

RF Exposure Report

Report No.: SA160725C02B

FCC ID: UDX-60052010

Test Model: MR33-HW

Received Date: Jul. 25, 2016

Test Date: Jul. 25 ~ Aug. 31, 2016

Issued Date: Sep. 12, 2016

Applicant: Cisco Systems, Inc.

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

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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 RF Exposure	5
2.1 Limits for Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
3 Calculation Result of Maximum Conducted Power	6

Release Control Record

Issue No.	Description	Date Issued
SA160725C02B	Original release	Sep. 12, 2016

1 Certificate of Conformity

Product: Wireless 802.11 abgn/ac indoor AP

Brand: Cisco

Test Model: MR33-HW

Sample Status: Engineering sample

Applicant: Cisco Systems, Inc.

Test Date: Jul. 25 ~ Aug. 31, 2016

Standards: FCC Part 2 (Section 2.1091)
KDB 447498 D01 General RF Exposure Guidance v06
IEEE C95.1

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.

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Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Sep. 12, 2016
Ken Liu / Senior 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

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

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Conducted Power

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Radio 1					
WLAN: CDD mode					
2412-2462	22.67	6.97	20	0.183	1
WLAN: Beamforming mode					
2412-2462	21.78	6.97	20	0.149	1
Radio 2					
WLAN: CDD mode					
5180-5240	26.40	8.54	20	0.620	1
5260-5320	22.86	8.54	20	0.275	1
5500-5700	22.84	8.54	20	0.273	1
5745-5825	26.77	8.54	20	0.676	1
WLAN: Beamforming mode					
5180-5240	26.07	8.54	20	0.575	1
5260-5320	21.32	8.54	20	0.193	1
5500-5700	21.30	8.54	20	0.192	1
5745-5825	26.72	8.54	20	0.668	1
Radio 3					
WLAN: CDD mode					
2412-2462	21.98	4.65	20	0.092	1
5180-5240	17.40	5.50	20	0.039	1
5260-5320	18.06	5.50	20	0.045	1
5500-5700	16.54	5.50	20	0.032	1
5745-5825	17.18	5.50	20	0.037	1
Radio 4					
BT LE					
2402-2480	5.44	5.67	20	0.003	1

Note:

Radio 1: 2.4GHz Band: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.97\text{dBi}$

Radio 2: 5GHz Band: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 8.54\text{dBi}$

Conclusion:

Both of the WLAN 2.4G & WLAN 5G & BT LE can transmit simultaneously, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

$$\text{Radio 1} + \text{Radio 2} + \text{Radio 3 (2.4G)} + \text{Radio 3 (5G)} + \text{Radio 4}$$

$$= 0.183 + 0.676 + 0.092 + 0.039 + 0.003 = 0.993$$

Therefore, the maximum calculation of this situation is 0.993, which is less than the "1" limit.

Note: All radio technologies can transmit simultaneously, but Radio 1 & Radio 2 & Radio 3 & Radio 4 will not simultaneously in the same sub-band.

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