TEST REPORT

Report Number. : 13571601-E5V2

Applicant : APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

Model : A2483 (Parent Model, Full Test)
A2640, A2636, A2638, A2639 (Variant Models)

Brand : APPLE

FCC ID : BCG-E4000A (Parent Model)
BCG-E4034A, BCG-E4002A, BCG-E4033A (Variant Models)

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
July 20, 2021

Prepared by:
UL Verification Services Inc.
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ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	6/24/2021	Initial Issue	Chin Pang
V2	7/20/2021	Address TCB's Questions on Section 9.4 and removed page 290 empty page	Chin Pang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

EUT DESCRIPTION: SMARTPHONE

MODEL: A2483 (PARENT MODEL)
A2640, A2636, A2638, A2639 (VARIANT MODELS)

BRAND: APPLE

FCC ID: BCG-E4000A (PARENT MODEL)
BCG-E4034A, BCG-E4002A, BCG-E4033A (VARIANT MODELS)

SERIAL NUMBER: L7LV2RR670 (CONDUCTED)
HXKPFXHXK2 (RADIATED)

SAMPLE RECEIPT DATE: 10/26/2020, 06/11/2021

DATE TESTED: OCTOBER 26, 2020 -JUNE 18, 2021

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	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 A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By: Prepared By:

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2. TEST RESULT SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

FCC Clause	Requirement	Result	Comment
See Comment	Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	6 dB BW	Complies	None.
15.407 (a) (1-4), (h) (1)	Output Power	Complies	None.
15.407 (a) (1-3, 5)	PSD	Complies	None.
15.209, 15.205, 15.407 (b)	Radiated Emissions	Complies	None.
15.207	AC Mains Conducted Emissions	Complies	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:
- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- FCC KDB 662911 D01 v02r01
- FCC KDB 789033 D02 v02r01-
- ANSI C63.10-2013
- KDB 414788 D01 Radiated Test Site v01r01

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building 1: 47173 Benicia Street, Fremont, CA 94538	US0104	2324A	208313
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538	US0104	22541	208313
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538	US0104	2324B	208313

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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

5.4. 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

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS and NFC. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

Testing was performed on the parent model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC and by ISED-Canada.

The Model and FCC ID covered by this report includes:

Parent Model: A2483, FCC ID: BCG-E4000A

Variant Models: A2640; FCC ID: BCG-E4034A
A2636; FCC ID: BCG-E4002A
A2638; FCC ID: BCG-E4033A
A2639; FCC ID: BCG-E4034A

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6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 1TX			
5180-5240	802.11a	Covered by 802.11n HT20 1TX	
5180-5240	802.11n HT20	19.88	97.27
5190-5230	802.11n HT40	20.39	109.40
5180-5240	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5190-5230	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5210	802.11ac VHT80	17.39	54.83
5180-5240	802.11ax HE20	19.96	99.08
5190-5230	802.11ax HE40	20.35	108.39
5210	802.11ax HE80	16.91	49.09
5.2 GHz band, 2TX			
5180-5240	802.11n HT20 CDD	19.88	97.27
5180-5240	802.11n HT20 SDM/STBC	Covered by 802.11n HT20 2TX CDD	
5190-5230	802.11n HT40 CDD	22.40	173.78
5190-5230	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5180-5240	802.11ac VHT20 SDM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5190-5230	802.11ac VHT40 SDM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5210	802.11ac VHT80 CDD	19.25	84.14
5210	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5180-5240	802.11ax HE20 OFDMA	19.97	99.31
5190-5230	802.11ax HE40 OFDMA	22.37	172.58
5210	802.11ax HE80 OFDMA	18.95	78.52

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5.3 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 1TX			
5260 - 5320	802.11a	Covered by 802.11n HT20 1TX	
5260 - 5320	802.11n HT20	19.95	98.86
5270 - 5310	802.11n HT40	20.40	109.65
5260 - 5320	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5270 - 5310	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5290	802.11ac VHT80	16.97	49.77
5260 - 5320	802.11ax HE20	19.89	97.50
5270 - 5310	802.11ax HE40	20.43	110.41
5290	802.11ax HE80	16.46	44.26
5.3 GHz band, 2TX			
5260 - 5320	802.11n HT20 CDD	19.89	97.50
5260 - 5320	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5270 - 5310	802.11n HT40 CDD	22.49	177.42
5270 - 5310	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5260 - 5320	802.11ac VHT20 SDM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5270 - 5310	802.11ac VHT40 SDM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5290	802.11ac VHT80 CDD	18.35	68.39
5290	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5260 - 5320	802.11n HT20 CDD MCS0	Covered by 802.11n HT20 2TX CDD	
5260 - 5320	802.11n HT20 STBC MCS0	Covered by 802.11n HT20 2TX CDD	
5270 - 5310	802.11n HT40 CDD MCS0	Covered by 802.11n HT40 2TX CDD	
5270 - 5310	802.11n HT40 STBC MCS0	Covered by 802.11n HT40 2TX CDD	
5260 - 5320	802.11ax HE20 OFDMA	19.94	98.63
5270 - 5310	802.11ax HE40 OFDMA	22.42	174.58
5290	802.11ax HE80 OFDMA	18.41	69.34

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5.6 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 1TX			
5500-5720	802.11a	Covered by 802.11n HT20 1TX	
5500-5720	802.11n HT20	19.94	98.63
5510-5710	802.11n HT40	20.45	110.92
5500-5720	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5510-5710	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5530-5690	802.11ac VHT80	20.42	110.15
5500-5720	802.11ax HE20	19.94	98.63
5510-5710	802.11ax HE40	20.44	110.66
5530-5690	802.11ax HE80	20.38	109.14
5.6 GHz band, 2TX			
5500-5720	802.11n HT20 CDD	19.93	98.40
5500-5720	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5510-5710	802.11n HT40 CDD	22.43	174.98
5510-5710	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5500-5720	802.11ac VHT20 SDM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5510-5710	802.11ac VHT40 SDM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5530-5690	802.11ac VHT80 CDD	22.89	194.54
5530-5690	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5500-5720	802.11ax HE20 OFDMA	19.92	98.17
5510-5710	802.11ax HE40 OFDMA	22.43	174.98
5530-5690	802.11ax HE80 OFDMA	22.86	193.20

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5.8 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 1TX			
5745-5825	802.11a	Covered by 802.11n HT20 1TX	
5745-5825	802.11n HT20	21.42	138.68
5755-5795	802.11n HT40	20.40	109.65
5745-5825	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5755-5795	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5775	802.11ac VHT80	20.46	111.17
5745-5825	802.11ax HE20	21.45	139.64
5755-5795	802.11ax HE40	20.41	109.90
5775	802.11ax HE80	20.33	107.89
5.8 GHz band, 2TX			
5745-5825	802.11n HT20 CDD	24.41	276.06
5745-5825	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5755-5795	802.11n HT40 CDD	23.35	216.27
5755-5795	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5745-5825	802.11ac VHT20 STM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5755-5795	802.11ac VHT40 STM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5775	802.11ac VHT80 CDD	23.31	214.29
5775	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5745-5825	802.11ax HE20 OFDMA	24.43	277.33
5755-5795	802.11ax HE40 OFDMA	23.35	216.27
5775	802.11ax HE80 OFDMA	23.33	215.28

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antennas gain and IFA type as provided by the manufacturer' are as follows:

Frequency Range	ANT 6 (Core 0)	ANT 5 (Core 1)
5180 - 5240	-6.3	-4.0
5260 – 5320	-3.8	-4.1
5500 - 5720	-3.3	-3.3
5745 - 5825	-2.7	-3.3

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was WiFi FW Version: 20_10_745_15

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6.5. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z on Ant 6 (Core 0), Ant 5 (Core 1) and 2TX. It was determined that X (Flatbed) orientation was the worst-case orientation for Ant 6; and Y (Landscape) orientation was the worst case for both Ant 5 and 2TX.

IEEE 802.11 ax modes were used to perform on radiated harmonic spurious final test to cover all modes since it has widest bandwidth modulation, highest power density and power tuned to maximum based on among all the modes. For testing purposes, radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-40GHz, and power line conducted emissions were performed with the EUT set at the 2TX CDD mode among the CDD/SDM modes with power setting equal or higher than FCC & IC conducted SISO modes as worst-case scenario.

For Radiated band edge test all test modes have been investigated with power setting equal or higher than FCC & IC conducted SISO modes as worst-case scenario.

Below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz, the worst-case configuration reported was tested with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop. There were no emissions found below 30MHz within 20dB of the limit

For simultaneous transmission with the Bluetooth was investigated, no noticeable emission was found.

The output power and psd for the IEEE 802.11 ax mode were investigated between all different tones, and we found that SU mode had the highest output power and the lowest tone had the highest PSD readings. And after investigation, antenna port conducted tests were performed on both SU and lowest tones; radiated spurious emission and radiated band edge tests were performed on full RU and lowest tones

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. For radiated bandedge, following are the worst-case data rates set for test:

802.11n HT20mode: MCS7
802.11n HT40mode: MCS7
802.11ac VHT80 mode: MCS9
802.11ax HE20/HE40/HE80 FULL Tones RU & 26 Tones RU, MCS11

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The WiFi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		**Manufacturer**	**Model**	**Serial Number**		**FCC ID/ DoC**
Laptop		Apple	Macbook Pro	C02YL3ZMJHC8		BCGA1989
Laptop AC/DC adapter		Liteon Technology	A1424	NSW25679		DoC
EUT AC/DC adapter		Apple	A1720	C3D8417A7R93KVPA8		DoC
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Shielded	1.0	N/A
3	Antenna	1	SMA	Un-shielded	0.2	To spectrum Analyzer
I/O CABLES (RF RADIATED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Un-shielded	1	N/A

TEST SETUP

The EUT setup is shown as below. Test software exercised the radio card.

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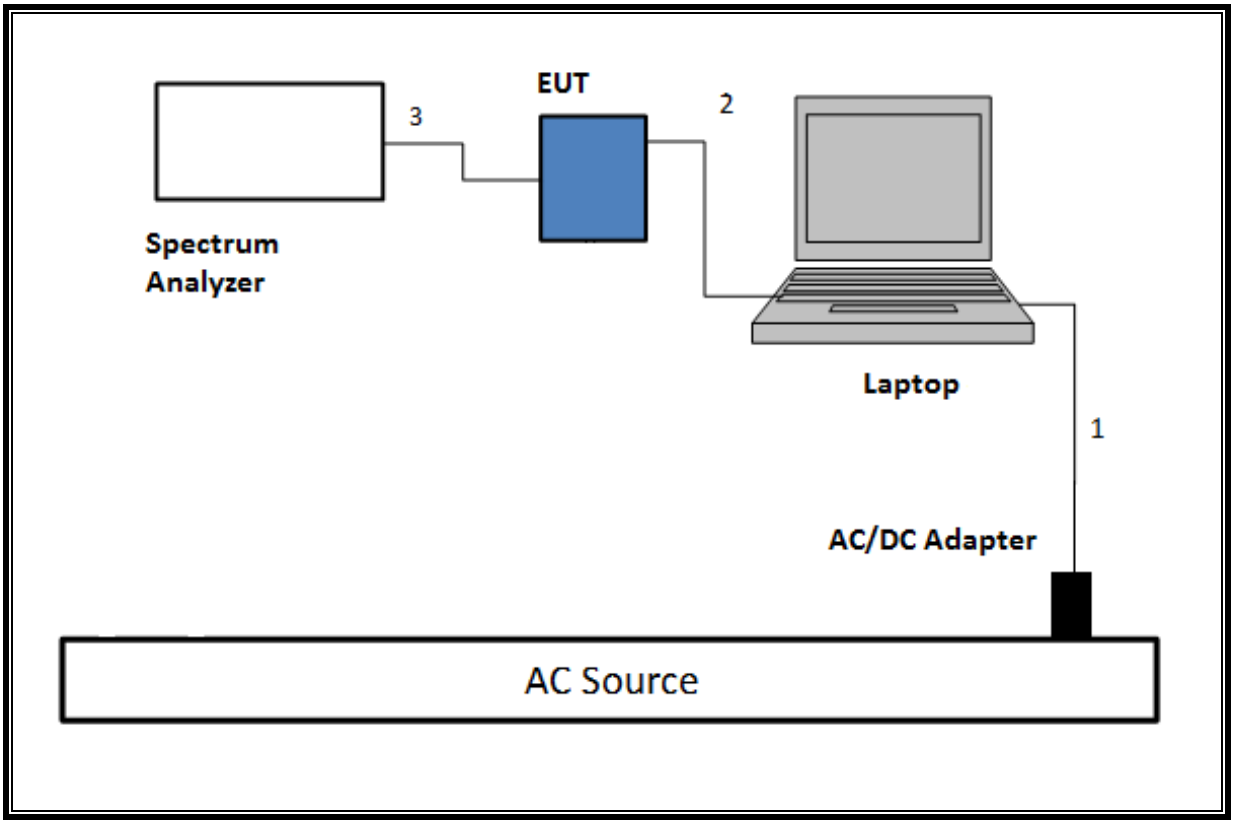
TEST SETUP - CONDUCTED TESTS

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

SETUP DIAGRAM



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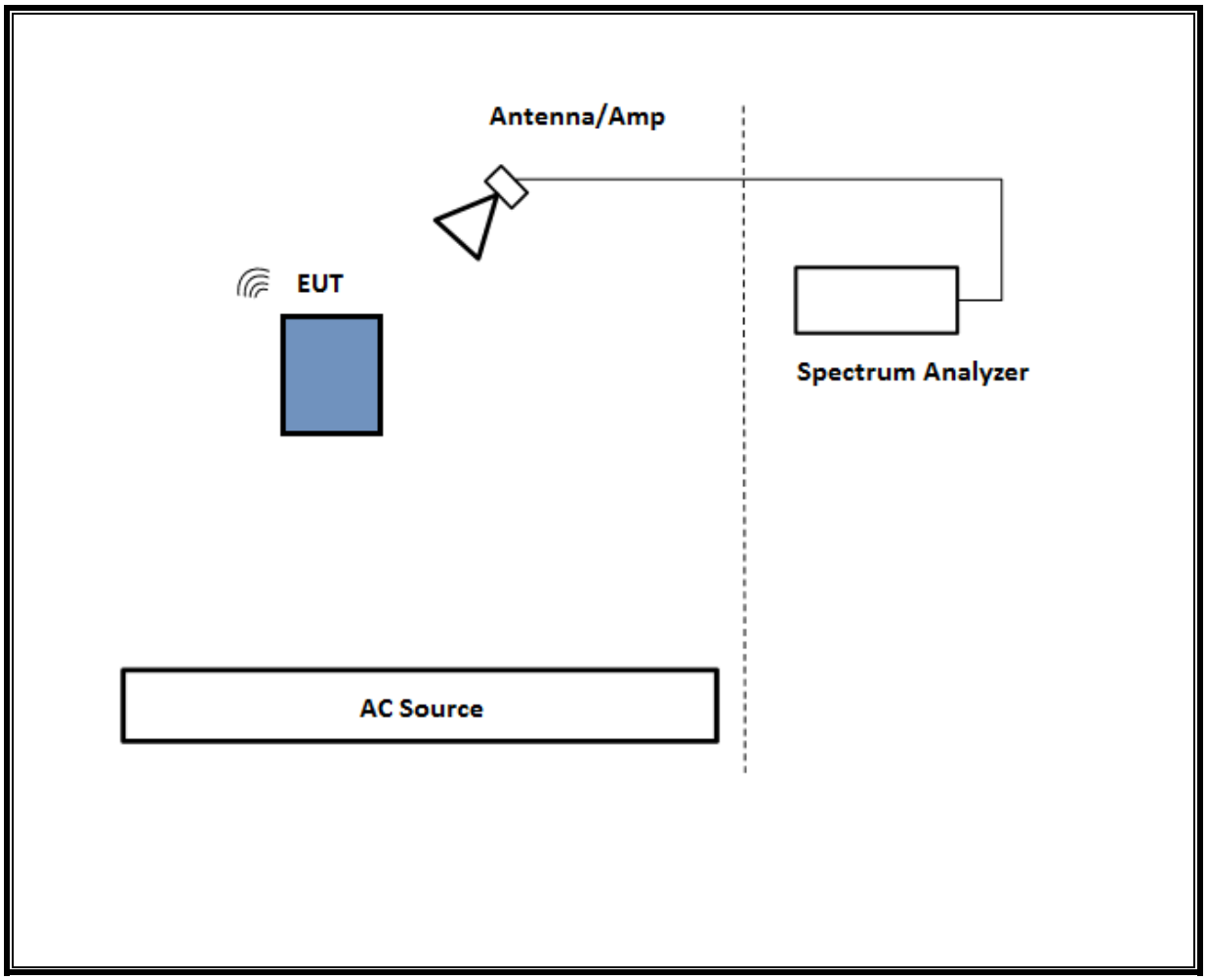
SETUP DIAGRAM FOR RADIATED TESTS Above 1GHz



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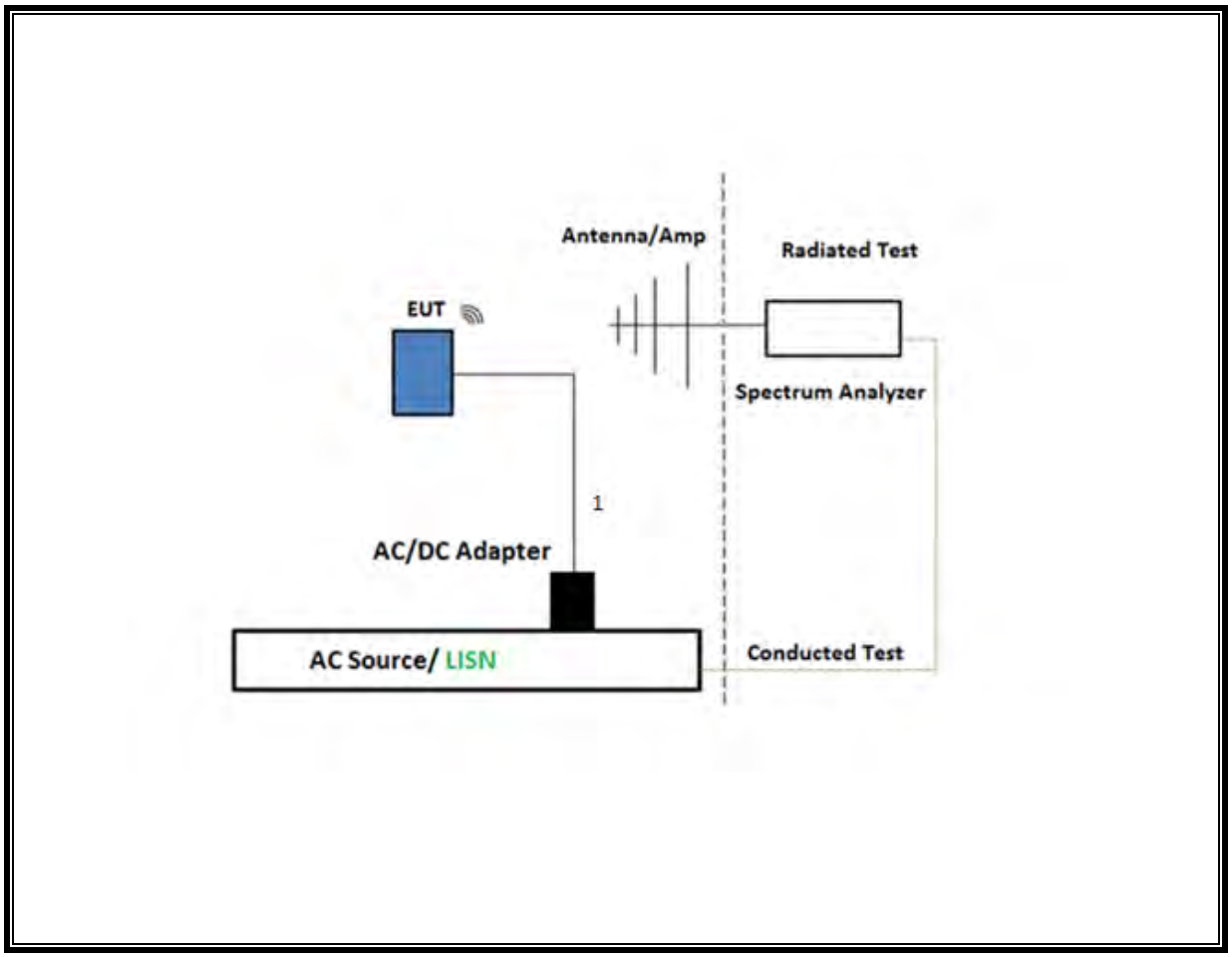
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



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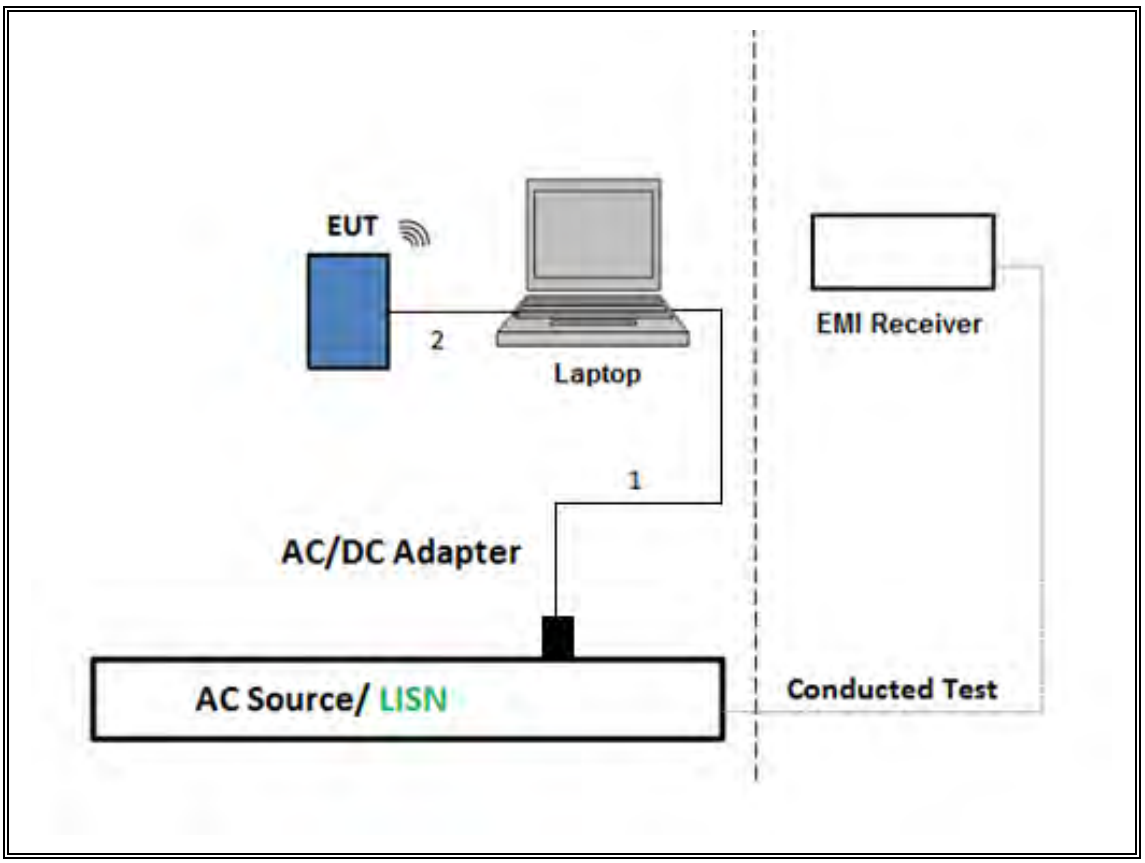
TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



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7. 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

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.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

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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 LIST					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T119	04/21/2021	04/21/2020
*Amplifier, 1 to 18GHz	Amplical	AMP0.1G18-47-20	172121	06/10/2021	09/29/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T342	01/25/2022	01/25/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	PRE0213971	09/25/2021	09/25/2020
RF Amplifier, 1-18GHz	AMPLICAL	AMP0.1G18-47-20	190323	12/03/2021	12/03/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	PRE0078107	03/01/2022	03/01/2021
Amplifier, 1 to 18GHz	Amplical	AMP1G18-35	138301	03/30/2022	03/30/2021
Antenna, BroadBand Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	PRE0184052	11/12/2021	11/12/2020
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0180174	12/29/2021	12/29/2020
EMI Test Receiver	Rohde & Schwarz	ESW44	201500	11/19/2021	11/19/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	PRE0213833	09/25/2021	09/25/2020
Amplifier, 1 to 18GHz	Amplical	AMP0.1G18-47-20	206055	03/10/2022	03/10/2021
Antenna, Horn 1-18GHz	ETS Lindgren	3117	PRE0213973	08/20/2021	08/20/2020
RF Amplifier, 1-18GHz	AMPLICAL	AMP1G7-24-27	205876	03/14/2022	03/14/2021
EMI Test Receiver	Rohde & Schwarz	ESW44	201499	11/19/2021	11/19/2020
Power Meter, P-series single channel	Keysight	N1912A	T1244	01/25/2022	01/25/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T342	01/25/2022	01/25/2021
Power Sensor	Keysight	N19**2**1A	T1224	01/25/2022	01/25/2021
Antenna, Active Loop 9KHz to 30MHz	EMCO	6502	T35	11/23/2021	11/23/2020
*Antenna Horn, 18 to 26GHz	ARA	SWH-28	T125	04/17/2021	04/17/2020
*Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	04/08/2021	04/19/2020
Antenna, Horn 26.5GHz to 40GHz	ARA	MWH-2640	T90	05/03/2022	05/03/2021
There's a	Miteq	TTA2640-35-HG	T1864	04/19/2022	04/19/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/27/2022	01/27/2021
Power Meter, P-series single channel	Keysight	N1912A	T1273	01/21/2022	01/21/2021
Power Sensor	Keysight	N1921A	T1226	02/19/2022	02/19/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T906	07/20/2021	07/20/2020
EMI Receiver	Rohde & Schwarz	ESW44	201501	09/23/2021	09/23/2020
EMI Receiver	Rohde & Schwarz	ESW44	201502	09/17/2021	09/17/2020

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AC Line Conducted					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	T1436	02/19/2022	02/19/2021
Power Cable, Line Conducted Emissions	UL	PR1	T861	10/27/2021	10/27/2020
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01	PRE0186446	01/20/2022	01/20/2021
UL AUTOMATION SOFTWARE					
Radiated Software	UL	UL EMC	Ver 9.5, Mar 6, 2020		
Conducted Software	UL	UL EMC	2020.2.26		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, February 21, 2020		

Note: *Testing is completed before equipment expiration date.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

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)
5GHz Band						
802.11n HT20 1Tx MSC0	1.917	1.938	0.989	98.92%	0.00	0.010
802.11n HT20 1Tx MCS7	0.228	0.249	0.918	91.75%	0.37	4.386
802.11n HT20 CDD MCS0	1.920	1.938	0.991	99.07%	0.00	0.010
802.11n HT20 CDD MCS7	0.136	0.157	0.869	86.88%	0.61	7.353
802.11n HT40 1Tx MCS0	0.942	0.962	0.979	97.92%	0.09	1.062
802.11n HT40 1Tx MCS7	0.128	0.148	0.866	86.61%	0.62	7.806
802.11n HT40 CDD MCS0	0.944	0.964	0.979	97.93%	0.09	1.059
802.11n HT40 CDD MCS7	0.128	0.148	0.866	86.59%	0.63	7.825
802.11ac VHT80 1Tx MCS0	0.460	0.480	0.958	95.83%	0.18	2.174
802.11ac VHT80 1Tx MCS9	0.072	0.092	0.783	78.26%	1.06	13.889
802.11ac VHT80 CDD MCS0	0.459	0.478	0.960	96.03%	0.18	2.179
802.11ac VHT80 CDD MCS9	0.060	0.080	0.752	75.19%	1.24	16.667
802.11ax HE20 1Tx MCS0	1.560	1.580	0.987	98.73%	0.00	0.010
802.11ax HE20 1Tx MCS11	3.995	4.025	0.993	99.25%	0.00	0.010
802.11ax HE20 OFDMA MCS0	1.560	1.580	0.987	98.73%	0.00	0.010
802.11ax HE20 OFDMA MCS11	3.990	4.025	0.991	99.13%	0.00	0.010
802.11ax HE40 1Tx MCS0	1.546	1.566	0.987	98.72%	0.00	0.010
802.11ax HE40 1Tx MCS11	3.990	4.025	0.991	99.13%	0.00	0.010
802.11ax HE40 OFDMA MCS0	1.544	1.566	0.986	98.60%	0.00	0.010
802.11ax HE40 OFDMA MCS11	3.995	4.030	0.991	99.13%	0.00	0.010
802.11ax HE80 1Tx MCS0	1.474	1.496	0.985	98.53%	0.00	0.010
802.11ax HE80 1Tx MCS11	3.995	4.025	0.993	99.25%	0.00	0.010
802.11ax HE80 OFDMA MCS0	1.472	1.494	0.985	98.53%	0.00	0.010
802.11ax HE80 OFDMA MCS11	3.995	4.025	0.993	99.25%	0.00	0.010

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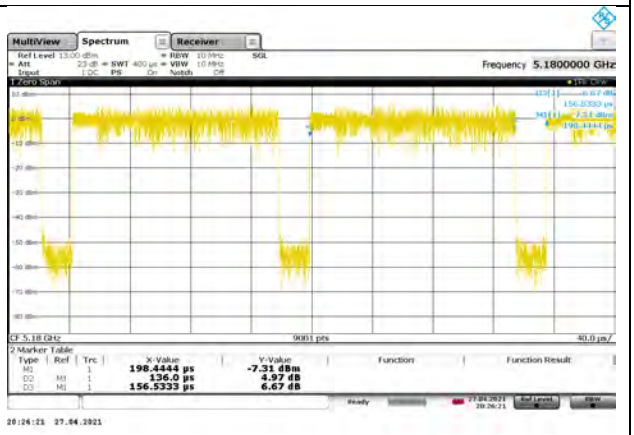
DUTY CYCLE PLOTS

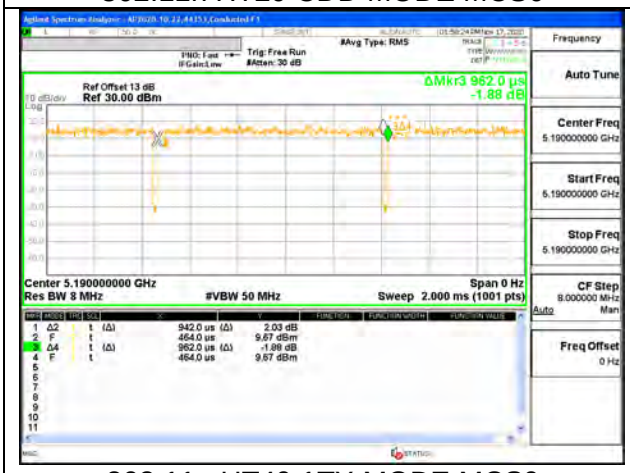
802.11n HT20 1TX MODE MCS0

802.11n HT20 1TX MODE MCS7

802.11n HT20 CDD MODE MCS0



802.11n HT20 CDD MODE MCS7



802.11n HT40 1TX MODE MCS0

802.11n HT40 1TX MODE MCS7

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802.11n HT40 CDD MODE MCS0

802.11n HT40 CDD MODE MCS7

802.11ac VHT80 1TX MODE MSC0

802.11ac VHT80 1TX MODE MSC9

802.11ac VHT80 CDD MODE MCS0

802.11ac VHT80 CDD MODE MCS9

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802.11ax HE20 1Tx MCS0

802.11ax HE20 1Tx MCS11

802.11ax HE20 OFDMA MCS0

802.11ax HE20 OFDMA MCS11

802.11ax HE40 1Tx MCS0

802.11ax HE40 1Tx MCS11

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802.11ax HE40 OFDMA MCS0

802.11ax HE40 OFDMA MCS11

802.11ax HE80 1Tx MCS0

802.11ax HE80 1Tx MCS11

802.11ax HE80 OFDMA MCS0

802.11ax HE80 OFDMA MCS11

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9.2. 26 dB & 99% BANDWIDTHS

LIMITS

None; for reporting purposes only.

