# CERTIFICATION TEST REPORT

**Report Number. :** 12935947-E6V3

| | | |
|---|---|---|
| **Applicant** | : | Microsoft Corporation<br>One Microsoft Way<br>Redmond, WA 98052-6399<br>USA |
| **Model** | : | 1872 |
| **FCC ID** | : | C3K1872 |
| **IC ID** | : | 3048A-1872 |
| **EUT Description** | : | Portable Computing Device |
| **Test Standard(s)** | : | FCC 47 CFR PART 15 SUBPART E<br>ISED RSS-247 ISSUE 2<br>ISED RSS-GEN ISSUE 5 |

**Date Of Issue:**
September 11, 2019

**Prepared by:**
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# REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V1 | 8/29/2019 | Initial Review | -- |
| V2 | 9/11/2019 | Section 5.2: Table updated<br>Section 5.4 & 8.4: Antenna Gains Updated<br>Section 5.6: Statements updated & added<br>Section 8.3: 99% bandwidth updated<br>Section 8.4: Output power and PSD updated<br>Section 10: Statement added, Setup photos Removed | Henry Lau |
| V3 | 9/13/2019 | Section 6: Statement updated | Henry Lau |



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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399
USA

**EUT DESCRIPTION:** Portable Computing Device

**MODEL:** 1872

**SERIAL NUMBER:** 006404792757(Conducted)
013880192757(Conducted)
013885392757(Radiated)
014813492757(Radiated)

**DATE TESTED:** July 16, 2019 – August 21, 2019 and September 9 – 11, 2019

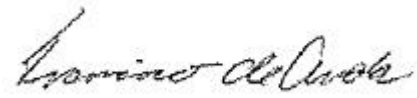
| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart E | Complies |
| ISED RSS-247 Issue 2 | Complies |
| ISED RSS-GEN Issue 5 | Complies |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:



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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 905462 D02 v02/D03 v01r02/D06 v02, FCC KDB 789033 D02 v02r01, ANSI C63.10-2013, FCC 06-96, RSS-GEN Issue 5, and RSS-247 Issue 2.

The scope of this report covers the 802.11ax modes in the 5.2 & 5.3 GHz band of Model 1872.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street | 47266 Benicia Street | 47658 Kato Rd |
|---|---|---|
| ☐ Chamber A | ☐ Chamber D | ☒ Chamber I |
| ☐ Chamber B | ☐ Chamber E | ☐ Chamber J |
| ☐ Chamber C | ☐ Chamber F | ☒ Chamber K |
| | ☐ Chamber G | ☒ Chamber L |
| | ☐ Chamber H | ☐ Chamber M |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.



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# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

**RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

**MAINS CONDUCTED EMISSIONS**

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz | 3.84 dB |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz | 3.65 dB |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz | 2.52 dB |
| Worst Case Radiated Disturbance, 30 to 1000 MHz | 4.88 dB |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz | 4.24 dB |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB |

Uncertainty figures are valid to a confidence level of 95%.


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# 5. EQUIPMENT UNDER TEST

## 5.1. EUT DESCRIPTION

The EUT is a Portable Computing Device.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

**5.2 GHz BAND 802.11 ax MODE**

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|---|---|---|---|
| **5.2 GHz band, 2TX** | | | |
| 5180-5240 | 802.11ax HE20 SU | 16.41 | 43.75 |
| 5180-5240 | 802.11ax HE20 OFDMA, 242-Tones | 16.83 | 48.19 |
| 5190-5230 | 802.11ax HE40 SU | 17.46 | 55.72 |
| 5190-5230 | 802.11ax HE40 OFDMA, 484-Tones | 17.70 | 58.88 |
| 5210 | 802.11ax HE80 SU | 17.30 | 53.70 |
| 5210 | 802.11ax HE80 OFDMA, 242-Tones | 17.61 | 57.68 |
| 5250 | 802.11ax HE160 SU | 16.21 | 41.78 |
| 5250 | 802.11ax HE160 OFDMA, 484-Tones | 17.64 | 58.08 |

**5.3 GHz BAND 802.11 ax MODE**

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|---|---|---|---|
| **5.3 GHz band, 2TX** | | | |
| 5260-5320 | 802.11ax HE20 SU | 20.75 | 118.85 |
| 5260-5320 | 802.11ax HE20 OFDMA, 242-Tones | 20.87 | 122.18 |
| 5270-5310 | 802.11ax HE40 SU | 18.45 | 69.98 |
| 5270-5310 | 802.11ax HE40 OFDMA, 242-Tones | 20.45 | 110.92 |
| 5290 | 802.11ax HE80 SU | 18.61 | 72.61 |
| 5290 | 802.11ax HE80 OFDMA, 242-Tones | 20.26 | 106.17 |

## 5.3. TEST REDUCTIONS CASES

26dB Bandwidth:

- All tones were tested for each bandwidth.
- For HE20 & HE40, each Low, Mid, High RU allocation is tested to their respective Low, Mid and High channel.
- For HE80 & HE160, Low, Mid & High RU allocations were tested.

99% Bandwidth:

- All tones were tested for each bandwidth.
- For HE20 & HE40, each Low, Mid, High RU allocation is tested to their respective Low, Mid and High channel.
- For HE80 & HE160, Low, Mid & High RU allocation were tested.

Output Power and Power Spectral Density

- All tones were tested for each bandwidth.
- For HE20 & HE40, every RU allocation per channel is the same power thus each Low, Mid, High RU allocation is tested to their respective Low, Mid and High channel.
- For HE80 & HE160, Low, Mid & High RU allocations were tested.

Radiated Band Edge:

- All tones and bandwdiths were tested.
- The RU allocations closest to the band edge was tested to cover all other RU's.

Radiated Spurious Emissions:

- 26T and 242T at HE20 was investigated. It was determined that 26T at the highest power setting to be worst case thus 26T will be representative of all RU's at all tones at HE20, HE40, HE80, and HE160.



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## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two dual band PIFA antennas, with a maximum gain as below table:

| Frequency Band (GHz) | Chain 0 | Chain 1 |
|---|---|---|
| | Antenna Gain (dBi) | Antenna Gain (dBi) |
| 5180-5240 | 6 | 3 |
| 5260-5320 | 7.8 | 3.5 |
| 5500-5700 | 8 | 4 |
| 5745-5825 | 8.3 | 4.6 |

## 5.5. SOFTWARE AND FIRMWARE

The operating system installed on the EUT is MTEOS 1.652.0.

The Wifi Driver installed on the EUT is version 99.0.43.8.

The test utility software used during testing was version 11.1916.0-09531

## 5.6. WORST-CASE CONFIGURATION AND MODE

**WORST-CASE CONFIGURATION AND MODE FOR FINAL TEST**

Please refer to UL Report number: 12935947-E4 for worst case Radiated emissions below 30MHz, below 1GHz, above 18GHz, power line conducted emissions data and simultaneous TX data.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

For all modes, tests were performed with the EUT set at the 2Tx MIMO mode with power setting equal to SISO modes as the worst case scenario thus MIMO is representative of SISO.

The EUT has one intended orientations, X; therefore, all final radiated testing was performed with the EUT in X orientation.

Worst-case data rates as provided by the client were:

802.11ax HE20mode: MCS0
802.11ax HE40mode: MCS0
802.11ax HE80mode: MCS0
802.11ax HE160mode: MCS0

EUT does not employ CDD for HT, VHT and HE rates. CDD is supported for legacy modes only.

## 5.7. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| AC DC Adapter | Microsoft | 1706 | 0C130J02T8396 | DoC |
| USB Mouse | Microsoft | 1113 | X821908-002 | DoC |
| USB Type C to Audio Jack | SONY | A1-0231 | N/A | DoC |
| Earphone | SONY | AG1100 | N/A | DoC |
| Earphone | SONY | AG1100 | N/A | DoC |

**I/O CABLES (CONDUCTED TEST)**

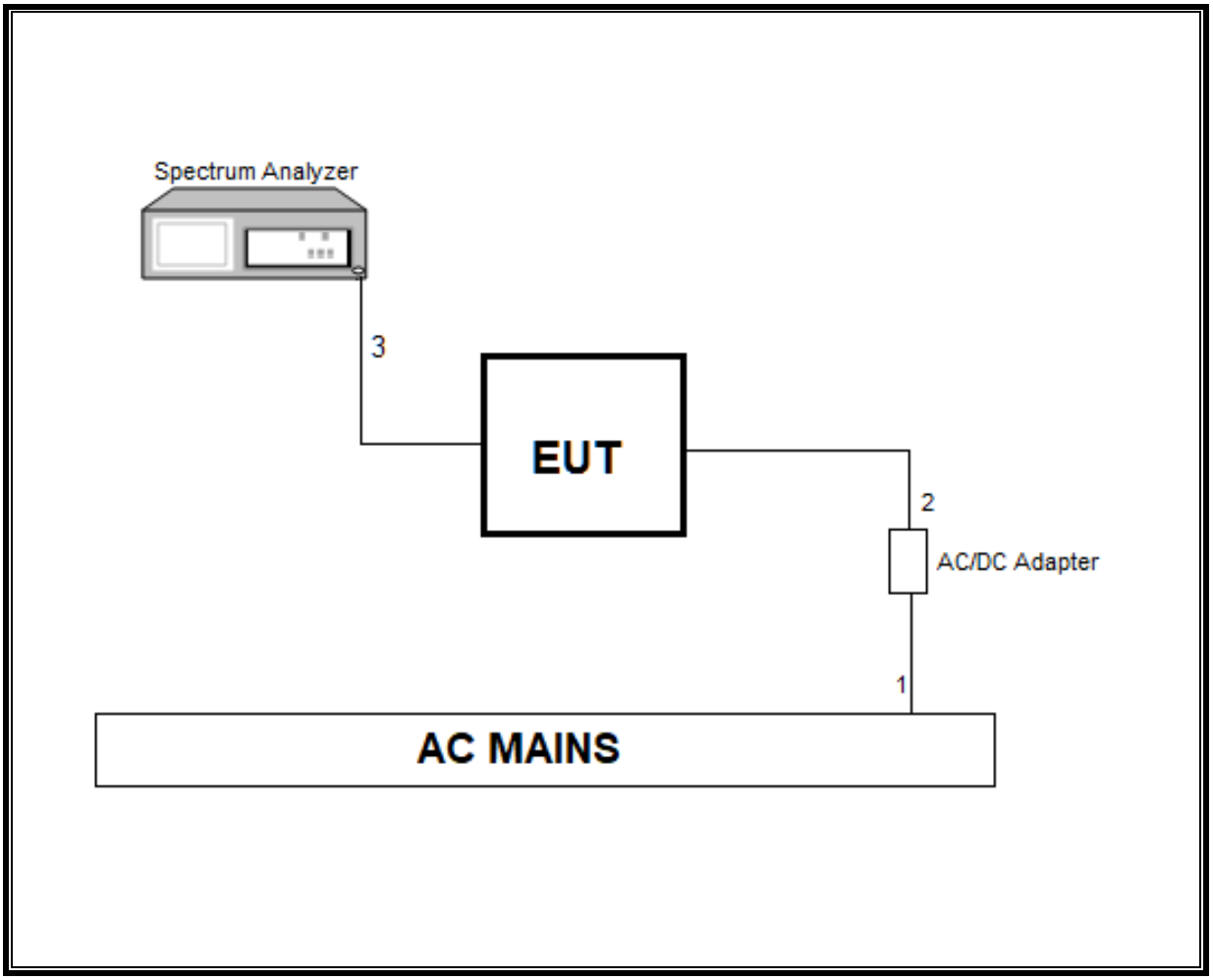
| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | AC | 1 | AC | Un-Shielded | 0.2 | to AC/DC Adaptor |
| 2 | DC | 1 | DC | Shielded | 1 | to Laptop, to EUT |
| 3 | Antenna | 1 | SMA | Un-Shielded | 0.2 | to Analyzer |

**I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | AC | 1 | Type C | Un-shielded | 0.2 | to AC/DC Adapter |
| 2 | DC | 1 | DC | Shielded | 1 | to EUT |
| 3 | USB | 1 | Type A | Shielded | 1.5 | EUT TO Mouse |
| 4 | USB | 1 | Type C | Shielded | 0.1 | EUT to earphone AUX |
| 5 | earphone | 1 | 3.5mm | Un-shielded | 1 | EUT to earphone |

**TEST SETUP**

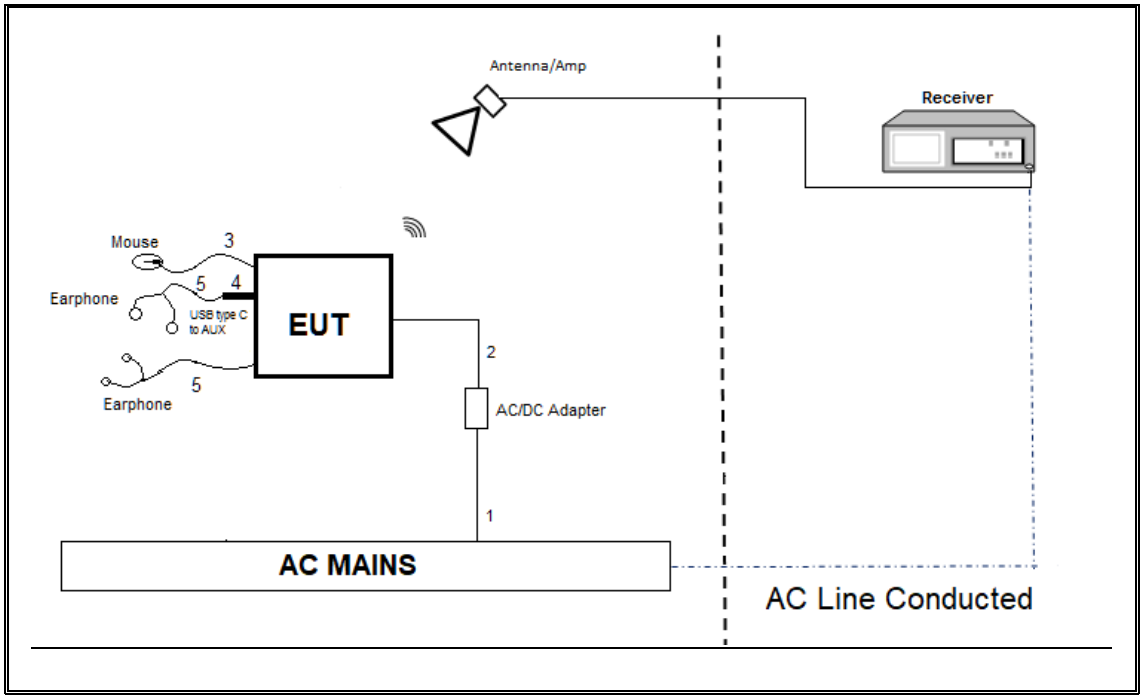
**CONDUCTED TEST SETUP DIAGRAM**




**TEST SETUP**

For conducted tests, the test software exercises the radio.

## RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM




## TEST SETUP

For radiated tests: EUT is connected to all support equipment. The test software exercises the radio.

# 6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

99% Occupied BW: KDB 789033 D02 v02r01, Section D.

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.



