TEST REPORT

APPLICANT	:	Reliance Communications LLC
PRODUCT NAME	:	Orbic Q10
MODEL NAME	:	RC609L
BRAND NAME	:	Orbic
FCC ID	:	2ABGH-RC609LTM
STANDARD(S)	:	47 CFR Part 2 47 CFR Part 22 Subpart H 47 CFR Part 24 Subpart E 47 CFR Part 27 Subpart H&L&M 47 CFR Part 90, Subpart S
RECEIPT DATE	:	2023-02-24
TEST DATE	:	2023-03-10
ISSUE DATE	:	2023-03-10

Edited by: Peng Mi (Rapporteur)

Approved by: Shen Junsheng (Supervisor)

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DIRECTORY

1. Technical Information ····· 3
1.1. Applicant and Manufacturer Information ····· 3
1.2. Equipment Under Test (EUT) Description ····· 3
1.3. Test Standards and Results ····· 6
1.4. Environmental Conditions ····· 6
2. 47 CFR Part 2, Part 22, 24, 27 and Part 90 Requirements ····· 7
2.1. Radiated Out of Band Emissions ····· 7
Annex A Test Uncertainty ····· 14
Annex B Testing Laboratory Information ····· 15

Change History		
Version	Date	Reason for change
1.0	2023-03-10	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:	35F, HBC HuiLong Center Building-II Minzhi Street, Longhua, Shenzhen, P.R. China 518110

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic Q10	
Sample No.:	4#	
Hardware Version:	V1.0	
Software Version:	ORB609L_V1.2.9_BTM-ST	
Modulation Type:	GSM/GPRS Mode with GMSK Modulation EDGE Mode with 8PSK Modulation WCDMA Mode with QPSK Modulation HSDPA Mode with QPSK Modulation HSUPA Mode with QPSK Modulation HSPA+ Mode with 16QAM Modulation LTE with QPSK, 16QAM, 64QAM Modulation	
Operating Frequency Range:	GSM 850MHz	Tx: 824MHz-849MHz
		Rx: 869MHz-894MHz
	GSM 1900MHz	Tx: 1850MHz-1910MHz
		Rx: 1930MHz-1990MHz
	WCDMA Band V	Tx: 824MHz-849MHz
		Rx: 869MHz-894MHz
	WCDMA Band IV	Tx: 1710MHz-1755MHz
		Rx: 2110MHz-2155MHz
	WCDMA Band II	Tx: 1850MHz-1910MHz
		Rx: 1930MHz-1990MHz

Frequency Range:	LTE Band 2	Tx: 1850MHz–1910MHz
		Rx: 1930MHz–1990MHz
	LTE Band 4	Tx: 1710MHz–1755MHz
		Rx: 2110MHz–2155MHz
	LTE Band 5	Tx: 824MHz–849MHz
		Rx: 869MHz–894MHz
	LTE Band 12	Tx: 699MHz–716MHz
		Rx: 729MHz–746MHz
Frequency Range:	LTE Band 25	Tx: 1850MHz–1915MHz
		Rx: 1930MHz–1995MHz
	LTE Band 26	Tx: 824MHz–849MHz
		Rx: 869MHz–894MHz
	LTE Band 41	Tx: 2496MHz–2690MHz
		Tx: 2496MHz–2690MHz
	LTE Band 66	Tx: 1710MHz –1780MHz
		Rx: 2110MHz–2200MHz
	LTE Band 71	Tx: 663MHz–698MHz
		Rx: 617MHz–652MHz
Channel Bandwidth:	LTE Band 2	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 4	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 5	1.4MHz, 3MHz, 5MHz, 10MHz
	LTE Band 12	1.4MHz, 3 MHz, 5 MHz, 10MHz
	LTE Band 25	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 26	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
	LTE Band 41	5 MHz, 10MHz, 15MHz, 20MHz
	LTE Band 66	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz

Accessory Information:	Battery	
	Brand Name:	N/A
	Model No.:	BTE-3402
	Serial No.:	N/A
	Capacity:	3400mAh
	Rated Voltage:	3.8V
	Charge Limit:	4.35V
	Manufacturer:	Phenix New Energy(Hui Zhou)Co.,Ltd.
	AC Adapter	
	Brand Name:	N/A
	Model No.:	TPA-23A050200UU01
	Serial No.:	N/A
	Rated Output:	5V⎓2000mA
	Rated Input:	100-240V~50/60Hz, 0.3A
	Manufacturer:	Shenzhen Tianyin Electronics Co.,Ltd.

