

# ANTENNA

# TEST REPORT

ISSUED BY  
Shenzhen BALUN Technology Co., Ltd.

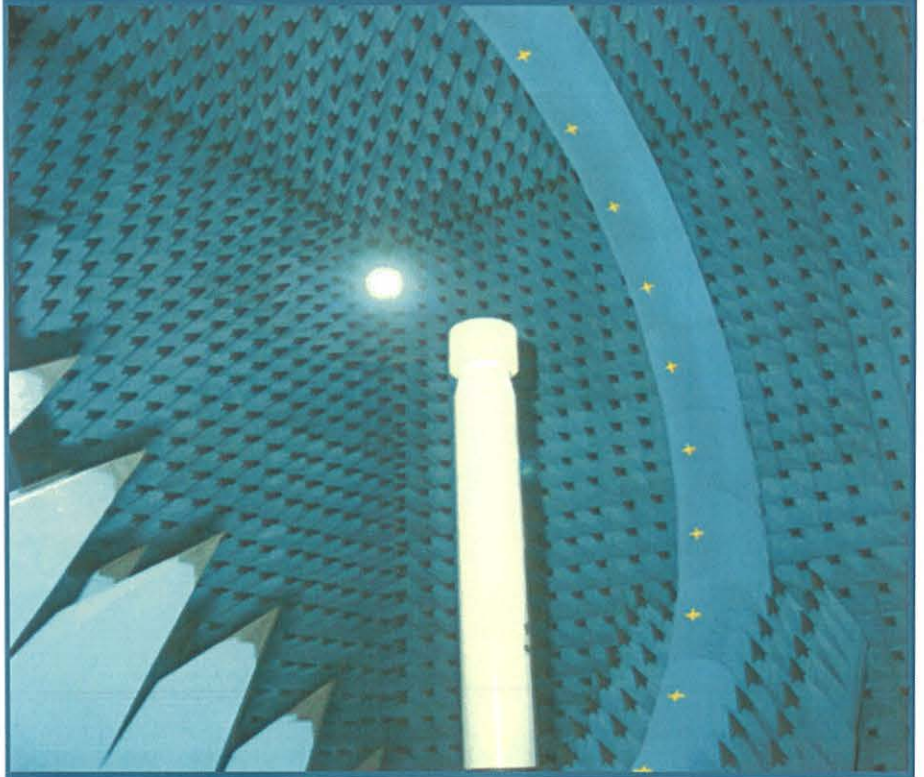


FOR  
**BLE / 2.4GHz RF Soc Bluetooth Module**

**Antenna**

ISSUED TO  
New Spirit Technology Ltd.

6/F Karin Building, 166 Wai Yip Street, Kwun Tong, Kowloon, HongKong



Prepared by: *Peng Mengbin*  
Peng Mengbin  
(Reporting Specialist)  
Date: *Dec 18, 2014*

Approved by: *Wei Yanquan*  
Wei Yanquan  
(Chief Engineer)  
Date: *Dec 18, 2014*

Report No: BL-SZ14C0055-901  
EUT Type: BLE / 2.4GHz RF Soc Bluetooth Module  
Antenna  
Model Name: KNRF51822\_A24  
Brand Name: NEW SPIRIT  
Test Standard: IEEE149-1979  
Maximum: Gain: -3.10(dBi)  
Efficiency: 8%  
Test Date: Dec 16, 2014  
Date of Issue: Dec 18, 2014

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**Revision History**

<u>Version</u>	<u>Issue Date</u>	<u>Revisions</u>
<u>Rev. 01</u>	<u>Dec 18, 2014</u>	<u>Initial Issue</u>

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# 1 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
Fax Number	+86 755 6182 4271

## 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	<p>The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588.</p> <p>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.</p>
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 Announce

- (1) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (2) The test report is invalid if there is any evidence and/or falsification.
- (3) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (4) 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.
- (5) 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

Applicant	New Spirit Technology Ltd.
Address	6/F Karin Building, 166 Wai Yip Street, Kwun Tong, Kowloon, HongKong
Contact Person	Leo Lee
Telephone Number	852 27633211
Fax Number	N/A
E-mail Address	info@newspirit.com.hk