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# 7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **ID Num** | **Cal Due** | **Last Cal** |
| Antenna, Passive Loop 30Hz to 1MHz | ELETRO METRICS | EM-6871 | PRE0179465 | 05/31/2020 | 05/31/2019 |
| Antenna, Passive Loop 100kHz to 30MHz | ELETRO METRICS | EM-6872 | PRE0179467 | 05/31/2020 | 05/31/2019 |
| Amplifier, 9KHz to 1GHz, 32dB | Sonoma Instrument | 310 | PRE0186650 | 12/13/2019 | 12/13/2018 |
| Hybrid Antenna, 30MHz to 3GHz | Sunol Sciences Corp | JB3 | PRE0184971 | 11/13/2019 | 11/13/2018 |
| Amplifier, 9kHz to 1GHz, 32 dB | Sonoma Instrument | 310 | PRE0180175 | 06/29/2020 | 06/29/2019 |
| Antenna, Horn 1-18GHz | ETS-Lindgren | 3117 | T120 | 07/10/2020 | 07/10/2019 |
| Amplifier, 1 to18GHz | MITEQ | AFS42-00101800-25-S-42 | T1568 | 06/18/2020 | 06/18/2019 |
| Antenna, Horn 1-18GHz | ETS-Lindgren | 3117 | T862 | 06/05/2020 | 06/05/2019 |
| Amplifier, 1 to18GHz | MITEQ | AFS42-00101800-25-S-42 | PRE018078 | 08/01/2019 | 08/01/2018 |
| Antenna, Horn 18 to 26.5GHz | ARA | MWH-1826/B | PRE0182188 | 08/29/2019 | 08/29/2018 |
| Rf Amplifier, 18-26.5GHz, 60dB gain | Amplical | AMP18G26.5-60 | PRE0181238 | 05/01/2020 | 05/01/2019 |
| Antenna, Horn 26 to 40GHz | ARA | MWH-2640 | T90 | 09/11/2019 | 09/11/2018 |
| Pre-Amp, 26-40GHz | Amplical | AMP26G40-60 | PRE0181238 | 05/01/2020 | 05/01/2019 |
| Power Meter, P-series single channel | Agilent (Keysight) Technologies | N1911A | T1265 | 01/29/2020 | 01/29/2019 |
| Power Sensor, P-series, 50MHz to 18GHz, Wideband | Agilent (Keysight) Technologies | N1921A | T1227 | 02/05/2020 | 02/05/2019 |
| EMI Test Receiver | Rohde & Schwarz | ESW44 | PRE0179367 | 05/16/2020 | 05/16/2019 |
| EMI Test Receiver | Rohde & Schwarz | ESW44 | PRE0179372 | 02/16/2020 | 02/16/2019 |
| EMI Test Receiver | Rohde & Schwarz | ESW44 | PRE0179367 | 05/16/2020 | 05/16/2019 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Agilent (Keysight) Technologies | N9030A | T917 | 01/24/2020 | 01/24/2019 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Agilent (Keysight) Technologies | N9030A | T908 | 01/23/2020 | 01/23/2019 |
| **AC Line Conducted** | | | | | |
| EMI Receiver | Rohde & Schwarz | ESR | T1436 | 02/14/2020 | 02/14/2019 |
| LISN for Conducted Emissions CISPR-16 | FCC INC. | FCC LISN 50/250 | T1310 | 01/24/2020 | 01/24/2019 |
| **Test Software List** | | | | | |
| Radiated Software | UL | UL EMC | | Ver 9.5, June 22, 2018 & Jan 11, 2019 | |
| Antenna Port Software | UL | UL RF | | Ver 9.7, May 7, 2019 | |
| AC Line Conducted Software | UL | UL EMC | | Ver 9.5, May 26, 2015 | |

**NOTES**:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.



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# 8. ANTENNA PORT TEST RESULTS FOR 11ax 5.2 & 5.3 GHz Band

## 8.1. ON TIME AND DUTY CYCLE

**LIMITS**

None; for reporting purposes only.

**PROCEDURE**

KDB 558074 D01 Zero-Span Spectrum Analyzer Method.

## ON TIME AND DUTY CYCLE RESULTS

### 802.11ax HE20

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---|---|---|---|---|---|---|
| 802.11ax HE20 OFDMA, SU | 3.963 | 4.008 | 0.989 | 98.88% | 0.00 | 0.010 |
| 802.11ax HE20 OFDMA, RU size 242T | 3.973 | 4.018 | 0.989 | 98.88% | 0.00 | 0.010 |
| 802.11ax HE20 OFDMA, RU size 106T | 3.983 | 4.028 | 0.989 | 98.88% | 0.00 | 0.010 |
| 802.11ax HE20 OFDMA, RU size 52T | 3.980 | 4.030 | 0.988 | 98.76% | 0.00 | 0.010 |
| 802.11ax HE20 OFDMA, RU size 26T | 3.979 | 4.029 | 0.988 | 98.76% | 0.00 | 0.010 |

### 802.11ax HE40

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---|---|---|---|---|---|---|
| 802.11ax HE40 OFDMA, SU | 3.966 | 4.020 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE40 OFDMA, RU size 484T | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE40 OFDMA, RU size 242T | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE40 OFDMA, RU size 106T | 3.976 | 4.020 | 0.989 | 98.91% | 0.00 | 0.010 |
| 802.11ax HE40 OFDMA, RU size 52T | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE40 OFDMA, RU size 26T | 3.976 | 4.020 | 0.989 | 98.91% | 0.00 | 0.010 |


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**802.11ax HE80**

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---|---|---|---|---|---|---|
| 802.11ax HE80 OFDMA, SU | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE80 OFDMA, RU size 996T | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE80 OFDMA, RU size 484T | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE80 OFDMA, RU size 242T | 3.966 | 4.020 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE80 OFDMA, RU size 106T | 3.976 | 4.030 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE80 OFDMA, RU size 52T | 3.966 | 4.020 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE80 OFDMA, RU size 26T | 3.966 | 4.020 | 0.987 | 98.66% | 0.00 | 0.010 |

**802.11ax HE160**

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---|---|---|---|---|---|---|
| 802.11ax HE160 OFDMA, SU | 2.279 | 2.324 | 0.981 | 98.06% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 2x996T | 3.985 | 4.029 | 0.989 | 98.91% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 996T | 3.975 | 4.020 | 0.989 | 98.88% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 484T | 3.985 | 4.029 | 0.989 | 98.91% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 242T | 3.975 | 4.029 | 0.987 | 98.66% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 106T | 3.975 | 4.020 | 0.989 | 98.88% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 52T | 3.975 | 4.020 | 0.989 | 98.88% | 0.00 | 0.010 |
| 802.11ax HE160 OFDMA, RU size 26T | 3.975 | 4.029 | 0.987 | 98.66% | 0.00 | 0.010 |

## DUTY CYCLE PLOTS


802.11ax HE20 OFDMA, SU MODE


802.11ax HE20 OFDMA, RU size 242T MODE


802.11ax HE20 OFDMA, RU size 106T MODE


802.11ax HE20 OFDMA, RU size 52T MODE


802.11ax HE20 OFDMA, RU size 26T MODE

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802.11ax HE40 OFDMA, SU MODE


802.11ax HE40 OFDMA, RU size 484T MODE


802.11ax HE40 OFDMA, RU size 242T MODE


802.11ax HE40 OFDMA, RU size 106T MODE


802.11ax HE40 OFDMA, RU size 52T MODE


802.11ax HE40 OFDMA, RU size 26T MODE


802.11ax HE80 OFDMA, SU MODE


802.11ax HE80 OFDMA, RU size 996T MODE


802.11ax HE80 OFDMA, RU size 484T MODE


802.11ax HE80 OFDMA, RU size 242T MODE


802.11ax HE80 OFDMA, RU size 106T MODE


802.11ax HE80 OFDMA, RU size 52T MODE


802.11ax HE80 OFDMA, RU size 26T MODE

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802.11ax HE160 OFDMA, SU MODE


802.11ax HE160 OFDMA, RU size 2x996T MODE


802.11ax HE160 OFDMA, RU size 996T MODE


802.11ax HE160 OFDMA, RU size 484T MODE


802.11ax HE160 OFDMA, RU size 242T MODE


802.11ax HE160 OFDMA, RU size 106T MODE


802.11ax HE160 OFDMA, RU size 52T MODE


802.11ax HE160 OFDMA, RU size 26T MODE

## 8.2. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

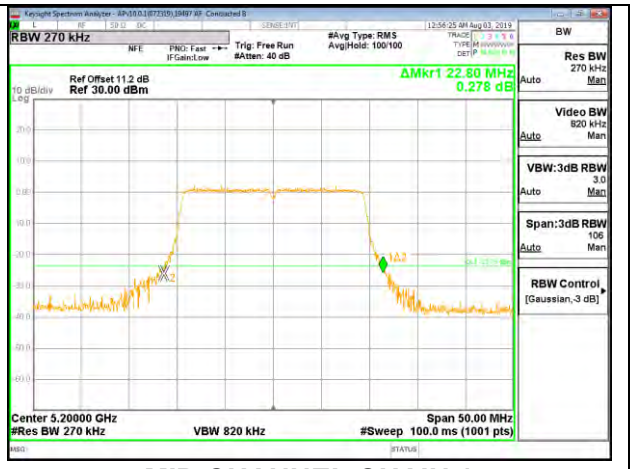
## 8.2.1. 802.11ax HE20 MODE IN THE 5.2 GHz BAND

**2TX Chain 0 + Chain 1 OFDMA MODE**

| RU Size (Tones) | RU Index | Channel | Frequency (MHz) | 26 dB Bandwidth Chain 0 (MHz) | 26 dB Bandwidth Chain 1 (MHz) |
|---|---|---|---|---|---|
| 242T | 61 | Low | 5180 | 22.95 | 24.50 |
| | | Mid | 5200 | 22.75 | 22.80 |
| | | High | 5240 | 23.00 | 22.65 |
| 106T | 53 | Low | 5180 | 22.10 | 22.00 |
| | | Mid | 5200 | 20.80 | 20.85 |
| | 54 | High | 5240 | 21.55 | 21.60 |
| 52T | 37 | Low | 5180 | 21.40 | 21.40 |
| | 38 | Mid | 5200 | 18.50 | 18.65 |
| | 40 | High | 5240 | 21.00 | 20.40 |
| 26T | 0 | Low | 5180 | 20.60 | 20.15 |
| | 4 | Mid | 5200 | 18.30 | 18.25 |
| | 8 | High | 5240 | 20.60 | 20.20 |

