




FCC PART 15.249 TEST REPORT

For

LEEDARSON LIGHTING CO., LTD.

Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China

FCC ID: 2AB2Q-11A19060WCCTM

| | |
|--|--|
| Report Type: Original Report | Product Type: LED Lamp |
| Report Number: RXM210923050-00B | |
| Report Date: 2021-11-04 | |
| Reviewed By: Candy Li |  |
| Reviewed By: RF Engineer | |
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

| | |
|-----------------------|---|
| Product | LED Lamp |
| Tested Model | 11A19060WCCTM01 |
| Multiple Model | 11A19060WCCTMxx, 11aSy-A800ST-Q1TZM-xx (Where "y" may be "A"-"Z" for different enclosure pattern design; "xx or XX" may be "00" to "99", which designates for different beam angle, color of eyelet contact, package of style, color of enclosure.) |
| Model Differences | Refer to the DoS letter |
| Frequency Range | 5726~5874MHz |
| Modulation Technique | CW |
| Antenna Specification | 3.0dBi |
| Voltage Range | AC 120V/60Hz |
| Date of Test | 2021-10-08 to 2021-11-04 |
| Sample serial number | RXM210923050-S1(Assigned by ATC, Shenzhen) |
| Received date | 2021-09-23 |
| Sample/EUT Status | Good condition |

Objective

This test report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

| Parameter | | Uncertainty |
|------------------------|----------------|-------------|
| Emissions, Radiated | 30MHz - 1GHz | 4.28dB |
| | 1GHz- 18GHz | 4.98dB |
| | 18GHz- 26.5GHz | 5.06dB |
| | 26.5GHz- 40GHz | 4.72dB |
| Temperature | | 1°C |
| Humidity | | 6% |
| Supply voltages | | 0.4% |

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A-2.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing by manufacturer.

Swept frequency range: 5726~5874MHz

Low channel: 5726MHz; Middle channel: 5800MHz; High channel: 5874MHz

EUT Exercise Software

EUT was test in test mode configured for testing by manufacturer and power level is default*.

Equipment Modifications

No modifications were made to the unit tested.

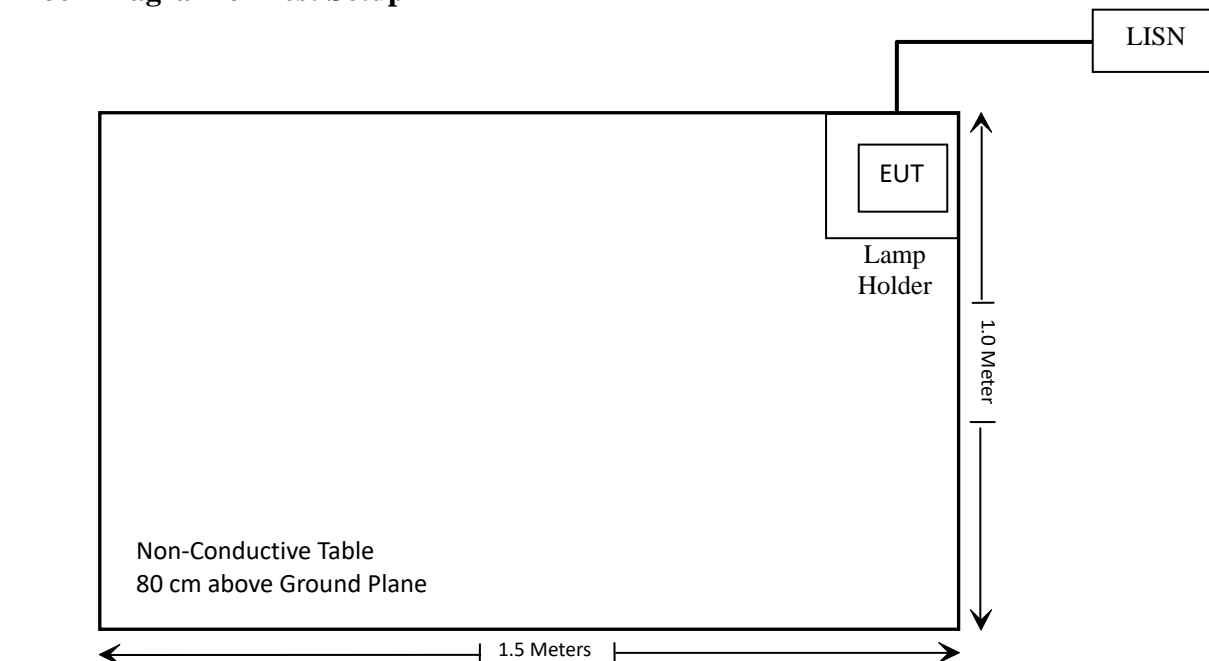
Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|---------|---------------|
| Unknown | Lamp holder | Unknown | Unknown |

Support Cable Descriptions

| Cable Description | Length (m) | From/Port | To |
|------------------------------------|------------|-------------|------|
| Un-Shielded Un-Detachable AC Cable | 1.2 | Lamp holder | LISN |

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|-----------------------------|--|---------------|
| §15.203 | Antenna Requirement | Compliant |
| §15.207(a) | Conduction Emissions | Compliant |
| 15.205, §15.209, §15.249(d) | Radiated Emissions& Outside of Band Emission | Compliant |
| §15.215 (c) | 20 dB Bandwidth | Compliant |