### 2.2 Manufacturer

Manufacturer	New Spirit Technology Ltd.
Address	6/F Karin Building, 166 Wai Yip Street, Kwun Tong, Kowloon, HongKong
Contact Person	Leo Lee
Telephone Number	852 27633211
Fax Number	N/A
E-mail Address	info@newspirit.com.hk

### 2.3 General Description for Equipment under Test (EUT)

EUT Type	BLE / 2.4GHz RF Soc Bluetooth Module Antenna
Model Name	KNRF51822_A24
Antenna Type	PCB Antenna
Hardware Version	V1.0

### 2.4 Technical Information

Frequency Range	2400MHz~ 2500MHz
Test Frequencies	2402MHz, 2441MHz, 2480MHz

## 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)	0.2dB
Gain	0.5dB

## 4 GENERAL TEST CONFIGURATIONS

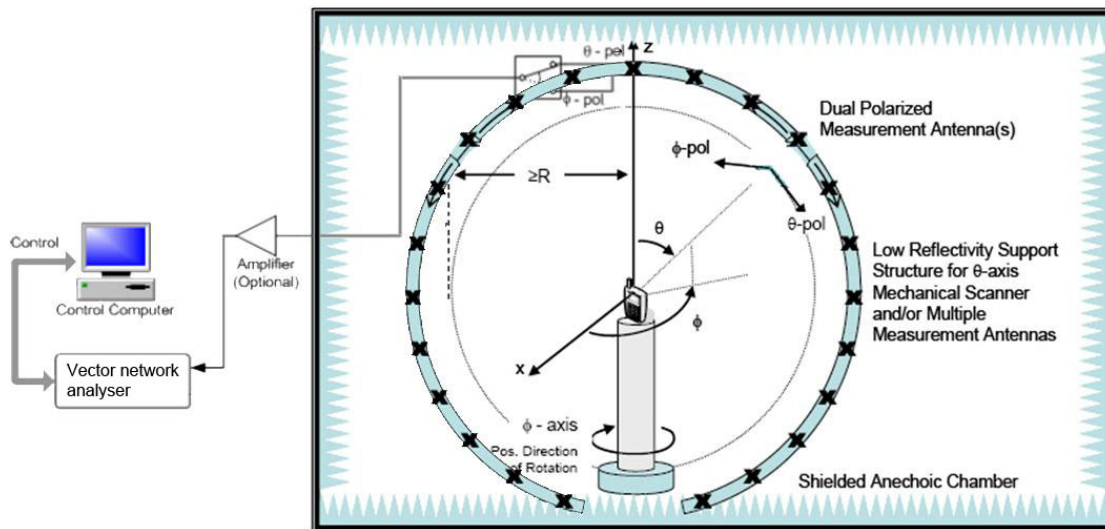
### 4.1 Test Condition

Environment Parameter	Selected Values During Tests			
	Ambient Pressure	Temperature	Voltage	Relative Humidity
Normal Temperature, Normal Voltage (NTNV)	100 to 102 KPa	25°C	N/A	51%

### 4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Vector Network Analyzer	Agilent	E5071C	MY46103472	2014.12.12	2015.12.11
5*5*5 Full Anechoic Chamber	SATIMO	5*5*5	N/A	2014.09.05	2015.09.04
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855-0001	2014.10.25	2015.10.24

