



# RF TEST REPORT

**Report No.:** 20241217G26961X-W5

**Product Name:** 5G Mobile Phone

**Model No. :** NX789J

**FCC ID:** 2A9QD-NX789J

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

**Address:** Room 3101, Building D1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Street, Nanshan District Shenzhen, China

**Dates of Testing:** 12/18/2024 - 01/14/2025

**Issued by:** CCIC Southern Testing Co., Ltd.

**Lab Location:** Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China.

**Tel:** 86-755-26627338      **E-Mail:** manager@ccic-set.com

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## Test Report

**Product**.....: 5G Mobile Phone

**Brand Name** .....: REDMAGIC

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

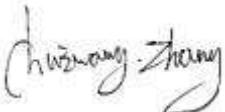
**Applicant Address**.....: Room 3101, Building D1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Street, Nanshan District Shenzhen, China

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

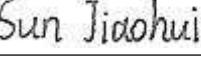
**Manufacturer Address**.....: Room 3101, Building D1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Street, Nanshan District Shenzhen, China

**Test Standards**.....: 47 CFR Part 15 Subpart C 15.247  
ANSI C63.10-2020

**Test Result**.....: Pass

**Tested by** .....:  2025.01.14

Chuiwang Zhang, Test Engineer

**Reviewed by** .....:  2025.01.14

Sun Jiaohui, Senior Engineer

**Approved by** .....:  2025.01.14

Chris You, Manager

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Change History		
Issue	Date	Reason for change
1.0	2025.01.14	First edition

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	5G Mobile Phone
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n (HT20/HT40)/ax(HE20/HE40)
Frequency Range	802.11b/g/n/ax-20MHz: 2.412GHz - 2.462GHz 802.11n/ax-40MHz: 2.422GHz-2.452GHz
Channel Number	802.11b/g/n/ax-20MHz: 11 802.11n/ax-40MHz: 7
Transfer Rate	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n : up to 300Mbps (2×2MIMO) 802.11ax : up to 573.529Mbps (2×2MIMO)
Modulation Type	DSSS (802.11b), OFDM (802.11g/n/ax), OFDMA (802.11ax)
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1: -2.20dBi Antenna 2: -1.15dBi
Power supply	Rechargeable Li-ion Polymer Battery DC7.68V/3450mAh

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 2: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.

## 1.2. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC certification standards:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C	Radio Frequency Devices
2	ANSI C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices
3	KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for Compliance Measurement on Digital Transmission Systems, Frequency Hopping Spread Spectrum Systems, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.203 15.247(c)	Antenna Requirement	PASS
2	15.247(b)(3)	Maximum Conducted Output Power	PASS
3	15.247(a)(2)	6dB and 99% Bandwidth	PASS
4	15.247(d)	Conducted Band Edges and Spurious Emission	PASS
5	15.247(e)	Power spectral density (PSD)	PASS
6	15.207	AC Power Line Conducted Emission	PASS
7	15.209 15.205 15.247(d)	Radiated Band Edges and Spurious Emission	PASS

Note 1: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10-2020.

Note 2: These RF tests were performed according to the method of measurements prescribed in KDB 558074 D01 15.247 Meas Guidance v05r02.

### 1.3. Channel List

For 20MHz bandwidth systems, use Channel 1~ Channel 11.

Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency
1	2412MHz	5	2432MHz	9	2452MHz
2	2417MHz	6	2437MHz	10	2457MHz
3	2422MHz	7	2442MHz	11	2462MHz
4	2427MHz	8	2447MHz		

Note: Channel 1, 6 & 11 selected for 802.11b/g/n-HT20/ax-HE20 as Lowest, Middle and Highest channel. Channel 3, 6 & 9 selected for 802.11n-HT40/ax-HE40 as Lowest, Middle and Highest Channel.

### 1.4. Test environment and mode

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

Operating Environment	
Temperature	15°C - 35°C
Humidity	30% -60%
Atmospheric Pressure	86kPa-106kPa
Test mode:	
Continuously transmitting mode	Keep the EUT in continuous transmitting with modulation

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Conducted Output Power Power Spectral Density 6dB and 99% Bandwidth Conducted Spurious Emission Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
	802.11g	6 Mbps	1/6/11
	802.11n-HT20/ax-HE20	MCS 0	1/6/11
	802.11n-HT40/ax-HE40	MCS 0	3/6/9
	802.11b	1 Mbps	1/11
Band Edge	802.11g	6 Mbps	1/11
	802.11n-HT20/ax-HE20	MCS 0	1/11
	802.11n-HT40/ax-HE40	MCS 0	3/9

### 1.5. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Laptop	HP	TPN-Q221	HP	5CD14347QB	FCC DOC

### 1.6. EUT Operation Test Setup

For RF test items, an engineering test program was provided and enable to make EUT transmitting.



