TEST REPORT

APPLICANT	:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
PRODUCT NAME	:	Bluetooth Earphone
MODEL NAME	:	RMA2301
BRAND NAME	:	realme
FCC ID	:	2AUYFRMA2301-R
STANDARD(S)	:	47 CFR Part 15 Subpart B
RECEIPT DATE	:	2023-04-25
TEST DATE	:	2023-05-07
ISSUE DATE	:	2023-06-01

Edited by: Chen Bilian(Rapporteur)

Approved by: Xiao Xiong(Supervisor)

NOTE: This document is issued by Shenzhen Morlab Communications Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.

MORLAB
Shenzhen Morlab Communications Technology Co., Ltd.
FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen ,GuangDong Province, P. R. China
Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

DIRECTORY

1. Technical Information 3
1.1. Applicant and Manufacturer Information 3
1.2. Equipment Under Test (EUT) Description 3
2. Test Results 5
2.1. Applied Reference Documents 5
2.2. EUT Setup and Operating Conditions 6
3. 47 CFR Part 15B Requirements 7
3.1. Conducted Emission 7
3.2. Radiated Emission 11
Annex A Test Uncertainty 18
Annex B Testing Laboratory Information 19

Change History		
Version	Date	Reason for change
1.0	2023-06-01	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Applicant Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China
Manufacturer:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Manufacturer Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Bluetooth Earphone	
EUT No.:	1#	
Hardware Version:	V1.2	
Software Version:	V1.1.0.27	
Frequency Range:	Bluetooth: 2402 MHz ~ 2480 MHz	
Accessory:	**Battery 1 (for Earphone)**	
	Brand Name:	N/A
	Model No.:	115560
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	43mAh
	Rated Voltage:	3.85V
	Charge Limit:	4.4V
	Manufacturer:	Chongqing VDL Electronics Co., Ltd.
	Battery 2 (for Charging case)	
	Brand Name:	N/A
	Model No.:	751536
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	460mAh
	Rated Voltage:	3.8V
	Charge Limit:	4.35V
	Manufacturer:	Chongqing VDL Electronics Co., Ltd.

Note:

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	2023.05.07	Fan Zehang	PASS	No deviation
2	15.109	Radiated Emission	2023.05.07	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

Test Item	
Radiated Emission	
Mode 1 :	EUT + Bluetooth Idle + Battery 1 + Battery 2+ Adapter + USB cable + USB Extension Cable + Charging Mode
Mode 2 :	**EUT + Bluetooth Link + Battery 1 + Mobile Phone + Play 1KHZ Audio**
Conducted Emission	
Mode 1 :	**EUT + Bluetooth Idle + Battery 1 + Battery 2+ Adapter + USB cable + USB Extension Cable + Charging Mode**
Remark: The above test mode in boldface (Mode 1) was the worst case of conducted emission test, only the test data of these modes were reported. The above test mode in boldface (Mode 2) 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:

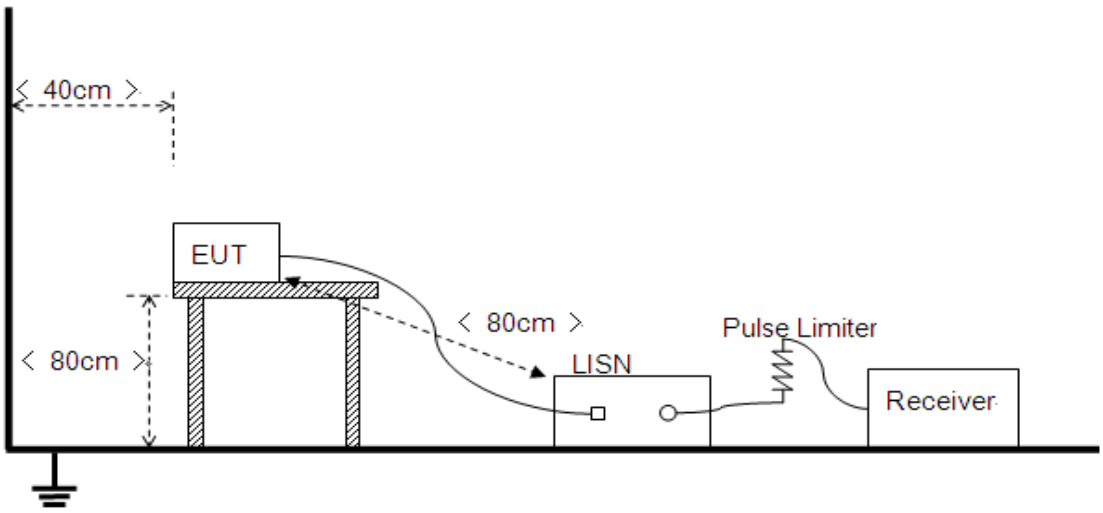
a) The limit subjects to the Class B digital device.

