

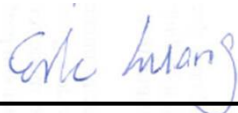
FCC SAR Test Report

APPLICANT : Sierra Wireless Inc
EQUIPMENT : PCIe wireless WAN card
BRAND NAME : SIERRA WIRELESS
MODEL NAME : EM7455
FCC ID : N7NEM7455-D8
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: P29S) 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



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA782332-04	Rev. 01	Initial issue of report	Oct. 02, 2017



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Sierra Wireless Inc, PCIe wireless WAN card, EM7455, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)
		Body	1g SAR (W/kg)	
Licensed	WCDMA II		0.91	1.28
	WCDMA IV		0.97	
	WCDMA V		0.92	
	LTE Band 4		0.81	
	LTE Band 7		1.06	
	LTE Band 12		0.97	
	LTE Band 13		1.17	
	LTE Band 2 / 25		0.88	
	LTE Band 5 / 26		1.05	
	LTE Band 41		0.70	

This device is in compliance 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, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications



2. 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.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

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

3. 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



4. Equipment Under Test (EUT) Information

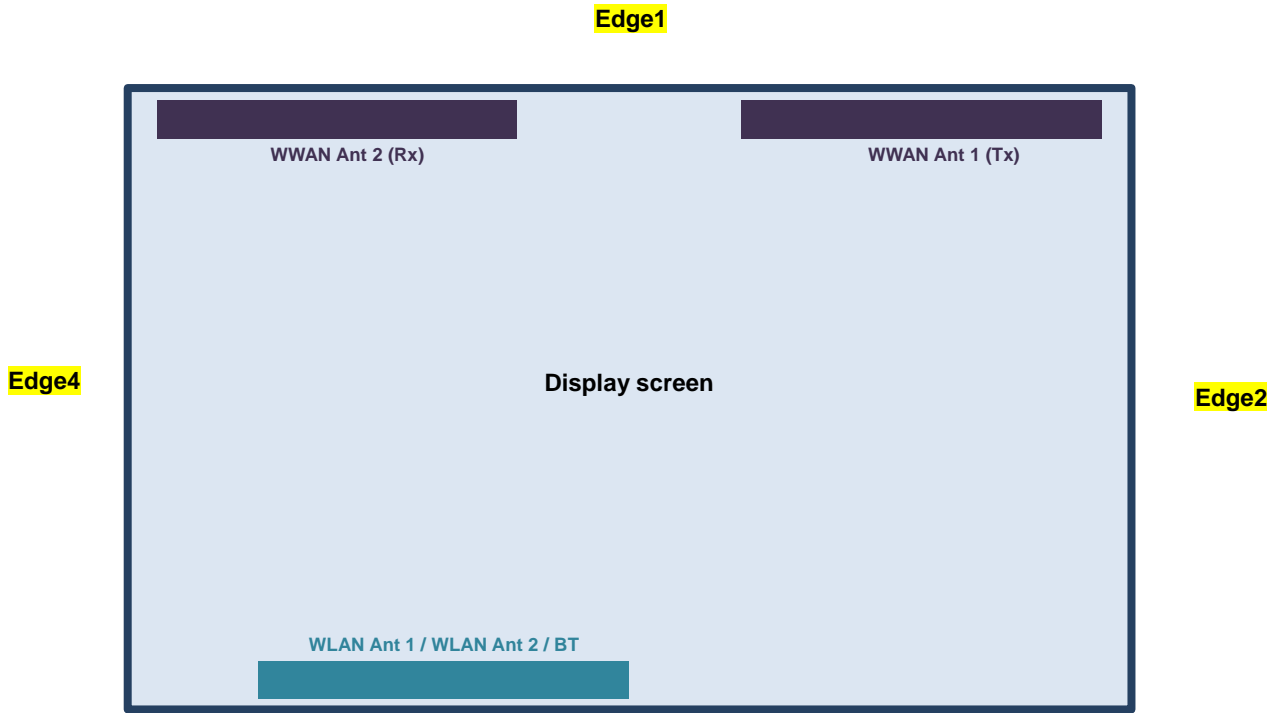
4.1 General Information

Product Feature & Specification	
Equipment Name	PCIe wireless WAN card
Brand Name	SIERRA WIRELESS
Model Name	EM7455
FCC ID	N7NEM7455-D8
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: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM
EUT Stage	Identical Prototype
Remark:	
<ol style="list-style-type: none"> For WWAN SAR results are referenced from FCC ID: N7NEM7455-D8 (Sporton Report No. FA742818) and the result also used perform simultaneous transmission analysis. 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 (Sporton Report No.: FA782332) and the result also used perform simultaneous transmission analysis. 	