### 4.3 Test Setup



## ANNEX A TEST RESULTS

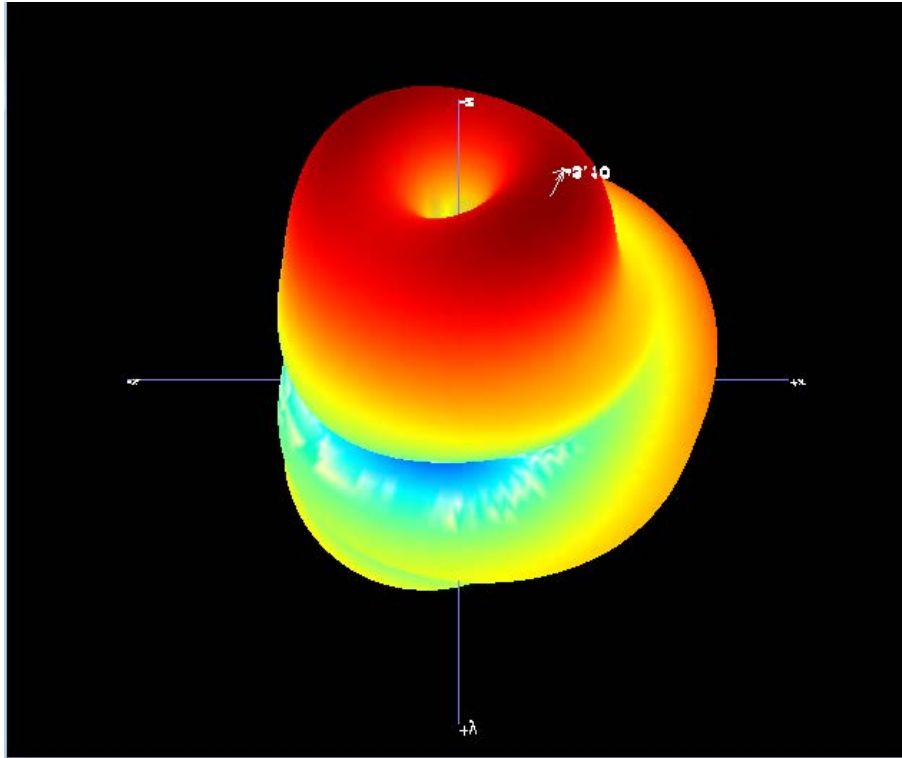
### A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
2402MHz	-3.10	8
2441MHz	-3.42	7
2480MHz	-4.11	7