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.



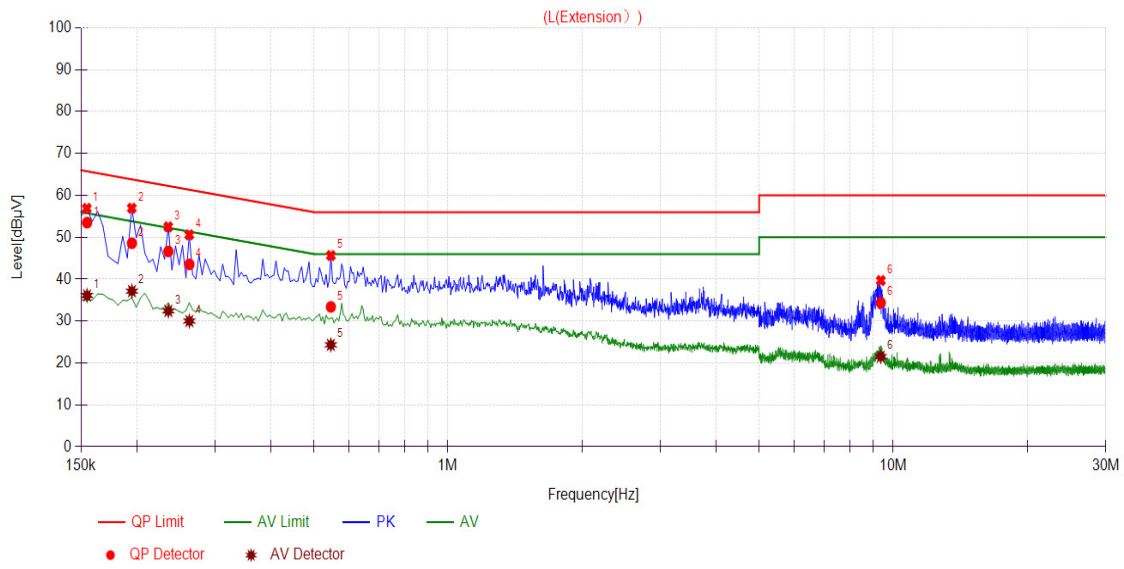
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. A Pulse Limiter is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

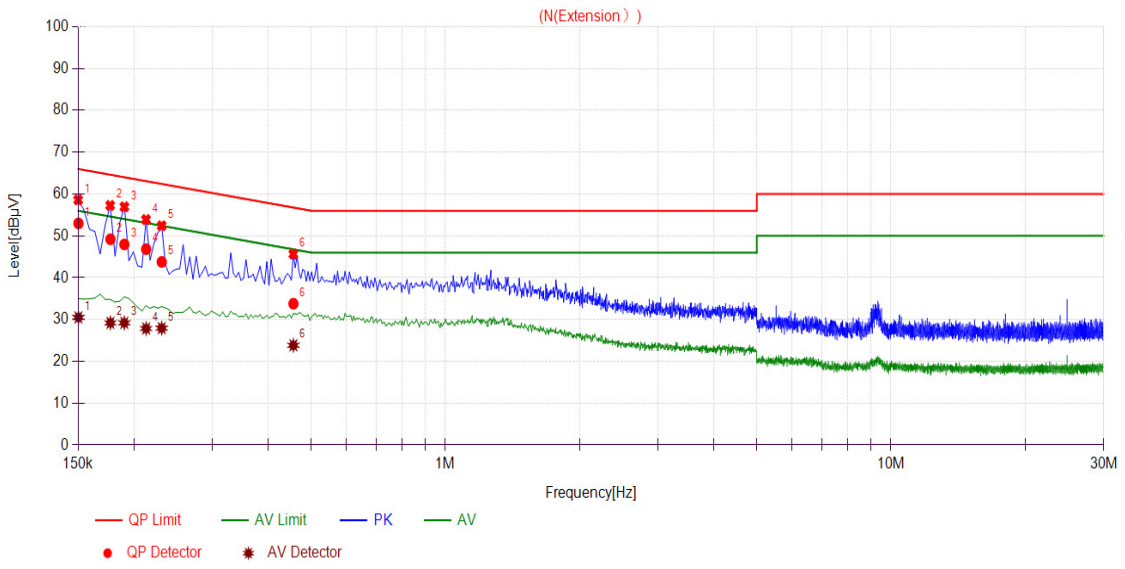
Set RBW=9 kHz, VBW=30 kHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both 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	0.1547	53.51	36.12	65.75	55.75	Line	PASS
2	0.1951	48.58	37.15	63.82	53.82		PASS
3	0.2356	46.62	32.43	62.25	52.25		PASS
4	0.2626	43.54	30.01	61.35	51.35		PASS
5	0.5458	33.39	24.33	56.00	46.00		PASS
6	9.3733	34.36	21.52	60.00	50.00		PASS



