CERTIFICATION TEST REPORT

Report Number. : R12935938-E8

Applicant	:	Microsoft Corporation One Microsoft Way Redmond, WA 98052-6399 USA
Model	:	1868
FCC ID	:	C3K1868
IC ID	:	3048A-1868
EUT Description	:	Portable Computing Device
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
2019-09-17

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	--	Initial Issue	
2	2019-09-10	Added AC Power Adaptor to support equipment. Added justification for waiving SISO testing to Section 6.6. Added model similarity explanation to Section 4. Revised 802.11ax HE 40 SU, 484T RU65, and 26T RU8 99%BW results in Section 9.3.	Brian T. Kiewra
3	2019-09-17	Revised test date range in Section 1 to accommodate minor retesting. Revised radiated emissions reduction statement in Section 6.3.	Brian T. Kiewra

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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: 1868

SERIAL NUMBER: See section 6.5

DATE TESTED: 2019-07-17 to 2019-09-17

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 LLC 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.

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Approved & Released For
UL LLC By:

Prepared By:

Jeffrey Moser
Operations Leader
Consumer Technology Division
UL LLC

Niklas Haydon
Engineer
Consumer Technology Division
UL LLC

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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 789033 D02 v02r01, ANSI C63.10-2013, FCC 06-96, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr. Suite B, Morrisville, North Carolina, USA. 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.

12 Laboratory Dr.	2800 Perimeter Park Dr. Suite B
ISED Site Code: 2180C	
☐ Chamber A	☒ Chamber North
☐ Chamber C	☒ Chamber South

The above test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

4. SCOPE OF REPORT

This test report covers the radiated emissions and antenna port conducted emissions for model 1868 for 5.2 GHz and 5.3 GHz 802.11ax HE20, HE40, HE80, and HE160. Antenna port conducted emissions data in this report is leveraged by model 1867. For model 1867, radiated emissions can be found in UL report number R12922855-E8. For model 1868, AC mains line conducted emissions and worst-case radiated emisisons can be found in UL report number R12935938-E11.

For the antenna port conducted emissons portion of this report, the worst-case antenna gain across both models was used to represent a worst-case scenario. Both models will be implemented with the same power.

Models 1867 and 1868 are electrically and RF equivalent as they use the same motherboard, radio module and on-board RF components. Both models share a common WiFi and BT power table. The radio-related firmware and driver versions are the same for the two models. The peak antenna gains are in the antenna gain section of the report. Antenna port conducted emissions measurements are done on model 1868 (FCC ID: C3K1868, IC: 3048A-1868) and the data is leveraged for model 1867 (FCC ID: C3K1867, IC: 3048A-1867). Highest antenna gain across the two models in each band has been considered while doing the conducted emissions measurements. Separate radiated & SAR measurements are done on each model.

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5. CALIBRATION AND UNCERTAINTY

5.1. 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.

5.2. 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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	2.00%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
RF output power, radiated (SAC)	4.52 dB
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	2.50 dB
All emissions, radiated	4.88 dB
Temperature	2.26°C
Humidity	6.79%
DC Supply voltages	1.70%
Time	3.39%

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

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Portable Computing Device that contains 802.11 a/ac/ax/b/g/n 20/40/80/160MHz 2x2 dual band and BT/BLE radios.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 2TX			
5180-5240	802.11ax HE20 SU	16.27	42.36
5190-5230	802.11ax HE40 OFDMA, 484-Tones	17.49	56.10
5210	802.11ax HE80 OFDMA, 996-Tones	17.59	57.41
5250	802.11ax HE160 SU	15.37	34.43

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 2TX			
5260-5320	802.11ax HE20 SU	20.21	104.95
5270-5310	802.11ax HE40 OFDMA, 242-Tones	20.29	106.91
5290	802.11ax HE80 OFDMA, 242-Tones	20.87	122.18

SISO and MIMO per chain power are set to the same level .

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6.3. TEST REDUCTIONS CASES

99% bandwidth:

- The narrowest (a representative RU) and widest modes were tested.

26dB bandwidth:

- The narrowest (a representative RU) and widest modes were tested.

Power measurements:

- All tones were tested for each bandwidth.
- Low, middle, and high RU allocation were tested.

Power spectral density:

- All tones were tested for each bandwidth.
- Low, middle, and high RU allocation 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 allocations.

Radiated spurious emissions:

- For 5.2GHz band, multiple modes were investigated and for final measurements HE20 242T/RU61 was used. The output power for this mode was set to a power setting that represented both the highest output power and highest PSD across all production power settings for all bandwidth / RU configurations.

- For 5.3GHz band, multiple modes were investigated and for final measurements HE20 26T was used. The output power for this mode was set to a power setting that represented both the highest output power and highest PSD across all production power settings for all bandwidth / RU configurations.

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6.4. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	Antenna Type	Peak Gain (dBi) Chain 0 (Right)	Peak Gain (dBi) Chain 1 (Left)
Model 1867			
2.4 to 2.48	PIFA	0.7	2.6
5.15 to 5.25		4.9	4.4
5.25 to 5.35		6.1	5.0
5.47 to 5.72		7.2	5.5
5.725 to 5.85		9.4	5.6
Model 1868			
2.4 to 2.48	PIFA	0.4	1.0
5.15 to 5.25		3.6	2.2
5.25 to 5.35		5.2	3.5
5.47 to 5.72		6.4	4.7
5.725 to 5.85		7.8	4.5

The 5 GHz WLAN radio utilizes Chain 0 and chain 1.

NOTE:
Antenna 1 = Chain 0
Antenna 2 = Chain 1

6.5. SOFTWARE AND FIRMWARE

EUT	Serial Number	Radio Test Tool Version	OS Version	BT Driver Version	WiFi Driver Version	EUT's Power Supply (s/n)
R-557-1868-FCC-CONDUCTED-02	005210692757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P01P9596
R-557-1868-FCC-CONDUCTED-03	005216792757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P03GE596
R-557-1868-FCC-RADIATED-10	013886292757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P02KC596
R-557-1868-FCC-RADIATED-11	013891692757	11.1916.0-09531	MTEOS 1.652.0	21.0.19157.20088	99.0.43.8	0D130P01S7596

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6.6. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emissions were performed in worst-case test report R12935938-E11.

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.

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 NSS2
802.11ax HE40mode: MCS0 NSS2
802.11ax HE80mode: MCS0 NSS2
802.11ax HE160mode: MCS0 NSS2

All radios that can transmit simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

MIMO and SISO power are same setting per chain, therefore MIMO mode tested as worst-case to cover SISO mode.

6.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
USB Hub	J5 Create	JCA374	AY2A1904000477 / AY6A1903004261	N/A
Earbuds	Sony	MDR-EX14AP	Non-serialized	N/A
USB Flash Drive	Kingston	DataTraveler G4	Non-serialized	N/A
AC Power Adaptor	Microsoft	1706	0D130P02KC596	N/A

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Mains	1	12-pin	Mains	<3	None
2	USB-A	1	USB-A	USB	<3	None
3	USB-C	1	USB-C	USB	<3	None
4	Aux	1	Aux	Aux	<3	None

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TEST SETUP

The test utility software was located on the laptop during the tests and was used to exercised the radios.

SETUP DIAGRAMS

Please refer to 12935938-EP1 for setup diagrams

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7. MEASUREMENT METHOD

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

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

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

Conducted Output Power: KDB 789033 D02 v02r01, Section II E.3.b (Method PM-G) and KDB 789033 D02 v02r01, Section E.2.b (Method SA-1)

Power Spectral Density: KDB 789033 D02 v02r01, Section II F

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

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

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8. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-04-22	2020-04-22
	Gain-Loss Chains				
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2019-03-13	2020-03-13
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2019-02-28	2020-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-03-22	2020-03-22
	Gain-Loss Chains				
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2019-03-15	2020-03-15
	Receiver & Software				
SA0026	Spectrum Analyzer	Agilent	N9030A	2019-03-19	2020-03-19
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

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Test Equipment Used – Antenna Port Conducted Testing (Morrisville – RP)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0027	PXA Signal Analyzer	Keysight Technologies	MY54490254	2019-05-15	2020-05-15
s/n 160938893	Environmental Meter	Fisher Scientific	14-650-118	2019-06-17	2020-06-17
224604-002	Coaxial Testing Cable	Uti-flex	UFA147A-0-0180-200200	NA	NA
Antenna Port	Antenna Port Software	Antenna	Version 10.0.1	NA	NA
126431 (PRE0128068)	RF Power Meter	Anritsu	ML2495A	2019-04-30	2020-04-30
126430 (PRE0128067)	Pulse Power Sensor, 300MHz to 40GHz	Anritsu	MA2411B	2019-04-30	2020-04-30
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2019-06-14	2020-06-14
PWS001 (PRE0137347)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2019-05-06	2020-05-06

Test Equipment Used – Antenna Port Conducted Testing (Morrisville – Conducted One)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
T177	PSA Signal Analyzer	Keysight Technologies	E4446A	2019-04-22	2020-04-22
HI0090	Environmental Meter	Fisher Scientific	17-E670X-80-1	2019-06-17	2020-06-17
Antenna Port	Antenna Port Software	Antenna	Version 10.0.1	NA	NA

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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

NOTE: Throughout this section:
Antenna 1 = Chain 0
Antenna 2 = Chain 1

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 D01 Zero-Span Spectrum Analyzer Method.

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5.2 GHz BAND ON TIME AND DUTY CYCLE RESULTS

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	3.966	4.014	0.988	98.80%	0.00	0.010
802.11ax HE20 OFDMA, RU size 242T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE20 OFDMA, RU size 106T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE20 OFDMA, RU size 52T	3.976	4.024	0.988	98.81%	0.00	0.010
802.11ax HE20 OFDMA, RU size 26T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE40 OFDMA, SU	3.964	4.012	0.988	98.80%	0.00	0.010
802.11ax HE40 OFDMA, RU size 484T	3.970	4.024	0.987	98.66%	0.00	0.010
802.11ax HE40 OFDMA, RU size 242T	3.968	4.028	0.985	98.51%	0.00	0.010
802.11ax HE40 OFDMA, RU size 106T	3.968	4.028	0.985	98.51%	0.00	0.010
802.11ax HE40 OFDMA, RU size 52T	3.974	4.041	0.983	98.34%	0.00	0.010
802.11ax HE40 OFDMA, RU size 26T	3.970	4.022	0.987	98.71%	0.00	0.010
802.11ax HE80 OFDMA, SU	3.978	4.026	0.988	98.81%	0.00	0.010
802.11ax HE80 OFDMA, RU size 996T	3.968	4.018	0.988	98.76%	0.00	0.010
802.11ax HE80 OFDMA, RU size 484T	3.976	4.028	0.987	98.71%	0.00	0.010
802.11ax HE80 OFDMA, RU size 242T	3.976	4.028	0.987	98.71%	0.00	0.010
802.11ax HE80 OFDMA, RU size 106T	3.974	4.024	0.988	98.76%	0.00	0.010
802.11ax HE80 OFDMA, RU size 52T	3.970	4.024	0.987	98.66%	0.00	0.010
802.11ax HE80 OFDMA, RU size 26T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE160 OFDMA, SU	2.277	2.323	0.980	98.02%	0.00	0.010
802.11ax HE160 OFDMA, RU size 2x996T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE160 OFDMA, RU size 996T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE160 OFDMA, RU size 484T	3.974	4.028	0.987	98.66%	0.00	0.010
802.11ax HE160 OFDMA, RU size 242T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE160 OFDMA, RU size 106T	3.976	4.026	0.988	98.76%	0.00	0.010
802.11ax HE160 OFDMA, RU size 52T	3.974	4.028	0.987	98.66%	0.00	0.010
802.11ax HE160 OFDMA, RU size 26T	3.976	4.028	0.987	98.71%	0.00	0.010