Note 1: This is a variant report to request a Class II Permissive change for the original report (Report No.: SZ22030300W05, FCC ID: 2ABGH-RC609LTM). Based on the similarity between before, apply for the following changes:

1. Add second supplier for LCD, Fingerprint, Speaker, Memory, Filter, SAW, Duplexer and GPS LNA.
2. Add a Band 4 compatible solution for other carrier.
3. Have antenna modifications, but without RF parameters and gain change.
4. Add conductive sponge, ground conductive cloth and sealing form for speaker in housing.
5. Remove SAR sensor and Non-Carrier Bands (B13/B14/B29), even though these functions were disabled by software in original certificate.

Due to the above changes, we have evaluated and retested worst case of radiated spurious emissions, the test results are better than before, all other test items are no need to be retested. We only recorded the worse case of radiated spurious emissions in this report.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22, Part 24 and Part 27 and Part 90 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services
4	47 CFR Part 27	Miscellaneous Wireless Communications Services
5	47 CFR Part 90	Miscellaneous Wireless Communications Services

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	2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h) 27.53(m)(4)	Radiated Out of Band Emissions	Mar. 10, 2023	Su Zhan	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% confidence intervals.

1.4. Environmental Conditions

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

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

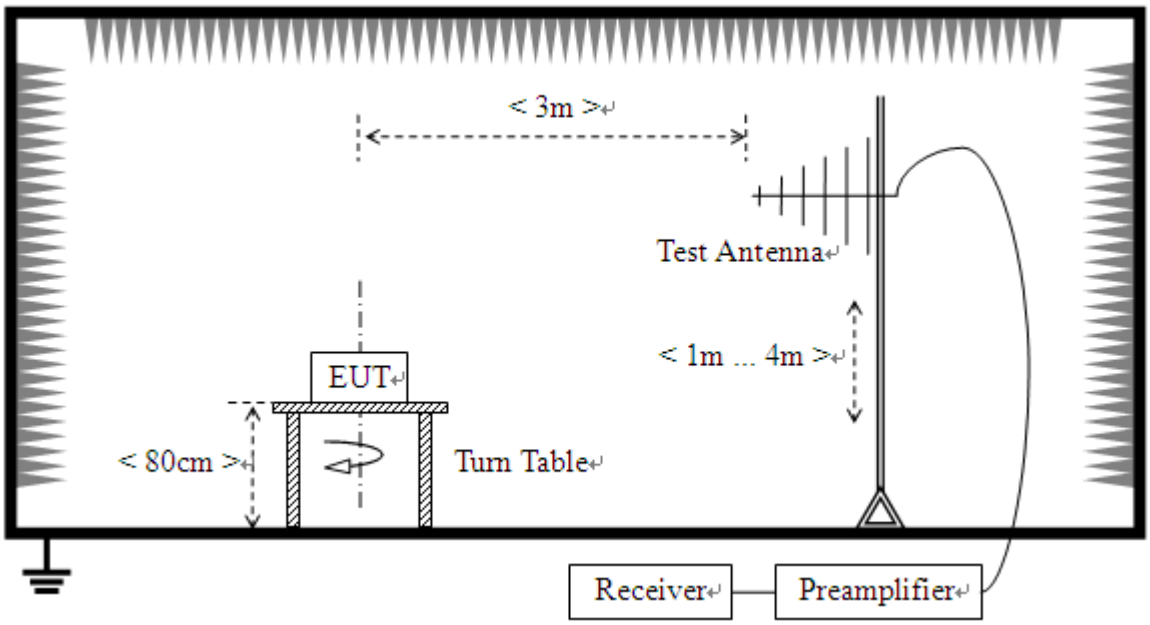
2. 47 CFR Part 2, Part 22, 24, 27 and Part 90 Requirements