Test Equipment List

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--|------------------------------|-------------------------|---------------|------------------|----------------------|
| AC Line Conducted Emission Test | | | | | |
| Rohde& Schwarz | Test Receiver | ESPI3 | 100396 | 2020/12/24 | 2021/12/23 |
| R & S | L.I.S.N. | ENV216 | 101314 | 2020/12/25 | 2021/12/24 |
| Anritsu Corp | 50ΩCoaxial Switch | MP59B | 6200506474 | 2020/12/25 | 2021/12/24 |
| Unknown | RF Coaxial Cable | N-2m | No.2 | 2020/12/25 | 2021/12/24 |
| Rohde & Schwarz | Test Software | ES-K1 V1.71 | Unknown | NCR | NCR |
| Radiated Emission Test | | | | | |
| Rohde& Schwarz | Test Receiver | ESR | 101817 | 2020/12/24 | 2021/12/23 |
| Rohde&Schwarz | Spectrum Analyzer | FSV40 | 101495 | 2020/12/24 | 2021/12/23 |
| SONOMA INSTRUMENT | Amplifier | 310 N | 186131 | 2020/12/25 | 2021/12/24 |
| A.H. Systems, inc. | Preamplifier | PAM-0118P | 531 | 2021/07/08 | 2022/07/07 |
| Quinstar | Amplifier | QLW-1840553 6-J0 | 15964001002 | 2020/11/28 | 2021/11/27 |
| Anritsu Corp | 50 Coaxial Switch | MP59B | 6100237248 | 2020/12/25 | 2021/12/24 |
| Schwarzbeck | Bilog Antenna | VULB9163 | 9163-323 | 2020/01/05 | 2023/01/04 |
| Schwarzbeck | Horn Antenna | BBHA9120D | 9120D-1067 | 2020/01/05 | 2023/01/04 |
| Schwarzbeck | HORN ANTENNA | BBHA9170 | 9170-359 | 2020/01/05 | 2023/01/04 |
| OREGON SCIENTIFIC | Temperature & Humidity Meter | JB913R | GZ-WS004 | 2020/01/02 | 2023/01/01 |
| FARAD | Test Software | EZ_EMV V 1. 1.4.2 | V1.1.4.2 | NCR | NCR |
| Unknown | RF Coaxial Cable | N-5m | No.3 | 2020/12/25 | 2021/12/24 |
| Unknown | RF Coaxial Cable | N-5m | No.4 | 2020/12/25 | 2021/12/24 |
| Unknown | RF Coaxial Cable | N-1m | No.5 | 2020/12/25 | 2021/12/24 |
| Unknown | RF Coaxial Cable | N-1m | No.6 | 2020/12/25 | 2021/12/24 |
| CD | Band Reject Filter | BRM-5.725/5. 875G-45 | 065 | 2020/12/25 | 2021/12/24 |
| CD | High Pass Filter | HPM-8.0/18G- 60 | 020 | 2020/12/25 | 2021/12/24 |

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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 shall be considered sufficient to comply with the provisions of this Section. 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.

Antenna Connector Construction

The EUT has one internal antenna which was permanently attached and the antenna gain is 3dBi, fulfill the requirement of this section. Please refer to the EUT photos.

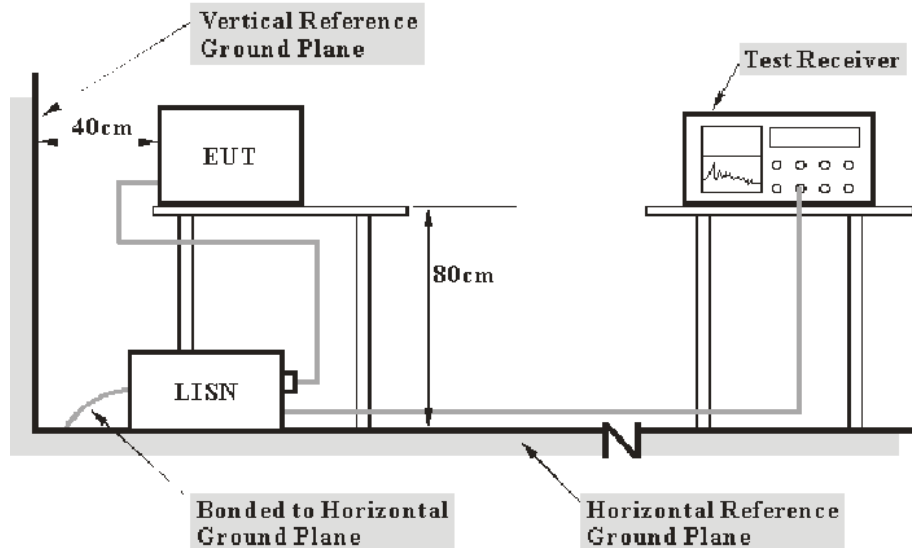
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz |

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Transd Factor & Margin Calculation

The Transd factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Transd Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\begin{aligned} \text{Margin} &= \text{Limit} - \text{level} \\ \text{Level} &= \text{reading level} + \text{Transd Factor} \end{aligned}$$

Test Data

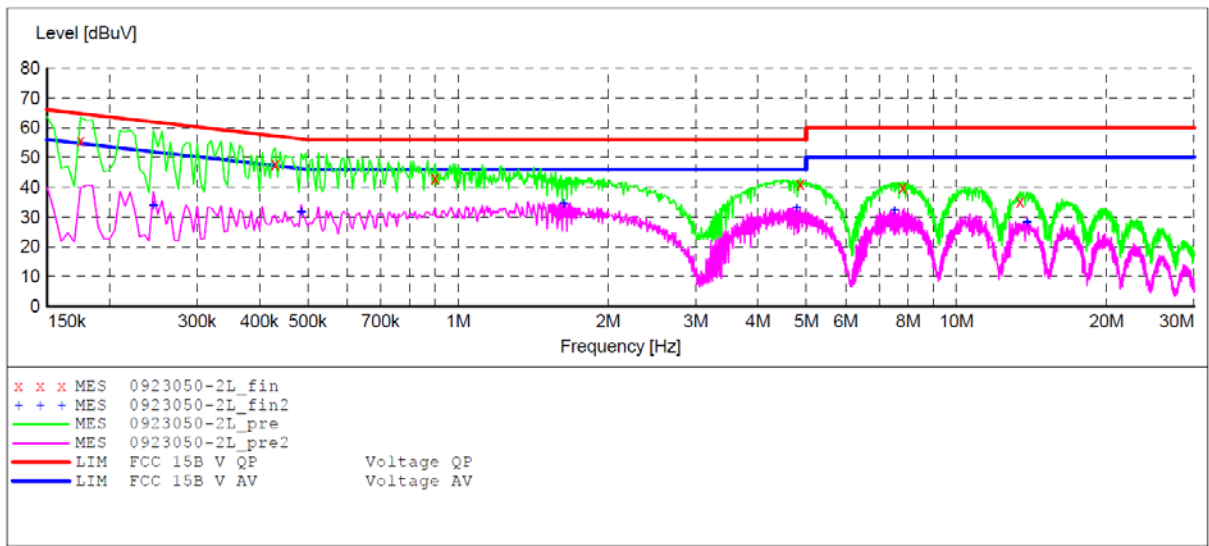
Environmental Conditions

| | |
|---------------------------|-----------|
| Temperature: | 23 °C |
| Relative Humidity: | 48 % |
| ATM Pressure: | 101.0 kPa |

The testing was performed by Anny on 2021-10-13.

