



# FCC SAR REPORT

FCC ID : N7NEM75S  
Equipment : WWAN Module  
Brand Name : Sierra  
Model Name : EM7511  
Applicant : Sierra Wireless Inc.  
13811 Wireless Way Richmond,  
BC, V6V 3A4 Canada  
Standard : FCC 47 CFR Part 2 (2.1093)

The product was installed into Notebook (Brand Name Getac, Model Name: S410, S410G4, S410-4012C, S410-4212D, S410-4212E S410Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, “-“, “\_” or blank for marketing purpose and no impact safety related critical components and constructions.)) during evaluation.

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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



Approved by: Cona Huang / Deputy Manager

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## History of this test report

Report No.	Version	Description	Issued Date
FA0D1215-01	01	Initial issue of report	Aug. 19, 2021

**1. Equipment Under Test (EUT) Information****1.1 General Information**

Product Feature & Specification	
Equipment Name	WWAN Module
Brand Name	Sierra
Model Name	EM7511
FCC ID	N7NEM75S
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 14: 790.5 MHz ~ 795.5 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM

Host Information	
Equipment Name	Notebook
Brand Name	Getac
Model Name	S410, S410G4, S410-4012C, S410-4212D, S410-4212E S410Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, "-", "_" or blank for marketing purpose and no impact safety related critical components and constructions.)
Integrated WLAN Module 1	
Brand Name	Intel
Model Name	AX201NGW
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5GHz Band: 5150 MHz ~ 5350 MHz, 5470 MHz ~ 5725 MHz, 5725 MHz ~ 5850 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
Integrated WLAN Module 2	
Brand Name	Realtek
Model Name	RTL8822CE
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5GHz Band: 5150 MHz ~ 5350 MHz, 5470 MHz ~ 5725 MHz, 5725 MHz ~ 5850 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80
EUT Stage	Production Unit
<b>Remark:</b> 1. The Intel AX201NGW and Realtek RTL8822CE WLAN / Bluetooth modules are also integrated into this host, WLAN / Bluetooth power and WLAN evaluation results which can be referred to Sporton SAR Test Report, Report No.: FA0D1216-01 (FCC ID: PD9AX201NG) and FA0D1216-02 (FCC ID: TX2-RTL8822CE).	

Reviewed by: **Jason Wang**Report Producer: **Paula Chen**

Sample List		
DVT SKUs	SKU B	SKU F
CPU	i5	i5
Display Resolution	FHD	FHD
Discrete Graphics	Not Support	Support (T1000)
Wifi/BT	Support (RTL8822CE) (AX201NGW)	Support (AX201NGW)
Touch	Not Support	Not Support
Sunlight Readable	Support	Support
Main Storage	SSD 1 TB	SSD 1 TB
Battery	Main	Main
2nd Storage	Not Support	Not Support
Webcam	Support	Support
Smart Card	Support	Support
Option I/O Ports	RS232 + USB + Audio + LAN + Fischer	RS232 + USB + Audio + LAN + Fischer
Discrete GPS	Not Support	Not Support
Finger Print	Not Support	Not Support
Contactless Smart Card(NFC)	Not Support	Not Support

