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TEST REPORT

For

SZ DJI Osmo Technology Co.,Ltd.

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Nanshan District, Shenzhen, China

FCC ID: 2ANDR-R21708
IC: 23060-R21708

| | |
|---|---------------------------------|
| Report Type: Original Report | Product Name: RONIN 2 |
| Report Number: RDG170730002-00D | |
| Report Date: 2017-08-28 | |
| Reviewed By: Jerry Zhang EMC Manager | |
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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. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SZ DJI Osmo Technology Co.,Ltd.*'s product, model number: *R2* (**FCC ID: 2ANDR-R21708, IC: 23060-R21708**) (the "EUT") in this report was a *RONIN 2*, which was measured approximately: 63 cm (L) x 41.6 cm (W) x 72 cm (H), DC 22.8V from battery, the battery can be removed from the device and charged by charging Hub.

All measurement and test data in this report was gathered from production sample serial number: 170730002 (Assigned by BACL, Dongguan). The EUT was received on 2017-07-30.

Objective

This type approval report is prepared on behalf of *SZ DJI Osmo Technology Co.,Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communications Commission's rules. And RSS-247, Issue 2, February 2017, RSS-Gen Issue 4, November 2014 of the Innovation, Science and Economic Development Canada.

The tests were performed in order to determine compliance with FCC Rules Part 15, Subpart E, section 15.203, 15.205, 15.209 and 15.407 rules, and RSS-247, Issue 2, February 2017, RSS-Gen Issue 4, November 2014 of the Innovation, Science and Economic Development Canada.

Related Submittal(s)/Grant(s)

FCC submissions with Part 15C DTS, FCC ID: 2ANDR-R21708 .
FCC submissions with Part 15C DSS, FCC ID: 2ANDR-R21708.
ISED submissions with RSS-247 DTSs and FHSs, IC: 23060-R21708.
Part of system submissions with FCC: 2ANDR-R2TX11708, IC: 23060-R2TX11708.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”. And RSS-247, ISSUE 2, February 2017, RSS-GeN ISSUE 4, November 2014 of the Innovation, Science and Economic Development Canada.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

| Parameter | Measurement Uncertainty |
|-----------------------------------|--|
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±0.61 dB |
| Power Spectral Density, conducted | ±0.61 dB |
| Unwanted Emissions, radiated | 30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~40GHz: 5.23 dB |
| Unwanted Emissions | ±1.5 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, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO 17025 by CNAS(Lab code: L5662). And accredited to ISO 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

For 5725~5850MHz band, total 60 channels were employed:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 1 | 5727 | 31 | 5787 |
| 2 | 5729 | 32 | 5789 |
| 3 | 5731 | 33 | 5791 |
| ~ | ~ | ~ | ~ |
| 29 | 5783 | 59 | 5843 |
| 30 | 5785 | 60 | 5845 |

3 channels were tested: 5727MHz, 5787MHz and 5845MHz

EUT Exercise Software

The software “RF Certification.exe” was used for testing, which was provided by manufacturer. The maximum power level was configured as below table:

| Test Software Version | RF Certification.exe | | |
|-----------------------|----------------------|---------|---------|
| Test Frequency | 5727MHz | 5787MHz | 5845MHz |
| Power Level Setting | 1300 | 1300 | 1300 |

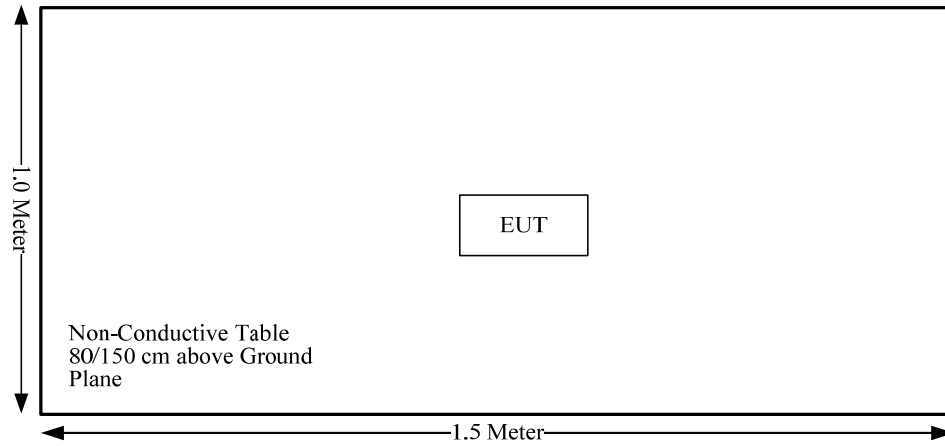
The duty cycle as below:

| T _{on} (ms) | T _{on+off} (ms) | Duty Cycle (%) | Minimum Transmission Duration (T) (ms) |
|----------------------|--------------------------|----------------|--|
| 1.396 | 3.996 | 34.9 | 1.396 |



No modification was made to the EUT.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|--|----------------|
| FCC §15.407 (f) & §1.1310 & §2.1091 RSS-102§4 | Maximum Permissible Exposure (MPE) | Compliance |
| FCC§15.203 RSS-GEN§8.3 | Antenna Requirement | Compliance |
| FCC§15.207 (a) RSS-Gen §8.8 | AC Line Conducted Emissions | Not Applicable |
| FCC§15.205& §15.209 &§15.407(b) RSS-247§6.2 | Undesirable Emission& Restricted Bands | Compliance |
| FCC§15.407(b) (1),(2),(3),(4) RSS-247§6.2 | Out Of Band Emissions | Compliance |
| FCC§15.407(a) RSS-247 §6.2 RSS-Gen§6.6 | Emission Bandwidth | Compliance |
| FCC§15.407(a) RSS-247 §6.2 | Conducted Transmitter Output Power | Compliance |
| FCC§15.407 (a) RSS-247 §6.2 | Power Spectral Density | Compliance |
| FCC§15.407(g) | Frequency stability | Compliance |

Note:

Not Applicable: the device was powered by battery.

FCC §15.407 (f) , §1.1310 , §2.1091& RSS-102 § 4- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.407(f) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Averaging Time (minutes) |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *(180/f ²) | 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;

According to §1.1310 and §2.1091 RF exposure is calculated.

According to RSS-102 § 4 Table 4, RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms) | Power Density (W/m ²) | Reference Period (minutes) |
|------------------------|---------------------------|--|-----------------------------------|----------------------------|
| 0.003-10 ²¹ | 83 | 90 | - | Instantaneous* |
| 0.1-10 | - | 0.73/ f | - | 6** |
| 1.1-10 | 87/ f ^{0.5} | - | - | 6** |
| 10-20 | 27.46 | 0.0728 | 2 | 6 |
| 20-48 | 58.07/ f ^{0.25} | 0.1540/ f ^{0.25} | 8.944/ f ^{0.5} | 6 |
| 48-300 | 22.06 | 0.05852 | 1.291 | 6 |
| 300-6000 | 3.142 f ^{0.3417} | 0.008335 f ^{0.3417} | 0.02619 f ^{0.6834} | 6 |
| 6000-15000 | 61.4 | 0.163 | 10 | 6 |
| 15000-150000 | 61.4 | 0.163 | 10 | 616000/ f ^{1.2} |
| 150000-300000 | 0.158 f ^{0.5} | 4.21 x 10 ⁻⁴ f ^{0.5} | 6.67 x 10 ⁻⁵ f | 616000/ f ^{1.2} |

Note: f is frequency in MHz.
 *Based on nerve stimulation (NS).
 ** Based on specific absorption rate (SAR).

