



TEST REPORT

APPLICANT : Nubia Technology Co., Ltd.
PRODUCT NAME : REDMAGIC WATCH
MODEL NAME : SW2102
BRAND NAME : REDMAGIC
STANDARD(S) : 47 CFR Part 15 Subpart B
RECEIPT DATE : 2020-11-16
TEST DATE : 2020-12-12 to 2020-12-14
ISSUE DATE : 2021-02-08

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Change History		
Version	Date	Reason for change
1.0	2021-02-08	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Nubia Technology Co., Ltd.
Applicant Address:	Room 1801, Building 2, Chongwen Park, Nanshan Zhiyuan, No.3370, Liuxian Rd, Nanshan District, Shenzhen City, Guangdong Province, P. R. China
Manufacturer:	Nubia Technology Co., Ltd.
Manufacturer Address:	Room 1801, Building 2, Chongwen Park, Nanshan Zhiyuan, No.3370, Liuxian Rd, Nanshan District, Shenzhen City, Guangdong Province, P. R. China

1.2. Equipment Under Test (EUT) Description

Product Name:	REDMAGIC WATCH
Serial No.:	(N/A, marked #1 by test site)
Hardware Version:	P2
Software Version:	1.7.0.11
Tx Frequency:	Bluetooth 5.0: 2402 MHz ~ 2480 MHz
Rx Frequency:	Bluetooth 5.0: 2402 MHz ~ 2480 MHz GPS: 1559 MHz ~ 1610 MHz

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	2020.12.14	Huang Zhiye	PASS	No deviation
2	15.109	Radiated Emission	2020.12.12	Yang Jie	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% risk level.



2.2. EUT Setup and Operating Conditions

Test Items	
Radiated Emission	
Mode 1	: EUT + Adapter + Bluetooth Link + APP LINK+ GPS Rx
Conducted Emission	
Mode 1	: EUT + Adapter + Bluetooth Link + APP LINK+ GPS Rx

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).

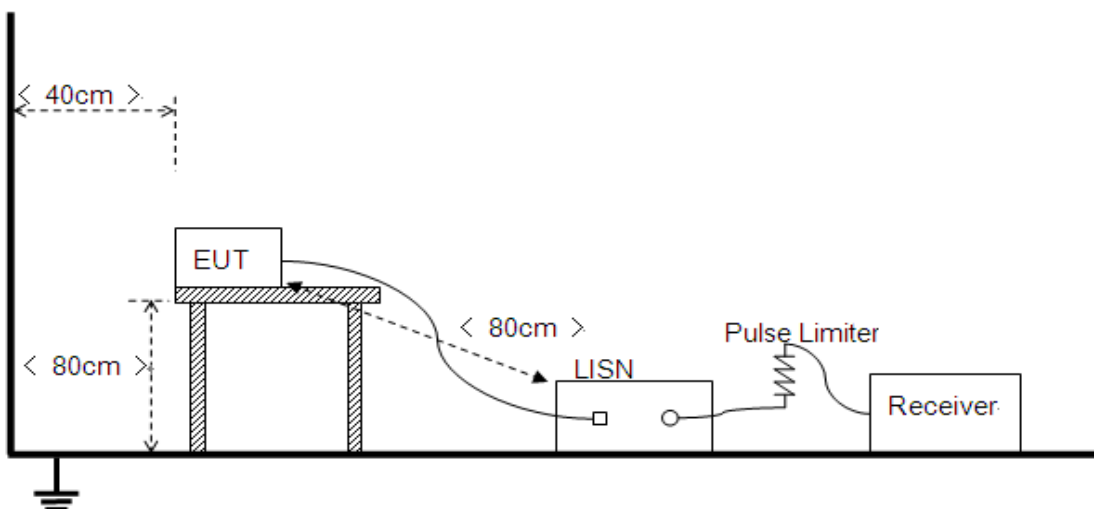
Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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.





