



# TEST REPORT

**APPLICANT** : Sonim Technologies, Inc.  
**PRODUCT NAME** : GSM, WCDMA, LTE Cell Phone  
**MODEL NAME** : XP3900  
**BRAND NAME** : Sonim  
**STANDARD(S)** : 47 CFR Part 15 Subpart B  
**FCC ID** : WYPP14303  
**RECEIPT DATE** : 2021-04-23  
**TEST DATE** : 2021-05-07 to 2021-05-08  
**ISSUE DATE** : 2021-06-29

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Xiao Xiong(Supervisor)

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Change History		
Version	Date	Reason for change
1.0	2021-06-29	First edition



# 1. Technical Information

Note: Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Sonim Technologies, Inc.
<b>Applicant Address:</b>	6836 Bee Cave Road, Building 1, Suite 279, Austin, Texas 78746, USA
<b>Manufacturer:</b>	Sonim Technologies, Inc.
<b>Manufacturer Address:</b>	6836 Bee Cave Road, Building 1, Suite 279, Austin, Texas 78746, USA

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	GSM, WCDMA, LTE Cell Phone
<b>Serial No.:</b>	N/A
<b>IMEI:</b>	001080002706654
<b>Hardware Version:</b>	P14303: 0200 P14403: 0201(Non-camera)
<b>Software Version:</b>	3P.2.0-01-11.0.0-19.20.16
<b>Tx Frequency:</b>	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz Bluetooth5.0: 2402 MHz ~ 2480 MHz



	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz;5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz;5745MHz ~ 5825 MHz																							
<b>Rx Frequency:</b>	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz WCDMA Band II: 1930 MHz ~ 1990 MHz WCDMA Band IV: 2110 MHz ~ 2155 MHz WCDMA Band V: 869 MHz ~ 894 MHz LTE Band 2: 1930 MHz ~ 1990 MHz LTE Band 4: 2110 MHz ~ 2155 MHz LTE Band 5: 869 MHz ~ 894 MHz LTE Band 7: 2620 MHz ~ 2690 MHz LTE Band 12: 729 MHz ~ 746 MHz LTE Band 13: 746 MHz ~ 756 MHz LTE Band 14: 758 MHz ~ 768 MHz LTE Band 25: 1930 MHz ~ 1995 MHz LTE Band 26: 859 MHz ~894 MHz LTE Band 30:2350 MHz ~ 2360MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 2110 MHz ~ 2200 MHz LTE Band 71: 617 MHz ~ 652 MHz Bluetooth5.0: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz;5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz;5745MHz ~ 5825 MHz GPS/Galileo/GLONASS/BDS: 1559 MHz ~ 1610 MHz FM: 87.5 MHz~108MHz																							
<b>Ancillary Equipment:</b>	<b>Battery</b> <table border="1"> <tr> <td>Brand Name:</td> <td>Sonim</td> </tr> <tr> <td>Model No.:</td> <td>BAT-02300-01S</td> </tr> <tr> <td>Serial No.:</td> <td>(N/A, marked #1 by test site)</td> </tr> <tr> <td>Capacity:</td> <td>2300mAh</td> </tr> <tr> <td>Rated Voltage:</td> <td>3.85V</td> </tr> <tr> <td>Charge Limit:</td> <td>4.2V</td> </tr> <tr> <td>Manufacturer:</td> <td>Tianjin Lishen Battery Joint-Stock Co., Ltd.</td> </tr> </table> <b>AC Adapter</b> <table border="1"> <tr> <td>Brand Name:</td> <td>Sonim</td> </tr> <tr> <td>Model No.:</td> <td>UC13US</td> </tr> <tr> <td>Serial No.:</td> <td>(N/A, marked #1 by test site)</td> </tr> <tr> <td>Rated Input:</td> <td>100-240V~50/60Hz, 0.35A</td> </tr> </table>		Brand Name:	Sonim	Model No.:	BAT-02300-01S	Serial No.:	(N/A, marked #1 by test site)	Capacity:	2300mAh	Rated Voltage:	3.85V	Charge Limit:	4.2V	Manufacturer:	Tianjin Lishen Battery Joint-Stock Co., Ltd.	Brand Name:	Sonim	Model No.:	UC13US	Serial No.:	(N/A, marked #1 by test site)	Rated Input:	100-240V~50/60Hz, 0.35A
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	Rated Output:	5V $\Rightarrow$ 2A
	Manufacturer:	Jiangsu Chenyang Electron Co., Ltd.

**Note:**

1. According to the certificate holder, they declare that the model XP3900 (FCC ID: WYPP14303) has two types, namely "P14303" and "P14403", the difference is as follows. The main measuring model is XP3900 (Type: P14303), only the results for XP3900 (Type: P14303) were recorded in this report. The model XP3900 (Type: P14403) has verified RE.