Calculation Formula:

Prediction of power density at the distance of the applicable MPE limit:

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

| Mode | Frequency (MHz) | Antenna Gain | | Tune-up Power | | Evaluation Distance (cm) | Power Density | | MPE Limit | |
|-----------|-----------------|--------------|-----------|---------------|--------|--------------------------|-----------------------|---------------------|---------------------------|-----------------------------|
| | | (dBi) | (numeric) | (dBm) | (mW) | | (mW/cm ²) | (W/m ²) | FCC (mW/cm ²) | RSS-102 (W/m ²) |
| 2.4G FHSS | 2408-2475.5 | 2.81 | 1.91 | 21 | 125.89 | 20.00 | 0.0479 | 0.479 | 1.0 | 5.36 |
| 5.8G NII | 5727-5845 | 4.59 | 2.88 | 17 | 50.12 | 20.00 | 0.0287 | 0.287 | 1.0 | 9.69 |
| BLE | 2402-2480 | 3.12 | 2.05 | 7 | 5.01 | 20.00 | 0.0020 | 0.02 | 1.0 | 5.35 |

Note: User may catch the hand-held loop to use, in this use condition, the radio antenna to the hand is more than 20cm (please refer to the EUT external photo), and the user body should keep more than 20cm from the radio antenna.

The 2.4G FHSS or 5.8G NII can transmit simultaneously with BLE, but 2.4G FHSS and 5.8G NII can't transmit simultaneously. So, the maximum ratio was 2.4G FHSS+ BLE:

For FCC:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$= S_{FHSS}/S_{limit-FHSS} + S_{BLE}/S_{limit-BLE}$$

$$= 0.0479/1 + 0.002/1$$

$$= 0.0499$$

$$< 1.0$$

For RSS-102:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$= S_{FHSS}/S_{limit-FHSS} + S_{BLE}/S_{limit-BLE}$$

$$= 0.479/5.36 + 0.02/5.35$$

$$= 0.0931$$

$$< 1.0$$

Result: Compliance, The device meets MPE requirement for Devices Used by the General Public (Uncontrolled Environment) at distance ≥20 cm.

FCC §15.203 ,RSS-GEN§8.3- 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.

According to RSS-Gen §8.3, The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.⁹ When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

Antenna Connector Construction

The EUT has two internal antenna arrangement for 5.8G mode, one for transmitting and another one for receiving, the antenna gain is 4.59 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

**FCC §15.209, §15.205 , §15.407(b) &RSS-247 §6.2, RSS-GEN§8.10–
UNWANTED EMISSION**

Applicable Standard

According to FCC §15.407; §15.209; §15.205;

(b) *Undesirable emission limits.* Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) 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.

(2) For transmitters operating in the 5.25-5.35 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.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) 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.

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

(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

According to RSS-247§6.2

Frequency band 5150-5250 MHz

6.2.1.2 Unwanted emission limits

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

Frequency band 5250-5350 MHz

6.2.2.2 Unwanted emission limits

Devices shall comply with the following:

- a) All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or
- b) All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text “for indoor use only.”

Frequency bands 5470-5600 MHz and 5650-5725 MHz:

6.2.3.2 Unwanted emission limits

Emissions outside the band 5470-5600 MHz and 5650-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Frequency band 5725-5850 MHz

6.2.4.2 Unwanted emission limits

Devices operating in the band 5725-5850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

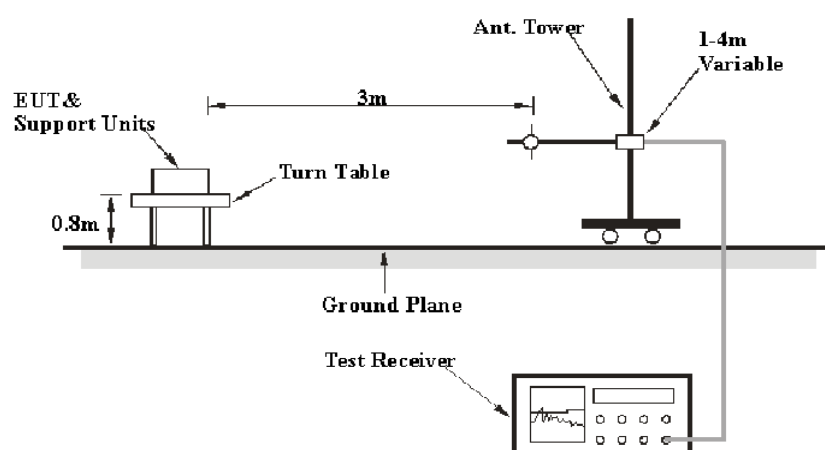
Devices operating in the band 5725-5850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

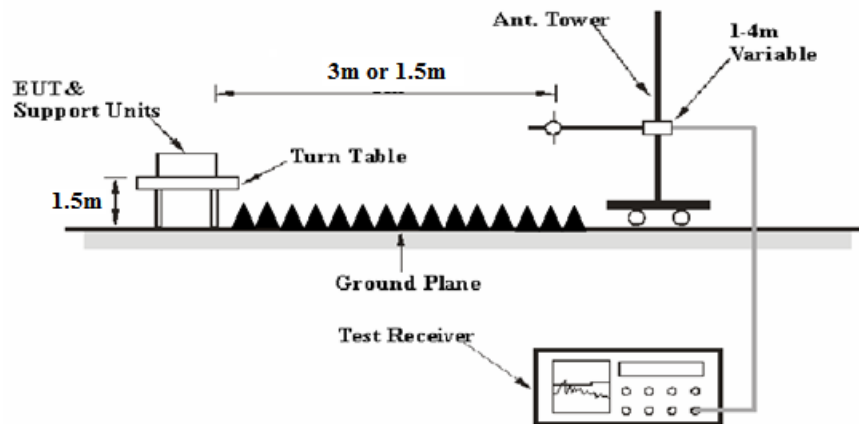
Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

- 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- 27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

EUT Setup

Below 1 GHz:



Above 1 GHz:

The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.407 and RSS-247, RSS-Gen 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 & Spectrum Analyzer Setup were set with the following configurations:

30-1000MHz:

| Frequency Range | RBW | Video B/W | IF B/W | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz | 120 kHz | QP |

1GHz- 40GHz:

| Detector | Duty cycle | RBW | Video B/W |
|----------|------------|------|-----------|
| PK | Any | 1MHz | 3 MHz |
| Ave. | >98% | 1MHz | 10 Hz |
| | <98% | 1MHz | 1/T |

Test Procedure

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.

