

# TEST REPORT

**Applicant:** ALPHA GROUP CO., LTD.

**Address of Applicant:** Alpha Animation Industrial Area, Jinhong Road East & Fengxiang Road North, Chenghai District, Shantou, Guangdong, China 515800

**Manufacturer:** ALPHA GROUP CO., LTD.

**Address of Manufacturer:** Alpha Animation Industrial Area, Jinhong Road East & Fengxiang Road North, Chenghai District, Shantou, Guangdong, China 515800

**Equipment Under Test (EUT)**

**Product Name:** Race Tin - Tin Car - Super Car A

**Model No.:** US253101, US253102, US253103, US253104, US253105, US253106

**FCC ID:** 2AIRP-253101

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.227

**Date of sample receipt:** May 07, 2021

**Date of Test:** May 08-19, 2021

**Date of report issued:** May 20, 2021

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



**Robinson Luo**

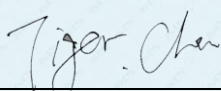
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

| Version No. | Date         | Description |
|-------------|--------------|-------------|
| 01          | May 20, 2021 | Original    |
|             |              |             |
|             |              |             |
|             |              |             |
|             |              |             |

Prepared By:

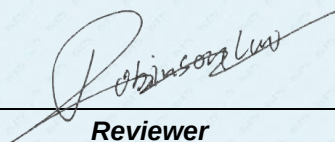


Date:

May 20, 2021

Project Engineer

Check By:



Date:

May 20, 2021

Reviewer

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## 4 Test Summary

| Radio Spectrum Technical Requirement |                                  |        |                                  |        |
|--------------------------------------|----------------------------------|--------|----------------------------------|--------|
| Item                                 | Standard                         | Method | Requirement                      | Result |
| Antenna Requirement                  | 47 CFR Part 15, Subpart C 15.227 | N/A    | 47 CFR Part 15, Subpart C 15.203 | Pass   |

| Radio Spectrum Matter Part                           |                                  |                                    |                                                |        |
|------------------------------------------------------|----------------------------------|------------------------------------|------------------------------------------------|--------|
| Item                                                 | Standard                         | Method                             | Requirement                                    | Result |
| 20dB Bandwidth                                       | 47 CFR Part 15, Subpart C 15.227 | ANSI C63.10 (2013) Section 6.9     | 47 CFR Part 15, Subpart C 15.215               | Pass   |
| Field Strength of the Fundamental Signal (15.227(a)) | 47 CFR Part 15, Subpart C 15.227 | ANSI C63.10 (2013) Section 6.4     | 47 CFR Part 15, Subpart C 15.227(a)            | Pass   |
| Radiated Emissions                                   | 47 CFR Part 15, Subpart C 15.227 | ANSI C63.10 (2013) Section 6.4&6.5 | 47 CFR Part 15, Subpart C 15.227(b) & C 15.209 | Pass   |

Remark:

Pass: The EUT complies with the essential requirements in the standard.

### 4.1 Measurement Uncertainty

| Test Item         | Frequency Range | Measurement Uncertainty | Notes |
|-------------------|-----------------|-------------------------|-------|
| Radiated Emission | 30MHz-200MHz    | 3.8039dB                | (1)   |
| Radiated Emission | 200MHz-1GHz     | 3.9679dB                | (1)   |
| Radiated Emission | 1GHz-18GHz      | 4.29dB                  | (1)   |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