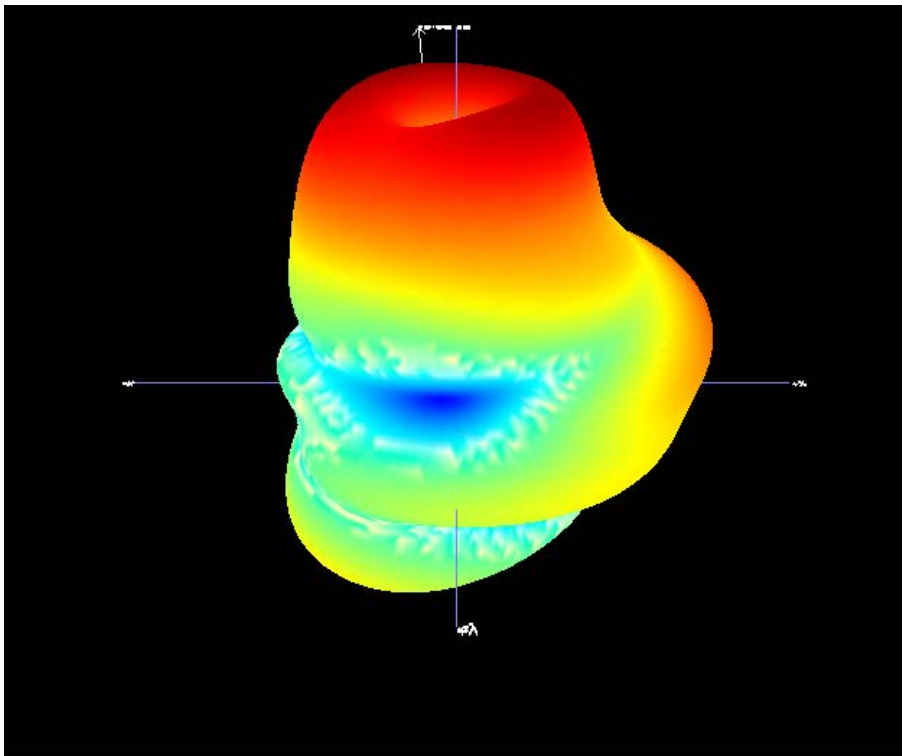
## ANNEX B RADIATION PATTERN

### B.1 3D Pattern

B1.1 3D Pattern for 2402MHz

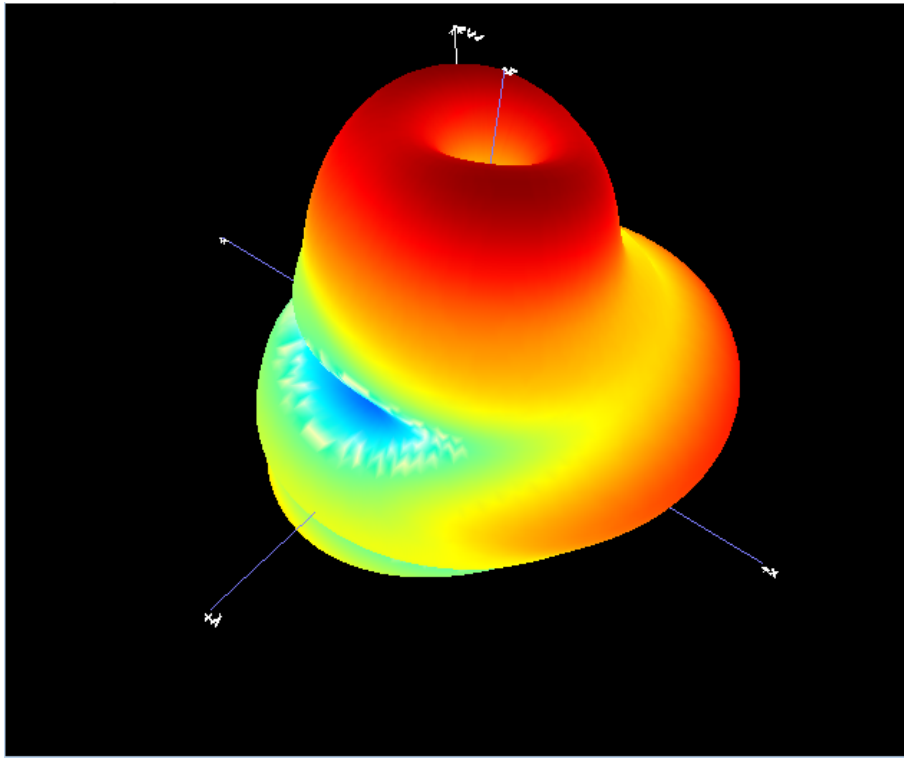