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04, emission shall be computed as: $E [dB\mu V/m] = EIRP[dBm] + 95.2$, for $d = 3$ meters.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m

Distance extrapolation factor = $20 \log (\text{specific distance } [3m] / \text{test distance } [1.5m])$ dB

Extrapolation result = Corrected Amplitude (dB μ V/m) - distance extrapolation factor (6dB)

Corrected Amplitude & Margin Calculation

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:

$$\text{Margin} = \text{Extrapolation result} - \text{Limit}$$

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------|-------------------|-----------------|--------------------|------------------|----------------------|
| R&S | EMI Test Receiver | ESCI | 100224 | 2016-09-01 | 2017-08-31 |
| Sunol Sciences | Antenna | JB3 | A060611-1 | 2014-11-06 | 2017-11-05 |
| HP | Amplifier | 8447E | 2434A02181 | 2016-09-01 | 2017-09-01 |
| R&S | Spectrum Analyzer | FSU 26 | 200256 | 2016-12-08 | 2017-12-08 |
| R&S | Spectrum Analyzer | FSP 38 | 100478 | 2016-12-08 | 2017-12-08 |
| ETS-Lindgren | Horn Antenna | 3115 | 000 527 35 | 2016-01-05 | 2019-01-04 |
| Ducommun Technologies | Horn Antenna | ARH-4223-02 | 1007726-02 1304 | 2017-06-16 | 2020-06-15 |
| Ducommun Technologies | Horn Antenna | ARH-2823-02 | 1007726-01 1302 | 2016-11-18 | 2019-11-18 |
| Mini-Circuit | Amplifier | ZVA-213-S+ | SN054201245 | 2017-02-19 | 2018-02-19 |
| Quinstar | Amplifier | QLW-18405536-JO | 15964001001 | 2016-09-06 | 2017-09-06 |
| Unknown | Coaxial Cable | Chamber A-1 | 4m | 2016-09-01 | 2017-09-01 |
| Unknown | Coaxial Cable | Chamber B-1 | 0.75m | 2016-09-01 | 2017-09-01 |
| Unknown | Coaxial Cable | Chamber A-2 | 10m | 2016-09-01 | 2017-09-01 |
| Unknown | Coaxial Cable | Chamber B-2 | 8m | 2016-09-01 | 2017-09-01 |
| Farad | Test Software | EZ-EMC | V1.1.4.2 | N/A | N/A |

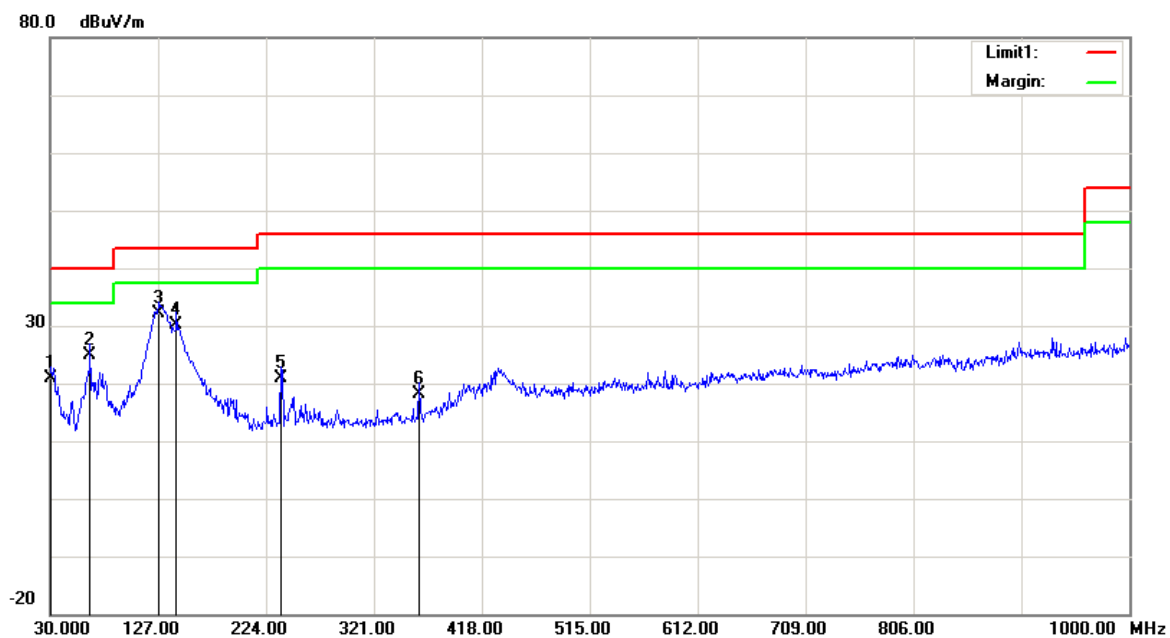
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

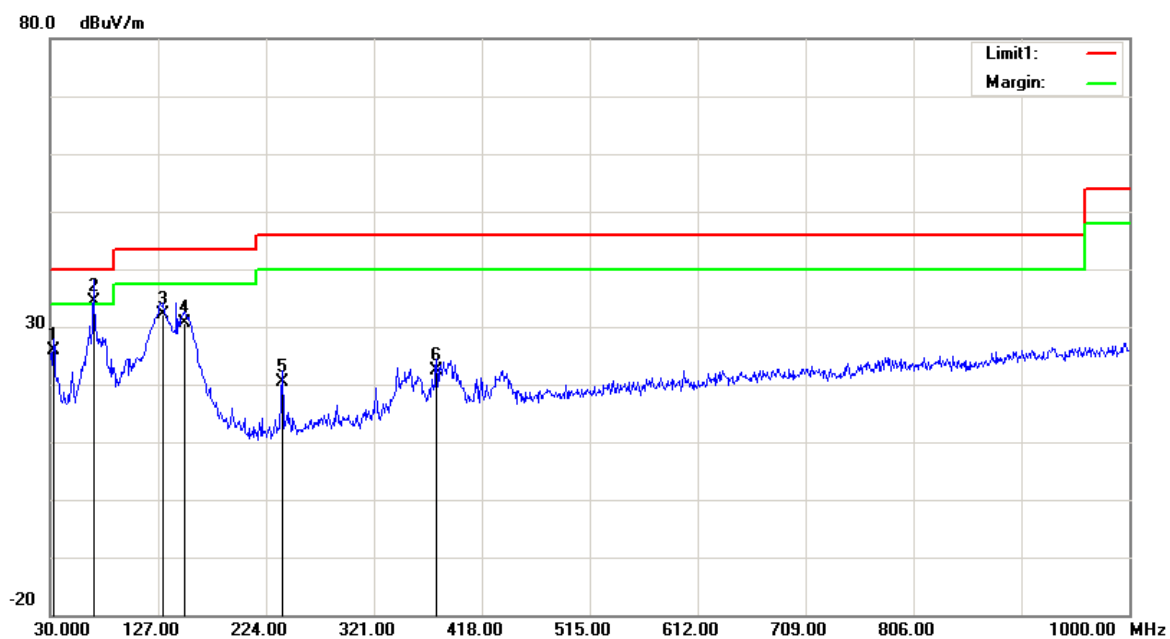
| | |
|---------------------------|-----------|
| Temperature: | 27.6 °C |
| Relative Humidity: | 30 % |
| ATM Pressure: | 100.1 kPa |

