

Antenna test report

Applicable to Gateway

Platform: CWA438TCOM

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Document revision

Version	Owner	Date	Description
0.1	Simon Bai	30/01/2026	Creation
0.2	Simon Bai	21/04/2026	Updated ZB3 antenna cable length
0.3	Simon Bai	29/06/2026	Updated ZB1 and BT antenna type description

1.1 Introduction

This document provides the antenna technical data for the gateway CWA438TCOM.

The antenna manufacturer's name and address are:

- WHA YU INDUSTRIAL CO., LTD.
- No. 326, Sec.2, Kung Tao 5 Road, Hsinchu City 300043, Taiwan

Figure 1 : Overall view of the CWA438TCOM

1.2 Test equipment

The list of equipment used to measure the antennas:

Network Analyzer: Keysight E5063A



Figure 2 : Network analyzer used (Keysight E5063A).

Test Company	Wha Yu Industrial Co., Ltd.
Test Address	No. 326, Sec. 2, Gongdao 5th Rd., East Dist., Hsinchu City 300043 , Taiwan (R.O.C.)
Test Date	2026/01/23
Test Instrument#1	Network Analyzer (Keysight E5063A) Calibration date: 2024/09/27 Due date: 2026/09/26

Anechoic chamber: MVG/Starlab



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

Test Company	Wha Yu Industrial Co., Ltd.
Test Address	No. 326, Sec. 2, Gongdao 5th Rd., East Dist., Hsinchu City 300043 , Taiwan (R.O.C.)
Test Date	2026/01/23
Test Instrument#1	Network Analyzer (R&S® ZND) Calibration date: 2024/02/12 Due date: 2026/02/11
Test Instrument#2	Anechoic chamber: MVG/Starlab Calibration date: 2025/06/05 Due date: 2026/06/04

1.3 D.U.T

The CWA438TCOM contains 4* dual-band 2.4GHz/5GHz, 4* 6GHz Wi-Fi antennas, and 1* 2.45GHz Zigbee off-board 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.

Antenna	Vantiva PN	Cable Length (mm)
DB1	6355522F	148
DB2	6355523F	129
DB3	6355524F	103
DB4	6355525F	106
6G1	6355518F	141
6G2	6355519F	105
6G3	6355520F	65
6G4	6355521F	45
ZB3	6358926B	275

Figure 4: Wi-Fi antennas used in the CWA438TCOM.

Additionally, there are also 1* 2.45GHz PCB-etched IFA-type BT antenna and 1* 2.45GHz PCB-etched IFA-type Zigbee antennas placed on the PCBA.

Figure 5: Design and location of the BT/ZB antennas in the CWA438TCOM.

1.4 Antenna peak gain

1.4.1 Wi-Fi antenna in the 2.4GHz band

Frequency (GHz)	Peak gain (dBi)			
	DB1	DB2	DB3	DB4
2.40	2.9	3.8	3.5	3.5
2.41	2.7	3.5	3.8	3.3
2.42	2.5	3.2	3.9	2.9
2.43	2.3	3.4	4.0	2.7
2.44	2.3	3.4	4.1	2.4
2.45	2.7	3.2	4.1	2.3
2.46	3.1	3.0	4.2	2.2
2.47	3.4	2.7	4.3	2.0
2.48	3.3	2.5	4.4	1.9
2.49	3.3	2.4	4.4	2.0
2.50	3.4	2.3	4.5	2.1

Frequency Band	Peak gain max(dBi)			
	DB1	DB2	DB3	DB4
2400-2483.5MHz	3.4	3.8	4.5	3.5

1.4.2 Wi-Fi antenna in the 5GHz band

Frequency (GHz)	Peak gain (dBi)			
	DB1	DB2	DB3	DB4
5.15	5.5	4.4	3.6	3.4
5.20	5.3	4.2	3.8	3.3
5.30	5.0	3.9	3.8	3.3
5.40	5.0	4.4	3.6	3.6
5.50	4.8	4.0	3.8	3.7
5.60	4.2	3.5	4.1	3.7
5.70	4.3	3.7	3.7	4.8
5.80	4.5	4.1	3.0	5.2
5.85	4.7	4.2	2.8	4.9

Peak gain max (dBi)	UNII-1 (5150-5250MHz)	UNII-2 (5250-5350MHz)	UNII-2C (5470-5725MHz)	UNII-3 (5725-5850MHz)
DB1	5.5	5.0	4.8	4.7
DB2	4.4	3.9	4.0	4.2
DB3	3.8	3.8	4.1	3.0
DB4	3.4	3.3	4.8	5.2

1.4.3 Wi-Fi antenna in the 6GHz band

Frequency (GHz)	Peak gain (dBi)			
	6G1	6G2	6G3	6G4
5.925	3.9	4.6	3.1	3.4
6.000	3.7	4.9	3.6	3.2
6.100	3.5	5.4	3.7	3.1
6.200	3.4	5.6	3.7	3.3
6.300	3.0	4.9	3.7	3.0
6.400	3.5	3.9	4.3	3.0
6.500	3.3	3.9	3.6	3.4
6.600	3.8	3.7	3.5	3.0
6.700	4.5	4.5	3.6	2.7
6.800	4.8	4.0	4.1	3.1
6.900	4.0	3.9	3.9	3.5
7.000	4.3	4.0	4.1	3.5
7.100	4.1	4.2	4.6	3.6
7.125	4.0	4.2	4.6	3.5

