



REPORT No.: SZ23010129E01

# TEST REPORT

**APPLICANT** : Shenzhen Tengfei Technology Management Ltd.

**PRODUCT NAME** : REDMAGIC GAMING MOUSE

**MODEL NAME** : GS001J

**BRAND NAME** : REDMAGIC

**FCC ID** : 2A9QD-GS001J

**STANDARD(S)** : 47 CFR Part 15 Subpart B

**RECEIPT DATE** : 2023-01-16

**TEST DATE** : 2023-02-17 to 2023-03-14

**ISSUE DATE** : 2023-04-21

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**MORLAB**

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Change History		
Version	Date	Reason for change
1.0	2023-04-21	First edition



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Shenzhen Tengfei Technology Management Ltd.
<b>Applicant Address:</b>	Room 3101, Building D1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Street, Nanshan, Shenzhen, China
<b>Manufacturer:</b>	Shenzhen Tengfei Technology Management Ltd.
<b>Manufacturer Address:</b>	Room 3101, Building D1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Street, Nanshan, Shenzhen, China

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	REDMAGIC GAMING MOUSE	
<b>EUT No.:</b>	1#	
<b>Hardware Version:</b>	V1.1.0.12	
<b>Software Version:</b>	SNKJBD002_100KEY_RGB_V1.4 20221019	
<b>Mouse Tx&amp;Rx Frequency:</b>	Bluetooth: 2402 MHz ~ 2480 MHz 2.4G: 2402 MHz ~ 2480 MHz	
<b>USB Receiver Rx Frequency:</b>	2.4G: 2402 MHz ~ 2480 MHz	
<b>Accessory:</b>	<b>Battery</b>	
	Brand Name:	N/A
	Model No.:	582728
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	450mAh
	Rated Voltage:	3.7V
	Charge Limit:	4.2V
	Manufacturer:	Dongguan Hengxun Energy Technology 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	2023.02.17	Fan Zehang	PASS	No deviation
2	15.109	Radiated Emission	2023.03.14	Yang Lian	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(Mouse) + Bluetooth Idle + 2.4G Link + PC + PC Adapter+ USB Receiver + Working Mode
Mode 2	: EUT(Mouse) + Bluetooth Link + 2.4G Idle + PC + PC Adapter + Working Mode
<b>Mode 3</b>	<b>: EUT(Mouse) + Bluetooth Idle + 2.4G Idle + USB Cable + PC + PC Adapter + Working Mode</b>
Conducted Emission	
<b>Mode 3</b>	<b>: EUT(Mouse) + Bluetooth Idle + 2.4G Idle + USB Cable + PC + PC Adapter + Working Mode</b>
Mode 4	: EUT(USB Receiver) + 2.4G Link + PC + PC Adapter + Mouse + Working Mode
<b>Remark:</b> The above test mode in boldface (Mode 3) was the worst case of conducted emission test, only the test data of these modes were reported. The above test mode in boldface (Mode 3) 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 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

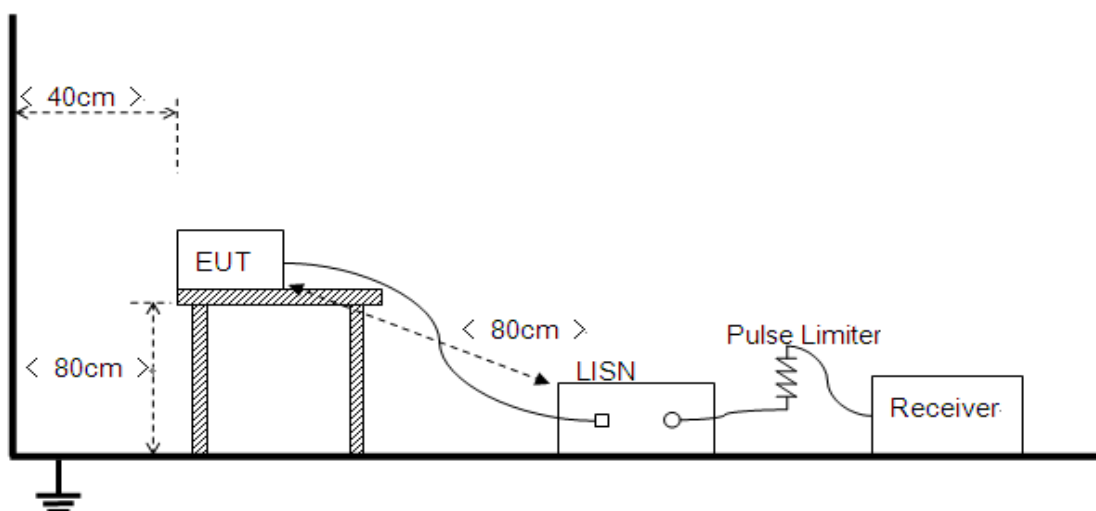
Frequency Range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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.





