

RF Exposure Report

Report No.: SA171011E02A

FCC ID: UXX-S5A750A

Test Model: S5A750A

Received Date: Oct. 13, 2017

Test Date: Dec. 05, 2017

Issued Date: Apr. 20, 2018

Applicant: Cradlepoint, Inc.

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Release Control Record

Issue No.	Description	Date Issued
SA171011E02A	Original release.	Apr. 20, 2018

1 Certificate of Conformity

Product: WiFi Access Point

Brand: cradlepoint

Test Model: S5A750A

Sample Status: ENGINEERING SAMPLE

Applicant: Cradlepoint, Inc.

Test Date: Dec. 05, 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.

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Date:

Apr. 20, 2018

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Date:

Apr. 20, 2018

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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/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 27cm away from the body of the user.
So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1 (Radio 1, 2)	5.19	2.4~2.4835	PIFA	i-pex(MHF)
	4.81	5.15~5.25		
	5.91	5.25~5.35		
	4.90	5.47~5.725		
	6.69	5.725~5.85		
2 (Radio 1, 2)	3.04	2.4~2.4835	PIFA	i-pex(MHF)
	7.37	5.15~5.25		
	6.90	5.25~5.35		
	6.65	5.47~5.725		
	6.89	5.725~5.85		
3 (Radio 3)	3.89	2.4~2.4835	PIFA	i-pex(MHF)
	6.58	5.15~5.25		
	6.87	5.25~5.35		
	6.27	5.47~5.725		
	7.01	5.725~5.85		

2.5 Calculation Result

Simultaneously transmission condition:

Condition	Technology		
1	WLAN (Radio 1) (2.4GHz-2TX)	WLAN (Radio 2) (5GHz-2TX)	WLAN (Radio 3) (5GHz-1TX)
2	WLAN (Radio 1) (2.4GHz-2TX)	WLAN (Radio 2) (5GHz-2TX)	WLAN (Radio 3) (2.4GHz-1TX)

For 2.4GHz, 5GHz (U-NII-1 & UNII-3 band) data was copied from the original test report (Report No.: SA171011E02)

Radio 1:

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462	721.992	7.19	27	0.41266	1

NOTE:

Directional gain = $10 \log[(10^{G_{0/20}} + 10^{G_{1/20}^2}) / 2] = 7.19\text{dBi}$

Radio 2:

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5180-5240	368.707	9.19	27	0.33400	1
5260-5320	187.485	9.43	27	0.17948	1
5500-5580 5660-5700	196.249	8.83	27	0.16363	1
5745-5825	424.356	9.80	27	0.44238	1

NOTE:

U-NII-1: Directional gain = $10 \log[(10^{G_{0/20}} + 10^{G_{1/20}^2}) / 2] = 9.19\text{dBi}$

U-NII-2A: Directional gain = $10 \log[(10^{G_{0/20}} + 10^{G_{1/20}^2}) / 2] = 9.43\text{dBi}$

U-NII-2C: Directional gain = $10 \log[(10^{G_{0/20}} + 10^{G_{1/20}^2}) / 2] = 8.83\text{dBi}$

U-NII-3: Directional gain = $10 \log[(10^{G_{0/20}} + 10^{G_{1/20}^2}) / 2] = 9.8\text{dBi}$

Radio 3:

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462	211.349	3.89	27	0.05650	1
5180-5240	75.858	6.58	27	0.03768	1
5260-5320	56.624	6.87	27	0.03007	1
5500-5580 5660-5700	66.374	6.27	27	0.03069	1
5745-5825	92.045	7.01	27	0.05047	1

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

Condition 1:

WLAN 2.4GHz (Radio 1) + WLAN 5GHz (Radio 2) + WLAN 5GHz (Radio 3) = $0.41266 / 1 + 0.44238 / 1 + 0.05047 / 1 = 0.90551$

Condition 2:

WLAN 2.4GHz (Radio 1) + WLAN 5GHz (Radio 2) + WLAN 2.4GHz (Radio 3) = $0.41266 / 1 + 0.44238 / 1 + 0.05650 / 1 = 0.91154$

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

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