

# TEST REPORT

**Report Number:** 14523772-E8V2

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

**Model :** A3105 (Full Test Model)  
A3106, A3108 (Variant Model)

**Brand :** APPLE

**FCC ID :** BCG-E8440A (Full Test Model)  
BCG-E8441A, BCG-E8442A ( Variant Model)

**EUT Description :** SMARTPHONE

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

**Date Of Issue:**  
August 29, 2023

**Prepared by:**  
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## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	8/26/2023	Initial Issue	Tony X. Li
V2	8/29/2023	Addressed TCB Questions on Sections 6.2, 6.5, 8, and 9	Tony X. Li

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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:** A3105 (Full Test Model)  
A3106, A3108 (Variant Model)

**BRAND:** APPLE

**SERIAL NUMBER:** JKX4322779  
GD61FMWJ6W, FHW1W7V195, D20VVH9KF7

**SAMPLE RECEIPT DATE:** MARCH 23, 2023

**DATE TESTED:** APRIL 03, 2023 – AUGUST 26, 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 can demonstrate 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 considered 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 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  
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## 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 15
- 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 checked="" 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
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%.

## 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)

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

### **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.

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with cellular GSM, GPRS, EGPRS, UMTS, LTE, 5GNR1, IEEE 802.11a/b/g/n/ac/ax, Bluetooth (BT), Ultra-Wideband (UWB), GPS, NFC, NB UNII, 802.15.4, 802.15.4ab-NB and MSS technologies. The rechargeable battery is not user accessible.

The Model and FCC ID covered by this report includes:

Full Test Model: A3105, FCC ID: BCG-E8440A

Variant Model:           A3106; FCC ID: BCG-E8441A  
                              A3108; FCC ID: BCG-E8442A

### 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	19.47	88.51
5190-5230	802.11n HT40	20.48	111.69
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	16.45	44.16
5180-5240	802.11ax HE20	19.35	86.10
5190-5230	802.11ax HE40	20.44	110.66
5210	802.11ax HE80	16.47	44.36
<b>5.2 GHz band, 2TX</b>			
5180-5240	802.11n HT20 CDD	19.47	88.51
5180-5240	802.11n HT20 SDM/STBC	Covered by 802.11n HT20 2TX CDD	
5190-5230	802.11n HT40 CDD	21.96	157.04
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	18.43	69.66
5210	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5180-5240	802.11ax HE20 OFDMA	19.48	88.72
5180-5240	802.11ax HE20 OFDMA SDM	Covered by 802.11ax HE20 OFDMA	
5190-5230	802.11ax HE40 OFDMA	21.88	154.17
5190-5230	802.11ax HE40 OFDMA SDM	Covered by 802.11ax HE40 OFDMA	
5210	802.11ax HE80 OFDMA	18.48	70.47
5210	802.11ax HE80 OFDMA 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	19.47	88.51
5270 - 5310	802.11n HT40	20.44	110.66
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	16.98	49.89
5250	802.11ac VHT160	14.46	27.93
5260 - 5320	802.11ax HE20	19.46	88.31
5270 - 5310	802.11ax HE40	20.48	111.69
5290	802.11ax HE80	16.95	49.55
5250	802.11ax HE160	14.46	27.93
<b>5.3 GHz band, 2TX</b>			
5260 - 5320	802.11n HT20 CDD	19.47	88.51
5260 - 5320	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5270 - 5310	802.11n HT40 CDD	21.93	155.96
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	19.45	88.10
5290	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5250	802.11ac VHT160 CDD	16.95	49.55
5250	802.11ac VHT160 SDM/STBC	Covered by 802.11ac VHT160 2TX CDD	
5260 - 5320	802.11ax HE20 OFDMA	19.48	88.72
5260 - 5320	802.11ax HE20 OFDMA SDM	Covered by 802.11ax HE20 OFDMA	
5270 - 5310	802.11ax HE40 OFDMA	21.93	155.96
5270 - 5310	802.11ax HE40 OFDMA SDM	Covered by 802.11ax HE40 OFDMA	
5290	802.11ax HE80 OFDMA	18.98	79.07
5290	802.11ax HE80 OFDMA SDM	Covered by 802.11ax HE80 OFDMA	
5250	802.11ax HE160 OFDMA	16.92	49.20
5250	802.11ax HE160 OFDMA 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	19.48	88.72
5510-5710	802.11n HT40	20.46	111.17
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	20.47	111.43
5570	802.11ac VHT160	15.43	34.91
5500-5720	802.11ax HE20	19.46	88.31
5510-5710	802.11ax HE40	20.45	110.92
5530-5690	802.11ax HE80	20.45	110.92
5570	802.11ax HE160	15.45	35.08
<b>5.6 GHz band, 2TX</b>			
5500-5720	802.11n HT20 CDD	19.47	88.51
5500-5720	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5510-5710	802.11n HT40 CDD	21.95	156.68
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	22.94	196.79
5530-5690	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5570	802.11ac VHT160 CDD	17.96	62.52
5570	802.11ac VHT160 SDM/STBC	Covered by 802.11ac VHT160 2TX CDD	
5500-5720	802.11ax HE20 OFDMA	19.49	88.92
5500-5720	802.11ax HE20 OFDMA SDM	Covered by 802.11ax HE20 OFDMA	
5510-5710	802.11ax HE40 OFDMA	21.98	157.76
5510-5710	802.11ax HE40 OFDMA SDM	Covered by 802.11ax HE40 OFDMA	
5530-5690	802.11ax HE80 OFDMA	22.94	196.79
5530-5690	802.11ax HE80 OFDMA SDM	Covered by 802.11ax HE80 OFDMA	
5570	802.11ax HE160 OFDMA	17.97	62.66
5570	802.11ax HE160 OFDMA 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	20.96	124.74
5755-5795	802.11n HT40	20.45	110.92
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	20.48	111.69
5745-5825	802.11ax HE20	20.95	124.45
5755-5795	802.11ax HE40	20.47	111.43
5775	802.11ax HE80	20.47	111.43
<b>5.8 GHz band, 2TX</b>			
5745-5825	802.11n HT20 CDD	23.98	250.03
5745-5825	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5755-5795	802.11n HT40 CDD	23.46	221.82
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	23.44	220.80
5775	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5745-5825	802.11ax HE20 OFDMA	23.94	247.74
5745-5825	802.11ax HE20 OFDMA SDM	Covered by 802.11ax HE20 OFDMA	
5755-5795	802.11ax HE40 OFDMA	23.49	223.36
5755-5795	802.11ax HE40 OFDMA SDM	Covered by 802.11ax HE40 OFDMA	
5775	802.11ax HE80 OFDMA	23.44	220.80
5775	802.11ax HE80 OFDMA 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	-3.20	-4.50
5250-5350	-2.90	-4.90
5500-5700	-2.00	-3.80
5725-5825	-2.00	-4.00

**6.4. SOFTWARE AND FIRMWARE**

The EUT firmware installed during testing was 23\_10\_686.

## 6.5. WORST-CASE CONFIGURATION AND MODE

The fundamentals of the EUT were investigated in three orthogonal orientations X, Y and Z on ANT 6, ANT 5 and 2TX. It was determined that Y (Landscape) orientation was the worst-case orientation for ANT 5, and X (Flatbed) was the worst case for ANT 6, and for 2TX.

802.11n 2TX and 802.11ax 2TX modes were used to perform on radiated harmonic spurious final test to cover all SISO modes. Max power was 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 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:

802.11n 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 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

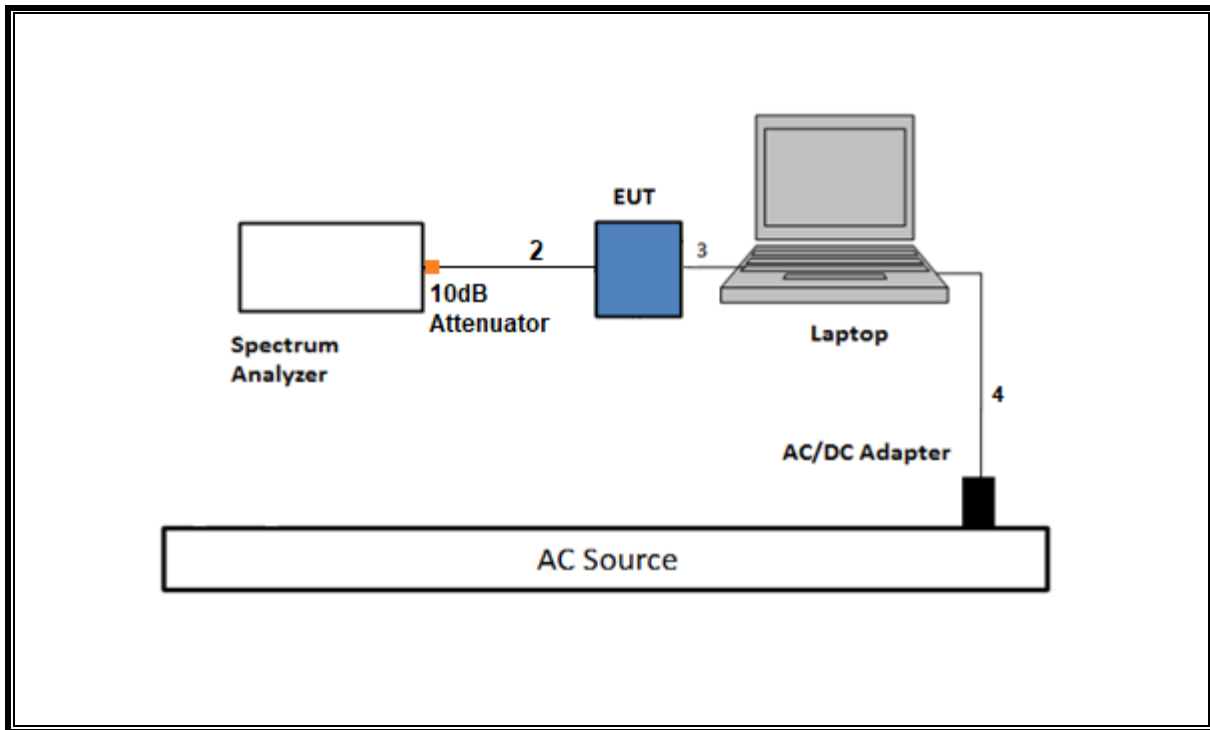
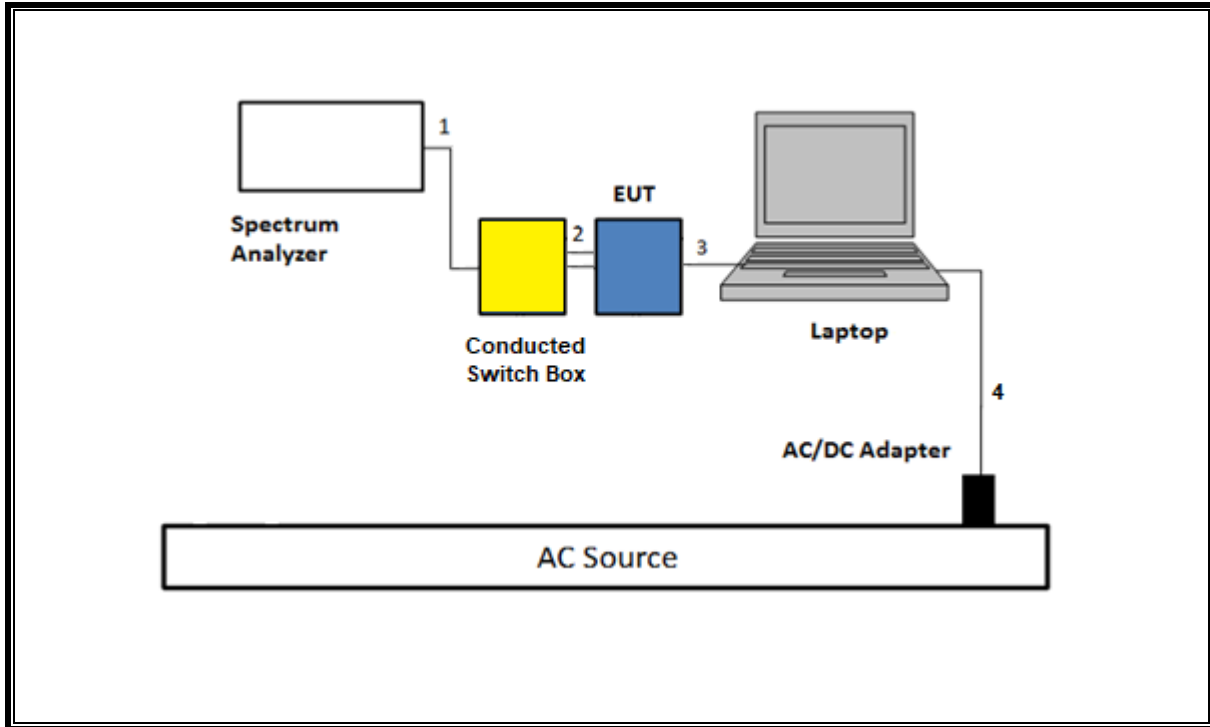
SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
Laptop	Apple	Macbook Pro	C02VD7SAHV22	BCGA1708		
Laptop AC/DC adapter	Liteon Technology	A1424	NSW25679	DoC		
EUT AC/DC adapter	Apple	A1720	C3D8417A7R93KVPA8	DoC		
Conducted Switch Box	UL	n/a	208281	N/A		
10dB Fixed 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	SMA	1	SMA	Shielded	0.75	To spectrum Analyzer
2	Antenna	2	SMA	Un-shielded	0.2	To Conducted Switch Box
3	USB-C	1	USB-C	Shielded	1.0	N/A
4	AC	1	AC	Un-shielded	2	N/A
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

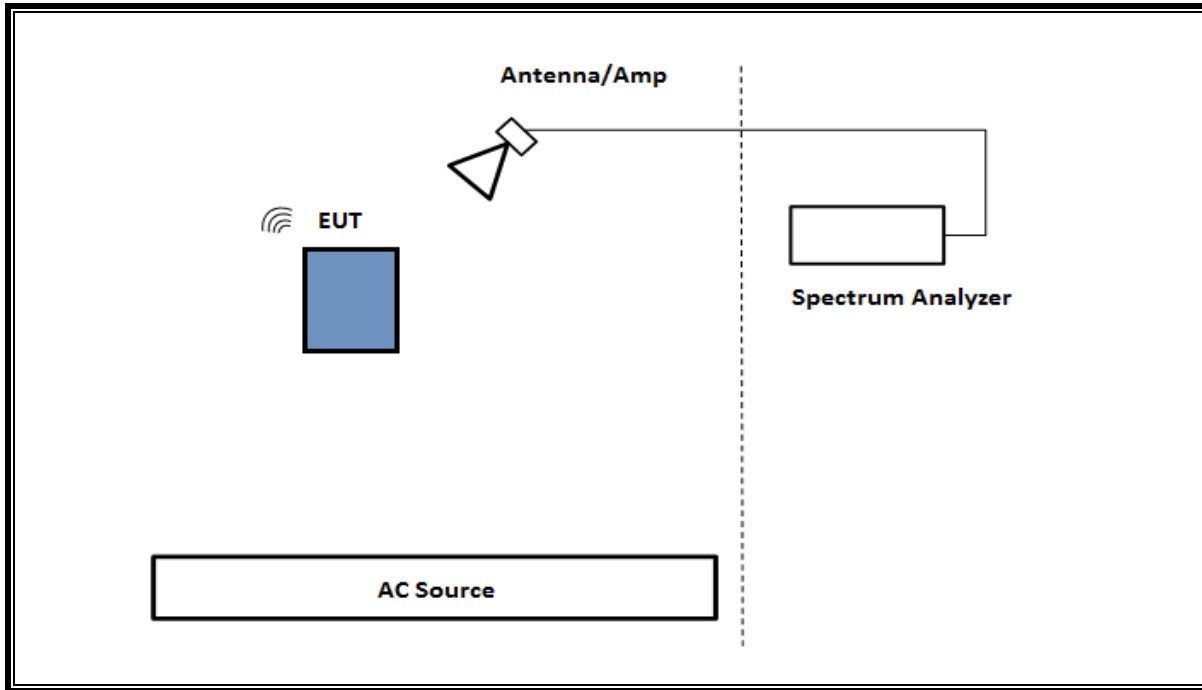
The EUT setup is shown as below. Test software exercised the radio card.



