

ANTENNA PASSIVE TEST REPORT TABLE OF CONTENTS

Applicant	Nebula Electronic Technology Corporation
Manufacturer	Nebula Electronic Technology Corporation
Product Name	BT638 BLE Module
Model No	BT638-2
Date Initial Sample(s) Received	2025-06-18
Testing Date	2025-06-18

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1. General Information

1.1 Details of Client

Applicant	Nebula Electronic Technology Corporation
Address:	Room 1504, No. 8, Lane 777, Gaoke East Road, Pudong New Area, Shanghai
Manufacturer	Nebula Electronic Technology Corporation
Address:	Room 1504, No. 8, Lane 777, Gaoke East Road, Pudong New Area, Shanghai

1.2 General Description of EUT

Device Description:	BT638 BLE Module
Device Model:	BT638-2
Hardware Version:	N/A
Software Version:	N/A

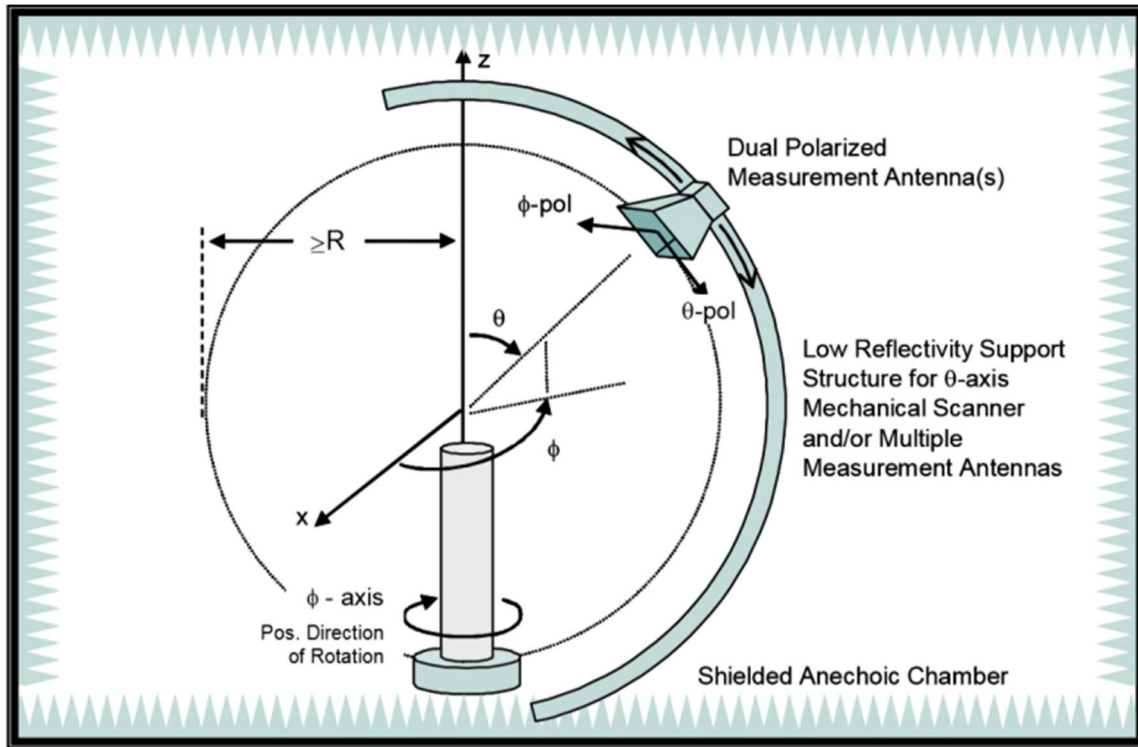
1.3 Laboratory Environment

Temperature	Min. =19°C, Max. = 25°C	
Relative humidity	Min. =40%, Max. =72%	
Shield effect	0.7-6GHz	> 100dB
Ground resistance	<0.5Ω	

