



TESTING LABORATORY  
CERTIFICATE#4323.01



## FCC PART 15.407 TEST REPORT

For

**SWIT Electronics Co., Ltd.**

10 Heng Tong Road, Xin'gang Economic and Technological Development Zone, Nanjing 210038 China

**FCC ID: 2AFFC-CURVE500RX**

|                                        |                                                                                                                                                                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Type:</b><br>Original Report | <b>Product Type:</b><br>500ft Wireless HD                                                                                                                                                                                  |
| <b>Test Engineer:</b>                  | Lee Li                                                                                                                                                                                                                     |
| <b>Report Number:</b>                  | RSHA200420002-00A                                                                                                                                                                                                          |
| <b>Report Date:</b>                    | 2020-07-15                                                                                                                                                                                                                 |
| <b>Reviewed By:</b>                    | Oscar Ye<br>EMC Manager                                                                                                                                                                                                    |
| <b>Test Laboratory:</b>                | Bay Area Compliance Laboratories Corp. (Kunshan)<br>No.248 Chenghu Road,Kunshan,Jiangsu province,China<br>Tel: +86-0512-86175000<br>Fax: +86-0512-88934268<br><a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a> |

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

## **TABLE OF CONTENTS**

|                                                                                                                    |           |
|--------------------------------------------------------------------------------------------------------------------|-----------|
| <b>GENERAL INFORMATION .....</b>                                                                                   | <b>4</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....                                                           | 4         |
| OBJECTIVE .....                                                                                                    | 4         |
| RELATED SUBMITTAL(S)/GRANT(S) .....                                                                                | 4         |
| TEST METHODOLOGY .....                                                                                             | 5         |
| MEASUREMENT UNCERTAINTY .....                                                                                      | 5         |
| TEST FACILITY .....                                                                                                | 5         |
| <b>SYSTEM TEST CONFIGURATION .....</b>                                                                             | <b>6</b>  |
| DESCRIPTION OF TEST CONFIGURATION .....                                                                            | 6         |
| EUT EXERCISE SOFTWARE .....                                                                                        | 6         |
| EQUIPMENT MODIFICATIONS .....                                                                                      | 8         |
| SUPPORT EQUIPMENT LIST AND DETAILS .....                                                                           | 8         |
| EXTERNAL I/O CABLE .....                                                                                           | 8         |
| BLOCK DIAGRAM OF TEST SETUP .....                                                                                  | 9         |
| <b>SUMMARY OF TEST RESULTS .....</b>                                                                               | <b>11</b> |
| <b>TEST EQUIPMENT LIST .....</b>                                                                                   | <b>12</b> |
| <b>FCC §15.247 (I) &amp; §1.1310 &amp; §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE) .....</b>                      | <b>14</b> |
| APPLICABLE STANDARD .....                                                                                          | 14        |
| CALCULATED FORMULARY: .....                                                                                        | 14        |
| CALCULATED DATA (WORST CASE): .....                                                                                | 14        |
| <b>FCC §15.203 – ANTENNA REQUIREMENT .....</b>                                                                     | <b>15</b> |
| APPLICABLE STANDARD .....                                                                                          | 15        |
| ANTENNA CONNECTOR CONSTRUCTION .....                                                                               | 15        |
| <b>FCC §15.407 (b) (6) §15.207 (a) – AC POWER LINE CONDUCTED EMISSIONS .....</b>                                   | <b>16</b> |
| APPLICABLE STANDARD .....                                                                                          | 16        |
| EUT SETUP .....                                                                                                    | 16        |
| EMI TEST RECEIVER SETUP .....                                                                                      | 16        |
| TEST PROCEDURE .....                                                                                               | 17        |
| CORRECTED FACTOR & OVER LIMIT CALCULATION .....                                                                    | 17        |
| TEST RESULTS SUMMARY .....                                                                                         | 17        |
| TEST DATA .....                                                                                                    | 17        |
| <b>§15.205 &amp; §15.209 &amp; §15.407(B) (1), (4),(6),(7) – UNDESIRABLE EMISSION &amp; RESTRICTED BANDS .....</b> | <b>20</b> |
| APPLICABLE STANDARD .....                                                                                          | 20        |
| EUT SETUP .....                                                                                                    | 20        |
| EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP .....                                                                  | 21        |
| TEST PROCEDURE .....                                                                                               | 21        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION (FOR ABOVE 1GHz) .....                                                    | 22        |
| TEST DATA .....                                                                                                    | 22        |
| <b>FCC §15.407(a) &amp; §15.407(e) – EMISSION BANDWIDTH .....</b>                                                  | <b>34</b> |
| APPLICABLE STANDARD .....                                                                                          | 34        |
| TEST PROCEDURE .....                                                                                               | 34        |
| TEST DATA .....                                                                                                    | 35        |
| <b>FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER .....</b>                                           | <b>41</b> |
| APPLICABLE STANDARD .....                                                                                          | 41        |
| TEST PROCEDURE .....                                                                                               | 41        |

|                                                              |           |
|--------------------------------------------------------------|-----------|
| TEST DATA .....                                              | 42        |
| <b>FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY .....</b> | <b>43</b> |
| APPLICABLE STANDARD .....                                    | 43        |
| TEST PROCEDURE.....                                          | 43        |
| TEST DATA .....                                              | 44        |

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

|                      |                                          |
|----------------------|------------------------------------------|
| Applicant            | SWIT Electronics Co., Ltd.               |
| Tested Model         | CURVE500 Rx                              |
| Series Model         | FLOW500H Rx                              |
| Model Difference     | Model name                               |
| Product Type         | 500ft Wireless HD                        |
| Power Supply         | DC 7V~17V                                |
| RF Function          | SRD                                      |
| Operating Frequency  | 5182.5~5222.5MHz, 5762.5~5822.5MHz       |
| Channel Number       | 5182.5~5222.5MHz: 3, 5762.5~5822.5MHz: 4 |
| Channel Separation   | 20 MHz                                   |
| Modulation Type      | OFDM                                     |
| Antenna Type         | Omni Antenna                             |
| Maximum Antenna Gain | 1.0 dBi                                  |

#### Adapter information:

Model: SW-120100

Input: AC 100-240V, 50/60Hz, 0.5A

Output: DC 12V, 1000mA

*\*All measurement and test data in this report was gathered from production sample serial number: 20200420002.  
(Assigned by the BACL. The EUT supplied by the applicant was received on 2020-04-20)*

### Objective

This type approval report is prepared on behalf of *SWIT Electronics Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions' rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

### Related Submittal(s)/Grant(s)

FCC Part 15.407 NII submitted with FCC ID: 2AFFC-CURVE500TX

## 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 and Bay Area Compliance Laboratories Corp. (Kunshan).

## Measurement Uncertainty

| Item                               |             | Uncertainty |
|------------------------------------|-------------|-------------|
| AC Power Lines Conducted Emissions |             | 3.19 dB     |
| RF conducted test with spectrum    |             | 0.9dB       |
| RF Output Power with Power meter   |             | 0.5dB       |
| Radiated emission                  | 30MHz~1GHz  | 6.11dB      |
|                                    | 1GHz~6GHz   | 4.45dB      |
|                                    | 6GHz~18GHz  | 5.23dB      |
|                                    | 18GHz~40GHz | 5.65dB      |
| Occupied Bandwidth                 |             | 0.5kHz      |
| Temperature                        |             | 1.0℃        |
| Humidity                           |             | 6%          |

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 Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01), the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISSED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

In **5182.5-5222.5MHz** band, the channel list is as below, channel 00, 01, 02 were tested.

| Channel | Frequency (MHz) |
|---------|-----------------|
| 00      | 5182.5          |
| 01      | 5202.5          |
| 02      | 5222.5          |

In **5762.5-5822.5MHz** band, the channel list is as below, channel 03, 04, 06 were tested.

| Channel | Frequency (MHz) |
|---------|-----------------|
| 03      | 5762.5          |
| 04      | 5782.5          |
| 05      | 5802.5          |
| 06      | 5822.5          |

### EUT Exercise Software

RF test tool: ARSiriusPCTool

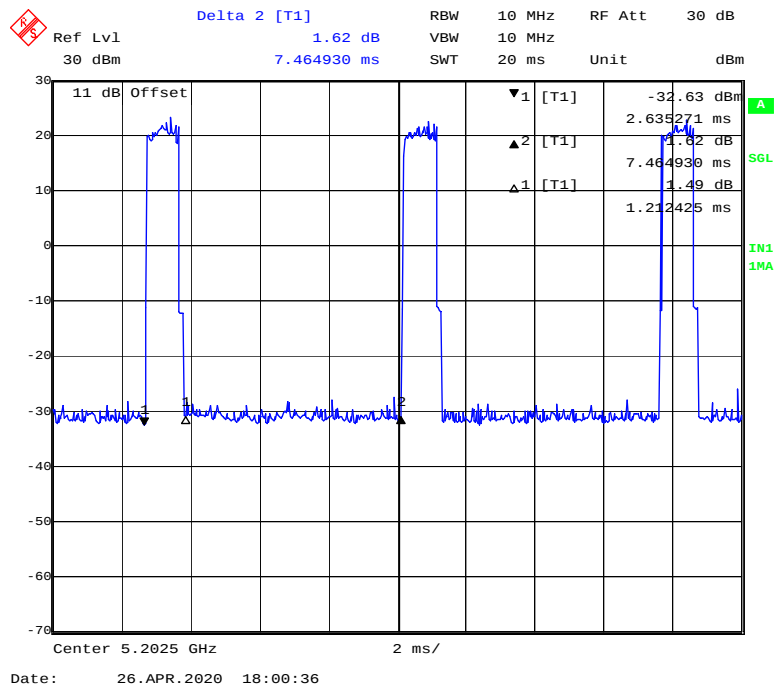
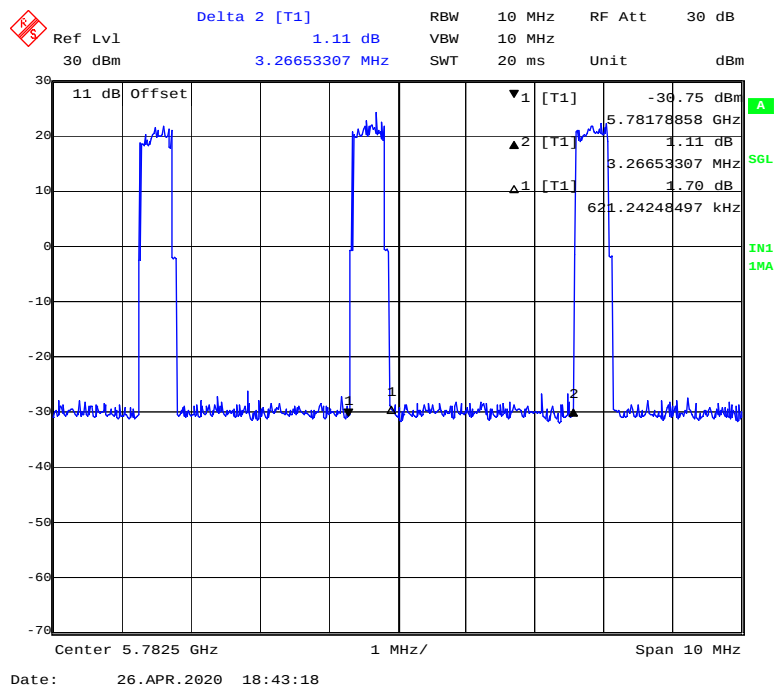
Pre-scan with all the data rates, and the worst case was performed as below:

5182.5-5222.5MHz band:

| Frequency (MHz) | Data Rate | Power Setting |
|-----------------|-----------|---------------|
| 5182.5          | MCS 0     | 12            |
| 5202.5          |           | 12            |
| 5222.5          |           | 12            |

5762.5-5822.5MHz band:

| Frequency (MHz) | Data Rate | Power Setting |
|-----------------|-----------|---------------|
| 5762.5          | MCS 0     | 12            |
| 5782.5          |           | 12            |
| 5822.5          |           | 12            |

**Maximum Duty Cycle****5182.5-5222.5MHz:****Frequency: 5202.5MHz****5762.5-5822.5MHz:****Frequency: 5782.5MHz**

| Frequency Range (MHz) | Duty Cycle (%) | T (ms) | 1/T (kHz) | 10log(1/x) |
|-----------------------|----------------|--------|-----------|------------|
| 5182.5-5222.5         | 16.24          | 1.212  | 0.83      | 7.89       |
| 5762.5-5822.5         | 19.01          | 0.621  | 1.61      | 7.21       |

Note: "x" means duty cycle.

### Equipment Modifications

No modification was made to the EUT.