B1.2 3D Pattern for 2441MHz



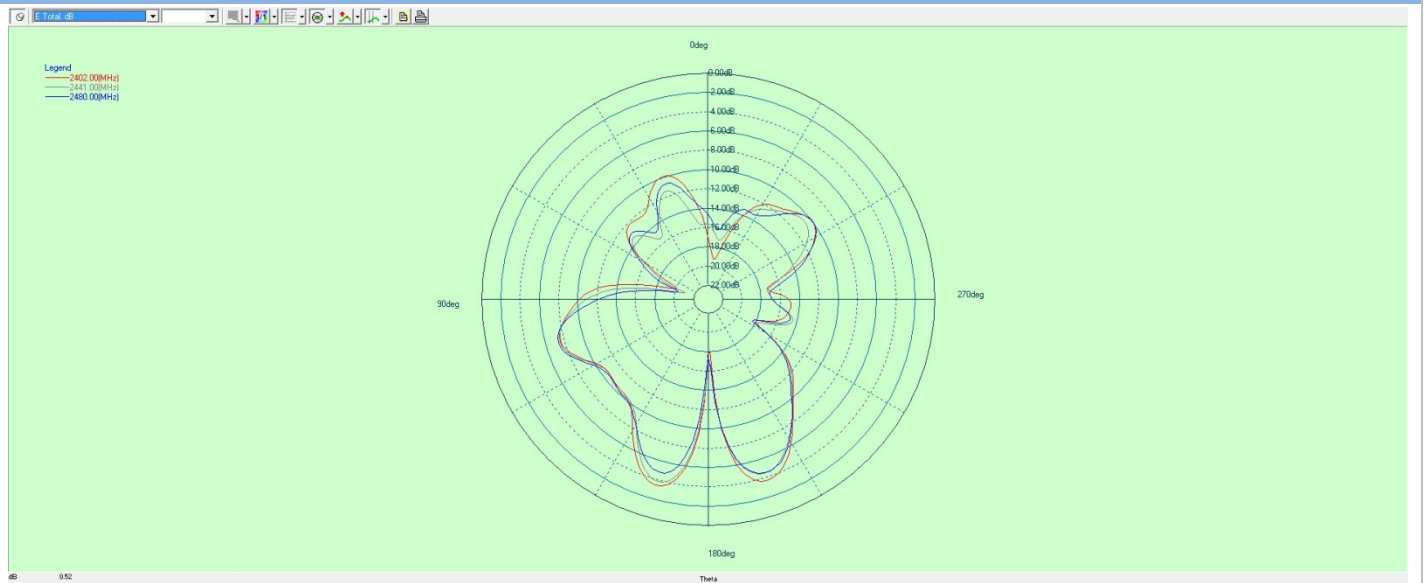


B1.3 3D Pattern for 2480MHz

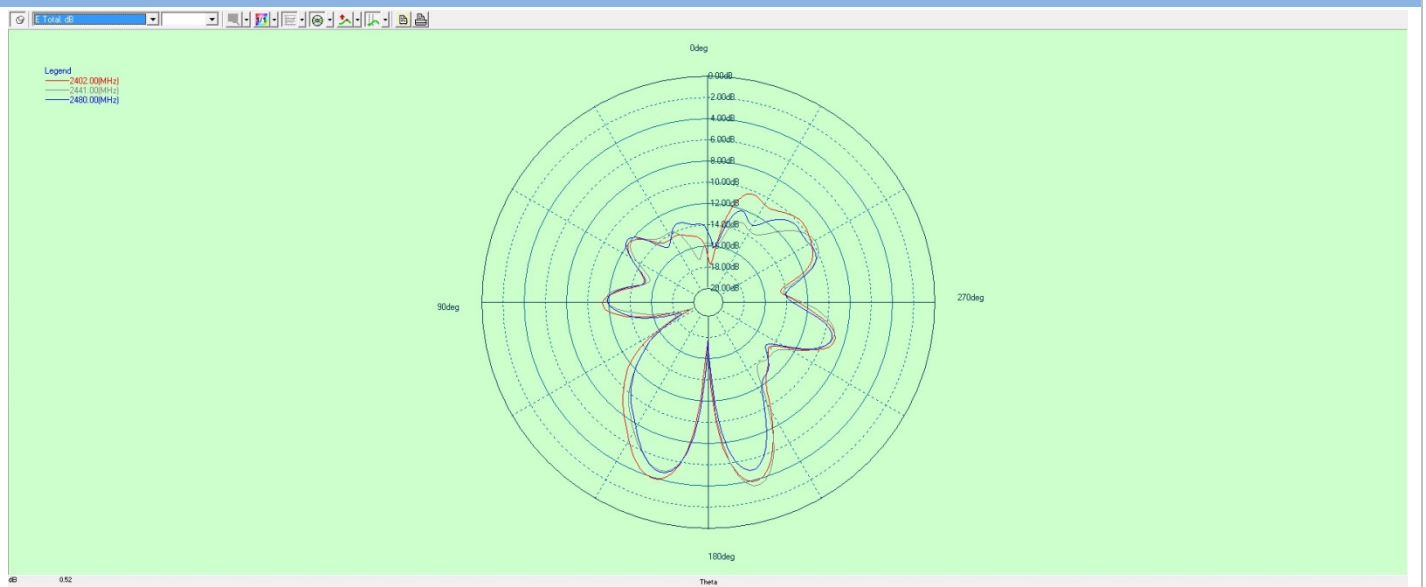