2. OTA Measurements System Configuration

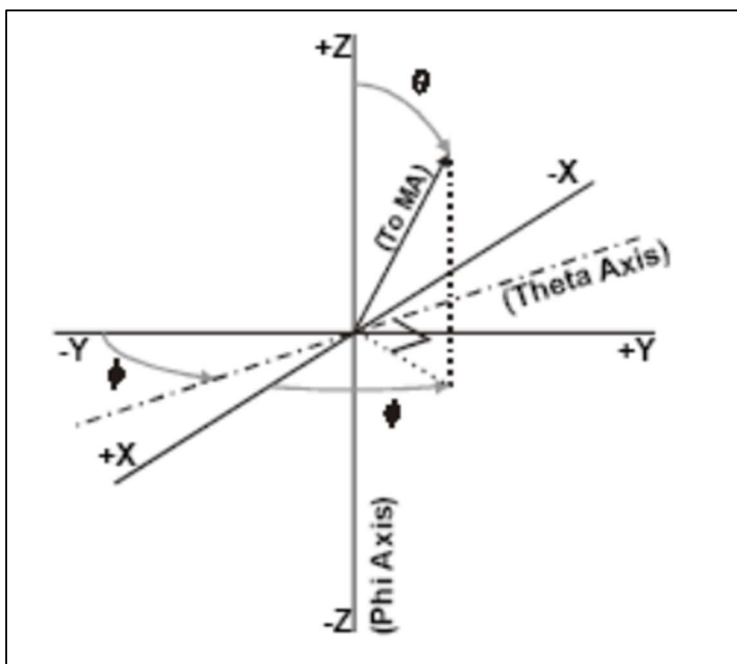
2.1 Test Configuration

Conical-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 1.5m



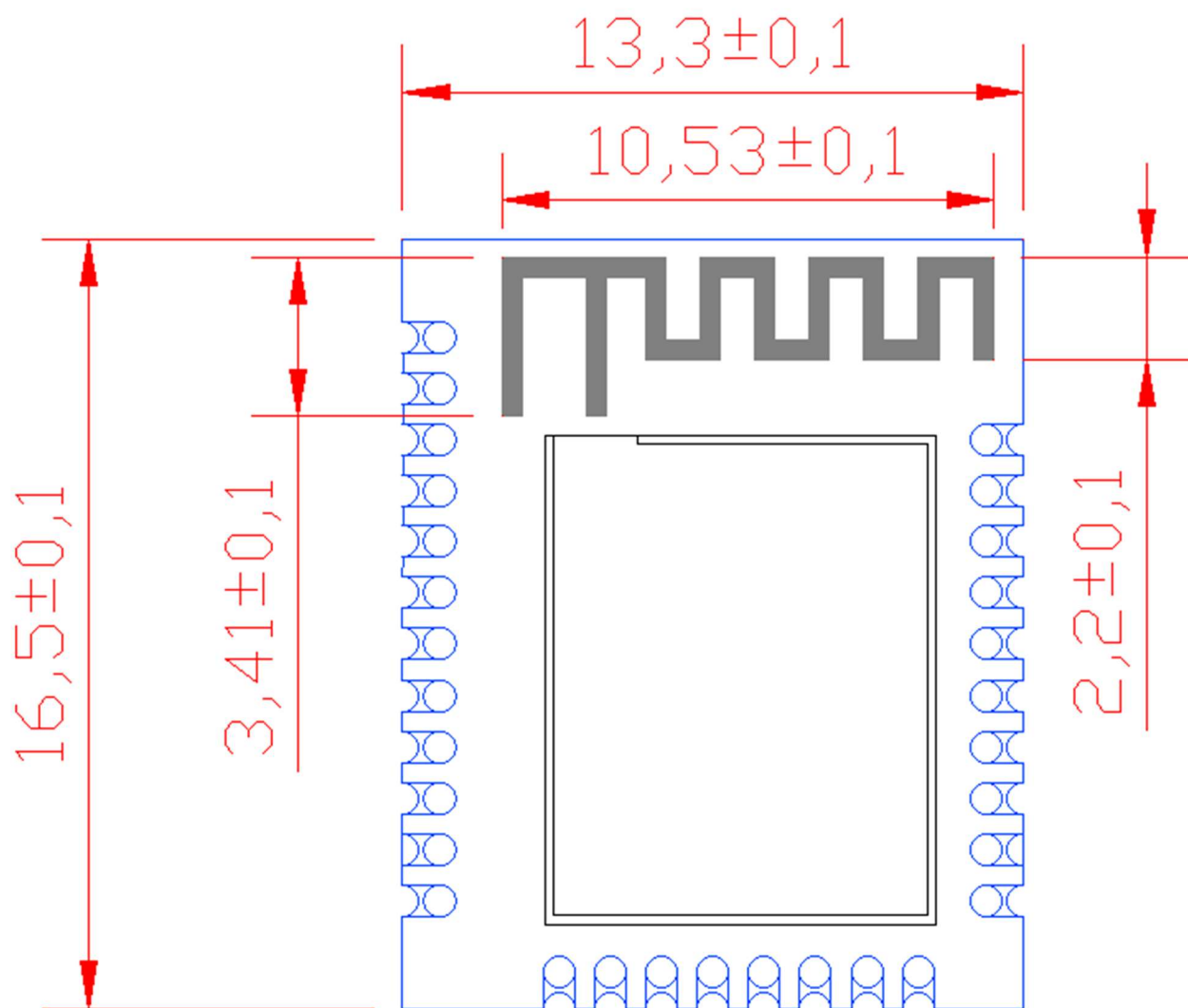
2.2 Test Measurement

Spherical coordinate system



3. The ANT SPEC.

The module antenna is an on-board antenna with a size of 15.1mm×11.2mm. The following figure shows the dimension of the antenna. The PCB is double-sided FR4 with a thickness of 0.8mm .



