



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZSAR-TRF-01 Rev. A/0 May15,2023

Report No.: SZCR241000381013

Page: 1 of 13

FCC TEST REPORT PART 0

Application No.: SZCR2410003810WM
Applicant: Sonim Technologies, Inc.
Address of Applicant: 4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA
Manufacturer: Sonim Technologies, Inc.
Address of Manufacturer: 4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA
Product Name: smartphone
Model No.(EUT): X800
Type No.: S1003/S1001/S1004/S1005/S1006/S1010
Trade Mark: Sonim
FCC ID: WYPS1003
Date of Receipt: 2024-12-10
Date of Test: 2024-12-12 to 2025-01-04
Date of Issue: 2025-01-10
Test conclusion: **PASS**

Keny Xu

Keny Xu
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2025-01-10		Original

Authorized for issue by:				
		Calvin Weng		
		Calvin Weng/Project Engineer		
		Eric Fu		
		Eric Fu/Reviewer		



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1 General Information

1.1 General Description of EUT

Product Name:	smartphone		
Model No.:	X800		
Trade Mark:	Sonim		
Product Phase:	production unit		
Device Type:	portable device		
Exposure Category:	uncontrolled environment / general population		
IMEI:	016582000014737; 016582000014935; 016582000014679; 016582000008952.		
Hardware Version:	V1.0		
Software Version:	X80.0-01-14.0-19.40.01		
Antenna Type:	PIFA Antenna		
Device Operating Configurations:			
Modulation Mode:	GSM: GMSK, 8PSK; WCDMA: QPSK, 16QAM LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM (PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM), CP-OFDM (QPSK, 16QAM, 64QAM, 256QAM) WIFI: DSSS, OFDM, OFDMA; BT: GFSK, π/4DQPSK, 8DPSK		
Device Class:	B		
GPRS Multi-slots Class:	33	EGPRS Multi-slots Class:	33
HSDPA UE Category:	10	HSUPA UE Category:	6
HSPA+:	14		
Power Class:	4, tested with power level 5(GSM850)		
	1, tested with power level 0(GSM1900)		
	3, tested with power control "all 1"(WCDMA Band)		
	3, tested with power control "max power"(LTE Band)		
Frequency Bands:	Band	Tx(MHz)	Rx(MHz)
	GSM850	824~849	869~894
	GSM1900	1850~1910	1930~1990
	WCDMA Band II	1850~1910	1930~1990
	WCDMA Band IV	1710~1755	2110~2155
	WCDMA Band V	824~849	869~894
	LTE Band 2	1850 ~1910	1930 ~1990



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LTE Band 4	1710~1755	2110~2155
LTE Band 5	824~849	869-894
LTE Band 7	2500~2570	2620~2690
LTE Band 12	699~716	729~746
LTE Band 13	777~787	746~756
LTE Band 14	788~798	758~768
LTE Band 25	1850~1915	1930~1995
LTE Band 26	814~849	859~894
LTE Band 30	2305~2315	2350~2360
LTE Band 38	2570~2620	2570~2620
LTE Band 41	2496~2690	2496~2690
LTE Band 42	3450~3550	3450~3550
LTE Band 43	3600~3800	3600~3800
LTE Band 48	3550~3700	3550~3700
LTE Band 66	1710~1780	2110~2200
LTE Band 71	663~698	617~652
NR Band n2	1850 ~1910	1930 ~1990
NR Band n5	824~849	869-894
NR Band n7	2500~2570	2620~2690
NR Band n14	788~798	758~768
NR Band n25	1850~1915	1930~1995
NR Band n26	814~849	859~894
NR Band n30	2305~2315	2350~2360
NR Band n38	2570~2620	2570~2620
NR Band n41 (Class 2/3)	2496~2690	2496~2690
NR Band n48	3550~3700	3550~3700
NR Band n66	1710~1780	2110~2200
NR Band n70	1695~1710	1995~2020
NR Band n71	663~698	617~652
NR Band n77(Class 2/3)	3450~3550	3450~3550
	3700~3980	3700~3980
NR Band n78(Class	3450~3550	3450~3550



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	2/3)	3700~3800	3700~3800
	WIFI 2.4G	2412~2462	2412~2462
	WIFI 5G	5150~5350	5150~5350
		5470~5600	5470~5600
		5650~5725	5650~5725
		5725~5850	5725~5850
	WIFI 6E	5925~6425	5925~6425
		6425~6525	6425~6525
		6525~6875	6525~6875
		6875~7125	6875~7125
BT	2402~2480	2402~2480	
NFC	13.56	13.56	
RF Cable:	<input checked="" type="checkbox"/> Provided by applicant <input type="checkbox"/> Provided by the laboratory		
Battery Information:	Model:	BAT-05000-21S	
	Normal Voltage:	3.87V	
	Rated capacity:	5000mAh	
	Manufacturer:	Shenzhen Aerospace Electronic Co., Ltd.	
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1.2 Test Location

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Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China
Post code:	518057
Test engineer:	Charley Yi

1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1336**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.



