



Wi-Fi/IoT/Lora/HL antennas

Specification & Test report

Applicable to Gateway

Platform: **OWM7111IOT**



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Document revision

Version	Owner	Status	Description
0.1	David Zhao	Draft	Creation
0.2	David Zhao		Updated
0.3	David Zhao	Correct typos	Updated
0.4	David Zhao	Add Gains at elevation above 30 degree Cone	Updated
0.5	David Zhao	Updated antenna manufacturer name and address. And add antennas' model (IPN and MPN)	Updated

1.1 Introduction

Document does provide antenna technical data for OWM7111IOT.

Antenna manufacturer is Wha Yu industrial Co., td., address is: No. 326, Sec. 2, Gongdao 5th Rd., East Dist., Hsinchu City 300043 , Taiwan.

1.2 Test equipment

- List of used equipment:
 - Network Analyzer: Keysight E5063A



Figure 1 : Used network analyzer

- MVG/SQ24L

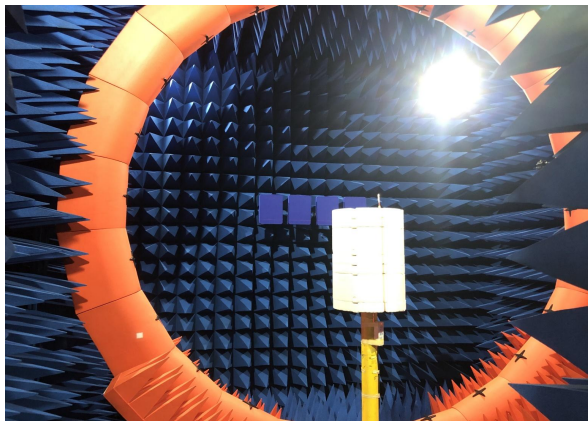


Figure 2 : Used SQ24L

Test Company	Wha Yu Industrial Co., Ltd.
Test Address	No. 326, Sec. 2, Gongdao 5th Rd., East Dist., Hsinchu City 300043 , Taiwan
Test Date	22-Jul-24
Test Instruments	Network Analyzer: Keysight E5063A, SG24L

1.3 D.U.T

The OWM7111IOT contains:

- Two off-board dual-band WiFi antennas: DB1 & DB2
- Four off-board WiFi antennas: 6G1, 6G2, 6G3, 6G4
- Three off-board IoT antennas: IoT1, IoT2, IoT3
- Two off-board Lora antennas: LR1, LR2
- One off-board HaLow antenna: HL

Function	IPN	MPN
DB1	6338351C	C2074-510129-A
DB2	6338352C	C2074-510130-A
IOT1 (Thread)	6338355D	C2074-510153-A
IOT2 (Zigbee)	6338356D	C2074-510157-A
IOT3 (BLE)	6338357D	C2074-510158-A
LR1	6338358D	C2074-510154-A
LR2	6341772C	C2074-510155-A
HL(HaLow)	6341773C	C2074-510156-A
6G1/6G2	6338353C	C2074-510131-A
6G3/6G4	6338354C	C2074-510132-A

