

**The Mines Press, Inc**

# RF TEST REPORT

**Report Type:**

FCC Part 15C RF report

**Model:**

745-067

**REPORT NUMBER:**

191000090SHA-001

**ISSUE DATE:**

Nov 4, 2019

**DOCUMENT CONTROL NUMBER:**

TTRFFCCPART15C\_V1 © 2018 Intertek



## TEST REPORT

**Applicant:** The Mines Press, Inc  
231 Croton Avenue, Cortlandt Manor, NY 10567 USA

**Manufacturer:** The Mines Press, Inc  
231 Croton Avenue, Cortlandt Manor, NY 10567 USA  
The Mines Press, Inc

**Manufacturing site:** Shenzhen CWC Technology Co., Ltd.  
Zone B, 5 Building, Mei'jia'mei Industrial Park, Guiyue Road, Guanlan  
Street, Longhua, Shenzhen, China

**FCC ID:** 2ATXKWC745067

## SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

**47CFR Part 15 (2018):** Radio Frequency Devices (Subpart C)

**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

## PREPARED BY:

## REVIEWED BY:



Project Engineer  
Teddy Yin



Reviewer  
Daniel Zhao

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

## TEST REPORT

### Content

|                                                     |           |
|-----------------------------------------------------|-----------|
| <b>REVISION HISTORY.....</b>                        | <b>4</b>  |
| <b>MEASUREMENT RESULT SUMMARY .....</b>             | <b>5</b>  |
| <b>1 GENERAL INFORMATION .....</b>                  | <b>6</b>  |
| 1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) ..... | 6         |
| 1.2 TECHNICAL SPECIFICATION .....                   | 6         |
| 1.3 DESCRIPTION OF TEST FACILITY .....              | 7         |
| <b>2 TEST SPECIFICATIONS.....</b>                   | <b>8</b>  |
| 2.1 STANDARDS OR SPECIFICATION .....                | 8         |
| 2.2 MODE OF OPERATION DURING THE TEST.....          | 8         |
| 2.3 TEST SOFTWARE LIST .....                        | 8         |
| 2.4 TEST PERIPHERALS LIST .....                     | 8         |
| 2.5 TEST ENVIRONMENT CONDITION:.....                | 8         |
| 2.6 INSTRUMENT LIST .....                           | 9         |
| 2.7 MEASUREMENT UNCERTAINTY .....                   | 10        |
| <b>3 RADIATED EMISSIONS .....</b>                   | <b>11</b> |
| 3.1 LIMIT .....                                     | 11        |
| 3.2 MEASUREMENT PROCEDURE .....                     | 11        |
| 3.3 TEST CONFIGURATION .....                        | 12        |
| 3.4 TEST RESULTS OF RADIATED EMISSIONS .....        | 14        |
| <b>4 CONDUCTED EMISSIONS .....</b>                  | <b>16</b> |
| 4.1 LIMIT .....                                     | 16        |
| 4.2 TEST CONFIGURATION .....                        | 16        |
| 4.3 MEASUREMENT PROCEDURE .....                     | 17        |
| 4.4 TEST RESULTS OF CONDUCTED EMISSIONS.....        | 18        |

## Revision History

| Report No.       | Version | Description             | Issued Date |
|------------------|---------|-------------------------|-------------|
| 191000090SHA-001 | Rev. 01 | Initial issue of report | Nov 4, 2019 |
|                  |         |                         |             |
|                  |         |                         |             |

## Measurement result summary

| TEST ITEM           | FCC REFERENCE | RESULT |
|---------------------|---------------|--------|
| Radiated emissions  | 15.209        | Pass   |
| Conducted emissions | 15.207        | Pass   |

Notes: 1: NA =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

## TEST REPORT

### 1 GENERAL INFORMATION

#### 1.1 Description of Equipment Under Test (EUT)

|                       |                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------|
| Product name:         | Narwhal Wireless Charger                                                              |
| Type/Model:           | 745-067                                                                               |
| Description of EUT:   | EUT is a wireless charger.                                                            |
| Rating:               | Input: DC5V, 2A<br>Output: DC5V, 1A or DC9V, 1.1A                                     |
| Category of EUT:      | Class B                                                                               |
| EUT type:             | <input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing |
| Software Version:     | /                                                                                     |
| Hardware Version:     | /                                                                                     |
| Sample received date: | Oct 9, 2019                                                                           |
| Date of test:         | Oct 9~14, 2019                                                                        |

