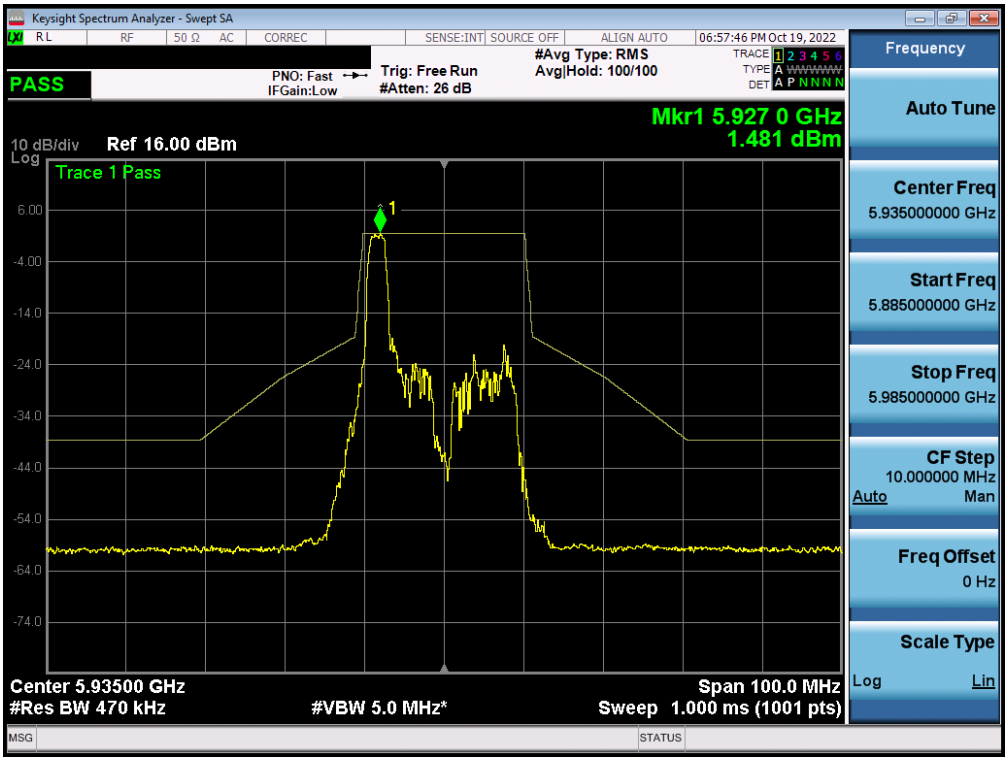
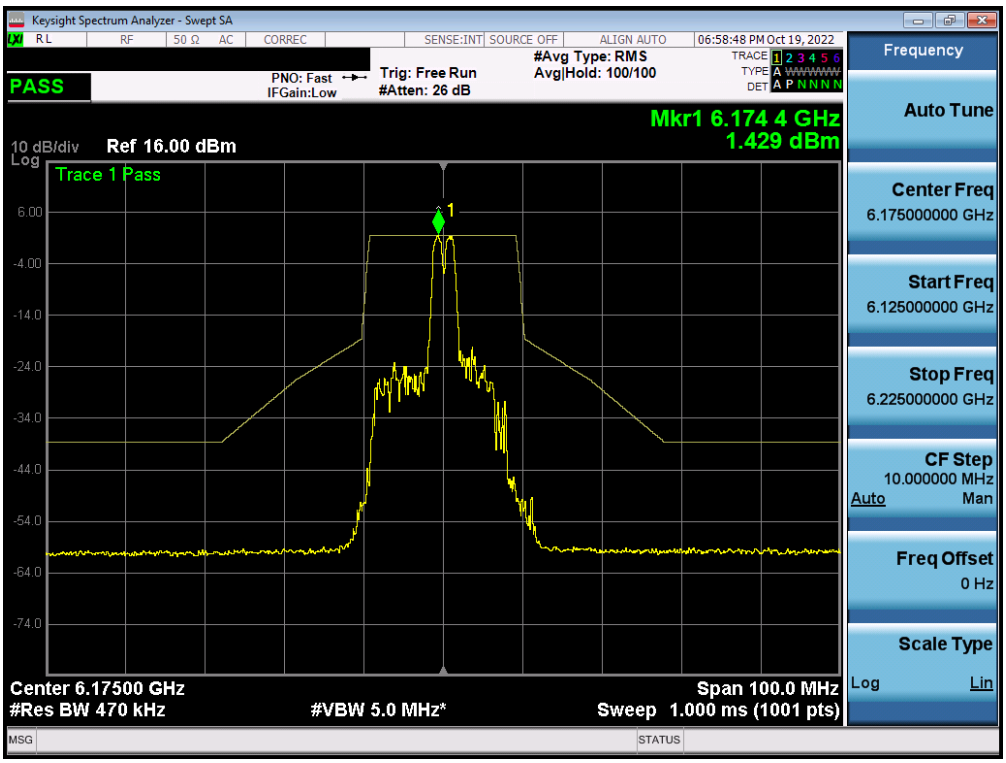
MIMO Antenna-2 In-Band Emission Measurements (26 Tones) - SP



Plot 7-568. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) UNII Band 5) – Ch. 2 - SP



Plot 7-569. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 45) - SP

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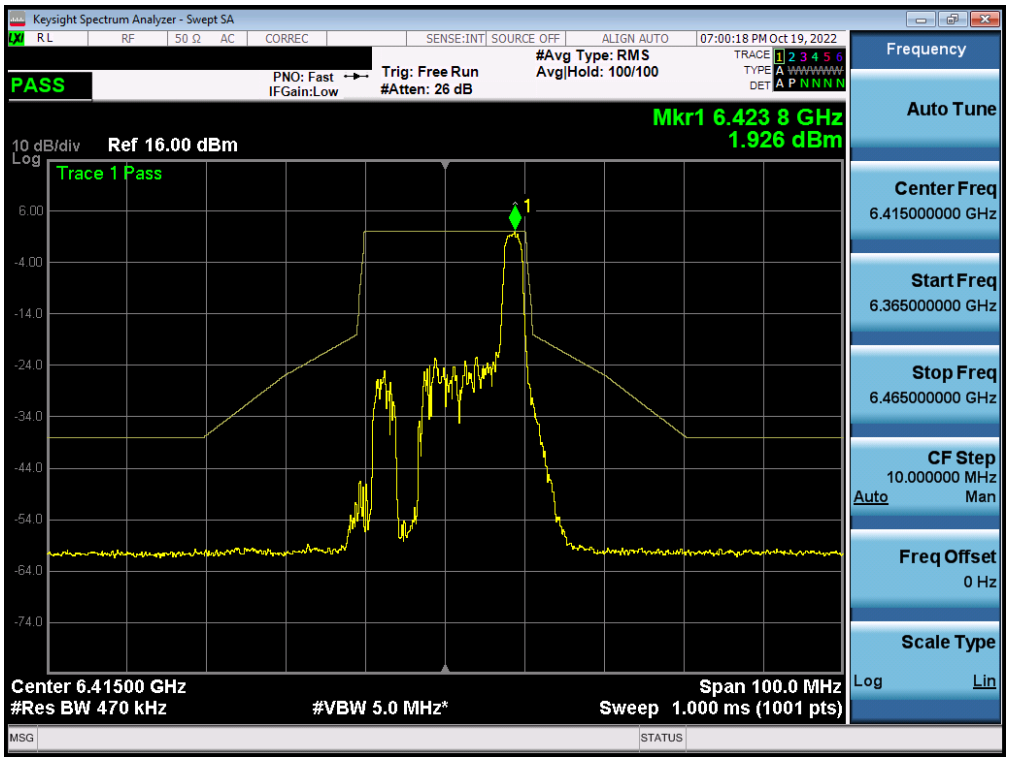
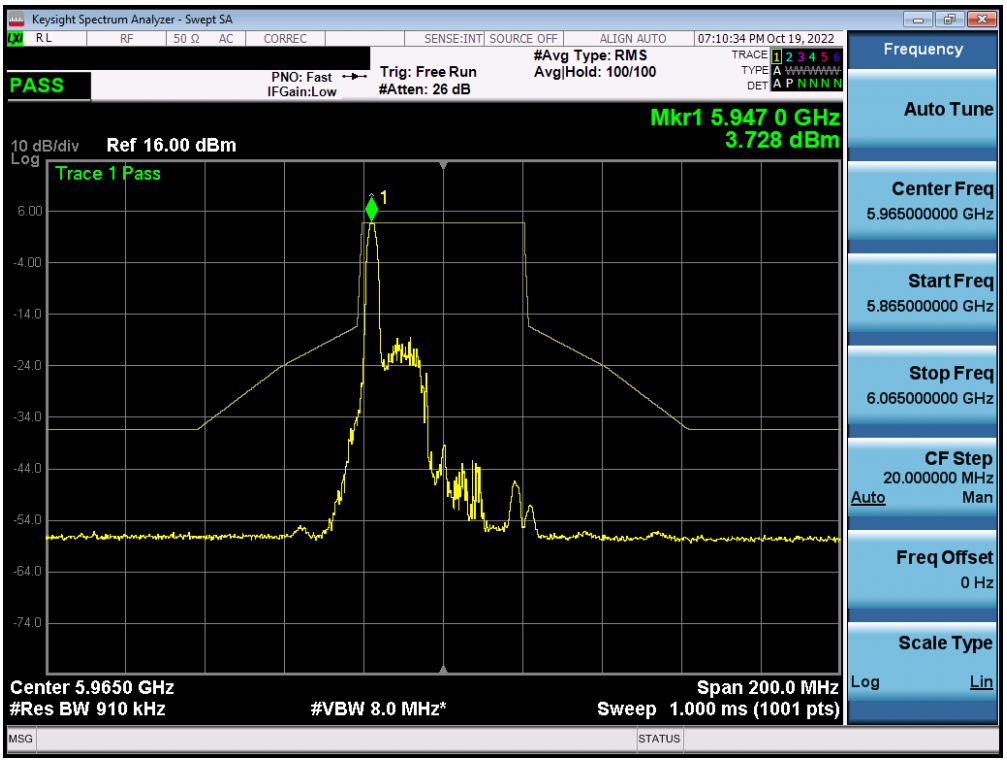


Plot 7-570. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) UNII Band 5) – Ch. 93) - SP



Plot 7-571. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 3) - SP

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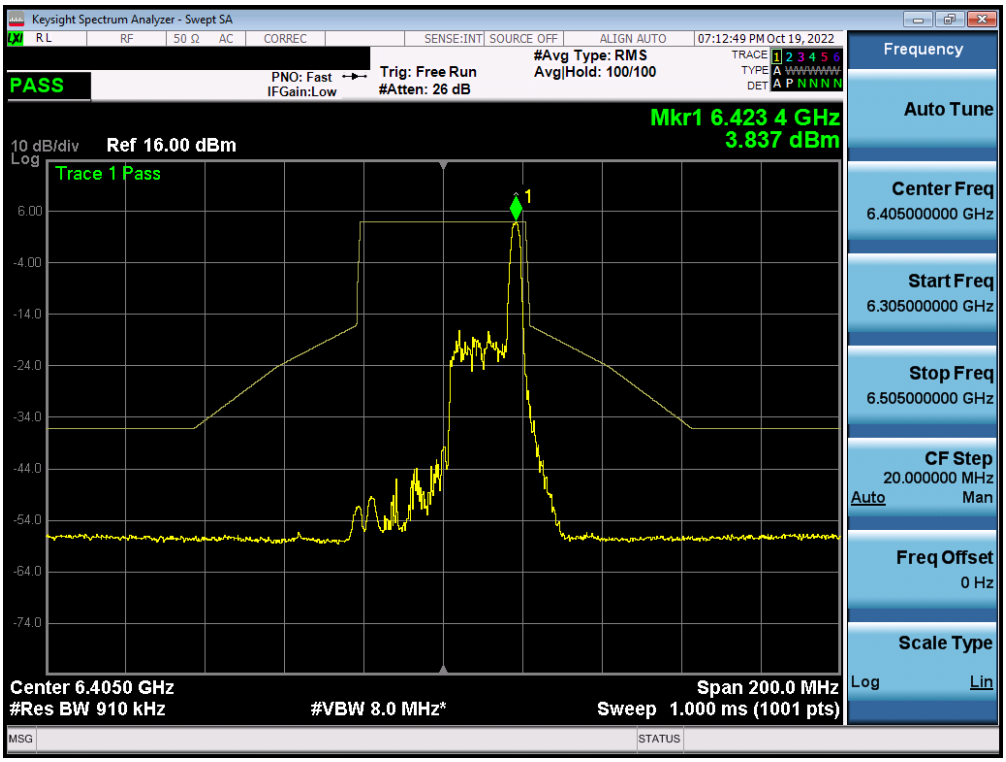
Plot 7-572. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43) - SP



Plot 7-573. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 91) - SP

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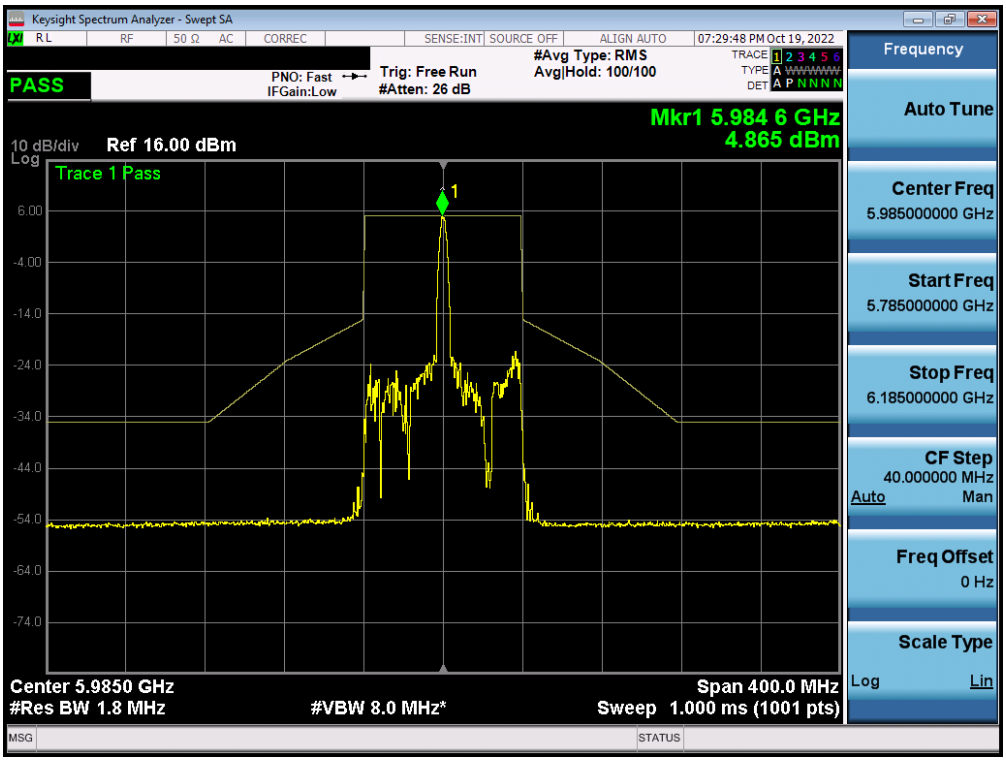
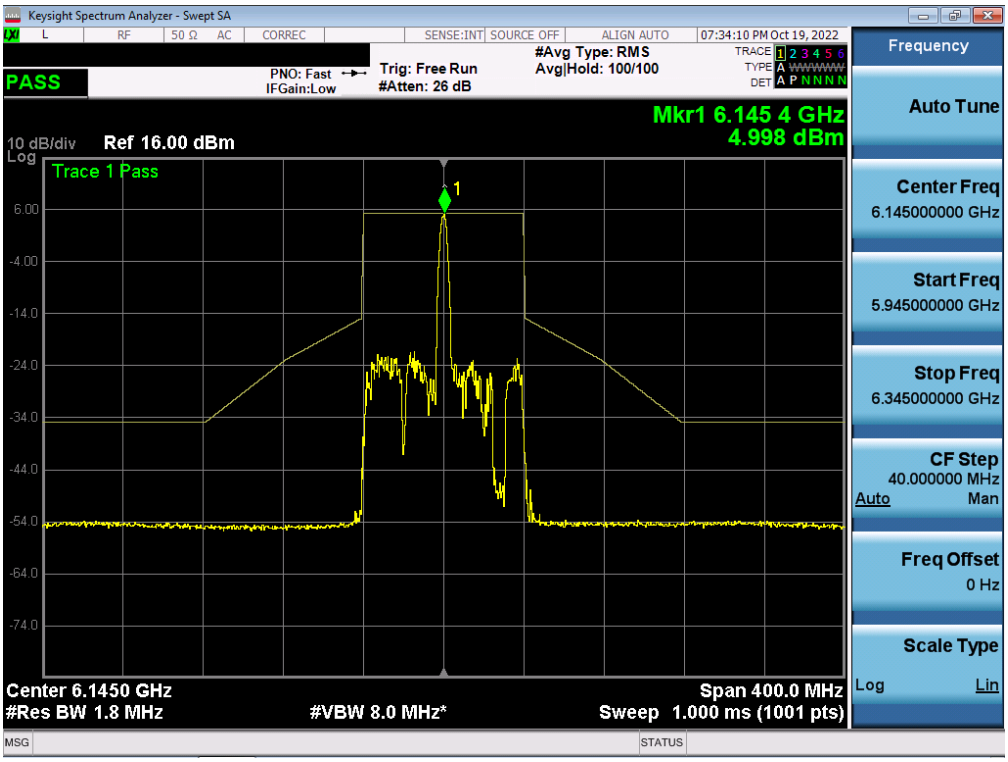


Plot 7-574. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 7) - SP



Plot 7-575. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39) - SP

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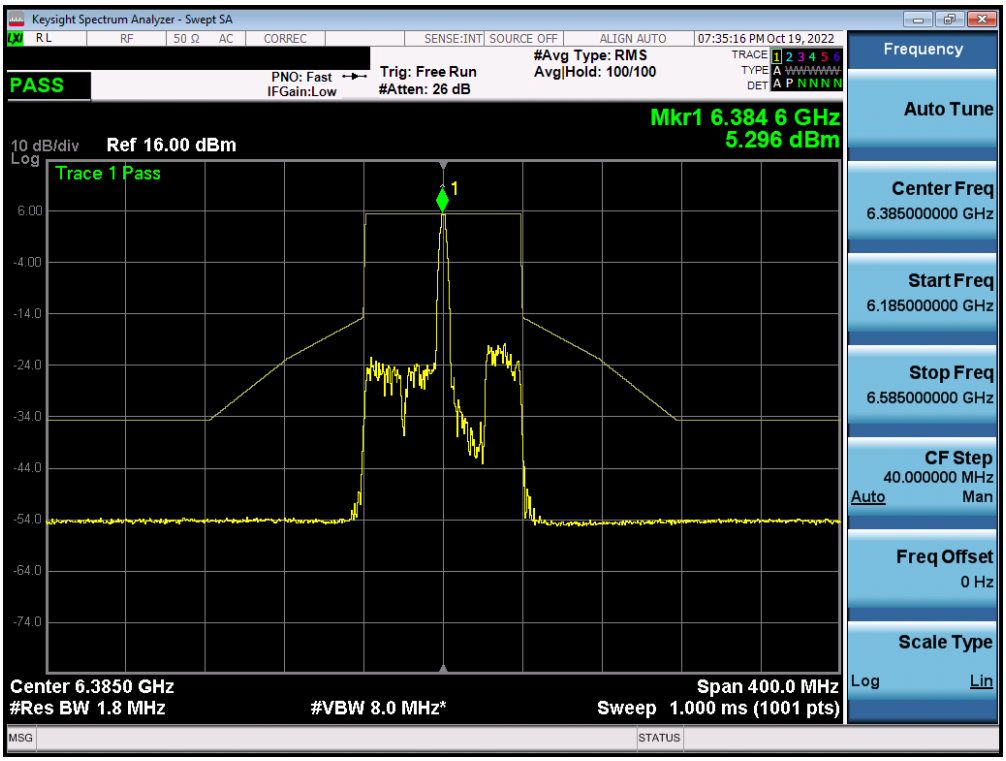
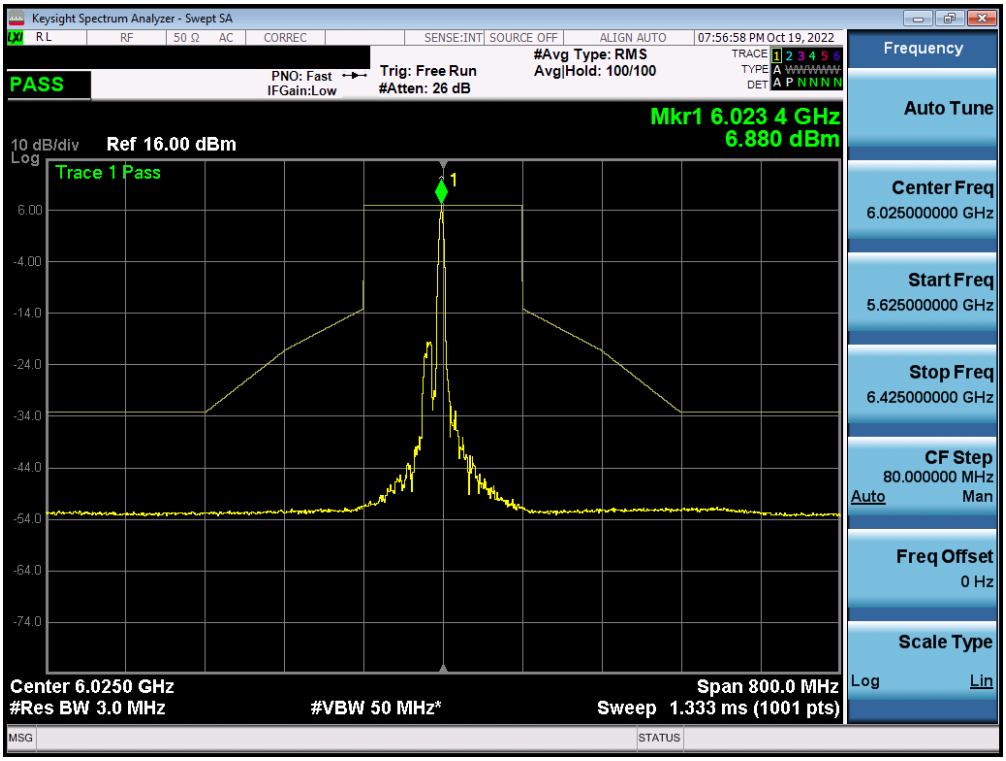


Plot 7-576. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 87) - SP



Plot 7-577. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 15) - SP

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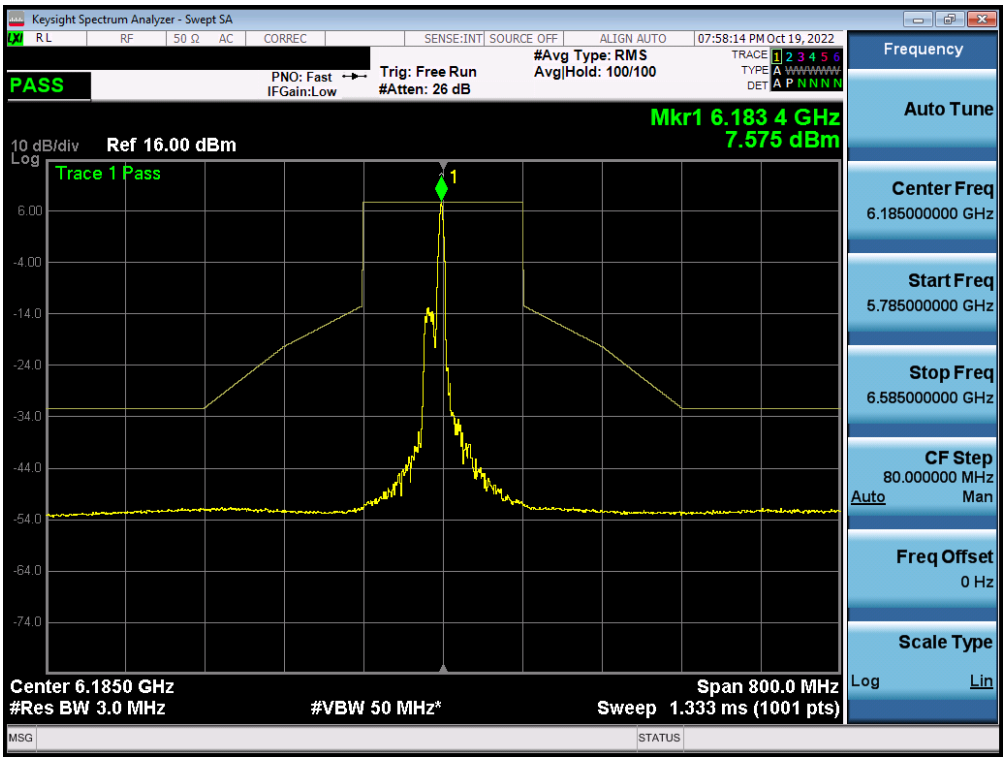
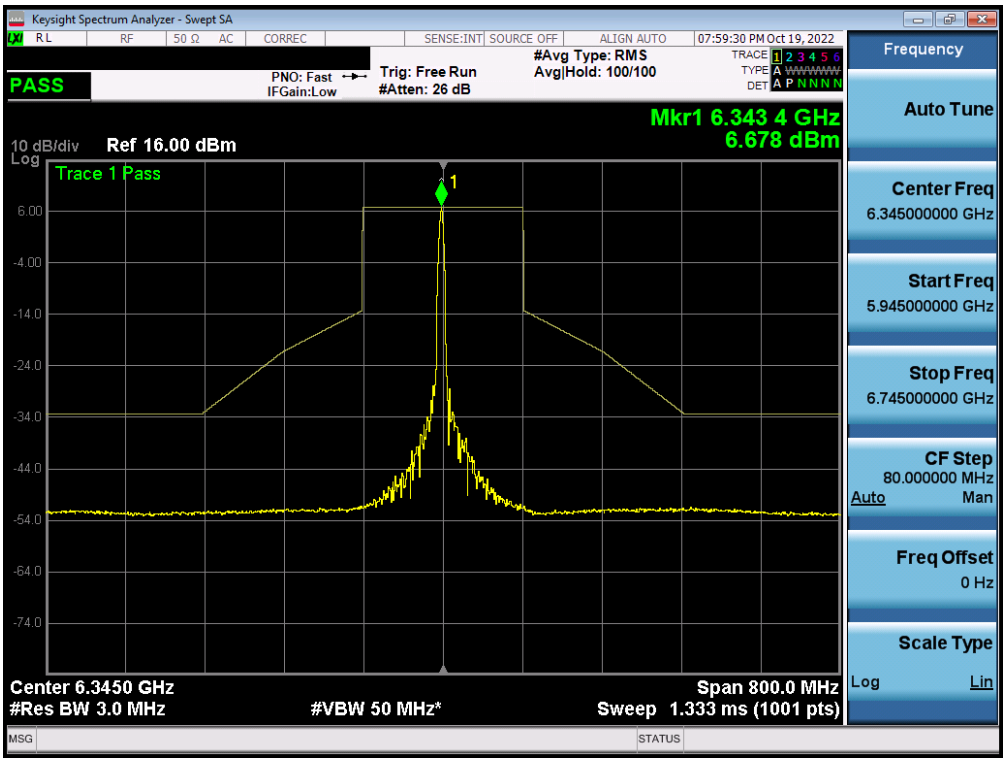