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DUTY CYCLE PLOTS

802.11ax HE20 OFDMA, SU MODE

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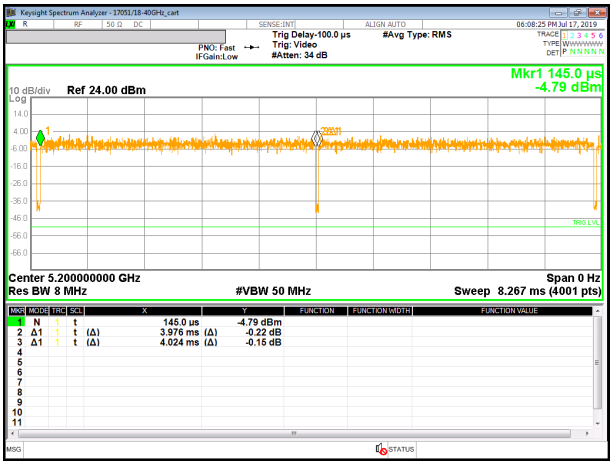
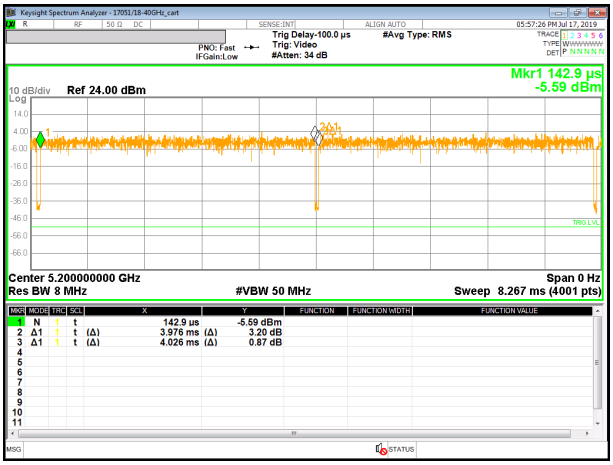
802.11ax HE20 OFDMA, RU size 242T MODE

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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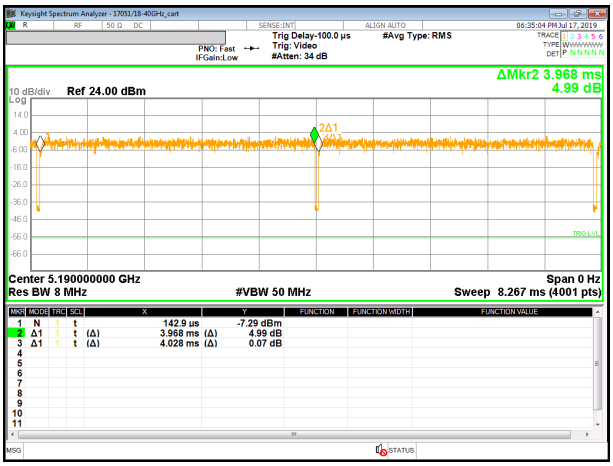
802.11ax HE40 OFDMA, SU MODE

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

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802.11ax HE80 OFDMA, SU MODE

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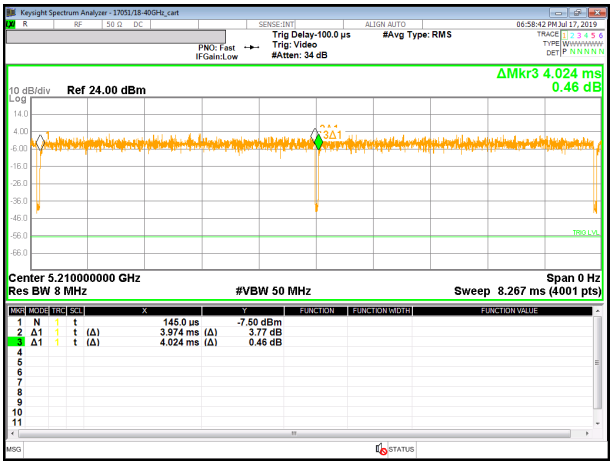
802.11ax HE80 OFDMA, RU size 996T MODE

802.11ax HE80 OFDMA, RU size 484T MODE

802.11ax HE80 OFDMA, RU size 242T MODE



802.11ax HE80 OFDMA, RU size 106T MODE

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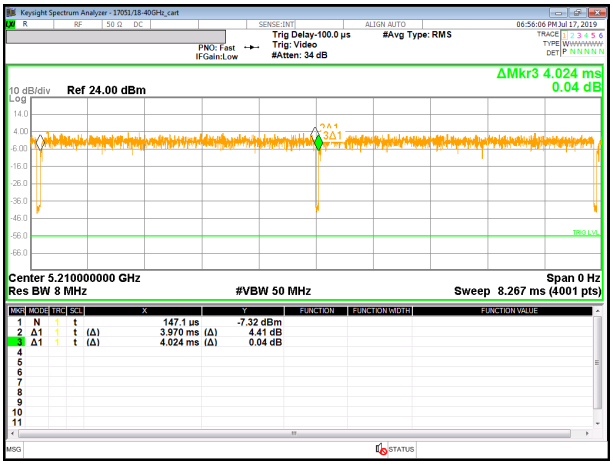

802.11ax HE80 OFDMA, RU size 52T MODE

802.11ax HE80 OFDMA, RU size 26T MODE

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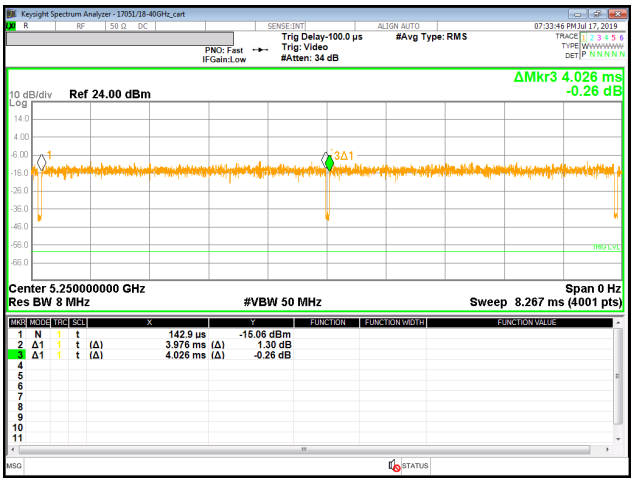
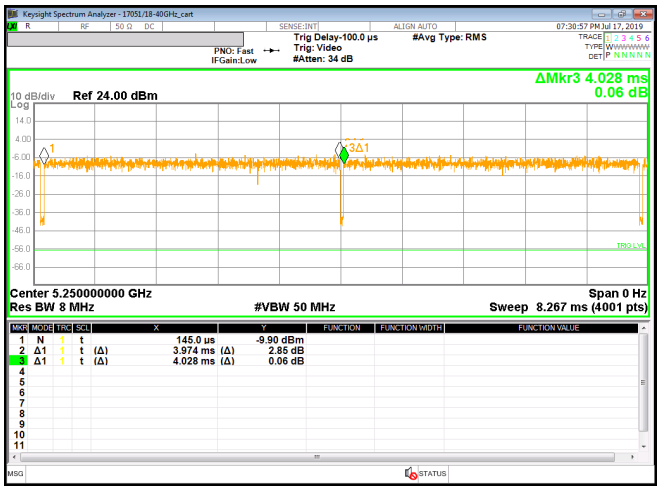
802.11ax HE160 OFDMA, SU MODE

802.11ax HE160 OFDMA, RU size 2x996T MODE

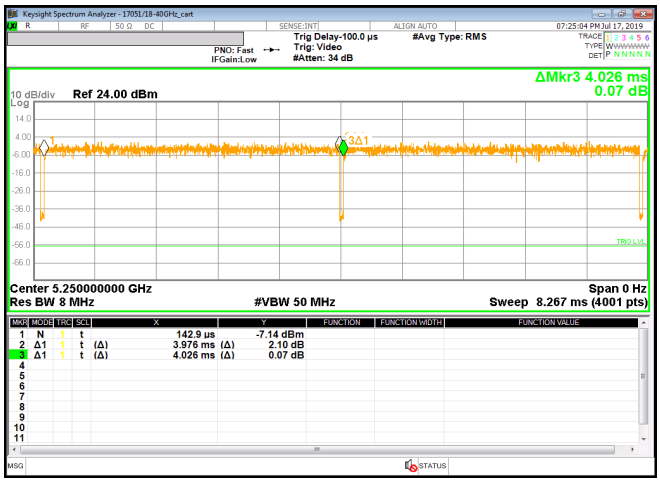


802.11ax HE160 OFDMA, RU size 996T MODE



802.11ax HE160 OFDMA, RU size 484T MODE

802.11ax HE160 OFDMA, RU size 242T MODE



802.11ax HE160 OFDMA, RU size 106T MODE

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802.11ax HE160 OFDMA, RU size 52T MODE

802.11ax HE160 OFDMA, RU size 26T MODE

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5.3 GHz BAND ON TIME AND DUTY CYCLE RESULTS

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	3.961	4.022	0.985	98.48%	0.00	0.010
802.11ax HE20 OFDMA, RU size 242T	3.976	4.027	0.987	98.73%	0.00	0.010
802.11ax HE20 OFDMA, RU size 106T	3.976	4.027	0.987	98.73%	0.00	0.010
802.11ax HE20 OFDMA, RU size 52T	3.976	4.027	0.987	98.73%	0.00	0.010
802.11ax HE20 OFDMA, RU size 26T	3.976	4.027	0.987	98.73%	0.00	0.010
802.11ax HE40 OFDMA, SU	3.968	4.014	0.989	98.85%	0.00	0.010
802.11ax HE40 OFDMA, RU size 484T	3.976	4.024	0.988	98.81%	0.00	0.010
802.11ax HE40 OFDMA, RU size 242T	3.979	4.027	0.988	98.81%	0.00	0.010
802.11ax HE40 OFDMA, RU size 106T	3.979	4.027	0.988	98.81%	0.00	0.010
802.11ax HE40 OFDMA, RU size 52T	3.979	4.027	0.988	98.81%	0.00	0.010
802.11ax HE40 OFDMA, RU size 26T	3.979	4.027	0.988	98.81%	0.00	0.010
802.11ax HE80 OFDMA, SU	3.976	4.029	0.987	98.68%	0.00	0.010
802.11ax HE80 OFDMA, RU size 996T	3.976	4.029	0.987	98.68%	0.00	0.010
802.11ax HE80 OFDMA, RU size 484T	3.976	4.029	0.987	98.68%	0.00	0.010
802.11ax HE80 OFDMA, RU size 242T	3.976	4.029	0.987	98.68%	0.00	0.010
802.11ax HE80 OFDMA, RU size 106T	3.976	4.029	0.987	98.68%	0.00	0.010
802.11ax HE80 OFDMA, RU size 52T	3.976	4.029	0.987	98.68%	0.00	0.010
802.11ax HE80 OFDMA, RU size 26T	3.976	4.029	0.987	98.68%	0.00	0.010

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DUTY CYCLE PLOTS

802.11ax HE20 OFDMA, SU MODE

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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

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802.11ax HE80 OFDMA, SU MODE

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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

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802.11ax HE80 OFDMA, RU size 52T MODE

802.11ax HE80 OFDMA, RU size 26T MODE

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9.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