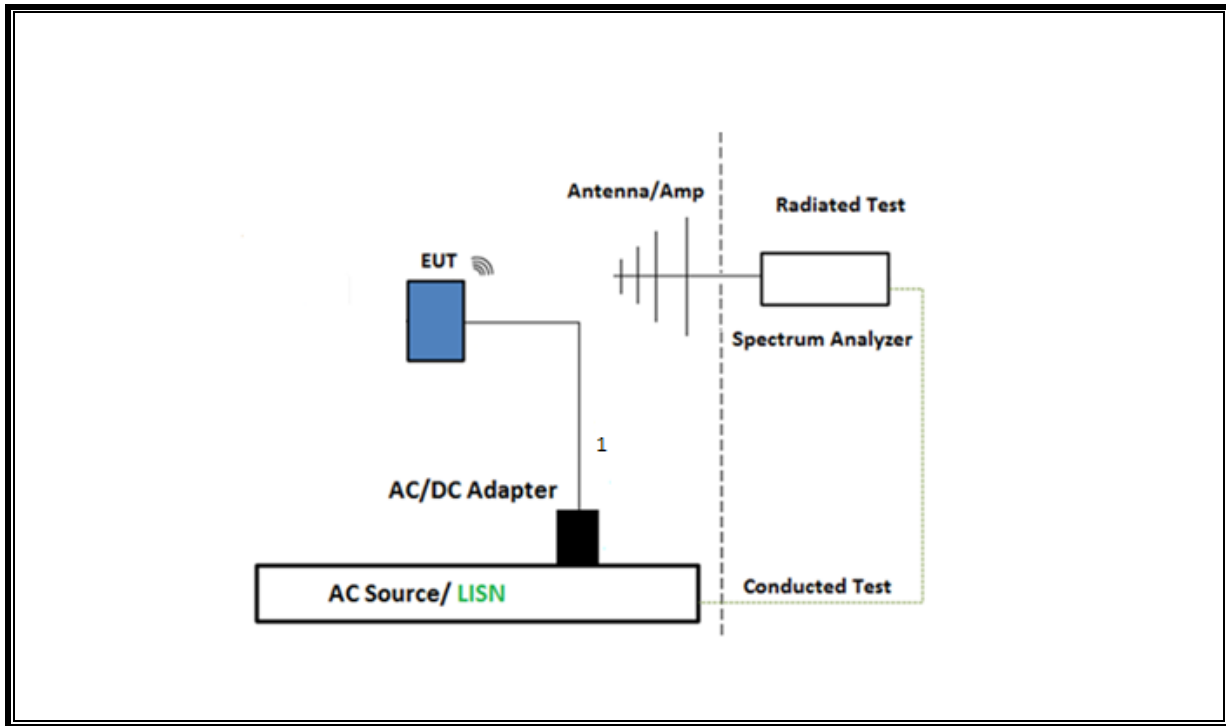
**SETUP DIAGRAM FOR CONDUCTED TESTS**



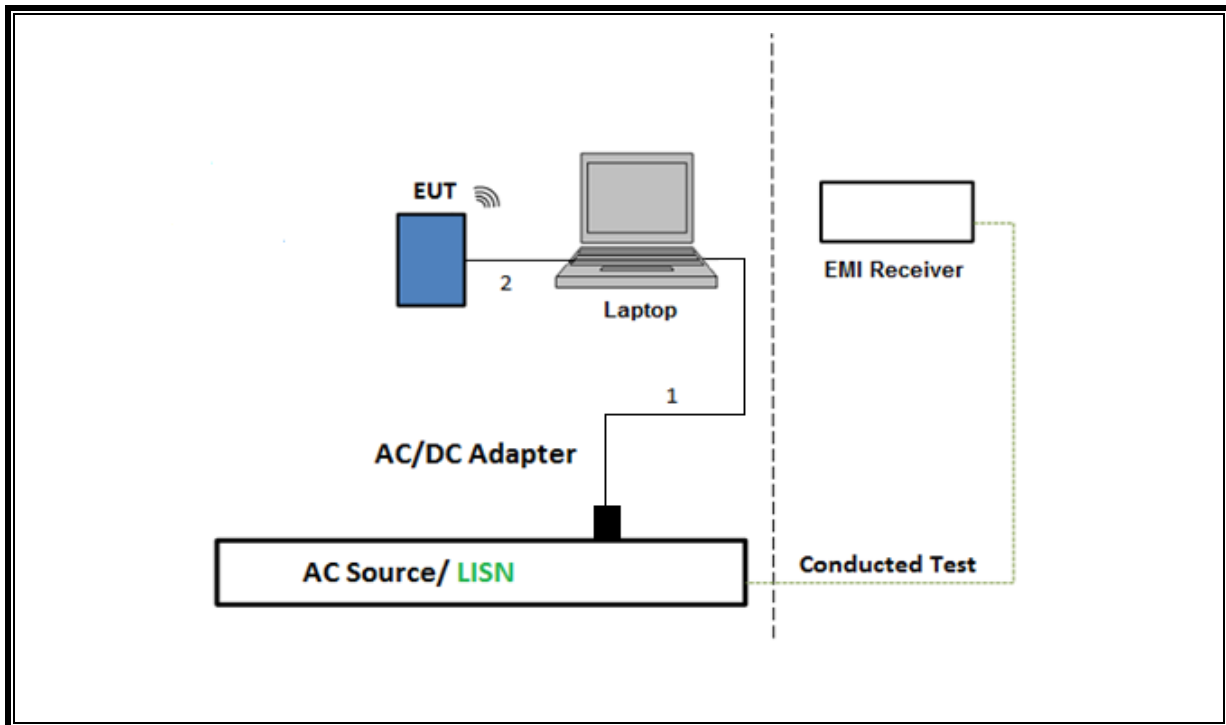
**SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz**



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



**TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION**



## 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

## 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
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight Technologies Inc	E4440A	81311	02/29/2024	02/07/2023
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A-544	87738	02/28/2024	02/28/2023
*Conducted Switch Box	N/A	CSB	221008	06/21/2023	06/21/2022
Conducted Switch Box	N/A	CSB	208281	04/30/2024	04/12/2023
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	
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90756	01/31/2024	01/24/2023
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90389	01/31/2024	01/24/2023
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	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	191428	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	200897	03/31/2024	03/07/2023
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	230300	01/12/2024	01/12/2023
*RF Filter Box, 1-18GHz, 12 Port.	UL-FR1	Frankenstein	231875	04/19/2023	04/19/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	170063	02/29/2024	02/29/2023
*Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80404	08/31/2024	08/25/2023
RF Filter Box, 1-18GHz, 12 Port	UL-FR1	Frankenstein	216812	09/17/2023	09/17/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230548	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	222740	08/31/2023	08/31/2022
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	84797	09/20/2023	09/20/2022
*RF Filter Box, 1-18GHz	UL-FR1	NA	171389	05/31/2023	05/31/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201497	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, 17 Ports	UL-FR1	RATS 2	226780	03/29/2024	03/29/2023
*Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80430	08/08/2023	08/08/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201499	02/29/2024	02/29/2023
RF Filter Box, 1-18GHz, 12 Port.	UL-FR1	Frankenstein	231249	02/29/2024	02/29/2023

TEST EQUIPMENT LIST (Cont.)					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	200784	01/31/2024	01/31/2023
RF Filter Box, 1-18GHz, 12 Port	UL-FR1	Frankenstein	220095	01/31/2024	01/31/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201500	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	226673	01/09/2024	01/09/2023
*RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	226781	04/30/2023	04/30/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169935	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	84796	09/19/2023	09/19/2022
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80707	05/31/2024	05/31/2023
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	225474	03/31/2024	03/31/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201502	02/29/2024	02/29/2023
*Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80402	07/31/2023	07/31/2022
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	225575	03/03/2024	03/03/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	223461	02/29/2024	02/29/2023
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	226671	01/09/2024	01/09/2023
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	RATS 2	226779	03/05/2024	03/05/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	226078	02/29/2024	02/29/2023
*Antenna, Horn 18 to 26.5GHz	A.R.A.	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
*Antenna Horn, 18 to 26.5GHz	ARA	MWH-1826/B	172353	06/01/2023	06/01/2022
*Antenna, Horn 26.5 to 40GHz	A.R.A.	MWH-2640/B	172367	06/30/2024	06/28/2023
AMP26G40-65	AMPLICAL	AMP26G40-65	172346	02/29/2024	02/29/2023
Antenna, Broadband Hybrid, 30MHz to 3GHz	SunAR rf motion	JB3	171863	10/20/2023	10/20/2022
Amplifier 9 KHz - 1 GHz	SONOMA INSTRUMENT	310N	230310	02/02/2024	02/02/2023
*Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	170014	07/28/2023	07/28/2022
*Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	170015	07/28/2023	07/28/2022
*Antenna, Horn 1-18GHz	ETS-Lindgren	3117	81887	06/01/2023	06/01/2022
*EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201500	02/17/2023	02/17/2022
RF Filter Box, 1-18GHz	UL-FR1	NA	168534	01/05/2024	01/05/2023

<b>AC Line Conducted</b>					
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	93091	02/29/2024	03/29/2023
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01-480V	175764	01/31/2024	01/31/2023
**Transient Limiter	TE	TBFL1	207996	08/15/2023	07/15/2022

<b>UL AUTOMATION SOFTWARE</b>			
Radiated Software	UL	UL EMC	Ver 9.5, May 1 , 2023
Conducted Software	UL	UL EMC	2020.8.16
AC Line Conducted Software	UL	UL EMC	Ver 9.5, Mar 3, 2023

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

\*\*Cal Due date should be 07/15/2023 and according to internal quality system, it was extended to 08/15/2023.

## 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.

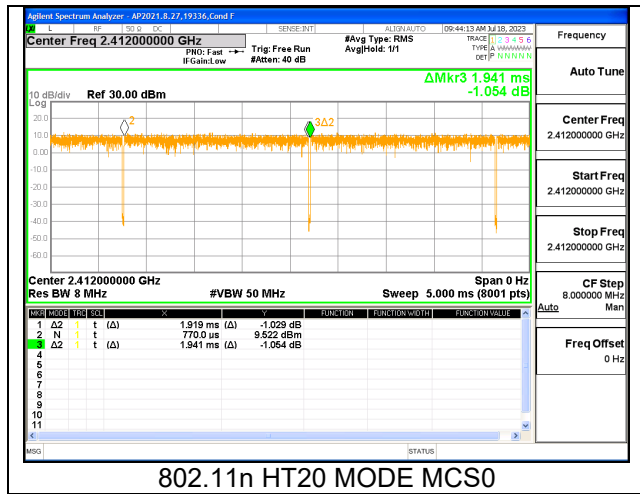
#### ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
<b>5GHz Band</b>						
802.11n HT20 MCS0	1.919	1.941	0.989	98.87%	0.00	0.010
802.11n HT20 MCS7	0.227	0.249	0.910	91.01%	0.41	4.409
802.11n HT40 MCS0	0.944	0.965	0.977	97.74%	0.10	1.060
802.11n HT40 MCS7	0.511	0.532	0.961	96.08%	0.17	1.958
802.11ac VHT80 MCS0	0.460	0.482	0.955	95.45%	0.20	2.175
802.11ac VHT80 MCS9	0.127	0.150	0.848	84.79%	0.72	7.856
802.11ac VHT160 MCS0	0.252	0.272	0.926	92.64%	0.33	3.970
802.11ac VHT160 MCS11	0.055	0.077	0.720	72.04%	1.42	18.123
802.11ax HE20 RU26, MCS0	3.992	4.029	0.991	99.08%	0.00	0.010
802.11ax HE20 RU26, MCS11	0.292	0.330	0.886	88.61%	0.53	3.423
802.11ax HE20 RU106, MCS0	3.512	3.542	0.991	99.15%	0.00	0.010
802.11ax HE20 RU106, MCS11	0.264	0.300	0.880	87.96%	0.56	3.791
802.11ax HE40 RU26, MCS0	3.961	4.029	0.983	98.31%	0.00	0.010
802.11ax HE40 RU26, MCS11	0.293	0.328	0.892	89.23%	0.49	3.414
802.11ax HE40 RU106, MCS0	3.485	3.540	0.984	98.45%	0.00	0.010
802.11ax HE40 RU106, MCS11	0.264	0.299	0.882	88.25%	0.54	3.789
802.11ax HE80 RU26, MCS0	3.965	4.031	0.984	98.36%	0.00	0.010
802.11ax HE80 RU26, MCS11	0.293	0.330	0.889	88.93%	0.51	3.411
802.11ax HE80 RU106, MCS0	3.515	3.542	0.992	99.24%	0.00	0.010
802.11ax HE80 RU106, MCS11	0.264	0.300	0.878	87.84%	0.56	3.795
802.11ax HE160 RU26, MCS0	3.510	3.550	0.989	98.87%	0.00	0.010
802.11ax HE160 RU26, MCS11	0.292	0.328	0.888	88.85%	0.51	3.430
802.11ax HE160 RU106, MCS0	3.510	3.550	0.989	98.87%	0.00	0.010
802.11ax HE160 RU106, MCS11	0.265	0.300	0.884	88.38%	0.54	3.769



Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
<b>5GHz Band</b>						
802.11ax HE20 SU, MCS0	1.487	1.507	0.987	98.67%	0.00	0.010
802.11ax HE20 SU, MCS11	0.146	0.168	0.868	86.80%	0.61	6.846
802.11ax HE40 SU, MCS0	0.771	0.795	0.970	96.98%	0.13	1.297
802.11ax HE40 SU, MCS11	0.101	0.123	0.825	82.47%	0.84	9.871
802.11ax HE80 SU, MCS0	0.400	0.422	0.947	94.70%	0.24	2.501
802.11ax HE80 SU, MCS11	0.099	0.121	0.820	81.97%	0.86	10.087
802.11ax HE160 SU, MCS0	0.232	0.252	0.919	91.95%	0.36	4.314
802.11ax HE160 SU, MCS11	0.069	0.089	0.770	77.00%	1.13	14.547

**DUTY CYCLE PLOTS**



Note: There are same duty cycle factor on 1TX and 2TX

## 9.2. 26 dB AND 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

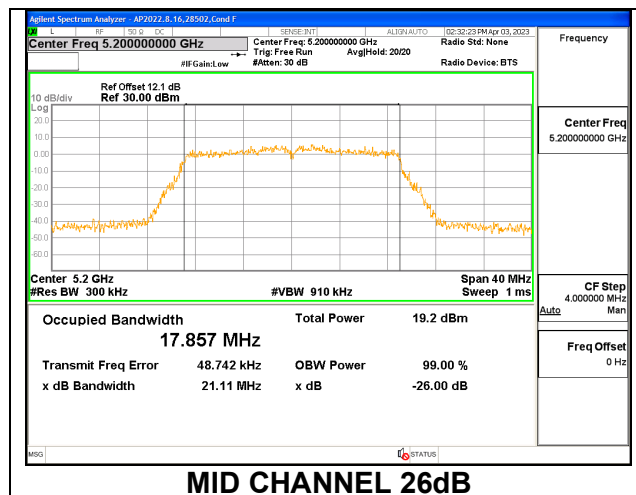
### RESULTS

<b>ID:</b>	32543	<b>Date:</b>	7/20/2023
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### 9.2.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

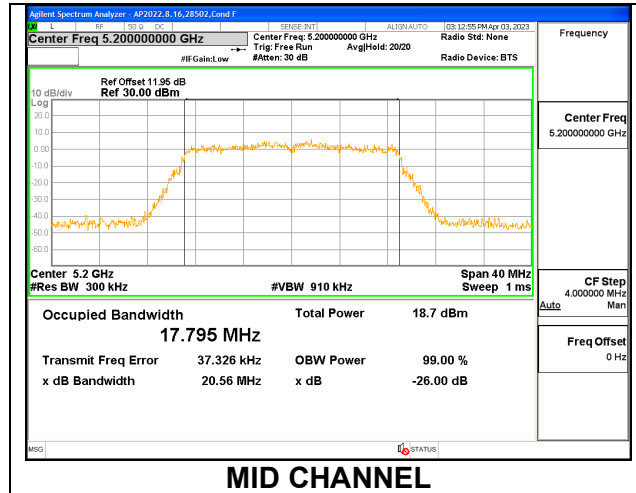
#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.47	17.7870
Mid	5200	21.11	17.8570
High	5240	20.99	17.8110



**1TX Antenna 5 MODE**

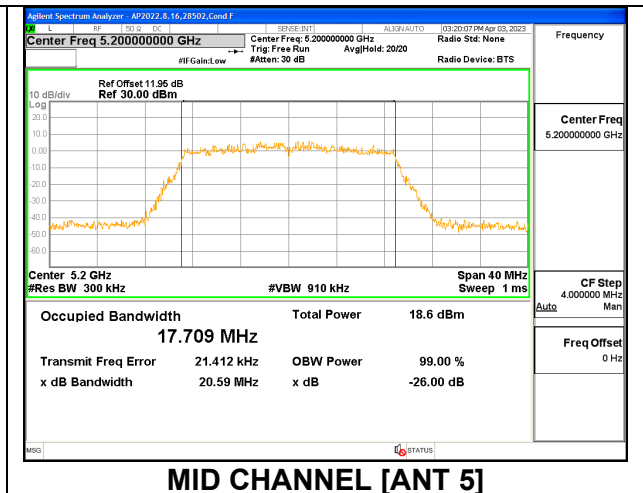
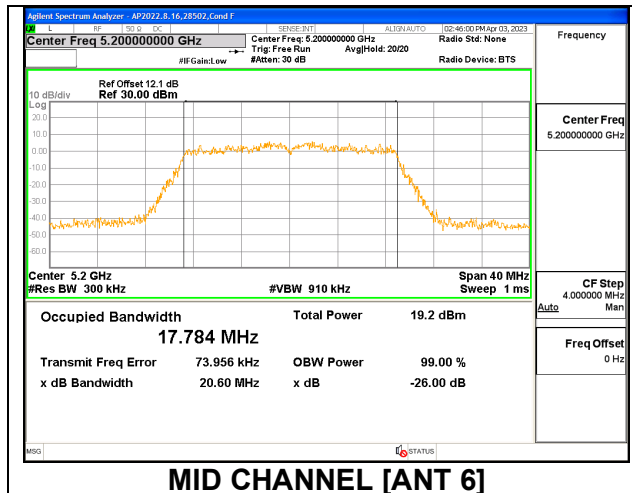
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.09	17.8230
Mid	5200	20.56	17.7950
High	5240	20.33	17.7650



**MID CHANNEL**

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

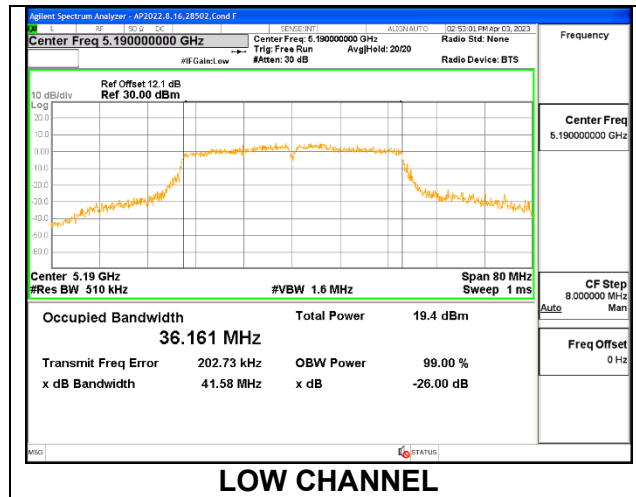
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	21.06	21.00	17.8020	17.7940
Mid	5200	20.60	20.59	17.7840	17.7090
High	5240	20.92	20.79	17.7310	17.7450



### 9.2.2. 802.11n HT40 MODE IN THE 5.2 GHz BAND

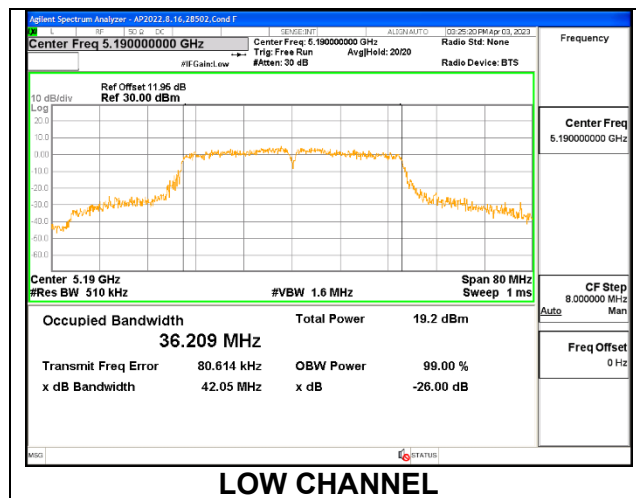
#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	41.58	36.1610
High	5230	40.71	36.1090