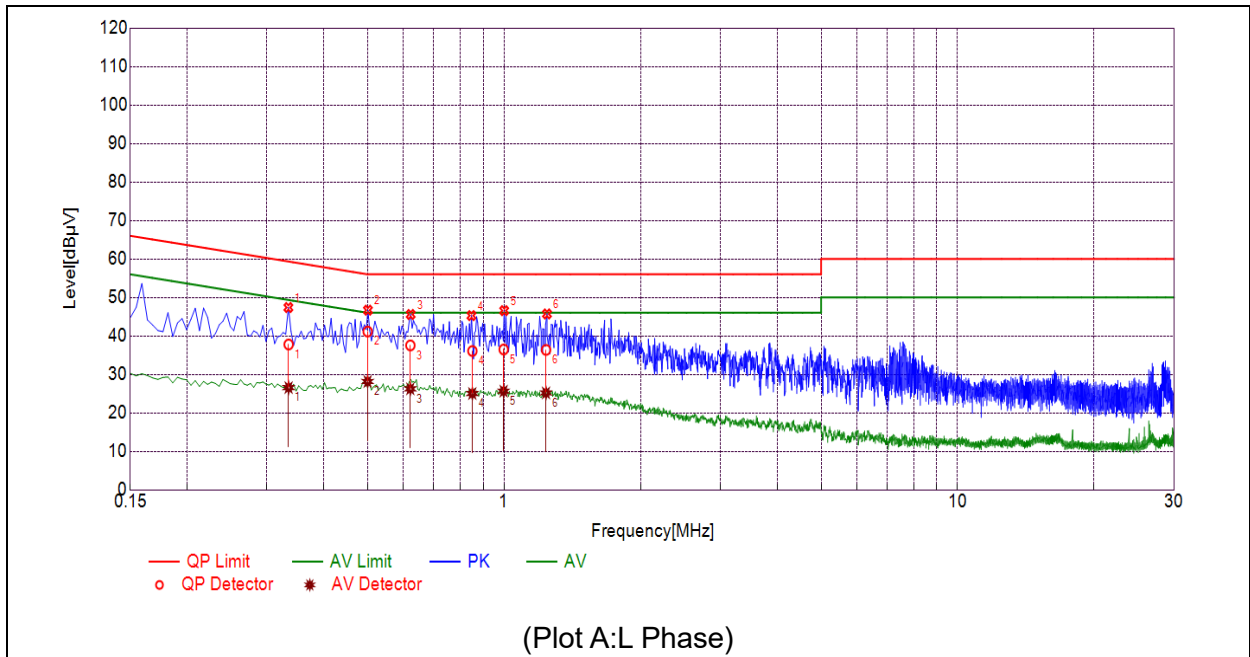
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument. A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

