

RF Exposure Evaluation Declaration

FCC ID: 2ALJ3AP30X
Applicant: HAN Networks Co., Ltd.
Application Type: Certification
Product: HAN Access Point
Model No.: AP301
Brand Name: HAN NETWORKS; HANNETWORKS
FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (NII)
Receive Date August 25, 2020
Test Date: November 18, 2020

Tested By : *Fran Chen*
(Fran Chen)
Reviewed By : *Paddy Chen*
(Paddy Chen)
Approved By : *Chenz Ker*
(Chenz Ker)



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 (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2010TW0002-UG	V1.0	Original Report	2020-12-07	Valid

CONTENTS

Description	Page
1. INTRODUCTION	5
1.1. Scope	5
1.2. MRT Test Location.....	5
2. PRODUCT INFORMATION	6
2.1. Feature of Equipment under Test.....	6
2.2. Description of Available Antennas	6
3. RF Exposure Evaluation	7
3.1. Limits	7
3.2. Test Result of RF Exposure Evaluation	8
Appendix A - EUT Photograph	9

§2.1033 General Information

Applicant	HAN Networks Co., Ltd.
Applicant Address	101-A16, 1st Floor, Building 3, No.9 compound, Yongfeng Road, Haidian District, Beijing, P.R. China
Manufacturer	HAN Networks Co., Ltd.
Manufacturer Address	101-A16, 1st Floor, Building 3, No.9 compound, Yongfeng Road, Haidian District, Beijing, P.R. China
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
FCC Rule Part(s)	2.1091
Model No.	AP301
Test Device Serial No.:	#1 <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering

Test Facility / Accreditations

1. MRT facility is an FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

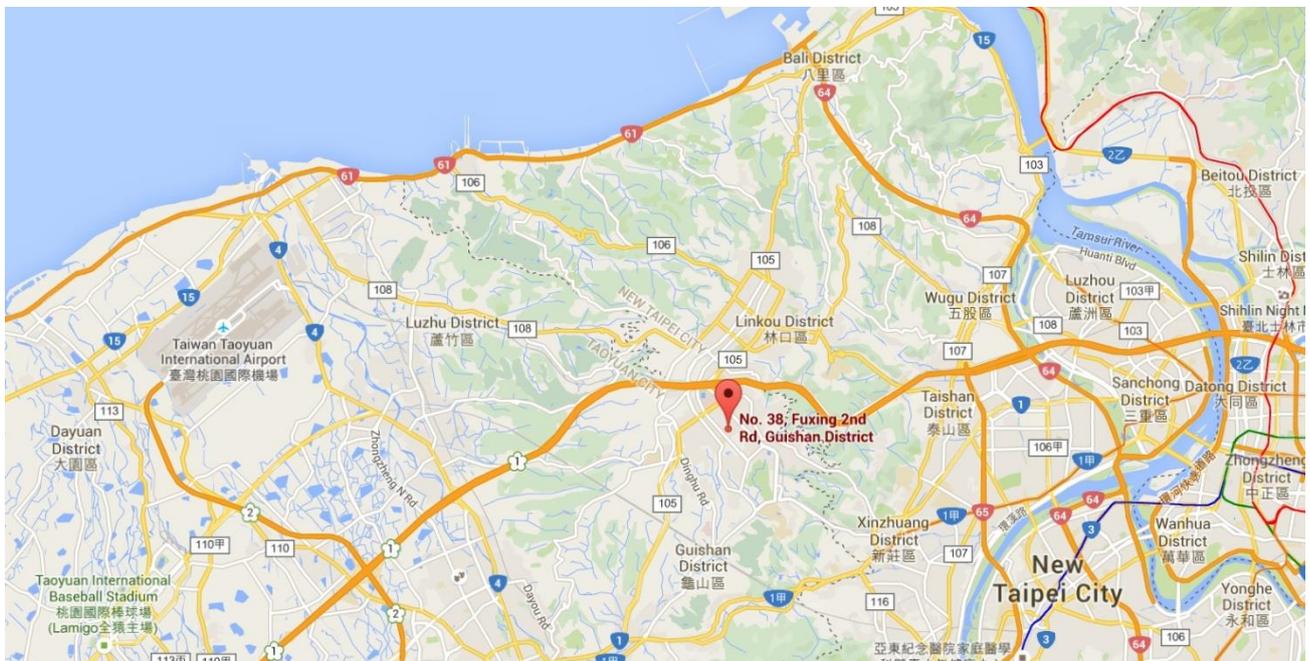
1. INTRODUCTION

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 Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name	HAN Access Point
Model No.	AP301
Brand Name:	HAN NETWORKS; HANNETWORKS
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Operating Temperature:	0 ~ 50 °C
Power Type:	PoE input or AC adapter input
Operating Environment:	Indoor Use

2.2. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	T _x Paths	Bandwidth (MHz)	Max Peak Gain (dBi)		CDD Directional Gain (dBi)		Beamforming Directional Gain (dBi)
				Ant 0	Ant 1	Power	PSD	
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 2*2 MIMO)								
PIFA	2412 ~ 2462	2	20, 40	3.20	3.30	3.30	6.31	6.31
Antenna	5150 ~ 5850	2	20, 40, 80	3.10	3.30	3.30	6.31	6.31

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g/n/ac/ax and it is correlated.

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,
 $\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01$;
- For power measurements on IEEE 802.11 devices,
 $\text{Array Gain} = 0 \text{ dB}$ for $N_{ANT} \leq 4$;

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

Note 2: The EUT also supports Beamforming mode, and the Beamforming support 802.11n/ac/ax, not include 802.11a/b/g. The directional gain = $G_{ANT} + \text{Array Gain}$ (3.01dBi).

Note 3: Antenna type and antenna gain are provided by the manufacturer.

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

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1mW/cm². 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	HAN Access Point, AP301
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 2.2.

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)
802.11b/g/n/VHT/ax	2412 ~ 2462	24.47	6.31	30.78
802.11a/n/ac/ax	5180~ 5825	22.92	6.31	29.23

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Safety Distance (cm)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
802.11b/g/n/ax	2412 ~ 2462	30.78	20	0.2381	1
802.11a/n/ac/ax	5180 ~ 5825	29.23	20	0.1666	1

CONCLUSION:

The max Power Density at R (20 cm) = 0.2381mW/cm² + 0.1666mW/cm² = 0.4047mW/cm² < 1mW/cm².

So the safety distance is 20cm for device installed without any other radio equipment.

————— The End —————

Appendix A - EUT Photograph

Refer to "2010TW0002-UE" file.