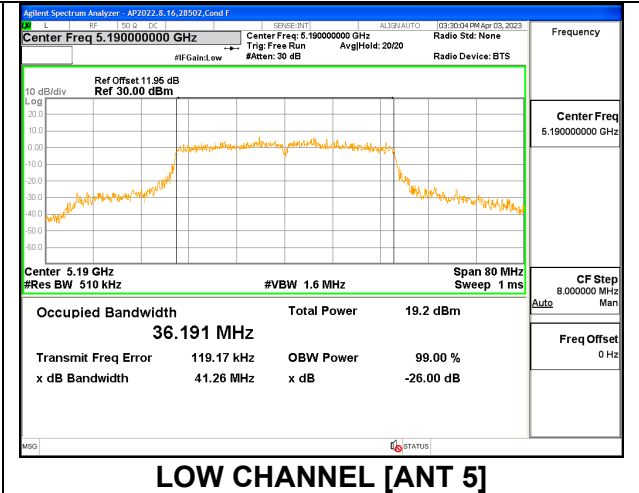
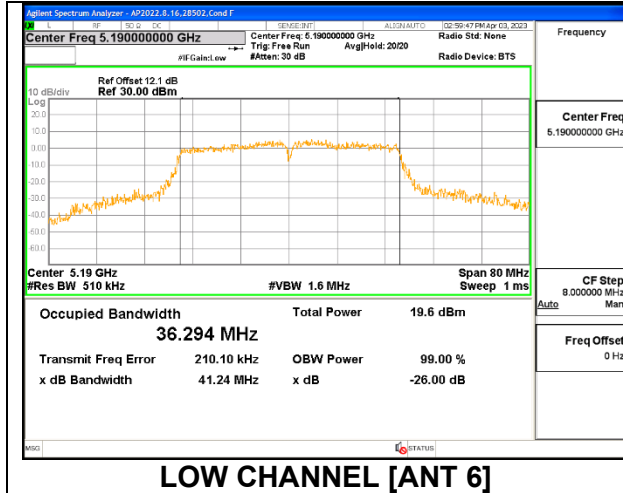
#### 1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	42.05	36.2090
High	5230	40.49	36.2420



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

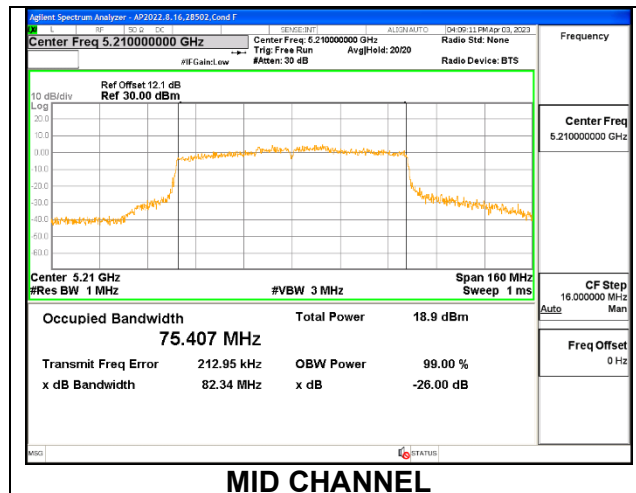
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	41.24	41.26	36.2940	36.1910
High	5230	40.52	40.27	36.2070	36.2170



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

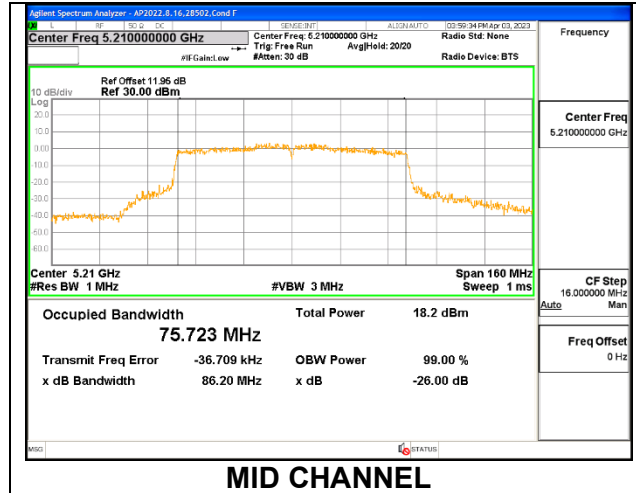
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	82.34	75.4070



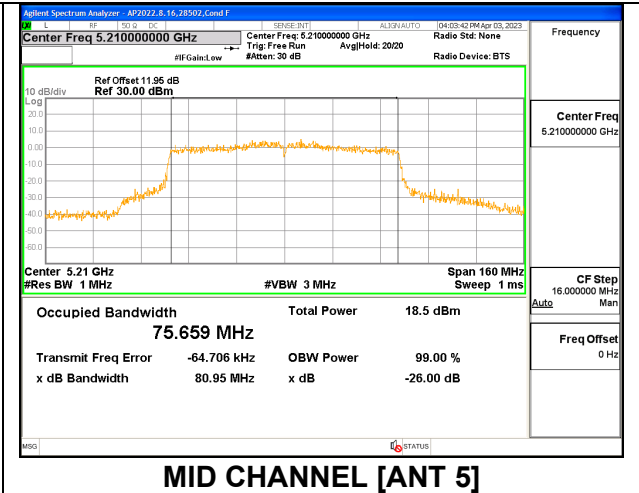
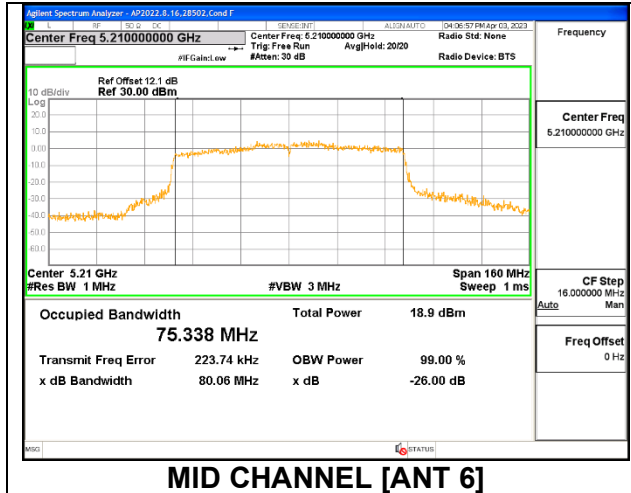
**1TX Antenna 5 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	86.20	75.7230



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

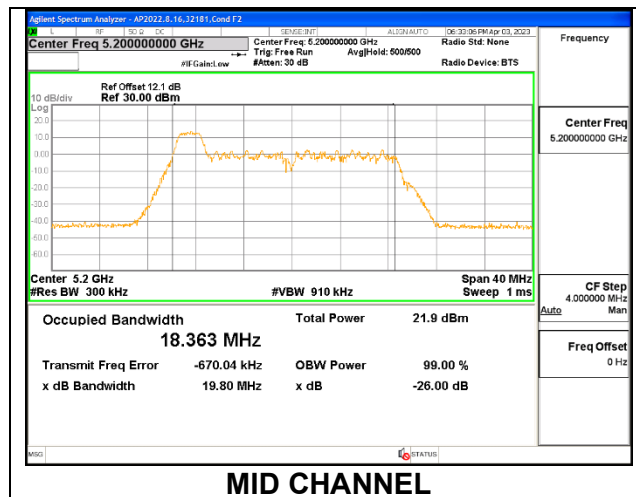
Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	80.06	80.95	75.3380	75.6590



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

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

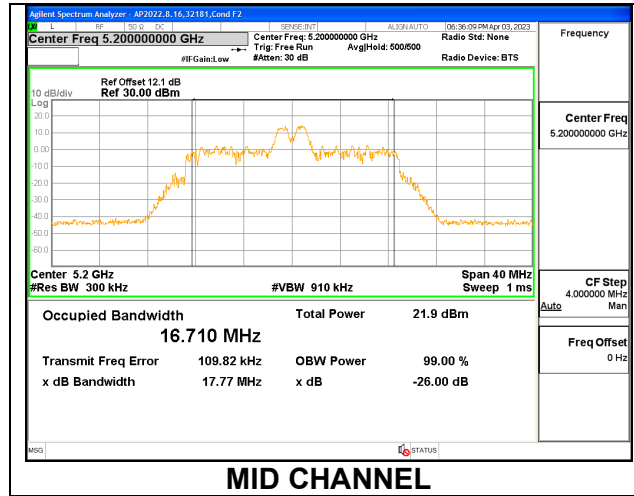
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.64	18.3070
Mid	5200	19.80	18.3630
High	5240	19.83	18.2030





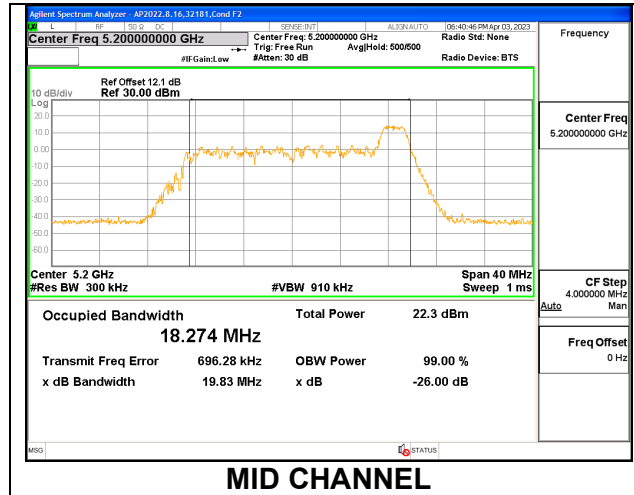
**1TX Antenna 6 MODE: 26 Tones, RU Index 4**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	18.12	16.6760
Mid	5200	17.77	16.7100
High	5240	18.38	16.9840



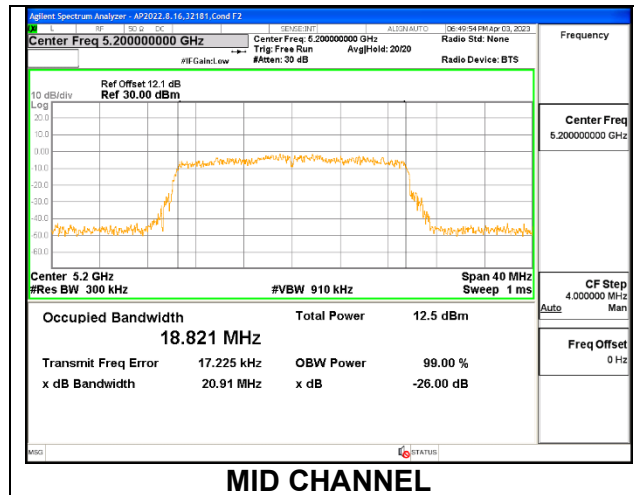
**1TX Antenna 6 MODE: 26 Tones, RU Index 8**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.81	18.4080
Mid	5200	19.83	18.2740
High	5240	19.83	18.4020



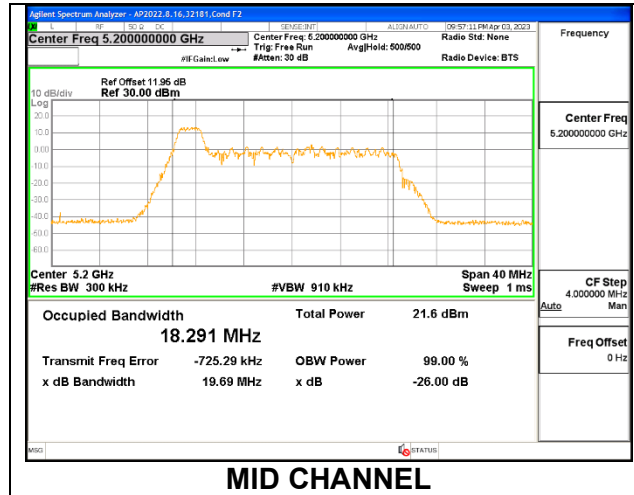
**1TX Antenna 6 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.82	18.8870
Mid	5200	20.91	18.8210
High	5240	21.06	18.9260



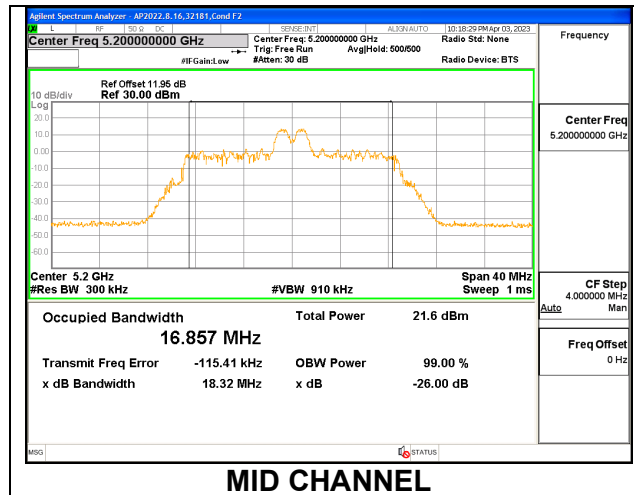
**1TX Antenna 5 MODE: 26 Tones, RU Index 0**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.75	18.1970
Mid	5200	19.69	18.2910
High	5240	19.70	18.2920



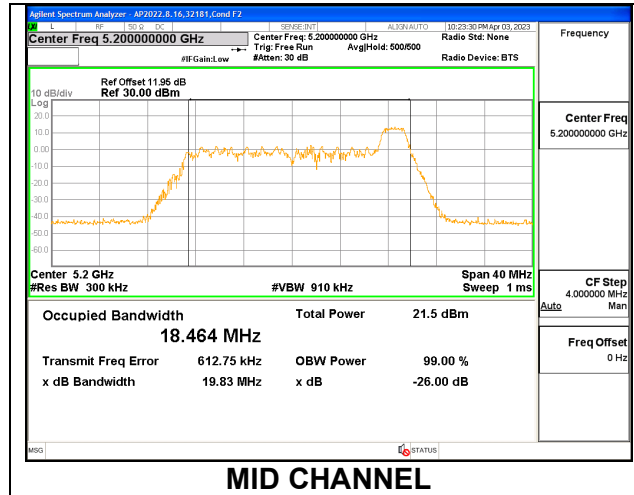
**1TX Antenna 5 MODE: 26 Tones, RU Index 4**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	17.79	16.4370
Mid	5200	18.32	16.8570
High	5240	18.36	16.8490



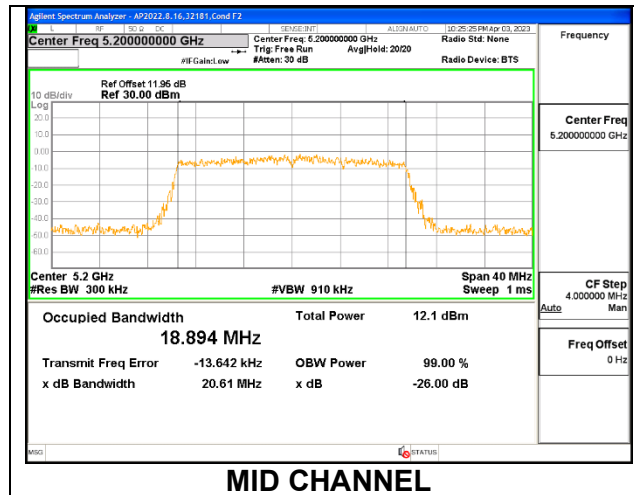
**1TX Antenna 5 MODE: 26 Tones, RU Index 8**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.04	18.4370
Mid	5200	19.83	18.4640
High	5240	19.82	18.3450



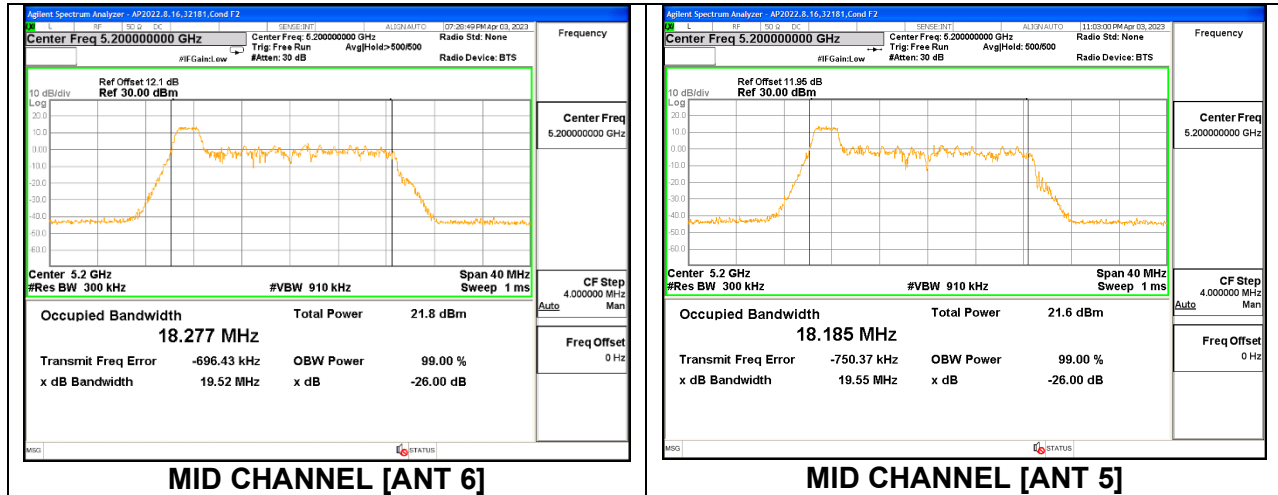
**1TX Antenna 5 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.35	18.9740
Mid	5200	20.61	18.8940
High	5240	20.81	18.8620



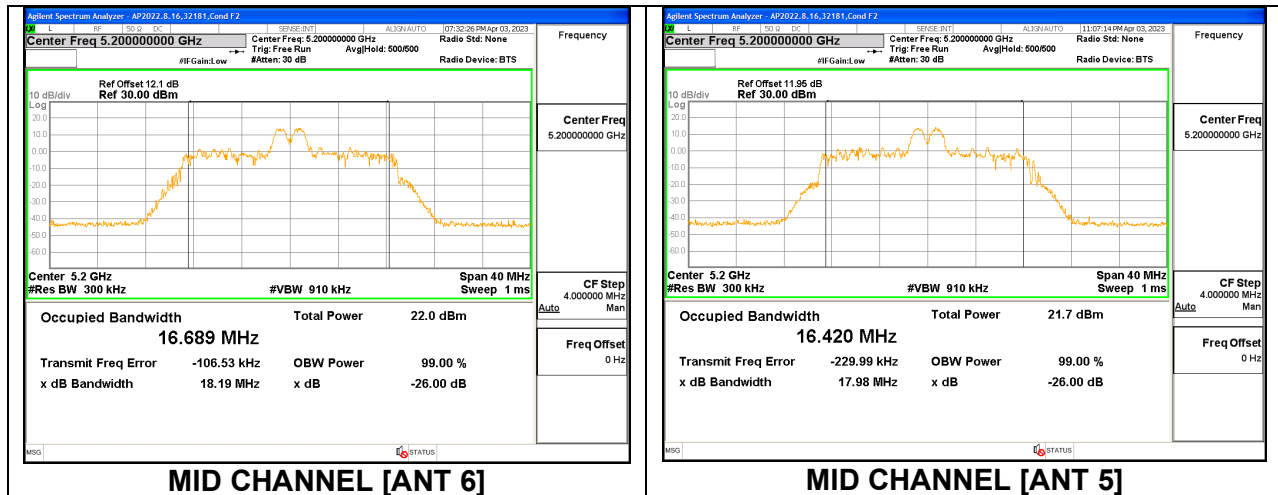
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0**