#### 1.2 Technical Specification

|                  |                 |
|------------------|-----------------|
| Frequency Range: | 105kHz – 210kHz |
|------------------|-----------------|

## TEST REPORT

### 1.3 Description of Test Facility

|            |                                                                        |
|------------|------------------------------------------------------------------------|
| Name:      | Intertek Testing Services Shanghai                                     |
| Address:   | Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China |
| Telephone: | 86 21 61278200                                                         |
| Telefax:   | 86 21 54262353                                                         |

|                                                                                   |                                                                               |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| The test facility is recognized, certified, or accredited by these organizations: | CNAS Accreditation Lab<br>Registration No. CNAS L0139                         |
|                                                                                   | FCC Accredited Lab<br>Designation Number: CN1175                              |
|                                                                                   | IC Registration Lab<br>CAB identifier.: CN0051                                |
|                                                                                   | VCCI Registration Lab<br>Registration No.: R-14243, G-10845, C-14723, T-12252 |
|                                                                                   | A2LA Accreditation Lab<br>Certificate Number: 3309.02                         |

## TEST REPORT

## 2 TEST SPECIFICATIONS

### 2.1 Standards or specification

47CFR Part 15 (2018)  
ANSI C63.10 (2013)

### 2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency are specified if used.

### 2.3 Test software list

| Test Items         | Software | Manufacturer | Version |
|--------------------|----------|--------------|---------|
| Conducted emission | ESxS-K1  | R&S          | V2.1.0  |
| Radiated emission  | ES-K1    | R&S          | V1.71   |

### 2.4 Test peripherals list

| Item No. | Name          | Brand and Model | Description      |
|----------|---------------|-----------------|------------------|
| 1        | Wireless load | /               | 100% power level |
| 2        | Wireless load | /               | 50% power level  |
| 3        | Wireless load | /               | 0% power level   |

### 2.5 Test environment condition:

| Test items                    | Temperature | Humidity |
|-------------------------------|-------------|----------|
| Radiated emission             | 25°C        | 55% RH   |
| Power line conducted emission | 25°C        | 55% RH   |

## TEST REPORT

### 2.6 Instrument list

| Conducted Emission                  |                       |              |           |              |            |
|-------------------------------------|-----------------------|--------------|-----------|--------------|------------|
| Used                                | Equipment             | Manufacturer | Type      | Internal no. | Due date   |
| <input checked="" type="checkbox"/> | Test Receiver         | R&S          | ESCS 30   | EC 2107      | 2020-07-15 |
| <input checked="" type="checkbox"/> | A.M.N.                | R&S          | ESH2-Z5   | EC 3119      | 2019-11-30 |
| <input checked="" type="checkbox"/> | Shielded room         | Zhongyu      | -         | EC 2838      | 2020-01-13 |
| Radiated Emission                   |                       |              |           |              |            |
| Used                                | Equipment             | Manufacturer | Type      | Internal no. | Due date   |
| <input checked="" type="checkbox"/> | Test Receiver         | R&S          | ESIB 26   | EC 3045      | 2020-09-12 |
| <input checked="" type="checkbox"/> | Active loop antenna   | Schwarzbeck  | FMZB1519  | EC 5345      | 2020-03-14 |
| <input checked="" type="checkbox"/> | Bilog Antenna         | TESEQ        | CBL 6112D | EC 4206      | 2019-12-10 |
| <input checked="" type="checkbox"/> | Semi-anechoic chamber | Albatross    | -         | EC 3048      | 2020-07-31 |
| Additional instrument               |                       |              |           |              |            |
| Used                                | Equipment             | Manufacturer | Type      | Internal no. | Due date   |
| <input checked="" type="checkbox"/> | Therom-Hygrograph     | ZJ1-2A       | S.M.I.F.  | EC 5198      | 2020-02-27 |
| <input checked="" type="checkbox"/> | Therom-Hygrograph     | ZJ1-2A       | S.M.I.F.  | EC 3325      | 2020-04-07 |

