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# **ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

Sharp Corporation, Mobile Communication B.U.

Applicant: 2-13-1, Hachihonmatsu-lida, Higashi-hiroshima-shi,

Hiroshima 739-0192, Japan

**Sharp Corporation** Manufacturer:

1 Takumi-cho, Sakai-ku, Sakai-Shi, Osaka 590-8522, Japan

**Product Name: Smart Phone** 

**Report Number:** ER/2018/30017

FCC ID: APYHRO00259

**FCC Rule Part:** §15.407, Cat: NII

**Issue Date:** Mar. 28, 2018

Mar. 05, 2018 ~ Mar. 23, 2018 **Date of Test:** 

Date of EUT Received: Mar. 05, 2018

## We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Tested By:

Marcus Tseng / Sr. Engineer

Approved By:

Jim Chang / Manager





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# **Revision History**

| Report Number | Revision | Description                  | Effected Page | Issue Date    | Revised By    |
|---------------|----------|------------------------------|---------------|---------------|---------------|
| ER/2018/30017 | Rev.00   | Initial creation of document | All           | Mar. 28, 2018 | Violetta Tang |

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## 1. GENERAL INFORMATION

## 1.1 Product Description

## General:

| onoral.           |  |  |  |
|-------------------|--|--|--|
| Product Name:     | Smart Phone                            |  |  |
| Hardware Version: | DVT                                    |  |  |
| Software Version: | N/A                                    |  |  |
|                   | 3.85V from Rechargeable Li-ion Battery |  |  |
| Power Supply:     | Battery:                               | Model No.: UBATIA286AFN2,<br>Supplier: SCUD (FUJIAN) Electronics Co., Ltd. |  |

## WLAN 5GHz:

| Wi-Fi                   | Frequency<br>Range | Channels   | Avg. Power<br>(dBm)   | Modulation<br>Technology |  |  |
|-------------------------|--------------------|--|---|--------------------------|--|--|
|                         | 5180~5240          | 4  | 14.84   |                          |  |  |
| 11a_20                  | 5260~5320          | 4  | 14.90   | OFDM                     |  |  |
|                         | 5500~5700          | 11   | 14.73   |                          |  |  |
| 11n HT/                 | 5180~5240          | 4  | HT: 17.66 (Worst Case)  |                          |  |  |
| ac_VHT                  | 5260~5320          | 4  | HT: 17.54 (Worst Case)  | OFDM                     |  |  |
| 20M                     | 5500~5700          | 11   | HT: 17.69 (Worst Case)  |                          |  |  |
| 11n HT/                 | 5190~5230          | 2 HT: 17.53 (Worst Case)   |   |                          |  |  |
| ac_VHT                  | ac_VHT 5270~5310   |  | HT: 17.54 (Worst Case)  | OFDM                     |  |  |
| 40M                     | 5510~5670          | 5 HT: 17.73 (Worst Case)   |   |                          |  |  |
| 5210                    |                    | 1  | 14.72   |                          |  |  |
| VHT80M                  | 11ac 5290          |  | 14.52   | OFDM                     |  |  |
| 5530~5610               |                    | 2  | 17.71   |                          |  |  |
| Modulation Type         |                    |  | 64QAM, 16QAM, QPSK, BPSK for OFDM<br>256QAM for OFDM in 802.11ac only |                          |  |  |
| Transition Rate:        |                    | 802.11 a: 6/9/12/18/24/36/48/54 Mbps<br>802.11 n_20MHz: 6.5 - 144.4Mbps<br>802.11 n_40MHz: 13.5 - 300.0Mbps<br>802.11 ac_20MHz: 6.5 -173.3Mbps                           |   |                          |  |  |
|                         |                    | 802.11 ac_40MHz: 13.5 –400.0Mbps<br>802.11 ac_80MHz: 29.3 – 866.7Mbps  |   |                          |  |  |
| Antenna Designation: 51 |                    | IFA Antenna,<br>5150~5250MHz Gain: -3.6dBi (Main) / -3.9dBi(Aux)<br>5250~5350MHz Gain: -3.6dBi (Main) / -3.9dBi(Aux)<br>5470~5725MHz Gain: -1.7dBi (Main) / -3.6dBi(Aux) |   |                          |  |  |

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## 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

KDB 789033 D02 v01r04 General UNII Test Procedures New Rules

FCC KDB 662911 D01 Multiple Transmitter Output

KDB 644545 D03 v01 Guidance for IEEE 802.11ac

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

## 1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

(TAF code 0513)

FCC Registration Numbers are: 509634 / TW0001

## 1.4 Special Accessories

There are no special accessories used while test was conducted.

## 1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2. SYSTEM TEST CONFIGURATION

## 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

## 2.3 Test Procedure

### 2.3.1 **Conducted Emissions**

The EUT is a placed on as turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

### 2.3.2 **Radiated Emissions**

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

## 2.4 Measurement Results Explanation Example

### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

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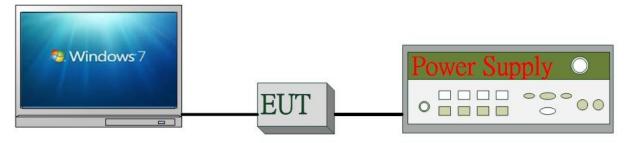
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## 2.5 Configuration of Tested System

Fig. 2-1 Radiated & AC Power Line Conducted Emission



Fig. 2-2 Conducted (Antenna Port) Emission



**Table 2-1 Equipment Used in Tested System** 

| Item | Equipment             | Mfr/Brand | Model/Type No. | Series No. | Data Cable | Power Cord |
|------|-----------------------|-----------|----------------|------------|------------|------------|
| 1.   | WLAN Test<br>Software | N/A       | N/A            | N/A        | N/A        | N/A        |
| 2.   | DC Power Supply       | Anritsu   | E3640A         | MY52410006 | N/A        | Unshielded |
| 3.   | Notebook              | Lenovo    | T440           | P0000564   | Shielded   | Unshielded |

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## 3. SUMMARY OF TEST RESULT

| FCC Rules                | Description Of Test                            | Result    |
|--------------------------|--|-----------|
| §15.207                  | AC Power Line Conducted Emission               | Compliant |
| §15.403(i)<br>§15.407(e) | 26 dB Emission Bandwidth                       | Compliant |
| §15.407(a)               | Maximum Conducted Output Power                 | Compliant |
| §15.407(a)               | Power Spectral Density                         | Compliant |
| §15.407(b)               | Undesirable Radiated Emissions                 | Compliant |
| §15.407(c)               | Transmission in case of Absence of Information | Compliant |
| §15.407(g)               | Frequency Stability                            | Compliant |
| §15.203<br>§15.407(a)    | Antenna Requirement                            | Compliant |

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## 4. DESCRIPTION OF TEST MODES

## 4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

| 802.11a / n HT20 Mode, |           |  |  |
|------------------------|-----------|--|--|
| 802.11ac VHT20 Mode    |           |  |  |
| Channel                | Frequency |  |  |
| 36                     | 5180      |  |  |
| 40                     | 5200      |  |  |
| 44                     | 5220      |  |  |
| 48                     | 5240      |  |  |

| 802.11 n HT40 Mode,<br>802.11ac VHT40 Mode |           |  |
|--|-----------|--|
| channel                                    | Frequency |  |
| 38 5190                                    |           |  |
| 46   | 5230      |  |

| 802.11ac VHT80 Mode |           |  |
|---------------------|-----------|--|
| channel             | Frequency |  |
| 42                  | 5210      |  |

Operated band in 5250 MHz ~5350 MHz:

| Operated band in ozoo iiii                    |           |  |
|---|-----------|--|
| 802.11a / n HT20 Mode,<br>802.11ac VHT20 Mode |           |  |
| channel                                       | Frequency |  |
| 52  | 5260      |  |
| 56  | 5280      |  |
| 60  | 5300      |  |
| 64  | 5320      |  |
|   |           |  |

| 802.11 n HT40 Mode,<br>802.11ac VHT40 Mode |           |  |
|--|-----------|--|
| channel                                    | Frequency |  |
| 54   | 5270      |  |
| 62   | 5310      |  |

| 802.11ac V | /HT80 Mode |
|------------|------------|
| Channel    | Frequency  |
| 58         | 5290       |

Operated band in 5470 MHz ~5725 MHz:

| 802.11a / n HT20 Mode, |  |  |  |  |  |  |  |  |
|------------------------|--|--|--|--|--|--|--|--|
| 802.11ac VHT20 Mode    |  |  |  |  |  |  |  |  |
| Frequency              |  |  |  |  |  |  |  |  |
| 5500                   |  |  |  |  |  |  |  |  |
| 5520                   |  |  |  |  |  |  |  |  |
| 5540                   |  |  |  |  |  |  |  |  |
| 5560                   |  |  |  |  |  |  |  |  |
| 5580                   |  |  |  |  |  |  |  |  |
| 5600                   |  |  |  |  |  |  |  |  |
| 5620                   |  |  |  |  |  |  |  |  |
| 5640                   |  |  |  |  |  |  |  |  |
| 5660                   |  |  |  |  |  |  |  |  |
| 5680                   |  |  |  |  |  |  |  |  |
| 5700                   |  |  |  |  |  |  |  |  |
|                        |  |  |  |  |  |  |  |  |

| 802.11 n HT40 Mode, |  |  |  |  |  |  |  |  |
|---------------------|--|--|--|--|--|--|--|--|
| 802.11ac VHT40 Mode |  |  |  |  |  |  |  |  |
| quency              |  |  |  |  |  |  |  |  |
| 5510                |  |  |  |  |  |  |  |  |
| 5550                |  |  |  |  |  |  |  |  |
| 5590                |  |  |  |  |  |  |  |  |
| 5630                |  |  |  |  |  |  |  |  |
| 5670                |  |  |  |  |  |  |  |  |
|                     |  |  |  |  |  |  |  |  |

| 802.11ac VHT80 Mode |           |  |  |  |  |  |
|---------------------|-----------|--|--|--|--|--|
| channel             | Frequency |  |  |  |  |  |
| 106                 | 5530      |  |  |  |  |  |
| 122                 | 5610      |  |  |  |  |  |

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## 4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. Test program used to control the EUT for staying in continuous transmitting mode is prorammed.
- 3. Investigation has been done on all the possible configurations for searching the worst case.
- 4. The given UE is pre-scanned among 802.11n and ac modes, and 802.11n yields the highest reading that generates the highest emission.

### RADIATED EMISSION TEST

| RADIATED EMISSION TEST:              |                                      |            |             |            |           |         |  |  |  |
|--------------------------------------|--------------------------------------|------------|-------------|------------|-----------|---------|--|--|--|
| RADIATED EMISSION TEST (BELOW 1 GHz) |                                      |            |             |            |           |         |  |  |  |
| MODE                                 | FREQUENCY                            | AVAILABLE  | TESTED      | MODULATION | DATA RATE | ANTENNA |  |  |  |
| IVIODE                               | BAND (MHz)                           | CHANNEL    | CHANNEL     | MODULATION | (Mbps)    | PORT    |  |  |  |
| 802.11a                              | 5180~5240                            | 36 to 48   | 36,44,48    | OFDM       | 6         | MAIN    |  |  |  |
| 802.11ac_VHT80                       | 5210                                 | 42         | 42          | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11a                              | 5260~5320                            | 52 to 64   | 52,60,64    | OFDM       | 6         | MAIN    |  |  |  |
| 802.11ac_VHT80                       | 5290                                 | 58         | 58          | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11a                              | 5500~5700                            | 100 to 140 | 100,116,140 | OFDM       | 6         | MAIN    |  |  |  |
| 802.11ac_VHT80                       | 5530~5610                            | 106 to 122 | 106,122     | OFDM       | MCS8      | MIMO    |  |  |  |
|                                      | RADIATED EMISSION TEST (ABOVE 1 GHz) |            |             |            |           |         |  |  |  |
| MODE                                 | FREQUENCY                            | AVAILABLE  | TESTED      | MODULATION | DATA RATE | ANTENNA |  |  |  |
| WIODL                                | BAND (MHz)                           | CHANNEL    | CHANNEL     | WODULATION | (Mbps)    | PORT    |  |  |  |
| 802.11a                              | 5180~5240                            | 36 to 48   | 36,44,48    | OFDM       | 6         | MAIN    |  |  |  |
| 802.11n_HT20                         |                                      | 30 10 40   |             | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11n_HT40                         | 5190~5230                            | 38 to 46   | 38,46       | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11ac_VHT80                       | 5210                                 | 42         | 42          | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11a                              | 5260~5320                            | 52 to 64   | 52,60,64    | OFDM       | 6         | MAIN    |  |  |  |
| 802.11n_HT20                         | 3200 3320                            | 32 10 04   | 32,00,04    | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11n_HT40                         | 5270~5310                            | 54 to 62   | 54,62       | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11ac_VHT80                       | 5290                                 | 58         | 58          | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11a                              | 5500~5700                            | 100 to 140 | 100,116,140 | OFDM       | 6         | MAIN    |  |  |  |
| 802.11n_HT20                         | 3300~3700                            | 100 to 140 | 100,110,140 | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11n_HT40                         | 5510~5670                            | 102 to 134 | 102,110,134 | OFDM       | MCS8      | MIMO    |  |  |  |
| 802.11ac_VHT80                       | 5530~5610                            | 106 to 122 | 106,122     | OFDM       | MCS8      | MIMO    |  |  |  |

## Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n/ac WLAN Transmitter for channel Low, Mid and High, the worst case E1 position was reported.

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### ANTENNA PORT CONDUCTED MEASUREMENT

| ANTENNAFO      | KI OONDOOI | ED MILAGOR | CIVICIA I.   |            |           |      |
|----------------|------------|------------|--------------|------------|-----------|------|
|                |            | CON        | IDUCTED TEST |            |           |      |
| MODE           | FREQUENCY  |            | TESTED       | MODULATION | DATA RATE |      |
|                | BAND (MHz) | CHANNEL    | CHANNEL      |            | (Mbps)    | PORT |
| 802.11a        | 5180~5240  | 36 to 48   | 36,44,48     | OFDM       | 6         | MAIN |
| 802.11n_HT20   | 3100 3240  | 30 10 40   | 50,44,40     | OFDM       | MCS8      | MIMO |
| 802.11n_HT40   | 5190~5230  | 38 to 46   | 38,46        | OFDM       | MCS8      | MIMO |
| 802.11ac_VHT80 | 5210       | 42         | 42           | OFDM       | MCS8      | MIMO |
| 802.11a        | 5260~5320  | 52 to 64   | E2 60 64     | OFDM       | 6         | MAIN |
| 802.11n_HT20   | 5200~5520  | 32 10 04   | 52,60,64     | OFDM       | MCS8      | MIMO |
| 802.11n_HT40   | 5270~5310  | 54 to 62   | 54,62        | OFDM       | MCS8      | MIMO |
| 802.11ac_VHT80 | 5290       | 58         | 58           | OFDM       | MCS8      | MIMO |
| 802.11a        | 5500 5700  | 100 to 110 | 100 116 110  | OFDM       | 6         | MAIN |
| 802.11n_HT20   | 5500~5700  | 100 to 140 | 100,116,140  | OFDM       | MCS8      | MIMO |
| 802.11n_HT40   | 5510~5670  | 102 to 134 | 102,110,134  | OFDM       | MCS8      | MIMO |
| 802.11ac_VHT80 | 5530~5610  | 106 to 122 | 106,122      | OFDM       | MCS8      | MIMO |

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## 5. MEASUREMENT UNCERTAINTY

| Test Items                              | Uncertainty                |
|---|----------------------------|
| AC Power Line Conducted Emission        | +/- 2.586 dB               |
| 26dB Emission Bandwidth                 | +/- 123.36 Hz              |
| The Maximum Output Power Measurement    | +/- 0.96 dB                |
| Peak Power Spectral Density Measurement | +/- 1.67 dB                |
| Frequency Stability                     | +/- 123.36 Hz              |
| Temperature                             | +/- 0.65 °C                |
| Humidity                                | +/- 4.6 %                  |
| DC / AC Power Source                    | DC= +/- 0.13%, AC=+/- 0.2% |

## Radiated Spurious Emission:

|                                   | 9kHz-30MHz: +/-2.87dB      |
|-----------------------------------|----------------------------|
|                                   | 30MHz - 180MHz: +/- 3.37dB |
| Measurement uncertainty           | 180MHz -417MHz: +/- 3.19dB |
| (Polarization : <b>Vertical</b> ) | 0.417GHz-1GHz: +/- 3.19dB  |
|                                   | 1GHz - 18GHz: +/- 4.04dB   |
|                                   | 18GHz - 40GHz: +/- 4.04dB  |

|                                     | 9kHz-30MHz: +/-2.87dB      |
|-------------------------------------|----------------------------|
|                                     | 30MHz - 167MHz: +/- 4.22dB |
| Measurement uncertainty             | 167MHz -500MHz: +/- 3.44dB |
| (Polarization : <b>Horizontal</b> ) | 0.5GHz-1GHz: +/- 3.39dB    |
|                                     | 1GHz - 18GHz: +/- 4.08dB   |
|                                     | 18GHz - 40GHz: +/- 4.08dB  |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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## 6. CONDUCTED EMISSION TEST

## 6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

| Frequency range | Limits<br>dB(uV) |          |  |  |
|-----------------|------------------|----------|--|--|
| MHz             | Quasi-peak       | Average  |  |  |
| 0.15 to 0.50    | 66 to 56         | 56 to 46 |  |  |
| 0.50 to 5       | 56               | 46       |  |  |
| 5 to 30         | 60               | 50       |  |  |

### Note

## 6.2 Measurement Equipment Used

| EQUIPMENT<br>TYPE | MFR         | MODEL<br>NUMBER | SERIAL<br>NUMBER | LAST<br>CAL. | CAL DUE.   |
|-------------------|-------------|-----------------|------------------|--------------|------------|
| EMI Test Receiver | R&S         | ESCI7           | 100760           | 2017/06/06   | 2018/06/05 |
| Coaxial Cables    | N/A         | WK CE<br>Cable  | N/A              | 2018/01/02   | 2019/01/01 |
| Notebook          | Lenovo      | T440P           | P0000564         | N/A          | N/A        |
| LISN              | SCHWARZBECK | NSLK 8127       | 8127-649         | 2017/05/22   | 2018/05/21 |

## 6.3 EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz power source.

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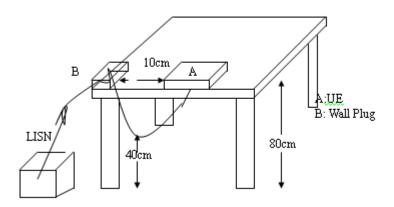
<sup>1.</sup> The lower limit shall apply at the transition frequencies

<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50



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## 6.4 Test SET-UP



### 6.5 Measurement Procedure

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all phases of power being supplied by given UE are completed.

## 6.6 Measurement Result

Note: Refer to next page for measurement data and plots.

Note2: The \* reveals the worst-case results that closet to the limit.

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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Site Conduction Room

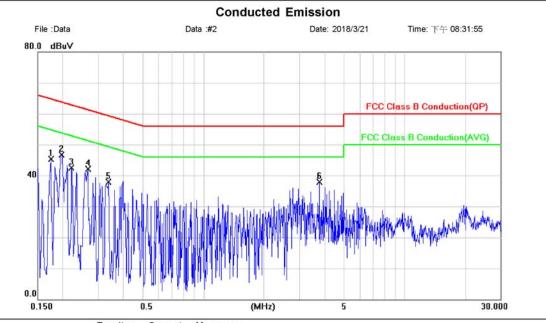
Limit: FCC Class B Conduction(QP)

Mode: Operation

Note:

Temperature: Phase: L1

Power: AC 120V/60Hz Humidity: 58 %



| Mk. | Freq.  | Reading<br>Level                         | Correct<br>Factor   | Measure-<br>ment   | Limit  | Over  |  |  |
|-----|--------|--|---|--|--|---|--|--|
|     | MHz    | dBuV                                     | dB  | dBuV   | dBuV   | dB  | Detector   | Comment  |
|     | 0.1740 | 45.27                                    | 0.00  | 45.27  | 64.77  | -19.50  | peak   |  |
| *   | 0.1965 | 46.79                                    | 0.00  | 46.79  | 63.76  | -16.97  | peak   |  |
|     | 0.2220 | 42.44                                    | 0.00  | 42.44  | 62.74  | -20.30  | peak   |  |
|     | 0.2660 | 42.20                                    | 0.00  | 42.20  | 61.24  | -19.04  | peak   |  |
|     | 0.3380 | 37.84                                    | 0.00  | 37.84  | 59.25  | -21.41  | peak   |  |
|     | 3.7660 | 37.94                                    | 0.06  | 38.00  | 56.00  | -18.00  | peak   |  |
|     |        | MHz 0.1740 * 0.1965 0.2220 0.2660 0.3380 | Mk. Freq. Level  MHz dBuV  0.1740 45.27  * 0.1965 46.79  0.2220 42.44  0.2660 42.20  0.3380 37.84 | Mk.         Freq.         Level         Factor           MHz         dBuV         dB           0.1740         45.27         0.00           *         0.1965         46.79         0.00           0.2220         42.44         0.00           0.2660         42.20         0.00           0.3380         37.84         0.00 | Mk.         Freq.         Level         Factor         ment           MHz         dBuV         dB         dBuV           0.1740         45.27         0.00         45.27           *         0.1965         46.79         0.00         46.79           0.2220         42.44         0.00         42.44           0.2660         42.20         0.00         42.20           0.3380         37.84         0.00         37.84 | Mk.         Freq.         Level         Factor         ment         Limit           MHz         dBuV         dB         dBuV         dBuV           0.1740         45.27         0.00         45.27         64.77           *         0.1965         46.79         0.00         46.79         63.76           0.2220         42.44         0.00         42.44         62.74           0.2660         42.20         0.00         42.20         61.24           0.3380         37.84         0.00         37.84         59.25 | Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB         dBuV         dBuV         dB           0.1740         45.27         0.00         45.27         64.77         -19.50           *         0.1965         46.79         0.00         46.79         63.76         -16.97           0.2220         42.44         0.00         42.44         62.74         -20.30           0.2660         42.20         0.00         42.20         61.24         -19.04           0.3380         37.84         0.00         37.84         59.25         -21.41 | Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB         dBuV         dBuV         dB         Detector           0.1740         45.27         0.00         45.27         64.77         -19.50         peak           *         0.1965         46.79         0.00         46.79         63.76         -16.97         peak           0.2220         42.44         0.00         42.44         62.74         -20.30         peak           0.2660         42.20         0.00         42.20         61.24         -19.04         peak           0.3380         37.84         0.00         37.84         59.25         -21.41         peak |

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Site Conduction Room

Phase:

AC 120V/60Hz

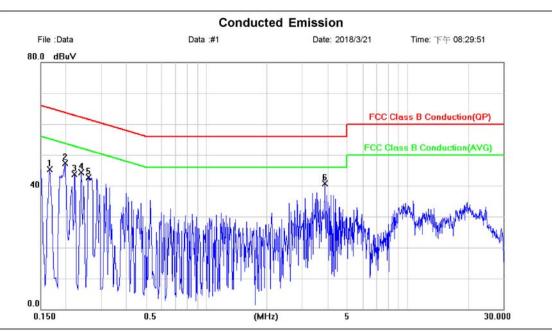
Power:

Temperature:

Humidity: 58 %

Limit: FCC Class B Conduction(QP) Mode: Operation

Note:



| No. | Mk. | Freq.  | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit | Over   |          |         |
|-----|-----|--------|------------------|-------------------|------------------|-------|--------|----------|---------|
|     |     | MHz    | dBuV             | dB                | dBuV             | dBuV  | dB     | Detector | Comment |
| 1   |     | 0.1660 | 45.29            | 0.00              | 45.29            | 65.16 | -19.87 | peak     |         |
| 2   |     | 0.1980 | 47.29            | 0.00              | 47.29            | 63.69 | -16.40 | peak     |         |
| 3   |     | 0.2220 | 43.74            | 0.00              | 43.74            | 62.74 | -19.00 | peak     |         |
| 4   |     | 0.2380 | 44.25            | 0.00              | 44.25            | 62.17 | -17.92 | peak     |         |
| 5   |     | 0.2587 | 42.68            | 0.00              | 42.68            | 61.47 | -18.79 | peak     |         |
| 6   | *   | 3.8940 | 40.66            | 0.06              | 40.72            | 56.00 | -15.28 | peak     |         |



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## 7. DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

### Formula:

Duty Cycle = Ton / (Ton+Toff)

## **Measurement Procedure:**

- 1. Set span = Zero
- 2. RBW = 8MHz
- 3. VBW = 8MHz,
- 4. Detector = Peak

## **Duty Cycle:**

| Mode        | Duty Cycle (%) | Duty Cycle (%)  Duty Factor (dB) =10*log ( 1/Duty Cycle ) |      | VBW<br>setting<br>(kHz) |
|-------------|----------------|---|------|-------------------------|
| 802.11a     | 98.23          | 0.08  | 0.88 | 1.00                    |
| 802.11n_20  | 98.10          | 0.08  | 0.74 | 1.00                    |
| 802.11n_40  | 96.19          | 0.17  | 4.66 | 5.00                    |
| 802.11ac_80 | 92.54          | 0.34  | 2.78 | 3.00                    |

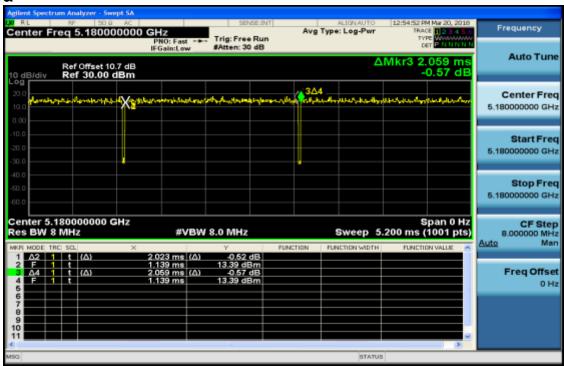
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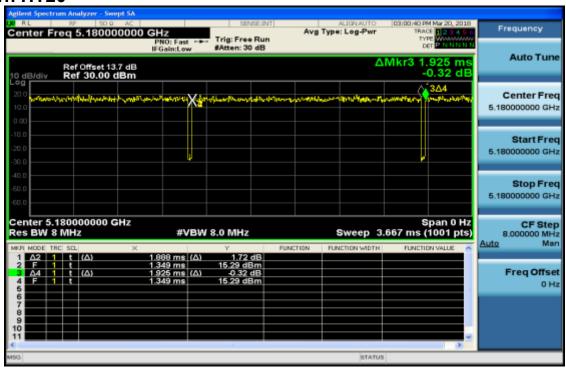


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## **DUTY CYCLE TEST SIGNAL Measurement Result** 802.11a



## 802.11n HT20



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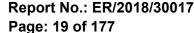
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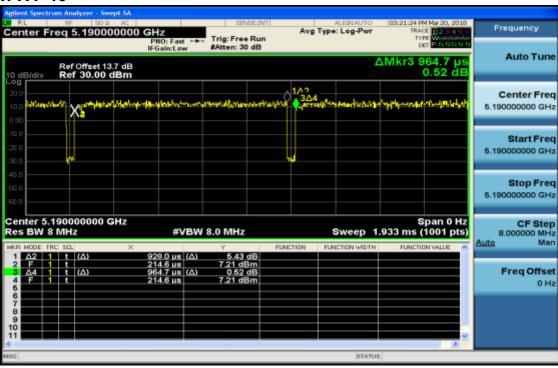
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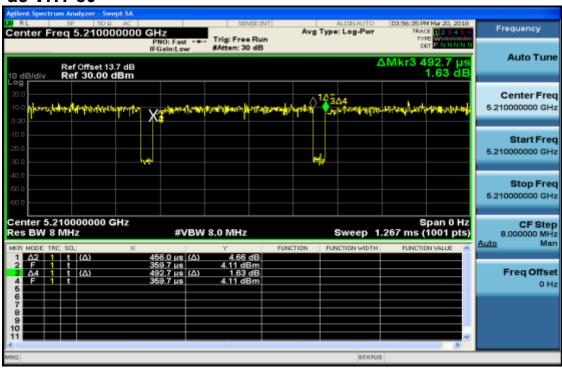




## 802.11n HT 40



## 802.11 ac VHT 80



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## 8. 26DB EMISSION BANDWIDTH MEASUREMENT

## 8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

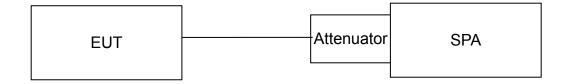
### 8.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
  - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
  - b. Mark the peak frequency and –26dB (upper and lower) frequency.
- 4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
- 5. Repeat above procedures until all test default channel measured were complete.