### Support Equipment List and Details

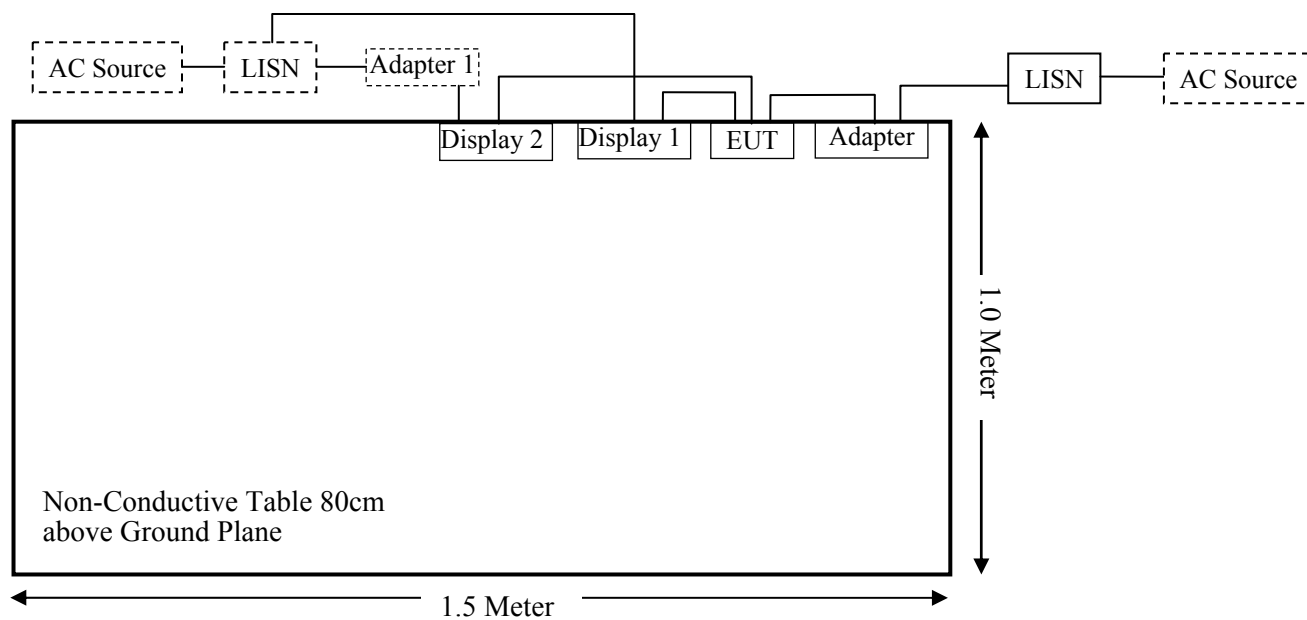
| Manufacturer | Description | Model         | Serial Number |
|--------------|-------------|---------------|---------------|
| DELL         | Display 1   | U255H         | /             |
| SWIT         | Display 2   | CM-S73H       | /             |
| Xinspower    | Adapter 1   | A241-12020001 | /             |

### External I/O Cable

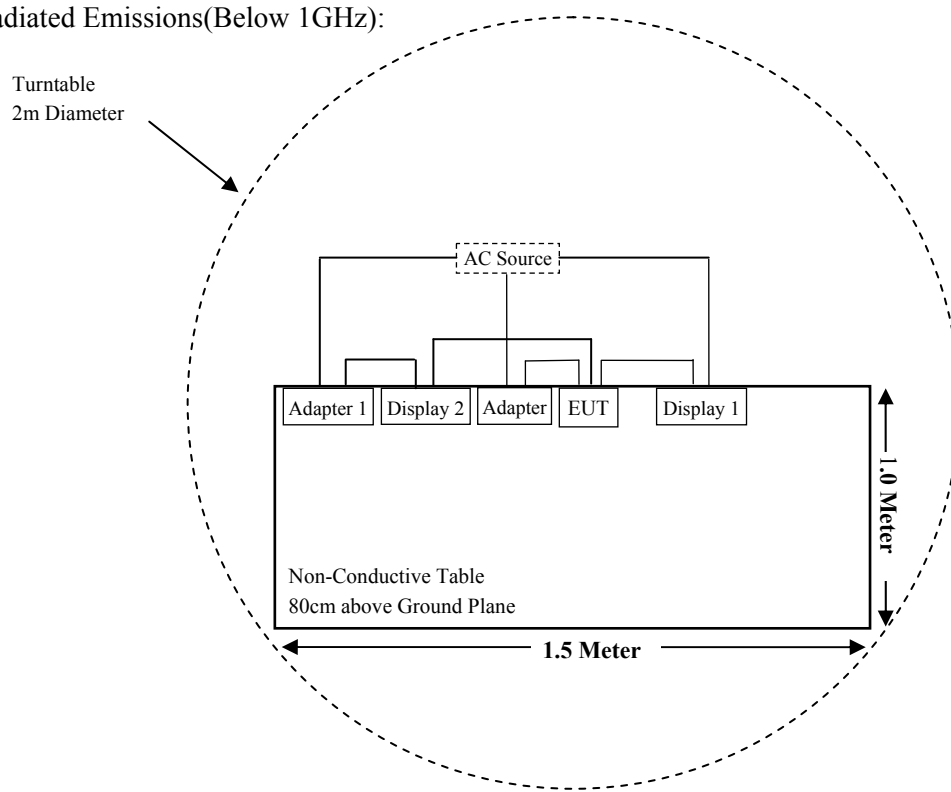
| Cable Description | Length (m) | From Port | To             |
|-------------------|------------|-----------|----------------|
| Power Cable       | 1.0        | EUT       | Adapter        |
| Power Cable       | 1.0        | Adapter   | LISN/AC Source |
| Cable             | 1.0        | EUT       | Display 1      |
| Power Cable       | 1.0        | Display 1 | LISN/AC Source |
| Cable             | 1.0        | EUT       | Display 2      |
| Power Cable       | 1.0        | Display 2 | Adapter 1      |
| Power Cable       | 1.0        | Adapter 1 | LISN/AC Source |

## Block Diagram of Test Setup

For Conducted Emissions:

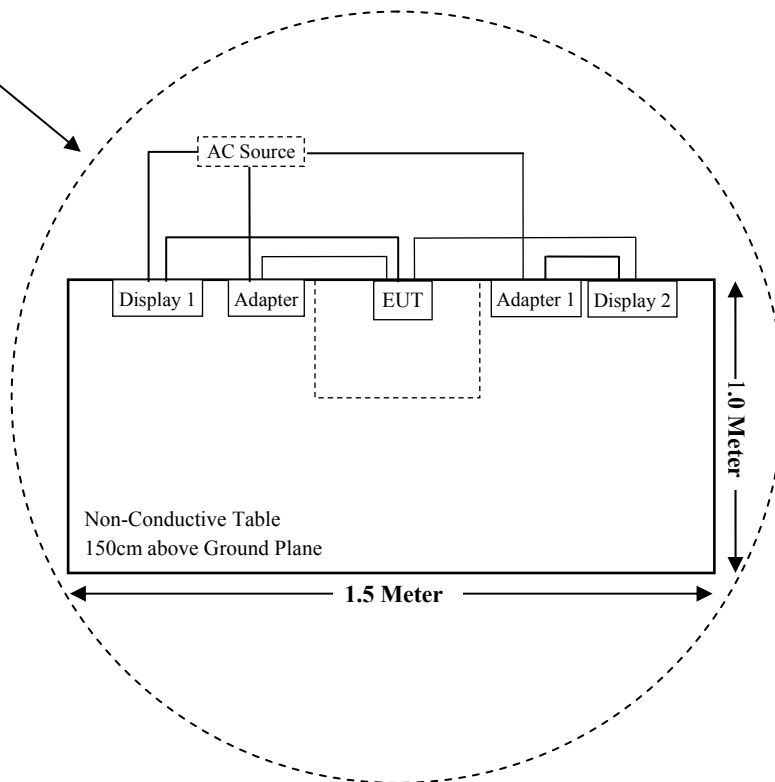


For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):

Turntable  
2m Diameter



## SUMMARY OF TEST RESULTS

| FCC Rules                                          | Description of Test                     | Result    |
|----------------------------------------------------|-----------------------------------------|-----------|
| §1.1310 & §2.1091                                  | Maximum Permissible Exposure (MPE)      | Compliant |
| §15.203                                            | Antenna Requirement                     | Compliant |
| §15.207 & §15.407(b) (6)                           | AC Power Line Conducted Emissions       | Compliant |
| § 15.205 & §15.209 & §15.407(b) (1), (4), (6), (7) | Undesirable Emission & Restricted Bands | Compliant |
| §15.407(a) & §15.407(e)                            | Emission Bandwidth                      | Compliant |
| §15.407(a) (1) (3)                                 | Conducted Transmitter Output Power      | Compliant |
| §15.407(a) (1) (3)                                 | Power Spectral Density                  | Compliant |

## TEST EQUIPMENT LIST

| Manufacturer                               | Description                    | Model     | Serial Number | Calibration Date | Calibration Due Date |
|--------------------------------------------|--------------------------------|-----------|---------------|------------------|----------------------|
| <b>Radiated Emission Test (Chamber 1#)</b> |                                |           |               |                  |                      |
| Rohde & Schwarz                            | EMI Test Receiver              | ESCI      | 100195        | 2019-12-14       | 2020-12-13           |
| Sunol Sciences                             | Broadband Antenna              | JB3       | A090413-1     | 2017-12-26       | 2020-12-25           |
| Sonoma Instrunent                          | Pre-amplifier                  | 310N      | 171205        | 2019-08-14       | 2020-08-13           |
| Rohde & Schwarz                            | Auto test Software             | EMC32     | 100361        | /                | /                    |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-8   | 008           | 2019-08-15       | 2020-08-14           |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-9   | 009           | 2019-08-15       | 2020-08-14           |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-10  | 010           | 2019-08-15       | 2020-08-14           |
| <b>Radiated Emission Test (Chamber 2#)</b> |                                |           |               |                  |                      |
| Rohde & Schwarz                            | EMI Test Receiver              | ESU40     | 100207        | 2020-04-01       | 2021-03-31           |
| ETS-LINDGREN                               | Horn Antenna                   | 3115      | 9207-3900     | 2017-07-15       | 2020-07-14           |
| ETS-LINDGREN                               | Horn Antenna                   | 3116      | 2516          | 2020-01-17       | 2023-01-16           |
| A.H.Systems,inc                            | Amplifier                      | PAM-0118P | 512           | 2020-02-20       | 2021-02-19           |
| EM Electronics Corporation                 | Amplifier                      | EM18G40G  | 060726        | 2020-03-22       | 2021-03-21           |
| MICRO-TRONICS                              | Band Reject Filter             | BRC50703  | G094          | 2019-08-05       | 2020-08-04           |
| MICRO-TRONICS                              | Band Reject Filter             | BRC50705  | G085          | 2019-08-05       | 2020-08-04           |
| Narda                                      | Attenuator                     | 10dB      | 010           | 2019-08-15       | 2020-08-14           |
| Rohde & Schwarz                            | Auto test Software             | EMC32     | 100361        | /                | /                    |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-6   | 006           | 2019-08-15       | 2020-08-14           |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-11  | 011           | 2019-08-15       | 2020-08-14           |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-12  | 012           | 2019-08-15       | 2020-08-14           |
| MICRO-COAX                                 | Coaxial Cable                  | Cable-13  | 013           | 2019-08-15       | 2020-08-14           |
| <b>RF Conducted Test</b>                   |                                |           |               |                  |                      |
| Rohde & Schwarz                            | EMI Test Receiver              | ESIB26    | 100146        | 2019-12-14       | 2020-12-13           |
| Agilent                                    | Power Meter                    | N1912A    | MY5000492     | 2019-11-18       | 2020-11-17           |
| Agilent                                    | Power Sensor                   | N1921A    | MY54210024    | 2019-11-18       | 2020-11-17           |
| Narda                                      | Attenuator                     | 10dB      | 010           | 2019-08-15       | 2020-08-14           |
| BACL                                       | Temperature & Humidity Chamber | BTH-150   | 30023         | 2019-12-20       | 2020-12-19           |
| SWIT                                       | RF Cable                       | SWIT C01  | C01           | Each Time        | /                    |

| Manufacturer                   | Description       | Model    | Serial Number          | Calibration Date | Calibration Due Date |
|--------------------------------|-------------------|----------|------------------------|------------------|----------------------|
| <b>Conducted Emission Test</b> |                   |          |                        |                  |                      |
| Rohde & Schwarz                | EMI Test Receiver | ESR      | 1316.3003K03-101746-zn | 2019-08-05       | 2020-08-04           |
| Rohde & Schwarz                | LISN              | ESH3-Z5  | 862770/011             | 2019-11-30       | 2020-11-29           |
| Rohde & Schwarz                | LISN              | ENV216   | 101115                 | 2019-12-14       | 2020-12-13           |
| Audix                          | Test Software     | e3       | V9                     | --               | --                   |
| Rohde & Schwarz                | Pulse limiter     | ESH3-Z2  | 357.8810.52            | 2019-08-10       | 2020-08-09           |
| MICRO-COAX                     | Coaxial Cable     | Cable-15 | 015                    | 2019-08-15       | 2020-08-14           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## FCC §15.247 (I) & §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to subpart 15.247 (i) and subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

| Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                               | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3-1.34                                            | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30                                             | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300                                              | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500                                            | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000                                        | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz; \* = Plane-wave equivalent power density

### Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

### Calculated Data (worst case):

| Frequency Range (MHz) | Maximum Antenna Gain |           | Tune-up Conducted Power |       | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-----------------------|----------------------|-----------|-------------------------|-------|--------------------------|-------------------------------------|---------------------------------|
|                       | (dBi)                | (numeric) | (dBm)                   | (mW)  |                          |                                     |                                 |
| 5182.5~5222.5         | 1.0                  | 1.26      | 15.50                   | 35.48 | 20                       | 0.0089                              | 1.00                            |
| 5762.5~5822.5         | 1.0                  | 1.26      | 16.50                   | 44.67 | 20                       | 0.0112                              | 1.00                            |

### Note:

The Tune-up conducted power was declared by the Manufacturer.

