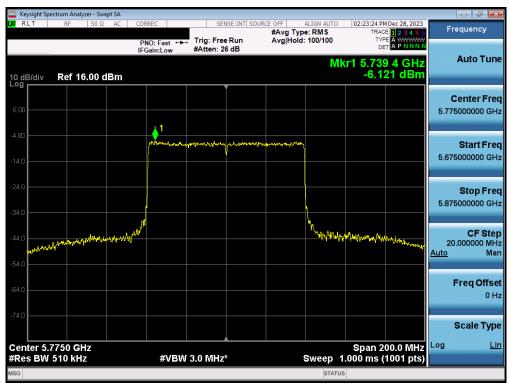




Plot 7-95. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 151)



Plot 7-96. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 3) - Ch. 155)

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Per ANSI C63.10-2013 Section 14.3.2.2 and KDB 662911 v02r01 Section E)2), the power spectral density at Antenna-1 and Antenna-2 were first measured separately with reduced Antenna-1 and Antenna-2 powers per manufacture's tune-up document. The measured values were then summed in linear power units then converted back to dBm.

Sample Directional Gain Calculation:

Assuming the antenna gain is -8.61 dBi for Antenna-1 and -7.68 dBi for Antenna-2.

Directional gain =
$$10 \log[(10^{G_1/20} + 10^{G_2/20} + ... + 10^{G_N/20})^2 / N_{ANT}] dBi$$

= $10 \log[(10^{-8.61/20} + 10^{-7.68/20} / 2] dBi$
= $(-5.12) dBi$

Sample MIMO Calculation:

Assuming the average conducted power spectral density was measured to be 5.88 dBm for Antenna-1 and 6.27 dBm for Antenna-2.

Sample e.i.r.p Power Spectral Density Calculation:

Assuming the average MIMO power density was calculated to be 9.09 dBm with directional gain of -5.12 dBi.

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7.6 Radiated Emission Measurements

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, 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 in the 5.15-5.25 GHz and 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of −27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

All out of band emissions appearing in a restricted band as specified in FCC §15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in the table below per FCC §15.209 and RSS-Gen (8.9).

Frequency	Field Strength [μV/m]	Measured Distance [Meters]		
0.009 - 0.490 MHz	2400\F (kHz)	300		
0.490 – 1.705 MHz	24000\F (kHz)	30		
1.705 – 30.00 MHz	30	30		
30.00 – 88.00 MHz	100	3		
88.00 – 216.0 MHz	150	3		
216.0 – 960.0 MHz	200	3		
Above 960.0 MHz	500	3		

Table 7-16. Radiated Limits

Test Procedures Used

ANSI C63.10-2013 – Sections 12.7.7.2, 12.7.6, 12.7.5 (Radiated Spurious Emissions) ANSI C63.10-2013 – Section 12.7.4.4 (Band Edge Measurements)

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Test Settings - Above 1GHz

<u>Average Field Strength Measurements (Method AD – Average Detection)</u>

- 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 $\geq 2 \times \text{span} \setminus \text{RBW}$)
- 6. Sweep time = auto
- 7. Trace (RMS) averaging was performed over at least 100 traces.

Peak Field Strength Measurements

- 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.

Test Settings - Below 1GHz

Quasi-Peak Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest.
- 2. RBW = 120kHz (for emissions from 30MHz 1GHz)
- 3. Detector = quasi-peak
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize.

Test Setup

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

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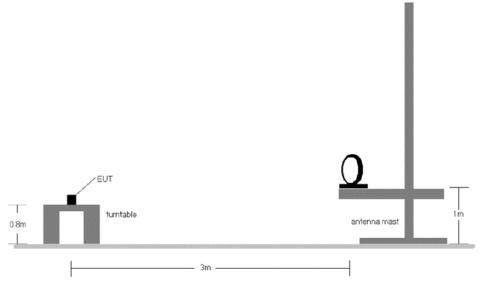