4. Test Equipment List

Type of Equipment	Model Number	Manufacture
Network Analyzer	ZNB8 S/N 103535	R&S
Switch Control System	OSP 130 S/N 100358	R&S
MAPS Controller	2090 S/N 114576	ETS-Lindgren L.P.
Test Software	EMQuest™ REV 1.14 Build 31654	ETS-Lindgren L.P.
Full Anechoic Wireless Test chamber	ETS-Lindgren AMS- 8923 CT000596-1149	ETS-Lindgren L.P.

5. Measurement Uncertainty

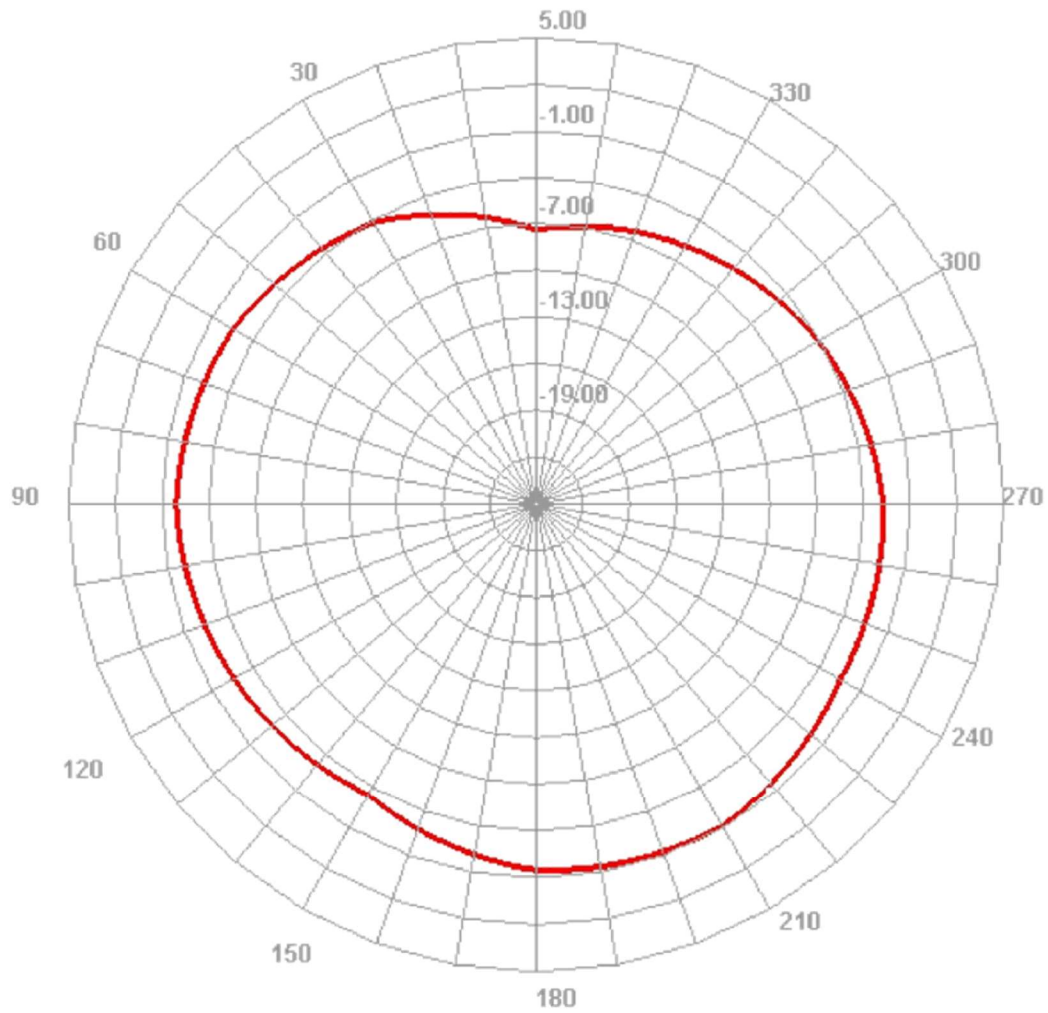
Item	617-698MHz (dB)	699-798MHz (dB)	814-894MHz (dB)	1695-1780MHz (dB)	1850-2020MHz (dB)	2300-2800MHz (dB)	3300-3800MHz (dB)	5150-5925MHz (dB)
Gain	0.75	0.9	0.74	0.84	0.83	0.9	0.84	0.86
Efficiency	0.75	0.9	0.74	0.84	0.83	0.9	0.84	0.86
Measurement Uncertainty (95% CONFIDENCE INTERVAL) K=2								