**Conclusion: The device meets MPE at distance 20cm.**

## **FCC §15.203 – ANTENNA REQUIREMENT**

---

### **Applicable Standard**

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. 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407, if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has two Omni antennas which the antenna gain are both 1.0 dBi, the antennas must use a unique type of connector to attach to the EUT, fulfill the requirement of this section. Please refer to the EUT photos.

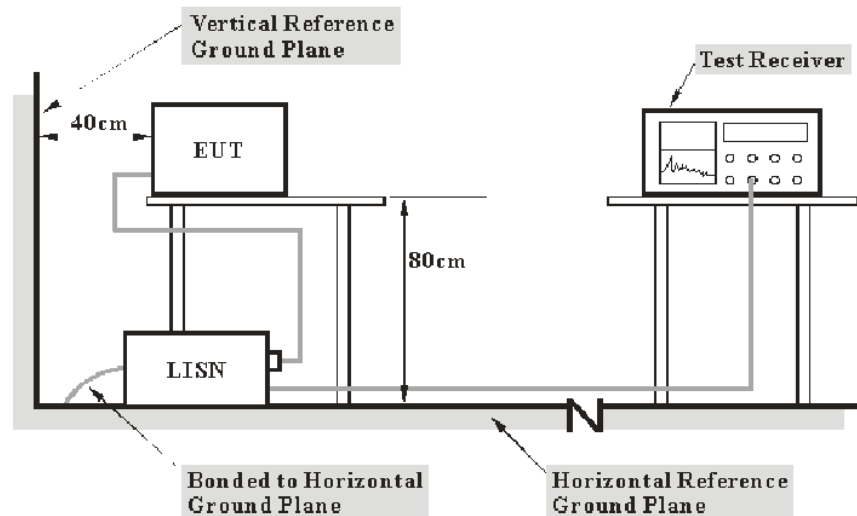
**Result:** Compliant.

## FCC §15.407 (b) (6) §15.207 (a) – AC POWER LINE CONDUCTED EMISSIONS

### Applicable Standard

FCC §15.207(a), §15.407(b) (6)

### 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 setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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 LISN.

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

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

## Corrected Factor & Over Limit Calculation

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

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

## Test Data

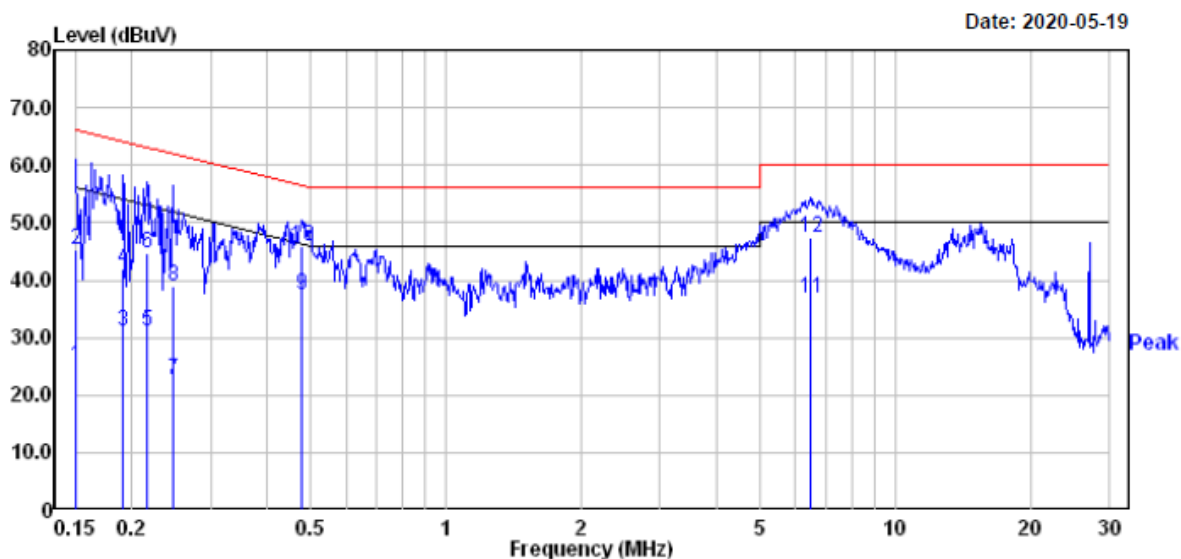
### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25.7 °C   |
| Relative Humidity: | 51 %      |
| ATM Pressure:      | 101.3 kPa |

*The testing was performed by Lee Li on 2020-05-19.*

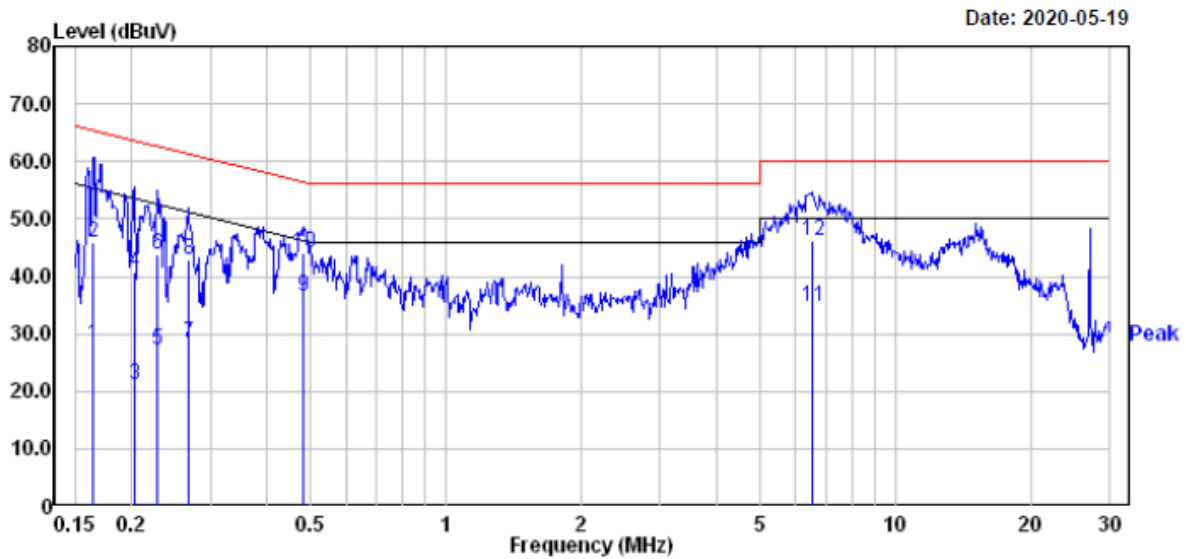
*EUT operation mode: Transmitting in low channel of 5762.5-5822.5MHz (worst case)*

## AC 120V/60 Hz, Line



|    |       | Read  |        |       | Limit | Over   |         |
|----|-------|-------|--------|-------|-------|--------|---------|
|    | Freq  | Level | Factor | Level | Line  | Limit  | Remark  |
|    | MHz   | dBuV  | dB     | dBuV  | dBuV  | dB     |         |
| 1  | 0.150 | 5.10  | 19.82  | 24.92 | 56.00 | -31.08 | Average |
| 2  | 0.150 | 25.60 | 19.82  | 45.42 | 66.00 | -20.58 | QP      |
| 3  | 0.191 | 11.30 | 19.82  | 31.12 | 53.98 | -22.86 | Average |
| 4  | 0.191 | 22.10 | 19.82  | 41.92 | 63.98 | -22.06 | QP      |
| 5  | 0.216 | 11.20 | 19.82  | 31.02 | 52.96 | -21.94 | Average |
| 6  | 0.216 | 24.80 | 19.82  | 44.62 | 62.96 | -18.34 | QP      |
| 7  | 0.247 | 2.80  | 19.82  | 22.62 | 51.86 | -29.24 | Average |
| 8  | 0.247 | 19.00 | 19.82  | 38.82 | 61.86 | -23.04 | QP      |
| 9  | 0.476 | 17.80 | 19.76  | 37.56 | 46.41 | -8.85  | Average |
| 10 | 0.476 | 26.20 | 19.76  | 45.96 | 56.41 | -10.45 | QP      |
| 11 | 6.488 | 17.20 | 19.51  | 36.71 | 50.00 | -13.29 | Average |
| 12 | 6.488 | 28.00 | 19.51  | 47.51 | 60.00 | -12.49 | QP      |

## AC 120V/60 Hz, Neutral



|    |       | Read  |        |       | Limit | Over   |         |
|----|-------|-------|--------|-------|-------|--------|---------|
|    | Freq  | Level | Factor | Level | Line  | Limit  | Remark  |
|    | MHz   | dBuV  | dB     | dBuV  | dBuV  | dB     |         |
| 1  | 0.164 | 8.10  | 19.83  | 27.93 | 55.25 | -27.32 | Average |
| 2  | 0.164 | 26.00 | 19.83  | 45.83 | 65.25 | -19.42 | QP      |
| 3  | 0.204 | 1.40  | 19.82  | 21.22 | 53.45 | -32.23 | Average |
| 4  | 0.204 | 20.80 | 19.82  | 40.62 | 63.45 | -22.83 | QP      |
| 5  | 0.228 | 7.40  | 19.82  | 27.22 | 52.52 | -25.30 | Average |
| 6  | 0.228 | 24.10 | 19.82  | 43.92 | 62.52 | -18.60 | QP      |
| 7  | 0.267 | 8.50  | 19.82  | 28.32 | 51.20 | -22.88 | Average |
| 8  | 0.267 | 23.00 | 19.82  | 42.82 | 61.20 | -18.38 | QP      |
| 9  | 0.484 | 16.90 | 19.76  | 36.66 | 46.27 | -9.61  | Average |
| 10 | 0.484 | 24.30 | 19.76  | 44.06 | 56.27 | -12.21 | QP      |
| 11 | 6.557 | 15.30 | 19.51  | 34.81 | 50.00 | -15.19 | Average |
| 12 | 6.557 | 26.80 | 19.51  | 46.31 | 60.00 | -13.69 | QP      |

**Note:**

- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)  
 2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

## §15.205 & §15.209 & §15.407(B) (1), (4),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

### Applicable Standard

FCC §15.407 (b) (1), (4), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of  $-27$  dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

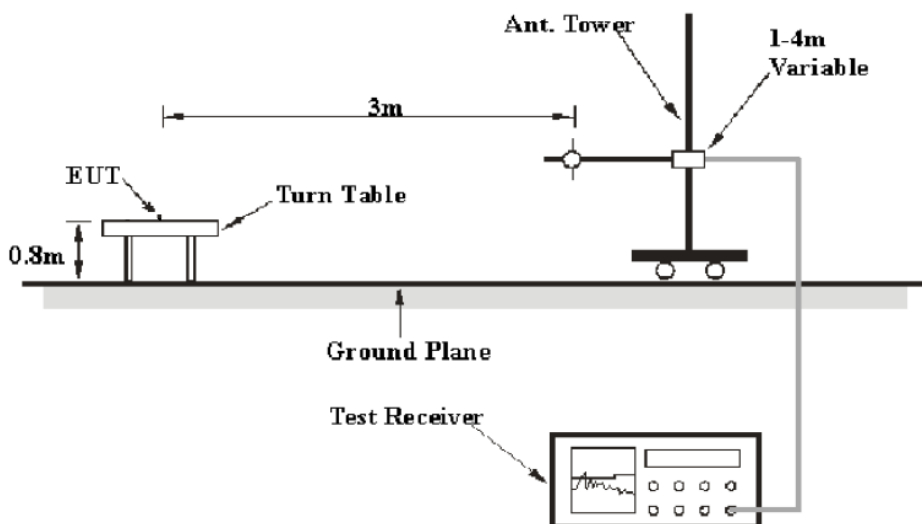
The provisions of §15.205 apply to intentional radiators operating under this section.

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

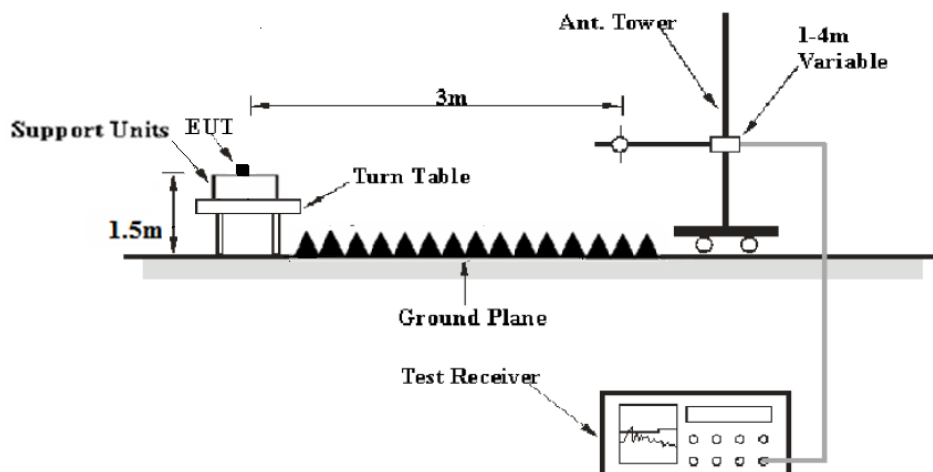
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as:  $E$  [dB $\mu$ V/m] = EIRP [dBm] + 95.2, for  $d = 3$  meters.

