

## FCC PART 15.249

## TEST REPORT

For

### Superior Electronics Corporation

No. 10 Lane 31, Chongde St., Sinyi District, Taipei City, 110, Taiwan

**FCC ID: K4ER400BQ**

|                                        |                                                                                                                                                                                                                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Type:</b><br>Original Report | <b>Product Name:</b><br>Microwave RTE Sensor                                                                                                                                                                                                                                        |
| <b>Report Number:</b> RGMA190104001-00 |                                                                                                                                                                                                                                                                                     |
| <b>Report Date:</b> 2019-01-22         |                                                                                                                                                                                                                                                                                     |
| <b>Reviewed By:</b>                    | <i>Jerry Zhang</i>                                                                                                                                                                                                                                                                  |
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\* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “\*” .

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## GENERAL INFORMATION

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

|                             |                         |
|-----------------------------|-------------------------|
| <b>EUT Name:</b>            | Microwave RTE Sensor    |
| <b>EUT Model:</b>           | SD-R400-BQ              |
| <b>Rated Input Voltage:</b> | 12-24VDC                |
| <b>External Dimension:</b>  | 80mm(L)*60mm(W)*54mm(H) |
| <b>Serial Number:</b>       | 190104001               |
| <b>EUT Received Date:</b>   | 2019.01.08              |

### Objective

This type approval report is prepared on behalf of **Superior Electronics Corporation** 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 Rules Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

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

N/A.

### 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. (Dongguan).

### Measurement Uncertainty

| Parameter                         | Measurement Uncertainty                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Occupied Channel Bandwidth        | ±5 %                                                                                                                                                         |
| Unwanted Emissions, radiated      | 30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical<br>200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical<br>1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB |
| Temperature                       | ±1°C                                                                                                                                                         |
| Humidity                          | ±5%                                                                                                                                                          |
| DC and low frequency voltages     | ±0.4%                                                                                                                                                        |
| Duty Cycle                        | 1%                                                                                                                                                           |
| AC Power Lines Conducted Emission | 3.12 dB (150 kHz to 30 MHz)                                                                                                                                  |

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxihu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

## SYSTEM TEST CONFIGURATION

### Justification

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

The device operates on frequency: 24150 MHz

### EUT Exercise Software

No software was used in test.

### Equipment Modifications

No modifications were made to the EUT.

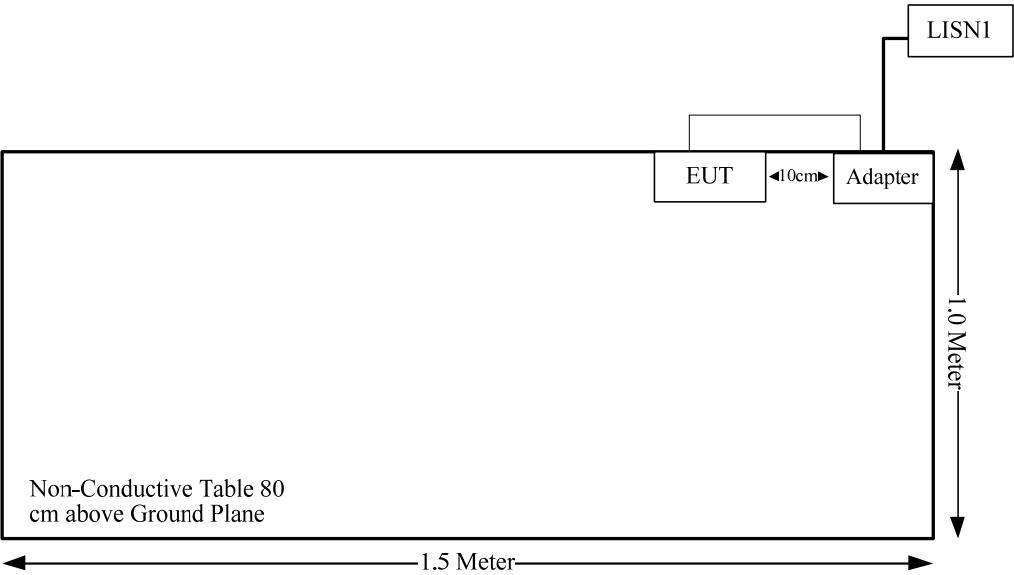
### Local Support Equipment List and Details

| Manufacturer | Description | Model    | Serial Number |
|--------------|-------------|----------|---------------|
| unknown      | adapter     | 2ABB018F | /             |

### Support Cable List and Details

| Cable Description | Shielding Type | Ferrite Core | Length(m) | From    | To  |
|-------------------|----------------|--------------|-----------|---------|-----|
| power cable       | No             | No           | 4         | adapter | EUT |

Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

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

## **FCC§15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

### **Antenna Connector Construction**

The EUT has one internal antenna arrangement, and the antenna gain is 2.15 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

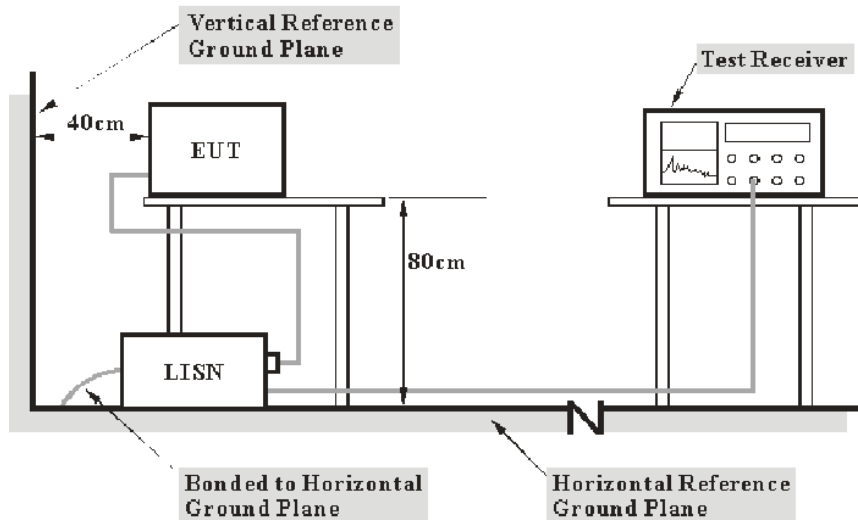
**Result:** Compliant.