|                                                                                                                                                                 |                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Product Name:                                                                                                                                                   | Race Tin - Tin Car - Super Car A                           |
| Model No.:                                                                                                                                                      | US253101, US253102, US253103, US253104, US253105, US253106 |
| Test Model No:                                                                                                                                                  | US253101                                                   |
| Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference is model name for commercial purpose. |                                                            |
| Serial No.:                                                                                                                                                     | N/A                                                        |
| Hardware Version:                                                                                                                                               | YY-9005T                                                   |
| Software Version:                                                                                                                                               | TX-2S                                                      |
| Test sample(s) ID:                                                                                                                                              | GTS202105000020-1                                          |
| Sample(s) Status:                                                                                                                                               | Engineer sample                                            |
| Operation Frequency:                                                                                                                                            | 27.145MHz                                                  |
| Channel Number:                                                                                                                                                 | 1                                                          |
| Modulation:                                                                                                                                                     | ASK                                                        |
| Antenna type:                                                                                                                                                   | Wire antenna                                               |
| Antenna gain:                                                                                                                                                   | 20dBi(Declared by applicant)                               |
| Power supply:                                                                                                                                                   | DC 3.0V (1.5V x 2 "AA" Size Batteries)                     |



## 5.2 Test mode

|                                                                                                                                                                                                                       |                                                    |       |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------|-------|
| Transmitter mode                                                                                                                                                                                                      | Keep the EUT in transmitting with modulation mode. |       |       |
| Remark: new battery is used during all test.                                                                                                                                                                          |                                                    |       |       |
| Pre-test mode.                                                                                                                                                                                                        |                                                    |       |       |
| GTS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows: |                                                    |       |       |
| Axis                                                                                                                                                                                                                  | X                                                  | Y     | Z     |
| Field Strength(dBuV/m)                                                                                                                                                                                                | 67.88                                              | 68.96 | 68.90 |
| Final Test Mode:                                                                                                                                                                                                      |                                                    |       |       |
| According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”: Y axis (see the test setup photo)                                                                                    |                                                    |       |       |

## 5.3 Description of Support Units

|       |
|-------|
| None. |
|-------|

## 5.4 Test Facility

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>• <b>FCC —Registration No.: 381383</b><br/>Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.</li> <li>• <b>IC —Registration No.: 9079A</b><br/>The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A</li> <li>• <b>NVLAP (LAB CODE:600179-0)</b><br/>Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0</li> </ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 5.5 Test Location

|                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All tests were performed at:                                                                                                                                                                                                                                  |
| <p>Global United Technology Services Co., Ltd.<br/>Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102<br/>Tel: 0755-27798480<br/>Fax: 0755-27798960</p> |

## 6 Equipment List

| Radiated Emission: |                                     |                                |                             |               |                     |                         |
|--------------------|-------------------------------------|--------------------------------|-----------------------------|---------------|---------------------|-------------------------|
| Item               | Test Equipment                      | Manufacturer                   | Model No.                   | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                  | 3m Semi- Anechoic Chamber           | ZhongYu Electron               | 9.2(L)*6.2(W)* 6.4(H)       | GTS250        | July. 02 2020       | July. 01 2025           |
| 2                  | Control Room                        | ZhongYu Electron               | 6.2(L)*2.5(W)* 2.4(H)       | GTS251        | N/A                 | N/A                     |
| 3                  | EMI Test Receiver                   | Rohde & Schwarz                | ESU26                       | GTS203        | June. 25 2020       | June. 24 2021           |
| 4                  | BiConiLog Antenna                   | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | June. 25 2020       | June. 24 2021           |
| 5                  | Double -ridged waveguide horn       | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120 D                 | GTS208        | June. 25 2020       | June. 24 2021           |
| 6                  | Horn Antenna                        | ETS-LINDGREN                   | 3160                        | GTS217        | June. 25 2020       | June. 24 2021           |
| 7                  | EMI Test Software                   | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 8                  | Coaxial Cable                       | GTS                            | N/A                         | GTS213        | June. 25 2020       | June. 24 2021           |
| 9                  | Coaxial Cable                       | GTS                            | N/A                         | GTS211        | June. 25 2020       | June. 24 2021           |
| 10                 | Coaxial cable                       | GTS                            | N/A                         | GTS210        | June. 25 2020       | June. 24 2021           |
| 11                 | Coaxial Cable                       | GTS                            | N/A                         | GTS212        | June. 25 2020       | June. 24 2021           |
| 12                 | Amplifier(100kHz-3GHz)              | HP                             | 8347A                       | GTS204        | June. 25 2020       | June. 24 2021           |
| 13                 | Amplifier(2GHz-20GHz)               | HP                             | 84722A                      | GTS206        | June. 25 2020       | June. 24 2021           |
| 14                 | Amplifier (18-26GHz)                | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June. 25 2020       | June. 24 2021           |
| 15                 | Band filter                         | Amindeon                       | 82346                       | GTS219        | June. 25 2020       | June. 24 2021           |
| 16                 | Power Meter                         | Anritsu                        | ML2495A                     | GTS540        | June. 25 2020       | June. 24 2021           |
| 17                 | Power Sensor                        | Anritsu                        | MA2411B                     | GTS541        | June. 25 2020       | June. 24 2021           |
| 18                 | Wideband Radio Communication Tester | Rohde & Schwarz                | CMW500                      | GTS575        | June. 25 2020       | June. 24 2021           |
| 19                 | Splitter                            | Agilent                        | 11636B                      | GTS237        | June. 25 2020       | June. 24 2021           |
| 20                 | Loop Antenna                        | ZHINAN                         | ZN30900A                    | GTS534        | June. 25 2020       | June. 24 2021           |
| 21                 | Breitband hornantenne               | SCHWARZBECK                    | BBHA 9170                   | GTS579        | Oct. 18 2020        | Oct. 17 2021            |
| 22                 | Amplifier                           | TDK                            | PA-02-02                    | GTS574        | Oct. 18 2020        | Oct. 17 2021            |
| 23                 | Amplifier                           | TDK                            | PA-02-03                    | GTS576        | Oct. 18 2020        | Oct. 17 2021            |
| 24                 | PSA Series Spectrum Analyzer        | Rohde & Schwarz                | FSP                         | GTS578        | June. 25 2020       | June. 24 2021           |