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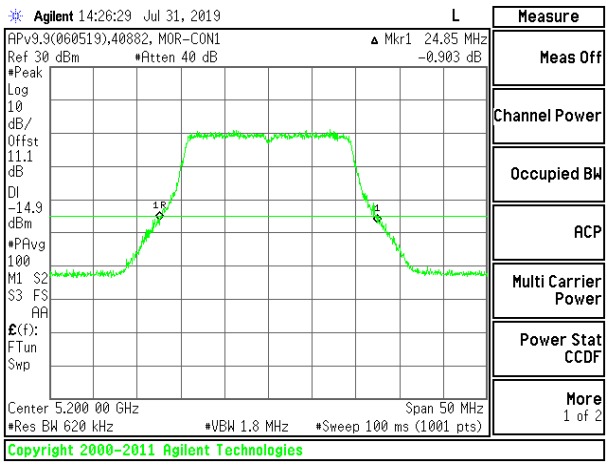
9.2.1. 802.11ax HE20 MODE IN THE 5.2 GHz BAND

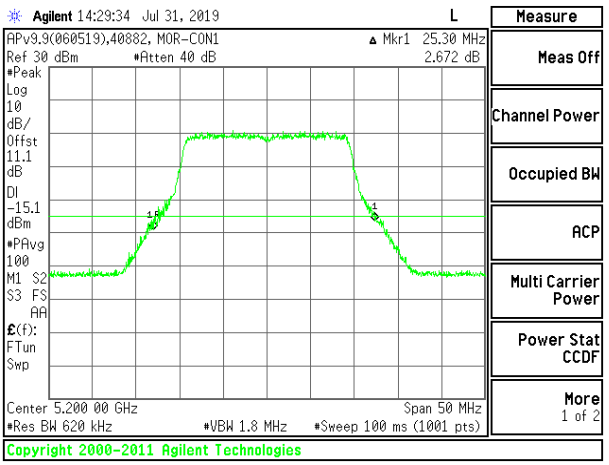
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	25.55	25.15
Mid	5200	24.85	25.30
High	5240	24.95	25.75

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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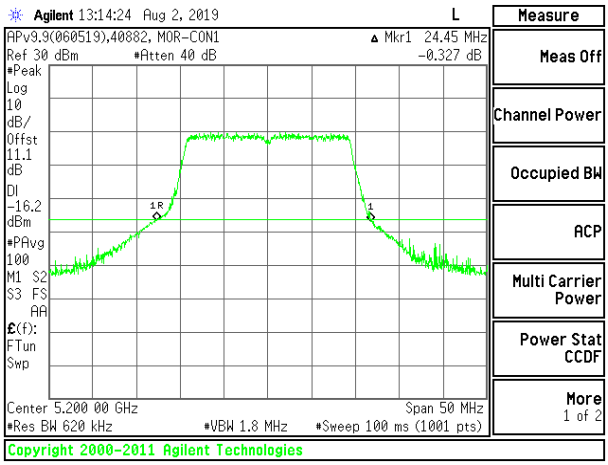
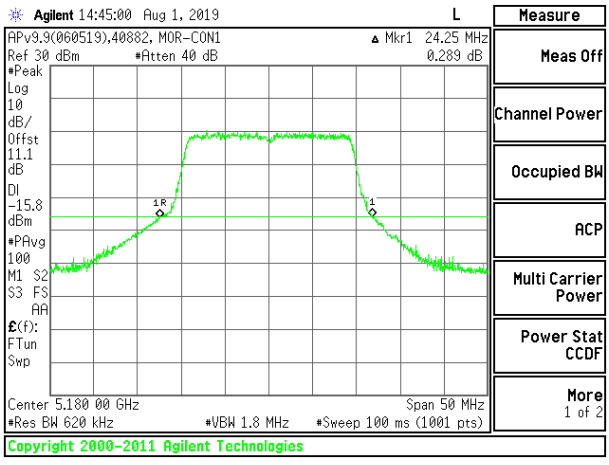
2TX Antenna 1 + Antenna 2 OFDMA MODE – 242-Tones, RU Index 61

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	25.45	24.25
Mid	5200	24.45	25.05
High	5240	24.25	24.65

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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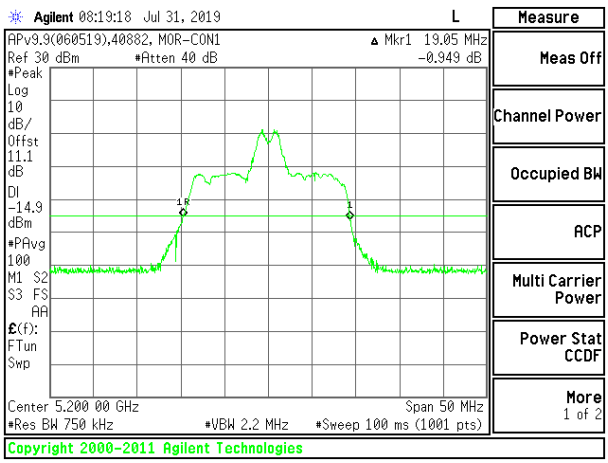
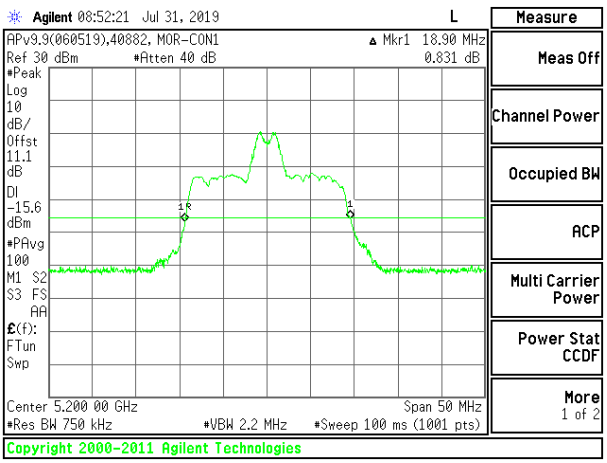
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5180	19.10	18.85
Mid	5200	19.05	18.90
High	5240	19.10	18.95

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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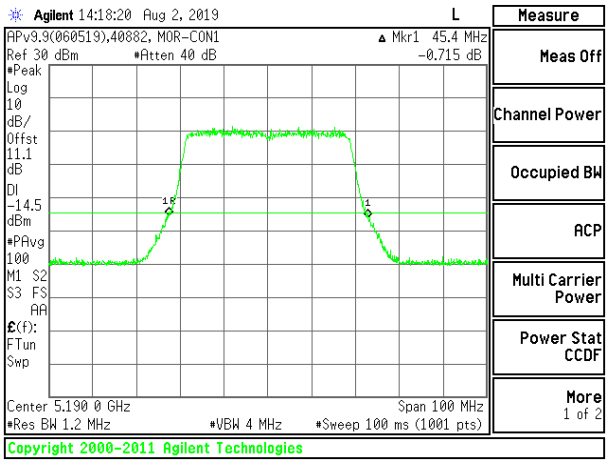
9.2.2. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

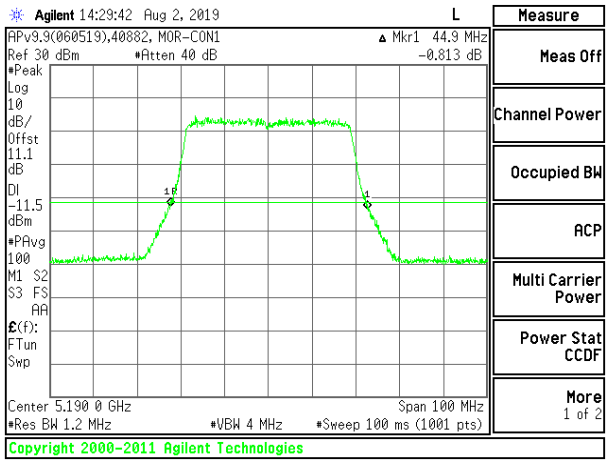
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	45.40	44.90
High	5230	44.70	45.30

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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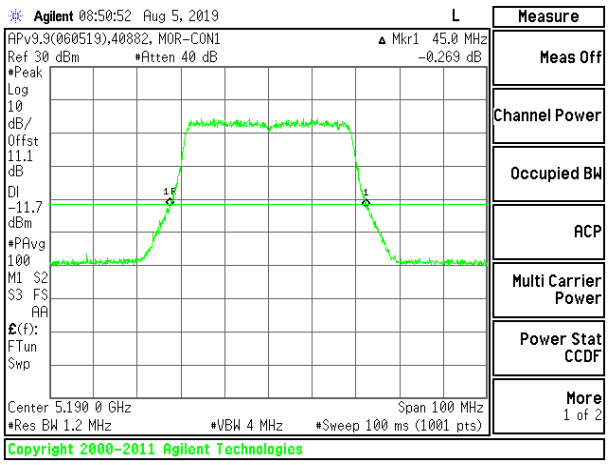
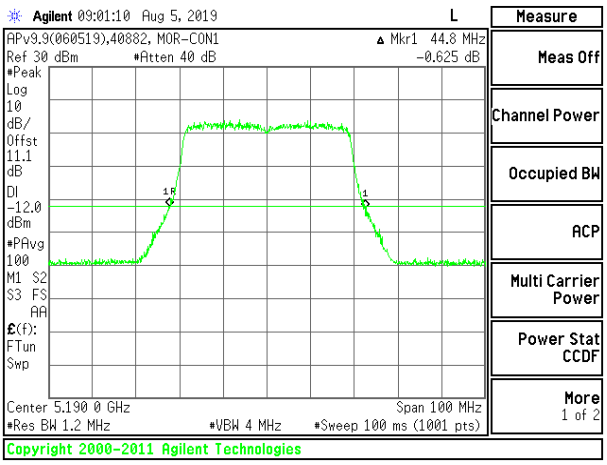
2TX Antenna 1 + Antenna 2 OFDMA MODE – 484-Tones, RU Index 65

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	45.00	44.80
High	5230	45.20	44.90

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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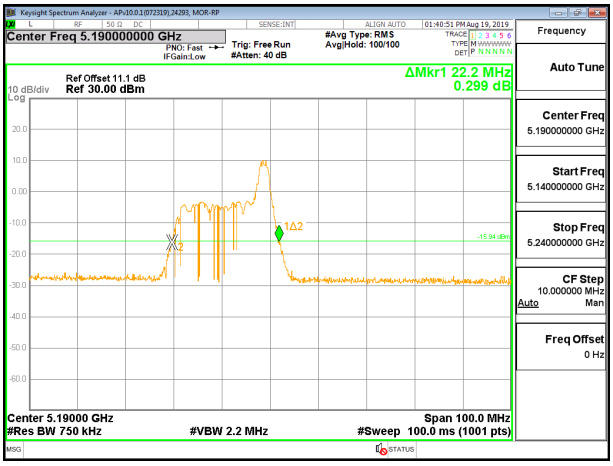
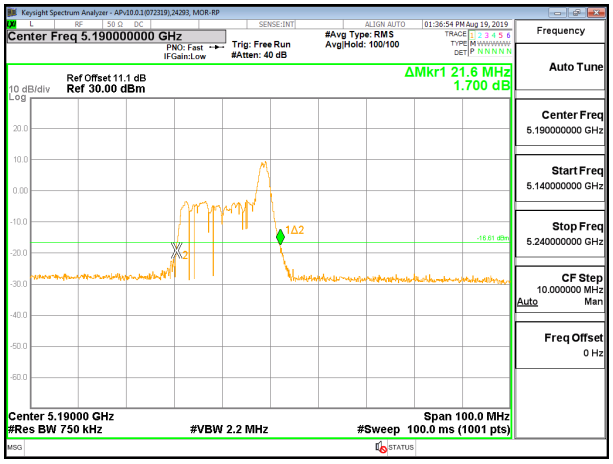
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5190	22.20	21.60
High	5230	22.80	23.50

