



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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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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1.4. Product Information

Product Name	Wireless Access Point
Model No.	WPJ419, WPJ419HV, WPJ419LV
Brand Name	COMPEX
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 Type	Frequency Band (GHz)	Max Peak Gain (dBi)	CDD Directional Gain (dBi)		BF Directional Gain (dBi)
			For Power	For PSD	
Wi-Fi Antenna 1# (2*2 MIMO)					
Omni-directional	2.4 ~ 2.5	3.78	3.78	6.79	6.79
	5.15 ~ 5.9	4.63	4.63	7.64	7.64
Wi-Fi Antenna 2# (2*2 MIMO)					
Omni-directional	2.4 ~ 2.5	2	2	5.01	5.01
	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 = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.

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

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

- For power measurements on IEEE 802.11 devices,

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

2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac, not include 802.11a/b/g. Directional gain = $G_{ANT} + \text{BF Gain}$.

3. For beamforming operation, Compex software automatically backs power down based on a $10\log(N)$ 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 P_{th} (mW) described in the following formula.

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

Where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).

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

2.2. Test Result

Product	Wireless Access Point
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Max. Tune-up Conducted Power (dBm)	Max. Antenna Gain (dBi)	Max. ERP		Exclusion Threshold (mW) @ 20cm
					dBm	mW	
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.

_____ The End _____