

Testing Report

Customer Name: Ningbo Hangyong Electronics Co., Ltd.

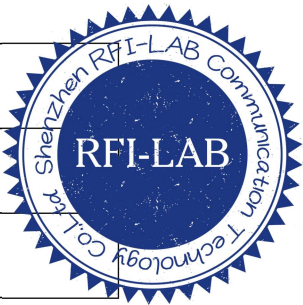
Product Name: 433M PCB On-Board Antenna

Sample Model: E3

Reference Standard: *GB/T 9410-2008; ANSI/IEEE Std149-1979*

Issue Date: 2026.7.6

Engineer: Zkmis	Date: 2026.7.6
Auditor: Eason	Date: 2026.7.6
Approver: Amon	Date: 2026.7.6



Version

Version No.	Date	Description	Formulate	Approval
A0	2026.7.6	For the first time, formulate	Zkris	Eason

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1.1 General information of testing institutions

Name	Shenzhen RFI-LAB Communication Technology Co., Ltd.
Address	103 Building 1 Tingwei Industrial Park,No.6, Liufang Road, Zone 67Xingdong,Xin'an Subdistrict,Bao'an District, Shenzhen, Guangdong, China
Tel	/
E-mail	/
Equipment	All the equipment used in the report is fixed in 103 Building 1 Tingwei Industrial Park,No.6, Liufang Road, Zone 67Xingdong,Xin'an Subdistrict,Bao'an District, Shenzhen, Guangdong, China

The diagram illustrates the RayZone-5000 SISO Test Setup. It shows a PC connected to a Network Analyzer and a Router. The Network Analyzer is connected to the RayZone5000 RF Switching Unit (1X46) via a ferrite cable. The RF Switching Unit is connected to the Anechoic Chamber (CTS RayZone-5000) via a ferrite cable. The Anechoic Chamber contains a Dual-Polar Measurement Probe and a Com Antenna. The setup is controlled by a Turntable Controller (DB9) connected to the RF Switching Unit. The diagram also shows the connection of the Network Analyzer to the Router and the PC.

1.3 Test equipment

Equipment	Model No.	Serial No.	Manufacturer	Calibration date	Next calibration date
OTA Test System	RayZone-5000	RFI-LAB-RF-D00	GTS	2026.1.19	2028.1.18
Network Analyzer	E5071C	RFI-LAB-RF-D01	KEYSIGHT	2026.5.25	2027.5.24
Network Analyzer	E5071C	RFI-LAB-RF-C02	KEYSIGHT	2026.5.25	2027.5.24

1.4 Test environment

Temperature	23.7°C
Humidity	58%RH
Pressure	100.22kPa

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

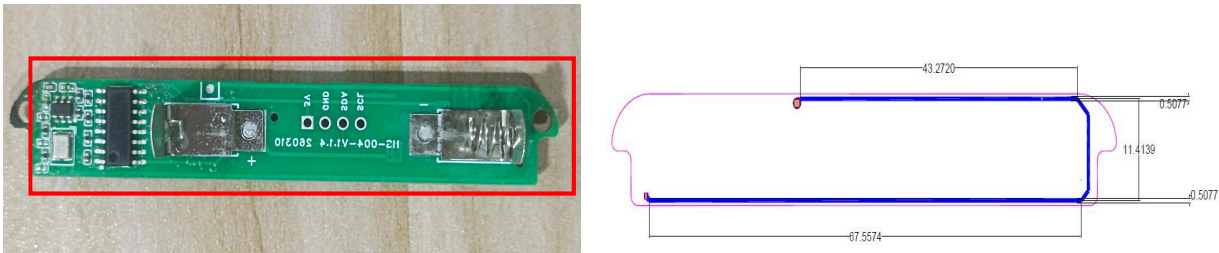
2.1 Client information

Name	Ningbo Hangyong Electronics Co., Ltd.
Address	Inside the compound of Huilong Industrial Zone (Xingxin Weaving), Qiu'ai Town, Yinzhou District, Ningbo City
Contacts	/
Tel	/
E-mail	/
Manufacturer	Ningbo Hangyong Electronics Co., Ltd.
Address	Inside the compound of Huilong Industrial Zone (Xingxin Weaving), Qiu'ai Town, Yinzhou District, Ningbo City