## B.2 1D Radiation Pattern

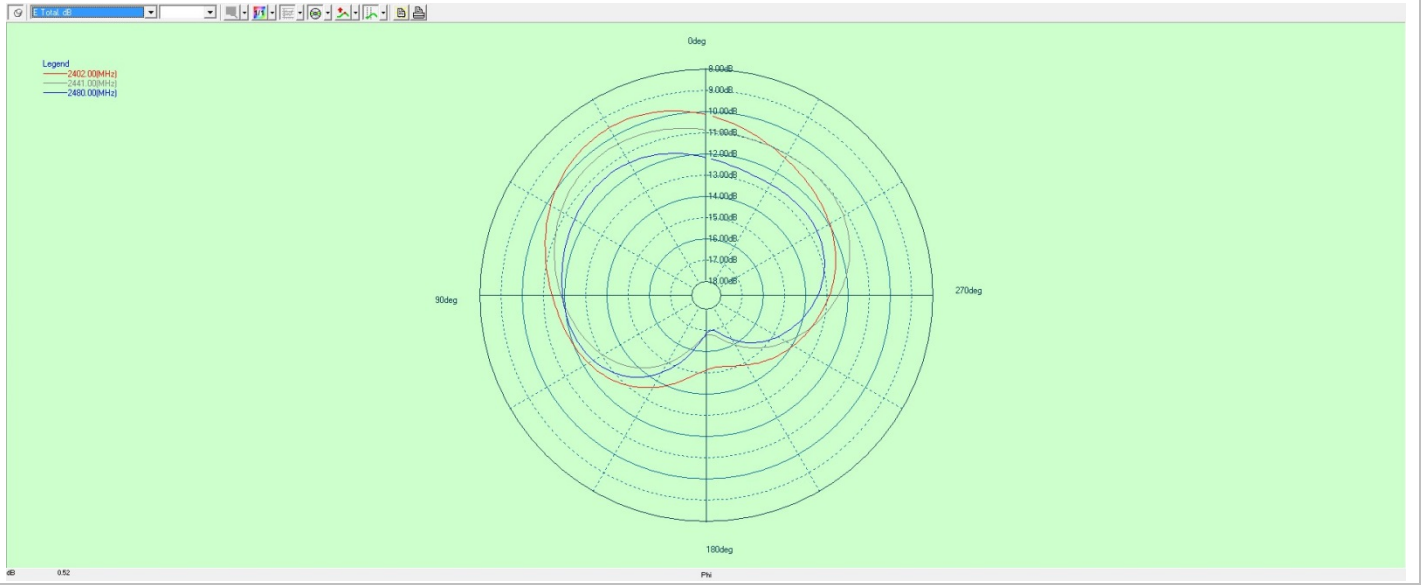
### B.2.1 PHI=0



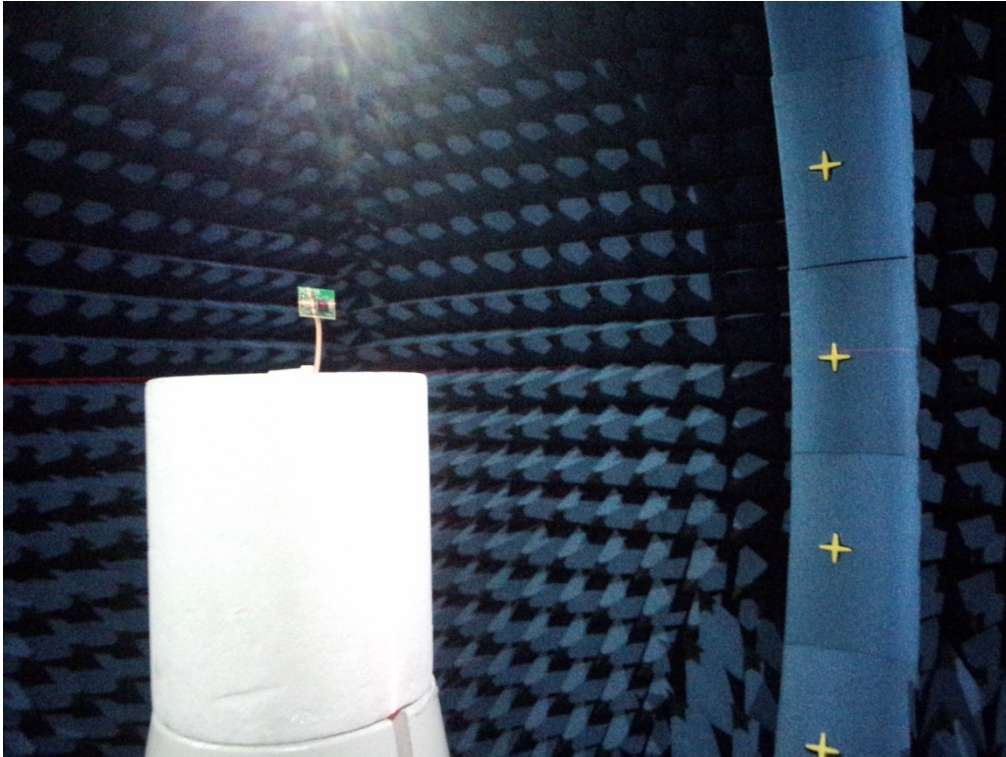
