



TEST REPORT

APPLICANT : Reliance Communications LLC

PRODUCT NAME : Orbic Speed X

MODEL NAME : RC400LX

BRAND NAME : Orbic, Kajeet

FCC ID : 2ABGH-RC400LX

STANDARD(S) : 47 CFR Part 15 Subpart B

RECEIPT DATE : 2020-04-16

TEST DATE : 2020-04-20 to 2020-04-23

ISSUE DATE : 2020-07-13

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Change History		
Issue	Date	Reason for Change
1.0	2020-07-13	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States
Manufacturer:	Unimaxcomm
Manufacturer Address:	Room 602, Floor 6th, Building B, Software Park T3,Hi-Tech Park South, Nanshan District, Shenzhen, P.R. China

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic Speed X
Serial No.:	(N/A, marked #1 by test site)
Hardware Version:	V1.1
Software Version:	ORB400LX_V1.0.2_BVZNAKJ
Tx Frequency:	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 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 802.11 b/g/n: 2.412 GHz ~ 2.462 GHz 802.11 n/ac: 5.180 GHz ~ 5.240 GHz; 5.745 GHz ~ 5.825 GHz
Rx Frequency:	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 14: 758 MHz ~ 768 MHz LTE Band 17: 734 MHz ~ 746 MHz LTE Band 25: 1930 MHz ~ 1995 MHz LTE Band 26: 859 MHz ~ 894 MHz LTE Band 30: 2350 MHz ~ 2360 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 2110 MHz ~ 2200 MHz LTE Band 71: 617 MHz ~ 652 MHz 802.11 b/g/n: 2.412 GHz ~ 2.462 GHz 802.11 n/ac: 5.180 GHz ~ 5.240 GHz; 5.745 GHz ~ 5.825 GHz	
Ancillary Equipment:	Battery	
	Brand Name:	Orbic
	Model No.:	BTE-3003
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	3000mAh
	Rated Voltage:	3.7V
	Charge Limit:	4.2V
	Manufacturer:	Phenix New Energy(Huizhou) Co., Ltd.
	AC Adapter	
	Brand Name:	Orbic
	Model No.:	TPA-5950100UU
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V ~ 50/60Hz, 0.2A
	Rated Output:	5.0V = 1.0A
	Manufacturer:	ShenZhen Kingfulin Technology Co., Ltd

Note:

1. The Orbic Speed X supports WCDMA Band II, Band IV, Band V, HSDPA, HSUPA, HSPA+, DC-HSPA, LTE Band 2/4/5/7/12/14/17/25/26/30/41/66/71 and WIFI functions.
2. The EUT is equipped with a T-Flash card slot, single SIM card slots and a Micro USB port which can be connected to ancillary equipments.



3. This test report is updated from the original report (Report No.: SZ20040157E01, Model: RC400L). According to the previous similarity, only modify the product name, model, software and hardware version; Add a brand; Add 3G/4G RF front end components (added UMTS Band 4 and LTE Band 7/12/14/17/25/26/30/41/71); Disable LTE Band 13 (Remove LTE Band 13 components); Disable WiFi MIMO function and change to SISO (Remove one WiFi connector and related components), the WiFi chip and circuit are the same as before. We evaluated and tested the above changes, which had no impact on the test results.
4. 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	2020.04.23	Huang Zhiye	PASS ^{Note 2}	No deviation
2	15.109	Radiated Emission	2020.04.20	Yang Jie	PASS ^{Note 2}	No deviation

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

Note 2: The test results of these test items in this report refer to the test report (Report No.: SZ20040157E01).

Note 3: 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.



2.2. EUT Setup and Operating Conditions

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

Test Mode	
Mode 1	: EUT + Adapter + WCDMA/LTE Band Idle + WLAN Idle + Battery + Charging
Mode 2	: EUT + WCDMA/LTE Band Idle + WLAN Idle + PC + Battery + Normal working
Remark: The above test mode in boldface (Mode 2) was the worst cases of radiated emission test; only the test data of the mode was reported. The above test mode in boldface (Mode 1) was the worst cases of conducted emission test; only the test data of the mode was 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 50 μ H/50 Ω line impedance stabilization network (LISN).