2.2 Description of EUT(S)

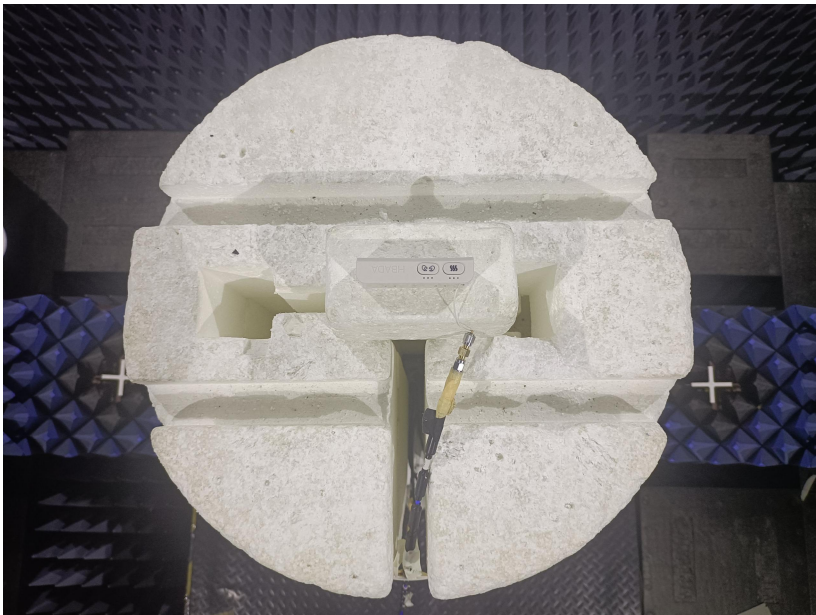
Product Name	433M PCB On-Board Antenna
Sample Model	E3
Serial No.	/
Antenna Type	PCB Antenna
Test Item	VSWR;Antenna gain; Efficiency; Radiation pattern
Frequency Range	428~438MHz
Received Date	2026.7.6
Test Date	2026.7.6
Remark	/

