



REPORT No.: SZ21010412E01

TEST REPORT

APPLICANT : Reliance Communications LLC

PRODUCT NAME : Orbic Myra

MODEL NAME : R678L5

BRAND NAME : Orbic

FCC ID : 2ABGH-R678L5

STANDARD(S) : 47 CFR Part 15 Subpart B

RECEIPT DATE : 2021-02-22

TEST DATE : 2021-05-03 to 2021-05-06

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Change History		
Version	Date	Reason for Change
1.0	2021-05-27	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:	ZJY RIGHT SOURCE INDIA PRIVATE LIMITED
Manufacturer Address:	MIDC industrial Area, Shiravane, Nerul, India

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic Myra
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	V2.2
Software Version:	ORB678L5_v1.0.42_BVZ
Tx Frequency:	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 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n77: 3300 MHz ~ 4200 MHz 5G NR n260: 37000 MHz ~ 29500 MHz 5G NR n261: 27.5 GHz ~ 28.35 GHz Bluetooth 5.0: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz; 5745 MHz ~ 5825 MHz



Rx Frequency:	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 12: 729 MHz ~ 746 MHz LTE Band 13: 746 MHz ~ 756 MHz LTE Band 46: 5150 MHz ~ 5925 MHz LTE Band 66: 2110 MHz ~ 2200 MHz 5G NR n2: 1930 MHz ~ 1990 MHz 5G NR n5: 869 MHz ~ 894 MHz 5G NR n66: 2110 MHz ~ 2200 MHz 5G NR n77: 3300 MHz ~ 4200 MHz 5G NR n260: 37000 MHz ~ 29500 MHz 5G NR n261: 27.5 GHz ~ 28.35 GHz Bluetooth 5.0: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz; 5745 MHz ~ 5825 MHz	
Ancillary Equipment:	AC Adapter	
	Brand Name:	Orbic
	Model No.:	BLJ-QC06HU
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V~ 50/60Hz Max. 0.5A
	Rated Output:	5V=3A , 9V=2A , 12V=1.5A
	Manufacturer:	Baolijin
	Battery	
	Brand Name:	Orbic
	Model No.:	BLE-5001
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	5000 mAh
	Rated Voltage:	3.85V
	Charge Limit:	4.4V
	Manufacturer:	HUIZHOU DXDRAGON INC

Note:



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1. 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	2021.05.06	Wu Runfeng	PASS	No deviation
2	15.109	Radiated Emission	2021.05.03	Lin Jiayong	PASS	No deviation

Note 1: 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 2: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.



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 + 2.4 G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 2 :	GSM1900 Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 3 :	WCDMA Band II Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 4 :	WCDMA Band IV Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 5 :	WCDMA BandV Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 6 :	LTE Band 2 Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 7 :	LTE Band 4 Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 8 :	LTE Band 5 Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 9 :	LTE Band 12Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 10 :	LTE Band 13Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 11 :	LTE Band 46Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 12 :	LTE Band 66 Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 13 :	NSA_2A_n2A Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 14 :	NSA_2A_n5A Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card + GPS Rx
Mode 15 :	NSA_2A_n66A Idle + Bluetooth Idle + 5G WLAN Idle + Camera + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 16 :	NSA_2A_n260A Idle + Bluetooth Idle + 5G WLAN Idle + MP4 + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 17 :	NSA_2A_n261A Idle + Bluetooth Idle + 5G WLAN Idle+ PC(data transfer) + Battery + Earphone + USB Cable + SIM Card + PC Adapter

**Remark:**

The above test mode in boldface (Mode 15) was the worst case of conducted emission test, only the test data of these modes were reported. The above test mode in boldface (Mode 17) was the worst case of radiated emission test, 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 50 μ H/50 Ω line impedance stabilization network (LISN).

