

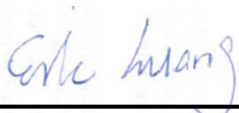
# FCC SAR Test Report

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



## SPORTON INTERNATIONAL INC.

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



## **Table of Contents**

|                                                 |   |
|-------------------------------------------------|---|
| 1. Administration Data .....                    | 4 |
| 2. Guidance Applied.....                        | 4 |
| 3. Equipment Under Test (EUT) Information ..... | 5 |
| 3.1 General Information .....                   | 5 |
| 4. Antenna Location.....                        | 6 |
| 5. SAR test exclusion table .....               | 7 |
| 6. Simultaneous Transmission Analysis .....     | 8 |
| 7. References.....                              | 9 |

## Revision History

| REPORT NO.  | VERSION | DESCRIPTION             | ISSUED DATE   |
|-------------|---------|-------------------------|---------------|
| FA782210-03 | Rev. 01 | Initial issue of report | Sep. 27, 2017 |
|             |         |                         |               |
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## **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.                                                                                                                       |
| Test Site Location | No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)<br>TEL: +886-3-327-3456<br>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 |

## **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

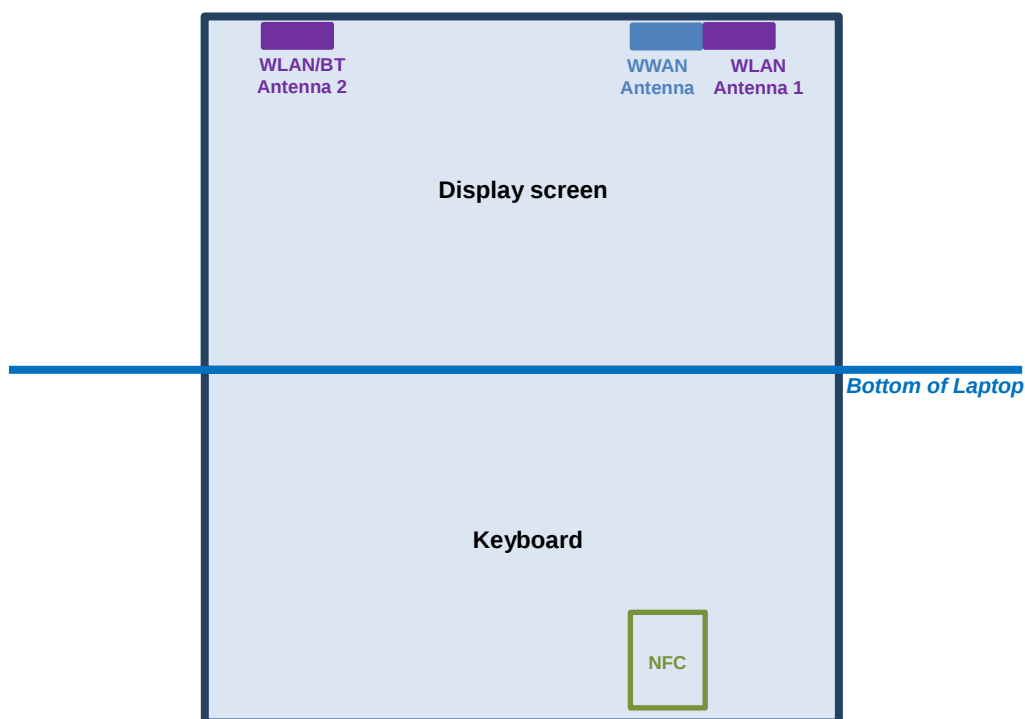
### **3. Equipment Under Test (EUT) Information**

#### **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<br>WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz<br>WCDMA Band V: 826.4 MHz ~ 846.6 MHz<br>LTE Band 2: 1850 MHz ~ 1910 MHz<br>LTE Band 4: 1710 MHz ~ 1755 MHz<br>LTE Band 5: 824 MHz ~ 849 MHz<br>LTE Band 7: 2500 MHz ~ 2570 MHz<br>LTE Band 12: 699 MHz ~ 716 MHz<br>LTE Band 13: 777 MHz ~ 787 MHz<br>LTE Band 25: 1850 MHz ~ 1915 MHz<br>LTE Band 26: 814 MHz ~ 849 MHz<br>LTE Band 41: 2496 MHz ~ 2690 MHz |
| Mode                                                                                                                                                                                                                                                                                                                                                                                                           | RMC 12.2Kbps<br>HSDPA<br>HSUPA<br>DC-HSDPA<br>LTE: QPSK, 16QAM                                                                                                                                                                                                                                                                                                                                                                                  |
| EUT Stage                                                                                                                                                                                                                                                                                                                                                                                                      | Identical Prototype                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Remark :</b><br>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.<br>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<br>WLAN 5GHz : 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80<br>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:**

- The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
- Maximum power is the source-based time-average power and represents the maximum RF output power among production units
- 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.
- 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.
- 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:  

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR}$$
  - ☐ 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
- 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
  - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · ( f(MHz)/150)] mW, at 100 MHz to 1500 MHz
  - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz
- For WWAN tune-up is referred to FCC ID: N7NEM7455, SIERRA EM7455 Module Report, and available date is on 2015/07/28.
- 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<br>Summed<br>1g SAR (W/kg) | 1+3+4<br>Summed<br>1g SAR (W/kg) |
|-------------------|---------------|-----------------------|---------------------|-----------|----------------------------------|----------------------------------|
|                   | WWAN          | 2.4GHz WLAN<br>Ant1+2 | 5GHz WLAN<br>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.