## TEST REPORT

### 2.7 Measurement uncertainty

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

| Measurement                       | Frequency      | Expanded Uncertainty<br>( $k=2$ ) |
|-----------------------------------|----------------|-----------------------------------|
| Conducted emission at mains ports | 9kHz ~ 150kHz  | 3.52 dB                           |
|                                   | 150kHz ~ 30MHz | 3.19 dB                           |
| Radiated Emissions up to 1 GHz    | 30MHz ~ 1GHz   | 4.90 dB                           |
| Radiated Emissions above 1 GHz    | 1GHz ~ 6GHz    | 5.02 dB                           |
|                                   | 6GHz ~ 18GHz   | 5.28 dB                           |

## TEST REPORT

### 3 Radiated emissions

Test result: Pass

#### 3.1 Limit

| 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                             |

#### 3.2 Measurement Procedure

##### For Radiated emission below 30MHz:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

##### For Radiated emission above 30MHz:

- The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 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.

## TEST REPORT

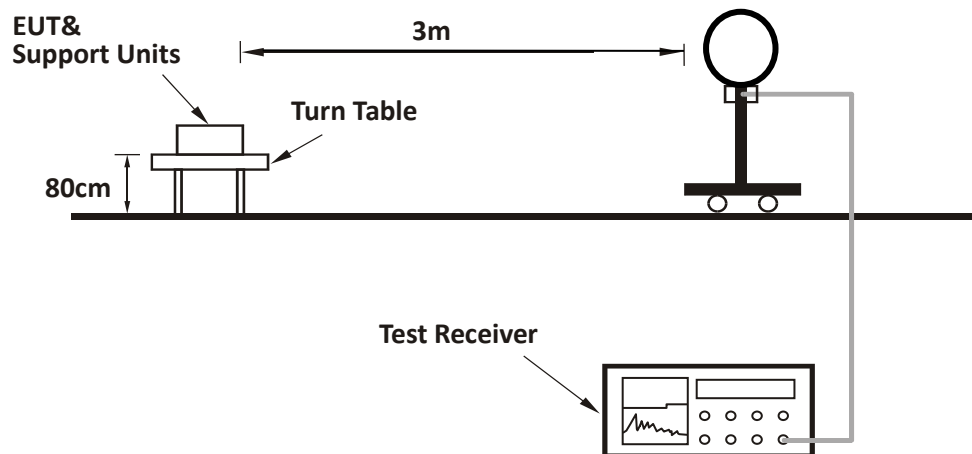
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

### Note:

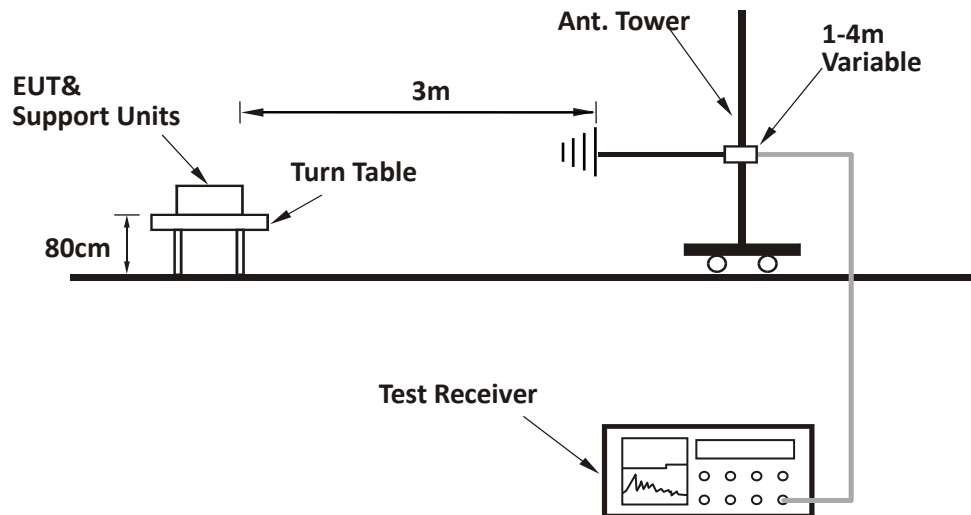
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. All modes of operation were evaluated and the worst-case emissions were reported

