

Plot 7-429. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) - Ch. 183)



Plot 7-430. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) - Ch. 143)

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Plot 7-431. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) - Ch. 183)



Plot 7-432. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 189)

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Plot 7-433. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 209)



Plot 7-434. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 233)

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Plot 7-435. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 187)



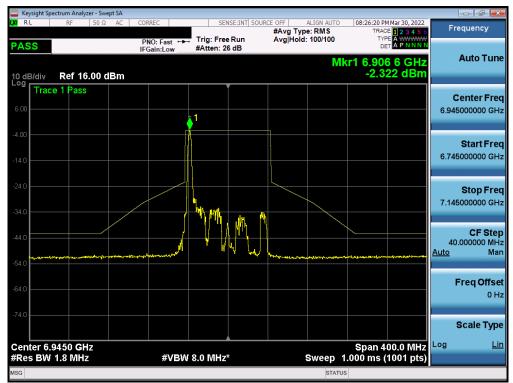
Plot 7-436. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 211)

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Plot 7-437. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 227)



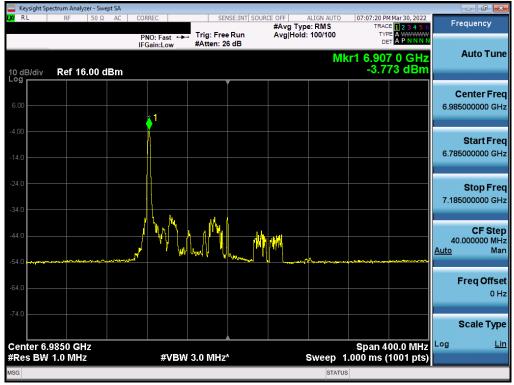
Plot 7-438. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 199)

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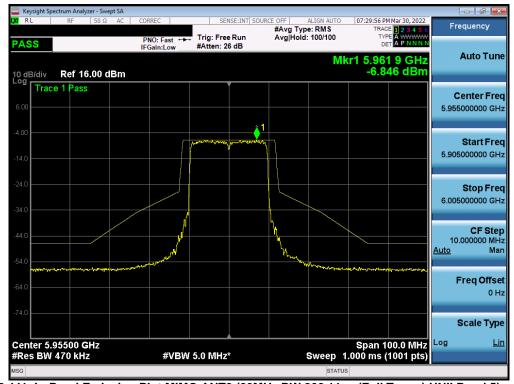
Plot 7-439. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 215)



Plot 7-440. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 8) - Ch. 207)

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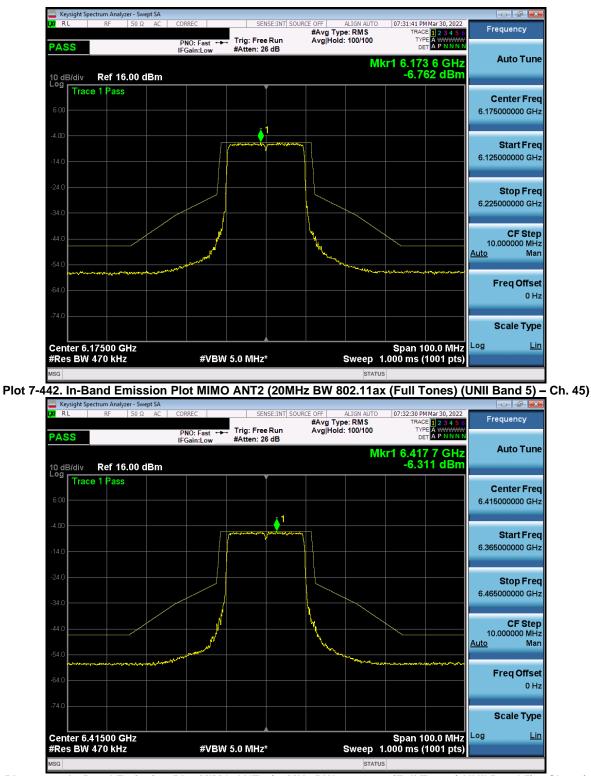


# MIMO Antenna-2 In-Band Emission Measurements (Full Tones)

Plot 7-441. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) UNII Band 5) - Ch. 1)

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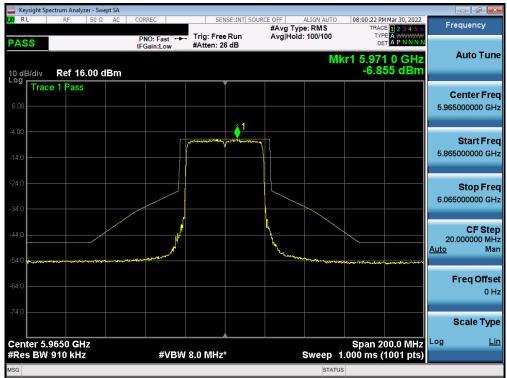




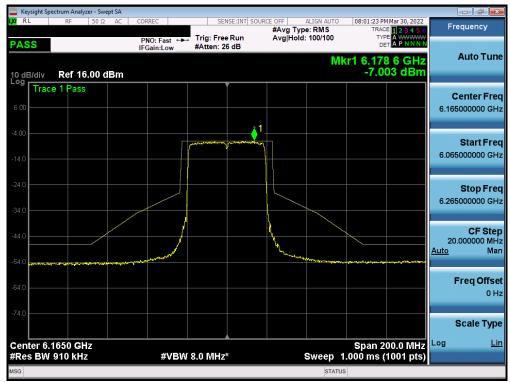
Plot 7-443. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) UNII Band 5) - Ch. 93)

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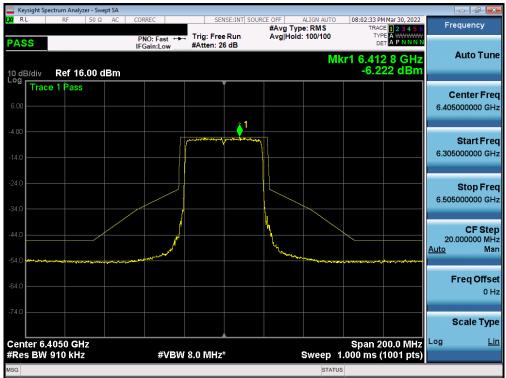
Plot 7-444. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 3)



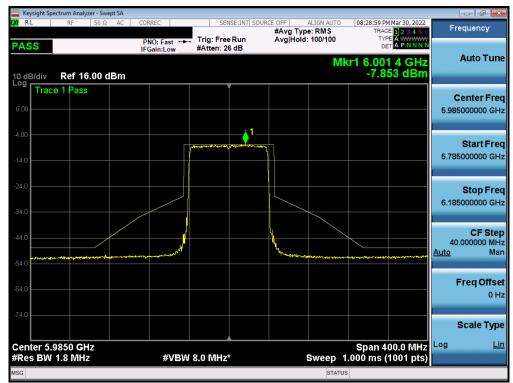
Plot 7-445. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 43)

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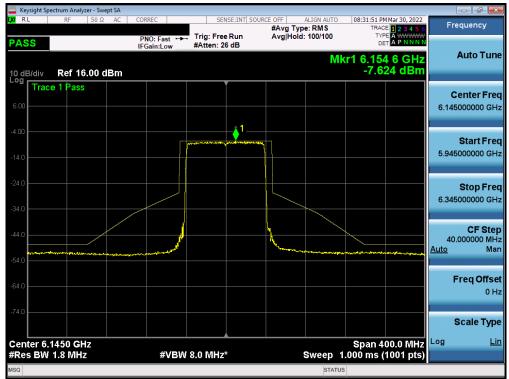
Plot 7-446. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 91)



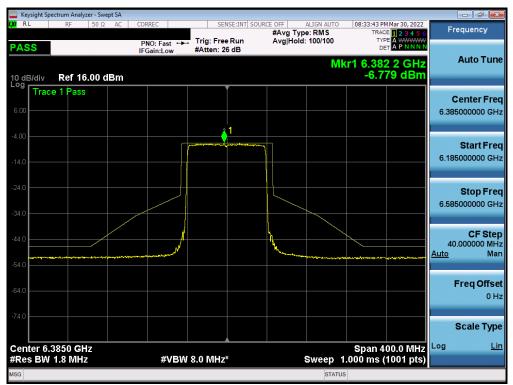
Plot 7-447. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 7)

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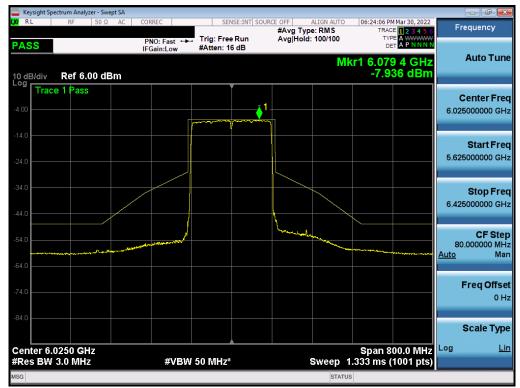
Plot 7-448. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 39)