EUT Operation Mode: Transmitting (worst case is Low channel)

AC 120V/60 Hz, Line



MEASUREMENT RESULT: "0923050-2L_fin"

2021-10-13 11:00

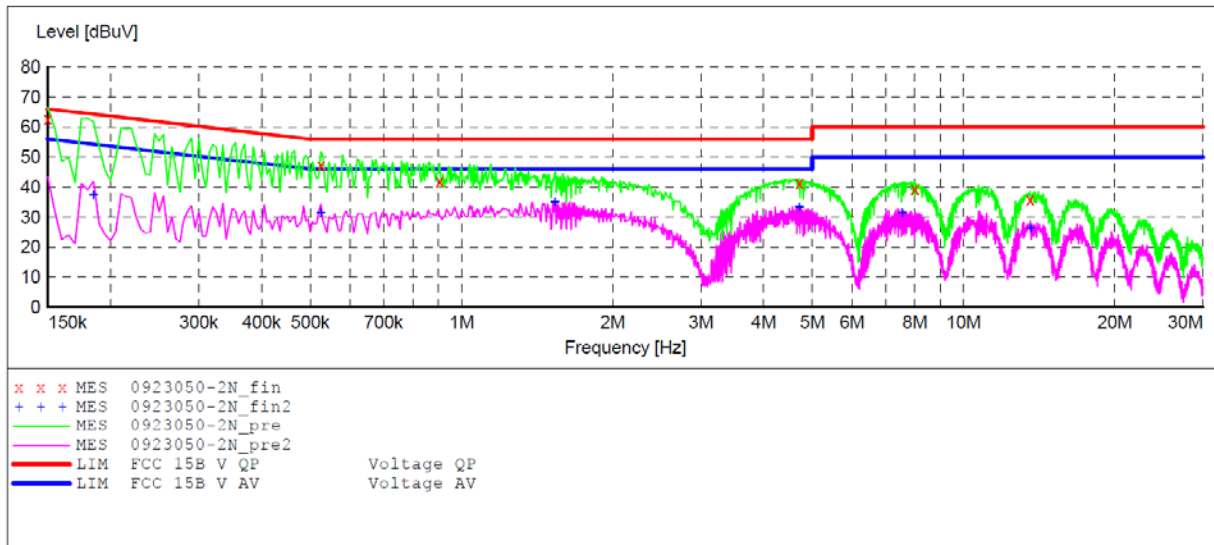
| Frequency MHz | Level dBuV | Transd dB | Limit dBuV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.175000 | 55.70 | 10.8 | 65 | 9.3 | QP | L1 | GND |
| 0.430000 | 47.70 | 11.0 | 57 | 9.3 | QP | L1 | GND |
| 0.900000 | 43.00 | 11.1 | 56 | 13.0 | QP | L1 | GND |
| 4.860000 | 41.00 | 11.4 | 56 | 15.0 | QP | L1 | GND |
| 7.810000 | 39.90 | 11.5 | 60 | 20.1 | QP | L1 | GND |
| 13.425000 | 35.30 | 11.6 | 60 | 24.7 | QP | L1 | GND |

MEASUREMENT RESULT: "0923050-2L_fin2"

2021-10-13 11:00

| Frequency MHz | Level dBuV | Transd dB | Limit dBuV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.245000 | 33.70 | 10.9 | 52 | 18.3 | AV | L1 | GND |
| 0.485000 | 31.60 | 11.0 | 46 | 14.4 | AV | L1 | GND |
| 1.630000 | 34.50 | 11.2 | 46 | 11.5 | AV | L1 | GND |
| 4.780000 | 32.90 | 11.4 | 46 | 13.1 | AV | L1 | GND |
| 7.510000 | 32.20 | 11.5 | 50 | 17.8 | AV | L1 | GND |
| 13.875000 | 28.20 | 11.6 | 50 | 21.8 | AV | L1 | GND |

AC 120V/60 Hz, Neutral



MEASUREMENT RESULT: "0923050-2N_fin"

2021-10-13 11:33

| Frequency MHz | Level dBuV | Transd dB | Limit dBuV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.150000 | 62.60 | 10.8 | 66 | 3.4 | QP | N | GND |
| 0.525000 | 47.30 | 11.0 | 56 | 8.7 | QP | N | GND |
| 0.905000 | 42.00 | 11.1 | 56 | 14.0 | QP | N | GND |
| 4.710000 | 41.40 | 11.4 | 56 | 14.6 | QP | N | GND |
| 8.000000 | 39.40 | 11.5 | 60 | 20.6 | QP | N | GND |
| 13.575000 | 35.70 | 11.6 | 60 | 24.3 | QP | N | GND |

MEASUREMENT RESULT: "0923050-2N_fin2"

2021-10-13 11:03

| Frequency MHz | Level dBuV | Transd dB | Limit dBuV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.185000 | 37.10 | 10.8 | 54 | 16.9 | AV | N | GND |
| 0.525000 | 31.40 | 11.0 | 46 | 14.6 | AV | N | GND |
| 1.535000 | 34.90 | 11.2 | 46 | 11.1 | AV | N | GND |
| 4.710000 | 33.40 | 11.4 | 46 | 12.6 | AV | N | GND |
| 7.550000 | 31.40 | 11.5 | 50 | 18.6 | AV | N | GND |
| 13.600000 | 26.30 | 11.6 | 50 | 23.7 | AV | N | GND |

FCC§15.205, §15.209 & §15.249(d) - RADIATED EMISSIONS

Applicable Standard

As per FCC§15.249 (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 | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|-----------------------|--|--|
| 902–928 MHz | 50 | 500 |
| 2400–2483.5 MHz | 50 | 500 |
| 5725–5875 MHz | 50 | 500 |
| 24.0–24.25 GHz | 250 | 2500 |

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

As per FCC§15.249 (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 Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000MHz:

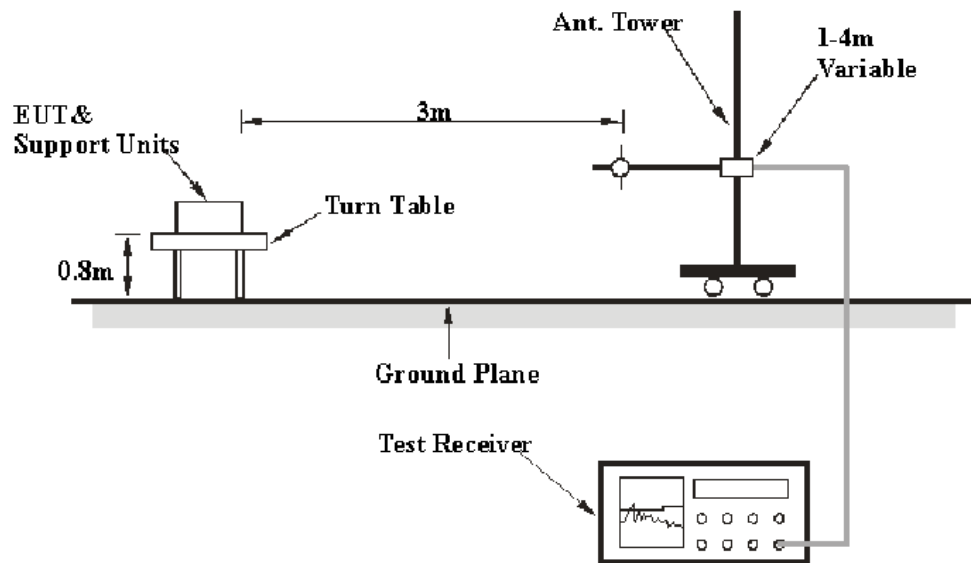
$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000MHz:

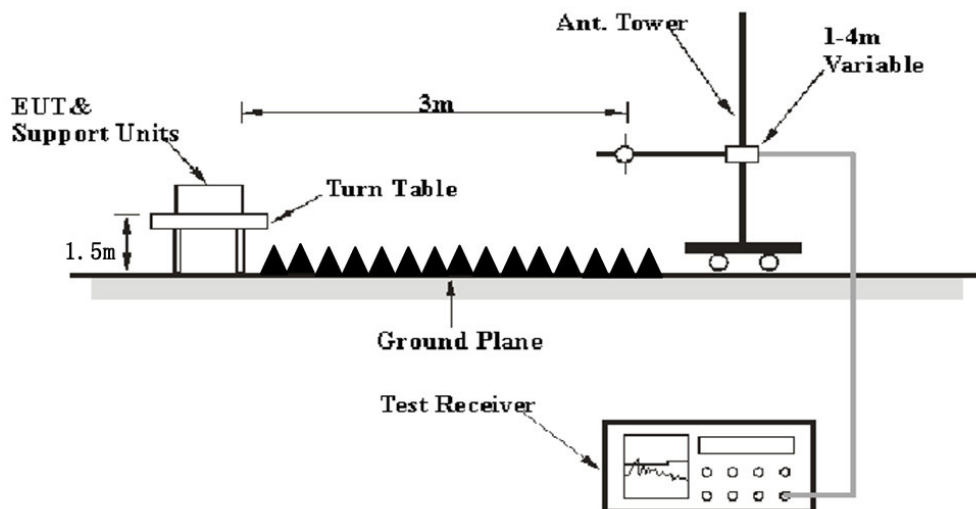
$$\begin{aligned} \text{Peak: RBW} &= 1\text{MHz} / \text{VBW} = 1\text{MHz} / \text{Sweep} = \text{Auto} \\ \text{Average: RBW} &= 1\text{MHz} / \text{VBW} = 10\text{Hz} / \text{Sweep} = \text{Auto} \end{aligned}$$

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane for below 1GHz or 1.5 meter for above 1GHz, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

Test Data

Environmental Conditions

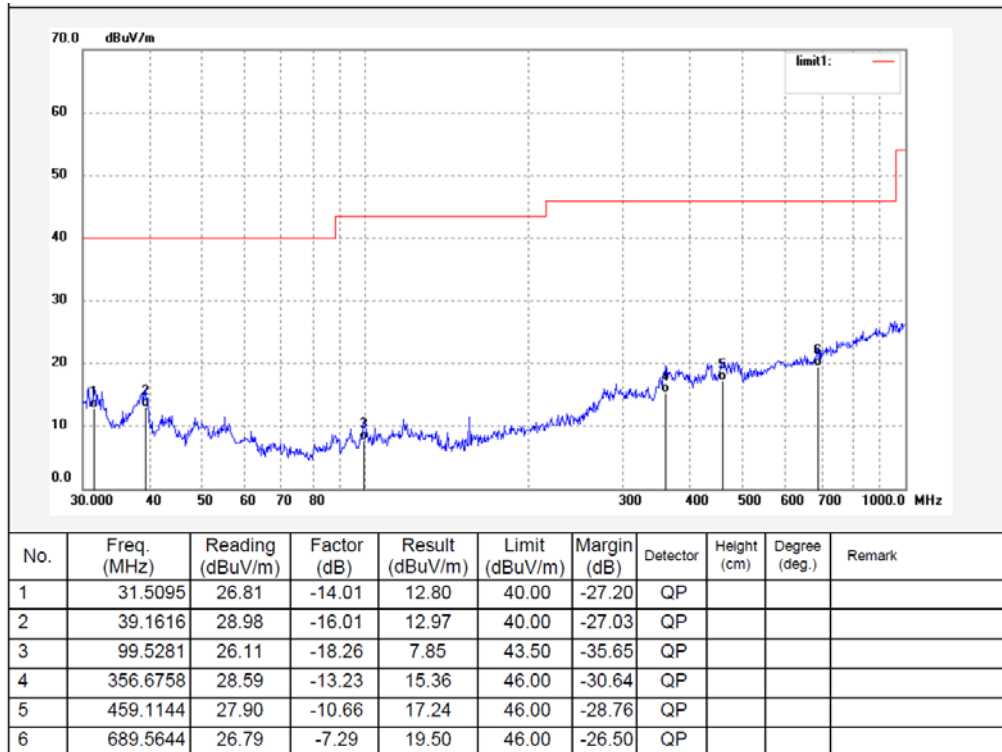
| | |
|---------------------------|-----------------|
| Temperature: | 23~25 °C |
| Relative Humidity: | 48~50 % |
| ATM Pressure: | 100.9~103.0 kPa |

The testing was performed by Fan Yang and Ting Lv on 2021-10-08 and 2021-10-13.