Model name	Type name	Variant
XP3900	P14303	With camera
	P14403	Without camera

2. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.



## 2. Test Results

### 2.1. Applied Reference Documents

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method determination Remark
1	15.107	Conducted Emission	2021.05.08	Wu Runfeng	PASS	No deviation
2	15.109	Radiated Emission	2021.05.07	Lin Jiayong	PASS	No deviation

**Note 1:** The tests were performed according to the method of measurements prescribed in ANSI C63.4-2014.

**Note 2:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

**Note 3:** When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.



## 2.2. EUT Setup and Operating Conditions

Note: All of the following test modes are tested in all the test items.

Test Modes	
Mode 1	: GSM850Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 2	: GSM1900 Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode3	: WCDMA Band II Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 4	: WCDMA Band IV Idle + Bluetooth Idle + 2.4G WLAN Idle + GPS Rx + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 5	: WCDMA Band V Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card + FM Rx
Mode 6	: LTE Band 2 Idle+ Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 7	: LTE Band 4 Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 8	: LTE Band 5Idle+ Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 9	: LTE Band 7 Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 10	: LTE Band 12Idle+ Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 11	: LTE Band 13 Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 12	: LTE Band 14Idle+ Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card + Galileo Rx
Mode 13	: LTE Band 25 Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card + GLONASS Rx
Mode 14	: LTE Band 26Idle+ Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card + BDS Rx
<b>Mode 15</b>	<b>: LTE Band 30Idle+ Bluetooth Idle + 2.4G WLAN Idle + Camera + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card</b>
Mode 16	: LTE Band 41Idle + Bluetooth Idle + 2.4G WLAN Idle + MP4 + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 17	: LTE Band66 Idle + Bluetooth Idle + 2.4G WLAN Idle + PC(data transfer) + Battery + SIM Card + PC Adapter + Earphone



Mode 18 :	LTE Band 71Idle + Bluetooth Idle + 2.4G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card + GPS Rx
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**Remark:**  
The above test mode in boldface (Mode 15) was the worst case of radiated emission and conducted emission tests, only the test data of these modes were reported.

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106



### 3. 47 CFR Part 15B Requirements

#### 3.1. Conducted Emission

##### 3.1.1. Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

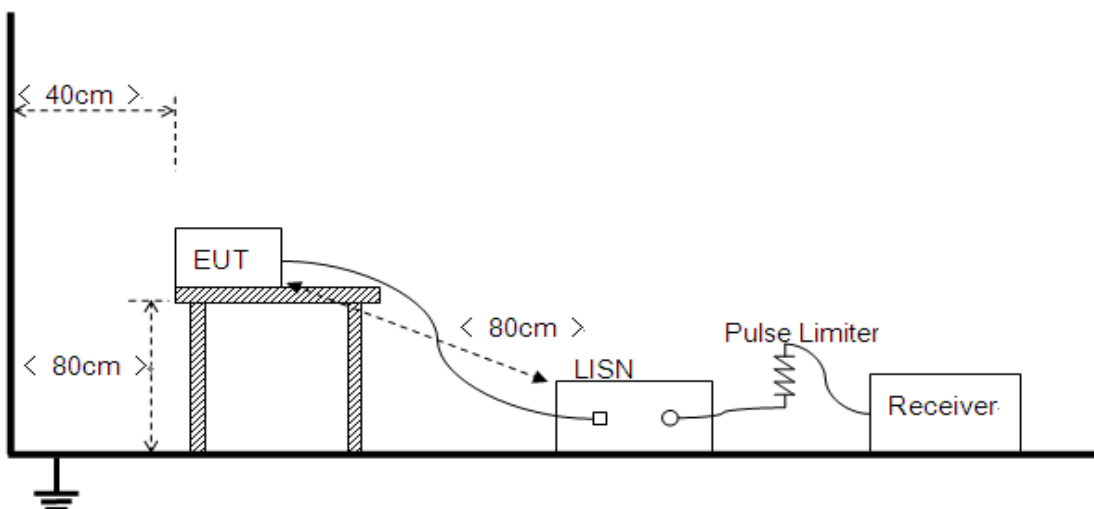
Frequency range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- a) The limit subjects to the Class B digital device.
- b) The lower limit shall apply at the band edges.
- c) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