## 1.7. Laboratory Facilities

### **FCC-Registration No.: CN1283**

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun. 30th, 2025.

### **ISED Registration: 11185A**

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on Aug. 04, 2016, valid time is until Jun. 30th, 2025.

### **CAB number: CN0064**

### **A2LA Code: 5721.01**

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

## 2. Test Requirements

### 2.1. Antenna requirement

#### 2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### 2.1.2. Antenna Information

##### Antenna Category: Internal Antenna

A internal Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

##### Antenna General Information:

For SISO, there is only one transmitter output therefore the directional gain is equal to the antenna gain.

For MIMO, since the EUT is uncorrelated with each other across all Tx chains. The directional gains are as follows:

Operating frequency range	Ant1 Antenna Gain (dBi)	Ant2 Antenna Gain (dBi)	Uncorrelated Chains Directional gain (dBi)
2412-2462MHz	-2.2	-1.15	-1.64

Note 1: Uncorrelated directional gain =  $10 \log[(10^{\text{Ant1}/10} + 10^{\text{Ant2}/10}) / N_{\text{ANT}}] \text{ dBi.}$

#### 2.1.3. Result: comply

The EUT has two permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

## 2.2. Maximum Conducted Output Power

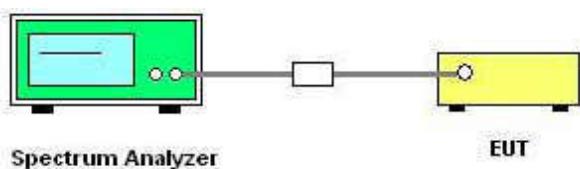
### 2.2.1. Limit of Maximum Conducted Output Power

For DTSs employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W.

### 2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.2.3. Test Setup



### 2.2.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.9.2.2.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:  
Set instrument center frequency to DTS channel center frequency / Set span to at least 1.5 times the OBW / RBW = 1% to 5% of the OBW, not to exceed 1 MHz. / Set VBW  $\geq [3 \times \text{RBW}]$ . / Detector: RMS / Sweep time: Auto / Trace mode: Average / Trace average at least 100 traces in power averaging (rms) mode.
5. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
6. Add  $[10 \log (1 / D)]$ , where D is the duty cycle), to the measured PSD to compute the average PSD during the actual transmission time.
7. Record the measurement results in the test report.

### 2.2.5. Test Result of Maximum Conducted Output Power

Please refer to Appendix A for detail.

## 2.3. 6dB and 99% Bandwidth

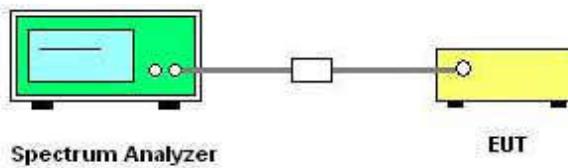
### 2.3.1. Limit of 6dB Bandwidth

The minimum 6 dB Occupied bandwidth shall be at least 500 kHz.

### 2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.3.3. Test Setup



### 2.3.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.8.1 and 6.9.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the spectrum analyzer “Channel Bandwidth” function to easurement the 6dB EBW and 99% OBW.  
For 6dB EBW Use the following spectrum analyzer settings:  
RBW: 100kHz / VBW: 300kHz / Detector: Peak / Trace mode: Max hold / Sweep time: Auto couple / Allow trace to fully stabilize.
5. For 99% OBW Use the following spectrum analyzer settings:  
Set Span = 1.5 times to 5.0 times the OBW/ RBW = Within 1% to 5% of OBW/VBW  $\geq 3 \times \text{RBW}$   
Set Detector = Peak/Trace mode = max hold/ Sweep time = auto couple.
7. Record the measurement results in the test report.

### 2.3.5. Test Results of 6dB and 99% Bandwidth

Please refer to Appendix A for detail.

