



# RF EXPOSURE EVALUATION REPORT

**FCC ID** : N7NEM92  
**Equipment** : Wireless Module  
**Brand Name** : Sierra Wireless  
**Model Name** : EM9293  
**Applicant** : Sierra Wireless, ULC  
13811 Wireless Way, Richmond, BC, Canada V6A 3A4  
**Manufacturer** : Sierra Wireless, ULC  
13811 Wireless Way, Richmond, BC, Canada V6A 3A4  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

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 evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. 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



## 1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Wireless Module
Brand Name	Sierra Wireless
Model Name	EM9293
FCC ID	N7NEM92
Wireless Technology and Frequency Range	LTE Band 106: 897.5 MHz ~ 900.5 MHz
Mode	LTE: QPSK, 16QAM, 64QAM

Reviewed by: Jason Wang

Report Producer: Paula Chen

## 2. Maximum RF average output power among production units

Mode		Maximum Average power(dBm)
LTE	Band 106	24



### 3. Determination of exemption

Per 1.1307(b)(3), (i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by:

$$P_{th} \text{ (mW)} = \text{ERP}_{20\text{cm}} (d / 20)^x \text{ for distance } d \leq 20\text{cm}$$

$$P_{th} \text{ (mW)} = \text{ERP}_{20\text{cm}} \text{ for distance } 20\text{cm} < d \leq 40\text{cm}$$

$$x = -\log_{10} \left( \frac{60}{\text{ERP}_{20\text{cm}} \sqrt{f}} \right)$$

$\text{ERP}_{20\text{cm}} \text{ (mW)}$	$0.3 \text{ GHz} \leq f < 1.5 \text{ GHz}$ :	2040
	$1.5 \text{ GHz} \leq f \leq 6 \text{ GHz}$ :	3060

- (C) Or using Table 1 and the minimum separation distance ( $R$  in meters) from the body of a nearby person for the frequency ( $f$  in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply,  $R$  must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$ .
1.34-30	$3,450 R^2/f^2$ .
30-300	$3.83 R^2$ .
300-1,500	$0.0128 R^2 f$ .
1,500-100,000	$19.2R^2$ .



## 4. RF Exposure Evaluation

### 4.1. Standalone assessment

#### General Note:

- P<sub>i</sub> is mean the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm.
- P<sub>th</sub> is mean the exemption threshold power (P<sub>th</sub>) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i.
- The distance of 20cm is for this device.

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	P <sub>i</sub> (dBm)	P <sub>i</sub> (mW)	Maximum Output RF Power Limit (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/P <sub>th</sub>
LTE Band 106	10.50	24.00	34.5	32.35	32.35	1717.91	3000	1830.900	0.938

### 4.2. Collocated assessment

#### General Note:

- This MPE analysis is applicable to any collocated transmitters with transmit power for WLAN is less than or equal to 20dBm and for Bluetooth is less than or equal to 15dBm.
- A maximum antenna gain of 5 dBi for WLAN /BT has been assumed for all collocated antennas.
- The device support DPS (Dynamic Power Share) function to achieve higher uplink data rate keeping the total power unchanged in 5G NR NSA EN-DC mode according to 3GPP 38.213, when the equipment has a dynamic power sharing capability, it adjusts the LTE or NR transmission power so that the instantaneous total power does not exceed the specified value, when the maximum transmission power of NR (P LTE, P NR) and the specified total power (P total) have been set and the instantaneous calculated total transmission power exceeds P total, the NR transmission power is reduced so that the actual transmission power of the user equipment will not exceed Ptotal power. So if the LTE and NR standalone SAR is testing at total power level, the EN-DC combine MPE(LTE+NR) will not higher than the each standalone LTE and NR MPE, therefore, the simultaneous transmission analysis is used standalone MPE at total power level to show compliance.
- Either MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (*Evaluat<sub>dk</sub>* term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1).
- The sum of the ratios of the applicable terms for MPE-based and MPE shall be less than 1, to determine WWAN + WLAN + BT simultaneous transmission exposure compliance.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluat_{dk}}{Exposure\ Limit_k} \leq 1 \quad (C.1)$$

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	P <sub>i</sub> (dBm)	P <sub>i</sub> (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/P <sub>th</sub>
LTE Band 106	10.00	24.00	34.0	31.85	31.85	1531.09	1830.900	0.836
WLAN2.4GHz Band	5.0	20.00	25.0	22.85	22.85	192.75	3060.000	0.063
WLAN5GHz Band	5.0	20.00	25.0	22.85	22.85	192.75	3060.000	0.063
WLAN6GHz Band	5.0	20.00	25.0	22.85	22.85	192.75	3060.000	0.063
Bluetooth	5.0	15.00	20.0	17.85	17.85	60.95	3060.000	0.020

Maximum WWAN Pi/P <sub>th</sub> Ratio	WLAN Pi/P <sub>th</sub> Ratio	Bluetooth Pi/P <sub>th</sub> Ratio	$\Sigma$ (P/P <sub>th</sub> Ratio) of WWAN + WLAN + Bluetooth
0.836	0.063	0.020	0.919

**Conclusion:**

Based on FCC 47 CFR §1.1307, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Band	Maximum Conducted Power (dBm)	Standalone Allow Antenna Gain (dBi)	Collocated Allow Antenna Gain (dBi)
EM9293	LTE	LTE Band 106	24.00	10.50	10.00