Plot 7-578. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47) - SP



Plot 7-579. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 79) – SP

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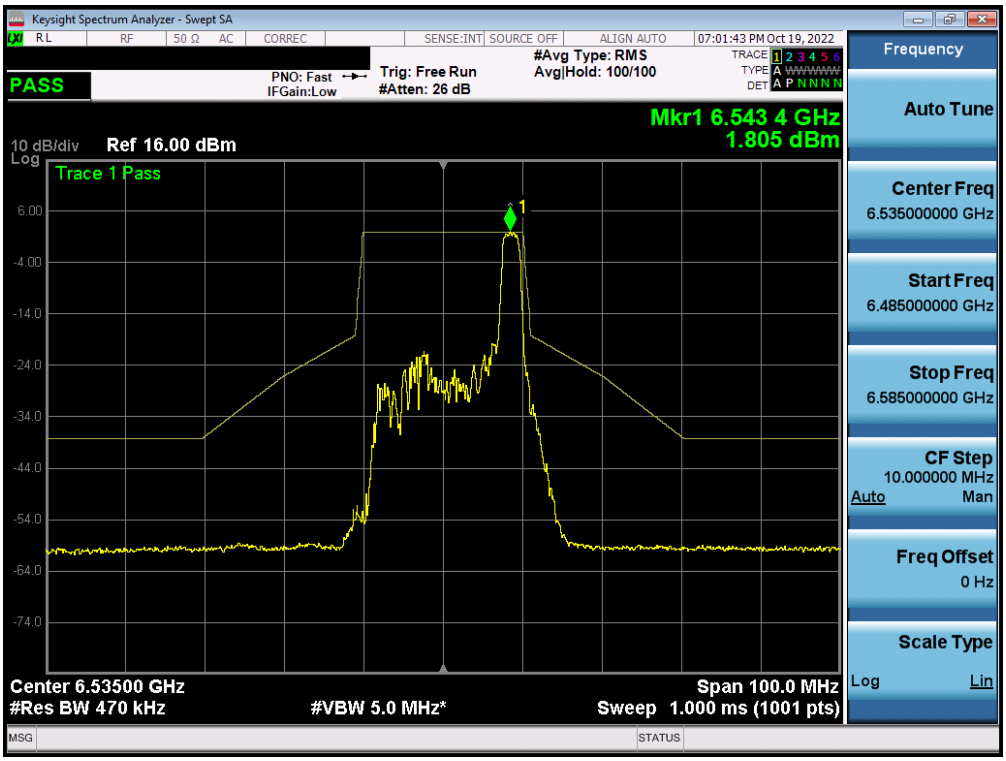
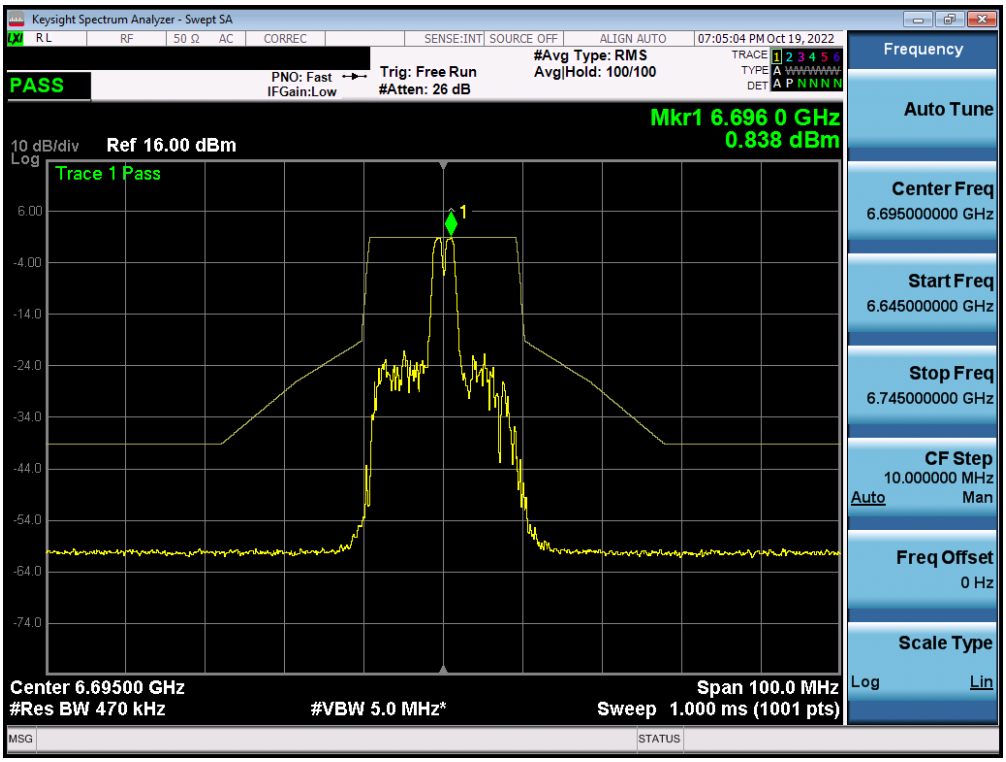


Plot 7-580. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 117) – SP



Plot 7-581. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 149) – SP

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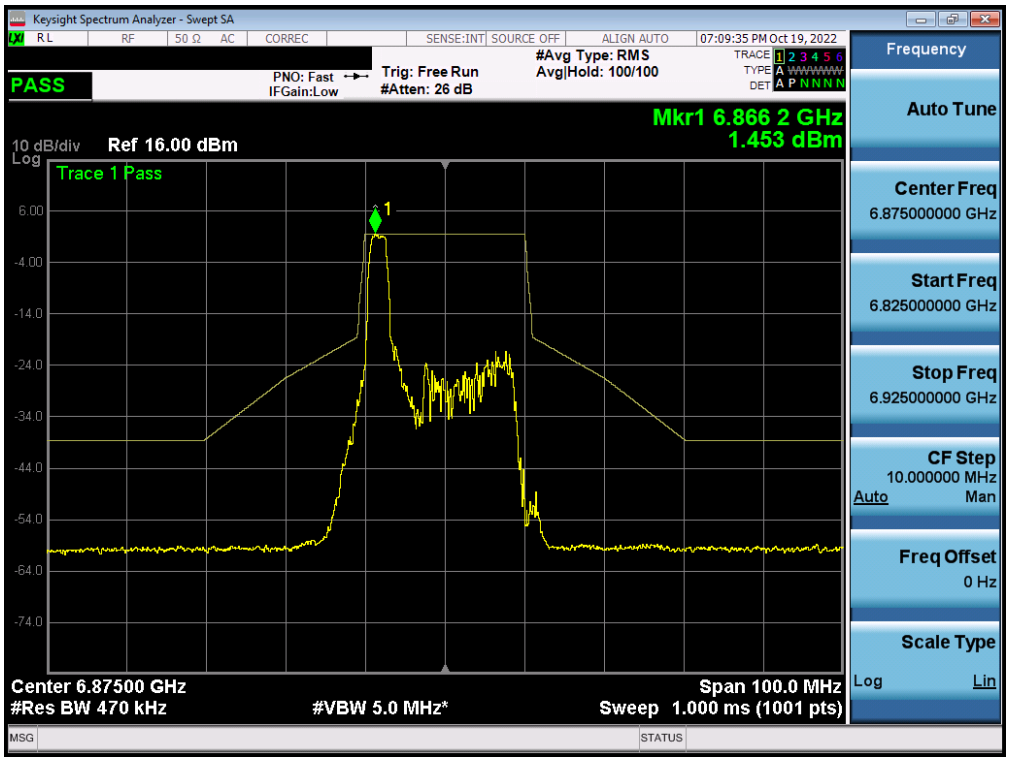
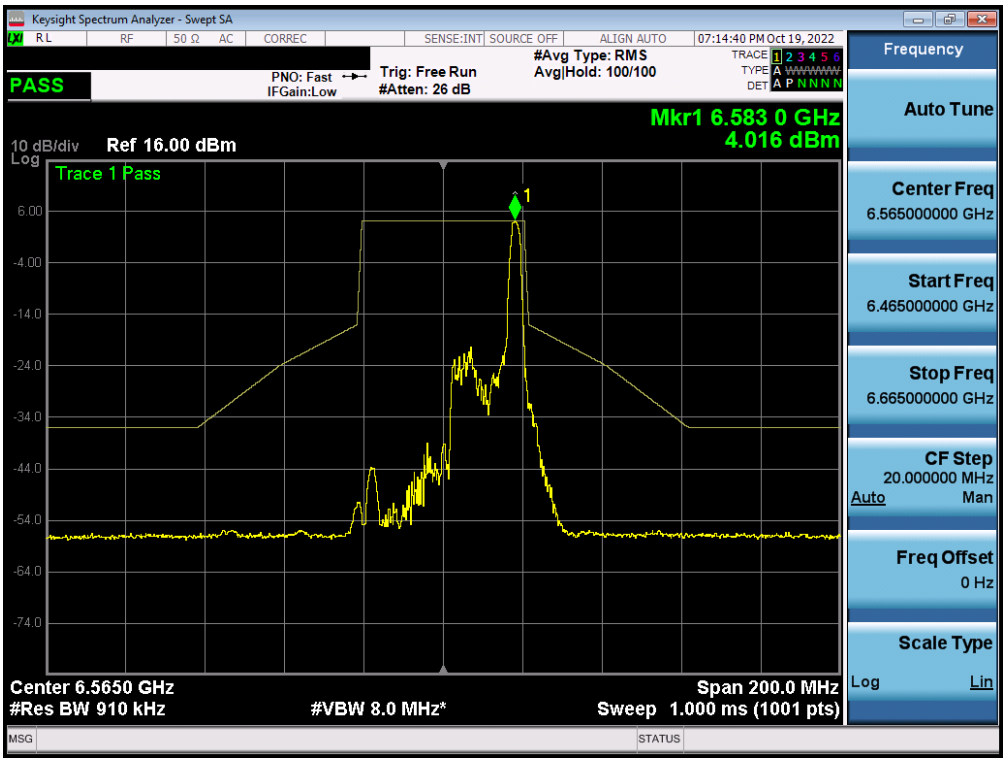


Plot 7-582. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 185) – SP



Plot 7-583. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 123) – SP

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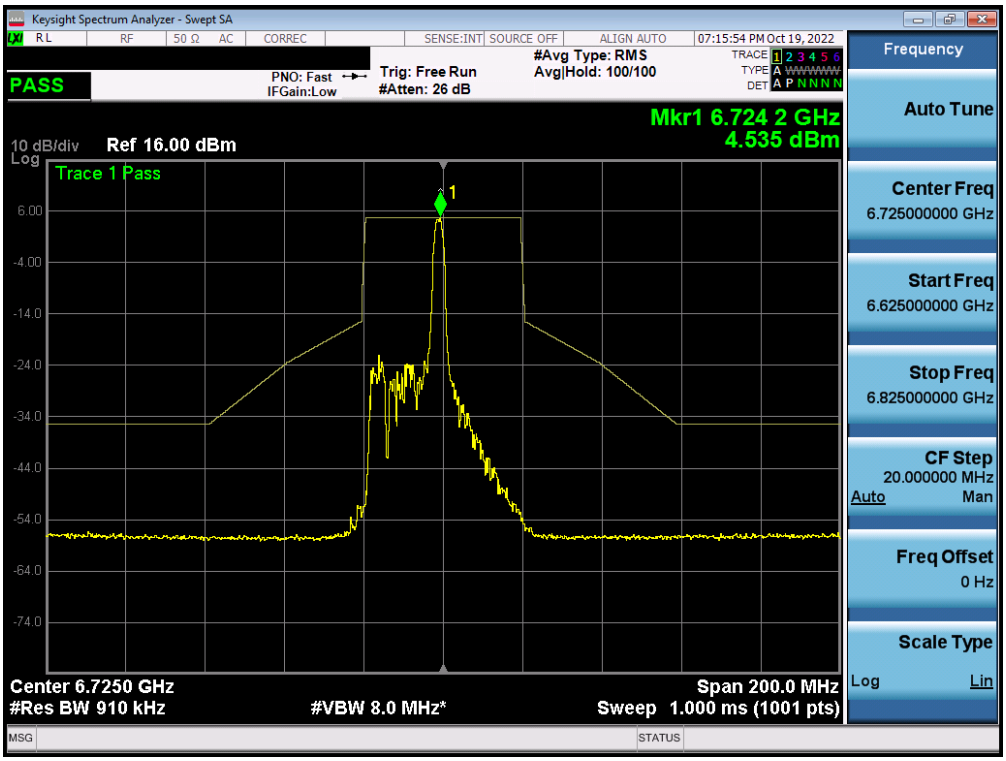
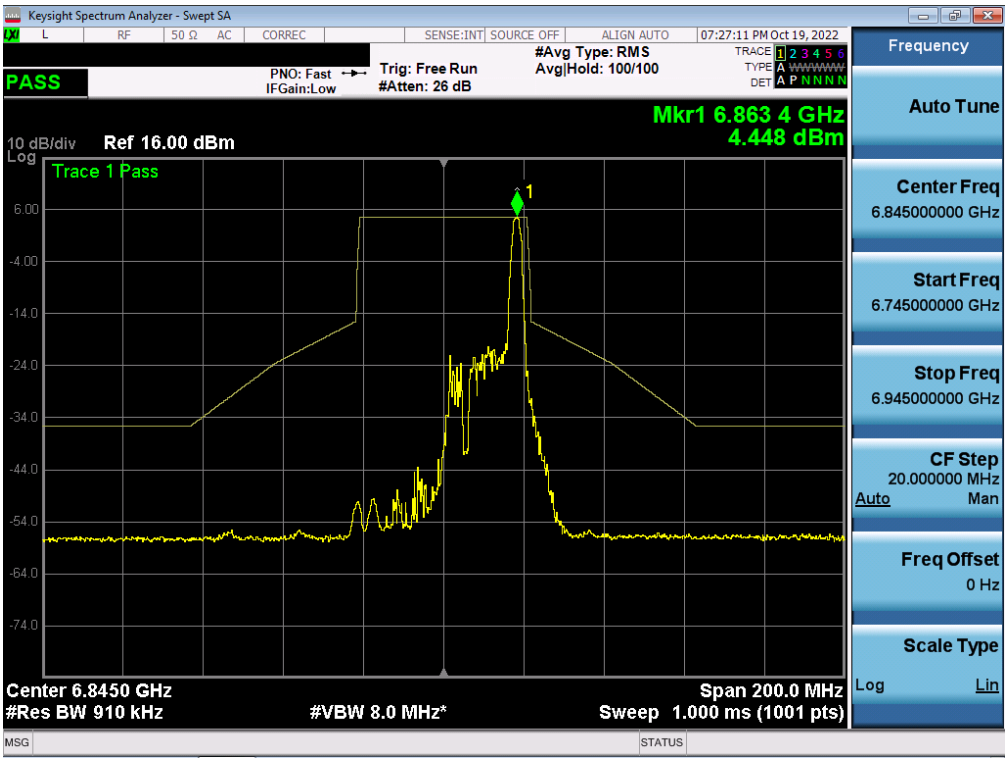


Plot 7-584. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 155) – SP



Plot 7-585. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 179) – SP

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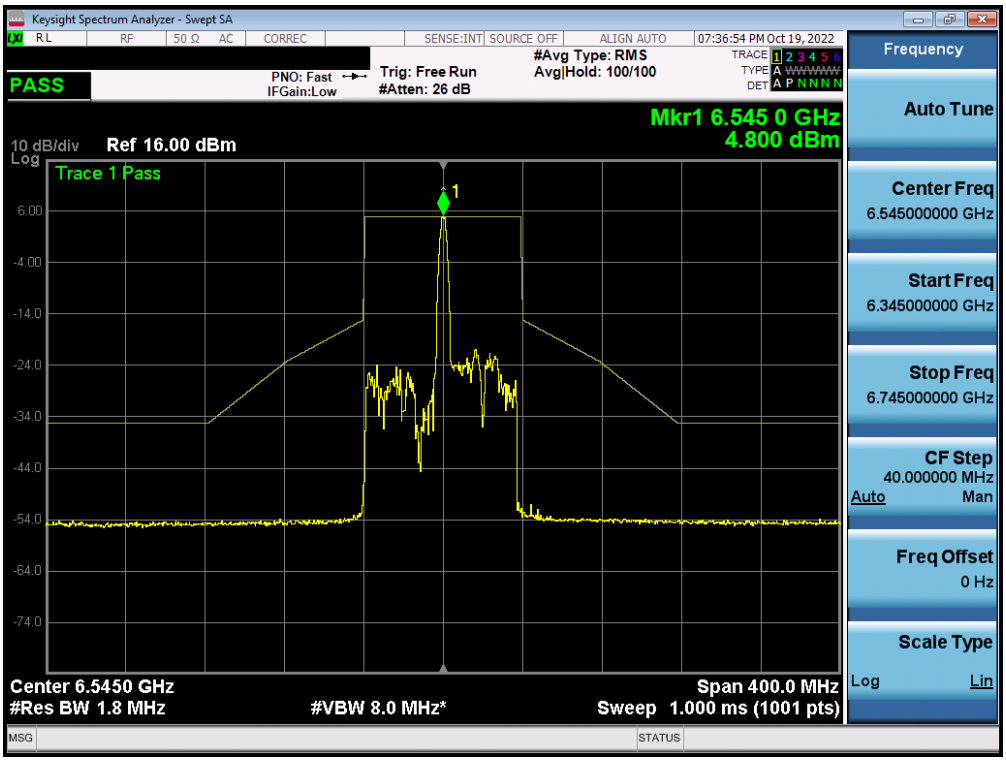
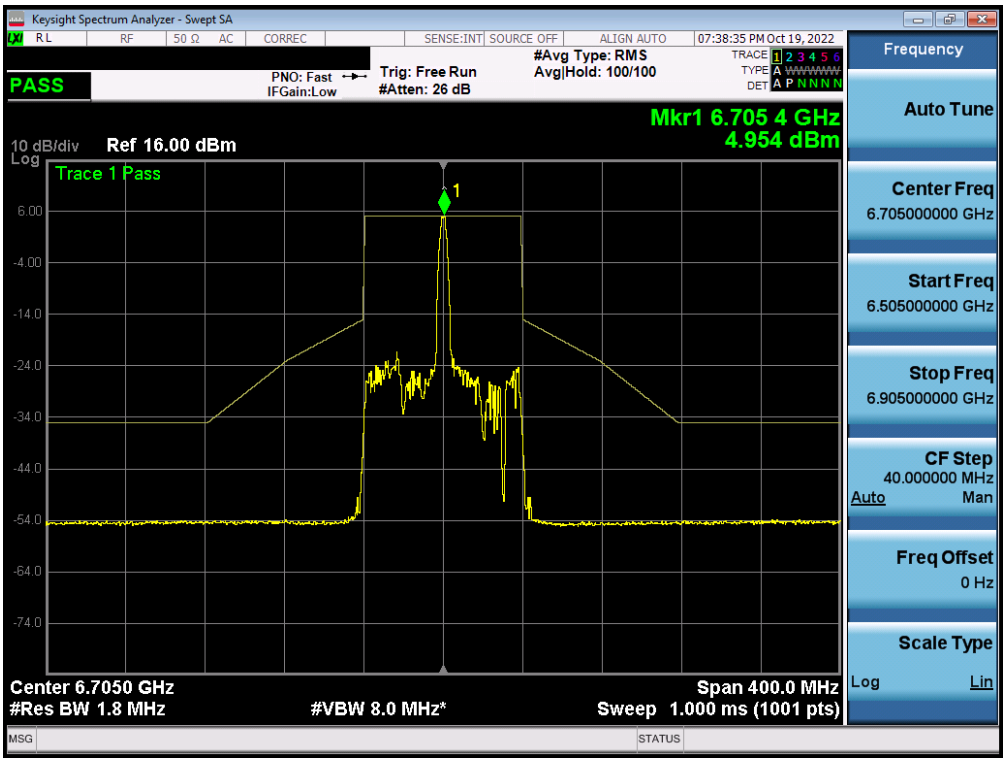


Plot 7-586. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 119) – SP



Plot 7-587. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 151) – SP

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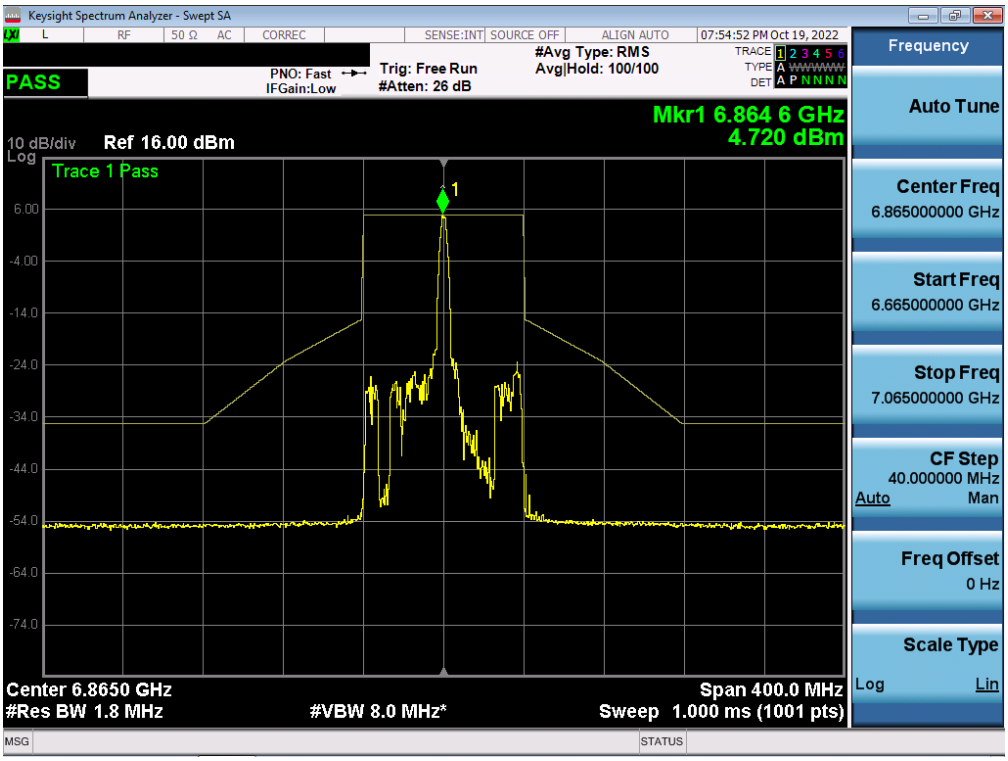
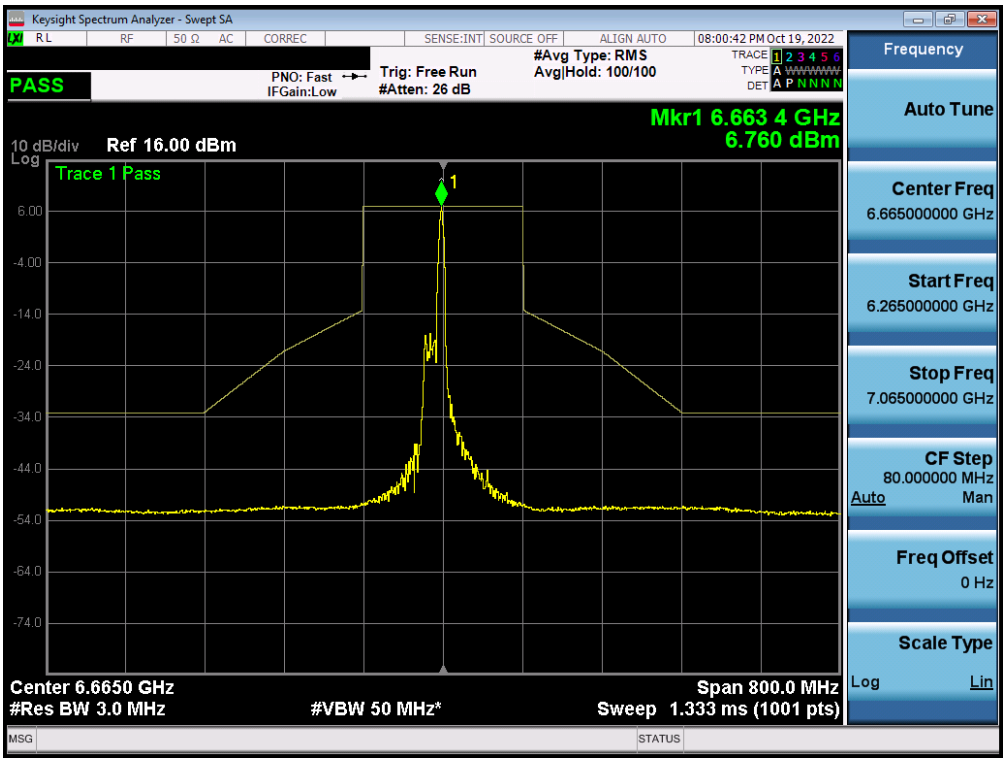


Plot 7-588. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 183) – SP



Plot 7-589. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 143) – SP

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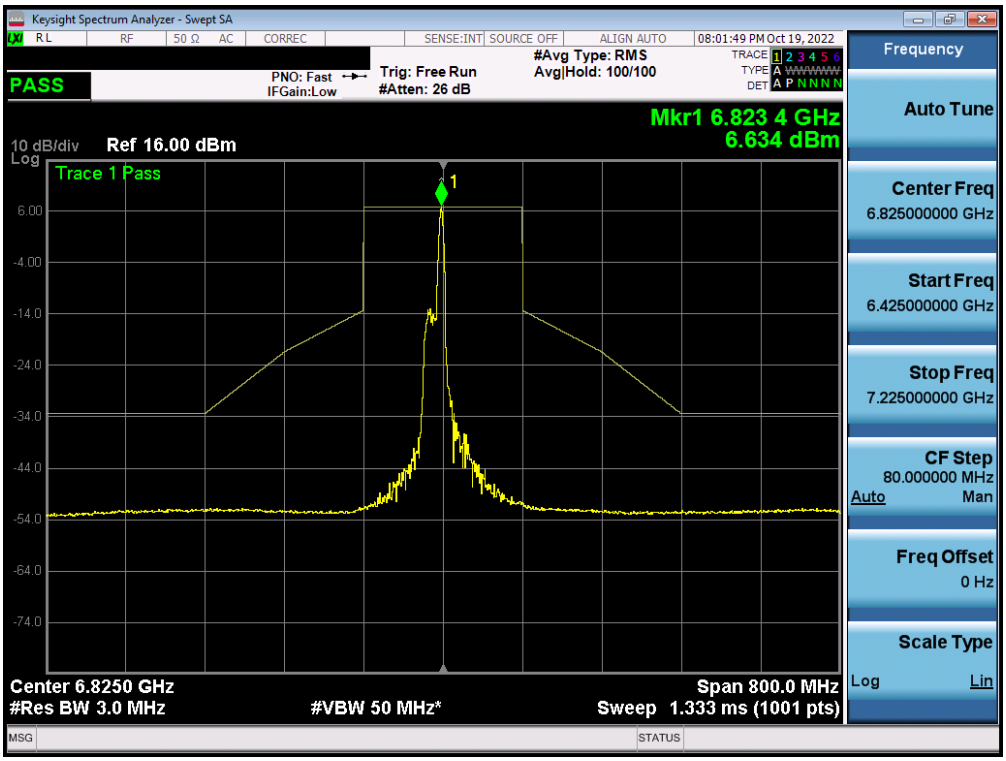

Plot 7-590. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 175) – SP

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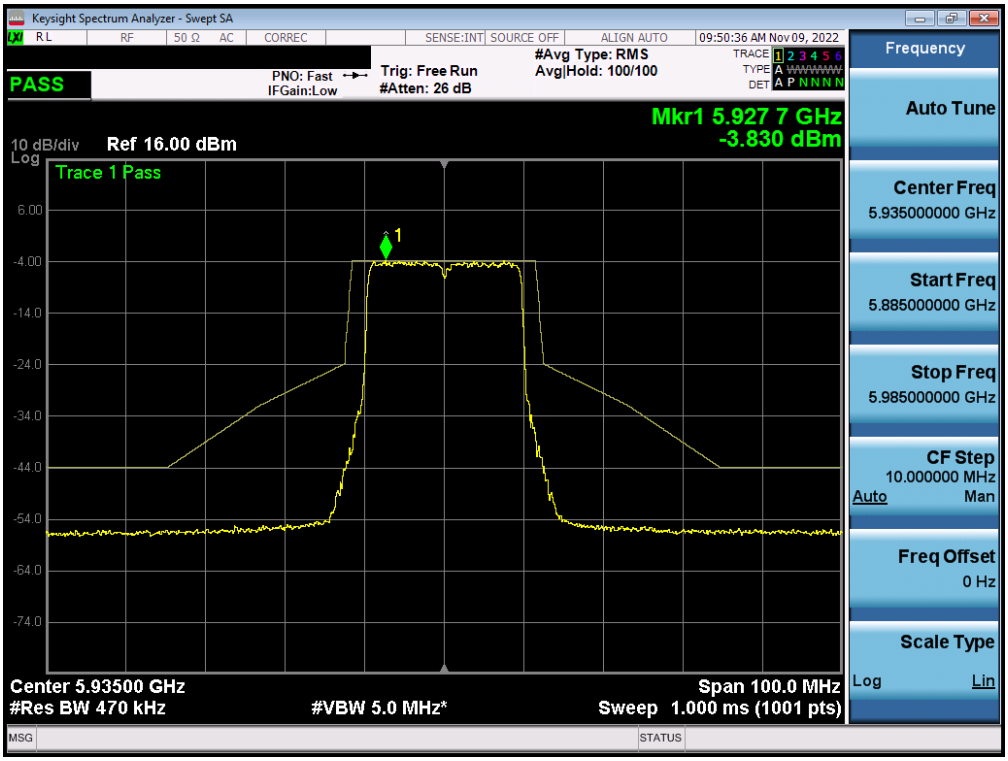
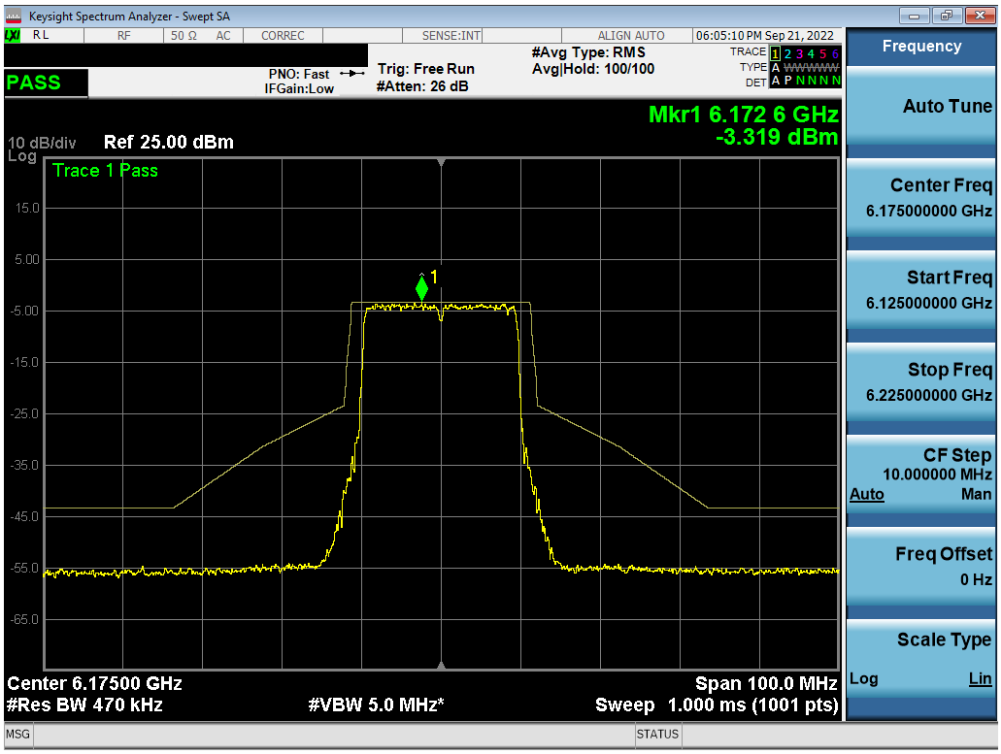
MIMO Antenna-2 In-Band Emission Measurements (Full Tones) – LPI/SP