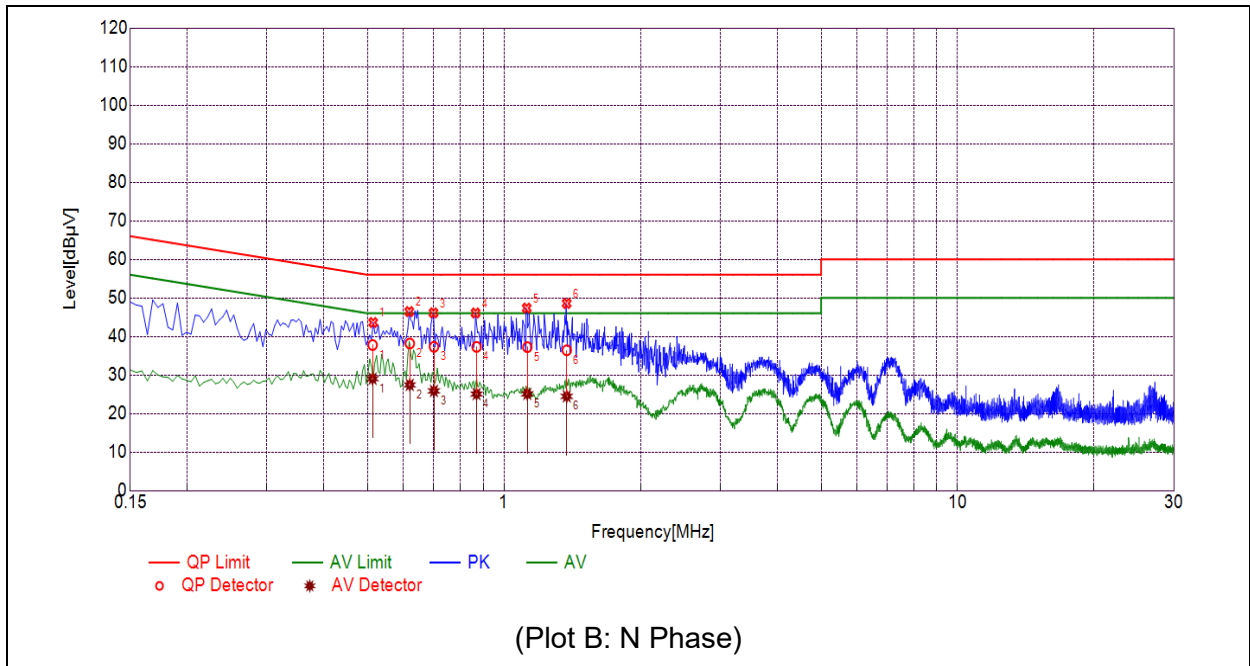
3.1.3. Test Result

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	0.3349	37.78	26.57	59.33	49.33	Line	PASS
2	0.5002	41.14	28.15	56.00	46.00		PASS
3	0.6213	37.53	26.24	56.00	46.00		PASS
4	0.8512	36.08	25.03	56.00	46.00		PASS
5	0.9978	36.47	25.64	56.00	46.00		PASS
6	1.2373	36.37	25.18	56.00	46.00		PASS



NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.5130	37.78	29.05	56.00	46.00	Neutral	PASS
2	0.6196	38.17	27.44	56.00	46.00		PASS
3	0.7005	37.31	25.87	56.00	46.00		PASS
4	0.8697	37.29	25.06	56.00	46.00		PASS
5	1.1252	37.23	25.10	56.00	46.00		PASS
6	1.3746	36.41	24.46	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	
	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
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($\mu\text{V/m}$).