** The testing was performed by Tony Zeng on 2017-08-11.*

Test Mode: Transmitting

1) 30MHz-1GHz(Middle channel was the worst):**Horizontal:**

| Frequency (MHz) | Receiver Reading (dBuV) | Detector | Correction Factor (dB/m) | Cord. Amp. (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|-------------------------|----------|--------------------------|---------------------|----------------|-------------|
| 30.9700 | 26.01 | QP | -5.11 | 20.90 | 40.00 | 19.10 |
| 65.8900 | 42.57 | QP | -17.77 | 24.80 | 40.00 | 15.20 |
| 127.9700 | 43.00 | QP | -10.90 | 32.10 | 43.50 | 11.40 |
| 143.4900 | 42.33 | QP | -12.13 | 30.20 | 43.50 | 13.30 |
| 237.5800 | 33.10 | QP | -12.30 | 20.80 | 46.00 | 25.20 |
| 361.7400 | 27.18 | QP | -8.98 | 18.20 | 46.00 | 27.80 |

Vertical:

| Frequency (MHz) | Receiver Reading (dBuV) | Detector | Correction Factor (dB/m) | Cord. Amp. (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|-------------------------|----------|--------------------------|---------------------|----------------|-------------|
| 32.9100 | 32.38 | QP | -6.58 | 25.80 | 40.00 | 14.20 |
| 68.8000 | 52.00 | QP | -17.50 | 34.50 | 40.00 | 5.50 |
| 131.8500 | 43.16 | QP | -11.06 | 32.10 | 43.50 | 11.40 |
| 151.2500 | 42.79 | QP | -12.19 | 30.60 | 43.50 | 12.90 |
| 238.5500 | 32.64 | QP | -12.24 | 20.40 | 46.00 | 25.60 |
| 377.2600 | 31.24 | QP | -8.84 | 22.40 | 46.00 | 23.60 |

2) 1-40GHz:

| Frequency (MHz) | Receiver | | Rx Antenna | | Cable loss (dB) | Amplifier Gain (dB) | Corrected Amplitude (dBμV/m) | Extrapolation result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-------------------------|------------------------|----------------|----------------|-------|-----------------------|---------------------------|------------------------------------|-------------------------------------|-------------------|----------------|
| Reading (dBμV) | Detector (PK/QP/AV) | Polar (H/V) | Factor (dB) | | | | | | | |
| Low Channel:5727 MHz | | | | | | | | | | |
| 5727 | 64.37 | PK | H | 34.19 | 4.67 | 0.00 | 103.23 | 97.23 | N/A | N/A |
| 5727 | 63.81 | AV | H | 34.19 | 4.67 | 0.00 | 102.67 | 96.67 | N/A | N/A |
| 5727 | 71.97 | PK | V | 34.19 | 4.67 | 0.00 | 110.83 | 104.83 | N/A | N/A |
| 5727 | 71.28 | AV | V | 34.19 | 4.67 | 0.00 | 110.14 | 104.14 | N/A | N/A |
| 5725 | 46.48 | PK | V | 34.19 | 4.67 | 0.00 | 85.34 | 79.34 | 122.20 | 42.86 |
| 5720 | 34.02 | PK | V | 34.19 | 4.66 | 0.00 | 72.87 | 66.87 | 110.80 | 43.93 |
| 5700 | 26.54 | PK | V | 34.18 | 4.65 | 0.00 | 65.37 | 59.37 | 105.20 | 45.83 |
| 5650 | 26.32 | PK | V | 34.16 | 4.60 | 0.00 | 65.08 | 59.08 | 68.20 | 9.12 |
| 11454 | 50.73 | PK | V | 38.95 | 6.85 | 36.62 | 59.91 | 53.91 | 74.00 | 20.09 |
| 11454 | 47.26 | AV | V | 38.95 | 6.85 | 36.62 | 56.44 | 50.44 | 54.00 | 3.56 |
| 17181 | 47.82 | PK | V | 41.25 | 8.69 | 37.05 | 60.71 | 54.71 | 74.00 | 19.29 |
| 17181 | 33.53 | AV | V | 41.25 | 8.69 | 37.05 | 46.42 | 40.42 | 54.00 | 13.58 |
| 5699 | 46.21 | PK | V | 34.18 | 4.65 | 35.85 | 49.19 | 43.19 | 74.00 | 30.81 |
| 5699 | 32.17 | AV | V | 34.18 | 4.65 | 35.85 | 35.15 | 29.15 | 54.00 | 24.85 |
| 6985 | 46.26 | PK | V | 35.17 | 5.32 | 35.94 | 50.81 | 44.81 | 74.00 | 29.19 |
| 6985 | 32.26 | AV | V | 35.17 | 5.32 | 35.94 | 36.81 | 30.81 | 54.00 | 23.19 |
| Middle Channel:5787 MHz | | | | | | | | | | |
| 5787 | 62.42 | PK | H | 34.21 | 4.71 | 0.00 | 101.34 | 95.34 | N/A | N/A |
| 5787 | 61.84 | AV | H | 34.21 | 4.71 | 0.00 | 100.76 | 94.76 | N/A | N/A |
| 5787 | 72.32 | PK | V | 34.21 | 4.71 | 0.00 | 111.24 | 105.24 | N/A | N/A |
| 5787 | 71.94 | AV | V | 34.21 | 4.71 | 0.00 | 110.86 | 104.86 | N/A | N/A |
| 11574 | 50.34 | PK | V | 39.00 | 6.87 | 36.61 | 59.60 | 53.60 | 74.00 | 20.40 |
| 11574 | 47.18 | AV | V | 39.00 | 6.87 | 36.61 | 56.44 | 50.44 | 54.00 | 3.56 |
| 17361 | 47.64 | PK | V | 42.29 | 8.67 | 36.78 | 61.82 | 55.82 | 74.00 | 18.18 |
| 17361 | 32.66 | AV | V | 42.29 | 8.67 | 36.78 | 46.84 | 40.84 | 54.00 | 13.16 |
| 5898 | 46.57 | PK | V | 34.26 | 4.61 | 35.85 | 49.59 | 43.59 | 74.00 | 30.41 |
| 5898 | 33.23 | AV | V | 34.26 | 4.61 | 35.85 | 36.25 | 30.25 | 54.00 | 23.75 |
| 6636 | 46.35 | PK | V | 34.47 | 5.28 | 35.80 | 50.30 | 44.30 | 74.00 | 29.70 |
| 6636 | 33.12 | AV | V | 34.47 | 5.28 | 35.80 | 37.07 | 31.07 | 54.00 | 22.93 |
| High Channel:5845 MHz | | | | | | | | | | |
| 5845 | 61.89 | PK | H | 34.24 | 4.67 | 0.00 | 100.80 | 94.80 | N/A | N/A |
| 5845 | 60.36 | AV | H | 34.24 | 4.67 | 0.00 | 99.27 | 93.27 | N/A | N/A |
| 5845 | 71.52 | PK | V | 34.24 | 4.67 | 0.00 | 110.43 | 104.43 | N/A | N/A |
| 5845 | 70.16 | AV | V | 34.24 | 4.67 | 0.00 | 109.07 | 103.07 | N/A | N/A |
| 5850 | 33.95 | PK | V | 34.24 | 4.67 | 0.00 | 72.86 | 66.86 | 122.20 | 55.34 |
| 5855 | 29.17 | PK | V | 34.24 | 4.66 | 0.00 | 68.07 | 62.07 | 110.80 | 48.73 |
| 5875 | 27.91 | PK | V | 34.25 | 4.64 | 0.00 | 66.80 | 60.80 | 105.20 | 44.40 |
| 5925 | 26.36 | PK | V | 34.27 | 4.63 | 0.00 | 65.26 | 59.26 | 68.20 | 8.94 |
| 11690 | 50.93 | PK | V | 39.00 | 6.90 | 36.63 | 60.20 | 54.20 | 74.00 | 19.80 |
| 11690 | 47.37 | AV | V | 39.00 | 6.90 | 36.63 | 56.64 | 50.64 | 54.00 | 3.36 |
| 17535 | 47.48 | PK | V | 43.32 | 8.69 | 36.53 | 62.96 | 56.96 | 74.00 | 17.04 |
| 17535 | 33.41 | AV | V | 43.32 | 8.69 | 36.53 | 48.89 | 42.89 | 54.00 | 11.11 |
| 6569 | 46.52 | PK | V | 34.34 | 5.28 | 35.77 | 50.37 | 44.37 | 74.00 | 29.63 |
| 6569 | 33.21 | AV | V | 34.34 | 5.28 | 35.77 | 37.06 | 31.06 | 54.00 | 22.94 |