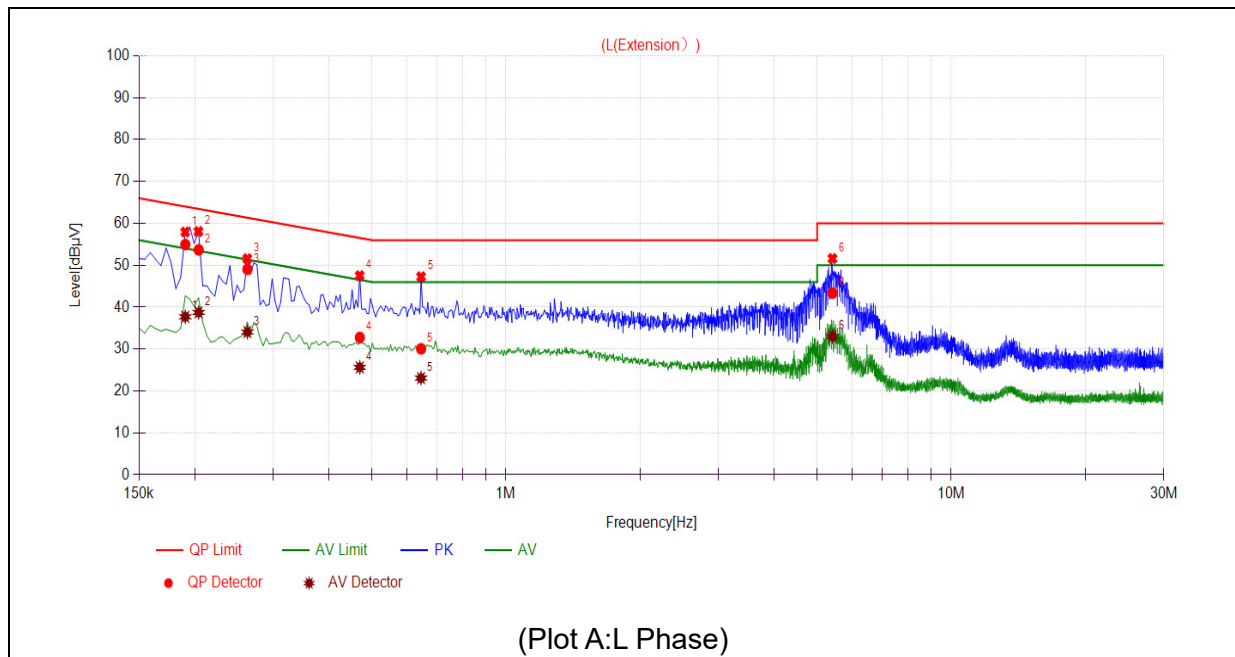
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides  $50\Omega/50\mu\text{H}$  of coupling impedance for the measuring instrument.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