RESULTS

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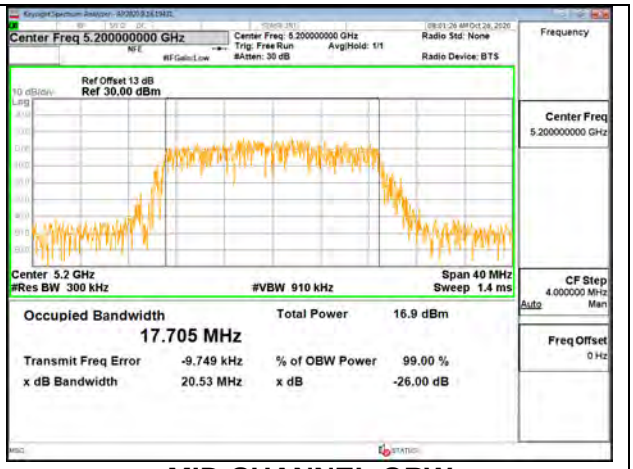
9.2.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	22.15	17.6170
Mid	5200	21.85	17.7050
High	5240	21.95	17.5670

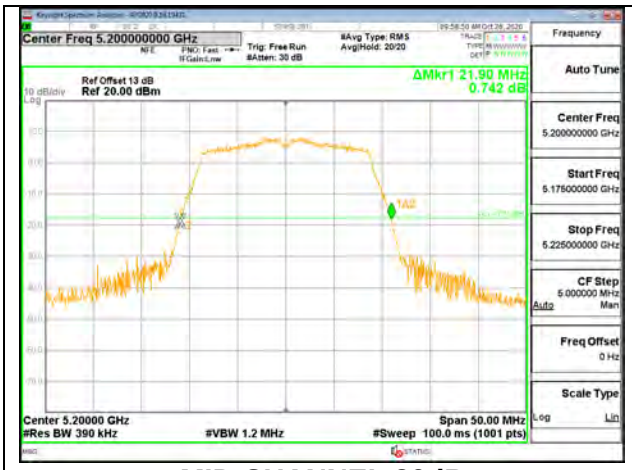
MID CHANNEL 26dB



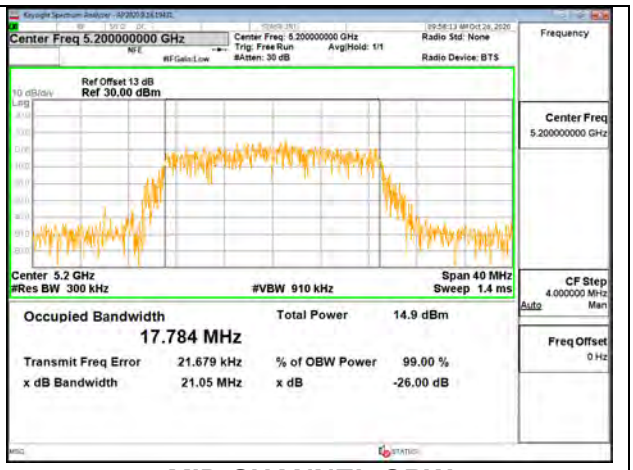
MID CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	22.00	17.6080
Mid	5200	21.90	17.7840
High	5240	22.10	17.6450



MID CHANNEL 26dB



MID CHANNEL OBW

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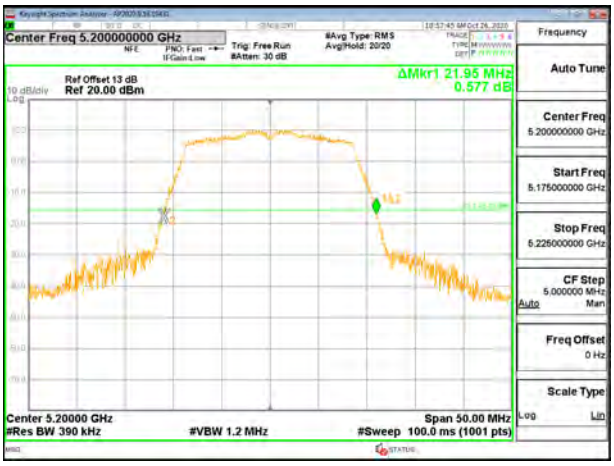
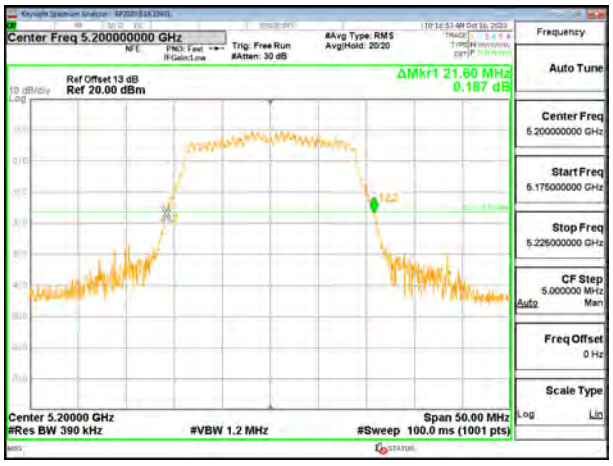
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	22.15	21.65	17.6610	17.6300
Mid	5200	21.95	21.60	17.6000	17.6510
High	5240	22.00	21.75	17.7730	17.6440

MID CHANNEL 26dB

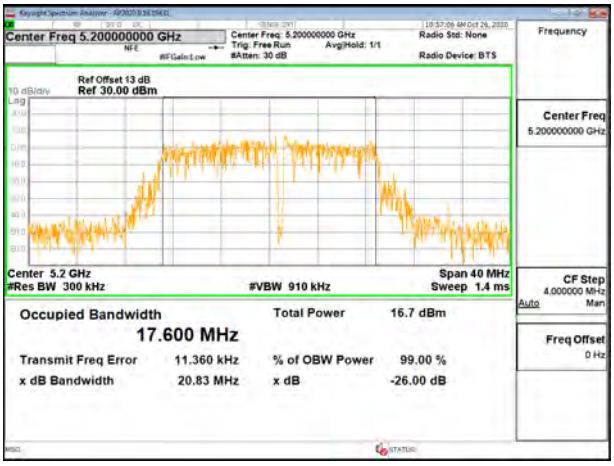


MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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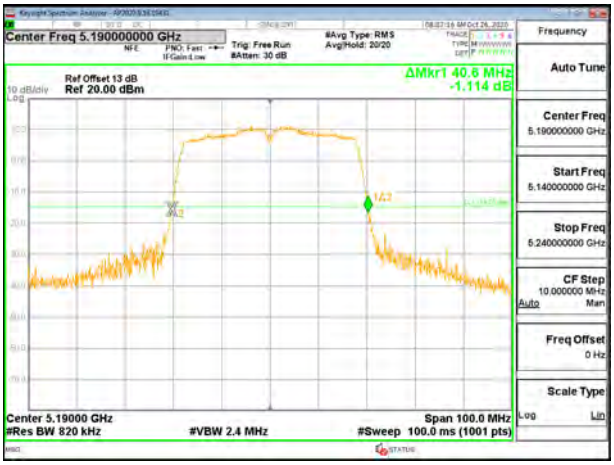
9.2.2. 802.11n HT40 MODE IN THE 5.2 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	40.60	35.9280
High	5230	40.80	36.0570

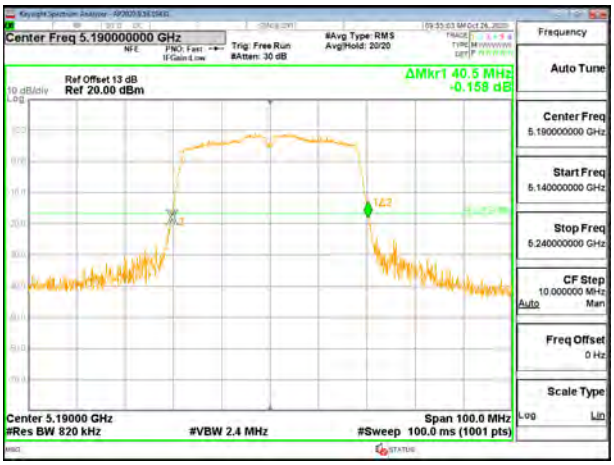


LOW CHANNEL 26dB

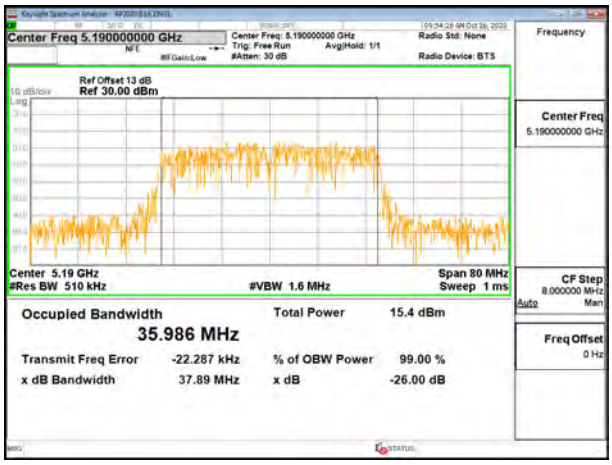
LOW CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	40.50	35.9860
High	5230	40.90	36.0160



LOW CHANNEL 26dB



LOW CHANNEL OBW

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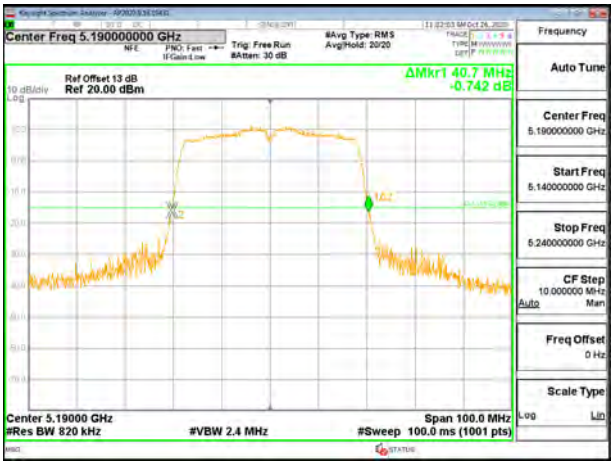
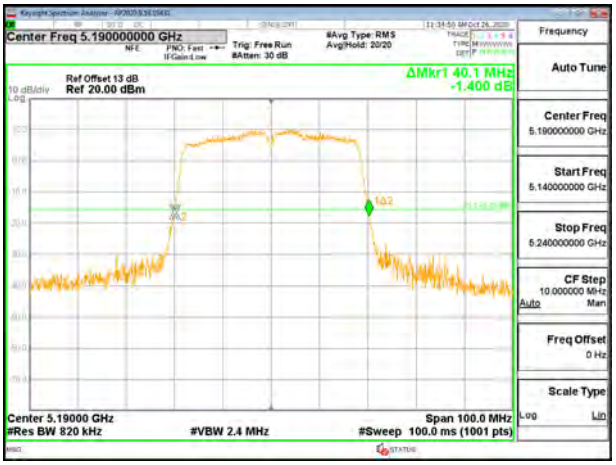
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	40.70	40.10	35.9420	36.0210
High	5230	40.70	40.30	36.0920	35.9560

LOW CHANNEL 26dB



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW

LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

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9.2.3. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

1TX Antenna 6 MODE

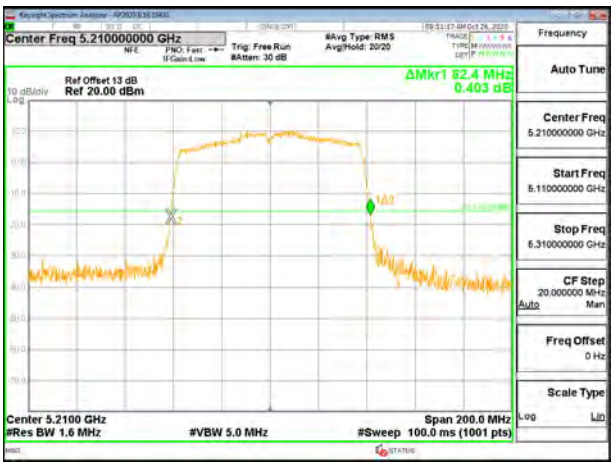
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	82.60	75.0240

MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	82.40	75.1600



MID CHANNEL 26dB

MID CHANNEL OBW

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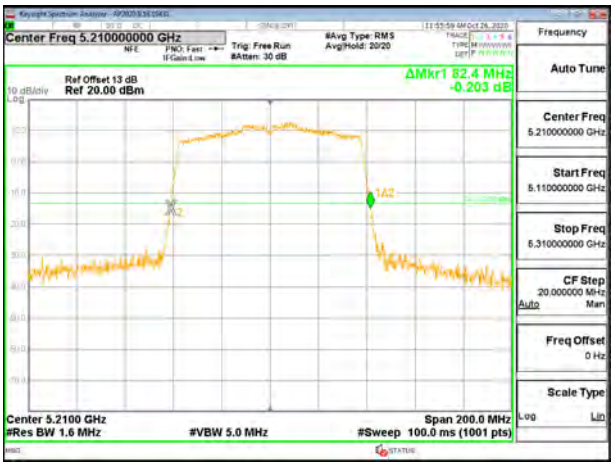
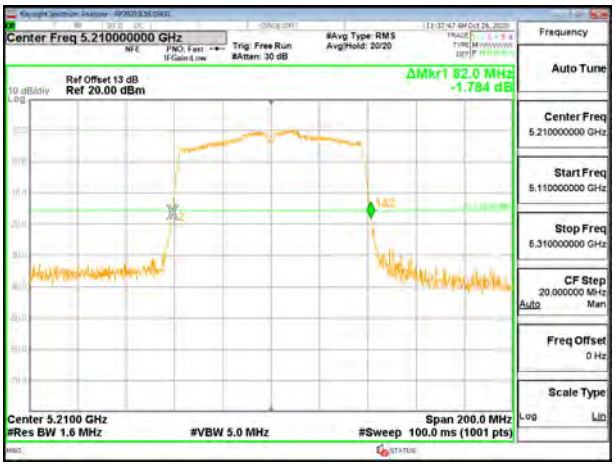
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	82.40	82.00	75.2810	75.4190

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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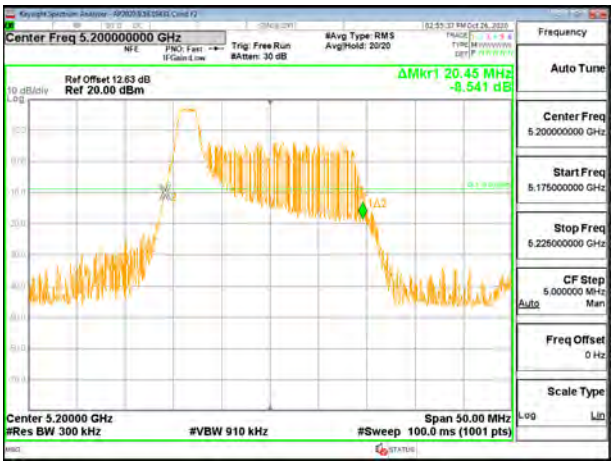
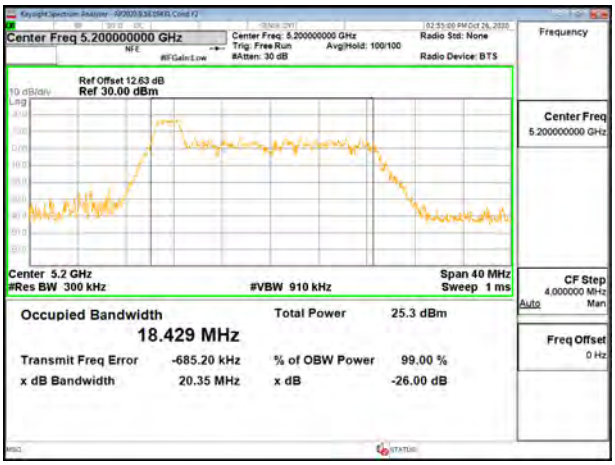
9.2.4. 802.11ax HE20 MODE IN THE 5.2 GHz BAND

1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.35	18.4970
Mid	5200	20.45	18.4290
High	5240	20.35	18.9340



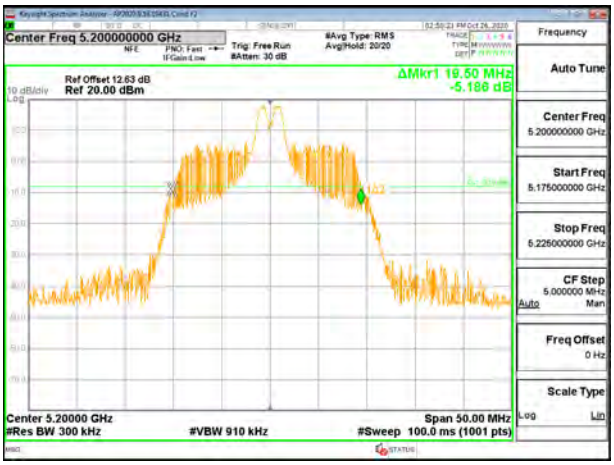
MID CHANNEL 26dB



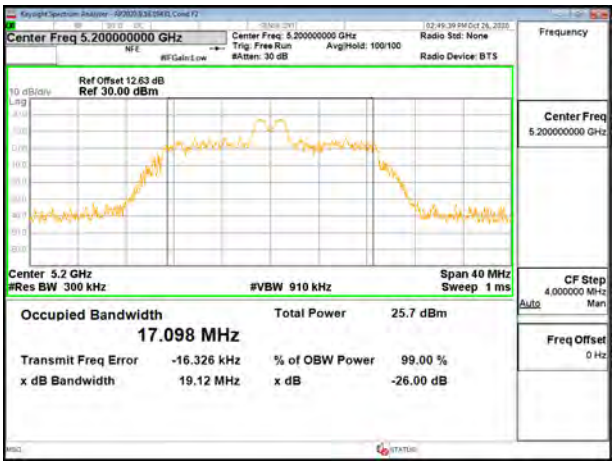
MID CHANNEL OBW

1TX Antenna 6 MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.45	17.1600
Mid	5200	19.50	17.0980
High	5240	19.50	17.1670



MID CHANNEL 26dB



MID CHANNEL OBW

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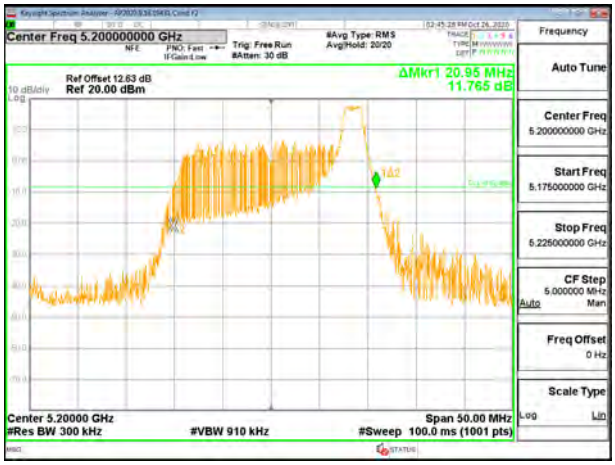
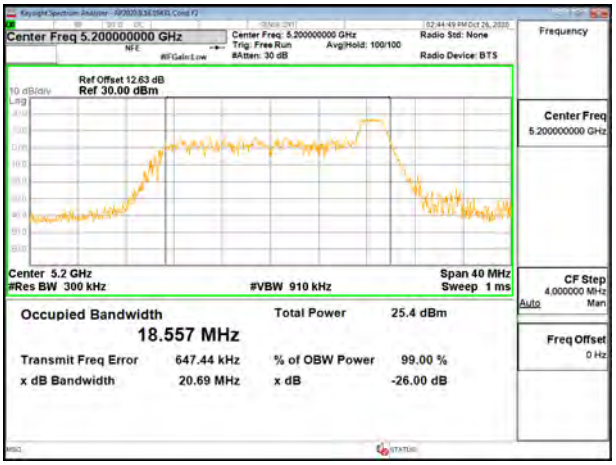
1TX Antenna 6 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.95	18.5530
Mid	5200	20.95	18.5570
High	5240	21.00	18.6340



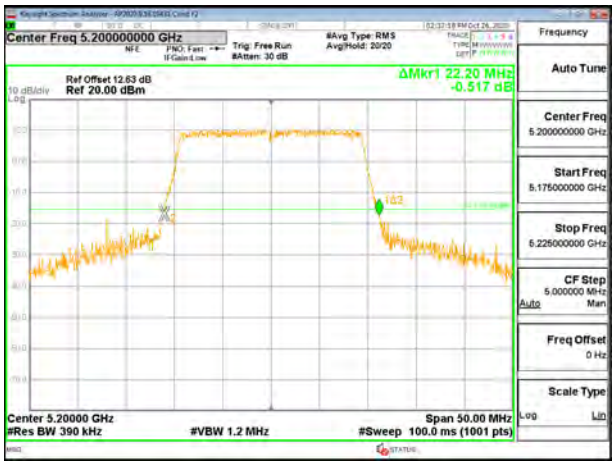
MID CHANNEL 26dB



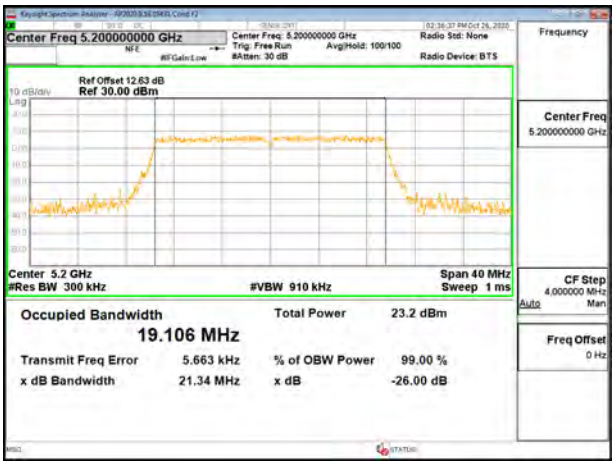
MID CHANNEL OBW

1TX Antenna 6 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.90	19.0090
Mid	5200	22.00	19.1060
High	5240	22.10	19.0420



MID CHANNEL 26dB



MID CHANNEL OBW

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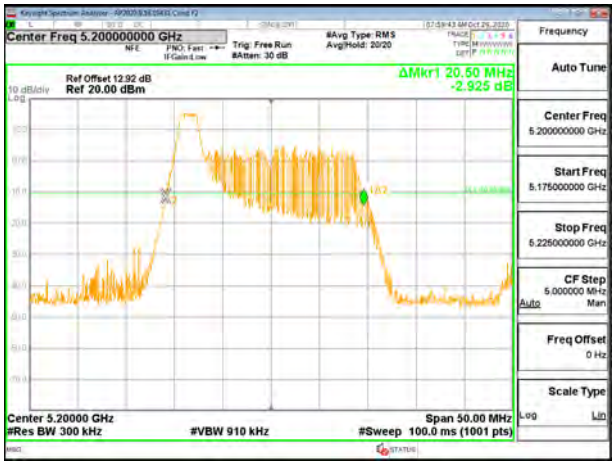
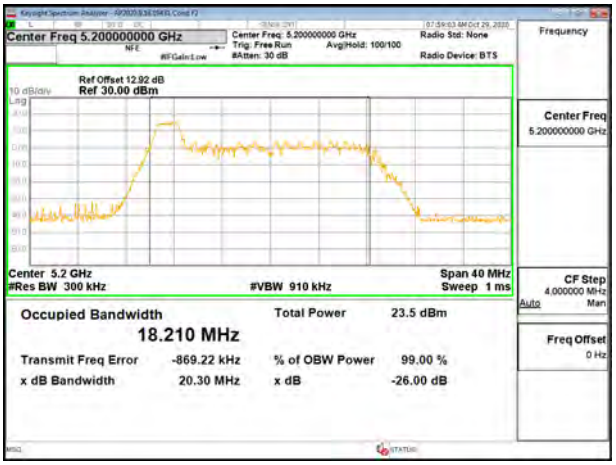
1TX Antenna 5 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.55	18.4970
Mid	5200	20.50	18.2100
High	5240	20.25	18.3290



