



# TEST REPORT

**Report Number:** 14523744-E8V2

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

**Model:** A3101 (Full Test Model)  
A3102, A3104 (Variant Models)

**Brand:** APPLE

**FCC ID:** BCG-E8436A (Full Test Model)  
BCG-E8437A, BCG-E8438A (Variant Models)

**EUT Description:** SMARTPHONE

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

**Date Of Issue:**  
August 09, 2023

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## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	8/5/2023	Initial Issue	Francisco Guarnero
V2	8/9/2023	Addressed TCB questions	Chris Xiong

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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:** A3101 (Full Test Model)  
 A3102, A3104 (Variant Models)

**BRAND:** APPLE

**SERIAL NUMBER:** WFV6QM1296 (Radiated), C07GQW000CA00003PN  
 (Conducted)

**SAMPLE RECEIPT DATE:** February 14, 2023

**DATE TESTED:** February 15, 2023 – AUGUST 08, 2023

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.

Approved & Released For  
UL Verification Services Inc. By:



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UL Verification Services Inc.

## 2. TEST RESULT SUMMARY

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 15E
- FCC KDB 662911 D01 v02r01
- FCC KDB 789033 D02 v02r01
- FCC KDB 644545 D03 v01
- 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
<input type="checkbox"/>	Building 1: 47173 Benicia Street, Fremont, CA 94538 USA	US0104	2324A	550739
<input checked="" type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, CA 94538 USA			
<input checked="" type="checkbox"/>	Building 3: 843 Auburn Court, Fremont, CA 94538 USA			
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, CA 94538 USA			
<input checked="" type="checkbox"/>	Building 5: 47670 Kato Rd, Fremont, CA 94538 USA			



## 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 <sub>LAB</sub>
Conducted Antenna Port Emission Measurement	1.94 dB
Power Spectral Density	2.466 dB
Time Domain Measurements Using SA	3.39 dB
RF Power Measurement Direct Method Using Power Meter	0.450 dB (Peak), 1.3 dB (Ave)
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.2%
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%.

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## 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 cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC, NB UNII, 802.15.4, 802.15.4ab-NB and MSS technologies.

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 Models and FCC IDs covered by this report include:

Full Test Model: A3101, FCC ID: BCG-E8436A

Variant Models:       A3102, FCC ID: BCG-E8437A  
                          A3104, FCC ID: BCG-E8438A

## 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)
<b>5.2 GHz band, 1TX</b>			
5180-5240	802.11a	Covered by 802.11n HT20 1TX	
5180-5240	802.11n HT20	19.23	83.75
5190-5230	802.11n HT40	20.24	105.68
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	17.21	52.60
5180-5240	802.11ax HE20	19.23	83.75
5190-5230	802.11ax HE40	20.24	105.68
5210	802.11ax HE80	16.72	46.99
<b>5.2 GHz band, 2TX</b>			
5180-5240	802.11n HT20 CDD	19.25	84.14
5180-5240	802.11n HT20 SDM/STBC	Covered by 802.11n HT20 2TX CDD	
5190-5230	802.11n HT40 CDD	21.75	149.62
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	19.22	83.56
5210	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5180-5240	802.11ax HE20 OFDMA	19.24	83.95
5180-5240	802.11ax HE20 SDM	Covered by 802.11ax HE20 OFDMA	
5190-5230	802.11ax HE40 OFDMA	21.76	149.97
5190-5230	802.11ax HE40 SDM	Covered by 802.11ax HE40 OFDMA	
5210	802.11ax HE80 OFDMA	18.70	74.13
5210	802.11ax HE80 SDM	Covered by 802.11ax HE80 OFDMA	

**5.3 GHz BAND (FCC)**

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
<b>5.3 GHz band, 1TX</b>			
5260 - 5320	802.11a	Covered by 802.11n HT20 1TX	
5260 - 5320	802.11n HT20	19.22	83.56
5270 - 5310	802.11n HT40	20.23	105.44
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	16.74	47.21
5250	802.11ac VHT160	16.21	41.78
5260 - 5320	802.11ax HE20	19.25	84.14
5270 - 5310	802.11ax HE40	20.20	104.71
5290	802.11ax HE80	16.20	41.69
5250	802.11ax HE160	15.72	37.33
<b>5.3 GHz band, 2TX</b>			
5260 - 5320	802.11n HT20 CDD	19.23	83.75
5260 - 5320	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5270 - 5310	802.11n HT40 CDD	21.69	147.57
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	18.24	66.68
5290	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5250	802.11ac VHT160 CDD	18.21	66.22
5250	802.11ac VHT160 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5260 - 5320	802.11ax HE20 OFDMA	19.24	83.95
5260 - 5320	802.11ax HE20 SDM	Covered by 802.11ax HE20 OFDMA	
5270 - 5310	802.11ax HE40 OFDMA	21.72	148.59
5270 - 5310	802.11ax HE40 SDM	Covered by 802.11ax HE40 OFDMA	
5290	802.11ax HE80 OFDMA	18.19	65.92
5290	802.11ax HE80 SDM	Covered by 802.11ax HE80 OFDMA	
5250	802.11ax HE160 OFDMA	18.24	66.68
5250	802.11ax HE160 SDM	Covered by 802.11ax HE160 OFDMA	

**5.6 GHz BAND (FCC)**

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
<b>5.6 GHz band, 1TX</b>			
5500-5720	802.11a	Covered by 802.11n HT20 1TX	
5500-5720	802.11n HT20	19.23	83.75
5510-5710	802.11n HT40	20.21	104.95
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	20.24	105.68
5570	802.11ac VHT160	15.72	37.33
5500-5720	802.11ax HE20	19.23	83.75
5510-5710	802.11ax HE40	20.23	105.44
5530-5690	802.11ax HE80	20.22	105.20
5570	802.11ax HE160	15.69	37.07
<b>5.6 GHz band, 2TX</b>			
5500-5720	802.11n HT20 CDD	19.23	83.75
5500-5720	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5510-5710	802.11n HT40 CDD	21.74	149.28
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	22.73	187.50
5530-5690	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5570	802.11ac VHT160 CDD	18.22	66.37
5570	802.11ac VHT160 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5500-5720	802.11ax HE20 OFDMA	19.26	84.33
5500-5720	802.11ax HE20 SDM	Covered by 802.11ax HE20 OFDMA	
5510-5710	802.11ax HE40 OFDMA	21.72	148.59
5510-5710	802.11ax HE40 SDM	Covered by 802.11ax HE40 OFDMA	
5530-5690	802.11ax HE80 OFDMA	22.71	186.64
5530-5690	802.11ax HE80 SDM	Covered by 802.11ax HE80 OFDMA	
5570	802.11ax HE160 OFDMA	18.22	66.37
5570	802.11ax HE160 SDM	Covered by 802.11ax HE160 OFDMA	

**5.8 GHz BAND (FCC)**

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
<b>5.8 GHz band, 1TX</b>			
5745-5825	802.11a	Covered by 802.11n HT20 1TX	
5745-5825	802.11n HT20	20.75	118.85
5755-5795	802.11n HT40	20.25	105.93
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	20.21	104.95
5745-5825	802.11ax HE20	20.75	118.85
5755-5795	802.11ax HE40	20.24	105.68
5775	802.11ax HE80	20.20	104.71
<b>5.8 GHz band, 2TX</b>			
5745-5825	802.11n HT20 CDD	23.74	236.59
5745-5825	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5755-5795	802.11n HT40 CDD	23.24	210.86
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	23.22	209.89
5775	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5745-5825	802.11ax HE20 OFDMA	23.75	237.14
5745-5825	802.11ax HE20 SDM	Covered by 802.11ax HE20 OFDMA	
5755-5795	802.11ax HE40 OFDMA	23.21	209.41
5755-5795	802.11ax HE40 SDM	Covered by 802.11ax HE40 OFDMA	
5775	802.11ax HE80 OFDMA	23.22	209.89
5775	802.11ax HE80 SDM	Covered by 802.11ax HE80 OFDMA	

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna Type is IFA.

The antennas' gains, as provided by the manufacturer, are as follows:

Frequency Range (GHz)	Antenna 6 (dBi)	Antenna 5 (dBi)
5150-5250	-3.4	-6.0
5250-5350	-3.2	-6.0
5500-5700	-4.5	-3.7
5725-5825	-5.2	-3.6

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was WiFi FW Version: 23\_10\_663.



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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 and ANT 5. It was determined that Y (Landscape) orientation was the worst-case orientation for ANT 6, ANT5, 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 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.

Simultaneous transmission with the Bluetooth was investigated, and no noticeable emission was found.

The output power and psd for the IEEE 802.11 ax mode were investigated between all different tones, and baseline investigation SU mode had the highest output power and the lowest tone, RU26 on 5.2 and 5.8GHz band had the highest PSD readings, and for 5.3 and 5.6GHz band, RU106 are the worst case. Therefore, antenna port conducted and radiated tests were performed on 5.2 & 5.8 GHz band at SU, RU26 Tones and 5.3 and 5.6 GHz band at SU , RU106 tones.

With same power on Full RU and SU higher data rate, investigation were performed on both band edge to determine the worst case, and SU mode was determined to be the worst case.

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 band edge, the following are the worst-case data rates set for test. 802.11ax 5.3G & 5.6G bands does not support RU-26 Tone.

802.11n HT20 mode: MCS7

802.11n HT40 mode: MCS7

802.11ac VHT80 mode: MCS9

802.11ac VHT160 mode MCS9

802.11ax (5.2G & 5.8G bands): HE20/HE40/HE80 RU 26 Tones and SU mode: MCS11.

802.11ax (5.3G & 5.6G bands) – Unsupported RU26): HE20/HE40/HE80/HE160 RU 106 Tones and SU mode: MCS11.

Note: In the Radiated Plots and emissions data, ANT0=ANT6 and ANT1=ANT5.

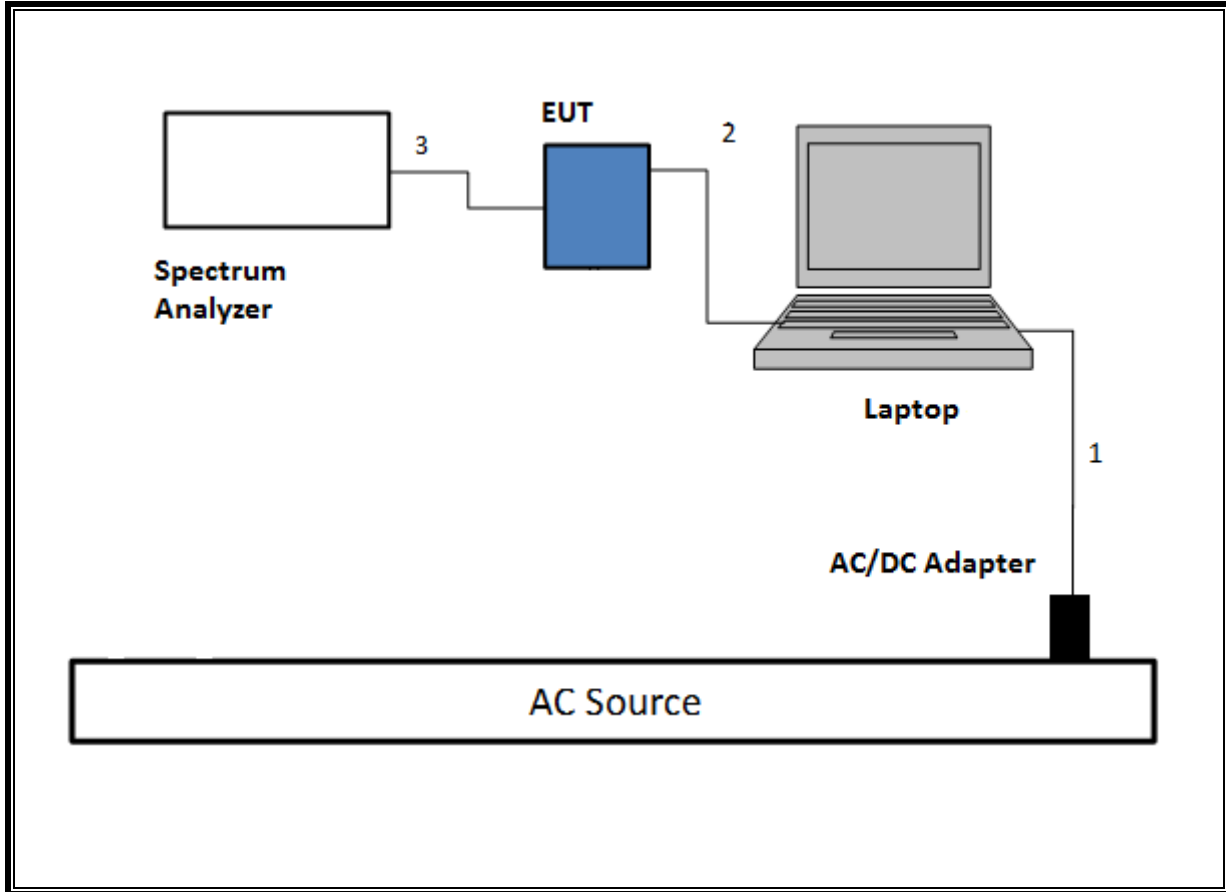
## 6.6. DESCRIPTION OF TEST SETUP

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		
10dB Fixed Attenuator, 2 Watts Up to 26.5 GHz	Pasternack Enterprises	PE7024-10	236358	N/A		
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-C	1	USB-C	Shielded	1.0	N/A
3	Antenna	1	SMA	Un-shielded	0.2	To spectrum Analyzer
I/O CABLES (RF RADIATED and AC LINE 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	N/A