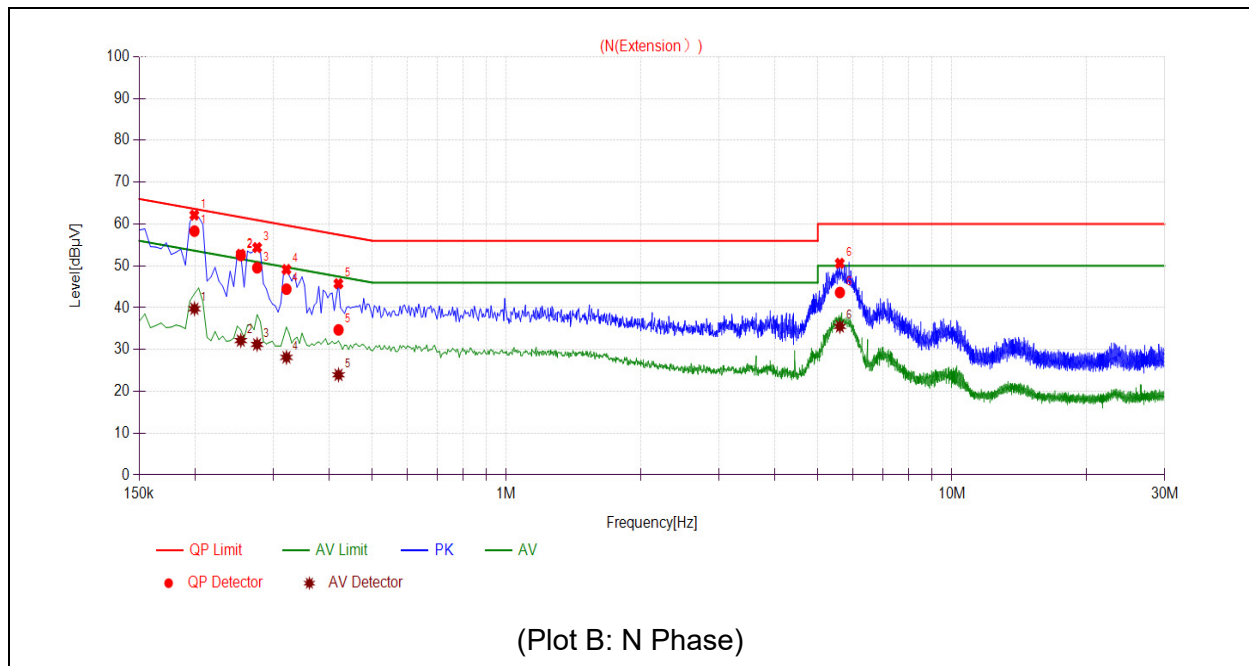
Set RBW=9 kHz, VBW=30 kHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both 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
		Quasi-peak	Average	Quasi-peak	Average		
1	0.1905	54.96	37.71	64.01	54.01	Line	PASS
2	0.2041	53.68	38.74	63.44	53.44		PASS
3	0.2627	49.04	34.06	61.35	51.35		PASS
4	0.4697	32.77	25.64	56.52	46.52		PASS
5	0.6447	30.07	23.08	56.00	46.00		PASS
6	5.4096	43.37	33.01	60.00	50.00		PASS





No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quasi-peak	Average	Quasi-peak	Average		
1	0.1996	58.30	39.75	63.63	53.63	Neutral	PASS
2	0.2536	52.48	32.15	61.64	51.64		PASS
3	0.2759	49.54	31.22	60.94	50.94		PASS
4	0.3211	44.43	28.13	59.68	49.68		PASS
5	0.4202	34.69	23.94	57.44	47.44		PASS
6	5.6025	43.62	35.52	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	
	( $\mu\text{V/m}$ )	(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( $\mu\text{V/m}$ ).

