TEST REPORT

No. I22Z60589-WMD10

for

Sonim Technologies, Inc.

Smart phone

Model Name: XP9900(P14001), XP9900(P14002), XP9900(P14003), XP9900(P14004), XP9900(P14005), XP9900(P14006), XP9900(P14010)

FCC ID: WYPP14010

with

Hardware Version: V1.0

Software Version: 10.0.0-01-12.0.0-10.60.10

Issued Date: 2022-10-09

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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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

Tel: +86(0)10-62304633-2512, Fax: +86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z60589-WMD10	Rev.0	1st edition	2022-10-09

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

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

Location 2: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project Data

Testing Start Date: 2022-08-10

Testing End Date: 2022-10-09

1.5. Signature

董原

Dong Yuan

(Prepared this test report)

周宇

Zhou Yu

(Reviewed this test report)

赵慧麟

Zhao Hui Lin

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Sonim Technologies, Inc.
Address /Post:	6500 River Place Blvd., Building 7, Suite 250, Austin, TX 78730, USA
Contact:	Avena xu
Email:	Avena.xu@sonimtech.com
Telephone:	1-650-378-8100

2.2. Manufacturer Information

Company Name:	Sonim Technologies, Inc.
Address /Post:	6500 River Place Blvd., Building 7, Suite 250, Austin, TX 78730, USA
Contact:	Avena xu
Email:	Avena.xu@sonimtech.com
Telephone:	1-650-378-8100

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Smart phone
Model Name	XP9900（P14001), XP9900（P14002), XP9900（P14003), XP9900（P14004), XP9900（P14005), XP9900（P14006), XP9900（P14010)
FCC ID	WYPP14010
Antenna	Embedded
Extreme vol. Limits	3.6VDC to 4.45VDC (nominal: 3.9VDC)
Extreme temp. Tolerance	-20°C to +55°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT114a	016188000068069	V1.0	10.0.0-01-12.0.0-10.60.10	2022-08-09

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery

AE1

Model	BAT-05000-01S
Manufacturer	Dongguan Veken Battery Co., Ltd.
Capacitance	4850mAh

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters are supplied by the customer, which are the bases of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-21 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01

5. Laboratory Environment

Fully-anechoic chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

Shielded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω

6. Summary Of Test Result

Second source:

n5

Items	Test Name	Clause in FCC rules	Verdict
1	Emission Limit	2.1051/22.917	P

Terms used in Verdict column

P	Pass. The EUT complies with the essential requirements in the standard.
NP	Not Performed. The test was not performed by CTTL.
NA	Not Applicable.The test was not applicable.
BR	Re-use test data from basic model report.
F	Fail. The EUT does not comply with the essential requirements in the standard.

All the test results are based on normal power.
All the test results are based on XP9900(P14001).

n77L: 3450MHz-3550MHz
n77H: 3700MHz-3980MHz
n78L: 3450MHz-3550MHz
n41 n77L and n77H are tested by power class 2.
n78L is tested by power class 3.
n25 overlaps the entire frequency range of n2. Therefore, test data provided in this report covers n2 as well as n25.

Explanation of worst-case configuration
NR modulation: DFT-s-OFDM pi/2 BPSK; QPSK; 16QAM; 64QAM; 256QAM
CP-OFDM QPSK; 16QAM; 64QAM; 256QAM
NR BW: 20/30/40/50/60/70/80/90/100MHz for n41, 20/30/40/50/60/70/80/90/100MHz for n77L and n77H, 20/30/40/50/60/70/80/90MHz for n78L, 5/10MHz for n14 and n30, 5/10/15/20/30/40MHz for n66 and 5/10/15/20MHz for other NR bands.
The EUT supports B5/12/13/14/30/66-n2, B2/30/48/66-n5, B2-n14, B12-n25, B5/12/14-n30, B66-n41, B2/5/12/13/14/30-n66, B2/66-n71, B5/12/13/14-n77L, B5/12/13/14-n77H, B2/7/13-n78L.
The test results provided in this report represent the worst case configuration.
For all the NSA cases, LTE Bands are set under the 10MHz bandwidth, middle channel, 50RB and QPSK modulation.

The Equipment Under Test (EUT) is a Class 2 Permissive Change to XP9900(P14001), XP9900(P14002), XP9900(P14003), XP9900(P14004), XP9900(P14005), XP9900(P14006), XP9900(P14010)(FCC ID: WYPP14010).
For detail differences between two models please refer the Declaration of Changes document.

7. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Radio Communication Test Station	MT8000A	6262093285	Anritsu	2022-12-13	1 year
Radio Communication Analyzer	MT8821C	6201763159	Anritsu	2023-08-02	1 year
Signal&Spectrum Analyzer	FSW	104038	R&S	2023-06-20	1 year
PXA Signal Analyzer	N9030A	MY54490239	Keysight	2022-08-29	1 year
PXA Signal Analyzer	N9030A	MY54490239	Keysight	2023-08-31	1 year
Climate chamber	SH-242	93008556	ESPEC	2023-12-23	3 years
Test Receiver	E4440A	MY48250642	Agilent	2023-03-10	1 year
EMI Antenna	VULB9163	9163-482	Schwarzbeck	2022-11-16	1 year
Signal Generator	SMF100A	101295	R&S	2022-12-23	1 year
EMI Antenna	3117	00058889	ETS-Lindgren	2022-11-07	1 year
EMI Antenna	LB-7180-NF	J203001300005	A-INFO	2023-02-23	1 year
Universal Radio Communication Tester	MT8821C	Anritsu	6262257899	2023-05-15	1 year
	MT8000A	Anritsu	6262261933	2023-05-15	1 year

Annex A: Measurement Results

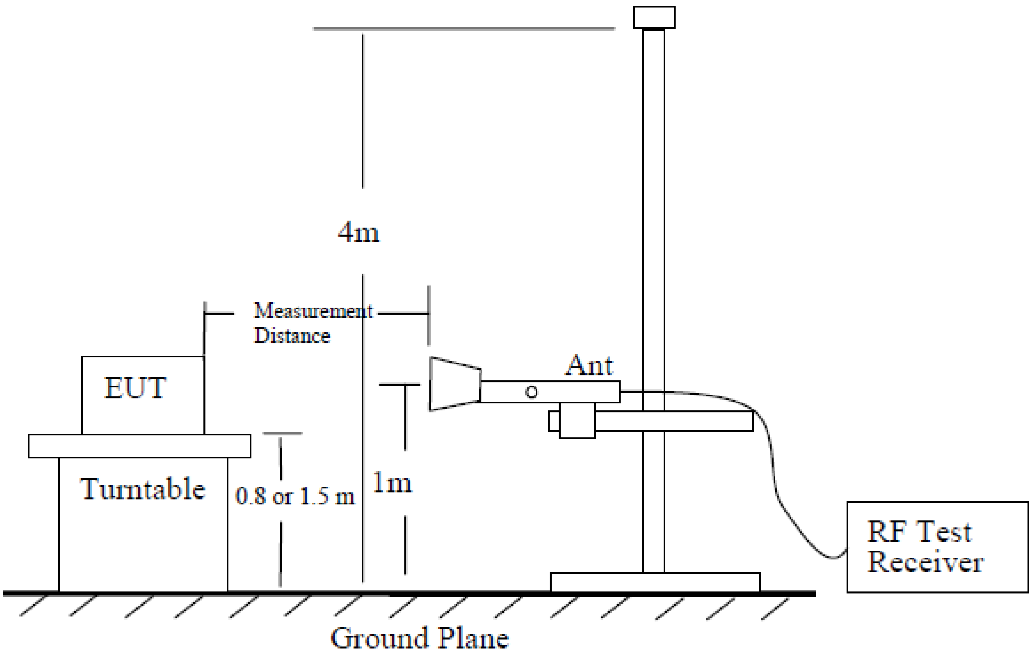
A.1 Emission Limit

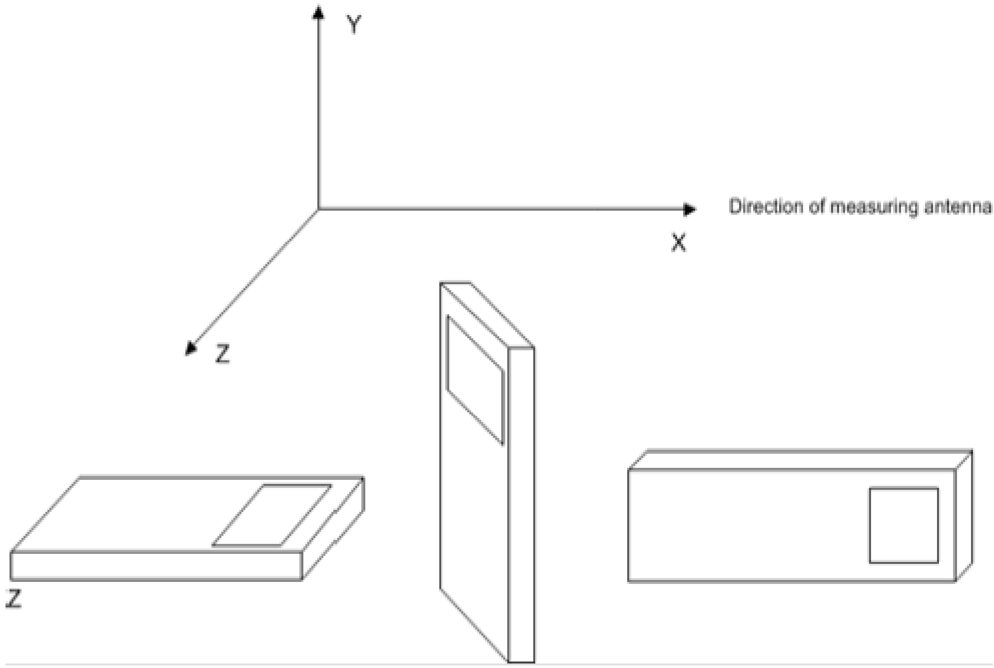
The measurements procedures in C63.26 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the NR Bands 5.

