TEST REPORT

APPLICANT	:	Reliance Communications LLC
PRODUCT NAME	:	Orbic Joy
MODEL NAME	:	RC608L
BRAND NAME	:	Orbic
FCC ID	:	2ABGH-RC608L
STANDARD(S)	:	47 CFR Part 15 Subpart B
RECEIPT DATE	:	2022-03-31
TEST DATE	:	2022-04-09 to 2023-05-27
ISSUE DATE	:	2023-06-09

Edited by: Chen Bilian

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Approved by: Xiao Xiong

Xiao Xiong(Supervisor)

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MORLAB

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Change History		
Version	Date	Reason for Change
1.0	2023-06-09	First edition

1. Technical Information

Note: Provide by applicant

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	555 Wireless Blvd. Hauppauge, NY 11788
Manufacturer:	Unimaxcomm
Manufacturer Address:	35F, HBC HuiLong Center Building-II Minzhi Street, Longhua, Shenzhen, P.R. China 518110

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic Joy
EUT No.:	2#, 5#
Hardware Version:	V1.0
Software Version:	ORB608L_v1.0.39_BVZPP
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 Bluetooth: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/ac/n: 5180 MHz ~ 5240 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 66: 2110 MHz ~ 2200 MHz Bluetooth: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/ac/n: 5180 MHz ~ 5240 MHz; 5745 MHz ~ 5825 MHz	
Accessory:	**AC Adapter**	
	Brand Name:	N/A
	Model No.:	TPA-23A050200UU01
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V~ 50/60Hz, 0.3A
	Rated Output:	5.0V⎓2000mA
	Manufacturer:	Shenzhen Tianyin Electronics Co.,Ltd.
	Battery	
	Brand Name:	N/A
	Model No.:	BTE-3402
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	3400mAh
	Rated Voltage:	3.8V
	Charge Limit:	4.35V
	Manufacturer:	Phenix New Energy(Hui Zhou)Co.,Ltd.

Note:

1. This test report is variant from the original report (Report No. : SZ22040313E01, model name: RC608L) based on the similarity between before, the product has following change(s):

   1) Add second source for PCB, Mic, RF receiver, Display, Receiver, Rear Camera, Front Camera, Side Key FPC and Speaker transfer FPC.

   2) Memory change from integrated memory to discrete memory.

   3) Change applicant address and software version

   This test has been tested RE and CE. For CE, only the worst case is recorded in this report. For RE, the test results in this report still refer to the test results of the original test report. The others are the same as before.

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	2023.05.27	Fan Zehang	PASS	No deviation
2	15.109	Radiated Emission	2022.05.16	Yin Xiaogang	PASS[Note 4]	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.

Note 4: The test results of these test items in this report refer to the test report (Report No.: SZ22040313E01).

2.2. EUT Setup and Operating Conditions

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

Test Item	
Mode 1 :	GSM850 Idle + Bluetooth Idle + 2.4G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 2 :	GSM1900 Idle + Bluetooth Idle + 5G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 3 :	WCDMA Band II Idle + Bluetooth Idle + 2.4G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 4 :	WCDMA Band IV Idle + Bluetooth Idle + 5G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 5 :	WCDMA Band V Idle + Bluetooth Idle + 2.4G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 6 :	LTE Band 2 Idle + Bluetooth Idle + 5G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 7 :	LTE Band 4 Idle + Bluetooth Idle + 2.4G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 8 :	LTE Band 5 Idle + Bluetooth Idle + 5G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 9 :	LTE Band 12 Idle + Bluetooth Idle + 2.4G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 10 :	LTE Band 13 Idle + Bluetooth Idle + 5G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 11 :	LTE Band 5 Idle + Bluetooth Idle + 5.8GHz SRD + Adapter + Battery + USB Cable + Earphone + SIM Card
Mode 12 :	**WCDMA Band II Idle + Bluetooth Idle + 2.4G WLAN Idle + Adapter + Battery + USB Cable + Earphone + SIM Card + Rear Camera + Recording Mode**
Mode 13 :	LTE Band 66 Idle + Bluetooth Idle + 5G WLAN Idle + Battery + USB Cable + Earphone + SIM Card + PC + PC Adapter + Data Transfer Mode
Remark: The above test mode in boldface (Mode 12) was the worst case of conducted emission test, only the test data of these modes were reported. The above test mode in boldface (Mode 12) 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 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:

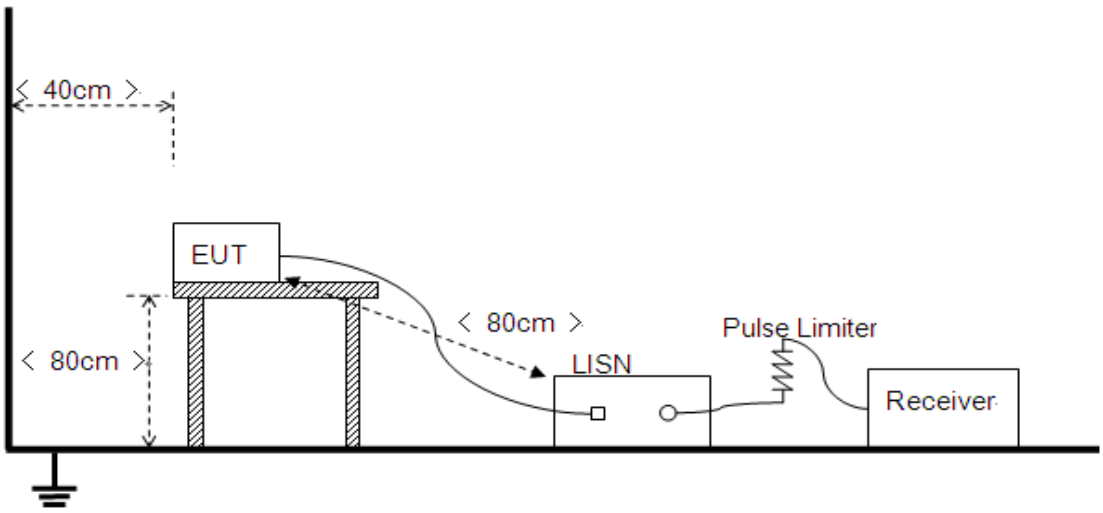
a) The limit subjects to the Class B digital device.

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.



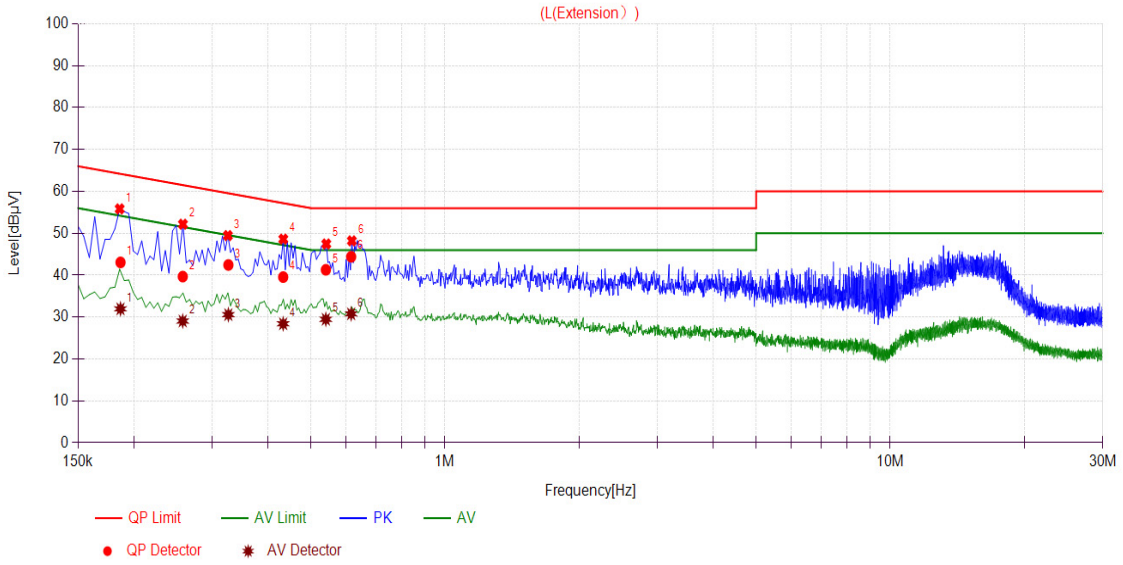
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. A Pulse Limiter is 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 inma intained with respect to the impedance characteristics as prescribed in ANSI C63.4-2014 at Clause 4.3.