FCC §15.407(a)& RSS-247 §6.2,RSS-Gen §6.6– EMISSION BANDWIDTH**Applicable Standard**

15.407(a), RSS-247 §6.2 and RSS-Gen §6.6

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| R&S | Spectrum Analyzer | FSU 26 | 200256 | 2016-12-08 | 2017-12-08 |
| Unknown | Coaxial Cable | 0.1m | C-1 | Each Time | / |

* **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 Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

Test Data**Environmental Conditions**

| | |
|---------------------------|-----------|
| Temperature: | 27.5°C |
| Relative Humidity: | 47.6 % |
| ATM Pressure: | 100.2 kPa |

* The testing was performed by Sun Zhong on 2017-08-15.

Test Result: Pass.

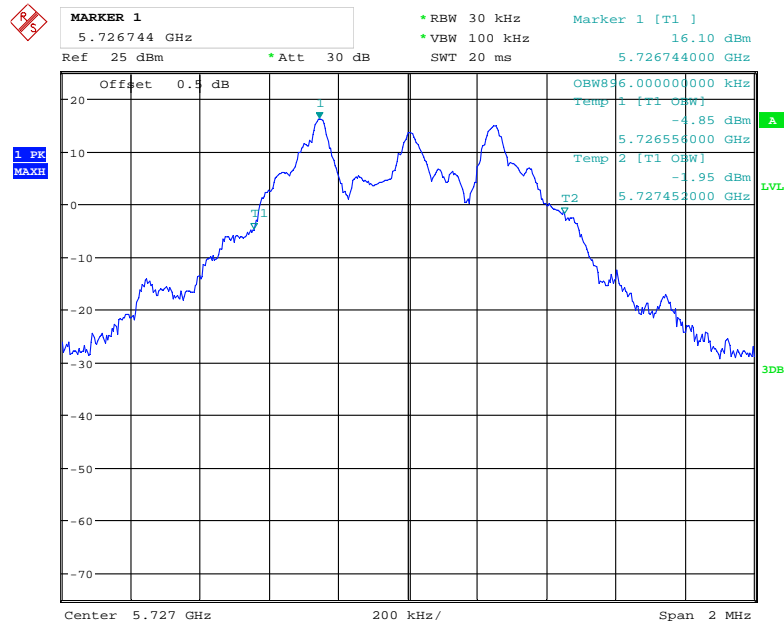
Please refer to the following tables and plots.

Test mode: Transmitting

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) | 6 dB Emission Bandwidth Limits (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------------|-------------------------------|--------------------------------------|------------------------------|
| Low | 5727 | 0.786 | ≥0.5 | 0.896 |
| Middle | 5787 | 0.796 | ≥0.5 | 0.936 |
| High | 5845 | 0.821 | ≥0.5 | 0.944 |

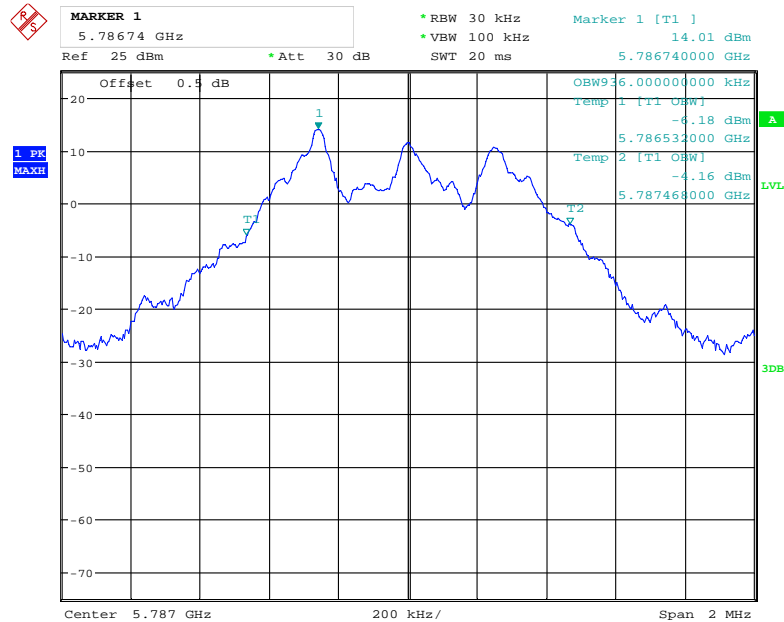
99% Occupied Bandwidth:

Low Channel



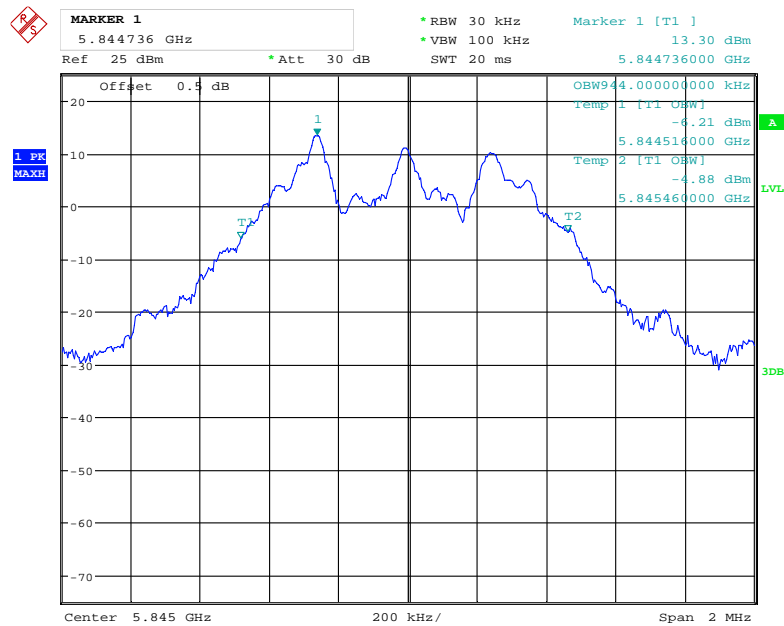
Date: 15.AUG.2017 20:30:39

Middle Channel



Date: 15.AUG.2017 20:29:14

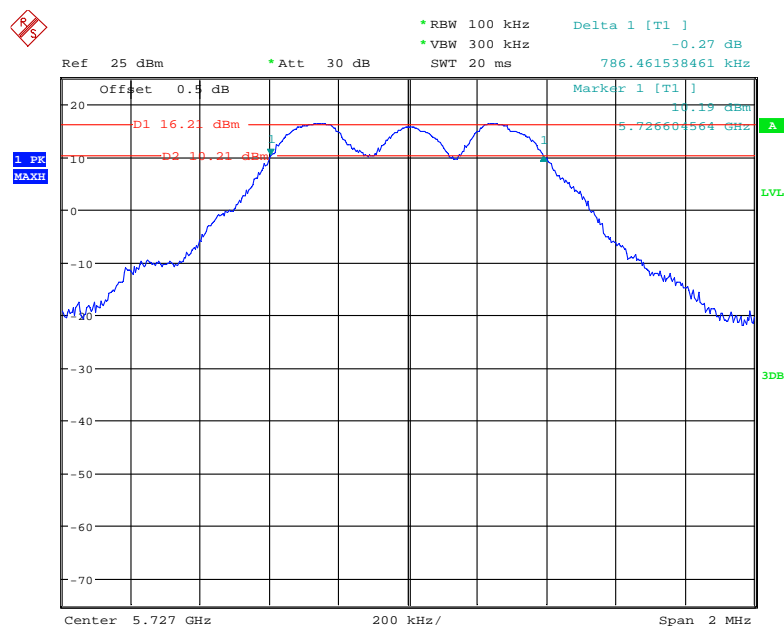
High Channel



Date: 15.AUG.2017 20:30:04

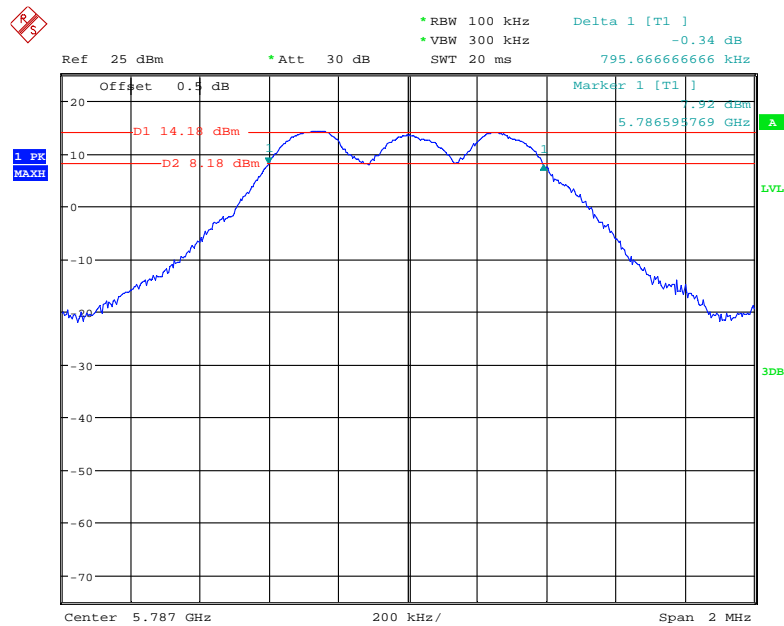
6dB Bandwidth:

Low Channel



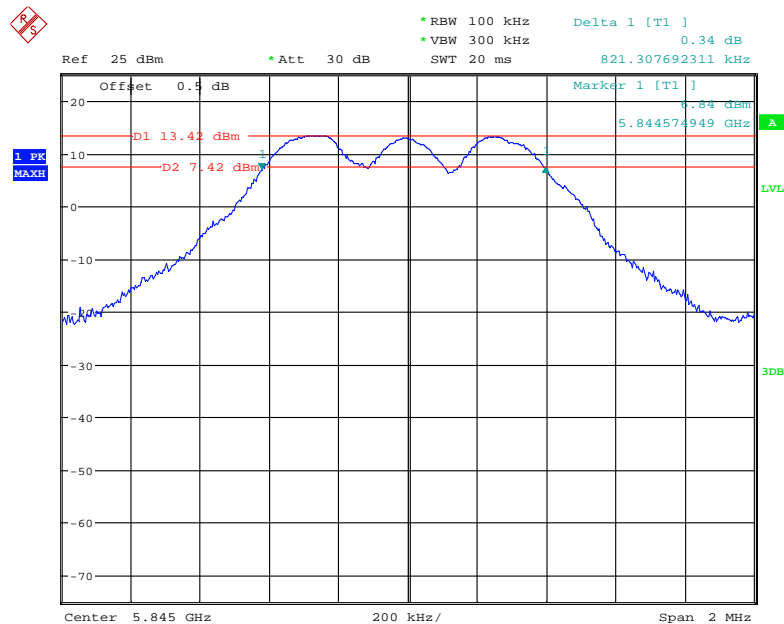
Date: 15.AUG.2017 20:25:06

Middle Channel



Date: 15.AUG.2017 20:21:55

High Channel



Date: 15.AUG.2017 20:23:39

FCC §15.407(a) & RSS-247 §6.2– MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.407(a)

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(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).

(ii) For an indoor 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.

(iii) For fixed point-to-point access points 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. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum

power spectral density shall not exceed 11 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.

(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.

