





# **FCC Co-Location Test Report**

FCC ID : I88WX5610-B0

Equipment : AX7800 WiFi 6E Tri-Band Gigabit Wireless

**Extender** 

Model No. : WX5610-B0

Brand Name : ZYXEL

Applicant : Zyxel Communications Corporation

Address : No.2 Industry East RD. IX, Hsinchu Science

Park, Hsinchu 30075, Taiwan

Standard : 47 CFR FCC Part 15.247

47 CFR FCC Part 15.407

Received Date : Dec. 26, 2022

Tested Date : Jan. 18 ~ Feb. 13, 2023

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: Approved by:

Along Chen/ Assistant Manager Gary Chang / Manager

Report No.: FR2D2801CO Page: 1 of 13



## **Table of Contents**

GENERAL DESCRIPTION	5
Information	5
The Equipment List	7
Reference Guidance	7
Deviation from Test Standard and Measurement Procedure	3
Measurement Uncertainty	8
TEST CONFIGURATION	9
Testing Facility	g
The Worst Test Modes and Channel Details	g
TRANSMITTER TEST RESULTS	10
Unwanted Emissions into Restricted Frequency Bands	10
TEST LABORATORY INFORMATION	13
	Information The Equipment List Test Standards Reference Guidance Deviation from Test Standard and Measurement Procedure Measurement Uncertainty TEST CONFIGURATION Testing Facility The Worst Test Modes and Channel Details TRANSMITTER TEST RESULTS Unwanted Emissions into Restricted Frequency Bands TEST LABORATORY INFORMATION

Page : 2 of 13

**Appendix A. Unwanted Emissions Into Restricted Frequency Bands** 



## **Release Record**

Report No.	Version	Description	Issued Date
FR2D2801CO	Rev. 01	Initial issue	Mar. 22, 2023

Report No.: FR2D2801CO Page: 3 of 13



## **Summary of Test Results**

FCC Rules	Test Items	Measured	Result
15.247(d)			
15.407(b)	Radiated Emissions	[dBuV/m at 3m]: 41.64MHz 31.82 (Margin -8.18dB) - QP	Pass
15.209		(g 1042)	

### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

#### **Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Report No.: FR2D2801CO Page: 4 of 13



## 1 General Description

## 1.1 Information

## 1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency	802.11b/g/n/ax: 2412 MHz ~ 2462 MHz 802.11a/n/ac/ax: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz, 5745 ~ 5825 MHz 5925 MHz ~ 6425 MHz; 6425 MHz ~ 6525 MHz; 6525 MHz ~ 6875 MHz; 6875 MHz ~ 7125 MHz
Modulation Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac/ax: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)

### 1.1.2 Antenna Details

### For 2.4G

Ant. No.	Brand	Model	Туре	Connector	Gain (dBi)
1	Airgain	N01MSAMA-PK1-G85U (Ant1_2G)	Dipole	ipex	3.9
2	Airgain	N01MSAMB-PK1-B100U (Ant3_2G)	Dipole	ipex	5.0

#### For 5G

Ant.	Ant. Brand Model		Type Con		Operating Frequencies (MHz) / Gain (dBi)			
No.	Diana	Model	турс	Connector	5150~5250	5250~5350	5470~5725	5725~5850
3	Airgain	N02MSAMC-PK1 -W125U (Ant2_5G)	Dipole	ipex	5.5	5.0	5.1	5.0
4	Airgain	N02MSAMD-PK1 -A135U (Ant5_5G)	Dipole	ipex	4.9	3.5	4.4	3.6

### For 6G

Ant.	Brand	Model	Model Type		Operating Frequencies (MHz) / Gain (dBi)			ain (dBi)
No.	Bidild	Model	1,700	Connector	5925~6425	6425~6525	6525~6875	6875~7125
5	Airgain	N06MSAME-PK1- E165U (Ant6_6G)	Dipole	ipex	4.9	4.0	4.7	5.3
6	Airgain	N06MSAMF-PK1- R175U (Ant7_6G)	Dipole	ipex	5.1	4.9	5.2	4.4
7	Airgain	N06MSAMG-PK1 -Y190U (Ant8_6G)	Dipole	ipex	5.5	5.6	5.6	5.0
8	Airgain	N06MSAMH-PK1 -P185U (Ant9_6G)	Dipole	ipex	5.9	5.9	5.7	5.8

Page : 5 of 13

Report No.: FR2D2801CO



## 1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter
	· · · · · · · · · · · · · · · · · · ·

### 1.1.4 Accessories

	Accessories					
No.	Equipment	Description				
1	AC adapter	Brand: DVE Model: DSA-36PFN-12 FUS 120300 I/P: 100-240V~ 50-60Hz 1.0A O/P: 12.0V=3.0A, 36.0W Power Line: 1.5m non-shielded without core				
2	Ethernet Cable	1.8m non-shielded without core				

Report No.: FR2D2801CO Page: 6 of 13



## 1.2 The Equipment List

Test Item	Radiated Emission							
Test Site	966 chamber3 / (03CH03-WS)							
Tested Date	Jan. 18 ~ Feb. 13, 2023							
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until			
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023			
Spectrum Analyzer	R&S	FSV40	101499	Mar. 08, 2022	Mar. 07, 2023			
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 01, 2022	Oct. 31, 2023			
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Jun. 28, 2022	Jun. 27, 2023			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 15, 2022	Dec. 14, 2023			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 27, 2022	Oct. 26, 2023			
Preamplifier	EMC	EMC02325	980187	Jul. 16, 2022	Jul. 15, 2023			
Preamplifier	EMC	EMC184045SE	980897	Aug. 01, 2022	Jul. 31, 2023			
Preamplifier	EMC	EMC184045SE	980903	Jul. 16, 2022	Jul. 15, 2023			
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 04, 2022	Oct. 03, 2023			
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800 -001	Sep. 23, 2022	Sep. 22, 2023			
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Sep. 23, 2022	Sep. 22, 2023			
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Sep. 23, 2022	Sep. 22, 2023			
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 23, 2022	Sep. 22, 2023			
RF cable-8M	EMC	EMC104-SM-SM-80 00	181107	Sep. 23, 2022	Sep. 22, 2023			
Measurement Software	AUDIX	e3	6.120210g	NA	NA			
Note: Calibration Inter	val of instruments liste	d above is one year.						

### 1.3 Test Standards

47 CFR FCC Part 15.247 47 CFR FCC Part 15.407 ANSI C63.10-2013

## 1.4 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01

Report No.: FR2D2801CO Page: 7 of 13



## 1.5 Deviation from Test Standard and Measurement Procedure

None

## 1.6 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty	
Parameters	Uncertainty
Unwanted Emission ≤ 1GHz	±3.96 dB
Unwanted Emission > 1GHz	±4.51 dB

Report No.: FR2D2801CO Page: 8 of 13



## 2 Test Configuration

## 2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	03CH03-WS
Address of Test Site	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

FCC Designation No.: TW0009FCC site registration No.: 207696

➤ ISED#: 10807C

➤ CAB identifier: TW2732

## 2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode		
Unwanted Emissions	2.4g 11g CH6 + 5g 11ax HE40 CH159 + 6g 11ax HE160 CH111		
NOTE: The selected channel is the maximum power channel of Wi-Fi mode.			

Report No.: FR2D2801CO Page: 9 of 13



## 3 Transmitter Test Results

## 3.1 Unwanted Emissions into Restricted Frequency Bands

### 3.1.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit					
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)		
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300		
0.490~1.705	24000/F(kHz)	33.8 - 23	30		
1.705~30.0	30	29	30		
30~88	100	40	3		
88~216	150	43.5	3		
216~960	200	46	3		
Above 960	500	54	3		

#### Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2**:

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

Un-restricted band emissions above 1GHz Limit				
Operating Band	Limit			
5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]			
5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]			
5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]			
5.725 - 5.850 GHz	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Report No.: FR2D2801CO Page: 10 of 13



Un-restricted band emissions above 1GHz Limit				
Operating Band PK Limit		AV Limit		
5.925 – 7.125 GHz	e.i.r.p7 dBm [88.2 dBuV/m@3m]	e.i.r.p27 dBm [68.2 dBuV/m@3m]		

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

#### 3.1.2 Test Procedures

- Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m.
- Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

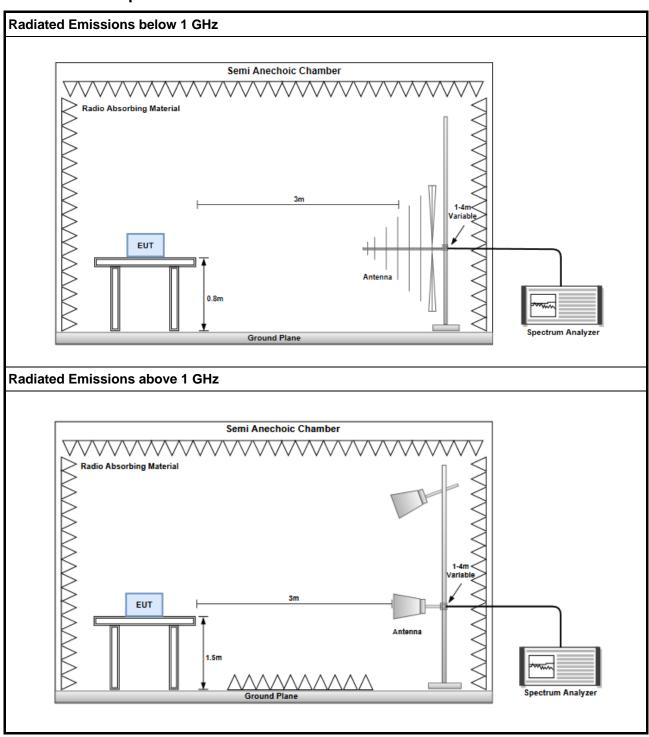
#### Note:

- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

Report No.: FR2D2801CO Page: 11 of 13



## 3.1.3 Test Setup



## 3.1.4 Test Results

Refer to Appendix A.

Report No.: FR2D2801CO Page: 12 of 13



## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <a href="http://www.icertifi.com.tw">http://www.icertifi.com.tw</a>.

#### Linkou

Tel: 886-2-2601-1640 No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)

#### Kwei Shan

Tel: 886-3-271-8666
No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

#### Kwei Shan Site II

Tel: 886-3-271-8640 No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666 Fax: 886-3-318-0345

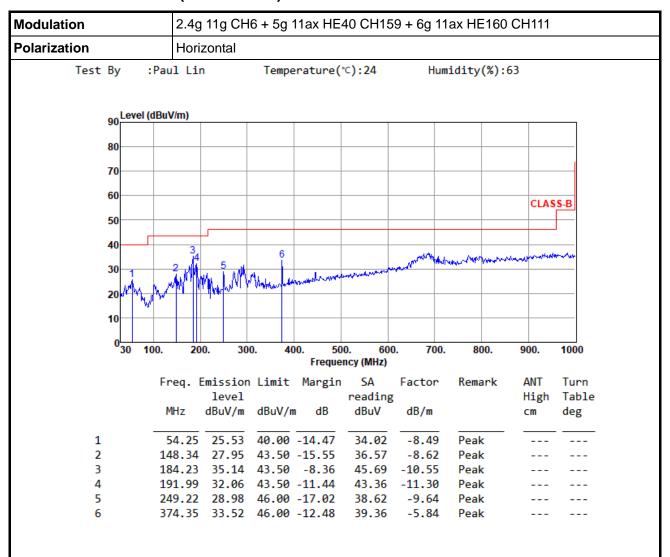
Email: ICC Service@icertifi.com.tw

==END==

Report No.: FR2D2801CO Page: 13 of 13



### **Unwanted Emissions (Below 1GHz)**



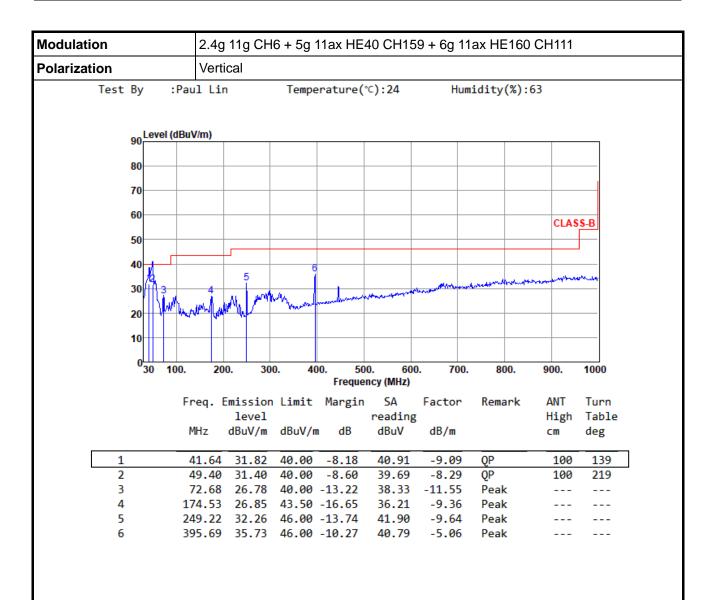
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB/m)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.





Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB/m)

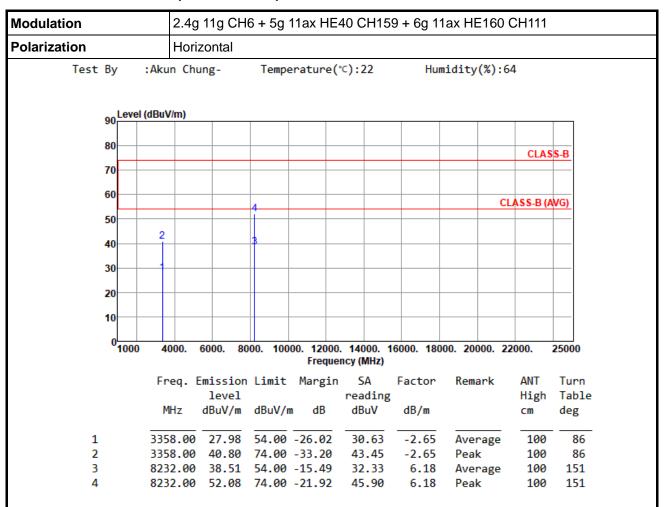
\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



## **Unwanted Emissions (Above 1GHz)**

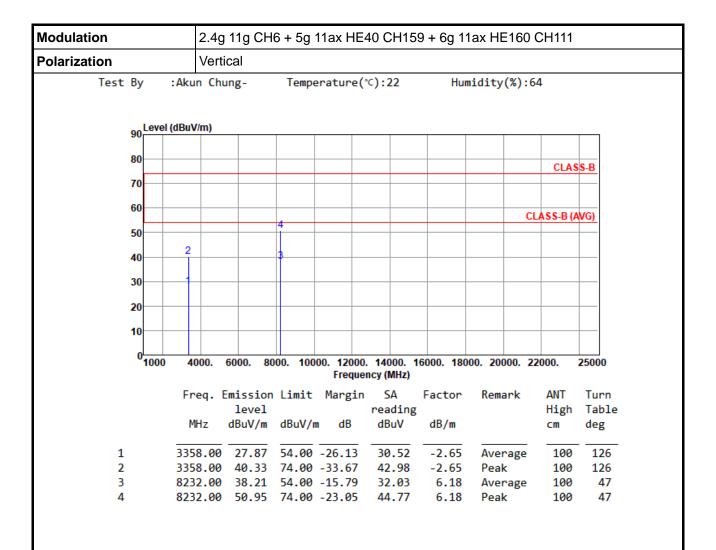


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB/m)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).





Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB/m)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).