2.3 EUT appearance

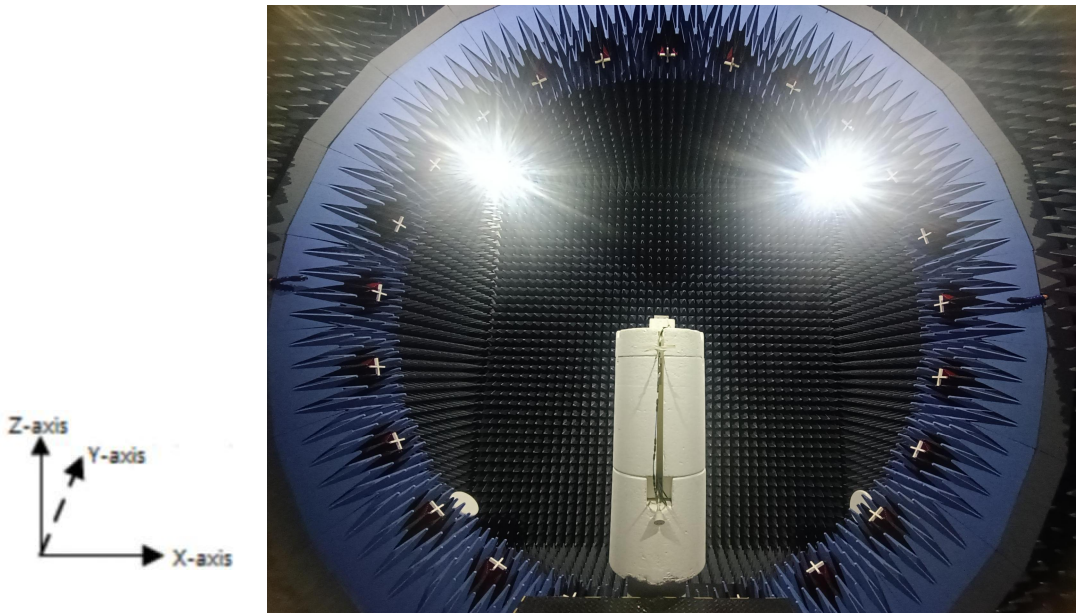


2.4 EUT setup photo of free space OTA testing

Planform



Front view



3. Test Results

3.1 Test standard

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

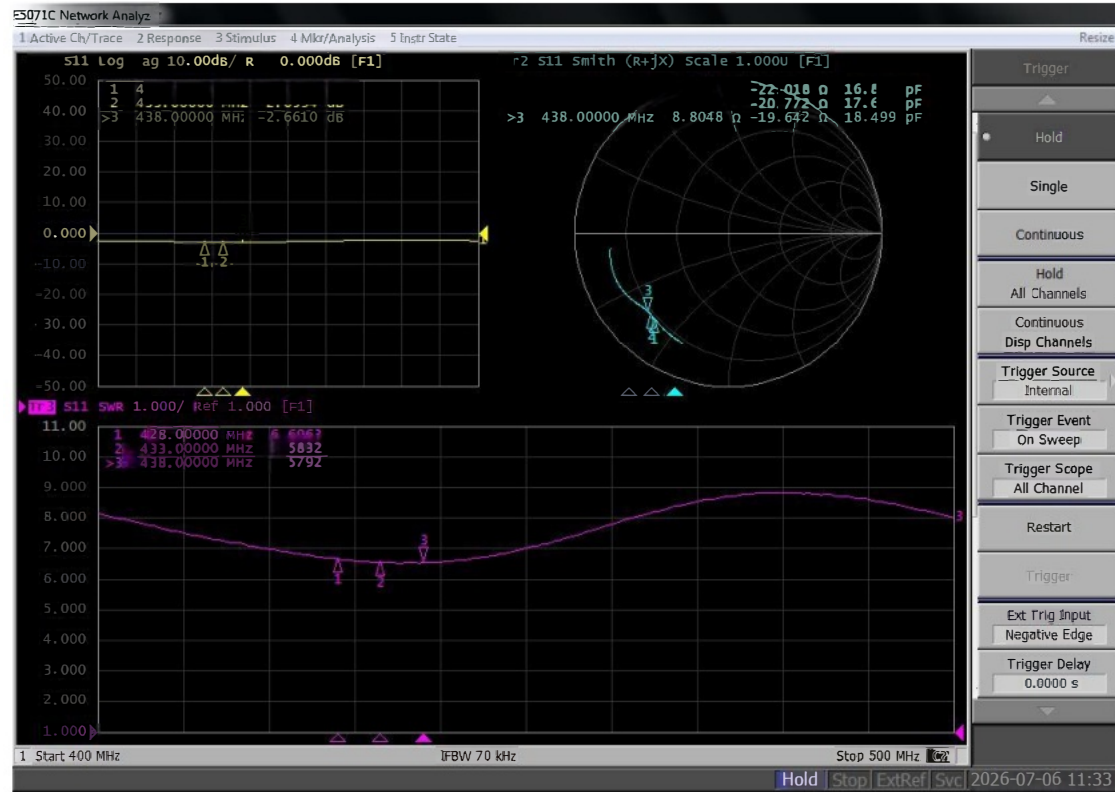
3.2 Test uncertainty

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
VSWR	± 0.3
Antenna gain	$\pm 0.72\text{dB}$
Radiation efficiency	$\pm 0.72\text{dB}$