3.1.3. Test Result

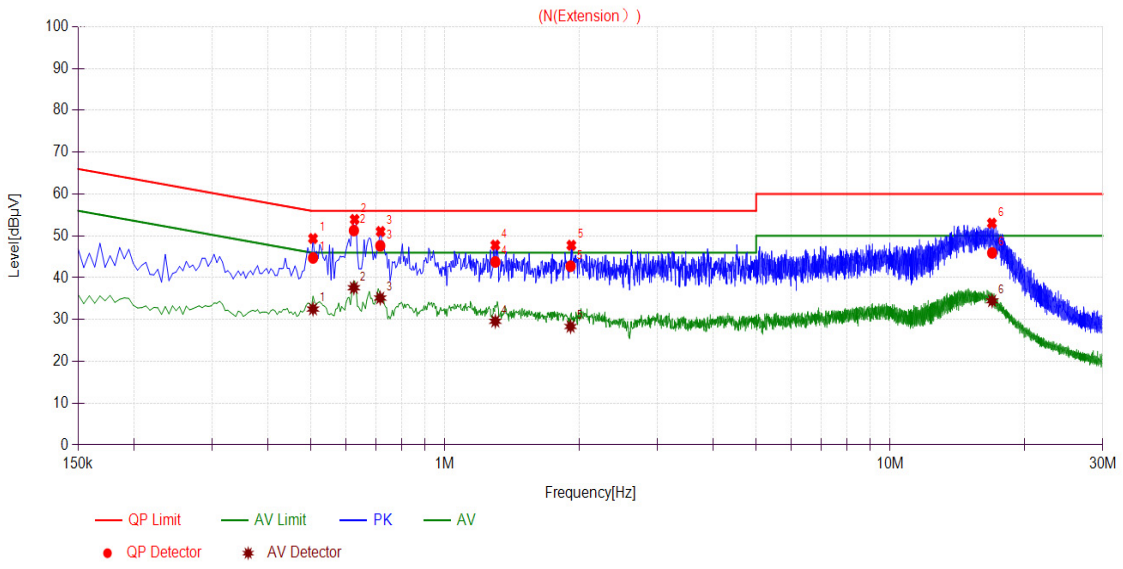
Set RBW=9 kHz, VBW=30 kHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both 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:



(Plot A:L Phase)

NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quasi-peak	Average	Quasi-peak	Average		
1	0.1868	43.06	31.96	64.18	54.18	Line	PASS
2	0.2577	39.66	29.06	61.50	51.50		PASS
3	0.3263	42.44	30.58	59.54	49.54		PASS
4	0.4332	39.55	28.40	57.19	47.19		PASS
5	0.5402	41.29	29.47	56.00	46.00		PASS
6	0.6157	44.40	30.77	56.00	46.00		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quasi-peak	Average	Quasi-peak	Average		
1	0.5055	44.72	32.50	56.00	46.00	Neutral	PASS
2	0.6244	51.27	37.59	56.00	46.00		PASS
3	0.7156	47.62	35.14	56.00	46.00		PASS
4	1.2976	43.78	29.58	56.00	46.00		PASS
5	1.9150	42.76	28.33	56.00	46.00		PASS
6	16.9359	45.92	34.47	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	
	(μV/m)	(dBμV/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 dBμV/m is calculated by 20log Emission Level(μV/m).

