

# Camelion North America Inc.

## TEST REPORT

**SCOPE OF WORK**

EMC TESTING-WF82, IF82

**REPORT NUMBER**

200325125GZU-001

**ISSUE DATE**

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**PAGES**

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**DOCUMENT CONTROL NUMBER**

FCC Part 15.249-d

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**TEST REPORT**

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Manufacturing Site : Same as applicant  
Intertek Report No: 200325125GZU-001  
FCC ID: 2AWG2- WF82

**Test standards****47 CFR PART 15 Subpart C: 2019 section 15.249****Sample Description**

Product : LED Wireless Wave Activated Light Bar  
Models No. : WF82, IF82  
Electrical Rating : Powered by 3.7Vdc (recharged batteries)  
Charged by 5Vdc(adaptor)  
Remark: The device will be sold without adaptor  
When the device was charging, it cannot work normally  
  
**Serial No.** : Not Labeled  
Date Received : 25 March 2020  
Date Test Conducted : 25 March 2020-25 May 2020

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**TEST REPORT****CONTENT**

|  |           |
|--|-----------|
| <b>TEST REPORT</b> .....                         | <b>1</b>  |
| <b>CONTENT</b> .....                             | <b>3</b>  |
| <b>1.0 TEST RESULT SUMMARY</b> .....             | <b>4</b>  |
| <b>2.0 GENERAL DESCRIPTION</b> .....             | <b>5</b>  |
| 2.1 PRODUCT DESCRIPTION .....                    | 5         |
| 2.2 RELATED SUBMITTAL(S) GRANTS .....            | 6         |
| 2.3 TEST METHODOLOGY .....                       | 6         |
| 2.4 TEST FACILITY .....                          | 6         |
| <b>3.0 SYSTEM TEST CONFIGURATION</b> .....       | <b>6</b>  |
| 3.1 JUSTIFICATION .....                          | 6         |
| 3.2 EUT EXERCISING SOFTWARE .....                | 7         |
| 3.3 SPECIAL ACCESSORIES .....                    | 7         |
| 3.4 MEASUREMENT UNCERTAINTY .....                | 8         |
| 3.5 EQUIPMENT MODIFICATION .....                 | 8         |
| 3.6 SUPPORT EQUIPMENT LIST AND DESCRIPTION ..... | 9         |
| <b>4.0 MEASUREMENT RESULTS</b> .....             | <b>10</b> |
| 4.1 ANTENNA REQUIREMENT .....                    | 10        |
| 4.2 OCCUPIED BANDWIDTH .....                     | 11        |
| 4.3 RADIATED EMISSION AND BAND EDGES .....       | 14        |
| <b>5.0 TEST EQUIPMENT LIST</b> .....             | <b>26</b> |

**TEST REPORT****1.0 TEST RESULT SUMMARY**

| Test Item              | Test Requirement                         | Test Method                              | Result |
|------------------------|--|--|--------|
| Antenna Requirement    | FCC PART 15 C<br>Section 15.203          | FCC PART 15 C<br>Section 15.203          | PASS   |
| Occupied Bandwidth     | FCC PART 15 C<br>section 15.215(c)       | ANSI C63.10:<br>Clause 6.9               | PASS   |
| Radiated Emission      | FCC PART 15 C<br>section 15.249 (a), (d) | ANSI C63.10:<br>Clause 6.4, 6.5 &<br>6.6 | PASS   |
| Band Edges Measurement | FCC PART 15 C<br>section 15.249 (d)      | ANSI C63.10:<br>Clause 6.10              | PASS   |

**Remark:**

**N/A:** not applicable. Refer to the relative section for the details.

**EUT:** In this whole report EUT means Equipment Under Test.

**Tx:** In this whole report Tx (or tx) means Transmitter.

**Rx:** In this whole report Rx (or rx) means Receiver.

**RF:** In this whole report RF means Radio Frequency.

**ANSI C63.10:** the detail version is ANSI C63.10:2013 in the whole report.

Models WF82, IF82 are declared identical in terms of electrical and mechanical design. Their difference lies in the model name, which apply for different trademark

Camelion: IF82

Westinghouse: WF82

So model WF82 was selected for full test.

## TEST REPORT

### 2.0 General Description

#### 2.1 Product Description

|                      |            |
|----------------------|------------|
| Operating Frequency: | 2478MHz    |
| Type of Modulation:  | GFSK       |
| Number of Channels:  | 1 Channel  |
| Antenna Type:        | PCB Layout |
| Antenna Gain:        | 0.9dBi     |
| Power Supply:        | 3.7Vdc     |

## TEST REPORT

### 2.2 Related Submittal(s) Grants

This is an application for certification of:  
DXX - Part 15 Low Power Communication Device Transmitter.

Remaining portions are subject to the following procedures:

1. Receiver portion of Module: exempt from technical requirement of this Part.
2. Charging mode and lighting mode: evaluated by FCC SDOC

### 2.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.10. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans and final tests were performed in the semi-anechoic chamber to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise.