3.3 Test data

3.3.1 S11 parameters



3.3.2 S11 data

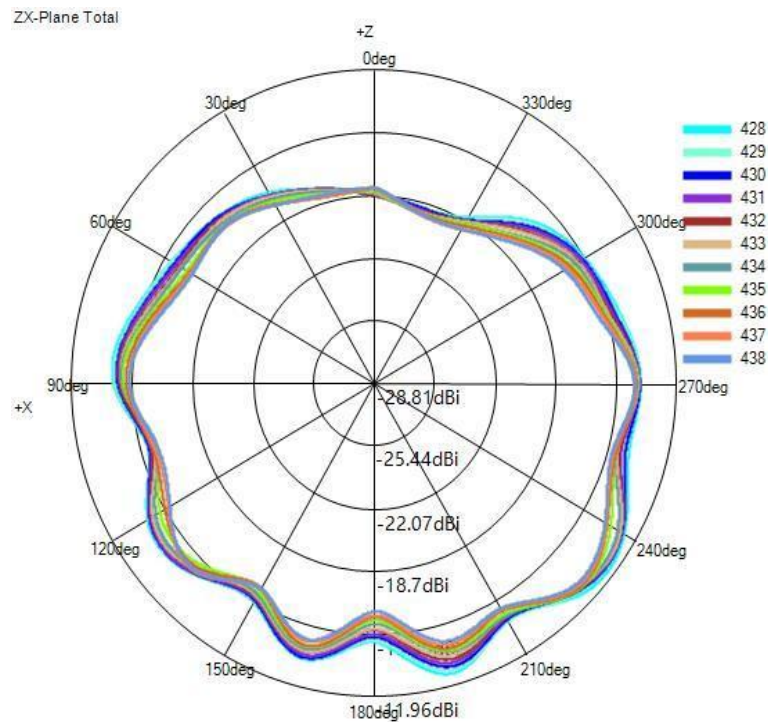
Frequency/MHz	428	433	438
VSWR	6.6963	6.5832	6.5792

3.3.3 Typical free space efficiency and gain

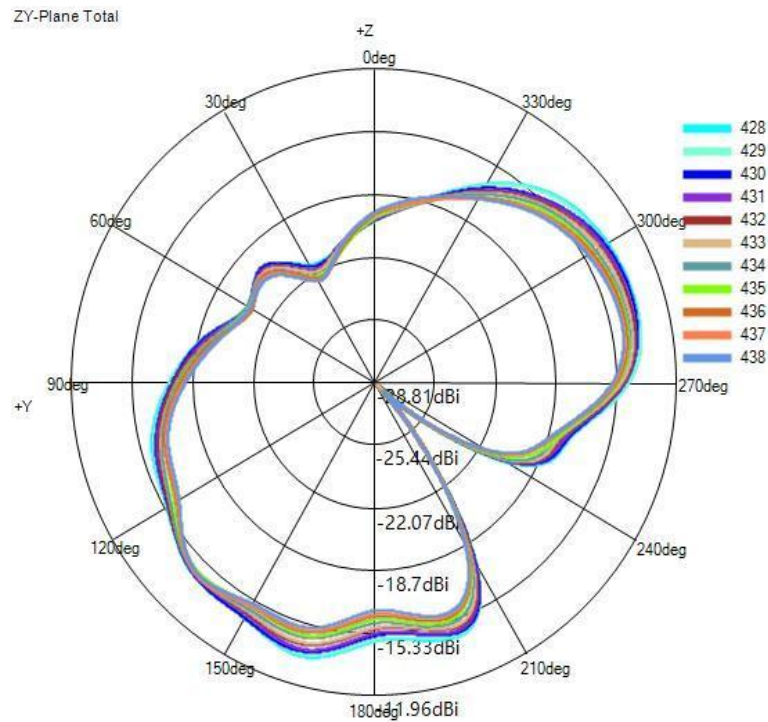
Frequency/MHz	428	429	430	431	432	433	434	435	436	437	438
Peak Gain/dBi	-2.29	-2.42	-2.39	-1.50	-1.51	0	-1.73	-2.75	-1.78	-1.87	-2.91
Efficiency/%	2.95	2.90	2.85	2.77	2.71	2.66	2.59	2.53	2.48	2.44	2.39