The procedure of radiated spurious emissions is as follows:

Using the test configuration as follow, measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits.





The emission characteristics of the EUT can be identified from the pre-scan measurement information.

Exploratory radiated measurements (pre-scans) may be performed to determine the general EUT radiated emissions characteristics and, when necessary, the EUT-to-measurement antenna orientation that produces the maximum emission amplitude. Pre-scans shall only be used to determine the emission frequencies (i.e., not amplitude levels). The information garnered from a pre-scan can then be used to perform final compliance measurements using either the substitution or direct field strength method.

For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80 cm above the reference ground plane. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e., field strength or received power). When orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25 cm.

The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.

For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table or support at a nominal height of 1.5 m above the ground plane. When maximizing the emissions from the EUT for measurement, the EUT and its transmitting antenna(s) shall be rotated through 360°. For each mode of operation to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored.

Final measurements shall be performed for the worst case combination(s) of variable technical parameters that result in the maximum measured emission amplitude, record the frequency and amplitude of the highest fundamental emission (if applicable), and the frequency and amplitude data for the six highest-amplitude spurious emissions.

A.1.2 Measurement Limit

n5: 22.917 specify that Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

A.1.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the NR Bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the NR Bands into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The range of evaluated frequency is from 30MHz to 40GHz.

Measurement Results:

Second source:

DC_30A_n5A, 5MHz, Channel 165300

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1650.01	-55.76	3.57	5.23	2.15	-56.25	-13.00	43.25	H
2479.50	-46.39	4.60	6.04	2.15	-47.10	-13.00	34.10	V
3309.23	-62.19	5.29	7.74	2.15	-61.89	-13.00	48.89	H
4128.93	-57.44	6.04	9.03	2.15	-56.60	-13.00	43.60	V
4961.86	-58.34	6.67	9.86	2.15	-57.30	-13.00	44.30	V
5789.21	-58.04	7.21	10.54	2.15	-56.86	-13.00	43.86	H

DC_30A_n5A, 5MHz, Channel 167300

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1674.51	-54.74	3.58	5.19	2.15	-55.28	-13.00	42.28	H
2509.50	-46.28	4.63	6.12	2.15	-46.94	-13.00	33.94	H
3348.23	-61.06	5.32	7.84	2.15	-60.69	-13.00	47.69	V
4172.11	-58.46	6.14	9.07	2.15	-57.68	-13.00	44.68	V
5019.66	-58.38	6.57	9.93	2.15	-57.17	-13.00	44.17	V
5850.50	-58.16	7.24	10.53	2.15	-57.02	-13.00	44.02	V

DC_30A_n5A, 5MHz, Channel 169300

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1690.51	-55.26	3.59	5.16	2.15	-55.84	-13.00	42.84	V
2539.50	-43.18	4.66	6.17	2.15	-43.82	-13.00	30.82	H
3387.23	-61.28	5.35	7.93	2.15	-60.85	-13.00	47.85	V
4232.00	-54.18	6.26	9.13	2.15	-53.46	-13.00	40.46	V
5084.43	-57.52	6.73	10.02	2.15	-56.38	-13.00	43.38	V
5913.87	-57.39	7.44	10.52	2.15	-56.46	-13.00	43.46	V

Sample：1690.51 MHz

Power (EIRP) = P_{Mea} - P_{pl} + G_a

Power (-55.84dBm) = P_{Mea} (-55.26dBm) - P_{pl} (3.59dB)+ Ga(5.16dBi) – 2.15

Note: Expanded measurement uncertainty

Frequency range	Expanded measurement uncertainty
30MHz-1GHz	5.76dB, k=2
1GHz-18GHz	4.69dB, k=2
18GHz-40GHz	3.37dB, k=2

Note: The measurement results showed here are worst cases

Annex B: Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology

NVLAP® ilac-MRA

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

2022-10-01 through 2023-09-30
Effective Dates

For the National Voluntary Laboratory Accreditation Program

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