## 2.4. Power spectral density (PSD)

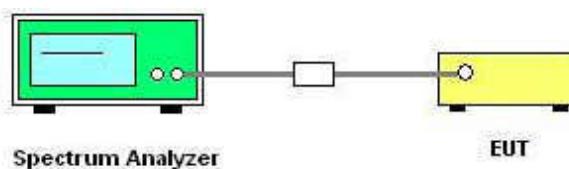
### 2.4.1. Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

### 2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.4.3. Test Setup



### 2.4.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.10.5.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:  
Set instrument center frequency to DTS channel center frequency / Set the span to 1.5 times the DTS bandwidth / RBW: 3kHz / VBW: 10kHz / Detector: RMS / Sweep time: Auto couple / Trace mode: Average / Employ trace averaging (rms) mode over a minimum of 100 traces / Use the peak marker function to determine the maximum power level.
5. Add  $[10 \log (1 / D)]$ , where D is the duty cycle), to the measured PSD to compute the average PSD during the actual transmission time.
6. Record the measurement results in the test report.

#### 2.4.5. Test Results of Power Spectral Density

Please refer to Appendix A for detail.

## 2.5. Conducted Band Edges and Spurious Emissions

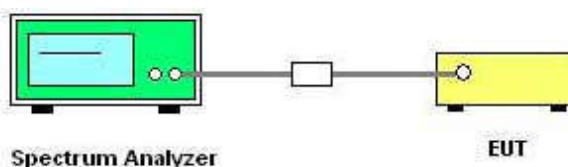
### 2.5.1. Limit of Conducted Band Edges and Spurious Emissions

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### 2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.5.3. Test Setup



### 2.5.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.11 and 11.12.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

Reference level measurement: Set spectrum analyzer center frequency to DTS channel center frequency / Set the span to  $\geq 1.5$  times the DTS bandwidth / RBW: 100kHz / VBW: 300kHz / Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize / Use the peak marker function to determine the maximum PSD level and attenuate it by 30dB.

Emission level measurement: Set the center frequency and span to encompass frequency range to be measured / RBW: 100kHz / VBW: 300kHz / Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize / Use the peak marker function to determine the maximum amplitude level.

5. Record the measurement results in the test report.

### 2.5.5. Test Results of Conducted Band Edges and Spurious Emissions

Please refer to Appendix A for detail.

## 2.6. Radiated Band Edge and Spurious Emission

### 2.6.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level. If the transmitter uses an RMS average conducted power limit, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

§15.209(a) Radiated emission limits:

Frequency (MHz)	Field Strength ( $\mu$ V/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Restricted bands of operation refer to §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	( <sup>2</sup> )
13.36-13.41	/	/	/

Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

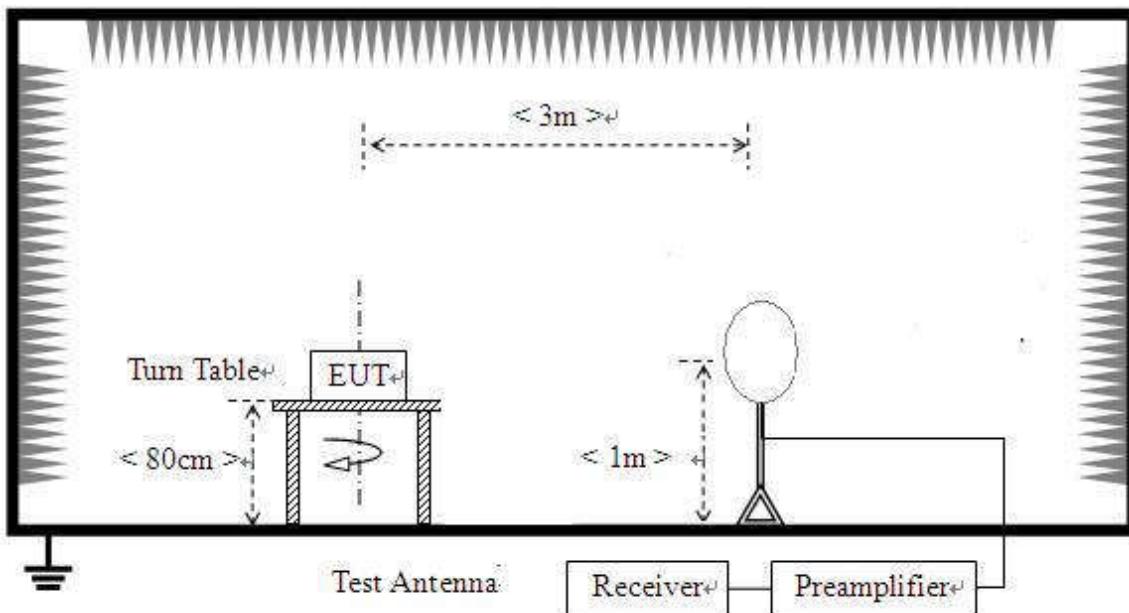
<sup>2</sup>Above 38.6.