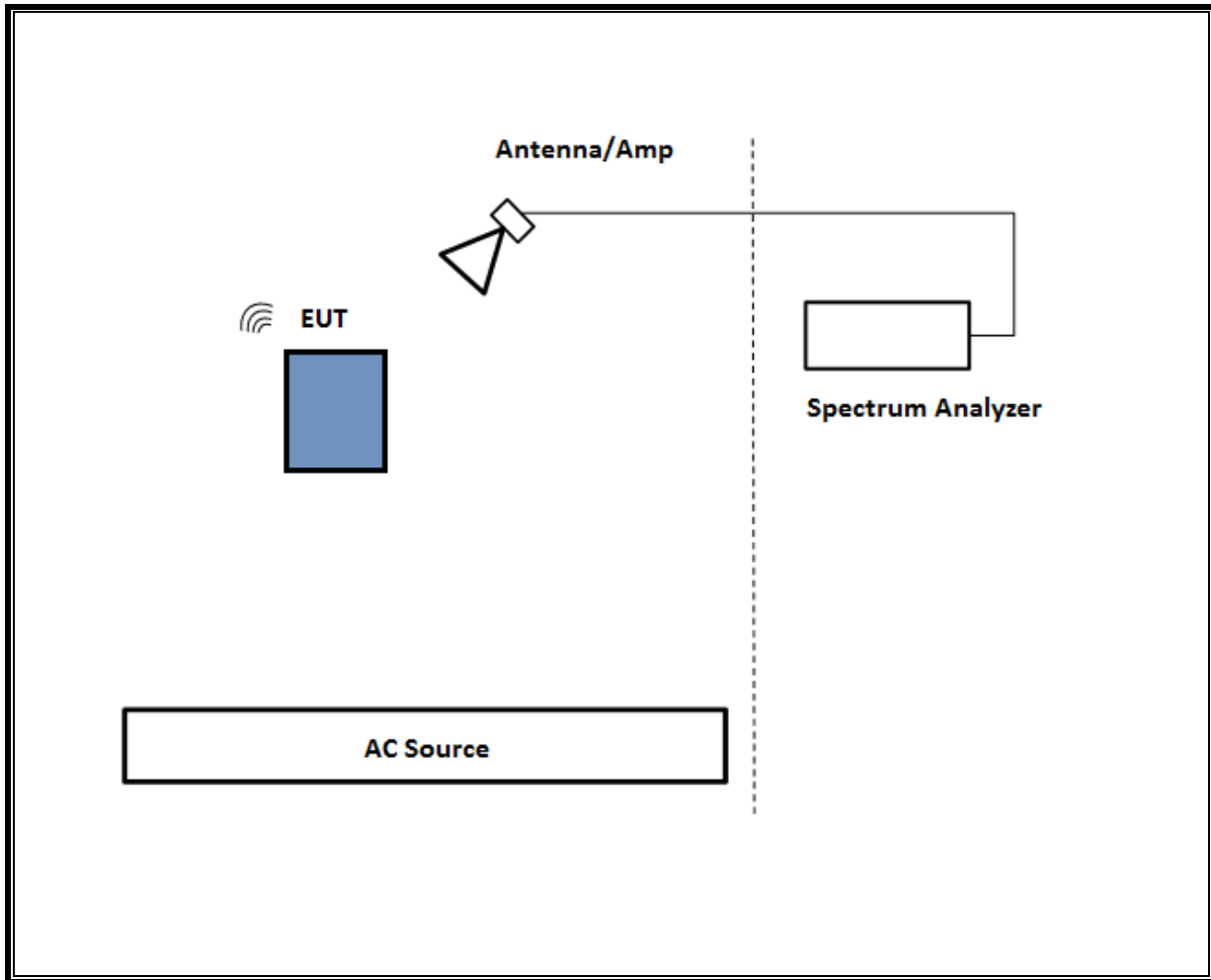
### TEST SETUP

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

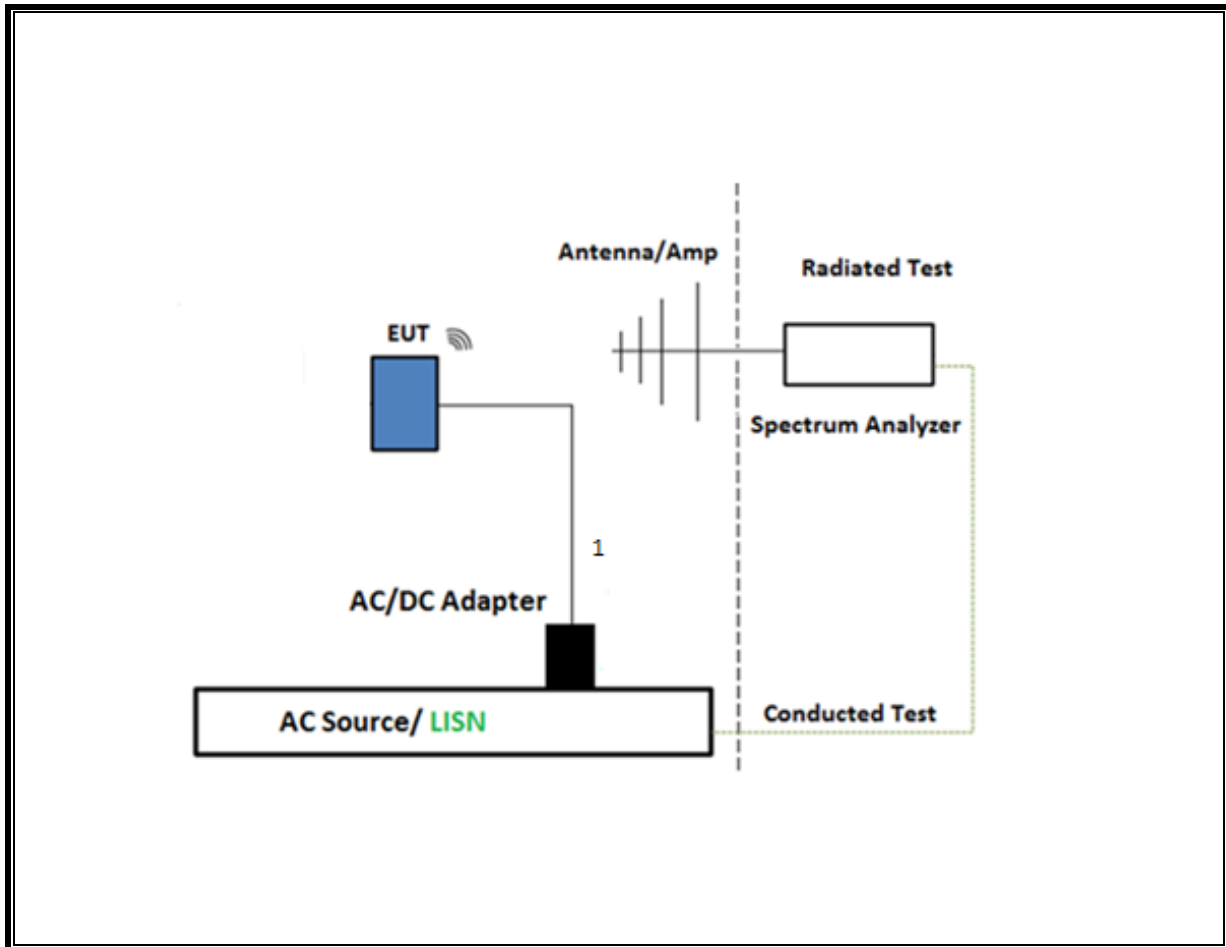
**SETUP DIAGRAM FOR CONDUCTED TESTS**



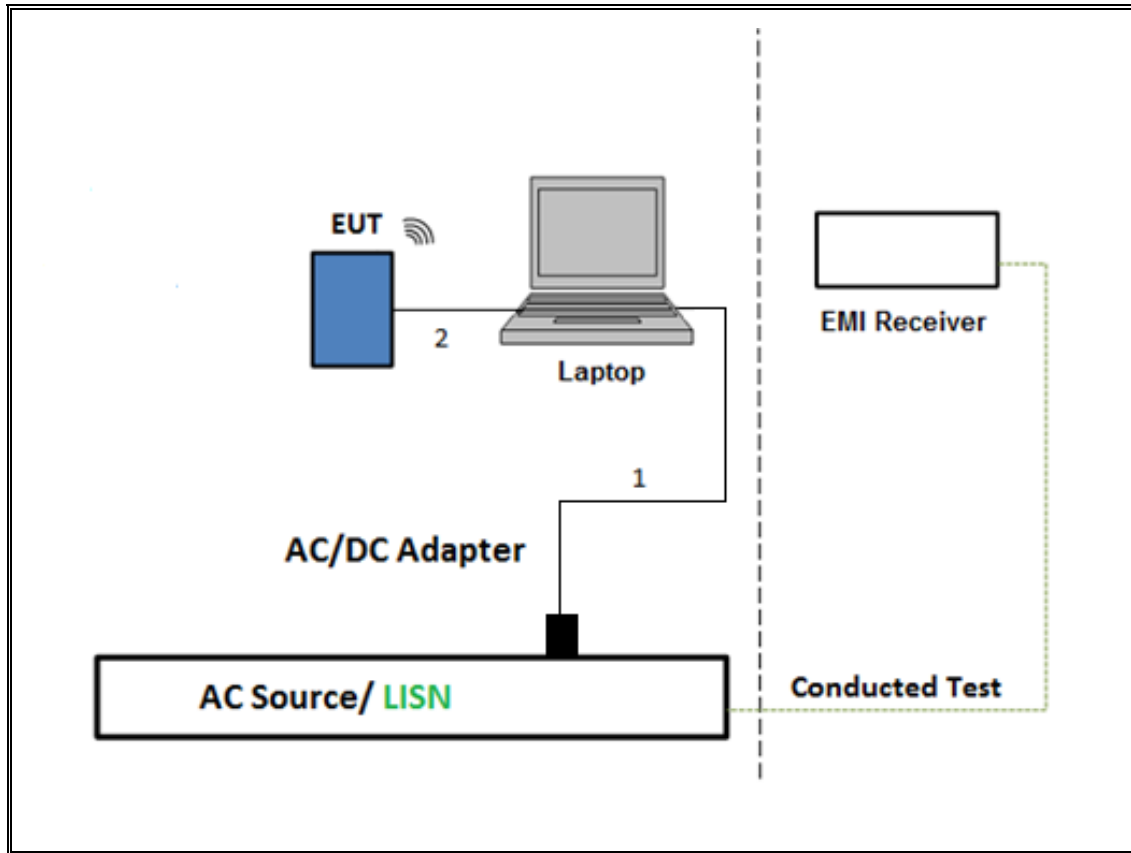
**SETUP DIAGRAM FOR RADIATED TESTS ABOVE 1GHz**



**SETUP DIAGRAM FOR BELOW 1GHz and AC LINE CONDUCTED TEST**



**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, Section E.3.b (Method PM-G)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

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

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

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

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

## 8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	85214	02/02/2024	02/02/2023
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight Technologies Inc	E4440A	79602	02/29/2024	02/29/2023
ESW44 EMI TEST RECEIVER	Rohde & Schwarz	ESW44	191428	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	206807	02/28/2024	02/28/2023
RF Filter Box, 1-18GHz, 12 Port.	UL-FR1	Frankenstein	230878	02/29/2024	02/29/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	230299	01/12/2024	01/12/2023
RF Filter Box, 1-18GHz, 12 Port.	UL-FR1	Frankenstein	231874	04/19/2024	04/19/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169936	02/22/2024	02/22/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	222740	08/31/2023	08/31/2022
RF Filter Box, 1-18GHz, 12 Port	UL-FR1	Frankenstein	217255	08/23/2023	08/23/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201499	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	41112	10/07/2023	10/07/2022
RF Filter Box, 1-18GHz, 12 Port.	UL-FR1	Frankenstein	231249	02/29/2024	02/29/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201500	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	200784	01/31/2024	01/31/2023
RF Filter Box, 1-18GHz, 2x12, 1x8 switches.	UL-FR1	Frankenstein, 2 Amp version	235088	04/30/2024	04/30/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169935	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	226673	01/09/2024	01/09/2023
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	226781	04/30/2024	04/30/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	223461	02/29/2024	02/29/2023
*Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80402	07/05/2023	07/05/2022
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	225575	11/13/2023	11/13/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201497	02/29/2024	02/29/2023
*Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	80714	06/10/2023	06/10/2022
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	170648	08/23/2023	08/23/2022
EMI TEST RECEIVER 9kHz - 3.6GHz	Rohde & Schwarz	ESR3	171646	02/29/2024	02/29/2023
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	175765	01/24/2024	01/24/2023
*Transient Limiter	TE	TBFL1	207996	07/15/2023	07/15/2022

UL AUTOMATION SOFTWARE			
Radiated Software	UL	UL EMC	Version 9.5, 01 May 2023
Conducted Software	UL	UL EMC	2022.8.16
AC Line Conducted Software	UL	UL EMC	Version 9.5, 03 March 2023



TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
*Conducted Switch Box	N/A	CSB	221008	06/21/2023	06/21/2022
10dB Fixed Attenuator, 2 Watts Up to 26.5 GHz	Pasternack Enterprises	PE7024-10	236358	Verified/Characterized before use	
10dB Fixed Attenuator, 2 Watts Up to 26.5 GHz	Pasternack Enterprises	PE7024-10	236355	Verified/Characterized before use	
*Antenna, Passive Loop 100KHz to 30MHz	ETS-Lindgren	EM-6872	170015	07/28/2023	07/28/2022
*Antenna, Passive Loop 30Hz to 1MHz	Electro-Metrics	EM-6871	170013	07/28/2023	07/28/2022
Power Meter, P-series single channel	Keysight	N1911A	90754	01/31/2024	01/31/2023
Power sensor	Keysight	N1921A	80119	01/31/2024	01/31/2023
*Antenna Horn, 26.5 to 40GHz	ARA	MWH-2640/B	172367	06/01/2023	06/01/2022
*Antenna Horn, 18 to 26.5GHz	ARA	MWH-1826/B	172353	06/01/2023	06/01/2022
RF Amplifier Assembly, 18-26.5GHz, 60dB Gain	AMPLICAL	AMP18G26.5- 60	171583	02/29/2024	02/29/2023
AMP26G40-65	AMPLICAL	AMP26G40- 65	172346	02/29/2024	02/29/2023

\*Testing was completed before calibration due date and/or after calibration was completed.

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

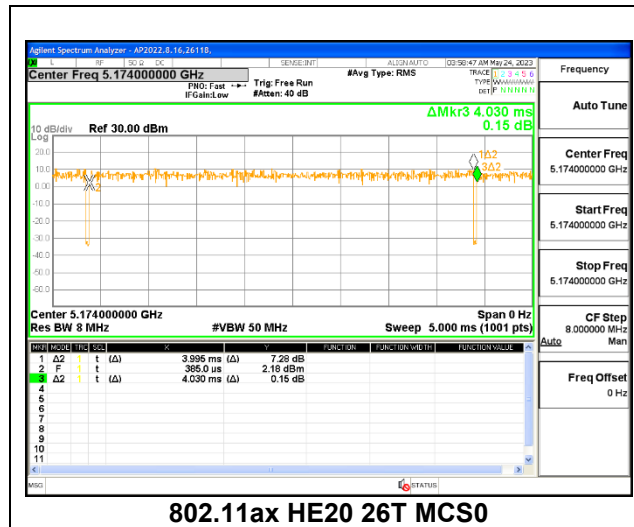
#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### DUTY CYCLE PLOT



**ON TIME AND DUTY CYCLE RESULTS**

Mode	Rate	ON Time B (ms)	Period (ms)	Duty Cycle (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Minimum VBW 1/B (kHz)
HT20	MCS0	0.9803	1.0225	0.9587	95.87%	0.18	1.020
	MCS7	0.1363	0.1572	0.8674	86.74%	0.62	7.335
HT40	MCS0	0.4924	0.5149	0.9562	95.62%	0.19	2.031
	MCS7	0.0885	0.1093	0.8093	80.93%	0.92	11.306
VHT80	MCS0	0.2536	0.2764	0.9175	91.75%	0.37	3.943
	MCS9	0.0588	0.0818	0.7188	71.88%	1.43	17.018
VHT160	MCS0	1.1403	1.1611	0.9821	98.21%	0.00	0.010
	MCS9	0.0879	0.1080	0.8139	81.39%	0.89	11.377
HE20 26T	MCS0	3.9950	4.0300	0.9913	99.13%	0.00	0.010
	MCS11	0.2935	0.3279	0.8952	89.52%	0.48	3.407
HE20 106T	MCS0	3.5180	3.5560	0.9893	98.93%	0.00	0.010
	MCS11	0.2641	0.2996	0.8815	88.15%	0.55	3.786
HE20 SU	MCS0	1.4879	1.5127	0.9836	98.36%	0.00	0.010
	MCS11	0.1459	0.1679	0.8690	86.90%	0.61	6.854
HE40 26T	MCS0	3.9775	4.0338	0.9860	98.60%	0.00	0.010
	MCS11	0.2896	0.3256	0.8893	88.93%	0.51	3.453
HE40 106T	MCS0	3.5200	3.5550	0.9902	99.02%	0.00	0.010
	MCS11	0.2632	0.2984	0.8820	88.20%	0.55	3.799
HE40 SU	MCS0	0.7730	0.7955	0.9717	97.17%	0.12	1.294
	MCS11	0.1008	0.1228	0.8208	82.08%	0.86	9.921
HE80 26T	MCS0	3.9718	4.0338	0.9846	98.46%	0.00	0.010
	MCS11	0.2918	0.3301	0.8840	88.40%	0.54	3.427
HE80 106T	MCS0	3.5160	3.5520	0.9899	98.99%	0.00	0.010
	MCS11	0.2633	0.2985	0.8821	88.21%	0.54	3.798
HE80 SU	MCS0	0.4011	0.4214	0.9519	95.19%	0.21	2.493
	MCS11	0.0817	0.1042	0.7838	78.38%	1.06	12.241
HE160 26T	MCS0	3.9900	4.0250	0.9913	99.13%	0.00	0.010
	MCS11	0.2922	0.3272	0.8930	89.30%	0.49	3.422
HE160 106T	MCS0	3.5190	3.5520	0.9907	99.07%	0.00	0.010
	MCS11	0.2639	0.2990	0.8826	88.26%	0.54	3.789
HE160 SU	MCS0	0.2316	0.2526	0.9169	91.69%	0.38	4.318
	MCS11	0.0688	0.0888	0.7748	77.48%	1.11	14.535

NOTE: 1Tx and 2Tx duty cycle are the same

## 9.2. 26 dB and 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

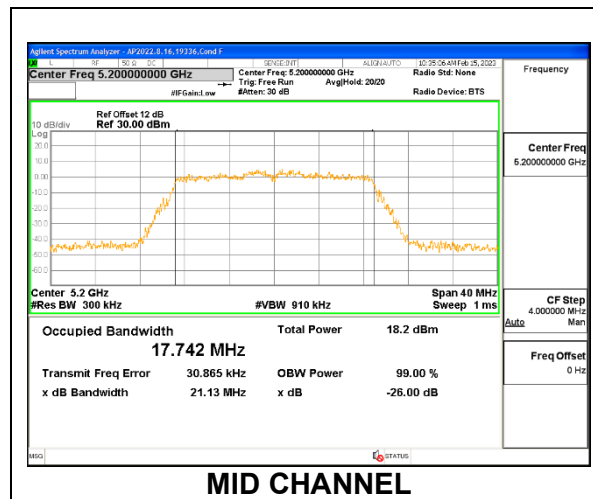
### RESULTS

<b>ID:</b>	19336
<b>DATE:</b>	2/15/2023

### 9.2.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

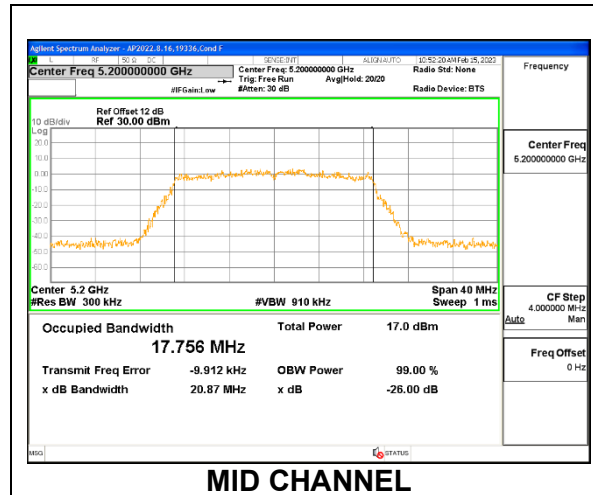
#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.23	17.762
Mid	5200	21.13	17.742
High	5240	20.81	17.742



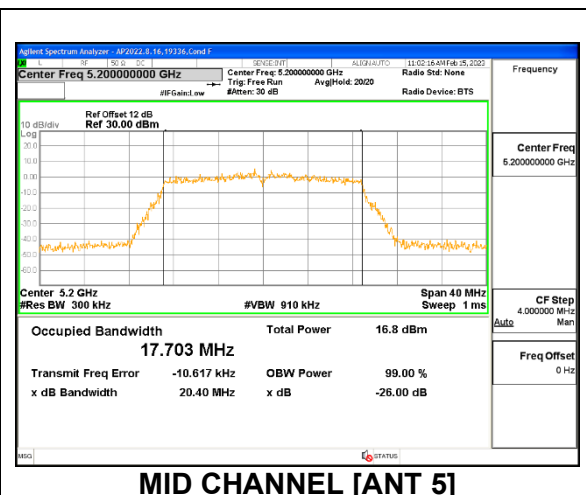
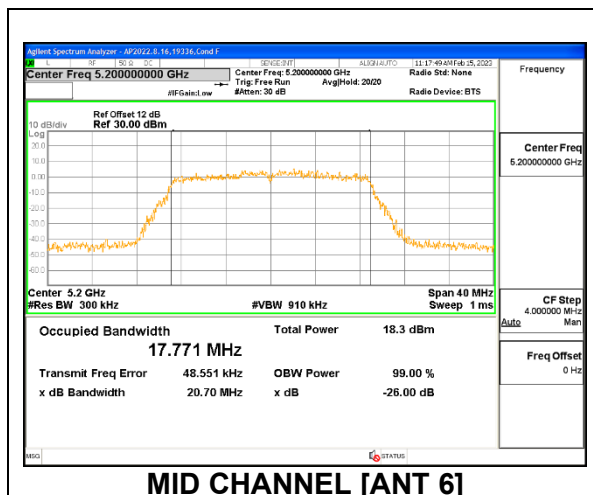
**1TX Antenna 5 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.89	17.831
Mid	5200	20.87	17.756
High	5240	20.84	17.741



**2TX Antenna 6 + Antenna 5 CDD MODE**

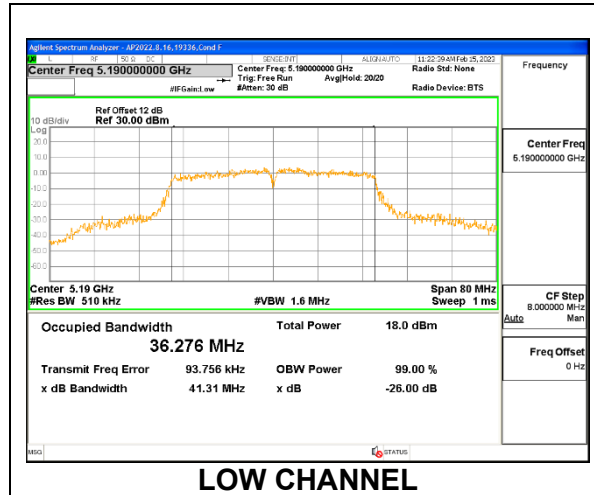
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	21.25	17.796	21.73	17.834
Mid	5200	20.70	17.771	20.40	17.703
High	5240	20.82	17.795	20.56	17.799