### 2.4 Test Facility

All tests were performed at:

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

Except Conducted Emissions was performed at:

Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China

A2LA Certificate Number 0078.10

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

## 3.0 System Test Configuration

### 3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. It was powered by 3.7Vdc supply.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The

## TEST REPORT

antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. The spurious emissions more than 20 dB below the permissible value are not reported.

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Frequency range of radiated emission measurements

| Lowest frequency generated in the device | Upper frequency range of measurement  |
|--|---|
| 9 kHz to below 10 GHz                    | 10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower                             |
| At or above 10 GHz to below 30 GHz       | 5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower                             |
| At or above 30 GHz                       | 5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified |

Number of fundamental frequencies to be tested in EUT transmit band

| Frequency range in which device operates | Number of frequencies | Location in frequency range of operation    |
|--|-----------------------|---|
| 1 MHz or less                            | 1                     | Middle                                      |
| 1 MHz to 10 MHz                          | 2                     | 1 near top and 1 near bottom                |
| More than 10 MHz                         | 3                     | 1 near top, 1 near middle and 1 near bottom |

### 3.2 EUT Exercising Software

No special exercising software

### 3.3 Special Accessories

No special accessories used.

## TEST REPORT

### 3.4 Measurement Uncertainty

| No. | Item                                   | Measurement Uncertainty |
|-----|--|-------------------------|
| 1   | 20 dB Bandwidth                        | 2.3%                    |
|     | 6dB Bandwidth                          |                         |
|     | 99% Bandwidth                          |                         |
| 2   | Carrier Frequencies Separated          | 2.3%                    |
| 3   | Dwell Time                             | 1.2%                    |
| 4   | Maximum Peak Conducted Output Power    | 1.5dB                   |
| 5   | Peak Power Spectral Density            | 1.5dB                   |
| 6   | Out of Band Conducted Emissions        | 1.5dB                   |
| 7   | Band edges measurement                 | 1.5dB                   |
| 8   | Radiated Emissions                     | 4.7 dB (25 MHz-1 GHz)   |
|     |  | 4.8 dB (1 GHz-18 GHz)   |
|     |  | 5.21dB (18GHz-26GHz)    |
| 9   | Conducted Emissions at Mains Terminals | 2.58dB                  |
| 10  | Temperature                            | 0.5 °C                  |
| 11  | Humidity                               | 0.4 %                   |
| 12  | Time                                   | 1.2%                    |

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with ETSI TR 100 028-2001.

The measurement uncertainty is given with a confidence of 95%, k=2.

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value

### 3.5 Equipment Modification

Any modifications installed previous to testing by Camelion North America Inc. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

## TEST REPORT

### 3.6 Support Equipment List and Description

The client makes a continuous transmit sample for test, in actual use, it will have duty cycle (detail information can refer to page 16).

## TEST REPORT

### 4.0 Measurement Results

#### 4.1 Antenna Requirement

Standard requirement:

15.203 requirement:

For intentional device. According to 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.

EUT Antenna:

The antenna is a PCB Layout and no consideration of replacement. The best case gain of the antenna is 0.9 dBi.



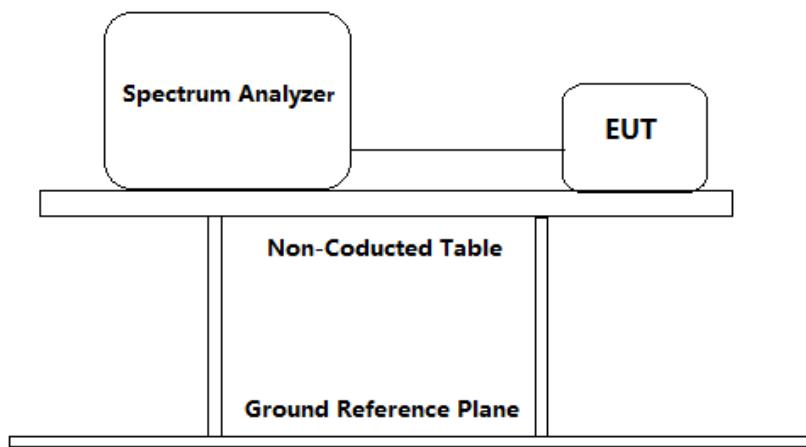
**TEST REPORT****4.2 Occupied Bandwidth**

Test Requirement: FCC PART 15 C section 15.215(c)  
(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure.  
that the 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated

Test Method: ANSI C63.10: Clause 6.9

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The highest, middle and the lowest channels were selected for the final test as listed below.

Test Configuration:

**Test Procedure:**

The transmitter was operated at its maximum carrier power measured under normal test conditions.

- a) The instrument center frequency was set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer was between 1.5 times and 5.0 times the OBW(20 dB Bandwidth).
- b) The nominal IF filter bandwidth (3 dB RBW) was in the range of 1% to 5% of the OBW, and VBW was approximately three times the RBW.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope was more than [10 log (OBW/RBW)] below the reference level.