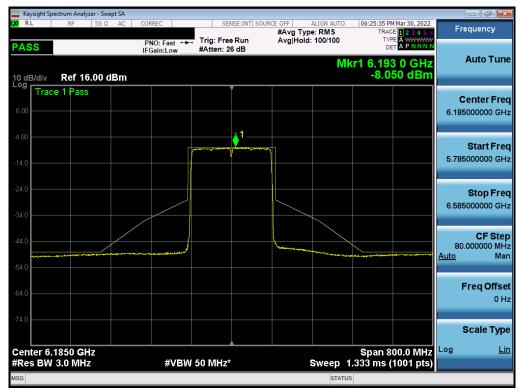
Plot 7-449. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 87)

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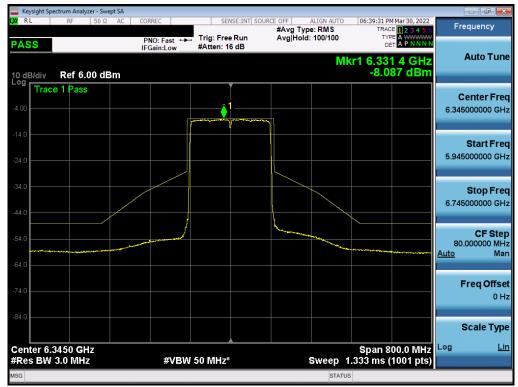
Plot 7-450. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 15)



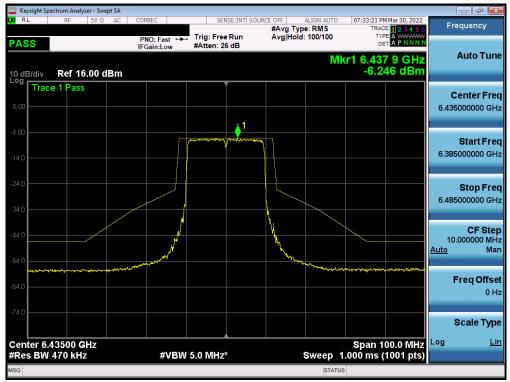
Plot 7-451. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 47)

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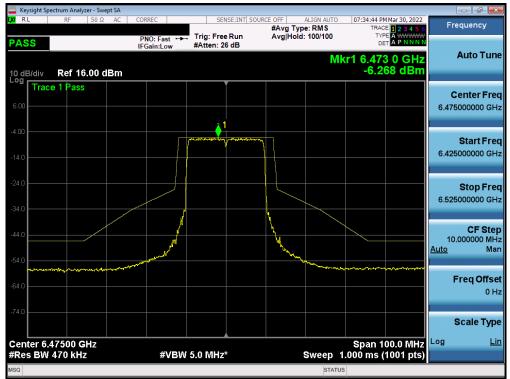
Plot 7-452. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 5) - Ch. 79)



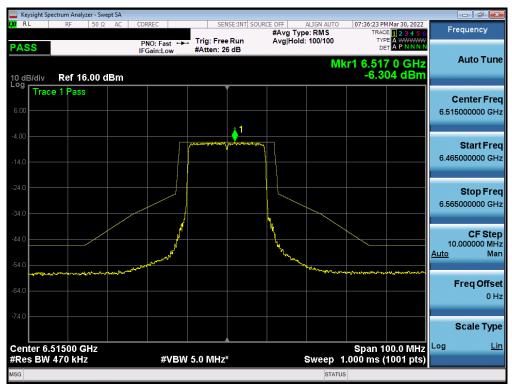
Plot 7-453. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 97)

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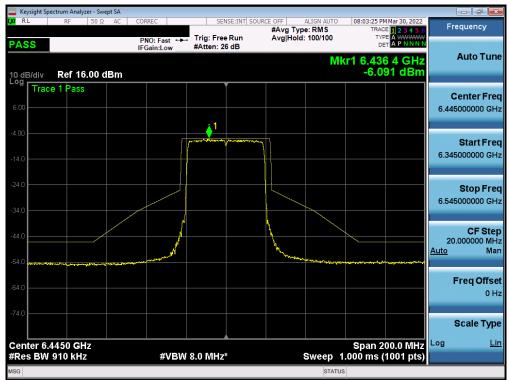
Plot 7-454. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 105)



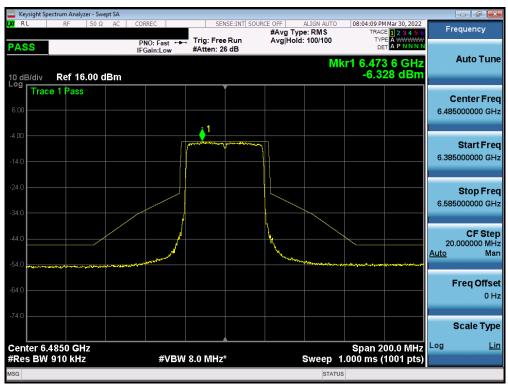
Plot 7-455. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 113)

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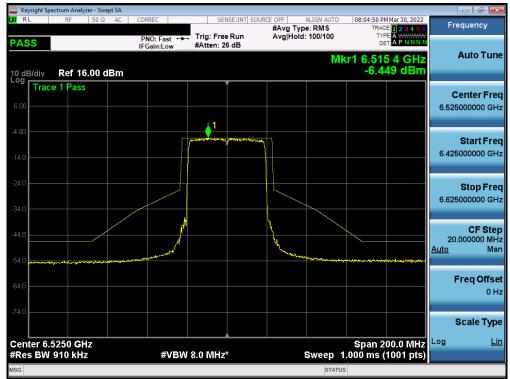
Plot 7-456. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 99)



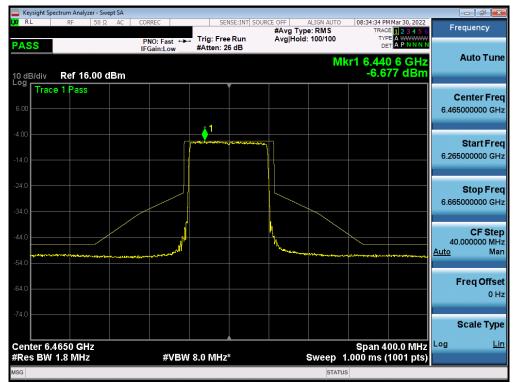
Plot 7-457. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 107)

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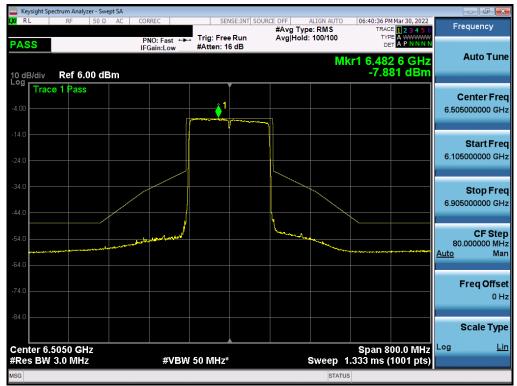
Plot 7-458. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 115)



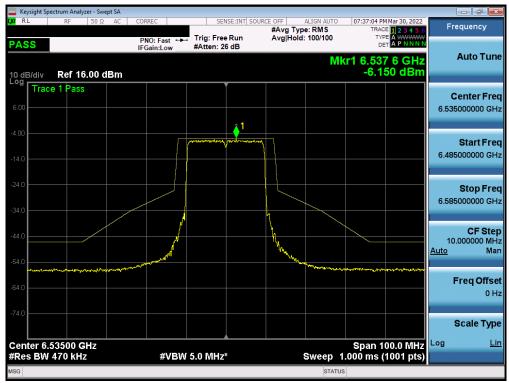
Plot 7-459. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 103)

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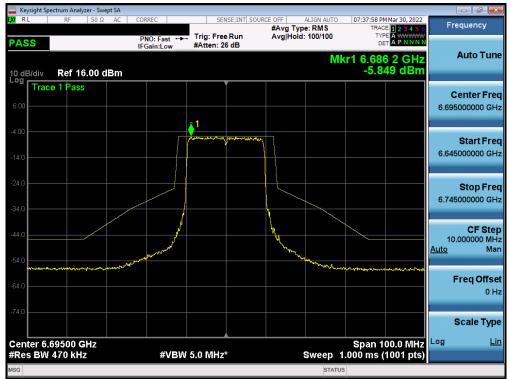
Plot 7-460. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 6) - Ch. 111)