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

The spacing between the peripherals was 10 cm.

The adapter was connected to the main LISN with a 120 V/60 Hz AC power source.

### 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 first 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 Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

$V_C$  (cord. Reading): corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN

$C_f$ : Correction Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within 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 Equipment List and Details

| Manufacturer | Description        | Model     | Serial Number | Calibration Date | Calibration Due Date |
|--------------|--------------------|-----------|---------------|------------------|----------------------|
| R&S          | EMI Test Receiver  | ESCS 30   | 830245/006    | 2018-12-10       | 2019-12-10           |
| Unknown      | Coaxial Cable      | C-NJNJ-50 | C-0200-01     | 2018-09-05       | 2019-09-05           |
| R&S          | Test Software      | EMC32     | Version8.53.0 | N/A              | N/A                  |
| R&S          | Two-line V-network | ENV 216   | 101614        | 2018-12-10       | 2019-12-10           |

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

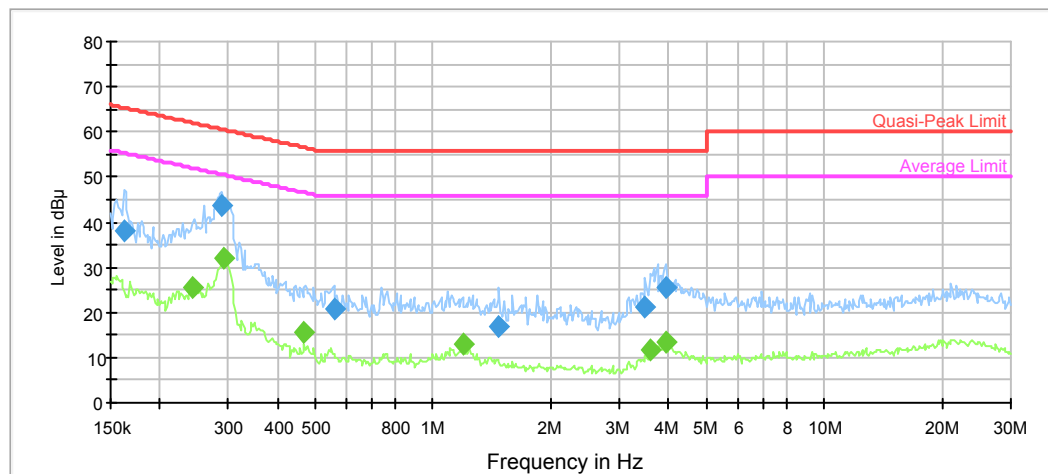
**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25.8 °C   |
| <b>Relative Humidity:</b> | 54 %      |
| <b>ATM Pressure:</b>      | 100.8 kPa |

The testing was performed by Lily Xie on 2019-01-15.

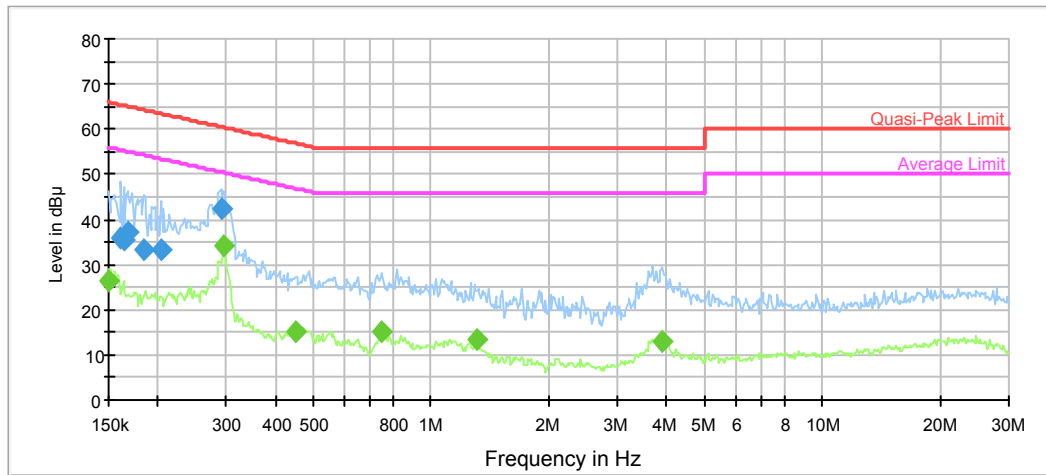
**Test Mode:** Transmitting

**AC120V, 60 Hz, Line:**



| Frequency (MHz) | QuasiPeak (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|------------|
| 0.162441        | 37.9             | 9.000           | L1   | 11.0       | 27.4        | 65.3         | Compliance |
| 0.288307        | 43.6             | 9.000           | L1   | 10.2       | 17.0        | 60.6         | Compliance |
| 0.558572        | 20.6             | 9.000           | L1   | 9.8        | 35.4        | 56.0         | Compliance |
| 1.476605        | 16.9             | 9.000           | L1   | 9.8        | 39.1        | 56.0         | Compliance |
| 3.491417        | 21.0             | 9.000           | L1   | 9.8        | 35.0        | 56.0         | Compliance |
| 3.934683        | 25.4             | 9.000           | L1   | 9.8        | 30.6        | 56.0         | Compliance |

| Frequency (MHz) | Average (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|----------------|-----------------|------|------------|-------------|--------------|------------|
| 0.243884        | 25.5           | 9.000           | L1   | 10.3       | 26.5        | 52.0         | Compliance |
| 0.292938        | 32.2           | 9.000           | L1   | 10.2       | 18.2        | 50.4         | Compliance |
| 0.468757        | 15.6           | 9.000           | L1   | 9.9        | 30.9        | 46.5         | Compliance |
| 1.190776        | 13.1           | 9.000           | L1   | 9.8        | 32.9        | 46.0         | Compliance |
| 3.575883        | 11.7           | 9.000           | L1   | 9.8        | 34.3        | 46.0         | Compliance |
| 3.934683        | 13.2           | 9.000           | L1   | 9.8        | 32.8        | 46.0         | Compliance |