2.1. Radiated Out of Band Emissions

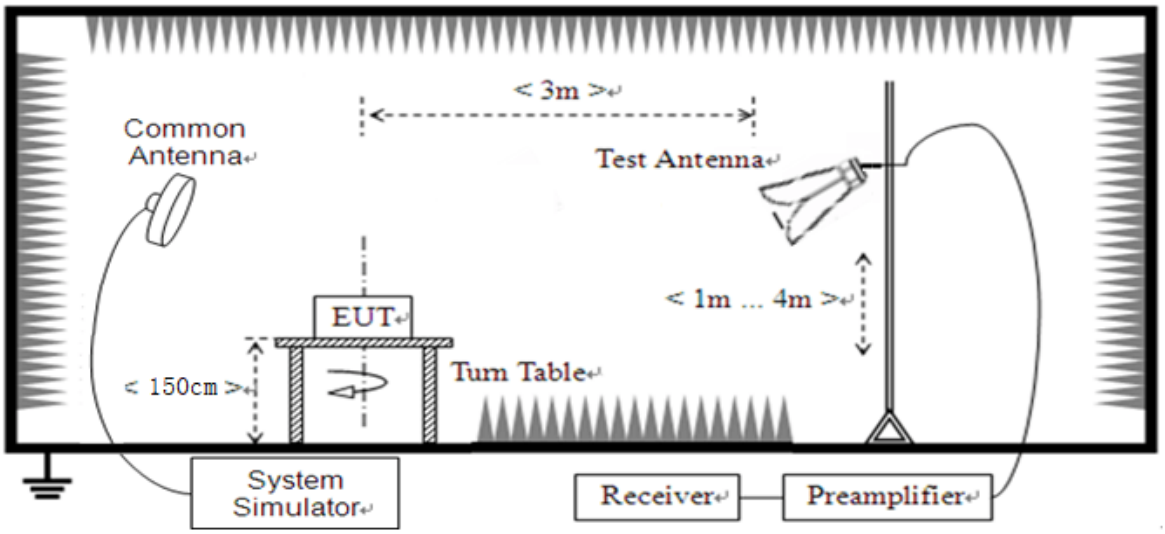
2.1.1.Requirement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency.

2.1.2.Test Description



(For the test frequency from 30MHz to1GHz)



(For the test frequency above 1GHz)

The EUT is located in a 3m Full-Anechoic Chamber, the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.
A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power and only the test result of the maximum output power was recorded.
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 and the Turn Table is actuated to turn from 0° to 360°to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.
Note: When doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.1.3.Test Procedure

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements.

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

2.1.4.Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST_TX_ANT}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of A_{TOT}.

Note1: The power of the EUT transmitting frequency should be ignored.

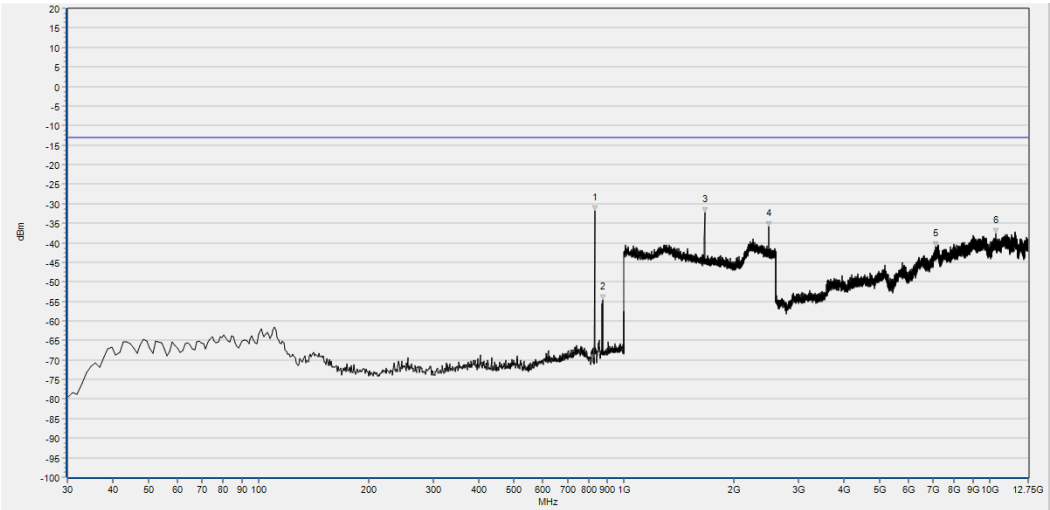
Note2: All test mode and condition mentioned were considered and evaluated respectively by performing full test, only the worst data were recorded and reported.