## 8.3 Measurement Equipment Used

| EQUIPMENT TYPE           | MFR          | MODEL SERIAL NUMBER NUMBER |            | LAST CAL.  | CAL DUE.   |
|--------------------------|--------------|----------------------------|------------|------------|------------|
| EXA Spectrum<br>Analyzer | Agilent      | N9010A                     | MY54200716 | 2017/10/16 | 2018/10/15 |
| DC Power Supply          | Anritsu      | E3640A                     | MY52410006 | 2017/11/28 | 2018/11/27 |
| Attenuator               | Mini-Circuit | BW-S10W2+                  | 2          | 2018/01/02 | 2019/01/01 |
| Notebook                 | Lenovo       | T440                       | P0000564   | N/A        | N/A        |

## 8.4 Test Set-up



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# 8.5 Measurement Result 26dB Bandwidth

802.11a Main

| 002. I Ta_IVIAIII  |                     |                    |  |  |  |  |
|--------------------|---------------------|--------------------|--|--|--|--|
| Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |  |  |  |  |
| 5180               | 21.46               | 13.315             |  |  |  |  |
| 5220               | 21.75               | 13.375             |  |  |  |  |
| 5240               | 22.26               | 13.476             |  |  |  |  |
| 5260               | 21.47               | 13.319             |  |  |  |  |
| 5300               | 21.39               | 13.303             |  |  |  |  |
| 5320               | 21.94               | 13.412             |  |  |  |  |
| 5500               | 21.37               | 13.299             |  |  |  |  |
| 5580               | 21.79               | 13.383             |  |  |  |  |
| 5700               | 21.67               | 13.358             |  |  |  |  |

## 802.11n\_HT20\_Main

## 802.11n\_HT20\_Aux1

| Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |        | Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |
|--------------------|---------------------|--------------------|--------|--------------------|---------------------|--------------------|
| 5180               | 22.39               | 13.500             | 13.500 |                    | 23.09               | 13.634             |
| 5220               | 22.58               | 13.538             |        | 5220               | 22.32               | 13.487             |
| 5240               | 22.73               | 13.565             |        | 5240               | 23.44               | 13.700             |
| 5260               | 22.20               | 13.463             |        | 5260               | 22.39               | 13.501             |
| 5300               | 22.84               | 13.587             |        | 5300               | 22.87               | 13.593             |
| 5320               | 22.68               | 13.556             |        | 5320               | 22.61               | 13.542             |
| 5500               | 22.69               | 13.558             |        | 5500               | 22.55               | 13.532             |
| 5580               | 22.53               | 13.527             |        | 5580               | 22.69               | 13.559             |
| 5700               | 22.77               | 13.574             |        | 5700               | 22.67               | 13.554             |

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802.11n HT40 Main

802.11n HT40 Aux1

| Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |
|--------------------|---------------------|--------------------|
| 5190               | 41.58               | 16.189             |
| 5230               | 42.50               | 16.284             |
| 5270               | 42.08               | 16.240             |
| 5310               | 41.75               | 16.206             |
| 5510               | 43.00               | 16.335             |
| 5550               | 42.61               | 16.295             |
| 5670               | 43.26               | 16.361             |

| Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |  |  |  |  |
|--------------------|---------------------|--------------------|--|--|--|--|
| 5190               | 41.91               | 16.223             |  |  |  |  |
| 5230               | 42.21               | 16.254             |  |  |  |  |
| 5270               | 42.25               | 16.258             |  |  |  |  |
| 5310               | 42.21               | 16.254             |  |  |  |  |
| 5510               | 42.19               | 16.252             |  |  |  |  |
| 5550               | 43.05               | 16.340             |  |  |  |  |
| 5670               | 42.59               | 16.293             |  |  |  |  |

802.11ac \_VHT80\_Main

802.11ac \_VHT80\_Aux1

| Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |
|--------------------|---------------------|--------------------|
| 5210               | 85.34               | 19.312             |
| 5290               | 82.04               | 19.140             |
| 5530               | 85.14               | 19.301             |
| 5610               | 84.81               | 19.284             |

| Frequency<br>(MHz) | 26dB<br>BW<br>(MHz) | 10 Log (B)<br>(dB) |
|--------------------|---------------------|--------------------|
| 5210               | 85.66               | 19.328             |
| 5290               | 85.32               | 19.311             |
| 5530               | 85.39               | 19.314             |
| 5610               | 85.24               | 19.306             |

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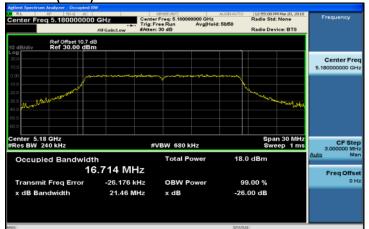
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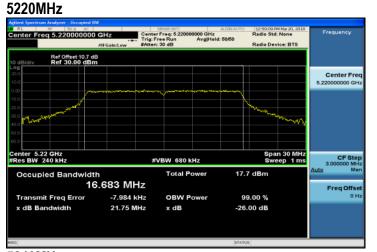
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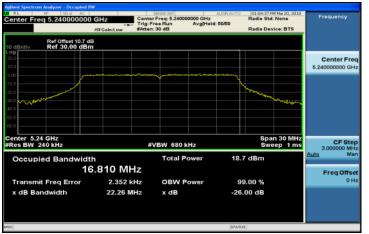
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## 802.11a (Main) 5180MHz

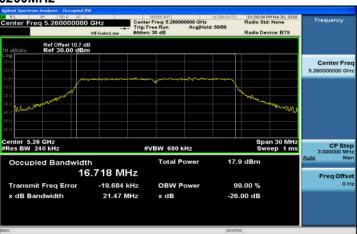




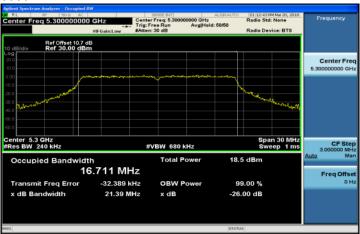
## 5240MHz



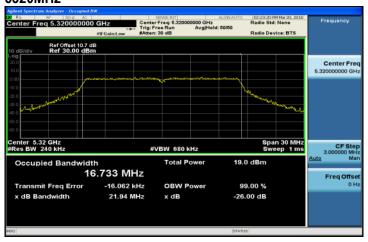
### 5260MHz



## 5300MHz



## 5320MHz



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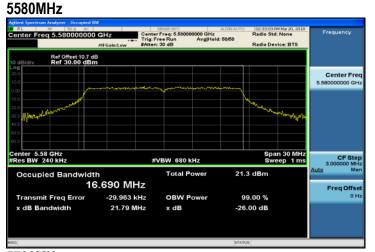
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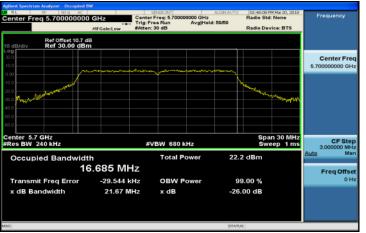
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### 5500MHz

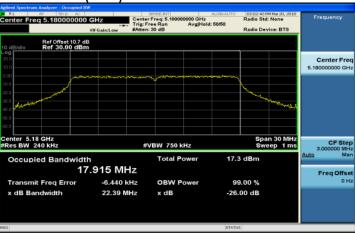




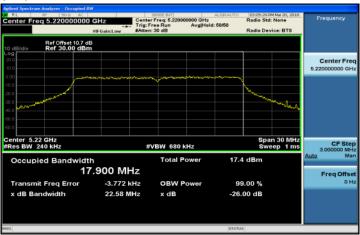
## 5700MHz



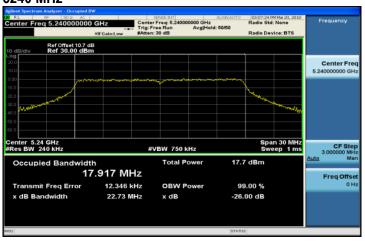
## 802.11n HT20 (Main) 5180 MHz



## 5220 MHz



## 5240 MHz



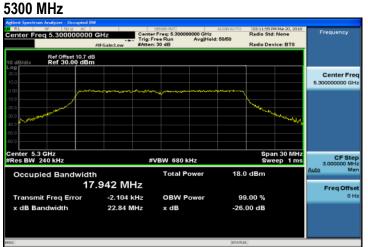
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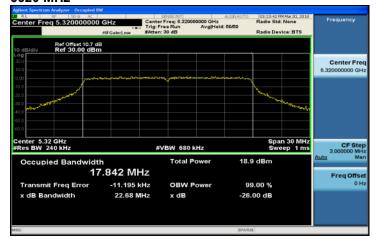
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### 5260 MHz

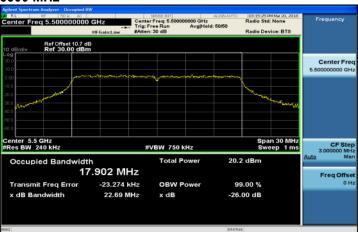




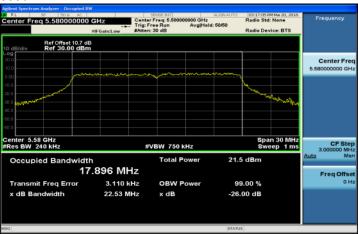
## 5320 MHz



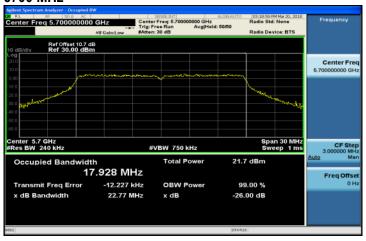
### 5500 MHz



## 5580 MHz



## 5700 MHz



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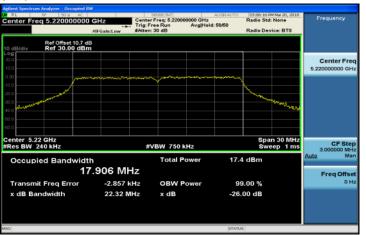


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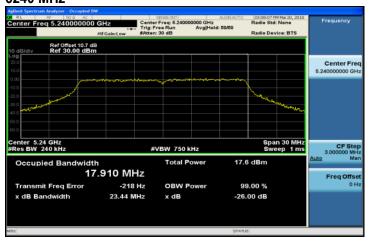
## 802.11n HT20 (Aux1) 5180 MHz



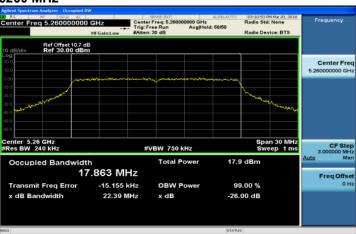
## 5220 MHz



## 5240 MHz



### 5260 MHz



## 5300 MHz



## 5320 MHz



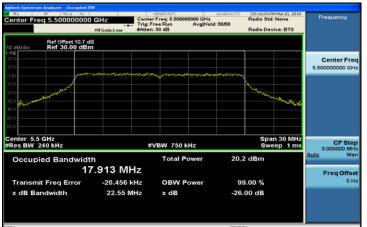
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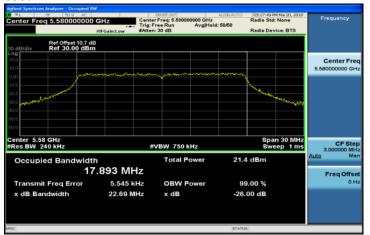


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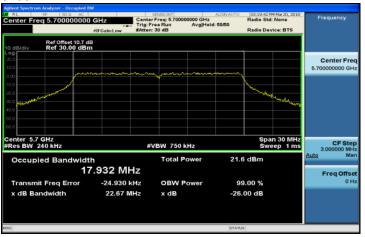
### 5500 MHz



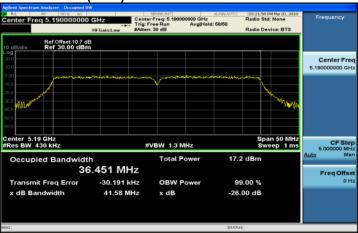
## 5580 MHz



## 5700 MHz



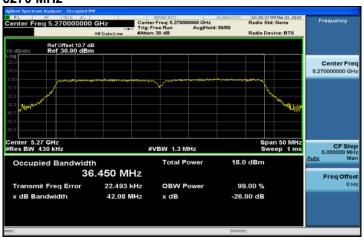
## 802.11n HT40 (Main) 5190 MHz



## 5230 MHz



## 5270 MHz



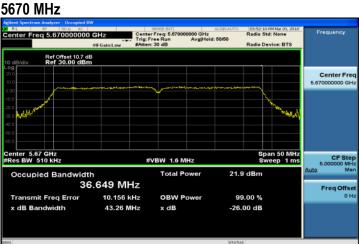
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### 5310MHz





## 5510 MHz



## 5550 MHz

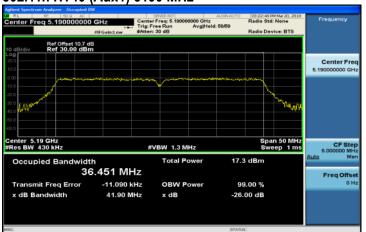


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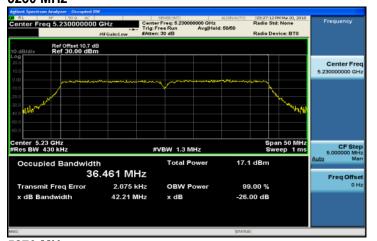


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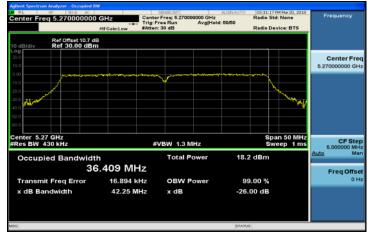
## 802.11n HT40 (Aux1) 5190 MHz



# 5230 MHz



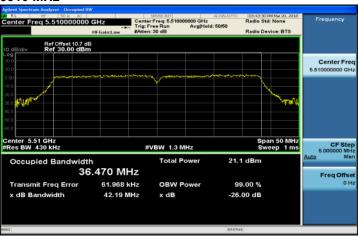
## 5270 MHz



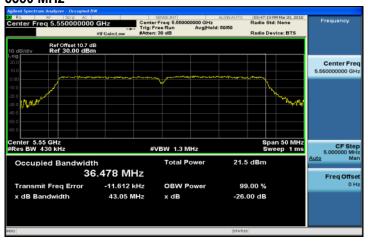
### 5310MHz



## 5510 MHz



## 5550 MHz

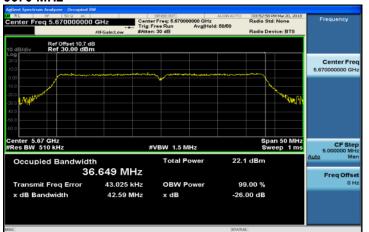


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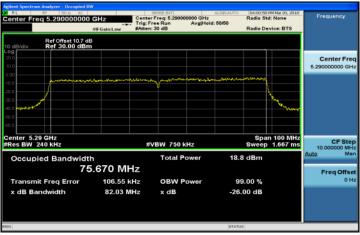
### 5670 MHz



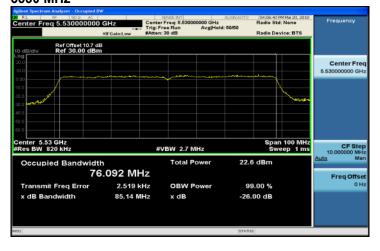
## 802.11ac VHT80 (Main) 5210 MHz



## 5290 MHz



## 5530 MHz

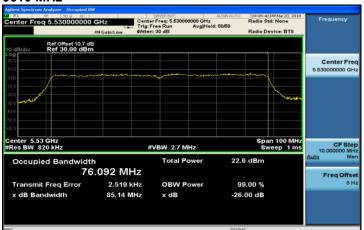


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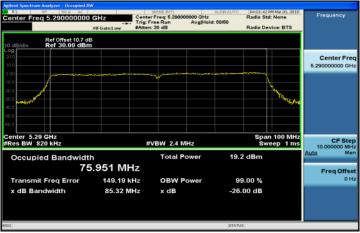
### 5610 MHz



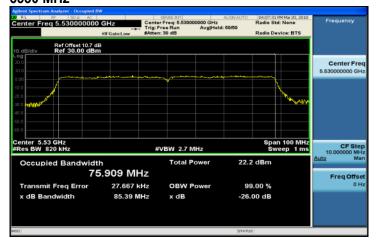
## 802.11ac VHT80 (Aux1) 5210 MHz



## 5290 MHz



## 5530 MHz

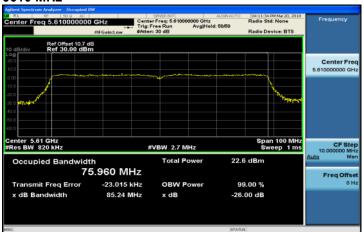


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## 5610 MHz



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## 9. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

## 9.1 Standard Applicable

| OPERZTION<br>Band | EUT CATEGORY |                                   | LIMIT                             |
|-------------------|--------------|-----------------------------------|-----------------------------------|
| U-NII-1           |              | Access Point (Mater device )      | 1 Watt(30dBm)                     |
|                   |              | Fixed point-to-point Acess Ponit  | 1 Watt(30dBm)                     |
|                   |              | Mobile and portable clinet device | 250mW(23.98dBm)                   |
| U-NII-2A          |              |                                   | 250mW(23.98dBm) or 11dBm+10 log B |
| U-NII-2C          |              |                                   | 250mW(23.98dBm) or 11dBm+10 log B |
| U-NII-3           |              |                                   | 1 Watt(30dBm)                     |

If transmitting antennas of directional gain greater than 6 dBi are used, both the transmit power and the power spectral density shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.

### Note:

The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below: Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

|          | Effective Legacy Gain (dBi) | Limit    |
|----------|-----------------------------|----------|
| UNII-1   | -3.6+3.01=-0.59dBi          | 23.98dBm |
| UNII-2A  | -3.6+3.01=-0.59dBi          | 23.98dBm |
| U-NII-2C | -1.7+3.01=1.31dBi           | 23.98dBm |

Therefore the limit no needs to reduce for the UNII-1, U-NII-2A and U-NII-2C band.

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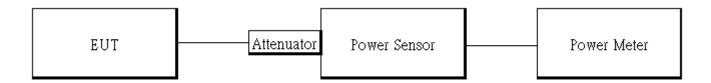
### 9.2 Measurement Procedure

- Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
- Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
- Record the max. reading and add 10 log(1/duty cycle).
- Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

## 9.3 Measurement Equipment Used

| EQUIPMENT TYPE  | MFR          | MODEL<br>NUMBER | SERIAL<br>NUMBER | LAST CAL.  | CAL DUE.   |
|-----------------|--------------|-----------------|------------------|------------|------------|
| Power Meter     | Anritsu      | ML2496A         | 1242004          | 2017/10/16 | 2018/10/15 |
| DC Power Supply | Anritsu      | E3640A          | MY52410006       | 2017/11/28 | 2018/11/27 |
| Attenuator      | Mini-Circuit | BW-S10W2+       | 2                | 2018/01/02 | 2019/01/01 |
| Notebook        | Lenovo       | T440            | P0000564         | N/A        | N/A        |

## 9.4 Test Set-up



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### 9.5 Measurement Result

## **Conducted output power**

## 802 11a Main

| 002.11a_waiii |                    |              |                         |                        |                            |                  |        |      |
|---------------|--------------------|--------------|-------------------------|------------------------|----------------------------|------------------|--------|------|
| СН            | Frequency<br>(MHz) | Data<br>Rate | TOTAL<br>POWER<br>(dBm) | TOTAL<br>POWER<br>(mW) | REQUIRED<br>LIMIT<br>(dBm) |                  | RESULT |      |
| 36            | 5180               | 6            | 11.70                   | 14.781                 |                            | 30               |        | PASS |
| 44            | 5220               | 6            | 14.84                   | 30.459                 | 30                         |                  | PASS   |      |
| 48            | 5240               | 6            | 14.83                   | 30.389                 | 30                         |                  | PASS   |      |
| 52            | 5260               | 6            | 14.90                   | 30.882                 | 23.98                      | or 11+10log(B) = | 24.32  | PASS |
| 60            | 5300               | 6            | 14.86                   | 30.599                 | 23.98                      | or 11+10log(B) = | 24.30  | PASS |
| 64            | 5320               | 6            | 11.94                   | 15.621                 | 23.98                      | or 11+10log(B) = | 24.41  | PASS |
| 100           | 5500               | 6            | 11.90                   | 15.478                 | 23.98                      | or 11+10log(B) = | 24.30  | PASS |
| 116           | 5580               | 6            | 14.73                   | 29.697                 | 23.98                      | or 11+10log(B) = | 24.38  | PASS |
| 140           | 5700               | 6            | 11.79                   | 15.091                 | 23.98                      | or 11+10log(B) = | 24.36  | PASS |

### 802.11n\_HT20\_MIMO

| СН  | Frequency | Data | Avg. POWER (dBm) |       | TOTAL<br>POWER | TOTAL<br>POWER | REQUIRED<br>LIMIT |                  |       | RESULT |
|-----|-----------|------|------------------|-------|----------------|----------------|-------------------|------------------|-------|--------|
| ОП  | (MHz)     | Rate | CH 0             | CH 1  | (dBm)          | (mW)           | (dBm)             |                  |       | KEGOLI |
| 36  | 5180      | MCS8 | 12.75            | 10.58 | 14.89          | 30.804         |                   | 30               |       | PASS   |
| 44  | 5220      | MCS8 | 14.57            | 14.31 | 17.53          | 56.610         |                   | 30               |       | PASS   |
| 48  | 5240      | MCS8 | 14.68            | 14.46 | 17.66          | 58.323         |                   | 30               |       | PASS   |
| 52  | 5260      | MCS8 | 14.57            | 14.34 | 17.54          | 56.800         | 23.98             | or 11+10log(B) = | 24.46 | PASS   |
| 60  | 5300      | MCS8 | 14.56            | 14.31 | 17.52          | 56.543         | 23.98             | or 11+10log(B) = | 24.59 | PASS   |
| 64  | 5320      | MCS8 | 11.66            | 11.24 | 14.54          | 28.458         | 23.98             | or 11+10log(B) = | 24.54 | PASS   |
| 100 | 5500      | MCS8 | 11.77            | 11.6  | 14.77          | 30.011         | 23.98             | or 11+10log(B) = | 24.53 | PASS   |
| 116 | 5580      | MCS8 | 14.67            | 14.53 | 17.69          | 58.716         | 23.98             | or 11+10log(B) = | 24.53 | PASS   |
| 140 | 5700      | MCS8 | 11.67            | 11.32 | 14.59          | 28.744         | 23.98             | or 11+10log(B) = | 24.55 | PASS   |

## 802.11n\_HT40\_MIMO

| СН  | Frequency<br>(MHz) | Data<br>Rate | Avg. POWER (dBm) |       | TOTAL<br>POWER | TOTAL<br>POWER | REQUIRED<br>LIMIT |                  |       | RESULT |
|-----|--------------------|--------------|------------------|-------|----------------|----------------|-------------------|------------------|-------|--------|
| Сп  |                    |              | CH 0             | CH 1  | (dBm)          | (mW)           | (dBm)             |                  |       | RESULT |
| 38  | 5190               | MCS8         | 12.52            | 10.6  | 14.84          | 30.483         |                   | 30               |       | PASS   |
| 46  | 5230               | MCS8         | 14.38            | 14.32 | 17.53          | 56.565         |                   | 30               |       | PASS   |
| 54  | 5270               | MCS8         | 14.41            | 14.32 | 17.54          | 56.763         | 23.98             | or 11+10log(B) = | 27.24 | PASS   |
| 62  | 5310               | MCS8         | 11.72            | 10.98 | 14.54          | 28.452         | 23.98             | or 11+10log(B) = | 27.21 | PASS   |
| 102 | 5510               | MCS8         | 11.72            | 11.53 | 14.80          | 30.209         | 23.98             | or 11+10log(B) = | 27.25 | PASS   |
| 110 | 5550               | MCS8         | 14.58            | 14.53 | 17.73          | 59.299         | 23.98             | or 11+10log(B) = | 27.30 | PASS   |
| 134 | 5670               | MCS8         | 11.57            | 11.12 | 14.53          | 28.354         | 23.98             | or 11+10log(B) = | 27.29 | PASS   |

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802.11ac VHT80 MIMO

| 602.11ac_V11100_MMMC |     |                    |              |                  |       |                |                |                   |                  |       |        |
|----------------------|-----|--------------------|--------------|------------------|-------|----------------|----------------|-------------------|------------------|-------|--------|
|                      | СН  | Frequency<br>(MHz) | Data<br>Rate | Avg. POWER (dBm) |       | TOTAL<br>POWER | TOTAL<br>POWER | REQUIRED<br>LIMIT |                  |       | RESULT |
|                      | OII |                    |              | CH 0             | CH 1  | (dBm)          | (mW)           |                   | (dBm)            |       | KLOOLI |
|                      | 42  | 5210               | MCS8         | 12.09            | 10.52 | 14.72          | 29.621         |                   | 30               |       | PASS   |
|                      | 58  | 5290               | MCS8         | 11.52            | 10.81 | 14.52          | 28.313         | 23.98             | or 11+10log(B) = | 30.14 | PASS   |
|                      | 106 | 5530               | MCS8         | 11.47            | 11.26 | 14.71          | 29.558         | 23.98             | or 11+10log(B) = | 30.30 | PASS   |
|                      | 122 | 5610               | MCS8         | 14.65            | 14.07 | 17.71          | 59.022         | 23.98             | or 11+10log(B) = | 30.28 | PASS   |

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# 10. POWER SPECTRAL DENSITY

# 10.1 Standard Applicable

| OPERZTION<br>Band |   | EUT CATEGORY                      | LIMIT         |
|-------------------|---|-----------------------------------|---------------|
| U-NII-1           |   | Access Point (Mater device )      | 17dBm/ MHz    |
|                   |   | Fixed point-to-point Acess Ponit  |               |
|                   | V | Mobile and portable clinet device | 11dBm/ MHz    |
| U-NII-2A          | V |                                   | 11dBm/ MHz    |
| U-NII-2C          | √ |                                   | 11dBm/ MHz    |
| U-NII-3           |   |                                   | 30dBm/ 500kHz |

If transmitting antennas of directional gain greater than 6 dBi are used, both the transmit power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### Note:

The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

|          | Effective Legacy Gain (dBi) | Limit |
|----------|-----------------------------|-------|
| UNII-1   | -3.6+3.01=-0.59dBi          | 11dBm |
| UNII-2A  | -3.6+3.01=-0.59dBi          | 11dBm |
| U-NII-2C | -1.7+3.01=1.31dBi           | 11dBm |

Therefore the limit needs to reduce for the UNII-1, U-NII-2A and U-NII-2C band.

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#### 10.2Measurement Procedure

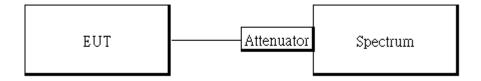
- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
- 4. For U-NII1, U-NII-2A, U-NII-2C Band:
  - Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
- 5. User the cursor on spectrum to peak search the highest level of trace
- 6. Record the max. reading and add 10 log(1/duty cycle).
- 7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome.