Host Information		
Equipment Name	Portable Computer	
Brand Name	DELL	
Model Name	P29S	
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

5. Antenna Location

< Tablet Mode >



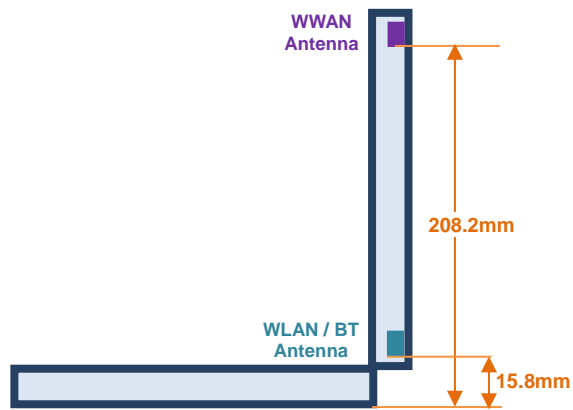
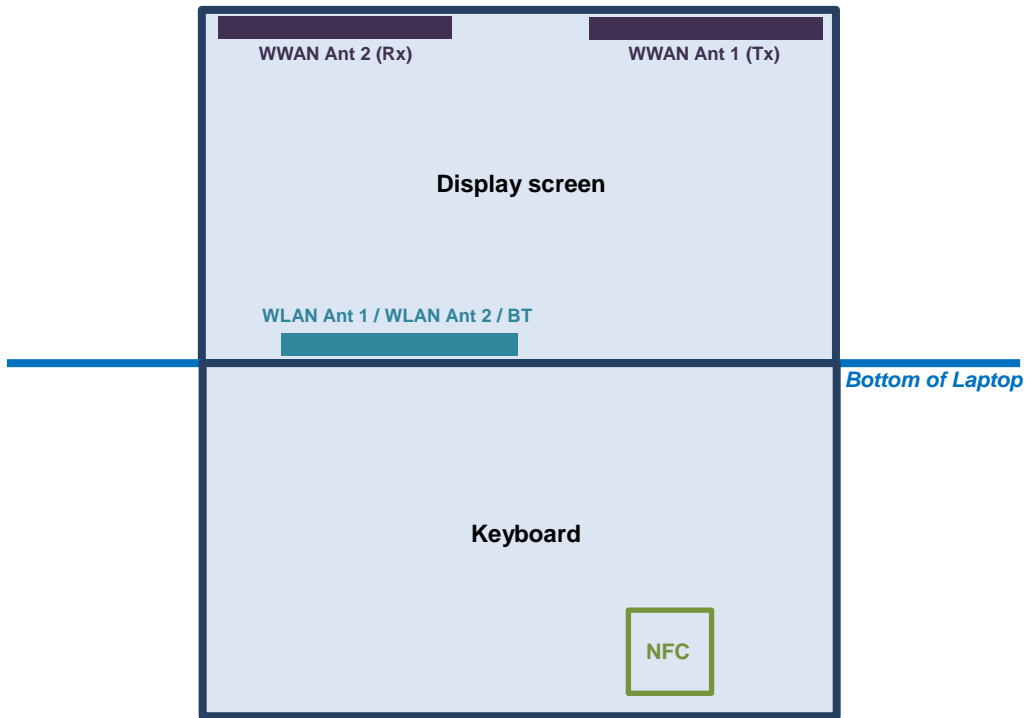
Edge3

Front View

The separation distance for antenna to edge :

Antenna	To Edge1 (mm)	To Edge2 (mm)	To Edge3 (mm)	To Edge4 (mm)
WWAN Ant 1 (Tx)	< 5	7	196.5	183
WWAN Ant 2 (Rx)	< 5	183	196.5	7
WLAN Ant 1 / WLAN Ant 2 / BT	185	135	< 5	55

< Laptop Mode >



<Side View>

6. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + WLAN 2.4GHz + BT	Yes
2.	WWAN + WLAN 5GHz + BT	Yes

General Note:

1. For WWAN SAR results are referenced from FCC ID: N7NEM7455-D8, Sporton SAR test Report, Report No.: FA742818 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, Sporton SAR test Report, Report No.: FA782332, and the result also used perform simultaneous transmission analysis.
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, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

6.1 Body Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	5	6	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)	1+2+6 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)		
		WWAN	2.4GHz WLAN Ant 1	2.4GHz WLAN Ant 2	5GHz WLAN Ant 1	5GHz WLAN Ant 2	Bluetooth						
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)						
WCDMA	WCDMA II	Bottom Face at 0mm	0.347	0.273	0.397	0.264	0.187	0.014	1.017	0.798	0.634	0.625	
		Edge 1 at 0mm	0.911							0.911	0.911	0.911	0.911
		Bottom Face at 6mm	0.612	0.273	0.397	0.264	0.187	0.014	1.282	1.063	0.899	0.890	
		Edge 1 at 15mm	0.869							0.869	0.869	0.869	0.869
		Edge 2 at 0mm	0.330							0.330	0.330	0.330	0.330
	WCDMA IV	Bottom Face at 0mm	0.279	0.273	0.397	0.264	0.187	0.014	0.949	0.730	0.566	0.557	
		Edge 1 at 0mm	0.974							0.974	0.974	0.974	0.974
		Bottom Face at 6mm	0.540	0.273	0.397	0.264	0.187	0.014	1.210	0.991	0.827	0.818	
		Edge 1 at 15mm	0.899							0.899	0.899	0.899	0.899
		Edge 2 at 0mm	0.390							0.390	0.390	0.390	0.390
	WCDMA V	Bottom Face at 0mm	0.257	0.273	0.397	0.264	0.187	0.014	0.927	0.708	0.544	0.535	
		Edge 1 at 0mm	0.924							0.924	0.924	0.924	0.924
		Bottom Face at 6mm	0.494	0.273	0.397	0.264	0.187	0.014	1.164	0.945	0.781	0.772	
		Edge 1 at 15mm	0.341							0.341	0.341	0.341	0.341
		Edge 2 at 0mm	0.373							0.373	0.373	0.373	0.373