| RF Conducted Test: |                                                |              |                  |            |                        |                            |
|--------------------|------------------------------------------------|--------------|------------------|------------|------------------------|----------------------------|
| Item               | Test Equipment                                 | Manufacturer | Model No.        | Serial No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |
| 1                  | MXA Signal Analyzer                            | Agilent      | N9020A           | GTS566     | June. 25 2020          | June. 24 2021              |
| 2                  | EMI Test Receiver                              | R&S          | ESCI 7           | GTS552     | June. 25 2020          | June. 24 2021              |
| 3                  | Spectrum Analyzer                              | Agilent      | E4440A           | GTS533     | June. 25 2020          | June. 24 2021              |
| 4                  | MXG vector Signal Generator                    | Agilent      | N5182A           | GTS567     | June. 25 2020          | June. 24 2021              |
| 5                  | ESG Analog Signal Generator                    | Agilent      | E4428C           | GTS568     | June. 25 2020          | June. 24 2021              |
| 6                  | USB RF Power Sensor                            | DARE         | RPR3006W         | GTS569     | June. 25 2020          | June. 24 2021              |
| 7                  | RF Switch Box                                  | Shongyi      | RFSW3003328      | GTS571     | June. 25 2020          | June. 24 2021              |
| 8                  | Programmable Constant Temp & Humi Test Chamber | WEWON        | WHTH-150L-40-880 | GTS572     | June. 25 2020          | June. 24 2021              |

| General used equipment: |                                 |              |           |               |                        |                            |
|-------------------------|---------------------------------|--------------|-----------|---------------|------------------------|----------------------------|
| Item                    | Test Equipment                  | Manufacturer | Model No. | Inventory No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |
| 1                       | Humidity/ Temperature Indicator | KTJ          | TA328     | GTS243        | June. 25 2020          | June. 24 2021              |
| 2                       | Barometer                       | ChangChun    | DYM3      | GTS255        | June. 25 2020          | June. 24 2021              |



## 7 Radio Spectrum Technical Requirement

### 7.1 Antenna Requirement

#### 7.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.227

#### 7.1.2 Conclusion

Standard Requirement:

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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is Wire antenna, the best case gain of the antenna is 20dBi, reference to the appendix II for details.

