

ISED CABid: ES1909

Test Report No:  
NIE: 67442RRF.006

## Partial Test Report

USA FCC Part 15.407, 15.209

CANADA RSS-247, RSS-Gen

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (*) Identification of item tested         | Communications device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| (*) Trademark                             | Ring LLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| (*) Model and /or type reference          | 5AT3T3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Other identification of the product       | FCC ID: 2AEUPBHAXN001<br>IC: 20271-BHAXN001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| (*) Features                              | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Applicant                                 | Ring LLC<br>1523 26th Street, Santa Monica, 90404, California, United States                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Test method requested, standard           | USA FCC Part 15.407 (10-1-20) Edition: Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements.<br>USA FCC Part 15.209 (10-1-20) Edition: Radiated emission limits; general requirements.<br>CANADA RSS-247 Issue 2 (February 2017).<br>CANADA RSS-Gen Issue 5 Amendment 1 (March 2019).<br>Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02<br>General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.<br>Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated 10/31/2013<br>ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. |
| Approved by (name / position & signature) | José Manuel Gómez<br>Industrial & Automotive<br>EMC Lab. Manager                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Date of issue                             | 2021-08-26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Report template No                        | FDT08_23<br>(*) "Data provided by the client"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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## Competences and guarantees

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DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed test in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

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## General Conditions

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## Uncertainty

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Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

## Data provided by the client

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The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample of the model number 5AT3T3 is a communications device with wireless technologies.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of result.

## Usage of samples

---

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

| Control N° | Description           | Model  | Serial N°        | Reception  |
|------------|-----------------------|--------|------------------|------------|
| 67442/028  | Communications Device | 5AT3T3 | GCB1ES0011360001 | 2021/05/03 |

Auxiliary elements used with the Sample S/01:

| Control N° | Description         | Model         | Serial N°        | Reception  |
|------------|---------------------|---------------|------------------|------------|
| 67442/018  | AC/DC Power Adapter | DSA-36PDB FUS | GB51PR011077003K | 2021/04/13 |

Sample S/01 has undergone the test(s): The tests indicated in the Appendix A.

## Test sample description

|                                               |                           |                                |                      |              |                    |   |    |
|-----------------------------------------------|---------------------------|--------------------------------|----------------------|--------------|--------------------|---|----|
| Ports..... :                                  | Port name and description | Cable                          |                      |              |                    |   |    |
|                                               |                           | Specified max length [m]       | Attached during test | Shielded     | Coupled to patient |   |    |
|                                               | AC power port             | >3m                            | Yes                  | No           |                    |   |    |
|                                               | USB power port            | <3m                            | Yes                  | Yes          |                    |   |    |
|                                               | Ethernet ports            | >3m                            | Yes                  | No           |                    |   |    |
|                                               |                           |                                |                      |              |                    |   |    |
|                                               |                           |                                |                      |              |                    |   |    |
| Supplementary information to the ports..... : |                           |                                |                      |              |                    |   |    |
| Rated power supply .....                      | Voltage and Frequency     |                                | Reference poles      |              |                    |   |    |
|                                               |                           |                                | L1                   | L2           | L3                 | N | PE |
|                                               | X                         | AC: 110V (60Hz).               | X                    |              |                    | X |    |
|                                               | X                         | DC: 12V, 3A                    |                      |              |                    |   |    |
| Rated Power .....                             | Not provided.             |                                |                      |              |                    |   |    |
| Clock frequencies.....                        | Not provided.             |                                |                      |              |                    |   |    |
| Other parameters .....                        | Not provided.             |                                |                      |              |                    |   |    |
| Software version .....                        | Not provided.             |                                |                      |              |                    |   |    |
| Hardware version .....                        | Not provided.             |                                |                      |              |                    |   |    |
| Dimensions in cm (W x H x D) .....            | Not provided.             |                                |                      |              |                    |   |    |
| Mounting position .....                       | X                         | Table top equipment            |                      |              |                    |   |    |
|                                               |                           | Wall/Ceiling mounted equipment |                      |              |                    |   |    |
|                                               |                           | Floor standing equipment       |                      |              |                    |   |    |
|                                               |                           | Hand-held equipment            |                      |              |                    |   |    |
|                                               |                           | Other:                         |                      |              |                    |   |    |
| Modules/parts.....                            | Module/parts of test item |                                | Type                 | Manufacturer |                    |   |    |
|                                               |                           |                                |                      |              |                    |   |    |
| Accessories (not part of the test item) ..... | Description               |                                | Type                 | Manufacturer |                    |   |    |
|                                               |                           |                                |                      |              |                    |   |    |
| Documents as provided by the applicant .....  | Description               |                                | File name            | Issue date   |                    |   |    |
|                                               |                           |                                |                      |              |                    |   |    |

## Identification of the client

Ring LLC

1523 26th Street, Santa Monica, 90404, California, United States

## Testing period and place

|               |                                        |
|---------------|----------------------------------------|
| Test Location | DEKRA Testing and Certification S.A.U. |
| Date (start)  | 2021-05-22                             |
| Date (finish) | 2021-06-15                             |

## Document history

| Report number | Date       | Description    |
|---------------|------------|----------------|
| 67442RRF.006  | 2021-08-26 | First release. |

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

|                   |                              |
|-------------------|------------------------------|
| Temperature       | Min. = 15 °C<br>Max. = 35 °C |
| Relative humidity | Min. = 20 %<br>Max. = 75 %   |

In the semianechoic chamber, the following limits were not exceeded during the test.

|                   |                              |
|-------------------|------------------------------|
| Temperature       | Min. = 15 °C<br>Max. = 35 °C |
| Relative humidity | Min. = 20 %<br>Max. = 75 %   |

In the chamber for conducted measurements, the following limits were not exceeded during the test:

|                   |                              |
|-------------------|------------------------------|
| Temperature       | Min. = 15 °C<br>Max. = 35 °C |
| Relative humidity | Min. = 20 %<br>Max. = 75 %   |

## Remarks and comments

The tests have been performed by the technical personnel: Daniel Mejías, Jaime Barranquero and Antonio Manuel Sánchez.

Used instrumentation:

### Radiated Measurements:

|    |                                                                | Last Calibration | Due Calibration |
|----|----------------------------------------------------------------|------------------|-----------------|
| 1. | Semianechoic Absorber Lined Chamber ALBATROSS P29419           | 2020/01          | 2023/01         |
| 2. | Shielded Room ALBATROSS PROJECTS GMBH P29419                   | N.A.             | N.A.            |
| 3. | EMI Test Receiver 2 Hz – 44 GHz Rhode and Schwarz ESW44        | 2019/10          | 2021/10         |
| 4. | Horn. Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D | 2019/11          | 2022/12         |
| 5. | Horn. Antenna 18-40 GHz SCHWARZBECK BBHA 9170                  | 2021/03          | 03/2024         |
| 6. | Preamplifier 30dB 500MHz-18GHz SCHWARZBECK BBV 9718 C          | 2021/02          | 2022/02         |
| 7. | Pre-amplifier G>30dB 18-40 GHz BONN ELEKTRONIK BLMA 1840-3G    | 2019/11          | 2021/11         |
| 8. | Hybrid Bilog Antenna 30MHz-6GHz ETS LINDGREN 3142E             | 2019/02          | 2022/02         |

### Conducted Measurements

|    |                                                                      | Last Calibration | Due Calibration |
|----|----------------------------------------------------------------------|------------------|-----------------|
| 1. | Shielded Room ALBATROSS PROJECTS GMBH P29419                         | N.A.             | N.A.            |
| 2. | Spectrum Analyzer 9KHz-6GHz ROHDE AND SCHWARZ FSL6                   | 2021/04          | 2023/04         |
| 3. | Vector Signal Generator 100KHz-6GHz ROHDE AND SCHWARZ SMU200A        | 2021/04          | 2023/04         |
| 4. | Signal Generator 9KHz-6GHz ROHDE AND SCHWARZ SMB100A                 | 2019/10          | 2021/10         |
| 5. | Extension For Open Switch Unit to 40GHz ROHDE AND SCHWARZ OPS-B157Wx | 2021/03          | 2023/03         |
| 6. | Open Switch Unit Up To 6GHz ROHDE AND SCHWARZ OSP-B157W8             | 2021/03          | 2023/03         |

## Testing verdicts

|                 |     |
|-----------------|-----|
| Not applicable: | N/A |
| Pass:           | P   |
| Fail:           | F   |
| Not measured:   | N/M |

## Summary

### A. Common requirements for all Bands:

| FCC PART 15 PARAGRAPH / RSS-247                     |         |        |
|-----------------------------------------------------|---------|--------|
| Requirement – Test case                             | Verdict | Remark |
| Transmitter. Duty Cycle                             | N/A     |        |
| Transmitter. 99% Occupied Bandwidth                 | N/A     |        |
| Transmitter. 26 dB Emission Bandwidth (EBW)         | N/A     |        |
| <u>Supplementary information and remarks:</u> None. |         |        |

## Appendix A: Test Common requirements for all Bands

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## TEST CONDITIONS

(\*) Declared by the Client.

POWER SUPPLY (\*):

Vnominal: 110 Vac  
Type of Power Supply: AC/DC Adapter.

ANTENNA (\*):

Type of Antennas: Integral (stamped metal).

Maximum Declared Antenna Gain WLAN1 U-NII-1: +3.5 dBi  
Maximum Declared Antenna Gain WLAN1 U-NII-3: +5.2 dBi  
Maximum Declared Antenna Gain WLAN2 U-NII-1: +2.8 dBi  
Maximum Declared Antenna Gain WLAN2 U-NII-3: +4.9 dBi

Directional Antenna Gain Calculations for CDD MIMO:

U-NII-1:

- For 2Tx CDD MIMO modes, in accordance with KDB 662911 D01 v02r01 Section F)2)f)(ii), directional gain was calculated as (worst case):

$N_{SS} = 1$ ,  $N_{ANT} = 2$ ,  $G_{WLAN1} = 3.5$  dBi,  $G_{WLAN2} = 2.8$  dBi

$$\begin{aligned} \text{Directional Gain} &= 10 \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left( \sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right] = 10 \log \left[ \frac{\sum_{j=1}^1 \left( \sum_{k=1}^2 g_{j,k} \right)^2}{2} \right] \\ &= 10 \log \left[ \frac{(g_{1,1} + g_{1,2})^2}{2} \right] = 10 \log \left[ \frac{\left( 10^{\frac{3.5}{10}} + 10^{\frac{2.8}{10}} \right)^2}{2} \right] = 10 \log \left[ \frac{\left( 10^{\frac{2.8}{10}} + 10^{\frac{3.5}{10}} \right)^2}{2} \right] = 6.17 \text{ dBi} \end{aligned}$$

U-NII-3:

- For 2Tx CDD MIMO modes, in accordance with KDB 662911 D01 v02r01 Section F)2)f)(ii), directional gain was calculated as (worst case):

$N_{SS} = 1$ ,  $N_{ANT} = 2$ ,  $G_{WLAN1} = 5.2$  dBi,  $G_{WLAN2} = 4.9$  dBi

$$\begin{aligned} \text{Directional Gain} &= 10 \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left( \sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right] = 10 \log \left[ \frac{\sum_{j=1}^1 \left( \sum_{k=1}^2 g_{j,k} \right)^2}{2} \right] \\ &= 10 \log \left[ \frac{(g_{1,1} + g_{1,2})^2}{2} \right] = 10 \log \left[ \frac{\left( 10^{\frac{5.2}{10}} + 10^{\frac{4.9}{10}} \right)^2}{2} \right] = 10 \log \left[ \frac{\left( 10^{\frac{4.9}{10}} + 10^{\frac{5.2}{10}} \right)^2}{2} \right] = 8.06 \text{ dBi} \end{aligned}$$

# TEST FREQUENCIES (\*):

## U-NII-1 Band:

|                              |                                                                                            |                         |
|------------------------------|--------------------------------------------------------------------------------------------|-------------------------|
| Technology Tested:           | WLAN (IEEE 802.11 a20 / n2040 / ac204080 / ax204080 2x2)                                   |                         |
| Modes:                       | 802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps (SISO, or MIMO with CDD)                       |                         |
|                              | 802.11n HT20: MCS0 to MCS23 (1 or 2 spatial stream with either SISO or 2 chain MIMO CDD)   |                         |
|                              | 802.11n HT40: MCS0 to MCS23 (1 or 2 spatial stream with either SISO or 2 chain MIMO CDD)   |                         |
|                              | 802.11ac VHT20: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF) |                         |
|                              | 802.11ac VHT40: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF) |                         |
|                              | 802.11ac VHT80: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF) |                         |
|                              | 802.11ax HE20: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF)  |                         |
|                              | 802.11ax HE40: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF)  |                         |
|                              | 802.11ax HE80: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF)  |                         |
| Setting of cores / ports:    | WLAN1, WLAN2, WLAN12                                                                       |                         |
| Beamforming:                 | No.                                                                                        |                         |
| Frequency Range:             | 5150 - 5250 MHz                                                                            |                         |
| Operating Channel Bandwidth: | 20 MHz                                                                                     |                         |
| Transmission Channels:       | Channels                                                                                   | Channel Frequency (MHz) |
|                              | Lowest (36)                                                                                | 5180                    |
|                              | Middle (40)                                                                                | 5200                    |
|                              | 44                                                                                         | 5220                    |
|                              | Highest (48)                                                                               | 5240                    |
| Operating Channel Bandwidth: | 40 MHz                                                                                     |                         |
| Transmission Channels:       | Channels                                                                                   | Channel Frequency (MHz) |
|                              | Lowest (38)                                                                                | 5190                    |
|                              | Highest (46)                                                                               | 5230                    |
| Operating Channel Bandwidth: | 80 MHz                                                                                     |                         |
| Transmission Channels:       | Channels                                                                                   | Channel Frequency (MHz) |
|                              | Single (42)                                                                                | 5210                    |

U-NII-3:

|                              |                                                                                            |                         |
|------------------------------|--------------------------------------------------------------------------------------------|-------------------------|
| Technology Tested:           | WLAN (IEEE 802.11 a20 / n2040 / ac204080 / ax204080 2x2)                                   |                         |
| Modes:                       | 802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps (SISO, or MIMO with CDD)                       |                         |
|                              | 802.11n HT20: MCS0 to MCS23 (1 or 2 spatial stream with either SISO or 2 chain MIMO CDD)   |                         |
|                              | 802.11n HT40: MCS0 to MCS23 (1 or 2 spatial stream with either SISO or 2 chain MIMO CDD)   |                         |
|                              | 802.11ac VHT20: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF) |                         |
|                              | 802.11ac VHT40: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF) |                         |
|                              | 802.11ac VHT80: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF) |                         |
|                              | 802.11ax HE20: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF)  |                         |
|                              | 802.11ax HE40: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF)  |                         |
|                              | 802.11ax HE80: MCS0 to MCS9 (1 or 2 spatial stream) (SISO, or MIMO with CDD without TxBF)  |                         |
| Setting of cores / ports:    | WLAN1, WLAN2, WLAN12                                                                       |                         |
| Beamforming:                 | No.                                                                                        |                         |
| Frequency Range:             | 5725 MHz to 5850 MHz                                                                       |                         |
| Operating Channel Bandwidth: | 20 MHz                                                                                     |                         |
| Transmission Channels:       | Channel                                                                                    | Channel Frequency (MHz) |
|                              | Lowest (149)                                                                               | 5745                    |
|                              | 153                                                                                        | 5765                    |
|                              | Middle (157)                                                                               | 5785                    |
|                              | 161                                                                                        | 5805                    |
|                              | Highest (165)                                                                              | 5825                    |
| Operating Channel Bandwidth: | 40 MHz                                                                                     |                         |
| Transmission Channels:       | Channel                                                                                    | Channel Frequency (MHz) |
|                              | Lowest (151)                                                                               | 5755                    |
|                              | Highest (159)                                                                              | 5795                    |
| Operating Channel Bandwidth: | 80 MHz                                                                                     |                         |
| Transmission Channels:       | Single (155)                                                                               | 5775                    |

## POWER SETTINGS (\*):

### U-NII-1. FCC:

#### WLAN1

| Channel | Frequency | 11a  | 11n  | 11ac | 11he |
|---------|-----------|------|------|------|------|
| 36      | 5180 MHz  | 24.5 | 24.5 | 24.5 | 24.5 |
| 40      | 5200 MHz  | 27   | 26.5 | 27   | 25   |
| 44      | 5220 MHz  | 30   | 25   | 29   | 25   |
| 48      | 5240 MHz  | 30   | 25   | 28.5 | 25.5 |
| 38      | 5190 MHz  |      | 19   | 18   | 18,5 |
| 46      | 5230 MHz  |      | 23.5 | 24.5 | 24.5 |
| 42      | 5210 MHz  |      |      | 19   | 19   |

#### WLAN2

| Channel | Frequency | 11a | 11n | 11ac | 11he |
|---------|-----------|-----|-----|------|------|
| 36      | 5180 MHz  | 24  | 24  | 24   | 24   |
| 40      | 5200 MHz  | 27  | 27  | 27   | 26.5 |
| 44      | 5220 MHz  | 28  | 28  | 28   | 28   |
| 48      | 5240 MHz  | 30  | 30  | 30   | 30   |
| 38      | 5190 MHz  |     | 17  | 17.5 | 18   |
| 46      | 5230 MHz  |     | 25  | 25.5 | 25.5 |
| 42      | 5210 MHz  |     |     | 18   | 18   |

#### WLAN12

| Channel | Frequency | 11a | 11n | 11ac | 11he |
|---------|-----------|-----|-----|------|------|
| 36      | 5180 MHz  | 24  | 24  | 24   | 24   |
| 40      | 5200 MHz  | 27  | 27  | 27   | 26.5 |
| 44      | 5220 MHz  | 28  | 28  | 28   | 28   |
| 48      | 5240 MHz  | 30  | 30  | 30   | 30   |
| 38      | 5190 MHz  |     | 17  | 17.5 | 18   |
| 46      | 5230 MHz  |     | 25  | 25.5 | 25.5 |
| 42      | 5210 MHz  |     |     | 18   | 18   |

## U-NII-1. Canada:

### WLAN1

| Channel | Frequency | 11a  | 11n  | 11ac | 11he |
|---------|-----------|------|------|------|------|
| 36      | 5180 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 40      | 5200 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 44      | 5220 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 48      | 5240 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 38      | 5190 MHz  |      | 19   | 18   | 18.5 |
| 46      | 5230 MHz  |      | 18.5 | 19.5 | 18.5 |
| 42      | 5210 MHz  |      |      | 19   | 19   |

### WLAN2

| Channel | Frequency | 11a  | 11n  | 11ac | 11he |
|---------|-----------|------|------|------|------|
| 36      | 5180 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 40      | 5200 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 44      | 5220 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 48      | 5240 MHz  | 18.5 | 18.5 | 18.5 | 18.5 |
| 38      | 5190 MHz  |      | 17   | 17.5 | 18   |
| 46      | 5230 MHz  |      | 19   | 19   | 19.5 |
| 42      | 5210 MHz  |      |      | 18   | 18.5 |

### WLAN12

| Channel | Frequency | 11a  | 11n | 11ac | 11he |
|---------|-----------|------|-----|------|------|
| 36      | 5180 MHz  | 12.5 | 13  | 13   | 13   |
| 40      | 5200 MHz  | 12.5 | 13  | 13   | 13   |
| 44      | 5220 MHz  | 12.5 | 13  | 13   | 13   |
| 48      | 5240 MHz  | 12.5 | 13  | 13   | 13   |
| 38      | 5190 MHz  |      | 12  | 12.5 | 13   |
| 46      | 5230 MHz  |      | 12  | 12.5 | 13   |
| 42      | 5210 MHz  |      |     | 12.5 | 12.5 |

### U-NII-3. FCC & CANADA:

#### WLAN1

| Channel | Frequency | 11a | 11n  | 11ac | 11he |
|---------|-----------|-----|------|------|------|
| 149     | 5745 MHz  | 25  | 26   | 22   | 25.5 |
| 153     | 5765 MHz  | 25  | 23   | 18   | 24   |
| 157     | 5785 MHz  | 27  | 24   | 26   | 30   |
| 161     | 5805 MHz  | 21  | 23   | 21.5 | 20.5 |
| 165     | 5825 MHz  | 21  | 24.5 | 21.5 | 21   |
| 151     | 5755 MHz  |     | 16.5 | 17   | 16.5 |
| 159     | 5795 MHz  |     | 22   | 24   | 23   |
| 155     | 5775 MHz  |     |      | 17   | 17.5 |

#### WLAN2

| Channel | Frequency | 11a  | 11n  | 11ac | 11he |
|---------|-----------|------|------|------|------|
| 149     | 5745 MHz  | 29   | 30   | 28   | 30   |
| 153     | 5765 MHz  | 30   | 30   | 30   | 30   |
| 157     | 5785 MHz  | 30   | 30   | 30   | 30   |
| 161     | 5805 MHz  | 30   | 30   | 30   | 30   |
| 165     | 5825 MHz  | 27.5 | 26.5 | 27   | 27.5 |
| 151     | 5755 MHz  |      | 26   | 26   | 26.5 |
| 159     | 5795 MHz  |      | 26   | 26   | 26.5 |
| 155     | 5775 MHz  |      |      | 21.5 | 21.5 |

#### WLAN12

| Channel | Frequency | 11a  | 11n  | 11ac | 11he |
|---------|-----------|------|------|------|------|
| 149     | 5745 MHz  | 24   | 25.5 | 25   | 25.5 |
| 153     | 5765 MHz  | 25   | 24   | 25   | 24   |
| 157     | 5785 MHz  | 25   | 24   | 25   | 25.5 |
| 161     | 5805 MHz  | 24.5 | 20   | 25   | 18.5 |
| 165     | 5825 MHz  | 24   | 25   | 25   | 20   |
| 151     | 5755 MHz  |      | 13   | 17   | 14   |
| 159     | 5795 MHz  |      | 18   | 24   | 24   |
| 155     | 5775 MHz  |      |      | 19   | 18.5 |

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode on the lowest and highest channels at the rated power for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied instructions to configure the EUT. The customer supplied a document containing the setup instructions.

The worst cases for testing were identified for output power and spurious levels at the band edges which were selected based on preliminary testing that correspond to next data rates:

|                   |                                                |
|-------------------|------------------------------------------------|
| - 802.11a:        | 6 Mbps SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12. |
| - 802.11n HT20:   | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11n HT40:   | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ac VHT20: | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ac VHT40: | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ac VHT80: | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ax HE20:  | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ax HE40:  | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ax HE80:  | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |

#### CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and connected to the spectrum analyzer using a low loss RF cable. The reading in the spectrum analyzer is corrected taking into account the internal and external RF cable loss.

For all modes:



## RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz) and 1 GHz-18 GHz Double ridge horn antenna is situated at a distance of 3 m and a distance of 1 m for the frequency range 17 GHz-40 GHz (18 GHz-40 GHz horn antenna).

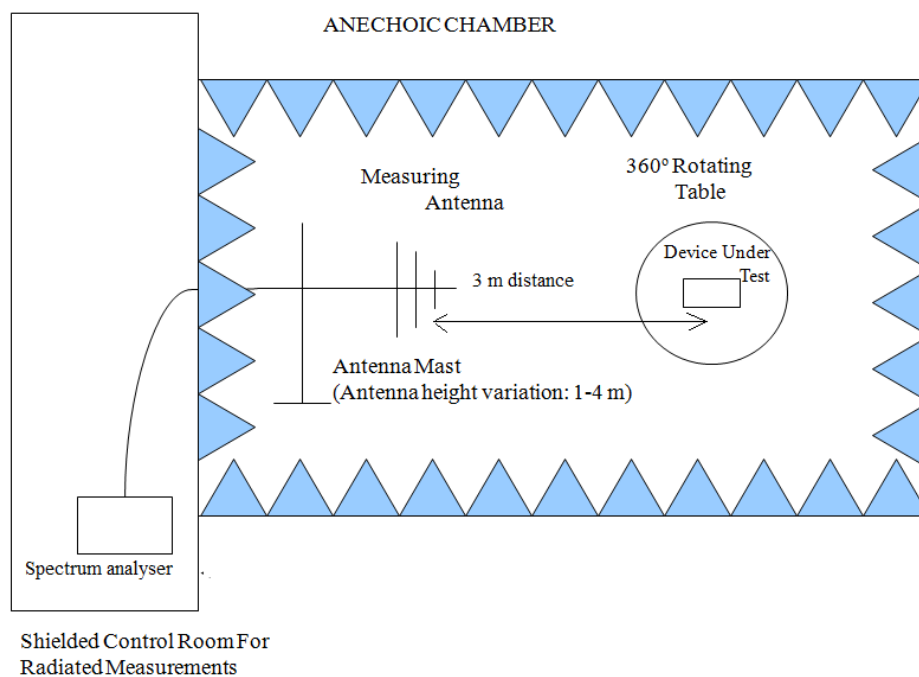
For radiated emissions in the range 17 GHz-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

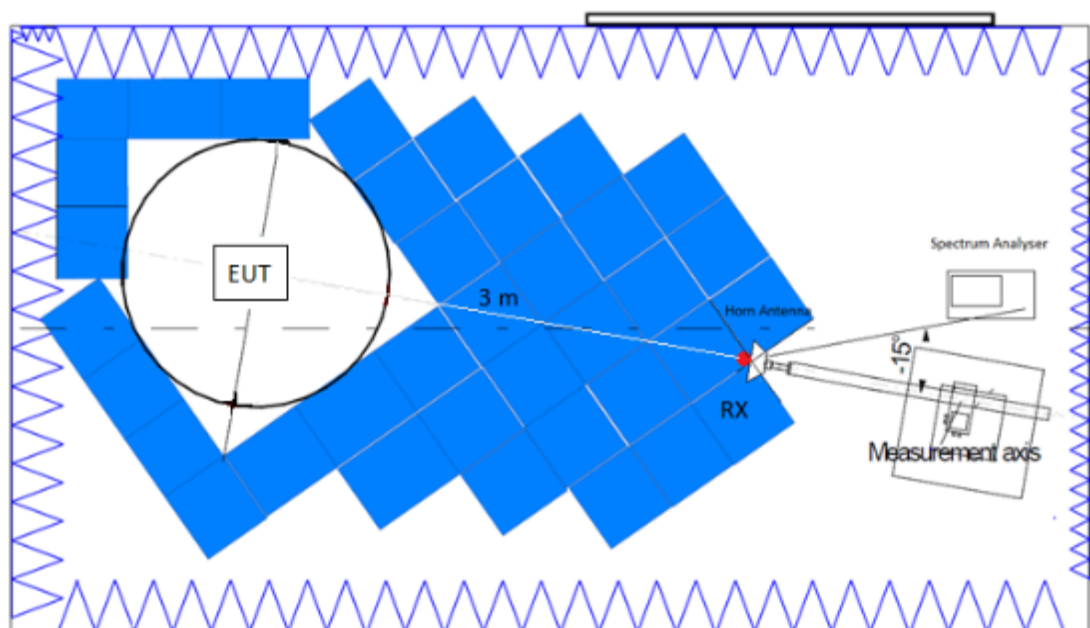
Measurements were made in both horizontal and vertical planes of polarization.

The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.

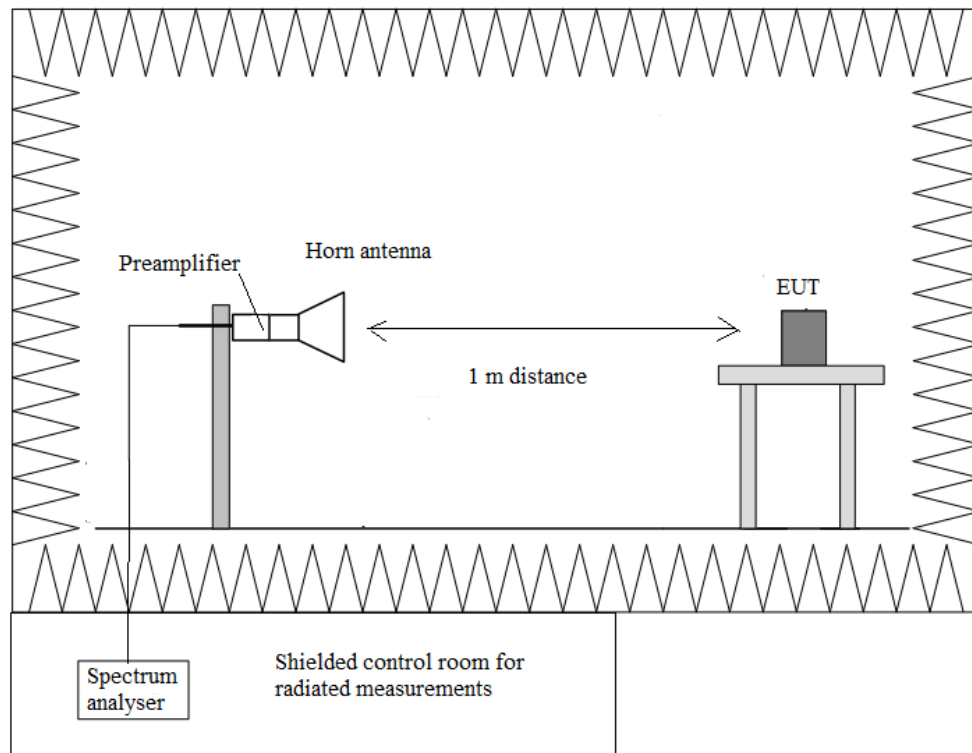
Radiated measurements setup  $f < 1$  GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup  $f > 17$  GHz:



## Transmitter. Duty Cycle

### SPECIFICATION:

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

### RESULTS:

These results are for modes with data rates with a Duty Cycle < 98%. The rest of modes with a Duty Cycle > 98%.

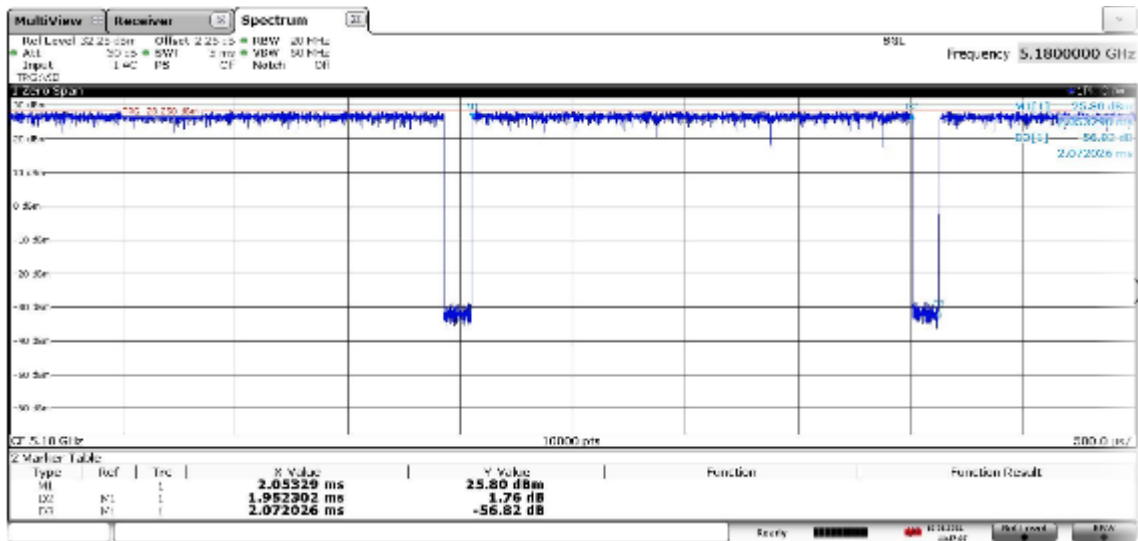
- Preliminary tests determined the SISO worst-case: WLAN1.
- Preliminary tests determined the MIMO worst-case: WLAN12.

| Band    | Technique   | Mode                   | Pulse (ms) | Period (ms) | Duty Cycle Correction (dB) |
|---------|-------------|------------------------|------------|-------------|----------------------------|
| U-NII-1 | SISO WLAN1  | 802.11 a / 20 MHz      | 1.952302   | 2.072026    | 0.26                       |
| U-NII-3 | SISO WLAN1  | 802.11 a / 20 MHz      | 1.952302   | 2.072026    | 0.26                       |
| U-NII-1 | SISO WLAN1  | 802.11 n / 20 MHz      | 5.39897    | 5.65576     | 0.20                       |
| U-NII-3 | SISO WLAN1  | 802.11 n / 20 MHz      | 5.39897    | 5.65576     | 0.20                       |
| U-NII-1 | SISO WLAN1  | 802.11 ac / 20 MHz     | 5.39797    | 5.65576     | 0.20                       |
| U-NII-3 | SISO WLAN1  | 802.11 ac / 20 MHz     | 5.39797    | 5.65576     | 0.20                       |
| U-NII-1 | SISO WLAN1  | 802.11 he / 20 MHz     | 5.42431    | 5.82405     | 0.31                       |
| U-NII-3 | SISO WLAN1  | 802.11 he / 20 MHz     | 5.42431    | 5.82405     | 0.31                       |
| U-NII-1 | SISO WLAN1  | 802.11 n / 40 MHz      | 10.82194   | 12.38243    | 0.59                       |
| U-NII-3 | SISO WLAN1  | 802.11 n / 40 MHz      | 10.82194   | 12.38243    | 0.59                       |
| U-NII-1 | SISO WLAN1  | 802.11 ac / 40 MHz     | 10.82104   | 12.39979    | 0.59                       |
| U-NII-3 | SISO WLAN1  | 802.11 ac / 40 MHz     | 10.82104   | 12.39979    | 0.59                       |
| U-NII-1 | SISO WLAN1  | 802.11 he / 40 MHz     | 10.82997   | 11.48826    | 0.26                       |
| U-NII-3 | SISO WLAN1  | 802.11 he / 40 MHz     | 10.82997   | 11.48826    | 0.26                       |
| U-NII-1 | SISO WLAN1  | 802.11 ac / 80 MHz     | 5.41339    | 5.64129     | 0.18                       |
| U-NII-3 | SISO WLAN1  | 802.11 ac / 80 MHz     | 5.41339    | 5.64129     | 0.18                       |
| U-NII-1 | SISO WLAN1  | 802.11 he / 80 MHz     | 5.43454    | 5.74513     | 0.24                       |
| U-NII-3 | SISO WLAN1  | 802.11 he / 80 MHz     | 5.43454    | 5.74513     | 0.24                       |
| U-NII-1 | MIMO WLAN12 | 802.11 a / 20 MHz (**) | 1.9692     | 2.0968      | 0.27                       |
| U-NII-3 | MIMO WLAN12 | 802.11 a / 20 MHz (**) | 1.9692     | 2.0968      | 0.27                       |
| U-NII-1 | MIMO WLAN12 | 802.11 n / 20 MHz      | 10.8093    | 11.9183     | 0.42                       |
| U-NII-3 | MIMO WLAN12 | 802.11 n / 20 MHz      | 10.8093    | 11.9183     | 0.42                       |
| U-NII-1 | MIMO WLAN12 | 802.11 ac / 20 MHz     | 10.8847    | 11.9366     | 0.40                       |
| U-NII-3 | MIMO WLAN12 | 802.11 ac / 20 MHz     | 10.8847    | 11.9366     | 0.40                       |
| U-NII-1 | MIMO WLAN12 | 802.11 he / 20 MHz     | 10.9162    | 12.2746     | 0.51                       |
| U-NII-3 | MIMO WLAN12 | 802.11 he / 20 MHz     | 10.9162    | 12.2746     | 0.51                       |
| U-NII-1 | MIMO WLAN12 | 802.11 n / 40 MHz      | 10.8457    | 12.3964     | 0.58                       |
| U-NII-3 | MIMO WLAN12 | 802.11 n / 40 MHz      | 10.8457    | 12.3964     | 0.58                       |
| U-NII-1 | MIMO WLAN12 | 802.11 ac / 40 MHz     | 10.8259    | 12.4307     | 0.60                       |
| U-NII-3 | MIMO WLAN12 | 802.11 ac / 40 MHz     | 10.8259    | 12.4307     | 0.60                       |
| U-NII-1 | MIMO WLAN12 | 802.11 he / 40 MHz     | 10.9003    | 12.015      | 0.42                       |
| U-NII-3 | MIMO WLAN12 | 802.11 he / 40 MHz     | 10.9003    | 12.015      | 0.42                       |
| U-NII-1 | MIMO WLAN12 | 802.11 ac / 80 MHz     | 5.4355     | 5.6453      | 0.16                       |
| U-NII-3 | MIMO WLAN12 | 802.11 ac / 80 MHz     | 5.4355     | 5.6453      | 0.16                       |
| U-NII-1 | MIMO WLAN12 | 802.11 he / 80 MHz     | 10.8447    | 12.2288     | 0.52                       |
| U-NII-3 | MIMO WLAN12 | 802.11 he / 80 MHz     | 10.8447    | 12.2288     | 0.52                       |

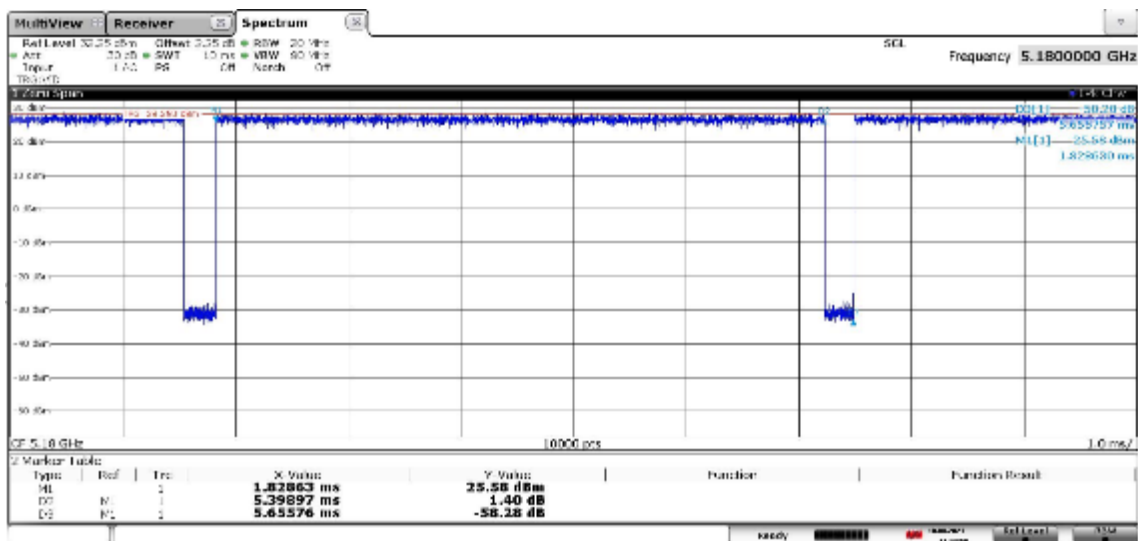
(\*\*): Preliminary testing determined the MIMO 802.11 a20 as the worst case mode.