Figure 7-5. Radiated Test Setup < 30MHz

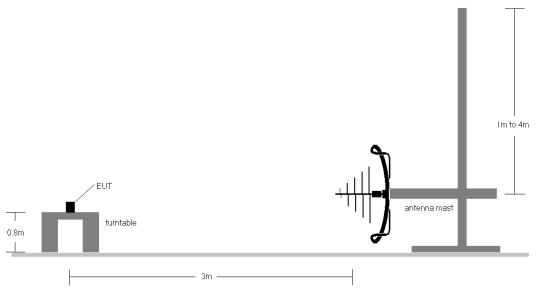


Figure 7-6. Radiated Test Setup < 1GHz

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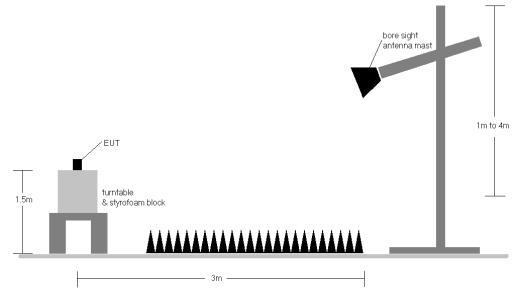


Figure 7-7. Radiated Test Setup > 1GHz

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Test Notes

- 1. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in §15.209. All spurious emissions that do not lie in a restricted band are subject to an average limit of -27dBm/MHz. At 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.
- 2. 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 [$68.2dB_{\mu}V/m$]. If a peak measurement passes the average limit, it was determined no further investigation is necessary.
- 3. The antenna is manipulated through typical positions, polarity, and length during the tests. The EUT is manipulated through three orthogonal planes.
- 4. This unit was tested with its standard battery.
- 5. 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.
- 6. 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.
- 7. 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.
- 8. The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 9. In the case where a peak-detector measurement passed the given RMS limit it was determined sufficient to demonstrate compliance.
- 10. The results recorded using the broadband antenna are known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
- 11. For radiated measurements, emissions were investigated for the fully-loaded RU configuration and for all of the partially-loaded RU configurations. Among all of the available partially-loaded RU configurations, only the configuration with the worst case emissions is reported.

Sample Calculations

Determining Spurious Emissions Levels

- 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 [dBμV/m] Limit [dBμV/m]

Radiated Band Edge Measurement Offset

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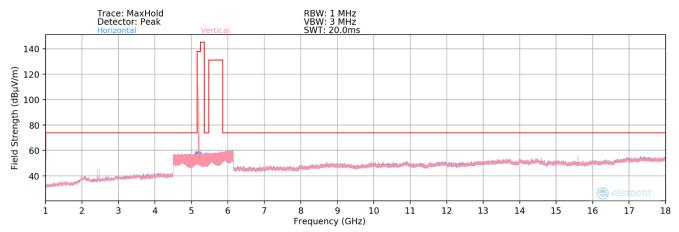
The amplitude offset shown in the radiated restricted band edge plots in Section Radiated Spurious
 Emission Measurements – Above 1GHz was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

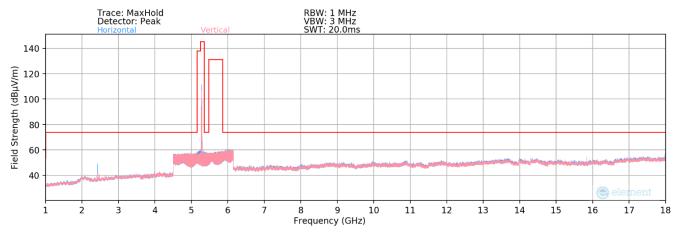
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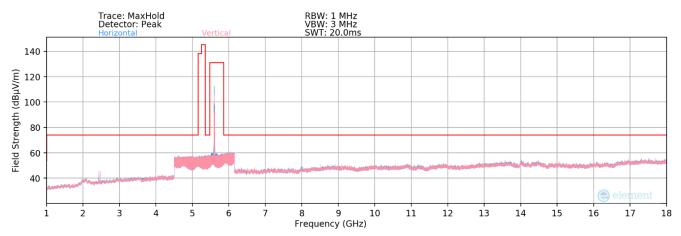
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Plot 7-97. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 1 Ch. 40)



Plot 7-98. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 2A Ch. 56)



Plot 7-99. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 2C Ch. 120)