Note3: All spurious emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

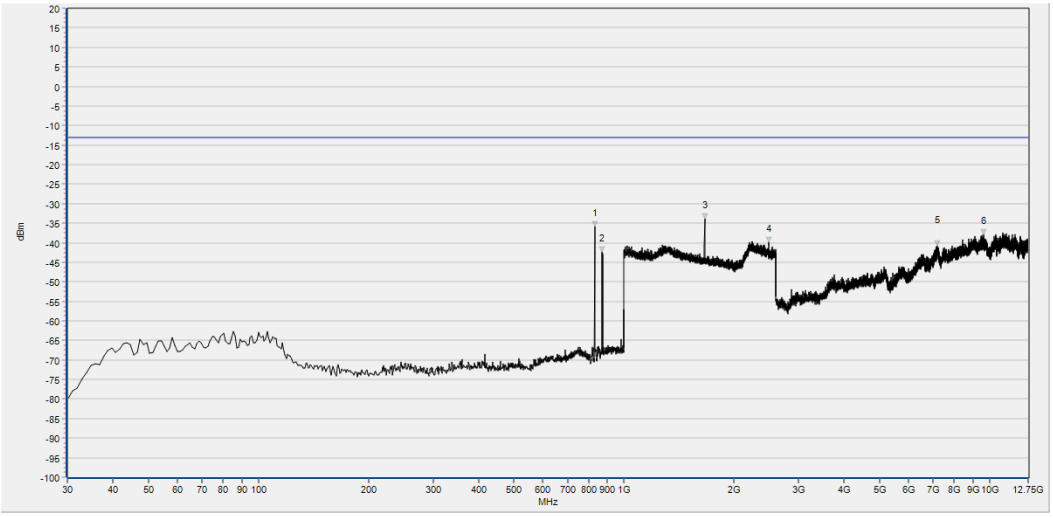
Note 4: N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.

Note5: The amplitude of emissions(18GHz to 10th harmonics) which are attenuated more than 20 dB below the limit are not be reported.

GSM850(GSM), Low Channel

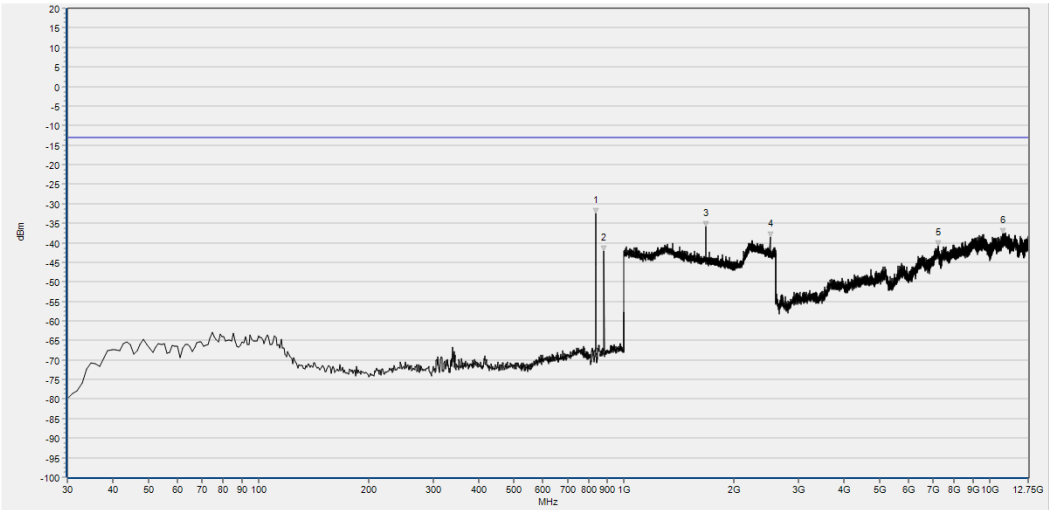


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	830.250	-31.78	-13.00	Horizontal	N/A
2	875.840	-54.59	-13.00	Horizontal	N/A
3	1661.385	-32.32	-13.00	Horizontal	PASS
4	2491.797	-35.94	-13.00	Horizontal	PASS
5	7098.191	-41.03	-13.00	Horizontal	PASS
6	10422.459	-37.57	-13.00	Horizontal	PASS

