PART 0 SAR CHAR REPORT

No. I21Z60790-SEM01

For

Honor Device Co., Ltd.

Smart Phone

Model Name: NTH-NX9

with

Hardware Version: HN2NTHM

Software Version: 4.2.0.107（C900E107R1P2）

FCC ID: 2AYGCNTH-NX9

Issued Date: 2021-9-9

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:

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I21Z60790-SEM01	Rev.0	2021-8-8	Initial creation of test report
I21Z60790-SEM01	Rev.1	2021-9-9	Update the information in section4.2 on page9

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1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL(Shouxiang)
Address:	No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

1.2 Testing Environment

Temperature:	18°C~25°C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

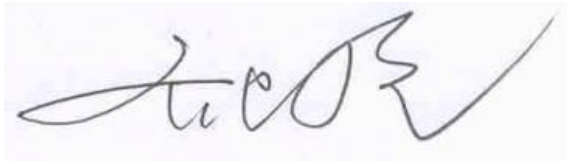
1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	May17, 2021
Testing End Date:	August 5, 2021

1.4 Signature

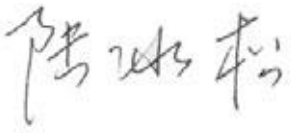
Lin Xiaojun

(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:	Smart Phone
Model name:	NTH-NX9
Operating mode(s):	GSM850/1900, WCDMA850/1700/1900, BT, Wi-Fi (2.4G/5G), 5G NR n7/n38/n41, LTE Band 2/4/5/7/12/17/26/38/41/66
Tested 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)
	704 –716 MHz (LTE Band 17)
	814 – 849 MHz (LTE Band 26)
	2570 – 2620 MHz (LTE Band 38)
	2496 – 2690 MHz (LTE Band 41)
	1710 – 1780 MHz (LTE Band 66)
	2500 – 2570 MHz (NR n7)
	2570 – 2620 MHz (NR n38)
	2496 – 2690 MHz (NR n41)
	2402 – 2480 MHz (Bluetooth)
	2412 – 2462 MHz (Wi-Fi 2.4G)
	5150-5825 MHz (Wi-Fi 5G)
GPRS/EGPRS Multislot Class:	12
GPRS capability Class:	B
Antenna type:	Integrated antenna
Hotspot mode:	Support
Note: 1 The device have similar frequency in some LTE bands ： LTEB5/26,12/17, since the supported frequency spans for the smaller LTE bands are completely cover by the larger LTE bands and the channel bandwidth and other operating parameters for the smaller band be fully supported by the larger band, therefore, only larger LTE bands were required to be tested for SAR.	

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 1	Receiver on(Standalone)
DSI 3	Receiver off(Standalone)
DSI 5	Receiver on (WWAN+WLAN/BT)
DSI 9	Receiver off(WWAN+WLAN/BT)
DSI 13	Hotspot on

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	Trigger Conditions	DSI	SAR design target	W/kg	Remark
Head	Rcv On	1	1g SAR design target	0.98	For GSM
Head	Rcv On	1	1g SAR design target	0.98	For WCDMA & LTE
Head	Rcv On	1	1g SAR design target	0.98	For NR
Head	Rcv On+Wifi5G+BT	5	1g SAR design target	0.39	For GSM
Head	Rcv On+Wifi5G+BT	5	1g SAR design target	0.39	For WCDMA & LTE
Head	Rcv On+Wifi5G+BT	5	1g SAR design target	0.39	For NR
Body Worn	Rcv Off	3	1g SAR design target	0.98	For GSM
Body Worn	Rcv Off	3	1g SAR design target	0.98	For WCDMA & LTE
Body Worn	Rcv Off	3	1g SAR design target	0.98	For NR
Body Worn	Rcv Off+Wifi5G+BT	9	1g SAR design target	0.62	For GSM
Body Worn	Rcv Off+Wifi5G+BT	9	1g SAR design target	0.62	For WCDMA & LTE
Body Worn	Rcv Off+Wifi5G+BT	9	1g SAR design target	0.62	For NR
Body Worn	Rcv Off+Wifi5G+BT	13	1g SAR design target	0.52	For NR
Extremity	Rcv Off	3	10g SAR design target	2.01	For GSM
Extremity	Rcv Off	3	10g SAR design target	2.8	For WCDMA & LTE
Extremity	Rcv Off	3	10g SAR design target	2.8	For NR
Extremity	Rcv Off+Wifi5G+BT	9	10g SAR design target	1.26	For GSM
Extremity	Rcv Off+Wifi5G+BT	9	10g SAR design target	1.77	For WCDMA & LTE
Extremity	Rcv Off+Wifi5G+BT	9	10g SAR design target	1.77	For NR