## 8 Radio Spectrum Matter Test Results

### 8.1 20dB Bandwidth

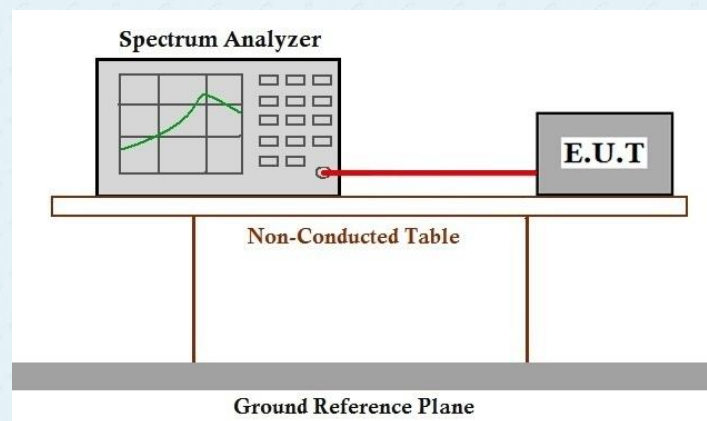
Test Requirement 47 CFR Part 15, Subpart C 15.215  
Test Method: ANSI C63.10 (2013) Section 6.9

#### 8.1.1 E.U.T. Operation

Operating Environment:

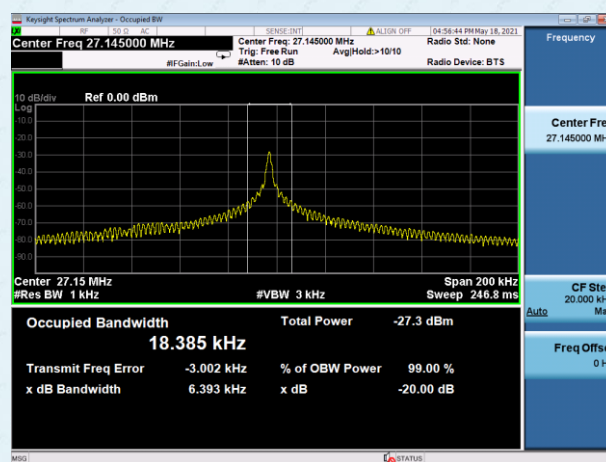
Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar  
Test mode Transmitter mode: Keep the EUT in transmitting with modulation mode.

#### 8.1.2 Test Setup Diagram



#### 8.1.3 Measurement Procedure and Data

| Mode | Frequency (MHz) | -20dB Bandwidth (kHz) | Limit | Conclusion |
|------|-----------------|-----------------------|-------|------------|
| TX   | 27.145          | 6.393                 | N/A   | Pass       |



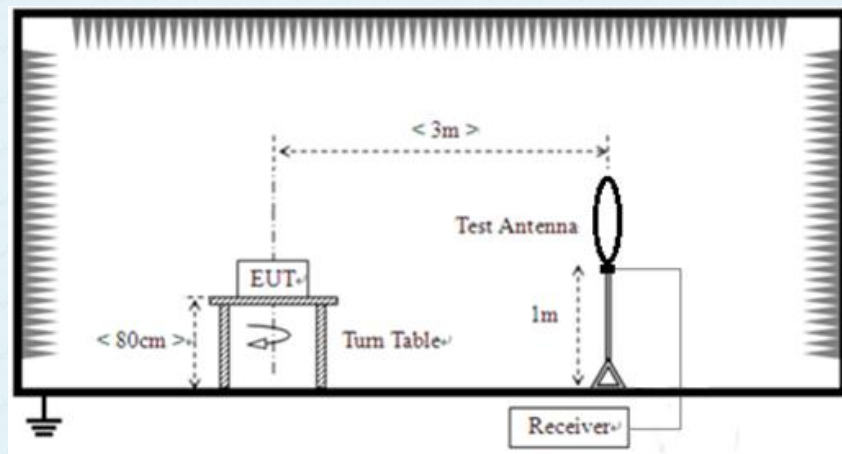
## 8.2 Field Strength of the Fundamental Signal (15.227(a))

Test Requirement 47 CFR Part 15, Subpart C 15.227(a)  
 Test Method: ANSI C63.10 (2013) Section 6.4  
 Measurement Distance: 3m  
 Limit:  $\leq 10000$  microvolts/meter at 3 meters, the emission limit is based on measurement instrumentation employing an average Detector. The provisions in § 15.35 for limiting peak emissions apply.

