PART 0 SAR CHAR REPORT

No. 23T04Z80206-09

For

OnePlus Technology (Shenzhen) Co., Ltd.

Mobile Phone

Model Name: CPH2611

with

Hardware Version: 11

Software Version: OxygenOS V14.0

FCC ID: 2ABZ2-AA560

Issued Date: 2023-11-21

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 CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
23T04Z80206-09	Rev.0	2023-11-21	Initial creation of test report

TABLE OF CONTENT

1 Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

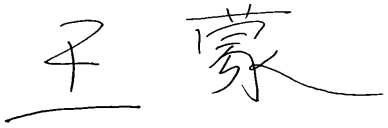
1.3. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%

1.4. Project data

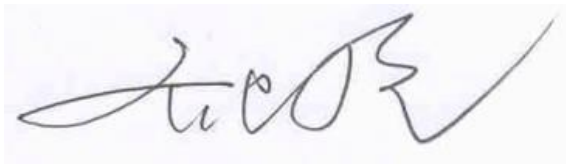
Testing Start Date:	2023-9-29
Testing End Date:	2023-11-19

1.5. Signature



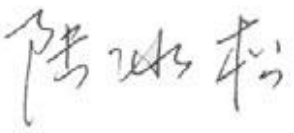
Wang Meng

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(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) Overview

Description:	Mobile Phone	
Model name:	CPH2611	
Operating mode(s):	GSM850/900/18001900, WCDMA B1/2/4/5/8 LTE Band FDD:1/2/3/4/5/7/8/12/13/17/18/19/20/25/26/28/30/66/71 LTE Band TDD:38/39/40/41/48 5G NR N1/2/3/5/7/20/25/28/38/40/41/66/71/77/78 BT, Wi-Fi(2.4G), Wi-Fi(5G), Wi-Fi(6E),NFC	
Tx Frequency:	824 – 849 MHz (GSM 850)	
	1850 – 1910 MHz (GSM 1900)	
	824–849 MHz (WCDMA 850 Band V)	
	1710 – 1755 MHz (WCDMA 1700 Band IV)	
	1850–1910 MHz (WCDMA1900 Band II)	
	1850 – 1910 MHz(LTE Band 2)	
	1710 – 1755 MHz (LTE Band 4)	
	824 – 849 MHz (LTE Band 5)	
	2500 – 2570 MHz(LTE Band 7)	
	699 – 716 MHz (LTE Band 12)	
	777 –787 MHz (LTE Band 13)	
	704 –716 MHz (LTE Band 17)	
	1850 – 1915 MHz(LTE Band 25)	
	814 – 849 MHz (LTE Band 26)	
	2305 – 2315 MHz (LTE Band 30)	
	2570 – 2620 MHz (LTE Band 38)	
	2496 – 2690 MHz (LTE Band 41)	
	1710 – 1780 MHz (LTE Band 66)	
	663 – 698 MHz (LTE Band 71)	
	2412 – 2462 MHz (Wi-Fi 2.4G)	
	5180 – 5240 MHz	(Wi-Fi 5G)
	5260 – 5320 MHz	
	5500 – 5700 MHz	
	5745 – 5825 MHz	
	5925 – 6425 MHz	(Wi-Fi 6E)
	6425 – 6525 MHz	
	6525 – 6875 MHz	
	6875 – 7125 MHz	
	2400 – 2483.5 MHz (Bluetooth)	
	1850 – 1910 MHz(n2)	
	824 – 849 MHz(n5)	
	2500 – 2570 MHz (n7)	
	1850 – 1915 MHz(n25)	
	2570 – 2620 MHz (n38)	
	2496 – 2690 MHz (n41)	
	1710– 1780 MHz (n66)	
	663 – 698 MHz (n71)	
	3450 – 3550 MHz (n77L)	
	3700 – 3980 MHz (n77H)	
	3450 – 3550 MHz (n78L)	
	3700 – 3800 MHz (n78H)	

	13.56 MHz (NFC)
GPRS/EGPRS Multislot Class:	33
Test device production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support

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
DSI4	FCC Body
DSI5	FCC Head
DSI9	WWAN+WIFI2.4G Body/ WWAN+WIFI5G Body/ WWAN+WIFI6E Body/ WWAN+BT Body
DSI10	WWAN+WIFI2.4G Head/ WWAN+WIFI5G Head/ WWAN+WIFI6E Head/ WWAN+BT Head
DSI14	WWAN+WIFI2.4G+BT Body/WWAN+WIFI5G+BT Body/ WWAN+WIFI6E+BT Body/WWAN+WIFI2.4G+WIFI5G Body/ WWAN+WIFI2.4G+WIFI6E Body/WWAN+WIFI2.4G+WIFI5G+BT Body/ WWAN+WIFI2.4G+WIFI6E+BT Body
DSI15	WWAN+WIFI2.4G+BT Head/WWAN+WIFI5G+BT Head/ WWAN+WIFI6E+BT Head/WWAN+WIFI2.4G+WIFI5G Head/ WWAN+WIFI2.4G+WIFI6E Head/WWAN+WIFI2.4G+WIFI5G+BT Head/ WWAN+WIFI2.4G+WIFI6E+BT Head

