

MRT Technology (Suzhou) Co., Ltd Phone: +886-3-3288388 Web: www.mrt-cert.com Report No.: 1808RSU025-U5 Report Version: V01 Issue Date: 11-16-2018

# **RF Exposure Evaluation Declaration**

FCC ID: 2ALJ3AP211

APPLICANT: HAN Networks Co., Ltd

**Application Type:** Certification

**Product:** HAN Access Point

Model No.: AP211

Brand Name: HAN NETWORKS

FCC Classification: Digital Transmission System (DTS)

Unlicensed National Information Infrastructure (NII)

Test Procedure(s): KDB 447498 D01v06

**Test Date:** September 06 ~ October 19, 2018

Reviewed By:

(Sunny Sun)

Approved By:

lac-MRA

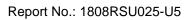


The test results relate only to the samples tested.

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.

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# **Revision History**

Report No.	Version	Description	Issue Date	Note
1808RSU025-U5	Rev. 01	Initial Report	11-17-2018	Valid

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### §2.1033 General Information

Applicant:	HAN Networks Co., Ltd			
Amplicant Address	5/F, Building 37, No. 8 Dongbeiwang West Road, Haidian District			
Applicant Address:	Beijing 100194, P.R. China			
Manufacturer:	HAN Networks Co., Ltd			
Manufacturer Address:	5/F, Building 37, No. 8 Dongbeiwang West Road, Haidian District			
Wandacturer Address.	Beijing 100194, P.R. China			
Test Site:	MRT Technology (Suzhou) Co., Ltd			
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development			
	Zone, Suzhou, China			
FCC Registration No.:	893164			
Test Device Serial No.:	N/A Production Pre-Production Engineering			

#### **Test Facility / Accreditations**

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

- MRT facility is a FCC registered (MRT Reg. No. 893164) 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.



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## 1. PRODUCT INFORMATION

## 1.1. Equipment Description

Product Name:	HAN Access Point	
Model No.:	AP211	
Brand Name:	HAN NETWORKS	
Wi-Fi Specification	802.11a/b/g/n/ac	
Bluetooth Specification:	v5.0	
Operating Temperature:	0 ~ 45 °C	
Power Type:	POE input or AC adapter input	
Operating Environment:	Indoor Use	

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### 1.2. Description of Available Antennas

Antenna Type	Frequency Band	Tx Paths	Per Chain Max Antenna Gain		Beam- Forming		CDD Directional Gain(dBi)	
	(GHz)		(d Ant 0	Bi) Ant 1	Directional Gain (dBi)	For Power	For PSD	
Wi-Fi Inte	Wi-Fi Internal Antenna							
	2412 ~ 2462	2	4.70	3.70	7.22	4.70	7.71	
	5150 ~ 5250	2	3.80	3.00	6.42	3.80	6.81	
PCB	5250 ~ 5350	2	3.80	3.00	6.42	3.80	6.81	
	5470 ~ 5725	2	4.60	3.80	7.22	4.60	7.61	
	5725 ~ 5850	2	4.60	3.00	6.85	4.60	7.61	
Bluetooth Internal Antenna								
PCB	2402 ~ 2480	1	3.	70				

#### Note:

- 1. The EUT supports SISO technology for 802.11b mode only.
- 2. 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 power spectral density (PSD) measurements on all devices,
     Array Gain = 10 log (N<sub>ANT</sub>/ N<sub>SS</sub>) dB = 3.01;
  - For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB for  $N_{ANT} \le 4$ ;

If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{\text{ANT}}$  set equal to the gain of the antenna having the highest gain.

3. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac, not include 802.11a/b/g. The directional gain =  $10*log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N_{ANT}]dBi$ .

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## 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	Electric Field	Magnetic Field	Power Density	Average Time		
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm <sup>2</sup> )	(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<sup>2</sup>

Pout = output power to antenna in mW

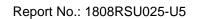
G = gain of antenna in linear scale

Pi = 3.1416

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

Pd is the limit of MPE, 1mW/cm<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.

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## 2.2. Test Result of RF Exposure Evaluation

Product	HAN Access Point
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at $R = 20 \text{ cm}$ $(\text{mW/cm}^2)$	Limit (mW/cm²)
Bluetooth	2402 ~ 2480	23.60	0.0456	1
	2412 ~ 2462	28.06	0.1273	1
Wi-Fi	5180 ~ 5240	30.93	0.2465	1
	5745 ~ 5825	30.74	0.2359	1

### **CONCLUSION:**

The max Power Density at R (20 cm) = 0.0456mW/cm<sup>2</sup> + 0.2465 mW/cm<sup>2</sup> = 0.2921 mW/cm<sup>2</sup> < 1 mW/cm<sup>2</sup>.

Therefore, the Min Safety Distance is 20cm.

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# Appendix A – Test Setup Photograph

Refer to "1808RSU025-UT" file.

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## Appendix B – EUT Photograph

Refer to "1808RSU025-UE" file.

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