Peak gain max (dBi)	UNII-5 (5925-6425MHz)	UNII-6 (6425-6525MHz)	UNII-7 (6525-6875MHz)	UNII-8 (6875-7125MHz)
6G1	3.9	3.3	4.8	4.3
6G2	5.6	3.9	4.5	4.2
6G3	4.3	3.6	4.1	4.6
6G4	3.4	3.4	3.1	3.6

1.4.4 IoT antenna in the 2.4GHz band

Frequency (GHz)	Peak gain (dBi)		
	BT	ZB1	ZB3
2.40	2.1	2.5	4.4
2.41	1.9	2.5	4.4
2.42	1.8	2.5	4.4
2.43	1.4	2.2	4.5
2.44	1.3	2.3	4.5
2.45	1.2	2.4	4.5
2.46	1.3	2.3	4.4
2.47	1.5	2.2	4.3
2.48	1.6	2.0	4.2
2.49	2.0	2.0	4.2
2.50	2.3	2.0	4.2
Peak gain max.(dBi)	2.3	2.5	4.5

1.5 Wi-Fi 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 (4S4T)	Correlated signals (1S4T)
DG max (dBi)	0.4	5.8

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)	1.3	1.0	1.3	1.5

For correlated signals (1S4T)	UNII-1 (5150-5250MHz)	UNII-2 (5250-5350MHz)	UNII-2C (5470-5725MHz)	UNII-3 (5725-5850MHz)
DG max. (dBi)	6.8	6.1	6.9	6.9

1.5.3 In the 6GHz band

Max of directional gain over H and V polarizations

For uncorrelated signals (4S4T)	UNII-5 (5925-6425MHz)	UNII-6 (6425-6525MHz)	UNII-7 (6525-6875MHz)	UNII-8 (6875-7125MHz)
DG max. (dBi)	0.9	-0.5	-0.5	-0.4

For correlated signals (1S4T)	UNII-5 (5925-6425MHz)	UNII-6 (6425-6525MHz)	UNII-7 (6525-6875MHz)	UNII-8 (6875-7125MHz)
DG max. (dBi)	5.4	5.4	5.0	5.0