##### 3.1.2. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.





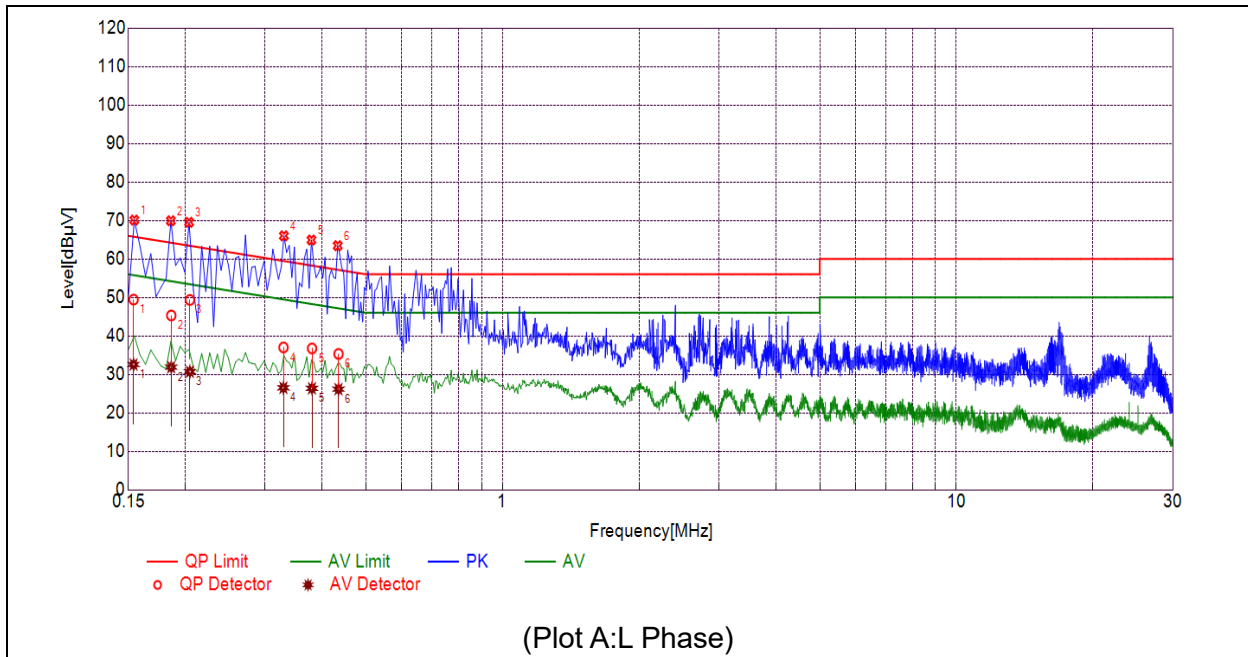
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

The power strip or extension cord has been investigated to make sure that the LISN integrity is maintained with respect to the impedance characteristics as prescribed in ANSI C63.4-2014 at Clause 4.3.

