RF Exposure Evaluation Report

FCC 47 CFR § 2.1091

for

AX3000 Wi-Fi 6 Smart Home Gateway
Wi-Fi 6 AX3000 IoT Gateway

Model: MS30

Prepared for:

D-Link Corporation

14420 Myford Road Suite 100 Irvine California United States 92606

Prepared by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City, Taiwan
Issued Date: July 30, 2024

Note: This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, NIST or any government agencies. The test results in the report only apply to the tested sample.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 30, 2024	Initial Issue	ALL	Peggy Tsai

Table of Contents

1 Attestation of Test Results

Applicant	D-Link Corporation 14420 Myford Road Suite 100 Irvine California United States 92606
Manufacturer	D-Link Corporation 14420 Myford Road Suite 100 Irvine California United States 92606
Model Name	MS30
Applicable Standards	FCC 47 CFR § 2.1091 FCC 47 CFR § 1.1307 FCC 47 CFR § 1.1310 Published RF exposure KDB procedures
Receive EUT Date:	January 31, 2024
Compliance Certification Services Inc. , tested the above equipment in accordance with the requirements set forth in the above standards. Determination of compliance is based on the results of the compliance measurement,not taking into account measurement instrumentation uncertainy.All indications of Pass/Fail in this report are opinions expressed by Compliance Certification Services Inc, based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.	
Approved & Released By: 	
Sky Zhou Asst. Section Manager	

2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1091, the following FCC Published RF exposure KDB procedures:

- 447498 D04 Interim General RF Exposure Guidance v01
- 865664 D02 RF Exposure Reporting v01r02

3 Device Under Test (DUT) Information

3.1 DUT Description

Product	AX3000 Wi-Fi 6 Smart Home Gateway Wi-Fi 6 AX3000 IoT Gateway
Trade Name	D-Link
Model No.	MS30
Model Discrepancy	N/A
EUT Serial #	U8HR13A000020
Software Version	1.00
Hardware Version	A1
Sample Stage	Identical prototype

3.2 Wireless Technologies

Frequency bands	☒ Bluetooth: 2402MHz-2480MHz ☒ 802.11b/g/n HT20/ax HE20: 2412MHz ~ 2462 MHz ☒ 802.11n HT40/ax HE40: 2422MHz ~ 2452MHz ☒ 802.11a/n HT20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5720MHz / 5745MHz ~ 5825MHz ☒ 802.11ac VHT20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5720MHz / 5745MHz ~ 5825MHz ☒ 802.11ax HE20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5720MHz / 5745MHz ~ 5825MHz ☒ 802.11n HT40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5710MHz / 5755MHz ~ 5795MHz ☒ 802.11ac VHT40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5710MHz / 5755MHz ~ 5795MHz ☒ 802.11ax HE40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5710MHz / 5755MHz ~ 5795MHz ☒ 802.11ac VHT80: 5210MHz / 5290MHz / 5530MHz ~ 5690MHz / 5775MHz ☒ 802.11ax HE80: 5210MHz / 5290MHz / 5530MHz ~ 5690MHz / 5775MHz ☒ 802.11ac VHT160: 5250 MHz / 5570 MHz ☒ 802.11ax HE160: 5250 MHz / 5570 MHz ☒ Others: Zigbee: 2405MHz-2480MHz
Exposure classification	☐ Occupational/Controlled exposure ☒ General Population/Uncontrolled exposure

Antenna Specification

Type: Dipole Antenna

(1) Bluetooth
JAE / AP02DL2527489C0
Gain: 0.34 dBi

(2) Zigbee
JAE / AP02DL2527489C0
Gain: 0.34 dBi

(3) WIFI 2.4GHz:
2G-1 (Chain 0): JAE / AP02DL2527487C0
2G-2 (Chain 1): JAE / AP02DL2527488C0

