RF Exposure Report

(Part 0: SAR Char Evaluation)

APPLICANT	: Xiaomi Communications Co., Ltd.
EQUIPMENT	: Mobile Phone
BRAND NAME	: Xiaomi
MODEL NAME	: 2201122G
FCC ID	: 2AFZZ122G
STANDARD	: FCC 47 CFR Part 2 (2.1093)

We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Tony Zhang

Reviewed by: Tony Zhang / Supervisor

Kat Yin

Approved by: Kat Yin / Manager

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

Sporton International (Kunshan) Inc.
TEL : 86-512-57900158 / FAX : 86-512-57900958   Issued Date : Jan. 12, 2022
Page 1 of 10   Form version. : 200414

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FA1O1701D	01	Initial issue of report	Jan. 12, 2022

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 sto ensure the product in compliance with RF exposure limit over a defined time window, for SAR (transmit frequency ≤ 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	Mobile Phone
Brand Name	Xiaomi
Model Name	2201122G
FCC ID	2AFZZ122G
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz 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 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz WLAN 6E U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6E U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6E U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6E U-NII-8: 6875 MHz ~ 7125 MHz Bluetooth: 2402 MHz ~ 2480 MHz WPC: 110KHz ~ 148 KHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 WLAN 5GHz 802.11ax HE20/HE40/HE80/HE160 WLAN 6GHz 802.11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE WPC: ASK 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>:

Uncertainty dB (k=2)	Freq<3GHz		Freq≥3GHz	
	Main Ant	**Aux Ant**	**Main Ant**	**Aux Ant**
Total uncertainty	1.0	1.5	1.5	2.0

Supported Band	Main Ant	Aux Ant
LTE B5/12/13/17/26	Mian Ant 0	Aux Ant 1
LTE B42/48	Mian Ant 10	Aux Ant 11/12/13
LTE B2/4/7/25/38/41/66	Mian Ant 3	Aux Ant 0/4/5/7
5G NR n5	Mian Ant 0	Aux Ant 1
5G NR n7/38/41/66	Mian Ant 4	Aux Ant 0/3/5
5G NR n77/78	Mian Ant 10	Aux Ant 11/12/13

Note：For Qualcomm Smart Transmitter mechanism is enabled for LTE/5G NR only.

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

$$SAR\_design\_target < SAR_{regulatory\_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$

SAR design Target :

Band	Antenna	Head DSI 1	Hotspot DSI 5	Body Worn DSI 4	Extremity DSI 2
LTE Band 7	Ant 0	0.78	0.13	0.78	1.63
LTE Band 7	Ant 3	0.87	0.35	0.87	1.83
LTE Band 12	Ant 0	0.87	0.87	0.87	1.83
LTE Band 17	Ant 0	0.87	0.87	0.87	1.83
LTE Band 13	Ant 0	0.87	0.87	0.87	1.83
LTE Band 2	Ant 3	0.87	0.79	0.87	1.83
LTE Band 25	Ant 3	0.87	0.79	0.87	1.83
LTE Band 5	Ant 0	0.87	0.87	0.87	1.83
LTE Band 26	Ant 0	0.87	0.87	0.87	1.83
LTE Band 4	Ant 0	0.04	0.78	0.78	1.63
LTE Band 4	Ant 3	0.87	0.81	0.87	1.83
LTE Band 66	Ant 0	0.04	0.78	0.78	1.63
LTE Band 66	Ant 3	0.87	0.81	0.87	1.83
LTE Band 38	Ant 0	0.05	0.78	0.78	1.63
LTE Band 38	Ant 3	0.87	0.43	0.87	1.83
LTE Band 41	Ant 0	0.05	0.78	0.78	1.63
LTE Band 41	Ant 3	0.87	0.43	0.87	1.83
LTE Band 42	Ant 12	0.01	0.69	0.69	1.45
LTE Band 48	Ant 12	0.00	0.22	0.69	1.45
FR1 n5	Ant 0	0.87	0.87	0.87	1.83
FR1 n7	Ant 0	0.78	0.27	0.78	1.63
FR1 n7	Ant 3	0.78	0.30	0.78	1.63
FR1 n66	Ant 0	0.78	0.78	0.78	1.63
FR1 n66	Ant 3	0.87	0.69	0.87	1.83
FR1 n38	Ant 0	0.78	0.13	0.78	1.63
FR1 n38	Ant 3	0.78	0.52	0.78	1.63
FR1 n41	Ant 0	0.78	0.13	0.78	1.63
FR1 n41	Ant 3	0.78	0.52	0.78	1.63
FR1 n77	Ant 12	0.69	0.61	0.69	1.45
FR1 n78 HPUE	Ant 12	0.69	0.54	0.69	1.45