(Plot B: N Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quasi-peak	Average	Quasi-peak	Average		
1	0.1502	52.99	30.50	65.99	55.99	Neutral	PASS
2	0.1772	49.19	29.20	64.62	54.62		PASS
3	0.1904	47.96	29.21	64.02	54.02		PASS
4	0.2131	46.83	27.85	63.08	53.08		PASS
5	0.2310	43.77	27.93	62.41	52.41		PASS
6	0.4561	33.79	23.83	56.76	46.76		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 indBμV/m is calculated by 20log Emission Level(μV/m).

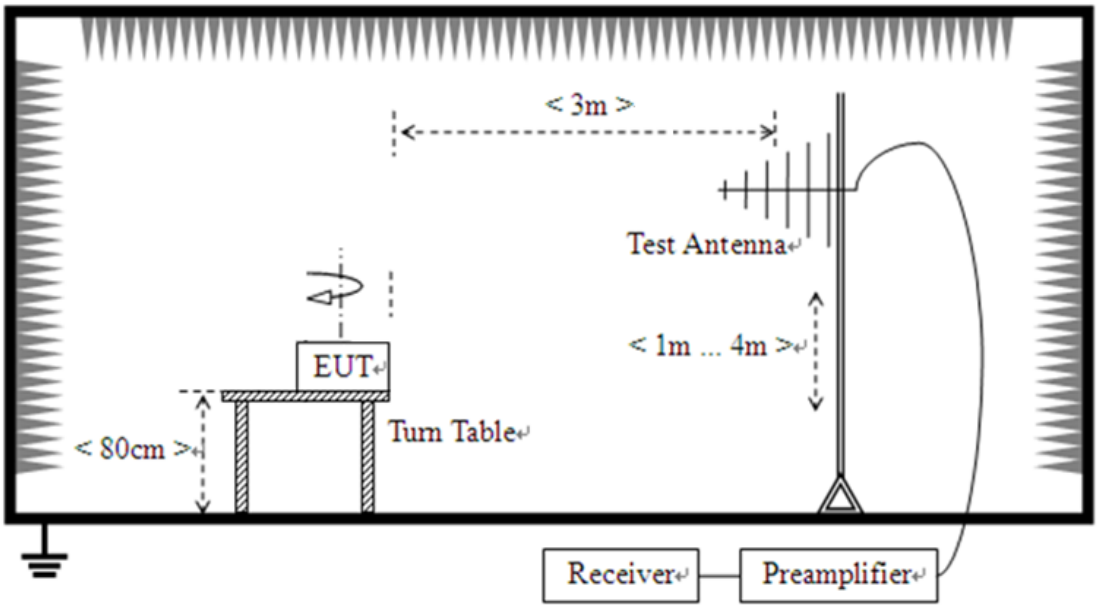
