

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>May. 05, 2019</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	Administrative Data (GENERAL INFORMATION)	3
1.1	Identification of the Testing Laboratory	3
1.2	Identification of the Responsible Testing Location.....	3
1.3	Laboratory Condition	3
1.4	Announce	3
2	PRODUCT INFORMATION	5
2.1	Applicant Information.....	5
2.2	Manufacturer Information	5
2.3	Factory Information	5
2.4	General Description for Equipment under Test (EUT)	5
2.5	Technical Information	5
3	SUMMARY OF TEST RESULTS	6
3.1	Test Standards	6
3.2	Test Verdict.....	6
3.3	Test Uncertainty	6
4	GENERAL TEST CONFIGURATIONS.....	7
4.1	Test Condition	7
4.2	Test Equipment List.....	7
4.3	Test Setup	7
ANNEX A	TEST RESULTS.....	8
A.1	Gain and Efficiency	8
ANNEX B	RADIATION PATTERN	10
ANNEX C	TEST SETUP PHOTO.....	13
ANNEX D	EUT PHOTO	14

1 Administrative Data (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location 1	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791. The laboratory is a testing organization accredited by China Metrology Accreditation (CMA). The accreditation certificate number is 2014192290Z.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	19°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v2.2.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without

prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Shenzhen LightWind Technology Co., LTD
Address	Room 24J, Qinghai Tower, No.7043, BeiHuan Road, Futian, Shenzhen, Guangdong, China

2.2 Manufacturer Information

Manufacturer	Shenzhen LightWind Technology Co., LTD
Address	Room 24J, Qinghai Tower, No.7043, BeiHuan Road, Futian, Shenzhen, Guangdong, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

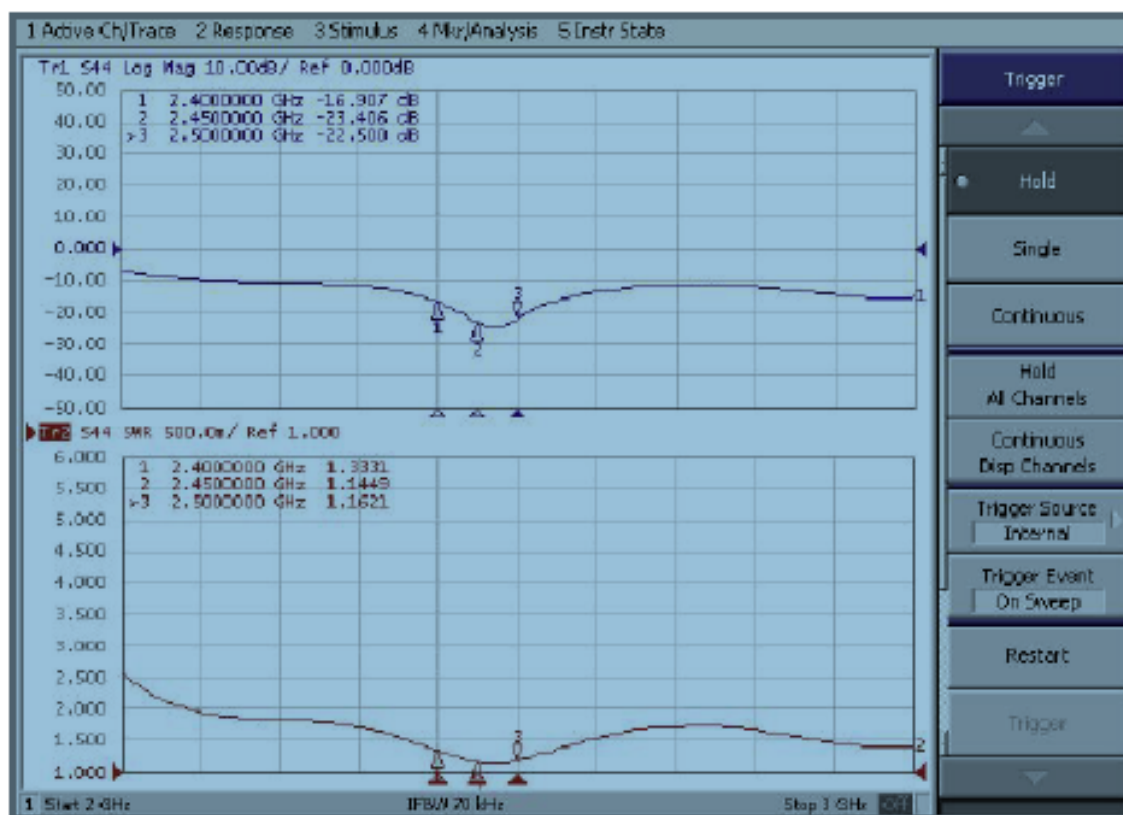
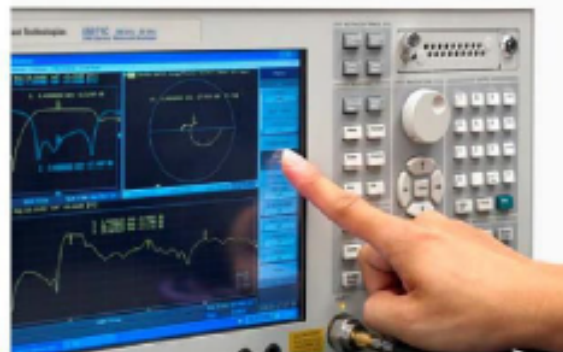
EUT Name	2.4GHz Spring Antenna
Model Name Under Test	13010001
Antenna Type	Spring Antenna
Dimensions	16mm x 3mm