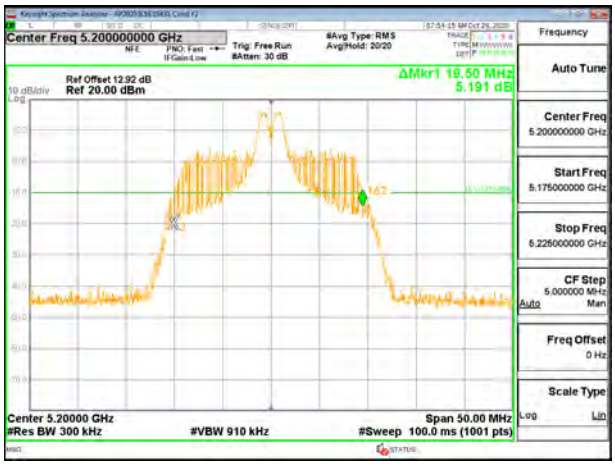
MID CHANNEL 26dB



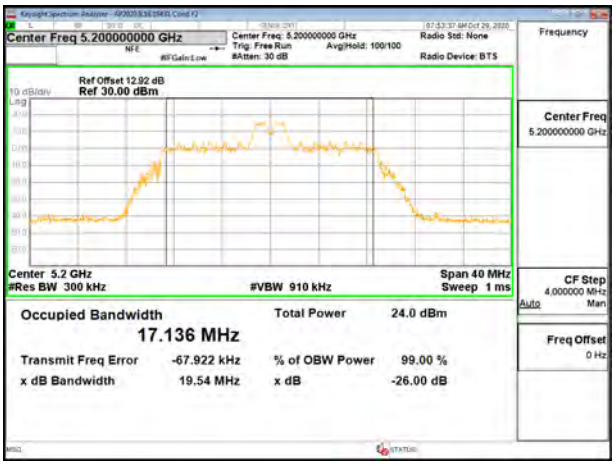
MID CHANNEL OBW

1TX Antenna 5 MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.55	17.1320
Mid	5200	19.50	17.1360
High	5240	19.70	17.1230



MID CHANNEL 26dB



MID CHANNEL OBW

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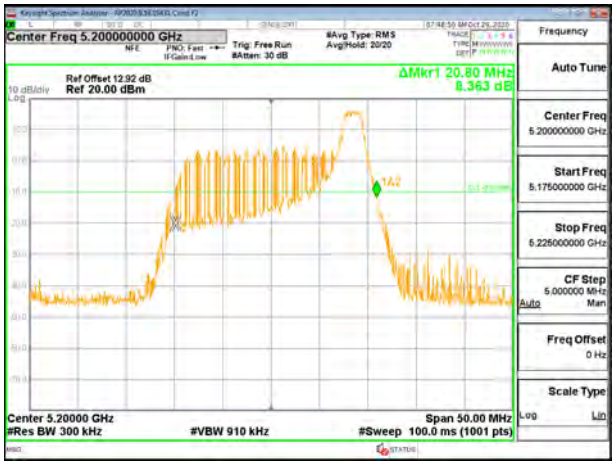
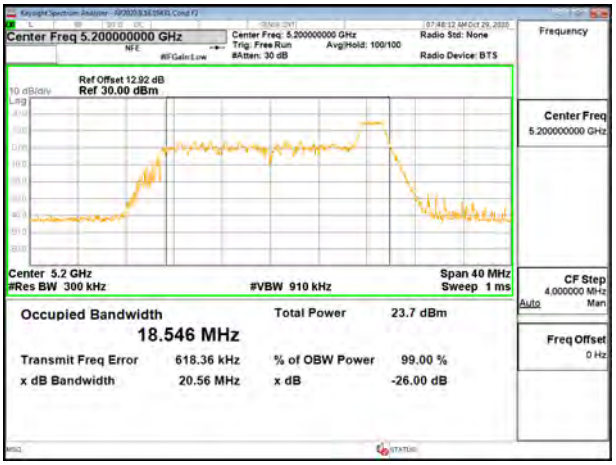
1TX Antenna 5 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.95	18.6870
Mid	5200	20.80	18.5460
High	5240	20.95	18.6000



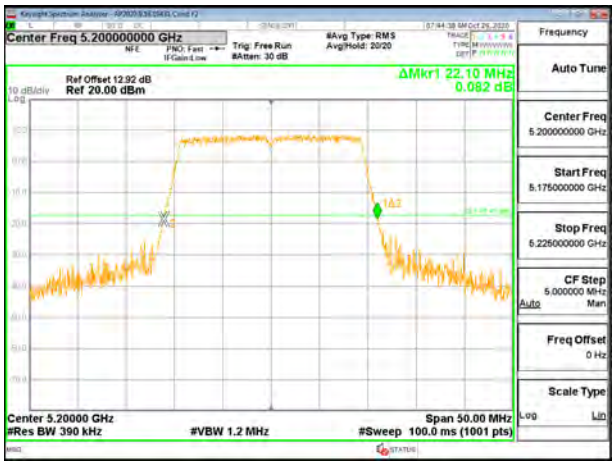
MID CHANNEL 26dB



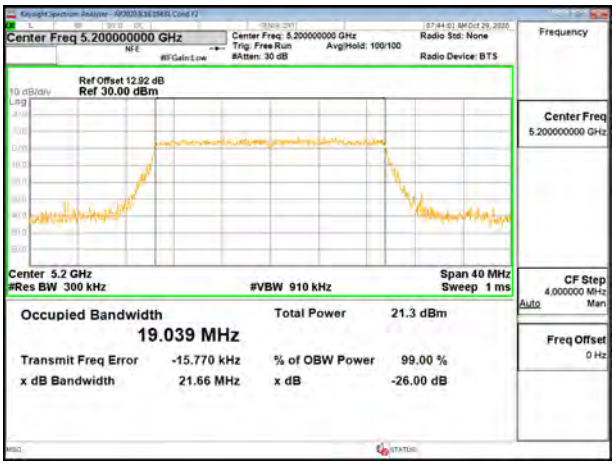
MID CHANNEL OBW

1TX Antenna 5 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	22.10	19.0600
Mid	5200	22.10	19.0390
High	5240	22.10	19.0640



MID CHANNEL 26dB



MID CHANNEL OBW

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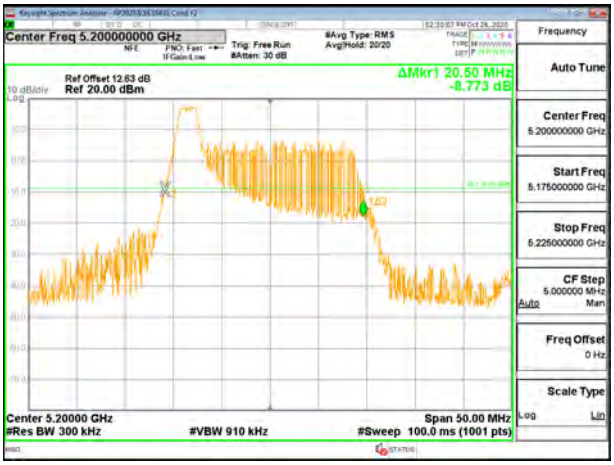
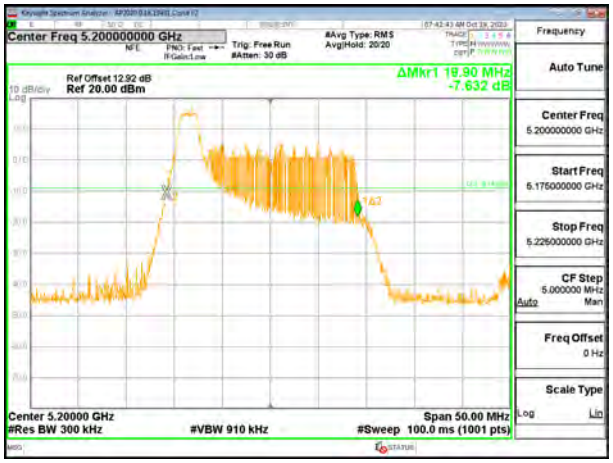
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	20.45	20.00	18.4790	18.4080
Mid	5200	20.50	19.90	18.4200	18.4560
High	5240	20.30	19.70	18.3520	18.3560

MID CHANNEL 26dB

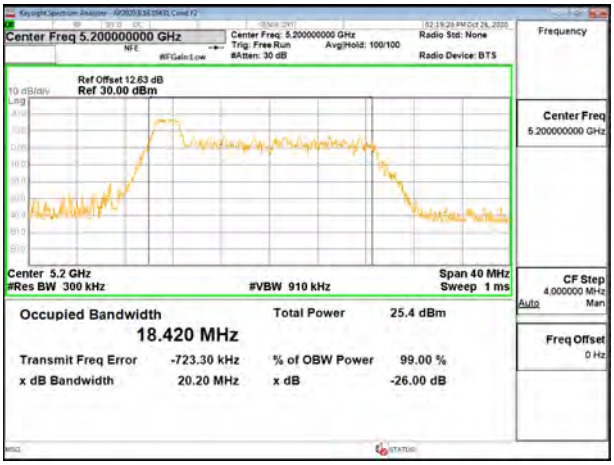


MID CHANNEL [ANT 6]

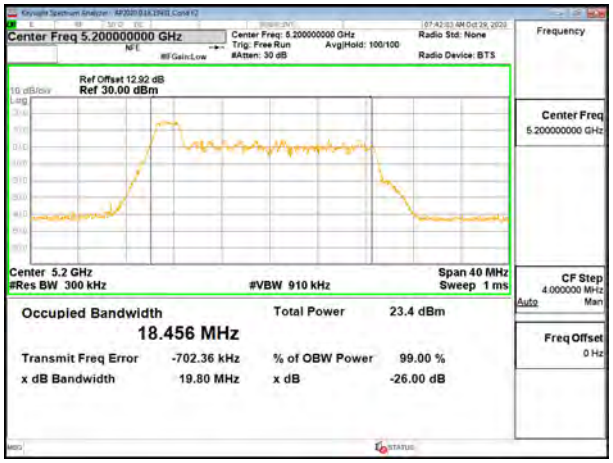


MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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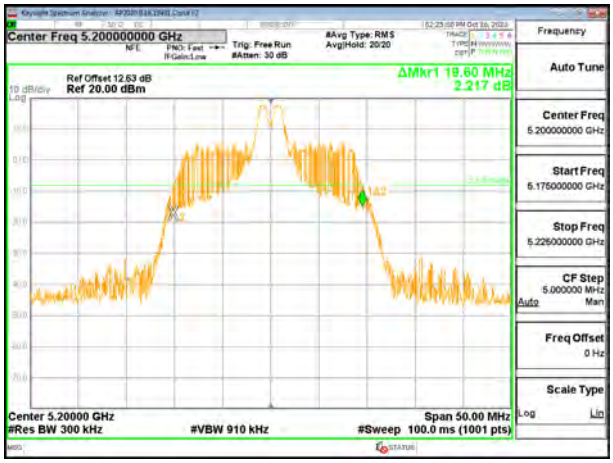
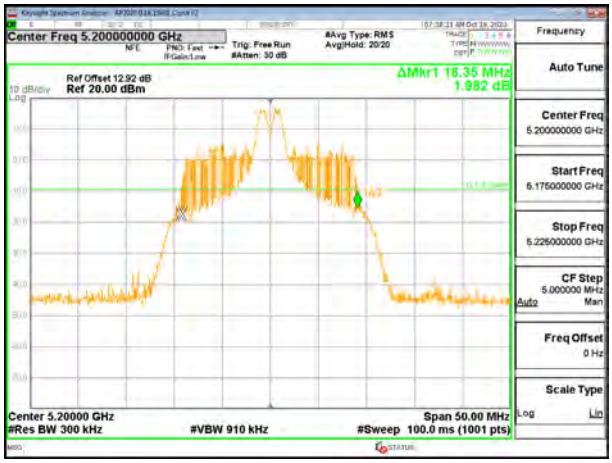
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	19.50	18.25	17.0880	16.8570
Mid	5200	19.60	18.35	17.1670	16.9010
High	5240	19.60	18.50	17.1710	16.8930

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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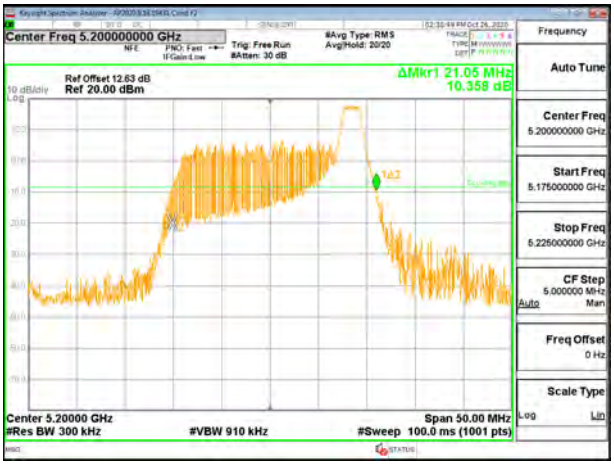
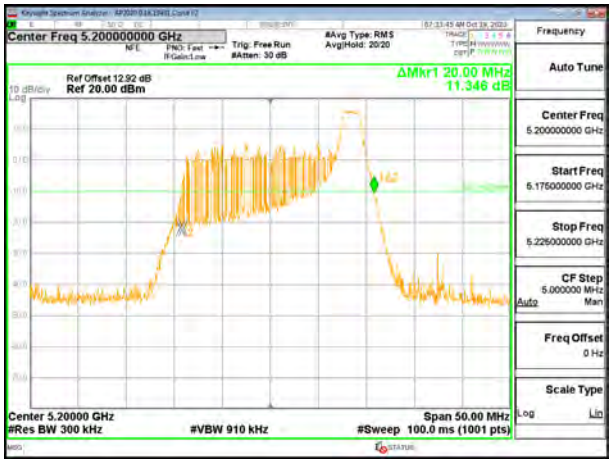
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	20.90	20.00	18.5920	18.4170
Mid	5200	21.05	20.00	18.6730	18.3980
High	5240	20.90	20.20	18.5060	18.4250

MID CHANNEL 26dB



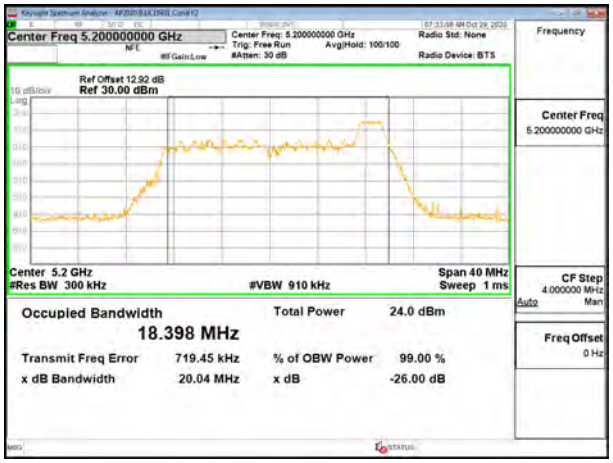
MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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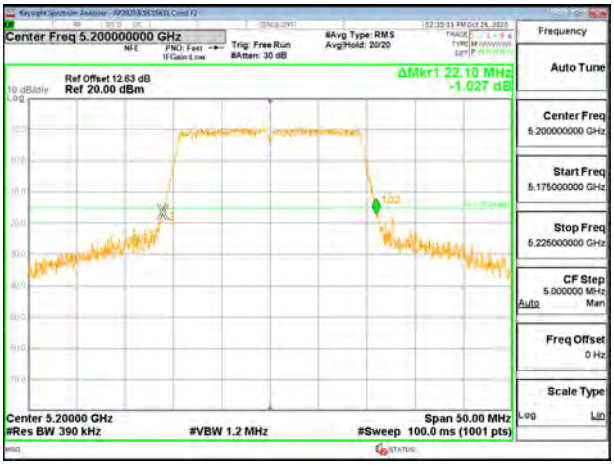
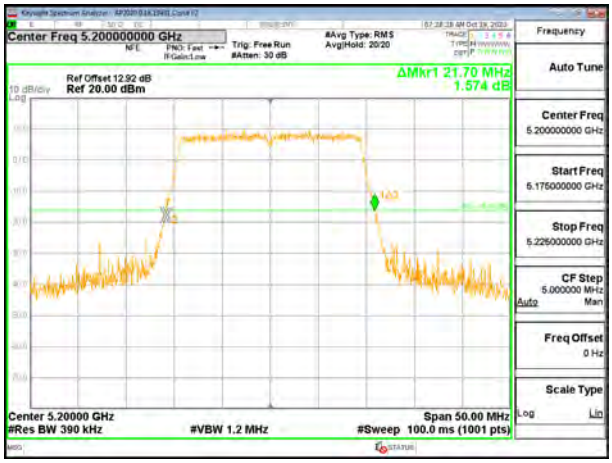
2TX Antenna 6 + Antenna 5 CDD MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	22.00	21.85	19.0430	19.0000
Mid	5200	22.10	21.70	19.0290	19.0250
High	5240	22.05	21.95	19.0560	19.0370

MID CHANNEL 26dB

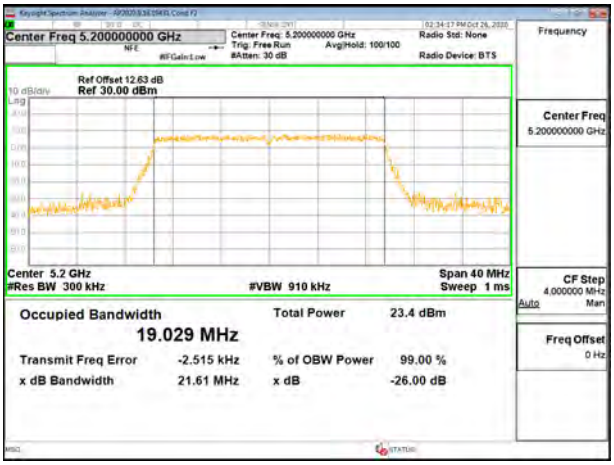


MID CHANNEL [ANT 6]

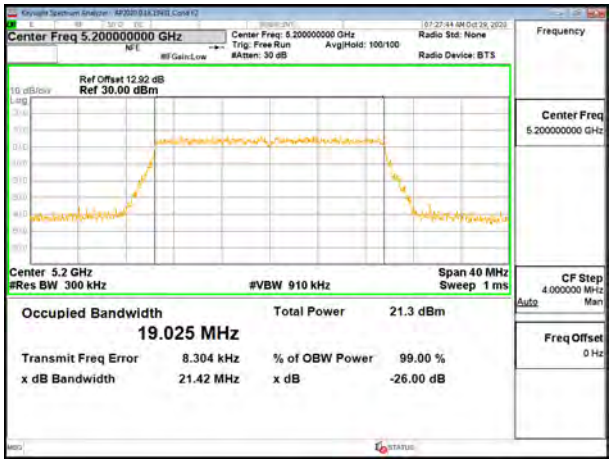


MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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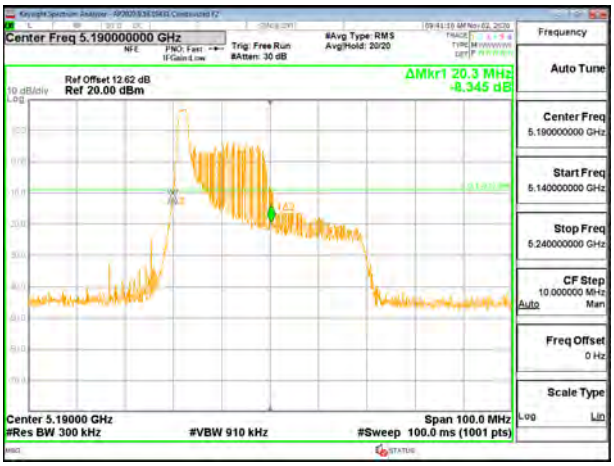
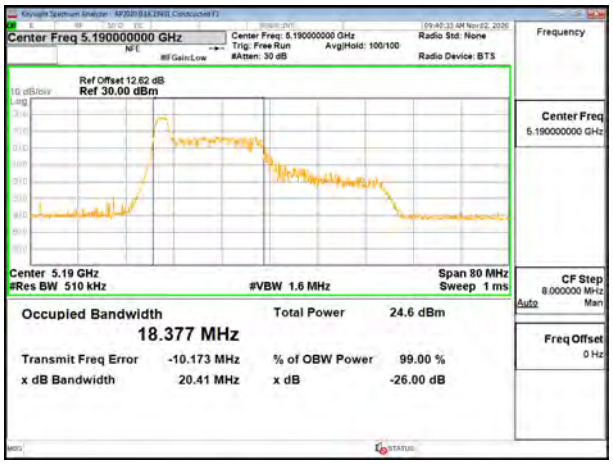
9.2.5. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.30	18.3770
High	5230	20.30	18.0520



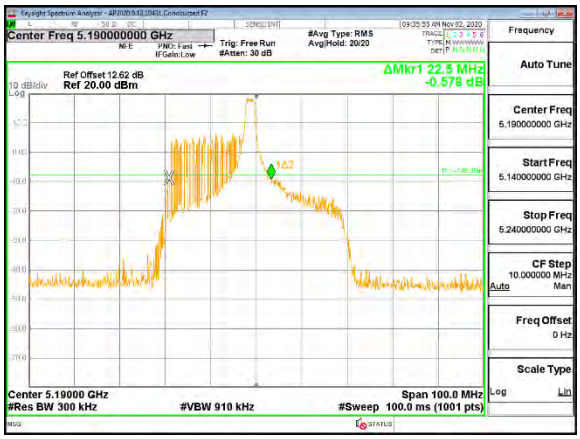
LOW CHANNEL 26dB



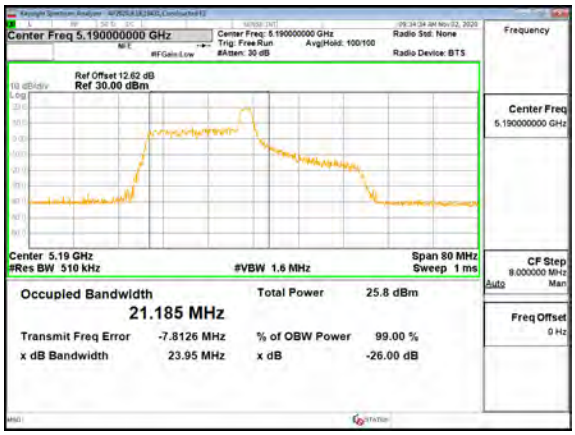
LOW CHANNEL OBW

1TX Antenna 6 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	22.50	21.1850
High	5230	22.90	21.5000



LOW CHANNEL 26dB



LOW CHANNEL OBW

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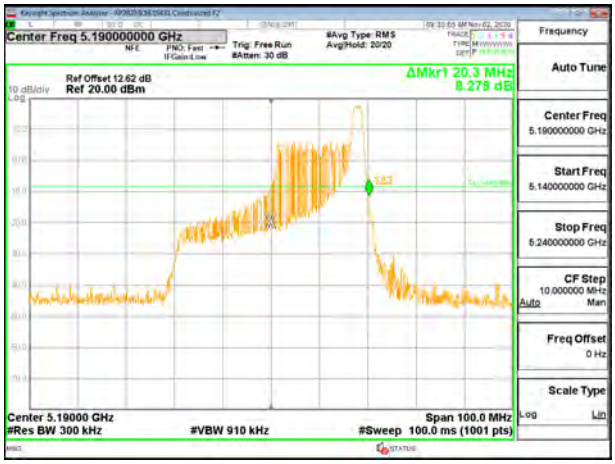
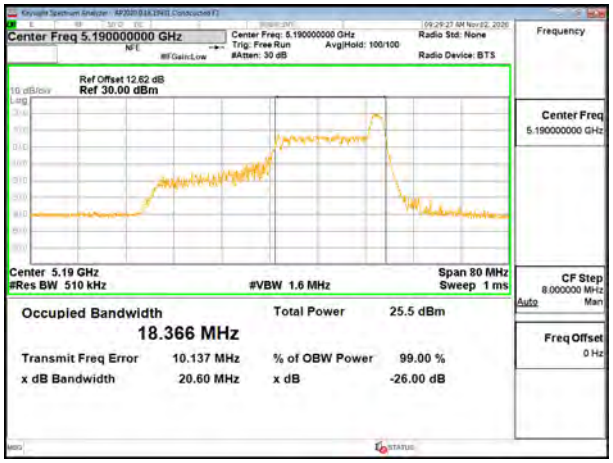
1TX Antenna 6 MODE: 26 Tones, RU Index 17

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.30	18.3660
High	5230	20.20	18.2130



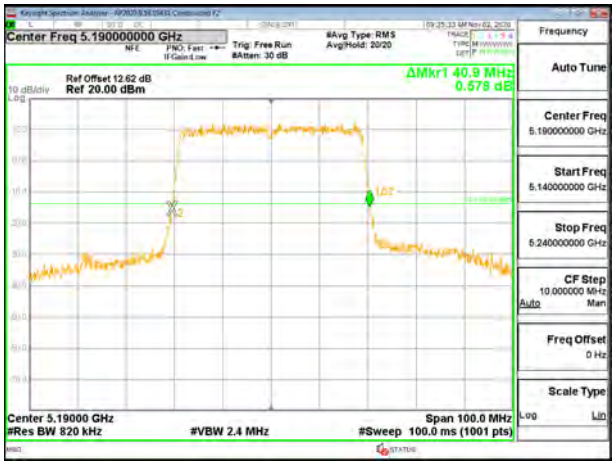
LOW CHANNEL 26dB



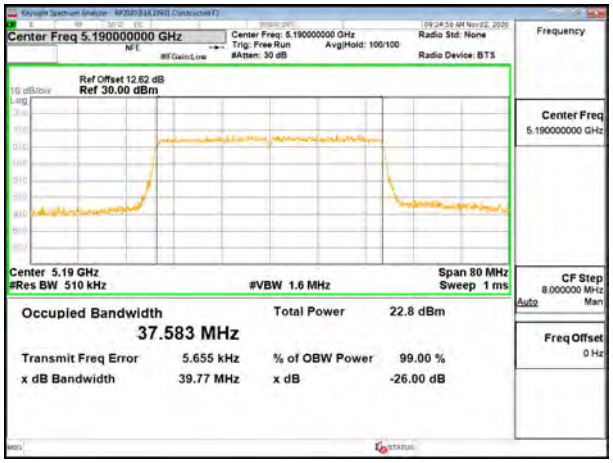
LOW CHANNEL OBW

1TX Antenna 6 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	40.90	37.5830
High	5230	41.10	37.6320



LOW CHANNEL 26dB



LOW CHANNEL OBW

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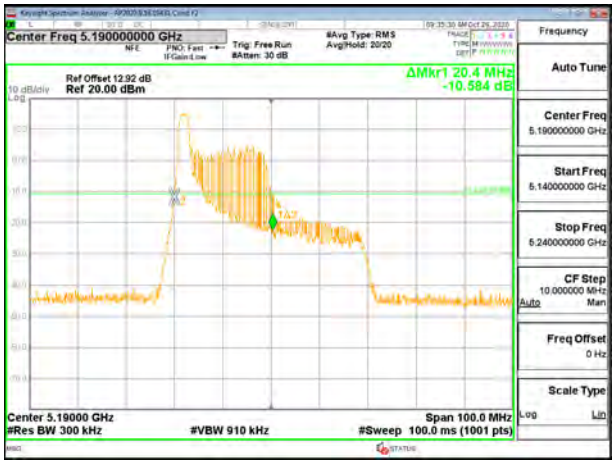
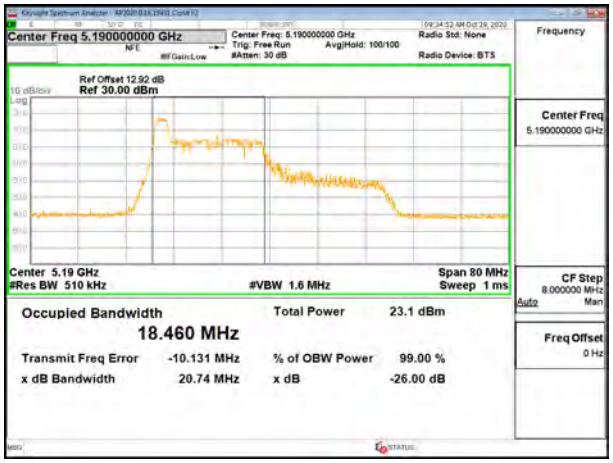
1TX Antenna 5 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.40	18.4600
High	5230	19.90	18.3750