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	19.80	19.56	18.2710	18.1510
Mid	5200	19.52	19.55	18.2770	18.1850
High	5240	19.62	19.58	18.2510	18.1120



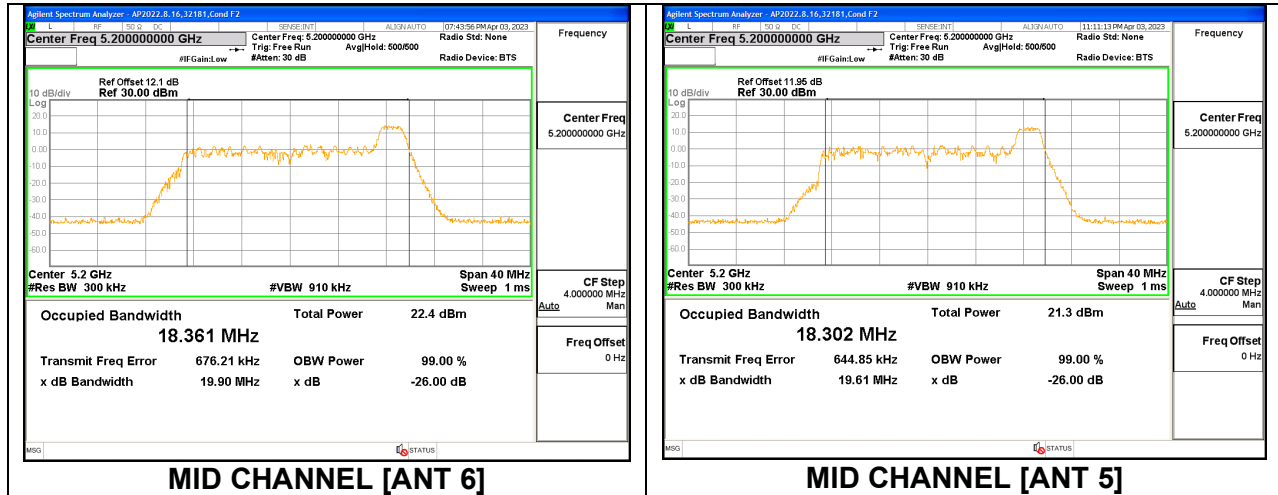
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 4**

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	18.39	18.16	16.7150	16.6900
Mid	5200	18.19	17.98	16.6890	16.4200
High	5240	18.22	17.73	16.5390	16.4250



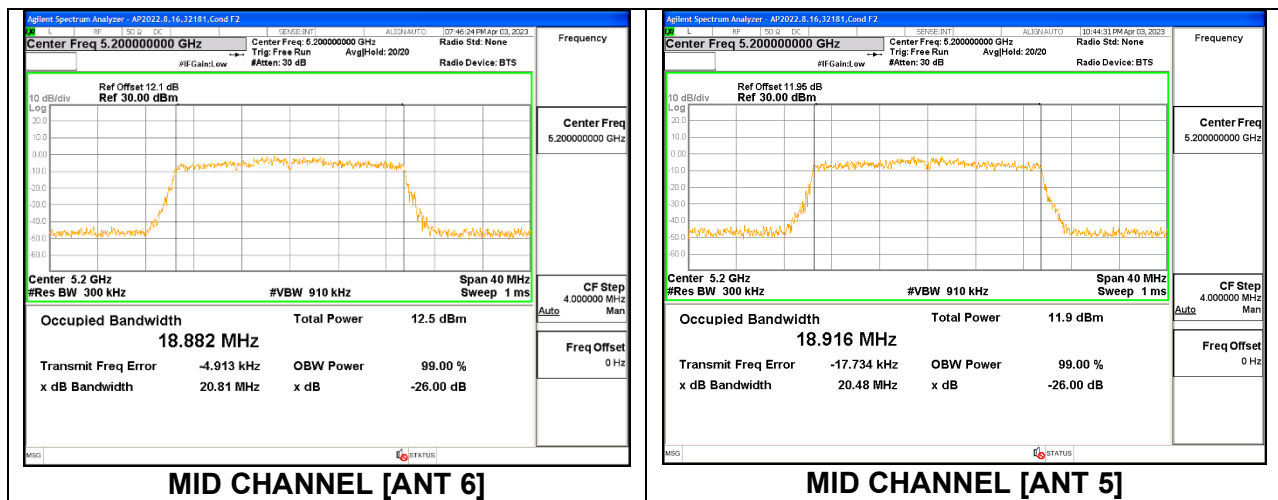
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 8**

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	19.82	19.67	18.1880	18.4360
Mid	5200	19.90	19.61	18.3610	18.3020
High	5240	20.11	19.61	18.3890	18.0050



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

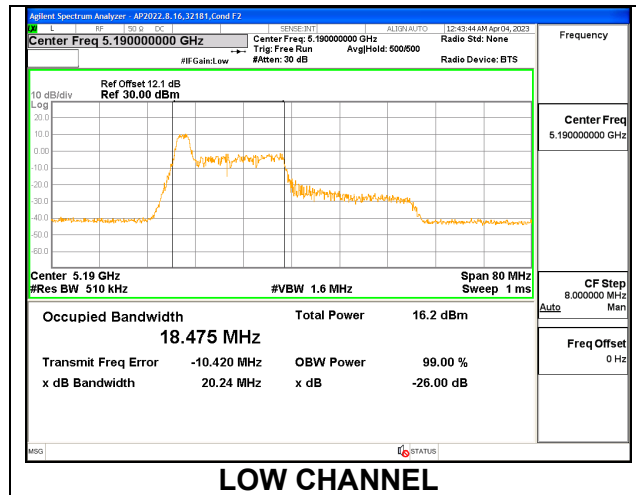
Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	21.66	20.89	18.9290	18.8900
Mid	5200	20.81	20.48	18.8820	18.9160
High	5240	20.65	20.89	18.8580	18.8620



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

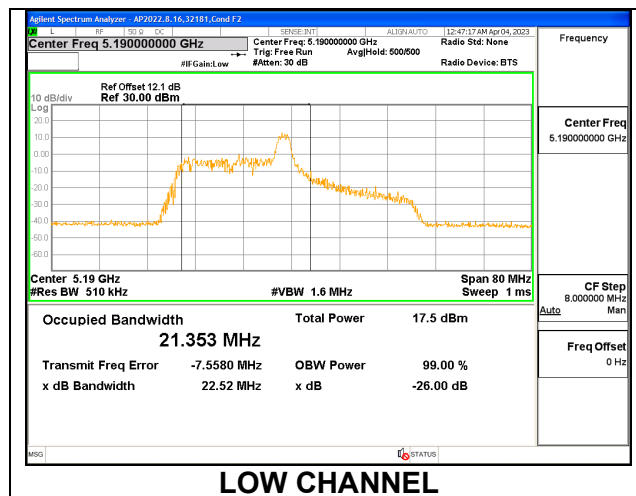
#### 1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.24	18.4750
High	5230	19.99	18.4400



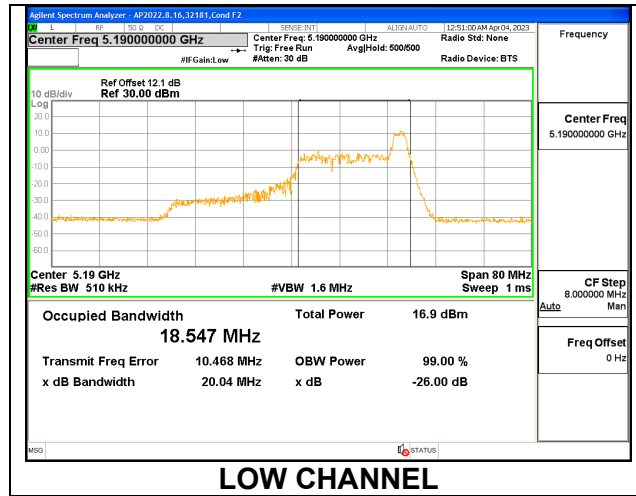
#### 1TX Antenna 6 MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	22.52	21.3530
High	5230	24.37	21.6360



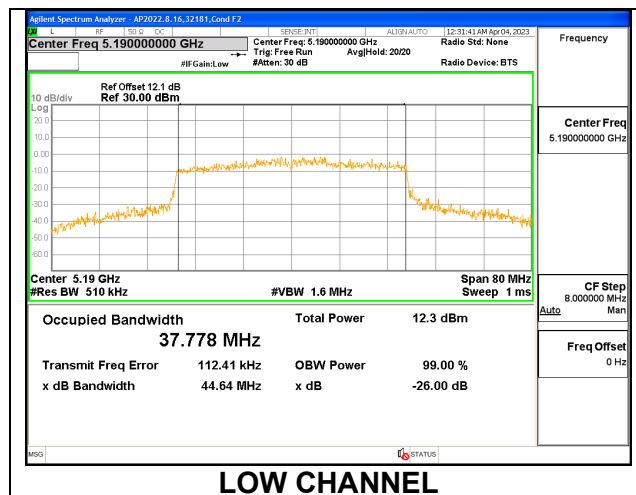
**1TX Antenna 6 MODE: 26 Tones, RU Index 17**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	20.04	18.5470
High	5230	20.83	18.5600



**1TX Antenna 6 MODE: SU Mode**

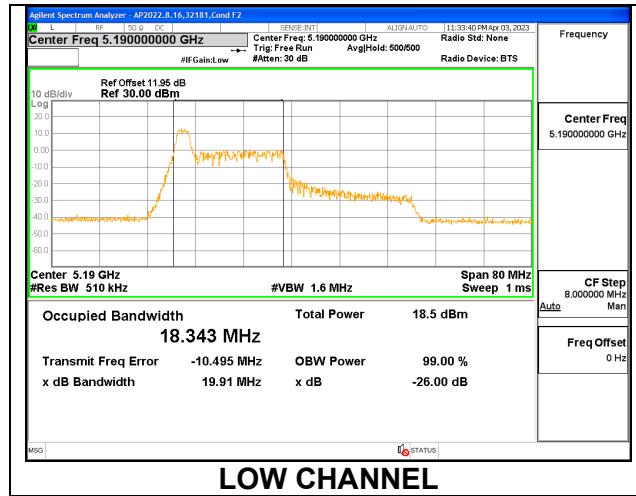
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	44.64	37.7780
High	5230	40.07	37.7700





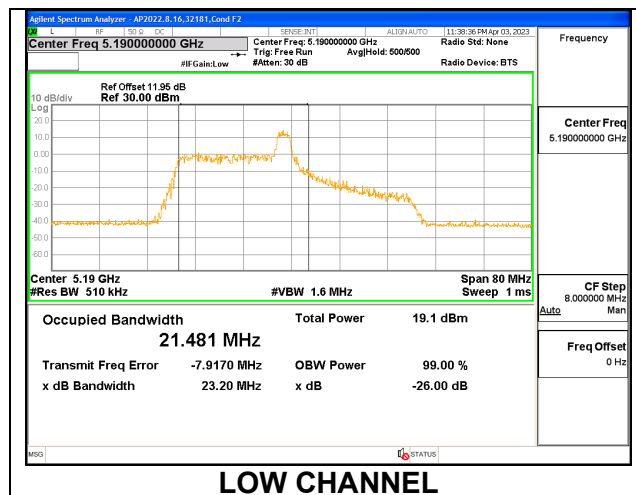
**1TX Antenna 5 MODE: 26 Tones, RU Index 0**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	19.91	18.3430
High	5230	20.29	18.3780



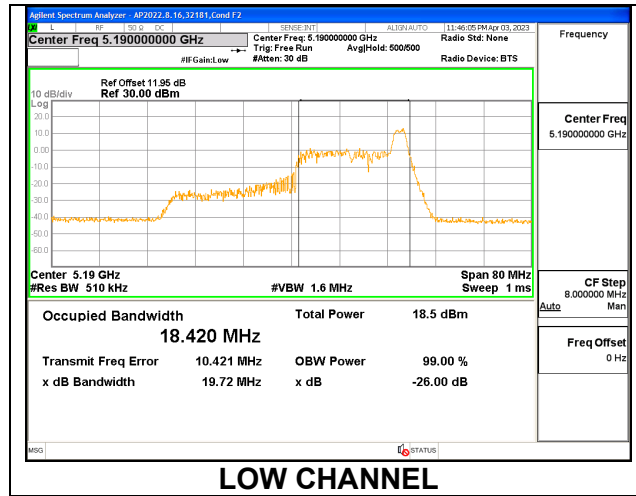
**1TX Antenna 5 MODE: 26 Tones, RU Index 8**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	23.20	21.4810
High	5230	23.24	21.2370



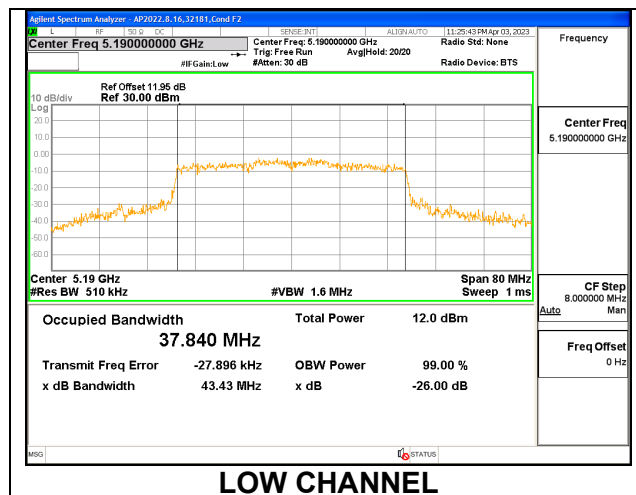
**1TX Antenna 6 MODE: 26 Tones, RU Index 17**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	19.72	18.4200
High	5230	19.72	18.4200



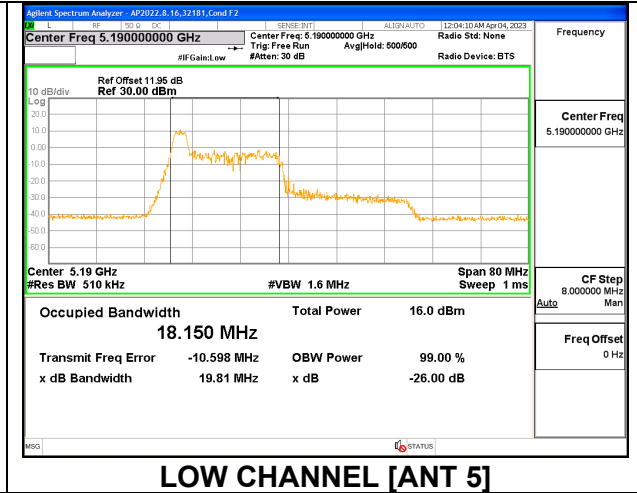
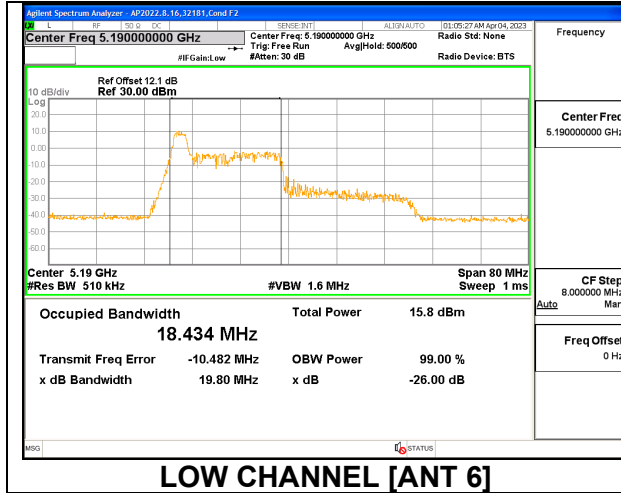
**1TX Antenna 6 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	43.43	37.8400
High	5230	40.42	37.6940



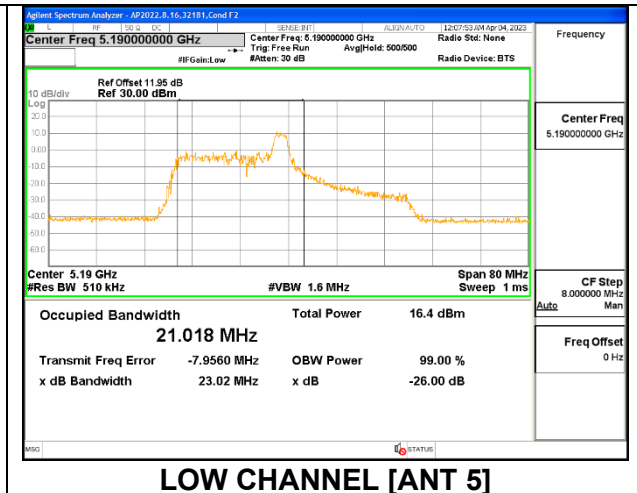
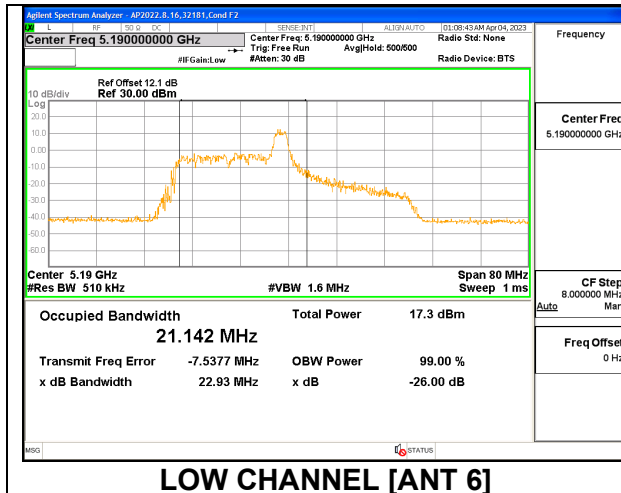
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0**

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	19.80	19.81	18.4340	18.1500
High	5230	20.05	19.87	18.4500	18.2920



