RF Exposure Report

Report No.:	SA180704E02
FCC ID:	UDX-60083010
Test Model:	MR55-HW
Received Date:	July 05, 2018
Test Date:	Oct. 18 to 19, 2018
Issued Date:	Dec. 24, 2018
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
SA180704E02	Original release.	Dec. 24, 2018

1 Certificate of Conformity

Product:	8x8 802.11a/b/g/n/ac/ax Access Point
Brand:	Cisco
Test Model:	MR55-HW
Sample Status:	ENGINEERING SAMPLE
Applicant:	Cisco Systems, Inc.
Test Date:	Oct. 18 to 19, 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 : Phoenix Huang , **Date:** Dec. 24, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** Dec. 24, 2018

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 34cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

WLAN Directional gain table – 8TX			
Frequency range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
5.15 ~ 5.25	9.29	PIFA	i-pex(MHF)
5.725 ~ 5.85	9.2		

WLAN Directional gain table – 4TX				
Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	Dual_1+Dual_2+Dual_3+Dual_4	5.43	PIFA	i-pex(MHF)
5.15 ~ 5.25	Single_1+Single_2+Single_3+Single_4	10.73		
5.725 ~ 5.85		10.68		

WLAN Directional gain table – 2TX				
Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	Dual_1+Dual_3	6.33	PIFA	i-pex(MHF)
5.15 ~ 5.25	Dual_2+Dual_3	8.47		
5.725 ~ 5.85		8.59		

Bluetooth antenna spec.			
Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Antenna Connector
3.61	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

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	864.55	5.43	34	0.20779	1
WLAN 2.4GHz (2TX)	2437	456.82	6.33	34	0.13508	1
WLAN 2.4GHz (1TX)	2437	204.174	5.54	34	0.05033	1
WLAN U-NII-1 (8TX)	5180	432.724	9.29	34	0.25295	1
WLAN U-NII-1 (4TX)	5230	430.677	10.73	34	0.35074	1
WLAN U-NII-1 (2TX)	5200	376.099	8.47	34	0.18203	1
WLAN U-NII-1 (1TX)	5200	224.905	6.2	34	0.06454	1
WLAN U-NII-3 (8TX)	5825	412.219	9.29	34	0.23603	1
WLAN U-NII-3 (4TX)	5825	902.442	10.68	34	0.72653	1
WLAN U-NII-3 (2TX)	5745	440.884	8.59	34	0.21936	1
WLAN U-NII-3 (1TX)	5745	238.781	6.39	34	0.07159	1
BT-LE	2402	4.508	3.61	34	0.00071	1

Note:
1. The Max. Power = Max. tune up power including tolerance.
2. 2.4GHz (4TX): The directional gain = 5.43dBi
   2.4GHz (2TX): The directional gain = 6.33dBi
   2.4GHz (1TX): The max. gain = 5.54dBi
   5GHz:
   U-NII-1 (8TX): The directional gain = 9.29dBi
   U-NII-1 (4TX): The directional gain = 10.73dBi
   U-NII-1 (2TX): The directional gain = 8.47dBi
   U-NII-1 (1TX): The max. gain = 6.2dBi
   U-NII-3 (8TX): The directional gain = 9.2dBi
   U-NII-3 (4TX): The directional gain = 10.68dBi
   U-NII-3 (2TX): The directional gain = 8.59dBi
   U-NII-3 (1TX): The max. gain = 6.39dBi

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 = 0.20779 / 1 + 0.72653 / 1 + 0.00071 / 1 = 0.93503

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

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