

RF TEST REPORT

FCC ID: 2BOM4-YIHAOREADER

Test Report No.....: RF250403002-01-002

Product(s) Name.....: Proxmark3

Model(s).....: Proxmark3

Trade Mark.....: Anruhoo

Applicant.....: Shenzhen Yihao Technology Co., Ltd.

Address.....: No. 101, No. 34, Education South Road, Pingdi Street, Longgang
District, Shenzhen City, Guangdong Province, China

Receipt Date.....: 2025.04.08

Test Date.....: 2025.04.09~2025.04.24

Issued Date.....: 2025.04.27

Standards.....: 47 CFR FCC Part 15.225;
ANSI C63.10:2013

Testing Laboratory.....: Shenzhen Haiyun Standard Technical Co., Ltd.

Prepared By:	Checked By:	Approved By:	
Jason Huang	Black Ding	Tim Zhang	
<i>Jason Huang</i>	<i>Black Ding</i>	<i>Tim Zhang</i>	

Table of Contents

History of this test report.....	4
1. General Information	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Basic Description of Equipment Under Test.....	5
2. Summary of Test Results	6
2.1 Summary of Test Items	6
2.2 Special Accessories and Auxiliary Equipment.....	6
2.3 Test Condition	6
2.4 Test Instruments.....	7
2.5 Measurement Uncertainty	8
2.6 Test Location	8
3. Test Procedure And Results	9
3.1 AC Power Line Conducted Emission.....	9
3.1.1 Limit	9
3.1.2 Test Procedure	9
3.1.3 Test Setup	9
3.1.4 Test Result of AC Power Line Conducted Emission	10
3.2 Radiated Emissions	12
3.2.1 Limit	12
3.2.2 Test Procedure	12
3.2.3 Test Setup	13
3.2.4 Test Result of Radiated Emission	15
3.3 Emissions mask.....	20
1.3.1 Limit	20
1.3.2 Test Procedure	20
1.3.3 Test Setup	21
1.3.4 Test result of emission mask	22

3.4	Frequency tolerance	23
1.4.1	Test standard	23
1.4.2	Test Procedure	23
1.4.3	Test Setup	23
1.4.4	Test results	23
3.5	20dB bandwidth measurement	24
1.5.1	Test standard	24
1.5.2	Test Procedure	24
1.5.3	Test Setup	24
1.5.4	Test results	24
4.	Antenna Requirement	26
	Test Specification	26

History of this test report

Original Report Issue Date: 2025.04.27

- ☒ No additional attachment
- ☐ Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General Information

1.1 Applicant

Shenzhen Yihao Technology Co., Ltd.

No. 101, No. 34, Education South Road, Pingdi Street, Longgang District, Shenzhen City,
Guangdong Province, China

1.2 Manufacturer

Shenzhen Yihao Technology Co., Ltd.

No. 101, No. 34, Education South Road, Pingdi Street, Longgang District, Shenzhen City,
Guangdong Province, China

1.3 Basic Description of Equipment Under Test

Test sample no.	POC250403002-S001
Product Name	Proxmark3
Model Name	Proxmark3
Trademark	Anruhoo
Power supply:	DC 5V from adapter
Modulation type	ASK
Operating frequency	13.56MHz
Antenna type	PCB Antenna
Antenna Gain	0 dBi

2. Summary of Test Results

2.1 Summary of Test Items

47 CFR FCC Part 15.225		
Test Item	FCC Clause	Results
AC Power Conducted Emission	15.207(a)	Pass
Radiated Emission	15.225(d), 15.209	Pass
Emission Mask	15.225(a), 15.225(b), 15.225(c)	Pass
Frequency Tolerance	15.225(e)	Pass
Antenna Requirement	15.203	Note
20dB Bandwidth	15.215(c)	Pass
Note: Pass: The EUT complies with the essential requirements in the standard.		

2.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
AC/DC ADAPTER	SUGARCUBE	ATP-48005000	/
DC source	Agilent	E3642A	MY52410016

2.3 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Conducted Emission	24.6°C, 54 % RH	120Vac, 60Hz	Freedom Zhuo
Radiated Emission	24.2°C, 51 % RH	120Vac, 60Hz	Freedom Zhuo
Emission Mask	24.1°C, 54 % RH	120Vac, 60Hz	Freedom Zhuo
20dB Bandwidth	24.2°C, 53 % RH	DC 5V	Albert Fan
Frequency tolerance	24.2°C, 53 % RH	4.25Vdc, 5Vdc, 5.75Vdc	Albert Fan

Note: adapter supply voltage AC 120V/60Hz.

2.4 Test Instruments

No.	Name of Equipment	Manufacturer	Model Number	Serial Number	Inventory No.	Last Calibration	Due Calibration
Radiated Emission							
1	Test receiver	Rohde&Schwarz	ESU	100184	JLE011	2025/3/1	2026/2/28
2	Log periodic antenna	Schwarzbeck	VULB 9168	1151	JLE012	2025/4/12	2026/4/11
3	Low frequency amplifier	/	LNA 0920N	2014	JLE023	2025/3/1	2026/2/28
4	High frequency amplifier	Schwarzbeck	BBV 9718	9718-284	JLE024	2025/3/1	2026/2/28
5	Horn Antenna	SCHWARZBECK	BBHA 9120 D	02670	JLE028	2025/4/12	2026/4/11
6	Temp&Humidity Recorder	Meideshi	JR900	/	JLE021	2025/4/15	2026/4/14
7	Horn Antenna	SCHWARZBECK	BBHA 9170	9170#685	JLE029	2024/7/15	2025/7/14
8	Loop Antenna	SCHWARZBECK	FMZB1519B	00029	JLE030	2024/7/15	2025/7/14
9	Broadband preamplifier	Schwarzbeck	BBV9721	9721-019	JLE025	2025/3/1	2026/2/28
10	Test software	Farad Technology Co., Ltd	EZ-EMC Ver.TW-03A2				
Conducted Emission							
1	LISN	Rohde&Schwarz	ENV216	100075	JLE002	2025/3/1	2026/2/28
2	ISN	Schwarzbeck	CATE 5 8158	#171	JLE003	2025/2/21	2026/2/20
3	ISN	Schwarzbeck	CAT 3 8158	00187	JLE032	2025/2/21	2026/2/20
4	Test receiver	Rohde&Schwarz	ESCI	100718	JLE010	2025/3/1	2026/2/28
5	Pulse limiter	Rohde&Schwarz	ESH3-Z2	102299	JLE047	2025/3/1	2026/2/28
6	Temp&Humidity Recorder	Meideshi	JR900	/	JLE020	2025/4/15	2026/4/14
7	Test software	Farad Technology Co., Ltd	EZ-EMC Ver.TW-03A2				
RF Conducted Emission							
1	MXA Signal Analyzer	Keysight	N9021B	MY60080169	JLE050	2025/3/1	2026/2/28

