A
Fax	N/A
E-mail	N/A

1.3 Details of Manufacturer

Manufacturer's Name	Razer (Asia-Pacific) Pte., Ltd.
Manufacturer's Address	1 one-north Crescent, #02-01, Singapore 138538
Contact	Sim Lee Fong
Tel.	N/A
Fax	N/A
E-mail	N/A



1.4 General Description of EUT

Device Description:	Soundbar
Device Manufacturer:	Razer (Asia-Pacific) Pte., Ltd.
Device Model:	RZ05-0428/ RZ05-0428XXXX-XXXX
Hardware Version:	N/A
Software Version:	N/A
S/N:	332209B03500166

Note: RZ05-0428XXXX-XXXX is a variant of RZ05-0428, PCB layout, electrical components used and internal wiring and functions were identical for the them with only different on Model name and /or product customization including and not limited to color and printed design. which is not related to RF performance. Thus, test data of RZ05-0428 is reused for RZ05-0428XXXX-XXXX. The change note is in the Appendix.

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	



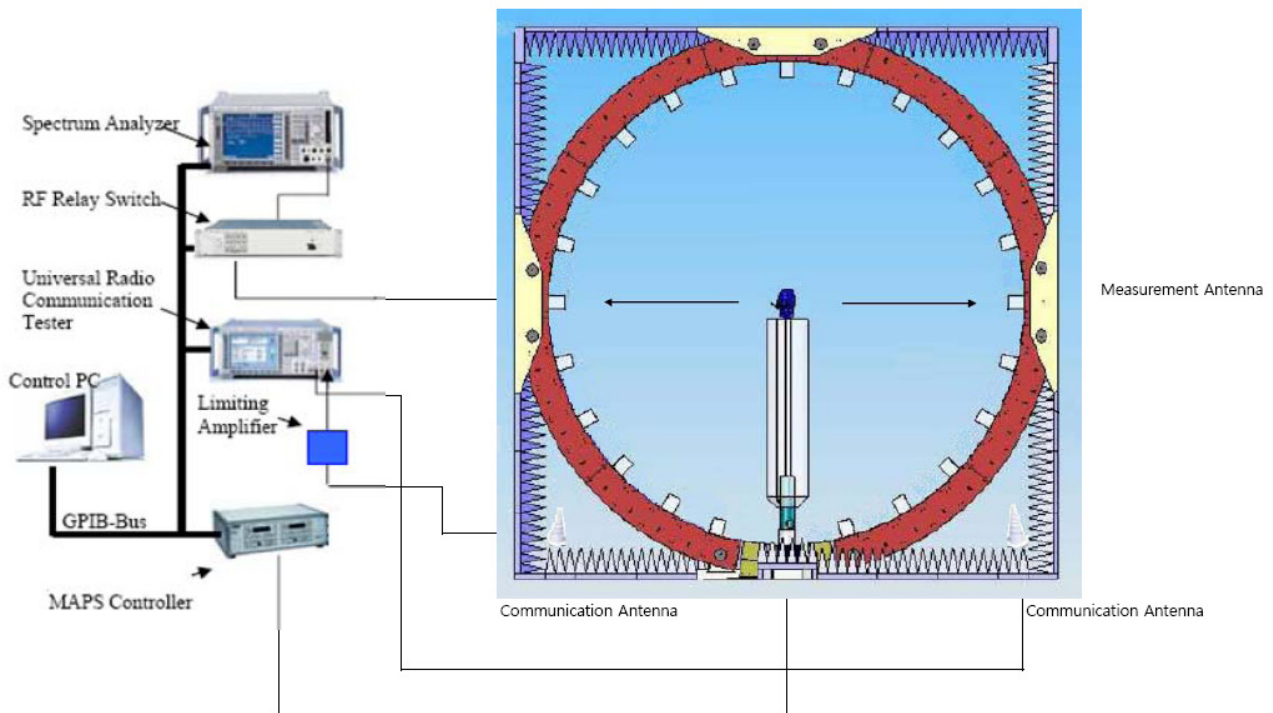
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2 OTA Measurements System Configuration