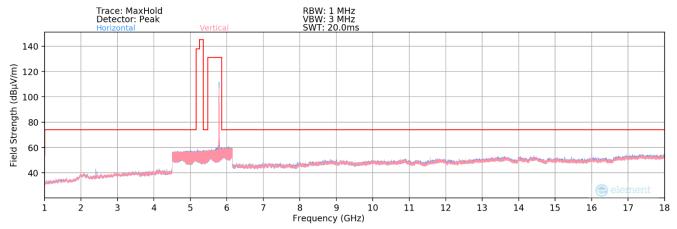
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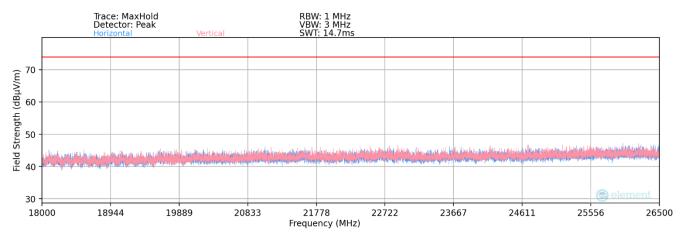
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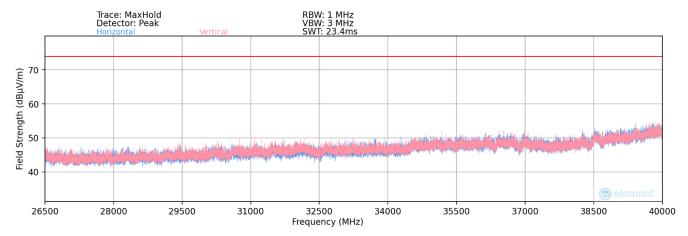




Plot 7-100. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 3 Ch. 157)



Plot 7-101. Radiated Spurious Plot 18GHz - 26.5GHz (802.11ax)



Plot 7-102. Radiated Spurious Plot 26.5GHz - 40GHz (802.11ax)

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MIMO Radiated Spurious Emission Measurements (26 Tones) - UNII 1

Worst Case Mode: 802.11ax (20MHz BW)
Worst Case Transfer Rate: MCS0

RU Index: 4
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5180MHz
Channel: 36

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10360.00	Peak	V	209	31	-65.72	12.12	0.00	53.40	68.20	-14.80
*	15540.00	Average	V	111	333	-72.67	14.11	0.00	48.44	53.98	-5.54
*	15540.00	Peak	V	111	333	-54.40	14.11	0.00	66.71	73.98	-7.27
*	20720.00	Average	V	-	-	-67.29	3.27	-9.54	33.44	53.98	-20.54
*	20720.00	Peak	V	-	-	-57.51	3.27	-9.54	43.22	73.98	-30.76
	25900.00	Peak	V	_	-	-56 95	4.35	-9 54	44 85	68.20	-23 35

Table 7-17. Radiated Measurements MIMO (26 Tones)

Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax (20MHz BW)

MCS0

4

1 & 3 Meters

5200MHz

40

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10400.00	Peak	V	211	28	-66.55	12.37	0.00	52.82	68.20	-15.38
*	15600.00	Average	V	111	336	-75.31	14.22	0.00	45.91	53.98	-8.07
*	15600.00	Peak	V	111	336	-55.72	14.22	0.00	65.50	73.98	-8.48
*	20800.00	Average	V	-	-	-66.52	3.40	-9.54	34.34	53.98	-19.64
*	20800.00	Peak	V	-	-	-56.04	3.40	-9.54	44.82	73.98	-29.16
	26000.00	Peak	V	-	1	-57.12	4.39	-9.54	44.72	68.20	-23.48

Table 7-18. Radiated Measurements MIMO (26 Tones)

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Worst Case Transfer Rate:

MCS0

RU Index:

4

Distance of Measurements:

1 & 3 Meters

Operating Frequency:

5240MHz

Channel:

48

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10480.00	Peak	V	211	22	-67.43	13.08	0.00	52.65	68.20	-15.55
*	15720.00	Average	V	109	332	-75.38	14.65	0.00	46.27	53.98	-7.71
*	15720.00	Peak	V	109	332	-56.24	14.65	0.00	65.41	73.98	-8.57
*	20960.00	Average	V	-	-	-67.78	3.41	-9.54	33.09	53.98	-20.89
*	20960.00	Peak	V	-	-	-57.69	3.41	-9.54	43.19	73.98	-30.79
Į	26200.00	Peak	V	-	-	-56.61	4.35	-9.54	45.20	68.20	-23.00

Table 7-19. Radiated Measurements MIMO (26 Tones)

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MIMO Radiated Spurious Emission Measurements (26 Tones) - UNII 2A