2.5 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

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

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 102\text{kHz}$
Power Spectral Density	$\pm 0.377\text{dB}$
Conducted Spurious Emission	$\pm 1.328\text{dB}$
RF power conducted	$\pm 0.384\text{dB}$
Conducted emission(9kHz~30MHz) AC main	$\pm 2.68\text{dB}$
Radiated emission(9kHz~30MHz)	$\pm 2.74\text{dB}$
Radiated emission (30MHz~1GHz)	$\pm 4.22\text{dB}$
Radiated emission (1GHz~18GHz)	$\pm 5.06\text{dB}$
Radiated emission (18GHz~40GHz)	$\pm 4.98\text{dB}$

2.6 Test Location

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110-113, 115, 116, Block B, Jinyuan Business Building, Bao'an District, Shenzhen, China
CNAS Registration Number:	CNAS L18252
CAB identifier	CN0145
A2LA Certificate Number	6823.01
Telephone:	0755-26024411

3. Test Procedure And Results

3.1 AC Power Line Conducted Emission

3.1.1 Limit

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.50	79	66	66 - 56	56 - 46
0.50 ~ 5.00	73	60	56	46
5.00 ~ 30.0	73	60	60	50

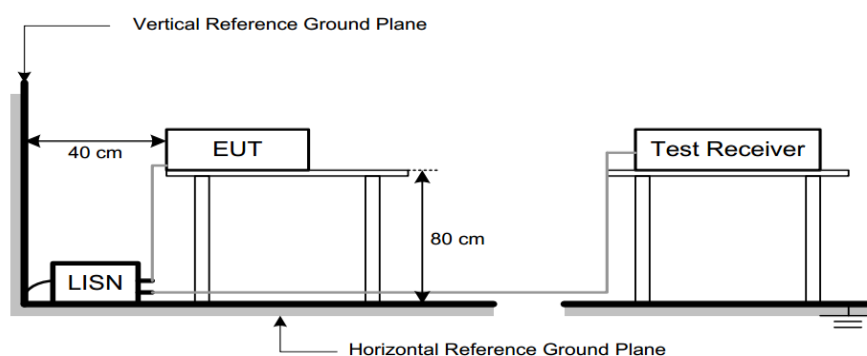
Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 Test Procedure

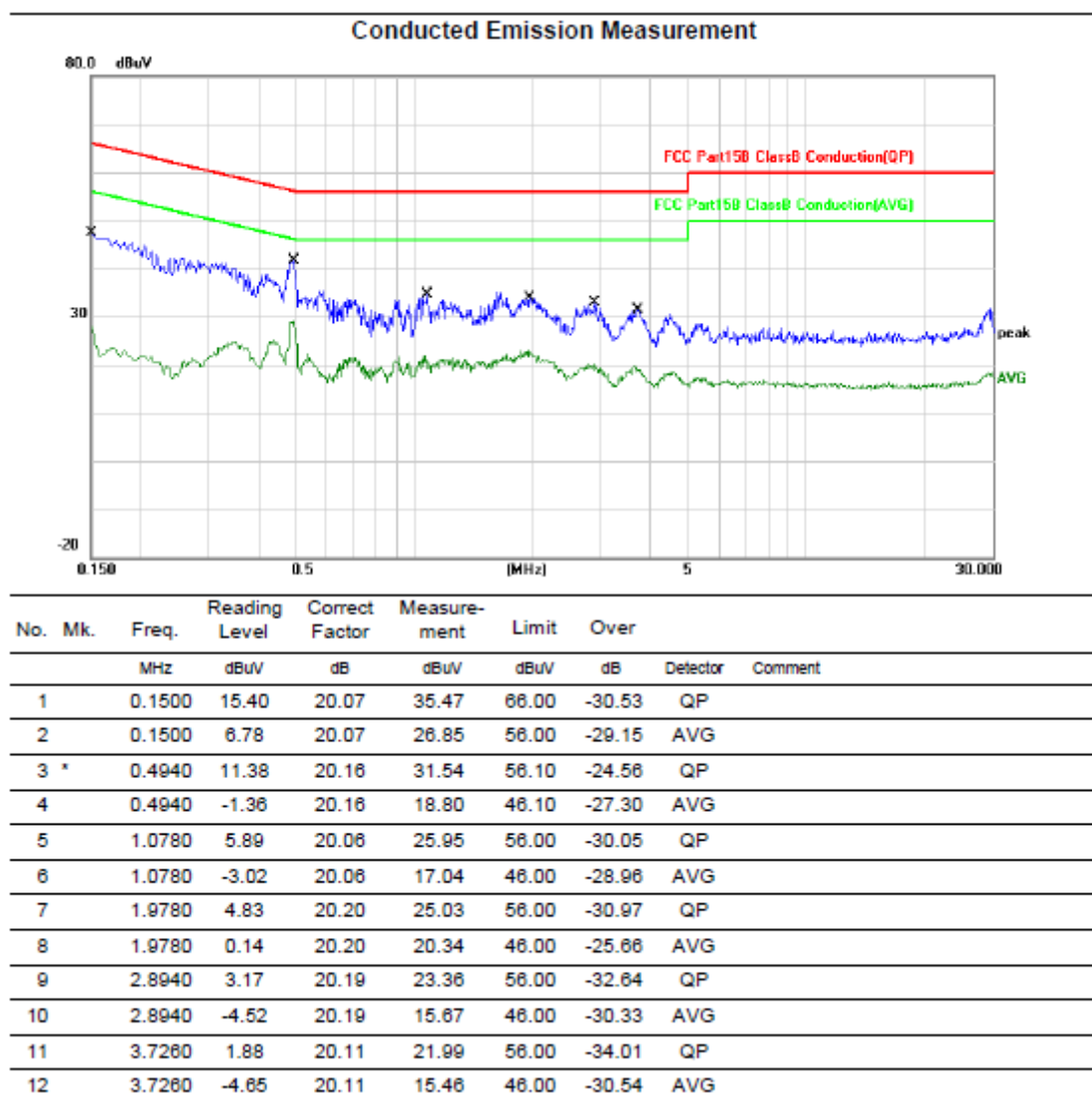
- a) The EUT was placed 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (AMN). All other support equipment powered from additional AMN. The AMN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b) Interconnecting cables that hang closer than 0.4 m to the ground plane shall be folded back and forth in the center forming a bundle 0.3 m to 0.4 m long.
- c) The frequency range from 150 kHz to 30 MHz was searched.
- d) Actual test configuration, please refer to the related Item – EUT Test Photos.
- e) The thickness of the insulation shall not be more than 150 mm.