**AC120V, 60 Hz, Neutral:**

| Frequency (MHz) | QuasiPeak (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|------------|
| 0.161152        | 36.0             | 9.000           | N    | 11.0       | 29.4        | 65.4         | Compliance |
| 0.163741        | 35.3             | 9.000           | N    | 11.0       | 29.9        | 65.2         | Compliance |
| 0.167702        | 37.2             | 9.000           | N    | 10.9       | 27.9        | 65.1         | Compliance |
| 0.184529        | 33.5             | 9.000           | N    | 10.7       | 30.8        | 64.3         | Compliance |
| 0.204669        | 33.3             | 9.000           | N    | 10.6       | 30.1        | 63.4         | Compliance |
| 0.290613        | 42.5             | 9.000           | N    | 10.2       | 18.0        | 60.5         | Compliance |

| Frequency (MHz) | Average (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|----------------|-----------------|------|------------|-------------|--------------|------------|
| 0.150000        | 26.5           | 9.000           | N    | 11.2       | 29.5        | 56.0         | Compliance |
| 0.295282        | 34.3           | 9.000           | N    | 10.2       | 16.1        | 50.4         | Compliance |
| 0.450448        | 15.3           | 9.000           | N    | 9.9        | 31.6        | 46.9         | Compliance |
| 0.750100        | 15.0           | 9.000           | N    | 9.8        | 31.0        | 46.0         | Compliance |
| 1.310256        | 13.4           | 9.000           | N    | 9.8        | 32.6        | 46.0         | Compliance |
| 3.903455        | 13.0           | 9.000           | N    | 9.8        | 33.0        | 46.0         | Compliance |

**FCC§15.205, §15.209&§15.249- 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:

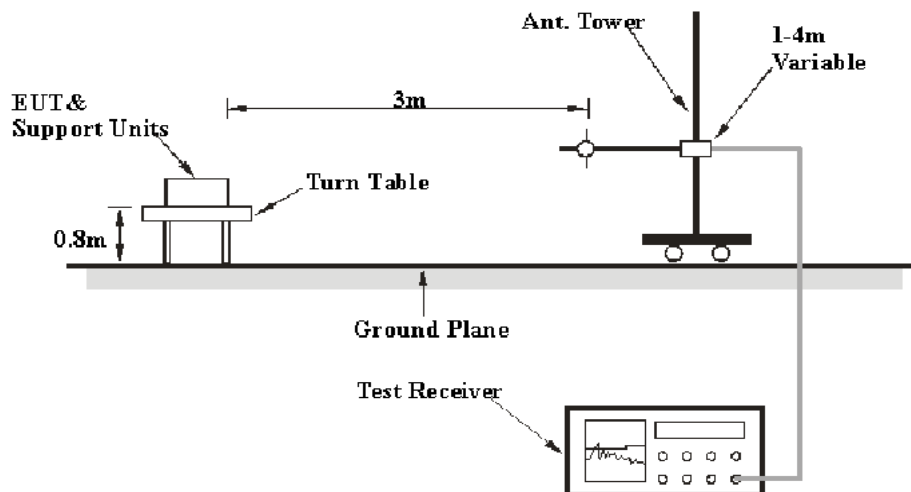
| Fundamental frequency | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|-----------------------|--------------------------------------------------|------------------------------------------------|
| 902–928 MHz           | 50                                               | 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.

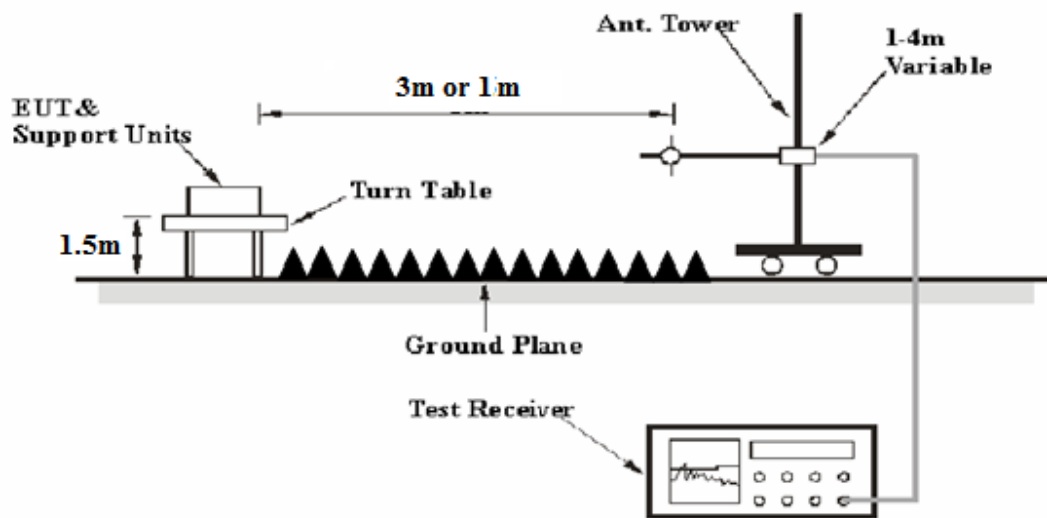
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

**EUT Setup**

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters chamber, 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.

According to C63.10, the above 26.5 GHz test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1 m

Distance extrapolation factor =  $20 \log (\text{specific distance [3m]}/\text{test distance [1m]})$  dB

Extrapolation result = Corrected Amplitude (dB $\mu$ V/m) - distance extrapolation factor (9.54dB)

For above 40GHz, external harmonic mixers are utilized. The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations, at the distance of 0.5m from the EUT. The Mixers and it's RF cables is compose a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

### Test Equipment Setup

The system was investigated from 30 MHz to 100 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

| Frequency Range   | RBW     | Video B/W | IF B/W  | Measurement |
|-------------------|---------|-----------|---------|-------------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz   | 120 kHz | QP          |
| Above 1 GHz       | 1MHz    | 3 MHz     | /       | PK          |
|                   | 1MHz    | 10 Hz     | /       | AV          |

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

## Test Procedure

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

All data was recorded in the Quasi-peak detection mode from 30 MHz to 1GHz, peak and average detection mode above 1 GHz.