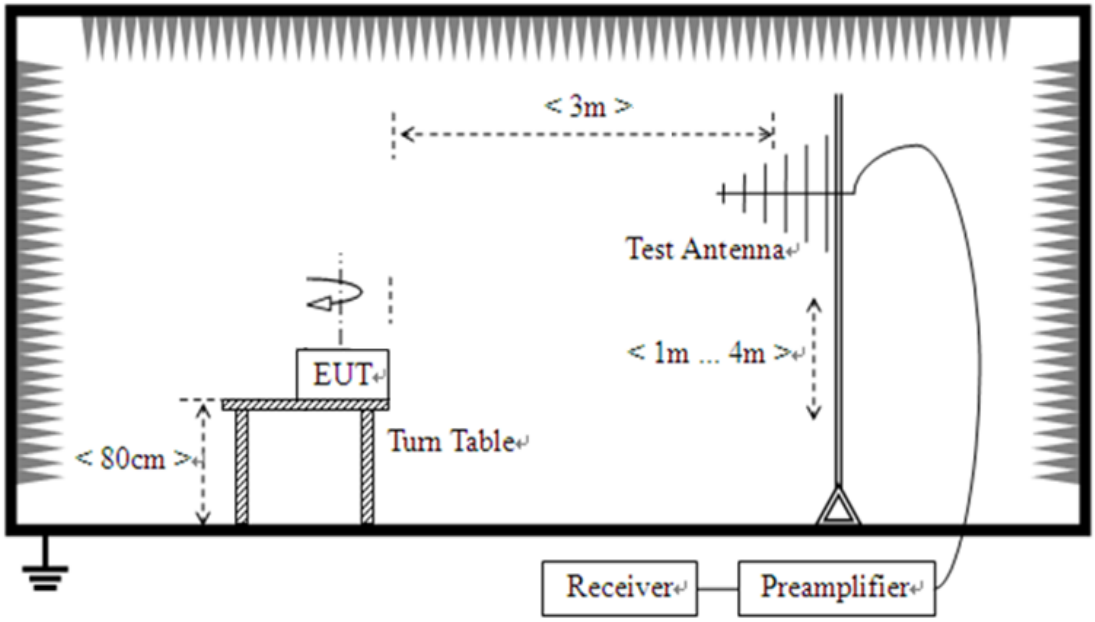
3.2.2. Frequency Range of Measurement

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

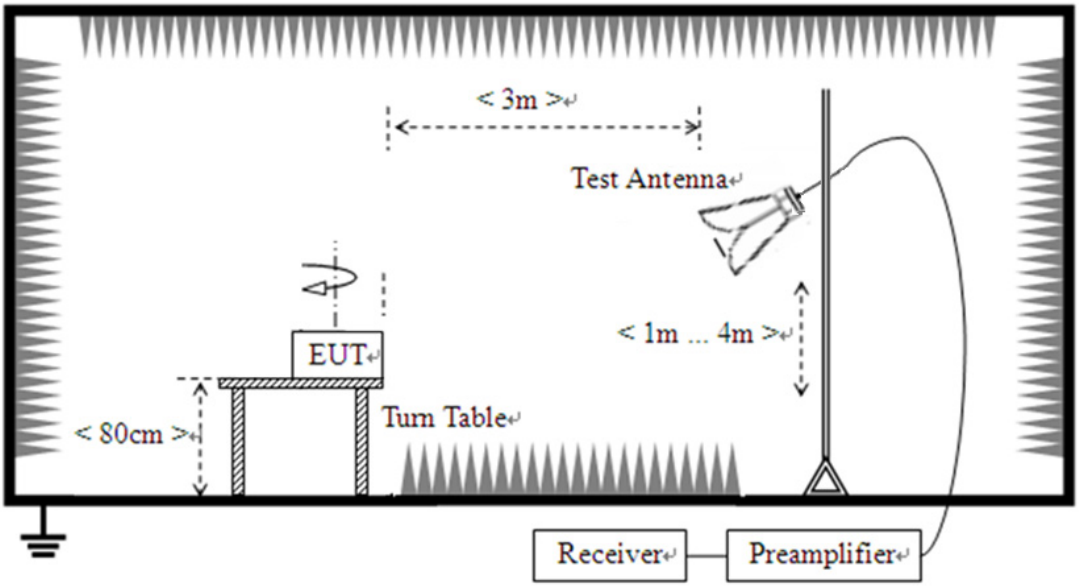
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705–108	1000.
108–500	2000.
500–1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

