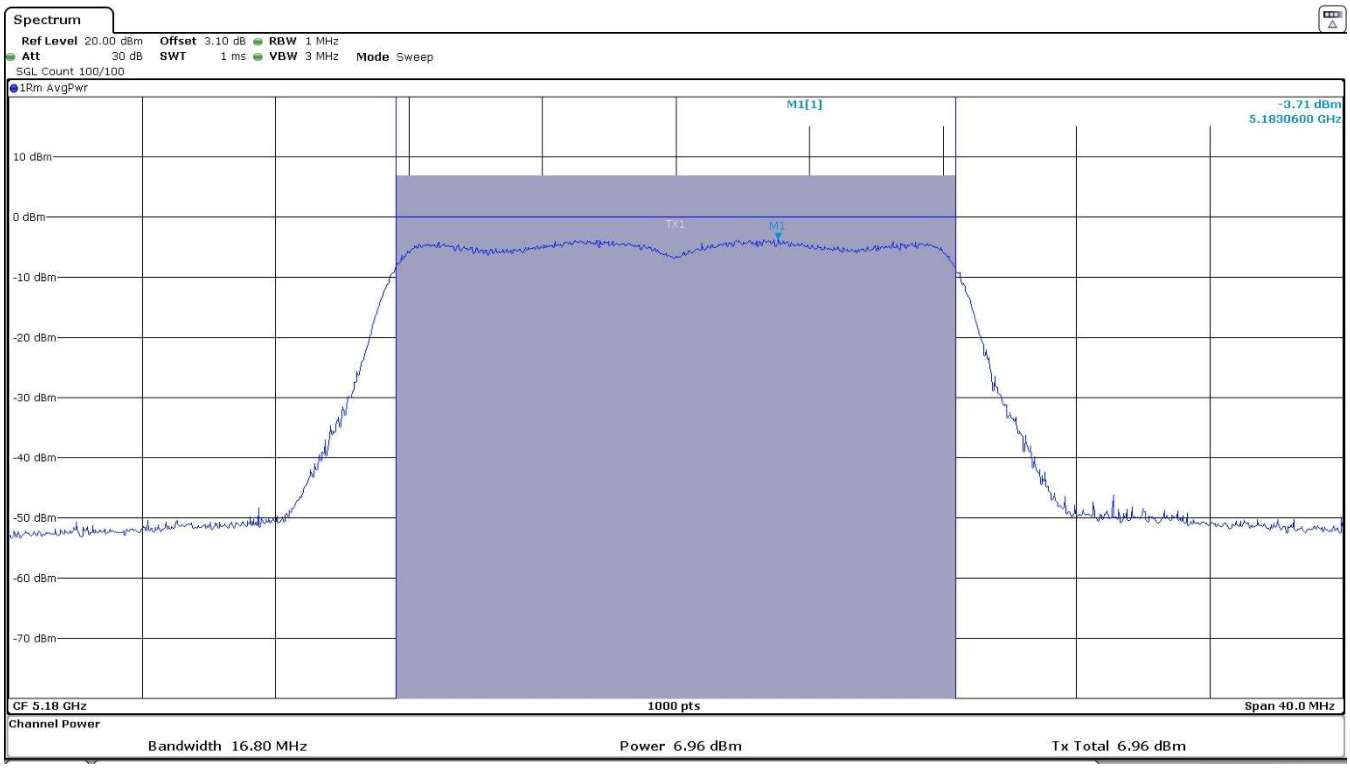
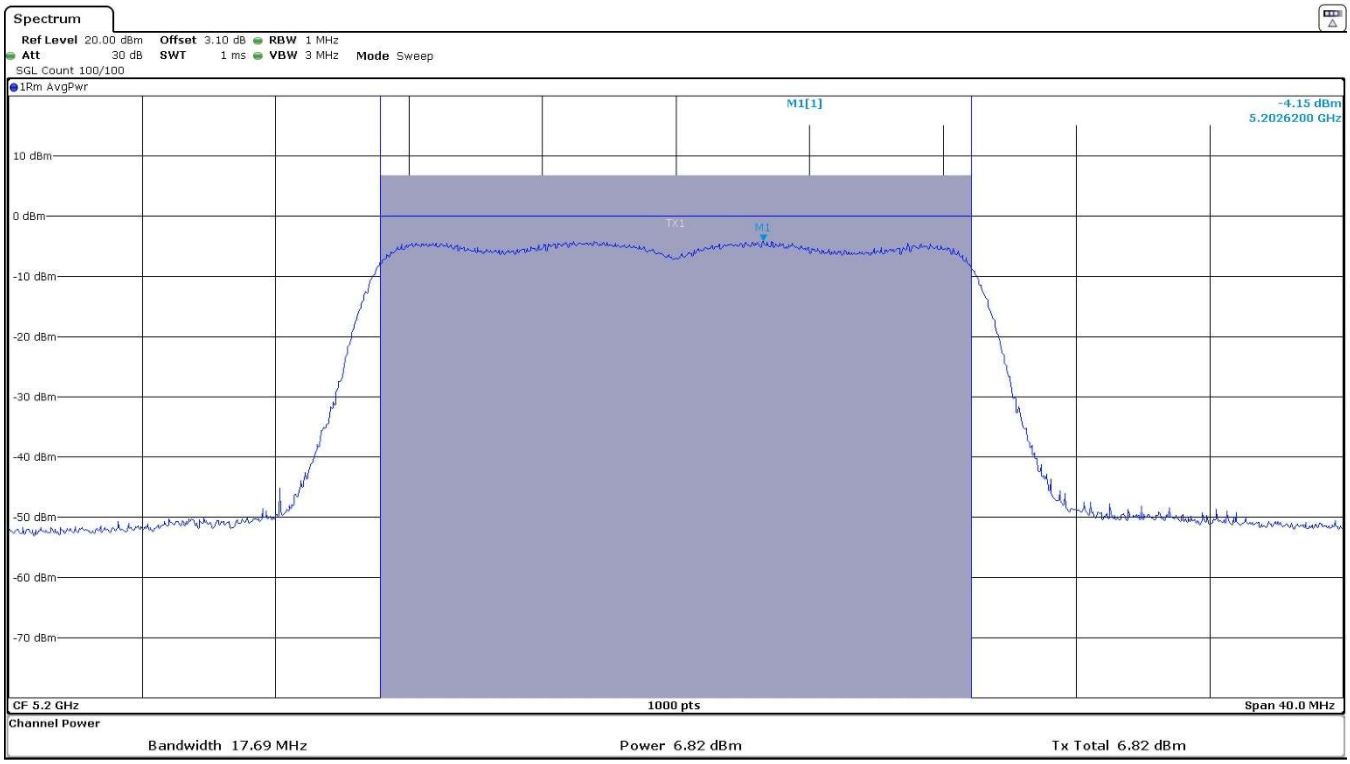
### Mode 802.11 ac20 (VHT20):

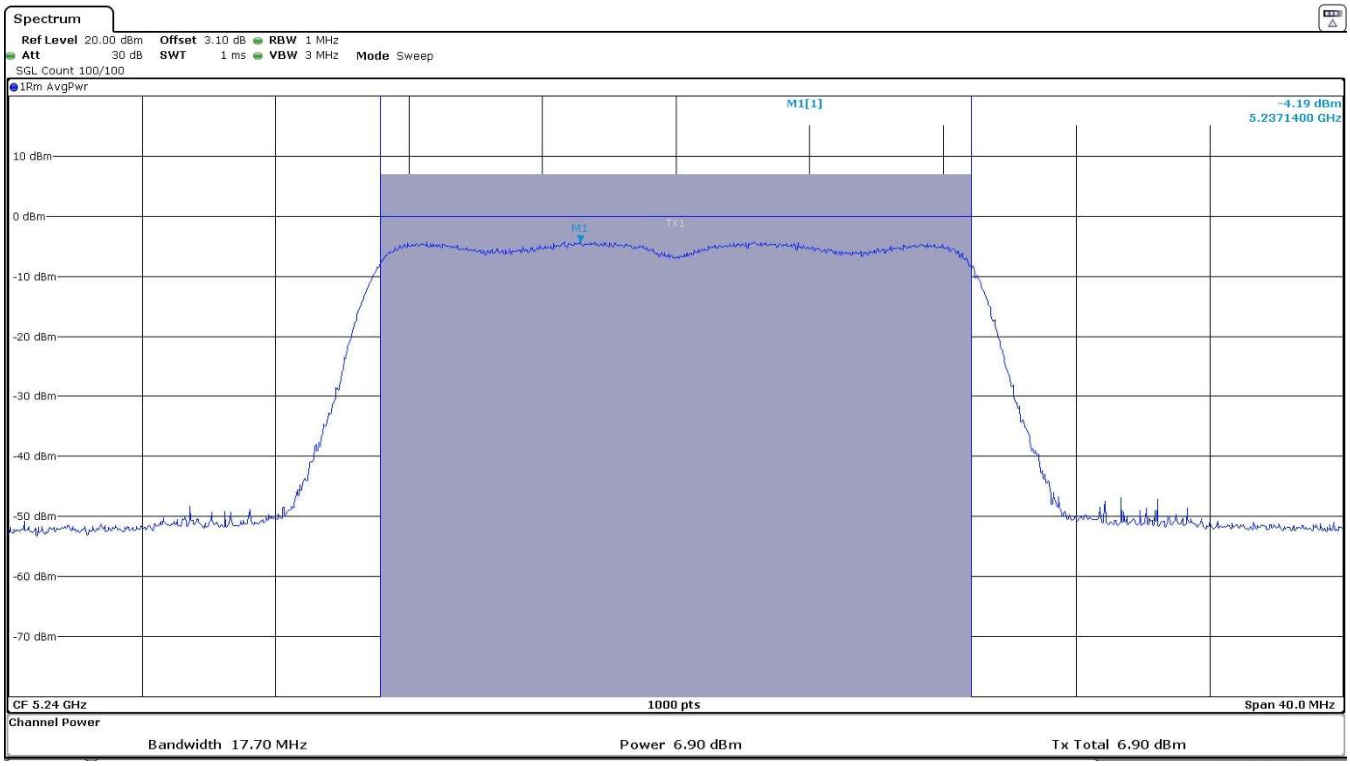
- Low Channel:




- Middle Channel:

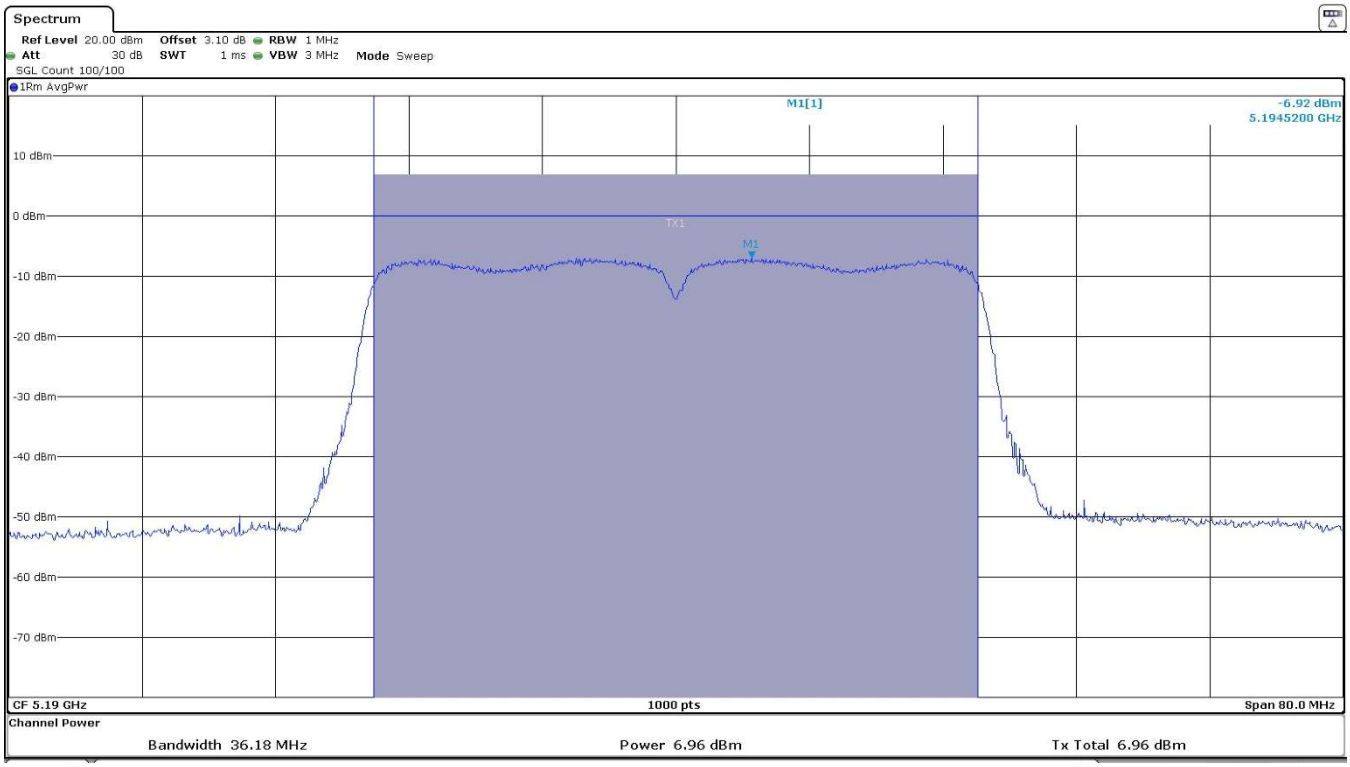


- High Channel:

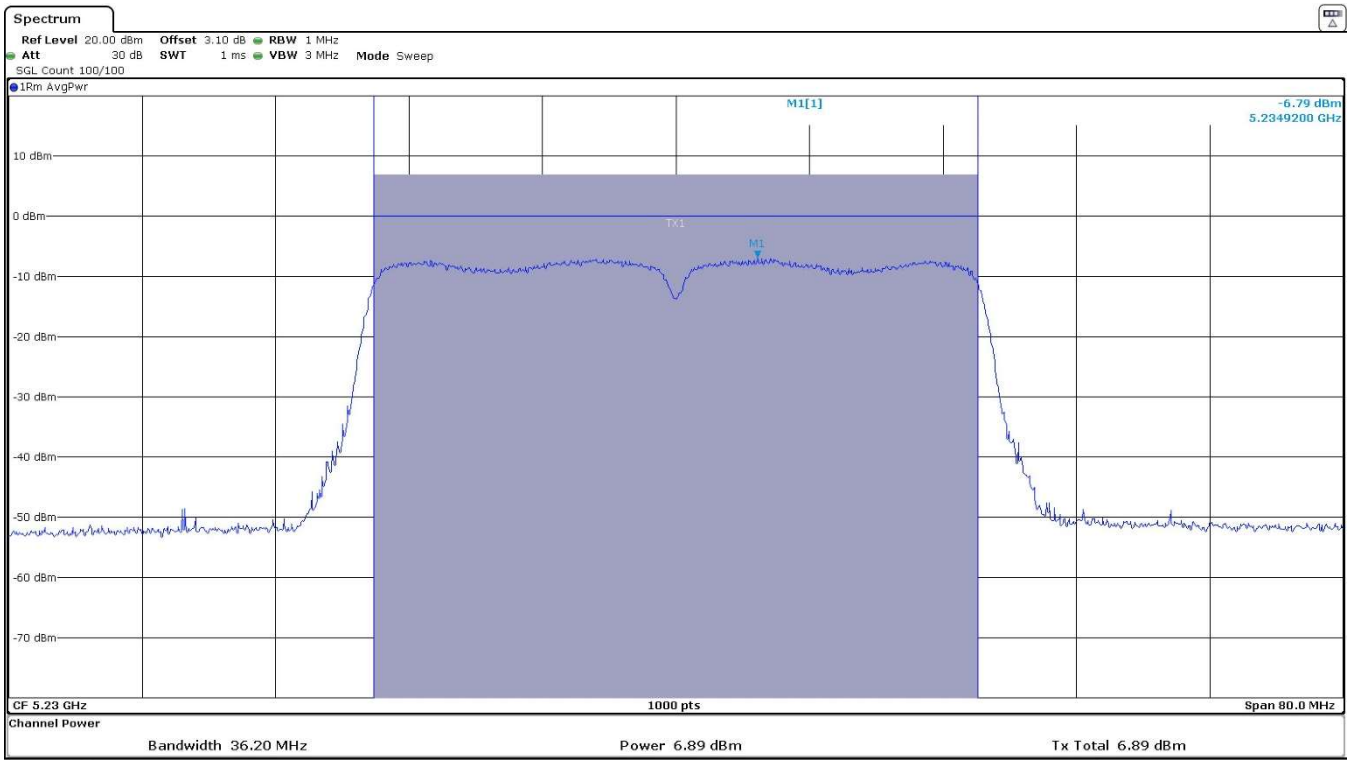



**Mode 802.11 n40 (HT40):**

- Low Channel:

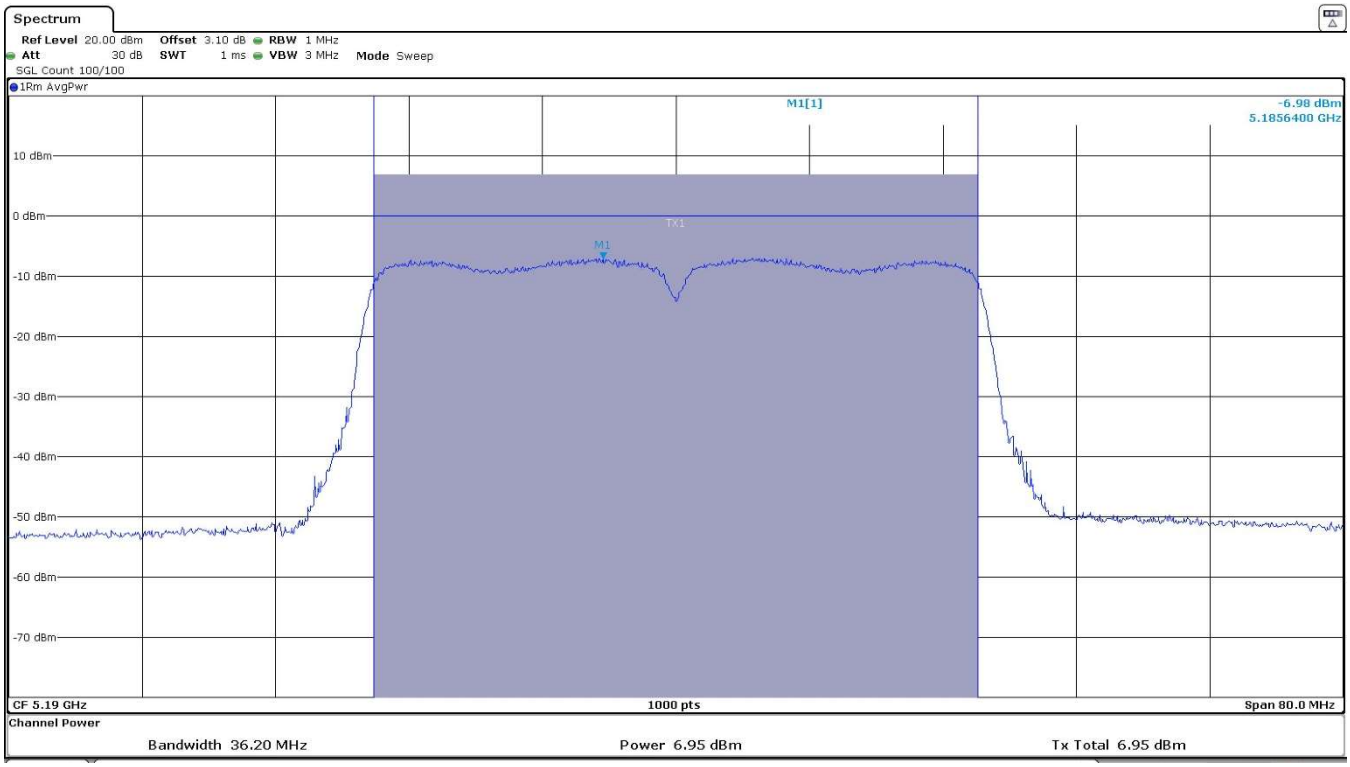


- High Channel:

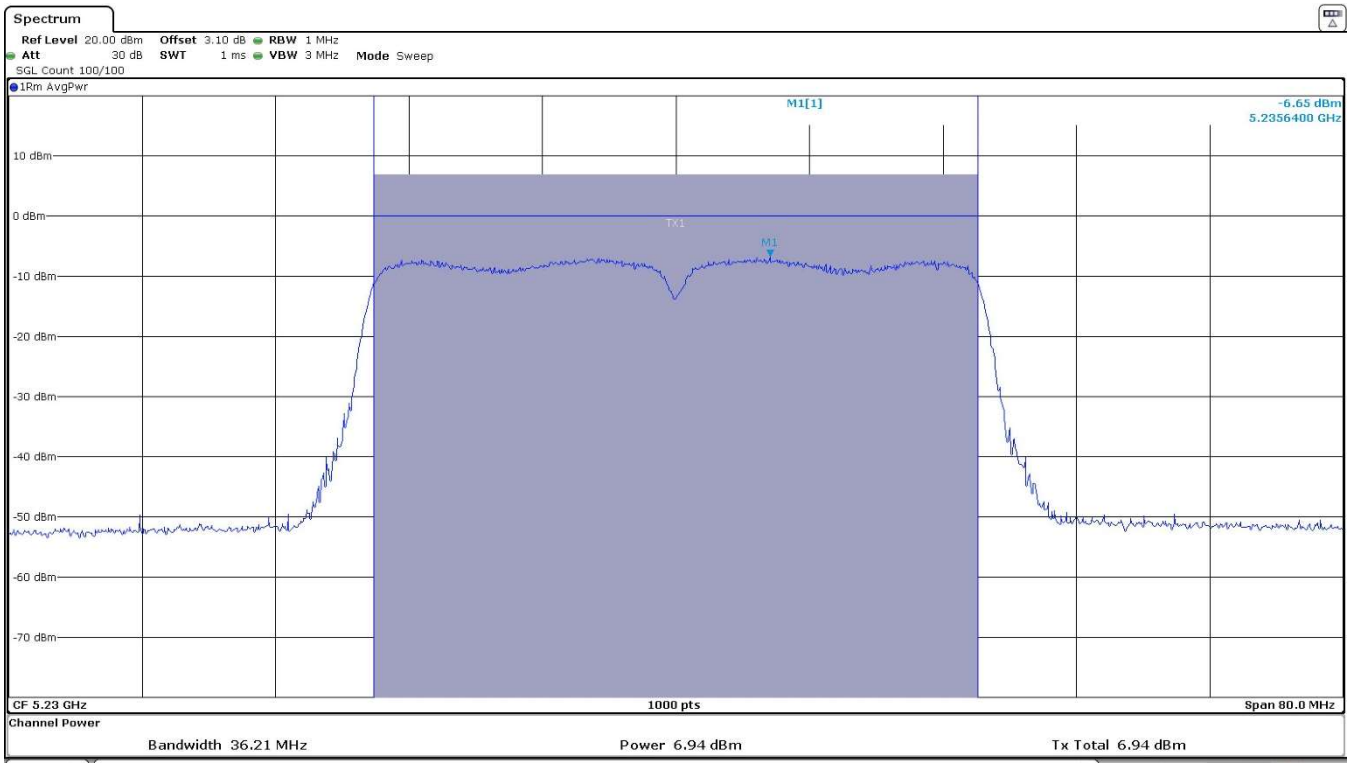



**Mode 802.11 ac40 (VHT40):**

- Low Channel:

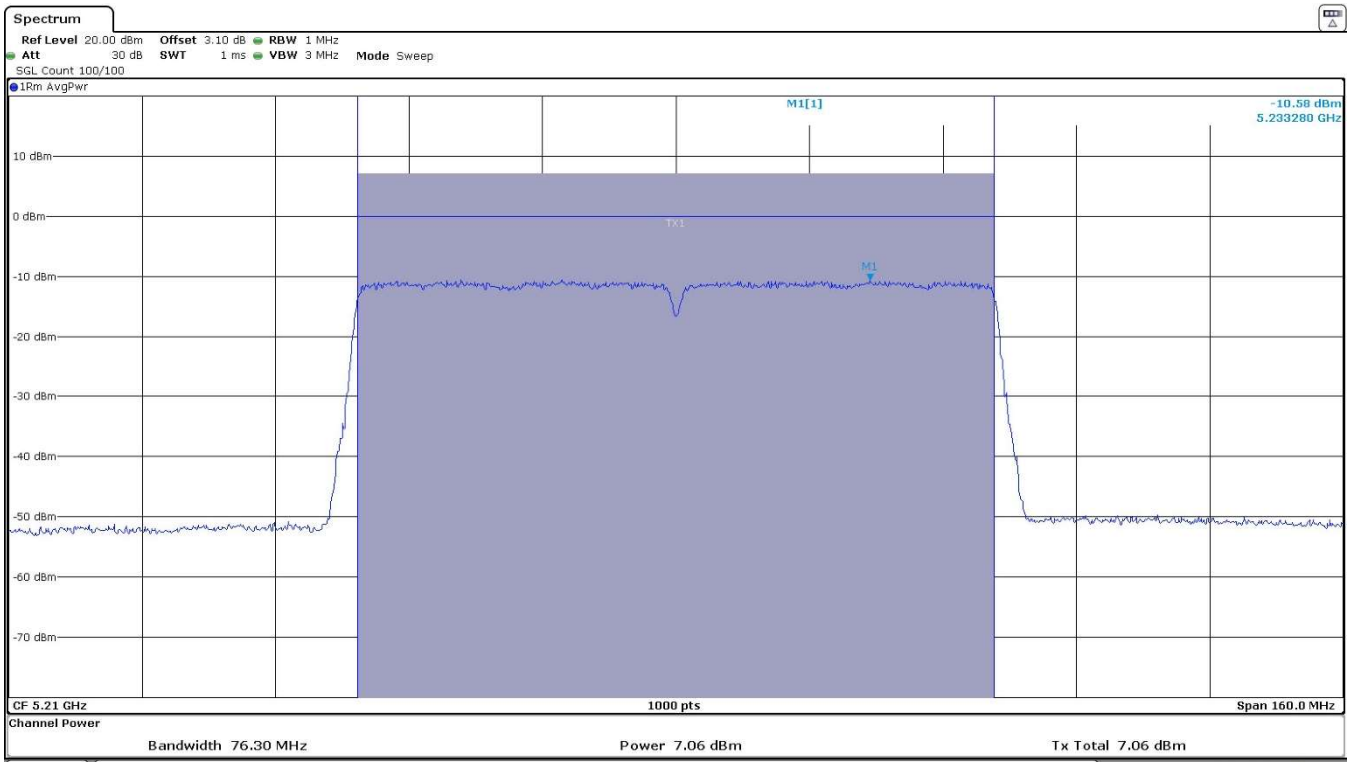


- High Channel:




**Mode 802.11 ac80 (VHT80):**

- Single Channel:



# FCC 15.407 (a)(1)(iv). Transmitter Maximum Power Spectral Density / RSS-247 6.2.1.1. Transmitter EIRP Spectral Density

SPECIFICATION:

FCC 15.407: 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.

RSS-247: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

RESULTS:

The maximum power spectral density (PSD) was measured using the method according to point F) referencing E.2.b) (Method SA-1) and E.2.b) (Method SA-2) of Guidance 789033 D02 General UNII Test Procedures New Rules v02r01.

The PSD test uses the same setup as the transmitter maximum conducted output power test. The result of the Peak PSD (Canada Power setting) was measured by colocation a maker on the peak of the signal and the results are in the tables below.

The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

For all modes of operation, the antenna gain is < 6 dBi.

Maximum Declared Antenna Gain: +0.9 dBi

**FCC power setting**

**Mode 802.11 a20:**

| Channels | Low Channel 36 (5180 MHz) | Middle Channel 40 (5220 MHz) | High Channel 48 (5240 MHz) |
|---|---|---|---|
| Maximum Conducted PSD (dBm) | -2.610 | -2.839 | -3.124 |
| Measurement uncertainty (dB) | <±1.30 dB | | |

**Mode 802.11 n20 (HT20):**

| Channels | Low Channel 36 (5180 MHz) | Middle Channel 40 (5220 MHz) | High Channel 48 (5240 MHz) |
|---|---|---|---|
| Maximum Conducted PSD (dBm) | -3.015 | -3.127 | -3.407 |
| Measurement uncertainty (dB) | <±1.30 dB | | |

**Mode 802.11 ac20 (VHT20):**

| Channels | Low Channel 36 (5180 MHz) | Middle Channel 40 (5220 MHz) | High Channel 48 (5240 MHz) |
|---|---|---|---|
| Maximum Conducted PSD (dBm) | -3.022 | -3.136 | -3.370 |
| Measurement uncertainty (dB) | <±1.30 dB | | |

**Mode 802.11 n40 (HT40):**

| Channels | Low Channel 38 (5190 MHz) | High Channel 46 (5230 MHz) |
|---|---|---|
| Maximum Conducted PSD (dBm) | -5.856 | -6.193 |
| Measurement uncertainty (dB) | <±1.30 dB | |

**Mode 802.11 ac40 (VHT40):**

| Channels | Low Channel 38 (5190 MHz) | High Channel 46 (5230 MHz) |
|---|---|---|
| Maximum Conducted PSD (dBm) | -5.336 | -5.768 |
| Measurement uncertainty (dB) | <±1.30 dB | |

**Mode 802.11 ac80 (VHT80):**

| Channels | Low Channel 42 (5210 MHz) |
|---|---|
| Maximum Conducted PSD (dBm) | -8.989 |
| Measurement uncertainty (dB) | <±1.30 dB |

