



# RADIO EXPOSURE TEST REPORT

**FCC ID** : YZKEAP102

**Equipment** : Dual-Band Wi-Fi 6 Indoor Access Point

**Brand Name** : Edgecore

**Model Name** : EAP102

**Applicant** : Edgecore Networks Corporation  
No. 1, Creation Rd. III, Science Park Hsinchu  
30077, Taiwan

**Manufacturer (1)** : Accton Technology Corporation  
No. 1, Creation Rd. III, Science Park Hsinchu  
30077, Taiwan

**Manufacturer (2)** : Accton Technology Corporation Zhunan Factory  
1F.& 5F, No. 1, Keyi St., Zhunan Township, Miaoli  
County 350 - TAIWAN

**Standard** : 47 CFR Part 2.1091

The product was received on Dec. 01, 2020, and testing was started from Dec. 04, 2020 and completed on Aug. 22, 2022. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

**Sporton International Inc. Hsinchu Laboratory**

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## Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
<b>1 General Description .....</b>	<b>5</b>
1.1 EUT General Information .....	5
1.2 Antenna Information .....	6
1.3 Table for Permissive Change .....	7
1.4 Accessories .....	7
1.5 Applicable Standards .....	8
1.6 Testing Location .....	8
<b>2 Maximum Permissible Exposure .....</b>	<b>9</b>
2.1 Limit of Maximum Permissible Exposure .....	9
2.2 MPE Calculation Method .....	9
2.3 MPE Exemption .....	10
2.4 Calculated Result and Limit.....	11
<b>Photographs of EUT v01</b>	





## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

**Declaration of Conformity:**

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

**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.

Reviewed by: **Sam Chen**

Report Producer: **Penny Kao**



# 1 General Description

## 1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK



## 1.2 Antenna Information

Set.	Ant.	2.4G Port	5G Port	Bluetooth Port	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	1	1	1	-	MAG. LAYERS	MSA-1313-25 GC4-A2-TN	PIFA Antenna	I-PEX	Note 1
	2	2	2	-			PIFA Antenna	I-PEX	
	3	3	3	-			PIFA Antenna	I-PEX	
	4	4	4	1			PIFA Antenna	I-PEX	

Note 1:

Set.	Ant.	Gain (dBi)		
		2.4GHz	5GHz	Bluetooth
1	1	5.43	7.54	-
	2	5.36	6.92	-
	3	5.24	6.80	-
	4	5.19	6.76	5.19

Note 2: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ; NSS1(g1,3) = 10^{G3/20} ; NSS1(g1,4) = 10^{G4/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2$$

$$DG = 10 \log \left[ \frac{(NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2}{N_{ANT}} \right] \Rightarrow 10$$

$$\log \left[ \frac{(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2}{N_{ANT}} \right]$$

Where ;

$$5G \ G1 = 7.54 \text{ dBi}; G2 = 6.92 \text{ dBi}; G3 = 6.80 \text{ dBi}; G4 = 6.76 \text{ dBi}; DG = 13.03 \text{ dBi}$$

Note 3: The above information was declared by manufacturer.

Note 4: The EUT has one set of antenna.



**For 2.4GHz function:**

For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX)

The EUT supports all antennas with TX/RX diversity functions.

At once time there are only two antenna port can transmitting/receiving RF signal.

Port 1 and Port 2 generated the worst case than Port 3 and Port 4, so it is tested and recorded in the report.

**For 5GHz function:**

For IEEE 802.11a/n/ac/ax mode (4TX/4RX)

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

**For Bluetooth function:**

Only Port 1 can be used as transmitting/receiving functions.

### 1.3 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA0N2725

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding UNII 2A and UNII 2C (5250~5350 MHz, 5470~5725 MHz) for this device. 2. Changing the distance of Maximum Permissible Exposure to "48cm" from "24cm".	Maximum Permissible Exposure
3. Adding two thermal pad in PCB backplane. 4. Changing transformer from "LK24126SN 2022x" to "LK24147SN 2106".	After evaluating, it doesn't affect the test result of this test report.

### 1.4 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	APD	WB-24J12R	Input: 100-240V~50-60Hz 0.7A Max. Output: 12.0V, 2.0A, 24.0W
Others			
Plug*1			
Console cable*1: Non-shielded, 1.5m			
Wall bracket*1			



### 1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
- ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ 47 CFR Part 1.1307
- ♦ 47 CFR Part 1.1310

### 1.6 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065      FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.





## 2 Maximum Permissible Exposure

### 2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1500	-	-	f/300	<6
1500-100,000	-	-	5	<6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1500	-	-	f/1500	<30
1500-100,000	-	-	1.0	<30

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Method

The MPE was calculated at 48 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

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



### 2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

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

Where

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

and

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

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance R between the person and the antenna / radiating structure, where  $R > \lambda / 2 \pi$ .

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



## 2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm <sup>2</sup> )	S Limit (mW/cm <sup>2</sup> )
2.4G;D1D	8.41	26.00	34.41	0.50	34.91	3.09742	48	0.10698	1.00000
5.2G;D1D	13.03	22.89	35.92	0.07	35.99	3.97192	48	0.13718	1.00000
5.3G;D1D	13.03	16.87	29.90	0.09	29.99	0.99770	48	0.03446	1.00000
5.6G;D1D	13.03	16.91	29.94	0.05	29.99	0.99770	48	0.03446	1.00000
5.8G;D1D	13.03	22.94	35.97	0.02	35.99	3.97192	48	0.13718	1.00000
2.4G;BT-LE	5.19	6.44	11.63	0.50	12.13	0.01633	48	0.00056	1.00000

MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2437	0.0196	0.48	34.91	32.76	1.888	4.424	Complies
5785	0.0082		35.99	33.84	2.421	4.424	Complies
2440	0.0196		12.13	9.98	0.010	4.424	Complies

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz+Bluetooth

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.48	34.91	32.76	1.888	4.424	0.98	<= 1
5785		35.99	33.84	2.421	4.424		
2440		12.13	9.98	0.010	4.424		

Note: The above antenna gain was declared by manufacturer.

—————THE END—————