

# TEST REPORT

**Report Number. :** 14749497-E5V4

**Applicant :** eero LLC  
660 3rd Street 4th Floor  
San Francisco, CA 94107, U.S.A.

**Model :** V010001

**Brand :** eero

**FCC ID :** 2AEM4-711917312

**IC :** 20631-711917312

**EUT Description :** Wireless Access Point

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART E  
ISED RSS-247 ISSUE 3  
ISED RSS-GEN ISSUE 5 + A1 + A2

**Date Of Issue:**  
2023-09-19

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

Rev.	Issue Date	Revisions	Revised By
V1	2023-08-25	Initial Issue	---
V2	2023-09-06	Updated Section 6.6 info, updated RSS 247 to issue 3.	Tina Chu
V3	2023-09-07	Updated Section 9.4 to remove straddle channels	Tina Chu
V4	2023-09-19	Added directional antenna gain formula on Section 9.5	Tina Chu

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** eero LLC  
660 3<sup>rd</sup> Street 4<sup>th</sup> Floor  
San Francisco, CA 94107, U.S.A.

**EUT DESCRIPTION:** Wireless Access Point

**MODEL:** V010001

**BRAND:** eero

**SERIAL NUMBER:** Radiated: GGB2-1E06-3237-0089, GGB2-1E04-3062-004P,  
GGB2-1E08-3287-0037  
Conducted: GGB2-1E04-3057-00DA, GGB2-1E06-3237-OOBQ

**SAMPLE RECEIPT DATE:** 2023-04-05

**DATE TESTED:** 2023-05-01 to 2023-08-08

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR Part 15 Subpart E	Complies
ISED RSS-247 Issue 3	Complies
ISED RSS-GEN Issue 5 + A1 + A2	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  
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## 2. TEST RESULT SUMMARY

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

Below is a list of the data provided by the customer:

- 1) Antenna gain and type (see section 6.3)
- 2) Cable Loss (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	RSS-GEN 6.7	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	RSS-247 6.2.4.1	6 dB BW	Compliant	None.
15.407 (a) (1), (3)(i)	RSS-247 6.2	Output Power	Compliant	None.
15.407 (a) (1), (3)(i)	RSS-247 6.2	PSD	Compliant	None.
15.209, 15.205, 15.407 (b)	RSS-GEN 8.9, 8.10, RSS-247 6.2	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Compliant	Refer to report 14749497-E6

### 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,
- FCC KDB 789033 D02,
- KDB 414788 D01 Radiated Test Site
- ANSI C63.10-2013,
- RSS-GEN Issue 5 + A1 + A2
- RSS-247 Issue 3

### 4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 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, U.S.A	US0104	2324A	550739
<input type="checkbox"/>	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A			
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A			



## 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>
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
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
Time Domain Measurements	3.39%
Temperature	0.57°C
Humidity	3.39%
DC Supply Voltages	0.57%

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 EUT is a low power indoor Access Point that supports 802.11 a/b/g/n/ac/ax/be 2.4G DTS/ 5G UNII band 1 and band 3 Wifi, BLE 1Mbps/2Mbps and 802.15.4 technologies

This report covers non-ax 5GHz Wifi radio.

### 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power, except 5.2G (IC) is recorded as maximum dBm EIRP, 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	26.06	403.65
5180-5240	802.11n HT20	25.96	394.46
5190-5230	802.11n HT40	25.43	349.14
5210	802.11ac VHT80	17.51	56.36
<b>5.2 GHz band, 2TX</b>			
5180-5240	802.11a CDD	28.66	734.51
5180-5240	802.11n HT20 CDD	28.89	774.46
5190-5230	802.11n HT40 CDD	28.68	737.90
5210	802.11ac VHT80 CDD	19.78	95.06
<b>5.2 GHz band, 4TX</b>			
5180-5240	802.11a CDD	24.62	289.73
5180-5240	802.11n HT20 CDD	25.30	338.84
5190-5230	802.11n HT40 CDD	27.86	610.94
5210	802.11ac VHT80 CDD	19.79	95.28

**5.2 GHz BAND (IC)**

Frequency Range (MHz)	Mode	Output Power (dBm EIRP)	Output Power (mW EIRP)
<b>5.2 GHz band, 1TX</b>			
5180-5240	802.11a	21.81	151.71
5180-5240	802.11n HT20	22.12	162.93
5190-5230	802.11n HT40	22.69	185.78
5210	802.11ac VHT80	22.73	187.50
<b>5.2 GHz band, 2TX</b>			
5180-5240	802.11a CDD	19.51	89.33
5180-5240	802.11n HT20 CDD	21.70	147.91
5190-5230	802.11n HT40 CDD	22.58	181.13
5210	802.11ac VHT80 CDD	22.26	168.27
<b>5.2 GHz band, 4TX</b>			
5180-5240	802.11a CDD	17.38	54.70
5180-5240	802.11n HT20 CDD	21.91	155.24
5190-5230	802.11n HT40 CDD	22.24	167.49
5210	802.11ac VHT80 CDD	20.49	111.94

**5.8 GHz BAND (FCC/IC)**

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
<b>5.8 GHz band, 1TX</b>			
5745-5805	802.11a	24.76	299.23
5745-5805	802.11n HT20	25.62	364.75
5755-5795	802.11n HT40	25.42	348.34
5775	802.11ac VHT80	25.09	322.85
<b>5.8 GHz band, 2TX</b>			
5745-5805	802.11a CDD	29.21	833.68
5745-5805	802.11n HT20 CDD	28.99	792.50
5755-5795	802.11n HT40 CDD	28.40	691.83
5775	802.11ac VHT80 CDD	25.38	345.14
<b>5.8 GHz band, 4TX</b>			
5745-5805	802.11a CDD	29.57	905.73
5745-5805	802.11n HT20 CDD	29.76	946.24
5755-5795	802.11n HT40 CDD	29.38	866.96
5775	802.11ac VHT80 CDD	25.72	373.25

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna(s) gain and type, cable loss as provided by the manufacturer' are as follows:

The radio utilizes Flex PCB antennas, with a maximum gain as below table. EUT support the following transmit configurations:

- 1x1 SISO, Antenna 6 only
- 2x2 MIMO, Antenna 6 and Antenna 4 only
- 4x4 MIMO, Antenna 6, Antenna 4, Antenna 9 and Antenna 1 only

Frequency Range (MHz)	Peak Antenna Gain (dBi)				Cable Loss (dB)
	Antenna 6	Antenna 4	Antenna 9	Antenna 1	
5150 – 5250	3.89	3.89	3.89	3.89	1.3
5725 - 5850	3.62	3.62	3.62	3.62	1.4

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was ath1210csu1-ipq95xx .

The test utility software used during testing was Qualcomm Radio Control Toolkit v4.1 Version 4.0.85.1

## 6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, 1GHz and 18GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. Data is representative for worst case across all bands.

Investigation was performed on 1TX, 2TX and 4TX 802.11a/n/ac and determined that 4Tx 802.11 a/n/ac mode covers 1TX, 2TX, 4TX 802.11 a/n/ac mode radiated spurious emissions.

Band edge was performed with the EUT set to transmit at the highest power on low, middle, and high channels.

The EUT can only be setup in desktop orientation; therefore, all radiated testing was performed with the EUT in desktop orientation.

This EUT supports BLE/ 802.15.4/DTS + 5GHz simultaneous transmission, please refer to 14749497-E6 for data.

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

802.11a mode: 6 Mbps  
802.11n HT20mode: MCS0  
802.11n HT40mode: MCS0  
802.11ac VHT80 mode: MCS0

**Note:** 802.11ac VHT20 and VHT40 have the same power as 802.11n HT20 and 802.11n HT40, so 802.11n HT20 and 802.11n HT40 were test as worst case.

Plots included in the report are representative of the method and settings parameters used for the test.

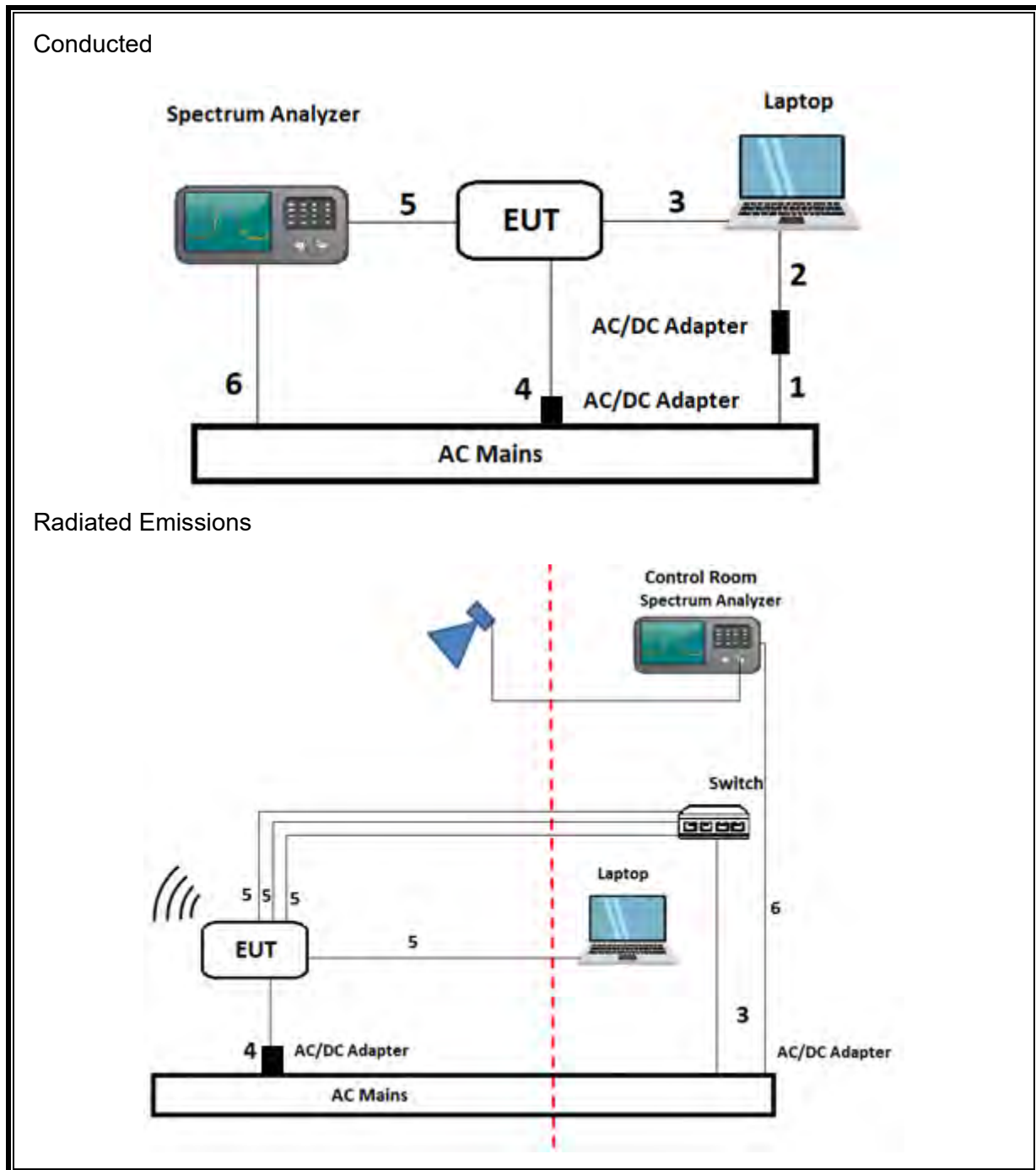
## 6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
EUT AC/DC Adapter (Luxshare)	eero	C310011	NA	DoC		
EUT AC/DC Adapter (Foxlink)	eero	C310011	NA	DoC		
Laptop	Lenovo	ThinkPad P15s Gen 2	PF-2YV2K6	DoC		
Laptop AC/DC Adapter	Lenovo	ADLX65Y	8SSA10R16875C1SG09PRSHT	DoC		
Laptop	Lenovo	ThinkPadT460	PC0JLLUT	DoC		
Laptop AC/DC Adapter	Lenovo	A-17-065N2A	8SSA10J20161C1SG8720X55 Rev:000	DoC		
Switch	Netgear	XS505M	6H11197M00054	DoC		
I/O CABLES (CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2-Prong	Un-shielded	1	AC Mains to LT AC/DC Adapter
2	DC	1	Barrel	Un-shielded	1.5	AC/DC Adapter to Laptop
3	Ethernet	1	RJ45	Un-shielded	1	Laptop to EUT
4	DC	1	Barrel	Un-shielded	1.5	AC/DC Adapter to EUT
5	SMA	1	SMA	Un-shielded	0.1	EUT to Spectrum Analyzer
6	AC	1	3-Prong	Un-shielded	1.5	AC Mains to Spectrum Analyzer
I/O CABLES (RADIATED TEST EMISSIONS)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
3	AC	1	2-Prong	Un-shielded	2	AC Mains to Switch
4	DC	1	Barrel	Un-shielded	1.5	AC/DC Adapter to EUT
5	I/O	4	RJ45	Un-shielded	>3 meter	EUT to Switch /Laptop. One cable connected to switch is <3 meter for 30MHz to 1GHz test.
6	AC	1	3-Prong	Un-shielded	1.5	AC Mains to Spectrum Analyzer
I/O CABLES (AC POWER LINE EMISSIONS)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
3	AC	1	2-Prong	Un-shielded	2	AC Mains to Switch
4	DC	1	Barrel	Un-shielded	1.5	AC/DC Adapter to EUT
5	I/O	5	RJ45	Un-shielded	>3 meter	EUT to Switch, Laptop to Switch

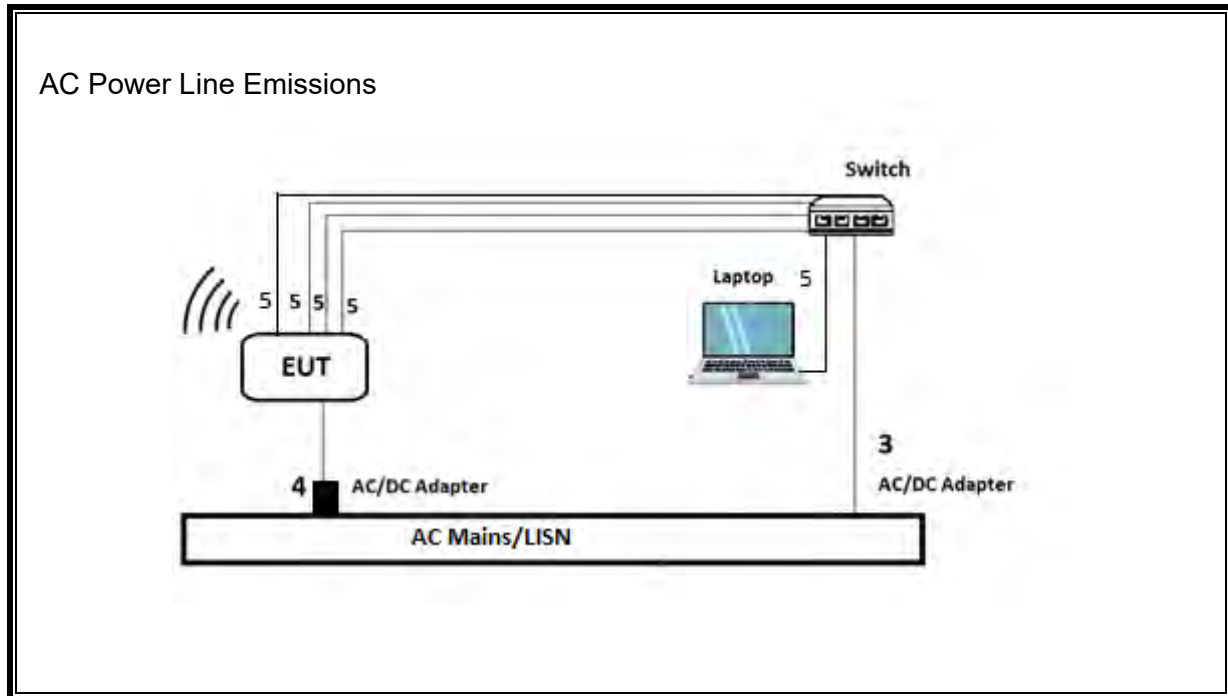
**TEST SETUP**

The EUT is powered by AC/DC adapter and connected to support equipment, and the radio is exercised remotely by command prompt GUI test utility software via ethernet.

**SETUP DIAGRAM**







## 7. MEASUREMENT METHOD

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

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

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

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

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

Power Spectral Density: KDB 789033 D02, Section F

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

Unwanted emissions in non-restricted bands: KDB 789033 D02, 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
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	219908	2024-05-31	2023-05-31
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	219910	2024-05-31	2023-05-31
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	80293	2024-04-30	2023-04-11
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	170647	2023-11-11	2022-11-11
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	222741	2023-08-31	2022-08-31
RF Filter Box, 1-18GHz	UL-FR1	n/a	171875	2023-11-10	2022-11-10
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230547	2024-02-29	2023-02-15
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	199659	2023-12-06	2022-12-06
Amplifier 18-26.5GHz, +5Vdc, -54dBm P1dB	AMPLICAL	AMP18G26.5-60	234683	2024-03-29	2023-03-18
Antenna, Horn 26.5 to 40GHz	ARA	MWH-2640/B	199661	2023-12-06	2022-12-06
Amplifier 26-40GHz +5Vdc, -62dBm P1dB	AMPLICAL	AMP26G40-60	234684	2024-03-29	2023-03-18
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	223083 (chamber k)	2023-10-25	2022-10-25
RF Filter Box, 1-18GHz, 8 Port	UL-FR1	SAC 8 port rf box 1	197920 (chamber k)	2024-05-31	2023-05-17
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	225688 (chamber k)	2024-02-29	2023-02-14
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	125178	2024-02-29	2023-02-06
10dB Fixed Attenuator, up to 26GHz	Pasternack Enterprises	PE7087-10	236189	Verified/characterized before use	
Power Meter, P-series single channel	Keysight Technologies Inc	N1921A	81319	2024-01-25	2023-01-25
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1911A	90718	2024-01-31	2023-01-31
AC Line Conducted					
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	175765	2024-01-31	2023-01-27
EMI TEST RECEIVER	Rohde & Schwarz	ESR	93091	2024-02-29	2023-02-20
Transient Limiter	TE	TBFL1	207996	2023-07-31	2022-07-15
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Ver 2023-01-18, 2023-03-03, 2023-05-01		
Antenna Port Software	UL	UL RF	Ver 2022-08-16		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 2022-02-17		

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

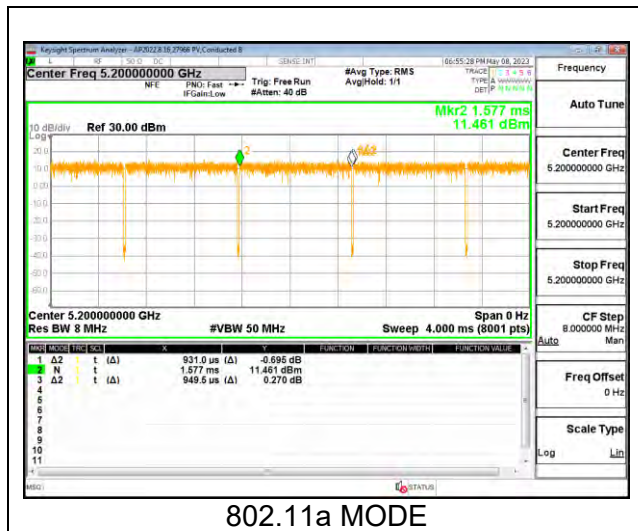
KDB 558074 Zero-Span Spectrum Analyzer Method.

#### 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)
802.11a	0.931	0.950	0.981	98.05	0.00	0.010
802.11n HT20	4.431	4.450	0.996	99.57	0.00	0.010
802.11n HT40	2.151	2.170	0.991	99.12	0.00	0.010
802.11ac VHT80	1.984	2.009	0.988	98.76	0.00	0.010

Note: Testing was performed for 1Tx, 2Tx and 4Tx. The above results are representative for 2Tx and 4Tx.

#### DUTY CYCLE SAMPLE PLOT



## **9.2. 26 dB BANDWIDTH**

### **LIMITS**

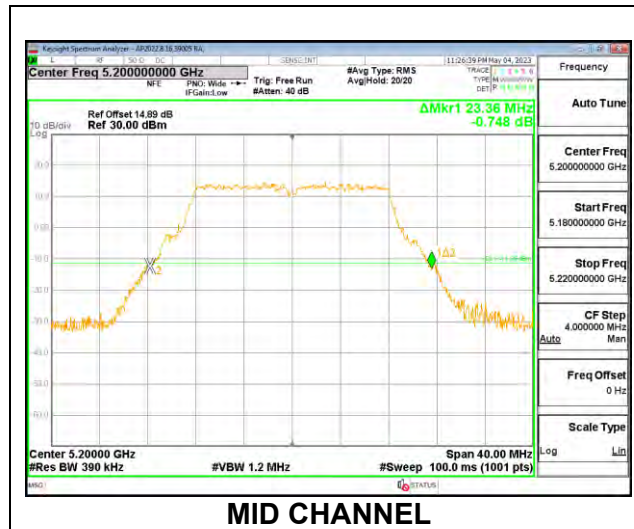
None; for reporting purposes only.

### **RESULTS**

### 9.2.1. 802.11a MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

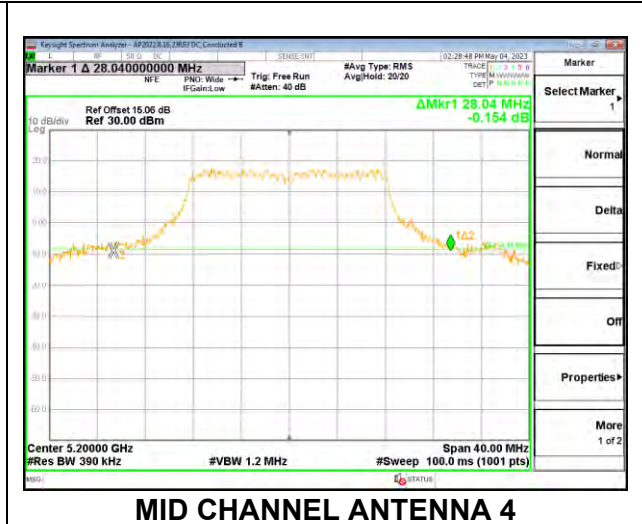
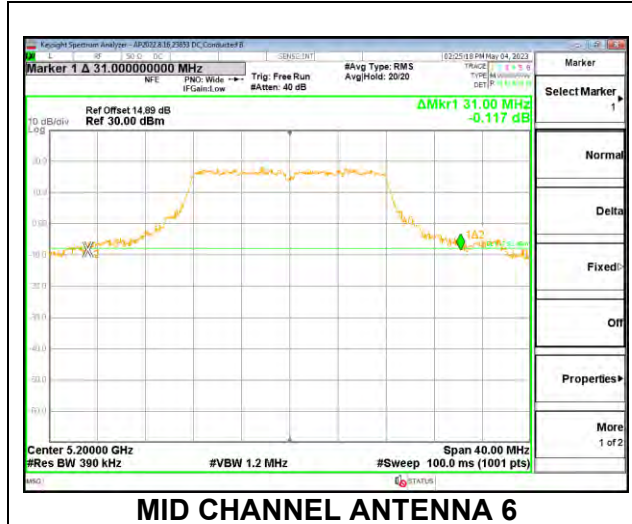
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	23.04
Mid	5200	23.36
High	5240	23.16



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Low	5180	24.80	25.28
Mid	5200	31.00	28.04
High	5240	28.48	24.28

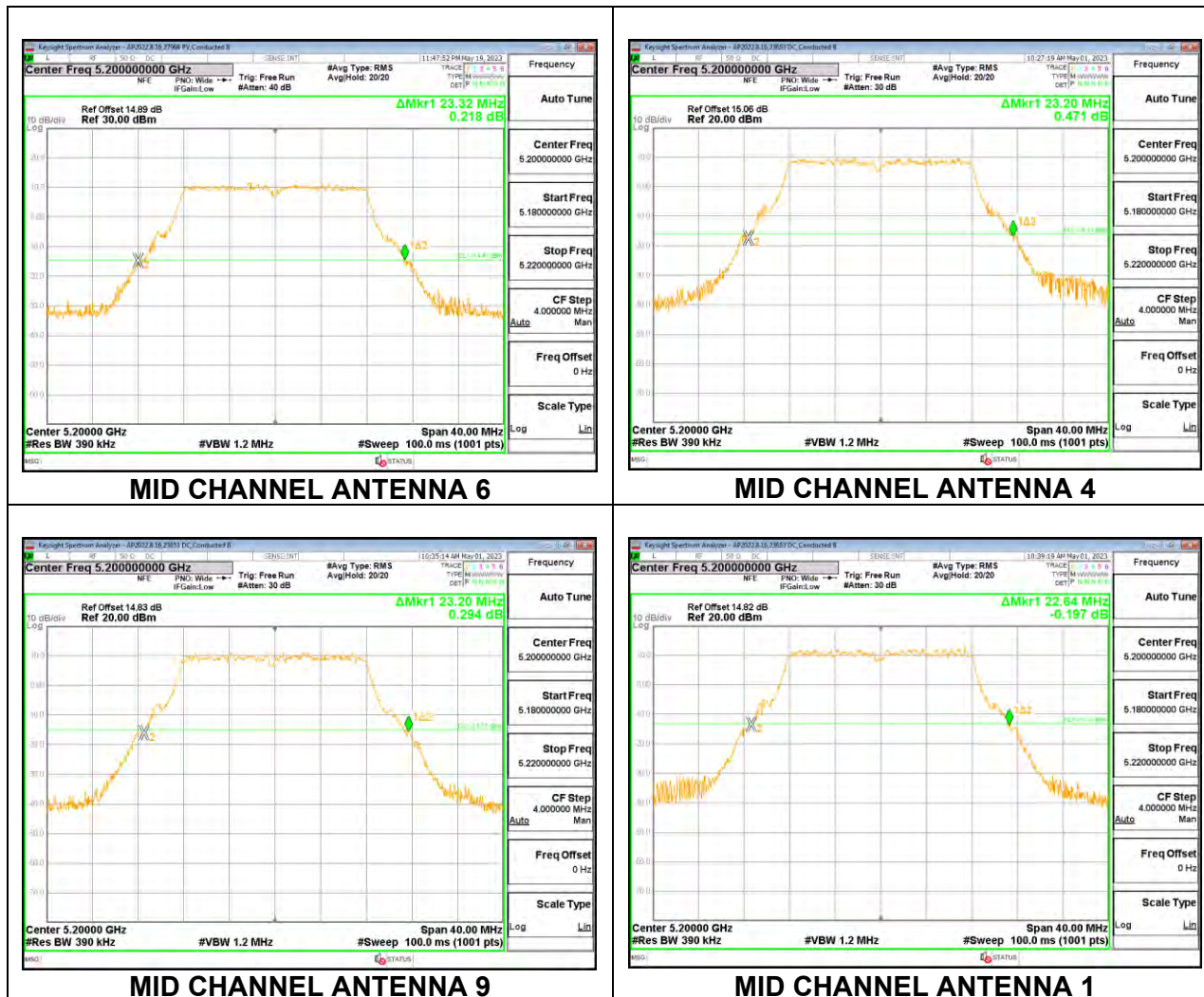
**MID CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5180	22.96	22.92	22.60	22.80
Mid	5200	23.32	23.20	23.20	22.64
High	5240	23.08	23.04	22.84	22.92

**MID CHANNEL**

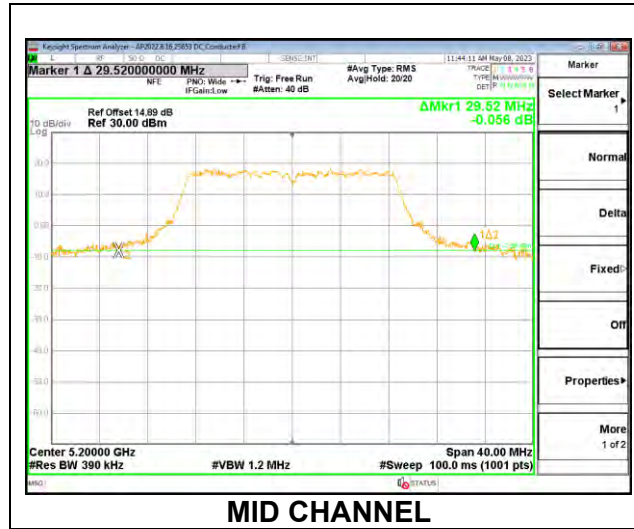




### 9.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

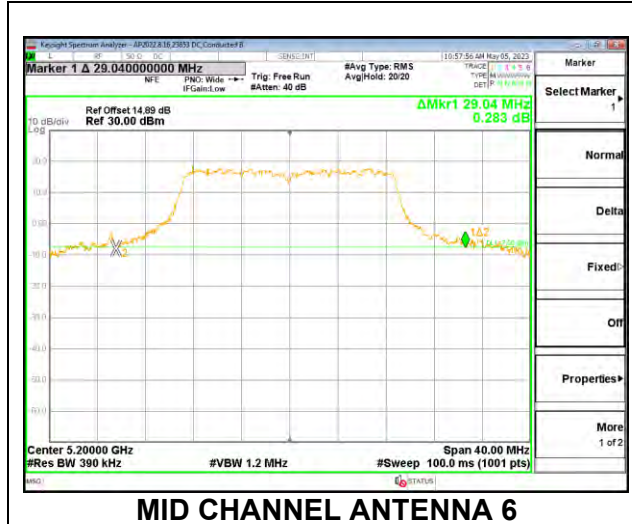
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	26.84
Mid	5200	29.52
High	5240	29.48



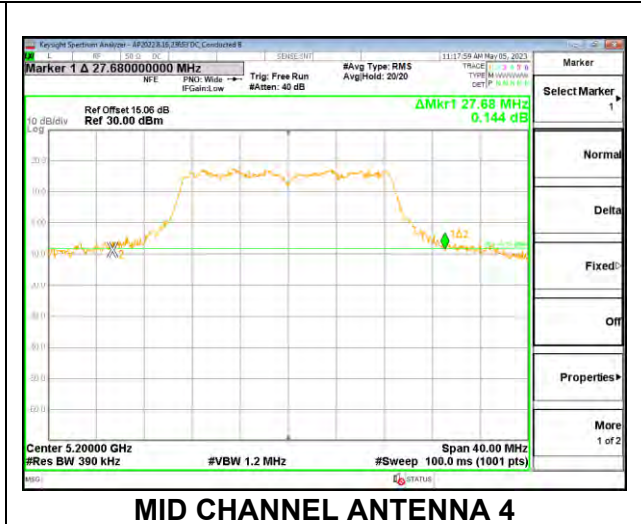
**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Low	5180	23.76	24.28
Mid	5200	29.04	27.68
High	5240	28.16	24.48

**MID CHANNEL**



**MID CHANNEL ANTENNA 6**

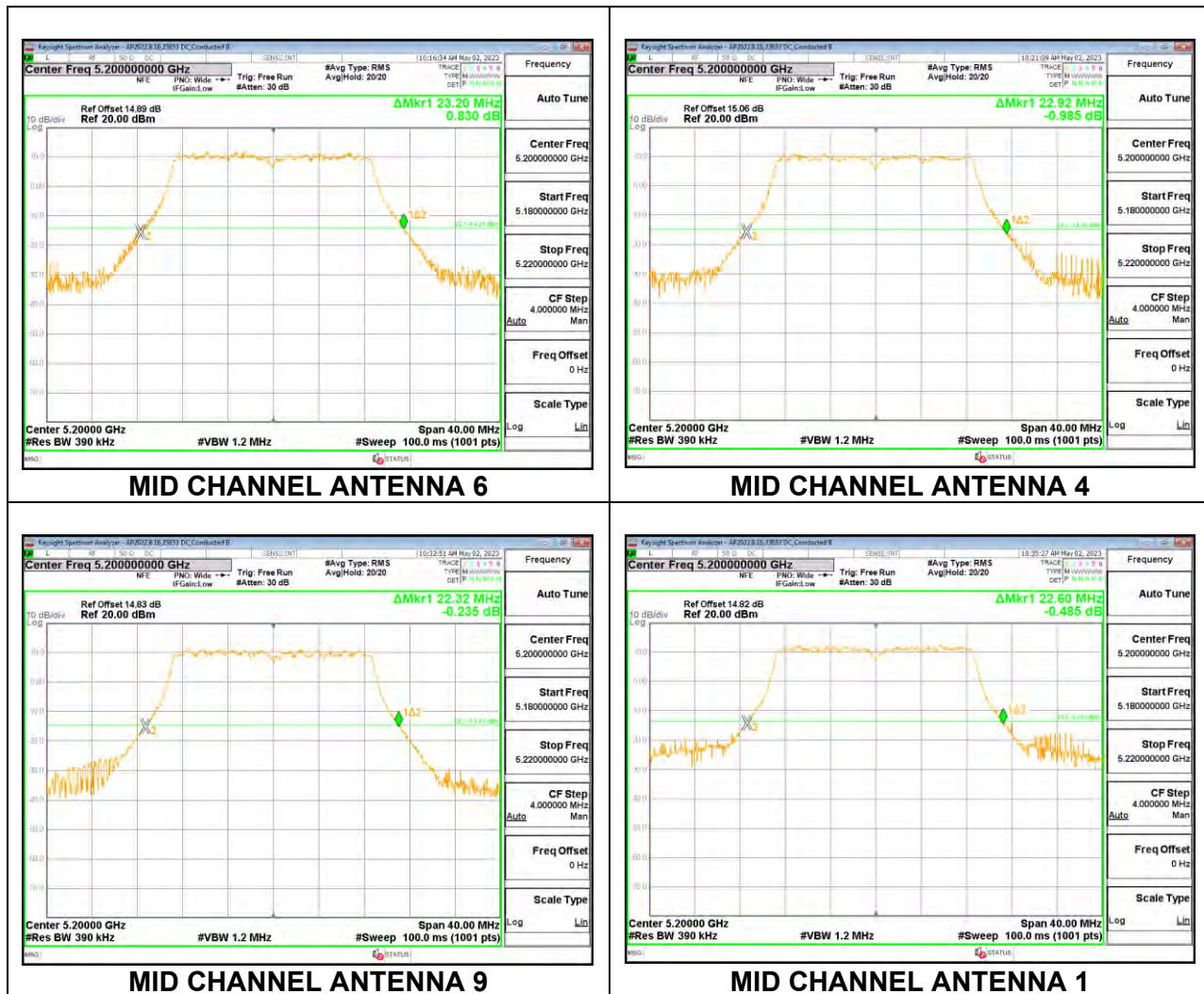


**MID CHANNEL ANTENNA 4**

**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5180	23.00	22.84	22.40	22.44
Mid	5200	23.20	22.92	22.32	22.60
High	5240	23.16	22.72	22.48	22.64