3.2.2. Frequency Range of Measurement

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

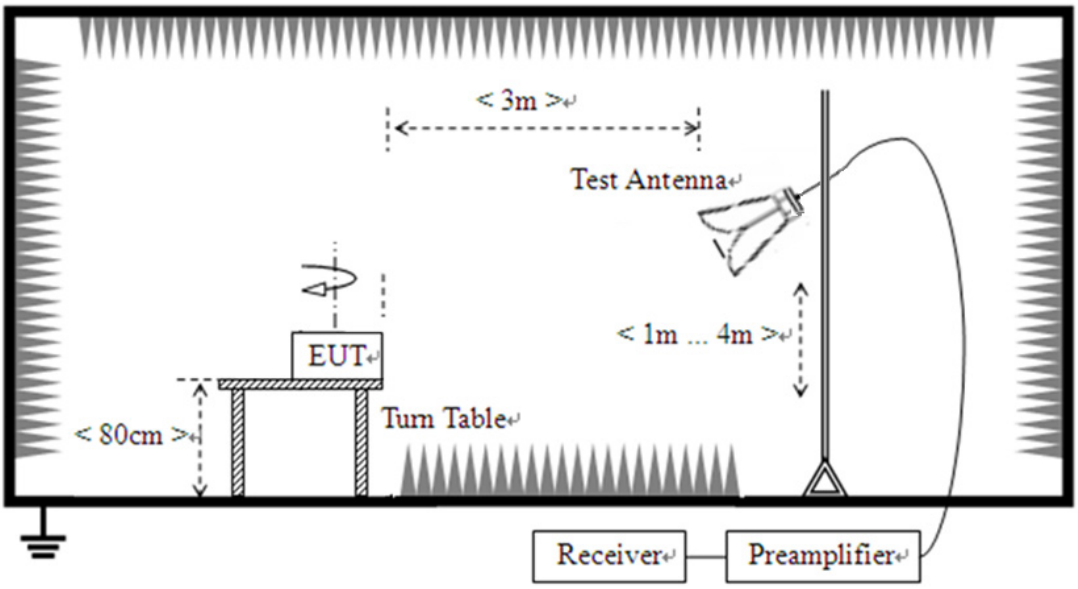
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705–108	1000.
108–500	2000.
500–1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

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

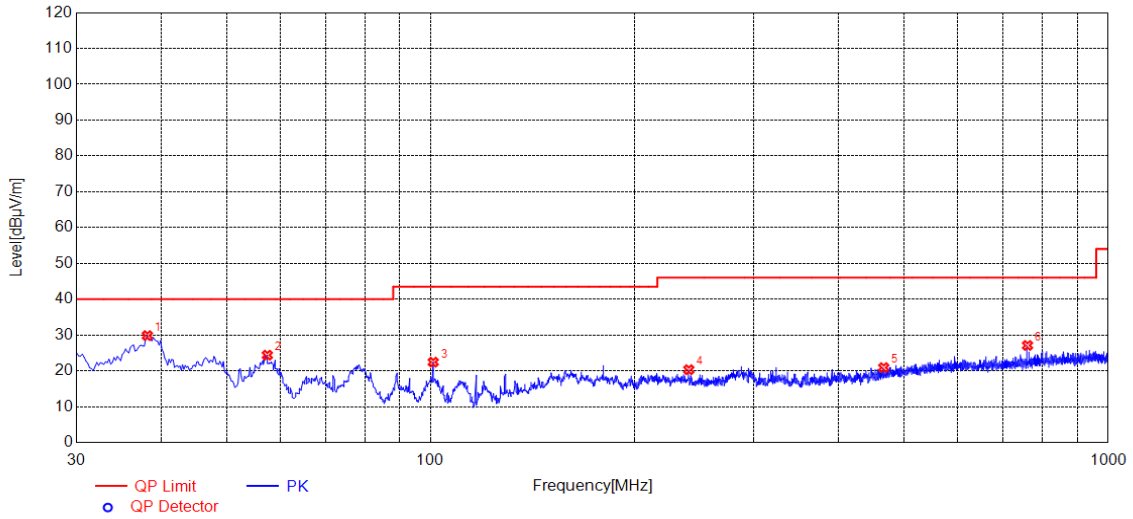
For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video bandwidth is set to 3MHz for peak measurements and as applicable for average measurements.

