



# CTC Laboratories, Inc.

1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China  
Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.org.cn

## TEST REPORT

**Report No.** .....: **CTC20220714E01**

**FCC ID**.....: **2AMN5-78355**

**Applicant**.....: **MARKLYN GROUP INC**

**Address**.....: 753011 2nd Line EHS. Mono. ON. L9W 5W4. Canada

**Manufacturer**.....: MARKLYN GROUP INC

**Address**.....: 753011 2nd Line EHS. Mono. ON. L9W 5W4. Canada

**Product Name**.....: **FloGlo 24" Starter Kit**

**Trade Mark**.....: Alpena

**Model/Type reference**.....: 78355

**Listed Model(s)** .....: 78359

**Standard**.....: **FCC CFR Title 47 Part 15 Subpart C Section 15.249**

**Date of receipt of test sample**...: July 15, 2022

**Date of testing**.....: July 15, 2022~ July 27, 2022

**Date of issue**.....: July 27, 2022

**Result**.....: **PASS**

Compiled by:  
(Printed name+signature)                      Zoe Xie                      *Zoe Xie*

---

Supervised by:  
(Printed name+signature)                      Miller Ma                      *Miller Ma*

---

Approved by:  
(Printed name+signature)                      Totti Zhao                      *Totti Zhao*

**Testing Laboratory Name**.....: **CTC Laboratories, Inc.**

**Address**.....: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park,  
Shenzhen, Guangdong, China

This test report may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CTC. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to CTC within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit. The test report merely correspond to the test sample.



Table of Contents

Page

**1. TEST SUMMARY ..... 3**

1.1. TEST STANDARDS..... 3

1.2. REPORT VERSION..... 3

1.3. TEST DESCRIPTION..... 4

1.4. TEST FACILITY ..... 5

1.5. MEASUREMENT UNCERTAINTY ..... 5

1.6. ENVIRONMENTAL CONDITIONS ..... 6

**2. GENERAL INFORMATION ..... 7**

2.1. CLIENT INFORMATION ..... 7

2.2. GENERAL DESCRIPTION OF EUT ..... 7

2.3. DESCRIPTION OF TEST MODES ..... 8

2.4. ACCESSORY EQUIPMENT INFORMATION ..... 8

2.5. MEASUREMENT INSTRUMENTS LIST ..... 9

**3. TEST ITEM AND RESULTS ..... 11**

3.1. AC POWER LINE CONDUCTED EMISSIONS ..... 11

3.2. 20 DB OCCUPIED BANDWIDTH ..... 13

3.3. RADIATED FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL..... 16

3.4. RADIATED SPURIOUS EMISSIONS AND BAND EDGE EMISSION ..... 18

3.5. ANTENNA REQUIREMENT ..... 24



# 1. TEST SUMMARY

## 1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.249](#): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices.

## 1.2. Report version

| Revised No. | Date of issue | Description |
|-------------|---------------|-------------|
| 01          | July 27, 2022 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |



### 1.3. Test Description

| Test Item                                | Section in CFR 47 | Result | Test Engineer |
|--|-------------------|--------|---------------|
| AC Power Line Conducted Emissions        | 15.207            | N/A    | N/A           |
| 20dB Occupied Bandwidth                  | 15.215/15.249     | PASS   | Alicia Liu    |
| Field strength of the Fundamental signal | 15.249(a)         | PASS   | Alicia Liu    |
| Spurious Emissions                       | 15.209/15.249(a)  | PASS   | Alicia Liu    |
| Band edge Emissions                      | 15.205/15.249(d)  | PASS   | Alicia Liu    |
| Antenna requirement                      | 15.203            | PASS   | Alicia Liu    |

Note: The measurement uncertainty is not included in the test result.

“N/A” This device is only powered battery, no need for part 15.207.



## 1.4. Test Facility

### Address of the report laboratory

#### CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

### Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

## 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



| Test Items                              | Measurement Uncertainty | Notes |
|---|-------------------------|-------|
| Transmitter power conducted             | 0.42 dB                 | (1)   |
| Transmitter power Radiated              | 2.14 dB                 | (1)   |
| Conducted spurious emissions 9kHz~40GHz | 1.60 dB                 | (1)   |
| Radiated spurious emissions 9kHz~40GHz  | 2.20 dB                 | (1)   |
| Conducted Emissions 9kHz~30MHz          | 3.20 dB                 | (1)   |
| Radiated Emissions 30~1000MHz           | 4.70 dB                 | (1)   |
| Radiated Emissions 1~18GHz              | 5.00 dB                 | (1)   |
| Radiated Emissions 18~40GHz             | 5.54 dB                 | (1)   |
| Occupied Bandwidth                      | -----                   | (1)   |

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=1.96$ .