2.5 Technical Information

Frequency Range	2400MHz~ 2480MHz
Test Frequencies	2400MHz, 2401MHz, 2402MHz, 2403MHz, 2404MHz, 2405MHz, 2406MHz, 2407MHz, 2408MHz, 2409MHz, 2410MHz, 2411MHz, 2412MHz, 2413MHz, 2414MHz, 2415MHz, 2416MHz, 2417MHz, 2418MHz, 2419MHz, 2420MHz, 2421MHz, 2422MHz, 2423MHz, 2424MHz, 2425MHz, 2426MHz, 2427MHz, 2428MHz, 2429MHz, 2430MHz, 2431MHz, 2432MHz, 2433MHz, 2434MHz, 2435MHz, 2436MHz, 2437MHz, 2438MHz, 2439MHz, 2440MHz, 2441MHz, 2442MHz, 2443MHz, 2444MHz, 2445MHz, 2446MHz, 2447MHz, 2448MHz, 2449MHz, 2450MHz, 2451MHz, 2452MHz, 2453MHz, 2454MHz, 2455MHz, 2456MHz, 2457MHz, 2458MHz, 2459MHz, 2460MHz, 2461MHz, 2462MHz, 2463MHz, 2464MHz, 2465MHz, 2466MHz, 2467MHz, 2468MHz, 2469MHz, 2470MHz, 2471MHz, 2472MHz, 2473MHz, 2474MHz, 2475MHz, 2476MHz, 2477MHz, 2478MHz, 2479MHz, 2480MHz