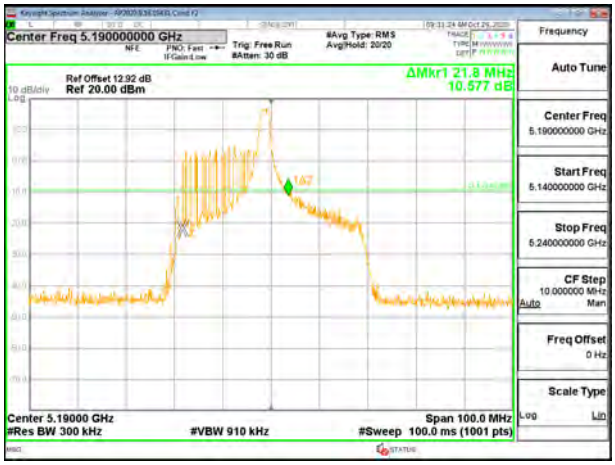
LOW CHANNEL 26dB



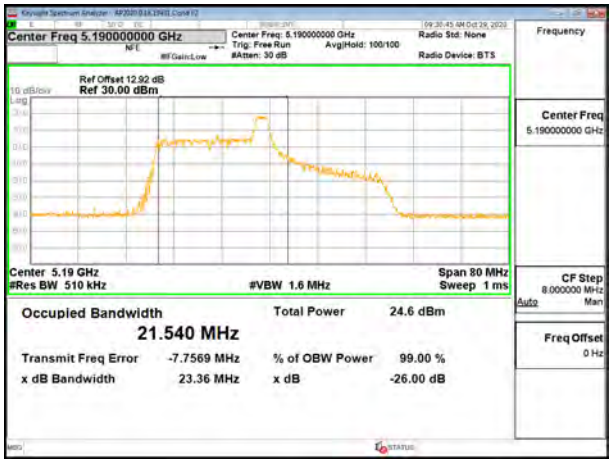
LOW CHANNEL OBW

1TX Antenna 5 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	21.80	21.5400
High	5230	22.60	21.3250



LOW CHANNEL 26dB



LOW CHANNEL OBW

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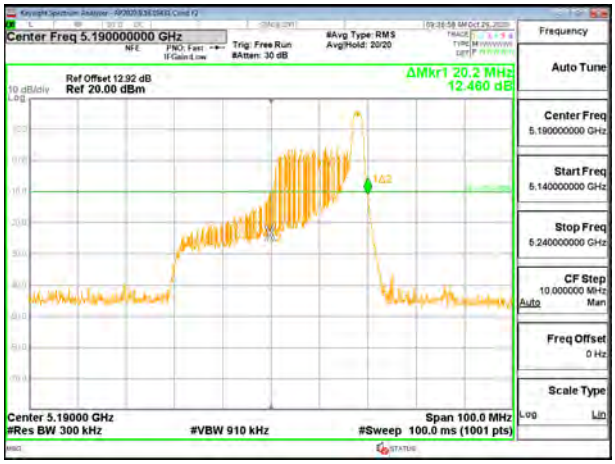
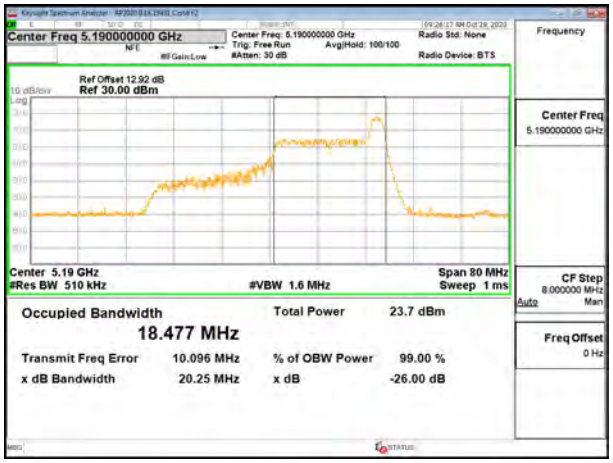
1TX Antenna 5 MODE: 26 Tones, RU Index 17

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.20	18.4770
High	5230	20.30	18.3090



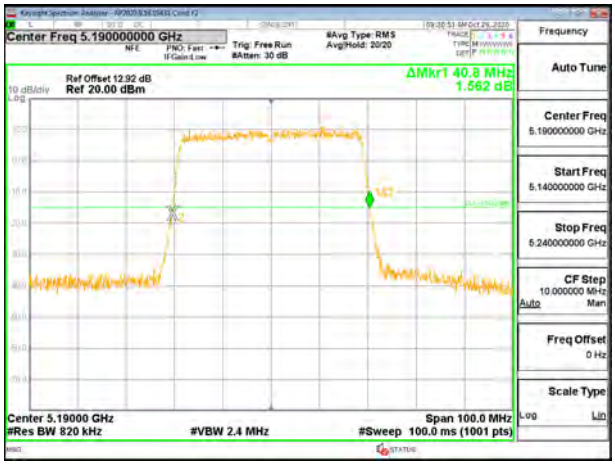
LOW CHANNEL 26dB



LOW CHANNEL OBW

1TX Antenna 5 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	40.80	37.6640
High	5230	41.00	37.5230



LOW CHANNEL 26dB

LOW CHANNEL OBW

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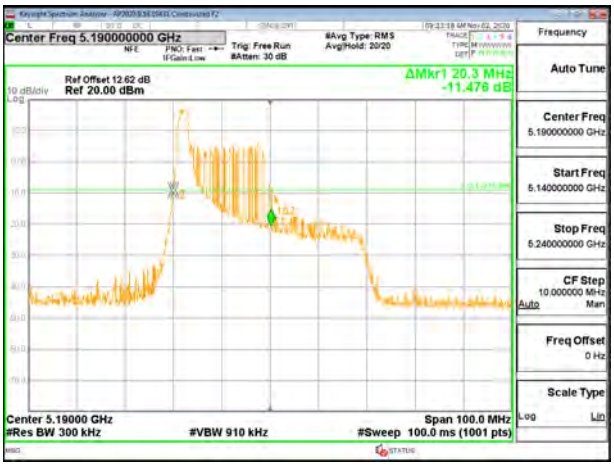
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	20.30	19.10	18.2220	18.0690
High	5230	20.00	19.60	18.1240	18.0460

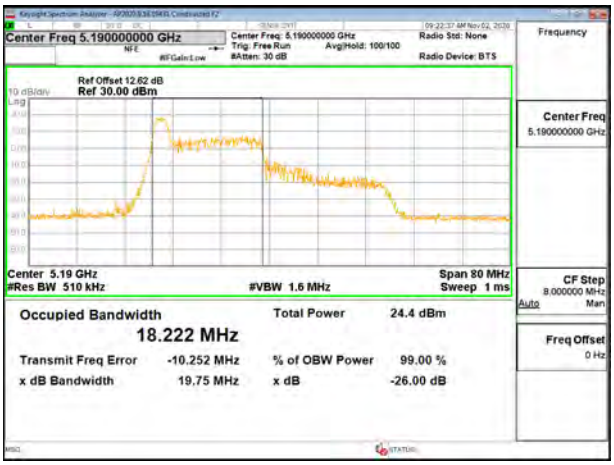
LOW CHANNEL 26dB



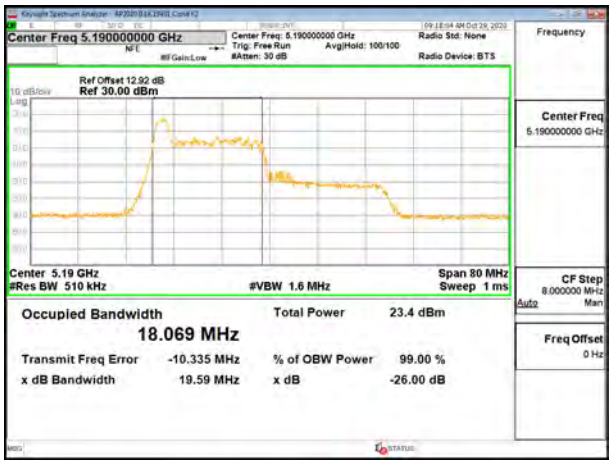
LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

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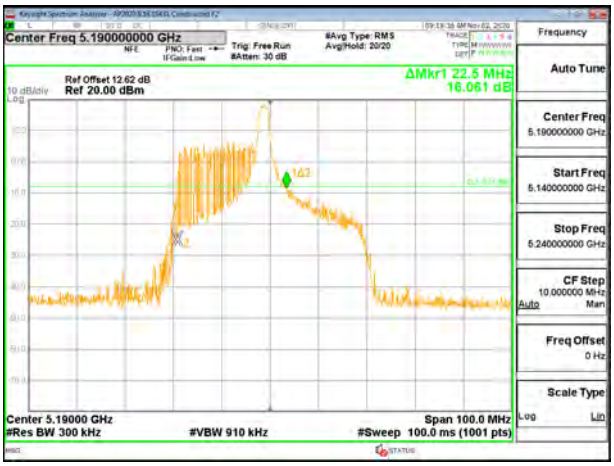
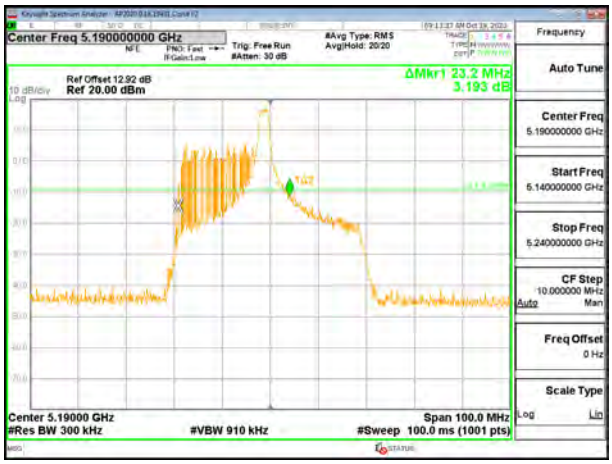
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	22.50	23.20	20.9800	21.1890
High	5230	22.50	22.10	20.9700	21.0700

LOW CHANNEL 26dB

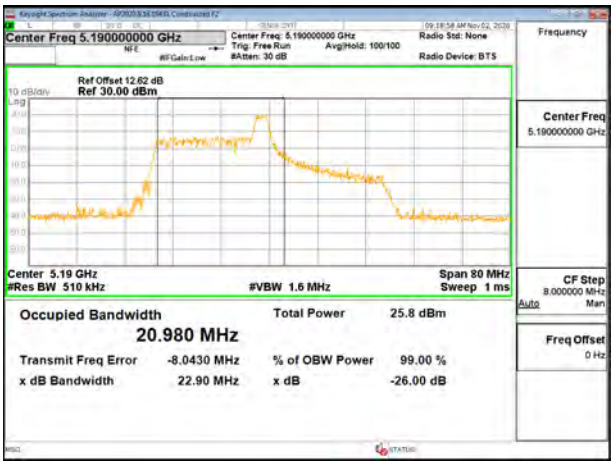


LOW CHANNEL [ANT 6]

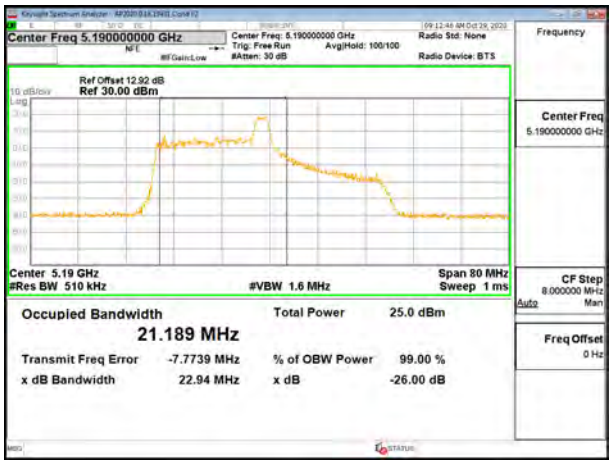


LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

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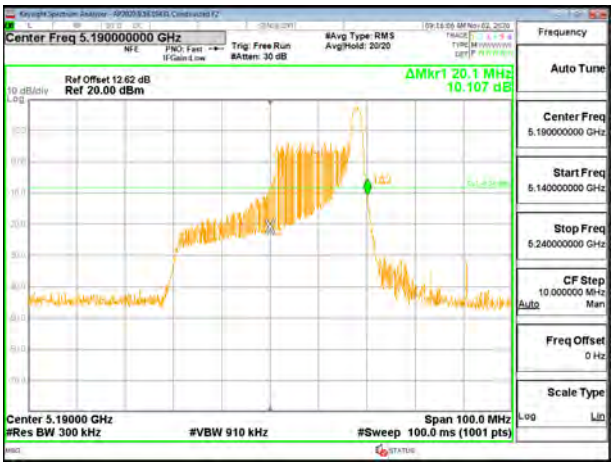
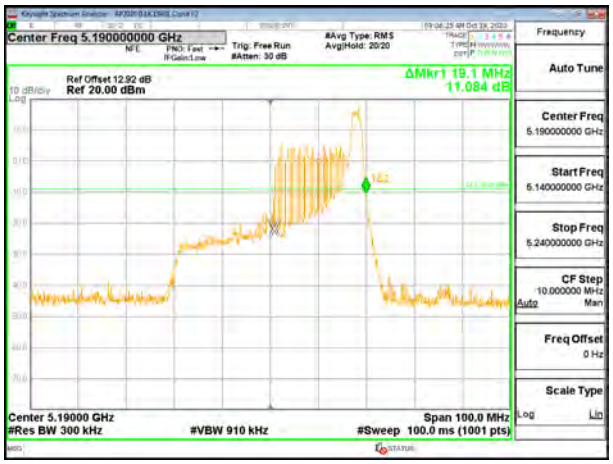
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 17

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	20.10	19.10	18.4920	18.1330
High	5230	20.10	19.20	18.3170	17.9560

LOW CHANNEL 26dB

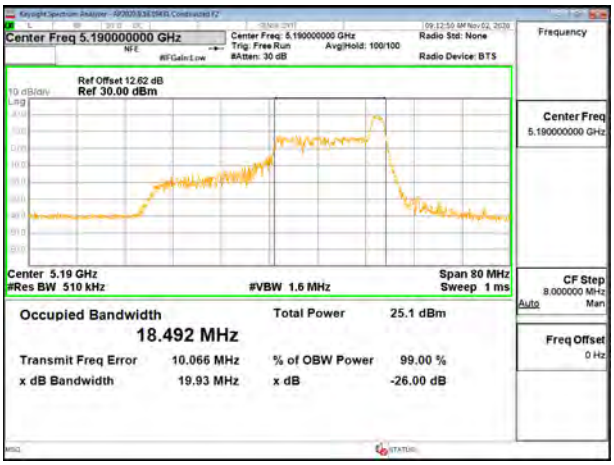


LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

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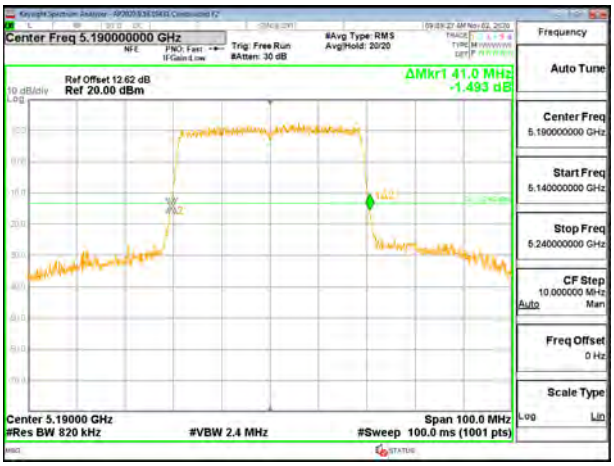
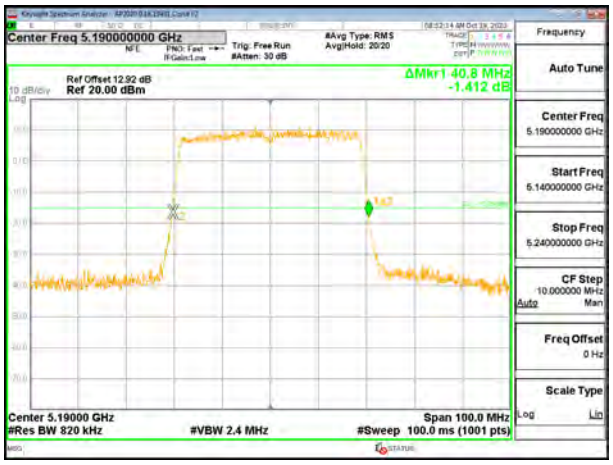
2TX Antenna 6 + Antenna 5 CDD MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	41.00	40.80	37.5570	37.6320
High	5230	40.90	40.70	37.5930	37.5340

LOW CHANNEL 26dB



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW

LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

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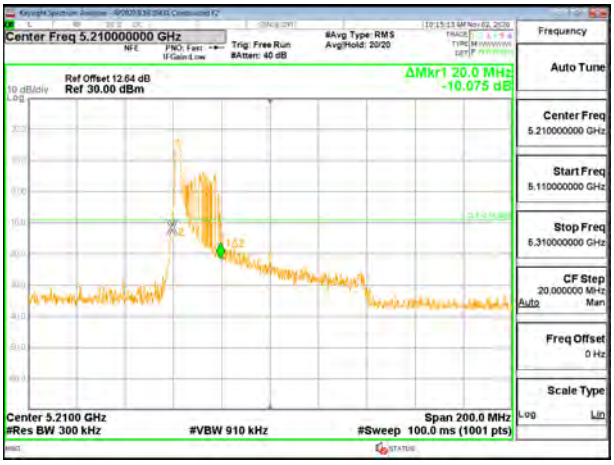
9.2.6. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	20.00	18.0810

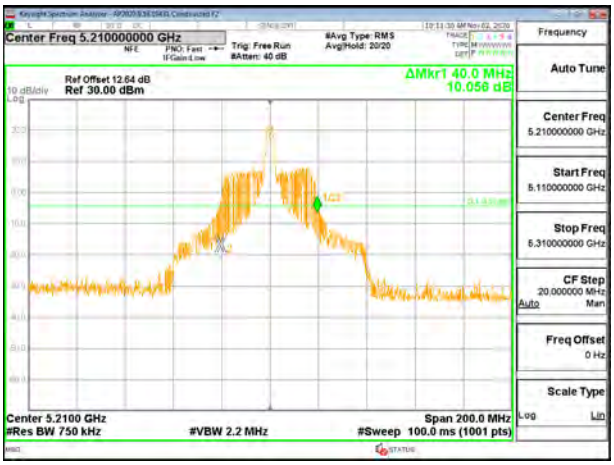


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 6 MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	40.00	37.0410



MID CHANNEL 26dB

MID CHANNEL OBW

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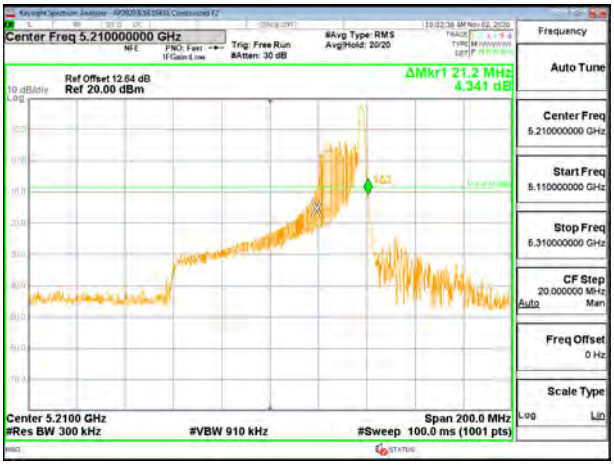
1TX Antenna 6 MODE: 26 Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	21.20	18.5890

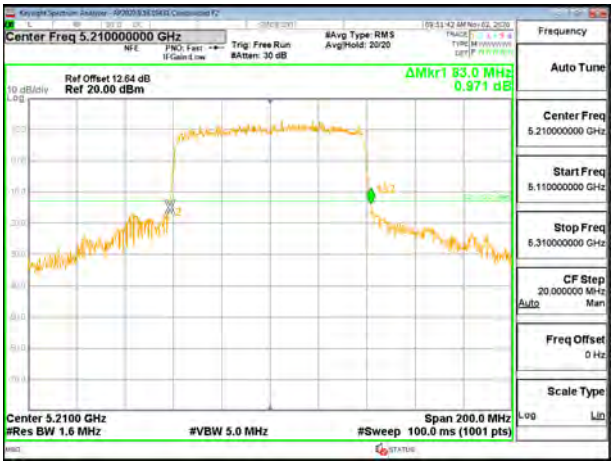


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 6 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	83.00	76.9370



MID CHANNEL 26dB

MID CHANNEL OBW

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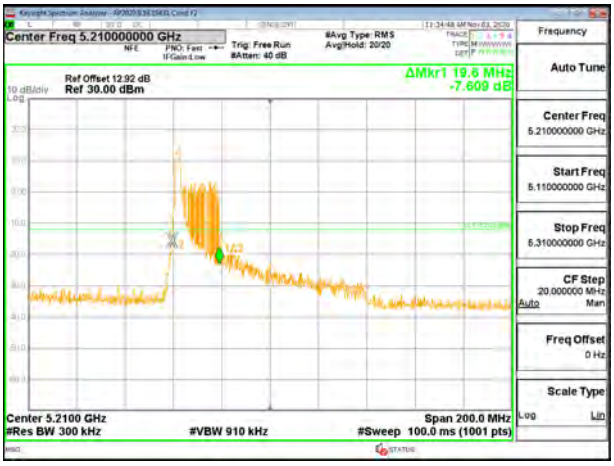
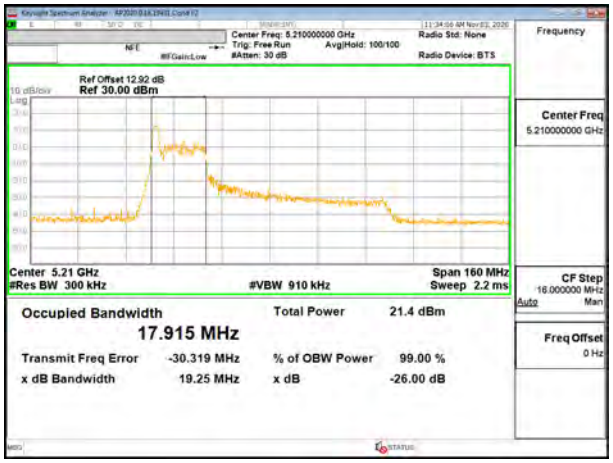
1TX Antenna 5 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.60	17.9150



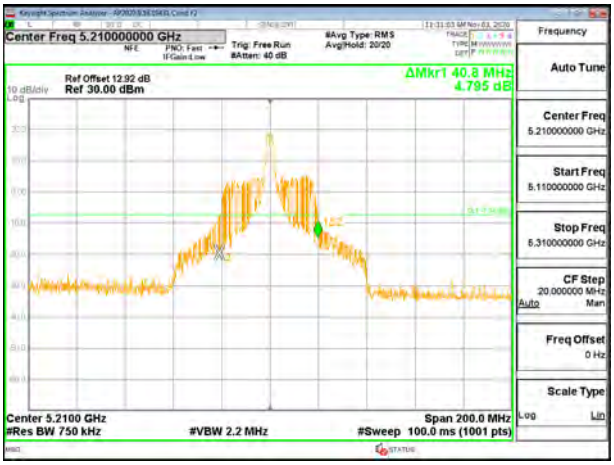
MID CHANNEL 26dB



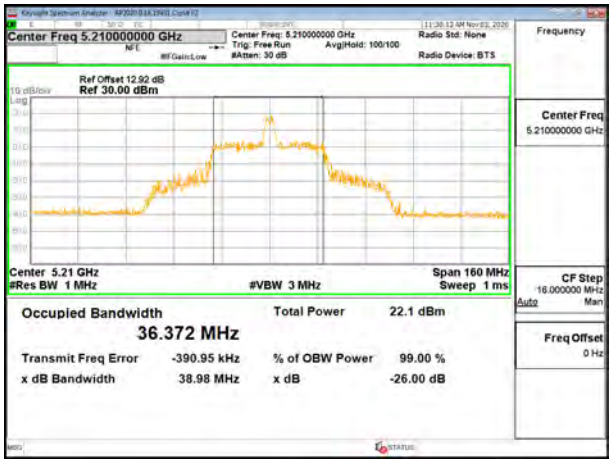
MID CHANNEL OBW

1TX Antenna 5 MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	40.80	36.3720



MID CHANNEL 26dB



MID CHANNEL OBW

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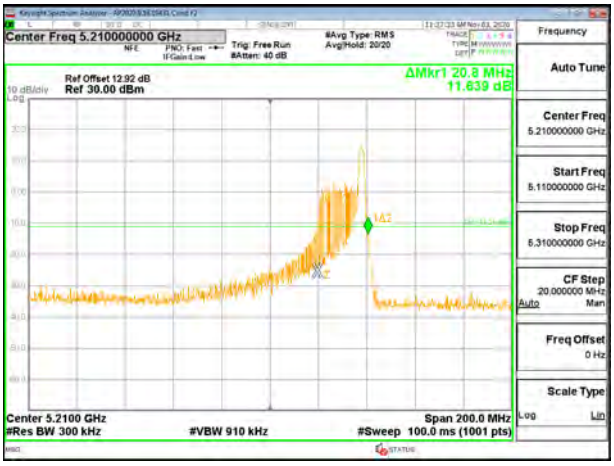
1TX Antenna 5 MODE: 26 Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	20.80	18.1520

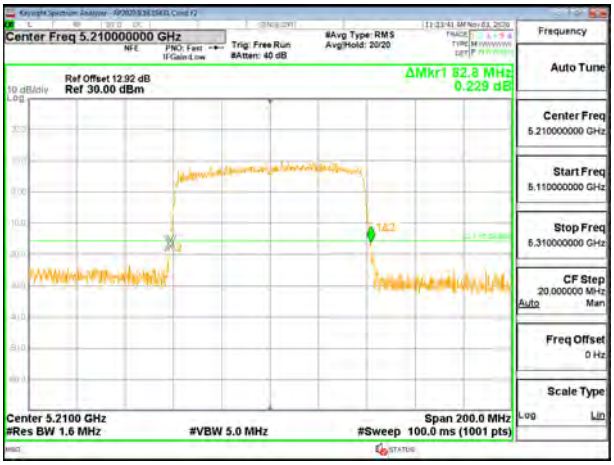


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 5 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	82.80	76.9700



MID CHANNEL 26dB

MID CHANNEL OBW

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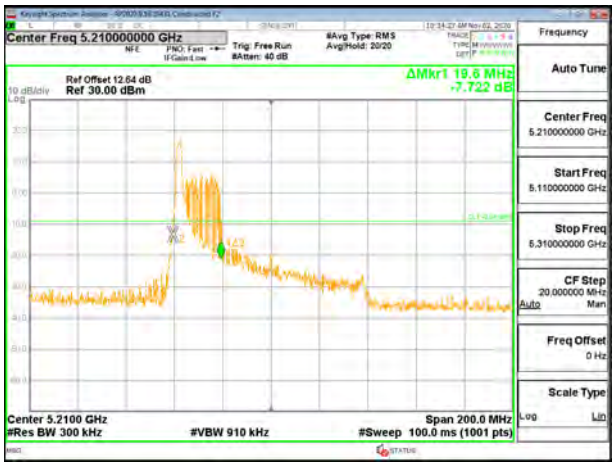
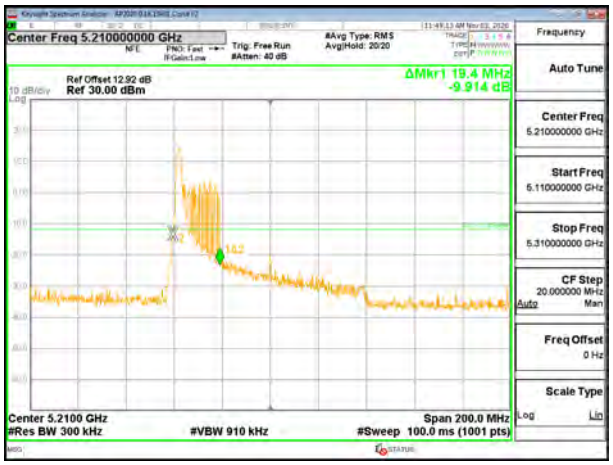
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	19.60	19.40	18.0100	18.0190