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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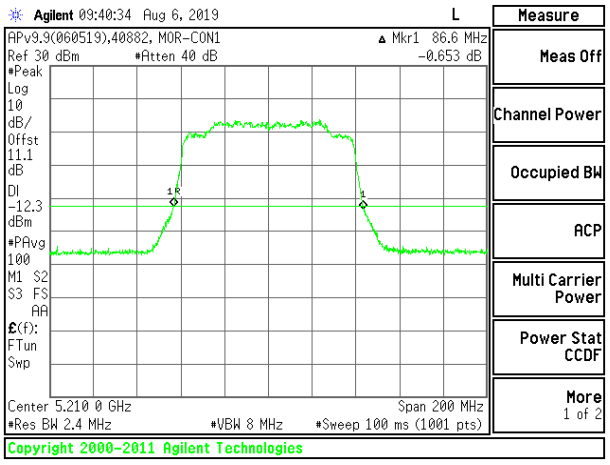
9.2.3. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

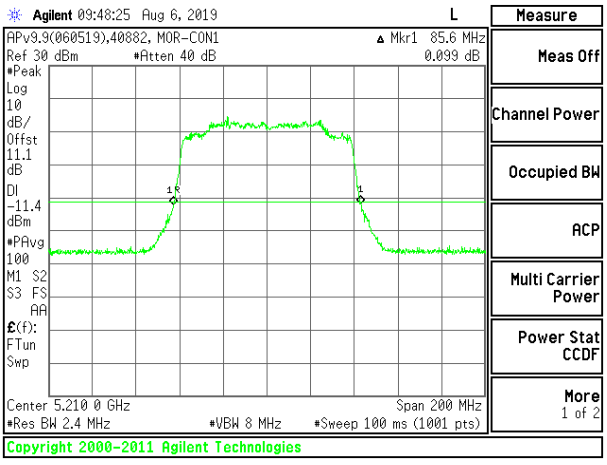
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	86.60	85.60

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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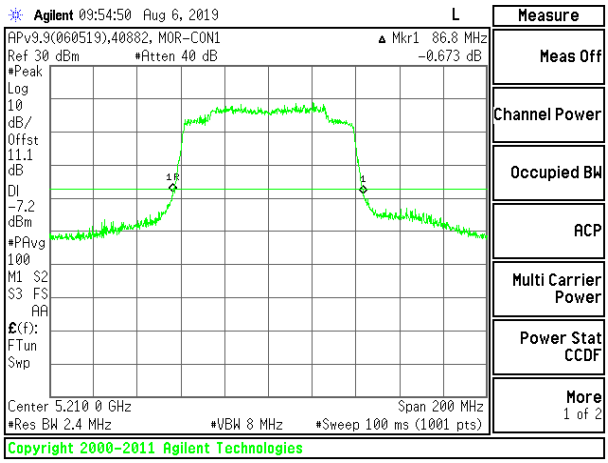
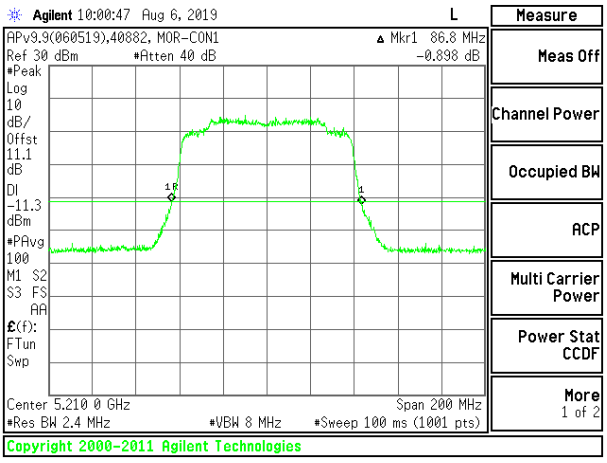
2TX Antenna 1 + Antenna 2 OFDMA MODE – 996-Tones, RU Index 67

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	86.80	86.80

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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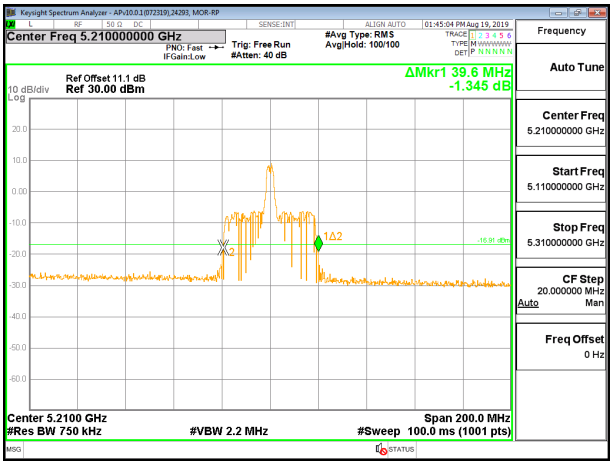
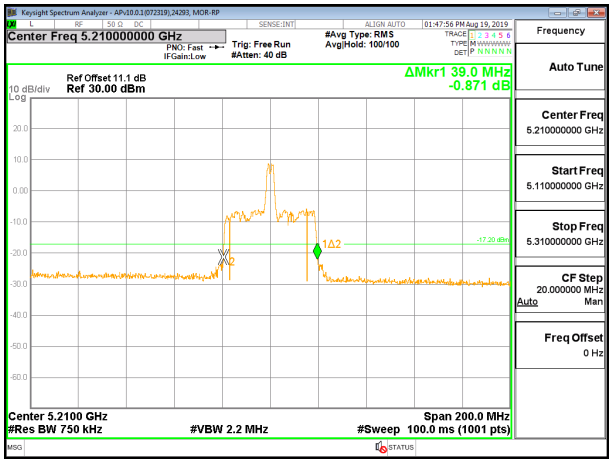
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5210	39.60	39.00

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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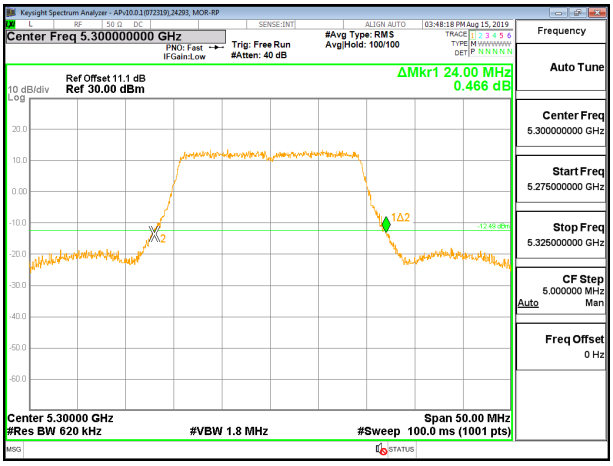
9.2.4. 802.11ax HE20 MODE IN THE 5.3 GHz BAND

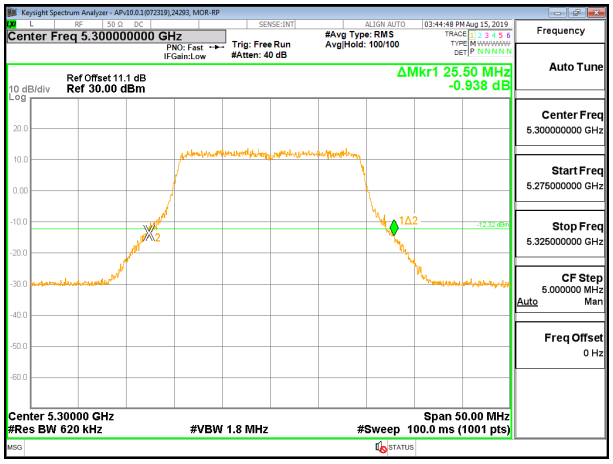
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	24.65	24.50
Mid	5300	24.00	25.50
High	5320	25.05	24.20

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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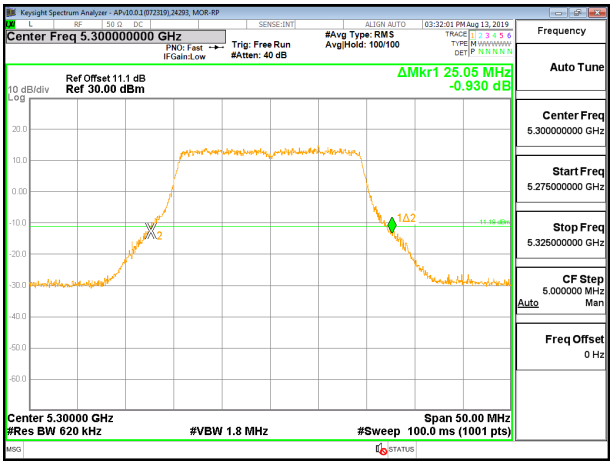
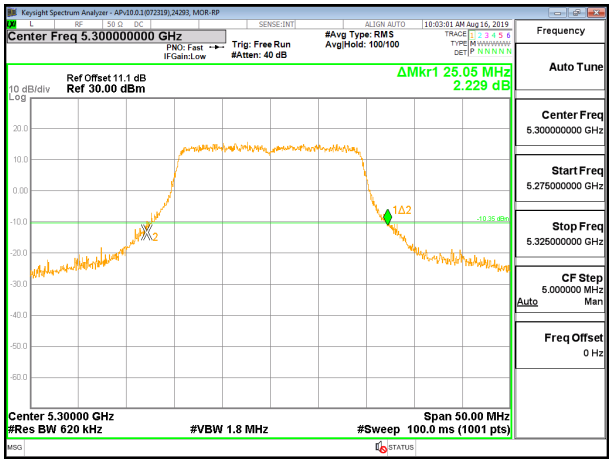
2TX Antenna 1 + Antenna 2 OFDMA MODE – 242-Tones, RU Index 61

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	25.05	24.75
Mid	5300	25.05	25.05
High	5320	23.95	25.00

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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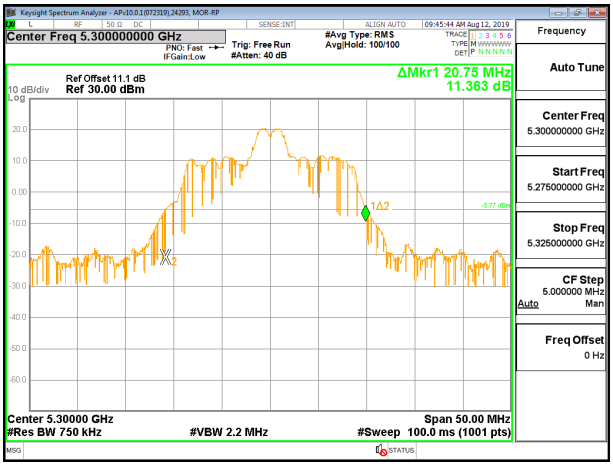
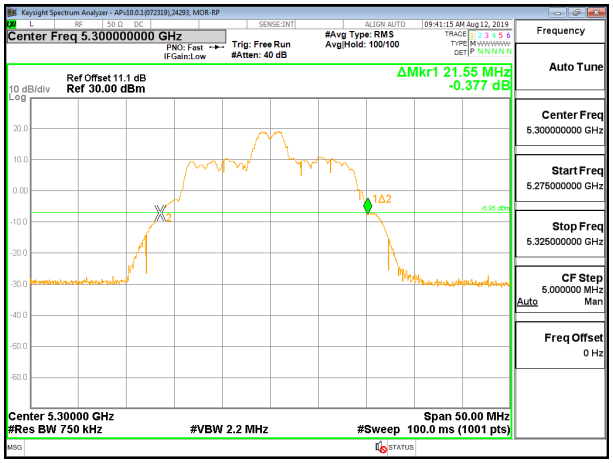
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5260	21.45	20.65
Mid	5300	20.75	21.55
High	5320	21.35	21.05

