RF Exposure Report

Report No.:	SA180704E03D
FCC ID:	UDX-60079010
Test Model:	MR45-HW
Received Date:	July 04, 2018
Test Date:	Nov. 20 to 21, 2018
Issued Date:	Mar. 12, 2019
Applicant:	Cisco Systems, Inc.
Address:	170 West Tasman Drive, San Jose, CA 95134 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location :	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA180704E03D	Original release.	Mar. 12, 2019

1 Certificate of Conformity

Product:	4x4 802.11a/b/g/n/ac/ax Access Point
Brand:	Cisco
Test Model:	MR45-HW
Sample Status:	ENGINEERING SAMPLE
Applicant:	Cisco Systems, Inc.
Test Date:	Nov. 20 to 21, 2018
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 : Mary Ko , **Date:** Mar. 12, 2019

Mary Ko / Specialist

Approved by : , **Date:** Mar. 12, 2019

May Chen / 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				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

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

where

Pd = power density in mW/cm^2

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 33cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

WLAN Directional gain table – 4TX			
Frequency range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	7.74	PIFA	i-pex(MHF)
5.15 ~ 5.25	8.40		
5.25 ~ 5.35	8.93		
5.47 ~ 5.725	8.51		
5.725 ~ 5.85	8.11		

WLAN Directional gain table – 2TX				
Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	2.4G Ant. 1+4	6.12	PIFA	i-pex(MHF)
5.15 ~ 5.25	5.15G Ant. 1+3	6.62		
5.25 ~ 5.35	5.35G Ant. 1+2	7.50		
5.47 ~ 5.725	5.55G Ant. 3+4	7.71		
5.725 ~ 5.85	5.85G Ant. 3+4	7.27		

Bluetooth antenna spec.			
Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Antenna Connector
4.24	2.4 ~ 2.4835	PIFA	i-pex(MHF)

Note: More detailed information, please refer to operating description.

2.5 Calculation Result of Maximum Conducted Power

For 2.4GHz, 5GHz (U-NII-1 & UNII-3 band) data was copied from the original test report (Report No.: SA180704E03)

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN 2.4GHz (4TX)	2437	872.013	7.74	33	0.37869	1
WLAN 2.4GHz (2TX)	2437	503.965	6.12	33	0.15072	1
WLAN 2.4GHz (1TX)	2437	258.226	3.70	33	0.04423	1
WLAN 5GHz (UNII-1)-4TX	5200	572.519	8.40	33	0.28944	1
WLAN 5GHz (UNII-1)-2TX	5200	309.064	6.62	33	0.10371	1
WLAN 5GHz (UNII-1)-1TX	5200	214.783	4.06	33	0.03997	1
WLAN 5GHz (UNII-2A)-4TX	5270	248.689	8.93	33	0.14204	1
WLAN 5GHz (UNII-2A)-2TX	5270	244.988	7.50	33	0.10067	1
WLAN 5GHz (UNII-2A)-1TX	5270	125.314	5.23	33	0.03053	1
WLAN 5GHz (UNII-2C)-4TX	5670	237.322	8.51	33	0.12305	1
WLAN 5GHz (UNII-2C)-2TX	5610	237.497	7.71	33	0.10243	1
WLAN 5GHz (UNII-2C)-1TX	5610	121.619	5.44	33	0.03110	1
WLAN 5GHz (UNII-3)-4TX	5745	996.654	8.11	33	0.47131	1
WLAN 5GHz (UNII-3)-2TX	5825	614.522	7.27	33	0.23950	1
WLAN 5GHz (UNII-3)-1TX	5785	266.686	4.51	33	0.05505	1
BT-LE	2402	4.083	4.24	33	0.00079	1

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 + Bluetooth = 0.37869 / 1 + 0.47131 / 1 + 0.00079 / 1 = 0.85079

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

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