## 3.3 Test Configuration

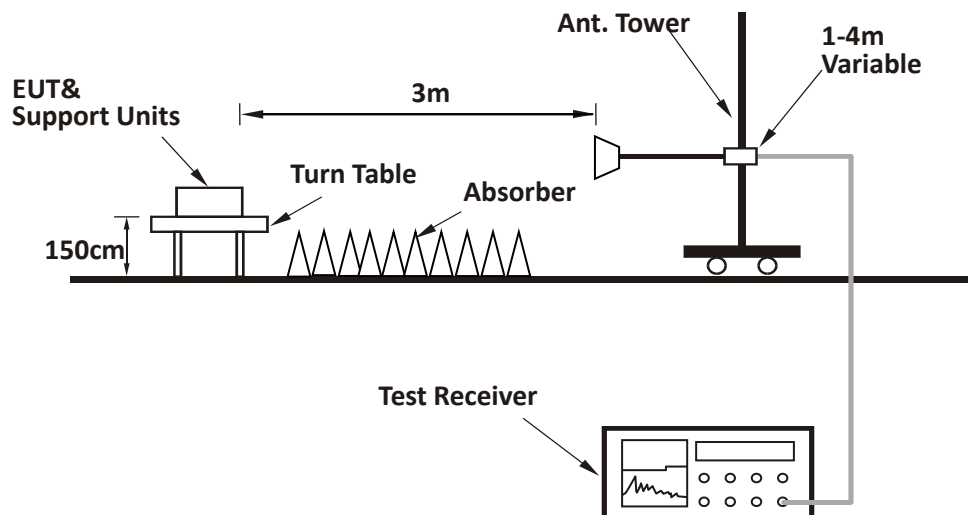
**For Radiated emission below 30MHz:**



**For Radiated emission 30MHz to 1GHz:**



**For Radiated emission above 1GHz:**



## TEST REPORT

### 3.4 Test Results of Radiated Emissions

EUT was tested with empty load, half load and full load, the full load is the worst case and we listed the results in the report.

#### Test data below 30MHz:

| Antenna Polarization | Frequency (MHz) | Corrected Reading (dBuV/m) | Correct Factor (dB/m) | Limit (dBuV/m) | Margin | Detector | Remark      |
|----------------------|-----------------|----------------------------|-----------------------|----------------|--------|----------|-------------|
| X                    | 0.12            | 80.80                      | 20.20                 | 92.30          | 11.50  | PK       | Fundamental |
| X                    | 0.21            | 65.60                      | 20.10                 | 82.30          | 16.70  | PK       | Spurious    |
| X                    | 0.81            | 48.10                      | 20.10                 | 58.90          | 10.80  | PK       | Spurious    |
| X                    | 1.53            | 34.90                      | 20.20                 | 47.90          | 13.00  | PK       | Spurious    |
| X                    | 7.21            | 37.70                      | 20.20                 | 59.10          | 21.40  | PK       | Spurious    |
| Y                    | 0.12            | 72.00                      | 20.20                 | 92.30          | 20.30  | PK       | Fundamental |
| Y                    | 0.21            | 63.00                      | 20.10                 | 82.30          | 19.30  | PK       | Spurious    |
| Y                    | 0.81            | 49.50                      | 20.10                 | 58.90          | 9.40   | PK       | Spurious    |
| Y                    | 1.65            | 33.20                      | 20.20                 | 46.60          | 13.40  | PK       | Spurious    |
| Y                    | 7.21            | 44.20                      | 20.20                 | 59.10          | 14.90  | PK       | Spurious    |

#### Test data from 30MHz to 1000MHz:

| Antenna Polarization | Frequency (MHz) | Corrected Reading (dBuV/m) | Correct Factor (dB/m) | Limit (dBuV/m) | Margin | Detector |
|----------------------|-----------------|----------------------------|-----------------------|----------------|--------|----------|
| H                    | 30.00           | 24.90                      | 21.30                 | 40.00          | 15.10  | PK       |
| H                    | 105.81          | 26.90                      | 11.30                 | 43.50          | 16.60  | PK       |
| H                    | 212.73          | 31.10                      | 11.30                 | 43.50          | 12.40  | PK       |
| H                    | 292.42          | 39.50                      | 14.30                 | 46.00          | 6.50   | PK       |
| H                    | 350.74          | 30.40                      | 15.90                 | 46.00          | 15.60  | PK       |
| H                    | 916.41          | 32.50                      | 25.40                 | 46.00          | 13.50  | PK       |
| V                    | 41.66           | 37.40                      | 15.30                 | 40.00          | 2.60   | PK       |
| V                    | 51.38           | 38.30                      | 8.40                  | 40.00          | 1.70   | PK       |
| V                    | 61.10           | 36.10                      | 5.70                  | 40.00          | 3.90   | PK       |
| V                    | 105.81          | 38.70                      | 11.30                 | 43.50          | 4.80   | PK       |
| V                    | 181.62          | 37.20                      | 10.80                 | 43.50          | 6.30   | PK       |
| V                    | 292.42          | 36.40                      | 14.30                 | 46.00          | 9.60   | PK       |

