



FCC RF Test Report

APPLICANT : Sonim Technologies, Inc.
EQUIPMENT : LTE Phone
BRAND NAME : Sonim
MODEL NAME : XP5800(PC2111)
FCC ID : WYPPC2100
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Dec. 07, 2017 and testing was completed on Dec. 12, 2017. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.
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China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR792101-06B	Rev. 01	Initial issue of report	Dec. 18, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Not Required	-
3.1	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
-	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Not Required	-
3.2	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) ≤ -17, -27 dBm/MHz & 15.209(a)	Pass	Under limit 2.94 dB at 11590.000 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Required	-
-	15.407(g)	Frequency Stability	Within Operation Band	Not Required	-
-	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Not Required	-
-	15.203 & 15.407(a)	Antenna Requirement	N/A	Not Required	-



1 General Description

1.1 Applicant

Sonim Technologies, Inc.

1825 S. Grant St., Suite 200., San Mateo, CA, 94402

1.2 Manufacturer

Sonim Technologies (Shenzhen) Limited

2nd Floor, No. 2 Building Phase B, Daqian Industrial park, Longchang Road, 67 District, Baoan, Shenzhen, P. R. China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE Phone
Brand Name	Sonim
Model Name	XP5800(PC2111)
FCC ID	WYPPC2100
EUT supports Radios application	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/ DC-HSDPA/HSPA+(16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40 Bluetooth v3.0 + EDR/ v 4.0 LE/ v 4.2 LE
IMEI Code	Conducted: N/A Radiation: 001080001912568/001080001912576
HW Version	A
SW Version	5SA.0.0-00-7.1.2-00.27.00
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report for XP5800(PC2111). The difference between the previous and current please refer to Appendix E. Based on the similarity between two models, only the conducted power and the worst case of RSE from original report (Sporton Report Number FR792101E) were verified for difference.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	802.11a : 16.52 dBm / 0.0449 W 802.11n HT20 : 15.57 dBm / 0.0361 W 802.11n HT40 : 14.26 dBm / 0.0267 W 802.11ac VHT20: 14.98 dBm / 0.0315 W 802.11ac VHT40: 12.94 dBm / 0.0197 W
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	PIFA Antenna with gain 2.00 dBi

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.		FCC Test Firm Registration No.
	TH01-KS	03CH03-KS	630927

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02
- ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	-	-	165	5825

Note: The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.



2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

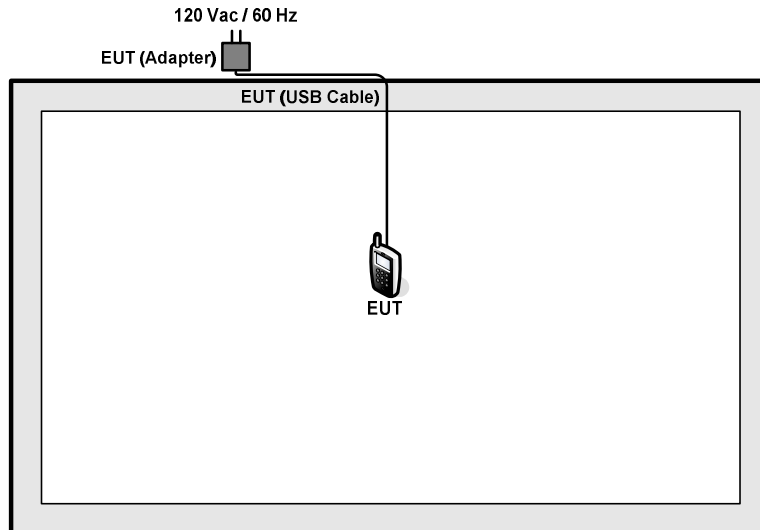
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0

Ch. #		Band IV : 5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

Ch. #		Band IV : 5725-5850 MHz	
		802.11ac VHT20	802.11ac VHT40
L	Low	149	151
M	Middle	157	-
H	High	165	159

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



2.4 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

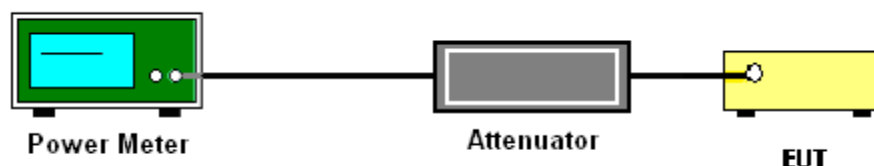
3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

3.2.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \quad \mu\text{V/m, where P is the eirp (Watts)}$$



EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

(3) KDB789033 D02 v02 G)2)c)

- (i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.³
- (ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.⁴

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).