3.1.3 Test Setup



3.1.4 Test Result of AC Power Line Conducted Emission

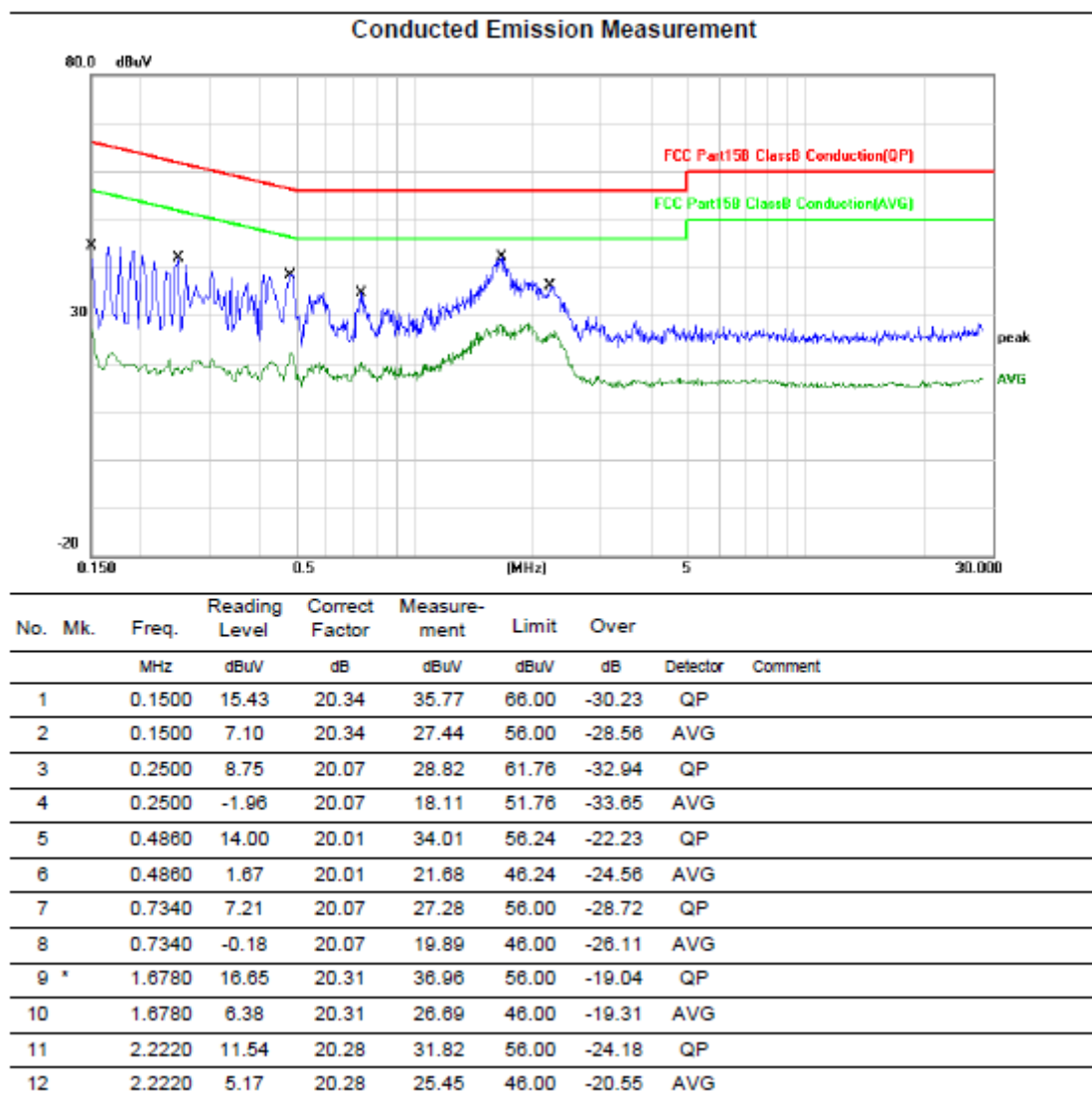
Test Frequency range:	150kHz~30MHz
Test mode:	Transmitting
Test voltage:	AC 120V/60Hz
Phase	Line



Note:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading Level + Correct Factor.
3. Over = Measurement - Limit

Test Frequency range:	150kHz~30MHz
Test mode:	Transmitting
Test voltage:	AC 120V/60Hz
Phase	Neutral



Note:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading Level + Correct Factor.
3. Over = Measurement - Limit

3.2 Radiated Emissions

3.2.1 Limit

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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

- Note:
- (1) The lower limit shall apply at the transition frequencies.
 - (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
 - (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 - (4) The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