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



3 Test Equipment List

Type of Equipment	Model Number	Manufacture	Calibration Date	Valid Period
Network Analyzer	E5071C S/N MY46523591	Keysight	2022/4/11	2023/4/10
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

Free Space			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-3.24	47.46	2.32
2355	-3.26	47.20	2.28
2360	-3.07	49.27	2.43
2365	-3.10	48.94	2.30
2370	-3.18	48.13	2.23
2375	-3.36	46.09	1.98
2380	-3.50	44.63	1.89
2385	-3.66	43.08	1.77
2390	-3.63	43.33	1.93
2395	-3.47	44.98	2.10
2400	-3.46	45.13	2.16
2402	-3.43	45.38	2.24
2405	-3.41	45.59	2.18
2410	-3.51	44.59	2.04
2415	-3.58	43.86	1.95
2420	-3.71	42.57	1.78
2425	-3.71	42.55	1.86
2430	-3.80	41.68	1.78
2435	-3.83	41.35	1.88
2440	-3.86	41.09	1.82
2441	-3.88	40.90	1.81
2445	-3.89	40.79	1.87
2450	-3.92	40.51	1.75
2455	-3.98	39.98	1.65
2460	-4.13	38.63	1.43
2465	-4.28	37.36	1.25
2470	-4.59	34.75	0.90
2475	-4.67	34.11	0.79
2480	-4.76	33.42	0.71
2482	-4.73	33.69	0.69
2485	-4.69	33.96	0.75
2490	-4.73	33.64	0.67
2495	-4.81	33.03	0.56
2500	-5.02	31.51	0.37
2505	-5.19	30.28	0.25



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2510	-5.26	29.78	0.09
2515	-5.44	28.55	-0.10
2520	-5.62	27.40	-0.37
2525	-5.99	25.16	-0.72
2530	-6.32	23.35	-0.98
2535	-6.61	21.82	-1.18
2540	-6.75	21.12	-1.20
2545	-6.67	21.52	-1.05
2550	-6.81	20.86	-1.15
2555	-6.99	20.00	-1.35
2560	-7.45	17.97	-1.81
2565	-7.80	16.60	-2.18
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2575	-8.13	15.37	-2.43
2580	-7.98	15.92	-2.17