# 10.3Measurement Equipment Used

| EQUIPMENT TYPE           | MFR          | MODEL<br>NUMBER | SERIAL<br>NUMBER | LAST CAL.  | CAL DUE.   |
|--------------------------|--------------|-----------------|------------------|------------|------------|
| EXA Spectrum<br>Analyzer | Agilent      | N9010A          | MY54200716       | 2017/10/16 | 2018/10/15 |
| DC Power Supply          | Anritsu      | E3640A          | MY52410006       | 2017/11/28 | 2018/11/27 |
| Attenuator               | Mini-Circuit | BW-S10W2+       | 2                | 2018/01/02 | 2019/01/01 |
| Notebook                 | Lenovo       | T440            | P0000564         | N/A        | N/A        |

#### 10.4Test Set-up



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#### 10.5Measurement Result

|                    | POWER DENSITY 802.11a MODE            |      |                |                |        |  |  |  |
|--------------------|---------------------------------------|------|----------------|----------------|--------|--|--|--|
| Frequency<br>(MHz) | I I I I I I I I I I I I I I I I I I I |      | Limit<br>(dBm) | Margin<br>(dB) |        |  |  |  |
| 5180               | -1.75                                 | 0.08 | -1.67          | 11             | -12.67 |  |  |  |
| 5220               | -2.06                                 | 0.08 | -1.98          | 11             | -12.98 |  |  |  |
| 5240               | -2.14                                 | 0.08 | -2.06          | 11             | -13.06 |  |  |  |
| 5260               | -1.81                                 | 0.08 | -1.73          | 11             | -12.73 |  |  |  |
| 5300               | -1.11                                 | 0.08 | -1.03          | 11             | -12.03 |  |  |  |
| 5320               | -0.67                                 | 0.08 | -0.59          | 11             | -11.59 |  |  |  |
| 5500               | 1.09                                  | 0.08 | 1.17           | 11             | -9.83  |  |  |  |
| 5580               | 1.48                                  | 0.08 | 1.56           | 11             | -9.44  |  |  |  |
| 5700               | 2.16                                  | 0.08 | 2.24           | 11             | -8.76  |  |  |  |

| POWER DENSITY 802.11n HT20 MODE |                     |      |                                   |                |                |  |  |
|---------------------------------|---------------------|------|-----------------------------------|----------------|----------------|--|--|
| Frequency<br>(MHz)              | Duty Factor Duty Du |      | PPSD With<br>Duty Factor<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |  |  |
| 5180                            | 0.07                | 0.08 | 0.15                              | 11             | -10.85         |  |  |
| 5220                            | 0.52                | 0.08 | 0.60                              | 11             | -10.40         |  |  |
| 5240                            | 0.16                | 0.08 | 0.24                              | 11             | -10.76         |  |  |
| 5260                            | 0.76                | 0.08 | 0.84                              | 11             | -10.16         |  |  |
| 5300                            | 1.36                | 0.08 | 1.44                              | 11             | -9.56          |  |  |
| 5320                            | 1.91                | 0.08 | 1.99                              | 11             | -9.01          |  |  |
| 5500                            | 3.18                | 0.08 | 3.26                              | 11             | -7.74          |  |  |
| 5580                            | 4.23                | 0.08 | 4.31                              | 11             | -6.69          |  |  |
| 5700                            | 4.51                | 0.08 | 4.59                              | 11             | -6.41          |  |  |

| POWER DENSITY 802.11n HT40 MODE |                                  |                |                                   |                |                |  |  |
|---------------------------------|----------------------------------|----------------|-----------------------------------|----------------|----------------|--|--|
| Frequency<br>(MHz)              | PPSD W/O<br>Duty Factor<br>(dBm) | Duty<br>Factor | PPSD With<br>Duty Factor<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |  |  |
| 5190                            | -3.23                            | 0.17           | -3.06                             | 11             | -14.06         |  |  |
| 5230                            | -3.46                            | 0.17           | -3.29                             | 11             | -14.29         |  |  |
| 5270                            | -3.03                            | 0.17           | -2.86                             | 11             | -13.86         |  |  |
| 5310                            | -1.85                            | 0.17           | -1.68                             | 11             | -12.68         |  |  |
| 5510                            | 0.75                             | 0.17           | 0.92                              | 11             | -10.08         |  |  |
| 5550                            | 1.83                             | 0.17           | 2.00                              | 11             | -9.00          |  |  |
| 5670                            | 1.68                             | 0.17           | 1.85                              | 11             | -9.15          |  |  |

| POWER DENSITY 802.11ac VHT80 MODE |  |      |       |    |        |  |  |  |
|-----------------------------------|--|------|-------|----|--------|--|--|--|
| Frequency<br>(MHz)                | CY Duty Factor (dBm) Duty Factor (dBm) PPSD With Duty Factor (dBm) Limit (dBm) |      |       |    |        |  |  |  |
| 5210                              | -6.31  | 0.34 | -5.97 | 11 | -16.97 |  |  |  |
| 5290                              | -5.86  | 0.34 | -5.52 | 11 | -16.52 |  |  |  |
| 5530                              | -3.28  | 0.34 | -2.94 | 11 | -13.94 |  |  |  |
| 5610                              | -2.59  | 0.34 | -2.25 | 11 | -13.25 |  |  |  |

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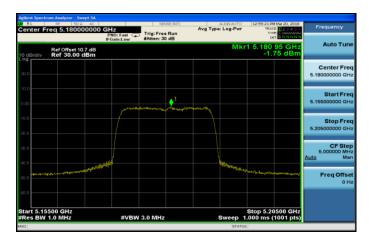
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#### 802.11a 5150~5250 MHz

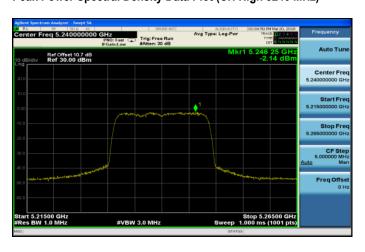
#### Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



#### Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)

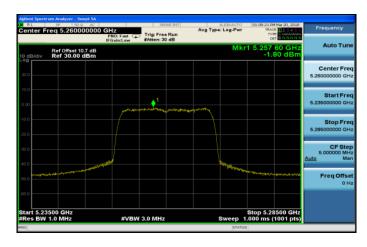


#### Peak Power Spectral Density Data Plot (CH High 5240 MHz)

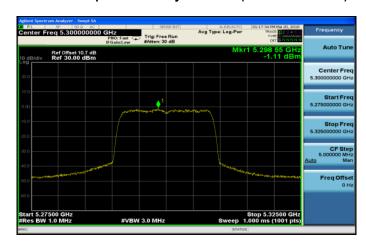


#### 802.11a 5250~5350 MHz

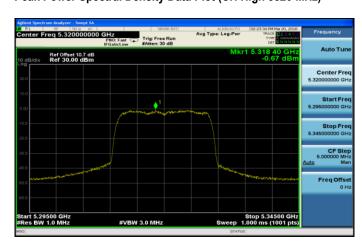
# Peak Power Spectral Density Data Plot (CH Low 5260 MHz)



#### Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



#### Peak Power Spectral Density Data Plot (CH High 5320 MHz)



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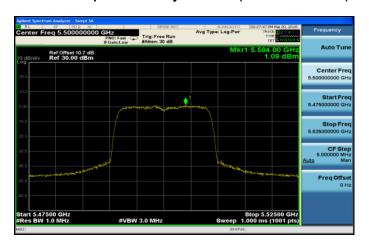
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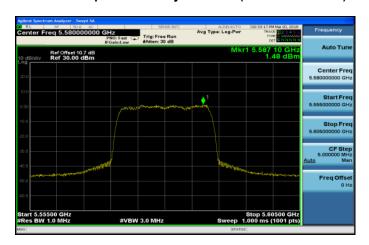
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#### 802.11a 5470~5725 MHz

#### Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



# Peak Power Spectral Density Data Plot (CH Mid 5580 MHz)

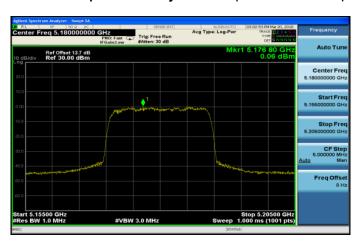


#### Peak Power Spectral Density Data Plot (CH High 5700 MHz)

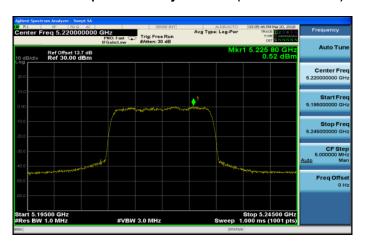


#### 802.11n HT20, 5150~5250 MHz

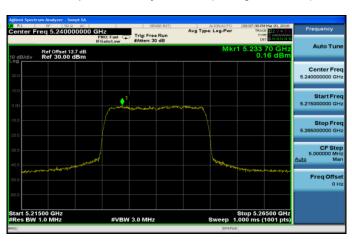
#### Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



#### Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



#### Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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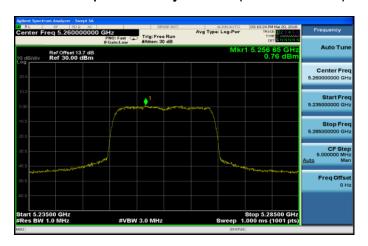
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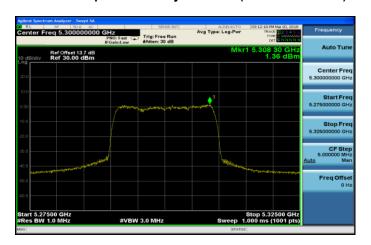
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#### 802.11n HT20, 5250~5350 MHz

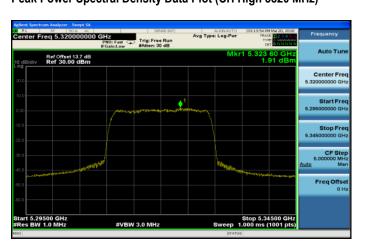
#### Peak Power Spectral Density Data Plot (CH Low 5260MHz)



# Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)

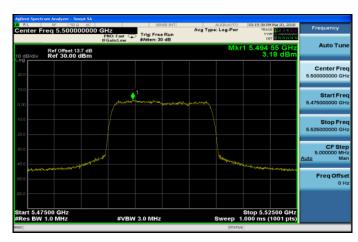


# Peak Power Spectral Density Data Plot (CH High 5320 MHz)

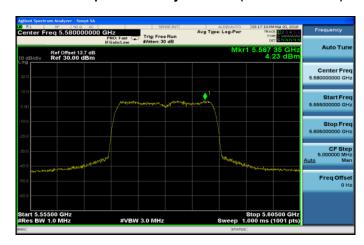


#### 802.11n HT20, 5470~5725 MHz

# Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



#### Peak Power Spectral Density Data Plot (CH Mid 5580MHz)



#### Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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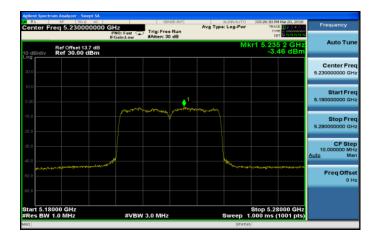
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#### 802.11n HT40, 5150~5250 MHz

# Peak Power Spectral Density Data Plot (CH Low 5190 MHz)

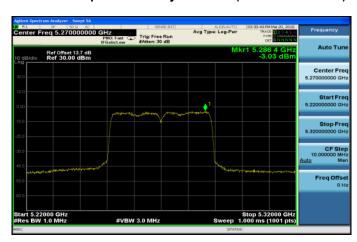


# Peak Power Spectral Density Data Plot (CH High 5230 MHz)

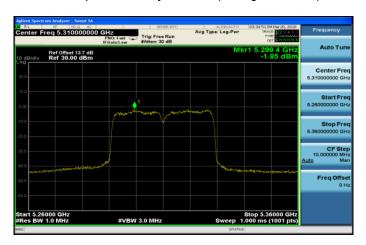


#### 802.11n HT40, 5250~5350 MHz

#### Peak Power Spectral Density Data Plot (CH Low 5270 MHz)



#### Peak Power Spectral Density Data Plot (CH High 5310 MHz)



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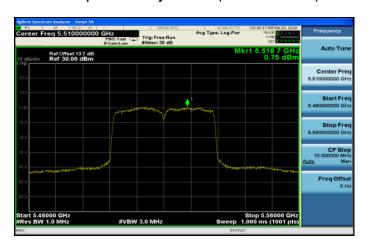
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#### 802.11n HT40, 5470~5725 MHz

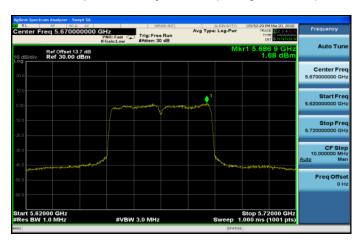
#### Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



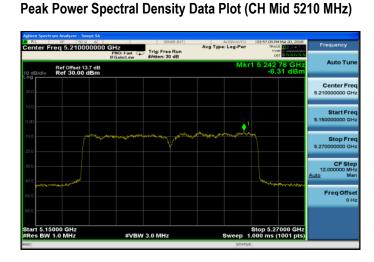
# Peak Power Spectral Density Data Plot (CH Mid 5550 MHz)



#### Peak Power Spectral Density Data Plot (CH High 5670 MHz)



# 802.11ac VHT80, 5150~5250 MHz



# 802.11ac VHT80, 5250~5350 MHz Peak Power Spectral Density Data Plot (CH Mid 5290 MHz)



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#### 802.11ac VHT80, 5470~5725 MHz

# Peak Power Spectral Density Data Plot (CH Low 5530 MHz)



# 802.11ac VHT80, 5470~5725 MHz

#### Peak Power Spectral Density Data Plot (CH High 5610 MHz)



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## 11. UNDESIRABLE RADIATED EMISSION MEASUREMENT

# 11.1Standard Applicable

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

| APPLICABLE TO   | LI  | MIT   |
|---|---|---|
| FCC KDB 789033 D02 General UNII Test Procedures New Rules | FIELD STRE  | ENGTH AT 3m   |
|   | PK: 74 (dBμV/m)   | AV 54 (dBμV/m)  |
| APPLICABLE TO   | EIRP LIMIT  | FIELD STRENGTH AT 3m  |
| 15.407(b)(1)  |   |   |
| 15.407(b)(2)  | PK: -27 (dBm/MHz)   | PK: 68.3 (dBµV/m)   |
| 15.407(b)(3)  |   |   |
| 15.407(b)(4)(i)   | PK:-27 (dBm/MHz) *1<br>PK:10 (dBm/MHz) *2<br>PK:15.6 (dBm/MHz) *3<br>PK:27 (dBm/MHz) *4 | PK: 68.2(dBµV/m) *1<br>PK:105.2 (dBµV/m) *2<br>PK: 110.8(dBµV/m) *3<br>PK:122.2 (dBµV/m) *4 |

<sup>\*1</sup> beyond 75 MHz or more above of the bandedge.

EIRP =  $((E*d)^2) / 30$ , where E is the field in V/m, d is the measurement distance (3m), EIRP is the equivalent isotropically radiated power in Watts.

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<sup>\*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

<sup>\*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

<sup>\*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.



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Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

| Frequency<br>(MHz) | Field strength (microvolts/meter) | Distance<br>(meters) |
|--------------------|-----------------------------------|----------------------|
| 0.009-0.490        | 2400/F(KHz)                       | 300                  |
| 0.490-1.705        | 24000/F(KHz)                      | 30                   |
| 1.705-30           | 30                                | 30                   |
| 30-88              | 100                               | 3                    |
| 88-216             | 150                               | 3                    |
| 216-960            | 200                               | 3                    |
| Above 960          | 500                               | 3                    |

#### Note:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level  $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

# 11.2Measurement Equipment Used

| EQUIPMENT<br>TYPE            | MFR                        | MODEL<br>NUMBER | SERIAL<br>NUMBER | LAST<br>CAL. | CAL DUE.   |
|------------------------------|----------------------------|-----------------|------------------|--------------|------------|
| Bi-log Antenna               | SCHWAZBECK                 | VULB9168        | 378              | 2017/12/29   | 2018/12/28 |
| Horn Antenna                 | Schwarzbeck                | BBHA9120D       | 1441             | 2017/08/04   | 2018/08/03 |
| Horn Antenna                 | Schwarzbeck                | BBHA9170        | 184              | 2017/12/12   | 2018/12/11 |
| Loop Antenna                 | ETS.LINDGREN               | 6502            | 148045           | 2017/09/26   | 2018/09/25 |
| Spectrum<br>Analyzer         | Agilent                    | E4446A          | MY51100003       | 2017/05/10   | 2018/05/09 |
| EMI Test<br>Receiver         | R&S                        | ESCI7           | 100760           | 2017/06/06   | 2018/06/05 |
| Pre-Amplifier                | HP                         | 8449B           | 3008A00578       | 2018/01/02   | 2019/01/01 |
| Pre-Amplifier                | HP                         | 8447D           | 2944A07676       | 2018/01/02   | 2019/01/01 |
| Pre-Amplifier                | EMC Instru-<br>ments Corp. | EMC0126530      | 980038           | 2018/01/02   | 2019/01/01 |
| Filter<br>2400-2483.5<br>MHz | EWT                        | EWT-14-0166     | M1               | 2018/01/02   | 2019/01/01 |
| Low Loss<br>Cable            | Huber Suhner               | 966_RX          | 9                | 2018/01/02   | 2019/01/01 |
| Notebook                     | Lenovo                     | T440            | P0000564         | N/A          | N/A        |

#### Note: N.C.R refers to Not Calibrated Required.

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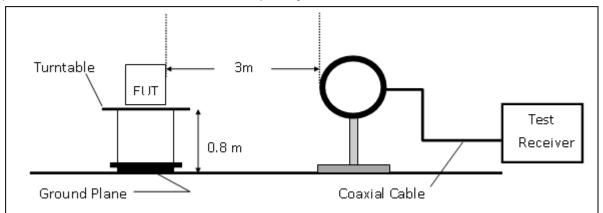
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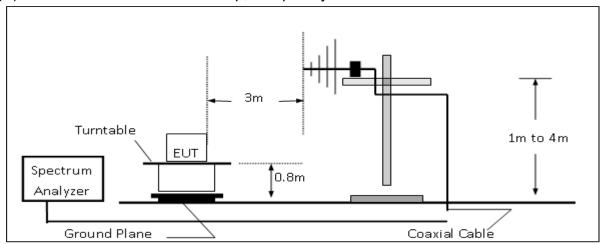


11.3Test SET-UP

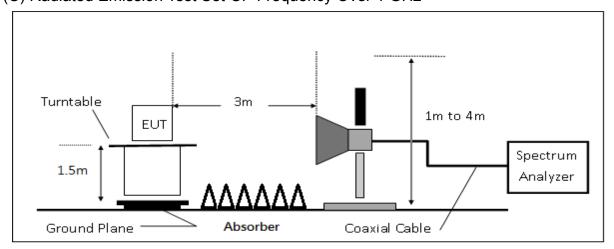
# (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



# (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



# (C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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#### 11.4Measurement Procedure

- The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 4. The turn table shall rotate 360 degrees to determine the position of maximum emission
- EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. Maximum procedure was performed on the six highest emissions to ensure EUT com-
- 10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 11. Repeat above procedures until all frequency measured were complete.

# 11.5Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

#### FS = RA + AF + CL - AG

| Where | FS = Field Strength    | CL = Cable Attenuation Factor (Cable Loss) |
|-------|------------------------|--|
|       | RA = Reading Amplitude | AG = Amplifier Gain                        |
|       | AF = Antenna Factor    |  |

Actual FS( $dB\mu V/m$ ) = SPA. Reading level( $dB\mu V$ ) + Factor(dB)

Factor(dB) = Antenna Factor(dBµV/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

#### Note:

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

#### 11.6Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

#### 11.7 Measurement Result

Refer to next page for tabular data sheets.

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# **Radiated Spurious Emission Measurement Result Below 1GHz Worst-Case Data:**

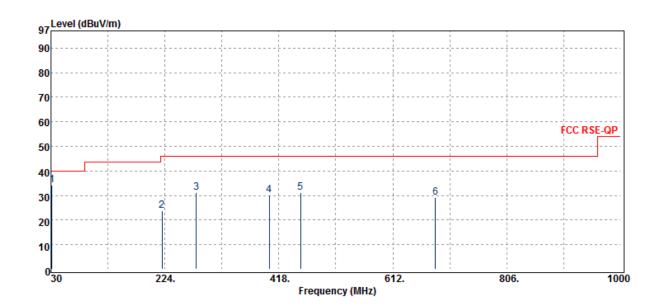
#### 802.11a 5150~5250 MHz

**Operation Band Test Date** :802.11aB1 :2018-03-19

Fundamental Frequency Temp./Humi. :5220 MHz :23 deg\_C / 62 RH

Operation Mode :Tx CH MID Engineer :Tin

EUT Pol. :E1 Plane Measurement Antenna Pol. :VERTICAL



| Freq.  | Note    | Detector | Spectrum      | Factor | Actual | Limit       | Margin |
|--------|---------|----------|---------------|--------|--------|-------------|--------|
|        |         | Mode     | Reading Level |        | FS     | <b>@</b> 3m |        |
| MHz    | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dΒμV/m      | dB     |
|        |         |          |               |        |        |             |        |
| 31.94  | S       | Peak     | 43.00         | -8.88  | 34.12  | 40.00       | -5.88  |
| 219.15 | S       | Peak     | 32.95         | -9.08  | 23.87  | 46.00       | -22.13 |
| 277.35 | S       | Peak     | 37.54         | -6.27  | 31.27  | 46.00       | -14.73 |
| 401.51 | S       | Peak     | 33.36         | -3.27  | 30.09  | 46.00       | -15.91 |
| 454.86 | S       | Peak     | 33.44         | -2.33  | 31.11  | 46.00       | -14.89 |
| 684.75 | S       | Peak     | 27.46         | 1.58   | 29.04  | 46.00       | -16.96 |

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**Operation Band** :802.11aB1 Fundamental Frequency :5220 MHz **Operation Mode** 

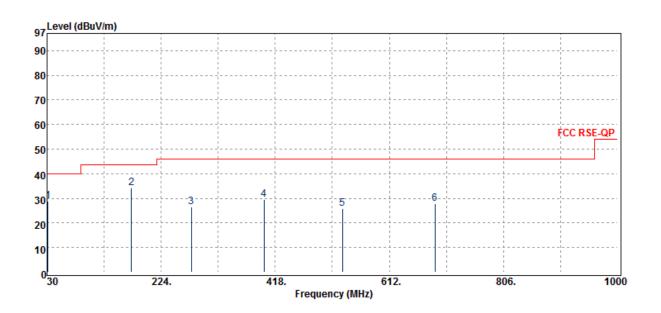
:Tx CH MID EUT Pol. :E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 37.74                     | -8.88  | 28.86        | 40.00        | -11.14 |
| 173.56 | S       | Peak             | 41.77                     | -7.70  | 34.07        | 43.50        | -9.43  |
| 275.41 | S       | Peak             | 32.99                     | -6.38  | 26.61        | 46.00        | -19.39 |
| 398.60 | S       | Peak             | 32.94                     | -3.41  | 29.53        | 46.00        | -16.47 |
| 532.46 | S       | Peak             | 27.40                     | -1.60  | 25.80        | 46.00        | -20.20 |
| 689.60 | S       | Peak             | 25.83                     | 1.88   | 27.71        | 46.00        | -18.29 |

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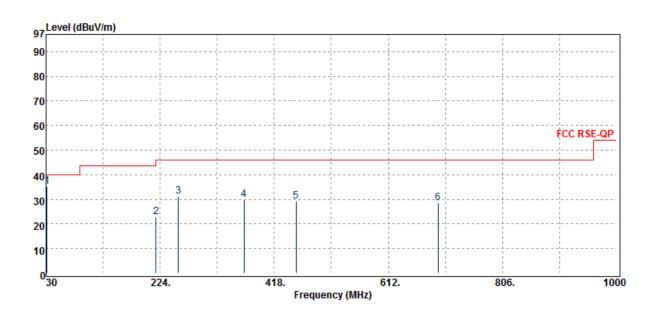
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#### 802.11a 5250~5350 MHz

**Operation Band** :802.11aB2 **Test Date** :2018-03-19

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 44.04                     | -8.88  | 35.16        | 40.00        | -4.84  |
| 217.21 | S       | Peak             | 32.06                     | -9.12  | 22.94        | 46.00        | -23.06 |
| 255.04 | S       | Peak             | 38.50                     | -7.15  | 31.35        | 46.00        | -14.65 |
| 366.59 | S       | Peak             | 33.99                     | -4.02  | 29.97        | 46.00        | -16.03 |
| 454.86 | S       | Peak             | 31.51                     | -2.33  | 29.18        | 46.00        | -16.82 |
| 696.39 | S       | Peak             | 27.45                     | 1.13   | 28.58        | 46.00        | -17.42 |

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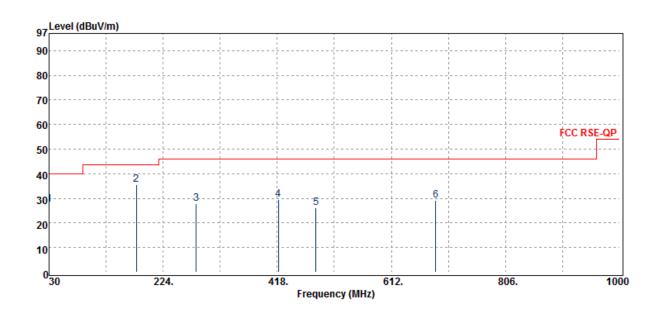
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB2 :5300 MHz :Tx CH MID :E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 30.00  | S       | Peak             | 36.64                     | -8.96  | 27.68        | 40.00        | -12.32 |
| 178.41 | S       | Peak             | 43.54                     | -8.06  | 35.48        | 43.50        | -8.02  |
| 280.26 | S       | Peak             | 33.92                     | -6.12  | 27.80        | 46.00        | -18.20 |
| 419.94 | S       | Peak             | 32.37                     | -2.77  | 29.60        | 46.00        | -16.40 |
| 483.96 | S       | Peak             | 28.91                     | -2.70  | 26.21        | 46.00        | -19.79 |
| 687.66 | S       | Peak             | 27.35                     | 1.76   | 29.11        | 46.00        | -16.89 |

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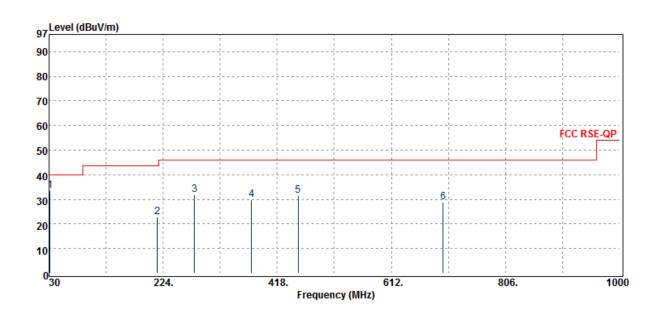
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# 802.11a, 5470~5725 MHz

**Operation Band Test Date** :2018-03-19 :802.11aB3

Fundamental Frequency :5580 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 42.45                     | -8.88  | 33.57        | 40.00        | -6.43  |
| 214.30 | S       | Peak             | 32.04                     | -9.17  | 22.87        | 43.50        | -20.63 |
| 277.35 | S       | Peak             | 38.01                     | -6.27  | 31.74        | 46.00        | -14.26 |
| 374.35 | S       | Peak             | 33.81                     | -3.96  | 29.85        | 46.00        | -16.15 |
| 453.89 | S       | Peak             | 33.92                     | -2.41  | 31.51        | 46.00        | -14.49 |
| 700.27 | S       | Peak             | 26.93                     | 1.82   | 28.75        | 46.00        | -17.25 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

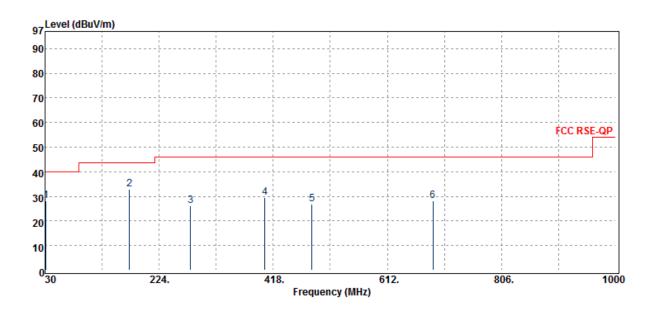
:802.11aB3 :5580 MHz :Tx CH MID :E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              | _      |
| 31.94  | S       | Peak             | 37.08                     | -8.88  | 28.20        | 40.00        | -11.80 |
| 173.56 | S       | Peak             | 40.53                     | -7.70  | 32.83        | 43.50        | -10.67 |
| 277.35 | S       | Peak             | 32.50                     | -6.27  | 26.23        | 46.00        | -19.77 |
| 403.45 | S       | Peak             | 32.68                     | -3.07  | 29.61        | 46.00        | -16.39 |
| 483.96 | S       | Peak             | 29.66                     | -2.70  | 26.96        | 46.00        | -19.04 |
| 689.60 | S       | Peak             | 26.46                     | 1.88   | 28.34        | 46.00        | -17.66 |

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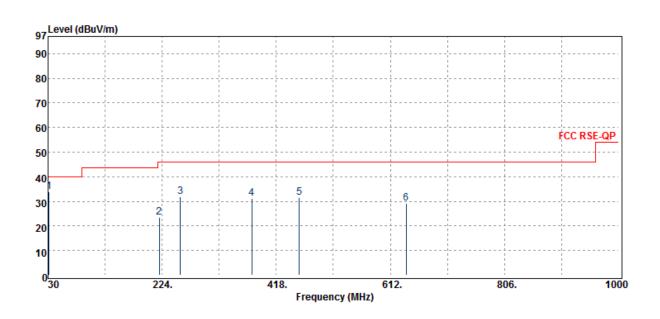
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#### 802.11ac VHT80 5150~5250 MHz

:802.11ac80B1 **Operation Band Test Date** :2018-03-19

Fundamental Frequency :5210 MHz Temp./Humi. :23 deg\_C / 62 RH Operation Mode :Tx CH LOW Engineer

EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 42.61                     | -8.88  | 33.73        | 40.00        | -6.27  |
| 219.15 | S       | Peak             | 32.63                     | -9.08  | 23.55        | 46.00        | -22.45 |
| 255.04 | S       | Peak             | 38.93                     | -7.15  | 31.78        | 46.00        | -14.22 |
| 376.29 | S       | Peak             | 35.22                     | -3.92  | 31.30        | 46.00        | -14.70 |
| 456.80 | S       | Peak             | 33.83                     | -2.37  | 31.46        | 46.00        | -14.54 |
| 639.16 | S       | Peak             | 28.48                     | 0.84   | 29.32        | 46.00        | -16.68 |