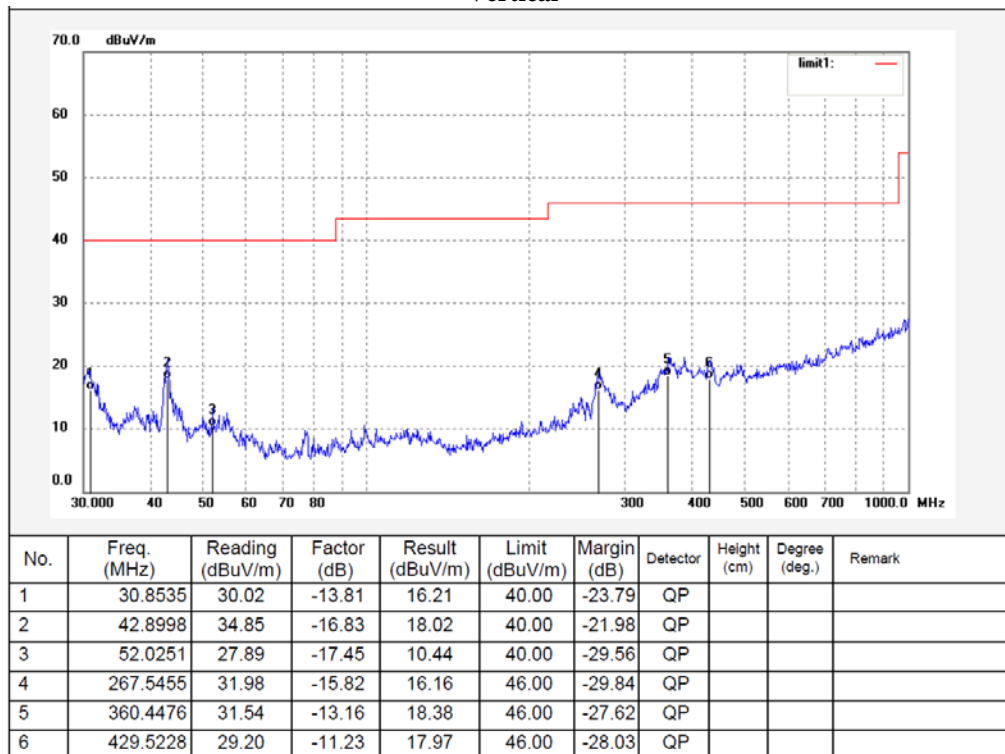
Test Mode: Transmitting

30MHz-1GHz: (Worst case is Low channel)

Horizontal



Vertical



1-40 GHz:

| Frequency (MHz) | Receiver | | Turntable Angle Degree | Rx Antenna | | Factor (dB/m) | Absolute Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|---------------------------|----------------|--------|------------------------|------------|-------------|---------------|-------------------------|----------------|-------------|
| | Reading (dBuV) | PK/AVG | | Height (m) | Polar (H/V) | | | | |
| Low Channel (5726 MHz) | | | | | | | | | |
| 5726 | 81.47 | PK | 59 | 1.8 | H | 3.96 | 85.43 | 114 | -28.57 |
| 5726 | 71.19 | AVG | 59 | 1.8 | H | 3.96 | 75.15 | 94 | -18.85 |
| 5726 | 81.32 | PK | 43 | 1.8 | V | 3.96 | 85.28 | 114 | -28.72 |
| 5726 | 70.51 | AVG | 43 | 1.8 | V | 3.96 | 74.47 | 94 | -19.53 |
| 5725 | 51.28 | PK | 77 | 1.6 | H | 3.97 | 55.25 | 74 | -18.75 |
| 5725 | 38.33 | AVG | 77 | 1.6 | H | 3.97 | 42.3 | 54 | -11.7 |
| 5725 | 49.25 | PK | 284 | 1.7 | V | 3.97 | 53.22 | 74 | -20.78 |
| 5725 | 37.95 | AVG | 284 | 1.7 | V | 3.97 | 41.92 | 54 | -12.08 |
| 11452 | 36.08 | PK | 62 | 2.0 | H | 14.9 | 50.98 | 74 | -23.02 |
| 11452 | 34.14 | PK | 277 | 2.0 | V | 14.9 | 49.04 | 74 | -24.96 |
| Middle Channel (5800 MHz) | | | | | | | | | |
| 5800 | 80.9 | PK | 351 | 1.7 | H | 4.19 | 85.09 | 114 | -28.91 |
| 5800 | 69.3 | AVG | 351 | 1.7 | H | 4.19 | 73.49 | 94 | -20.51 |
| 5800 | 81.38 | PK | 346 | 1.4 | V | 4.19 | 85.57 | 114 | -28.43 |
| 5800 | 71.66 | AVG | 346 | 1.4 | V | 4.19 | 75.85 | 94 | -18.15 |
| 11600 | 36.26 | PK | 281 | 1.6 | H | 14.59 | 50.85 | 74 | -23.15 |
| 11600 | 35.67 | PK | 70 | 1.2 | V | 14.59 | 50.26 | 74 | -23.74 |
| High Channel (5874 MHz) | | | | | | | | | |
| 5874 | 80.65 | PK | 312 | 1.9 | H | 4.4 | 85.05 | 114 | -28.95 |
| 5874 | 72.3 | AVG | 312 | 1.9 | H | 4.4 | 76.7 | 94 | -17.3 |
| 5874 | 81.8 | PK | 34 | 1.7 | V | 4.4 | 86.2 | 114 | -27.8 |
| 5874 | 70.63 | AVG | 34 | 1.7 | V | 4.4 | 75.03 | 94 | -18.97 |
| 5875 | 45.13 | PK | 129 | 1.4 | H | 4.41 | 49.54 | 74 | -24.46 |
| 5875 | 27.12 | AVG | 129 | 1.4 | H | 4.41 | 31.53 | 54 | -22.47 |
| 5875 | 45.78 | PK | 343 | 1.7 | V | 4.41 | 50.19 | 74 | -23.81 |
| 5875 | 26.47 | AVG | 343 | 1.7 | V | 4.41 | 30.88 | 54 | -23.12 |
| 11748 | 37.11 | PK | 314 | 1.2 | H | 14.35 | 51.46 | 74 | -22.54 |
| 11748 | 39.74 | PK | 275 | 1.7 | V | 14.35 | 54.09 | 74 | -19.91 |
| 11748 | 32.36 | AVG | 275 | 1.7 | V | 14.35 | 46.71 | 54 | -7.29 |

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

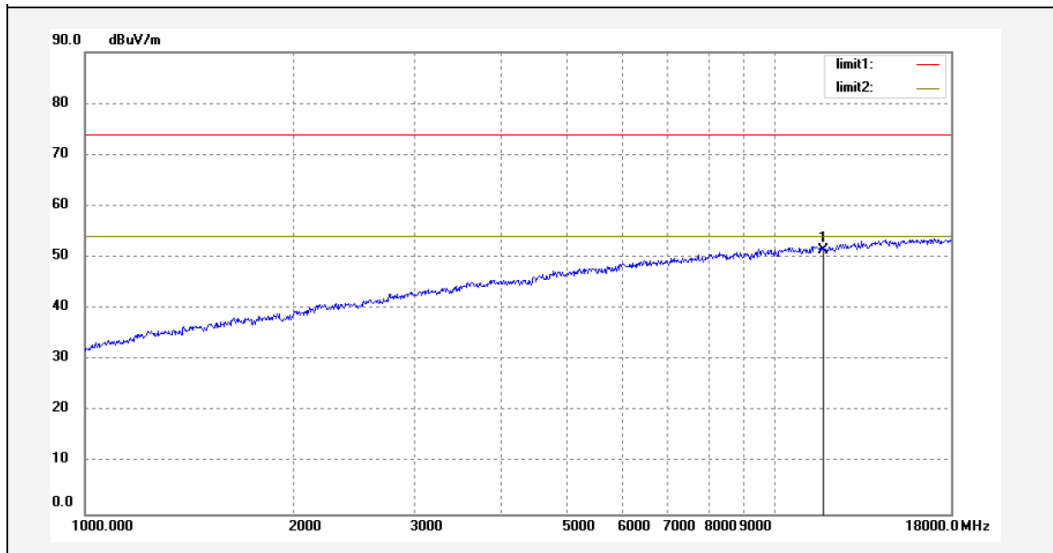
Corrected Amplitude = Corrected Factor + Reading

