FCC SAR Test Report

APPLICANT	:	Sierra Wireless Inc
EQUIPMENT	:	PCIe wireless WAN card
BRAND NAME	:	SIERRA WIRELESS
MODEL NAME	:	EM7455
FCC ID	:	N7NEM7455
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

The product was installed into Portable Computer (Brand Name DELL, Model Name: P28S) during test.

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA782210-03	Rev. 01	Initial issue of report	Sep. 27, 2017

1. Administration Data

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
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Applicant	
Company Name	Sierra Wireless Inc
Address	13811 Wireless Way, Richmond, BC, N/A V6V 3A4, Canada

Manufacturer	
Company Name	Sierra Wireless Inc
Address	13811 Wireless Way, Richmond, BC, N/A V6V 3A4, Canada

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

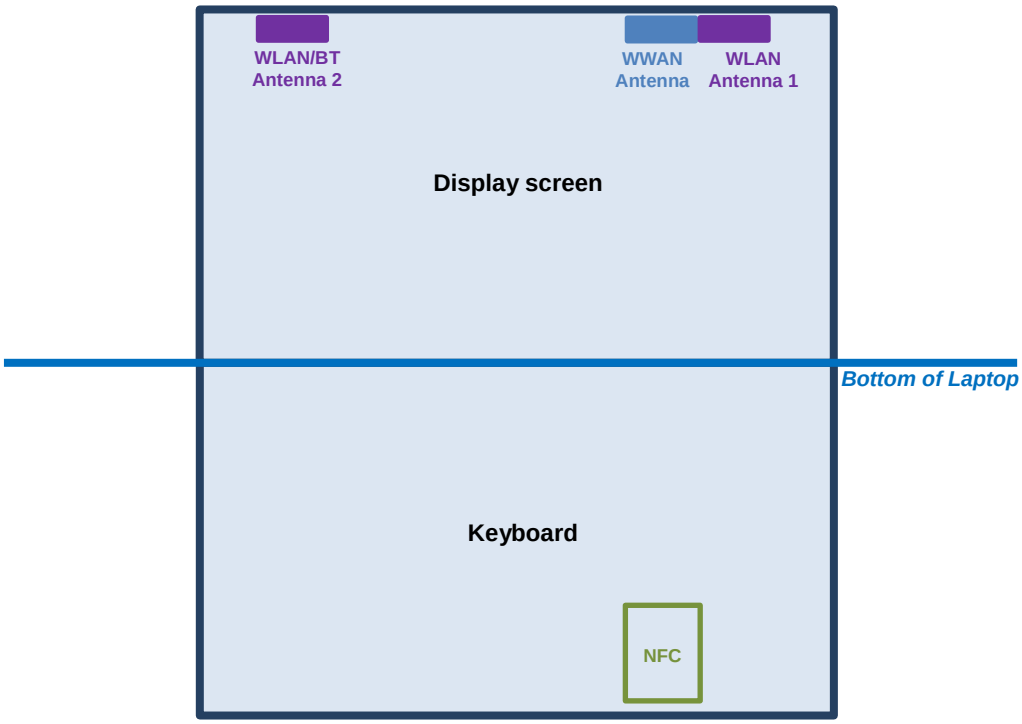
3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	PCIe wireless WAN card
Brand Name	SIERRA WIRELESS
Model Name	EM7455
FCC ID	N7NEM7455
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM
EUT Stage	Identical Prototype
Remark : 1. For WWAN SAR result is referred to FCC ID: N7NEM7455, Sporton SAR test Report, Report No.: FA681204-05 and the result also used perform simultaneous transmission analysis. 2. The WLAN module QUALCOMM QCNFA364A is also integrated in this host, for WLAN/BT evaluation results are referenced from the report of FCC ID: PPD-QCNFA364AH, (Bureau Veritas report No. SA150107E07B).	

Host Information		
Equipment Name		Portable Computer
Brand Name		DELL
Model Name		P28S
Wireless Technology		NFC:ASK
Integrated RFID Module	Brand Name	DELL
	Model Name	DWRFID1602
	Mode	RFID : ASK
Integrated WLAN Module	Brand Name	QUALCOMM
	Model Name	QCNFA364A
	Mode	WLAN 2.4GHz : 802.11b/g/n/ac HT20/HT40/VHT20/VHT40 WLAN 5GHz : 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE

4. Antenna Location



The separation distance for antenna to edge:

Antenna	To Bottom of Laptop (mm)
WWAN Antenna	197.02
WLAN Antenna 1	197.02
WLAN/BT Antenna 2	197.02

5. SAR test exclusion table

General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
7. For WWAN tune-up is referred to FCC ID: N7NEM7455, SIERRA EM7455 Module Report, and available date is on 2015/07/28.
8. For WLAN/BT tune-up is referenced from the report of FCC ID: PPD-QCNFA364AH, (Bureau Veritas report No. SA150107E07B).

Integrated Module		EM7455										QCNFA364A		
Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 12	LTE Band 13	LTE Band 5 / 26	LTE Band 4	LTE Band 2 / 25	LTE Band 7	LTE Band 41	BT	2.4GHz WLAN ANT 1+2	5GHz WLAN ANT 1+2
	Maximum power (dBm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	23.0	23.0	11.5	23.5	22.5
	Maximum rated power(mW)	251.0	251.0	251.0	251.0	251.0	251.0	251.0	251.0	200.0	200.0	14.0	224.0	178.0
Bottom of Laptop	Separation distance(mm)	197.02										197.02		
	exclusion threshold	992.0	1583.0	1579.0	878.0	938.0	994.0	1583.0	1578.0	1564.0	1561.0	1565.0	1566.0	1532.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No

Conclusion: According to table above, standalone SAR is not require in this report.

6. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + WLAN + Bluetooth	Yes

General Note:

1. For WWAN SAR result is referred to FCC ID: N7NEM7455, Sporton SAR test Report, Report No.: FA681204-05 and the result also used perform simultaneous transmission analysis.
2. The WLAN module QUALCOMM QCNFA364A is also integrated in this host, for WLAN/BT evaluation results are referenced from the report of FCC ID: PPD-QCNFA364AH, (Bureau Veritas report No. SA150107E07B).
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
4. Per KDB 447498 D01v06 SAR test exclusion in section6, the standalone SAR testing is not required for this device, 0.4 W/kg is used for simultaneous transmission analysis when the test separation distance is > 50mm.

Exposure Position	1	2	3	4	1+2+4 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)
	WWAN	2.4GHz WLAN Ant1+2	5GHz WLAN Ant1+2	Bluetooth		
	1g SAR (W/kg)					
Body	0.400	0.400	0.400	0.400	**1.200**	**1.200**

Conclusion:

In the table above, the summed SAR is compliant with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

7. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[6] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[7] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[8] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.