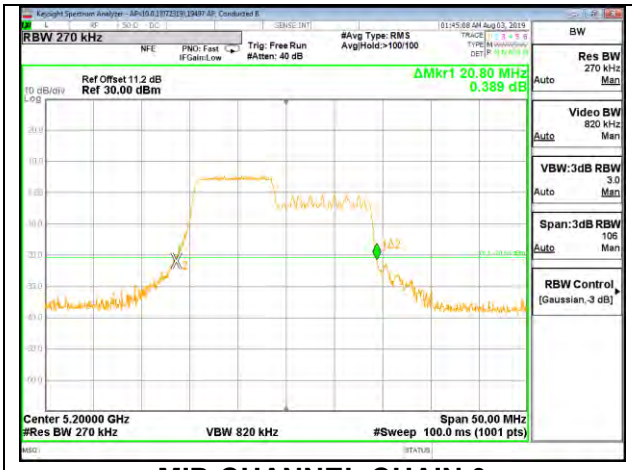
## 242-Tones, RU Index 61


MID CHANNEL CHAIN 0

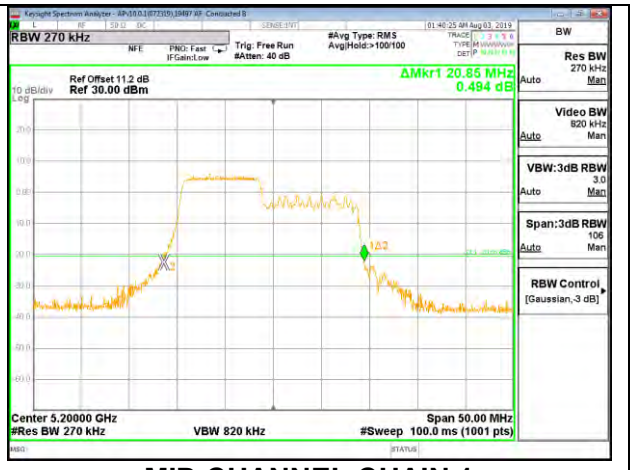



MID CHANNEL CHAIN 1

## 106-Tones, RU Index 53

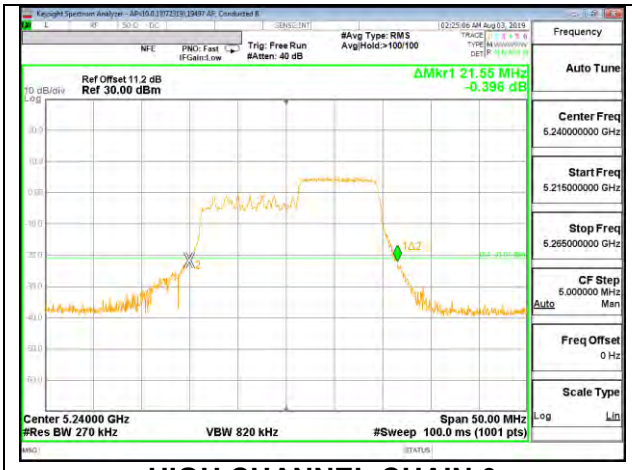



MID CHANNEL CHAIN 0

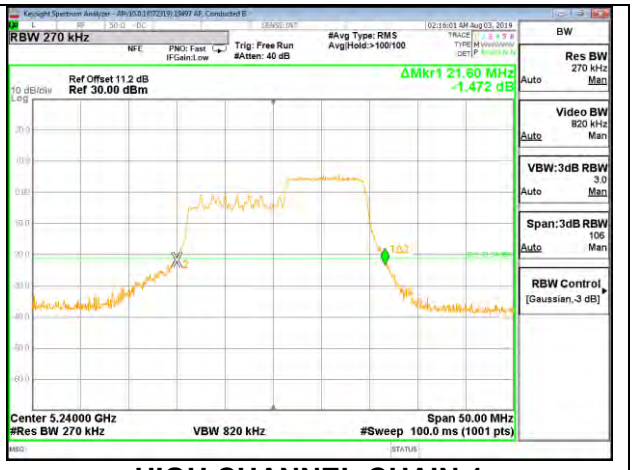



MID CHANNEL CHAIN 1

## 106-Tones, RU Index 54

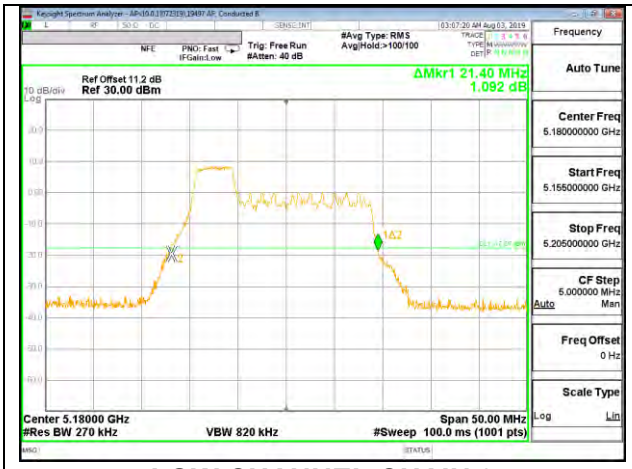



HIGH CHANNEL CHAIN 0

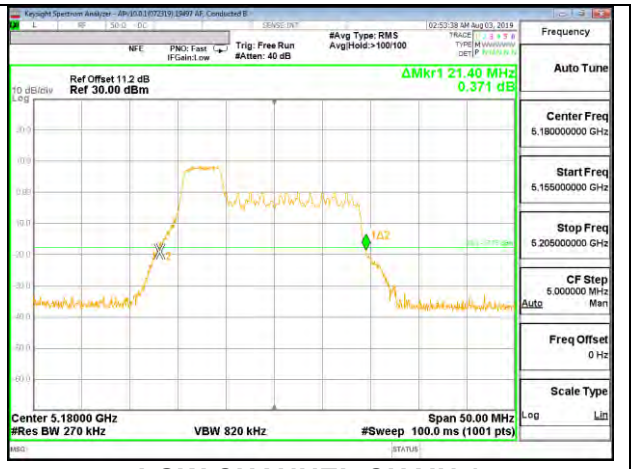



HIGH CHANNEL CHAIN 1

## 52-Tones, RU Index 37

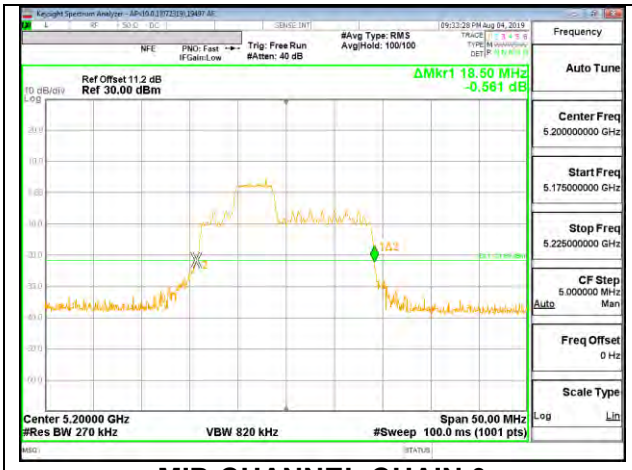



**LOW CHANNEL CHAIN 0**

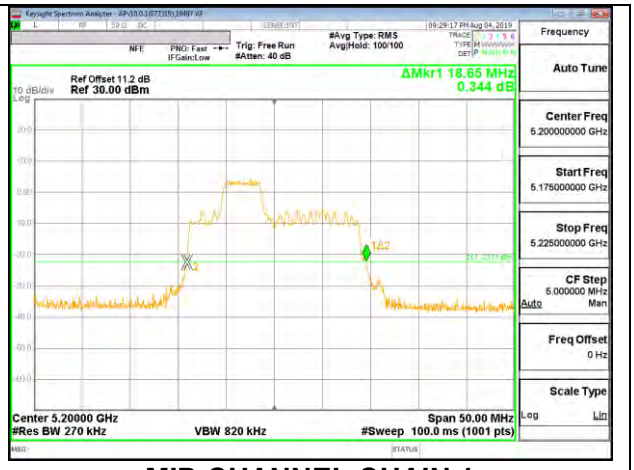



**LOW CHANNEL CHAIN 1**

## 52-Tones, RU Index 38

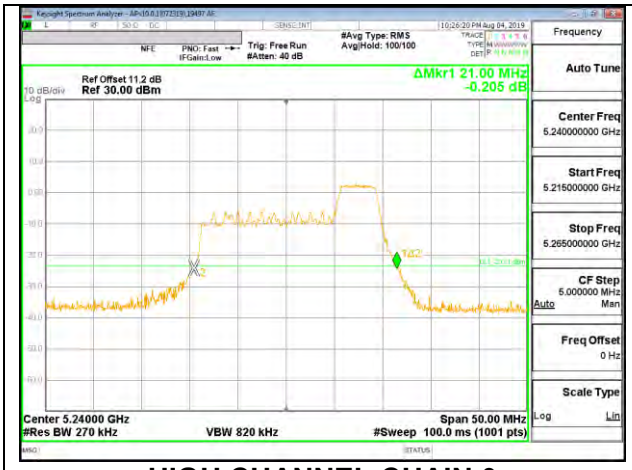



**MID CHANNEL CHAIN 0**

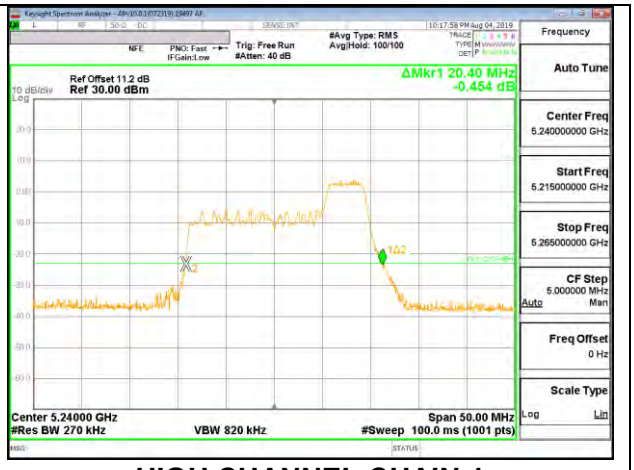



**MID CHANNEL CHAIN 1**

## 52-Tones, RU Index 40

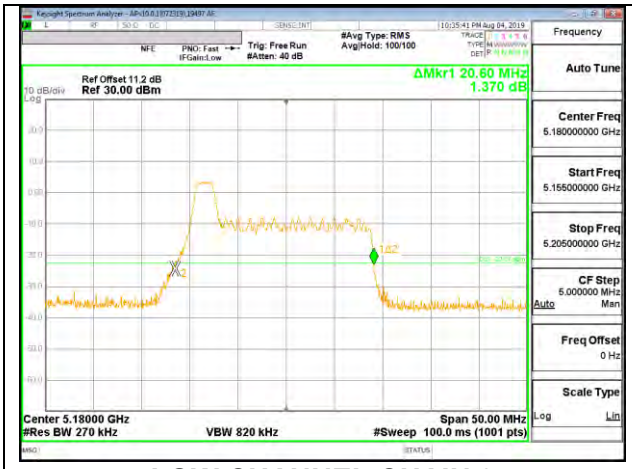



**HIGH CHANNEL CHAIN 0**

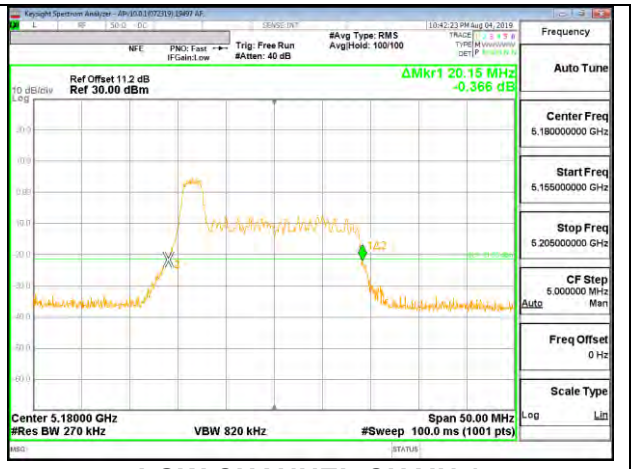



**HIGH CHANNEL CHAIN 1**

## 26-Tones, RU Index 0

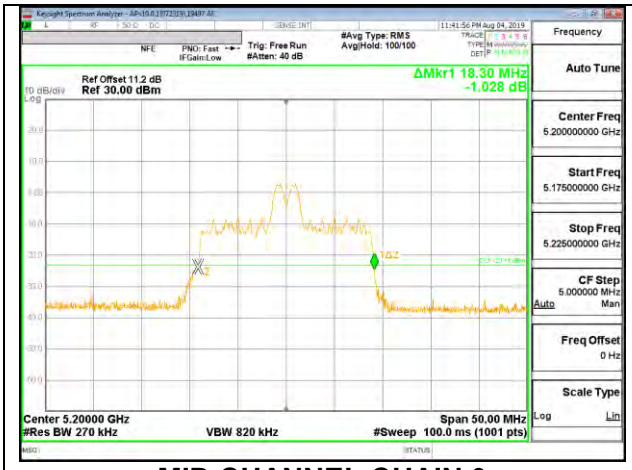



**LOW CHANNEL CHAIN 0**




**LOW CHANNEL CHAIN 1**

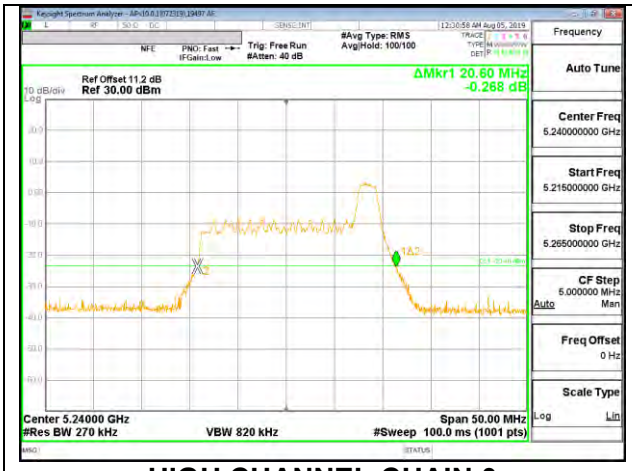
## 26-Tones, RU Index 4



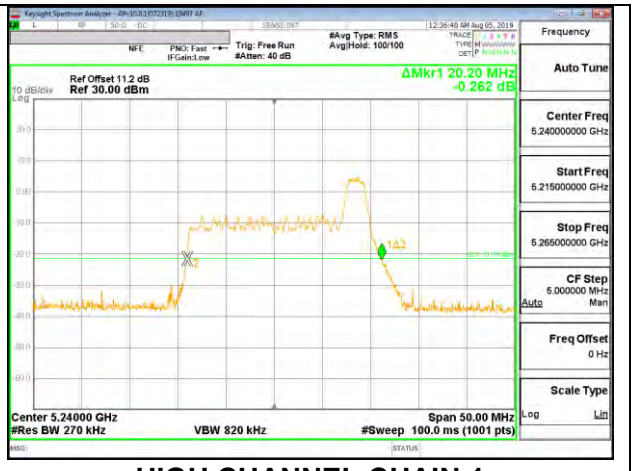

**MID CHANNEL CHAIN 0**


**MID CHANNEL CHAIN 1**

## 26-Tones, RU Index 8




**HIGH CHANNEL CHAIN 0**



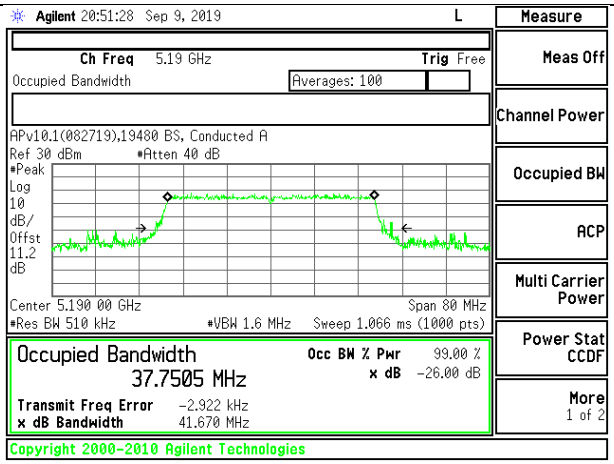

**HIGH CHANNEL CHAIN 1**

## 8.2.2. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

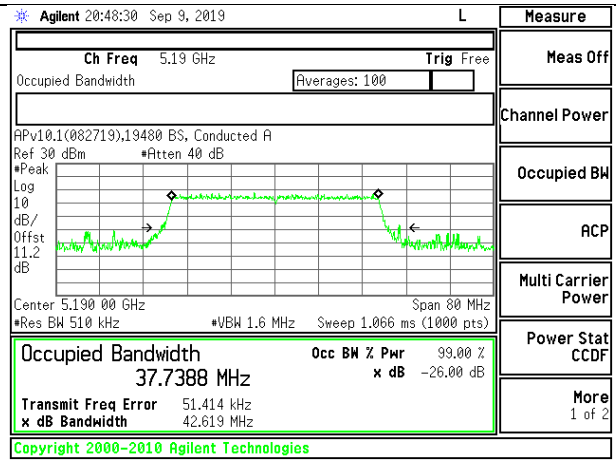
**2TX Chain 0 + Chain 1 OFDMA MODE**

| RU Size (Tones) | RU Index | Channel | Frequency (MHz) | 26 dB Bandwidth Chain 0 (MHz) | 26 dB Bandwidth Chain 1 (MHz) |
|---|---|---|---|---|---|
| 484T | 65 | Low | 5190 | 46.80 | 46.40 |
| | | High | 5230 | 46.50 | 46.00 |
| 242T | 61 | Low | 5190 | 23.30 | 23.20 |
| | 62 | High | 5230 | 22.60 | 22.90 |
| 106T | 53 | Low | 5190 | 22.90 | 22.90 |
| | 54 | Low | 5190 | 22.50 | 22.80 |
| | 56 | High | 5230 | 22.00 | 22.10 |
| 52T | 37 | Low | 5190 | 21.90 | 21.70 |
| | 40 | Low | 5190 | 21.90 | 21.80 |
| | 44 | High | 5230 | 21.40 | 21.50 |
| 26T | 0 | Low | 5190 | 20.30 | 20.00 |
| | 8 | Low | 5190 | 21.50 | 21.60 |
| | 17 | High | 5230 | 20.90 | 21.40 |

