

ANTENNA PASSIVE TEST REPORT

Application No. SZOA2408000173AT
Applicant Aifrotech Co.,LTD.
Manufacturer King Chuang Tech&Electronic Co., Ltd.
Product Name Game handle
Model No. ZKNS-015-BK ¹
Standards ANSI/IEEE Std 149-2021
Date Initial Sample(s) Received August 9, 2024
Testing Start Date August 9, 2024
Testing Finish Date September 3, 2024
Report Issue Date October 17, 2024

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

Yuanyu Luo

Prepared by: Yuanyu Luo/ Test Engineer

Ervin Li

Approved by: Ervin Li/ Technical Manager



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 Rev.: 01
 Page: 2 of 29

Revision History

Revision	Issue Date	Description
01	October 17, 2024	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
10	APPENDIX	29



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Report No.: SZOA2408000173AT01

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	Aifrotech Co.,LTD
Applicant's Address	Room 201,Building A,No.1,Qianwan Road, Qianhai Shenzhen-Hong Kong cooperation zone,Shenzhen(in Shenzhen Qianhai business secretary Co.,Ltd.)
Contact	MA LIANG
Tel.	+86-13424431664
Fax	N/A
E-mail	maliang@aifrotech.com

1.3 Details of Manufacturer

Manufacturer's Name	King Chuang Tech&Electronic Co., Ltd.
Manufacturer's Address	NO.58 Guangtian Road, Luotian Neighbour Yanluo Street, Baoan District, Shenzhen
Contact	N/A
Tel.	N/A
Fax	N/A
E-mail	N/A



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Report No.: SZOA2408000173AT01

Rev.: 01

Page: 5 of 29

1.4 General Description of EUT

Device Description:	Game handle
Device Manufacturer:	Aifrotech Co.,LTD.
Device Model:	ZKNS-015-BK ¹
Hardware Version:	N/A
Software Version:	N/A
Antenna Type:	Inverted f-form

Note 1: This machine (ZKRS-015-BK) is available in a range of models: ZKNS-015-WH, ZKNS-015-GY, ZKNS-015-PK, ZKNS-015-YLW, ZKNS-015-RD, ZKNS-015-PL, ZKNS-015-GN, ZKNS-015-GLD, ZKNS-015-SR, ZKNS-015-RG, ZKNS-015-CR, ZKNS-015-Vermilio, ZKNS-015-KH, ZKNS-015-BN, ZKNS-015-Rainbow, ZKNS-015-BU, ZKNS-015-ORG, they are exactly the same in circuit design, PCB layout, electrical components used, internal wiring and function, only the shell color is different, this does not affect the RF performance, Therefore, the test report of ZKNS-015-BK can be reused by them. Please refer to the appendix for the difference statement.

1.5 Test Procedure

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



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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