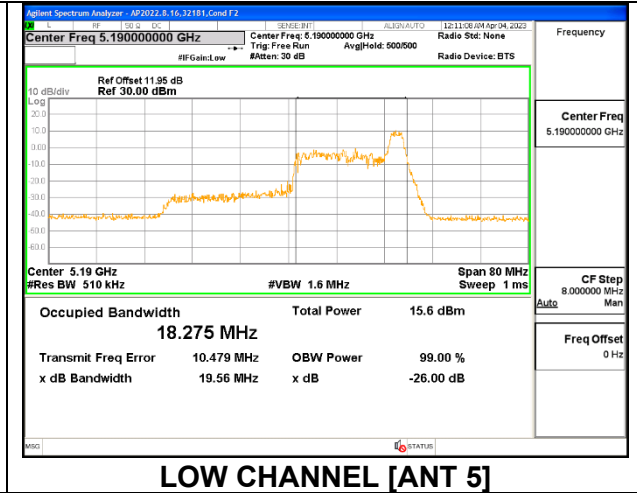
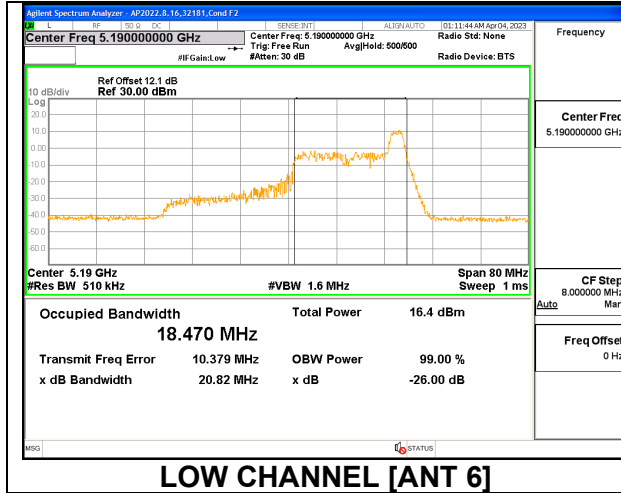
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 8**

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	22.93	23.02	21.1420	21.0180
High	5230	22.82	22.84	21.4360	21.0260



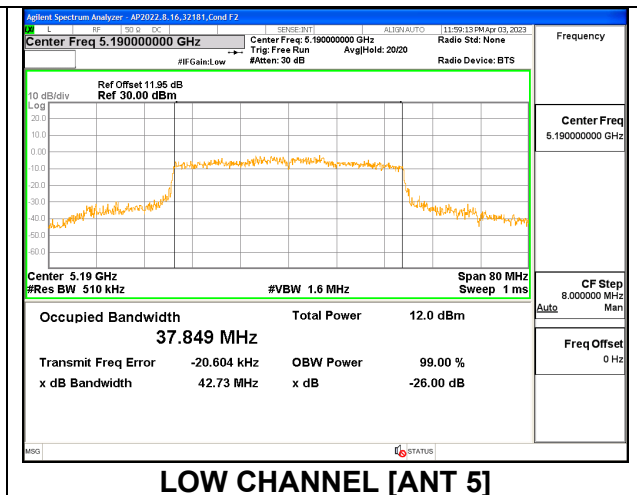
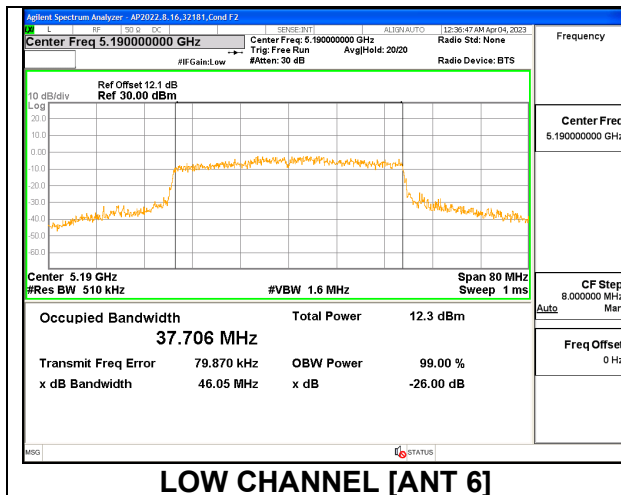
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 17**

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	20.82	19.56	18.4700	18.2750
High	5230	20.57	20.19	18.6460	18.3340



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

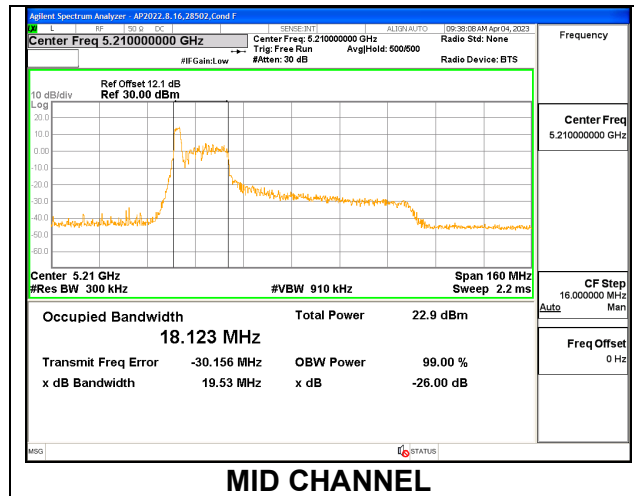
Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	46.05	42.73	37.7060	37.8490
High	5230	40.72	40.50	37.7110	37.6930



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

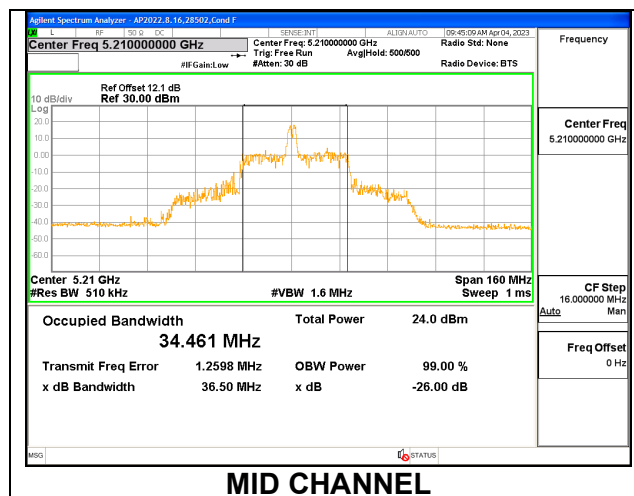
#### 1TX Antenna 6 MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.53	18.1230



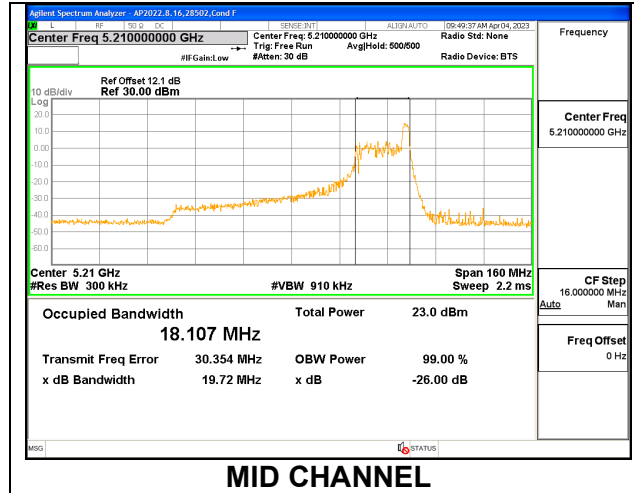
#### 1TX Antenna 6 MODE: 26 Tones, RU Index 18

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	36.50	34.4610



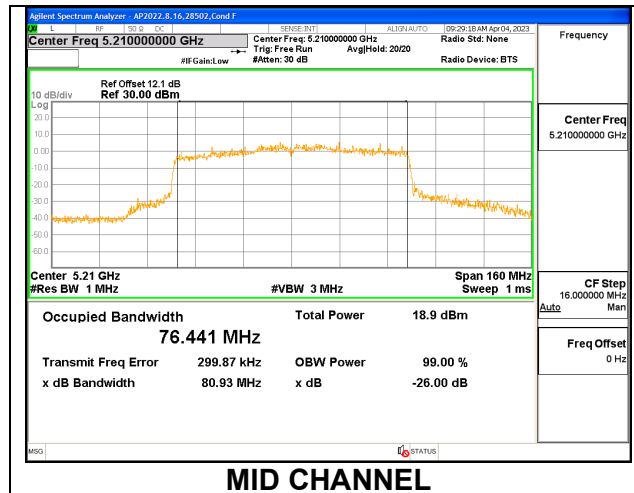
**1TX Antenna 6 MODE: 26 Tones, RU Index 36**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	19.72	18.1070



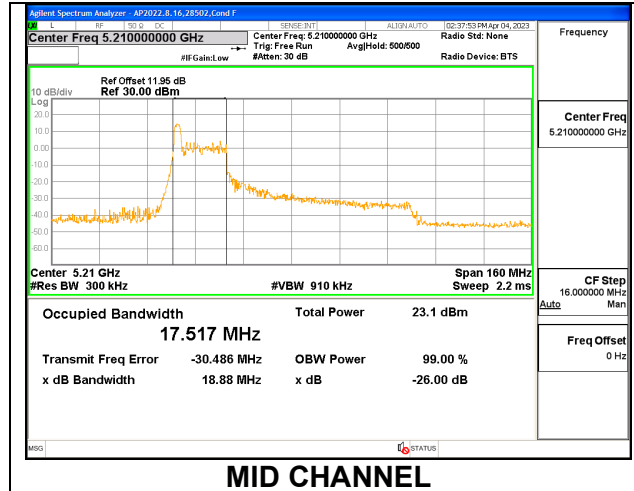
**1TX Antenna 6 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	80.93	76.4410



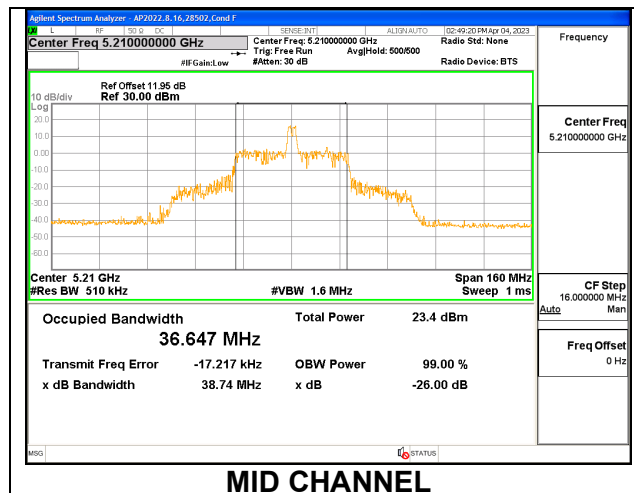
**1TX Antenna 5 MODE: 26 Tones, RU Index 0**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	18.88	17.5170



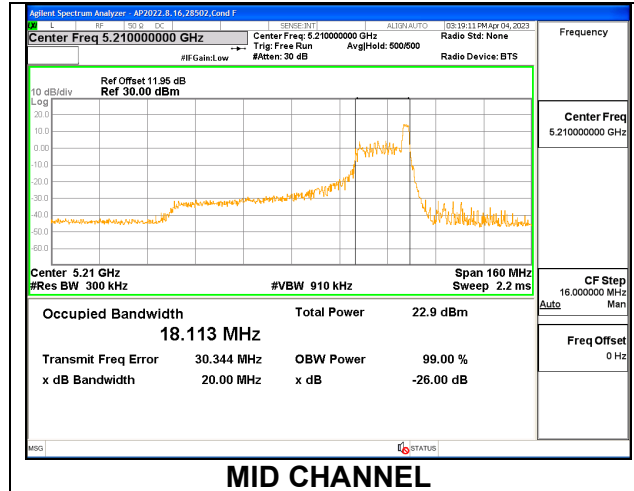
**1TX Antenna 5 MODE: 26 Tones, RU Index 18**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	38.74	36.6470



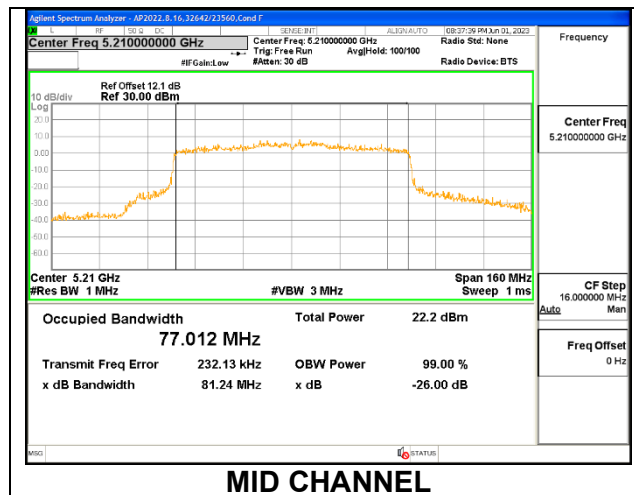
**1TX Antenna 5 MODE: 26 Tones, RU Index 36**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	20.00	18.1130



**1TX Antenna 5 MODE: SU Mode**

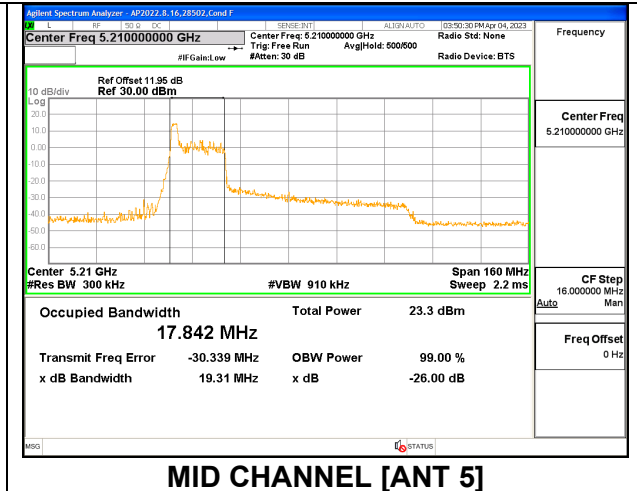
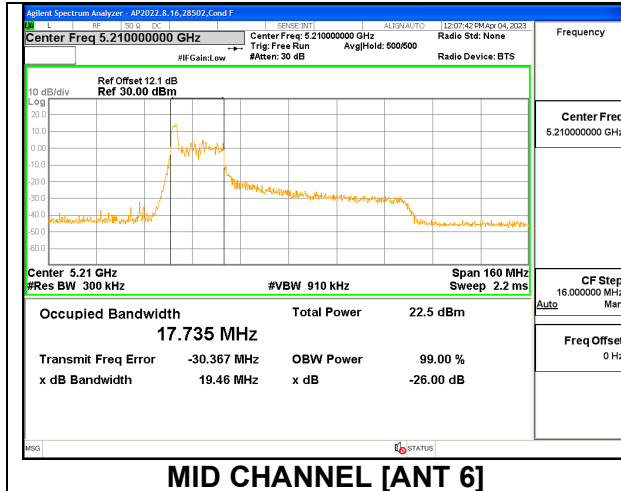
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5210	81.24	77.0120





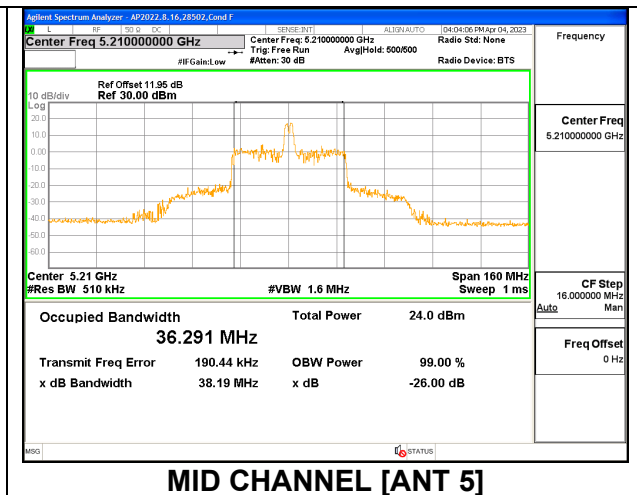
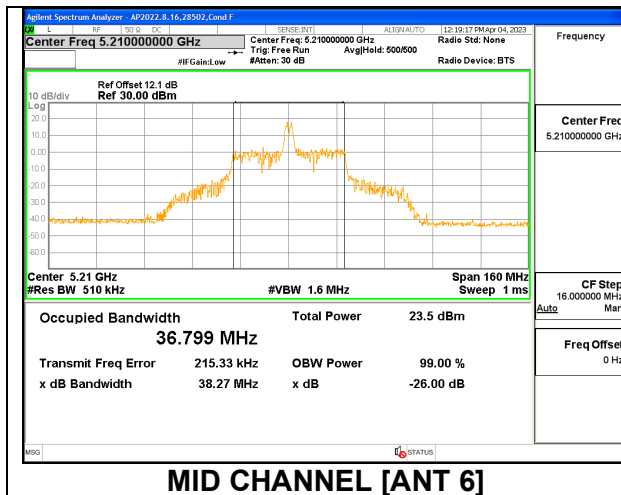
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 0**

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	19.46	19.31	17.7350	17.8420



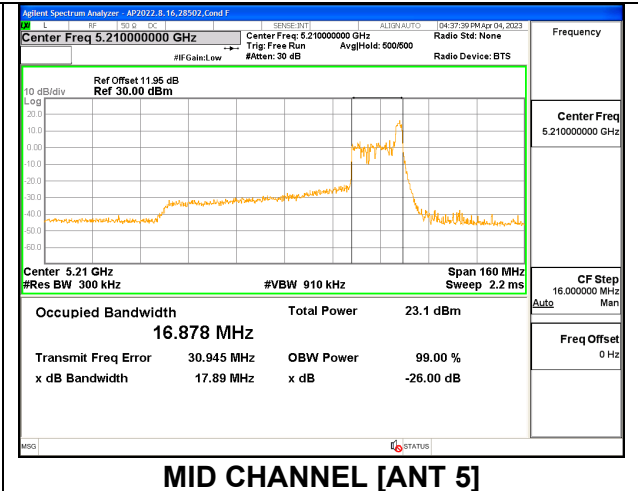
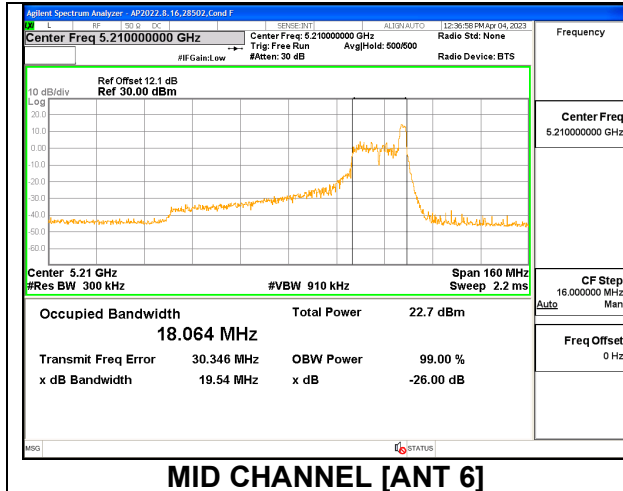
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 18**

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	38.27	38.19	36.7990	36.2910