802.11ax (20MHz BW) Worst Case Mode: Worst Case Transfer Rate: MCS0 RU Index: 4 Distance of Measurements: 1 & 3 Meters Operating Frequency: 5260MHz

Channel: 52

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10520.00	Peak	V	146	38	-65.73	12.95	0.00	54.22	68.20	-13.98
*	15780.00	Average	V	164	4	-79.55	14.23	0.00	41.68	53.98	-12.30
*	15780.00	Peak	V	164	4	-62.46	14.23	0.00	58.77	73.98	-15.21
*	21040.00	Average	V	-	-	-67.22	3.53	-9.54	33.77	53.98	-20.21
*	21040.00	Peak	V	-	-	-57.89	3.53	-9.54	43.10	73.98	-30.88
	26300.00	Peak	V	-	-	-57.02	4.27	-9.54	44.70	68.20	-23.50

Table 7-20. Radiated Measurements MIMO (26 Tones)

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 4

Distance of Measurements: 1 & 3 Meters Operating Frequency: 5280MHz

Channel: 56

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10560.00	Peak	V	146	43	-67.14	12.97	0.00	52.83	68.20	-15.37
*	15840.00	Average	V	169	0	-79.13	14.09	0.00	41.96	53.98	-12.02
*	15840.00	Peak	V	169	0	-60.96	14.09	0.00	60.13	73.98	-13.85
*	21120.00	Average	V	-	-	-67.36	3.66	-9.54	33.75	53.98	-20.23
*	21120.00	Peak	V	-	-	-56.59	3.66	-9.54	44.52	73.98	-29.46
	26400.00	Peak	V	-	-	-57.78	4.21	-9.54	43.89	68.20	-24.31

Table 7-21. Radiated Measurements MIMO (26 Tones)

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Worst Case Transfer Rate: MCS0

RU Index: 4

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5320MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	10640.00	Average	V	151	41	-77.65	12.51	0.00	41.86	53.98	-12.12
*	10640.00	Peak	V	151	41	-66.61	12.51	0.00	52.90	73.98	-21.08
*	15960.00	Average	V	156	1	-80.99	15.27	0.00	41.28	53.98	-12.70
*	15960.00	Peak	V	156	1	-64.79	15.27	0.00	57.48	73.98	-16.50
*	21280.00	Average	V	-	-	-67.62	3.75	-9.54	33.59	53.98	-20.39
*	21280.00	Peak	V	-	-	-57.68	3.75	-9.54	43.53	73.98	-30.45
	26600.00	Peak	V	-	-	-57.76	4.20	-9.54	43.90	68.20	-24.30

Table 7-22. Radiated Measurements MIMO (26 Tones)

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MIMO Radiated Spurious Emission Measurements (26 Tones) - UNII 2C

Worst Case Mode: 802.11ax (20MHz BW) Worst Case Transfer Rate: MCS0 RU Index: 4 Distance of Measurements: 1 & 3 Meters Operating Frequency: 5500MHz Channel: 100

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11000.00	Average	V	222	5	-76.55	12.66	0.00	43.11	53.98	-10.87
*	11000.00	Peak	V	222	5	-66.91	12.66	0.00	52.75	73.98	-21.23
	16500.00	Peak	V	125	323	-65.15	15.81	0.00	57.66	68.20	-10.54
	22000.00	Peak	٧	-	-	-57.42	3.75	-9.54	43.79	68.20	-24.41
	27500.00	Peak	>	-	-	-57.24	4.29	-9.54	44.50	68.20	-23.70

Table 7-23. Radiated Measurements MIMO (26 Tones)

Worst Case Mode: 802.11ax (20MHz BW) Worst Case Transfer Rate: MCS0 RU Index: Distance of Measurements: 1 & 3 Meters **Operating Frequency:** 5600MHz Channel: 120

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11200.00	Average	V	207	7	-77.15	12.54	0.00	42.39	53.98	-11.59
*	11200.00	Peak	V	207	7	-67.98	12.54	0.00	51.56	73.98	-22.42
	16800.00	Peak	V	124	322	-65.34	16.25	0.00	57.91	68.20	-10.29
*	22400.00	Average	V	-	-	-66.73	3.72	-9.54	34.45	53.98	-19.53
*	22400.00	Peak	V		-	-56.38	3.72	-9.54	44.79	73.98	-29.19
	28000.00	Peak	V	-	-	-57.51	4.51	-9.54	44.46	68.20	-23.74