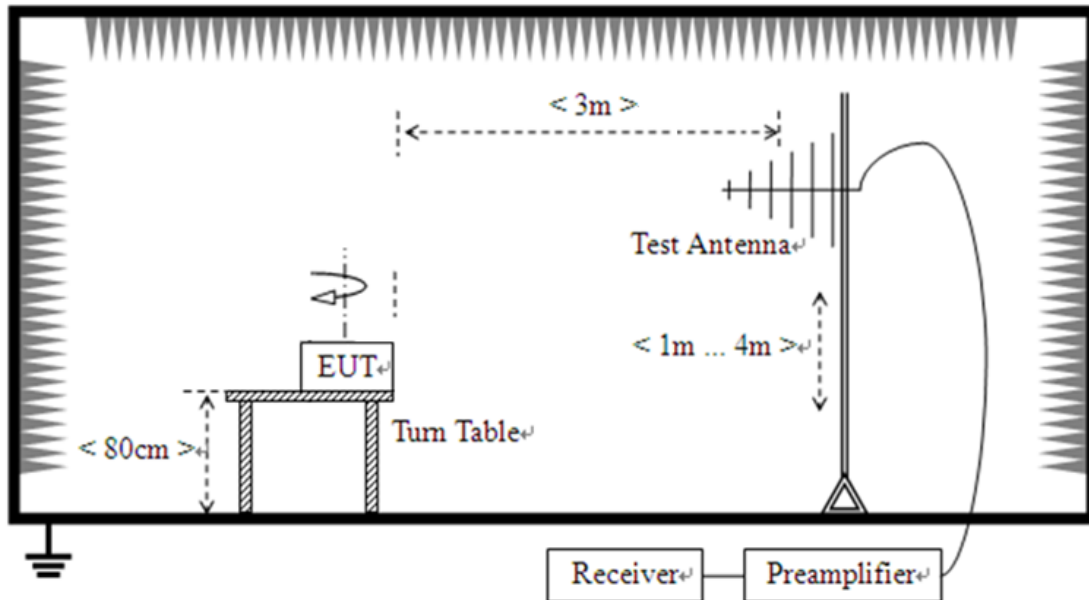
### 3.2.2. Frequency Range of Measurement

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

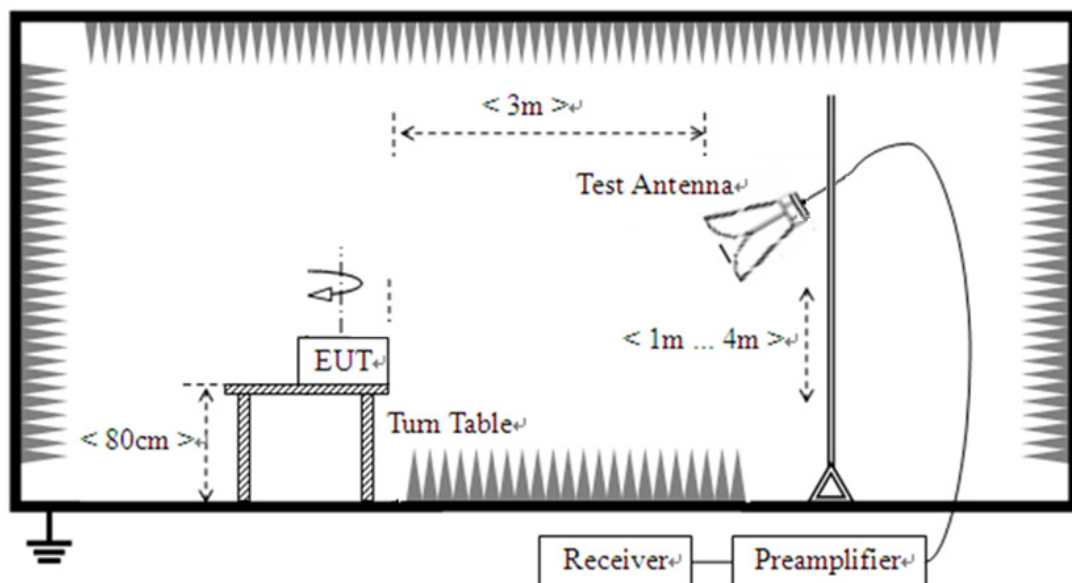
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705 .....	30.
1.705–108 .....	1000.
108–500 .....	2000.
500–1000 .....	5000.
Above 1000 .....	5th harmonic of the highest frequency or 40 GHz, whichever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

### 3.2.3. Test Setup

- 1) For radiated emissions from 30MHz to 1GHz



- 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. 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.