### EUT Setup

Below 1 GHz:



1 GHz-40 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

### EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

| Frequency Range   | RBW     | Video B/W | IF B/W  | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz   | 120 kHz | QP       |
| Above 1GHz        | 1MHz    | 3 MHz     | /       | PK       |
|                   | 1MHz    | 3 MHz     | /       | Ave.     |

### Test Procedure

During the radiated emission test, the adapter was connected to AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

**Corrected Amplitude & Margin Calculation (for Above 1GHz)**

The Corrected Amplitude is calculated by adding the Antenna Loss 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:

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

**Test Data****Environmental Conditions**

|                           |                 |
|---------------------------|-----------------|
| <b>Temperature:</b>       | 20.2~25.8 °C    |
| <b>Relative Humidity:</b> | 48~51 %         |
| <b>ATM Pressure:</b>      | 101.1~101.3 kPa |

*The testing was performed by Lee Li from 2020-05-10 to 2020-05-19.*

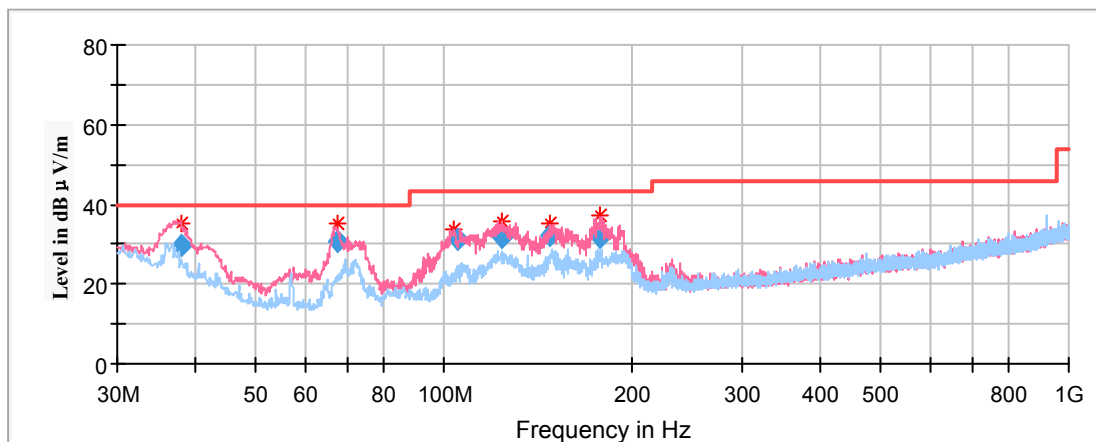
*Test Mode: Transmitting*

## Spurious Emission Test

5182.5-5222.5MHz:

30MHz-1GHz:

Pre-scan with low, middle, high channel in the X, Y and Z axes of orientation, the worst case **low channel in Z-axis of orientation** was recorded



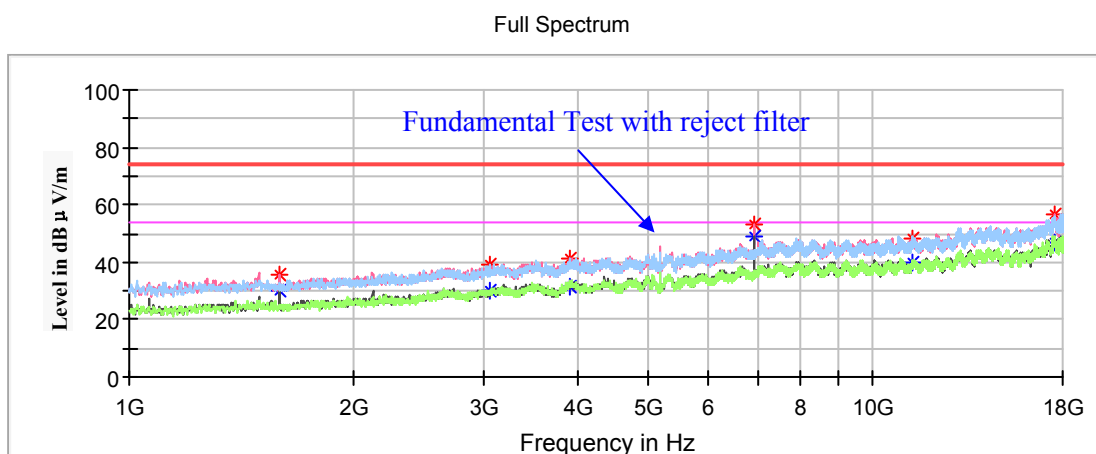
| Frequency<br>(MHz) | Corrected<br>Amplitude | Rx Antenna     |                | Turntable<br>Degree | Correct<br>Factor<br>(dB/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
|--------------------|------------------------|----------------|----------------|---------------------|-----------------------------|-------------------|----------------|
|                    | QuasiPeak<br>(dBμV/m)  | Height<br>(cm) | Polar<br>(H/V) |                     |                             |                   |                |
| 37.882250          | 29.66                  | 100.0          | V              | 152.0               | -9.3                        | 40.00             | 10.34          |
| 67.424550          | 30.69                  | 100.0          | V              | 112.0               | -17.4                       | 40.00             | 9.31           |
| 105.145700         | 31.35                  | 100.0          | V              | 255.0               | -13.9                       | 43.50             | 12.15          |
| 124.166600         | 31.68                  | 100.0          | V              | 240.0               | -11.4                       | 43.50             | 11.82          |
| 148.120300         | 32.42                  | 100.0          | V              | 240.0               | -12.3                       | 43.50             | 11.08          |
| 177.492700         | 31.50                  | 100.0          | V              | 240.0               | -13.5                       | 43.50             | 12.00          |

**1GHz-18GHz:**

(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

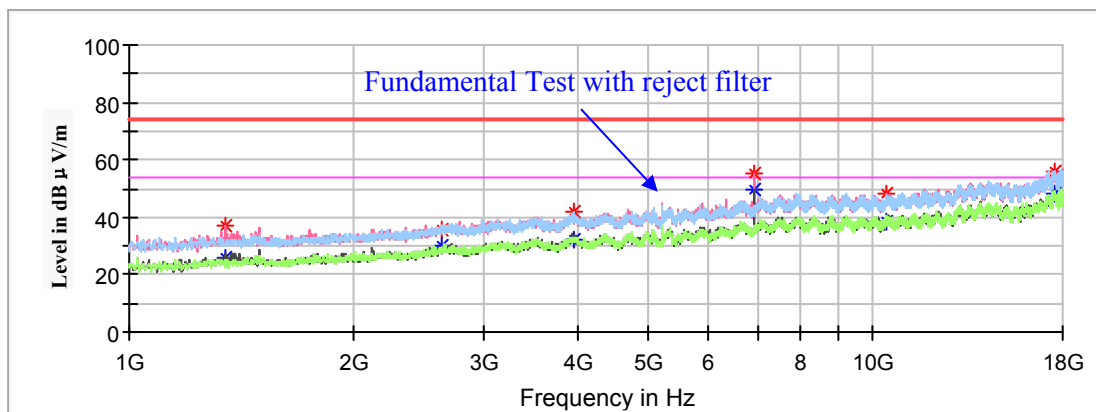
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor  
Corrected Amplitude = Corrected Factor + Reading  
Margin = Limit - Corrected. Amplitude

**Low Channel: 5182.5 MHz**

| Frequency (MHz) | Corrected Amplitude |                  | Rx Antenna  |             | Turntable Degree | Correct Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|------------------|-------------|-------------|------------------|-----------------------|----------------|-------------|
|                 | MaxPeak (dBμV/m)    | Average (dBμV/m) | Height (cm) | Polar (H/V) |                  |                       |                |             |
| 1593.300000     | ---                 | 29.80            | 150.0       | V           | 296.0            | -16.0                 | 54.00          | 24.20       |
| 1593.300000     | 35.98               | ---              | 150.0       | V           | 296.0            | -16.0                 | 74.00          | 38.02       |
| 3055.300000     | 39.21               | ---              | 200.0       | H           | 171.0            | -10.0                 | 68.20          | 28.99       |
| 3905.300000     | ---                 | 31.29            | 150.0       | H           | 348.0            | -7.3                  | 54.00          | 22.71       |
| 3905.300000     | 41.37               | ---              | 150.0       | H           | 348.0            | -7.3                  | 74.00          | 32.63       |
| 6909.200000     | 53.48               | ---              | 150.0       | V           | 57.0             | -0.3                  | 68.20          | 14.72       |
| 11334.300000    | ---                 | 39.81            | 150.0       | V           | 86.0             | 2.8                   | 54.00          | 14.19       |
| 11334.300000    | 48.55               | ---              | 150.0       | V           | 86.0             | 2.8                   | 74.00          | 25.45       |
| 17568.200000    | 56.64               | ---              | 200.0       | V           | 349.0            | 8.9                   | 68.20          | 11.56       |

**Middle Channel: 5202.5 MHz**

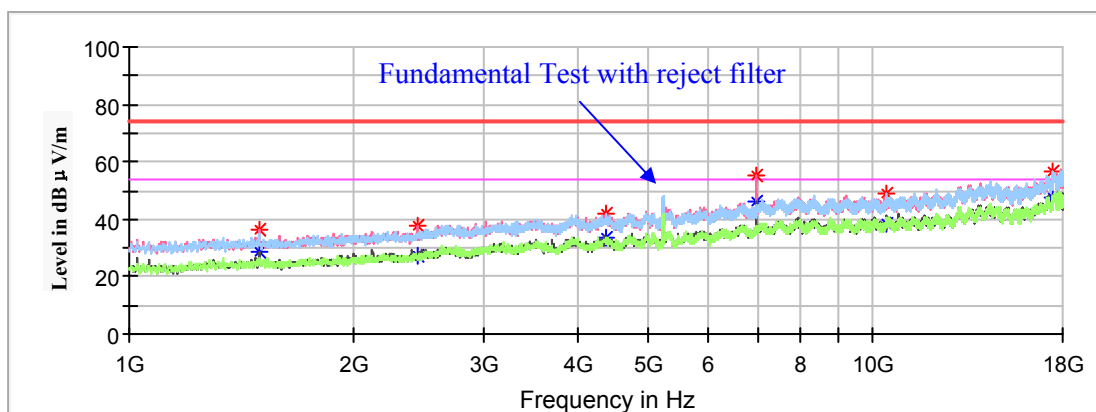
Full Spectrum



| Frequency (MHz) | Corrected Amplitude    |                        | Rx Antenna  |             | Turntable Degree | Correct Factor (dB/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
|-----------------|------------------------|------------------------|-------------|-------------|------------------|-----------------------|----------------------|-------------|
|                 | MaxPeak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) | Height (cm) | Polar (H/V) |                  |                       |                      |             |
| 1345.100000     | ---                    | 25.79                  | 150.0       | V           | 234.0            | -17.2                 | 54.00                | 28.21       |
| 1345.100000     | 36.90                  | ---                    | 150.0       | V           | 234.0            | -17.2                 | 74.00                | 37.10       |
| 2630.300000     | 35.59                  | ---                    | 150.0       | V           | 160.0            | -11.8                 | 68.20                | 32.61       |
| 3951.200000     | ---                    | 32.06                  | 200.0       | H           | 79.0             | -7.2                  | 54.00                | 21.94       |
| 3951.200000     | 41.75                  | ---                    | 200.0       | H           | 79.0             | -7.2                  | 74.00                | 32.25       |
| 6936.400000     | 55.01                  | ---                    | 200.0       | V           | 76.0             | -0.2                  | 68.20                | 13.19       |
| 10405.000000    | 48.40                  | ---                    | 200.0       | V           | 0.0              | 2.3                   | 68.20                | 19.80       |
| 17525.700000    | 56.13                  | ---                    | 150.0       | V           | 68.0             | 8.9                   | 68.20                | 12.07       |