MID CHANNEL 26dB



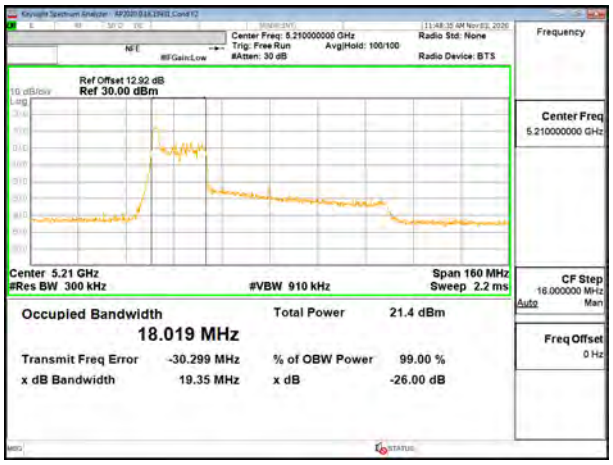
MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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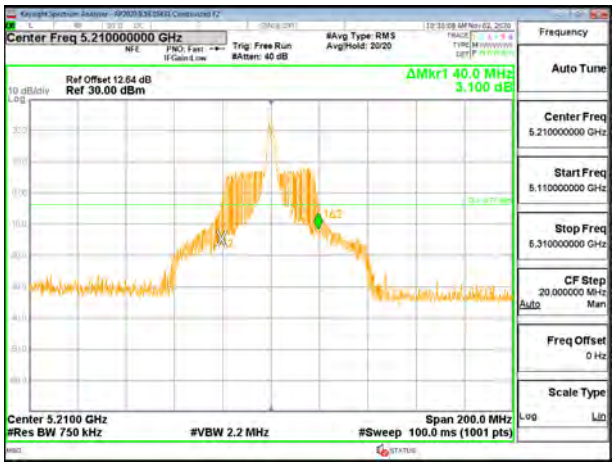
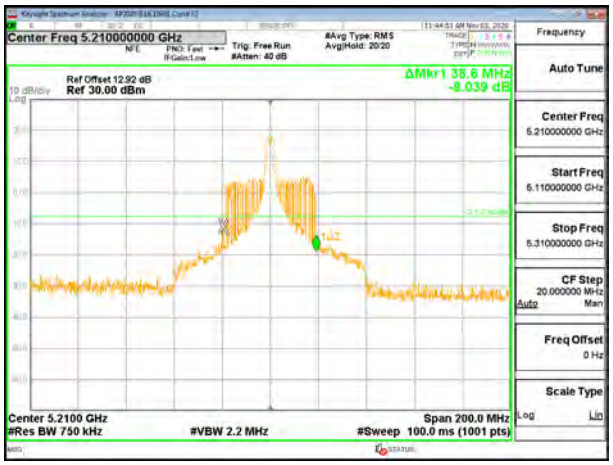
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	40.00	38.60	36.2530	36.1930

MID CHANNEL 26dB

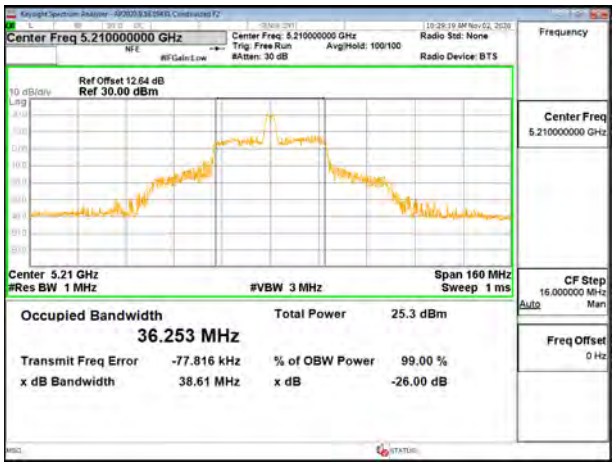


MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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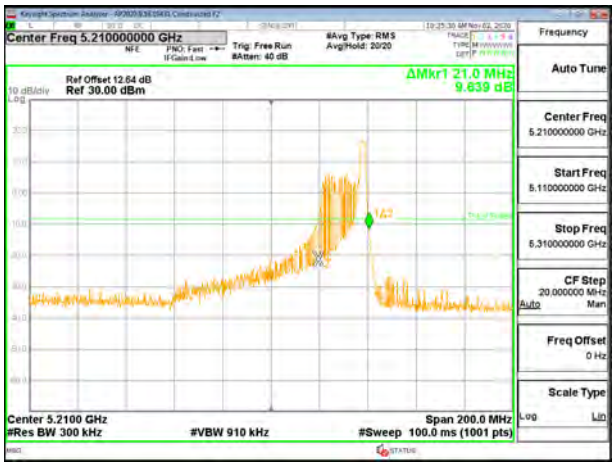
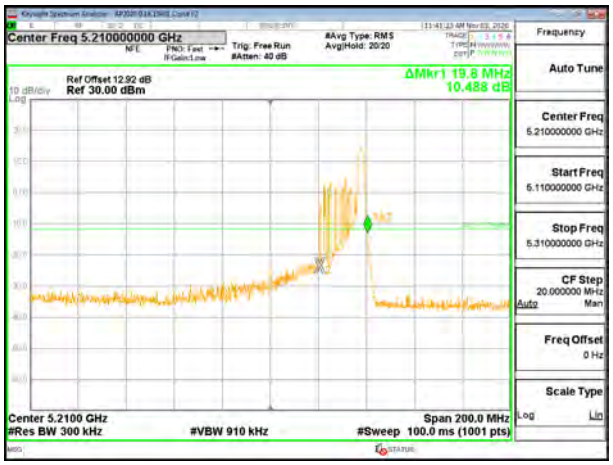
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	21.00	19.80	18.0150	17.8910

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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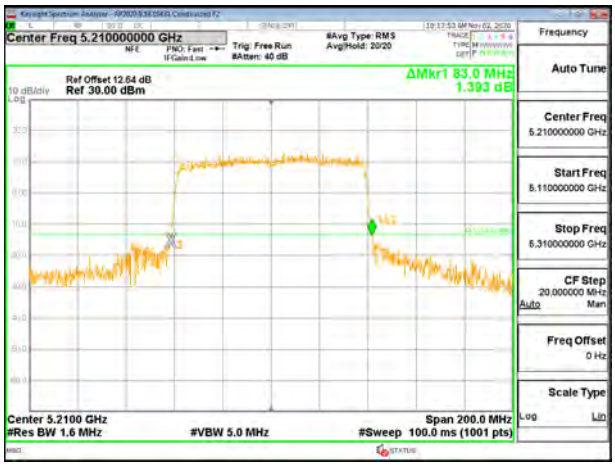
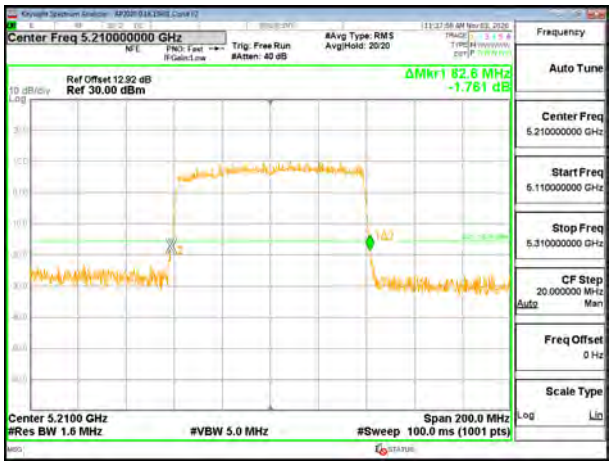
2TX Antenna 6 + Antenna 5 CDD MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	83.00	82.60	76.9710	76.9480

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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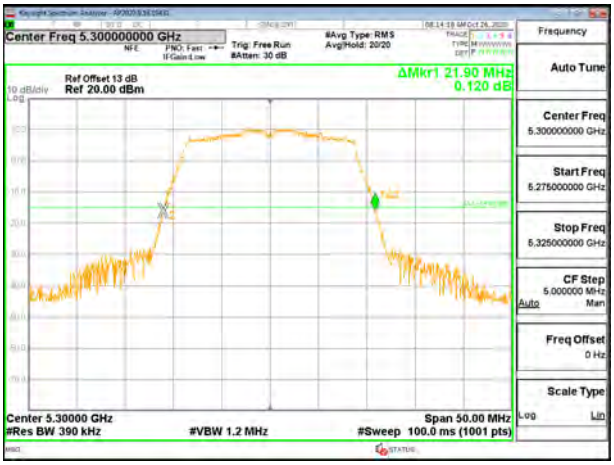
9.2.7. 802.11n HT20 MODE IN THE 5.3 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.90	17.6930
Mid	5300	21.90	17.6280
High	5320	21.95	17.6630

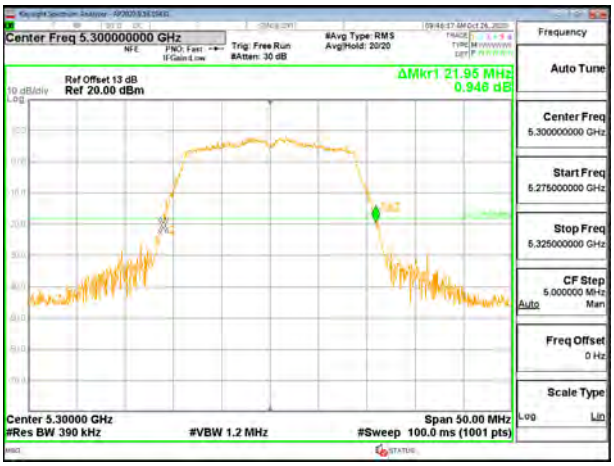


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.90	17.7040
Mid	5300	21.95	17.6380
High	5320	22.00	17.7290



MID CHANNEL 26dB

MID CHANNEL OBW

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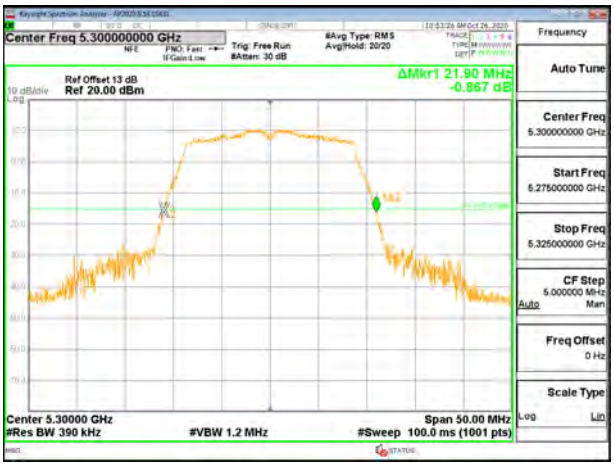
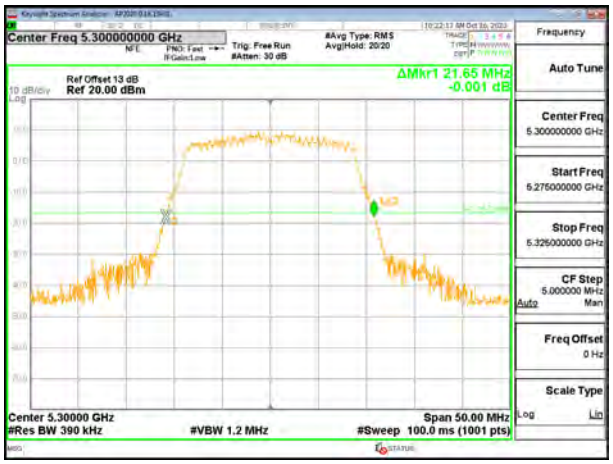
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	21.80	21.50	17.7040	17.6350
Mid	5300	21.90	21.65	17.6930	17.7070
High	5320	22.10	21.55	17.6590	17.7120

MID CHANNEL 26dB

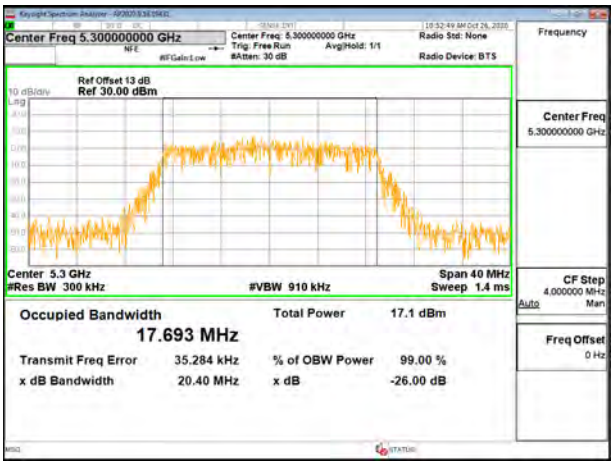


MID CHANNEL [ANT 6]

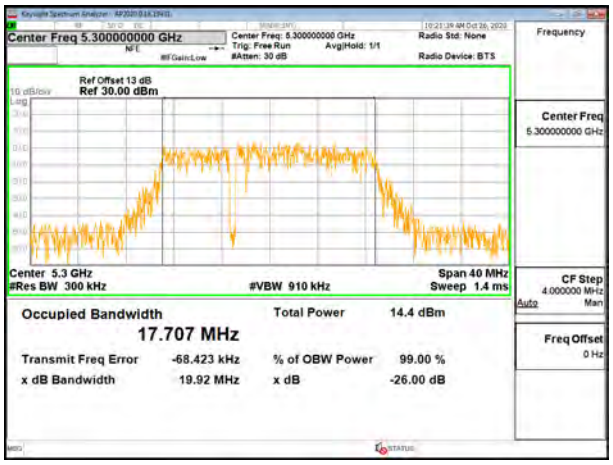


MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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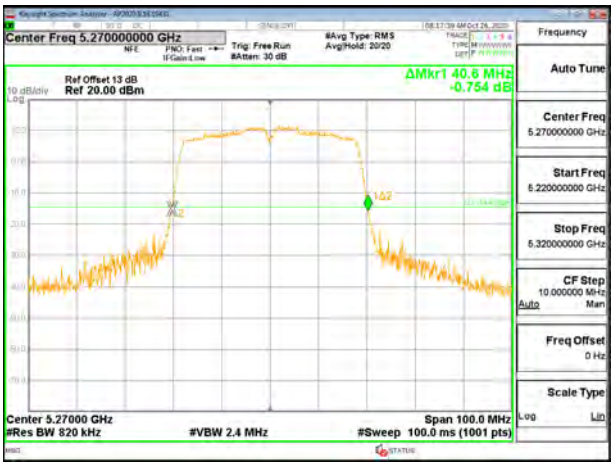
9.2.8. 802.11n HT40 MODE IN THE 5.3 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.60	36.0470
High	5310	40.70	36.0370

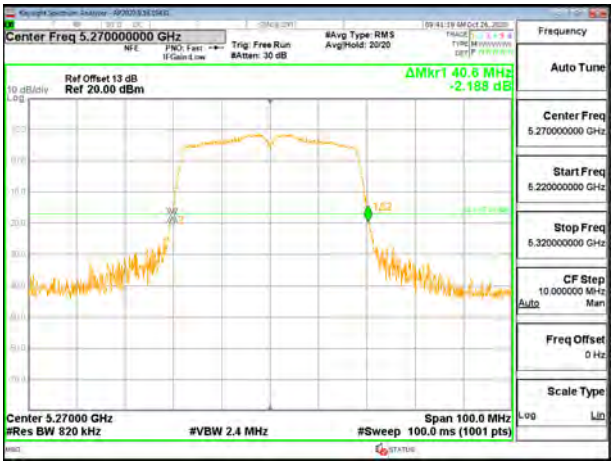


LOW CHANNEL 26dB

LOW CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.60	36.2310
High	5310	40.60	36.2310



LOW CHANNEL 26dB

LOW CHANNEL OBW

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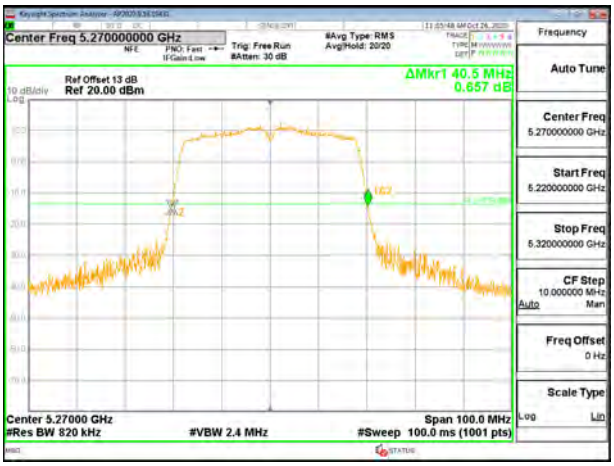
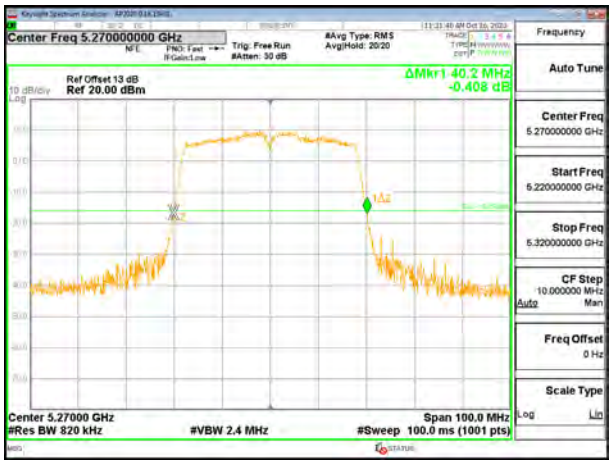
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	40.50	40.20	36.1760	36.0220
High	5310	40.60	40.40	36.1610	35.9520

LOW CHANNEL 26dB



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW

LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

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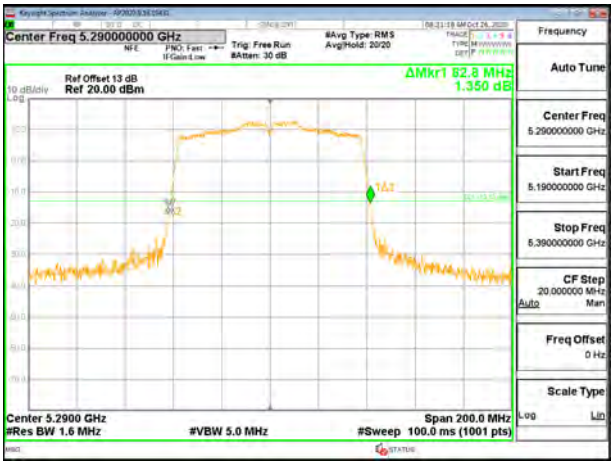
9.2.9. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99& Bandwidth (MHz)
Mid	5290	82.80	75.2400

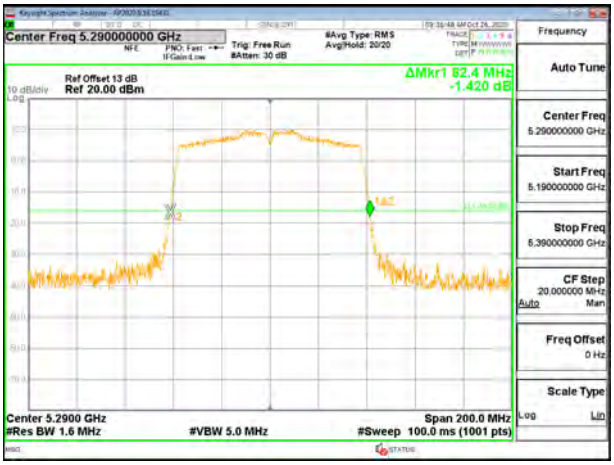


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99& Bandwidth (MHz)
Mid	5290	82.40	75.7070



MID CHANNEL 26dB

MID CHANNEL OBW

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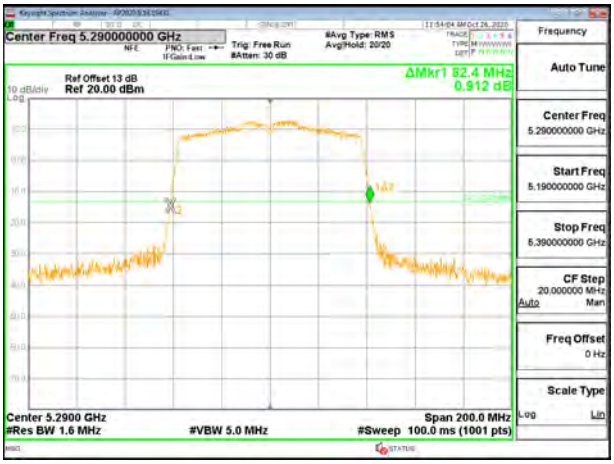
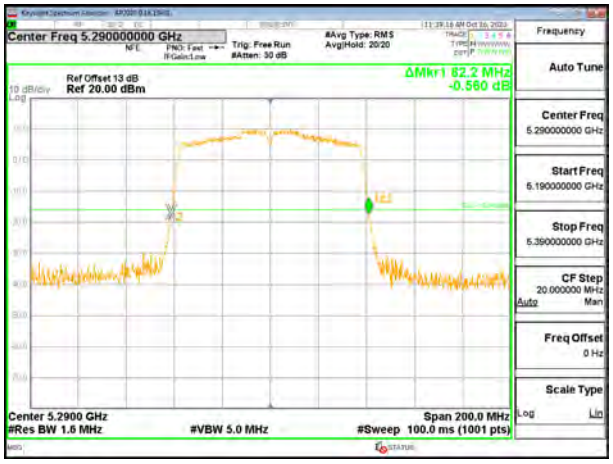
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	82.40	82.20	75.5980	75.3530

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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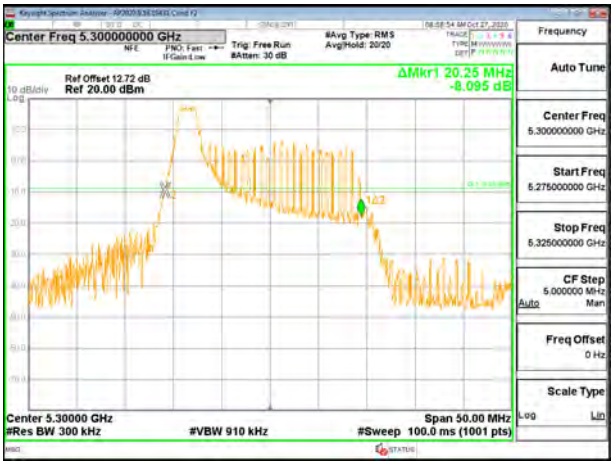
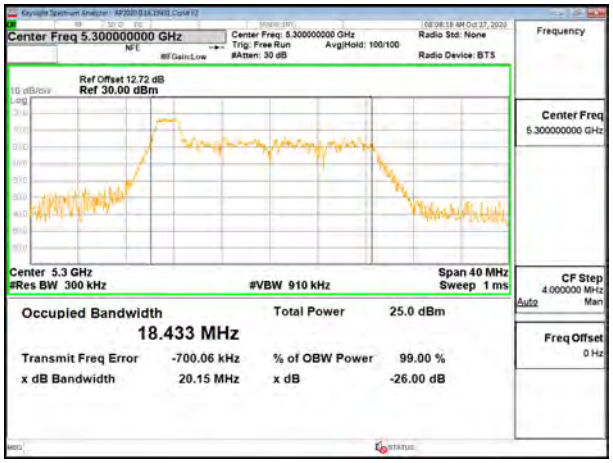
9.2.10. 802.11ax HE20 MODE IN THE 5.3 GHz BAND

1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.35	18.0920
Mid	5300	20.25	18.4330
High	5320	20.45	18.3960



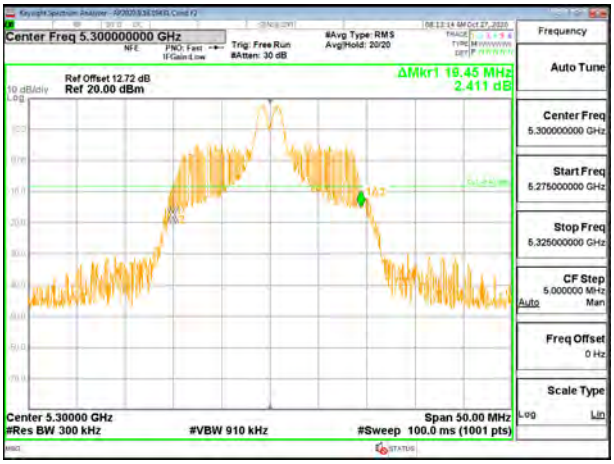
MID CHANNEL 26dB



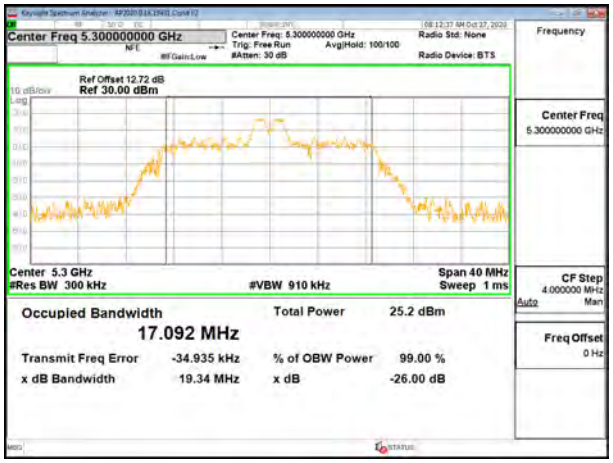
MID CHANNEL OBW

1TX Antenna 6 MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.45	17.1920
Mid	5300	19.45	17.0920
High	5320	19.45	17.1410



MID CHANNEL 26dB



MID CHANNEL OBW

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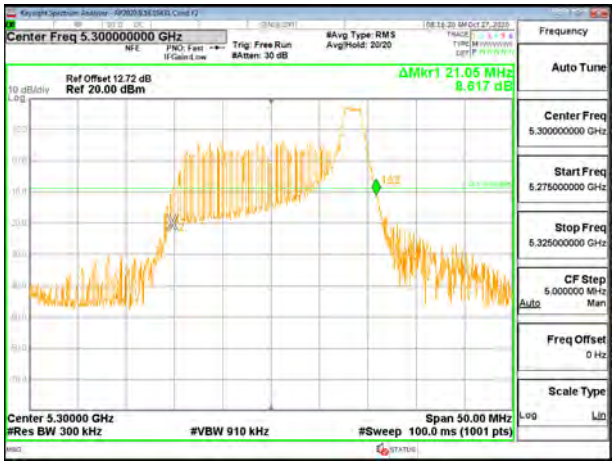
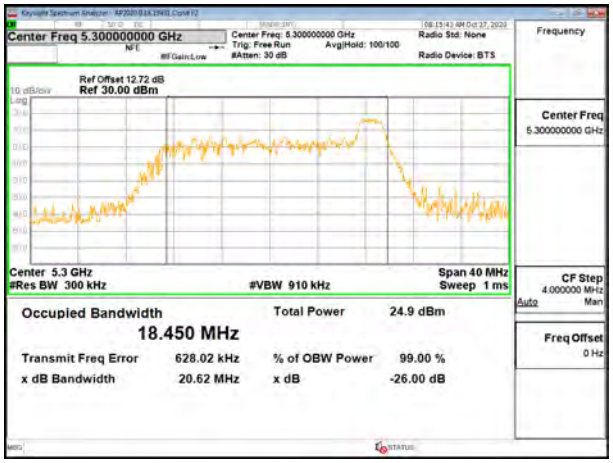
1TX Antenna 6 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.10	18.5000
Mid	5300	21.05	18.4500
High	5320	20.85	18.7280



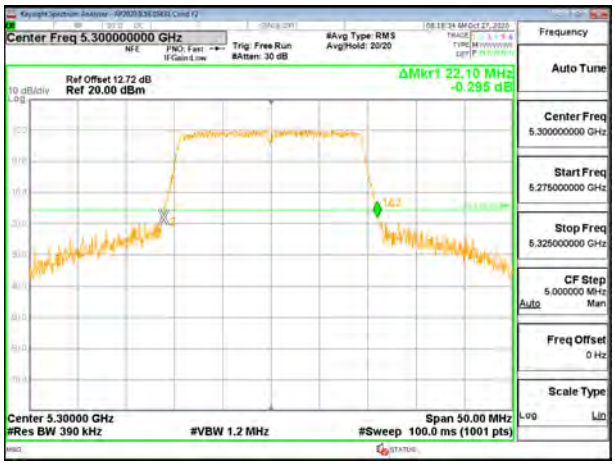
MID CHANNEL 26dB



MID CHANNEL OBW

1TX Antenna 6 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	22.10	19.0370
Mid	5300	22.10	19.0380
High	5320	22.15	19.0210