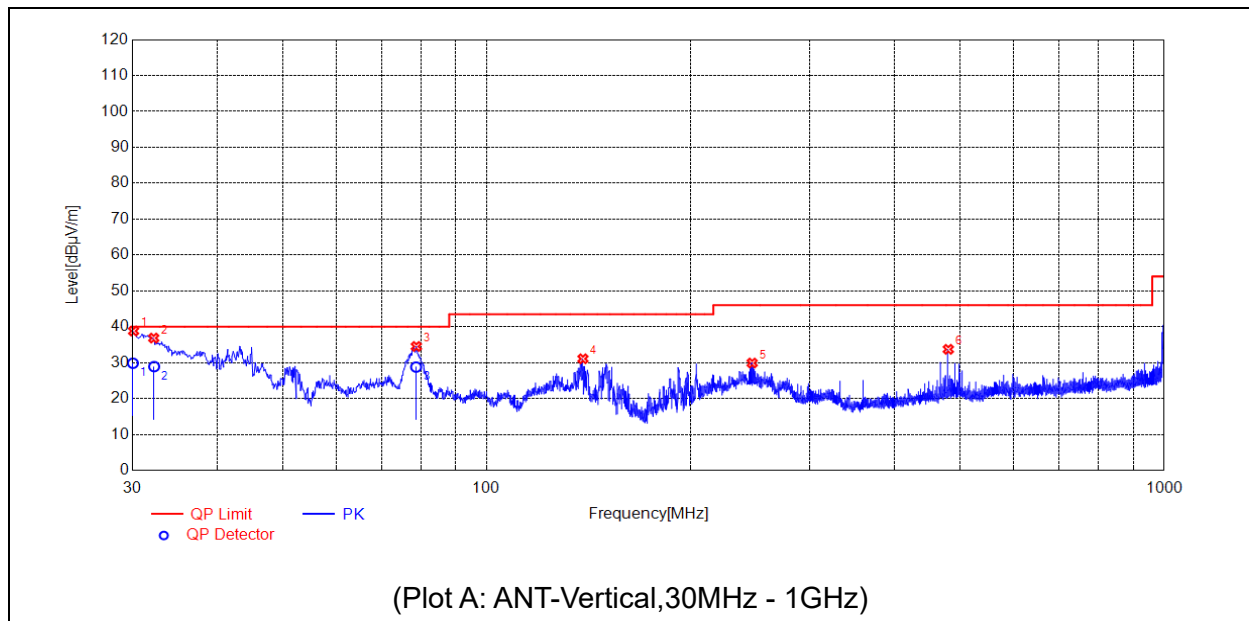
For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video bandwidth is set to 3MHz for peak measurements and as applicable for average measurements.

#### **3.2.4. Test Result**

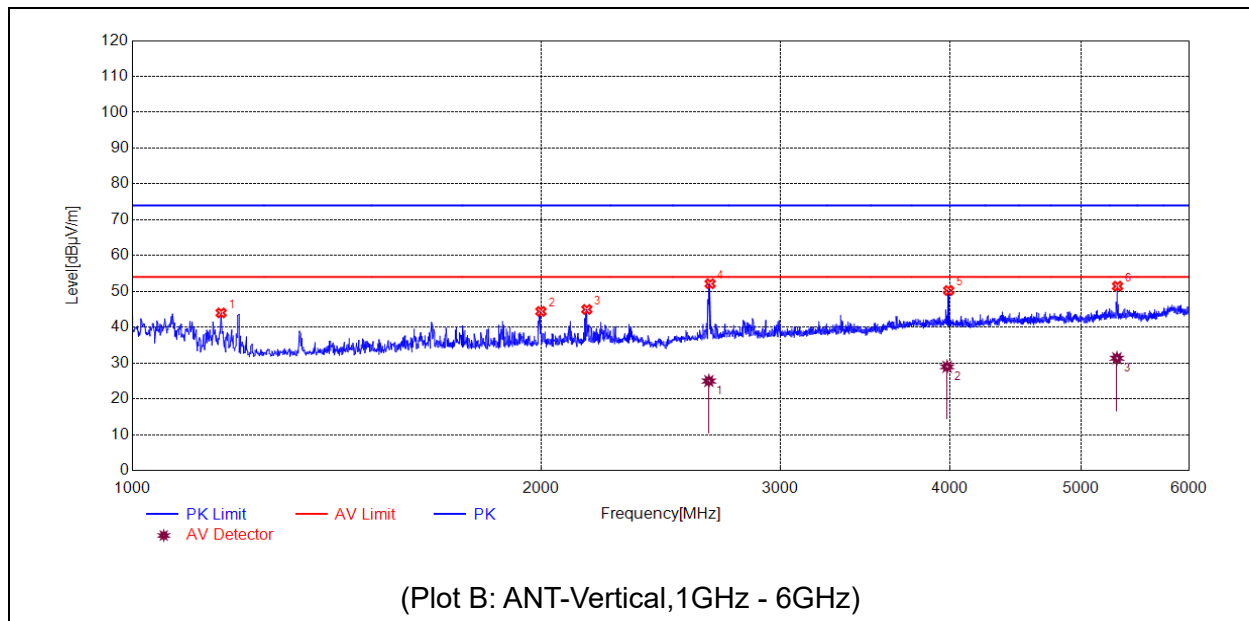
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