	Uncertainty dB 2/3/4G（except B7/B38/B41)	Uncertainty dB B7/B38/B41	Uncertainty dB N7/N38/N41
Sub6 radio TxAGC	1	1.2	1.5
Device to device variation	0.5	0.5	0.5
Total uncertainty	1.1	1.3	1.55

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	Plimit（dBm）					Pmax (dBm)
		Head	Body	WWAN+Wifi5 G+BT Head	WWAN+Wifi5 G+BT Body	Hotspot	
		DSI 1	DSI 3	DSI 5	DSI 9	DSI 13	
GSM_B850	0	32.2	32.2	28.2	30.2	28.2	32.2
GSM_B850	2	32.2	32.2	28.2	30.2	28.2	32.2
GSM_B1900	1	29.2	29.2	25.2	27.2	25.2	29.2
GSM_B1900	6	25.1	28.1	21.1	26.1	21.1	28.1
LTE_B2	1	23	22.2	19	20.2	19	23
LTE_B2	6	15.8	19.2	11.8	17.2	11.8	21.7
LTE_B4	1	23.5	22.7	19.5	20.7	19.5	23.5
LTE_B4	6	19.7	20.7	15.7	18.7	15.7	22.7
LTE_B5	0	24.5	24.5	20.5	22.5	20.5	24.5
LTE_B5	2	24.4	24.4	20.4	22.4	20.4	24.4
LTE_B7	1	22.5	22.5	18.5	20.5	18.5	22.5
LTE_B7	6	16.7	17.9	12.7	15.9	12.7	21
LTE_B7	3	21	21.4	17	19.4	17	23.5
LTE_B7	9	21.6	21.6	17.6	19.6	17.6	21.6
LTE_B12	0	24	24	20	22	20	24
LTE_B12	2	24.1	24.1	20.1	22.1	20.1	24.1
LTE_B17	0	24	24	20	22	20	24
LTE_B17	2	24.1	24.1	20.1	22.1	20.1	24.1
LTE_B26	0	24.5	24.5	20.5	22.5	20.5	24.5
LTE_B26	2	24.4	24.4	20.4	22.4	20.4	24.4
LTE_B38	1	23.6	23.6	19.6	21.6	19.6	24.5
LTE_B38	6	18.3	19.4	14.3	17.4	14.3	23.5
LTE_B41	1	23.4	23.2	19.4	21.2	19.4	24.5
LTE_B41	6	18.2	19.4	14.2	17.4	14.2	23.5
LTE_B66	1	23.5	22.5	19.5	20.5	19.5	23.5
LTE_B66	6	19.4	20.7	15.4	18.7	15.4	22.7
NR5G_N7	3	20.2	20.2	16.2	18.2	16.2	23.5
NR5G_N7	9	18.6	21.3	14.6	19.3	14.6	21.6
NR5G_N7	1	22.5	21.7	18.5	19.7	18.5	22.5
NR5G_N7	6	16.7	17.9	12.7	15.9	12.7	21

NR5G_N38	3	20.3	21.5	16.3	19.5	16.3	24.5
NR5G_N38	9	18.7	22.4	14.7	20.4	14.7	22.4
NR5G_N38	1	21.1	21.1	17.1	19.1	17.1	23.3
NR5G_N38	6	17.2	18	13.2	16	13.2	22.3
NR5G_N41	3	21.6	21.6	17.6	19.6	17.6	24.5
NR5G_N41	9	17.8	22.1	13.8	20.1	13.8	22.4
NR5G_N41	1	21.1	21.1	17.1	19.1	17.1	23.3
NR5G_N41	6	16	17.5	12	15.5	12	22.3
WCDMA_B2	1	23.5	21.9	19.5	19.9	19.5	23.5
WCDMA_B2	6	15.8	19.2	11.8	17.2	11.8	22.2
WCDMA_B4	1	23.5	22.2	19.5	20.2	19.5	23.5
WCDMA_B4	6	18.9	19.9	14.9	17.9	14.9	22.4
WCDMA_B5	0	24.5	24.5	20.5	22.5	20.5	24.5
WCDMA_B5	2	24.4	24.4	20.4	22.4	20.4	24.4

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.

3 The device have similar frequency in some LTE bands ： LTEB5/26,12/17, since the supported frequency spans for the smaller LTE bands are completely cover by the larger LTE bands, therefore, only larger LTE bands were required to be tested for SAR.

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.