

Bluetooth PCB Antenna

Test Report

Company: Shenzhen Alltokee Technology Co., Ltd.

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Baolong Street, Longgang District, Shenzhen

Product Name	Bluetooth PCB Antenna
Antenna Type	PCB antenna (IFA)
Maximum Gain	3.00 dBi
Efficiency	59.70%

Version 1.0

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1. General Description

EUT Name	Bluetooth PCB Antenna
Wireless type	BLE / 2.4G
Antenna Type	PCB antenna (Planar IFA)
Dimensions	Appendix A

2. Technical Information

Frequency Range	2400 MHz ~ 2500 MHz
Test Frequency	2400, 2405, 2410, ... , 2500 MHz (5 MHz step)

3. Test Standards

Identity	Document Title
IEEE 149-1979	IEEE Standard Test Procedures for Antennas

4. Test Item

Report Section	Description
Appendix B	S11 / VSWR
Appendix C	Gain and Efficiency
Appendix D	Radiation Pattern (1D and 3D)

5. Design Specifications

Taking into account the product's usage environment and design constraints, an approximately omnidirectional planar IFA antenna is adopted. Simulation modeling is conducted based on HFSS.

Frequency range	2.400 ~ 2.500 GHz
Antenna radiation efficiency (excluding port losses)	>49% (typ. 55%)
Peak Gain	3.0 dBi
Isolation degree	< -10 dB

Appendix A Antenna Dimension

2.4G

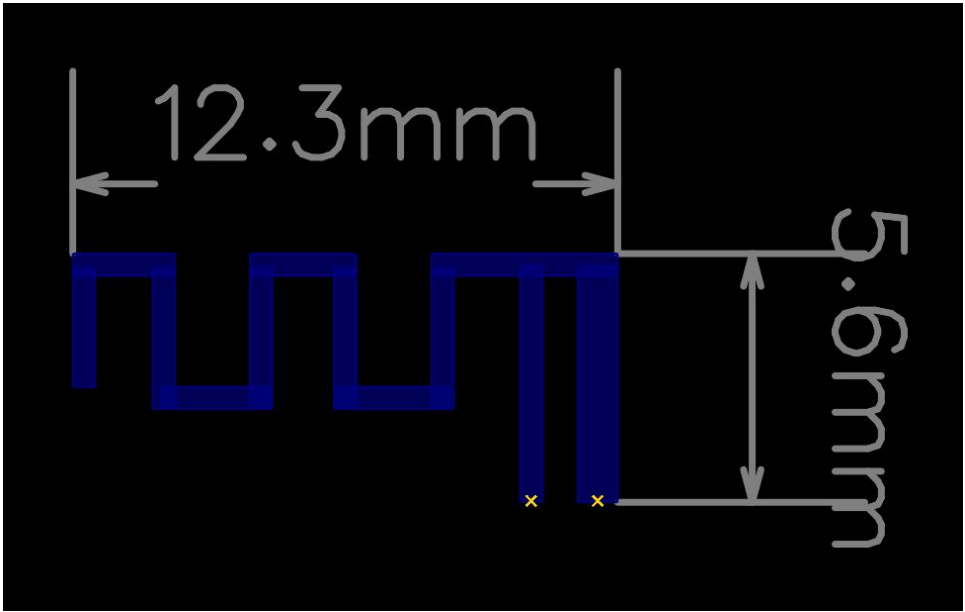


Figure A-1: Antenna Design & Dimension (2.4G Planar IFA)

Appendix B S11 / VSWR

Note: S11 / VSWR data is derived from the measured radiation efficiency (dB). The return loss is estimated based on the total efficiency at each frequency point.

Frequency (MHz)	Return Loss (dB)	VSWR
2400	-2.29	7.63
2450	-2.60	6.73
2500	-3.09	5.68

** Return Loss values are estimated from measured total radiation efficiency for reference purposes.*

Appendix C Gain and Efficiency

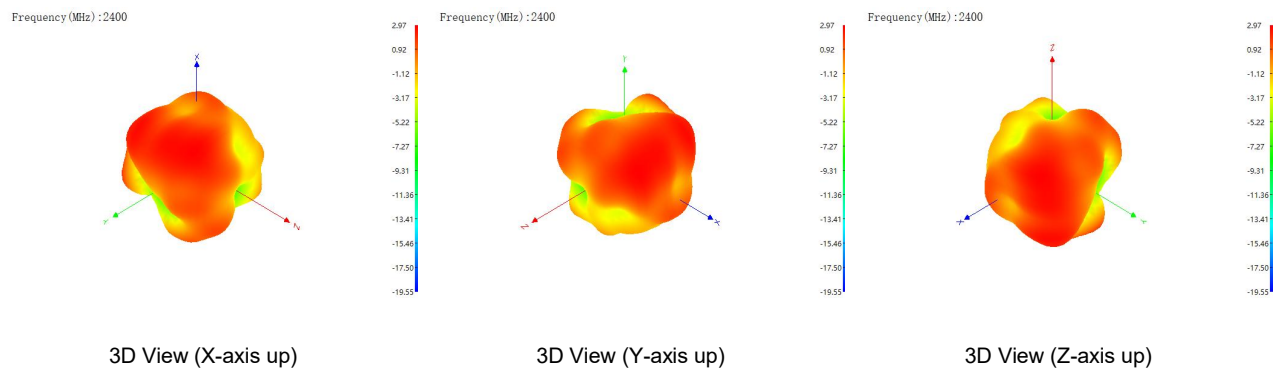
Frequency (MHz)	Efficiency (%)	Gain (dBi)	Directivity (dB)
2400	59.02	3.00	5.29
2410	57.81	2.87	5.25
2420	59.70	2.95	5.19
2430	57.81	2.83	5.21
2440	58.21	2.98	5.33
2450	54.95	2.90	5.50
2460	53.09	2.83	5.58
2470	53.09	2.92	5.67
2480	51.88	2.87	5.72
2490	50.58	2.81	5.77
2500	49.09	2.68	5.77

