

Antenna test report

Applicable to Gateway

Platform: [CGA438A](#)

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Document revision

Version	Owner	Date	Description
0.1	D. Lo Hine Tong	02/24/2025	Creation
0.2	D. Lo Hine Tong	03/06/2025	Add directional gain tables over Phi and Theta Add IOT antenna gain radiation patterns
0.2	D. Lo Hine Tong	03/10/2025	Keep only Max of the directional gains over H and V polarizations

1.1 Introduction

This document provides the antenna technical data for the gateway CGA438A. The antenna manufacturer name and address are:

- INPAQ Technology Co., Ltd.
- 566-1, Ko-Shi Road, Yang-Mei, Taoyuan, 32668 Taiwan



Figure 1 : Overall view of the CGA438A

1.2 Test equipment

The list of equipment used to measure the antennas are:

Network Analyzer: Keysight E5063A



Figure 2 : Network analyzer used (Keysight E5063A).

Anechoic chamber: MVG/SG24



Figure 3 : Anechoic chamber used (MVG/SG24).

Test Company	INPAQ Technology Co., Ltd.
Test Address	566-1, Ko-Shi Road, Yang-Mei, Taoyuan, 32668, Taiwan
Test Date	2025/01/16
Test Instrument#1	Network Analyzer Keysight E5063A Calibration date: 2024/2/27 Due date: March 2025
Test Instrument#2	Anechoic chamber: MVG/SG24 Calibration date: 2024/3/3 Due date: March 2025

1.3 D.U.T

The CGA438A contains 3* dual-band 2.4GHz/5GHz and 1*5GHz Wi-Fi antennas. The antennas are all dipole-type, printed on a small FR4-based PCB, equipped with a feeding coaxial cable and placed off the main board.

Wi-Fi Antenna	IPN	Antenna cable length (mm)
DB0	6345011C	80+/-2
DB1	6345012C	82+/-2
DB2	6345013C	148+/-3
5G	6345014B	138+/-3

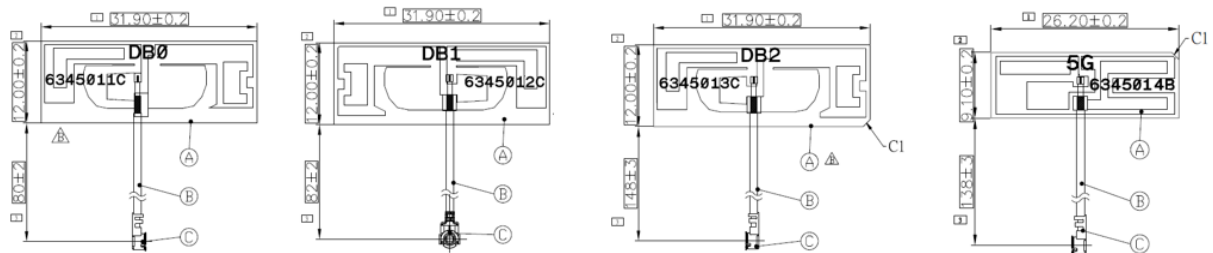


Figure 4: Wi-Fi antennas used in the CGA438A.

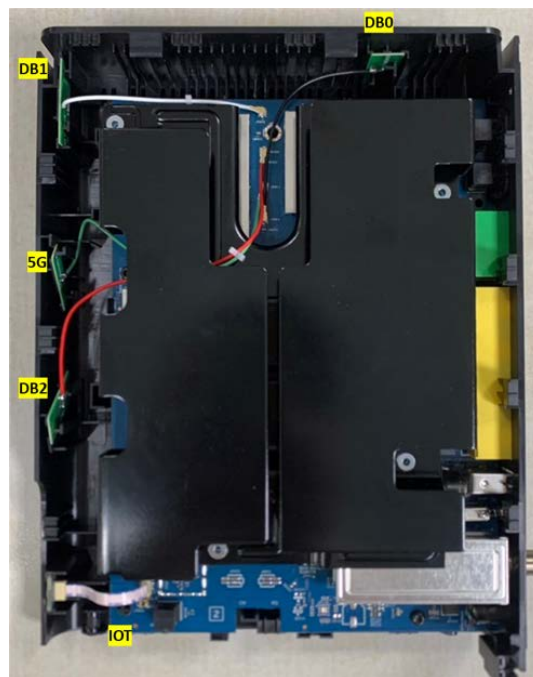


Figure 5: Location of the Wi-Fi antennas integrated in the CGA438A.