### B.2.2 PHI=90



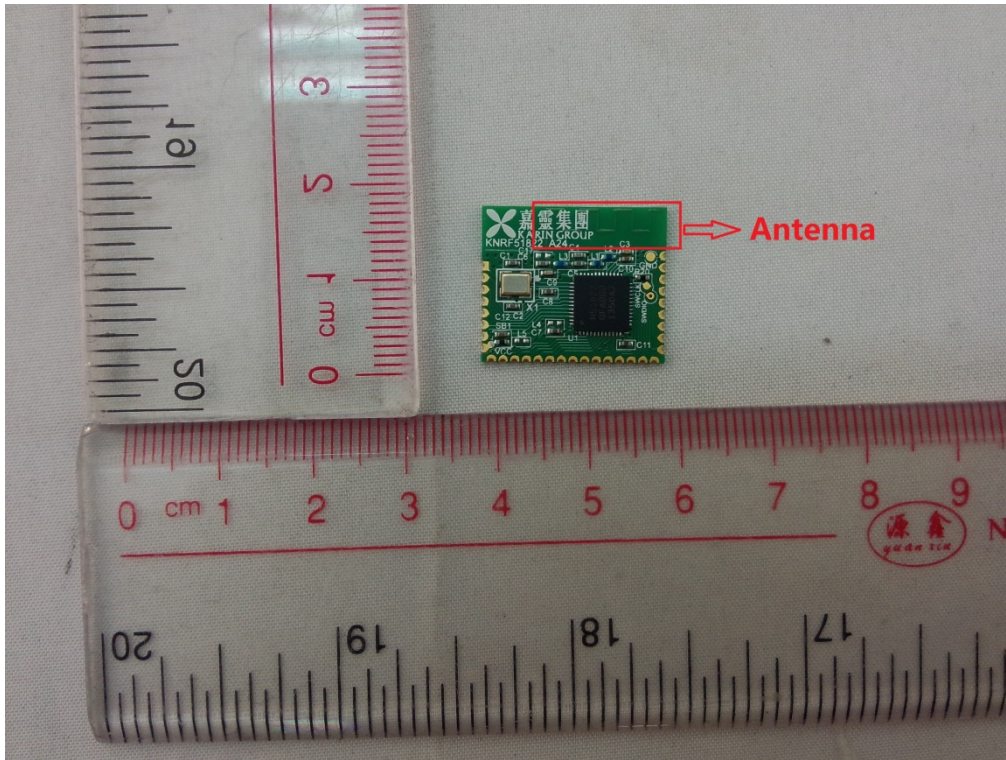
B2.3 THETA=90



## ANNEX C TEST SETUP PHOTO



## ANNEX D EUT PHOTO



--END OF REPORT--