6. Antenna Passive Test

Frequency(MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
2400	-10.08	-17.08	1.96
2410	-9.25	-16.11	2.45
2420	-8.82	-15.72	2.68
2430	-8.16	-15.23	3.00
2440	-7.47	-14.63	3.44
2450	-7.54	-14.51	3.54
2460	-6.98	-13.76	4.21
2470	-6.49	-13.45	4.52
2480	-6.25	-13.20	4.79
2490	-6.16	-13.15	4.84
2500	-6.13	-13.08	4.92

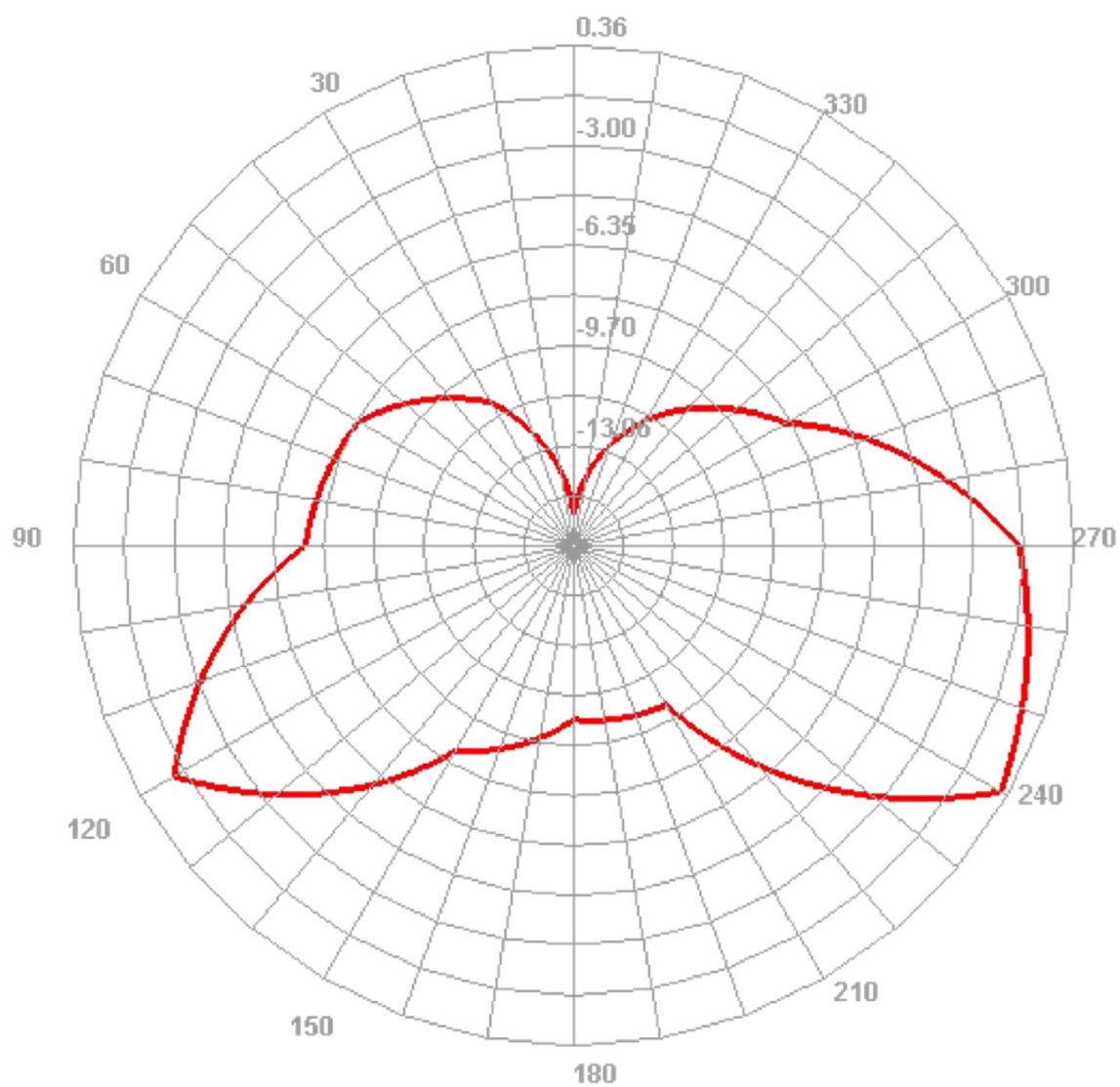
H-plane Co-polarization Pattern (Z Axis)

2450.000MHz H



V1-plane Co-polarization Pattern (Y Axis)

2450.000MHz E1



V2-plane Co-polarization Pattern (X Axis)