Table 7-24. Radiated Measurements MIMO (26 Tones)

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Worst Case Transfer Rate: MCS0

RU Index:

4

Distance of Measurements:

1 & 3 Meters

Operating Frequency:

5720MHz

Channel:

144

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11440.00	Average	V	209	352	-78.53	13.54	0.00	42.01	53.98	-11.97
*	11440.00	Peak	V	209	352	-68.85	13.54	0.00	51.69	73.98	-22.29
	17160.00	Peak	V	112	321	-64.24	16.79	0.00	59.55	68.20	-8.65
*	22880.00	Average	V	-	-	-67.03	3.87	-9.54	34.30	53.98	-19.68
*	22880.00	Peak	V	-	-	-57.38	3.87	-9.54	43.95	73.98	-30.03
	28600.00	Peak	V	-	1	-57.27	5.03	-9.54	45.22	68.20	-22.98

Table 7-25. Radiated Measurements MIMO (26 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager
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MIMO Radiated Spurious Emission Measurements (26 Tones) - UNII 3

Worst Case Mode: 802.11ax (20MHz BW) Worst Case Transfer Rate: MCS0 RU Index: 4 Distance of Measurements: 1 & 3 Meters Operating Frequency: 5745MHz Channel: 149

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11490.00	Average	V	199	345	-76.90	13.10	0.00	43.20	53.98	-10.78
*	11490.00	Peak	V	199	345	-68.04	13.10	0.00	52.06	73.98	-21.92
	17235.00	Peak	V	304	20	-64.03	16.91	0.00	59.88	68.20	-8.32
*	22980.00	Average	V	-	-	-66.91	3.75	-9.54	34.30	53.98	-19.68
*	22980.00	Peak	V	-	-	-55.99	3.75	-9.54	45.22	73.98	-28.76
	28725.00	Peak	V	-	-	-56.15	5.10	-9.54	46.41	68.20	-21.79

Table 7-26. Radiated Measurements MIMO (26 Tones)

Worst Case Mode: 802.11ax (20MHz BW) Worst Case Transfer Rate: MCS0 RU Index: 4 Distance of Measurements: 1 & 3 Meters Operating Frequency: 5785MHz Channel: 157

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11570.00	Average	٧	195	340	-75.24	12.96	0.00	44.72	53.98	-9.26
*	11570.00	Peak	V	195	340	-66.44	12.96	0.00	53.52	73.98	-20.46
	17355.00	Peak	V	297	23	-66.34	17.83	0.00	58.49	68.20	-9.71
	23140.00	Peak	V	-	-	-56.58	3.70	-9.54	44.58	68.20	-23.62
	28925.00	Peak	V	-	-	-57.13	5.00	-9.54	45.33	68.20	-22.87

Table 7-27. Radiated Measurements MIMO (26 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT			
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Worst Case Transfer Rate: MCS0

RU Index:

4

Distance of Measurements:

1 & 3 Meters

Operating Frequency: Channel:

5825MHz 165

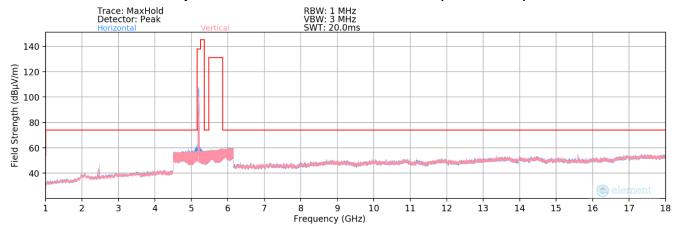
	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11650.00	Average	V	198	345	-76.65	13.39	0.00	43.74	53.98	-10.24
*	11650.00	Peak	V	198	345	-68.00	13.39	0.00	52.39	73.98	-21.59
	17475.00	Peak	V	301	22	-65.50	17.09	0.00	58.59	68.20	-9.61
	23300.00	Peak	٧	-	-	-56.40	3.73	-9.54	44.79	68.20	-23.41
	29125.00	Peak	V	-	-	-56.40	5.04	-9.54	46.10	68.20	-22.10

Table 7-28. Radiated Measurements MIMO (26 Tones)