**TEST REPORT**

- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) The dynamic range of the instrument at the selected RBW was more than 10 dB below the target “-20 dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW was at least 30 dB below the reference value.
- f) Peak detection and max hold mode (until the trace stabilizes) was used.
- g) Used the 20dB bandwidth function of the instrument and reported the measured bandwidth.
- h) The occupied bandwidth was reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division was clearly labeled. Tabular data was reported in addition to the plot(s).

**Used Test Equipment List**

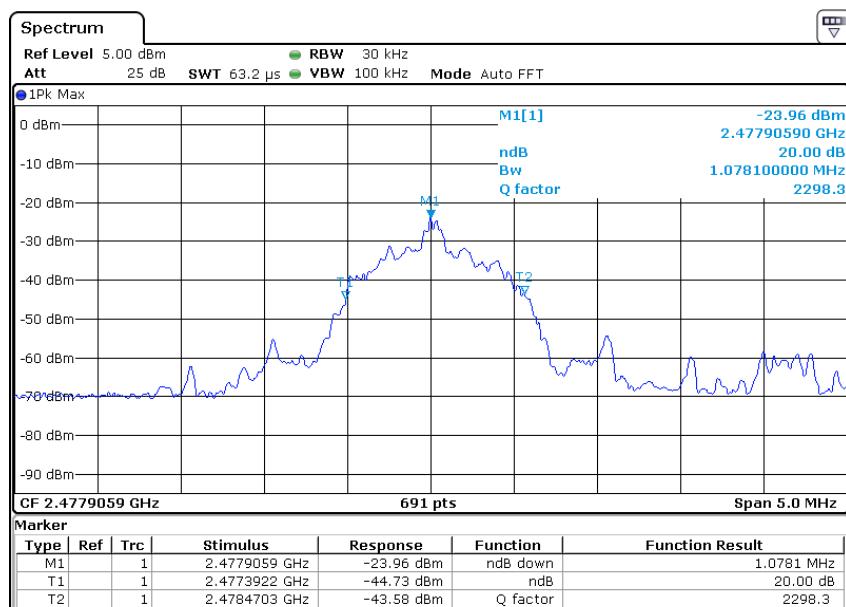
Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

**20 dB bandwidth:**

| Frequency<br>(MHz) | Measured 20dB<br>bandwidth<br>(MHz) | Limit<br>(kHz) | Result |
|--------------------|-------------------------------------|----------------|--------|
| 2478               | 1.078                               | /              | Pass   |

## TEST REPORT

## Result plot as follows:



## TEST REPORT

### 4.3 Radiated Emission and Band Edges

Test Requirement: FCC PART 15 C section 15.249 (a), (d)

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (dB $\mu$ V/m @ 3m) | Field Strength of Harmonics (dB $\mu$ V/m @ 3m) |
|-----------------------------|---|---|
| 902 to 928                  | 94.0  | 54.0  |
| 2400 to 2483.5              | 94.0  | 54.0  |
| 5725 to 5875                | 94.0  | 54.0  |

Note: The limits shown in the above table are based on measurements using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using a CISPR quasi-peak detector.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Test Method: ANSI C63.10: Clause 6.4, 6.5, 6.6, 6.10

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The lowest, middle and the lowest channels were selected for the final test as listed below.

Test site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Limit: The field strength of radiated emission outside of the specified frequency bands, except for harmonics at a distance of 3 meters shall not exceed the following values:

| Frequency (MHz) | Field Strength (dB $\mu$ V/m @ 3m) |
|-----------------|------------------------------------|
| 30-88           | 40.0                               |
| 88-216          | 43.5                               |
| 216-960         | 46.0                               |
| Above 960       | 54.0                               |

Detector: For Peak and Quasi-Peak value:

200 Hz for 9 kHz to 150 kHz

9 kHz for 150 kHz to 30 MHz

**TEST REPORT**

120 kHz for 30 MHz to 1GHz  
RBW = 1 MHz for  $f \geq 1$  GHz  
VBW  $\geq$  RBW  
Sweep = auto  
Detector function = peak for  $f \geq 1$  GHz, QP for  $f < 1$  GHz  
Trace = max hold

For Fundamental Frequency:  
RBW=2MHz, VBW=10MHz  
Sweep = auto  
Detector function = peak  
Trace = max hold

According 15.35(c), when the field strength (or envelope power) is not constant or it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train, including blanking intervals within the pulse train, as long as the pulse train does not exceed 0.1 seconds. In cases where the pulse train exceeds 0.1 second, the average value of field strength or output power shall be determined during a 0.1 second interval during which the field strength or power is at its maximum value.