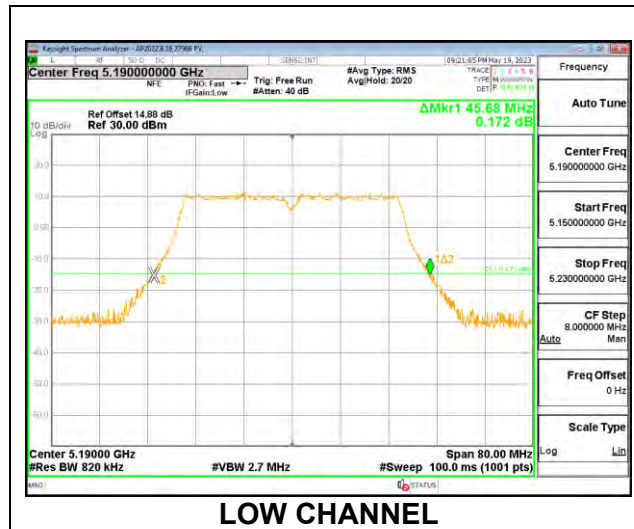
**MID CHANNEL**



### 9.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

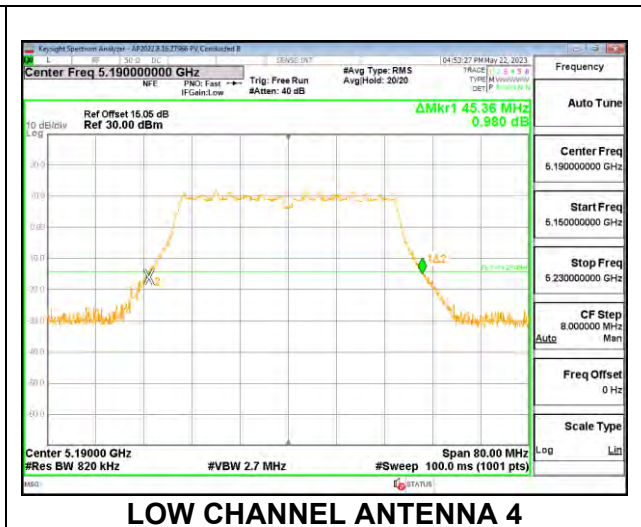
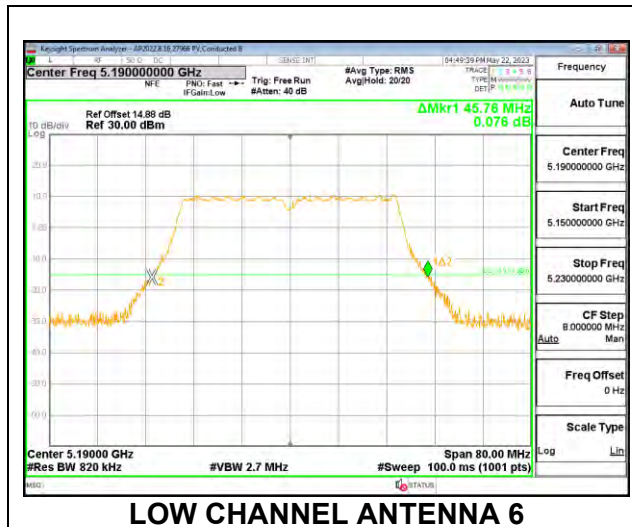
Channel	Frequency (MHz)	26dB Bandwidth (MHz)
Low	5190	45.68
High	5230	51.60



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Low	5190	45.76	45.36
High	5230	54.00	50.08

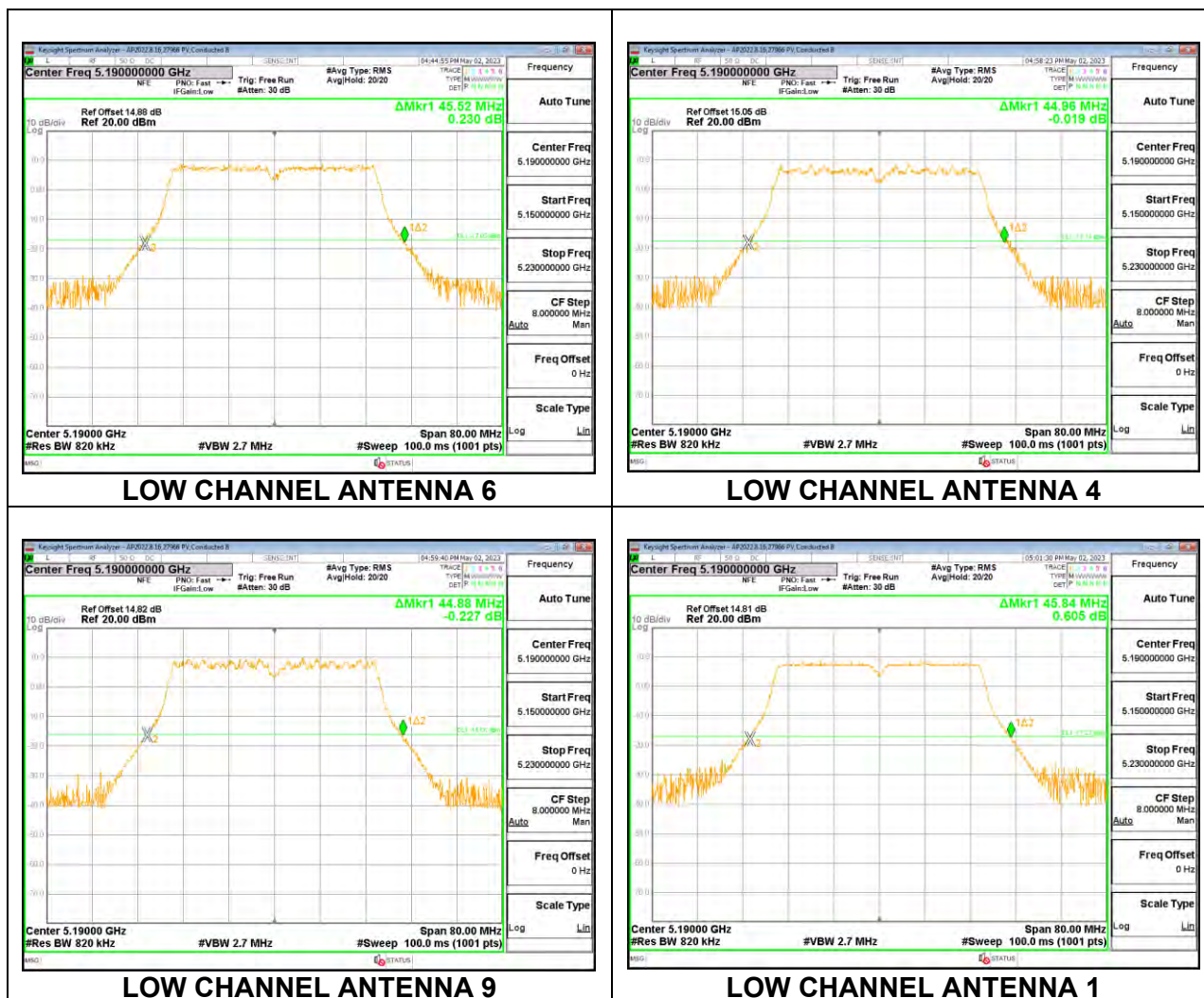
**LOW CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5190	45.52	44.96	44.88	45.84
High	5230	46.08	46.00	45.36	46.00

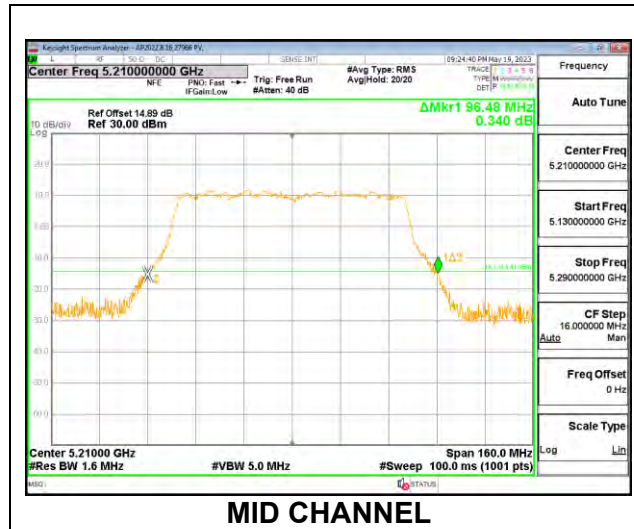
**LOW CHANNEL**



### 9.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

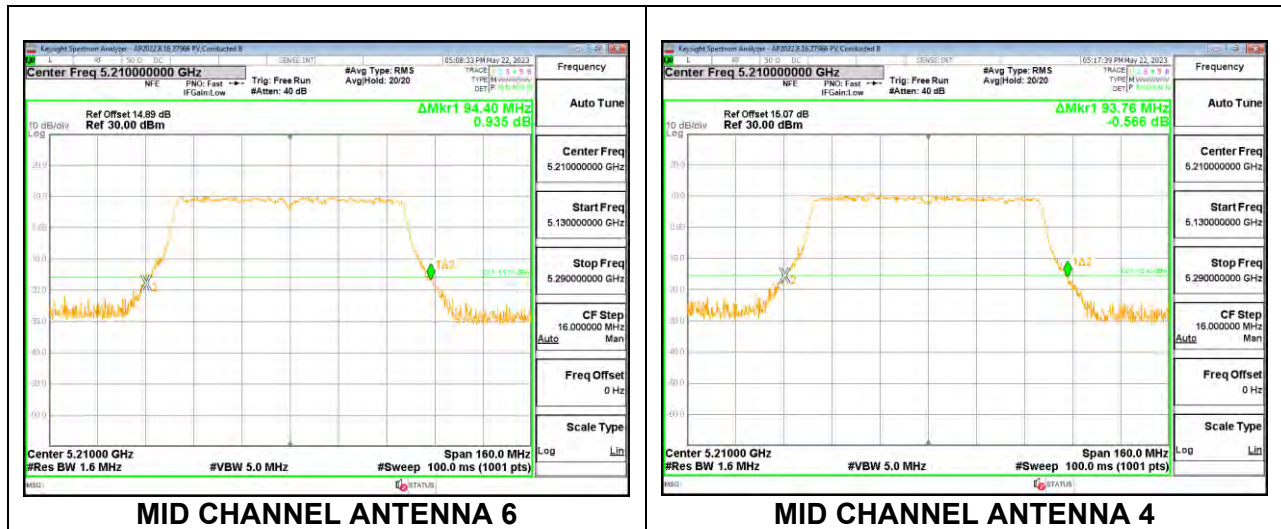
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5210	96.48



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Mid	5210	94.40	93.76

**MID CHANNEL**

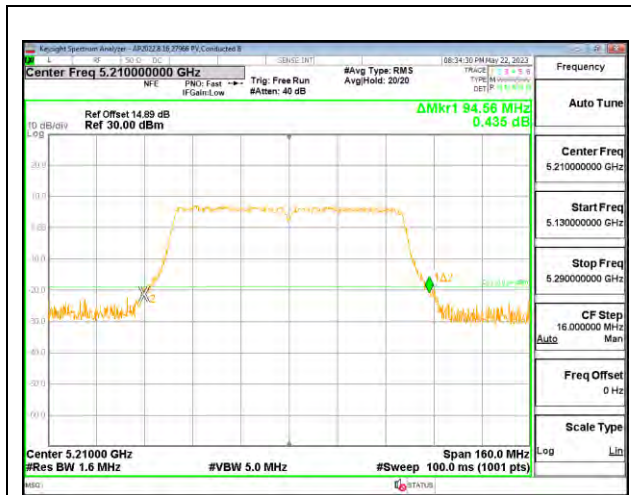




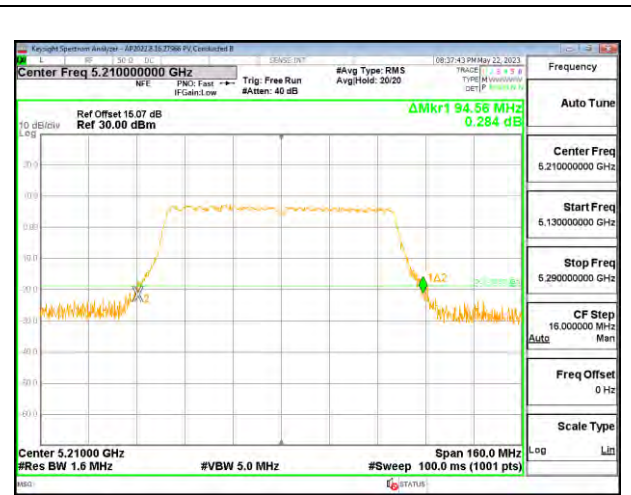
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Mid	5210	94.56	94.56	93.60	93.60

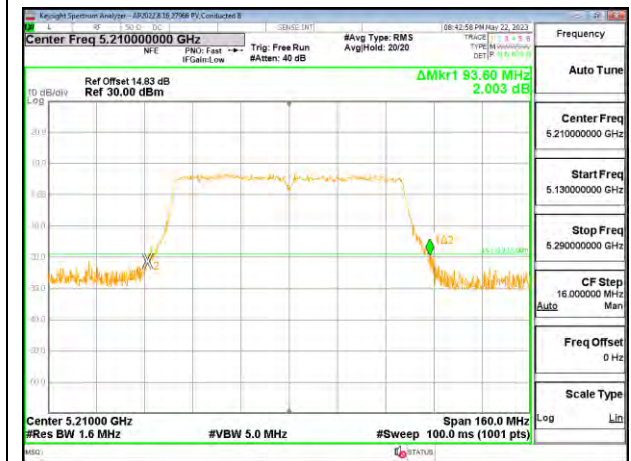
**MID CHANNEL**



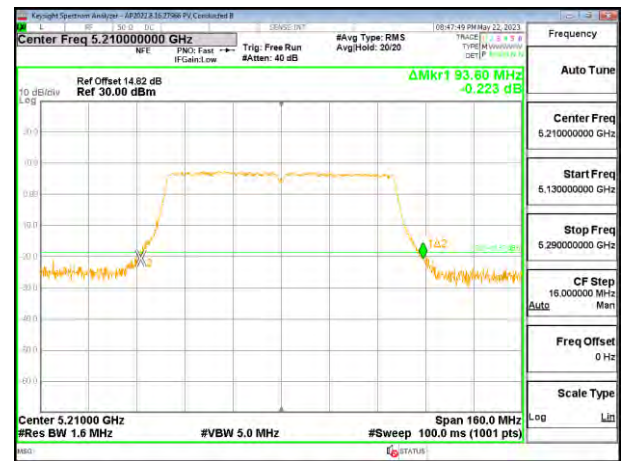
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

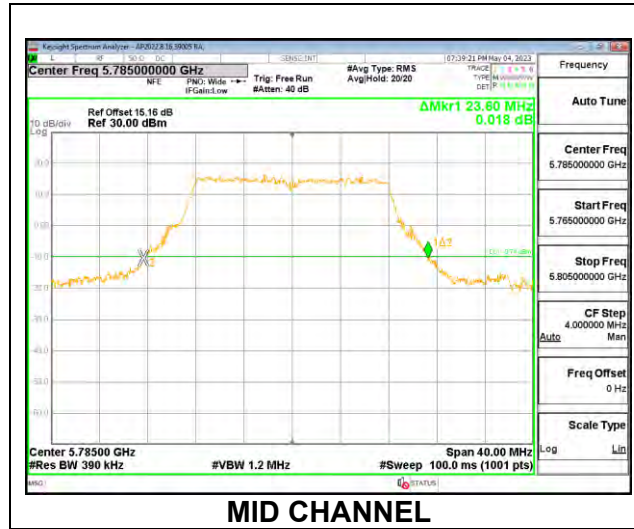


**MID CHANNEL ANTENNA 1**

### 9.2.5. 802.11a MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	23.72
Mid	5785	23.60
High	5805	23.60

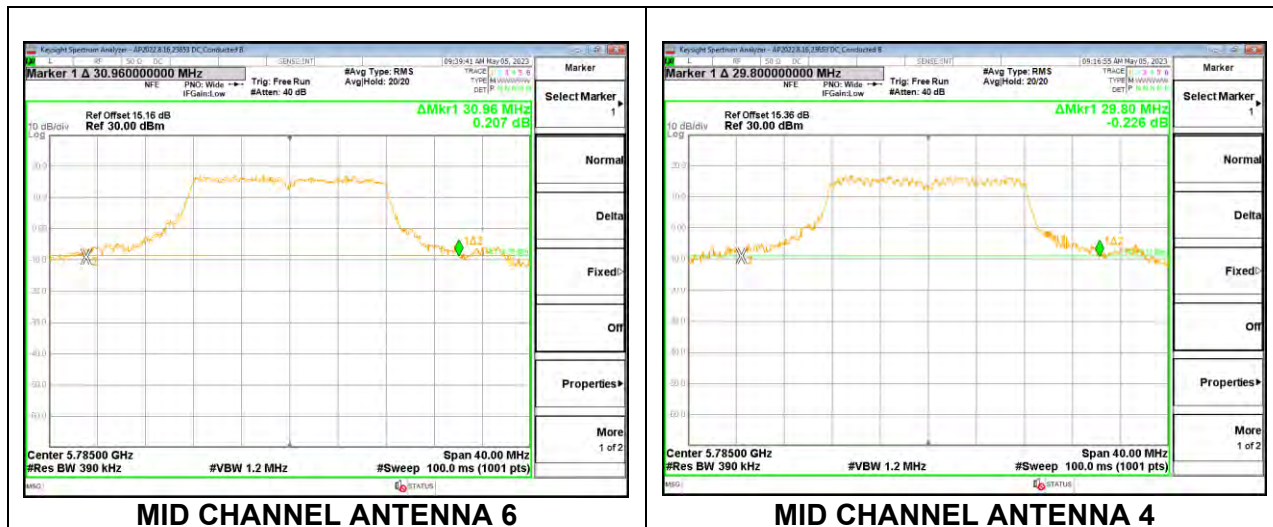


**MID CHANNEL**

**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Low	5745	36.44	35.24
Mid	5785	30.96	29.80
High	5805	35.20	37.08

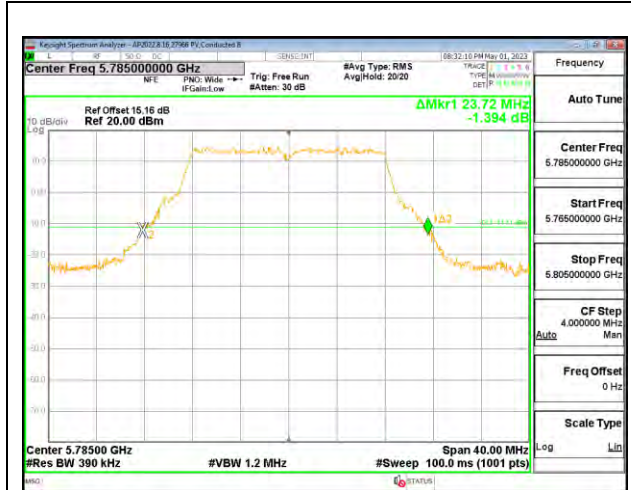
**MID CHANNEL**



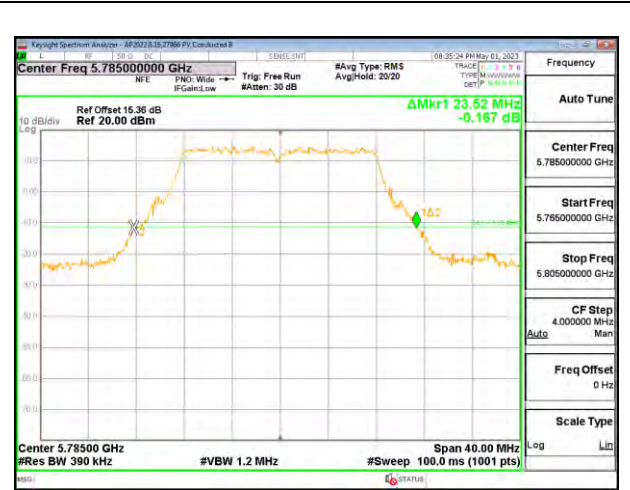
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5745	22.88	23.20	22.76	23.32
Mid	5785	23.72	23.52	23.56	24.16
High	5805	23.64	23.60	23.84	23.72

**MID CHANNEL**



**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

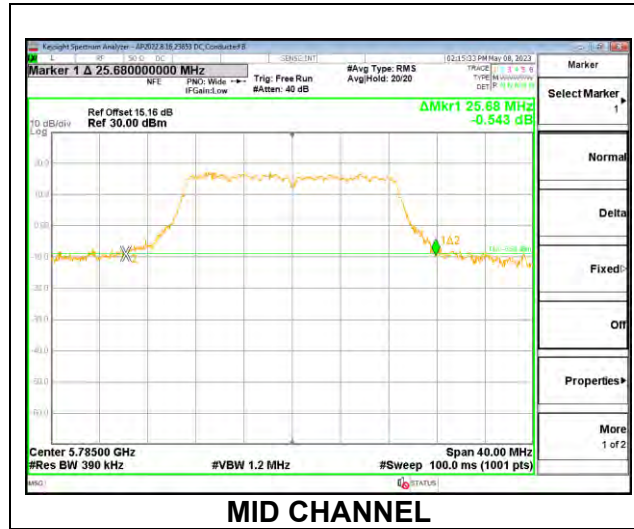


**MID CHANNEL ANTENNA 1**

### 9.2.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

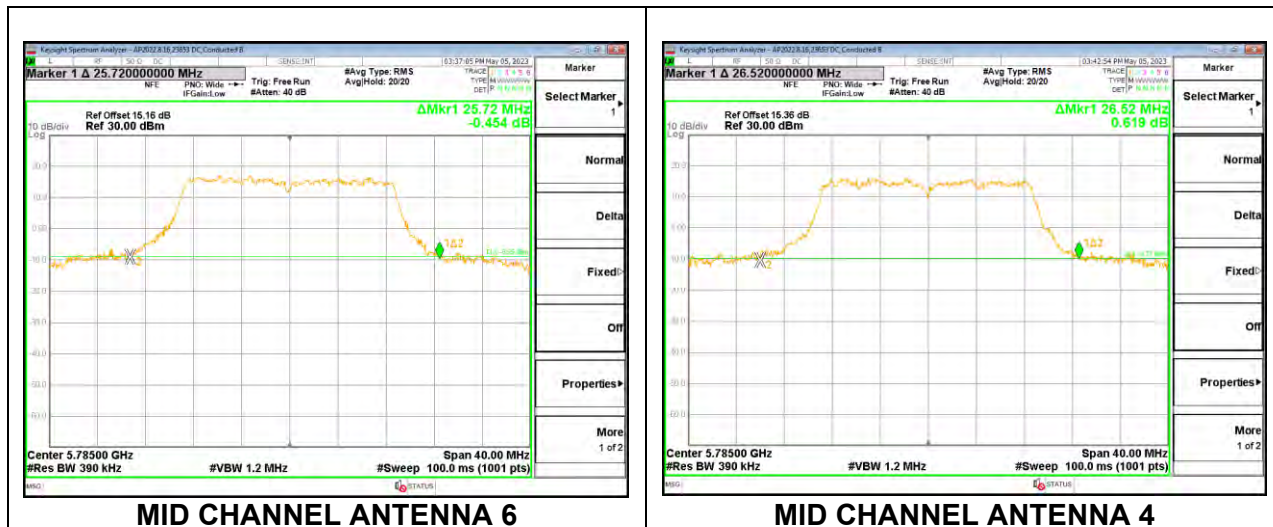
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	28.92
Mid	5785	25.68
High	5805	27.00



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Low	5745	26.60	33.00
Mid	5785	25.72	26.52
High	5805	29.72	27.68

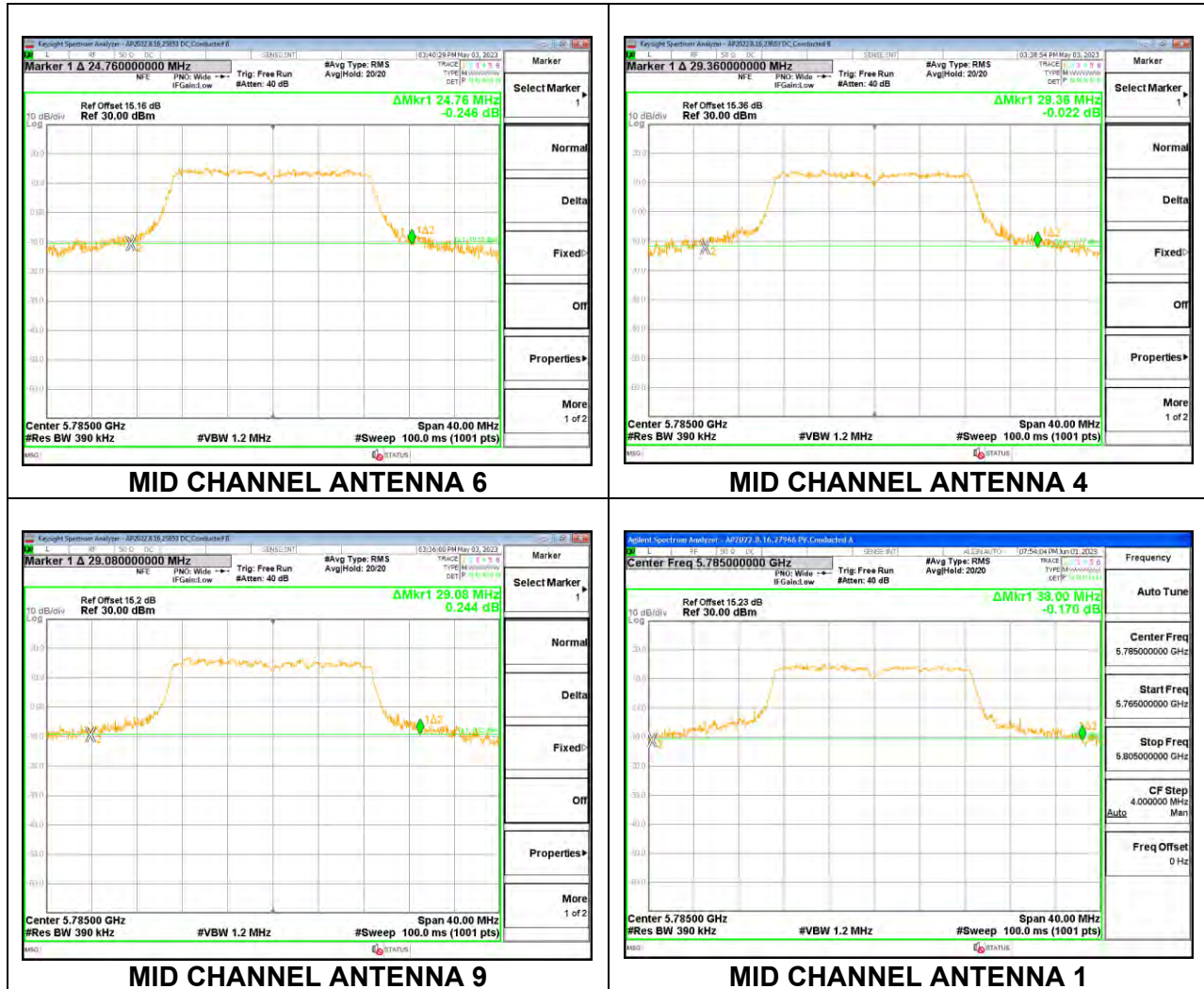
**MID CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5745	24.12	25.20	26.00	34.00
Mid	5785	24.76	29.36	29.08	38.00
High	5805	27.56	30.00	30.08	36.52

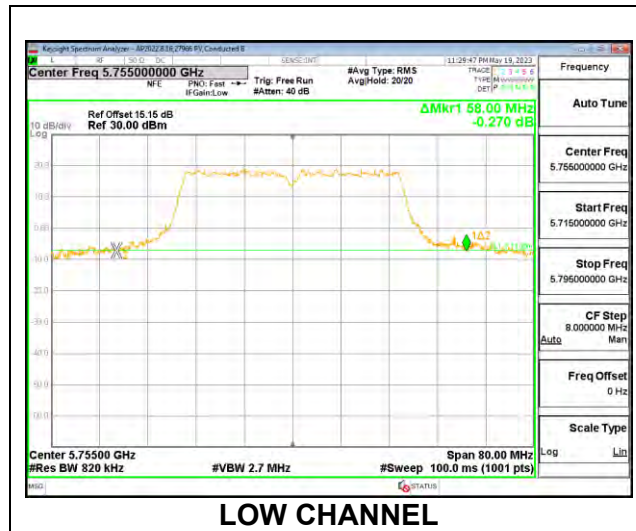
**MID CHANNEL**



### 9.2.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
Low	5755	58.00
High	5795	65.60

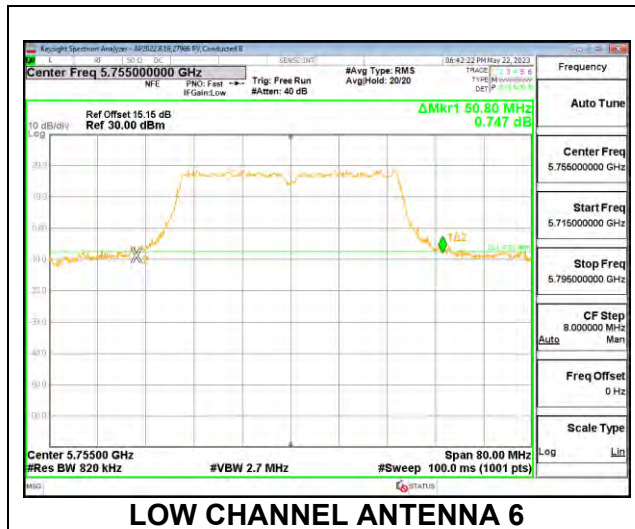




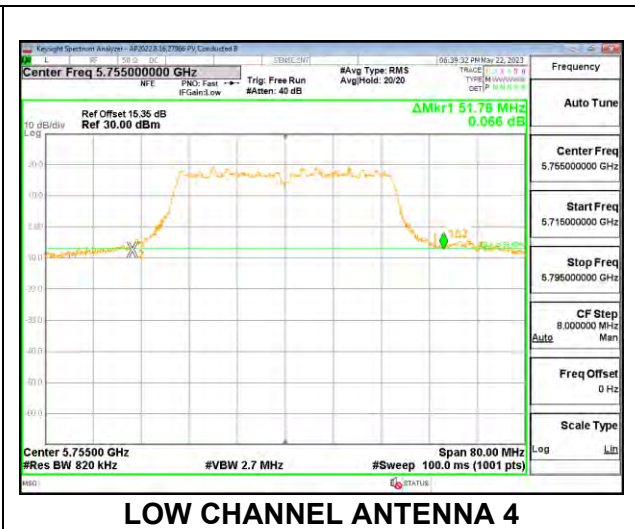
**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Low	5755	50.80	51.76
High	5795	54.16	54.32