3.3.4 Typical free space radiation pattern

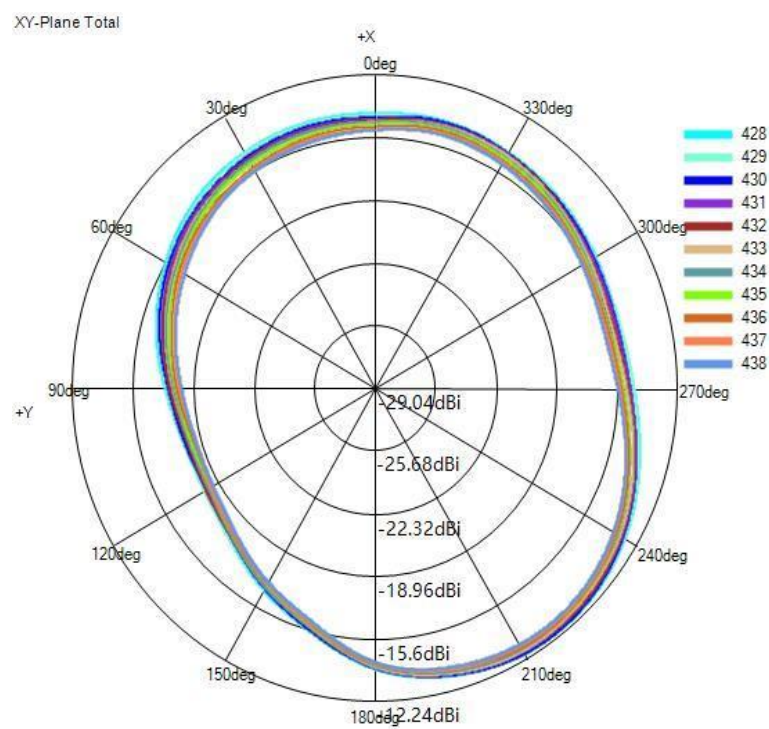
(1) X-Z Plane(unit:dBi):



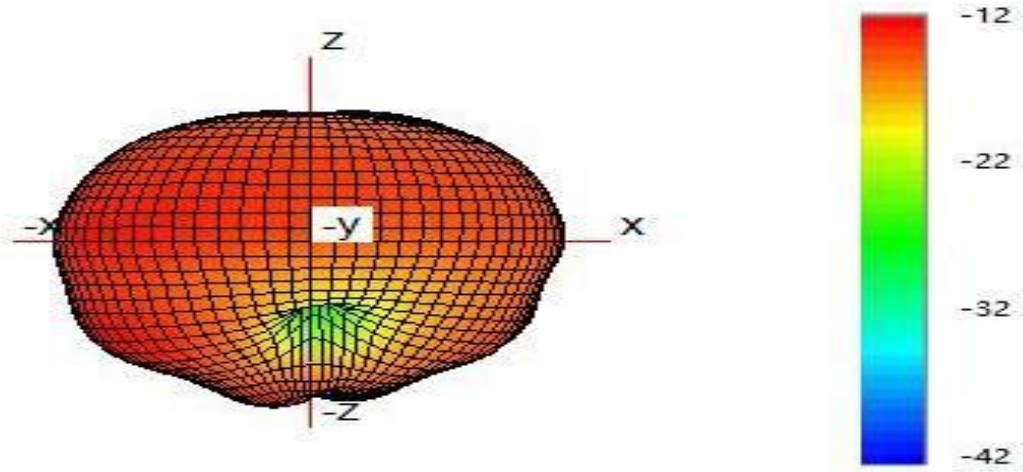
(2) Y-Z Plane(unit:dBi):



(3) X-Y Plane(unit:dBi):



(4) Typical Free Space 3D Radiation Pattern at 428MHz(unit:dBi):



End
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