**High Channel: 5222.5 MHz**

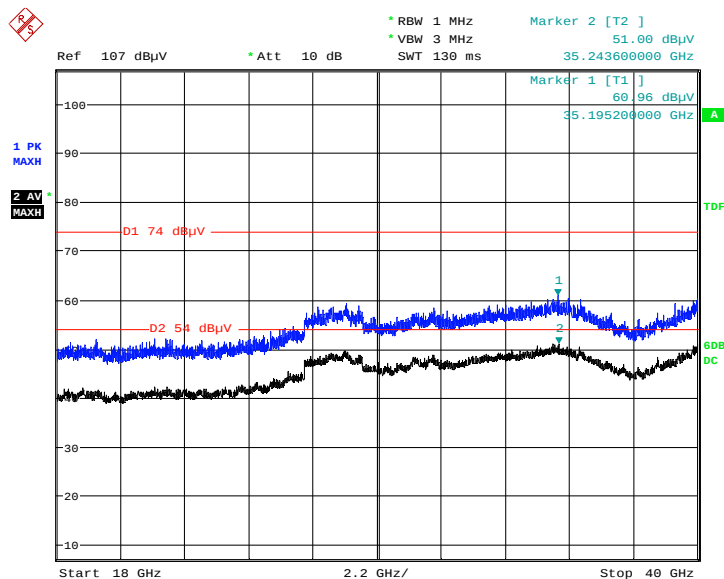
Full Spectrum



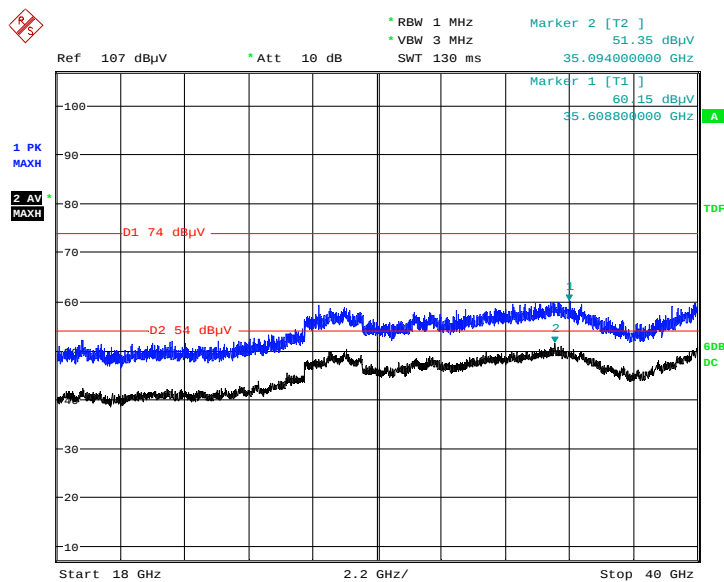
| Frequency (MHz) | Corrected Amplitude |                  | Rx Antenna  |             | Turntable Degree | Correct Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|------------------|-------------|-------------|------------------|-----------------------|----------------|-------------|
|                 | MaxPeak (dBμV/m)    | Average (dBμV/m) | Height (cm) | Polar (H/V) |                  |                       |                |             |
| 1494.700000     | ---                 | 28.42            | 150.0       | V           | 142.0            | -16.4                 | 54.00          | 25.58       |
| 1494.700000     | 36.54               | ---              | 150.0       | V           | 142.0            | -16.4                 | 74.00          | 37.46       |
| 2436.500000     | 37.86               | ---              | 200.0       | V           | 26.0             | -12.7                 | 68.20          | 30.34       |
| 4366.000000     | ---                 | 33.69            | 150.0       | H           | 5.0              | -6.4                  | 54.00          | 20.31       |
| 4366.000000     | 42.06               | ---              | 150.0       | H           | 5.0              | -6.4                  | 74.00          | 31.94       |
| 6963.600000     | 55.09               | ---              | 150.0       | V           | 186.0            | -0.1                  | 68.20          | 13.11       |
| 10445.000000    | 48.64               | ---              | 150.0       | H           | 0.0              | 2.3                   | 68.20          | 19.56       |
| 17498.500000    | 56.65               | ---              | 200.0       | H           | 323.0            | 8.9                   | 68.20          | 11.55       |

**18GHz-40GHz:**

Pre-scan with low, middle, high channel in the X, Y and Z axes of orientation, the worst case **low channel in Z-axis of orientation** was recorded

**Horizontal**

Date: 19.MAY.2020 08:55:07

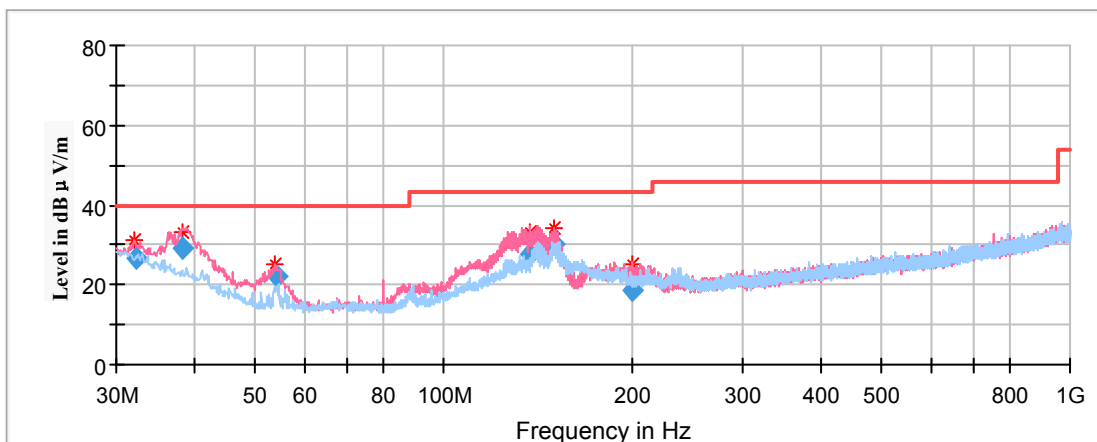
**Vertical**

Date: 19.MAY.2020 09:13:38

**5762.5-5822.5 MHz:**

**30MHz-1GHz:**

Pre-scan with low, middle, high channel in the X, Y and Z axes of orientation, the worst case **low channel in Z-axis of orientation** was recorded



| Frequency<br>(MHz) | Corrected<br>Amplitude | Rx Antenna     |                | Turntable<br>Degree | Correct<br>Factor<br>(dB/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
|--------------------|------------------------|----------------|----------------|---------------------|-----------------------------|-------------------|----------------|
|                    | QuasiPeak<br>(dBμV/m)  | Height<br>(cm) | Polar<br>(H/V) |                     |                             |                   |                |
| 32.386400          | 26.81                  | 100.0          | V              | 134.0               | -5.6                        | 40.00             | 13.19          |
| 38.369100          | 29.27                  | 100.0          | V              | 92.0                | -9.6                        | 40.00             | 10.73          |
| 53.994350          | 22.19                  | 200.0          | V              | 161.0               | -17.7                       | 40.00             | 17.81          |
| 137.335000         | 27.73                  | 100.0          | V              | 182.0               | -11.9                       | 43.50             | 15.77          |
| 150.483800         | 30.29                  | 100.0          | V              | 139.0               | -12.3                       | 43.50             | 13.21          |
| 199.801850         | 18.86                  | 100.0          | V              | 229.0               | -12.3                       | 43.50             | 24.64          |

**1GHz-18GHz:**

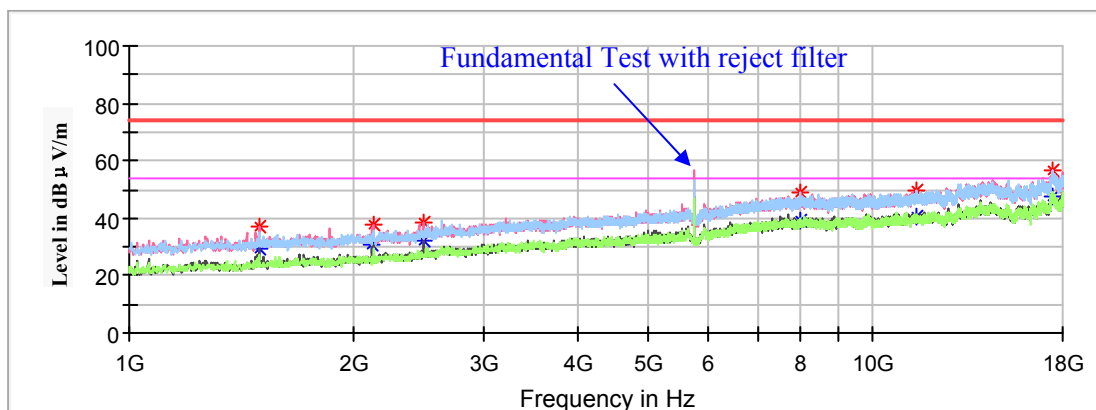
(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor  
Corrected Amplitude = Corrected Factor + Reading  
Margin = Limit - Corrected. Amplitude

**Low Channel: 5762.5 MHz**

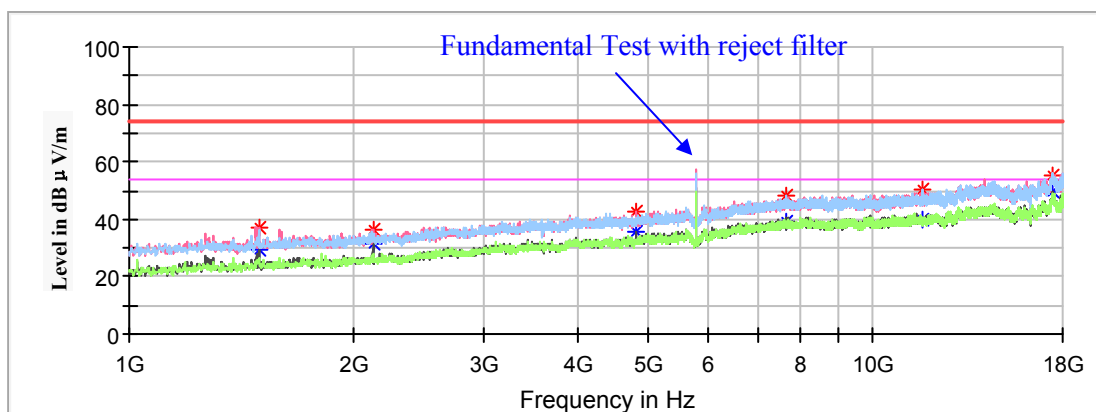
Full Spectrum



| Frequency (MHz) | Corrected Amplitude |                  | Rx Antenna  |             | Turntable Degree | Correct Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|------------------|-------------|-------------|------------------|-----------------------|----------------|-------------|
|                 | MaxPeak (dBμV/m)    | Average (dBμV/m) | Height (cm) | Polar (H/V) |                  |                       |                |             |
| 1493.000000     | ---                 | 29.71            | 150.0       | V           | 176.0            | -16.4                 | 54.00          | 24.29       |
| 1493.000000     | 37.02               | ---              | 150.0       | V           | 176.0            | -16.4                 | 74.00          | 36.98       |
| 2123.700000     | 37.48               | ---              | 200.0       | V           | 285.0            | -14.0                 | 68.20          | 30.72       |
| 2487.500000     | 38.61               | ---              | 150.0       | V           | 273.0            | -12.5                 | 74.00          | 35.39       |
| 2487.500000     | ---                 | 31.84            | 150.0       | V           | 273.0            | -12.5                 | 54.00          | 22.16       |
| 7968.300000     | 48.72               | ---              | 200.0       | H           | 1.0              | 1.8                   | 68.20          | 19.48       |
| 11525.000000    | 49.40               | ---              | 150.0       | H           | 0.0              | 2.8                   | 74.00          | 24.60       |
| 11525.000000    | ---                 | 40.59            | 150.0       | H           | 0.0              | 2.8                   | 54.00          | 13.41       |
| 17462.800000    | 56.55               | ---              | 150.0       | H           | 47.0             | 8.8                   | 68.20          | 11.65       |

**Middle Channel: 5782.5 MHz**

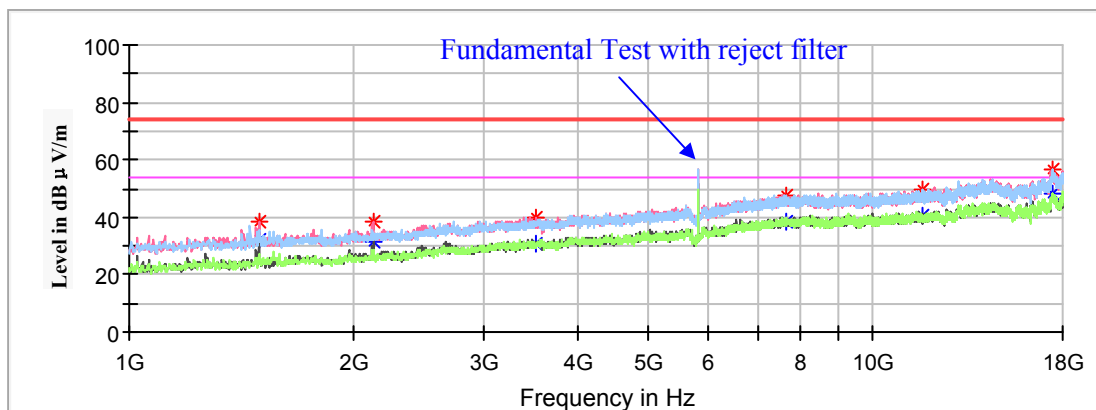
Full Spectrum



| Frequency (MHz) | Corrected Amplitude |                  | Rx Antenna  |             | Turntable Degree | Correct Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|------------------|-------------|-------------|------------------|-----------------------|----------------|-------------|
|                 | MaxPeak (dBμV/m)    | Average (dBμV/m) | Height (cm) | Polar (H/V) |                  |                       |                |             |
| 1493.000000     | ---                 | 29.68            | 150.0       | V           | 36.0             | -16.4                 | 54.00          | 24.32       |
| 1493.000000     | 37.33               | ---              | 150.0       | V           | 36.0             | -16.4                 | 74.00          | 36.67       |
| 2127.100000     | 36.57               | ---              | 150.0       | V           | 224.0            | -13.9                 | 68.20          | 31.63       |
| 4811.400000     | ---                 | 35.72            | 150.0       | V           | 327.0            | -5.6                  | 54.00          | 18.28       |
| 4811.400000     | 42.72               | ---              | 150.0       | V           | 327.0            | -5.6                  | 74.00          | 31.28       |
| 7630.000000     | 48.02               | ---              | 200.0       | H           | 83.0             | 1.2                   | 74.00          | 25.98       |
| 7630.000000     | ---                 | 39.37            | 200.0       | H           | 83.0             | 1.2                   | 54.00          | 14.63       |
| 11565.000000    | ---                 | 40.16            | 200.0       | H           | 21.0             | 3.1                   | 54.00          | 13.84       |
| 11565.000000    | 50.04               | ---              | 200.0       | H           | 21.0             | 3.1                   | 74.00          | 23.96       |
| 17464.500000    | 55.59               | ---              | 150.0       | V           | 20.0             | 8.8                   | 68.20          | 12.61       |

