RF Exposure Evaluation Declaration

FCC ID: TK4WLE600V5

APPLICANT: Compex Systems Pte Ltd.

Application Type: Certification

Product: WIRELESS-AC 2X2 27DBM NETWORK MINI PCIE ADAPTER

Model No.: WLE600V5-27

Trademark: COMPEX

FCC Classification: Unlicensed National Information Infrastructure (UNII)

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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
2007RSU035-U2	Rev. 01	Initial Report	09-17-2020	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	WIRELESS-AC 2X2 27DBM NETWORK MINI PCIE ADAPTER
Model No.:	WLE600V5-27
Serial Model No.:	WLE600V5-27ESD-I
Serial No.:	29449325
Rated Voltage:	DC 3.3V
Temperature:	-20 ~ 70°C
Wi-Fi Specification:	802.11a/n/ac, 2*2 MIMO
Frequency Range:	For 802.11a/n-HT20/ac-VHT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40: 5190~5230MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5775MHz
Modulation Technology:	802.11a/n/ac: OFDM
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps

Note: The difference between models is sold in different markets.

1.2. Antenna Description

Antenna Type	Frequency Band (GHz)	Model Name	Max Antenna Gain (dBi)	Directional Gain (dBi)	
				For Power	For PSD
Dipole Antenna	5.15~5.35	KMA5250_7	7.0	7.0	10.01
	5.70 ~5.90	KMA5800_6	6.0	6.0	9.01
Panel Antenna	4.90 ~5.90	FP4959-22DP	22.5	22.5	22.5

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 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 $N_{ANT} \leq 4$;

Note 2: Panel antenna support Cross-Polarized design, so directional gain is the gain of an individual antenna.
Note 3: When used with dipole antenna, this device was defined as P-T-MP application and support NII-1 / NII-3 bands. When used with panel antenna, this device was defined as P-T-P application and support NII-3 band.
Note 4: All antenna information (Antenna type and Peak Gain) is provided by the manufacturer.

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^2)	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: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
Pout = 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

Pd is the limit of MPE, $1mW/cm^2$. 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	WIRELESS-AC 2X2 27DBM NETWORK MINI PCIE ADAPTER
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

For P-T-MP configuration

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
802.11a/n/ac	5180 ~ 5240, 5745 ~ 5825	35.83	0.7616	1

CONCLUSION:

The max Power Density at R (20 cm) = 0.7616mW/cm^2 < 1mW/cm^2.

Therefore, the Min Safety Distance is 20cm.

For P-T-P configuration

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Power Density at R = 51 cm (mW/cm^2)
802.11a/n/ac	5180 ~ 5240, 5745 ~ 5825	45.11	6.4525	1	0.9923

CONCLUSION:

The max Power Density at R (51 cm) = 0.9923mW/cm^2 < 1mW/cm^2.

Therefore, the Min Safety Distance is 51cm.

The End

Appendix - EUT Photograph

Refer to “2007RSU035-UE” file.