3.2.2 Test Procedure

Below 30MHz

- a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of 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.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

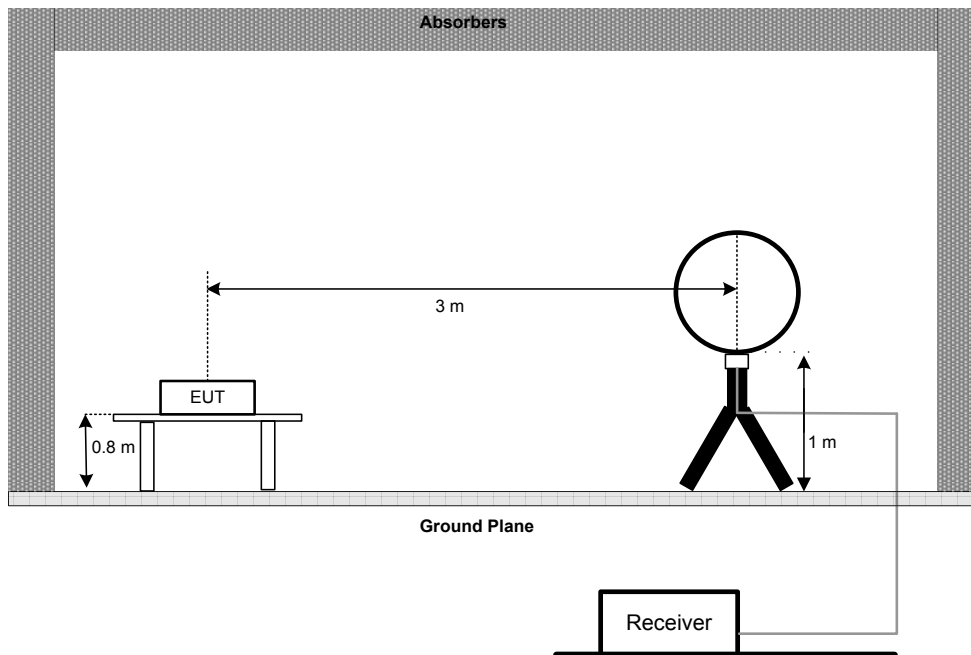
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

30MHz~1GHz

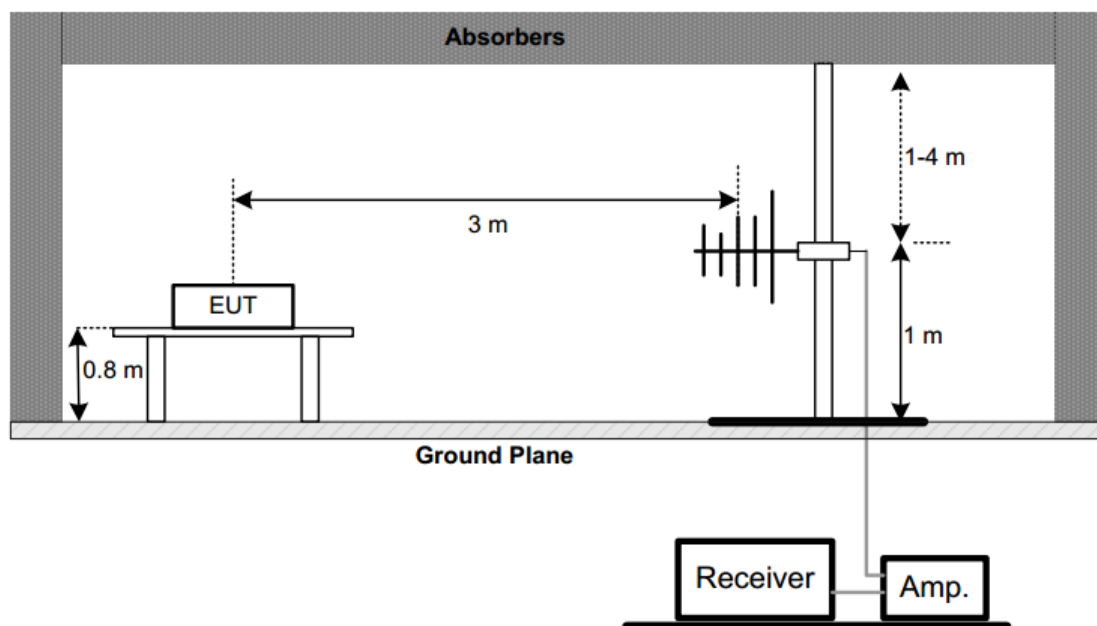
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna is a broadband antenna, and its height 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