## 1.6. Environmental conditions

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

|                    |             |
|--------------------|-------------|
| Temperature:       | 21°C ~ 27°C |
| Relative Humidity: | 40% ~ 60%   |
| Air Pressure:      | 101kPa      |



## 2. GENERAL INFORMATION

### 2.1. Client Information

|               |  |
|---------------|--|
| Applicant:    | MARKLYN GROUP INC                              |
| Address:      | 753011 2nd Line EHS. Mono. ON. L9W 5W4. Canada |
| Manufacturer: | MARKLYN GROUP INC                              |
| Address:      | 753011 2nd Line EHS. Mono. ON. L9W 5W4. Canada |

### 2.2. General Description of EUT

|                         |                        |
|-------------------------|------------------------|
| Product Name:           | FloGlo 24" Starter Kit |
| Trade Mark:             | /                      |
| Model/Type reference:   | 78355                  |
| Listed Model(s):        | /                      |
| Power supply:           | DC 3V from Battery     |
| Adapter mode:           | /                      |
| Hardware version:       | /                      |
| Software version:       | /                      |
| Serial number:          | 90JJ01kj2              |
| <b>RF Specification</b> |                        |
| Modulation:             | GFSK                   |
| Operation frequency:    | 2425-2455MHz           |
| Channel number:         | 4                      |
| Channel separation:     | 10MHz                  |
| Antenna type:           | Integral Antenna       |
| Antenna gain:           | 1dBi                   |



## 2.3. Description of Test Modes

The EUT has been tested under test mode condition. The Applicant provides software to control the EUT for staying in continuous transmitting and receiving mode for testing. Channels 01/02/04 were selected for testing.

### Operation Frequency List:

| Channel | Frequency (MHz) |
|---------|-----------------|
| 01      | 2425            |
| 02      | 2435            |
| 03      | 2445            |
| 04      | 2455            |

### Test Mode:

|  |
|--|
| For RF test items  |
| The engineering test program was provided and enabled to make EUT continuous transmit. (duty cycle>98%).   |
| For AC power line conducted emissions:   |
| The EUT was set to connect with large package sizes transmission.  |
| For Radiated spurious emissions test item:   |
| The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report. |

## 2.4. Accessory Equipment Information

| Equipment Information     |                  |              |              |
|---------------------------|------------------|--------------|--------------|
| Name                      | Model            | S/N          | Manufacturer |
| /                         | /                | /            | /            |
| Cable Information         |                  |              |              |
| Name                      | Shielded Type    | Ferrite Core | Length       |
| /                         | /                | /            | /            |
| Test Software Information |                  |              |              |
| Name                      | Software version | Power Level  | /            |
| EMI test                  | V1.1             | Index        | /            |





## 2.5. Measurement Instruments List

| Tonscend JS0806-2 Test system |                                     |                 |           |            |                  |
|-------------------------------|-------------------------------------|-----------------|-----------|------------|------------------|
| Item                          | Test Equipment                      | Manufacturer    | Model No. | Serial No. | Calibrated until |
| 1                             | Spectrum Analyzer                   | KEYSIGHT        | N9020A    | 100231     | Dec. 25, 2022    |
| 2                             | Spectrum Analyzer                   | Rohde & Schwarz | FUV40-N   | 101331     | Mar. 15, 2023    |
| 3                             | MXG Vector Signal Generator         | Agilent         | N5182A    | MY47420864 | Dec. 25, 2022    |
| 4                             | Signal Generator                    | Agilent         | E8257D    | MY46521908 | Dec. 25, 2022    |
| 5                             | Power Sensor                        | Agilent         | U2021XA   | MY5365004  | Mar. 15, 2023    |
| 6                             | Power Sensor                        | Agilent         | U2021XA   | MY5365006  | Mar. 15, 2023    |
| 7                             | High and low temperature box        | ESPEC           | MT3035    | N/A        | Mar. 24, 2023    |
| 8                             | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500    | 102414     | Dec. 25, 2022    |
| 9                             | 300328 v2.2.2 test system           | TONSCEND        | v2.6      | /          | /                |

| Radiated emission(3m chamber 2) |                          |              |            |            |                  |
|---------------------------------|--------------------------|--------------|------------|------------|------------------|
| Item                            | Test Equipment           | Manufacturer | Model No.  | Serial No. | Calibrated Until |
| 1                               | Trilog-Broadband Antenna | Schwarzbeck  | VULB 9168  | 9168-1013  | Jan. 12, 2023    |
| 2                               | Horn Antenna             | Schwarzbeck  | BBHA 9120D | 9120D-647  | Dec. 24, 2022    |
| 3                               | Spectrum Analyzer        | R&S          | FSU26      | 100105     | Dec. 25, 2022    |
| 4                               | Spectrum Analyzer        | R&S          | FSV40-N    | 101331     | Mar. 15, 2023    |
| 5                               | Pre-Amplifier            | SONOMA       | 310        | 186194     | Dec. 25, 2022    |
| 6                               | Low Noise Pre-Amplifier  | EMCI         | EMC051835  | 980075     | Dec. 25, 2022    |
| 7                               | Test Receiver            | R&S          | ESC17      | 100967     | Dec. 25, 2022    |