3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02.

Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW $\geq$ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

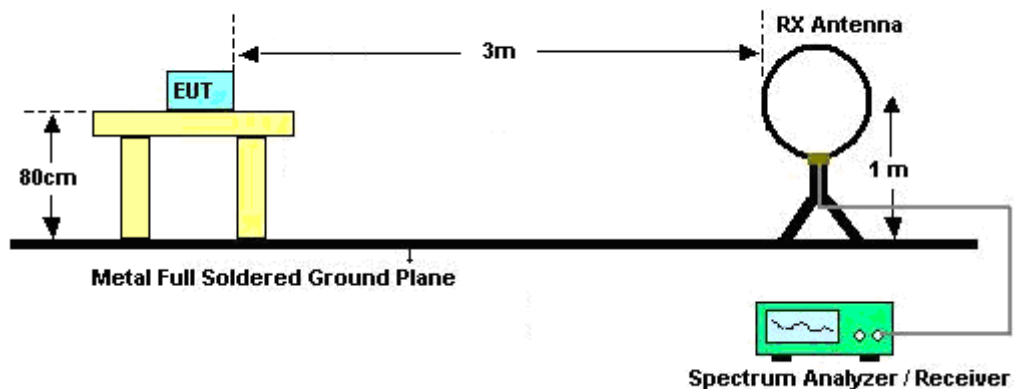
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

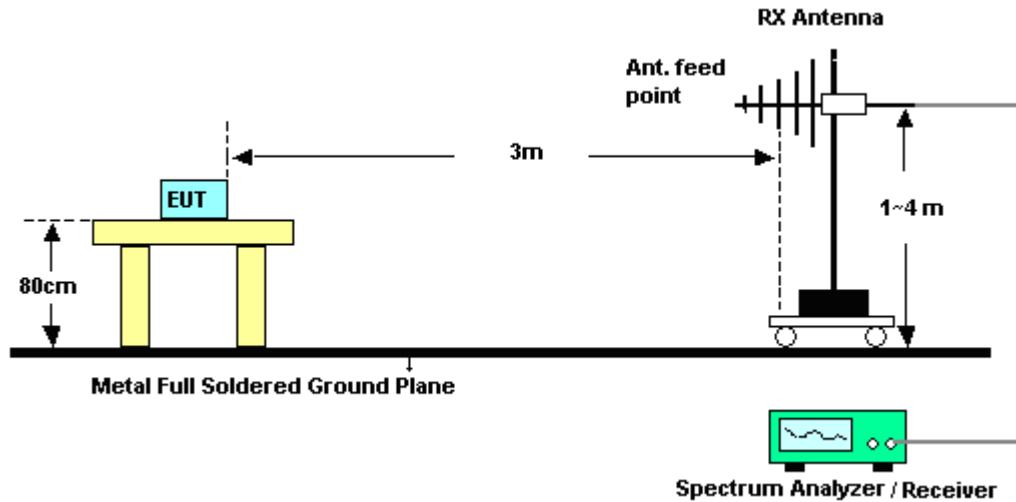
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.2.4 Test Setup