**LOW CHANNEL**



**LOW CHANNEL ANTENNA 6**



**LOW CHANNEL ANTENNA 4**

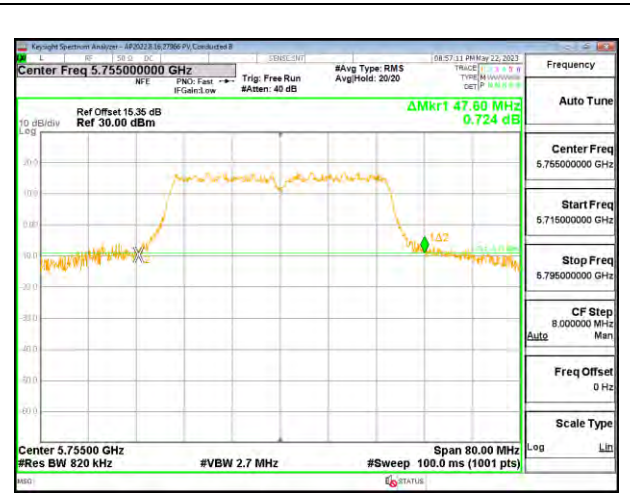
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Low	5755	46.72	47.60	46.88	74.64
High	5795	60.16	59.76	59.20	75.28

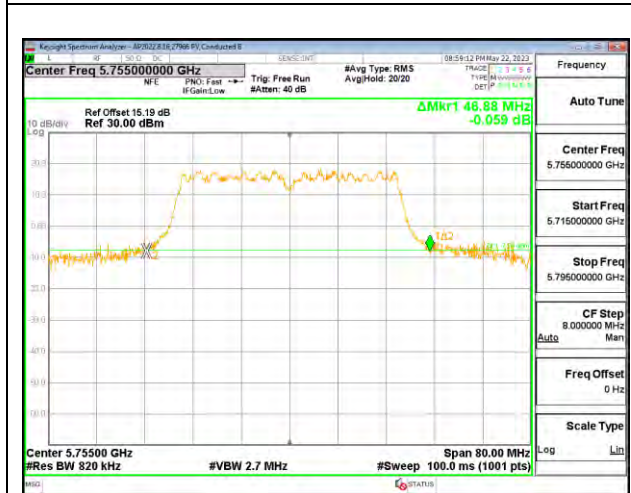
**LOW CHANNEL**



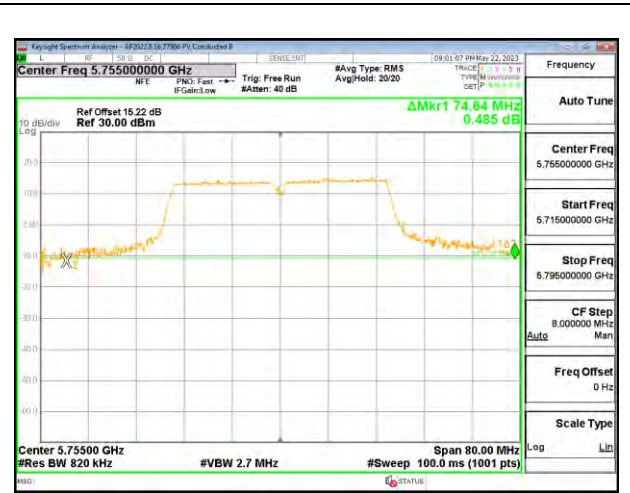
**LOW CHANNEL ANTENNA 6**



**LOW CHANNEL ANTENNA 4**



**LOW CHANNEL ANTENNA 9**

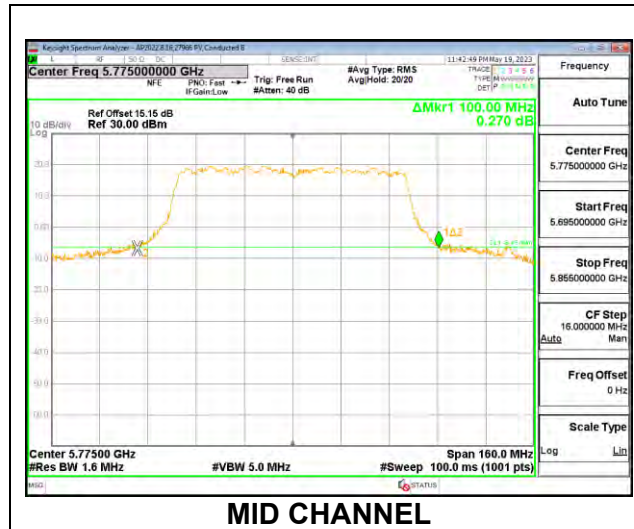


**LOW CHANNEL ANTENNA 1**

### 9.2.8. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

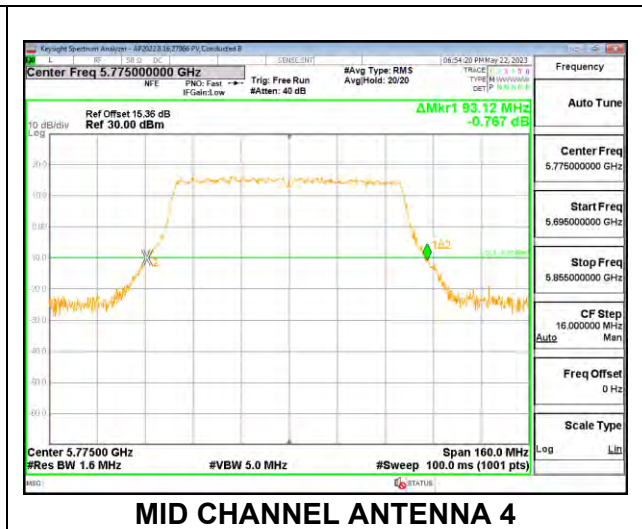
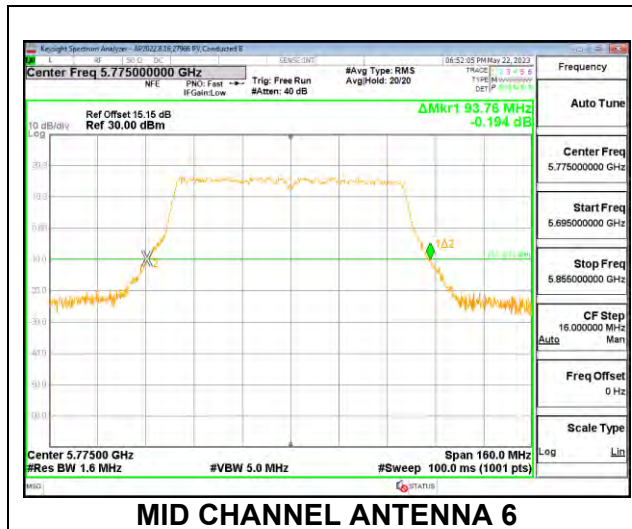
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5775	100.00



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)
Mid	5775	93.76	93.12

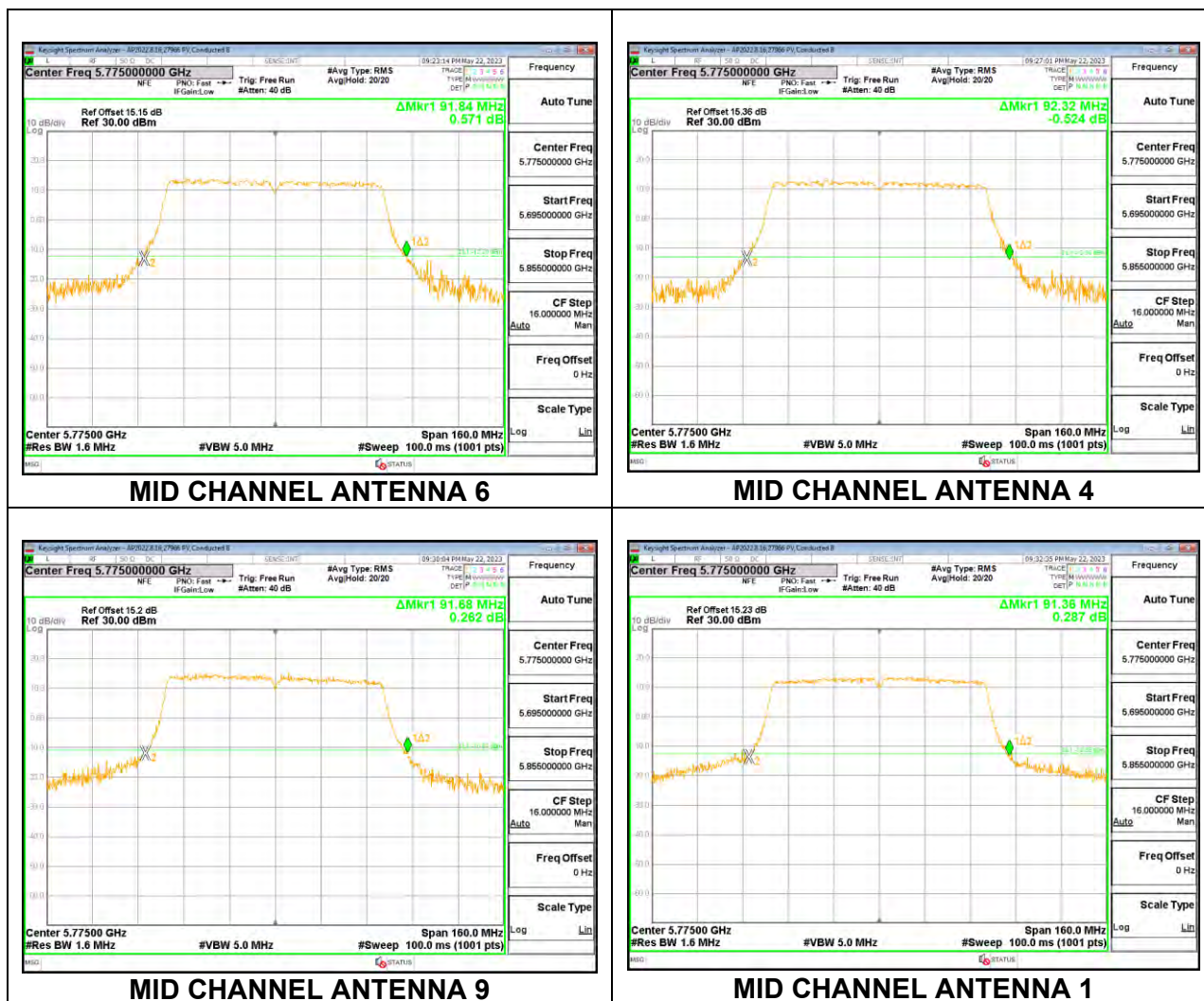
**MID CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 4 (MHz)	26 dB Bandwidth Antenna 9 (MHz)	26 dB Bandwidth Antenna 1 (MHz)
Mid	5775	91.84	92.32	91.68	91.36

**MID CHANNEL**



### **9.3. 99% BANDWIDTH**

#### **LIMITS**

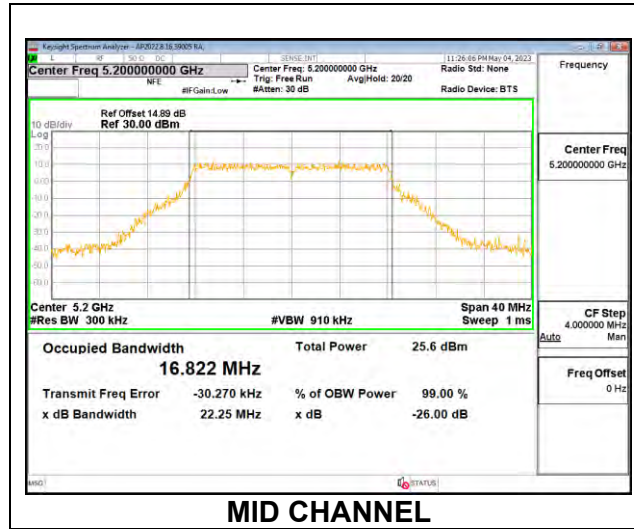
None; for reporting purposes only.

#### **RESULTS**

### 9.3.1. 802.11a MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

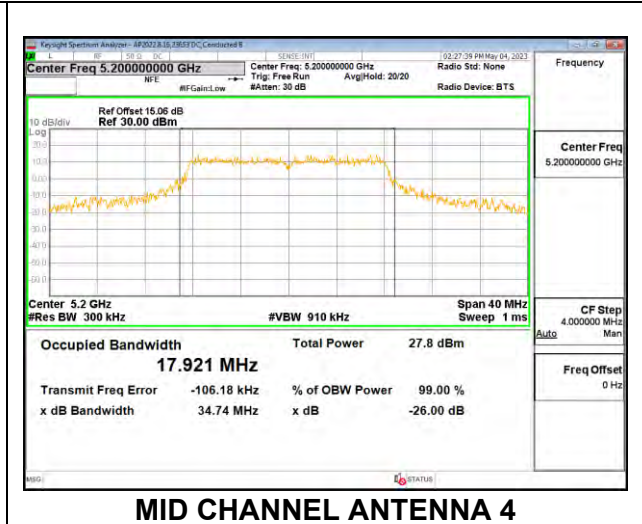
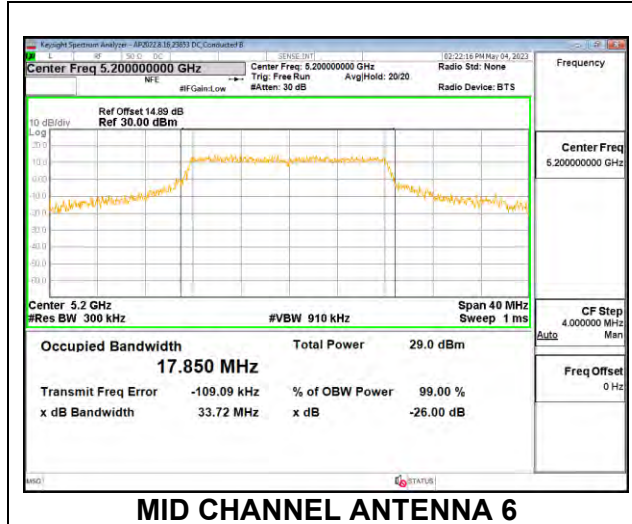
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	16.799
Mid	5200	16.822
High	5240	16.679



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Low	5180	17.094	17.319
Mid	5200	17.850	17.921
High	5240	17.522	17.100

**MID CHANNEL**

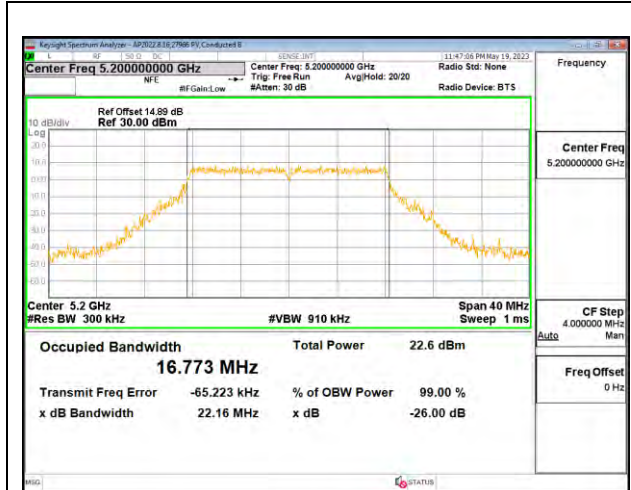




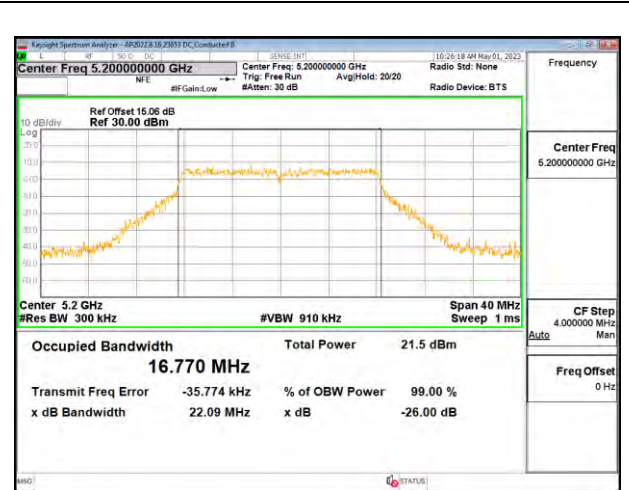
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5180	16.835	16.839	16.787	16.774
Mid	5200	16.773	16.770	16.730	16.771
High	5240	16.728	16.800	16.726	16.688

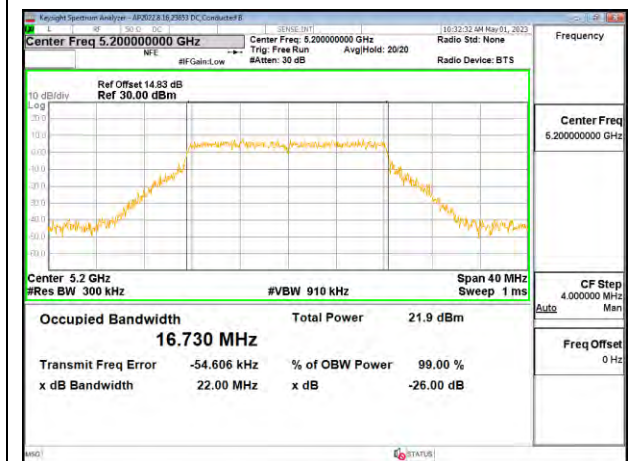
**MID CHANNEL**



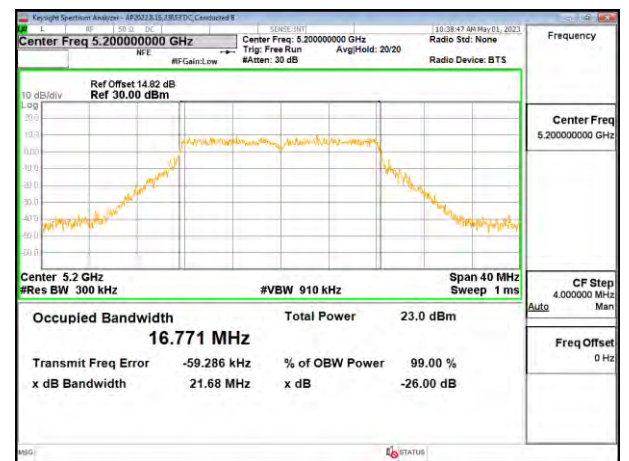
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

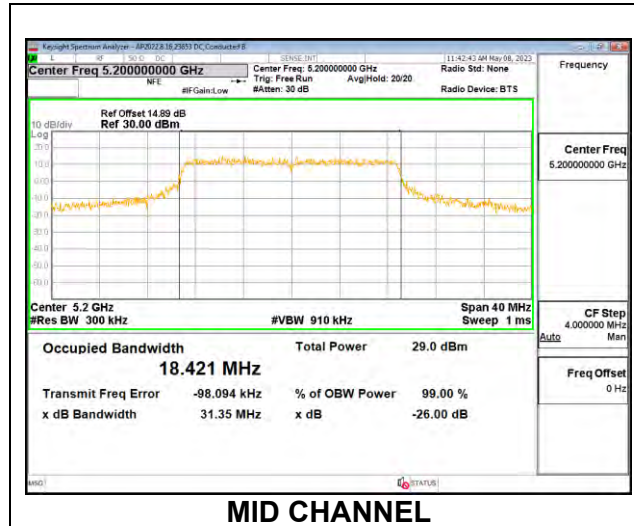


**MID CHANNEL ANTENNA 1**

### 9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

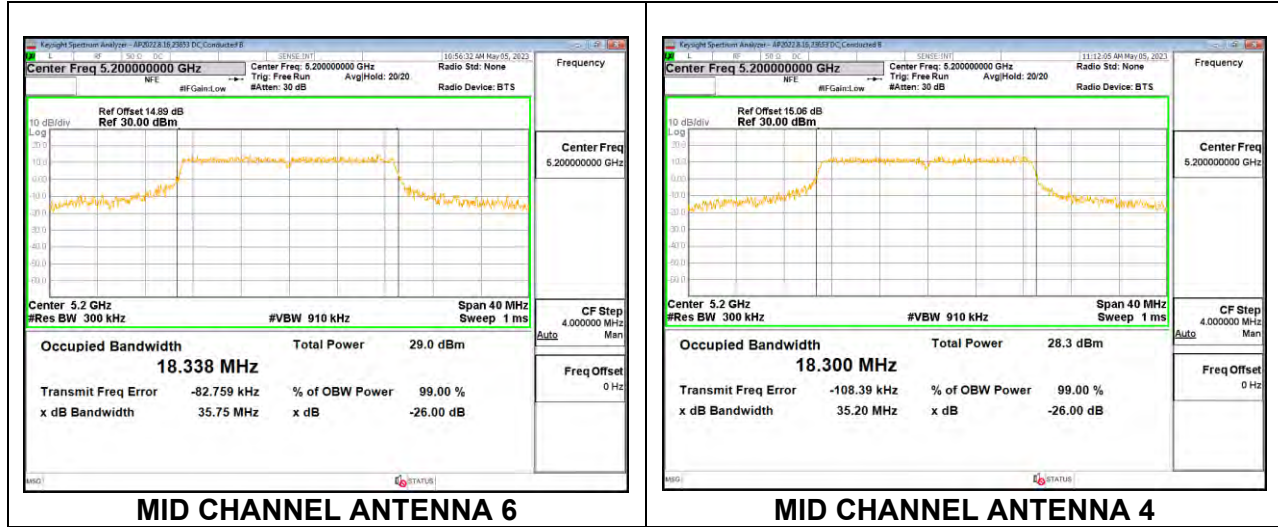
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	18.103
Mid	5200	18.421
High	5240	18.455



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Low	5180	18.015	18.044
Mid	5200	18.338	18.300
High	5240	18.341	18.020

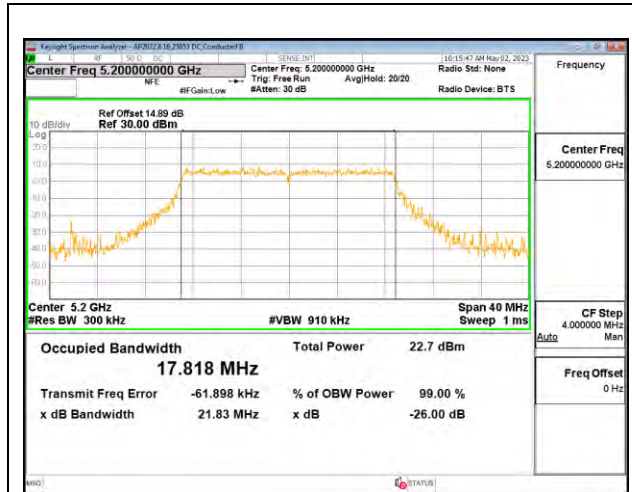
**MID CHANNEL**



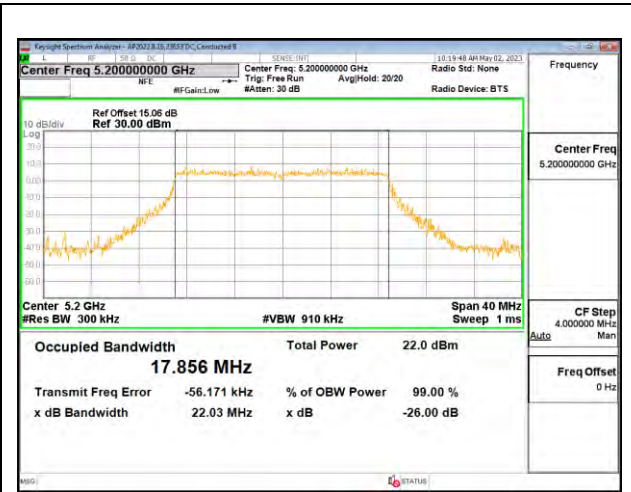
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5180	17.870	17.857	17.887	17.835
Mid	5200	17.818	17.856	17.889	17.811
High	5240	17.847	17.826	17.889	17.837

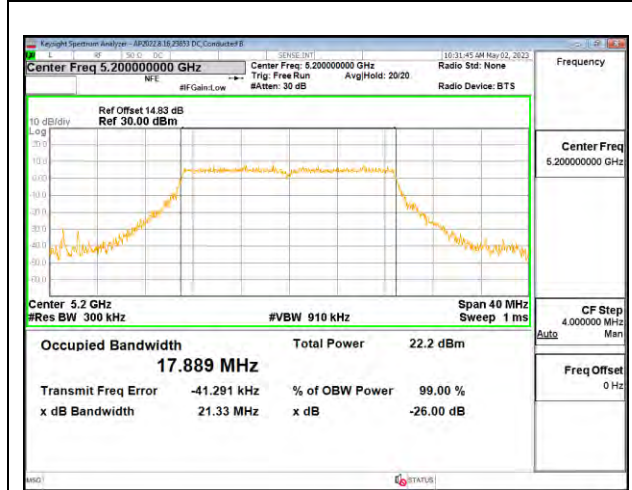
**MID CHANNEL**



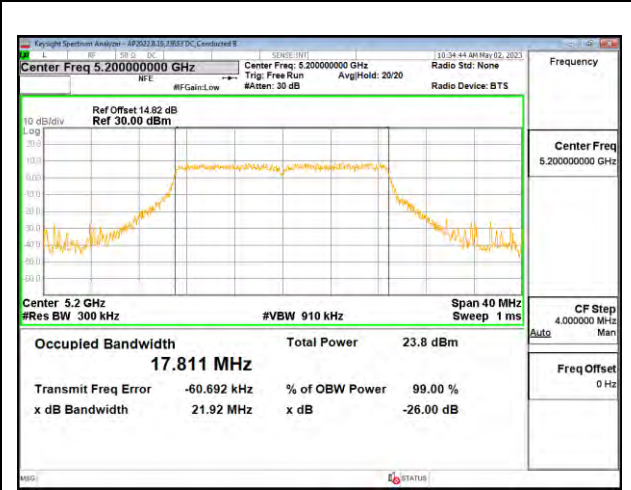
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

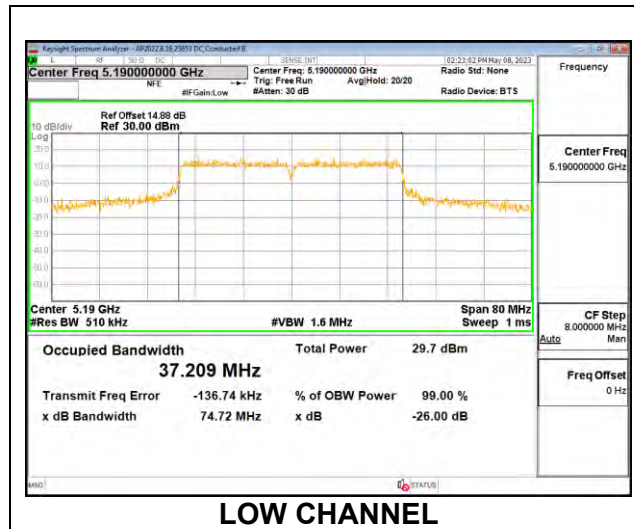


**MID CHANNEL ANTENNA 1**

### 9.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

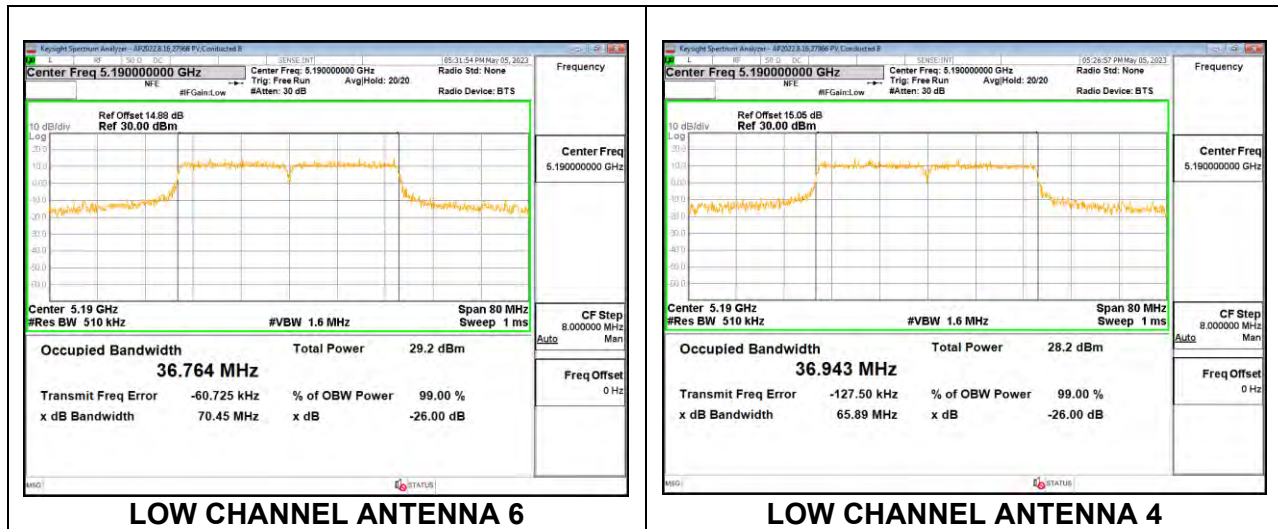
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	37.209
High	5230	37.101



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Low	5190	36.764	36.943
High	5230	37.139	36.717

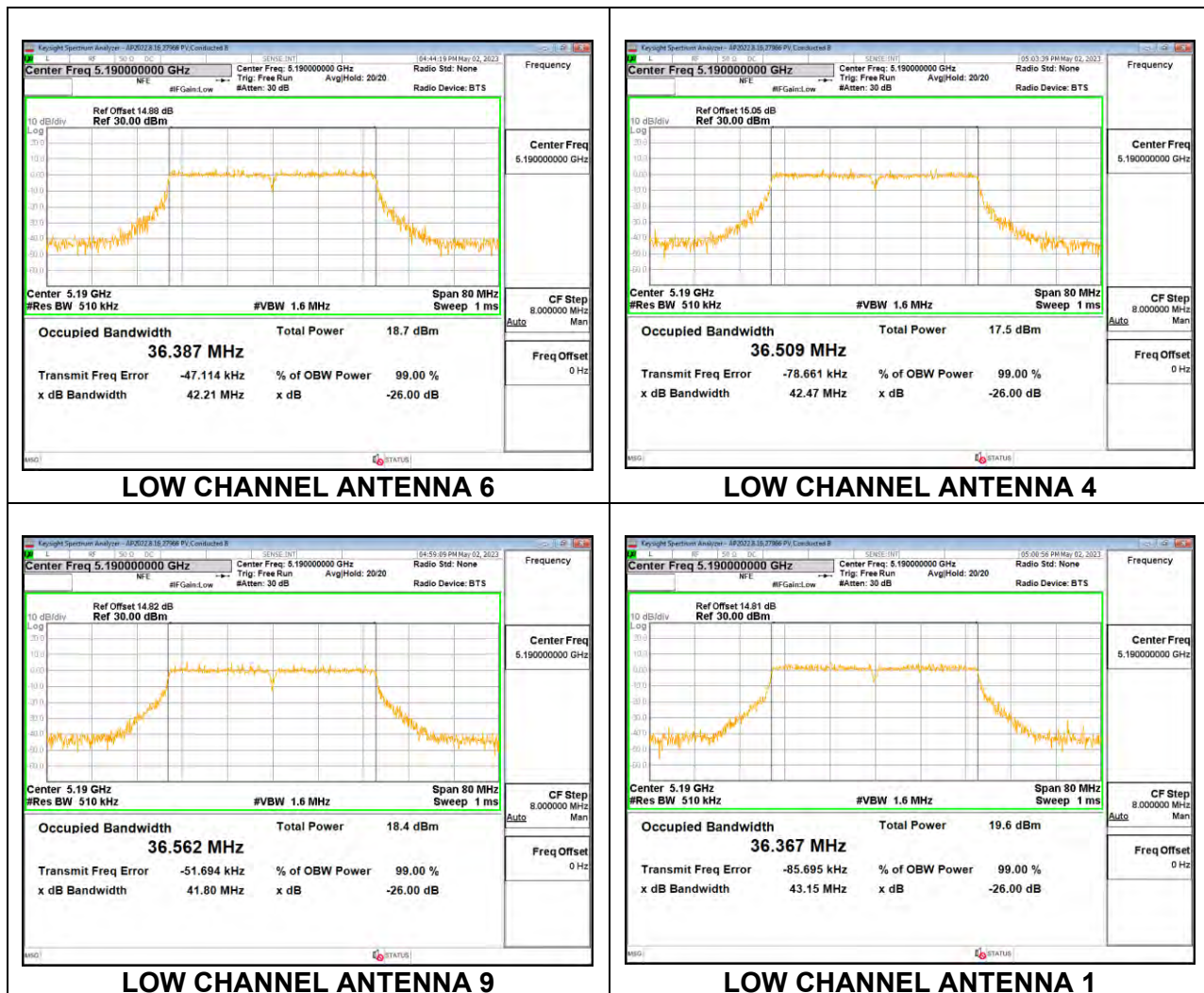
**LOW CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5190	36.387	36.509	36.562	36.367
High	5230	36.493	36.495	36.561	36.597