Plot 7-591. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) UNII Band 5) – Ch. 2 – LPI/SP



Plot 7-592. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 45) – LPI/SP

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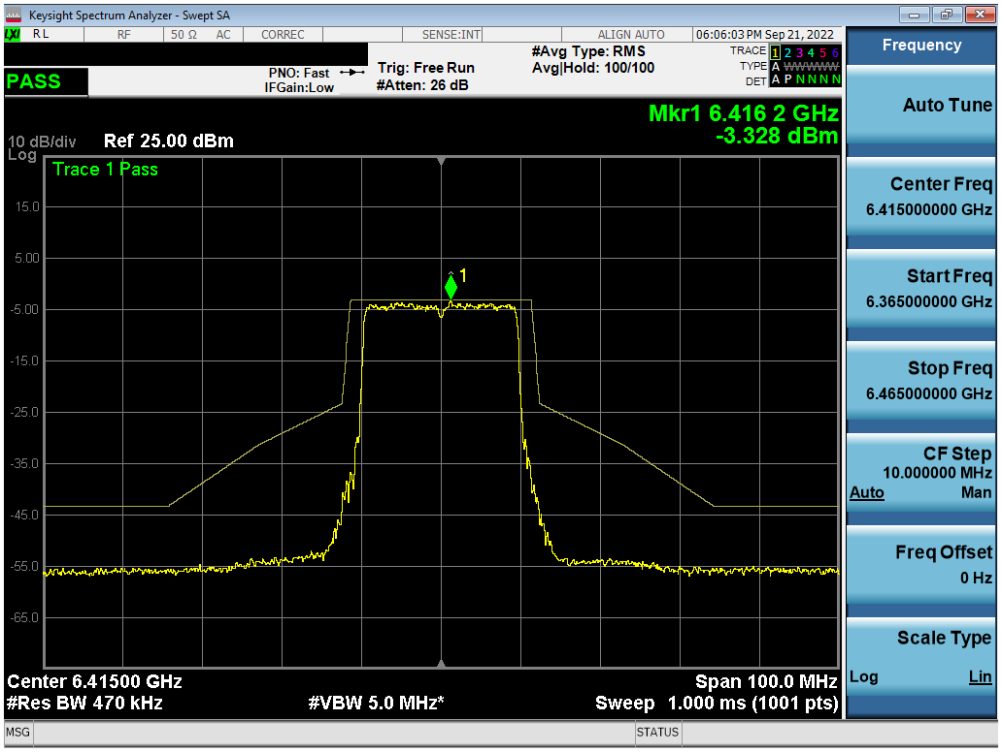
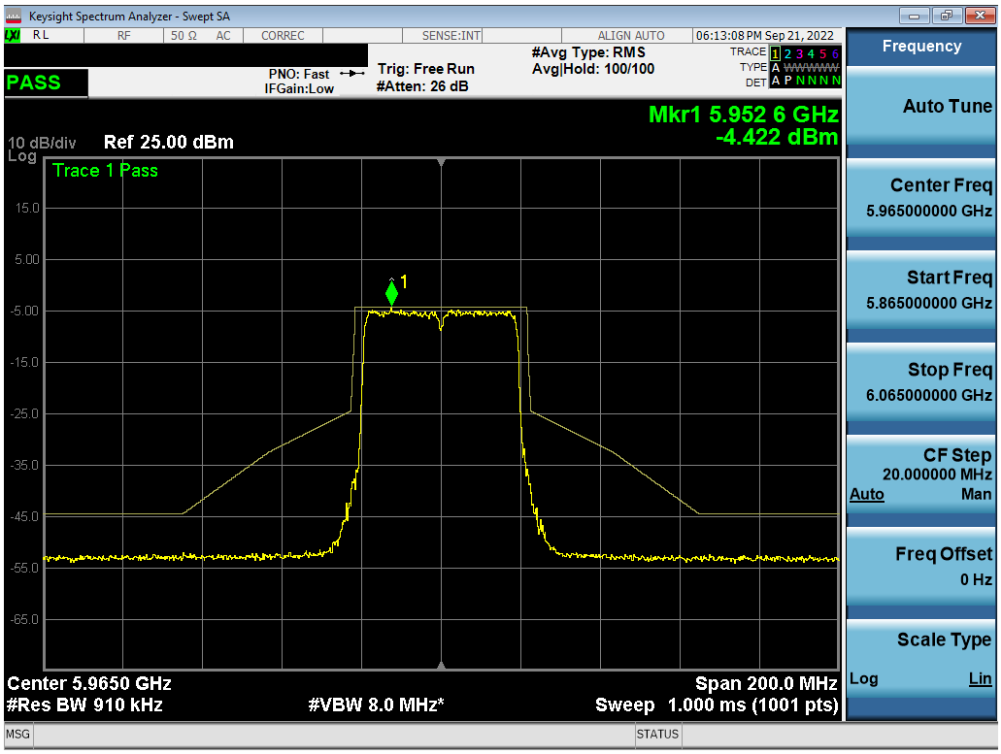


Plot 7-593. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) UNII Band 5) – Ch. 93) – LPI/SP



Plot 7-594. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 3) – LPI/SP

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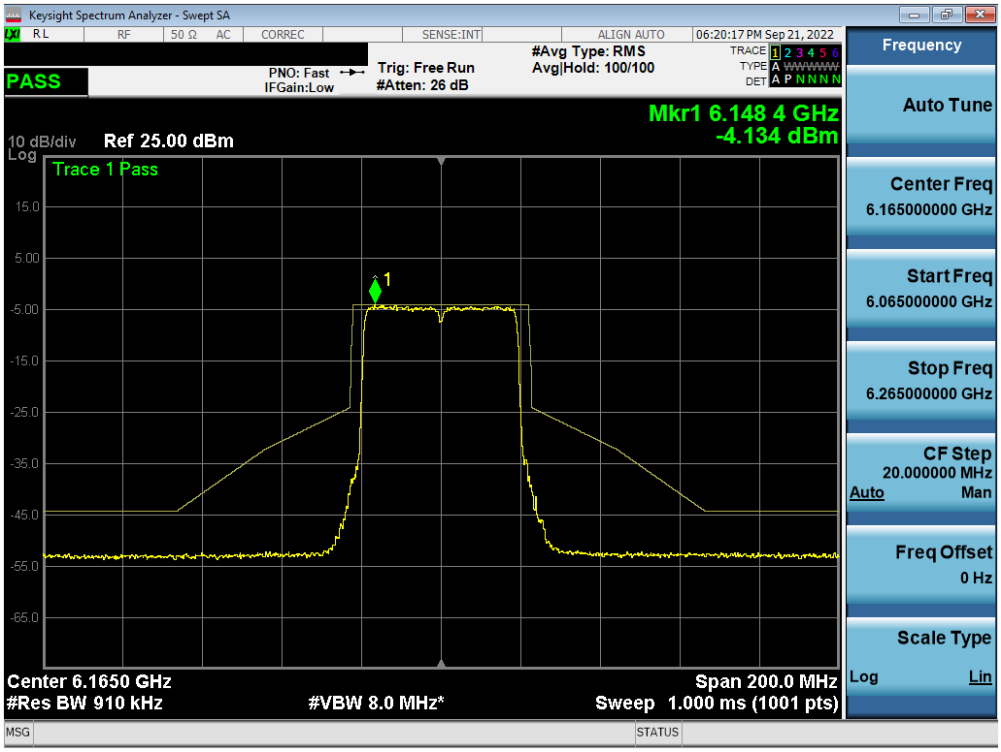
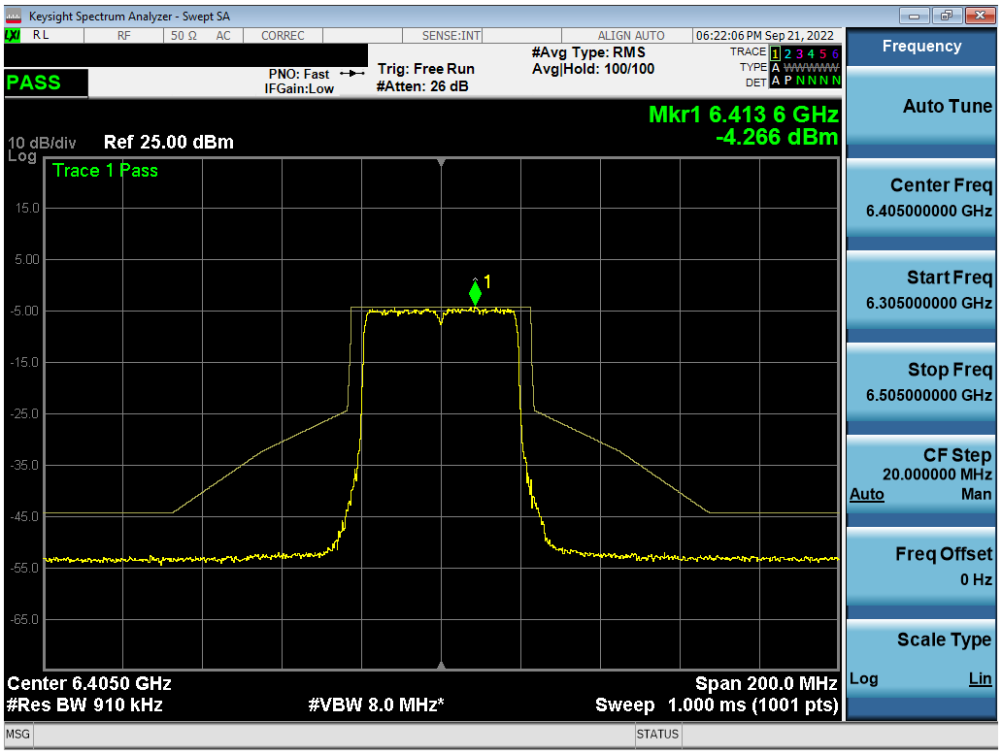


Plot 7-595. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 43) – LPI/SP



Plot 7-596. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 91) – LPI/SP

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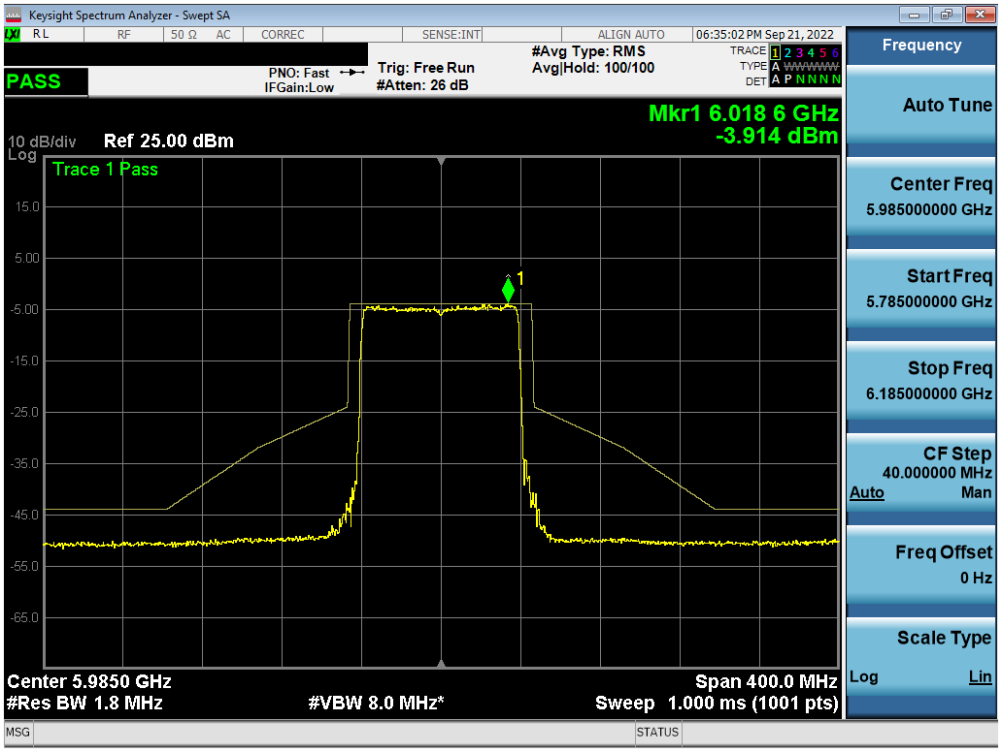
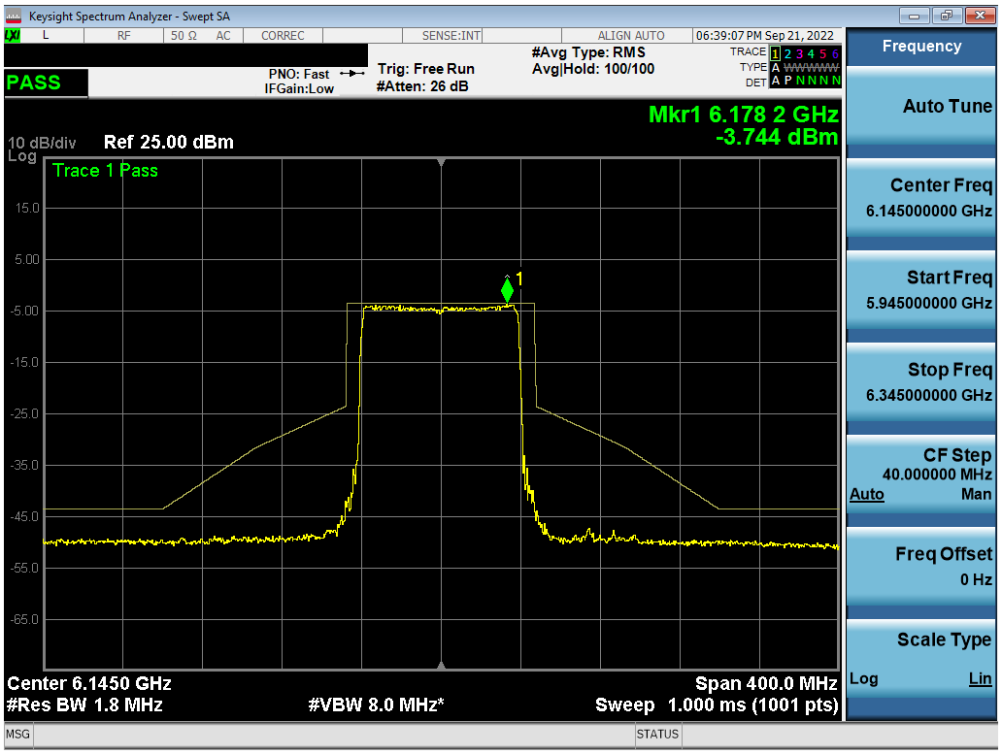


Plot 7-597. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 7) – LPI/SP



Plot 7-598. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 39) – LPI/SP

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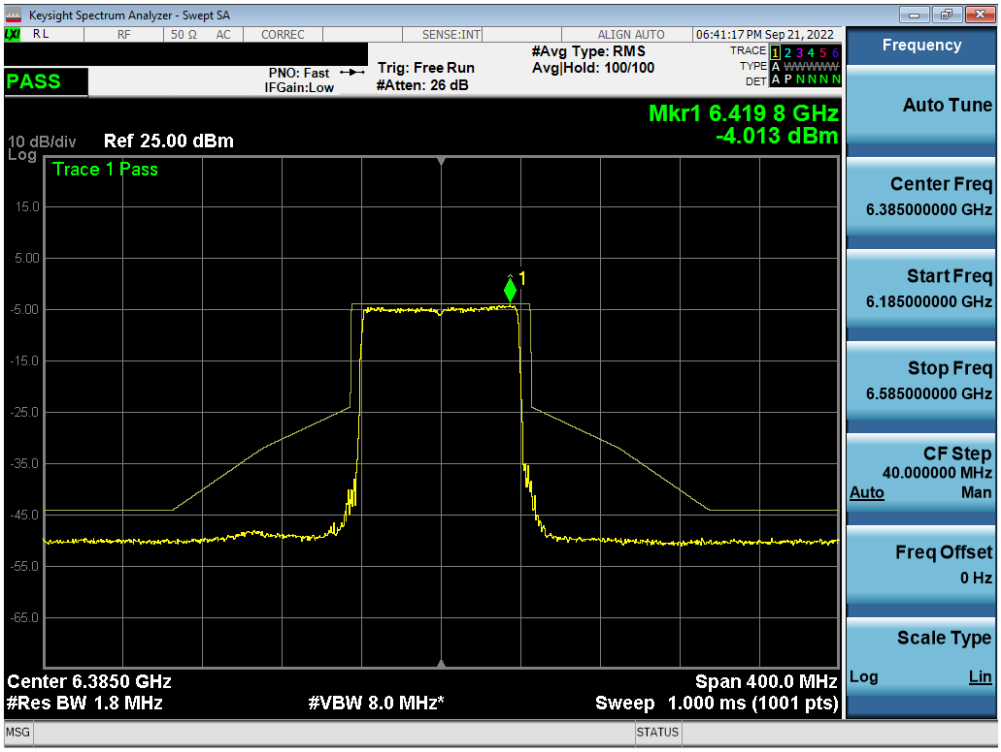
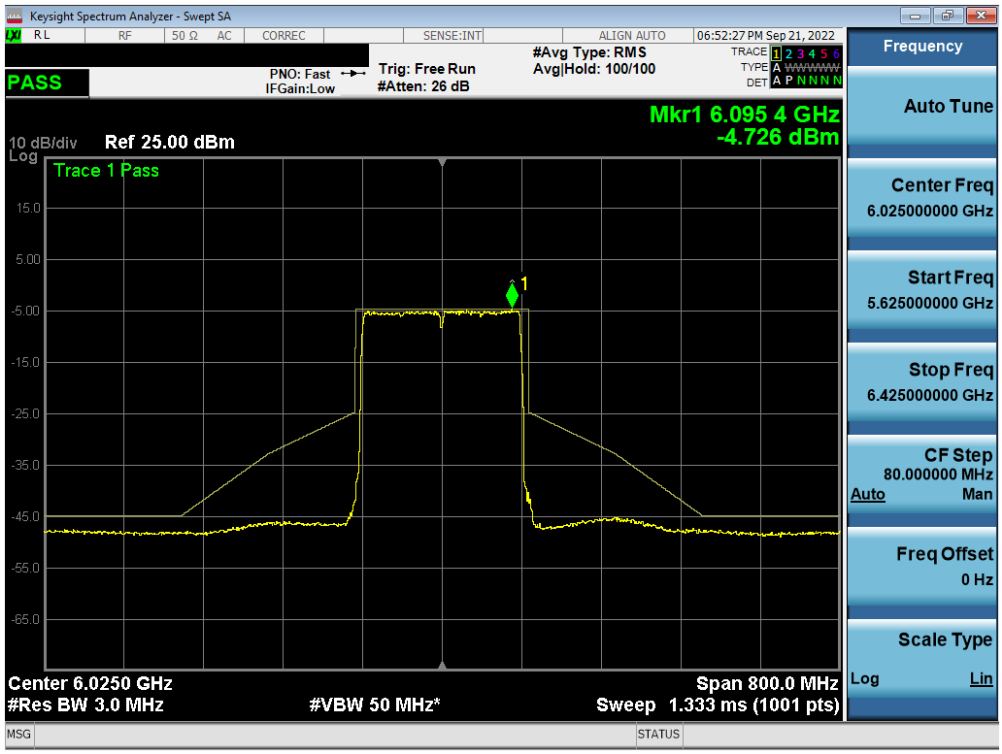


Plot 7-599. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 87) – LPI/SP



Plot 7-600. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 15) – LPI/SP

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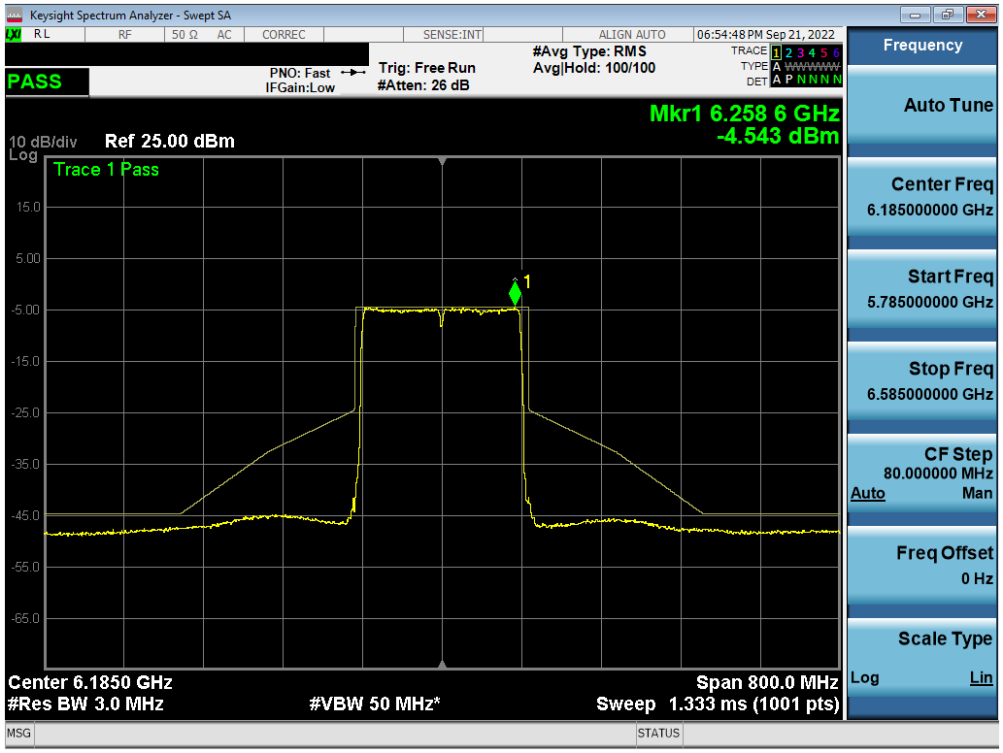
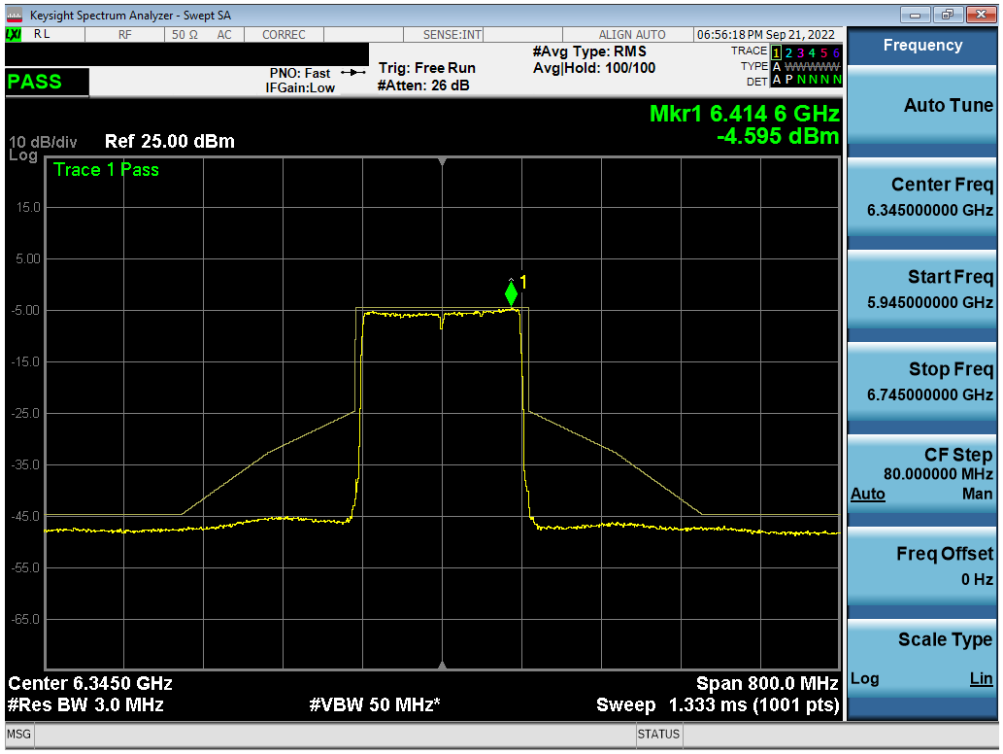