The average correction factor was computed by analyzing the on time in 100ms over one complete pulse train. Analysis of the remote transmitter on time in one complete pulse train, therefore the average value of fundamental frequency was: Average = Peak value +  $20\log(Duty\ cycle)$ , where the duty factor is calculated from following formula:

## TEST REPORT

The duration of one cycle =7.536ms

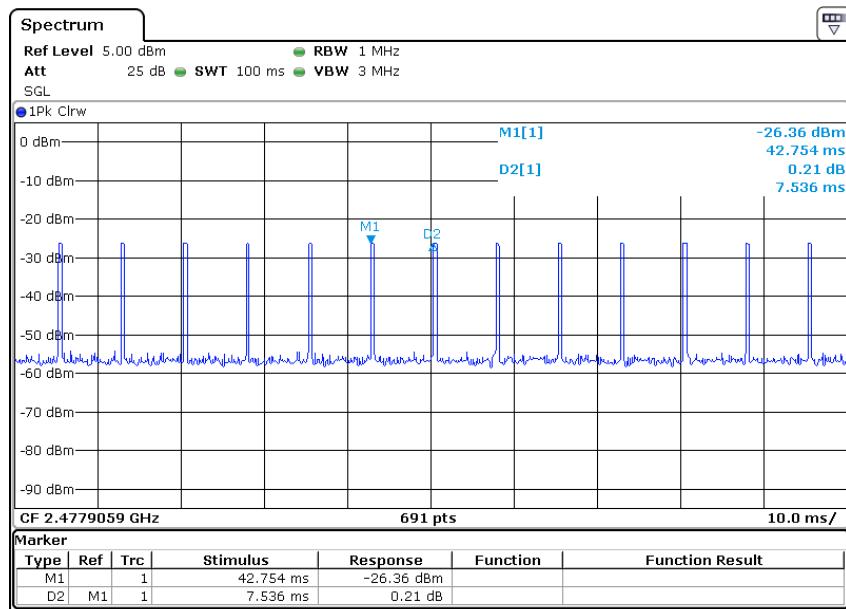
Effective period of the cycle =0.435ms

DC =0.435/7.536=0.058 or 5.8%

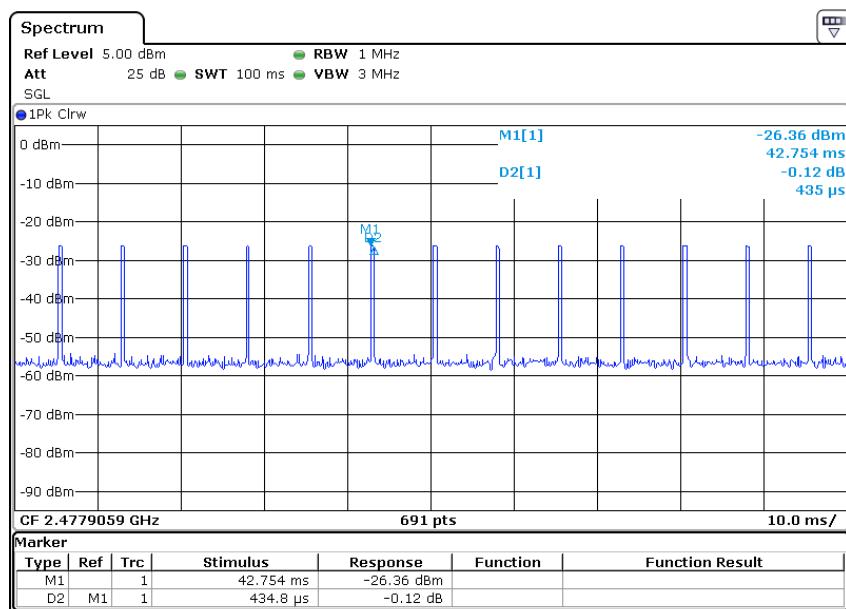
Therefore, the averaging factor is found by  $20\lg 0.1 = -24.8$

Please refer to below plots for more details.

The duration of one cycle:



Effective period of the cycle:



## TEST REPORT

### Field Strength Calculation:

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below:

$$FS = RA + AF + CF - AG + PD + AV$$

$$FS = RA + \text{Correct Factor} + AV$$

$$FS = \text{Field Strength in } dB\mu V/m$$

$$RA = \text{Receiver Amplitude (including preamplifier) in } dB\mu V$$

$$AF = \text{Antenna Factor in dB}$$

$$CF = \text{Cable Attenuation Factor in dB}$$

$$AG = \text{Amplifier Gain in dB}$$

$$PD = \text{Pulse Desensitization in dB}$$

$$AV = \text{Average Factor in } -dB$$

$$\text{Correct Factor} = AF + CF - AG + PD$$

### Where:

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu V$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$\text{Correct Factor} = 7.4 + 1.6 - 29.0 + 0 = -20 \text{ dB}$$