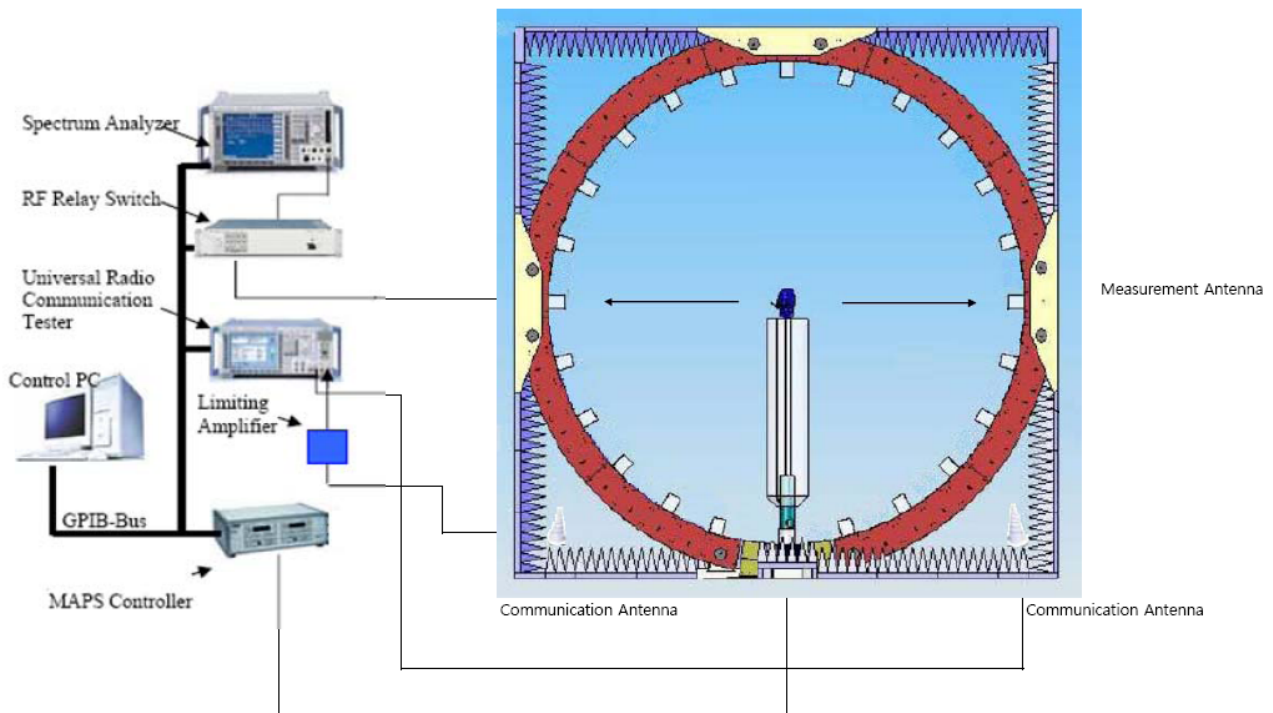
2.1 Test Configuration

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.: SZOA2408000173AT01
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	2024/01/30	2025/01/29
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 CH32			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-11.22	7.55	-6.98
2355	-11.25	7.50	-6.90
2360	-10.97	7.99	-6.57
2365	-11.11	7.75	-6.88
2370	-10.93	8.06	-6.62
2375	-11.05	7.86	-6.99
2380	-10.85	8.22	-6.75
2385	-10.78	8.35	-6.80
2390	-10.72	8.47	-6.61
2395	-10.58	8.76	-6.51
2400	-10.83	8.25	-6.76
2402	-10.82	8.29	-6.67
2405	-10.84	8.25	-6.68
2410	-10.93	8.07	-6.94
2415	-10.75	8.41	-6.68
2420	-10.46	8.99	-6.60
2425	-10.35	9.23	-6.44
2430	-10.24	9.46	-6.38
2435	-10.29	9.35	-6.52
2440	-10.03	9.94	-6.32
2441	-9.92	10.19	-6.24
2445	-9.68	10.76	-6.08



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Report No.: SZOA2408000173AT01

Rev.: 01

Page: 11 of 29

2450	-9.37	11.56	-5.84
2455	-9.05	12.45	-5.56
2460	-9.07	12.40	-5.67
2465	-8.91	12.87	-5.58
2470	-9.05	12.44	-5.82
2475	-8.93	12.79	-5.82
2480	-8.85	13.02	-5.76
2485	-8.64	13.66	-5.62
2490	-8.41	14.41	-5.27
2495	-8.09	15.54	-4.84
2500	-7.86	16.37	-4.50
2505	-7.57	17.48	-4.23
2510	-7.40	18.21	-4.04
2515	-7.42	18.12	-4.16
2520	-7.44	18.01	-4.26
2525	-7.57	17.51	-4.38
2530	-7.54	17.62	-4.40
2535	-7.53	17.66	-4.37
2540	-7.40	18.20	-4.21
2545	-7.21	19.00	-3.99
2550	-7.12	19.40	-3.83
2555	-7.08	19.57	-3.67
2560	-7.14	19.34	-3.73
2565	-7.15	19.29	-3.69
2570	-7.18	19.13	-3.63
2575	-7.11	19.46	-3.60
2580	-7.14	19.32	-3.60



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Report No.: SZA02408000173AT01

Rev.: 01

Page: 12 of 29

Free Space JL BT			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-12.57	5.53	-7.48
2355	-12.70	5.37	-7.50
2360	-12.50	5.62	-7.15
2365	-12.61	5.48	-7.16
2370	-12.55	5.56	-7.06
2375	-12.73	5.33	-7.20
2380	-12.75	5.31	-7.16
2385	-12.80	5.25	-7.28
2390	-12.85	5.19	-7.30
2395	-12.80	5.25	-7.37
2400	-13.12	4.87	-7.64
2402	-13.20	4.79	-7.89
2405	-13.30	4.67	-8.15
2410	-13.44	4.53	-8.26
2415	-13.40	4.57	-8.58
2420	-13.15	4.84	-8.42
2425	-13.16	4.83	-8.37
2430	-13.17	4.82	-8.36
2435	-13.25	4.74	-8.41
2440	-13.07	4.93	-8.37
2441	-12.97	5.04	-8.39
2445	-12.82	5.23	-8.11
2450	-12.71	5.36	-8.19