Summary: Peak Gain = 3.00 dBi @ 2400 MHz | Max Efficiency = 59.70% @ 2420 MHz | Avg Efficiency = 55.02%

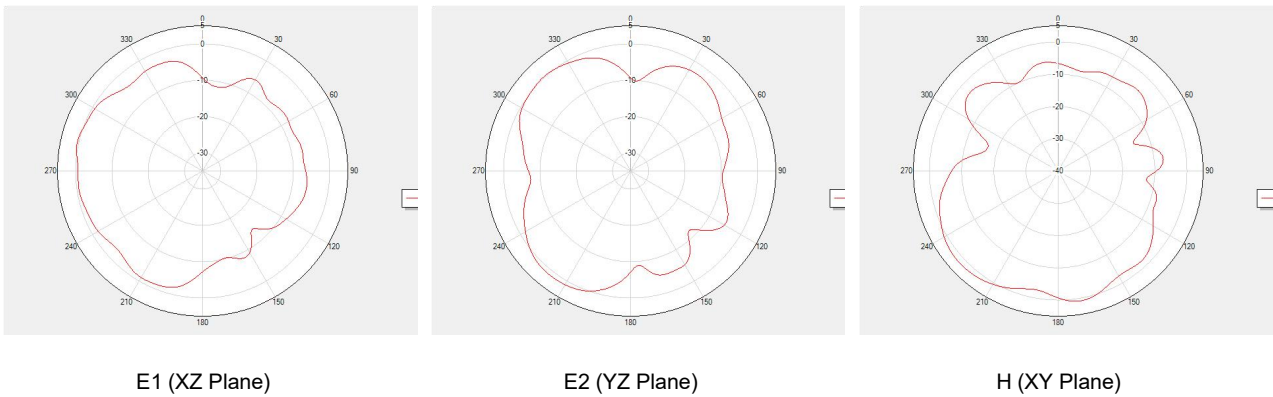
Appendix D Radiation Pattern (1D and 3D)

2400 MHz

3D Radiation Pattern

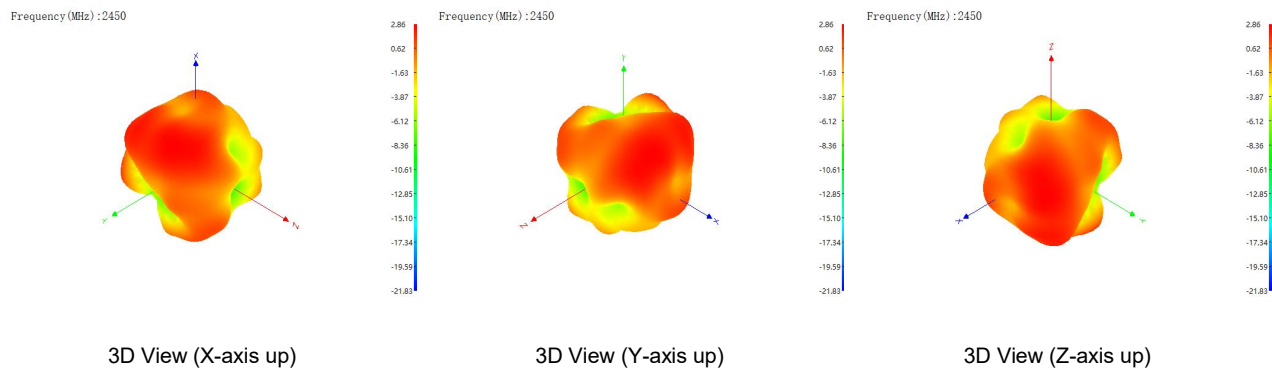


1D Radiation Pattern (Cut Planes)