**TEST REPORT**

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.  
2. Corrected Reading = Original Receiver Reading + Correct Factor  
3. Margin = Limit - Corrected Reading  
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,  
Limit = 40.00dBuV/m.  
Then Correct Factor =  $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$ ;  
Corrected Reading =  $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$ ;  
Margin =  $40.00\text{dBuV/m} - 10.20\text{dBuV/m} = 29.80\text{dB}$ .

## TEST REPORT

### 4 Conducted emissions

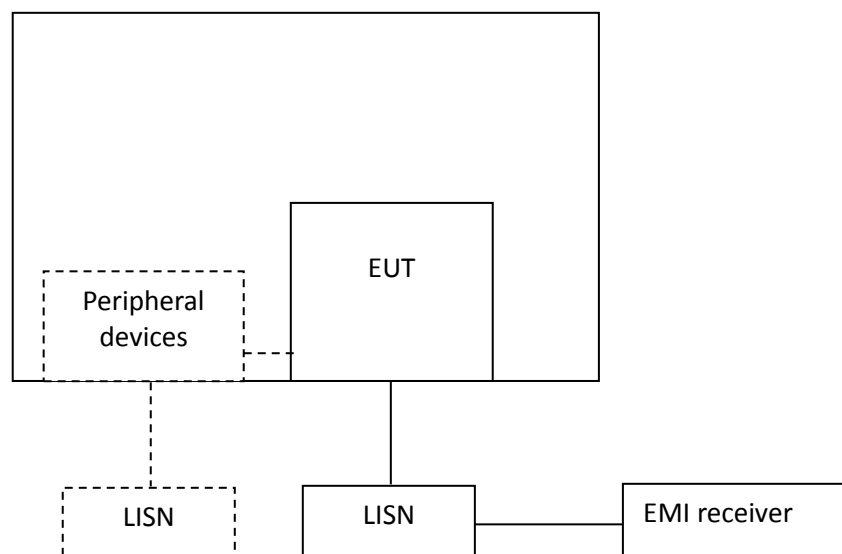
Test result: Pass

#### 4.1 Limit

| Frequency of Emission (MHz) | Conducted Emissions Limit (dBuV) |            |
|-----------------------------|----------------------------------|------------|
|                             | QP                               | AV         |
| 0.15-0.5                    | 66 to 56*                        | 56 to 46 * |
| 0.5-5                       | 56                               | 46         |
| 5-30                        | 60                               | 50         |

\* Decreases with the logarithm of the frequency.

#### 4.2 Test Configuration



**TEST REPORT****4.3 Measurement Procedure**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50  $\Omega$  LISN port (to which the EUT is connected), where permitted, terminated into a 50  $\Omega$  measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50  $\Omega$  measuring port is terminated by a measuring instrument having 50  $\Omega$  input impedance. All other ports are terminated in 50  $\Omega$  loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