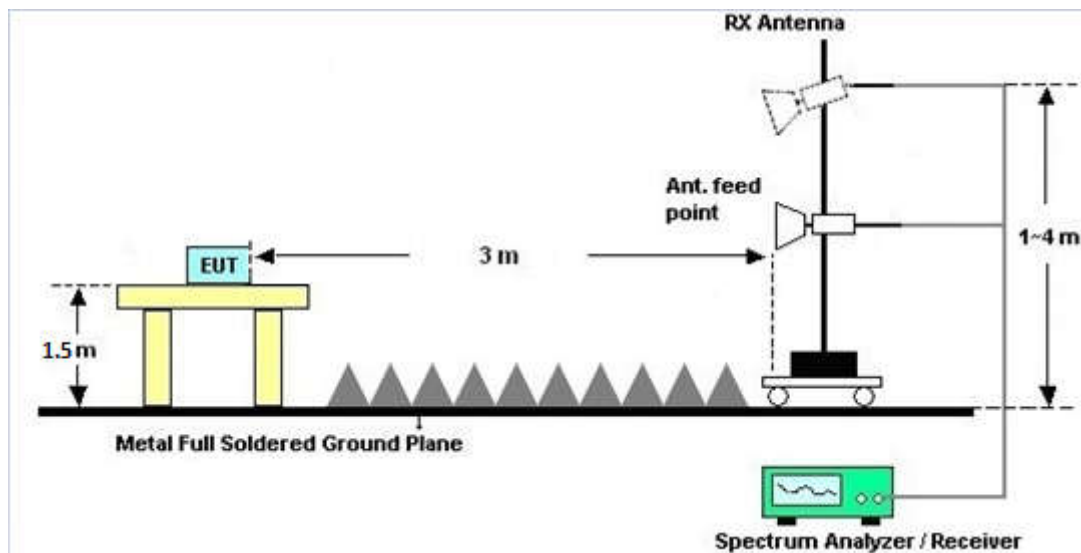
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



**3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.2.7 Duty Cycle

Please refer to Appendix C.

3.2.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix B.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Dec. 12, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Dec. 12, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 08, 2017	Dec. 12, 2017	Aug. 07, 2018	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 19, 2017	Dec. 11, 2017	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Dec. 11, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Dec. 11, 2017	Oct. 21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Dec. 11, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Dec. 11, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Dec. 11, 2017	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Dec. 11, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-H G	1887435	18GHz~40GHz	Oct. 12, 2017	Dec. 11, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1GHz~18GHz	Apr. 18, 2017	Dec. 11, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Dec. 11, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 11, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 11, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 11, 2017	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7 dB
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Appendix A. Conducted Test Results

Report Number : FR792101-06B

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2017/12/12	Relative Humidity:	51~55	%

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.58	16.05	30.00	2.00		Pass
11a	6Mbps	1	157	5785	0.58	16.52	30.00	2.00		Pass
11a	6Mbps	1	165	5825	0.58	16.50	30.00	2.00		Pass
HT20	MCS 0	1	149	5745	0.62	15.04	30.00	2.00		Pass
HT20	MCS 0	1	157	5785	0.62	15.57	30.00	2.00		Pass
HT20	MCS 0	1	165	5825	0.62	15.54	30.00	2.00		Pass
HT40	MCS 0	1	151	5755	0.64	14.15	30.00	2.00		Pass
HT40	MCS 0	1	159	5795	0.64	14.26	30.00	2.00		Pass
VHT20	MCS 0	1	149	5745	0.79	13.94	30.00	2.00		Pass
VHT20	MCS 0	1	157	5785	0.79	14.98	30.00	2.00		Pass
VHT20	MCS 0	1	165	5825	0.79	14.32	30.00	2.00		Pass
VHT40	MCS 0	1	151	5755	1.49	12.56	30.00	2.00		Pass
VHT40	MCS 0	1	159	5795	1.49	12.94	30.00	2.00		Pass



Appendix B. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT20 CH 165 5825MHz		5830	108.23	-	-	97.72	34.83	12.67	36.99	380	213	P	H
		5830	101.48	-	-	90.97	34.83	12.67	36.99	380	213	A	H
		5850.01	64.15	-58.13	122.28	53.67	34.82	12.69	37.03	380	213	P	H
		5856.8	59.08	-51.32	110.4	48.6	34.8	12.71	37.03	380	213	P	H
		5877.2	56.82	-46.85	103.67	46.31	34.8	12.73	37.02	380	213	P	H
		5936	52.25	-16.05	68.3	41.63	34.81	12.78	36.97	380	213	P	H
		5818	103.47	-	-	92.95	34.85	12.66	36.99	100	9	P	V
		5818	96.7	-	-	86.18	34.85	12.66	36.99	100	9	A	V
		5850.01	59.05	-63.23	122.28	48.57	34.82	12.69	37.03	100	9	P	V
		5856	54.88	-55.74	110.62	44.4	34.8	12.71	37.03	100	9	P	V
		5876.4	52.76	-51.5	104.26	42.25	34.8	12.73	37.02	100	9	P	V
		5929.2	53.29	-15.01	68.3	42.69	34.81	12.78	36.99	100	9	P	V
Remark		1. No other spurious found. 2. All results are PASS against Peak and Average limit line.											