3.2.3 Test Setup

(A) Radiated Emission Test Set-Up Frequency Below 30MHz



(B) Radiated Emission Test Set-Up Frequency Below 1 GHz

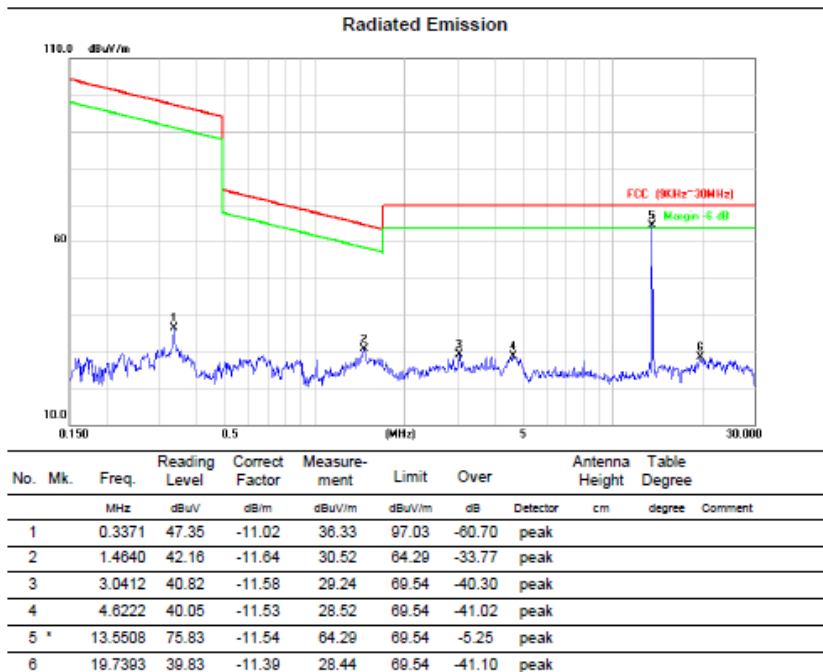
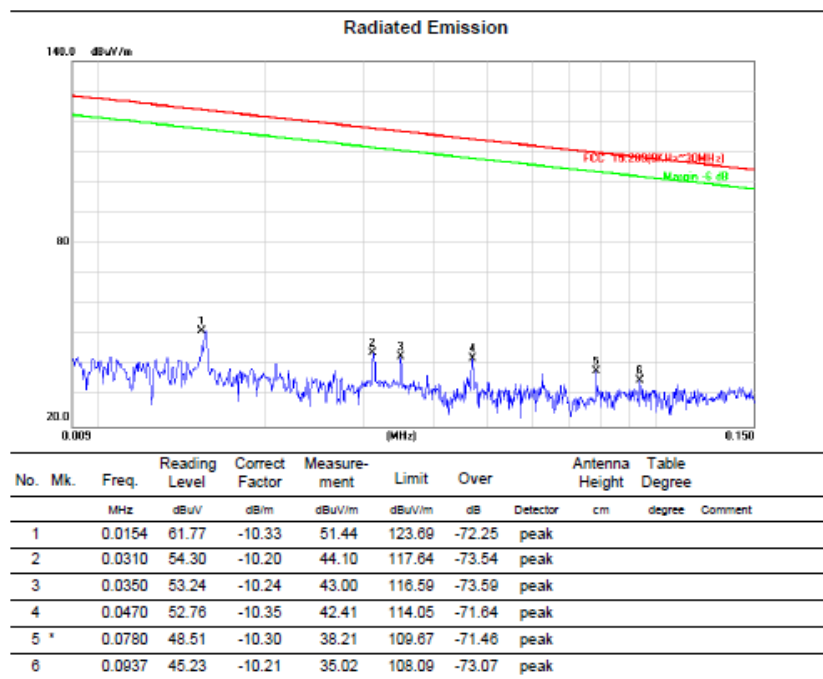


3.2.4 Test Result of Radiated Emission

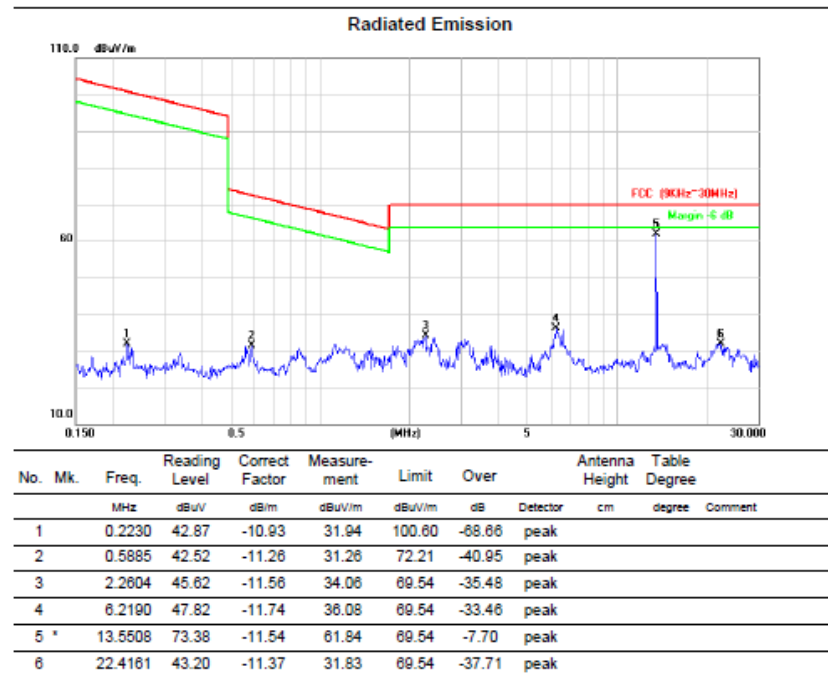
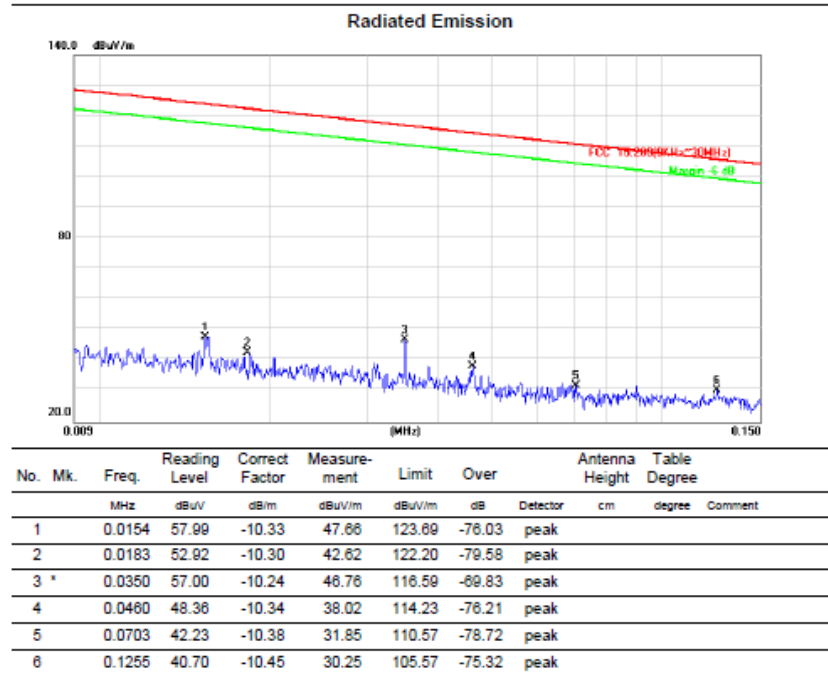
The worst measurement data as follows:

Below 30MHz	Test mode: Transmitting
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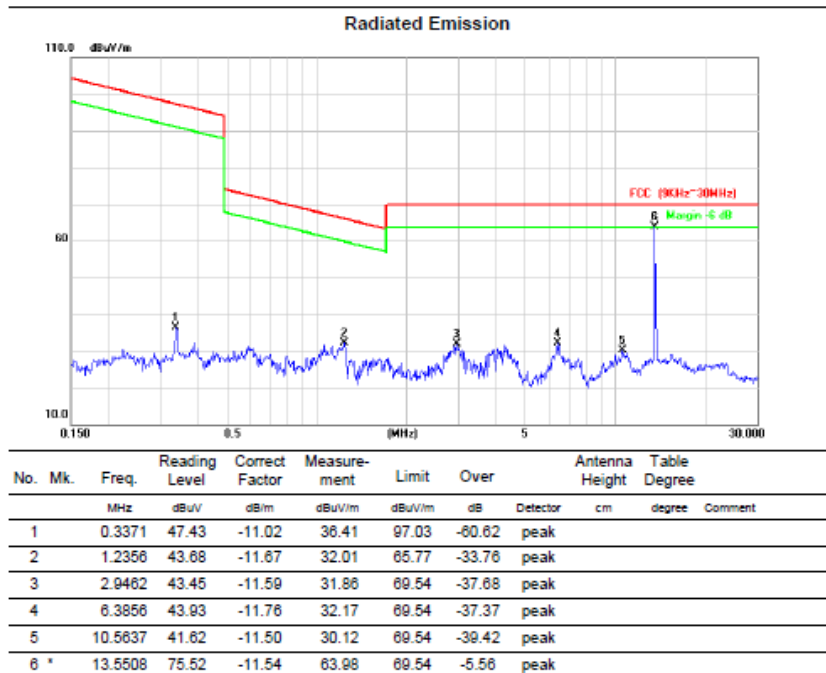
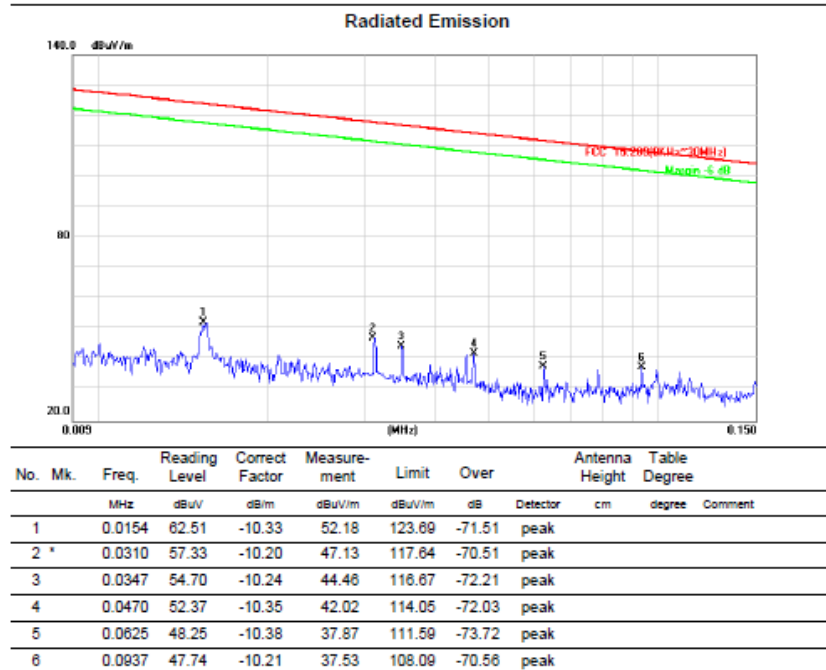
Parallel



Perpendicular



Ground- parallel



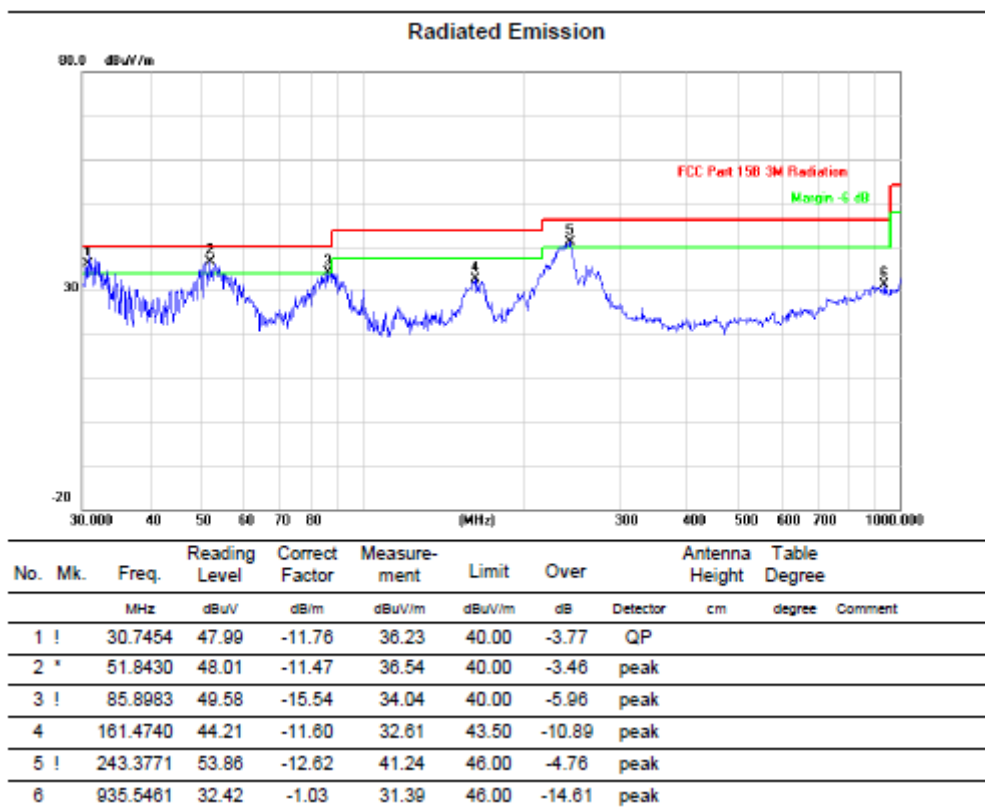
Note:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Level = Reading + Correct Factor.
3. Margin = Level - Limit