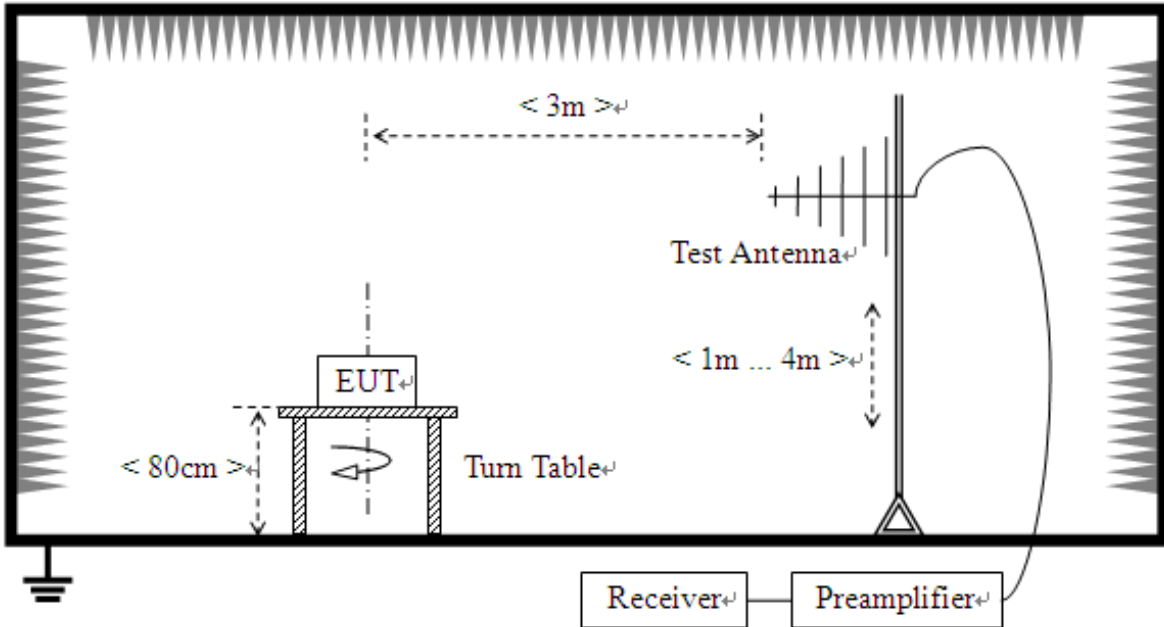
3.2.2. Frequency Range of Measurement

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

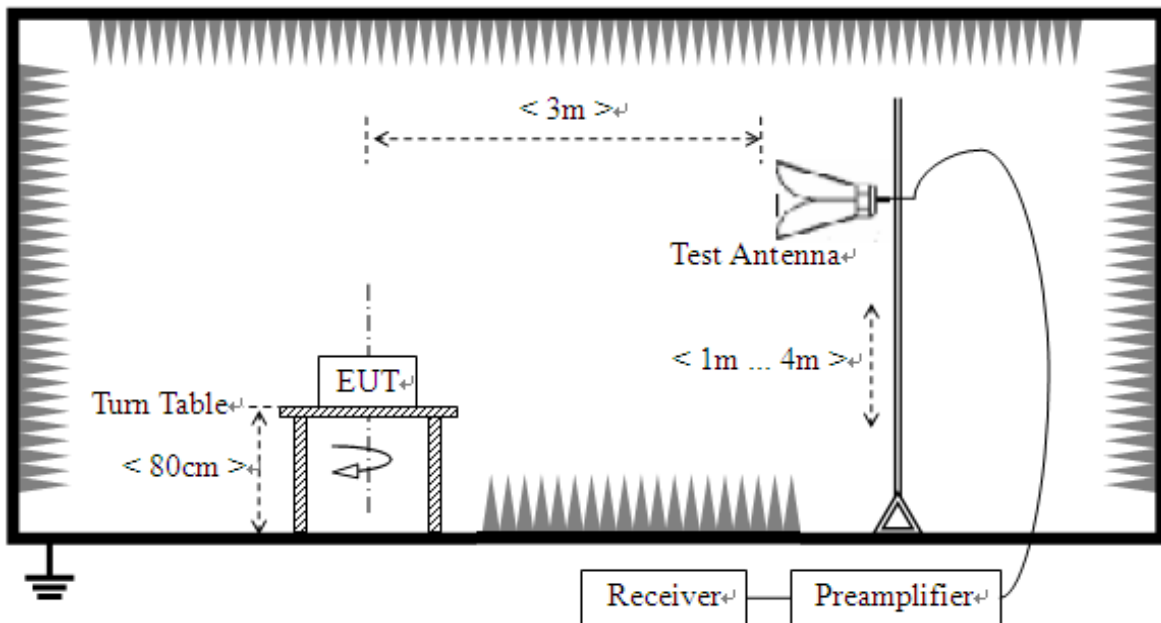
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

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:

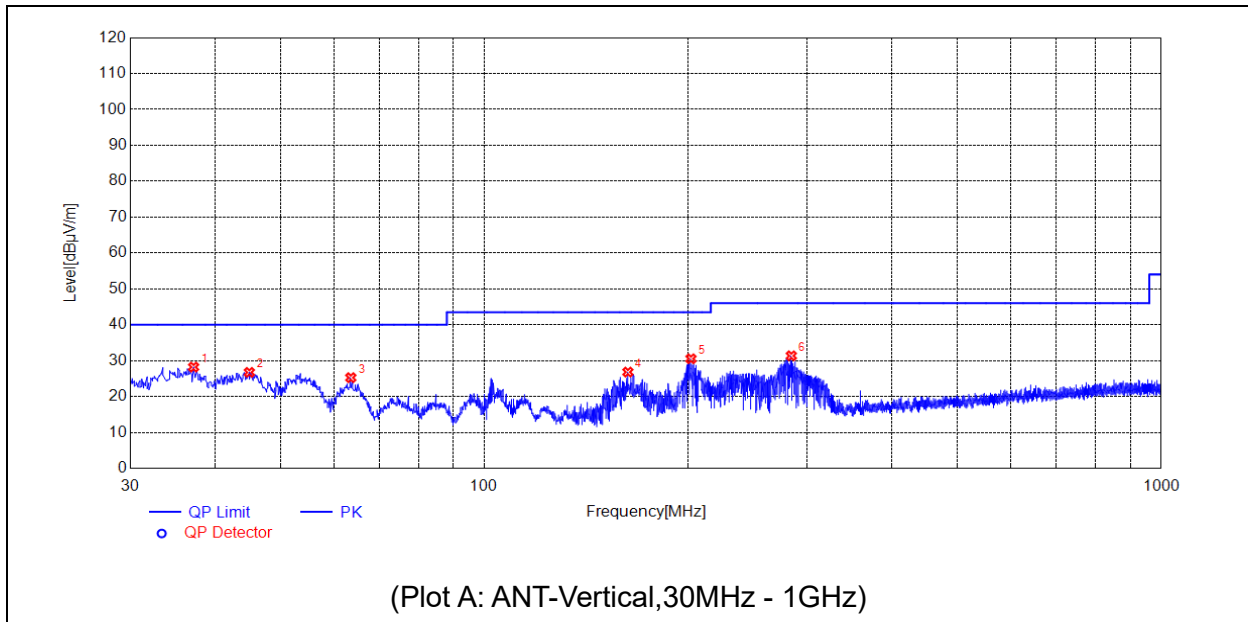
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal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

3.2.4. Test Result

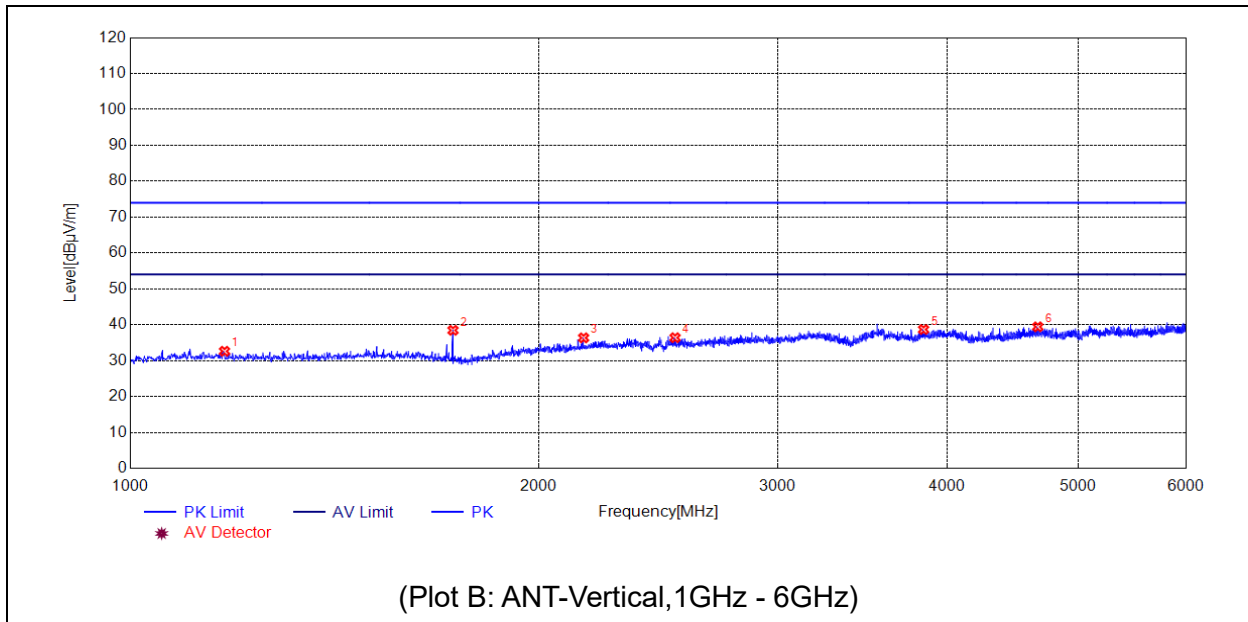
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

