ACCREDITED
TESTING LABORATORY
CERTIFICATE # 4821.01

BACL
Bay Area Compliance Labs Corp.

# FCC PART 15.407

# TEST REPORT

For

# MOIMSTONE CO., LTD

16, sapyeong-daero, Seocho-gu, Seoul, South Korea

## FCC ID: 2AAKFAIPHONE

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | AI Phone |

| | |
|---|---|
| **Report Number:** | RSZ180723002-00D |
| **Report Date:** | 2018-08-17 |
| **Reviewed By:** | Rocky Kang<br>RF Engineer |
| **Prepared By:** | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008<br>www.baclcorp.com.cn |

**Note**: This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP* or any agency of the Federal Government. * This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*".

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# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

The *MOIMSTONE CO., LTD's* product, model number: *AI-PHONE* (*FCC ID: 2AAKFAIPHONE)* or the "EUT" in this report was an *AI Phone,* which was measured approximately: 224 mm (L) * 170 mm (W) * 144 mm (H), rated with input voltage: DC 5 V from adapter.

Adapter Information:
Model: KT241050300US
Input: 100-240V ~ 50/60Hz, 0.8A
Output: 5V, 3A

**All measurement and test data in this report was gathered from production sample serial number: 180723002 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-07-23.*

## Objective

This type approval report is prepared on behalf of *MOIMSTONE CO., LTD* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

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

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

FCC Part 15.247 DTS&DSS and FCC Part 15B JBP submissions with FCC ID: 2AAKFAIPHONE.

## Test Methodology

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

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Measurement Uncertainty

| Parameter | | uncertainty |
|---|---|---|
| Occupied Channel Bandwidth | | ±5% |
| RF Output Power with Power meter | | ±0.5dB |
| RF conducted test with spectrum | | ±1.5dB |
| AC Power Lines Conducted Emissions | | ±1.95dB |
| Emissions, Radiated | Below 1GHz | ±4.75dB |
| | Above 1GHz | ±4.88dB |
| Temperature | | -30~60 ℃ |
| Humidity | | ±6% |
| Supply voltages | | ±0.4% |

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

# SYSTEM TEST CONFIGURATION

## Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The device support 802.11a/n20/n40/ac20/ac40/ac80 modes.

For 5150-5250MHz Band, 7 channels are provided to testing:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 36 | 5180 | 44 | 5220 |
| 38 | 5190 | 46 | 5230 |
| 40 | 5200 | 48 | 5240 |
| 42 | 5210 | / | / |

For 5725-5850MHz Band, 8 channels are provided to testing:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 149 | 5745 | 157 | 5785 |
| 151 | 5755 | 159 | 5795 |
| 153 | 5765 | 161 | 5805 |
| 155 | 5775 | 165 | 5825 |

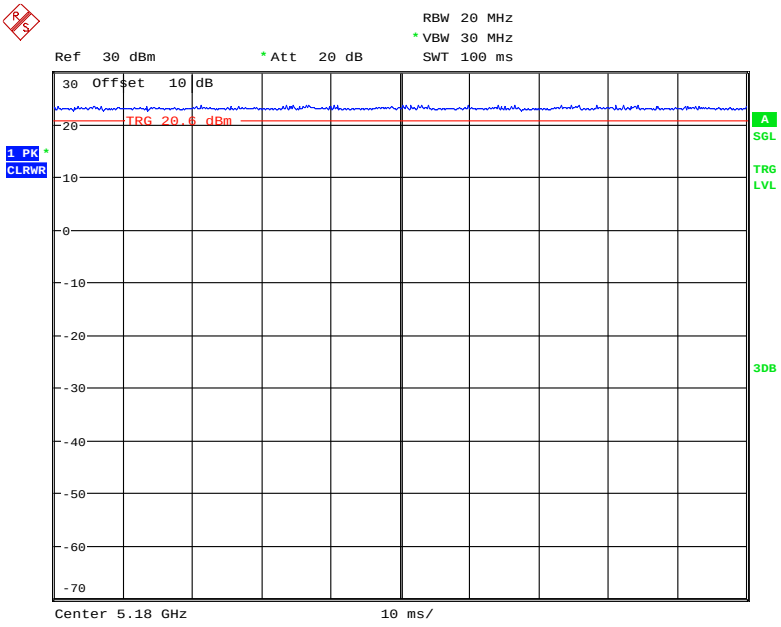
## EUT Exercise Software

CMD command was made to the EUT tested. Test frequencies and power level were configured as below:

| U-NII | Mode | Channel Number | Frequency (MHz) | Rate (Mbps) | Power Level |
|---|---|---|---|---|---|
| 5150 – 5250MHz | 802.11 a | CH36 | 5180 | 6 | 15 |
| | | CH40 | 5200 | 6 | 15 |
| | | CH48 | 5240 | 6 | 15 |
| | 802.11 n20 | CH36 | 5180 | MCS0 | 15 |
| | | CH40 | 5200 | MCS0 | 14 |
| | | CH48 | 5240 | MCS0 | 15 |
| | 802.11 n40 | CH38 | 5190 | MCS0 | 14 |
| | | CH46 | 5230 | MCS0 | 14 |
| | 802.11 ac20 | CH36 | 5180 | MCS0 | 15 |
| | | CH40 | 5200 | MCS0 | 15 |
| | | CH48 | 5240 | MCS0 | 15 |
| | 802.11 ac40 | CH38 | 5190 | MCS0 | 14 |
| | | CH46 | 5230 | MCS0 | 14 |
| | 802.11 ac80 | CH42 | 5210 | MCS0 | 14 |
| 5725 – 5850MHz | 802.11 a | CH149 | 5745 | 6 | 15 |
| | | CH157 | 5785 | 6 | 17 |
| | | CH165 | 5825 | 6 | 17 |
| | 802.11 n20 | CH149 | 5745 | MCS0 | 15 |
| | | CH157 | 5785 | MCS0 | 15 |
| | | CH165 | 5825 | MCS0 | 15 |
| | 802.11 n40 | CH151 | 5755 | MCS0 | 15 |
| | | CH159 | 5795 | MCS0 | 16 |
| | 802.11 ac20 | CH149 | 5745 | MCS0 | 15 |
| | | CH157 | 5785 | MCS0 | 15 |
| | | CH165 | 5825 | MCS0 | 15 |
| | 802.11 ac40 | CH151 | 5755 | MCS0 | 16 |
| | | CH159 | 5795 | MCS0 | 16 |
| | 802.11 ac80 | CH155 | 5775 | MCS0 | 16 |

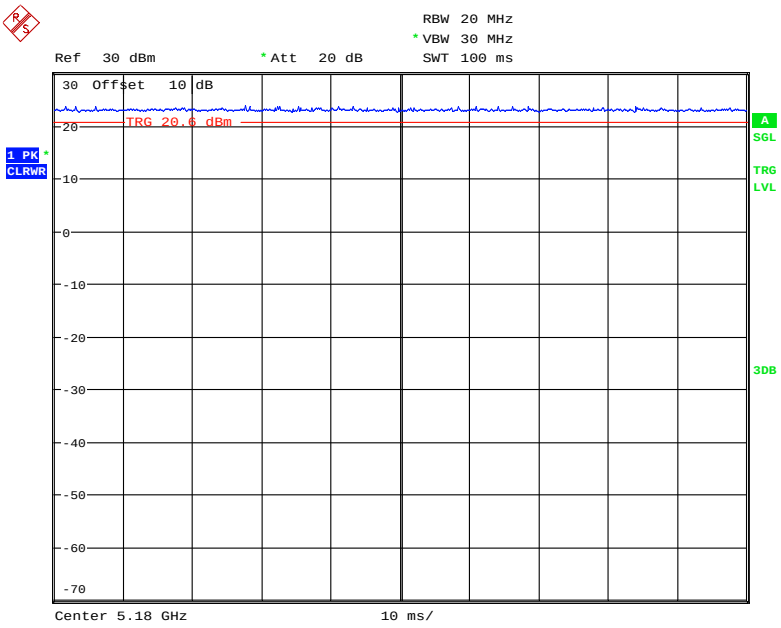
**Duty cycle**
5150-5250 MHz

**802.11a mode**




Date: 10.AUG.2018 18:55:45

**802.11n20 mode**

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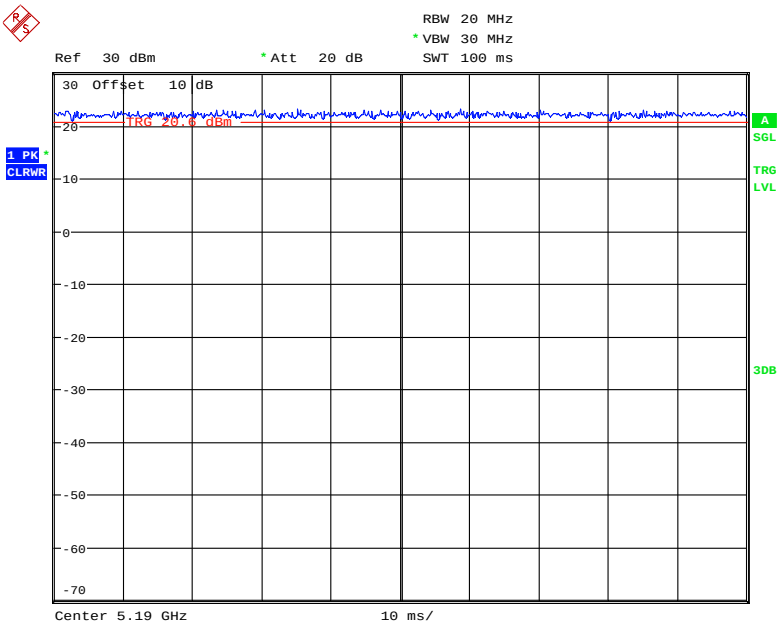
## 802.11n40 Mode

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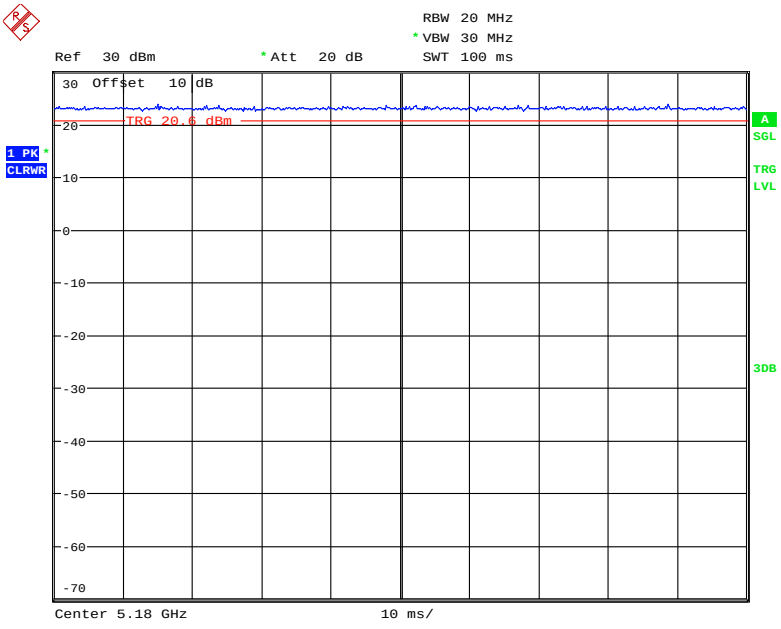
## 802.11ac20 Mode

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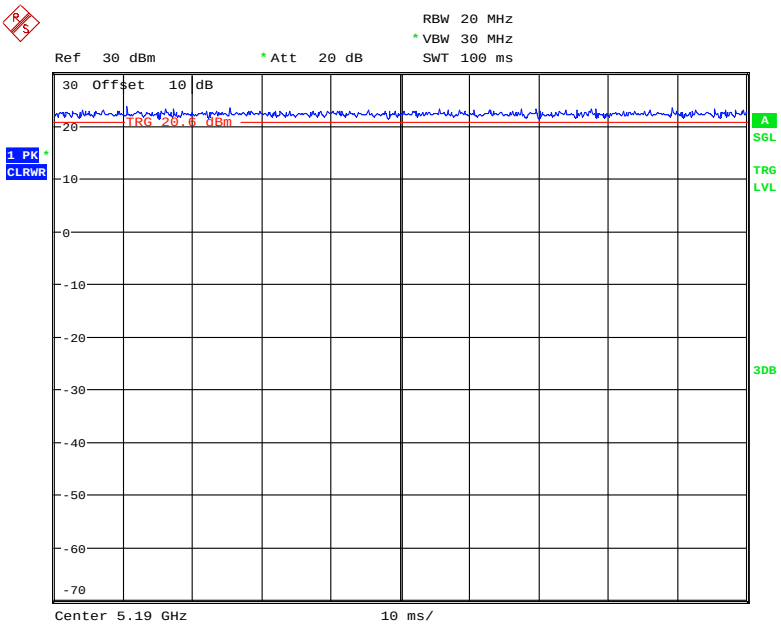
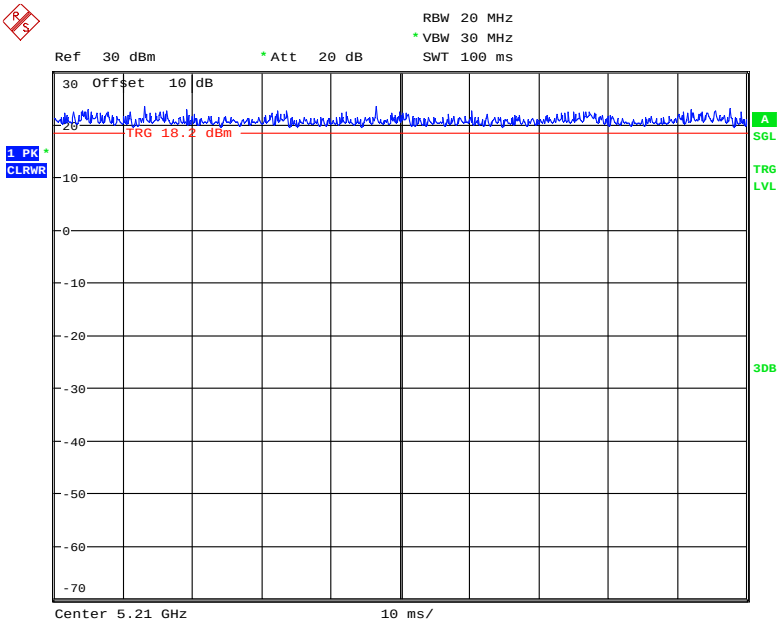
## 802.11ac40 Mode




Date: 10.AUG.2018 19:09:56

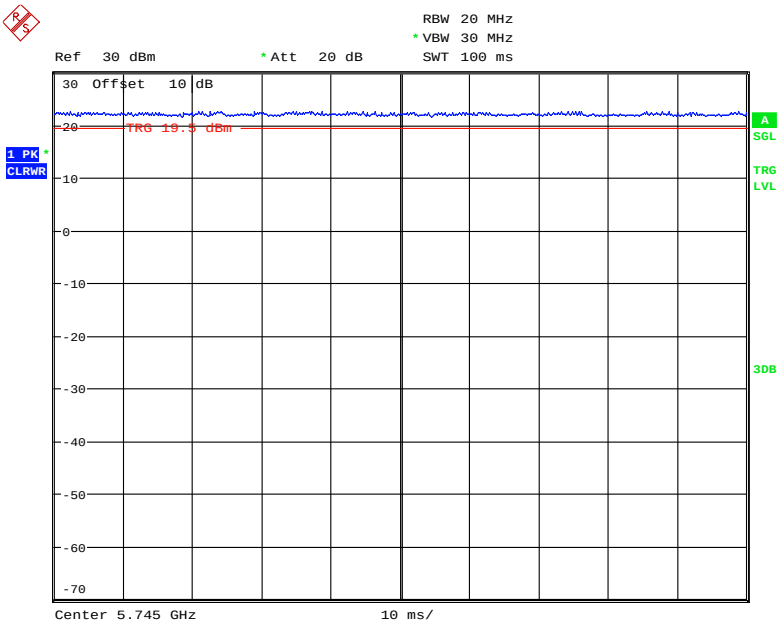
## 802.11ac80 Mode




Date: 10.AUG.2018 19:13:20

5725 – 5850MHz

**802.11a mode**

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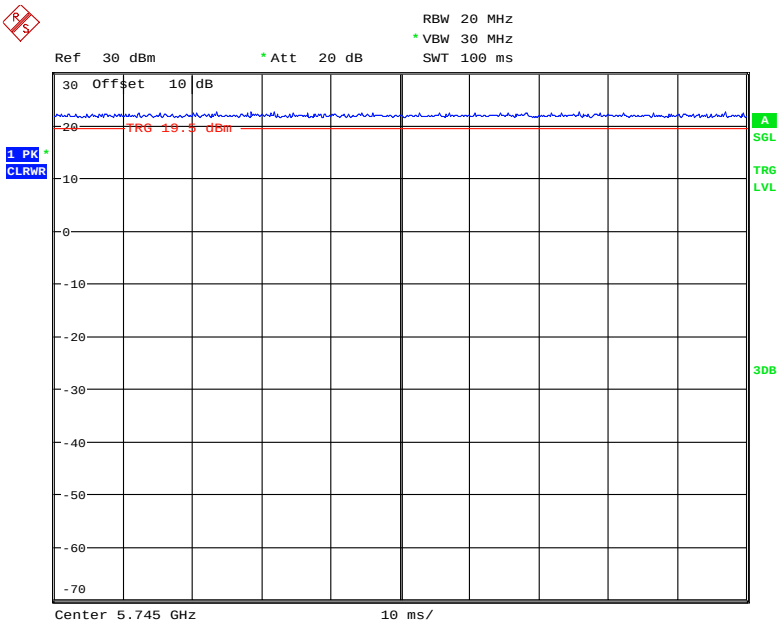
**802.11n20 mode**

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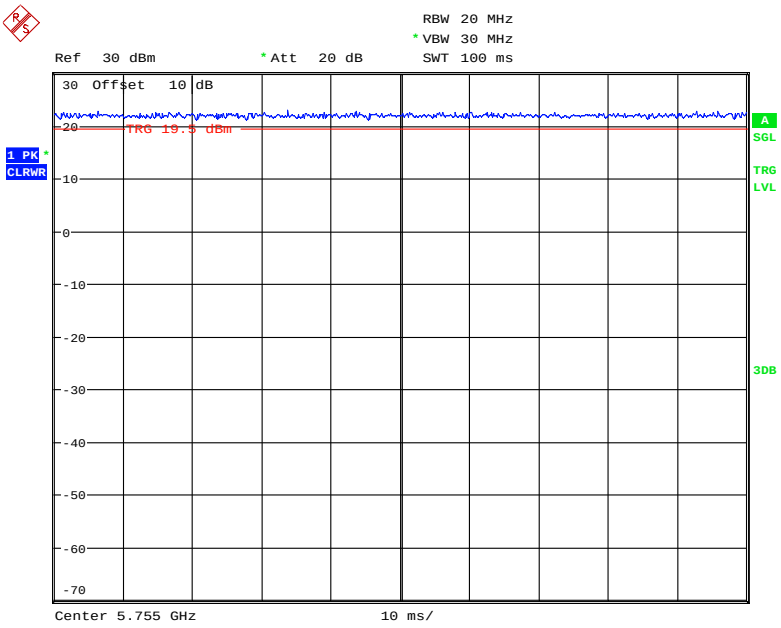
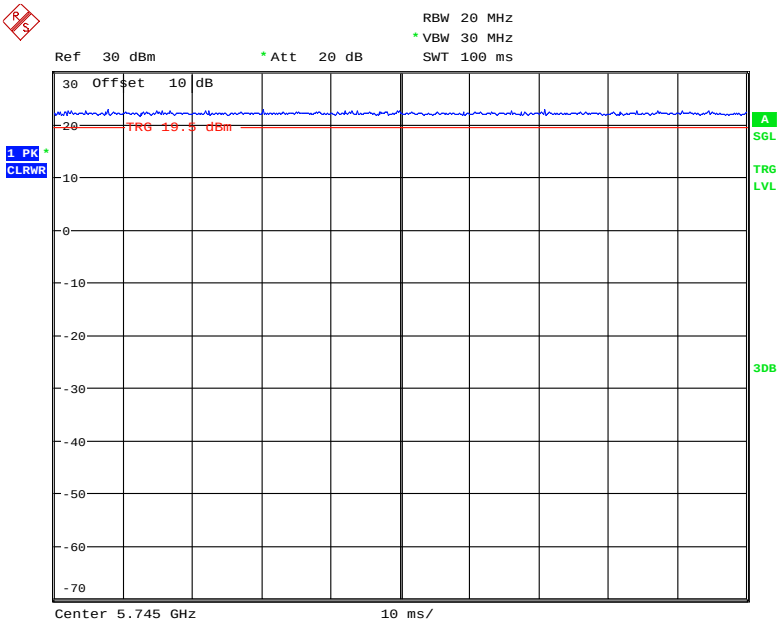
## 802.11n40 Mode




Date: 10.AUG.2018 19:27:12

## 802.11ac20 Mode

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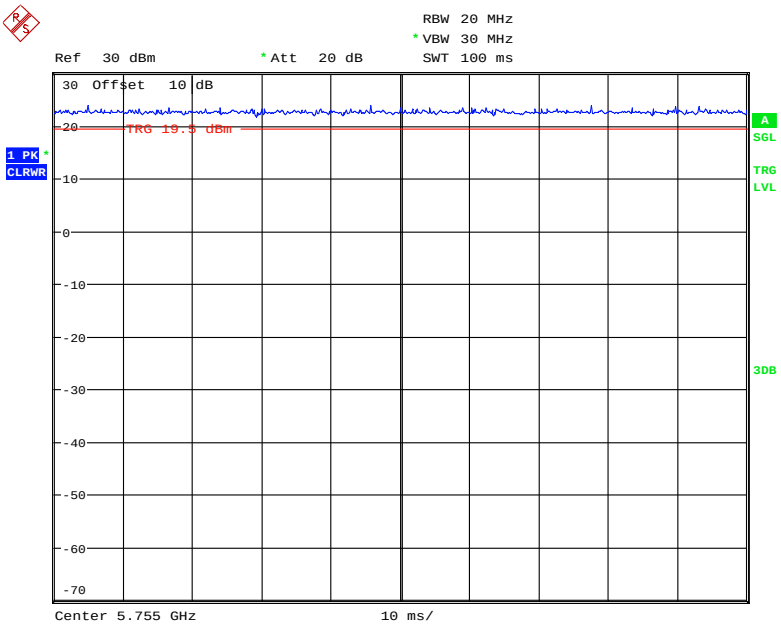
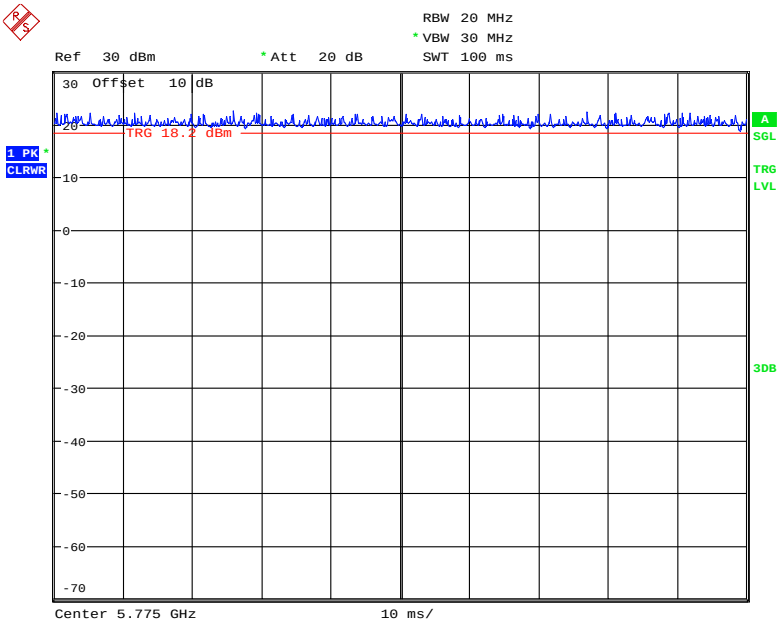
## 802.11ac40 Mode




Date: 10.AUG.2018 19:25:07

## 802.11ac80 Mode




Date: 10.AUG.2018 19:20:41

| Band | Duty Cycle (%) | T(ms) | 1/T(kHz) | VBW Setting | 10log(1/x) |
|---|---|---|---|---|---|
| **802.11a** | 100 | - | - | 10Hz | - |
| **802.11n20** | 100 | - | - | 10Hz | - |
| **802.11n40** | 100 | - | - | 10Hz | - |
| **802.11ac20** | 100 | - | - | 10Hz | - |
| **802.11ac40** | 100 | - | - | 10Hz | - |
| **802.11ac80** | 100 | - | - | 10Hz | - |

## Equipment Modifications

No modification was made to the EUT tested.

## Support Equipment List and Details

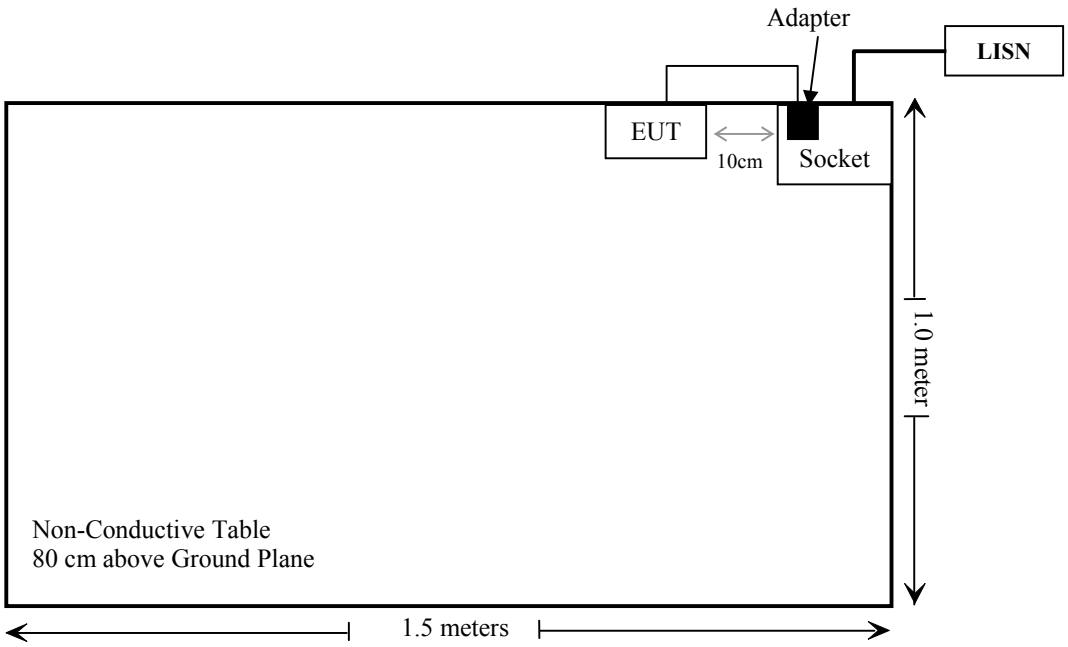
| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| / | / | / | / |

## External I/O Cable

| Cable Description | Length (m) | From/Port | To |
|---|---|---|---|
| Un-shielding Un-detachable DC Cable | 1.5 | EUT | Adapter |

## Block Diagram of Test Setup

For conducted emission:



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| §1.1307 (b) (1) & §2.1091 | Maximum Permissible exposure (MPE) | Compliance |
| §15.203 | Antenna Requirement | Compliance |
| §15.407(b)(6)& §15.207(a) | Conducted Emissions | Compliance |
| §15.205& §15.209 &§15.407(b) (1), (4),(7) | Undesirable Emission& Restricted Bands | Compliance |
| §15.407(b) (1),(4) | Out Of Band Emission | Compliance |
| §15.407(a) (1), (5),(e) | 26 dB Emission Bandwidth & 6dB Bandwidth | Compliance |
| §15.407(a)(1),(3) | Conducted Transmitter Output Power | Compliance |
| §15.407 (a)(1),(3) | Power Spectral Density | Compliance |

# TEST EQUIPMENT LIST

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **AC Line Conducted test** | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCS30 | 100176 | 2018-07-11 | 2019-07-11 |
| Rohde & Schwarz | LISN | ENV216 | 3560.6650.12-101613-Yb | 2017-12-21 | 2018-12-21 |
| Rohde & Schwarz | Transient Limiter | ESH3Z2 | DE25985 | 2018-05-21 | 2018-11-19 |
| Rohde & Schwarz | CE Test software | EMC 32 | V8.53.0 | NCR | NCR |
| N/A | Conducted Emission Cable | N/A | UF A210B-1-0720-504504 | 2018-05-12 | 2018-11-12 |
| **Radiated Emission Test** | | | | | |
| A.H.System | Horn Antenna | SAS-200/571 | 135 | 2015-08-18 | 2018-08-17 |
| Rohde & Schwarz | Signal Analyzer | FSEM | 845987/005 | 2018-06-23 | 2019-06-23 |
| Agilent | Spectrum Analyzer | 8564E | 3943A01781 | 2018-01-04 | 2019-01-04 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2017-12-22 | 2020-12-21 |
| Mini | Pre-amplifier | ZVA-183-S+ | 5969001149 | 2018-05-21 | 2019-05-21 |
| HP | Amplifier | HP8447E | 1937A01046 | 2018-05-21 | 2018-11-19 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101120 | 2018-01-11 | 2019-01-11 |
| UTiFLEX MICRO-C0AX | RF Cable | UFA147A-2362-100100 | MFR64639 231029-003 | 2018-04-01 | 2018-10-01 |
| Ducommun technologies | RF Cable | 104PEA | 218124002 | 2018-05-21 | 2018-11-19 |
| Ducommun technologies | RF Cable | RG-214 | 1 | 2018-05-21 | 2018-11-19 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2018-05-22 | 2018-11-22 |
| Ducommun Technologies | Horn Antenna | ARH-4223-02 | 1007726-04 | 2017-12-06 | 2020-12-05 |
| Ducommun Technologies | Horn Antenna | ARH-2823-02 | 1007726-04 | 2017-12-06 | 2020-12-05 |
| Ducommun Technologies | Pre-amplifier | ALN-22093530-01 | 991373-01 | 2018-08-03 | 2019-08-03 |

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| **RF Conducted Test** | | | | | |
| Rohde & Schwarz | Spectrum Analyzer | FSU26 | 200120 | 2017-12-24 | 2018-12-24 |
| Agilent | USB Wideband Power Meter | U2021XA | MY54250003 | 2018-03-21 | 2019-03-21 |
| Ducommun technologies | RF Cable | RG-214 | 3 | Each Time | |
| WEINSCHEL | 3dB Attenuator | N/A | N/A | Each Time | |

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

# §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## Applicable Standard

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

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

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

## Result

**Calculated Formulary:**

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. $mW/cm^2$)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

| Frequency (MHz) | Antenna Gain | | Conducted Power | | Evaluation Distance (cm) | Power Density ($mW/cm^2$) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|
| | (dBi) | (numeric) | (dBm) | (mW) | | | |
| 5150-5250 | 1.9 | 1.55 | 19 | 79.43 | 20 | 0.02 | 1.0 |
| 5725-5850 | 1.9 | 1.55 | 18 | 63.10 | 20 | 0.02 | 1.0 |

Simultaneous transmitting consideration: (referring to the DSS report, the highest MPE for Bluetooth is $0.002mW/cm^2$)

The ratio=$MPE/limit_{DSS}+MPE/limit_{NII}=0.002+0.02=0.022<1.0$, simultaneous exposure is not required.

Note:
1) The conducted power is the tune-up power of the Max Conducted Output Power.
2) 2.4GHz and 5GHz WiFi can't transmit simultaneously for this device.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.
**Result: Compliance**

# FCC §15.203 – ANTENNA REQUIREMENT

## Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

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

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

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

## Antenna Connector Construction

The EUT has one internal antenna arrangement, which was permanently attached and the antenna gain is 1.9 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

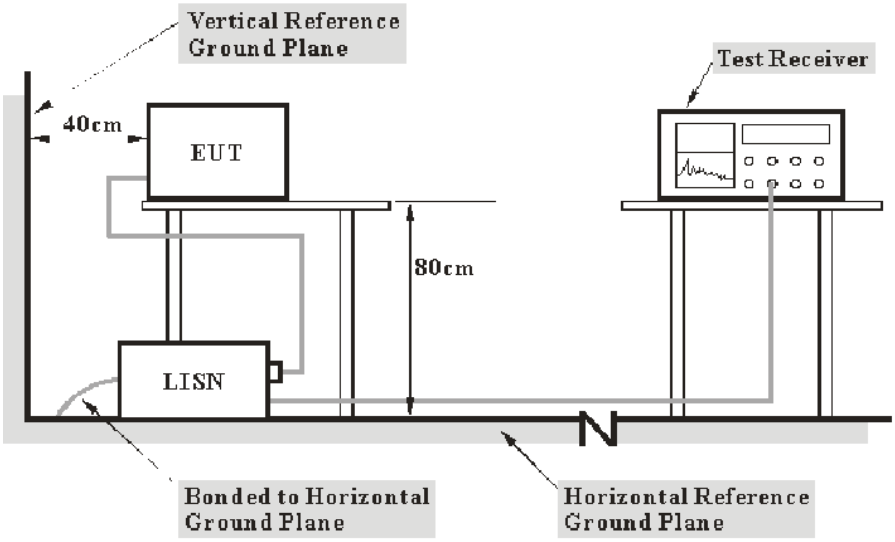
**Result:** Compliance.