## 484-Tones, RU Index 65

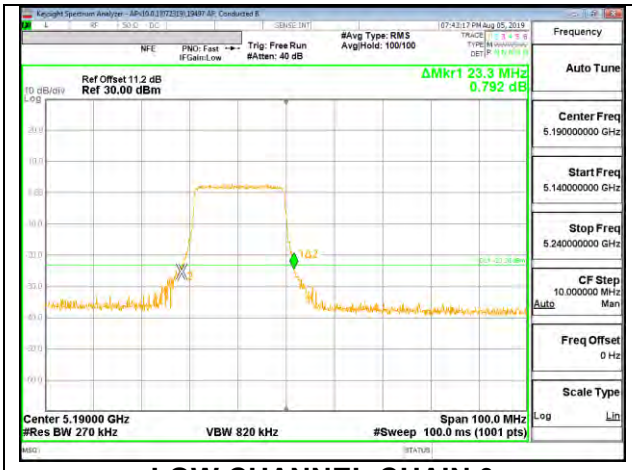



LOW CHANNEL CHAIN 0

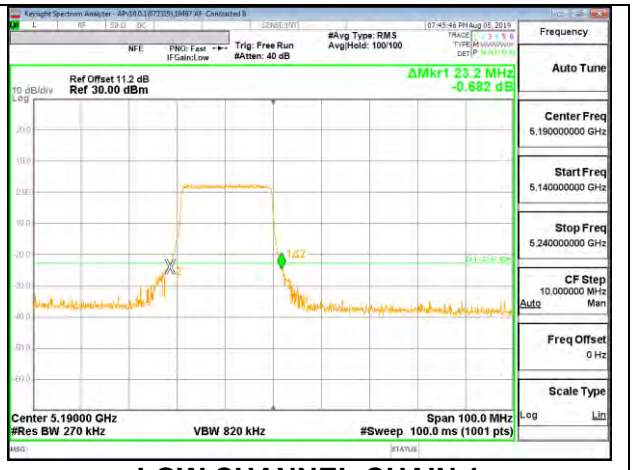



LOW CHANNEL CHAIN 1

## 242-Tones, RU Index 61

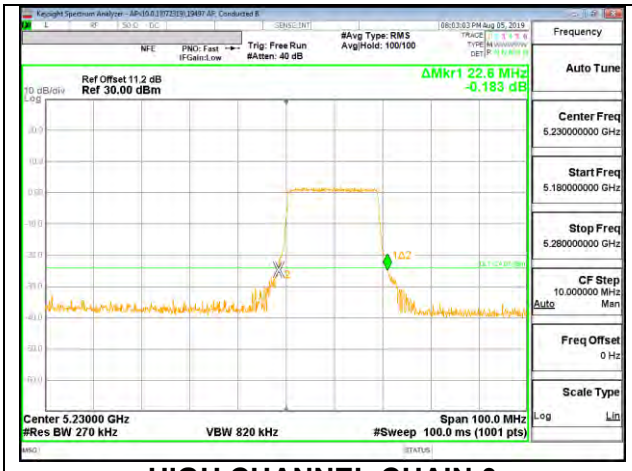



LOW CHANNEL CHAIN 0

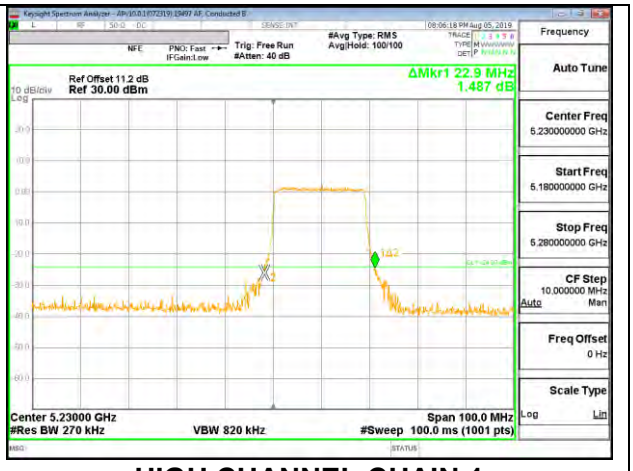



LOW CHANNEL CHAIN 1

## 242-Tones, RU Index 62

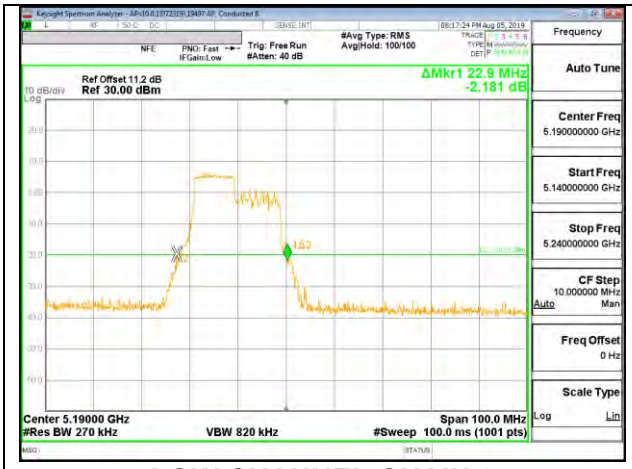



HIGH CHANNEL CHAIN 0

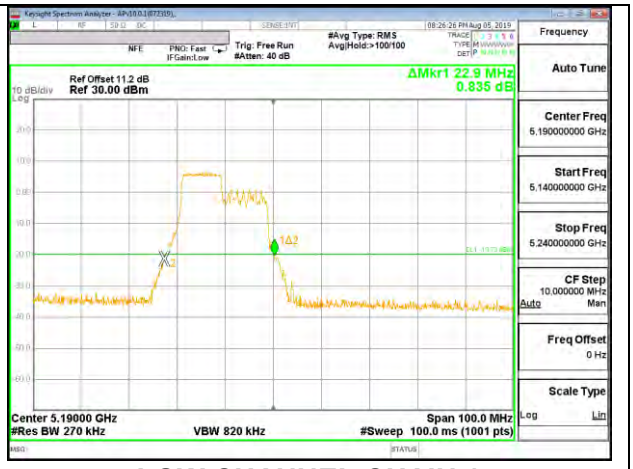



HIGH CHANNEL CHAIN 1

## 106-Tones, RU Index 53

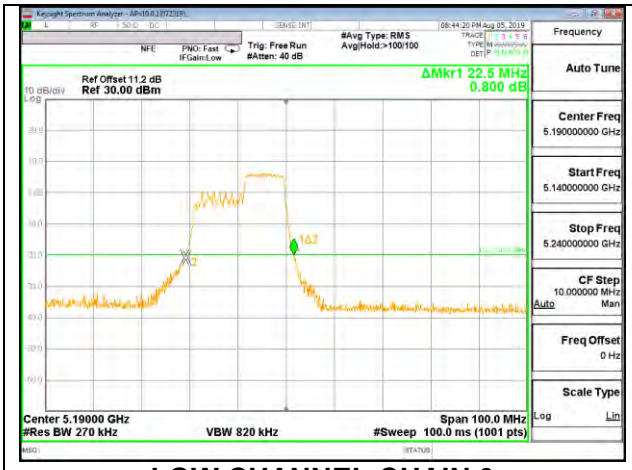



LOW CHANNEL CHAIN 0




LOW CHANNEL CHAIN 1

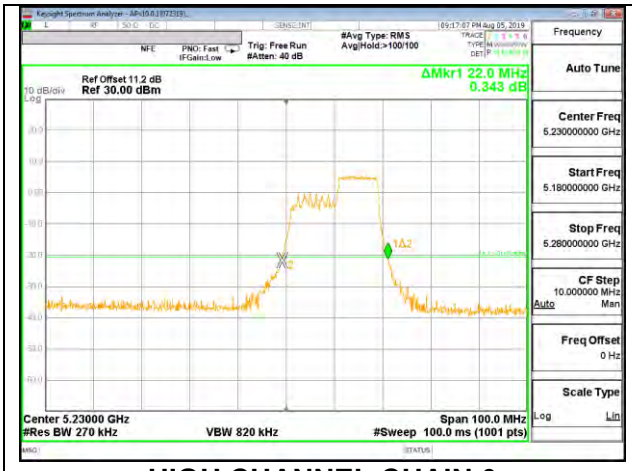
## 106-Tones, RU Index 54



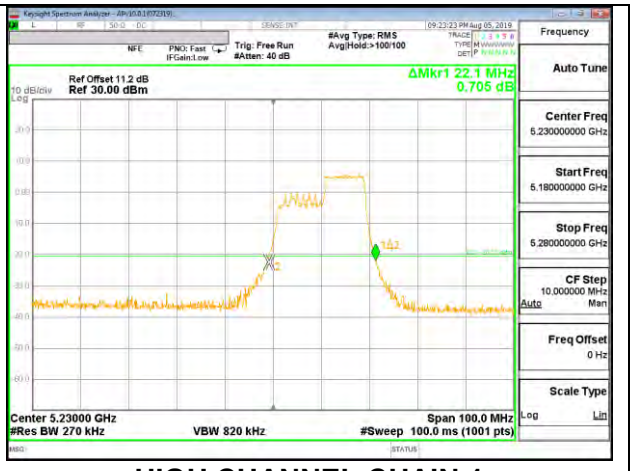

LOW CHANNEL CHAIN 0


LOW CHANNEL CHAIN 1

## 106-Tones, RU Index 56

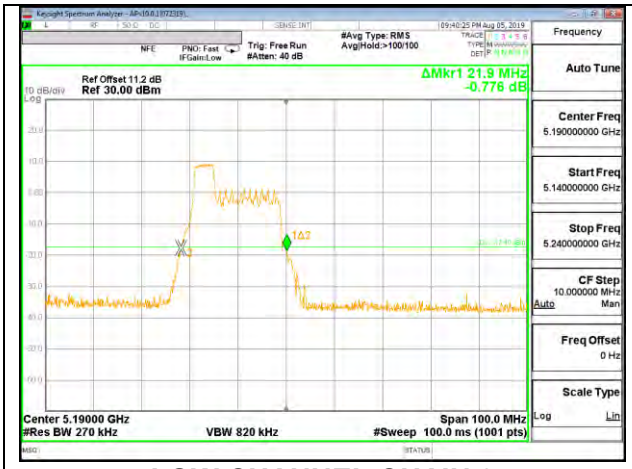



HIGH CHANNEL CHAIN 0

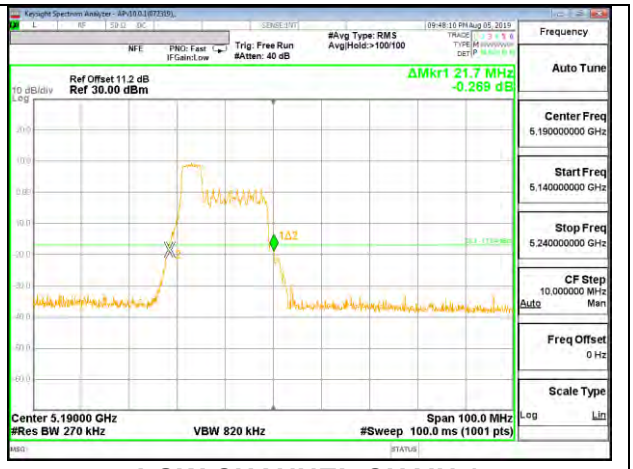



HIGH CHANNEL CHAIN 1

## 52-Tones, RU Index 37

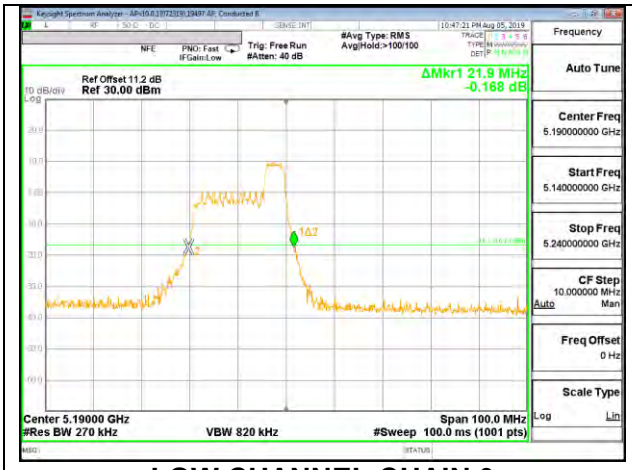



LOW CHANNEL CHAIN 0

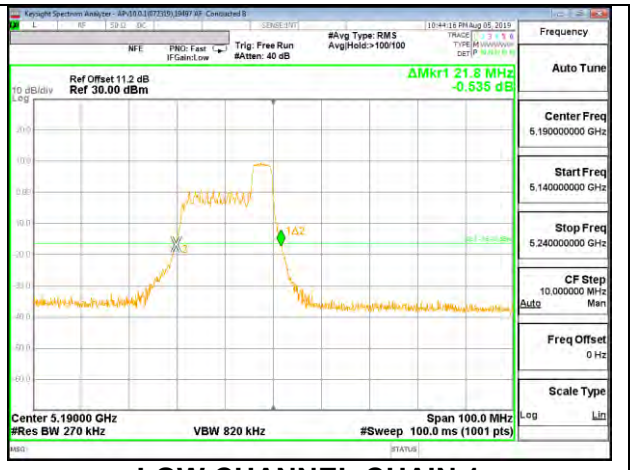



LOW CHANNEL CHAIN 1

## 52-Tones, RU Index 40

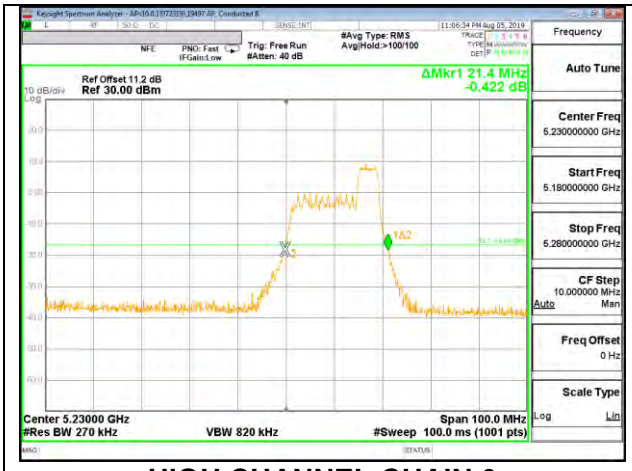



LOW CHANNEL CHAIN 0

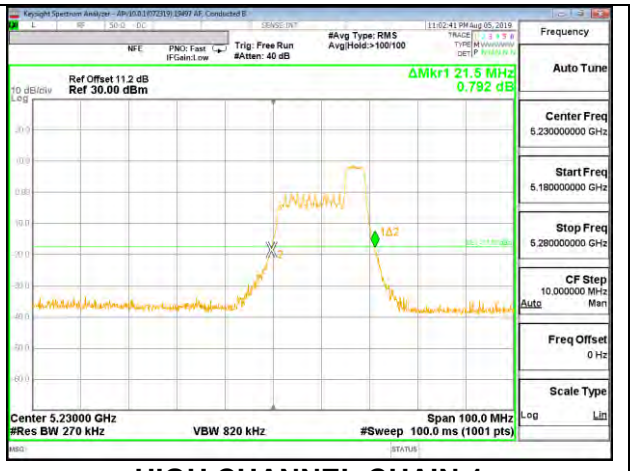



LOW CHANNEL CHAIN 1

## 52-Tones, RU Index 44

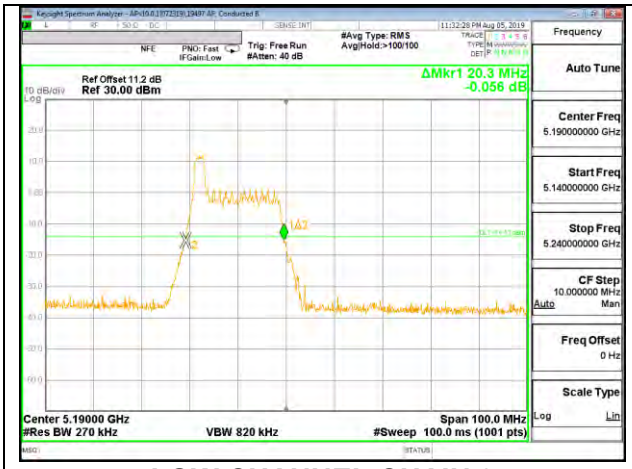



HIGH CHANNEL CHAIN 0

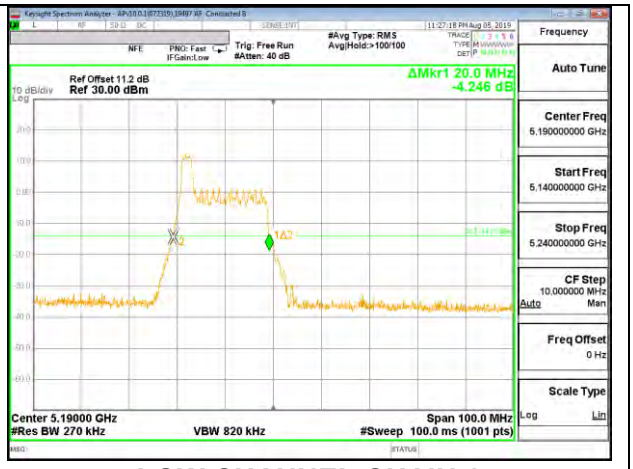



HIGH CHANNEL CHAIN 1

## 26-Tones, RU Index 0

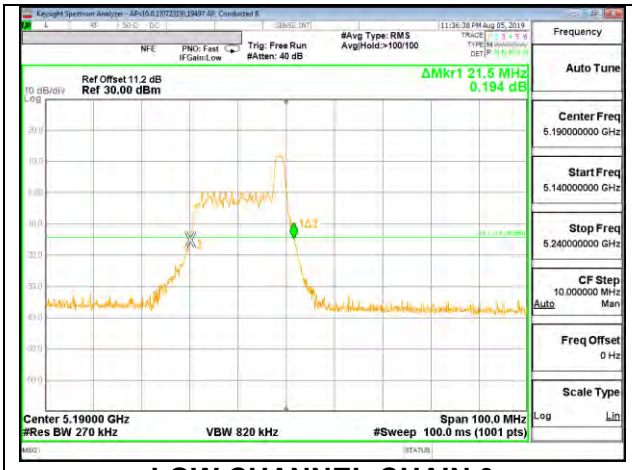



LOW CHANNEL CHAIN 0

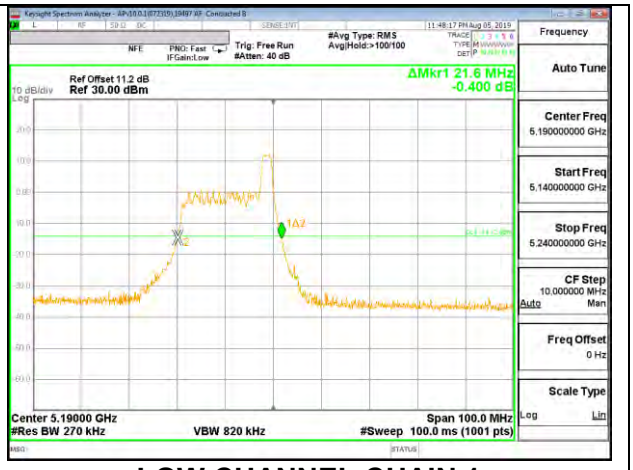



LOW CHANNEL CHAIN 1

## 26-Tones, RU Index 8

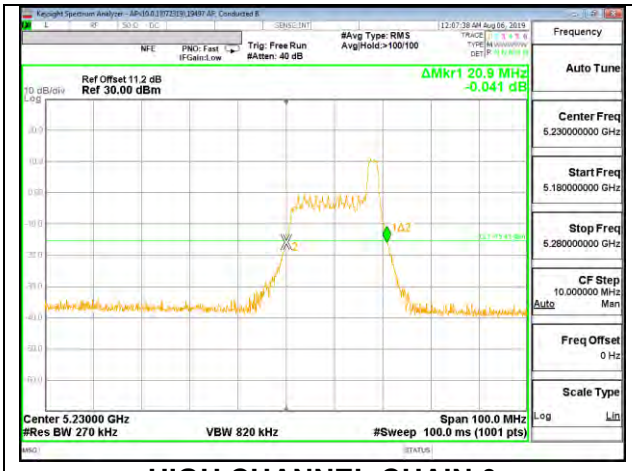



LOW CHANNEL CHAIN 0

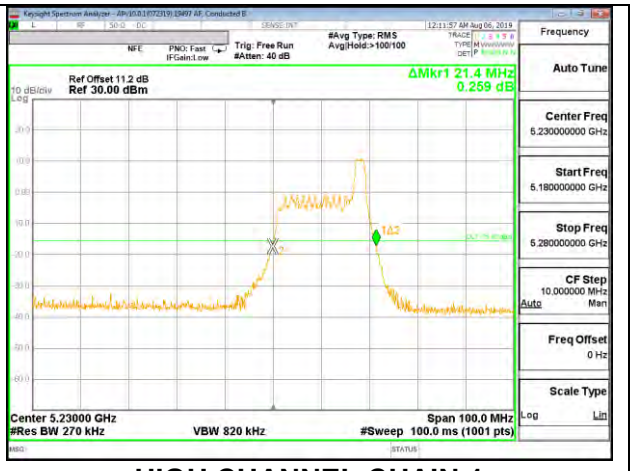



LOW CHANNEL CHAIN 1

## 26-Tones, RU Index 17




HIGH CHANNEL CHAIN 0



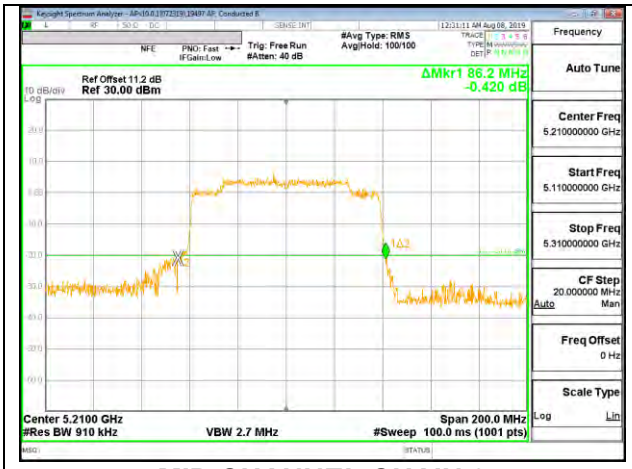

HIGH CHANNEL CHAIN 1

## 8.2.3. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

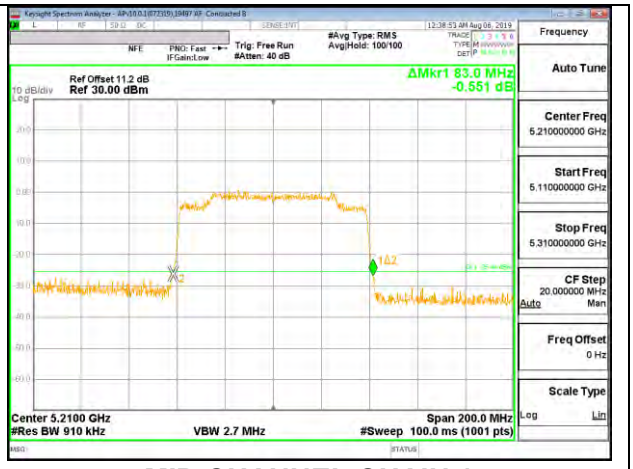
**2TX Chain 0 + Chain 1 OFDMA MODE**

| RU Size (Tones) | RU Index | Channel | Frequency (MHz) | 26 dB Bandwidth Chain 0 (MHz) | 26 dB Bandwidth Chain 1 (MHz) |
|---|---|---|---|---|---|
| 996T | 67 | Mid | 5210 | 86.20 | 83.00 |
| 484T | 65 | Mid | 5210 | 43.40 | 43.00 |
| | 66 | Mid | 5210 | 43.00 | 42.60 |
| 242T | 61 | Mid | 5210 | 22.80 | 22.80 |
| | 62 | Mid | 5210 | 41.80 | 41.80 |
| | 64 | Mid | 5210 | 22.80 | 22.60 |
| 106T | 53 | Mid | 5210 | 23.20 | 23.60 |
| | 56 | Mid | 5210 | 21.40 | 21.40 |
| | 60 | Mid | 5210 | 21.80 | 21.60 |
| 52T | 37 | Mid | 5210 | 21.80 | 22.20 |
| | 44 | Mid | 5210 | 20.80 | 21.00 |
| | 52 | Mid | 5210 | 21.40 | 21.40 |
| 26T | 0 | Mid | 5210 | 21.20 | 21.00 |
| | 18 | Mid | 5210 | 39.00 | 39.20 |
| | 36 | Mid | 5210 | 20.80 | 20.80 |

