RF Exposure Report

Report No.:	SABCKS-WTW-P21010762
FCC ID:	UXX-S5A107A
Contains FCC ID:	N7NEM91
Test Model:	S5A107A
Received Date:	Jan. 27, 2021
Test Date:	Mar. 02 ~ Mar. 09, 2021
Issued Date:	Mar. 10, 2021
Applicant:	Cradlepoint, Inc.
Address:	1111 West Jefferson Street ,Boise ,Idaho,United States 83702
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
SABCKS-WTW-P21010762	Original release.	Mar. 10, 2021

1 Certificate of Conformity

Product:	5G Adapter
Brand:	Cradlepoint, Inc.
Test Model:	S5A107A
Sample Status:	Engineering sample
Applicant:	Cradlepoint, Inc.
Test Date:	Mar. 02 ~ Mar. 09, 2021
Standards:	FCC Part 2 (Section 2.1091) IEEE C95.3 -2002
References Test Guidance:	KDB 447498 D01 General RF Exposure Guidance v06

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 RF characteristics under the conditions specified in this report.

Prepared by : Polly Chien , **Date:** Mar. 10, 2021

Polly Chien / Specialist

Approved by : Bruce Chen , **Date:** Mar. 10, 2021

Bruce Chen / Senior Project Engineer

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 72cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

For Model: S5A107A					
Antenna No.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
Ant 1	2.47	2.4~2.4835 GHz	Dipole	R-SMA	170mm
Ant 2	2.47	2.4~2.4835 GHz	Dipole	R-SMA	170mm
Ant 3	2.47	2.4~2.4835 GHz	Dipole	R-SMA	170mm
Ant 4	2.47	2.4~2.4835 GHz	Dipole	R-SMA	170mm
LTE Ant 1	2.5	700~960 MHz	Dipole	N-Type	204mm
	2.2	1428~1600 MHz			
	4.3	1700~2700 MHz			
	4.6	3300~3700 MHz			
	6.1	5150~5925 MHz			
LTE Ant 2 (GPS L1)	2.5	700~960 MHz	Dipole	N-Type	184mm
	2.2	1428~1600 MHz			
	4.3	1700~2700 MHz			
	4.6	3300~3700 MHz			
	6.1	5150~5925 MHz			
LTE Ant 3	2.5	700~960 MHz	Dipole	N-Type	187mm
	2.2	1428~1600 MHz			
	4.3	1700~2700 MHz			
	4.6	3300~3700 MHz			
	6.1	5150~5925 MHz			
LTE Ant 4 (GPS L5)	2.5	700~960 MHz	Dipole	N-Type	168mm
	2.2	1428~1600 MHz			
	4.3	1700~2700 MHz			
	4.6	3300~3700 MHz			
	6.1	5150~5925 MHz			

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.5 Calculation Result of Maximum Conducted Power

For WLAN:

Operation Mode	Evaluation Frequency (MHz)	Max Power Average (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN 2.4GHz	2412~2462	424.502	8.64	72	0.048	1

NOTE:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 / 4] = 8.64dBi

For WWAN < Worst Case> FCC ID: N7NEM91

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
LTE B41-HP	2498.5~2687.5	398.107	4.30	72	0.016	1

For FR2:

Operation Mode	Evaluation Frequency (GHz)	E.I.R.P. Power (dBm)	E.I.R.P. Power (mW)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
FR2 (n260)	37 ~ 40	47.83	60673.633	72	0.931	1
FR2 (n261)	27.5 ~ 28.35	47.43	55335.011	72	0.849	1

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

1. WLAN 2.4GHz + WWAN

= 0.048 / 1 + 0.017 /1 = 0.065

2. WLAN 2.4GHz + FR2

= 0.048 / 1 + 0.931 / 1 = 0.979

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

Appendix

WWAN module
MPE Evaluation for FCC ID: N7NEM91 Module

Mode	Equipment Category	Transmitter Range (MHz)		Maximum		Antenna Gain (dBi)	Power Density (mW/cm^2)		Ratio
		Start	Stop	(dBm)	(W)		Vaule	Limit	
UMTS	Band II	1852.4	1907.6	24.5	0.2818	4.3	0.0418	1	0.04180
	Band IV	1712.4	1752.6	24.5	0.2818	4.3	0.0418	1	0.04180
	Band V	826.4	846.6	24.5	0.2818	2.5	0.02762	0.5509	0.05014
LTE	Band 2	1850.7	1909.3	24	0.2512	4.3	0.03726	1	0.03726
	Band 4	1710.7	1754.3	24	0.2512	4.3	0.03726	1	0.03726
	Band 5	824.7	848.3	24	0.2512	2.5	0.02462	0.5498	0.04478
	Band 7	2502.5	2567.5	24	0.2512	4.3	0.03726	1	0.03726
	Band 12	699.7	715.3	24	0.2512	2.5	0.02462	0.4664	0.05279
	Band 13	779.5	784.5	24	0.2512	2.5	0.02462	0.5196	0.04738
	Band 14	790.5	795.5	24	0.2512	2.5	0.02462	0.527	0.04672
	Band 17	706.5	713.5	24	0.2512	2.5	0.02462	0.471	0.05227
	Band 25	1850.7	1914.3	24	0.2512	4.3	0.03726	1	0.03726
	Band 26	824.7	848.3	24	0.2512	2.5	0.02462	0.5498	0.04478
	Band 30	2307.5	2312.5	24	0.2512	4.3	0.03726	1	0.03726
	Band 38	2572.5	2617.5	24.8	0.302	4.3	0.04479	1	0.04479
	Band 41	2498.5	2687.5	24.8	0.302	4.3	0.04479	1	0.04479
	Band 41-HP	**2498.5**	**2687.5**	**26**	**0.3981**	**4.3**	**0.05905**	**1**	**0.05905**
	Band 42	3552.5	3597.5	24.8	0.302	4.6	0.048	1	0.04800
	Band 48	3552.5	3697.5	24.8	0.302	4.6	0.048	1	0.04800
	Band 66	1710.7	1779.3	24	0.2512	4.3	0.03726	1	0.03726
	Band 71	665.5	695.5	24	0.2512	2.5	0.02462	0.4436	0.05550
5GNR	nBand 2	1852.4	1907.6	24	0.2512	4.3	0.03726	1	0.03726
	nBand 5	826.5	846.5	24	0.2512	2.5	0.02462	0.551	0.04468
	nBand 41	2506.02	2679.99	24	0.2512	4.3	0.03726	1	0.03726
	nBand 66	1712.5	1777.5	24	0.2512	4.3	0.03726	1	0.03726
	nBand 71	665.5	695.5	24	0.2512	2.5	0.02462	0.4436	0.05550

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