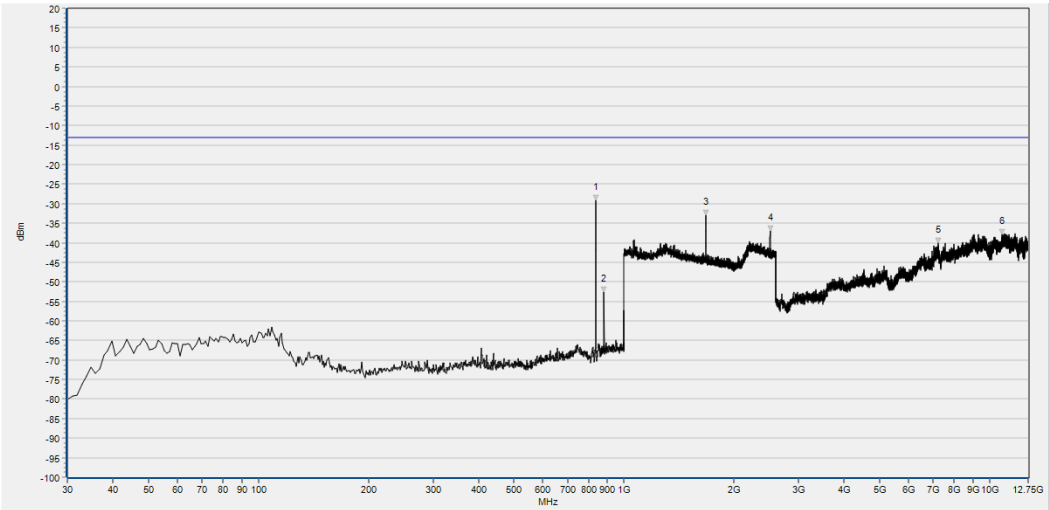


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	830.250	-35.81	-13.00	Horizontal	N/A
2	869.050	-42.28	-13.00	Horizontal	N/A
3	1660.744	-33.92	-13.00	Horizontal	PASS
4	2491.797	-39.97	-13.00	Horizontal	PASS
5	7197.863	-40.71	-13.00	Horizontal	PASS
6	9634.306	-37.82	-13.00	Horizontal	PASS

GSM850(EDGE), Mid Channel

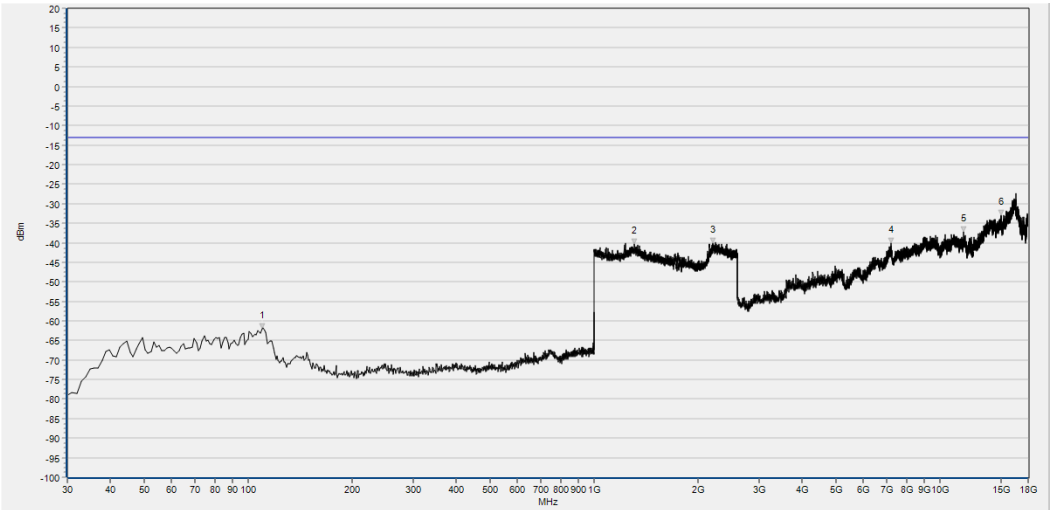


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	836.070	-32.49	-13.00	Horizontal	N/A
2	881.660	-42.18	-13.00	Horizontal	N/A
3	1672.269	-35.95	-13.00	Horizontal	PASS
4	2509.084	-38.55	-13.00	Horizontal	PASS
5	7247.700	-40.83	-13.00	Horizontal	PASS
6	10880.215	-37.76	-13.00	Horizontal	PASS