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Rev.: 01

Page: 13 of 29

2455	-12.58	5.53	-8.13
2460	-12.73	5.33	-8.25
2465	-12.73	5.33	-8.45
2470	-13.05	4.95	-8.71
2475	-13.16	4.83	-8.72
2480	-13.32	4.66	-8.95
2485	-13.36	4.61	-8.85
2490	-13.37	4.60	-8.91
2495	-13.31	4.67	-8.74
2500	-13.32	4.66	-8.60
2505	-13.25	4.74	-8.62
2510	-13.29	4.69	-8.55
2515	-13.47	4.49	-8.90
2520	-13.64	4.32	-9.06
2525	-13.79	4.18	-9.33
2530	-13.78	4.19	-9.33
2535	-13.72	4.25	-9.27
2540	-13.54	4.43	-9.15
2545	-13.29	4.69	-8.85
2550	-13.17	4.82	-8.67
2555	-13.12	4.87	-8.60
2560	-13.18	4.81	-8.49
2565	-13.14	4.85	-8.38
2570	-13.12	4.88	-8.25
2575	-13.00	5.02	-8.16
2580	-12.93	5.09	-8.09



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Report No.: SZOA2408000173AT01

Rev.: 01

Page: 14 of 29

Free Space Switch			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-6.17	24.18	-1.74
2355	-6.53	22.21	-2.46
2360	-6.42	22.80	-2.41
2365	-6.70	21.40	-2.65
2370	-6.88	20.51	-2.75
2375	-6.96	20.15	-2.81
2380	-7.15	19.29	-2.83
2385	-7.06	19.68	-2.78
2390	-7.30	18.63	-2.89
2395	-7.27	18.73	-2.93
2400	-7.67	17.12	-3.15
2402	-7.88	16.28	-3.40
2405	-8.04	15.72	-3.67
2410	-8.21	15.09	-3.74
2415	-8.48	14.19	-4.11
2420	-8.45	14.29	-4.17
2425	-8.65	13.64	-4.31
2430	-8.90	12.88	-4.62
2435	-9.06	12.41	-4.81
2440	-9.16	12.14	-5.01
2441	-9.13	12.23	-4.99
2445	-8.94	12.77	-4.80
2450	-8.95	12.72	-4.94



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Report No.: SZOA2408000173AT01

Rev.: 01

Page: 15 of 29

2455	-8.89	12.92	-4.80
2460	-9.14	12.18	-5.19
2465	-9.27	11.82	-5.20
2470	-9.57	11.05	-5.59
2475	-9.76	10.57	-5.74
2480	-9.94	10.14	-5.75
2485	-10.04	9.91	-5.56
2490	-10.05	9.88	-5.38
2495	-9.98	10.04	-5.12
2500	-9.97	10.08	-5.00
2505	-9.93	10.16	-5.04
2510	-10.01	9.99	-5.11
2515	-10.27	9.41	-5.52
2520	-10.53	8.85	-5.81
2525	-10.76	8.40	-6.11
2530	-10.91	8.11	-6.35
2535	-11.00	7.94	-6.50
2540	-11.05	7.85	-6.71
2545	-11.04	7.88	-6.80
2550	-11.17	7.63	-7.07
2555	-11.36	7.31	-7.12
2560	-11.64	6.86	-7.47
2565	-11.84	6.55	-7.61
2570	-12.00	6.31	-7.81
2575	-12.10	6.16	-7.96
2580	-12.17	6.07	-7.95



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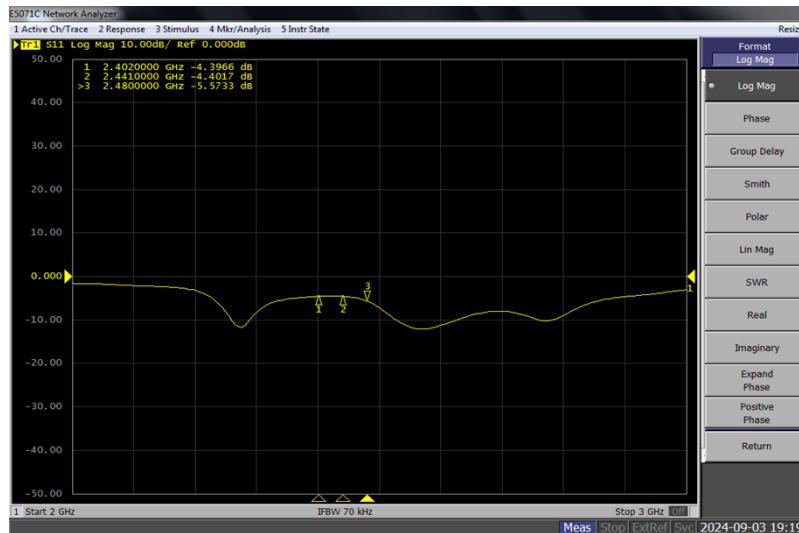
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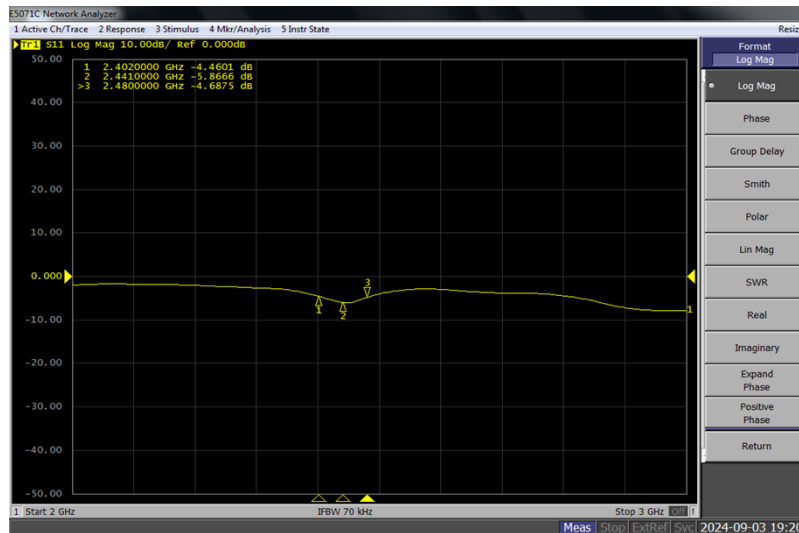
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6 Pattern Plots