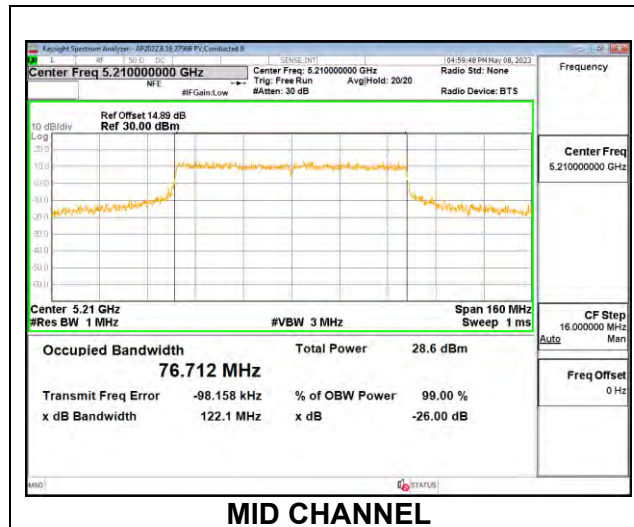
**LOW CHANNEL**



### 9.3.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	76.712

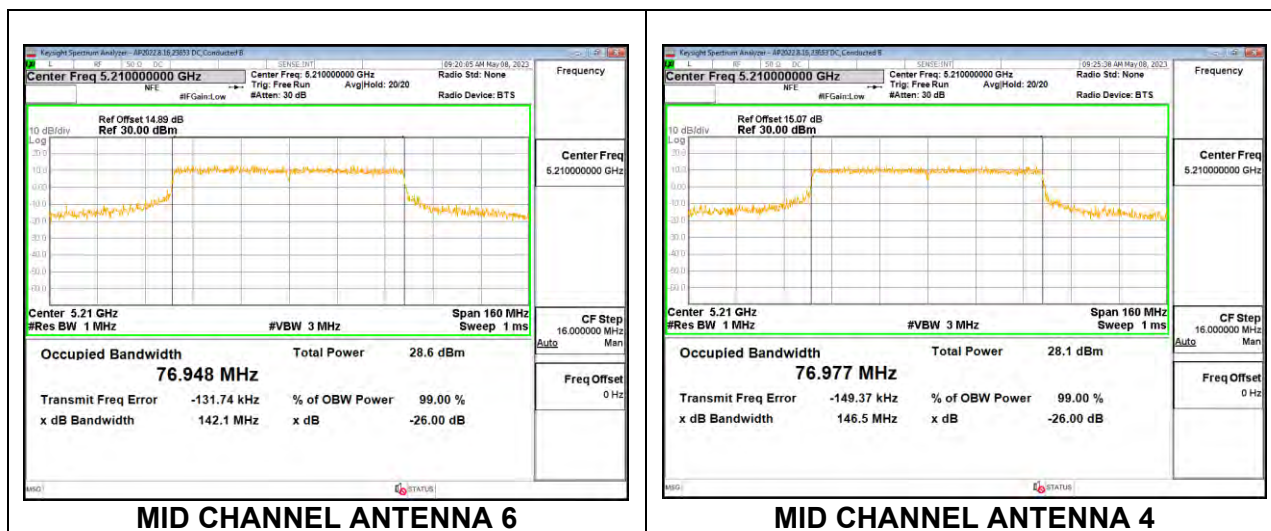




**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Mid	5210	76.948	76.977

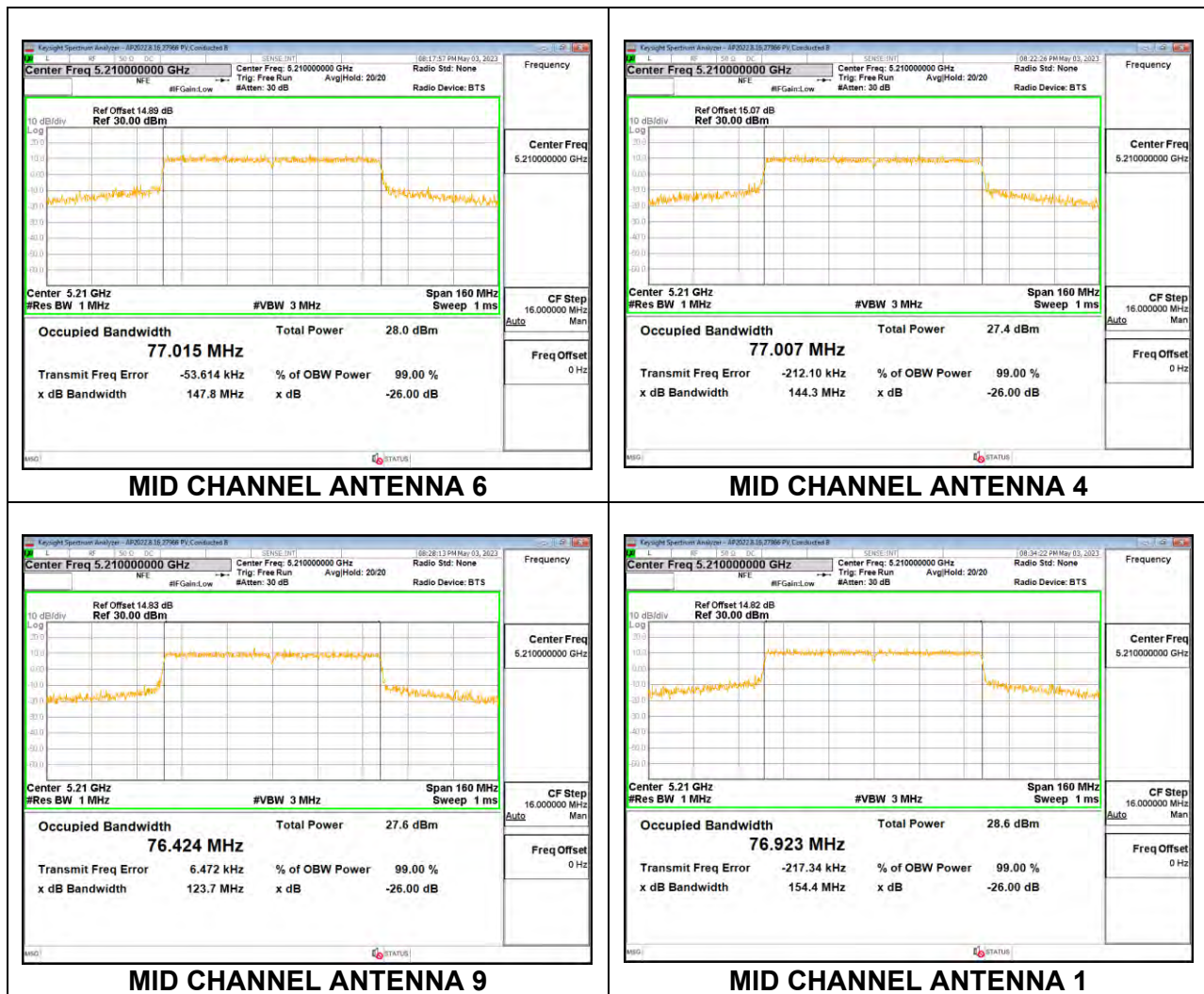
**MID CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Mid	5210	77.015	77.007	76.424	76.923

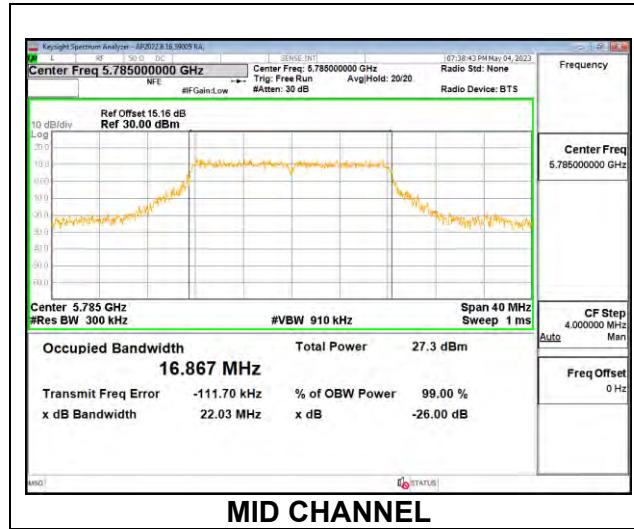
**MID CHANNEL**



### 9.3.5. 802.11a MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

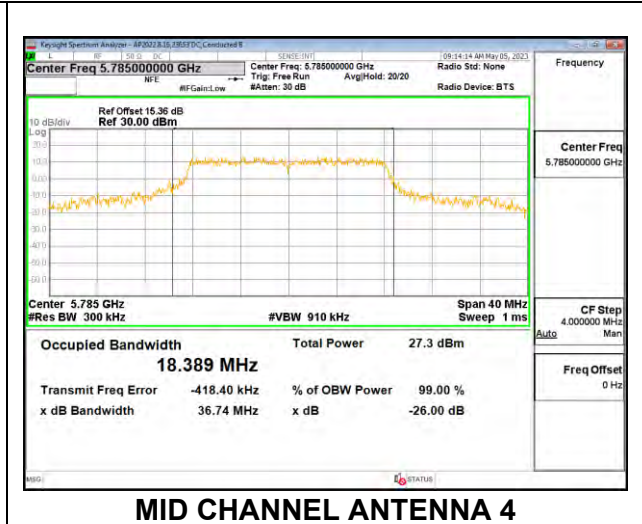
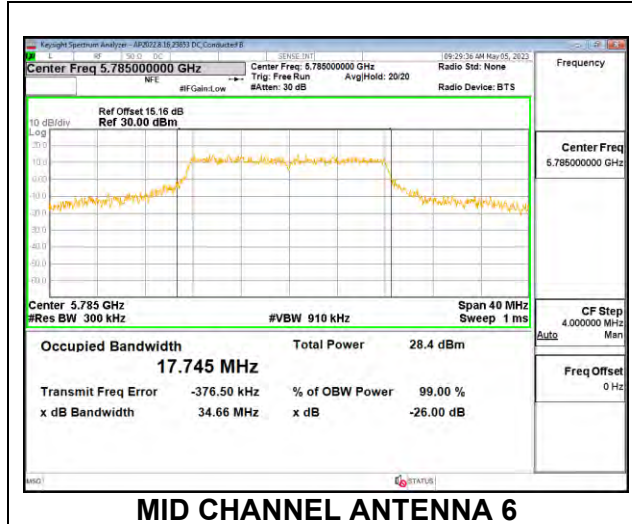
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.857
Mid	5785	16.867
High	5805	16.936



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Low	5745	18.511	19.495
Mid	5785	17.745	18.389
High	5805	18.232	19.570

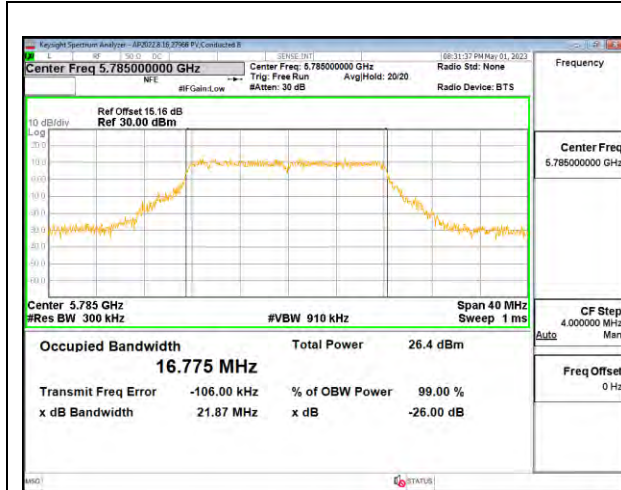
**MID CHANNEL**



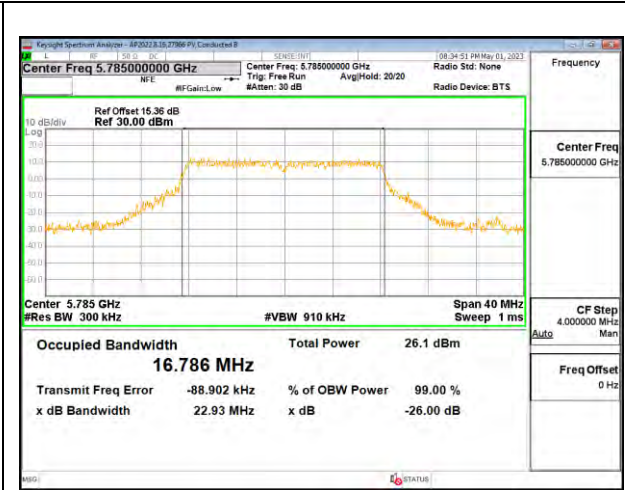
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5745	16.709	16.733	16.721	16.835
Mid	5785	16.775	16.786	16.893	17.062
High	5805	16.756	16.809	16.849	17.088

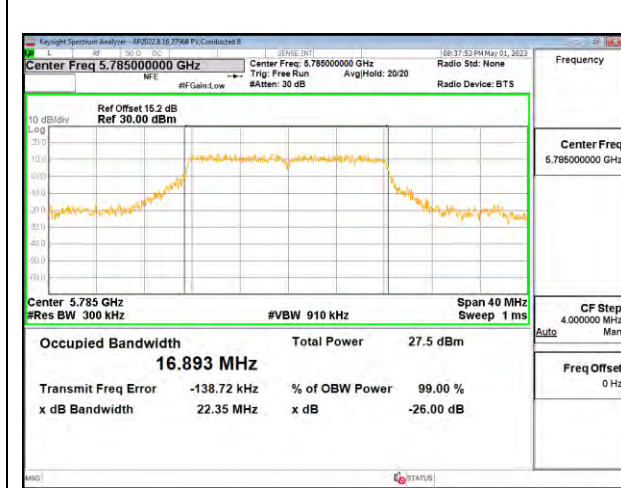
**MID CHANNEL**



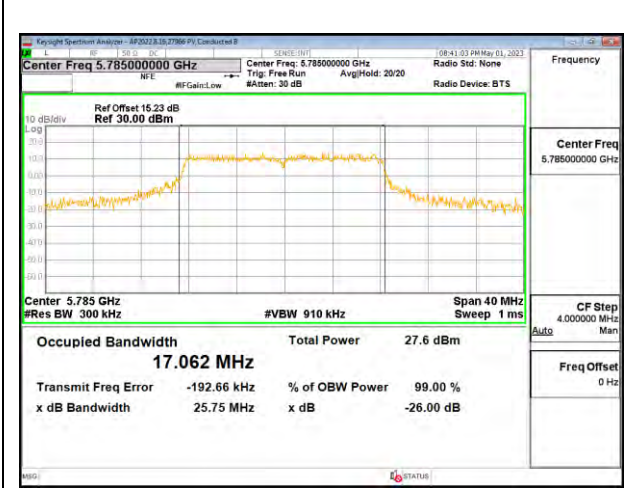
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

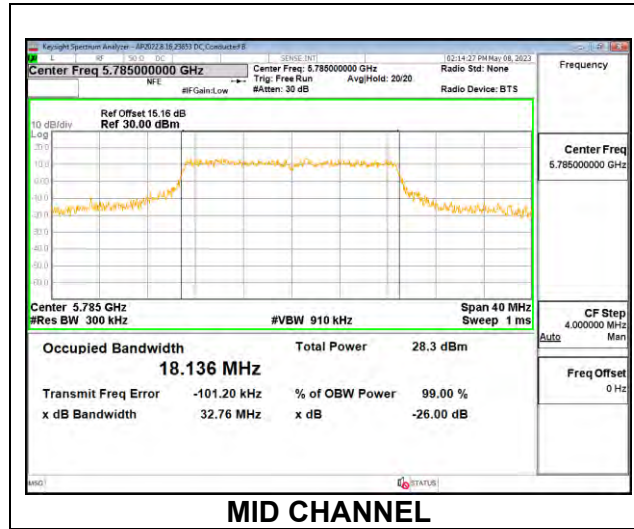


**MID CHANNEL ANTENNA 1**

### 9.3.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

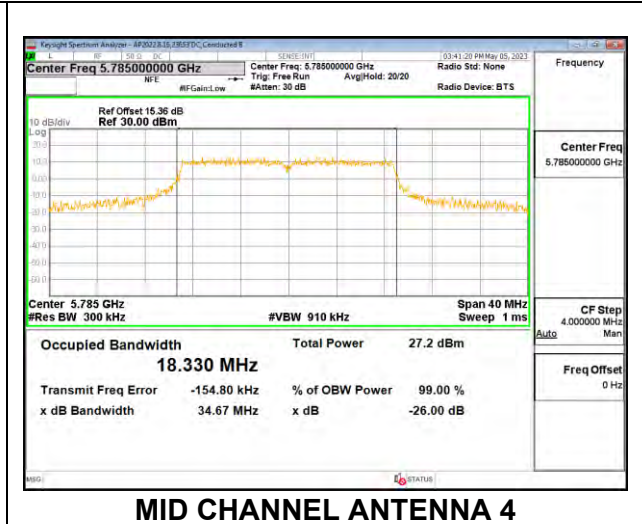
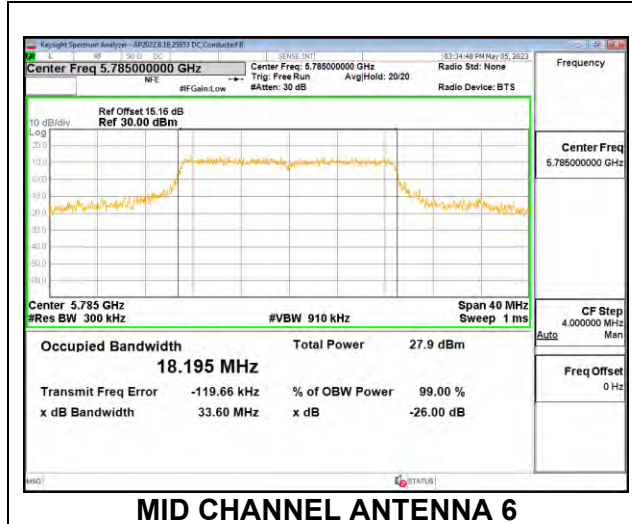
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	18.311
Mid	5785	18.136
High	5805	18.298



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Low	5745	18.294	18.446
Mid	5785	18.195	18.330
High	5805	18.322	18.456

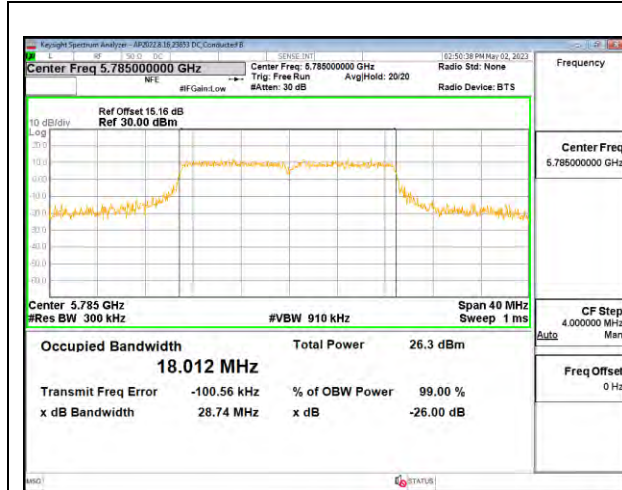
**MID CHANNEL**



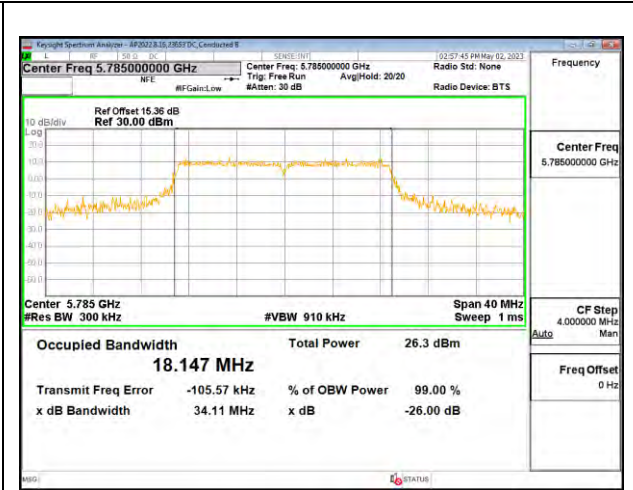
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5745	17.902	17.895	18.019	18.227
Mid	5785	18.012	18.147	18.253	19.255
High	5805	18.075	18.047	18.188	18.556

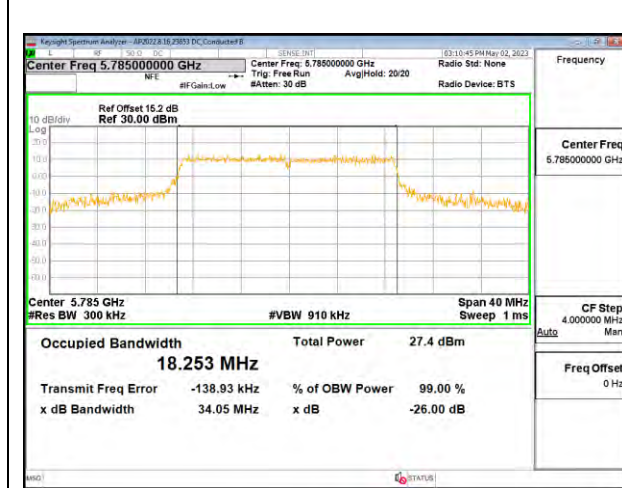
**MID CHANNEL**



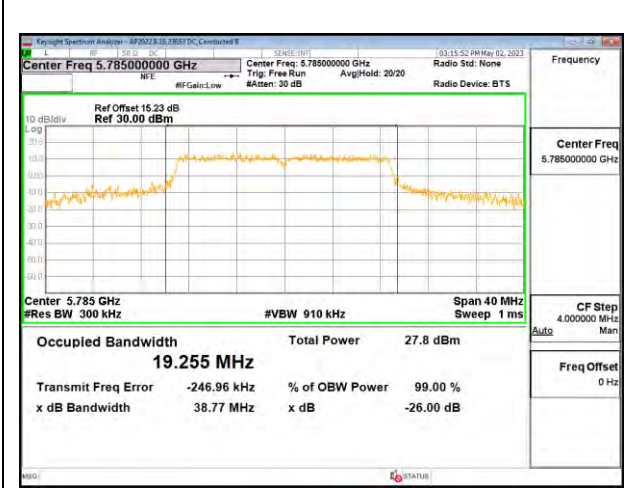
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**



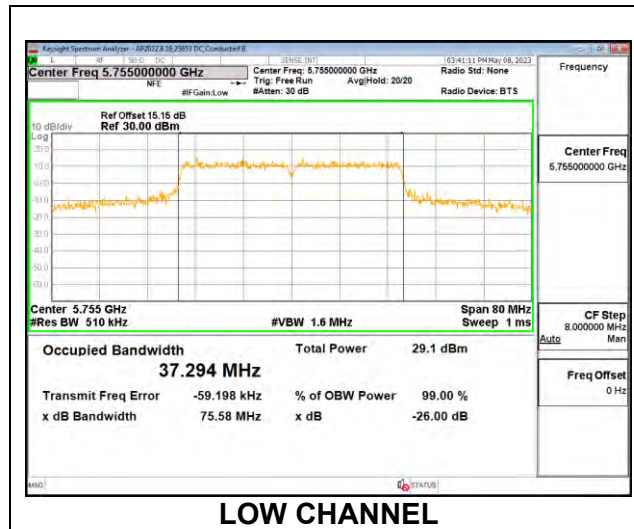
**MID CHANNEL ANTENNA 1**



### 9.3.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

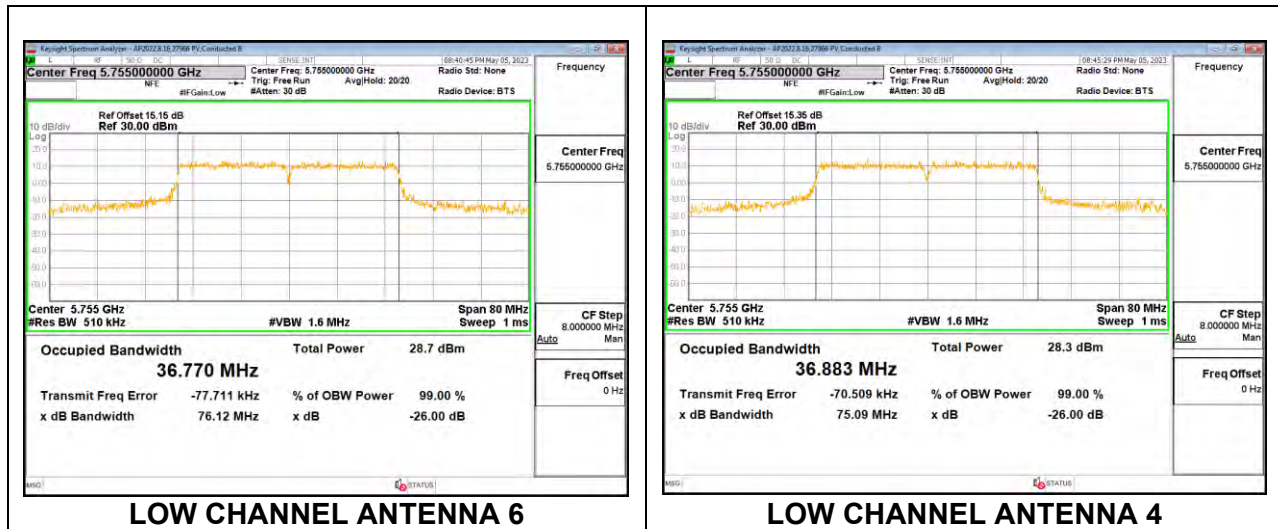
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	37.294
High	5795	37.380



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Low	5755	36.770	36.883
High	5795	36.724	36.810

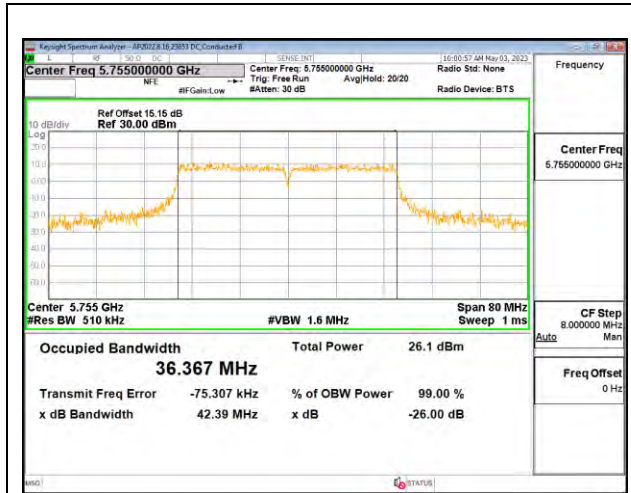
**LOW CHANNEL**



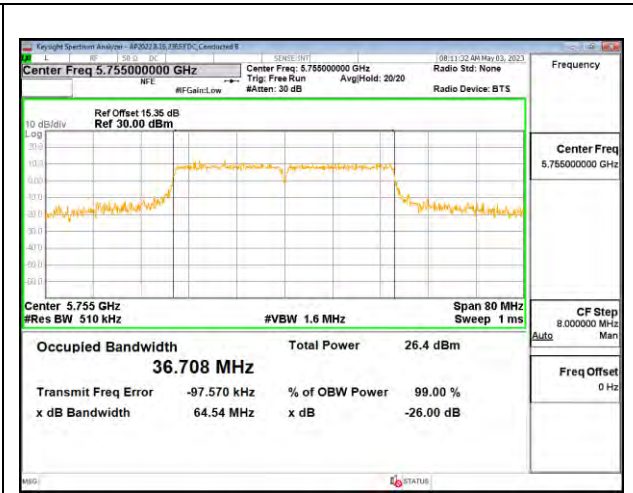
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Low	5755	36.367	36.708	36.906	36.793
High	5795	36.679	36.586	37.070	37.533

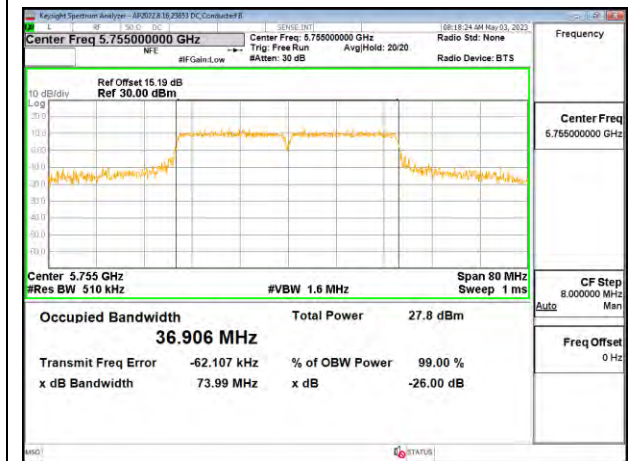
**LOW CHANNEL**



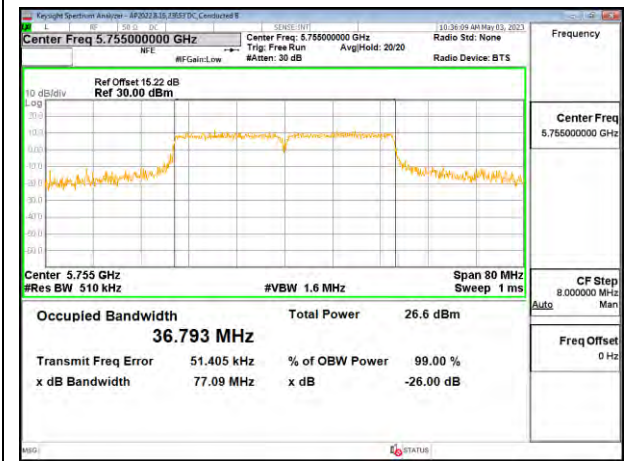
**LOW CHANNEL ANTENNA 6**



**LOW CHANNEL ANTENNA 4**



**LOW CHANNEL ANTENNA 9**

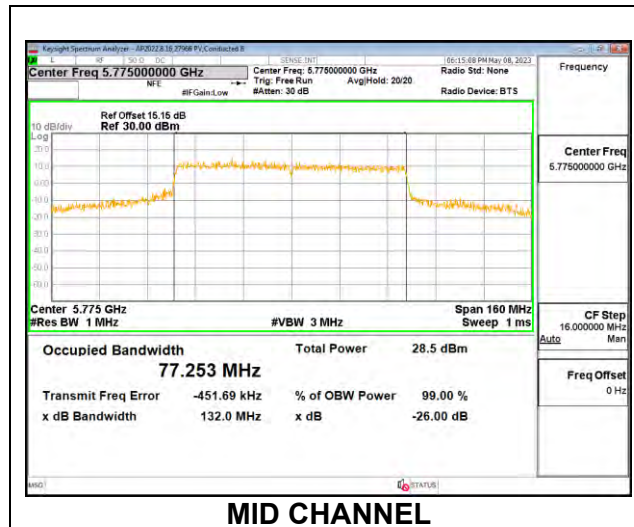


**LOW CHANNEL ANTENNA 1**

### 9.3.8. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

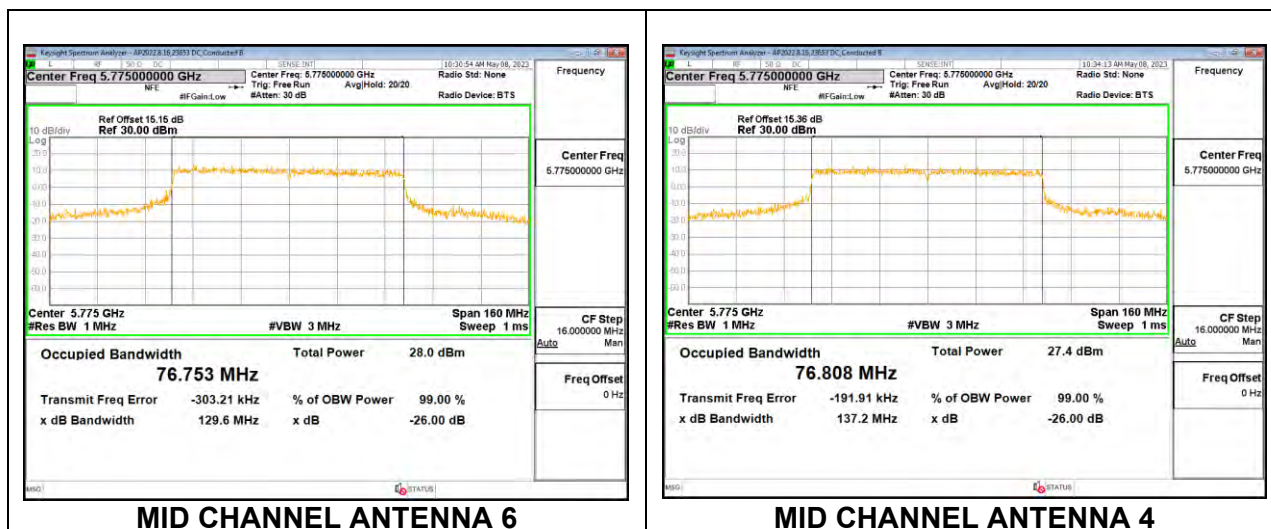
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5775	77.253



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)
Mid	5775	76.753	76.808

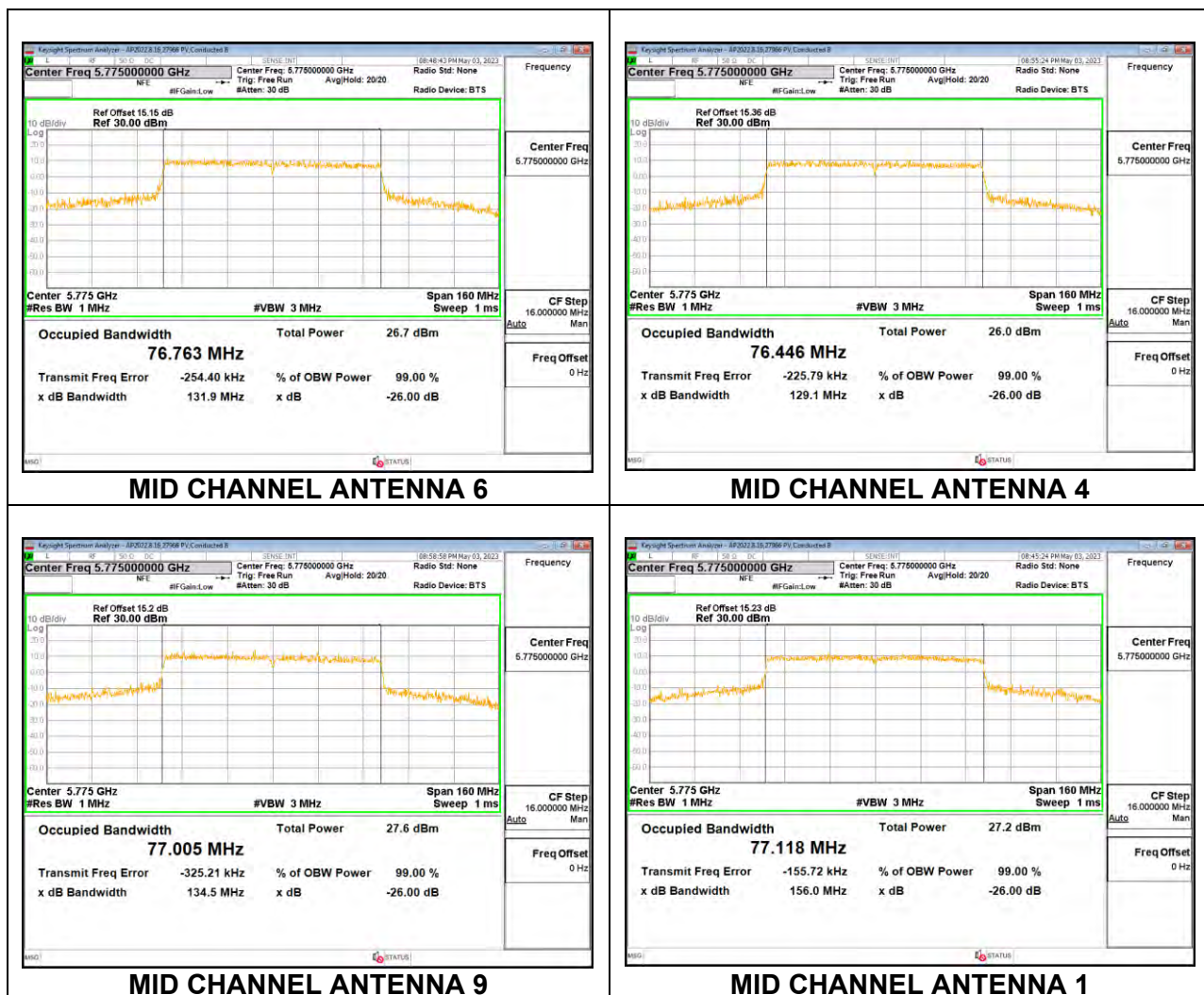
**MID CHANNEL**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 4 (MHz)	99% Bandwidth Antenna 9 (MHz)	99% Bandwidth Antenna 1 (MHz)
Mid	5775	76.763	76.446	77.005	77.118

**MID CHANNEL**



## **9.4. 6 dB BANDWIDTH**

### **LIMITS**

FCC §15.407 (e)

RSS-247 6.2.4.1

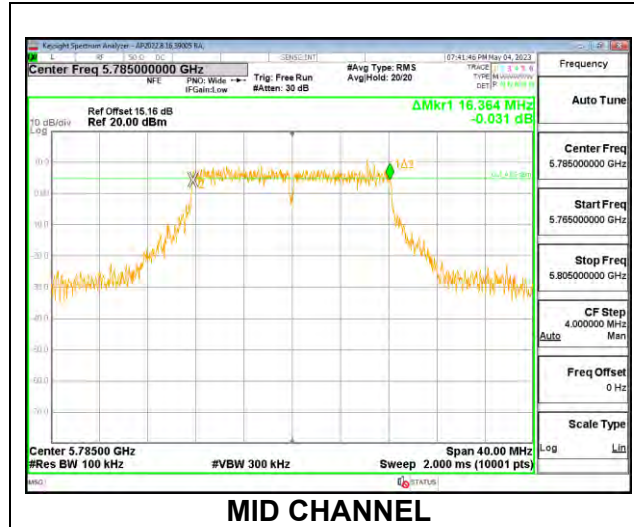
The minimum 6 dB bandwidth shall be at least 500 kHz.