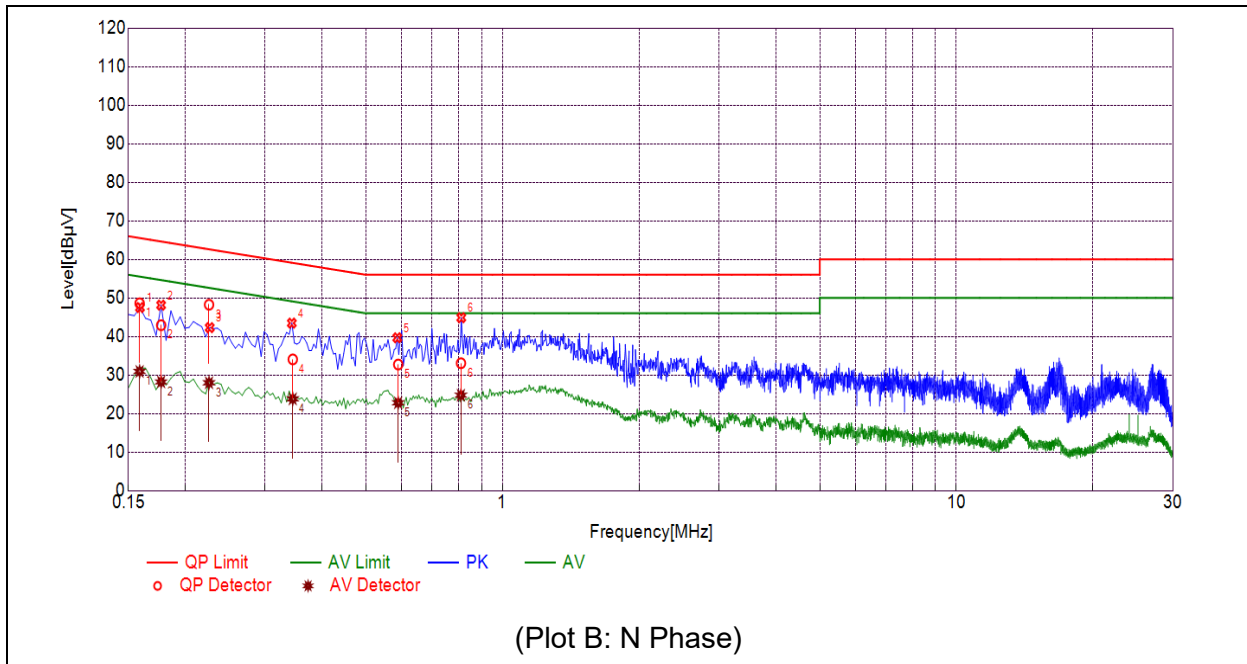
### 3.1.3. Test Result

RBW=9 kHz, VBW=30 kHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

**A. Test Plot and Suspicious Points:**



NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1539	49.44	32.56	65.79	55.79	Line	PASS
2	0.1863	45.32	31.87	64.20	54.20		PASS
3	0.2048	49.35	30.70	63.41	53.41		PASS
4	0.3292	37.00	26.52	59.47	49.47		PASS
5	0.3805	36.75	26.37	58.27	48.27		PASS
6	0.4352	35.32	26.16	57.15	47.15		PASS



NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1587	48.61	30.92	65.53	55.53	Neutral	PASS
2	0.1770	42.92	28.21	64.62	54.62		PASS
3	0.2257	48.23	27.99	62.61	52.61		PASS
4	0.3451	34.05	23.80	59.08	49.08		PASS
5	0.5891	32.72	22.78	56.00	46.00		PASS
6	0.8100	33.06	24.75	56.00	46.00		PASS



### 3.2. Radiated Emission

#### 3.2.1. Requirement

According to FCC section 15.109 (a), the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength Limitation at 3m Measurement Dist	
	( $\mu\text{V/m}$ )	( $\text{dB}\mu\text{V/m}$ )
30.0 - 88.0	100	20log 100
88.0 - 216.0	150	20log 150
216.0 - 960.0	200	20log 200
Above 960.0	500	20log 500

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in  $\text{dB}\mu\text{V/m}$  is calculated by  $20\log$  Emission Level( $\mu\text{V/m}$ ).

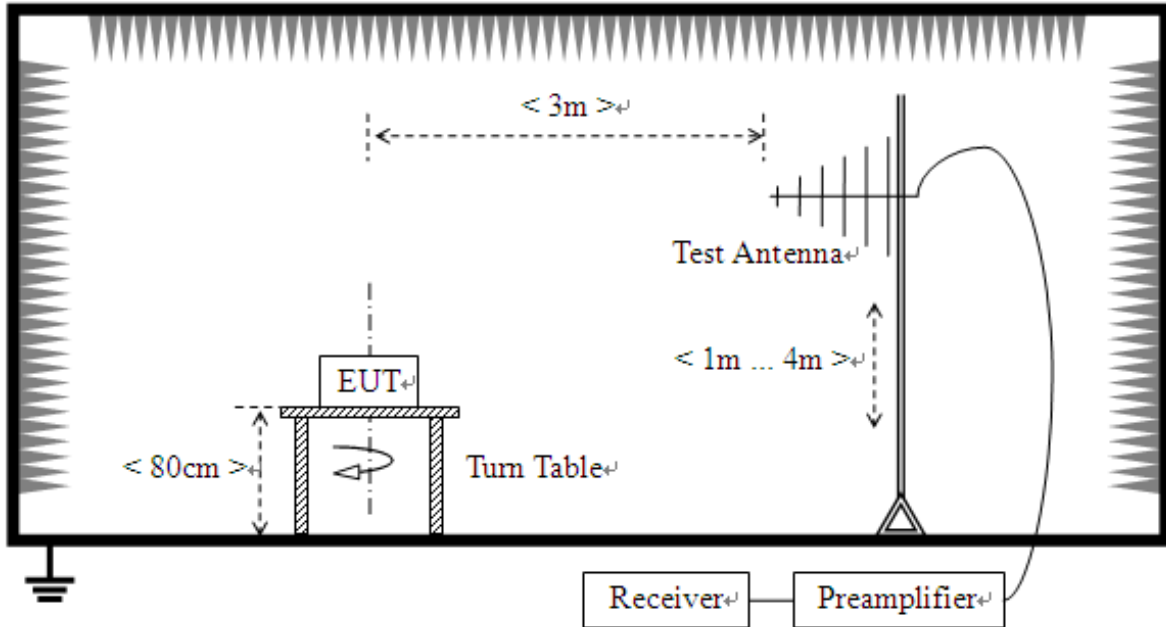
#### 3.2.2. Frequency range of measurement