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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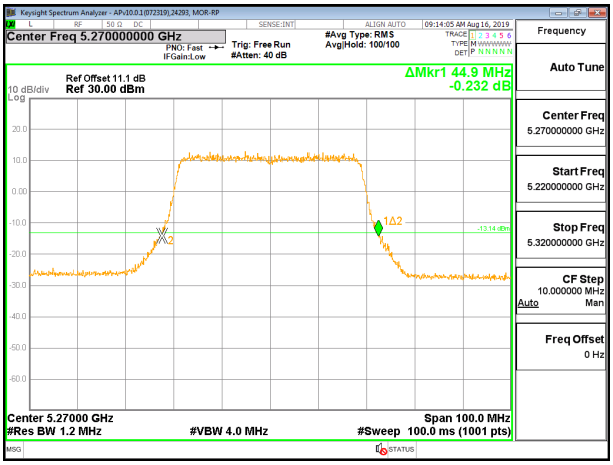
9.2.5. 802.11ax HE40 MODE IN THE 5.3 GHz BAND

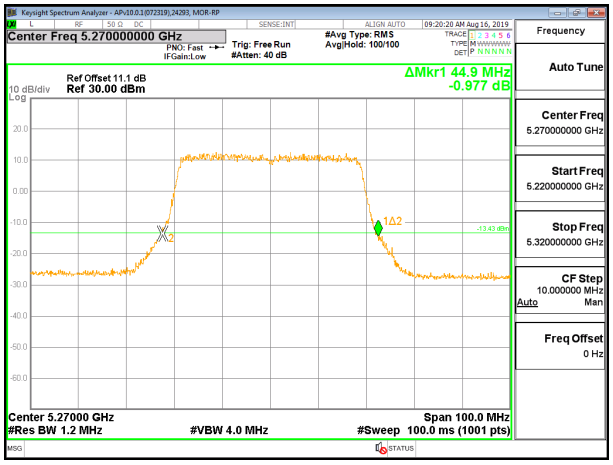
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5270	44.90	44.90
High	5310	45.20	45.00

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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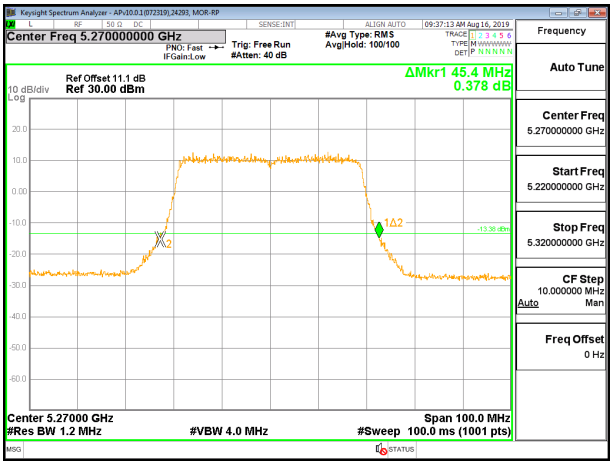
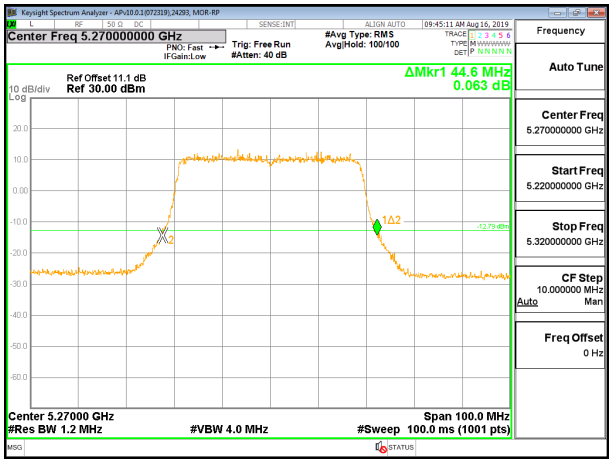
2TX Antenna 1 + Antenna 2 OFDMA MODE – 484-Tones, RU Index 65

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5270	45.40	44.60
High	5310	44.20	46.50

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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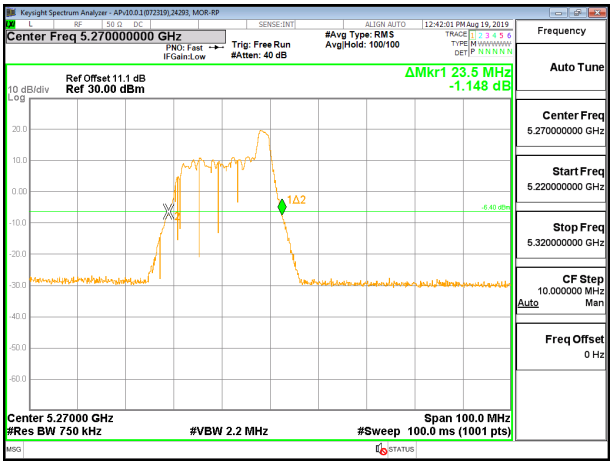
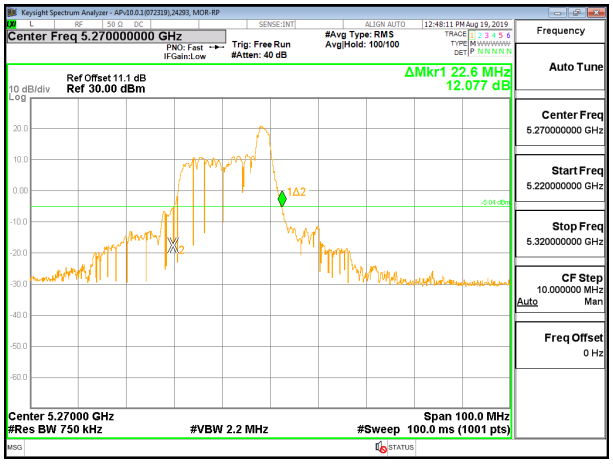
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Low	5270	23.50	22.60
High	5310	23.60	23.60

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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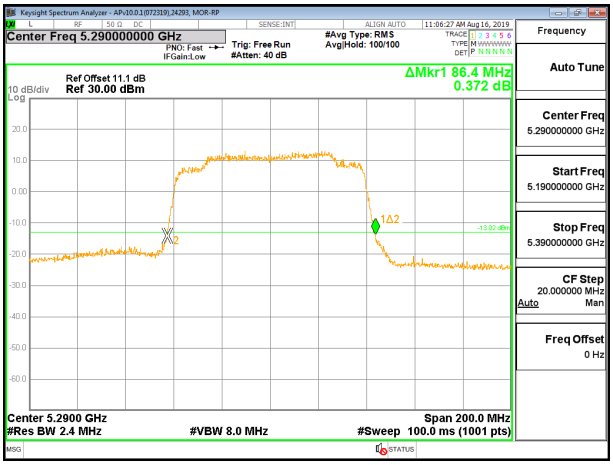
9.2.6. 802.11ax HE80 MODE IN THE 5.3 GHz BAND

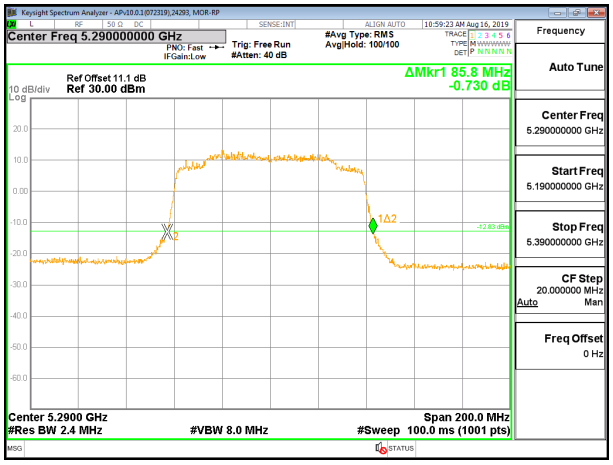
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5290	86.40	85.80

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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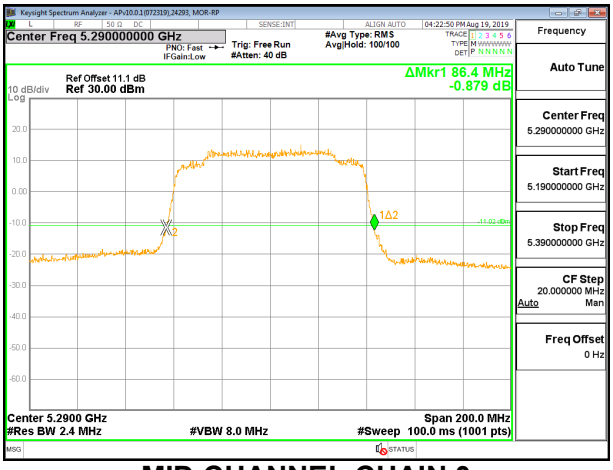
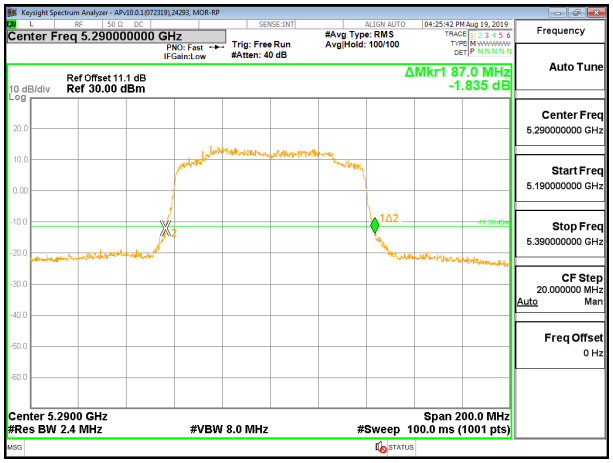
2TX Antenna 1 + Antenna 2 OFDMA MODE – 996-Tones, RU Index 67

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5290	86.40	87.00

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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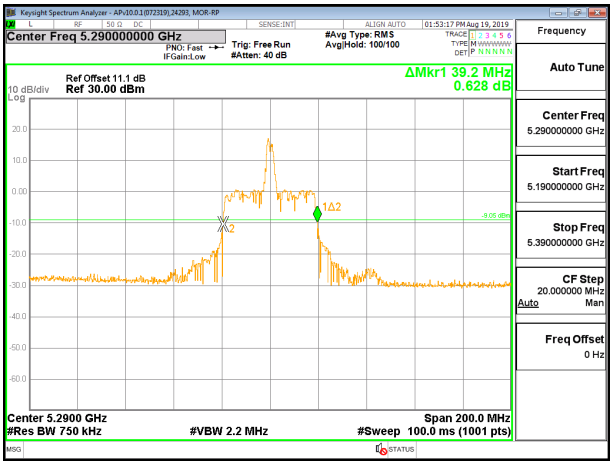
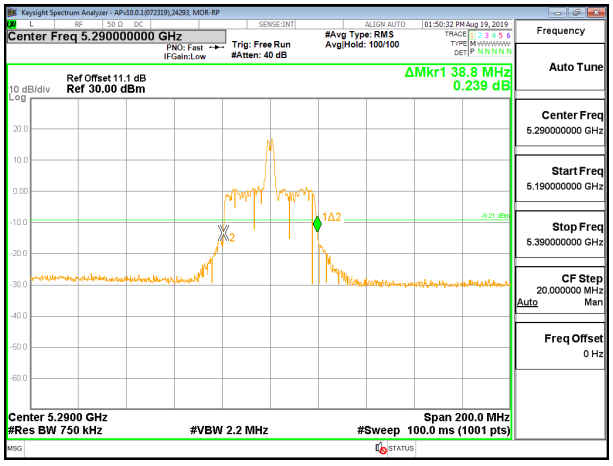
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5290	39.20	38.80

