RF Exposure Report

Report No.:	SA160819C08B
FCC ID:	UDX-60057010
Test Model:	MR74-HW
Received Date:	Aug. 19, 2016
Test Date:	Aug. 31 ~ Nov. 25, 2016
Issued Date:	Dec. 09, 2016
Applicant:	Cisco Systems, Inc.
Address:	170 West Tasman Drive, San Jose, CA 95134
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
SA160819C08B	Original release.	Dec. 09, 2016

1   Certificate of Conformity

Product:	AP Outdoor
Brand:	Cisco
Test Model:	MR74-HW
Sample Status:	Engineering sample
Applicant:	Cisco Systems, Inc.
Test Date:	Aug. 31 ~ Nov. 25, 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.

Prepared by : _____ , **Date:** _____Dec. 09, 2016_____

Suntee Liu / Specialist

Approved by : _____ , **Date:** _____Dec. 09, 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

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 36cm away from the body of the user. So, this device is classified as Mobile Device.

3   Calculation Result of Maximum Conducted Power

Ant. No.	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
Radio 1						
20	WLAN 2412~2462 (CDD mode)	25.09	7.01	36	0.100	1
20	WLAN 2412~2462 (Beamforming mode)	21.53	7.01	36	0.044	1
23	WLAN 2412~2462 (CDD mode)	24.87	14.01	36	0.474	1
23	WLAN 2412~2462 (Beamforming mode)	20.68	14.01	36	0.181	1
25	WLAN 2412~2462 (CDD mode)	25.12	11.11	36	0.258	1
25	WLAN 2412~2462 (Beamforming mode)	21.99	11.11	36	0.125	1
27	WLAN 2412~2462 (CDD mode)	24.69	12.81	36	0.345	1
27	WLAN 2412~2462 (Beamforming mode)	21.16	12.81	36	0.153	1
AIR-ANT2513P4M-N	WLAN 2412~2462 (CDD mode)	22.82	16.01	36	0.469	1
AIR-ANT2513P4M-N	WLAN 2412~2462 (Beamforming mode)	19.68	16.01	36	0.228	1
Radio 2						
20	WLAN 5180~5240 (CDD mode)	21.88	10.01	36	0.095	1
20	WLAN 5260~5320 (CDD mode)	22.37	10.01	36	0.106	1
20	WLAN 5500~5700 (CDD mode)	22.56	10.01	36	0.111	1
20	WLAN 5745~5825 (CDD mode)	25.09	10.01	36	0.199	1
20	WLAN 5180~5240 (Beamforming mode)	18.87	10.01	36	0.047	1
20	WLAN 5260~5320 (Beamforming mode)	19.36	10.01	36	0.053	1
20	WLAN 5500~5700 (Beamforming mode)	19.55	10.01	36	0.055	1
20	WLAN 5745~5825 (Beamforming mode)	22.08	10.01	36	0.099	1

Ant. No.	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	Radio 2					
21	WLAN 5180~5240 (CDD mode)	9.79	16.01	36	0.023	1
	WLAN 5260~5320 (CDD mode)	16.41	16.01	36	0.107	1
	WLAN 5500~5700 (CDD mode)	16.82	16.01	36	0.118	1
	WLAN 5745~5825 (CDD mode)	22.66	16.01	36	0.452	1
	WLAN 5180~5240 (Beamforming mode)	6.78	16.01	36	0.012	1
	WLAN 5260~5320 (Beamforming mode)	13.40	16.01	36	0.054	1
	WLAN 5500~5700 (Beamforming mode)	13.81	16.01	36	0.059	1
	WLAN 5745~5825 (Beamforming mode)	19.65	16.01	36	0.226	1
25	WLAN 5180~5240 (CDD mode)	19.16	10.11	36	0.052	1
	WLAN 5260~5320 (CDD mode)	22.53	10.11	36	0.113	1
	WLAN 5500~5700 (CDD mode)	22.68	10.11	36	0.117	1
	WLAN 5745~5825 (CDD mode)	25.35	10.11	36	0.216	1
	WLAN 5180~5240 (Beamforming mode)	16.15	10.11	36	0.026	1
	WLAN 5260~5320 (Beamforming mode)	19.52	10.11	36	0.056	1
	WLAN 5500~5700 (Beamforming mode)	19.67	10.11	36	0.058	1
	WLAN 5745~5825 (Beamforming mode)	22.27	10.11	36	0.106	1
27	WLAN 5180~5240 (CDD mode)	11.24	14.31	36	0.022	1
	WLAN 5260~5320 (CDD mode)	17.77	14.31	36	0.099	1
	WLAN 5500~5700 (CDD mode)	18.35	14.31	36	0.113	1
	WLAN 5745~5825 (CDD mode)	24.50	14.31	36	0.467	1
	WLAN 5180~5240 (Beamforming mode)	8.23	14.31	36	0.011	1
	WLAN 5260~5320 (Beamforming mode)	14.76	14.31	36	0.050	1
	WLAN 5500~5700 (Beamforming mode)	15.34	14.31	36	0.057	1
	WLAN 5745~5825 (Beamforming mode)	21.49	14.31	36	0.233	1