According to 15.33(b)(1), the frequency range of radiated measurement for the EUT is listed in the following table:

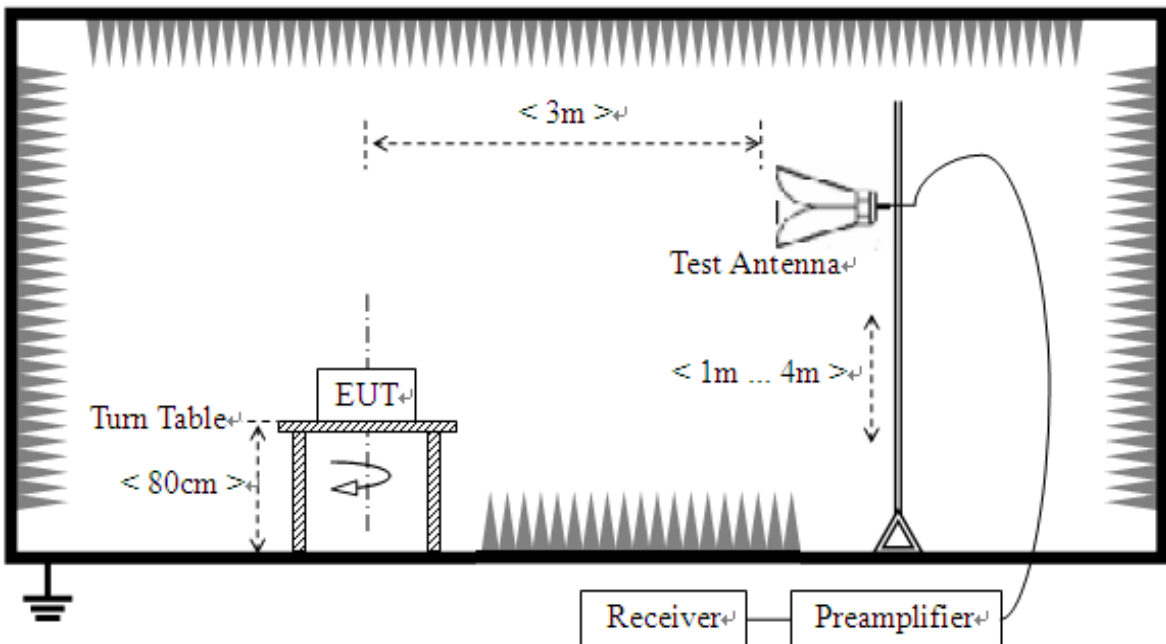
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705 .....	30.
1.705-108 .....	1000.
108-500 .....	2000.
500-1000 .....	5000.
Above 1000 .....	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

### 3.2.3. Test Setup

- 1) For radiated emissions from 30MHz to1GHz



- 2) For radiated emissions above 1GHz





The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

For measurements below 1GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

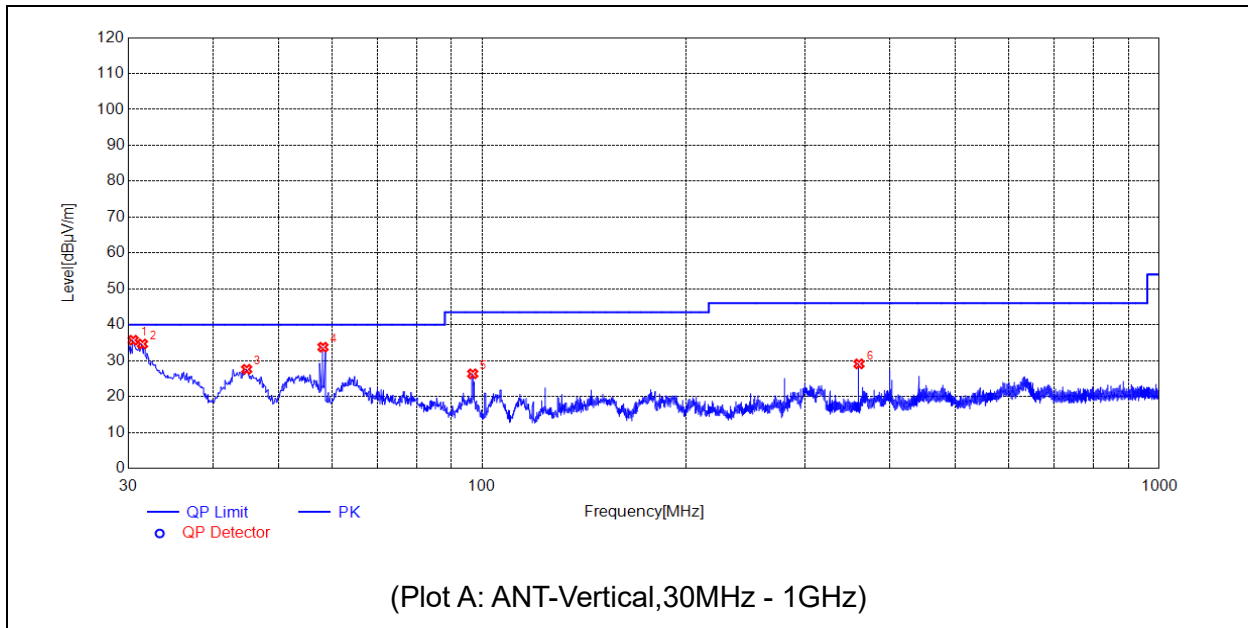
For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video bandwidth is set to 3MHz for peak measurements and as applicable for average measurements.