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1.4 Time-Averaging for SAR

The equipment under test (EUT) is a portable handset, it contains the Qualcomm modem supporting 2G/3G/4G/5G NR/BT/WLAN/NFC bands, but only 2G/3G/4G/5G NR are enabled with 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. we verification the applicable cases in part2.

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.

Nomenclature for Part 0 Report:

Technology	Term	Description
WWAN	P_{limit}	Power level that corresponds to the exposure design target (SAR_{design_target}) after accounting for all device design related uncertainties
	P_{max}	Maximum tune up output power
	SAR_{design_target}	Target SAR level < FCC SAR limit after accounting for all device design related uncertainties
	SAR_{Char}	Table containing P_{limit} for all technologies and bands

2 SAR CHARACTERIZATION

2.1 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 was determined by measurements for the relevant exposure conditions for that DSI. Detailed descriptions of the detection mechanisms are included in the operational description.

When 1g SAR and 10g SAR exposure comparison is needed, the worst-case was determined from SAR normalized to 1g or 10g SAR limit.

The device state index (DSI) conditions used in Table 1 represent different exposure scenarios.

Scenario	Description	SAR Test Cases
Head (DSI = 4)	Receiver on	Head SAR per KDB Publication 648474 D04
Body Worn&Hotspot (DSI = 1)	Sensor on	Body-worn SAR per KDB Publication 648474 D04 Hotspot SAR per KDB Publication 941225 D06
Body Worn&Hotspot (DSI = 6)	Sensor off	Body-worn SAR per KDB Publication 648474 D04 Hotspot SAR per KDB Publication 941225 D06
Phablet (DSI = 1)	Sensor on	Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04
Phablet (DSI = 6)	Sensor off	Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04

Table 1: DSI and Corresponding Exposure Scenarios

2.2 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.

$$\text{SAR_design_target} < \text{SAR}_{\text{regulatory_limit}} \times 10^{\frac{-\text{total uncertainty}}{10}}$$

Exposure position	Frequency band	SAR Regulatory Limit W/kg(1g)	SAR design target W/kg(1g)
Head	WWAN	1.6	0.8
Body worn/Hotspot	WWAN	1.6	0.8
Exposure position	Frequency band	SAR Regulatory Limit W/kg(10g)	SAR design target W/kg(10g)
Limbs	WWAN	4.0	2.6

2.3 SAR Char

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target, below the predefined time-averaged power limit, for each characterized technology and band. Smart Transmit allows the device to transmit at higher power instantaneously, as high as P_{max} , when needed, but enforces power limiting to maintain time-averaged transmit power to P_{limit} . Below table shows P_{limit} EFS settings and maximum tune up output power P_{max} configured for this EUT for various transmit conditions (DSI: Device State Index).

P_{limit} for supported technologies and bands (actual EFS settings)

Band	Mode	Antenna	P_{max} *	Uncertainty	P_{limit} (average)		
					Head	Sensor on	Sensor off
					DSI 4	DSI 1	DSI 6
GSM850	GPRS 2TS	1#	23.0	2.0	/	/	23.0
GSM850	GPRS 4TS	1#	22.0	2.0	20.5	/	/
GSM1900	GPRS 4TS	2#	21.0	2.0	18.5	/	21.0
WCDMA B2	RMC	2#	23.0	2.0	17.5	/	23.0
WCDMA B4	RMC	2#	23.0	1.5	18.0	/	23.0
WCDMA B5	RMC	1#	24.0	1.0	22.0	/	24.0
LTE B2	QPSK	2#	23.0	2.0	17.5	23.0	23.0
LTE B2 ENDC	QPSK	5#	23.0	1.0	23.0	23.0	23.0
LTE B4	QPSK	2#	23.0	1.5	18.0	23.0	23.0
LTE B4 ENDC	QPSK	5#	24.0	1.0	24.0	24.0	24.0
LTE B5	QPSK	1#	24.0	1.0	23.0	24.0	24.0
LTE B7	QPSK	2#	23.5	1.0	15.5	18.5	23.5
LTE B7	QPSK	5#	24.0	1.0	24.0	24.0	24.0
LTE B12	QPSK	1#	24.0	1.0	22.0	24.0	24.0
LTE B13	QPSK	1#	24.0	1.0	22.5	24.0	24.0
LTE B14	QPSK	1#	24.0	1.0	22.5	24.0	24.0
LTE B25	QPSK	2#	23.0	2.0	17.5	23.0	23.0
LTE B25 ENDC	QPSK	5#	23.0	1.0	23.0	23.0	23.0
LTE B26	QPSK	1#	24.0	1.0	23.0	24.0	24.0
LTE B30	QPSK	2#	23.0	1.5	17.5	23.0	23.0
LTE B38 PC3	QPSK	2#	22.0	1.0	15.5	18.0	22.0
LTE B38 ENDC	QPSK	5#	22.0	1.0	22.0	22.0	22.0