| Radiated emission(3m chamber 3) |                              |              |            |            |                  |
|---------------------------------|------------------------------|--------------|------------|------------|------------------|
| Item                            | Test Equipment               | Manufacturer | Model No.  | Serial No. | Calibrated Until |
| 1                               | Trilog-Broadband Antenna     | Schwarzbeck  | VULB 9168  | 9168-759   | Nov. 09, 2023    |
| 2                               | Horn Antenna                 | Schwarzbeck  | BBHA 9120D | 9120D-647  | Dec. 24, 2022    |
| 3                               | Test Receiver                | Keysight     | N9038A     | MY56400071 | Dec. 25, 2022    |
| 4                               | Broadband Premplifier        | SCHWARZBECK  | BBV9743B   | 259        | Dec. 25, 2022    |
| 5                               | Mirowave Broadband Amplifier | SCHWARZBECK  | BBV9718C   | 111        | Dec. 25, 2022    |
| 6                               | Loop Antenna                 | ZHINAN       | ZN30900A   | /          | Dec. 25, 2022    |

| Conducted Emission |                   |              |           |            |                  |
|--------------------|-------------------|--------------|-----------|------------|------------------|
| Item               | Test Equipment    | Manufacturer | Model No. | Serial No. | Calibrated until |
| 1                  | LISN              | R&S          | ENV216    | 101112     | Dec. 25, 2022    |
| 2                  | LISN              | R&S          | ENV216    | 101113     | Dec. 25, 2022    |
| 3                  | EMI Test Receiver | R&S          | ESCS30    | 100353     | Dec. 25, 2022    |

CTC Laboratories, Inc.

2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China  
 Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn



For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : <http://yz.cnca.cn>



| Test software |  |              |           |         |
|---------------|--|--------------|-----------|---------|
| Item          | Test Description                         | Manufacturer | Model No. | Version |
| 1             | Radiated emission/<br>Conducted Emission | Farad        | EZ-EMC    | RA-03A1 |

Note:1. The Cal. Interval was one year.

2. The cable loss has calculated in test result which connection between each test instruments.

### 3. TEST ITEM AND RESULTS

#### 3.1. AC Power Line Conducted Emissions

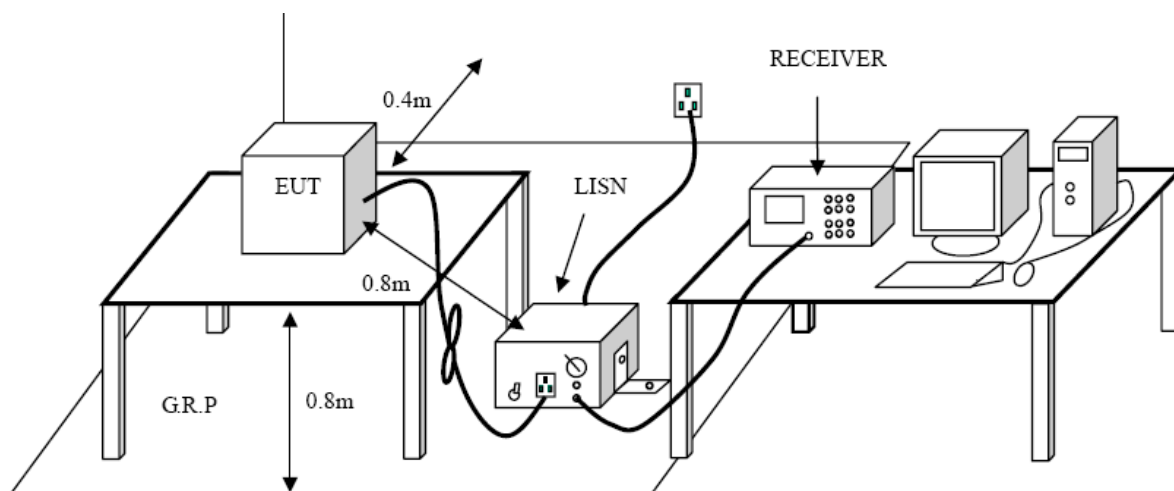
**Limit**

| Frequency     | Maximum RF Line Voltage (dB $\mu$ V) |               |
|---------------|--------------------------------------|---------------|
|               | Quasi-peak Level                     | Average Level |
| 150kHz~500kHz | 66 ~ 56 *                            | 56 ~ 46 *     |
| 500kHz~5MHz   | 56                                   | 46            |
| 5MHz~30MHz    | 60                                   | 50            |

Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

**Test Configuration**



**Test Procedure**

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

**Test Mode**

Please refer to the clause 2.3





**Test Results**

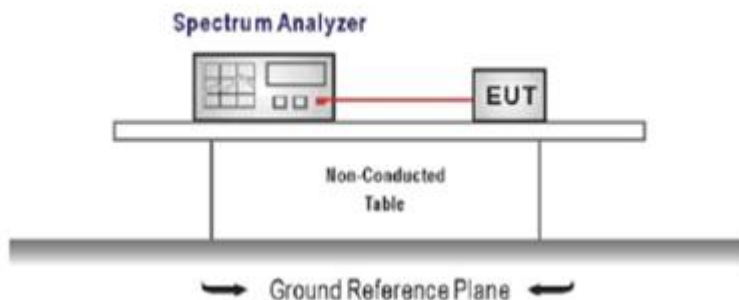
N/A

## 3.2. 20 dB Occupied Bandwidth

### Limit

Operation frequency range 2400MHz~2483.5MHz.