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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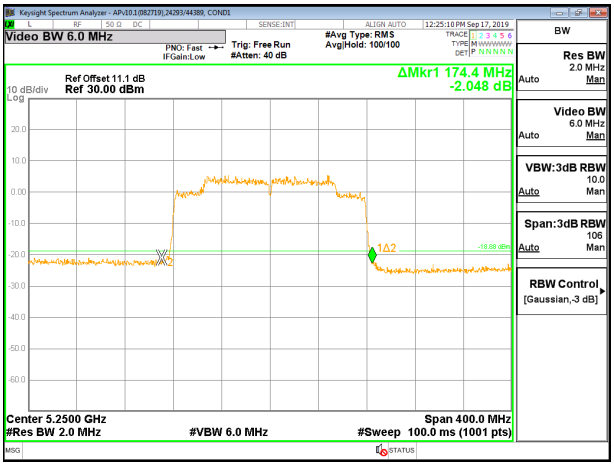
9.2.7. 802.11ax HE160 MODE IN THE 5.2 & 5.3 GHz BAND

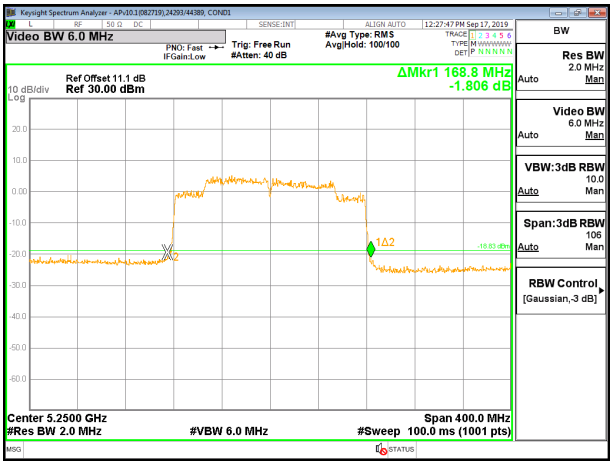
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	174.40	168.80

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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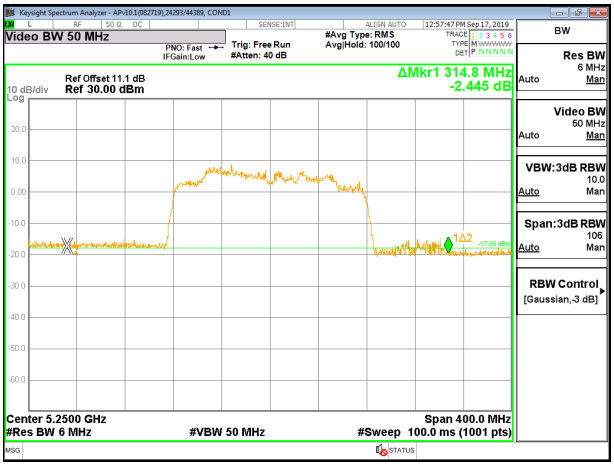
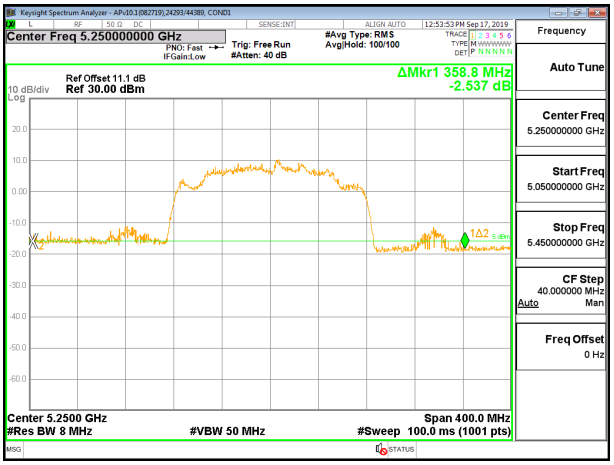
2TX Antenna 1 + Antenna 2 OFDMA MODE – 2x996-Tones, RU Index 68

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	314.80	358.80

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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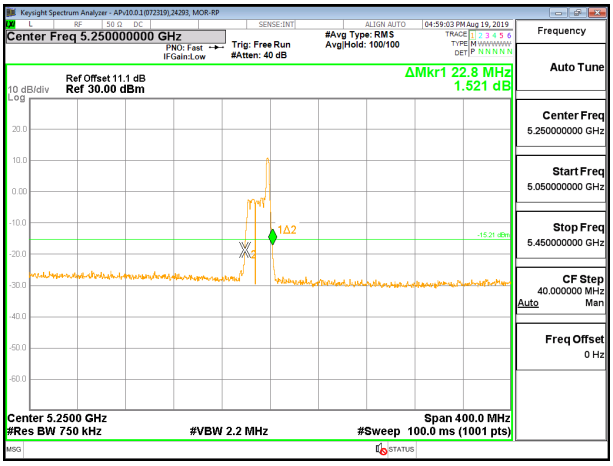
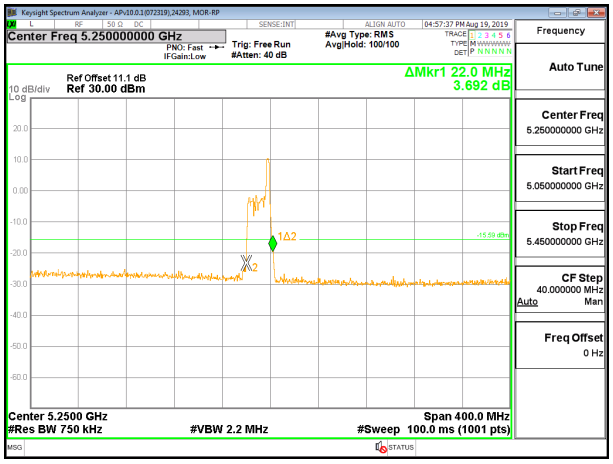
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth Chain 0 (MHz)	26 dB Bandwidth Chain 1 (MHz)
Mid	5250	22.80	22.00

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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9.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

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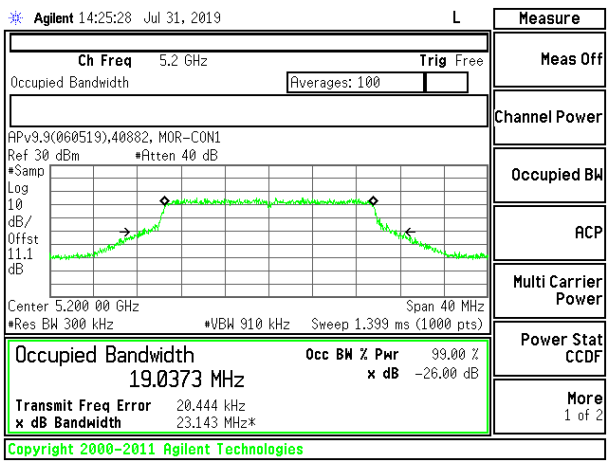
9.3.1. 802.11ax HE20 MODE IN THE 5.2 GHz BAND

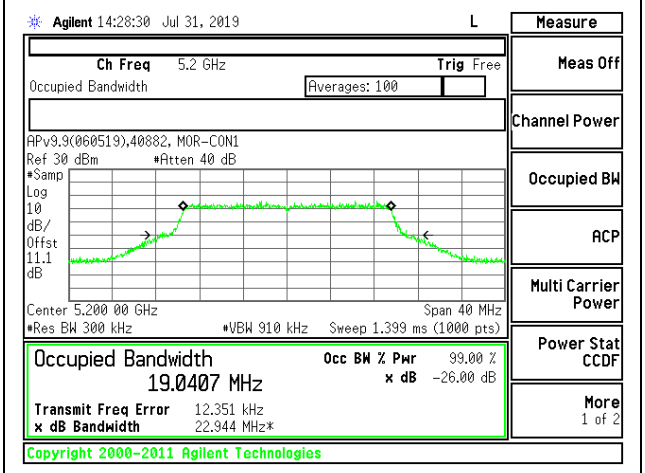
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5180	19.078	19.034
Mid	5200	19.037	19.041
High	5240	19.045	19.010

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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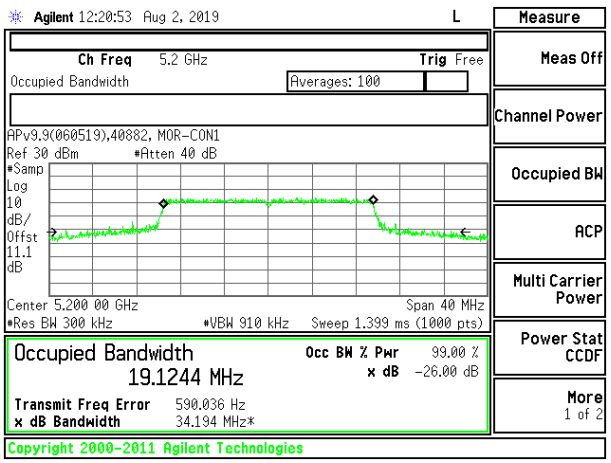
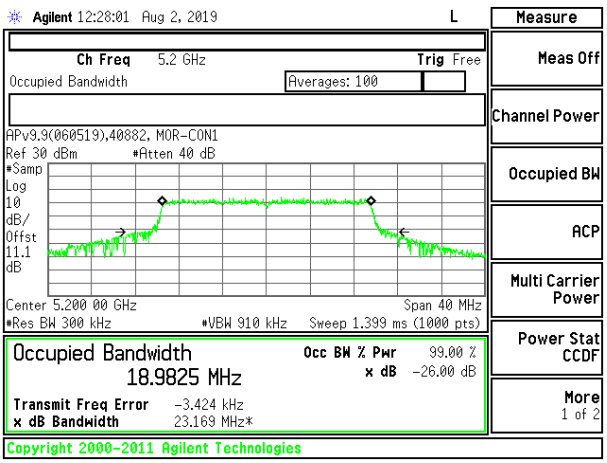
2TX Antenna 1 + Antenna 2 OFDMA MODE – 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5180	18.947	18.954
Mid	5200	19.124	18.983
High	5240	18.964	18.945