6.1 Return Loss



Free Space CH32



Free Space JL BT



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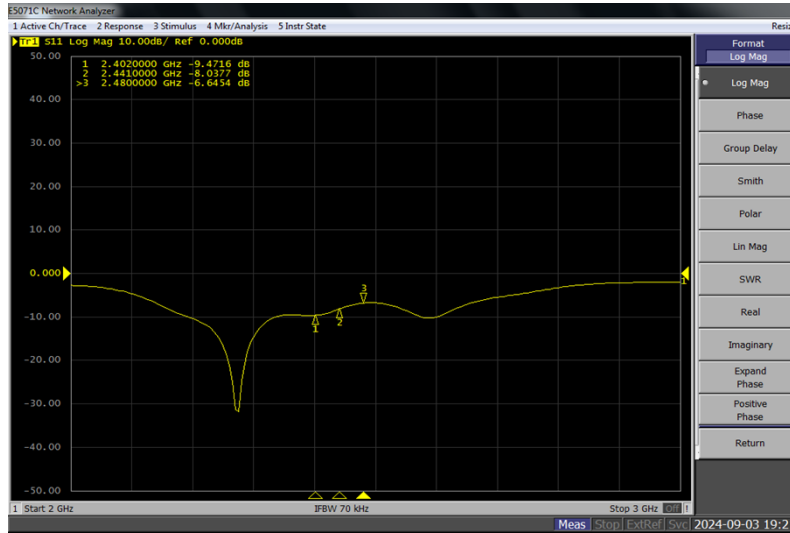
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Page: 17 of 29



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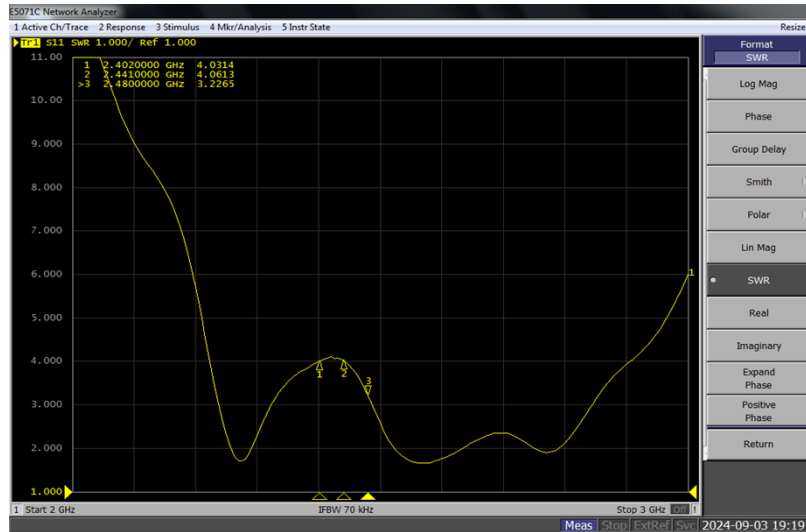
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6.2 VSWR