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 above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

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.

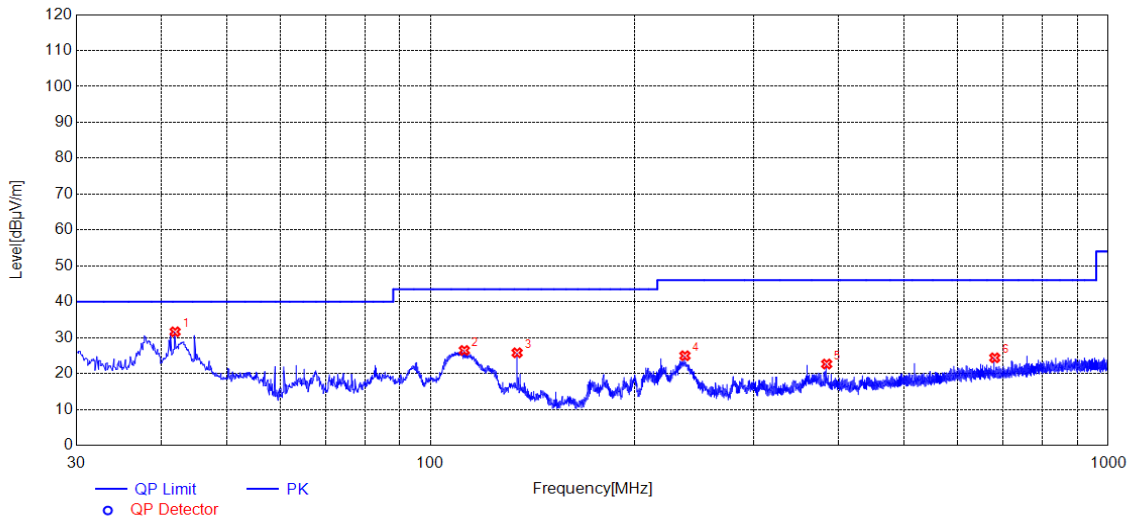
For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video bandwidth is set to 3MHz for peak measurements and as applicable for average measurements.

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.

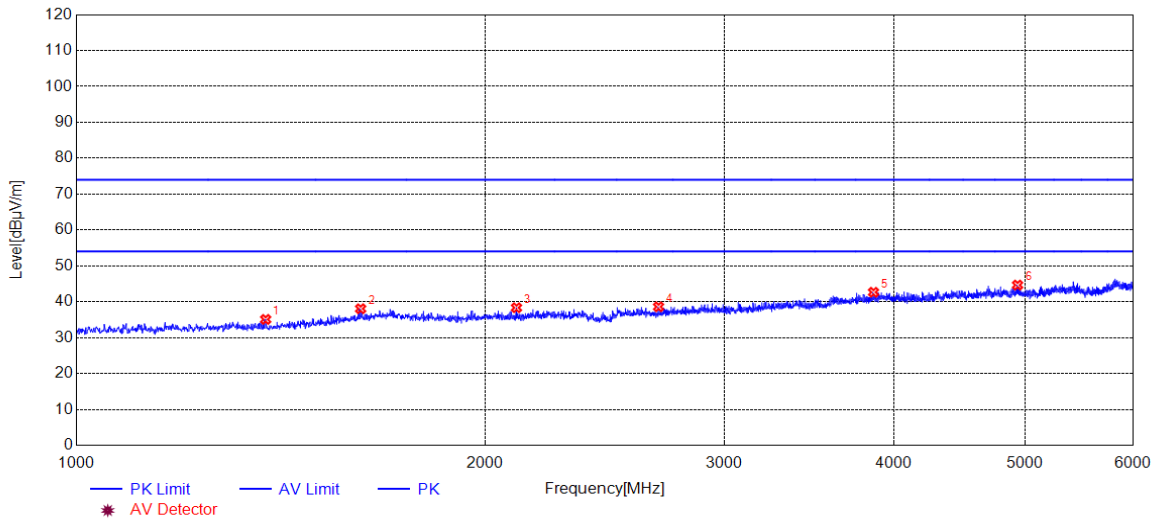
The amplitude of emissions which (6GHz-30GHz) are attenuated more than 20 dB below the permissible value need not be reported.

