



# **PART 0 SAR CHAR REPORT**

**No. I23N01711-SAR**

**For**

**Realme Chongqing Mobile Telecommunications Corp., Ltd.**

**Mobile Phone**

**Model Name: RMX3840**

**With**

**Hardware Version: 11**

**Software Version: realme UI 5.0**

**FCC ID: 2AUYFRMX3840**

**Issued Date: 2023-12-15**

**Designation Number: CN1210**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

**SAICT, Shenzhen Academy of Information and Communications Technology**

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn. www.saict.ac.cn



**REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I23N01711-SAR	Rev.0	1st edition	2023-12-15



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## 1. Summary of Test Report

### 1.1. Test Items

Description: Mobile Phone  
Model Name: RMX3840  
Applicant's Name: Realme Chongqing Mobile Telecommunications Corp., Ltd.  
Manufacturer's Name: Realme Chongqing Mobile Telecommunications Corp., Ltd.

### 1.2. Test Standards

ANSI C95.1:1992, IEEE 1528:2013

### 1.3. Test Result

Pass.

### 1.4. Testing Location

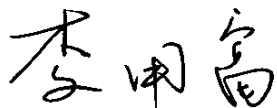
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

### 1.5. Project Data

Testing Start Date: 2023-11-12

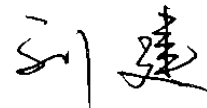
Testing End Date: 2023-12-11

### 1.6. Signature



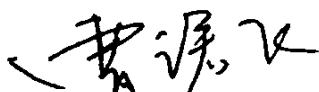
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Li Yongfu  
(Prepared this test report)



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Liu Jian  
(Reviewed this test report)



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Cao Junfei  
(Approved this test report)



## 2. Introduction

The equipment under test (EUT) is a smart phone. It contains the Qualcomm modem supporting 2G/3G/4G technologies and 5G NR Sub-6 GHz technologies. These modems enable Qualcomm Smart Transmit feature to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is in compliance with the FCC requirement.

In the Part 0 report, the EUT SAR are characterized for WWAN radios (2G/3G/4G/Sub6 NR) to determine the power limit that corresponds to the exposure design target after accounting for all device design related uncertainties, i.e., SAR\_design\_target (< FCC SAR limit) for sub-6. The SAR characterization are denoted as SAR Char. SAR Char will be used as input for Qualcomm Smart Transmit to operate. SAR Char will be loaded and store in the EUT via the Embedded File System (EFS).

The compliance test under the static transmission scenario and simultaneous transmission analysis are reported in Part 1 report. The validation of the time-averaging algorithm and compliance under the dynamic (time- varying) transmission scenario for WWAN technologies are reported in Part 2 report.

The EUT supports WLAN/BT radio as well but WLAN/BT modem is not enabled with Smart Transmit.

Nomenclature for Part 0 Report

Term	Description
$P_{limit}$	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

### 3. Equipment under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Description:	Mobile Phone
Model Name:	RMX3840
Condition of EUT as received:	No obvious damage in appearance
Frequency Bands:	GSM 850/1900, WCDMA Band 2/4/5, LTE Band 2/4/5/7/12/13/17/26/38/41/66, NR n5/n7/n38/n41/n66, Bluetooth, WLAN 2.4GHz/5GHz
Tested Tx Frequency:	824 – 849MHz (GSM 850)
	1850 – 1910MHz (GSM 1900)
	1850 – 1910MHz (WCDMA Band 2)
	1710 – 1755MHz (WCDMA Band 4)
	824 – 849MHz (WCDMA Band 5)
	1850 – 1910MHz (LTE Band 2)
	1710 – 1755MHz (LTE Band 4)
	824 – 849MHz (LTE Band 5)
	2500 – 2570MHz (LTE Band 7)
	699 – 716MHz (LTE Band 12)
	777 – 787MHz (LTE Band 13)
	704 – 716MHz (LTE Band 17)
	814 – 849MHz (LTE Band 26)
	2570 – 2620MHz (LTE Band 38)
	2496 – 2680MHz (LTE Band 41)
	1710 – 1780MHz (LTE Band 66)
	824 – 849MHz (NR n5)
	2500 – 2570MHz (NR n7)
	2570 – 2620MHz (NR n38)
	2496 – 2680MHz (NR n41)
1710 – 1780MHz (NR n66)	
2402 – 2480MHz (Bluetooth)	
2412 – 2462MHz (WLAN 2.4GHz)	
5150 – 5850MHz (WLAN 5GHz)	
GPRS / EDGE Multislot Class:	12
GPRS Capability Class:	B
Dual Transfer Mode (DTM)	Not support
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support
Product Dimensions:	Long 171.61mm;Wide 74.16mm;Overall Diagonal 174.00mm



## 4. SAR Characterization

### 4.1. DSI and SAR Determination

This device uses different Device State Index (DSI) to configure different time averaged power levels based on certain exposure scenarios. Depending on the detection scheme implemented in the smartphone, the worst-case SAR is further grouped and determined for each or combined exposure scenario