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

## Applicable Standard

FCC §15.207, §15.407(b) (6)

## EUT Setup




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

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

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

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

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

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

## Test Procedure

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

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

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

## Test Results Summary

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

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than $U_{cispr}$, if $L_m$ is less than $L_{lim}$, it implies that the EUT complies with the limit.

## Test Data

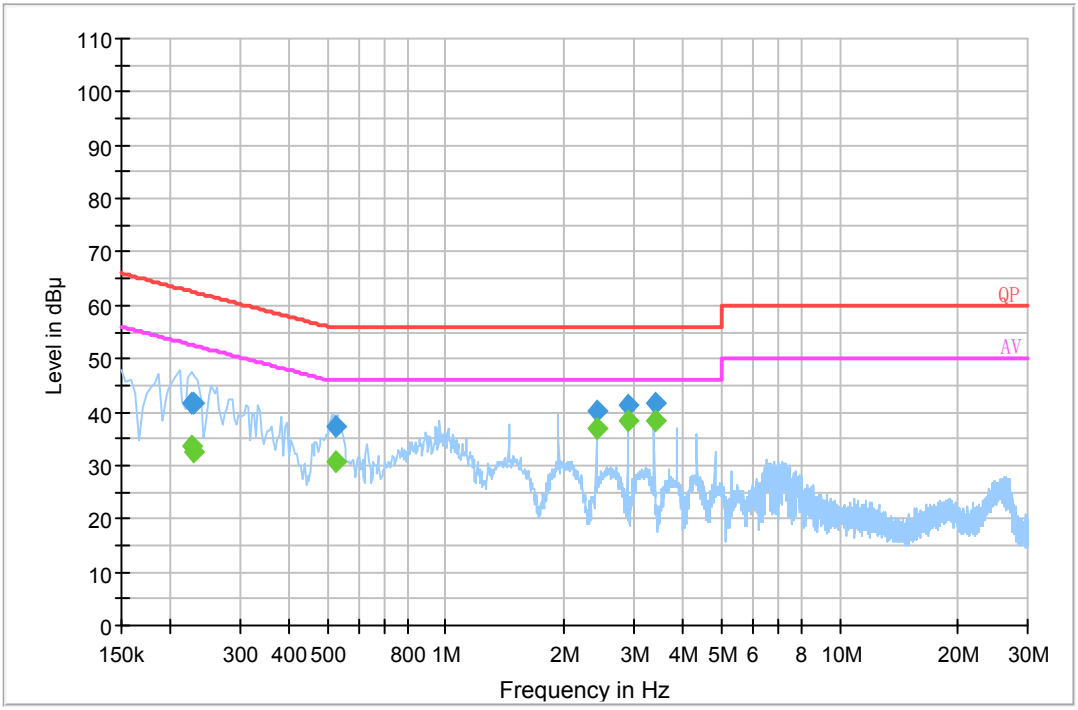
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Kiki Kong on 2018-08-12.*

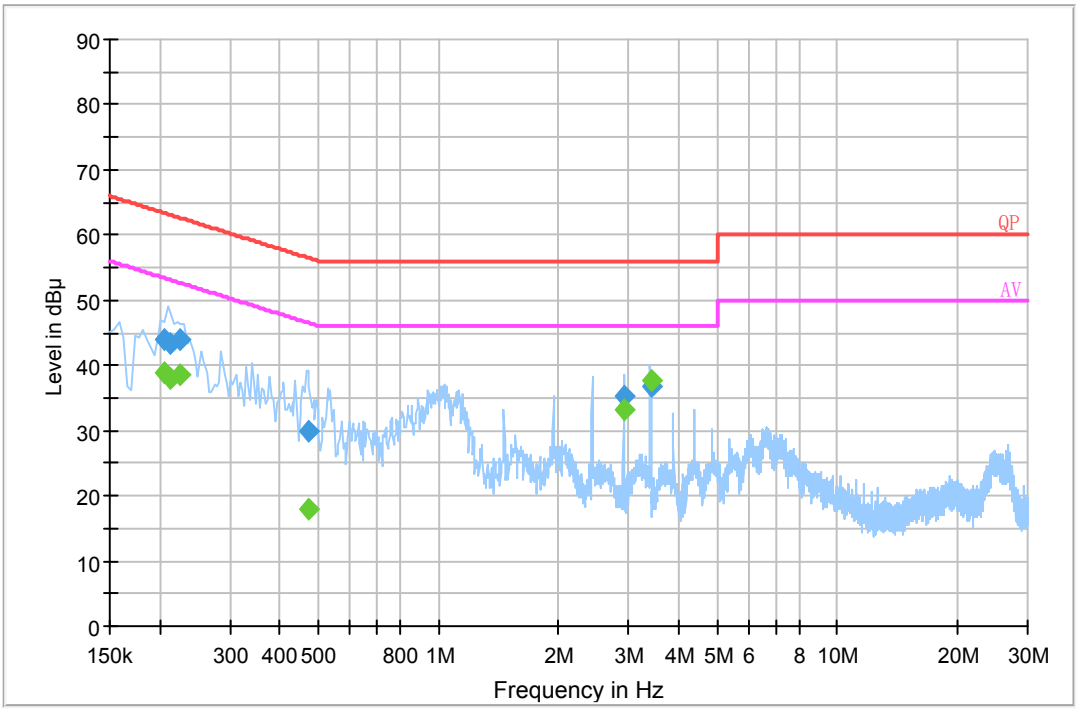
*EUT operation mode: Transmitting (worst case is 802.11a mode 5180 MHz)*

**AC 120V/60 Hz, Line:**




| Frequency (MHz) | Corrected Amplitude (dBµV) | Correction Factor (dB) | Limit (dBµV) | Margin (dB) | Detector (PK/Ave./QP) |
|---|---|---|---|---|---|
| 0.225500 | 41.6 | 20.1 | 62.6 | 21.0 | QP |
| 0.229500 | 41.8 | 20.1 | 62.5 | 20.7 | QP |
| 0.526050 | 37.2 | 20.1 | 56.0 | 18.8 | QP |
| 2.425850 | 40.4 | 20.0 | 56.0 | 15.6 | QP |
| 2.910590 | 41.4 | 20.0 | 56.0 | 14.6 | QP |
| 3.399330 | 41.5 | 20.0 | 56.0 | 14.5 | QP |
| 0.225500 | 33.8 | 20.1 | 52.6 | 18.8 | Ave. |
| 0.229500 | 32.6 | 20.1 | 52.5 | 19.9 | Ave. |
| 0.526050 | 30.7 | 20.1 | 46.0 | 15.3 | Ave. |
| 2.425850 | 36.9 | 20.0 | 46.0 | 9.1 | Ave. |
| 2.910590 | 38.2 | 20.0 | 46.0 | 7.8 | Ave. |
| 3.399330 | 38.2 | 20.0 | 46.0 | 7.8 | Ave. |

**AC120V, 60 Hz, Neutral:**




| Frequency (MHz) | Corrected Amplitude (dBµV) | Correction Factor (dB) | Limit (dBµV) | Margin (dB) | Detector (PK/Ave./QP) |
|---|---|---|---|---|---|
| 0.205500 | 44.0 | 20.1 | 63.4 | 19.4 | QP |
| 0.213500 | 43.4 | 20.1 | 63.1 | 19.7 | QP |
| 0.225500 | 44.1 | 20.1 | 62.6 | 18.5 | QP |
| 0.472990 | 29.9 | 20.1 | 56.5 | 26.6 | QP |
| 2.922230 | 35.3 | 20.0 | 56.0 | 20.7 | QP |
| 3.406970 | 36.8 | 20.0 | 56.0 | 19.2 | QP |
| 0.205500 | 38.7 | 20.1 | 53.4 | 14.7 | Ave. |
| 0.213500 | 37.9 | 20.1 | 53.1 | 15.2 | Ave. |
| 0.225500 | 38.5 | 20.1 | 52.6 | 14.1 | Ave. |
| 0.472990 | 17.9 | 20.1 | 46.5 | 28.6 | Ave. |
| 2.922230 | 33.1 | 20.0 | 46.0 | 12.9 | Ave. |
| 3.406970 | 37.7 | 20.0 | 46.0 | 8.3 | Ave. |

**Note:**
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

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

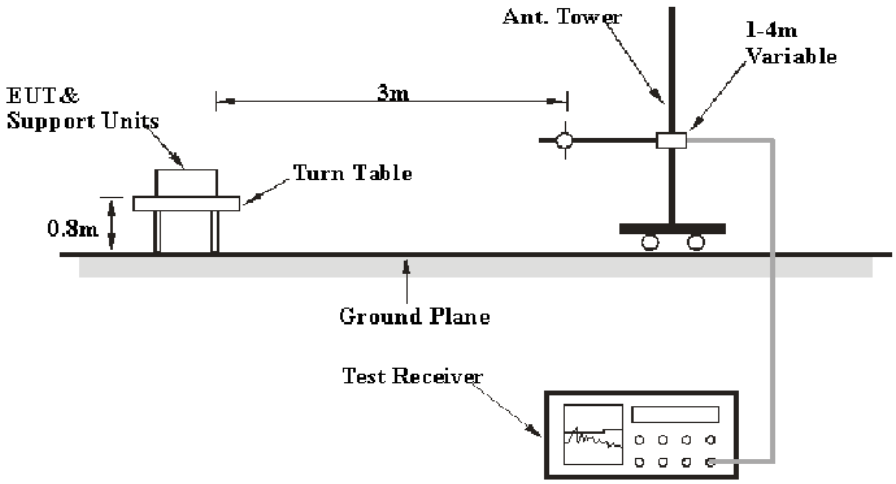
## Applicable Standard

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

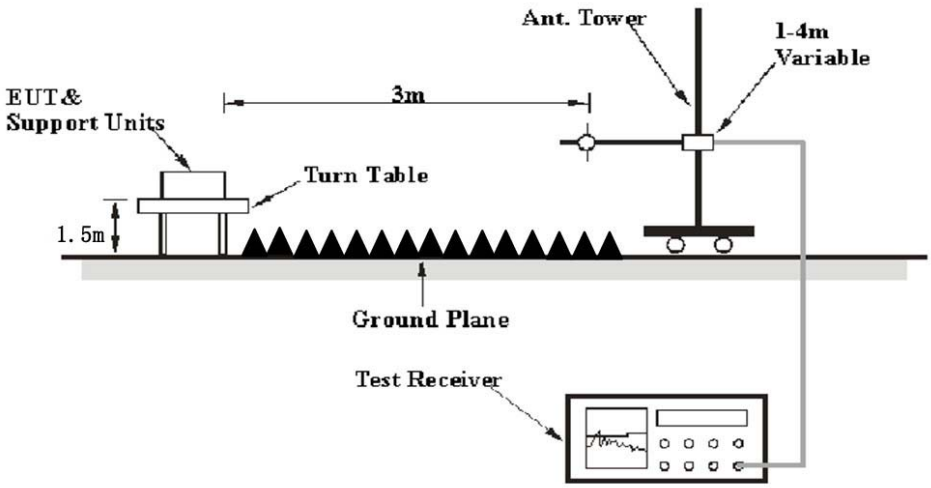
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

## EUT Setup

**Below 1 GHz:**



**Above 1 GHz:**




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

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

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

| Frequency Range | RBW | Video B/W | IF B/W | Measurement |
|---|---|---|---|---|
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz | 120 kHz | QP |
| Above 1 GHz | 1 MHz | 3 MHz | / | PK |
| | 1MHz | 10 Hz Note 1 | / | Average |
| | 1MHz | ＞1/T Note 2 | / | Average |

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

## Test Procedure

### Radiated Spurious Emission

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

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

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

## Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

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

Margin = Limit – Corrected Amplitude

## Test Results Summary

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than $U_{cispr}$, if $L_m$ is less than $L_{lim}$, it implies that the EUT complies with the limit.

## Test Data

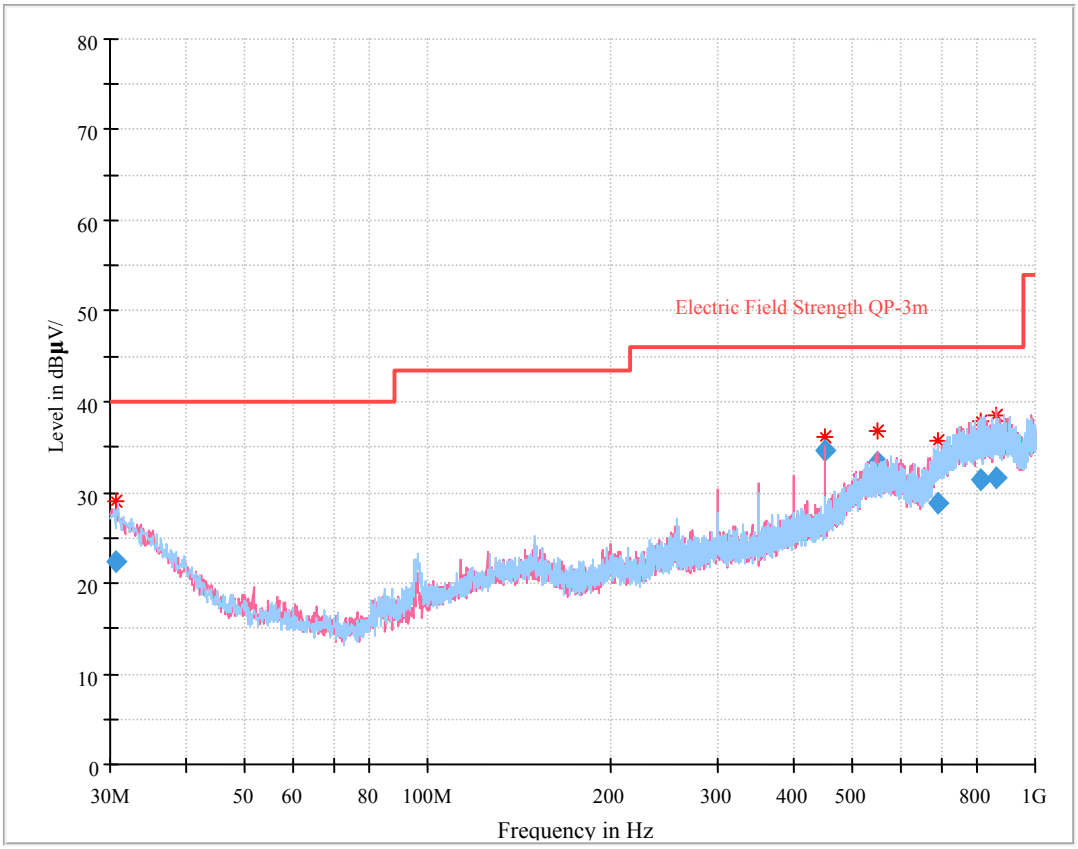
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Kiki Kong on 2018-08-09.*

*EUT operation mode: Transmitting*

**30 MHz – 1 GHz:** *(worst case is 802.11a mode 5180 MHz)*




| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna height (cm) | Antenna Polarity | Turntable position (degree) | Correction Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 30.784500 | 22.30 | 359.0 | H | 138.0 | 0.2 | 40.00 | 17.70 |
| 449.985250 | 34.60 | 103.0 | V | 304.0 | 0.2 | 46.00 | 11.40 |
| 550.026125 | 33.26 | 100.0 | V | 287.0 | 5.3 | 46.00 | 12.74 |
| 691.177000 | 28.79 | 386.0 | H | 121.0 | 6.4 | 46.00 | 17.21 |
| 812.621625 | 31.39 | 250.0 | V | 218.0 | 9.2 | 46.00 | 14.61 |
| 864.596875 | 31.62 | 191.0 | V | 257.0 | 9.7 | 46.00 | 14.38 |

**30 MHz ~ 40 GHz:**

**5150-5250 MHz:**

| Frequency (MHz) | Receiver | | Turntable | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBµV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBµV) | PK/QP/Ave. | Degree | Height (m) | Polar (H / V) | | | Limit (dBµV/m) | Margin (dB) |
| 802.11a | | | | | | | | | |
| 5180 MHz | | | | | | | | | |
| 5180.00 | 67.26 | PK | 45 | 1.2 | H | 41.80 | 109.06 | / | / |
| 5180.00 | 54.44 | Ave. | 45 | 1.2 | H | 41.80 | 96.24 | / | / |
| 5180.00 | 67.16 | PK | 170 | 1.3 | V | 41.80 | 108.96 | / | / |
| 5180.00 | 54.30 | Ave. | 170 | 1.3 | V | 41.80 | 96.10 | / | / |
| 5148.70 | 62.55 | PK | 264 | 1.7 | H | 6.90 | 69.45 | 74 | 4.55 |
| 5148.70 | 40.16 | Ave. | 264 | 1.7 | H | 6.90 | 47.06 | 54 | 6.94 |
| 5379.82 | 44.45 | PK | 294 | 1.5 | H | 6.93 | 51.38 | 74 | 22.62 |
| 5379.82 | 28.90 | Ave. | 294 | 1.5 | H | 6.93 | 35.83 | 54 | 18.17 |
| 10360.00 | 41.00 | PK | 187 | 1.2 | H | 15.66 | 56.66 | 74 | 17.34 |
| 10360.00 | 25.91 | Ave. | 187 | 1.2 | H | 15.66 | 41.57 | 54 | 12.43 |
| 5200 MHz | | | | | | | | | |
| 5200.00 | 68.98 | PK | 221 | 1.7 | H | 41.80 | 110.78 | / | / |
| 5200.00 | 54.92 | Ave. | 221 | 1.7 | H | 41.80 | 96.72 | / | / |
| 5200.00 | 67.90 | PK | 284 | 1.5 | V | 41.80 | 109.70 | / | / |
| 5200.00 | 55.26 | Ave. | 284 | 1.5 | V | 41.80 | 97.06 | / | / |
| 10400.00 | 40.52 | PK | 3 | 1.1 | H | 15.66 | 56.18 | 74 | 17.82 |
| 10400.00 | 25.91 | Ave. | 3 | 1.1 | H | 15.66 | 41.57 | 54 | 12.43 |
| 5240 MHz | | | | | | | | | |
| 5240.00 | 68.79 | PK | 336 | 1.0 | H | 41.80 | 110.59 | / | / |
| 5240.00 | 55.37 | Ave. | 336 | 1.0 | H | 41.80 | 97.17 | / | / |
| 5240.00 | 65.74 | PK | 127 | 1.7 | V | 41.80 | 107.54 | / | / |
| 5240.00 | 51.76 | Ave. | 127 | 1.7 | V | 41.80 | 93.56 | / | / |
| 5143.49 | 42.43 | PK | 152 | 1.9 | H | 6.90 | 49.33 | 74 | 24.67 |
| 5143.49 | 28.94 | Ave. | 152 | 1.9 | H | 6.90 | 35.84 | 54 | 18.16 |
| 5378.88 | 43.98 | PK | 301 | 2.4 | H | 6.93 | 50.91 | 74 | 23.09 |
| 5378.88 | 28.79 | Ave. | 301 | 2.4 | H | 6.93 | 35.72 | 54 | 18.28 |
| 10480.00 | 40.56 | PK | 135 | 1.4 | H | 16.56 | 57.12 | 74 | 16.88 |
| 10480.00 | 25.69 | Ave. | 135 | 1.4 | H | 16.56 | 42.25 | 54 | 11.75 |

| Frequency (MHz) | Receiver | | Turntable | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | Degree | Height (m) | Polar (H / V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11n20 | | | | | | | | | |
| 5180 MHz | | | | | | | | | |
| 5180.00 | 67.41 | PK | 344 | 2.1 | H | 41.80 | 109.21 | / | / |
| 5180.00 | 54.50 | Ave. | 344 | 2.1 | H | 41.80 | 96.30 | / | / |
| 5180.00 | 66.97 | PK | 222 | 2.1 | V | 41.80 | 108.77 | / | / |
| 5180.00 | 54.12 | Ave. | 222 | 2.1 | V | 41.80 | 95.92 | / | / |
| 5147.90 | 63.82 | PK | 66 | 1.3 | H | 6.90 | 70.72 | 74 | 3.28 |
| 5147.90 | 40.70 | Ave. | 66 | 1.3 | H | 6.90 | 47.60 | 54 | 6.40 |
| 5404.23 | 44.51 | PK | 100 | 1.9 | H | 6.93 | 51.44 | 74 | 22.56 |
| 5404.23 | 29.09 | Ave. | 100 | 1.9 | H | 6.93 | 36.02 | 54 | 17.98 |
| 10360.00 | 40.70 | PK | 348 | 1.2 | H | 15.66 | 56.36 | 74 | 17.64 |
| 10360.00 | 25.97 | Ave. | 348 | 1.2 | H | 15.66 | 41.63 | 54 | 12.37 |
| 5200 MHz | | | | | | | | | |
| 5200.00 | 67.49 | PK | 29 | 1.5 | H | 41.80 | 109.29 | / | / |
| 5200.00 | 54.13 | Ave. | 29 | 1.5 | H | 41.80 | 95.93 | / | / |
| 5200.00 | 65.27 | PK | 334 | 2.0 | V | 41.80 | 107.07 | / | / |
| 5200.00 | 53.28 | Ave. | 334 | 2.0 | V | 41.80 | 95.08 | / | / |
| 10400.00 | 40.39 | PK | 37 | 1.5 | H | 15.66 | 56.05 | 74 | 17.95 |
| 10400.00 | 25.72 | Ave. | 37 | 1.5 | H | 15.66 | 41.38 | 54 | 12.62 |
| 5240 MHz | | | | | | | | | |
| 5240.00 | 68.15 | PK | 43 | 1.6 | H | 41.80 | 109.95 | / | / |
| 5240.00 | 54.69 | Ave. | 43 | 1.6 | H | 41.80 | 96.49 | / | / |
| 5240.00 | 65.83 | PK | 311 | 1.3 | V | 41.80 | 107.63 | / | / |
| 5240.00 | 52.73 | Ave. | 311 | 1.3 | V | 41.80 | 94.53 | / | / |
| 5024.95 | 44.22 | PK | 332 | 1.0 | H | 6.90 | 51.12 | 74 | 22.88 |
| 5024.95 | 29.13 | Ave. | 332 | 1.0 | H | 6.90 | 36.03 | 54 | 17.97 |
| 5357.94 | 44.03 | PK | 14 | 1.6 | H | 6.93 | 50.96 | 74 | 23.04 |
| 5357.94 | 28.64 | Ave. | 14 | 1.6 | H | 6.93 | 35.57 | 54 | 18.43 |
| 10480.00 | 40.56 | PK | 114 | 2.4 | H | 16.56 | 57.12 | 74 | 16.88 |
| 10480.00 | 25.60 | Ave. | 114 | 2.4 | H | 16.56 | 42.16 | 54 | 11.84 |

| Frequency (MHz) | Receiver | | Turntable | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | Degree | Height (m) | Polar (H / V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11n40 | | | | | | | | | |
| 5190 MHz | | | | | | | | | |
| 5190.00 | 64.45 | PK | 169 | 1.6 | H | 41.80 | 106.25 | / | / |
| 5190.00 | 49.79 | Ave. | 169 | 1.6 | H | 41.80 | 91.59 | / | / |
| 5190.00 | 64.12 | PK | 125 | 1.7 | V | 41.80 | 105.92 | / | / |
| 5190.00 | 49.02 | Ave. | 125 | 1.7 | V | 41.80 | 90.82 | / | / |
| 5149.70 | 64.93 | PK | 50 | 1.6 | H | 6.90 | 71.83 | 74 | 2.17 |
| 5149.70 | 45.09 | Ave. | 50 | 1.6 | H | 6.90 | 51.99 | 54 | 2.01 |
| 5357.27 | 49.23 | PK | 353 | 2.3 | H | 6.93 | 56.16 | 74 | 17.84 |
| 5357.27 | 29.41 | Ave. | 353 | 2.3 | H | 6.93 | 36.34 | 54 | 17.66 |
| 10380.00 | 41.58 | PK | 255 | 1.4 | H | 15.66 | 57.24 | 74 | 16.76 |
| 10380.00 | 26.33 | Ave. | 255 | 1.4 | H | 15.66 | 41.99 | 54 | 12.01 |
| 5230 MHz | | | | | | | | | |
| 5230.00 | 63.95 | PK | 182 | 2.3 | H | 41.80 | 105.75 | / | / |
| 5230.00 | 48.60 | Ave. | 182 | 2.3 | H | 41.80 | 90.40 | / | / |
| 5230.00 | 63.30 | PK | 224 | 2.3 | V | 41.80 | 105.10 | / | / |
| 5230.00 | 48.21 | Ave. | 224 | 2.3 | V | 41.80 | 90.01 | / | / |
| 5148.20 | 52.51 | PK | 117 | 1.2 | H | 6.90 | 59.41 | 74 | 14.59 |
| 5148.20 | 29.66 | Ave. | 117 | 1.2 | H | 6.90 | 36.56 | 54 | 17.44 |
| 5360.58 | 50.25 | PK | 292 | 2.1 | H | 6.93 | 57.18 | 74 | 16.82 |
| 5360.58 | 29.35 | Ave. | 292 | 2.1 | H | 6.93 | 36.28 | 54 | 17.72 |
| 10460.00 | 41.16 | PK | 285 | 2.0 | H | 16.56 | 57.72 | 74 | 16.28 |
| 10460.00 | 26.28 | Ave. | 285 | 2.0 | H | 16.56 | 42.84 | 54 | 11.16 |

| Frequency (MHz) | Receiver | | Turntable | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | Degree | Height (m) | Polar (H / V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11ac20 | | | | | | | | | |
| 5180 MHz | | | | | | | | | |
| 5180.00 | 67.79 | PK | 308 | 2.1 | H | 41.80 | 109.59 | / | / |
| 5180.00 | 54.22 | Ave. | 308 | 2.1 | H | 41.80 | 96.02 | / | / |
| 5180.00 | 67.00 | PK | 324 | 1.9 | V | 41.80 | 108.80 | / | / |
| 5180.00 | 53.79 | Ave. | 324 | 1.9 | V | 41.80 | 95.59 | / | / |
| 5148.70 | 62.47 | PK | 49 | 1.7 | H | 6.90 | 69.37 | 74 | 4.63 |
| 5148.70 | 43.99 | Ave. | 49 | 1.7 | H | 6.90 | 50.89 | 54 | 3.11 |
| 5411.06 | 43.67 | PK | 302 | 1.9 | H | 6.93 | 50.60 | 74 | 23.40 |
| 5411.06 | 28.93 | Ave. | 302 | 1.9 | H | 6.93 | 35.86 | 54 | 18.14 |
| 10360.00 | 40.69 | PK | 81 | 2.0 | H | 15.66 | 56.35 | 74 | 17.65 |
| 10360.00 | 25.99 | Ave. | 81 | 2.0 | H | 15.66 | 41.65 | 54 | 12.35 |
| 5200 MHz | | | | | | | | | |
| 5200.00 | 67.86 | PK | 308 | 1.9 | H | 41.80 | 109.66 | / | / |
| 5200.00 | 54.39 | Ave. | 308 | 1.9 | H | 41.80 | 96.19 | / | / |
| 5200.00 | 67.23 | PK | 189 | 1.2 | V | 41.80 | 109.03 | / | / |
| 5200.00 | 53.69 | Ave. | 189 | 1.2 | V | 41.80 | 95.49 | / | / |
| 10400.00 | 43.26 | PK | 21 | 1.3 | H | 15.66 | 58.92 | 74 | 15.08 |
| 10400.00 | 25.87 | Ave. | 21 | 1.3 | H | 15.66 | 41.53 | 54 | 12.47 |
| 5240 MHz | | | | | | | | | |
| 5240.00 | 68.13 | PK | 159 | 2.0 | H | 41.80 | 109.93 | / | / |
| 5240.00 | 54.24 | Ave. | 159 | 2.0 | H | 41.80 | 96.04 | / | / |
| 5240.00 | 66.10 | PK | 111 | 2.3 | V | 41.80 | 107.90 | / | / |
| 5240.00 | 52.23 | Ave. | 111 | 2.3 | V | 41.80 | 94.03 | / | / |
| 5129.26 | 43.53 | PK | 84 | 2.1 | H | 6.90 | 50.43 | 74 | 23.57 |
| 5129.26 | 28.79 | Ave. | 84 | 2.1 | H | 6.90 | 35.69 | 54 | 18.31 |
| 5350.10 | 43.94 | PK | 199 | 2.0 | H | 6.93 | 50.87 | 74 | 23.13 |
| 5350.10 | 28.46 | Ave. | 199 | 2.0 | H | 6.93 | 35.39 | 54 | 18.61 |
| 10480.00 | 40.87 | PK | 128 | 1.1 | H | 16.56 | 57.43 | 74 | 16.57 |
| 10480.00 | 26.00 | Ave. | 128 | 1.1 | H | 16.56 | 42.56 | 54 | 11.44 |

| Frequency (MHz) | Receiver | | Turntable | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | Degree | Height (m) | Polar (H / V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11ac40 | | | | | | | | | |
| 5190 MHz | | | | | | | | | |
| 5190.00 | 64.67 | PK | 265 | 1.9 | H | 41.80 | 106.47 | / | / |
| 5190.00 | 48.77 | Ave. | 265 | 1.9 | H | 41.80 | 90.57 | / | / |
| 5190.00 | 62.60 | PK | 172 | 1.4 | V | 41.80 | 104.40 | / | / |
| 5190.00 | 47.53 | Ave. | 172 | 1.4 | V | 41.80 | 89.33 | / | / |
| 5149.70 | 63.06 | PK | 237 | 2.4 | H | 6.90 | 69.96 | 74 | 4.04 |
| 5149.70 | 43.11 | Ave. | 237 | 2.4 | H | 6.90 | 50.01 | 54 | 3.99 |
| 5350.66 | 41.13 | PK | 129 | 1.3 | H | 6.93 | 48.06 | 74 | 25.94 |
| 5350.66 | 28.57 | Ave. | 129 | 1.3 | H | 6.93 | 35.50 | 54 | 18.50 |
| 10380.00 | 39.72 | PK | 48 | 2.4 | H | 15.66 | 55.38 | 74 | 18.62 |
| 10380.00 | 25.72 | Ave. | 48 | 2.4 | H | 15.66 | 41.38 | 54 | 12.62 |
| 5230 MHz | | | | | | | | | |
| 5230.00 | 65.00 | PK | 140 | 1.4 | H | 41.80 | 106.80 | / | / |
| 5230.00 | 49.70 | Ave. | 140 | 1.4 | H | 41.80 | 91.50 | / | / |
| 5230.00 | 64.06 | PK | 159 | 1.7 | V | 41.80 | 105.86 | / | / |
| 5230.00 | 49.24 | Ave. | 159 | 1.7 | V | 41.80 | 91.04 | / | / |
| 5150.00 | 56.26 | PK | 337 | 2.1 | H | 6.60 | 62.86 | 74 | 11.14 |
| 5150.00 | 30.50 | Ave. | 337 | 2.1 | H | 6.60 | 37.10 | 54 | 16.90 |
| 5352.87 | 48.82 | PK | 92 | 1.2 | H | 6.93 | 55.75 | 74 | 18.25 |
| 5352.87 | 29.22 | Ave. | 92 | 1.2 | H | 6.93 | 36.15 | 54 | 17.85 |
| 10460.00 | 40.31 | PK | 280 | 2.3 | H | 16.56 | 56.87 | 74 | 17.13 |
| 10460.00 | 25.77 | Ave. | 280 | 2.3 | H | 16.56 | 42.33 | 54 | 11.67 |
| 802.11ac80 | | | | | | | | | |
| 5210 MHz | | | | | | | | | |
| 5210.00 | 64.29 | PK | 79 | 1.6 | H | 41.80 | 106.09 | / | / |
| 5210.00 | 44.85 | Ave. | 79 | 1.6 | H | 41.80 | 86.65 | / | / |
| 5210.00 | 64.17 | PK | 28 | 1.5 | V | 41.80 | 105.97 | / | / |
| 5210.00 | 44.02 | Ave. | 28 | 1.5 | V | 41.80 | 85.82 | / | / |
| 5130.76 | 63.51 | PK | 244 | 1.1 | H | 6.90 | 70.41 | 74 | 3.59 |
| 5130.76 | 45.68 | Ave. | 286 | 1.9 | H | 6.90 | 52.58 | 54 | 1.42 |
| 5351.76 | 50.43 | PK | 155 | 1.4 | H | 6.93 | 57.36 | 74 | 16.64 |
| 5351.76 | 30.63 | Ave. | 155 | 1.4 | H | 6.93 | 37.56 | 54 | 16.44 |
| 10420.00 | 39.22 | PK | 228 | 1.3 | H | 15.66 | 54.88 | 74 | 19.12 |
| 10420.00 | 25.35 | Ave. | 228 | 1.3 | H | 15.66 | 41.01 | 54 | 12.99 |