Ant. No.	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
Radio 2						
AIR-ANT2513 P4M-N	WLAN 5180~5240 (CDD mode)	20.17	16.01	36	0.255	1
	WLAN 5260~5320 (CDD mode)	16.41	16.01	36	0.107	1
	WLAN 5500~5700 (CDD mode)	16.82	16.01	36	0.118	1
	WLAN 5745~5825 (CDD mode)	22.66	16.01	36	0.452	1
	WLAN 5180~5240 (Beamforming mode)	17.16	16.01	36	0.127	1
	WLAN 5260~5320 (Beamforming mode)	13.40	16.01	36	0.054	1
	WLAN 5500~5700 (Beamforming mode)	13.81	16.01	36	0.059	1
	WLAN 5745~5825 (Beamforming mode)	19.65	16.01	36	0.226	1
Radio 3						
-	WLAN 2412~2462	23.82	3.9	36	0.036	1
	WLAN 5180~5240	15.77	5.2	36	0.008	1
	WLAN 5260~5320	18.22	5.2	36	0.013	1
	WLAN 5500~5700	18.34	5.2	36	0.014	1
	WLAN 5745~5825	18.55	5.2	36	0.015	1
Radio 4						
-	BT LE 2402~2480	5.16	5.6	36	0.001	1

Note:
Radio 1, Ant. No. 20, 2.4GHz: Directional gain = 4dBi + 10log(2) = 7.01dBi
Radio 1, Ant. No. 23, 2.4GHz: Directional gain = 11dBi + 10log(2) = 14.01dBi
Radio 1, Ant. No. 25, 2.4GHz: Directional gain = 8.1dBi + 10log(2) = 11.11dBi
Radio 1, Ant. No. 27, 2.4GHz: Directional gain = 9.8dBi + 10log(2) = 12.81dBi
Radio 1, Ant. No. AIR-ANT2513P4M-N, 2.4GHz: Directional gain = 13dBi + 10log(2) = 16.01dBi
Radio 2, Ant. No. 20, 5GHz: Directional gain = 7dBi + 10log(2) = 10.01dBi
Radio 2, Ant. No. 21, 5GHz: Directional gain = 13dBi + 10log(2) = 16.01dBi
Radio 2, Ant. No. 25, 5GHz: Directional gain = 7.1dBi + 10log(2) = 10.11dBi
Radio 2, Ant. No. 27, 5GHz: Directional gain = 11.3dBi + 10log(2) = 14.31dBi
Radio 2, Ant. No. AIR-ANT2513P4M-N, 5GHz: Directional gain = 13dBi + 10log(2) = 16.01dBi

Ant. No.: 20

Frequency Band	Max. Power (dBm)				Total Power (dBm)	Power Limit (dBm)
	Radio 1	Radio 2	Radio 3	Radio 4		
2.4GHz	25.09	-	23.82	5.16	27.54	30
5180~5240MHz	-	21.88	15.77	-	22.83	30
5260~5320MHz	-	22.37	18.22	-	23.78	30
5500~5700MHz	-	22.56	18.34	-	23.95	30
5745~5825MHz	-	25.09	18.55	-	25.96	30