Verdict: PASS

## Canada power setting

**Mode 802.11 a20:**

| Channels | Low Channel 36 (5180 MHz) | Middle Channel 40 (5220 MHz) | High Channel 48 (5240 MHz) |
|---|---|---|---|
| Maximum Conducted PSD (dBm) | -3.71 | -3.65 | -3.94 |
| Maximum EIRP Conducted PSD (dBm) | -2.81 | -2.75 | -3.04 |
| Measurement uncertainty (dB) | <±1.20 | | |

**Mode 802.11 n20 (HT20):**

| Channels | Low Channel 36 (5180 MHz) | Middle Channel 40 (5220 MHz) | High Channel 48 (5240 MHz) |
|---|---|---|---|
| Maximum Conducted PSD (dBm) | -4.16 | -4.07 | -3.08 |
| Maximum EIRP Conducted PSD (dBm) | -3.26 | -3.17 | -2.18 |
| Measurement uncertainty (dB) | <±1.20 | | |

**Mode 802.11 ac20 (VHT20):**

| Channels | Low Channel 36 (5180 MHz) | Middle Channel 40 (5220 MHz) | High Channel 48 (5240 MHz) |
|---|---|---|---|
| Maximum Conducted PSD (dBm) | -3.68 | -4.15 | -4.19 |
| Maximum EIRP Conducted PSD (dBm) | -2.78 | -3.25 | -3.29 |
| Measurement uncertainty (dB) | <±1.20 | | |

**Mode 802.11 n40 (HT40):**

| Channels | Low Channel 38 (5190 MHz) | High Channel 46 (5230 MHz) |
|---|---|---|
| Maximum Conducted PSD (dBm) | -6.92 | -6.79 |
| Maximum Corrected Conducted PSD (dBm) | -6.812 | -6.682 |
| Maximum EIRP Corrected Conducted PSD (dBm) | -5.912 | -5.782 |
| Measurement uncertainty (dB) | <±1.20 | |

**Mode 802.11 ac40 (VHT40):**

| Channels | Low Channel 38 (5190 MHz) | High Channel 46 (5230 MHz) |
|---|---|---|
| Maximum Conducted PSD (dBm) | -6.98 | -6.65 |
| Maximum Corrected Conducted PSD (dBm) | -6.875 | -6.545 |
| Maximum EIRP Corrected Conducted PSD (dBm) | -5.975 | -5.645 |
| Measurement uncertainty (dB) | <±1.20 | |

**Mode 802.11 ac80 (VHT80):**

| Channels | Low Channel 42 (5210 MHz) |
|---|---|
| Maximum Conducted PSD (dBm) | -10.58 |
| Maximum Corrected Conducted PSD (dBm) | -10.37 |
| Maximum EIRP Corrected Conducted PSD (dBm) | -9.47 |
| Measurement uncertainty (dB) | <±1.20 |

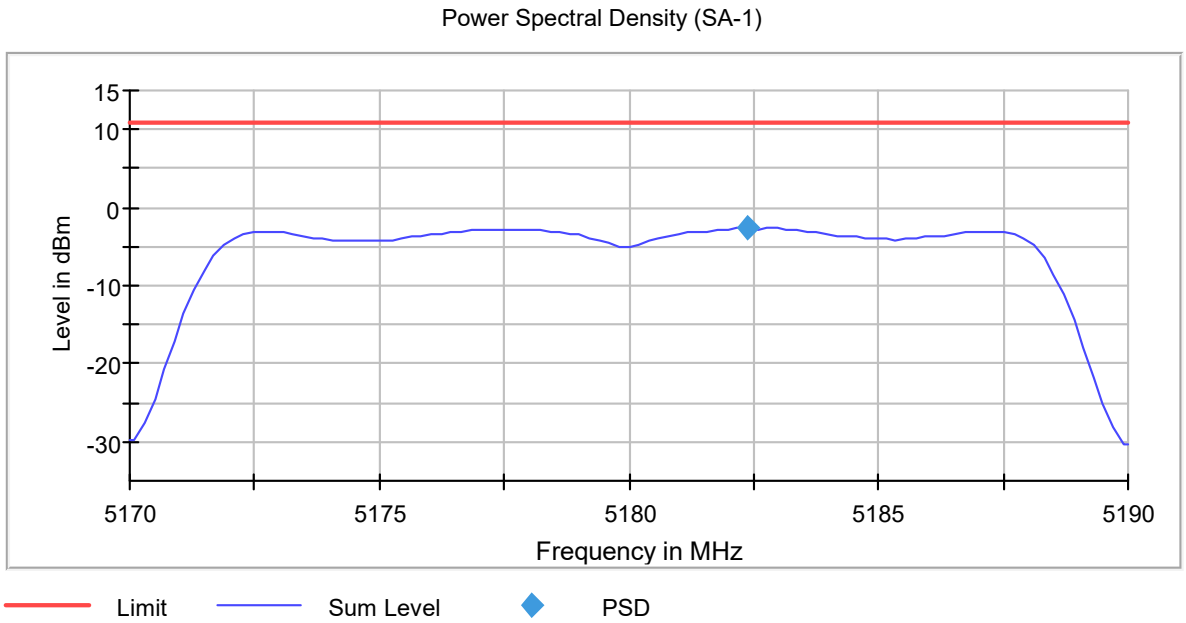
Verdict: PASS

## FCC power setting

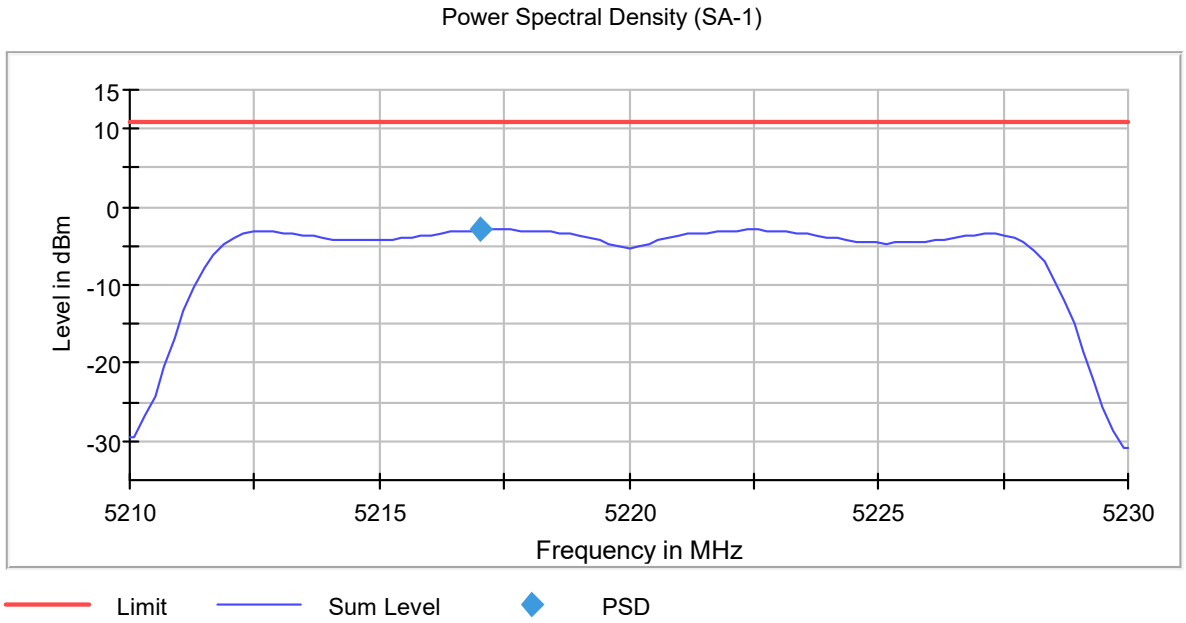
### SISO 802.11 a20:

#### U-NII-1 (5150-5250 MHz)

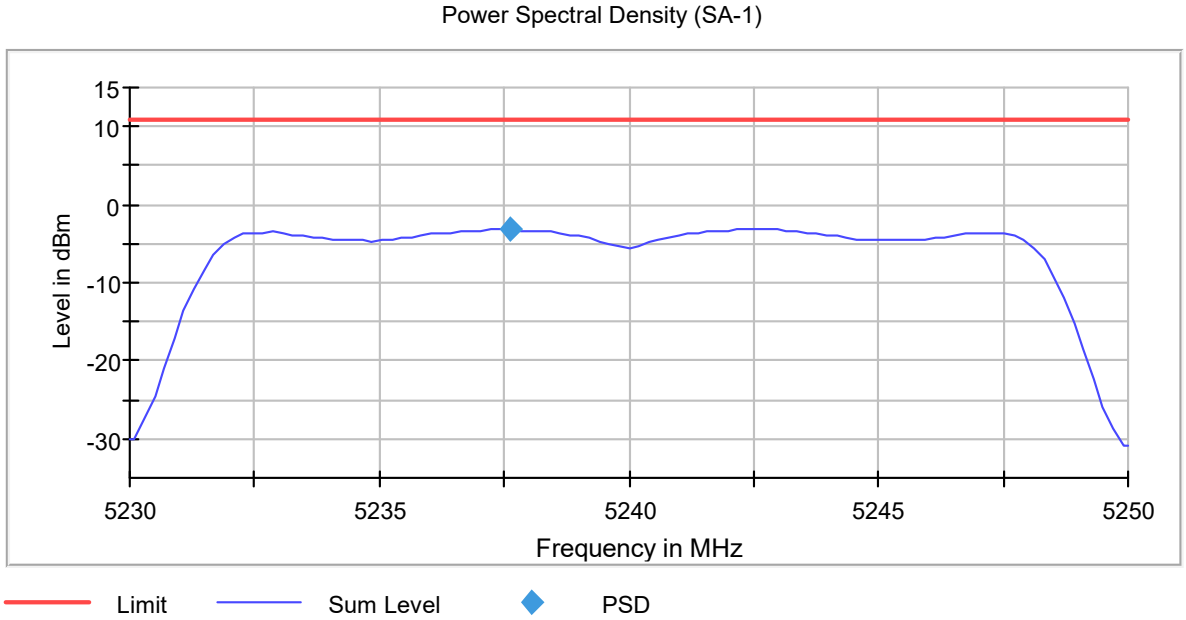
- Low Channel 36 (5180 MHz):




- Middle Channel 40 (5200 MHz):



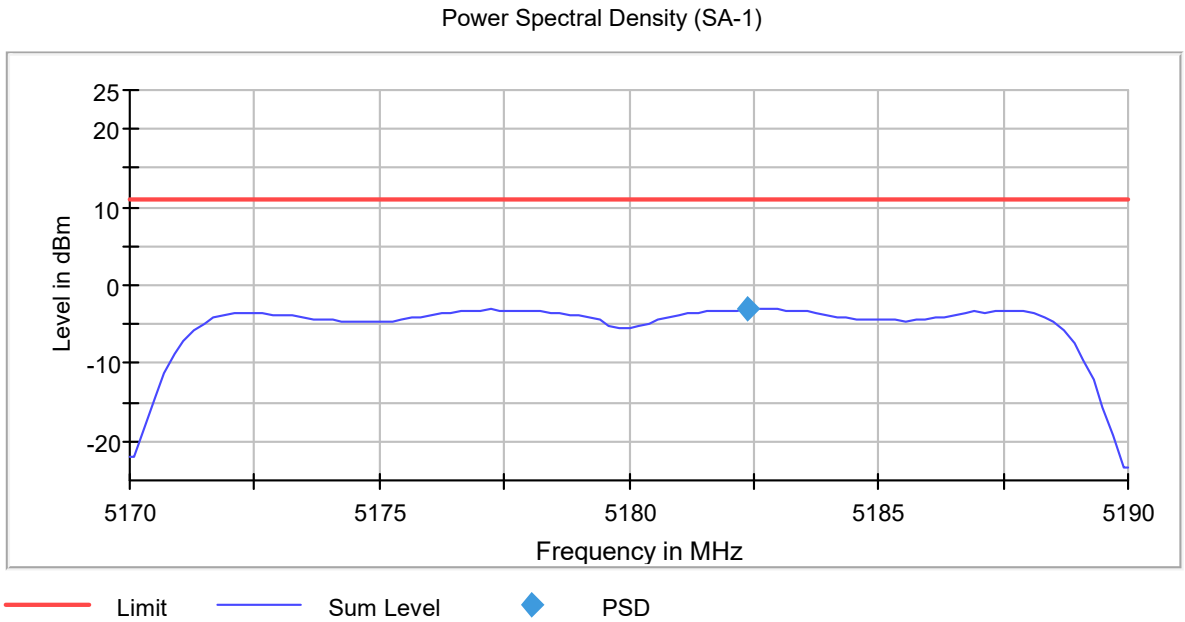
- High Channel 48 (5240 MHz):



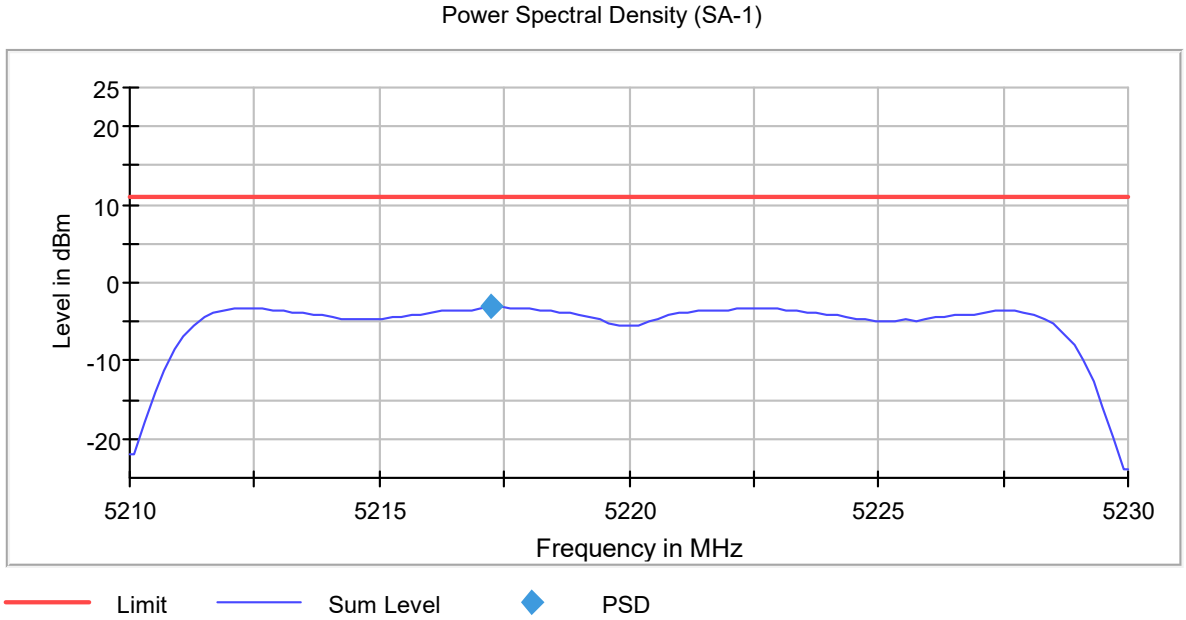

**SISO 802.11 n20 (HT20):**

**U-NII-1 (5150-5250 MHz)**

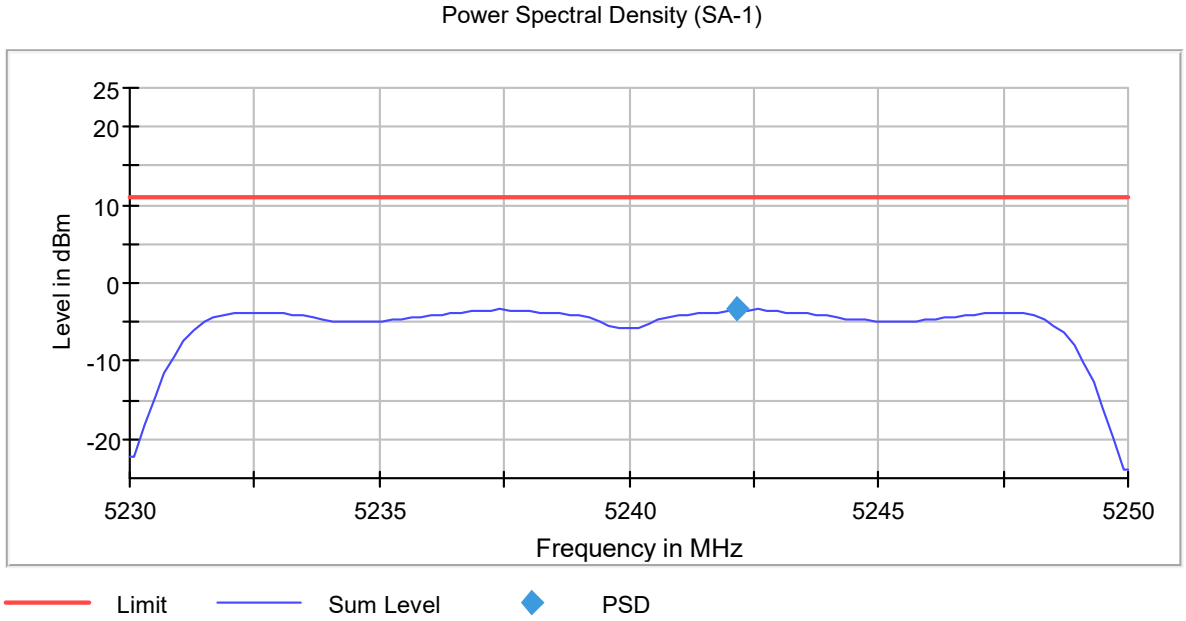
- Low Channel 36 (5180 MHz):



- Middle Channel 40 (5200 MHz):



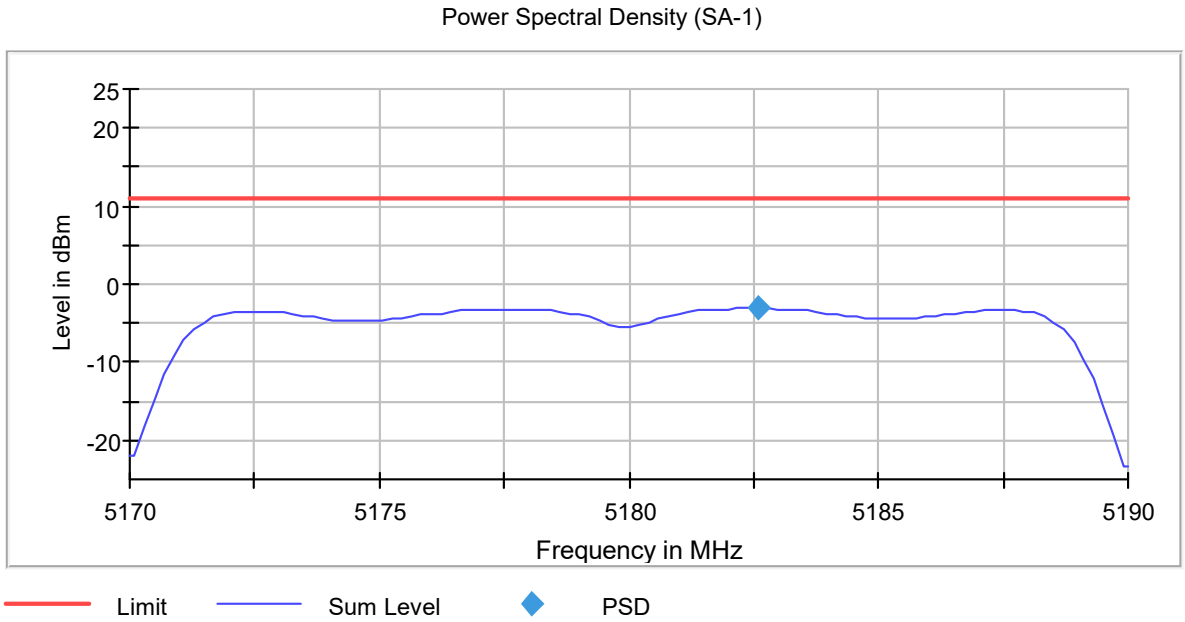

- High Channel 48 (5240 MHz):



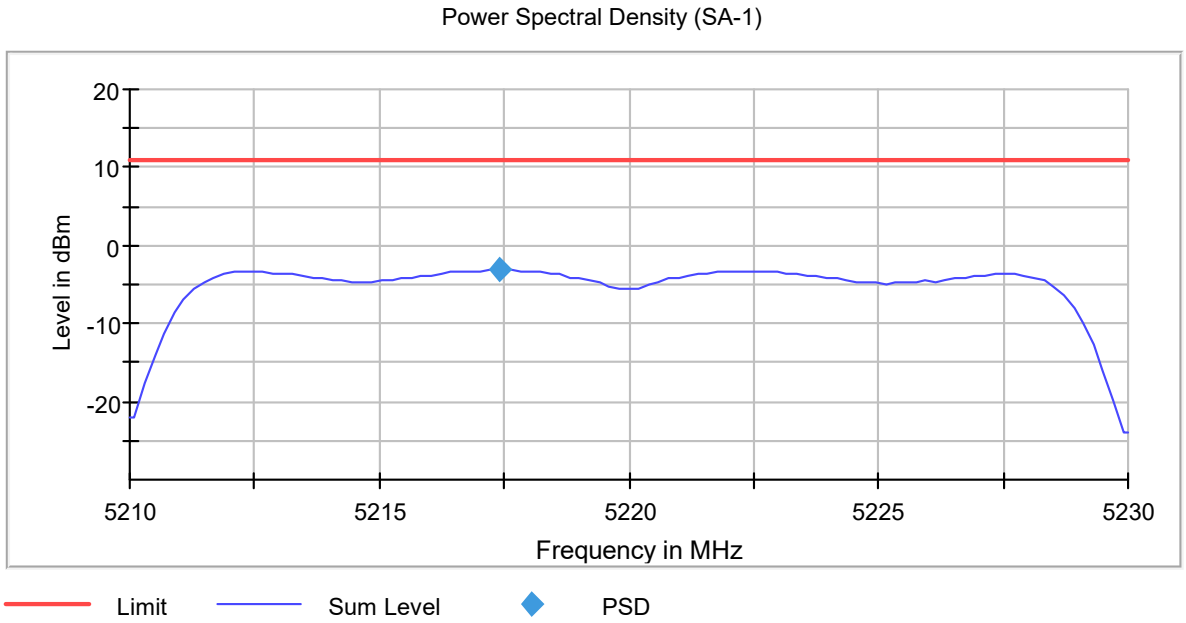
## SISO 802.11 ac20 (VHT20):

### U-NII-1 (5150-5250 MHz)

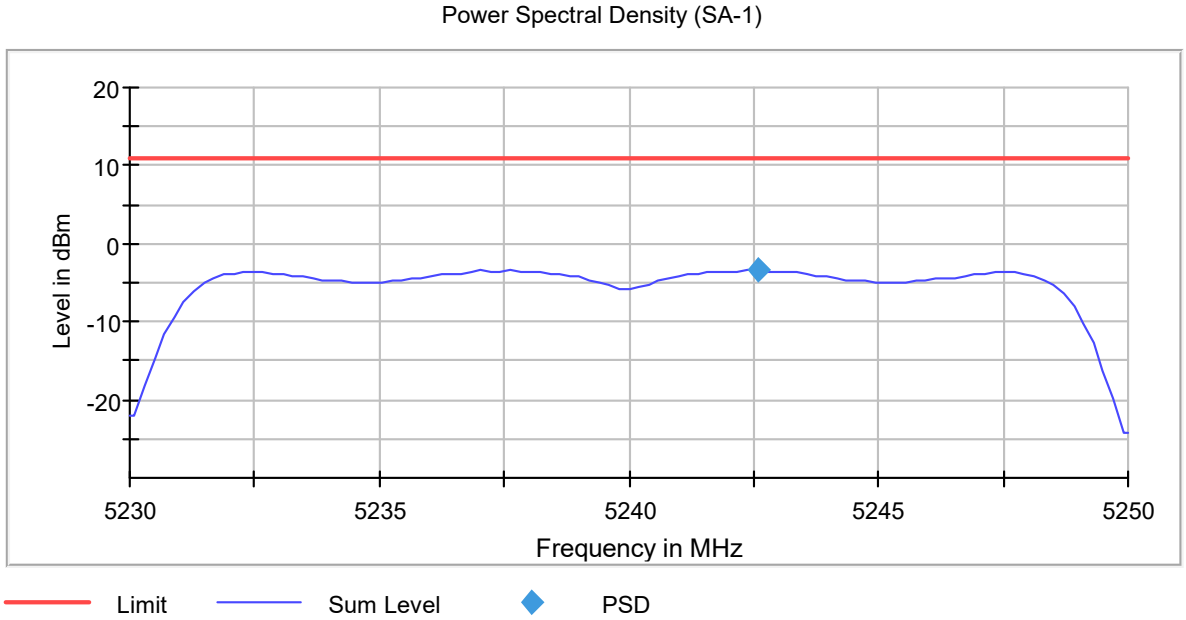
- Low Channel 36 (5180 MHz):




- Middle Channel 40 (5200 MHz):



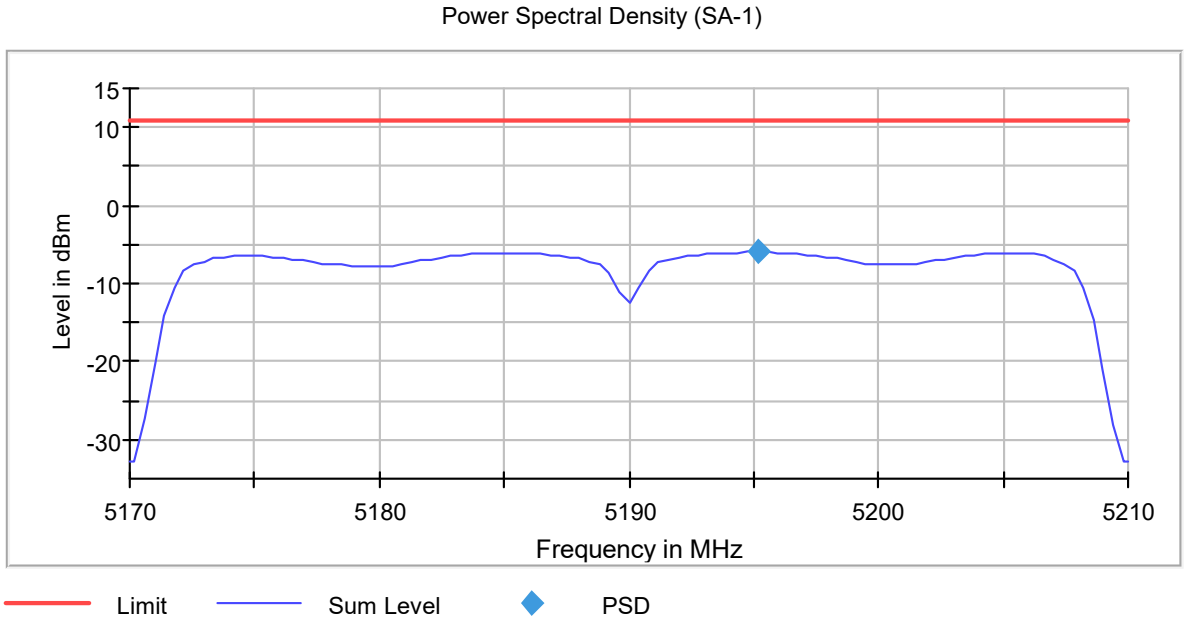
- High Channel 48 (5240 MHz):



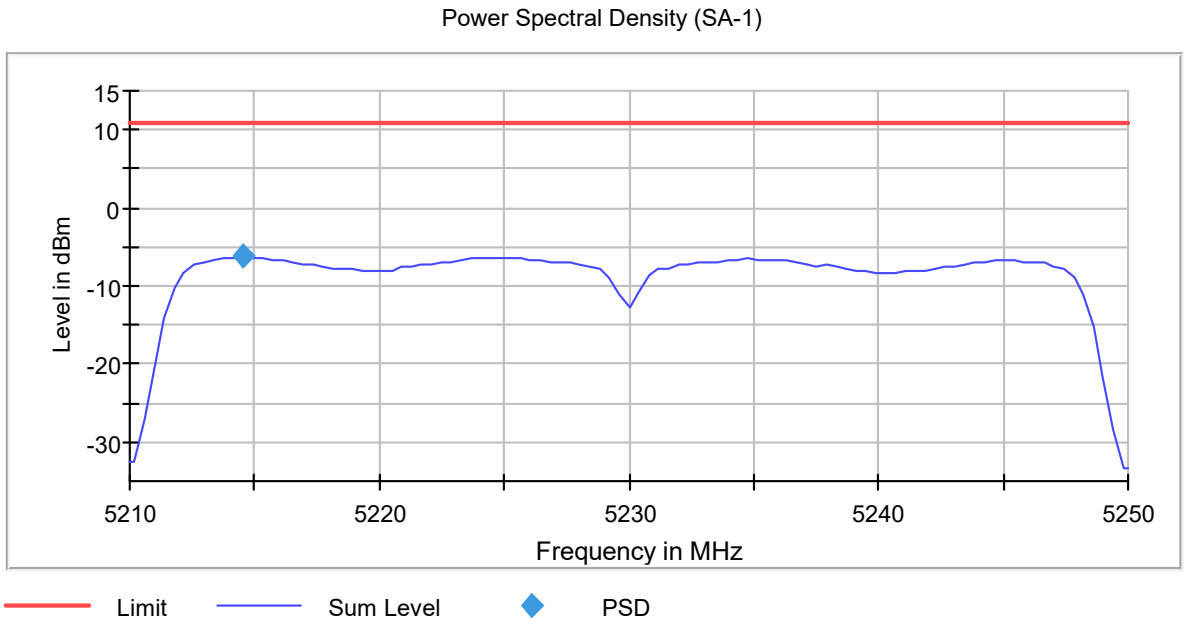

**SISO 802.11 n40 (HT40):**

**U-NII-1 (5150-5250 MHz)**

- Low Channel 38 (5190 MHz):



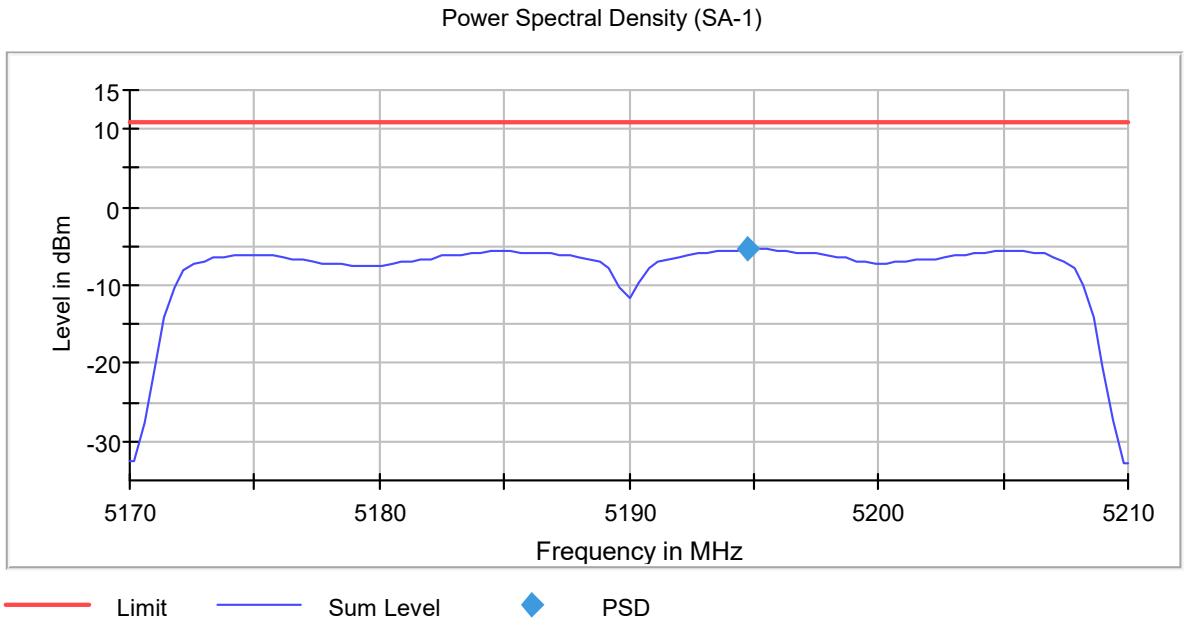
- High Channel 46 (5230 MHz):



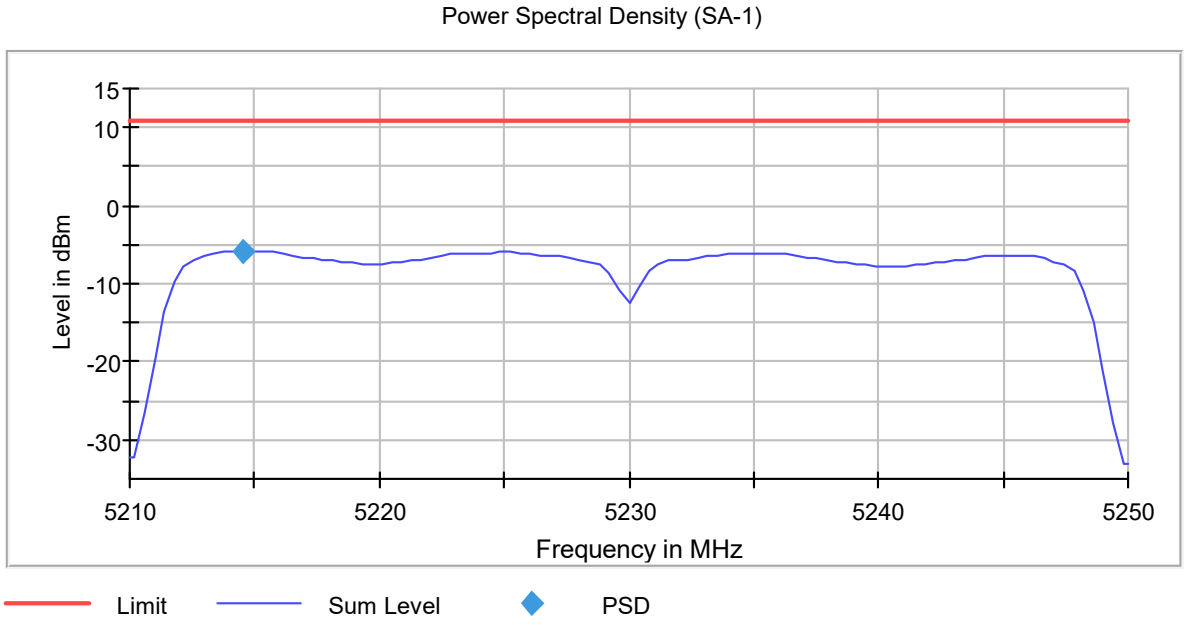

**SISO 802.11 ac40 (VHT40):**

**U-NII-1 (5150-5250 MHz)**

- Low Channel 38 (5190 MHz):



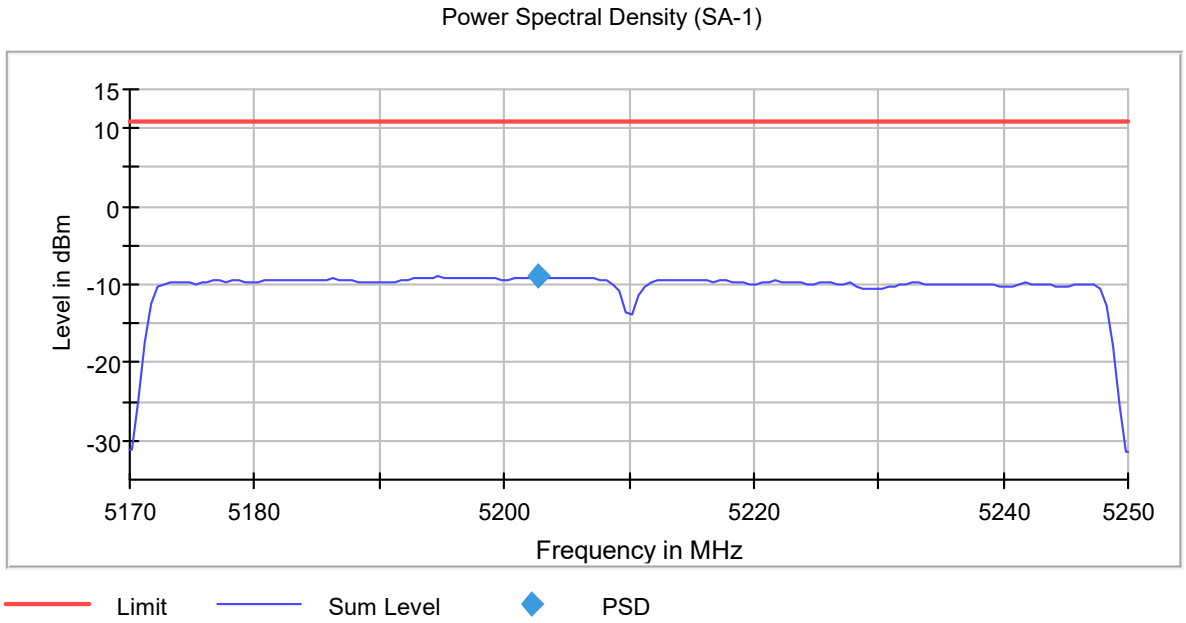
- High Channel 46 (5230 MHz):




**SISO 802.11 ac80 (VHT80):**

**U-NII-1 (5150-5250 MHz)**

- Single Channel 42 (5210 MHz):



# FCC 15.407 (b)(1)(6) / RSS-247 6.2.1.2. Transmitter Out of Band Radiated Emissions

SPECIFICATION:

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 –27 dBm/MHz (68.23 dBµV/m at 3 m distance).

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

| Frequency Range (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|---|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | - | 300 |
| 0.490-1.705 | 24000/F(kHz) | - | 300 |
| 1.705 - 30.0 | 30 | - | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| 960 - 40000 | 500 | 54 | 3 |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 1m for the frequency range 1 GHz-40 GHz and a distance of 3m for frequency range 30 MHz-1 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

**OUT OF BAND EMISSIONS**: For spurious emissions outside of the U-NII-1 band edge Restricted Bands 4.50-5.15 GHz and 5.35-5.46 GHz, the OFDM worst mode case was determined after preliminary measurements of the E.I.R.P. density (radiated).
The Low, Middle and High Channels were tested.

- **Worst-case (FCC setting):** **802.11 a20** (6 Mbps)**.**

**Frequency range 30 MHz - 1 GHz (worst-case):**

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

No spurious frequencies detected at less than 20 dB below the limit.

Measurement Uncertainty (dB) <± 5.1

**Frequency range 1 - 40 GHz (worst-case):**

The results in the next tables show the maximum measured levels in the 1 - 40 GHz frequency range.

The Low, Middle and High Channels were measured for out-of-band emissions for the worst mode.

Spurious frequencies in the restricted bands with peak levels above the average limit (54 dBµV/m at 3 m) are measured with an average detector for checking compliance with the average limit.

- LOW CHANNEL. No spurious frequencies at less than 20 dB below the limit.

- MIDDLE CHANNEL. No spurious frequencies at less than 20 dB below the limit.

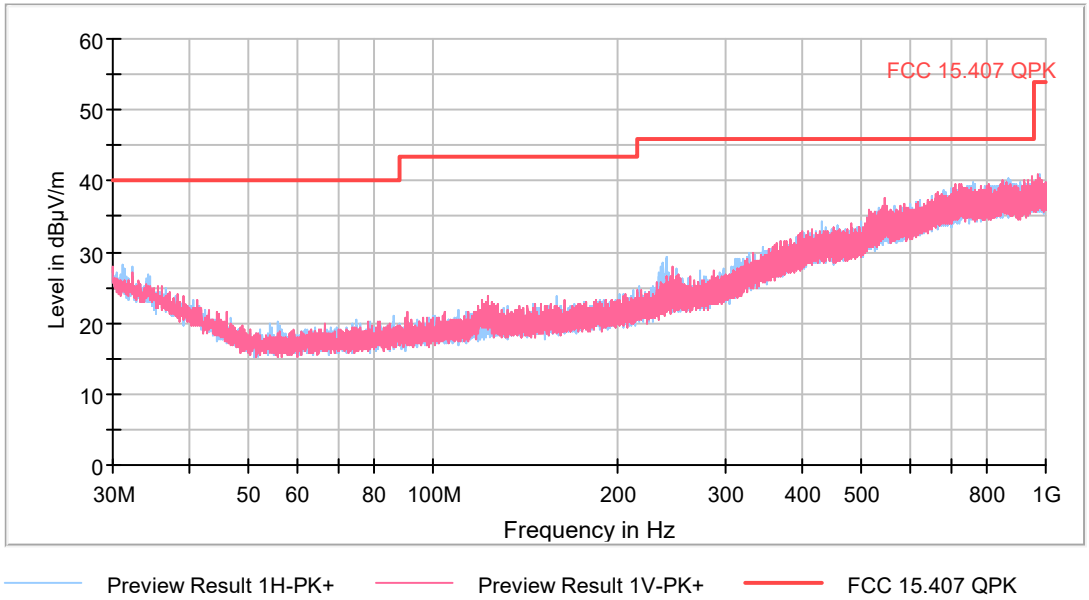
- HIGH CHANNEL. No spurious frequencies at less than 20 dB below the limit.

Measurement Uncertainty (dB): 1 GHz - 17 GHz <± 5.13
17 GHz - 26.5 GHz <± 5.08
26.5 GHz - 40 GHz <± 5.33

Verdict: PASS

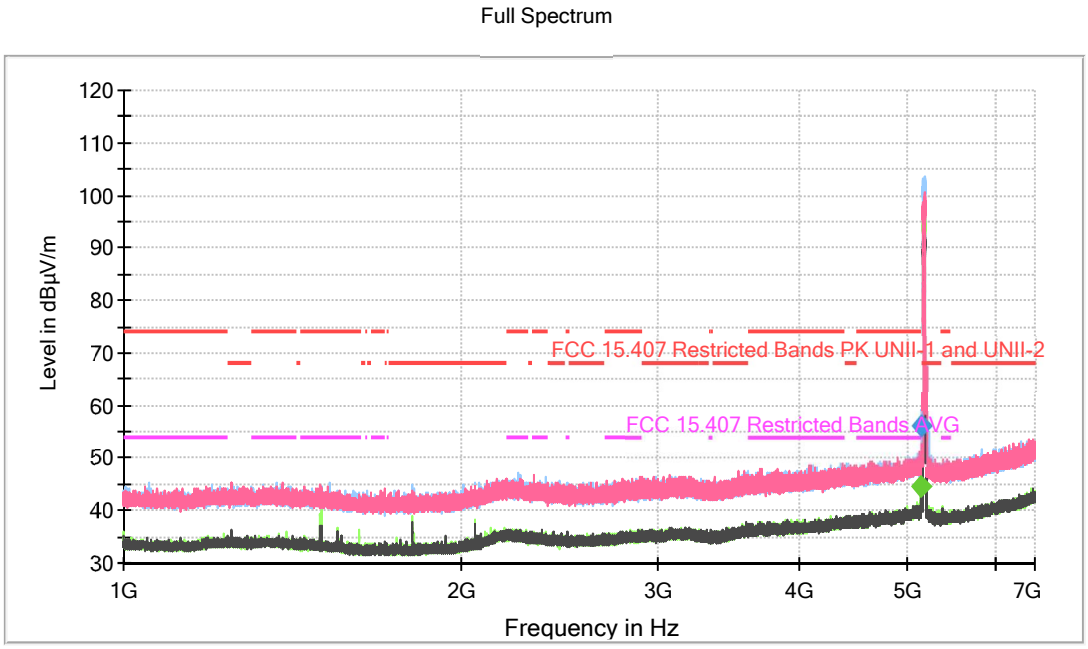
**FREQUENCY RANGE 30 MHz - 1 GHz (worst-case):**

This plot is valid for the Low, Middle and High Channels and all the modulation modes.



**FREQUENCY RANGE 1 - 6.5 GHz (worst mode):**

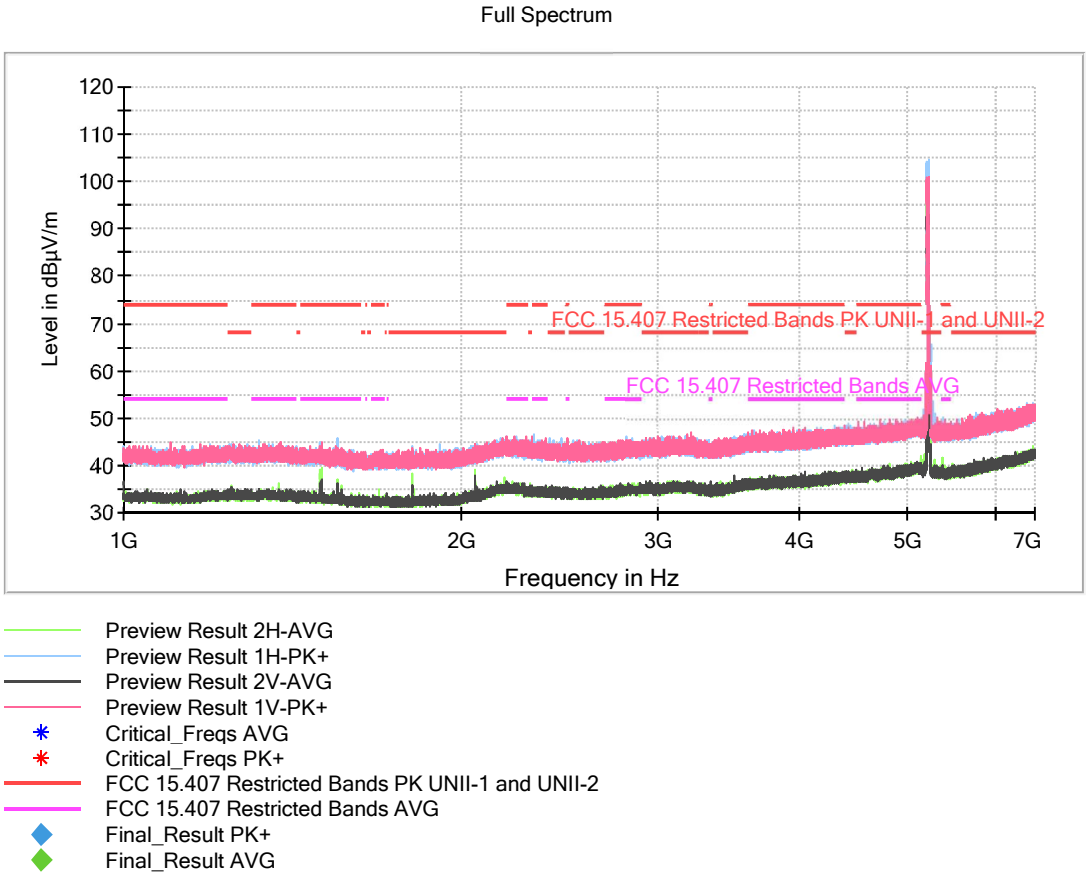
- Low Channel:




Preview Result 2H-AVG
Preview Result 1H-PK+
Preview Result 2V-AVG
Preview Result 1V-PK+
FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
FCC 15.407 Restricted Bands AVG
Final_Result PK+
Final_Result AVG

The peak above the limit is the carrier frequency.

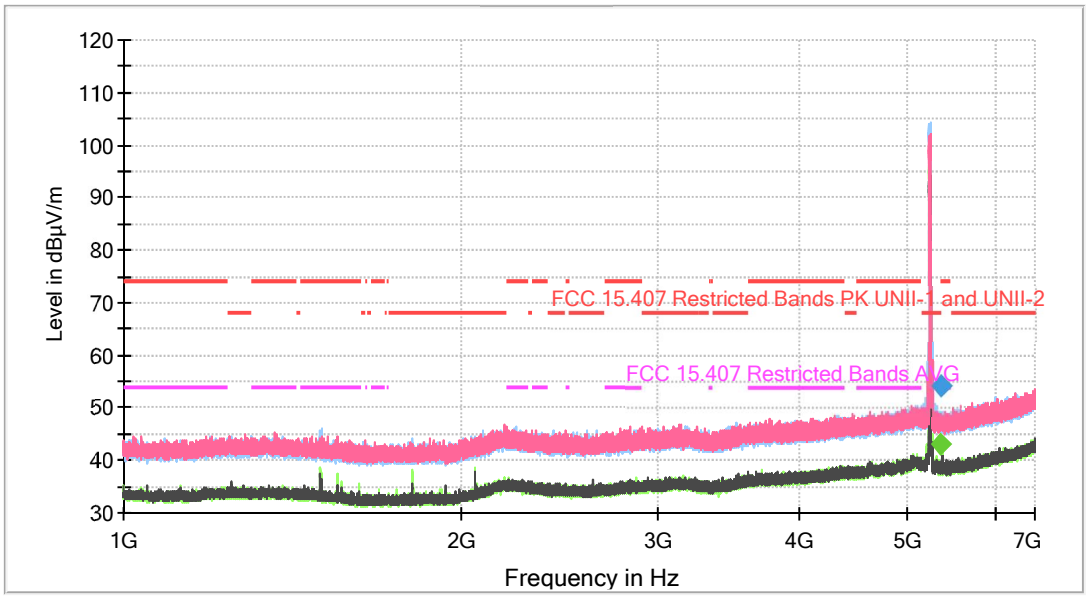
- Middle Channel:




The peak above the limit is the carrier frequency.

- High Channel:

Full Spectrum




Preview Result 2H-AVG
Preview Result 1H-PK+
Preview Result 2V-AVG
Preview Result 1V-PK+
FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
FCC 15.407 Restricted Bands AVG
Final_Result PK+
Final_Result AVG

The peak above the limit is the carrier frequency.