### Test Configuration



### Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a test channel  
RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  RBW  
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

### Test Mode:

Please refer to the clause 2.3

### Test Results

| Channel | 20dB Bandwidth (KHz) | Result |
|---------|----------------------|--------|
| Low     | 1091                 | Pass   |
| Middle  | 1089                 | Pass   |
| High    | 1098                 | Pass   |



|                    |   |
|--------------------|---|
| <p>GFSK-Low</p>    | <p>Agilent R T</p> <p>Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 10 dBm Atten 20 dB</p> <p>#Peak 10 Log dB/</p> <p>Center 2.425 GHz Span 3 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)</p> <p><b>Occupied Bandwidth 932.5876 kHz</b></p> <p><b>Occ BW % Pwr 99.00 %</b></p> <p><b>x dB -20.00 dB</b></p> <p><b>Transmit Freq Error 34.666 kHz</b></p> <p><b>x dB Bandwidth 1.091 MHz</b></p> <p>Trace/View</p> <p>Trace 1 2 3</p> <p>Clear Write</p> <p>Max Hold</p> <p>Min Hold</p> <p>View</p> <p>Blank</p> <p>More 1 of 2</p> |
| <p>GFSK-Middle</p> | <p>Agilent R T</p> <p>Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 10 dBm Atten 20 dB</p> <p>#Peak 10 Log dB/</p> <p>Center 2.435 GHz Span 3 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms (401 pts)</p> <p><b>Occupied Bandwidth 930.6266 kHz</b></p> <p><b>Occ BW % Pwr 99.00 %</b></p> <p><b>x dB -20.00 dB</b></p> <p><b>Transmit Freq Error 33.833 kHz</b></p> <p><b>x dB Bandwidth 1.089 MHz</b></p> <p>Trace/View</p> <p>Trace 1 2 3</p> <p>Clear Write</p> <p>Max Hold</p> <p>Min Hold</p> <p>View</p> <p>Blank</p> <p>More 1 of 2</p> |



GFSK-High

|                            |              |                      |           |
|----------------------------|--------------|----------------------|-----------|
| Agilent                    |              | R                    | T         |
| Occupied Bandwidth         |              | Trig Free            |           |
| Ref 10 dBm                 |              | Atten 20 dB          |           |
| #Peak                      |              |                      |           |
| Log                        |              |                      |           |
| 10                         |              |                      |           |
| dB/                        |              |                      |           |
| Center 2.455 GHz           |              | Span 3 MHz           |           |
| #Res BW 100 kHz            | #VBW 300 kHz | Sweep 5 ms (401 pts) |           |
| <b>Occupied Bandwidth</b>  |              | <b>Occ BW % Pwr</b>  | 99.00 %   |
| 936.5732 kHz               |              | <b>x dB</b>          | -20.00 dB |
| <b>Transmit Freq Error</b> | 35.703 kHz   |                      |           |
| <b>x dB Bandwidth</b>      | 1.098 MHz    |                      |           |

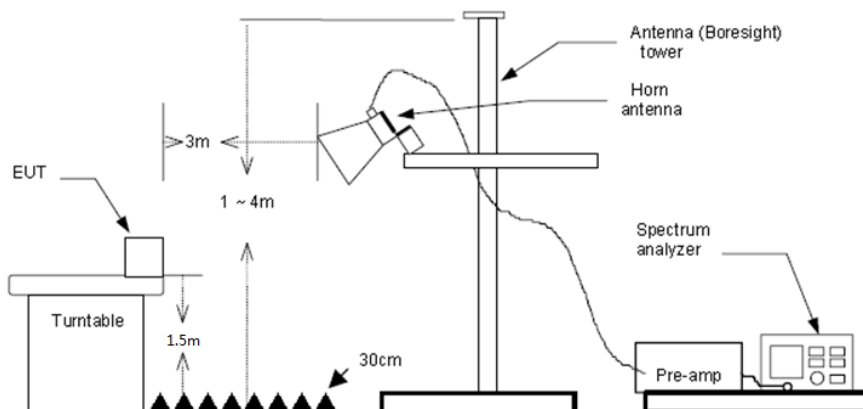
### 3.3. Radiated field strength of the fundamental signal

#### Limit

| Fundamental frequency | Field strength of fundamental (millivolts/meter/ AVG) | Field strength of harmonics (microvolts/meter/ AVG) |
|-----------------------|---|---|
| 902-928 MHz           | 50 (94dBuV/m @3m)                                     | 500 (54dBuV/m @3m)                                  |
| 2400-2483.5 MHz       | 50 (94dBuV/m @3m)                                     | 500 (54dBuV/m @3m)                                  |
| 5725-5875 MHz         | 50 (94dBuV/m @3m)                                     | 500 (54dBuV/m @3m)                                  |
| 24.0-24.25 GHz        | 250 (108dBuV/m @3m)                                   | 2500 (68dBuV/m @3m)                                 |

Frequencies above 1000 MHz, the field strength limits are based on average limits

#### Test Configuration



#### Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:  
RBW=1MHz, VBW=3MHz Peak detector for Peak value.