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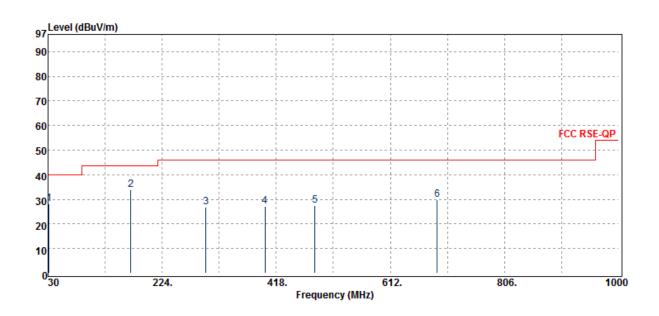
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B1 :5210 MHz :Tx CH LOW :E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 37.07                     | -8.88  | 28.19        | 40.00        | -11.81 |
| 170.65 | S       | Peak             | 41.28                     | -7.38  | 33.90        | 43.50        | -9.60  |
| 298.69 | S       | Peak             | 32.43                     | -5.55  | 26.88        | 46.00        | -19.12 |
| 398.60 | S       | Peak             | 30.64                     | -3.41  | 27.23        | 46.00        | -18.77 |
| 483.96 | S       | Peak             | 30.15                     | -2.70  | 27.45        | 46.00        | -18.55 |
| 691.54 | S       | Peak             | 28.19                     | 1.57   | 29.76        | 46.00        | -16.24 |

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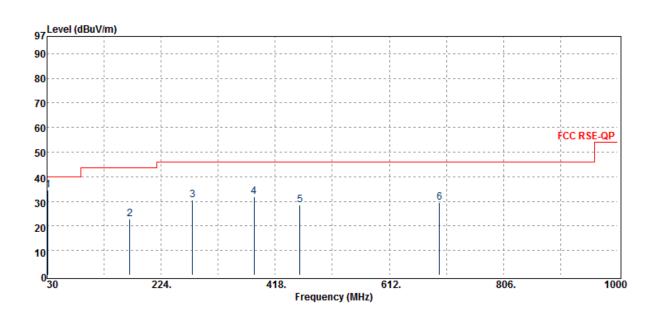
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#### 802.11ac VHT80 5250~5350 MHz

:802.11ac80B2 **Operation Band Test Date** :2018-03-19

Fundamental Frequency :5290 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 43.59                     | -8.88  | 34.71        | 40.00        | -5.29  |
| 170.65 | S       | Peak             | 30.31                     | -7.38  | 22.93        | 43.50        | -20.57 |
| 277.35 | S       | Peak             | 36.68                     | -6.27  | 30.41        | 46.00        | -15.59 |
| 382.11 | S       | Peak             | 35.51                     | -3.78  | 31.73        | 46.00        | -14.27 |
| 459.71 | S       | Peak             | 31.12                     | -2.46  | 28.66        | 46.00        | -17.34 |
| 697.36 | S       | Peak             | 28.37                     | 1.33   | 29.70        | 46.00        | -16.30 |

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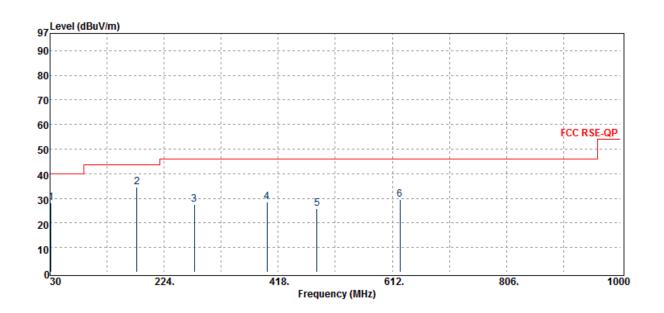
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B2 :5290 MHz :Tx CH HIGH :E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 37.20                     | -8.88  | 28.32        | 40.00        | -11.68 |
| 177.44 | S       | Peak             | 42.66                     | -7.99  | 34.67        | 43.50        | -8.83  |
| 275.41 | S       | Peak             | 34.04                     | -6.38  | 27.66        | 46.00        | -18.34 |
| 398.60 | S       | Peak             | 31.98                     | -3.41  | 28.57        | 46.00        | -17.43 |
| 483.96 | S       | Peak             | 28.53                     | -2.70  | 25.83        | 46.00        | -20.17 |
| 624.61 | S       | Peak             | 28.95                     | 0.71   | 29.66        | 46.00        | -16.34 |

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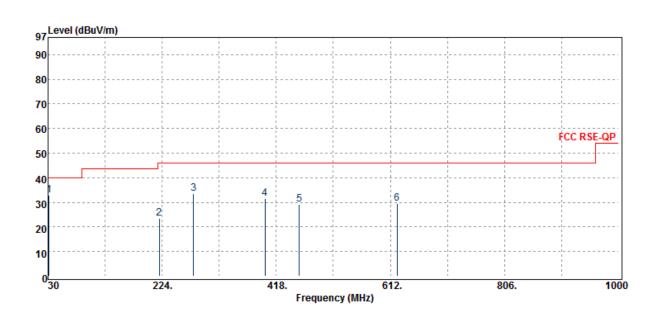
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#### 802.11ac VHT80 5470~5725 MHz

:802.11ac80B3 **Operation Band Test Date** :2018-03-19

Fundamental Frequency :5530 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 41.93                     | -8.88  | 33.05        | 40.00        | -6.95  |
| 219.15 | S       | Peak             | 32.62                     | -9.08  | 23.54        | 46.00        | -22.46 |
| 277.35 | S       | Peak             | 39.97                     | -6.27  | 33.70        | 46.00        | -12.30 |
| 398.60 | S       | Peak             | 34.86                     | -3.41  | 31.45        | 46.00        | -14.55 |
| 456.80 | S       | Peak             | 31.57                     | -2.37  | 29.20        | 46.00        | -16.80 |
| 623.64 | S       | Peak             | 28.88                     | 0.64   | 29.52        | 46.00        | -16.48 |

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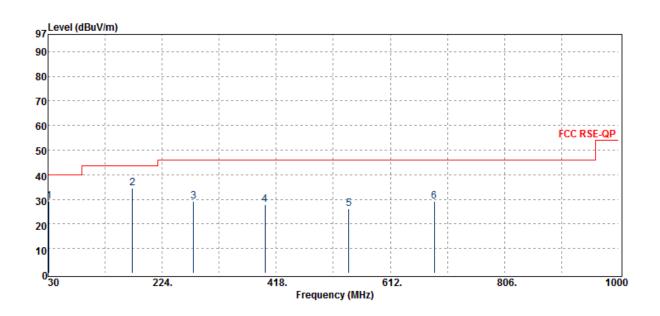
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz :Tx CH LOW :E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.  | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|--------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz    | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB     |
|        |         |                  |                           |        |              |              |        |
| 31.94  | S       | Peak             | 38.11                     | -8.88  | 29.23        | 40.00        | -10.77 |
| 173.56 | S       | Peak             | 42.41                     | -7.70  | 34.71        | 43.50        | -8.79  |
| 277.35 | S       | Peak             | 35.37                     | -6.27  | 29.10        | 46.00        | -16.90 |
| 398.60 | S       | Peak             | 31.21                     | -3.41  | 27.80        | 46.00        | -18.20 |
| 541.19 | S       | Peak             | 27.46                     | -1.40  | 26.06        | 46.00        | -19.94 |
| 686.69 | S       | Peak             | 27.60                     | 1.70   | 29.30        | 46.00        | -16.70 |

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#### **Above 1GHz Worst-Case Data:**

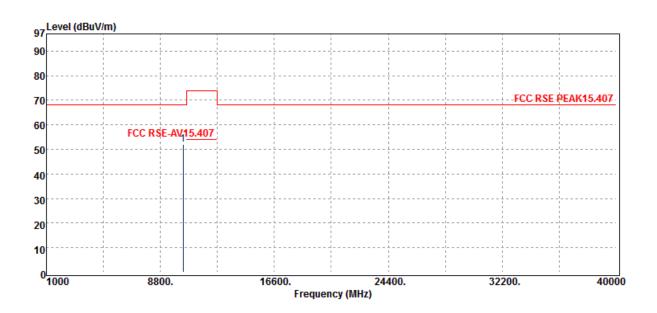
# Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz

**Operation Band** Test Date :802.11aB1 :2018-03-20

**Fundamental Frequency** Temp./Humi. :5180 MHz :23 deg C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Tin

EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10360.00 | Н       | Peak             | 31.77                     | 20.41  | 52.18        | 68.30        | -16.12         |

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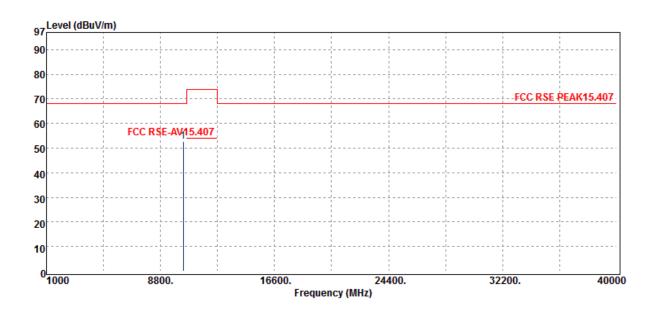
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**Operation Band** :802.11aB1 **Test Date** :2018-03-20

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10360.00 | Н       | Peak             | 32.42                     | 20.41  | 52.83        | 68.30        | -15.47         |

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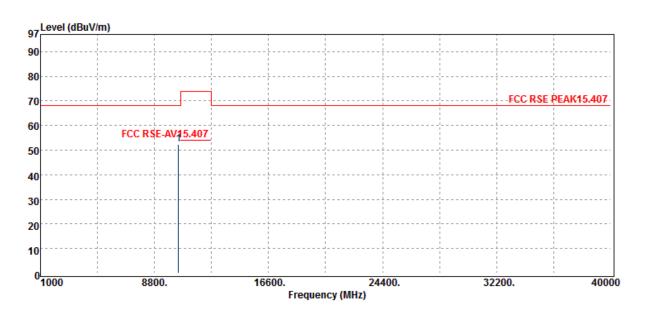
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**Operation Band** :802.11aB1 **Test Date** :2018-03-20

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10440.00 | Н       | Peak             | 31.66                     | 20.75  | 52.41        | 68.30        | -15.89         |

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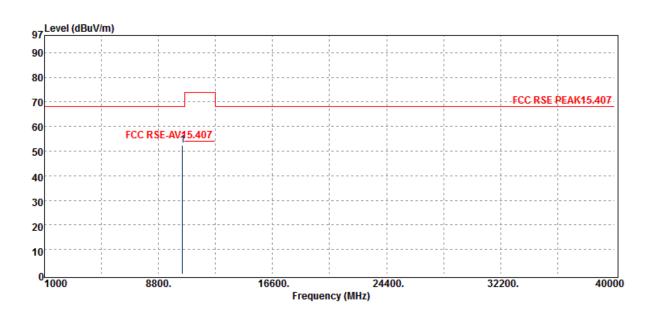
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**Operation Band** :802.11aB1 **Test Date** :2018-03-20

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10440.00 | Н       | Peak             | 31.68                     | 20.75  | 52.43        | 68.30        | -15.87         |

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**Operation Band** :802.11aB1 Fundamental Frequency **Operation Mode** 

EUT Pol.

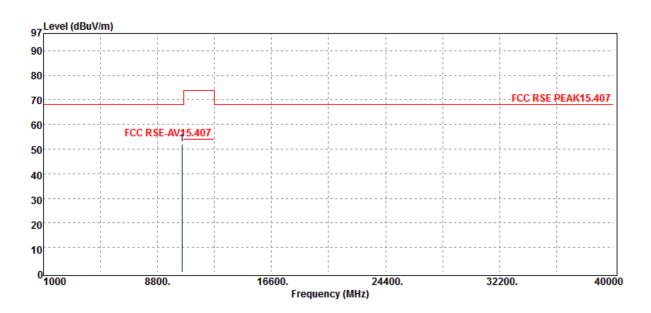
:5240 MHz :Tx CH HIGH :E1 Plane

**Test Date** :2018-03-20

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10480.00 | Н       | Peak             | 31.33                     | 20.79  | 52.12        | 68.30        | -16.18         |

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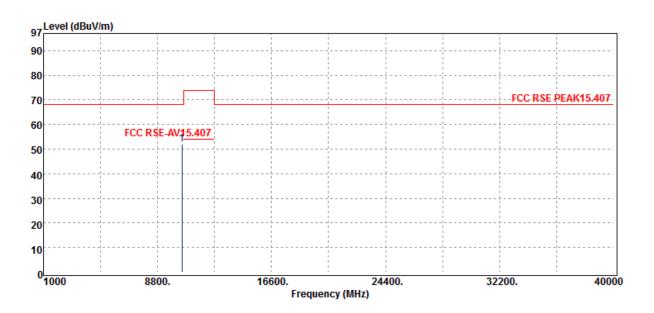
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**Operation Band** :802.11aB1 **Test Date** :2018-03-20

Fundamental Frequency :5240 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10480.00 | Н       | Peak             | 31.17                     | 20.79  | 51.96        | 68.30        | -16.34         |

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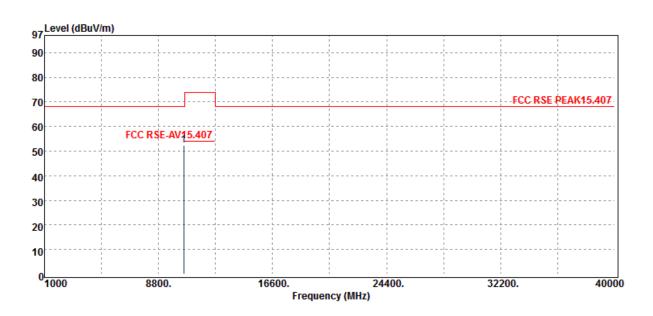
# Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

**Operation Band** :802.11aB2 **Test Date** :2018-03-20

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Tin

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10520.00 | Н       | Peak             | 31.70                     | 20.78  | 52.48        | 68.30        | -15.82         |

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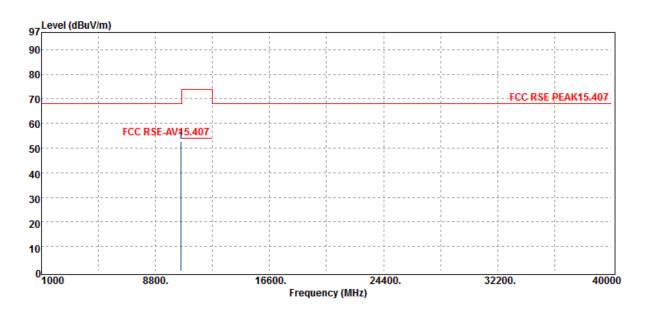


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**Operation Band** :802.11aB2 **Test Date** :2018-03-20

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10520.00 | Н       | Peak             | 32.04                     | 20.78  | 52.82        | 68.30        | -15.48         |

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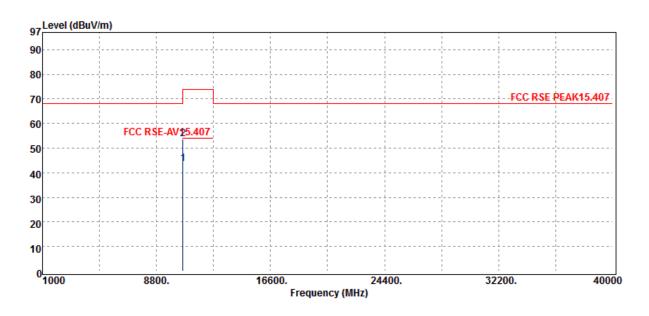
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**Operation Band** :802.11aB2 **Test Date** :2018-03-20

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10600.00 | Н       | Average          | 22.34                     | 21.18  | 43.52        | 54.00        | -10.48         |
| 10600.00 | Н       | Peak             | 32.53                     | 21.18  | 53.71        | 74.00        | -20.29         |

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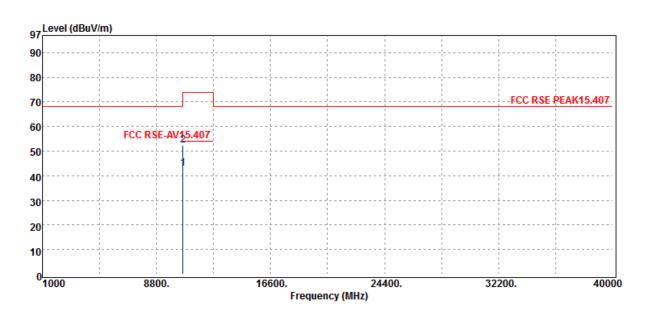
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**Operation Band** :802.11aB2 **Test Date** :2018-03-20

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10600.00 | Н       | Average          | 21.74                     | 21.18  | 42.92        | 54.00        | -11.08         |
| 10600.00 | Н       | Peak             | 31.02                     | 21.18  | 52.20        | 74.00        | -21.80         |

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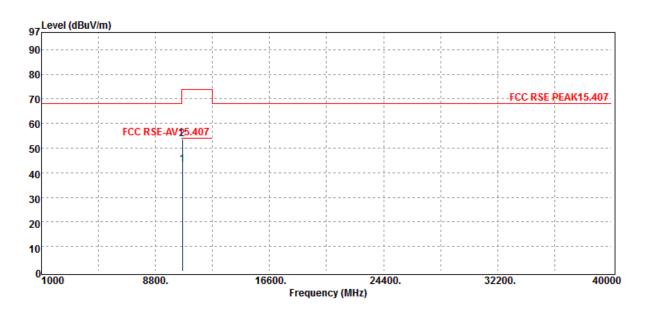
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**Operation Band** :802.11aB2 **Test Date** :2018-03-20

Fundamental Frequency :5320 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10640.00 | Н       | Average          | 22.20                     | 21.24  | 43.44        | 54.00        | -10.56         |
| 10640.00 | Н       | Peak             | 32.49                     | 21.24  | 53.73        | 74.00        | -20.27         |

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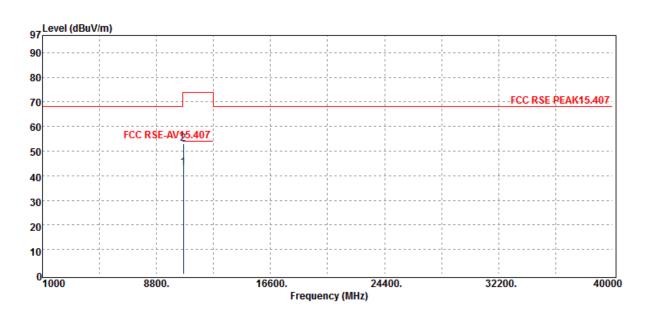
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**Operation Band** :802.11aB2 **Test Date** :2018-03-20

Fundamental Frequency :5320 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10640.00 | Н       | Average          | 22.20                     | 21.24  | 43.44        | 54.00        | -10.56         |
| 10640.00 | Н       | Peak             | 31.76                     | 21.24  | 53.00        | 74.00        | -21.00         |

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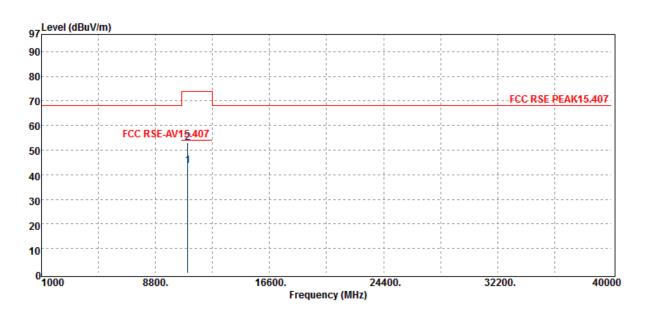
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## Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

**Operation Band** :802.11aB3 **Test Date** :2018-03-20

Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer

:Tin EUT Pol. :E1 Plane :VERTICAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11000.00 | Н       | Average          | 21.52                     | 22.17  | 43.69        | 54.00        | -10.31         |
| 11000.00 | Н       | Peak             | 31.02                     | 22.17  | 53.19        | 74.00        | -20.81         |

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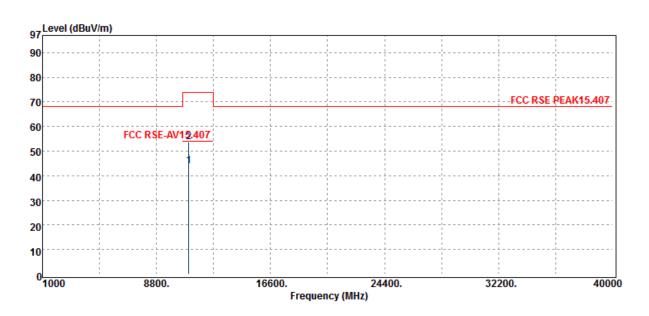


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**Operation Band** :802.11aB3 **Test Date** :2018-03-20 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11000.00 | Н       | Average          | 21.84                     | 22.17  | 44.01        | 54.00        | -9.99          |
| 11000.00 | Н       | Peak             | 31.59                     | 22.17  | 53.76        | 74.00        | -20.24         |

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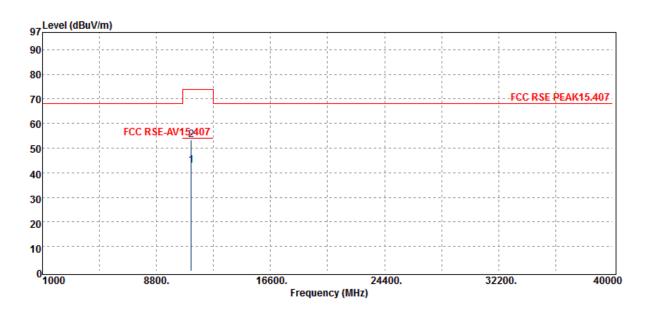
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**Operation Band** :802.11aB3 **Test Date** :2018-03-20

Fundamental Frequency :5580 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11160.00 | Н       | Average          | 20.78                     | 22.31  | 43.09        | 54.00        | -10.91         |
| 11160.00 | Н       | Peak             | 31.14                     | 22.31  | 53.45        | 74.00        | -20.55         |

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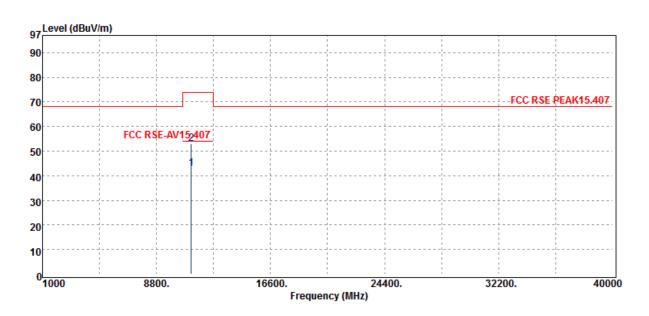
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**Operation Band** :802.11aB3 **Test Date** :2018-03-20

Fundamental Frequency :5580 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11160.00 | Н       | Average          | 20.59                     | 22.31  | 42.90        | 54.00        | -11.10         |
| 11160.00 | Н       | Peak             | 30.74                     | 22.31  | 53.05        | 74.00        | -20.95         |

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**Operation Band** Fundamental Frequency **Operation Mode** 

EUT Pol.

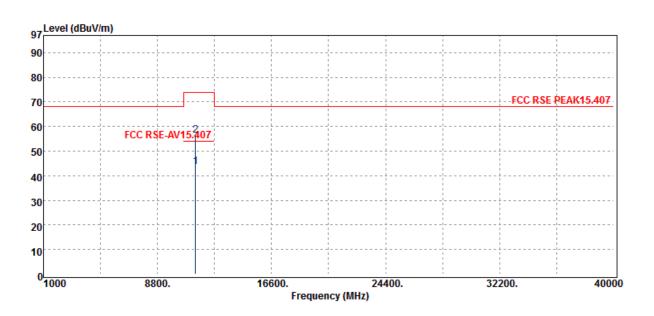
:802.11aB3 :5700 MHz :Tx CH HIGH :E1 Plane

**Test Date** :2018-03-20

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11400.00 | Н       | Average          | 21.21                     | 22.42  | 43.63        | 54.00        | -10.37         |
| 11400.00 | Н       | Peak             | 34.00                     | 22.42  | 56.42        | 74.00        | -17.58         |

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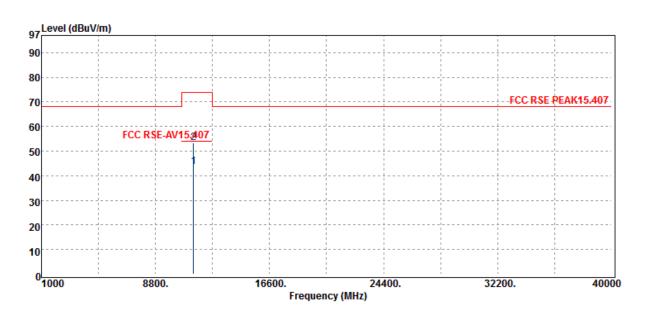
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz :Tx CH HIGH :E1 Plane

**Test Date** :2018-03-20 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμ̈V                     | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11400.00 | Н       | Average          | 21.09                     | 22.42  | 43.51        | 54.00        | -10.49         |
| 11400.00 | Н       | Peak             | 31.09                     | 22.42  | 53.51        | 74.00        | -20.49         |

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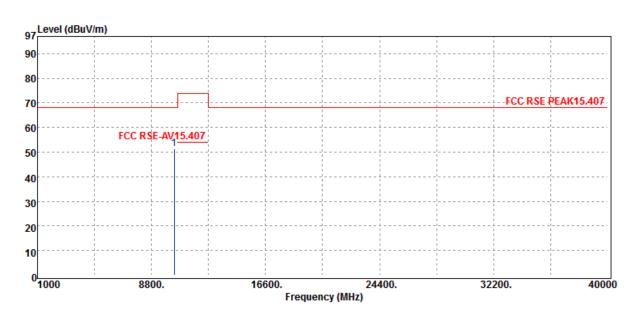
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# Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz

**Operation Band** :802.11n20B1 **Test Date** :2018-03-20

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Tin :VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10360.00 | Н       | Peak             | 31.01                     | 20.41  | 51.42        | 68.30        | -16.88         |

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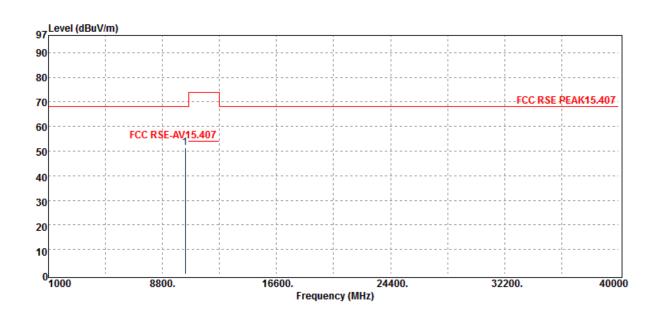


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**Operation Band** :802.11n20B1 **Test Date** :2018-03-20

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10360.00 | Н       | Peak             | 30.88                     | 20.41  | 51.29        | 68.30        | -17.01         |

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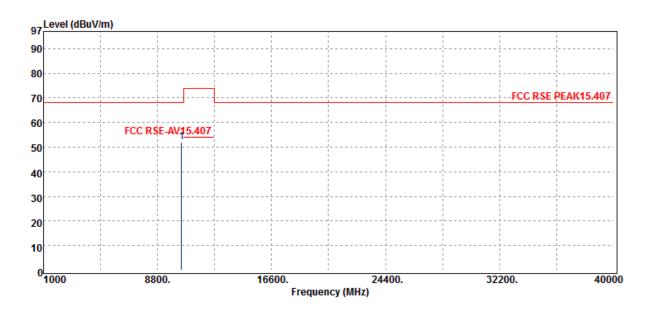
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**Operation Band** :802.11n20B1 **Test Date** :2018-03-20

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10440.00 | Н       | Peak             | 31.40                     | 20.75  | 52.15        | 68.30        | -16.15         |

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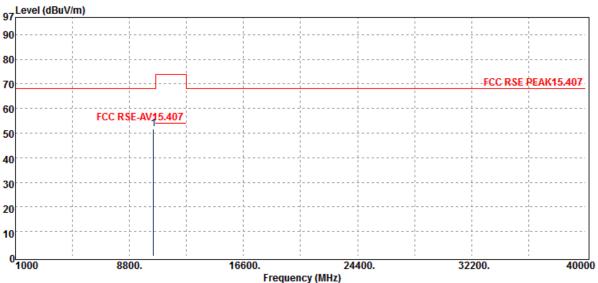
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**Operation Band** :802.11n20B1 **Test Date** :2018-03-20

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.





| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10440.00 | Н       | Peak             | 30.80                     | 20.75  | 51.55        | 68.30        | -16.75         |