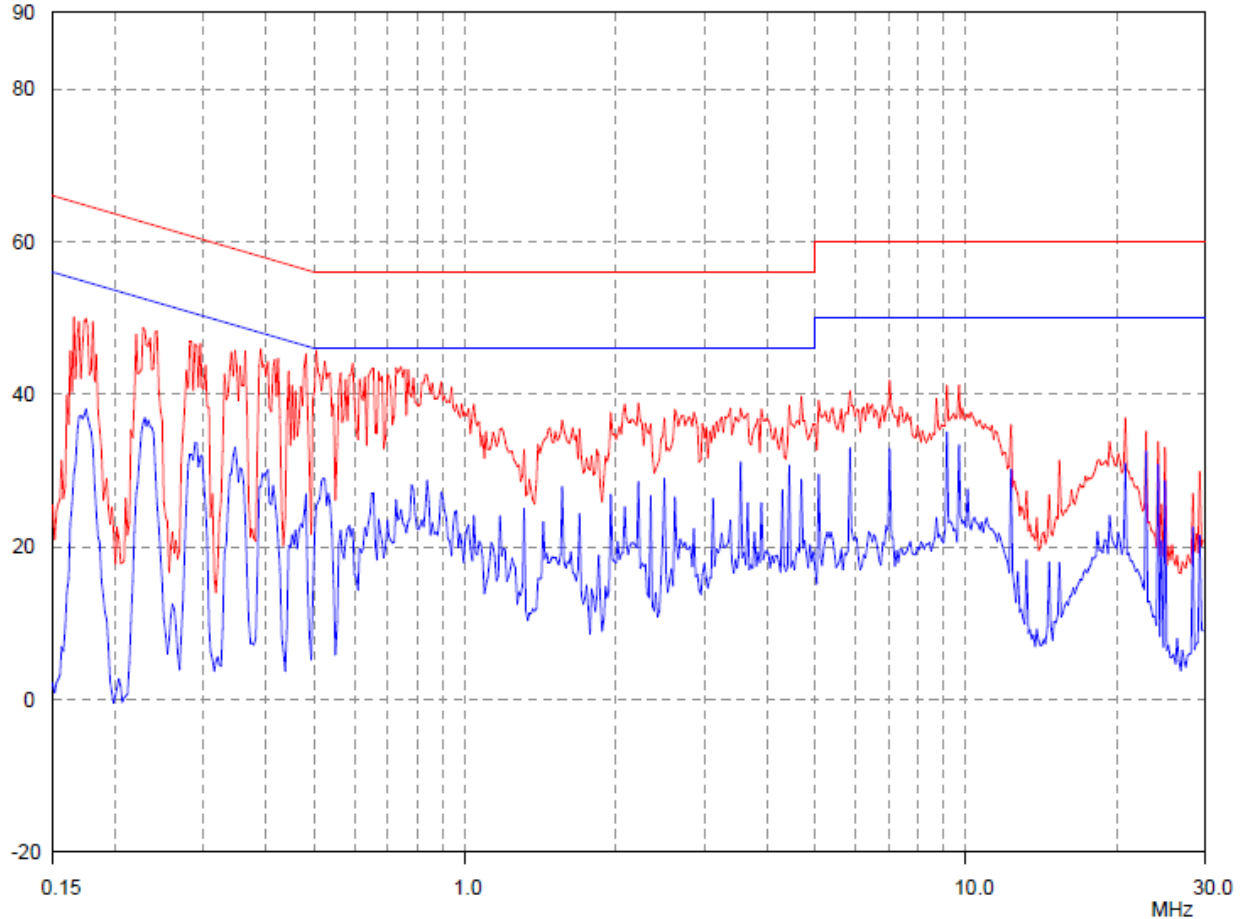
The bandwidth of the test receiver is set at 9 kHz.