Frequency	2G-1 (Chain 0) Gain (dBi)	2G-2 (Chain 1) Gain (dBi)	Direction gain (dBi)	Total Gain [Note 1] (dBi)
2412-2462MHz	1.27	1.79	1.54	4.54

[Note 1]: Total Gain=antenna gain + beamforming gain

(4) WIFI 5GHz:
5G-0: JAE / AP02DL2527487C0 (TX/RX)
5G-1: JAE / AP02DL2527488C0 (TX/RX)
5G-2: JAE / AP02DL2527488C0 (RX)

Band	5G-0 (Chain 0) Gain (dBi)	5G-1 (Chain 1) Gain (dBi)	5G-2 Gain (dBi)	Direction gain (dBi)	Total Gain [Note 1] (dBi)
Band I (U-NII 1) 5150-5250MHz	1.79	1.64	1.48	1.72	4.73
Band II (U-NII 2a) 5250-5350 MHz	1.88	1.73	2.11	1.81	4.82
Band III (U-NII 2c) 5470-5725 MHz	1.98	2.1	2.11	2.04	5.05
Band IV (U-NII 3) 5725-5850MHz	1.88	2.15	2.17	2.02	5.03

[Note 1]: Total Gain=antenna gain + beamforming gain

			Antenna Gain:		
BLE			0.34 dBi	(Numeric gain: 1.08)	
Zigbee			0.34 dBi	(Numeric gain: 1.08)	
			Antenna Gain:		
2.4GHz:	Chain 0		1.27 dBi	(Numeric gain: 1.34)	
2.4GHz:	Chain 1		1.79 dBi	(Numeric gain: 1.51)	
	Power Directional		1.54 dBi	(Numeric gain: 1.43)	Worst
	Total Gain		4.54 dBi	(Numeric gain: 2.84)	Worst
			Antenna Gain:		
5GHz(Band 1)	Chain 0		1.79 dBi	(Numeric gain: 1.51)	
5GHz(Band 1)	Chain 1		1.64 dBi	(Numeric gain: 1.46)	
	Power Directional		1.72 dBi	(Numeric gain: 1.49)	Worst
	Total Gain		4.73 dBi	(Numeric gain: 2.97)	Worst
5GHz(Band 2)	Chain 0		1.88 dBi	(Numeric gain: 1.54)	Worst
5GHz(Band 2)	Chain 1		1.73 dBi	(Numeric gain: 1.49)	Worst
	Power Directional		1.81 dBi	(Numeric gain: 1.52)	Worst
	Total Gain		4.82 dBi	(Numeric gain: 3.03)	Worst
5GHz(Band 3)	Chain 0		1.98 dBi	(Numeric gain: 1.58)	Worst
5GHz(Band 3)	Chain 1		2.10 dBi	(Numeric gain: 1.62)	Worst
	Power Directional		2.04 dBi	(Numeric gain: 1.60)	Worst
	Total Gain		5.05 dBi	(Numeric gain: 3.20)	Worst
5GHz(Band 4)	Chain 0		1.88 dBi	(Numeric gain: 1.54)	
5GHz(Band 4)	Chain 1		2.15 dBi	(Numeric gain: 1.64)	
	Power Directional		2.02 dBi	(Numeric gain: 1.59)	Worst
	Total Gain		5.03 dBi	(Numeric gain: 3.18)	Worst