**Note: For the band edge of 5150-5250MHz band testing, the amplifier had been use.**

**5725-5850 MHz:**

| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11a | | | | | | | | | |
| 5745 MHz | | | | | | | | | |
| 5745.00 | 65.04 | PK | 117 | 1.6 | H | 42.15 | 107.19 | / | / |
| 5745.00 | 51.01 | Ave. | 117 | 1.6 | H | 42.15 | 93.16 | / | / |
| 5745.00 | 63.94 | PK | 41 | 2.3 | V | 42.15 | 106.09 | / | / |
| 5745.00 | 50.46 | Ave. | 41 | 2.3 | V | 42.15 | 92.61 | / | / |
| 5686.37 | 28.38 | PK | 153 | 1.5 | H | 42.15 | 70.53 | 95.11 | 24.58 |
| 5716.71 | 28.35 | PK | 181 | 2.1 | H | 42.15 | 70.50 | 109.88 | 39.38 |
| 5724.79 | 29.77 | PK | 356 | 2.0 | H | 42.15 | 71.92 | 121.72 | 49.80 |
| 11490.00 | 41.47 | PK | 204 | 1.5 | H | 18.92 | 60.39 | 74 | 13.61 |
| 11490.00 | 26.70 | Ave. | 204 | 1.5 | H | 18.92 | 45.62 | 54 | 8.38 |
| 5785 MHz | | | | | | | | | |
| 5785.00 | 67.06 | PK | 87 | 1.4 | H | 42.08 | 109.14 | / | / |
| 5785.00 | 54.43 | Ave. | 87 | 1.4 | H | 42.08 | 96.51 | / | / |
| 5785.00 | 65.61 | PK | 123 | 2.2 | V | 42.08 | 107.69 | / | / |
| 5785.00 | 52.91 | Ave. | 123 | 2.2 | V | 42.08 | 94.99 | / | / |
| 11570.00 | 41.18 | PK | 45 | 1.0 | H | 19.17 | 60.35 | 74 | 13.65 |
| 11570.00 | 26.59 | Ave. | 45 | 1.0 | H | 19.17 | 45.76 | 54 | 8.24 |
| 5825 MHz | | | | | | | | | |
| 5825.00 | 67.87 | PK | 123 | 2.1 | H | 42.08 | 109.95 | / | / |
| 5825.00 | 54.57 | Ave. | 123 | 2.1 | H | 42.08 | 96.65 | / | / |
| 5825.00 | 67.25 | PK | 175 | 1.4 | V | 42.08 | 109.33 | / | / |
| 5825.00 | 53.61 | Ave. | 175 | 1.4 | V | 42.08 | 95.69 | / | / |
| 5851.15 | 34.27 | PK | 271 | 1.2 | H | 42.55 | 76.82 | 119.58 | 42.76 |
| 5858.04 | 32.77 | PK | 216 | 2.5 | H | 42.55 | 75.32 | 109.95 | 34.63 |
| 5876.40 | 28.73 | PK | 106 | 1.7 | H | 42.55 | 71.28 | 104.16 | 32.88 |
| 11650.00 | 40.37 | PK | 165 | 2.0 | H | 19.17 | 59.54 | 74 | 14.46 |
| 11650.00 | 25.15 | Ave. | 165 | 2.0 | H | 19.17 | 44.32 | 54 | 9.68 |

| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11n20 | | | | | | | | | |
| 5745 MHz | | | | | | | | | |
| 5745.00 | 66.89 | PK | 48 | 2.5 | H | 42.15 | 109.04 | / | / |
| 5745.00 | 53.71 | Ave. | 48 | 2.5 | H | 42.15 | 95.86 | / | / |
| 5745.00 | 65.62 | PK | 193 | 2.2 | V | 42.15 | 107.77 | / | / |
| 5745.00 | 53.29 | Ave. | 193 | 2.2 | V | 42.15 | 95.44 | / | / |
| 5725.00 | 31.47 | PK | 320 | 1.0 | H | 42.15 | 73.62 | 122.2 | 48.58 |
| 5720.00 | 29.12 | PK | 320 | 1.0 | H | 42.15 | 71.27 | 110.8 | 39.53 |
| 5700.00 | 27.15 | PK | 122 | 1.8 | H | 42.15 | 69.30 | 105.2 | 35.90 |
| 11490.00 | 38.38 | PK | 198 | 1.4 | H | 18.92 | 57.30 | 74 | 16.70 |
| 11490.00 | 23.58 | Ave. | 198 | 1.4 | H | 18.92 | 42.50 | 54 | 11.50 |
| 5785 MHz | | | | | | | | | |
| 5785.00 | 66.56 | PK | 56 | 2.0 | H | 42.08 | 108.64 | / | / |
| 5785.00 | 53.74 | Ave. | 56 | 2.0 | H | 42.08 | 95.82 | / | / |
| 5785.00 | 65.45 | PK | 244 | 2.4 | V | 42.08 | 107.53 | / | / |
| 5785.00 | 53.25 | Ave. | 244 | 2.4 | V | 42.08 | 95.33 | / | / |
| 11570.00 | 36.09 | PK | 137 | 1.5 | H | 19.17 | 55.26 | 74 | 18.74 |
| 11570.00 | 23.12 | Ave. | 137 | 1.5 | H | 19.17 | 42.29 | 54 | 11.71 |
| 5825 MHz | | | | | | | | | |
| 5825.00 | 66.95 | PK | 277 | 1.5 | H | 42.08 | 109.03 | / | / |
| 5825.00 | 54.18 | Ave. | 277 | 1.5 | H | 42.08 | 96.26 | / | / |
| 5825.00 | 65.82 | PK | 55 | 1.8 | V | 42.08 | 107.90 | / | / |
| 5825.00 | 53.32 | Ave. | 55 | 1.8 | V | 42.08 | 95.40 | / | / |
| 5850.00 | 31.28 | PK | 201 | 1.9 | H | 42.55 | 73.83 | 122.2 | 48.37 |
| 5855.00 | 28.60 | PK | 201 | 1.9 | H | 42.55 | 71.15 | 110.8 | 39.65 |
| 5875.00 | 27.32 | PK | 271 | 2.4 | H | 42.55 | 69.87 | 105.2 | 35.33 |
| 11650.00 | 38.33 | PK | 12 | 2.2 | H | 19.17 | 57.50 | 74 | 16.50 |
| 11650.00 | 23.89 | Ave. | 12 | 2.2 | H | 19.17 | 43.06 | 54 | 10.94 |

| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11n40 | | | | | | | | | |
| 5755 MHz | | | | | | | | | |
| 5755.00 | 65.03 | PK | 70 | 1.6 | H | 42.08 | 107.11 | / | / |
| 5755.00 | 52.54 | Ave. | 70 | 1.6 | H | 42.08 | 94.62 | / | / |
| 5755.00 | 63.47 | PK | 161 | 1.9 | V | 42.08 | 105.55 | / | / |
| 5755.00 | 51.13 | Ave. | 161 | 1.9 | V | 42.08 | 93.21 | / | / |
| 5725.00 | 33.46 | PK | 231 | 1.9 | H | 42.15 | 75.61 | 122.2 | 46.59 |
| 5720.00 | 30.24 | PK | 231 | 1.9 | H | 42.15 | 72.39 | 110.8 | 38.41 |
| 5700.00 | 29.17 | PK | 59 | 1.2 | H | 42.15 | 71.32 | 105.2 | 33.88 |
| 11510.00 | 38.67 | PK | 112 | 2.0 | H | 18.92 | 57.59 | 74 | 16.41 |
| 11510.00 | 23.96 | Ave. | 112 | 2.0 | H | 18.92 | 42.88 | 54 | 11.12 |
| 5795 MHz | | | | | | | | | |
| 5755.00 | 64.87 | PK | 81 | 2.3 | H | 42.08 | 106.95 | / | / |
| 5755.00 | 52.16 | Ave. | 81 | 2.3 | H | 42.08 | 94.24 | / | / |
| 5755.00 | 63.45 | PK | 335 | 1.8 | V | 42.08 | 105.53 | / | / |
| 5755.00 | 51.99 | Ave. | 335 | 1.8 | V | 42.08 | 94.07 | / | / |
| 5850.00 | 28.96 | PK | 213 | 1.7 | H | 42.55 | 71.51 | 122.2 | 50.69 |
| 5855.00 | 28.17 | PK | 213 | 1.7 | H | 42.55 | 70.72 | 110.8 | 40.08 |
| 5875.00 | 27.46 | PK | 340 | 1.1 | H | 42.55 | 70.01 | 105.2 | 35.19 |
| 11590.00 | 37.28 | PK | 329 | 1.5 | H | 19.17 | 56.45 | 74 | 17.55 |
| 11590.00 | 23.28 | Ave. | 329 | 1.5 | H | 19.17 | 42.45 | 54 | 11.55 |

| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11ac20 | | | | | | | | | |
| 5745 MHz | | | | | | | | | |
| 5745.00 | 66.04 | PK | 62 | 2.2 | H | 42.15 | 108.19 | / | / |
| 5745.00 | 52.54 | Ave. | 62 | 2.2 | H | 42.15 | 94.69 | / | / |
| 5745.00 | 65.13 | PK | 188 | 2.5 | V | 42.15 | 107.28 | / | / |
| 5745.00 | 51.63 | Ave. | 188 | 2.5 | V | 42.15 | 93.78 | / | / |
| 5694.99 | 27.96 | PK | 130 | 1.3 | H | 42.15 | 70.11 | 101.49 | 31.38 |
| 5720.00 | 28.89 | PK | 320 | 2.4 | H | 42.15 | 71.04 | 110.8 | 39.76 |
| 5724.74 | 34.35 | PK | 168 | 2.4 | H | 42.15 | 76.50 | 121.61 | 45.11 |
| 11490.00 | 40.17 | PK | 1 | 1.1 | H | 18.92 | 59.09 | 74 | 14.91 |
| 11490.00 | 24.97 | Ave. | 1 | 1.1 | H | 18.92 | 43.89 | 54 | 10.11 |
| 5785 MHz | | | | | | | | | |
| 5785.00 | 65.12 | PK | 132 | 1.2 | H | 42.08 | 107.20 | / | / |
| 5785.00 | 51.56 | Ave. | 132 | 1.2 | H | 42.08 | 93.64 | / | / |
| 5785.00 | 64.89 | PK | 28 | 1.1 | V | 42.08 | 106.97 | / | / |
| 5785.00 | 52.11 | Ave. | 28 | 1.1 | V | 42.08 | 94.19 | / | / |
| 11570.00 | 40.13 | PK | 236 | 1.5 | H | 19.17 | 59.30 | 74 | 14.70 |
| 11570.00 | 25.45 | Ave. | 236 | 1.5 | H | 19.17 | 44.62 | 54 | 9.38 |
| 5825 MHz | | | | | | | | | |
| 5825.00 | 65.78 | PK | 196 | 1.5 | H | 42.08 | 107.86 | / | / |
| 5825.00 | 52.46 | Ave. | 196 | 1.5 | H | 42.08 | 94.54 | / | / |
| 5825.00 | 65.56 | PK | 185 | 1.0 | V | 42.08 | 107.64 | / | / |
| 5825.00 | 52.21 | Ave. | 185 | 1.0 | V | 42.08 | 94.29 | / | / |
| 5850.00 | 32.47 | PK | 262 | 1.5 | H | 42.55 | 75.02 | 122.2 | 47.18 |
| 5855.00 | 29.84 | PK | 262 | 1.5 | H | 42.55 | 72.39 | 110.8 | 38.41 |
| 5875.00 | 28.54 | PK | 220 | 1.6 | H | 42.55 | 71.09 | 105.2 | 34.11 |
| 11650.00 | 40.04 | PK | 15 | 1.7 | H | 19.17 | 59.21 | 74 | 14.79 |
| 11650.00 | 25.08 | Ave. | 15 | 1.7 | H | 19.17 | 44.25 | 54 | 9.75 |

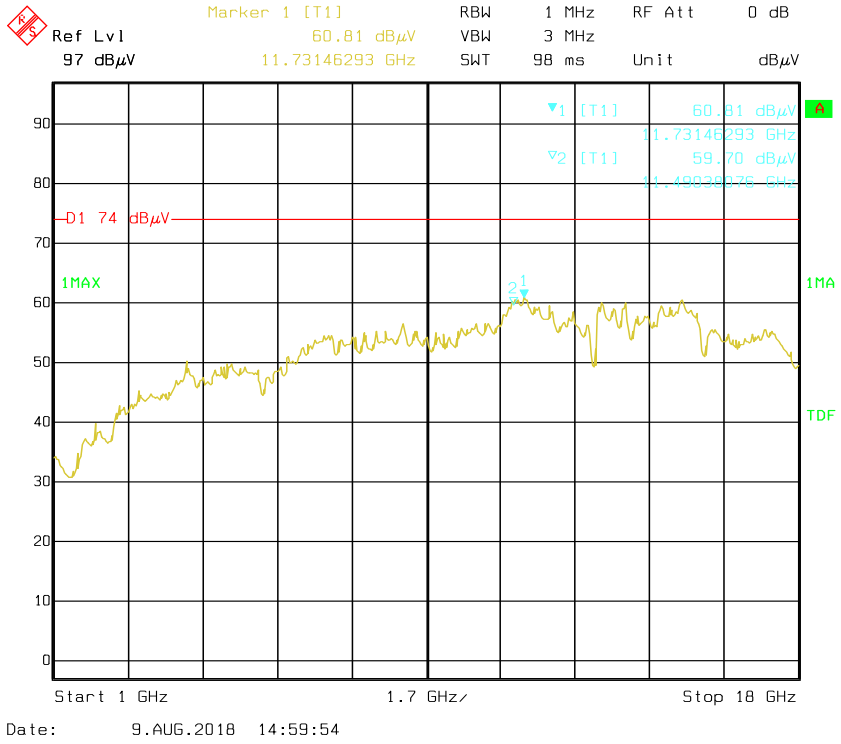
| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11ac40 | | | | | | | | | |
| 5755 MHz | | | | | | | | | |
| 5755.00 | 63.64 | PK | 68 | 1.2 | H | 42.08 | 105.72 | / | / |
| 5755.00 | 51.92 | Ave. | 68 | 1.2 | H | 42.08 | 94.00 | / | / |
| 5755.00 | 63.09 | PK | 198 | 1.7 | V | 42.08 | 105.17 | / | / |
| 5755.00 | 50.46 | Ave. | 198 | 1.7 | V | 42.08 | 92.54 | / | / |
| 5725.00 | 40.85 | PK | 133 | 1.5 | H | 42.15 | 83.00 | 122.2 | 39.20 |
| 5720.00 | 36.62 | PK | 133 | 1.5 | H | 42.15 | 78.77 | 110.8 | 32.03 |
| 5700.00 | 27.49 | PK | 213 | 1.3 | H | 42.15 | 69.64 | 105.2 | 35.56 |
| 11510.00 | 39.47 | PK | 60 | 1.3 | H | 18.92 | 58.39 | 74 | 15.61 |
| 11510.00 | 23.75 | Ave. | 60 | 1.3 | H | 18.92 | 42.67 | 54 | 11.33 |
| 5795 MHz | | | | | | | | | |
| 5795.00 | 63.52 | PK | 67 | 1.9 | H | 42.08 | 105.60 | / | / |
| 5795.00 | 51.18 | Ave. | 67 | 1.9 | H | 42.08 | 93.26 | / | / |
| 5795.00 | 62.15 | PK | 5 | 1.5 | V | 42.08 | 104.23 | / | / |
| 5795.00 | 49.62 | Ave. | 5 | 1.5 | V | 42.08 | 91.70 | / | / |
| 5850.00 | 28.40 | PK | 50 | 1.4 | H | 42.55 | 70.95 | 122.2 | 51.25 |
| 5855.00 | 28.31 | PK | 50 | 1.4 | H | 42.55 | 70.86 | 110.8 | 39.94 |
| 5875.00 | 27.54 | PK | 312 | 1.3 | H | 42.55 | 70.09 | 105.2 | 35.11 |
| 11590.00 | 37.29 | PK | 63 | 1.9 | H | 19.17 | 56.46 | 74 | 17.54 |
| 11590.00 | 23.37 | Ave. | 63 | 1.9 | H | 19.17 | 42.54 | 54 | 11.46 |

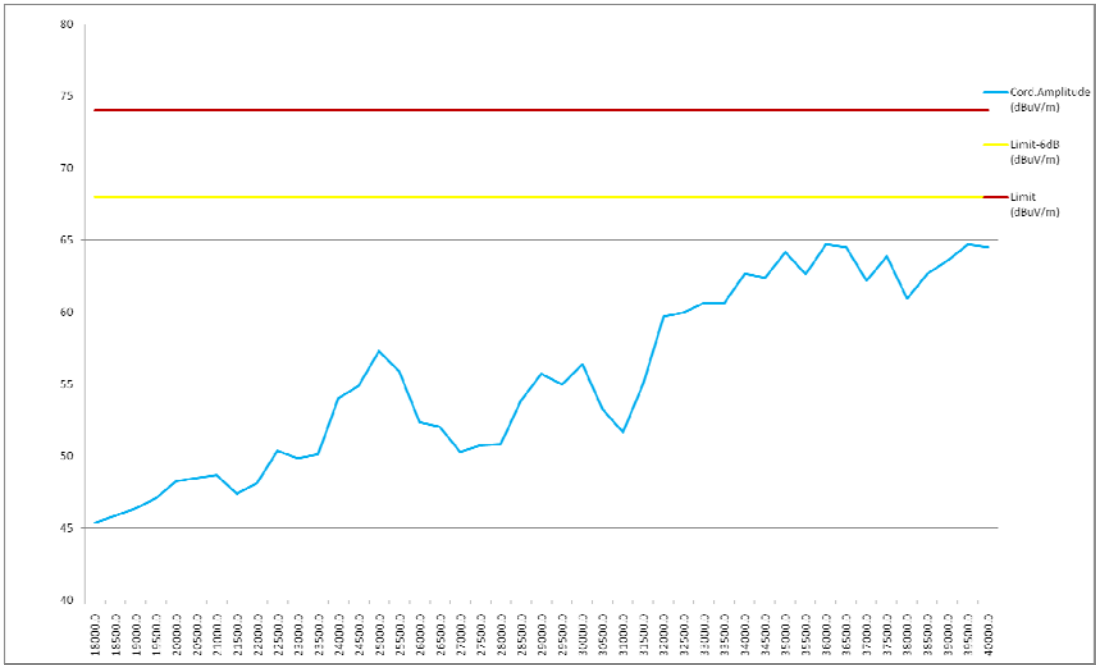
| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB/m) | Corrected Amplitude (dBμV/m) | FCC Part 15.407/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | PK/QP/Ave. | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| 802.11ac80 | | | | | | | | | |
| 5775 MHz | | | | | | | | | |
| 5775.00 | 60.52 | PK | 175 | 1.0 | H | 42.08 | 102.60 | / | / |
| 5775.00 | 47.89 | Ave. | 175 | 1.0 | H | 42.08 | 89.97 | / | / |
| 5775.00 | 58.52 | PK | 73 | 2.4 | V | 42.08 | 100.60 | / | / |
| 5775.00 | 45.79 | Ave. | 73 | 2.4 | V | 42.08 | 87.87 | / | / |
| 5725.00 | 37.23 | PK | 55 | 1.2 | H | 42.15 | 79.38 | 122.2 | 42.82 |
| 5720.00 | 36.48 | PK | 55 | 1.2 | H | 42.15 | 78.63 | 110.8 | 32.17 |
| 5695.00 | 34.56 | PK | 86 | 1.5 | H | 42.15 | 76.71 | 101.5 | 24.79 |
| 5850.00 | 33.12 | PK | 86 | 1.5 | H | 42.55 | 75.67 | 122.2 | 46.53 |
| 5855.00 | 28.89 | PK | 50 | 1.4 | H | 42.55 | 71.44 | 110.8 | 39.36 |
| 5875.00 | 27.77 | PK | 312 | 1.3 | H | 42.55 | 70.32 | 105.2 | 34.88 |
| 11550.00 | 37.90 | PK | 228 | 1.7 | H | 19.17 | 57.07 | 74 | 16.93 |
| 11550.00 | 23.51 | Ave. | 228 | 1.7 | H | 19.17 | 42.68 | 54 | 11.32 |

**Note:**
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude
All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

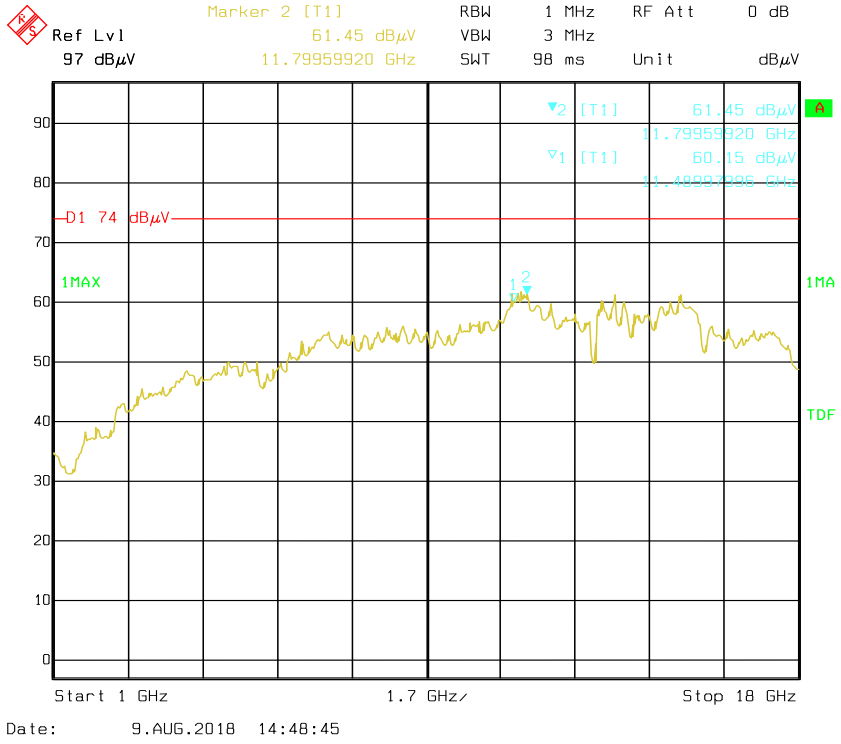
**Peak**

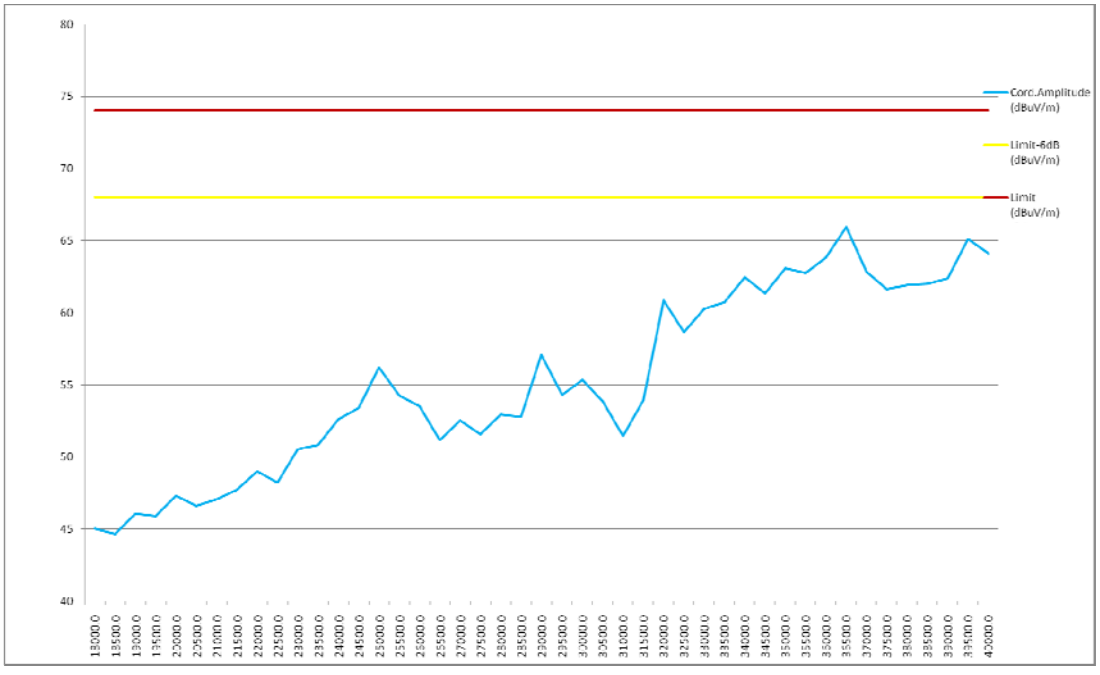
Pre-scan with 802.11a 5745MHz
**Horizontal**



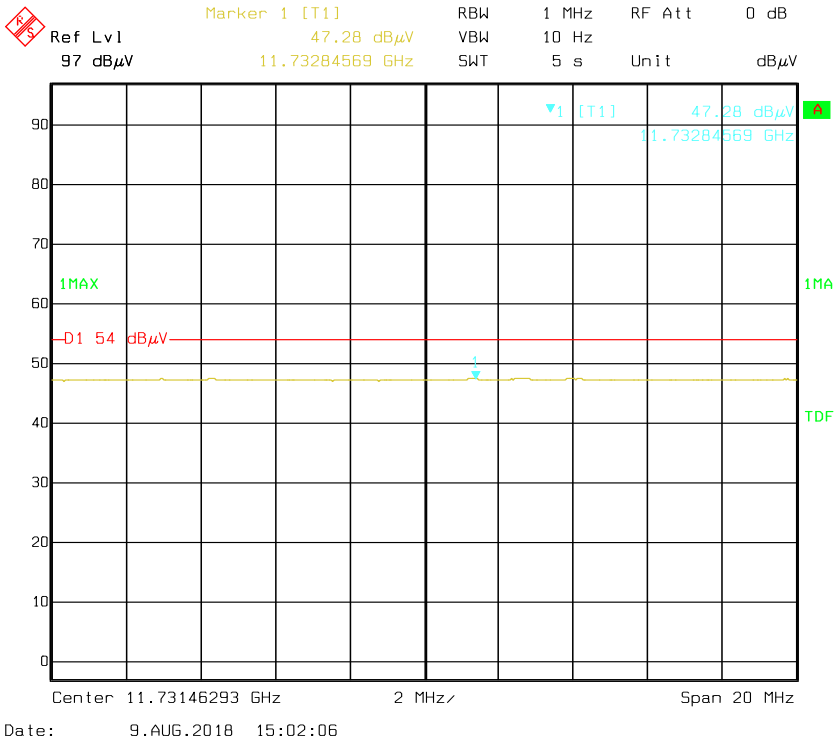



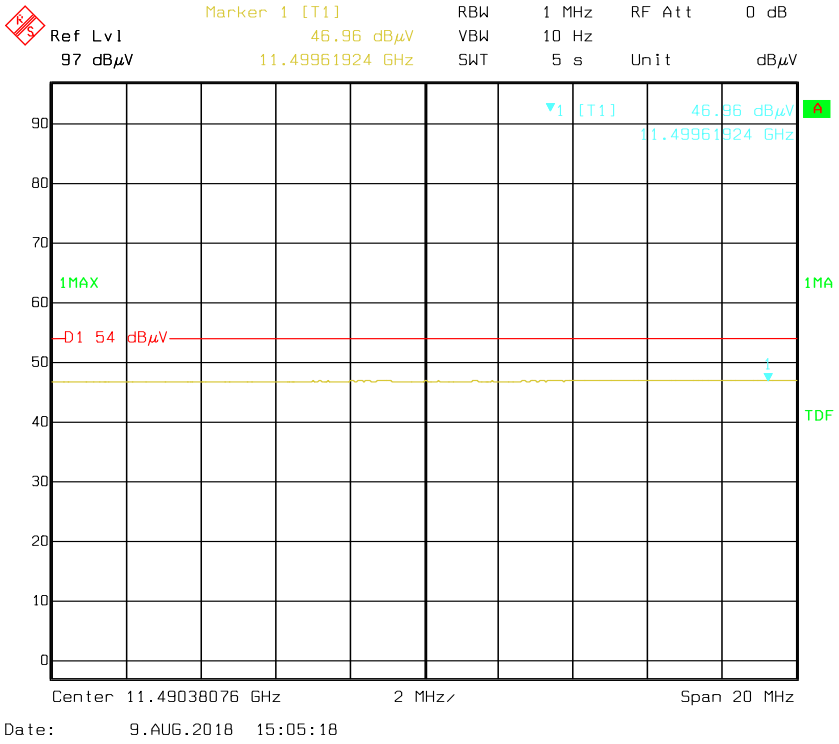
**Vertical**

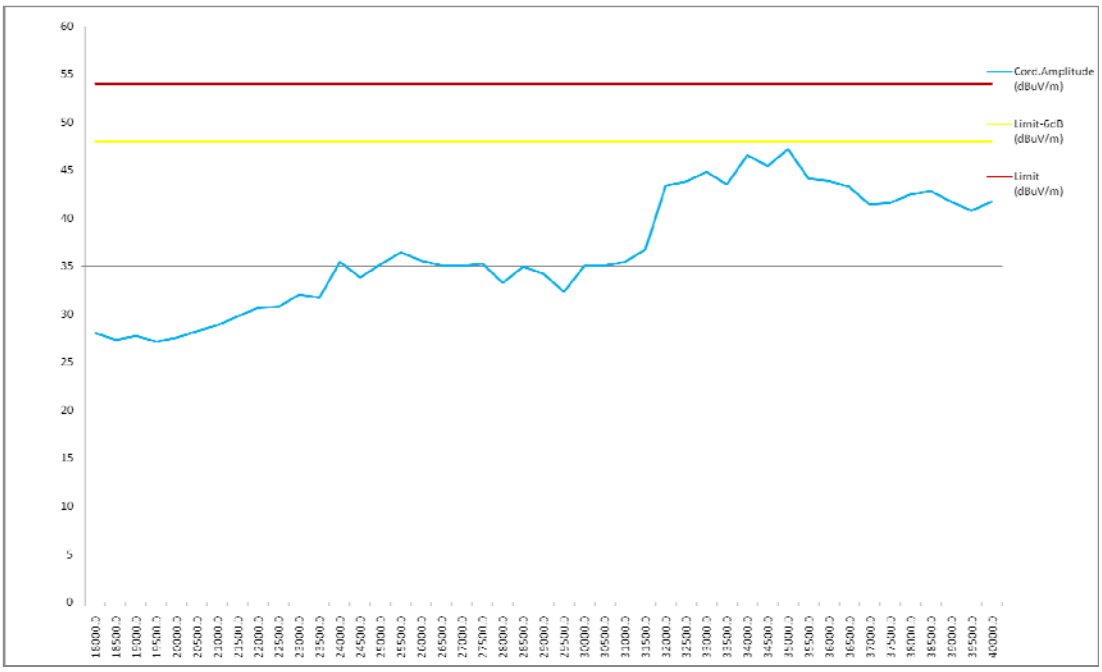

Marker 2 [T1]
Ref Lvl
97 dBµV
61.45 dBµV
11.79959920 GHz
RBW 1 MHz
VBW 3 MHz
SWT 98 ms
RF Att 0 dB
Unit dBµV
▼2 [T1] 61.45 dBµV
11.79959920 GHz
▽1 [T1] 60.15 dBµV
11.40997996 GHz
D1 74 dBµV
1MAX
1MA
TDF
A
Start 1 GHz
1.7 GHz/
Stop 18 GHz
Date: 9.AUG.2018 14:48:45


Corr.Amplitude (dBuV/m)
Limit-6dB (dBuV/m)
Limit (dBuV/m)