## 2.6.2. Measuring Instruments

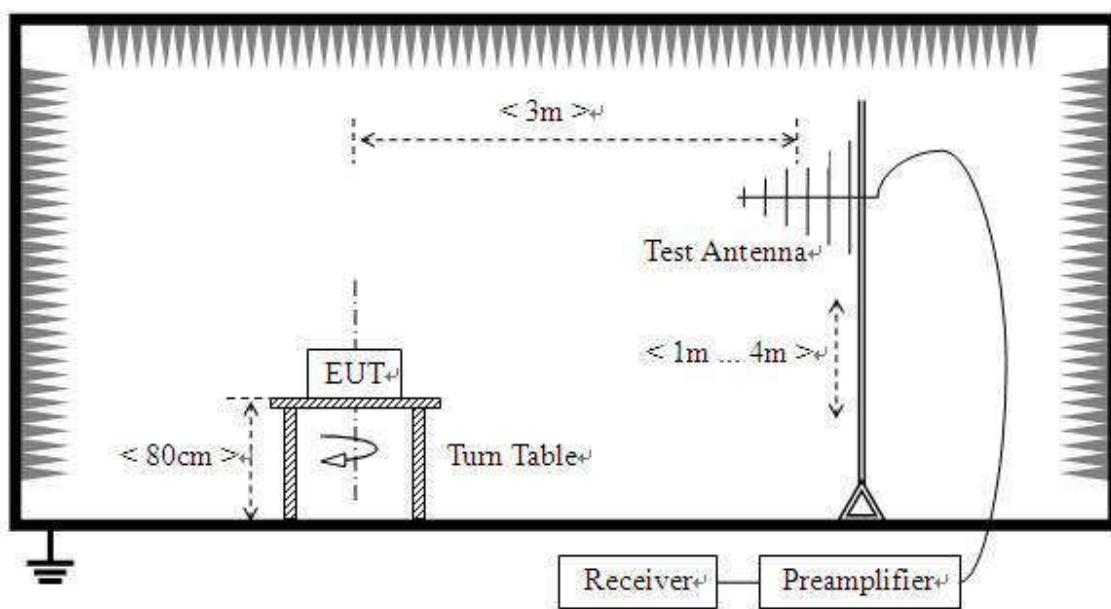
The measuring equipment is listed in the section 3 of this test report.

## 2.6.3. Test Setup

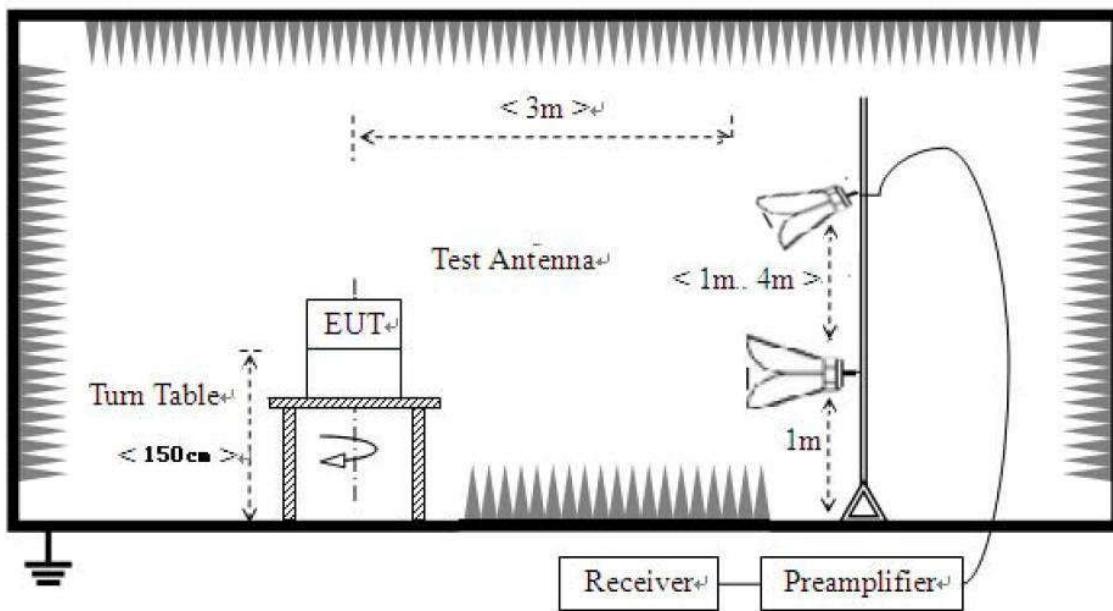
### For radiated emissions from 9 kHz to 30 MHz



### For radiated emissions from 30MHz to 1GHz



### For radiated emissions above 1GHz



#### 2.6.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8m for below 1GHz and 1.5m for above 1GHz above the ground at a 3 meters semi-anechoic chamber.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
7. For the radiated emission test above 1GHz:  
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at

the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. 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.