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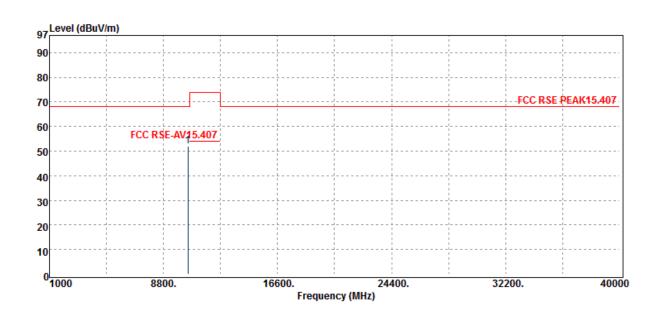


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**Operation Band** :802.11n20B1 **Test Date** :2018-03-20

Fundamental Frequency :5240 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10480.00 | Н       | Peak             | 31.20                     | 20.79  | 51.99        | 68.30        | -16.31         |

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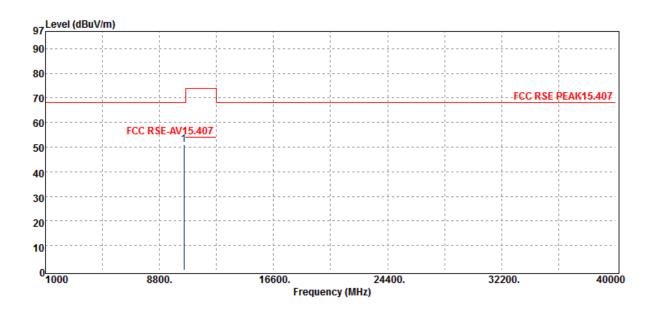
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**Operation Band** :802.11n20B1 **Test Date** :2018-03-20

Fundamental Frequency :5240 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10480.00 | Н       | Peak             | 30.07                     | 20.79  | 50.86        | 68.30        | -17.44         |

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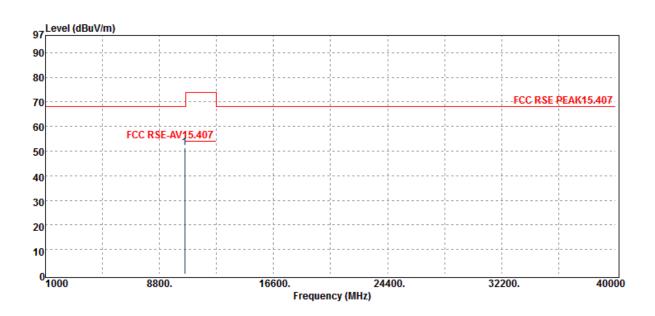
## Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz

**Operation Band** :802.11n20B2 **Test Date** :2018-03-20

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Tin

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10520.00 | Н       | Peak             | 30.54                     | 20.78  | 51.32        | 68.30        | -16.98         |

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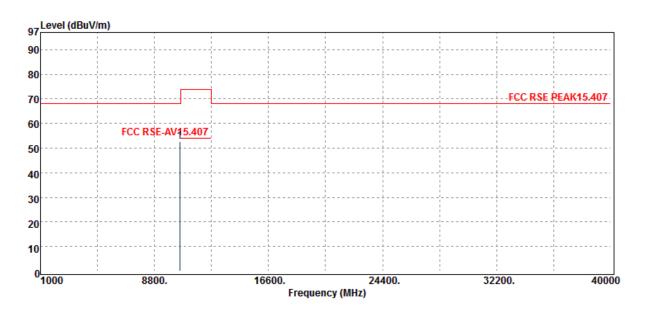
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**Operation Band** :802.11n20B2 **Test Date** :2018-03-20

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane

:HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10520.00 | Н       | Peak             | 31.92                     | 20.78  | 52.70        | 68.30        | -15.60         |

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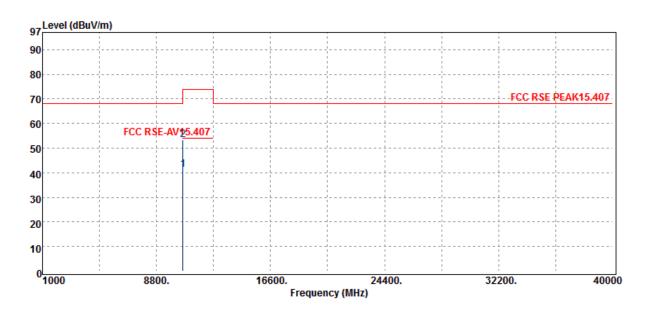
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**Operation Band** :802.11n20B2 **Test Date** :2018-03-20

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10600.00 | Н       | Average          | 20.24                     | 21.18  | 41.42        | 54.00        | -12.58         |
| 10600.00 | Н       | Peak             | 32.21                     | 21.18  | 53.39        | 74.00        | -20.61         |

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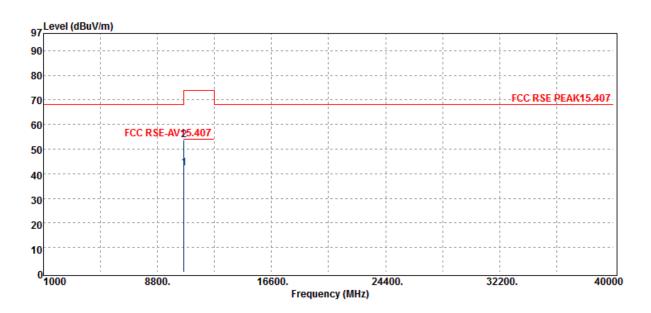
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**Operation Band** :802.11n20B2 **Test Date** :2018-03-20

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10600.00 | Н       | Average          | 21.19                     | 21.18  | 42.37        | 54.00        | -11.63         |
| 10600.00 | Н       | Peak             | 32.36                     | 21.18  | 53.54        | 74.00        | -20.46         |

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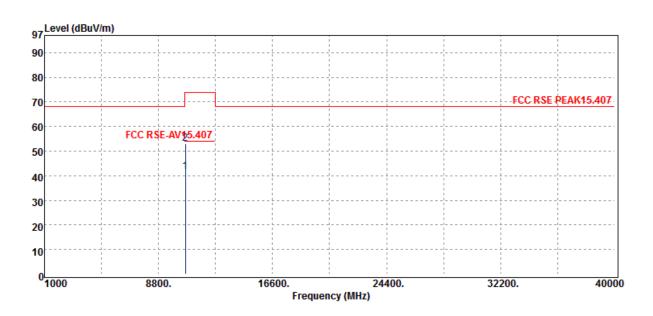


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**Operation Band** :802.11n20B2 **Test Date** :2018-03-20

Fundamental Frequency :5320 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10640.00 | Н       | Average          | 20.43                     | 21.24  | 41.67        | 54.00        | -12.33         |
| 10640.00 | Н       | Peak             | 31.69                     | 21.24  | 52.93        | 74.00        | -21.07         |

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**Operation Band** :802.11n20B2 Fundamental Frequency :5320 MHz

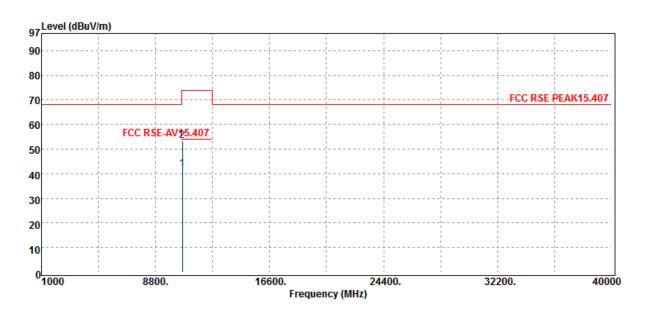
**Operation Mode** 

:Tx CH HIGH EUT Pol. :E1 Plane

**Test Date** :2018-03-20

Temp./Humi. :23 deg\_C / 62 RH Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10640.00 | Н       | Average          | 20.87                     | 21.24  | 42.11        | 54.00        | -11.89         |
| 10640.00 | Н       | Peak             | 32.05                     | 21.24  | 53.29        | 74.00        | -20.71         |

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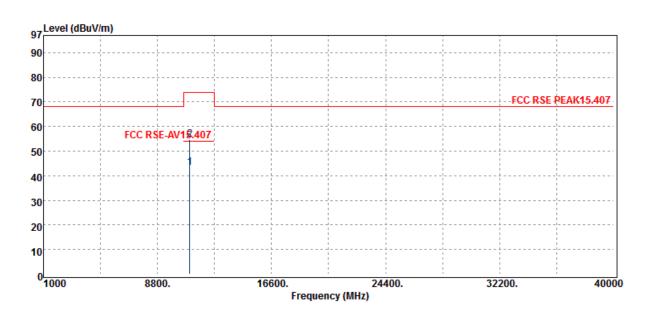
# Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz

**Operation Band** :802.11n20B3 **Test Date** :2018-03-20

Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Tin

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11000.00 | Н       | Average          | 21.03                     | 22.17  | 43.20        | 54.00        | -10.80         |
| 11000.00 | Н       | Peak             | 32.47                     | 22.17  | 54.64        | 74.00        | -19.36         |

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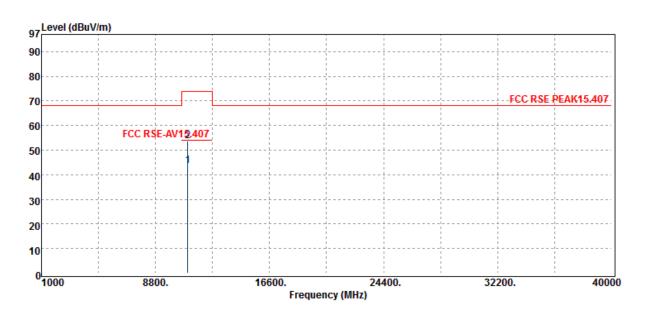


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**Operation Band** :802.11n20B3 **Test Date** :2018-03-20 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11000.00 | Н       | Average          | 21.39                     | 22.17  | 43.56        | 54.00        | -10.44         |
| 11000.00 | Н       | Peak             | 31.57                     | 22.17  | 53.74        | 74.00        | -20.26         |

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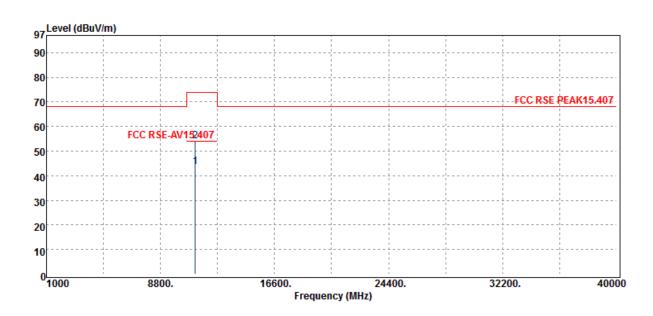


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**Operation Band** :802.11n20B3 **Test Date** :2018-03-20

Fundamental Frequency :5580 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11160.00 | Н       | Average          | 21.16                     | 22.31  | 43.47        | 54.00        | -10.53         |
| 11160.00 | Н       | Peak             | 31.85                     | 22.31  | 54.16        | 74.00        | -19.84         |

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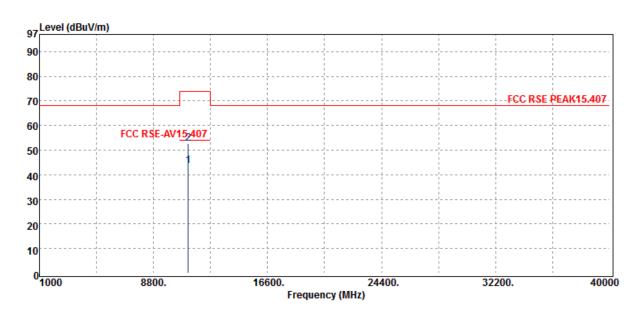


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**Operation Band** :802.11n20B3 **Test Date** :2018-03-20

Fundamental Frequency :5580 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11160.00 | Н       | Average          | 21.26                     | 22.31  | 43.57        | 54.00        | -10.43         |
| 11160.00 | Н       | Peak             | 30.34                     | 22.31  | 52.65        | 74.00        | -21.35         |

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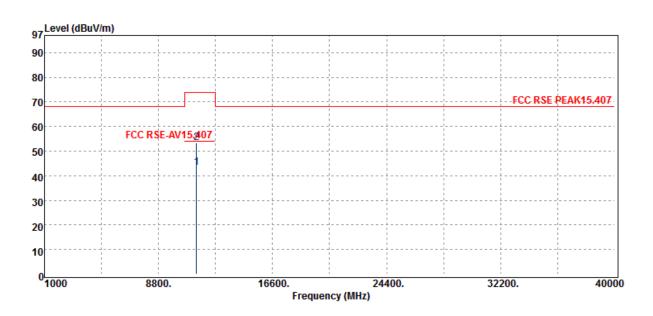


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**Operation Band** :802.11n20B3 **Test Date** :2018-03-20

Fundamental Frequency :5700 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer :VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11400.00 | Н       | Average          | 20.88                     | 22.42  | 43.30        | 54.00        | -10.70         |
| 11400.00 | Н       | Peak             | 30.87                     | 22.42  | 53.29        | 74.00        | -20.71         |

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**Operation Band** Fundamental Frequency **Operation Mode** 

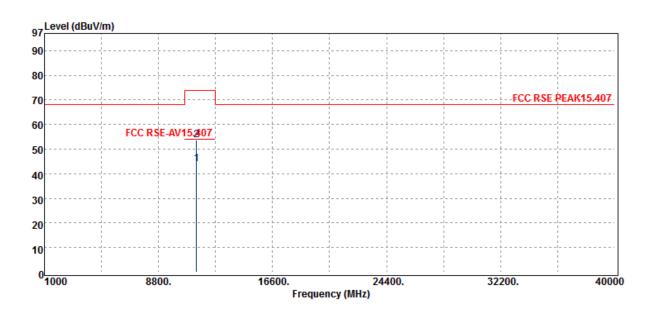
EUT Pol.

:802.11n20B3 :5700 MHz :Tx CH HIGH :E1 Plane

**Test Date** :2018-03-20 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11400.00 | Н       | Average          | 21.66                     | 22.42  | 44.08        | 54.00        | -9.92          |
| 11400.00 | Н       | Peak             | 31.36                     | 22.42  | 53.78        | 74.00        | -20.22         |

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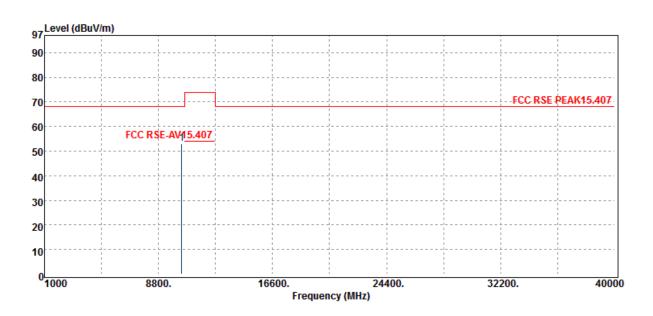
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# Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

**Operation Band** :802.11n40B1 **Test Date** :2018-03-20

Fundamental Frequency :5190 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Tin

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10380.00 | Н       | Peak             | 32.51                     | 20.48  | 52.99        | 68.30        | -15.31         |

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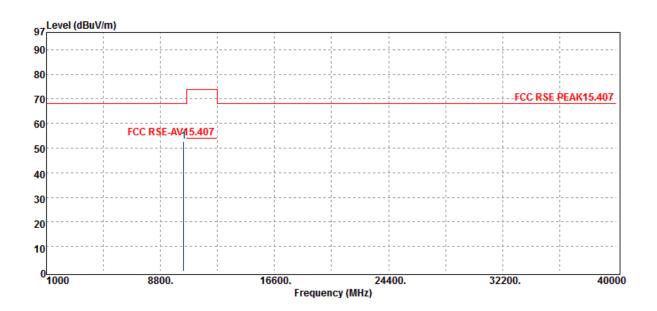
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**Operation Band** :802.11n40B1 **Test Date** :2018-03-20

Fundamental Frequency :5190 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10380.00 | Н       | Peak             | 32.23                     | 20.48  | 52.71        | 68.30        | -15.59         |

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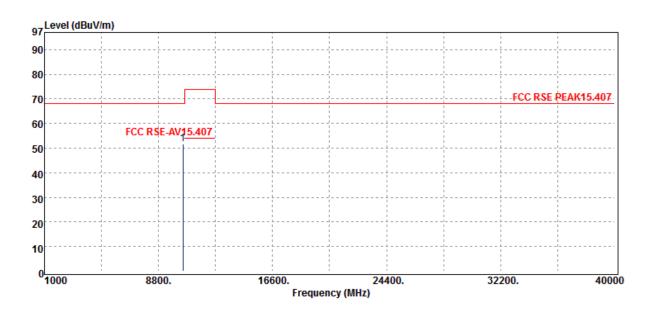
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**Operation Band** :802.11n40B1 **Test Date** :2018-03-20

Fundamental Frequency :5230 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10460.00 | Н       | Peak             | 30.90                     | 20.77  | 51.67        | 68.30        | -16.63         |

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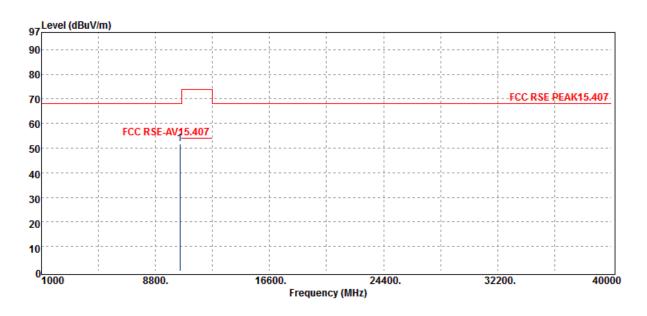


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**Operation Band** :802.11n40B1 **Test Date** :2018-03-20

Fundamental Frequency :5230 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10460.00 | Н       | Peak             | 30.97                     | 20.77  | 51.74        | 68.30        | -16.56         |

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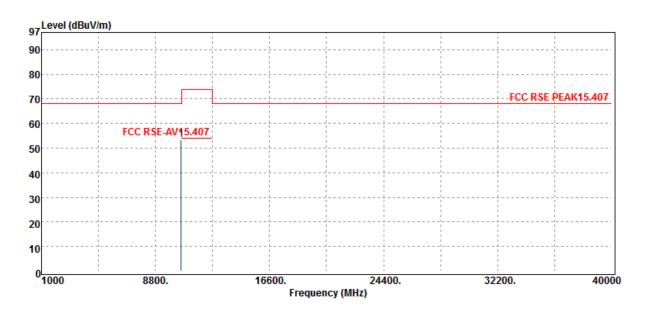
Page: 102 of 177

**Operation Band** :802.11n40B2 **Test Date** :2018-03-20

Fundamental Frequency :5270 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10540.00 | Н       | Peak             | 32.55                     | 20.82  | 53.37        | 68.30        | -14.93         |

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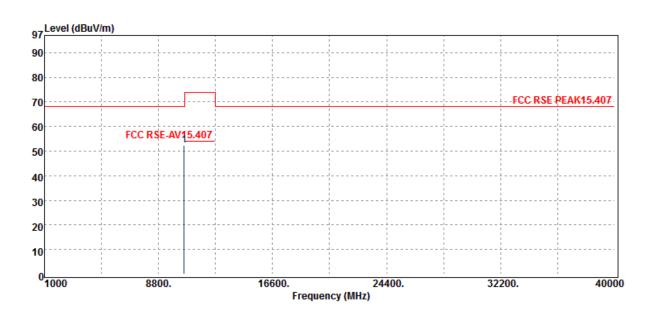
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**Operation Band** :802.11n40B2 **Test Date** :2018-03-20

Fundamental Frequency :5270 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10540.00 | Н       | Peak             | 31.51                     | 20.82  | 52.33        | 68.30        | -15.97         |

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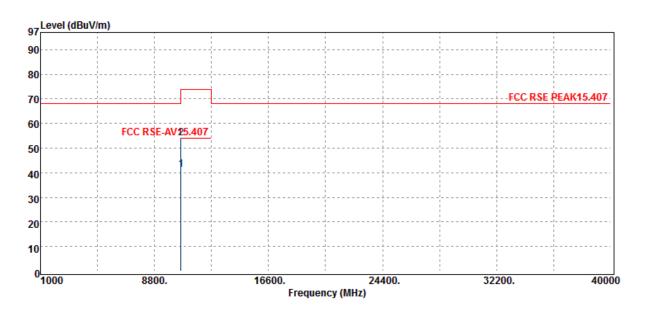
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**Operation Band** :802.11n40B2 **Test Date** :2018-03-20

Fundamental Frequency :5310 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10620.00 | Н       | Average          | 20.20                     | 21.21  | 41.41        | 54.00        | -12.59         |
| 10620.00 | Н       | Peak             | 32.67                     | 21.21  | 53.88        | 74.00        | -20.12         |

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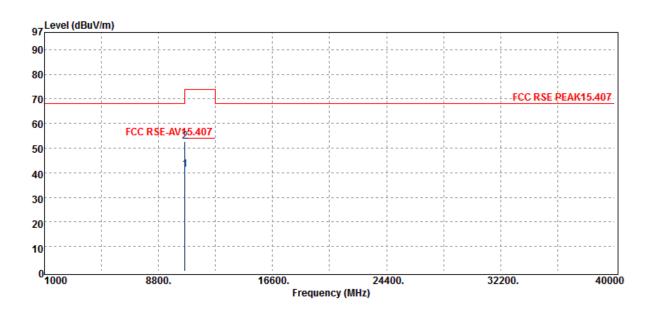
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**Operation Band** :802.11n40B2 **Test Date** :2018-03-20

Fundamental Frequency :5310 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10620.00 | Н       | Average          | 20.23                     | 21.21  | 41.44        | 54.00        | -12.56         |
| 10620.00 | Н       | Peak             | 31.59                     | 21.21  | 52.80        | 74.00        | -21.20         |

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EUT Pol.

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# Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz

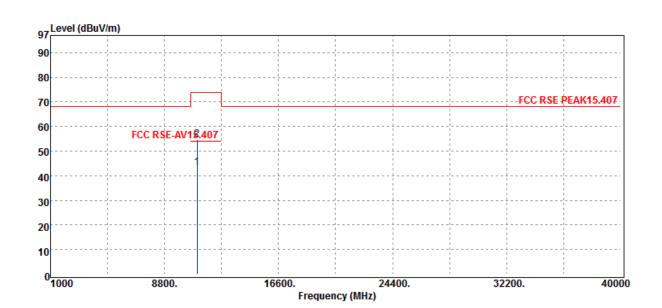
**Operation Band** :802.11n40B3 **Test Date** :2018-03-20

Fundamental Frequency :5510 MHz Temp./Humi. :23 deg\_C / 62 RH

Measurement Antenna Pol.

**Operation Mode** :Tx CH LOW Engineer :Tin :VERTICAL

:E1 Plane



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11020.00 | Н       | Average          | 21.10                     | 22.28  | 43.38        | 54.00        | -10.62         |
| 11020.00 | Н       | Peak             | 32.55                     | 22.28  | 54.83        | 74.00        | -19.17         |

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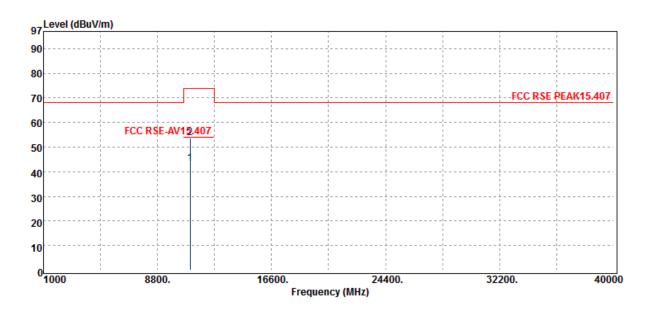
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**Operation Band** :802.11n40B3 **Test Date** :2018-03-20

Fundamental Frequency :5510 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** 

:Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11020.00 | Н       | Average          | 21.16                     | 22.28  | 43.44        | 54.00        | -10.56         |
| 11020.00 | Н       | Peak             | 31.31                     | 22.28  | 53.59        | 74.00        | -20.41         |

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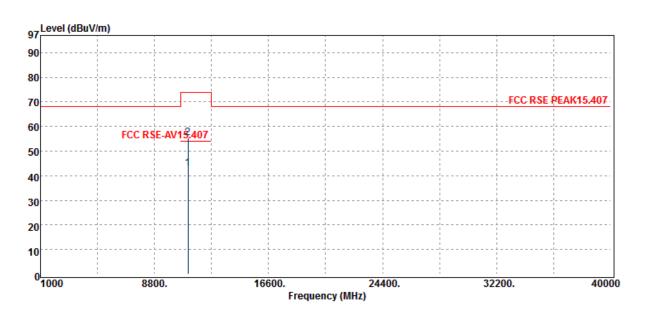


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**Operation Band** :802.11n40B3 **Test Date** :2018-03-20

Fundamental Frequency :5550 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH MID Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11100.00 | Н       | Average          | 20.44                     | 22.38  | 42.82        | 54.00        | -11.18         |
| 11100.00 | Н       | Peak             | 32.99                     | 22.38  | 55.37        | 74.00        | -18.63         |

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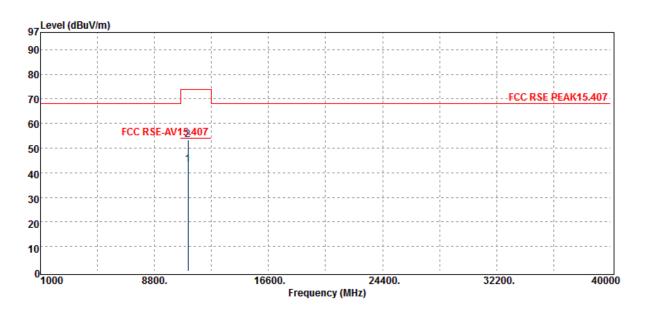
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**Operation Band** :802.11n40B3 **Test Date** :2018-03-20

Fundamental Frequency :5550 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11100.00 | Н       | Average          | 20.78                     | 22.38  | 43.16        | 54.00        | -10.84         |
| 11100.00 | Н       | Peak             | 30.94                     | 22.38  | 53.32        | 74.00        | -20.68         |

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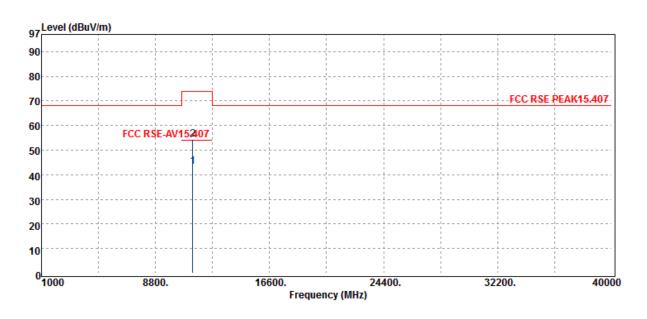


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**Operation Band** :802.11n40B3 **Test Date** :2018-03-20

Fundamental Frequency :5670 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11340.00 | Н       | Average          | 21.08                     | 22.34  | 43.42        | 54.00        | -10.58         |
| 11340.00 | Н       | Peak             | 31.93                     | 22.34  | 54.27        | 74.00        | -19.73         |

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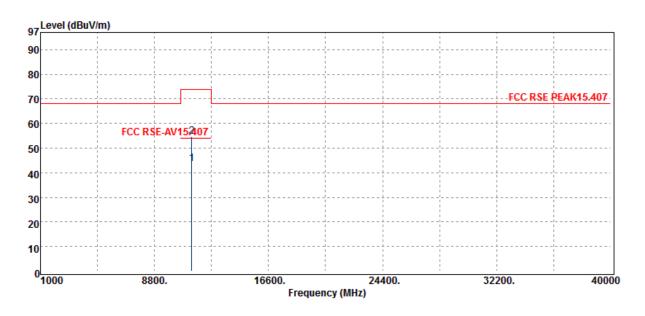


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**Operation Band** :802.11n40B3 **Test Date** :2018-03-20

Fundamental Frequency :5670 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH HIGH Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11340.00 | Н       | Average          | 21.42                     | 22.34  | 43.76        | 54.00        | -10.24         |
| 11340.00 | Н       | Peak             | 32.30                     | 22.34  | 54.64        | 74.00        | -19.36         |

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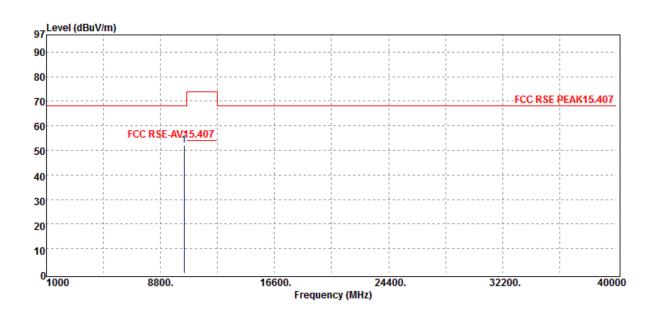
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## Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5150~5250 MHz

**Operation Band** :802.11ac80B1 **Test Date** :2018-03-20 Fundamental Frequency :5210 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane Measurement Antenna Pol. :VERTICAL



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dΒμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10420.00 | Н       | Peak             | 31.36                     | 20.69  | 52.05        | 68.30        | -16.25         |

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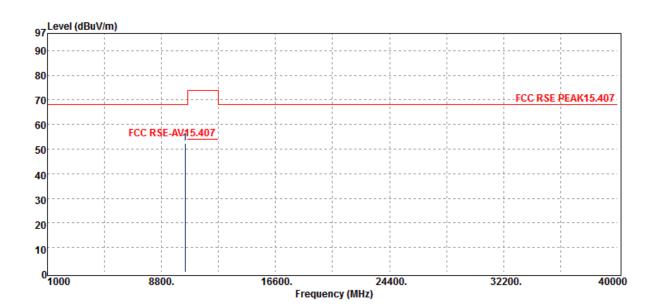


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**Operation Band** :802.11ac80B1 **Test Date** :2018-03-20

Fundamental Frequency :5210 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10420.00 | Н       | Peak             | 31.51                     | 20.69  | 52.20        | 68.30        | -16.10         |

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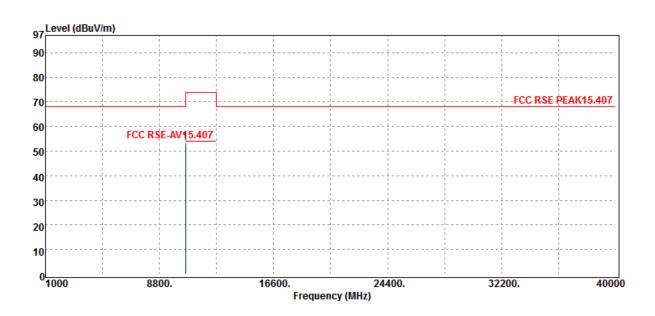
## Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5250~5350 MHz

**Operation Band** :802.11ac80B2 **Test Date** :2018-03-20

Fundamental Frequency :5290 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer :Tin

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              |                |
| 10580.00 | Н       | Peak             | 32.46                     | 21.03  | 53.49        | 68.30        | -14.81         |

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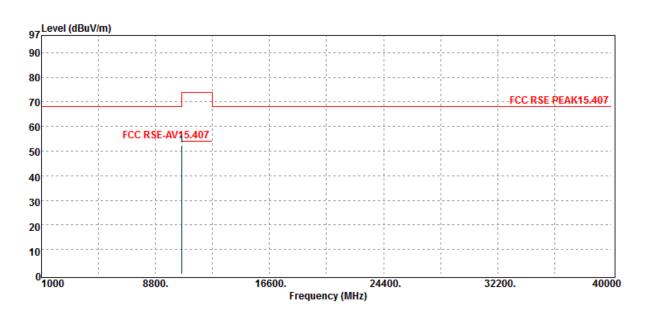
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B2 :5290 MHz :Tx CH HIGH :E1 Plane

**Test Date** :2018-03-20 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 10580.00 | Н       | Peak             | 31.29                     | 21.03  | 52.32        | 68.30        | -15.98         |

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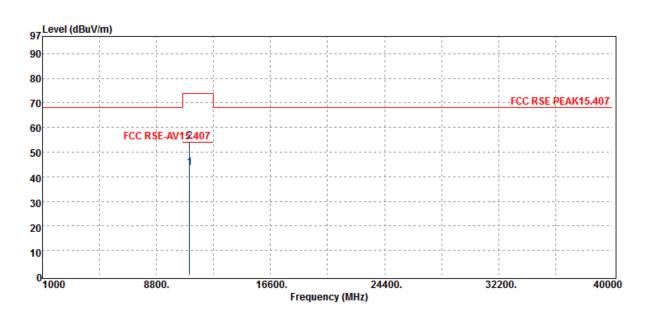
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## Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5470~5725 MHz

**Operation Band** :802.11ac80B3 **Test Date** :2018-03-20

Fundamental Frequency :5530 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Tin

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11060.00 | Н       | Average          | 21.13                     | 22.41  | 43.54        | 54.00        | -10.46         |
| 11060.00 | Н       | Peak             | 31.91                     | 22.41  | 54.32        | 74.00        | -19.68         |

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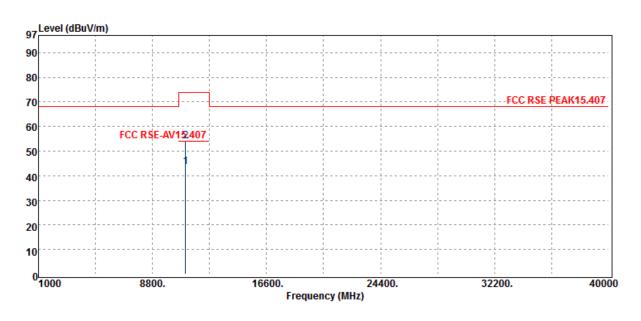


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**Operation Band** :802.11ac80B3 **Test Date** :2018-03-20 Fundamental Frequency :5530 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11060.00 | Н       | Average          | 21.28                     | 22.41  | 43.69        | 54.00        | -10.31         |
| 11060.00 | Н       | Peak             | 31.59                     | 22.41  | 54.00        | 74.00        | -20.00         |

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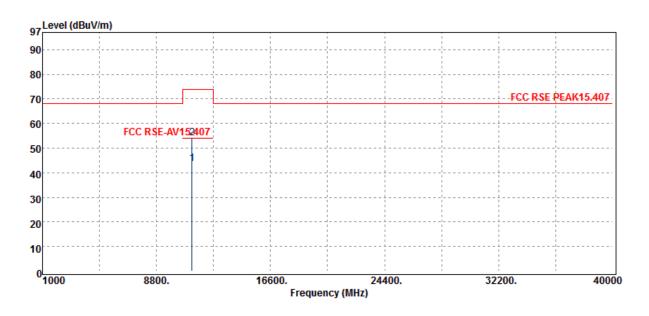


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**Operation Band** :802.11ac80B3 **Test Date** :2018-03-20 Fundamental Frequency :5610 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH HIGH Engineer

:VERTICAL EUT Pol. :E1 Plane Measurement Antenna Pol.



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11220.00 | Н       | Average          | 21.27                     | 22.36  | 43.63        | 54.00        | -10.37         |
| 11220.00 | Н       | Peak             | 31.51                     | 22.36  | 53.87        | 74.00        | -20.13         |

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:2018-03-20

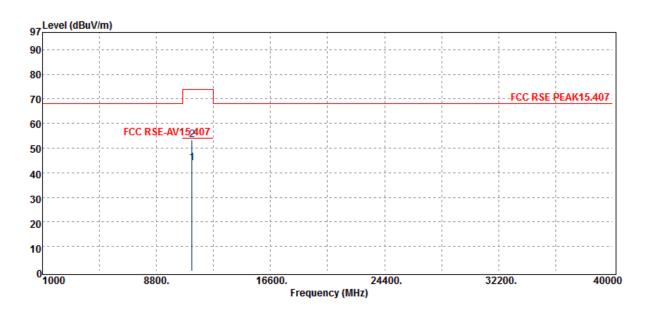
:23 deg\_C / 62 RH

**Operation Band** :802.11ac80B3 **Test Date** Fundamental Frequency :5610 MHz Temp./Humi.

**Operation Mode** :Tx CH HIGH

EUT Pol. :E1 Plane :HORIZONTAL Measurement Antenna Pol.

Engineer



| Freq.    | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Safe<br>Margin |
|----------|---------|------------------|---------------------------|--------|--------------|--------------|----------------|
| MHz      | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB             |
|          |         |                  |                           |        |              |              | _              |
| 11220.00 | Н       | Average          | 21.62                     | 22.36  | 43.98        | 54.00        | -10.02         |
| 11220.00 | Н       | Peak             | 30.85                     | 22.36  | 53.21        | 74.00        | -20.79         |

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# Band Edge falling to restricted band

802.11a mode **Operation Band** 

:802.11aB1

Fundamental Frequency :5180 MHz

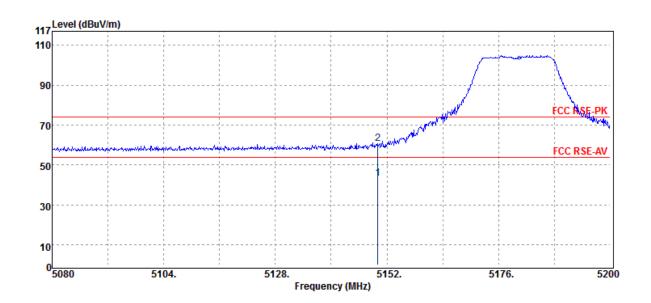
Operation Mode :Bandedge CH LOW

EUT Pol. :E1 Plane **Test Date** :2018-03-16

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



| Fre  | q. Note   | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|------|-----------|------------------|---------------------------|--------|--------------|--------------|--------|
| MH   | z F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
| 5150 | .00 E     | Average          | 35.16                     | 8.32   | 43.48        | 54.00        | -10.52 |
| 5150 | .00 E     | Peak             | 52.58                     | 8.32   | 60.90        | 74.00        | -13.10 |

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**Operation Band** Fundamental Frequency **Operation Mode** 

EUT Pol.

:802.11aB1 :5180 MHz

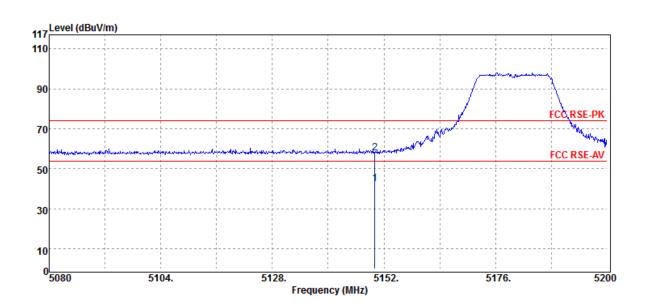
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-16 :23 deg\_C / 62 RH

Temp./Humi. Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBµV/m       | dBμV/m       | dB     |
| 5150.00 | E       | Average          | 34.24                  | 8.32   | 42.56        | 54.00        | -11.44 |
| 5150.00 | E       | Peak             | 49.62                  | 8.32   | 57.94        | 74.00        | -16.06 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB2 :5320 MHz

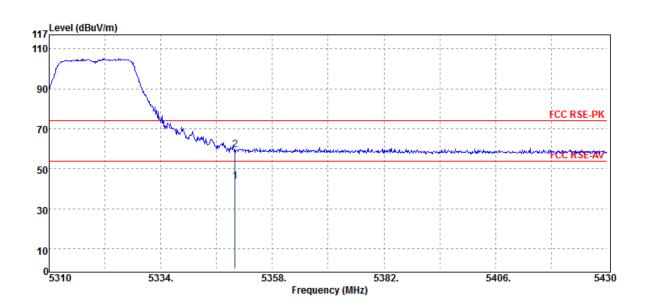
:Bandedge CH HIGH

:E1 Plane

**Test Date** :2018-03-16 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBμV/m       | dBμV/m       | dB     |
| 5350.00 | E       | Average          | 35.20                  | 8.63   | 43.83        | 54.00        | -10.17 |
| 5350.00 | E       | Peak             | 50.72                  | 8.63   | 59.35        | 74.00        | -14.65 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB2 :5320 MHz

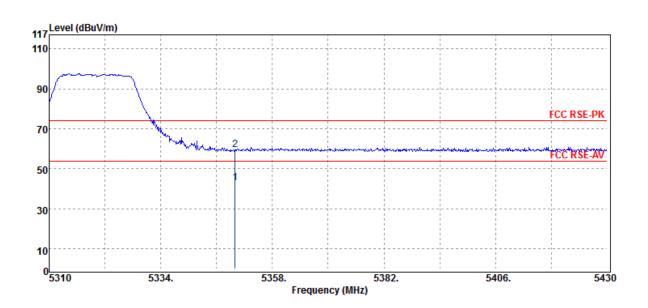
:Bandedge CH HIGH

:E1 Plane

**Test Date** :2018-03-16

Temp./Humi. :23 deg\_C / 62 RH Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBµV/m       | dBμV/m       | dB     |
| 5350.00 | E       | Average          | 34.24                  | 8.63   | 42.87        | 54.00        | -11.13 |
| 5350.00 | E       | Peak             | 51.01                  | 8.63   | 59.64        | 74.00        | -14.36 |

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**Operation Band** Fundamental Frequency

**Operation Mode** 

EUT Pol.

:802.11aB3 :5500 MHz

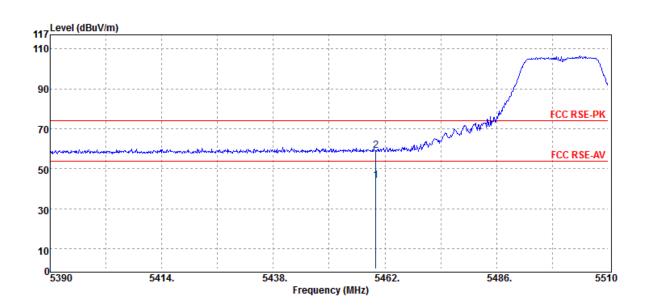
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-16 :23 deg\_C / 62 RH

Temp./Humi. Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
| 5460.00 | E       | Average          | 35.22                     | 8.75   | 43.97        | 54.00        | -10.03 |
| 5460.00 | Е       | Peak             | 50.44                     | 8.75   | 59.19        | 74.00        | -14.81 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz

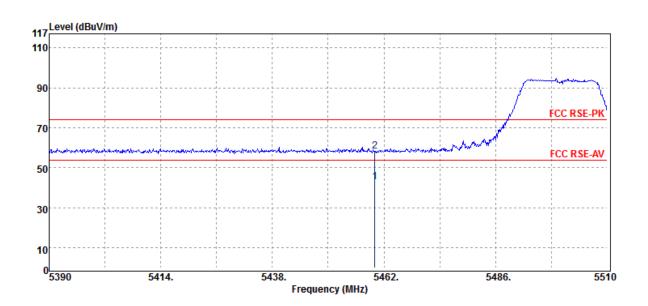
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-16 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμ̈V                  | dB     | dBµV/m       | dBμV/m       | dB     |
| 5460.00 | E       | Average          | 34.28                  | 8.75   | 43.03        | 54.00        | -10.97 |
| 5460.00 | E       | Peak             | 49.46                  | 8.75   | 58.21        | 74.00        | -15.79 |

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**Operation Band** :802.11aB3 Fundamental Frequency :5500 MHz **Operation Mode** 

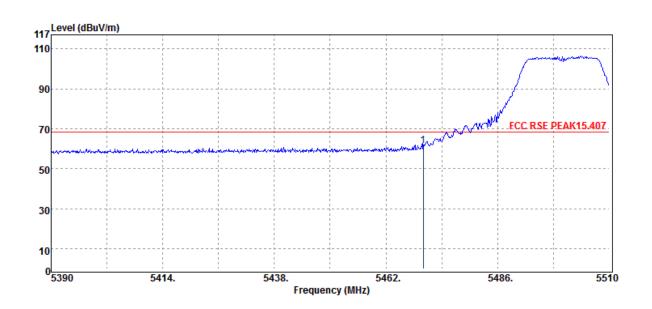
:Bandedge CH LOW RSE

EUT Pol. :E1 Plane **Test Date** :2018-03-16

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5470.00 | E       | Peak     | 52.95         | 8.74   | 61.69  | 68.30  | -6.61  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz

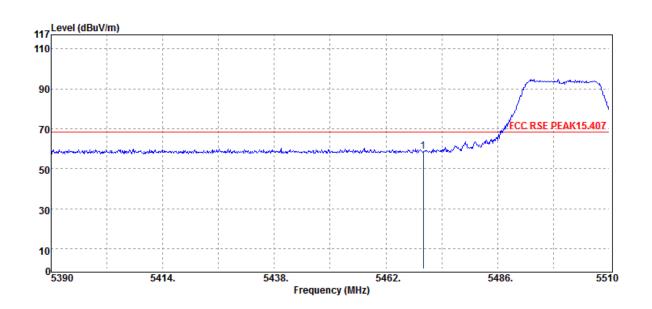
:Bandedge CH LOW RSE

:E1 Plane

**Test Date** :2018-03-16 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5470.00 | E       | Peak     | 49.98         | 8.74   | 58.72  | 68.30  | -9.58  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz

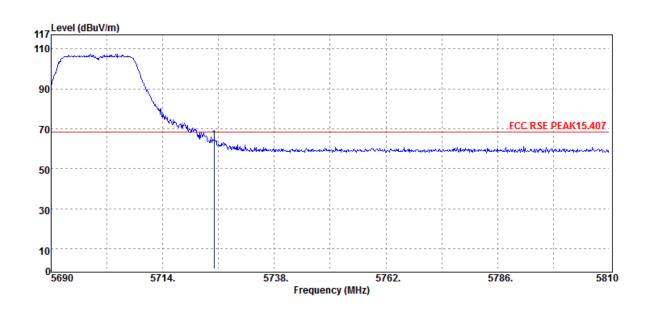
:Bandedge CH HIGH RSE

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5725.00 | E       | Peak     | 54.87         | 9.44   | 64.31  | 68.30  | -3.99  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz

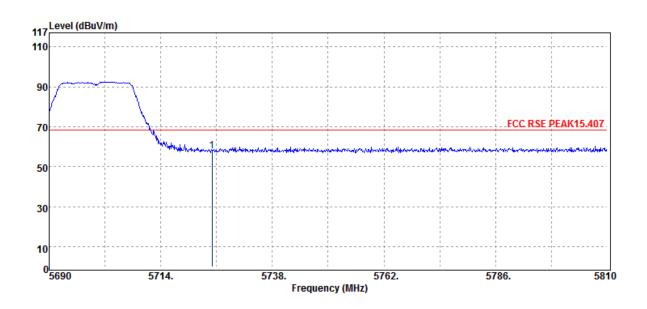
:Bandedge CH HIGH RSE

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5725.00 | E       | Peak     | 48.59         | 9.44   | 58.03  | 68.30  | -10.27 |

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### 802.11n20 HT mode

**Operation Band** Fundamental Frequency **Operation Mode** 

EUT Pol.

:802.11n20B1 :5180 MHz

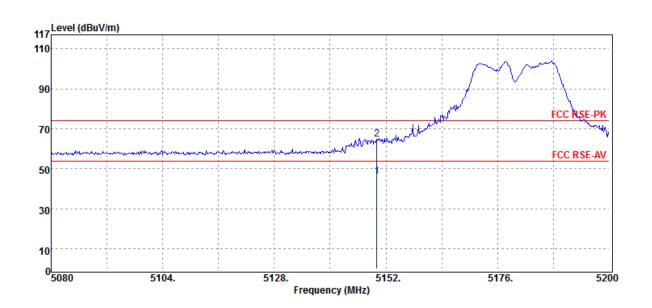
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBμV/m       | dBμV/m       | dB     |
| 5150.00 | E       | Average          | 37.74                  | 8.32   | 46.06        | 54.00        | -7.94  |
| 5150.00 | E       | Peak             | 56.33                  | 8.32   | 64.65        | 74.00        | -9.35  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B1 :5180 MHz

:Bandedge CH LOW

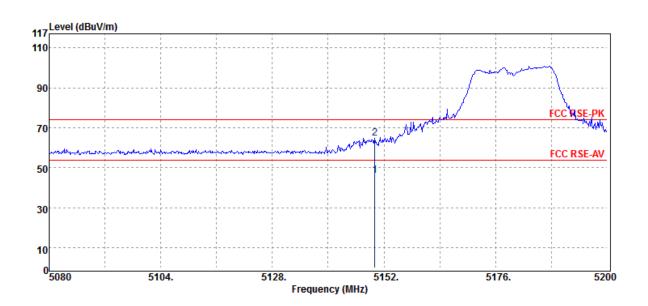
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBµV/m       | dB     |
| 5150.00 | E       | Average          | 37.66                     | 8.32   | 45.98        | 54.00        | -8.02  |
| 5150.00 | E       | Peak             | 56.46                     | 8.32   | 64.78        | 74.00        | -9.22  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5320 MHz

:Bandedge CH HIGH

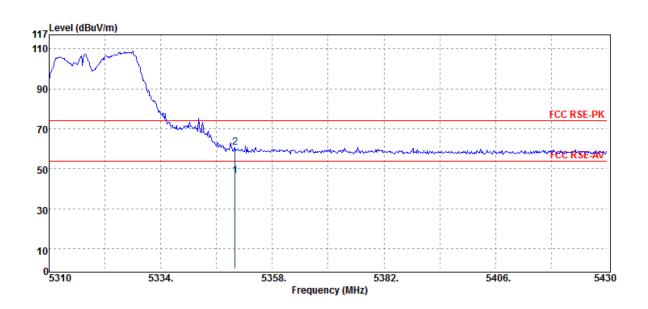
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBμV/m       | dBµV/m       | dB     |
| 5350.00 | E       | Average          | 37.87                  | 8.63   | 46.50        | 54.00        | -7.50  |
| 5350.00 | Е       | Peak             | 52.30                  | 8.63   | 60.93        | 74.00        | -13.07 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5320 MHz

:Bandedge CH HIGH

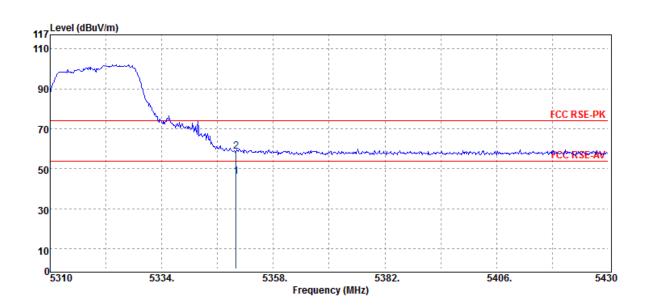
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
| 5350.00 | E       | Average          | 37.40                     | 8.63   | 46.03        | 54.00        | -7.97  |
| 5350.00 | Е       | Peak             | 50.21                     | 8.63   | 58.84        | 74.00        | -15.16 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

:Bandedge CH LOW

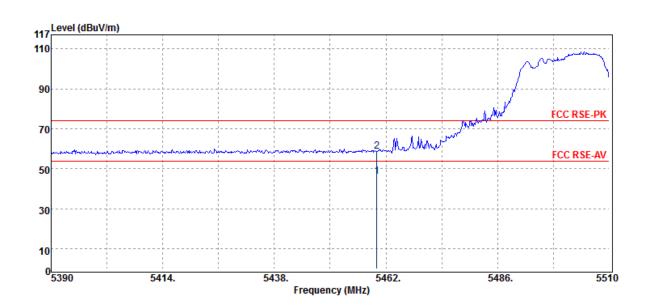
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBμV/m       | dBμV/m       | dB     |
| 5460.00 | E       | Average          | 37.35                  | 8.75   | 46.10        | 54.00        | -7.90  |
| 5460.00 | E       | Peak             | 49.93                  | 8.75   | 58.68        | 74.00        | -15.32 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

:Bandedge CH LOW

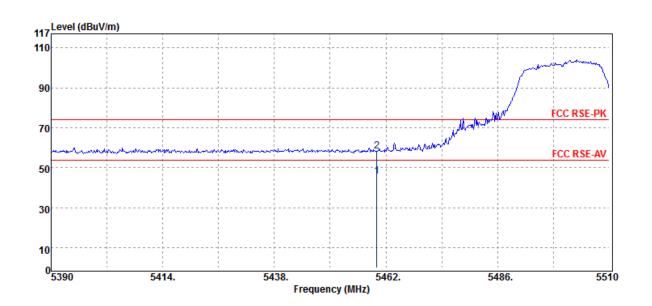
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
| 5460.00 | E       | Average          | 37.14                     | 8.75   | 45.89        | 54.00        | -8.11  |
| 5460.00 | E       | Peak             | 49.50                     | 8.75   | 58.25        | 74.00        | -15.75 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

:Bandedge CH LOW RSE

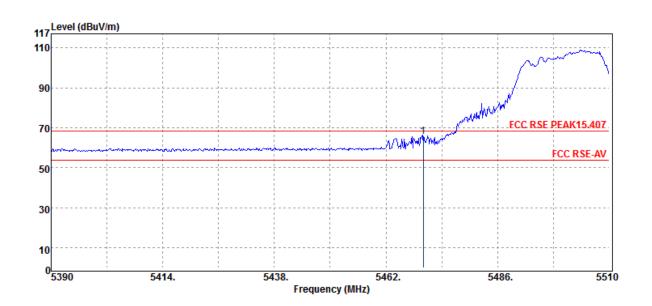
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5470.00 | Е       | Peak     | 56.98         | 8.74   | 65.72  | 68.30  | -2.58  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

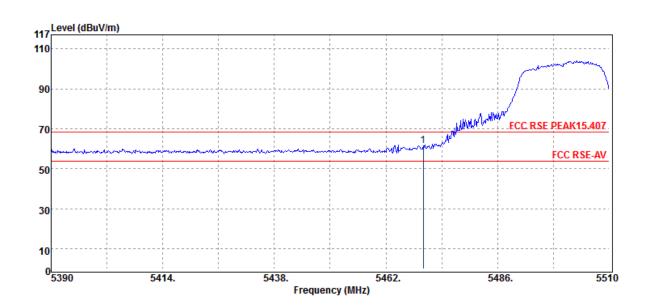
:Bandedge CH LOW RSE

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    | -      |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5470.00 | Е       | Peak     | 52.81         | 8.74   | 61.55  | 68.30  | -6.75  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz

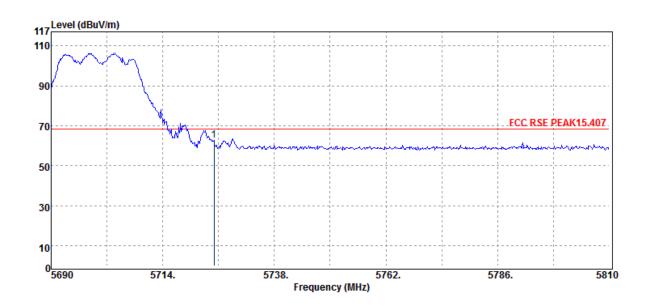
:Bandedge CH HIGH RSE

:E1 Plane

**Test Date** :2018-03-23 :23 deg\_C / 62 RH

Temp./Humi. Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5725.00 | E       | Peak     | 53.27         | 9.44   | 62.71  | 68.30  | -5.59  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz

:Bandedge CH HIGH RSE

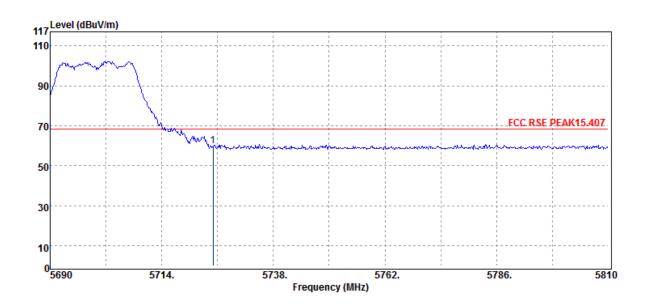
:E1 Plane

**Test Date** :2018-03-23

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5725.00 | E       | Peak     | 50.40         | 9.44   | 59.84  | 68.30  | -8.46  |

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### 802.11n40 HT mode

**Operation Band** Fundamental Frequency

**Operation Mode** EUT Pol.

:802.11n40B1 :5190 MHz

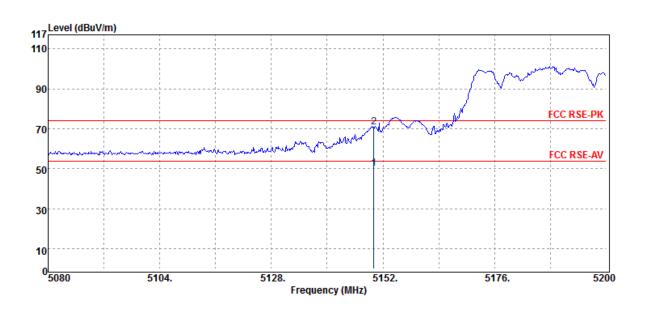
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-23 :23 deg\_C / 62 RH

Temp./Humi. Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
| 5150.00 | E       | Average          | 41.99                     | 8.32   | 50.31        | 54.00        | -3.69  |
| 5150.00 | E       | Peak             | 62.61                     | 8.32   | 70.93        | 74.00        | -3.07  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B1 :5190 MHz

:Bandedge CH LOW

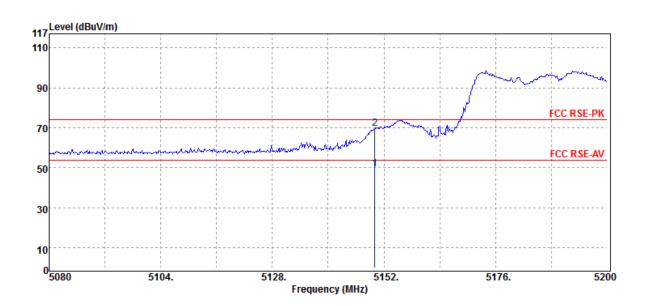
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBµV/m       | dBμV/m       | dB     |
| 5150.00 | E       | Average          | 40.99                  | 8.32   | 49.31        | 54.00        | -4.69  |
| 5150.00 | E       | Peak             | 61.21                  | 8.32   | 69.53        | 74.00        | -4.47  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B2 :5310 MHz

:Bandedge CH HIGH

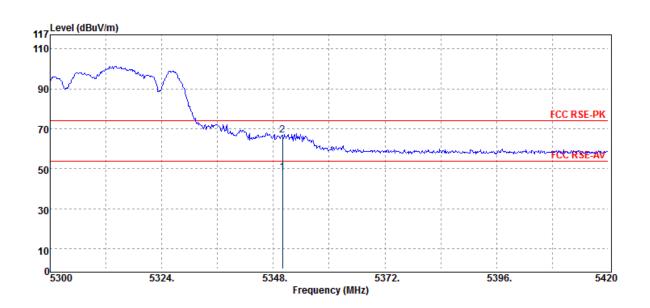
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
| 5350.00 | Е       | Average          | 39.72                     | 8.63   | 48.35        | 54.00        | -5.65  |
| 5350.00 | Е       | Peak             | 58.13                     | 8.63   | 66.76        | 74.00        | -7.24  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B2 :5310 MHz

:Bandedge CH HIGH

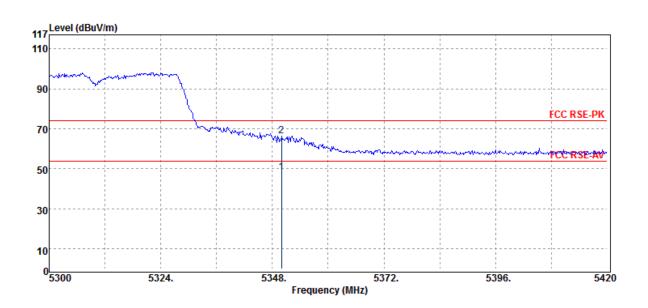
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBµV/m       | dBμV/m       | dB     |
| 5350.00 | E       | Average          | 39.42                  | 8.63   | 48.05        | 54.00        | -5.95  |
| 5350.00 | E       | Peak             | 57.88                  | 8.63   | 66.51        | 74.00        | -7.49  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz

:Bandedge CH LOW

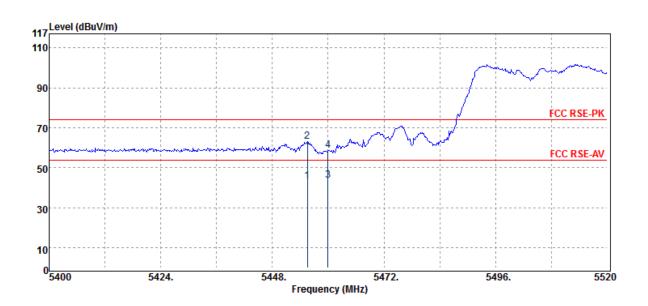
:E1 Plane

**Test Date** :2018-03-23

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit       | Margin |
|---------|---------|----------|---------------|--------|--------|-------------|--------|
|         |         | Mode     | Reading Level |        | FS     | <b>@</b> 3m |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBµV/m | dBµV/m      | dB     |
| 5455.56 | Е       | Average  | 34.76         | 8.75   | 43.51  | 54.00       | -10.49 |
| 5455.56 | Е       | Peak     | 54.39         | 8.75   | 63.14  | 74.00       | -10.86 |
| 5460.00 | E       | Average  | 34.80         | 8.75   | 43.55  | 54.00       | -10.45 |
| 5460.00 | Е       | Peak     | 49.84         | 8.75   | 58.59  | 74.00       | -15.41 |

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**Operation Band** Fundamental Frequency **Operation Mode** 

EUT Pol.

:802.11n40B3 :5510 MHz

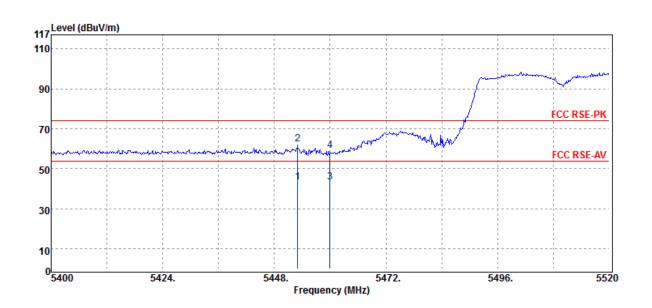
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-23 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBµV/m | dBµV/m | dB     |
| 5453.04 | Е       | Average  | 34.51         | 8.76   | 43.27  | 54.00  | -10.73 |
| 5453.04 | Е       | Peak     | 53.45         | 8.76   | 62.21  | 74.00  | -11.79 |
| 5460.00 | E       | Average  | 34.72         | 8.75   | 43.47  | 54.00  | -10.53 |
| 5460.00 | Е       | Peak     | 50.18         | 8.75   | 58.93  | 74.00  | -15.07 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz

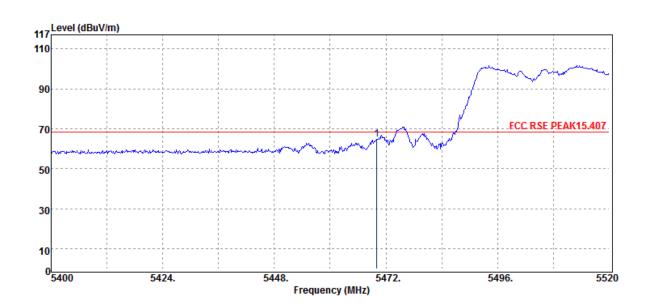
:Bandedge CH LOW RSE

:E1 Plane

**Test Date** :2018-03-23

Temp./Humi. :23 deg\_C / 62 RH Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    | -      |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dΒμV/m | dB     |
| 5470.00 | Е       | Peak     | 56.01         | 8.74   | 64.75  | 68.30  | -3.55  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz

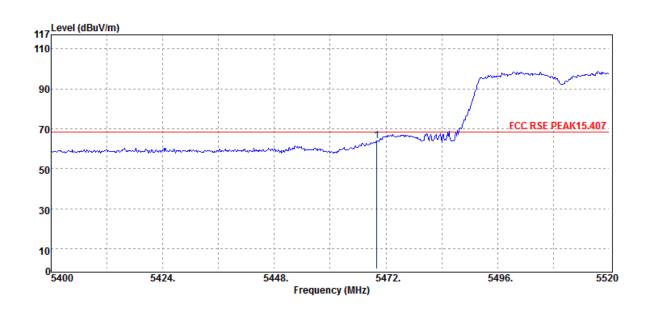
:Bandedge CH LOW RSE

:E1 Plane

**Test Date** :2018-03-23

Temp./Humi. :23 deg\_C / 62 RH Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBµV/m | dB     |
| 5470.00 | E       | Peak     | 55.08         | 8.74   | 63.82  | 68.30  | -4.48  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5670 MHz

:Bandedge CH HIGH RSE

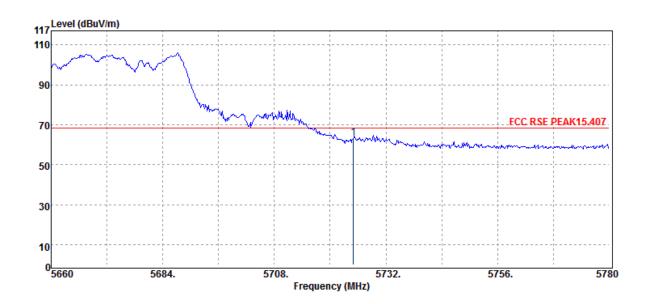
:E1 Plane

**Test Date** :2018-03-19

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5725.00 | E       | Peak     | 54.16         | 9.44   | 63.60  | 68.30  | -4.70  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5670 MHz

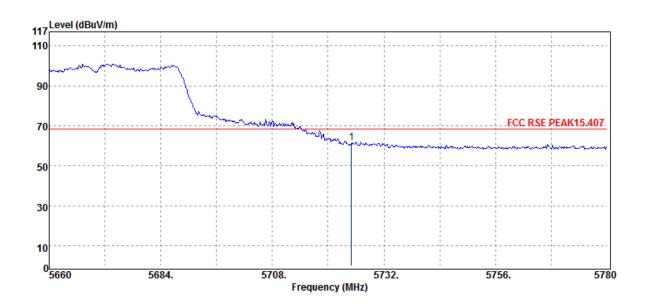
:Bandedge CH HIGH RSE

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m | dB     |
| 5725.00 | E       | Peak     | 52.01         | 9.44   | 61.45  | 68.30  | -6.85  |

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#### 802.11ac VHT80 mode

**Operation Band** Fundamental Frequency

**Operation Mode** EUT Pol.

:802.11ac80B1 :5210 MHz

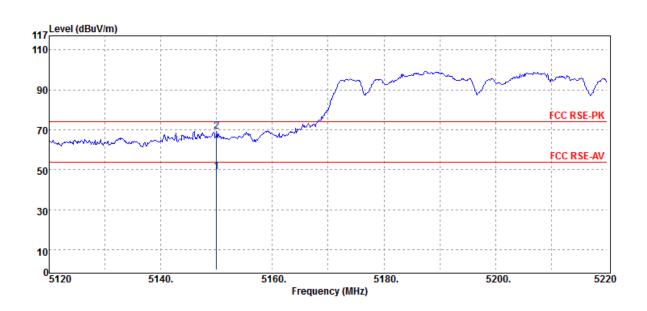
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBμV/m       | dBμV/m       | dB     |
| 5150.00 | E       | Average          | 40.51                  | 8.32   | 48.83        | 54.00        | -5.17  |
| 5150.00 | Е       | Peak             | 60.93                  | 8.32   | 69.25        | 74.00        | -4.75  |

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t (886-2) 2299-3279



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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B1 :5210 MHz

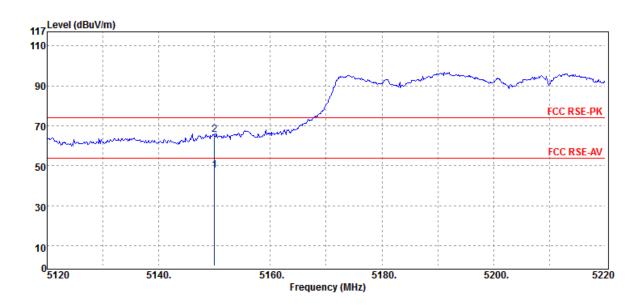
:Bandedge CH LOW

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
| 5150.00 | E       | Average          | 39.59                     | 8.32   | 47.91        | 54.00        | -6.09  |
| 5150.00 | Е       | Peak             | 57.29                     | 8.32   | 65.61        | 74.00        | -8.39  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B2 :5290 MHz

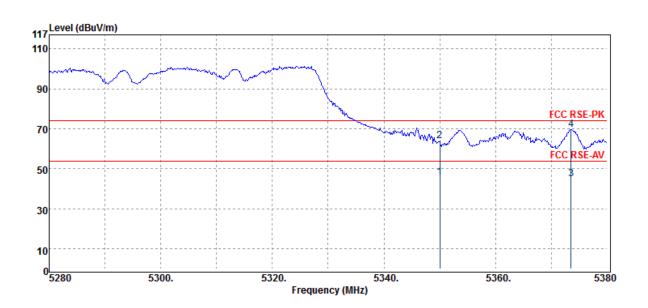
:Bandedge CH HIGH

:E1 Plane

**Test Date** :2018-03-19 :23 deg\_C / 62 RH

Temp./Humi. Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit  | Margin |
|---------|---------|----------|---------------|--------|--------|--------|--------|
|         |         | Mode     | Reading Level |        | FS     | @3m    |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBµV/m | dBµV/m | dB     |
| 5350.00 | Е       | Average  | 37.20         | 8.63   | 45.83  | 54.00  | -8.17  |
| 5350.00 | Е       | Peak     | 55.42         | 8.63   | 64.05  | 74.00  | -9.95  |
| 5373.50 | E       | Average  | 36.34         | 8.63   | 44.97  | 54.00  | -9.03  |
| 5373.50 | Е       | Peak     | 61.02         | 8.63   | 69.65  | 74.00  | -4.35  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B2 :5290 MHz

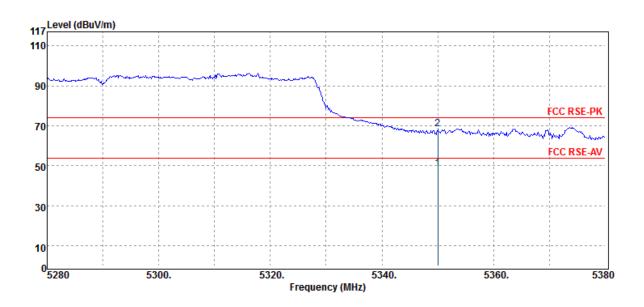
:Bandedge CH HIGH

:E1 Plane

**Test Date** :2018-03-19 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBµV/m       | dBμV/m       | dB     |
| 5350.00 | E       | Average          | 39.80                     | 8.63   | 48.43        | 54.00        | -5.57  |
| 5350.00 | Е       | Peak             | 59.61                     | 8.63   | 68.24        | 74.00        | -5.76  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz

:Bandedge CH LOW

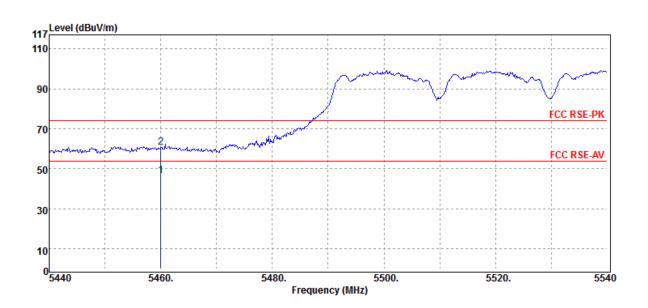
:E1 Plane

**Test Date** :2018-03-23

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμ̈V                  | dB     | dBµV/m       | dBμV/m       | dB     |
| 5460.00 | E       | Average          | 37.80                  | 8.75   | 46.55        | 54.00        | -7.45  |
| 5460.00 | E       | Peak             | 52.16                  | 8.75   | 60.91        | 74.00        | -13.09 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz

:Bandedge CH LOW

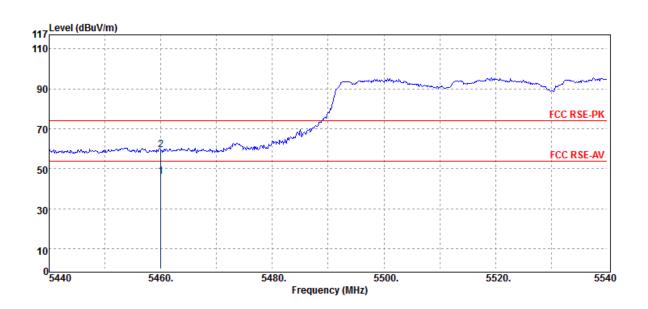
:E1 Plane

**Test Date** :2018-03-23

Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum<br>Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                      | dB     | dBμV/m       | dBμV/m       | dB     |
| 5460.00 | E       | Average          | 37.58                     | 8.75   | 46.33        | 54.00        | -7.67  |
| 5460.00 | Е       | Peak             | 50.91                     | 8.75   | 59.66        | 74.00        | -14.34 |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz

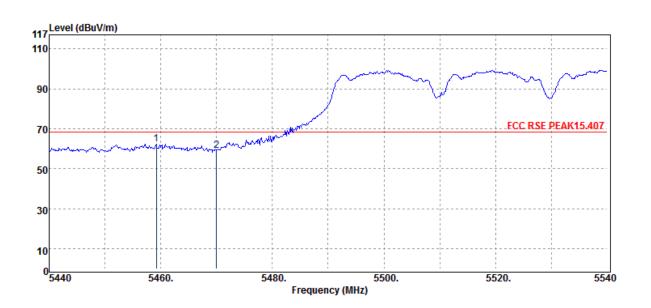
:Bandedge CH LOW RSE

:E1 Plane

**Test Date** :2018-03-23 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:VERTICAL Measurement Antenna Pol.



| Freq.   | Note    | Detector<br>Mode | Spectrum Reading Level | Factor | Actual<br>FS | Limit<br>@3m | Margin |
|---------|---------|------------------|------------------------|--------|--------------|--------------|--------|
| MHz     | F/H/E/S | PK/QP/AV         | dΒμV                   | dB     | dBμV/m       | dBμV/m       | dB     |
| 5459.20 | E       | Peak             | 53.69                  | 8.75   | 62.44        | 68.30        | -5.86  |
| 5470.00 | Е       | Peak             | 50.17                  | 8.74   | 58.91        | 68.30        | -9.39  |

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11ac80B3 :5530 MHz

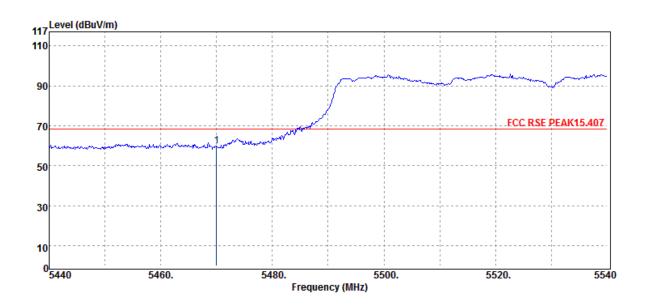
:Bandedge CH LOW RSE

:E1 Plane

**Test Date** :2018-03-23 Temp./Humi. :23 deg\_C / 62 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



| Freq.   | Note    | Detector | Spectrum      | Factor | Actual | Limit       | Margin |
|---------|---------|----------|---------------|--------|--------|-------------|--------|
|         |         | Mode     | Reading Level |        | FS     | <b>@</b> 3m |        |
| MHz     | F/H/E/S | PK/QP/AV | dΒμV          | dB     | dBμV/m | dBμV/m      | dB     |
| 5470.00 | E       | Peak     | 51.21         | 8.74   | 59.95  | 68.30       | -8.35  |

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### 12. TRANSMISSION IN THE ABSENCE OF DATA

# 12.1Standard Applicable

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

#### 12.2Result

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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#### 13. FREQUENCY STABILITY

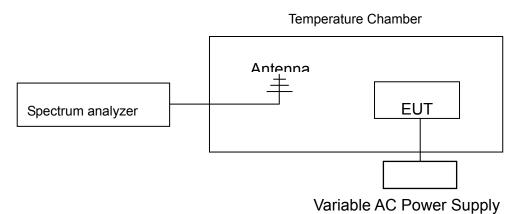
## 13.1Standard Applicable

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 user's manual.

### 13.2Measurement Procedure

- The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
- 2. Set EUT as normal operation.
- 3. Turn the EUT on and couple its output to spectrum.
- 4. Turn the EUT off and set the chamber to the highest temperature specified.
- 5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
- 6. Repeat step with the temperature chamber set to the lowest temperature.

#### 13.3Test SET-UP



## 13.4 Measurement Equipment Used:

| EQUIPMENT TYPE           | MFR          | MODEL<br>NUMBER | SERIAL<br>NUMBER | LAST CAL.  | CAL DUE.   |
|--------------------------|--------------|-----------------|------------------|------------|------------|
| EXA Spectrum<br>Analyzer | Agilent      | N9010A          | MY54200716       | 2017/10/16 | 2018/10/15 |
| DC Power Supply          | Anritsu      | E3640A          | MY52410006       | 2017/11/28 | 2018/11/27 |
| Attenuator               | Mini-Circuit | BW-S10W2+       | 2                | 2018/01/02 | 2019/01/01 |
| Notebook                 | Lenovo       | T440            | P0000564         | N/A        | N/A        |

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### 13.5Measurement Result

#### Startup:

| Operation Mode | 802.11 a | Test Date | 2018.03.20 |
|----------------|----------|-----------|------------|
| Temperature    | :23 ℃    | Test By   | Mike       |
| Humidity       | :68 %    |           |            |

| Test Temp. | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|            |              | 36      | 5180                           | 5,179.98486                    | 0.00000292          |
|            |              | 44      | 5220                           | 5,219.98486                    | 0.00000290          |
|            |              | 48      | 5240                           | 5,239.98486                    | 0.00000289          |
|            |              | 52      | 5260                           | 5,259.98486                    | 0.00000288          |
|            |              | 60      | 5300                           | 5,299.98486                    | 0.00000286          |
|            | 4.43V        | 64      | 5320                           | 5,319.98486                    | 0.00000285          |
|            |              | 100     | 5500                           | 5,499.98486                    | 0.00000275          |
|            |              | 116     | 5580                           | 5,579.98486                    | 0.00000271          |
|            |              | 140     | 5700                           | 5,699.98486                    | 0.00000266          |
| -10 °C     |              | 36      | 5180                           | 5,179.98486                    | 0.00000292          |
|            |              | 44      | 5220                           | 5,219.98486                    | 0.00000290          |
|            |              | 48      | 5240                           | 5,239.98486                    | 0.00000289          |
|            |              | 52      | 5260                           | 5,259.98486                    | 0.00000288          |
|            |              | 60      | 5300                           | 5,299.98486                    | 0.00000286          |
|            | 3.27V        | 64      | 5320                           | 5,319.98486                    | 0.00000285          |
|            |              | 100     | 5500                           | 5,499.98486                    | 0.00000275          |
|            |              | 116     | 5580                           | 5,579.98486                    | 0.00000271          |
|            |              | 140     | 5700                           | 5,699.96997                    | 0.00000527          |

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|       |       | 36  | 5180 | 5,179.98486 | 0.00000292 |
|-------|-------|-----|------|-------------|------------|
|       |       | 44  | 5220 | 5,219.98486 | 0.00000290 |
|       |       | 48  | 5240 | 5,239.98486 | 0.00000289 |
|       |       | 52  | 5260 | 5,259.98486 | 0.00000288 |
|       |       | 60  | 5300 | 5,299.98486 | 0.00000286 |
| 25 ℃  | 3.85V | 64  | 5320 | 5,319.98486 | 0.00000285 |
|       |       | 100 | 5500 | 5,499.98486 | 0.00000275 |
|       |       | 116 | 5580 | 5,579.98486 | 0.00000271 |
|       |       | 140 | 5700 | 5,699.98486 | 0.00000266 |
|       |       | 36  | 5180 | 5,179.98486 | 0.00000292 |
|       |       | 44  | 5220 | 5,219.98486 | 0.00000290 |
|       |       | 48  | 5240 | 5,239.98486 | 0.00000289 |
|       |       | 52  | 5260 | 5,259.98486 | 0.00000288 |
|       |       | 60  | 5300 | 5,299.98486 | 0.00000286 |
|       |       | 64  | 5320 | 5,319.98486 | 0.00000285 |
|       | 4.43V | 100 | 5500 | 5,499.98486 | 0.00000275 |
|       |       | 116 | 5580 | 5,579.98486 | 0.00000271 |
|       |       | 140 | 5700 | 5,699.98486 | 0.00000266 |
| 55 °C |       | 36  | 5180 | 5,179.98486 | 0.00000292 |
|       |       | 44  | 5220 | 5,219.98486 | 0.00000290 |
|       |       | 48  | 5240 | 5,239.98486 | 0.00000289 |
|       |       | 52  | 5260 | 5,259.98486 | 0.00000288 |
|       |       | 60  | 5300 | 5,299.98486 | 0.00000286 |
|       | 3.27V | 64  | 5320 | 5,319.98486 | 0.00000285 |
|       |       | 100 | 5500 | 5,499.98486 | 0.00000275 |
|       |       | 116 | 5580 | 5,579.98486 | 0.00000271 |
|       |       | 140 | 5700 | 5,699.98486 | 0.00000266 |

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| Operation Mode | 802.11 n_HT40 | Test Date | 2018.03.20 |
|----------------|---------------|-----------|------------|
| Temperature    | :23 ℃         | Test By   | Mike       |
| Humidity       | :68 %         |           | _          |

| Test Temp. | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|            |              | 38      | 5190                           | 5,189.97510                    | 0.00000480          |
|            |              | 46      | 5230                           | 5,229.97510                    | 0.00000476          |
|            |              | 54      | 5270                           | 5,269.97510                    | 0.00000473          |
|            |              | 62      | 5310                           | 5,309.97510                    | 0.00000469          |
|            | 4.43V        | 102     | 5510                           | 5,509.97510                    | 0.00000452          |
|            |              | 110     | 5550                           | 5,549.97510                    | 0.00000449          |
|            |              | 134     | 5670                           | 5,669.97510                    | 0.00000439          |
| -10 °C     |              | 38      | 5190                           | 5,189.97510                    | 0.00000480          |
|            |              | 46      | 5230                           | 5,229.97510                    | 0.00000476          |
|            |              | 54      | 5270                           | 5,269.97510                    | 0.00000473          |
|            |              | 62      | 5310                           | 5,309.97510                    | 0.00000469          |
|            | 3.27V        | 102     | 5510                           | 5,509.97510                    | 0.00000452          |
|            |              | 110     | 5550                           | 5,549.97510                    | 0.00000449          |
|            |              | 134     | 5670                           | 5,669.97510                    | 0.00000439          |

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|             |       | 38  | 5190 | 5,189.97510 | 0.00000480 |
|-------------|-------|-----|------|-------------|------------|
|             |       | 46  | 5230 | 5,229.97510 | 0.00000476 |
|             |       | 54  | 5270 | 5,269.97510 | 0.00000473 |
|             |       | 62  | 5310 | 5,309.97510 | 0.00000469 |
| 25 <b>℃</b> | 3.85V | 102 | 5510 | 5,509.97510 | 0.00000452 |
|             |       | 110 | 5550 | 5,549.97510 | 0.00000449 |
|             |       | 134 | 5670 | 5,669.97510 | 0.00000439 |
|             |       | 38  | 5190 | 5,189.97510 | 0.00000480 |
|             |       | 46  | 5230 | 5,229.97510 | 0.00000476 |
|             |       | 54  | 5270 | 5,269.97510 | 0.00000473 |
|             |       | 62  | 5310 | 5,309.97510 | 0.00000469 |
|             | 4.43V | 102 | 5510 | 5,509.97510 | 0.00000452 |
|             |       | 110 | 5550 | 5,549.97510 | 0.00000449 |
|             |       | 134 | 5670 | 5,670.00000 | 0.00000000 |
| 55 <b>℃</b> |       | 38  | 5190 | 5,189.97510 | 0.00000480 |
|             |       | 46  | 5230 | 5,229.97510 | 0.00000476 |
|             |       | 54  | 5270 | 5,269.97510 | 0.00000473 |
|             |       | 62  | 5310 | 5,309.97510 | 0.00000469 |
|             | 3.27V | 102 | 5510 | 5,509.97510 | 0.00000452 |
|             |       | 110 | 5550 | 5,549.97510 | 0.00000449 |
|             |       | 134 | 5670 | 5,669.97510 | 0.00000439 |

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| Operation Mode | 802.11 ac_VHT80 | Test Date | 2018.03.20 |
|----------------|-----------------|-----------|------------|
| Temperature    | :23 ℃           | Test By   | Mike       |
| Humidity       | :68 %           |           |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 42      | 5210                           | 5,209.95020                    | 0.00000956          |
|             |              | 58      | 5290                           | 5,290.04981                    | -0.00000941         |
|             | 4.43V        | 106     | 5530                           | 5,529.95020                    | 0.00000901          |
|             |              | 122     | 5610                           | 5,609.95020                    | 0.00000888          |
| -10 °C      |              | 42      | 5210                           | 5,210.00000                    | 0.00000000          |
|             |              | 58      | 5290                           | 5,290.04981                    | -0.00000941         |
|             | 3.27V        | 106     | 5530                           | 5,529.95020                    | 0.00000901          |
|             |              | 122     | 5610                           | 5,610.00000                    | 0.00000000          |
|             |              | 42      | 5210                           | 5,210.00000                    | 0.00000000          |
|             |              | 58      | 5290                           | 5,290.04981                    | -0.00000941         |
| 25 <b>℃</b> | 3.85V        | 106     | 5530                           | 5,529.95020                    | 0.00000901          |
|             |              | 122     | 5610                           | 5,609.95020                    | 0.00000888          |
|             |              | 42      | 5210                           | 5,209.95020                    | 0.00000956          |
|             |              | 58      | 5290                           | 5,290.04981                    | -0.00000941         |
|             | 4.43V        | 106     | 5530                           | 5,530.00000                    | 0.00000000          |
|             |              | 122     | 5610                           | 5,609.95020                    | 0.00000888          |
| 55 <b>℃</b> |              | 42      | 5210                           | 5,210.00000                    | 0.00000000          |
|             |              | 58      | 5290                           | 5,290.04981                    | -0.00000941         |
|             | 3.27V        | 106     | 5530                           | 5,529.95020                    | 0.00000901          |
|             |              | 122     | 5610                           | 5,610.00000                    | 0.00000000          |