#### **3.2.4. Test Result**

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

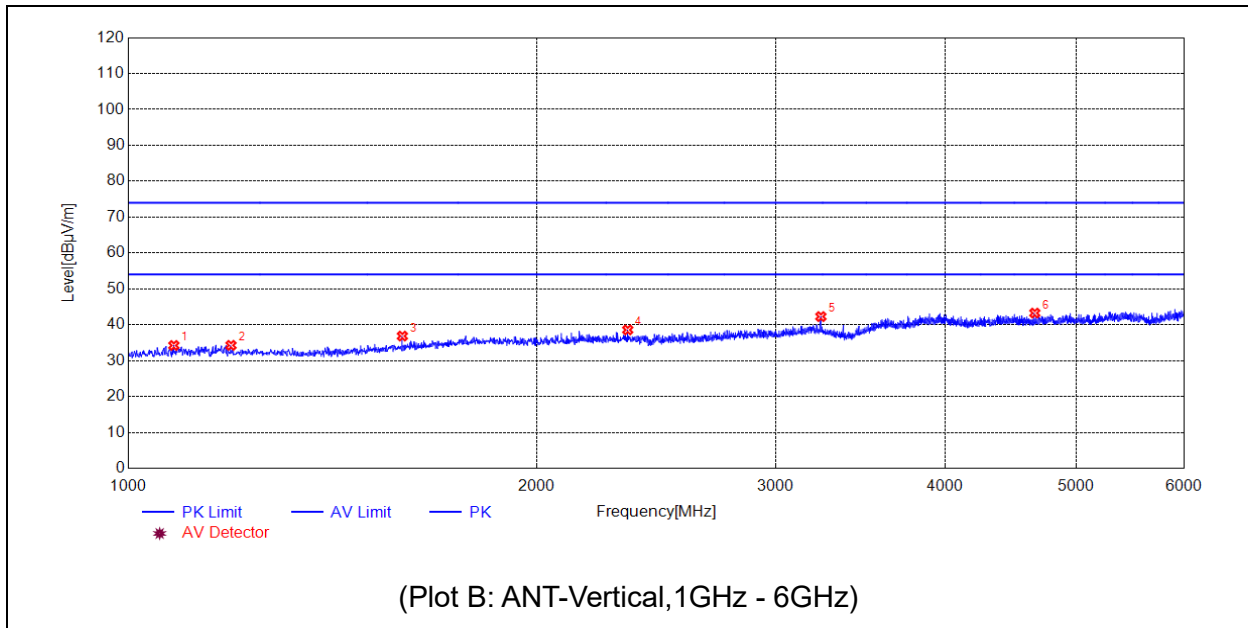
The amplitude of emissions (6GHz-30GHz) which are attenuated more than 20 dB below the permissible value need not be reported.

Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

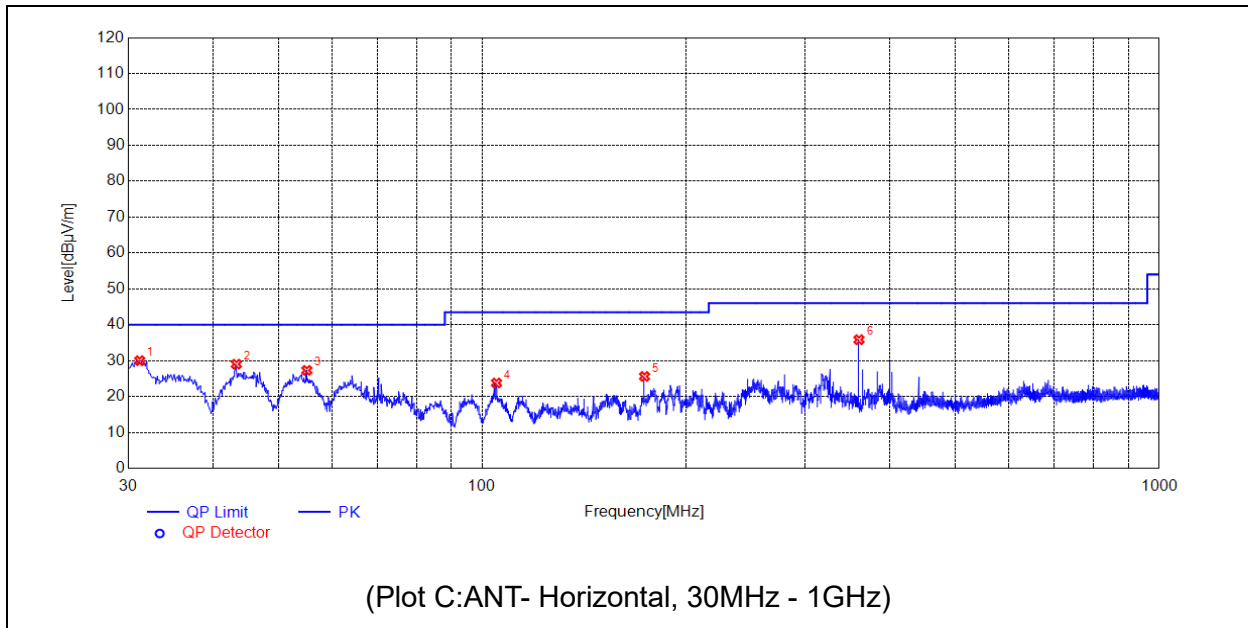


No.	Fre. MHz	Pk dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	30.4850	35.70	N.A	N.A	N.A	40.00	N.A	V	PASS
2	31.4551	34.65	N.A	N.A	N.A	40.00	N.A	V	PASS
3	44.8425	27.59	N.A	N.A	N.A	40.00	N.A	V	PASS
4	58.1328	33.76	N.A	N.A	N.A	40.00	N.A	V	PASS
5	96.7427	26.34	N.A	N.A	N.A	43.50	N.A	V	PASS
6	360.0270	29.10	N.A	N.A	N.A	46.00	N.A	V	PASS