**High Channel: 5822.5 MHz**

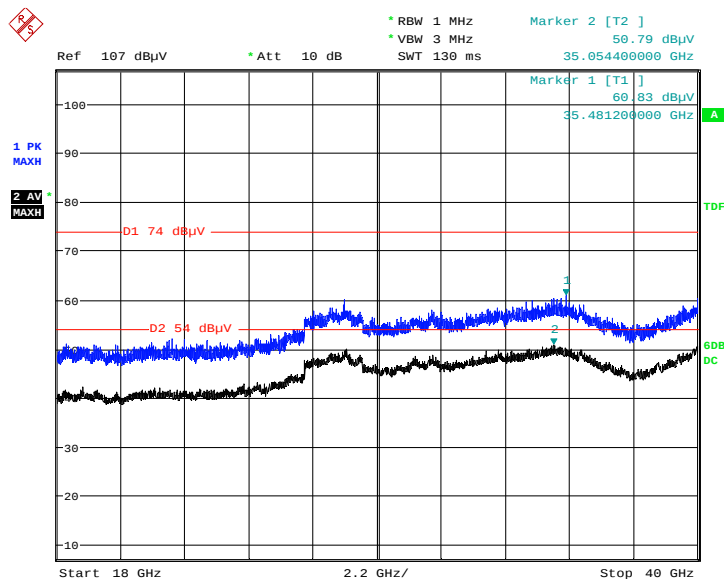
Full Spectrum



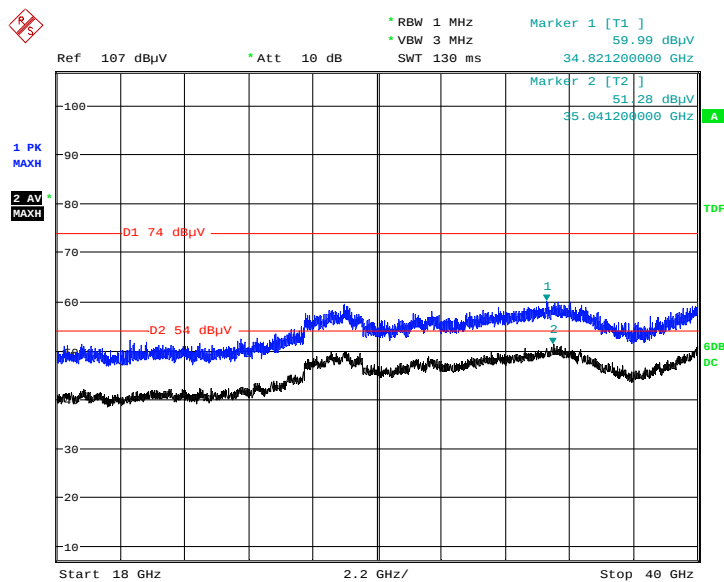
| Frequency (MHz) | Corrected Amplitude |                  | Rx Antenna  |             | Turntable Degree | Correct Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|------------------|-------------|-------------|------------------|-----------------------|----------------|-------------|
|                 | MaxPeak (dBμV/m)    | Average (dBμV/m) | Height (cm) | Polar (H/V) |                  |                       |                |             |
| 1493.000000     | ---                 | 32.25            | 150.0       | V           | 313.0            | -16.4                 | 54.00          | 21.75       |
| 1493.000000     | 38.80               | ---              | 150.0       | V           | 313.0            | -16.4                 | 74.00          | 35.20       |
| 2125.400000     | 38.17               | ---              | 200.0       | V           | 283.0            | -14.0                 | 68.20          | 30.03       |
| 3533.000000     | 40.14               | ---              | 200.0       | V           | 53.0             | -8.7                  | 68.20          | 28.06       |
| 7636.800000     | ---                 | 38.81            | 200.0       | V           | 340.0            | 1.2                   | 54.00          | 15.19       |
| 7636.800000     | 47.44               | ---              | 200.0       | V           | 340.0            | 1.2                   | 74.00          | 26.56       |
| 11645.000000    | 49.43               | ---              | 150.0       | H           | 80.0             | 3.1                   | 74.00          | 24.57       |
| 11645.000000    | ---                 | 40.81            | 150.0       | H           | 80.0             | 3.1                   | 54.00          | 13.19       |
| 17467.500000    | 56.80               | ---              | 200.0       | H           | 73.0             | 8.9                   | 68.20          | 11.40       |

**18GHz-40GHz:**

Pre-scan with low, middle, high channel in the X, Y and Z axes of orientation, the worst case **low channel in Z-axis of orientation** was recorded

**Horizontal**

Date: 19.MAY.2020 09:23:02

**Vertical**

Date: 19.MAY.2020 09:32:29

**Restricted Bands Emissions Test:**

Note:

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

Corrected Amplitude = Corrected Factor + Reading

Margin = Limit - Corrected. Amplitude

*(Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)***5182.5-5222.5 MHz band:**

| Frequency<br>(MHz)       | Corrected Amplitude |                     | Rx Antenna     |                | Turntable<br>Degree | Correct<br>Factor<br>(dB/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
|--------------------------|---------------------|---------------------|----------------|----------------|---------------------|-----------------------------|-------------------|----------------|
|                          | MaxPeak<br>(dBμV/m) | Average<br>(dBμV/m) | Height<br>(cm) | Polar<br>(H/V) |                     |                             |                   |                |
| Low Channel: 5182.5 MHz  |                     |                     |                |                |                     |                             |                   |                |
| 5150.00                  | 53.58               | ---                 | 200.0          | V              | 1.0                 | 5.2                         | 74.00             | 20.42          |
| 5150.00                  | ---                 | 47.91               | 200.0          | V              | 1.0                 | 5.2                         | 54.00             | 6.09           |
| High Channel: 5222.5 MHz |                     |                     |                |                |                     |                             |                   |                |
| 5350.00                  | ---                 | 48.42               | 150.0          | V              | 44.0                | 5.7                         | 54.00             | 5.58           |
| 5350.00                  | 56.11               | ---                 | 150.0          | V              | 44.0                | 5.7                         | 74.00             | 17.89          |

**5762.5-5822.5 MHz band:**

| Frequency<br>(MHz)       | Corrected Amplitude |                     | Rx Antenna     |                | Turntable<br>Degree | Correct<br>Factor<br>(dB/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
|--------------------------|---------------------|---------------------|----------------|----------------|---------------------|-----------------------------|-------------------|----------------|
|                          | MaxPeak<br>(dBμV/m) | Average<br>(dBμV/m) | Height<br>(cm) | Polar<br>(H/V) |                     |                             |                   |                |
| Low Channel: 5762.5 MHz  |                     |                     |                |                |                     |                             |                   |                |
| 5650.00                  | 56.37               | ---                 | 200.0          | V              | 240.0               | 6.4                         | 68.20             | 11.83          |
| 5700.00                  | 56.39               | ---                 | 200.0          | V              | 2.0                 | 6.5                         | 105.20            | 48.81          |
| 5720.00                  | 54.28               | ---                 | 150.0          | V              | 354.0               | 6.5                         | 110.80            | 56.52          |
| 5725.00                  | 54.70               | ---                 | 150.0          | V              | 28.0                | 6.5                         | 122.20            | 67.50          |
| High Channel: 5822.5 MHz |                     |                     |                |                |                     |                             |                   |                |
| 5850.00                  | 54.12               | ---                 | 150.0          | V              | 265.0               | 6.7                         | 122.20            | 68.08          |
| 5855.00                  | 53.51               | ---                 | 150.0          | V              | 208.0               | 6.7                         | 110.80            | 57.29          |
| 5875.00                  | 54.63               | ---                 | 150.0          | V              | 2.0                 | 6.8                         | 105.20            | 50.57          |
| 5925.00                  | 53.67               | ---                 | 150.0          | V              | 234.0               | 6.9                         | 68.20             | 14.53          |

## FCC §15.407(a) & §15.407(e) – EMISSION BANDWIDTH

### Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz band is made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### Test Procedure

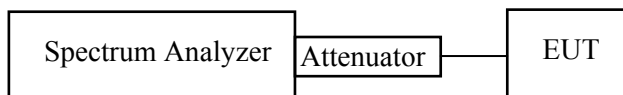
#### 1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

#### 2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 24.5 °C   |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 101.2 kPa |

The testing was performed by Lee Li on 2020-04-26.

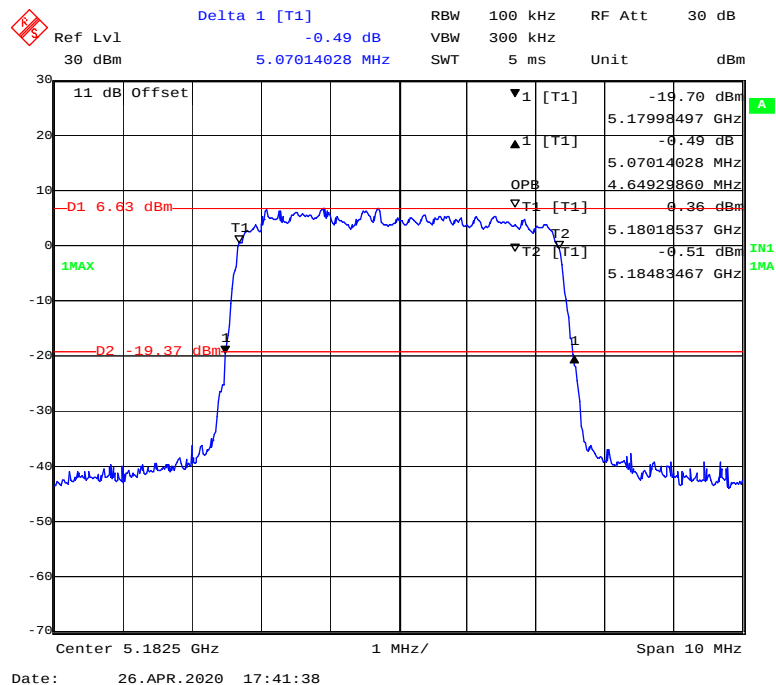
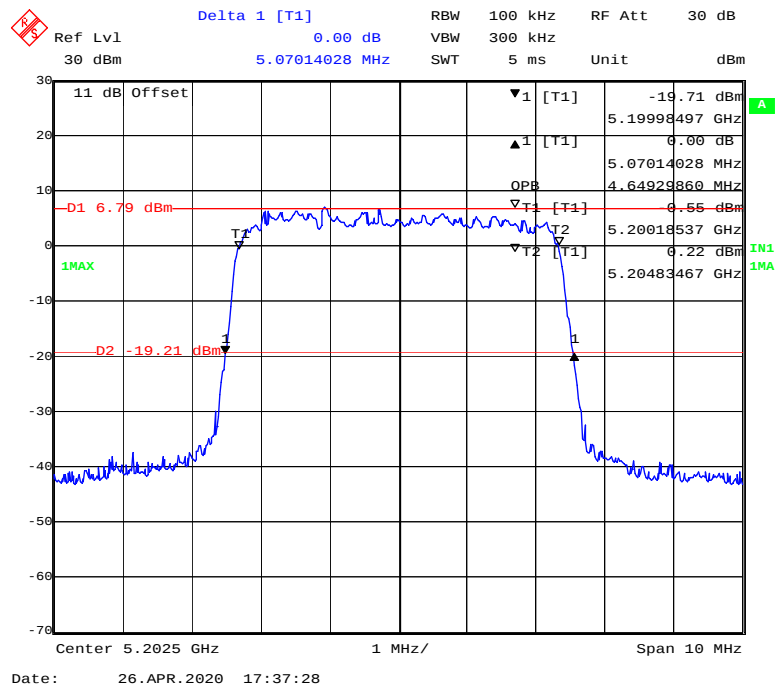
**Test Result:** Compliant

**5182.5-5222.5 MHz:**

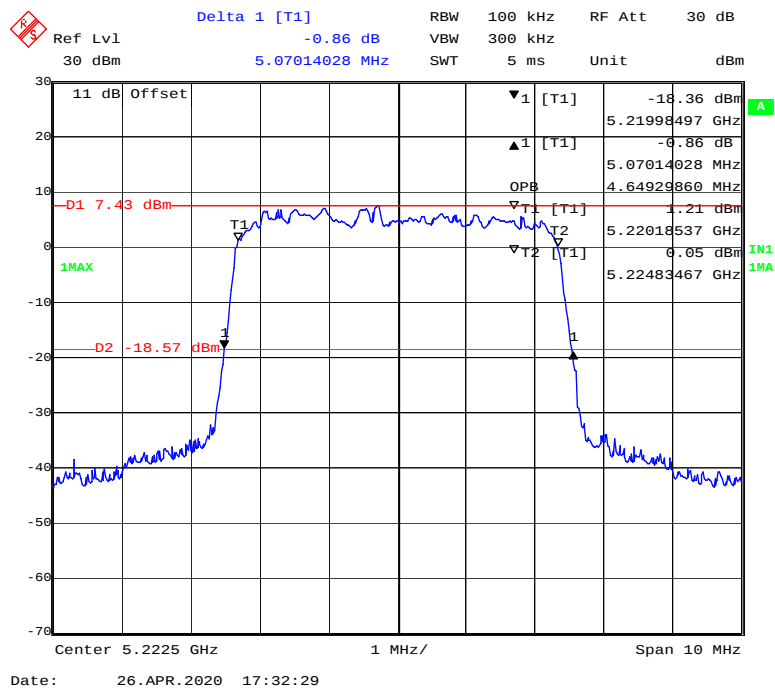
| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>26dB Bandwidth<br/>(MHz)</b> | <b>99% Bandwidth<br/>(MHz)</b> |
|----------------|----------------------------|---------------------------------|--------------------------------|
| Low            | 5182.5                     | 5.070                           | 4.649                          |
| Middle         | 5202.5                     | 5.070                           | 4.649                          |
| High           | 5222.5                     | 5.070                           | 4.649                          |