$$FS = 62 + (-20) + (-10) = 32 \text{ dB}\mu V/m$$

**TEST REPORT**

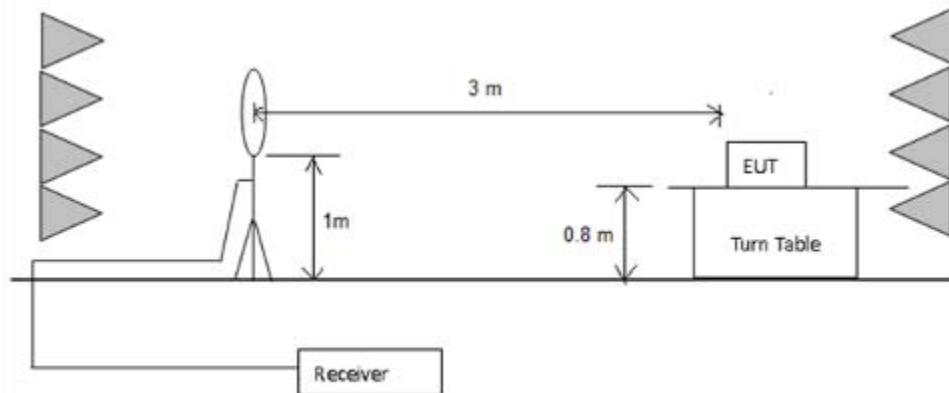
## Section 15.205 Restricted bands of operation.

| MHz                 | MHz                 | MHz             | GHz           |
|---------------------|---------------------|-----------------|---------------|
| 0.090 - 0.110       | 16.42 - 16.423      | 399.9 - 410     | 4.5 - 5.15    |
| 10.495 - 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 -         | 2483.5 - 2500   | 17.7 - 21.4   |
| 8.37625 - 8.38675   | 156.52525           | 2655 - 2900     | 22.01 - 23.12 |
| 8.41425 - 8.41475   | 156.7 - 156.9       | 3260 - 3267     | 23.6 - 24.0   |
| 12.29 - 12.293      | 162.0125 - 167.17   | 3332 - 3339     | 31.2 - 31.8   |
| 12.51975 - 12.52025 | 167.72 - 173.2      | 3345.8 - 3358   | 36.43 - 36.5  |
| 12.57675 - 12.57725 | 240 - 285           | 3600 - 4400     |               |
| 13.36 - 13.41       | 322 - 335.4         |                 |               |

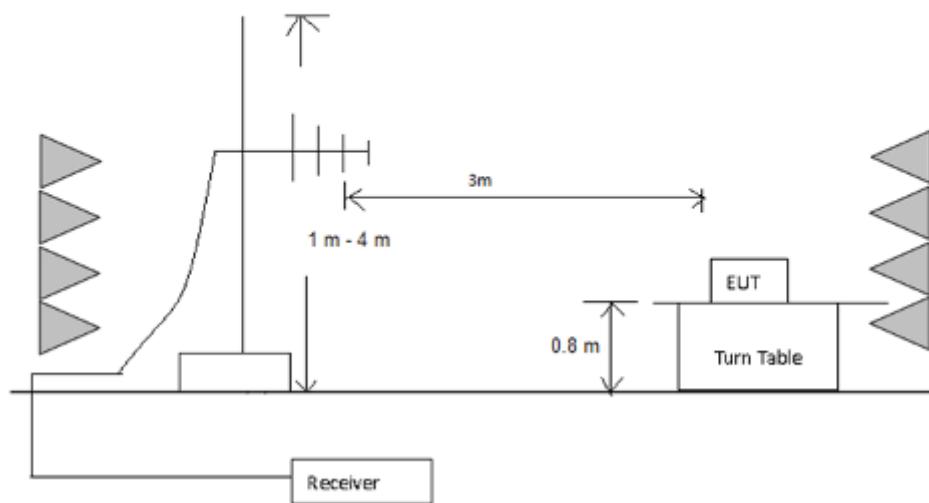
## TEST REPORT

### Test Configuration:

- 1) 9 kHz to 30 MHz emissions:

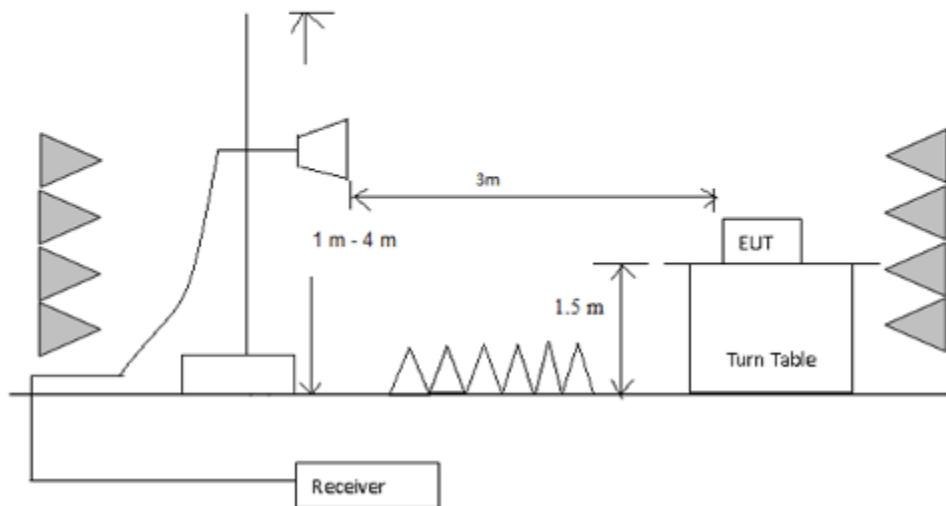


- 2) 30 MHz to 1 GHz emissions:



**TEST REPORT**

## 3) 1 GHz to 40 GHz emissions:

**Test Procedure:**

## 1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the special distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

## 2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

## 3) 1 GHz to 25 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2010 was used to perform radiated emission test above 1 GHz.