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	4/5	1.2	/
simultaneous transmission(Body)	9/14	0.7	/
simultaneous transmission(Head)	10/15	0.8	/

Total uncertainty	Uncertainty dB 2G	Uncertainty dB 3/4G	Uncertainty dB NR
	1	**0.8**	**1.2**

4.2 SAR Char

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating. Plimit is calculated by linearly scaling with the measured SAR at the Ppart0 to correspond to the SAR_design_target. When Plimit < Pmax, Ppart0 was used as Plimit in the Smart Transmit EFS. When Plimit >Pmax and Ppart0=Pmax, calculated Pmax 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+WIFI6E Body/ WWAN+BT Body	WWAN+WIFI2.4G Head/ WWAN+WIFI5G Head/ WWAN+WIFI6E Head/ WWAN+BT Head	WWAN+WIFI2.4G+BT Body/ WWAN+WIFI5G+BT Body/ WWAN+WIFI6E+BT Body/ WWAN+WIFI2.4G+WIFI5G Body/ WWAN+WIFI2.4G+WIFI6E Body/ WWAN+WIFI2.4G+WIFI5G+BT Body/ WWAN+WIFI2.4G+WIFI6E+BT Body	WWAN+WIFI2.4G+BT Head/ WWAN+WIFI5G+BT Head/ WWAN+WIFI6E+BT Head/ WWAN+WIFI2.4G+WIFI5G Head/ WWAN+WIFI2.4G+WIFI6E Head/ WWAN+WIFI2.4G+WIFI5G+BT Head/ WWAN+WIFI2.4G+WIFI6E+BT Head	Pmax*
		DSI 4	DSI 5	DSI 9	DSI 10	DSI 14	DSI 15	
G850	1	33	33	33	33	32	32	33
G1900	5	29.5	29.5	26.5	26.5	26	26.5	30
WB2	5	20.5	20.5	18	18	18	18	24
	6	21	18	18.5	18	18.5	18	23.5
WB4	5	21	21	18.5	18.5	18.5	18.5	24
	6	21	19	18.5	17.5	18.5	16.5	23.5
WB5	0	23.5	23.5	22.5	22	22.5	21	23.5
	1	24.2	24.2	22.7	22.7	22.7	22.7	24.2
LTE B2	0	20.5	18	17.5	17	17.5	16	22
	5	20.2	20.2	18.2	18.2	18.2	18.2	24.2
	6	20.5	18	18	17	18	16	23.5
	7	21	21.5	18.5	20	18.5	19	23
LTE B4	0	17.5	20	15	19	15	18	22
	5	21.2	22.2	18.7	19.7	18.7	19.7	24.2
	6	22	19	19	17.5	19	16.5	23.5
	7	22	21	19.5	19.5	19.5	18.5	24
LTE B5	0	23.5	22.5	21.5	20.5	21.5	19.5	23.5
	1	24.2	24.2	21.2	21.2	21.2	21.2	24.2
LTE B7	0	22.5	20	22.5	20	22.5	20	23
	2	23	22	20.5	19.5	20	19	23.5
LTE B12	0	23.5	23.5	23	22.5	23	21.5	23.5
	1	24.2	24.2	24.2	24.2	24.2	24.2	24.2
LTE B13	0	23.5	22	21.5	21	21.5	20	23.5
	1	24.2	24.2	23.7	23.7	23.7	23.7	24.2
LTE B17	0	23.5	23.5	23	22.5	23	21.5	23.5
	1	24.2	24.2	24.2	24.2	24.2	24.2	24.2
LTE B25	0	20.5	18	17.5	17	17.5	16	22
	5	20.2	20.2	18.2	18.2	18.2	18.2	24.2
	6	20.5	18	18	17	18	16	23.5
	7	21.2	21.7	18.7	20.2	18.7	19.2	23.2
LTE B26	0	23.5	22.5	21.5	20.5	21.5	19.5	23.5
	1	24.2	24.2	22.2	22.2	22.2	22.2	24.2
LTE 30	0	21.8	21.8	21.8	20.3	21.8	20.3	21.8
	2	23.5	23.5	21	21	21	21	23.5
	5	21.2	21.2	18.2	18.2	18.2	18.2	24.2
	6	20.1	20.1	17.1	18.6	17.1	17.6	23.6
LTE B38	0	21.5	21	19.5	19.5	19.5	18.5	23
	2	21	19	19	17.5	19	16.5	23.5
	5	20.7	20.7	18.2	18.2	18.2	18.2	24.2
	6	21.5	19	19	17	19	15.5	24