## 996-Tones, RU Index 67

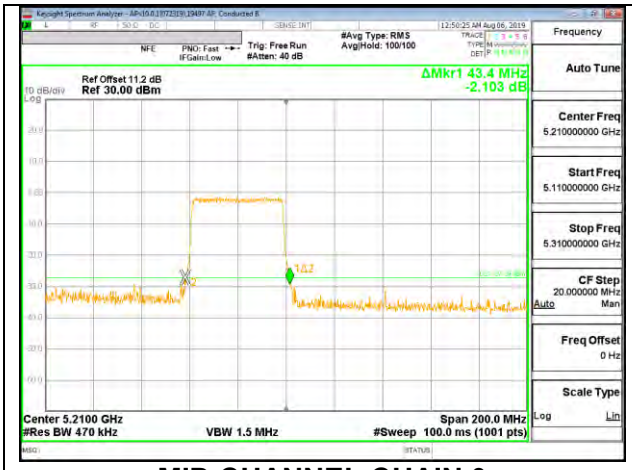



MID CHANNEL CHAIN 0




MID CHANNEL CHAIN 1

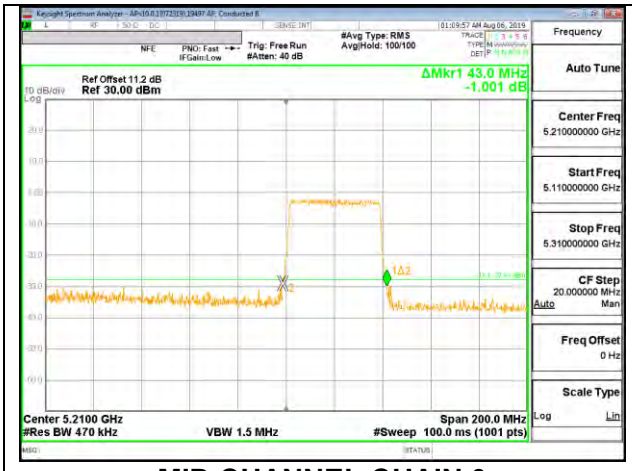
## 484-Tones, RU Index 65



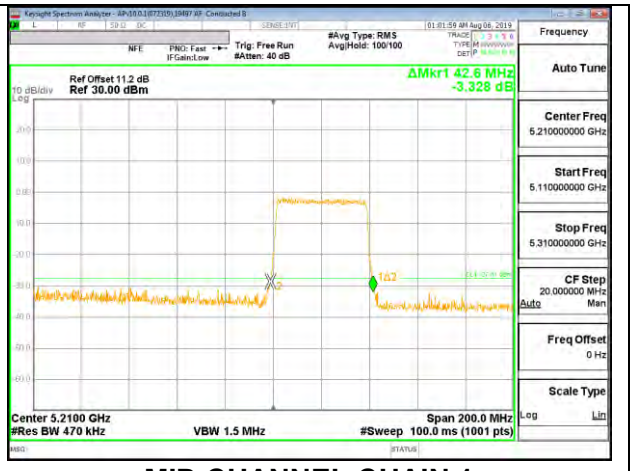

MID CHANNEL CHAIN 0


MID CHANNEL CHAIN 1

## 484-Tones, RU Index 66

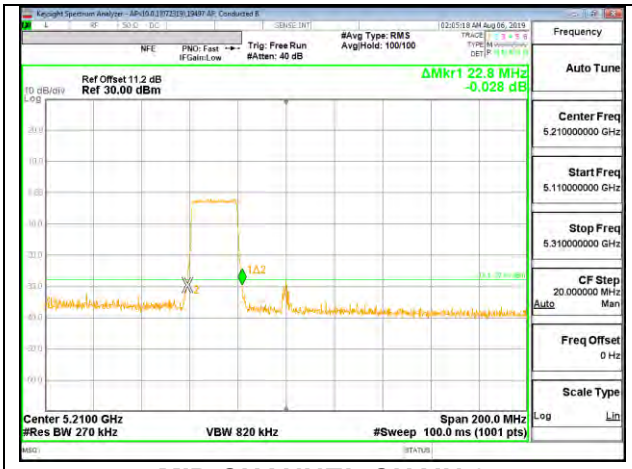



MID CHANNEL CHAIN 0

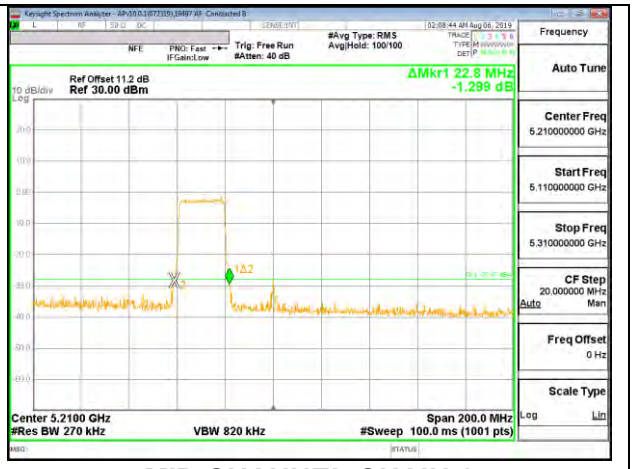



MID CHANNEL CHAIN 1

## 242-Tones, RU Index 61

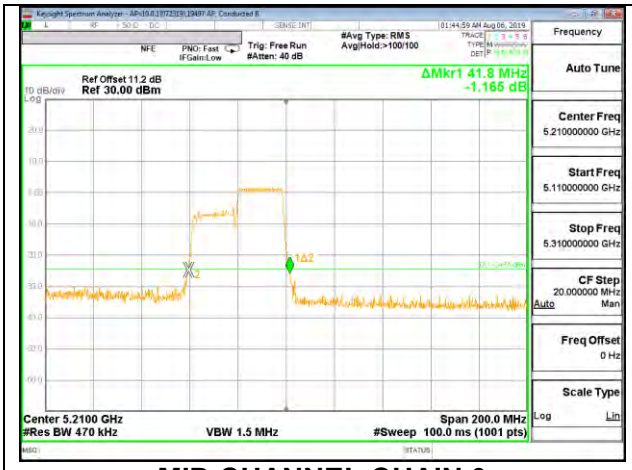



MID CHANNEL CHAIN 0




MID CHANNEL CHAIN 1

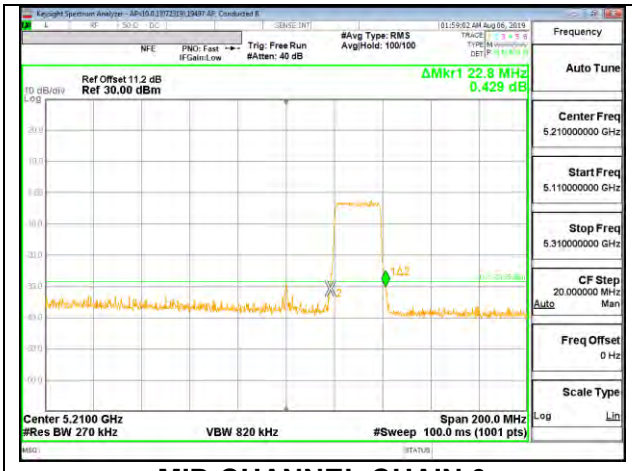
## 242-Tones, RU Index 62




MID CHANNEL CHAIN 0


MID CHANNEL CHAIN 1

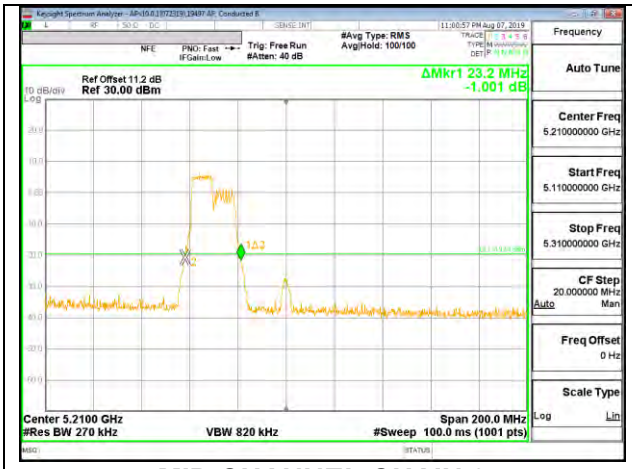
## 242-Tones, RU Index 64



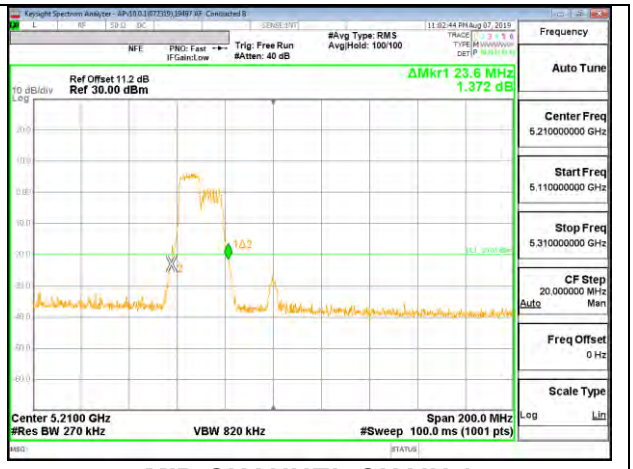

MID CHANNEL CHAIN 0


MID CHANNEL CHAIN 1

## 106-Tones, RU Index 53

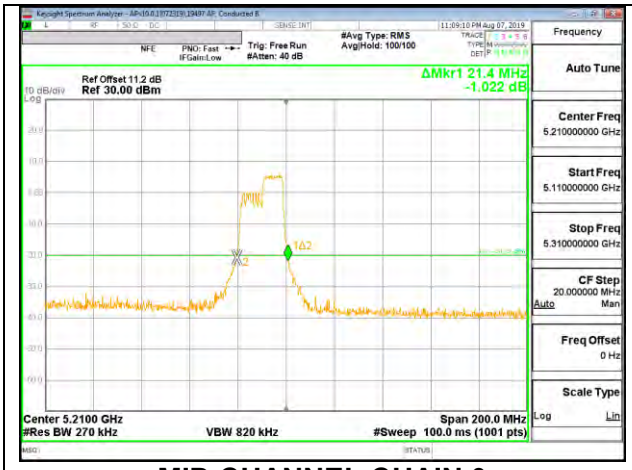



MID CHANNEL CHAIN 0

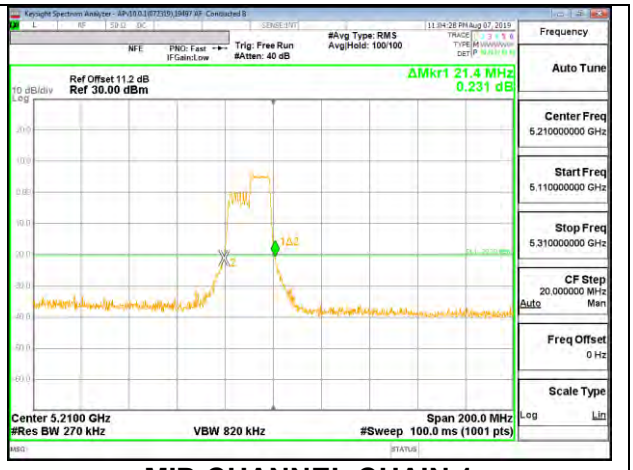



MID CHANNEL CHAIN 1

## 106-Tones, RU Index 56

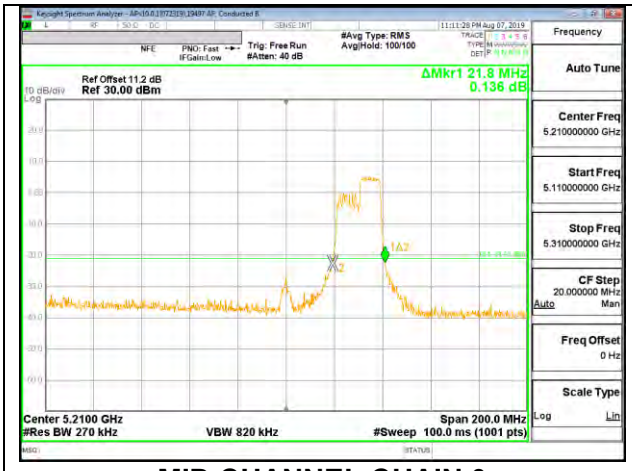



MID CHANNEL CHAIN 0

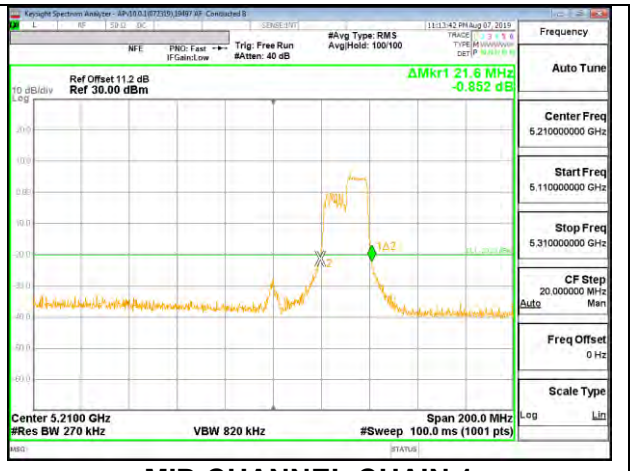



MID CHANNEL CHAIN 1

## 106-Tones, RU Index 60

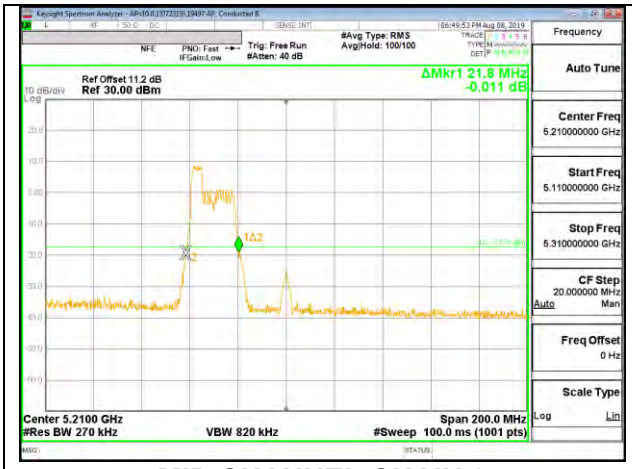



MID CHANNEL CHAIN 0

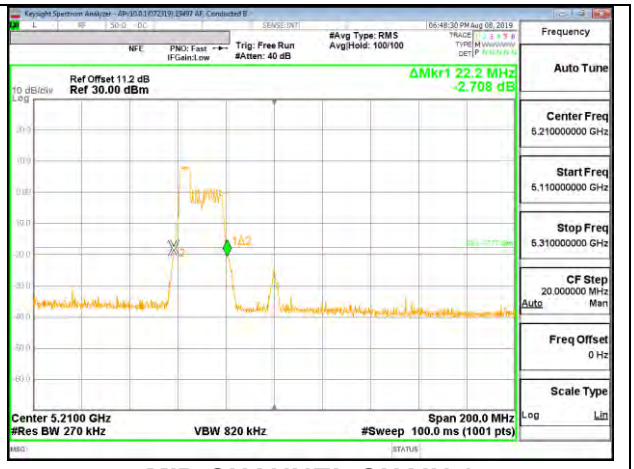



MID CHANNEL CHAIN 1

## 52-Tones, RU Index 37

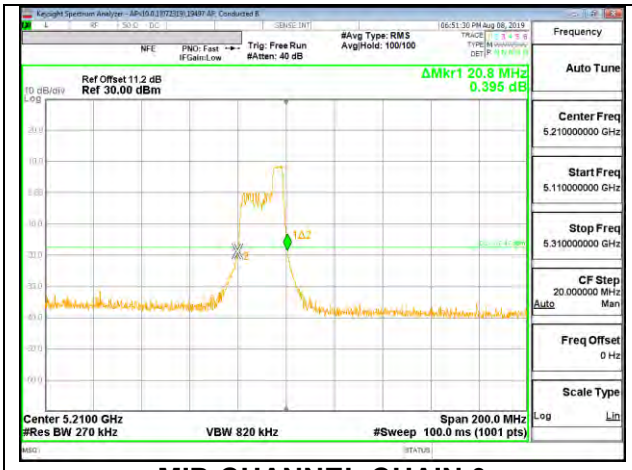



MID CHANNEL CHAIN 0

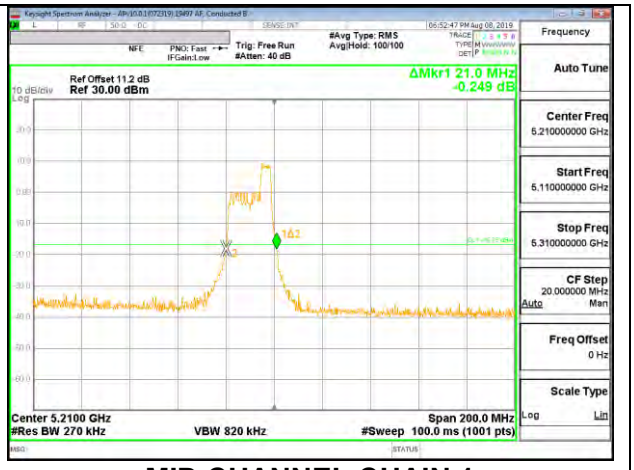



MID CHANNEL CHAIN 1