For testing performed with the horn antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

## 4) The receiver was scanned from 9 kHz to 25 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of

## TEST REPORT

the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

### Used Test Equipment List:

3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX), Double-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment List for details.

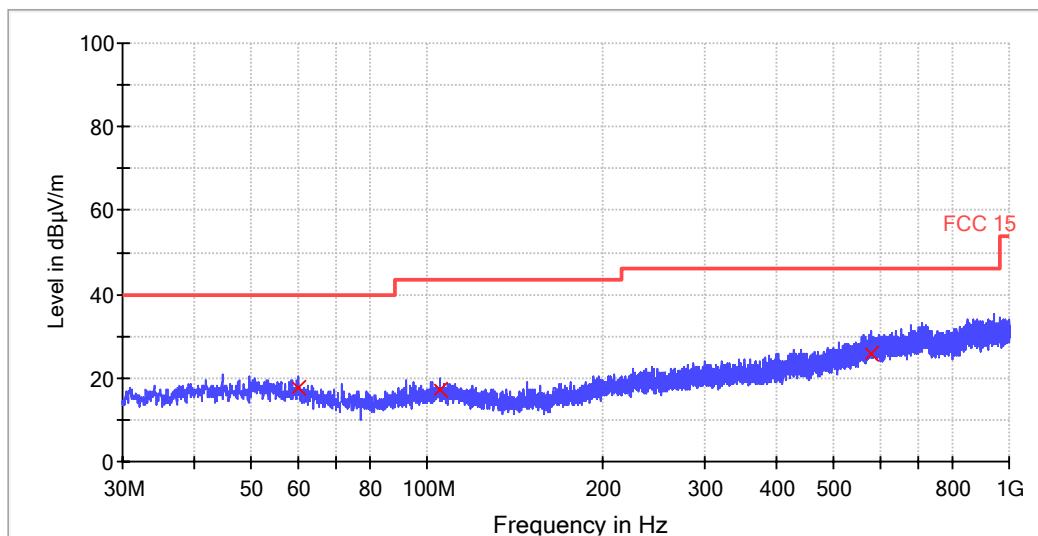
## TEST REPORT

### 9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

### 30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

Horizontal:



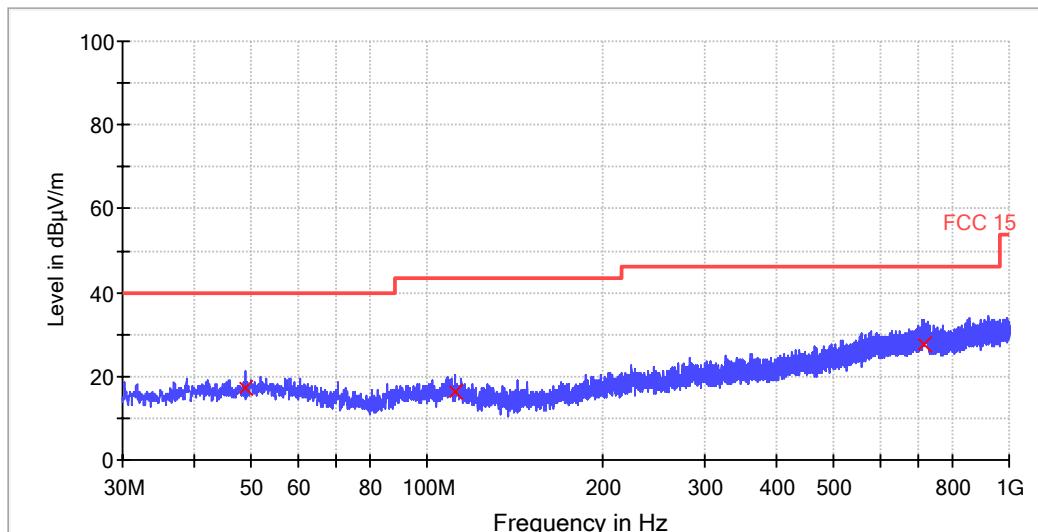
| Frequency (MHz) | Receiver Reading Level (dB $\mu$ V) | Correction factors (dB/m) | Emission Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) |
|-----------------|-------------------------------------|---------------------------|-------------------------------|----------------------|
| 60.08           | 4.4                                 | 13.2                      | 17.6                          | 40.0                 |
| 105.60          | 4.9                                 | 12.2                      | 17.1                          | 43.5                 |
| 577.92          | 4.5                                 | 21.4                      | 25.9                          | 46.0                 |