## **2. Guidance Applied**

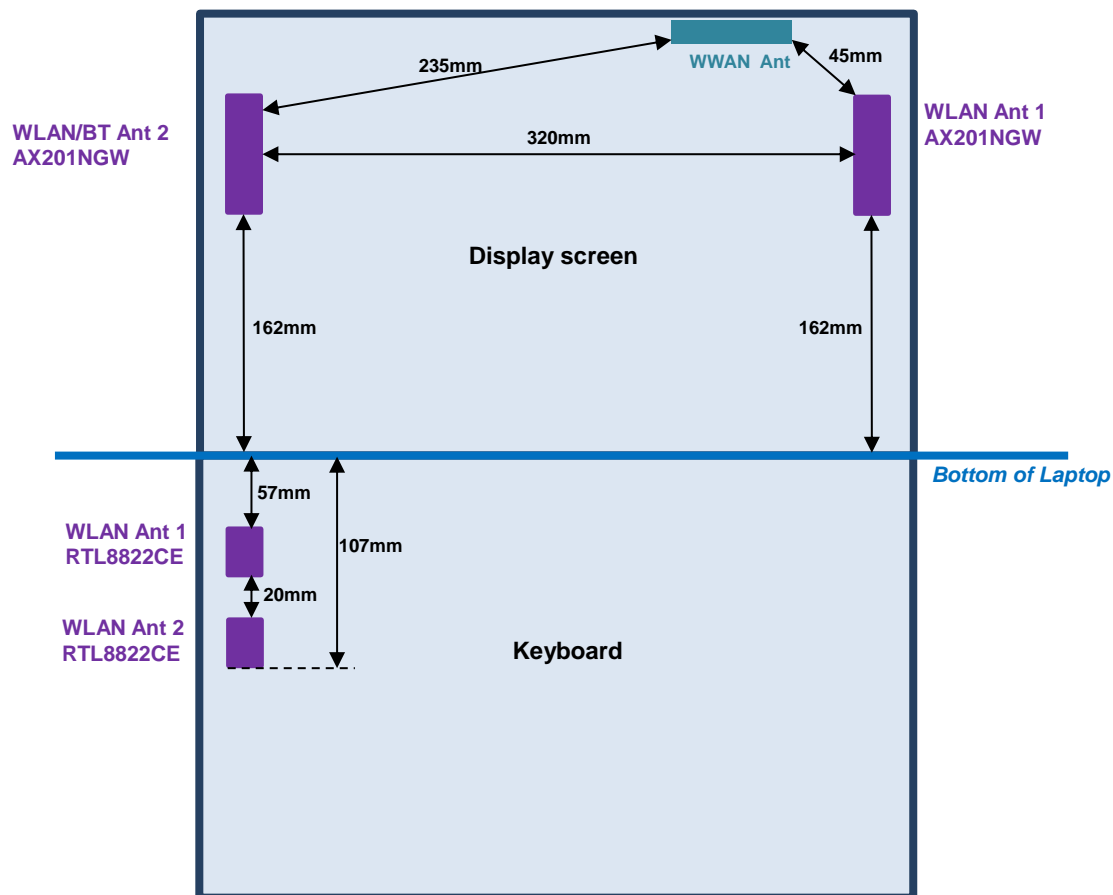
The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- 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. Maximum Tune-up Limit (Unit: dBm)**

Mode		Maximum Average power(dBm)
WCDMA	Band II	24
	Band IV	24
	Band V	24
LTE	Band 2	24
	Band 4	24
	Band 5	24
	Band 7	23.8
	Band 12	24
	Band 13	24
	Band 14	24
	Band 26	24
	Band 41	23.8
	Band 48	23
	Band 66	24

#### 4. SAR test exclusion table



The separation distance for antenna to edge :

Antenna	To Bottom of Laptop (mm)
WWAN Antenna	>200
AX201NGW WLAN Antenna 1	<200
AX201NGW WLAN/BT Antenna 2	<200
RTL8822CE WLAN Antenna 1	<200
RTL8822CE WLAN Antenna 2	<200



**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:  

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
 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. The below table, exemption limits for routine evaluation based on frequency and separation distance was according to SAR-based Exemption – §1.1307(b)(3)(i)(B).

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 12	LTE Band 13	LTE Band 14	LTE Band 5	LTE Band 26	LTE Band 4	LTE Band 66	LTE Band 2	LTE Band 7	LTE Band 41	LTE Band 48
	Calculated Frequency (MHz)	846	1750	1907	715	784	795	848	848	1754	1779	1909	2567	2687	3697
	Maximum power (dBm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	23.8	23.8	23.0
	Maximum rated power(mW)	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	239.88	239.88	199.53
Bottom of Laptop	Separation distance(mm)	222.0													
	exclusion threshold	1133.0	1833.0	1829.0	997.0	1068.0	1080.0	1135.0	1135.0	1833.0	1832.0	1829.0	1814.0	1812.0	1798.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No



## 5. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	EM7511+ AX201NGW+ RTL8822CE	Yes

**General Note:**

- The Intel AX201NGW and Realtek RTL8822CE WLAN / Bluetooth modules are also integrated into this host, WLAN / Bluetooth power and WLAN evaluation results which can be referred to Sporton SAR Test Report, Report No.: FA0D1216-01 (FCC ID: PD9AX201NG) and FA0D1216-02 (FCC ID: TX2-RTL8822CE).
- 2.4GHz WLAN and Bluetooth share the same antenna2, and cannot transmit simultaneously.
- 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.
- Per KDB 447498 D01v06 SAR test exclusion in section6, the standalone SAR testing is not required for this device, the estimated 1g SAR 0.4 W/kg is used for simultaneous transmission analysis when the separation distance is > 50mm.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
  - Scalar SAR summation < 1.6W/kg.
  - $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{separation distance, mm})$ , 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.
  - If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.
  - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