## SISO worst-case:

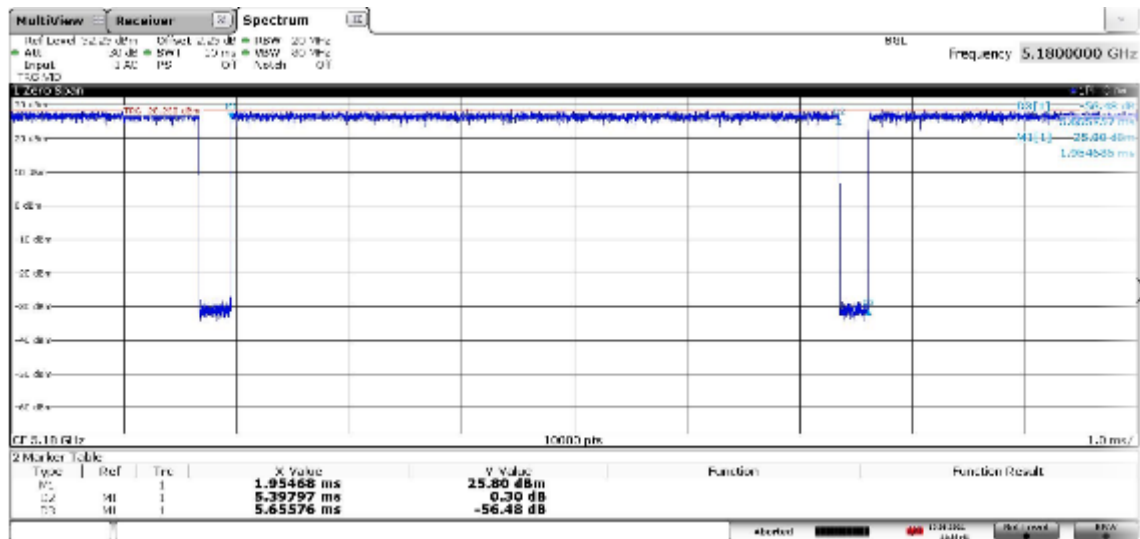
### SISO 802.11 a20:



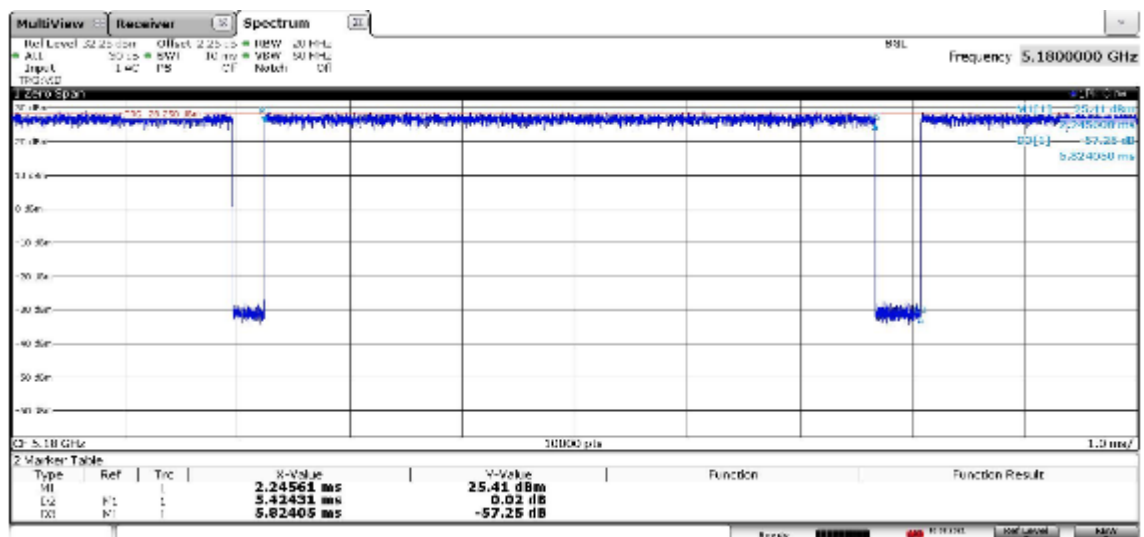
### SISO 802.11 n20:



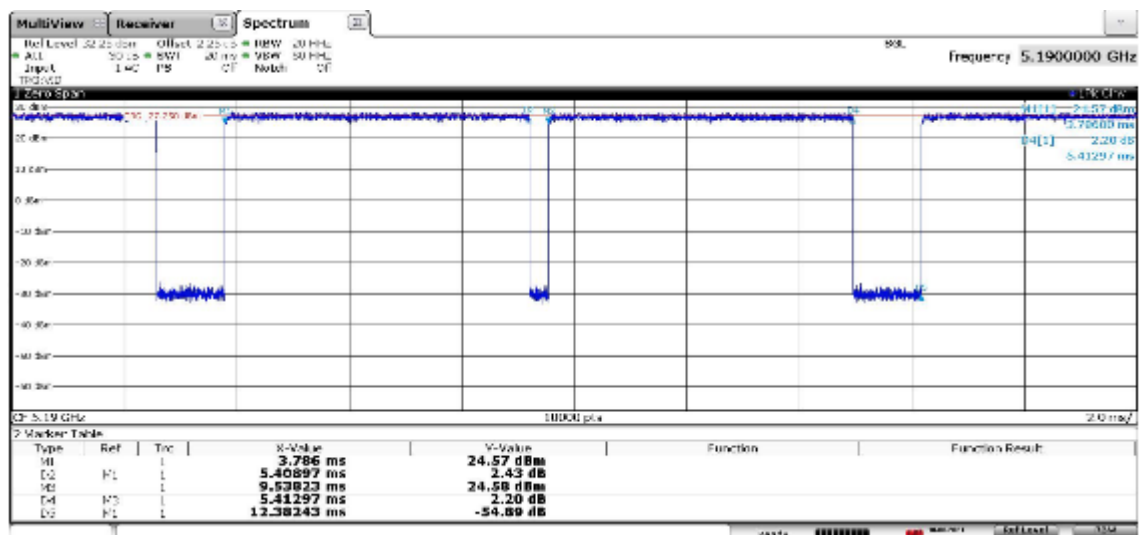
### SISO 802.11 ac20:



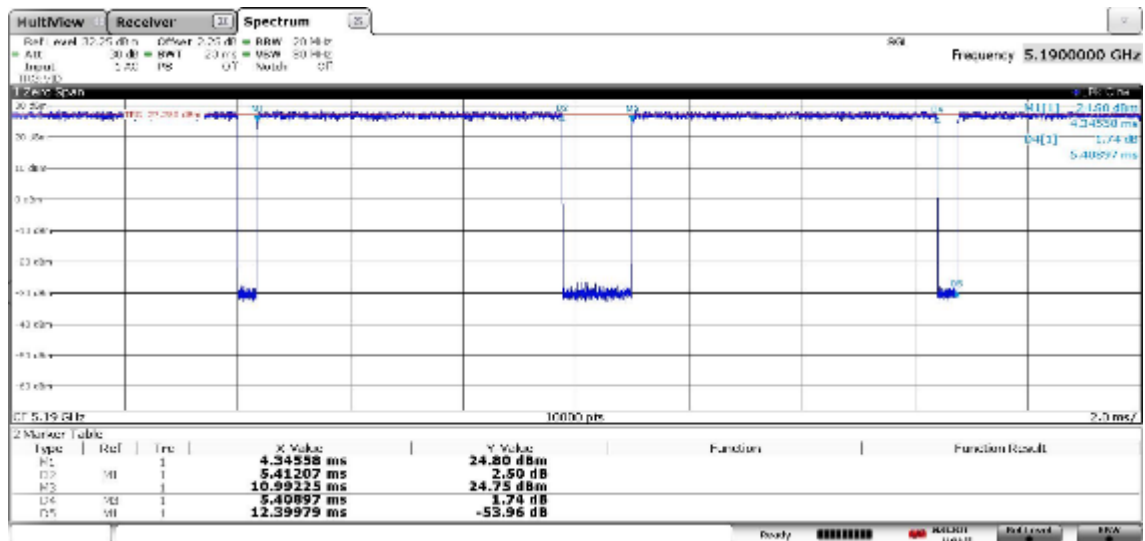
### SISO 802.11 he20:



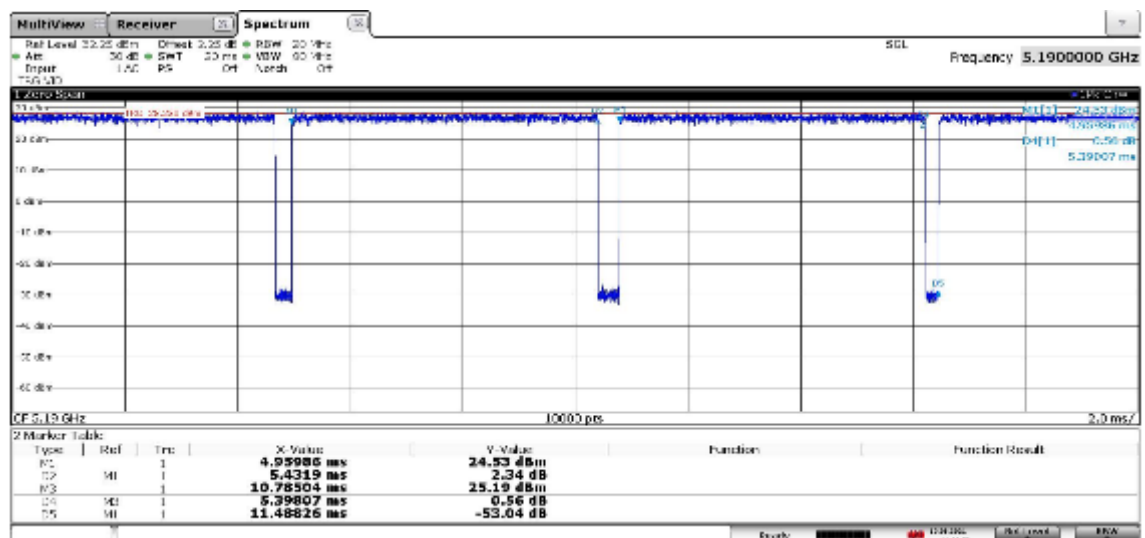
### SISO 802.11 n40:



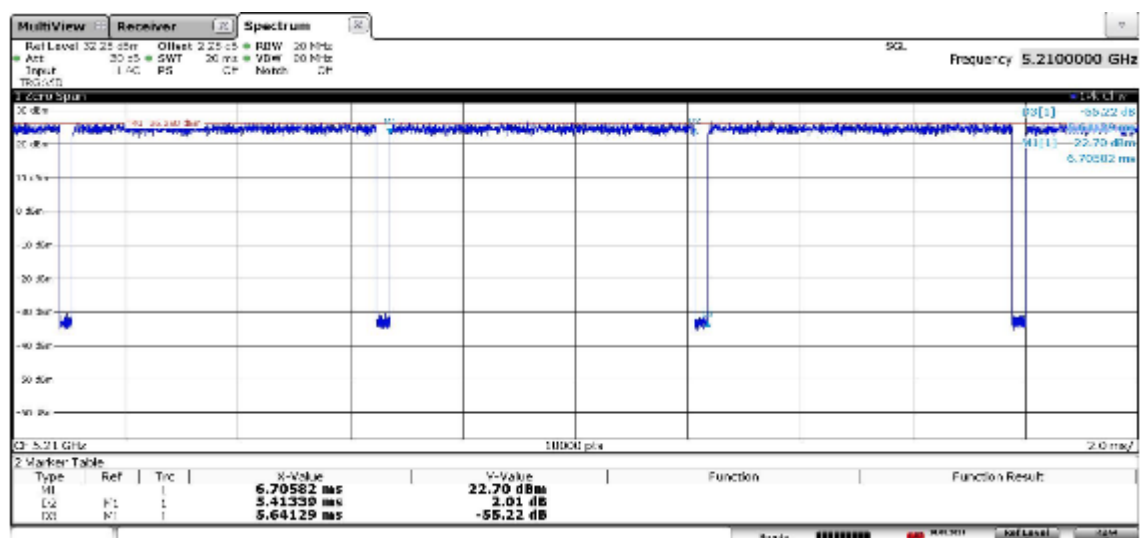
### SISO 802.11 ac40:

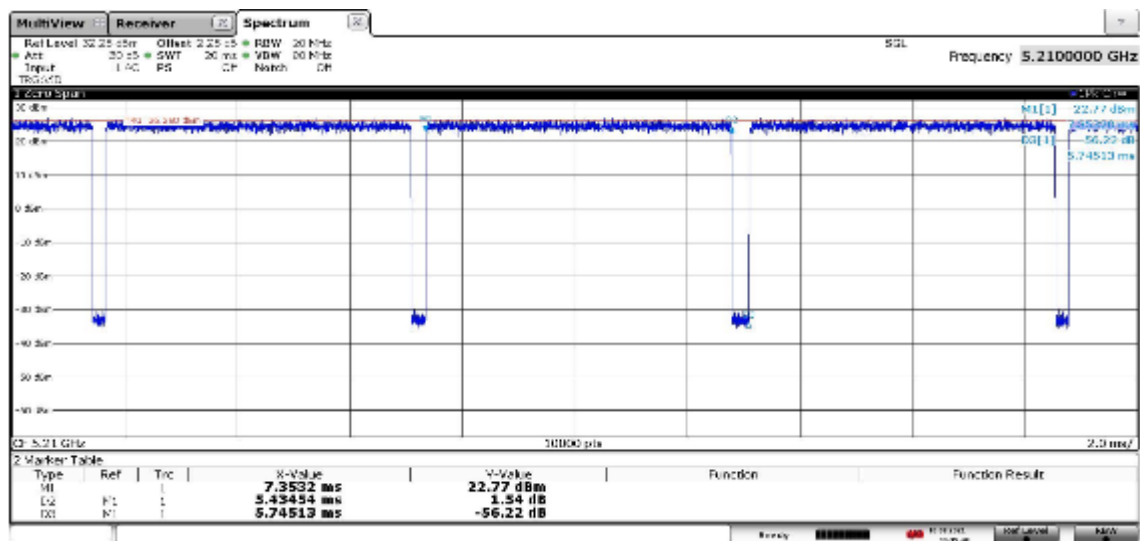


### SISO 802.11 he40:



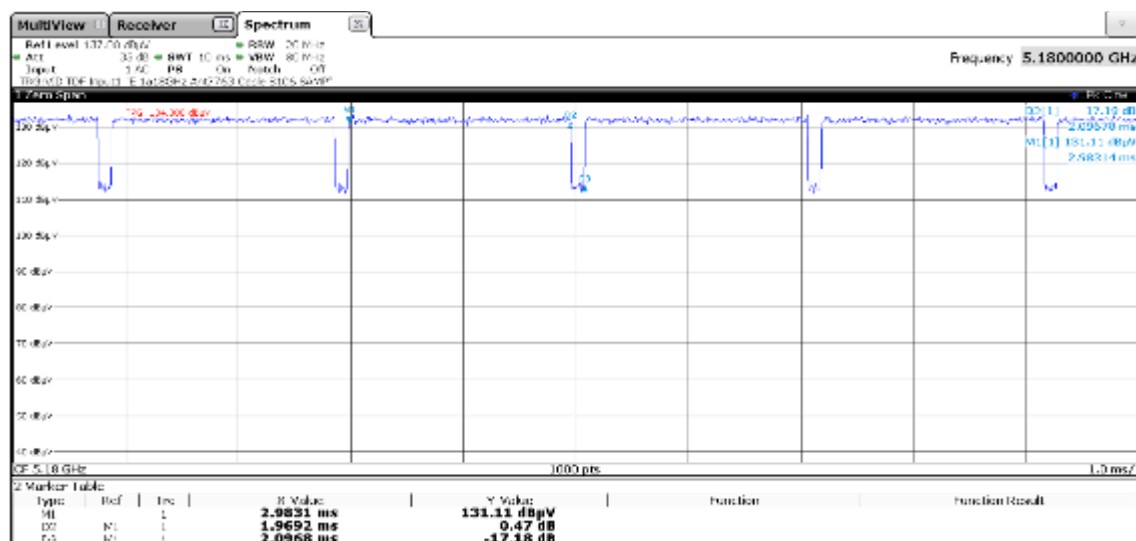
### SISO 802.11 ac80:



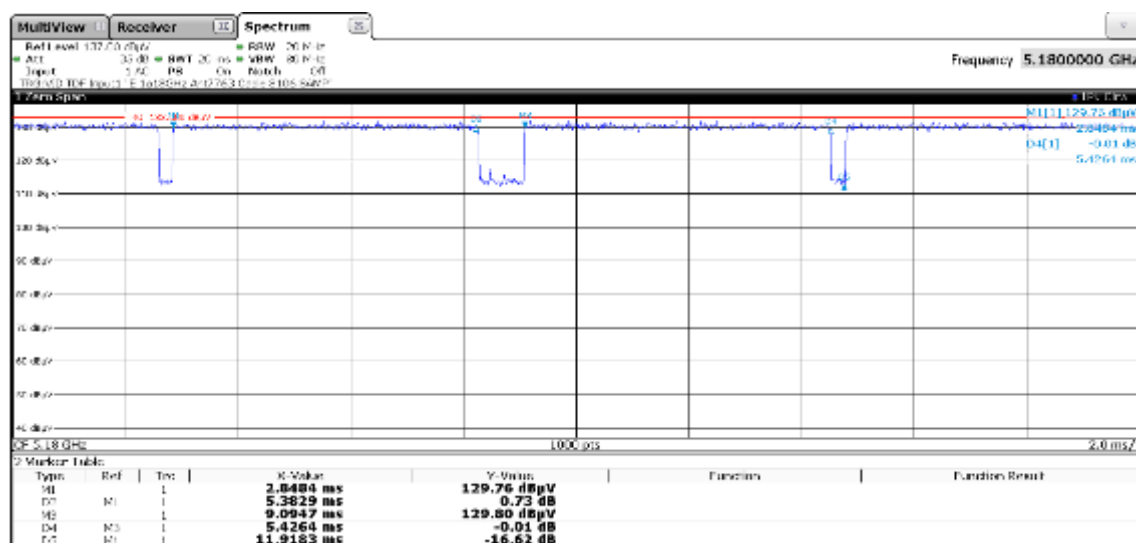


## MIMO worst-case:

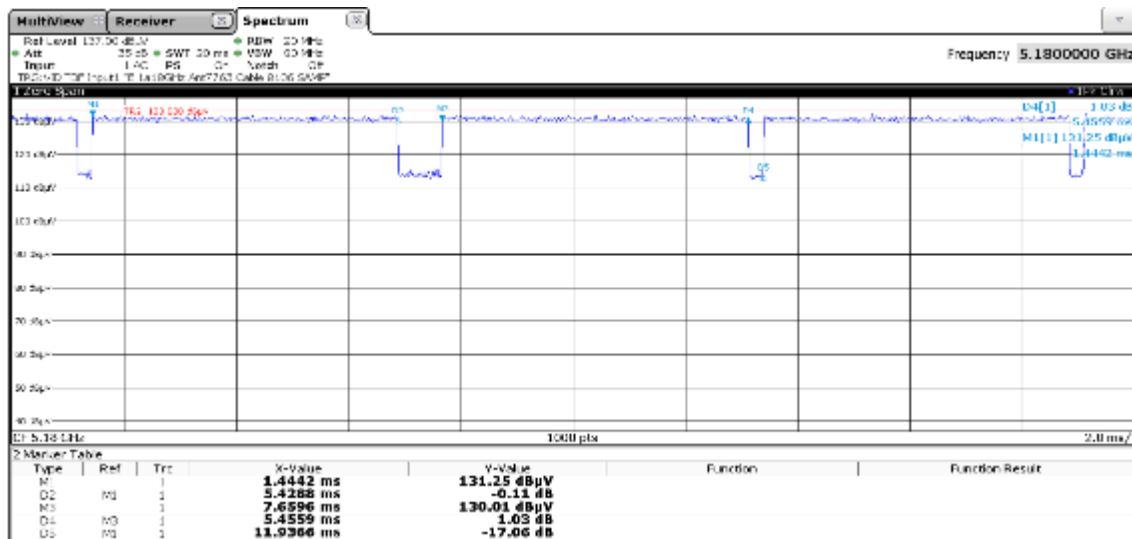
### MIMO 802.11 a20:



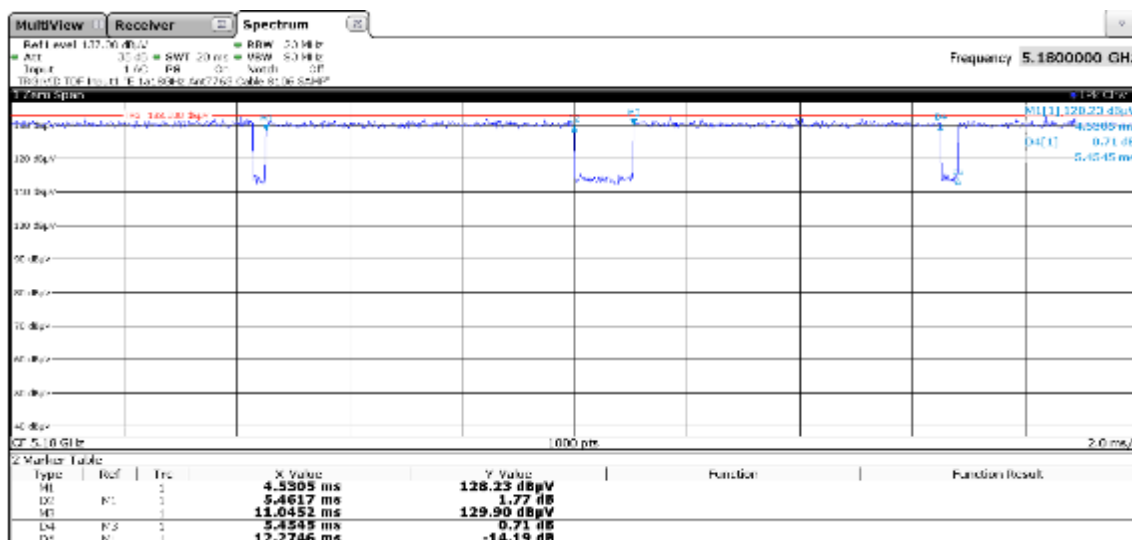
### MIMO 802.11 n20:



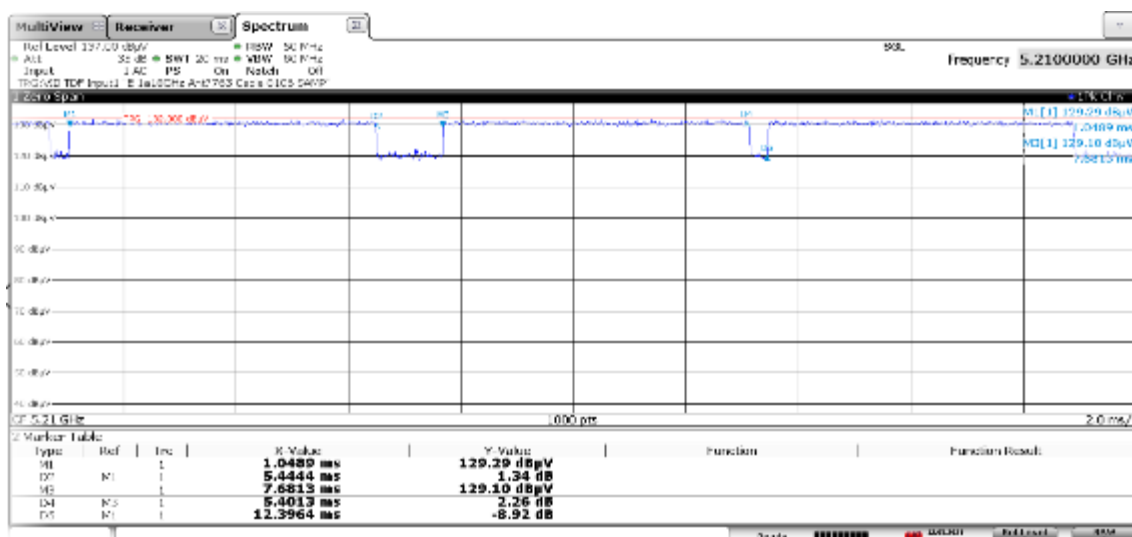
### MIMO 802.11 ac20:



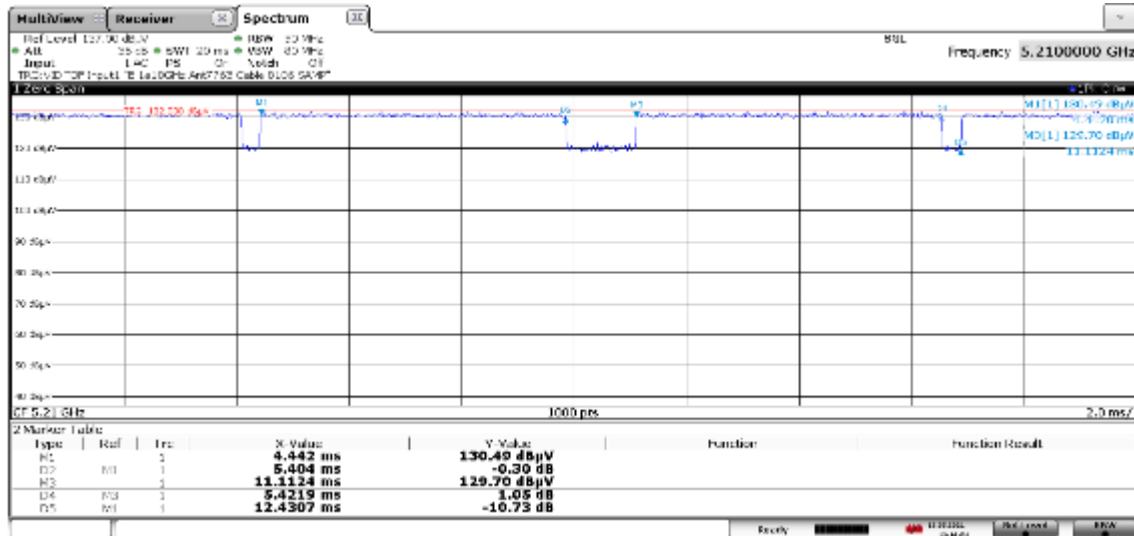
### MIMO 802.11 he20:



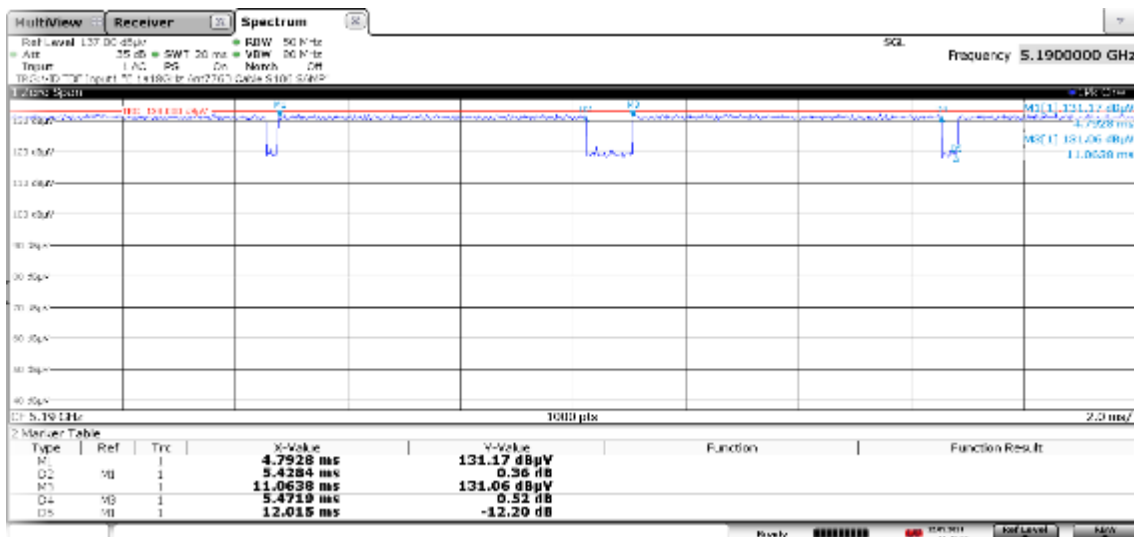
### MIMO 802.11 n40:



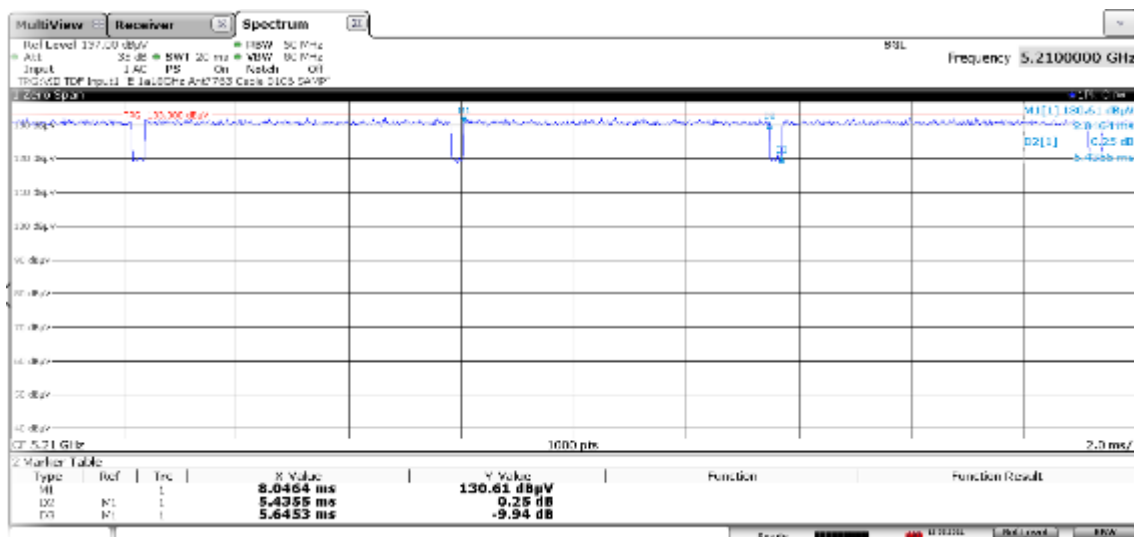
### MIMO 802.11 ac40:



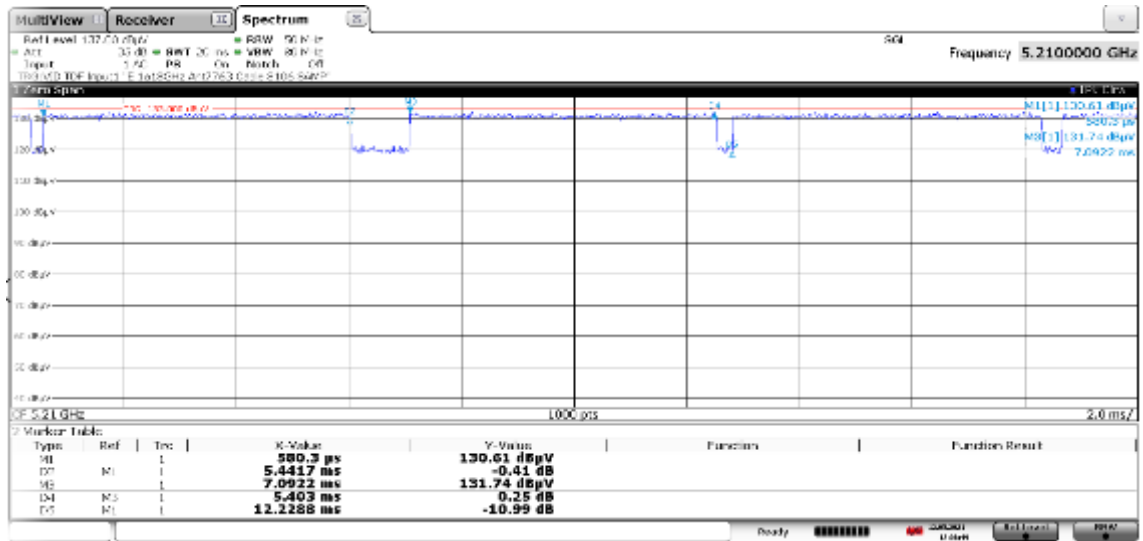
### MIMO 802.11 he40:



### MIMO 802.11 ac80:



# MIMO 802.11 he80:



## Transmitter. 99% Occupied Bandwidth

### SPECIFICATIONS:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

The following conditions shall be observed for measuring the occupied bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

### RESULTS:

This test was performed on all the supported modes of the EUT, in the worst data rates after preliminary testing:

|                   |                                                |
|-------------------|------------------------------------------------|
| - 802.11a:        | 6 Mbps SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12. |
| - 802.11n HT20:   | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11n HT40:   | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ac VHT20: | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ac VHT40: | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ac VHT80: | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ax HE20:  | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ax HE40:  | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |
| - 802.11ax HE80:  | MCS0 SISO 1Tx on WLAN1 / MIMO 2Tx on WLAN12.   |

- Preliminary tests determined the SISO worst case: WLAN1.
- Preliminary tests determined the MIMO worst case: WLAN12.