#### Test Mode

Please refer to the clause 2.3



**Test Results**

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Measure (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Polar H/V | Detector |
|-----------------|----------------|---------------|------------------|----------------|-------------|-----------|----------|
| 2425            | 101.23         | -11.25        | 89.98            | 114            | -24.02      | H         | PK       |
| 2425            | 100.12         | -11.25        | 88.87            | 94             | -5.13       | H         | AV       |
| 2435            | 101.43         | -9.41         | 92.02            | 114            | -21.98      | H         | PK       |
| 2435            | 100.12         | -9.41         | 90.71            | 94             | -3.29       | H         | AV       |
| 2455            | 101.22         | -11.07        | 90.15            | 114            | -23.85      | H         | PK       |
| 2455            | 100.45         | -11.07        | 89.38            | 94             | -4.62       | H         | AV       |
| 2425            | 102.58         | -11.25        | 91.33            | 114            | -22.67      | V         | PK       |
| 2425            | 102.06         | -11.25        | 90.81            | 94             | -3.19       | V         | AV       |
| 2435            | 102.02         | -9.41         | 92.61            | 114            | -21.39      | V         | PK       |
| 2435            | 101.04         | -9.41         | 91.63            | 94             | -2.37       | V         | AV       |
| 2455            | 102.37         | -11.07        | 91.3             | 114            | -22.7       | V         | PK       |
| 2455            | 101.72         | -11.07        | 90.65            | 94             | -3.35       | V         | AV       |

## Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Measure Level= Read Level+ Correct Factor
3. Margin = Measure Level-Limit

### 3.4. Radiated Spurious Emissions and Band edge Emission

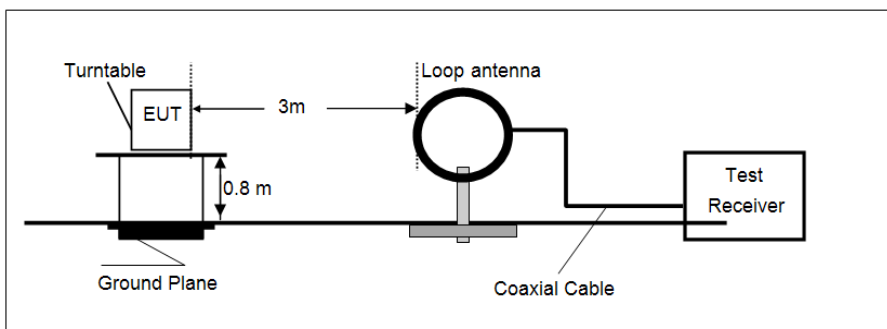
**Limit**

**FCC CFR Title 47 Part 15 Subpart C Section 15.209**

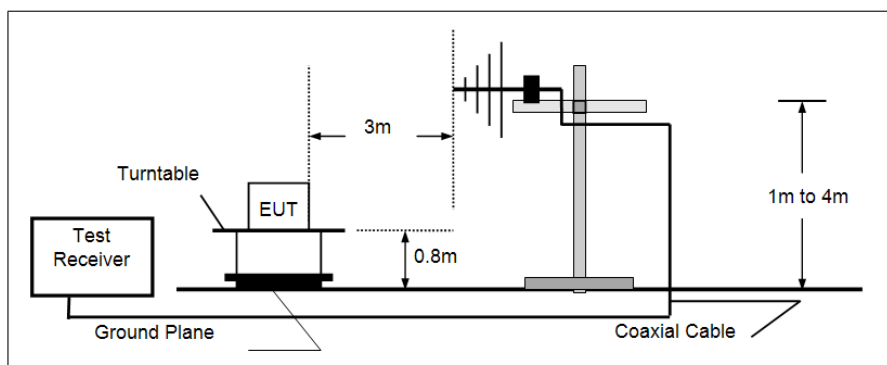
| Frequency     | Limit (dBuV/m @3m) | Value      |
|---------------|--------------------|------------|
| 30MHz~88MHz   | 40.00              | Quasi-peak |
| 88MHz~216MHz  | 43.50              | Quasi-peak |
| 216MHz~960MHz | 46.00              | Quasi-peak |
| 960MHz~1GHz   | 54.00              | Quasi-peak |
| Above 1GHz    | 54.00              | Average    |
|               | 74.00              | Peak       |