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.



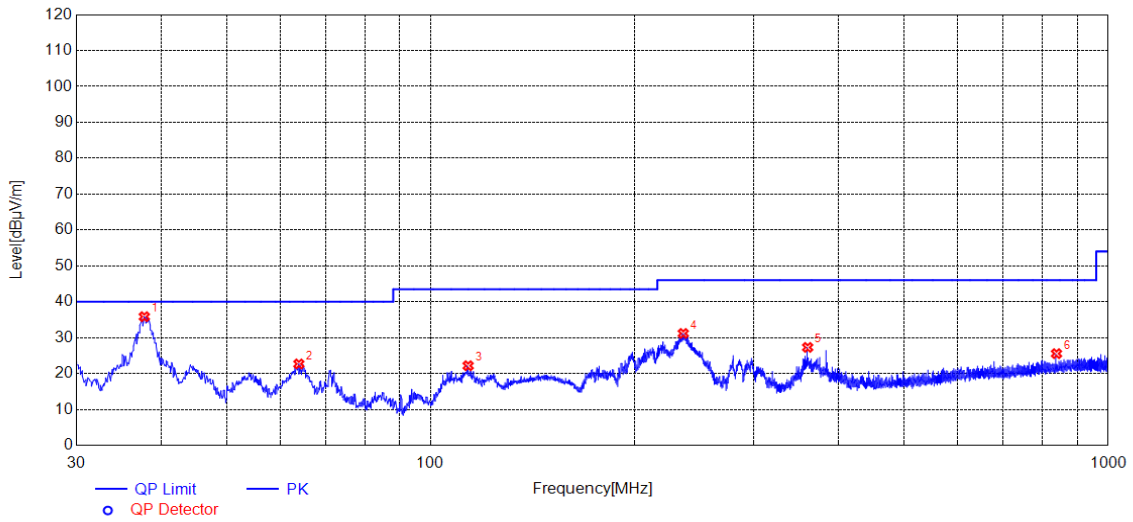
(Plot A: ANT-Vertical,30MHz - 1GHz)

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	41.9322	31.64	N.A	N.A	N.A	40.00	N.A	V	PASS
2	112.0702	26.44	N.A	N.A	N.A	43.50	N.A	V	PASS
3	134.0914	25.78	N.A	N.A	N.A	43.50	N.A	V	PASS
4	237.2127	24.96	N.A	N.A	N.A	46.00	N.A	V	PASS
5	383.9884	22.65	N.A	N.A	N.A	46.00	N.A	V	PASS
6	679.9650	24.38	N.A	N.A	N.A	46.00	N.A	V	PASS



