

RF Exposure Report

Report No.: SA170323D03A

FCC ID: 2ALJ3AP23X

Test Model: AP231, AP231e

Received Date: Mar. 23, 2017

Test Date: Jul. 12 ~ Sep. 19, 2017

Issued Date: Oct. 2, 2017

Applicant: HAN Networks Co., Ltd.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Release Control Record

Issue No.	Description	Date Issued
SA170323D03A	Original release.	Oct. 2, 2017

1 Certificate of Conformity

Product: HAN Access Point

Brand: HAN

Test Model: AP231, AP231e

Sample Status: Engineering sample

Applicant: HAN Networks Co., Ltd.

Test Date: Jul. 12 ~ Sep. 19, 2017

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Annie Chang , **Date:** Oct. 2, 2017
Annie Chang / Senior Specialist

Approved by : Rex Lai , **Date:** Oct. 2, 2017
Rex Lai / Assistant Manager

2 RF Exposure

2.1 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)
Limits For General Population / Uncontrolled Exposure				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm²

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 35cm away from the body of the user.
So, this device is classified as **Mobile Device**.

2.4 Calculation Result Of Maximum Conducted Power

For Internal antenna:

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462 (Original Approved)	27.68	6.52	35	0.1709	1
5180-5240 (Original Approved)	18.18	10.37	35	0.0465	1
5260-5320	18.49	10.37	35	0.0500	1
5500-5700	23.61	10.37	35	0.1624	1
5745-5825 (Original Approved)	29.79	10.37	35	0.6740	1

NOTE:

2.4GHz Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 4] = 6.52\text{dBi}$

5.0GHz Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 4] = 10.37\text{dBi}$

The Max Power = Max tune up power

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = 0.1709 + 0.6740 = 0.8449

Therefore the maximum calculations of above situations are less than the "1" limit.

For External antenna:

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462 (Original Approved)	26.13	7.01	38	0.1136	1
5180-5240 (Original Approved)	16.60	12.02	38	0.0401	1
5260-5320	16.93	12.02	38	0.0433	1
5500-5700	22.61	12.02	38	0.1600	1
5745-5825 (Original Approved)	29.79	12.02	38	0.8360	1

NOTE:

2.4GHz Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 4] = 7.01\text{dBi}$

5.0GHz Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / 4] = 12.02\text{dBi}$

The Max Power = Max tune up power

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = 0.1136 + 0.8360 = 0.9496

Therefore the maximum calculations of above situations are less than the "1" limit.

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