



RF Exposure Report

(Part 0: SAR Char Evaluation)

FCC ID : 2ABTU-FN990A28
Equipment : 5G NR Module
Brand Name : RuggON
Model No. : PX501
Applicant : RuggON Corporation
4F, No. 298, Yang Guan St., Neihu Dist., Taipei City, Taiwan
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.

Cona Huang

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. EMC & Wireless Communications Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan



Table of Contents

| | |
|--|----------|
| 1. Introduction | 4 |
| 2. SAR Characterization..... | 4 |
| 2.1 SAR design target and uncertainty..... | 5 |
| 2.2 SAR Char Table | 6 |



History of this test report



1. Introduction

The 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 RF exposure limit over a defined time window, for SAR (transmit frequency \leq 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 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

| | |
|--------------------|---|
| Plimit | The time-averaged RF power which corresponds to SAR_design_target. |
| Pmax | 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 | Plimit for all the technologies/bands for all applicable DSIs |

Test Lab Information

| | |
|---------------------------------------|--|
| Test Firm Name | Sporton International Inc. |
| Test Firm Information | No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan TEL: +886-3-327-3456 FAX: +886-3-328-4978 |
| Test Firm Registration Number for FCC | 553509 |
| FCC Designation No. | TW1190 |
| Test Engineers | Steven Chang, Aaron Chen |
| Report Producer | Paula Chen |

2. 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.

**2.1 SAR design target and uncertainty****<SAR design target and uncertainty>**

The detail SAR design target relate to each exposure conditions pls refer to operation description

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

| Band | Antenna | 1g SAR design target (W/kg) | TDD duty cycle | Power Tolerance (dB) |
|--------------------|---------|-----------------------------|----------------|----------------------|
| WCDMA II | 0 | 0.949 | 100.00% | 1 |
| WCDMA IV | 0 | 0.949 | 100.00% | 1 |
| WCDMA V | 0 | 0.949 | 100.00% | 1 |
| LTE Band 7 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 12/17 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 13 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 14 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 25/2 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 26/5 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 30 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 66/4 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 71 | 0 | 0.949 | 100.00% | 1 |
| LTE Band 41/38** | 0 | 0.949 | 63.30% | 1 |
| LTE Band 41 HPUE** | 0 | 0.949 | 43.30% | 1 |
| LTE Band 42** | 3 | 0.949 | 63.30% | 1 |
| LTE Band 43** | 3 | 0.949 | 63.30% | 1 |
| LTE Band 48** | 3 | 0.949 | 63.30% | 1 |
| n5 | 0 | 0.949 | 100.00% | 1 |
| n7 | 0 | 0.949 | 100.00% | 1 |
| n25/2 | 0 | 0.949 | 100.00% | 1 |
| n30 | 0 | 0.949 | 100.00% | 1 |
| n66 | 0 | 0.949 | 100.00% | 1 |
| n71 | 0 | 0.949 | 100.00% | 1 |
| n38 | 0 | 0.949 | 100.00% | 1 |
| n41 | 0 | 0.849 | 100.00% | 1.5 |
| n41 HPUE** | 0 | 0.949 | 50.00% | 1 |
| n41/n38 | 2 | 0.849 | 100.00% | 1.5 |
| n41 HPUE** | 2 | 0.949 | 50.00% | 1 |
| n48 | 1 | 0.949 | 100.00% | 1 |
| n48 | 3 | 0.949 | 100.00% | 1 |
| n77/78 | 1 | 0.849 | 100.00% | 1.5 |
| n77/78 HPUE** | 1 | 0.949 | 50.00% | 1 |
| n77/78 | 3 | 0.849 | 100.00% | 1.5 |
| n77/78 HPUE** | 3 | 0.949 | 50.00% | 1 |

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

**2.2 SAR Char Table****<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>**

*P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to P_{max} + device 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 & LTE TDD & NR TDD).

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

| Band | Antenna | TDD duty cycle | P _{limit} * | | P _{max} * (dBm) | Power Tolerance (dB) |
|--------------------|---------|----------------|----------------------|--------------------|-----------------------------|----------------------------|
| | | | DSI:0 Sensor off | DSI:1 Sensor on | | |
| WCDMA II | 0 | 100.00% | 23.5 | 22.7 | 23.5 | 1 |
| WCDMA IV | 0 | 100.00% | 23.5 | 20.3 | 23.5 | 1 |
| WCDMA V | 0 | 100.00% | 24.2 | 24.2 | 23.5 | 1 |
| LTE Band 7 | 0 | 100.00% | 24.3 | 24.3 | 23.0 | 1 |
| LTE Band 12/17 | 0 | 100.00% | 27.6 | 27.6 | 23.0 | 1 |
| LTE Band 13 | 0 | 100.00% | 25.7 | 25.7 | 23.0 | 1 |
| LTE Band 14 | 0 | 100.00% | 25.4 | 25.4 | 23.0 | 1 |
| LTE Band 25/2 | 0 | 100.00% | 23.0 | 22.3 | 23.0 | 1 |
| LTE Band 26/5 | 0 | 100.00% | 24.3 | 24.3 | 23.0 | 1 |
| LTE Band 30 | 0 | 100.00% | 23.5 | 23.5 | 22.0 | 1 |
| LTE Band 66/4 | 0 | 100.00% | 23.0 | 20.4 | 23.0 | 1 |
| LTE Band 71 | 0 | 100.00% | 29.5 | 29.5 | 23.0 | 1 |
| LTE Band 41/38** | 0 | 63.30% | 27.0 | 27.0 | 21.0 | 1 |
| LTE Band 41 HPUE** | 0 | 43.30% | | | 21.9 | 1 |
| LTE Band 42** | 3 | 63.30% | 13.9 | 13.9 | 19.5 | 1 |
| LTE Band 43** | 3 | 63.30% | 15.2 | 15.2 | 19.5 | 1 |
| LTE Band 48** | 3 | 63.30% | 14.5 | 14.5 | 19.5 | 1 |
| n5 | 0 | 100.00% | 24.1 | 24.1 | 23.5 | 1 |
| n7 | 0 | 100.00% | 23.7 | 23.7 | 23.5 | 1 |
| n25/2 | 0 | 100.00% | 23.5 | 22.0 | 23.5 | 1 |
| n30 | 0 | 100.00% | 23.7 | 23.7 | 22.0 | 1 |
| n66 | 0 | 100.00% | 23.5 | 21.0 | 23.5 | 1 |
| n71 | 0 | 100.00% | 30.2 | 30.2 | 23.5 | 1 |
| n38 | 0 | 100.00% | 24.7 | 24.7 | 24.0 | 1 |
| n41 | 0 | 100.00% | 23.6 | 23.6 | 23.0 | 1.5 |
| n41 HPUE** | 0 | 50.00% | | | 23.5 | 1 |
| n41/n38 | 2 | 100.00% | 16.2 | 16.2 | 23.0 | 1.5 |
| n41 HPUE** | 2 | 50.00% | | | 23.5 | 1 |
| n48 | 1 | 100.00% | 16.8 | 16.8 | 21.5 | 1 |
| n48 | 3 | 100.00% | 14.3 | 14.3 | 21.5 | 1 |
| n77/78 | 1 | 100.00% | 15.7 | 15.7 | 23.0 | 1.5 |
| n77/78 HPUE** | 1 | 50.00% | | | 23.5 | 1 |
| n77/78 | 3 | 100.00% | 12.7 | 12.7 | 23.0 | 1.5 |
| n77/78 HPUE** | 3 | 50.00% | | | 23.5 | 1 |