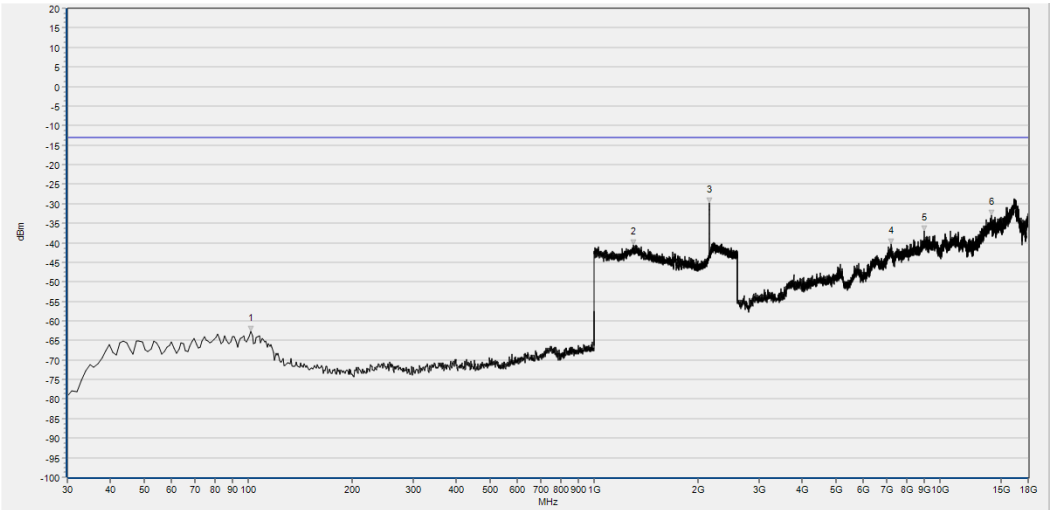


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	836.070	-29.22	-13.00	Horizontal	N/A
2	881.660	-52.63	-13.00	Horizontal	N/A
3	1672.909	-33.03	-13.00	Horizontal	PASS
4	2509.084	-36.91	-13.00	Horizontal	PASS
5	7251.391	-40.04	-13.00	Horizontal	PASS
6	10824.841	-37.80	-13.00	Horizontal	PASS

WCDMA Band IV (WCDMA), Mid Channel

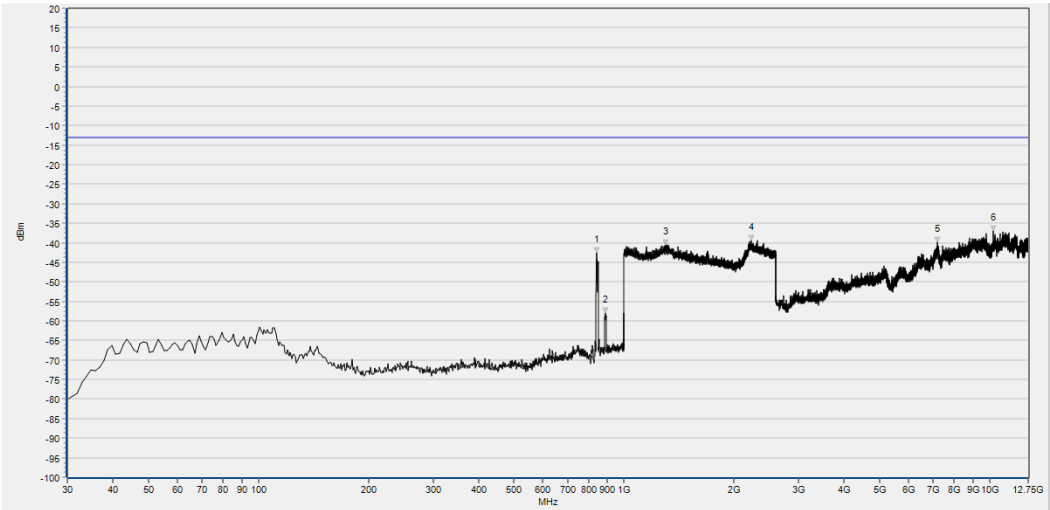


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	109.540	-62.00	-13.00	Horizontal	PASS
2	1310.524	-40.38	-13.00	Horizontal	PASS
3	2204.962	-40.08	-13.00	Horizontal	PASS
4	7237.643	-40.13	-13.00	Horizontal	PASS
5	11735.261	-37.25	-13.00	Horizontal	PASS
6	15014.657	-33.01	-13.00	Horizontal	PASS