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

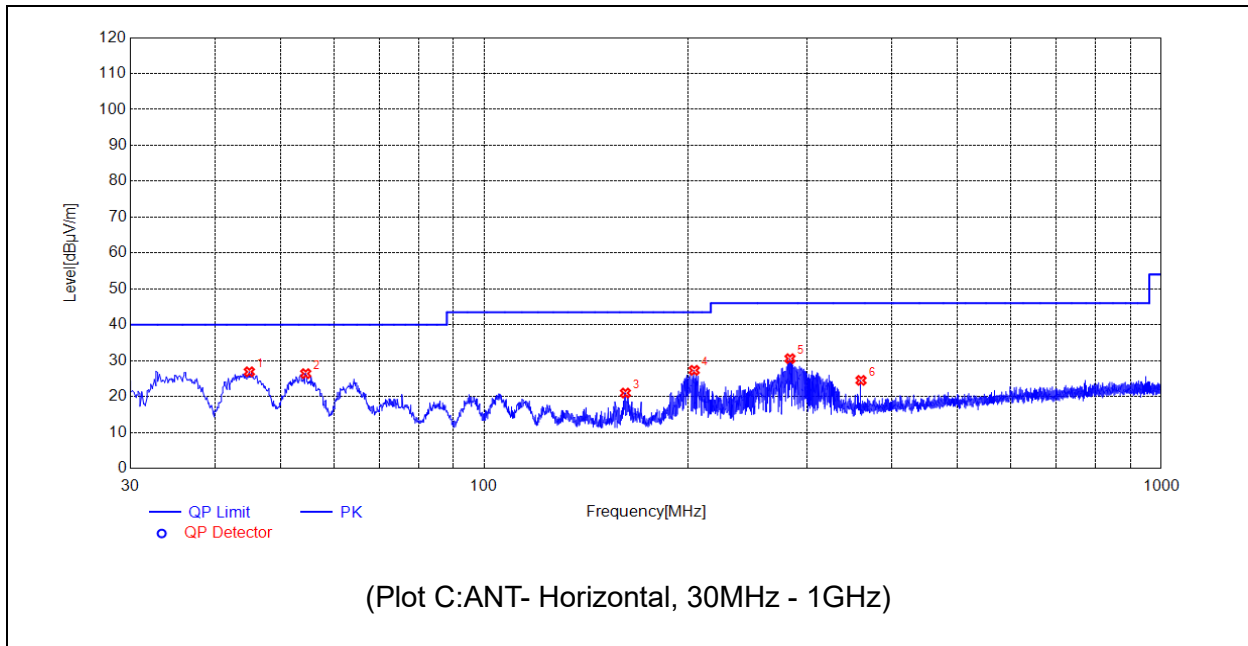
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.