Margin = Corrected. Amplitude - Limit

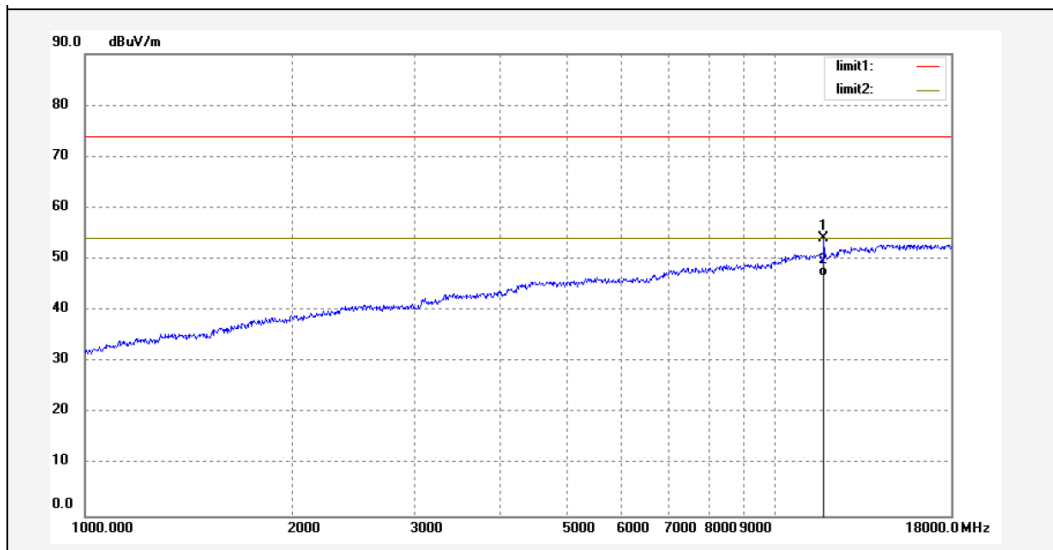
The other spurious emission which is 20dB to the limit was not recorded.

The test result of peak was less than the limit of average, so just peak values were recorded.

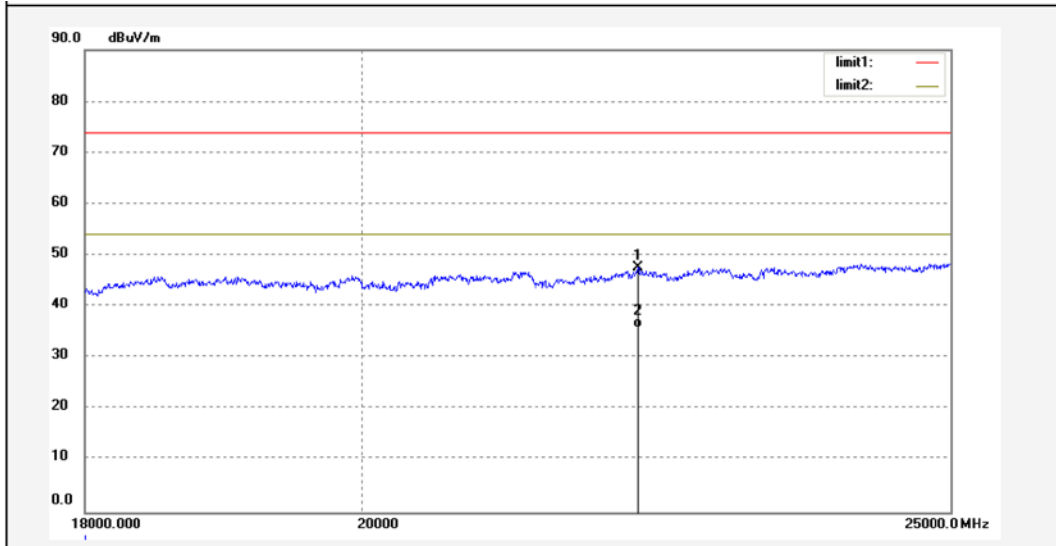
**Pre-scan with high channel Peak
1-18GHz
Horizontal**