**Test Configuration**

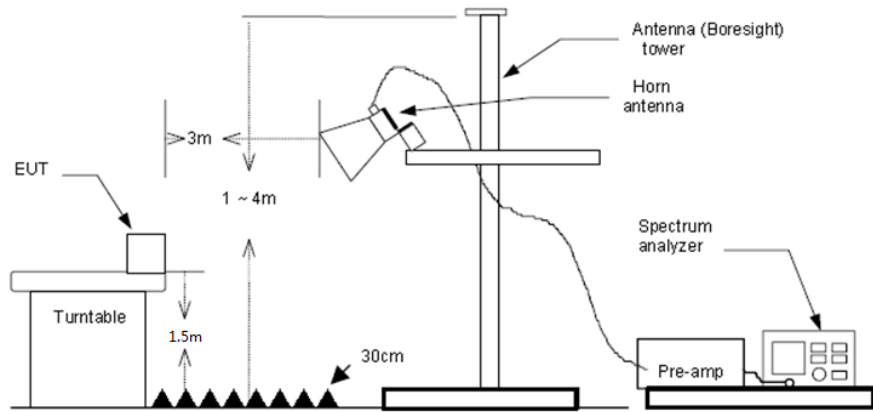
- 9 kHz ~ 30 MHz



- 30 MHz ~ 1 GHz



- Above 1 GHz



## Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings  
Span shall wide enough to fully capture the emission being measured;  
(1)Below 1 GHz:  
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;  
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.  
(2)From 1 GHz to 10th harmonic:  
RBW=1MHz, VBW=3MHz Peak detector for Peak value.  
RBW=1MHz, VBW=3MHz RMS detector for Average value.

## Test Mode:

Please refer to the clause 2.3

## Test Results

### Radiated Spurious Emissions

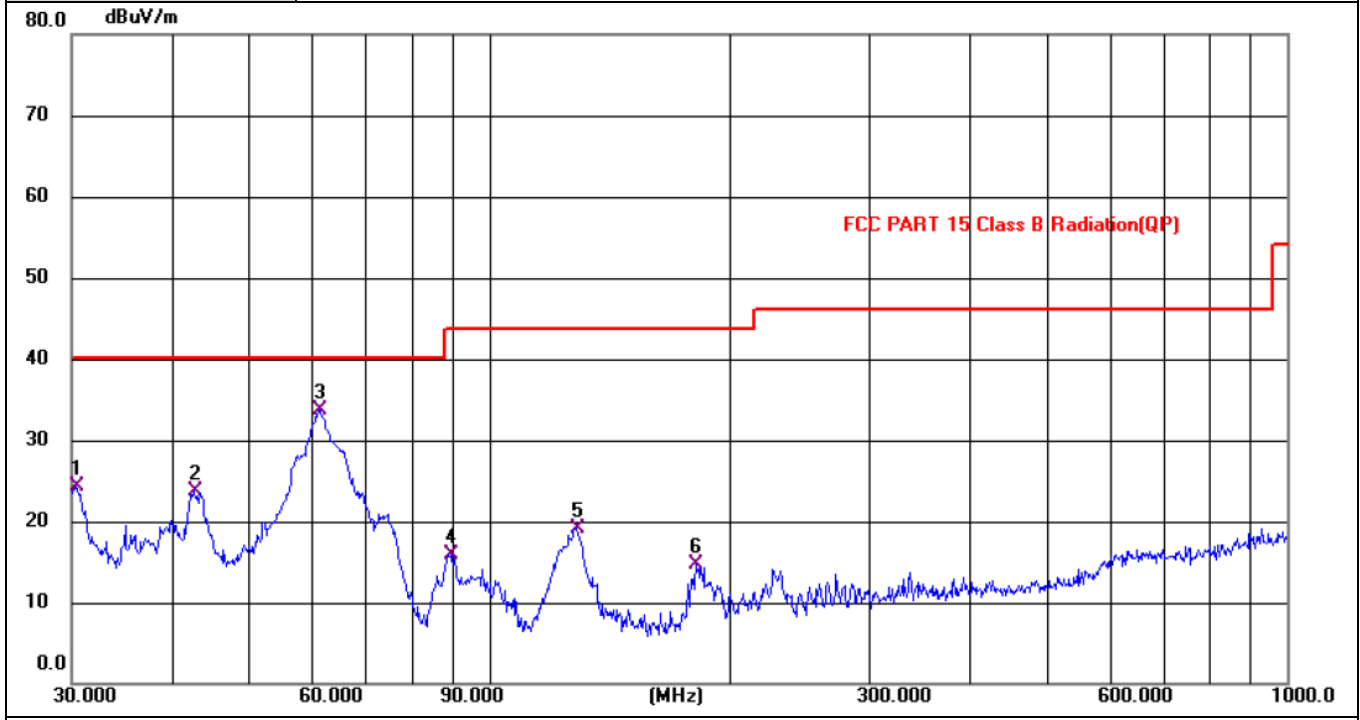
#### ■ 9 kHz ~ 30 MHz

The EUT was pre-scanned the frequency band (9 kHz ~ 30 MHz), found the radiated level lower than the limit, so don't show on the report.



■ 30 MHz ~ 1 GHz

|            |                     |
|------------|---------------------|
| Ant. Pol.  | Horizontal          |
| Test Mode: | 2425MHz(Worst case) |