### **RESULTS**

### 9.4.1. 802.11a MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.384	0.5
Mid	5785	16.364	0.5
High	5805	16.344	0.5

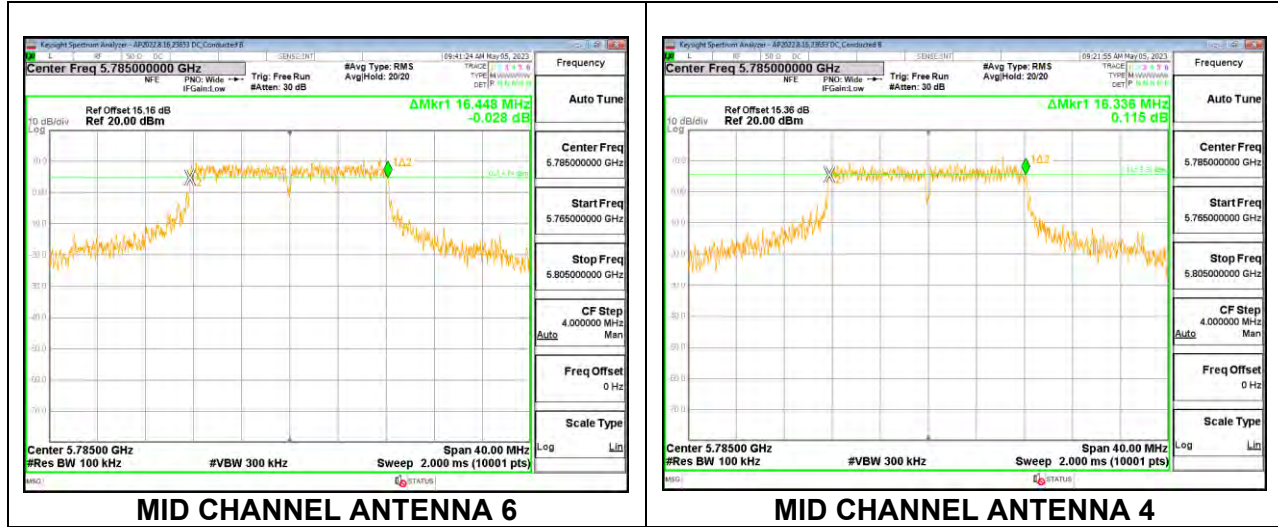




**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	Minimum Limit (MHz)
Low	5745	16.512	16.308	0.5
Mid	5785	16.448	16.336	0.5
High	5805	16.296	16.552	0.5

**MID CHANNEL**



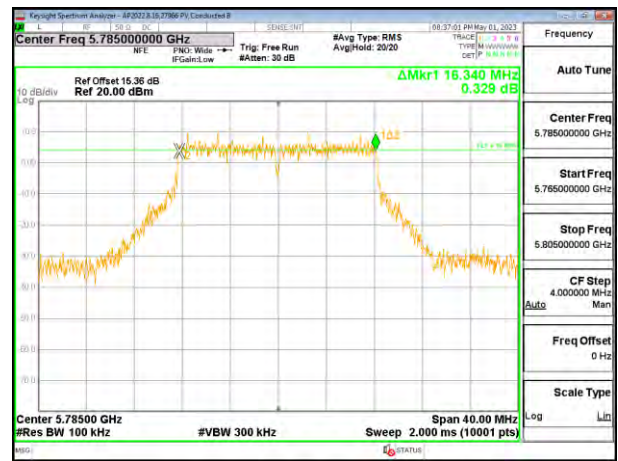
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	6 dB BW Antenna 9 (MHz)	6 dB BW Antenna 1 (MHz)	Minimum Limit (MHz)
Low	5745	16.332	16.380	16.372	16.368	0.5
Mid	5785	16.348	16.340	16.336	16.332	0.5
High	5805	16.388	16.352	16.276	16.376	0.5

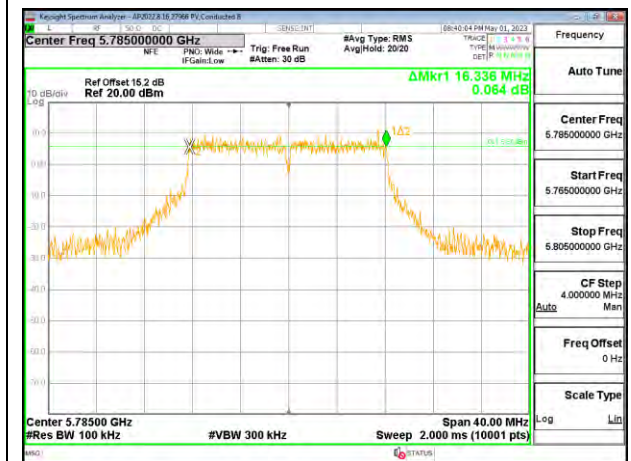
**MID CHANNEL**



**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

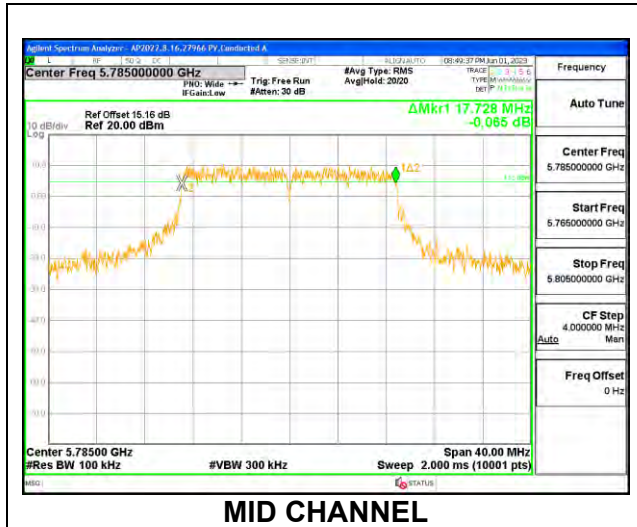


**MID CHANNEL ANTENNA 1**

### 9.4.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

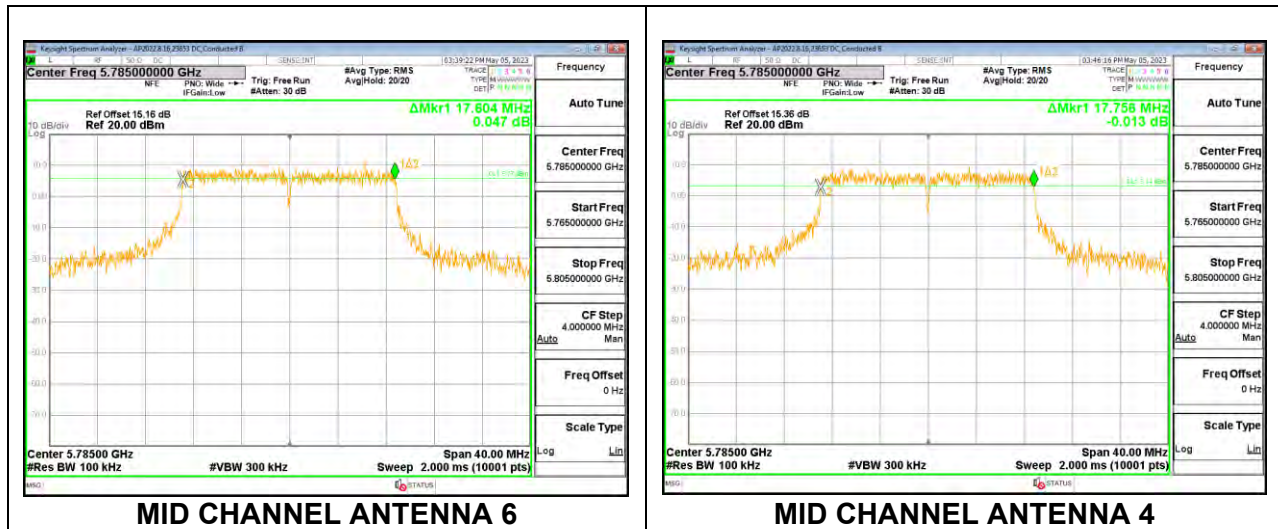
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.776	0.5
Mid	5785	17.728	0.5
High	5805	17.584	0.5



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	Minimum Limit (MHz)
Low	5745	17.596	17.608	0.5
Mid	5785	17.604	17.756	0.5
High	5805	17.568	17.624	0.5

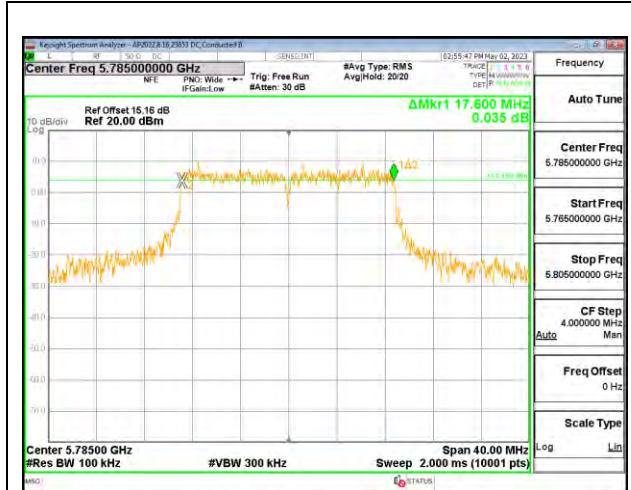
**MID CHANNEL**



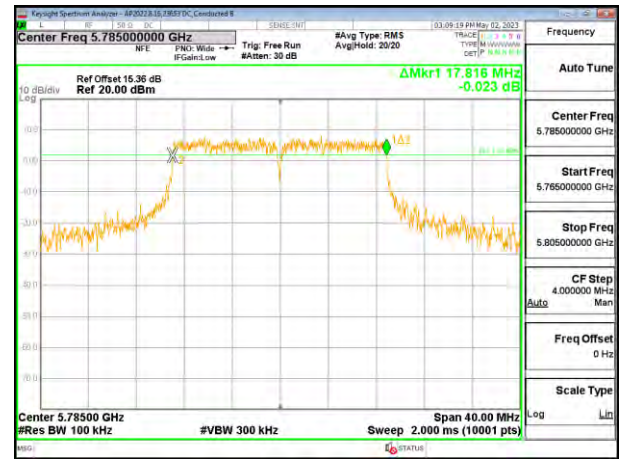
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	6 dB BW Antenna 9 (MHz)	6 dB BW Antenna 1 (MHz)	Minimum Limit (MHz)
Low	5745	17.848	17.660	17.556	17.704	0.5
Mid	5785	17.600	17.816	17.584	17.544	0.5
High	5805	17.736	17.788	17.816	17.676	0.5

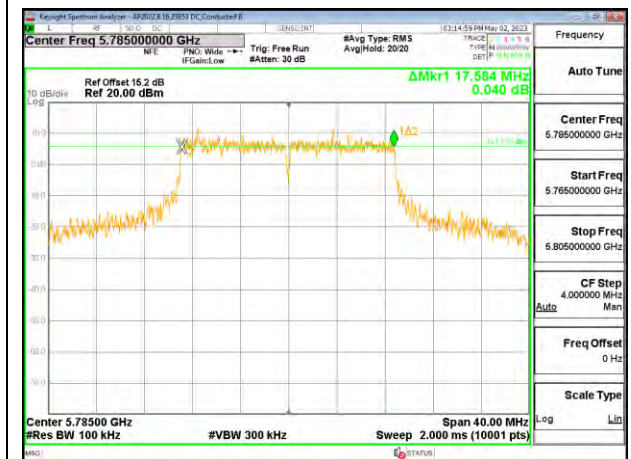
**MID CHANNEL**



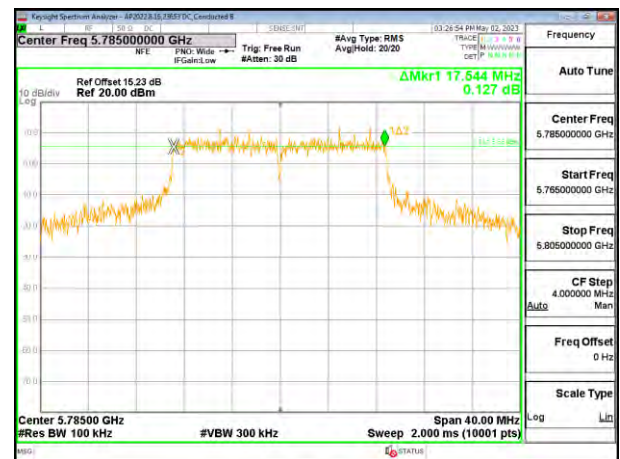
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**

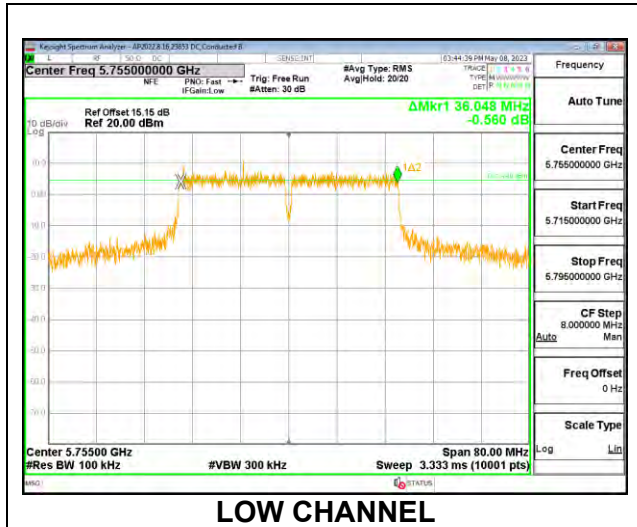


**MID CHANNEL ANTENNA 1**

### 9.4.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

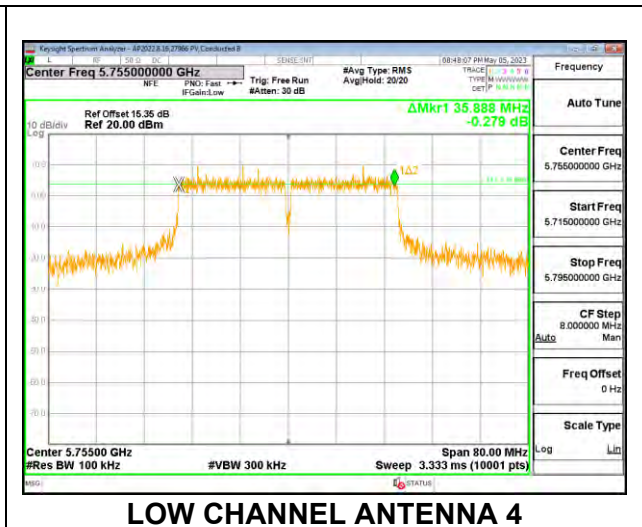
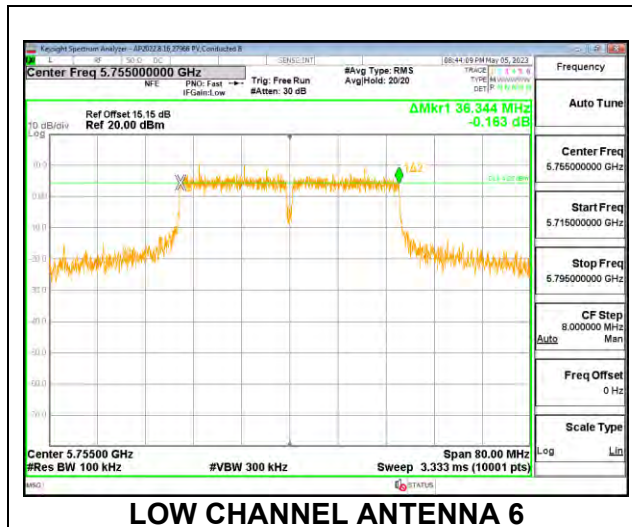
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	36.048	0.5
High	5795	36.488	0.5



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	Minimum Limit (MHz)
Low	5755	36.344	35.888	0.5
High	5795	36.336	36.096	0.5

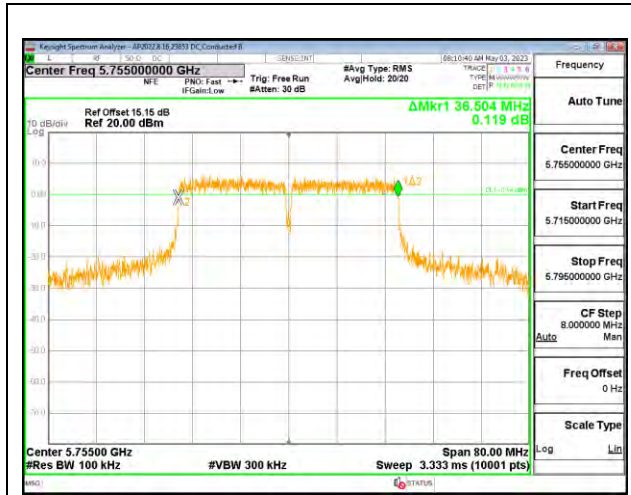
**LOW CHANNEL**



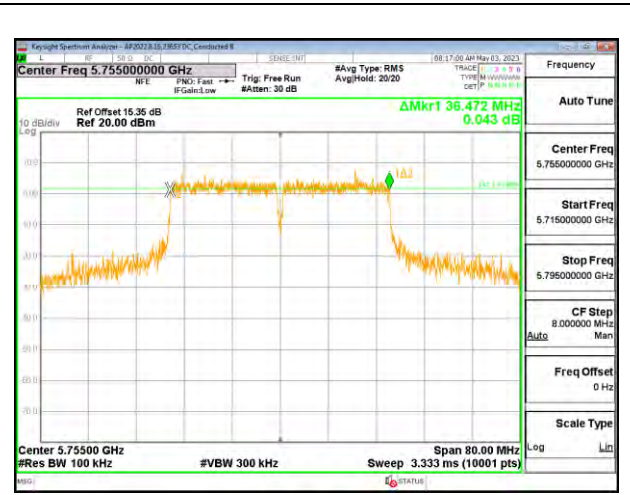
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	6 dB BW Antenna 9 (MHz)	6 dB BW Antenna 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.504	36.472	36.480	36.048	0.5
High	5795	36.528	36.464	36.504	36.512	0.5

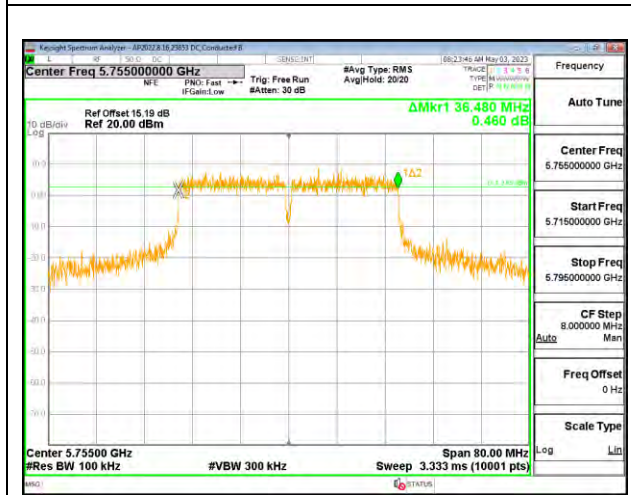
**LOW CHANNEL**



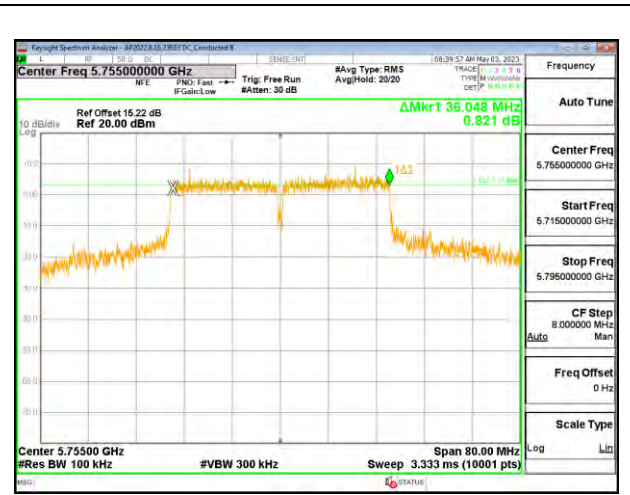
**LOW CHANNEL ANTENNA 6**



**LOW CHANNEL ANTENNA 4**



**LOW CHANNEL ANTENNA 9**



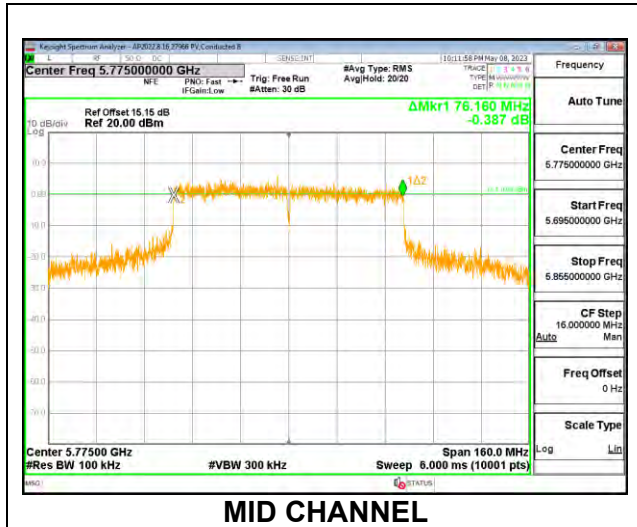
**LOW CHANNEL ANTENNA 1**



### 9.4.4. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE

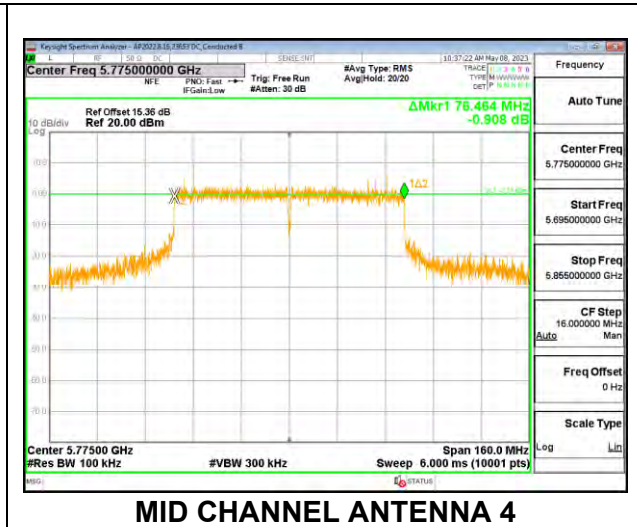
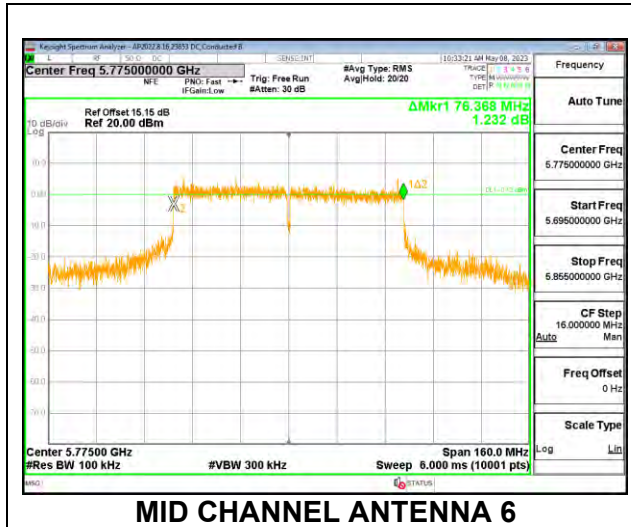
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Mid	5775	76.160	0.5



**2TX Antenna 6 + Antenna 4 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	Minimum Limit (MHz)
Mid	5775	76.368	76.464	0.5

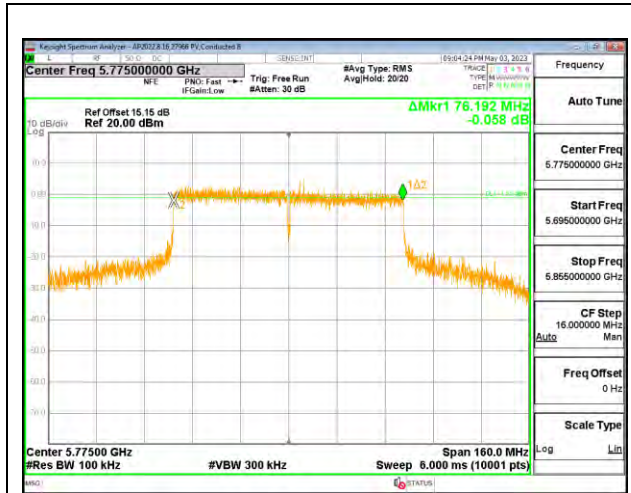
**MID CHANNEL**



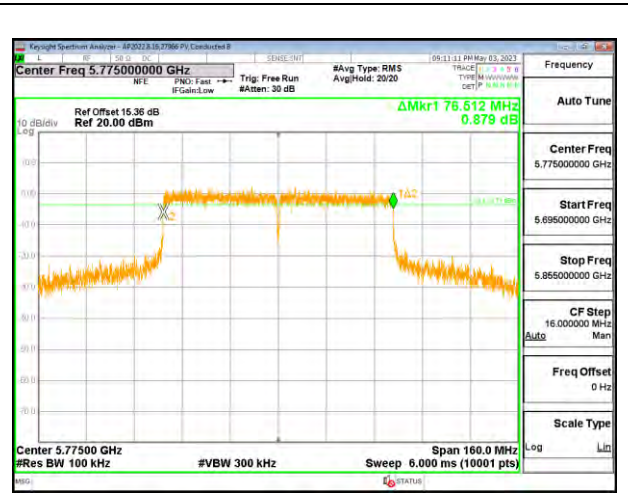
**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

Channel	Frequency (MHz)	6 dB BW Antenna 6 (MHz)	6 dB BW Antenna 4 (MHz)	6 dB BW Antenna 9 (MHz)	6 dB BW Antenna 1 (MHz)	Minimum Limit (MHz)
Mid	5775	76.192	76.512	76.512	76.192	0.5

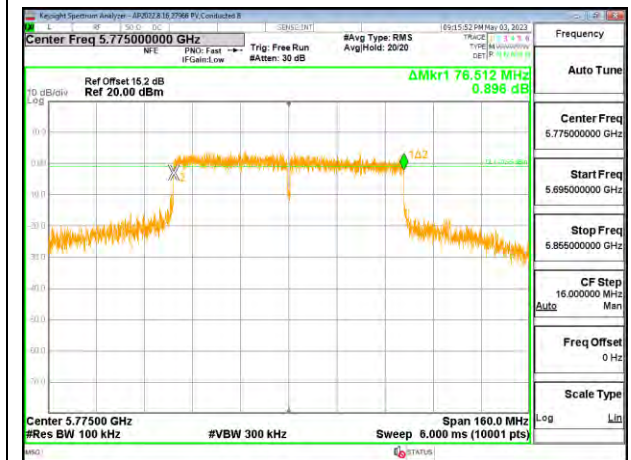
**MID CHANNEL**



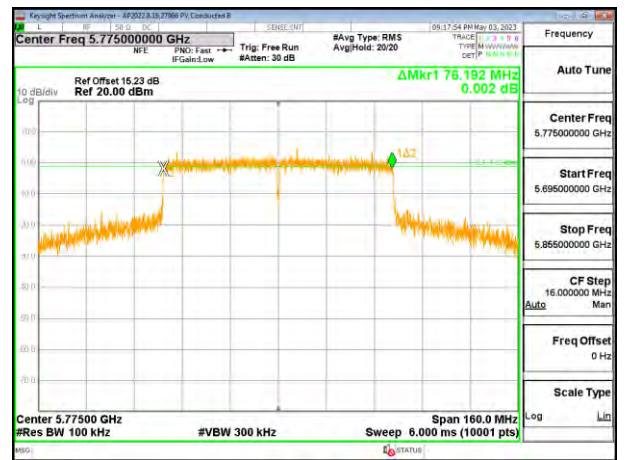
**MID CHANNEL ANTENNA 6**



**MID CHANNEL ANTENNA 4**



**MID CHANNEL ANTENNA 9**



**MID CHANNEL ANTENNA 1**

## 9.5. OUTPUT POWER AND PSD

### LIMITS

#### **FCC §15.407**

##### **Band 5.15–5.25 GHz**

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### **Band 5.725-5.85 GHz**

The maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

## RSS-247

### Band 5.15-5.25 GHz

The maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### Band 5.725-5.85 GHz

The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

## TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02, Section E.3.b (Method PM-G) and for straddles channels KDB 789033 D02, Section E.2.b (Method SA-1) was used.