Maximum Tune up power	Zigbee	10.00 dBm	(10.000 mW)
	BLE	10.00 dBm	(10.00 mW)
	WIFI 2.4GHz (DTS)_Non-BF		
	IEEE 802.11b_Ch0	24.00 dBm	(251.189 mW)
	IEEE 802.11b_Ch1	23.50 dBm	(223.872 mW)
	IEEE 802.11g_Ch0	21.00 dBm	(125.89 mW)
	IEEE 802.11g_Ch1	22.00 dBm	(158.49 mW)
	IEEE 802.11n HT 20 (Multiple)	24.00 dBm	(251.19 mW)
	IEEE 802.11n HT 40 (Multiple)	22.50 dBm	(177.83 mW)
	IEEE 802.11ax HE 20 (Multiple)	23.50 dBm	(223.87 mW)
	IEEE 802.11ax HE 40 (Multiple)	21.50 dBm	(141.25 mW)
	WIFI 2.4GHz (DTS)_BF		
	IEEE 802.11n HT 20 (Multiple)	21.50 dBm	(141.254 mW)
	IEEE 802.11n HT 40 (Multiple)	19.50 dBm	(89.125 mW)
	IEEE 802.11ax HE 20 (Multiple)	22.00 dBm	(158.49 mW)
	IEEE 802.11ax HE 40 (Multiple)	19.00 dBm	(79.43 mW)
	WIFI 5.2GHz (U-NII 1)_Non-BF		
	IEEE 802.11a_Ch0	23.50 dBm	(223.872 mW)
	IEEE 802.11a_Ch1	24.00 dBm	(251.189 mW)
	IEEE 802.11n HT 20 (Multiple)	26.00 dBm	(398.11 mW)
	IEEE 802.11n HT 40 (Multiple)	26.50 dBm	(446.68 mW)
	IEEE 802.11ac VHT 80 (Multiple)	19.00 dBm	(79.43 mW)
	IEEE 802.11ac VHT 160 (Multiple)	18.50 dBm	(70.79 mW)
	IEEE 802.11ax HE 20 (Multiple)	26.00 dBm	(398.11 mW)
	IEEE 802.11ax HE 40 (Multiple)	26.50 dBm	(446.68 mW)
	IEEE 802.11ax HE 80 (Multiple)	18.50 dBm	(70.79 mW)
	IEEE 802.11ax HE 160 (Multiple)	18.00 dBm	(63.10 mW)
	WIFI 5.2GHz (U-NII 1)_BF		
	IEEE 802.11n HT 20 (Multiple)	16.00 dBm	(39.811 mW)
	IEEE 802.11n HT 40 (Multiple)	18.00 dBm	(63.096 mW)
	IEEE 802.11ac VHT 80 (Multiple)	15.50 dBm	(35.48 mW)
	IEEE 802.11ac VHT 160 (Multiple)	15.50 dBm	(35.48 mW)
	IEEE 802.11ax HE 20 (Multiple)	16.00 dBm	(39.81 mW)
	IEEE 802.11ax HE 40 (Multiple)	17.50 dBm	(56.23 mW)
	IEEE 802.11ax HE 80 (Multiple)	17.00 dBm	(50.12 mW)
	IEEE 802.11ax HE 160 (Multiple)	18.00 dBm	(63.10 mW)

WIFI 5.3GHz (U-NII 2A)_Non-BF

IEEE 802.11a_Ch0	21.00 dBm	(125.89 mW)
IEEE 802.11a_Ch1	21.00 dBm	(125.89 mW)
IEEE 802.11n HT 20 (Multiple)	21.00 dBm	(125.89 mW)
IEEE 802.11n HT 40 (Multiple)	23.50 dBm	(223.87 mW)
IEEE 802.11ac VHT 80 (Multiple)	19.00 dBm	(79.43 mW)
IEEE 802.11ax HE 20 (Multiple)	22.00 dBm	(158.49 mW)
IEEE 802.11ax HE 40 (Multiple)	23.50 dBm	(223.87 mW)
IEEE 802.11ax HE 80 (Multiple)	18.50 dBm	(70.79 mW)

WIFI 5.3GHz (U-NII 2A)_BF

IEEE 802.11n HT 20 (Multiple)	21.00 dBm	(125.89 mW)
IEEE 802.11n HT 40 (Multiple)	23.50 dBm	(223.87 mW)
IEEE 802.11ac VHT 80 (Multiple)	15.50 dBm	(35.48 mW)
IEEE 802.11ax HE 20 (Multiple)	21.00 dBm	(125.89 mW)
IEEE 802.11ax HE 40 (Multiple)	24.00 dBm	(251.19 mW)
IEEE 802.11ax HE 80 (Multiple)	17.00 dBm	(50.12 mW)