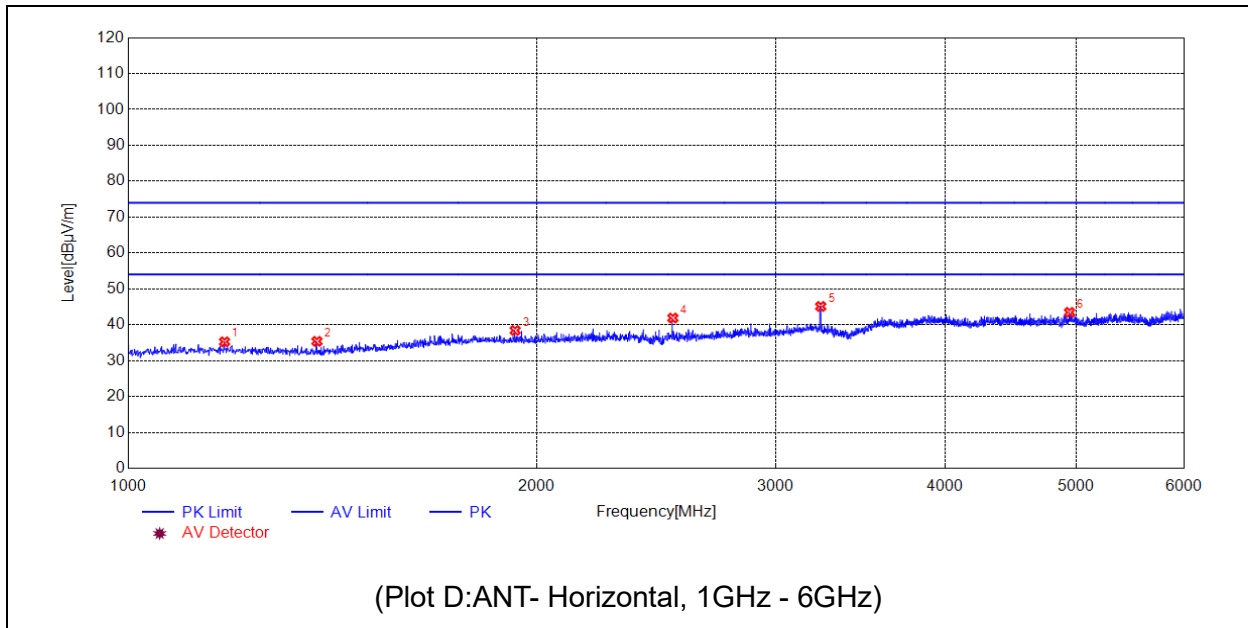




No.	Fre. MHz	Pk dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1080.0160	34.23	N.A	N.A	74.00	N.A	54.00	V	PASS
2	1190.0380	34.27	N.A	N.A	74.00	N.A	54.00	V	PASS
3	1592.1184	36.85	N.A	N.A	74.00	N.A	54.00	V	PASS
4	2334.2669	38.57	N.A	N.A	74.00	N.A	54.00	V	PASS
5	3240.4481	42.28	N.A	N.A	74.00	N.A	54.00	V	PASS
6	4659.7319	43.26	N.A	N.A	74.00	N.A	54.00	V	PASS



No.	Fre. MHz	Pk dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	31.1641	29.99	N.A	N.A	N.A	40.00	N.A	H	PASS
2	43.2903	29.01	N.A	N.A	N.A	40.00	N.A	H	PASS
3	55.0285	27.29	N.A	N.A	N.A	40.00	N.A	H	PASS
4	104.8915	23.77	41.03	N.A	N.A	43.50	N.A	H	PASS
5	173.5744	25.60	N.A	N.A	N.A	43.50	N.A	H	PASS
6	360.0270	35.84	N.A	N.A	N.A	46.00	N.A	H	PASS



No.	Fre. MHz	Pk dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1177.0354	35.26	N.A	N.A	74.00	N.A	54.00	H	PASS
2	1377.0754	35.39	N.A	N.A	74.00	N.A	54.00	H	PASS
3	1928.1856	38.42	N.A	N.A	74.00	N.A	54.00	H	PASS
4	2520.3041	41.88	N.A	N.A	74.00	N.A	54.00	H	PASS
5	3239.4479	45.11	N.A	N.A	74.00	N.A	54.00	H	PASS
6	4942.7886	43.47	N.A	N.A	74.00	N.A	54.00	H	PASS



## Annex A Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

### Uncertainty of Conducted Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	9kHz-150kHz	±3.3dB
	150kHz-30MHz	±2.8dB

### Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	±5.06dB
	200MHz-1000MHz	±5.04dB
	1GHz-6GHz	±5.18dB
	6GHz-18GHz	±5.48dB



## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

<b>Laboratory Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Laboratory Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
<b>Telephone:</b>	+86 755 36698555
<b>Facsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

### 3. Accreditation Certificate

<b>Accredited Testing Laboratory:</b>	The FCC designation number is CN1192. Test firm registration number is 226174. (Shenzhen Morlab Communications Technology Co., Ltd.)
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### 4. Test Software Utilized

<b>Model</b>	<b>Version Number</b>	<b>Producer</b>
JS32-RE	Version 2.0.2.0	Tonscend
TS+ -[ JS32-CE]	Version2.5.0.0	Tonscend

**5. Test Equipments Utilized**

Description	Model	Serial No.	Manufacturer	Cal. Date	Due. Date
Bi-Log Antenna	VULB 9163	9163-519	SCHWARZBE CK	2019/5/24	2022/5/23
Horn Antenna	BBHA 9120D	01774	SCHWARZBE CK	2019/7/26	2022/7/25
Receiver	N9038A	MY56400093	KEYSIGHT	2021/3/9	2022/3/8
6db Attenuator	BW-N6W5+	E191001	Mini-circuits	2020/10/20	2021/10/19
Preamplifier	S020180L320 3	61171/61172	LUCIX CORP.	2020/7/21	2021/7/20
Preamplifier	S10M100L380 2	46732	LUCIX CORP.	2020/7/21	2021/7/20
6db Attenuator	BW-N6W5+	E191001	Mini-circuits	2020/10/20	2021/10/19
Receiver	ESPI	101052	R&S	2020/7/21	2021/7/20
LISN	NSLK 8127	8127449	Schwarzbeck	2021/3/9	2022/3/8
LISN	NNBM 8125	81251742	Schwarzbeck	2021/3/9	2022/3/8
LISN	NNBM 8125	81251743	Schwarzbeck	2021/3/9	2022/3/8
10dB Pulse Limiter	VTSD 9561-F	VTSD 9561 F-B #206	SCHWARZBE CK	2020/7/24	2021/7/23

**6. Ancillary Equipment Utilized**

Description	Manufacturer	Model	Serial No.
PC	DELL	VOSTRO 5370	DF2DR A01 DPC
PC Adapter	DELL	LA45NM140	OKXTTW

————— END OF REPORT —————