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.

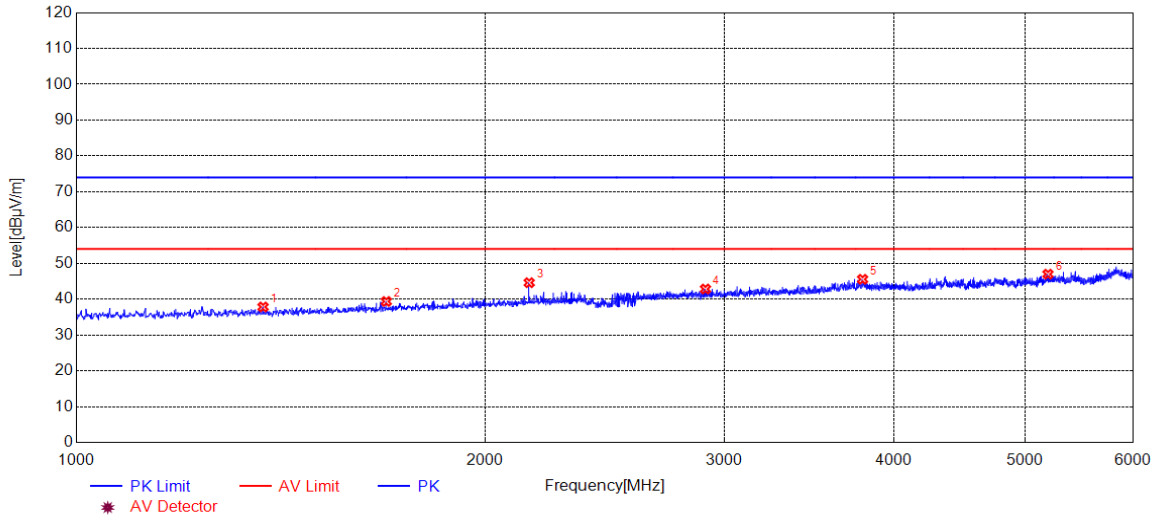
The amplitude of emissions (6GHz-12.5GHz) which are attenuated more than 20 dB below the permissible value need not be reported.

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.



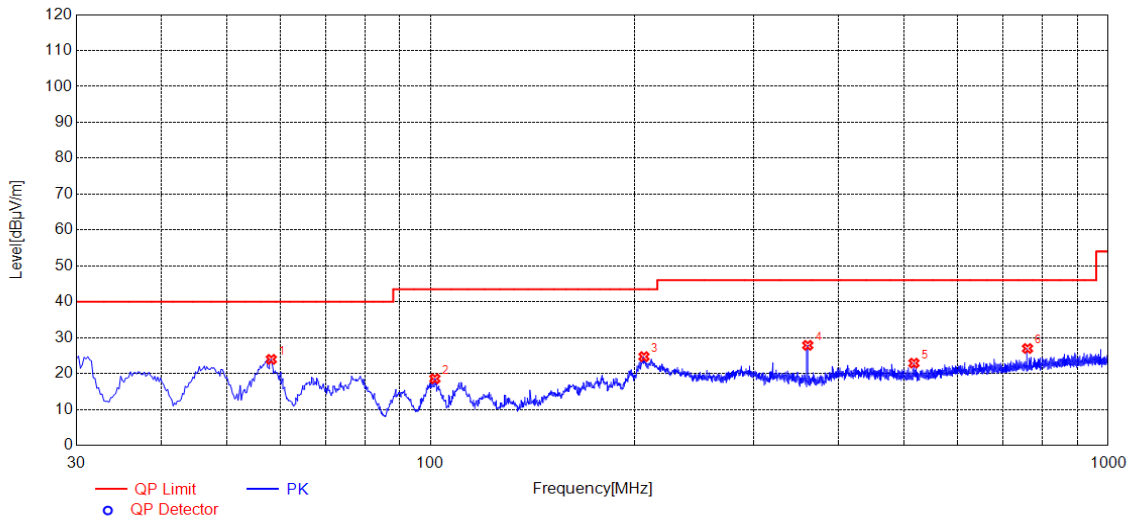
(Plot A: ANT-Vertical,30MHz - 1GHz)