**5762.5-5822.5MHz:**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>6dB Bandwidth<br/>(MHz)</b> | <b>99% Bandwidth<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------------|--------------------------------|
| Low            | 5762.5                     | 4.549                          | 4.649                          |
| Middle         | 5782.5                     | 4.569                          | 4.649                          |
| High           | 5822.5                     | 4.589                          | 4.649                          |

**5182.5-5222.5 MHz:****26 Bandwidth & 99% Occupied Bandwidth****Frequency: 5182.5 MHz****Frequency: 5202.5 MHz**

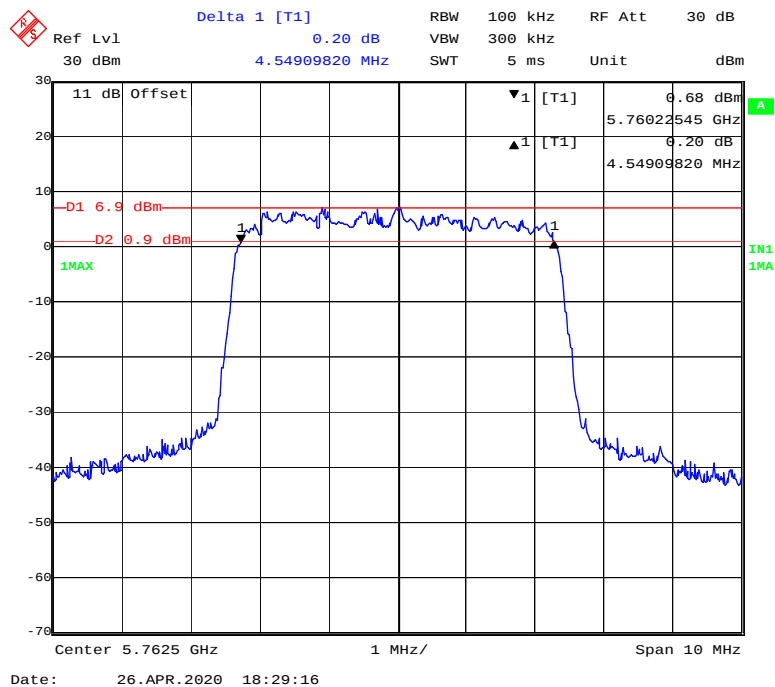
### Frequency: 5222.5 MHz



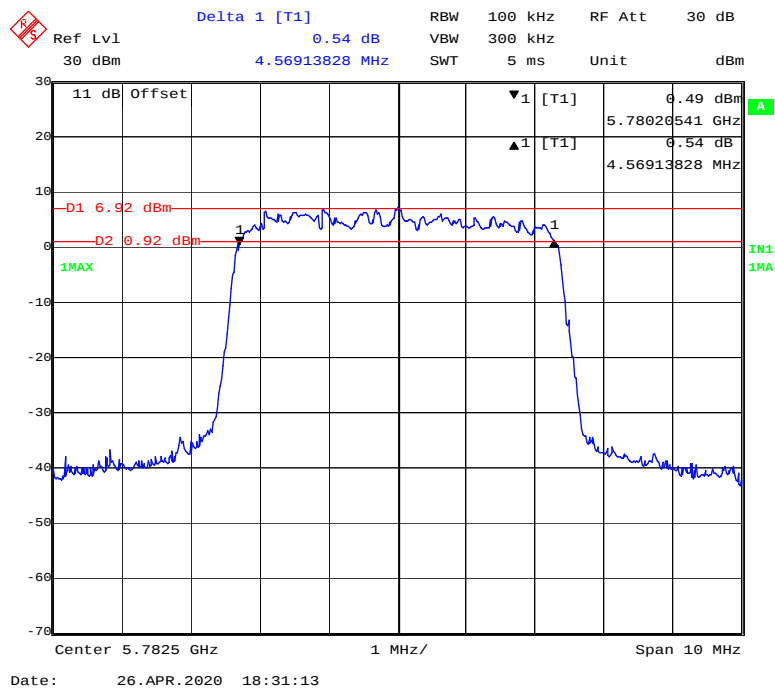
5762.5-5822.5 MHz

6 Bandwidth

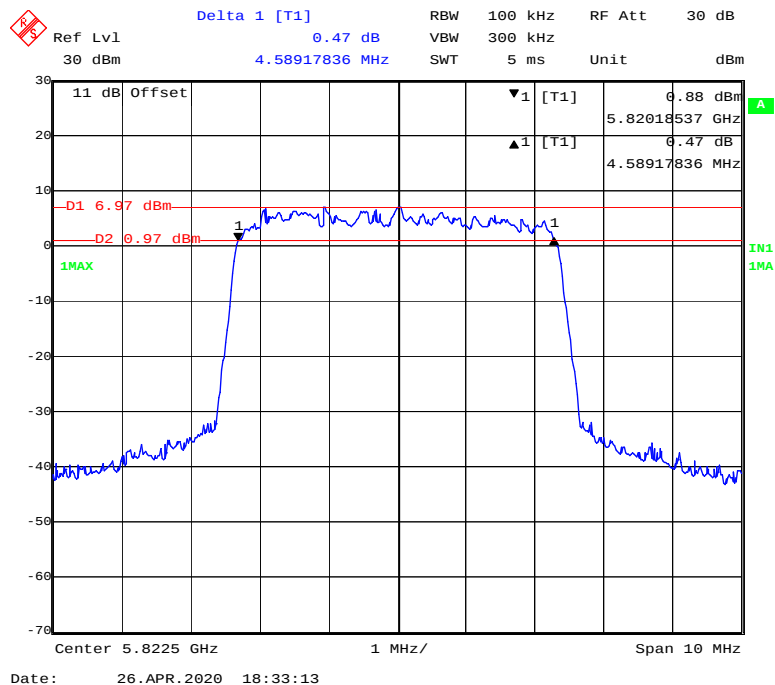
### Frequency: 5762.5 MHz



### Frequency: 5782.5 MHz

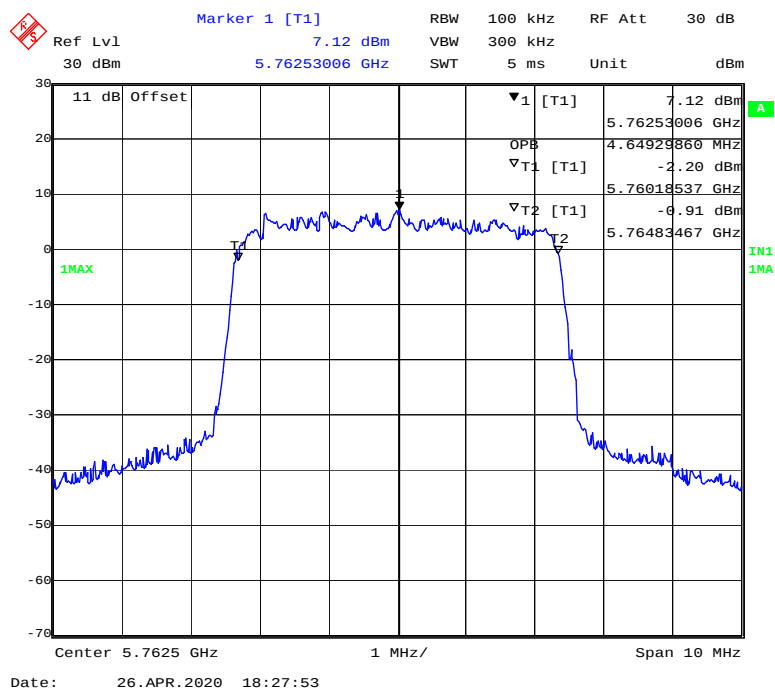


### Frequency: 5822.5 MHz

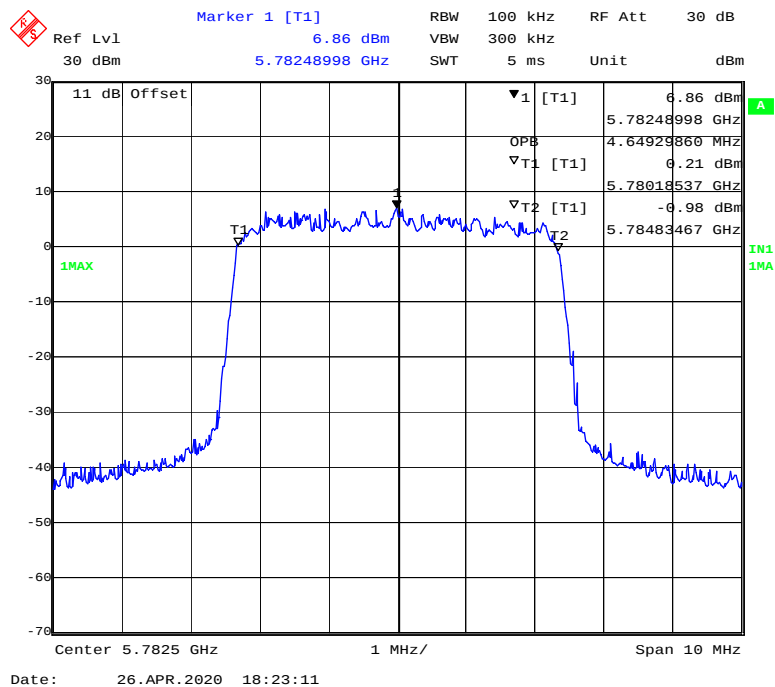


# 99% Occupied Bandwidth

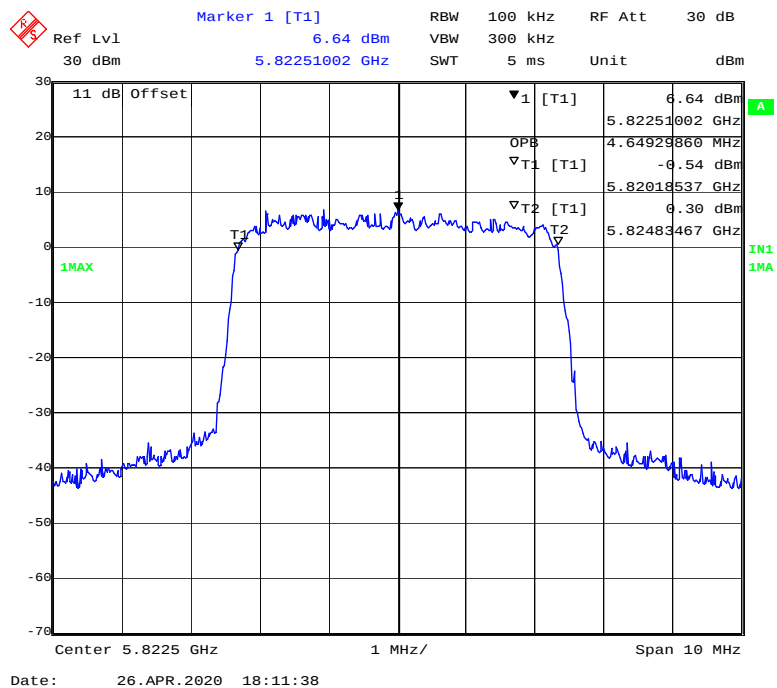
Frequency: 5762.5 MHz



Frequency: 5782.5 MHz



# Frequency: 5822.5 MHz



## **FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER**

### **Applicable Standard**

According to §15.407(a) (1)

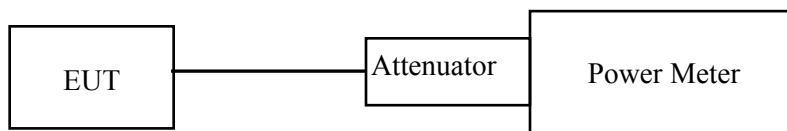
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

According to §15.407(a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### **Test Procedure**

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 24.2 °C   |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 101.3 kPa |

The testing was performed by Lee Li on 2020-04-26.