Free Space CH32



Free Space JL BT



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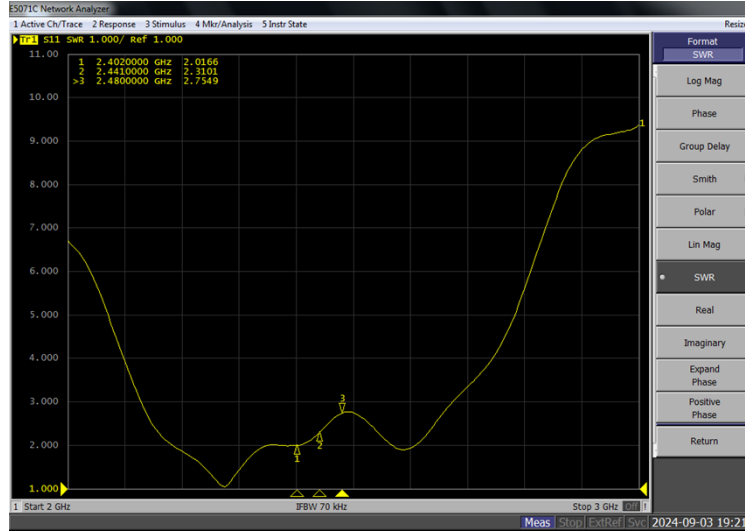
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Rev.: 01

Page: 19 of 29



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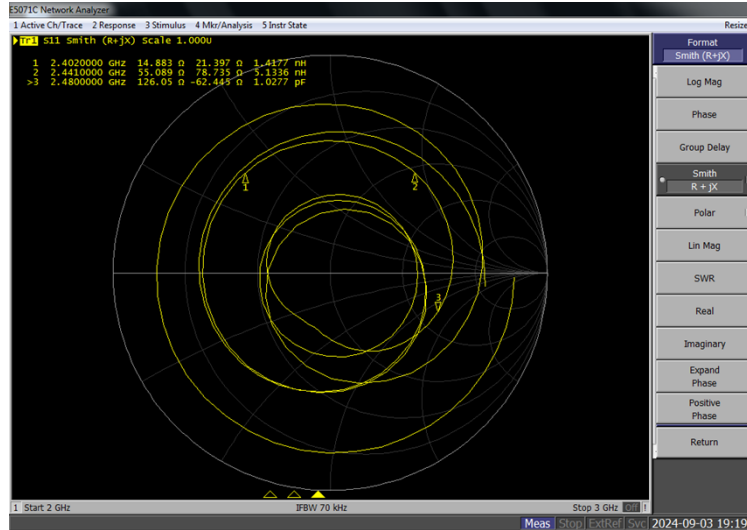
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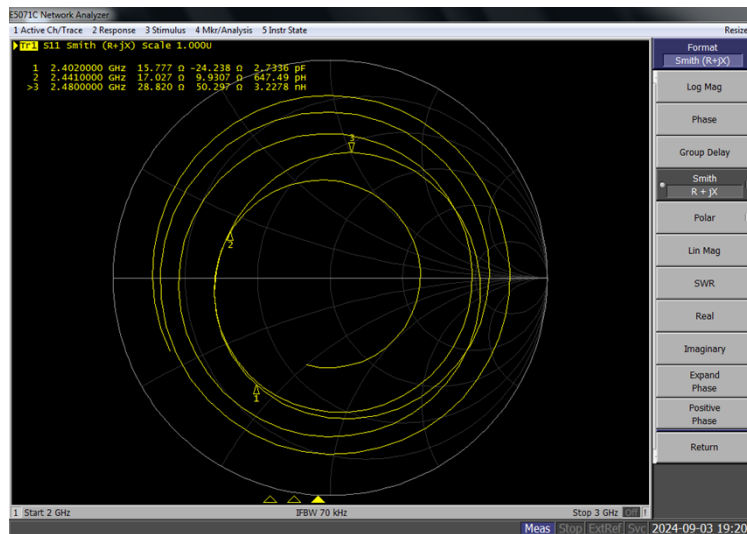
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6.3 Stimulus