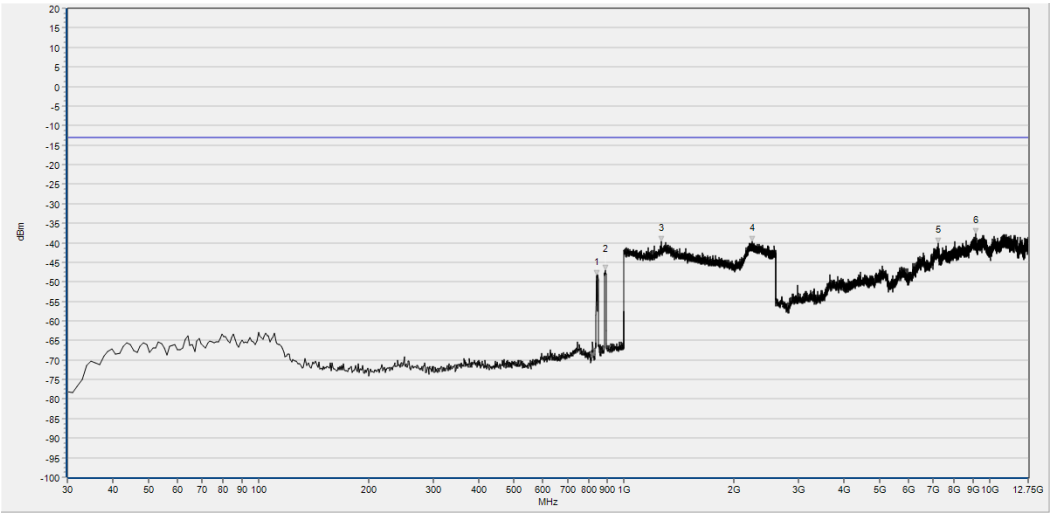


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	101.780	-62.74	-13.00	Horizontal	N/A
2	1302.201	-40.56	-13.00	Horizontal	N/A
3	2152.461	-29.91	-13.00	Horizontal	PASS
4	7243.244	-40.34	-13.00	Horizontal	PASS
5	9001.964	-37.03	-13.00	Horizontal	PASS
6	14082.088	-33.05	-13.00	Horizontal	PASS

LTE Band 26, 5MHz BW, Low Channel, QPSK



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	842.860	-42.52	-13.00	Vertical	N/A
2	888.450	-57.97	-13.00	Vertical	N/A
3	1296.439	-40.48	-13.00	Vertical	PASS
4	2224.810	-39.50	-13.00	Vertical	PASS
5	7186.789	-39.90	-13.00	Vertical	PASS
6	10239.725	-37.08	-13.00	Vertical	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	842.860	-48.38	-13.00	Vertical	N/A
2	887.480	-46.95	-13.00	Vertical	N/A
3	1262.505	-39.63	-13.00	Vertical	PASS
4	2244.658	-39.58	-13.00	Vertical	PASS
5	7244.008	-40.11	-13.00	Vertical	PASS
6	9152.555	-37.64	-13.00	Vertical	PASS

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test Items	Uncertainty
Radiated Emission	±2.95dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

4. Test Equipments Utilized

4.1 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2022.10.11	2023.10.10
System Simulator	MY48364176	8960-E5515C	Agilent	2023.02.27	2024.02.26
Receiver	MY54130016	N9038A	Agilent	2022.07.07	2023.07.06
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2022.05.25	2025.05.24
Test Antenna - Horn	9120D-963	BBHA 9120D	Schwarzbeck	2022.05.23	2025.05.24
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2022.07.08	2023.07.07
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2022.07.08	2023.07.07
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2022.07.08	2023.07.07
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2022.07.08	2023.07.07
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2022.07.08	2023.07.07
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2022.07.08	2023.07.07
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	LUCIX CORP.	2022.07.08	2023.07.07
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2022.07.23	2023.07.22
Notch Filter	N/A	WRCG-GSM850	Wainwright	2022.07.08	2023.07.07
Notch Filter	N/A	WRCGV-W Band II	Wainwright	2022.07.08	2023.07.07
Notch Filter	N/A	WRCGV -LTE B26	Wainwright	2022.07.08	2023.07.07
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09
Software Version: V1.2					

END OF REPORT