Plot 7-601. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 47) – LPI/SP



Plot 7-602. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 79) – LPI/SP

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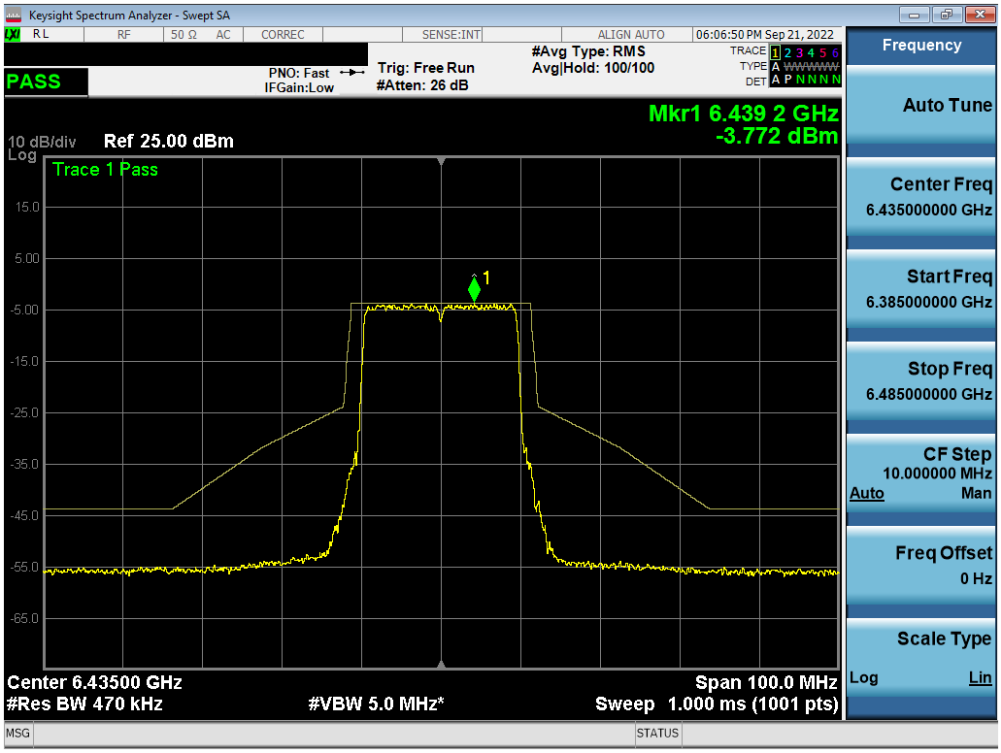
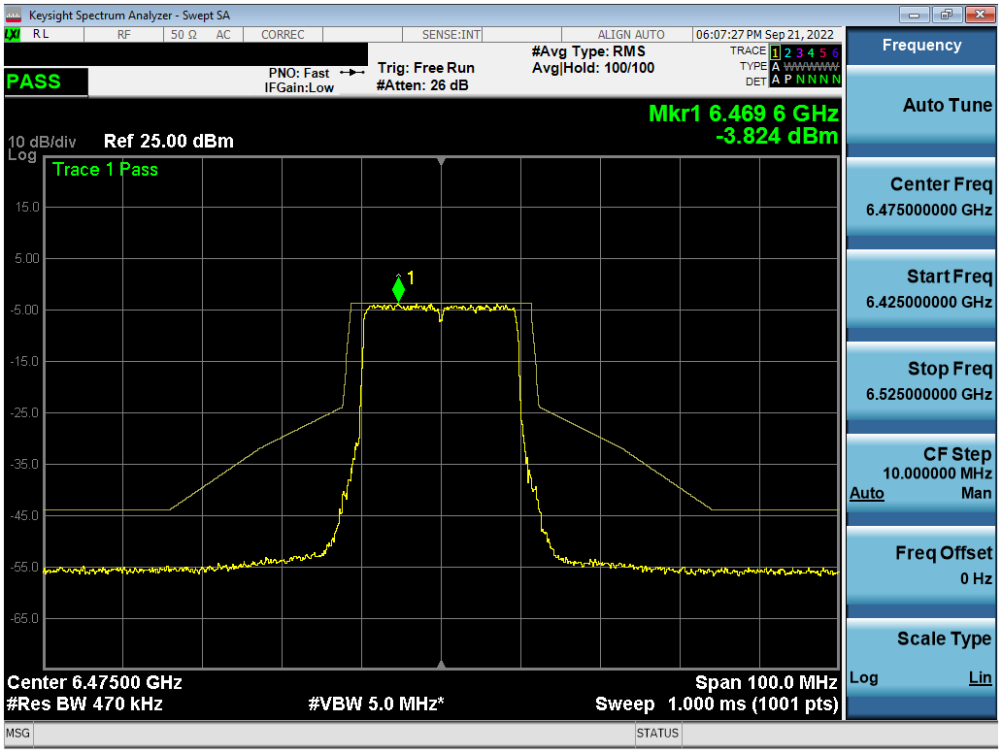


Plot 7-603. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 97) – LPI



Plot 7-604. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 105) – LPI

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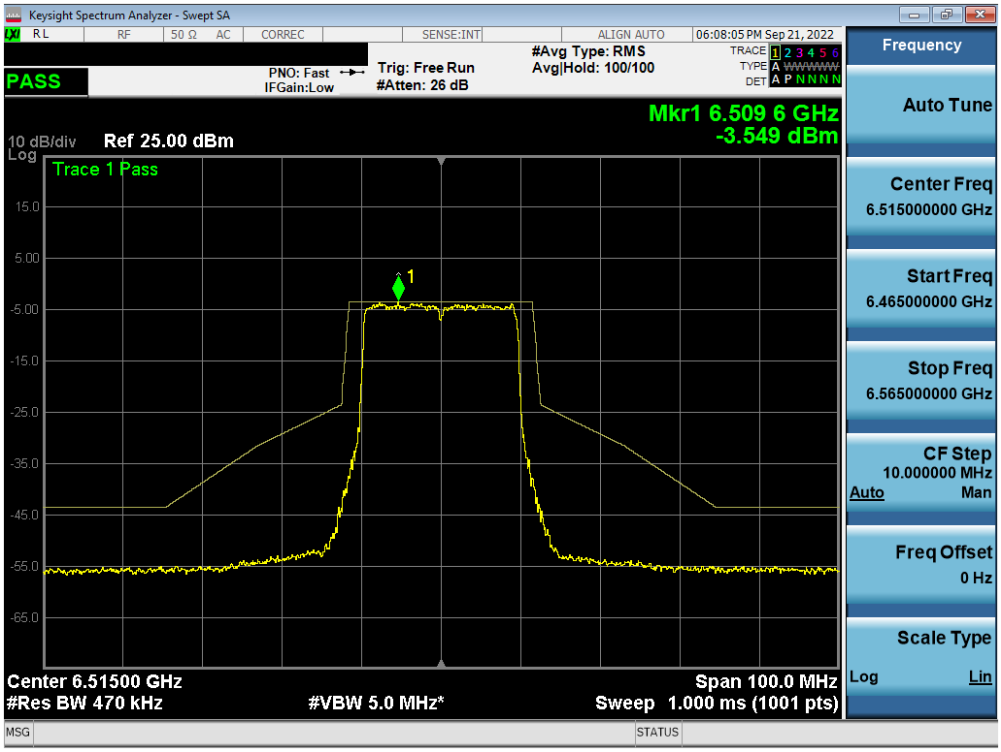
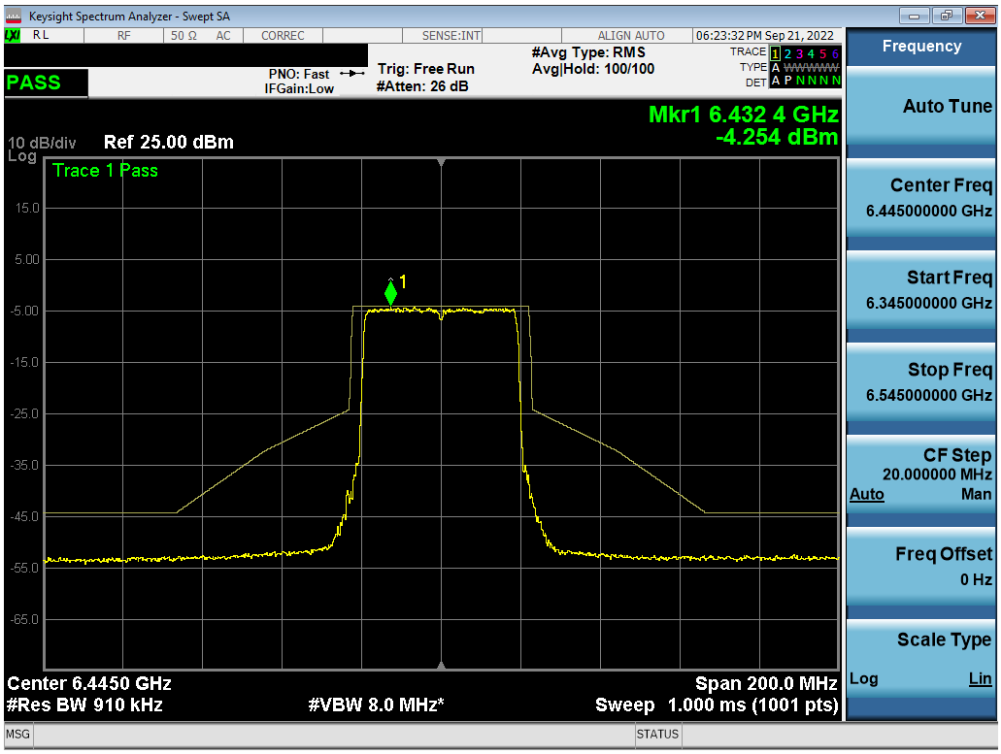


Plot 7-605. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 113) – LPI



Plot 7-606. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 99) – LPI

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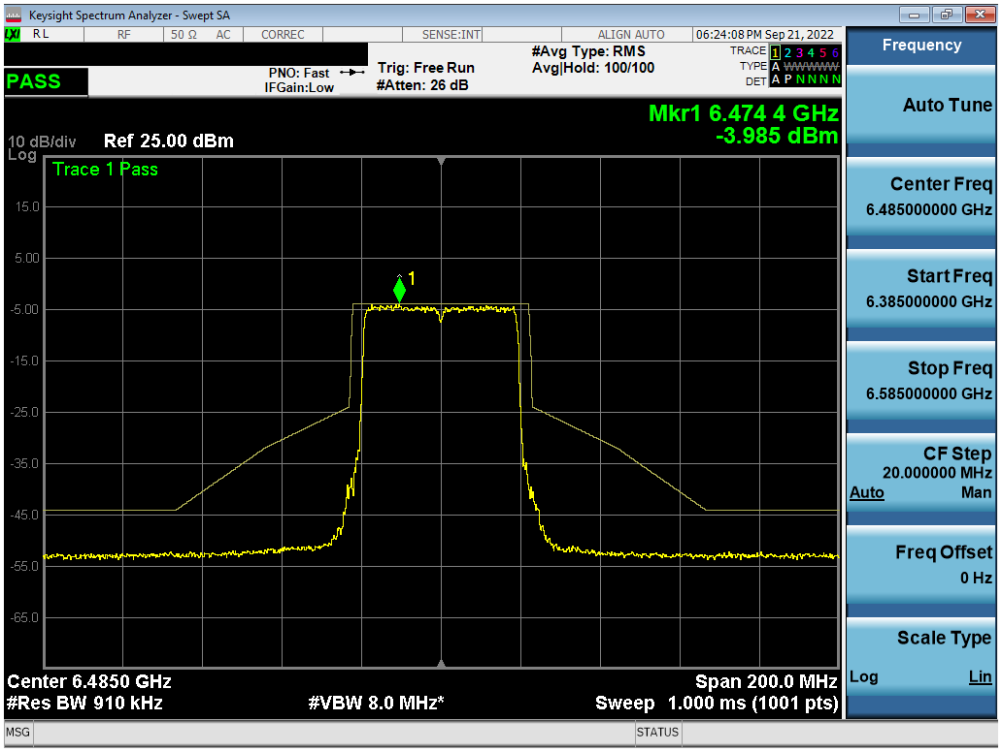
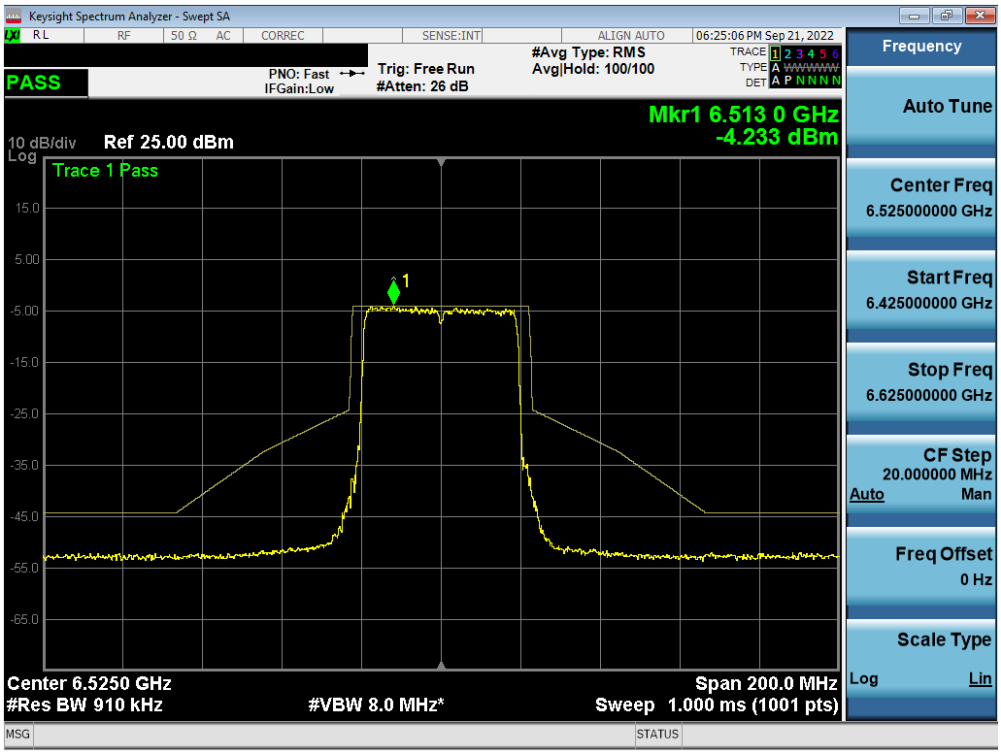


Plot 7-607. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 107) – LPI



Plot 7-608. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 115) – LPI

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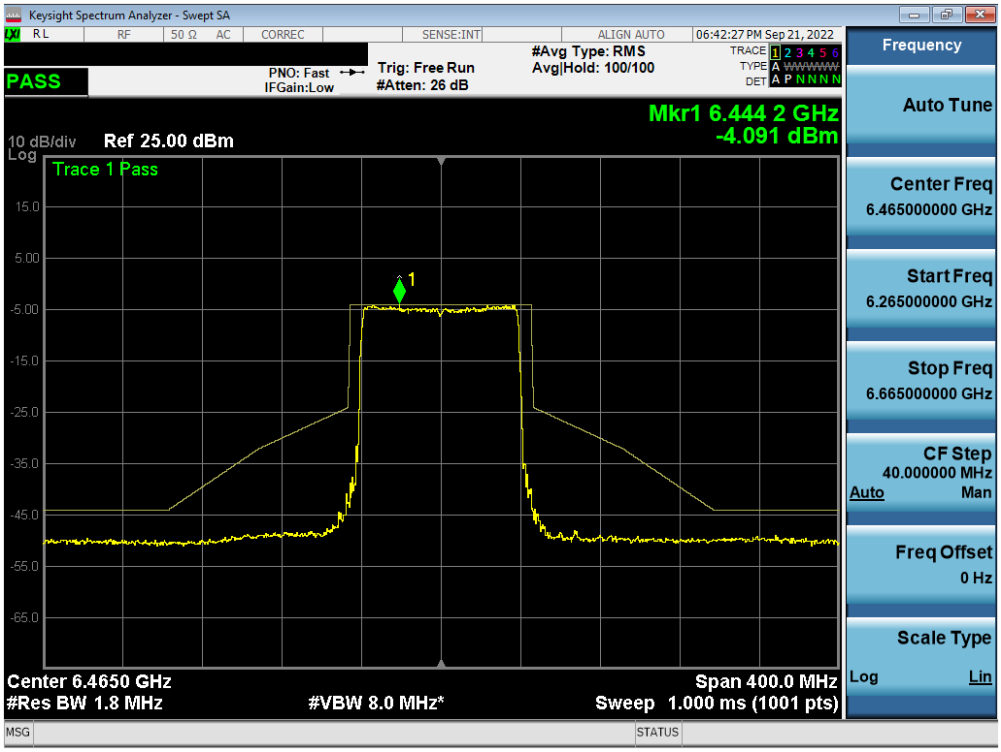
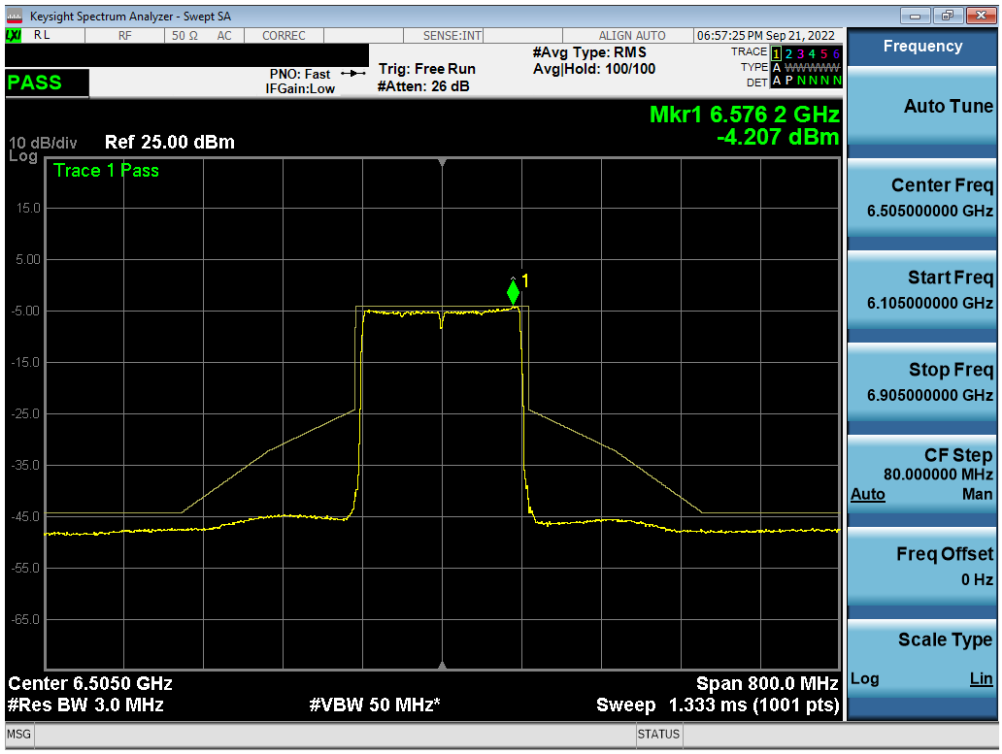


Plot 7-609. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 103) – LPI



Plot 7-610. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 111) – LPI

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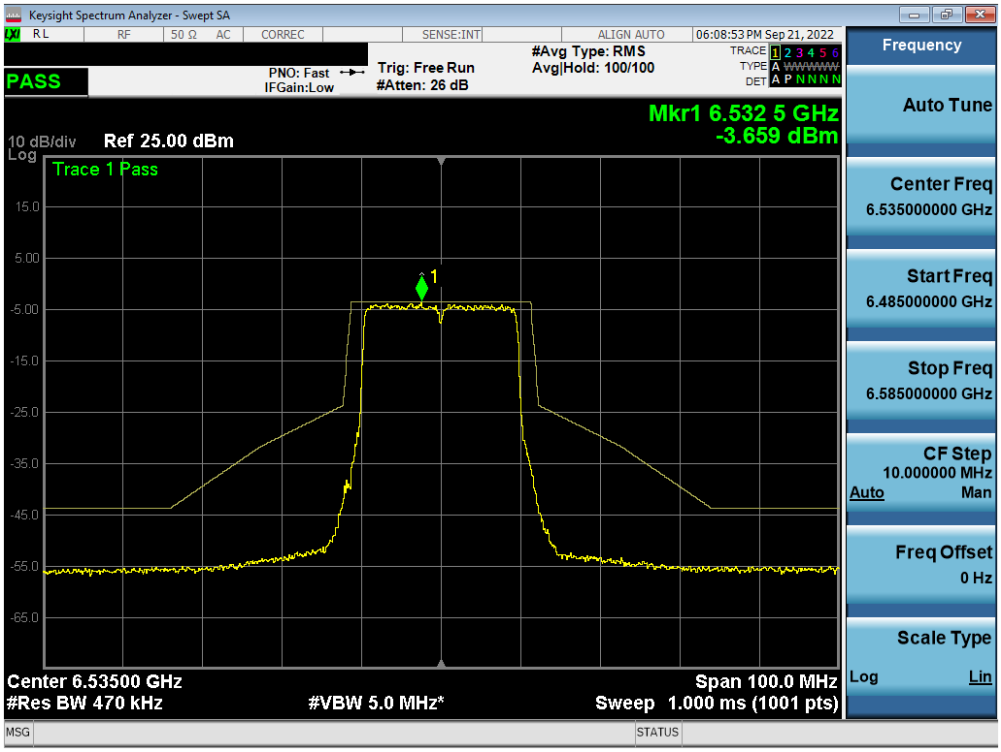
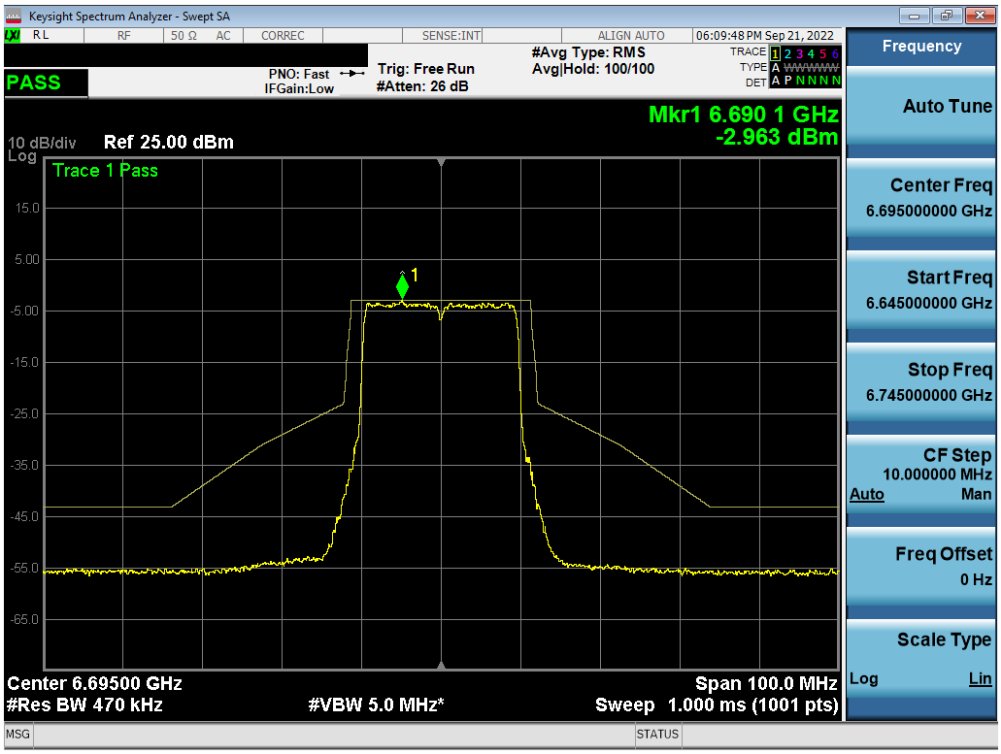


Plot 7-611. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 117) – LPI/SP



Plot 7-612. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 149) – LPI/SP

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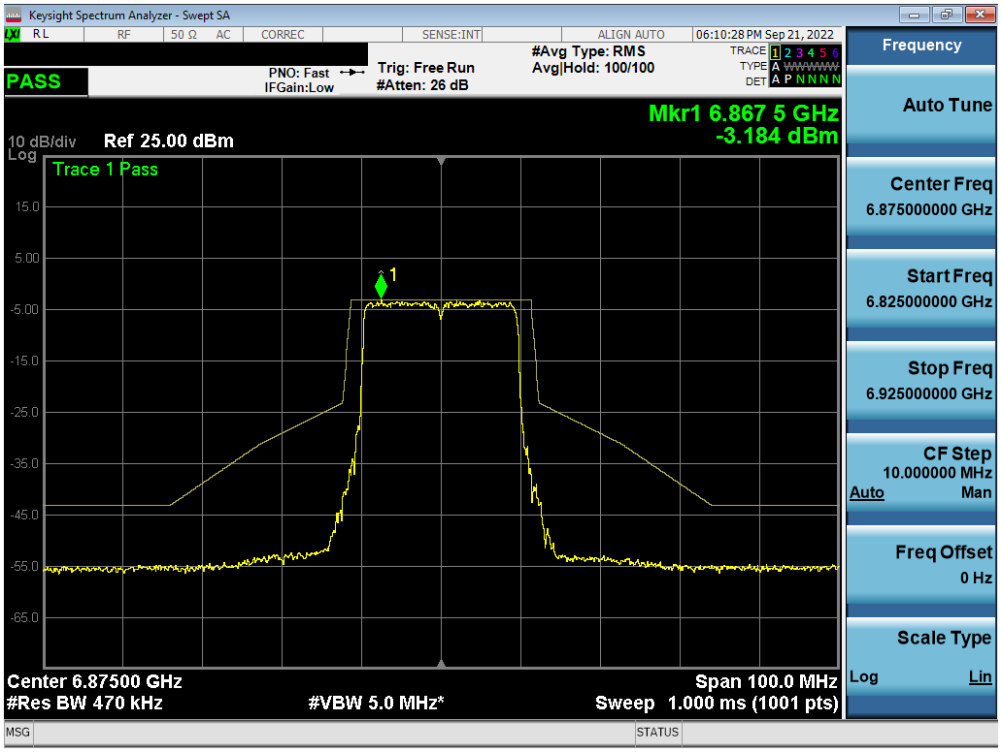
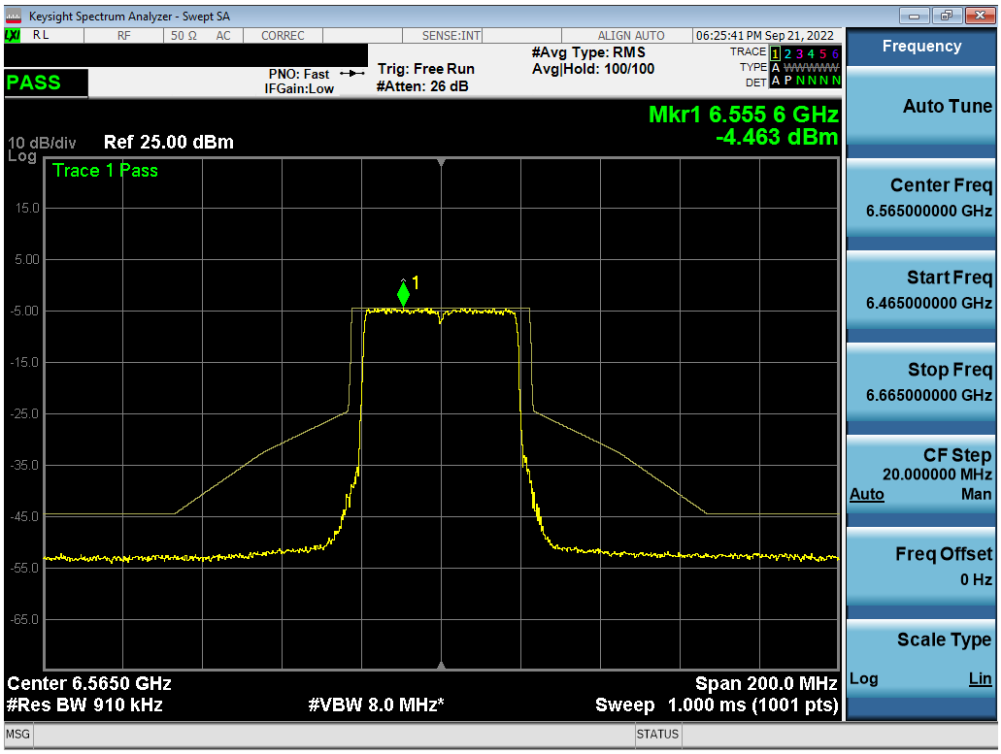