Ant. No.: 23/21

Frequency Band	Max. Power (dBm)				Total Power (dBm)	Power Limit (dBm)
	Radio 1	Radio 2	Radio 3	Radio 4		
2.4GHz	24.87	-	23.82	5.16	27.41	30
5180~5240MHz	-	9.79	15.77	-	16.75	30
5260~5320MHz	-	16.41	18.22	-	20.42	30
5500~5700MHz	-	16.82	18.34	-	20.66	30
5745~5825MHz	-	22.66	18.55	-	24.08	30

Ant. No.: 25

Frequency Band	Max. Power (dBm)				Total Power (dBm)	Power Limit (dBm)
	Radio 1	Radio 2	Radio 3	Radio 4		
2.4GHz	25.12	-	23.82	5.16	27.55	30
5180~5240MHz	-	19.16	15.77	-	20.80	30
5260~5320MHz	-	22.53	18.22	-	23.90	30
5500~5700MHz	-	22.68	18.34	-	24.04	30
5745~5825MHz	-	25.35	18.55	-	26.17	30

Ant. No.: 27

Frequency Band	Max. Power (dBm)				Total Power (dBm)	Power Limit (dBm)
	Radio 1	Radio 2	Radio 3	Radio 4		
2.4GHz	24.69	-	23.82	5.16	27.31	30
5180~5240MHz	-	11.24	15.77	-	17.08	30
5260~5320MHz	-	17.77	18.22	-	21.01	30
5500~5700MHz	-	18.35	18.34	-	21.36	30
5745~5825MHz	-	24.50	18.55	-	25.48	30

Ant. No.: AIR-ANT2513P4M-N

Frequency Band	Max. Power (dBm)				Total Power (dBm)	Power Limit (dBm)
	Radio 1	Radio 2	Radio 3	Radio 4		
2.4GHz	22.82	-	23.82	5.16	26.39	30
5180~5240MHz	-	20.17	15.77	-	21.52	30
5260~5320MHz	-	16.41	18.22	-	20.42	30
5500~5700MHz	-	16.82	18.34	-	20.66	30
5745~5825MHz	-	22.66	18.55	-	24.08	30

Conclusion:
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Radio 1 (Ant. 20) + Radio 2 (Ant. 20) + Radio 3 (2.4G) + Radio 4
= 0.100 + 0.199 + 0.036 + 0.001 = 0.336 < 1

Radio 1 (Ant. 20) + Radio 2 (Ant. 20) + Radio 3 (5G) + Radio 4
= 0.100 + 0.199 + 0.015 + 0.001 = 0.315 < 1

Radio 1 (Ant. 23) + Radio 2 (Ant. 21) + Radio 3 (2.4G) + Radio 4
= 0.474 + 0.452 + 0.036 + 0.001 = 0.963 < 1

Radio 1 (Ant. 23) + Radio 2 (Ant. 21) + Radio 3 (5G) + Radio 4
= 0.474 + 0.452 + 0.015 + 0.001 = 0.942 < 1

Radio 1 (Ant. 25) + Radio 2 (Ant. 25) + Radio 3 (2.4G) + Radio 4
= 0.258 + 0.216 + 0.036 + 0.001 = 0.511 < 1

Radio 1 (Ant. 25) + Radio 2 (Ant. 25) + Radio 3 (5G) + Radio 4
= 0.258 + 0.216 + 0.015 + 0.001 = 0.490 < 1

Radio 1 (Ant. 27) + Radio 2 (Ant. 27) + Radio 3 (2.4G) + Radio 4
= 0.345 + 0.467 + 0.036 + 0.001 = 0.849 < 1

Radio 1 (Ant. 27) + Radio 2 (Ant. 27) + Radio 3 (5G) + Radio 4
= 0.345 + 0.467 + 0.015 + 0.001 = 0.828 < 1

Radio 1 (Ant. AIR-ANT2513P4M-N) + Radio 2 (Ant. AIR-ANT2513P4M-N) + Radio 3 (2.4G) + Radio 4
= 0.469 + 0.452 + 0.036 + 0.001 = 0.958 < 1

Radio 1 (Ant. AIR-ANT2513P4M-N) + Radio 2 (Ant. AIR-ANT2513P4M-N) + Radio 3 (5G) + Radio 4
= 0.469 + 0.452 + 0.015 + 0.001 = 0.937 < 1

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