MID CHANNEL 26dB

MID CHANNEL OBW

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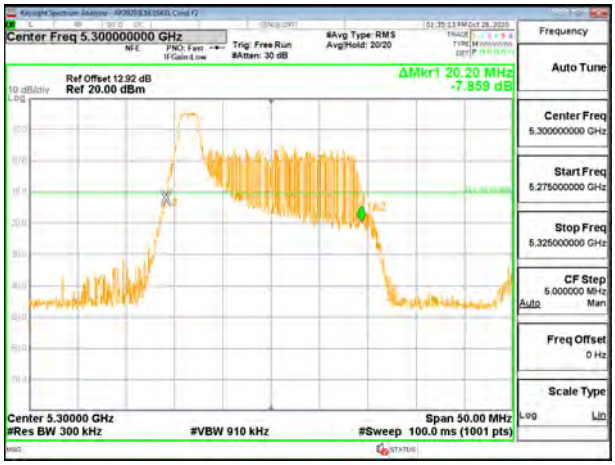
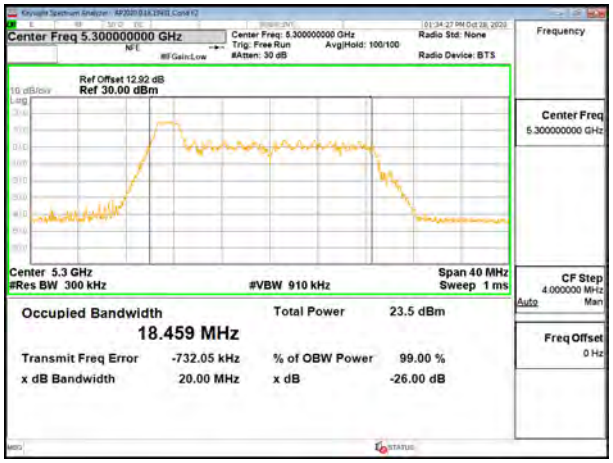
1TX Antenna 5 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.45	18.4300
Mid	5300	20.20	18.4590
High	5320	20.10	18.1650



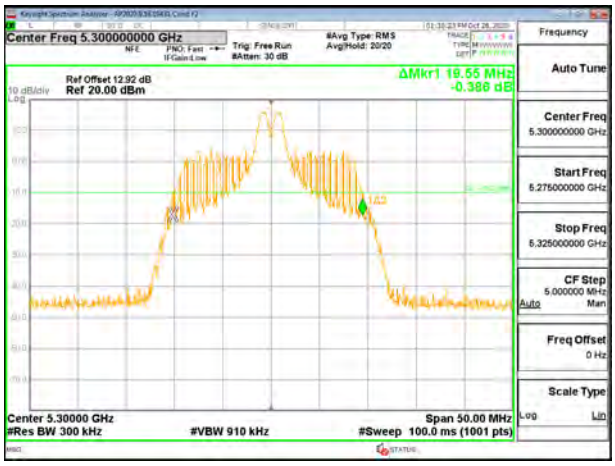
MID CHANNEL 26dB



MID CHANNEL OBW

1TX Antenna 5 MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.50	17.0540
Mid	5300	19.55	17.1870
High	5320	19.60	17.2330



MID CHANNEL 26dB

MID CHANNEL OBW

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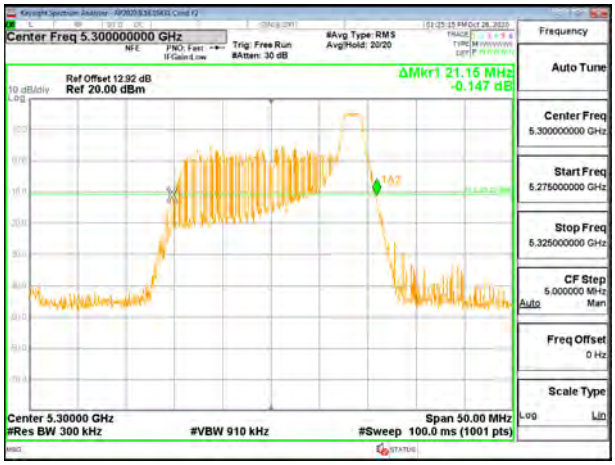
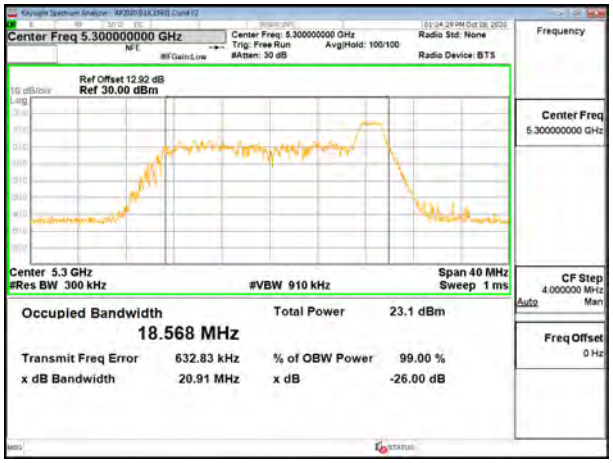
1TX Antenna 5 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.00	18.5090
Mid	5300	21.15	18.5680
High	5320	20.90	18.6470



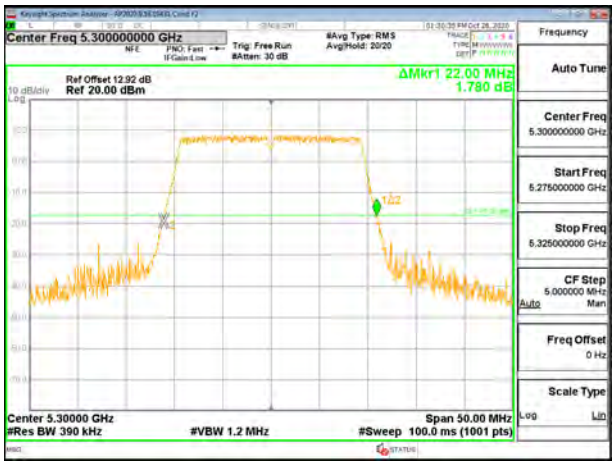
MID CHANNEL 26dB



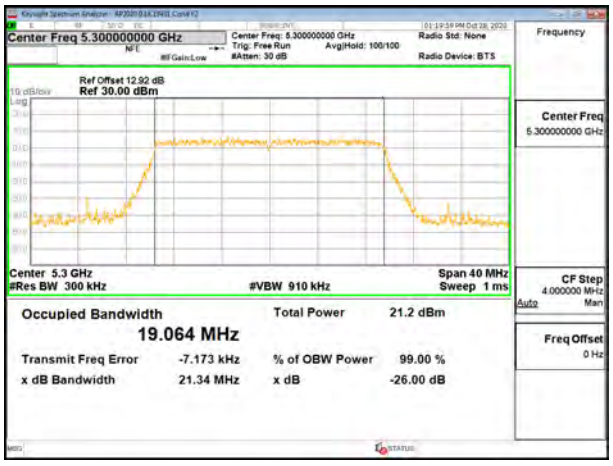
MID CHANNEL OBW

1TX Antenna 5 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	22.10	19.0720
Mid	5300	22.00	19.0640
High	5320	22.05	19.0710



MID CHANNEL 26dB



MID CHANNEL OBW

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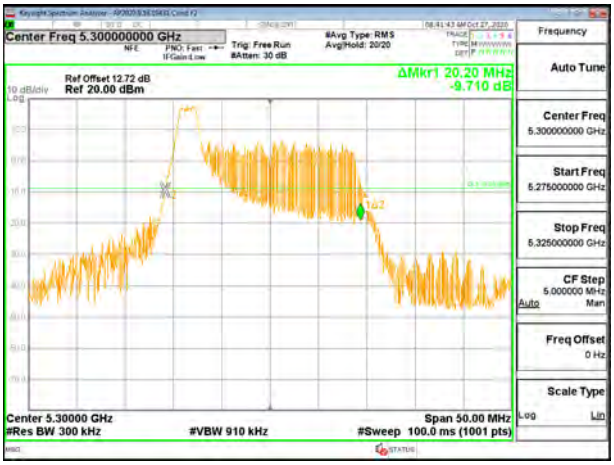
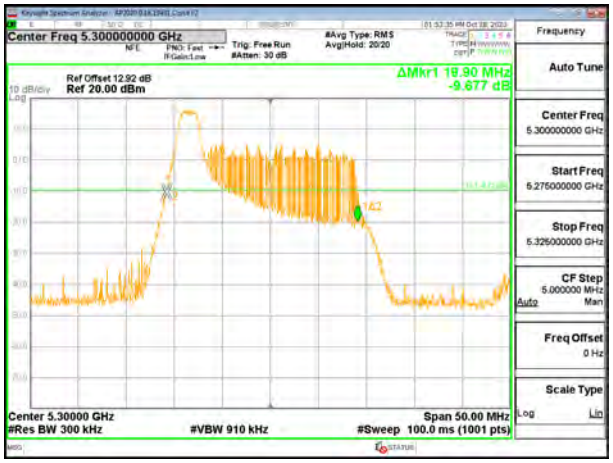
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	20.30	19.85	18.4030	18.1760
Mid	5300	20.20	19.90	18.2700	18.3660
High	5320	20.10	20.00	18.3370	18.2980

MID CHANNEL 26dB



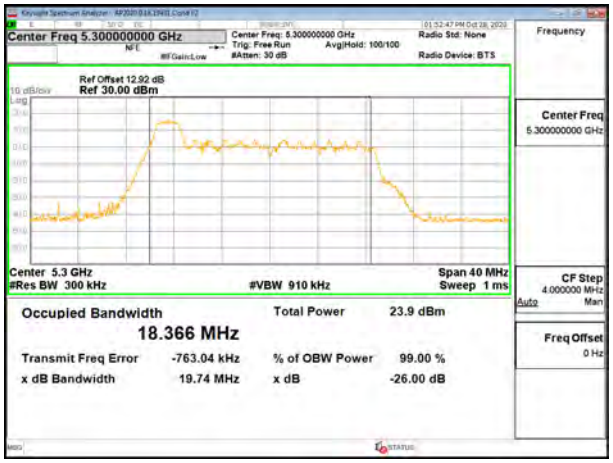
MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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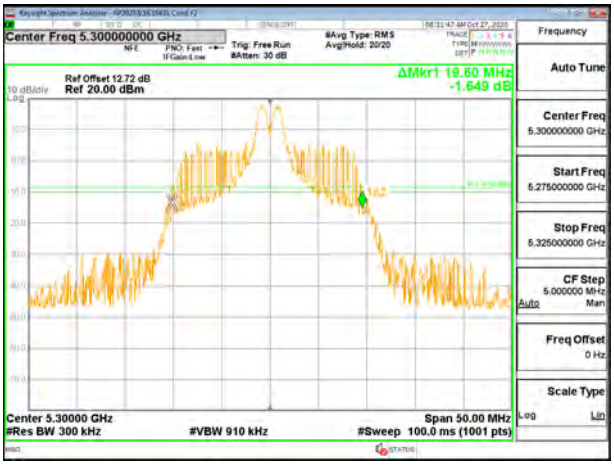
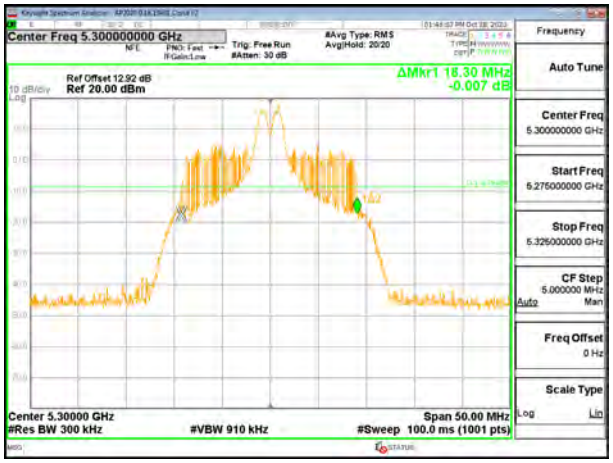
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	19.65	18.35	17.1030	16.7760
Mid	5300	19.60	18.30	17.0790	16.8080
High	5320	19.60	18.35	17.1420	16.8490

MID CHANNEL 26dB

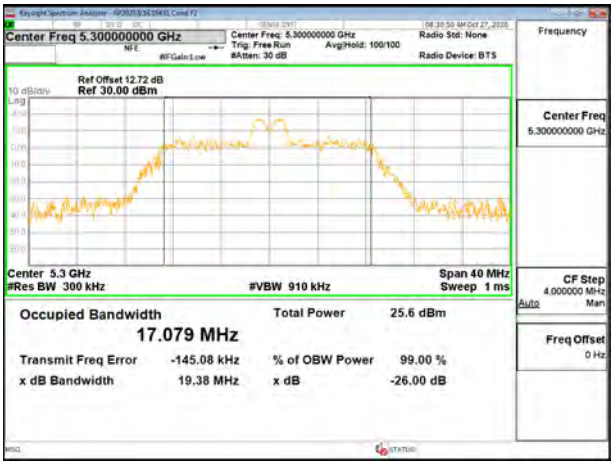


MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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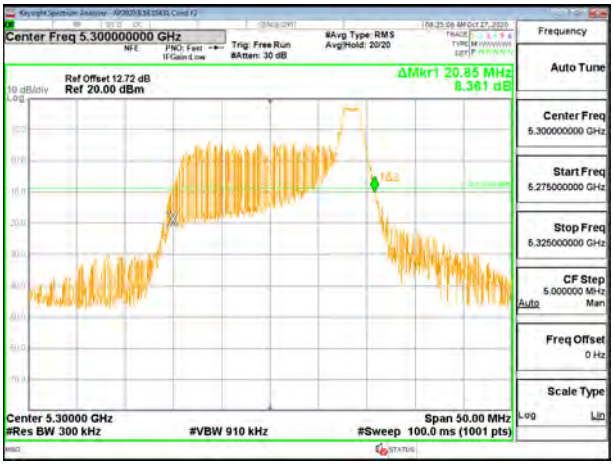
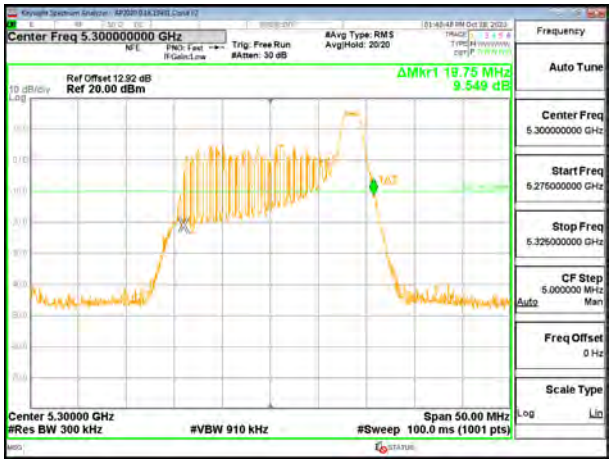
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	21.10	20.00	18.5510	18.4730
Mid	5300	20.85	19.76	18.5660	18.0130
High	5320	20.95	19.95	18.6220	18.3920

MID CHANNEL 26dB

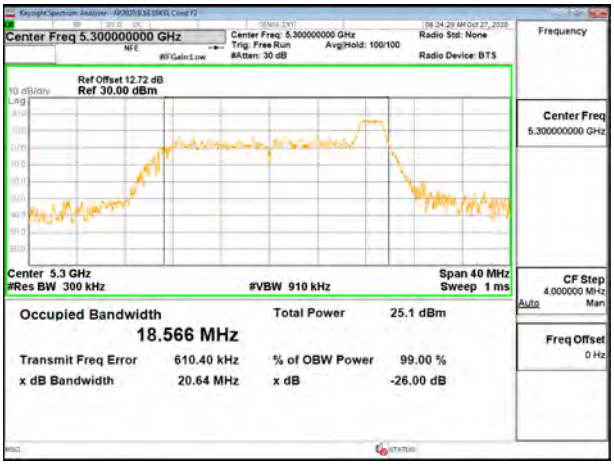


MID CHANNEL [ANT 6]

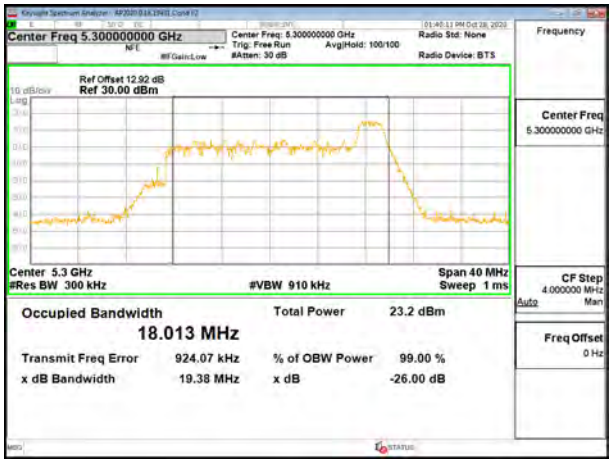


MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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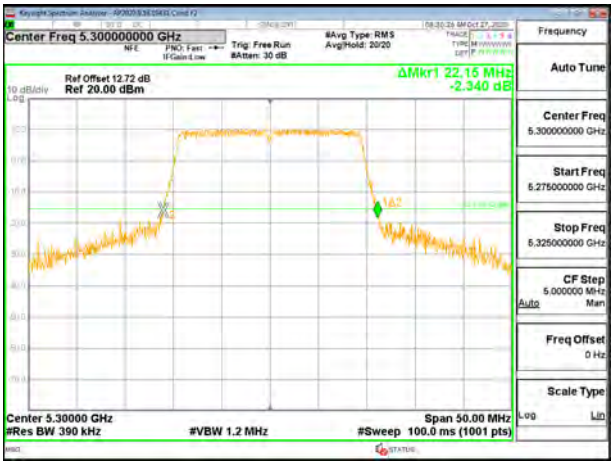
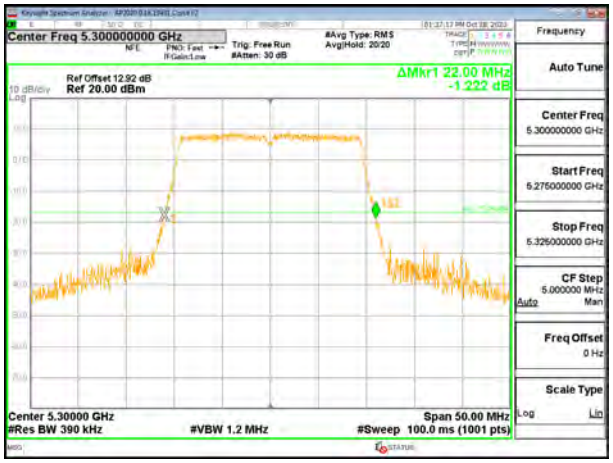
2TX Antenna 6 + Antenna 5 CDD MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	22.00	21.80	19.0310	19.0440
Mid	5300	22.15	22.00	19.0470	19.0230
High	5320	22.05	21.95	19.0370	19.0780

MID CHANNEL 26dB



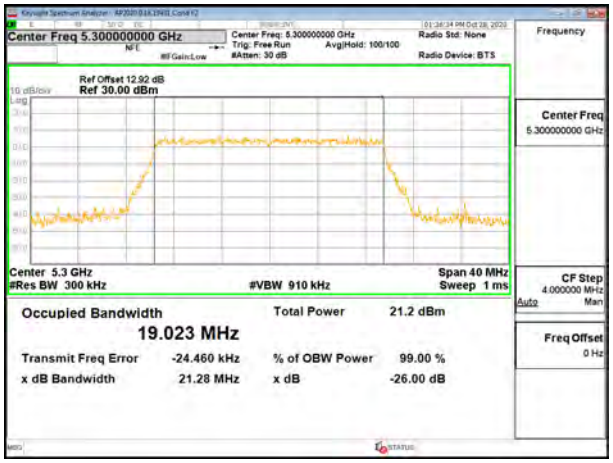
MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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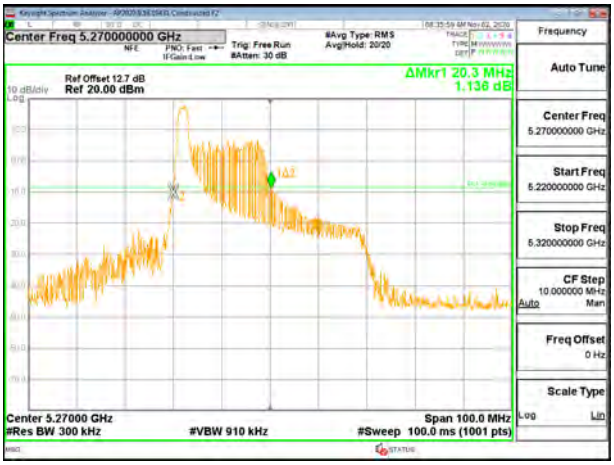
9.2.11. 802.11ax HE40 MODE IN THE 5.3 GHz BAND

1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	20.30	18.1200
High	5310	20.00	18.3080

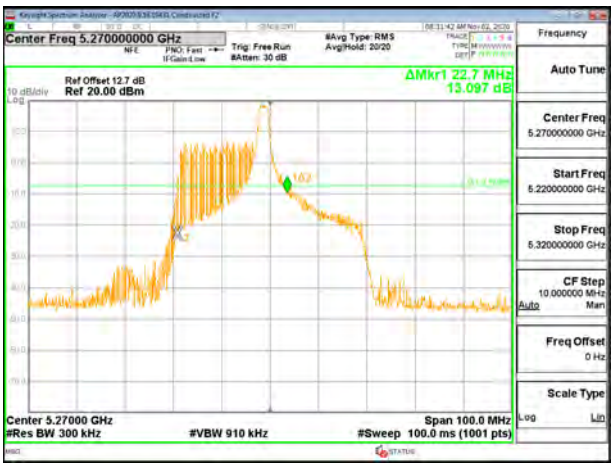


LOW CHANNEL 26dB

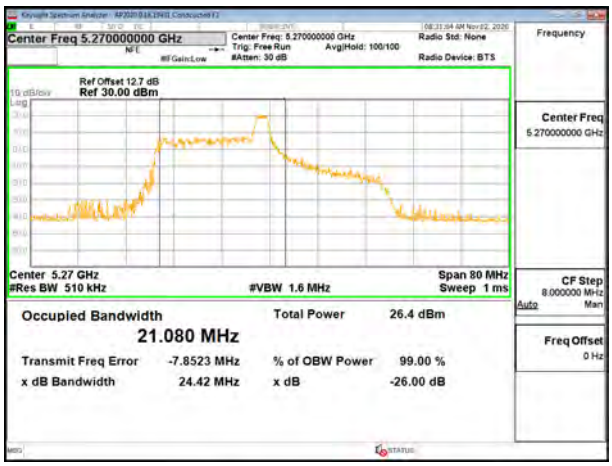
LOW CHANNEL OBW

1TX Antenna 6 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.70	21.0800
High	5310	24.10	20.9210



LOW CHANNEL 26dB



LOW CHANNEL OBW

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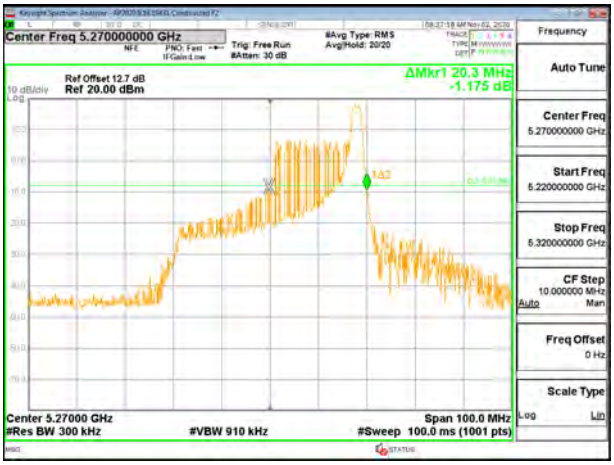
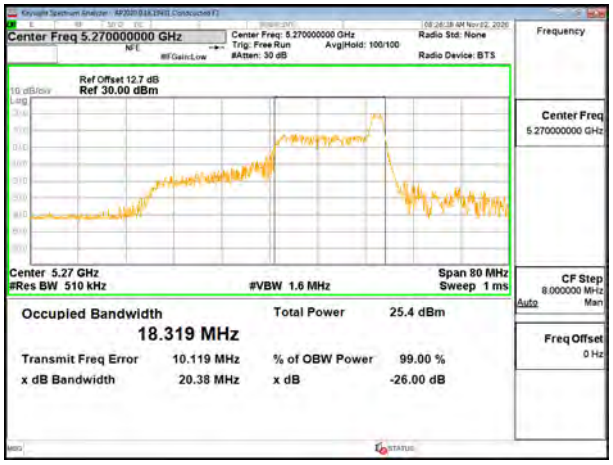
1TX Antenna 6 MODE: 26 Tones, RU Index 17

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	20.30	18.3190
High	5310	20.10	18.4420



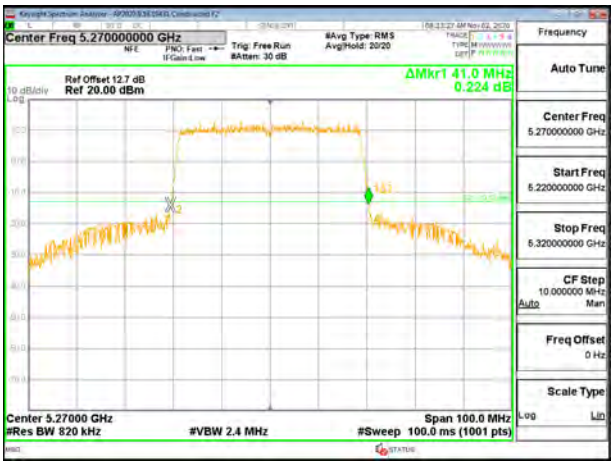
LOW CHANNEL 26dB



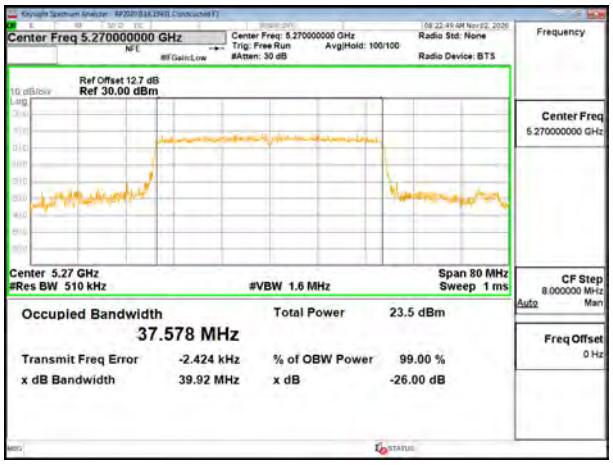
LOW CHANNEL OBW

1TX Antenna 6 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	41.00	37.5780
High	5310	41.00	37.6320



LOW CHANNEL 26dB



LOW CHANNEL OBW

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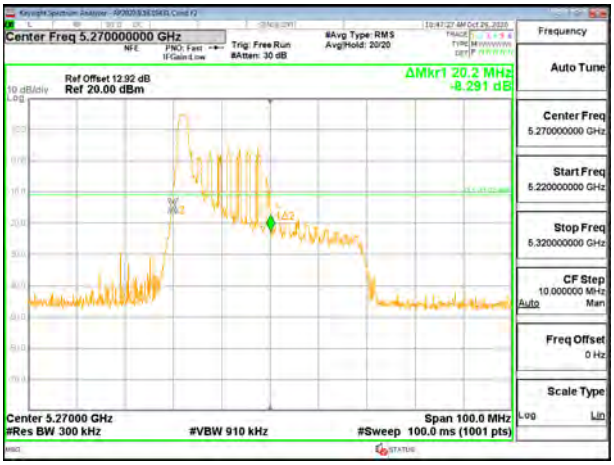
1TX Antenna 5 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	20.20	18.1470
High	5310	20.20	18.2000