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LTE B41 PC2	QPSK	2#	22.4	1.0	15.9	18.4	22.4
LTE B41 PC3	QPSK	2#	22.0	1.0	15.5	18.0	22.0
LTE B41 ENDC	QPSK	5#	22.0	1.0	22.0	22.0	22.0
LTE B42 PC3	QPSK	3#	21.0	2.0	19.5	21.0	21.0
LTE B43	QPSK	3#	21.0	2.0	19.0	21.0	21.0
LTE B48	QPSK	3#	20.0	2.0	18.0	20.0	20.0
LTE B66	QPSK	2#	23.0	1.5	18.0	23.0	23.0
LTE B66 ENDC	QPSK	5#	24.0	1.0	24.0	24.0	24.0
LTE B71	QPSK	1#	24.0	1.0	22.5	24.0	24.0
NR 5G N2	QPSK	2#	23.0	2.0	18.5	23.0	23.0
NR 5G N5	QPSK	1#	23.0	2.0	21.5	23.0	23.0
NR 5G N7	QPSK	2#	23.0	2.0	14.0	17.5	23.0
NR 5G N7	QPSK	5#	23.0	2.0	23.0	23.0	23.0
NR 5G N14	QPSK	1#	23.0	2.0	21.5	23.0	23.0
NR 5G N25	QPSK	2#	23.0	2.0	18.5	23.0	23.0
NR 5G N26	QPSK	1#	23.0	2.0	21.5	23.0	23.0
NR 5G N30	QPSK	2#	23.5	2.0	17.0	23.5	23.5
NR 5G N38	QPSK	2#	23.0	2.0	14.0	18.0	21.0
NR 5G N41 PC2	QPSK	2#	26.0	2.0	14.0	18.0	21.0
NR 5G N41 PC3	QPSK	2#	24.0	2.0	14.0	18.0	21.0
NR 5G N48	QPSK	3#	22.0	2.0	18.0	22.0	22.0
NR 5G N66	QPSK	2#	23.0	2.0	19.0	23.0	23.0
NR 5G N70	QPSK	5#	22.0	2.0	22.0	22.0	22.0
NR 5G N71	QPSK	1#	23.0	2.0	21.0	23.0	23.0
NR 5G N77 PC2	QPSK	3#	25.0	2.0	22.0	25.0	25.0
NR 5G N77 PC3	QPSK	3#	23.0	2.0	22.0	23.0	23.0
NR 5G N78 PC2	QPSK	3#	26.0	2.0	22.0	25.0	25.0
NR 5G N78 PC3	QPSK	3#	24.0	2.0	22.0	24.0	24.0
NR 5G N77 PC2	QPSK	7#	26.0	2.0	18.0	19.0	19.0
NR 5G N77 PC3	QPSK	7#	24.0	2.0	18.0	19.0	19.0
NR 5G N78 PC2	QPSK	7#	25.0	2.0	18.0	19.0	19.0
NR 5G N78 PC3	QPSK	7#	23.0	2.0	17.0	18.0	18.0



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Note:

- 1) * P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to $P_{max} + \text{Total uncertainty}$.
- 2) The max allowed output power is the $P_{limit} + \text{Total uncertainty}$, and if P_{limit} is higher than P_{max} , the device output power will be P_{max} instead.
- 3) Note that WLAN operations are not enabled with Smart Transmit.
- 4) The following table is duty cycle and factor used for calculating time average power.

Mode	Duty Cycle	Time Average calculation Factor
GSM 1TX	12.5%	-9.0
GSM 2TX	25.0%	-6.0
GSM 3TX	37.5%	-4.3
GSM 4TX	50.0%	-3.0
LTE FDD	100.0%	0.0
LTE TDD	63.3%	-2.0
LTE TDD HPUE	43.3%	-3.6

- End of Report -



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