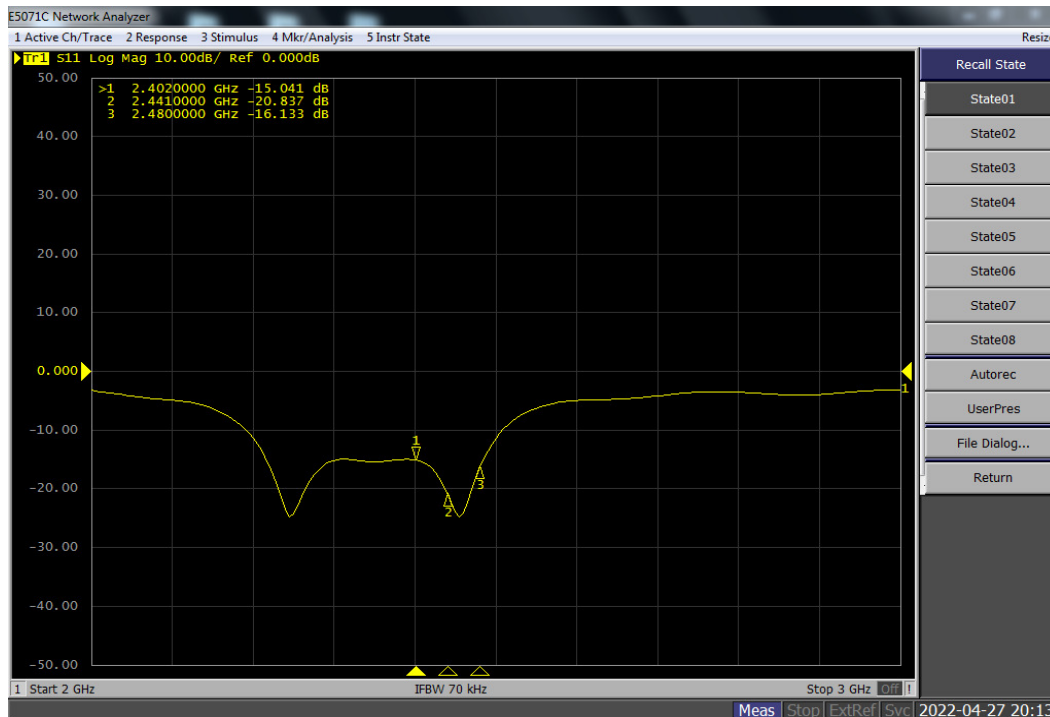


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6 Pattern Plots

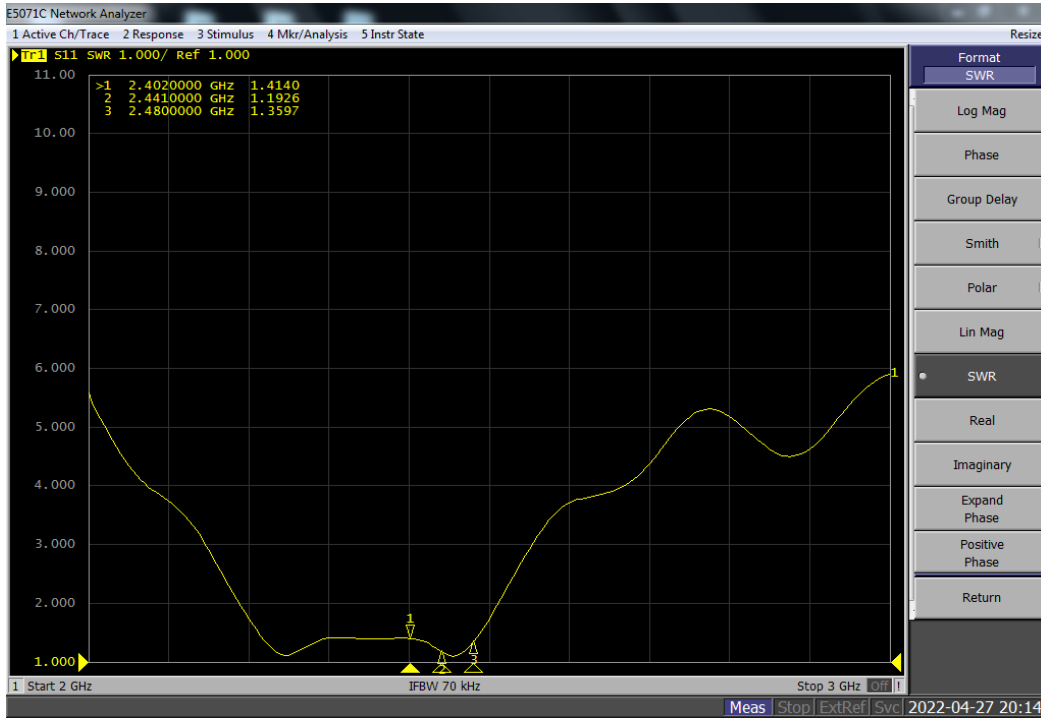
6.1 Return Loss



Free Space



6.2 VSWR



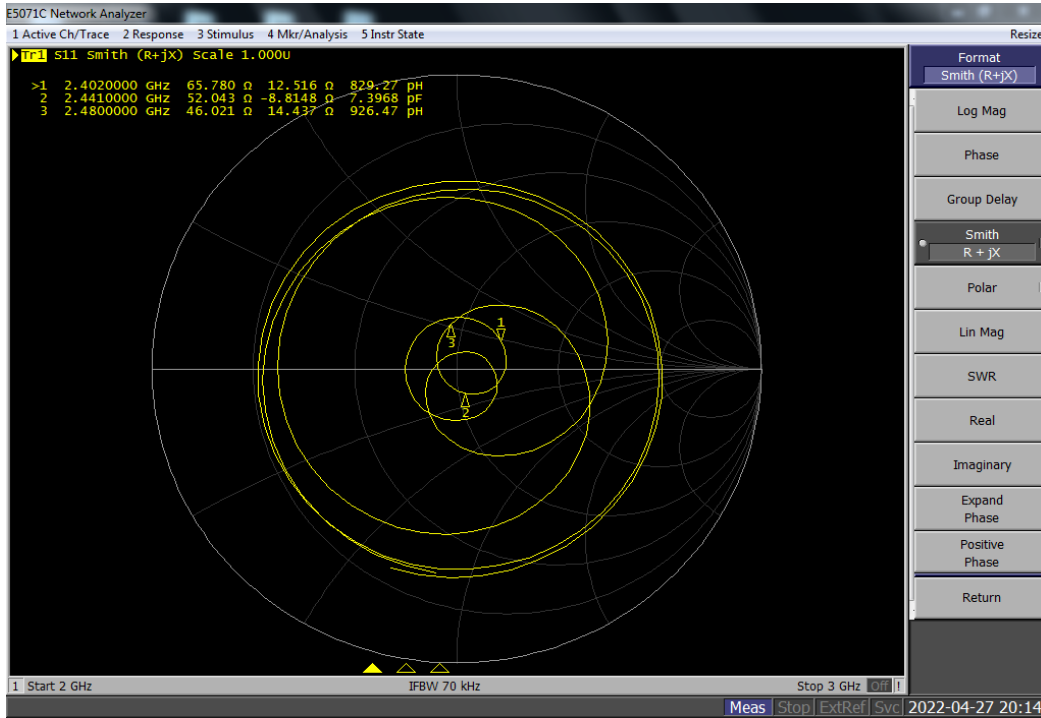