**SISO worst-case:**

**SISO 802.11 a20:**

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 16.629213                       | 17.378278                          | 29.662921                | 26.217229                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 16.629213                       | 16.779026                          | 16.629213                | 16.779026                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 16.629213                        | 16.629213                 | 16.779026                           | 16.779026                 | 16.779026                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

## SISO 802.11 n20 (VHT20):

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.677902                       | 17.977528                          | 17.677902                | 17.677902                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.677902                       | 17.677902                          | 17.677902                | 17.677902                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

### U-NII-3 (5725-5850 MHz):

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.827715                        | 17.827715                 | 17.827715                           | 17.677902                 | 17.677902                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

**SISO 802.11 ac20 (VHT20):**

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.677902                       | 18.277154                          | 29.213483                | 25.018727                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.677902                       | 17.827715                          | 17.677902                | 17.677902                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.827715                        | 17.677902                 | 17.677902                           | 17.827715                 | 17.977528                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

## SISO 802.11 ax20 (HE20):

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 19.026217                       | 19.026217                          | 19.026217                | 19.026217                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 19.176030                       | 19.176030                          | 19.026217                | 19.176030                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

### U-NII-3 (5725-5850 MHz):

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 19.026217                        | 19.176030                 | 22.921349                           | 19.176030                 | 19.176030                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

**SISO 802.11 n40 (HT40):**

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>151<br>(5755 MHz) | High Channel<br>159<br>(5795 MHz) |
|-------------------------------|----------------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                        | 36.500000                         |
| Measurement uncertainty (kHz) | <±36.95                          |                                   |

**SISO 802.11 ac40 (VHT40):**

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>151<br>(5755 MHz) | High Channel<br>159<br>(5795 MHz) |
|-------------------------------|----------------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 37.000000                        | 36.500000                         |
| Measurement uncertainty (kHz) | <±36.95                          |                                   |

**SISO 802.11 ax40 (HE40):**

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                       | 38.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                       | 38.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>151<br>(5755 MHz) | High Channel<br>159<br>(5795 MHz) |
|-------------------------------|----------------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                        | 38.500000                         |
| Measurement uncertainty (kHz) | <±36.95                          |                                   |

**SISO 802.11 ac80 (VHT80):**

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 75.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 75.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

**U-NII-3 (5725-5850 MHz):**

|                               |                                     |
|-------------------------------|-------------------------------------|
| Channel                       | Single Channel<br>155<br>(5775 MHz) |
| 99% Occupied Bandwidth (MHz)  | 76.000000                           |
| Measurement uncertainty (kHz) | <±36.95                             |

**SISO 802.11 ax80 (HE80):**

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 77.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 77.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

**U-NII-3 (5725-5850 MHz):**

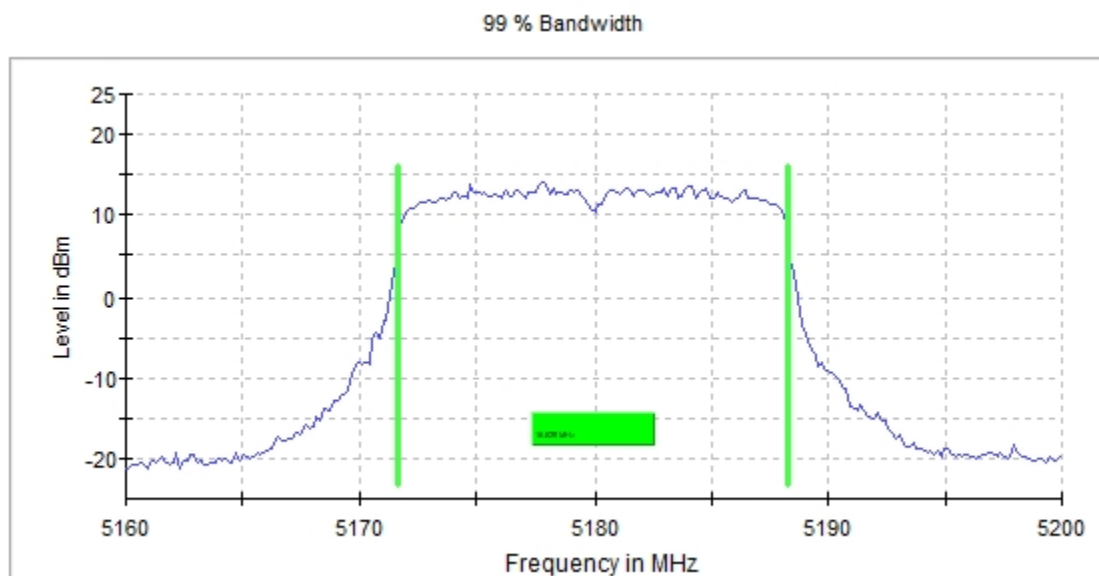
|                               |                                     |
|-------------------------------|-------------------------------------|
| Channel                       | Single Channel<br>155<br>(5775 MHz) |
| 99% Occupied Bandwidth (MHz)  | 77.500000                           |
| Measurement uncertainty (kHz) | <±36.95                             |

**SISO worst-case:**

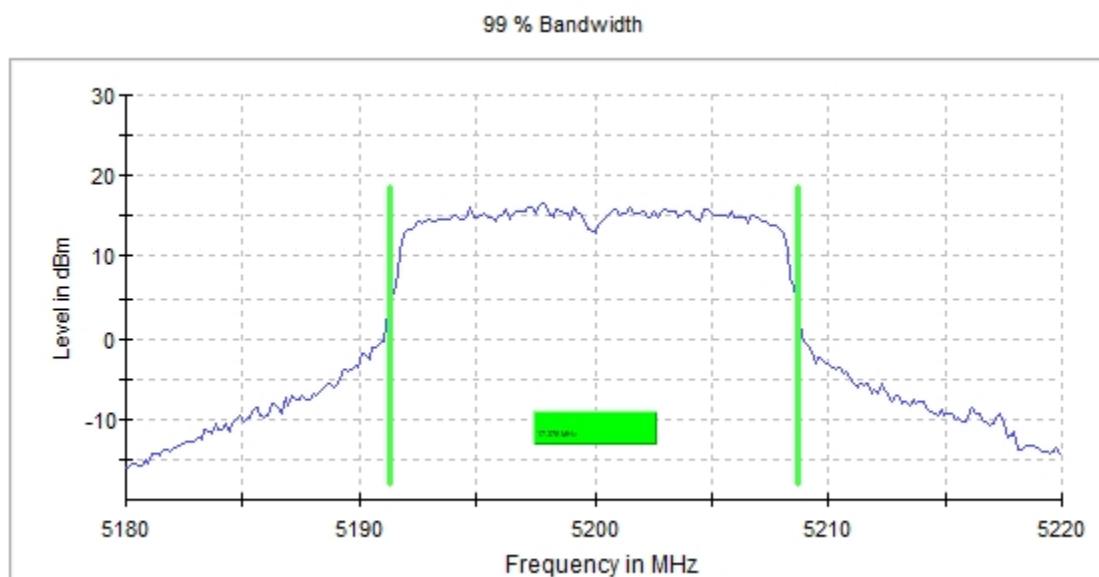
**SISO 802.11 a20:**

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

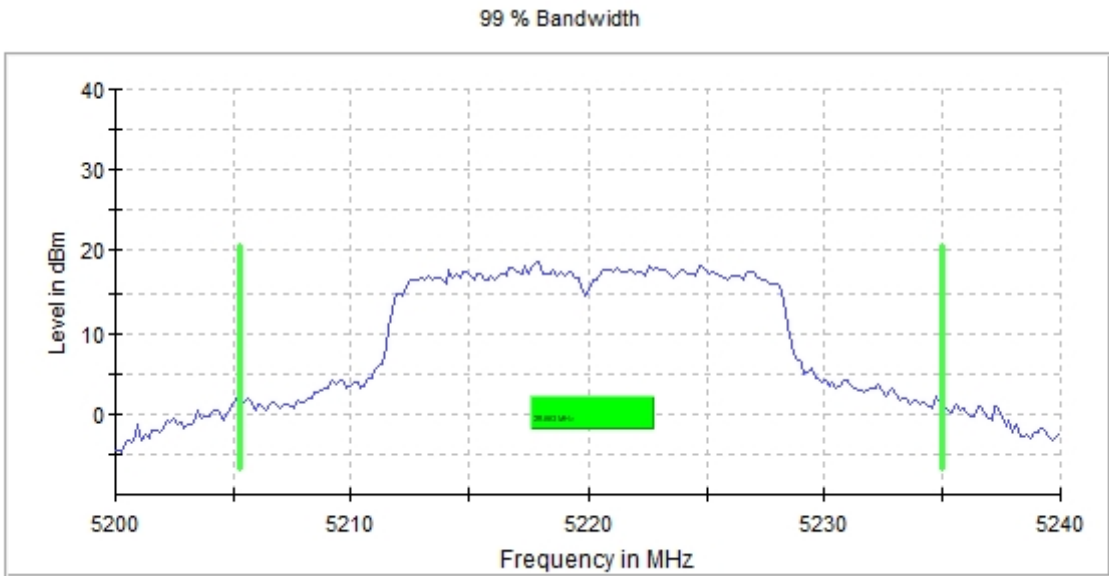
- Low Channel 36 (5180 MHz):



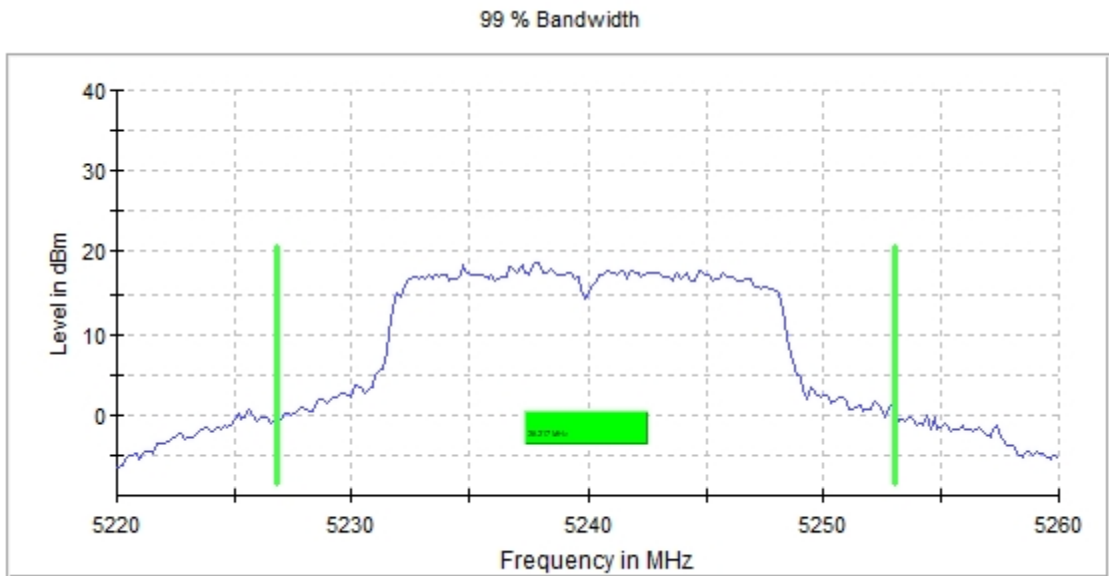
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

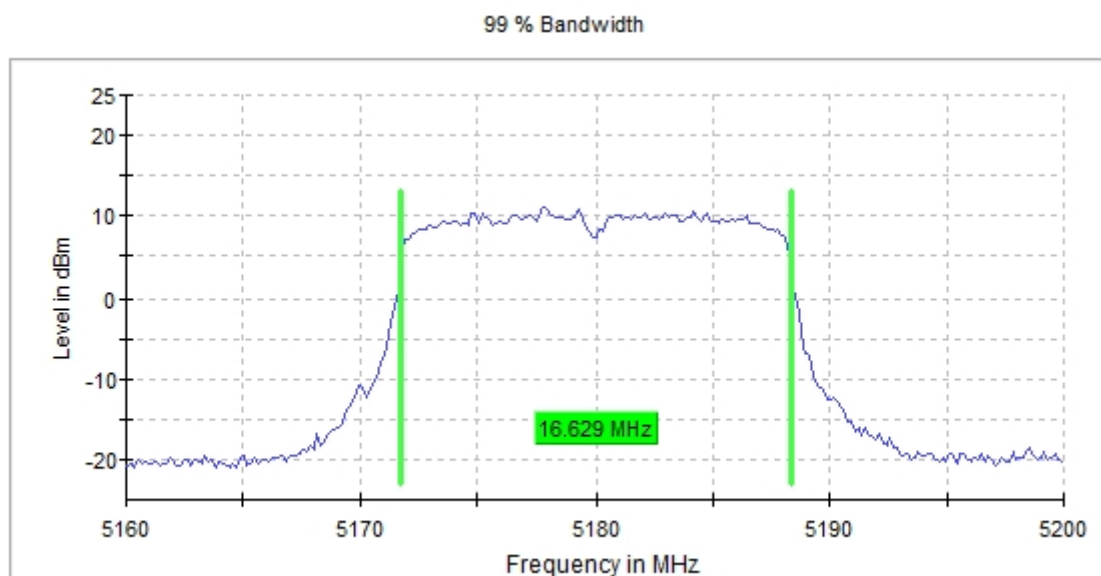


- High Channel 48 (5240 MHz):

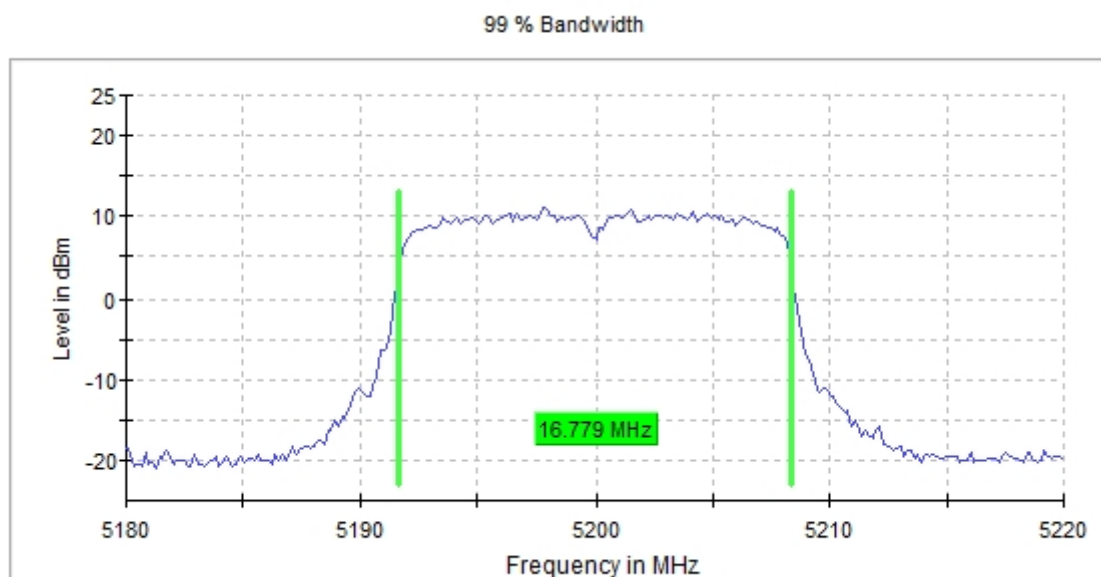


### U-NII-1 RSS (5150-5250 MHz)

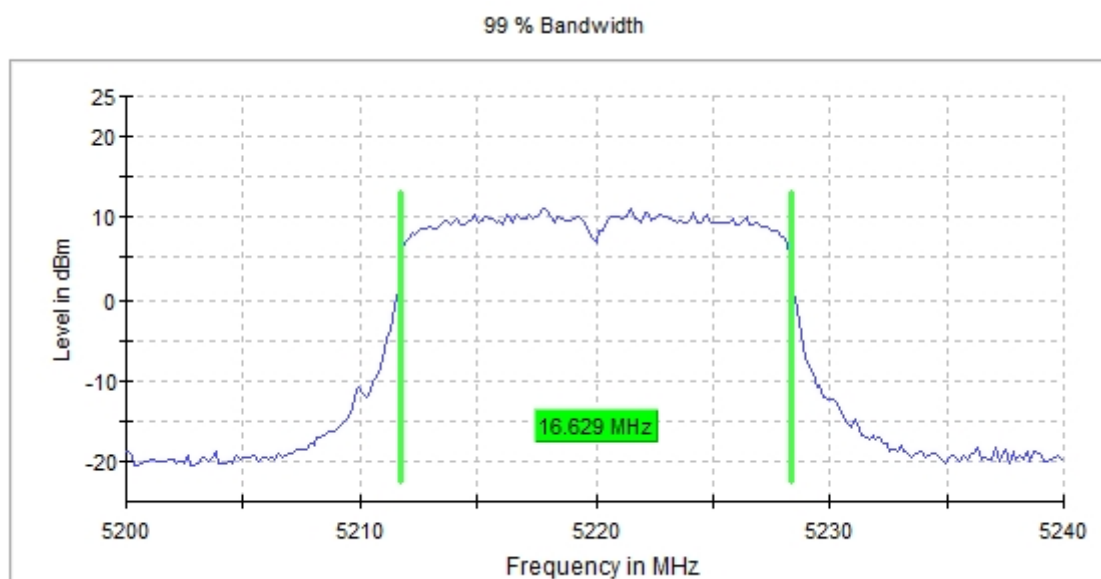
- Low Channel 36 (5180 MHz):



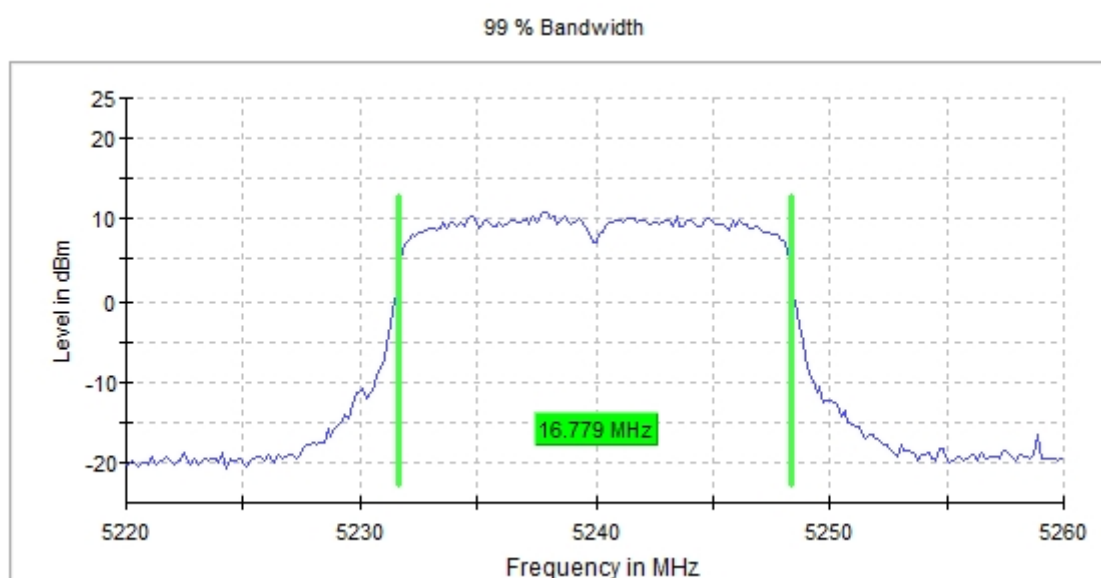
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

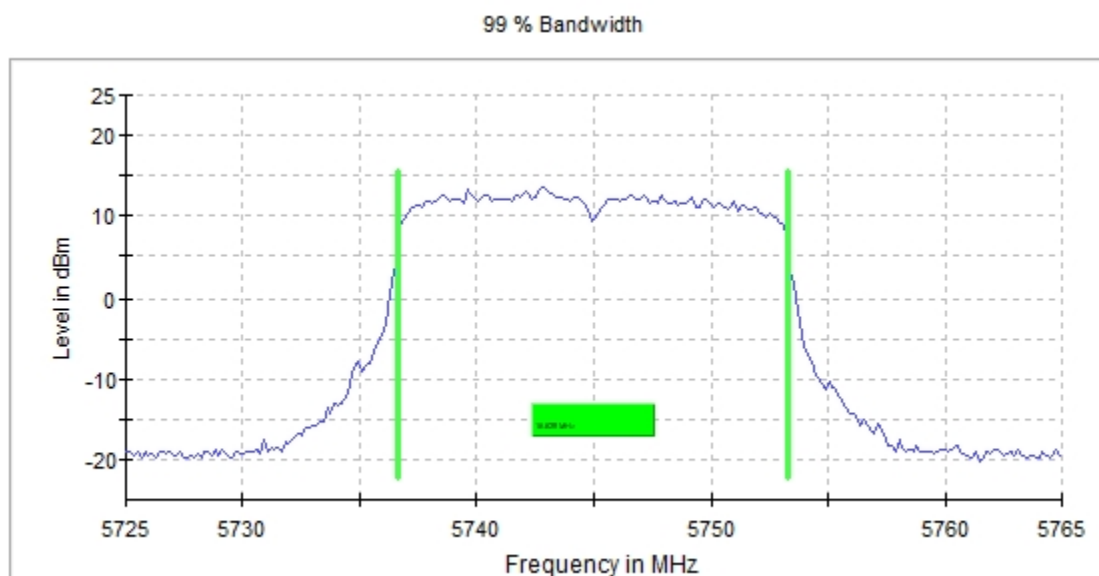


- High Channel 48 (5240 MHz):

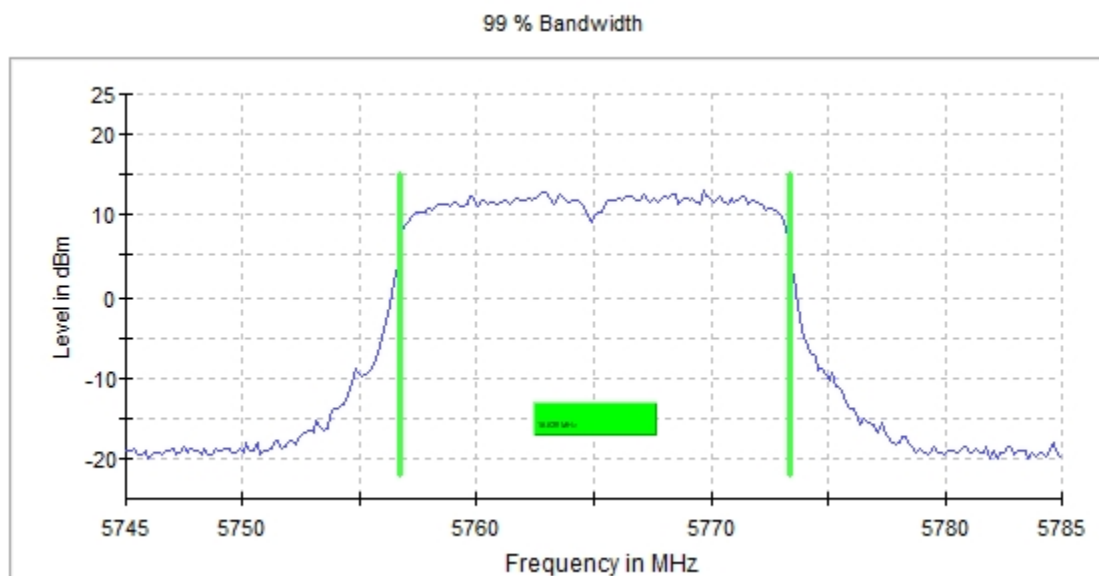


### U-NII-3 (5725-5850 MHz)

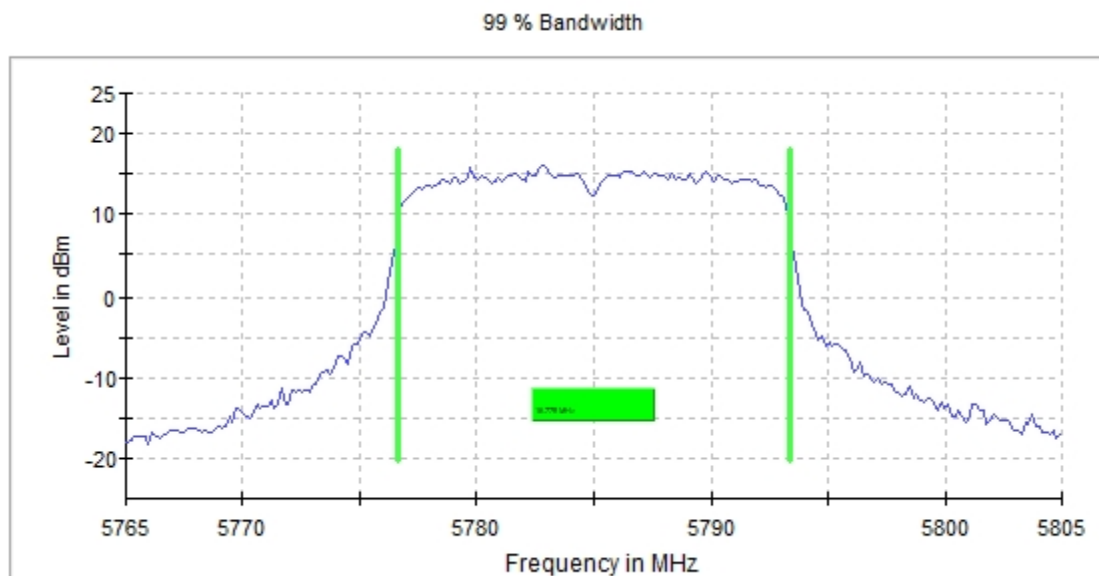
- Low Channel 149 (5745 MHz):



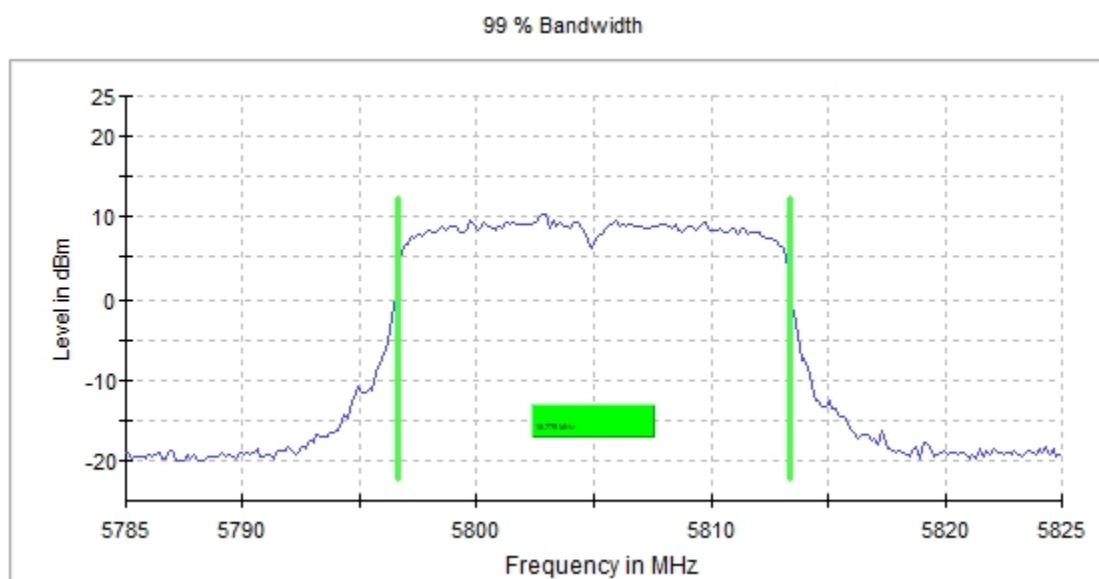
- Channel 153 (5765 MHz):



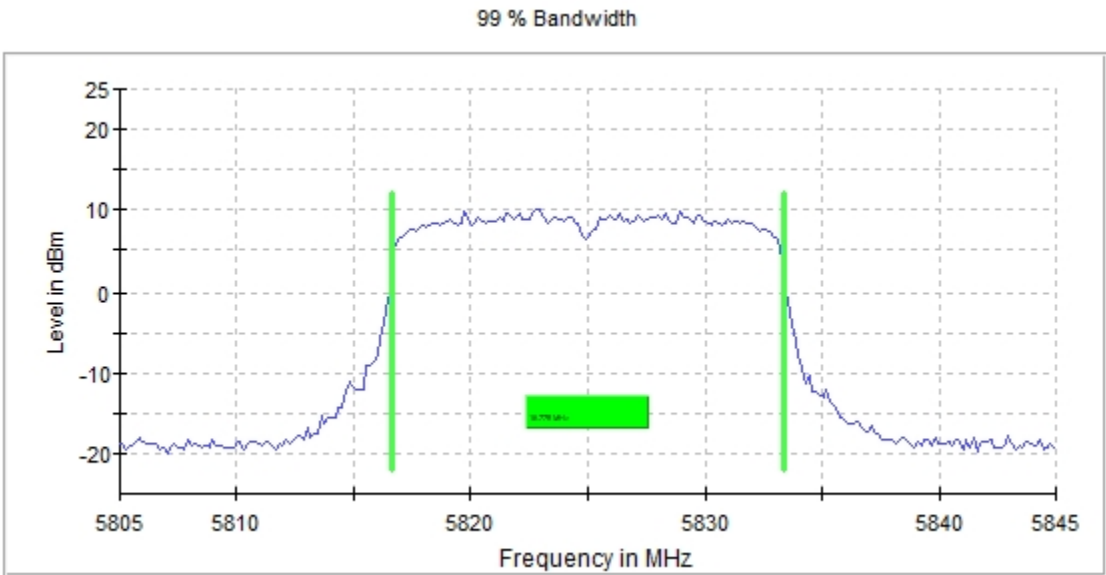
- Middle Channel 157 (5785 MHz):



- Channel 161 (5805 MHz):



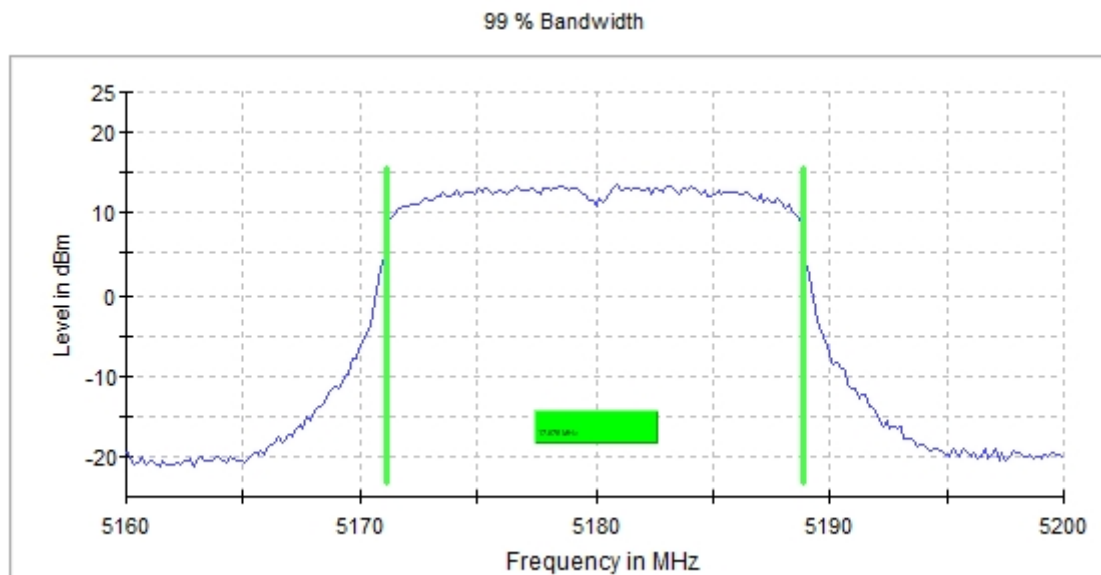
- High Channel 165 (5825 MHz):



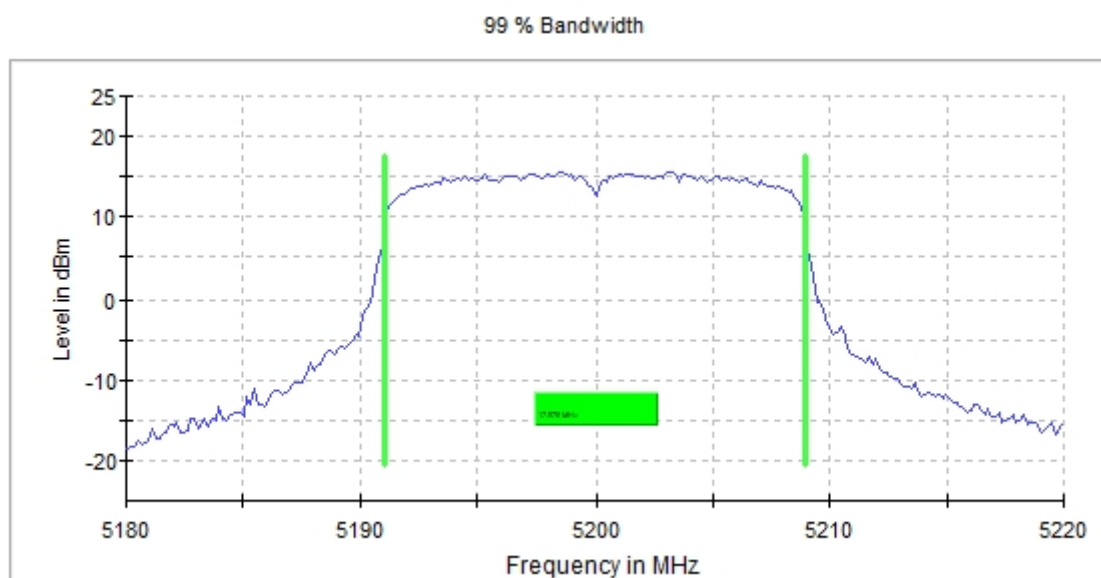
**SISO 802.11 n20 (HT20):**

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

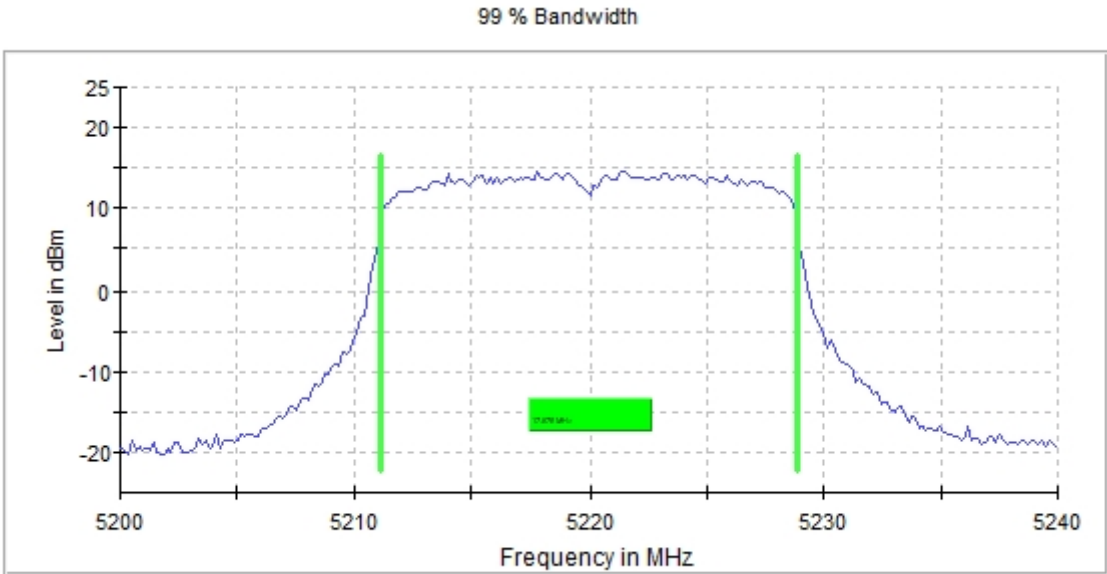
- Low Channel 36 (5180 MHz):



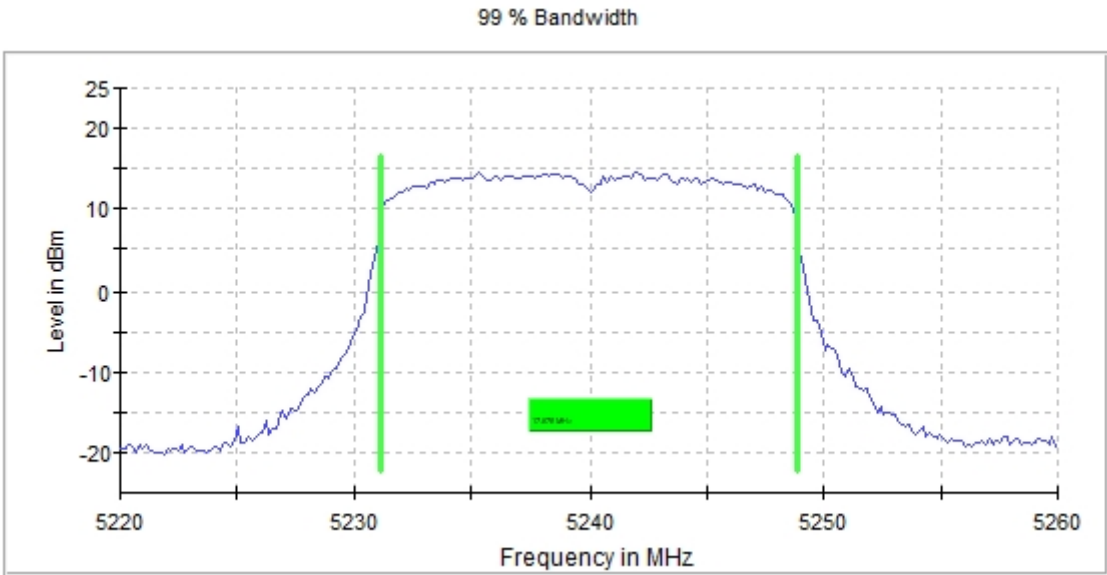
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

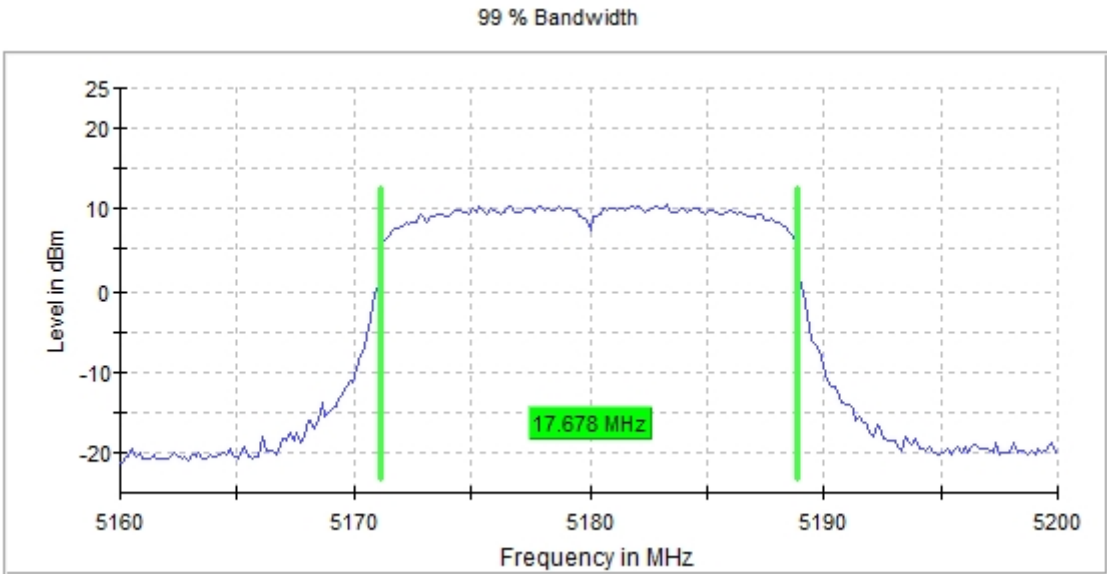


- High Channel 48 (5240 MHz):

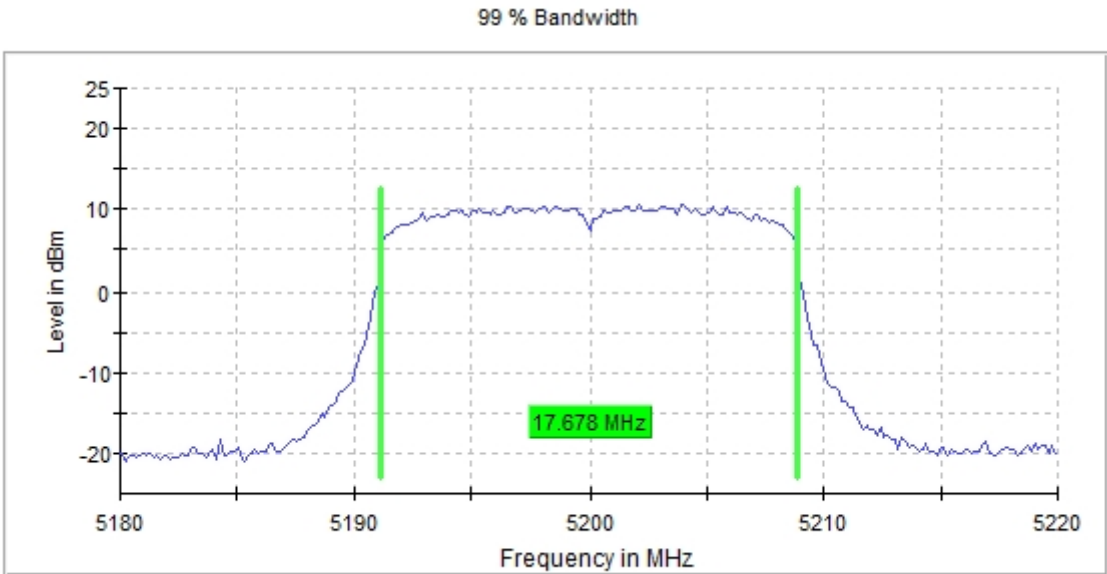


**U-NII-1 RSS (5150-5250 MHz)**

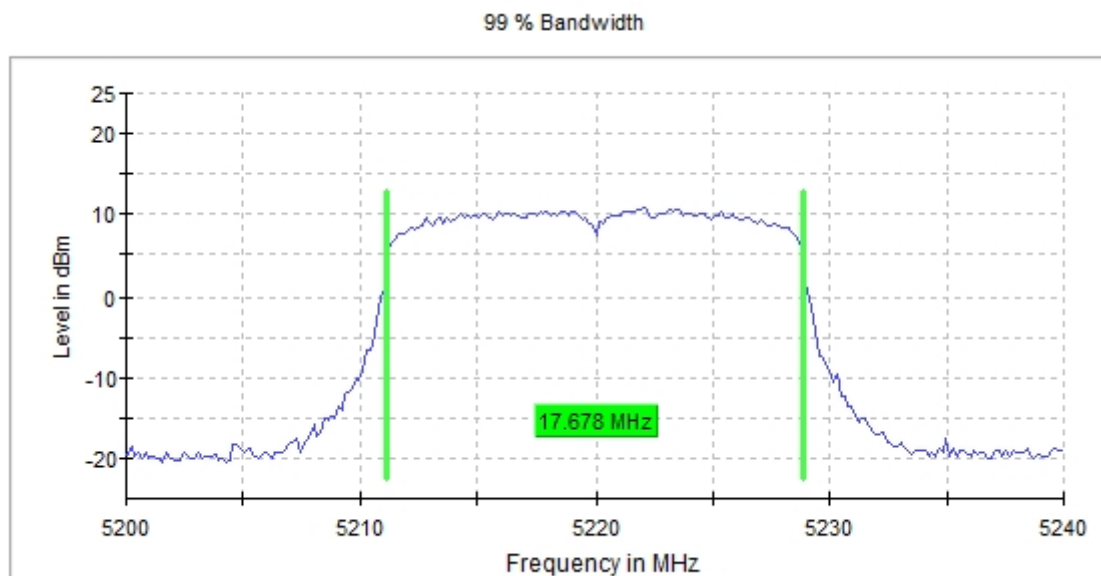
- Low Channel 36 (5180 MHz):