Free Space CH32



Free Space JL BT



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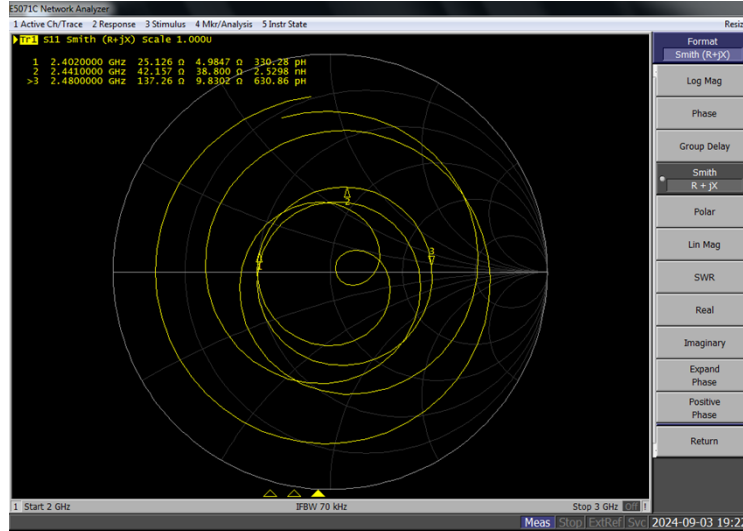
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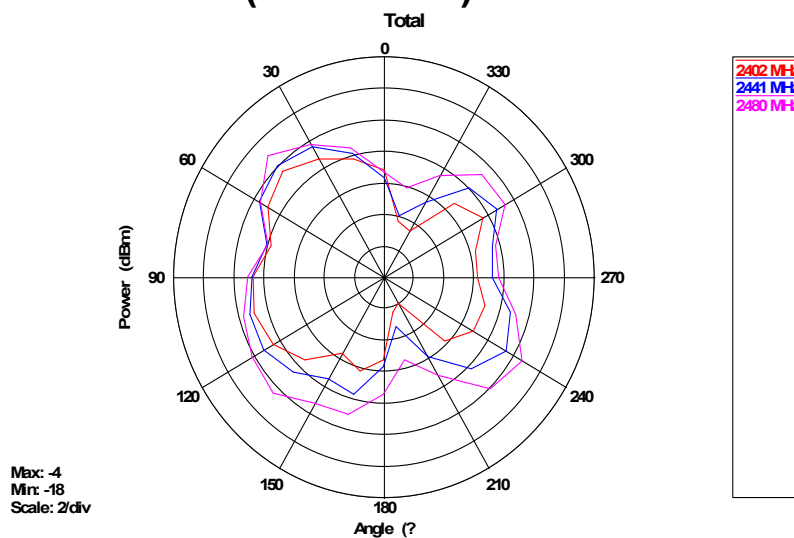
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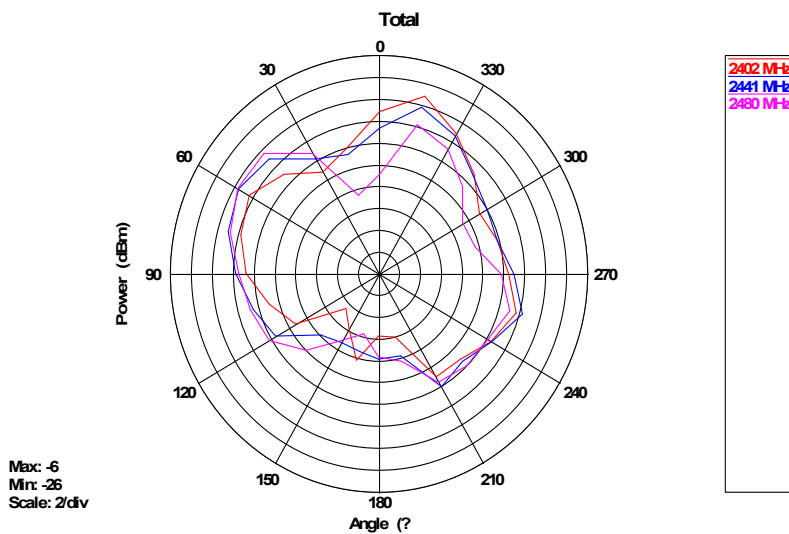
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7 2-D Antenna Pattern(Theta=90°)



Free Space CH32



Free Space JL BT



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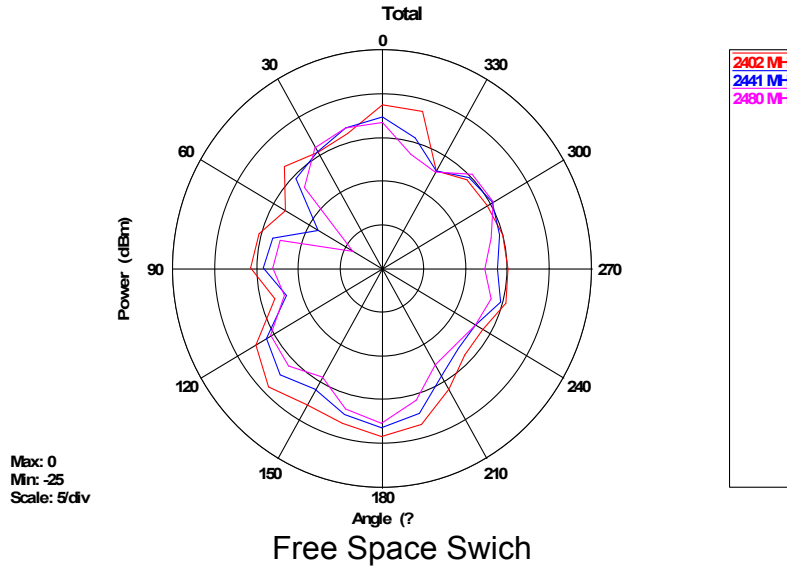
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Rev.: 01