## 52-Tones, RU Index 44

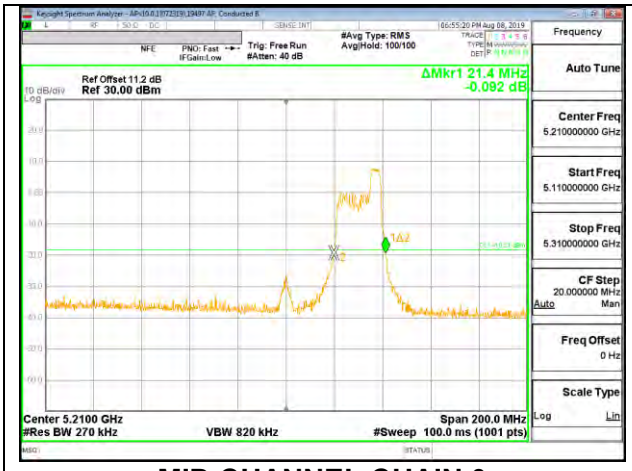



MID CHANNEL CHAIN 0

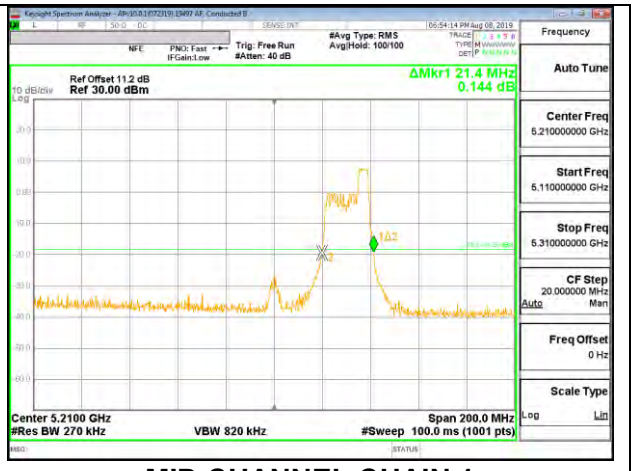



MID CHANNEL CHAIN 1

## 52-Tones, RU Index 52

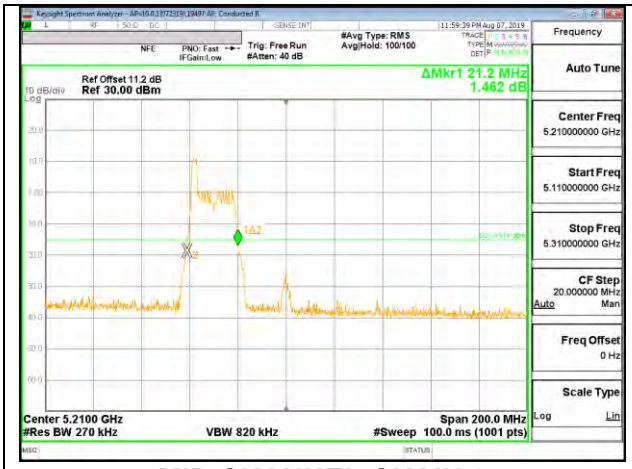



MID CHANNEL CHAIN 0

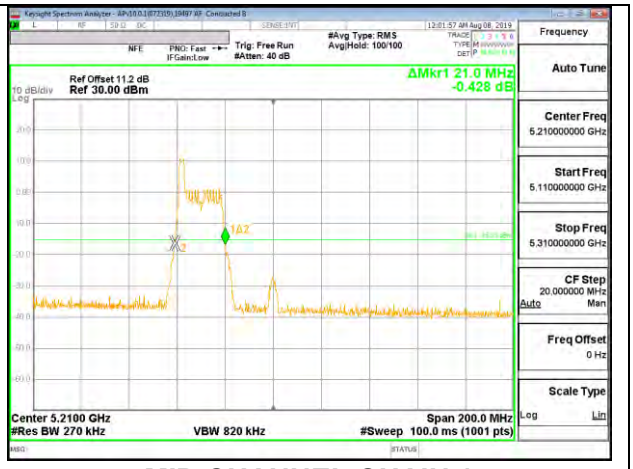



MID CHANNEL CHAIN 1

## 26-Tones, RU Index 0

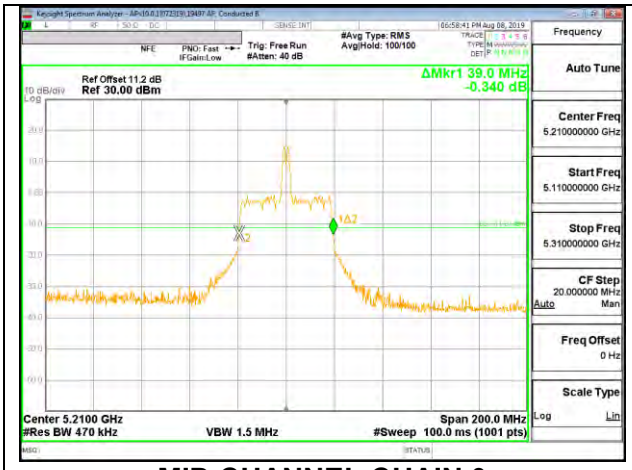



MID CHANNEL CHAIN 0

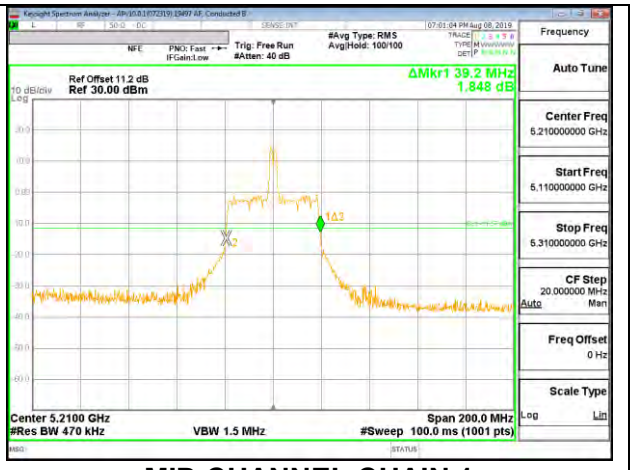



MID CHANNEL CHAIN 1

## 26-Tones, RU Index 18

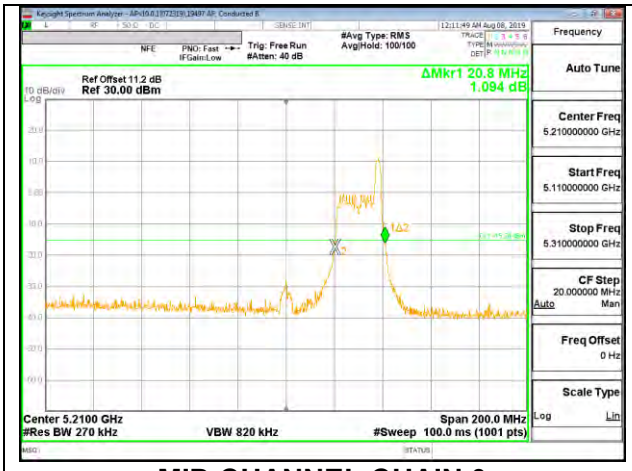



MID CHANNEL CHAIN 0

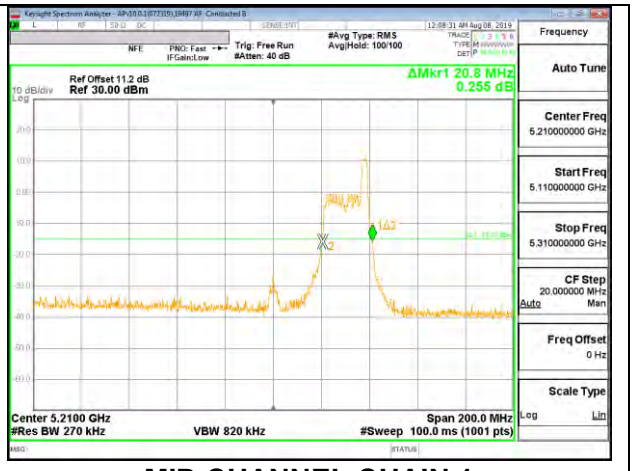



MID CHANNEL CHAIN 1

## 26-Tones, RU Index 36




MID CHANNEL CHAIN 0



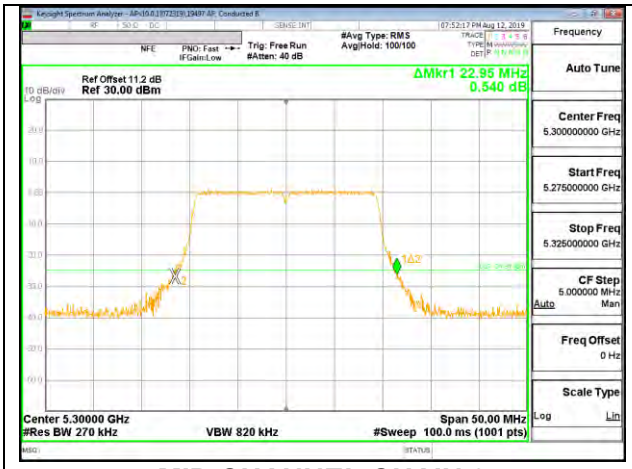

MID CHANNEL CHAIN 1

## 8.2.4. 802.11ax HE20 MODE IN THE 5.3 GHz BAND

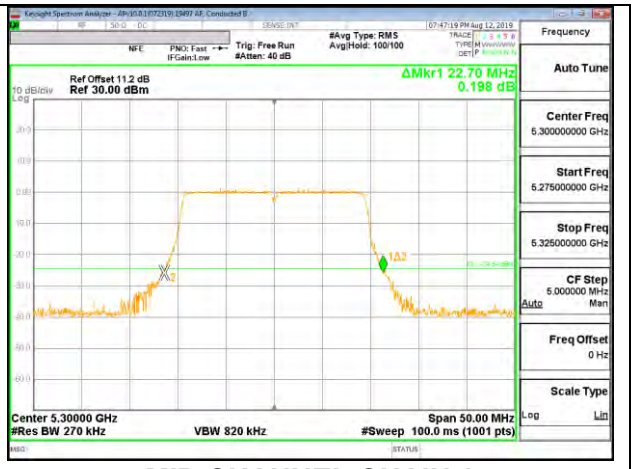
**2TX Chain 0 + Chain 1 OFDMA MODE**

| RU Size (Tones) | RU Index | Channel | Frequency (MHz) | 26 dB Bandwidth Chain 0 (MHz) | 26 dB Bandwidth Chain 1 (MHz) |
|---|---|---|---|---|---|
| 242T | 61 | Low | 5260 | 22.95 | 23.00 |
| | | Mid | 5300 | 22.95 | 22.70 |
| | | High | 5320 | 22.95 | 23.00 |
| 106T | 53 | Low | 5260 | 20.85 | 21.10 |
| | | Mid | 5300 | 21.10 | 20.80 |
| | 54 | High | 5320 | 23.90 | 23.90 |
| 52T | 37 | Low | 5260 | 20.45 | 20.70 |
| | 38 | Mid | 5300 | 18.85 | 18.75 |
| | 40 | High | 5320 | 22.10 | 22.40 |
| 26T | 0 | Low | 5260 | 20.25 | 20.25 |
| | 4 | Mid | 5300 | 18.40 | 18.40 |
| | 8 | High | 5320 | 20.95 | 21.05 |