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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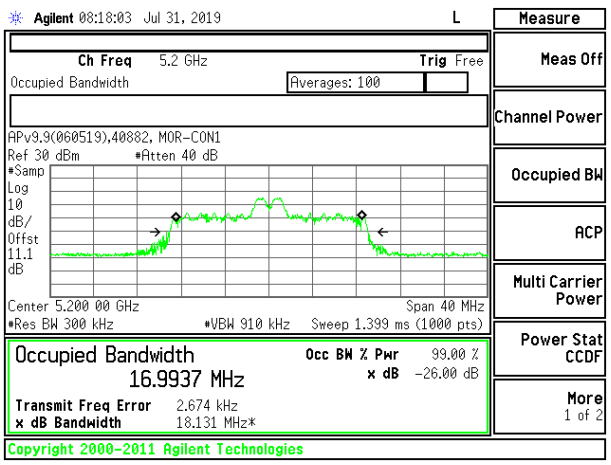
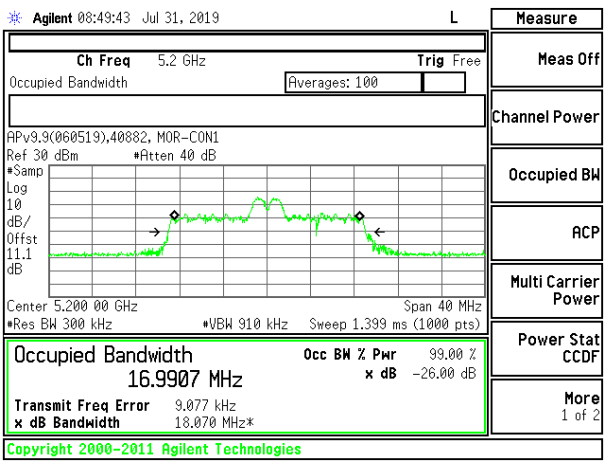
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5180	16.980	16.885
Mid	5200	16.994	16.991
High	5240	16.954	16.904

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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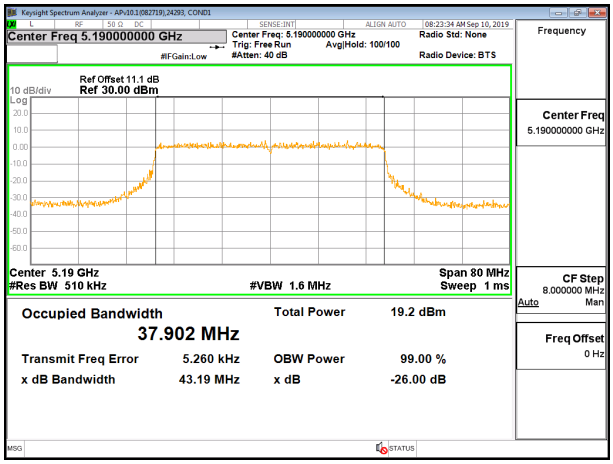
9.3.2. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

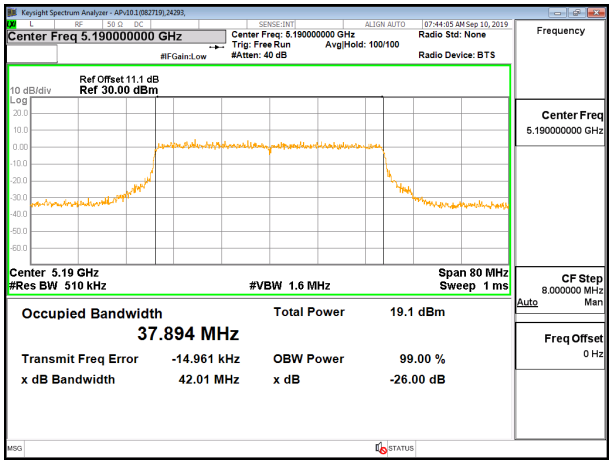
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5190	37.902	37.894
High	5230	38.091	37.894

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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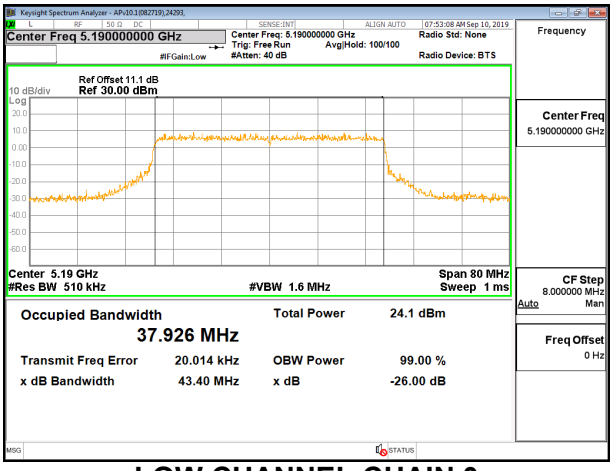
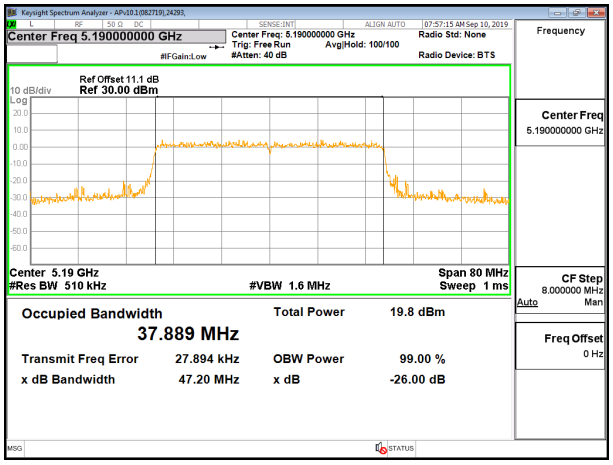
2TX Antenna 1 + Antenna 2 OFDMA MODE – 484-Tones, RU Index 65

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5190	37.926	37.889
High	5230	37.890	37.889

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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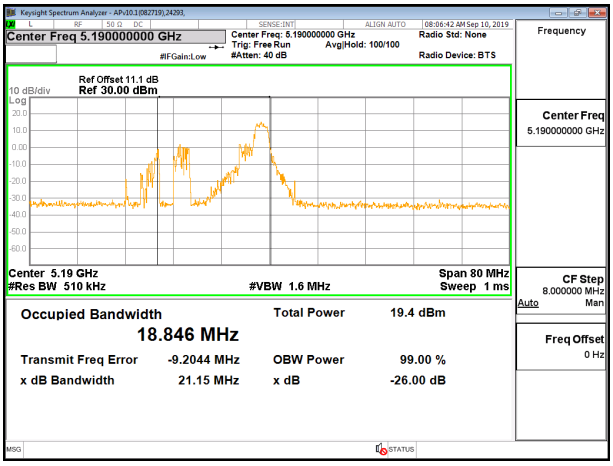
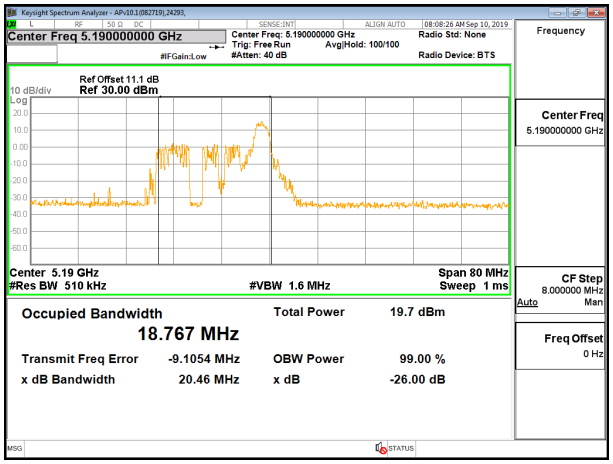
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5190	18.846	18.767
High	5230	18.139	18.245

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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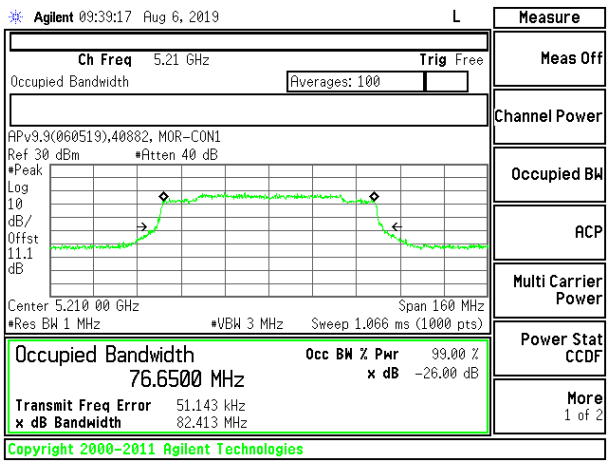
9.3.3. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

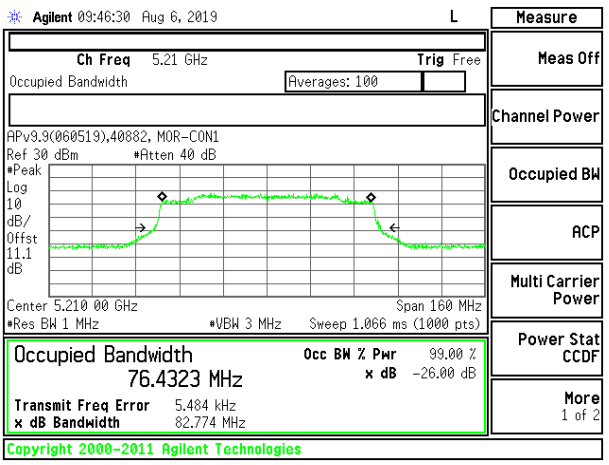
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Mid	5210	76.650	76.432

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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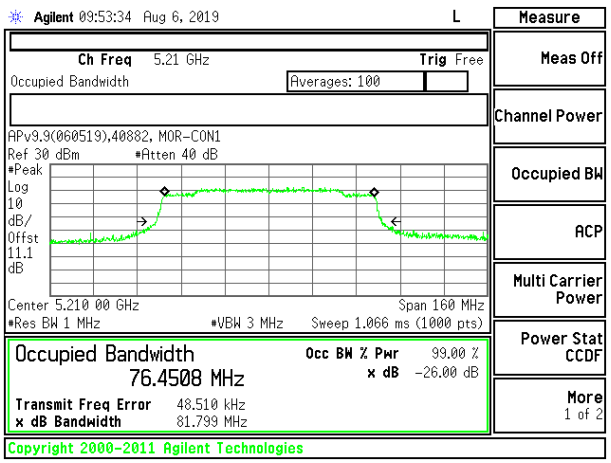
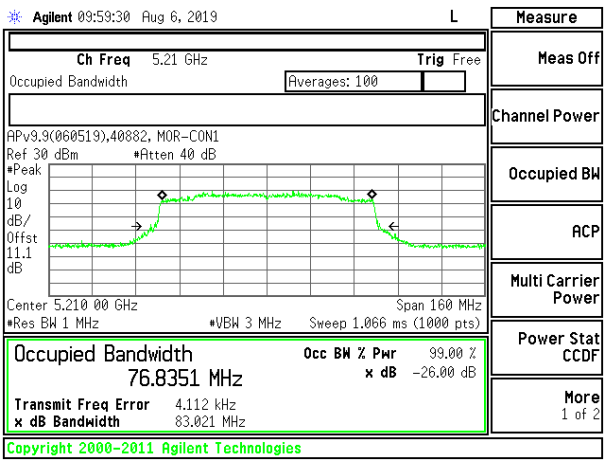
2TX Antenna 1 + Antenna 2 OFDMA MODE – 996-Tones, RU Index 67