### 8.2.1 E.U.T. Operation

Operating Environment:  
 Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1000 mbar  
 Test mode Transmitter mode: Keep the EUT in transmitting with modulation mode.

### 8.2.2 Test Setup Diagram



## 8.2.3 Measurement Procedure and Data

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. 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 antenna 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.
  - d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
  - f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
  - g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
- Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

### Measurement data:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Remark |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------|
| 27.145          | 91.47             | 12.26                 | 0.51            | 35.28              | 68.96          | 100.00              | -31.04          | Peak   |
| 26.96           | 85.33             | 12.27                 | 0.51            | 35.30              | 62.81          | 69.54               | -6.73           | QP     |
| 27.28           | 87.47             | 12.25                 | 0.51            | 35.27              | 64.96          | 69.54               | -4.58           | QP     |

### Remarks:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the above measurement data were shown in the report.

## 8.3 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.227(b) & C 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Measurement Distance: 3m

Limit:

| Frequency(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                           |
| Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz and 110-490kHz. Radiated emission limits in these two bands are based on measurements employing an average detector. |                                  |                              |
| Frequency(MHz)                                                                                                                                                                                                                                                                   | Field strength(microvolts/meter) | Measurement distance(meters) |
| 30-88                                                                                                                                                                                                                                                                            | 100                              | 3                            |
| 88-216                                                                                                                                                                                                                                                                           | 150                              | 3                            |
| 216-960                                                                                                                                                                                                                                                                          | 200                              | 3                            |
| Above 960                                                                                                                                                                                                                                                                        | 500                              | 3                            |
| Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for above 1000MHz. Radiated emission limits above 1000MHz is based on measurements employing an average detector.                                    |                                  |                              |



## 8.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C

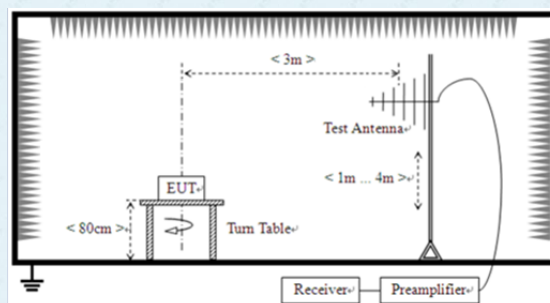
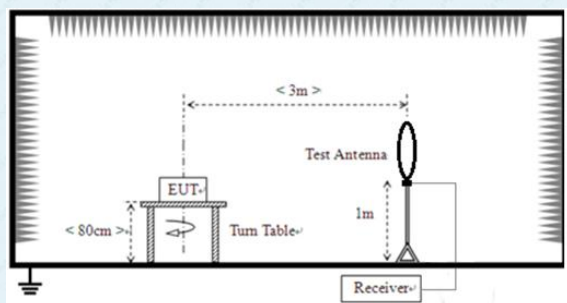
Humidity: 50 % RH

Atmospheric Pressure: 1000 mbar

Test mode

Transmitter mode: Keep the EUT in transmitting with modulation mode.