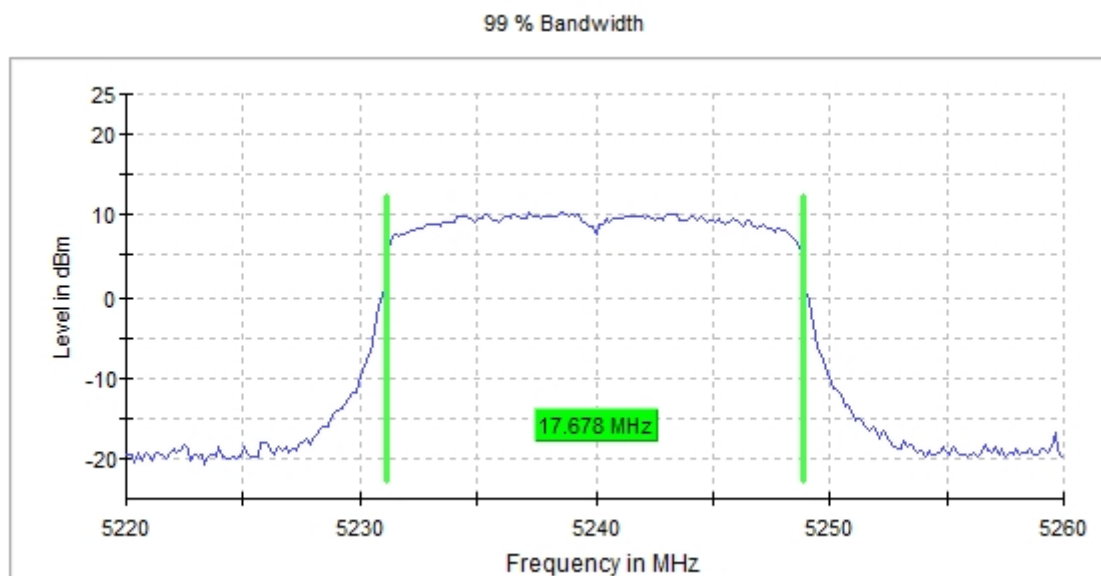
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

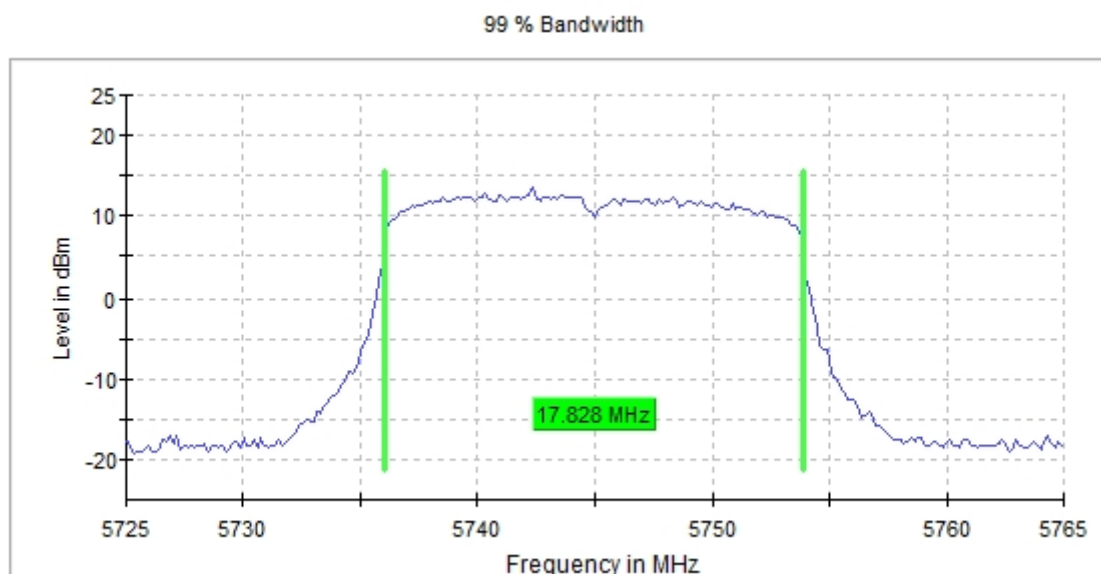


- High Channel 48 (5240 MHz):

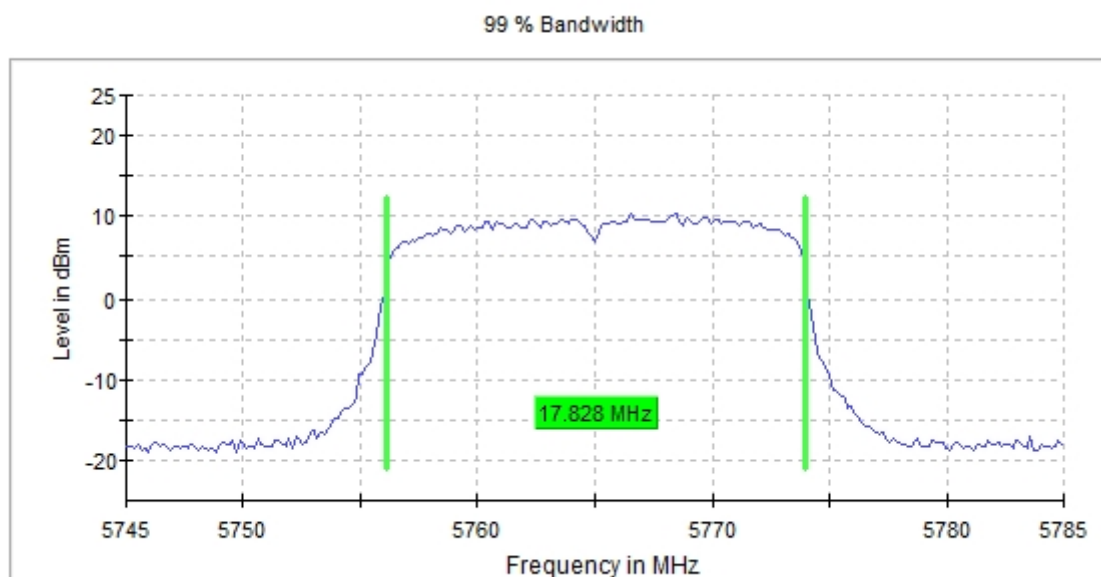


### U-NII-3 (5725-5850 MHz)

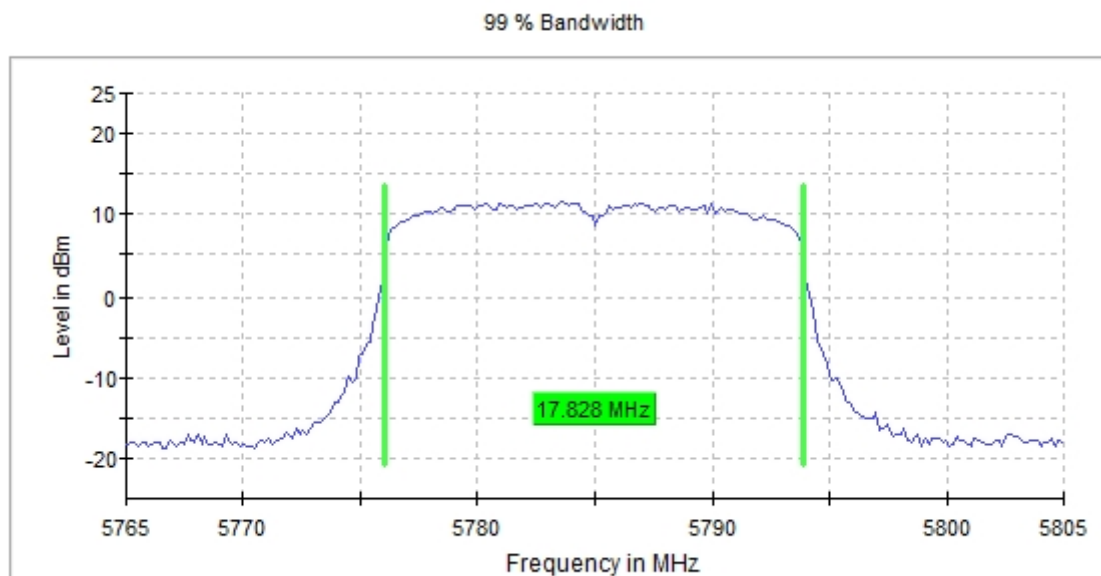
- Low Channel 149 (5745 MHz):



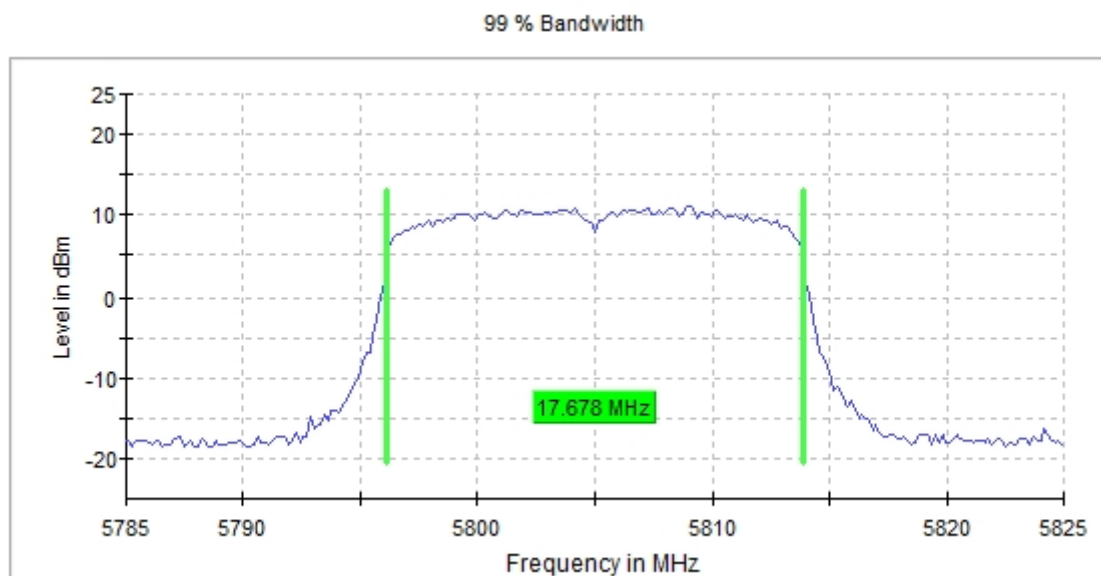
- Channel 153 (5765 MHz):



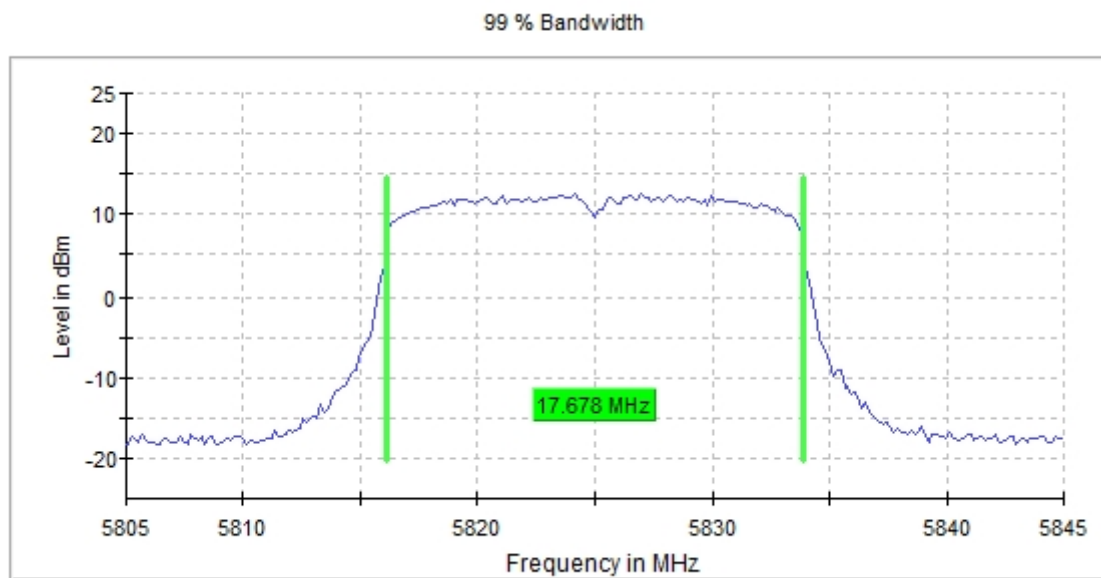
- Middle Channel 157 (5785 MHz):



- Channel 161 (5805 MHz):



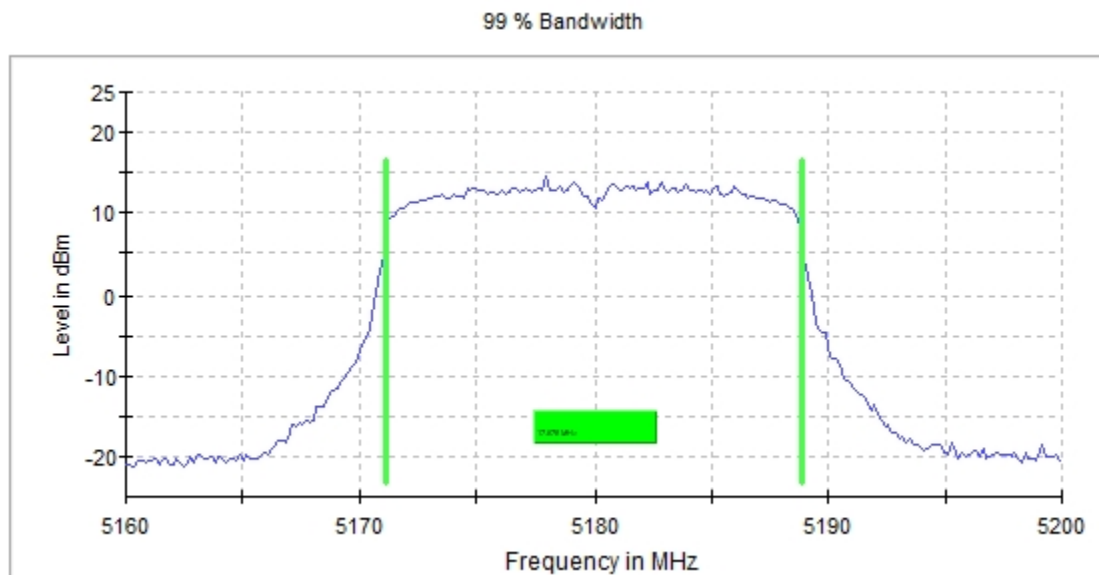
- High Channel 165 (5825 MHz):



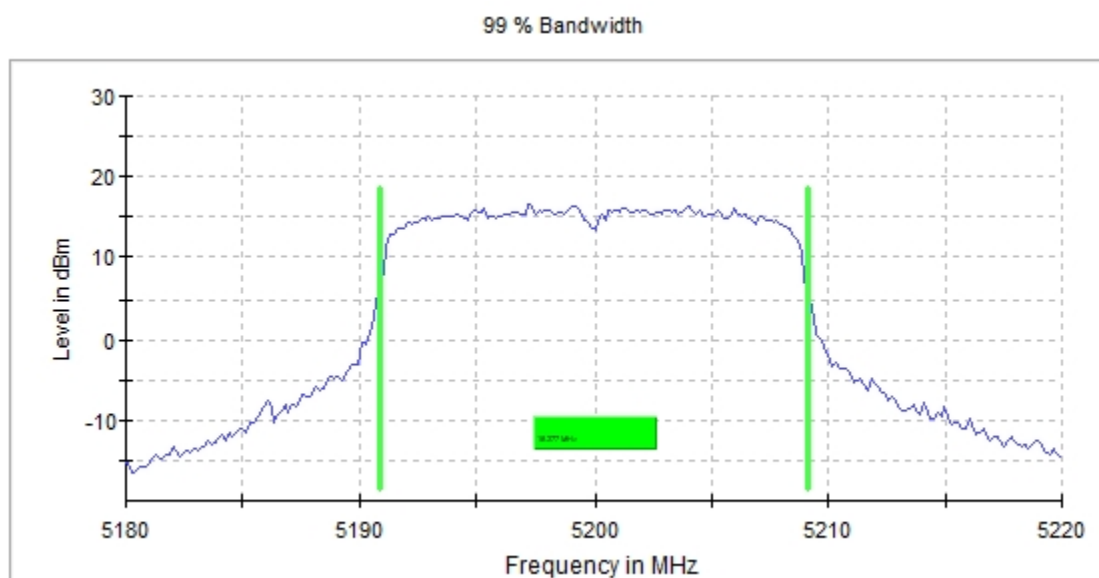
# **SISO 802.11 ac20 (VHT20):**

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

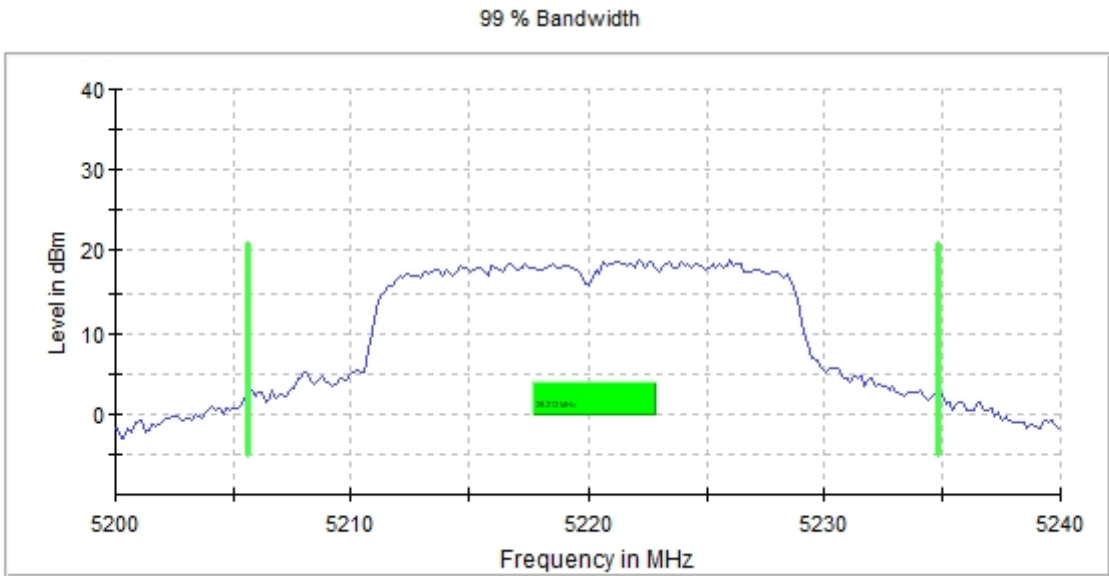
- Low Channel 36 (5180 MHz):



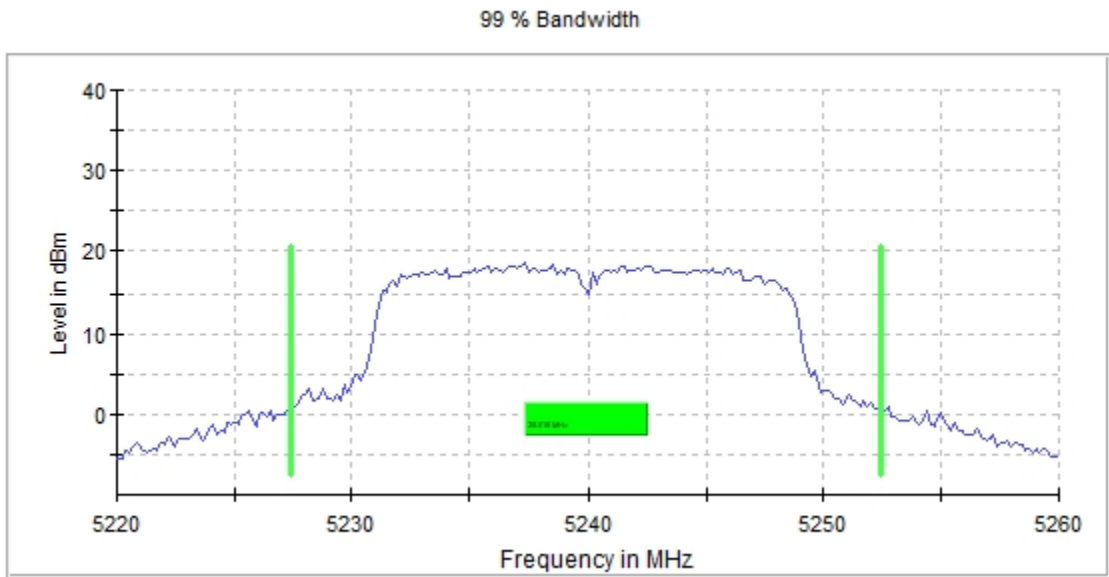
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

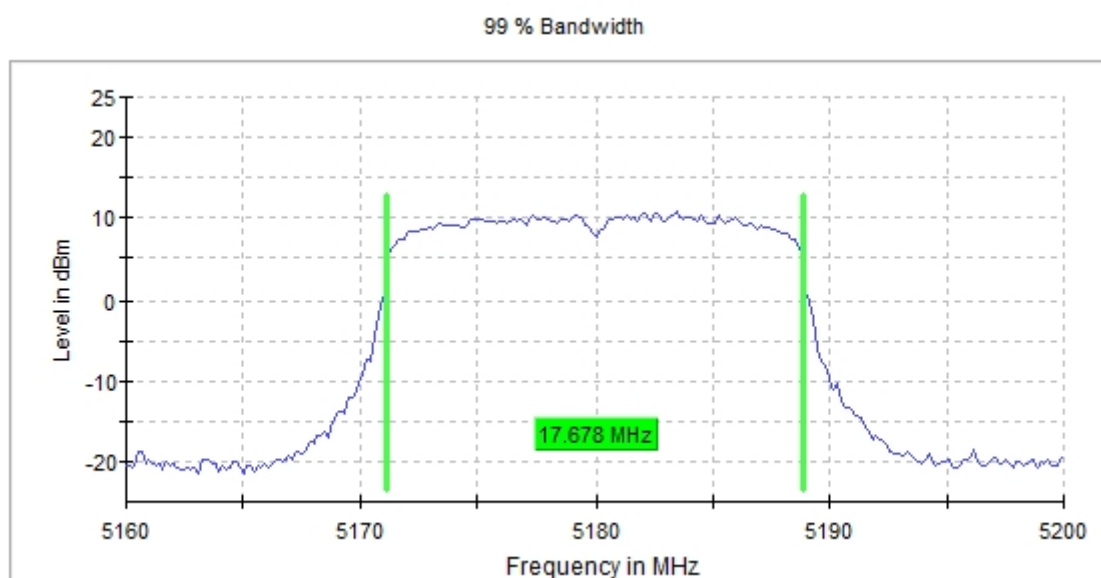


- High Channel 48 (5240 MHz):

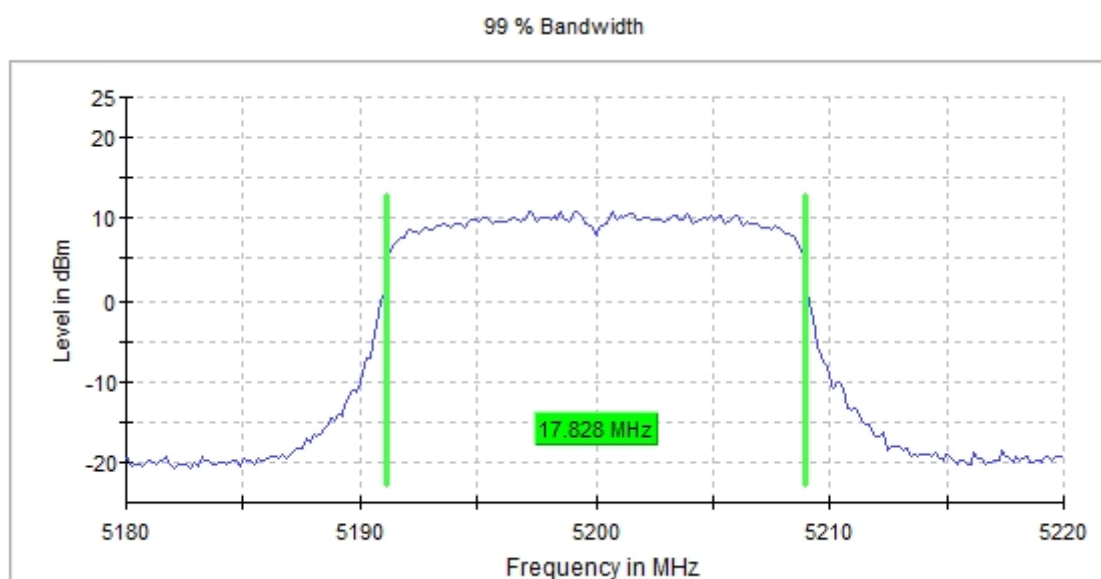


### U-NII-1 RSS (5150-5250 MHz)

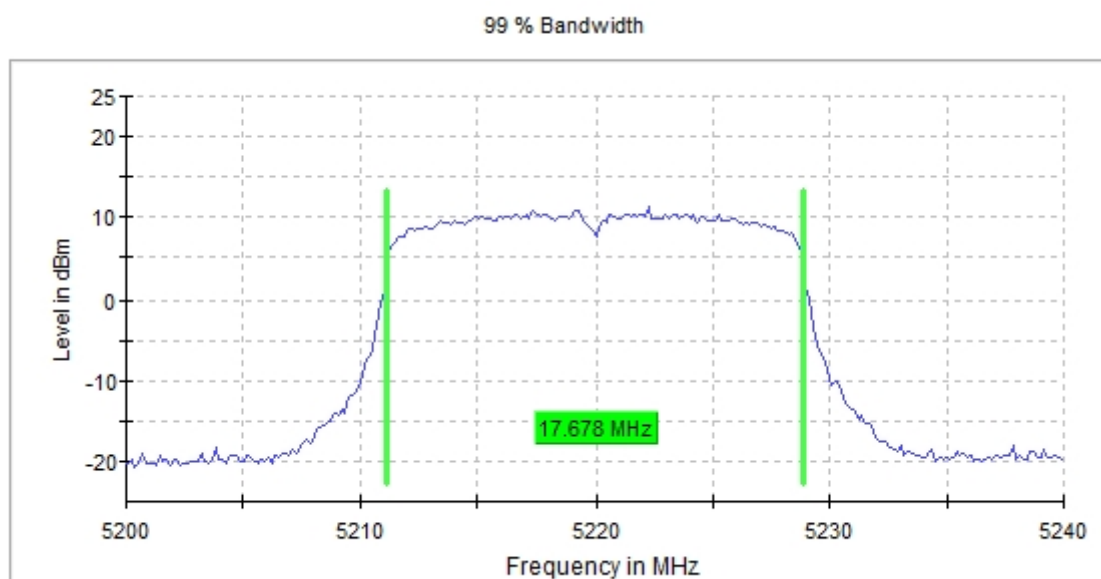
- Low Channel 36 (5180 MHz):



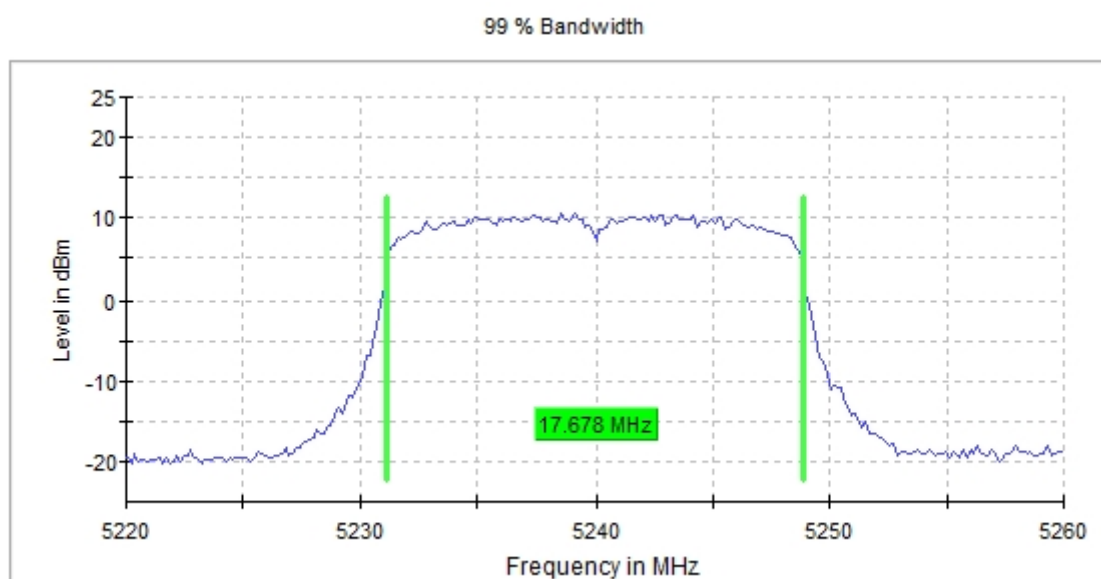
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

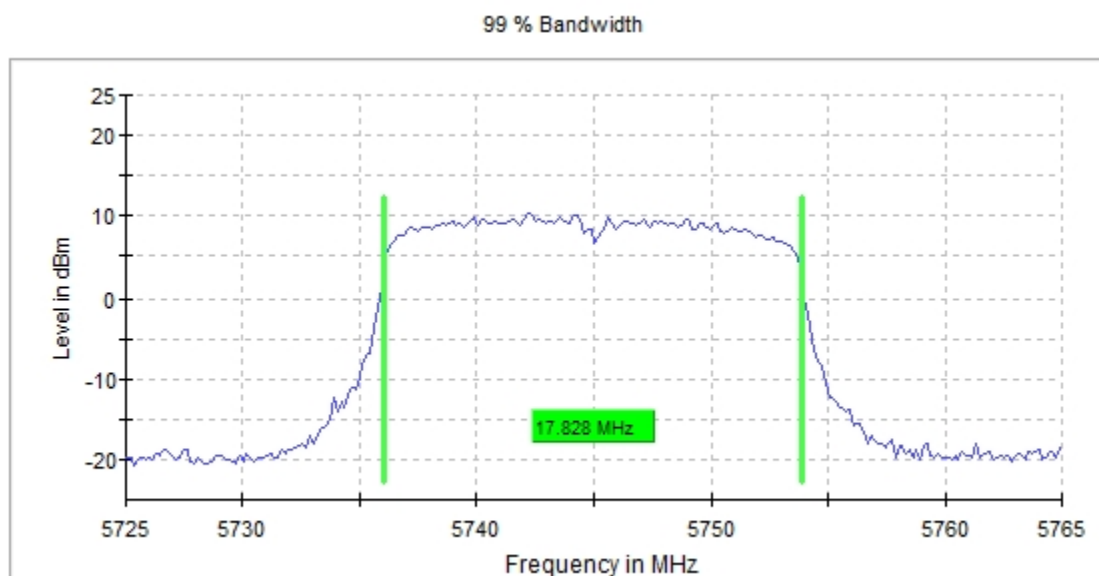


- High Channel 48 (5240 MHz):

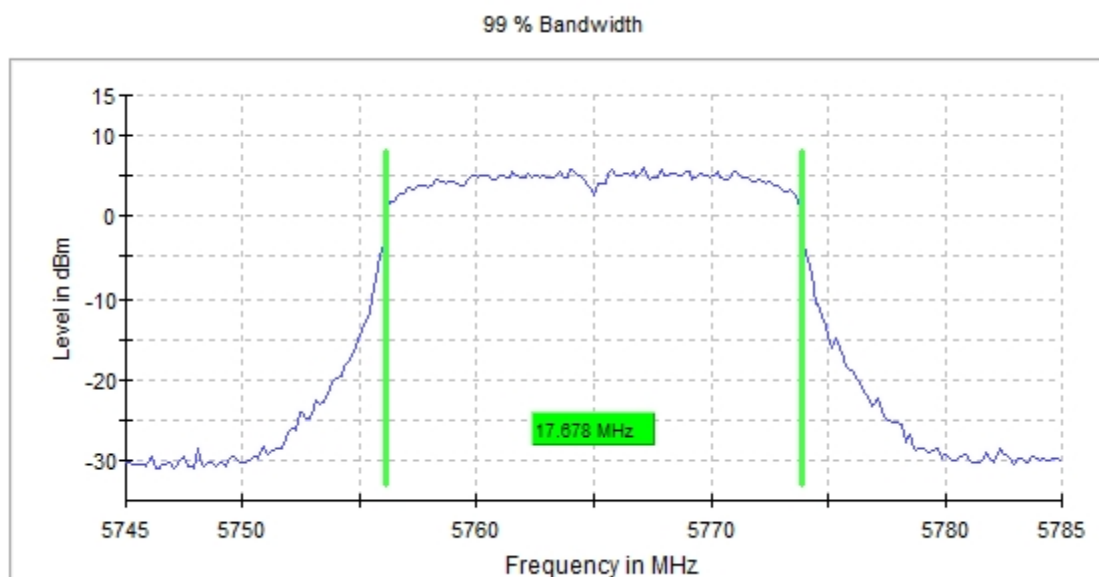


### U-NII-3 (5725-5850 MHz)

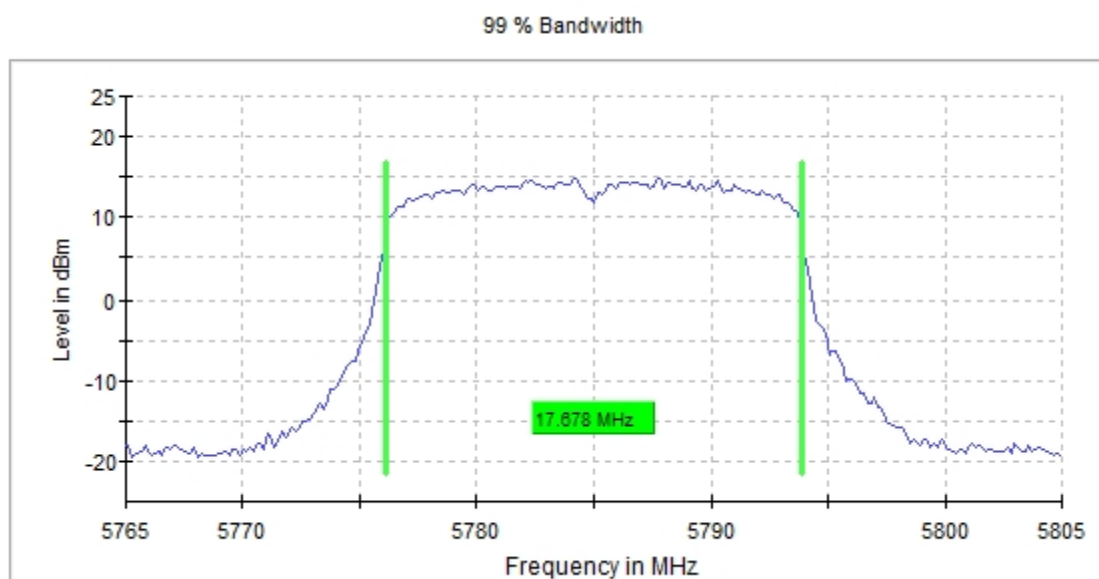
- Low Channel 149 (5745 MHz):



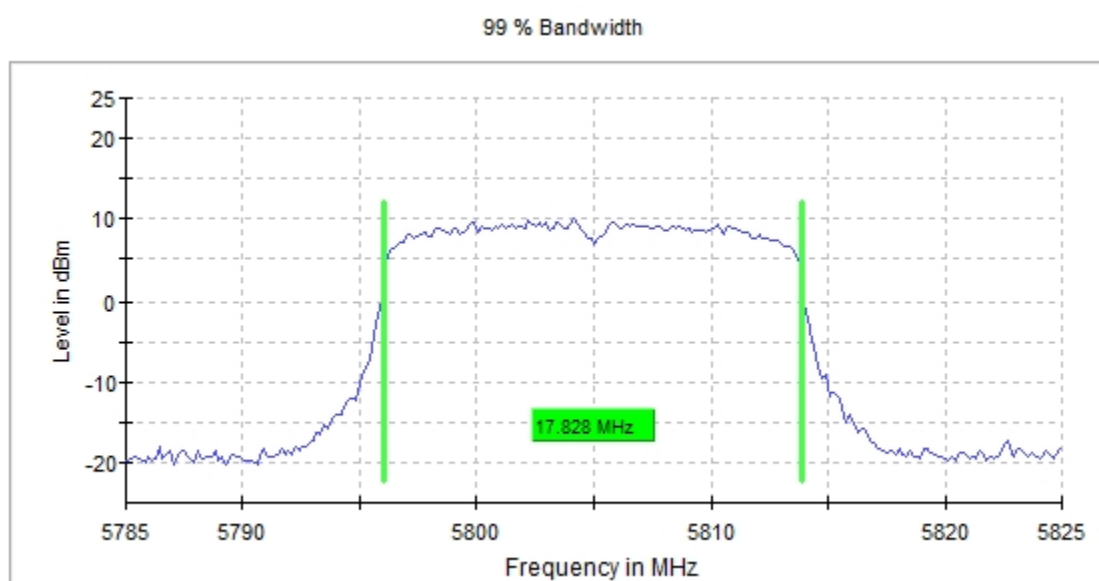
- Channel 153 (5765 MHz):



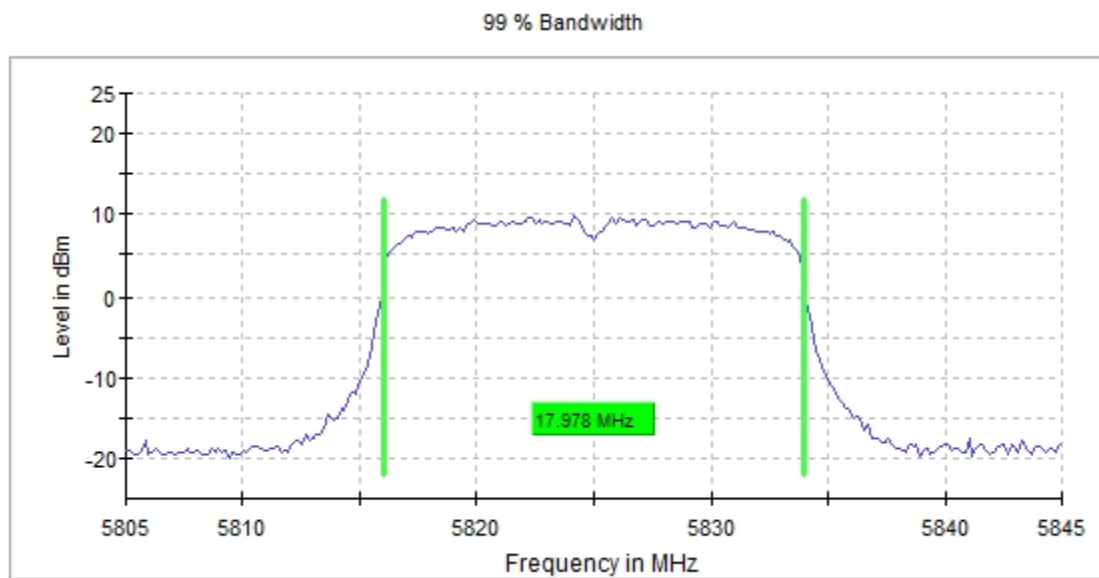
- Middle Channel 157 (5785 MHz):



- Channel 161 (5805 MHz):



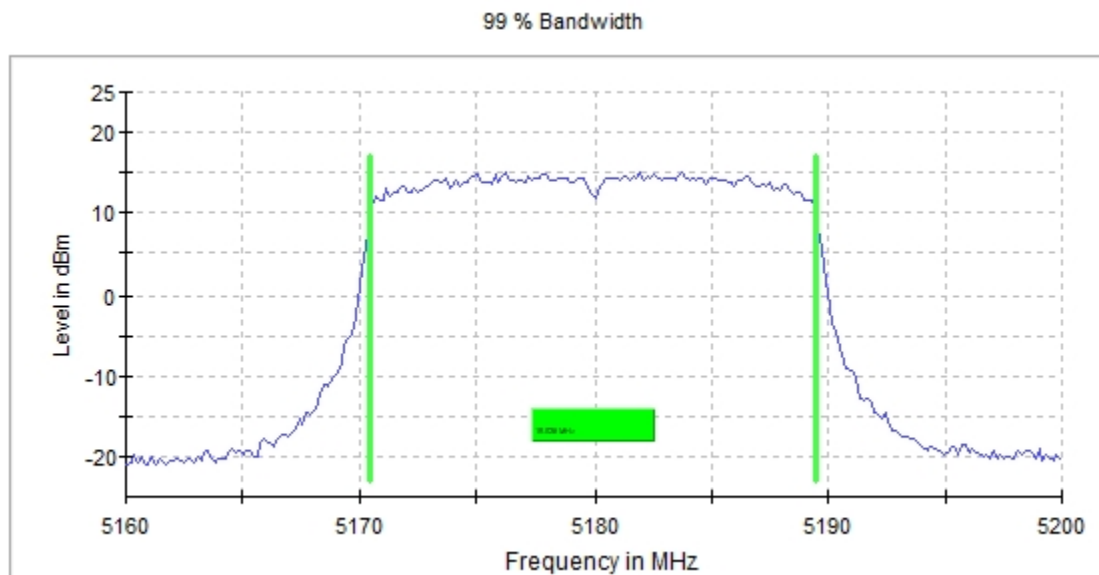
- High Channel 165 (5825 MHz):



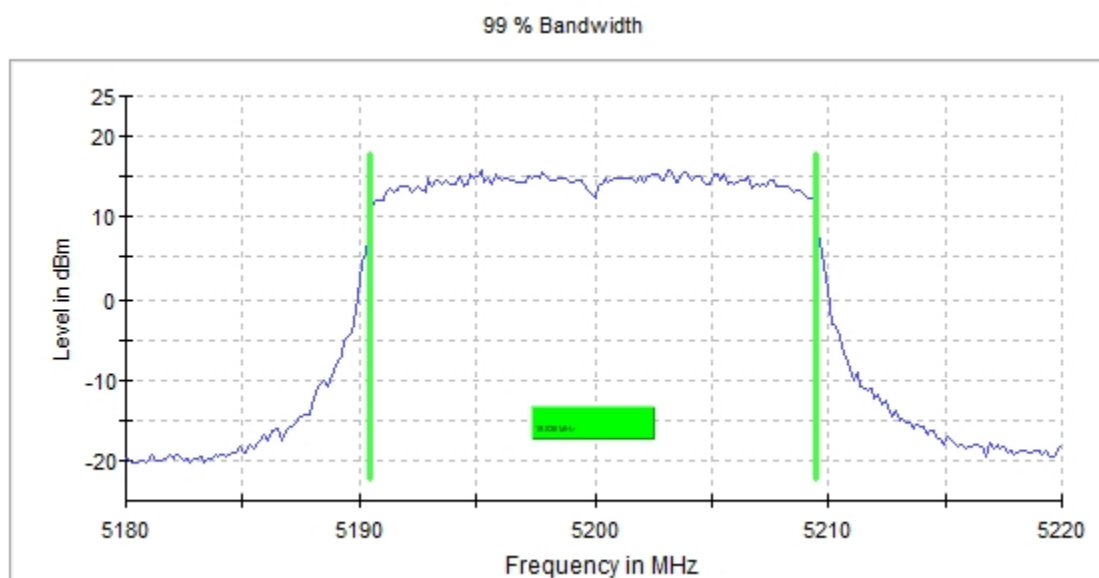
# **SISO 802.11 ax20 (HE20):**

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

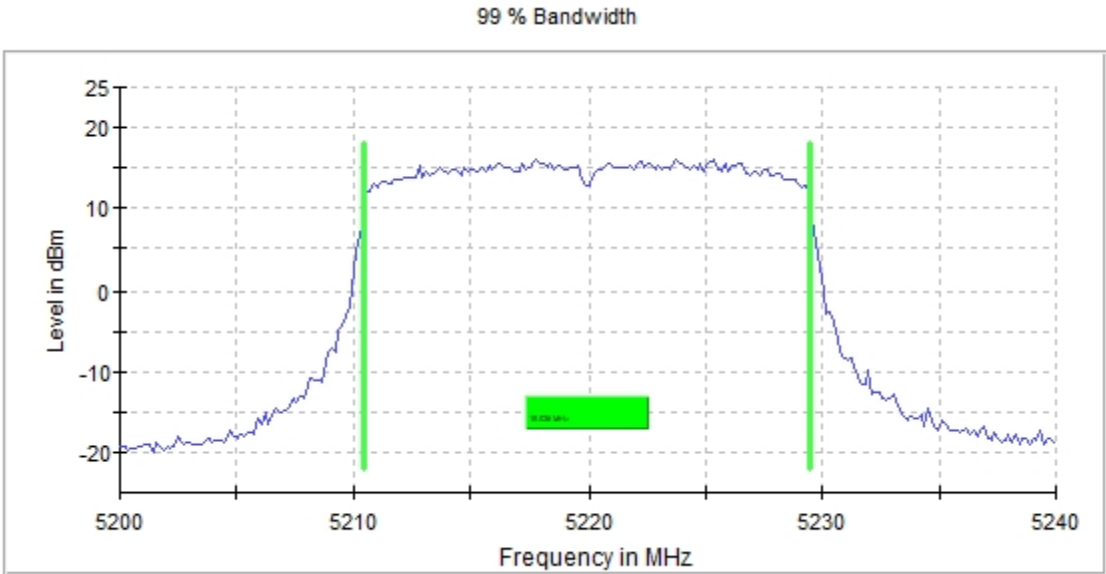
- Low Channel 36 (5180 MHz):



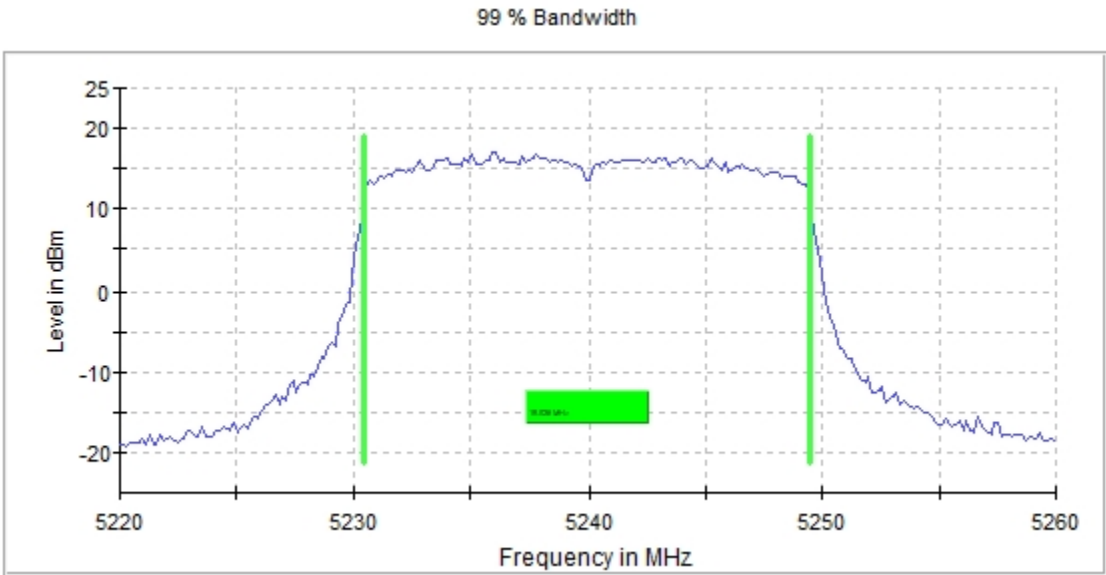
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

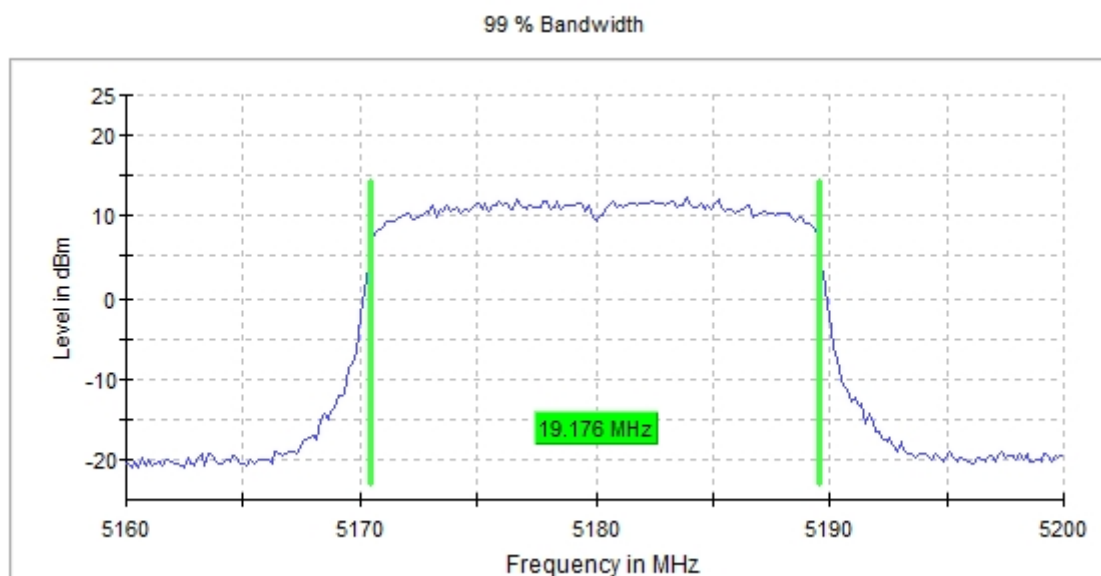


- High Channel 48 (5240 MHz):

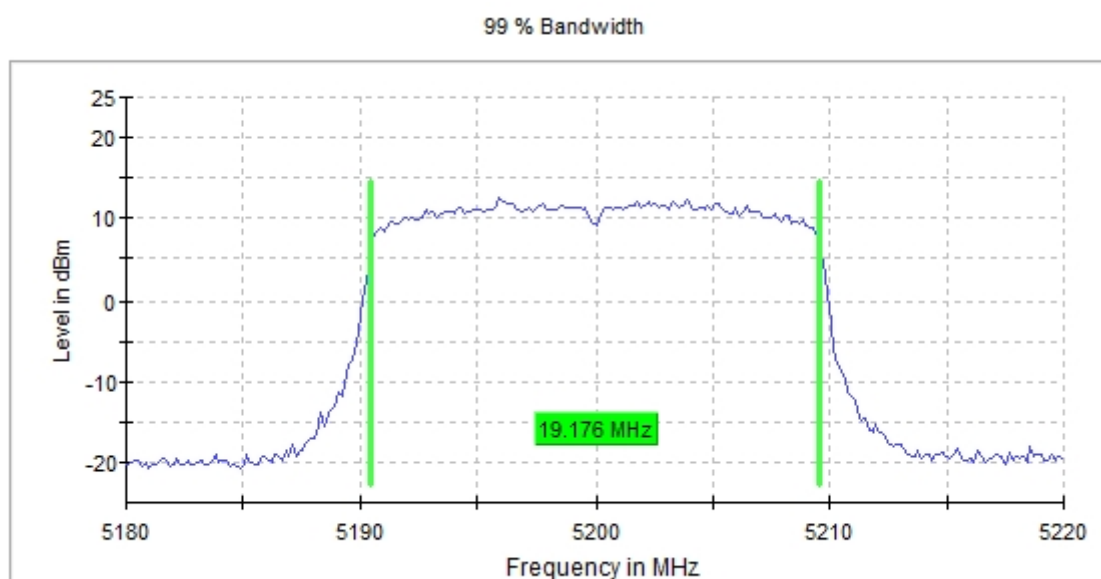


### U-NII-1 RSS (5150-5250 MHz)

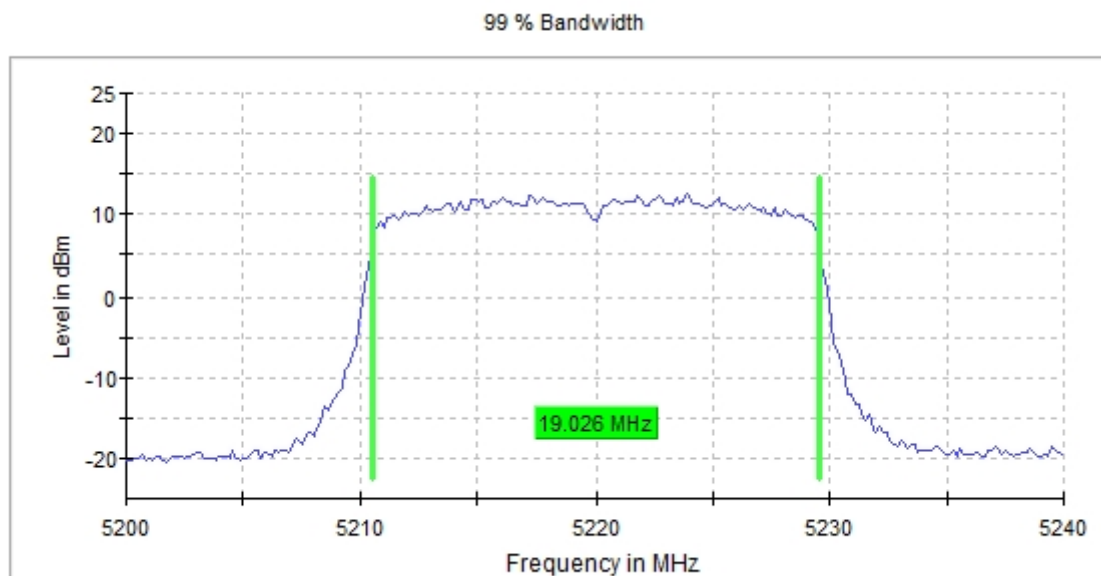
- Low Channel 36 (5180 MHz):



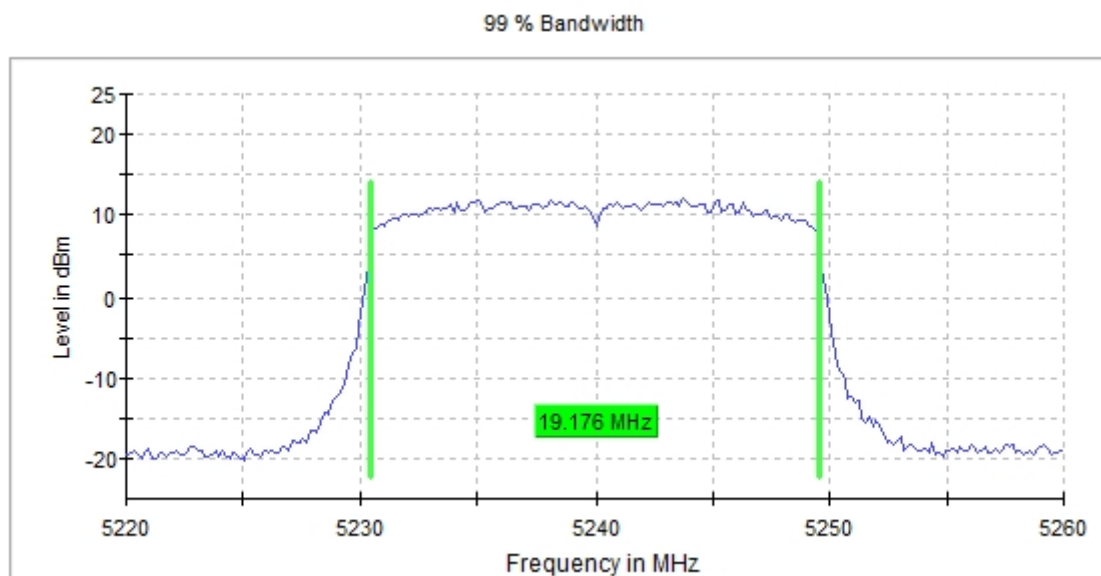
- Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

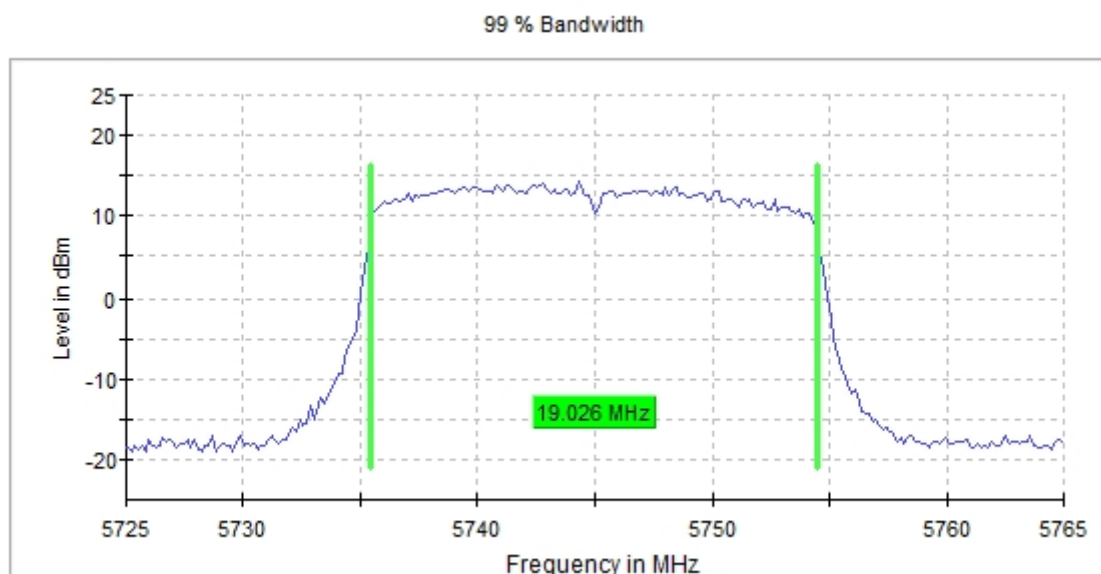


- High Channel 48 (5240 MHz):

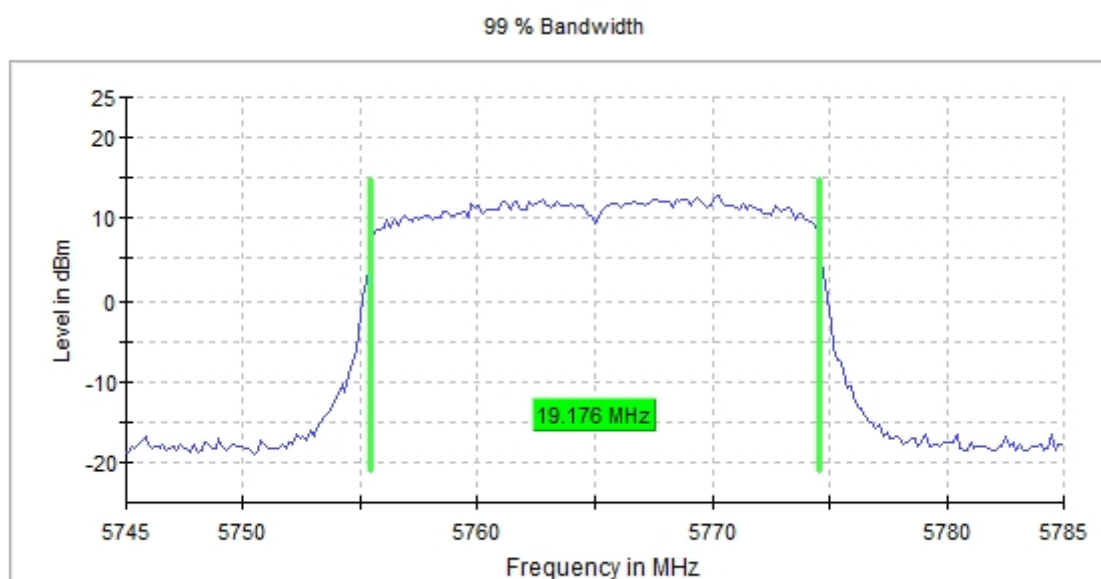


### U-NII-3 (5725-5850 MHz)

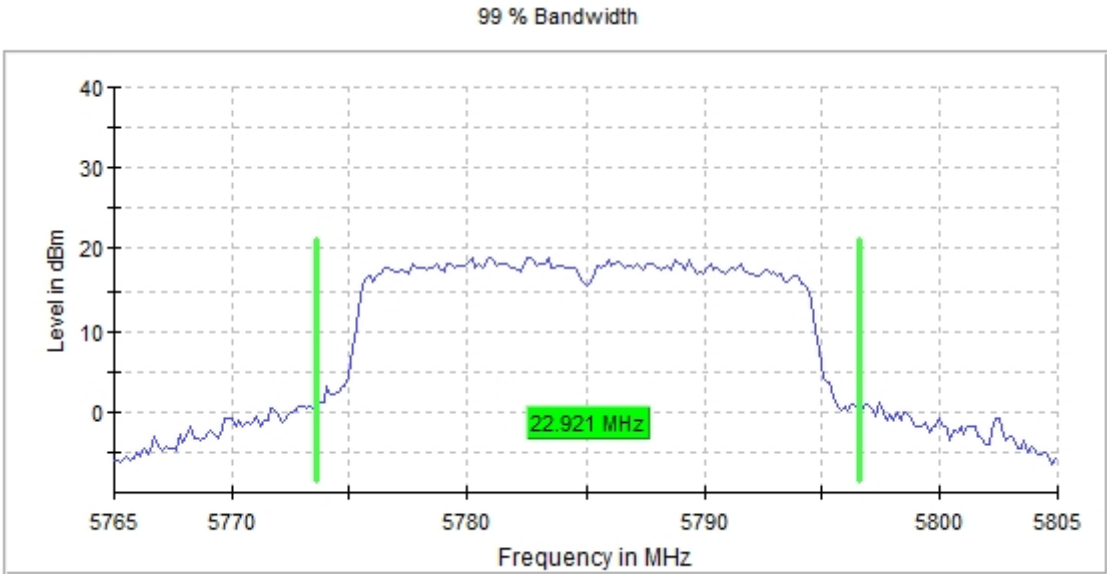
- Low Channel 149 (5745 MHz):



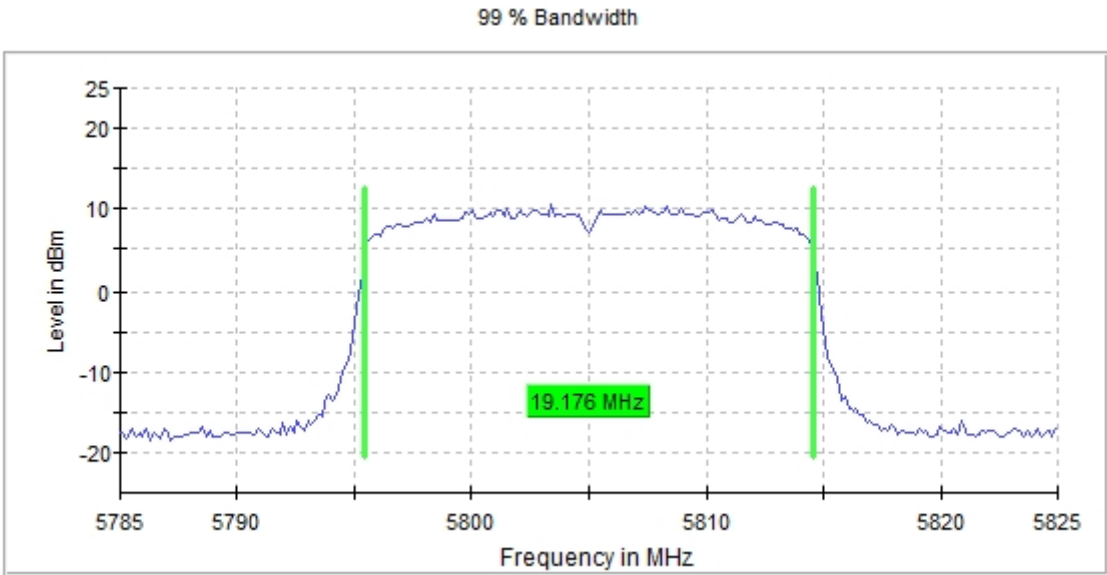
- Channel 153 (5765 MHz):



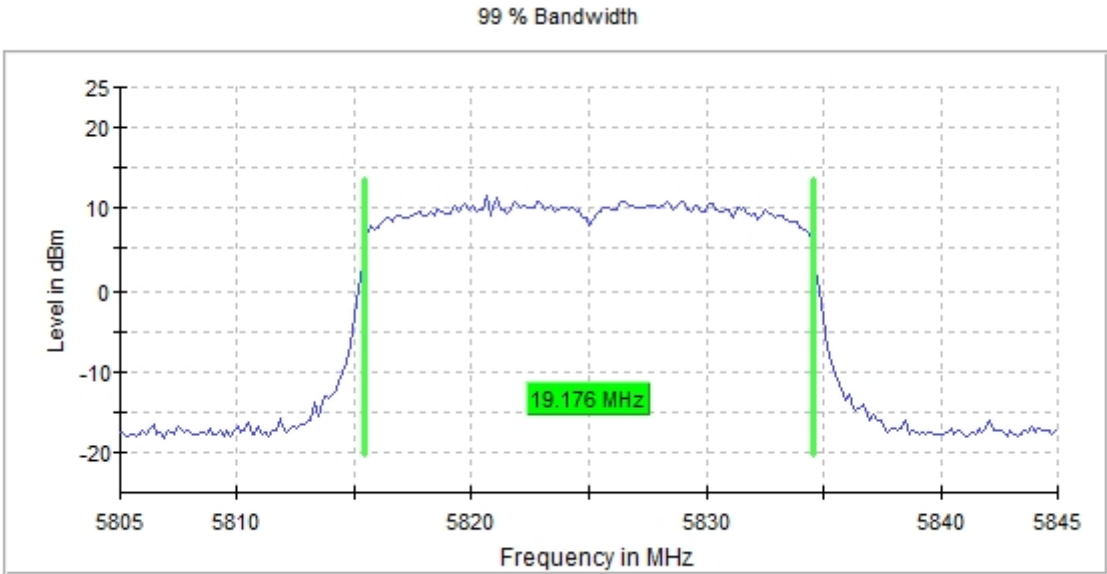
- Middle Channel 157 (5785 MHz):



- Channel 161 (5805 MHz):



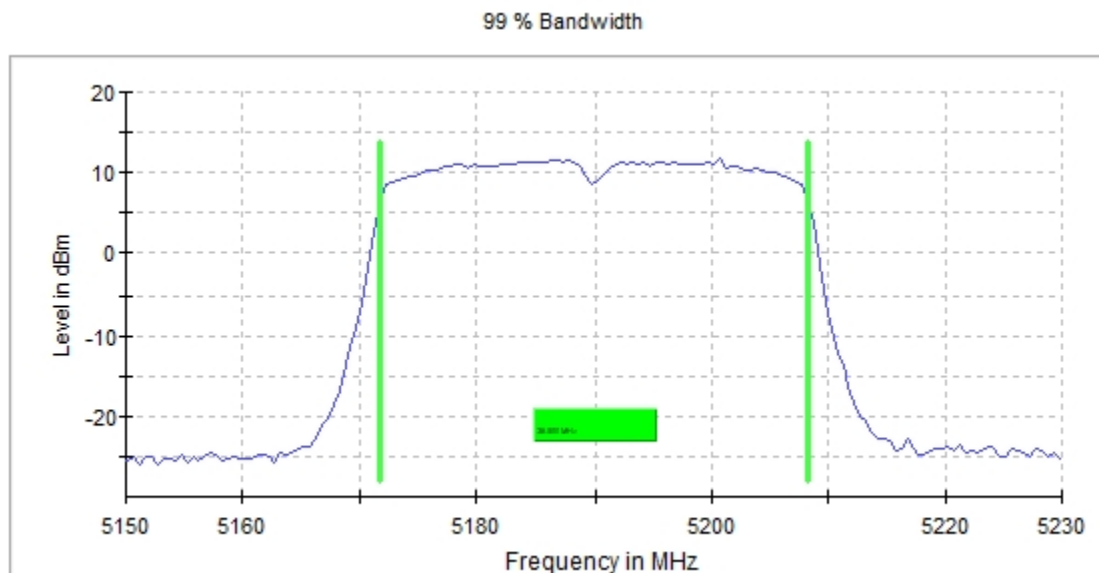
- High Channel 165 (5825 MHz):



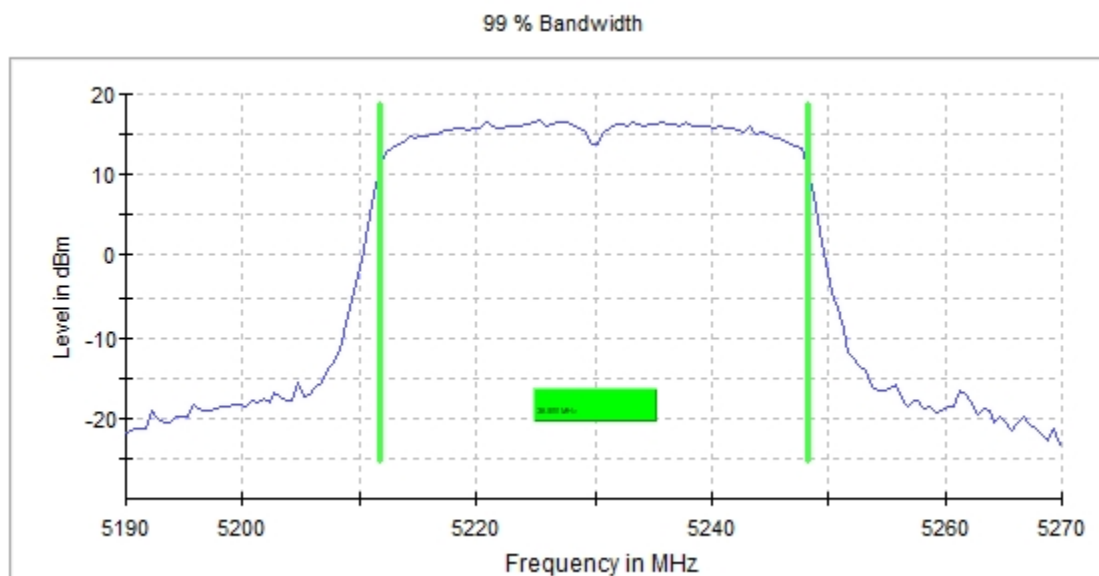
## SISO 802.11 n40 (VHT40):

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

- Low Channel 38 (5190 MHz):

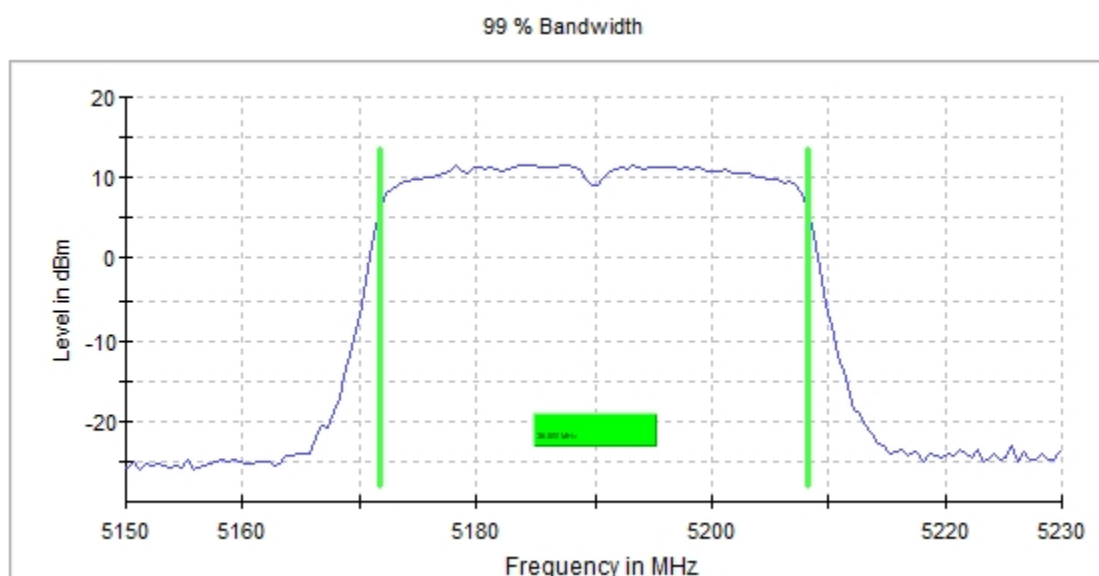


- High Channel 46 (5230 MHz):

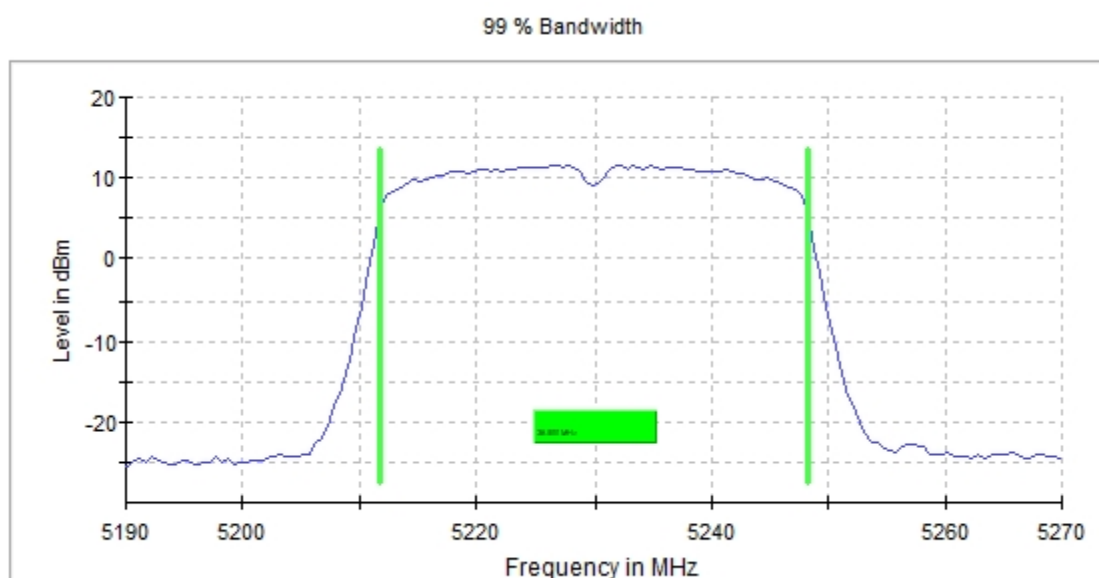


### U-NII-1 RSS (5150-5250 MHz)

- Low Channel 38 (5190 MHz):

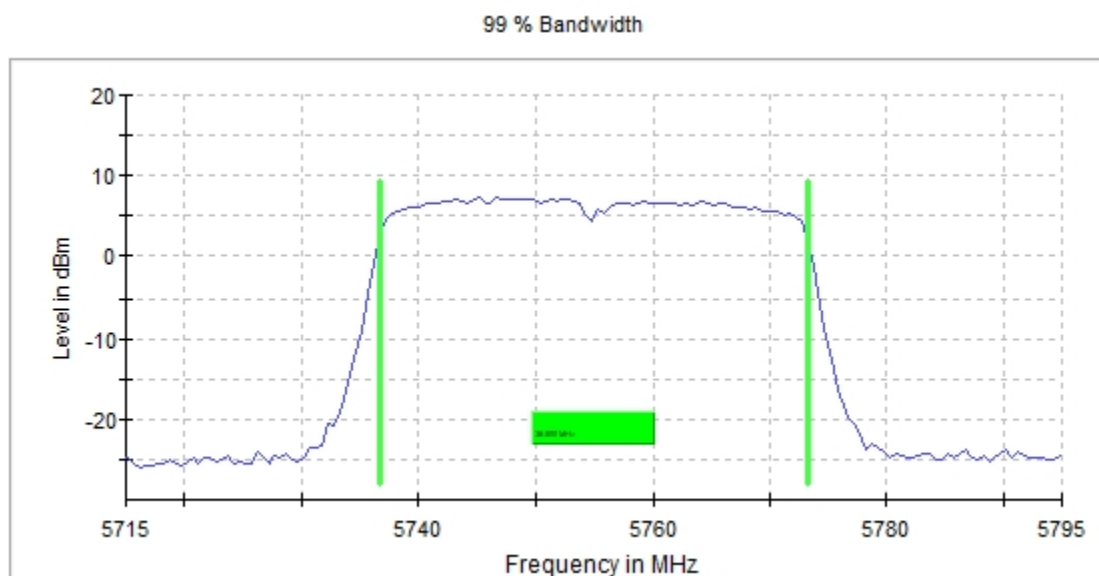


- High Channel 46 (5230 MHz):

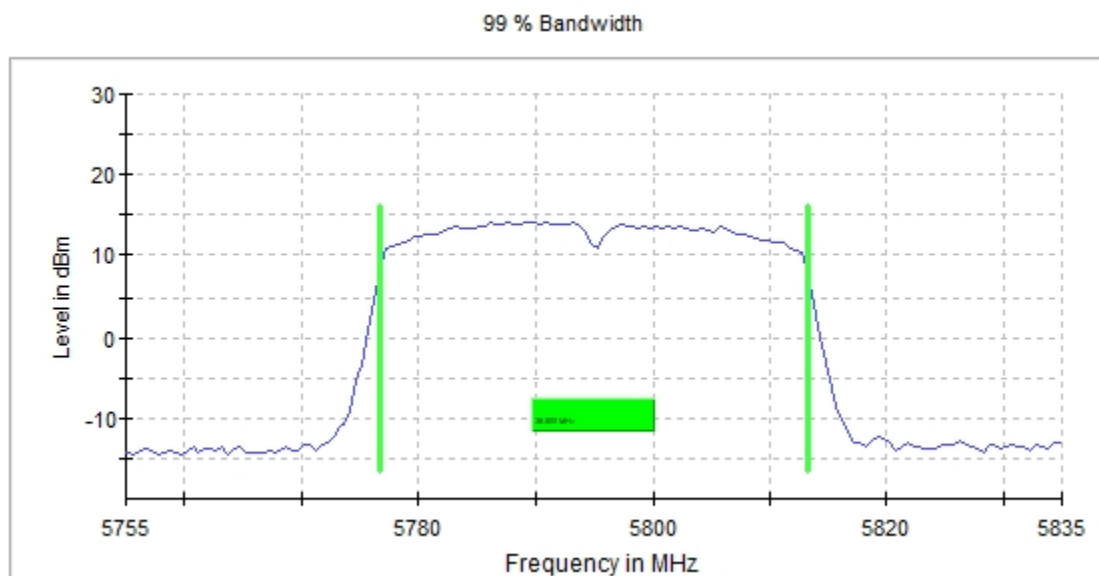


### U-NII-3 (5725-5850 MHz)

- Low Channel 151 (5755 MHz):



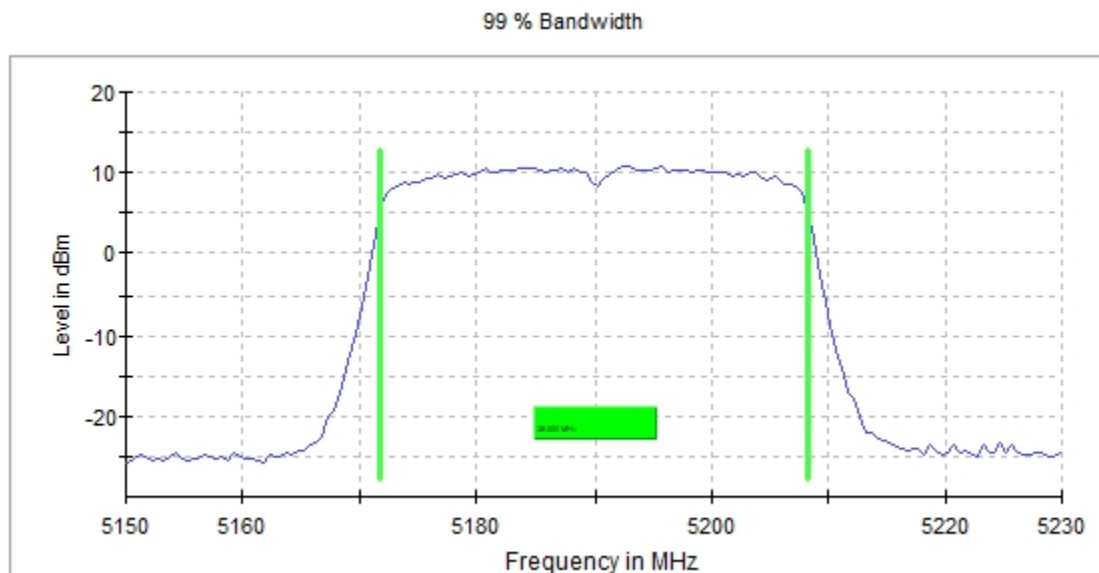
- High Channel 159 (5795 MHz):



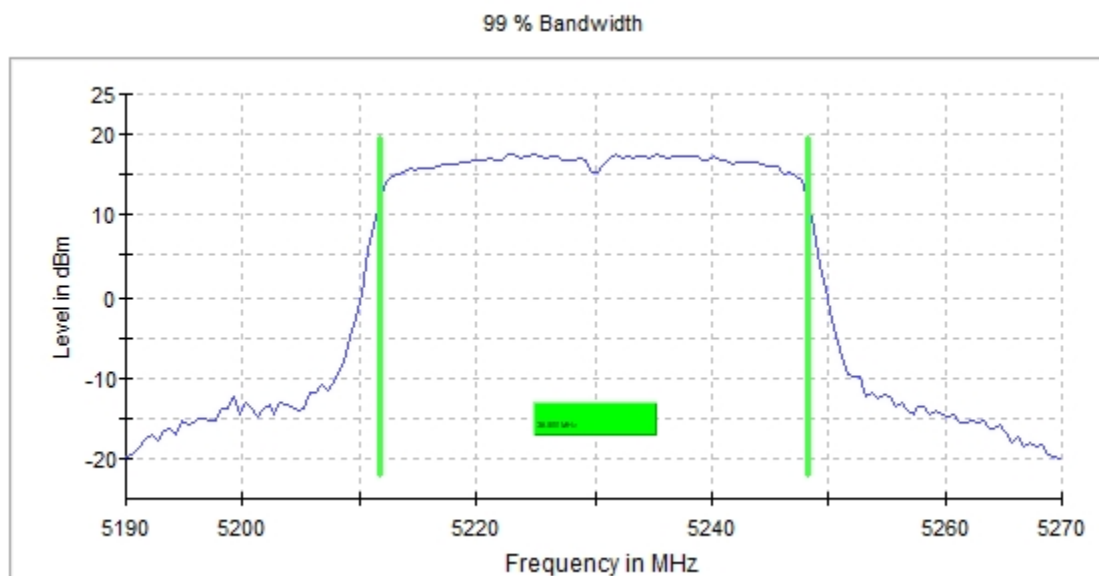
**SISO 802.11 ac40 (VHT40):**

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

- Low Channel 38 (5190 MHz):

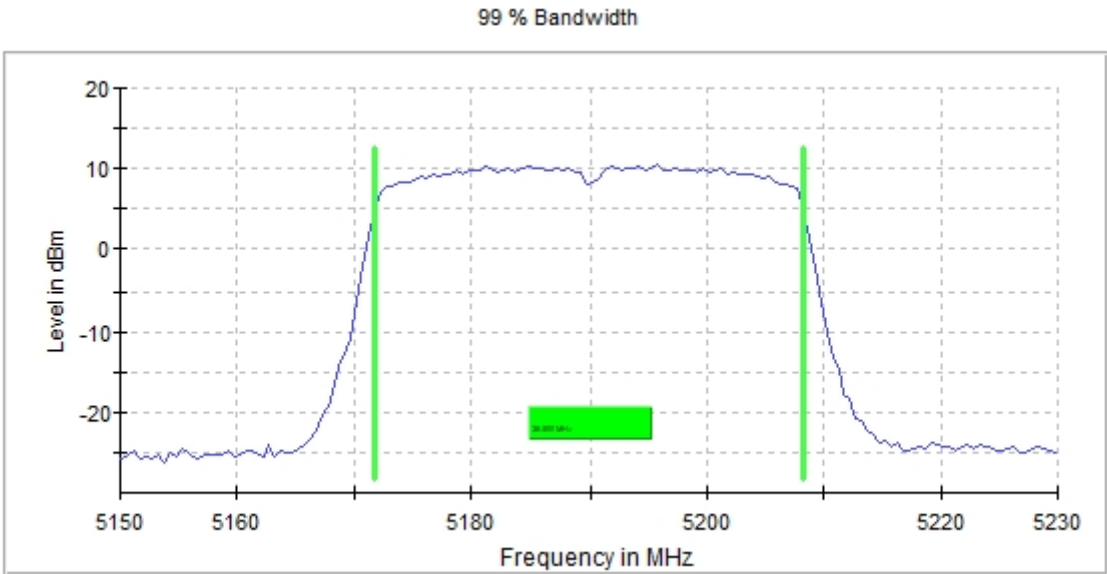


- High Channel 46 (5230 MHz):

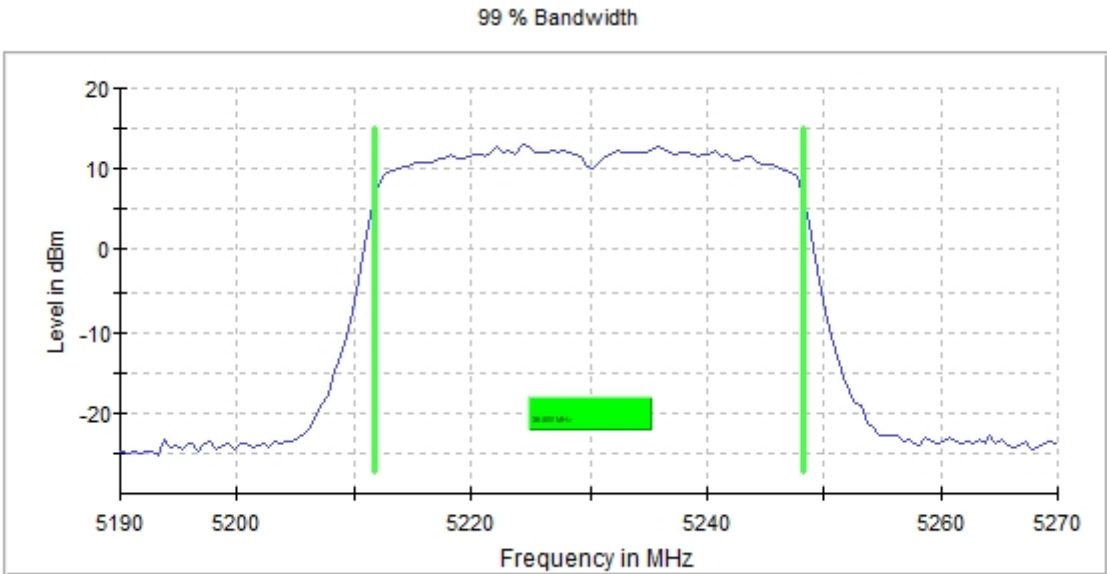


**U-NII-1 RSS (5150-5250 MHz)**

- Low Channel 38 (5190 MHz):

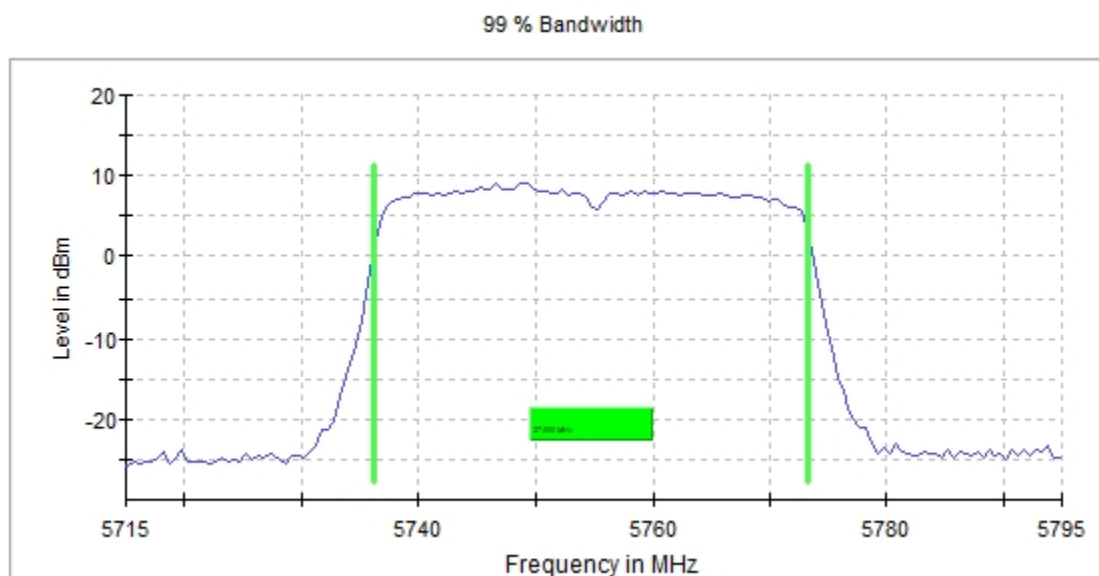


- High Channel 46 (5230 MHz):

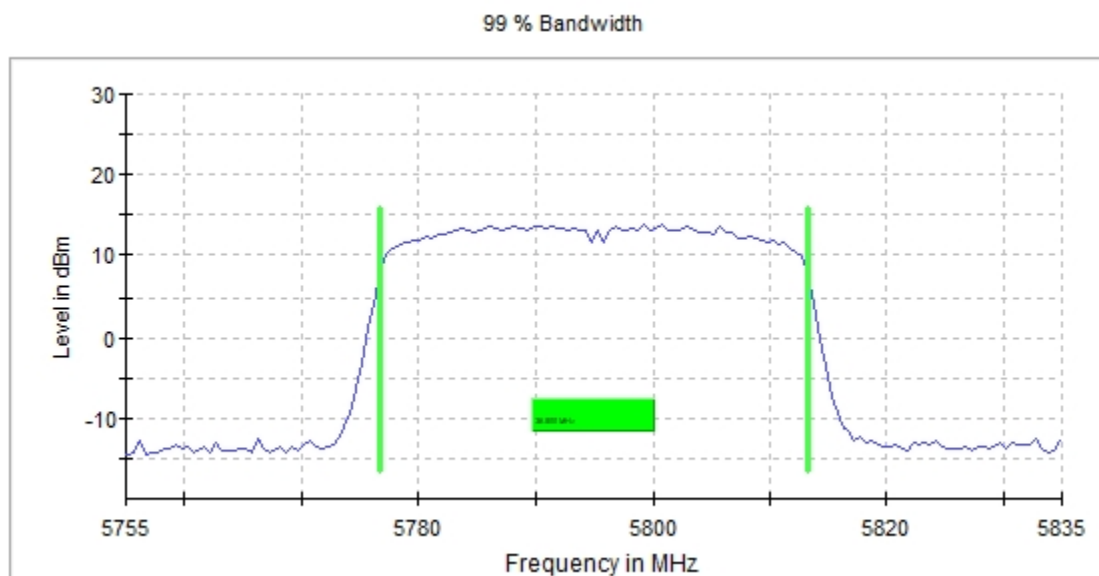


### U-NII-3 (5725-5850 MHz)

- Low Channel 151 (5755 MHz):



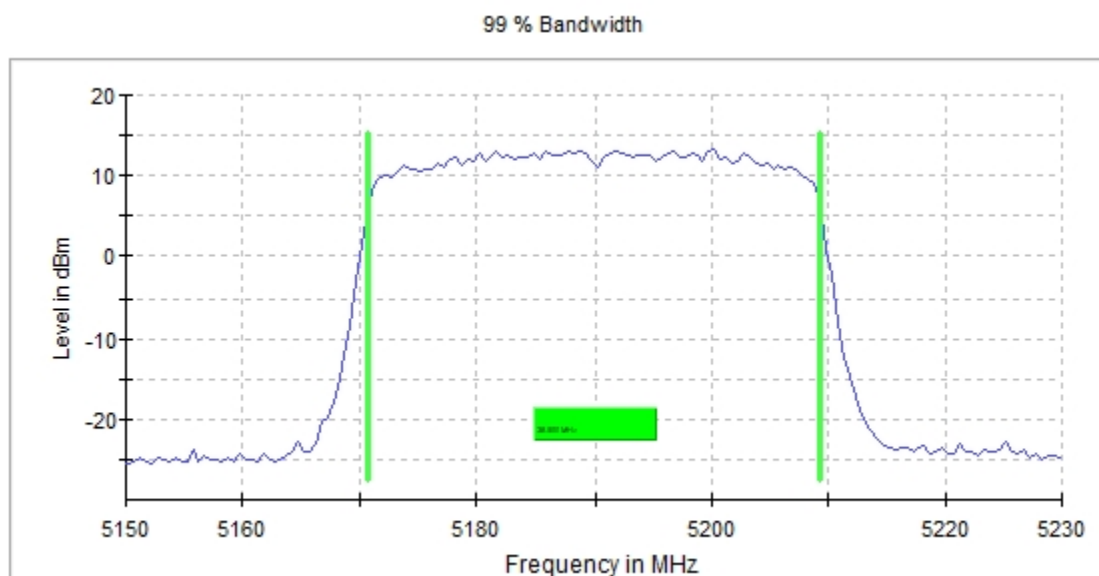
- High Channel 159 (5795 MHz):



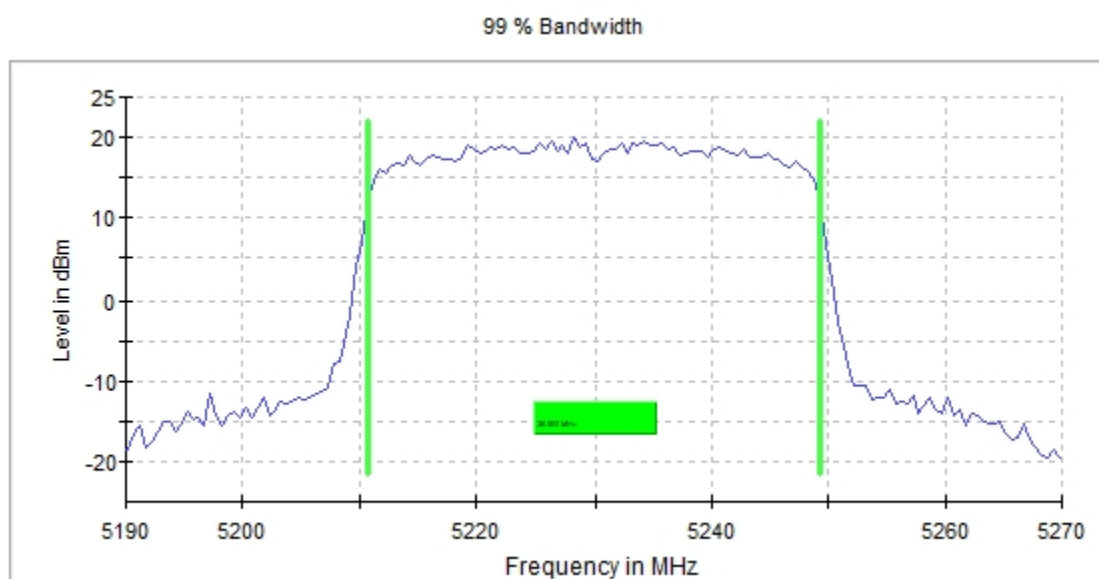
# **SISO 802.11 ax40 (HE40):**

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

- Low Channel 38 (5190 MHz):

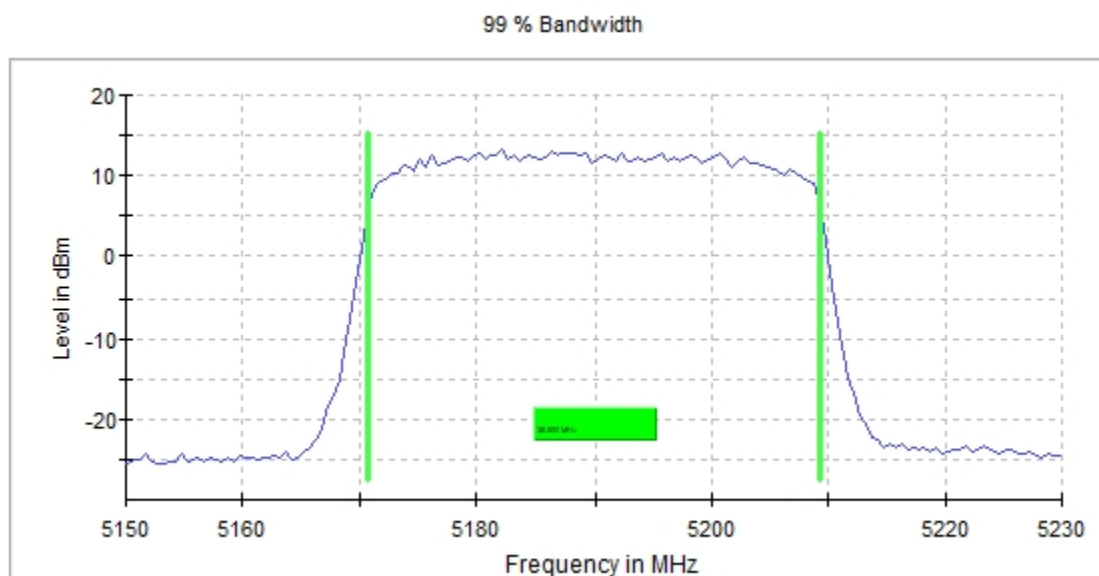


- High Channel 46 (5230 MHz):

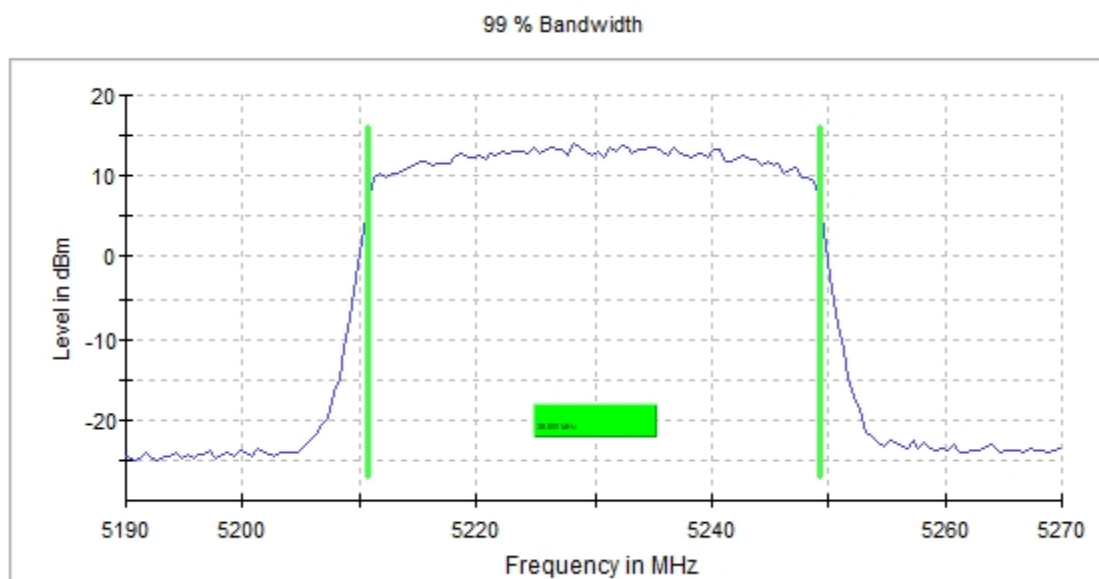


### U-NII-1 RSS (5150-5250 MHz)

- Low Channel 38 (5190 MHz):

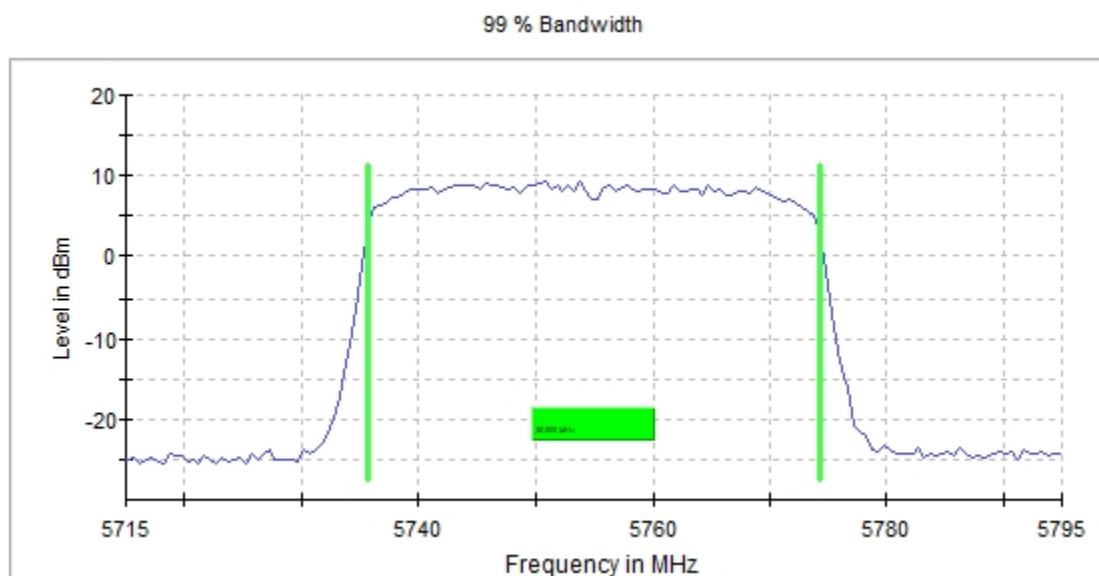


- High Channel 46 (5230 MHz):

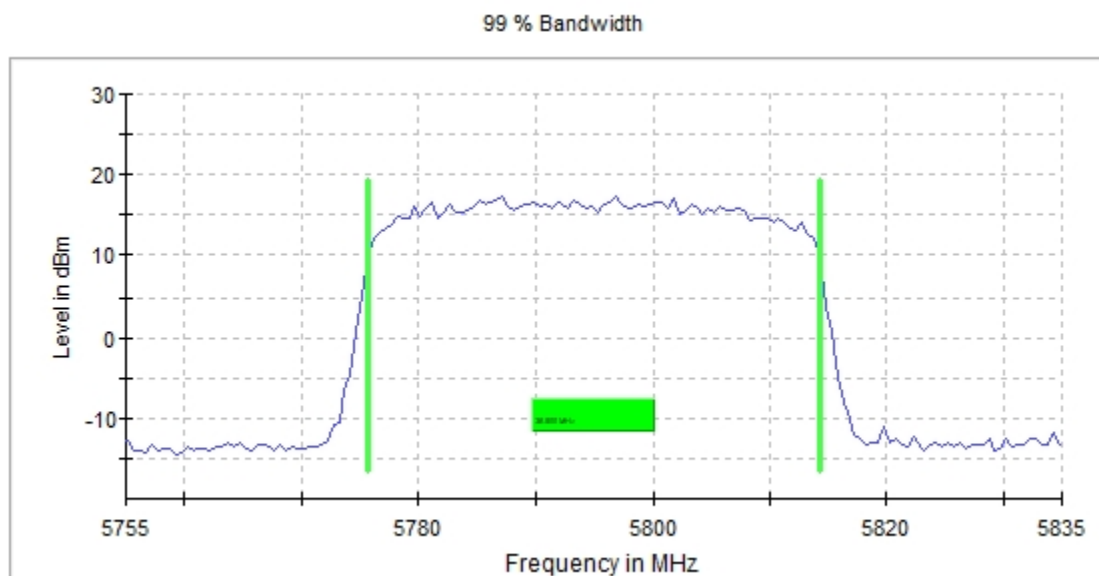


### U-NII-3 (5725-5850 MHz)

- Low Channel 151 (5755 MHz):



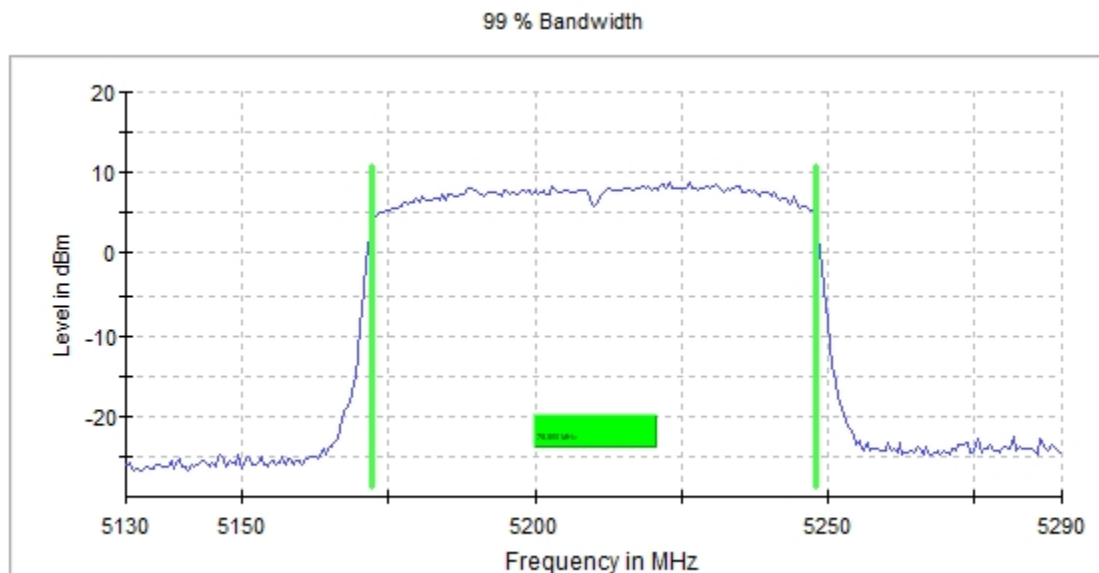
- High Channel 159 (5795 MHz):



# **SISO 802.11 ac80 (VHT80):**

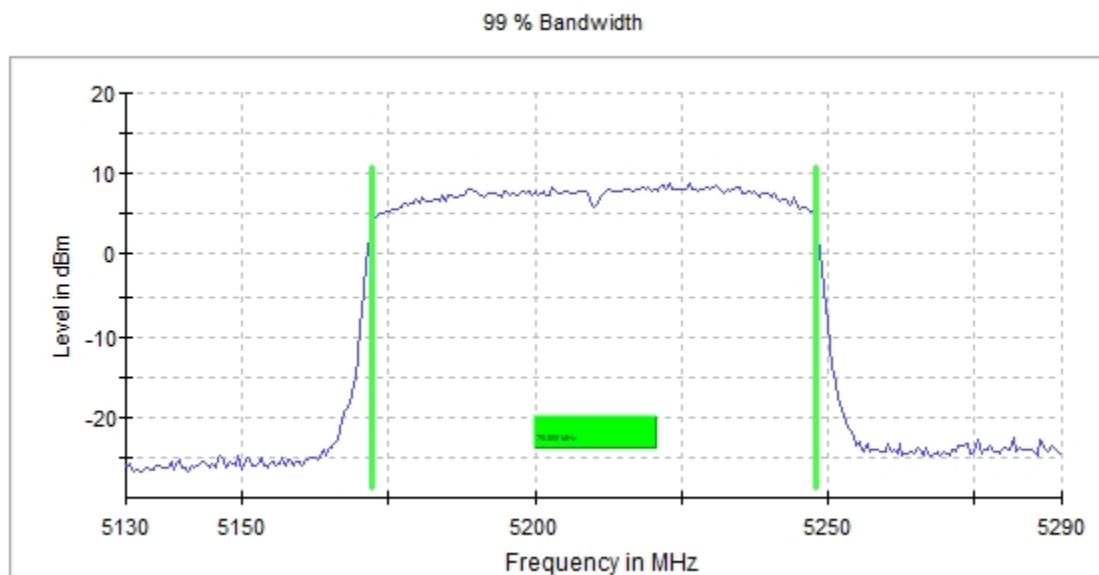
## **U-NII-1 FCC (5150-5250 MHz)**

- Single Channel 42 (5210 MHz):



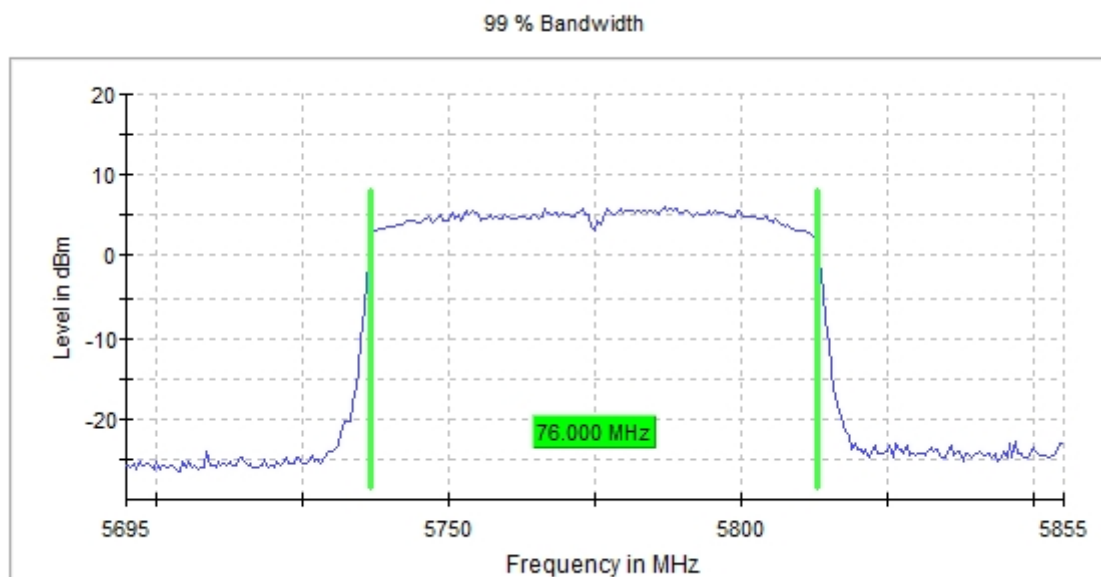
## **U-NII-1 RSS (5150-5250 MHz)**

- Single Channel 42 (5210 MHz):



**U-NII-3 (5725-5850 MHz)**

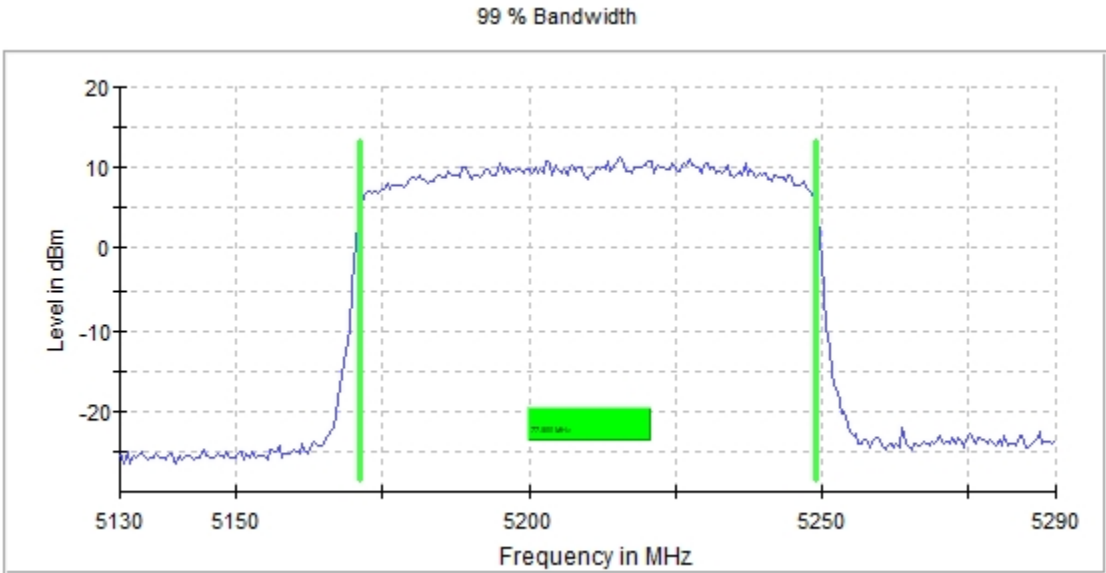
- Single Channel 155 (5775 MHz):



SISO 802.11 ax80 (HE80):

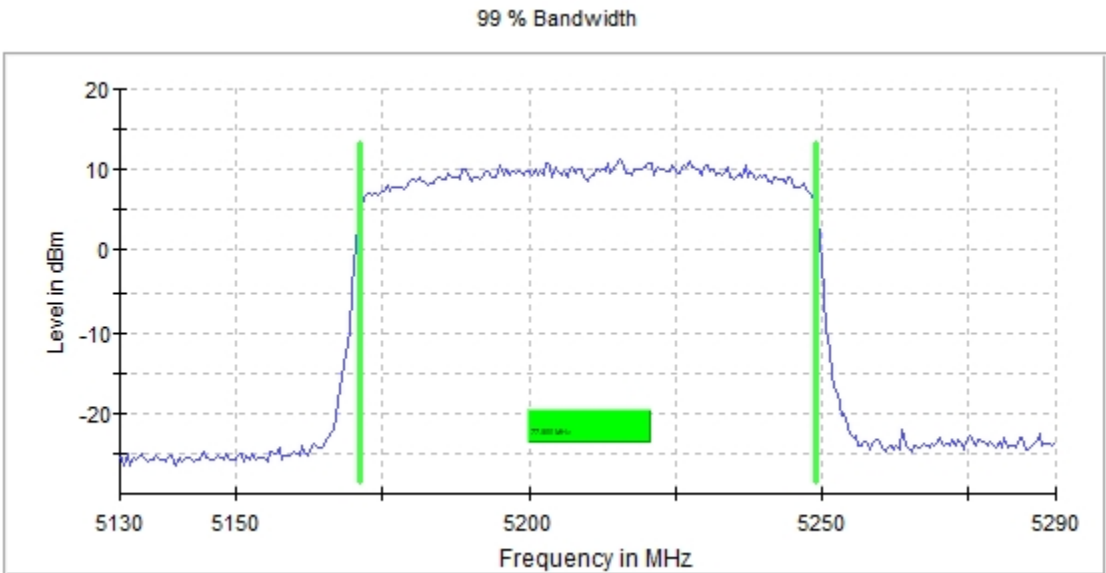
U-NII-1 FCC (5150-5250 MHz)

- Single Channel 42 (5210 MHz):



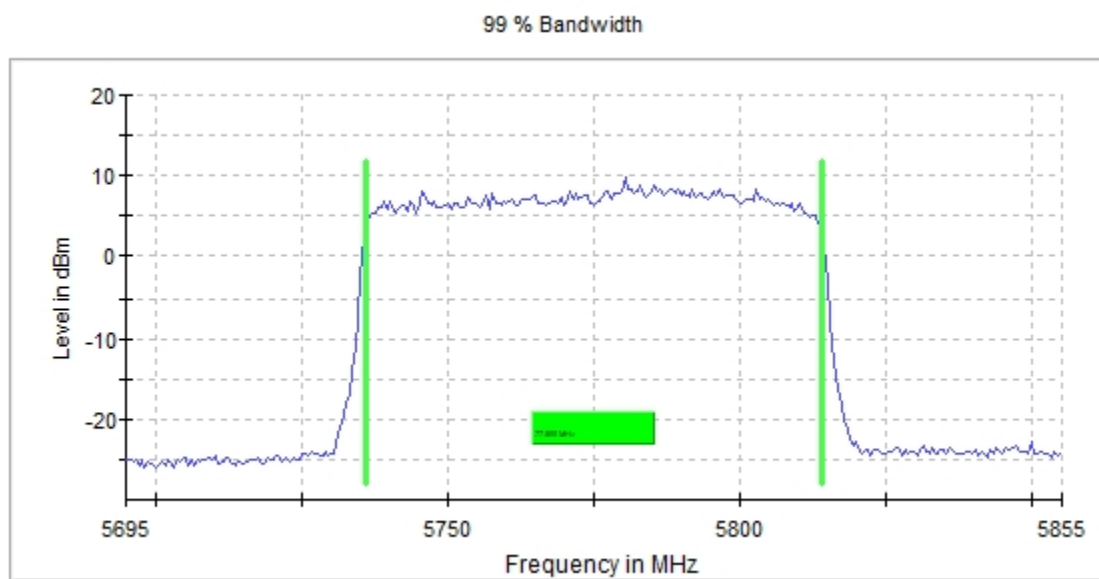
U-NII-1 RSS (5150-5250 MHz)

- Single Channel 42 (5210 MHz):



**U-NII-3 (5725-5850 MHz)**

- Single Channel 155 (5775 MHz):



**MIMO worst-case:**

**MIMO 802.11 a20:**

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.827715                       | 17.378278                          | 17.528090                | 17.378277                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 17.228465                       | 17.228465                          | 17.228465                | 17.378278                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 16.629213                        | 17.677902                 | 17.228465                           | 17.528090                 | 16.629213                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

**MIMO 802.11 n20 (VHT20):**

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 18.576780                       | 18.277154                          | 18.277154                | 18.277154                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 18.277154                       | 18.277154                          | 18.277154                | 18.277154                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 18.277154                        | 17.677902                 | 17.677902                           | 17.977528                 | 18.277154                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

**MIMO 802.11 ac20 (VHT20):**

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 18.277154                       | 18.277154                          | 18.277154                | 18.277154                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 18.127341                       | 18.277154                          | 18.277154                | 18.277154                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 18.426967                        | 17.677902                 | 18.277154                           | 18.277154                 | 18.277154                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

## MIMO 802.11 ax20 (HE20):

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 19.176030                       | 19.176030                          | 19.325843                | 19.176030                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

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

| Channels                      | Low Channel<br>36<br>(5180 MHz) | Middle Channel<br>40<br>(5200 MHz) | Channel 44<br>(5220 MHz) | High Channel<br>48<br>(5240 MHz) |
|-------------------------------|---------------------------------|------------------------------------|--------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 19.176030                       | 19.176030                          | 19.176030                | 19.176030                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                    |                          |                                  |

### U-NII-3 (5725-5850 MHz):

| Channels                      | Low Channel<br>149<br>(5745 MHz) | Channel 153<br>(5765 MHz) | Middle Channel<br>157<br>(5785 MHz) | Channel 161<br>(5805 MHz) | High Channel<br>165<br>(5825 MHz) |
|-------------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 19.176030                        | 19.176030                 | 19.176030                           | 19.026217                 | 19.176030                         |
| Measurement uncertainty (kHz) | <±36.95                          |                           |                                     |                           |                                   |

**MIMO 802.11 n40 (HT40):**

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>151<br>(5755 MHz) | High Channel<br>159<br>(5795 MHz) |
|-------------------------------|----------------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                        | 37.500000                         |
| Measurement uncertainty (kHz) | <±36.95                          |                                   |

**MIMO 802.11 ac40 (VHT40):**

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 36.500000                       | 36.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>151<br>(5755 MHz) | High Channel<br>159<br>(5795 MHz) |
|-------------------------------|----------------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                        | 39.500000                         |
| Measurement uncertainty (kHz) | <±36.95                          |                                   |

**MIMO 802.11 ax40 (HE40):**

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                       | 38.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

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

| Channels                      | Low Channel<br>38<br>(5190 MHz) | High Channel<br>46<br>(5230 MHz) |
|-------------------------------|---------------------------------|----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                       | 38.500000                        |
| Measurement uncertainty (kHz) | <±36.95                         |                                  |

**U-NII-3 (5725-5850 MHz):**

| Channels                      | Low Channel<br>151<br>(5755 MHz) | High Channel<br>159<br>(5795 MHz) |
|-------------------------------|----------------------------------|-----------------------------------|
| 99% Occupied Bandwidth (MHz)  | 38.500000                        | 38.500000                         |
| Measurement uncertainty (kHz) | <±36.95                          |                                   |

**MIMO 802.11 ac80 (VHT80):**

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 75.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 75.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

**U-NII-3 (5725-5850 MHz):**

|                               |                                     |
|-------------------------------|-------------------------------------|
| Channel                       | Single Channel<br>155<br>(5775 MHz) |
| 99% Occupied Bandwidth (MHz)  | 75.500000                           |
| Measurement uncertainty (kHz) | <±36.95                             |

**MIMO 802.11 ax80 (HE80):**

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 77.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

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

|                               |                                    |
|-------------------------------|------------------------------------|
| Channel                       | Single Channel<br>42<br>(5210 MHz) |
| 99% Occupied Bandwidth (MHz)  | 77.500000                          |
| Measurement uncertainty (kHz) | <±36.95                            |

**U-NII-3 (5725-5850 MHz):**

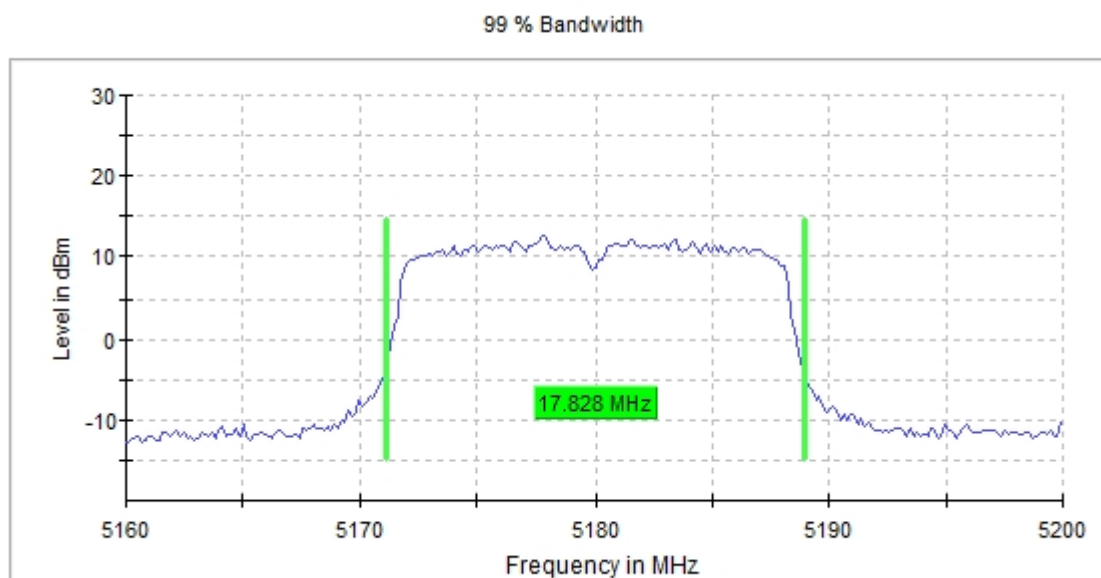
|                               |                                     |
|-------------------------------|-------------------------------------|
| Channel                       | Single Channel<br>155<br>(5775 MHz) |
| 99% Occupied Bandwidth (MHz)  | 77.500000                           |
| Measurement uncertainty (kHz) | <±36.95                             |

# **MIMO worst-case:**

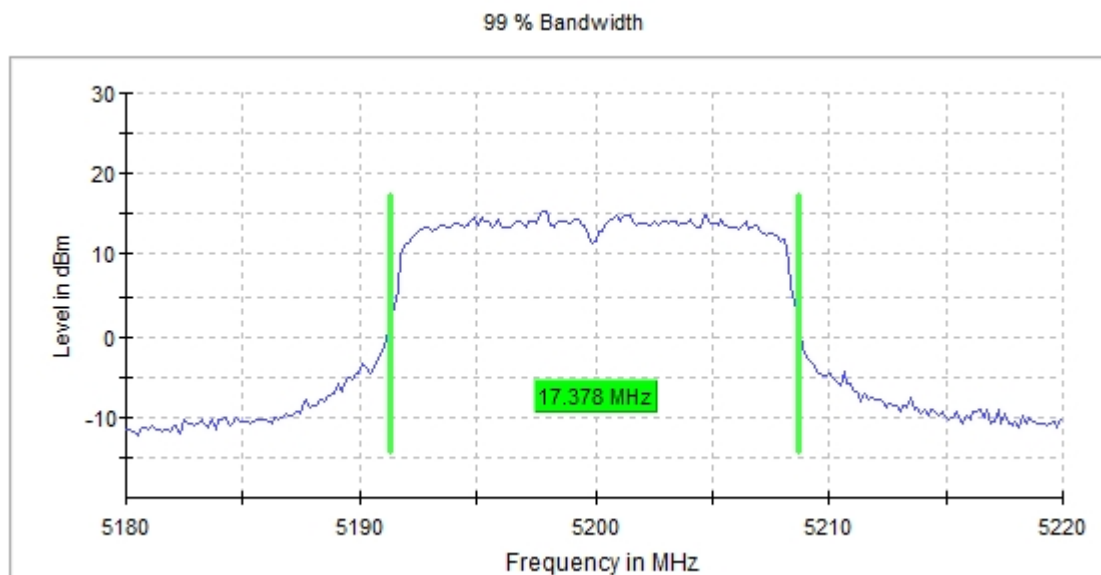
## **MIMO 802.11 a20:**

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

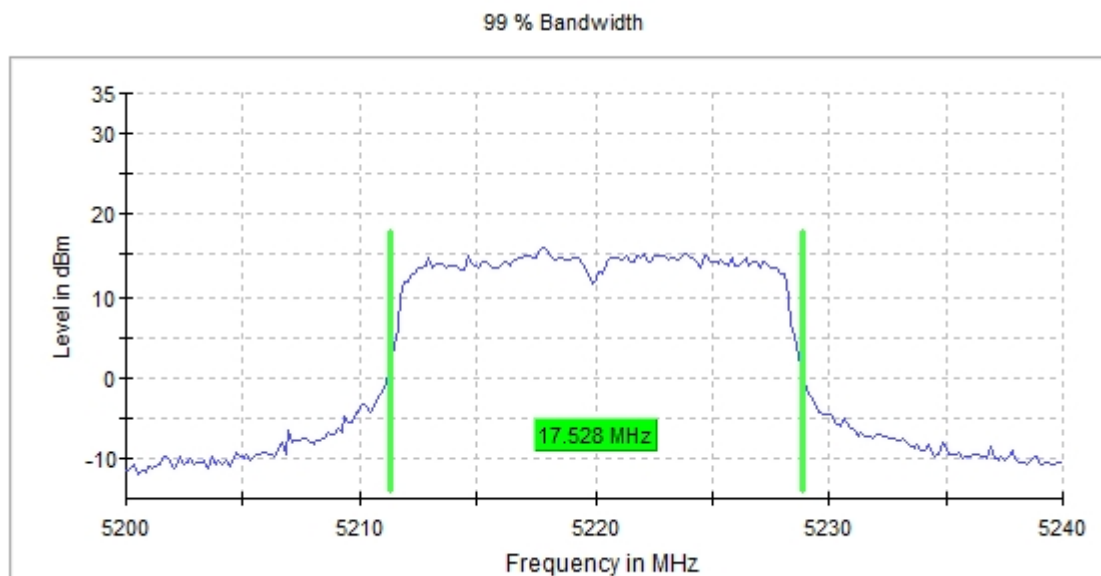
- Low Channel 36 (5180 MHz):



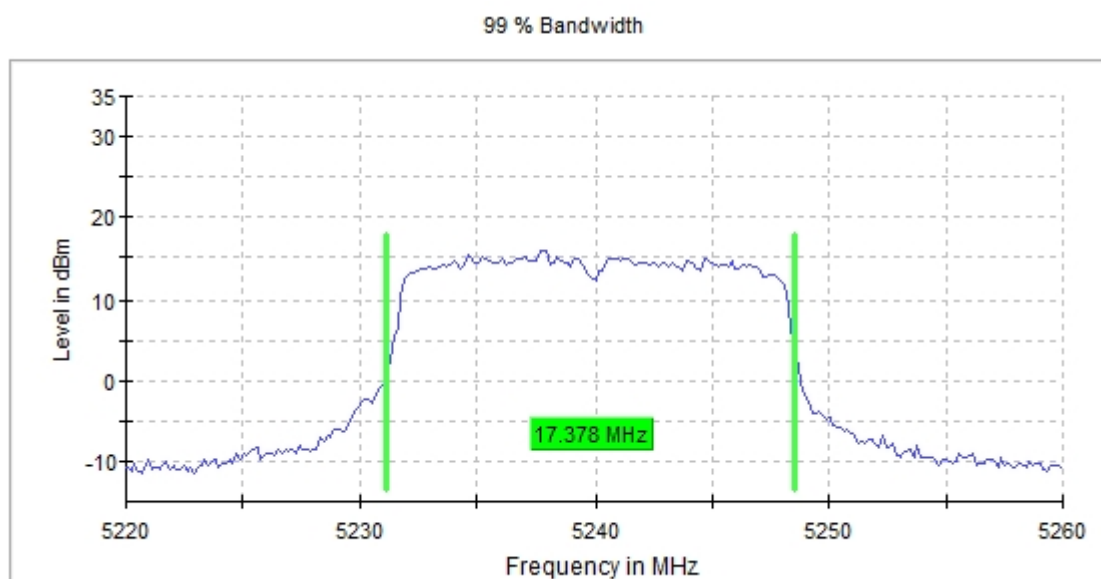
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

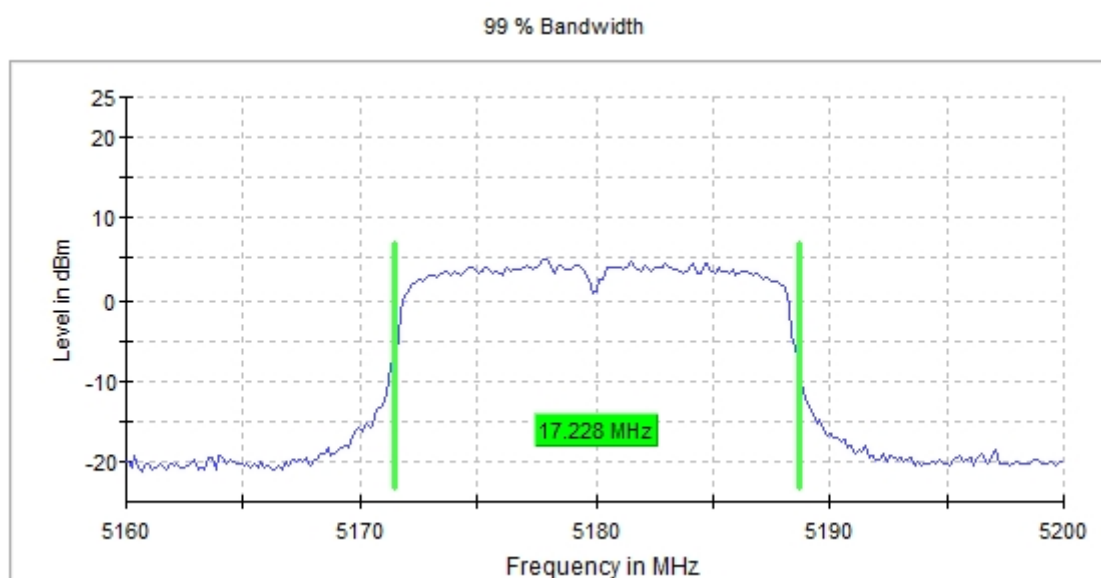


- High Channel 48 (5240 MHz):

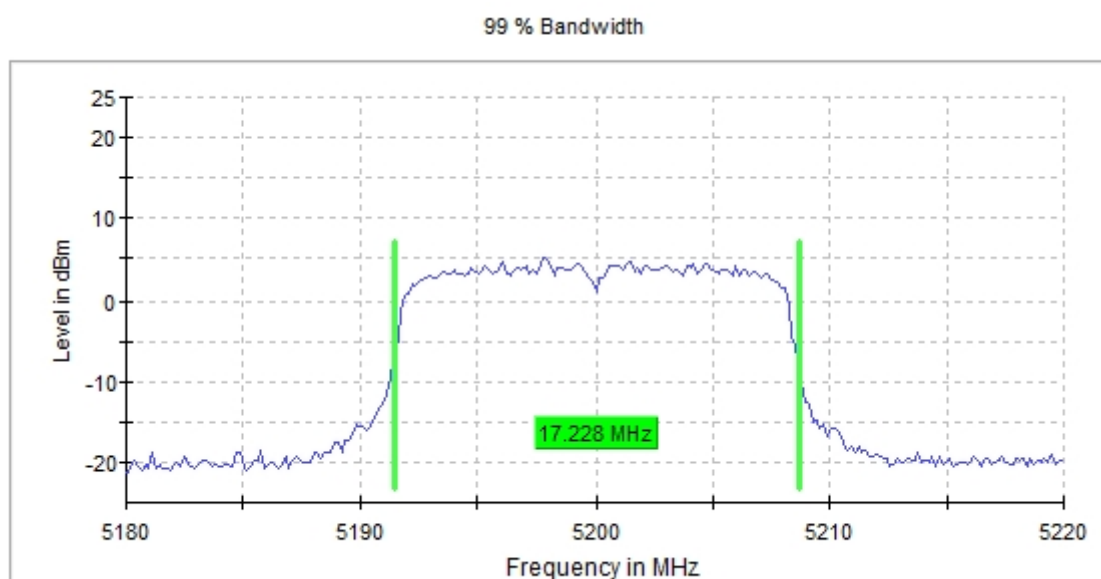


### U-NII-1 RSS (5150-5250 MHz)

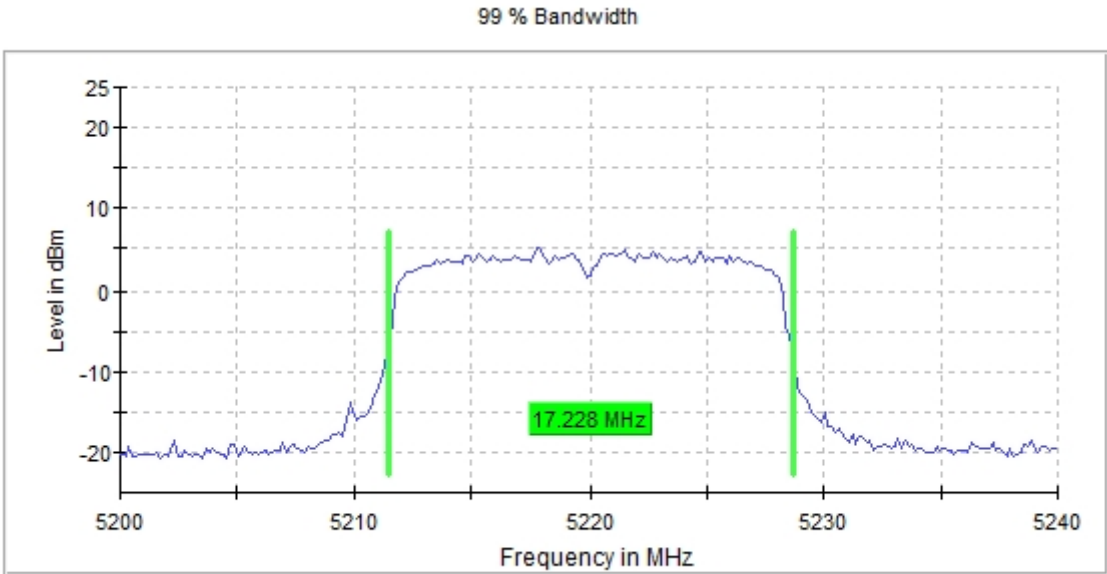
- Low Channel 36 (5180 MHz):



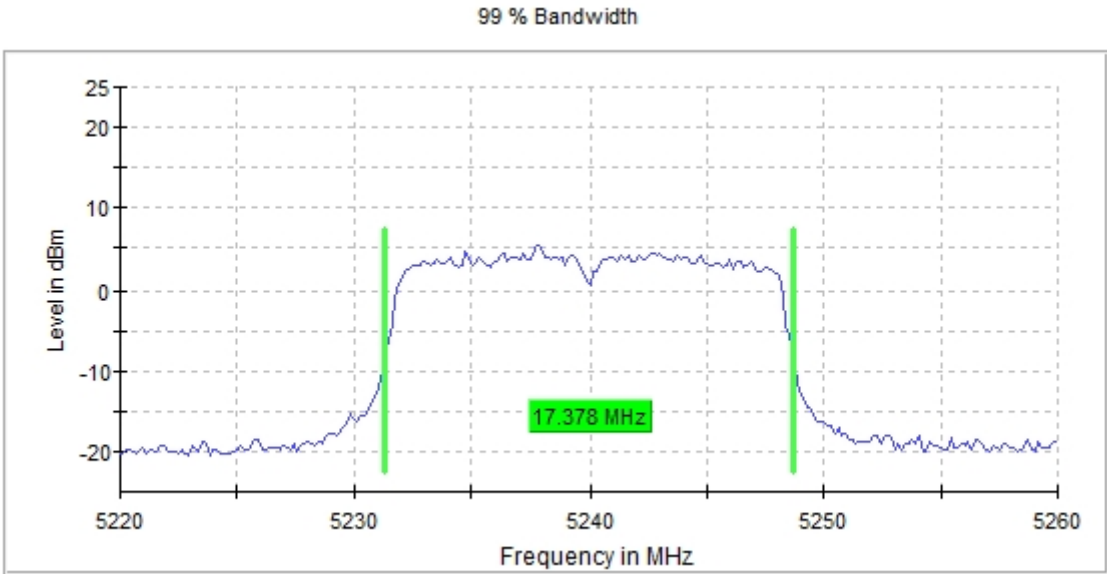
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

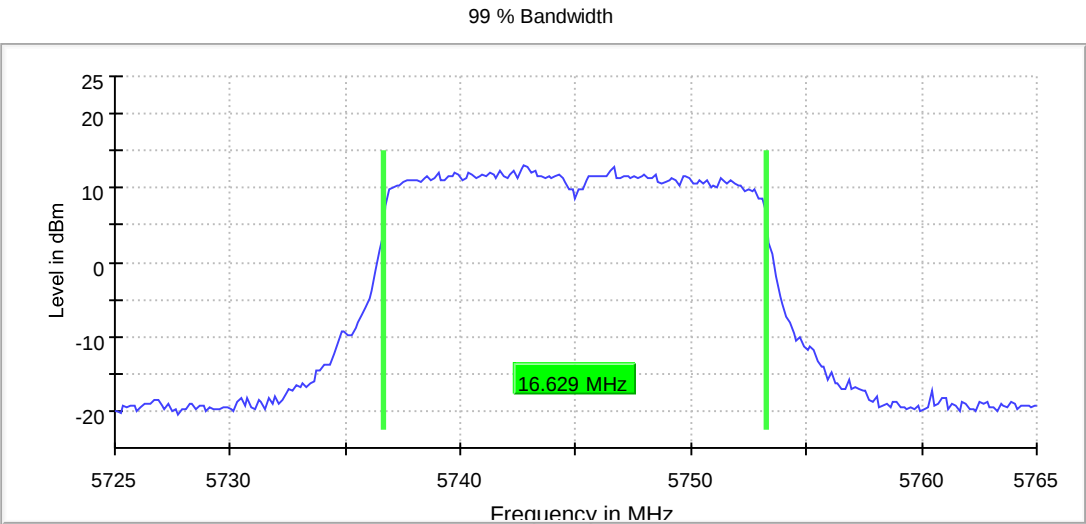


- High Channel 48 (5240 MHz):

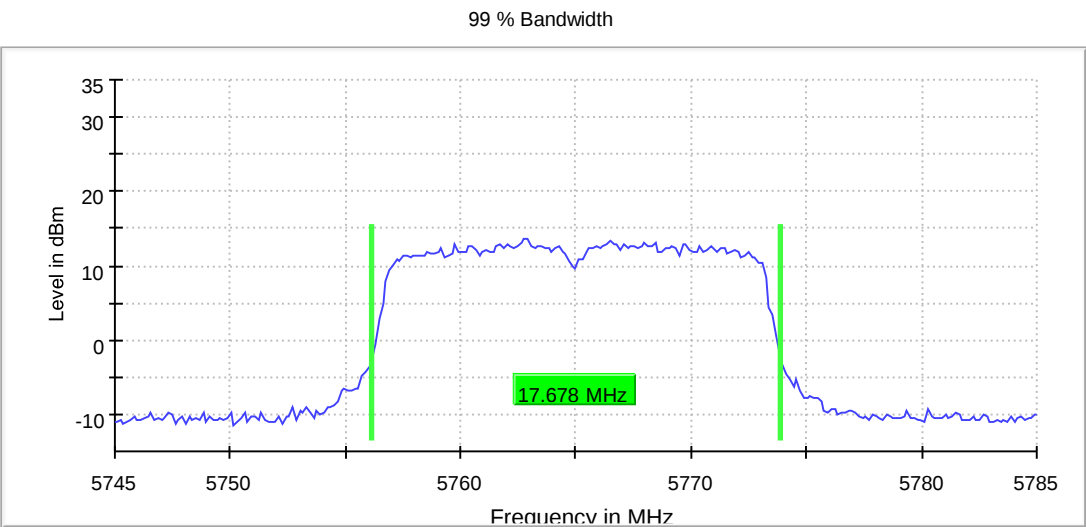


U-NII-3 (5725-5850 MHz)

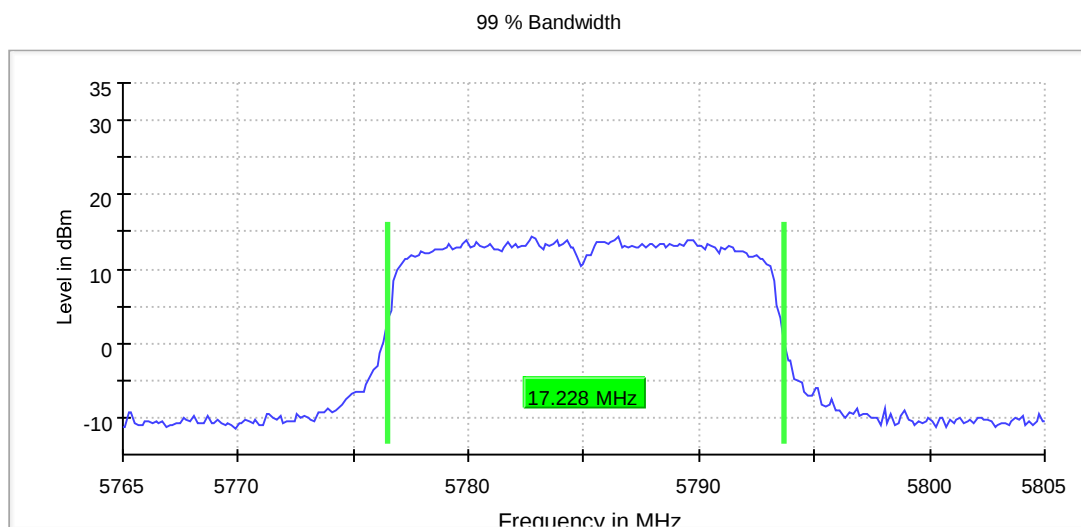
- Low Channel 149 (5745 MHz):



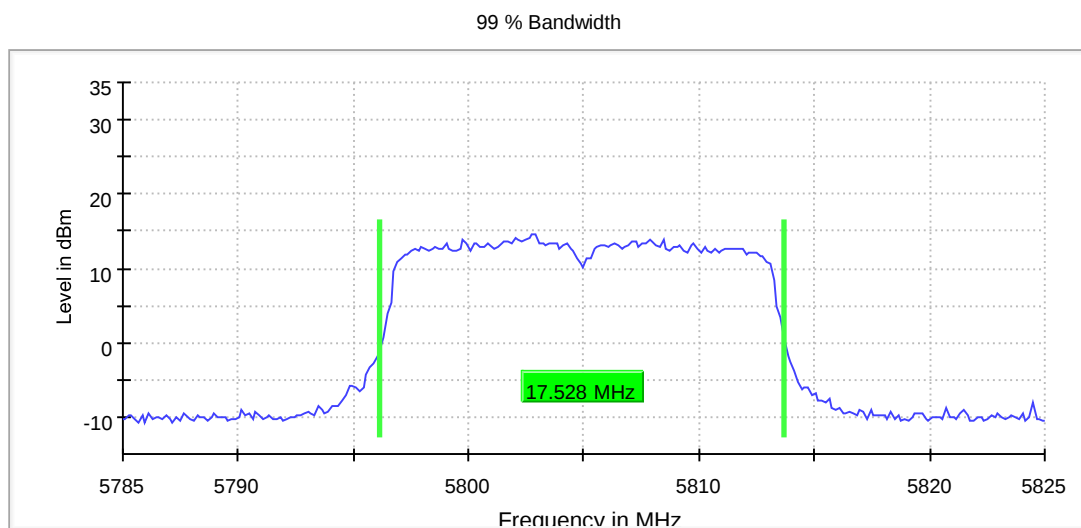
- Channel 153 (5765 MHz):



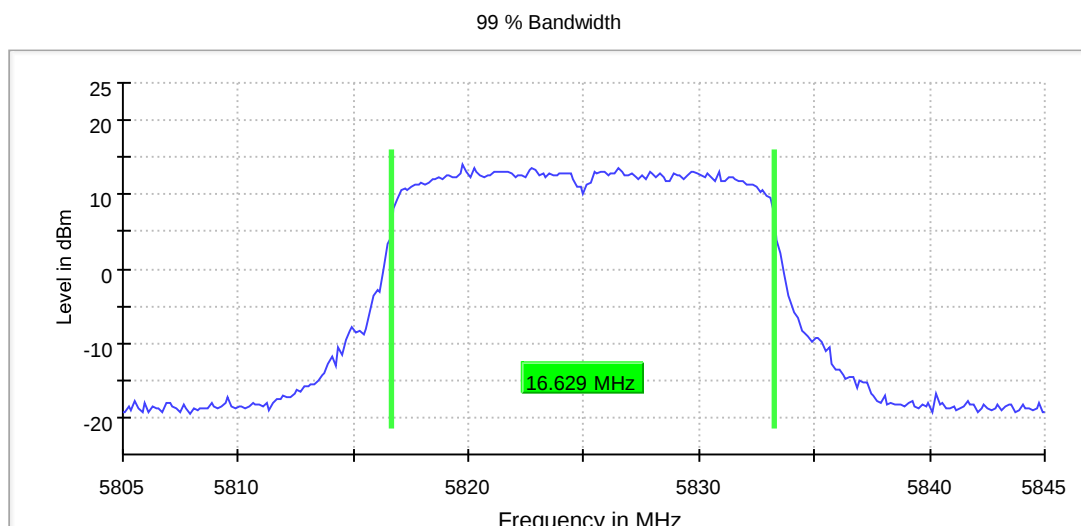
- Middle Channel 157 (5785 MHz):



- Channel 161 (5805 MHz):



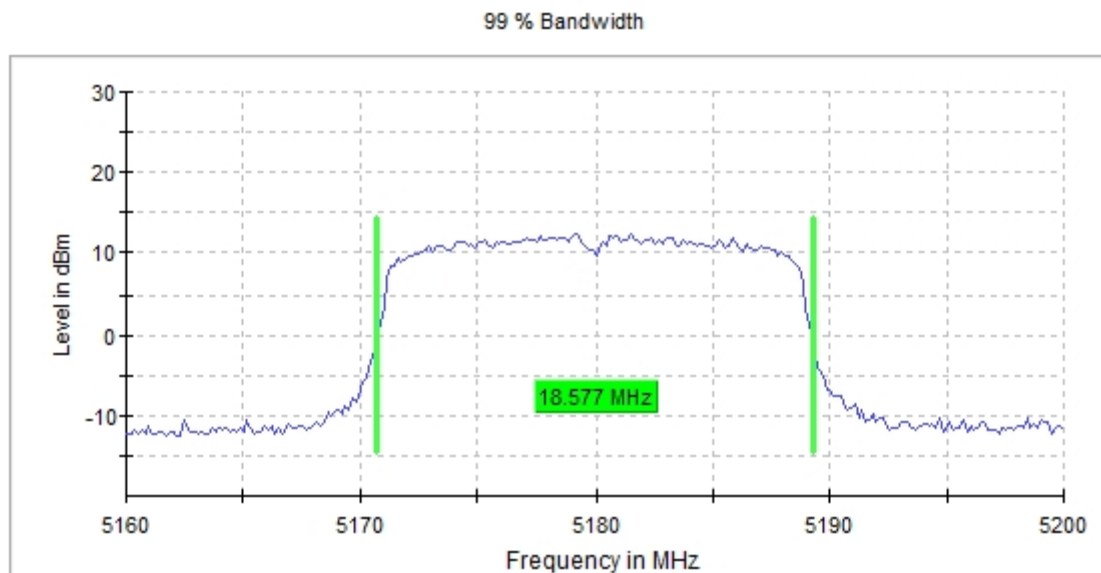
- High Channel 165 (5825 MHz):