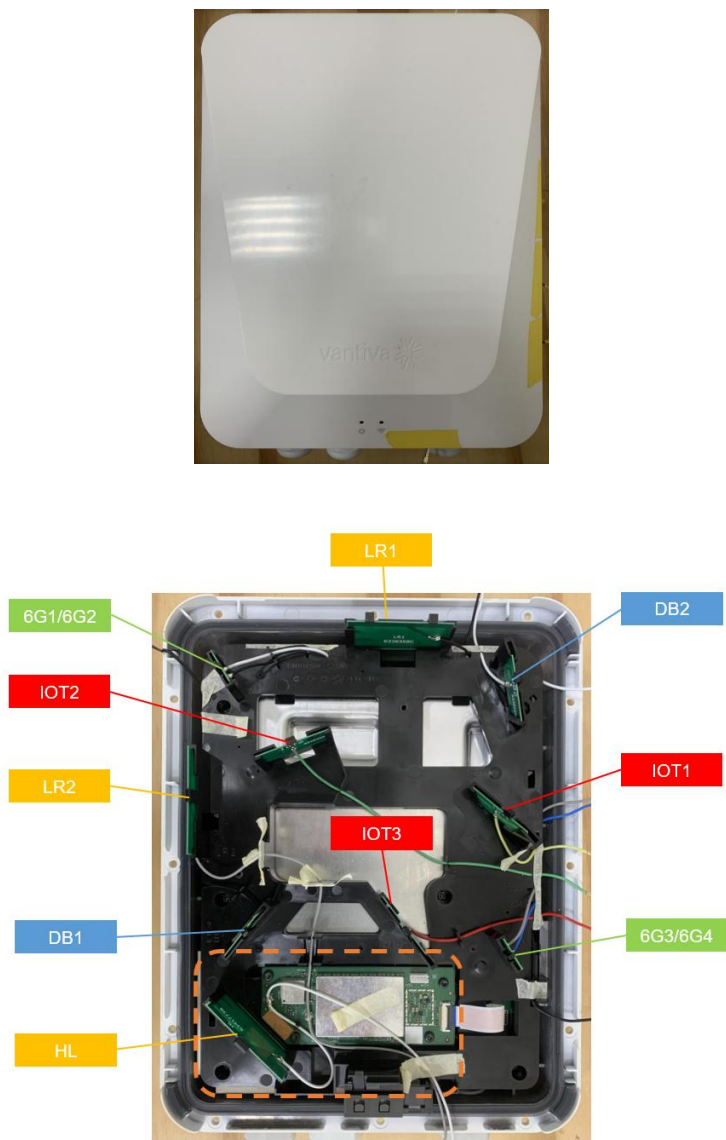


Figure 3: View of the OWM7111IOT device.

1.4 Antenna gain summary table

(maximum values)

	2400- 2483,5 MHz	5150- 5350 MHz	5470-5725 MHz	5725- 5850 MHz	900-930 MHz
Frequency band					
WiFi frequency	CH1-13	CH36-64	CH100-140	CH149-	

channels				165	
ANT1=DB1	5.4	7.0	7.3	7.2	
ANT2=DB2	6.1	7.5	8.5	8.7	
Uncorrelated directional gain	4.82	6.25	6.74	6.38	
Correlated directional gain at elevation above 30°	-	-3.21	-	-	-
Uncorrelated directional gain at elevation above 30°	-	-4.96	-	-	-
IoT1	6.0				
IoT2	6.7				
IoT3	5.9				
LR1					2.4
LR2					1.7
HL					2.4

	5925-6425 MHz	6425-6525 MHz	6525-6875 MHz	6875-7125 MHz
Frequency band				
WiFi frequency channels	CH1-93	CH97-113	CH117-185	CH189-233
ANT1=6G1	7.2	7.2	7.7	7.4
ANT2=6G2	6.2	5.8	6.9	6.0
ANT3=6G3	7.2	6.5	6.8	6.9
ANT2=6G4	6.9	6.2	7.2	7.3
Uncorrelated directional gain	4.18	3.41	4.20	4.27
Correlated directional gain at elevation above 30°	1.56	1.11	0.1	-0.1
Uncorrelated	-3.62	-3.92	-5.12	-5.57

directional gain at elevation above 30°				
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1.5 Peak Gain

Peak Gain (dBi)		
Freq (MHz)	DB1	DB2
2400	5.4	6.0
2410	4.9	6.1
2420	5.1	6.1
2430	5.0	5.8
2440	4.5	5.8
2450	4.6	6.0
2460	4.6	5.8
2470	4.3	5.7
2480	4.2	5.8
2490	4.0	5.5
2500	4.1	5.3

Peak Gain (dBi)		
Freq (MHz)	DB1	DB2
5150	6.7	6.9
5200	6.8	7.2
5300	7.0	7.4
5400	6.6	7.5
5500	6.7	8.5
5600	6.8	8.3
5700	7.3	8.2
5800	6.8	8.6
5850	7.2	8.7