## 8.3.2 Test Setup Diagram



## 8.3.3 Measurement Procedure and Data

- The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter 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 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

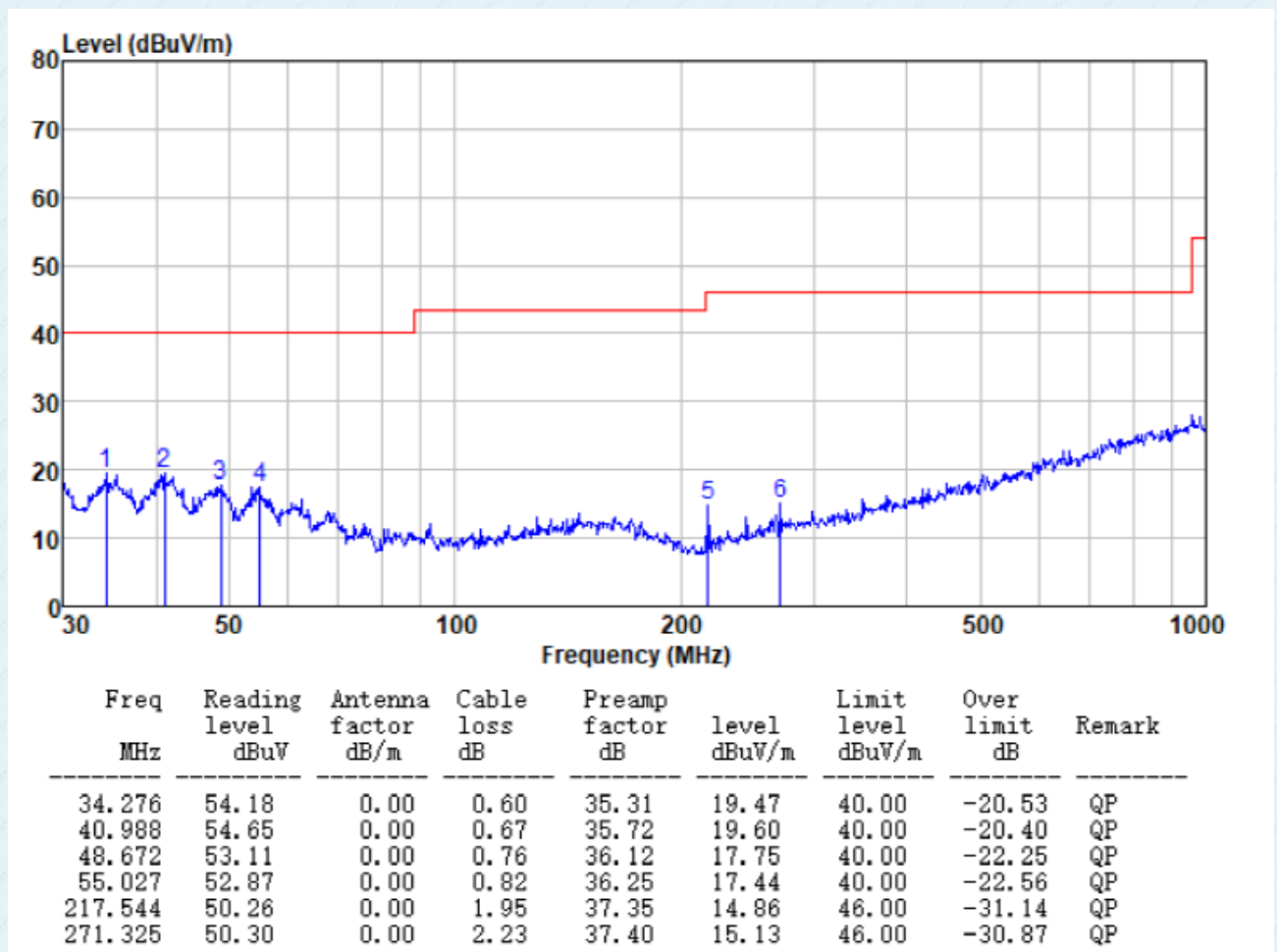
## Measurement data:

### ■ Below 30MHz

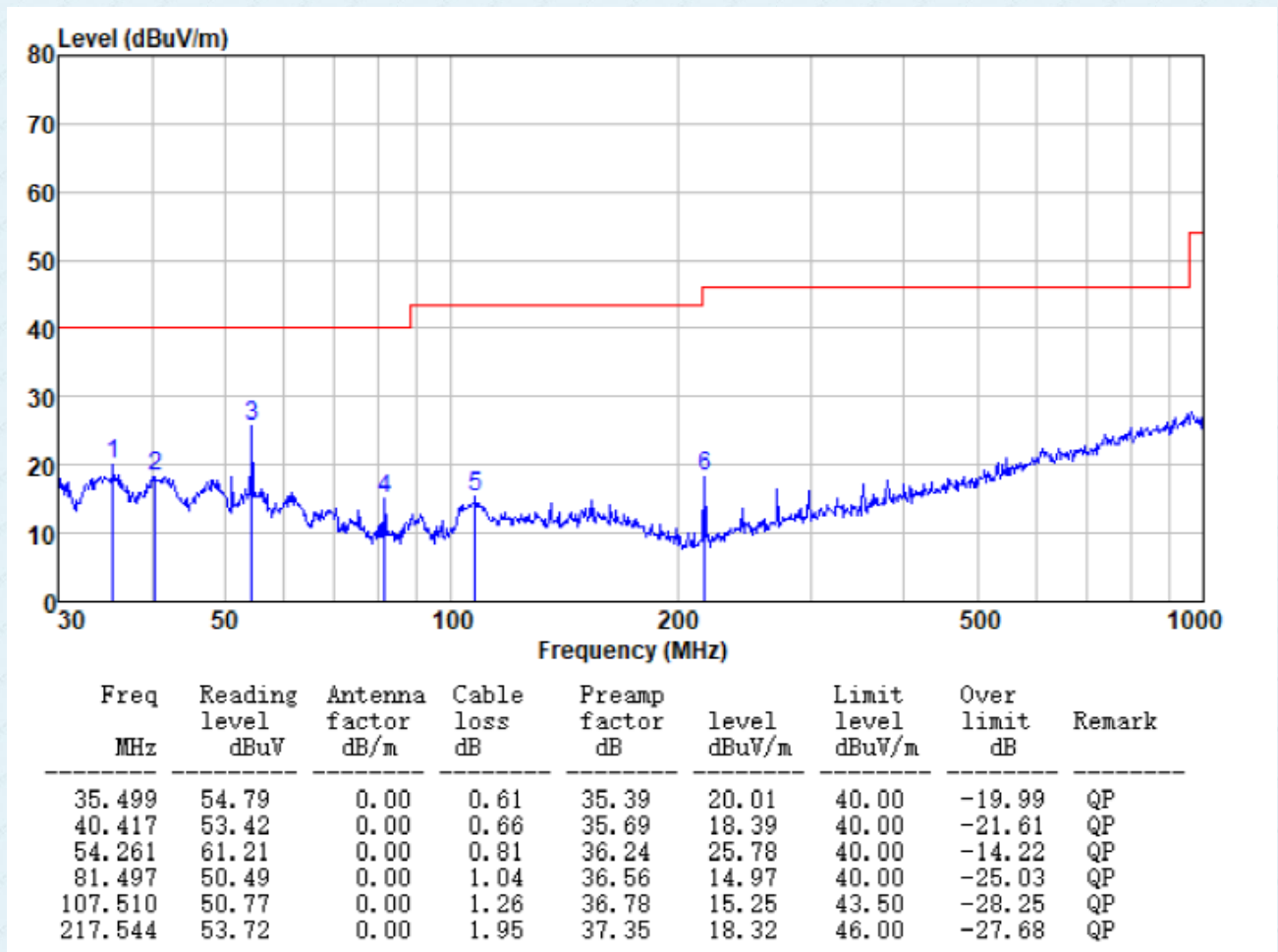
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to be reported.

### ■ 30MHz~1GHz

|       |                   |               |            |
|-------|-------------------|---------------|------------|
| Mode: | Transmitting mode | Polarization: | Horizontal |
|-------|-------------------|---------------|------------|



|       |                   |               |          |
|-------|-------------------|---------------|----------|
| Mode: | Transmitting mode | Polarization: | Vertical |
|-------|-------------------|---------------|----------|



Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

## 9 Test Setup Photo

Reference to the **appendix I** for details.

## 10 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----