(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

According to RSS-247 §6.2:

Frequency band 5150-5250 MHz

6.2.1.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10}B$, dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10}B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Frequency band 5250-5350 MHz

6.2.2.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10}B$, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10}B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10}B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency bands 5470-5600 MHz and 5650-5725 MHz

6.2.3.1 Power limits

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency band 5725-5850 MHz

6.2.4.1 Power limits

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

The maximum conducted output power shall not exceed 1 W. The output 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 output 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 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-multipoint³ systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-----------------------|--------|---------------|------------------|----------------------|
| Agilent | Wideband Power Sensor | N1921A | MY54210016 | 2016-11-03 | 2017-11-03 |
| Agilent | Wideband Power Sensor | N1921A | MY54170013 | 2016-11-03 | 2017-11-03 |
| Agilent | P-Series Power Meter | N1912A | MY5000448 | 2016-11-03 | 2017-11-03 |
| Unknown | Coaxial Cable | 0.1m | C-1 | Each Time | / |

* **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 Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

Test Data**Environmental Conditions**

| | |
|---------------------------|-----------|
| Temperature: | 27.5°C |
| Relative Humidity: | 47.6 % |
| ATM Pressure: | 100.2 kPa |

** The testing was performed by Sun Zhong on 2017-08-15.*

Test Mode: Transmitting

| Frequency (MHz) | Conducted Average Output Power (dBm) | Limit (dBm) | Result |
|----------------------------|---|------------------------|---------------|
| 5727 | 16.34 | 30 | PASS |
| 5787 | 14.37 | 30 | PASS |
| 5845 | 13.66 | 30 | PASS |

Note: the duty cycle have been calculated into the results

FCC §15.407(a)& RSS-247 §6.2 - POWER SPECTRAL DENSITY

Applicable Standard

According to FCC §15.407(a)

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(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).

(ii) For an indoor 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.

(iii) For fixed point-to-point access points 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. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

(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.

According to RSS-247 §6.2:

Frequency band 5150-5250 MHz

6.2.1.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10}B$, dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10}B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Frequency band 5250-5350 MHz

6.2.2.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10}B$, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10}B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10}B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency bands 5470-5600 MHz and 5650-5725 MHz**6.2.3.1 Power limits**

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency band 5725-5850 MHz**6.2.4.1 Power limits**

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

The maximum conducted output power shall not exceed 1 W. The output 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 output 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 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-multipoint³ systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| R&S | Spectrum Analyzer | FSU 26 | 200256 | 2016-12-08 | 2017-12-08 |
| Unknown | Coaxial Cable | 0.1m | C-1 | Each Time | / |

* **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: | 27.5°C |
| Relative Humidity: | 47.6 % |
| ATM Pressure: | 100.2 kPa |

** The testing was performed by Sun Zhong on 2017-08-15.*

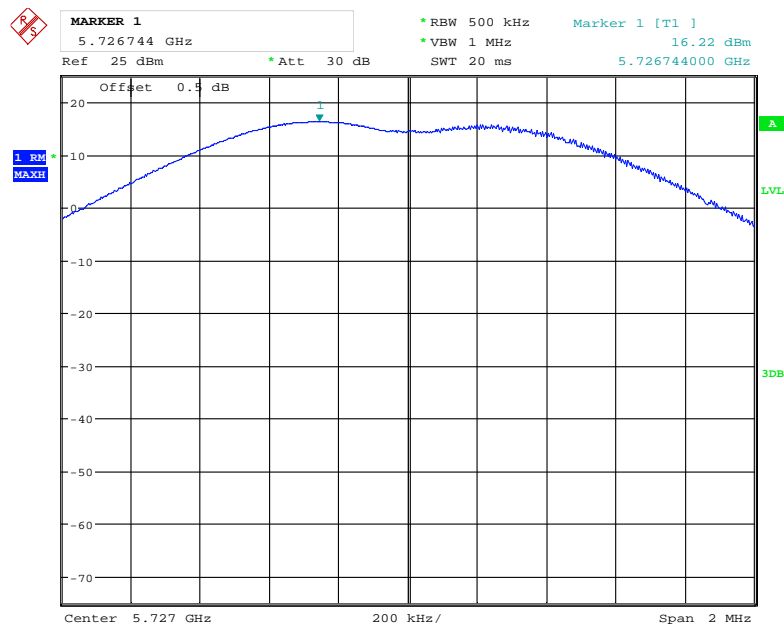
Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table and plot.

5725-5850MHz

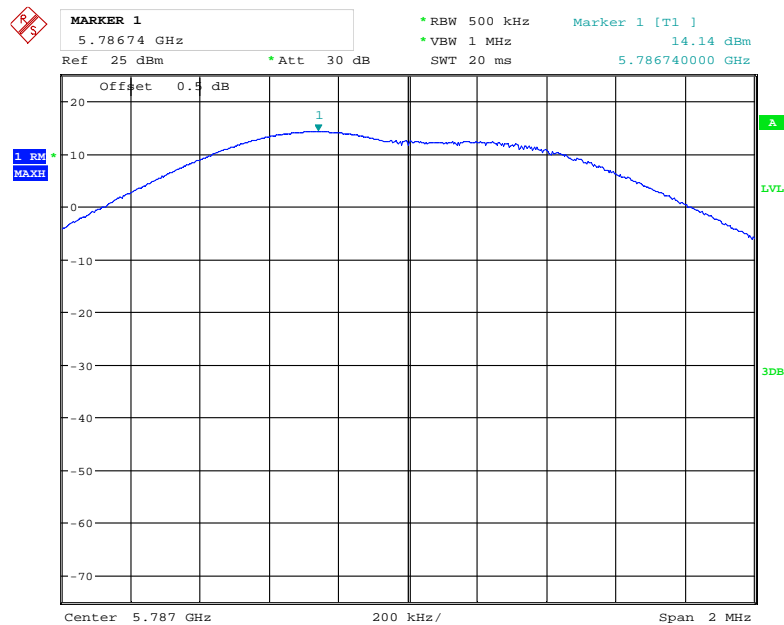
| Channel | Frequency (MHz) | Power Spectral Density (dBm/500kHz) | Limit (dBm/500kHz) |
|----------------|----------------------------|--|-------------------------------|
| Low | 5727 | 16.22 | 30 |
| Middle | 5787 | 14.14 | 30 |
| High | 5845 | 13.47 | 30 |

Low Channel



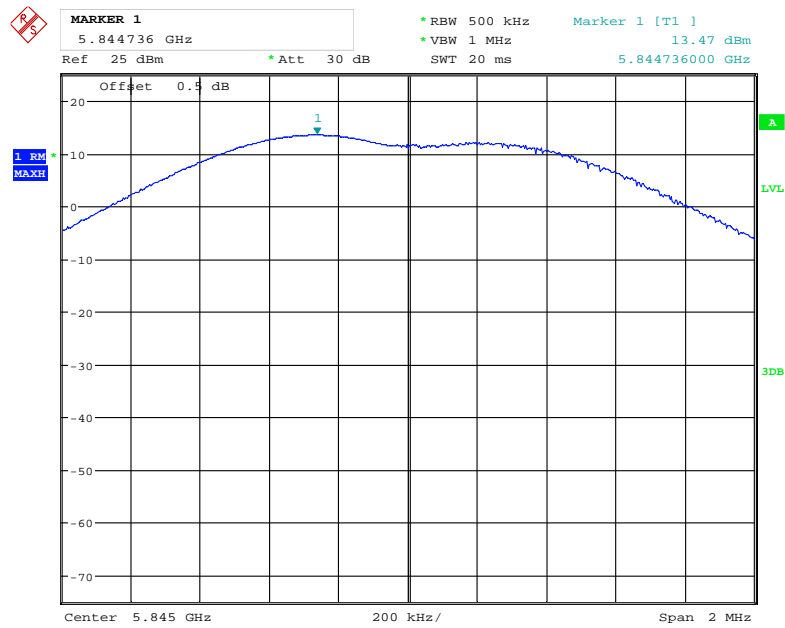
Date: 15.AUG.2017 20:33:19

Middle Channel



Date: 15.AUG.2017 20:33:54

High Channel



Date: 15.AUG.2017 20:34:15

FCC §15.407(b)& RSS-247 §6.2 – OUT- OF-BAND EMISSIONS

Applicable Standard

FCC §15.407

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) 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.