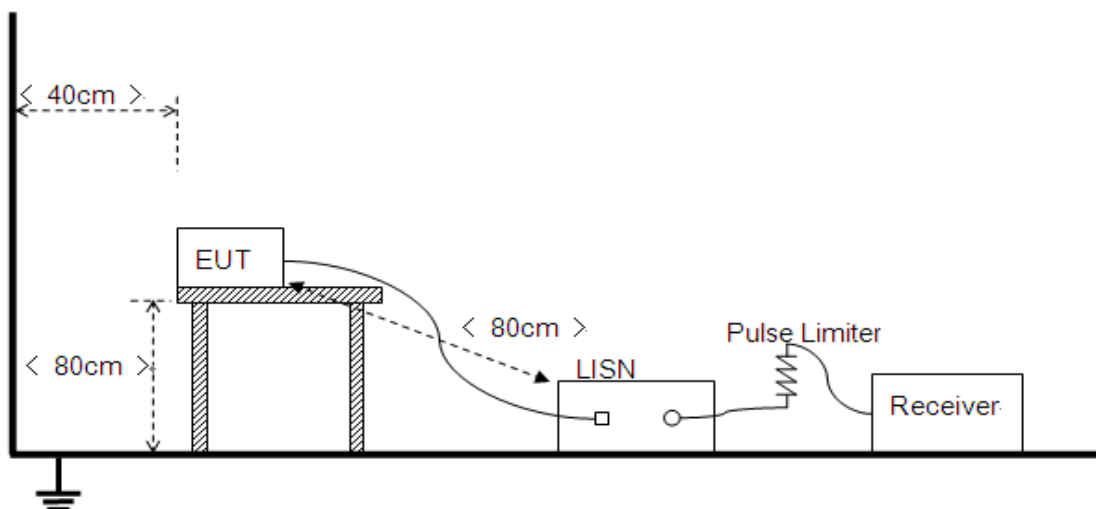
Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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.





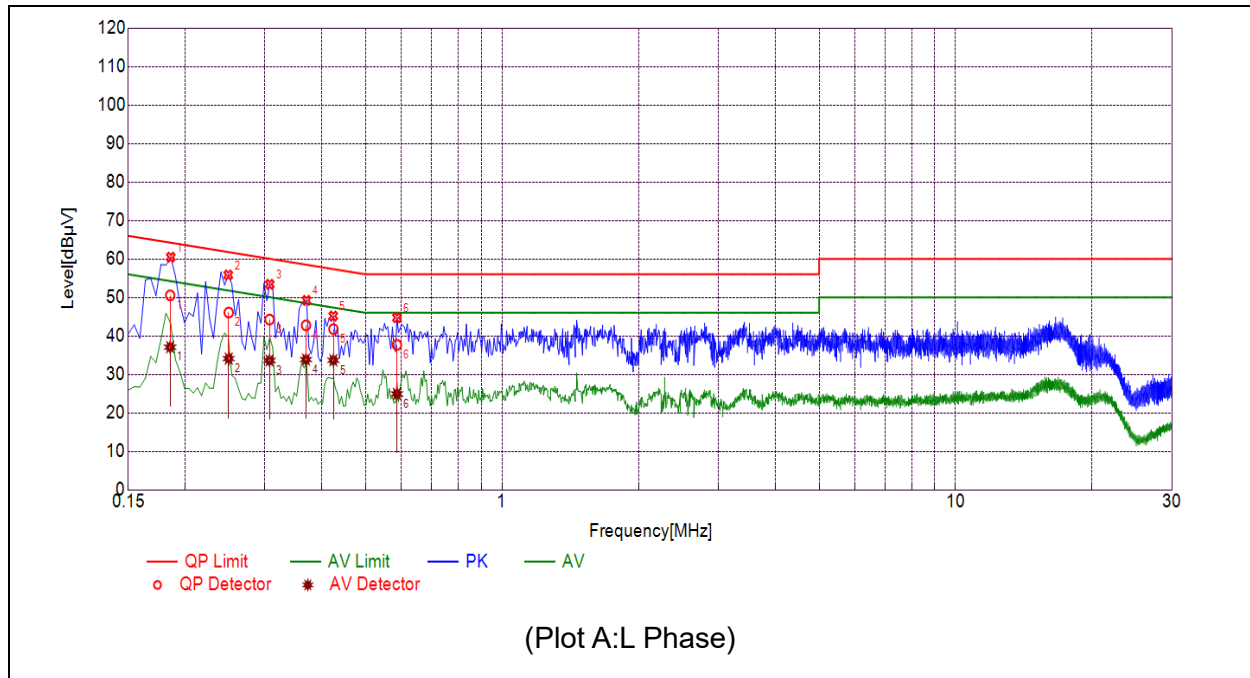
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument. A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