Additionally, a 2.4GHz IOT antenna is printed on the main board. The model used is a Printed Inverted F Antenna (PIFA) type.

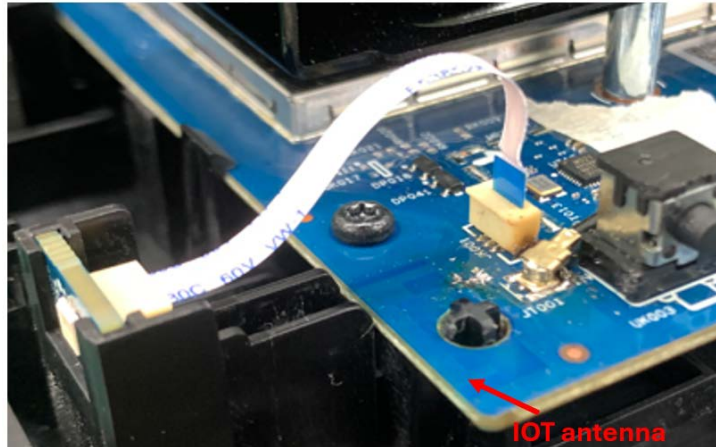


Figure 6: Design and location of the IOT antenna in the CGA438A.

1.4 Antenna peak gain

1.4.1 Wi-Fi antenna in the 2.4GHz band

Frequency (GHz)	Peak gain (dBi)		
	DB0	DB1	DB2
2.40	3.3	2.6	3.5
2.41	3.3	2.6	3.5
2.42	3.1	2.7	3.4
2.43	3.4	2.8	3.4
2.44	3.5	2.9	3.6
2.45	3.6	3.0	3.6
2.46	3.4	2.9	3.5
2.47	3.3	2.8	3.4
2.48	3.4	2.9	3.4
2.49	3.3	2.9	3.6
2.50	3.2	3.0	3.5

Frequency Band	Peak gain max(dBi)		
	DB0	DB1	DB2
2400-2483.5MHz	3.6	3.0	3.6

1.4.2 Wi-Fi antenna in the 5GHz band

Frequency (GHz)	Peak gain (dBi)			
	DB0	DB1	DB2	5G
5.15	5.5	5.2	5.1	5.2
5.20	5.4	5.2	5.0	5.0
5.25	5.6	5.3	5.1	5.1
5.30	5.4	5.3	5.2	5.0
5.35	5.3	5.3	5.4	4.9
5.40	5.4	5.3	5.4	4.9
5.45	5.7	5.0	5.4	5.0
5.50	5.7	5.2	5.3	4.7
5.55	5.7	5.2	5.2	4.9
5.60	5.2	5.3	5.0	4.5
5.65	5.3	5.6	5.0	4.9

5.70	5.4	5.6	5.0	4.7
5.75	5.7	5.4	5.2	5.0
5.80	5.4	5.3	5.0	5.0
5.85	5.6	5.1	5.2	5.3

Peak gain max (dBi)	UNII-1 (5150-5250MHz)	UNII-2 (5250-5350MHz)	UNII-2C (5470-5725MHz)	UNII-3 (5725-5850MHz)
DB0	5.6	5.6	5.7	5.7
DB1	5.3	5.3	5.6	5.6
DB2	5.1	5.4	5.4	5.2
5G	5.2	5.1	5.0	5.3