WIFI 5.5GHz (U-NII 2C)_Non-BF

IEEE 802.11a_Ch0	21.50 dBm	(141.25 mW)
IEEE 802.11a_Ch1	21.50 dBm	(141.25 mW)
IEEE 802.11n HT 20 (Multiple)	21.50 dBm	(141.25 mW)
IEEE 802.11n HT 40 (Multiple)	24.00 dBm	(251.19 mW)
IEEE 802.11ac VHT 80 (Multiple)	22.50 dBm	(177.83 mW)
IEEE 802.11ac VHT 160 (Multiple)	18.50 dBm	(70.79 mW)
IEEE 802.11ax HE 20 (Multiple)	22.00 dBm	(158.49 mW)
IEEE 802.11ax HE 40 (Multiple)	23.50 dBm	(223.87 mW)
IEEE 802.11ax HE 80 (Multiple)	22.00 dBm	(158.49 mW)
IEEE 802.11ax HE 160 (Multiple)	18.50 dBm	(70.79 mW)

WIFI 5.5GHz (U-NII 2C)_BF

IEEE 802.11n HT 20 (Multiple)	21.50 dBm	(141.25 mW)
IEEE 802.11n HT 40 (Multiple)	24.00 dBm	(251.19 mW)
IEEE 802.11ac VHT 80 (Multiple)	20.50 dBm	(112.20 mW)
IEEE 802.11ac VHT 160 (Multiple)	15.50 dBm	(35.48 mW)
IEEE 802.11ax HE 20 (Multiple)	19.00 dBm	(79.43 mW)
IEEE 802.11ax HE 40 (Multiple)	23.00 dBm	(199.53 mW)
IEEE 802.11ax HE 80 (Multiple)	19.50 dBm	(89.13 mW)
IEEE 802.11ax HE 160 (Multiple)	18.00 dBm	(63.10 mW)

	WIFI 5.8GHz (U-NII 3)_Non-BF		
	IEEE 802.11a_Ch0	26.50 dBm	(446.68 mW)
	IEEE 802.11a_Ch1	25.50 dBm	(354.81 mW)
	IEEE 802.11n HT 20 (Multiple)	27.50 dBm	(562.34 mW)
	IEEE 802.11n HT 40 (Multiple)	27.00 dBm	(501.19 mW)
	IEEE 802.11ac VHT 80 (Multiple)	25.50 dBm	(354.81 mW)
	IEEE 802.11ax HE 20 (Multiple)	27.50 dBm	(562.34 mW)
	IEEE 802.11ax HE 40 (Multiple)	27.50 dBm	(562.34 mW)
	IEEE 802.11ax HE 80 (Multiple)	25.50 dBm	(354.81 mW)
	WIFI 5.8GHz (U-NII 3)_BF		
	IEEE 802.11n HT 20 (Multiple)	27.00 dBm	(501.19 mW)
	IEEE 802.11n HT 40 (Multiple)	25.00 dBm	(316.23 mW)
	IEEE 802.11ac VHT 80 (Multiple)	24.50 dBm	(281.84 mW)
	IEEE 802.11ax HE 20 (Multiple)	27.50 dBm	(562.34 mW)
	IEEE 802.11ax HE 40 (Multiple)	27.50 dBm	(562.34 mW)
	IEEE 802.11ax HE 80 (Multiple)	24.50 dBm	(281.84 mW)

Notes:

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. The power referred the Tune up power of the test report TMWK2309003308KR, TMWK2309003309KR, TMWK2405001825KR and TMWK2405001827KR for RF Exposure assessment purpose.

4 Maximum Permissible Exposure

4.1 Limits for Maximum Permissible Exposure (MPE)

Table 1 - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	* 100	6
3.0-30	1842/f	4.89/f	* $900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* 100	30
1.34-30	824/f	2.19/f	* $180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

4.2 MPE Calculation Method

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ **Equation 1**

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

If, Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

4.3 MPE EXEMPTION

(A) The available maximum time-averaged power is no more than 1 mW

(B) The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold *Pth* (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). *Pth* is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

(C) Using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	**Threshold ERP (watts)**
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.
Note: R is in meters, f is in MHz.	

4.4 Multiple RF sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^{a} \frac{P_i}{P_{\mathrm{th},i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{\mathrm{th},j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

5 MPE Exemption Option B

Zigbee

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
Zigbee	2475.00	0.2	10.0	0.34	10.34	8.19	6.592	3060	Complies

Bluetooth

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
BLE	2476.00	0.2	10.0	0.34	10.34	8.19	6.592	3060	Complies

Non-Beamformig

WIFI 2.4GHz (DTS)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11b_Ch0	2457.00	0.2	24.0	1.27	25.27	23.12	205.116	3060	Complies
IEEE 802.11b_Ch1	2457.00	0.2	23.5	1.79	25.29	23.14	206.063	3060	Complies
IEEE 802.11g_Ch0	2462.00	0.2	21.0	1.27	22.27	20.12	102.802	3060	Complies
IEEE 802.11g_Ch1	2462.00	0.2	22.0	1.79	23.79	21.64	145.881	3060	Complies
IEEE 802.11n HT 20 (Multiple)	2457.00	0.2	24.0	1.54	25.54	23.39	218.273	3060	Complies
IEEE 802.11n HT 40 (Multiple)	2447.00	0.2	22.5	1.54	24.04	21.89	154.525	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	2457.00	0.2	23.5	1.54	25.04	22.89	194.536	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	2447.00	0.2	21.5	1.54	23.04	20.89	122.744	3060	Complies

WIFI 5.2GHz (U-NII 1)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11a_Ch0	5240.00	0.2	23.5	1.79	25.29	23.14	206.063	3060	Complies
IEEE 802.11a_Ch1	5240.00	0.2	24.0	1.64	25.64	23.49	223.357	3060	Complies
IEEE 802.11n HT 20 (Multiple)	5240.00	0.2	26.0	1.72	27.72	25.57	360.579	3060	Complies
IEEE 802.11n HT 40 (Multiple)	5230.00	0.2	26.5	1.72	28.22	26.07	404.576	3060	Complies
IEEE 802.11ac VHT 80 (Multiple)	5210.00	0.2	19.0	1.72	20.72	18.57	71.945	3060	Complies
IEEE 802.11ac VHT 160 (Multiple)	5250.00	0.2	18.5	1.72	20.22	18.07	64.121	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5240.00	0.2	26.0	1.72	27.72	25.57	360.579	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5230.00	0.2	26.5	1.72	28.22	26.07	404.576	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5210.00	0.2	18.5	1.72	20.22	18.07	64.121	3060	Complies
IEEE 802.11ax HE 160 (Multiple)	5250.00	0.2	18.0	1.72	19.72	17.57	57.148	3060	Complies

WIFI 5.3GHz (U-NII 2A)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11a_Ch0	5320.00	0.2	21.0	1.88	22.88	20.73	118.304	3060	Complies
IEEE 802.11a_Ch1	5320.00	0.2	21.0	1.73	22.73	20.58	114.288	3060	Complies
IEEE 802.11n HT 20 (Multiple)	5320.00	0.2	21.0	1.81	22.81	20.66	116.413	3060	Complies
IEEE 802.11n HT 40 (Multiple)	5270.00	0.2	23.5	1.81	25.31	23.16	207.014	3060	Complies
IEEE 802.11ac VHT 80 (Multiple)	5290.00	0.2	19.0	1.81	20.81	18.66	73.451	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5320.00	0.2	22.0	1.81	23.81	21.66	146.555	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5270.00	0.2	23.5	1.81	25.31	23.16	207.014	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5290.00	0.2	18.5	1.81	20.31	18.16	65.464	3060	Complies

WIFI 5.5GHz (U-NII 2C)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11a_Ch0	5720.00	0.2	21.5	1.98	23.48	21.33	135.831	3060	Complies
IEEE 802.11a_Ch1	5720.00	0.2	21.5	2.10	23.60	21.45	139.637	3060	Complies
IEEE 802.11n HT 20 (MIMO)	5720.00	0.2	21.5	2.04	23.54	21.39	137.721	3060	Complies
IEEE 802.11n HT 40 (MIMO)	5710.00	0.2	24.0	2.04	26.04	23.89	244.906	3060	Complies
IEEE 802.11ac VHT 80 (MIMO)	5690.00	0.2	22.5	2.04	24.54	22.39	173.380	3060	Complies
IEEE 802.11ac VHT 160 (Multiple)	5570.00	0.2	18.5	2.04	20.54	18.39	69.024	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5720.00	0.2	22.0	2.04	24.04	21.89	154.525	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5710.00	0.2	23.5	2.04	25.54	23.39	218.273	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5690.00	0.2	22.0	2.04	24.04	21.89	154.525	3060	Complies
IEEE 802.11ax HE 160 (Multiple)	5570.00	0.2	18.5	2.04	20.54	18.39	69.024	3060	Complies

WIFI 5.8GHz (U-NII 3)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11a_Ch0	5825.00	0.2	26.5	1.88	28.38	26.23	419.759	3060	Complies
IEEE 802.11a_Ch1	5825.00	0.2	25.5	2.15	27.65	25.50	354.813	3060	Complies
IEEE 802.11n HT 20 (Multiple)	5825.00	0.2	27.5	2.02	29.52	27.37	545.758	3060	Complies
IEEE 802.11n HT 40 (Multiple)	5795.00	0.2	27.0	2.02	29.02	26.87	486.407	3060	Complies
IEEE 802.11ac VHT 80 (Multiple)	5775.00	0.2	25.5	2.02	27.52	25.37	344.350	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5825.00	0.2	27.5	2.02	29.52	27.37	545.758	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5795.00	0.2	27.5	2.02	29.52	27.37	545.758	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5775.00	0.2	25.5	2.02	27.52	25.37	344.350	3060	Complies

Beamformig

WIFI 2.4GHz (DTS)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11n HT 20 (Multiple)	2437.00	0.2	21.5	4.54	26.04	23.89	244.906	3060	Complies
IEEE 802.11n HT 40 (Multiple)	2442.00	0.2	19.5	4.54	24.04	21.89	154.525	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	2437.00	0.2	22.0	4.54	26.54	24.39	274.789	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	2452.00	0.2	19.0	4.54	23.54	21.39	137.721	3060	Complies

WIFI 5.2GHz (U-NII 1)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11n HT 20 (Multiple)	5240.00	0.2	16.0	4.73	20.73	18.58	72.111	3060	Complies
IEEE 802.11n HT 40 (Multiple)	5230.00	0.2	18.0	4.73	22.73	20.58	114.288	3060	Complies
IEEE 802.11ac VHT 80 (Multiple)	5210.00	0.2	15.5	4.73	20.23	18.08	64.269	3060	Complies
IEEE 802.11ac VHT 160 (Multiple)	5250.00	0.2	15.5	4.73	20.23	18.08	64.269	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5240.00	0.2	16.0	4.73	20.73	18.58	72.111	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5230.00	0.2	17.5	4.73	22.23	20.08	101.859	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5210.00	0.2	17.0	4.73	21.73	19.58	90.782	3060	Complies
IEEE 802.11ax HE 160 (Multiple)	5250.00	0.2	18.0	4.73	22.73	20.58	114.288	3060	Complies

WIFI 5.3GHz (U-NII 2A)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11n HT 20 (Multiple)	5300.00	0.2	21.0	4.82	25.82	23.67	232.809	3060	Complies
IEEE 802.11n HT 40 (Multiple)	5270.00	0.2	23.5	4.82	28.32	26.17	414.000	3060	Complies
IEEE 802.11ac VHT 80 (Multiple)	5290.00	0.2	15.5	4.82	20.32	18.17	65.615	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5300.00	0.2	21.0	4.82	25.82	23.67	232.809	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5270.00	0.2	24.0	4.82	28.82	26.67	464.515	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5290.00	0.2	17.0	4.82	21.82	19.67	92.683	3060	Complies

WIFI 5.5GHz (U-NII 2C)

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11n HT 20 (MIMO)	5720.00	0.2	21.5	5.05	26.55	24.40	275.423	3060	Complies
IEEE 802.11n HT 40 (MIMO)	5550.00	0.2	24.0	5.05	29.05	26.90	489.779	3060	Complies
IEEE 802.11ac VHT 80 (MIMO)	5690.00	0.2	20.5	5.05	25.55	23.40	218.776	3060	Complies
IEEE 802.11ac VHT 160 (Multiple)	5570.00	0.2	15.5	5.05	20.55	18.40	69.183	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5720.00	0.2	19.0	5.05	24.05	21.90	154.882	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5710.00	0.2	23.0	5.05	28.05	25.90	389.045	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5690.00	0.2	19.5	5.05	24.55	22.40	173.780	3060	Complies
IEEE 802.11ax HE 160 (Multiple)	5570.00	0.2	18.0	5.05	23.05	20.90	123.027	3060	Complies

WIFI 5.8GHz (U-NII 3)_BF

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
IEEE 802.11n HT 20 (Multiple)	5825.00	0.2	27.0	5.03	32.03	29.88	972.747	3060	Complies
IEEE 802.11n HT 40 (Multiple)	5795.00	0.2	25.0	5.03	30.03	27.88	613.762	3060	Complies
IEEE 802.11ac VHT 80 (Multiple)	5775.00	0.2	24.5	5.03	29.53	27.38	547.016	3060	Complies
IEEE 802.11ax HE 20 (Multiple)	5825.00	0.2	27.5	5.03	32.53	30.38	1091.440	3060	Complies
IEEE 802.11ax HE 40 (Multiple)	5795.00	0.2	27.5	5.03	32.53	30.38	1091.440	3060	Complies
IEEE 802.11ax HE 80 (Multiple)	5775.00	0.2	24.5	5.03	29.53	27.38	547.016	3060	Complies

6 Simultaneous Transmission Analysis

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^{a}\frac{P_i}{P_{\mathrm{th},i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\mathrm{th},j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				
	1	DTS	+	BLE	+	Zigbee
	2	U-NII	+	BLE	+	Zigbee

6.1 Sum of the Zigbee + BLE + WiFi 2.4GHz

Mode	Frequency (MHz)	Max Tune-up ERP(mW)	ERP Threshold(mW)	simultaneous Transmission	simultaneous Transmission Limit
Zigbee	2475.00	6.592	3060	0.094	≤1
BLE	2476.00	6.592	3060		
WiFi 2.4GHz	2457.00	274.789	3060		

6.2 Sum of the Zigbee + BLE + WiFi 5GHz

Mode	Frequency (MHz)	Max Tune-up ERP(mW)	ERP Threshold(mW)	simultaneous Transmission	simultaneous Transmission Limit
Zigbee	2475.00	6.592	3060	0.361	≤1
BLE	2476.00	6.592	3060		
WiFi 5GHz	5825.00	1091.440	3060		

7 Facilities

All measurement facilities used to collect the measurement data are located at

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

☐ No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan.

--End of Test Report--