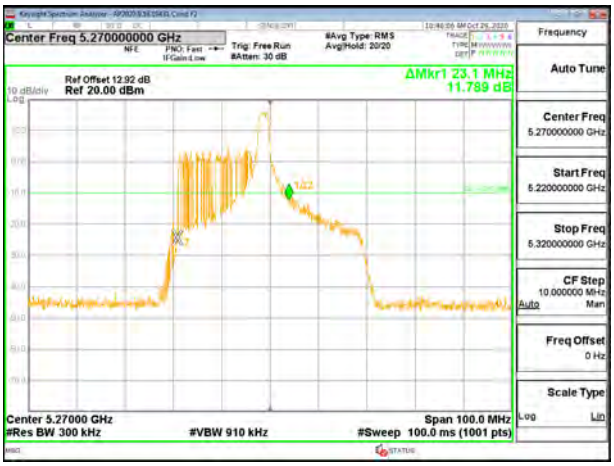


LOW CHANNEL 26dB

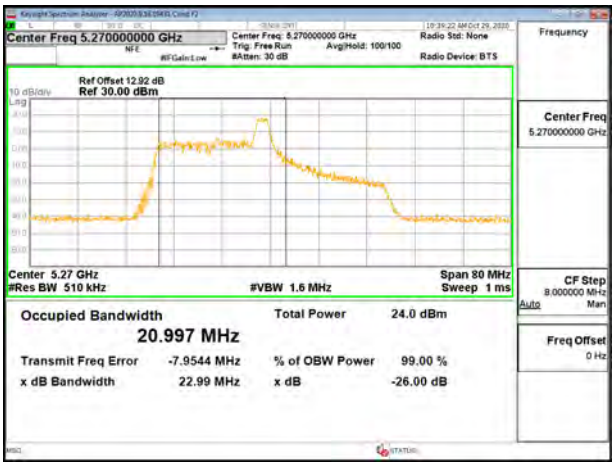
LOW CHANNEL OBW

1TX Antenna 5 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	23.10	20.9970
High	5310	22.90	21.0280



LOW CHANNEL 26dB



LOW CHANNEL OBW

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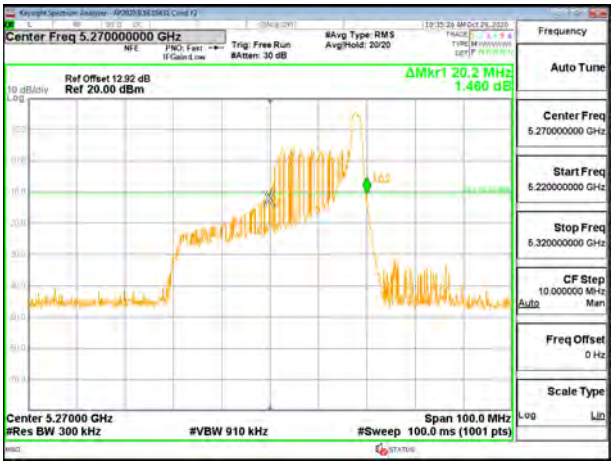
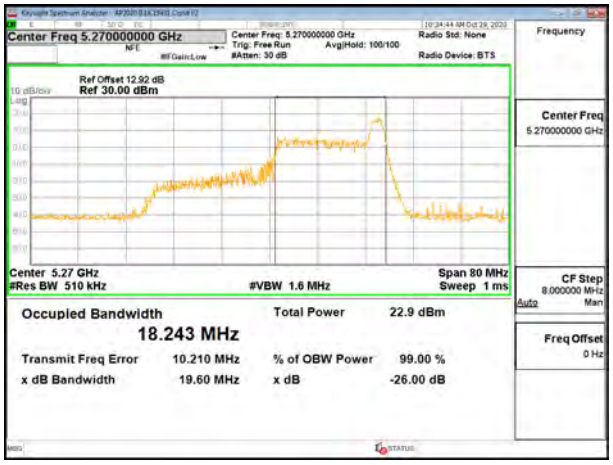
1TX Antenna 5 MODE: 26 Tones, RU Index 17

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	20.20	18.2430
High	5310	20.40	18.2770



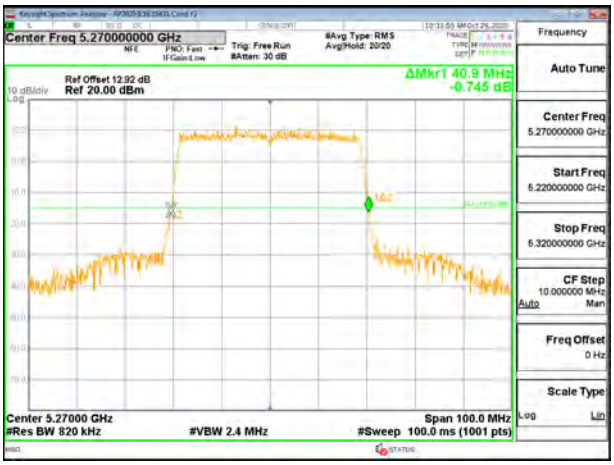
LOW CHANNEL 26dB



LOW CHANNEL OBW

1TX Antenna 5 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.90	37.6370
High	5310	41.00	37.5140



LOW CHANNEL 26dB

LOW CHANNEL OBW

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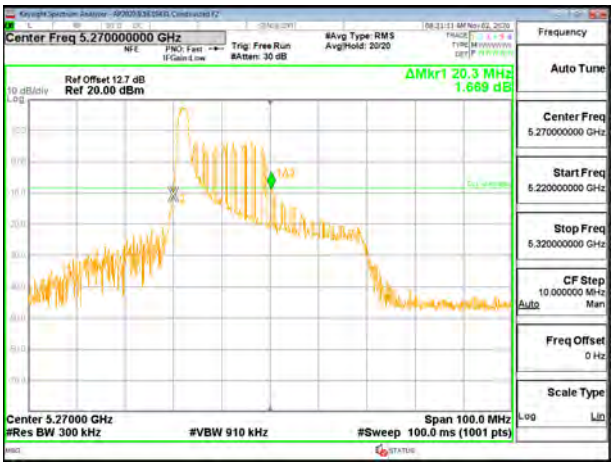
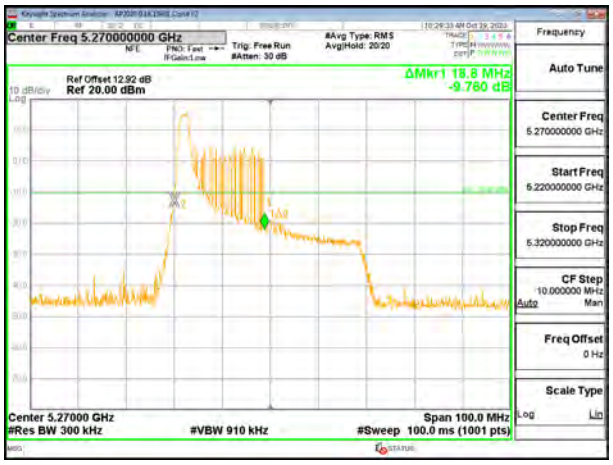
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	20.30	18.80	18.1290	18.0890
High	5310	20.40	19.40	18.1760	18.0700

LOW CHANNEL 26dB



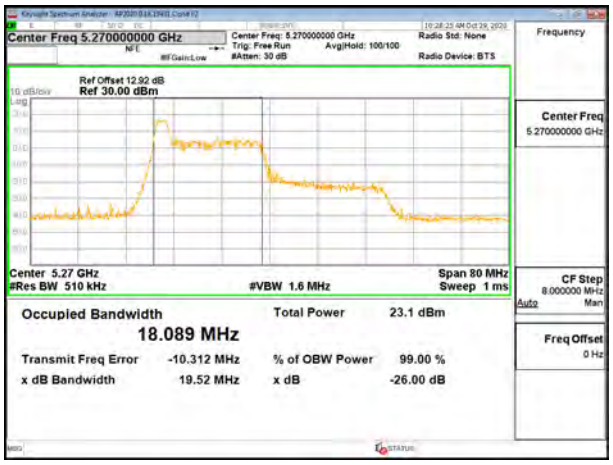
LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW

LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

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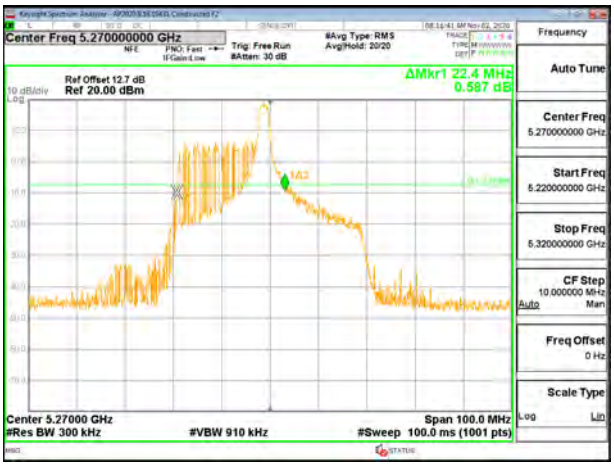
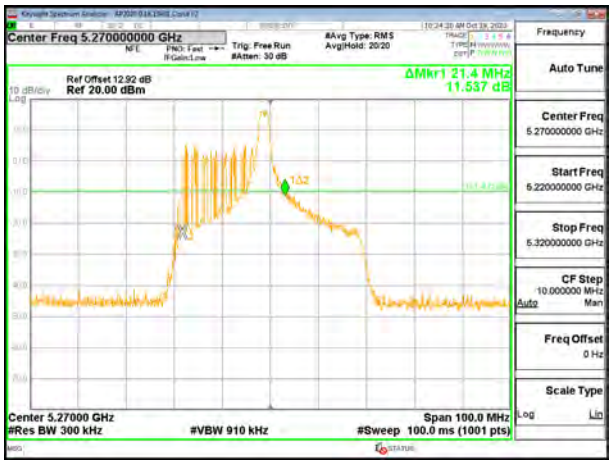
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	22.40	21.40	21.1610	20.9460
High	5310	22.40	22.20	20.8140	20.9670

LOW CHANNEL 26dB

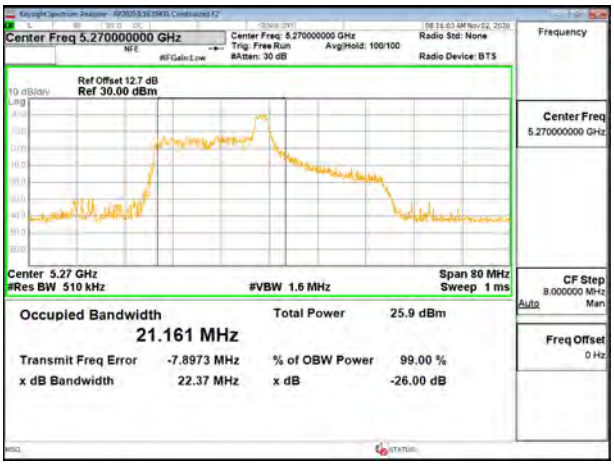


LOW CHANNEL [ANT 6]

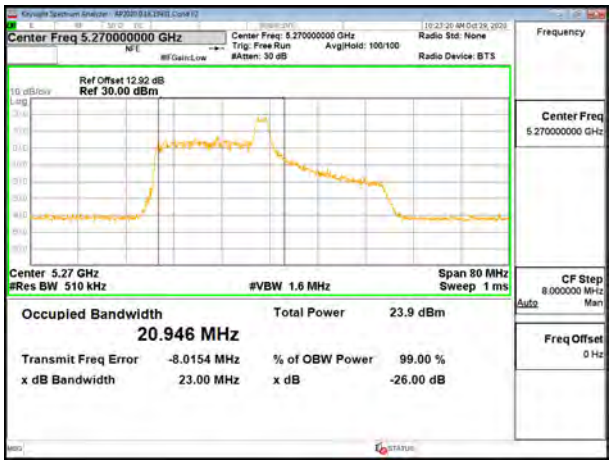


LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

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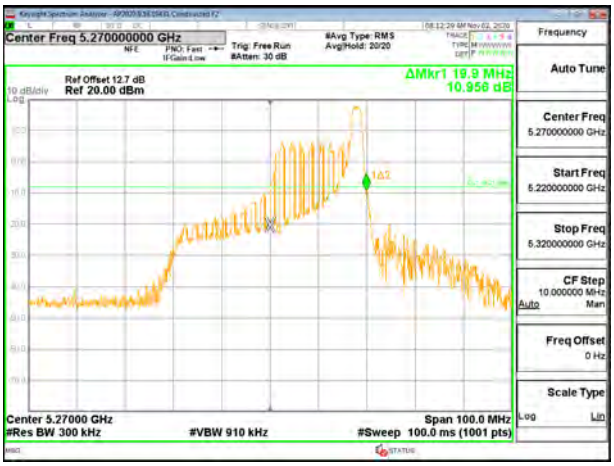
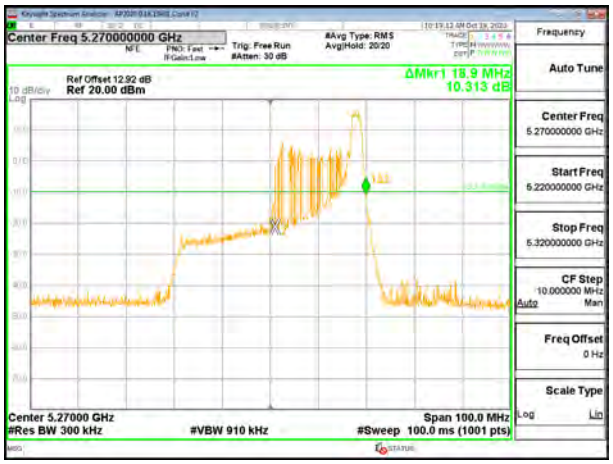
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 17

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	19.90	18.90	18.3630	18.0700
High	5310	20.10	19.10	18.4880	18.0110

LOW CHANNEL 26dB

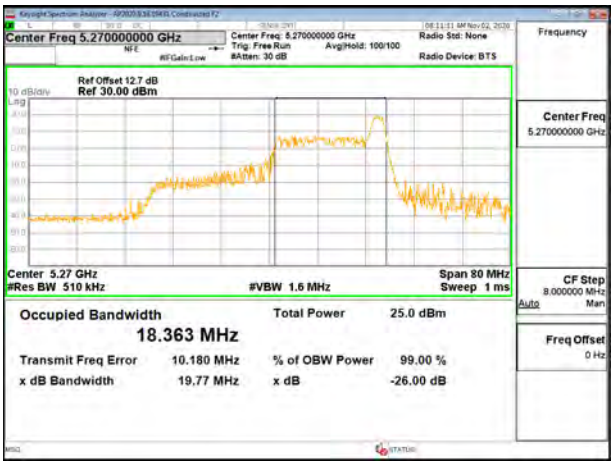


LOW CHANNEL [ANT 6]

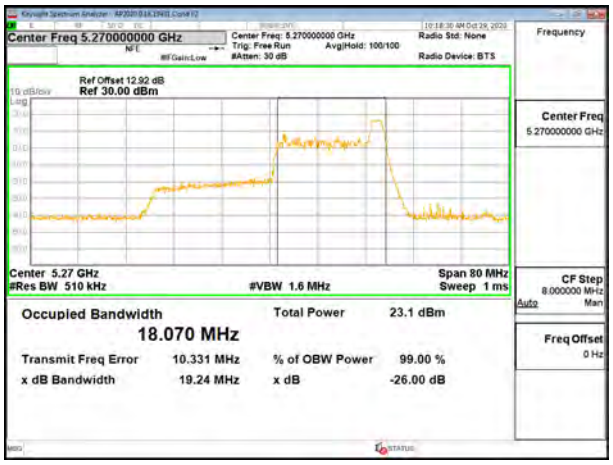


LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

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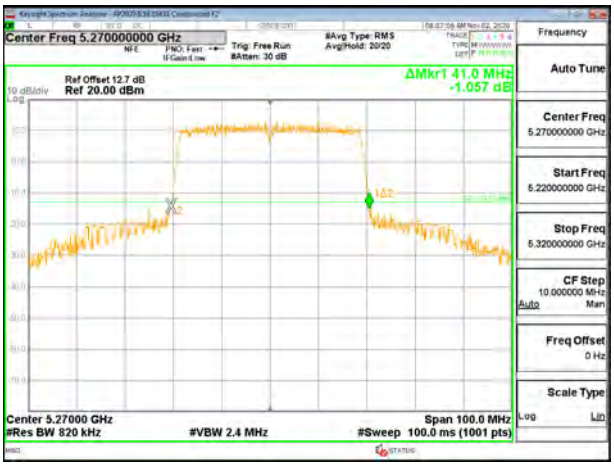
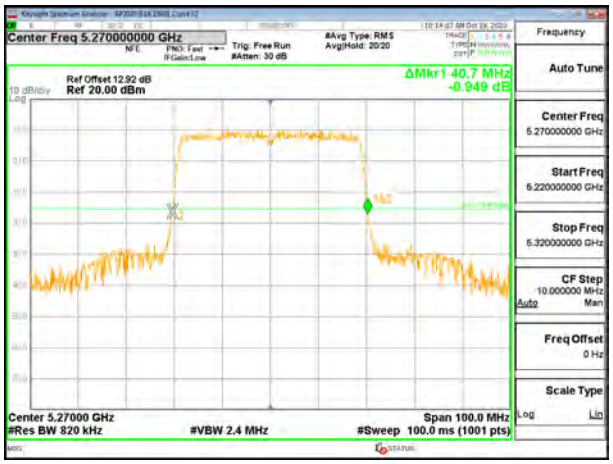
2TX Antenna 6 + Antenna 5 CDD MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	41.00	40.70	37.5900	37.5770
High	5310	40.90	41.10	37.6030	37.5610

LOW CHANNEL 26dB



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW

LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

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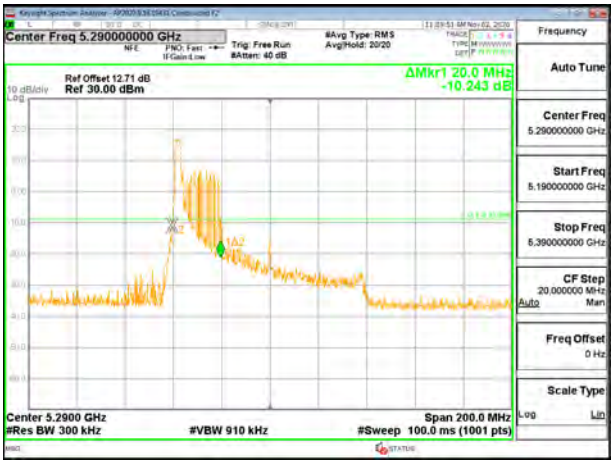
9.2.12. 802.11ax HE80 MODE IN THE 5.3 GHz BAND

1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	20.00	17.9490

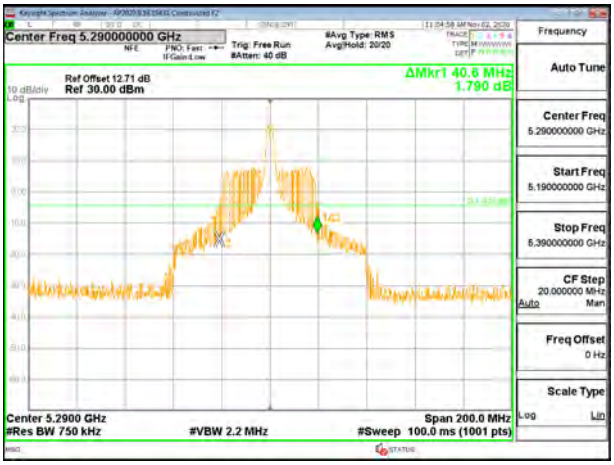


MID CHANNEL 26dB

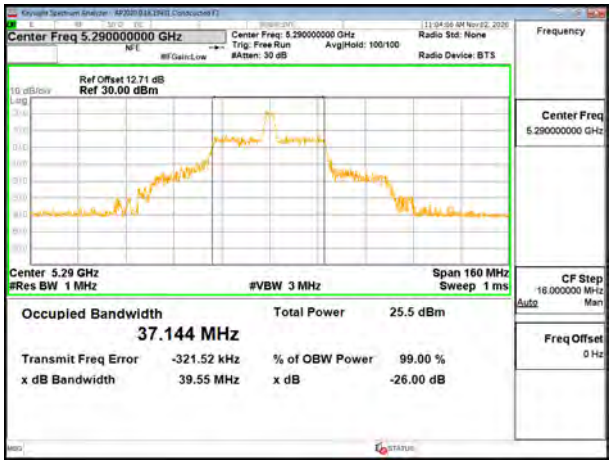
MID CHANNEL OBW

1TX Antenna 6 MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	40.60	37.1440



MID CHANNEL 26dB



MID CHANNEL OBW

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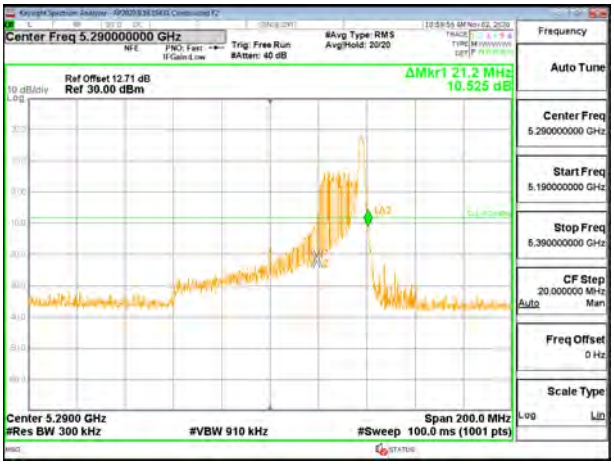
1TX Antenna 6 MODE: 26 Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	21.20	18.3400

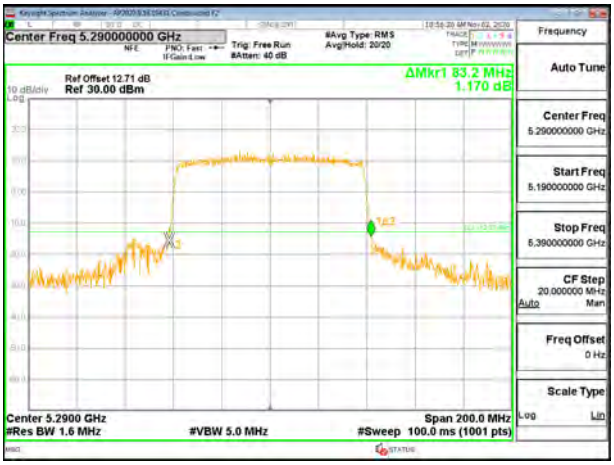


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 6 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	83.20	76.9530



MID CHANNEL 26dB

MID CHANNEL OBW

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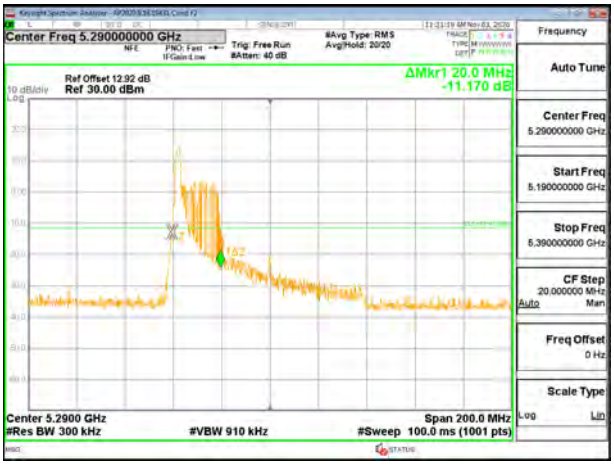
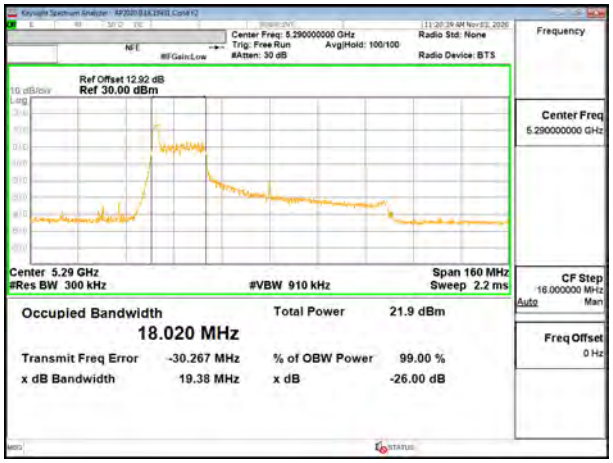
1TX Antenna 5 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	20.00	18.0200



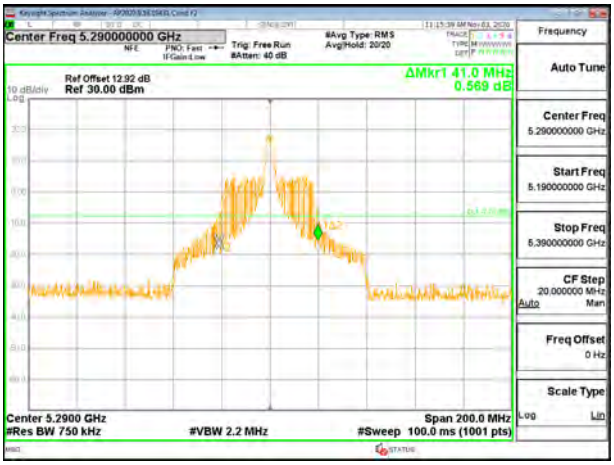
MID CHANNEL 26dB



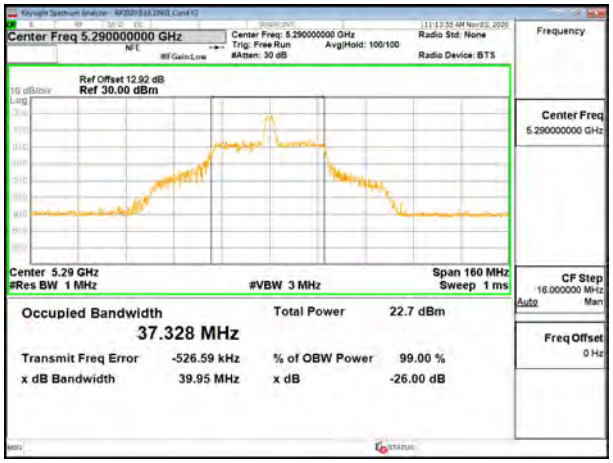
MID CHANNEL OBW

1TX Antenna 5 MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	41.00	37.3280



MID CHANNEL 26dB



MID CHANNEL OBW

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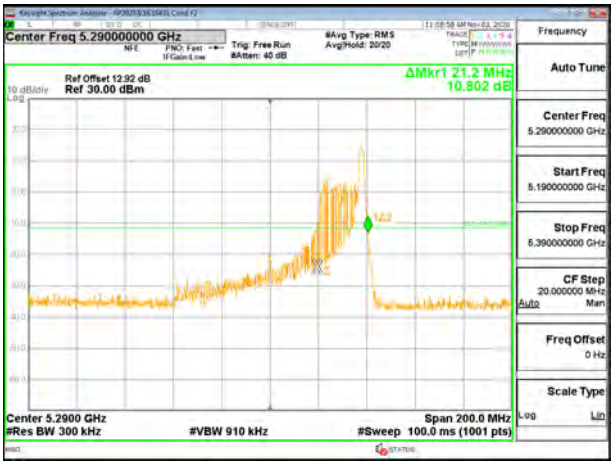
1TX Antenna 5 MODE: 26 Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	21.20	18.3470

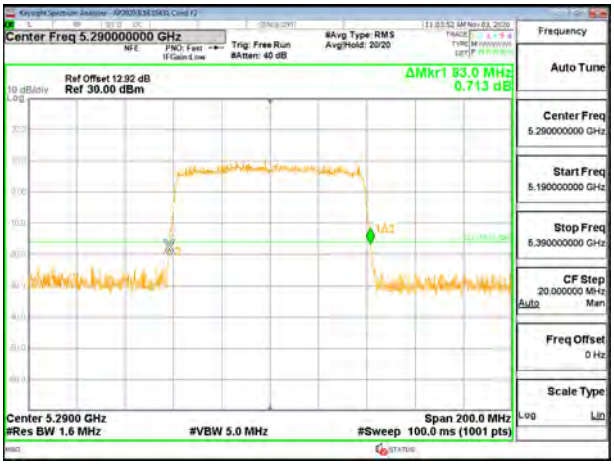


MID CHANNEL 26dB

MID CHANNEL OBW

1TX Antenna 5 MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	83.00	77.1050