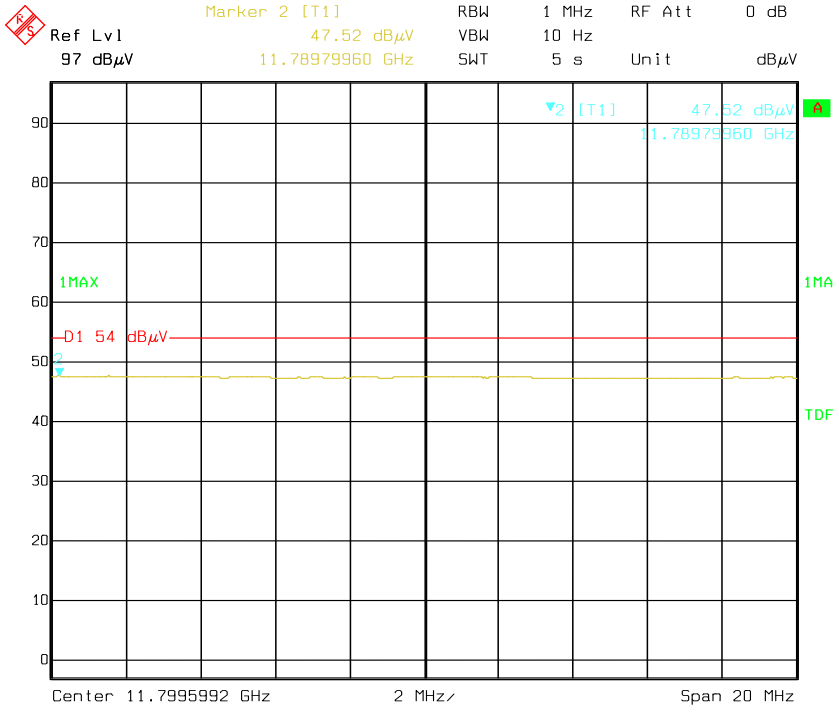
**Average**
**Horizontal**

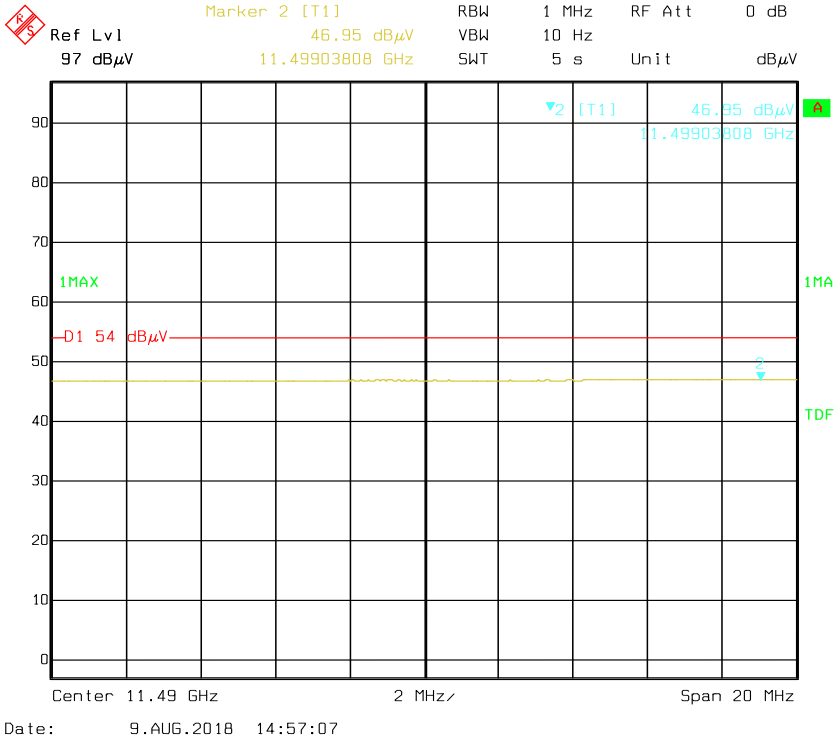


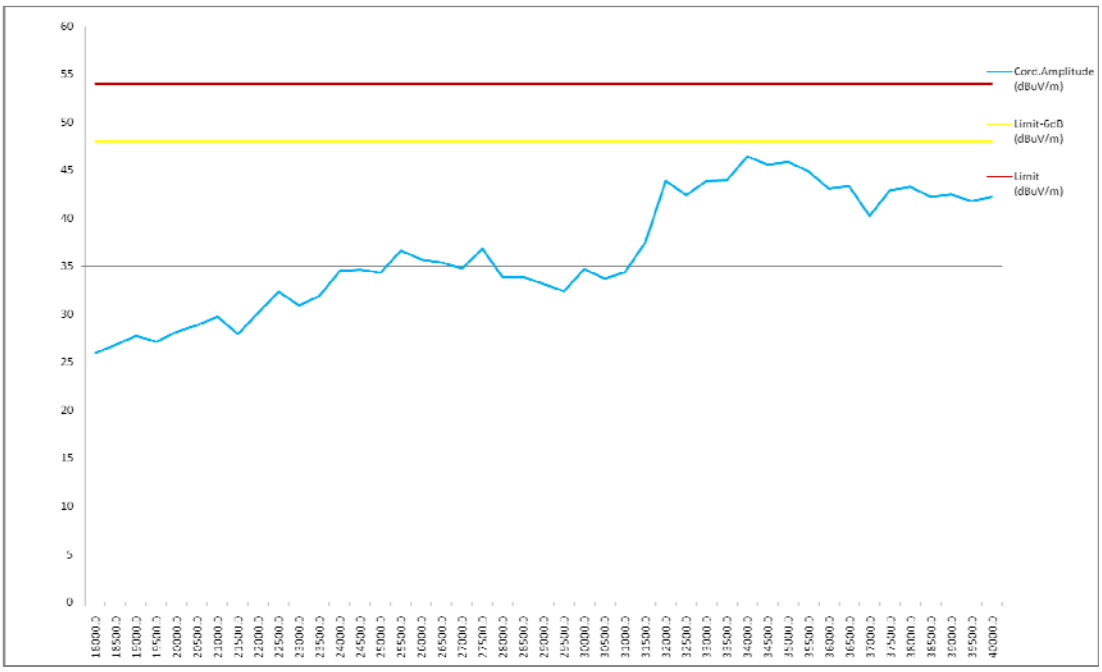




60
55
50
45
40
35
30
25
20
15
10
5
0
Corr.Amplitude (dBuV/m)
Limit-6dB (dBuV/m)
Limit (dBuV/m)

## Vertical


Marker 2 [T1]
RBW 1 MHz
RF Att 0 dB
Ref Lvl
47.52 dBµV
VBW 10 Hz
97 dBµV
11.78979960 GHz
SWT 5 s
Unit dBµV
▼2 [T1] 47.52 dBµV
11.78979960 GHz
A
1MAX
1MA
D1 54 dBµV
TDF
Center 11.7995992 GHz
2 MHz/
Span 20 MHz
Date: 9.AUG.2018 14:54:35


Marker 2 [T1]
RBW 1 MHz
RF Att 0 dB
Ref Lvl
46.95 dBµV
VBW 10 Hz
97 dBµV
11.49903808 GHz
SWT 5 s
Unit dBµV
▼2 [T1] 46.95 dBµV
11.49903808 GHz
A
1MAX
1MA
D1 54 dBµV
TDF
Center 11.49 GHz
2 MHz/
Span 20 MHz
Date: 9.AUG.2018 14:57:07


60
55
50
45
40
35
30
25
20
15
10
5
0
Corr.Amplitude (dBuV/m)
Limit-6dB (dBuV/m)
Limit (dBuV/m)

# §15.407(B) (1), (4) –OUT OF BAND EMISSION

## Applicable Standard

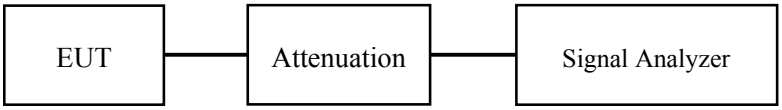
FCC §15.407 (b) (1), (4);

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 EIRP of –27dBm/MHz.

For transmitters operating in the 5.725–5.825 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.

## Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The Resolution bandwidth is set to 1MHz, The Video bandwidth is set to ≥ 1MHz, report the peak value out of the oprating band.
3. Repeat above procedures until all frequencies measured were complete.
4. when necessary, provided the measured energy is integrated to show the total power over 1 MHz.




## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Kiki Kong on 2018-08-04.*

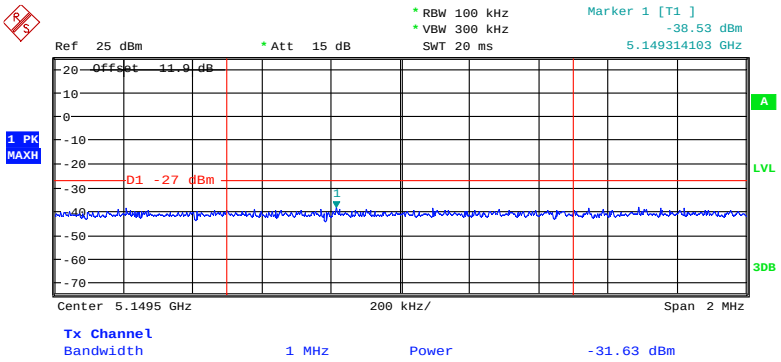
*EUT operation mode: Transmitting*

**5150 – 5250 MHz:**

| Testing Mode | Left band edge (dBm/MHz) | Right band edge (dBm/MHz) | Limit (dBm/MHz) |
|---|---|---|---|
| 802.11a | -31.63 | -42.39 | -27 |
| 802.11ac20 | -31.99 | -41.79 | -27 |
| 802.11ac40 | -27.63 | -41.73 | -27 |
| 802.11ac80 | -27.58 | -41.02 | -27 |
| 802.11n20 | -31.63 | -42.41 | -27 |
| 802.11n40 | -27.73 | -41.52 | -27 |

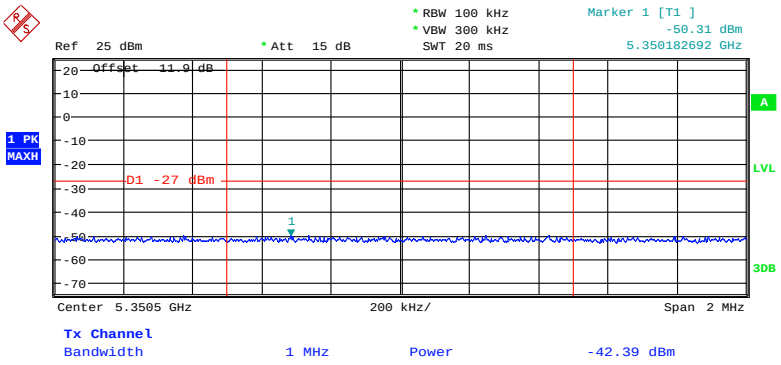
Note: For 5150-5250MHz band, the limit is EIRP, so the antenna gain had been adding to the plots.

## 802.11a mode, Band Edge, Left Side



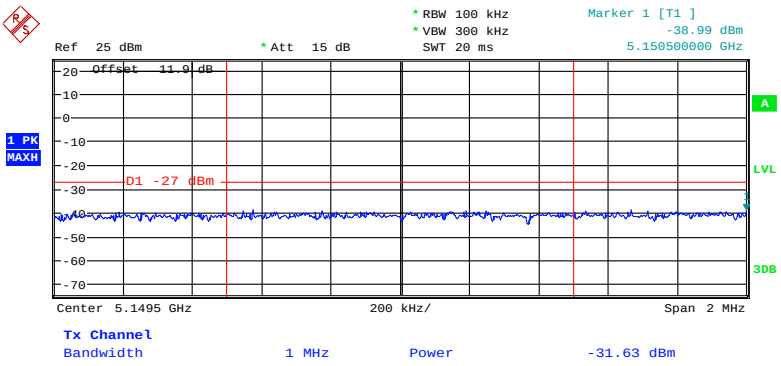

Date: 4.AUG.2018 10:46:51

## 802.11a mode, Band Edge, Right Side



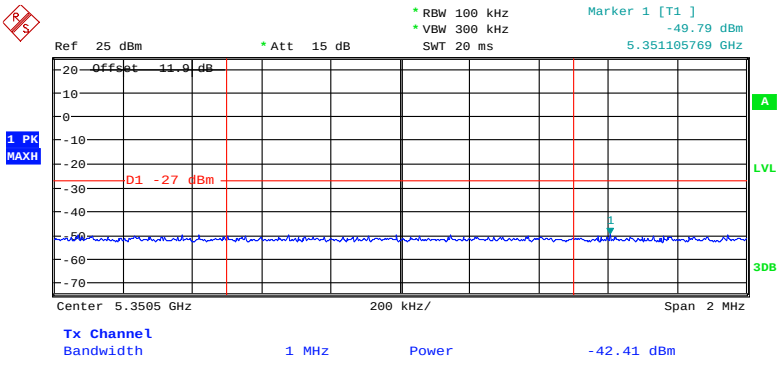

Date: 4.AUG.2018 10:47:38

## 802.11n20 mode, Band Edge, Left Side



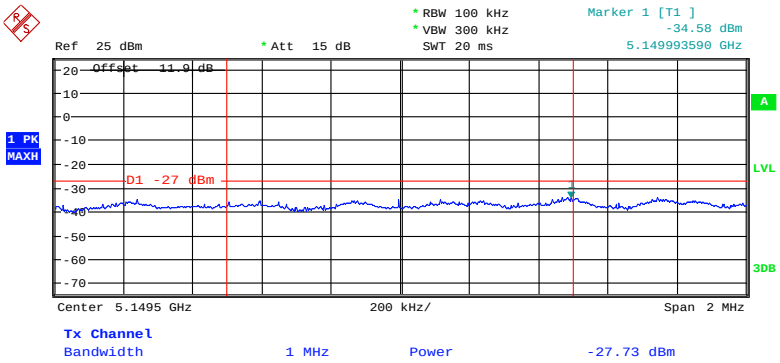

Date: 4.AUG.2018 10:50:08

## 802.11n20 mode, Band Edge, Right Side



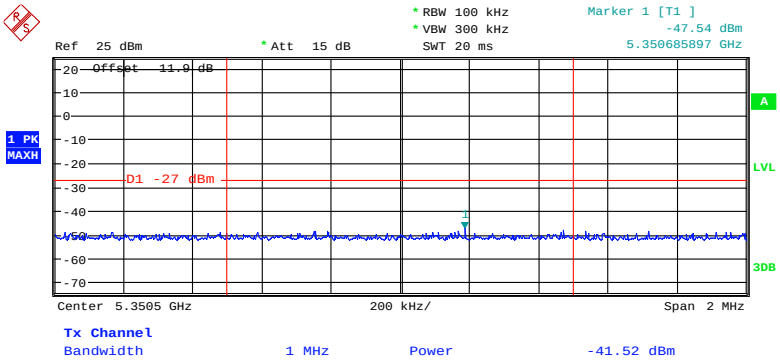

Date: 4.AUG.2018 10:51:20

## 802.11n40 mode, Band Edge, Left Side



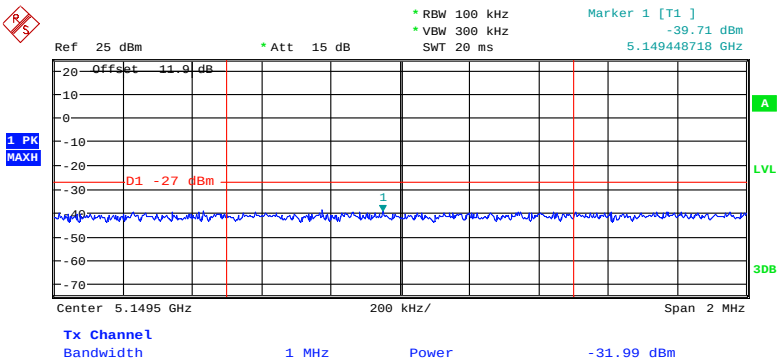

Date: 4.AUG.2018 10:58:27

## 802.11n40 mode, Band Edge, Right Side



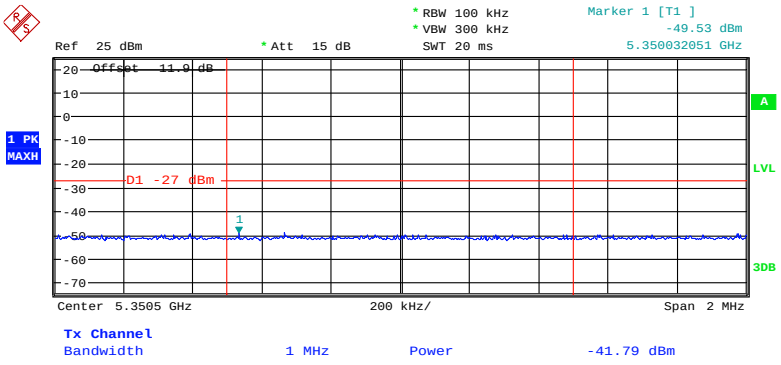

Date: 4.AUG.2018 11:00:57

## 802.11ac20 mode, Band Edge, Left Side



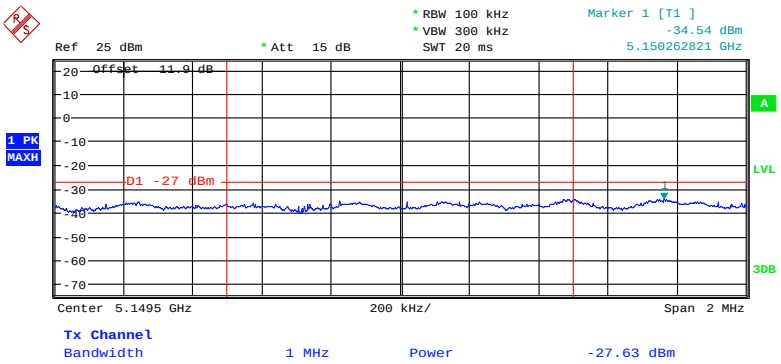

Date: 4.AUG.2018 10:53:33

## 802.11ac20 mode, Band Edge, Right Side



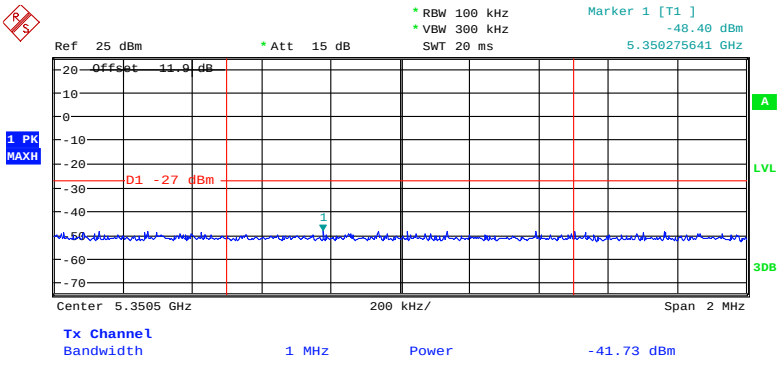

Date: 4.AUG.2018 10:55:23

## 802.11ac40 mode, Band Edge, Left Side



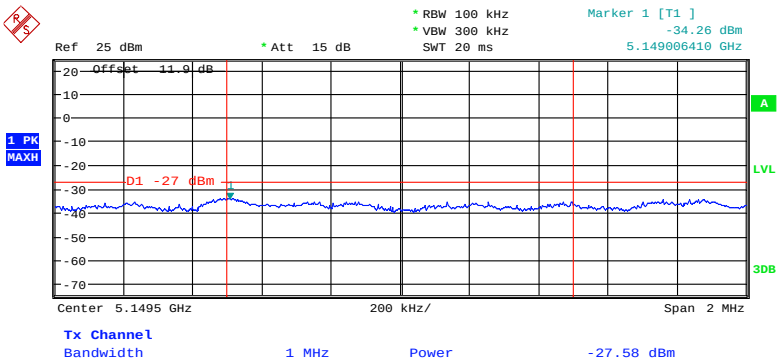

Date: 4.AUG.2018 11:06:34

## 802.11ac40 mode, Band Edge, Right Side



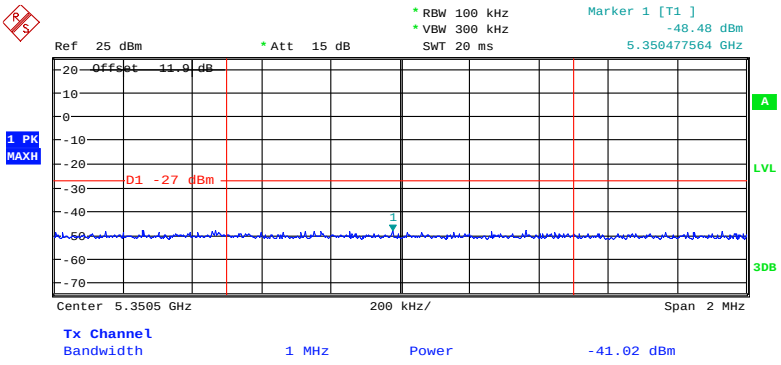

Date: 4.AUG.2018 11:07:46

## 802.11ac80 mode, Band Edge, Left Side




Date: 4.AUG.2018 11:09:13

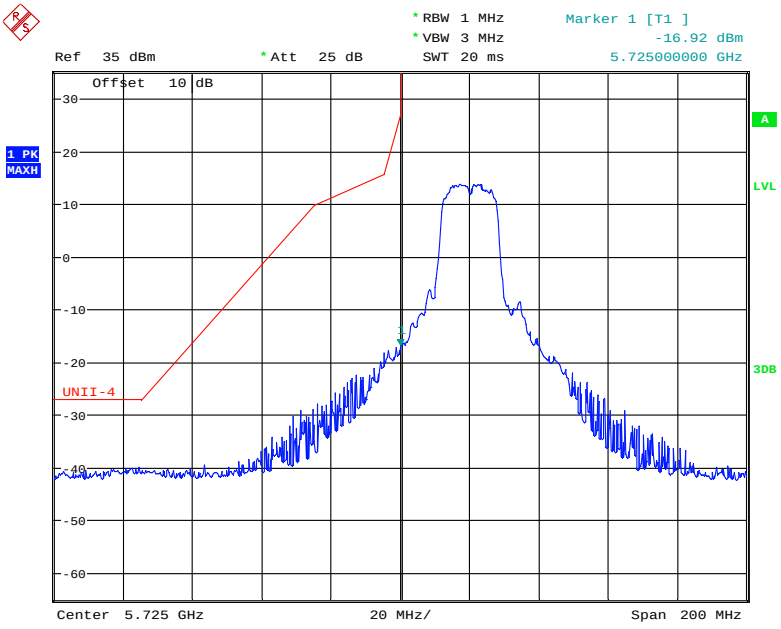
## 802.11ac80 mode, Band Edge, Right Side