WWAN Band	Exposure Position	1	2	3	4	5	6	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)	1+2+6 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)		
		WWAN 1g SAR (W/kg)	2.4GHz WLAN Ant 1 1g SAR (W/kg)	2.4GHz WLAN Ant 2 1g SAR (W/kg)	5GHz WLAN Ant 1 1g SAR (W/kg)	5GHz WLAN Ant 2 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)						
LTE	LTE Band 4	Bottom Face at 0mm	0.231	0.273	0.397	0.264	0.187	0.014	0.901	0.682	0.518	0.509	
		Edge 1 at 0mm	0.810							0.810	0.810	0.810	0.810
		Bottom Face at 6mm	0.508	0.273	0.397	0.264	0.187	0.014		1.178	0.959	0.795	0.786
		Edge 1 at 15mm	0.763							0.763	0.763	0.763	0.763
		Edge 2 at 0mm	0.290							0.290	0.290	0.290	0.290
	LTE Band 7	Bottom Face at 0mm	0.222	0.273	0.397	0.264	0.187	0.014		0.892	0.673	0.509	0.500
		Edge 1 at 0mm	1.055							1.055	1.055	1.055	1.055
		Bottom Face at 6mm	0.506	0.273	0.397	0.264	0.187	0.014		1.176	0.957	0.793	0.784
		Edge 1 at 15mm	0.474							0.474	0.474	0.474	0.474
		Edge 2 at 0mm	0.324							0.324	0.324	0.324	0.324
	LTE Band 12	Bottom Face at 0mm	0.449	0.273	0.397	0.264	0.187	0.014		1.119	0.900	0.736	0.727
		Edge 1 at 0mm	0.971							0.971	0.971	0.971	0.971
		Bottom Face at 6mm	0.377	0.273	0.397	0.264	0.187	0.014		1.047	0.828	0.664	0.655
		Edge 1 at 15mm	0.190							0.190	0.190	0.190	0.190
		Edge 2 at 0mm	0.254							0.254	0.254	0.254	0.254
	LTE Band 13	Bottom Face at 0mm	0.611	0.273	0.397	0.264	0.187	0.014		1.281	1.062	0.898	0.889
		Edge 1 at 0mm	1.168							1.168	1.168	1.168	1.168
		Bottom Face at 6mm	0.555	0.273	0.397	0.264	0.187	0.014		1.225	1.006	0.842	0.833
		Edge 1 at 15mm	0.370							0.370	0.370	0.370	0.370
		Edge 2 at 0mm	0.313							0.313	0.313	0.313	0.313
	LTE Band 25	Bottom Face at 0mm	0.367	0.273	0.397	0.264	0.187	0.014		1.037	0.818	0.654	0.645
		Edge 1 at 0mm	0.878							0.878	0.878	0.878	0.878
		Bottom Face at 6mm	0.565	0.273	0.397	0.264	0.187	0.014		1.235	1.016	0.852	0.843
		Edge 1 at 15mm	0.778							0.778	0.778	0.778	0.778
		Edge 2 at 0mm	0.258							0.258	0.258	0.258	0.258
	LTE Band 26	Bottom Face at 0mm	0.393	0.273	0.397	0.264	0.187	0.014		1.063	0.844	0.680	0.671
		Edge 1 at 0mm	1.047							1.047	1.047	1.047	1.047
		Bottom Face at 6mm	0.485	0.273	0.397	0.264	0.187	0.014		1.155	0.936	0.772	0.763
		Edge 1 at 15mm	0.322							0.322	0.322	0.322	0.322
		Edge 2 at 0mm	0.331							0.331	0.331	0.331	0.331
	LTE Band 41	Bottom Face at 0mm	0.141	0.273	0.397	0.264	0.187	0.014		0.811	0.592	0.428	0.419
		Edge 1 at 0mm	0.698							0.698	0.698	0.698	0.698
Bottom Face at 6mm		0.250	0.273	0.397	0.264	0.187	0.014		0.920	0.701	0.537	0.528	
Edge 1 at 15mm		0.215							0.215	0.215	0.215	0.215	
Edge 2 at 0mm		0.071							0.071	0.071	0.071	0.071	



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.