Plot 7-613. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 185) – LPI/SP



Plot 7-614. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 123) – LPI/SP

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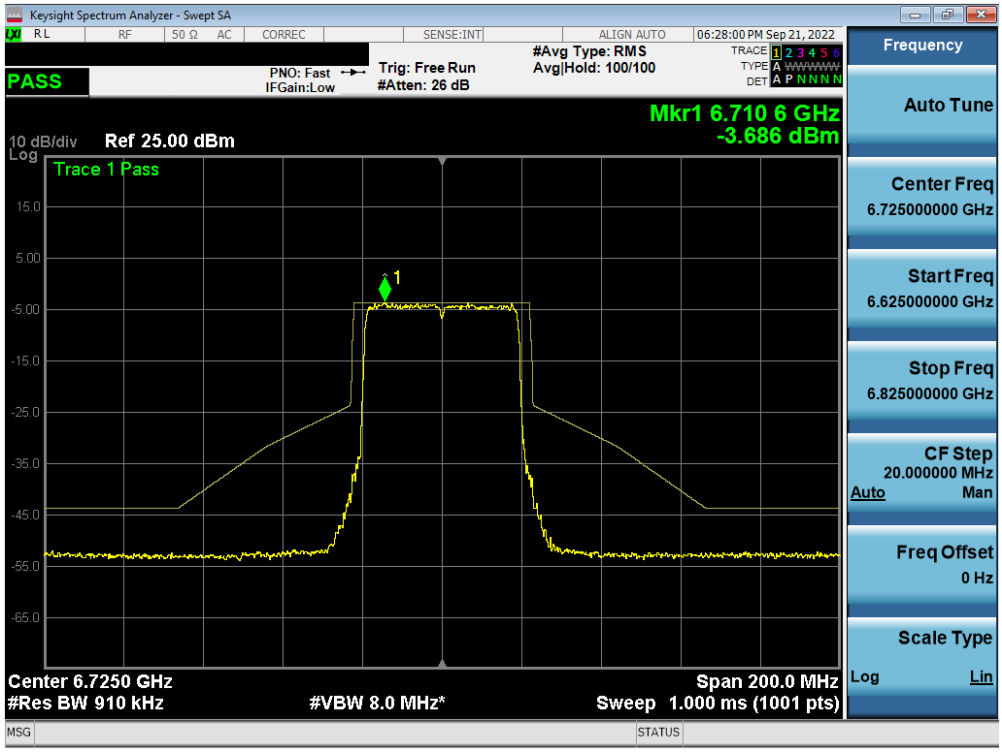
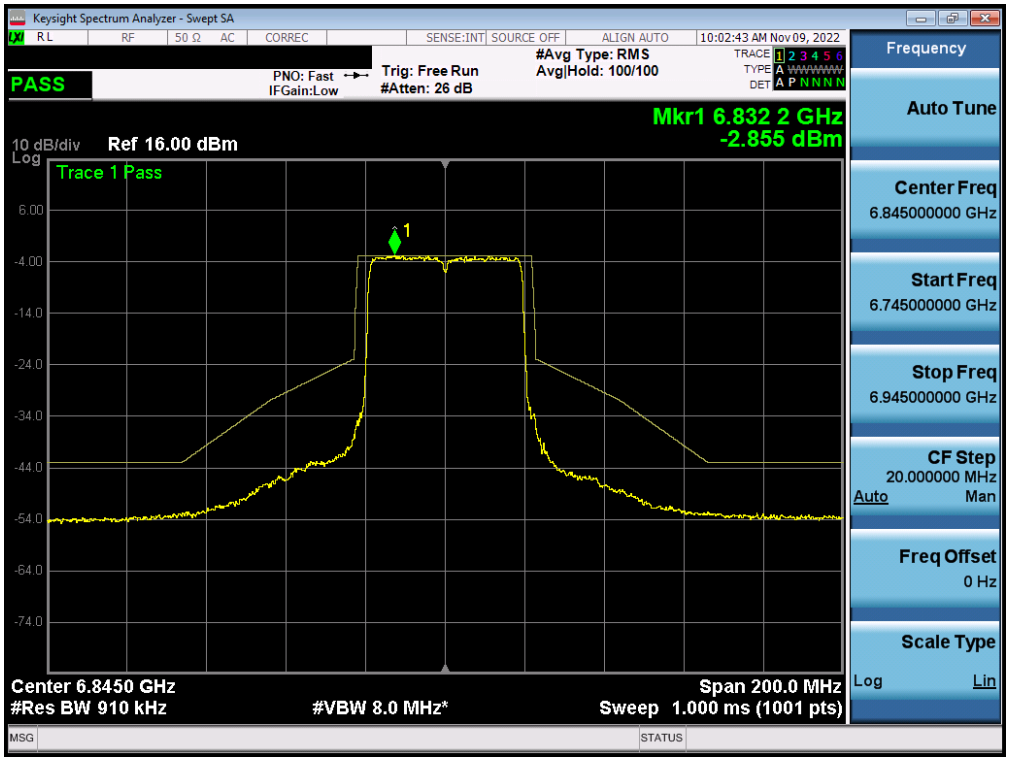


Plot 7-615. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 155) – LPI/SP



Plot 7-616. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 179) – LPI/SP

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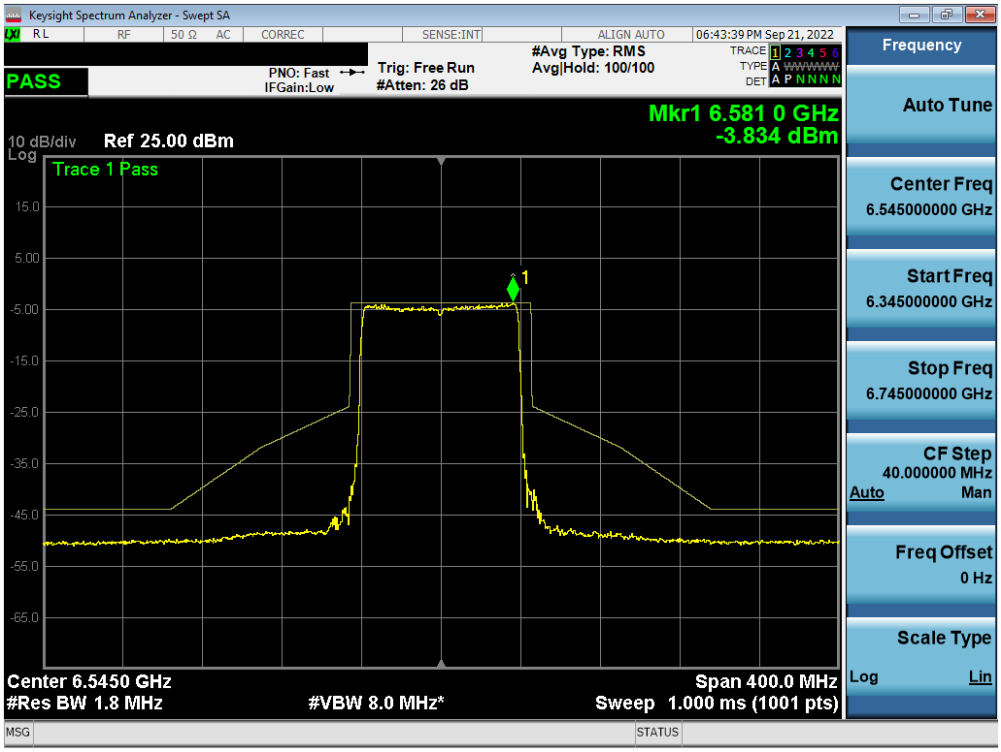
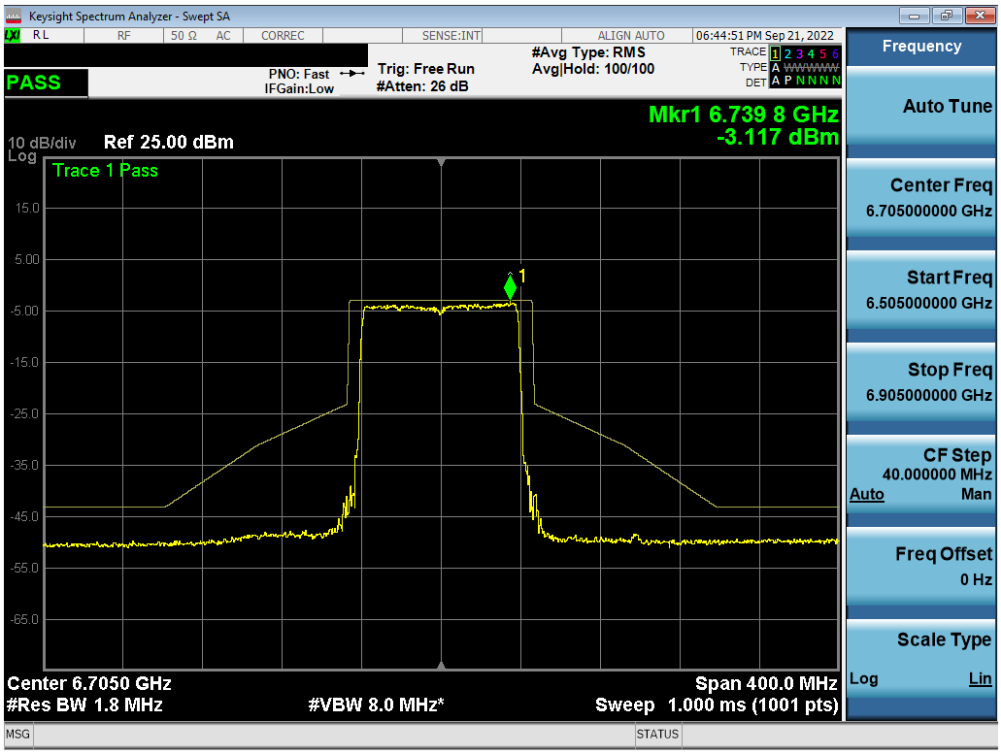


Plot 7-617. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 119) – LPI/SP



Plot 7-618. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 151) – LPI/SP

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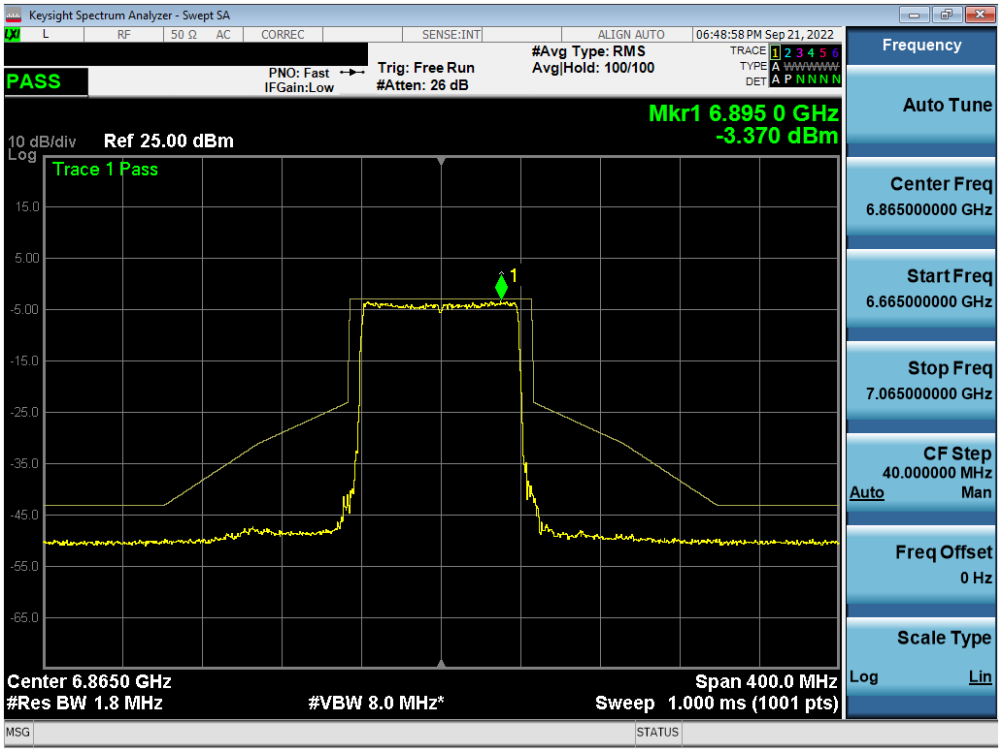
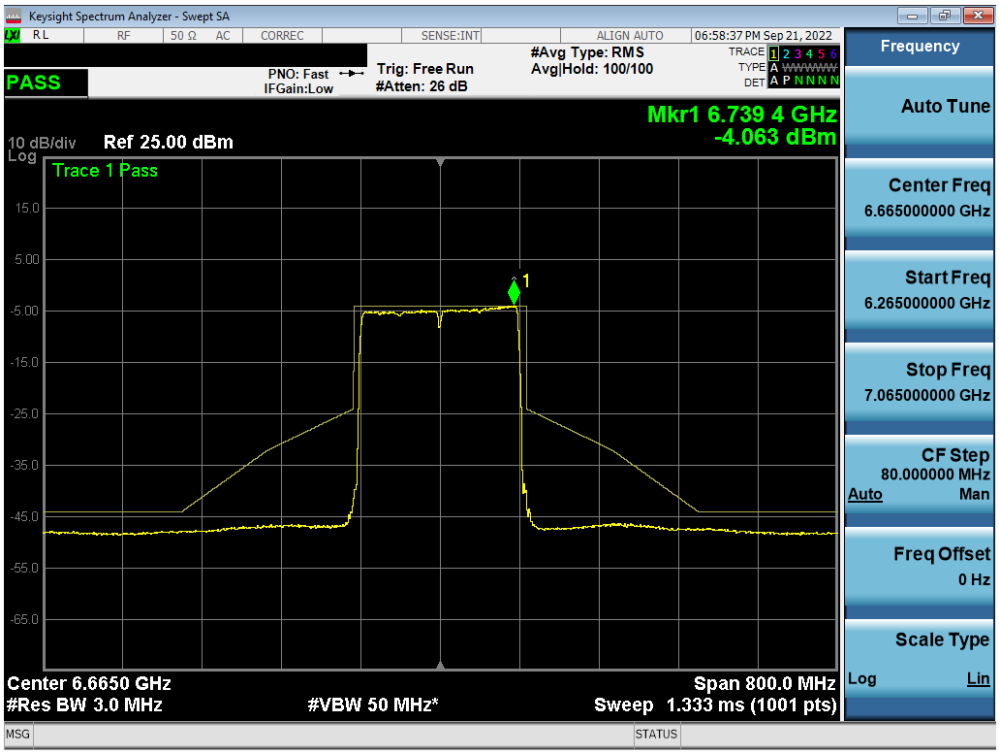


Plot 7-619. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 183) – LPI/SP



Plot 7-620. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 143) – LPI/SP

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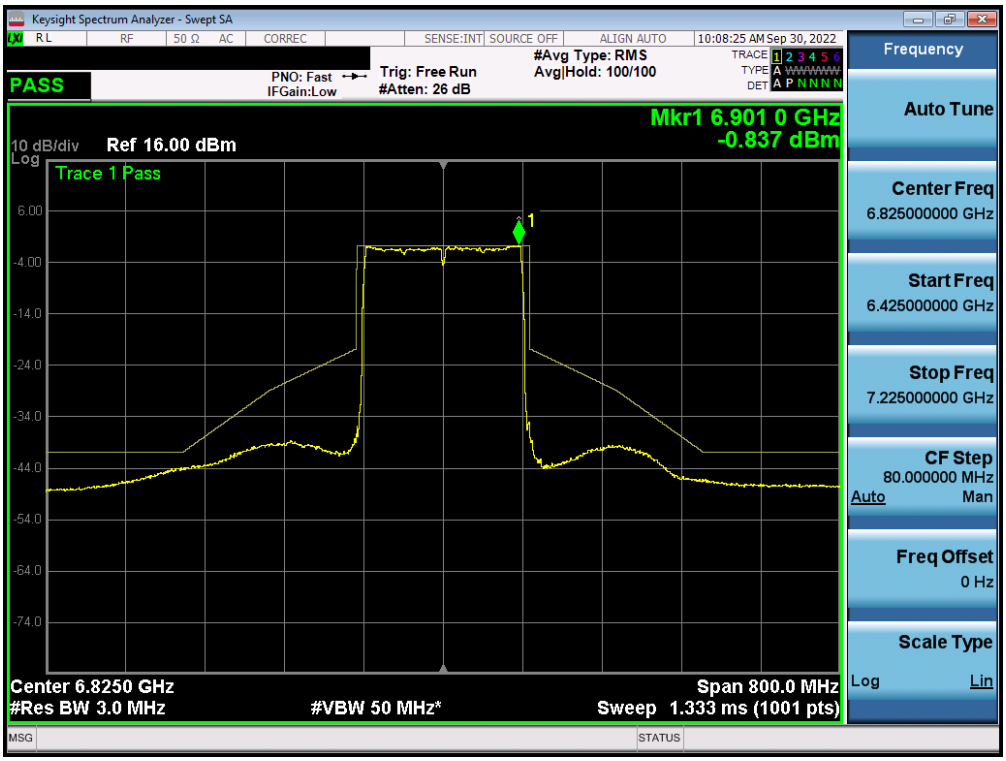
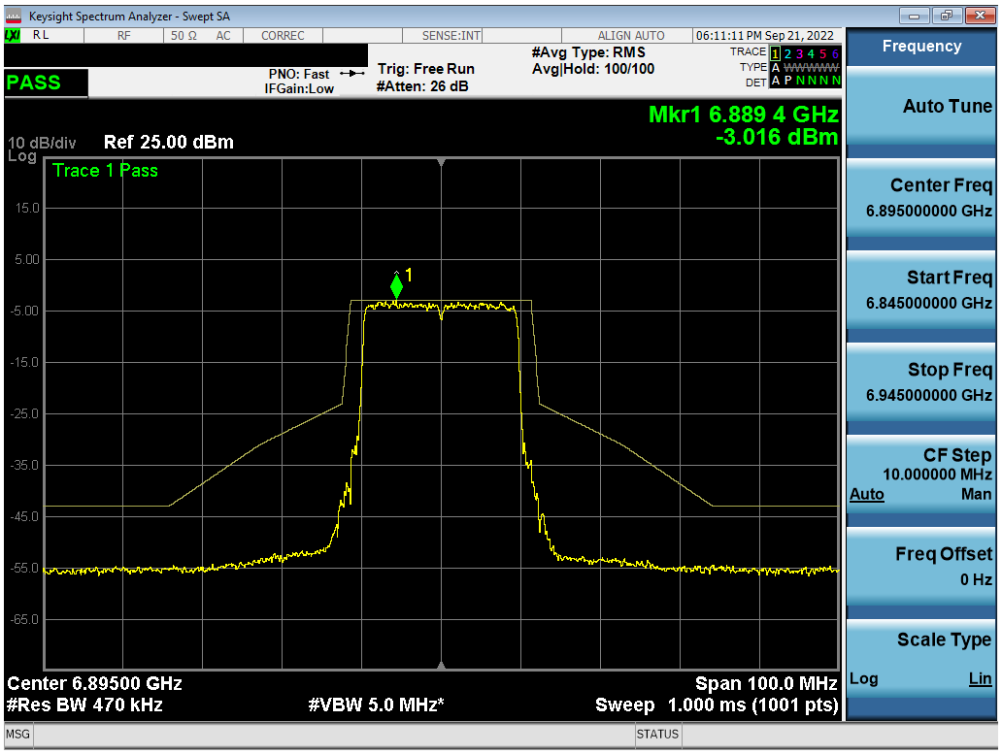


Plot 7-621. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 175) – LPI/SP



Plot 7-622. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 189) – LPI

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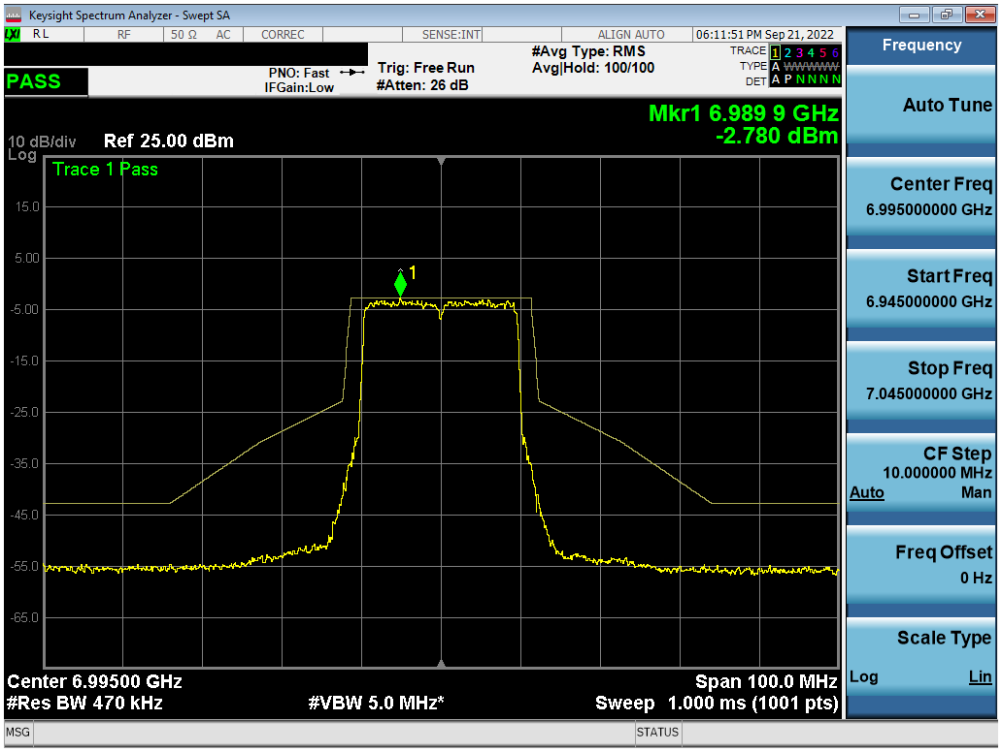
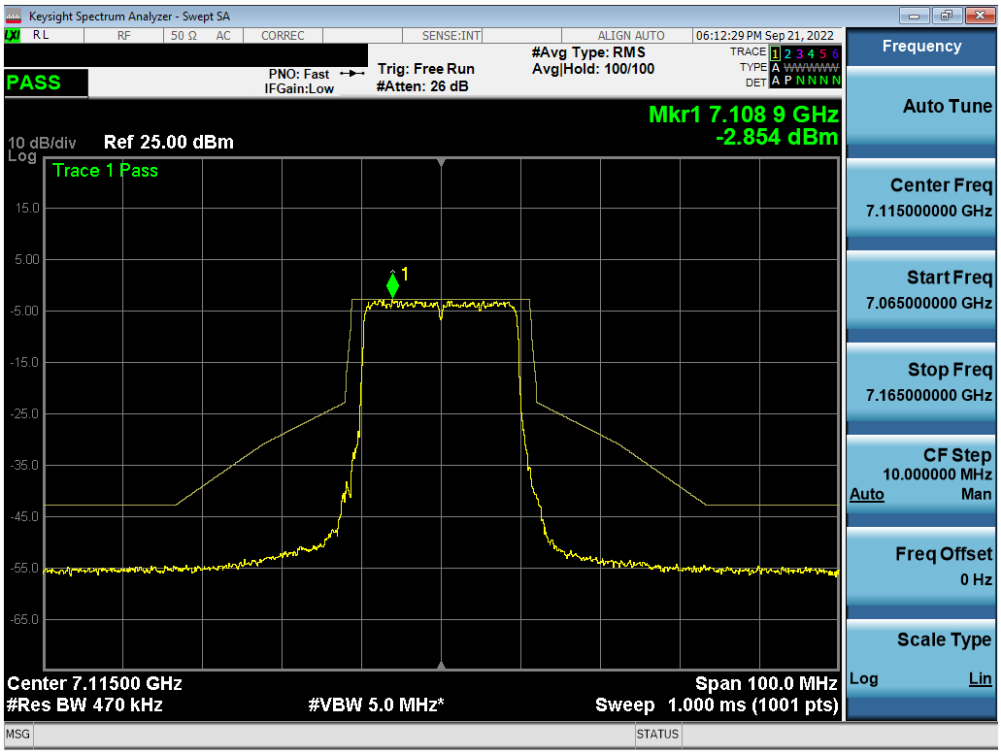


Plot 7-623. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 209) – LPI



Plot 7-624. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 233) – LPI

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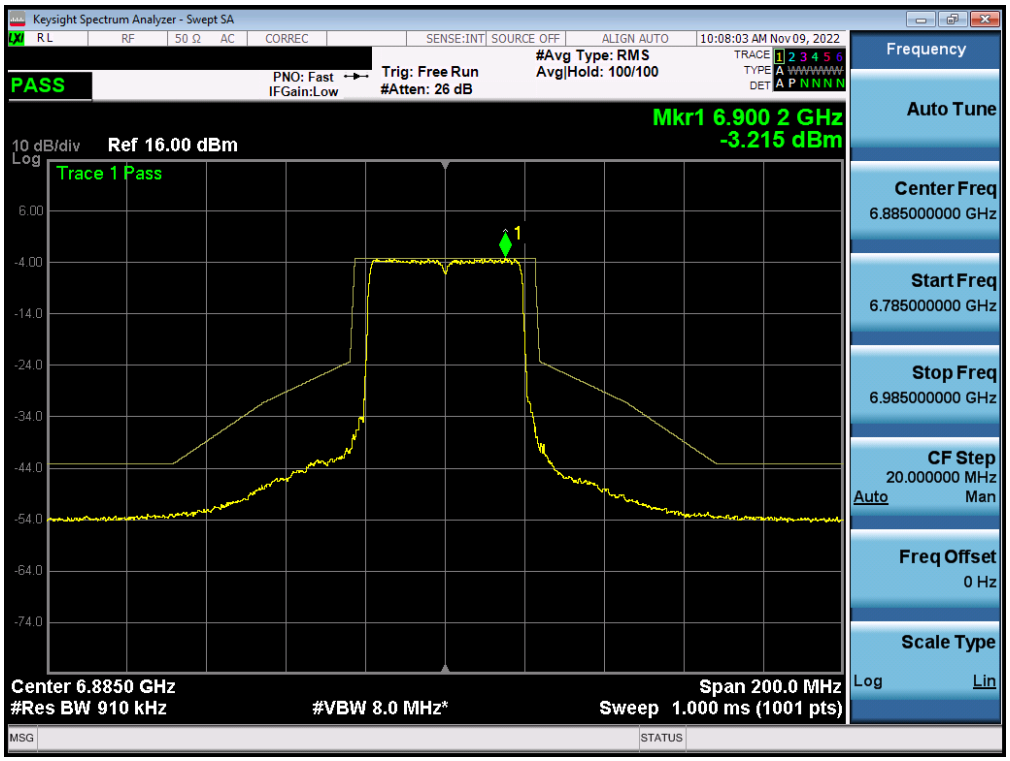
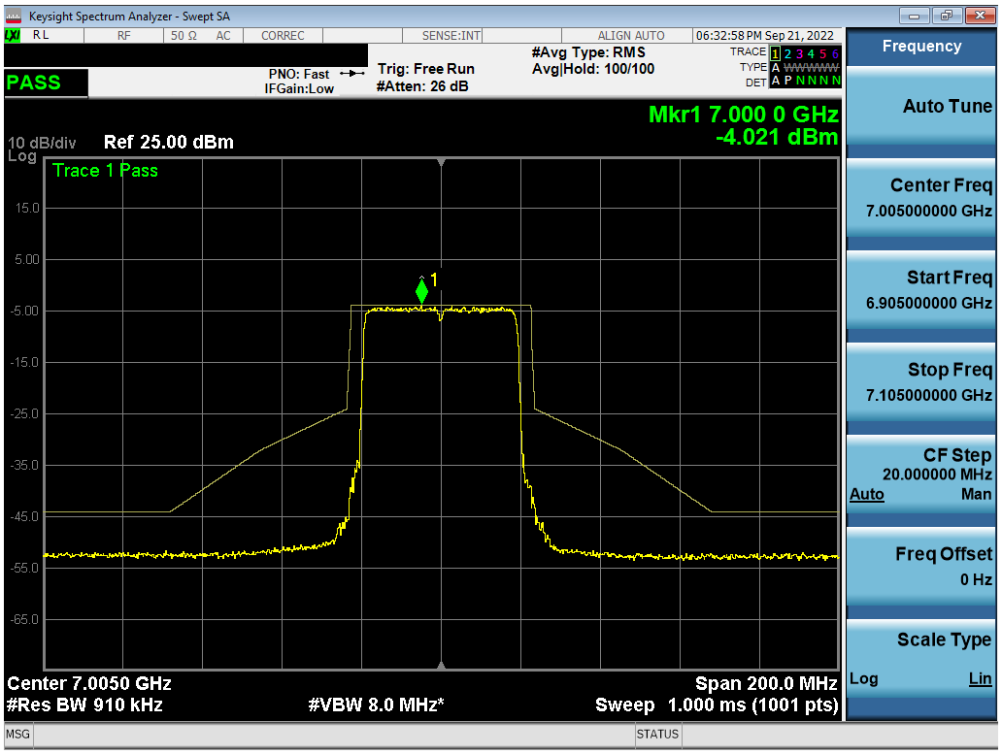