1.6 2D antenna gain radiation pattern

1.6.1 Wi-Fi antenna

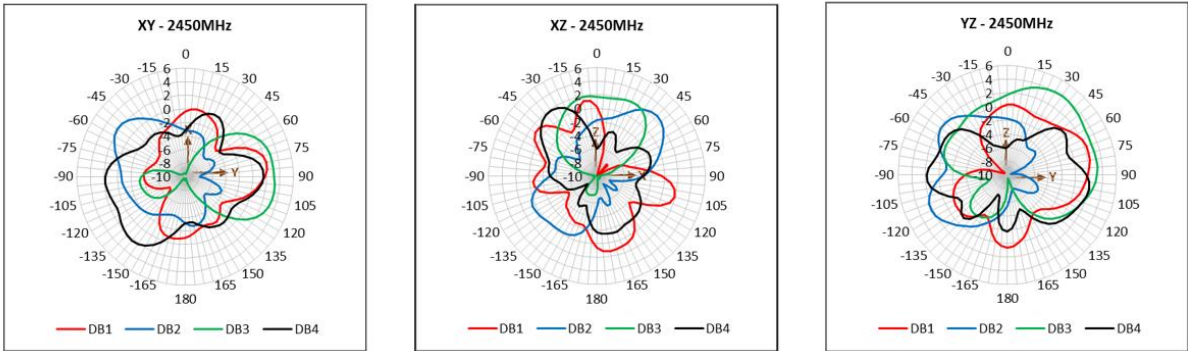


Figure 6: 2D Wi-Fi radiation pattern @2.45GHz

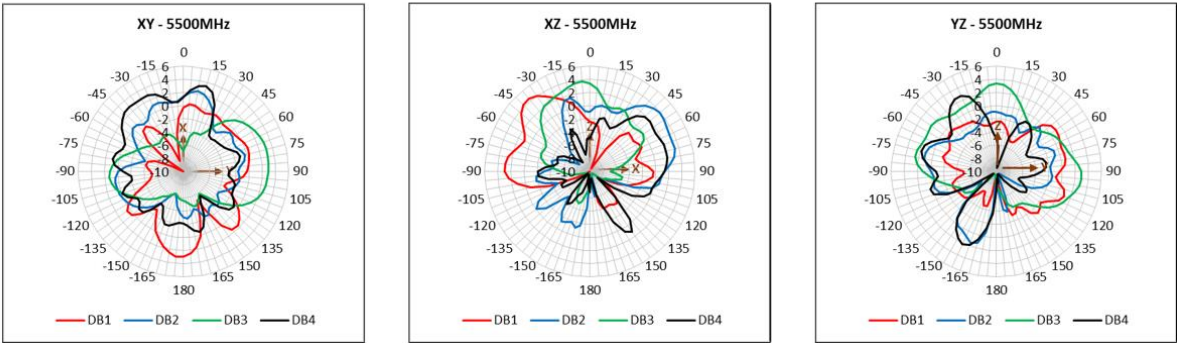


Figure 7: 2D Wi-Fi radiation pattern @5.5GHz

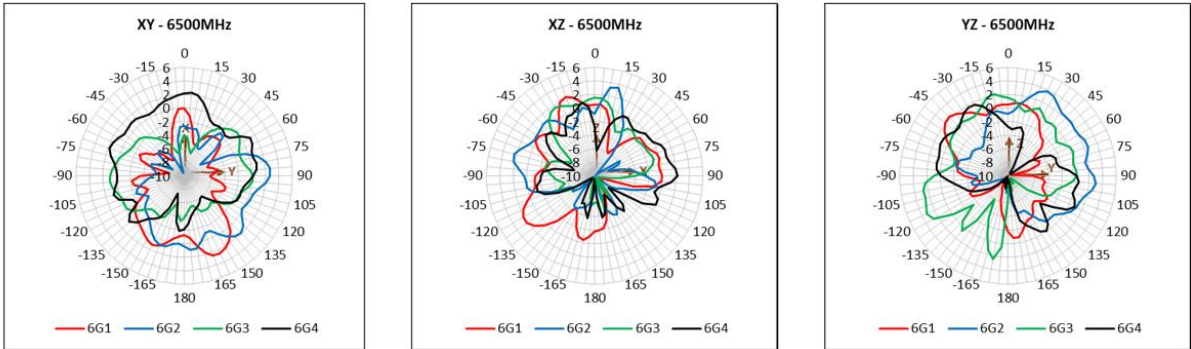


Figure 8: 2D Wi-Fi radiation pattern @6.5GHz

1.6.2 IOT antenna

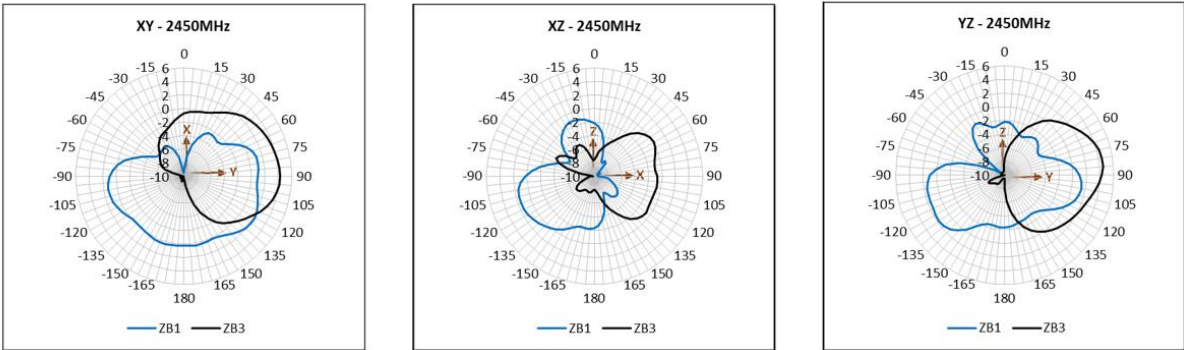


Figure 9: 2D Zigbee radiation pattern @2.45GHz

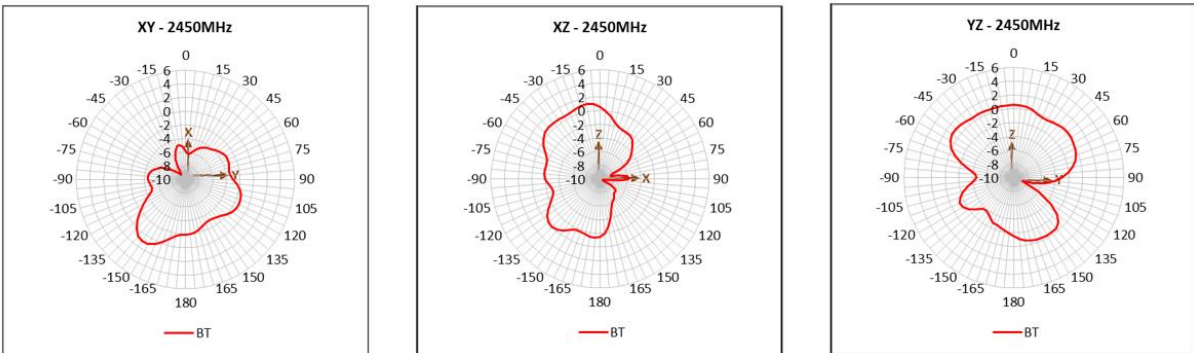


Figure 10: 2D BT radiation pattern @2.45GHz

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