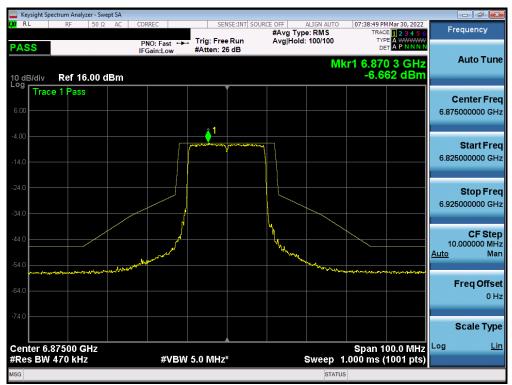
Plot 7-461. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 117)

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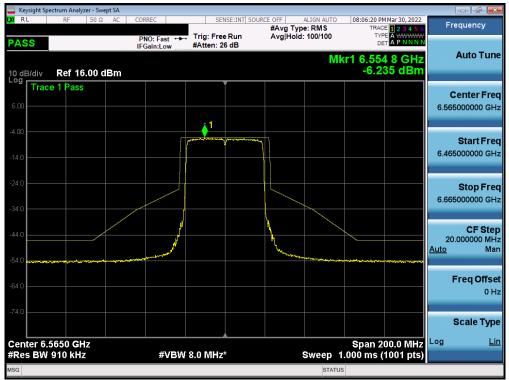
Plot 7-462. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 149)



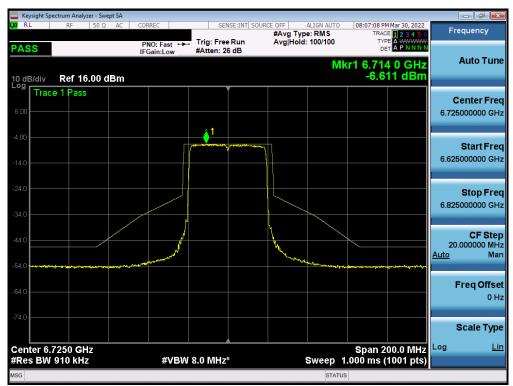
Plot 7-463. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 185)

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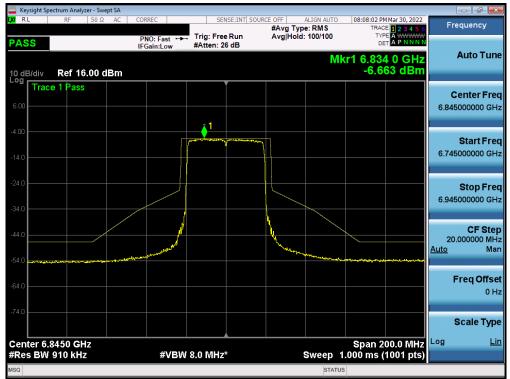
Plot 7-464. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 123)



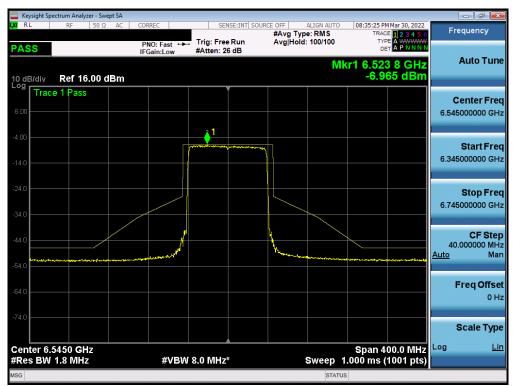
Plot 7-465. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 155)

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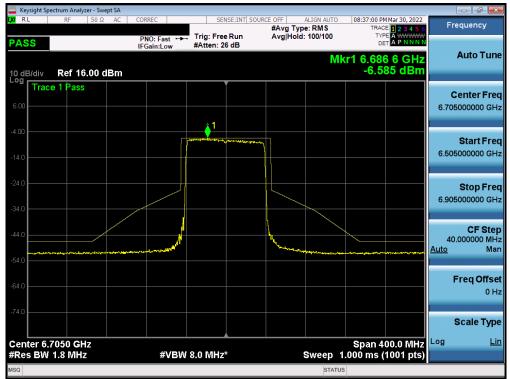
Plot 7-466. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 179)



Plot 7-467. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 119)

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Plot 7-468. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 151)



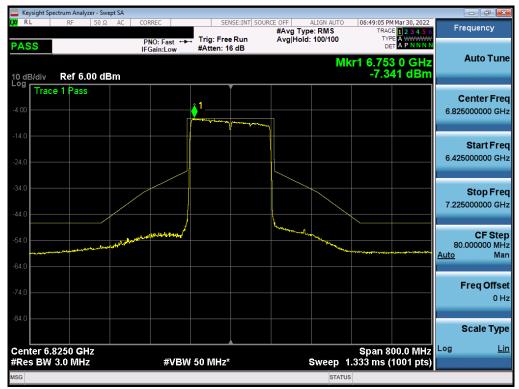
Plot 7-469. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 183)

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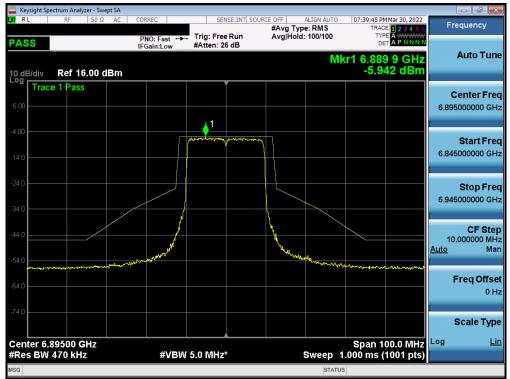
Plot 7-470. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 143)



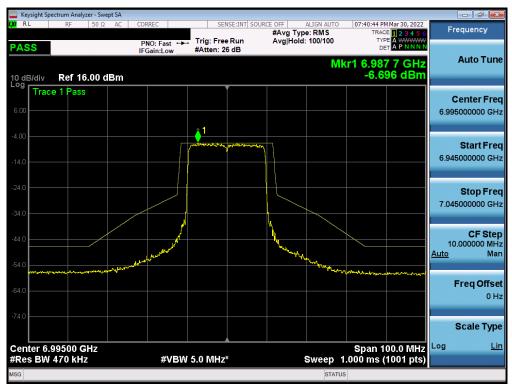
Plot 7-471. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 7) - Ch. 175)

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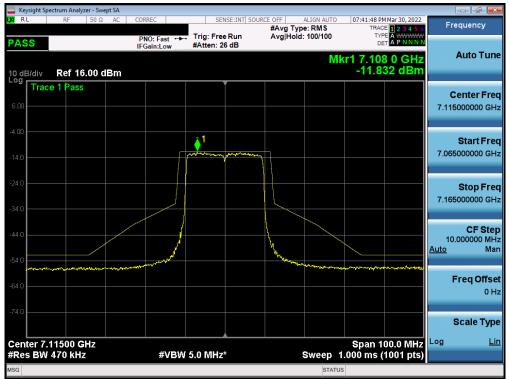
Plot 7-472. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 189)



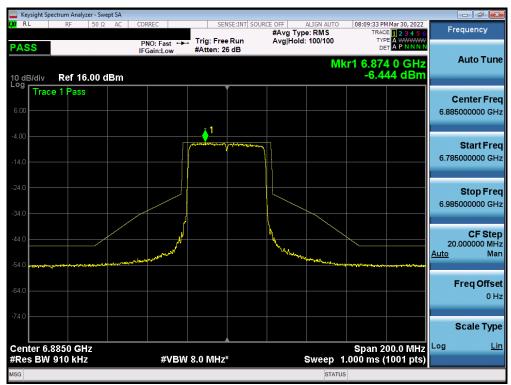
Plot 7-473. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 209)

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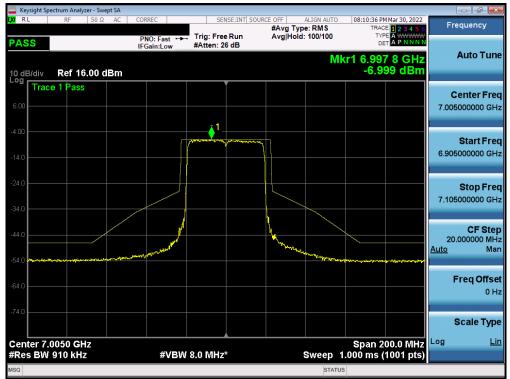
Plot 7-474. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 233)



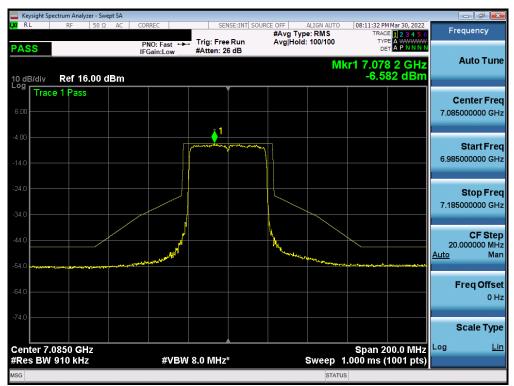
Plot 7-475. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 187)

