RF Exposure Evaluation Declaration

FCC ID:	TK4WLE900VX
APPLICANT:	Compex Systems Pte Ltd
Application Type:	Class II Permissive Change
Product:	802.11ac Dual Band Module
Model No.:	WLE900VX, WLE900VX-I
Brand Name:	COMPEX
FCC Classification:	Unlicensed National Information Infrastructure (UNII) Digital Transmission System (DTS)

Reviewed By : Jame Yuan
(Jame Yuan)

Approved By : Marlin Chen
(Marlin Chen)

Revision History

Report No.	Version	Description	Issue Date	Note
1801RSU027-U3	Rev. 01	Initial report	04-08-2018	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	802.11ac Dual Band Module
Model No.	WLE900VX, WLE900VX-I
Brand Name	COMPEX
Wi-Fi Specification	802.11a/n/ac
Frequency Range	For 802.11b/g/n-HT20: 2412 ~ 2462 MHz For 802.11n-HT40: 2422 ~ 2452 MHz For 802.11a/n-HT20: 5180~5320MHz, 5500~5700MHz, 5745~5825MHz For 802.11ac-VHT20: 5180~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40: 5190~5310MHz, 5510~5670MHz, 5755~5795MHz For 802.11ac-VHT40: 5190~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5775MHz
Type of Modulation	802.11b: DSSS 802.11a/g/n/ac: OFDM

1.2. Antenna Description

Original Antenna List

Antenna Type	Manufacturer	Tx Paths	Max Directional Gain (dBi)
Panel Antenna 1#	Compex Systems Pte Ltd	3	2.4GHz: 11.0
Panel Antenna 2#	Kenbotong Communication LTD	3	2.4GHz: 10.0, 5GHz: 10.0
Panel Antenna 3#	Smart Ant Inc	3	2.4GHz: 7.0, 5GHz: 7.0
Panel Antenna 4#	TAOGLAS Inc	3	2.4GHz: 4.5, 5GHz: 6.7
Panel Antenna 5#	Compex Systems Pte Ltd	3	2.4GHz: 5.0, 5GHz: 5.0
Panel Antenna 6#	Compex Systems Pte Ltd	3	2.4GHz: 5.0, 5GHz: 5.0
Omni Antenna 1#	Kunshan Wavelink Electronic Co., Ltd.	3	2.4GHz: 2.0, 5GHz: 2.0

New Antenna List

Antenna Type	Manufacturer	M/N	Max Directional Gain (dBi)
Omni Antenna 1#	Smart Ant Co., Ltd.	SAA05-220170	2.4GHz: 2.5, 5GHz: 5.0
Omni Antenna 2#	Smart Ant Co., Ltd.	SAA06-22096B	2.4GHz: 3.0, 5GHz: 6.0
Omni Antenna 3#	Smart Ant Co., Ltd.	SAA05-22042B	2.4GHz: 2.0, 5GHz: 2.0
Omni Antenna 4#	Smart Ant Co., Ltd.	SAA14-220150	2.4GHz: 5.0, 5GHz: 7.0
Omni Antenna 5#	Smart Ant Co., Ltd.	SAA06-220960	2.4GHz: 3.0, 5GHz: 6.0
Omni Antenna 6#	Smart Ant Co., Ltd.	SAA05-220420	2.4GHz: 2.0, 5GHz: 2.0
Omni Antenna 7#	Smart Ant Co., Ltd.	SAA04-22008C	2.4GHz: 4.5, 5GHz: 7.0

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

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	802.11ac Dual Band Module
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to Clause 1.2 of antenna description.

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
802.11b/g/n	2412 ~ 2462	35.30	0.6741	1
802.11a/n/ac	5180 ~ 5240 5260 ~ 5320 5500 ~ 5720 5745 ~ 5825	35.96	0.7847	1

CONCULISON:

The max Power Density at R (20 cm) = 0.7847mW/cm^2 < 1mW/cm^2
Therefore, the Min Safety Distance is 20cm.

The End