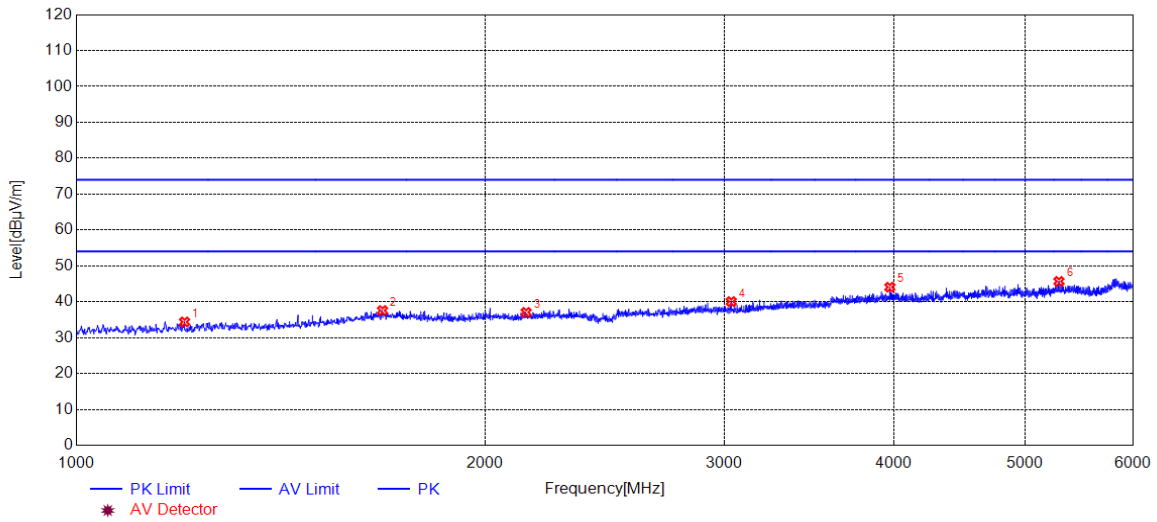
(Plot B: ANT-Vertical,1GHz - 6GHz)

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	1378.0756	35.08	N.A	N.A	74.00	N.A	54.00	V	PASS
2	1619.1238	38.06	N.A	N.A	74.00	N.A	54.00	V	PASS
3	2109.2218	38.34	N.A	N.A	74.00	N.A	54.00	V	PASS
4	2684.3369	38.60	N.A	N.A	74.00	N.A	54.00	V	PASS
5	3865.5731	42.65	N.A	N.A	74.00	N.A	54.00	V	PASS
6	4935.7872	44.65	N.A	N.A	74.00	N.A	54.00	V	PASS



(Plot C:ANT- Horizontal, 30MHz - 1GHz)

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	37.7608	35.84	N.A	N.A	N.A	40.00	N.A	H	PASS
2	63.8564	22.68	N.A	N.A	N.A	40.00	N.A	H	PASS
3	113.5254	22.18	N.A	N.A	N.A	43.50	N.A	H	PASS
4	235.8546	31.18	N.A	N.A	N.A	46.00	N.A	H	PASS
5	359.9300	27.29	N.A	N.A	N.A	46.00	N.A	H	PASS
6	838.6729	25.55	N.A	N.A	N.A	46.00	N.A	H	PASS



(Plot D:ANT- Horizontal, 1GHz - 6GHz)

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	1201.0402	34.38	N.A	N.A	74.00	N.A	54.00	H	PASS
2	1680.1360	37.56	N.A	N.A	74.00	N.A	54.00	H	PASS
3	2144.2288	37.05	N.A	N.A	74.00	N.A	54.00	H	PASS
4	3036.4073	40.05	N.A	N.A	74.00	N.A	54.00	H	PASS
5	3974.5949	44.07	N.A	N.A	74.00	N.A	54.00	H	PASS
6	5294.8590	45.68	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

Laboratory Name:	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:	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.)