The measurement method used for power spectral density is KDB 789033 D02, Section F

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Gated average output power was read directly from power meter.

## DIRECTIONAL ANTENNA GAIN

### For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

### For 2 TX:

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	Antenna 6 Antenna Gain (dBi)	Antenna 4 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
5.2	3.89	3.89	3.89	6.90
5.8	3.62	3.62	3.62	6.63

**For 4 TX:**

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	Antenn 6 Antenna Gain (dBi)	Antenna Antenna Gain (dBi)	Antenna Antenna Gain (dBi)	Antenna 1 Antenna Gain (dBi)	Uncorrelated Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
5.2	3.89	3.89	3.89	3.89	3.89	9.91
5.8	3.62	3.62	3.62	3.62	3.62	9.64

**DIRECTIONAL GAIN CALCULATION**

ANSI C63.10-2013 section 14.4.3

In the commonly occurring case of  $N_{ANT}$  transmit antennas, each with the same directional gain  $G_{ANT}$  dBi, being driven by  $N_{ANT}$  transmitter outputs of equal power, directional gain shall be computed as follows:

- a) If any transmit signals are correlated with each other:  
 Directional gain =  $G_{ANT} + 10 \log (N_{ANT})$  dBi
- b) If all transmit signals are completely uncorrelated with each other:  
 Directional gain =  $G_{ANT}$

Sample Calculation:

Ant1=3.89, Ant2=3.89, Ant3=3.89, Ant4=3.89

2Tx: Correlated Antenna gain= $3.89 + 10\log (2) =6.9$  dBi  
 4Tx: Correlated Antenna gain= $3.89 + 10\log (4) =9.91$ dBi

**RESULTS**

**9.5.1. 802.11a MODE IN THE 5.2 GHz BAND**

**1TX Antenna 6 MODE (FCC)**

<b>Test Engineer:</b>	RA 39005 and PV 27966
<b>Test Date:</b>	2023-06-01 to 2023-07-31

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	3.89	30.00	17.00
Mid	5200	3.89	30.00	17.00
High	5240	3.89	30.00	17.00

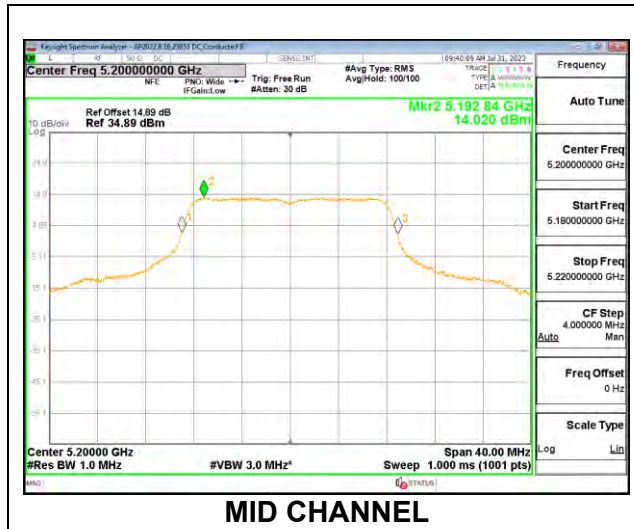
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	20.96	20.96	30.00	-9.04
Mid	5200	26.06	26.06	30.00	-3.94
High	5240	25.58	25.58	30.00	-4.42

**PSD Results**

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	8.667	8.67	17.00	-8.33
Mid	5200	14.020	14.02	17.00	-2.98
High	5240	13.304	13.30	17.00	-3.70





**1TX Antenna 6 MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-24

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5180	16.799
Mid	5200	16.822
High	5240	16.679

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5180	22.25	10.00
Mid	5200	22.26	10.00
High	5240	22.22	10.00

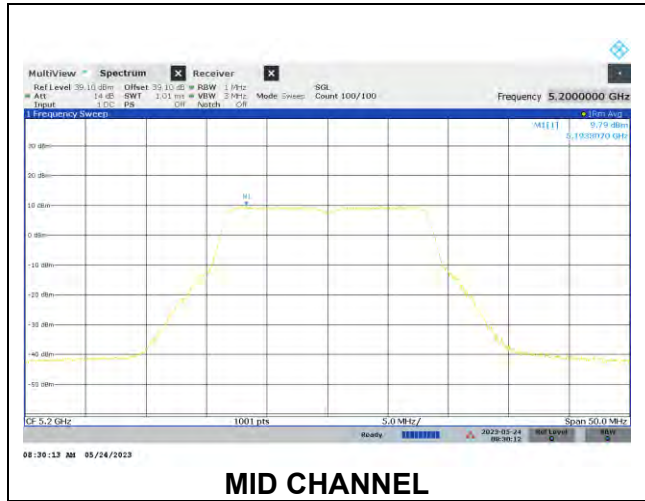
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5180	21.81	21.81	22.25	-0.44
Mid	5200	21.73	21.73	22.26	-0.52
High	5240	21.39	21.39	22.22	-0.83

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.82	9.82	10.00	-0.18
Mid	5200	9.79	9.79	10.00	-0.21
High	5240	9.44	9.44	10.00	-0.56



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC)**

<b>Test Engineer:</b>	DC 23653 and PV 27966
<b>Test Date:</b>	2023-05-04 to 2023-06-08

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	3.89	6.90	30.00	16.10
Mid	5200	3.89	6.90	30.00	16.10
High	5240	3.89	6.90	30.00	16.10

<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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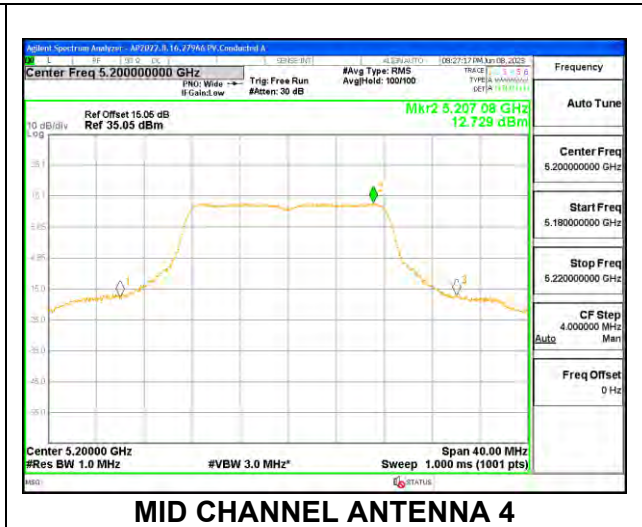
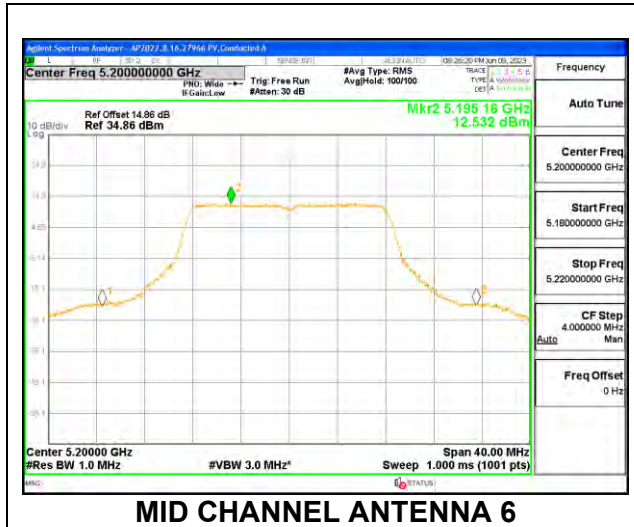
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	20.11	20.31	23.22	30.00	-6.78
Mid	5200	24.68	24.75	27.73	30.00	-2.27
High	5240	25.57	25.73	28.66	30.00	-1.34

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/1MHz)	Antenna 4 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	7.665	7.749	10.72	16.10	-5.38
Mid	5200	12.532	12.729	15.64	16.10	-0.46
High	5240	13.364	12.294	15.87	16.10	-0.23

### MID CHANNEL



**2TX Antenna 6 + Antenna 4 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-23

(Note: IC Output Power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5180	17.094
Mid	5200	17.850
High	5240	17.100

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5180	22.33	10.00
Mid	5200	22.52	10.00
High	5240	22.33	10.00

<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5180	19.51	19.51	22.33	-2.82
Mid	5200	18.91	18.91	22.52	-3.60
High	5240	18.69	18.69	22.33	-3.64

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.61	9.61	10.00	-0.39
Mid	5200	9.49	9.49	10.00	-0.51
High	5240	9.75	9.75	10.00	-0.25



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC)**

<b>Test Engineer:</b>	DC 23653 and PV 27966
<b>Test Date:</b>	2023-05-01 to 2023-06-08

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	3.89	9.91	30.00	13.09
Mid	5200	3.89	9.91	30.00	13.09
High	5240	3.89	9.91	30.00	13.09

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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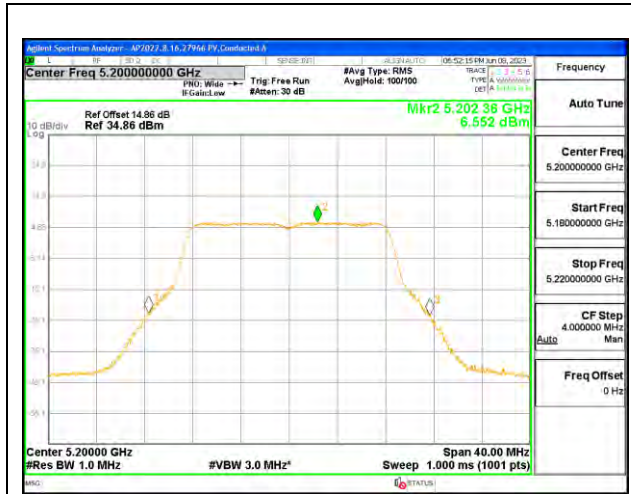
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	16.48	16.63	16.10	16.95	22.57	30.00	-7.43
Mid	5200	18.62	18.72	18.21	18.81	24.62	30.00	-5.38
High	5240	18.56	18.65	18.01	19.00	24.59	30.00	-5.41

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/1MHz)	Antenna 4 Meas PSD (dBm/1MHz)	Antenna 9 Meas PSD (dBm/1MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	4.328	4.564	4.068	4.993	10.52	13.09	-2.57
Mid	5200	6.552	6.699	6.146	6.740	12.56	13.09	-0.53
High	5240	6.799	6.233	6.522	7.717	12.88	13.09	-0.21

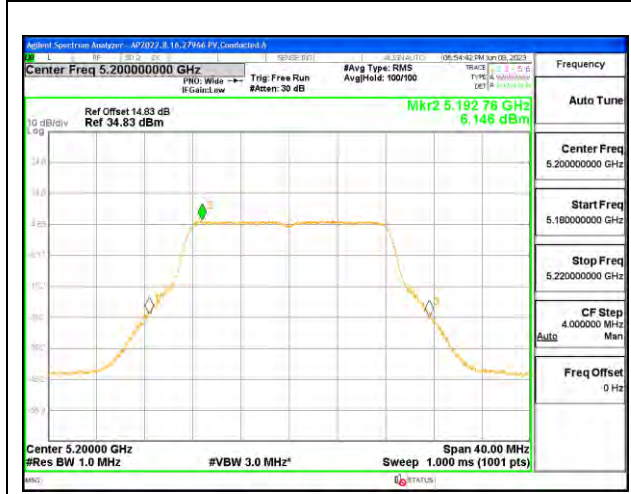
MID CHANNEL



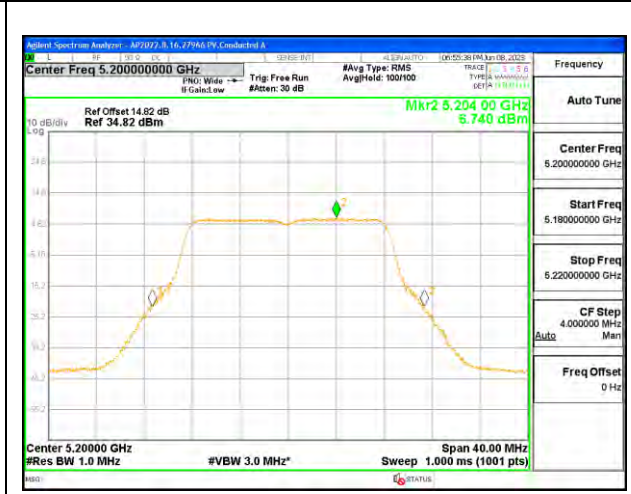
MID CHANNEL ANTENNA 6



MID CHANNEL ANTENNA 4



MID CHANNEL ANTENNA 9



MID CHANNEL ANTENNA 1



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-22

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5180	16.774
Mid	5200	16.770
High	5240	16.688

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5180	22.25	10.00
Mid	5200	22.25	10.00
High	5240	22.22	10.00

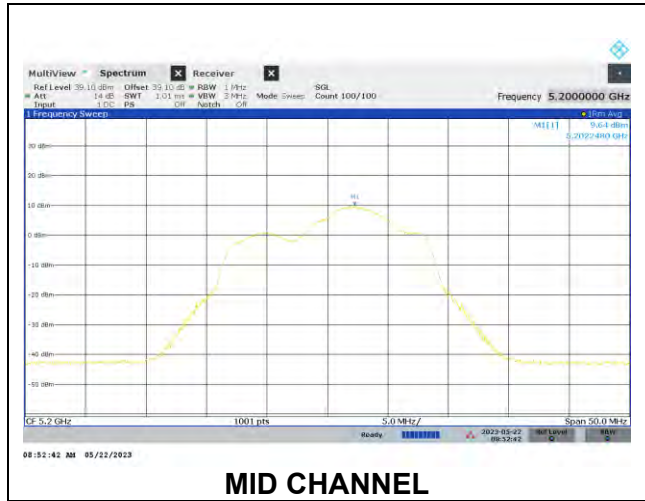
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5180	17.38	17.38	22.25	-4.87
Mid	5200	16.52	16.52	22.25	-5.72
High	5240	17.17	17.17	22.22	-5.05

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.60	9.60	10.00	-0.40
Mid	5200	9.64	9.64	10.00	-0.36
High	5240	9.50	9.50	10.00	-0.50



### 9.5.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE (FCC)

<b>Test Engineer:</b>	DC 23653 and PV 27966
<b>Test Date:</b>	2023-05-08 to 2023-06-01

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5180	3.89	30.00	17.00
Mid	5200	3.89	30.00	17.00
High	5240	3.89	30.00	17.00

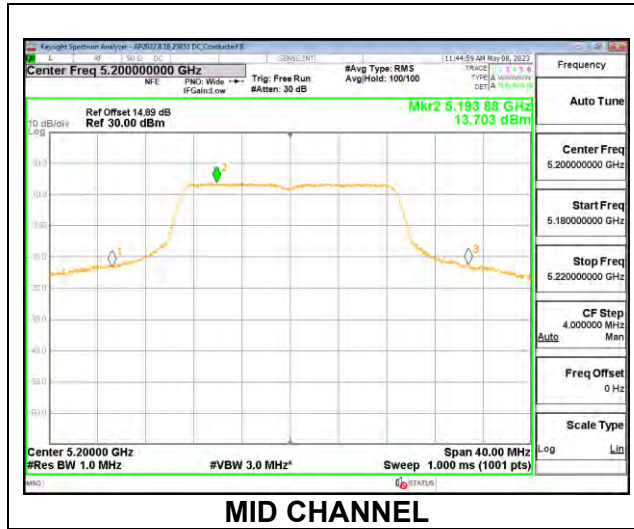
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	21.35	21.35	30.00	-8.65
Mid	5200	25.96	25.96	30.00	-4.04
High	5240	25.57	25.57	30.00	-4.43

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.066	9.07	17.00	-7.93
Mid	5200	13.703	13.70	17.00	-3.30
High	5240	13.361	13.36	17.00	-3.64



**1TX Antenna 6 MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-24

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5180	18.103
Mid	5200	18.421
High	5240	18.455

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5180	22.58	10.00
Mid	5200	22.65	10.00
High	5240	22.66	10.00

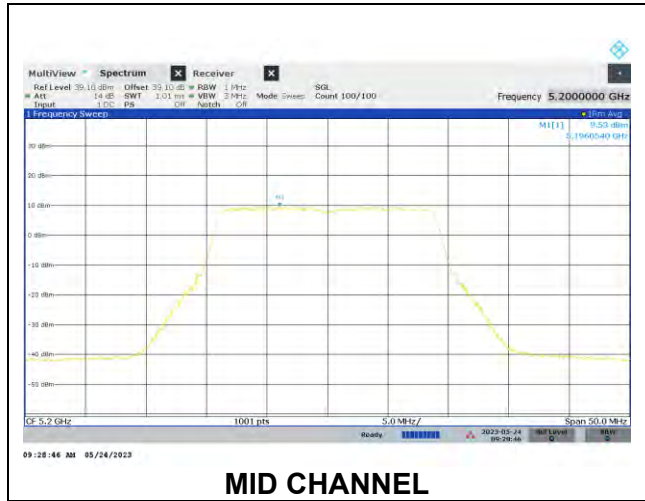
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5180	21.67	21.67	22.58	-0.91
Mid	5200	21.49	21.49	22.65	-1.16
High	5240	22.12	22.12	22.66	-0.54

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.82	9.82	10.00	-0.18
Mid	5200	9.53	9.53	10.00	-0.47
High	5240	9.87	9.87	10.00	-0.13



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC)**

<b>Test Engineer:</b>	DC 23653 and PV 27966
<b>Test Date:</b>	2023-05-04 to 2023-06-08

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5180	3.89	6.90	30.00	16.10
Mid	5200	3.89	6.90	30.00	16.10
High	5240	3.89	6.90	30.00	16.10

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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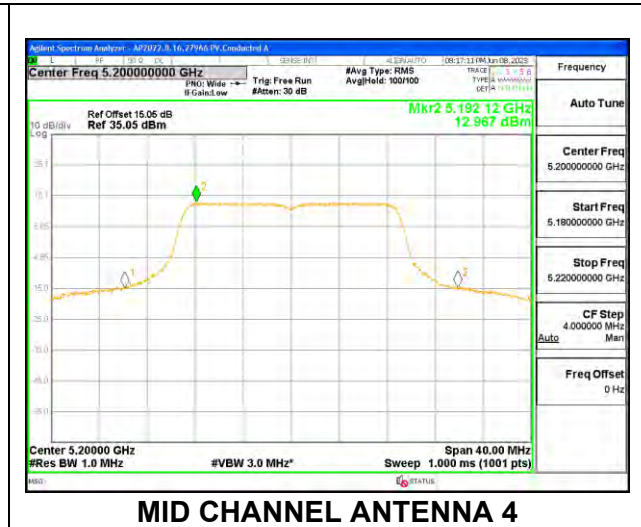
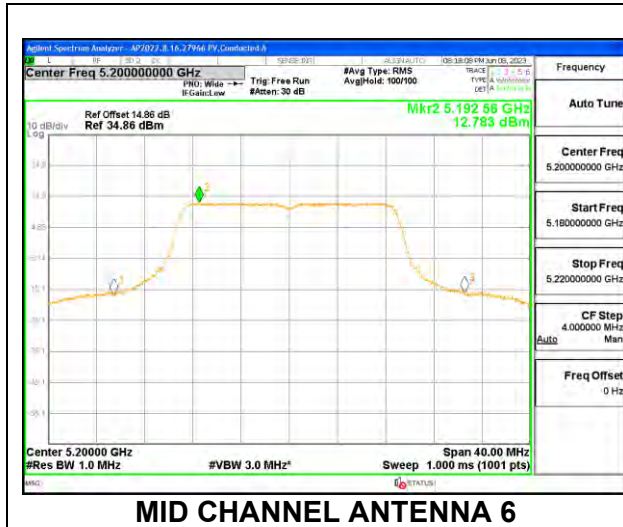
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	21.82	21.67	24.76	30.00	-5.24
Mid	5200	25.42	25.45	28.45	30.00	-1.55
High	5240	25.74	26.02	28.89	30.00	-1.11

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/1MHz)	Antenna 4 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	8.882	8.851	11.88	16.10	-4.22
Mid	5200	12.783	12.967	15.89	16.10	-0.21
High	5240	12.886	12.919	15.91	16.10	-0.19

### MID CHANNEL





**2TX Antenna 6 + Antenna 4 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-23

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5180	18.015
Mid	5200	18.300
High	5240	18.020

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5180	22.56	10.00
Mid	5200	22.62	10.00
High	5240	22.56	10.00

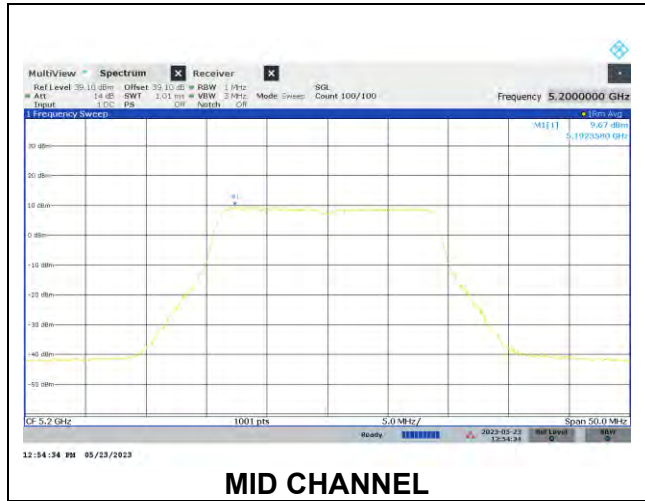
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5180	21.37	21.37	22.56	-1.19
Mid	5200	21.70	21.70	22.62	-0.92
High	5240	21.56	21.56	22.56	-0.99

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.79	9.79	10.00	-0.21
Mid	5200	9.67	9.67	10.00	-0.33
High	5240	9.49	9.49	10.00	-0.51



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC)**

<b>Test Engineer:</b>	DC 23653 and PV 27966
<b>Test Date:</b>	2023-05-02 to 2023-06-08

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	3.89	9.91	30.00	13.09
Mid	5200	3.89	9.91	30.00	13.09
High	5240	3.89	9.91	30.00	13.09

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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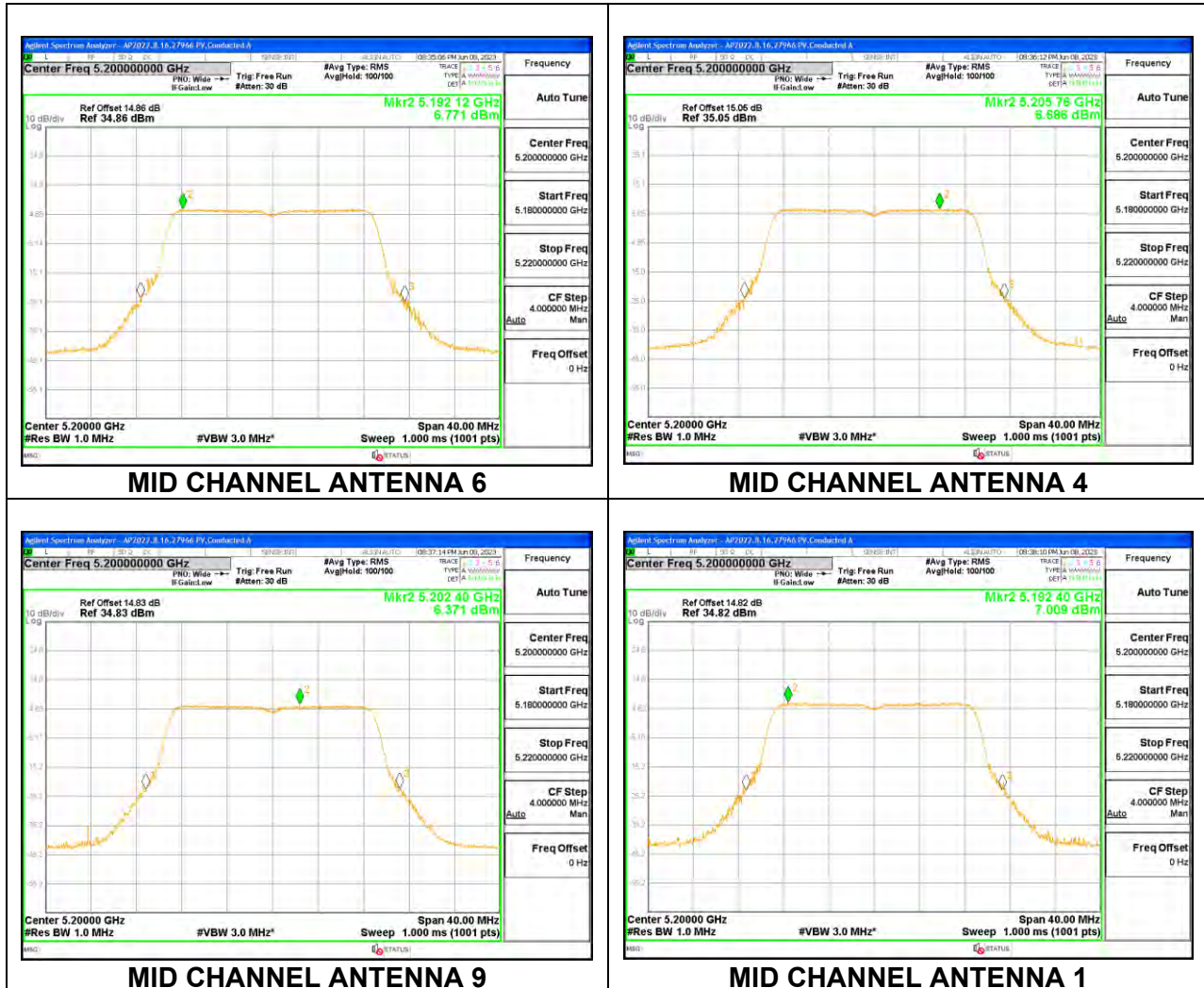
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	16.65	16.84	16.03	16.44	22.52	30.00	-7.48
Mid	5200	19.19	19.41	18.76	19.71	25.30	30.00	-4.70
High	5240	18.50	18.46	18.13	18.86	24.52	30.00	-5.48

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/1MHz)	Antenna 4 Meas PSD (dBm/1MHz)	Antenna 9 Meas PSD (dBm/1MHz)	Antenna 1 Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	4.506	4.842	4.152	5.012	10.66	13.09	-2.43
Mid	5200	6.771	6.686	6.371	7.009	12.74	13.09	-0.35
High	5240	6.268	6.141	5.706	6.223	12.11	13.09	-0.98

MID CHANNEL



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-22

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5180	17.780
Mid	5200	17.811
High	5240	17.826

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5180	22.50	10.00
Mid	5200	22.51	10.00
High	5240	22.51	10.00

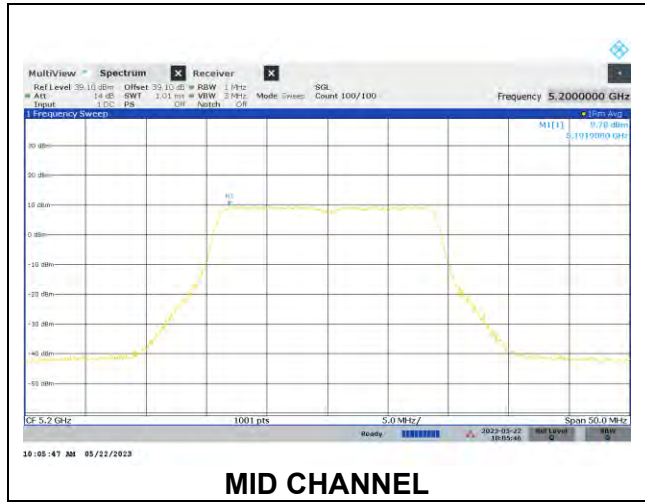
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5180	21.29	21.29	22.50	-1.21
Mid	5200	21.91	21.91	22.51	-0.59
High	5240	21.63	21.63	22.51	-0.88

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.82	9.82	10.00	-0.18
Mid	5200	9.78	9.78	10.00	-0.22
High	5240	9.80	9.80	10.00	-0.20



### 9.5.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE (FCC)

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-19

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5190	3.89	30.00	17.00
High	5230	3.89	30.00	17.00

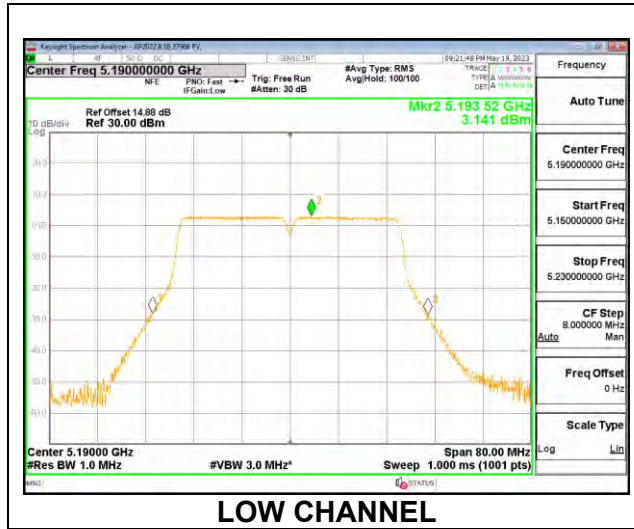
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	18.06	18.06	30.00	-11.94
High	5230	25.43	25.43	30.00	-4.57

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	3.141	3.14	17.00	-13.86
High	5230	10.667	10.67	17.00	-6.33



**LOW CHANNEL**



**1TX Antenna 6 MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-24

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5190	37.209
High	5230	37.101

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5190	23.00	10.00
High	5230	23.00	10.00

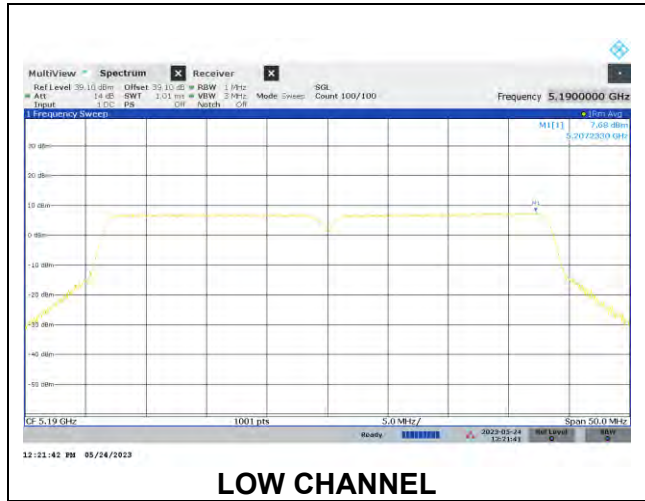
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5190	22.69	22.69	23.00	-0.31
High	5230	22.66	22.66	23.00	-0.34

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	7.68	7.68	10.00	-2.32
High	5230	7.86	7.86	10.00	-2.14



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5190	3.89	6.90	30.00	16.10
High	5230	3.89	6.90	30.00	16.10

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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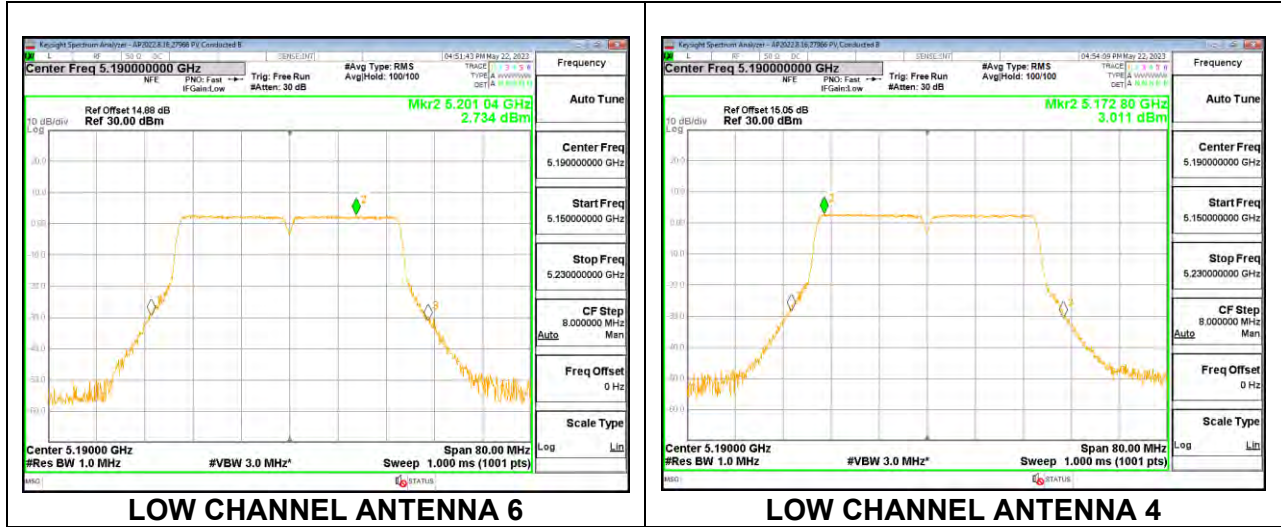
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	17.82	17.97	20.91	30.00	-9.09
High	5230	25.62	25.72	28.68	30.00	-1.32