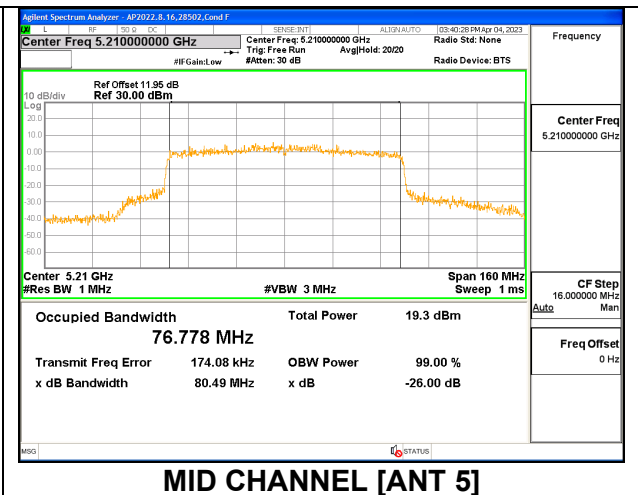
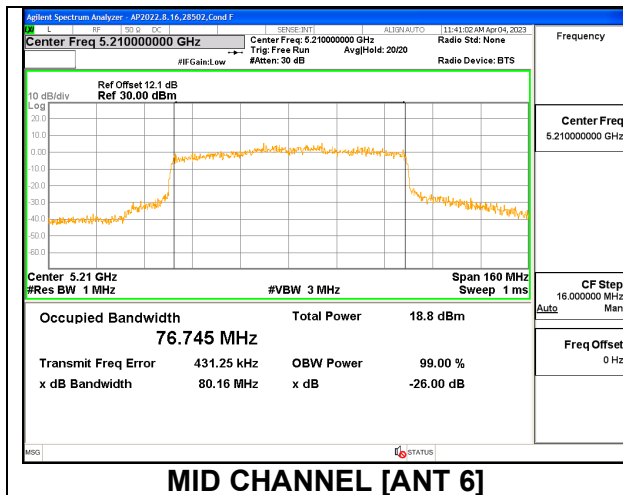
**2TX Antenna 6 + Antenna 5 CDD MODE: 26 Tones, RU Index 36**

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	19.54	17.89	18.0640	16.8780



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

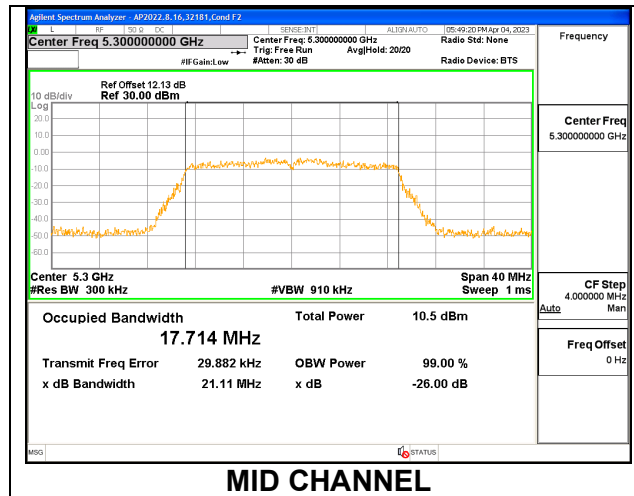
Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	80.16	80.49	76.7450	76.7780



### 9.2.7. 802.11n HT20 MODE IN THE 5.3 GHz BAND

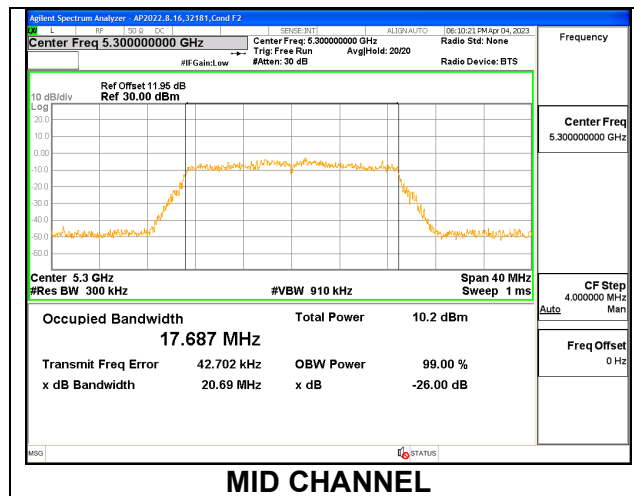
#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	21.06	17.8380
Mid	5300	21.11	17.7140
High	5320	21.50	17.7740



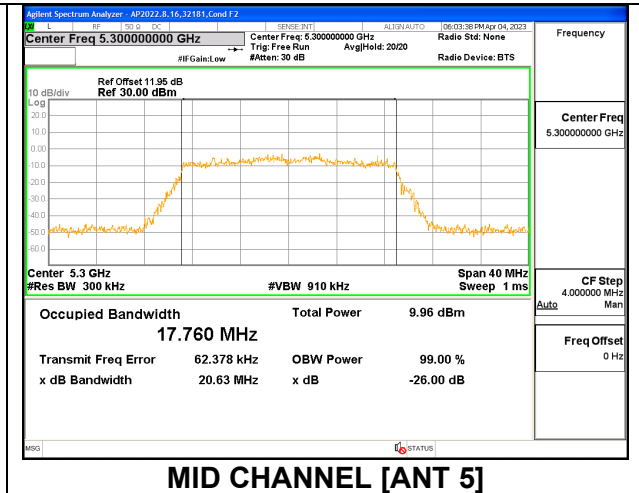
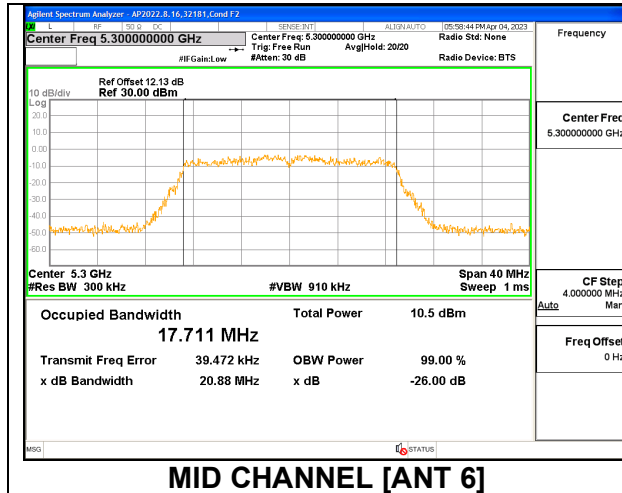
#### 1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.69	17.7260
Mid	5300	20.69	17.6870
High	5320	21.57	17.7940



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

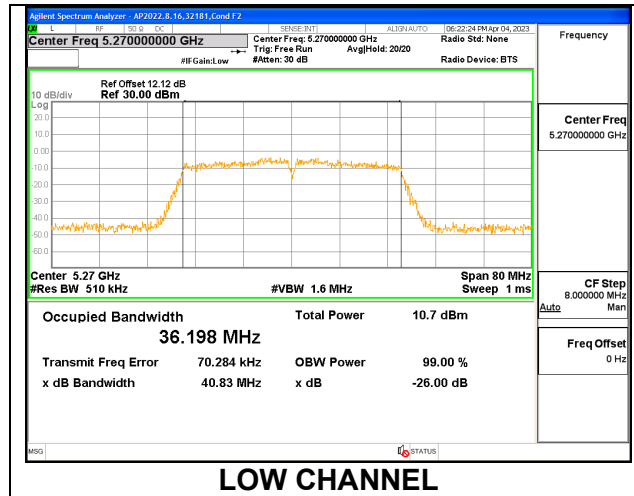
Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5260	20.77	20.53	17.7880	17.7050
Mid	5300	20.88	20.63	17.7110	17.7600
High	5320	21.34	20.98	17.8930	17.7810



### 9.2.8. 802.11n HT40 MODE IN THE 5.3 GHz BAND

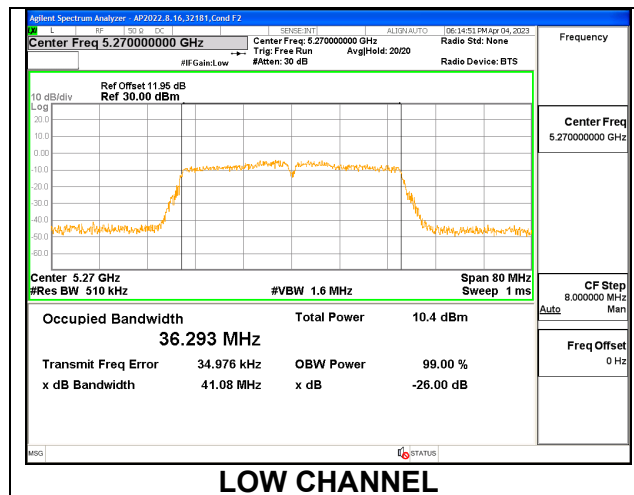
#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.83	36.1980
High	5310	41.05	36.3160



#### 1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	41.08	36.2930
High	5310	40.69	36.1910

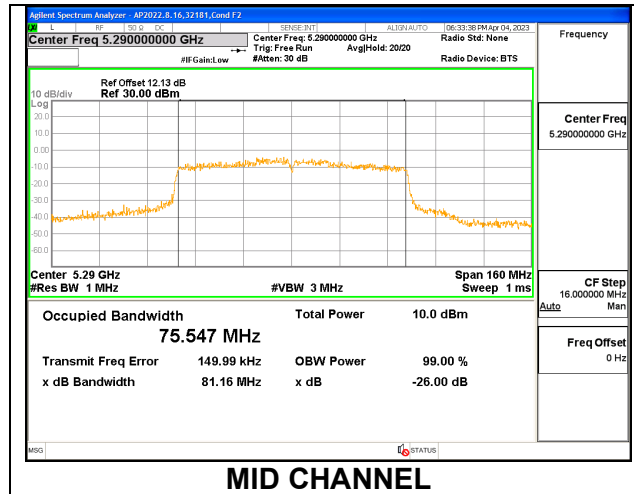




### 9.2.9. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

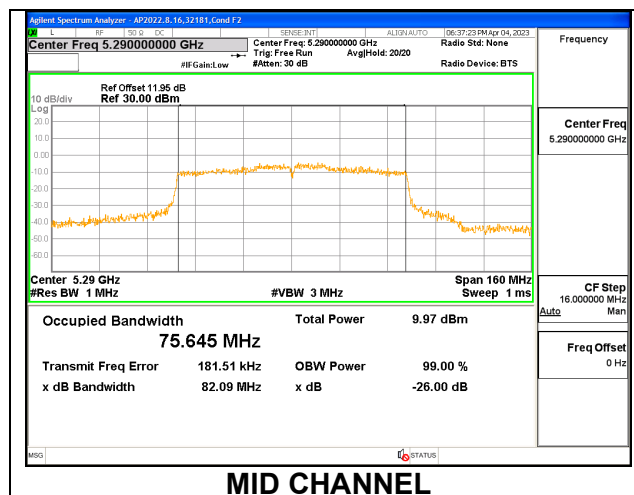
#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99& Bandwidth (MHz)
Mid	5290	81.16	75.5470



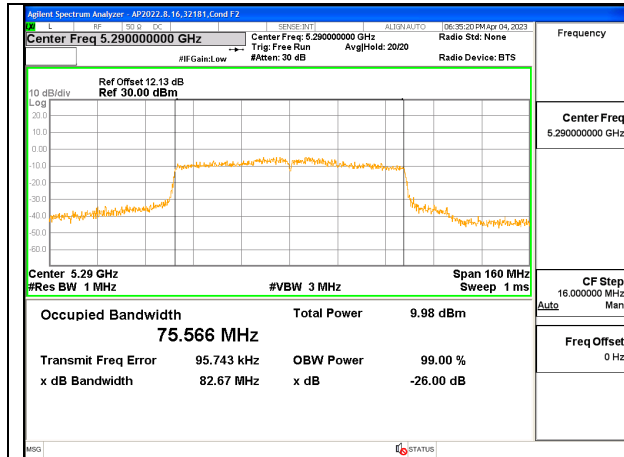
#### 1TX Antenna 5 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99& Bandwidth (MHz)
Mid	5290	82.09	75.6450

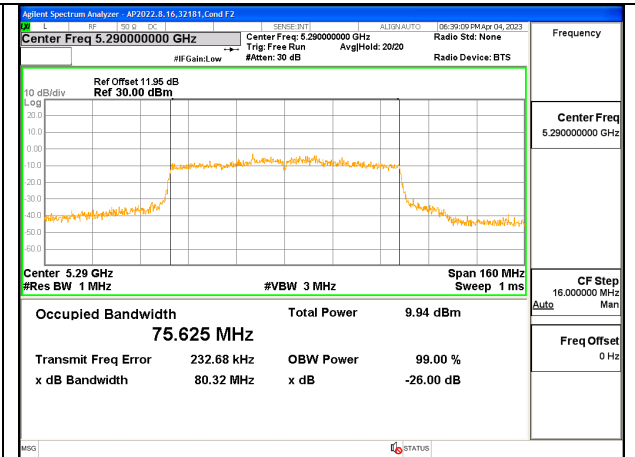


**2TX Antenna 6 + Antenna 5 CDD MODE**

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	82.67	80.32	75.5660	75.6250



**MID CHANNEL [ANT 6]**



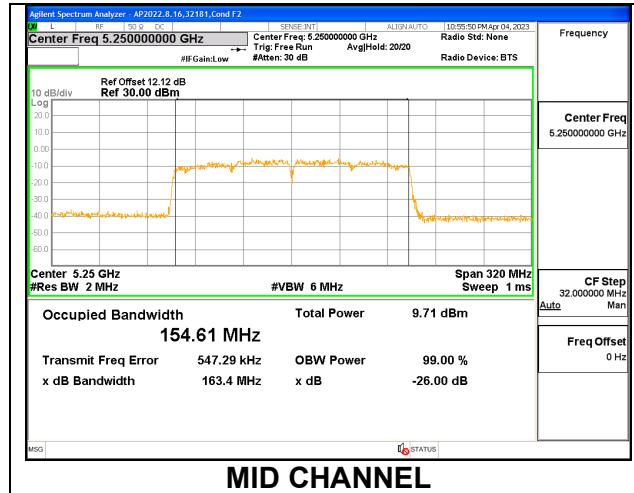
**MID CHANNEL [ANT 5]**



**9.2.10. 802.11ac VHT160 MODE IN THE 5.3 GHz BAND**

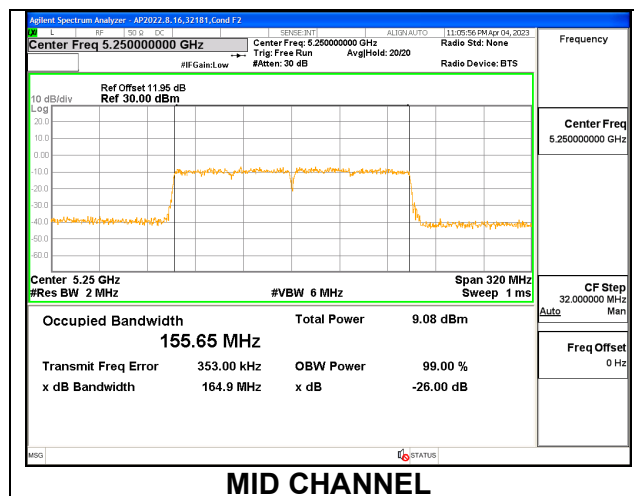
**1TX Antenna 6 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99& Bandwidth (MHz)
Mid	5250	163.40	154.6100



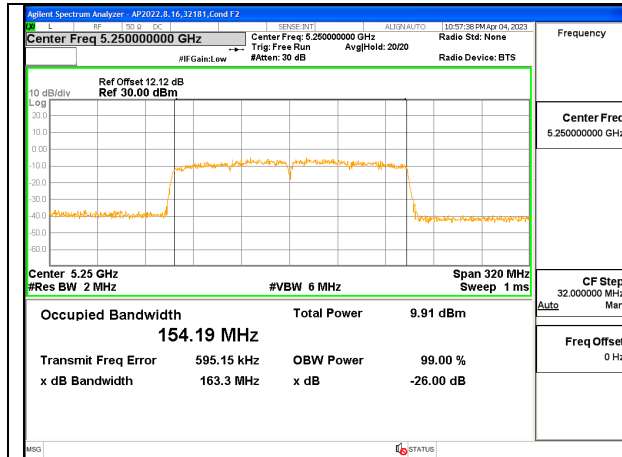
**1TX Antenna 5 MODE**

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99& Bandwidth (MHz)
Mid	5250	164.90	155.6500

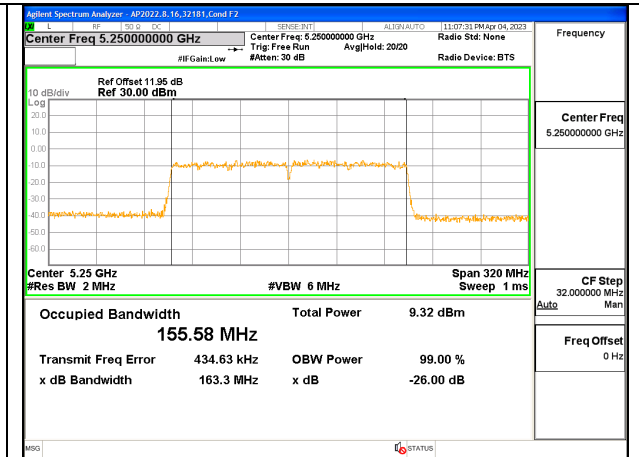


**2TX Antenna 6 + Antenna 5 CDD MODE**

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5250	163.30	163.30	154.1900	155.5800



**MID CHANNEL [ANT 6]**

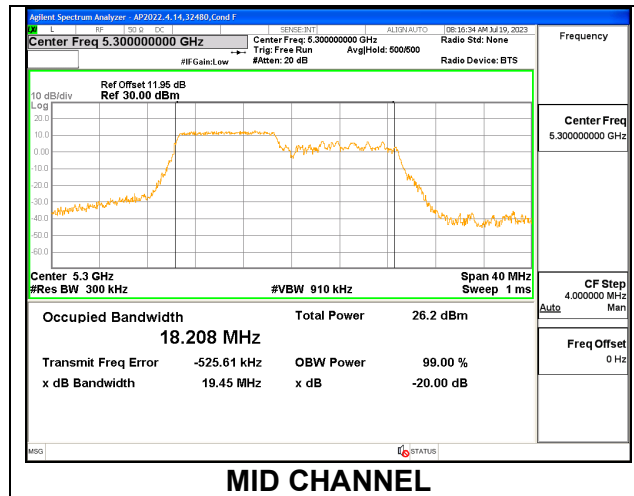


**MID CHANNEL [ANT 5]**

**9.2.11. 802.11ax HE20 MODE IN THE 5.3 GHz BAND**

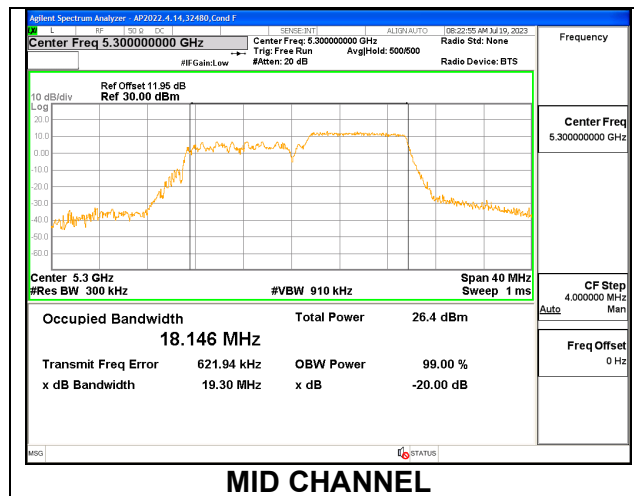
**1TX Antenna 6 MODE: 106 Tones, RU Index 53**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.37	18.140
Mid	5300	19.45	18.208
High	5320	19.56	18.197