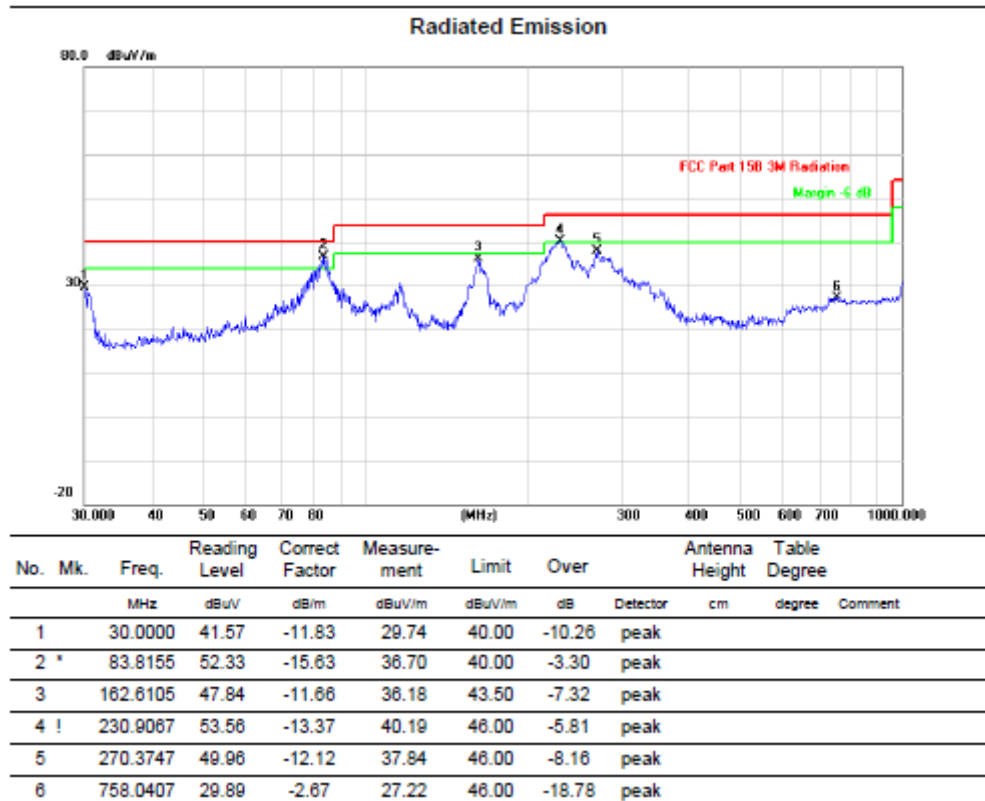
30MHz~1GHz

Test mode: Transmitting

Vertical



Horizontal



Note:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Measure-ment = Reading Level + Correct Factor.
3. Over = Measure-ment – Limit

3.3 Emissions mask

1.3.1 Limit

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

- Note:
- (1) The lower limit shall apply at the transition frequencies.
 - (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
 - (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 - (4) The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

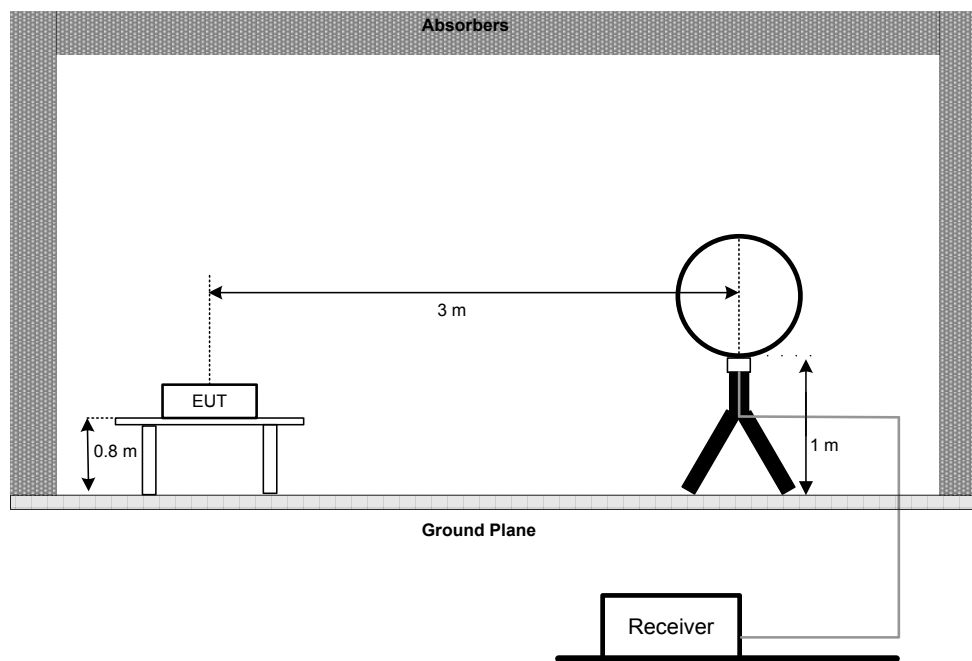
1.3.2 Test Procedure

Below 30MHz

- f) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- g) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- h) The height of 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.
- i) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- j) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

1.3.3 Test Setup

(B) Radiated Emission Test Set-Up Frequency Below 30MHz

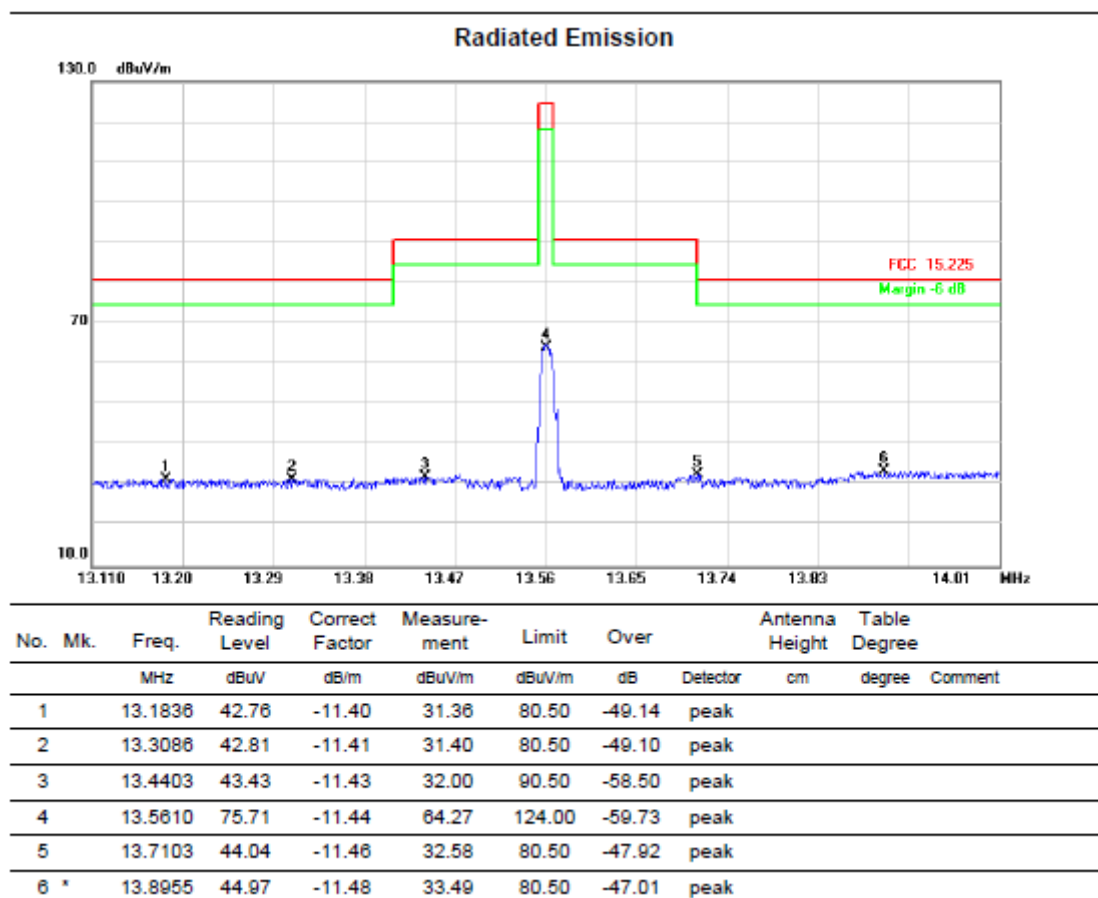


1.3.4 Test result of emission mask

Pre-scan parallel, perpendicular, ground- parallel test data, worst case for ground- parallel test data as follows:

Below 30MHz	Test mode: Transmitting
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Ground- parallel



Note:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Level = Reading + Correct Factor.
3. Margin = Level – Limit

3.4 Frequency tolerance

1.4.1 Test standard

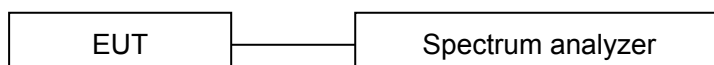
FCC Part 15.215(e)

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+ 50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

1.4.2 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Environmental Conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

1.4.3 Test Setup



1.4.4 Test results

Power Supply (DC)	Temperature (°C)	Measured Frequency(MHz)	Frequency deviation	Limit
5	-20	13.559995	-0.00004%	$\pm 0.01\%$
	-10	13.559996	-0.00003%	
	0	13.559998	-0.00001%	
	10	13.559995	-0.00004%	
	20	13.559998	-0.00001%	
	30	13.559996	-0.00003%	
	40	13.559996	-0.00003%	
	50	13.559995	-0.00004%	
4.25	20	13.559998	-0.00001%	
5.75	20	13.559995	-0.00004%	

3.5 20dB bandwidth measurement

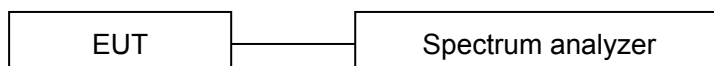
1.5.1 Test standard

FCC Part 15.215(c)

1.5.2 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Environmental Conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

1.5.3 Test Setup



1.5.4 Test results

Test mode	20dB bandwidth (KHz)
Transmitting	0.246

For details refer to following test result.



4. Antenna Requirement

Test Specification

Test standard : Part 15.203

According to the manufacturer declared, the EUT has one PCB antenna, and the antenna is permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

S

Statement

1. The report is invalid without the official seal or special seal of Shenzhen Haiyun Standard Technology Co., Ltd. (hereinafter referred to as the unit).
2. The report is invalid without the signature of the approver.
3. The report is invalid if altered arbitrarily.
4. The report shall not be partially copied without the written approval of the unit.
5. The reported test results are only valid for the tested samples.
6. If there is any objection to the test report, it shall be submitted to the test unit within 15 days from the date of receiving the report, and the overdue shall not be accepted.

Shenzhen Haiyun Standard Technology Co., Ltd.

Address: Room 110, 111, 112, 113, 115, 116, Block B, Jinyuan Business Building, No. 302, Xixiang Avenue, Labor Community, Xixiang Street, Baoan District, Shenzhen, China

Tel: 0755-26024411

Email: service@hy-lab.cn

(END OF REPORT)