



## RF Exposure Evaluation Declaration

---

**FCC ID:** TK4WLE1216V520

**APPLICANT:** Compex Systems Pte Ltd

**Application Type:** Certification

**Product:** 4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module

**Model No.:** WLE1216V5-20, WLE1216V5-20-I

**Brand Name:** COMPEX

**FCC Classification:** Unlicensed National Information Infrastructure (UNII)

Reviewed By : \_\_\_\_\_  
( Jame Yuan )

Approved By : \_\_\_\_\_  
( Marlin Chen )



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.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

---

## Revision History

Report No.	Version	Description	Issue Date	Note
1710RSU02003	Rev. 01	Draft Report	11-20-2017	

## 1. PRODUCT INFORMATION

### 1.1. Equipment Description

Product Name	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module
Model No.	WLE1216V5-20, WLE1216V5-20-I
Brand Name	COMPEX
Wi-Fi Specification	802.11a/n/ac
Frequency Range	For 802.11a/n-HT20/ac-VHT20: 5180~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40: 5190~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5775MHz
Type of Modulation	802.11a/n/ac: OFDM
Maximum Average Output Power	802.11a: 22.72dBm 802.11n-HT20: 25.74dBm 802.11n-HT40: 25.82dBm 802.11ac-VHT20: 25.89dBm 802.11ac-VHT40: 25.60dBm 802.11ac-VHT80/802.11ac-VHT80+80: 21.36dBm

## 1.2. Antenna Description

No.	Antenna	Manufacturer	Frequency Band (MHz)	Max Peak Gain (dBi)
<b>Wi-Fi External Antenna List (5GHz 4*4 MIMO)</b>				
1#	Omni Directional	Exceltek Electronics Technology Co., Ltd.	2400 ~ 2500	3.0
			5150 ~ 5850	5.0
2#	Omni Directional	Laird Smart Technology Co., Ltd.	2400 ~ 2500	2.2
			5150 ~ 5850	3.5
3#	Omni Directional	Linx Technologies	2400 ~ 2500	2.5
			5150 ~ 5850	4.6
4#	Omni Directional	Kenbotong Technology Co., Ltd.	5150 ~ 5850	10.0

Note 1: The device didn't support beam-forming technology and Cyclic Delay Diversity (CDD) technology, and the transmit signals are uncorrected, so no add array gain to the band power and band PSD.

Note 2: We selected the max peak gain antenna 4# to perform all RF testing.

## 2. RF Exposure Evaluation

### 2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$r$  = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.

## 2.2. Test Result of RF Exposure Evaluation

Product	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11a/n/ac	5180 ~ 5240	25.89	0.7722	1
	5260 ~ 5320			
	5500 ~ 5720			
	5745 ~ 5825			

### CONCLUSION:

Therefore, the Min Safety Distance R = 20cm.

\_\_\_\_\_ The End \_\_\_\_\_