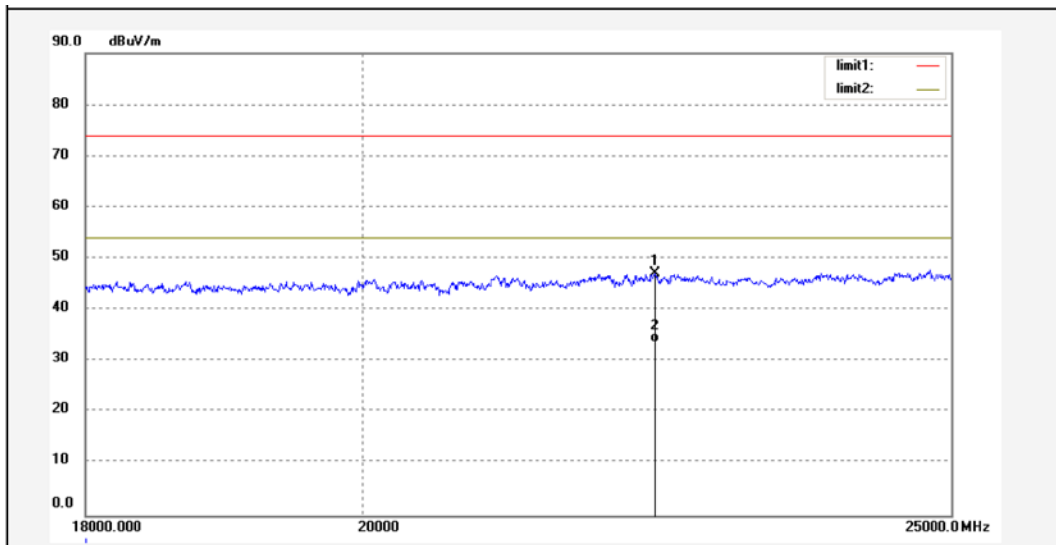
Vertical



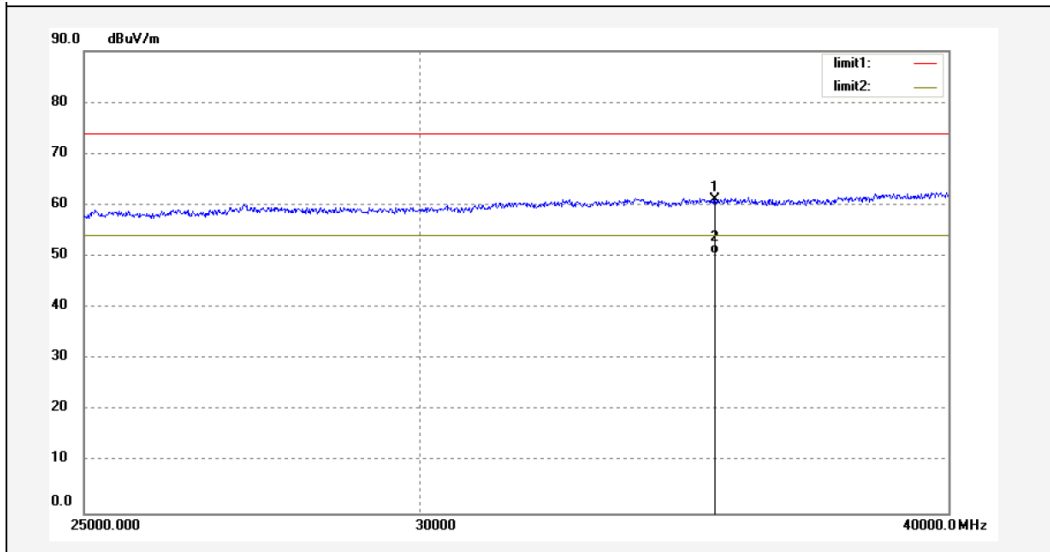
18-25GHz Horizontal



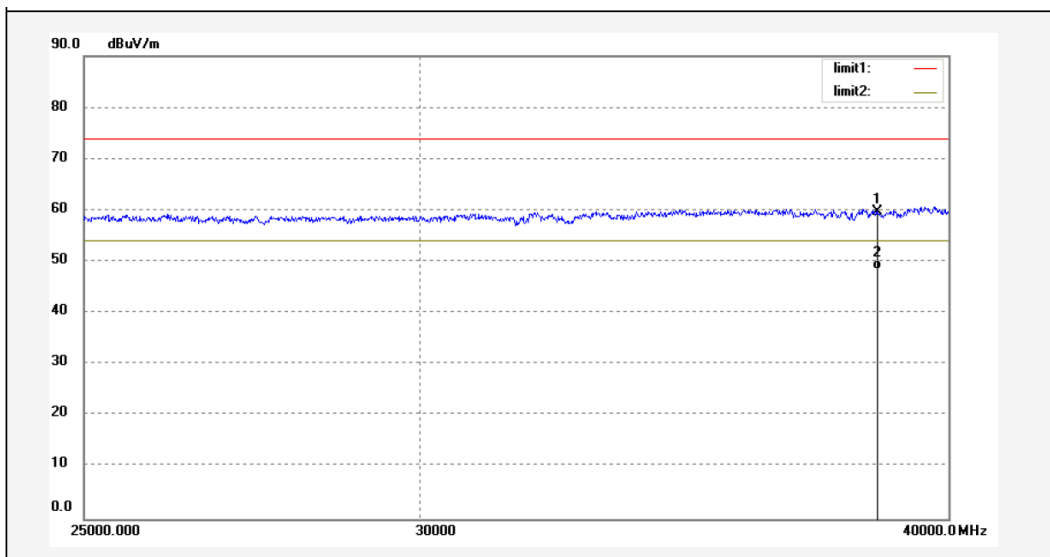
Vertical



25-40GHz Horizontal



Vertical



FCC§15.215(c) - 20dB EMISSION BANDWIDTH

Applicable Standard

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 20 dB 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 Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

| | |
|---------------------------|-----------|
| Temperature: | 25.6 °C |
| Relative Humidity: | 48 % |
| ATM Pressure: | 101.0 kPa |

The testing was performed by Fan Yang on 2021-10-25 and 2021-11-04.

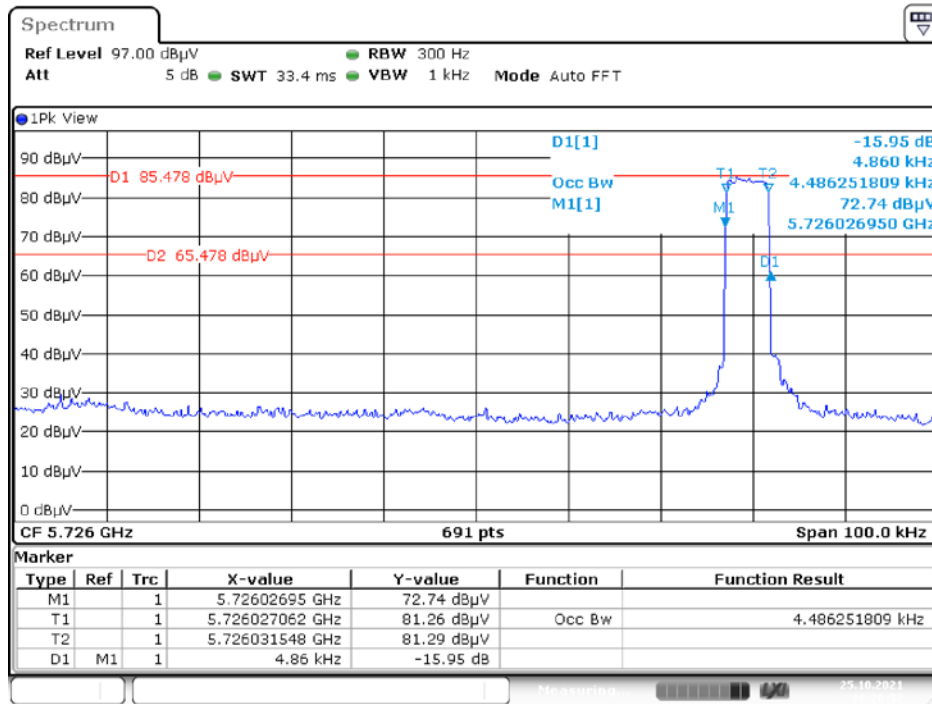
Test Mode: Transmitting

Please refer to the following table and plots.

| Channel | Frequency (MHz) | 20dB Bandwidth (kHz) |
|---------|-----------------|----------------------|
| Low | 5726 | 4.86 |
| Middle | 5800 | 8.00 |
| High | 5874 | 6.44 |