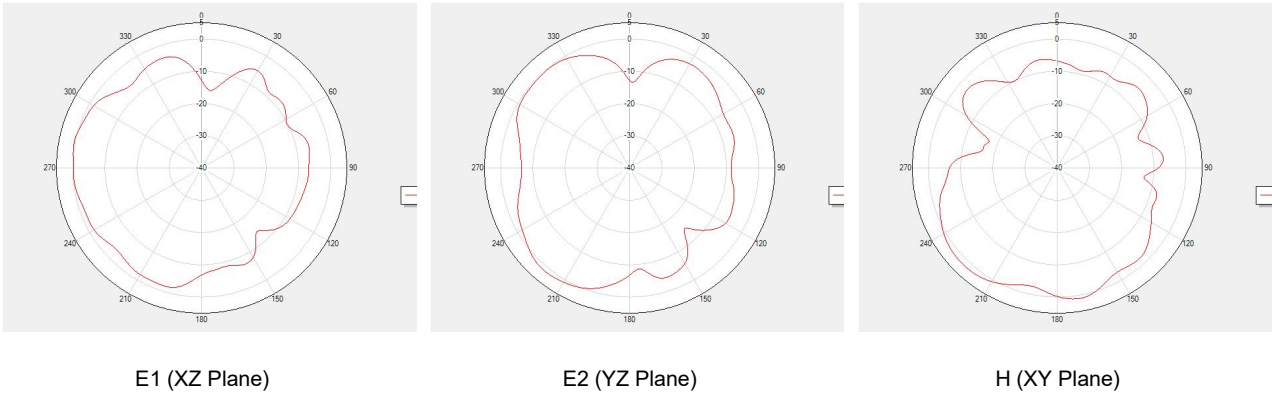


2450 MHz

3D Radiation Pattern

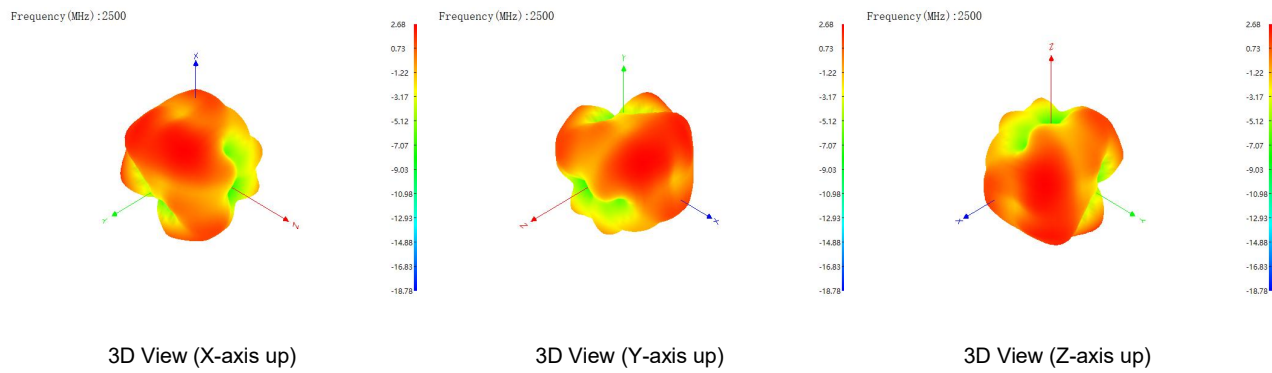


1D Radiation Pattern (Cut Planes)

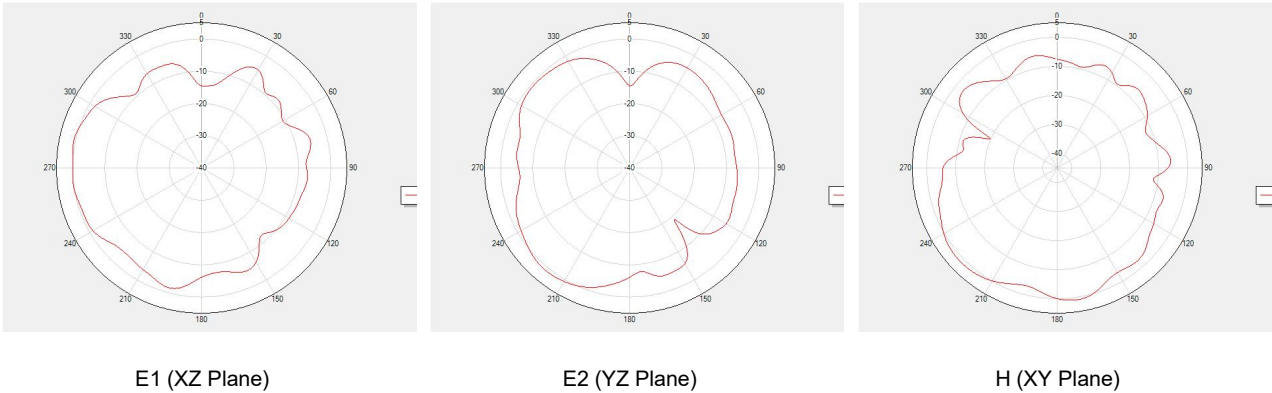


2500 MHz

3D Radiation Pattern



1D Radiation Pattern (Cut Planes)



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