## 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:

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

**Test Equipment List and Details**

| Manufacturer          | Description       | Model                    | Serial Number        | Calibration Date | Calibration Due Date |
|-----------------------|-------------------|--------------------------|----------------------|------------------|----------------------|
| R&S                   | EMI Test Receiver | ESCI                     | 100224               | 2018-12-10       | 2019-12-10           |
| Sunol Sciences        | Antenna           | JB3                      | A060611-1            | 2017-11-10       | 2020-11-10           |
| HP                    | Amplifier         | 8447D                    | 2727A05902           | 2018-09-05       | 2019-09-05           |
| Unknown               | Coaxial Cable     | C-NJNJ-50                | C-0400-01            | 2018-09-05       | 2019-09-05           |
| Unknown               | Coaxial Cable     | C-NJNJ-50                | C-0075-01            | 2018-09-05       | 2019-09-05           |
| R&S                   | Spectrum Analyzer | FSU 26                   | 200256               | 2019-01-04       | 2020-01-04           |
| R&S                   | Spectrum Analyzer | 8564E                    | 3943A01781           | 2019-01-04       | 2020-01-04           |
| TDK RF                | Horn Antenna      | HRN-0118                 | 130 084              | 2018-10-12       | 2021-10-12           |
| Ducommun Technologies | Horn Antenna      | ARH-4223-02              | 1007726-01<br>1304   | 2016-11-18       | 2019-11-18           |
| Ducommun Technologies | Horn Antenna      | ARH-2823-02              | 1007726-01<br>1302   | 2016-11-18       | 2019-11-18           |
| OML                   | Harmonic Mixer    | WR19/M19HWD              | U60313-1             | 2016-10-14       | 2019-10-14           |
| OML                   | Horn Antenna      | M19RH                    | 11648-01             | 2016-10-14       | 2019-10-14           |
| OML                   | Harmonic Mixer    | WR12/M12HWD              | E60120-1             | 2016-10-19       | 2019-10-19           |
| OML                   | Horn Antenna      | M12RH                    | E60120-2             | 2016-10-19       | 2019-10-19           |
| OML                   | Harmonic Mixer    | WR08/M08HWD              | F60313-1             | 2016-10-24       | 2019-10-24           |
| OML                   | Horn Antenna      | M08RH                    | F60313-2             | 2016-10-24       | 2019-10-24           |
| MICRO-COAX            | Coaxial Cable     | UFA147-1-2362-<br>100100 | 64639 231029-<br>001 | 2018-02-24       | 2019-02-28           |
| Mini                  | Pre-amplifier     | ZVA-183-S+               | 5969001149           | 2018-09-05       | 2019-09-05           |
| Quinstar              | Amplifier         | QLW-18405536-JO          | 15964001001          | 2018-06-27       | 2019-06-27           |
| Farad                 | Test Software     | EZ-EMC                   | V1.1.4.2             | N/A              | N/A                  |

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

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

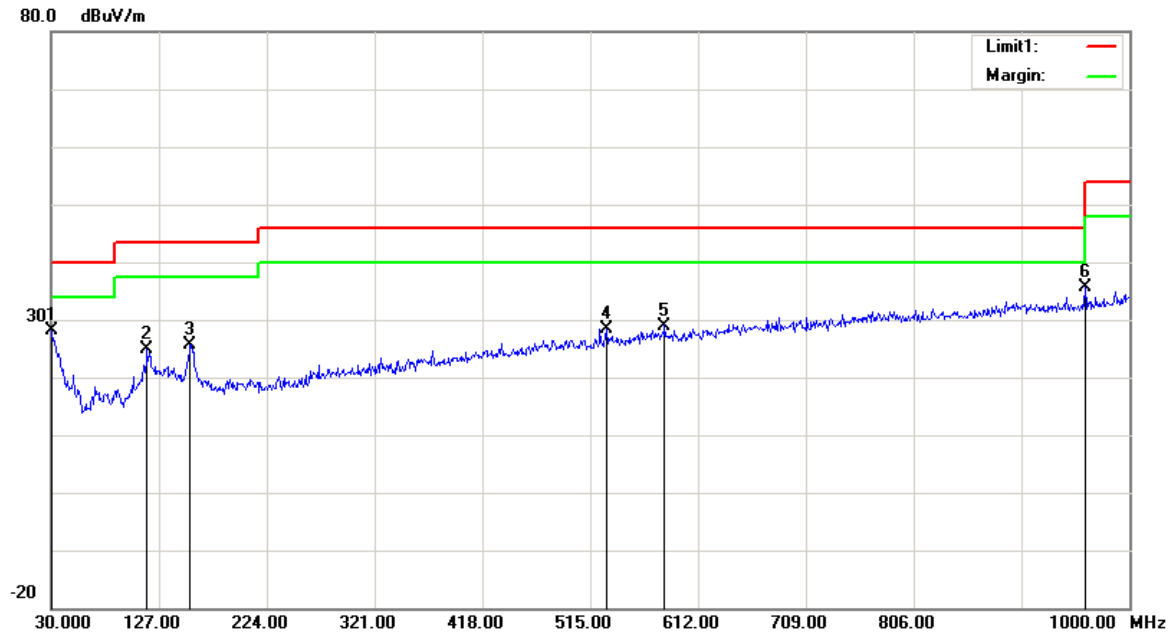
|                           |                 |
|---------------------------|-----------------|
| <b>Temperature:</b>       | 23.4~24.3 °C    |
| <b>Relative Humidity:</b> | 43~58 %         |
| <b>ATM Pressure:</b>      | 100.3~100.8 kPa |

The testing was performed by Tyler Pan on 2019-01-15, 2019-01-16.