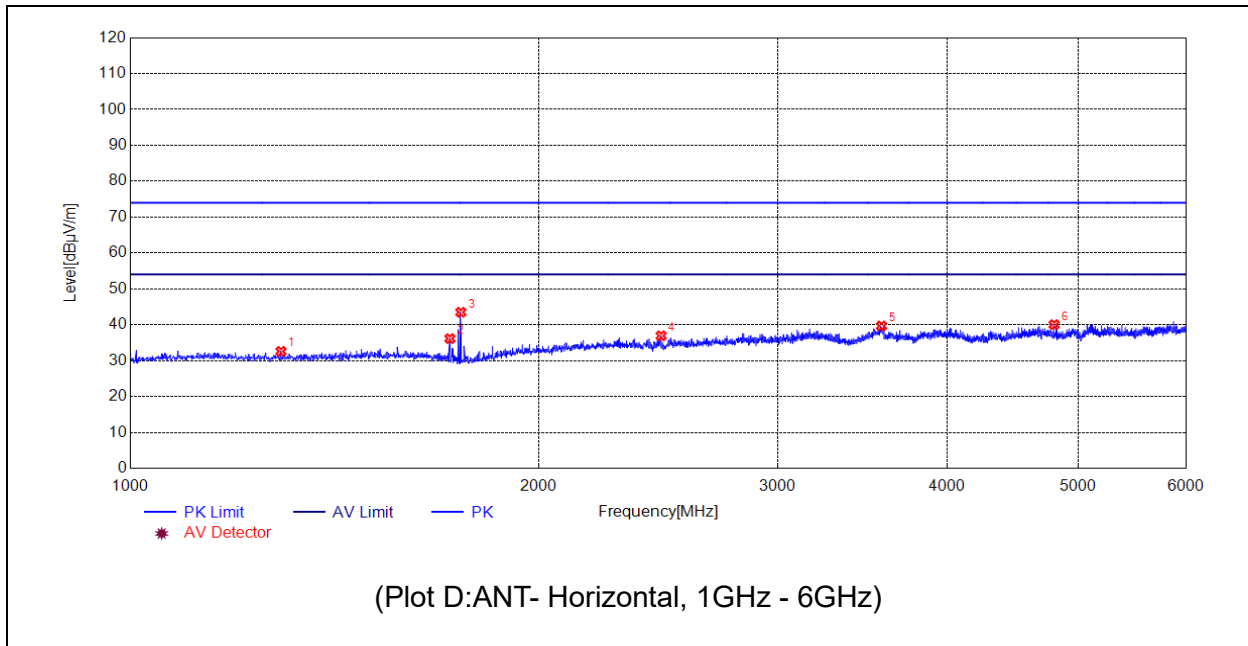
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	37.1787	28.21	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
2	44.9395	26.74	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
3	63.4683	25.26	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
4	162.9033	26.82	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
5	201.9012	30.53	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
6	284.0684	31.35	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	1173.0346	32.62	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1729.1458	38.45	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2158.2316	36.35	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	2521.3043	36.39	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	3844.5689	38.68	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	4667.7335	39.43	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	44.9395	26.90	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	54.4464	26.39	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	161.5452	20.98	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	204.1324	27.31	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	282.8073	30.56	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	360.0270	24.50	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS



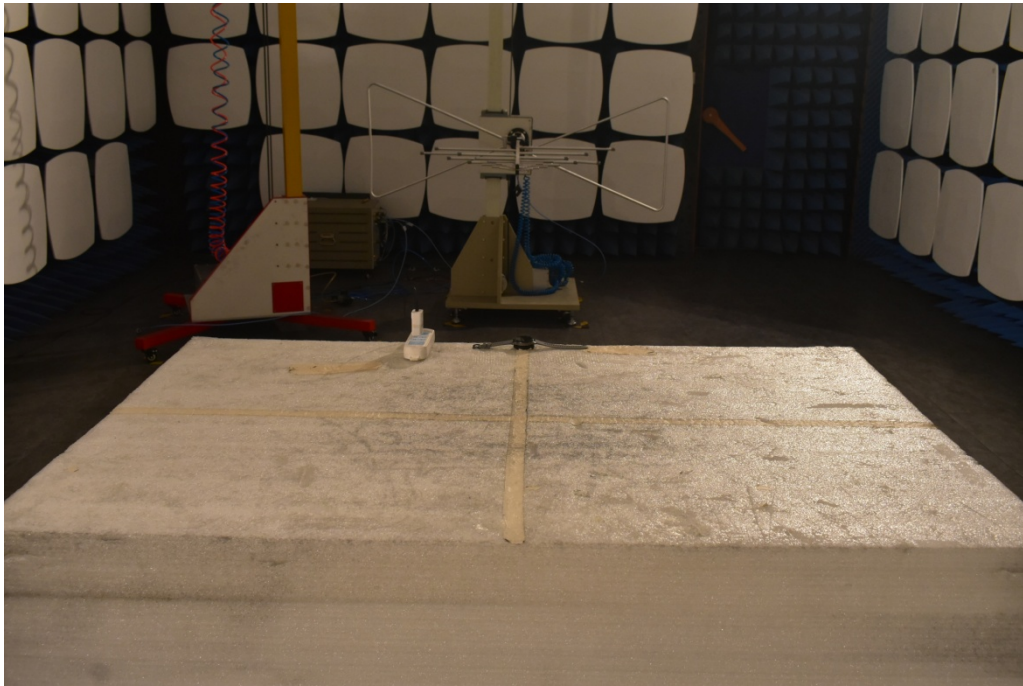
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1291.0582	32.59	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1720.1440	36.15	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	1752.1504	43.49	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	2462.2925	36.93	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	3579.5159	39.67	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	4798.7598	40.04	N.A.	N.A.	74.00	N.A.	54.00	H	PASS