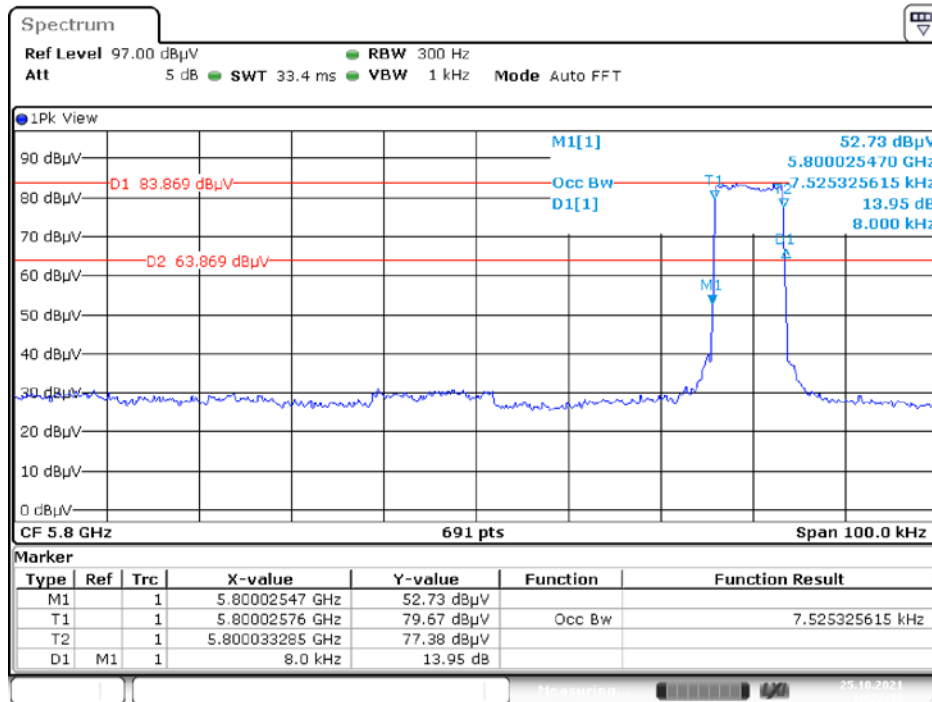
| Mode | 20dB bandwidth(MHz) |
|-----------------|---------------------|
| Swept frequency | 149.52 |

Low Channel



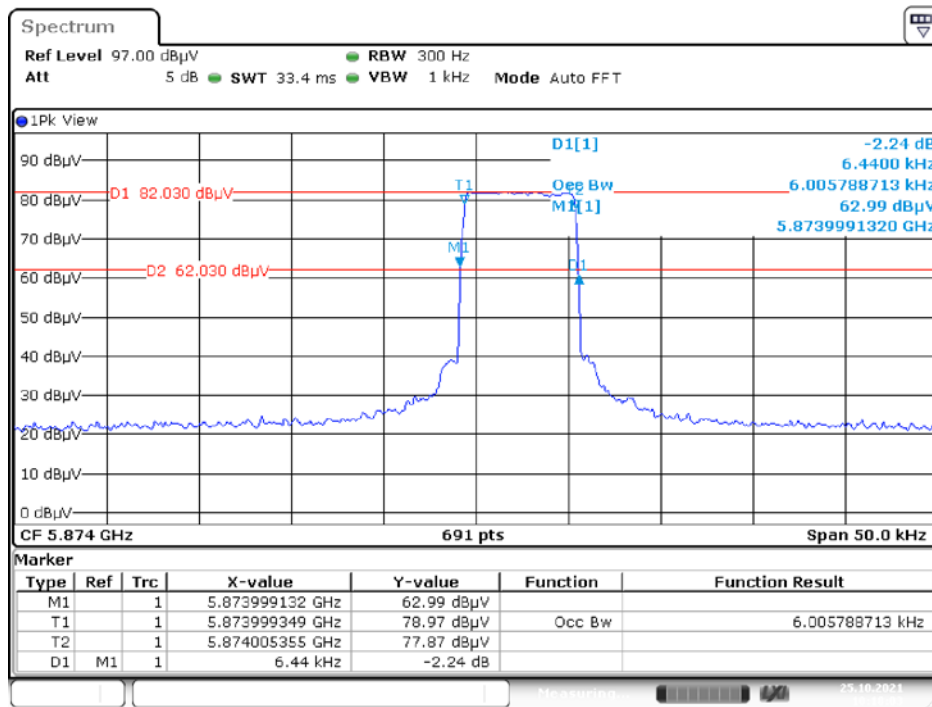
Date: 25.OCT.2021 10:26:52

Middle Channel



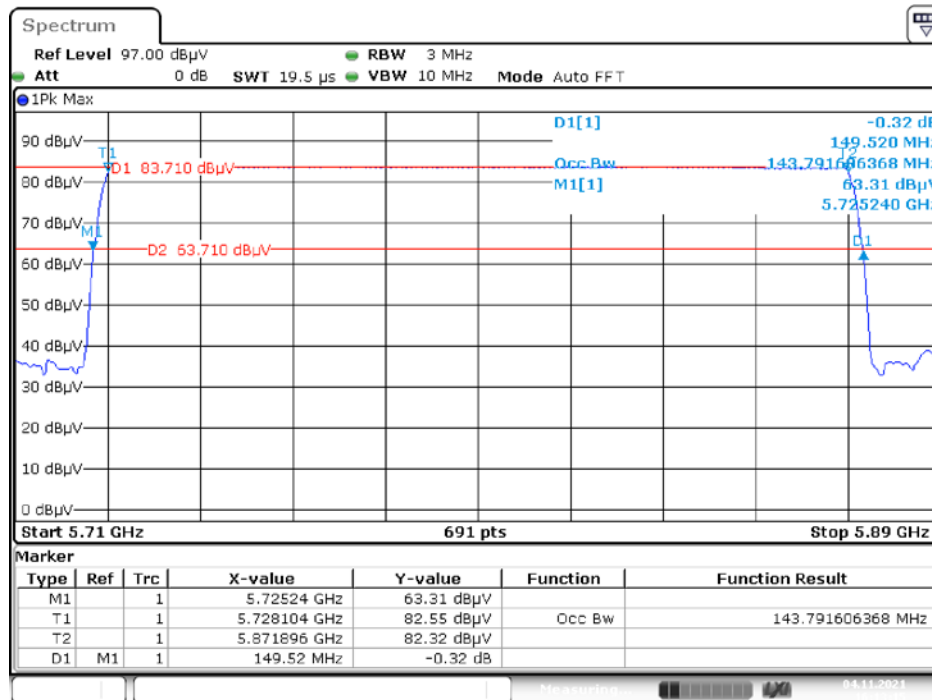
Date: 25.OCT.2021 10:22:33

High Channel



Date: 25.OCT.2021 10:18:04

Swept frequency:



Date: 4.NOV.2021 16:13:16

***** END OF REPORT *****