Date: 4.AUG.2018 11:09:49

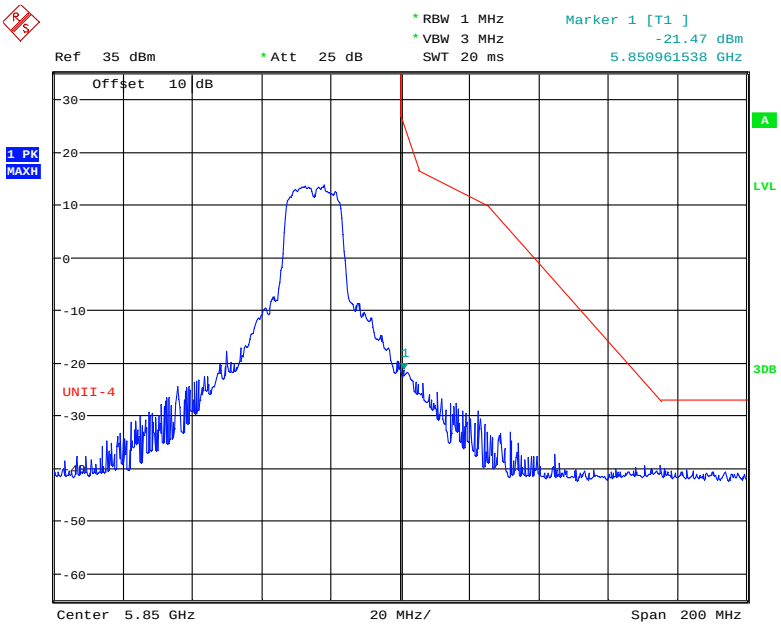
**5725 – 5850 MHz:**

## 802.11a mode, Band Edge, Left Side



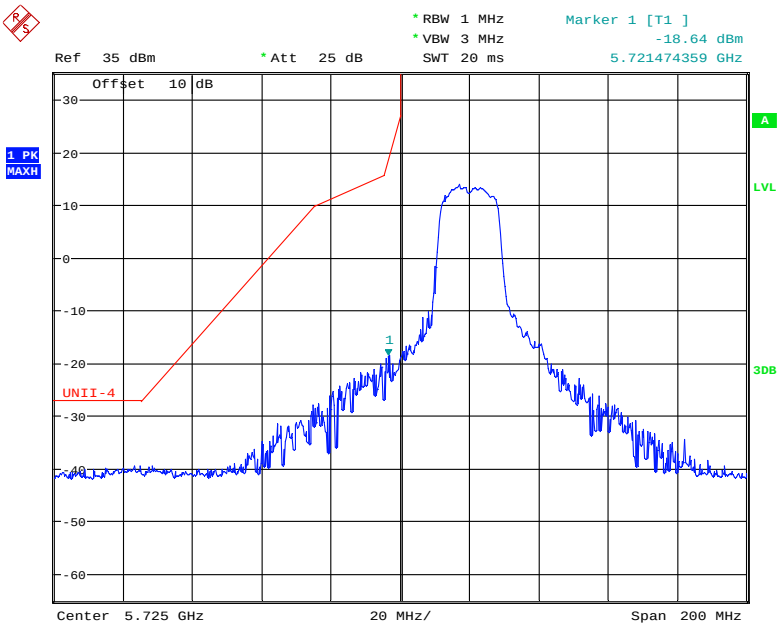

Date: 4.AUG.2018 11:23:21

## 802.11a mode, Band Edge, Right Side



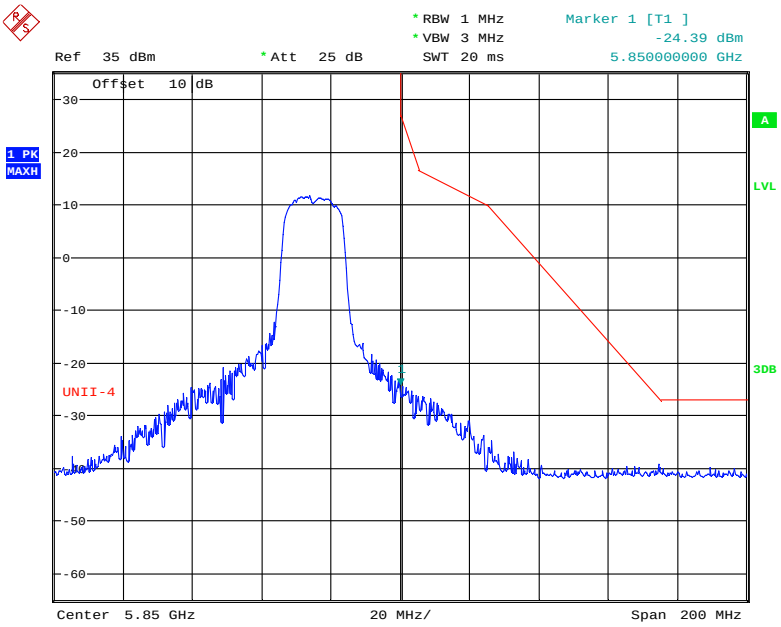

Date: 4.AUG.2018 11:25:13

## 802.11n20 mode, Band Edge, Left Side



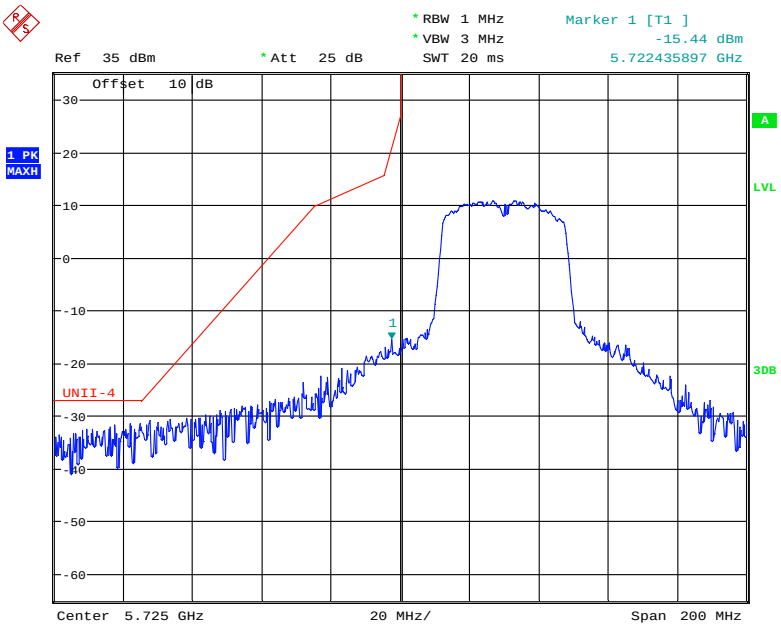

Date: 4.AUG.2018 11:29:08

## 802.11n20 mode, Band Edge, Right Side



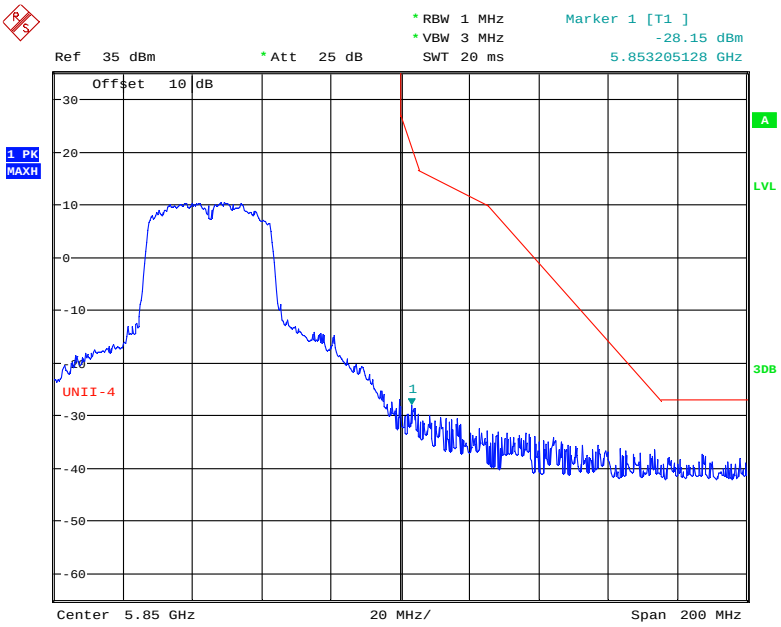

Date: 4.AUG.2018 11:27:25

## 802.11n40 mode, Band Edge, Left Side



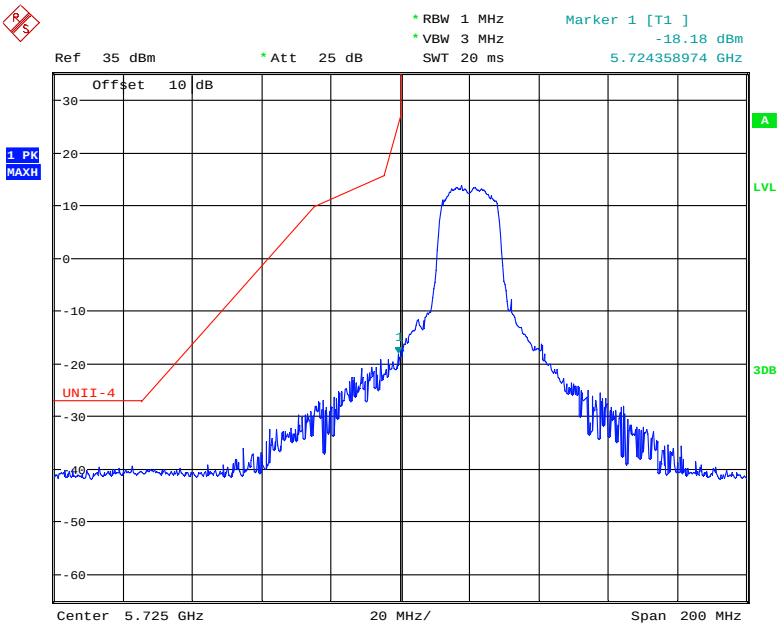

Date: 4.AUG.2018 11:35:06

## 802.11n40 mode, Band Edge, Right Side



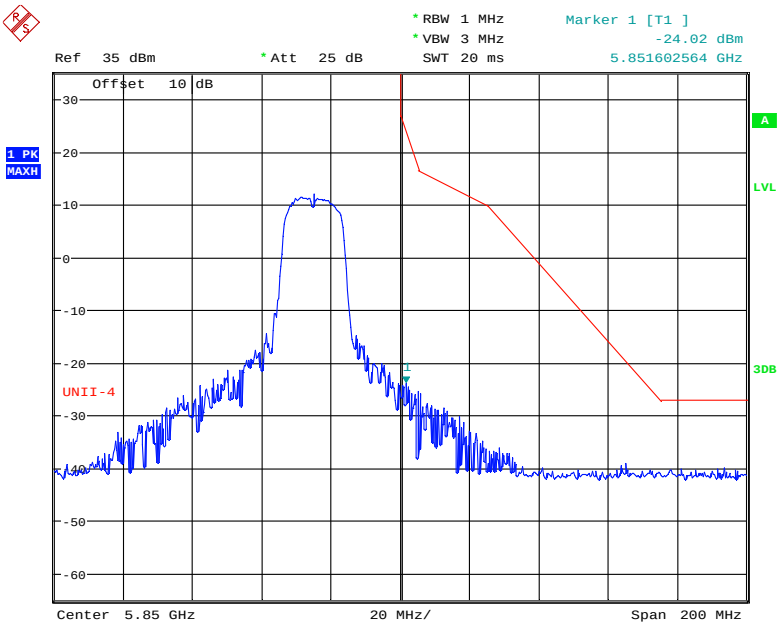

Date: 4.AUG.2018 11:33:32

## 802.11ac20 mode, Band Edge, Left Side



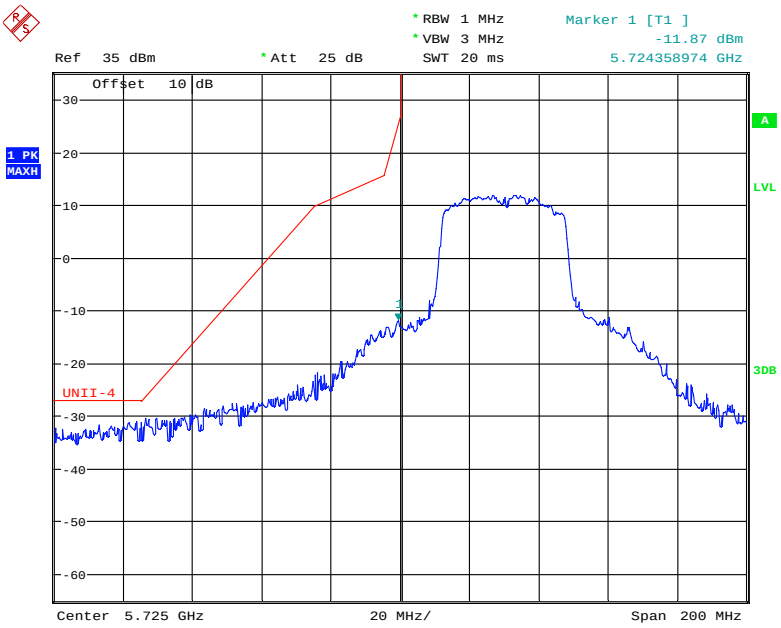

Date: 4.AUG.2018 11:30:35

## 802.11ac20 mode, Band Edge, Right Side



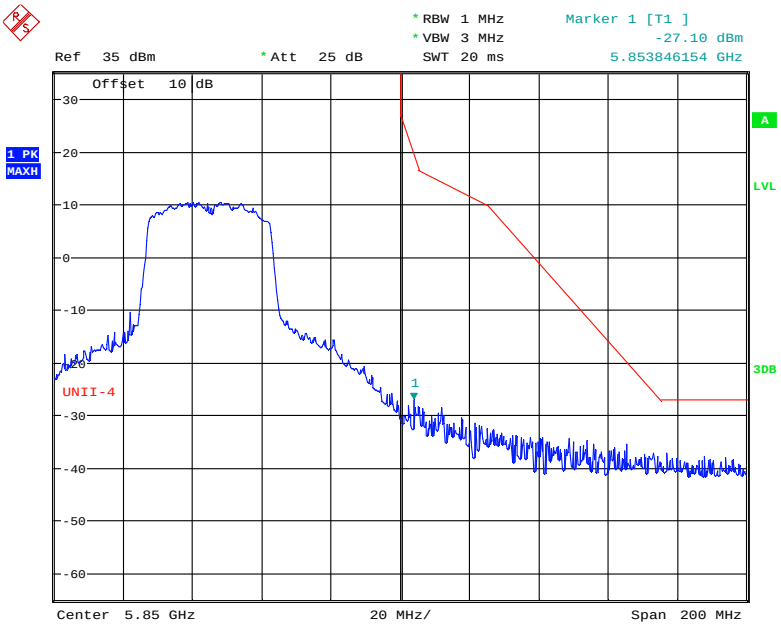

Date: 4.AUG.2018 11:32:08

## 802.11ac40 mode, Band Edge, Left Side



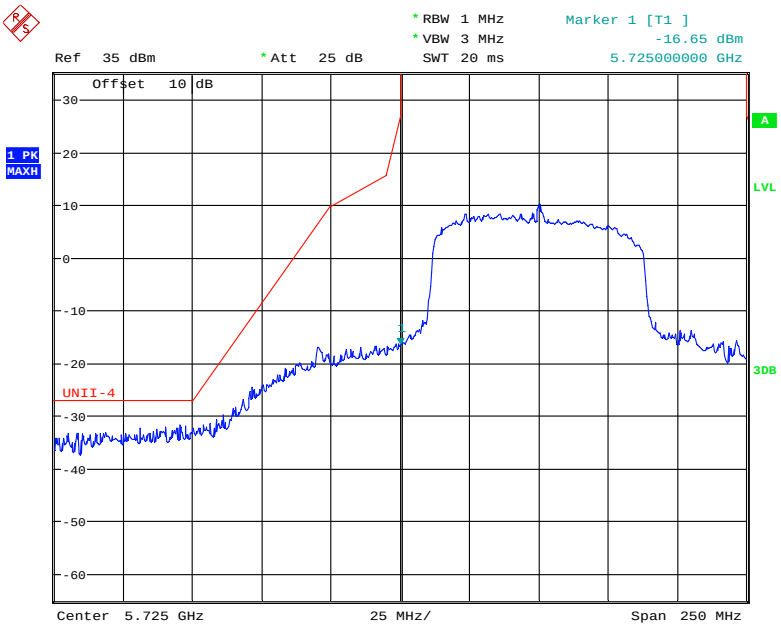

Date: 4.AUG.2018 11:37:14

## 802.11ac40 mode, Band Edge, Right Side



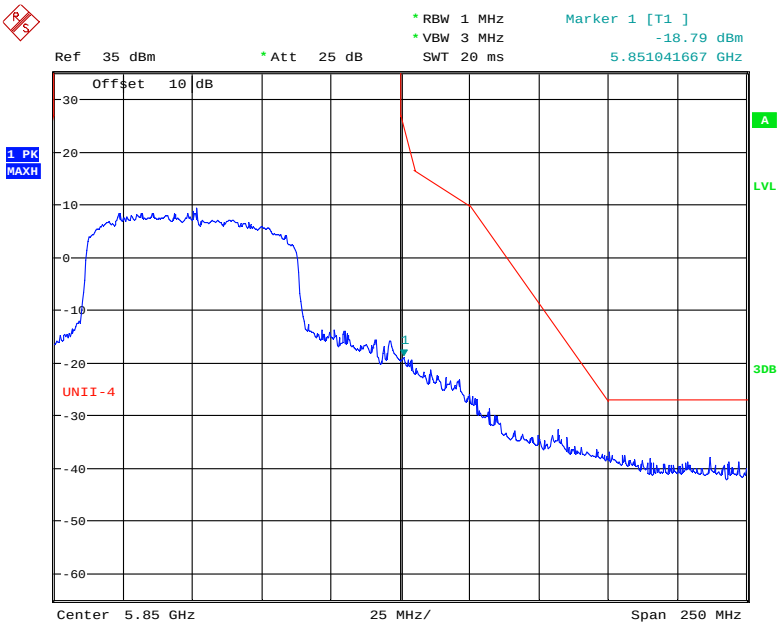

Date: 4.AUG.2018 11:38:34

## 802.11ac80 mode, Band Edge, Left Side




Date: 4.AUG.2018 11:41:10

## 802.11ac80 mode, Band Edge, Right Side




Date: 4.AUG.2018 11:39:59

# FCC §15.407(a) (1) – 26 dB & 6dB EMISSION BANDWIDTH

## Applicable Standard

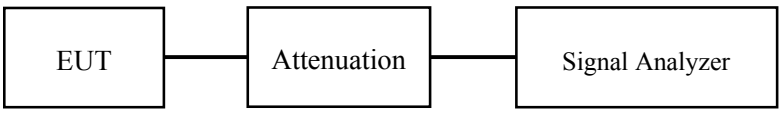
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

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

## Test Procedure

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

2. **Minimum Emission Bandwidth for the band 5.725-5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.




## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 26℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Kiki Kong on 2018-08-04 and 2018-08-10.*

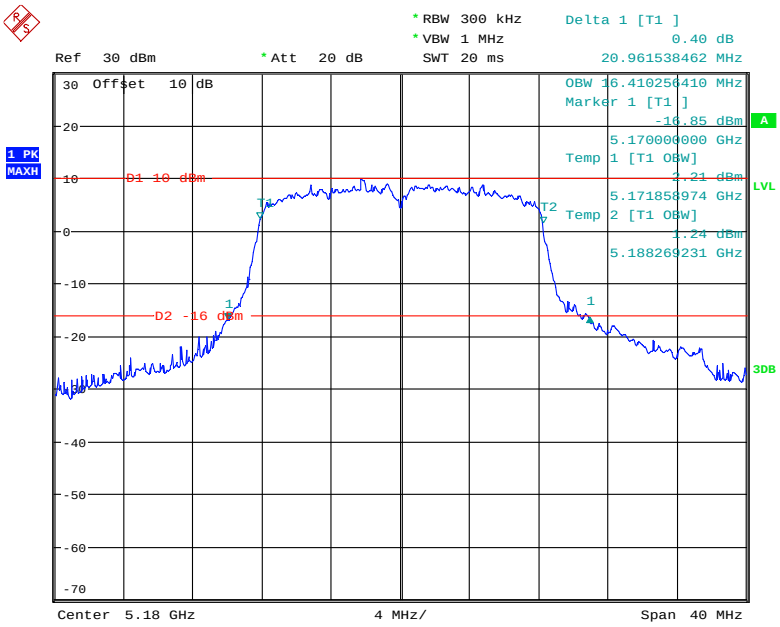
*EUT operation mode: Transmitting*

**Test Result:** Pass; please refer to the following tables and plots.

**5150 MHz - 5250 MHz:**

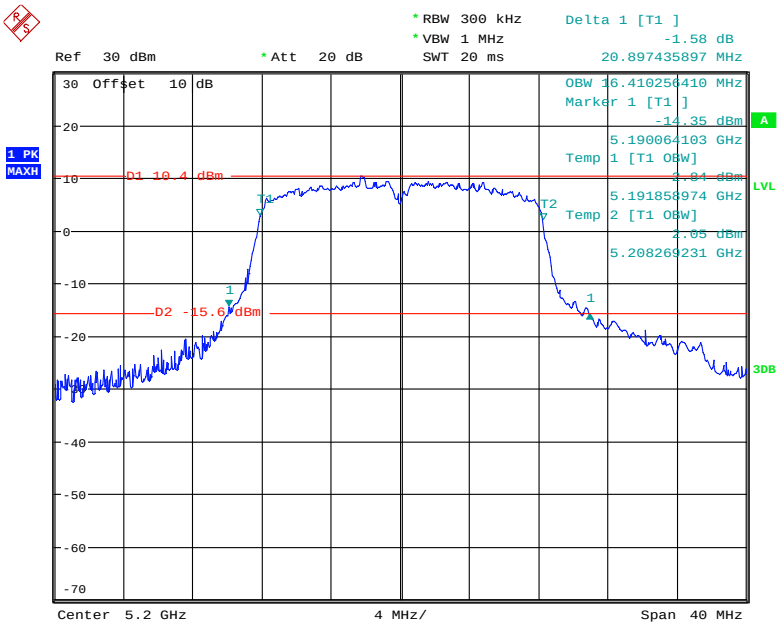
| Frequency (MHz) | 26 dB Bandwidth (MHz) | 99% Bandwidth (MHz) | Remark |
|---|---|---|---|
| **802.11a** | | | No transmitted signal in the 99% bandwidth extends into the U-NII-2A band |
| 5180 | 20.96 | 16.41 | |
| 5200 | 20.90 | 16.41 | |
| 5240 | 20.26 | 16.41 | |
| **802.11n20** | | | |
| 5180 | 21.92 | 17.56 | |
| 5200 | 20.90 | 17.50 | |
| 5240 | 21.79 | 17.50 | |
| **802.11n40** | | | |
| 5190 | 47.18 | 36.15 | |
| 5230 | 47.44 | 36.03 | |
| **802.11ac20** | | | |
| 5180 | 21.99 | 17.56 | |
| 5200 | 21.86 | 17.56 | |
| 5240 | 21.67 | 17.50 | |
| **802.11ac40** | | | |
| 5190 | 46.15 | 36.03 | |
| 5230 | 45.77 | 36.03 | |
| **802.11ac80** | | | |
| 5210 | 84.23 | 75.38 | |

## 802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz



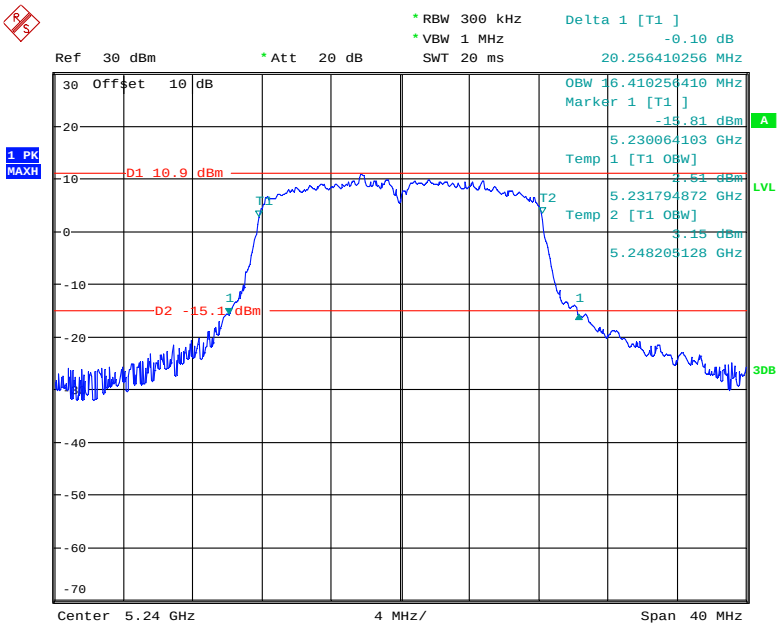

Date: 4.AUG.2018 13:10:34

## 802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz



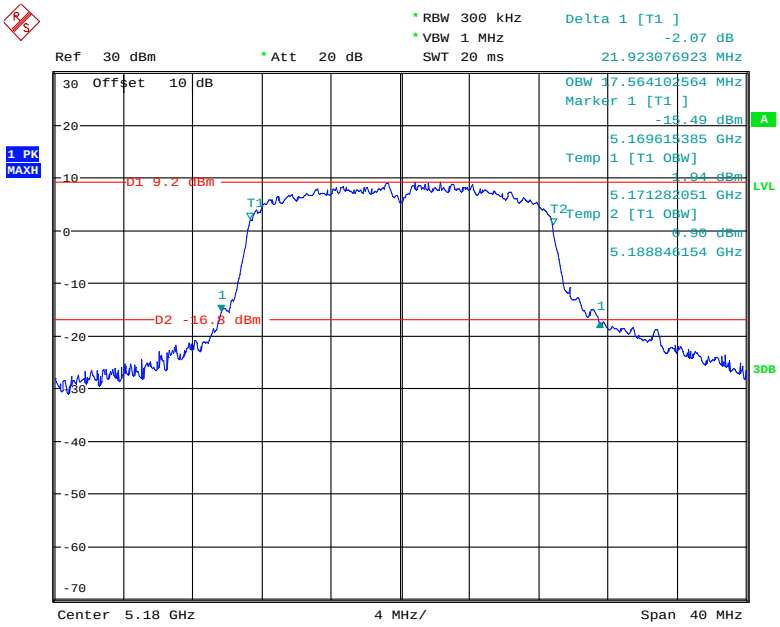

Date: 4.AUG.2018 13:15:44

## 802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



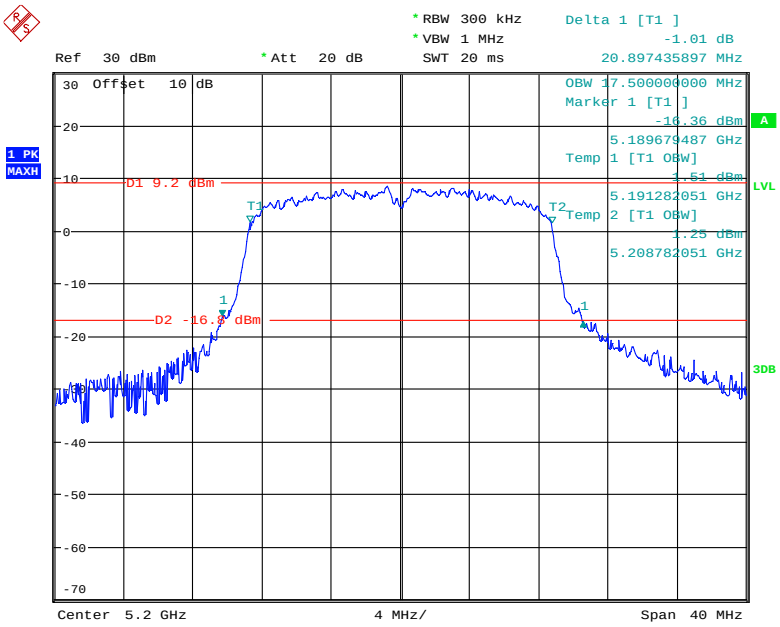

Date: 4.AUG.2018 13:17:29

## 802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz



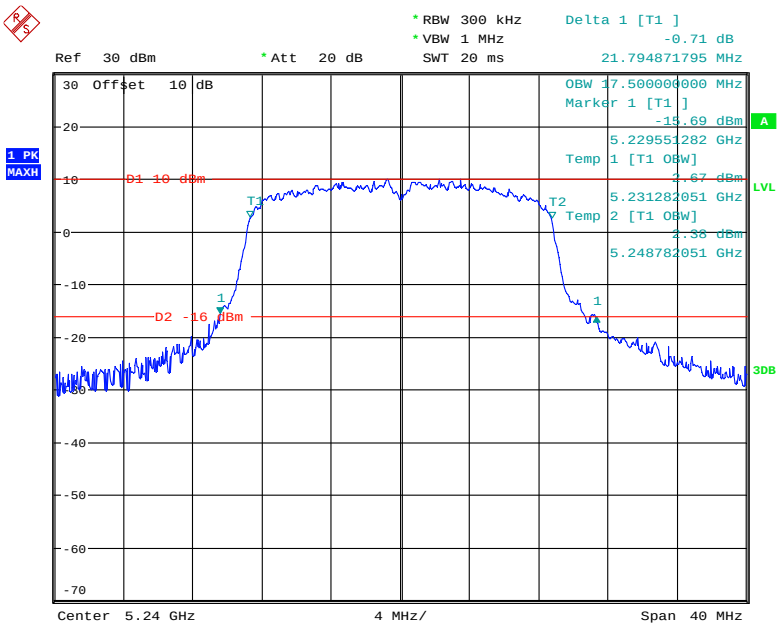

Date: 4.AUG.2018 13:22:09

## 802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz



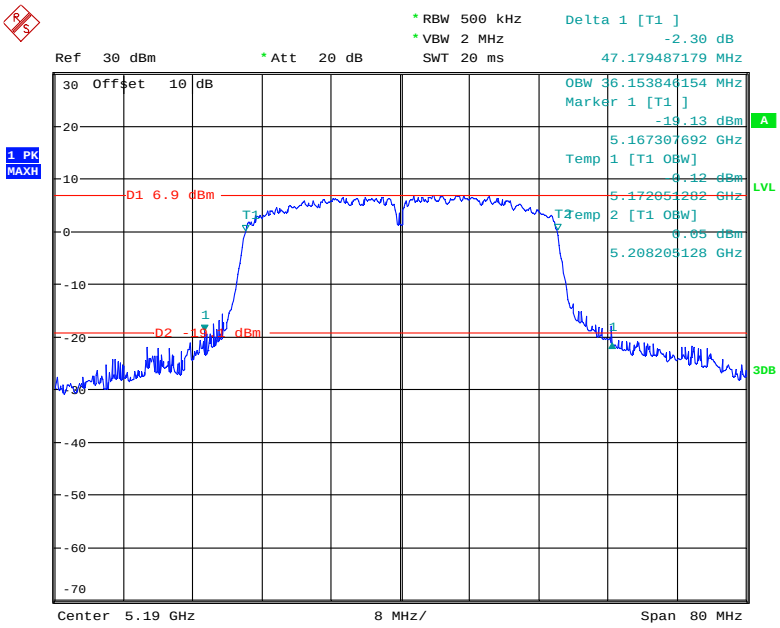

Date: 4.AUG.2018 13:23:26

## 802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



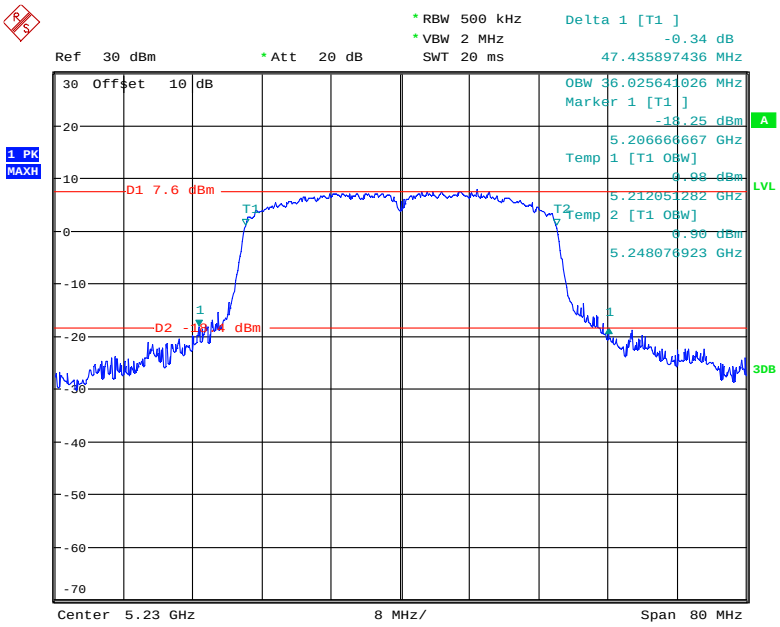

Date: 4.AUG.2018 13:25:34

## 802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5190 MHz



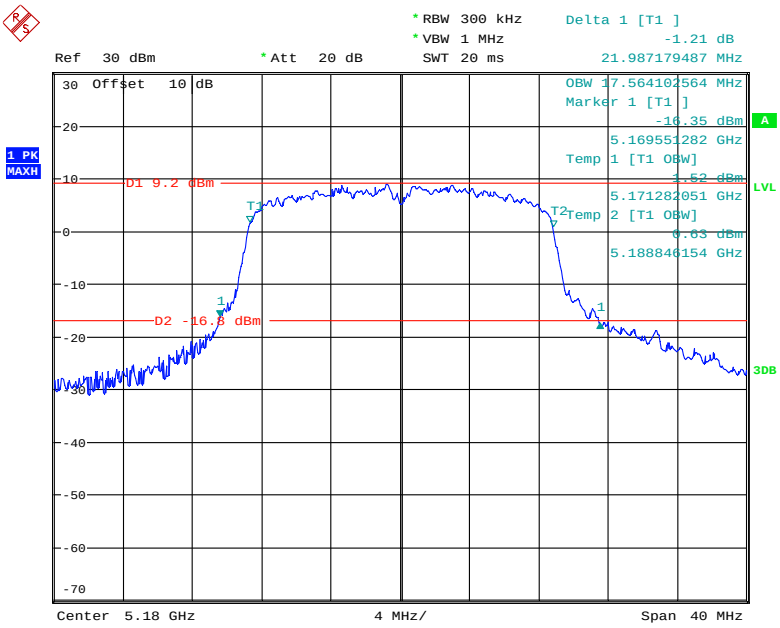

Date: 4.AUG.2018 13:52:34

## 802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz



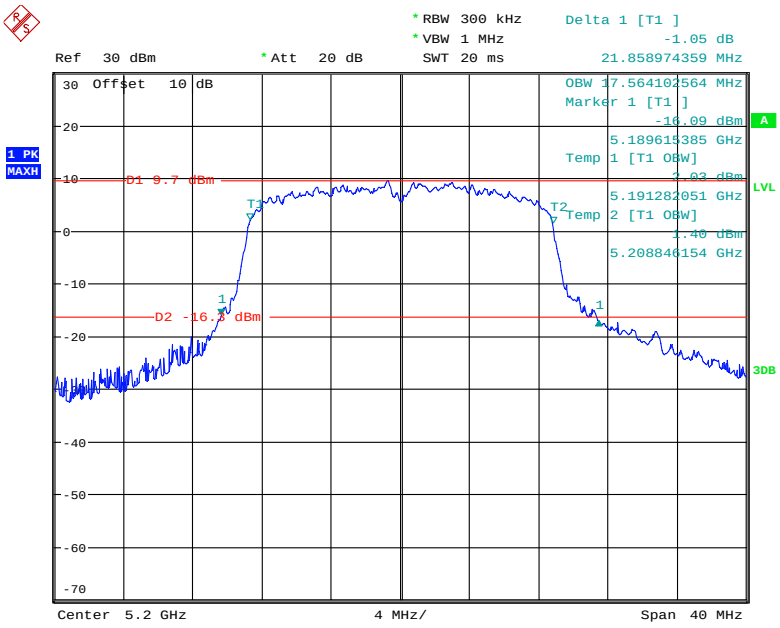

Date: 4.AUG.2018 13:50:16

## 802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz



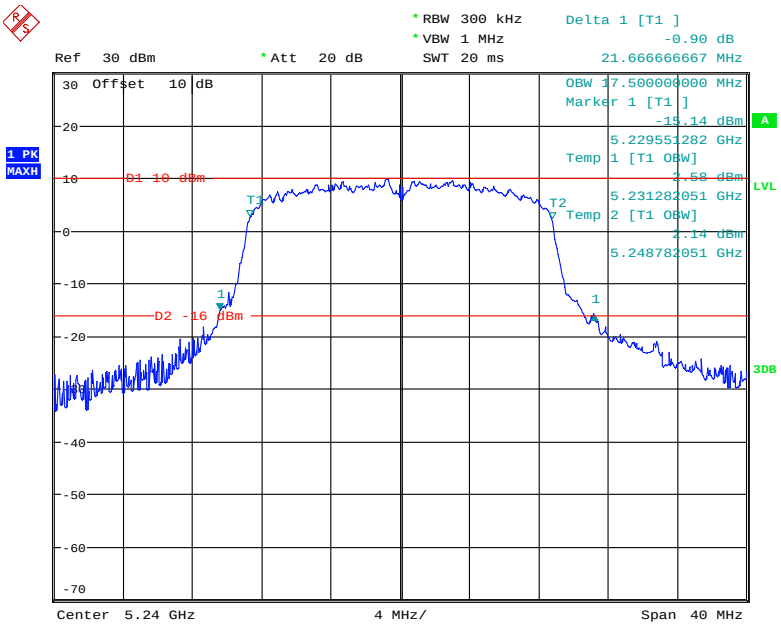

Date: 4.AUG.2018 13:31:41

## 802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz



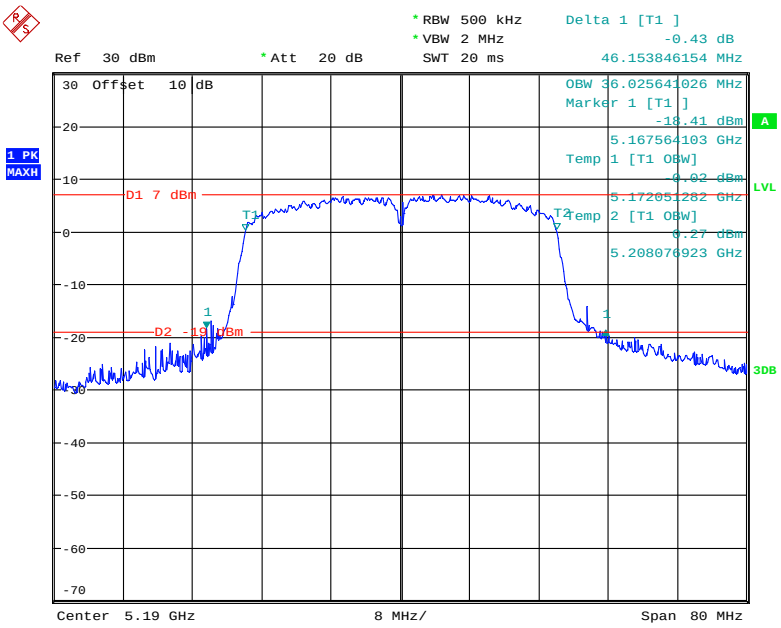

Date: 4.AUG.2018 13:30:17

## 802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



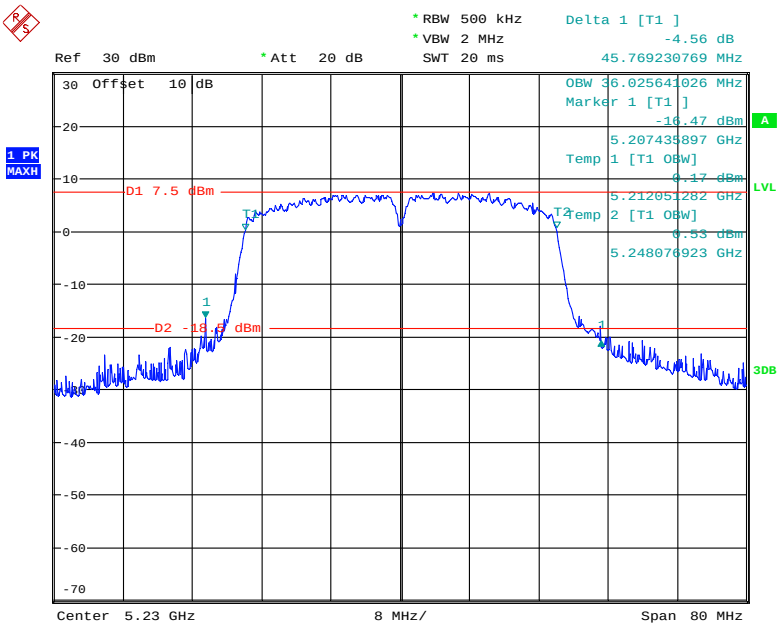

Date: 4.AUG.2018 13:28:10

## 802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5190 MHz



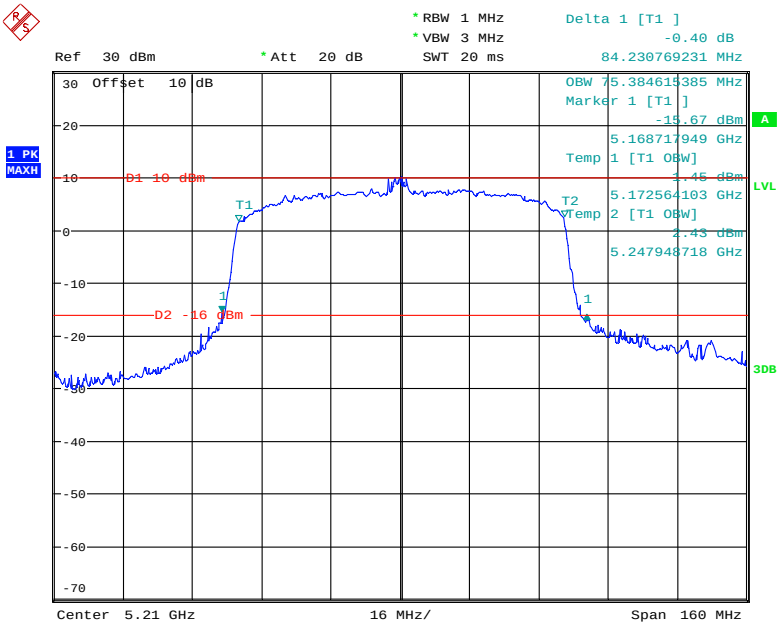

Date: 4.AUG.2018 13:54:51

## 802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz




Date: 4.AUG.2018 13:57:30

## 802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5210 MHz

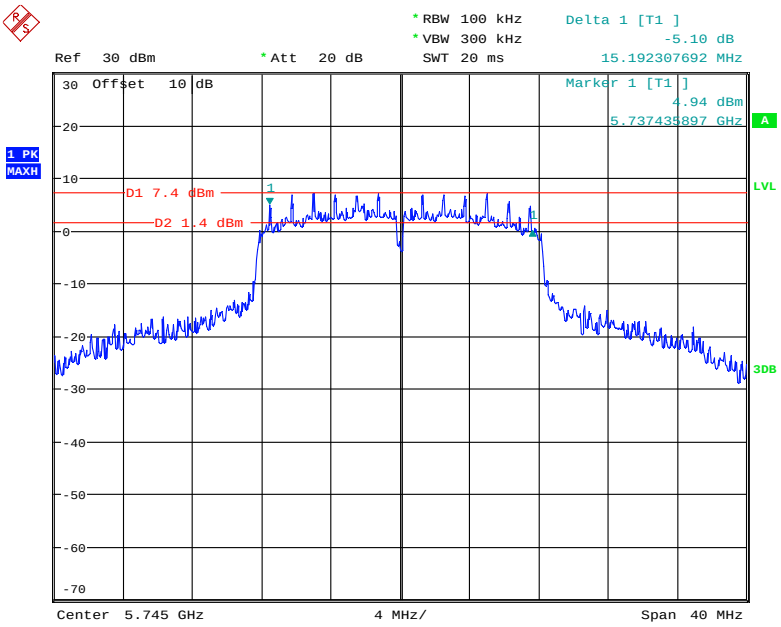



Date: 4.AUG.2018 14:00:34

**5725 MHz – 5850 MHz:**

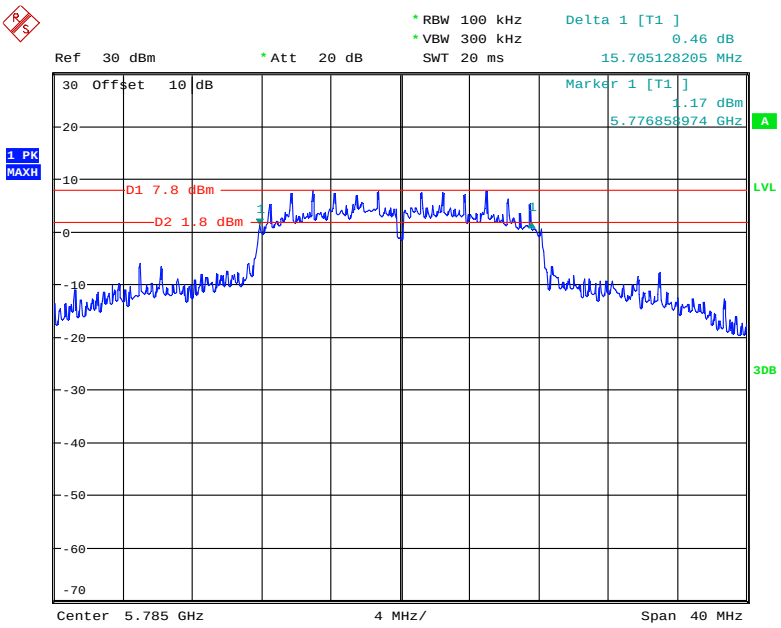
| Frequency (MHz) | 6 dB Bandwidth (MHz) | 99% Bandwidth (MHz) | Limit (MHz) | Remark |
|---|---|---|---|---|
| **802.11a** | | | | No transmitted signal in the 99% bandwidth extends into the U-NII-2C band |
| 5745 | 15.19 | 16.73 | 0.5 | |
| 5785 | 15.71 | 16.86 | 0.5 | |
| 5825 | 15.26 | 17.12 | 0.5 | |
| **802.11n20** | | | | |
| 5745 | 15.19 | 18.65 | 0.5 | |
| 5785 | 15.19 | 17.50 | 0.5 | |
| 5825 | 15.19 | 18.21 | 0.5 | |
| **802.11n40** | | | | |
| 5755 | 35.29 | 36.41 | 0.5 | |
| 5795 | 35.32 | 36.15 | 0.5 | |
| **802.11ac20** | | | | |
| 5745 | 15.19 | 17.69 | 0.5 | |
| 5785 | 16.03 | 17.50 | 0.5 | |
| 5825 | 15.51 | 17.50 | 0.5 | |
| **802.11ac40** | | | | |
| 5755 | 35.29 | 37.05 | 0.5 | |
| 5795 | 35.19 | 36.41 | 0.5 | |
| **802.11ac80** | | | | |
| 5775 | 72.69 | 75.90 | 0.5 | |