1.4.3 IOT antenna in the 2.4GHz band

Frequency (GHz)	Peak gain (dBi)
	IOT
2.40	2.5
2.41	2.5
2.42	2.5
2.43	2.6
2.44	2.8
2.45	3.0
2.46	3.0
2.47	2.9
2.48	2.9
2.49	2.7

Peak gain max.(dBi)	3.0
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1.5 Antenna directional gain

1.5.1 In the 2.4GHz band

Max of directional gain over H and V polarizations

Directional Gain max	2400-2483.5MHz	
	Uncorrelated signals (3S3T)	Correlated signals (1S3T)
DG max (dBi)	0.9	5.3

1.5.2 In the 5GHz band

Max of directional gain over H and V polarizations

For uncorrelated signals (4S4T)	UNII-1 (5150-5250MHz)	UNII-2 (5250-5350MHz)	UNII-2C (5470-5725MHz)	UNII-3 (5725-5850MHz)
DG max. (dBi)	1.0	1.0	1.0	0.9

For correlated signals (1S4T)	UNII-1 (5150-5250MHz)	UNII-2 (5250-5350MHz)	UNII-2C (5470-5725MHz)	UNII-3 (5725-5850MHz)
DG max. (dBi)	6.4	6.4	6.2	6.2

1.6 2D antenna gain radiation pattern

1.6.1 Wi-Fi antenna

@2.45GHz

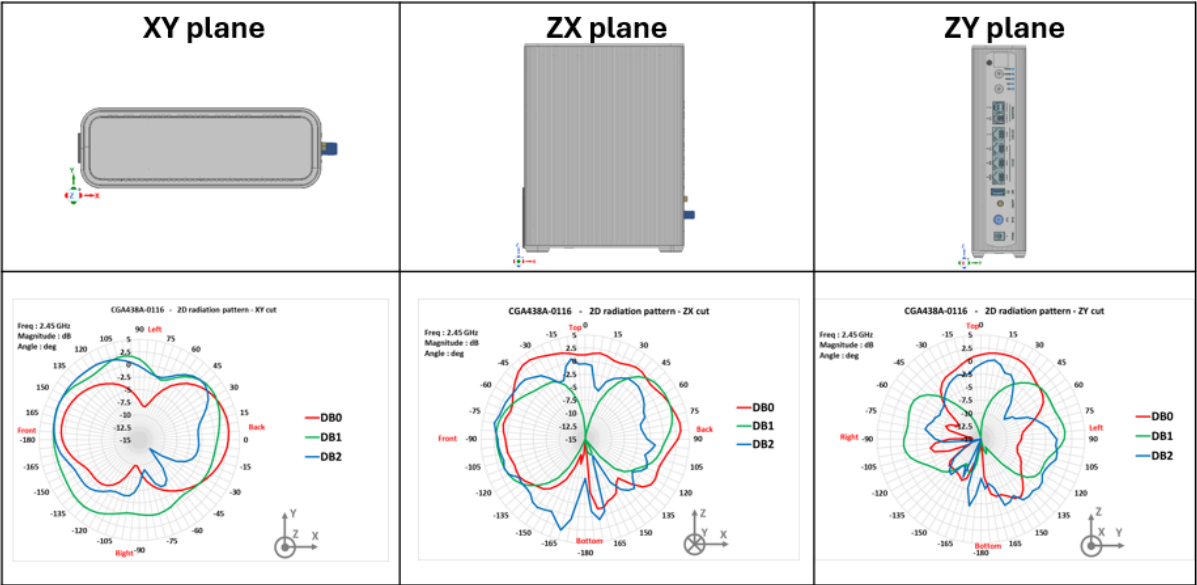


Figure 7: 2D radiation pattern @2.45GHz.