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 1MHz)	Antenna 4 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	2.734	3.011	5.89	16.10	-10.21
High	5230	10.603	10.825	13.73	16.10	-2.37

### LOW CHANNEL



**2TX Antenna 6 + Antenna 4 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-23

(Note: IC output power & PSD were tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5190	36.764
High	5230	36.717

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5190	23.00	10.00
High	5230	23.00	10.00

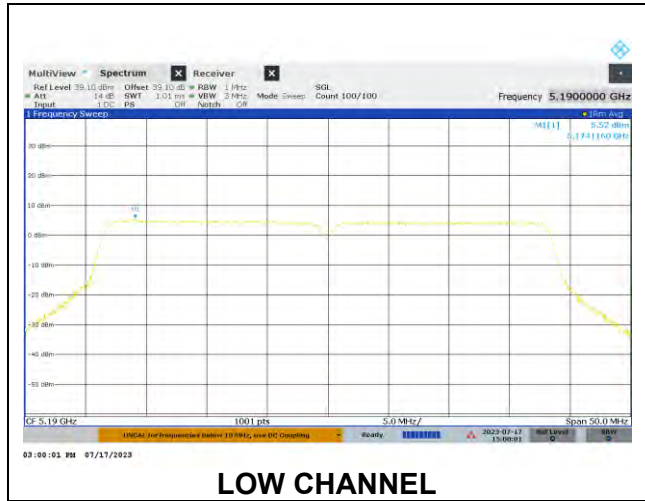
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5190	20.26	20.26	23.00	-2.74
High	5230	22.58	22.58	23.00	-0.42

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	5.52	5.52	10.00	-4.48
High	5230	7.44	7.44	10.00	-2.56



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-02 to 2023-06-08

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5190	3.89	9.91	30.00	13.09
High	5230	3.89	9.91	30.00	13.09

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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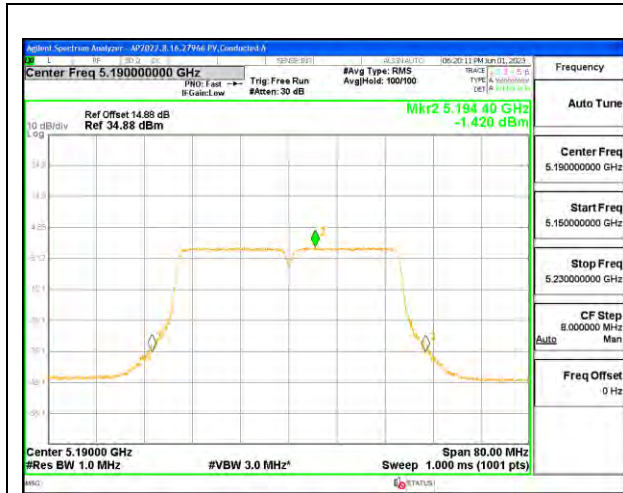
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	14.56	14.69	14.15	14.81	20.58	30.00	-9.42
High	5230	21.92	21.65	21.46	22.27	27.86	30.00	-2.14

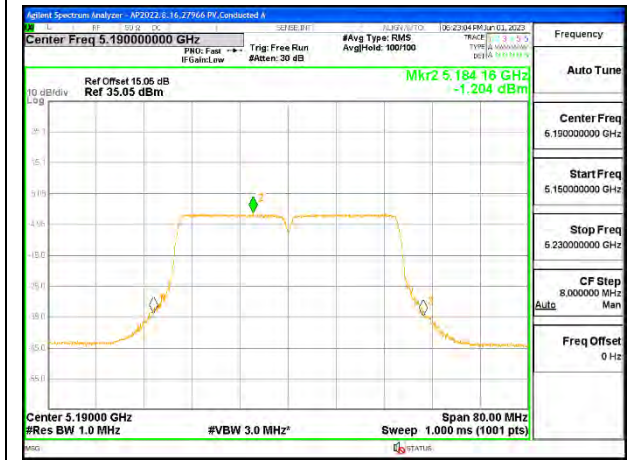
**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 1MHz)	Antenna 4 Meas PSD (dBm/ 1MHz)	Antenna 9 Meas PSD (dBm/ 1MHz)	Antenna 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	-1.420	-1.204	-1.703	-0.971	4.70	13.09	-8.39
High	5230	6.274	6.078	5.921	6.550	12.23	13.09	-0.86

**LOW CHANNEL**



**LOW CHANNEL ANTENNA 6**



**LOW CHANNEL ANTENNA 4**



**LOW CHANNEL ANTENNA 9**



**LOW CHANNEL ANTENNA 1**



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-23

(Note: IC output power & PSD was tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Low	5190	36.367
High	5230	36.493

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Low	5190	23.00	10.00
High	5230	23.00	10.00

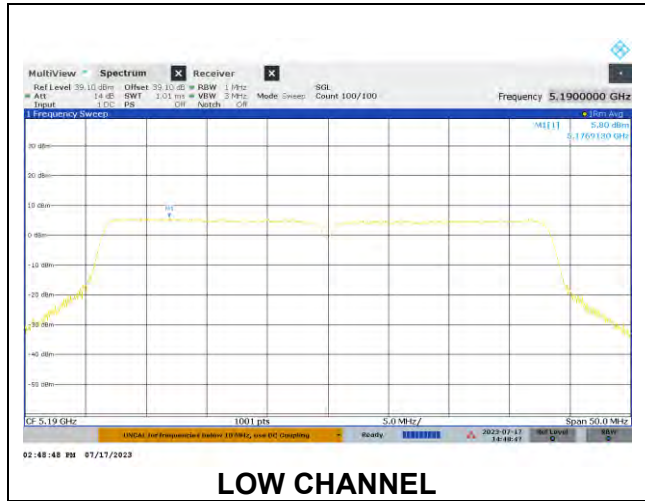
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Low	5190	20.52	20.52	23.00	-2.48
High	5230	22.24	22.24	23.00	-0.76

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	5.80	5.80	10.00	-4.20
High	5230	7.44	7.44	10.00	-2.56



### 9.5.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE (FCC)

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-19

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5210	3.89	30.00	17.00

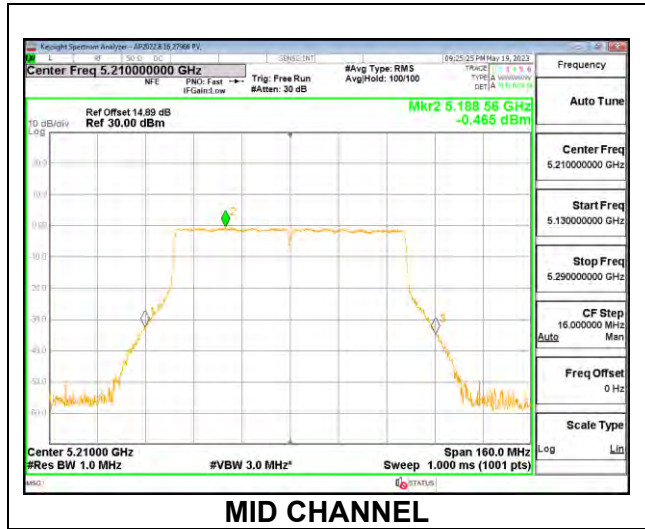
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	17.51	17.51	30.00	-12.49

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-0.465	-0.47	17.00	-17.47



**1TX Antenna 6 MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-24

(Note: IC output power & PSD was tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Mid	5210	76.712

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Mid	5210	23.00	10.00

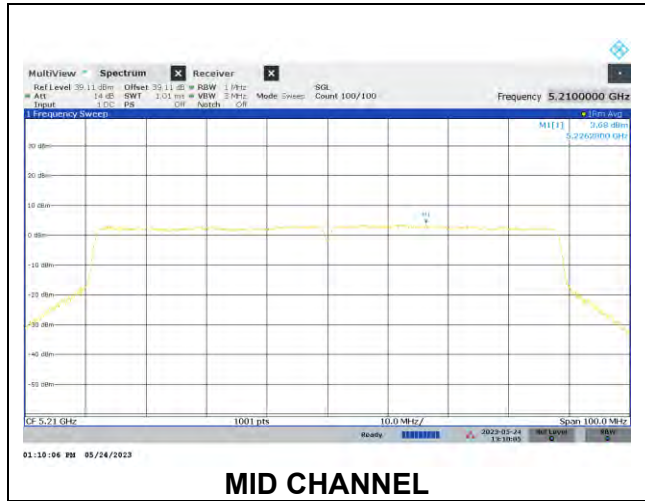
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Mid	5210	22.73	22.73	23.00	-0.27

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	3.68	3.68	10.00	-6.32



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5210	3.89	6.90	30.00	16.10

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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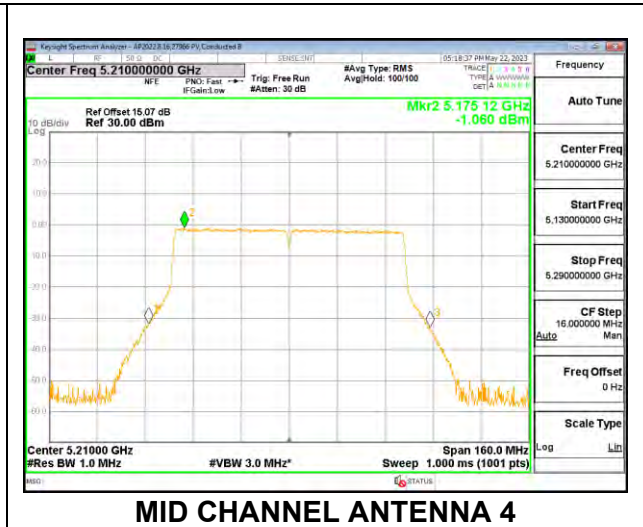
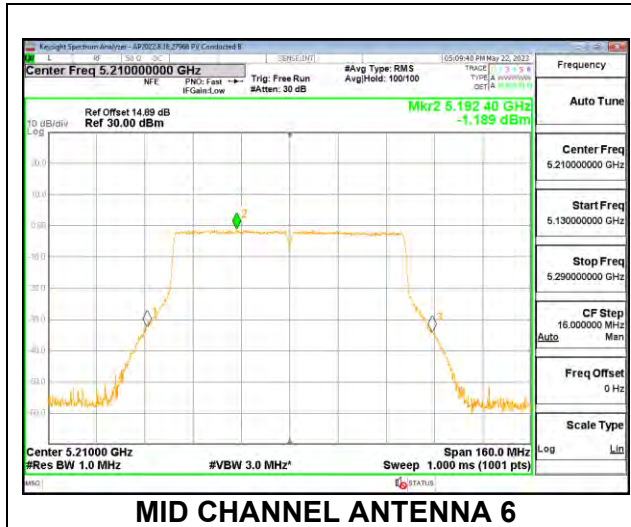
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	16.70	16.84	19.78	30.00	-10.22

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 1MHz)	Antenna 4 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-1.189	-1.060	1.89	16.10	-14.21

### MID CHANNEL





**2TX Antenna 6 + Antenna 4 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-23

(Note: IC output power & PSD was tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Mid	5210	76.948

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Mid	5210	23.00	10.00

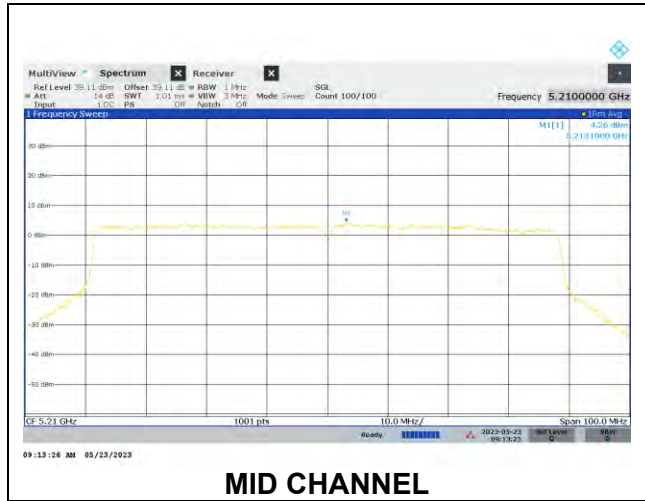
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Mid	5210	22.26	22.26	23.00	-0.74

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	4.26	4.26	10.00	-5.74



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5210	3.89	9.91	30.00	13.09

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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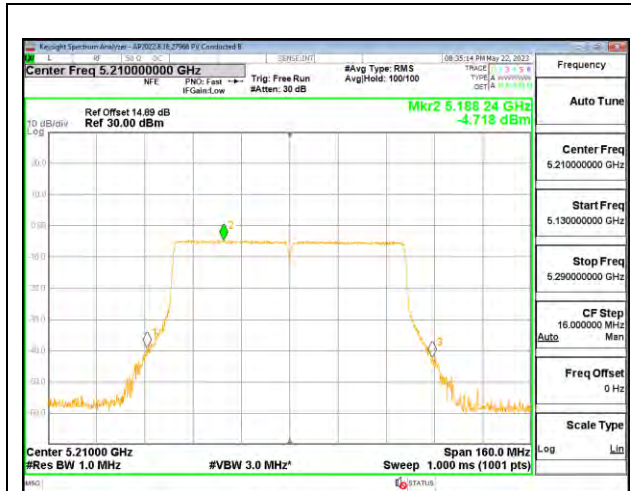
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	13.75	13.81	13.03	14.37	19.79	30.00	-10.21

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 1MHz)	Antenna 4 Meas PSD (dBm/ 1MHz)	Antenna 9 Meas PSD (dBm/ 1MHz)	Antenna 1 Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-4.718	-4.462	-5.536	-4.513	1.23	13.09	-11.86

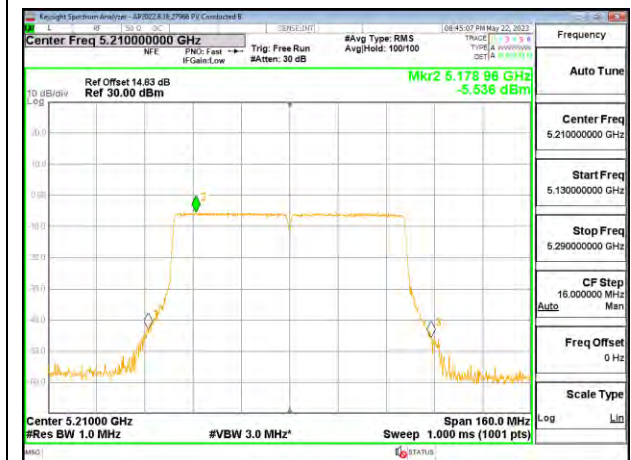
### MID CHANNEL



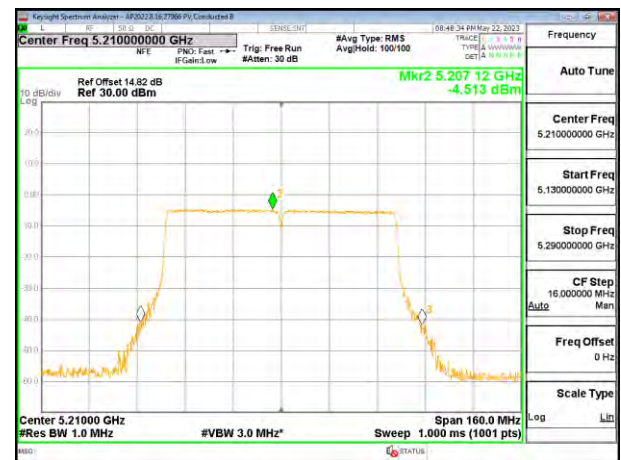
MID CHANNEL ANTENNA 6



MID CHANNEL ANTENNA 4



MID CHANNEL ANTENNA 9



MID CHANNEL ANTENNA 1

**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (IC)**

<b>Test Engineer:</b>	CW 20756
<b>Test Date:</b>	2023-05-23

(Note: IC output power & PSD was tested by radiated method)

**Bandwidth and Antenna Gain**

Channel	Frequency (MHz)	Min 99% BW (MHz)
Mid	5210	76.424

**Limits**

Channel	Frequency (MHz)	ISED EIRP Limit (dBm)	ISED EIRP PSD Limit (dBm/ 1MHz)
Mid	5210	23.00	10.00

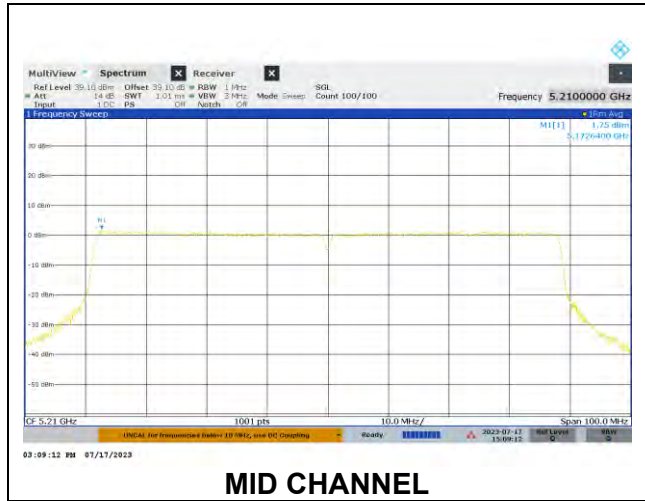
<b>Duty Cycle CF (dB)</b>	0.00	Included in Calculations of Corr'd PSD
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**Output Power Results**

Channel	Frequency (MHz)	Total Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit EIRP (dBm)	Power Margin (dB)
Mid	5210	20.49	20.49	23.00	-2.51

**PSD Results**

Channel	Frequency (MHz)	Total Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit EIRP (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	1.75	1.75	10.00	-8.25



### 9.5.5. 802.11a MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE (FCC+IC)

<b>Test Engineer:</b>	RA 39005
<b>Test Date:</b>	2023-05-04

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500kHz)
Low	5745	3.62	30.00	30.00
Mid	5785	3.62	30.00	30.00
High	5805	3.62	30.00	30.00

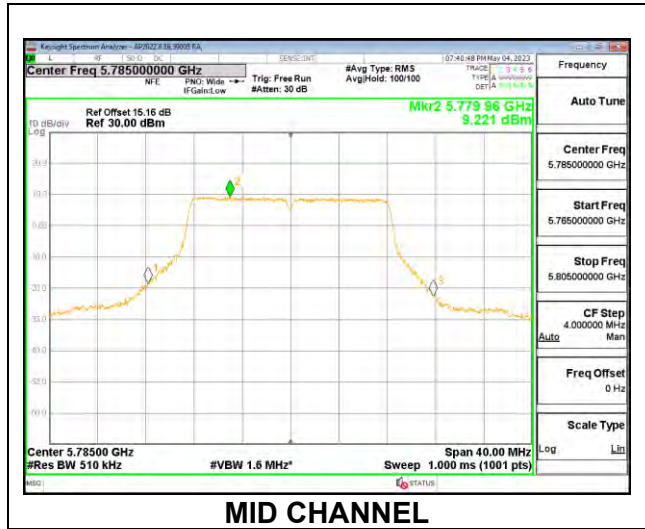
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	24.76	24.76	30.00	-5.24
Mid	5785	24.18	24.18	30.00	-5.82
High	5805	23.83	23.83	30.00	-6.17

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Low	5745	9.880	9.880	30.00	-20.12
Mid	5785	9.221	9.221	30.00	-20.78
High	5805	8.578	8.578	30.00	-21.42





**2TX Antenna 6 + Antenna 4 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	DC 23653
<b>Test Date:</b>	2023-05-05

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/500kHz)
Low	5745	3.62	6.63	30.00	29.37
Mid	5785	3.62	6.63	30.00	29.37
High	5805	3.62	6.63	30.00	29.37

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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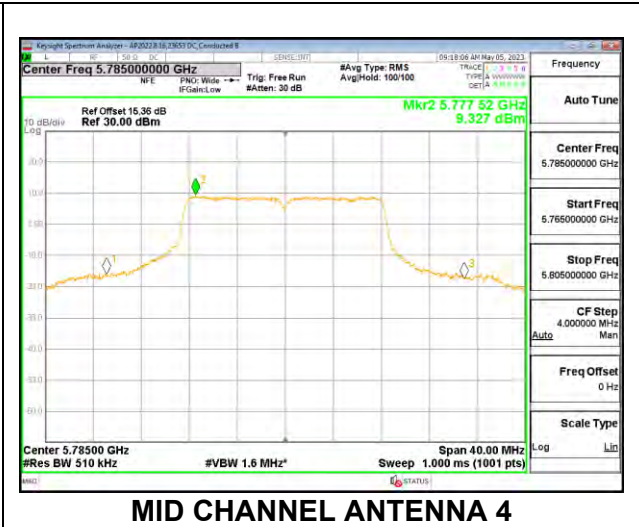
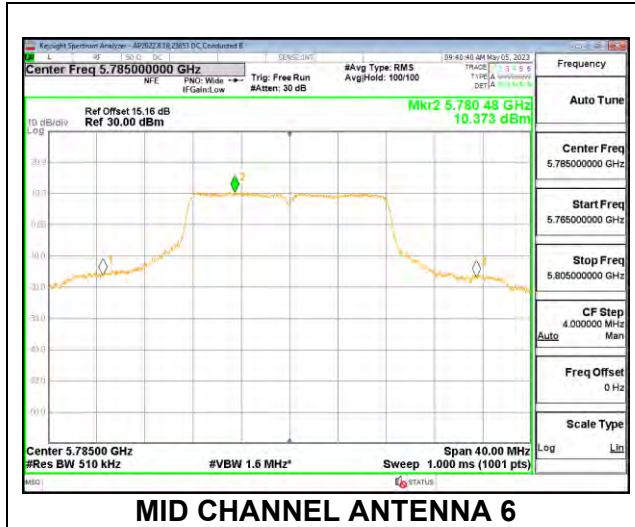
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	26.22	26.17	29.21	30.00	-0.79
Mid	5785	25.55	25.52	28.55	30.00	-1.45
High	5805	25.43	25.23	28.34	30.00	-1.66

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/500kHz)	Antenna 4 Meas PSD (dBm/500kHz)	Total Corr'd PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	PSD Margin (dB)
Low	5745	11.183	10.371	13.806	29.37	-15.56
Mid	5785	10.373	9.327	12.892	29.37	-16.48
High	5805	9.915	9.314	12.635	29.37	-16.73

### MID CHANNEL



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-01

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500kHz)
Low	5745	3.62	9.64	30.00	26.36
Mid	5785	3.62	9.64	30.00	26.36
High	5805	3.62	9.64	30.00	26.36

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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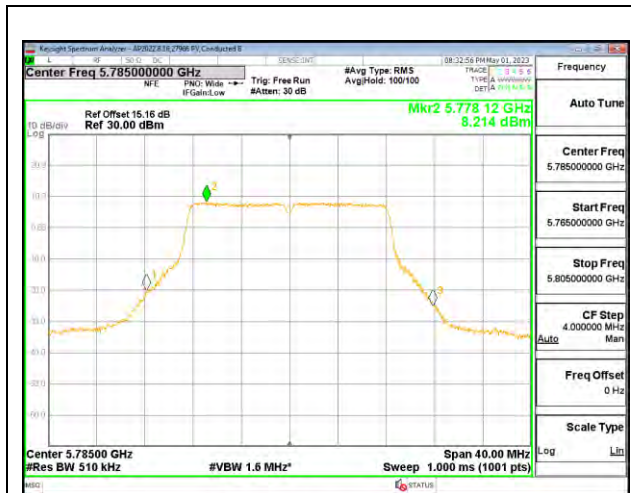
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	22.77	22.26	22.75	22.69	28.64	30.00	-1.36
Mid	5785	23.13	23.25	23.98	23.78	29.57	30.00	-0.43
High	5805	23.07	22.83	23.46	23.60	29.27	30.00	-0.73

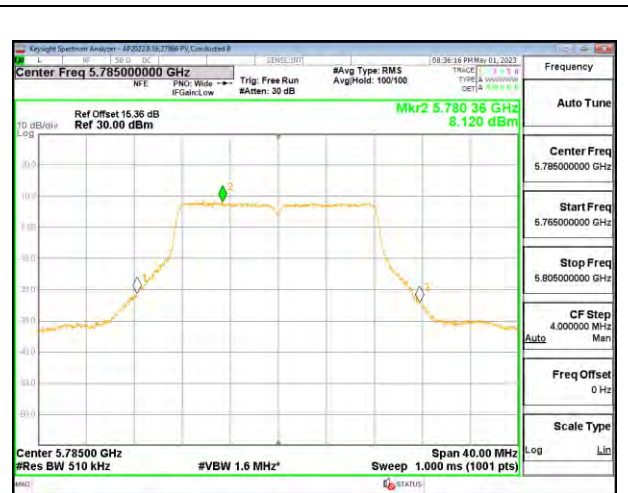
**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 500kHz)	Antenna 4 Meas PSD (dBm/ 500kHz)	Antenna 9 Meas PSD (dBm/ 500kHz)	Antenna 1 Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Low	5745	8.090	7.727	8.476	8.522	14.236	26.36	-12.12
Mid	5785	8.214	8.120	9.949	9.531	15.048	26.36	-11.31
High	5805	7.768	7.789	8.757	9.104	14.415	26.36	-11.94

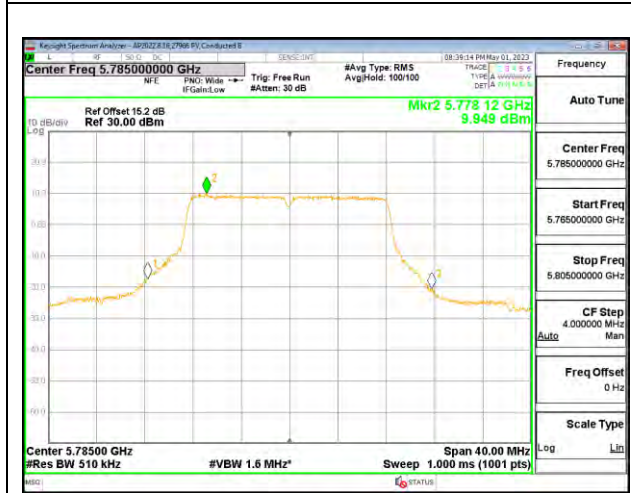
### MID CHANNEL



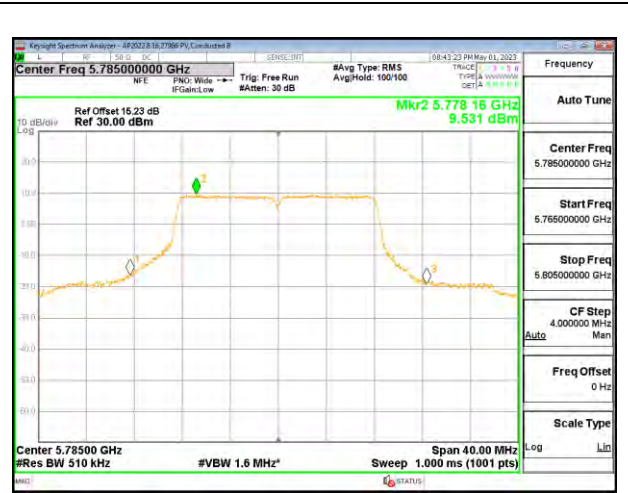
MID CHANNEL ANTENNA 6



MID CHANNEL ANTENNA 4



MID CHANNEL ANTENNA 9



MID CHANNEL ANTENNA 1

### 9.5.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE (FCC+IC)

<b>Test Engineer:</b>	DC 23653
<b>Test Date:</b>	2023-05-08

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500kHz)
Low	5745	3.62	30.00	30.00
Mid	5785	3.62	30.00	30.00
High	5805	3.62	30.00	30.00

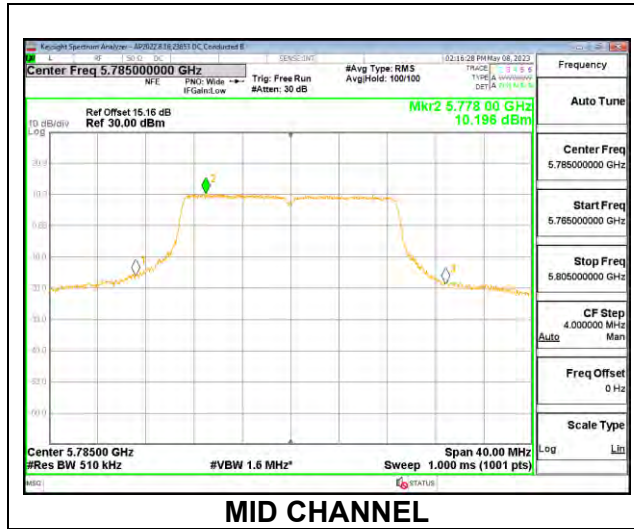
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	25.62	25.62	30.00	-4.38
Mid	5785	25.11	25.11	30.00	-4.89
High	5805	24.80	24.80	30.00	-5.20

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Low	5745	10.468	10.468	30.00	-19.53
Mid	5785	10.196	10.196	30.00	-19.80
High	5805	9.509	9.509	30.00	-20.49



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	DC 23653
<b>Test Date:</b>	2023-05-05

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/500kHz)
Low	5745	3.62	6.63	30.00	29.37
Mid	5785	3.62	6.63	30.00	29.37
High	5805	3.62	6.63	30.00	29.37

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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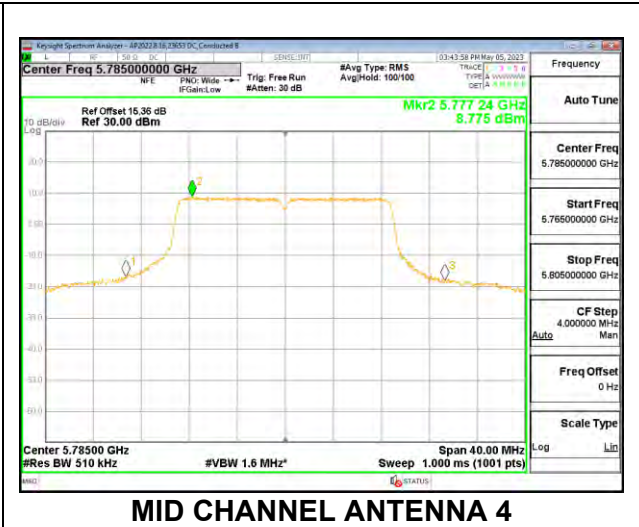
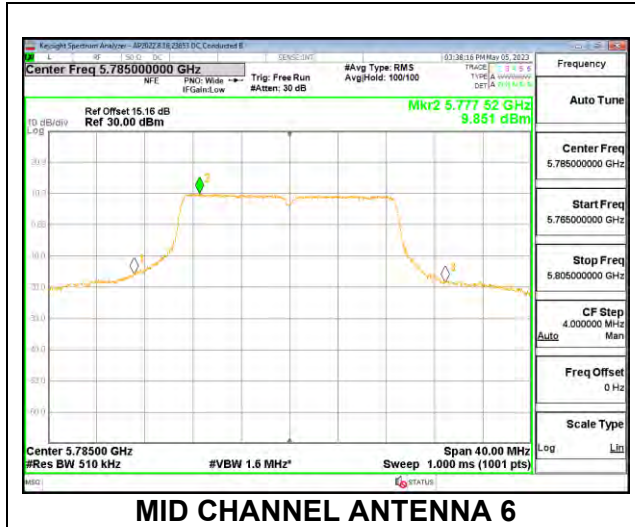
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	25.84	26.11	28.99	30.00	-1.01
Mid	5785	25.35	25.31	28.34	30.00	-1.66
High	5805	24.96	24.84	27.91	30.00	-2.09

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/500kHz)	Antenna 4 Meas PSD (dBm/500kHz)	Total Corr'd PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	PSD Margin (dB)
Low	5745	10.666	9.841	13.283	29.37	-16.09
Mid	5785	9.851	8.775	12.357	29.37	-17.01
High	5805	9.191	8.402	11.825	29.37	-17.55

### MID CHANNEL





**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	DC 23653
<b>Test Date:</b>	2023-05-05

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/500KHz)
Low	5745	3.62	9.64	30.00	26.36
Mid	5785	3.62	9.64	30.00	26.36
High	5805	3.62	9.63	30.00	26.37

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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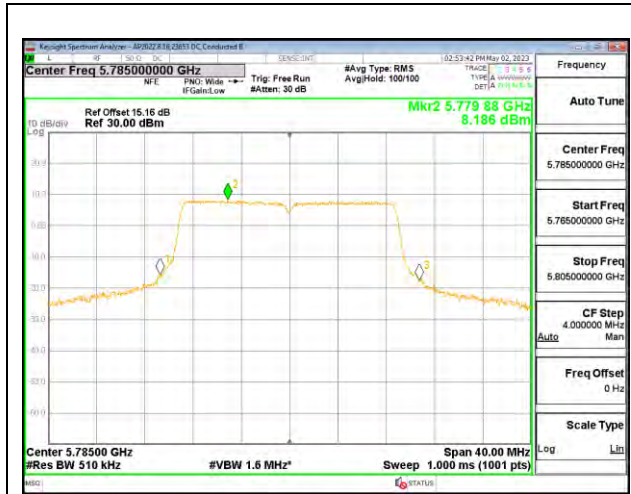
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna Meas Power (dBm)	Antenna Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	22.98	23.22	23.32	22.80	29.11	30.00	-0.89
Mid	5785	23.54	23.59	23.98	23.85	29.76	30.00	-0.24
High	5805	23.10	22.97	23.39	23.44	29.25	30.00	-0.75