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Mid	5210	76.451	76.835

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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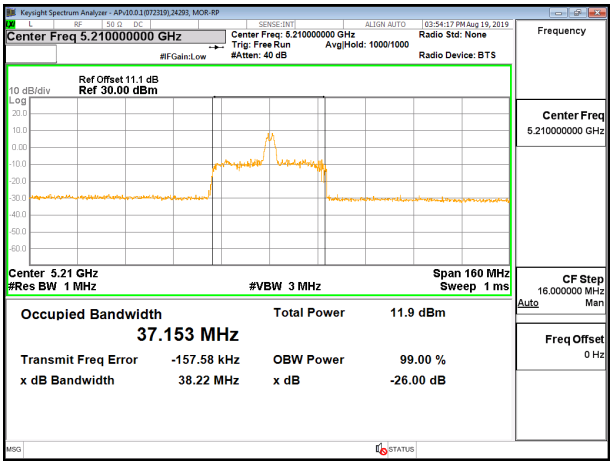
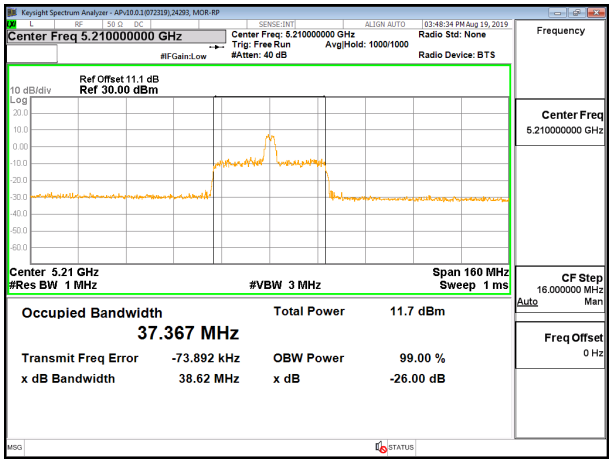
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 18

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Mid	5210	37.153	37.367

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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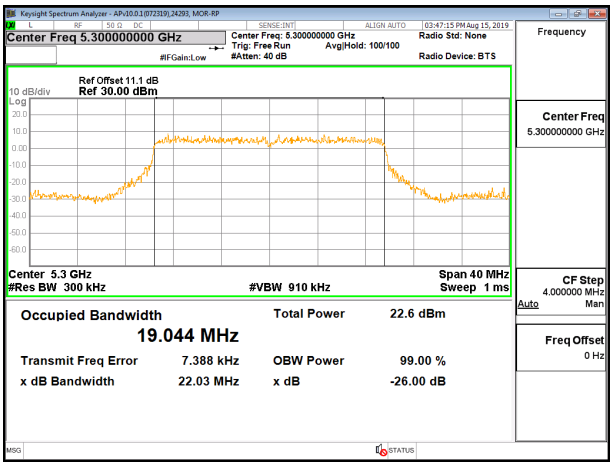
9.3.4. 802.11ax HE20 MODE IN THE 5.3 GHz BAND

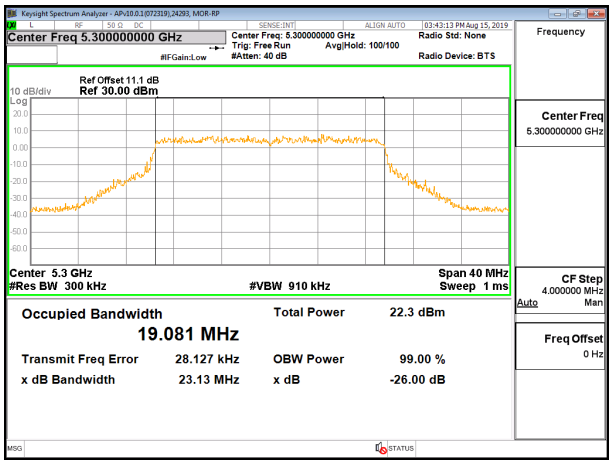
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5260	19.132	19.050
Mid	5300	19.044	19.081
High	5320	19.016	19.125

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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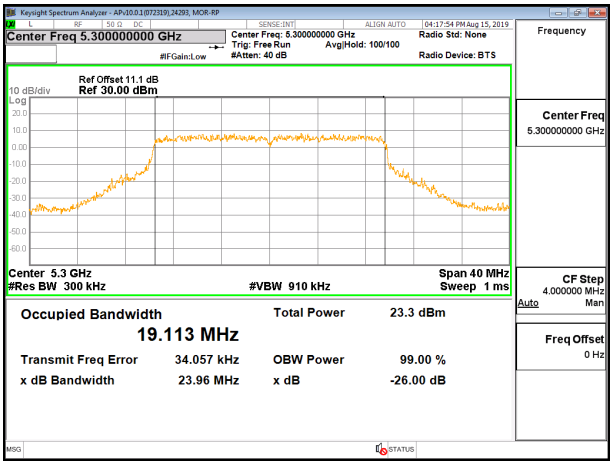
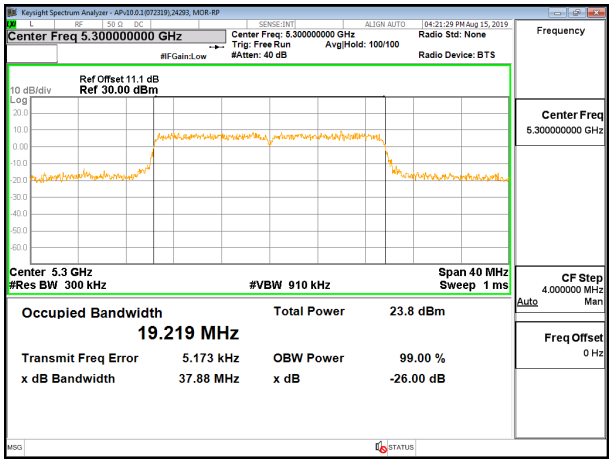
2TX Antenna 1 + Antenna 2 OFDMA MODE – 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5260	19.080	19.069
Mid	5300	19.113	19.219
High	5320	19.068	19.087

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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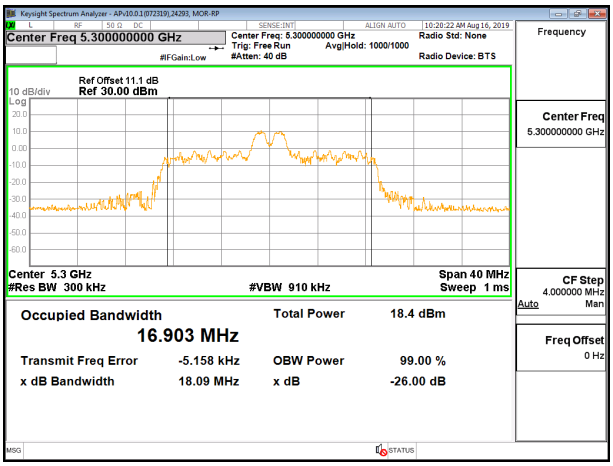
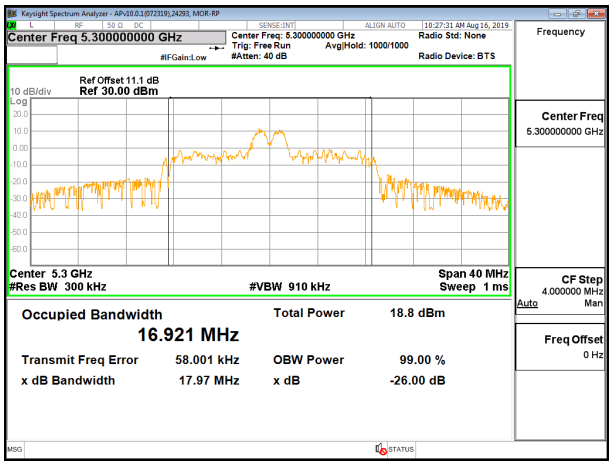
2TX Antenna 1 + Antenna 2 OFDMA MODE – 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5260	17.002	17.070
Mid	5300	16.903	16.921
High	5320	17.067	16.895

MID CHANNEL



MID CHANNEL CHAIN 0



MID CHANNEL CHAIN 1

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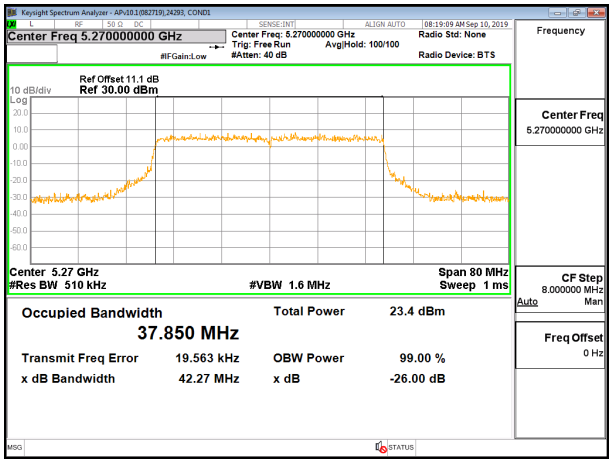
9.3.5. 802.11ax HE40 MODE IN THE 5.3 GHz BAND

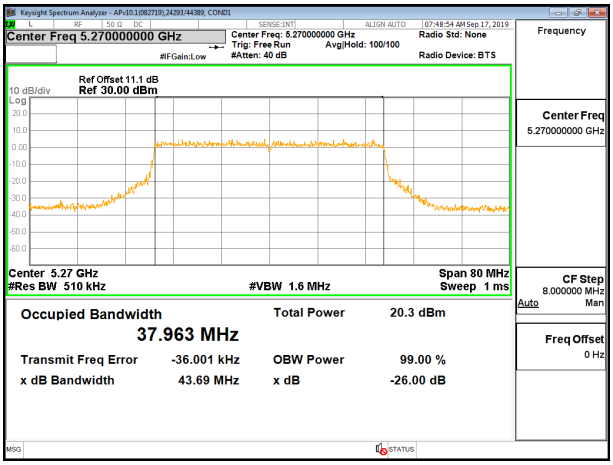
2TX Antenna 1 + Antenna 2 SU MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5270	37.850	37.963
High	5310	37.873	37.830

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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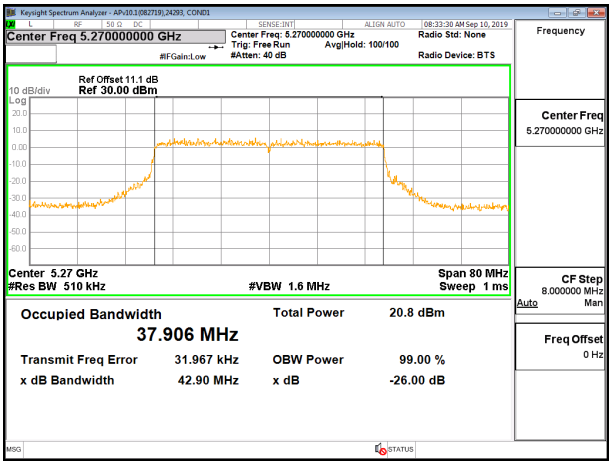
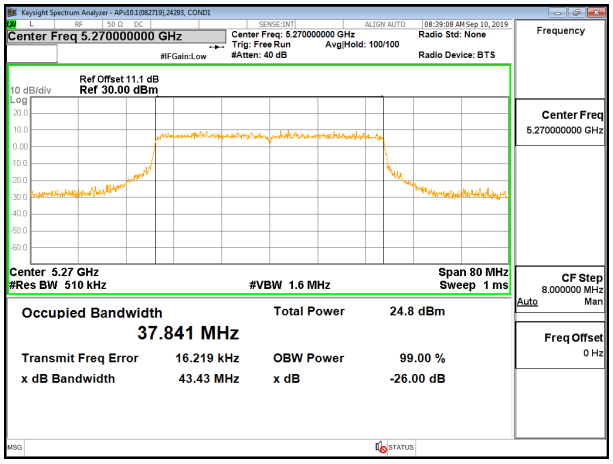
2TX Antenna 1 + Antenna 2 OFDMA MODE – 484-Tones, RU Index 65

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low	5270	37.906	37.841
High	5310	37.849	37.910

LOW CHANNEL



LOW CHANNEL CHAIN 0



LOW CHANNEL CHAIN 1

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