#### Remark:

1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Quasi Peak (dB $\mu$ V/m) = Corr. (dB) + Read Level (dB $\mu$ V)
3. Margin (dB) = Limit QPK (dB $\mu$ V/m) – Quasi Peak (dB $\mu$ V/m)

**TEST REPORT**

Vertical:



| Frequency (MHz) | Receiver Reading Level (dB $\mu$ V) | Correction factors (dB/m) | Emission Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) |
|-----------------|-------------------------------------|---------------------------|-------------------------------|----------------------|
| 48.80           | 3.3                                 | 13.9                      | 17.2                          | 40.0                 |
| 111.76          | 4.4                                 | 12.0                      | 16.4                          | 43.5                 |
| 714.60          | 4.5                                 | 23.1                      | 27.6                          | 46.0                 |

Remark:

1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Quasi Peak (dB $\mu$ V/m) = Corr. (dB) + Read Level (dB $\mu$ V)
3. Margin (dB) = Limit QPK (dB $\mu$ V/m) – Quasi Peak (dB $\mu$ V/m)

**TEST REPORT**
**1~25 GHz Radiated Emissions. Peak & Average Measurement**
**PK Measurement:**

| Frequency (MHz) | PK Reading Level (dB $\mu$ V) | Correction factors (dB/m) | PK Emission Level (dB $\mu$ V/m) | PK Limit (dB $\mu$ V/m) | Antenna polarization |
|-----------------|-------------------------------|---------------------------|----------------------------------|-------------------------|----------------------|
| 2400.00         | 50.5                          | -8.1                      | 42.4                             | 74.0                    | Horizontal           |
| 2478.00         | 98.7                          | -7.9                      | 90.8                             | 114.0                   | Horizontal           |
| 2483.50         | 68.6                          | -7.8                      | 60.8                             | 74.0                    | Horizontal           |
| 4955.69         | 51.8                          | -0.9                      | 50.9                             | 74.0                    | Horizontal           |
| 7433.97         | 47.3                          | 2.6                       | 49.9                             | 74.0                    | Horizontal           |
| 9910.66         | 39                            | 6.3                       | 45.3                             | 74.0                    | Horizontal           |
| 2400.00         | 50.9                          | -8.1                      | 42.8                             | 74.0                    | Vertical             |
| 2478.00         | 100.1                         | -7.9                      | 92.2                             | 114.0                   | Vertical             |
| 2483.50         | 71.9                          | -7.8                      | 64.1                             | 74.0                    | Vertical             |
| 4955.69         | 59.6                          | -0.9                      | 58.7                             | 74.0                    | Vertical             |
| 7433.97         | 47.8                          | 2.6                       | 50.4                             | 74.0                    | Vertical             |
| 9910.66         | 48                            | 6.3                       | 54.3                             | 74.0                    | Vertical             |

**TEST REPORT**
**AV Measurement:**

| Frequency (MHz) | AV Reading Level (dB $\mu$ V) | Correction factors (dB/m) | AV Emission Level (dB $\mu$ V/m) | AV Limit (dB $\mu$ V/m) | Antenna polarization |
|-----------------|-------------------------------|---------------------------|----------------------------------|-------------------------|----------------------|
| 2400.00         | 42.4                          | -24.8                     | 17.6                             | 54.0                    | Horizontal           |
| 2478.00         | 90.8                          | -24.8                     | 66.0                             | 94.0                    | Horizontal           |
| 2483.50         | 60.8                          | -24.8                     | 36.0                             | 54.0                    | Horizontal           |
| 4955.69         | 50.9                          | -24.8                     | 26.1                             | 54.0                    | Horizontal           |
| 7433.97         | 49.9                          | -24.8                     | 25.1                             | 54.0                    | Horizontal           |
| 9910.66         | 45.3                          | -24.8                     | 20.5                             | 54.0                    | Horizontal           |
| 2400.00         | 42.8                          | -24.8                     | 18.0                             | 54.0                    | Vertical             |
| 2478.00         | 92.2                          | -24.8                     | 67.4                             | 94.0                    | Vertical             |
| 2483.50         | 64.1                          | -24.8                     | 39.3                             | 54.0                    | Vertical             |
| 4955.69         | 58.7                          | -24.8                     | 33.9                             | 54.0                    | Vertical             |
| 7433.97         | 50.4                          | -24.8                     | 25.6                             | 54.0                    | Vertical             |
| 9910.66         | 54.3                          | -24.8                     | 29.5                             | 54.0                    | Vertical             |

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 + Correction Factor

Correction Factor = Antenna Factor + Cable Loss - Preamplifier Factor.