Plot 7-625. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 187) – LPI



Plot 7-626. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 211) – LPI

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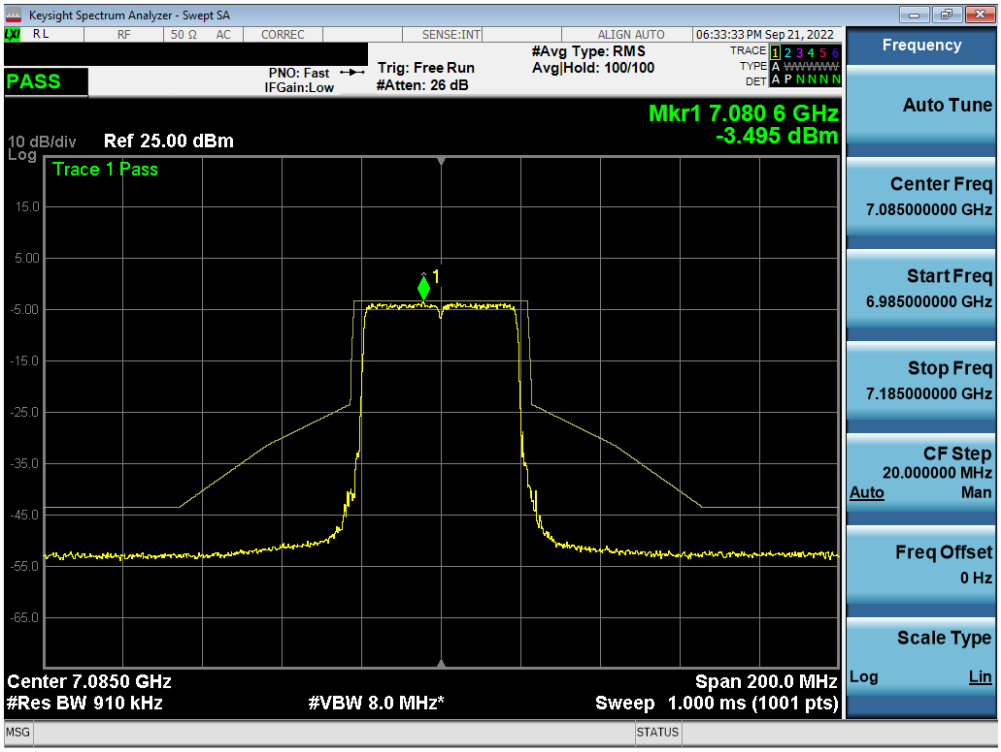
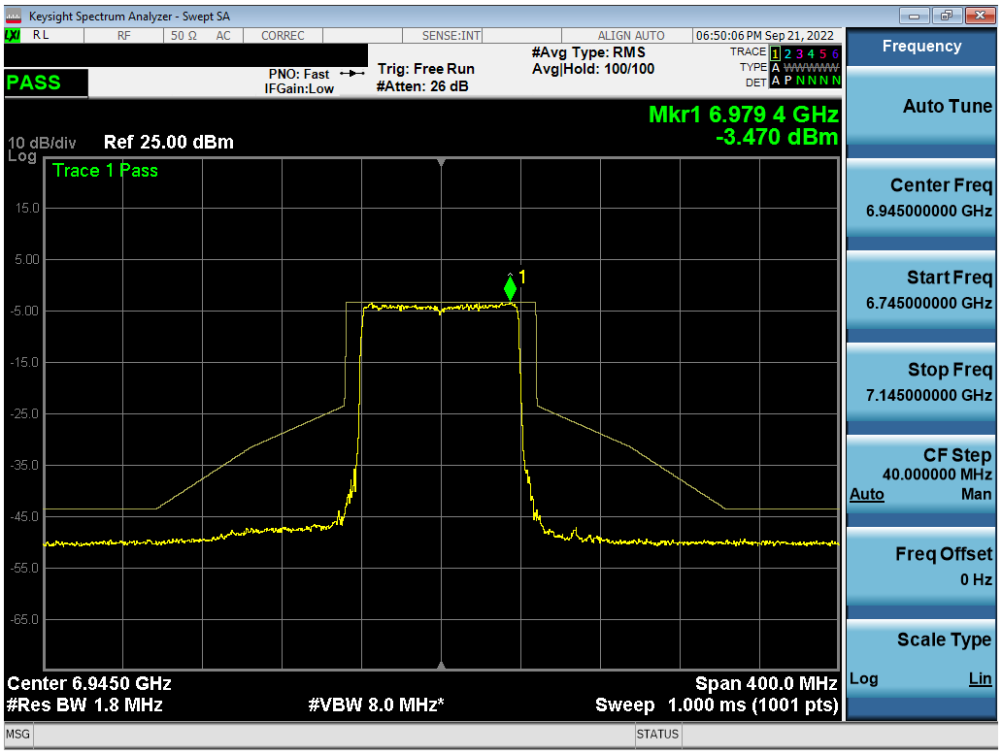


Plot 7-627. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 227) – LPI



Plot 7-628. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 199) – LPI

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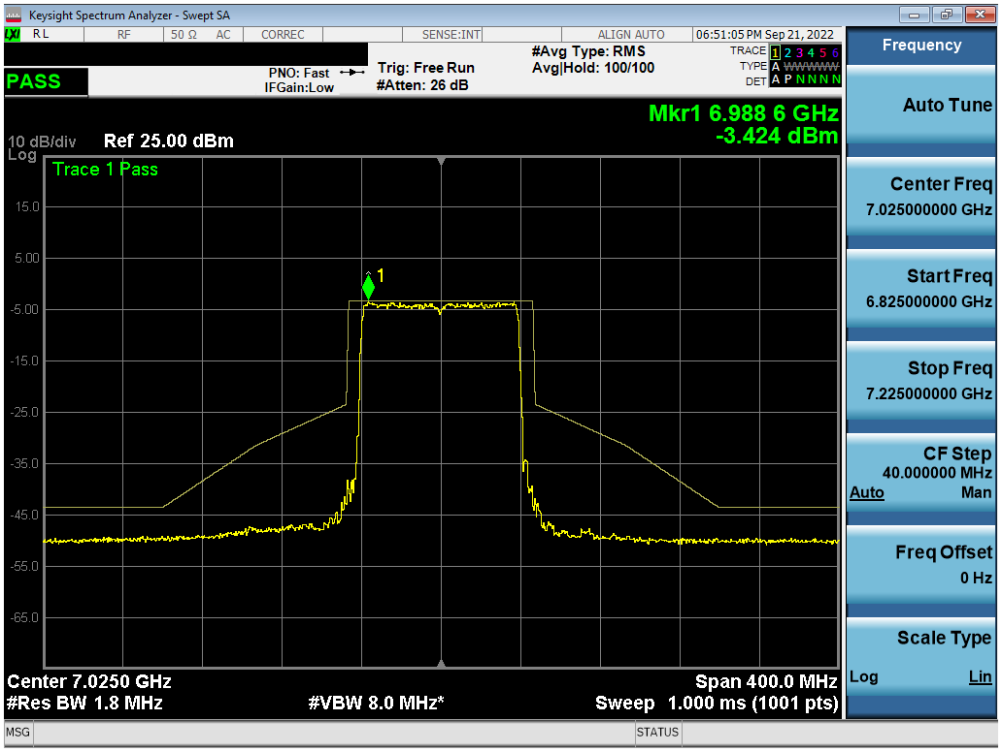
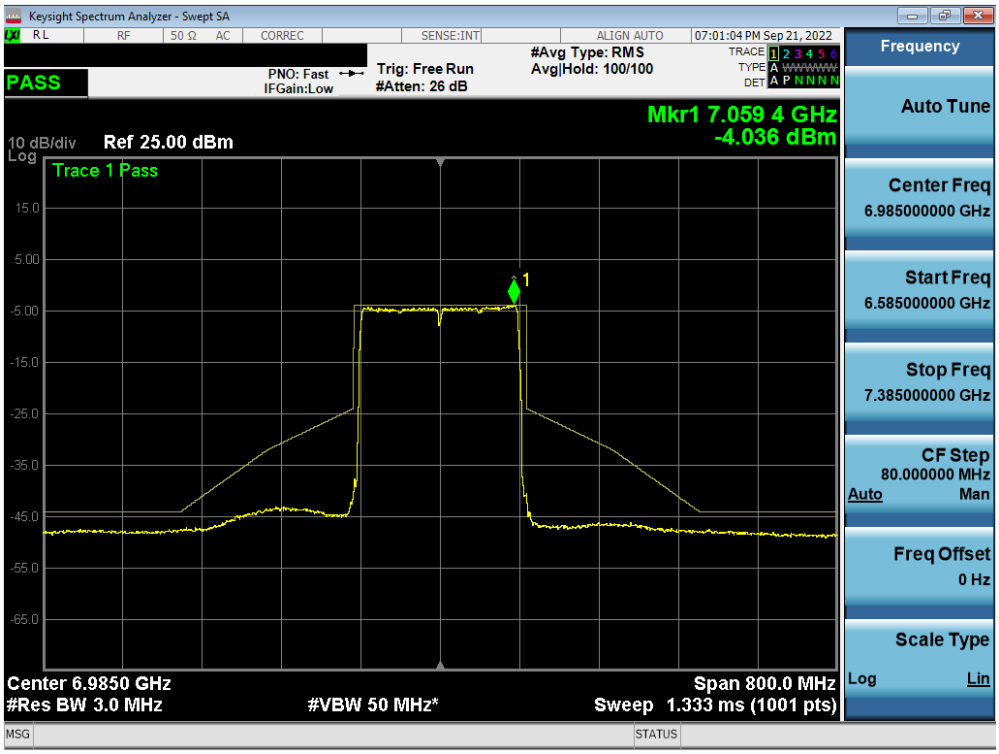


Plot 7-629. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 215) – LPI



Plot 7-630. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 207) – LPI

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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

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. 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.
6. 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 of KDB 987594 D02 v01r01 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.

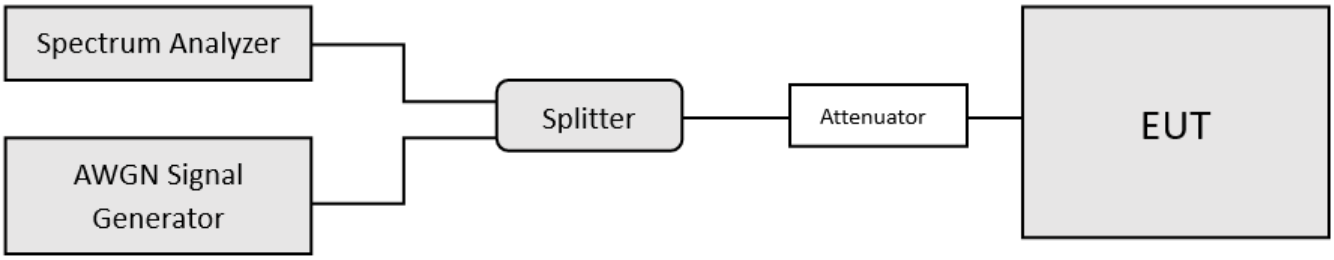

Figure 7-5. Contention-based protocol test setup, conducted method

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 7-631). The amplitude of the signal was increased until detected by the EUT, signaled by the ceasing of transmission (see Plot 7-647), M1 indicates the point at which the AWGN signal is introduced. D1 indicates where the AWGN signal is terminated, at least 10 seconds following M1.
2. 15 trials were run in order to ensure certainty of 90%
3. Per Guidance from KDB 987594 D04 v01, contention based protocol was tested with receiver with the lowest antenna gain.
4. All CBP Timing Plots shown are for the ceased condition. Some spikes that may be shown are from adjacent portions of the spectrum that are still transmiting.

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

Equation 7-1. Detection Level Calculation

Band	Channel	Channel Freq [MHz]	Channel BW [MHz]	Incumbent Freq [MHz]	Injected (AWGN) [dBm]	Antenna Gain [dBi]	Adjusted Power Level [dBm]	Detection Limit [dBm]	Margin [dB]
UNII Band 5	53	6215	20	6215	-85.58	-7.27	-78.31	-62.0	-16.31
	47	6185	160	6110	-85.87	-7.27	-78.60	-62.0	-16.60
				6185	-83.98	-7.27	-76.71	-62.0	-14.71
				6260	-75.03	-7.27	-67.76	-62.0	-5.76
UNII Band 6	101	6455	20	6455	-89.92	-9.94	-79.98	-62.0	-17.98
	111	6505	160	6430	-85.39	-9.94	-75.45	-62.0	-13.45
				6505	-85.36	-9.94	-75.42	-62.0	-13.42
				6580	-87.28	-9.94	-77.34	-62.0	-15.34
UNII Band 7	149	6695	20	6695	-86.43	-7.45	-78.98	-62.0	-16.98
	175	6825	160	6750	-85.40	-7.45	-77.95	-62.0	-15.95
				6825	-83.30	-7.45	-75.85	-62.0	-13.85
				6900	-85.70	-7.45	-78.25	-62.0	-16.25
UNII Band 8	197	6935	20	6935	-89.93	-5.75	-84.18	-62.0	-22.18
	207	6985	160	6910	-82.94	-5.75	-77.19	-62.0	-15.19
				6985	-85.95	-5.75	-80.20	-62.0	-18.20
				7060	-87.98	-5.75	-82.23	-62.0	-20.23

Table 7-54. Contention Based Protocol – Incumbent Detection Results

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Band	Channel	Channel Freq [MHz]	Channel BW [MHz]	Incumbent Freq [MHz]	Antenna Gain [dBi]	EUT Transmission Status Adjusted AWGN Power (dBm)		
						Normal	Minimal	Ceased
UNII Band 5	53	6215	20	6215	-7.27	-83.35	-79.31	-78.31
	47	6185	160	6110	-7.27	-81.89	-79.63	-78.60
				6185	-7.27	-78.95	-77.43	-76.71
				6260	-7.27	-70.07	-68.86	-67.76
UNII Band 6	101	6455	20	6455	-9.94	-81.49	-80.88	-79.98
	111	6505	160	6430	-9.94	-77.34	-76.35	-75.45
				6505	-9.94	-78.42	-76.63	-75.42
				6580	-9.94	-78.54	-78.09	-77.34
UNII Band 7	149	6695	20	6695	-7.45	-81.06	-79.67	-78.98
	175	6825	160	6750	-7.45	-80.95	-78.95	-77.95
				6825	-7.45	-79.05	-77.05	-75.85
				6900	-7.45	-80.65	-79.25	-78.25
UNII Band 8	197	6935	20	6935	-5.75	-85.18	-84.78	-84.18
	207	6985	160	6910	-5.75	-78.39	-77.99	-77.19
				6985	-5.75	-82.80	-81.20	-80.20
				7060	-5.75	-84.91	-83.47	-82.23

Table 7-55. Contention Based Protocol – Detection Results – All Tx Cases

CBP Detection (1 = Detection, Blank = No Detection)																				
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 (%)
UNII Band 5	53	6215	20	6215	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	47	6185	160	6110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				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
UNII Band 6	101	6455	20	6455	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	111	6505	160	6430	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				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
UNII Band 7	149	6695	20	6695	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	175	6825	160	6750	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				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
UNII Band 8	197	6935	20	6935	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
	207	6985	160	6910	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
				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 7-56. Contention Based Protocol – Incumbent Detection Trial Results

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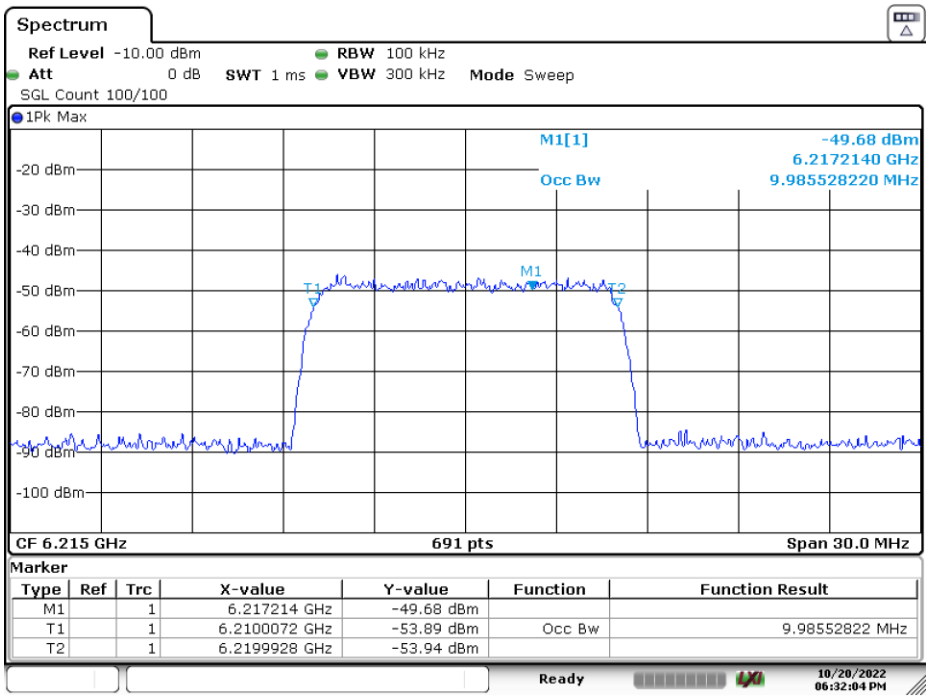
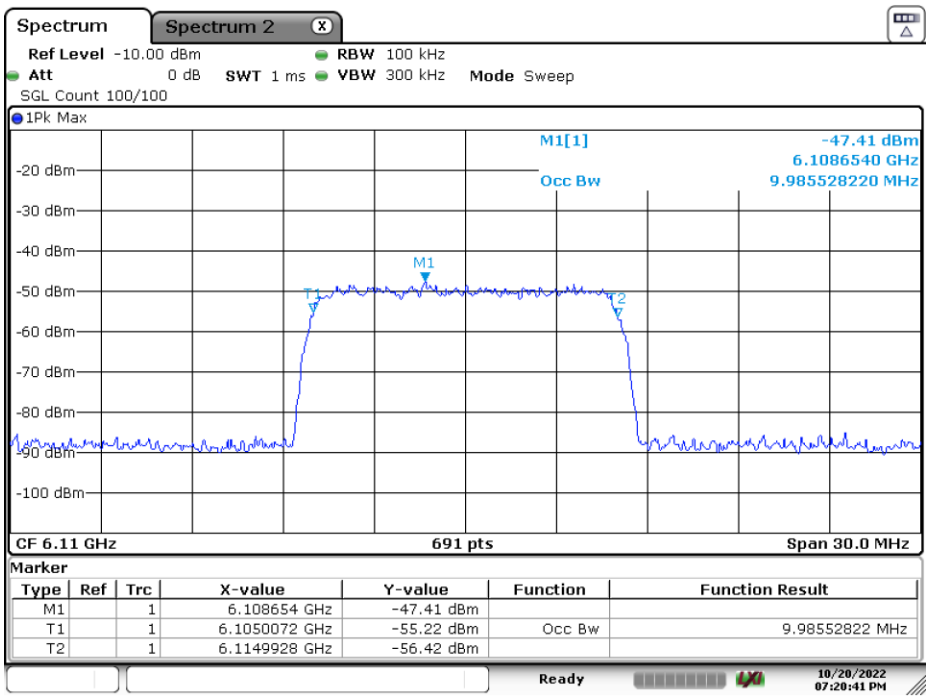
AWGN Plots



Date: 20.OCT.2022 18:32:03

Plot 7-631. AWGN Signal – UNII 5 – 20MHz



Date: 20.OCT.2022 19:20:41

Plot 7-632. AWGN Signal – UNII 5 – 160MHz - Low

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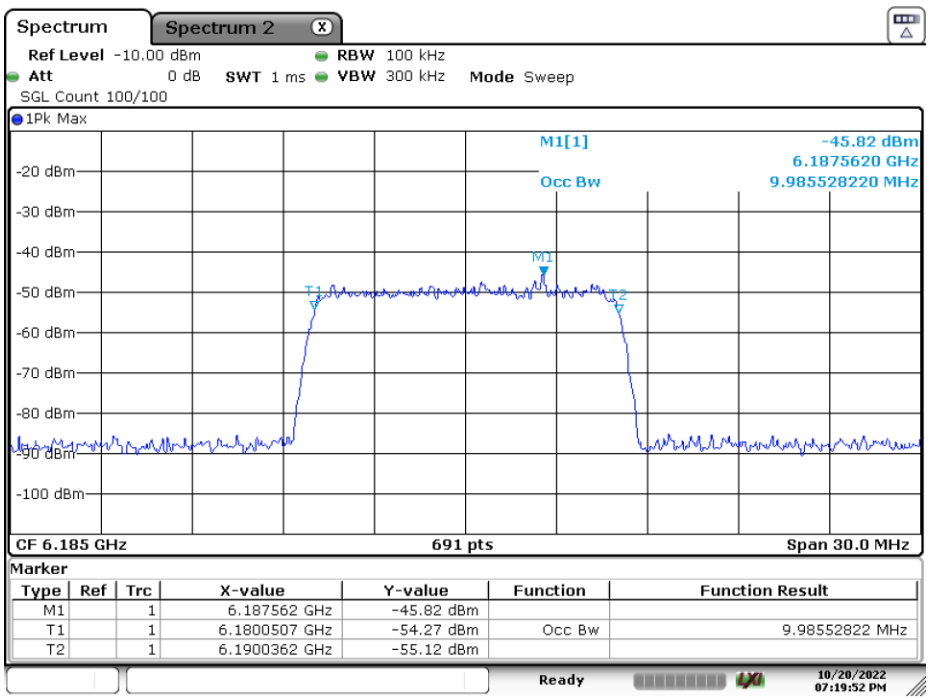
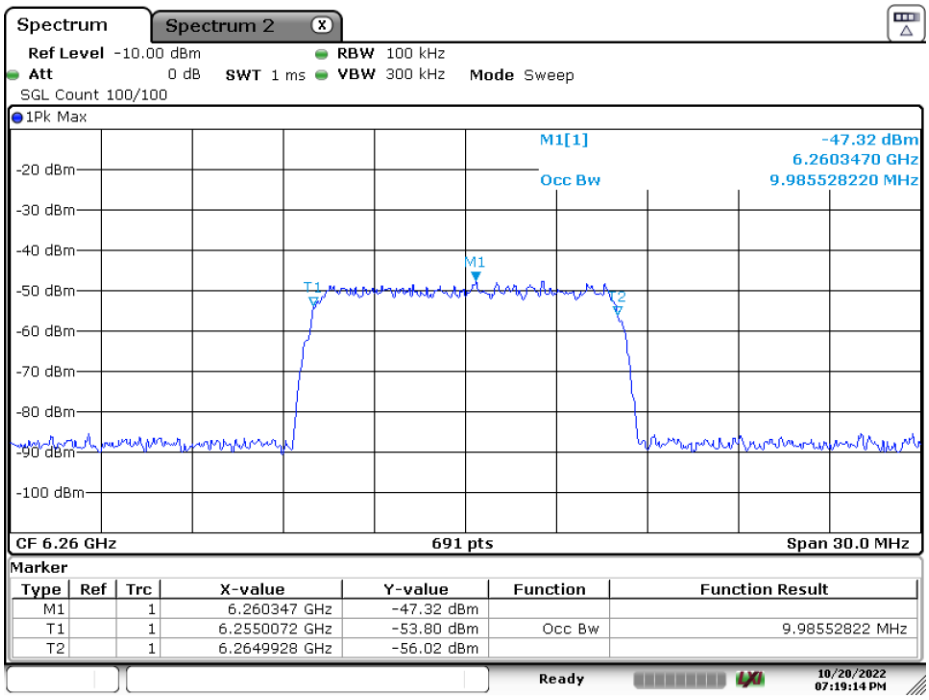


Date: 20.OCT.2022 19:19:52

Plot 7-633. AWGN Signal – UNII 5 – 160MHz - Mid



Date: 20.OCT.2022 19:19:13

Plot 7-634. AWGN Signal – UNII 5 – 160MHz - High

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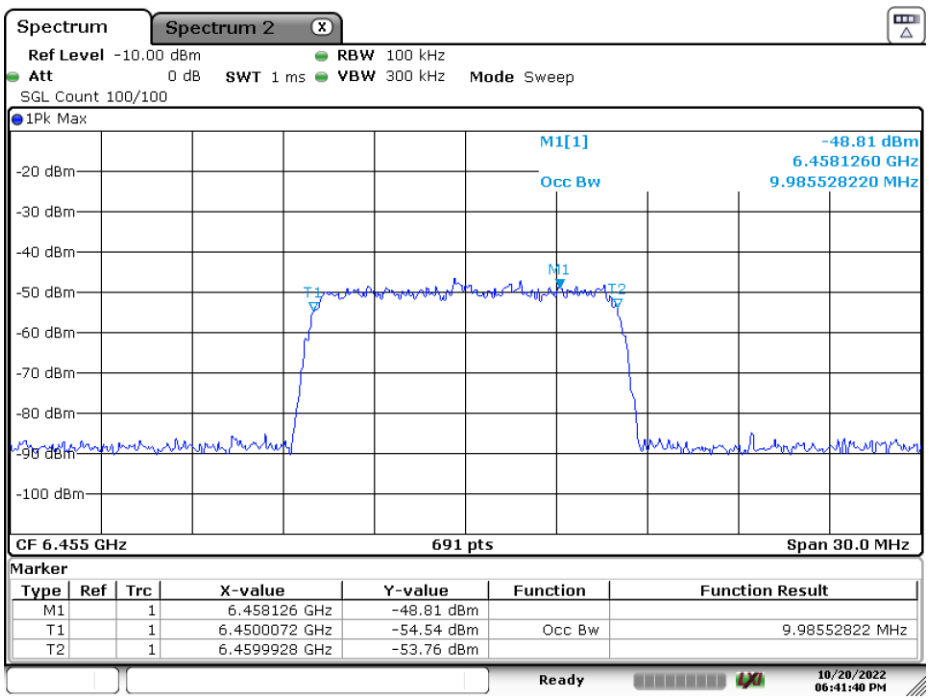
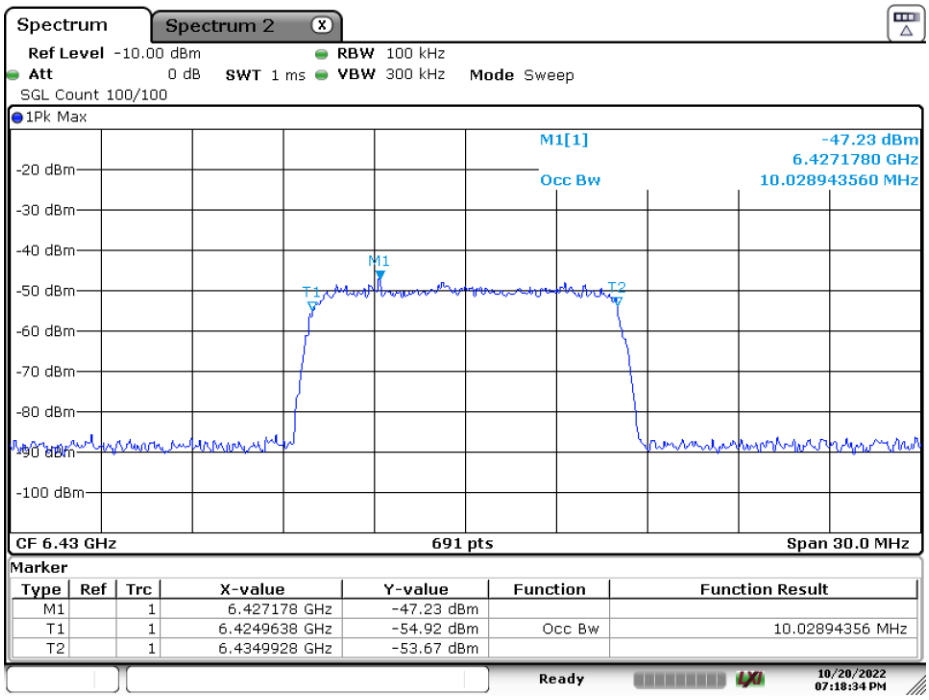


Date: 20.OCT.2022 18:41:40

Plot 7-635. AWGN Signal – UNII 6 – 20MHz



Date: 20.OCT.2022 19:18:34

Plot 7-636. AWGN Signal – UNII 6 – 160MHz - Low

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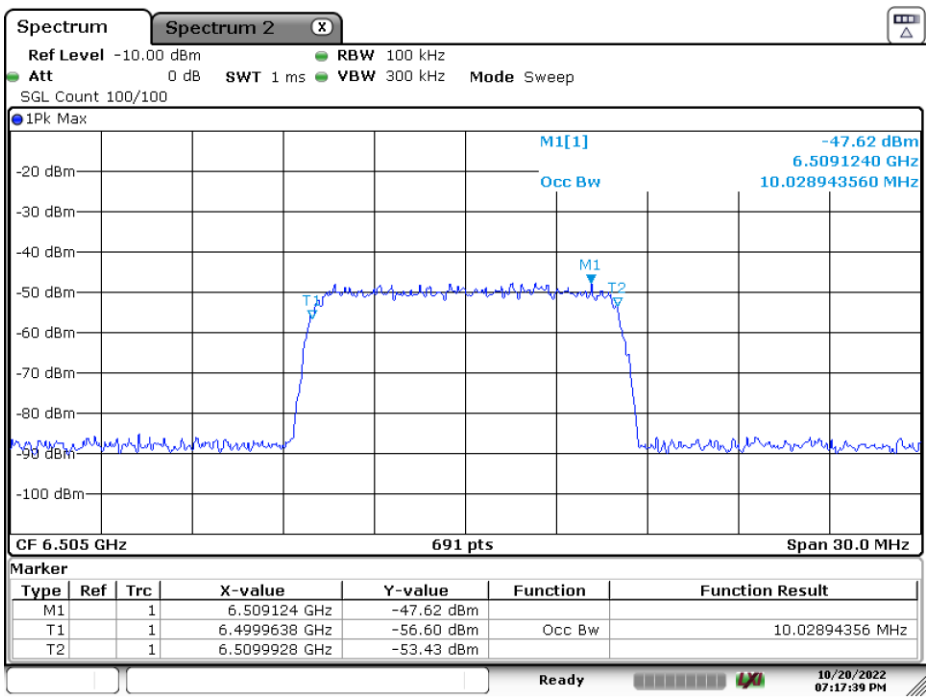

