

Testing Report

Customer Name: Dongguan Zhongkang Technology Electronics Co., Ltd

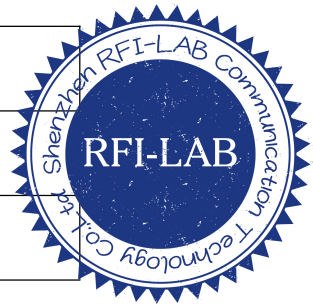
Product Name: Smart Dumbbell

Sample Model: ISD-1001

Reference Standard: *GB/T 9410-2008; ANSI/IEEE Std 149-1979*

Issue Date: 2022.1.19

Engineer: Jeremy	Date: 2021.12.16
Auditor: Eason	Date: 2022.1.19
Approver: Aaron	Date: 2022.1.19



Version

Version No.	Date	Description	Formulate	Approval
A0	2021.12.17	For the first time, formulate	Jeremy	Eason
A1	2022.1.19	Add Antenna photos	Jeremy	Eason

Contents

1.General Information.....	3
1.1 General information of testing institutions.....	3
1.2 Testing principle.....	3
1.3 Test equipment.....	4
1.4 Test environment.....	4
1.5 Statement.....	4
2.Sample Information.....	5
2.1 Client information.....	5
2.2 Description of EUT(S).....	5
2.3 Antenna photos and antenna size.....	6
2.4 DUT setup photo of free space OTA testing.....	7
3.Test Results.....	8
3.1 Test standard.....	8
3.2 Test uncertainty.....	8
3.3 Test data.....	9
3.3.1 S11 parameters.....	9
3.3.2 VSWR.....	9
3.3.3 Gain, Efficiency.....	9
3.3.4 Typical free space radiation pattern.....	10
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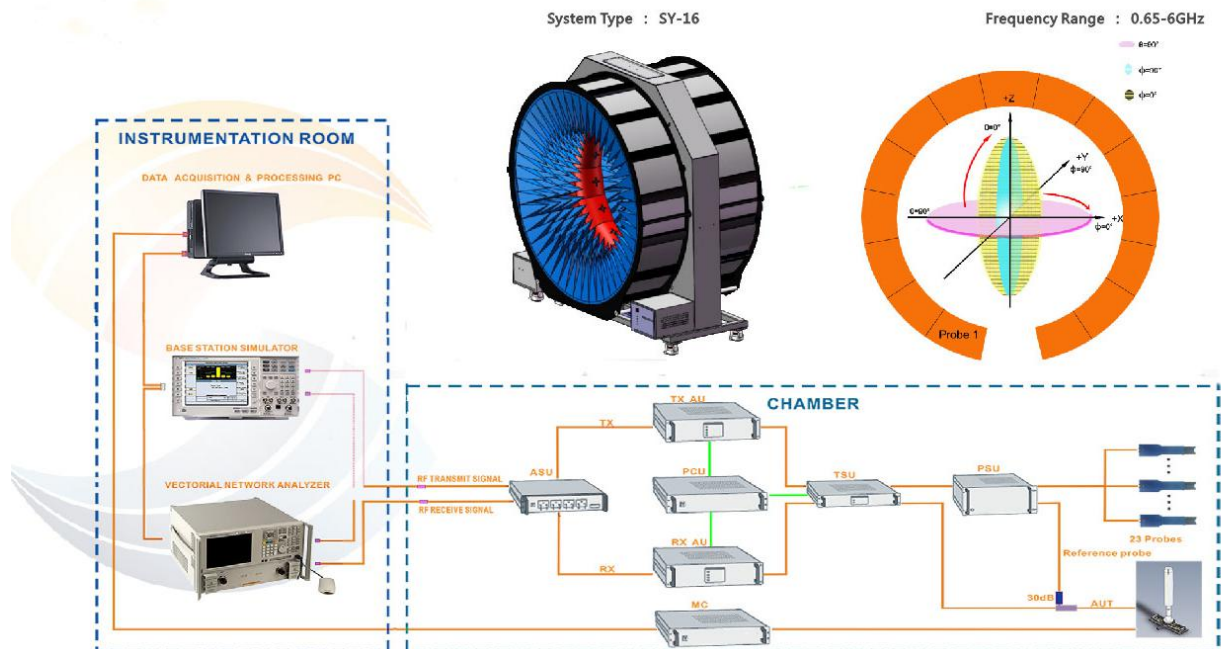
1.General Information

1.1 General information of testing institutions

Name	Shenzhen RFI-LAB Communication Technology Co., Ltd.
Address	10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ
Tel	13631623357
E-mail	liss@tech-now.com
Equipment	All the equipment used in the report is fixed in 10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ

1.2 Testing principle

RFI-LAB Multi-Probe OTA Measurement System



1.3 Test equipment

Equipment	Model No.	Serial No.	Manufacturer	Calibration date	Next calibration date
16 probe microwave chamber	3*3*2.5	RFI-LAB-RF-A00	SUNYIELD	2021.03.15	2023.03.14
Network Analyzer	E5071C	RFI-LAB-RF-A02	Agilent	2021.5.14	2022.5.13
Network Analyzer	E5071C	RFI-LAB-RF-C02	KEYSIGHT	2021.5.14	2022.5.13

1.4 Test environment

Temperature	23.7°C
Humidity	58%RH
Pressure	100.01kPa

1.5 Statement

- (1) The test results in the report are only applicable to the tested samples and the tested samples work under the environment described in the report.
- (2) Only Shenzhen RFI-LAB Communication Technology Co., Ltd. have the right to modify the report, and the modification information shall be annotated in the revision form.
- (3) Any objection to this report shall be raised within 30 days after formal confirmation of the report.
- (4) This report is invalid if there is any evidence that the sample information provided is falsified.
- (5) The report is invalid without the signature of the auditor and approver.

2. Sample Information

2.1 Client information

Name	Dongguan Zhongkang Technology Electronics Co., Ltd
Address	No.12, Yansha Road, Tianxin, Tangxia Town, Dongguan City,Guangdong
Contacts	Ge Zhang
Tel	17727957634
E-mail	rd3engineer01@zk-keji.com

2.2 Description of EUT(S)

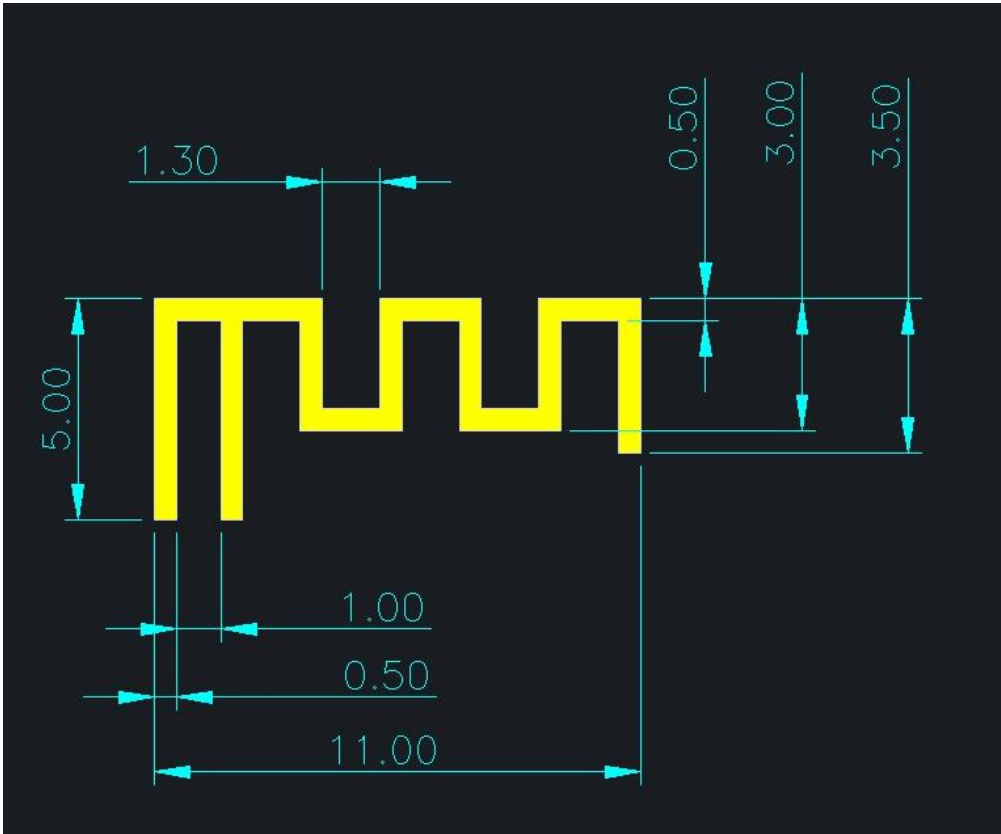
Product Name	Smart Dumbbell
Sample Model	ISD-1001
Size	/
Serial No.	/
Test Item	VSWR; Gain; Efficiency; Radiation pattern
Frequency Range	2400MHz-2500MHz
Received Date	2021.12.16
Test Date	2021.12.16
Remark	The length of the RF cable is 55 mm

2.3 Antenna photos and antenna size

Antenna photos



Antenna size

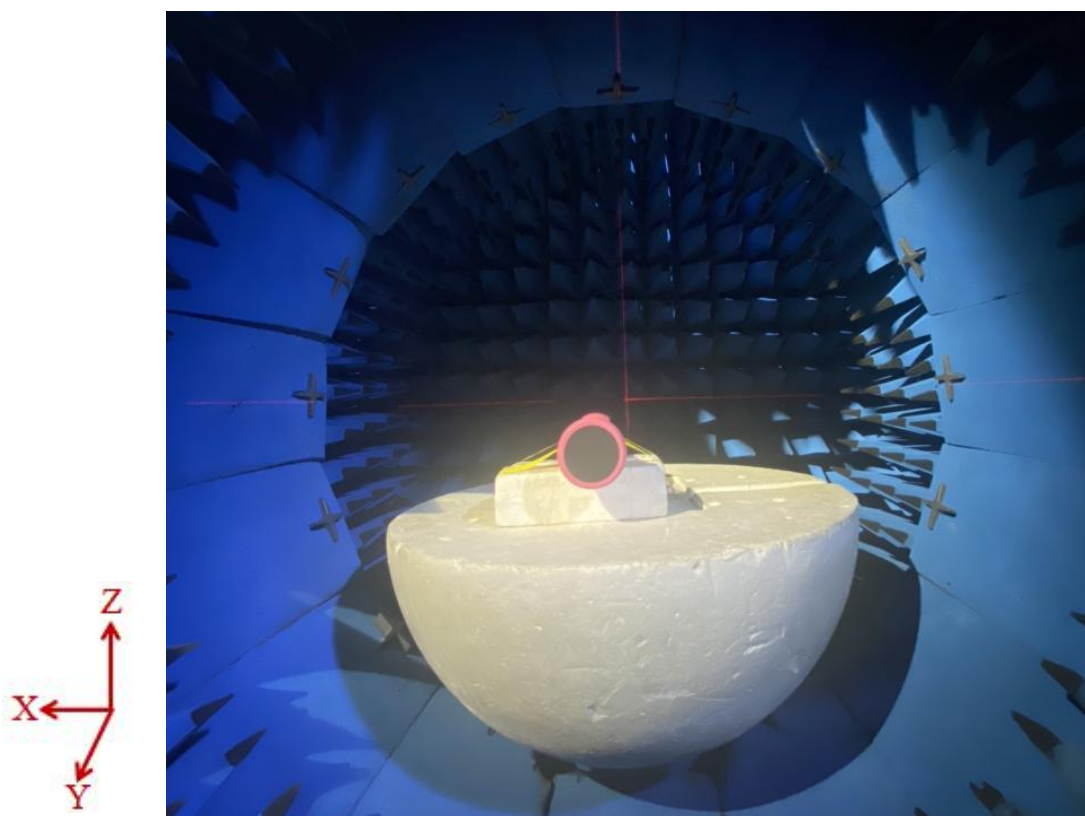


2.4 DUT setup photo of free space OTA testing

Planform



Front view



3. Test Results

3.1 Test standard

Name	Parameter	Method	Standard no.
Mobile communication antenna	VSWR	Generic specification for antennas used in the mobile communications	GB/T 9410-2008
	Antenna gain		
	Radiation pattern		
Antenna	Radiation efficiency	IEEE Standard Test Procedures for Antennas	ANSI/IEEE Std 149-1979
	Gain and directivity		

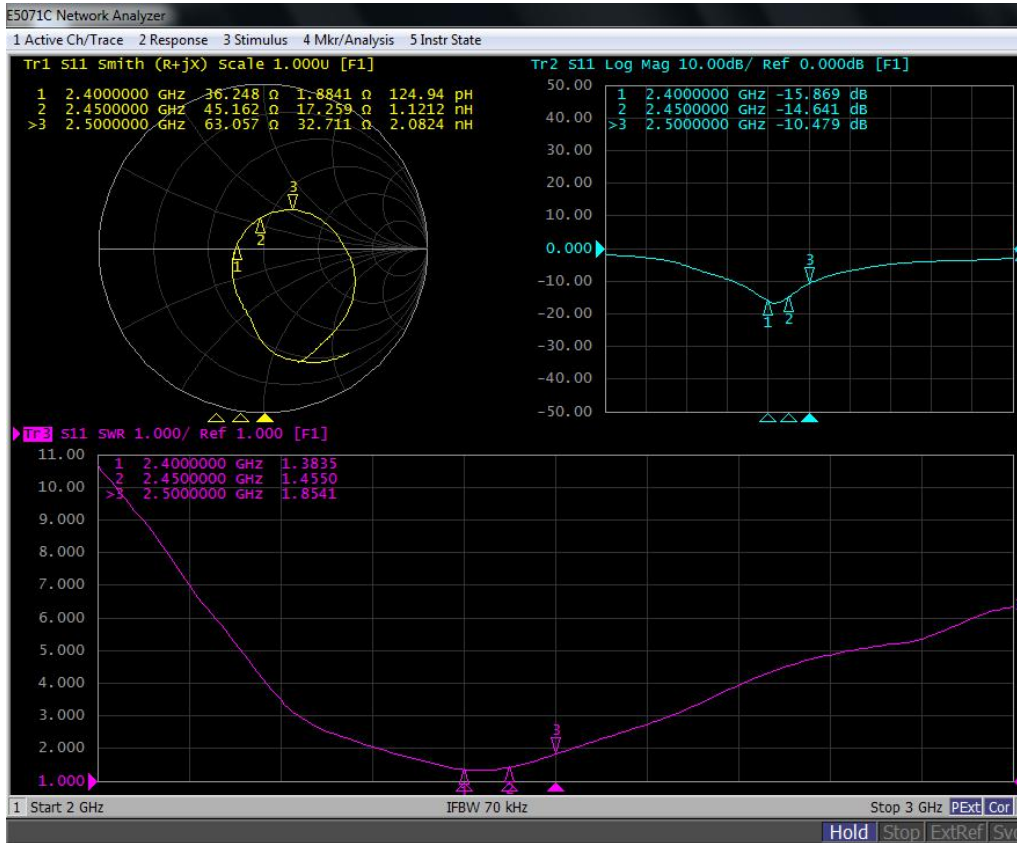
3.2 Test uncertainty

The uncertainty was calculated on the basis of the GUM published by ISO, using the inclusion factor of $K=2$ and the 95% confidence level to express the extended uncertainty.

Item	Uncertainty
Antenna gain	$\pm 1\text{dB}$
Radiation efficiency	$\pm 10\%$

3.3 Test data

3.3.1 S11 parameters



3.3.2 VSWR

Frequency/MHz	2400	2450	2500
VSWR	1.3835	1.4550	1.8541

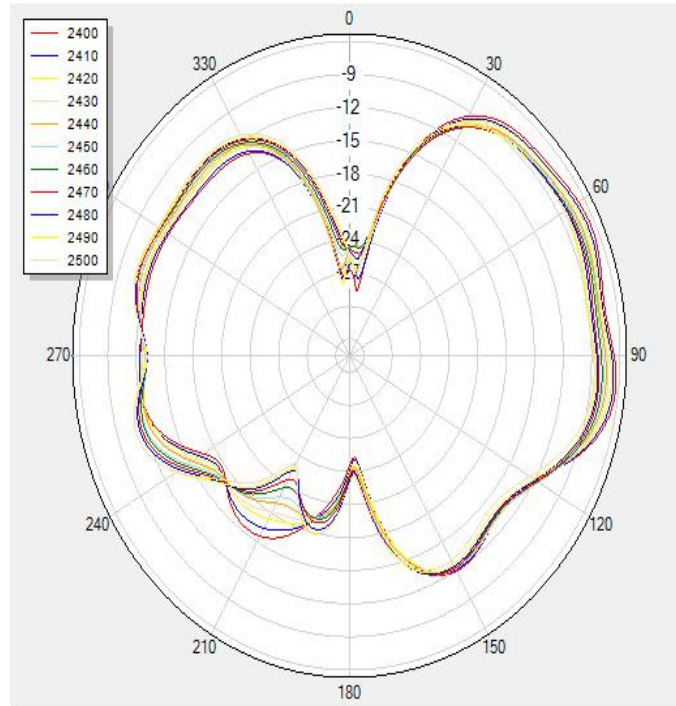
3.3.3 Gain, Efficiency

Frequency/MHz	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain/dBi	-4.76	-5.02	-5.02	-5.05	-4.93	-4.91	-4.81	-4.76	-4.66	-4.57	-4.63
Efficiency/%	10.19	9.98	9.86	9.66	9.59	9.60	9.50	9.50	9.53	9.51	9.32

3.3.4 Typical free space radiation pattern

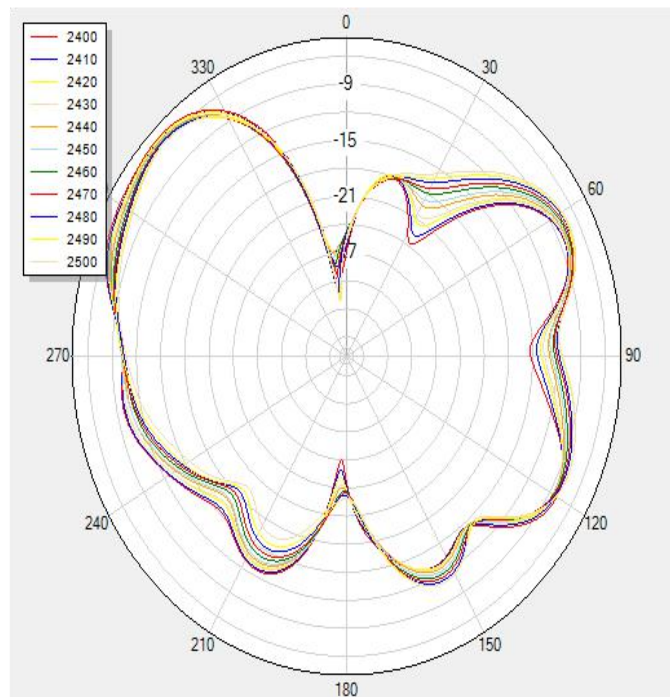
(1) X-Z Plane:

V Phi=0



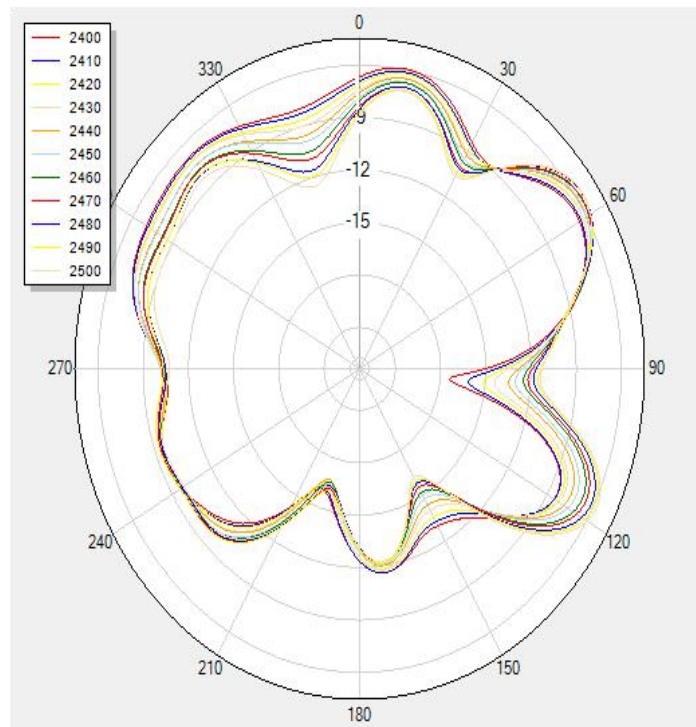
(2) Y-Z Plane:

V Phi=90

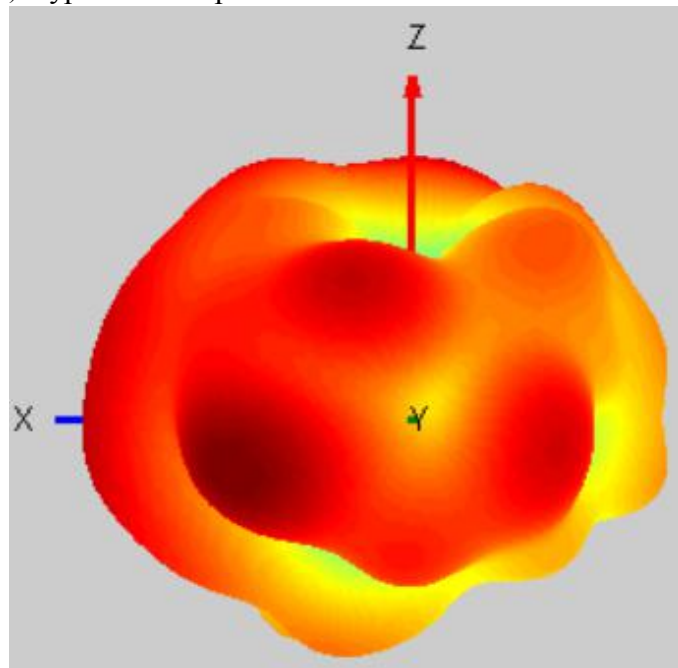


(3) X-Y Plane:

H Theta=90



(4) Typical Free Space 3D Radiation Pattern at 2.45GHz:



End

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