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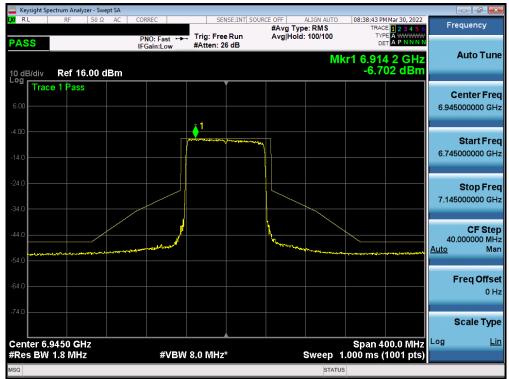
Plot 7-476. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 211)



Plot 7-477. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 227)

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Plot 7-478. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 199)



Plot 7-479. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 215)

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					ir Gain.L	.0w				M	lkr1 6.91	3 0 GHz		Auto Tune
10 c Log	B/div	Ref	16.00 d	Bm							-12.0	95 dBm		
LOG							· · · · ·							Center Freq
6.0	) <u> </u>													5000000 GHz
-4.00	)				<u>î</u> 1									Start Freq
-14.0	,				<mark></mark>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Marine Carlos	Anner					6.78	5000000 GHz
									A manufacture	ן				
-24.0	) <u> </u>									-				Stop Freq
													7.18	5000000 GHz
-34.0														
-44.0	)				ļ					_				CF Step
			- Malhar	une sensed	1					Hunner	Mar for and the production		Auto	Man
-54.0	) <b></b>													
-64.0														Freq Offset
-04.0														0 Hz
-74.0														
														Scale Type
	nter 6.9											VV.V IVII 12	Log	Lin
#Re	es BW	1.0 M	Hz		#	¢VBW	3.0 MHz	*		Sweep	1.000 ms (	1001 pts)		
MSG										STAT	US			

Plot 7-480. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tones) (UNII Band 8) - Ch. 207)

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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# 7.6 Contention Based Protocol – 802.11ax §15.407(d)(6)

#### Test Overview and Limit

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band (herein referred to as unlicensed devices) are required to use technologies that include a contention-based protocol to avoid co-channel interference with incumbent devices sharing the band. To ensure incumbent co-channel operations are detected in a technology-agnostic manner, unlicensed devices are required to detect co-channel radio frequency energy (energy detect) and avoid simultaneous transmission.

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain.

To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel.

#### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2 KDB 987594 D02 v01r01 KDB 987594 D04 V01

#### **Test Settings**

- 1. Configure the EUT to transmit with a constant duty cycle.
- 2. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.
- 3. Set the signal analyzer center frequency to the nominal EEUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2, as shown in Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
- **4.** Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two.
- 5. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in Figure 2.
- 7. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
- 8. Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
- **9.** (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- **10.** Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.

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# Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

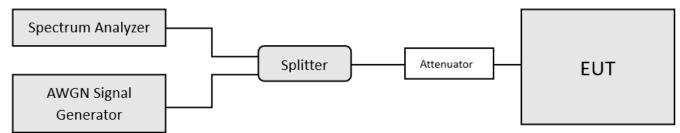


Figure 7-5. Contention-based protocol test setup, conducted method

# Test Notes

1. Per guidance from KDB 987594 D02 v01r01, contention based protocol was tested using an AWGN signal with a bandwidth of 10MHz (see Plot 7-481). The amplitude of the signal was increased until detected by the EUT, signaled by the ceasing of transmission (see Plot 7-497), marker indicates the point at which the AWGN signal is introduced.

2.

3. 15 trials were ran in order to assure that at least 90% of certainty was met.

Detection Level = Injected AWGN Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)

Band	Channel	Channel Freq [MHz]	Channel BW [MHz]	Incumbent Freq [MHz]	Injected (AWGN) [dBm]	Antenna Gain [dBi]	Path Loss (dB)	Adjusted Power Level [dBm]	Detection Limit [dBm]	Margin [dB]
	53	6215	20	6215	-74.12	-10.50	0.49	-63.13	-62.0	-1.13
UNII				6110	-74.60	-10.50	0.46	-63.64	-62.0	-1.64
Band 5	47	6185	160	6185	-74.18	-10.50	0.48	-63.20	-62.0	-1.20
				6260	-74.64	-10.50	0.50	-63.64	-62.0	-1.64
	101	6455	20	6455	-76.33	-12.00	0.54	-63.79	-62.0	-1.79
UNII				6430	-76.20	-12.00	0.53	-63.67	-62.0	-1.67
Band 6	111	6505	160	6505	-75.60	-12.00	0.55	-63.05	-62.0	-1.05
				6580	-75.58	-12.00	0.57	-63.01	-62.0	-1.01
	149	6695	20	6695	-76.07	-12.40	0.59	-63.08	-62.0	-1.08
UNII				6750	-76.03	-12.40	0.60	-63.03	-62.0	-1.03
Band 7	175	6825	160	6825	-76.25	-12.40	0.62	-63.23	-62.0	-1.23
				6900	-76.22	-12.40	0.63	-63.19	-62.0	-1.19
	197	6935	20	6935	-75.79	-11.70	0.64	-63.45	-62.0	-1.45
UNII				6910	-75.80	-11.70	0.64	-63.46	-62.0	-1.46
Band 8	207	6985	160	6985	-75.38	-11.70	0.65	-63.03	-62.0	-1.03
				7060	-75.39	-11.70	0.66	-63.03	-62.0	-1.03

#### **Equation 7-1. Detection Level Calculation**

Table 7-26. Contention Based Protocol – Incumbent Detection Results

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 274 of 220
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					EU	EUT Transmission Status				
Band	Channel	Channel Freq	Channel BW	Incumbent	Adjus	sted AWGN Power (	dBm)			
Bana	Charmer	[MHz]	[MHz]	Freq [MHz]	Normal	Minimal	Ceased			
	53	6215	20	6215	-79.62	-65.44	-63.13			
UNII				6110	-79.69	-65.98	-63.64			
Band 5	47	6185	160	6185	-79.36	-65.47	-63.20			
				6260	-78.99	-65.83	-63.64			
	101	6455	20	6455	-78.88	-65.14	-63.79			
UNII				6430	-78.83	-65.21	-63.67			
Band 6	111	6505	160	6505	-78.79	-65.19	-63.05			
				6580	-78.92	-65.39	-63.01			
	149	6695	20	6695	-79.63	-66.01	-63.08			
UNII				6750	-79.48	-65.89	-63.03			
Band 7	175	6825	160	6825	-79.16	-65.57	-63.23			
				6900	-79.02	-65.44	-63.19			
	197	6935	20	6935	-78.96	-65.36	-63.45			
UNII				6910	-79.28	-65.69	-63.46			
Band 8	207	6985	160	6985	-79.60	-66.01	-63.03			
				7060	-79.48	-65.89	-63.03			

Table 7-27. Contention Based Protocol – Detection Results – All Tx Cases

Band	Channel	Channel Freq [MHz]	Channel BW [MHz]	Incumbent Freq [MHz]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Detection Rate (%)
	53	6215	20	6215	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
UNII				6110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
Band 5	47	6185	160	6185	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				6260	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	101	6455	20	6455	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
UNII				6430	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
Band 6	111	6505	160	6505	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				6580	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	149	6695	20	6695	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
UNII				6750	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
Band 7	175	6825	160	6825	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				6900	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	197	6935	20	6935	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
UNII				6910	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
Band 8	207	6985	160	6985	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				7060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100

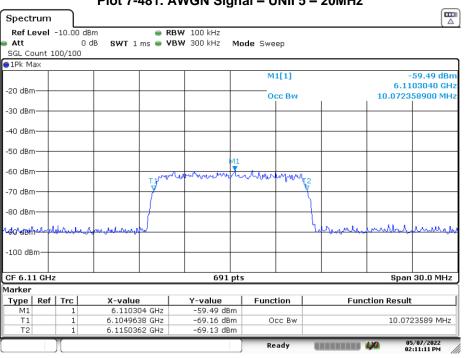
Table 7-28. Contention Based Protocol – Incumbent Detection Trial Results