Test Mode: Transmitting

| Frequency Range (MHz) | Frequency (MHz) | Average Conducted Output Power (dBm) | Limit (dBm) | Result |
|-----------------------|-----------------|--------------------------------------|-------------|--------|
| 5182.5-5222.5 MHz     | 5182.5          | 15.09                                | 30          | PASS   |
|                       | 5202.5          | 14.86                                | 30          | PASS   |
|                       | 5222.5          | 14.96                                | 30          | PASS   |
| 5762.5-5822.5 MHz     | 5762.5          | 16.31                                | 30          | PASS   |
|                       | 5782.5          | 16.03                                | 30          | PASS   |
|                       | 5822.5          | 16.18                                | 30          | PASS   |

| Frequency Range(MHz) | Maximum Conducted Output Power (dBm) | Maximum Antenna gain (dBi) | Maximum e.i.r.p (dBm) | e.i.r.p Limit elevation angle above 30 degrees (dBm) | Result |
|----------------------|--------------------------------------|----------------------------|-----------------------|------------------------------------------------------|--------|
| 5182.5-5222.5 MHz    | 15.09                                | 1.0                        | 16.09                 | 21                                                   | PASS   |

## **FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY**

---

### **Applicable Standard**

According to §15.407(a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

According to §15.407(a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### **Test Procedure**

The measurements are base on FCC KDB 789033 D02 General UNII Test Proceдыres New Rules v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Maximum power spectral density (PPSD) ,Method SA-2 (power averaging (rms) detection with trace averaging) was used.

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 24.5 °C   |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 101.3 kPa |

The testing was performed by Lee Li on 2020-07-15

Test Mode: Transmitting

**5182.5-5222.5 MHz:**

| Frequency (MHz) | Reading (dBm/100kHz) | Reading (dBm/MHz) | 10log(1/X) (dB) | PSD (dBm/MHz) | Limit (dBm/MHz) | Result |
|-----------------|----------------------|-------------------|-----------------|---------------|-----------------|--------|
| 5180            | -45.06               | -35.06            | 7.89            | -27.17        | 17              | PASS   |
| 5200            | -47.53               | -37.53            | 7.89            | -29.64        | 17              | PASS   |
| 5220            | -46.93               | -36.93            | 7.89            | -29.04        | 17              | PASS   |

**5762.5-5822.5 MHz:**

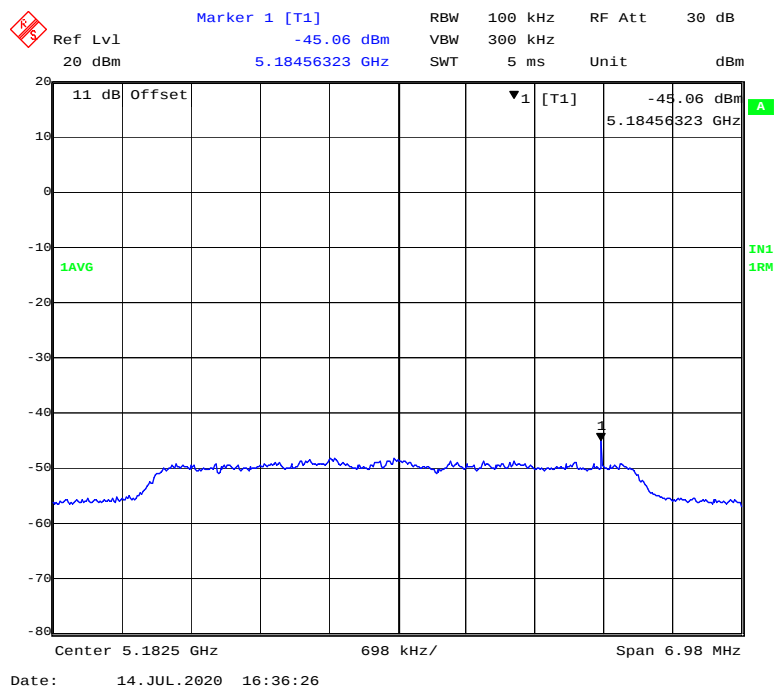
| Frequency (MHz) | Reading (dBm/100kHz) | Reading (dBm/500kHz) | 10log(1/X) (dB) | PSD (dBm/500kHz) | Limit (dBm/500kHz) | Result |
|-----------------|----------------------|----------------------|-----------------|------------------|--------------------|--------|
| 5760            | -44.41               | -37.41               | 7.21            | -30.20           | 30                 | PASS   |
| 5780            | -44.87               | -37.87               | 7.21            | -30.66           | 30                 | PASS   |
| 5820            | -44.23               | -37.23               | 7.21            | -30.02           | 30                 | PASS   |

**Note:**

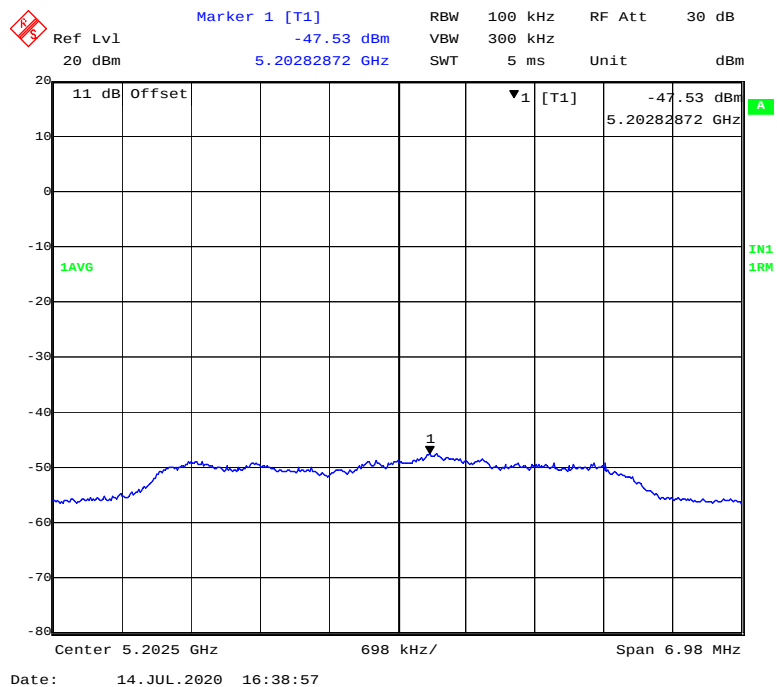
1. “x” means duty cycle.
2. dBm/100kHz conversion to dBm/MHz need add a factor  $10 \cdot \log(500\text{kHz}/100\text{kHz}) = 7.0\text{dB}$

5182.5-5222.5 MHz:

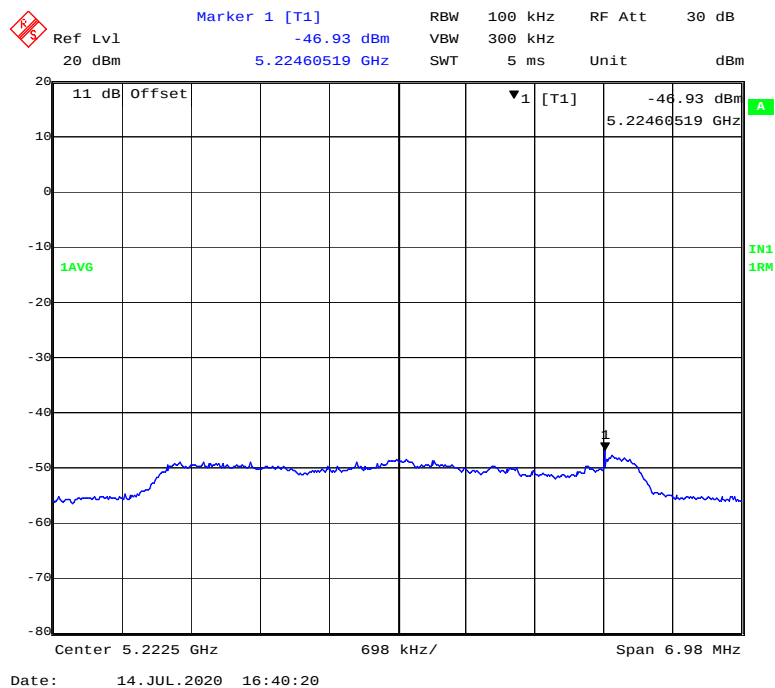
### Power spectral density-5182.5 MHz



### Power spectral density-5202.5 MHz

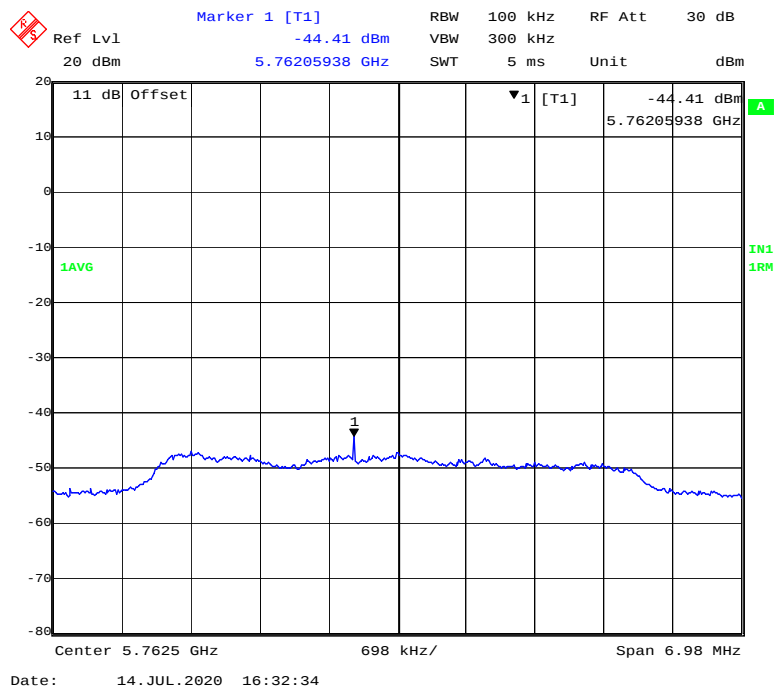


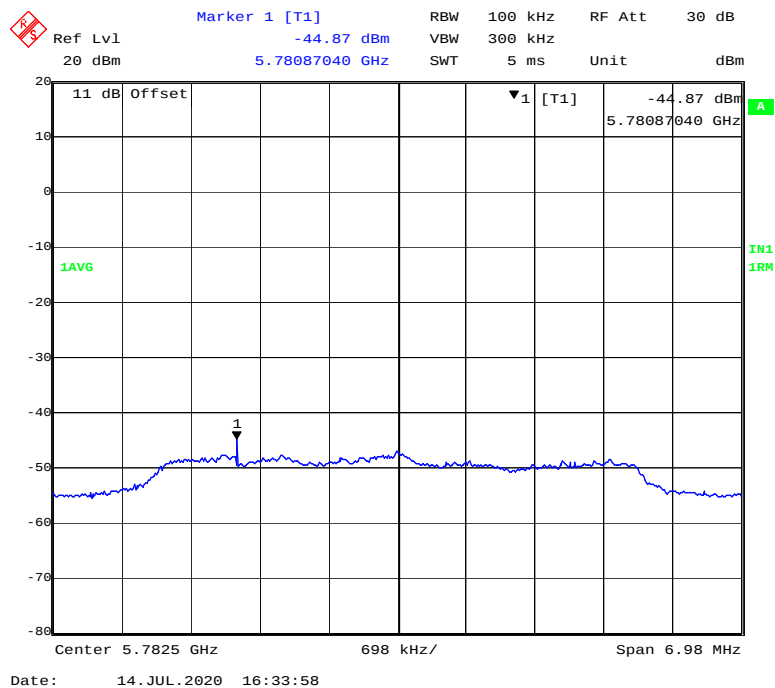
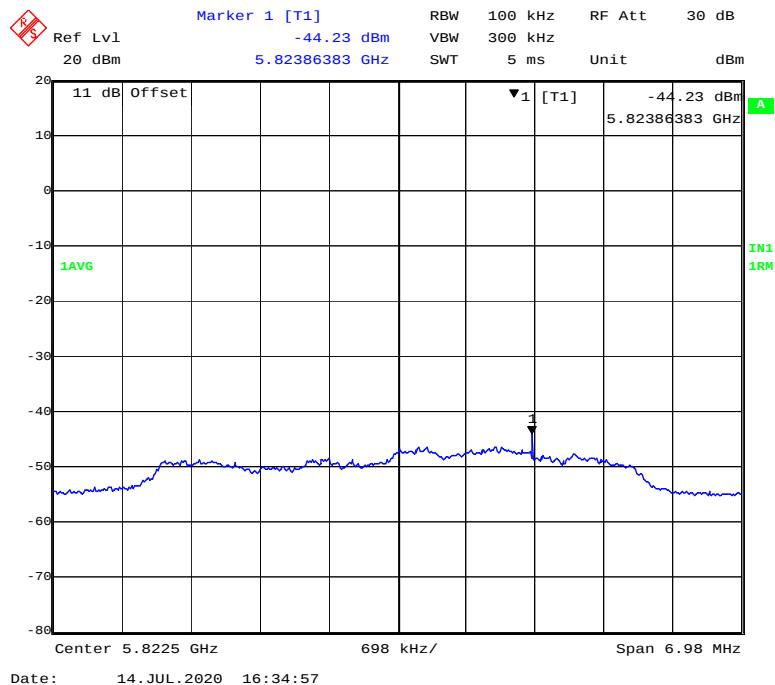
### Power spectral density-5222.5 MHz



5762.5-5822.5 MHz:

### Power spectral density-5762.5 MHz



**Power spectral density-5782.5 MHz****Power spectral density-5822.5 MHz****\*\*\*\*\* END OF REPORT \*\*\*\*\***