

RF Exposure Report

(Part 0: SAR Char Evaluation)

APPLICANT : Guangdong OPPO Mobile Telecommunications Corp., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : OPPO
MODEL NAME : CPH2639
FCC ID : R9C-OP23302
STANDARD : FCC 47 CFR PART 2 (2.1093)

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB 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. (Shenzhen), the test report shall not be reproduced except in full.



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Table of Contents

1. Introduction	4
2. Product Description	5
3. SAR Characterization.....	6
3.1 SAR design target and uncertainty.....	6
3.2 SAR Char Table	7



History of this test report

Report No.	Version	Description	Issued Date
FA431509B	01	Initial issue of report	May 06, 2024



1. Introduction

The RF exposure limit is defined based on time-averaged RF exposure. The product implements MediaTek TA-SAR 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. TA-SAR 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 TA-SAR algorithm. Both SAR char will be entered via the MediaTek's NV suggestion to enable the TA-SAR 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 uncertainty.
SAR char	P_{limit} for all the technologies/bands for all applicable ECI



2. Product Description

Product Feature & Specification	
Equipment Name	Mobile PHONE
Brand Name	OPPO
Model Name	CPH2639
FCC ID	R9C-OP23302
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 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n26: 814 MHz ~ 849 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 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 ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is supported) LTE: QPSK, 16QAM, 64QAM 5G NR : CP-OFDM / DFT-s-OFDM, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac VHT20/VHT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 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 TA-SAR algorithm to control and manage RF exposure for $f < 6$ GHz.

3.1 SAR design target and uncertainty

SAR design Target:

Band	Antenna	Head (Standalone)	Head (Simultaneous)	Body Worn (Standalone)	Body Worn (Simultaneous & Hotspot)	Extremity (Standalone)	Extremity (Simultaneous)
		(ECI2)	(ECI4)	(ECI1)	(ECI3)	(ECI1)	(ECI3)
GSM850_SAR design target	Ant 0	0.91	0.75	0.91	0.60	2.27	1.44
GSM850_SAR design target	Ant 1	0.65	0.50	0.91	0.60	2.27	1.44
GSM1900_SAR design target	Ant 0	0.91	0.75	0.91	0.30	2.27	1.44
GSM1900_SAR design target	Ant 1	0.75	0.60	0.91	0.40	2.27	1.44
WCDMA II_SAR design target	Ant 0	0.91	0.75	0.30	0.40	2.27	1.44
WCDMA II_SAR design target	Ant 1	0.85	0.65	0.30	0.40	2.27	1.44
WCDMA IV_SAR design target	Ant 0	0.91	0.75	0.25	0.40	2.27	1.44
WCDMA IV_SAR design target	Ant 1	0.85	0.65	0.25	0.30	2.27	1.44
WCDMA V_SAR design target	Ant 0	0.91	0.75	0.91	0.60	2.27	1.44
WCDMA V_SAR design target	Ant 1	0.65	0.55	0.91	0.60	2.27	1.44
LTE Band 2_SAR design target	Ant 0	0.91	0.75	0.25	0.40	2.27	1.44
LTE Band 2_SAR design target	Ant 1	0.80	0.65	0.25	0.40	2.27	1.44
LTE Band 2_SAR design target	Ant 4	0.91	0.75	0.91	0.60	2.27	1.44
LTE Band 66/4_SAR design target	Ant 0	0.91	0.75	0.25	0.40	2.27	1.44
LTE Band 66/4_SAR design target	Ant 1	0.80	0.65	0.25	0.30	2.27	1.44
LTE Band 66/4_SAR design target	Ant 4	0.91	0.75	0.91	0.60	2.27	1.44
LTE Band 26/5_SAR design target	Ant 0	0.91	0.75	0.91	0.20	2.27	1.44
LTE Band 26/5_SAR design target	Ant 1	0.60	0.50	0.91	0.60	2.27	1.44
LTE Band 7_SAR design target	Ant 0	0.91	0.75	0.20	0.20	2.27	1.44
LTE Band 7_SAR design target	Ant 1	0.80	0.65	0.30	0.50	2.27	1.44
LTE Band 7_SAR design target	Ant 4	0.65	0.55	0.20	0.30	2.27	1.44
LTE Band 12/17_SAR design target	Ant 0	0.91	0.75	0.91	0.15	2.27	1.44
LTE Band 12/17_SAR design target	Ant 1	0.60	0.50	0.91	0.15	2.27	1.44
LTE Band 13_SAR design target	Ant 0	0.91	0.75	0.91	0.60	2.27	1.44
LTE Band 13_SAR design target	Ant 1	0.60	0.50	0.91	0.60	2.27	1.44
LTE Band 41/38 PC3_SAR design target	Ant 0	0.91	0.75	0.15	0.20	2.27	1.44
LTE Band 41/38 PC3_SAR design target	Ant 1	0.85	0.70	0.25	0.50	2.27	1.44
LTE Band 41/38 PC3_SAR design target	Ant 4	0.91	0.50	0.20	0.30	2.27	1.44
FR1 n26/5_SAR design target	Ant 0	0.91	0.75	0.91	0.20	2.27	1.44
FR1 n26/5_SAR design target	Ant 1	0.60	0.50	0.91	0.60	2.27	1.44
FR1 n7_SAR design target	Ant 0	0.91	0.75	0.20	0.20	2.27	1.44
FR1 n7_SAR design target	Ant 1	0.80	0.65	0.25	0.60	2.27	1.44
FR1 n7_SAR design target	Ant 4	0.65	0.50	0.25	0.40	2.27	1.44
FR1 n66_SAR design target	Ant 0	0.91	0.75	0.25	0.30	2.27	1.44
FR1 n66_SAR design target	Ant 1	0.70	0.60	0.25	0.30	2.27	1.44
FR1 n66_SAR design target	Ant 4	0.91	0.75	0.91	0.60	2.27	1.44
FR1 n41/38_SAR design target	Ant 0	0.91	0.75	0.20	0.30	2.27	1.44
FR1 n41/38_SAR design target	Ant 1	0.70	0.60	0.30	0.60	0.90	0.70
FR1 n41/38_SAR design target	Ant 4	0.70	0.60	0.30	0.40	2.27	1.44

Uncertainty:

tem	Uncertainty dB (k=2)
Total uncertainty	1.2

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 TA-SAR algorithm to control and manage RF exposure for f < 6 GHz.