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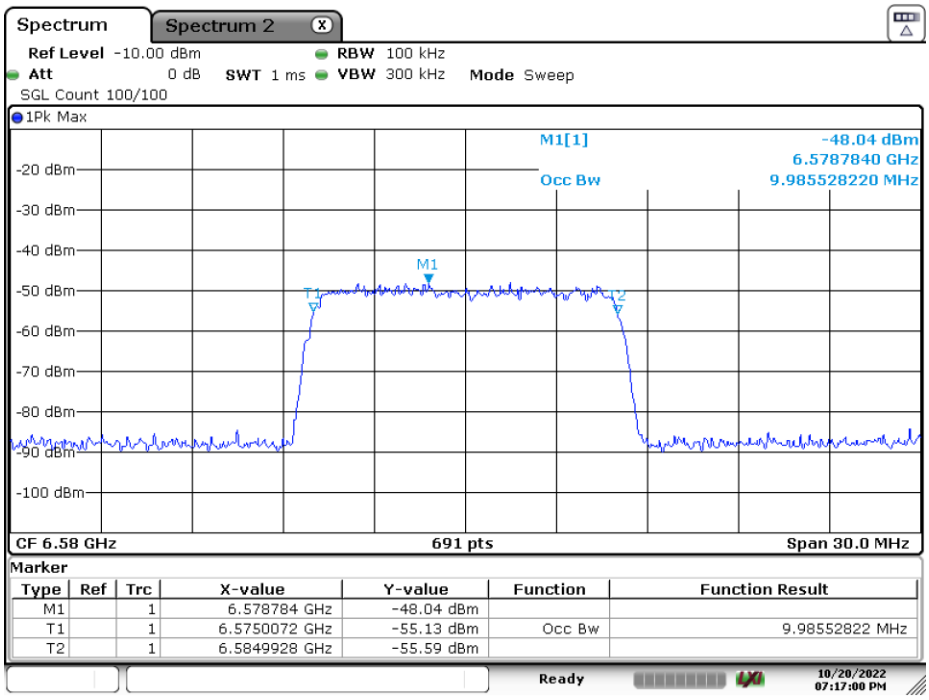
Plot 7-637. AWGN Signal – UNII 6 – 160MHz - Mid



Date: 20.OCT.2022 19:17:00

Plot 7-638. AWGN Signal – UNII 6 – 160MHz - High

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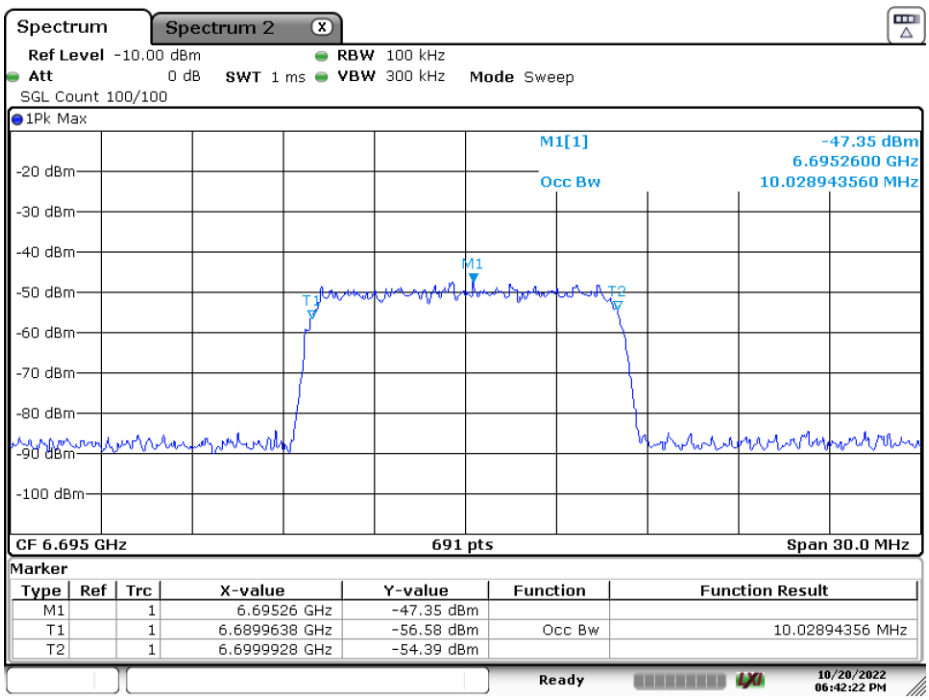

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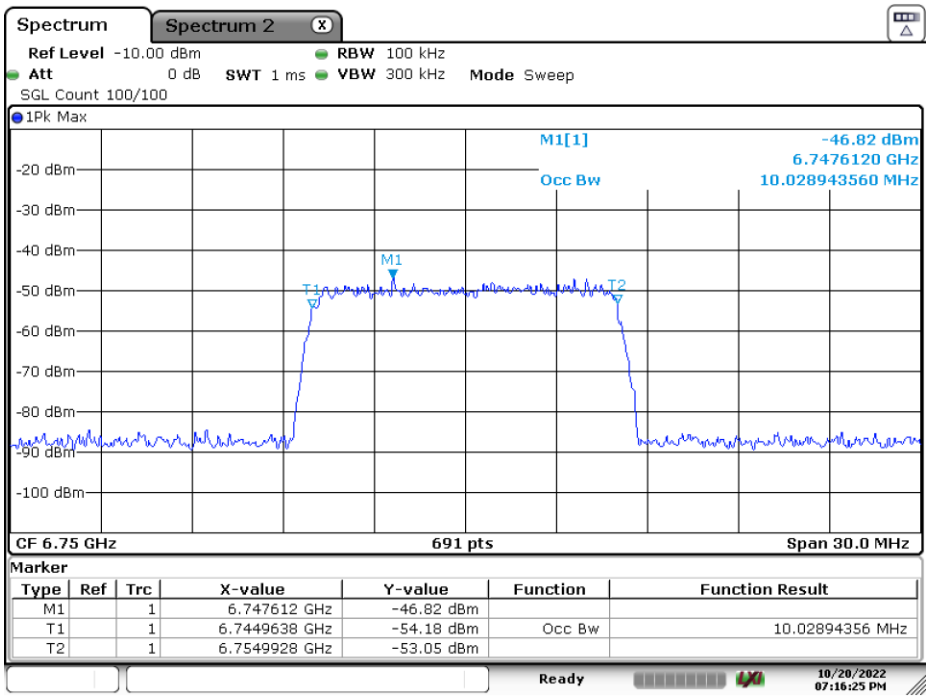
Plot 7-639. AWGN Signal – UNII 7 – 20MHz



Date: 20.OCT.2022 19:16:25

Plot 7-640. AWGN Signal – UNII 7 – 160MHz - Low

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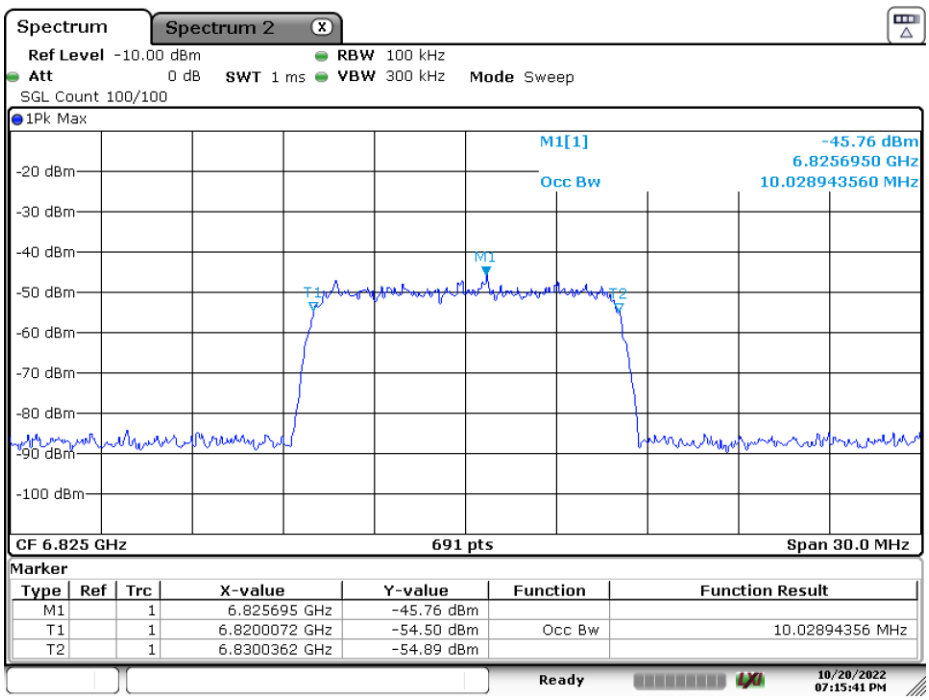

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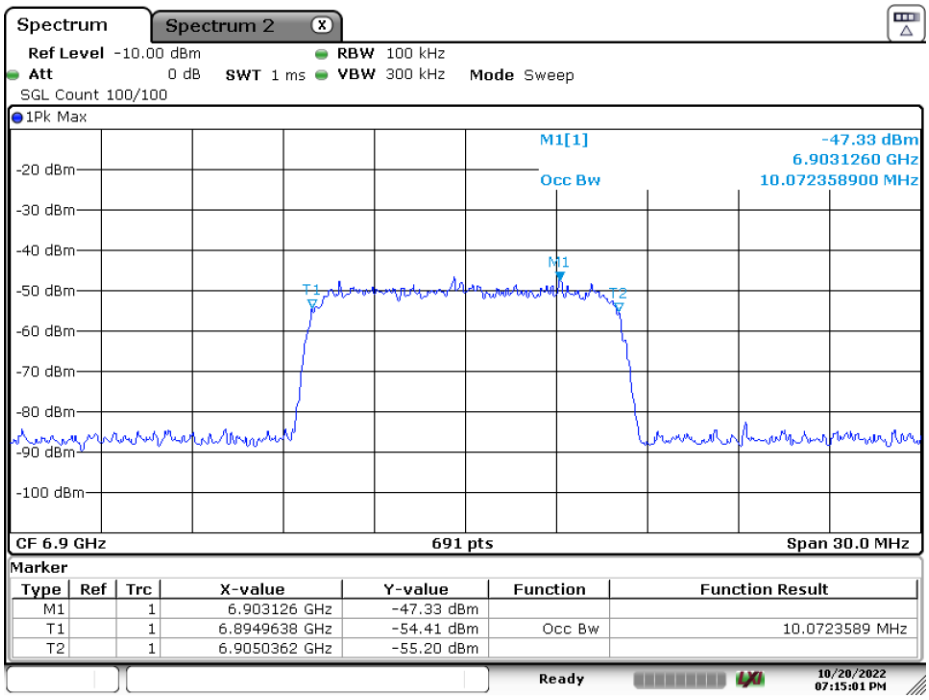
Plot 7-641. AWGN Signal – UNII 7 – 160MHz - Mid



Date: 20.OCT.2022 19:15:01

Plot 7-642. AWGN Signal – UNII 7 – 160MHz - High

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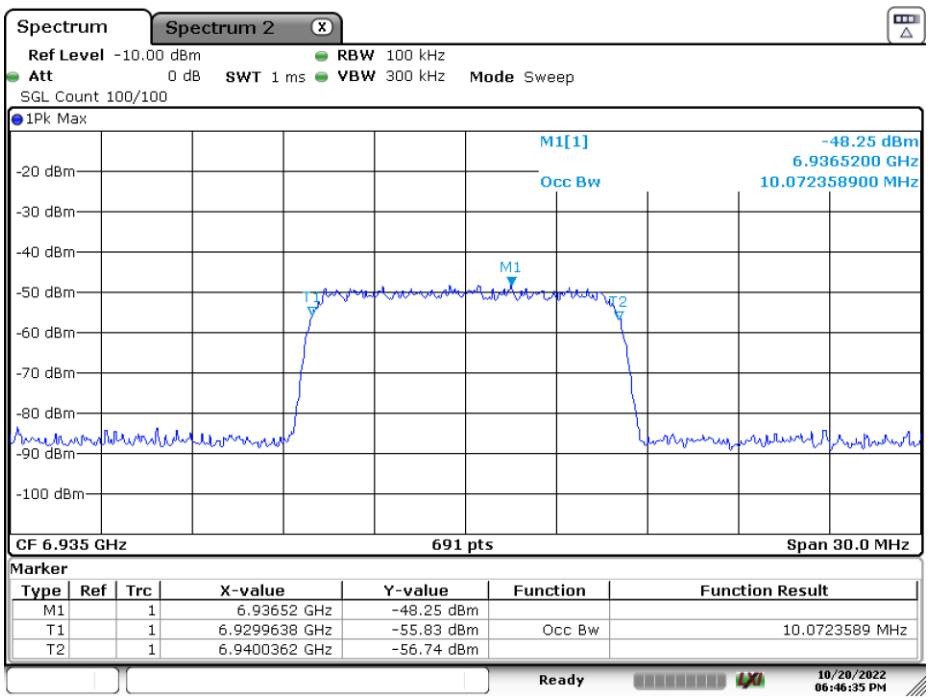

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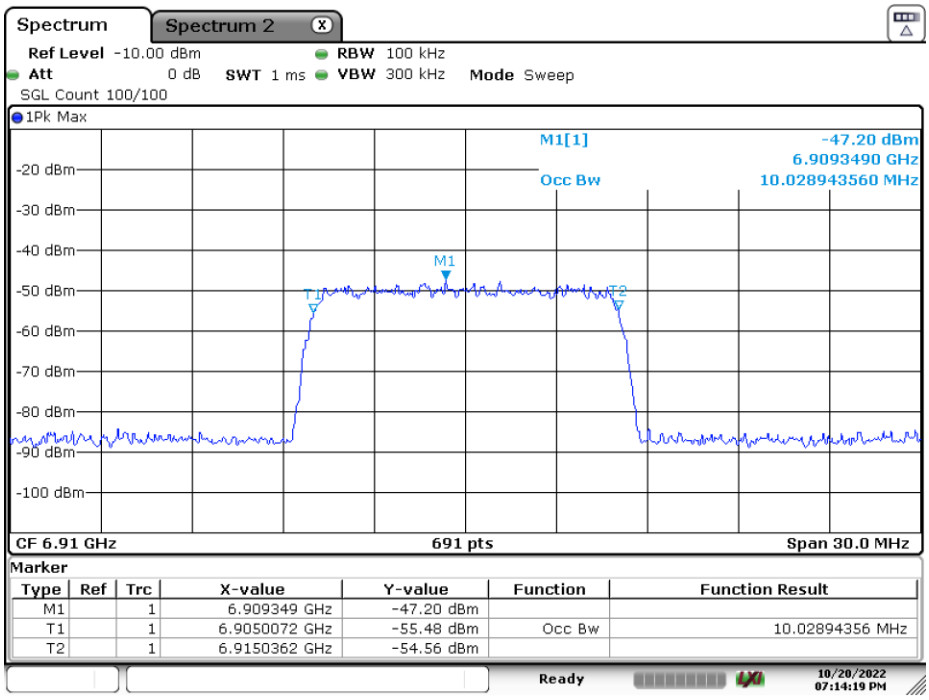
Plot 7-643. AWGN Signal – UNII 8 – 20MHz



Date: 20.OCT.2022 19:14:18

Plot 7-644. AWGN Signal – UNII 8 – 160MHz - Low

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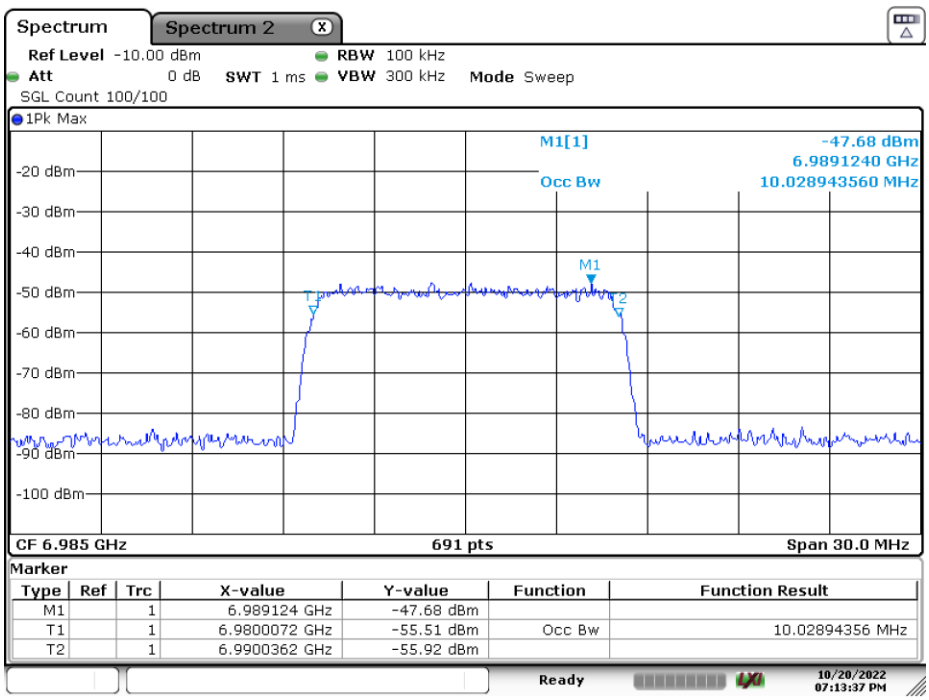

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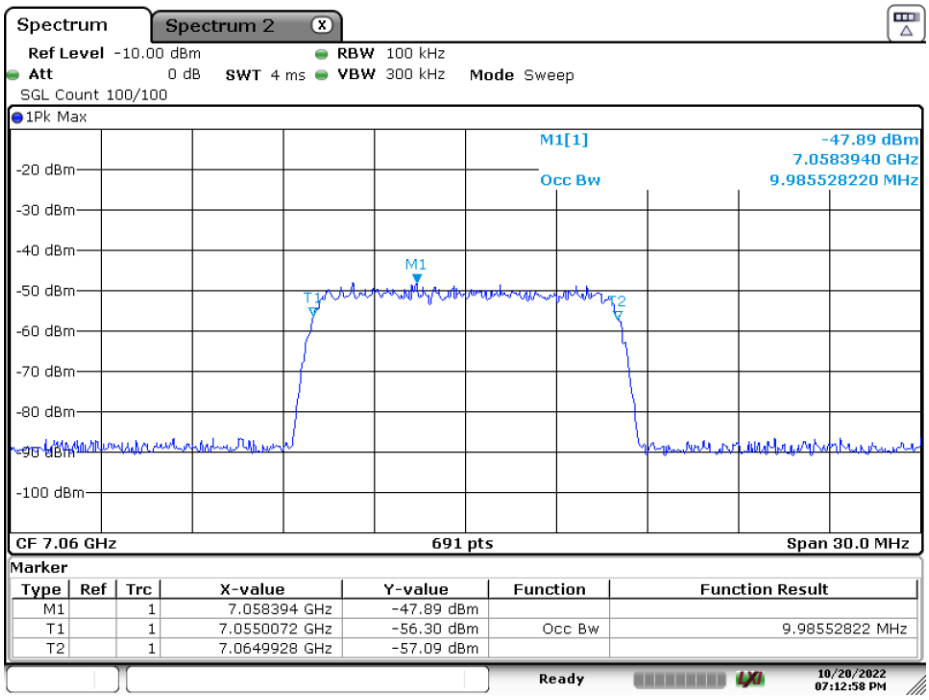
Plot 7-645. AWGN Signal – UNII 8 – 160MHz - Mid



Date: 20.OCT.2022 19:12:58

Plot 7-646. AWGN Signal – UNII 8 – 160MHz - High

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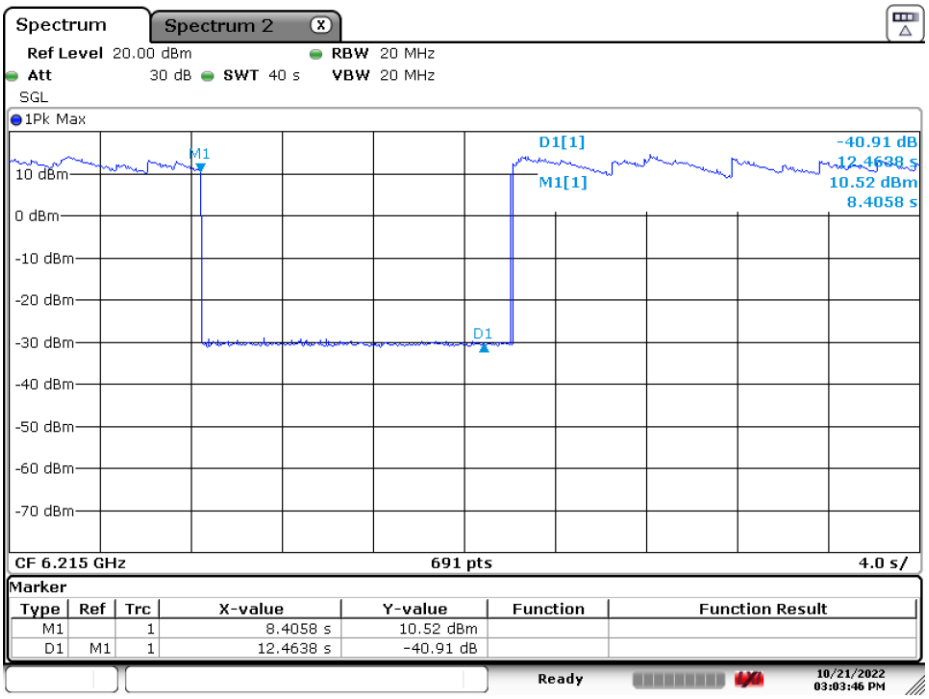
CBP Timing Plots



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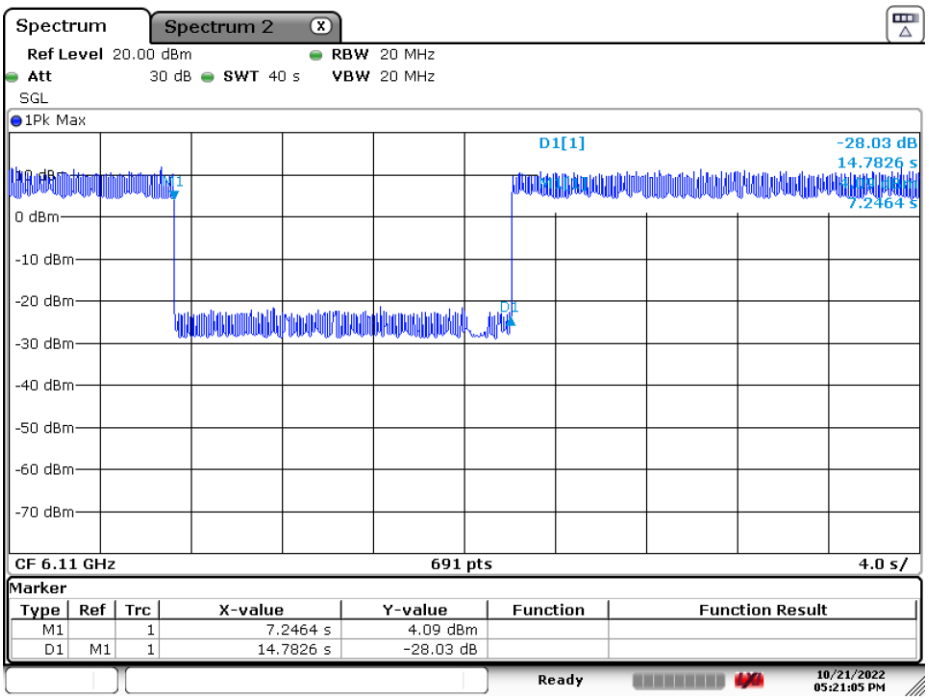
Plot 7-647. Contention Based Protocol Timing Plot – UNII 5 – 20MHz Ch53



Date: 21.OCT.2022 17:21:05

Plot 7-648. Contention Based Protocol Timing Plot – UNII 5 – 160MHz Ch47 – Low

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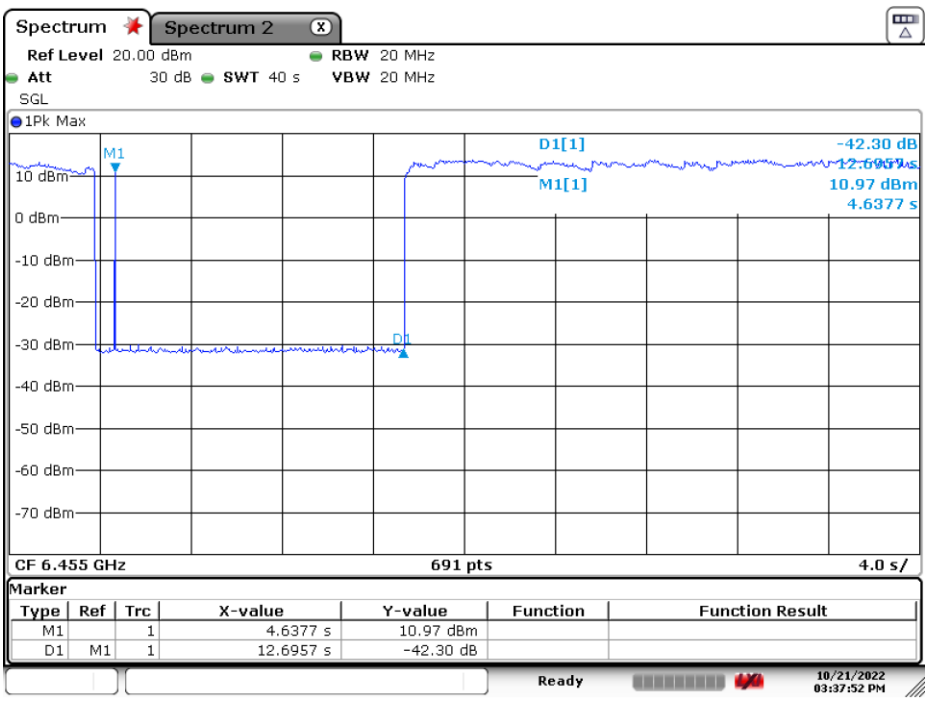

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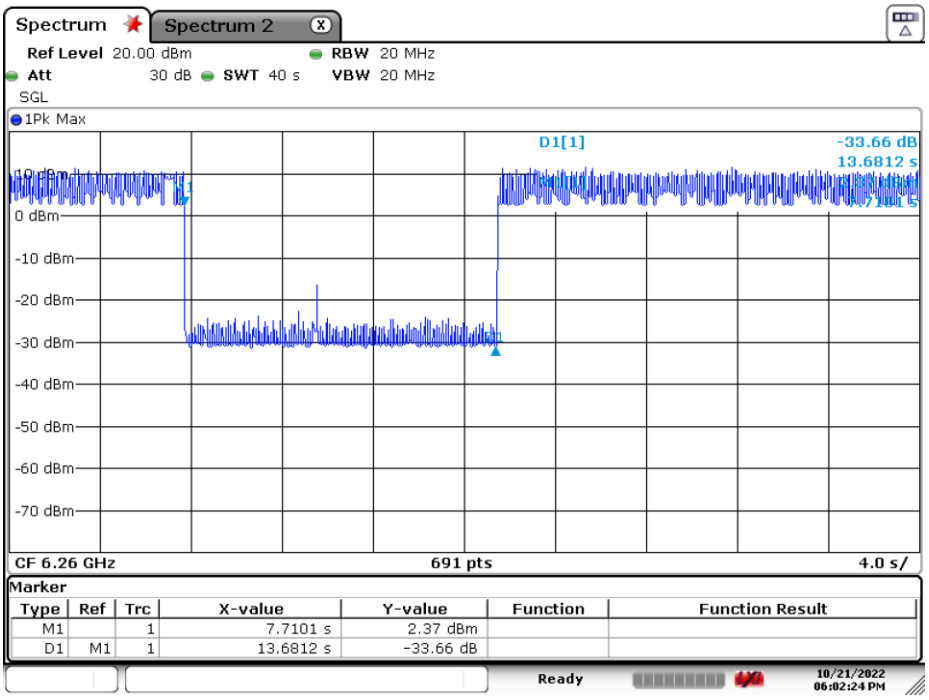
Plot 7-649. Contention Based Protocol Timing Plot – UNII 5 – 160MHz Ch47 – Mid