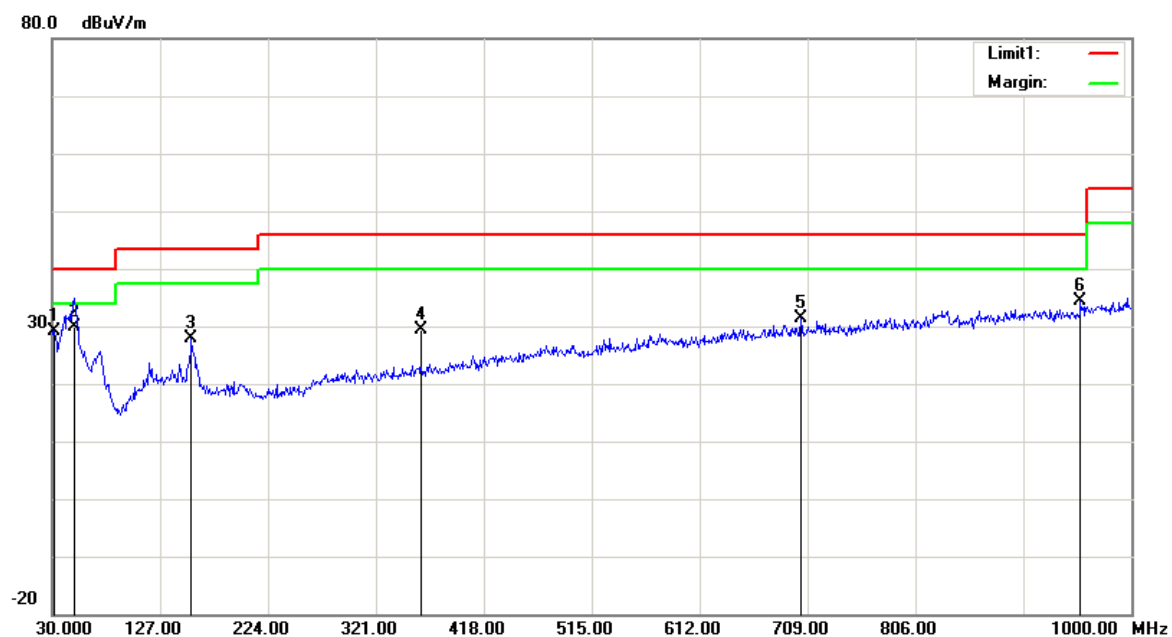
Test Mode: Transmitting

1) 30MHz-1GHz:

Horizontal:



| Frequency (MHz) | Receiver Reading (dBuV) | Detector | Correction Factor (dB/m) | Cord. Amp. (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|-------------------------|----------|--------------------------|---------------------|----------------|-------------|
| 30.0000         | 26.29                   | peak     | 1.72                     | 28.01               | 40.00          | 11.99       |
| 116.3300        | 30.05                   | peak     | -5.13                    | 24.92               | 43.50          | 18.58       |
| 155.1300        | 31.59                   | peak     | -5.87                    | 25.72               | 43.50          | 17.78       |
| 529.5500        | 27.99                   | peak     | 0.39                     | 28.38               | 46.00          | 17.62       |
| 581.9300        | 27.98                   | peak     | 1.02                     | 29.00               | 46.00          | 17.00       |
| 960.2300        | 12.73                   | peak     | 22.90                    | 35.63               | 54.00          | 18.37       |

**Vertical:**

| Frequency (MHz) | Receiver Reading (dBuV) | Detector | Correction Factor (dB/m) | Cord. Amp. (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|-------------------------|----------|--------------------------|---------------------|----------------|-------------|
| 31.9400         | 29.02                   | peak     | 0.19                     | 29.21               | 40.00          | 10.79       |
| 50.3700         | 41.06                   | QP       | -11.27                   | 29.79               | 40.00          | 10.21       |
| 155.1300        | 33.66                   | peak     | -5.87                    | 27.79               | 43.50          | 15.71       |
| 361.7400        | 32.16                   | peak     | -2.80                    | 29.36               | 46.00          | 16.64       |
| 703.1800        | 28.35                   | peak     | 3.11                     | 31.46               | 46.00          | 14.54       |
| 954.4100        | 37.78                   | peak     | -3.31                    | 34.47               | 46.00          | 11.53       |

**2) 1GHz-40GHz**

| Frequency (MHz) | Receiver       |          | Rx Antenna  |                  | Cable loss (dB) | Amplifier Gain (dB) | Corrected Amplitude (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|----------------|----------|-------------|------------------|-----------------|---------------------|------------------------------|----------------|-------------|
|                 | Reading (dBμV) | Detector | Polar (H/V) | Factor (dB(1/m)) |                 |                     |                              |                |             |
| 24150.00        | 83.51          | PK       | H           | 35.41            | 10.96           | 37.12               | 92.76                        | 127.96         | 35.20       |
| 24150.00        | 78.25          | AV       | H           | 35.41            | 10.96           | 37.12               | 87.50                        | 107.96         | 20.46       |
| 24150.00        | 100.50         | PK       | V           | 35.41            | 10.96           | 37.12               | 109.75                       | 127.96         | 18.21       |
| 24150.00        | 96.37          | AV       | V           | 35.41            | 10.96           | 37.12               | 105.62                       | 107.96         | 2.34        |
| 24000.00        | 42.54          | PK       | V           | 35.35            | 10.87           | 37.40               | 51.36                        | 74.00          | 22.64       |
| 24000.00        | 32.35          | AV       | V           | 35.35            | 10.87           | 37.40               | 41.17                        | 54.00          | 12.83       |
| 24250.00        | 42.51          | PK       | V           | 35.45            | 11.02           | 36.94               | 52.04                        | 74.00          | 21.96       |
| 24250.00        | 32.47          | AV       | V           | 35.45            | 11.02           | 36.94               | 42.00                        | 54.00          | 12.00       |