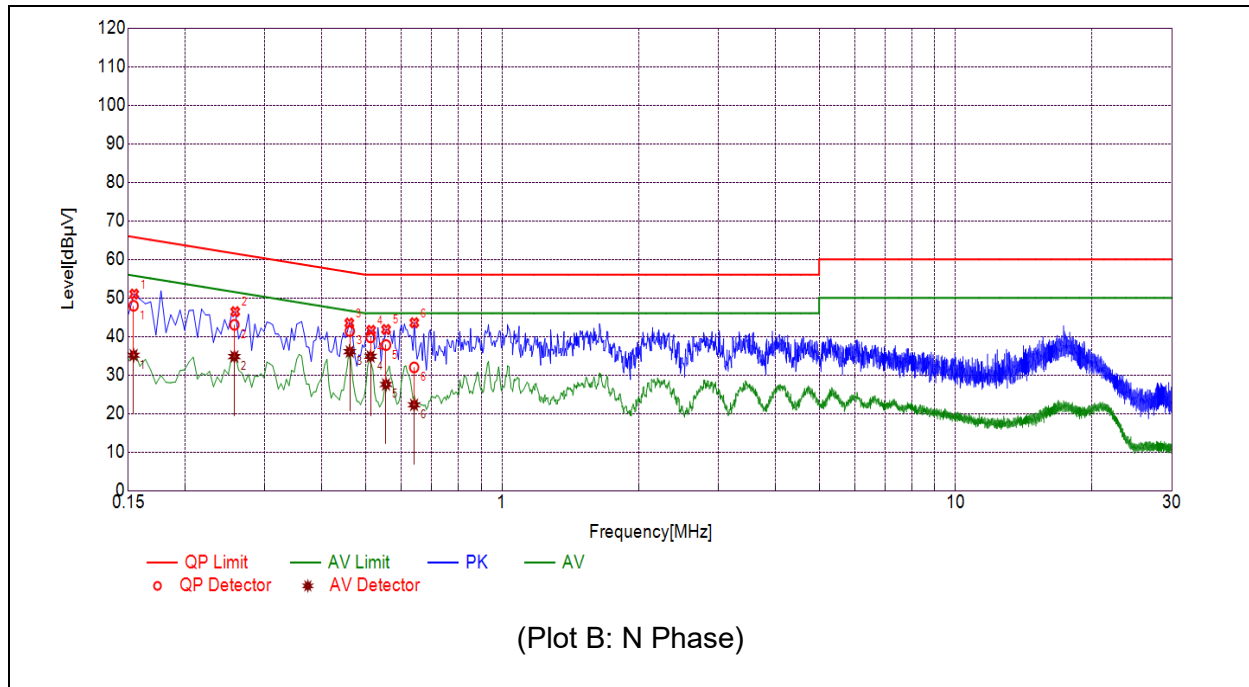
3.1.3. Test Result

Set 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	0.1854	50.53	37.07	64.24	54.24	Line	PASS
2	0.2496	46.07	34.10	61.77	51.77		PASS
3	0.3071	44.25	33.61	60.05	50.05		PASS
4	0.3695	42.76	33.85	58.51	48.51		PASS
5	0.4247	41.77	33.66	57.36	47.36		PASS
6	0.5863	37.68	24.92	56.00	46.00		PASS



NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1540	47.96	35.13	65.78	55.78	Neutral	PASS
2	0.2569	43.02	34.78	61.53	51.53		PASS
3	0.4615	41.40	36.06	56.67	46.67		PASS
4	0.5130	39.76	34.83	56.00	46.00		PASS
5	0.5548	37.77	27.56	56.00	46.00		PASS
6	0.6398	31.98	22.25	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	
	($\mu\text{V/m}$)	(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 dB $\mu\text{V/m}$ is calculated by 20log Emission Level($\mu\text{V/m}$).

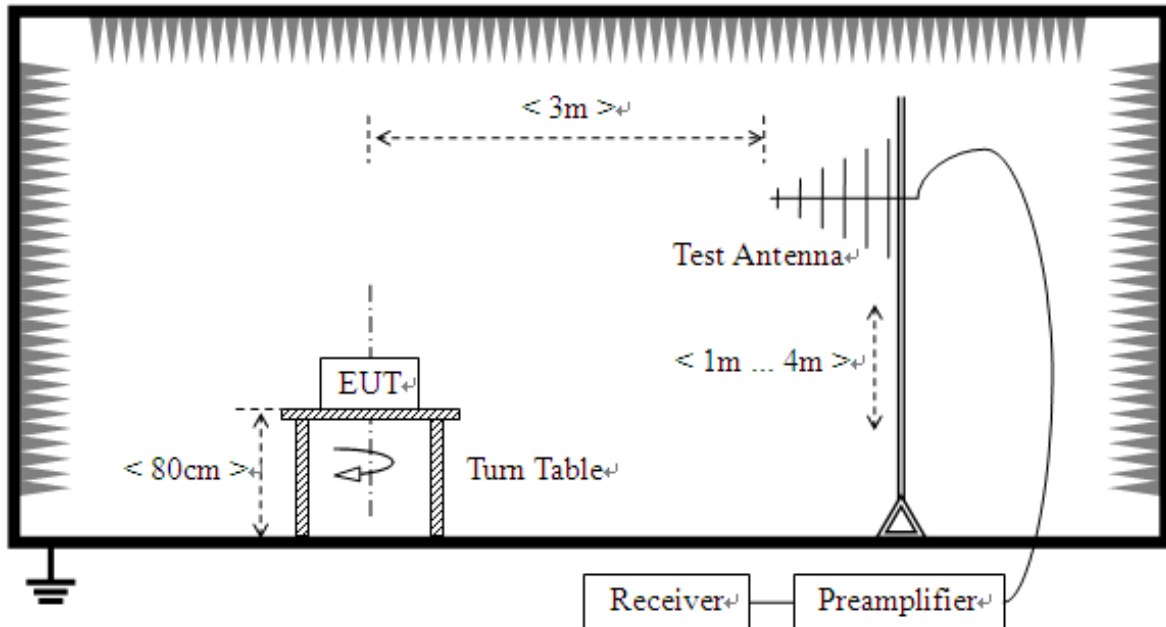
3.2.2. Frequency Range of Measurement

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

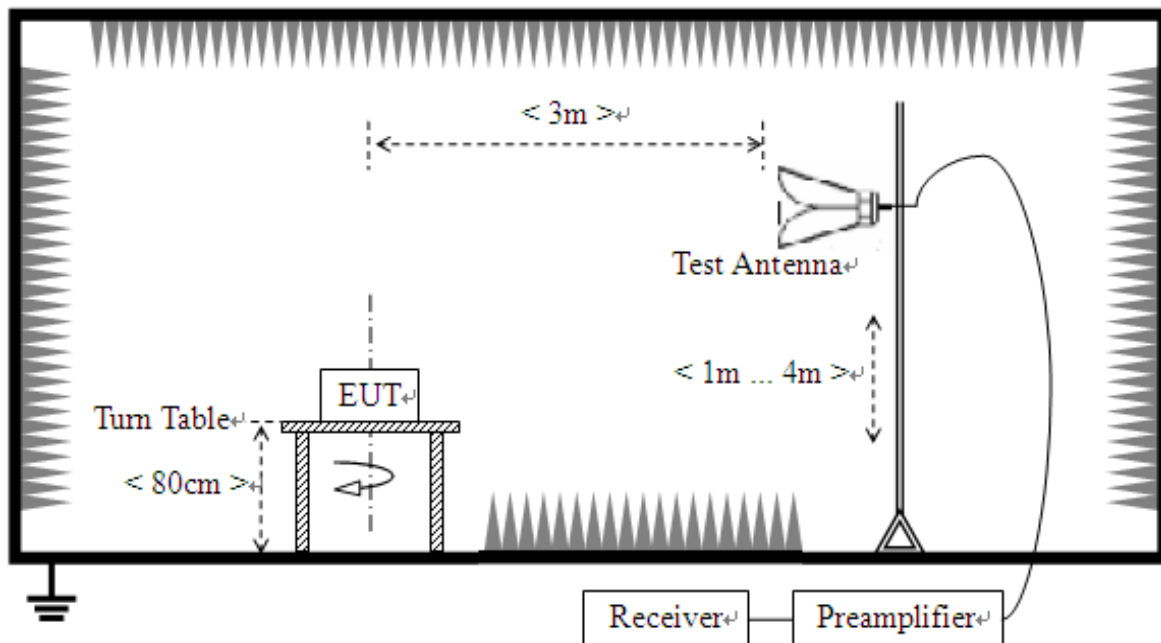
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

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 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 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

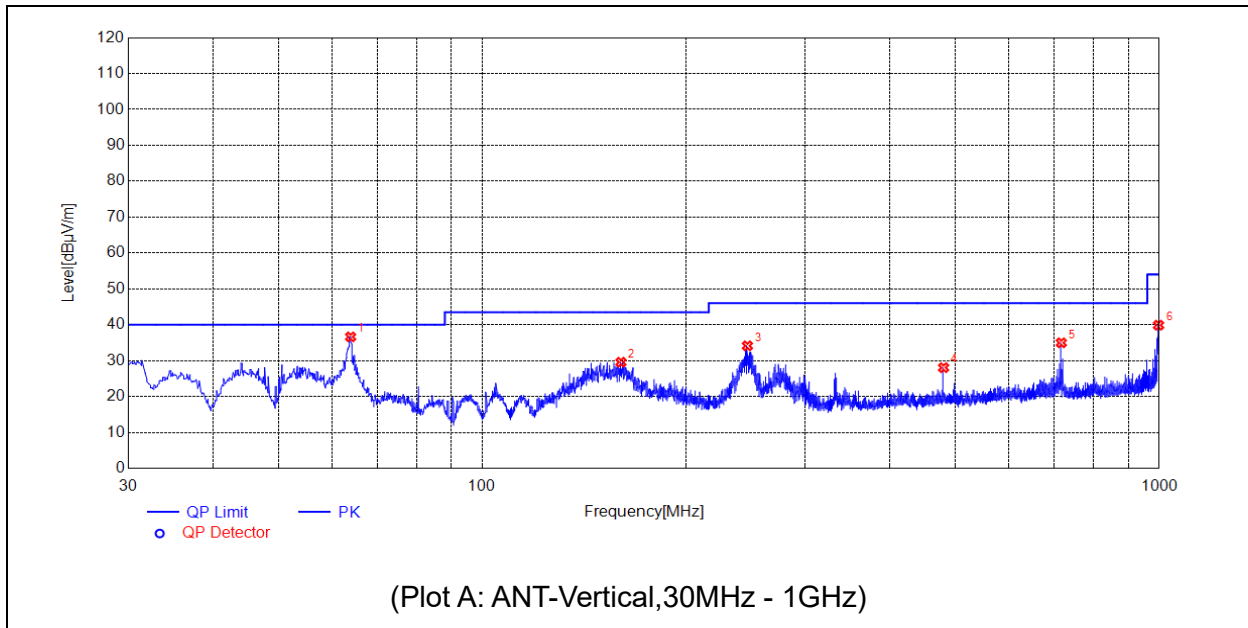
For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