@5.15GHz

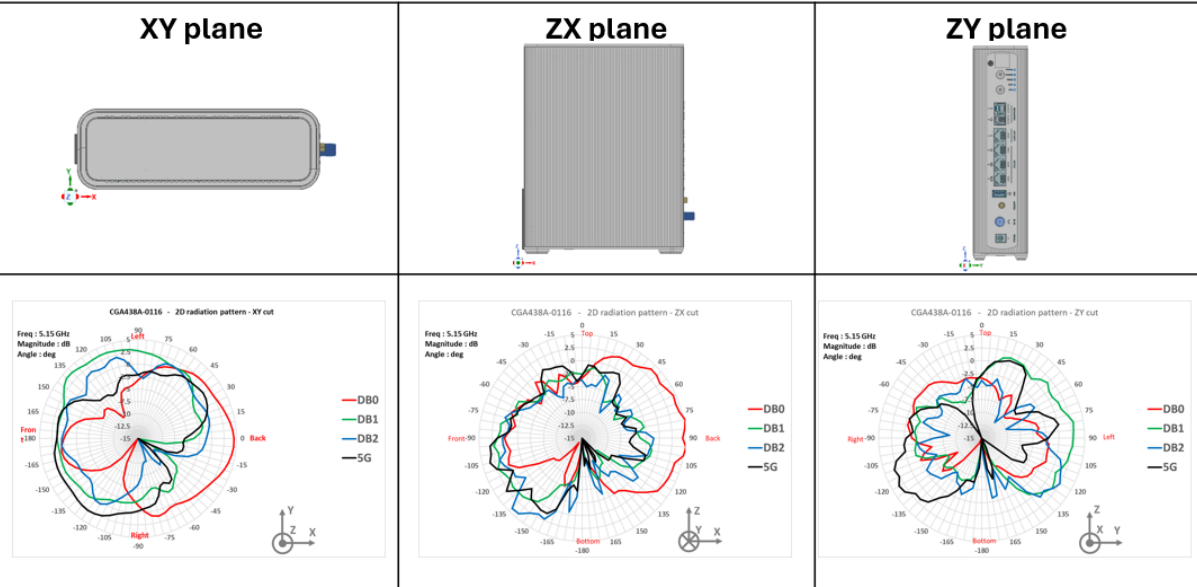


Figure 8: 2D radiation pattern @5.15GHz of UNII-1.

@5.30GHz

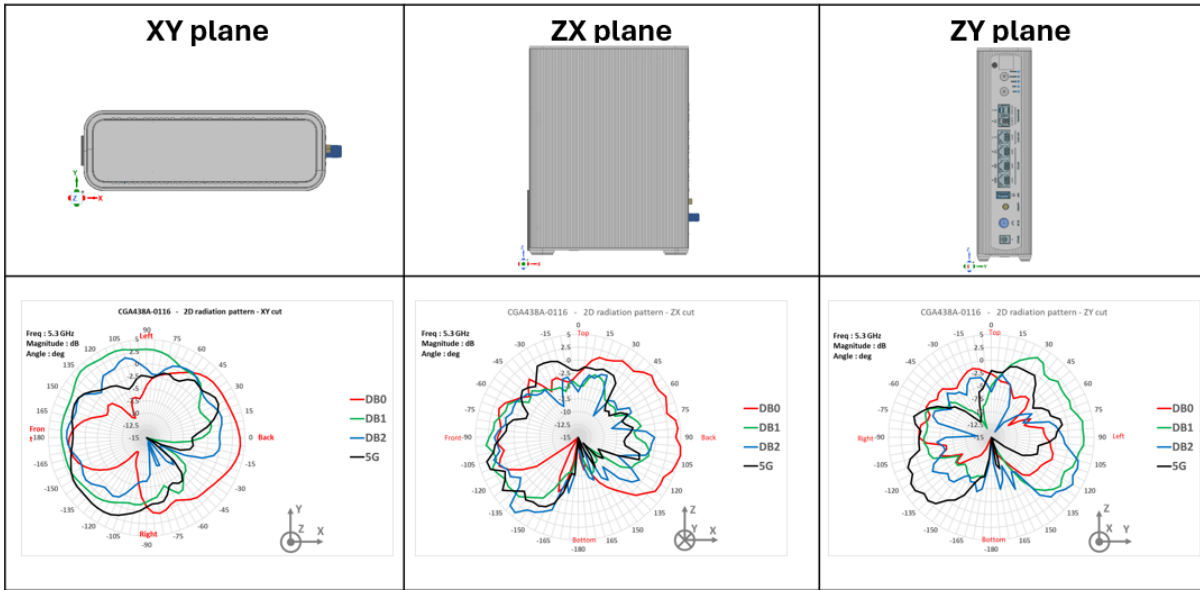


Figure 9: 2D radiation pattern @5.30GHz of UNII-2.