Final Test Level (AV) = PK + Average Factor

Remark:

- 1) Harmonic Emissions was tested with filter (Product name: MICRO-TRONICS, model name: BRM50702), other radiated emissions were found below the reference noise level  
When Peak emission level was below AV limit, the AV emission level was not recorded.
- 2) For Band Edges test without filter.

## TEST REPORT

### 5.0 Test Equipment List

| Equipment No. | Equipment  | Model                | Manufacturer  | Cal. Due date (YYYY-MM-DD) | Calibration Interval |
|---------------|--|----------------------|---------------|----------------------------|----------------------|
| EM030-04      | 3m Semi-Anechoic Chamber                                   | 9×6×6 m <sup>3</sup> | ETS•LINDGREN  | 4/10/2021                  | 1Y                   |
| EM080-05      | EMI Test Receiver (9 kHz~3 GHz)                            | ESCI                 | R&S           | 7/17/2020                  | 1Y                   |
| EM031-02      | EMI Test Receiver (9 kHz~7 GHz)                            | R&S ESR7             | R&S           | 10/22/2020                 | 1Y                   |
| EM031-03      | Signal and Spectrum Analyzer (10 Hz~40 GHz)                | R&S FSV40            | R&S           | 9/8/2020                   | 1Y                   |
| EM011-04      | Loop antenna (9 kHz-30 MHz)                                | HFH2-Z2              | R&S           | 6/24/2020                  | 1Y                   |
| EM061-03      | TRILOG Super Broadband test Antenna (TX)                   | VULB 9161            | SCHWARZBECK   | 6/22/2020                  | 1Y                   |
| EM033-01      | TRILOG Super Broadband test Antenna(RX)                    | VULB 9163            | SCHWARZBECK   | 9/19/2020                  | 1Y                   |
| EM033-06      | Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(TX)  | 3115                 | ETS           | 9/6/2022                   | 3Y                   |
| EM033-02      | Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)  | R&S HF907            | R&S           | 6/22/2020                  | 1Y                   |
| EM033-05      | Pyramidal Horn Antenna (18 GHz-26.5 GHz)(TX)               | 3160-09              | ETS           | 8/12/2020                  | 1Y                   |
| EM033-03      | High Frequency Antenna & preamplifier(18 GHz~26.5 GHz)(RX) | R&S SCU-26           | R&S           | 4/24/2021                  | 1Y                   |
| EM033-04      | High Frequency Antenna & preamplifier (26 GHz-40 GHz)      | R&S SCU-40           | R&S           | 4/24/2021                  | 1Y                   |
| EM031-02-01   | Coaxial cable(9 kHz-1 GHz)                                 | N/A                  | R&S           | 4/12/2021                  | 1Y                   |
| EM033-02-02   | Coaxial cable(1 GHz-18 GHz)                                | N/A                  | R&S           | 4/12/2021                  | 1Y                   |
| EM033-04-02   | Coaxial cable(18 GHz~40 GHz)                               | N/A                  | R&S           | 4/24/2021                  | 1Y                   |
| EM045-01      | Broadband power meter                                      | OSP120/OSP-B157      | R&S           | 11/24/2020                 | 1Y                   |
| EM082-02      | Vector signal generator                                    | SMBV100A             | R&S           | 4/15/2021                  | 1Y                   |
| EM031-01      | Signal Generator (9 kHz~6 GHz)                             | SMB100A              | R&S           | 7/18/2020                  | 1Y                   |
| EM040-01      | Band Reject/Notch Filter                                   | WRHFV                | Wainwright    | N/A                        | 1Y                   |
| EM040-02      | Band Reject/Notch Filter                                   | WRCGV                | Wainwright    | N/A                        | 1Y                   |
| EM040-03      | Band Reject/Notch Filter                                   | WRCGV                | Wainwright    | N/A                        | 1Y                   |
| EM022-03      | 2.45 GHz Filter  | BRM50702             | Micro-Tronics | 5/10/2021                  | 1Y                   |
| SA016-16      | Programmable Temperature & Humidity Test Chamber           | MHU-800LJ            | TERCHY        | 10/13/2020                 | 1Y                   |
| SA016-22      | Climatic Test Chamber                                      | C7-1500              | Vötsch        | 11/10/2020                 | 1Y                   |
| SA012-74      | Digital Multimeter   | FLUKE175             | FLUKE         | 10/13/2020                 | 1Y                   |
| EM010-01      | Regulated DC Power supply                                  | PAB-3003A            | GUANHUA       | N/A                        | 1Y                   |
| SA040-22      | Regulated DC Power supply                                  | IT6721               | ITECH         | 9/8/2020                   | 1Y                   |
| EM084-06      | Audio Analyzer   | 8903B                | HP            | 4/15/2021                  | 1Y                   |
| EM045-01-01   | EMC32 software (RE/RS)                                     | V10.01.00            | R&S           | N/A                        | N/A                  |
| EM045-01-09   | EMC32 software (328/893)                                   | V10.01.00            | R&S           | N/A                        | N/A                  |

\*\*\*\*\*End of the test report\*\*\*\*\*