Date: 21.OCT.2022 18:02:24

Plot 7-650. Contention Based Protocol Timing Plot – UNII 5 – 160MHz Ch47 - High

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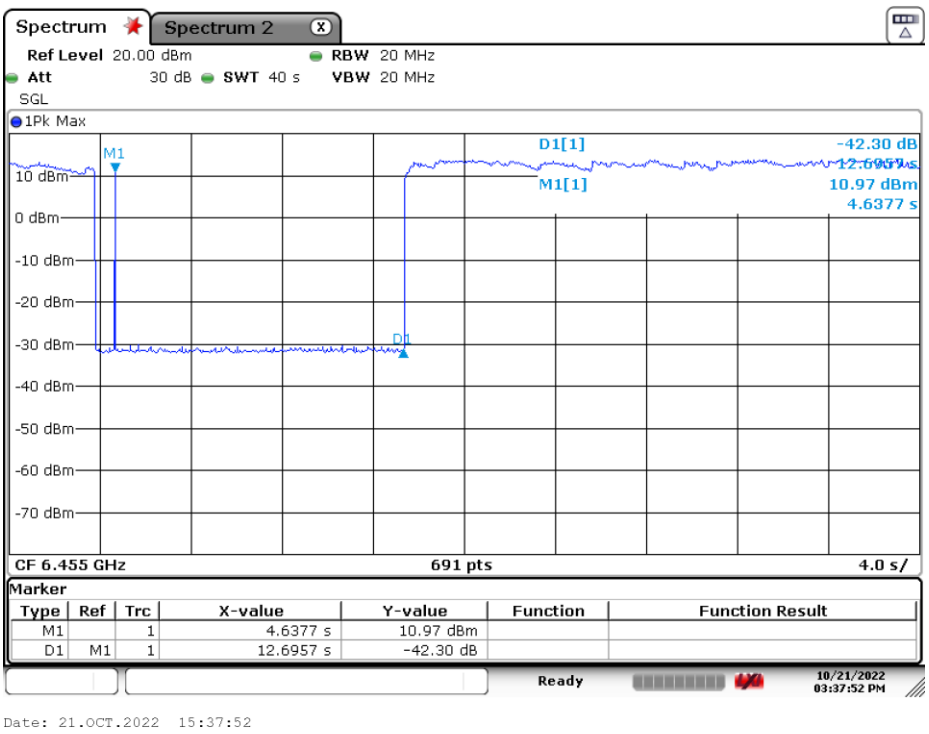
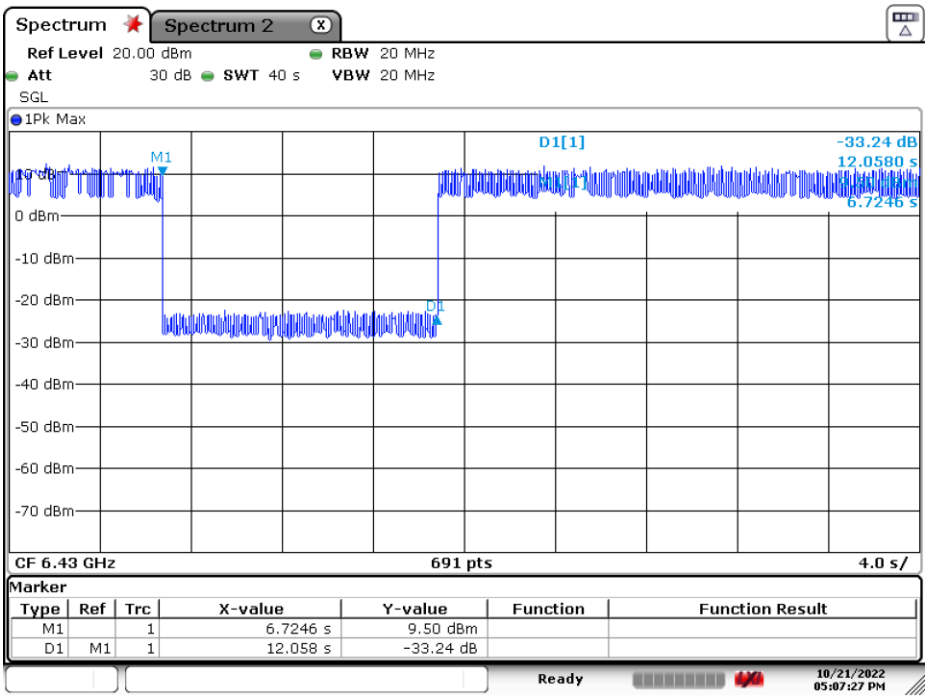


Date: 21.OCT.2022 15:37:52

Plot 7-651. Contention Based Protocol Timing Plot – UNII 6 – 20MHz Ch101



Date: 21.OCT.2022 17:07:27

Plot 7-652. Contention Based Protocol Timing Plot – UNII 6 – 160MHz Ch111 – Low

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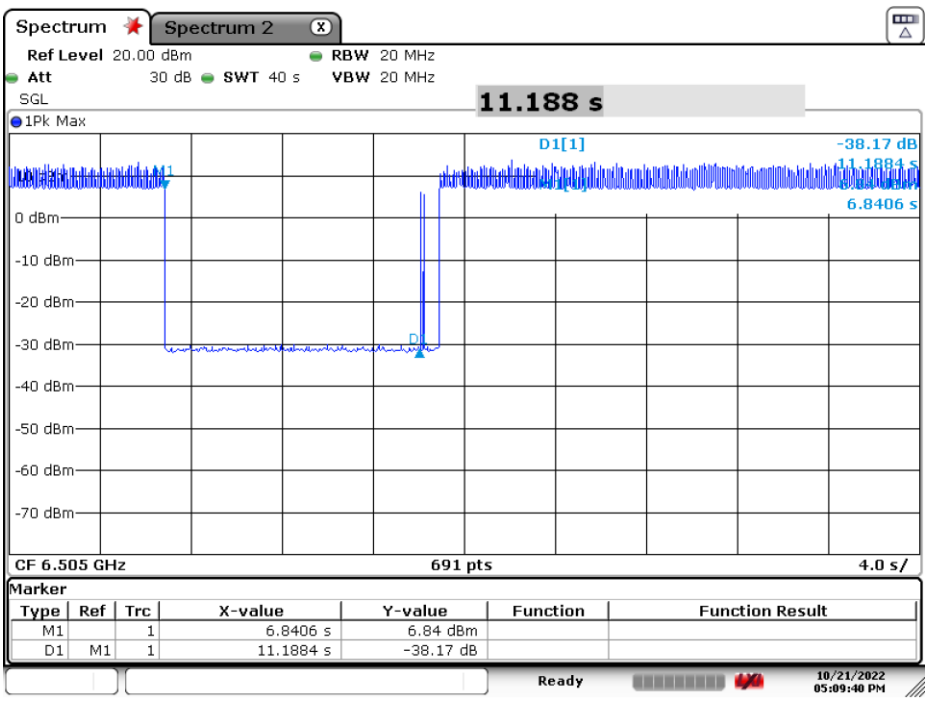
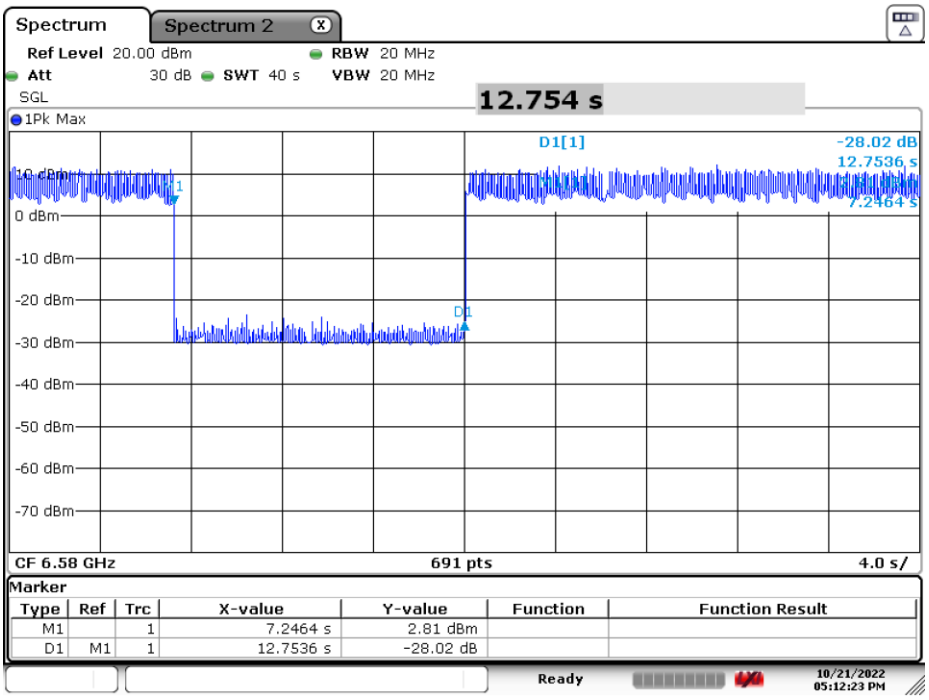


Date: 21.OCT.2022 17:09:40

Plot 7-653. Contention Based Protocol Timing Plot – UNII 6 – 160MHz Ch111 – Mid



Date: 21.OCT.2022 17:12:23

Plot 7-654. Contention Based Protocol Timing Plot – UNII 6 – 160MHz Ch111 - High

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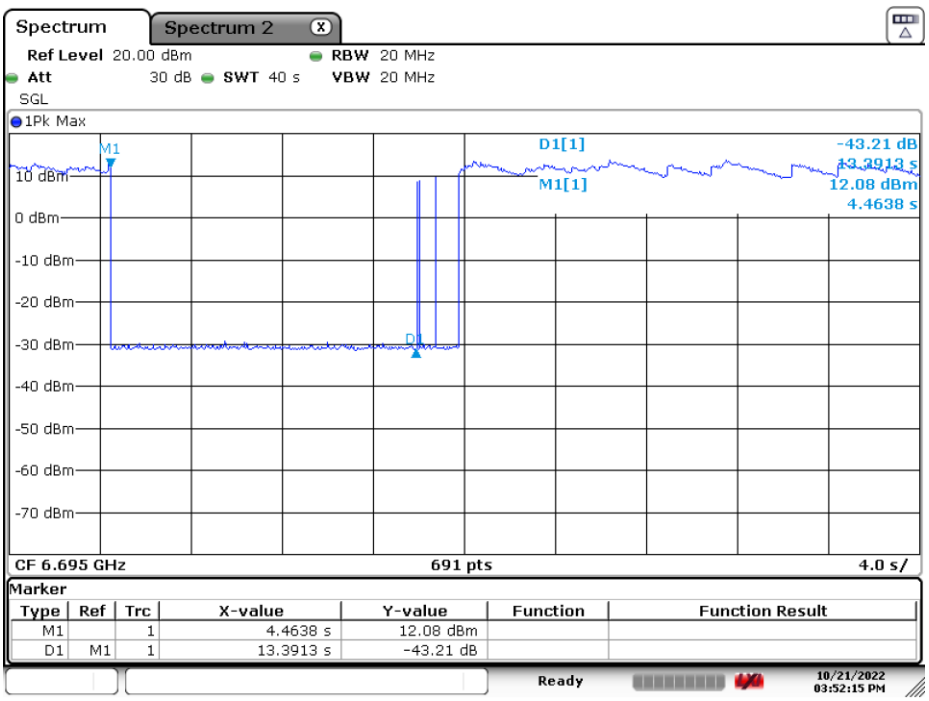

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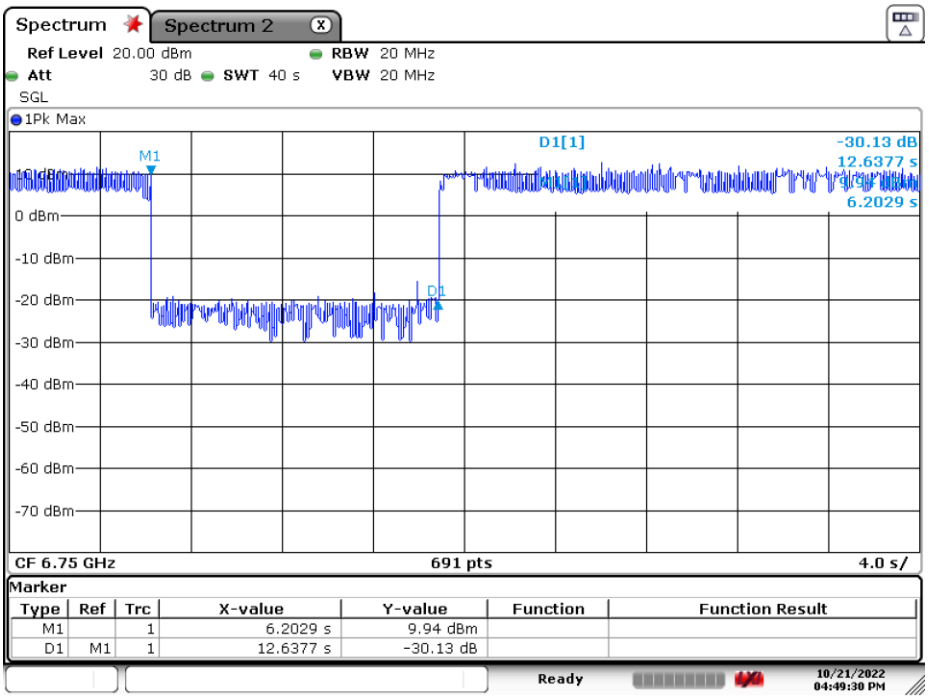
Plot 7-655. Contention Based Protocol Timing Plot – UNII 7 – 20MHz Ch149



Date: 21.OCT.2022 16:49:30

Plot 7-656. Contention Based Protocol Timing Plot – UNII 7 – 160MHz Ch175 – Low

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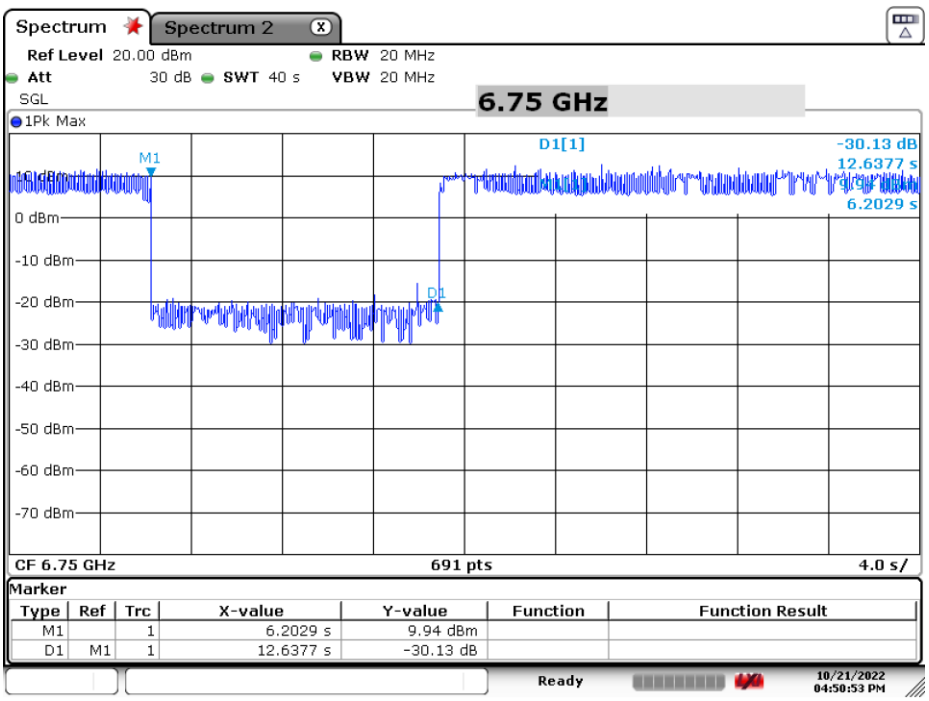
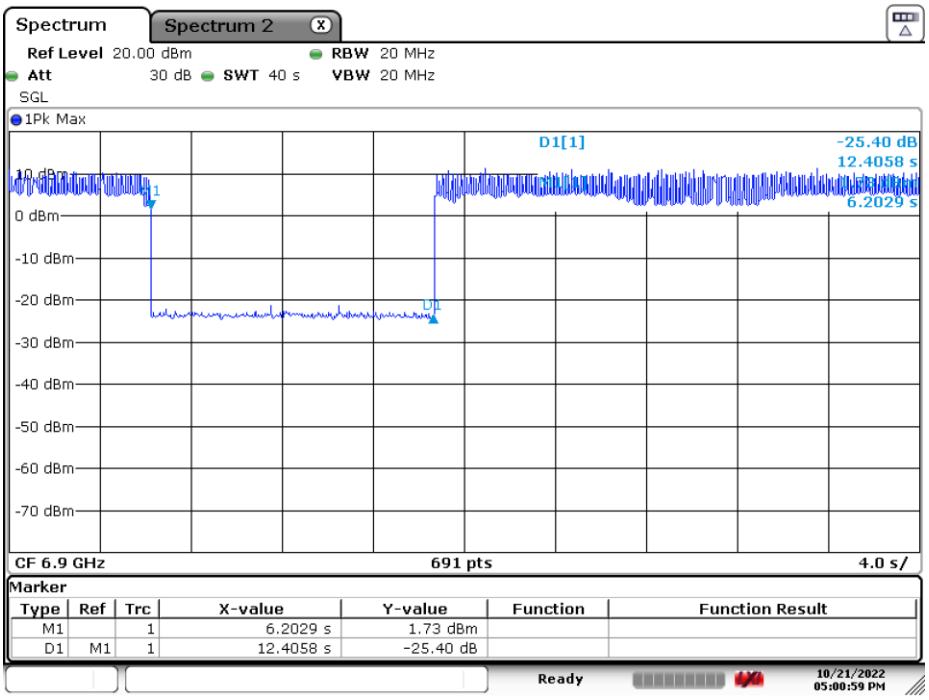


Date: 21.OCT.2022 16:50:53

Plot 7-657. Contention Based Protocol Timing Plot – UNII 7 – 160MHz Ch175 – Mid



Date: 21.OCT.2022 17:00:59

Plot 7-658. Contention Based Protocol Timing Plot – UNII 7 – 160MHz Ch175 - High

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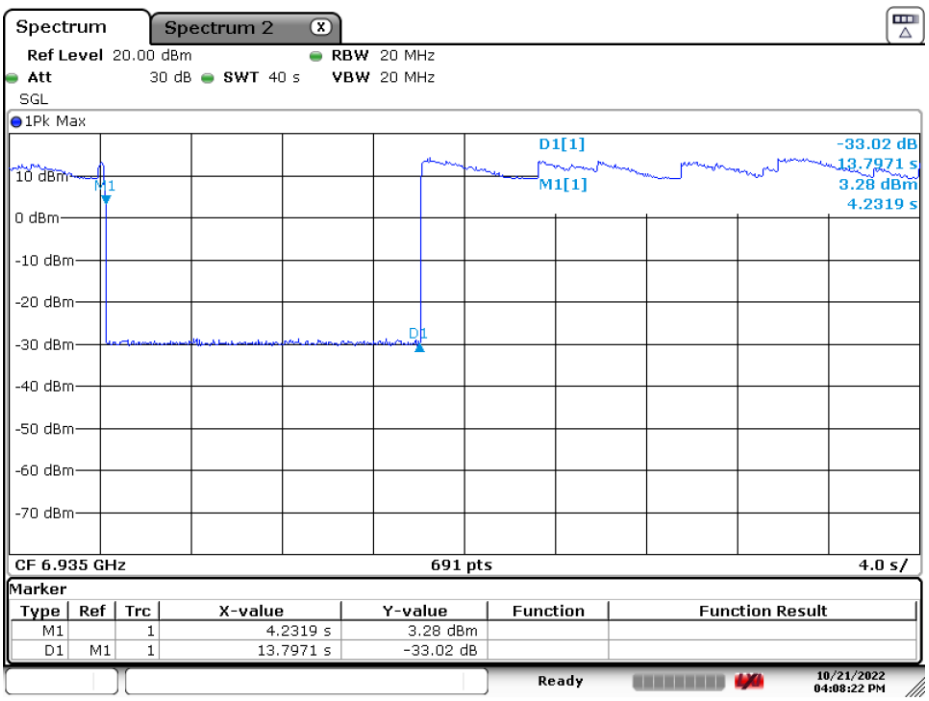
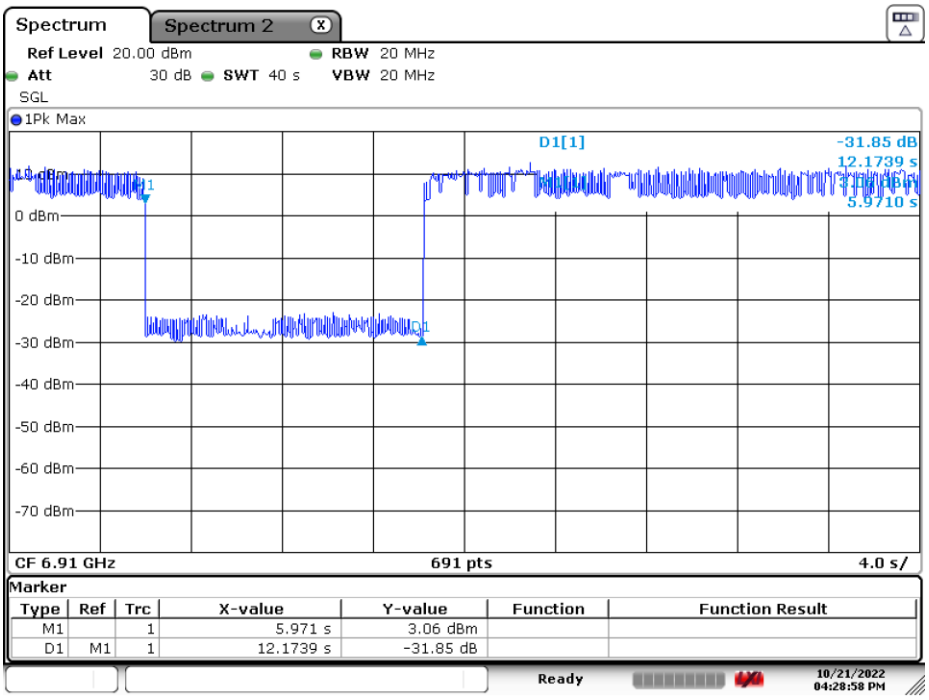


Date: 21.OCT.2022 16:08:23

Plot 7-659. Contention Based Protocol Timing Plot – UNII 8 – 20MHz Ch197



Date: 21.OCT.2022 16:28:57

Plot 7-660. Contention Based Protocol Timing Plot – UNII 8 – 160MHz Ch207 – Low

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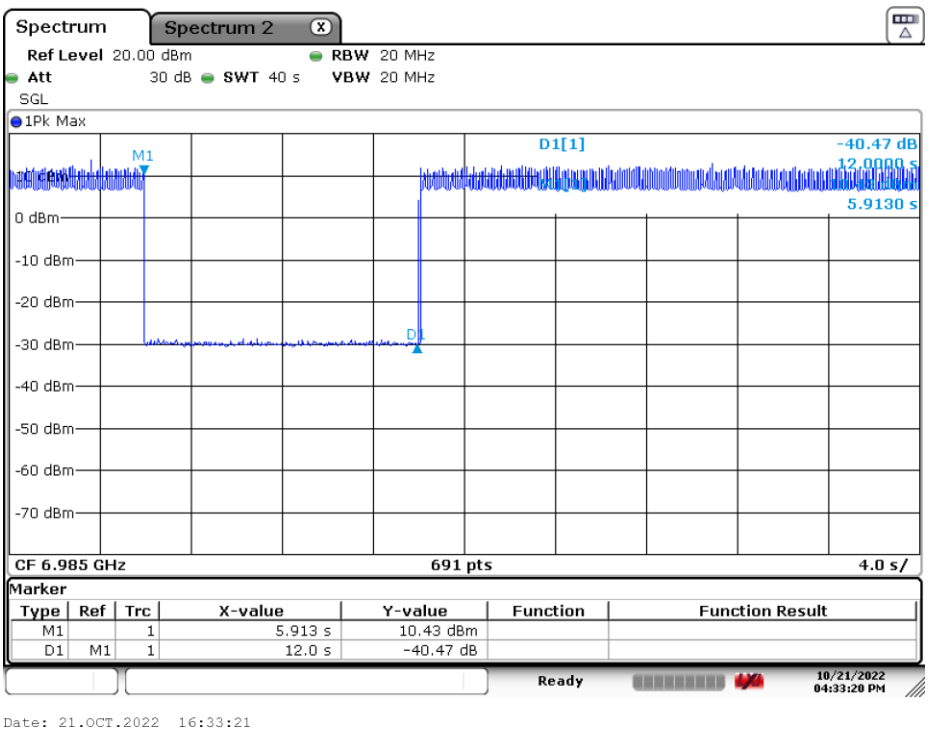
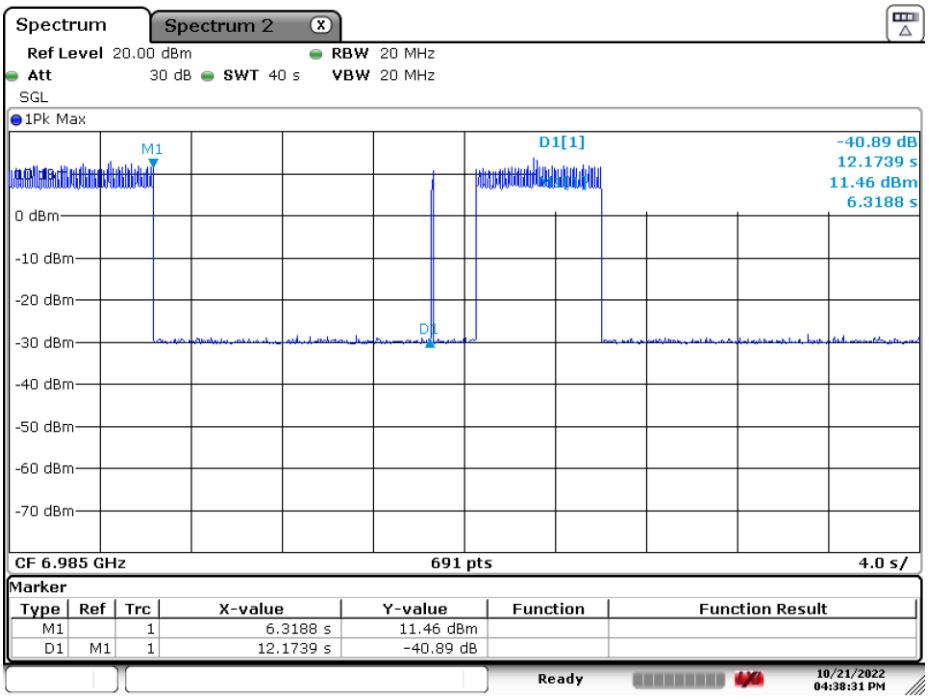


Date: 21.OCT.2022 16:33:21

Plot 7-661. Contention Based Protocol Timing Plot – UNII 8 – 160MHz Ch207 – Mid



Date: 21.OCT.2022 16:38:30

Plot 7-662. 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. 802.11ax (20/40/80/160MHz)), 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

Emissions found in a restricted band are subject to the limits of 15.209 as shown in the table below.

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

Table 7-57. 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 ≥ 2 x 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
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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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.

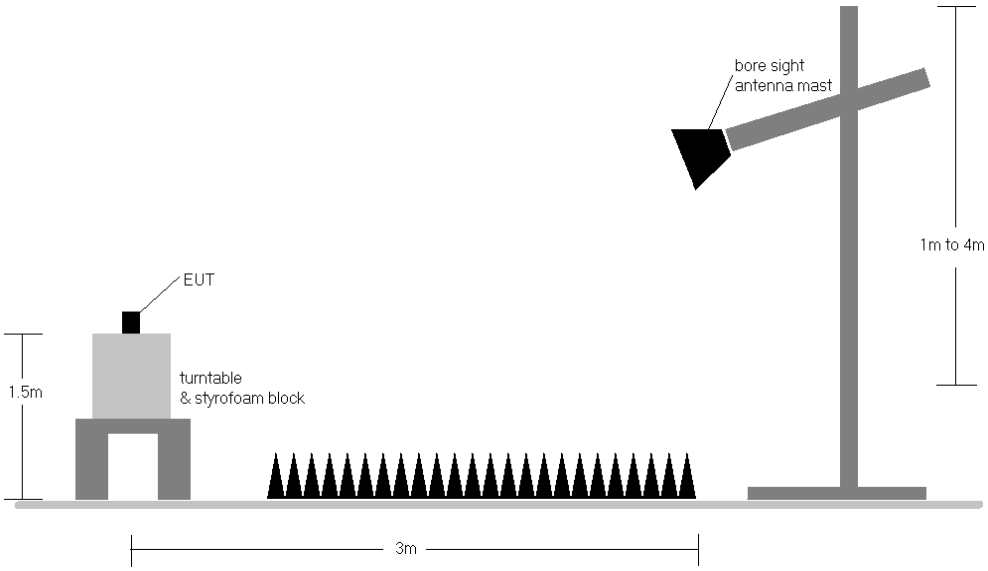

Figure 7-6. Test Instrument & Measurement Setup

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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 7-57.
2. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-34. 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.
3. 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

- Field Strength Level $_{[dB\mu V/m]}$ = 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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