## 802.11a mode, 6dB Emission Bandwidth, 5745 MHz



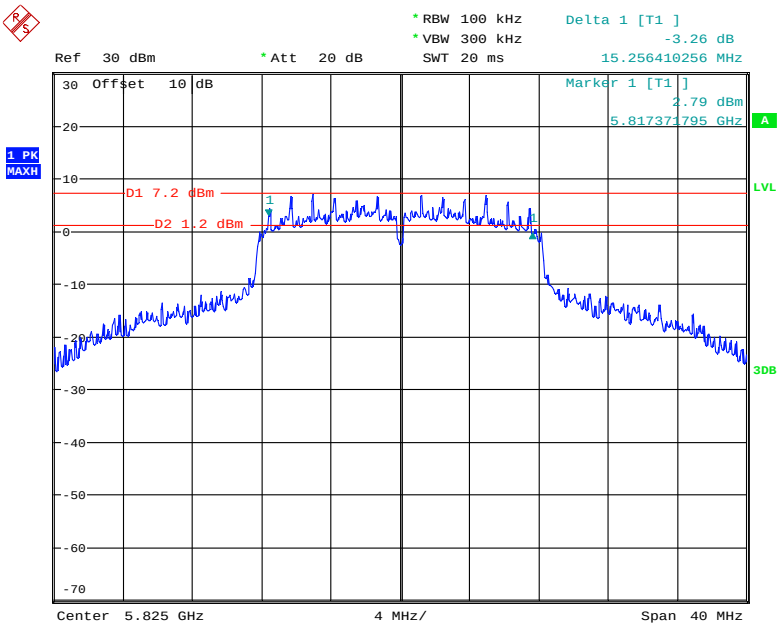

Date: 4.AUG.2018 15:16:29

## 802.11a mode, 6dB Emission Bandwidth, 5785 MHz



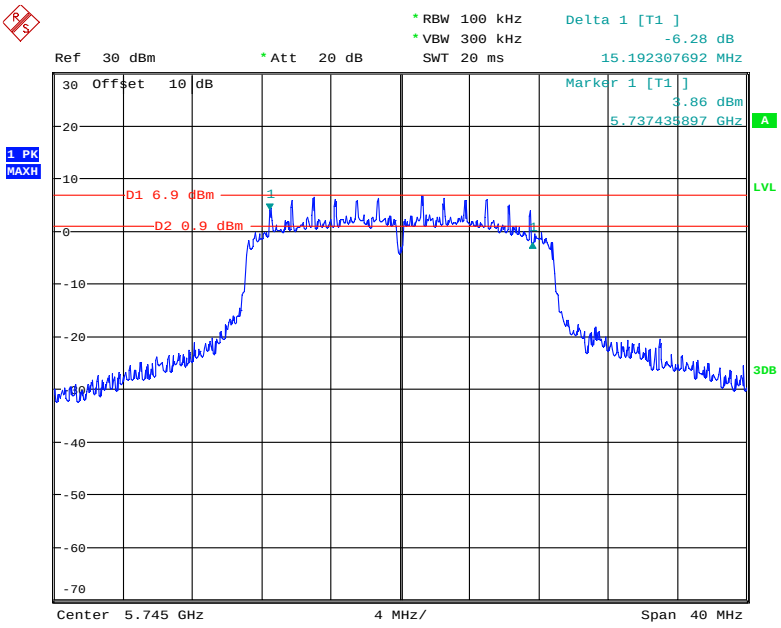

Date: 4.AUG.2018 15:14:46

## 802.11a mode, 6dB Emission Bandwidth, 5825 MHz



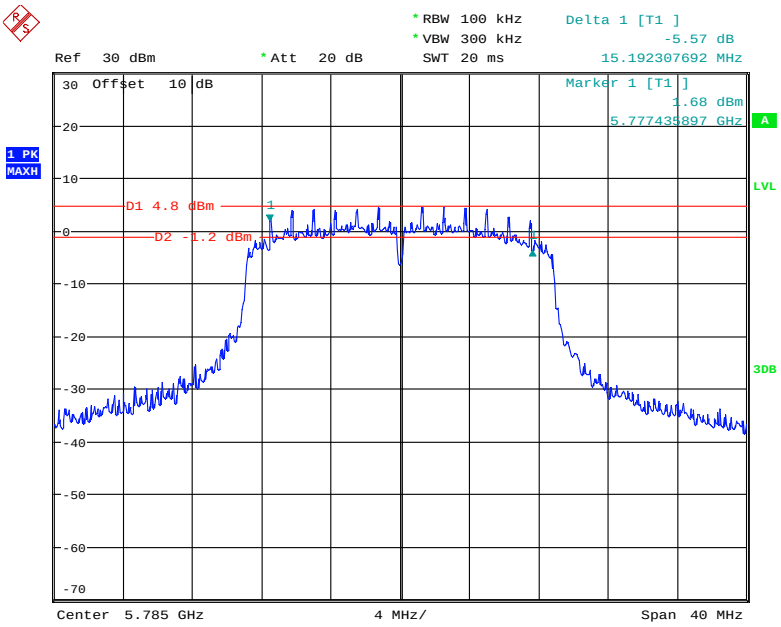

Date: 4.AUG.2018 15:13:18

## 802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



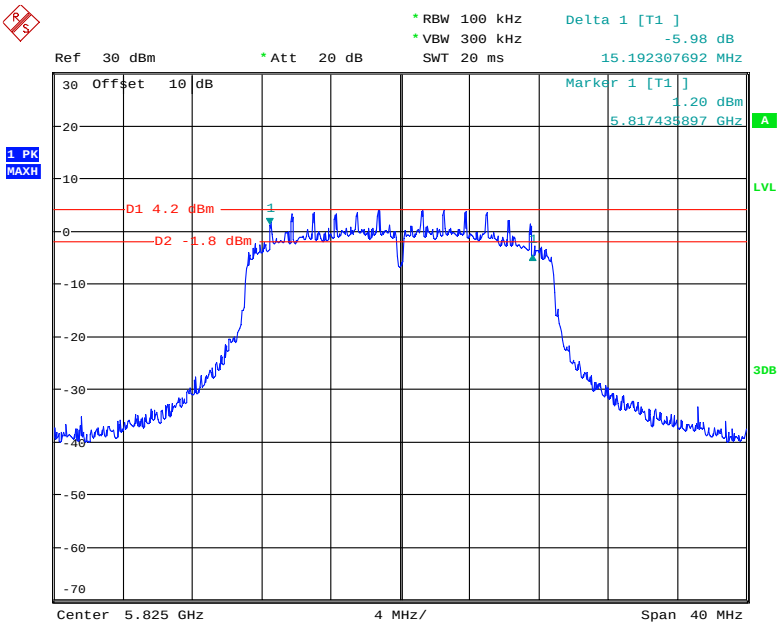

Date: 4.AUG.2018 15:18:48

## 802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



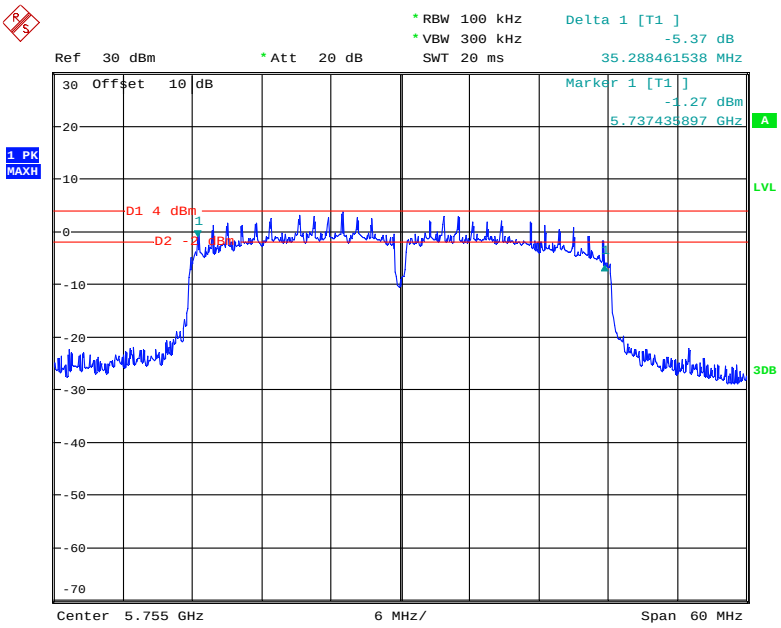

Date: 4.AUG.2018 15:20:23

## 802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



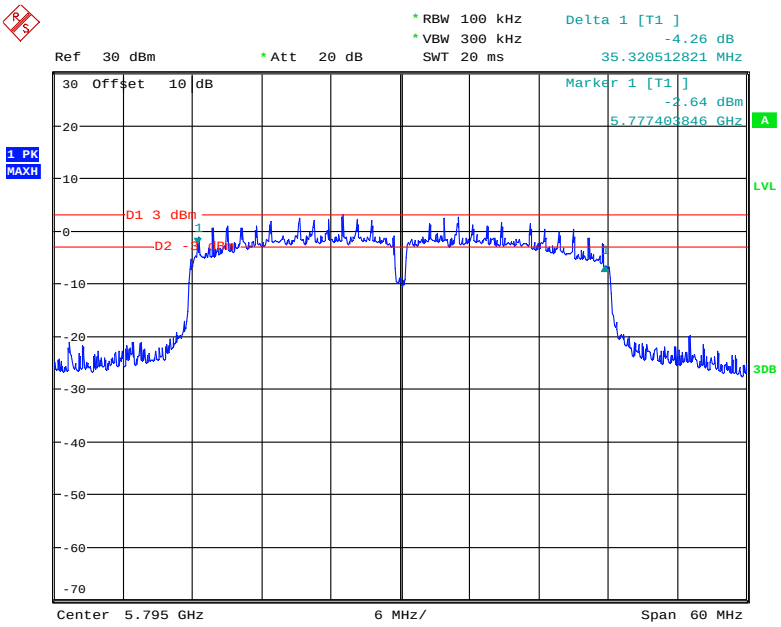

Date: 4.AUG.2018 15:21:37

## 802.11n40 mode, 6dB Emission Bandwidth, 5755 MHz



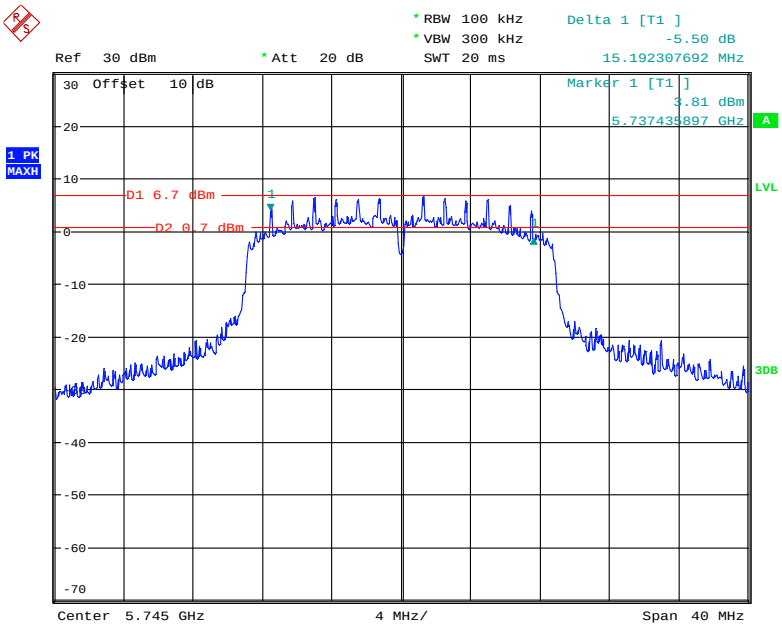

Date: 4.AUG.2018 15:28:16

## 802.11n40 mode, 6dB Emission Bandwidth, 5795 MHz



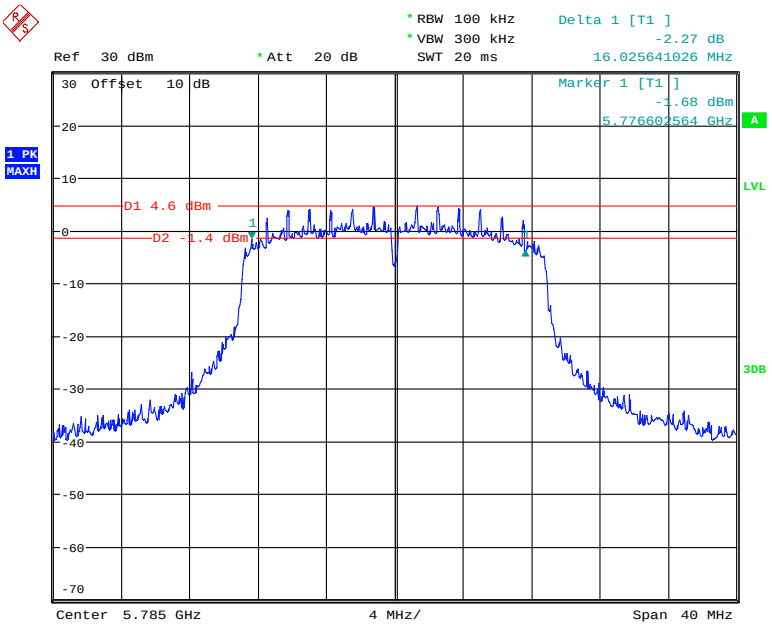

Date: 4.AUG.2018 15:29:49

## 802.11ac20 mode, 6dB Emission Bandwidth, 5745 MHz



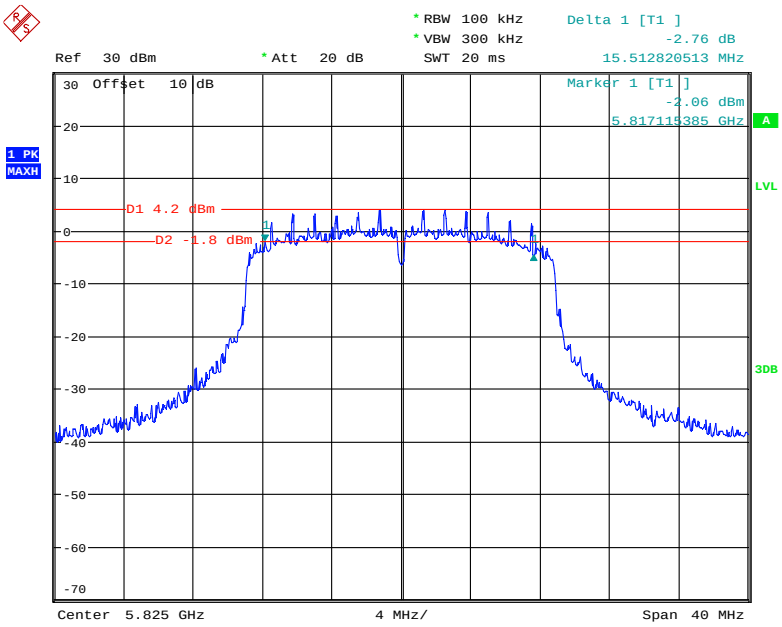

Date: 4.AUG.2018 15:25:43

## 802.11ac20 mode, 6dB Emission Bandwidth, 5785 MHz



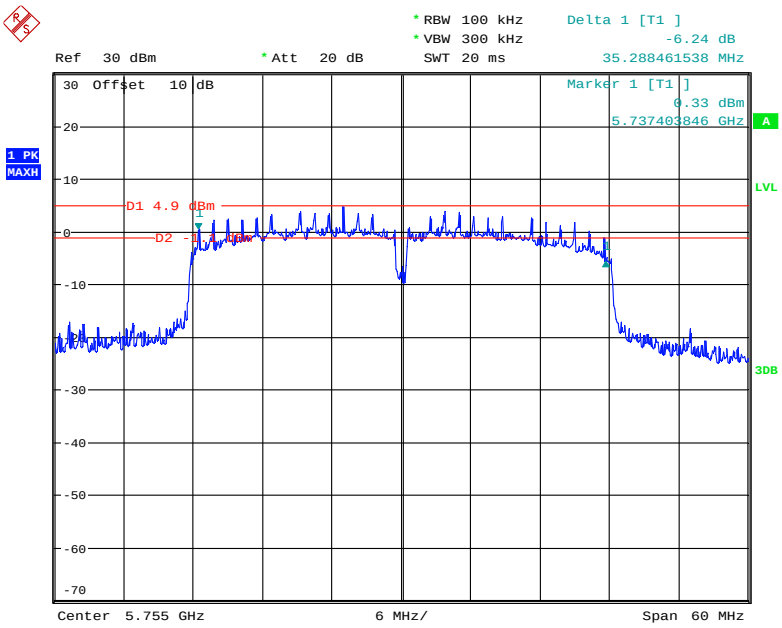

Date: 4.AUG.2018 15:24:04

## 802.11ac20 mode, 6dB Emission Bandwidth, 5825 MHz



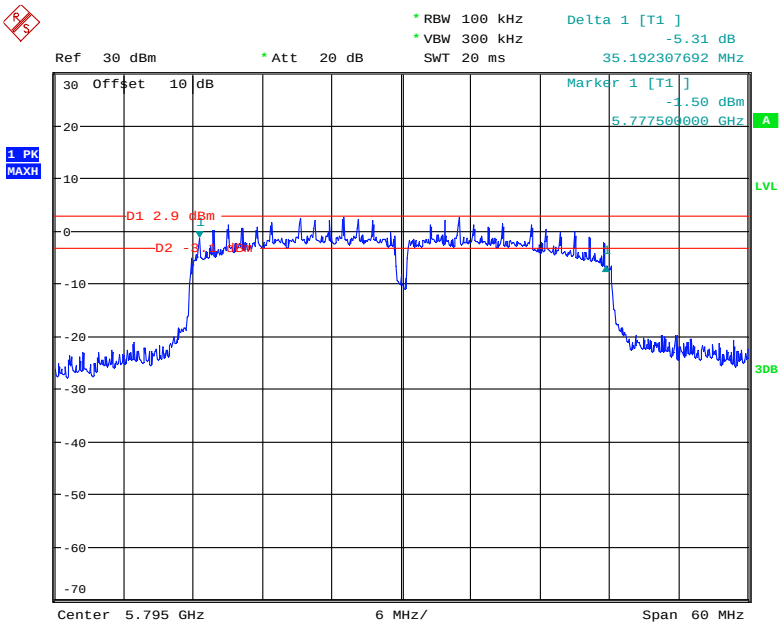

Date: 4.AUG.2018 15:22:44

## 802.11ac40 mode, 6dB Emission Bandwidth, 5755 MHz



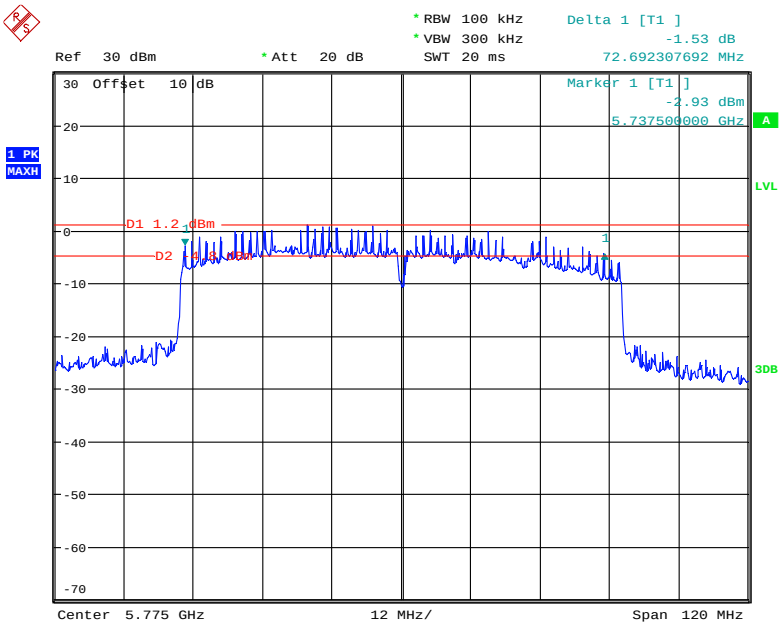

Date: 4.AUG.2018 15:31:25

## 802.11ac40 mode, 6dB Emission Bandwidth, 5795 MHz



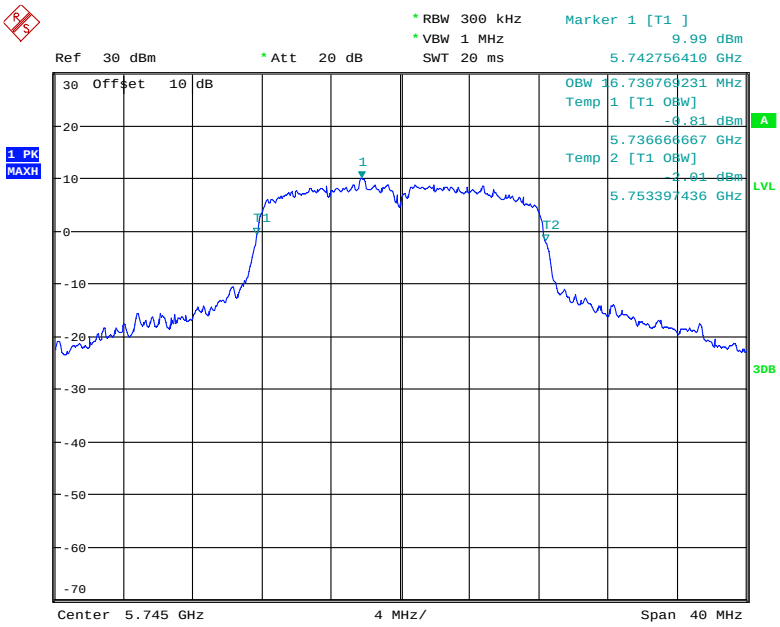

Date: 4.AUG.2018 15:32:39

## 802.11ac80 mode, 6dB Emission Bandwidth, 5775 MHz



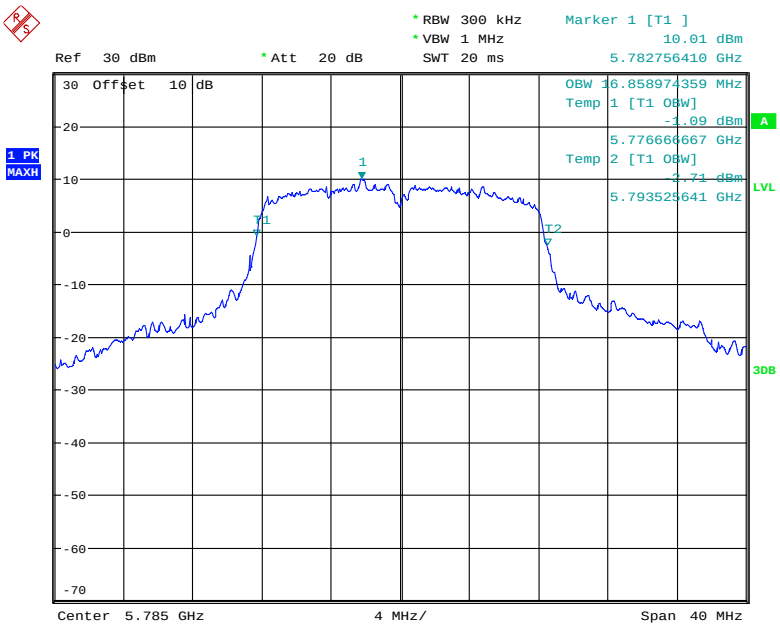

Date: 4.AUG.2018 15:36:34

## 802.11a mode, 99% Occupied Bandwidth, 5745 MHz



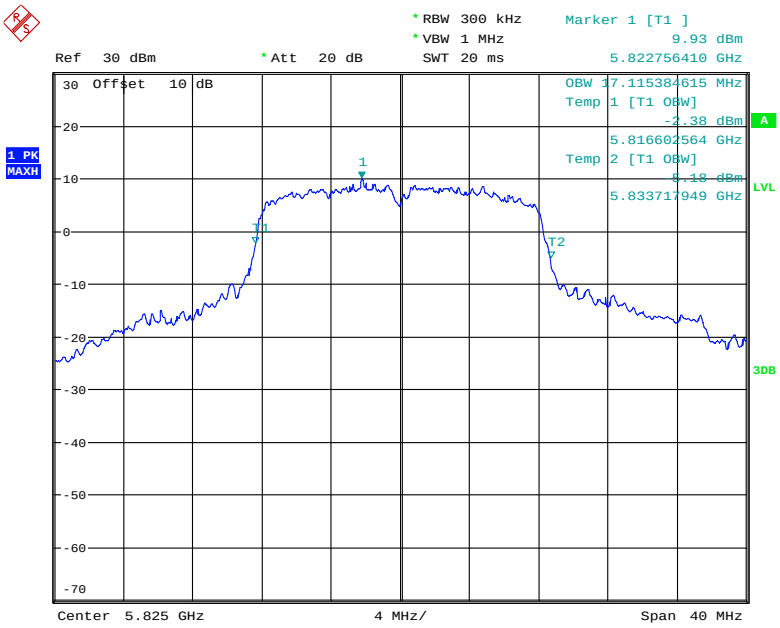

Date: 4.AUG.2018 14:58:15

## 802.11a mode, 99% Occupied Bandwidth, 5785 MHz



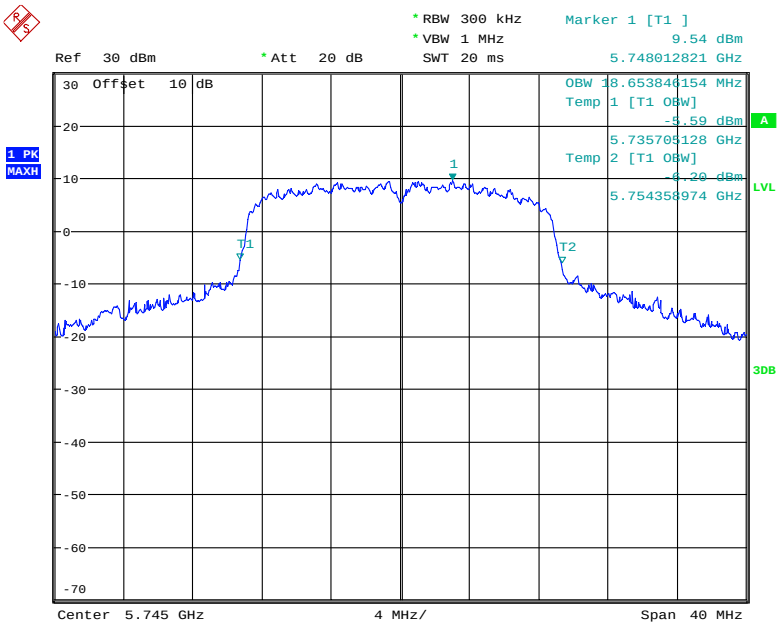

Date: 4.AUG.2018 14:59:02

## 802.11a mode, 99% Occupied Bandwidth, 5825 MHz



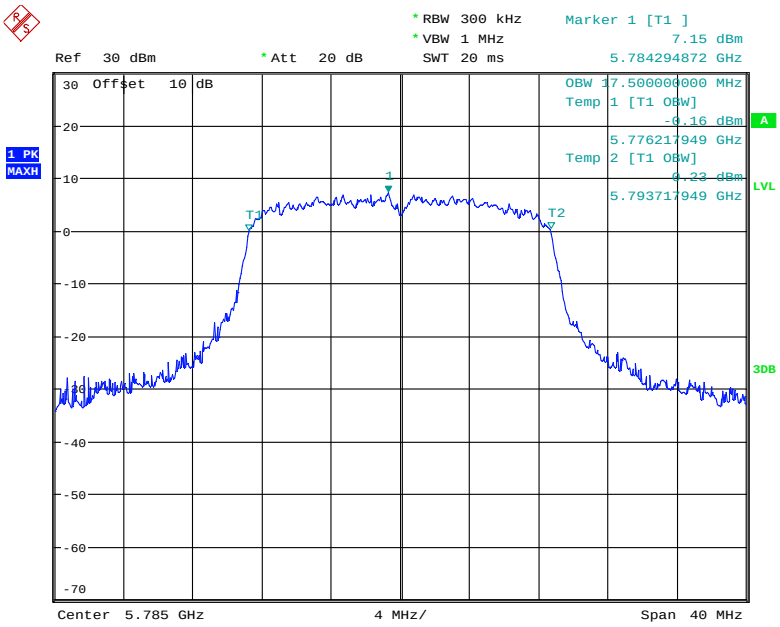

Date: 10.AUG.2018 19:55:20

## 802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



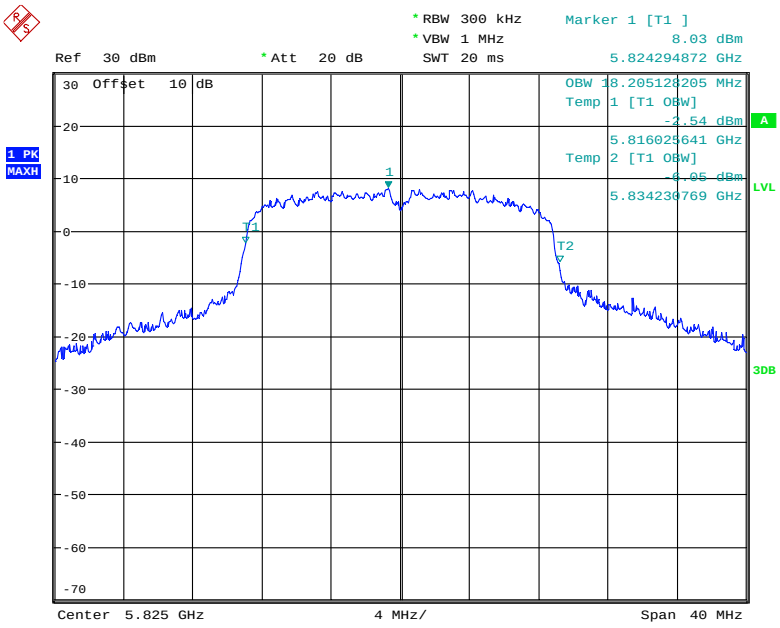

Date: 4.AUG.2018 15:00:15

## 802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



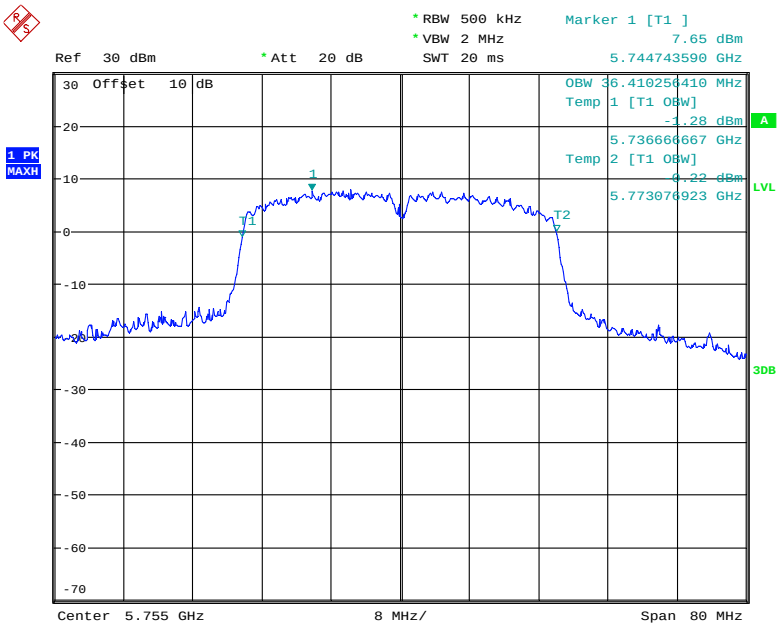

Date: 4.AUG.2018 15:00:46

## 802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



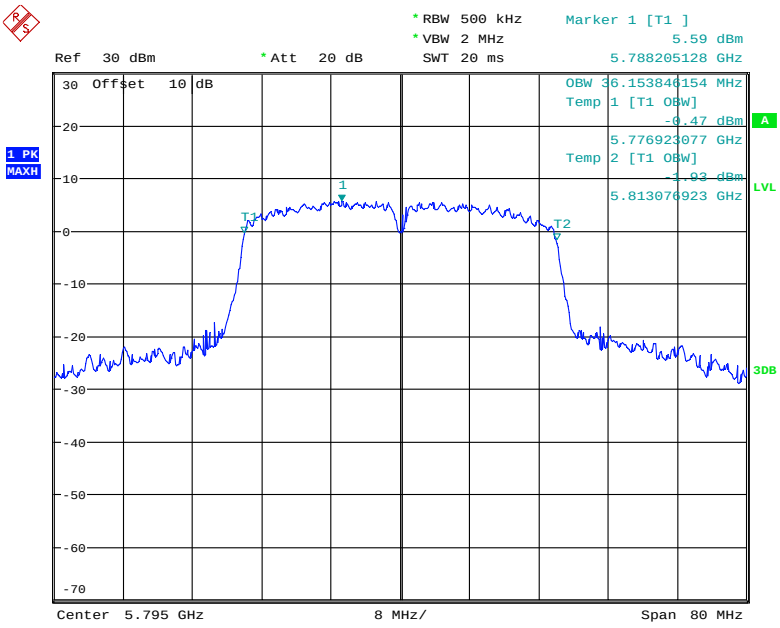

Date: 4.AUG.2018 15:01:25

## 802.11n40 mode, 99% Occupied Bandwidth, 5755 MHz



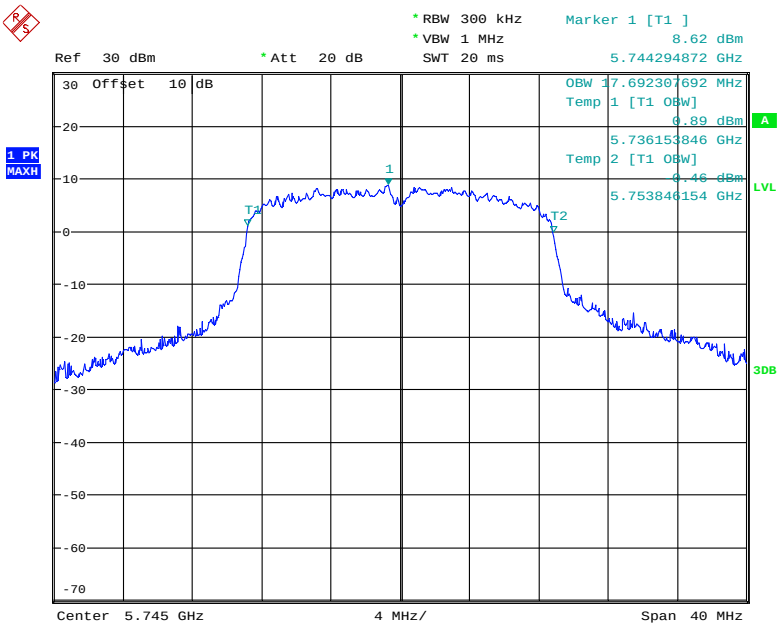

Date: 4.AUG.2018 15:04:23

## 802.11n40 mode, 99% Occupied Bandwidth, 5795 MHz



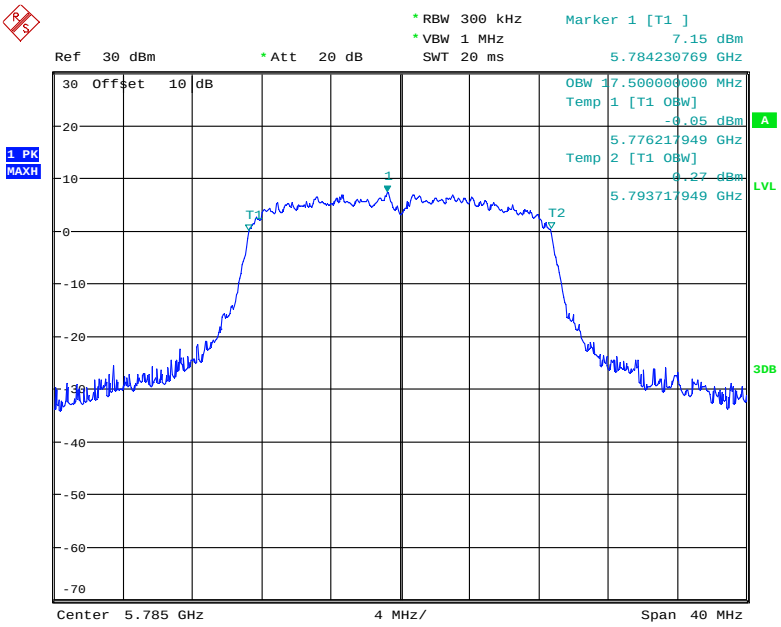

Date: 4.AUG.2018 15:04:57

## 802.11ac20 mode, 99% Occupied Bandwidth, 5745 MHz



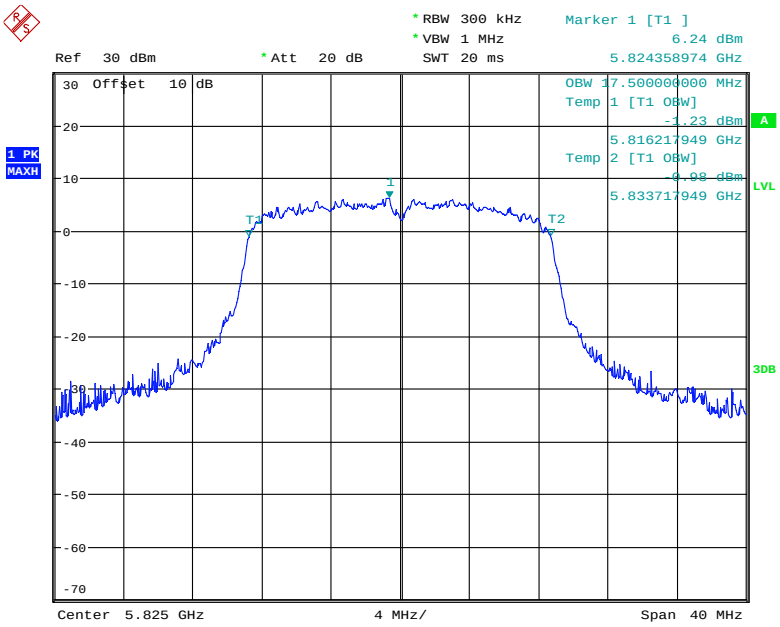

Date: 4.AUG.2018 15:02:14

## 802.11ac20 mode, 99% Occupied Bandwidth, 5785 MHz



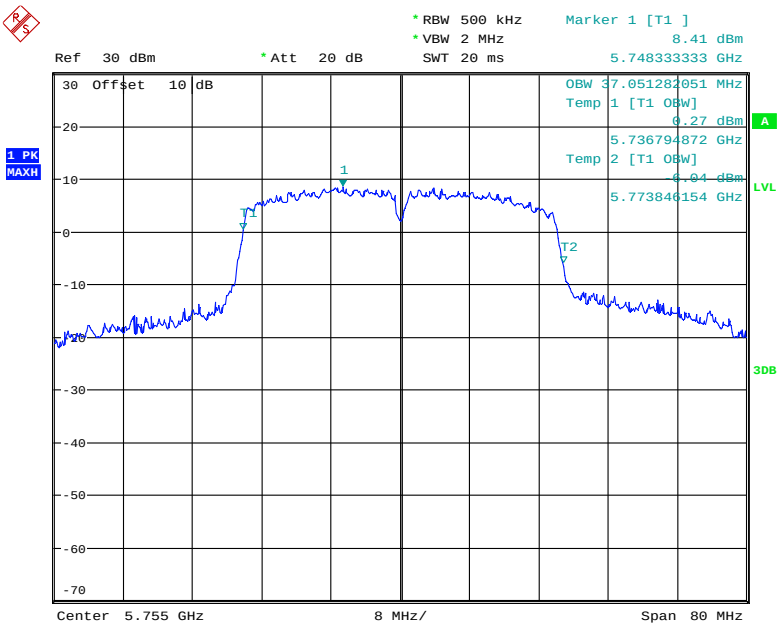

Date: 4.AUG.2018 15:02:51