9.2.2. 802.11n HT40 MODE IN THE 5.2 GHz BAND

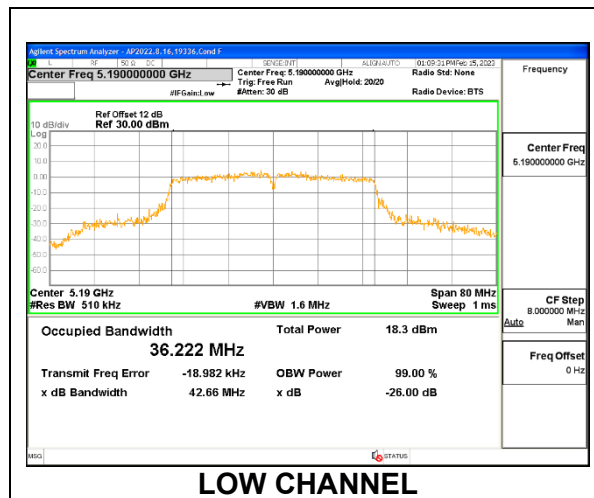
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	41.31	36.276
High	5230	40.63	36.140



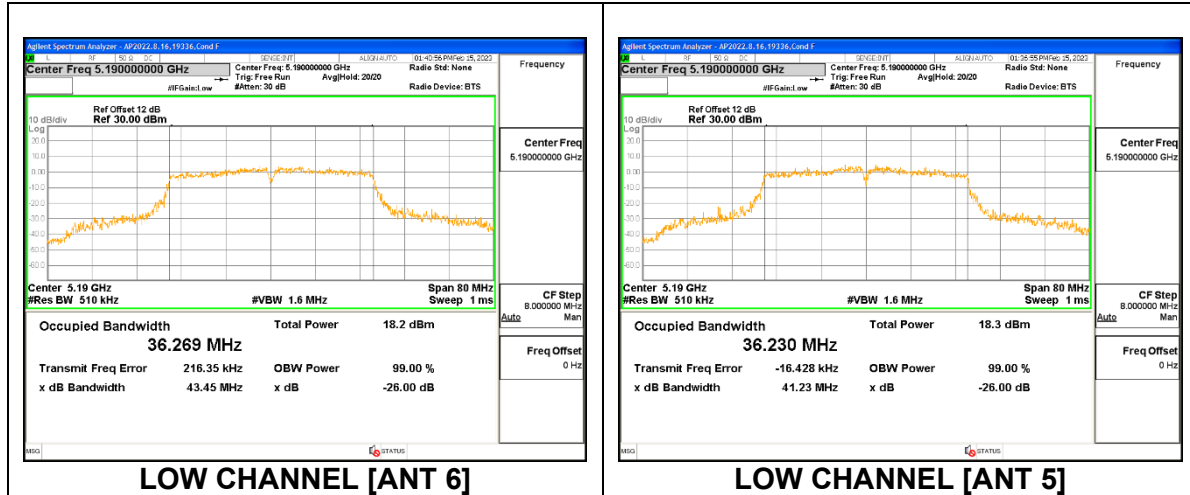
**1TX Antenna 5 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	42.66	36.222
High	5230	40.97	36.187



**2TX Antenna 6 + Antenna 5 CDD MODE**

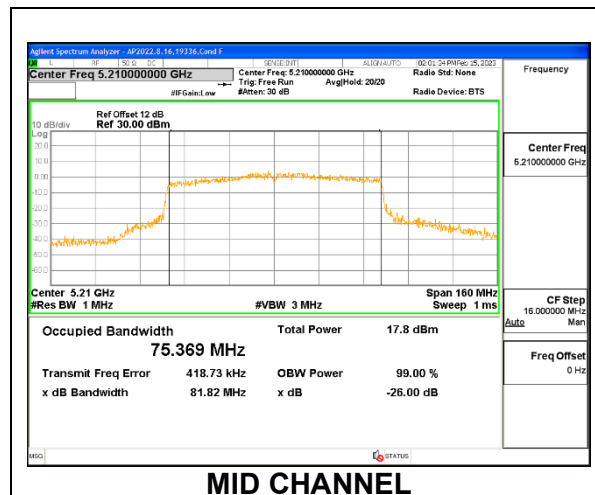
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	43.45	36.269	41.23	36.230
High	5230	40.25	36.197	40.07	36.218



**9.2.3. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND**

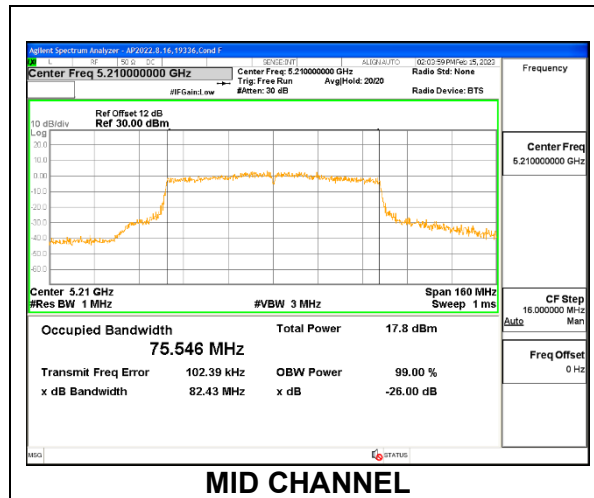
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	81.82	75.369



**1TX Antenna 5 MODE**

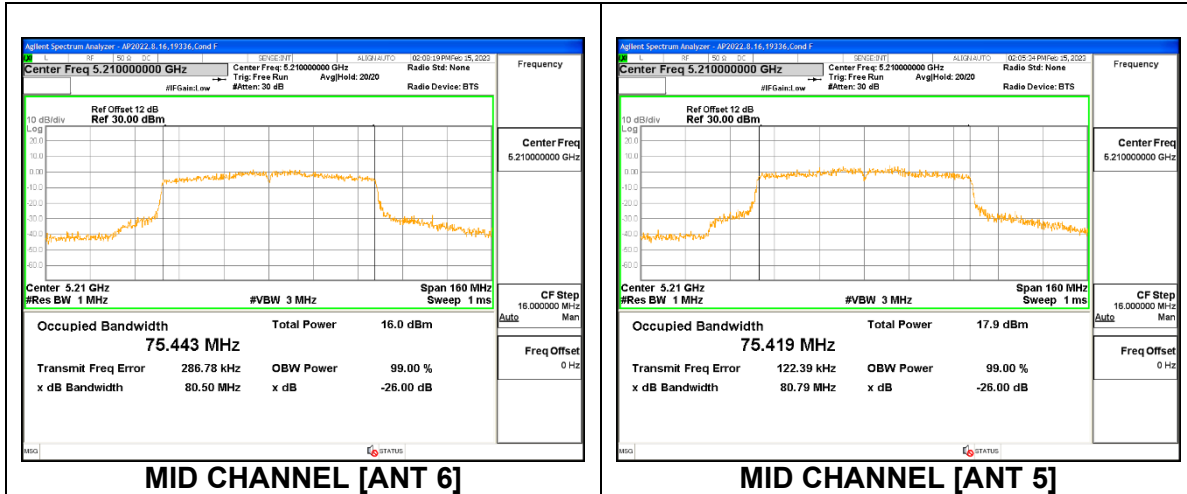
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	82.43	75.546





**2TX Antenna 6 + Antenna 5 CDD MODE**

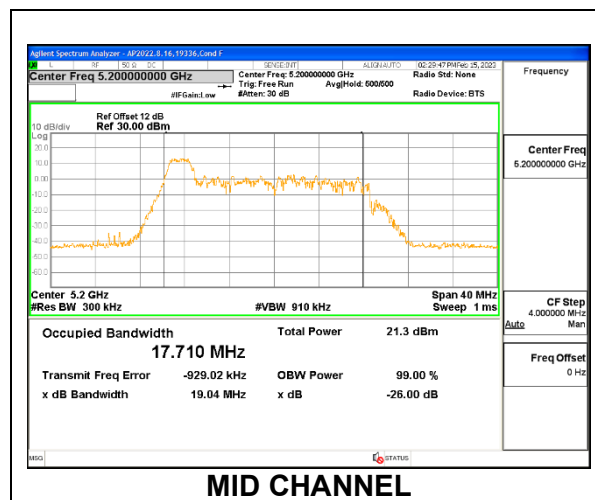
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	80.50	75.443	80.79	75.419



**9.2.4. 802.11ax HE20 MODE IN THE 5.2 GHz BAND**

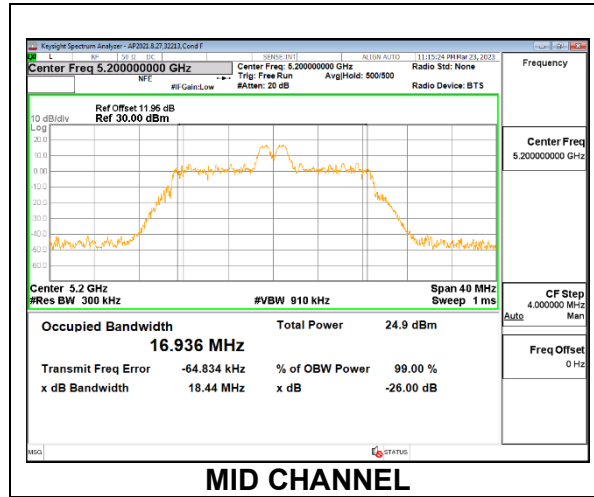
**1TX Antenna 6 MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.47	18.297
Mid	5200	19.04	17.710
High	5240	19.59	18.334



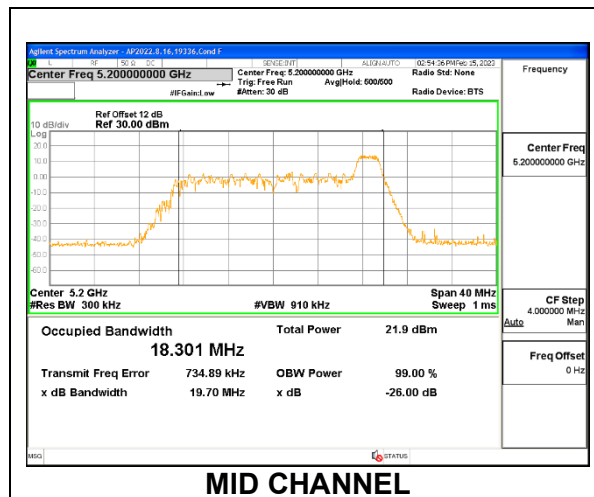
**1TX Antenna 6 MODE: 26-Tone, RU Index 4**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	18.17	16.852
Mid	5200	18.44	16.936
High	5240	18.28	16.974



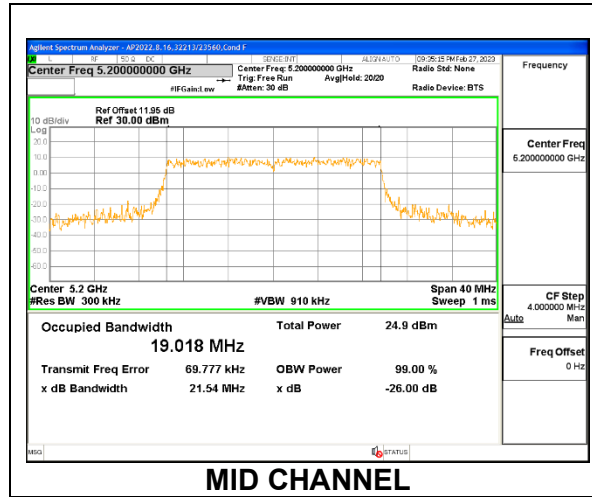
**1TX Antenna 6 MODE: 26-Tone, RU Index 8**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.17	17.832
Mid	5200	19.70	18.301
High	5240	19.96	18.423



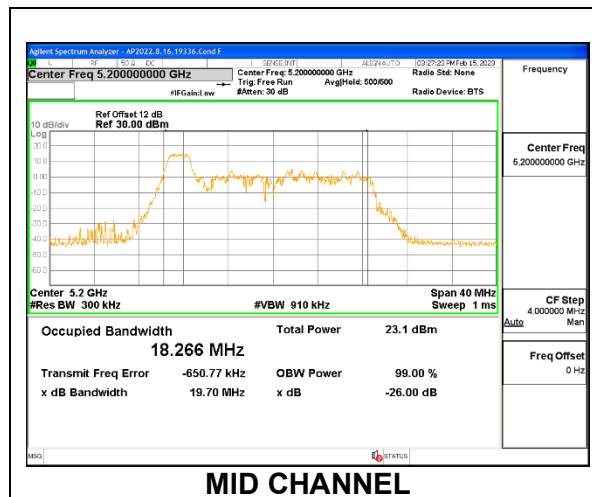
**1TX Antenna 6 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.41	18.972
Mid	5200	21.54	19.018
High	5240	21.09	19.034



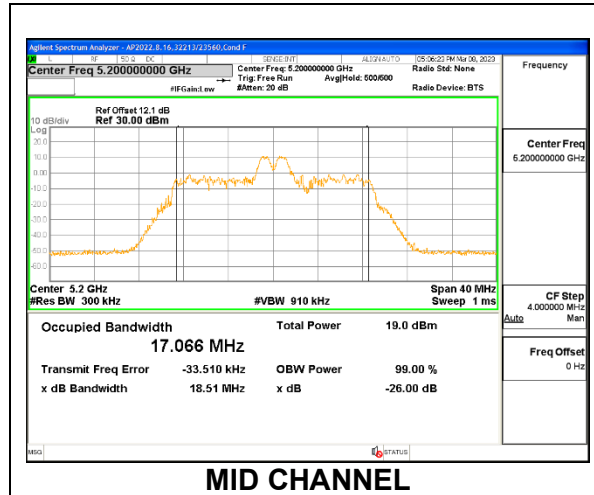
**1TX Antenna 5 MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.70	18.286
Mid	5200	19.70	18.266
High	5240	19.81	18.298



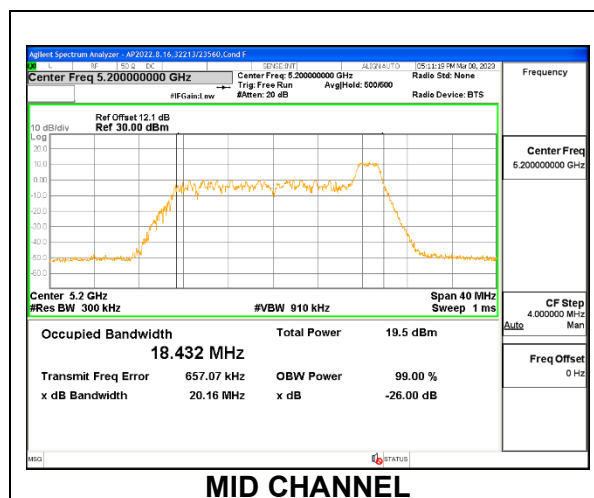
**1TX Antenna 5 MODE: 26-Tone, RU Index 4**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	18.16	16.632
Mid	5200	18.51	17.066
High	5240	18.04	16.842



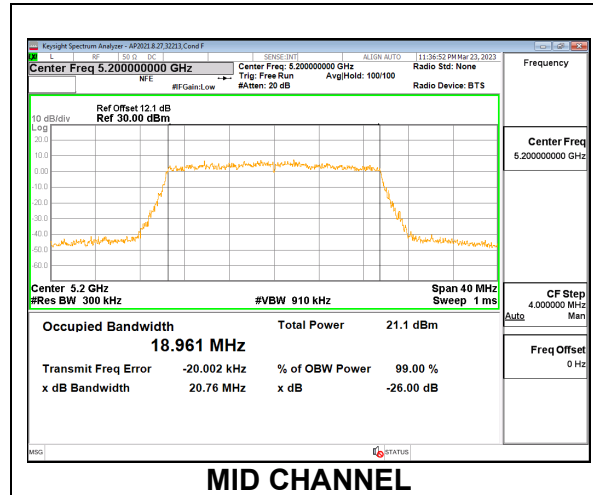
**1TX Antenna 5 MODE: 26-Tone, RU Index 8**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.02	18.469
Mid	5200	20.16	18.432
High	5240	19.95	18.414



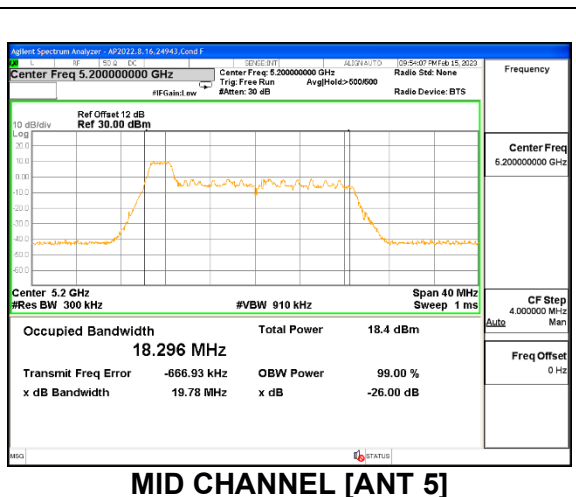
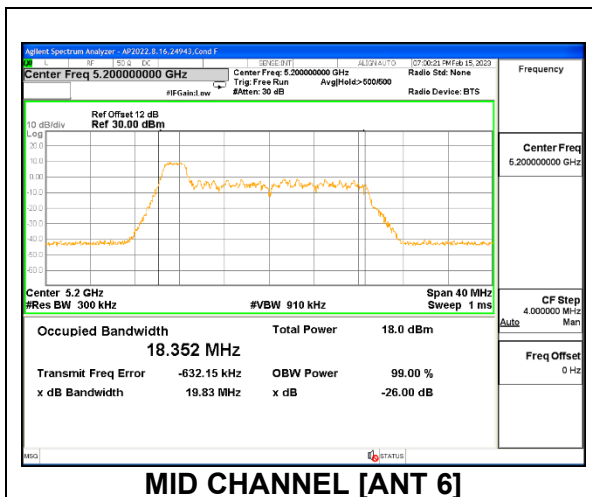
**1TX Antenna 5 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.52	19.019
Mid	5200	20.76	18.961
High	5240	21.35	19.073



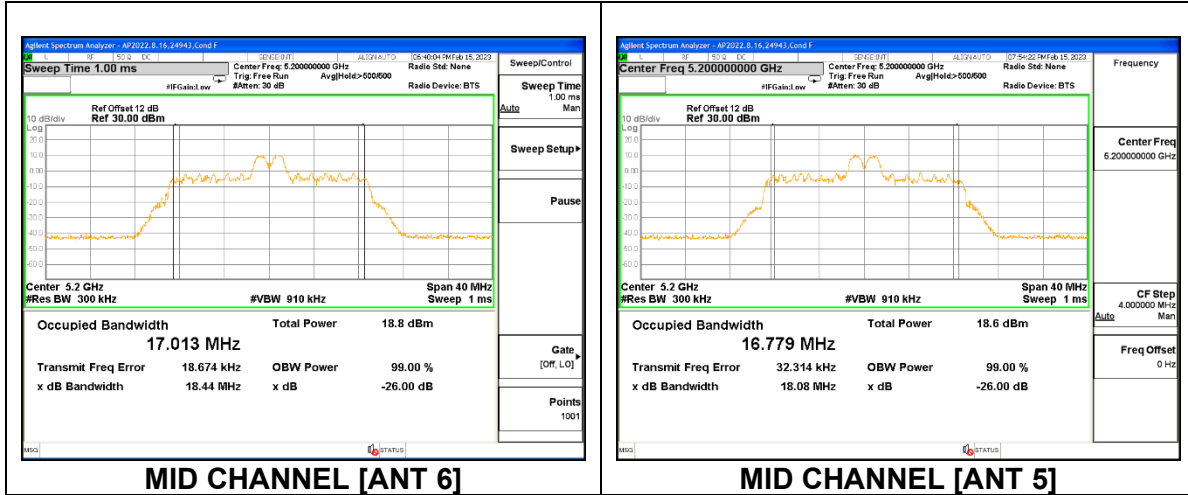
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	19.78	18.373	19.65	18.294
Mid	5200	19.83	18.352	19.78	18.296
High	5240	19.69	18.254	19.84	18.251