## 242-Tones, RU Index 61

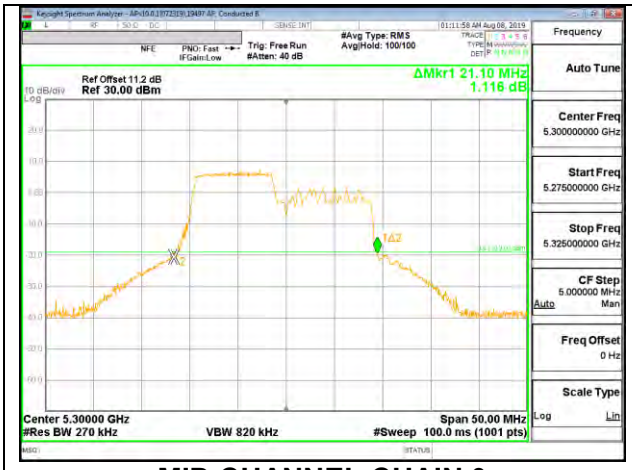



MID CHANNEL CHAIN 0




MID CHANNEL CHAIN 1

## 106-Tones, RU Index 53




MID CHANNEL CHAIN 0

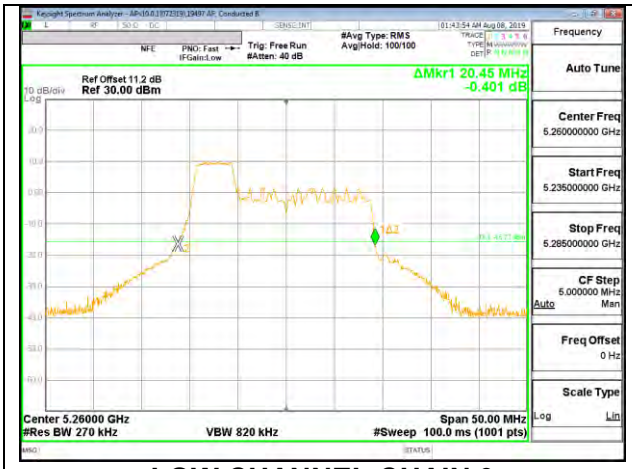

MID CHANNEL CHAIN 1

## 106-Tones, RU Index 54

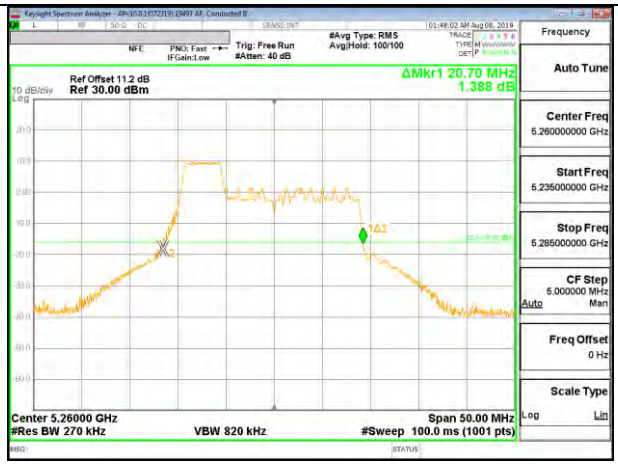

HIGH CHANNEL CHAIN 0


HIGH CHANNEL CHAIN 1

## 52-Tones, RU Index 37



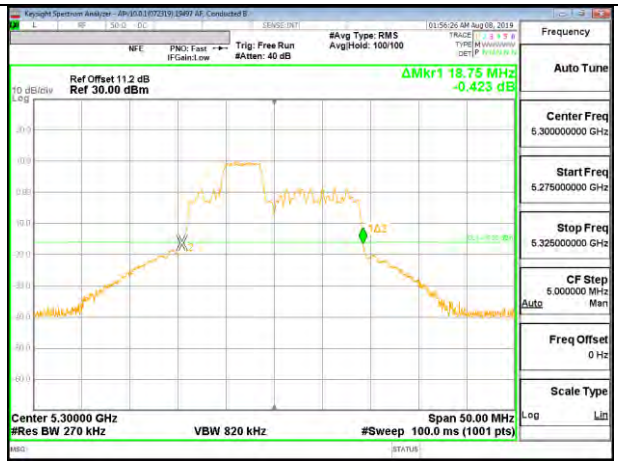

LOW CHANNEL CHAIN 0




LOW CHANNEL CHAIN 1

## 52-Tones, RU Index 38

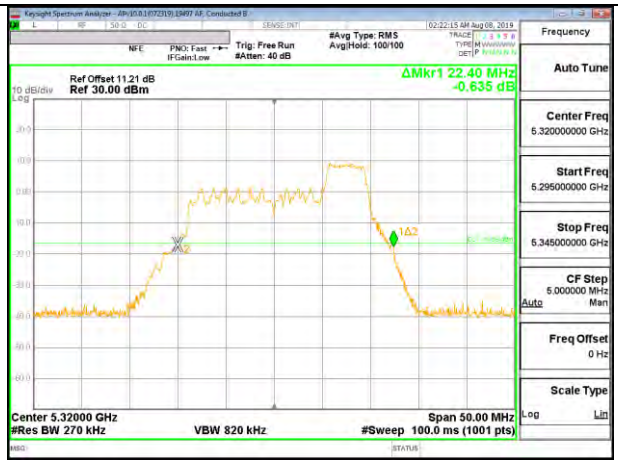

MID CHANNEL CHAIN 0




MID CHANNEL CHAIN 1

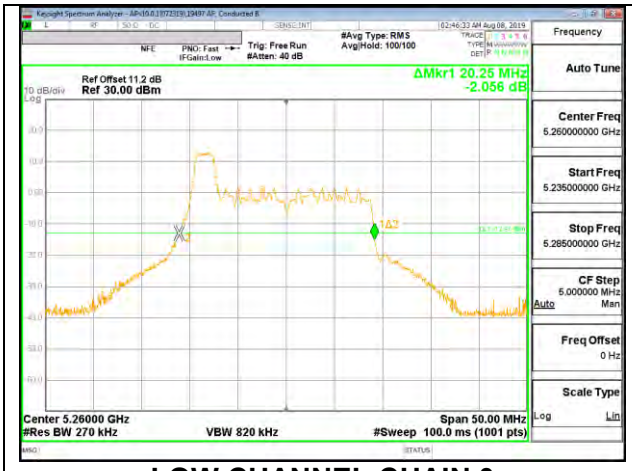
## 52-Tones, RU Index 40


HIGH CHANNEL CHAIN 0

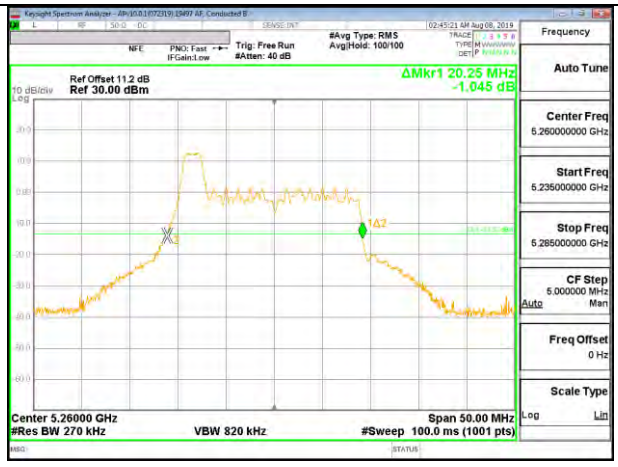



HIGH CHANNEL CHAIN 1

## 26-Tones, RU Index 0

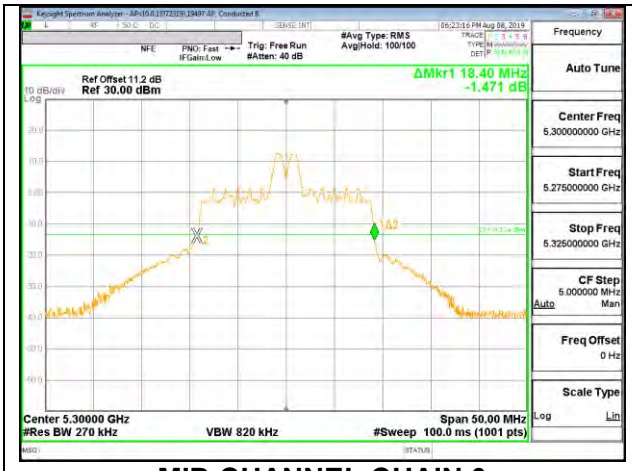



LOW CHANNEL CHAIN 0

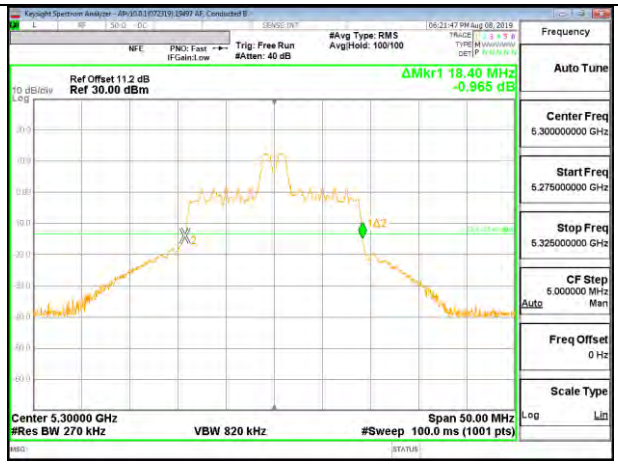



LOW CHANNEL CHAIN 1

## 26-Tones, RU Index 4

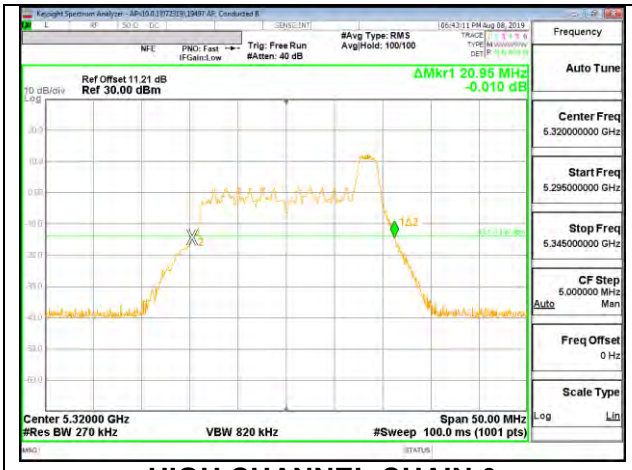



MID CHANNEL CHAIN 0




MID CHANNEL CHAIN 1

## 26-Tones, RU Index 8




HIGH CHANNEL CHAIN 0

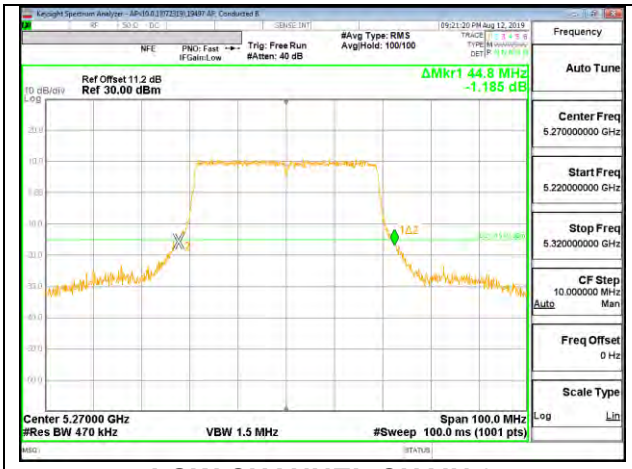

HIGH CHANNEL CHAIN 1

## 8.2.5. 802.11ax HE40 MODE IN THE 5.3 GHz BAND

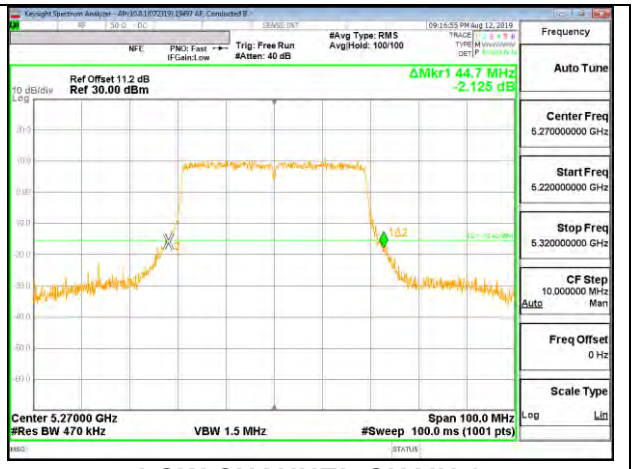
**2TX Chain 0 + Chain 1 OFDMA MODE**

| RU Size (Tones) | RU Index | Channel | Frequency (MHz) | 26 dB Bandwidth Chain 0 (MHz) | 26 dB Bandwidth Chain 1 (MHz) |
|---|---|---|---|---|---|
| 484T | 65 | Low | 5270 | 44.80 | 44.70 |
| | | High | 5310 | 45.30 | 46.10 |
| 242T | 61 | Low | 5270 | 26.00 | 23.90 |
| | 62 | High | 5310 | 26.20 | 25.90 |
| 106T | 53 | Low | 5270 | 21.30 | 21.40 |
| | 54 | Low | 5270 | 22.60 | 22.50 |
| | 56 | High | 5310 | 22.40 | 22.70 |
| 52T | 37 | Low | 5270 | 21.20 | 21.00 |
| | 40 | Low | 5270 | 22.00 | 21.90 |
| | 44 | High | 5310 | 21.60 | 21.50 |
| 26T | 0 | Low | 5270 | 20.10 | 20.10 |
| | 8 | Low | 5270 | 21.40 | 21.50 |
| | 17 | High | 5310 | 21.00 | 20.90 |

