RF Exposure Evaluation Declaration

FCC ID:	TK4WPJ428
APPLICANT:	Compex Systems Pte Ltd
Application Type:	Certification
Product:	Wireless Access Point
Model No.:	WPJ428HV
Serial Model:	WPJ428LV, WPJ418LV, WPJ418HV, MMS428LV, MMS428HV, MMS418LV, MMS418HV
Trademark:	COMPEX
FCC Classification:	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (UNII)

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Revision History

Report No.	Version	Description	Issue Date	Note
1704RSU00204	Rev. 01	Initial report	06-25-2017	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Wireless Access Point
Model No.	WPJ428HV
Serial Model	WPJ428LV, WPJ418LV, WPJ418HV, MMS428LV, MMS428HV, MMS418LV, MMS418HV
Brand Name	COMPEX
Wi-Fi Specification	802.11a/b/g/n/ac
Frequency Range	**2.4GHz:** For 802.11b/g/n-HT20: 2412 ~ 2462 MHz For 802.11n-HT40: 2422 ~ 2452 MHz **5GHz:** 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
Type of Modulation	802.11b: DSSS 802.11g/a/n/ac: OFDM

Note: Differences between all models are for different marketing requirement, HV version (48V) means POE jack input, LV version (24V) means DC jack input, the other was the same.

1.2. Antenna Description

Antenna Type	Frequency Band (MHz)	TX Paths	Per Chain Max Antenna Gain (dBi)	
			Ant 0	Ant 1
P-T-P Operation				
Panel Antenna 1#	2412 ~ 2462	1	11	--
		2	11	11
Panel Antenna 2#	5150 ~ 5250, 5725 ~ 5850	1	25	--
		2	25	25

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: The DTS band & UNII-1 band & UNII-3 band will be used for point-to-point operation that is declared 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 Access Point
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

For 2.4GHz ISM Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density Limit (mW/cm^2)	Safety Distance R (cm)
802.11b/g/n	2412 ~ 2462	22.94	1	14.04

For 5GHz UNII Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density Limit (mW/cm^2)	Safety Distance R (cm)
802.11a/n/ac	5180 ~ 5240	14.89	1	27.85
	5745 ~ 5825	19.32	1	46.39

CONCULISON:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously. Therefore, the Min Safety Distance R = 14.04cm + 46.39cm = 60.43cm.

The End