



## RF Exposure Evaluation Declaration

---

**FCC ID:** TK4WPQ872

**Applicant:** Compex Systems Pte Ltd.

**Application Type:** Certification

**Product:** Wireless Access Point

**Model No.:** WPQ872, WPQ872-I, WPQ872HV, WPQ872LV

**Brand Name:** COMPEX

**FCC Classification:** Unlicensed National Information Infrastructure (UNII)  
Digital Transmission System (DTS)

Reviewed By:

*Jame Yuan*

( Jame Yuan )

Approved By:

*Robin Wu*

( Robin Wu )



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
2001RSU050-U5	Rev. 01	Initial Report	08-20-2020	Valid

## General Information

<b>Applicant:</b>	Compex Systems Pte Ltd.
<b>Applicant Address:</b>	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
<b>Manufacturer:</b>	Compex Systems Pte Ltd.
<b>Manufacturer Address:</b>	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
<b>Test Site:</b>	MRT Technology (Suzhou) Co., Ltd
<b>Test Site Address:</b>	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

## Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Designation No. CN1166) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



## 1. INTRODUCTION

### 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

### 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

Product Name:	Wireless Access Point
Model No.:	WPQ872, WPQ872-I, WPQ872HV, WPQ872LV
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Bluetooth Version:	v5.0 single mode (Bluetooth-LE Only)

Note 1: This device has two antenna configurations, one is internal, another is external, detail see EUT photo and operation description.

Note 2: The difference of models is only for marketing different client.

### 2.2. Antenna Description

Antenna Type	Frequency Band (GHz)	T <sub>x</sub> Paths	Max Antenna Gain (dBi)	Directional Gain (dBi)	
				For Power	For PSD
External Antenna					
Dipole Antenna	2.4	4	2.3	2.3	8.32
	5	4	5.0	5.0	11.02
Internal Antenna					
Panel	2.4	4	6.0	6.0	12.02
	5	4	7.0	7.0	13.02
Bluetooth Antenna					
FPC	2.4	1	3		

Note:

The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows,  $N_{ANT} = 4$ ,  $N_{SS} = 1$ .

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,  
Array Gain =  $10 \log (N_{ANT} / N_{SS})$  dB = 6.02;
- For power measurements on IEEE 802.11 devices,  
Array Gain = 0 dB for  $N_{ANT} \leq 4$ ;

### 3. RF Exposure Evaluation

#### 3.1. 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
1500-100000	--	--	5	6
(B) Limits for General Population / Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100000	--	--	1	30

f= Frequency in MHz

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

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.

### 3.2. Test Result of RF Exposure Evaluation

Product	Wireless Access Point
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 2.2.

Test Mode	Frequency Band (MHz)	Max Conducted Power (dBm)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
<b>External Antenna Configuration</b>					
Bluetooth-LE	2402 ~ 2480	5.97	3.0	0.0016	1
802.11b/g/n/ax	2412 ~ 2462	23.91	2.3	0.0831	1
802.11a/n/ac/ax	5180 ~ 5825	23.78	5.0	0.1502	1
<b>Internal Antenna Configuration</b>					
Bluetooth-LE	2402 ~ 2480	5.97	3.0	0.0016	1
802.11b/g/n/ax	2412 ~ 2462	23.97	6.0	0.1976	1
802.11a/n/ac/ax	5180 ~ 5825	23.88	7.0	0.2436	1

#### Conclusion:

WLAN 5GHz and 2.4GHz & Bluetooth can transmit simultaneously.

The max Power Density at R (20 cm) =  $0.0016\text{mW/cm}^2 + 0.1976\text{mW/cm}^2 + 0.2436\text{mW/cm}^2 = 0.4428\text{mW/cm}^2 < 1\text{mW/cm}^2$ .

So the EUT complies with the requirement.

The End

## **Appendix - EUT Photograph**

Refer to “2001RSU050-UE” file.