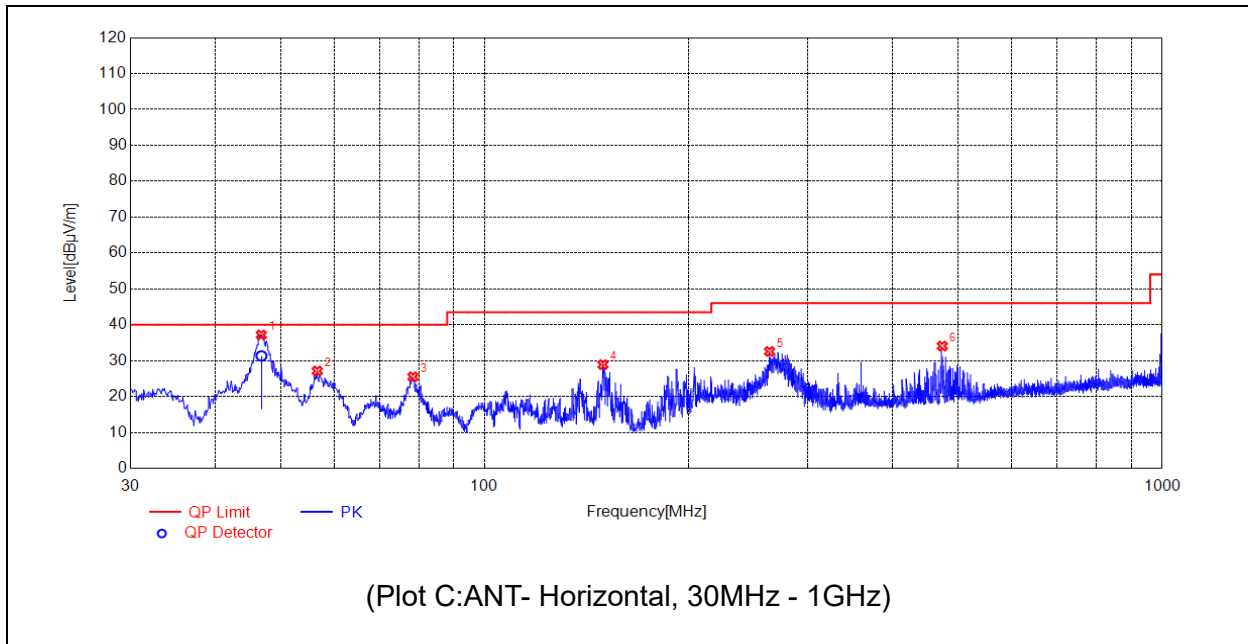
Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.