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	38.1496	29.84	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
2	57.3595	24.38	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
3	100.8242	22.43	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
4	240.3381	20.32	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
5	466.1992	20.90	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	759.9740	27.09	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS



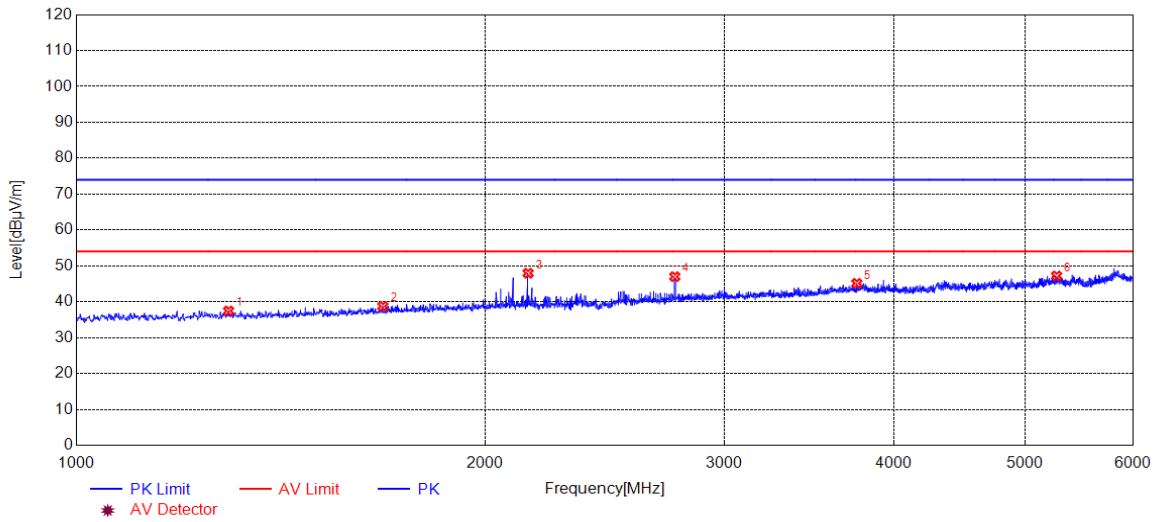
(Plot B: ANT-Vertical,1GHz - 6GHz)

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	1372.0744	37.83	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1691.1382	39.38	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2155.2310	44.60	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	2906.3813	42.84	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	3794.5589	45.56	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	5196.8394	46.99	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	58.1356	23.95	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	101.4063	18.55	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
3	206.3813	24.71	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	360.0600	27.86	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
5	516.6493	22.90	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	759.9740	26.98	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	1294.0588	37.45	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1681.1362	38.74	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2151.2302	47.96	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	2759.3519	47.01	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	3757.5515	45.13	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	5273.8548	47.20	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	2022/11/7	2025/11/6
Bi-Log Antenna	VULB 9163	9163-519	SCHWARZBECK	2022/5/25	2025/5/24
Horn Antenna	BBHA 9120D	9120D-963	SCHWARZBECK	2022/5/25	2025/5/24
Horn Antenna	BBHA 9120D	01774	SCHWARZBECK	2022/7/13	2025/7/12
Receiver	N9038A	MY54130016	Agilent	2022/7/7	2023/7/6
Receiver	N9038A	MY56400093	KEYSIGHT	2023/2/9	2024/2/8
6db Attenuator	BW-N6W5+	E191001	Mini-circuits	2022/10/11	2023/10/10
Preamplifier	S020180L3203	61171/61172	LUCIX CORP.	2022/7/8	2023/7/7
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 Cable	QA360-40-KKF-2	22290046	Qualwave	N/A	N/A
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	2022/7/7	2023/7/6
LISN	NSLK 8127	8127449	Schwarzbeck	2023/2/21	2024/2/20
10dB Pulse Limiter	VTSD 9561-F	VTSD 9561 F-B #206	SCHWARZBECK	2022/7/6	2023/7/5

6. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
Adapter	HUAWEI	HW-050200C01	H785LBJBY16392
USB extension cable(Shield, 1M)	HUAWEI	N/A	N/A

Mobile Phone	HONOR	PLK-AL10	N/A

END OF REPORT