@5.55GHz

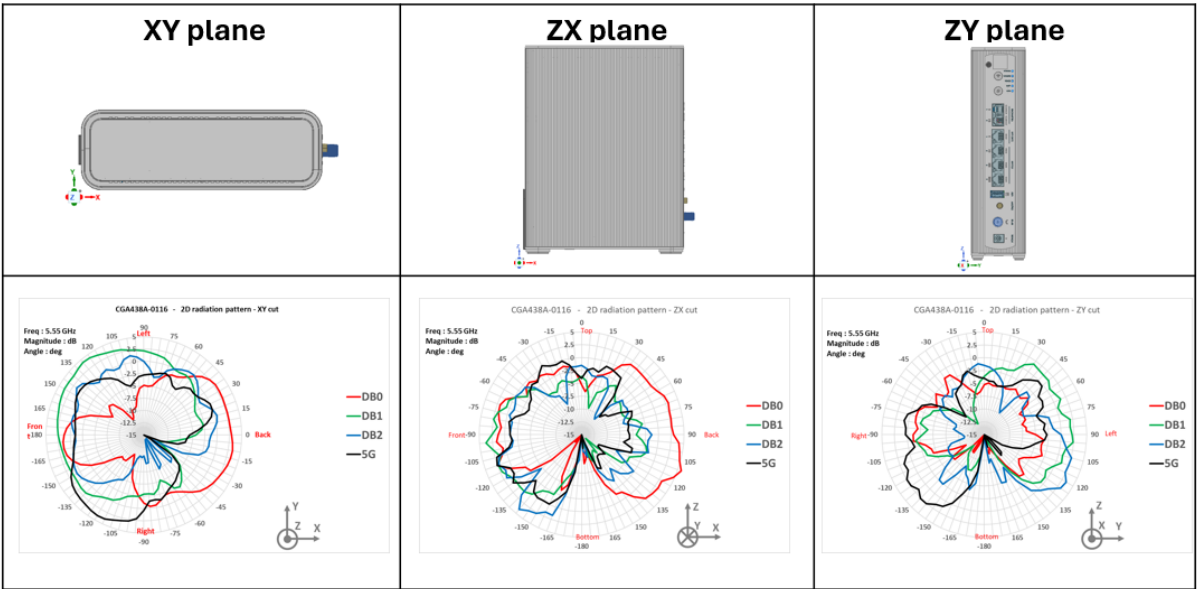


Figure 10: 2D radiation pattern @5.55GHz of UNII-2C.