### **2.6.5. Test Results of Radiated Band Edge and Spurious Emission**

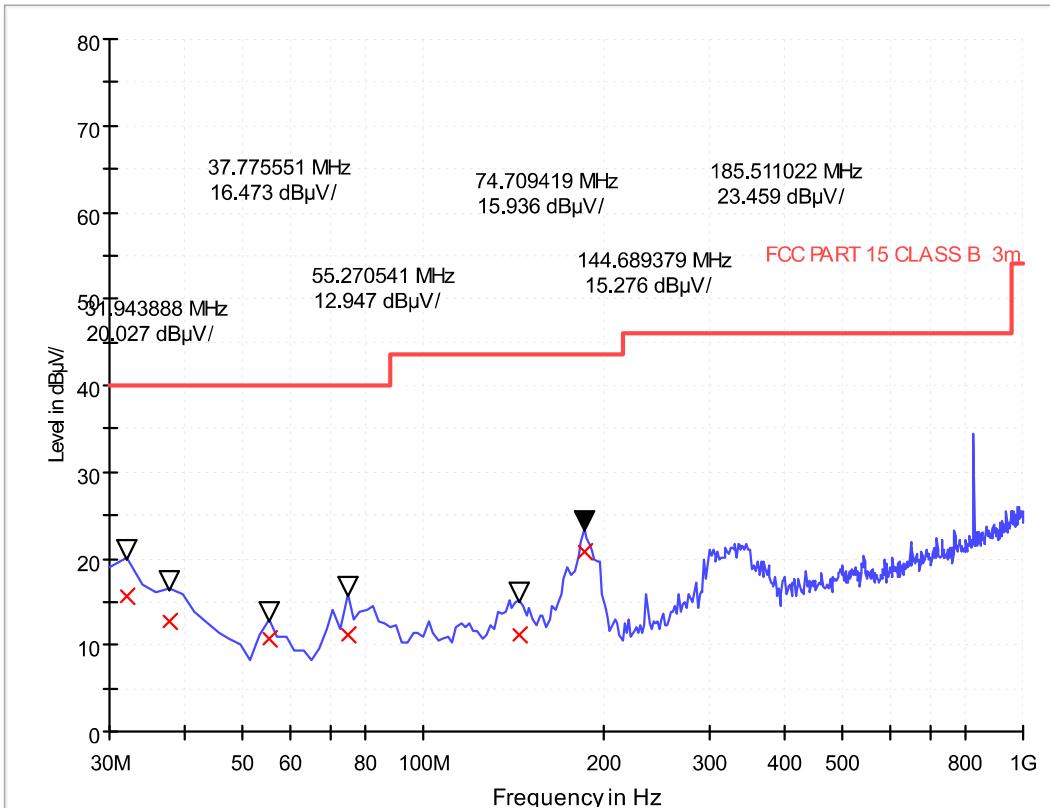
For 9 kHz to 30MHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1GHz, All of the EUT Configure mode were tested and found 802.11b\_2462MHz (Ant1) channel is the worst mode, the worst case is recorded in this report.

For 1GHz to 25GHz, Only worst-case data is reported.

**For 30MHz to 1000MHz**

Test site:	3M anechoic chamber	Environment:	Temp: 23°C; Humi:48%;101kPa
Operator:	Huang Chaoming	Test Date:	2024.12.25
Test Mode:	WIFI - TX	Test Result:	Pass



Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK(dB)	Limit - QPK (dB $\mu$ V/m)
31.960000	15.62	120.000	100.0	H	18.3	24.38	40.0
37.760000	12.74	120.000	100.0	H	15.3	27.26	40.0
55.280000	10.66	120.000	100.0	H	7.0	29.34	40.0
74.720000	11.12	120.000	100.0	H	7.2	28.88	40.0
144.68000	11.23	120.000	100.0	H	11.9	32.27	43.5
185.52000	20.84	120.000	100.0	H	11.8	22.66	43.5

**Remark:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value - Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.