## 802.11ac20 mode, 99% Occupied Bandwidth, 5825 MHz



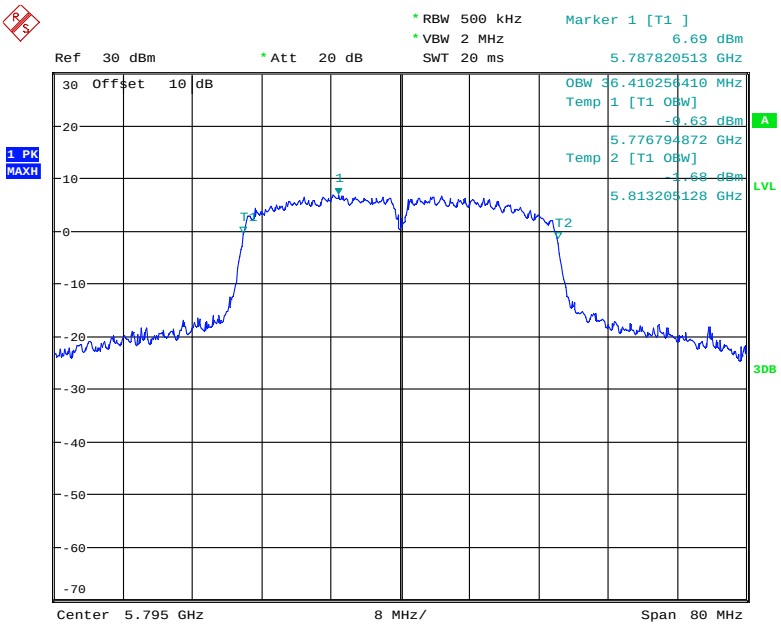

Date: 4.AUG.2018 15:03:16

## 802.11ac40 mode, 99% Occupied Bandwidth, 5755 MHz



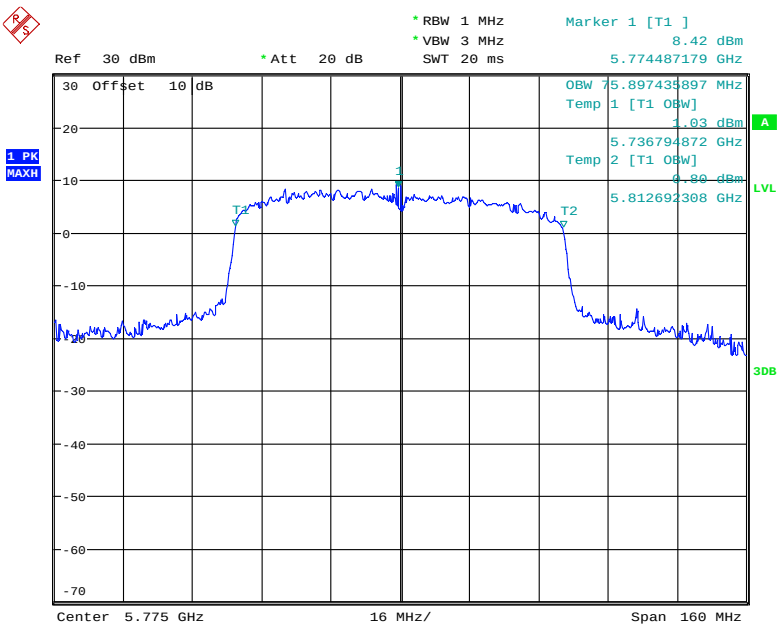

Date: 4.AUG.2018 15:05:44

## 802.11ac40 mode, 99% Occupied Bandwidth, 5795 MHz




Date: 4.AUG.2018 15:06:25

## 802.11ac80 mode, 99% Occupied Bandwidth, 5775 MHz




Date: 4.AUG.2018 15:07:21

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

## Applicable Standard

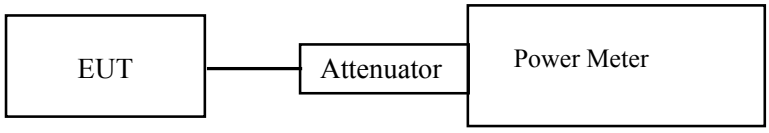
For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

## Test Procedure

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



## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 26 ℃ |
| **Relative Humidity:** | 54 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Kiki Kong on 2018-08-02.*

*EUT operation mode: Transmitting*

**Test Result:** Pass

Please refer to the following tables.

**5150 MHz – 5250 MHz**

| Frequency (MHz) | Output Power (dBm) | Limit (dBm) |
|---|---|---|
| 802.11a | | |
| 5180 | 18.22 | 24 |
| 5200 | 18.58 | |
| 5240 | 17.86 | |
| 802.11n20 | | |
| 5180 | 18.12 | 24 |
| 5200 | 17.66 | |
| 5240 | 17.76 | |
| 802.11n40 | | |
| 5190 | 17.29 | 24 |
| 5230 | 17.65 | |
| 802.11ac20 | | |
| 5180 | 17.94 | 24 |
| 5200 | 17.43 | |
| 5240 | 17.39 | |
| 802.11ac40 | | |
| 5190 | 16.17 | 24 |
| 5230 | 16.85 | |
| 802.11ac80 | | |
| 5210 | 16.78 | 24 |

**5725 MHz – 5825 MHz:**

| Frequency (MHz) | Output Power (dBm) | Limit (dBm) |
|---|---|---|
| 802.11a | | |
| 5745 | 17.08 | 30 |
| 5785 | 17.59 | |
| 5825 | 17.55 | |
| 802.11n20 | | |
| 5745 | 17.59 | 30 |
| 5785 | 17.58 | |
| 5825 | 17.89 | |
| 802.11n40 | | |
| 5755 | 16.91 | 30 |
| 5795 | 16.82 | |
| 802.11ac20 | | |
| 5745 | 17.60 | 30 |
| 5785 | 17.66 | |
| 5825 | 17.56 | |
| 802.11ac40 | | |
| 5755 | 17.57 | 30 |
| 5795 | 16.92 | |
| 802.11ac80 | | |
| 5775 | 17.19 | 30 |

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

## Applicable Standard

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

## Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW $\geqslant$ 1/T, where T is defined in section II.B.l.a).
b) Set VBW $\geqslant$ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 26 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101 kPa |

*The testing was performed by Kiki Kong on 2018-08-04.*

*EUT operation mode: Transmitting*

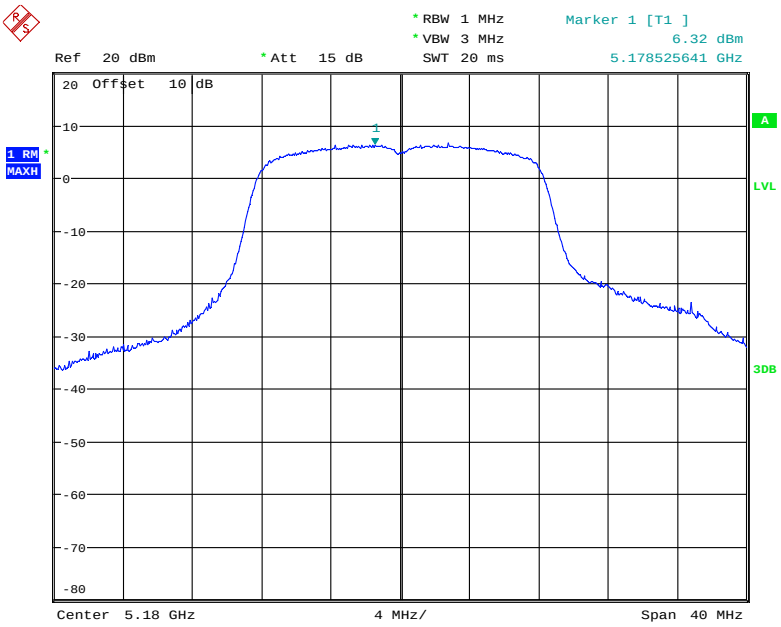
**Test Result:** Pass

Please refer to the following tables and plots.

### 5150 MHz – 5250 MHz

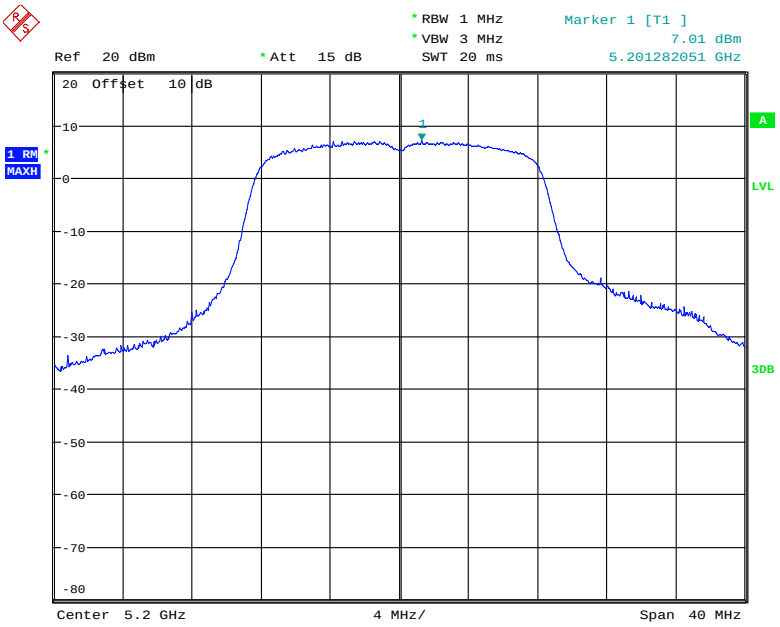
| Frequency (MHz) | Power Spectral Density (dBm/MHz) | Limit (dBm/MHz) |
|---|---|---|
| **802.11a** | | |
| 5180 | 6.32 | 11 |
| 5200 | 7.01 | |
| 5240 | 7.32 | |
| **802.11n20** | | |
| 5180 | 6.60 | 11 |
| 5200 | 6.02 | |
| 5240 | 7.55 | |
| **802.11n40** | | |
| 5190 | 2.19 | 11 |
| 5230 | 2.85 | |
| **802. 11ac20** | | |
| 5180 | 6.49 | 11 |
| 5200 | 6.91 | |
| 5240 | 7.48 | |
| **802. 11ac40** | | |
| 5190 | 2.54 | 11 |
| 5230 | 2.90 | |
| **802. 11ac80** | | |
| 5210 | 0.04 | 11 |