3.2.4. Test Result

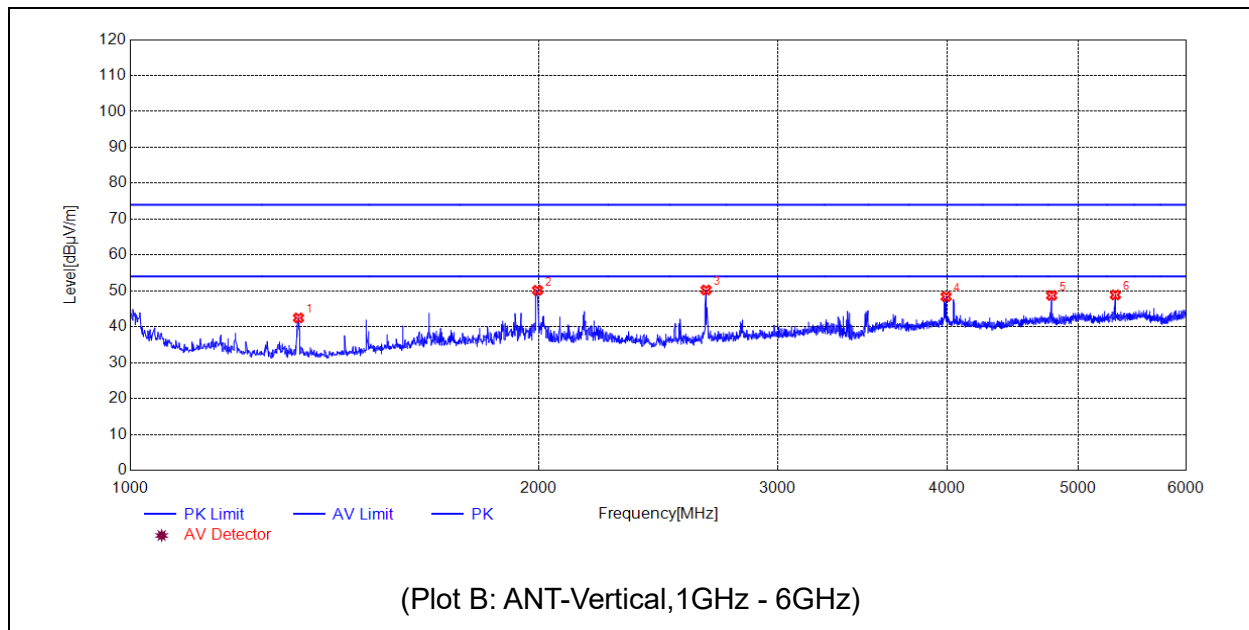
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

The amplitude of emissions which (6GHz-40GHz) are attenuated more than 20 dB below the permissible value need not be reported.

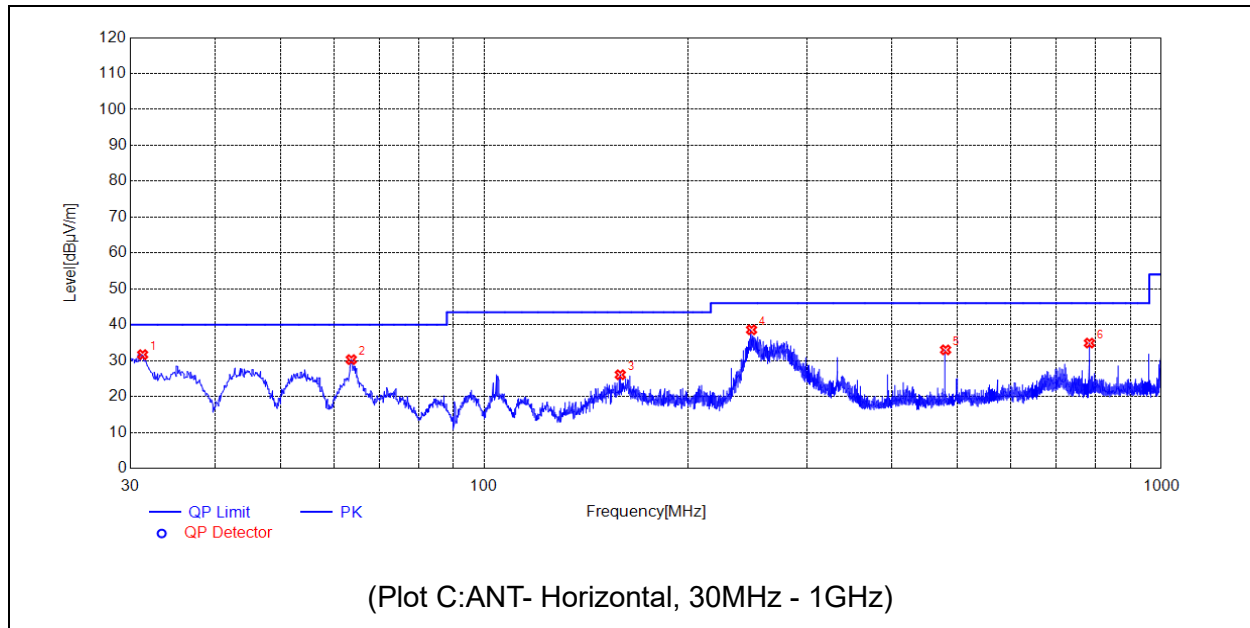
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.



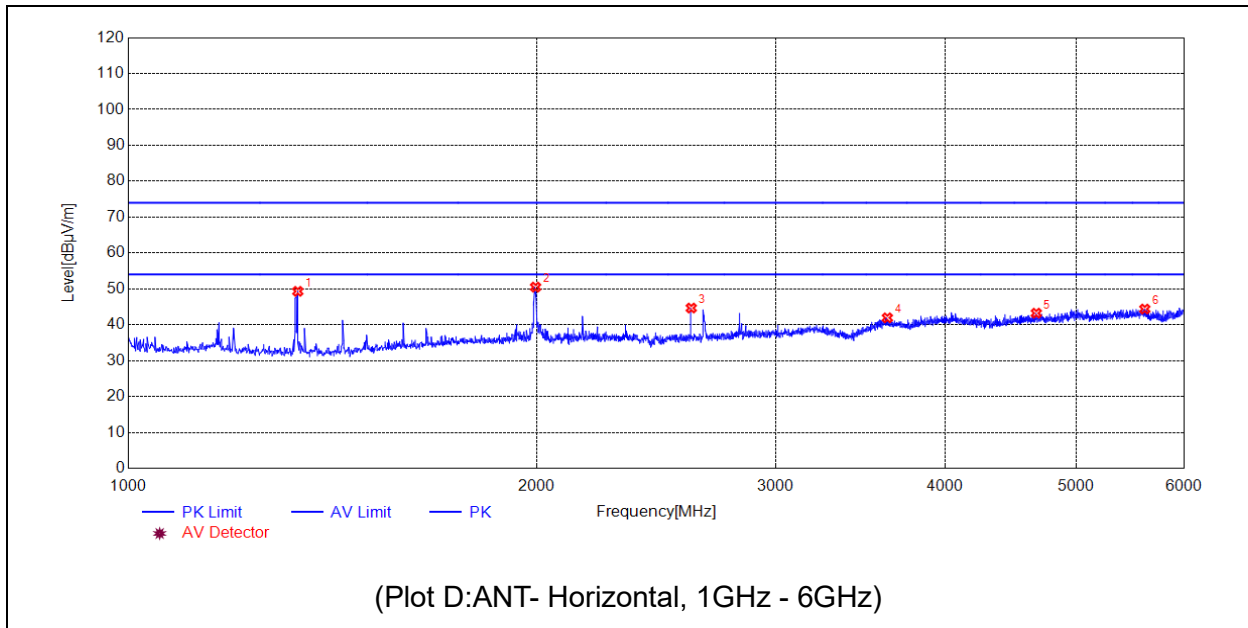
No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	63.8564	36.63	N.A	N.A	N.A	40.00	N.A	V	PASS
2	160.1870	29.57	N.A	N.A	N.A	43.50	N.A	V	PASS
3	246.3316	34.13	N.A	N.A	N.A	46.00	N.A	V	PASS
4	480.0280	28.05	N.A	N.A	N.A	46.00	N.A	V	PASS
5	716.4406	34.97	N.A	N.A	N.A	46.00	N.A	V	PASS
6	997.4777	39.88	N.A	N.A	N.A	54.00	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	1330.0660	42.47	N.A	N.A	74.00	N.A	54.00	V	PASS
2	1996.1992	50.16	N.A	N.A	74.00	N.A	54.00	V	PASS
3	2657.3315	50.24	N.A	N.A	74.00	N.A	54.00	V	PASS
4	3994.5989	48.39	N.A	N.A	74.00	N.A	54.00	V	PASS
5	4778.7558	48.71	N.A	N.A	74.00	N.A	54.00	V	PASS
6	5324.8650	48.87	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	31.2611	31.68	N.A	N.A	N.A	40.00	N.A	H	PASS
2	63.5654	30.29	N.A	N.A	N.A	40.00	N.A	H	PASS
3	158.7319	26.07	N.A	N.A	N.A	43.50	N.A	H	PASS
4	248.0778	38.60	N.A	N.A	N.A	46.00	N.A	H	PASS
5	480.0280	33.00	N.A	N.A	N.A	46.00	N.A	H	PASS
6	782.9893	34.90	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	1333.0666	49.31	N.A	N.A	74.00	N.A	54.00	H	PASS
2	1996.1992	50.49	N.A	N.A	74.00	N.A	54.00	H	PASS
3	2600.3201	44.66	N.A	N.A	74.00	N.A	54.00	H	PASS
4	3627.5255	41.93	N.A	N.A	74.00	N.A	54.00	H	PASS
5	4671.7343	43.23	N.A	N.A	74.00	N.A	54.00	H	PASS
6	5616.9234	44.38	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	±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 B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Morlab Laboratory of Shenzhen Morlab Communications Technology Co., Ltd.
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:	Morlab Laboratory of Shenzhen Morlab Communications Technology Co., Ltd.
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	2020.07.21	2021.07.20
Test Receiver	R&S	ESPI	101052	2020.07.21	2021.07.20
LISN	Schwarzbeck	NSLK 8127	8127449	2021.03.09	2022.03.08
Pulse Limiter (10dB)	Schwarzbeck	VTSD 9561-F	VTSD 9561 F-B #206	2019.08.13	2022.08.12
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-519	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	1774	2019.07.29	2022.07.28
Test Antenna - Horn	Schwarzbeck	BBHA 9170	BBHA 9170 773#	2019.07.26	2022.07.25
Radiated Disturbance Preamplifier	rflight	S020180L3203	61171/61172	2020.07.21	2021.07.20
Radiated Disturbance Preamplifier	rflight	S10M100L3802	46732	2020.07.21	2021.07.20
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2020.01.06	2023.01.05

5. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
PC	APPLE	A1370	N/A
PC Adapter	APPLE	A1374	N/A

_____ END OF REPORT _____