**DSI and Corresponding Exposure Scenarios**

Scenario	Description
DSI 2	FCC Head (Standalone)
DSI 1	FCC Body (Standalone)
DSI 4	FCC Head (WWAN + WLAN 2.4GHz/WLAN 5GHz/BT)
DSI 3	FCC Body (WWAN + WLAN 2.4GHz/WLAN 5GHz/BT)
DSI 6	FCC Head (WWAN + WLAN 2.4GHz + BT, WWAN + WLAN 5GHz + BT, WWAN + WLAN 2.4GHz + WLAN 5GHz, WWAN + WLAN 2.4GHz + WLAN 5GHz+ BT)
DSI 5	FCC Body (WWAN + WLAN 2.4GHz + BT, WWAN + WLAN 5GHz + BT, WWAN + WLAN 2.4GHz + WLAN 5GHz, WWAN + WLAN 2.4GHz + WLAN 5GHz+ BT)

#### 4.2. SAR Design Target and Uncertainty

SAR\_design\_target is determined by ensuring that it is less than FCC SAR limit after accounting for total device designed related uncertainties specified by the manufacturer.

To account for total uncertainty, SAR\_design\_target should be determined as:

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

Exposure conditions	DSI	SAR design target W/kg(1g)	Remark
stand-alone	1/2	1.2	/

Total uncertainty	Uncertainty dB 2/3/4G	Uncertainty dB NR
	1.0	1.2





### 4.3. SAR Char

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating.  $P_{limit}$  is calculated by linearly scaling with the measured SAR at the Ppart0 to correspond to the SAR\_design\_target. When  $P_{limit} < P_{max}$ ,  $P_{part0}$  was used as  $P_{limit}$  in the Smart Transmit EFS. When  $P_{limit} > P_{max}$  and  $P_{part0} = P_{max}$ , calculated  $P_{max}$  was used in the Smart Transmit EFS. All reported SAR obtained from the Ppart0 SAR tests was less than SAR\_Design\_target + device uncertainty.

Band	Antenna	FCC Body	FCC Head	WWAN+WIFI2.4G Body/ WWAN+WIFI5G Body/ WWAN+BT Body	WWAN+WIFI2.4G Head/ WWAN+WIFI5G Head/ WWAN+BT Head	WWAN+WIFI2.4G+BT Body/ WWAN+WIFI5G+BT Body/ WWAN+WIFI2.4G+WIFI5G Body/ WWAN+WIFI2.4G+WIFI5G+BT Body	WWAN+WIFI2.4G+BT Head/ WWAN+WIFI5G+BT Head/ WWAN+WIFI2.4G+WIFI5G Head/ WWAN+WIFI2.4G+WIFI5G+BT Head	Pmax*
		DSI 1	DSI 2	DSI 3	DSI 4	DSI 5	DSI 6	
G850	0	33.5	33.5	33.5	33.5	33.5	33.5	33.5
G1900	4	30.5	30.5	29.9	30.5	29.9	30.5	30.5
WB2	4	23.3	24.5	22.1	24.5	22.1	24.5	24.5
	1	21.9	18.1	20.7	17.1	20.7	17.1	23.9
WB4	4	23.7	24.5	22.5	24.5	22.5	24.5	24.5
	1	23.5	19.0	22.1	18.0	22.1	18.0	23.9
WB5	0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
	1	24.8	24.8	24.8	24.8	24.8	24.8	24.8
LTE B2	4	23.1	23.5	21.9	23.5	21.9	23.5	23.5
	1	22.3	17.7	21.1	16.7	21.1	16.7	22.9
LTE B4	4	22.7	23.5	21.5	23.5	21.5	23.5	23.5
	1	22.9	18.9	21.7	17.9	21.7	17.9	22.9
	5	21.7	20.5	20.7	19.5	20.7	19.5	21.7
LTE B5	0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	1	24.3	24.3	24.3	24.3	24.3	24.3	24.3
LTE B7	4	21.3	23.5	20.1	23.5	20.1	23.5	23.5
	1	22.9	17.3	21.7	16.3	21.7	16.3	22.9
	5	21.2	20.0	21.2	19.0	21.2	19.0	21.2
LTE B12	0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	1	24.3	24.3	24.3	24.3	24.3	24.3	24.3
LTE B13	0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	1	24.3	24.3	24.3	24.3	24.3	24.3	24.3
LTE B17	0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	1	24.3	24.3	24.3	24.3	24.3	24.3	24.3
LTE B26	0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	1	24.3	24.3	24.3	24.3	24.3	24.3	24.3
LTE B38	4	23.0	24.0	21.8	24.0	21.8	24.0	24.0
	1	22.6	19.8	21.4	18.8	21.4	18.8	23.4
	5	21.7	21.7	21.7	19.2	21.7	19.2	21.7
LTE B41	4	23.1	24.5	21.7	24.5	21.7	24.5	24.5
	1	22.3	19.7	20.9	18.7	20.9	18.7	23.9
	5	22.2	21.7	22.2	18.7	22.2	18.7	22.2
LTE B66	4	23.4	24.0	22.4	24.0	22.4	24.0	24.0
	1	22.8	18.5	21.8	17.5	21.8	17.5	23.4
	5	22.1	19.3	20.9	18.3	20.9	18.3	22.1
N5	0	24.2	24.2	24.2	24.2	24.2	24.2	24.2
	1	24.0	24.0	24.0	24.0	24.0	24.0	24.0
N7	4	21.1	23.7	19.7	23.7	19.7	23.7	23.7
	1	22.7	17.9	21.7	16.9	21.7	16.9	23.1
	5	21.4	19.4	21.0	16.4	21.0	16.4	21.4
N38	4	21.0	24.2	19.7	24.2	19.7	24.2	24.2
	1	20.6	17.4	19.4	16.4	19.4	16.4	23.6
	5	21.9	20.1	21.9	19.1	21.9	19.1	21.9
N41	4	20.6	24.2	19.2	24.2	19.2	24.2	24.2
	1	19.6	17.6	18.4	16.6	18.4	16.6	23.6
	5	21.5	19.7	20.1	18.7	20.1	18.7	21.9
N66	4	22.2	24.2	21.0	24.2	21.0	24.2	24.2
	1	22.6	18.1	21.2	17.1	21.2	17.1	23.6
	5	21.8	20.6	20.6	19.6	20.6	19.6	23.4