## TEST REPORT

### 4.4 Test Results of Conducted Emissions

#### Test Curve:

L-Line

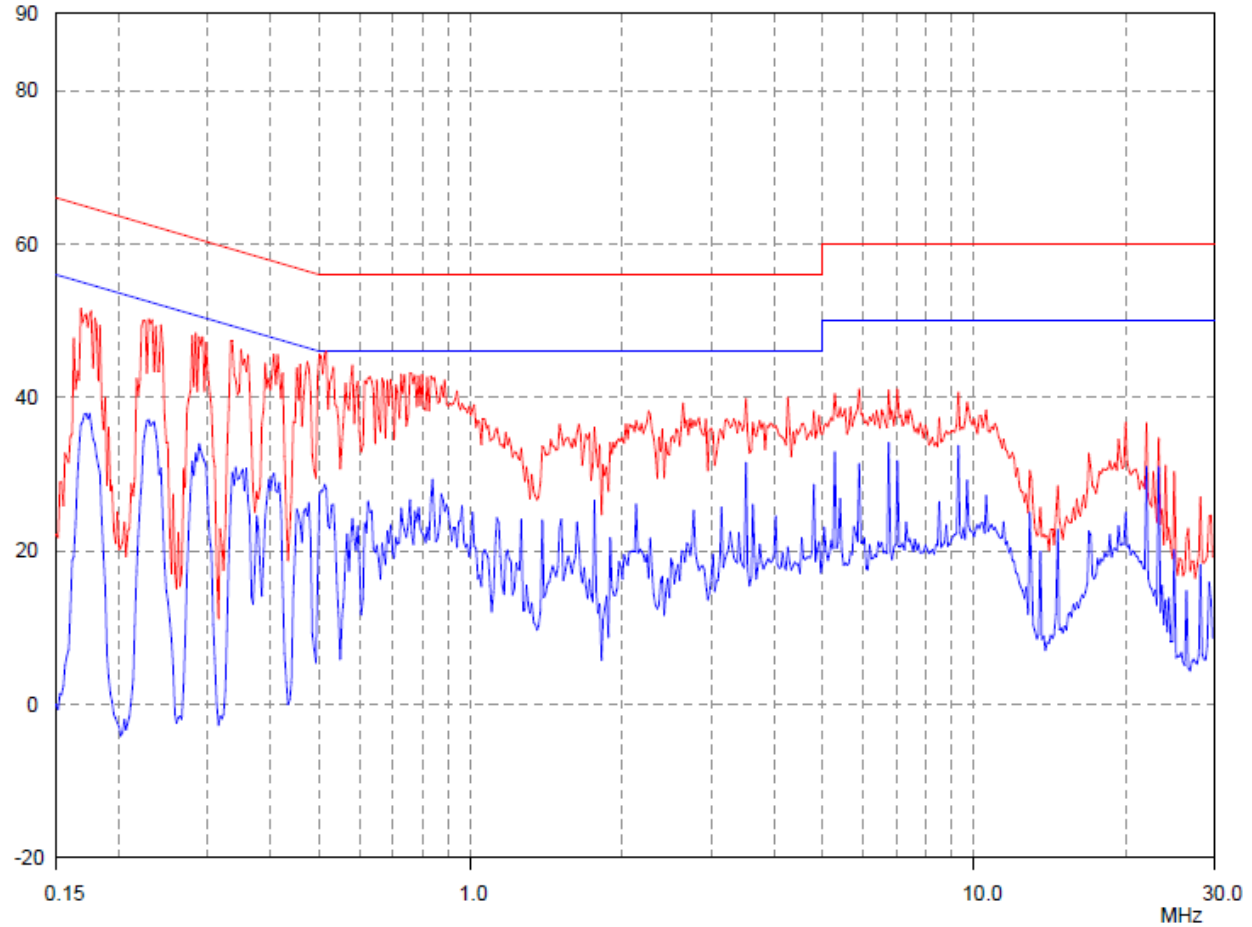


| Frequency (MHz) | Quasi-peak               |              |             | Average                  |              |             |
|-----------------|--------------------------|--------------|-------------|--------------------------|--------------|-------------|
|                 | Corrected Reading (dBuV) | Limit (dBuV) | Margin (dB) | Corrected Reading (dBuV) | Limit (dBuV) | Margin (dB) |
| 0.43            | *                        | 57.25        | *           | *                        | 47.25        | *           |
| 0.72            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 1.01            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 1.30            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 1.58            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 28.34           | *                        | 60.00        | *           | *                        | 50.00        | *           |

Note: \* means the emission level 10dB below the relevant limit.

## TEST REPORT

N-Line



| Frequency (MHz) | Quasi-peak               |              |             | Average                  |              |             |
|-----------------|--------------------------|--------------|-------------|--------------------------|--------------|-------------|
|                 | Corrected Reading (dBuV) | Limit (dBuV) | Margin (dB) | Corrected Reading (dBuV) | Limit (dBuV) | Margin (dB) |
| 0.43            | *                        | 57.25        | *           | *                        | 47.25        | *           |
| 0.72            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 1.01            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 1.30            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 1.58            | *                        | 56.00        | *           | *                        | 46.00        | *           |
| 28.34           | *                        | 60.00        | *           | *                        | 50.00        | *           |

Note: \* means the emission level 10dB below the relevant limit.

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.  
 2. Corrected Reading = Original Receiver Reading + Correct Factor  
 3. Margin = Limit - Corrected Reading  
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

\*\*\*\*\* END \*\*\*\*\*