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Spectrum	<u> </u>										
Ref Level Att SGL Count		OdB SWT 1 m	e RBW	100 kHz 300 kHz	Mode	Swe	ер				(
●1Pk Max											
						M	1[1]				62.62 dBm
-20 dBm-							_				50000 GH2
						00	c Bw			10.0289	43560 MH: I
-30 dBm											
-40 dBm											
-50 dBm											
-60 dBm			Thruth	www	1 WIM	w.	winthy	2			
-70 dBm			7				1	Ī –			
			1					1			
-80 dBm			1					T			
uga Abhard	my	assand march	/					6	www.	- Marghan	Myserman
-100 dBm-											
CF 6.215 G	Hz			691	pts					Span	30.0 MHz
Marker			1			_			_		
Type Ref	Trc 1	X-value 6.215	- CH2	<u>Y-value</u> -62.62 dB		Funct	tion		Func	tion Result	
T1	1	6.2100072		-67.33 dB		0	c Bw			10.0289	94356 MHz
T2	1	6.2200362		-67.80 dB							
	)[					Re	ady	1			5/07/2022 :07:50 PM

Date: 7.MAY.2022 14:07:50



Plot 7-481. AWGN Signal – UNII 5 – 20MHz

Date: 7.MAY.2022 14:11:11

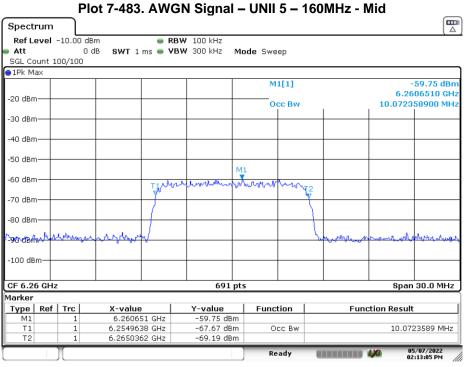
#### Plot 7-482. AWGN Signal - UNII 5 - 160MHz - Low

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 276 of 220
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Spectrum										
Ref Level Att SGL Count :		OdB SWT 1 ms	<ul> <li>RBW 100 kHz</li> <li>VBW 300 kHz</li> </ul>	Mo	de Swe	ер				
⊖1Pk Max										
					M	1[1]				59.32 dBm
-20 dBm				_		CC BW				74310 GHz 58900 MHz
					0				10.0723	38900 MH2
-30 dBm				+						
-40 dBm				_						
-50 dBm										
-60 dBm		T1	mutulum	un	M1	mor	F2			
-70 dBm		Ť	r	<u> </u>			Ý			
							ή.			
-80 dBm									the physical	
rðal gjent rute	<sup>مر</sup> الحکام ک	and the work of the					M.	091497-201 <sup>4</sup> 9	w. www.	Man and south
-100 dBm										
-100 0011										
CF 6.185 G	Hz	- I I	69	91 pts					Span	30.0 MHz
Marker										
	Trc	X-value	Y-value		Func	tion		Function Result		
M1 T1	1	6.187431 GH 6.1799638 GH				cc Bw			10.07	23589 MHz
T2	1	6.1900362 GF			0	CCBW			10.07	23209 MHZ
	][				Re	ady	1			5/07/2022 ::12:09 PM

Date: 7.MAY.2022 14:12:09



Date: 7.MAY.2022 14:13:05

#### Plot 7-484. AWGN Signal - UNII 5 - 160MHz - High

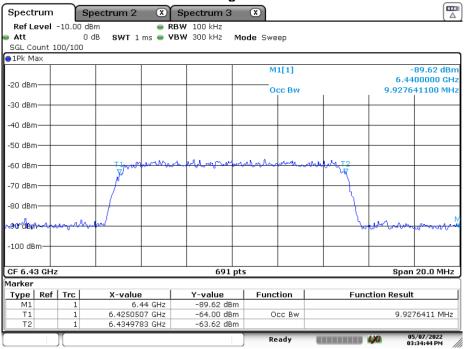
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 277 of 220	
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Spectru	n S	pectrum 2 🛛 🗴	Spectrum 3	×				
	el -10.00 d		RBW 100 kHz				, ,	_
Att		dB SWT 1 ms 👄 '	<b>VBW</b> 300 kHz	Mode Swe	ер			
SGL Coun	t 100/100							_
😑 1Pk Max								
				M	1[1]		-59.87 dB	
-20 dBm—					CC BW		6.4552890 GF 9.927641100 MF	
				0		1	9.927041100 Mi	<b>H</b> 2
-30 dBm—								
10.10								
-40 dBm—								
-50 dBm—								
-30 ubiii				M1				
-60 dBm—		Timmen	under and mary	and my market	Lac. MA	Marling		
		1 y				NY I		
-70 dBm—						$\rightarrow$		
-80 dBm—								
<sup>ለረ</sup> ፁወ/ፅፁስት~ <sup>ው</sup>	Marine Carlos and a						<u>᠆ᢉᢦ᠕ᡁᡐ᠁᠆᠆᠕᠉ᢔᠿᠵᡥᠿᠣ</u>	~~~
-100 dBm-								
-100 uBiii-								
CF 6.455	GHz		691	pts			Span 20.0 MH	<u>z</u>
Marker								
	ef Trc	X-value	Y-value	Func	tion	Fun	ction Result	
M1 T1	1	6.455289 GHz	-59.87 dBr -62.96 dBr		cc Bw		9.9276411 MH:	_
T1 T2	1	6.4500507 GHz 6.4599783 GHz	-62.96 dBi		CC BW		9.9276411 MH;	4
		0.7399703 GHZ	U4.02 UDI				05/07/2022	_
L	Л			Re	ady		05/07/2022 03:33:06 PM	1

Date: 7.MAY.2022 15:33:06





Date: 7.MAY.2022 15:34:43

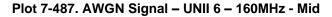
Plot 7-486. AWGN Signal - UNII 6 - 160MHz - Low

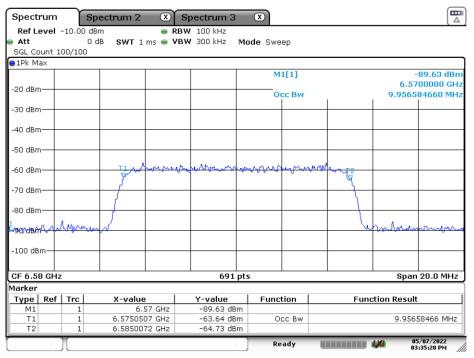
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)					
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Spect	rum		Spectrum 2	×	Spec	trum 3	3	$\mathbf{D}$					
	evel	-10.00			<b>RBW</b> 10								
Att SGL Cr	ount 1	00/100	) dB <b>SWT</b> 1	ms 😑 🎙	<b>/BW</b> 30	IO KHZ	Mode	Swe	ep				
O 1Pk M		,											
-								M	1[1]				-87.45 dBm
-20 dBn	_											6.49	950000 GHz
-20 aBh	n							0	cc Bw			9.8986	597540 MHz
-30 dBn	n												
-40 dBn	n		_										
-50 dBn	n												
-60 dBn	n		TIM	man	m	hould be	haven.	يەتمال	-	Ac	A. 12		
-70 dBn			P								( T		
			1										
-80 dBn	n												
serde'n	nam 4	Anana	wand								hy	hand	man
-100 dB	3m_						ļ						
CF 6.5	05 GF	lz				691	pts					Spar	n 20.0 MHz
Marker													
Туре	Ref	Trc	X-value			value		Func	tion		Fund	ction Resul	t l
M1		1		95 GHz		37.45 dE		-				0.000	
T1 T2		1	6.50005			54.85 dE 53.64 dE		0	CC BW			9.898	69754 MHz
			01000001					De	ady	-			5/07/2022
								Re	au,			0	3:33:43 PM

Date: 7.MAY.2022 15:33:43





Date: 7.MAY.2022 15:35:20

# Plot 7-488. AWGN Signal – UNII 6 – 160MHz - High

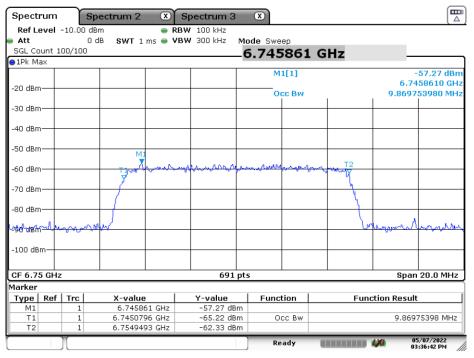
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 270 of 220	
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Spect	rum		Spectrum 2	×	Spectrum 3	3 (	x					
Ref Le	evel	-10.00	dBm	- R	RBW 100 kHz							
🗕 Att		1	DdB SWT 1	ms 👄 ٧	<b>/BW</b> 300 kHz	Mod	e Swe	ер				
		100/100				_6.	698	856	GH	z		
⊖1Pk M	ax									_		
							М	1[1]				56.56 dBm
-20 dBm	ן			ļ								85600 GHz
							0	CC BW		I	9.9565	84660 MHz
-30 dBm	<u>ו</u> רי		_									
-40 dBm	-+-י		-			-						
-50 dBm	-ר			<u> </u>					M1			
-60 dBm			T1 . A	m. Mr.	1. March March	In	Albana	maria	No.	м., то		
-00 UBII			Xarra	0.000.000		T						
-70 dBm												
70 abii	·											
-80 dBm	∩					<u> </u>						
										٦.		
1901dBa	<u>r m</u>	ange and	philat			-				V	myn	Phonenty
-100 dB	m+					<u> </u>						
CF 6.69	95 GI	Hz			691	pts					Span	20.0 MHz
Marker												
Туре	Ref	Trc	X-value	e	Y-value		Func	tion		Fund	tion Result	
M1		1	6.698	56 GHz	-56.56 di	3m						
T1		1	6.69002		-62.23 di		0	cc Bw			9.956	58466 MHz
T2		1	6.69997	83 GHz	-64.24 di	3m						
							Re	ady				5/07/2022 :36:11 PM