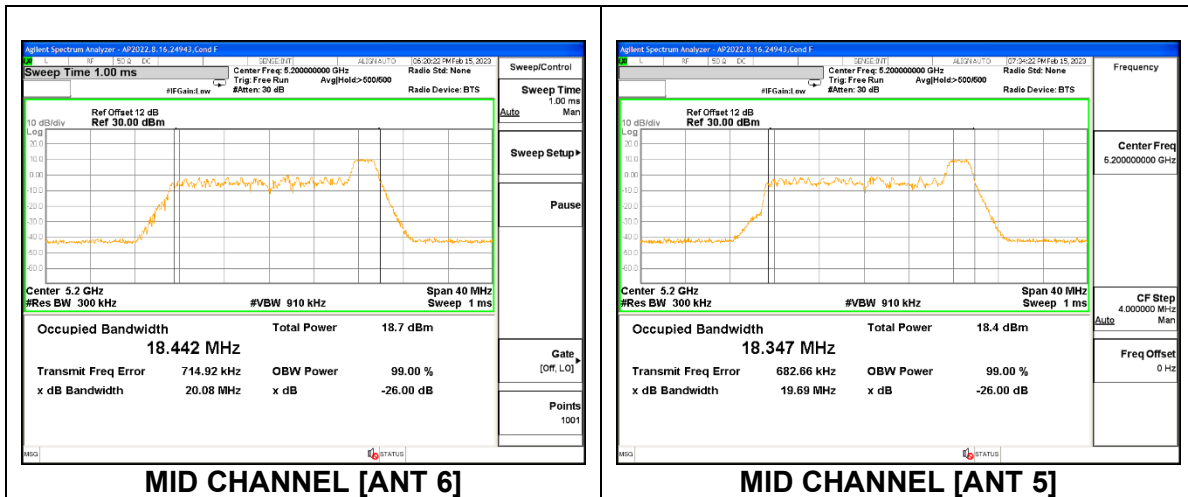
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 4**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	18.23	16.797	18.19	16.811
Mid	5200	18.44	17.013	18.08	16.779
High	5240	18.27	16.914	18.12	16.754



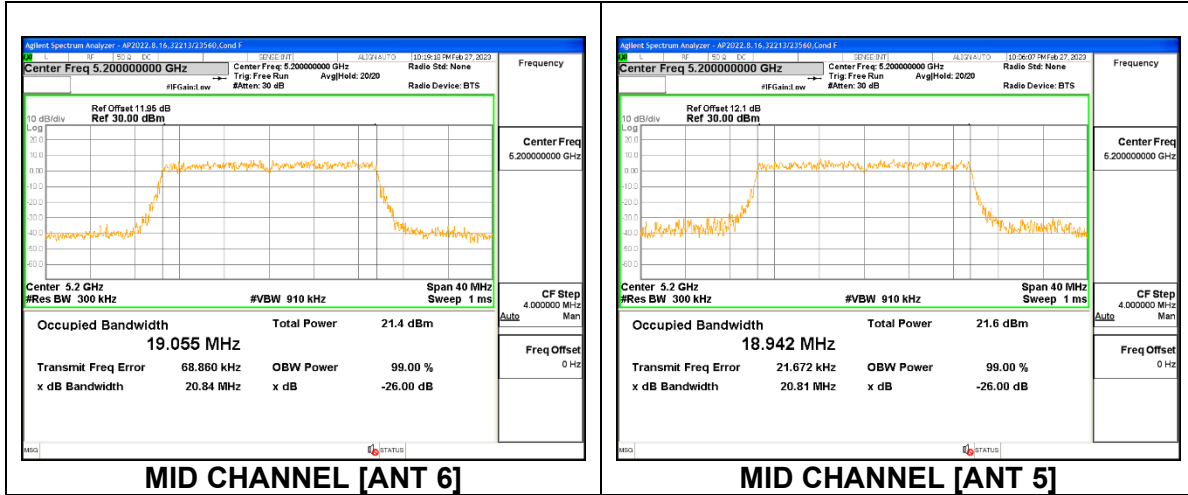
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 8**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	19.96	18.251	19.55	18.204
Mid	5200	20.08	18.442	19.69	18.347
High	5240	20.04	18.413	19.53	18.275



**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: SU, Single User**

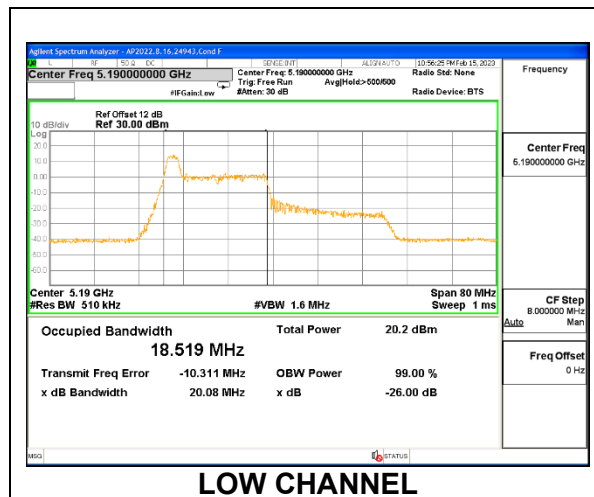
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	21.08	19.036	20.77	18.940
Mid	5200	20.84	19.055	20.81	18.942
High	5240	20.72	18.968	20.53	18.985



**9.2.5. 802.11ax HE40 MODE IN THE 5.2 GHz BAND**

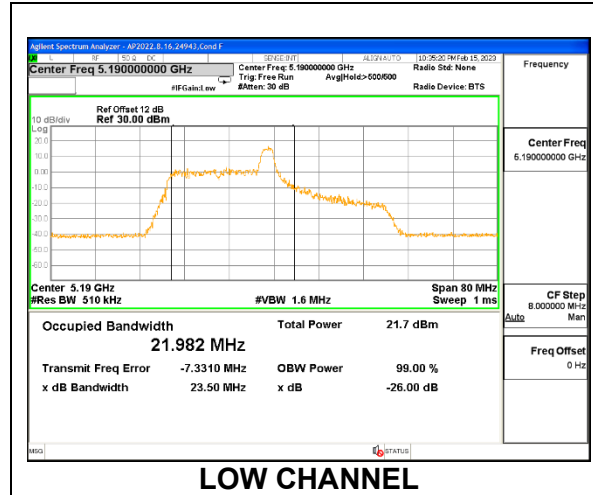
**1TX Antenna 6 MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.08	18.519
High	5230	19.98	18.516



**1TX Antenna 6 MODE: 26-Tone, RU Index 8**

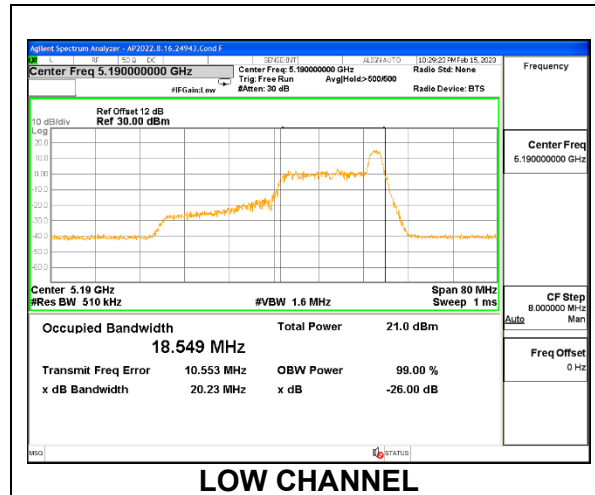
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	23.50	21.982
High	5230	25.10	21.955





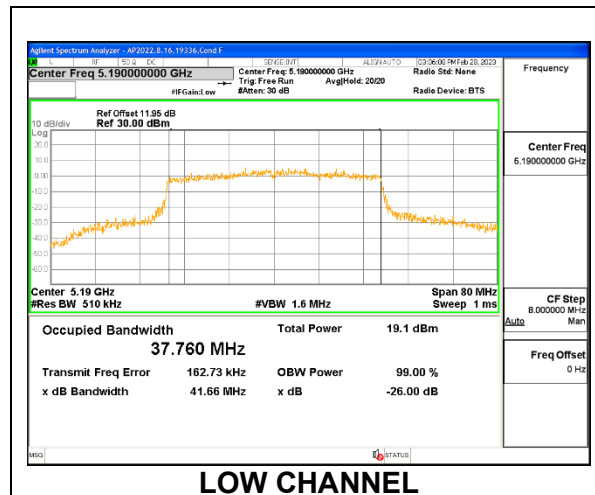
**1TX Antenna 6 MODE: 26-Tone, RU Index 17**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.23	18.549
High	5230	20.47	18.597



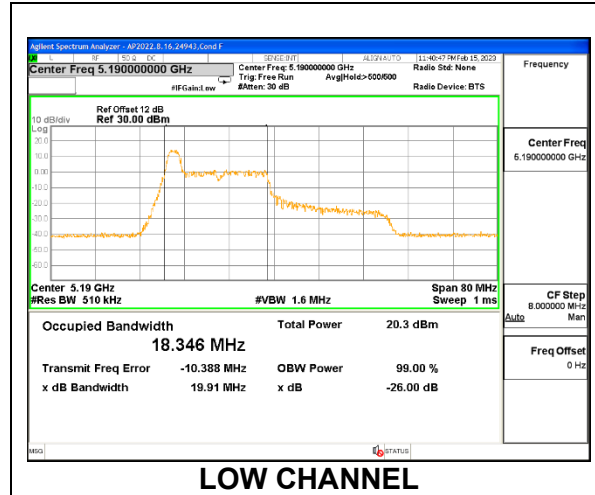
**1TX Antenna 6 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	41.66	37.760
High	5230	40.69	37.610



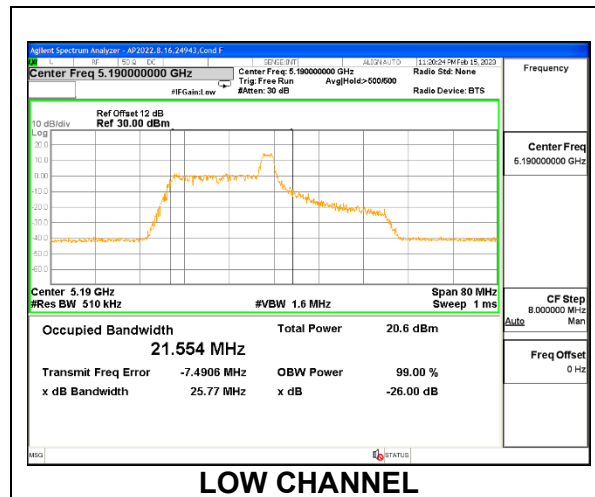
**1TX Antenna 5 MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	19.91	18.346
High	5230	20.38	18.453



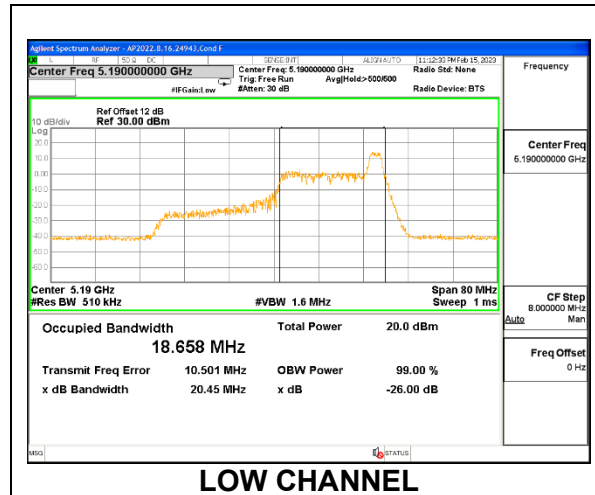
**1TX Antenna 5 MODE: 26-Tone, RU Index 8**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	25.77	21.554
High	5230	25.24	21.665



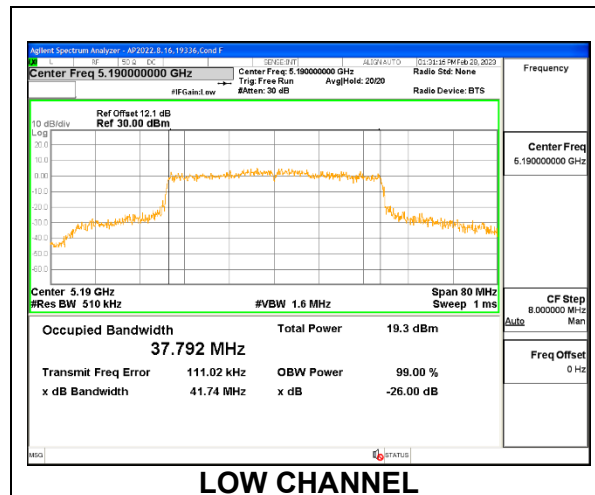
**1TX Antenna 5 MODE: 26-Tone, RU Index 17**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.45	18.658
High	5230	20.86	18.704



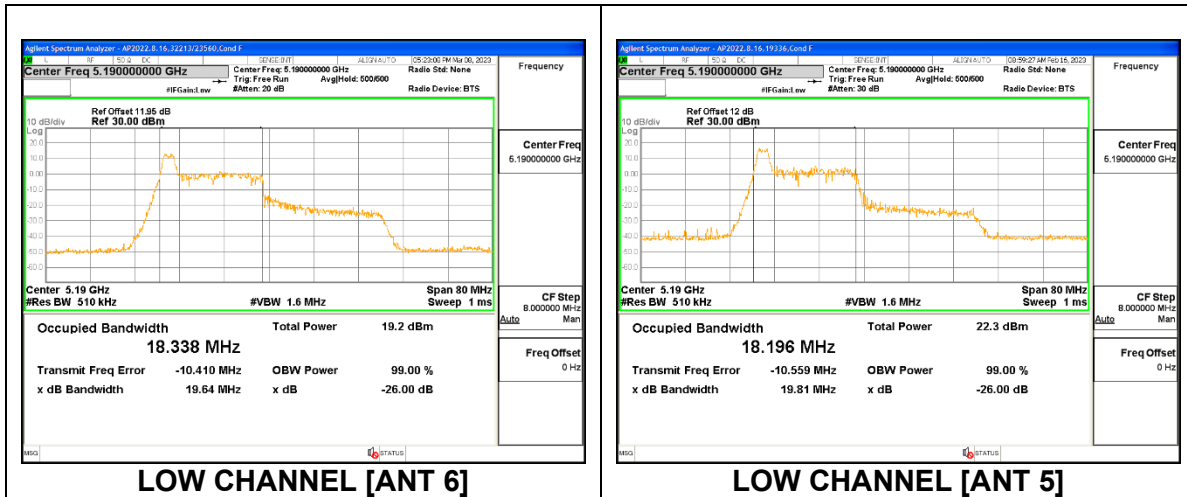
**1TX Antenna 5 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	41.74	37.792
High	5230	40.55	37.754



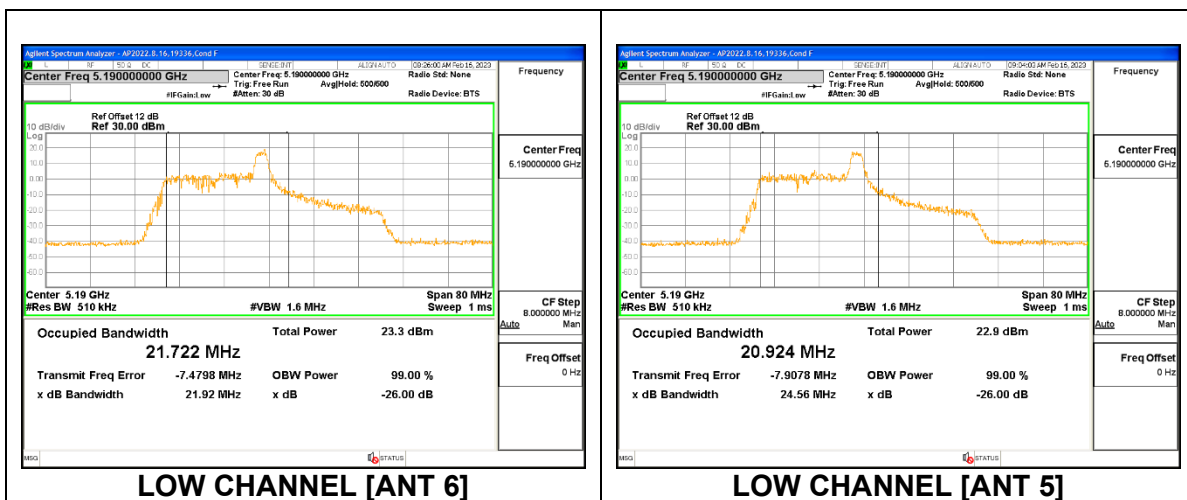
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	19.64	18.338	19.81	18.196
High	5230	20.14	18.428	19.69	18.339



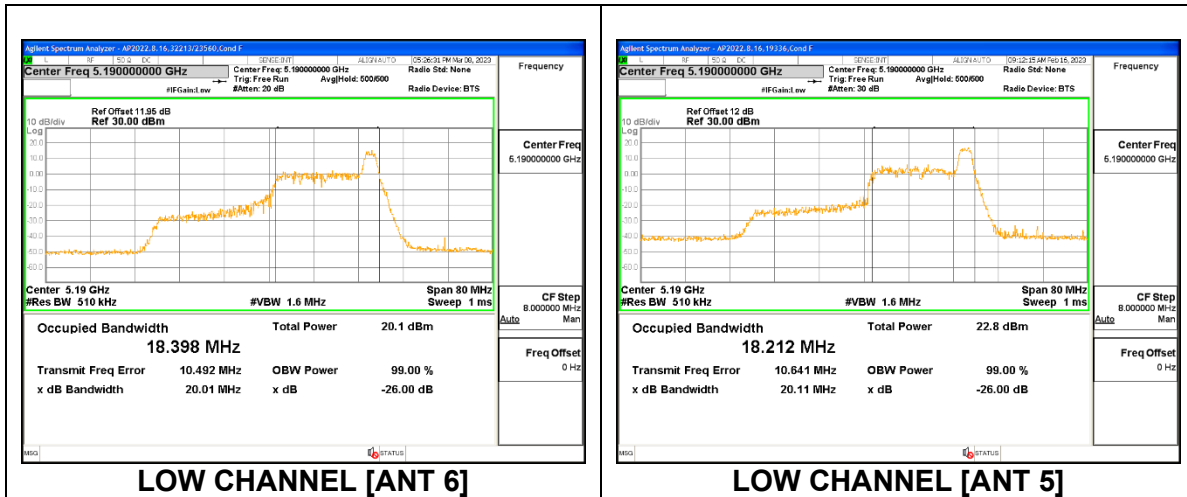
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 8**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	21.92	21.722	24.56	20.924
High	5230	23.57	21.261	24.10	20.735



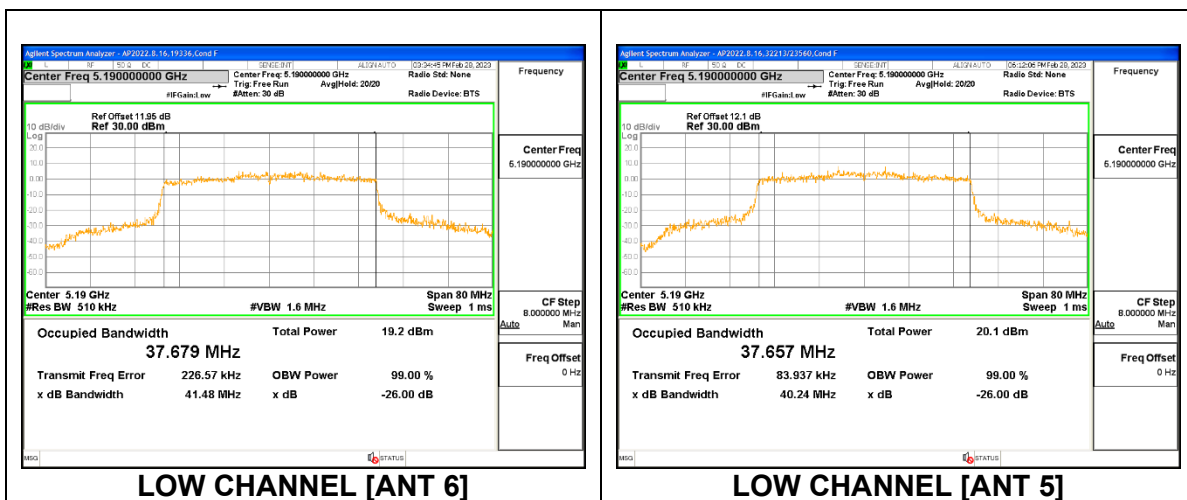
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 17**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	20.01	18.398	20.11	18.212
High	5230	20.95	18.688	19.84	18.272



**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: SU, Single User**

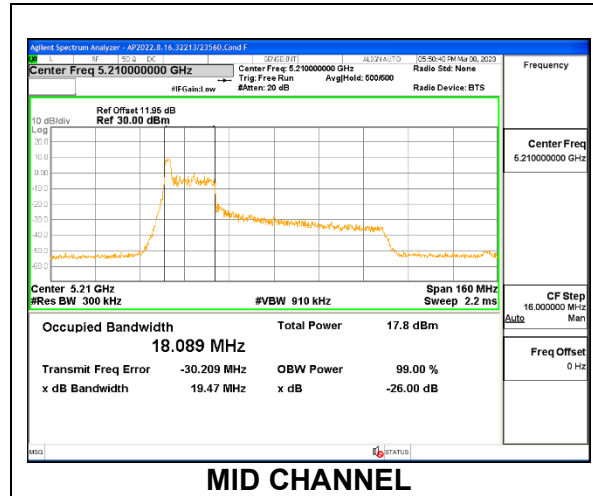
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	41.48	37.679	40.24	37.657
High	5230	40.08	37.688	39.90	37.684



### 9.2.6. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

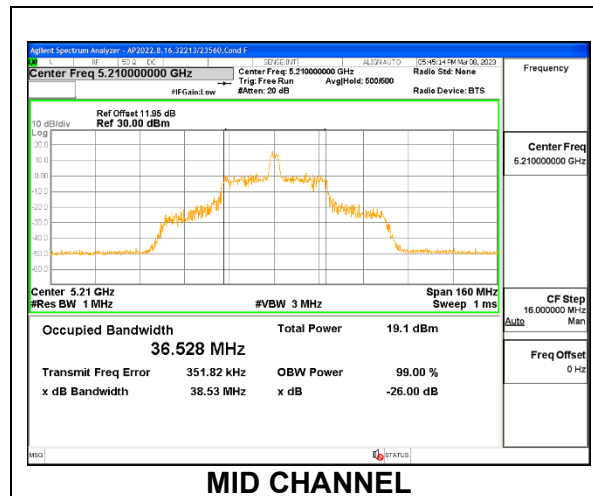
#### 1TX Antenna 6 MODE: 26-Tone, RU Index 0

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.47	18.089



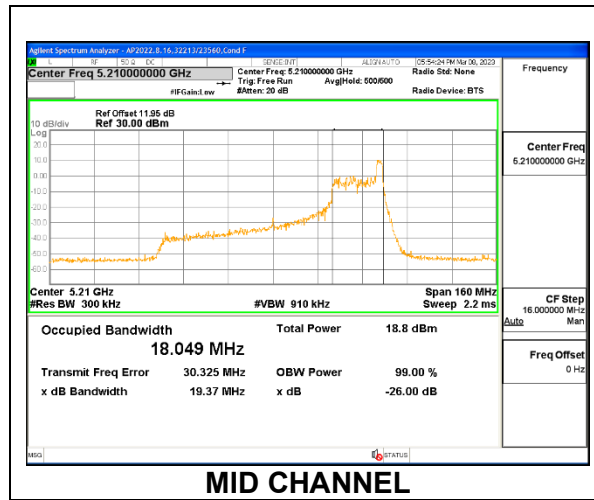
#### 1TX Antenna 6 MODE: 26-Tone, RU Index 18

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	38.53	36.528



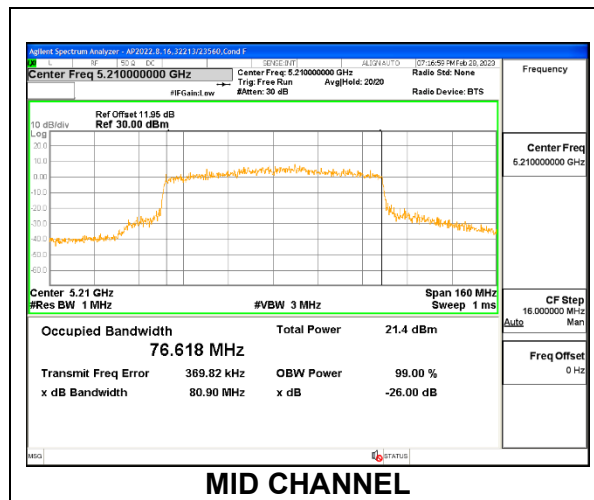
**1TX Antenna 6 MODE: 26-Tone, RU Index 36**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.37	18.049



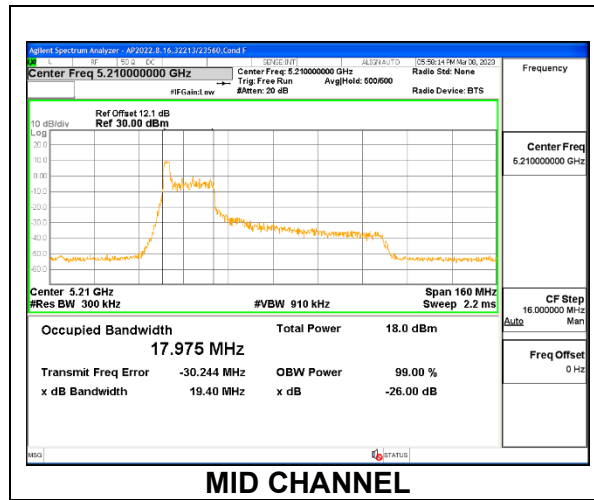
**1TX Antenna 6 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	80.90	76.618



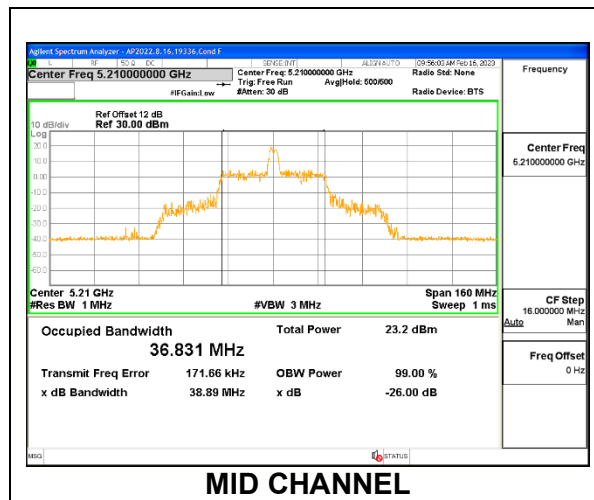
**1TX Antenna 5 MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.40	17.975



**1TX Antenna 5 MODE: 26-Tone, RU Index 18**

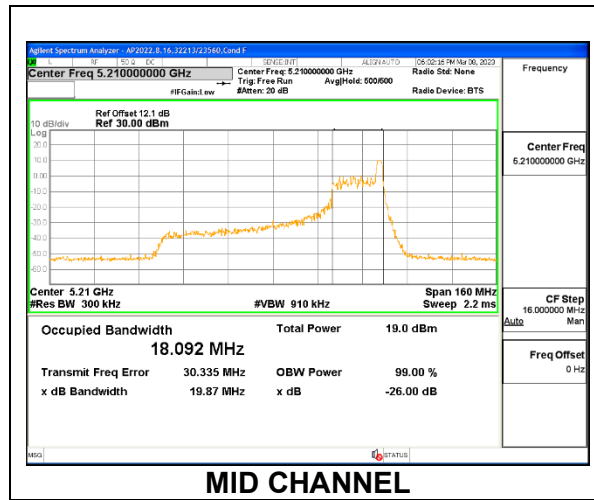
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	38.89	36.831





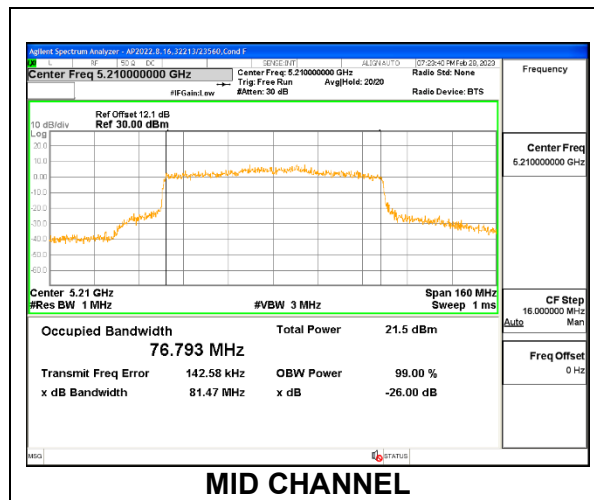
**1TX Antenna 5 MODE: 26-Tone, RU Index 36**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.87	18.092



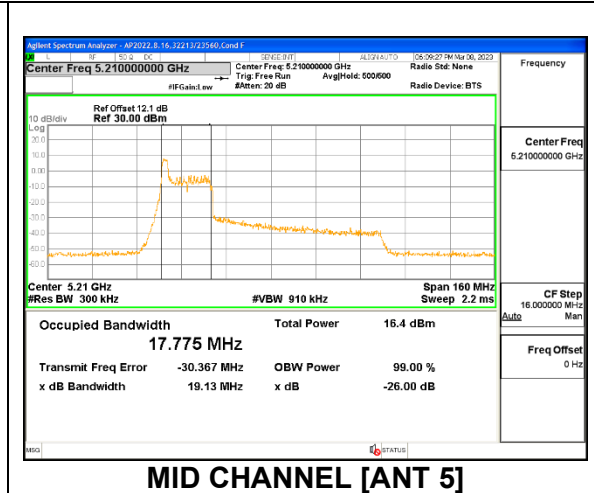
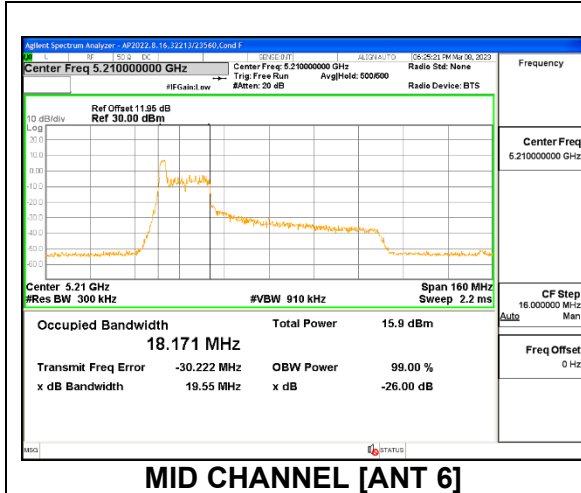
**1TX Antenna 5 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	81.47	76.793



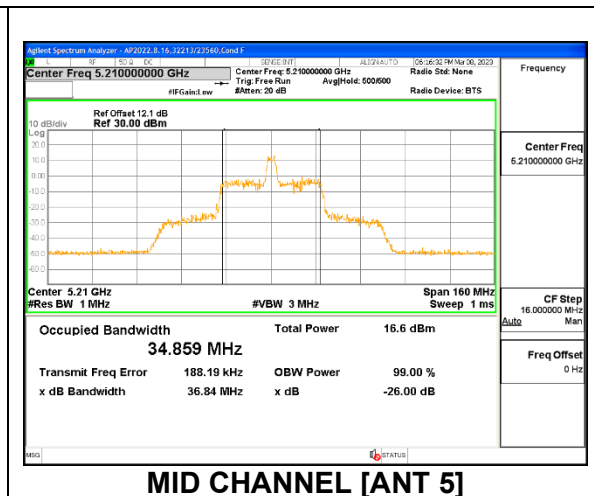
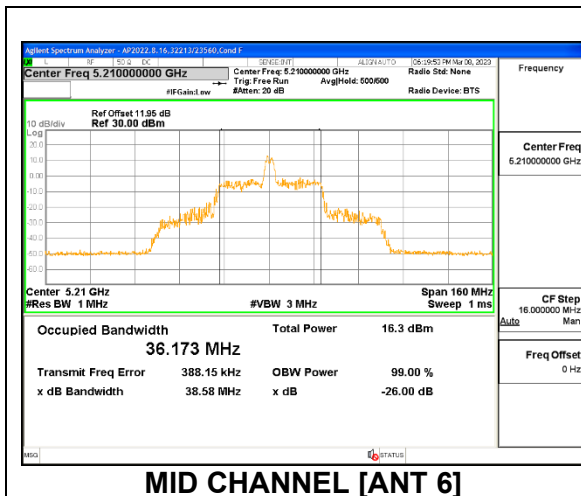
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 0**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	19.55	18.171	19.13	17.775



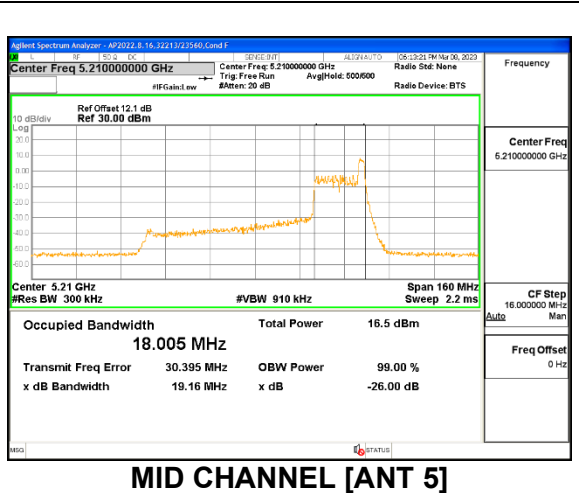
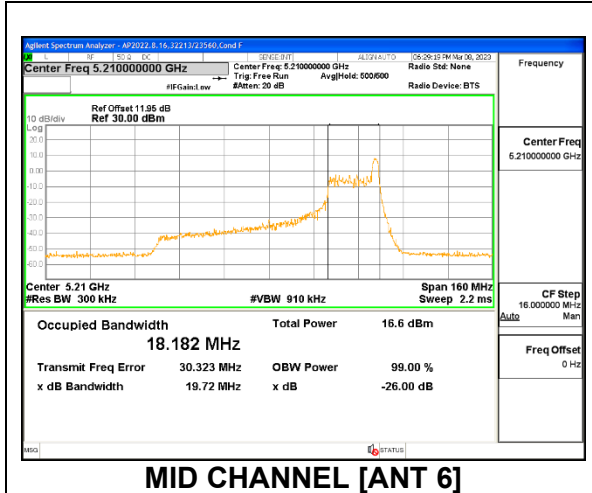
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 18**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	38.58	36.173	36.84	34.859



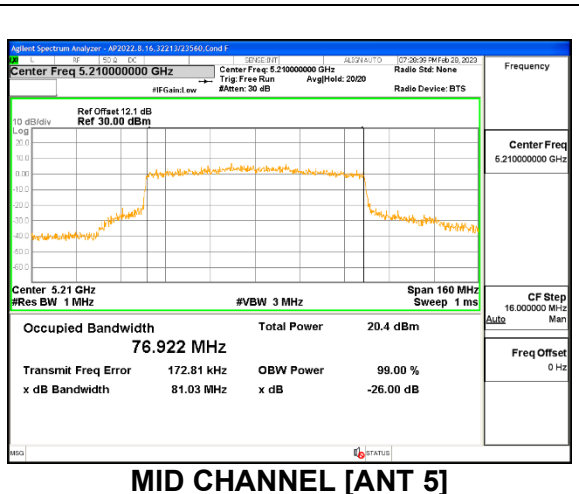
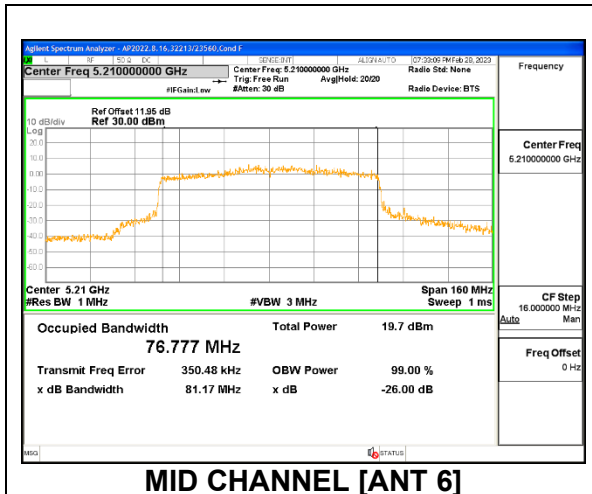
**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: 26-Tone, RU Index 36**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	19.72	18.182	19.16	18.005



**2TX Antenna 6 + Antenna 5 CDD OFDMA MODE: SU, Single User**

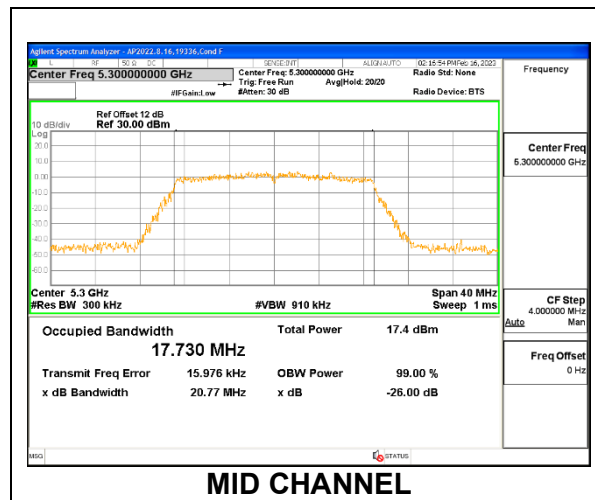
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	81.17	76.777	81.03	76.922



9.2.7. 802.11n HT20 MODE IN THE 5.3 GHz BAND

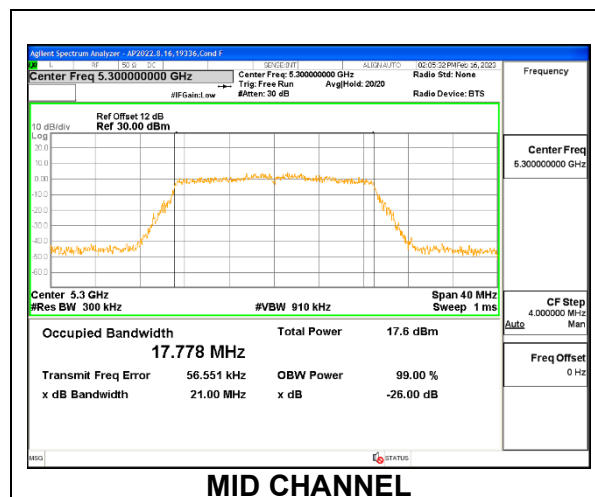
1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.45	17.752
Mid	5300	20.77	17.730
High	5320	20.99	17.854



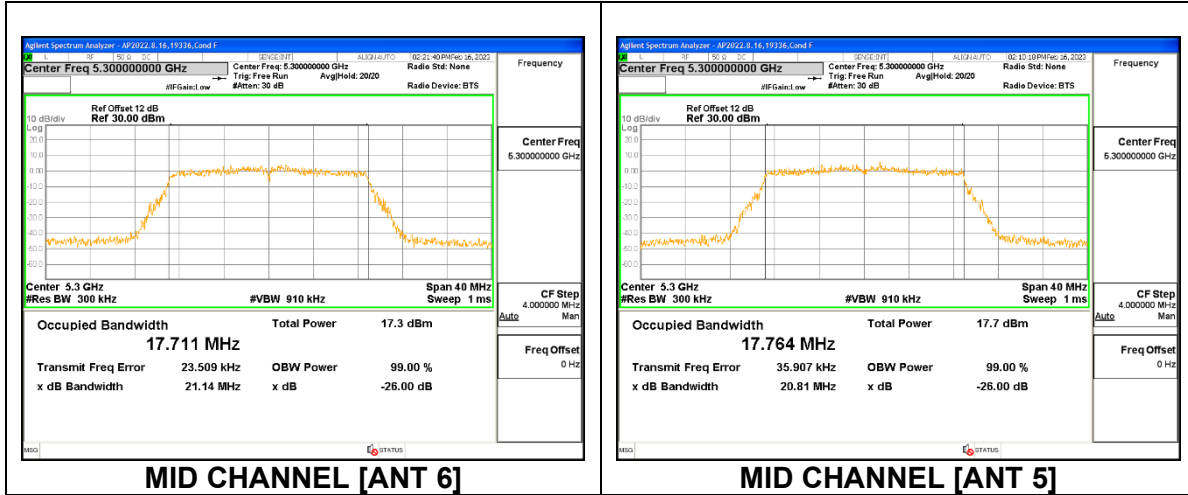
1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.05	17.743
Mid	5300	21.00	17.778
High	5320	21.40	17.893



**2TX Antenna 6 + Antenna 5 CDD MODE**

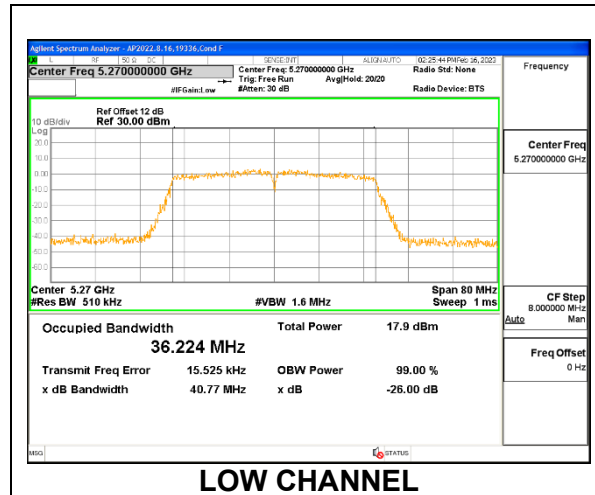
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	20.79	17.715	20.78	17.747
Mid	5300	21.14	17.711	20.81	17.764
High	5320	21.66	17.816	21.00	17.764



9.2.8. 802.11n HT40 MODE IN THE 5.3 GHz BAND

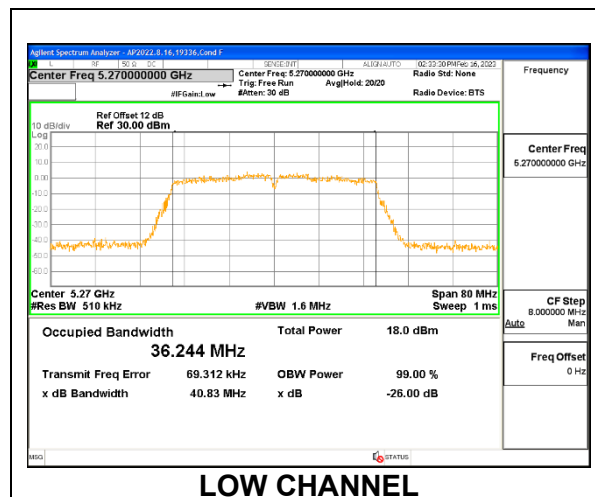
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.77	36.224
High	5310	42.53	36.223



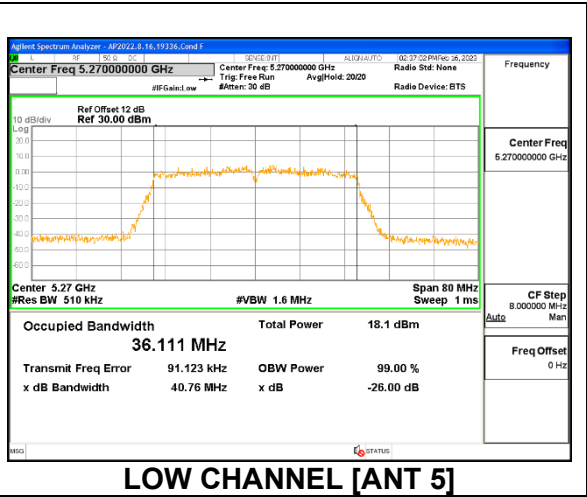
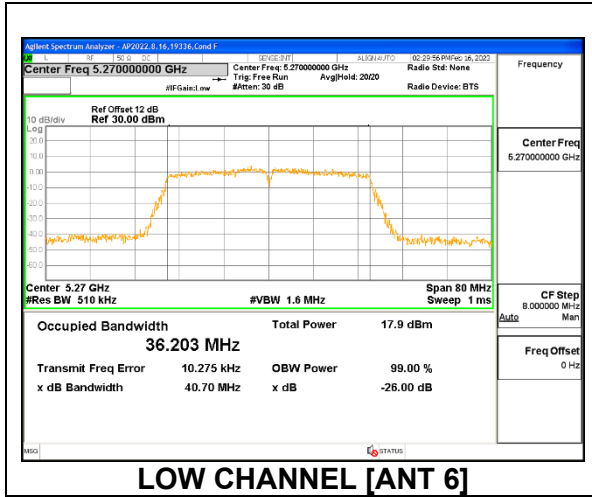
**1TX Antenna 5 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.83	36.244
High	5310	42.24	36.241



**2TX Antenna 6 + Antenna 5 CDD MODE**

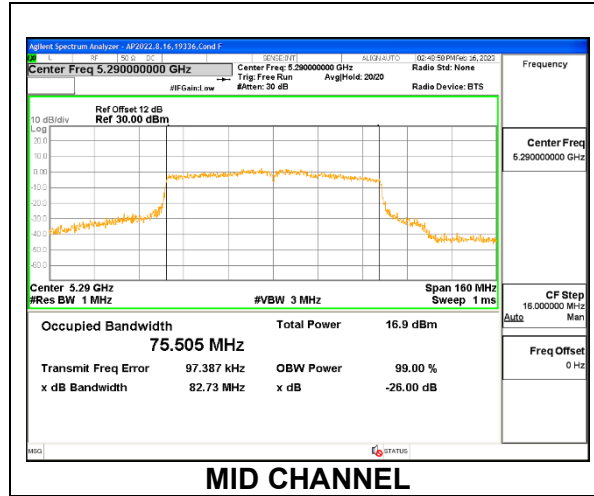
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	40.70	36.203	40.76	36.111
High	5310	41.45	36.255	41.47	36.299



9.2.9. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

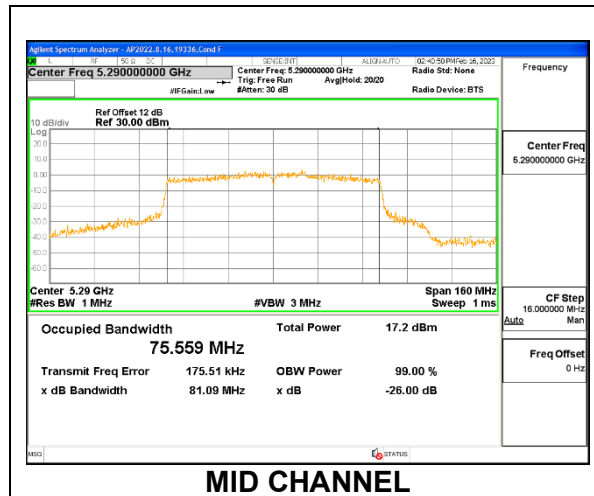
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	82.73	75.505



**1TX Antenna 5 MODE**

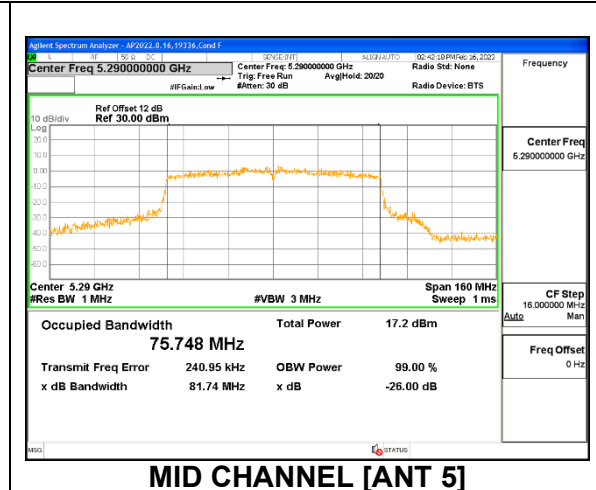
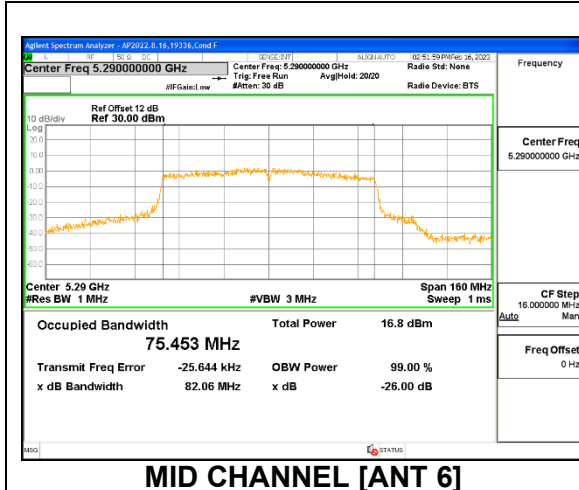
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	81.09	75.559





**2TX Antenna 6 + Antenna 5 CDD MODE**

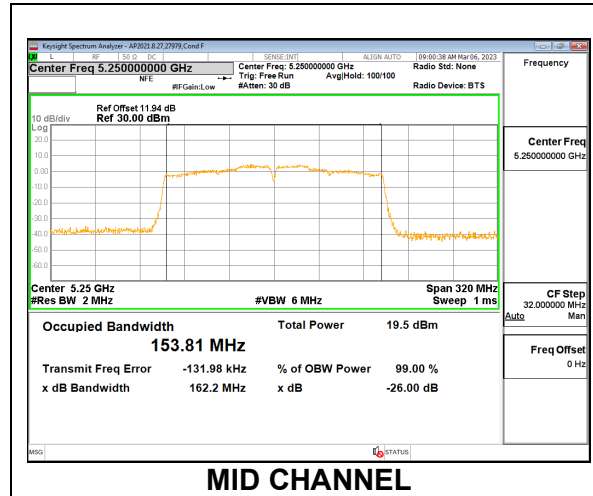
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	82.06	75.453	81.74	75.748



9.2.10. 802.11ac VHT160 MODE IN THE 5.3 GHz BAND

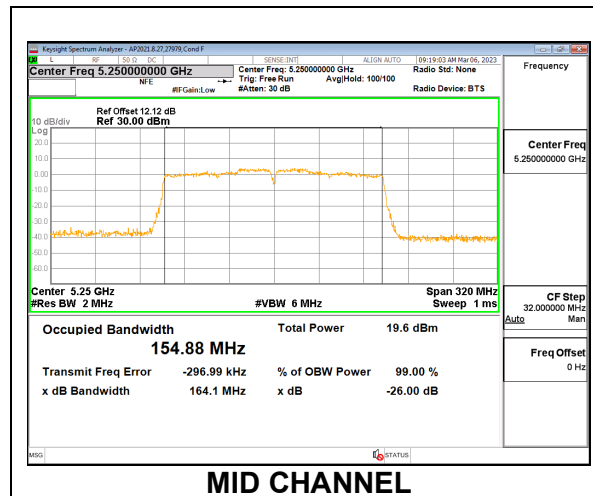
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5250	162.2	153.81



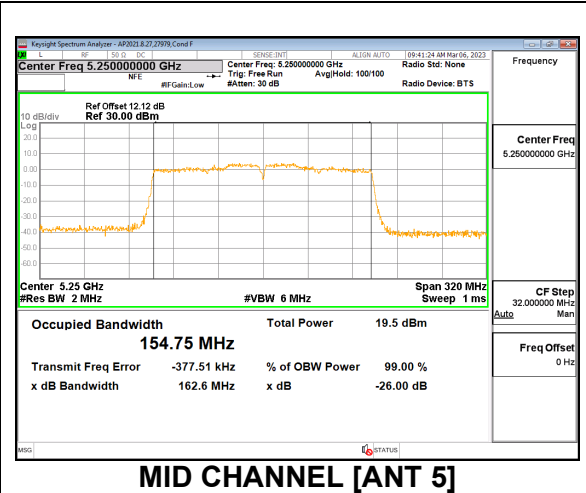
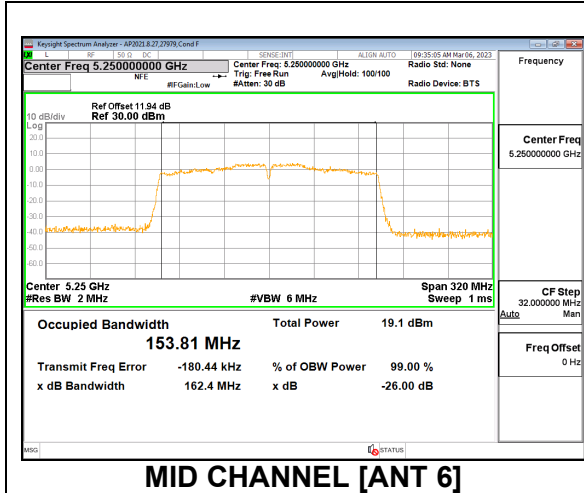
**1TX Antenna 5 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5250	164.1	154.88



**2TX Antenna 6 + Antenna 5 CDD MODE**

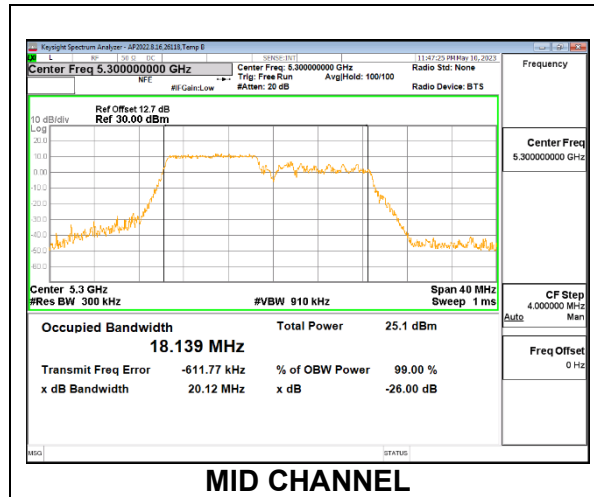
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5250	162.4	153.81	162.6	154.75



9.2.11. 802.11ax HE20 MODE IN THE 5.3 GHz BAND

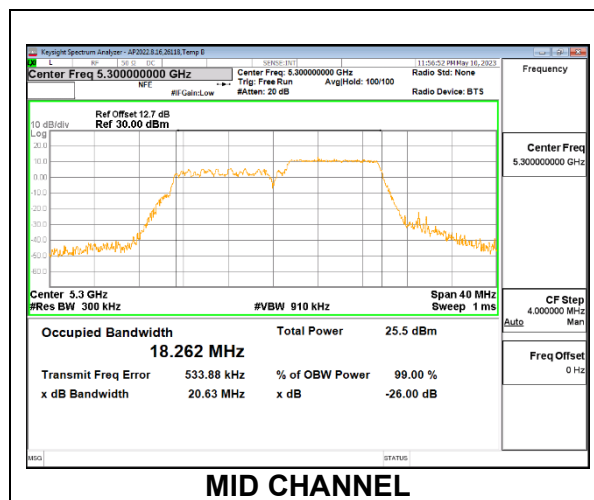
1TX Antenna 6 MODE: 106-Tone, RU Index 53

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.31	18.130
Mid	5300	20.12	18.139
High	5320	20.12	18.027



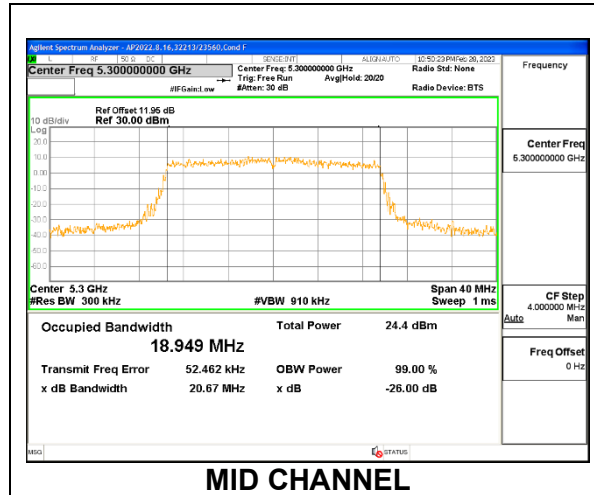
1TX Antenna 6 MODE: 106-Tone, RU Index 54

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.83	18.175
Mid	5300	20.63	18.262
High	5320	20.73	18.179



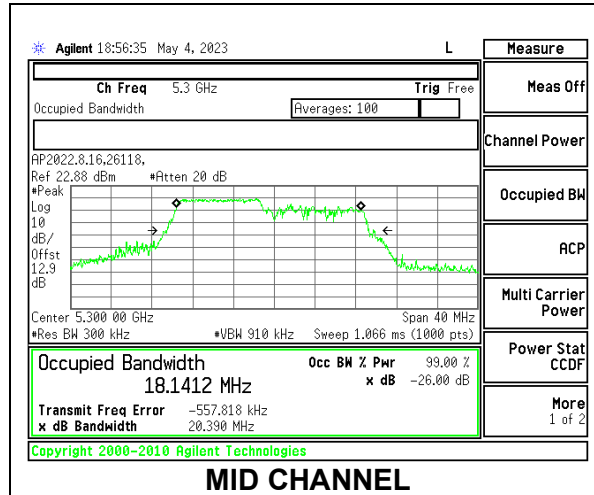
**1TX Antenna 6 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.79	18.899
Mid	5300	20.67	18.949
High	5320	21.24	18.951



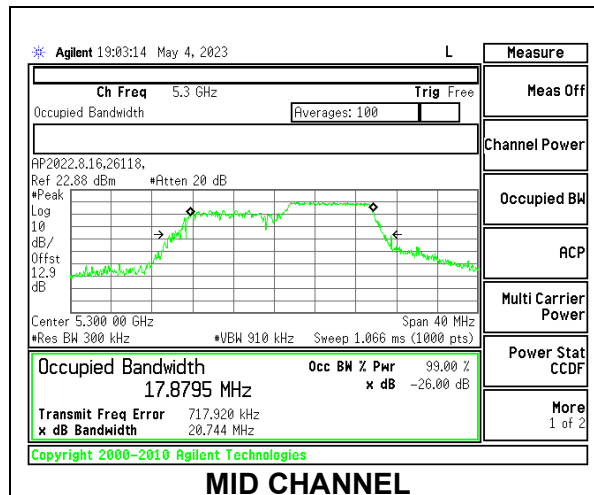
**1TX Antenna 5 MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.544	18.1353
Mid	5300	20.390	18.1412
High	5320	20.378	18.1116



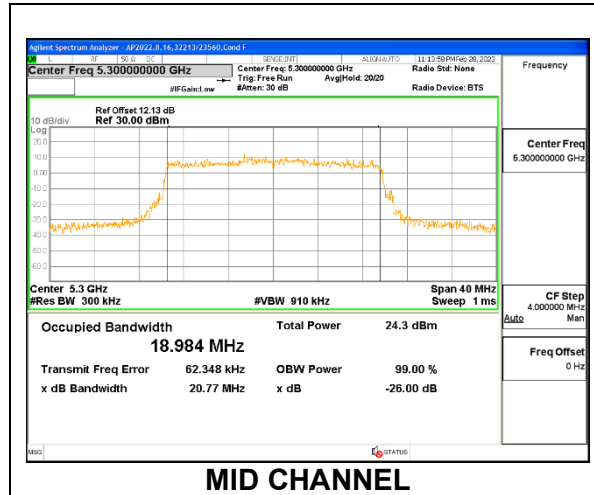
**1TX Antenna 5 MODE: 106-Tone, RU Index 54**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.300	18.2179
Mid	5300	20.744	17.8795
High	5320	20.414	18.2165



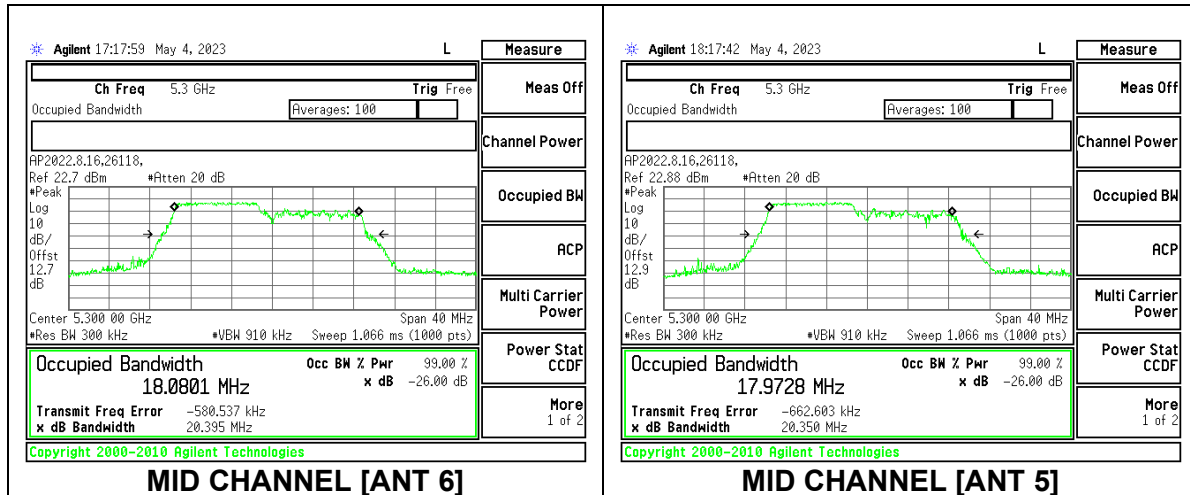
**1TX Antenna 5 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.51	18.905
Mid	5300	20.77	18.984
High	5320	20.90	18.956



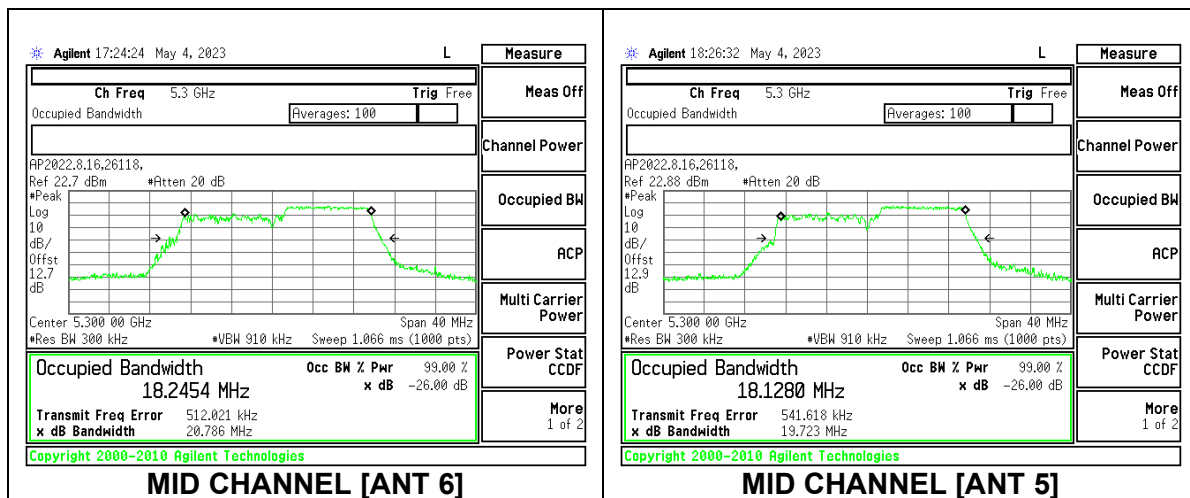
**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	20.12	18.155	19.837	17.8051
Mid	5300	20.395	18.0801	20.350	17.9728
High	5320	20.268	17.3402	20.179	18.1205



**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 54**

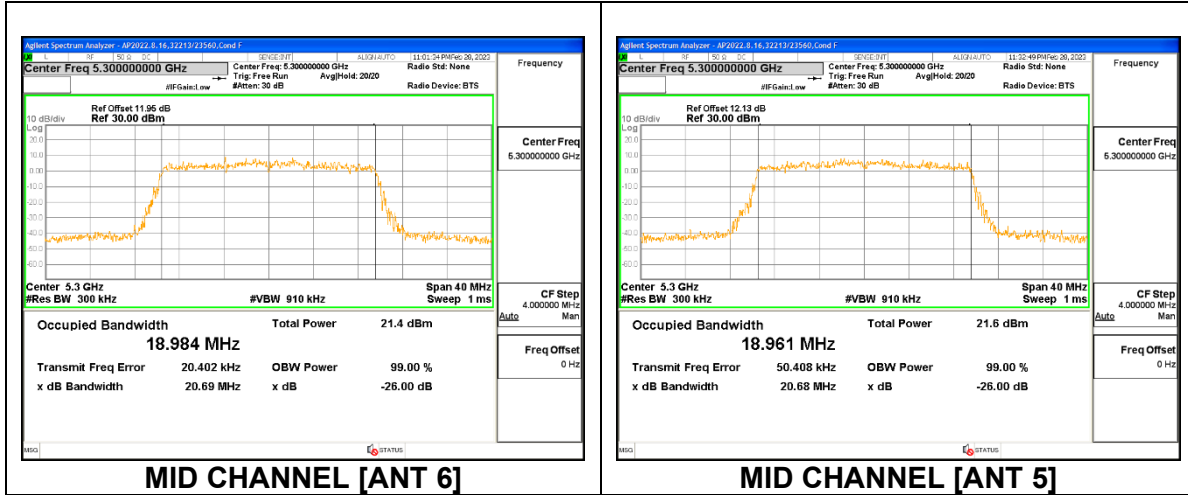
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	20.78	18.112	19.660	18.0797
Mid	5300	20.786	18.2454	19.723	18.1280
High	5320	20.872	17.7692	19.977	18.1184





**2TX Antenna 6 + Antenna 5 OFDMA MODE: SU, Single User**

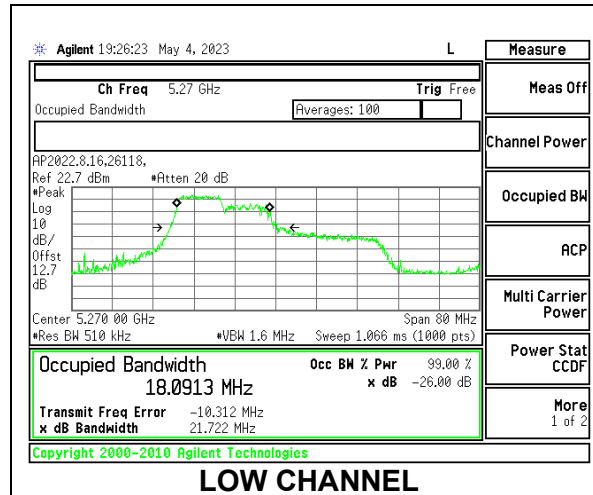
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	20.88	18.927	20.56	18.881
Mid	5300	20.69	18.984	20.68	18.961
High	5320	20.67	18.891	20.95	18.912



9.2.12. 802.11ax HE40 MODE IN THE 5.3 GHz BAND

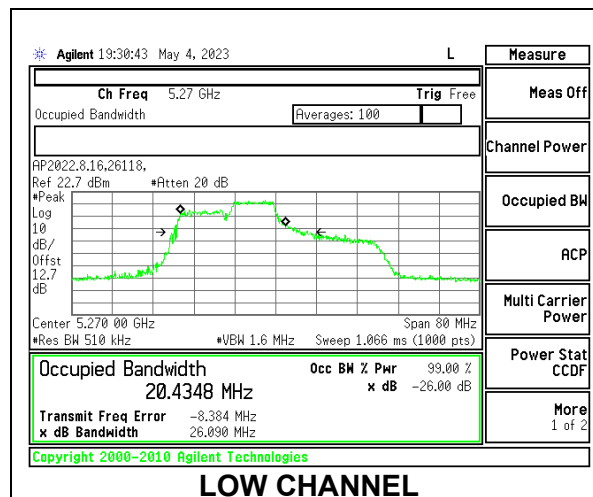
1TX Antenna 6 MODE: 106-Tone, RU Index 53

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	21.722	18.0913
High	5310	21.495	17.7910



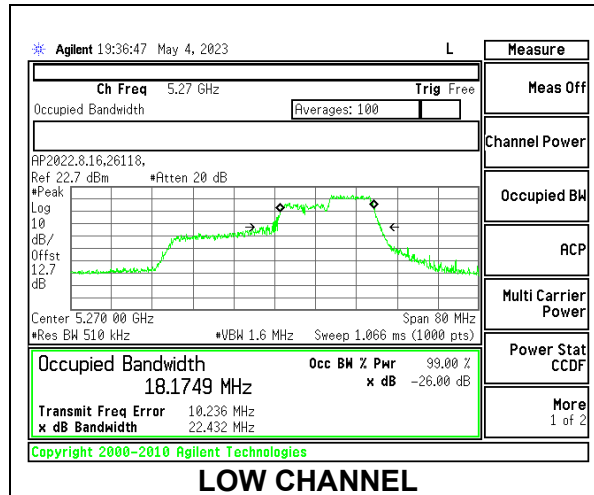
1TX Antenna 6 MODE: 106-Tone, RU Index 54

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	26.090	20.4348
High	5310	26.772	20.5547



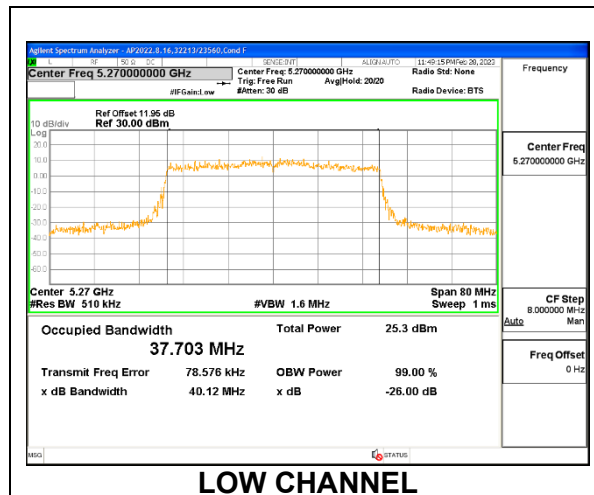
**1TX Antenna 6 MODE: 106-Tone, RU Index 56**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.432	18.1749
High	5310	22.940	18.3176



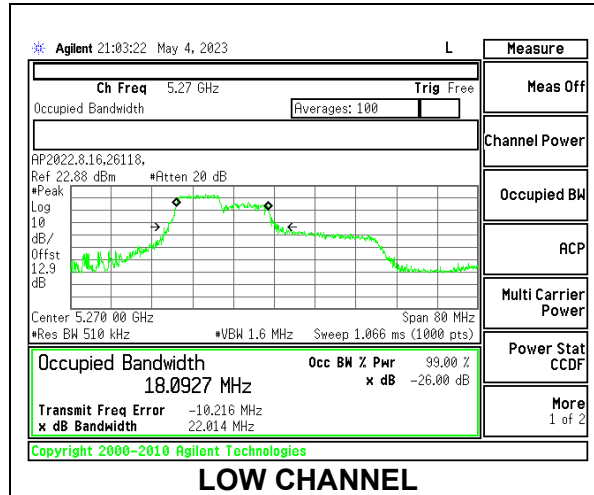
**1TX Antenna 6 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.12	37.703
High	5310	41.17	37.822



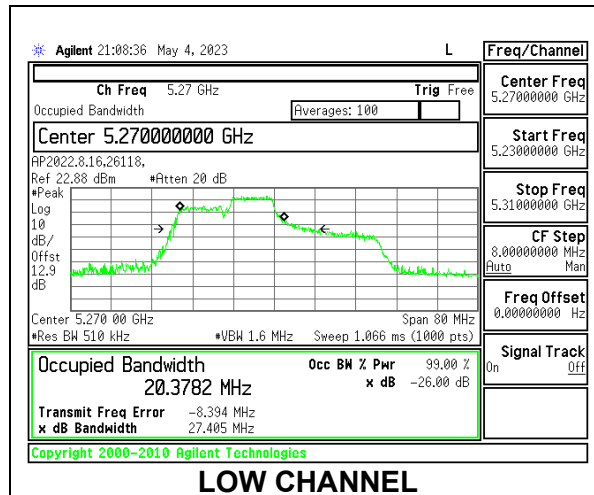
**1TX Antenna 5 MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.014	18.0927
High	5310	22.034	18.1618



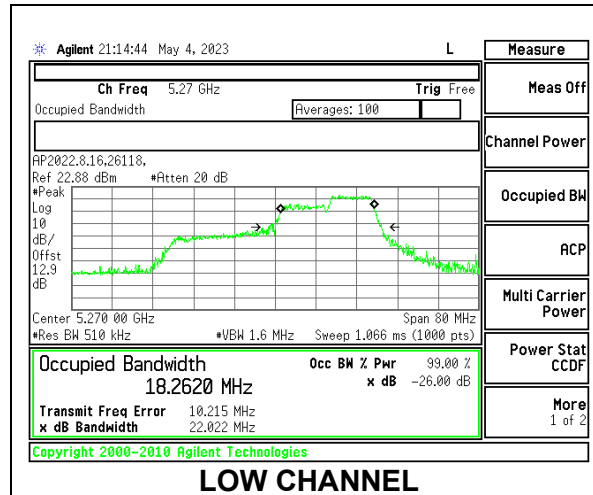
**1TX Antenna 5 MODE: 106-Tone, RU Index 54**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	27.405	20.3782
High	5310	27.324	20.3922



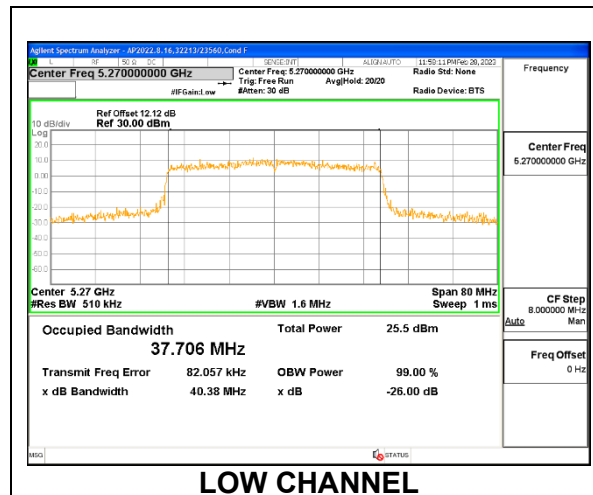
**1TX Antenna 5 MODE: 106-Tone, RU Index 56**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.022	18.2620
High	5310	22.490	18.0832



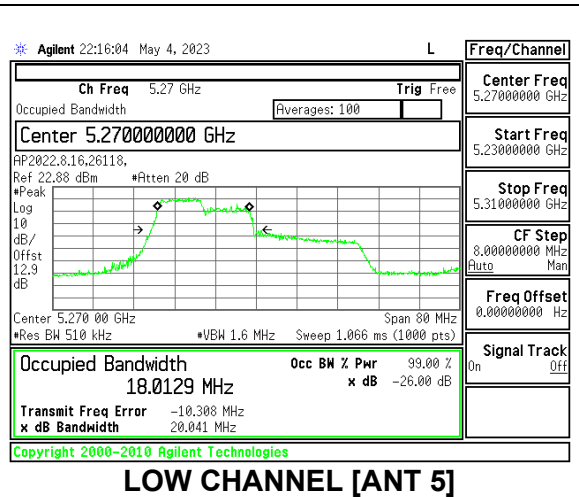
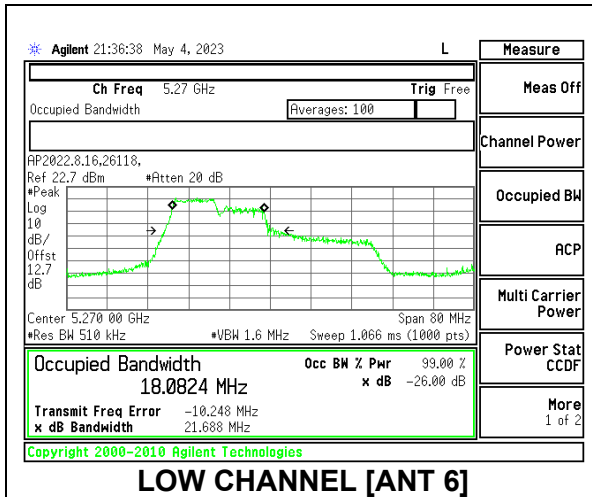
**1TX Antenna 5 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.38	37.706
High	5310	39.74	37.697



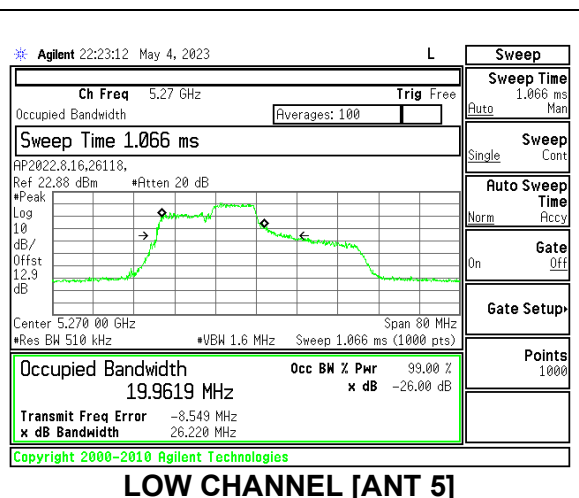
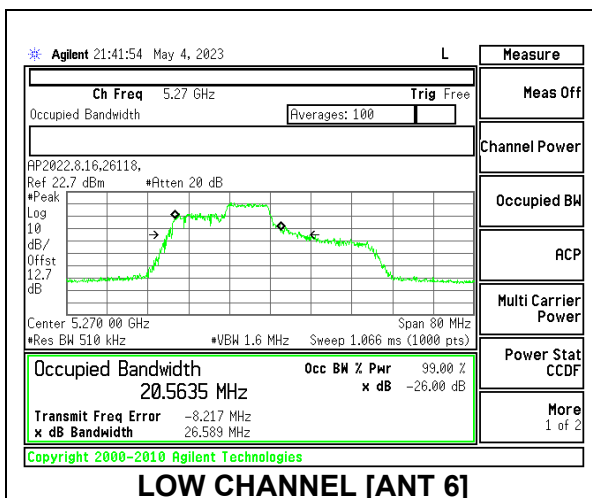
**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	21.688	18.0824	20.041	18.0129
High	5310	21.447	18.1558	20.378	18.0375



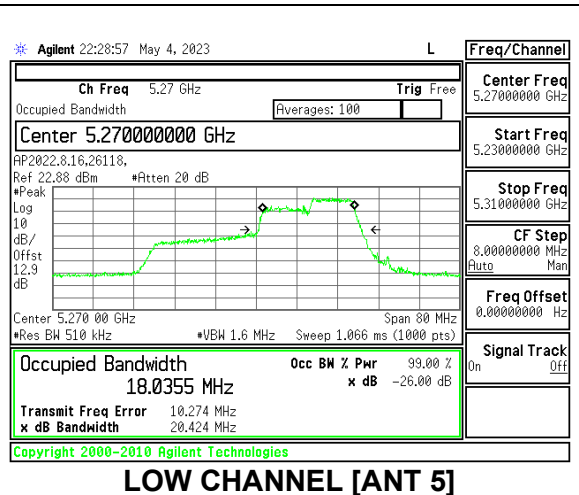
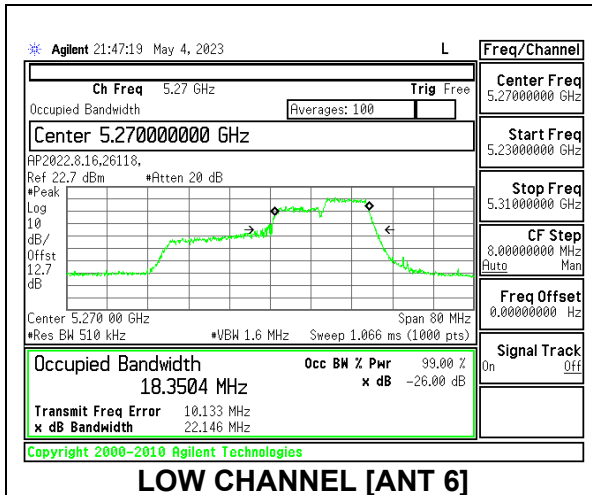
**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 54**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	26.589	20.5635	26.220	19.9619
High	5310	28.815	20.4220	26.438	19.9842



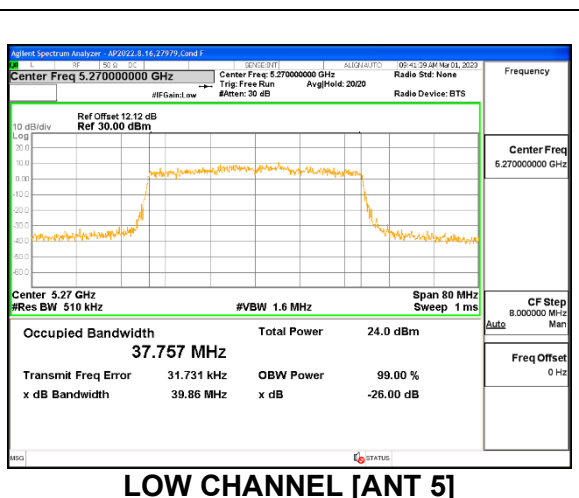
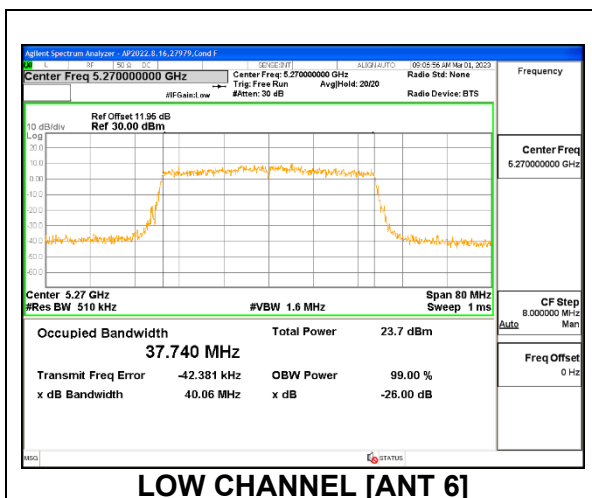
**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 56**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	22.146	18.3504	20.424	18.0355
High	5310	22.773	18.1457	21.211	18.0074



**2TX Antenna 6 + Antenna 5 OFDMA MODE: SU, Single User**

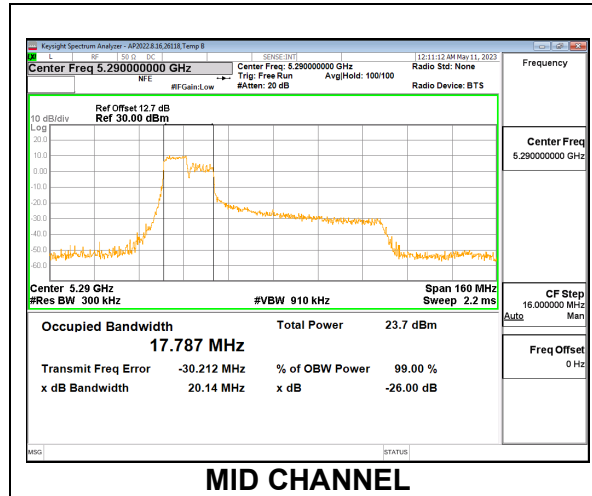
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	40.06	37.740	39.86	37.757
High	5310	40.13	37.711	40.77	37.760



9.2.13. 802.11ax HE80 MODE IN THE 5.3 GHz BAND

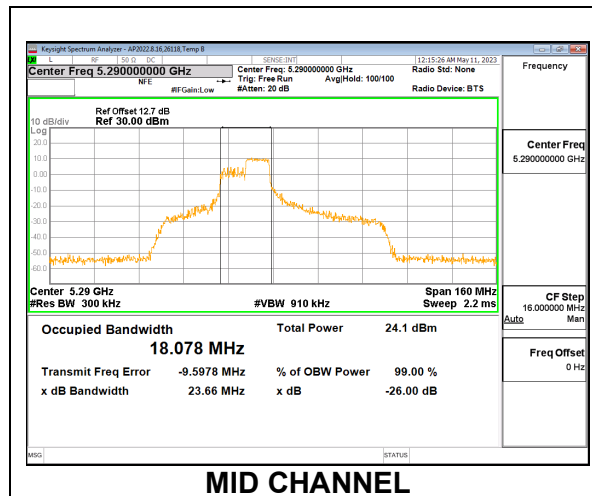
**1TX Antenna 6 MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	20.14	17.787



**1TX Antenna 6 MODE: 106-Tone, RU Index 56**

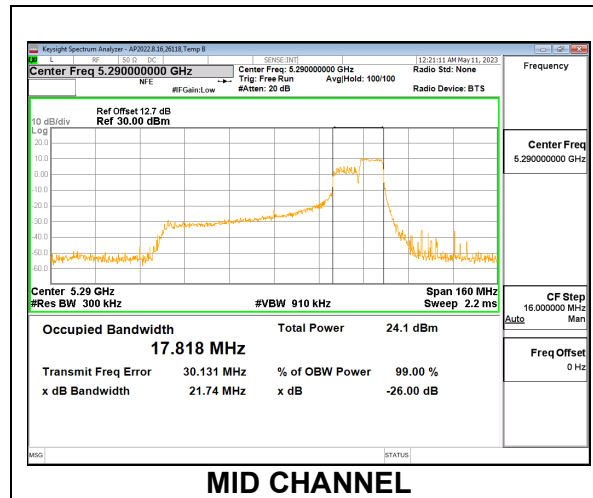
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	23.66	18.078





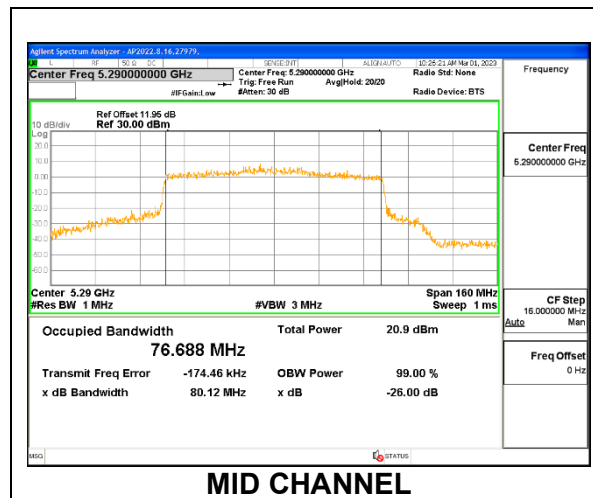
**1TX Antenna 6 MODE: 106-Tone, RU Index 60**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	21.74	17.818



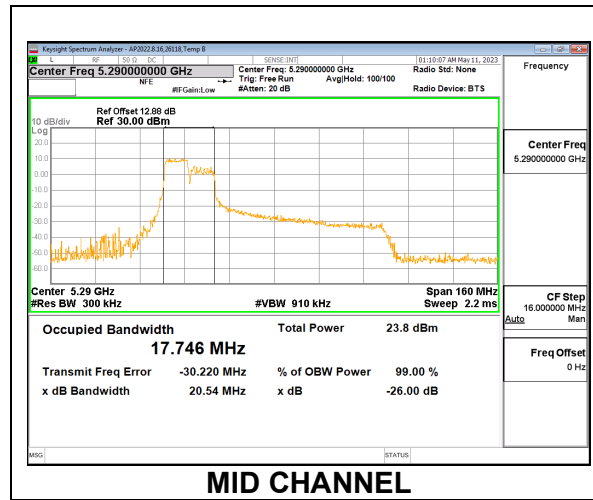
**1TX Antenna 6 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	80.12	76.688



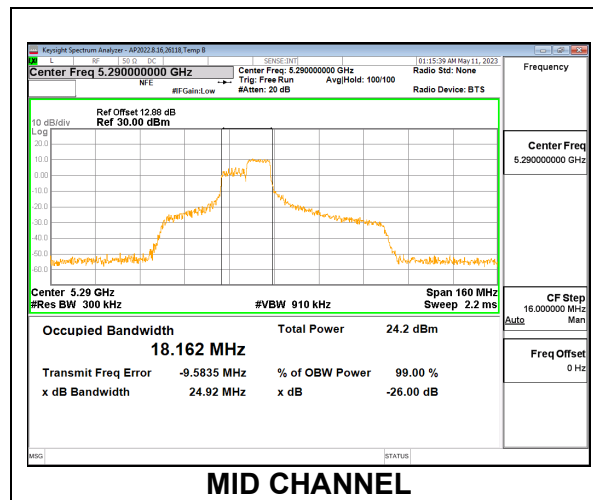
**1TX Antenna 5 MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	20.54	17.746



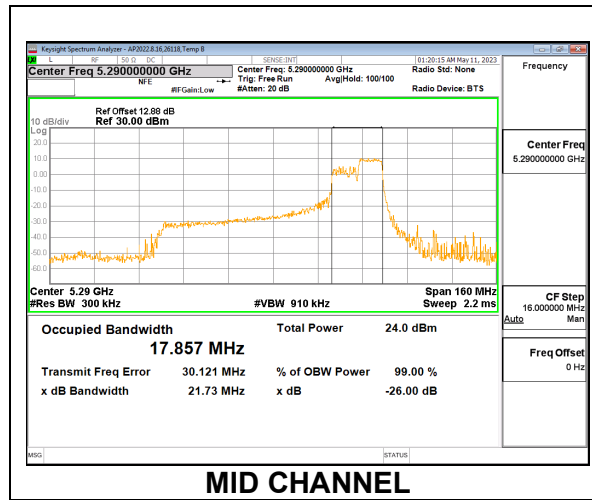
**1TX Antenna 5 MODE: 106-Tone, RU Index 56**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	24.92	18.162



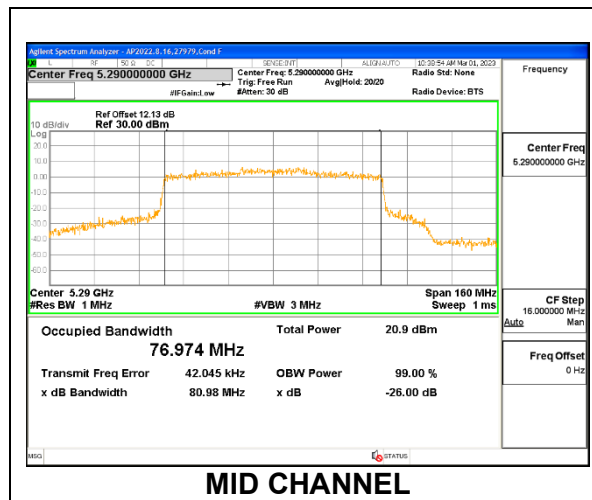
**1TX Antenna 5 MODE: 106-Tone, RU Index 60**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	21.73	17.857



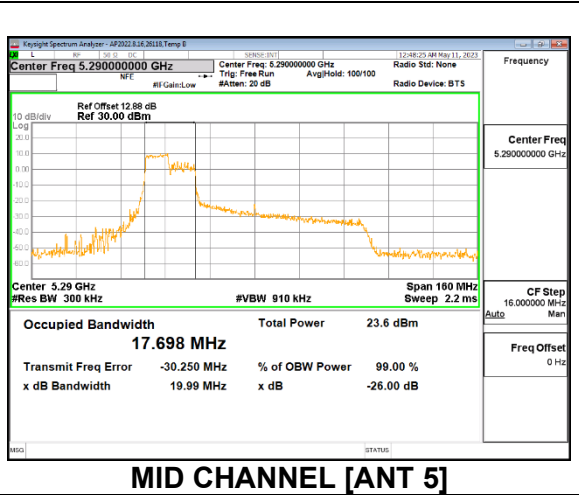
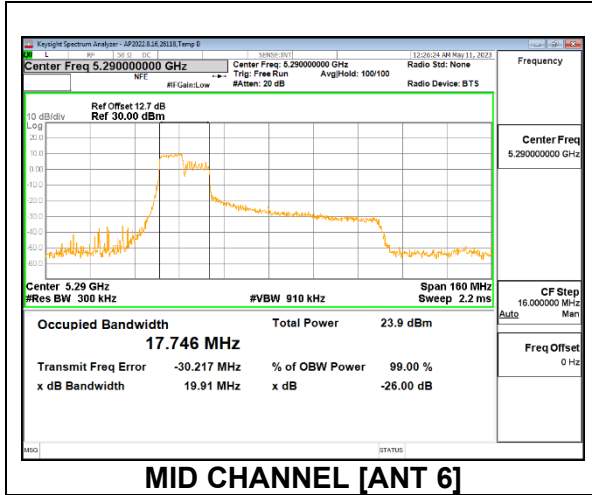
**1TX Antenna 5 MODE: SU, Single User**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	80.98	76.974



**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 53**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	19.91	17.746	19.99	17.698



**2TX Antenna 6 + Antenna 5 OFDMA MODE: 106-Tone, RU Index 56**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5290	24.27	18.221	21.91	17.156