@5.85GHz

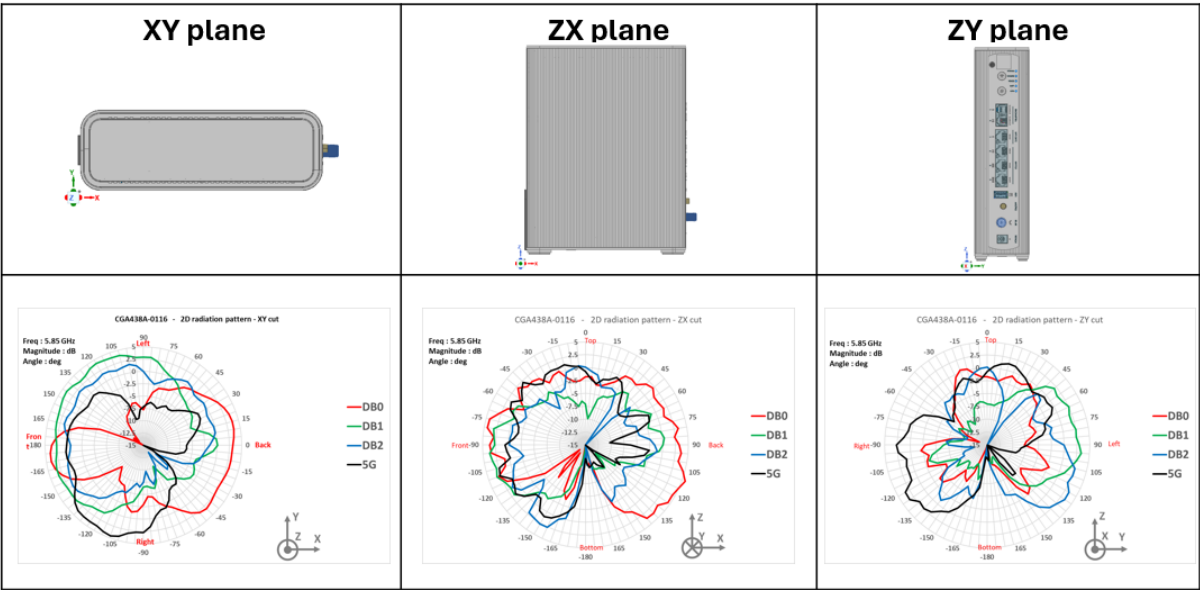
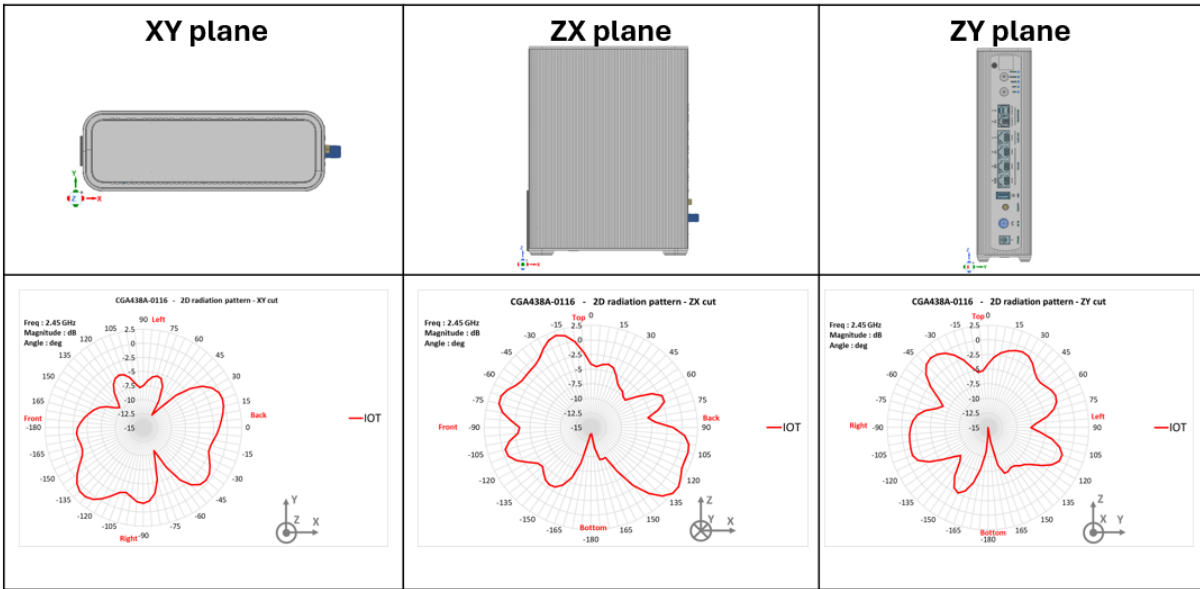


Figure 11: 2D radiation pattern @5.85GHz of UNII-3.

1.6.2 IOT antenna

IOT@2.45GHz



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