Band	Antenna	Head DSI 1	Hotspot DSI 5	Body Worn DSI 4	Extremity DSI 3
LTE Band 7	Ant 4	0.54	0.17	0.78	1.63
LTE Band 7	Ant 5	0.60	0.23	0.06	1.63
LTE Band 7	Ant 7	0.17	0.36	0.14	1.63
LTE Band 12	Ant 1	0.39	0.42	0.24	1.63
LTE Band 17	Ant 1	0.39	0.42	0.24	1.63
LTE Band 13	Ant 1	0.40	0.47	0.78	1.63
LTE Band 2	Ant 4	0.44	0.20	0.78	1.63
LTE Band 25	Ant 4	0.44	0.20	0.78	1.63
LTE Band 5	Ant 1	0.27	0.42	0.78	1.63
LTE Band 26	Ant 1	0.27	0.42	0.78	1.63
LTE Band 4	Ant 4	0.45	0.15	0.78	1.63
LTE Band 4	Ant 5	0.67	0.24	0.11	1.63
LTE Band 66	Ant 4	0.45	0.15	0.78	1.63
LTE Band 66	Ant 5	0.67	0.24	0.11	1.63
LTE Band 38	Ant 4	0.38	0.12	0.78	1.63
LTE Band 38	Ant 5	0.34	0.18	0.05	1.63
LTE Band 41	Ant 4	0.38	0.12	0.78	1.63
LTE Band 41	Ant 5	0.34	0.18	0.05	1.63
LTE Band 42	Ant 10	0.66	0.33	0.78	1.63
LTE Band 42	Ant 11	0.69	0.69	0.69	1.45
LTE Band 42	Ant 13	0.69	0.25	0.25	1.45
LTE Band 48	Ant 10	0.74	0.41	0.78	1.63
LTE Band 48	Ant 11	0.28	0.16	0.69	1.45
LTE Band 48	Ant 13	0.69	0.36	0.69	1.45
FR1 n5	Ant 1	0.48	0.57	0.30	1.63
FR1 n7	Ant 4	0.49	0.30	0.87	1.83
FR1 n7	Ant 5	0.77	0.53	0.07	1.63
FR1 n66	Ant 4	0.51	0.25	0.87	1.83
FR1 n66	Ant 5	0.49	0.32	0.07	1.63
FR1 n38	Ant 4	0.87	0.29	0.87	1.83
FR1 n38	Ant 5	0.78	0.44	0.06	1.63
FR1 n41	Ant 4	0.87	0.29	0.87	1.83
FR1 n41	Ant 5	0.78	0.44	0.06	1.63
FR1 n77	Ant 10	0.56	0.30	0.78	1.63
FR1 n77	Ant 11	0.58	0.52	0.17	1.45
FR1 n77	Ant 13	0.69	0.28	0.69	1.45
FR1 n78 HPUE	Ant 10	0.65	0.34	0.78	1.63
FR1 n78 HPUE	Ant 11	0.59	0.66	0.25	1.45
FR1 n78 HPUE	Ant 13	0.69	0.35	0.69	1.45

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)> for LAT

Band	Antenna	Head DSI 1	Hotspot DSI 5	Body Worn Sensor Off DSI 4	Sensor On DSI 2	Pmax*
LTE Band 7	Ant 0	34.70	18.00	30.90	19.00	21.0
LTE Band 7	Ant 3	32.00	19.50	27.00	19.50	24.5
LTE Band 12	Ant 0	33.40	29.40	31.80	24.50	24.5
LTE Band 17	Ant 0	33.40	29.40	31.80	24.50	24.5
LTE Band 13	Ant 0	33.70	30.10	33.00	24.50	24.5
LTE Band 2	Ant 3	31.50	21.50	27.30	21.50	24.7
LTE Band 25	Ant 3	31.50	21.50	27.30	21.50	24.7
LTE Band 5	Ant 0	34.80	27.20	30.70	24.50	24.5
LTE Band 26	Ant 0	34.80	27.20	30.70	24.50	24.5
LTE Band 4	Ant 0	20.50	28.00	31.50	21.50	21.5
LTE Band 4	Ant 3	31.50	22.00	27.30	22.00	24.7
LTE Band 66	Ant 0	20.50	28.00	31.50	21.50	21.5
LTE Band 66	Ant 3	31.50	22.00	27.30	22.00	24.7
LTE Band 38	Ant 0	18.6	26.10	32.70	19.50	19.5
LTE Band 38	Ant 3	32.50	19.70	27.40	19.70	22.7
LTE Band 41	Ant 0	18.6	26.10	32.70	19.50	19.5
LTE Band 41	Ant 3	32.50	19.70	27.40	19.70	22.7
LTE Band 42	Ant 12	18.0	22.50	27.9	18.00	19.0
LTE Band 48	Ant 12	15.5	15.5	23.80	15.5	16.5
FR1 n5	Ant 0	31.80	28.20	30.60	24.50	24.5
FR1 n7	Ant 0	37.60	20.00	33.20	20.00	23.0
FR1 n7	Ant 3	31.50	18.50	29.40	18.50	22.5
FR1 n66	Ant 0	35.50	27.90	31.50	22.00	23.0
FR1 n66	Ant 3	29.50	22.00	28.90	22.00	23.0
FR1 n38	Ant 0	32.70	17.50	35.10	17.50	21.5
FR1 n38	Ant 3	30.30	17.50	28.70	17.50	22.5
FR1 n41	Ant 0	32.70	17.50	35.10	17.50	21.5
FR1 n41	Ant 3	30.30	18.50	28.70	18.50	22.5
FR1 n77	Ant 12	35.40	18.70	26.10	18.70	23.7
FR1 n78 PC2	Ant 12	37.70	18.00	27.30	18.00	25.0
FR1 n78 PC3	Ant 12	37.70	18.00	27.30	18.00	23.7

