


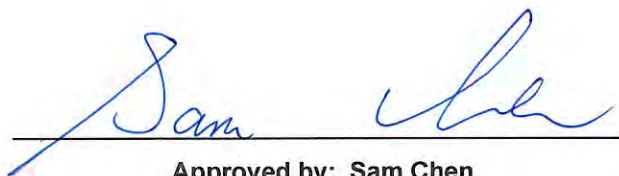


# RADIO EXPOSURE TEST REPORT

FCC ID : O2U-5842  
Equipment : Wireless Access Point  
Brand Name :   
Model Name : WR5842  
Applicant : COMPAL BROADBAND NETWORKS,INC.  
13F-1, No.1, Taiyuan 1st St., Zhubei City, Hsinchu  
County 30288, Taiwan, R.O.C.  
Manufacturer : COMPAL BROADBAND NETWORKS,INC.  
13F-1, No.1, Taiyuan 1st St., Zhubei City, Hsinchu  
County 30288, Taiwan, R.O.C.  
Standard : 47 CFR Part 2.1091

The product was received on Apr. 14, 2022, and testing was started from Apr. 25, 2022 and completed on Jul. 07, 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**

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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<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: **Vicky Huang**



# 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) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5250 5250-5320 5500-5720 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)



## 1.2 Antenna Information

Ant.	2.4GHz Port	5GHz Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	-	LYNWAVE	ALX21P-052AA2-00	PCB Antenna	I-PEX	3.1
2	2	-	LYNWAVE	ALX21P-052AA3-00	PCB Antenna	I-PEX	3.3
3	-	1	LYNWAVE	ALX21P-092AA1-00	PCB Antenna	I-PEX	4.7
4	-	2	LYNWAVE	ALX21P-092AA2-00	PCB Antenna	I-PEX	4.8

Note 1: The above information was declared by manufacturer.

Note 2: The EUT has four antennas.

Note 3: 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	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left[ \sum_{k=1}^{N_{ANT}} \xi_{j,k} \right]^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

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

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

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

$$DG = 10 \log \left[ \frac{(NSS1(g1,1) + NSS1(g1,2))^2}{N_{ANT}} \right] \Rightarrow 10 \log \left[ \frac{(10^{G1/20} + 10^{G2/20})^2}{N_{ANT}} \right]$$

Where ;

$$2.4G : G1 = 3.1 \text{ dBi} ; G2 = 3.3 \text{ dBi} ; DG = 6.21 \text{ dBi}$$

$$5G : G1 = 4.7 \text{ dBi} ; G2 = 4.8 \text{ dBi} ; DG = 7.76 \text{ dBi}$$

### For 2.4GHz:

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

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

Port 1, Port 2 could transmit/receive simultaneously.

#### For 5GHz:

#### For IEEE 802.11a/n/ac/ax mode (2TX/2RX):

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

Port 1, Port 2 could transmit/receive simultaneously.



### 1.3 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA241343

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

Modifications	Performance Checking
1. Adding U-NII-2A and U-NII-2C bands (5250~5350 MHz, 5470~5725 MHz) for this device, and it has the straddle channels (5690 MHz, 5710MHz, 5720 MHz). 2. Adding 160MHz	MPE

Note: The MPE result of 2.4GHz and WLAN-5GHz U-NII 1, 3 Band were based on the original report.

### 1.4 Accessories

Power	Brand	Model	Rating
Adapter	Frecom	F18L10-120150SPAU	INPUT: 100-240V, 50/60Hz, 0.6A OUTPUT: 12V, 1.5A, 18W

### 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 51 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	6.21	29.16	35.37	0.50	35.87	3.86367	51	0.11821	1.00000
5.2G;D1D	7.76	27.93	35.69	0.30	35.99	3.97192	51	0.12152	1.00000
5.3G;D1D	7.76	22.00	29.76	0.23	29.99	0.99770	51	0.03248	1.00000
5.6G;D1D	7.76	22.13	29.89	0.10	29.99	0.99770	51	0.03347	1.00000
5.8G;D1D	7.76	28.16	35.92	0.07	35.99	3.97192	51	0.12152	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
2457	0.0194	0.51	35.87	33.72	2.355	4.994	Complies
5775	0.0083	0.51	35.99	33.84	2.421	4.994	Complies

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

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
2457	0.51	35.87	33.72	2.355	4.994	0.96	<= 1
5775	0.51	35.99	33.84	2.421	4.994		

—————THE END—————