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6.3 Stimulus



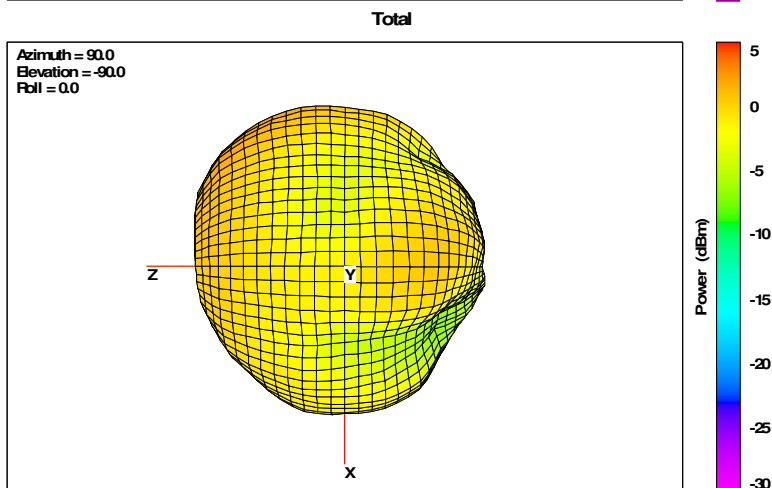
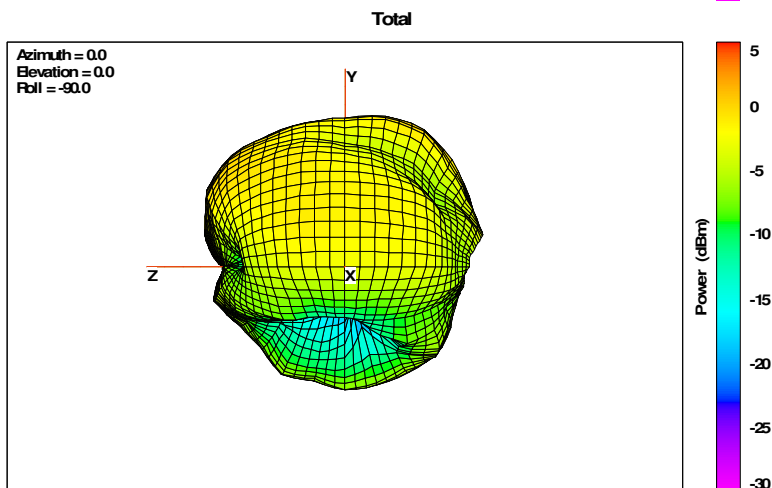
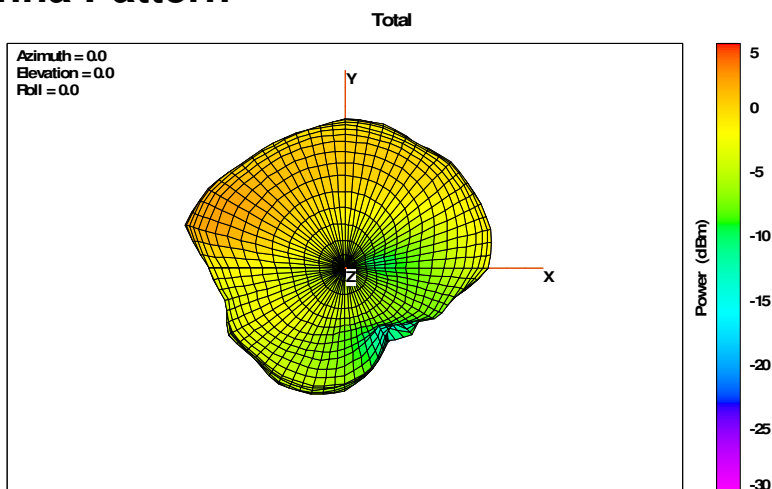
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7 3-D Antenna Pattern



