RF Exposure Report

(Part 0: SAR Char Evaluation)

FCC ID	**: UZ7ET65AW**
Equipment	**: Rugged 2 in 1 Android Tablet**
Brand Name	**: Zebra**
Model Name	**: ET65AW**
Applicant	**: Zebra Technologies Corporation 1 Zebra Plaza, Holtsville, NY 11742**
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.

Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA371211C	01	Initial issue of report	Sep. 20, 2023

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 sto ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (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 operat without SAR characterization at the device level, beforehand.

This report describes the procedures for the SAR char and the parameters obtained from SAR characterization (reffered 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

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. Product Description

Product Feature & Specification	
Equipment Name	Rugged 2 in 1 Android Tablet
FCC ID	UZ7ET65AW
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 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 n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n13: 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz~6525 MHz, 6525MHz~6875 MHz, 6875MHz~7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC: 13.56 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE NFC: ASK

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

<SAR design target and uncertainty>

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

Band	Antenna	TDD Duty cycle	Device Uncertainty (dB)	WLAN ON		WLAN OFF	
				Sensor OFF	Sensor ON	Sensor OFF	Sensor ON
				1g SAR design target (W/kg)	1g SAR design target (W/kg)	1g SAR design target (W/kg)	1g SAR design target (W/kg)
WCDMA II	1	100.00%	1.00	0.95	0.95	0.95	0.95
WCDMA IV	1	100.00%	1.00	0.95	0.95	0.95	0.95
WCDMA V	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B2/25	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B2/25	4	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B66/4	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B66/4	4	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B5/26	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B7	3	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B12/B17	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B13	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B14	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B30	3	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B71	1	100.00%	1.00	0.95	0.95	0.95	0.95
LTE B41/38(PC3)	3	63.30%	1.00	0.95	0.95	0.95	0.95
LTE B41 (PC2)	3	43.30%	1.00	0.95	0.95	0.95	0.95
LTE B48**	3	63.30%	1.00	0.95	0.95	0.95	0.95
n2/25	1	100.00%	1.00	0.95	0.95	0.95	0.95
n2/25	4	100.00%	1.00	0.95	0.95	0.95	0.95
n5/26	1	100.00%	1.00	0.95	0.95	0.95	0.95
n7	3	100.00%	1.00	0.95	0.95	0.95	0.95
n12	1	100.00%	1.00	0.95	0.95	0.95	0.95
n13	1	100.00%	1.00	0.95	0.95	0.95	0.95
n14	1	100.00%	1.00	0.95	0.95	0.95	0.95
n30	3	100.00%	1.00	0.95	0.95	0.95	0.95
n66	1	100.00%	1.00	0.95	0.95	0.95	0.95
n66	4	100.00%	1.00	0.95	0.95	0.95	0.95
n71	1	100.00%	1.00	0.95	0.95	0.95	0.95
n38/41(PC3)	3	100.00%	1.00	0.95	0.95	0.95	0.95
n41 (PC2)	3	100.00%	1.00	0.95	0.95	0.95	0.95
n41(PC3)_SRS	6	100.00%	1.00	0.95	0.16	0.95	0.95
n41 (PC2)_SRS	6	100.00%	1.00	0.95	0.16	0.95	0.95
n48	3	100.00%	1.00	0.95	0.95	0.95	0.95
n77/78(PC3)	3	100.00%	1.00	0.95	0.95	0.95	0.95
n77/78 (PC2)	3	100.00%	1.00	0.95	0.95	0.95	0.95
n77/78(PC3)_SRS	6	100.00%	1.00	0.95	0.16	0.95	0.95
n77/78 (PC2)_SRS	6	100.00%	1.00	0.95	0.16	0.95	0.95

Band	Antenna	TDD Duty cycle	Device Uncertainty (dB)	WLAN ON	WLAN OFF
				1g SAR design target (W/kg)	1g SAR design target (W/kg)
LTE B7	2	100.00%	1.00	0.95	0.95
LTE B41/38(PC3)	2	63.30%	1.00	0.95	0.95
LTE B41 (PC2)	2	43.30%	1.00	0.95	0.95
n7	2	100.00%	1.00	0.95	0.95
n38/41(PC3)	2	100.00%	1.00	0.95	0.95
n41 (PC2)	2	100.00%	1.00	0.95	0.95
n77/78(PC3)	2	100.00%	1.00	0.95	0.95
n77/78 (PC2)	2	100.00%	1.00	0.95	0.95
n41(PC3)_SRS	5	100.00%	1.00	0.95	0.95
n41 (PC2)_SRS	5	100.00%	1.00	0.95	0.95
n77/78(PC3)_SRS	5	100.00%	1.00	0.95	0.95
n77/78 (PC2)_SRS	5	100.00%	1.00	0.95	0.95