Page: 23 of 29



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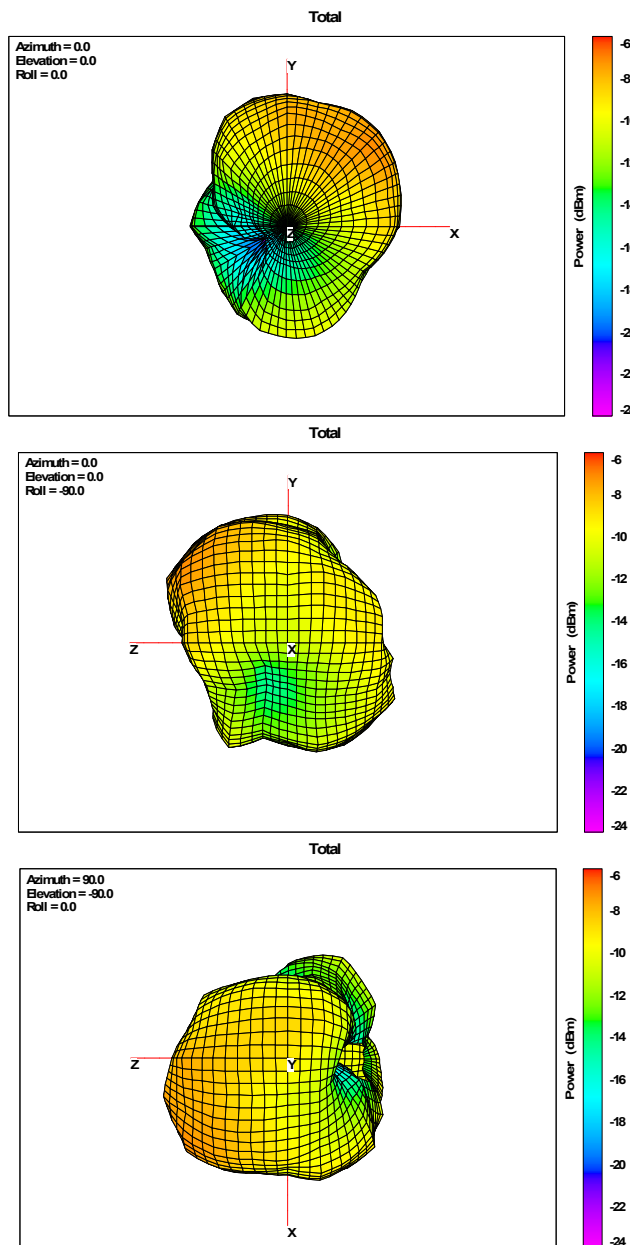
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8 3-D Antenna Pattern