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#### 2 Minutes:

| Operation Mode | 802.11 a | Test Date | 2018.03.20 |
|----------------|----------|-----------|------------|
| Temperature    | :23 ℃    | Test By   | Mike       |
| Humidity       | :68 %    |           |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 36      | 5180                           | 5,179.98850                    | 0.00000222          |
|             |              | 44      | 5220                           | 5,219.98061                    | 0.00000371          |
|             |              | 48      | 5240                           | 5,239.99298                    | 0.00000134          |
|             |              | 52      | 5260                           | 5,259.98118                    | 0.00000358          |
|             |              | 60      | 5300                           | 5,299.98164                    | 0.00000346          |
|             | 4.43V        | 64      | 5320                           | 5,319.98467                    | 0.00000288          |
|             |              | 100     | 5500                           | 5,499.97700                    | 0.00000418          |
|             |              | 116     | 5580                           | 5,579.99201                    | 0.00000143          |
|             |              | 140     | 5700                           | 5,699.99058                    | 0.00000165          |
| -10 °C      |              | 36      | 5180                           | 5,179.99164                    | 0.00000161          |
|             |              | 44      | 5220                           | 5,219.98552                    | 0.00000277          |
|             |              | 48      | 5240                           | 5,239.98283                    | 0.00000328          |
|             |              | 52      | 5260                           | 5,259.99325                    | 0.00000128          |
|             |              | 60      | 5300                           | 5,299.97762                    | 0.00000422          |
|             | 3.27V        | 64      | 5320                           | 5,319.99464                    | 0.00000101          |
|             |              | 100     | 5500                           | 5,499.98800                    | 0.00000218          |
|             |              | 116     | 5580                           | 5,579.98994                    | 0.00000180          |
|             |              | 140     | 5700                           | 5,699.96089                    | 0.00000686          |
|             |              | 36      | 5180                           | 5,179.97611                    | 0.00000461          |
|             |              | 44      | 5220                           | 5,219.98952                    | 0.00000201          |
|             |              | 48      | 5240                           | 5,239.97750                    | 0.00000429          |
|             |              | 52      | 5260                           | 5,259.98302                    | 0.00000323          |
|             |              | 60      | 5300                           | 5,299.98648                    | 0.00000255          |
| 25 <b>℃</b> | 3.85V        | 64      | 5320                           | 5,319.99363                    | 0.00000120          |
|             |              | 100     | 5500                           | 5,499.97592                    | 0.00000438          |
|             |              | 116     | 5580                           | 5,579.98332                    | 0.00000299          |
|             |              | 140     | 5700                           | 5,699.98891                    | 0.00000195          |

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| ř           |       |     | ī    |             | ì          |
|-------------|-------|-----|------|-------------|------------|
|             |       | 36  | 5180 | 5,179.99441 | 0.00000108 |
|             |       | 44  | 5220 | 5,219.98515 | 0.00000285 |
|             |       | 48  | 5240 | 5,239.98681 | 0.00000252 |
|             |       | 52  | 5260 | 5,259.99158 | 0.00000160 |
|             |       | 60  | 5300 | 5,299.98234 | 0.00000333 |
|             |       | 64  | 5320 | 5,319.98748 | 0.00000235 |
|             | 4.43V | 100 | 5500 | 5,499.98052 | 0.00000354 |
|             |       | 116 | 5580 | 5,579.99130 | 0.00000156 |
|             |       | 140 | 5700 | 5,699.99076 | 0.00000162 |
| 55 <b>℃</b> |       | 36  | 5180 | 5,179.99400 | 0.00000116 |
|             |       | 44  | 5220 | 5,219.97519 | 0.00000475 |
|             |       | 48  | 5240 | 5,239.97707 | 0.00000438 |
|             |       | 52  | 5260 | 5,259.99225 | 0.00000147 |
|             |       | 60  | 5300 | 5,299.98307 | 0.00000319 |
|             | 3.27V | 64  | 5320 | 5,319.98943 | 0.00000199 |
|             |       | 100 | 5500 | 5,499.98675 | 0.00000241 |
|             |       | 116 | 5580 | 5,579.97541 | 0.00000441 |
|             |       | 140 | 5700 | 5,699.98649 | 0.00000237 |

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| Operation Mode | 802.11 n_HT40 | Test Date | 2018.03.20 |
|----------------|---------------|-----------|------------|
| Temperature    | :23 ℃         | Test By   | Mike       |
| Humidity       | :68 %         |           |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 38      | 5190                           | 5,189.96850                    | 0.00000607          |
|             |              | 46      | 5230                           | 5,229.97711                    | 0.00000438          |
|             |              | 54      | 5270                           | 5,269.97792                    | 0.00000419          |
|             |              | 62      | 5310                           | 5,309.96558                    | 0.00000648          |
|             | 4.43V        | 102     | 5510                           | 5,509.97928                    | 0.00000376          |
|             |              | 110     | 5550                           | 5,549.98294                    | 0.00000307          |
|             |              | 134     | 5670                           | 5,669.97570                    | 0.00000429          |
| -10 °C      |              | 38      | 5190                           | 5,189.96939                    | 0.00000590          |
|             |              | 46      | 5230                           | 5,229.98260                    | 0.00000333          |
|             |              | 54      | 5270                           | 5,269.97721                    | 0.00000432          |
|             |              | 62      | 5310                           | 5,309.96599                    | 0.00000641          |
|             | 3.27V        | 102     | 5510                           | 5,509.97069                    | 0.00000532          |
|             |              | 110     | 5550                           | 5,549.97935                    | 0.00000372          |
|             |              | 134     | 5670                           | 5,669.97820                    | 0.00000385          |
|             |              | 38      | 5190                           | 5,189.97581                    | 0.00000466          |
|             |              | 46      | 5230                           | 5,229.97363                    | 0.00000504          |
|             |              | 54      | 5270                           | 5,269.96550                    | 0.00000655          |
|             |              | 62      | 5310                           | 5,309.98350                    | 0.00000311          |
| 25 <b>℃</b> | 3.85V        | 102     | 5510                           | 5,509.98025                    | 0.00000358          |
|             |              | 110     | 5550                           | 5,549.96913                    | 0.00000556          |
|             |              | 134     | 5670                           | 5,669.97377                    | 0.00000463          |
|             |              | 38      | 5190                           | 5,189.98196                    | 0.00000348          |
|             |              | 46      | 5230                           | 5,229.98073                    | 0.00000369          |
|             |              | 54      | 5270                           | 5,269.97624                    | 0.00000451          |
|             |              | 62      | 5310                           | 5,309.97665                    | 0.00000440          |
|             | 4.43V        | 102     | 5510                           | 5,509.98439                    | 0.00000283          |
|             |              | 110     | 5550                           | 5,549.97512                    | 0.00000448          |
|             |              | 134     | 5670                           | 5,669.99850                    | 0.00000026          |
| 55 <b>℃</b> |              | 38      | 5190                           | 5,189.96674                    | 0.00000641          |
|             |              | 46      | 5230                           | 5,229.98463                    | 0.00000294          |
|             |              | 54      | 5270                           | 5,269.97884                    | 0.00000402          |
|             |              | 62      | 5310                           | 5,309.97232                    | 0.00000521          |
|             | 3.27V        | 102     | 5510                           | 5,509.97513                    | 0.00000451          |
|             |              | 110     | 5550                           | 5,549.97224                    | 0.00000500          |
|             |              | 134     | 5670                           | 5,669.97600                    | 0.00000423          |

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| Operation Mode | 802.11 ac_VHT80 | Test Date | 2018.03.20 |
|----------------|-----------------|-----------|------------|
| Temperature    | :23 ℃           | Test By   | Mike       |
| Humidity       | :68 %           | -         |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 42      | 5210                           | 5,209.94484                    | 0.00001059          |
|             |              | 58      | 5290                           | 5,290.04804                    | -0.00000908         |
|             | 4.43V        | 106     | 5530                           | 5,529.95028                    | 0.00000899          |
|             |              | 122     | 5610                           | 5,609.94847                    | 0.00000919          |
| -10 °C      |              | 42      | 5210                           | 5,210.00770                    | -0.00000148         |
|             |              | 58      | 5290                           | 5,290.05251                    | -0.00000993         |
|             | 3.27V        | 106     | 5530                           | 5,529.95302                    | 0.00000850          |
|             |              | 122     | 5610                           | 5,609.99090                    | 0.00000162          |
|             |              | 42      | 5210                           | 5,209.99499                    | 0.00000096          |
|             |              | 58      | 5290                           | 5,290.04269                    | -0.00000807         |
| 25 <b>℃</b> | 3.85V        | 106     | 5530                           | 5,529.95523                    | 0.00000810          |
|             |              | 122     | 5610                           | 5,609.95739                    | 0.00000760          |
|             |              | 42      | 5210                           | 5,209.95896                    | 0.00000788          |
|             |              | 58      | 5290                           | 5,290.05315                    | -0.00001005         |
|             | 4.43V        | 106     | 5530                           | 5,530.00527                    | -0.00000095         |
|             |              | 122     | 5610                           | 5,609.94736                    | 0.00000938          |
| 55 <b>℃</b> |              | 42      | 5210                           | 5,210.00600                    | -0.00000115         |
|             |              | 58      | 5290                           | 5,290.04835                    | -0.00000914         |
|             | 3.27V        | 106     | 5530                           | 5,529.95070                    | 0.00000891          |
|             |              | 122     | 5610                           | 5,609.99566                    | 0.00000077          |

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#### 5 Minutes:

| Operation Mode | 802.11 a | Test Date | 2018.03.20 |
|----------------|----------|-----------|------------|
| Temperature    | :23 ℃    | Test By   | Mike       |
| Humidity       | :68 %    |           |            |

|             | <u> </u>     | 1          | Measured  | Spectrum    |            |
|-------------|--------------|------------|-----------|-------------|------------|
| Test Temp.  | Test Voltage | Channel    | Frequency | Frequency   | ΔFrequency |
| rest remp.  | Test voitage | Cilalillei | (MHz)     | (MHz)       | (MHz)      |
|             |              | 36         | 5180      | 5,179.98318 | 0.00000325 |
|             |              | 44         | 5220      | 5,219.97913 | 0.00000400 |
|             |              | 48         | 5240      | 5,239.97773 | 0.00000425 |
|             |              | 52         | 5260      | 5,259.98970 | 0.00000196 |
|             |              | 60         | 5300      | 5,299.98247 | 0.00000331 |
|             | 4.43V        | 64         | 5320      | 5,319.98548 | 0.00000273 |
|             |              | 100        | 5500      | 5,499.98022 | 0.00000360 |
|             |              | 116        | 5580      | 5,579.99269 | 0.00000131 |
|             |              | 140        | 5700      | 5,699.97900 | 0.00000368 |
| -10 °C      |              | 36         | 5180      | 5,179.97808 | 0.00000423 |
|             |              | 44         | 5220      | 5,219.99022 | 0.00000187 |
|             |              | 48         | 5240      | 5,239.98562 | 0.00000274 |
|             |              | 52         | 5260      | 5,259.97945 | 0.00000391 |
|             |              | 60         | 5300      | 5,299.98111 | 0.00000356 |
|             | 3.27V        | 64         | 5320      | 5,319.98193 | 0.00000340 |
|             |              | 100        | 5500      | 5,499.98548 | 0.00000264 |
|             |              | 116        | 5580      | 5,579.99300 | 0.00000125 |
|             |              | 140        | 5700      | 5,699.97661 | 0.00000410 |
|             | I            |            |           | ·           |            |
|             |              | 36         | 5180      | 5,179.97756 | 0.00000433 |
|             |              | 44         | 5220      | 5,219.98253 | 0.00000335 |
|             |              | 48         | 5240      | 5,239.99052 | 0.00000181 |
|             |              | 52         | 5260      | 5,259.97697 | 0.00000438 |
|             |              | 60         | 5300      | 5,299.98609 | 0.00000262 |
| 25 <b>℃</b> | 3.85V        | 64         | 5320      | 5,319.98974 | 0.00000193 |
|             |              | 100        | 5500      | 5,499.98782 | 0.00000221 |
|             |              | 116        | 5580      | 5,579.99005 | 0.00000178 |
|             |              | 140        | 5700      | 5,699.98957 | 0.00000183 |

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| r           | T     |     |      |             |            |
|-------------|-------|-----|------|-------------|------------|
|             |       | 36  | 5180 | 5,179.99035 | 0.00000186 |
|             |       | 44  | 5220 | 5,219.98738 | 0.00000242 |
|             |       | 48  | 5240 | 5,239.98745 | 0.00000239 |
|             |       | 52  | 5260 | 5,259.99452 | 0.00000104 |
|             |       | 60  | 5300 | 5,299.99383 | 0.00000116 |
|             |       | 64  | 5320 | 5,319.97721 | 0.00000428 |
|             | 4.43V | 100 | 5500 | 5,499.97567 | 0.00000442 |
|             |       | 116 | 5580 | 5,579.97496 | 0.00000449 |
|             |       | 140 | 5700 | 5,699.98391 | 0.00000282 |
| 55 <b>℃</b> |       | 36  | 5180 | 5,179.97616 | 0.00000460 |
|             |       | 44  | 5220 | 5,219.97764 | 0.00000428 |
|             |       | 48  | 5240 | 5,239.98575 | 0.00000272 |
|             |       | 52  | 5260 | 5,259.99430 | 0.00000108 |
|             |       | 60  | 5300 | 5,299.99356 | 0.00000122 |
|             | 3.27V | 64  | 5320 | 5,319.99251 | 0.00000141 |
|             |       | 100 | 5500 | 5,499.97741 | 0.00000411 |
|             |       | 116 | 5580 | 5,579.99092 | 0.00000163 |
|             |       | 140 | 5700 | 5,699.98001 | 0.00000351 |

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| Operation Mode | 802.11 n_HT40 | Test Date | 2018.03.20 |
|----------------|---------------|-----------|------------|
| Temperature    | :23 ℃         | Test By   | Mike       |
| Humidity       | :68 %         |           |            |

|             |              |         | Measured  | Spectrum    |             |
|-------------|--------------|---------|-----------|-------------|-------------|
| Test Temp.  | Test Voltage | Channel | Frequency | Frequency   | ΔFrequency  |
|             |              |         | (MHz)     | (MHz)       | (MHz)       |
|             |              | 38      | 5190      | 5,189.97066 | 0.00000565  |
|             |              | 46      | 5230      | 5,229.97367 | 0.00000503  |
|             |              | 54      | 5270      | 5,269.98053 | 0.00000369  |
|             |              | 62      | 5310      | 5,309.98371 | 0.00000307  |
|             | 4.43V        | 102     | 5510      | 5,509.97070 | 0.00000532  |
|             |              | 110     | 5550      | 5,549.97317 | 0.00000484  |
|             |              | 134     | 5670      | 5,669.96514 | 0.00000615  |
| -10 °C      |              | 38      | 5190      | 5,189.97174 | 0.00000545  |
|             |              | 46      | 5230      | 5,229.96949 | 0.00000583  |
|             |              | 54      | 5270      | 5,269.96519 | 0.00000660  |
|             |              | 62      | 5310      | 5,309.97091 | 0.00000548  |
|             | 3.27V        | 102     | 5510      | 5,509.97890 | 0.00000383  |
|             |              | 110     | 5550      | 5,549.96844 | 0.00000569  |
|             |              | 134     | 5670      | 5,669.96868 | 0.00000552  |
|             |              | 38      | 5190      | 5,189.97026 | 0.00000573  |
|             |              | 46      | 5230      | 5,229.97184 | 0.00000539  |
|             |              | 54      | 5270      | 5,269.97074 | 0.00000555  |
|             |              | 62      | 5310      | 5,309.97027 | 0.00000560  |
| 25 <b>℃</b> | 3.85V        | 102     | 5510      | 5,509.96522 | 0.00000631  |
|             |              | 110     | 5550      | 5,549.97322 | 0.00000482  |
|             |              | 134     | 5670      | 5,669.97137 | 0.00000505  |
|             |              | 38      | 5190      | 5,189.98018 | 0.00000382  |
|             |              | 46      | 5230      | 5,229.98209 | 0.00000343  |
|             |              | 54      | 5270      | 5,269.97465 | 0.00000481  |
|             |              | 62      | 5310      | 5,309.98178 | 0.00000343  |
|             | 4.43V        | 102     | 5510      | 5,509.96725 | 0.00000594  |
|             |              | 110     | 5550      | 5,549.96783 | 0.00000580  |
|             |              | 134     | 5670      | 5,670.00582 | -0.00000103 |
| 55 <b>℃</b> |              | 38      | 5190      | 5,189.96770 | 0.00000622  |
|             |              | 46      | 5230      | 5,229.98162 | 0.00000352  |
|             |              | 54      | 5270      | 5,269.97170 | 0.00000537  |
|             |              | 62      | 5310      | 5,309.98449 | 0.00000292  |
|             | 3.27V        | 102     | 5510      | 5,509.97809 | 0.00000398  |
|             |              | 110     | 5550      | 5,549.96870 | 0.00000564  |
|             |              | 134     | 5670      | 5,669.97783 | 0.00000391  |

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| Operation Mode | 802.11 ac_VHT80 | Test Date | 2018.03.20 |
|----------------|-----------------|-----------|------------|
| Temperature    | :23 ℃           | Test By   | Mike       |
| Humidity       | :68 %           | _         |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 42      | 5210                           | 5,209.95766                    | 0.00000813          |
|             |              | 58      | 5290                           | 5,290.05519                    | -0.00001043         |
|             | 4.43V        | 106     | 5530                           | 5,529.94679                    | 0.00000962          |
|             |              | 122     | 5610                           | 5,609.95203                    | 0.00000855          |
| -10 °C      |              | 42      | 5210                           | 5,209.99187                    | 0.00000156          |
|             |              | 58      | 5290                           | 5,290.04841                    | -0.00000915         |
|             | 3.27V        | 106     | 5530                           | 5,529.94872                    | 0.00000927          |
|             |              | 122     | 5610                           | 5,610.00264                    | -0.00000047         |
|             |              | 42      | 5210                           | 5,210.00777                    | -0.00000149         |
|             |              | 58      | 5290                           | 5,290.05293                    | -0.00001001         |
| 25 <b>℃</b> | 3.85V        | 106     | 5530                           | 5,529.94379                    | 0.00001016          |
|             |              | 122     | 5610                           | 5,609.95737                    | 0.00000760          |
|             |              | 42      | 5210                           | 5,209.94792                    | 0.00001000          |
|             |              | 58      | 5290                           | 5,290.05717                    | -0.00001081         |
|             | 4.43V        | 106     | 5530                           | 5,529.99951                    | 0.00000009          |
|             |              | 122     | 5610                           | 5,609.94850                    | 0.00000918          |
| 55 <b>℃</b> |              | 42      | 5210                           | 5,210.00118                    | -0.00000023         |
|             |              | 58      | 5290                           | 5,290.05841                    | -0.00001104         |
|             | 3.27V        | 106     | 5530                           | 5,529.95589                    | 0.00000798          |
|             |              | 122     | 5610                           | 5,609.99211                    | 0.00000141          |

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#### 10 Minutes:

| Operation Mode | 802.11 a | Test Date | 2018.03.20 |
|----------------|----------|-----------|------------|
| Temperature    | :23 ℃    | Test By   | Mike       |
| Humidity       | :68 %    |           |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 36      | 5180                           | 5,179.97501                    | 0.00000482          |
|             |              | 44      | 5220                           | 5,219.98453                    | 0.00000296          |
|             |              | 48      | 5240                           | 5,239.99204                    | 0.00000152          |
|             |              | 52      | 5260                           | 5,259.97680                    | 0.00000441          |
|             |              | 60      | 5300                           | 5,299.97617                    | 0.00000450          |
|             | 4.43V        | 64      | 5320                           | 5,319.99263                    | 0.00000139          |
|             |              | 100     | 5500                           | 5,499.97527                    | 0.00000450          |
|             |              | 116     | 5580                           | 5,579.98989                    | 0.00000181          |
|             |              | 140     | 5700                           | 5,699.98749                    | 0.00000219          |
| -10 °C      |              | 36      | 5180                           | 5,179.97861                    | 0.00000413          |
|             |              | 44      | 5220                           | 5,219.99480                    | 0.00000100          |
|             |              | 48      | 5240                           | 5,239.97716                    | 0.00000436          |
|             |              | 52      | 5260                           | 5,259.98360                    | 0.00000312          |
|             |              | 60      | 5300                           | 5,299.97871                    | 0.00000402          |
|             | 3.27V        | 64      | 5320                           | 5,319.97872                    | 0.00000400          |
|             |              | 100     | 5500                           | 5,499.97807                    | 0.00000399          |
|             |              | 116     | 5580                           | 5,579.98220                    | 0.00000319          |
|             |              | 140     | 5700                           | 5,699.96720                    | 0.00000576          |
| '           | •            |         |                                |                                |                     |
|             |              | 36      | 5180                           | 5,179.97700                    | 0.00000444          |
|             |              | 44      | 5220                           | 5,219.99473                    | 0.00000101          |
|             |              | 48      | 5240                           | 5,239.98191                    | 0.00000345          |
|             |              | 52      | 5260                           | 5,259.97867                    | 0.00000406          |
|             |              | 60      | 5300                           | 5,299.98384                    | 0.00000305          |
| 25 <b>℃</b> | 3.85V        | 64      | 5320                           | 5,319.97779                    | 0.00000417          |
|             |              | 100     | 5500                           | 5,499.99177                    | 0.00000150          |
|             |              | 116     | 5580                           | 5,579.98446                    | 0.00000278          |
|             |              | 140     | 5700                           | 5,699.99101                    | 0.00000158          |

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| r           |       |     |      |             | i i        |
|-------------|-------|-----|------|-------------|------------|
|             |       | 36  | 5180 | 5,179.99379 | 0.00000120 |
|             |       | 44  | 5220 | 5,219.97819 | 0.00000418 |
|             |       | 48  | 5240 | 5,239.98707 | 0.00000247 |
|             |       | 52  | 5260 | 5,259.97839 | 0.00000411 |
|             |       | 60  | 5300 | 5,299.97695 | 0.00000435 |
|             |       | 64  | 5320 | 5,319.97495 | 0.00000471 |
|             | 4.43V | 100 | 5500 | 5,499.97710 | 0.00000416 |
|             |       | 116 | 5580 | 5,579.99318 | 0.00000122 |
|             |       | 140 | 5700 | 5,699.98971 | 0.00000181 |
| 55 <b>℃</b> |       | 36  | 5180 | 5,179.99197 | 0.00000155 |
|             |       | 44  | 5220 | 5,219.98015 | 0.00000380 |
|             |       | 48  | 5240 | 5,239.99160 | 0.00000160 |
|             |       | 52  | 5260 | 5,259.98839 | 0.00000221 |
|             |       | 60  | 5300 | 5,299.97546 | 0.00000463 |
|             | 3.27V | 64  | 5320 | 5,319.99442 | 0.00000105 |
|             |       | 100 | 5500 | 5,499.98902 | 0.00000200 |
|             |       | 116 | 5580 | 5,579.97789 | 0.00000396 |
|             |       | 140 | 5700 | 5,699.99196 | 0.00000141 |

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| Operation Mode | 802.11 n_HT40 | Test Date | 2018.03.20 |
|----------------|---------------|-----------|------------|
| Temperature    | :23 ℃         | Test By   | Mike       |
| Humidity       | :68 %         |           |            |

|             |              | l       | Measured  | Spectrum    |             |
|-------------|--------------|---------|-----------|-------------|-------------|
| Test Temp.  | Test Voltage | Channel | Frequency | Frequency   | ΔFrequency  |
|             |              |         | (MHz)     | (MHz)       | (MHz)       |
|             |              | 38      | 5190      | 5,189.96537 | 0.00000667  |
|             |              | 46      | 5230      | 5,229.98080 | 0.00000367  |
|             |              | 54      | 5270      | 5,269.97031 | 0.00000563  |
|             |              | 62      | 5310      | 5,309.97798 | 0.00000415  |
|             | 4.43V        | 102     | 5510      | 5,509.98283 | 0.00000312  |
|             |              | 110     | 5550      | 5,549.97085 | 0.00000525  |
|             |              | 134     | 5670      | 5,669.96674 | 0.00000587  |
| -10 °C      |              | 38      | 5190      | 5,189.98176 | 0.00000352  |
|             |              | 46      | 5230      | 5,229.96791 | 0.00000614  |
|             |              | 54      | 5270      | 5,269.97452 | 0.00000484  |
|             |              | 62      | 5310      | 5,309.97703 | 0.00000433  |
|             | 3.27V        | 102     | 5510      | 5,509.96519 | 0.00000632  |
|             |              | 110     | 5550      | 5,549.97808 | 0.00000395  |
|             |              | 134     | 5670      | 5,669.97888 | 0.00000373  |
|             |              | 38      | 5190      | 5,189.97977 | 0.00000390  |
|             |              | 46      | 5230      | 5,229.97741 | 0.00000432  |
|             |              | 54      | 5270      | 5,269.97862 | 0.00000406  |
|             |              | 62      | 5310      | 5,309.97000 | 0.00000565  |
| 25 <b>℃</b> | 3.85V        | 102     | 5510      | 5,509.98167 | 0.00000333  |
|             |              | 110     | 5550      | 5,549.98038 | 0.00000354  |
|             |              | 134     | 5670      | 5,669.97098 | 0.00000512  |
|             |              | 38      | 5190      | 5,189.98476 | 0.00000294  |
|             |              | 46      | 5230      | 5,229.98367 | 0.00000312  |
|             |              | 54      | 5270      | 5,269.97182 | 0.00000535  |
|             |              | 62      | 5310      | 5,309.96686 | 0.00000624  |
|             | 4.43V        | 102     | 5510      | 5,509.97832 | 0.00000393  |
|             |              | 110     | 5550      | 5,549.97140 | 0.00000515  |
|             |              | 134     | 5670      | 5,670.00907 | -0.00000160 |
| 55 <b>℃</b> |              | 38      | 5190      | 5,189.98388 | 0.00000311  |
|             |              | 46      | 5230      | 5,229.97240 | 0.00000528  |
|             |              | 54      | 5270      | 5,269.97070 | 0.00000556  |
|             |              | 62      | 5310      | 5,309.97261 | 0.00000516  |
|             | 3.27V        | 102     | 5510      | 5,509.96594 | 0.00000618  |
|             |              | 110     | 5550      | 5,549.98424 | 0.00000284  |
|             |              | 134     | 5670      | 5,669.96577 | 0.00000604  |

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| Operation Mode | 802.11 ac_VHT80 | Test Date | 2018.03.20 |
|----------------|-----------------|-----------|------------|
| Temperature    | :23 ℃           | Test By   | Mike       |
| Humidity       | :68 %           |           |            |

| Test Temp.  | Test Voltage | Channel | Measured<br>Frequency<br>(MHz) | Spectrum<br>Frequency<br>(MHz) | ΔFrequency<br>(MHz) |
|-------------|--------------|---------|--------------------------------|--------------------------------|---------------------|
|             |              | 42      | 5210                           | 5,209.94897                    | 0.00000979          |
|             |              | 58      | 5290                           | 5,290.04831                    | -0.00000913         |
|             | 4.43V        | 106     | 5530                           | 5,529.95683                    | 0.00000781          |
|             |              | 122     | 5610                           | 5,609.94185                    | 0.00001037          |
| -10 °C      |              | 42      | 5210                           | 5,210.00042                    | -0.00000008         |
|             |              | 58      | 5290                           | 5,290.04575                    | -0.00000865         |
|             | 3.27V        | 106     | 5530                           | 5,529.94067                    | 0.00001073          |
|             |              | 122     | 5610                           | 5,609.99264                    | 0.00000131          |
|             |              | 42      | 5210                           | 5,210.00809                    | -0.00000155         |
|             |              | 58      | 5290                           | 5,290.04845                    | -0.00000916         |
| 25 <b>℃</b> | 3.85V        | 106     | 5530                           | 5,529.95850                    | 0.00000750          |
|             |              | 122     | 5610                           | 5,609.94945                    | 0.00000901          |
|             |              | 42      | 5210                           | 5,209.95088                    | 0.00000943          |
|             |              | 58      | 5290                           | 5,290.04826                    | -0.00000912         |
|             | 4.43V        | 106     | 5530                           | 5,529.99859                    | 0.00000025          |
|             |              | 122     | 5610                           | 5,609.94807                    | 0.00000926          |
| 55 <b>℃</b> |              | 42      | 5210                           | 5,210.00270                    | -0.00000052         |
|             |              | 58      | 5290                           | 5,290.05590                    | -0.00001057         |
|             | 3.27V        | 106     | 5530                           | 5,529.94757                    | 0.00000948          |
|             |              | 122     | 5610                           | 5,609.99108                    | 0.00000159          |

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### 14. ANTENNA REQUIREMENT

# 14.1Standard Applicable

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

According to §15.407, 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.

#### 14.2Antenna Connected Construction

An embedded-in antenna design is used.

The antenna is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

~ End of Report ~

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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