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

<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 Pmax + 1dB 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} + 1dB 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	WLAN ON		WLAN OFF		P max*
			Sensor OFF	Sensor ON	Sensor OFF	Sensor ON	
			Plimit	Plimit	Plimit	Plimit	
WCDMA II	1	100.00%	26.2	16.5	26.2	16.5	23.5
WCDMA IV	1	100.00%	24.6	15.5	24.6	15.5	23.5
WCDMA V	1	100.00%	30.3	19.5	30.3	19.5	24.0
LTE B2/25	1	100.00%	25.4	16.4	25.4	16.4	23.5
LTE B2/25	4	100.00%	27.8	16	27.8	16	23.5
LTE B66/4	1	100.00%	24.6	15.3	24.6	15.3	23.5
LTE B66/4	4	100.00%	28.6	16	28.6	16	23.5
LTE B5/26	1	100.00%	30.7	19.9	30.7	19.9	23.5
LTE B7	3	100.00%	29.5	15.8	29.5	15.8	23.5
LTE B12/B17	1	100.00%	30.4	20.5	30.4	20.5	23.5
LTE B13	1	100.00%	31.4	21.1	31.4	21.1	23.5
LTE B14	1	100.00%	31.9	21.4	31.9	21.4	23.5
LTE B30	3	100.00%	27.3	16.3	27.3	16.3	22.0
LTE B71	1	100.00%	31.2	21.3	31.2	21.3	23.5
LTE B41/38(PC3)**	3	63.30%	27.2	13.8	27.2	13.8	21.5
LTE B41 (PC2)**	3	43.30%					22.4
LTE B48**	3	63.30%	21	9.2	21	9.2	19.0
n2/25	1	100.00%	26.3	16.7	26.3	16.7	23.5
n2/25	4	100.00%	29	16.3	29	16.3	23.5
n5/26	1	100.00%	30.2	20.1	30.2	20.1	23.5
n7	3	100.00%	29.1	16.1	29.1	16.1	23.5
n12	1	100.00%	29.9	20.8	29.9	20.8	23.5
n13	1	100.00%	30.6	21.2	30.6	21.2	23.5
n14	1	100.00%	31.3	21.3	31.3	21.3	23.5
n30	3	100.00%	28.8	16.9	28.8	16.9	22.0
n66	1	100.00%	24.2	15	24.2	15	23.5
n66	4	100.00%	30	16.1	30	16.1	23.5
n71	1	100.00%	31.2	21.4	31.2	21.4	23.5
n38/41(PC3)	3	100.00%	29.6	15.8	29.6	15.8	23.5
n41 (PC2)	3	100.00%					26.0
n41(PC3)_SRS	6	100.00%	28.3	6.6	28.3	14.3	19.5
n41 (PC2)_SRS	6	100.00%					22.5
n48	3	100.00%	23	9.3	23	9.3	21.0
n77/78(PC3)	3	100.00%	20.7	9.6	20.7	9.6	23.5
n77/78 (PC2)	3	100.00%					26.0
n77/78(PC3)_SRS	6	100.00%	29.4	4	29.4	11.7	21.0
n77/78 (PC2)_SRS	6	100.00%					24.0

Band	Antenna	TDD Duty cycle	WLAN ON	WLAN OFF	P max*
			Plimit	Plimit	
LTE B7	2	100.00%	13.6	13.6	23.5
LTE B41/38(PC3)**	2	63.30%	13.7	13.7	21.5
LTE B41 (PC2)**	2	43.30%			22.4
n7	2	100.00%	13.7	13.7	23.5
n38/41(PC3)	2	100.00%	13.5	13.5	23.5
n41 (PC2)	2	100.00%			26.0
n77/78(PC3)	2	100.00%	9.5	9.5	23.5
n77/78 (PC2)	2	100.00%			26.0
n41(PC3)_SRS	5	100.00%	12.8	12.8	23.5
n41 (PC2)_SRS	5	100.00%			24.5
n77/78(PC3)_SRS	5	100.00%	11	11	19.5
n77/78 (PC2)_SRS	5	100.00%			22.5