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8 The EUT and Test Configuration

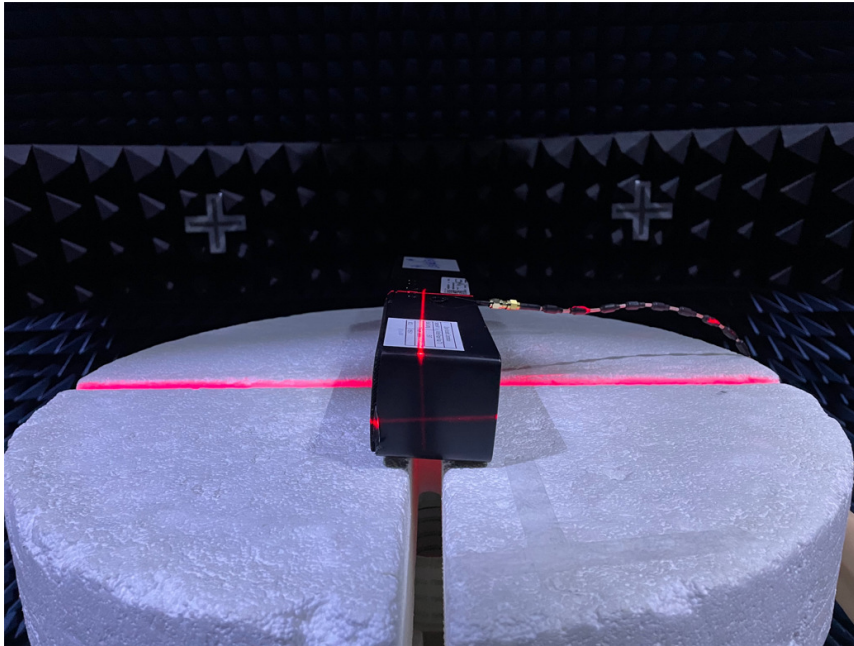


Front side of EUT



Back side of EUT





Free Space View of RZ05-0428



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9 Appendix



Model / Item Confirmation Letter

We Razer Inc. declare that our product: Soundbar and its below model (s) / item(s): RZ05-0428_RZ05-0428XXXX-XXXX (X can be 0-9 or A-Z), Only the model RZ05-0428 was tested, Since according to the declaration from the applicant ,the electrical circuit design, PCB layout, electrical components used and internal wiring and functions were identical for the above models with only different on Model name and /or product customization including and not limited to color and printed design.

Print Name: Johnsen Tia

Title: Senior Director, Regulatory & Compliance

Signature:



On behalf of Company: Razer Inc.

Telephone: +65 6571 6828

E-mail: johnsen.tia@razer.com

End of Report