## 802.11a mode, Power Spectral Density, 5180 MHz



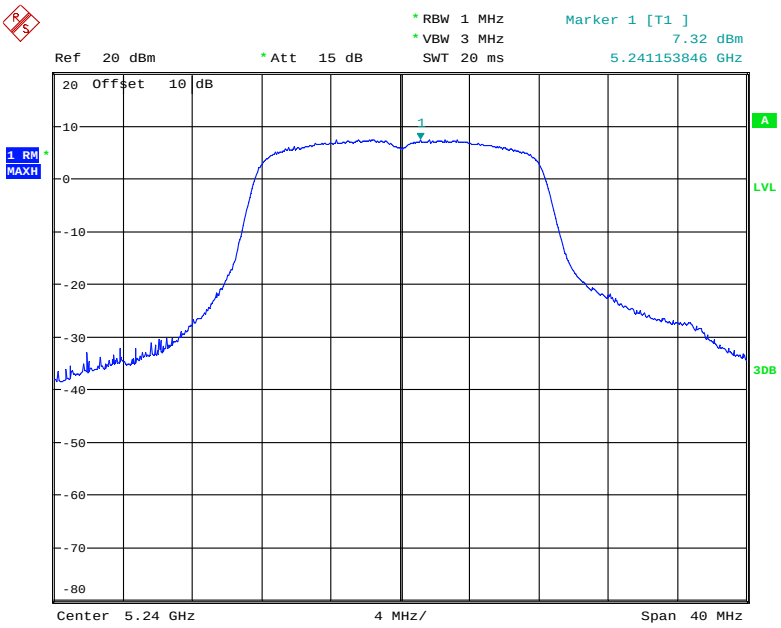

Date: 4.AUG.2018 16:08:24

## 802.11a mode, Power Spectral Density, 5200 MHz



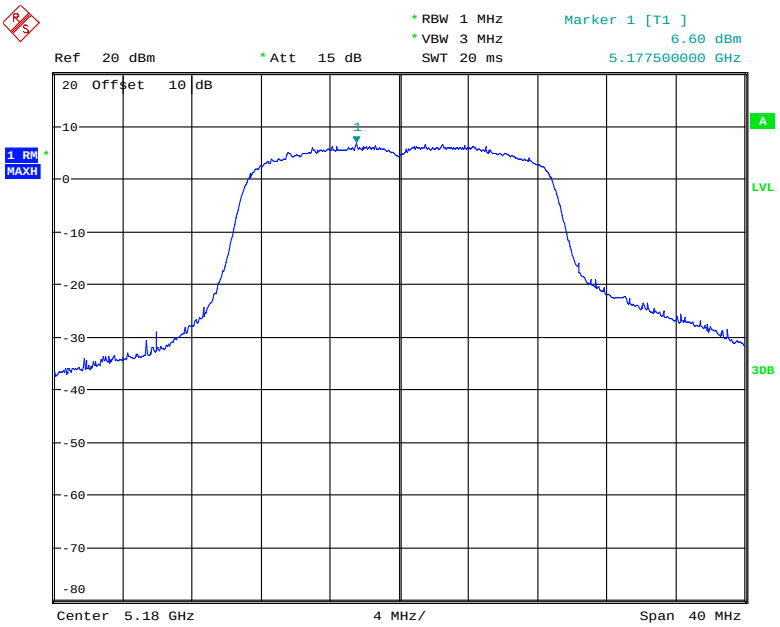

Date: 4.AUG.2018 16:08:00

## 802.11a mode, Power Spectral Density, 5240 MHz



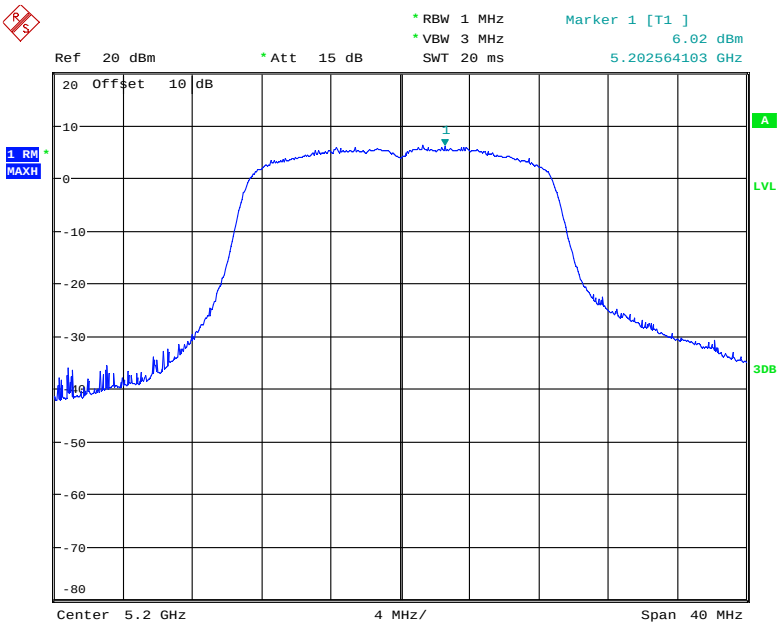

Date: 4.AUG.2018 16:07:29

## 802.11n20 mode, Power Spectral Density, 5180 MHz



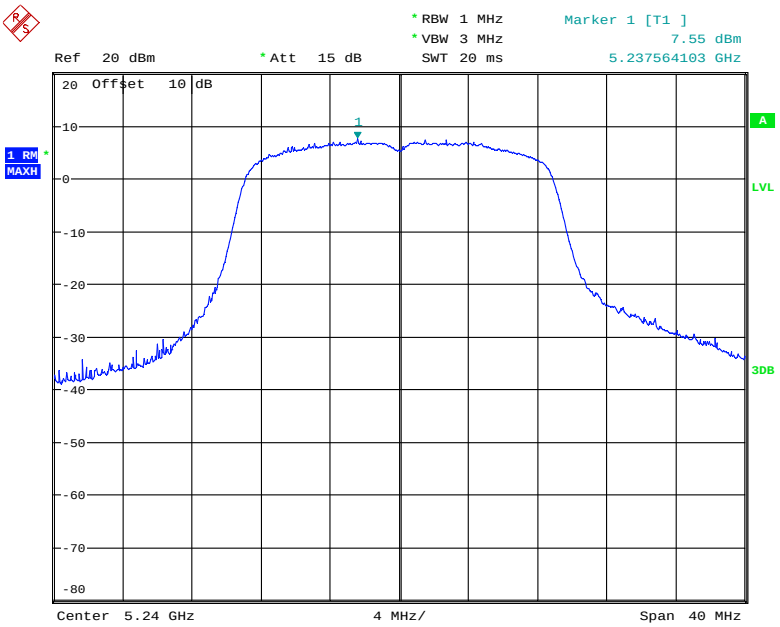

Date: 4.AUG.2018 16:09:00

## 802.11n20 mode, Power Spectral Density, 5200 MHz



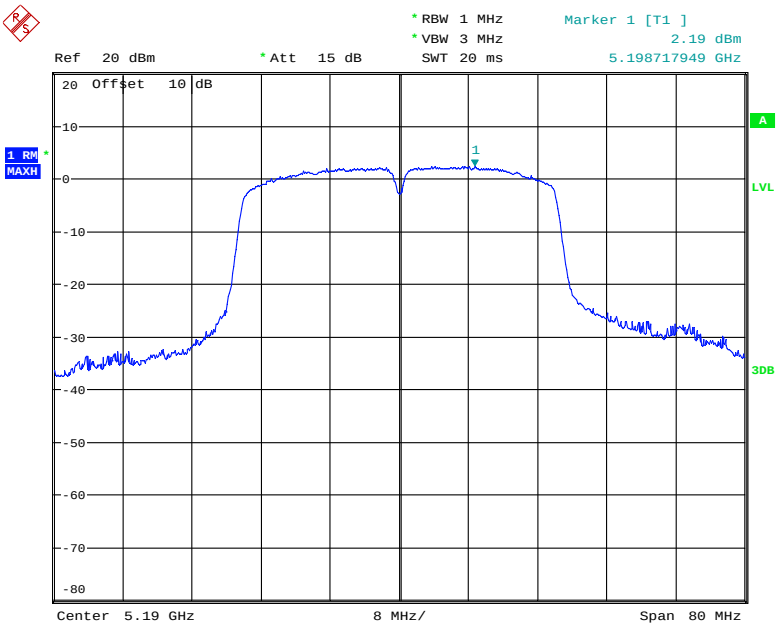

Date: 4.AUG.2018 16:09:21

## 802.11n20 mode, Power Spectral Density, 5240 MHz



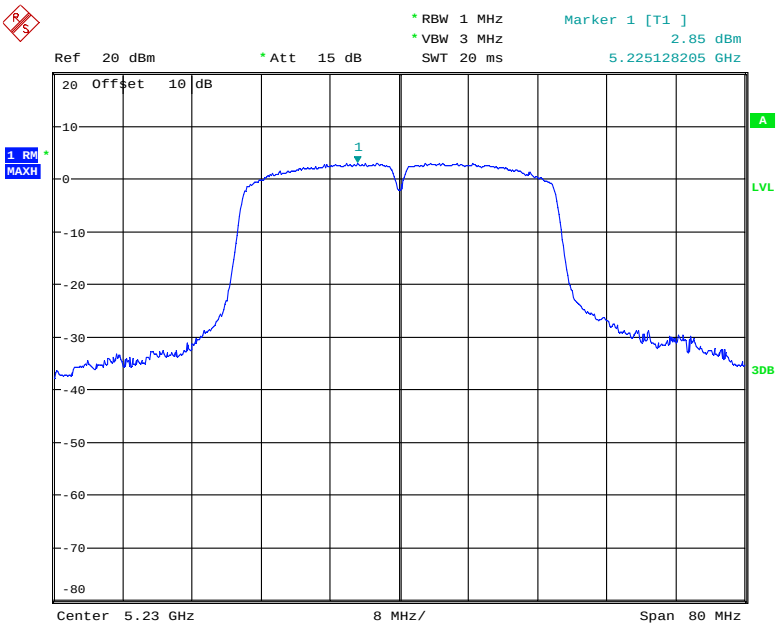

Date: 4.AUG.2018 16:09:43

## 802.11n40 mode, Power Spectral Density, 5190 MHz



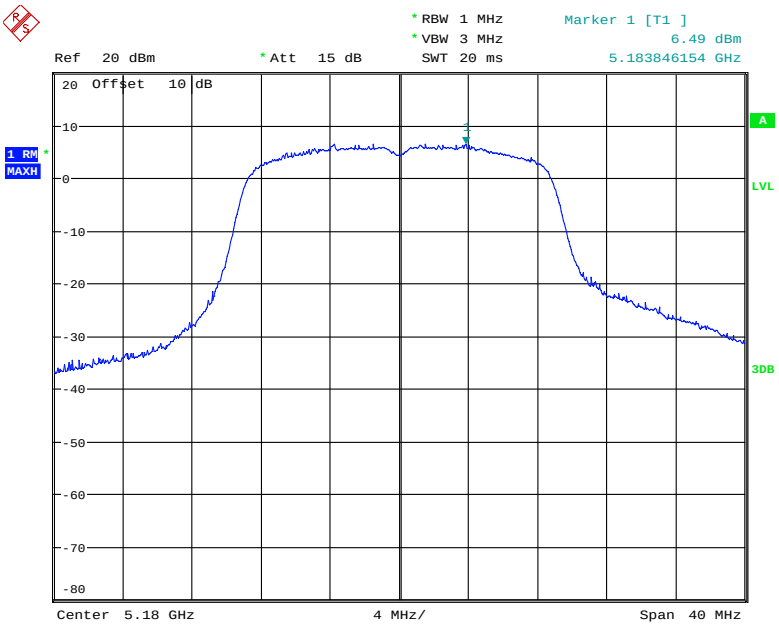

Date: 4.AUG.2018 16:11:56

## 802.11n40 mode, Power Spectral Density, 5230 MHz



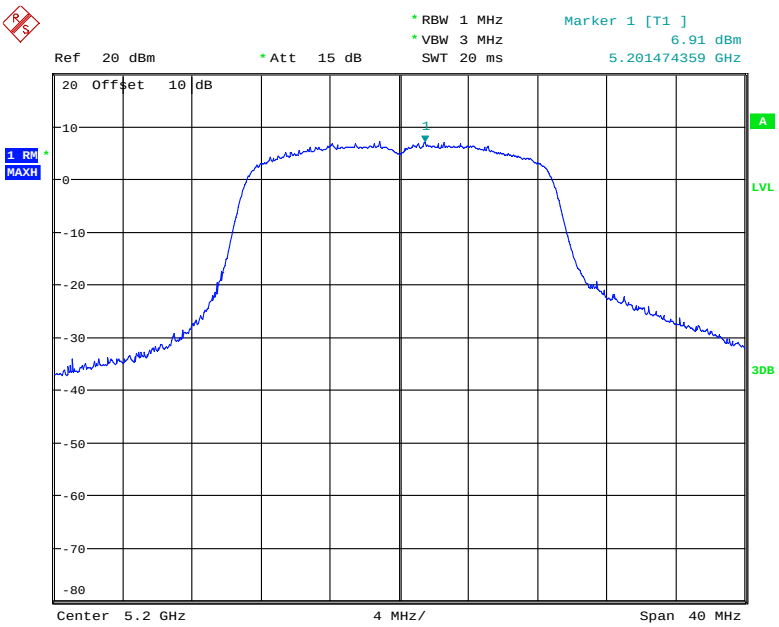

Date: 4.AUG.2018 16:12:30

## 802.11ac20 mode, Power Spectral Density, 5180 MHz



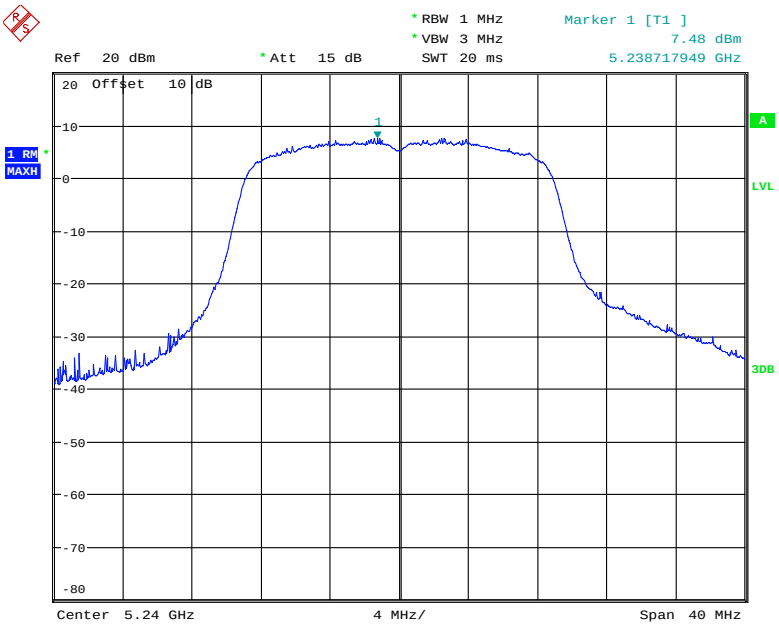

Date: 4.AUG.2018 16:11:13

## 802. 11ac20 mode, Power Spectral Density, 5200 MHz



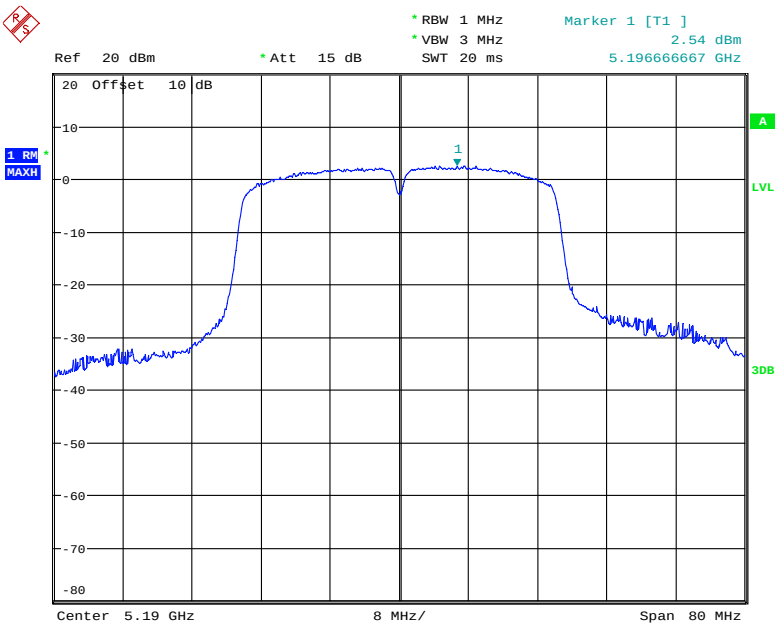

Date: 4.AUG.2018 16:10:41

## 802. 11ac20 mode, Power Spectral Density, 5240 MHz



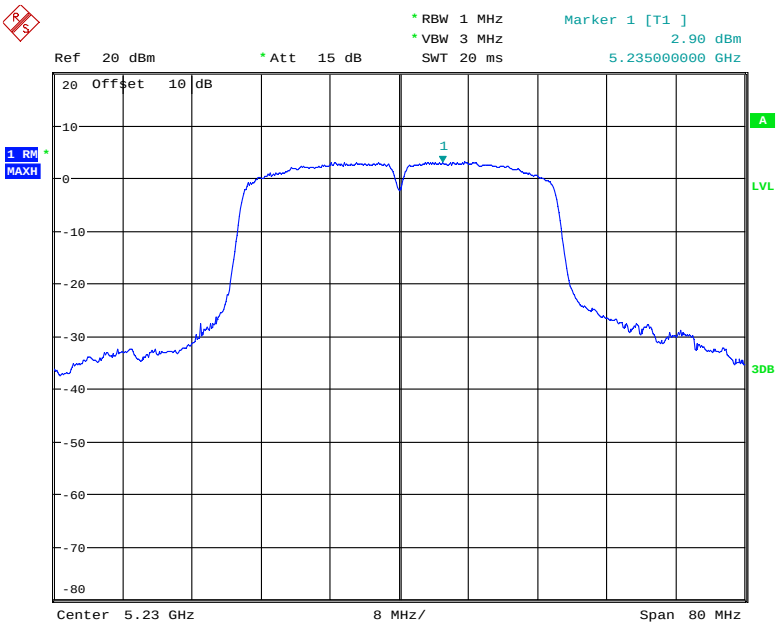

Date: 4.AUG.2018 16:10:16

## 802. 11ac40 mode, Power Spectral Density, 5190 MHz



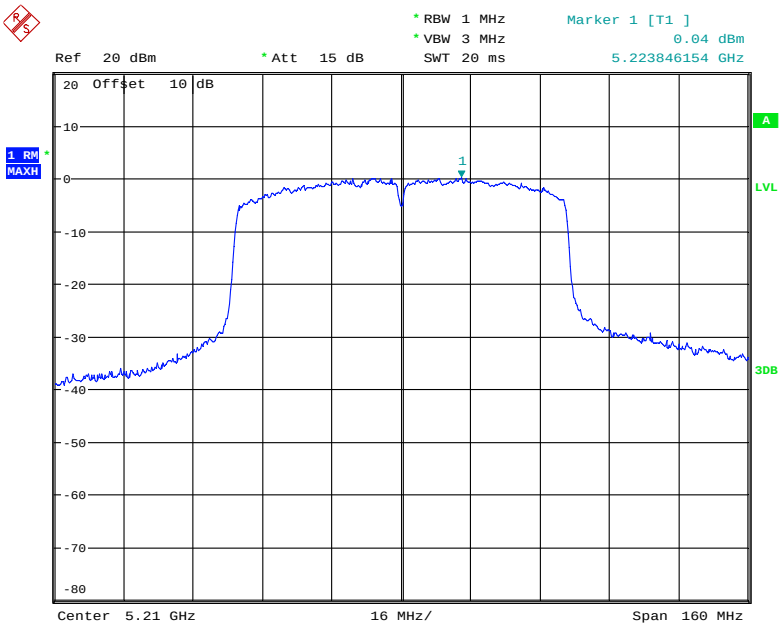

Date: 4.AUG.2018 16:15:28

## 802. 11ac40 mode, Power Spectral Density, 5230 MHz




Date: 4.AUG.2018 16:15:05

## 802. 11ac80 mode, Power Spectral Density, 5210 MHz

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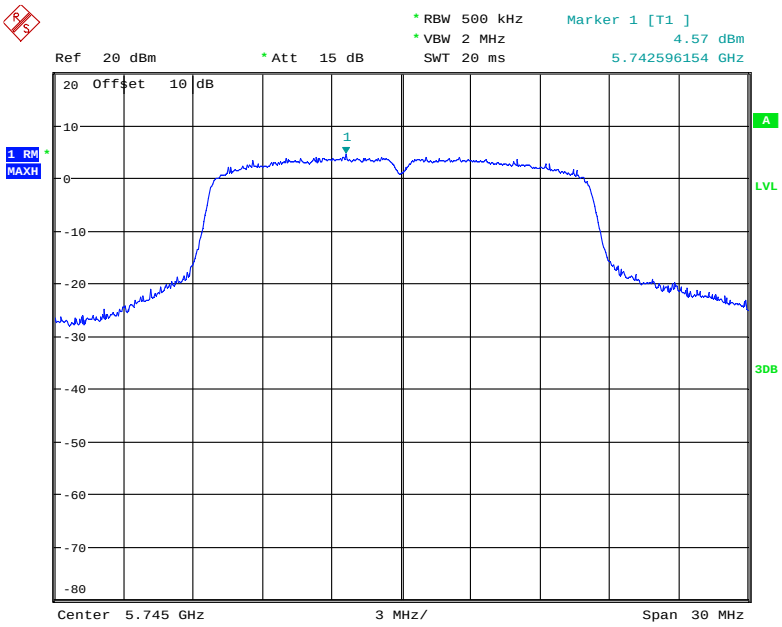
**5725 MHz – 5825 MHz:**

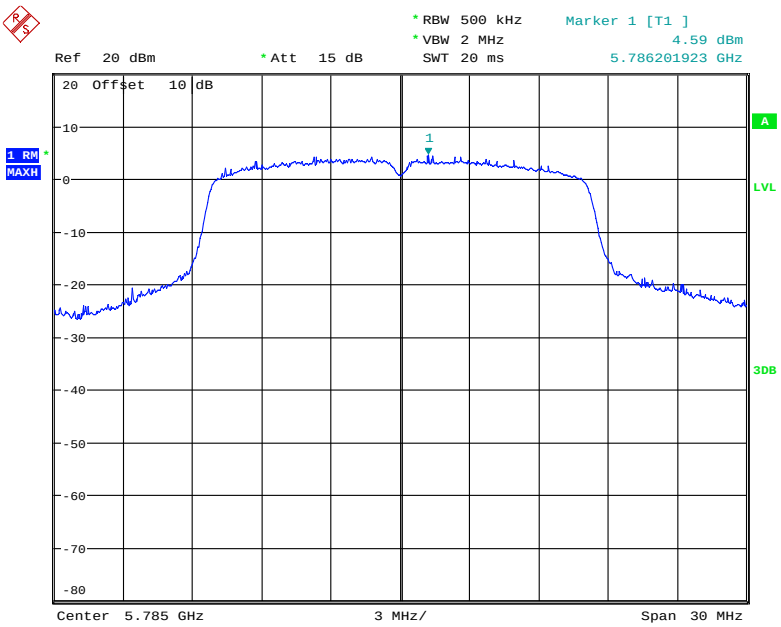
| Frequency (MHz) | Power Spectral Density (dBm/500kHz) | Limit (dBm/500kHz) |
|---|---|---|
| **802.11a** | | |
| 5745 | 4.57 | 30 |
| 5785 | 4.59 | |
| 5825 | 4.60 | |
| **802.11n20** | | |
| 5745 | 4.94 | 30 |
| 5785 | 3.51 | |
| 5825 | 3.20 | |
| **802.11n40** | | |
| 5755 | 1.41 | 30 |
| 5795 | 1.22 | |
| **802.11ac20** | | |
| 5745 | 5.17 | 30 |
| 5785 | 3.38 | |
| 5825 | 3.03 | |
| **802. 11ac40** | | |
| 5755 | 2.03 | 30 |
| 5795 | 1.18 | |
| **802.11ac80** | | |
| 5775 | -1.36 | 30 |

## 802.11a mode, Power Spectral Density, 5745 MHz



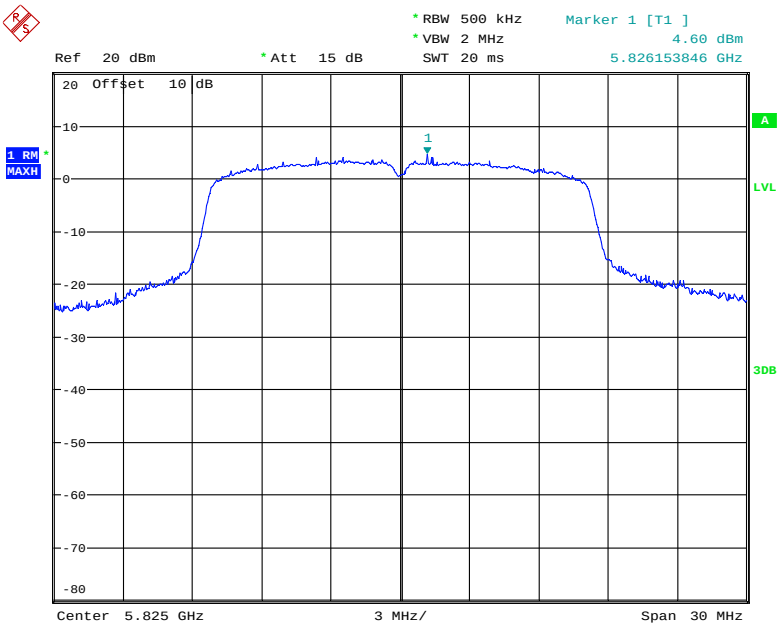

Date: 4.AUG.2018 15:58:42

## 802.11a mode, Power Spectral Density, 5785 MHz



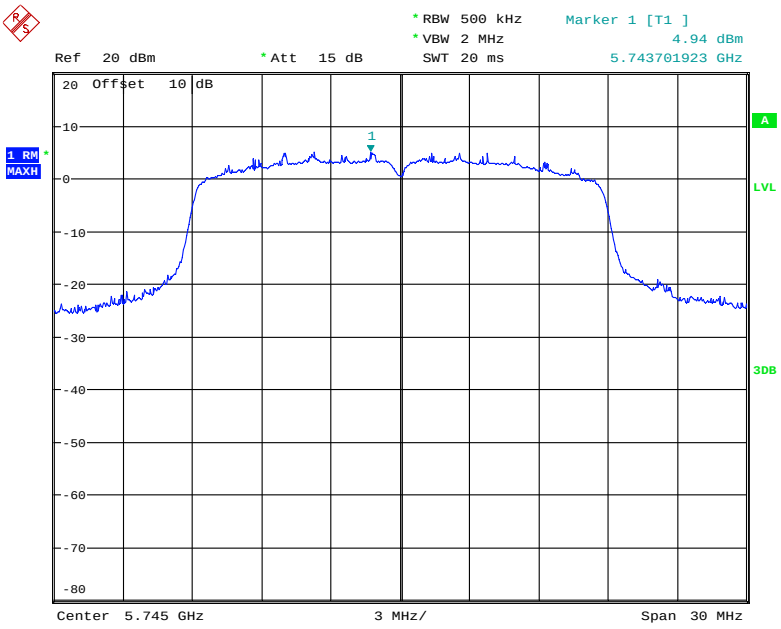

Date: 4.AUG.2018 15:59:09

## 802.11a mode, Power Spectral Density, 5825 MHz



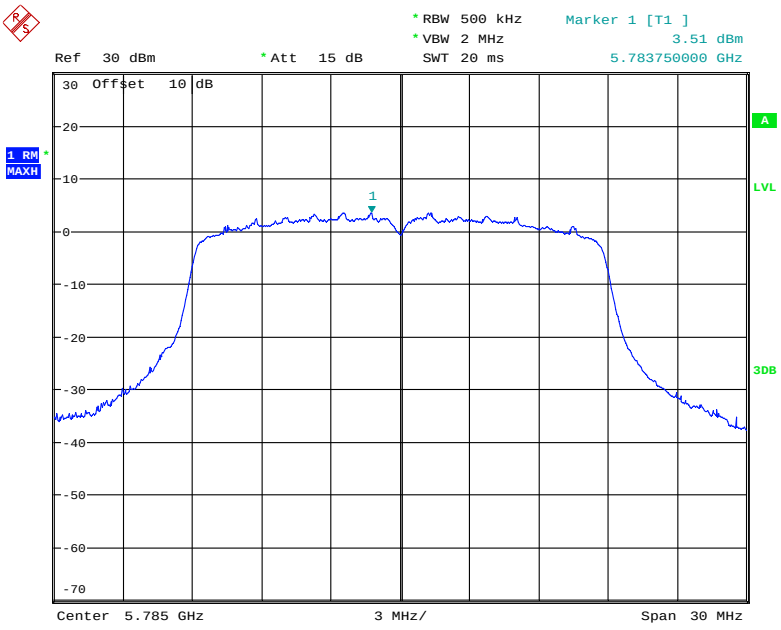

Date: 4.AUG.2018 15:59:46

## 802.11n20 mode, Power Spectral Density, 5745 MHz



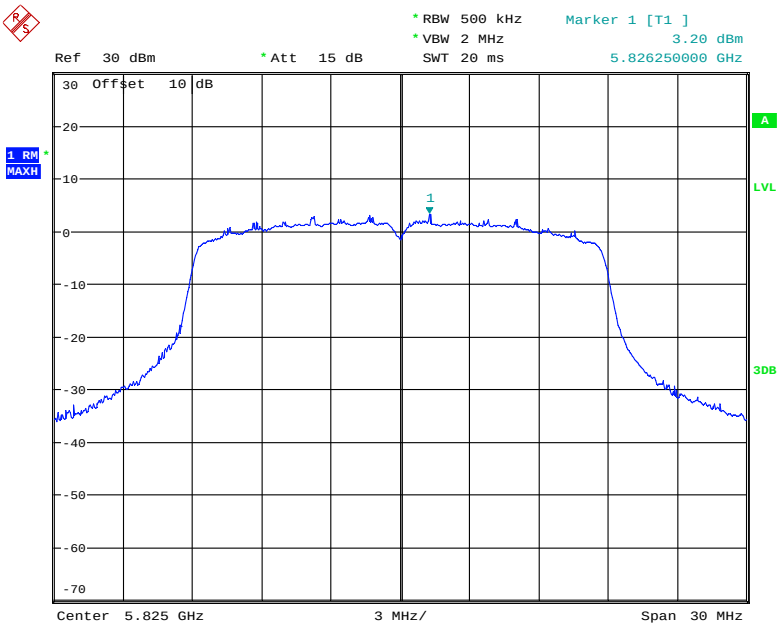

Date: 4.AUG.2018 15:55:07

## 802.11n20 mode, Power Spectral Density, 5785 MHz



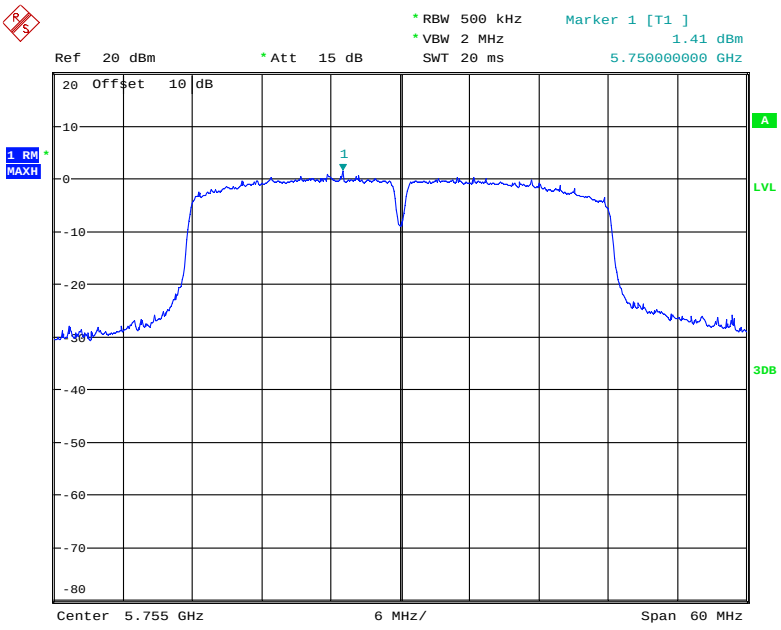

Date: 4.AUG.2018 18:27:39

## 802.11n20 mode, Power Spectral Density, 5825 MHz



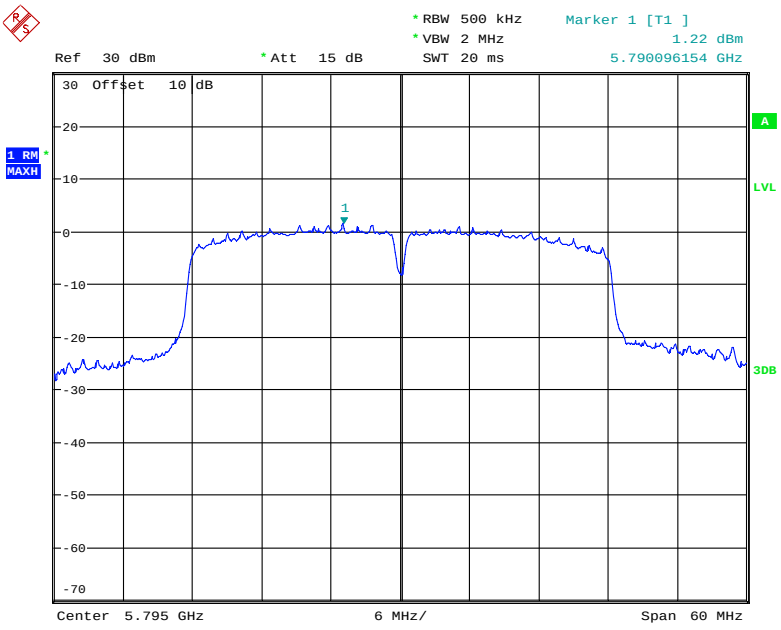

Date: 4.AUG.2018 18:28:46

## 802.11n40 mode, Power Spectral Density, 5755 MHz



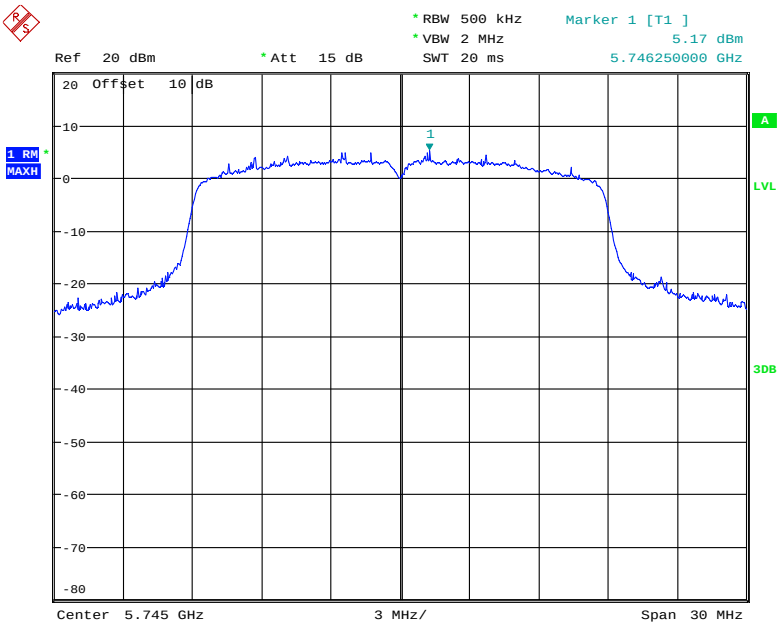

Date: 4.AUG.2018 15:52:33

## 802.11n40 mode, Power Spectral Density, 5795 MHz



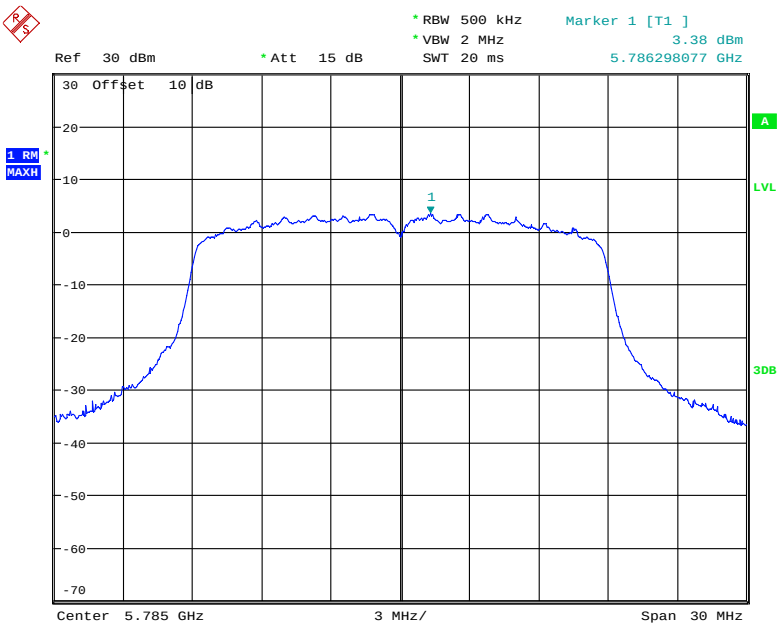

Date: 4.AUG.2018 18:45:54

## 802.11ac20 mode, Power Spectral Density, 5745 MHz




Date: 4.AUG.2018 15:58:01

## 802. 11ac20 mode, Power Spectral Density, 5785 MHz

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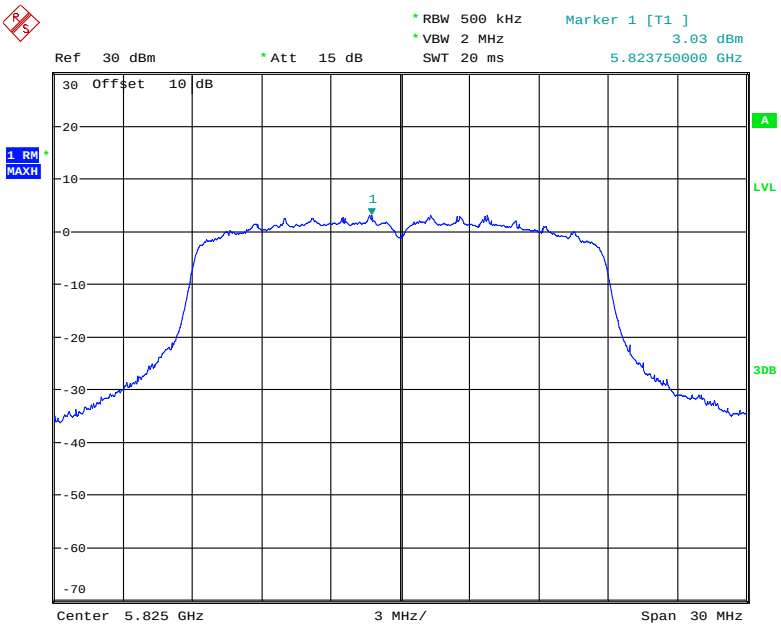
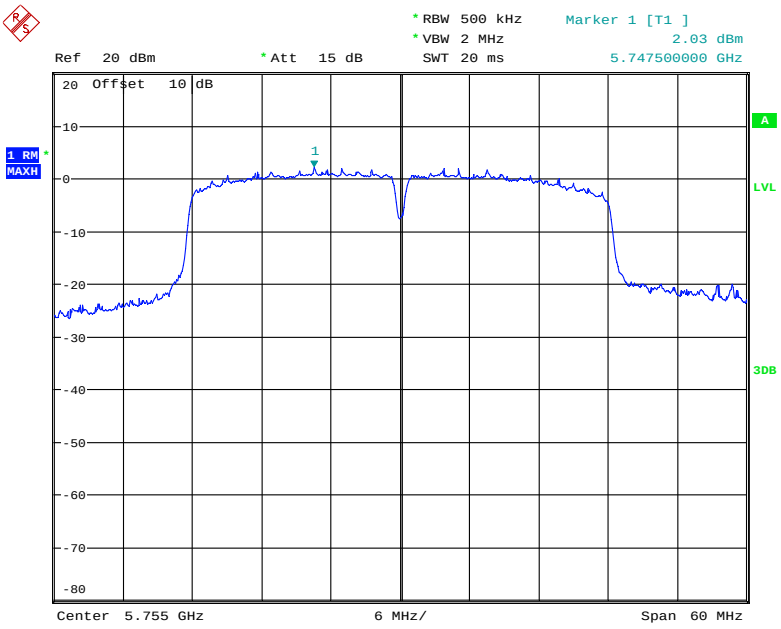
## 802. 11ac20 mode, Power Spectral Density, 5825 MHz




Date: 4.AUG.2018 18:53:08

## 802. 11ac40 mode, Power Spectral Density, 5755 MHz

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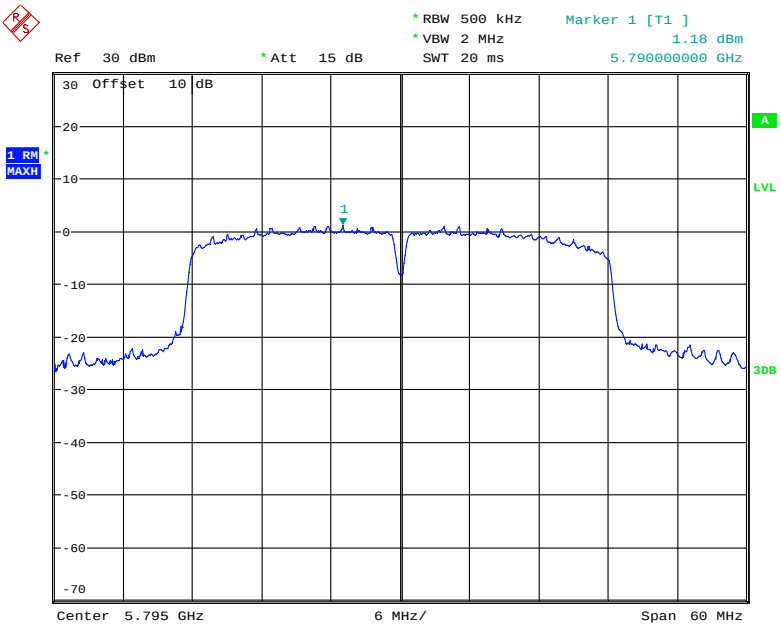
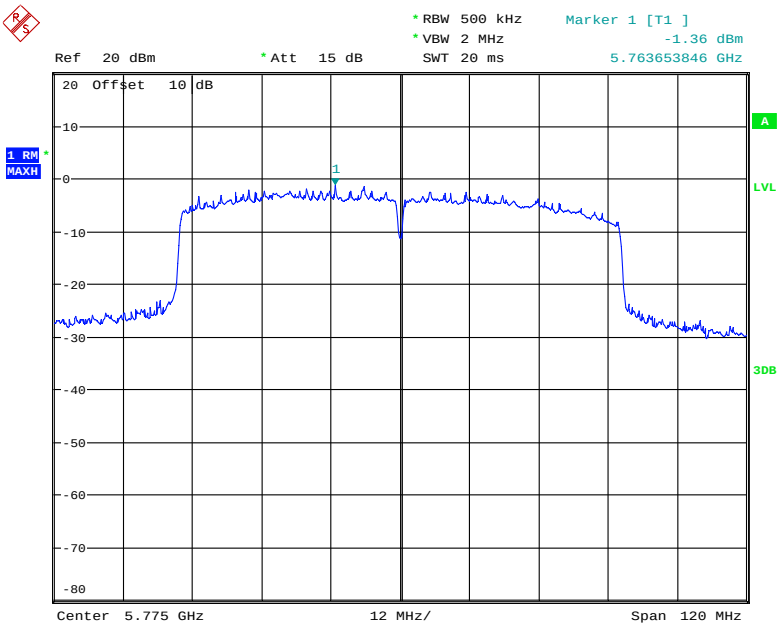
## 802. 11ac40 mode, Power Spectral Density, 5795 MHz




Date: 4.AUG.2018 18:49:33

## 802. 11ac80 mode, Power Spectral Density, 5775 MHz

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