Peak Gain (dBi)				
Freq (MHz)	6G1	6G2	6G3	6G4
5925	7.2	5.5	6.6	6.2
6000	7.0	6.0	7.1	6.0
6100	6.5	6.2	6.9	6.1
6200	6.3	5.3	6.7	6.2
6300	6.3	6.3	7.2	6.9
6400	6.3	6.1	6.8	6.3
6500	7.2	5.8	6.5	6.2
6600	7.7	6.9	6.8	6.5
6700	6.6	6.6	6.6	6.4
6800	6.9	6.4	6.8	7.2
6900	7.4	6.0	6.7	7.2
7000	6.8	5.9	6.7	7.3
7100	6.5	5.4	6.9	6.5
7125	6.6	5.4	6.8	6.4

Peak Gain (dBi)		
Freq (MHz)	LR1	LR2
900	1.7	1.5
902	2.1	1.7
915	2.4	1.6
928	2.0	1.3
930	2.1	1.4

Peak Gain (dBi)	
Freq (MHz)	HL
900	1.8
902	2.2
915	2.4
928	1.9
930	1.9

Peak Gain (dBi)			
Freq (MHz)	IOT1	IOT2	IOT3
2400	5.3	6.2	5.9
2410	5.2	6.4	5.8
2420	4.8	6.6	5.9
2430	5.3	6.7	5.9
2440	5.9	6.7	5.8
2450	5.5	6.6	5.7
2460	5.2	6.6	5.5
2470	6.0	6.5	5.0
2480	5.8	6.4	5.0
2490	6.1	6.3	4.8
2500	6.6	6.2	4.8

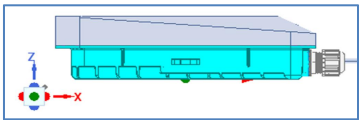
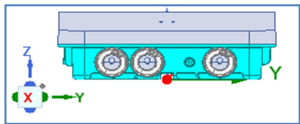
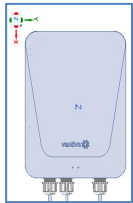
	Peak Directional Gain (dBi)
Frequency (GHz)	2S2T (DB1, DB2)
2.41	4.56
2.42	4.7
2.43	4.82
2.44	4.21
2.45	4.28
2.46	4.5
2.47	4.26
2.48	4.41
2.49	4.34

	Peak Directional Gain (dBi)
Frequency (GHz)	2S2T (DB1, DB2)
5.15	5.9
5.2	5.9
5.3	5.63
5.4	6.25

5.5	6.74
5.6	6.54
5.7	6.18
5.8	6.34
5.85	6.38

	Peak Directional Gain (dBi)
Frequency (GHz)	4S4T (6G1, 6G2, 6G3, 6G4)
5.925	4.18
6	4.11
6.1	3.92
6.2	3.59
6.3	4.11
6.4	3.50
6.5	3.41
6.6	4.20
6.7	3.80
6.8	4.10
6.9	4.27
7	4.17
7.1	3.65
7.125	3.76

1.6 WiFi antennas: 2D radiation pattern

X-Z plane	Y-Z plane	X-Y plane
 <i>Left view</i>	 <i>Front view</i>	 <i>Top view</i>

September 18, 2024

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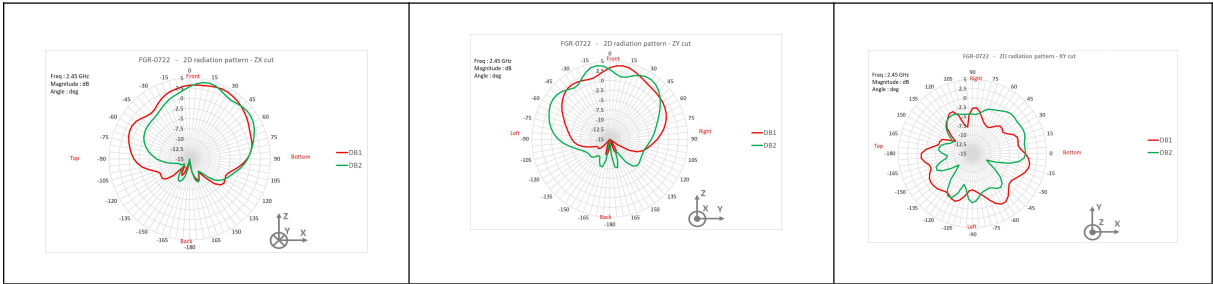


Figure 4 : 2D cuts of peak gain for WiFi antennas @2.45GHz.