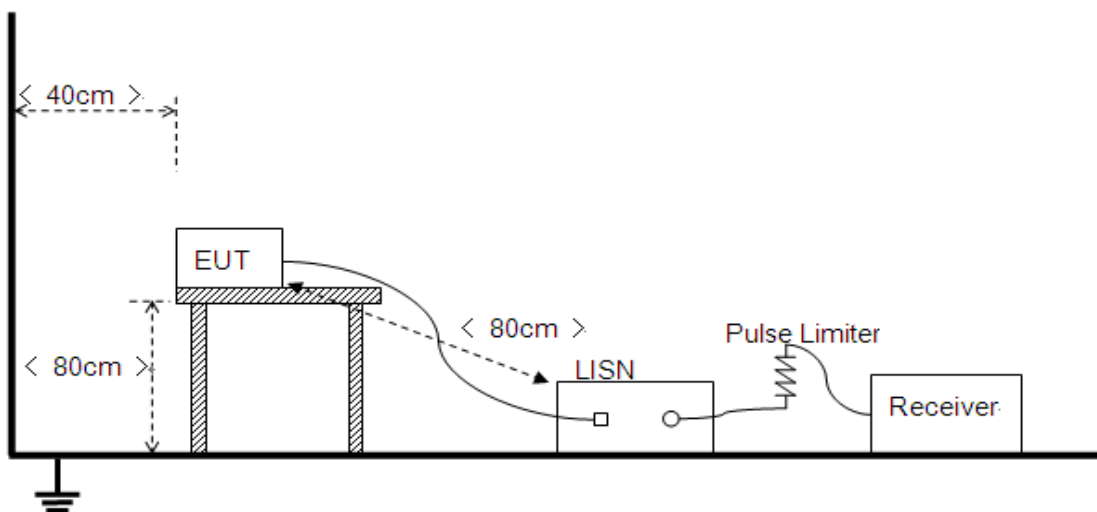
Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- The limit subjects to the Class B digital device.
- The lower limit shall apply at the band edges.
- 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.





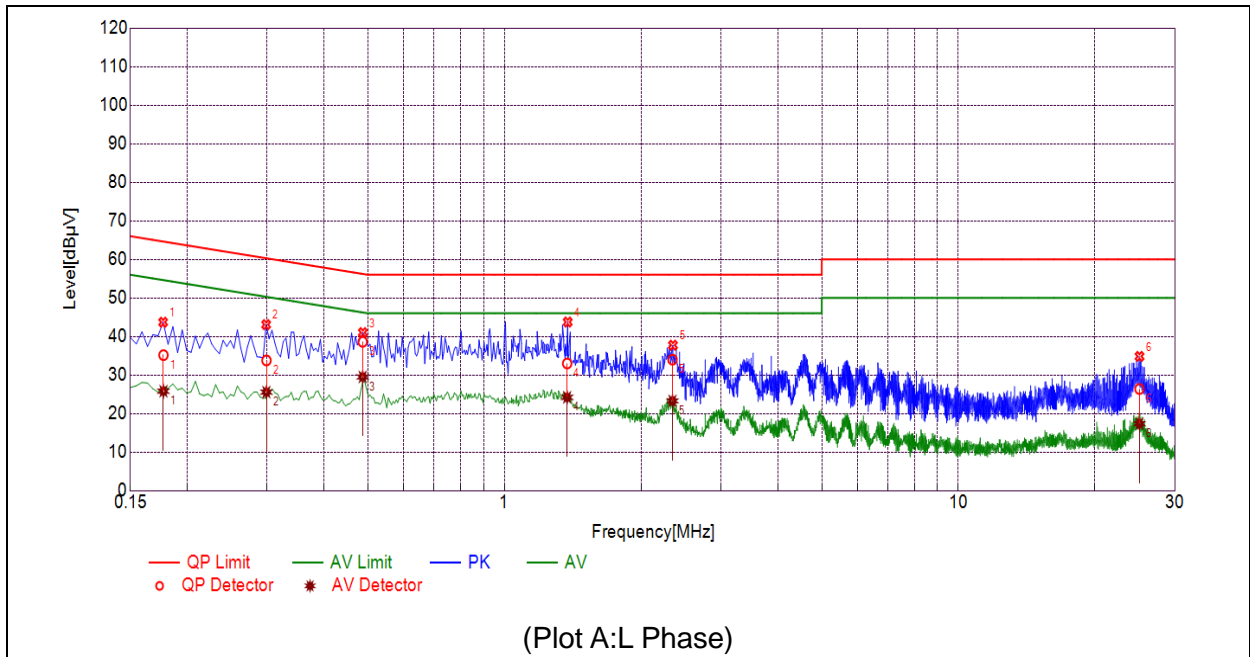
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument. A 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.

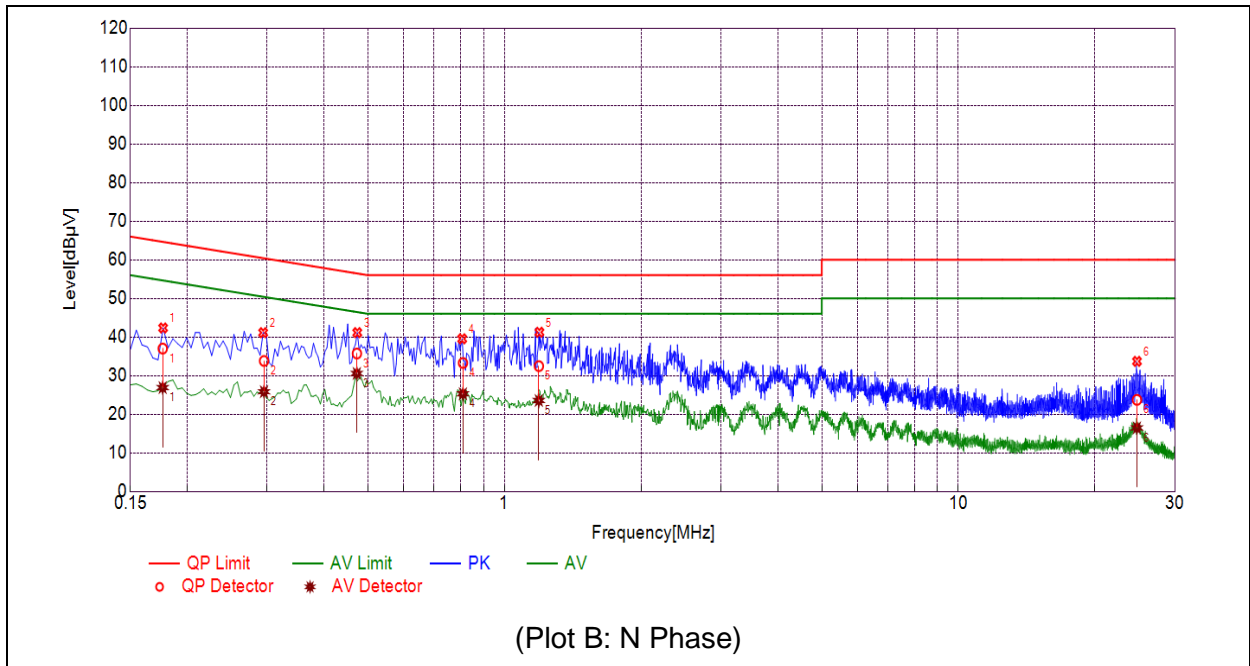
3.1.3. Test Result

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	0.1773	35.16	25.80	64.61	54.61	Line	PASS
2	0.2989	33.78	25.56	60.27	50.27		PASS
3	0.4871	38.60	29.50	56.22	46.22		PASS
4	1.3742	32.99	24.20	56.00	46.00		PASS
5	2.3449	33.97	23.27	56.00	46.00		PASS
6	25.0565	26.37	17.36	60.00	50.00		PASS



NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1766	37.00	26.89	64.64	54.64	Neutral	PASS
2	0.2953	33.80	25.82	60.37	50.37		PASS
3	0.4729	35.73	30.56	56.46	46.46		PASS
4	0.8100	33.27	25.29	56.00	46.00		PASS
5	1.1904	32.45	23.55	56.00	46.00		PASS
6	24.7376	23.72	16.46	60.00	50.00		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($\mu\text{V/m}$).

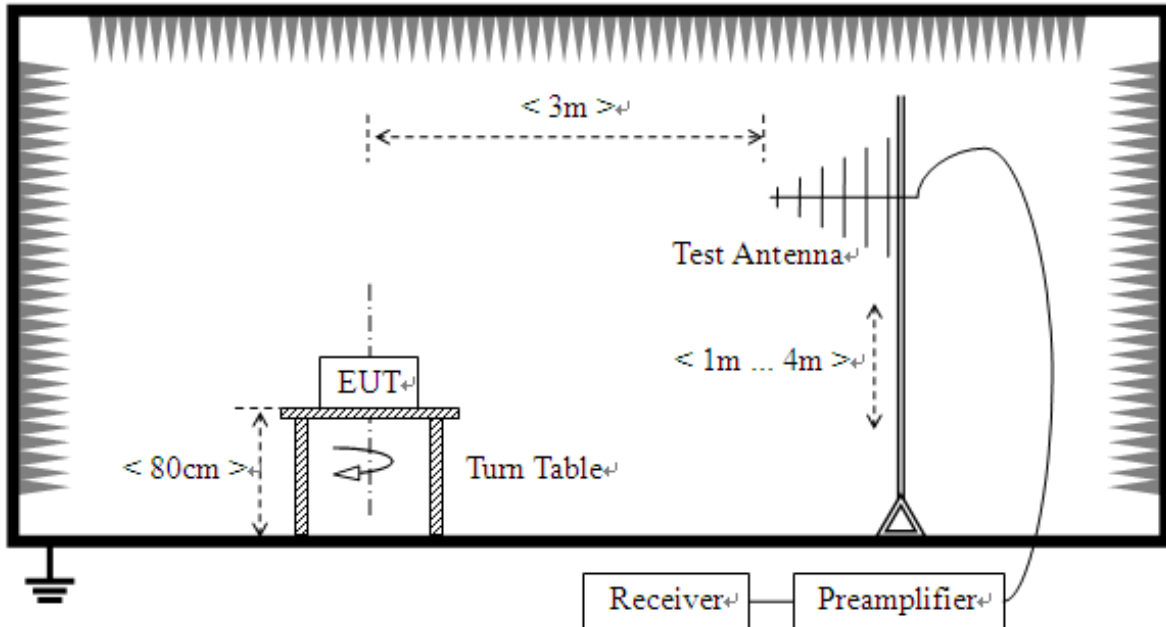
3.2.2. Frequency Range of Measurement

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

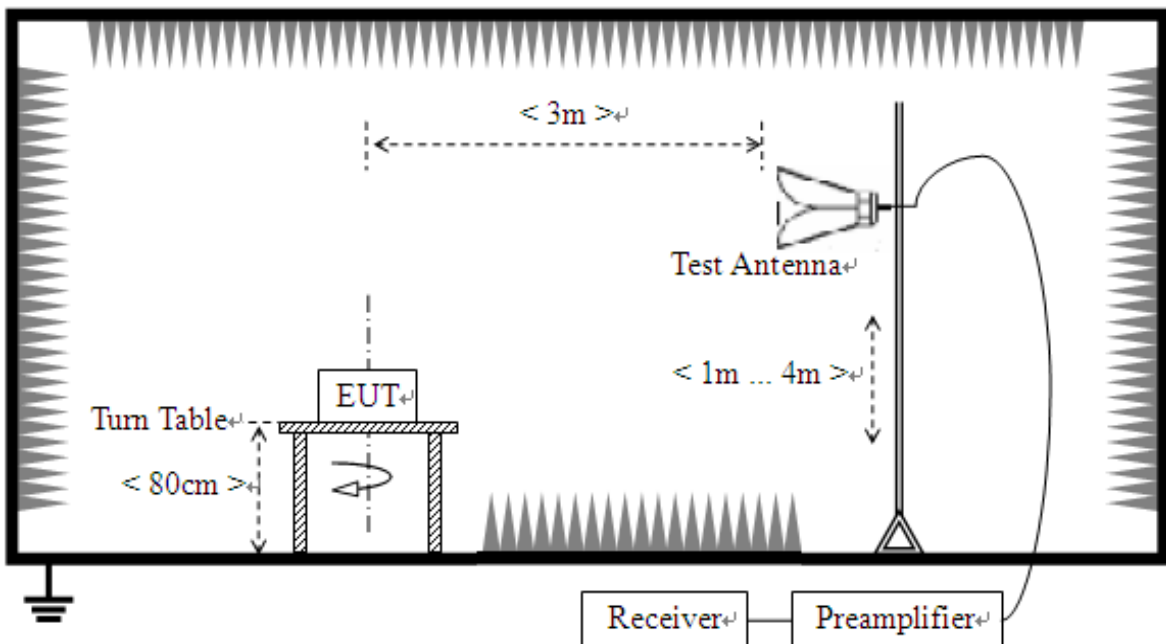
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

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:

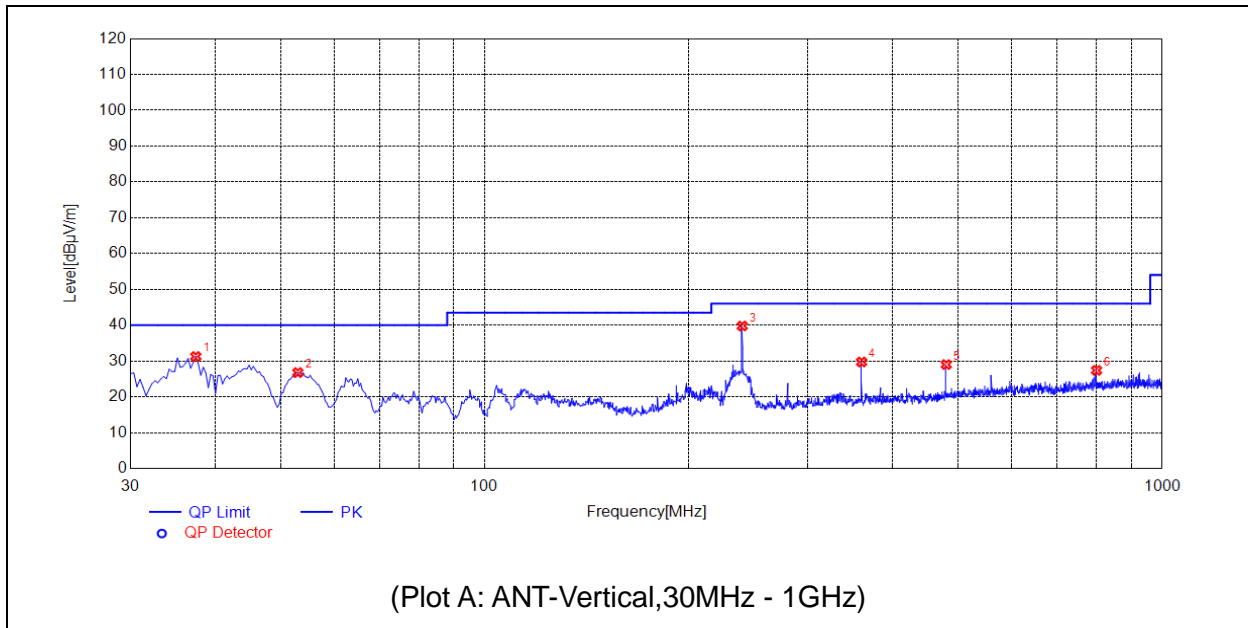
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal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

3.2.4. Test Result

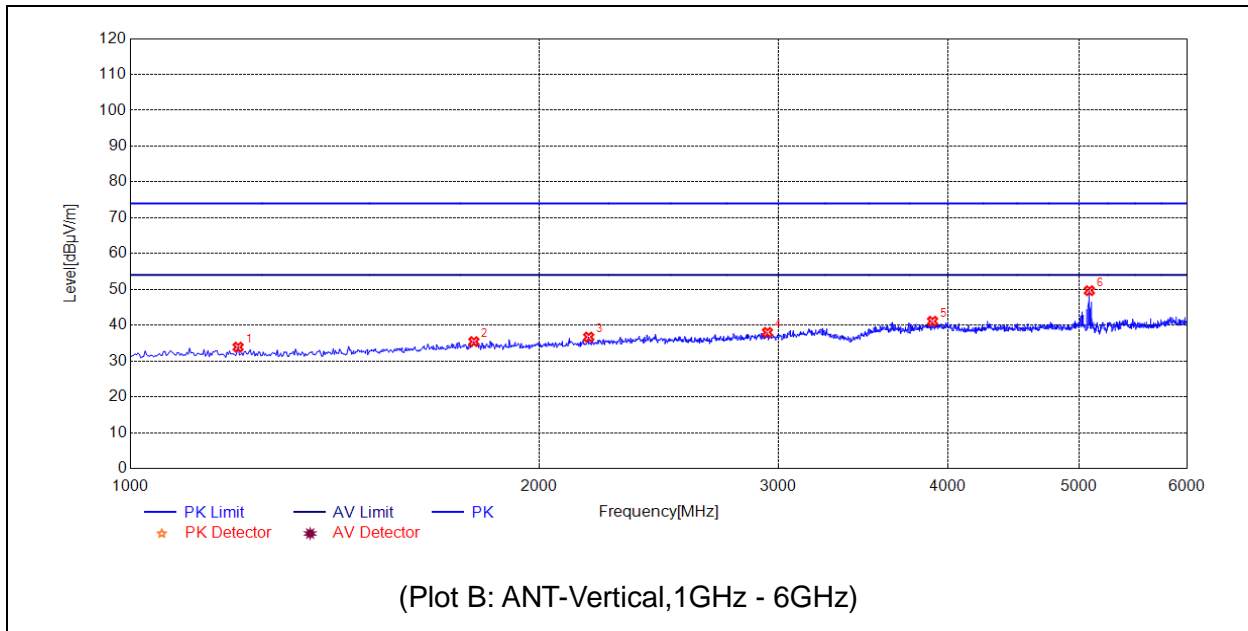
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

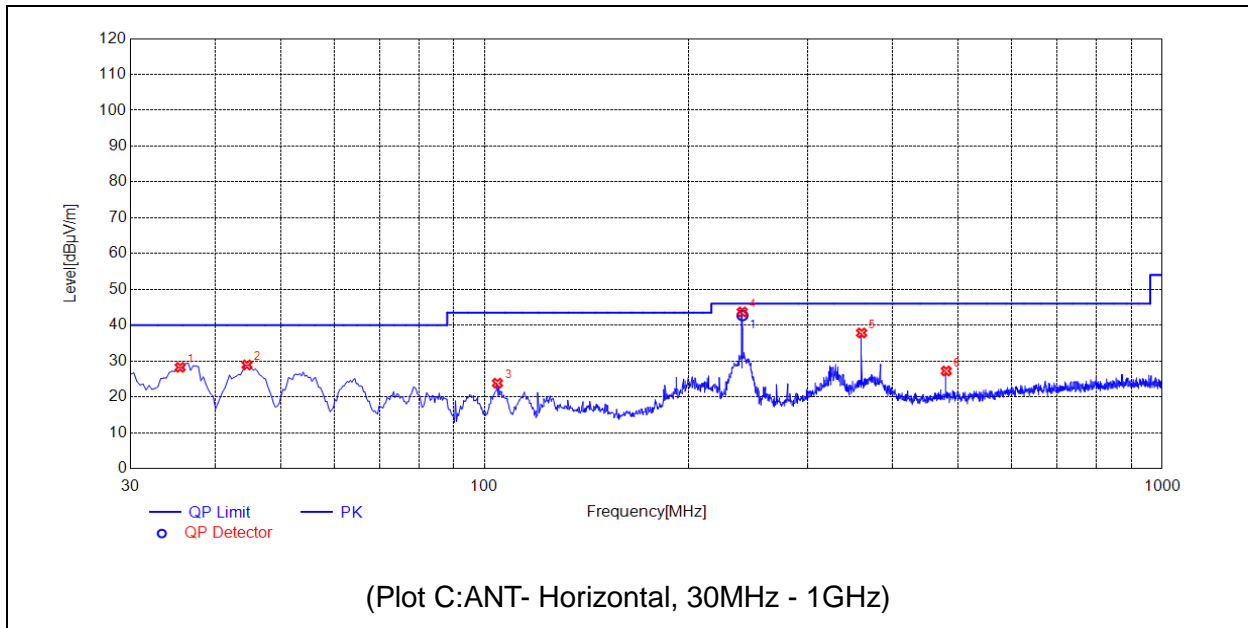
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.



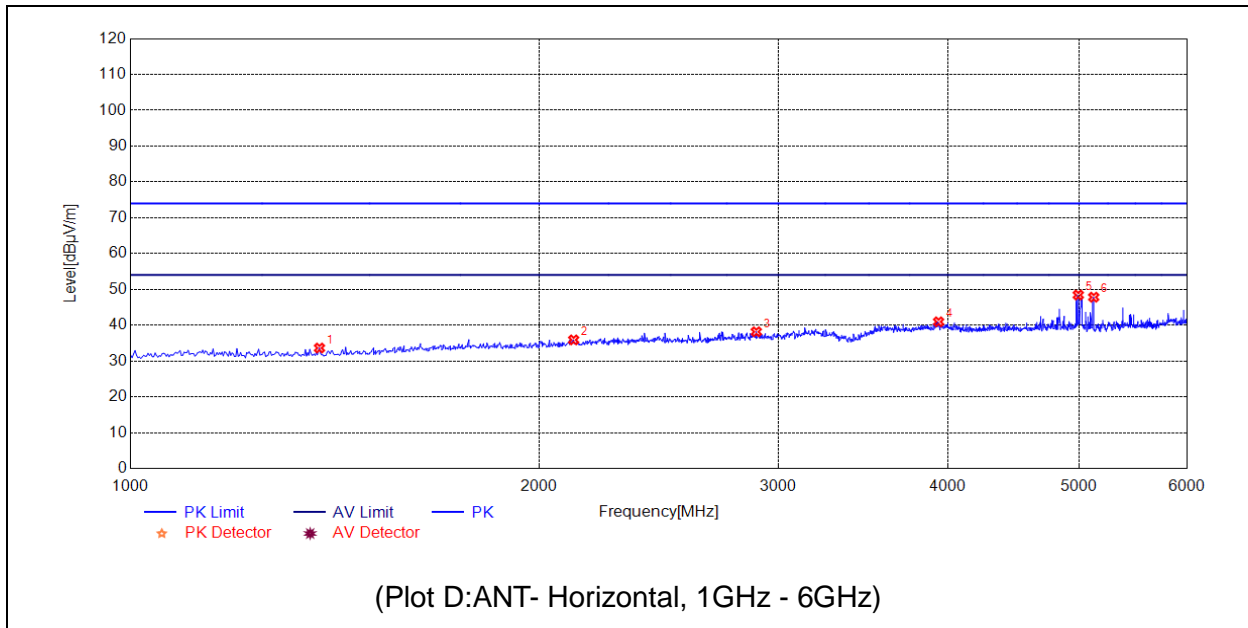
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	37.4391	31.25	N.A	N.A	N.A	40.00	N.A	V	PASS
2	52.9643	26.78	N.A	N.A	N.A	40.00	N.A	V	PASS
3	239.9133	39.78	N.A	N.A	N.A	46.00	N.A	V	PASS
4	359.9100	29.73	N.A	N.A	N.A	46.00	N.A	V	PASS
5	479.9066	29.01	N.A	N.A	N.A	46.00	N.A	V	PASS
6	799.7899	27.39	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	1200.1001	33.89	N.A	N.A	74.00	N.A	54.00	V	PASS
2	1790.3952	35.42	N.A	N.A	74.00	N.A	54.00	V	PASS
3	2175.5878	36.69	N.A	N.A	74.00	N.A	54.00	V	PASS
4	2945.9730	38.01	N.A	N.A	74.00	N.A	54.00	V	PASS
5	3898.9495	41.11	N.A	N.A	74.00	N.A	54.00	V	PASS
6	5087.0435	49.64	N.A	N.A	74.00	N.A	54.00	V	PASS



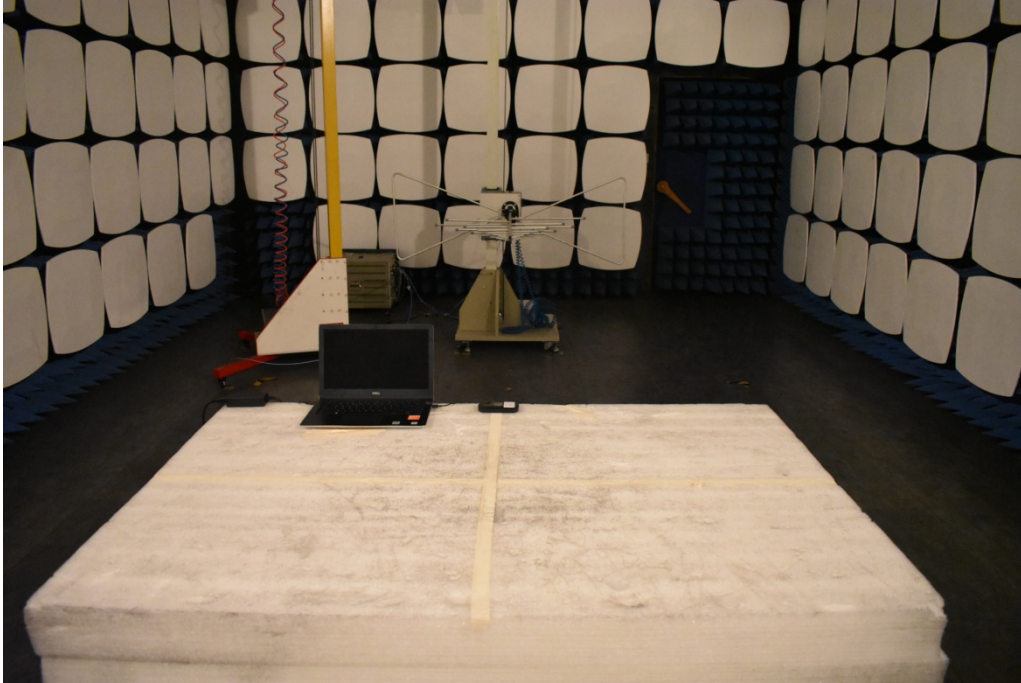
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	35.4985	28.24	N.A	N.A	N.A	40.00	N.A	H	PASS
2	44.5549	28.90	N.A	N.A	N.A	40.00	N.A	H	PASS
3	104.3915	23.82	N.A	N.A	N.A	43.50	N.A	H	PASS
4	240.0001	43.70	42.70	N.A	N.A	46.00	N.A	H	PASS
5	359.9100	37.84	N.A	N.A	N.A	46.00	N.A	H	PASS
6	479.9066	27.22	N.A	N.A	N.A	46.00	N.A	H	PASS



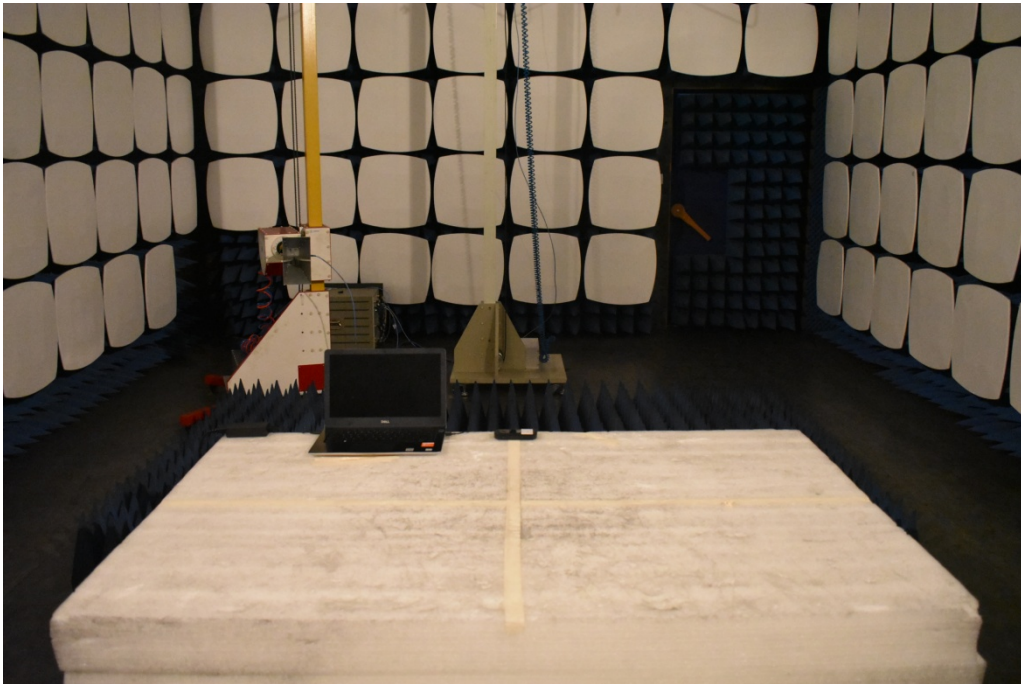
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1377.6888	33.63	N.A	N.A	74.00	N.A	54.00	H	PASS
2	2120.5603	35.90	N.A	N.A	74.00	N.A	54.00	H	PASS
3	2890.9455	38.16	N.A	N.A	74.00	N.A	54.00	H	PASS
4	3938.9695	40.95	N.A	N.A	74.00	N.A	54.00	H	PASS
5	4991.9960	48.43	N.A	N.A	74.00	N.A	54.00	H	PASS
6	5124.5623	47.82	N.A	N.A	74.00	N.A	54.00	H	PASS

Annex A Photographs of Test Setup

1. Radiated Emission(30MHz-1GHz)



2. Radiated Emission(Above 1GHz)



3. Conducted Emission





Annex B 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	±4.1dB
	150kHz-30MHz	±3.7dB

Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	±5.06dB
	200MHz-1000MHz	±5.24dB
	1GHz-6GHz	±5.18dB
	6GHz-18GHz	±5.48dB



Annex C Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

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

2. Identification of the Responsible Testing Location

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

3. Accreditation Certificate

Accredited Testing Laboratory:	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

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

**5. Test Equipments Utilized**

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2019.07.29	2020.07.28
Test Receiver	R&S	ESPI	101052	2019.07.29	2020.07.28
LISN	Schwarzbeck	NSLK 8127	812744	2020.03.26	2021.03.25
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-F	VTSD 9561 F-B #206	2019.08.13	2020.08.12
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-519	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	1774	2019.07.26	2022.07.25
Test Antenna - Horn	Schwarzbeck	BBHA9170	BBHA9170#774	2019.07.26	2022.07.25
Radiated Disturbance Preampfier	rflight	S020180L3203	61171/61172	2019.07.29	2020.07.28
Radiated Disturbance Preampfier	rflight	S10M100L3802	46732	2019.07.29	2020.07.28
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2019.07.13	2022.07.12
PC	DELL	VOSTRO 5370	DF2DR A01 DPC	N/A	N/A
PC Adapter	DELL	LA45NM140 LPS	OKXTTW	N/A	N/A

————— END OF REPORT —————