**40GHz-100GHz**

| Frequency (GHz) | Receiver       |          | Rx Antenna  |                  | Corrected Amplitude (dBμV/m) | Extrapolation result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|----------------|----------|-------------|------------------|------------------------------|-------------------------------|----------------|-------------|
|                 | Reading (dBμV) | Detector | Polar (H/V) | Factor (dB(1/m)) |                              |                               |                |             |
| 48.3*           | 31.29          | PK       | V           | 40.08            | 71.37                        | 61.83                         | 87.96          | 26.13       |
| 48.3*           | 19.78          | AV       | V           | 40.08            | 59.86                        | 50.32                         | 67.96          | 17.64       |
| 72.45*          | 32.14          | PK       | V           | 43.85            | 75.99                        | 66.45                         | 87.96          | 21.51       |
| 72.45*          | 20.11          | AV       | V           | 43.85            | 63.96                        | 54.42                         | 67.96          | 13.54       |
| 96.6*           | 30.1           | PK       | V           | 45.92            | 76.02                        | 66.48                         | 87.96          | 21.48       |
| 96.6*           | 18.54          | AV       | V           | 45.92            | 64.46                        | 54.92                         | 67.96          | 13.04       |

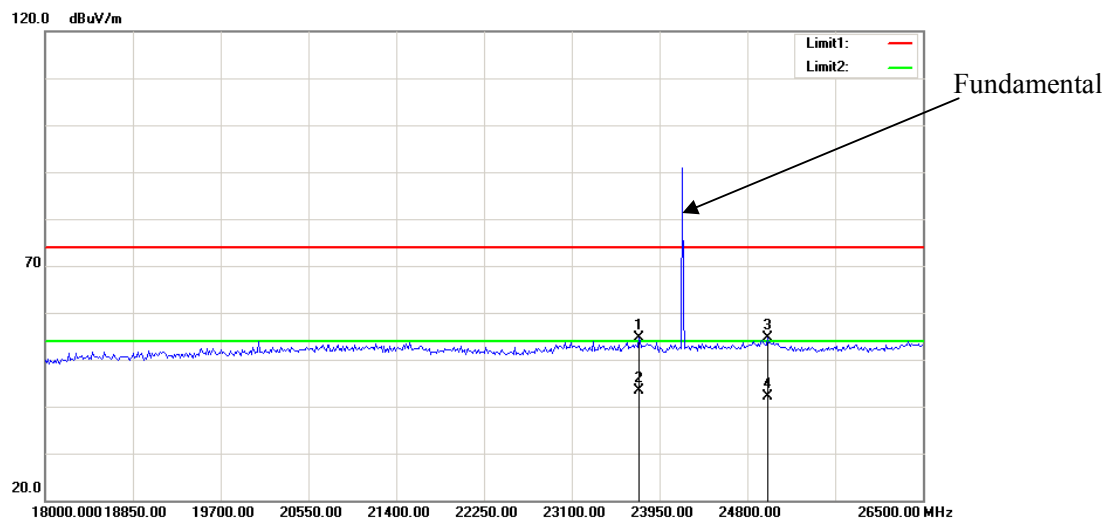
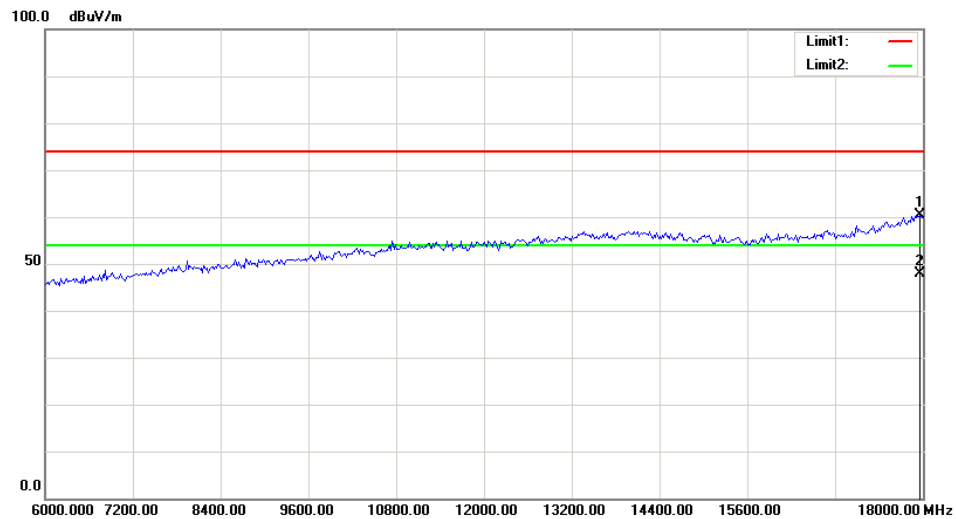
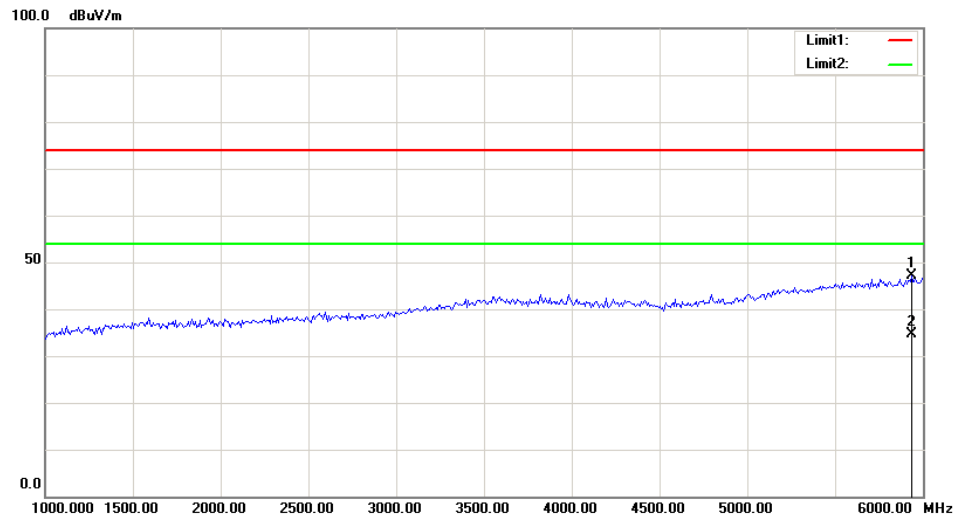
Note:

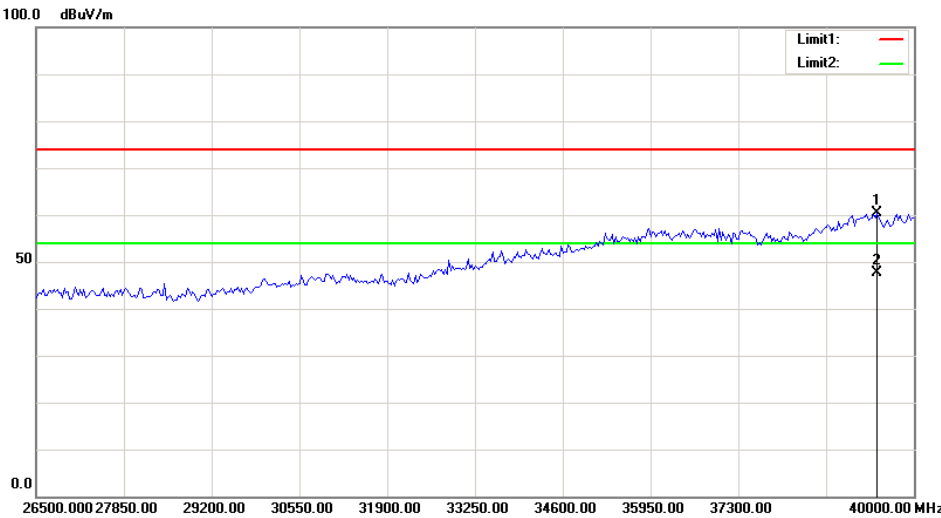
for the range 40-100GHz, the test performed at the distance 1.0 m.

\*: Harmonics frequency.

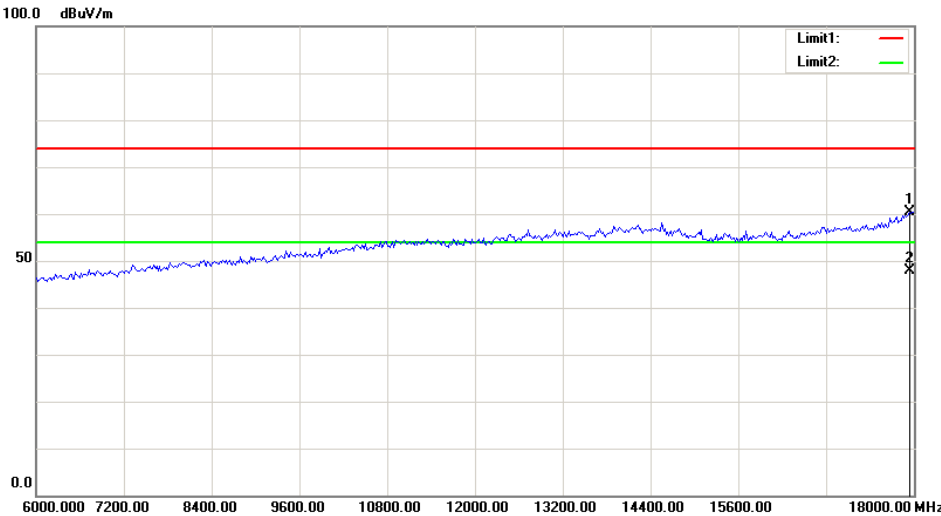
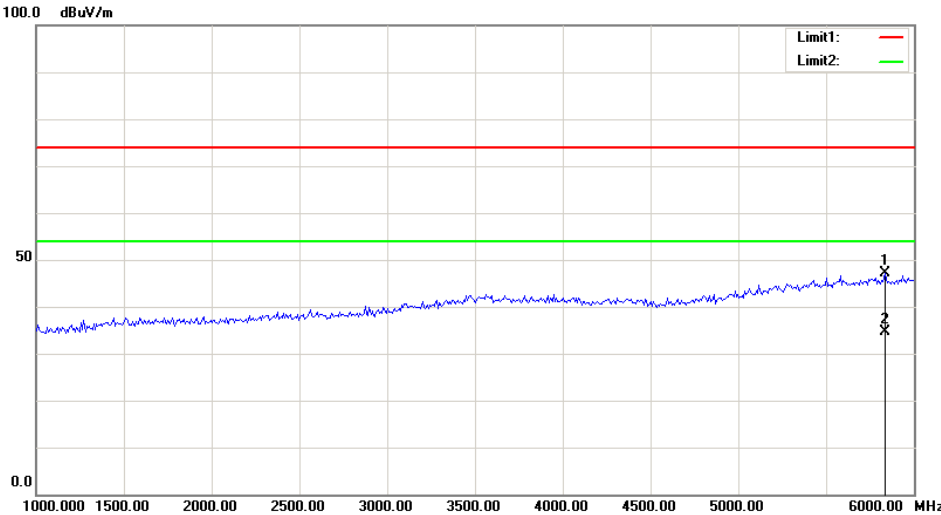
Emissions under the noise floor have not recored.