LTE B41-PC2	0	23.1	22.6	20.6	21.6	20.6	20.6	24.5
	2	21.1	20.6	19.1	19.1	19.1	18.1	25
	5	21.1	21.1	19.1	19.1	19.1	19.1	25.5
	6	23.6	21.6	21.6	21.6	21.6	21.1	25
LTE B41-PC3	0	21.7	21.2	19.2	20.2	19.2	19.2	23.7
	2	19.7	19.2	17.7	17.7	17.7	16.7	24.2
	5	19.5	19.5	17.5	17.5	17.5	17.5	24
	6	22	20	20	20	20	19.5	23.5
LTE B48	6	20.2	19.2	20.2	17.7	20.2	16.7	20.2
	8	23.5	18	21	16.5	20.5	15.5	24
	10	20.2	19.7	18.2	18.7	18.2	17.7	20.2
	12	24.2	17.2	22.2	15.2	22.2	14.7	24.2
LTE B66	0	18	20	16	19	16	18	22
	5	21.2	22.2	18.7	19.7	18.7	19.7	24.2
	6	22	19	19	17.5	19	16.5	23.5
	7	22.6	21.1	20.1	19.6	20.1	18.6	23.6
LTE B71	0	22.5	22	20	21	20	20	23.5
	1	24.2	24.2	24.2	24.2	24.2	24.2	24.2
N2	0	19.5	19.5	17	18.5	17	17	22
	5	20	20	17.5	17.5	17.5	17.5	24
	6	22	17.5	19	16.5	19	15	23.5
	7	21.2	20.7	18.7	19.7	18.7	18.7	23.2
N5	0	23.2	22.7	21.2	21.2	21.2	20.2	23.2
	1	23.5	23.5	20.5	20.5	20.5	20.5	24
N7	0	21	21	21	19.5	21	19.5	23
	2	22	22	19.5	19.5	19.5	19.5	23.5
N25	0	20	19	17.5	17.5	17.5	15	22
	5	19.5	19.5	17.5	17.5	17.5	17.5	24
	6	19	17.5	19	16	19	15	23.5
	7	21.2	21.2	19.2	20.2	19.2	19.2	23.2
N38	0	22.5	20.5	22.5	19	22.5	19	23
	2	23	23	20.5	20.5	20.5	20.5	23.5
	5	21.5	22.5	19	20	19	20	24
	6	19.7	16.7	18.2	15.7	18.2	14.2	23.2
N41-PC2	0	20.5	19	20.5	19	20.5	19	24.5
	2	22	22	19.5	19.5	19.5	19.5	25
	5	19.5	25.5	19.5	25.5	19.5	25.5	25.5
	6	19	15	18	15	18	14	25
N41-PC3	0	20.5	19	20.5	19	20.5	19	23
	2	22	22	19.5	19.5	19.5	19.5	23.5
	5	19.5	24	19.5	24	19.5	24	24
	6	18.7	14.7	17.7	14.7	17.7	13.7	23.2
N66	0	20.5	19.5	18	18	18	17	22
	5	19.5	19.5	17	17	17	17	24
	6	22	18.5	19.5	17	19.5	16	23.5
	7	21.7	21.2	18.7	20.2	18.7	18.7	23.2
N71	0	23.2	22.7	21.2	21.2	21.2	20.2	23.2
	1	24	24	23.5	23.5	23.5	23.5	24
N77-PC2	6	20.8	16.3	20.8	14.8	20.8	13.8	20.8
	8	22.2	19.2	19.7	17.7	19.7	16.7	24.2
	10	18.8	17.8	18.8	16.3	18.8	14.8	20.8
	12	19.5	13	16.5	11	16.5	10.5	25
N77-PC3	6	19.8	16.3	19.8	14.8	19.8	13.8	19.8
	8	22.2	19.2	19.7	17.7	19.7	16.7	23.2
	10	18.8	17.8	18.8	16.3	18.8	14.8	19.8
	12	19.5	13	16.5	11	16.5	10.5	24
N78-PC2	6	22	16	21.5	16	21.5	16	22
	8	21.5	18	19	17	19	16	26
	10	21	18	18.5	18	18.5	17.5	22
	12	19.5	13.5	16.5	11.5	16.5	10.5	26
N78-PC3	6	20	16	20	16	20	16	20
	8	21.5	18	19	17	19	16	24
	10	20	18	18.5	18	18.5	17.5	20
	12	19.5	13.5	16.5	11.5	16.5	10.5	24

Note:

1 When Pmax <Plimit, the DUT will operate at a power level up to Pmax.

2 Pmax is used for RF tune up procedure. The maximum allowed output power is equal to Pmax + device uncertainty.

5 Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

Therefore, the measurement uncertainty is not required.