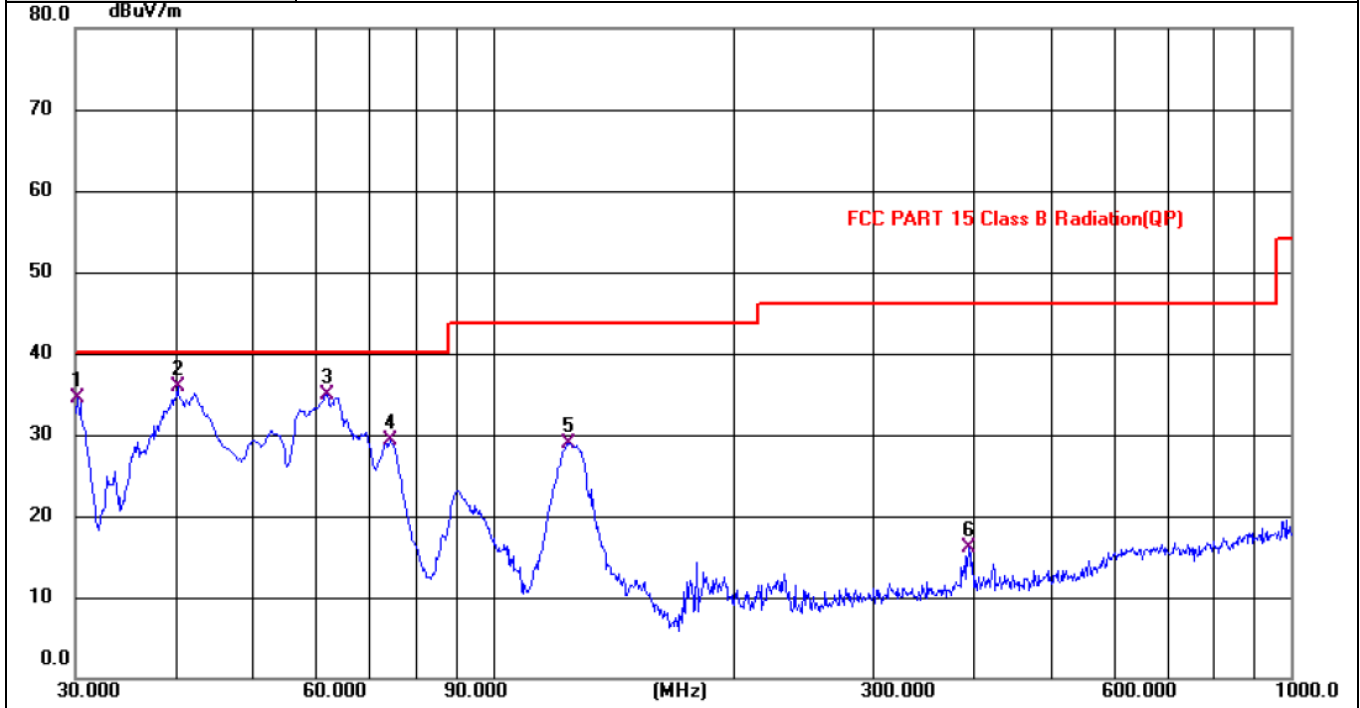
| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1   |     | 30.3173      | 39.62                    | -15.38                  | 24.24                      | 40.00           | 15.76      | QP       |
| 2   |     | 42.7496      | 40.91                    | -17.14                  | 23.77                      | 40.00           | 16.23      | QP       |
| 3   | *   | 61.1316      | 47.56                    | -13.90                  | 33.66                      | 40.00           | 6.34       | QP       |
| 4   |     | 89.5900      | 39.66                    | -23.72                  | 15.94                      | 43.50           | 27.56      | QP       |
| 5   |     | 128.5630     | 44.46                    | -25.27                  | 19.19                      | 43.50           | 24.31      | QP       |
| 6   |     | 181.9202     | 38.06                    | -23.37                  | 14.69                      | 43.50           | 28.81      | QP       |

Remarks:

- 1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 2. Measure Level= Read Level+ Correct Factor
- 3. Margin = Measure Level-Limit



|            |                     |
|------------|---------------------|
| Ant. Pol.  | Vertical            |
| Test Mode: | 2425MHz(Worst case) |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1   |     | 30.2111      | 49.82                    | -15.40                  | 34.42                      | 40.00           | 5.58       | QP       |
| 2   | *   | 40.2757      | 53.46                    | -17.50                  | 35.96                      | 40.00           | 4.04       | QP       |
| 3   |     | 61.7781      | 49.12                    | -14.16                  | 34.96                      | 40.00           | 5.04       | QP       |
| 4   |     | 74.3955      | 53.88                    | -24.55                  | 29.33                      | 40.00           | 10.67      | QP       |
| 5   |     | 124.1330     | 53.49                    | -24.50                  | 28.99                      | 43.50           | 14.51      | QP       |
| 6   |     | 394.8545     | 34.11                    | -18.09                  | 16.02                      | 46.00           | 29.98      | QP       |

Remarks:  
 1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor  
 2. Measure Level= Read Level+ Correct Factor  
 3. Margin = Measure Level-Limit