Date: 7.MAY.2022 15:36:11

Plot 7-489. AWGN Signal – UNII 7 – 20MHz



Date: 7.MAY.2022 15:36:42

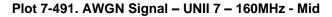
# Plot 7-490. AWGN Signal - UNII 7 - 160MHz - Low

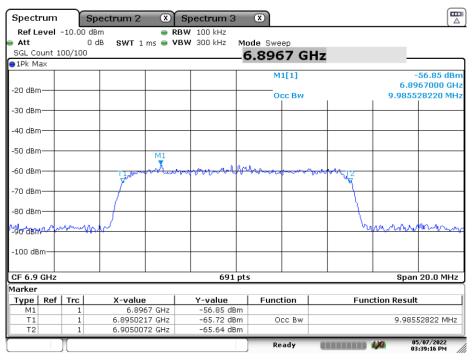
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 280 of 220	
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Spect	rum	$\neg$	Spec	trum 2	2 (X)	Sp	ectrum	3	×					
	evel	-10.00			-		100 kHz							
Att			0 dB	SWT	1 ms 😑	VBW	300 kHz		de Swe					
SGL Co		100/100	J					_6	.828	3792	2 G	Hz	-	
OIPK M	ax				_			1		1[1]				-57.66 dBm
									IV.	1[1]				287920 GHz
-20 dBrr	n-+		-					+	0	CC BW				41100 MHz
-30 dBm	_													
-30 aBn														
-40 dBm	n_							_						
-50 dBm	n-+-				_									
											M1			
-60 dBm	n-+			три	- where the second	******	° <del></del>	10-0	ᡔᡘᡰᠼᡧᡔ᠋ᢔᢦ	Algerand of	AMA.	www.2		
-70 dBm				, y								Υ,		
-70 ubii	"			1										
-80 dBrr	n —		-+	1										
				1										
-90 dBn	rizaqu	MANY	when	, W	-			+					mona	aman 3a
-100 dB	1m-+							+						
CF 6.8	25 GI	Hz					69	1 pts					Spar	20.0 MHz
Marker														]
Туре	Ref	_		X-valu			Y-value		Func	tion		Fund	tion Result	:
M1 T1		1			792 GHz 507 GHz		-57.66 d			CC BW			0.00	76411 MHz
T2		1			783 GHz	-	-65.61 d		U	CUBW			9,92	70411 MHZ
<u> </u>		7		5.0277	. 55 6/12		00.010		-		-			5/07/2022
L									R	eady				3:38:19 PM

Date: 7.MAY.2022 15:38:18





Date: 7.MAY.2022 15:39:16

# Plot 7-492. AWGN Signal – UNII 7 – 160MHz - High

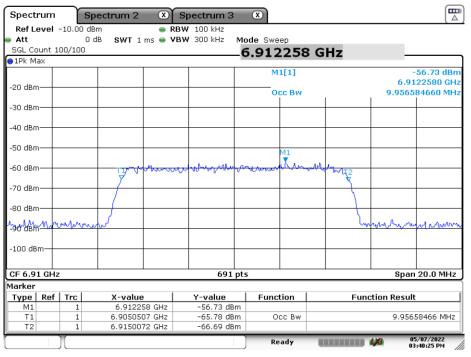
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:	Daga 281 of 220			
1M2201200003-23-R1.PY7	3/25/2022 - 5/19/2022	Portable Handset	Page 281 of 320			
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Spect	rum	$\neg$	Spec	trum 2	X	Spe	ctrum 3	3 (	X					
Ref L	evel	-10.00	l dBm		-	RBW 1	LOO kHz							
🗕 Att			0 dB	SWT 1	. ms 👄 🎙	VBW 3	300 kHz	Mod	e Swe	ер				
SGL Co	ount 1	100/100	כ					6.	935	5608	3 G	Hz		
⊖1Pk M	ах							-						
									M	1[1]				55.39 dBm
-20 dBm	n													56080 GHz
									0	CC BW		1	9.9276	41100 MHz
-30 dBm	n		_					+					-	
-40 dBrr	n-+-							+						
-50 dBr	n——							MI						
-60 dBm					n me	مناجمه	um	mal	Mr	hum	der the	ma		
-00 001	'			1000			0 -0- U	1	v	~~~·		r v 42		
-70 dBm	n—											1		
-80 dBrr	n—+		-+					+						
I				{									monuner	uhann
<u>^-90-d8</u> h	Value V	ry wash						-						ary own-
-100 dB	_													
-100 dB	m													
CF 6.9	35 GI	Hz					691	L pts					Span	20.0 MHz
Marker														
Туре	Ref			X-valu			'-value	_	Func	Function Function Result				
M1 T1		1			08 GHz		-55.39 d -65.43 d			CC BW			0.00	76411 MU-
T2		1		6.93005			-65.43 a -65.95 d		0	CC BW			9,92	76411 MHz
		1 1		0,00997	00 8112	1	00.90 u		_		_			5/07/2022
									Re	eady				39:51 PM

Date: 7.MAY.2022 15:39:51

Plot 7-493. AWGN Signal – UNII 8 – 20MHz

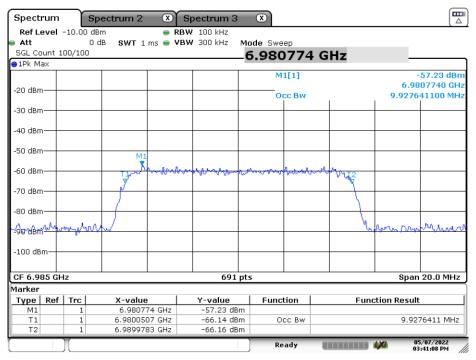


Date: 7.MAY.2022 15:40:24

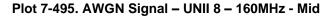
#### Plot 7-494. AWGN Signal - UNII 8 - 160MHz - Low

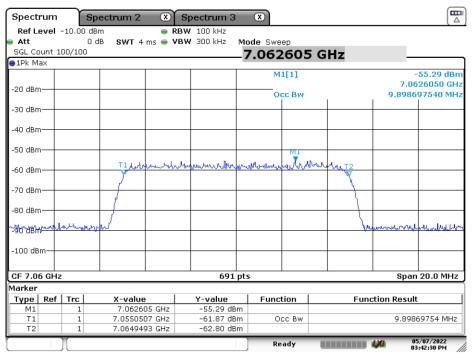
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 202 of 220	
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Date: 7.MAY.2022 15:41:07





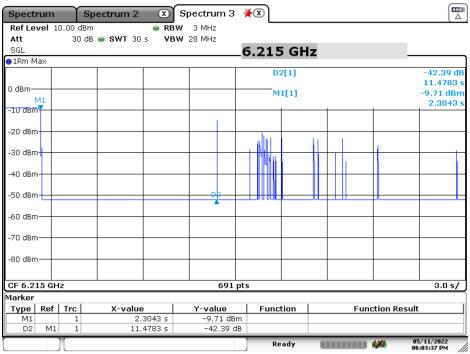
Date: 7.MAY.2022 15:42:30

# Plot 7-496. AWGN Signal – UNII 8 – 160MHz - High

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dega 202 of 220	
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# **CBP Timing Plots**