Band 4 5725~5850MHz
WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11650	50.72	-23.28	74	60.53	39.44	16.29	65.54	300	360	P	H
VHT20		11650	52.98	-21.02	74	62.79	39.44	16.29	65.54	100	256	P	V
CH 165 5825MHz	!	11650	50.18	-3.82	54	59.99	39.44	16.29	65.54	100	256	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 159 5795MHz		5642.8	52.95	-15.35	68.3	42.15	35	12.48	36.68	380	199	P	H
		5692.8	53.46	-46.53	99.99	42.75	34.95	12.53	36.77	380	199	P	H
		5704.4	52.53	-54	106.53	41.81	34.94	12.55	36.77	380	199	P	H
		5724.8	51.35	-70.49	121.84	40.67	34.92	12.57	36.81	380	199	P	H
		5788	103.03	-	-	92.47	34.86	12.64	36.94	380	199	P	H
		5788	96.4	-	-	85.84	34.86	12.64	36.94	380	199	A	H
		5850.4	51.73	-69.66	121.39	41.25	34.82	12.69	37.03	380	199	P	H
		5857.2	52.7	-57.58	110.28	42.22	34.8	12.71	37.03	380	199	P	H
		5901.6	52.75	-32.83	85.58	42.2	34.8	12.75	37	380	199	P	H
		5972.8	53.17	-15.13	68.3	42.48	34.81	12.84	36.96	380	199	P	H
		5648	52.67	-15.63	68.3	41.87	35	12.48	36.68	100	11	P	V
		5668.8	52.68	-29.57	82.25	41.91	34.97	12.52	36.72	100	11	P	V
		5711.6	51.48	-57.07	108.55	40.8	34.94	12.55	36.81	100	11	P	V
		5720.4	50.85	-60.96	111.81	40.17	34.92	12.57	36.81	100	11	P	V
		5784	99.08	-	-	88.52	34.88	12.62	36.94	100	11	P	V
		5784	92.08	-	-	81.52	34.88	12.62	36.94	100	11	A	V
		5853.6	52.49	-61.6	114.09	42.01	34.8	12.71	37.03	100	11	P	V
		5862.4	52.11	-56.72	108.83	41.62	34.8	12.71	37.02	100	11	P	V
		5881.2	52.27	-48.42	100.69	41.76	34.8	12.73	37.02	100	11	P	V
		5938.8	52.3	-16	68.3	41.66	34.81	12.8	36.97	100	11	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												


Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11590	52.6	-21.4	74	62.44	39.39	16.24	65.47	100	30	P	H
VHT40	!	11590	49.96	-4.04	54	59.8	39.39	16.24	65.47	100	30	A	H
CH 159		11590	53.47	-20.53	74	63.31	39.39	16.24	65.47	100	252	P	V
5795MHz	!	11590	51.06	-2.94	54	60.9	39.39	16.24	65.47	100	252	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

5GHz WIFI 802.11n VHT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n VHT40 LF		32.91	26.03	-13.97	40	31.42	26.14	0.77	32.3	100	0	P	H
		60.07	23.94	-16.06	40	41.03	14	1.12	32.21	-	-	P	H
		210.42	22.69	-20.81	43.5	35.74	17.04	2.13	32.22	-	-	P	H
		326.82	24.99	-21.01	46	33.41	20.74	2.92	32.08	-	-	P	H
		521.79	24.64	-21.36	46	29.07	23.99	3.43	31.85	-	-	P	H
		922.4	30.01	-15.99	46	27.8	29	4.62	31.41	-	-	P	H
		32.91	34.93	-5.07	40	40.32	26.14	0.77	32.3	120	30	P	V
		43.58	34.71	-5.29	40	45.9	20	1	32.19	-	-	P	V
		61.04	26.83	-13.17	40	44.14	13.78	1.13	32.22	-	-	P	V
		323.91	26.95	-19.05	46	35.54	20.61	2.88	32.08	-	-	P	V
		450.98	25.57	-20.43	46	28.97	25.36	3.18	31.94	-	-	P	V
		917.55	29.89	-16.11	46	27.7	29	4.61	31.42	-	-	P	V
Remark		1. No other spurious found. 2. All results are PASS against limit line.											