<P_{limit} for supported technologies and bands>

Band	Antenna	Head (Standalone)	Head (Simultaneous)	Body Worn (Standalone)	Body Worn (Simultaneous & Hotspot)	Extremity (Standalone)	Extremity (Simultaneous)	P _{max} *
		(ECI2)	(ECI4)	(ECI1)	(ECI3)	(ECI1)	(ECI3)	
GSM850	Ant 0	31.80	30.80	23.8	23.8	23.8	23.8	23.8
GSM850	Ant 1	20.80	19.80	23.8	23.8	23.8	23.8	23.8
GSM1900	Ant 0	33.10	32.10	20.8	19.30	20.8	19.30	20.8
GSM1900	Ant 1	16.80	15.80	20.8	18.30	20.8	18.30	20.8
WCDMA II	Ant 0	32.20	31.20	22.10	19.60	22.10	19.60	23.6
WCDMA II	Ant 1	16.60	15.60	21.10	18.60	21.10	18.60	23.6
WCDMA IV	Ant 0	33.80	32.80	21.60	19.10	21.60	19.10	23.6
WCDMA IV	Ant 1	17.60	16.60	20.60	18.10	20.60	18.10	23.6
WCDMA V	Ant 0	31.90	30.90	23.6	23.6	23.6	23.6	23.6
WCDMA V	Ant 1	20.10	19.10	23.6	23.6	23.6	23.6	23.6
LTE Band 2	Ant 0	32.40	31.40	21.60	19.10	21.60	19.10	22.6
LTE Band 2	Ant 1	16.60	15.60	20.60	18.10	20.60	18.10	22.6
LTE Band 2(ENDC Only)	Ant 4	27.30	26.30	22.1	22.1	22.1	22.1	22.1
LTE Band 66/4	Ant 0	34.10	33.10	21.60	19.10	21.60	19.10	23.6
LTE Band 66/4	Ant 1	17.60	16.60	21.10	18.60	21.10	18.60	23.6
LTE Band 66/4	Ant 4	36.20	35.20	23.1	23.1	23.1	23.1	23.1
LTE Band 26/5	Ant 0	32.60	31.60	23.6	22.60	23.6	22.60	23.6
LTE Band 26/5	Ant 1	19.60	18.60	23.6	23.6	23.6	23.6	23.6
LTE Band 7	Ant 0	28.70	27.70	21.10	18.60	21.10	18.60	23.6
LTE Band 7	Ant 1	13.10	12.10	16.60	14.10	16.60	14.10	23.6
LTE Band 7	Ant 4	21.90	20.90	20.40	17.90	20.40	17.90	22.9
LTE Band 12/17	Ant 0	33.80	32.80	23.6	22.60	23.6	22.60	23.6
LTE Band 12/17	Ant 1	21.60	20.60	23.6	23.10	23.6	23.10	23.6
LTE Band 13	Ant 0	32.40	31.40	23.6	23.6	23.6	23.6	23.6
LTE Band 13	Ant 1	21.60	20.60	23.6	23.6	23.6	23.6	23.6
LTE Band 41/38 PC3	Ant 0	28.20	27.20	22.60	20.10	22.60	20.10	23.6
LTE Band 41/38 PC3	Ant 1	13.60	12.60	16.60	14.10	16.60	14.10	21.6
LTE Band 41/38 PC3	Ant 4	23.60	20.40	20.40	18.40	20.40	18.40	20.9
FR1 n26/5	Ant 0	33.60	32.60	24.0	23.50	24.0	23.50	24.0
FR1 n26/5	Ant 1	20.50	19.50	24.0	24.0	24.0	24.0	24.0
FR1 n7	Ant 0	28.40	27.40	21.50	19.00	21.50	19.00	24.0
FR1 n7	Ant 1	13.50	12.50	16.50	14.00	16.50	14.00	24.0
FR1 n7	Ant 4	21.80	20.80	20.80	18.30	20.80	18.30	23.3
FR1 n66	Ant 0	33.20	32.20	22.00	20.00	22.00	20.00	24.0
FR1 n66	Ant 1	18.00	17.00	21.50	19.00	21.50	19.00	24.0
FR1 n66	Ant 4	36.60	35.60	23.3	23.3	23.3	23.3	23.3
FR1 n41/38	Ant 0	27.60	26.60	21.00	19.00	21.00	19.00	24.0
FR1 n41/38	Ant 1	13.50	12.50	17.00	14.50	17.00	14.50	24.0
FR1 n41/38	Ant 4	21.30	20.30	20.80	18.30	20.80	18.30	23.3



- Note: 1) *P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to P_{max} + total uncertainty.
- 2) 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).
- 3) The max allowed output power is the P_{limit} + total uncertainty, and if P_{limit} is higher than P_{max}, the device output power will be P_{max} instead.
- 4) The following table is duty cycle and factor used for calculating time average power.

GSM/FDD/TDD	Duty Cycle	Time average calculation factor(dB)
GSM 1TX	12.50%	-9.0
GSM 2TX	25%	-6.0
GSM 3TX	37.50%	-4.3
GSM 4TX	50%	-3.0
FDD LTE	100%	0.0
TDD LTE	63.30%	-2.0
NR FDD/TDD	100%	0.0