Date: 11.MAY.2022 18:03:37

# Plot 7-497. Contention Based Protocol Timing Plot – UNII 5 – 20MHz Ch53

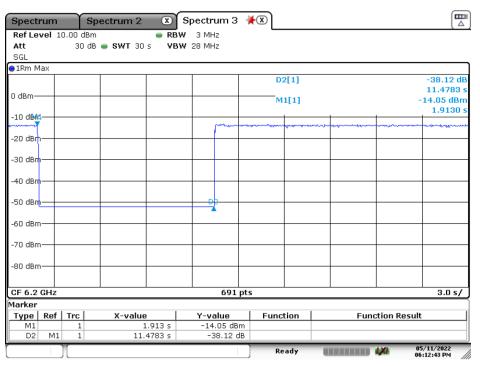
Spectrum S	pectrum 2 🛛 🗴	Spectrum 3 👌	¥⊗)		
Ref Level 10.00 dBm	n 🖷 RB	W 3 MHz	· · · · · ·		
Att 30 dB	8 🖷 SWT 30 s 🛛 VB	<b>W</b> 28 MHz			
SGL					
⊖1Rm Max					
			M1[1]		-15.17 dBm
0.10					2.0000 s
0 dBm			D2[1]		-35.64 dE
to do.					10.3478 9
-10 dBm		des communations			
				· · · · · · · · · · · · · · · · · · ·	
-20 dBm					
-30 dBm					
-30 ubii					
-40 dBm					
-40 UBII					
-50 dBm		D2			
-30 dbin					
-60 dBm-					
-00 0011					
-70 dBm					
, o abiii					
-80 dBm					
-00 0011					
CF 6.2 GHz		691 pt	5		3.0 s/
Marker		Y-value			
Type Ref Trc			Function	Functi	ion Result
M1 1	2.0 s	-15.17 dBm			
D2 M1 1	10.3478 s	-35.64 dB			
			Ready		05/11/2022
					06:08:34 PM

Date: 11.MAY.2022 18:08:34

# Plot 7-498. Contention Based Protocol Timing Plot – UNII 5 – 160MHz Ch47 – Low

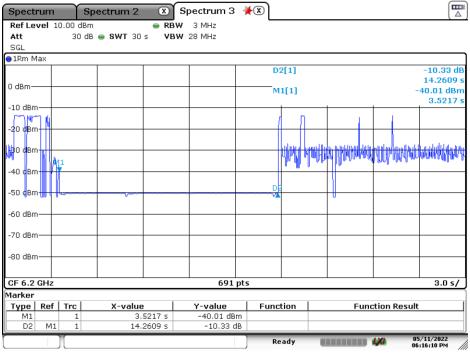
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 284 of 320	
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Date: 11.MAY.2022 18:12:43





Date: 11.MAY.2022 18:16:10

### Plot 7-500. Contention Based Protocol Timing Plot – UNII 5 – 160MHz Ch47 - High

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 285 of 320	
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Spect	rum	s	pectrum 2	×	Spectrum 3	¥X	)				
	vel 1	LO.OO dBr		● RBW							
Att		30 di	8 👄 <b>SWT</b> 30 s	VBW	/ 28 MHz						
SGL											
⊖1Rm N	1ax										
							D2[1]				-42.64 dB 13.2609 s
0 dBm-			+ +								-10.10 dBm
	M:	1					mit[1]				3.1739 s
-10 dBn	n	,	+ +						1		
-20 dBn	n – H										
-30 dBn											
30 001	'										
-40 dBn	n — 📙										
-50 dBn	n —		+			- 62					
-60 dBn	n		+ +								
-70 dBn	n — —										
-80 dBn	-										
-80 UBN											
CF 6.4	55 GH	lz			691	pts					3.0 s/
Marker											
Туре	Ref		X-value		Y-value		unction	_	Fund	tion Resul	t
M1 D2	M1	1		739 s 509 s	-10.10 dB -42.64 d						
	1411		13.2	1092	-42.04 U				_		5 /44 /2022
							Ready				5/11/2022 7:19:58 PM

Date: 11.MAY.2022 19:19:58



Spectrum 🍸 Spectrum 2 🗷	Spectrum 3 👌	<b>★</b> ⊗]		
Ref Level 10.00 dBm 🛛 👄 RB	W 3 MHz			· · · · ·
Att 30 dB 👄 SWT 30 s VB	<b>W</b> 28 MHz			
SGL				
1Rm Max				
		D2[1]		-30.90 dB
				14.0870 s
0 dBm		M1[1]		-15.37 dBm
				3.4348 s
-10 dBm				
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
-20 dBm				
-30 dBm				
-40 dBm		DP		
-50 dBm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
-50 ubili				
-60 dBm				
-00 uBIII				
-70 dBm				
-/o usin				
-80 dBm				
-so usin				
CF 6.51 GHz	691 pt:	5		3.0 s/
1arker				
Type   Ref   Trc   X-value	Y-value	Function	Function	Result
M1 1 3.4348 s	-15.37 dBm			
D2 M1 1 14.087 s	-30.90 dB			
		Ready	444	05/11/2022
				07:26:20 PM

Date: 11.MAY.2022 19:26:20

# Plot 7-502. Contention Based Protocol Timing Plot - UNII 6 - 160MHz Ch111 - Low

FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 286 of 320	
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Spect	rum	s	pectrum 2	X	Spectrum 3	¥x				
	vel 1	10.00 dBr		● RB		-				
Att		30 di	8 👄 SWT 30 s	S VB	₩ 28 MHz					
SGL ●1Rm M	1									
O TRUU IA	IdX						D2[1]			-37.57 dB
							02[1]			14.7826 s
0 dBm-			+ +				M1[1]			-14.89 dBm
										3.8261 s
-10 dBn		MI								
		7								
-20 <b>d</b> Bn										
-30 dBn	-									
00 001										
-40 dBn	n						_			
-50 dBn	י—ר						D2	 		
							<b>A</b>			
-60 dBn	י—ר		+ +				-			
-70 dBn	—ר									
00 d0-										
-80 dBn										
CF 6.5	1 GH:	z			691 p	ots				3.0 s/
Marker										]
Туре	Ref		X-value		Y-value		iction	Fund	tion Resu	ılt
M1		1		261 s	-14.89 dBr			 		
D2	M1	1	14.7	826 s	-37.57 di	3				
		Л					Ready		LXI	05/11/2022 07:23:13 PM

Date: 11.MAY.2022 19:23:13





Plot 7-504. Contention Based Protocol Timing Plot – UNII 6 – 160MHz Ch111 - High

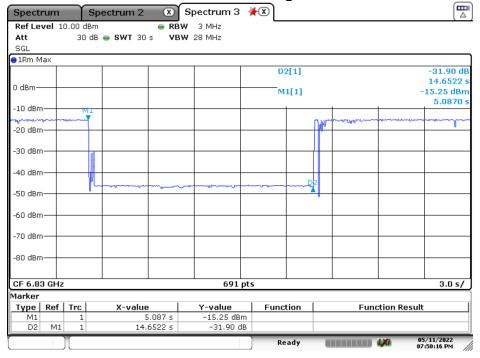
FCC ID: PY7-57325M		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates: EUT Type:		Dogo 297 of 220	
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Spect	rum	$\neg$	Spectrum 2	x	Spectrum 3	<b>*</b> ×	)					
Ref Le Att SGL	vel 1		3m dB 😑 <b>SWT</b> 30	e RBN s VBN	W 3 MHz W 28 MHz							
●1Rm M	lax											
0 dBm—						D2[1] M1[1]				-42.64 dB 13.2609 s -10.10 dBm 3.1739 s		
-10 dBm	r <b>T</b>	,							<u> </u>	T		
-20 dBm												
-30 dBm	۱ <b>—</b>											
-40 dBm	۱ <u> </u>											
-50 dBm	γ <del>- </del>		_									
-60 dBm	1		_									
-70 dBm												
-80 dBm	-											
CF 6.4	55 GF	Ηz			691	pts					3.0 s/	
Marker												
Type	Ref		X-value	1739 s	<u>Y-value</u> -10.10 dBr		unction	tion Function Result			sult	
M1 D2	М1	1		2609 s	-10.10 dBi -42.64 d							
		)[					Ready			LXI	05/11/2022 07:19:58 PM	

Date: 11.MAY.2022 19:19:58

#### Plot 7-505. Contention Based Protocol Timing Plot - UNII 7 - 20MHz Ch149

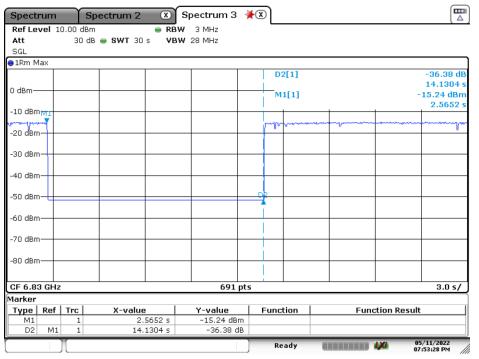


Date: 11.MAY.2022 19:50:16

FCC ID: PY7-57325M	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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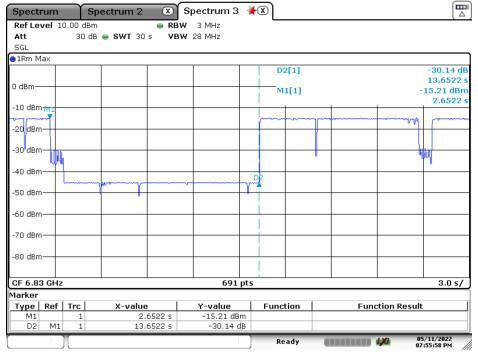