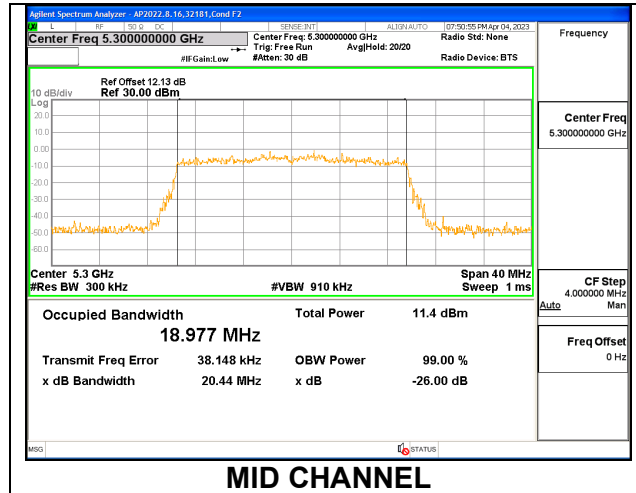
**1TX Antenna 6 MODE: 106 Tones, RU Index 54**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.52	18.227
Mid	5300	19.30	18.146
High	5320	19.45	18.252



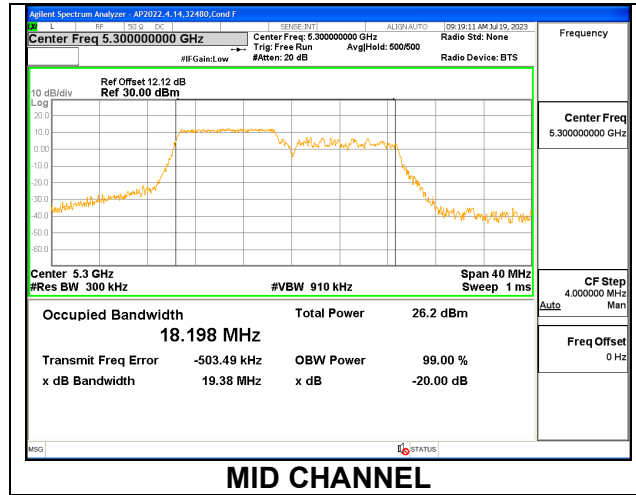
**1TX Antenna 6 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.73	18.885
Mid	5300	20.44	18.977
High	5320	21.02	18.986



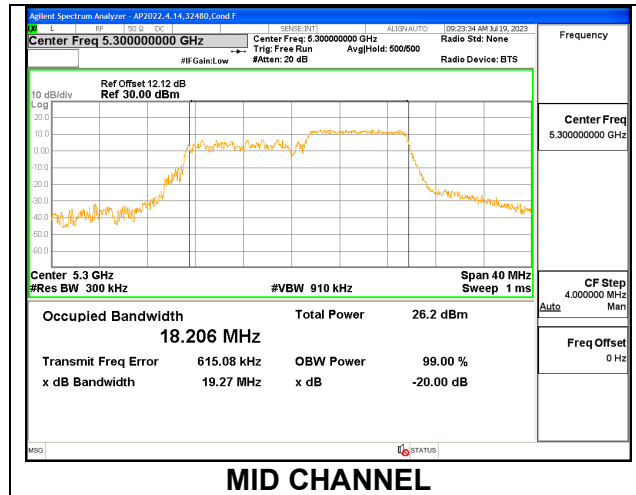
**1TX Antenna 5 MODE: 106 Tones, RU Index 53**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.32	18.169
Mid	5300	19.38	18.198
High	5320	19.33	18.190



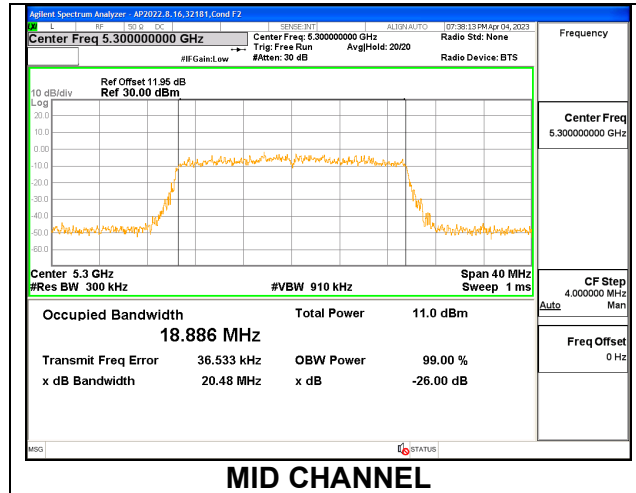
**1TX Antenna 5 MODE: 106 Tones, RU Index 54**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.32	18.198
Mid	5300	19.27	18.206
High	5320	19.25	18.227



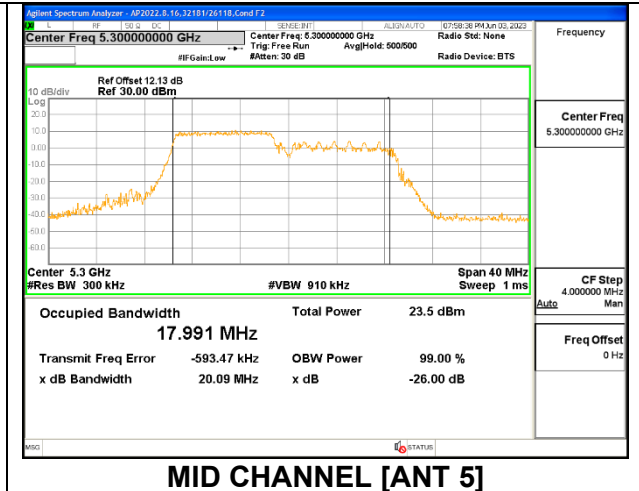
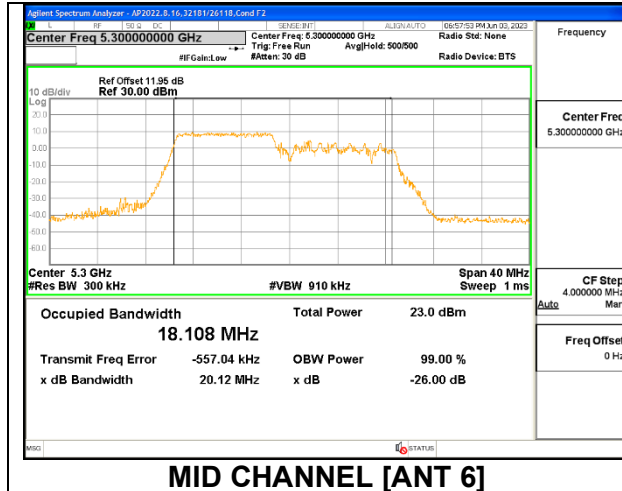
**1TX Antenna 5 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	20.28	18.907
Mid	5300	20.48	18.886
High	5320	20.48	18.931



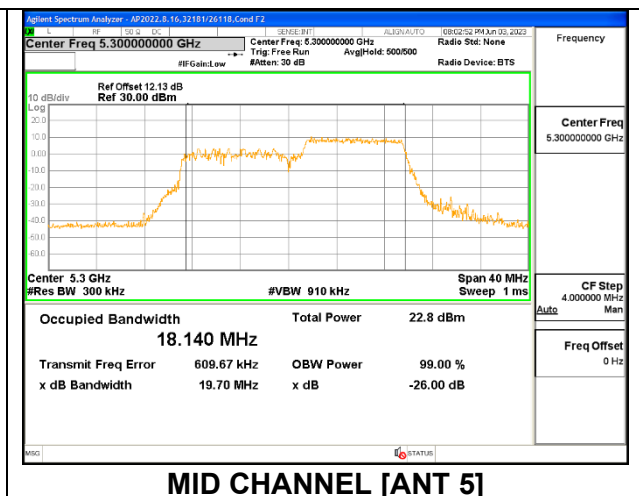
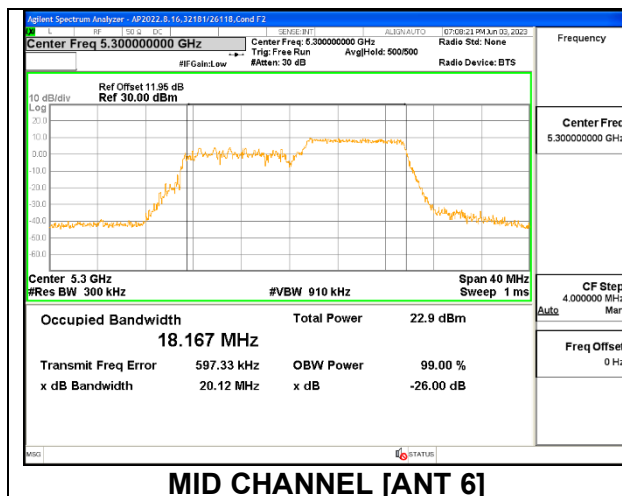
**2TX Antenna 6 + Antenna 5 CDD MODE: 103 Tones, RU Index 53**

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	20.20	20.03	18.1310	17.9570
Mid	5300	20.12	20.09	18.1080	17.9910
High	5320	20.20	20.25	18.0770	18.1130



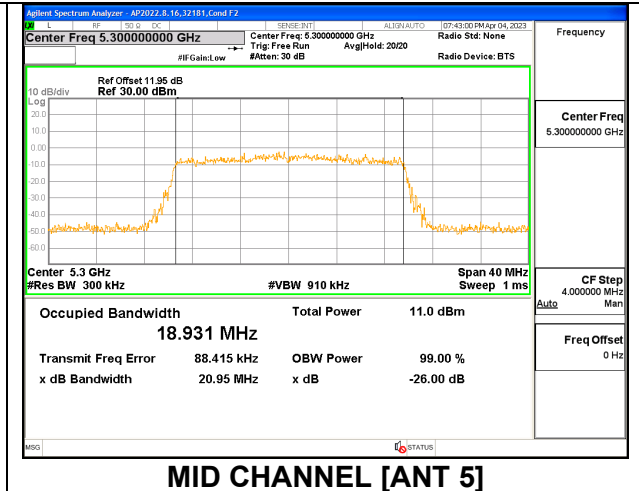
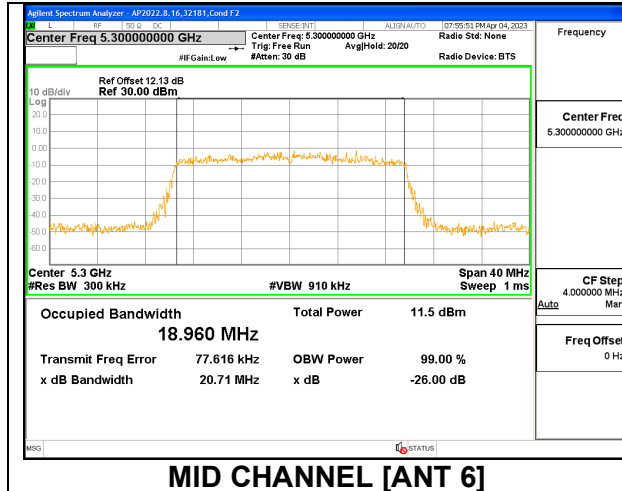
**2TX Antenna 6 + Antenna 5 CDD MODE: 106 Tones, RU Index 54**

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	20.58	19.85	18.2480	18.1820
Mid	5300	20.12	19.70	18.1670	18.1400
High	5320	21.00	19.71	18.1540	18.1410



**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	20.58	20.87	18.9820	18.9200
Mid	5300	20.71	20.95	18.9600	18.9310
High	5320	20.99	21.52	18.9380	18.9620

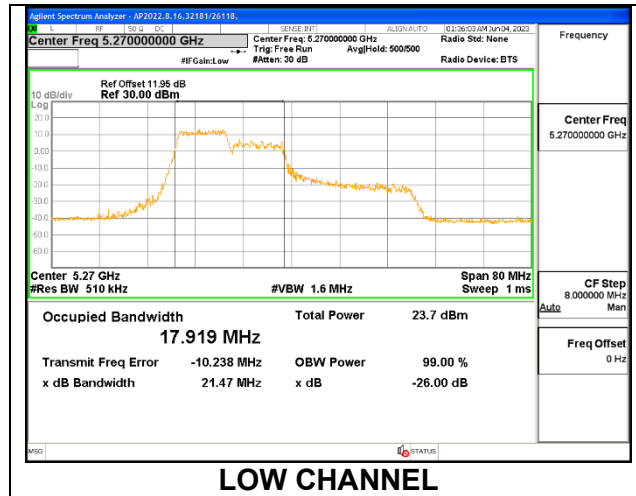




**9.2.12. 802.11ax HE40 MODE IN THE 5.3 GHz BAND**

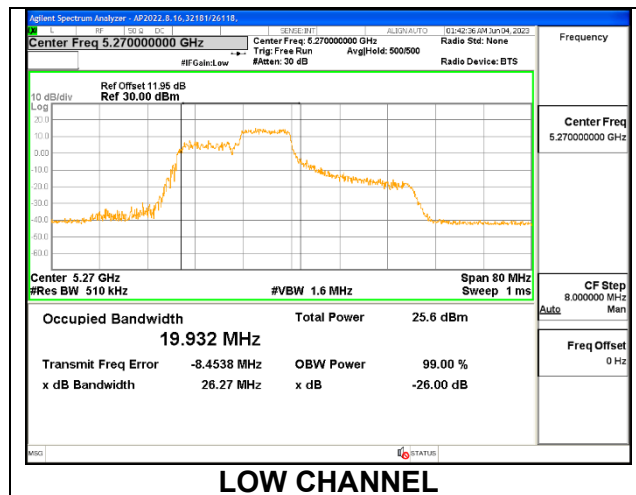
**1TX Antenna 6 MODE: 106 Tones, RU Index 53**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	21.47	17.9190
High	5310	21.27	17.9120



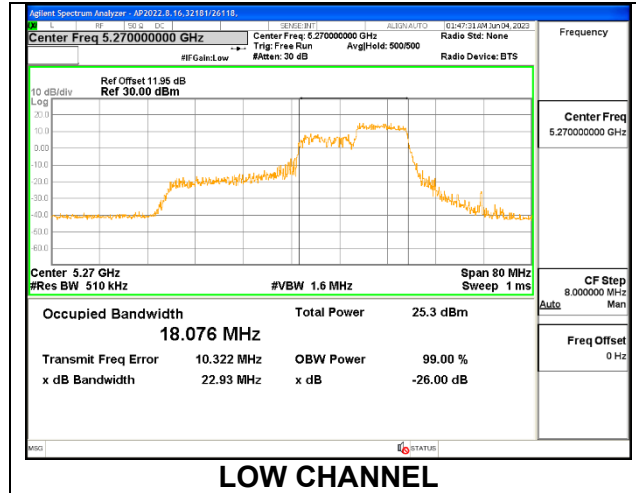
**1TX Antenna 6 MODE: 106 Tones, RU Index 54**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	26.27	19.9320
High	5310	25.95	19.5760



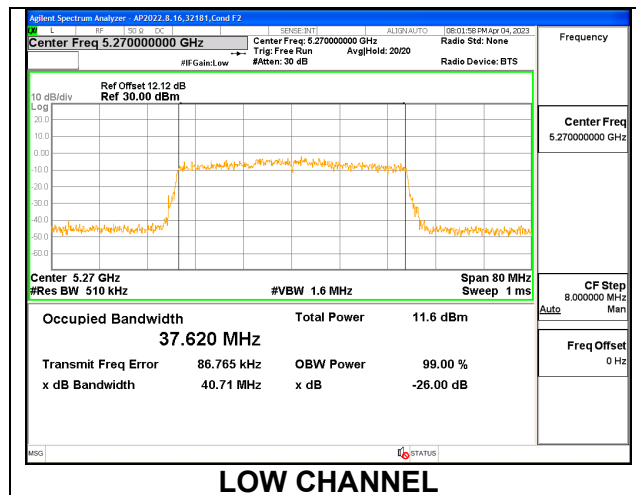
**1TX Antenna 6 MODE: 106 Tones, RU Index 56**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.93	18.0760
High	5310	22.58	18.0360



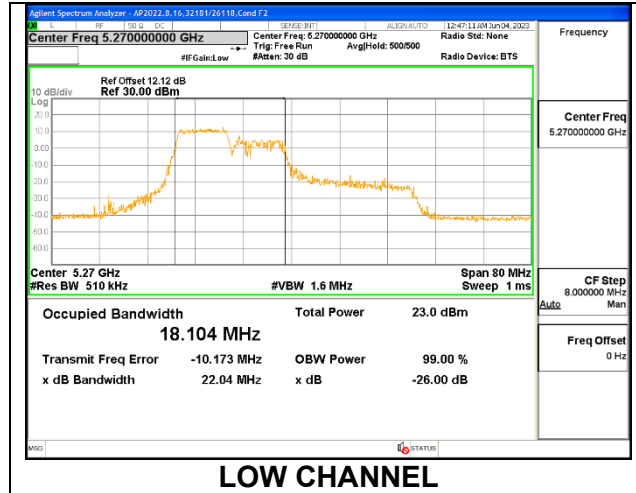
**1TX Antenna 6 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.71	37.6200
High	5310	40.13	37.8180



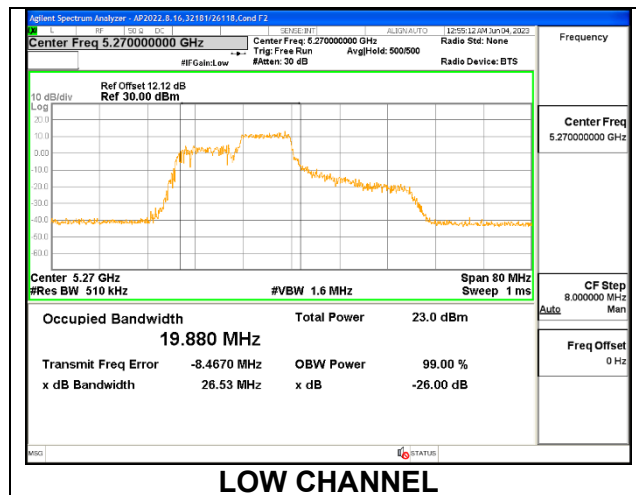
**1TX Antenna 5 MODE: 106 Tones, RU Index 53**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.04	18.1040
High	5310	21.43	18.0680



