



RF Exposure Report

(Part 0: SAR Char Evaluation)

FCC ID : QYLEM9190F
Equipment : WWAN Module
Model Name : EM9190
Applicant : Getac Technology Corporation.
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Standard : FCC 47 CFR Part 2 (2.1093)

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has 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.

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History of this test report

Report No.	Version	Description	Issued Date
FA182625A	01	Initial issue of report	Oct. 25, 2021



1. Introduction

The FCC RF exposure limit is defined based on time-averaged RF exposure. The product implements Qualcomm Smart Transmit feature which controls the instantaneous transmitting power for WWAN transmitter to ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (transmit frequency \leq 6GHz) and power density (transmit frequency $>$ 6GHz) to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is compliant to the regulation requirement. Cannot operate without SAR characterization at the device level, beforehand.

This report describes the procedures for the SAR char generation, and the parameters obtained from SAR characterization (referred to as SAR char, respectively) will be used as input for Smart Transmit. Both SAR char will be entered via the Embedded File System (EFS) to enable the Smart Transmit Feature.

Terminologies in this report

P_{limit}	The time-averaged RF power which corresponds to SAR_design_target.
P_{max}	Maximum target power level
SAR_design_target:	The design target for SAR compliance. It should be less than regulatory power density limit to account for all device design related uncertainties.
SAR char	P_{limit} for all the technologies/bands for all applicable DSI



2. Product Description

Product Feature & Specification	
Equipment Name	WWAN Module
FCC ID	QYLEM9190F
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 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 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz (Rx only) LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM



3. SAR Characterization

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for $f < 6$ GHz.

3.1 SAR design target and uncertainty

Exposure conditions	SAR design target	W/kg
Bottom of Laptop	1g SAR design target	0.95

Item	Uncertainty dB (k=2)
Total uncertainty	1.0

To account for total uncertainty, SAR_design_target should be determined as:

$$SAR_{design_target} < SAR_{regulatory_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$



3.2 SAR Char Table

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for f < 6 GHz.

<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>

Band	Antenna	Duty cycle	P limit (dBm) time-average power	P Max* (dBm) time-average power
WCDMA B2	Main	100.00%	20.90	23.50
WCDMA B4	Main	100.00%	19.00	23.50
WCDMA B5	Main	100.00%	25.90	23.50
LTE B7	Main	100.00%	20.30	23.00
LTE B12/17	Main	100.00%	28.80	23.00
LTE B13	Main	100.00%	27.30	23.00
LTE B14	Main	100.00%	26.90	23.00
LTE B25/2	Main	100.00%	21.10	23.00
LTE B26/5	Main	100.00%	25.60	23.00
LTE B40	Main	63.30%	22.90	21.00
LTE B41/B38 PC3	Main	63.30%	18.90	20.80
LTE B41 PC2	Main	43.30%		20.70
LTE B48	Main	63.30%	21.10	21.00
LTE B66/4	Main	100.00%	19.50	23.00
LTE B71	Main	100.00%	28.60	23.00
FR1 n2	Main	100.00%	20.40	22.50
FR1 n5	Main	100.00%	24.80	22.50
FR1 n66	Main	100.00%	19.00	22.50
FR1 n71	Main	100.00%	28.10	22.50

*P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to P_{max} + 1.0 dB uncertainty.

**All P_{limit} power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM).

The max allowed output power is the P_{limit} + 1.0 dB device uncertainty, and if P_{limit} is higher than P_{max}, the device output power will be P_{max} instead.