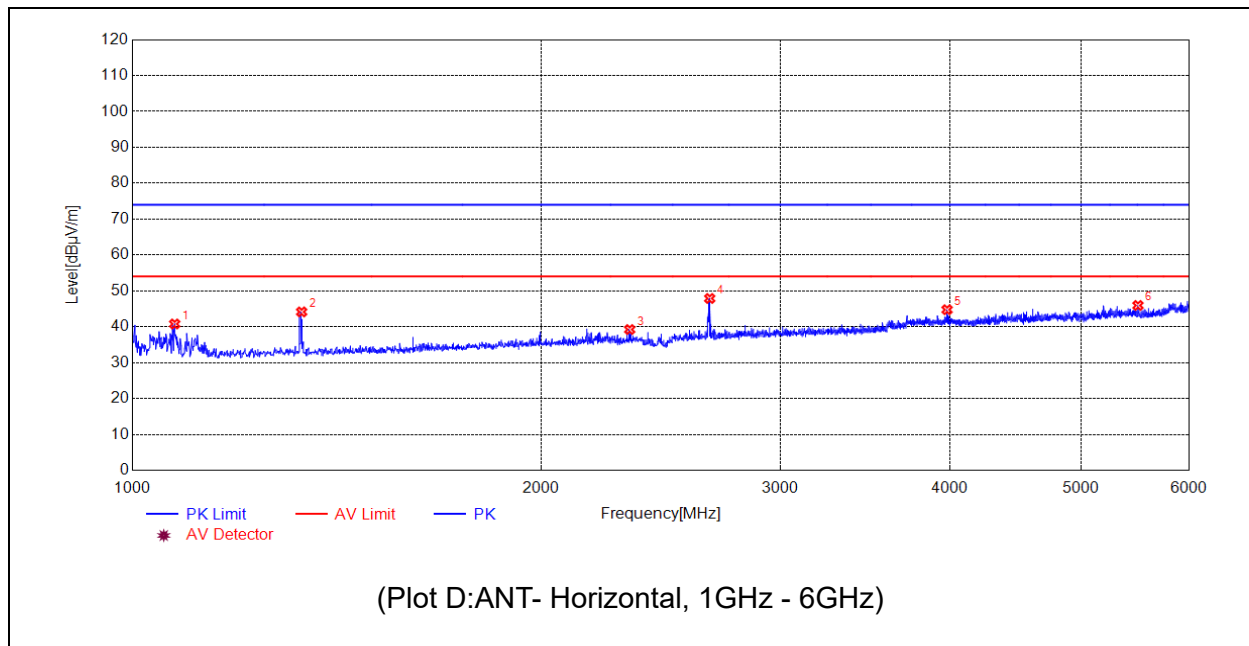
No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	30.0970	38.82	29.84	N.A.	N.A.	40.00	N.A.	V	PASS
2	32.2312	36.85	28.91	N.A.	N.A.	40.00	N.A.	V	PASS
3	78.6989	34.51	28.78	N.A.	N.A.	40.00	N.A.	V	PASS
4	138.6509	31.08	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
5	246.4286	29.90	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	480.0280	33.72	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	1162.0324	43.99	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1999.1998	44.41	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2161.2322	44.96	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	2664.3329	52.13	N.A.	24.98	74.00	N.A.	54.00	V	PASS
5	3993.5987	50.24	N.A.	28.94	74.00	N.A.	54.00	V	PASS
6	5317.8636	51.45	N.A.	31.33	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	46.7827	37.18	31.32	N.A.	N.A.	40.00	N.A.	H	PASS
2	56.5807	27.14	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	78.3108	25.50	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
4	149.4189	28.89	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	263.2113	32.57	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	473.5284	34.06	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	1074.0148	40.78	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1332.0664	44.14	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2324.2649	39.24	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	2662.3325	47.89	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	3982.5965	44.75	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	5505.9012	45.94	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

<b>Laboratory Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Laboratory Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
<b>Telephone:</b>	+86 755 36698555
<b>Facsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

### 3. Accreditation Certificate

<b>Accredited Testing Laboratory:</b>	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
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
Horn Antenna	BBHA9170	BBHA9170 #773	SCHWARZBECK	2022/7/14	2025/7/13
Receiver	N9038A	MY541300 16	Agilent	2022/7/7	2023/7/6
Receiver	N9038A	MY564000 93	KEYSIGHT	2023/2/9	2024/2/8
6db Attenuator	BW-N6W5+	E191001	Mini-circuits	2022/10/11	2023/10/10
Preamplifier	S020180L3203	61171/611 72	LUCIX CORP.	2022/7/8	2023/7/7
Preamplifier	S10M100L3802	46732	LUCIX CORP.	2022/7/8	2023/7/7
Preamplifier	DCLNA0118-40 C-S	DS77209	Decentest	2022/7/23	2023/7/22
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	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	2022/7/6	2023/7/5
System	CMW500	152038	R&S	2022/10/11	2023/10/10



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Simulator					
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#### 6. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
PC	APPLE	A1370	N/A
PC Adapter	APPLE	A1374	N/A
Adapter	HUAWEI	HW-050200C01	H785LBJBY16392

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