



## RF Exposure Report

**Report No.:** SA150720E02

**FCC ID:** UXX-S4A542A

**Test Model:** S4A543A

**Series Model:** S4A542A

**Received Date:** July 20, 2015

**Test Date:** Aug. 06, 2015

**Issued Date:** Aug. 14, 2015

**Applicant:** Cradlepoint, Inc

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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**Test Location (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin  
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**Test Location (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin  
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A D T

### Release Control Record

Issue No.	Description	Date Issued
SA150720E02	Original release.	Aug. 14, 2015



A D T

# 1 Certificate of Conformity

**Product:** Advanced Edge Router  
**Brand:** cradlepoint  
**Test Model:** S4A543A  
**Series Model:** S4A542A  
**Sample Status:** ENGINEERING SAMPLE  
**Applicant:** Cradlepoint, Inc  
**Test Date:** Aug. 06, 2015  
**Standards:** FCC Part 2 (Section 2.1091)  
KDB 447498 D03  
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 :** Phoenix Huang , **Date:** Aug. 14, 2015  
Phoenix Huang / Specialist

**Approved by** May Chen , **Date:** Aug. 14, 2015  
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 <sup>2</sup> )	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<sup>2</sup>

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**.

### 3 Calculation Result of Maximum Conducted Power

**For WLAN:**

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2412-2462	710.332	6.51	27	0.34715	1
5180-5240	462.954	7.91	27	0.31232	1
5745-5825	226.046	7.91	27	0.15250	1

Note:

2.4GHz: Directional gain = 3.50dBi + 10log(2) = 6.51dBi

5GHz: Directional gain = 4.9dBi + 10log(2) = 7.91dBi

**For 3G/LTE 3G module FCC ID: N7NMC7355, Model No.: MC7354**

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Source-Based Time-Averaged Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
824-849	2000	2.00	27	0.08650	0.5493

Note: 1. Limit of Power Density = F/1500

2. Calculations for RF Exposure compliance in the cellular and PCS bands are base on the maximum source based time-average power obtained from 2-Slot GPRS operation. The resulting duty cycle factor is 2/8, or 6.02dB.

**For 3G/LTE 3G USB device\_Contains FCC ID: N7NMC7355, Model no.: MC400LPE**

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Source-Based Time-Averaged Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
824-849	2000	2.00	27	0.08650	0.5493

Note: 1. Limit of Power Density = F/1500

2. Calculations for RF Exposure compliance in the cellular and PCS bands are base on the maximum source based time-average power obtained from 2-Slot GPRS operation. The resulting duty cycle factor is 2/8, or 6.02dB.

**Conclusion:**

All of the WLAN/3G/LTE 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

Therefore, the worst-case situation is 0.34715 / 1 + 0.31232 / 1 + 0.08650 / 1 + 0.08650 / 1 = 0.974, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

--- END ---

## Appendix

### MPE Evaluation for FCC ID: N7NMC7355 Radio Module

Mode	Equipment Category	Max Transmitter Duty Cycle	Transmitter Range (MHz)		Maximum		Antenna Gain (dBi)	Distance to Human Body (cm)	Power Density (mW/cm <sup>2</sup> )		Ratio
			Start	Stop	(dBm)	(W)			Vaule	Limit	
GPRS	Class 10	25%	824	849	33	2	2	27	0.0865	0.54933	<b>0.15746455</b>
		25%	1850	1910	30	1	3	27	0.05445	1	0.05445
EDGE	Class 10	25%	824	849	28	0.63	2	27	0.02725	0.54933	0.04960588
		25%	1850	1910	27	0.5	3	27	0.02723	1	0.02723
	Class 11	37.50%	824	849	26.2	0.42	2	27	0.02725	0.54933	0.04960588
		37.50%	1850	1910	25.2	0.33	3	27	0.02695	1	0.02695
	Class 12	50%	824	849	25	0.32	2	27	0.02768	0.54933	0.05038866
		50%	1850	1910	24	0.25	3	27	0.02723	1	0.02723
CDMA	EvDo	100%	824	849	25	0.32	2	27	0.05536	0.54933	0.10077731
		100%	1850	1910	25	0.32	3	27	0.0697	1	0.0697
		100%	817	824	25	0.32	2	27	0.05536	0.54466	0.10164139
UMTS	HSDPA HSUPA	100%	824	849	24	0.25	2	27	0.04325	0.54933	0.07873227
		100%	1710	1755	24	0.25	3	27	0.05445	1	0.05445
		100%	1850	1910	24	0.25	3	27	0.05445	1	0.05445
LTE	Band 17	100%	704	716	24	0.25	2	27	0.04325	0.46933	0.09215264
	Band 13	100%	777	787	24	0.25	2	27	0.04325	0.518	0.08349421
	Band 5	100%	824	849	24	0.25	2	27	0.04325	0.54933	0.07873227
	Band 4	100%	1710	1755	24	0.25	3	27	0.05445	1	0.05445
	Band 2	100%	1850	1910	24	0.25	3	27	0.05445	1	0.05445
	Band 25	100%	1850	1915	24	0.25	3	27	0.05445	1	0.05445

**Note:**

1. The ratios which were indicated in bold type of the max ratio.
2. 698~960MHz: Antenna gain is 2dBi
3. 1710~2700MHz: Antenna gain is 3dBi