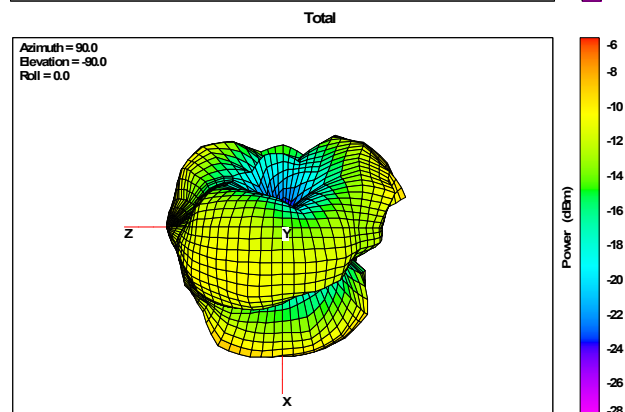
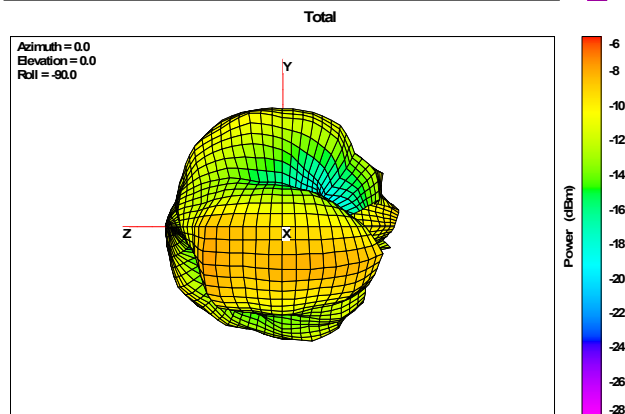
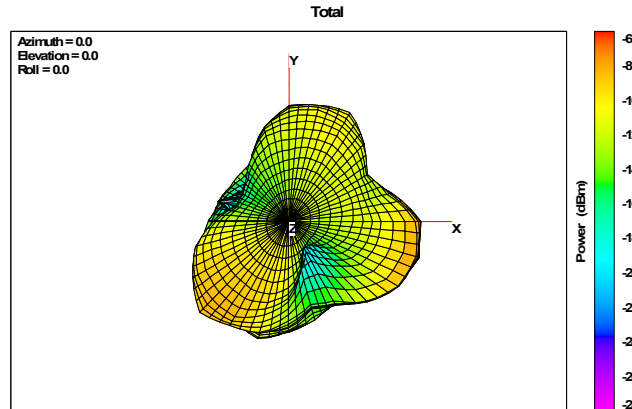
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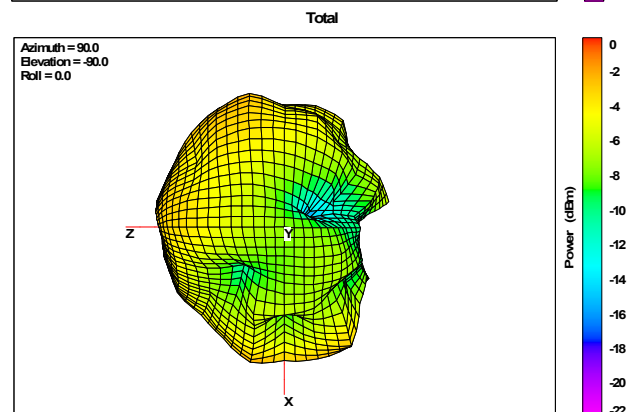
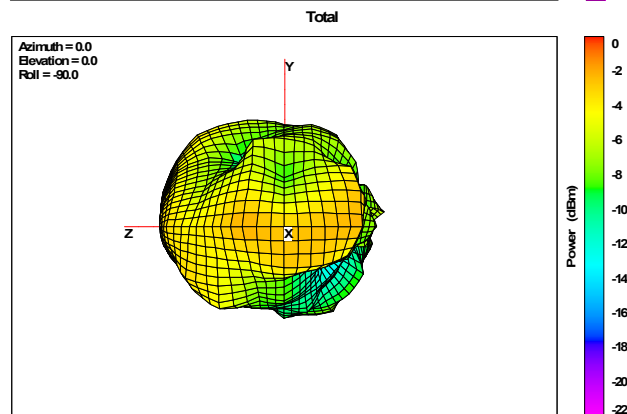
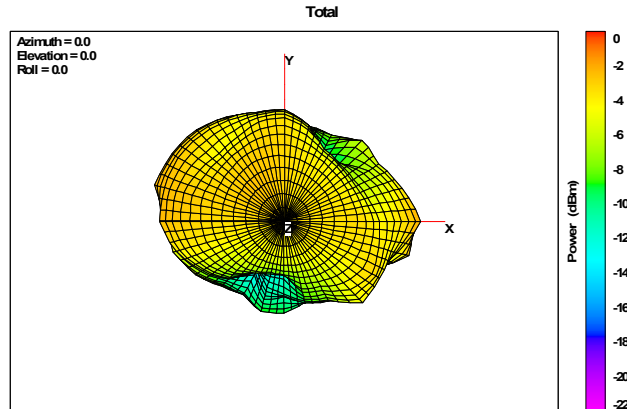
Free Space JL BT



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9 The EUT and Test Configuration



Photo of EUT



Free Space View



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Rev.: 01

Page: 28 of 29



Free Space Setup



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Page: 29 of 29

10 Appendix

Model / Item Confirmation Letter

We(公司名)Alfrutech Co.,LTD(产品名)EVOTOP_____and its below
model (s) / item(s)(系列型号) ZKNS-015-BK
are identical on circuitry design, PCB layout, electrical
components used, internal wiring and functions with the model/item
No.:(ZKNS-015-WH, ZKNS-015-GY, ZKNS-015-PK, ZKNS-015-YLW,
ZKNS-015-RD, ZKNS-015-PL, ZKNS-015-GN, ZKNS-015-GLD, ZKNS-015-SR,
ZKNS-015-RG, ZKNS-015-CR, ZKNS-015-Vermilio, ZKNS-015-KH, ZKNS-015-BN
ZKNS-015-Rainbow, ZKNS-015-BU, ZKNS-015-ORG
which we chose to be tested by SGS and only different on (差异之处) color

Company

Chop: _____
Authorized signature _____ Position: _____

_____ 马良

_____ date 2024.7.24

---END---



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