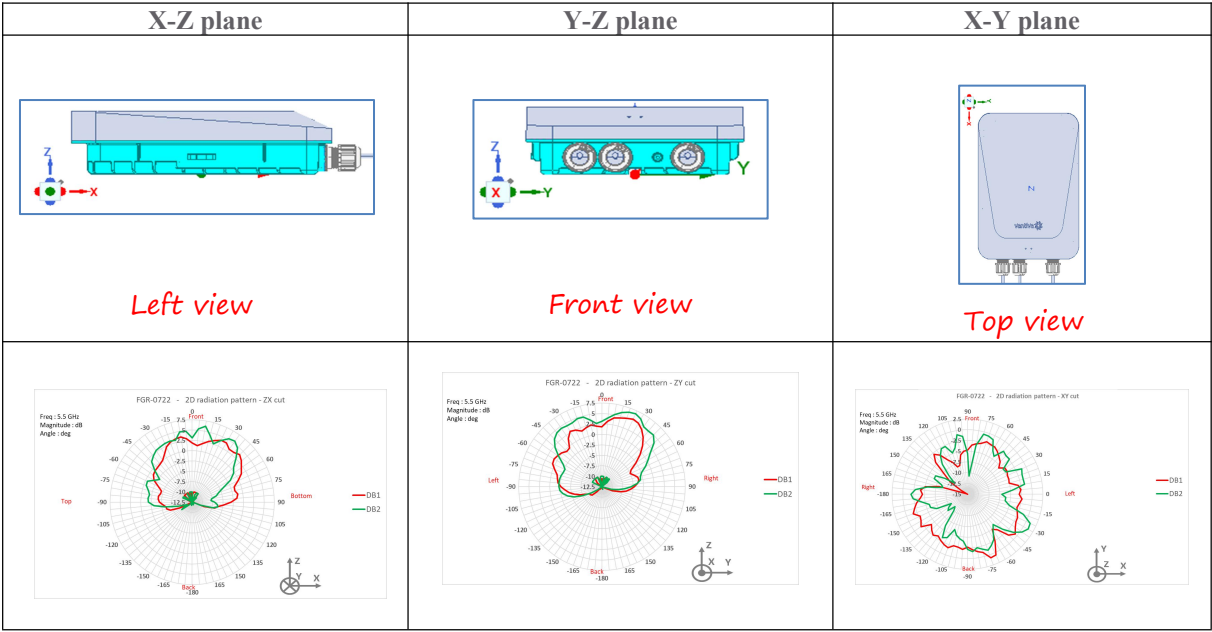


Figure 5 : 2D cuts of peak gain for WiFi antennas @5.5GHz.

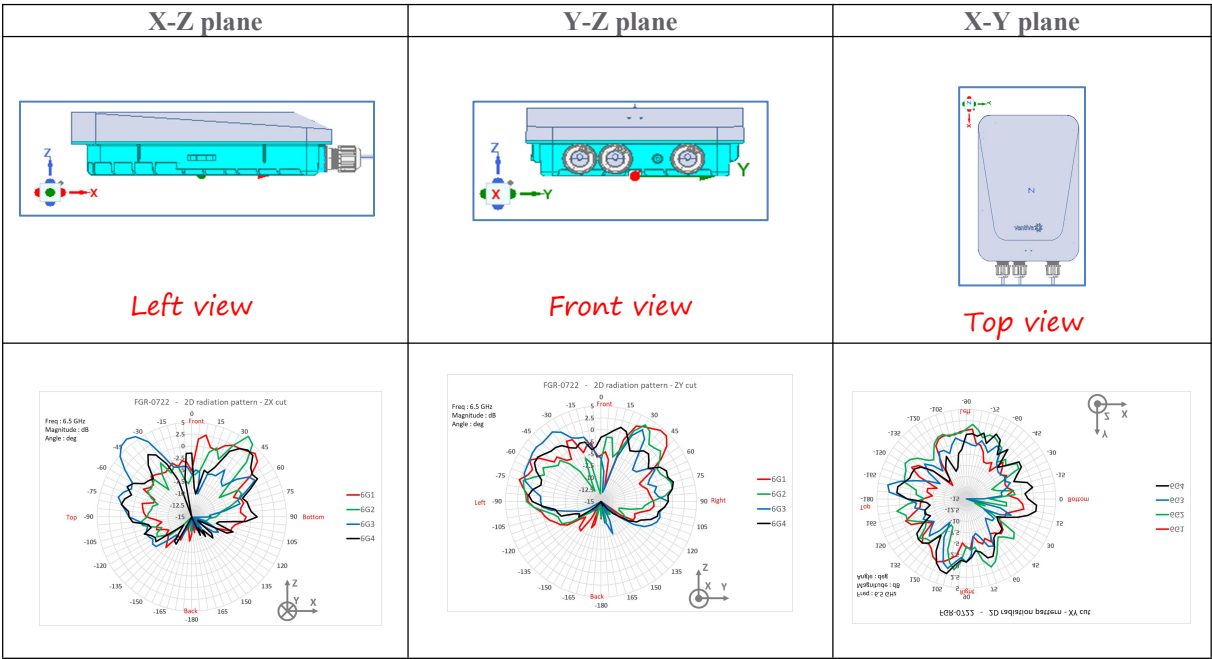
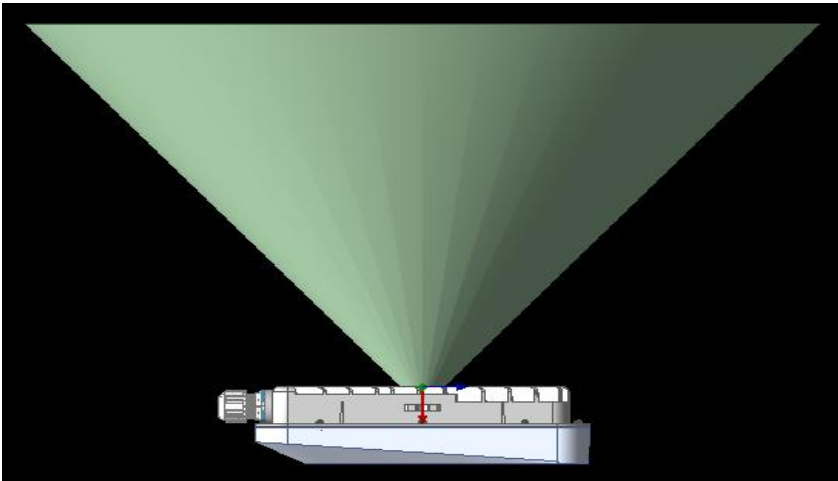


Figure 6 : 2D cuts of peak gain for WiFi antennas @6.5GHz.

1.7 WiFi antennas: Gain values at elevation above 30 degree



	DG max in the cone (dBi)
Freq (GHz)	Horizontal(1S4T)
5.925	1.44
6	1.56
6.1	0.53
6.2	-0.06
6.3	-0.72
6.4	0.12
6.5	1.11
6.6	-0.06
6.7	-0.12
6.8	0.1
6.9	-0.16
7	-0.7
7.1	-0.15
7.125	-0.10
Max	1.56

	DG max in the cone (dBi)
Freq (GHz)	Horizontal(4S4T)
5.925	-3.83
6	-3.62
6.1	-4.93
6.2	-5.60
6.3	-6.12
6.4	-4.36
6.5	-3.92
6.6	-5.61
6.7	-5.83
6.8	-5.12
6.9	-5.57
7	-6.02
7.1	-5.91
7.125	-5.77
Max	-3.62

	DG max in the cone (dBi)
Freq (GHz)	Horizontal(1S2T)
5.15	-3.52
5.2	-3.21
5.3	-3.25
5.4	-3.15
5.5	-2.97

5.6	-3.32
5.7	-3.04
5.8	-3.39
5.85	-3.22
Max	-2.97

	DG max in the cone (dBi)
Freq (GHz)	Horizontal(2S2T)
5.15	-5.14
5.2	-4.96
5.3	-5.33
5.4	-5.60
5.5	-5.52
5.6	-6.24
5.7	-6.02
5.8	-6.40
5.85	-6.22
Max	-4.96

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