MID CHANNEL 26dB

MID CHANNEL OBW

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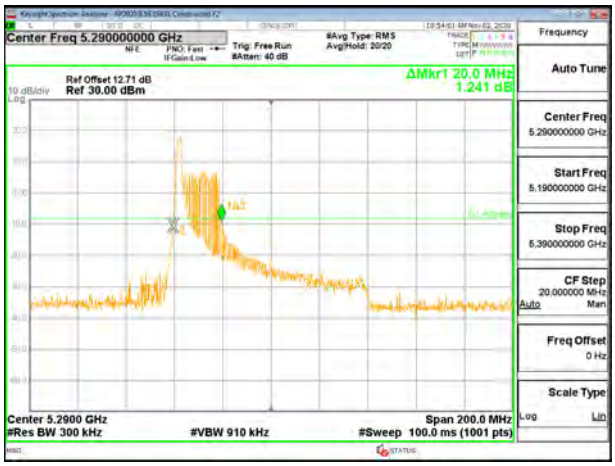
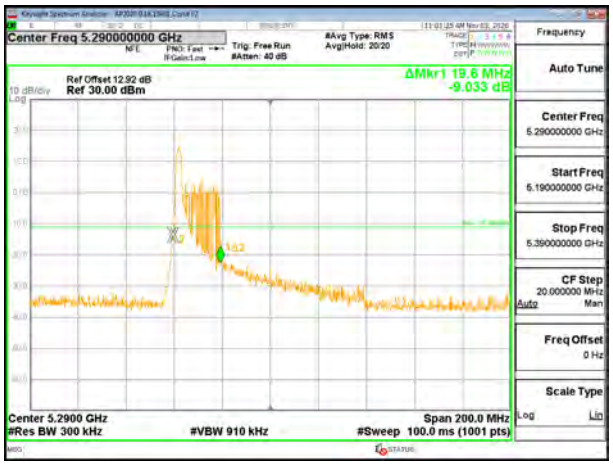
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	20.00	19.60	18.0320	17.9230

MID CHANNEL 26dB

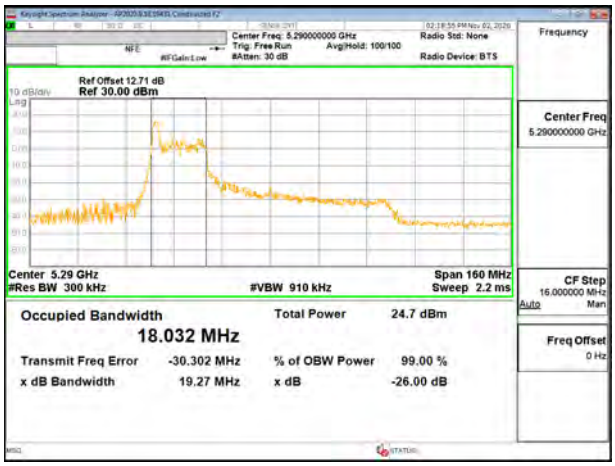


MID CHANNEL [ANT 6]

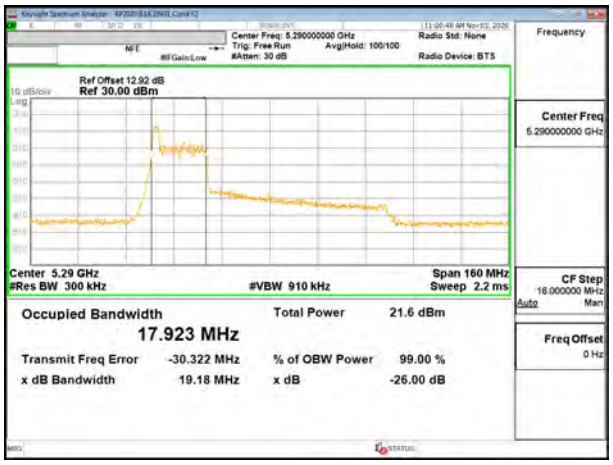


MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

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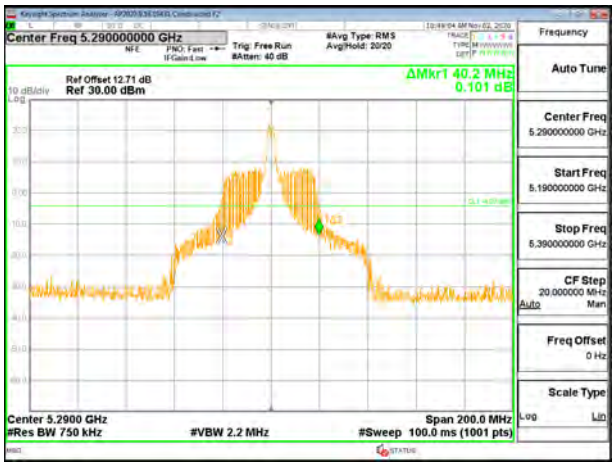
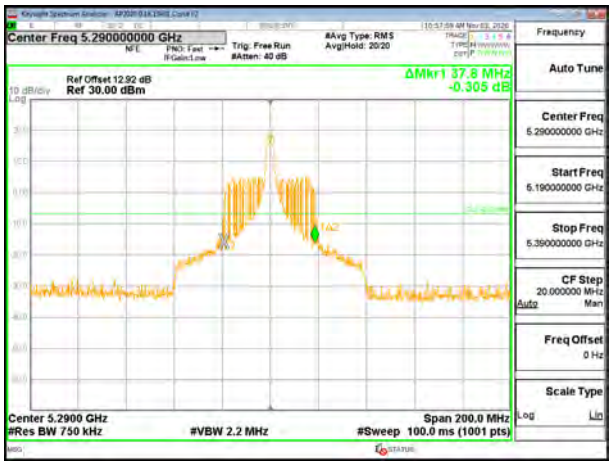
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	40.20	37.80	36.3860	36.1920

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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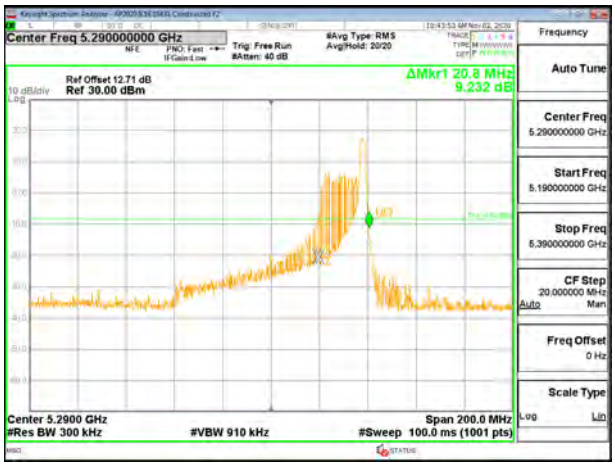
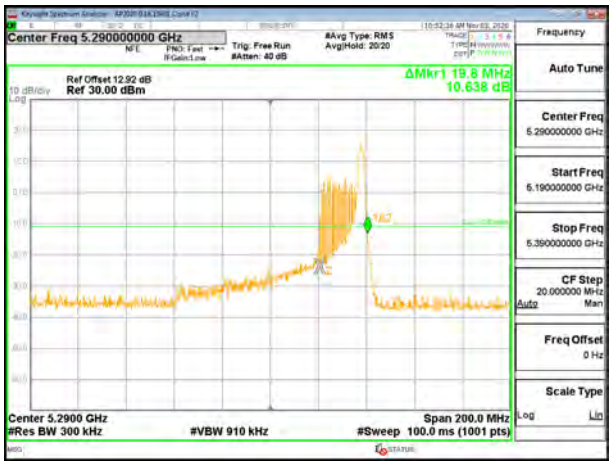
2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 36

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	20.80	19.80	18.1900	17.9130

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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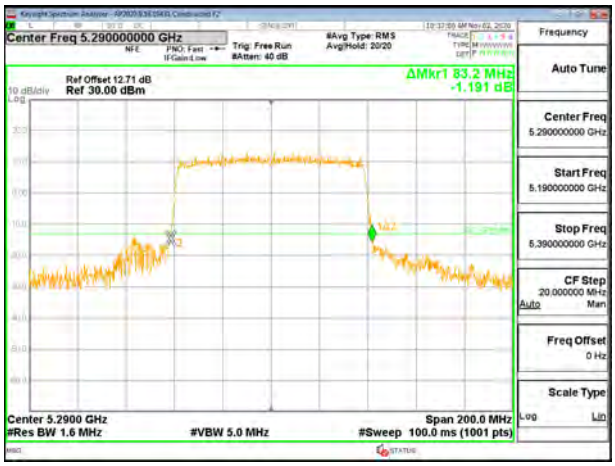
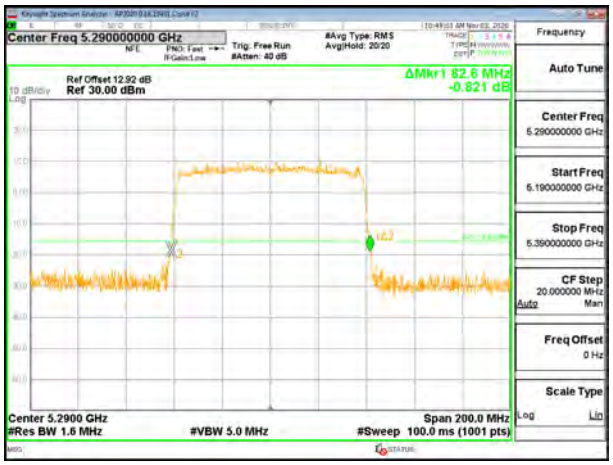
2TX Antenna 6 + Antenna 5 CDD MODE: SU Mode

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	83.20	82.60	77.0480	77.1330

MID CHANNEL 26dB

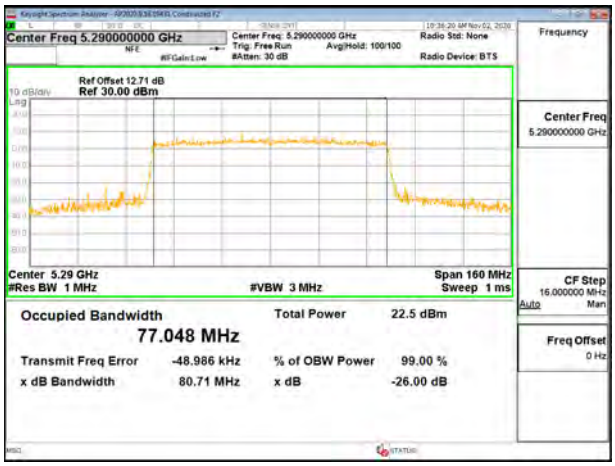


MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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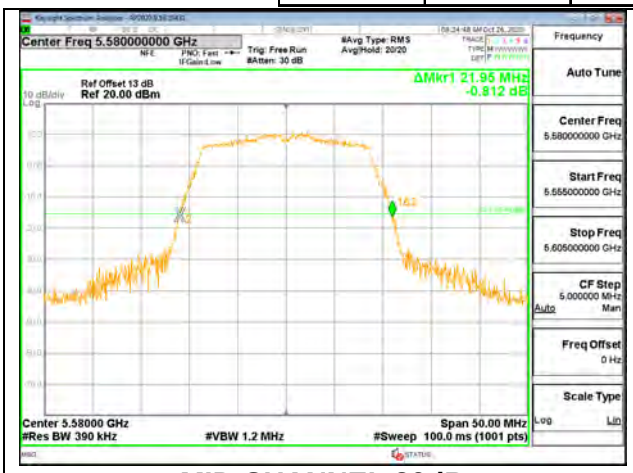
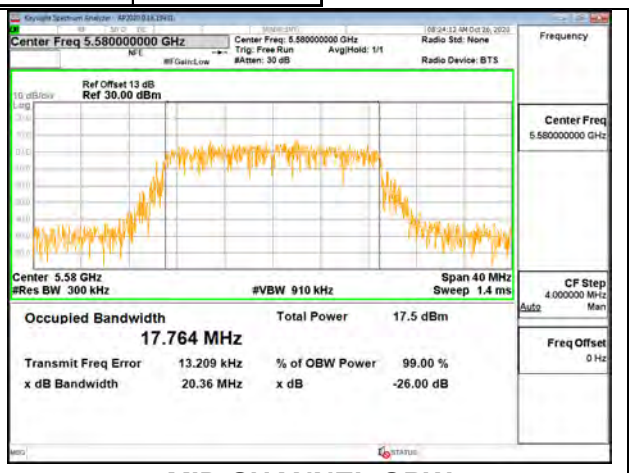
9.2.13. 802.11n HT20 MODE IN THE 5.6 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	22.00	17.7780
Mid	5580	21.95	17.7640
High	5700	22.00	17.7500
144	5720	21.90	17.6820



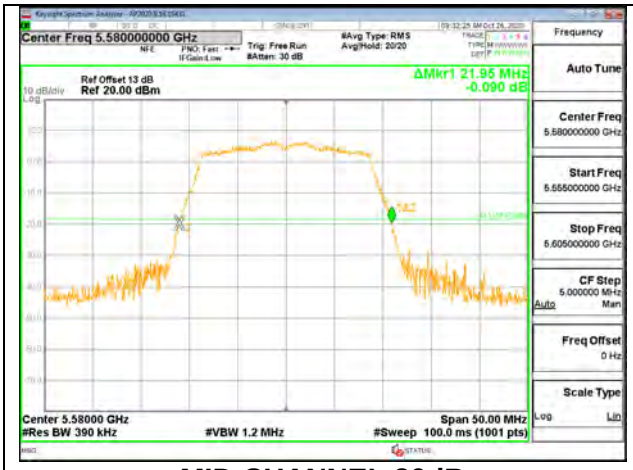
MID CHANNEL 26dB



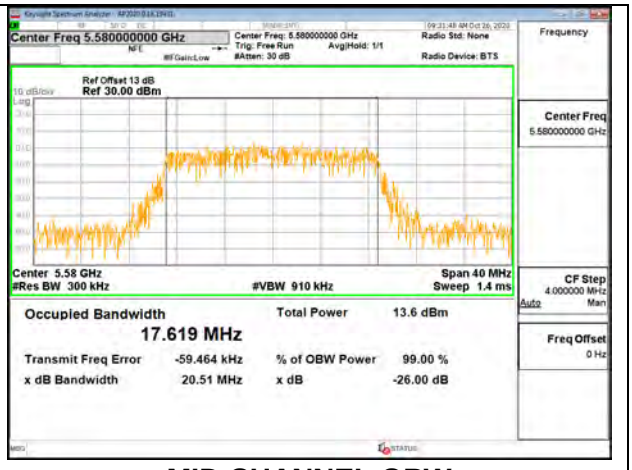
MID CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	21.70	17.6180
Mid	5580	21.95	17.6190
High	5700	21.90	17.6780
144	5720	21.70	17.6830



MID CHANNEL 26dB



MID CHANNEL OBW

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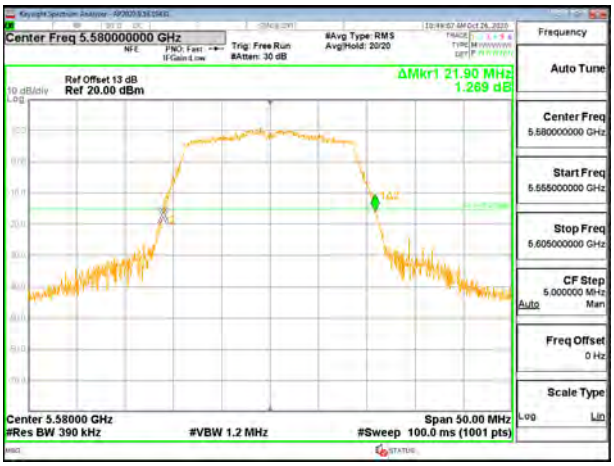
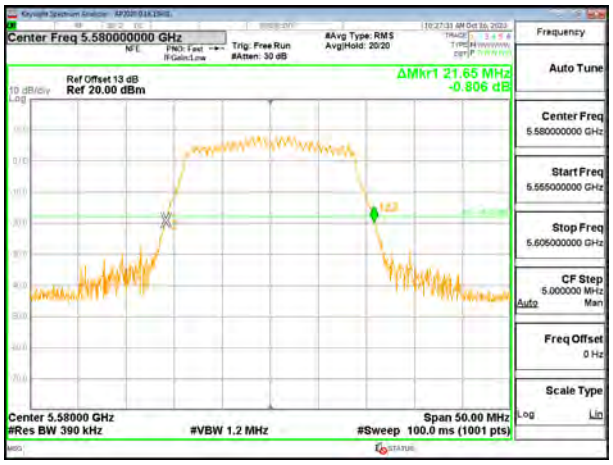
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5500	21.75	21.55	17.7350	17.7100
Mid	5580	21.90	21.65	17.7010	17.6910
High	5700	21.95	21.70	17.6030	17.7120
144	5720	21.80	21.65	17.7160	17.7070

MID CHANNEL 26dB

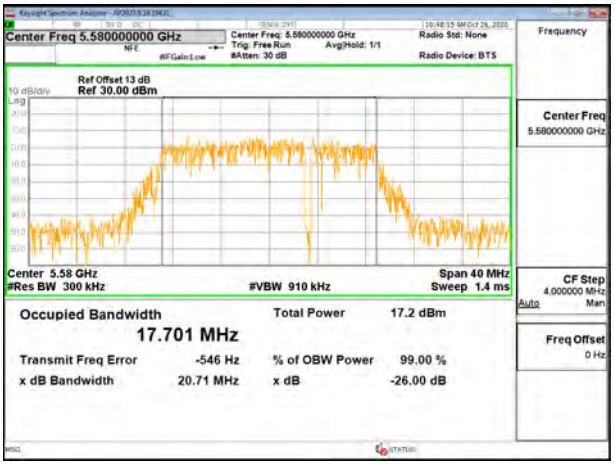


MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW



MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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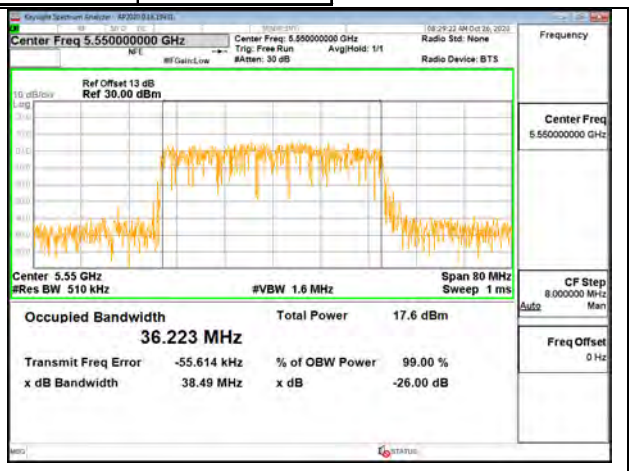
9.2.14. 802.11n HT40 MODE IN THE 5.6 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	40.70	36.1100
Mid	5550	40.60	36.2230
High	5670	40.80	36.4030
142	5710	40.50	36.1640

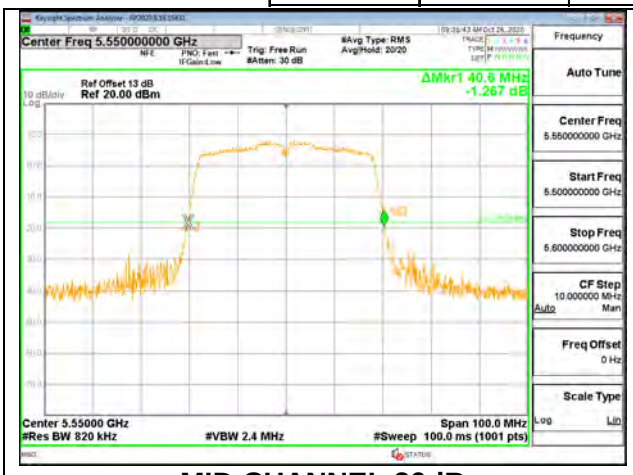
MID CHANNEL 26dB



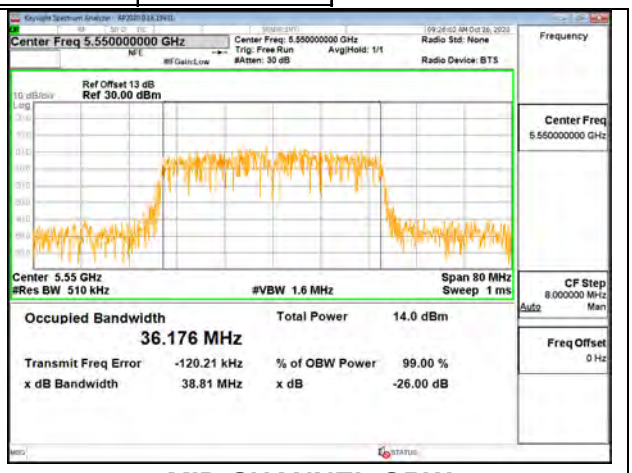
MID CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	40.80	35.9850
Mid	5550	40.60	36.1760
High	5670	40.90	36.0820
142	5710	40.60	36.2030



MID CHANNEL 26dB



MID CHANNEL OBW

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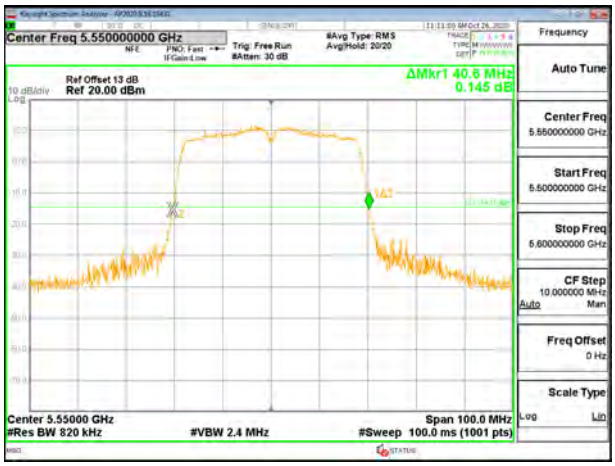
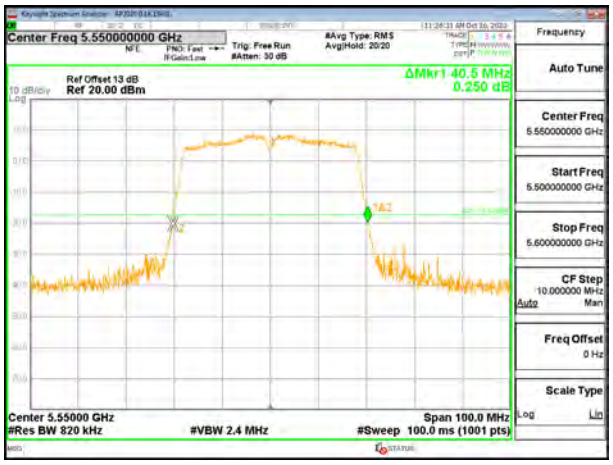
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5510	40.70	40.20	36.1730	36.0700
Mid	5550	40.60	40.50	36.1550	36.0570
High	5670	40.70	40.10	35.9280	36.0420
142	5710	40.60	40.40	36.3730	36.3060

MID CHANNEL 26dB



MID CHANNEL [ANT 6]



MID CHANNEL [ANT 5]

MID CHANNEL OBW

MID CHANNEL [ANT 6]

MID CHANNEL [ANT 5]

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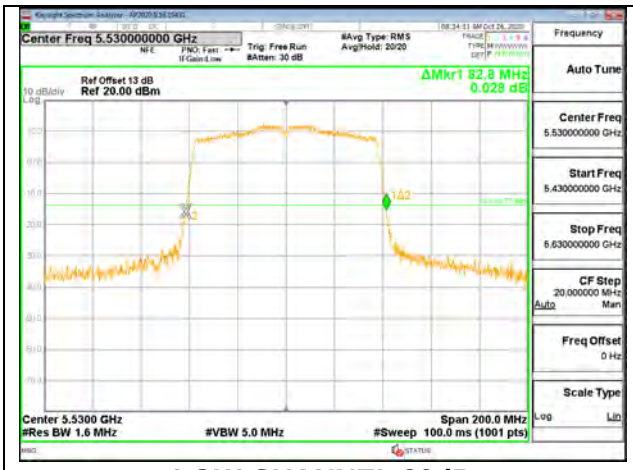
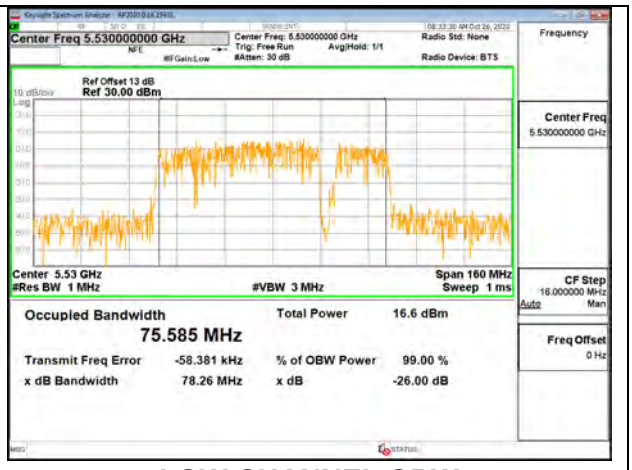
9.2.15. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5530	82.80	75.5850
High	5610	82.60	75.1460
138	5690	82.80	74.8030



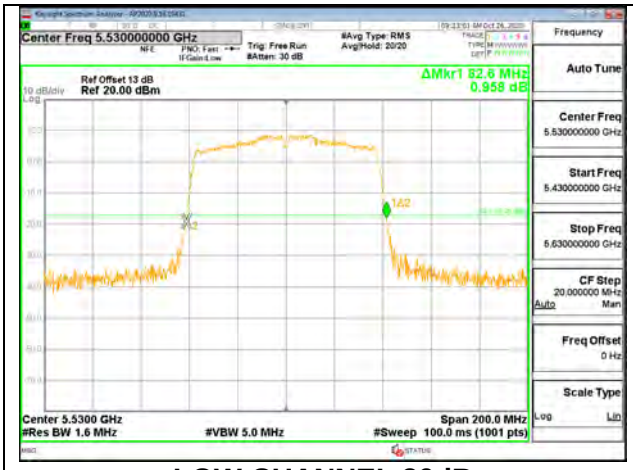
LOW CHANNEL 26dB



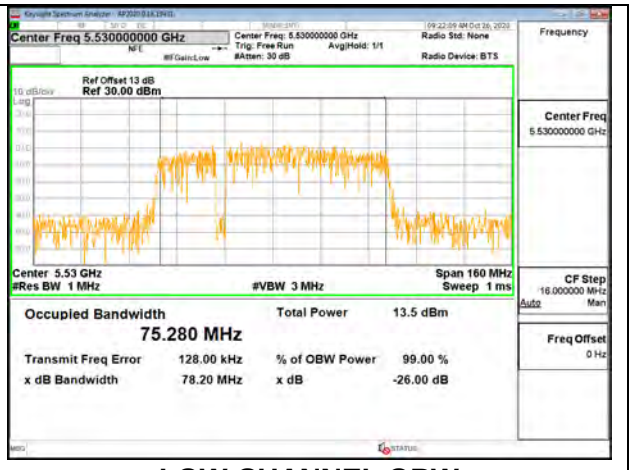
LOW CHANNEL OBW

1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5530	82.60	75.2800
High	5610	82.80	75.5420
138	5690	82.60	75.5520



LOW CHANNEL 26dB



LOW CHANNEL OBW

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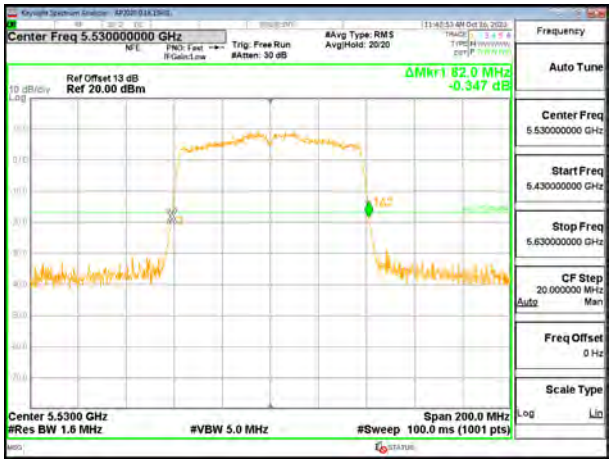
2TX Antenna 6 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5530	82.60	82.00	75.2250	75.6770
High	5610	82.60	82.40	75.6780	75.0000
138	5690	82.80	82.40	75.7610	75.4730

LOW CHANNEL 26dB

LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW

LOW CHANNEL [ANT 6]

LOW CHANNEL [ANT 5]

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