(2) For transmitters operating in the 5.25-5.35 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.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

According to RSS-247§6.2

Frequency band 5150-5250 MHz**6.2.1.2 Unwanted emission limits**

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

Frequency band 5250-5350 MHz**6.2.2.2 Unwanted emission limits**

Devices shall comply with the following:

- a) All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or
- b) All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text “for indoor use only.”

Frequency bands 5470-5600 MHz and 5650-5725 MHz:**6.2.3.2 Unwanted emission limits**

Emissions outside the band 5470-5600 MHz and 5650-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Frequency band 5725-5850 MHz**6.2.4.2 Unwanted emission limits**

Devices operating in the band 5725-5850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5725-5850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

- a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| R&S | Spectrum Analyzer | FSU 26 | 200256 | 2016-12-08 | 2017-12-08 |
| Unknown | Coaxial Cable | 0.1m | C-1 | Each Time | / |

* **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: | 27.5°C |
| Relative Humidity: | 47.6 % |
| ATM Pressure: | 100.2 kPa |

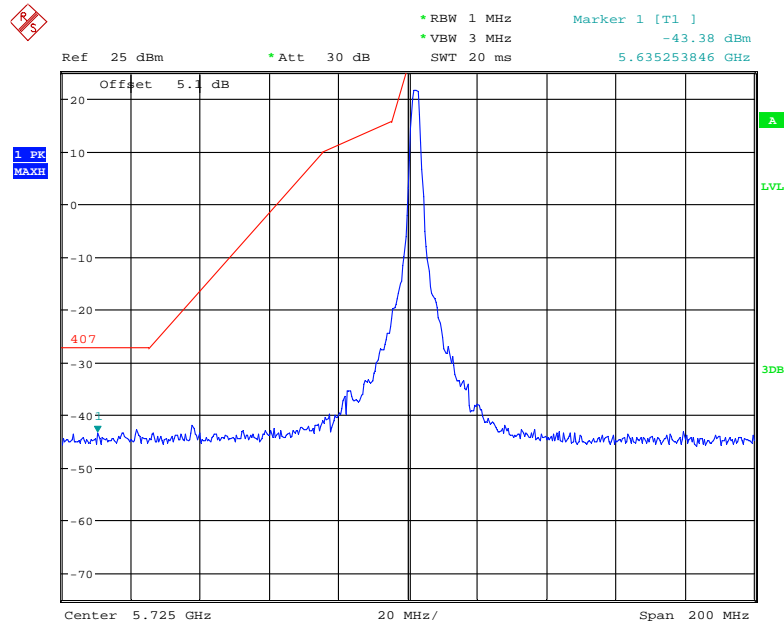
* *The testing was performed by Sun Zhong on 2017-08-15.*

Test Result: Pass.

The antenna gain was offset in the display. Please refer to the following tables and plots.

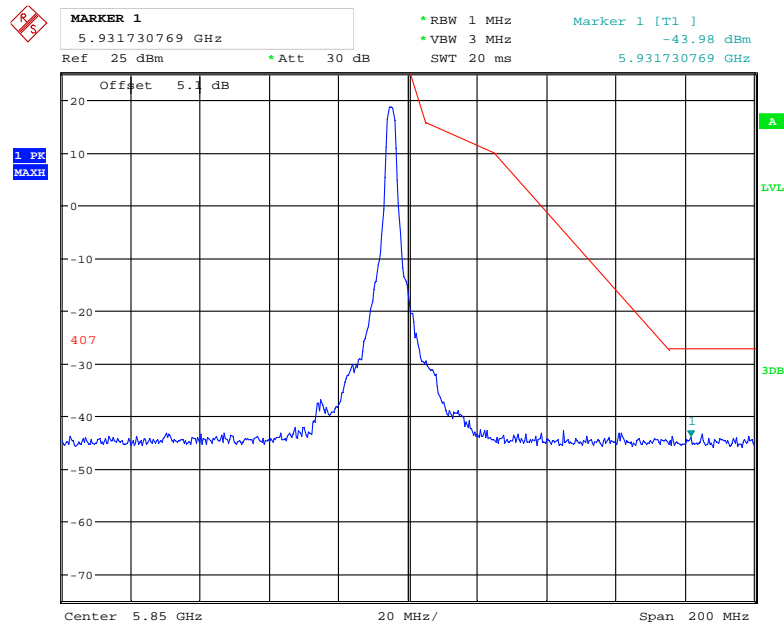
5725-5850MHz:

Low Channel



Date: 15.AUG.2017 19:53:31

High Channel



Date: 15.AUG.2017 19:54:20

FCC §15.407(g) – FREQUENCY STABILITY**Applicable Standard**

FCC §15.407

(g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Test Procedure

According to C63.10-2013 clause 6.8.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------------------|--------|---------------|------------------|----------------------|
| R&S | Spectrum Analyzer | FSU 26 | 200256 | 2016-12-08 | 2017-12-08 |
| Dongzhixu | High Temperature Test Chamber | DP1000 | 201105083-4 | 2016-09-10 | 2017-09-09 |
| UNI-T | Multimeter | UT39A | M130199938 | 2017-04-02 | 2018-04-02 |
| Unknown | Coaxial Cable | 0.1m | C-1 | Each Time | / |

* **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: | 27.5°C |
| Relative Humidity: | 47.6 % |
| ATM Pressure: | 100.2 kPa |

* The testing was performed by Sun Zhong on 2017-08-15.

Test mode: Transmitting

Test Result: Complaint

| Temperature | Voltage | f_L at Low Test Channel | F_H at High Test Channel | Limit |
|-------------|----------|---------------------------|----------------------------|---|
| °C | V_{DC} | MHz | MHz | |
| -20 | 22.8 | 5726.5568 | 5845.4600 | f_L and f_H Within 5725~5850MHz range |
| -10 | | 5726.5562 | 5845.4613 | |
| 0 | | 5726.5563 | 5845.4612 | |
| 10 | | 5726.5561 | 5845.4603 | |
| 20 | | 5726.5560 | 5845.4612 | |
| 30 | | 5726.5564 | 5845.4602 | |
| 40 | | 5726.5563 | 5845.4614 | |
| 50 | | 5726.5562 | 5845.4613 | |
| 25 | 18 | 5726.5570 | 5845.4608 | |
| 25 | 27 | 5726.5570 | 5845.4609 | |

Note: the f_L and f_H determined by 99% Occupied bandwidth low edge at Low test channel and High edge at High test channel.

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