Annex A Photographs of Test Setup

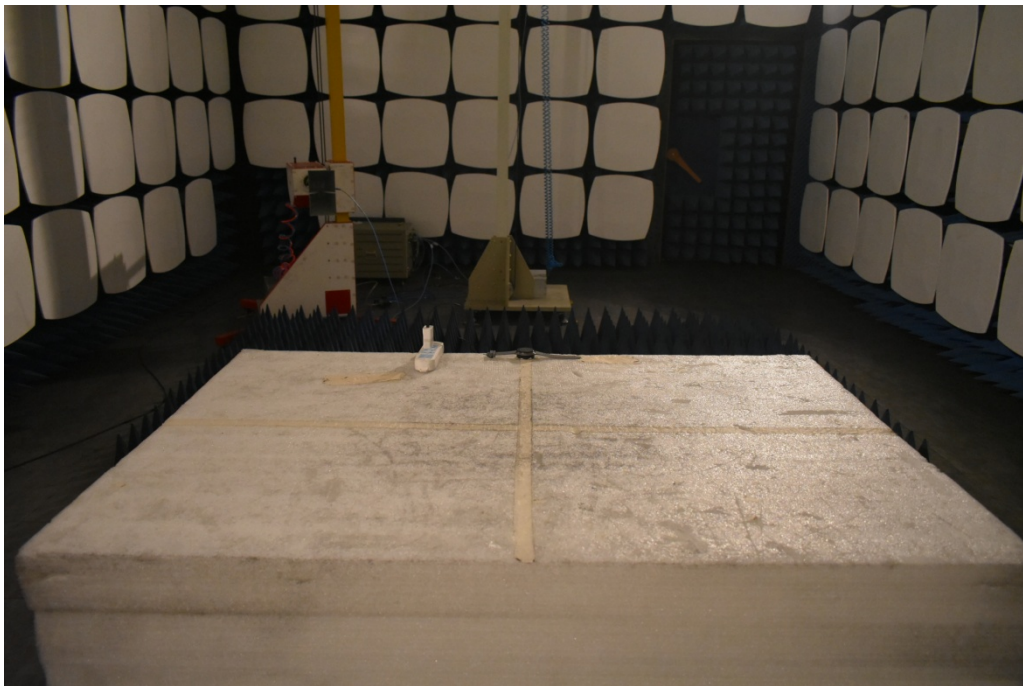
1. Conducted Emission



2. Radiated Emission(30MHz-1GHz)



3. Radiated Emission(above 1GHz)





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	±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 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	2020.07.21	2021.07.20
Test Receiver	R&S	ESPI	101052	2020.07.21	2021.07.20
LISN	Schwarzbeck	NSLK 8127	8127449	2020.03.26	2021.03.25
Pulse Limiter (10dB)	Schwarzbeck	VTSD 9561-F	VTSD 9561 F-B #206	2020.07.24	2021.07.23
Radiated Disturbance Preamplifier	rflight	S020180L3 203	61171/61172	2020.07.21	2021.07.20
Radiated Disturbance Preamplifier	rflight	S10M100L 3802	46732	2020.07.21	2021.07.20
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-519	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	01774	2019.07.26	2022.07.25
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2020.01.06	2023.01.05

6. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
Adapter	HUAWEI	HW050200C01	H785LBJBY16392

_____ END OF REPORT _____