**Note:**

1. When  $P_{max} < P_{limit}$ , the DUT will operate at a power level up to  $P_{max}$ .
2.  $P_{max}$  is used for RF tune up procedure. The maximum allowed output power is equal to  $P_{max}$  + device uncertainty.

## 5. Measurement Uncertainty

### 5.1. Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
<b>Measurement system</b>										
1	Probe calibration	B	12.7	N	2	1	1	6.35	6.35	∞
2	Axial isotropy	B	4.7	R	√3	√0.5	√0.5	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	√3	1	1	4.8	4.8	∞
4	Boundary effect	B	1.1	R	√3	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	√3	1	1	0.6	0.6	∞
7	Modulation response	B	4.0	R	√3	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
10	Integration time	B	1.7	R	√3	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	√3	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	√3	1	1	1.7	1.7	∞
13	Probe positioned mech. restrictions	B	0.35	R	√3	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
15	Post-processing	B	1.0	R	√3	1	1	0.6	0.6	∞
<b>Test sample related</b>										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Power scaling	B	0	R	√3	1	1	0	0	∞
19	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
<b>Phantom and set-up</b>										
20	Phantom uncertainty	B	1.0	R	√3	1	1	0.6	0.6	∞
21	Algorithm for correcting SAR for deviations in permittivity and conductivity	B	1.9	N	1	1	0.84	1.9	1.6	∞
22	Liquid conductivity (target)	B	5.0	R	√3	0.64	0.43	1.8	1.2	∞
23	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	9
24	Liquid permittivity (target)	B	5.0	R	√3	0.6	0.49	1.7	1.4	∞
25	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	9
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{23} c_i^2 u_i^2}$						11.6	11.4	95.5
Expanded uncertainty (Confidence interval of 95 %)		$u_e = 2u_c$						23.2	22.8	

**5.2. Measurement Uncertainty for Normal SAR Tests (3GHz~6GHz)**

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
<b>Measurement system</b>										
1	Probe calibration	B	13.9	N	2	1	1	6.95	6.95	∞
2	Axial isotropy	B	4.7	R	√3	√0.5	√0.5	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	√3	1	1	4.8	4.8	∞
4	Boundary effect	B	1.1	R	√3	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	√3	1	1	0.6	0.6	∞
7	modulation response	B	4.0	R	√3	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.0	R	√3	1	1	0.0	0.0	∞
10	Integration time	B	1.7	R	√3	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	√3	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	√3	1	1	1.7	1.7	∞
13	Probe positioned mech. Restrictions	B	0.35	R	√3	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
15	Post-processing	B	1.0	R	√3	1	1	0.6	0.6	∞
<b>Test sample related</b>										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Power scaling	B	0	R	√3	1	1	0	0	∞
19	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
<b>Phantom and set-up</b>										
20	Phantom uncertainty	B	1.0	R	√3	1	1	0.6	0.6	∞
21	Algorithm for correcting SAR for deviations in permittivity and conductivity	B	1.9	N	1	1	0.84	1.9	1.6	∞
22	Liquid conductivity (target)	B	5.0	R	√3	0.64	0.43	1.8	1.2	∞
23	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	9
24	Liquid permittivity (target)	B	5.0	R	√3	0.6	0.49	1.7	1.4	∞
25	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	9
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						11.9	11.8	95.5
Expanded uncertainty (Confidence interval of 95 %)		$u_e = 2u_c$						23.8	23.6	

\*\*\*END OF REPORT\*\*\*