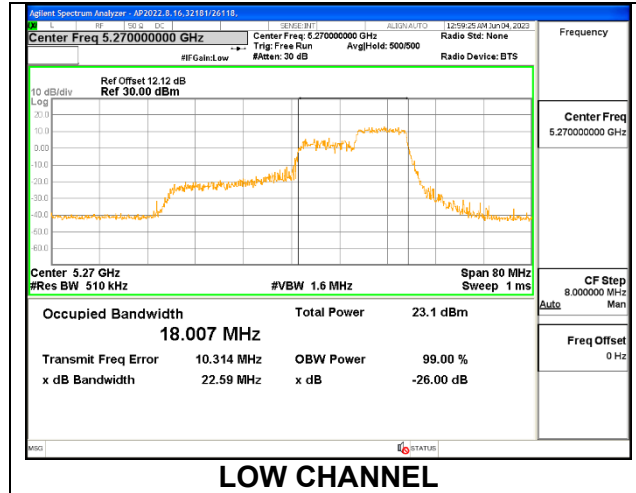
**1TX Antenna 5 MODE: 106 Tones, RU Index 54**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	26.53	19.8800
High	5310	28.51	19.9130



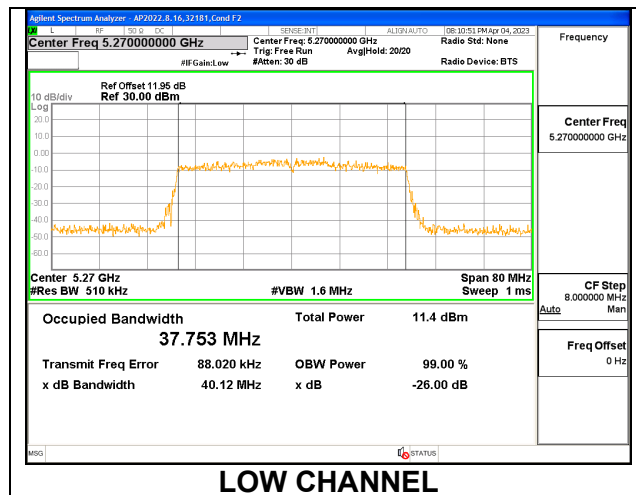
**1TX Antenna 5 MODE: 106 Tones, RU Index 56**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	22.59	18.0070
High	5310	22.45	18.3300



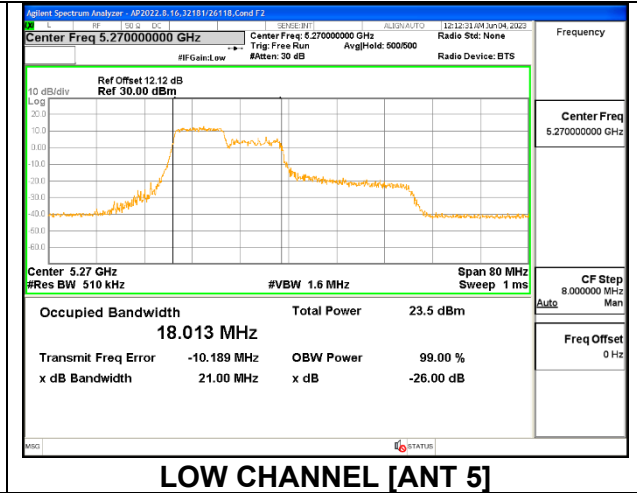
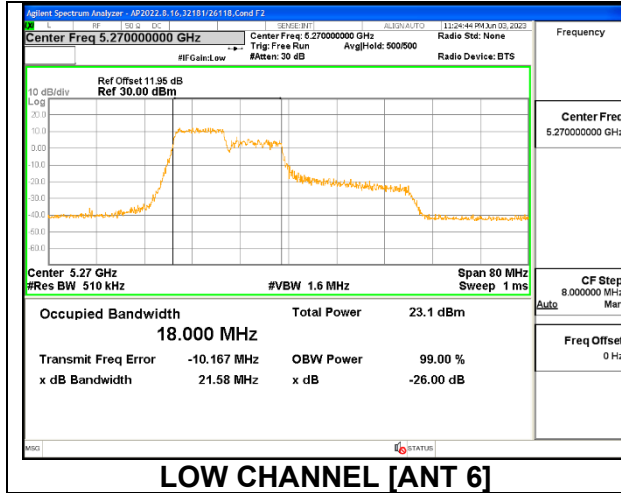
**1TX Antenna 5 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	40.12	37.7530
High	5310	43.54	37.8140



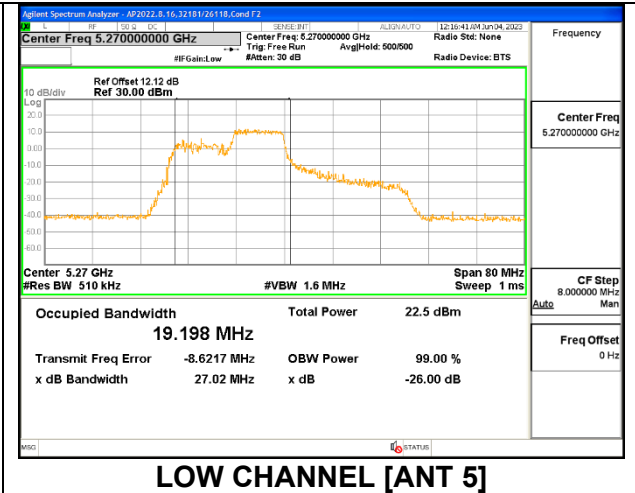
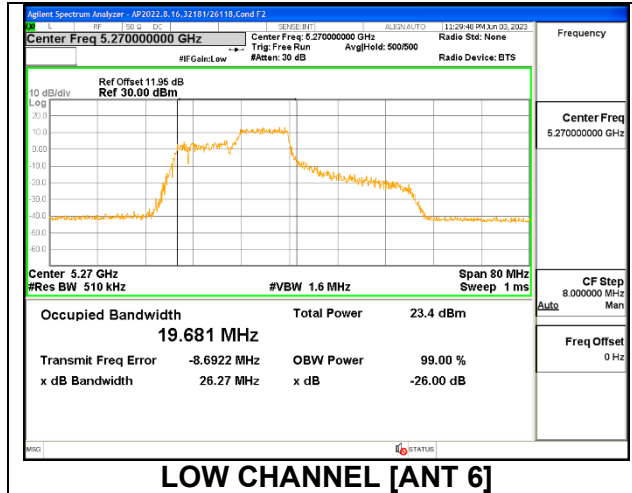
**2TX Antenna 6 + Antenna 5 CDD MODE: 106 Tones, RU Index 53**

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	21.58	21.00	18.0000	18.0130
High	5310	21.55	20.79	18.0520	17.8320



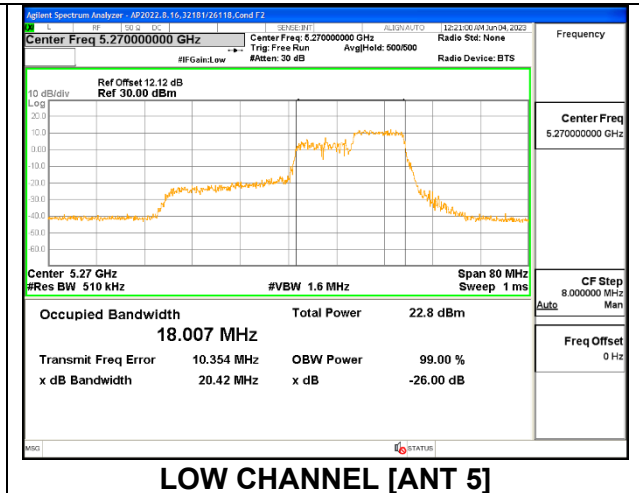
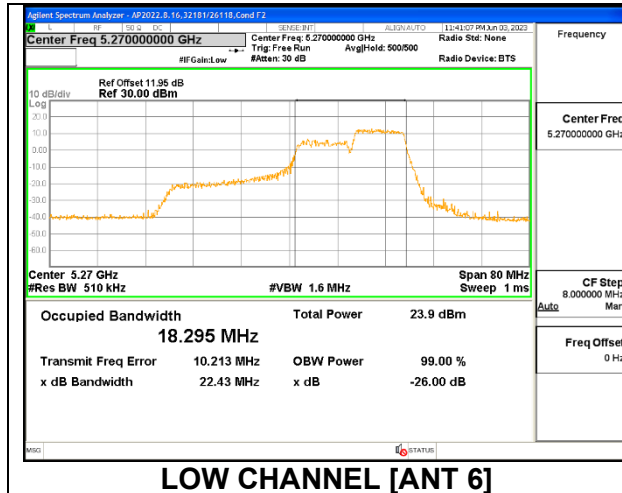
**2TX Antenna 6 + Antenna 5 CDD MODE: 106 Tones, RU Index 54**

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	26.27	27.02	19.6810	19.1980
High	5310	25.83	25.23	19.7430	19.3270



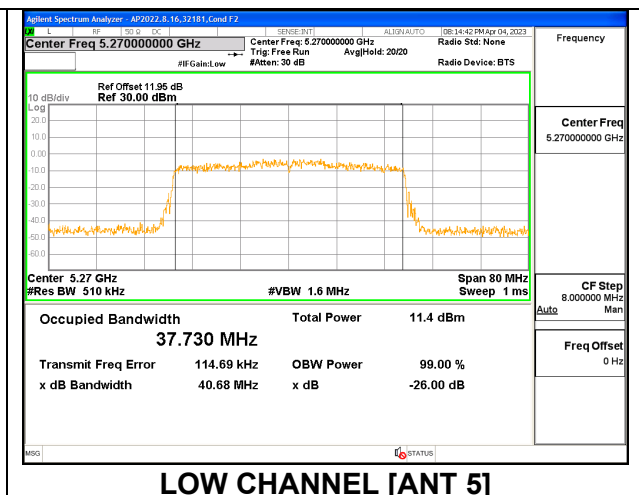
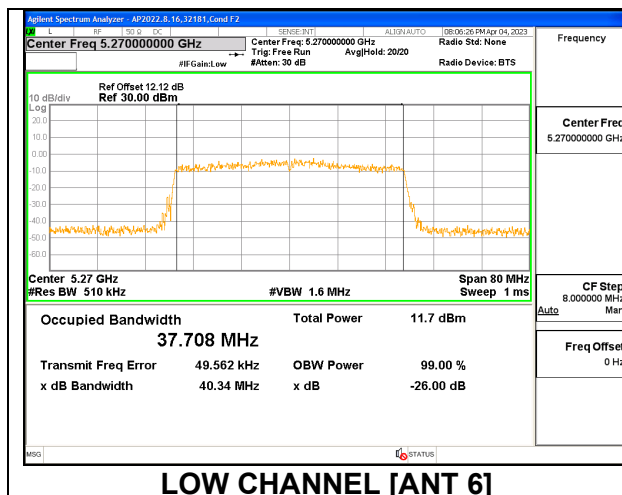
**2TX Antenna 6 + Antenna 5 CDD MODE: 106 Tones, RU Index 56**

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	22.43	20.42	18.2950	18.0070
High	5310	22.40	20.19	18.0920	17.9820



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

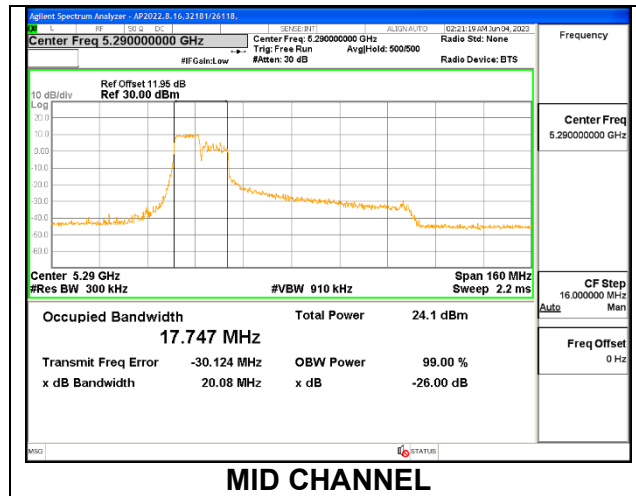
Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5270	40.34	40.68	37.7080	37.7300
High	5310	41.15	47.70	37.8390	37.8040



**9.2.13. 802.11ax HE80 MODE IN THE 5.3 GHz BAND**

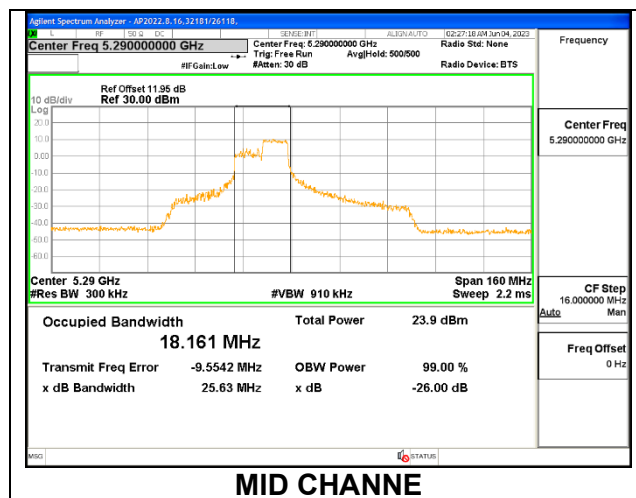
**1TX Antenna 6 MODE: 106 Tones, RU Index 53**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	20.08	17.7470



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

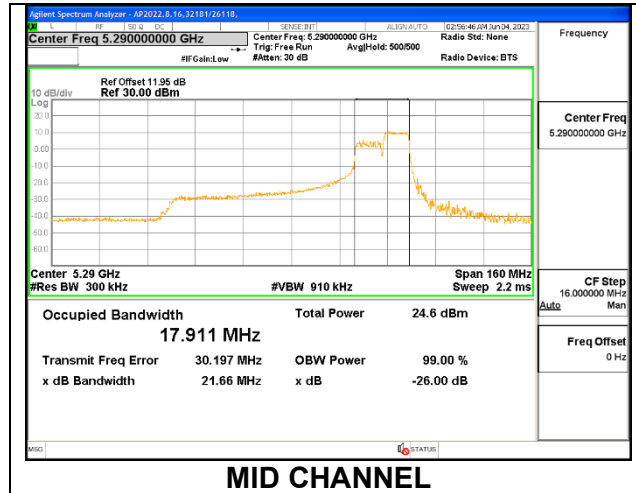
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	25.63	18.1610





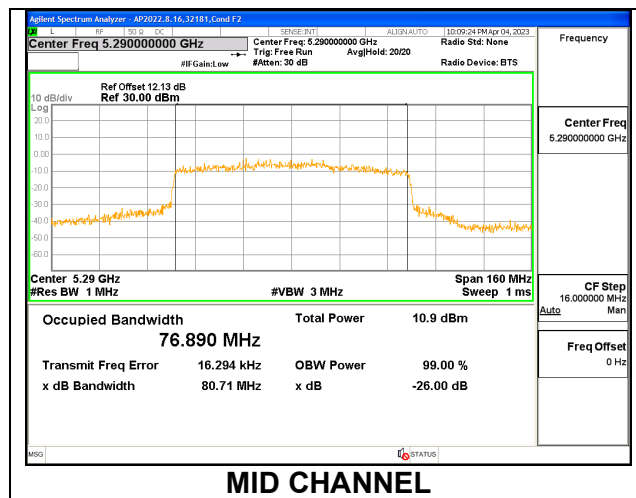
**1TX Antenna 6 MODE: 106 Tones, RU Index 60**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	21.66	17.9110



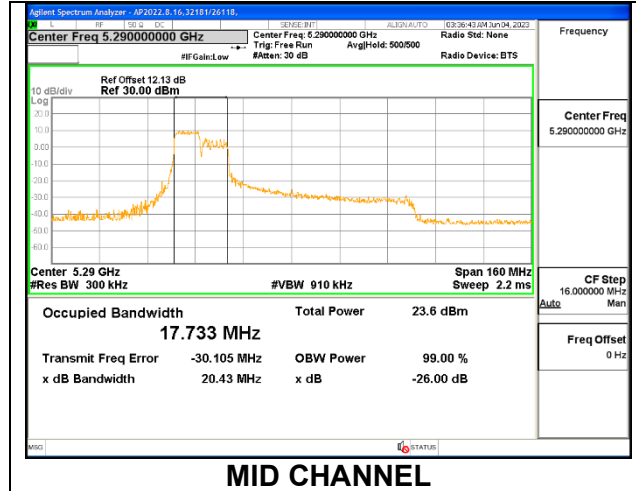
**1TX Antenna 6 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	80.71	76.890



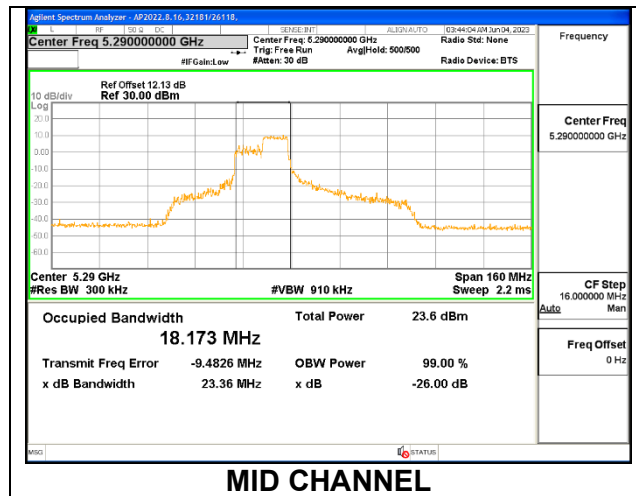
**1TX Antenna 5 MODE: 106 Tones, RU Index 53**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	20.43	17.730



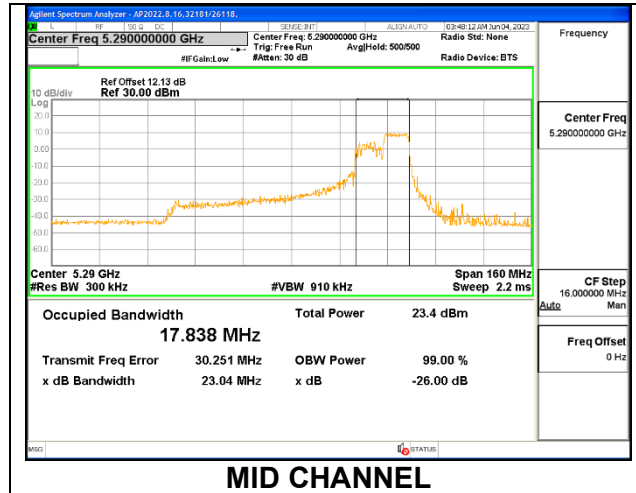
**1TX Antenna 5 MODE: 106 Tones, RU Index 56**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	23.36	18.1730



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

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	23.04	17.8380



**1TX Antenna 5 MODE: SU Mode**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Mid	5290	82.24	76.9760