#### Plot 7-506. Contention Based Protocol Timing Plot – UNII 7 – 160MHz Ch175 – Low



Date: 11.MAY.2022 19:53:28

#### Plot 7-507. Contention Based Protocol Timing Plot - UNII 7 - 160MHz Ch175 - Mid

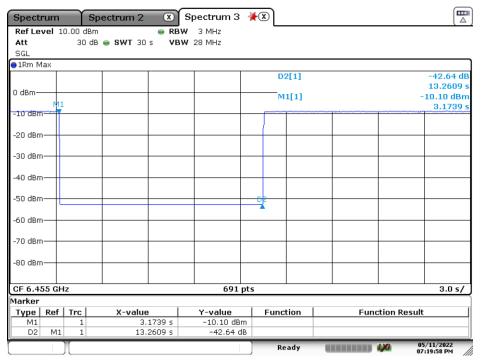


Date: 11.MAY.2022 19:55:58

FCC ID: PY7-57325M	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 289 of 320
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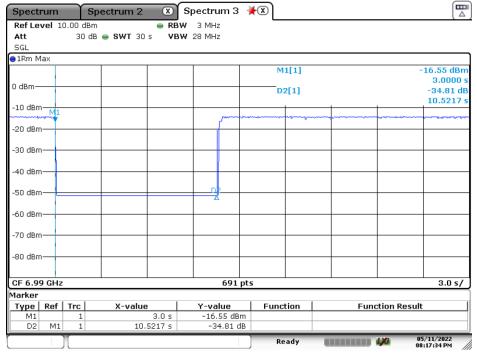


#### Plot 7-508. Contention Based Protocol Timing Plot – UNII 7 – 160MHz Ch175 - High



Date: 11.MAY.2022 19:19:58

#### Plot 7-509. Contention Based Protocol Timing Plot - UNII 8 - 20MHz Ch197

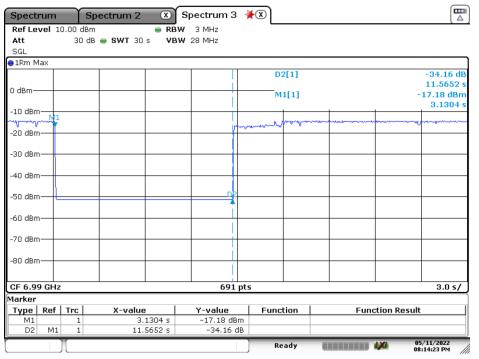


Date: 11.MAY.2022 20:17:34

FCC ID: PY7-57325M	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 200 of 220
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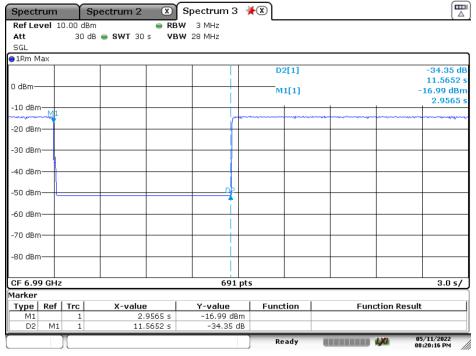


# Plot 7-510. Contention Based Protocol Timing Plot – UNII 8 – 160MHz Ch207 – Low



Date: 11.MAY.2022 20:14:23

#### Plot 7-511. Contention Based Protocol Timing Plot - UNII 8 - 160MHz Ch207 - Mid



Date: 11.MAY.2022 20:20:16

FCC ID: PY7-57325M	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-512. Contention Based Protocol Timing Plot – UNII 8 – 160MHz Ch207 - High

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# 7.7 Radiated Spurious Emission Measurements – Above 1GHz §15.205, §15.209

#### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. All channels, modes (e.g. 802.11a, 802.11n (20MHz BW), 802.11n (40MHz BW), and 802.11ac (80MHz)), and modulations/data rates were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

# For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-33 per Section 15.209.

Frequency	Field Strength [μV/m]	Measured Distance [Meters]	
Above 960.0 MHz	500	3	
Table 7.00 Dadiated Limite			

 Table 7-29. Radiated Limits

#### Test Procedures Used

ANSI C63.10-2013 – Sections 12.7.7.2, 12.7.6, 12.7.5 KDB 789033 D02 v02r01 – Section G

# Test Settings

#### Average Measurements above 1GHz (Method AD)

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = power average (RMS)
- 5. Number of measurement points = 1001 (Number of points must be  $\geq 2 \times \text{span/RBW}$ )
- 6. Averaging type = power (RMS)
- 7. Sweep time = auto couple
- 8. Trace was averaged over 100 sweeps

#### Peak Measurements above 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = peak

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- 5. Sweep time = auto couple
- 6. Trace mode = max hold
- 7. Trace was allowed to stabilize

#### Peak Measurements below 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. Span was set greater than 1MHz
- 3. RBW = 120kHz
- 4. Detector = CISPR quasi-peak
- 5. Sweep time = auto couple
- 6. Trace was allowed to stabilize

# Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

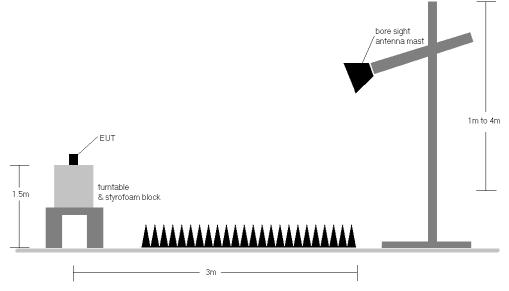


Figure 7-6. Test Instrument & Measurement Setup

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# Test Notes

- 1. All emissions that lie in the restricted bands (denoted by a \* next to the frequency) specified in §15.205 are below the limit shown in Table 7-33.
- 2. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-33. All spurious emissions that do not lie in a restricted band are subject to an average limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBµV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dBµV/m.
- All spurious emissions that do not lie in a restricted band are subject to a peak limit not to exceed 20dB of the average limit [68.2dBµV/m]. If a peak measurement passes the average limit it was determined no further investigation is necessary.
- 4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- 5. This unit was tested with its standard battery.
- 6. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 7. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 8. Radiated spurious emissions were investigated while operating in MIMO mode, however, it was determined that single antenna operation produced the worst case emissions. Since the emissions produced from MIMO operation were found to be more than 20dB below the limit, the MIMO emissions are not reported.
- 9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
- 10. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

# Sample Calculations

# **Determining Spurious Emissions Levels**

- ο Field Strength Level [dBµV/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- Margin [dB] = Field Strength Level  $[dB\mu V/m]$  Limit  $[dB\mu V/m]$

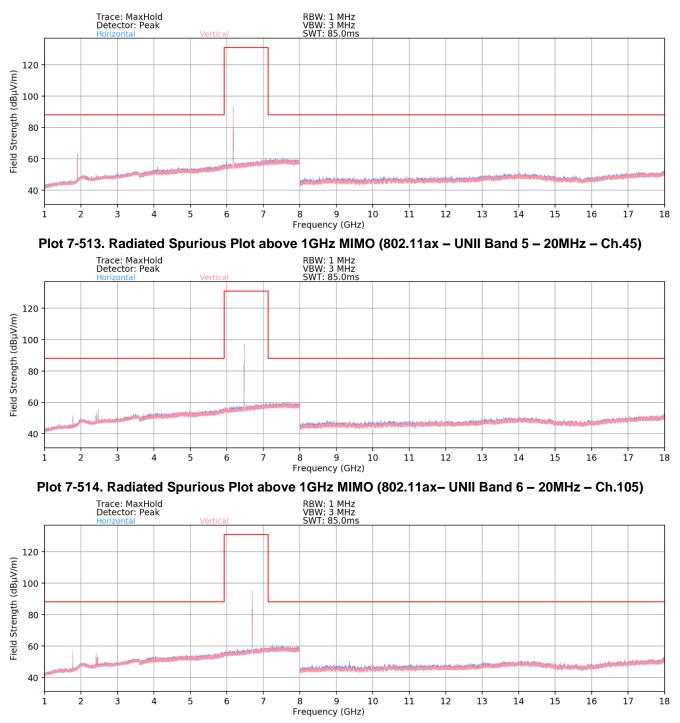
#### Radiated Band Edge Measurement Offset

The amplitude offset shown in the radiated restricted band edge plots was calculated using the formula:
 Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

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# 7.7.1 MIMO Radiated Spurious Emission Measurements (106 Tones)



Plot 7 314. Radiated Spurious Plot above 1GHz MIMO (802.11ax-UNII Band 7 - 20MHz - Ch.149)

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