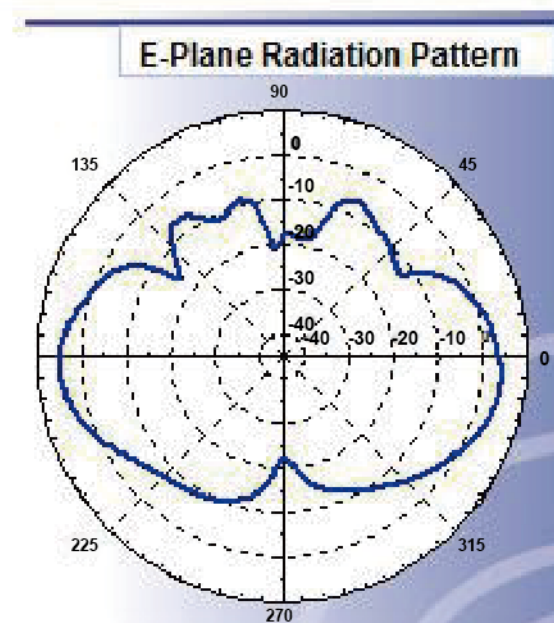
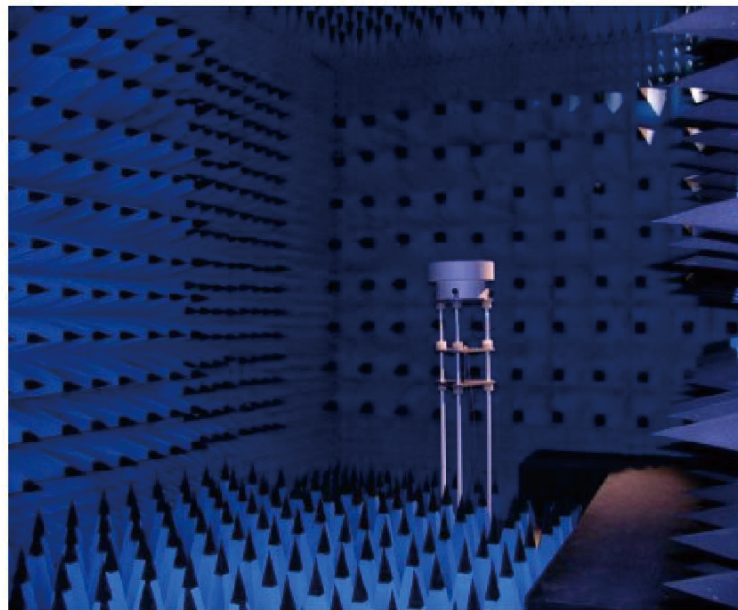
S Parameter Test

Agilent E5071C



Gain Test

*Antenna
Radiation
Pattern
VS
Gain*



3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	IEEE149-1979	IEEE Standard Test Procedures for Antennas

3.2 Test Verdict

Report Section	Description	Remark
ANNEX A.1	Gain and Efficiency	--
ANNEX B	Radiation Pattern	--

3.3 Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Item	Uncertainty
VSWR(S11)	± 0.2
Gain	$\pm 0.5\text{dB}$

4 GENERAL TEST CONFIGURATIONS

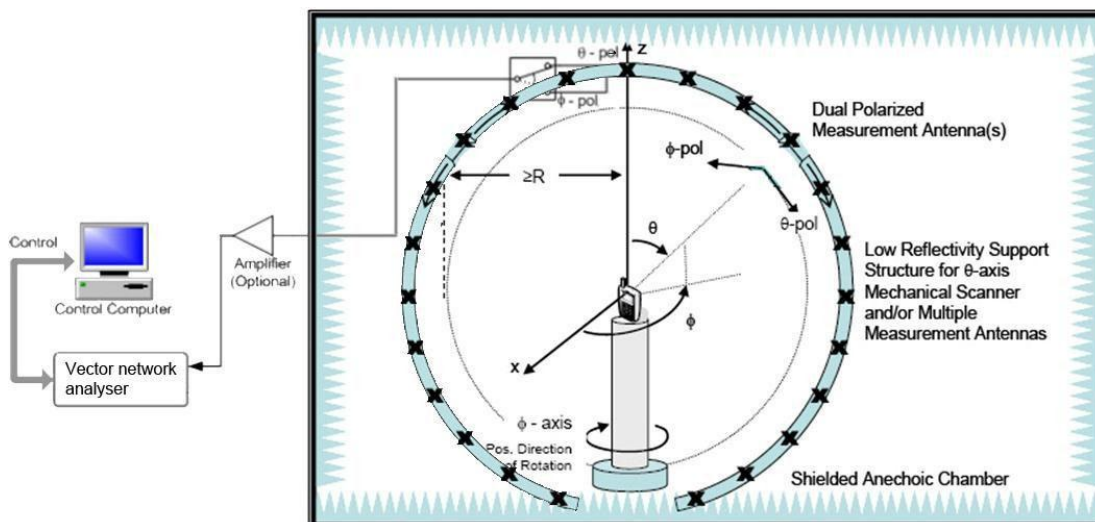
4.1 Test Condition

Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	100 to 102	19 to 25	N/A	45 to 55

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Vector Network Analyzer	Agilent	E5071C	MY46103472	2018.03.14	2019.03.13
5*5*5 Full Anechoic Chamber	SATIMO	5*5*5	CN-1307-555	2016.09.28	2018.09.27
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855-0001	2016.12. 09	2018.12.08

4.3 Test Setup



ANNEX A TEST RESULTS

A.1 Gain and Efficiency

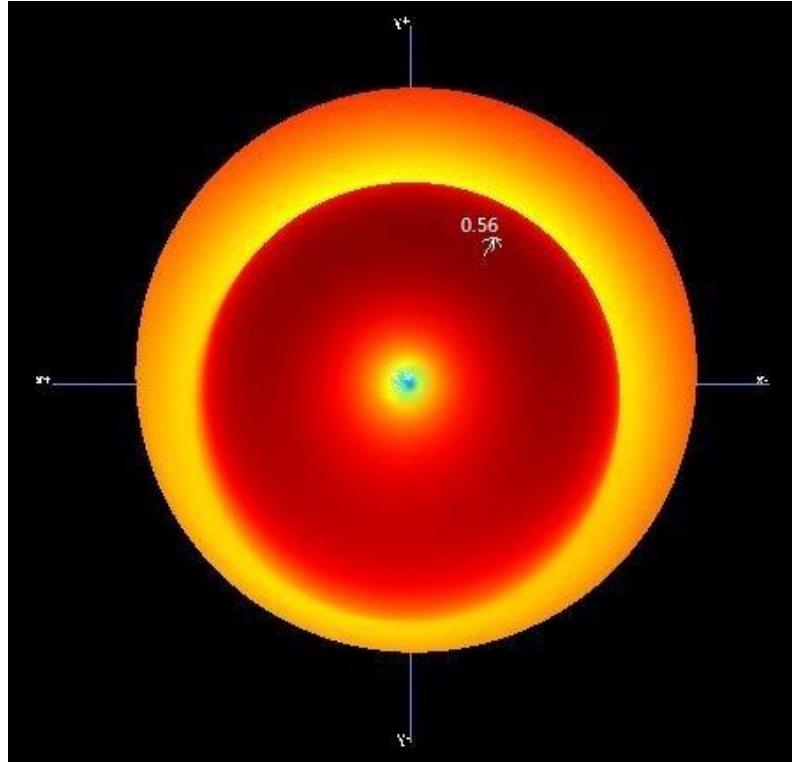
Frequency	Gain (dBi)	Efficiency (%)
2400MHz	0.56	35
2401MHz	0.56	35
2402MHz	0.55	35
2403MHz	0.55	35
2404MHz	0.55	35
2405MHz	0.54	35
2406MHz	0.54	35
2407MHz	0.54	35
2408MHz	0.54	35
2409MHz	0.53	35
2410MHz	0.53	35
2411MHz	0.53	34
2412MHz	0.53	34
2413MHz	0.52	34
2414MHz	0.52	34
2415MHz	0.52	34
2416MHz	0.51	34
2417MHz	0.51	34
2418MHz	0.51	34
2419MHz	0.50	33
2420MHz	0.50	33
2421MHz	0.50	33
2422MHz	0.50	33
2423MHz	0.49	33
2424MHz	0.49	33
2425MHz	0.49	33
2426MHz	0.49	33
2427MHz	0.48	33
2428MHz	0.48	33
2429MHz	0.48	33
2430MHz	0.48	33
2431MHz	0.48	33
2432MHz	0.47	32
2433MHz	0.47	32
2434MHz	0.47	32
2435MHz	0.47	32
2436MHz	0.46	31
2437MHz	0.46	31
2438MHz	0.46	31

2439MHz	0.46	30
2440MHz	0.45	30
2441MHz	0.45	30
2442MHz	0.45	30
2443MHz	0.44	30
2444MHz	0.44	30
2445MHz	0.43	30
2446MHz	0.43	31
2447MHz	0.44	31
2448MHz	0.44	31
2449MHz	0.44	31
2450MHz	0.45	31
2451MHz	0.45	31
2452MHz	0.45	31
2453MHz	0.45	31
2454MHz	0.46	31
2455MHz	0.46	31
2456MHz	0.46	31
2457MHz	0.46	32
2458MHz	0.47	32
2459MHz	0.47	32
2460MHz	0.47	32
2461MHz	0.47	32
2462MHz	0.48	32
2463MHz	0.48	32
2464MHz	0.48	32
2465MHz	0.49	32
2466MHz	0.49	32
2467MHz	0.49	32
2468MHz	0.50	32
2469MHz	0.50	32
2470MHz	0.50	32
2471MHz	0.51	32
2472MHz	0.51	32
2473MHz	0.52	32
2474MHz	0.52	32
2475MHz	0.53	32
2476MHz	0.53	32
2477MHz	0.54	31
2478MHz	0.54	31
2479MHz	0.55	31
2480MHz	0.55	31

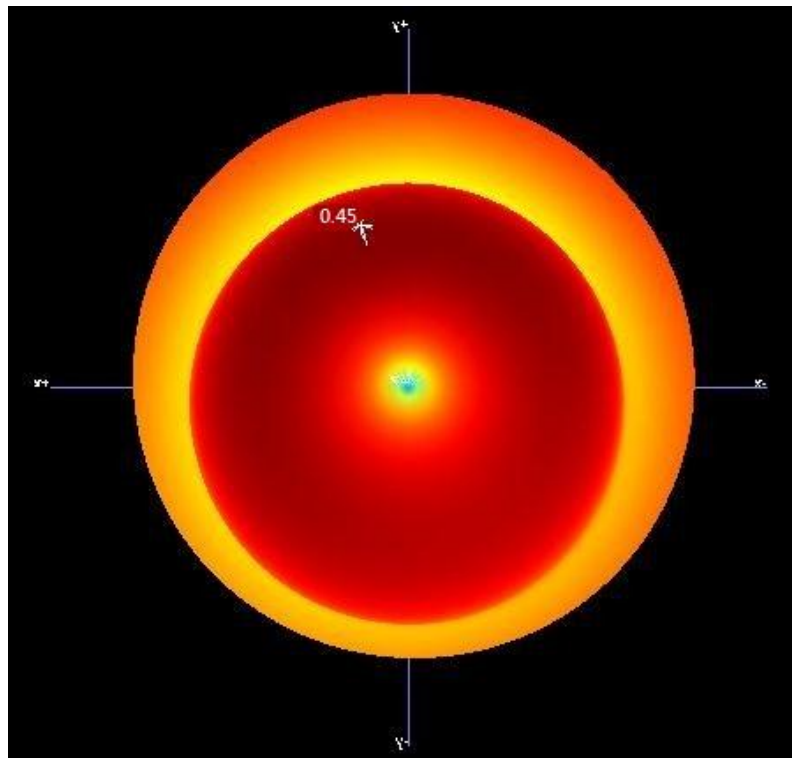
ANNEX B RADIATION PATTERN

B.1 3D Pattern

B1.1 3D Pattern for 2400MHz

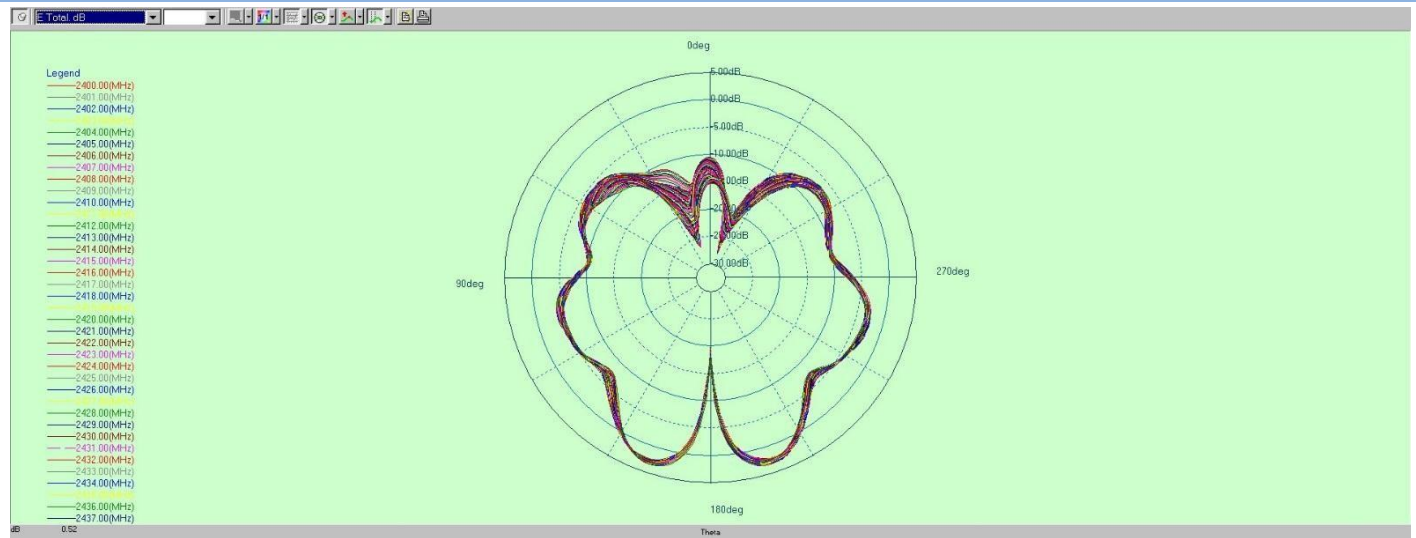


B1.2 3D Pattern for 2450MHz

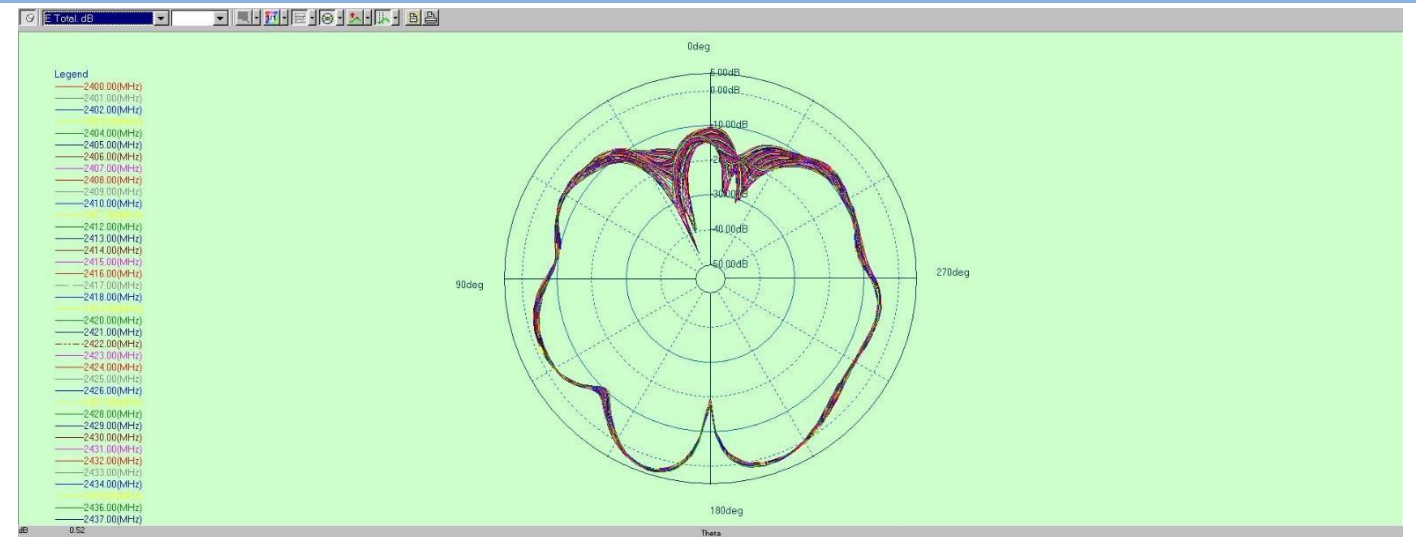


B.2 1D Radiation Pattern

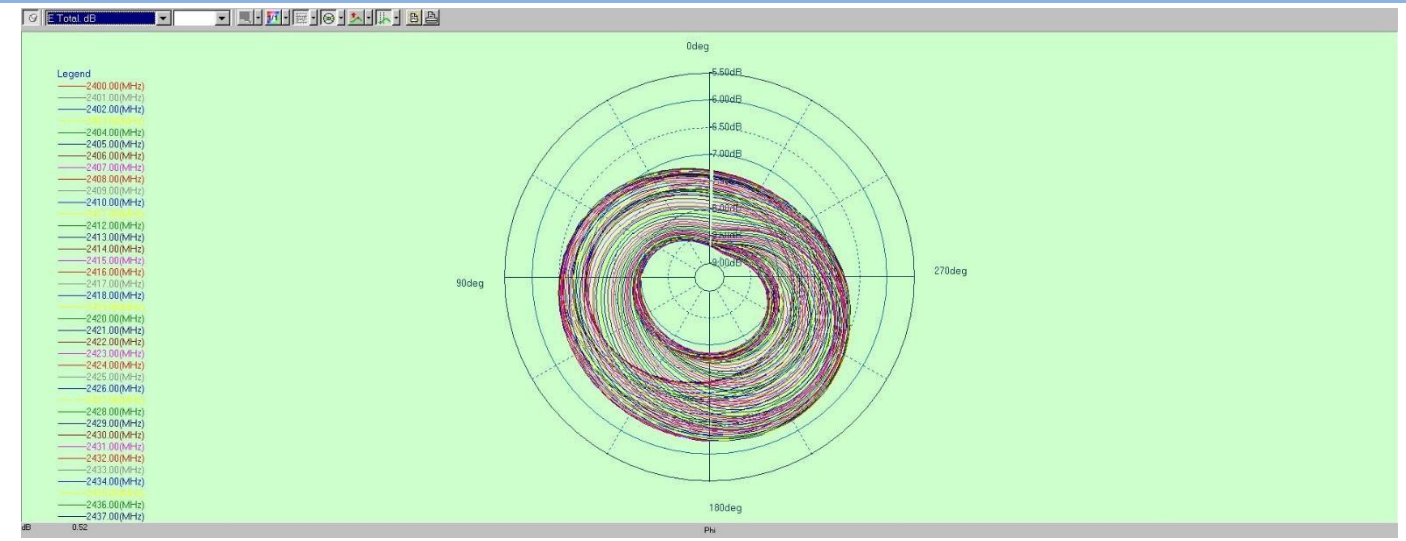
B2.1 PHI=0



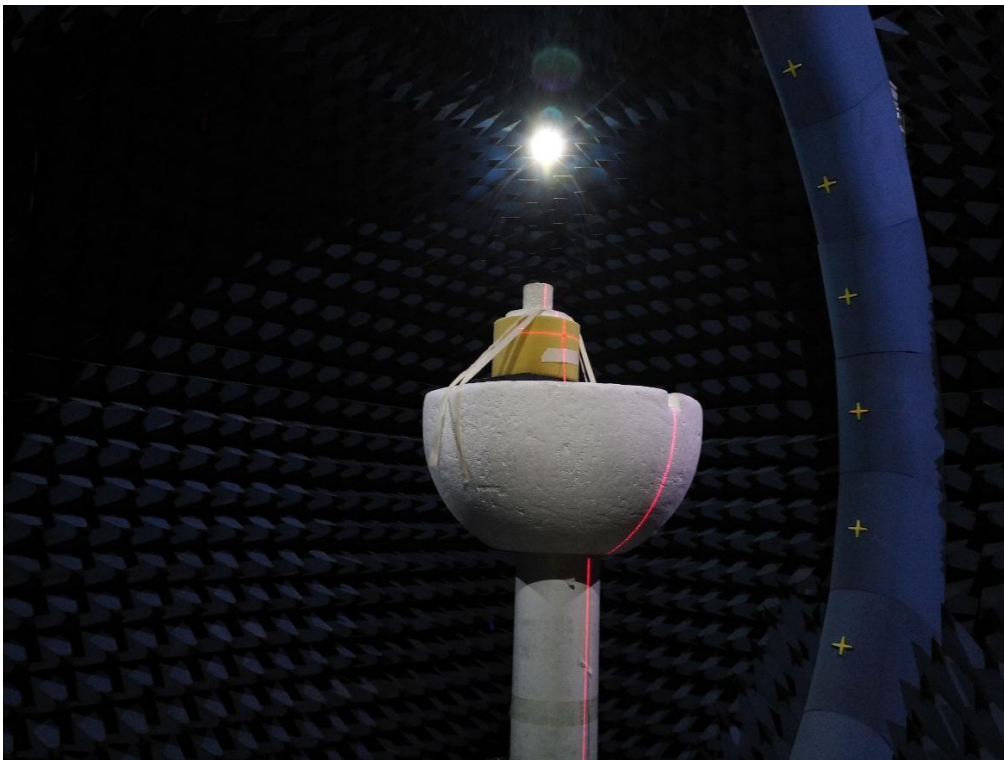
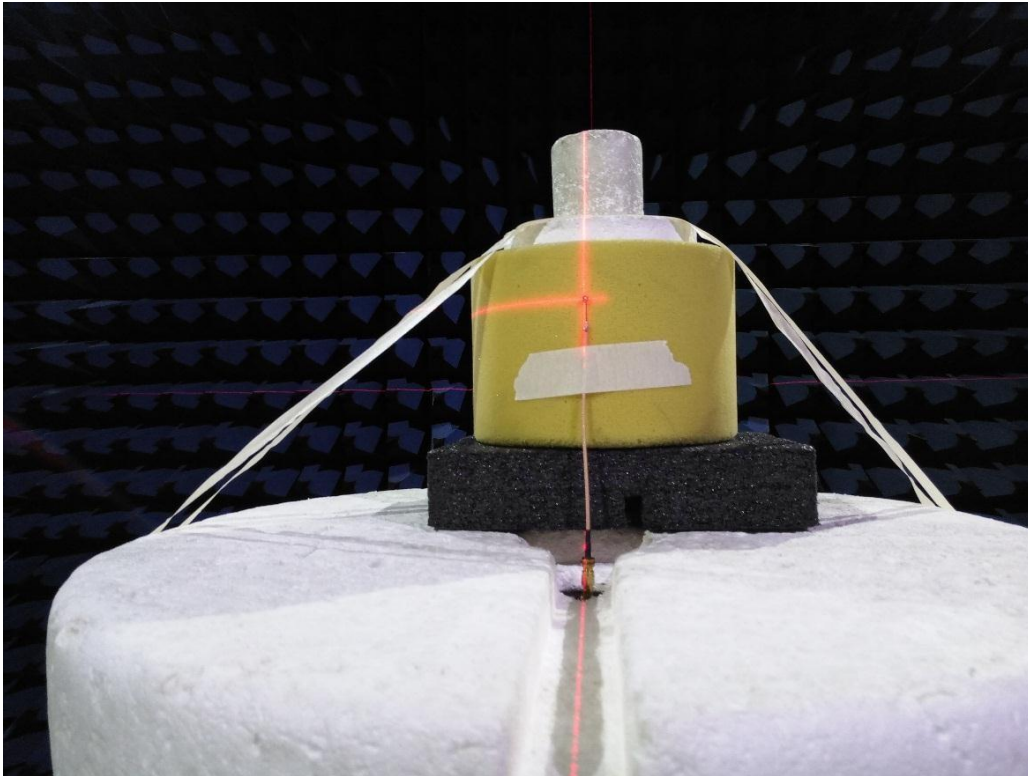
B2.2 PHI=90



B2.3 THETA=90



ANNEX C TEST SETUP PHOTO



DOCUMENT NUMBER		UNIT:MM				EDITION	REVISE	DATE
							ADDITION	2019-11-23

18.00

0.50±0.1

13.00

TECHNICAL REQUIREMENTS									
Product Model:	2.4G antenna	SpringLength:	18MM	DESIGN					
Frequency:	2371-2500MHz	Antenna Size:	Outer diameter of the circle	AUDIT					
S.W.R.:	≤1.5	Antenna Length:	Note the size required (As illustrated)	RATIFY					
Antenna Gain:	3	Connector Type:	No interface-Direct welding service	QUANTITY		SCALE			
Impedance:	50Ω	Operating Temp.:	-10 ~ +60 °C	1		1 : 1			
Max Input powet:	50W	Storage Temp.:	-10 ~ +70 °C						
Polarization Type:	Vertical or horizontal								
Material model:	brass							NAME	
Spring OD:	Wire diameter 0.5mm								
								Customer Material Number	2.4G antenna
								Part Number	
Shen zhen Sheng bang er Technology Co., LTD									