■ Above 1 GHz

| Frequency<br>(MHz)     | Reading<br>(dBuV) | Correct<br>dB/m | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Polar<br>H/V | Detector |
|------------------------|-------------------|-----------------|--------------------|-------------------|----------------|--------------|----------|
| Low Channel-2425MHz    |                   |                 |                    |                   |                |              |          |
| 4810.000               | 58.4              | -4.82           | 53.58              | 74                | -20.42         | H            | PK       |
| 4810.000               | 43.13             | -4.82           | 38.31              | 54                | -15.69         | H            | AV       |
| 7215.000               | 54.54             | 1.61            | 56.15              | 74                | -17.85         | H            | PK       |
| 7215.000               | 40.09             | 1.61            | 41.7               | 54                | -12.3          | H            | AV       |
| 4810.000               | 61.23             | -4.82           | 56.41              | 74                | -17.59         | V            | PK       |
| 4810.000               | 41.13             | -4.82           | 36.31              | 54                | -17.69         | V            | AV       |
| 7215.000               | 52.18             | 1.61            | 53.79              | 74                | -20.21         | V            | PK       |
| 7215.000               | 40.33             | 1.61            | 41.94              | 54                | -12.06         | V            | AV       |
| Middle Channel-2435MHz |                   |                 |                    |                   |                |              |          |
| 4880.000               | 58.48             | -4.87           | 53.61              | 74                | -20.39         | H            | PK       |
| 4880.000               | 41.6              | -4.87           | 36.73              | 54                | -17.27         | H            | AV       |
| 7320.000               | 52.65             | 1.51            | 54.16              | 74                | -19.84         | H            | PK       |
| 7320.000               | 38.62             | 1.51            | 40.13              | 54                | -13.87         | H            | AV       |
| 4880.000               | 58.57             | -4.87           | 53.7               | 74                | -20.3          | V            | PK       |
| 4880.000               | 41.77             | -4.87           | 36.9               | 54                | -17.1          | V            | AV       |
| 7320.000               | 55.76             | 1.51            | 57.27              | 74                | -16.73         | V            | PK       |
| 7320.000               | 38.33             | 1.51            | 39.84              | 54                | -14.16         | V            | AV       |
| High Channel-2455MHz   |                   |                 |                    |                   |                |              |          |
| 4950.000               | 58.99             | -4.32           | 54.67              | 74                | -19.33         | H            | PK       |
| 4950.000               | 41.89             | -4.32           | 37.57              | 54                | -16.43         | H            | AV       |
| 7435.000               | 53.48             | 1.48            | 54.96              | 74                | -19.04         | H            | PK       |
| 7435.000               | 37.96             | 1.48            | 39.44              | 54                | -14.56         | H            | AV       |
| 4950.000               | 57.36             | -4.32           | 53.04              | 74                | -20.96         | V            | PK       |
| 4950.000               | 41.93             | -4.32           | 37.61              | 54                | -16.39         | V            | AV       |
| 7435.000               | 52.66             | 1.48            | 54.14              | 74                | -19.86         | V            | PK       |
| 7435.000               | 38.76             | 1.48            | 40.24              | 54                | -13.76         | V            | AV       |

## Remarks:

1. Correct (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Measure Level= Read Level+ Correct Factor
3. Margin = Measure Level-Limit
4. Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3h Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

**Bandedge Emission**

| Frequenc<br>(MHz) | Reading<br>(dBuV) | Correct<br>dB/m | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Polar<br>H/V | Detector |
|-------------------|-------------------|-----------------|--------------------|-------------------|----------------|--------------|----------|
| Low Channel       |                   |                 |                    |                   |                |              |          |
| 2310.000          | 58.52             | -12.9           | 45.62              | 74                | -28.38         | H            | PK       |
| 2310.000          | 43.25             | -12.9           | 30.35              | 54                | -23.65         | H            | AV       |
| 2390.000          | 54.66             | -12.34          | 42.32              | 74                | -31.68         | H            | PK       |
| 2390.000          | 40.21             | -12.34          | 27.87              | 54                | -26.13         | H            | AV       |
| 2310.000          | 61.35             | -12.9           | 48.45              | 74                | -25.55         | V            | PK       |
| 2310.000          | 41.25             | -12.9           | 28.35              | 54                | -25.65         | V            | AV       |
| 2390.000          | 52.3              | -12.34          | 39.96              | 74                | -34.04         | V            | PK       |
| 2390.000          | 40.45             | -12.34          | 28.11              | 54                | -25.89         | V            | AV       |
| High Channel      |                   |                 |                    |                   |                |              |          |
| 2483.500          | 59.11             | -11.98          | 47.13              | 74                | -26.87         | H            | PK       |
| 2483.500          | 42.01             | -11.98          | 30.03              | 54                | -23.97         | H            | AV       |
| 2500.000          | 53.6              | -11.48          | 42.12              | 74                | -31.88         | H            | PK       |
| 2500.000          | 38.08             | -11.48          | 26.6               | 54                | -27.4          | H            | AV       |
| 2483.500          | 57.48             | -11.98          | 45.5               | 74                | -28.5          | V            | PK       |
| 2483.500          | 42.05             | -11.98          | 30.07              | 54                | -23.93         | V            | AV       |
| 2500.000          | 52.78             | -11.48          | 41.3               | 74                | -32.7          | V            | PK       |
| 2500.000          | 38.88             | -11.48          | 27.4               | 54                | -26.6          | V            | AV       |

## Remarks:

1. Correct (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Measure Level= Read Level+ Correct Factor
3. Margin = Measure Level-Limit



### 3.5. Antenna requirement

#### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

#### Test Result

This product has a PCB antenna, fulfill the requirement of this section.

\*\*\*\*\*THE END\*\*\*\*\*