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is not under 6dB.
P/A	P eak or A verage
H/V	H orizontal or V ertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

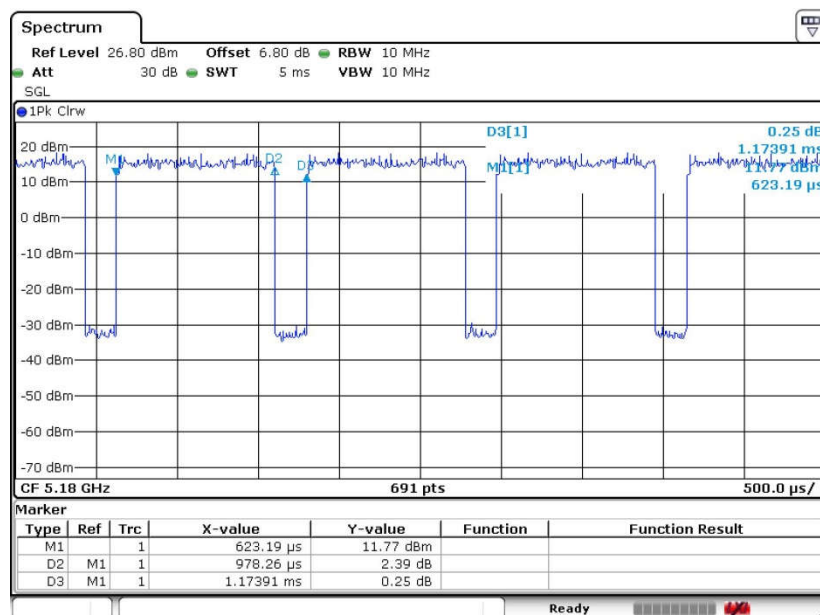
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Duty Cycle Plots

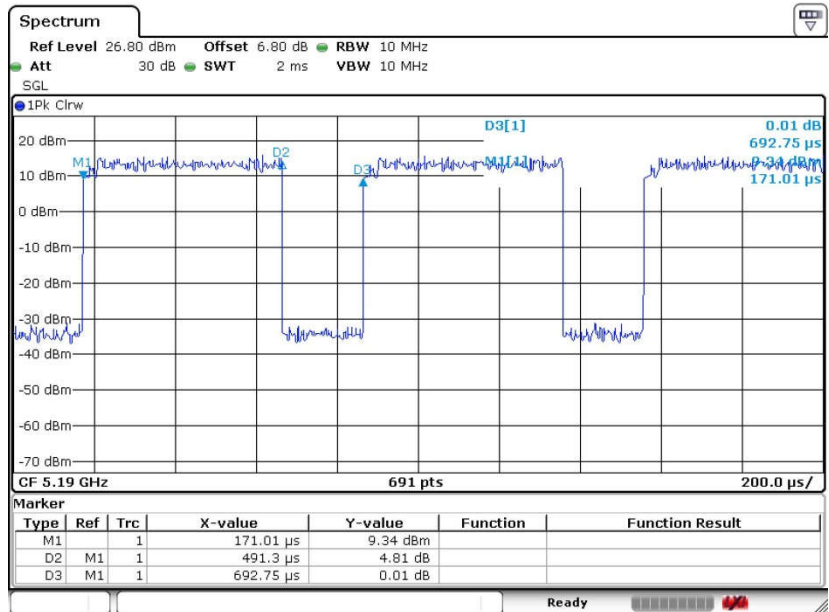
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11ac VHT20	83.33	0.978	1.022	3 kHz
802.11ac VHT40	70.92	0.491	2.035	3 kHz

802.11ac VHT20





802.11ac VHT40





Appendix E. Product Equality Declaration

Sonim Technologies, Inc. Company

Address: 1825 S. Grant St., Suite 200., San Mateo, CA, 94402

Date: December 13, 2017

Product Equality Declaration

We, Sonim Technologies, Inc., declare on our sole responsibility for the product of XP5800 (PC2111) as below:

The difference of XP5800 (PC2111) 5SA.0.0-00-7.1.2-00.25.01 and XP5800 (PC2111) 5SA.0.0-00-7.1.2-00.27.00 as below:

- HW: Same Hardware
- SW:
 - 802.11ac is enabled

All the others are the same.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,



Contact Person: Avena Xu

Company: Sonim Technologies, Inc.

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FAX: +1 650 3788190

E-mail: avena.xu@sonimtech.com