<Plimit for supported technologies and bands (Plimit in EFS file)> for UAT

Band	Antenna	Head DSI 1	Hotspot DSI 5	Body Worn Sensor Off DSI 4	Sensor On DSI 2	Pmax*
LTE Band 7	Ant 4	17.50	17.50	30.10	17.50	23.5
LTE Band 7	Ant 5	21.00	20.00	20.00	23.00	23.0
LTE Band 7	Ant 7	23.00	23.00	23.00	23.00	23.0
LTE Band 12	Ant 1	21.20	21.20	24.20	24.20	24.2
LTE Band 17	Ant 1	21.20	21.20	24.20	24.20	24.2
LTE Band 13	Ant 1	20.50	20.20	27.20	24.20	24.2
LTE Band 2	Ant 4	14.50	16.00	27.80	19.50	22.5
LTE Band 25	Ant 4	15.50	16.00	27.80	19.50	22.5
LTE Band 5	Ant 1	21.20	21.20	28.40	24.00	24.0
LTE Band 26	Ant 1	21.20	21.20	29.40	24.00	24.0
LTE Band 4	Ant 4	15.50	16.50	27.70	21.00	22.5
LTE Band 4	Ant 5	19.00	19.00	21.00	23.00	23.0
LTE Band 66	Ant 4	16.50	16.50	27.70	21.00	22.5
LTE Band 66	Ant 5	19.00	19.00	21.00	23.00	23.0
LTE Band 38	Ant 4	16.50	16.50	27.40	16.50	20.5
LTE Band 38	Ant 5	20.00	18.00	19.00	21.00	21.0
LTE Band 41	Ant 4	16.50	16.50	27.40	16.50	20.5
LTE Band 41	Ant 5	20.00	18.00	19.00	21.00	21.0
LTE Band 42	Ant 10	17.20	17.20	32.10	19.20	22.2
LTE Band 42	Ant 11	22.30	25.40	29.00	18.50	18.5
LTE Band 42	Ant 13	26.90	17.70	20.7	17.70	21.7
LTE Band 48	Ant 10	14.50	14.50	28.10	16.50	19.5
LTE Band 48	Ant 11	15.0	15.0	26.80	16.0	16.0
LTE Band 48	Ant 13	25.40	18.00	26.40	18.00	20.0
FR1 n5	Ant 1	21.20	21.20	22.20	24.20	24.2
FR1 n7	Ant 4	16.50	19.50	31.50	19.50	24.5
FR1 n7	Ant 5	20.50	20.50	20.50	21.50	21.5
FR1 n66	Ant 4	18.50	18.50	28.30	21.50	24.5
FR1 n66	Ant 5	17.50	17.50	19.50	20.50	20.5
FR1 n38	Ant 4	18.50	18.50	29.90	18.50	24.5
FR1 n38	Ant 5	25.40	21.50	21.50	23.00	23.0
FR1 n41	Ant 4	19.50	19.50	29.90	19.50	24.5
FR1 n41	Ant 5	26.40	21.50	21.50	23.00	23.0
FR1 n77	Ant 10	16.20	16.50	28.10	18.20	24.2
FR1 n77	Ant 11	21.70	21.70	21.70	23.70	23.7
FR1 n77	Ant 13	26.10	16.50	24.50	16.50	23.7
FR1 n78 PC2	Ant 10	16.50	16.50	26.80	19.50	25.5
FR1 n78 PC2	Ant 11	23.00	23.00	23.00	25.00	25.0
FR1 n78 PC2	Ant 13	29.30	17.20	25.20	17.20	25.0
FR1 n78 PC3	Ant 10	16.50	16.50	26.80	19.50	24.2
FR1 n78 PC3	Ant 11	23.00	23.00	23.00	25.00	23.7
FR1 n78 PC3	Ant 13	29.30	17.20	25.20	17.20	23.7

Note: 1) *Pmax is used for RF tune up procedure. The maximum allowed output power is equal to Pmax + Total uncertainty.

2) All Plimit 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).

3) The max allowed output power is the Plimit + Total uncertainty, and if Plimit is higher than Pmax, the device output power will be Pmax instead.

4) LTE Band 7 at Antenna 7 is only active When at CA mode.