4. Test Software Utilized

Model	Version Number	Producer
TS+ -[JS32-RE]	Version 2.5.0.6	Tonscend
TS+ -[JS32-CE]	Version 2.5.0.0	Tonscend

5. Test Equipments Utilized

Description	Model	Serial No.	Manufacturer	Cal. Date	Due. Date
Bi-Log Antenna	VULB 9163	9163-274	SCHWARZBECK	2019/11/23	2022/11/22
Bi-Log Antenna	VULB 9163	9163-274	SCHWARZBECK	2022/11/7	2025/11/6
Bi-Log Antenna	VULB 9163	9163-519	SCHWARZBECK	2019/5/24	2022/5/23
Bi-Log Antenna	VULB 9163	9163-519	SCHWARZBECK	2022/5/25	2025/5/24
Horn Antenna	BBHA 9120D	9120D-963	SCHWARZBECK	2019/5/24	2022/5/23
Horn Antenna	BBHA 9120D	9120D-963	SCHWARZBECK	2022/5/25	2025/5/24
Horn Antenna	BBHA 9120D	01774	SCHWARZBECK	2019/7/26	2022/7/25
Horn Antenna	BBHA 9120D	01774	SCHWARZBECK	2022/7/13	2025/7/12
Horn Antenna	BBHA9170	BBHA9170 #773	SCHWARZBECK	2019/7/26	2022/7/25
Horn Antenna	BBHA9170	BBHA9170 #773	SCHWARZBECK	2022/7/14	2025/7/13
Receiver	N9038A	MY54130016	Agilent	2021/7/16	2022/7/15
Receiver	N9038A	MY54130016	Agilent	2022/7/7	2023/7/6
Receiver	N9038A	MY56400093	KEYSIGHT	2022/3/3	2023/3/2
Receiver	N9038A	MY56400093	KEYSIGHT	2023/2/9	2024/2/8
6db Attenuator	BW-N6W5+	E191001	Mini-circuits	2021/10/18	2022/10/17
6db Attenuator	BW-N6W5+	E191001	Mini-circuits	2022/10/11	2023/10/10
Preamplifier	S020180L3203	61171/61172	LUCIX CORP.	2021/7/16	2022/7/15
Preamplifier	S020180L3203	61171/61172	LUCIX CORP.	2022/7/8	2023/7/7
Preamplifier	S10M100L3802	46732	LUCIX CORP.	2021/7/16	2022/7/15
Preamplifier	S10M100L3802	46732	LUCIX CORP.	2022/7/8	2023/7/7
RF Coaxial Cable	PE330	MRE001	Pasternack	N/A	N/A
RF Coaxial Cable	CLU18	MRE002	Pasternack	N/A	N/A
RF Coaxial Cable	CLU18	MRE003	Pasternack	N/A	N/A
RF Coaxial Cable	QA360-40-KK-0.5	22290045	Qualwave	N/A	N/A
RF Coaxial	QA360-40-KKF	22290046	Qualwave	N/A	N/A

Cable	-2				
RF Coaxial Cable	QA500-18-NN-5	22120181	Qualwave	N/A	N/A
RF Coaxial Cable	BNC	MRE04	Qualwave	N/A	N/A
Receiver	ESPI	101052	R&S	2021/7/16	2022/7/15
Receiver	ESPI	101052	R&S	2022/7/7	2023/7/6
LISN	NSLK 8127	8127449	Schwarzbeck	2022/3/3	2023/3/2
LISN	NSLK 8127	8127449	Schwarzbeck	2023/2/21	2024/2/20
10dB Pulse Limiter	VTSD 9561-F	VTSD 9561 F-B #206	SCHWARZBECK	2021/7/21	2022/7/20
10dB Pulse Limiter	VTSD 9561-F	VTSD 9561 F-B #206	SCHWARZBECK	2022/7/6	2023/7/5
System Simulator	CMW500	152038	R&S	2021/10/21	2022/10/20
System Simulator	CMW500	152038	R&S	2022/10/11	2023/10/10

5. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
PC	DELL	VOSTRO 5370	DF2DR A01 DPC
PC Adapter	DELL	LA45NM140	OKXTTW
Earphone	OPPO	NA	EMC-03

END OF REPORT