Exposure Position	EM7511	AX201NGW					RTL8822CE				1+2+3+7+8 Summed 1g SAR (W/kg)	1+2+3+9+10 Summed 1g SAR (W/kg)	1+2+6+7+8 Summed 1g SAR (W/kg)	1+2+6+9+10 Summed 1g SAR (W/kg)	1+4+5+6+7+8 Summed 1g SAR (W/kg)	1+4+5+6+9+10 Summed 1g SAR (W/kg)	SPLSR	Case No
	1	2	3	4	5	6	7	8	9	10								
	WWAN	2.4GHz WLAN Ant 1	2.4GHz WLAN Ant 2	5GHz WLAN Ant 1	5GHz WLAN Ant 2	Bluetooth Ant 2	2.4GHz WLAN Ant 1	2.4GHz WLAN Ant 2	5GHz WLAN Ant 1	5GHz WLAN Ant 2								
	Estimated 1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)								
Bottom of Laptop at 0mm	0.400	0.001	0.001	0.001	0.001	0.001	0.260	0.363	0.905	0.686	1.025	1.993	1.025	1.993	1.026	1.994	0.04	Case 1

## 5.1 SPLSR Evaluation and Analysis

**General Note:**

1.  $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$ . If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary
2. The detail hotspot point for each transmitter in each exposure condition are showing as below figure and the minimum 3D distance for each sum combination is used for SPLSR analysis.

	Band	Position	SAR (W/kg)	Gap	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results
				(mm)			
Case 1	WWAN	Bottom of Laptop	0.4	0	45.0	0.40	0.01
	AX201NGW 2.4GHz WLAN Ant 1		0.001	0			
	WWAN		0.4	0	235.0	0.40	0.00
	AX201NGW 2.4GHz WLAN Ant 2		0.001	0			
	WWAN		0.4	0	45.0	0.40	0.01
	AX201NGW 5GHz WLAN Ant 1		0.001	0			
	WWAN		0.4	0	235.0	0.40	0.00
	AX201NGW 5GHz WLAN Ant 2 + Bluetooth Ant 2		0.002	0			
	WWAN		0.4	0	235.0	1.02	0.00
	RTL 8822CE 2.4GHz WLAN Ant 1+2.4GHz WLAN Ant 2		0.623	0			
	WWAN		0.4	0	235.0	1.99	0.01
	RTL 8822CE 5GHz WLAN Ant 1+5GHz WLAN Ant 2		1.591	0			
	AX201NGW 2.4GHz WLAN Ant 1		0.001	0	320.0	0.00	0.00
	AX201NGW 2.4GHz WLAN Ant 2		0.001	0			
	AX201NGW 2.4GHz WLAN Ant 1		0.001	0	320.0	0.00	0.00
	AX201NGW Bluetooth Ant 2		0.001	0			
	AX201NGW 2.4GHz WLAN Ant 1		0.001	0	320.0	0.62	0.00
	RTL 8822CE 2.4GHz WLAN Ant 1+2.4GHz WLAN Ant 2		0.623	0			
	AX201NGW 2.4GHz WLAN Ant 1		0.001	0	320.0	1.59	0.01
	RTL 8822CE 5GHz WLAN Ant 1+5GHz WLAN Ant 2		1.591	0			
	AX201NGW 2.4GHz WLAN Ant 2		0.001	0	57.0	0.62	0.01
	RTL 8822CE 2.4GHz WLAN Ant 1+2.4GHz WLAN Ant 2		0.623	0			
	AX201NGW 2.4GHz WLAN Ant 2		0.001	0	57.0	1.59	0.04
	RTL 8822CE 5GHz WLAN Ant 1+5GHz WLAN Ant 2		1.591	0			
	AX201NGW 5GHz WLAN Ant 1		0.001	0	320.0	0.00	0.00
	AX201NGW 5GHz WLAN Ant 2 + Bluetooth Ant 2		0.002	0			
	AX201NGW 5GHz WLAN Ant 1		0.001	0	320.0	0.62	0.00
	RTL 8822CE 2.4GHz WLAN Ant 1+2.4GHz WLAN Ant 2		0.623	0			
	AX201NGW 5GHz WLAN Ant 1		0.001	0	320.0	1.59	0.01
	RTL 8822CE 5GHz WLAN Ant 1+5GHz WLAN Ant 2		1.591	0			
	AX201NGW 5GHz WLAN Ant 2 + Bluetooth Ant 2		0.002	0	57.0	0.63	0.01
	RTL 8822CE 2.4GHz WLAN Ant 1+2.4GHz WLAN Ant 2		0.623	0			
	AX201NGW 5GHz WLAN Ant 2 + Bluetooth Ant 2		0.002	0	57.0	1.59	0.04
	RTL 8822CE 5GHz WLAN Ant 1+5GHz WLAN Ant 2		1.591	0			

## **6. 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.