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/500kHz)	Antenna 4 Meas PSD (dBm/500kHz)	Antenna 9 Meas PSD (dBm/500kHz)	Antenna 1 Meas PSD (dBm/500kHz)	Total Corr'd PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	PSD Margin (dB)
Low	5745	7.969	7.754	8.397	8.578	14.207	26.36	-12.15
Mid	5785	8.186	8.277	9.672	8.825	14.802	26.36	-11.56
High	5805	7.675	8.059	8.857	9.059	14.470	26.37	-11.90

### MID CHANNEL



MID CHANNEL ANTENNA 6



MID CHANNEL ANTENNA 4



MID CHANNEL ANTENNA 9



MID CHANNEL ANTENNA 1

### 9.5.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE (FCC+IC)

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-19

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISE Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500KHz)
Low	5755	3.62	30.00	30.00
High	5795	3.62	30.00	30.00

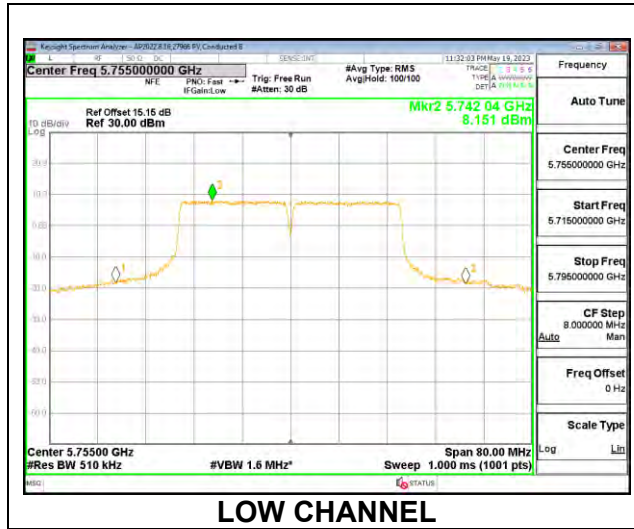
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	25.42	25.42	30.00	-4.58
High	5795	24.86	24.86	30.00	-5.14

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Low	5755	8.151	8.151	30.00	-21.85
High	5795	7.696	7.696	30.00	-22.30



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500KHz)
Low	5755	3.62	6.63	30.00	29.37
High	5795	3.62	6.63	30.00	29.37

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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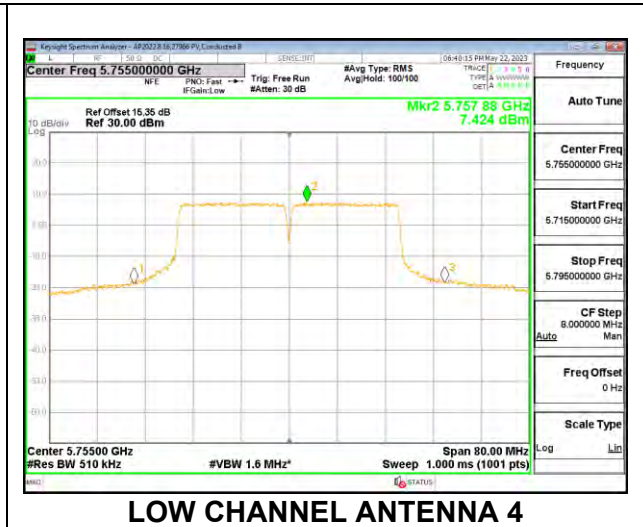
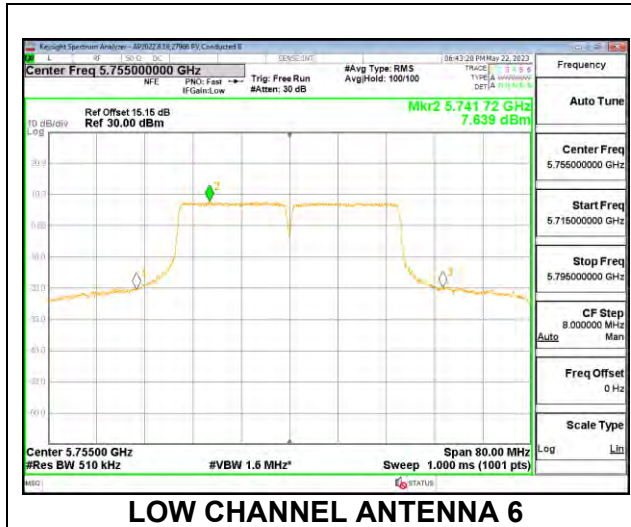
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	25.27	25.51	28.40	30.00	-1.60
High	5795	24.74	24.66	27.71	30.00	-2.29

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 500KHz)	Antenna 4 Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5755	7.639	7.424	10.543	29.37	-18.83
High	5795	7.391	7.104	10.260	29.37	-19.11

### LOW CHANNEL



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500KHz)
Low	5755	3.62	9.64	30.00	26.36
High	5795	3.62	9.64	30.00	26.36

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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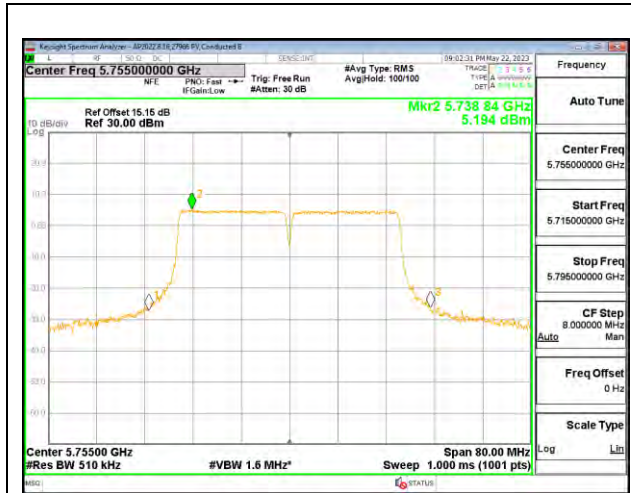
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	22.74	22.95	23.12	22.79	28.92	30.00	-1.08
High	5795	23.20	23.05	23.60	23.56	29.38	30.00	-0.62

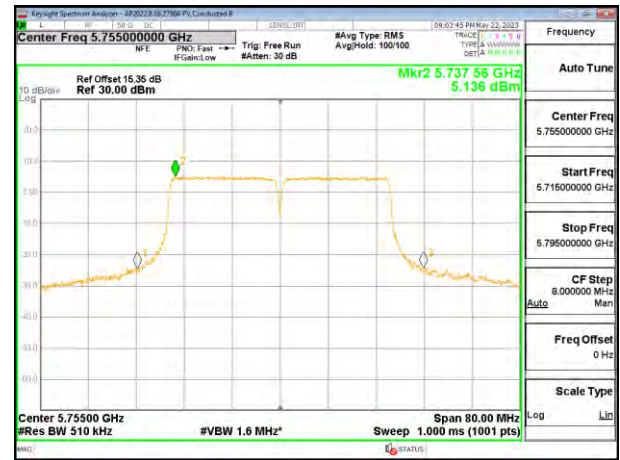
**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 500kHz)	Antenna 4 Meas PSD (dBm/ 500kHz)	Antenna 9 Meas PSD (dBm/ 500kHz)	Antenna 1 Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Low	5755	5.194	5.136	5.534	5.110	11.267	26.36	-15.09
High	5795	5.999	5.567	6.757	6.654	12.292	26.36	-14.07

### LOW CHANNEL



LOW CHANNEL ANTENNA 6



LOW CHANNEL ANTENNA 4



LOW CHANNEL ANTENNA 9



LOW CHANNEL ANTENNA 1



### 9.5.8. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

#### 1TX Antenna 6 MODE (FCC+IC)

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-19

#### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISE Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500KHz)
Mid	5775	3.62	30.00	30.00

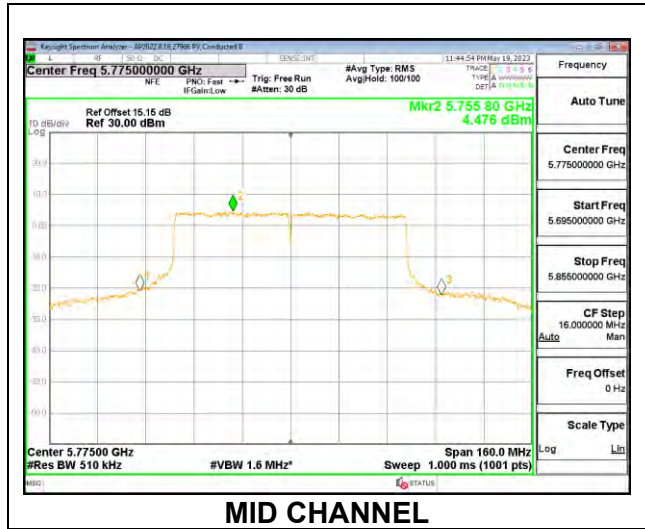
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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#### Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	25.09	25.09	30.00	-4.91

#### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Mid	5775	4.476	4.476	30.00	-25.52



**2TX Antenna 6 + Antenna 4 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	PV 27966
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500kHz)
Mid	5755	3.62	6.63	30.00	29.37

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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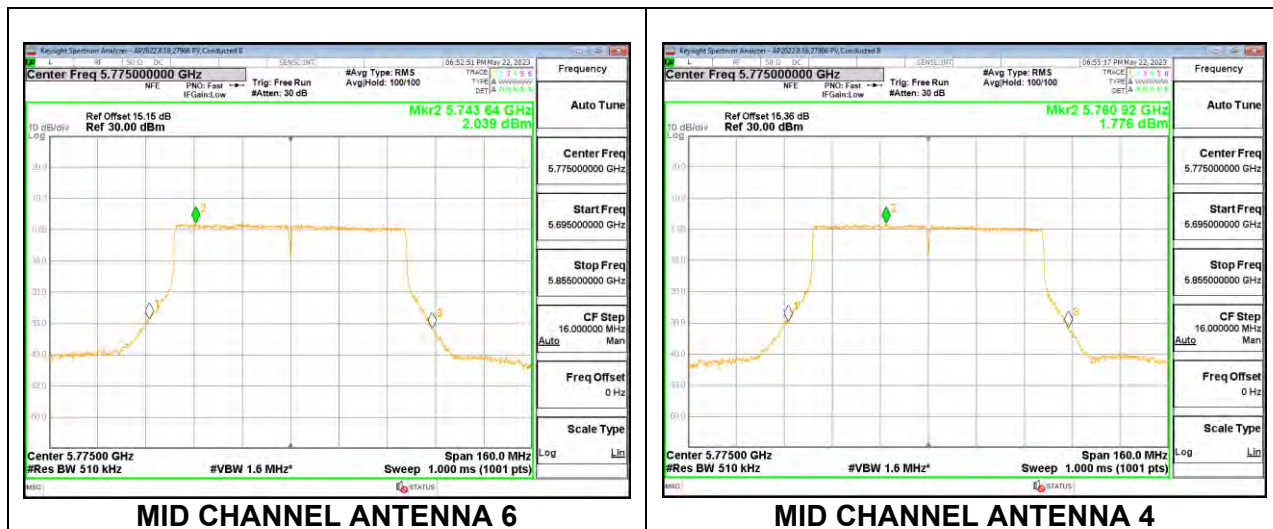
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5755	22.41	22.33	25.38	30.00	-4.62

**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 500kHz)	Antenna 4 Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Mid	5755	2.039	1.776	4.920	29.37	-24.45

### MID CHANNEL



**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE (FCC+IC)**

<b>Test Engineer:</b>	PV 27996
<b>Test Date:</b>	2023-05-22

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBm)	FCC/ISED Power Limit (dBm)	FCC/ISED PSD Limit (dBm/ 500KHz)
Mid	5755	3.62	9.64	30.00	26.36

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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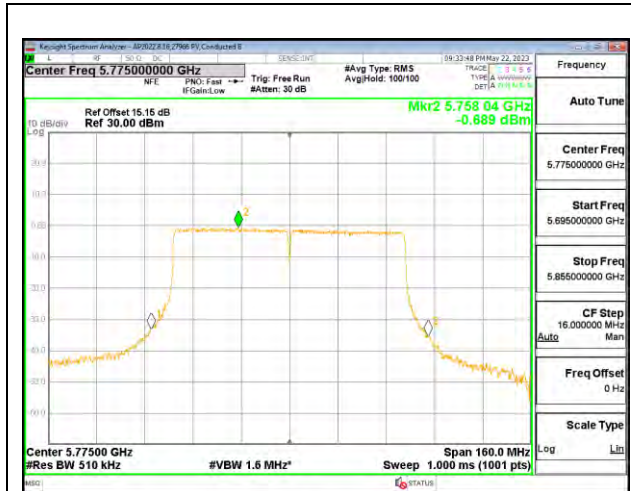
**Output Power Results**

Channel	Frequency (MHz)	Antenna 6 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Antenna 9 Meas Power (dBm)	Antenna 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5755	19.82	19.46	19.95	19.55	25.72	30.00	-4.28

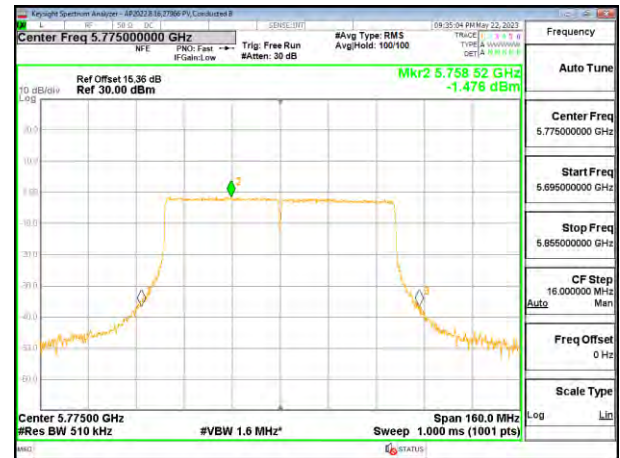
**PSD Results**

Channel	Frequency (MHz)	Antenna 6 Meas PSD (dBm/ 500kHz)	Antenna 4 Meas PSD (dBm/ 500kHz)	Antenna 9 Meas PSD (dBm/ 500kHz)	Antenna 1 Meas PSD (dBm/ 500kHz)	Total Corr'd PSD (dBm/ 500kHz)	PSD Limit (dBm/ 500kHz)	PSD Margin (dB)
Mid	5755	-0.689	-1.476	-0.476	-1.210	5.076	26.36	-21.28

### MID CHANNEL



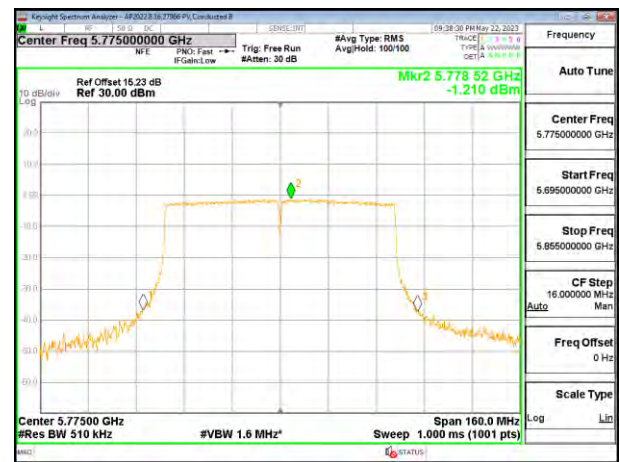
MID CHANNEL ANTENNA 6



MID CHANNEL ANTENNA 4



MID CHANNEL ANTENNA 9



MID CHANNEL ANTENNA 1

## 10. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209 -Restricted bands

FCC §15.407(b)(1-3) -Un-Restricted bands

RSS 247 Issue 3 Sections

6.2.1.2 (for 5150-5250 MHz band)

6.2.4.3 (for 5725-5850 MHz band)

### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

The spectrum from 30 MHz to 1GHz and 18GHz to 40 GHz is investigated with the transmitter set to transmit at the channel with highest output power as worst-case scenario. 1GHz to 18GHz was set to the lowest, middle, and highest channels in the 5 GHz bands.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only. Blue color trace on plots: Parallel orientation. Green color trace on plots: Perpendicular orientation.

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

**KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification**

OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

NOTE: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to  $Y - 51.5 = Z$  dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.



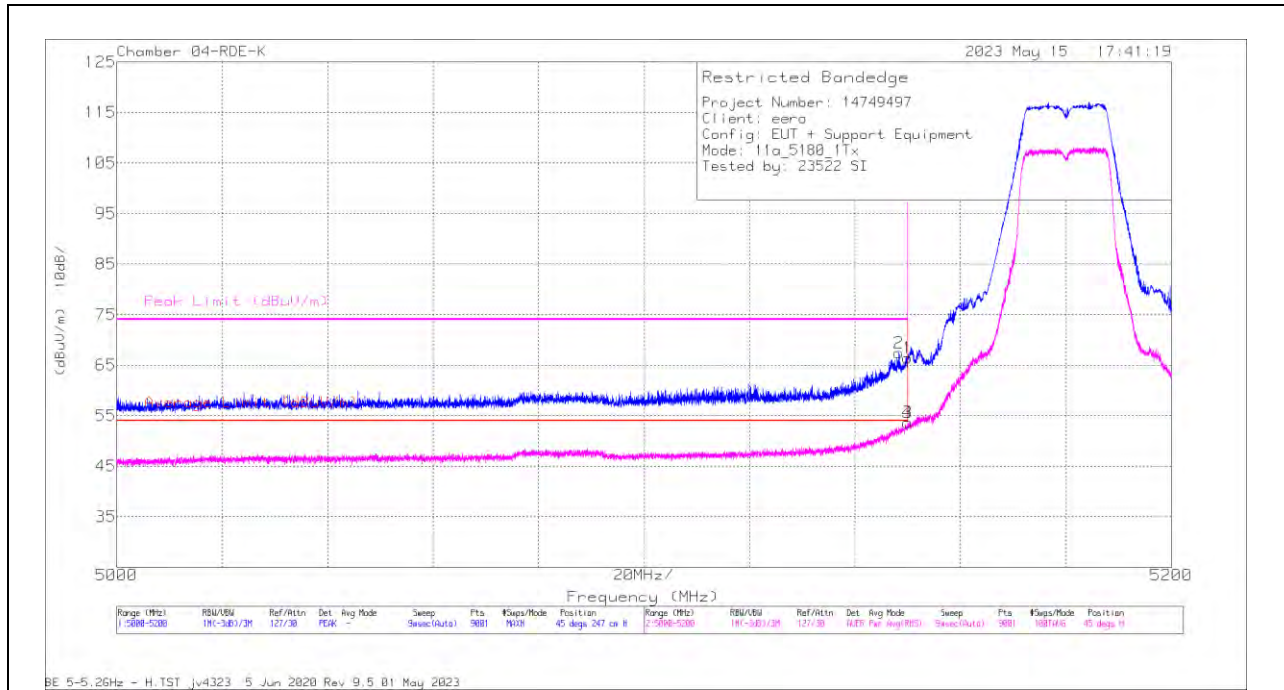
## 10.1. TRANSMITTER ABOVE 1 GHz

### 10.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

#### 1TX Antenna 6 MODE

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT

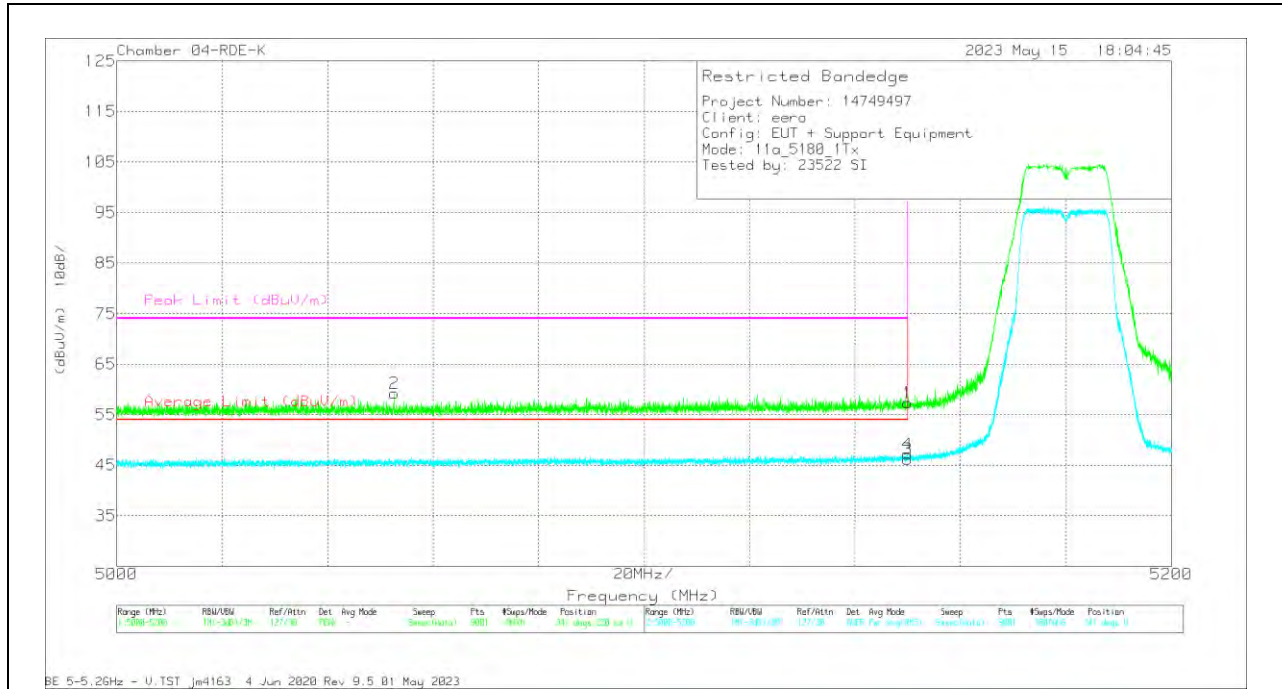


#### Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB) 3mH	Amp/Cbl/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5150	63.22	Pk	34.1	-30.9	66.42	-	-	74	-7.58	45	247	H
2	* 5148.31	64.25	Pk	34	-30.8	67.45	-	-	74	-6.55	45	247	H
3	* 5150	50.37	RMS	34.1	-30.9	53.57	54	-43	-	-	45	247	H
4	* 5149.999	50.39	RMS	34.1	-30.9	53.59	54	-41	-	-	45	247	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

### VERTICAL RESULT



### Trace Markers

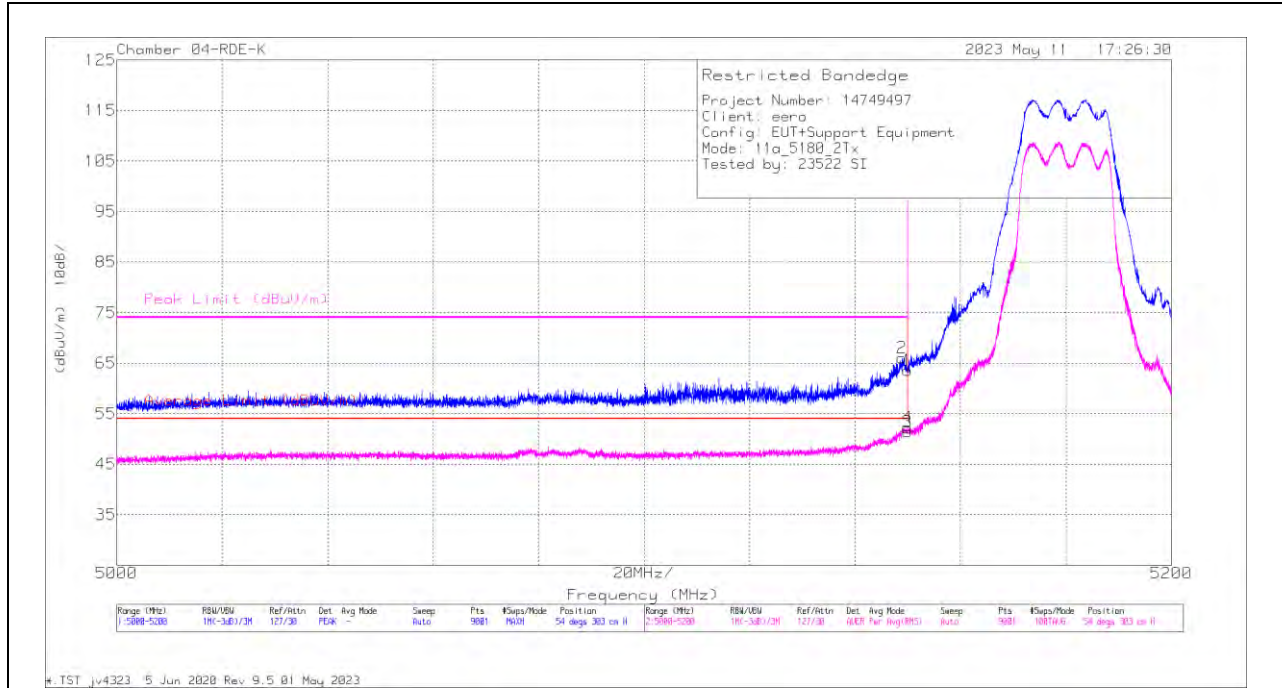
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB) 3mH	Amp/Cbl/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5150	54.11	Pk	34.1	-30.9	57.31	-	-	74	-16.69	341	220	V
2	* 5052.666	56.36	Pk	33.9	-31	59.26	-	-	74	-14.74	341	220	V
3	* 5150	42.92	RMS	34.1	-30.9	46.12	54	-7.88	-	-	341	220	V
4	* 5149.932	43.86	RMS	34.1	-30.9	47.06	54	-6.94	-	-	341	220	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**2TX Antenna 6 + Antenna 4 CDD MODE**

**BANDEDGE (LOW CHANNEL)**

**HORIZONTAL RESULT**

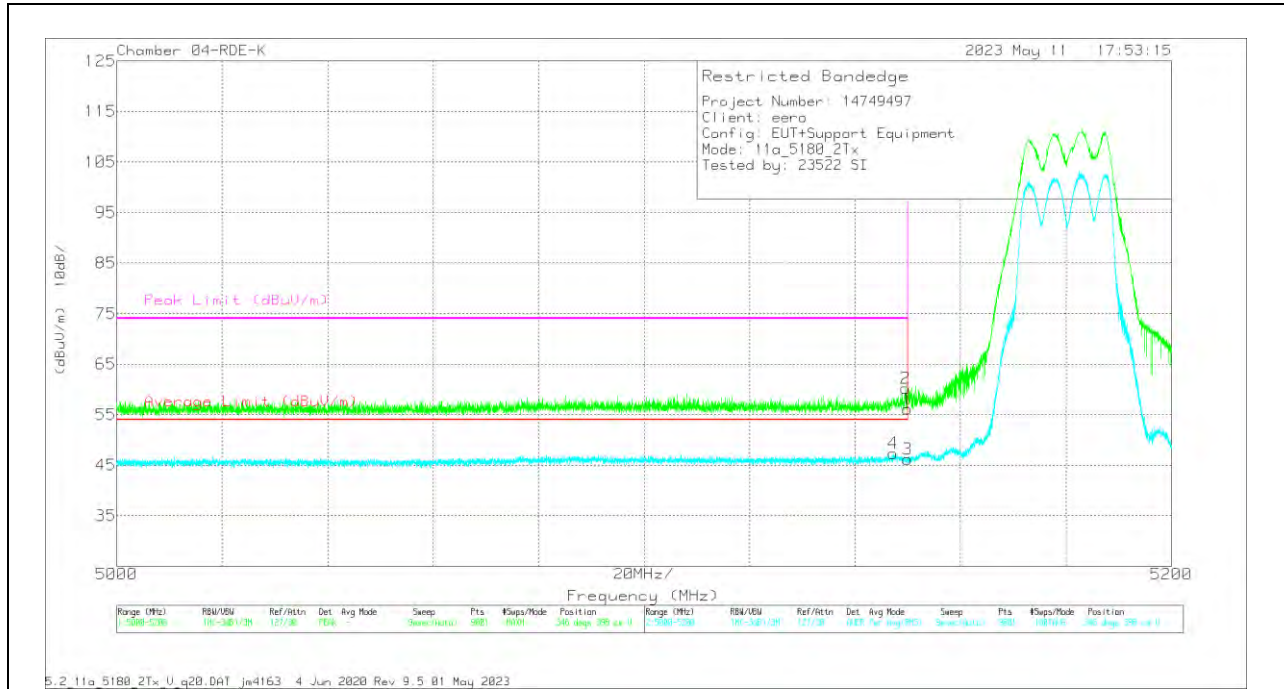


**Trace Markers**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB) 3mH	Amp/Cb/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5150	60.42	Pk	34.1	-30.9	63.62	-	-	74	-10.38	54	303	H
2	* 5148.91	62.93	Pk	34	-30.9	66.03	-	-	74	-7.97	54	303	H
3	* 5150	48.07	RMS	34.1	-30.9	51.27	54	-2.73	-	-	54	303	H
4	* 5149.91	48.92	RMS	34.1	-30.9	52.12	54	-1.88	-	-	54	303	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

### VERTICAL RESULT



### Trace Markers

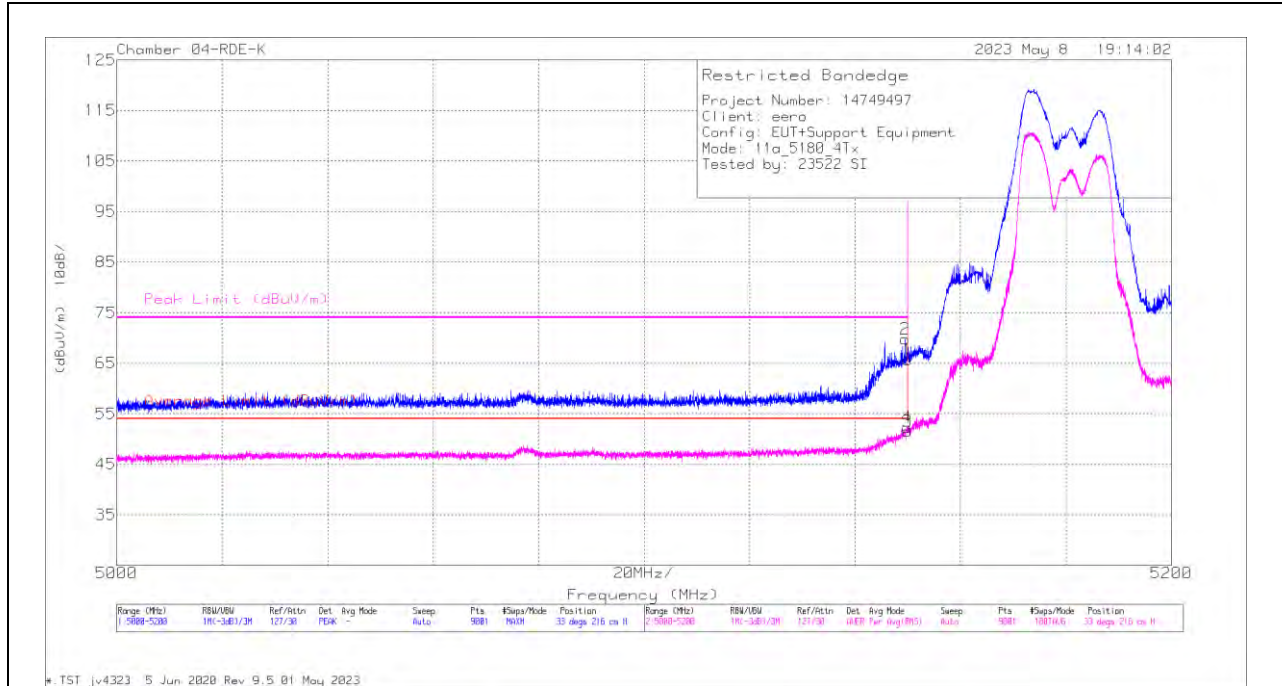
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB) 3mH	Amp/Cbl/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5150	52.89	Pk	34.1	-30.9	56.09	-	-	74	-17.91	346	398	V
2	* 5149.621	56.98	Pk	34.1	-30.9	60.18	-	-	74	-13.82	346	398	V
3	* 5150	42.98	RMS	34.1	-30.9	46.18	54	-7.72	-	-	346	398	V
4	* 5147.199	44.17	RMS	34	-30.8	47.37	54	-6.53	-	-	346	398	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**4TX Antenna 6 + Antenna 4 + Antenna 9 + Antenna 1 CDD MODE**

**BANDEDGE (LOW CHANNEL)**

**HORIZONTAL RESULT**



**Trace Markers**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB) 3mH	Amp/Cb/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5150	62.47	Pk	34.1	-30.9	65.67	-	-	74	-8.33	33	216	H
2	* 5149.487	66.59	Pk	34.1	-30.9	69.79	-	-	74	-4.21	33	216	H
3	* 5150	48.27	RMS	34.1	-30.9	51.47	54	-2.53	-	-	33	216	H
4	* 5149.843	48.97	RMS	34.1	-30.9	52.17	54	-1.83	-	-	33	216	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection