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Report No.: 2112RSU018-U5 Report Version: V01 Issue Date: 05-24-2022

# **RF Exposure Evaluation Declaration**

FCC ID: TK4WPJ419

**Applicant:** Compex Systems Pte Ltd

**Product:** Wireless Access Point

Model No.: WPJ419, WPJ419HV, WPJ419LV

**Brand Name:** COMPEX

FCC Rule Part(s) FCC Part 2.1091

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	Jame Yuan	ilac-MRA	
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	Robin Wu	Milabilia	TESTING LABORATORY CERTIFICATE #3628.01

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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## **Revision History**

Report No.	Version	Description	Issue Date	Note
2112RSU018-U5	Rev. 01	Initial Report	05-24-2022	Valid



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## 1. General Information

### 1.1. Applicant

Compex Systems Pte Ltd

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

### 1.2. Manufacturer

Compex Systems Pte Ltd

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

## 1.3. Testing Facility

$\boxtimes$	Test Site - MRT Suzhou Laboratory  Laboratory Location (Suzhou - Wuzhong)							
	D8 Building, No.2	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China						
	Laboratory Loca	Laboratory Location (Suzhou - SIP)						
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China							
	Laboratory Accre	editations						
	A2LA: 3628.01		CNAS	S: L10551				
	FCC: CN1166	ISED: CN0001						
	VOCE	□R-20025	□G-20034	□C-20020	□T-20020			
	VCCI:	□R-20141	□G-20134	□C-20103	□T-20104			
	Test Site – MRT Shenzhen Laboratory							
	Laboratory Location (Shenzhen)  1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China  Laboratory Accreditations							
	A2LA: 3628.02		CNAS	: L10551				
	FCC: CN1284		ISED:	CN0105				
	Test Site – MRT	Taiwan Laboratory	1					
	Laboratory Location (Taiwan)							
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)  Laboratory Accreditations							
	TAF: L3261-1907	25						
	FCC: 291082, TW	/3261	ISED:	TW3261				



#### 1.4. Product Information

Product Name	Wireless Access Point	
Model No.	WPJ419, WPJ419HV, WPJ419LV	
Brand Name	DMPEX	
Wi-Fi Specification	802.11a/b/g/n/ac	
Antenna Information	Refer to Section 1.5	
Power Supply	AC Adapter or PoE	

#### Remark:

- 1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
- 2. The difference of models is only for marketing different client.

#### 1.5. Antenna Details

Antenna	Frequency Band	Max Peak Gain	CDD Direction	BF Directional			
Туре	(GHz)	(dBi)	For Power	For PSD	Gain (dBi)		
Wi-Fi Antenn	Wi-Fi Antenna 1# (2*2 MIMO)						
Omni-	2.4 ~ 2.5	3.78	3.78	6.79	6.79		
directional	5.15 ~ 5.9	4.63	4.63	7.64	7.64		
Wi-Fi Antenna 2# (2*2 MIMO)							
Omni-	2.4 ~ 2.5	2	2	5.01	5.01		
directional	5.15 ~ 5.9	3	3	6.01	6.01		

#### Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows,  $N_{ANT} = 2$ ,  $N_{SS} = 1$ .

If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

• For power spectral density (PSD) measurements on all devices,

Array Gain = 
$$10 \log (N_{ANT}/N_{SS}) dB = 3.01$$
;

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB for 
$$N_{ANT} \le 4$$
;

- 2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac, not include 802.11a/b/g. Directional gain =  $G_{ANT}$  + BF Gain.
- 3. For beamforming operation, Compex software automatically backs power down based on a 10log(N) factor based on CDD power.



## 2. RF Exposure Evaluation

#### 2.1. Test Limits

Per § 1.1307(b)(3)(i)(B), a single RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are less than or the threshold Pth (mW) described in the following formula.

$$P_{\text{th}} (\text{mW}) = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \le 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \le 40 \text{ cm} \end{cases}$$
(B. 2)

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20}\operatorname{cm}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and ERP<sub>20cm</sub> is per Formula (B.1).

$$P_{\text{th}} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \le f < 1.5 \text{ GHz} \\ \\ 3060 & 1.5 \text{ GHz} \le f \le 6 \text{ GHz} \end{cases}$$
(B. 1)



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#### 2.2. Test Result

Product	Wireless Access Point
Test Item	RF Exposure Evaluation

Test Mode	Frequency	Max.	Max. Tune-up	Max.	Max.	ERP	Exclusion
	Band	Conducted	Conducted	Antenna			Threshold
	(MHz)	Power	Power	Gain (dBi)	dBm	mW	(mW)
		(dBm)	(dBm)				@ 20cm
802.11b/g/n	2412 ~ 2462	27.07	27.5	3.78	29.13	818.46	3060
802.11a/n/ac	5180 ~ 5825	25.64	26.0	4.63	28.48	704.69	3060

Note: Max EIRP = Max turn-up conducted power (dBm) + Max. Antenna Gain (dBi).

Max ERP = Max EIRP - 2.15dB.

#### **CONCLUSION:**

WLAN 2.4GHz Band, WLAN 5GHz can transmit simultaneously.

Exposure ratio = 818.46 / 3060 + 704.69 / 3060 = 0.5 < 1

Therefore, the device qualifies for RF exposure test exemption.

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