## 484-Tones, RU Index 65

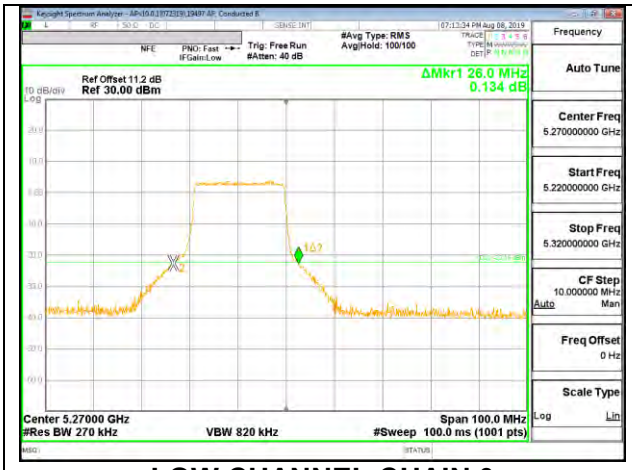



LOW CHANNEL CHAIN 0

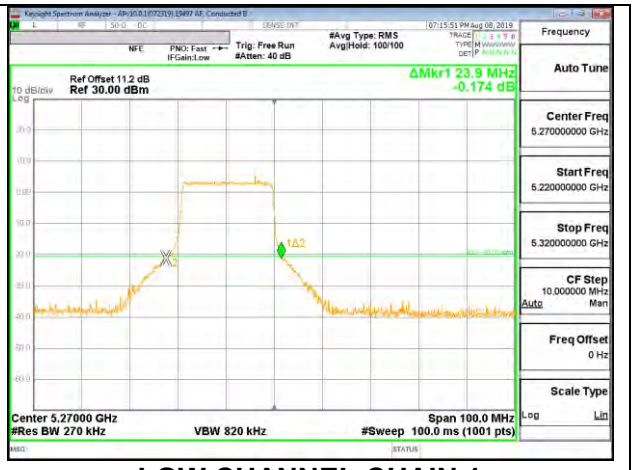



LOW CHANNEL CHAIN 1

## 242-Tones, RU Index 61

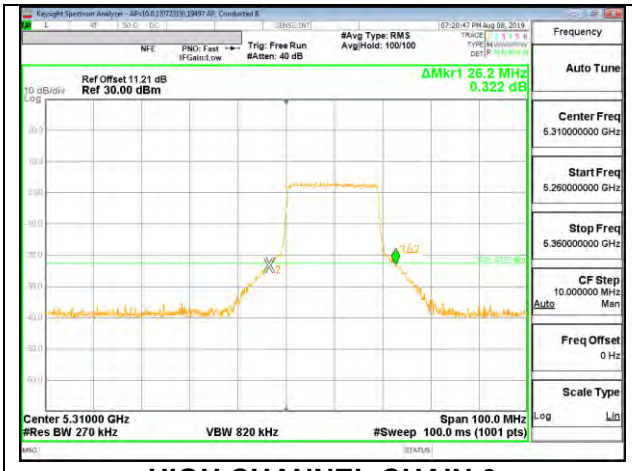



LOW CHANNEL CHAIN 0

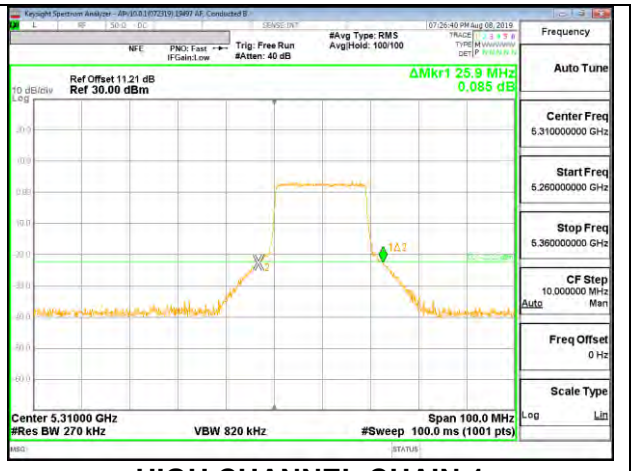



LOW CHANNEL CHAIN 1

## 242-Tones, RU Index 62

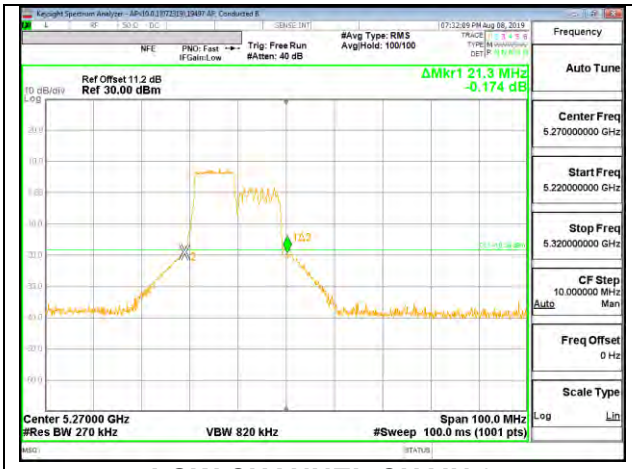



HIGH CHANNEL CHAIN 0

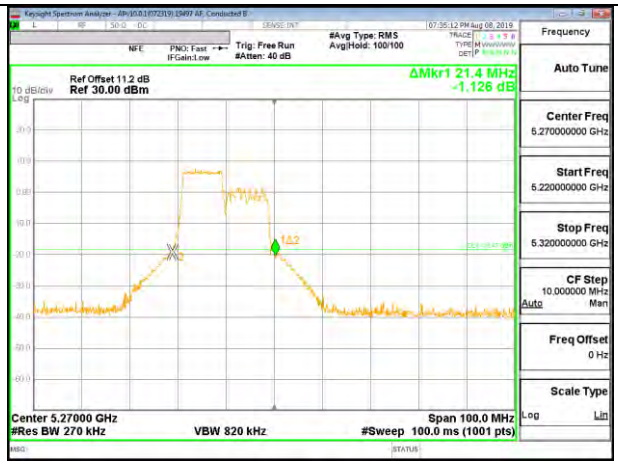



HIGH CHANNEL CHAIN 1

## 106-Tones, RU Index 53

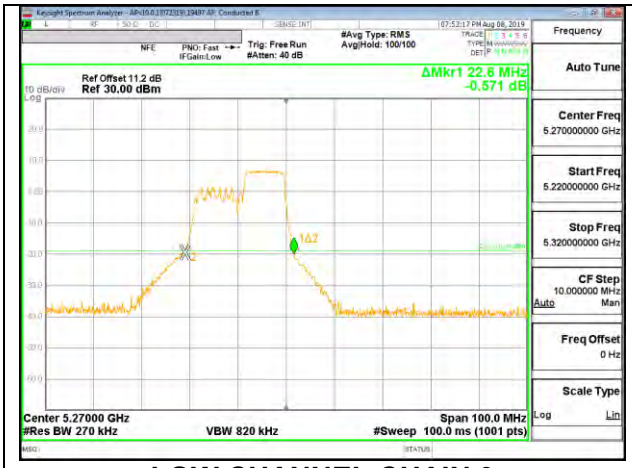



LOW CHANNEL CHAIN 0

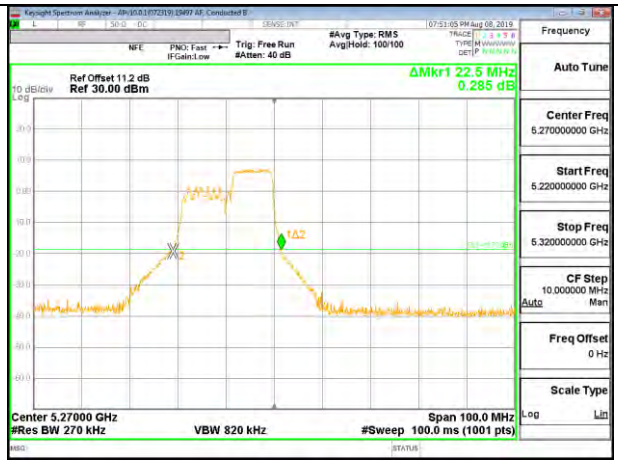



LOW CHANNEL CHAIN 1

## 106-Tones, RU Index 54

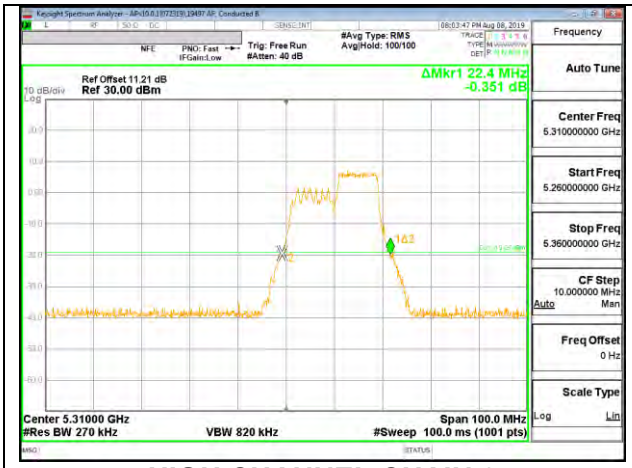



LOW CHANNEL CHAIN 0

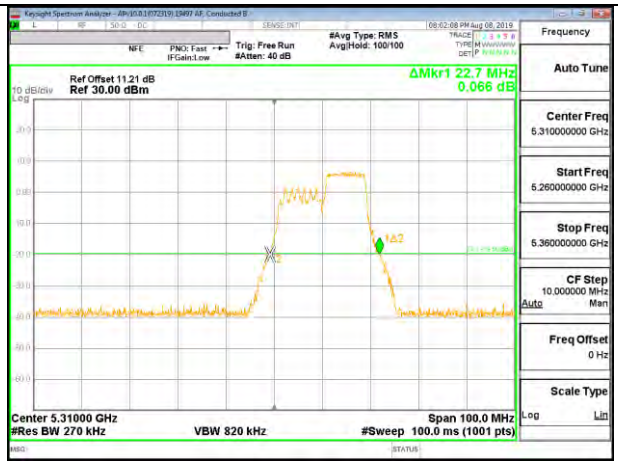



LOW CHANNEL CHAIN 1

## 106-Tones, RU Index 56

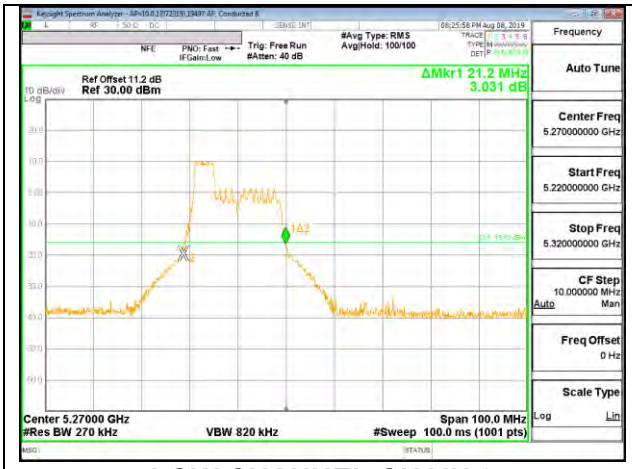



HIGH CHANNEL CHAIN 0

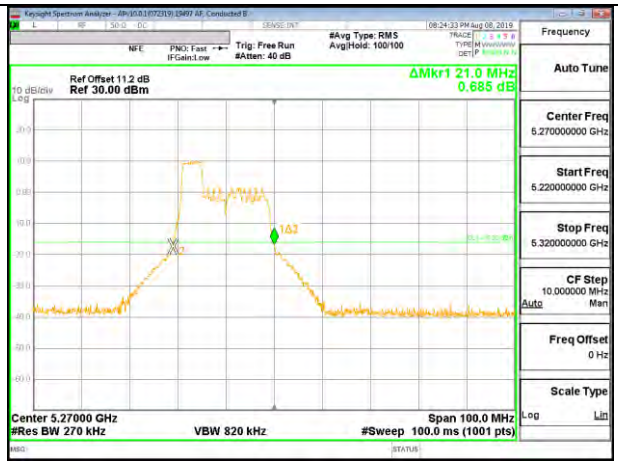



HIGH CHANNEL CHAIN 1

## 52-Tones, RU Index 37

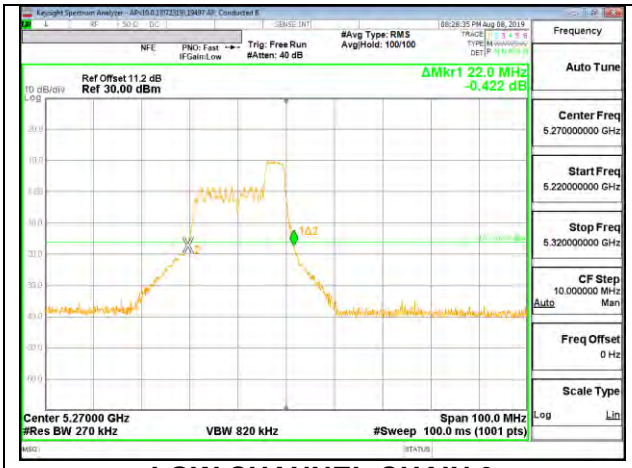



**LOW CHANNEL CHAIN 0**

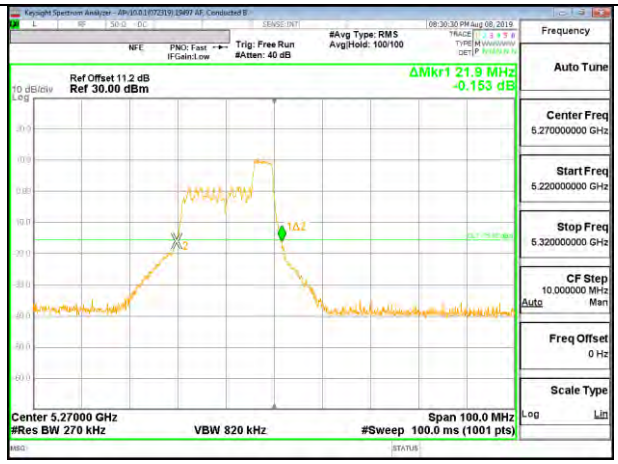



**LOW CHANNEL CHAIN 1**

## 52-Tones, RU Index 40

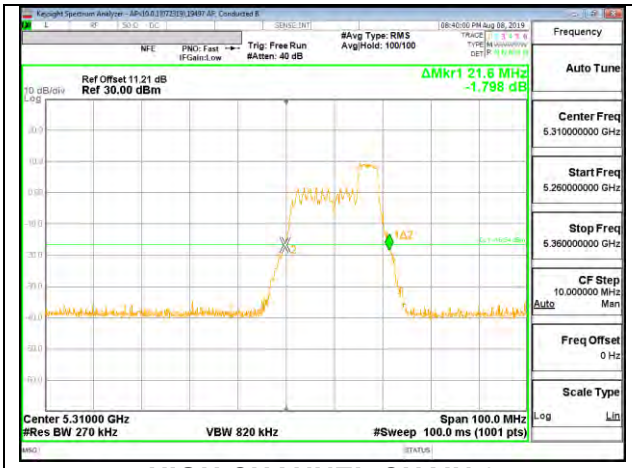



**LOW CHANNEL CHAIN 0**

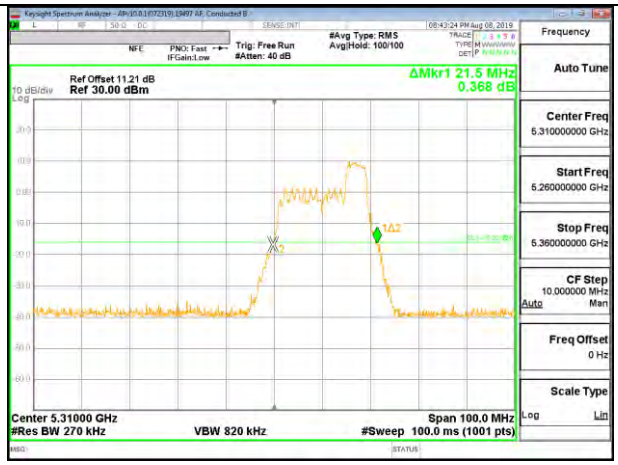



**LOW CHANNEL CHAIN 1**

## 52-Tones, RU Index 44

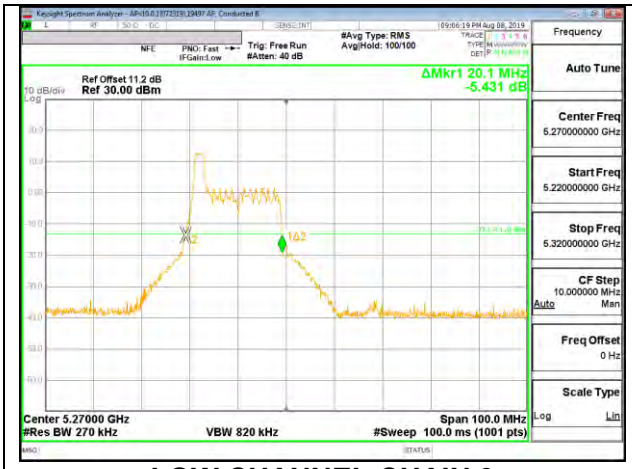



**HIGH CHANNEL CHAIN 0**

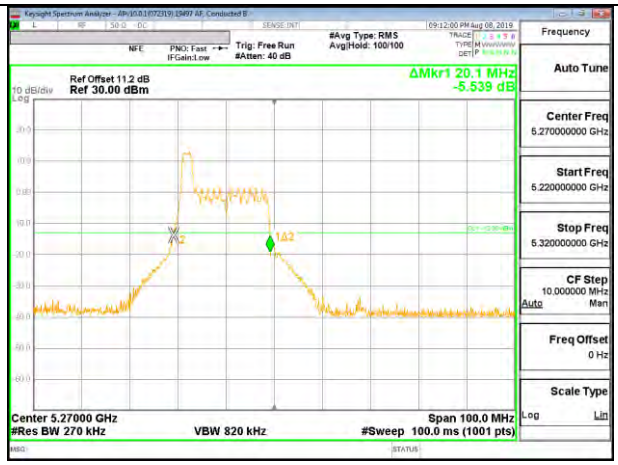



**HIGH CHANNEL CHAIN 1**

## 26-Tones, RU Index 0

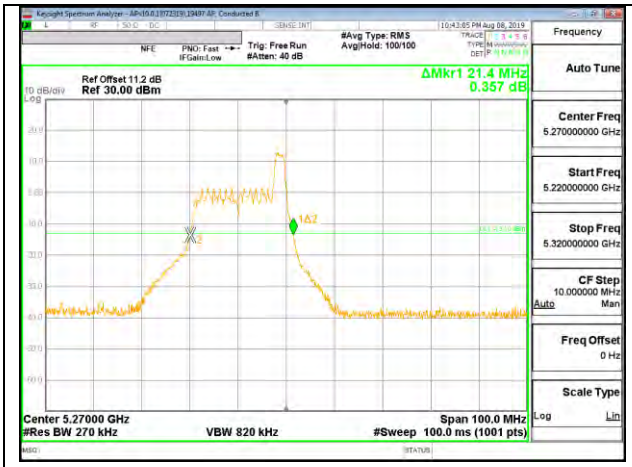



LOW CHANNEL CHAIN 0

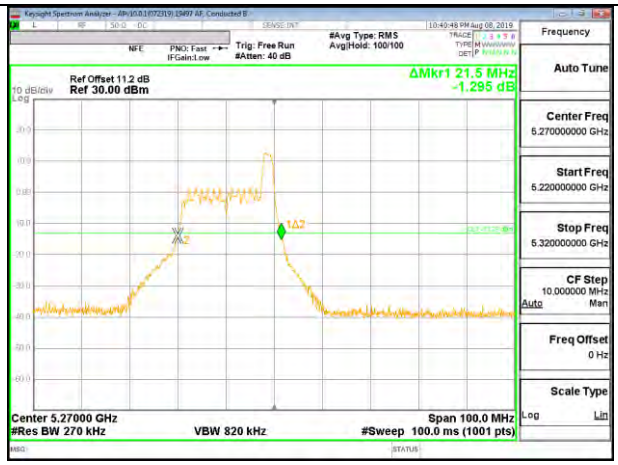



LOW CHANNEL CHAIN 1

## 26-Tones, RU Index 8

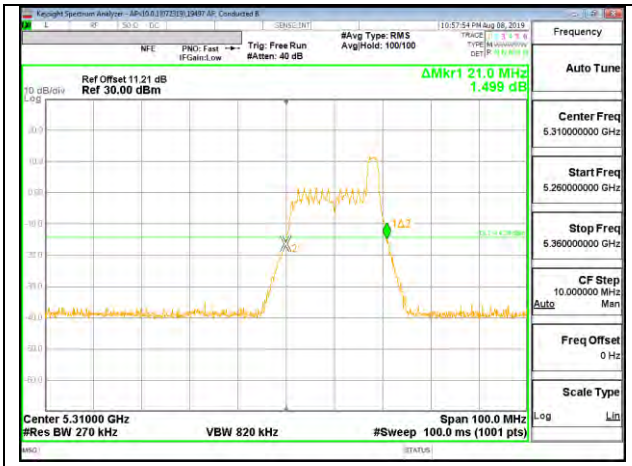



LOW CHANNEL CHAIN 0

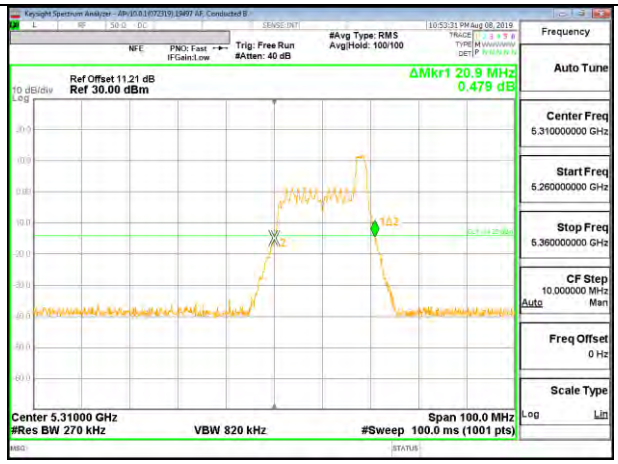



LOW CHANNEL CHAIN 1

## 26-Tones, RU Index 17




HIGH CHANNEL CHAIN 0




HIGH CHANNEL CHAIN 1