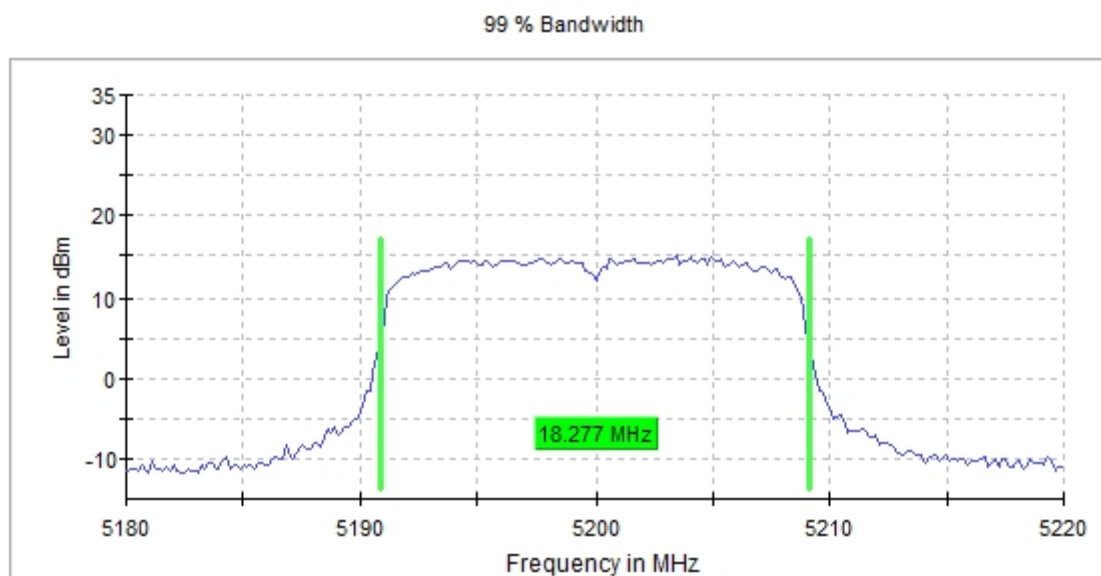
**MIMO 802.11 n20 (HT20):**

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

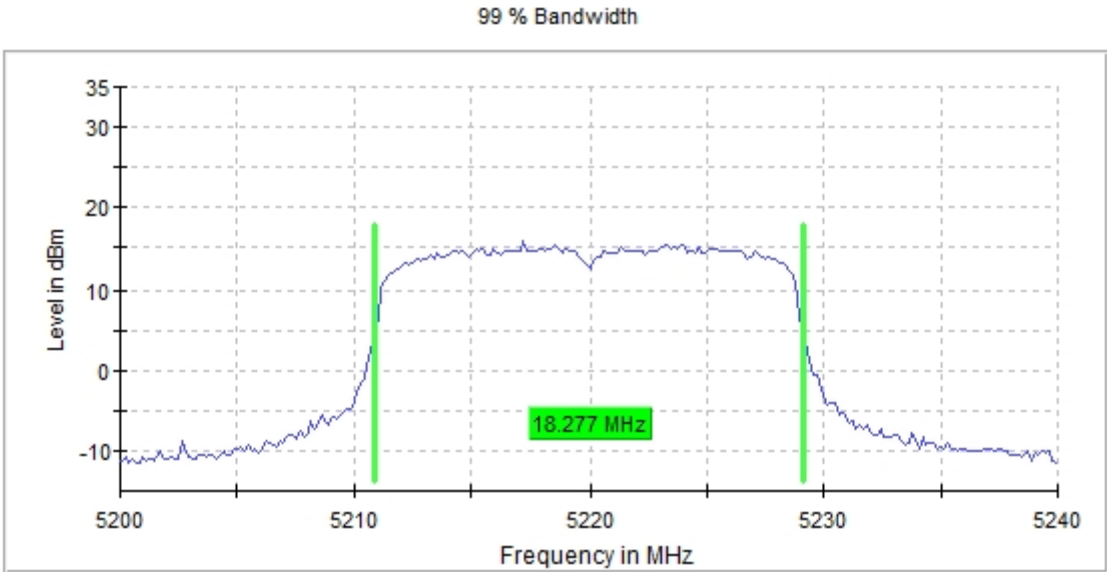
- Low Channel 36 (5180 MHz):



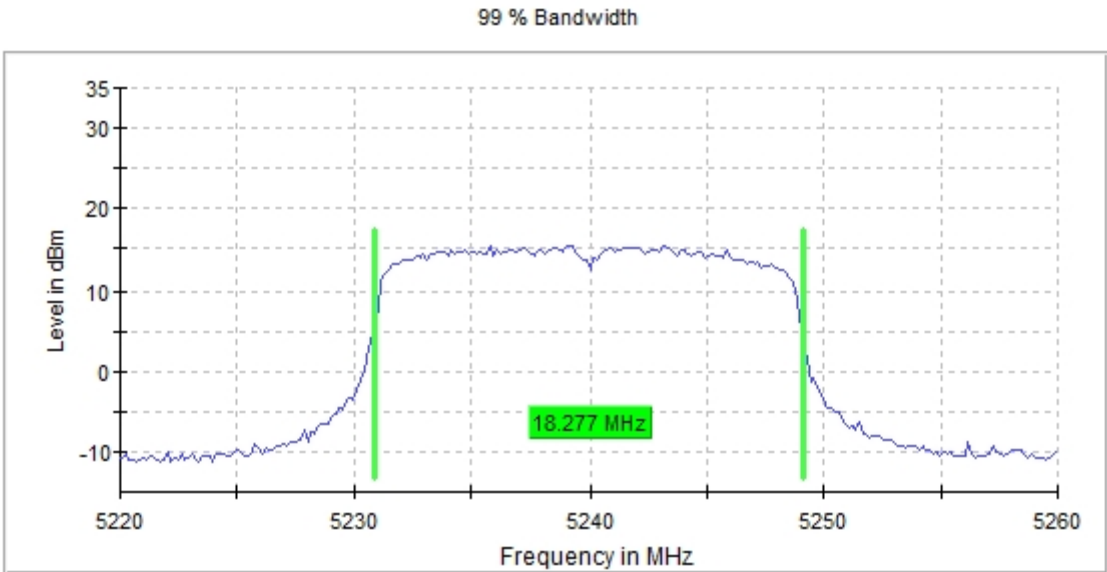
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

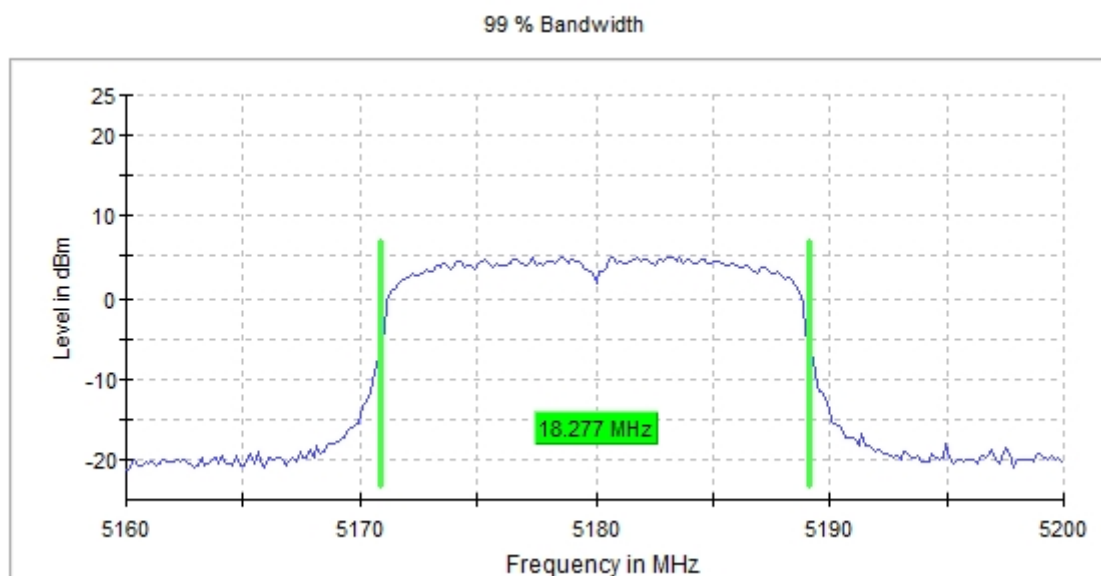


- High Channel 48 (5240 MHz):

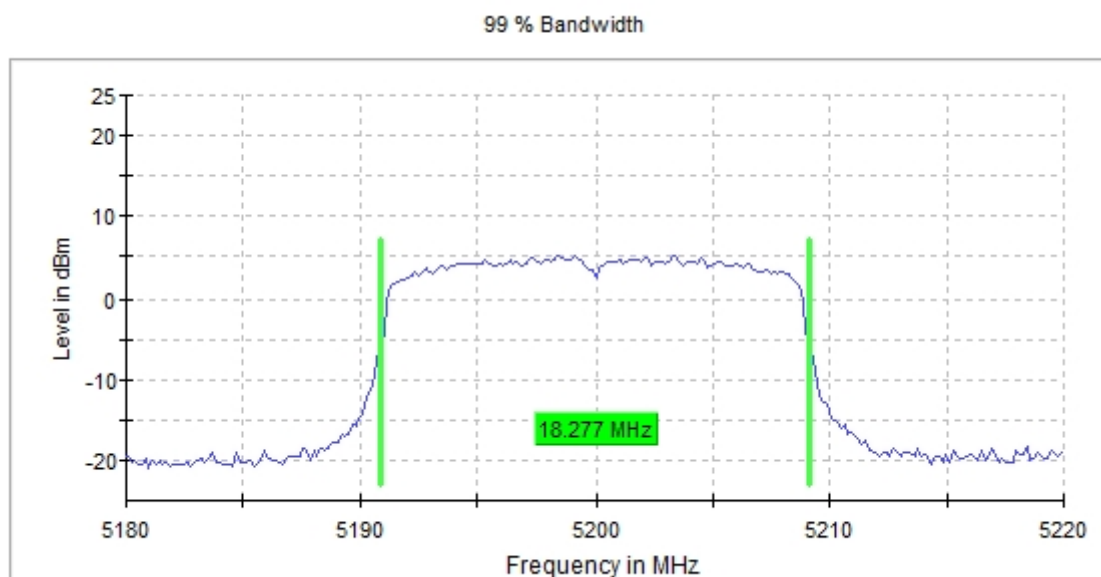


### U-NII-1 RSS (5150-5250 MHz)

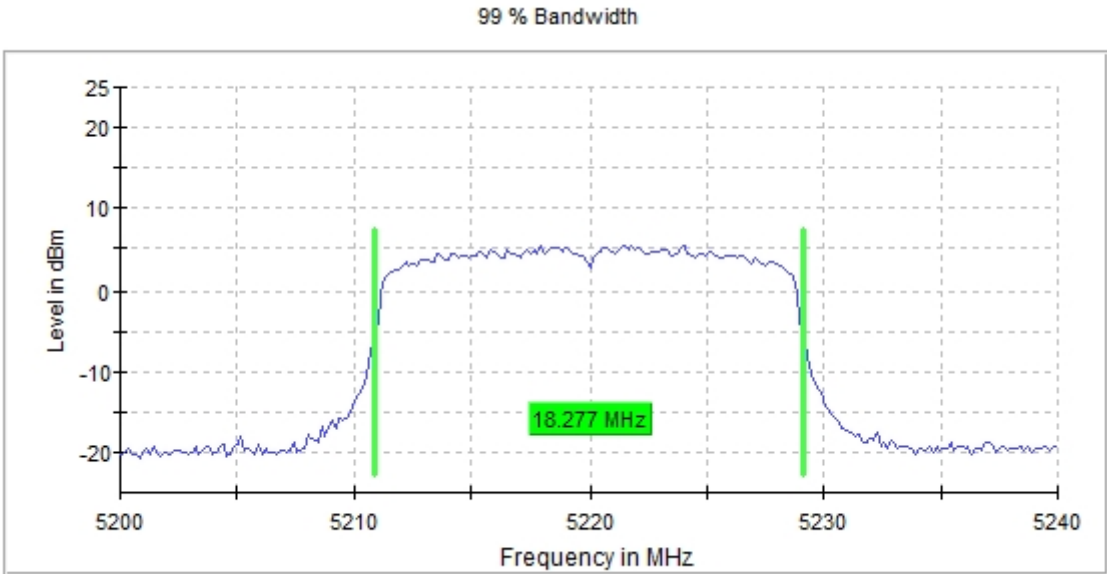
- Low Channel 36 (5180 MHz):



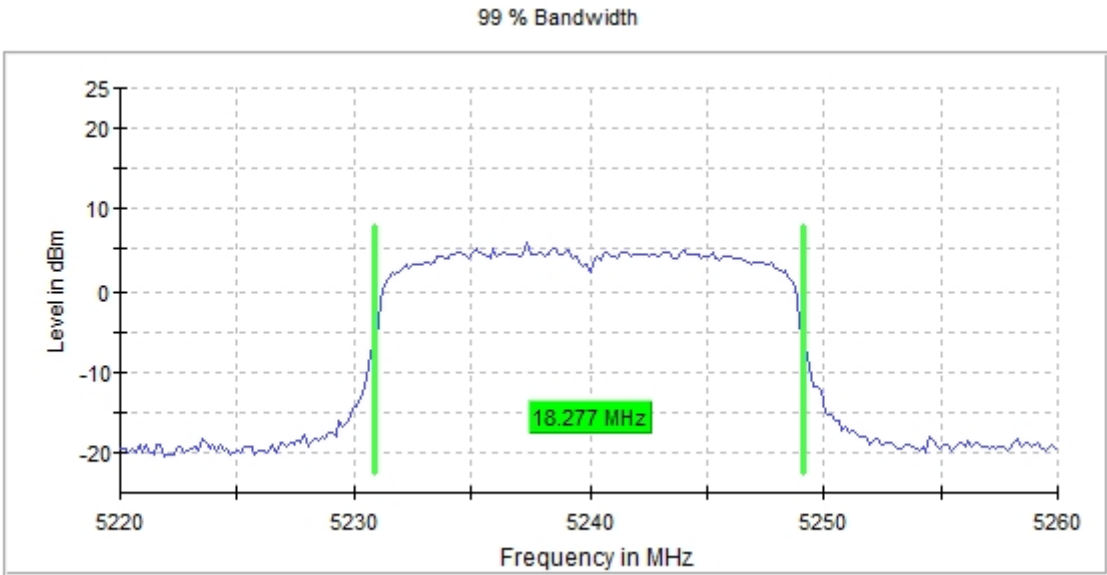
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

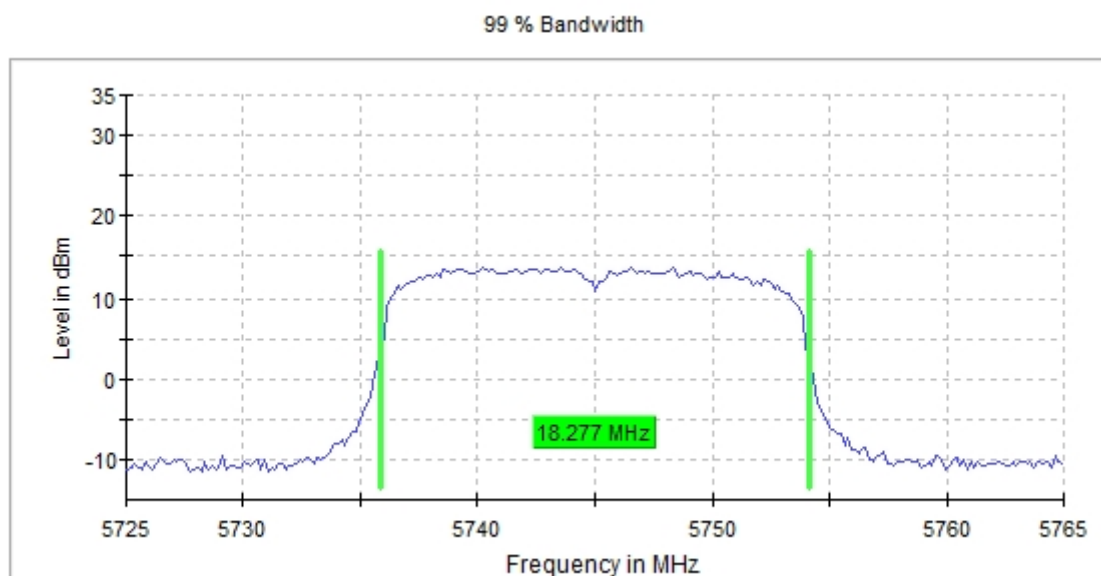


- High Channel 48 (5240 MHz):

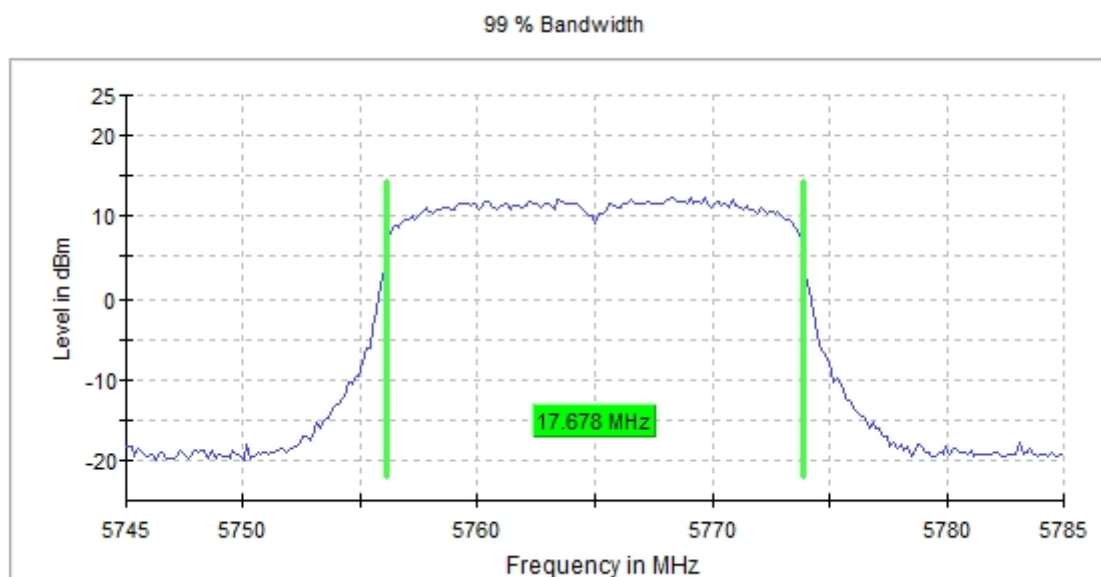


### U-NII-3 (5725-5850 MHz)

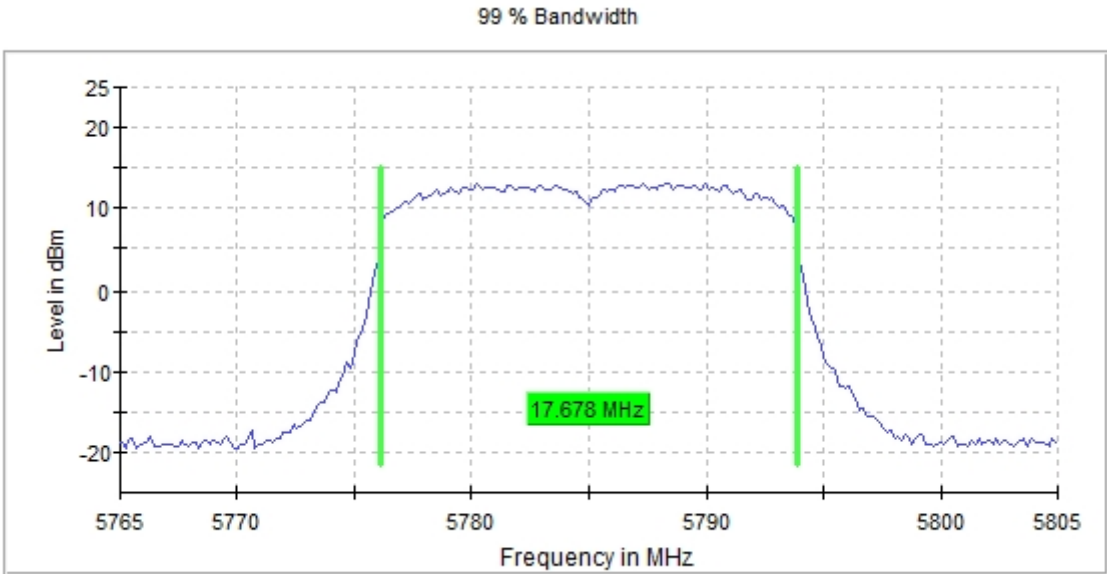
- Low Channel 149 (5745 MHz):



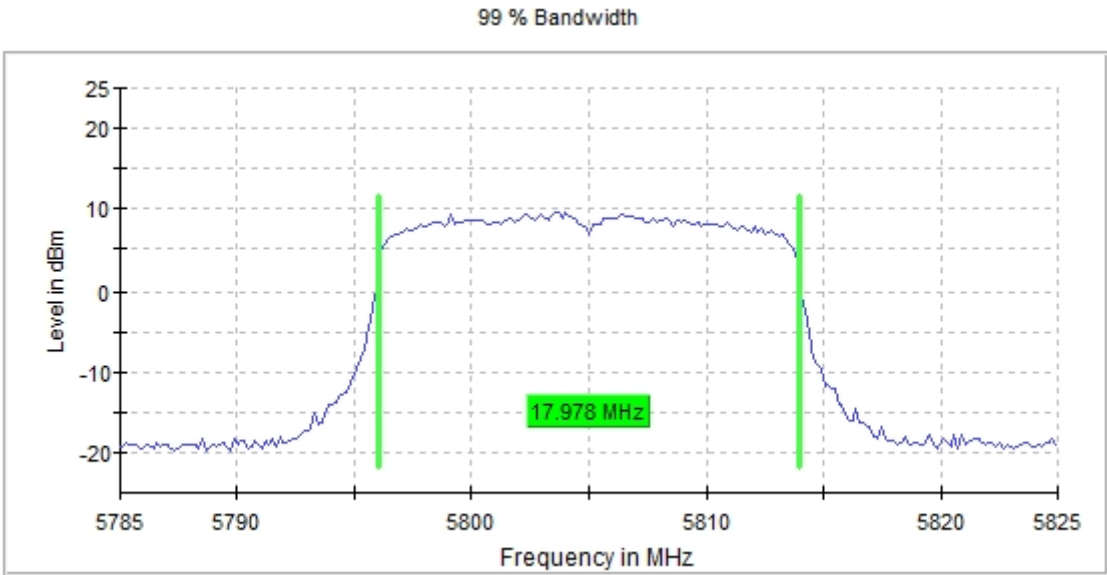
- Channel 153 (5765 MHz):



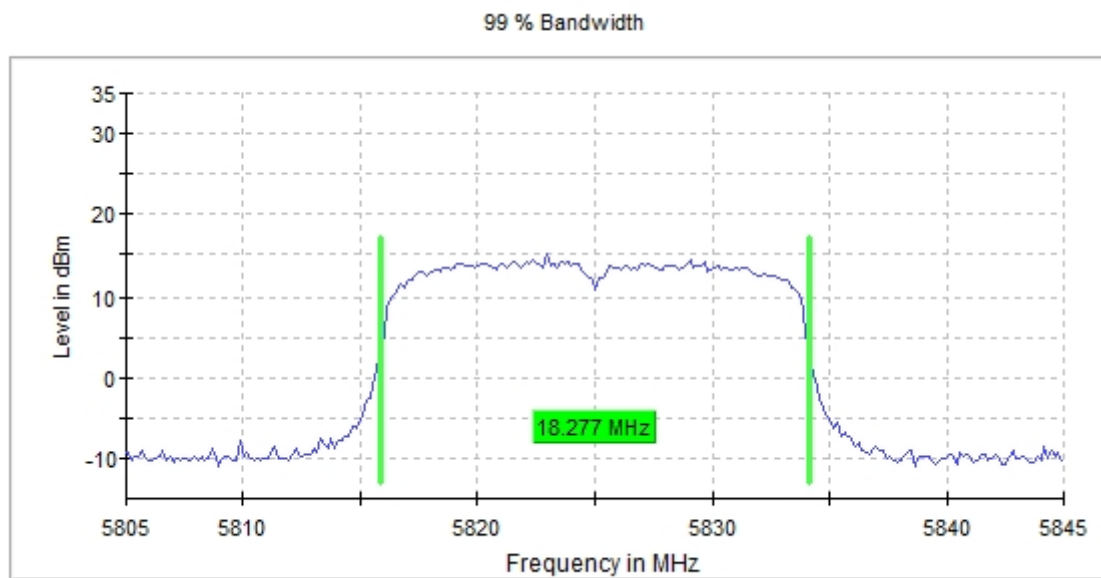
- Middle Channel 157 (5785 MHz):



- Channel 161 (5805 MHz):



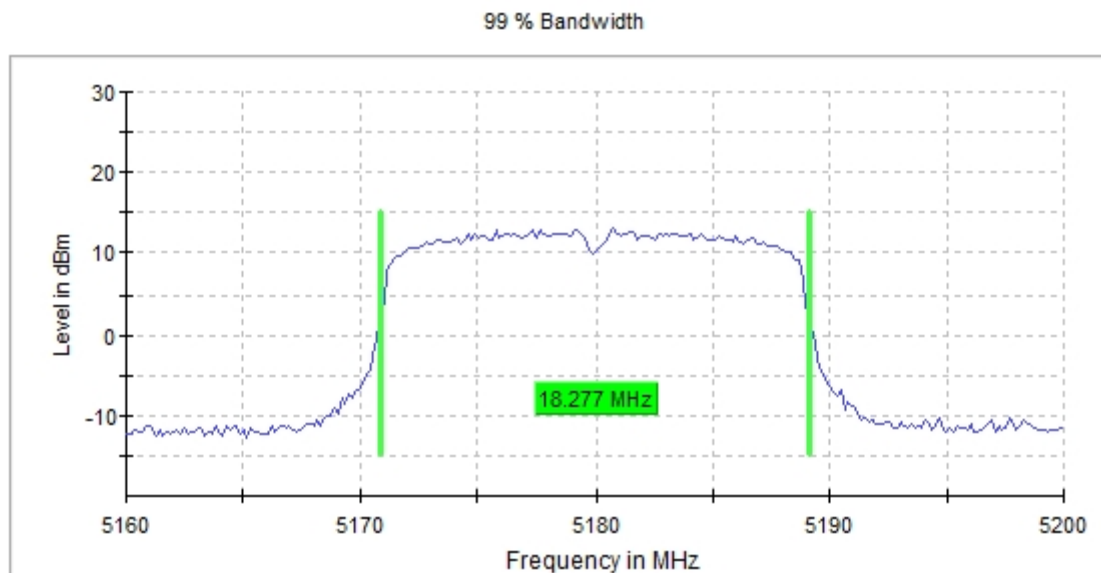
- High Channel 165 (5825 MHz):



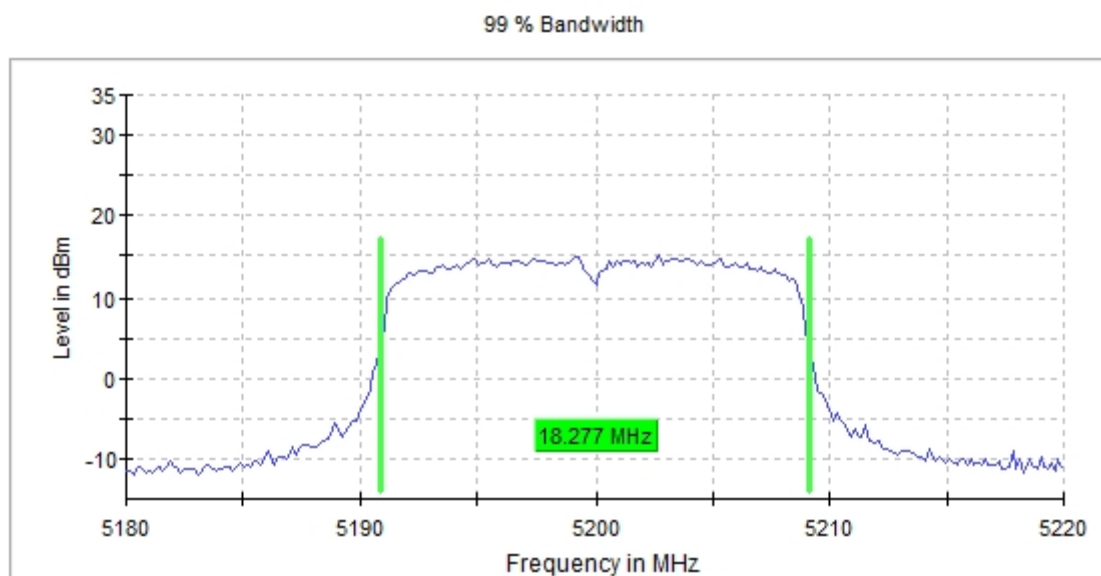
**MIMO 802.11 ac20 (VHT20):**

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

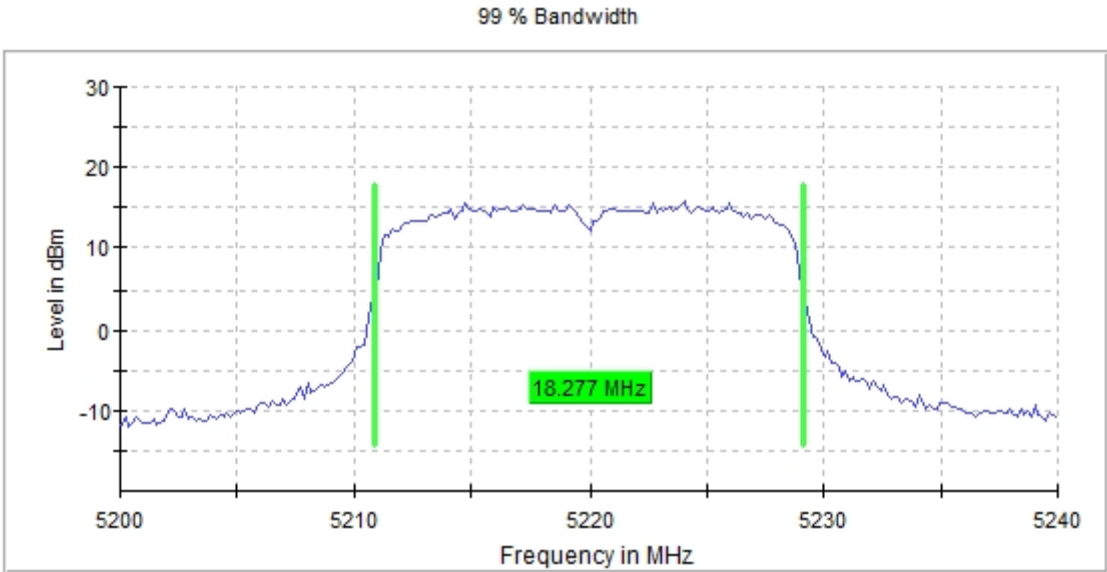
- Low Channel 36 (5180 MHz):



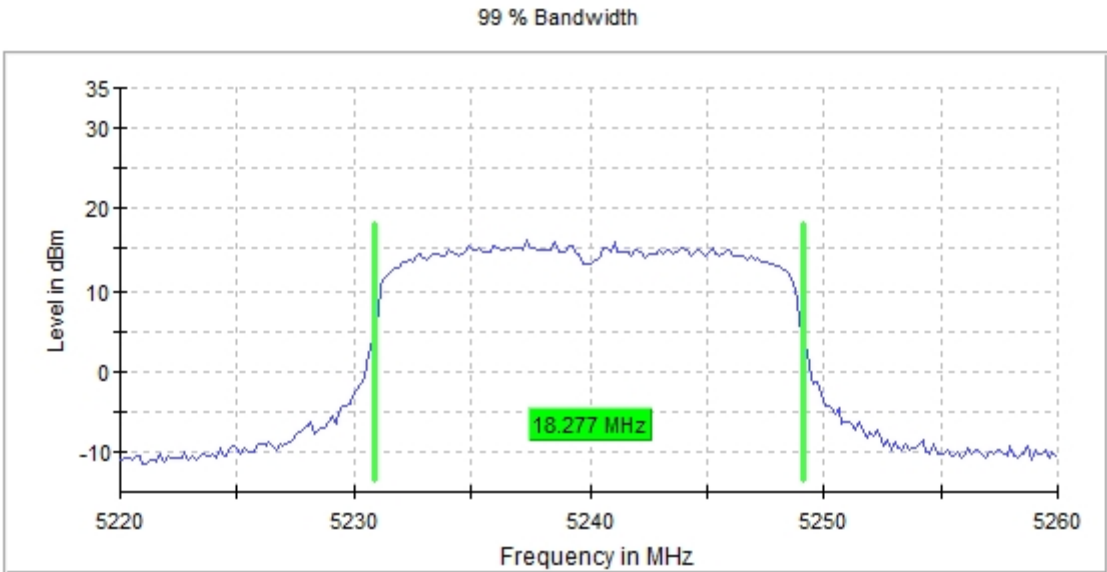
- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):

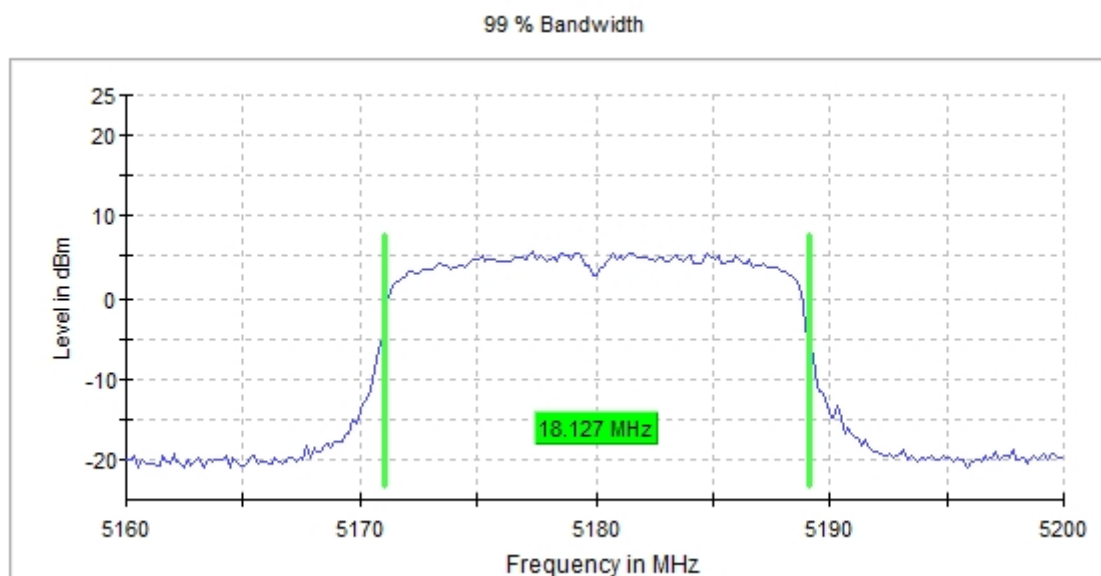


- High Channel 48 (5240 MHz):

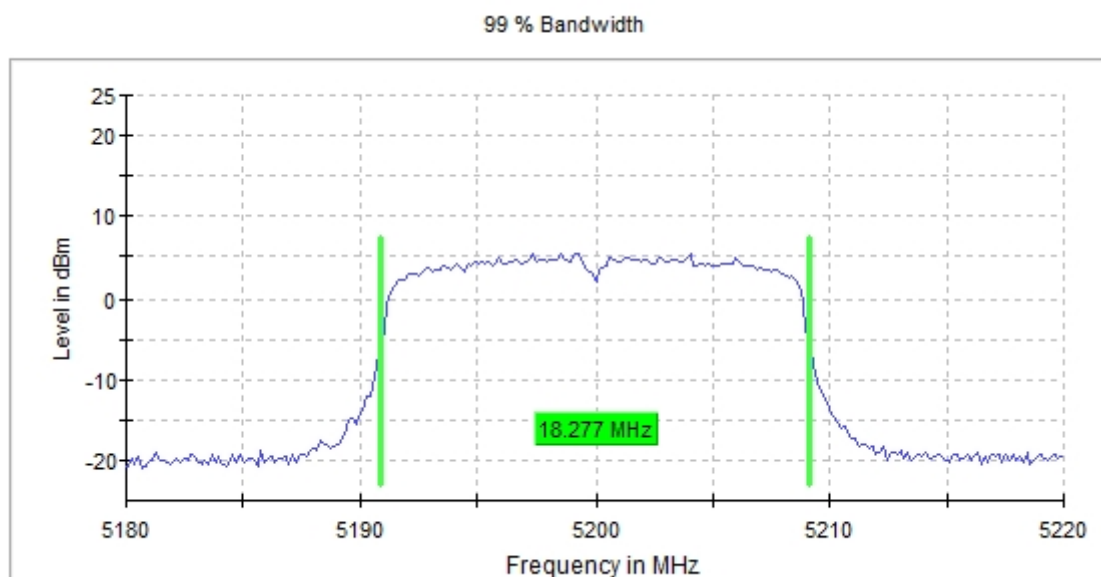


### U-NII-1 RSS (5150-5250 MHz)

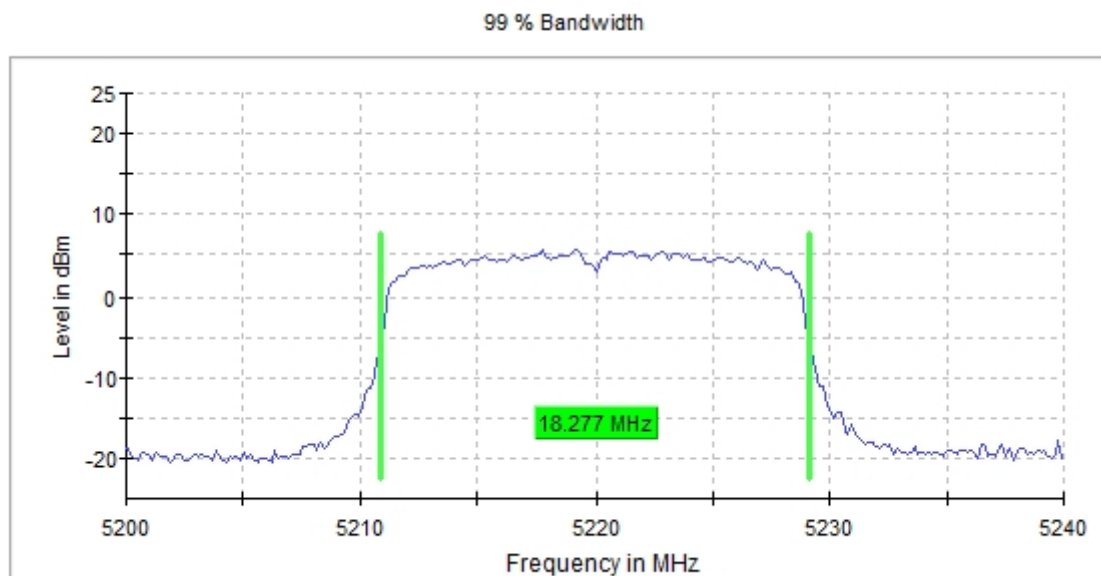
- Low Channel 36 (5180 MHz):



- Middle Channel 40 (5200 MHz):



- Channel 44 (5220 MHz):



- High Channel 48 (5240 MHz):