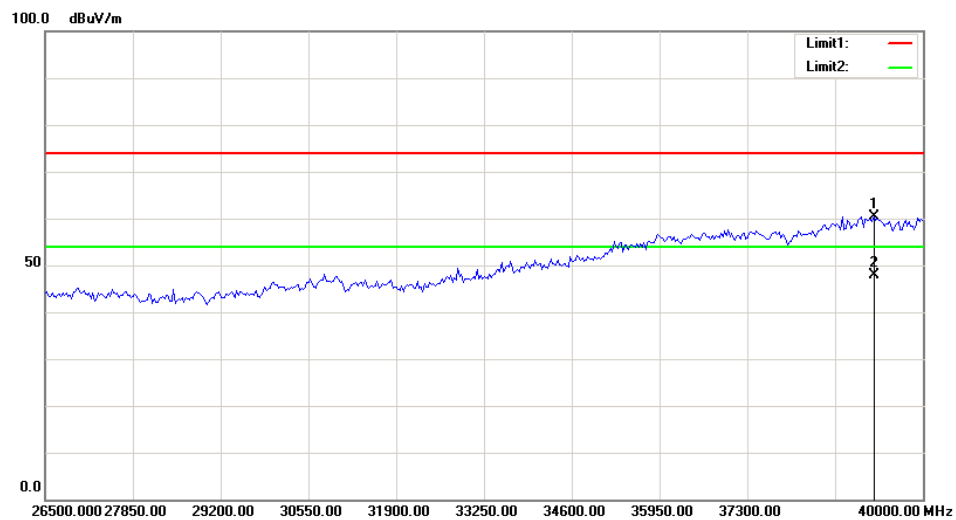
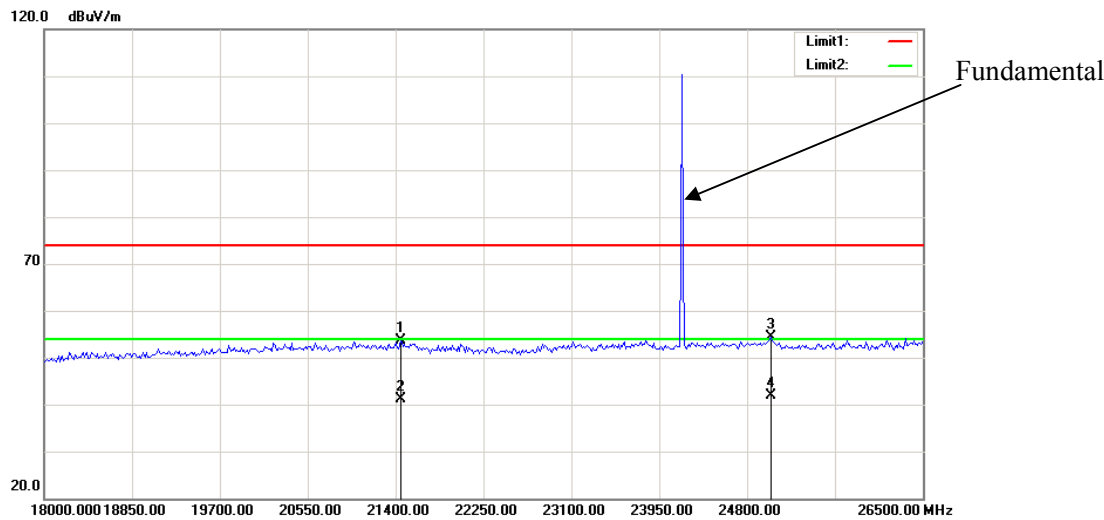
Test plots  
Horizontal





Vertical





## FCC §15.215(c) – 20 dB BANDWIDTH TESTING

### 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. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
3. Repeat above procedures until all frequencies measured were complete.

### Test Equipment List and Details

| Manufacturer          | Description       | Model                    | Serial Number        | Calibration Date | Calibration Due Date |
|-----------------------|-------------------|--------------------------|----------------------|------------------|----------------------|
| R&S                   | Spectrum Analyzer | FSU 26                   | 200256               | 2019-01-04       | 2020-01-04           |
| Ducommun Technologies | Horn Antenna      | ARH-4223-02              | 1007726-01<br>1304   | 2016-11-18       | 2019-11-18           |
| MICRO-COAX            | Coaxial Cable     | UFA147-1-<br>2362-100100 | 64639 231029-<br>001 | 2018-02-24       | 2019-02-28           |
| Quinstar              | Amplifier         | QLW-<br>18405536-JO      | 15964001001          | 2018-06-27       | 2019-06-27           |

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

### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.6 °C   |
| Relative Humidity: | 35 %      |
| ATM Pressure:      | 100.3 kPa |

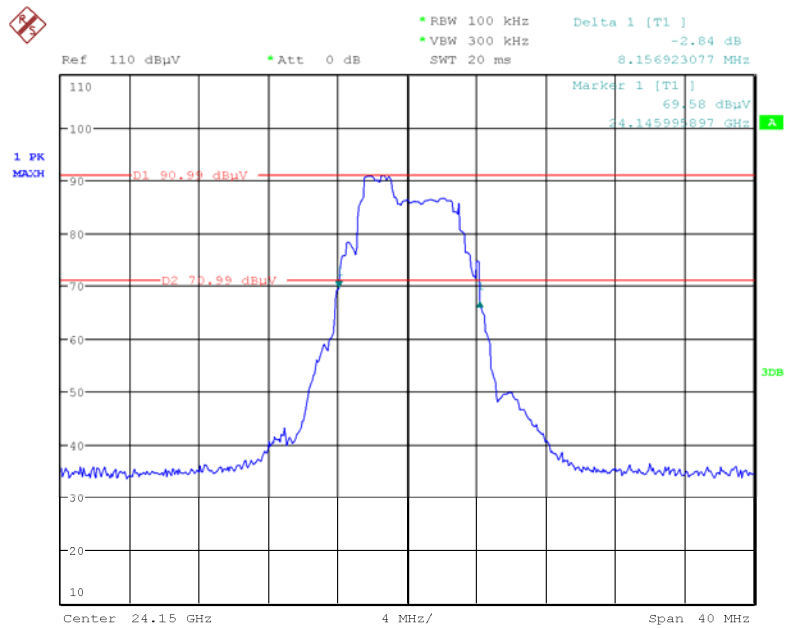
*The testing was performed by Tyler Pan on 2019-01-16.*

**Test Result:** Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

| Frequency<br>(MHz) | 20 dB Bandwidth<br>(MHz) |
|--------------------|--------------------------|
| 24150              | 8.157                    |



Date: 16.JAN.2019 11:16:03

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