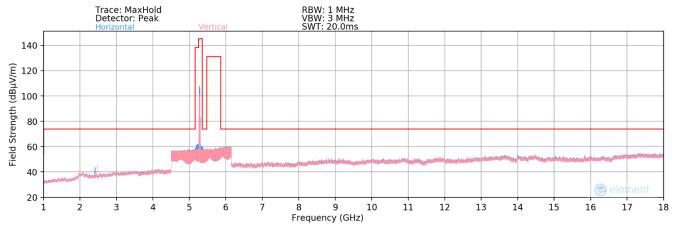
FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager
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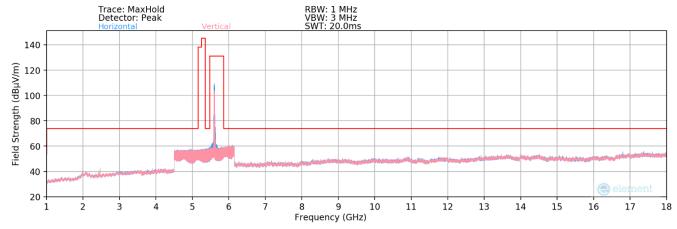
7.6.2 MIMO Radiated Spurious Emission Measurements (242 Tones)



Plot 7-103. Radiated Spurious Plot above 1GHz MIMO (802.11ax – UNII 1 Ch. 40)



Plot 7-104. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 2A Ch. 56)



Plot 7-105. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 2C Ch. 120)

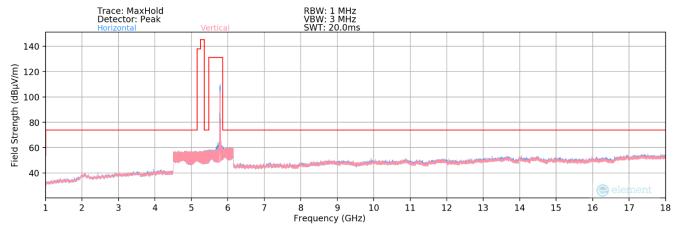
FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 92 of 110
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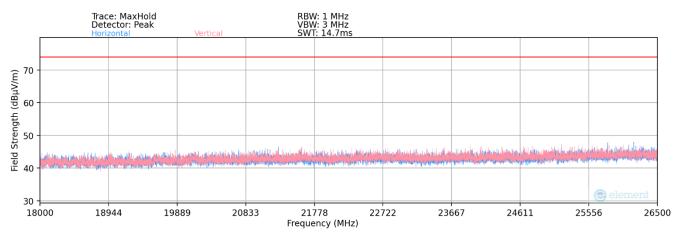
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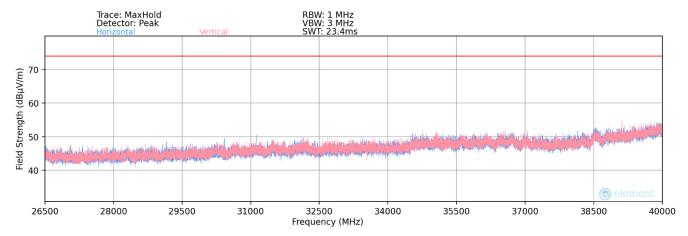




Plot 7-106. Radiated Spurious Plot above 1GHz MIMO (802.11ax - UNII 3 Ch. 157)



Plot 7-107. Radiated Spurious Plot 18GHz - 26.5GHz (802.11ax)



Plot 7-108. Radiated Spurious Plot 26.5GHz - 40GHz (802.11ax)

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MIMO Radiated Spurious Emission Measurements (242 Tones) - UNII 1

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5180MHz

Channel: 36

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10360.00	Peak	V	207	26	-68.01	12.12	0.00	51.11	68.20	-17.09
*	15540.00	Average	V	116	35	-76.75	14.11	0.00	44.36	53.98	-9.62
*	15540.00	Peak	V	116	35	-62.58	14.11	0.00	58.53	73.98	-15.45
*	20720.00	Average	V	-	-	-66.92	3.27	-9.54	33.81	53.98	-20.17
*	20720.00	Peak	V	-	-	-57.14	3.27	-9.54	43.59	73.98	-30.39
	25900.00	Peak	V	-	-	-56.89	4.35	-9.54	44.92	68.20	-23.28

Table 7-29. Radiated Measurements MIMO (242 Tones)

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5200MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10400.00	Peak	V	227	38	-67.79	12.37	0.00	51.58	68.20	-16.62
*	15600.00	Average	V	110	37	-77.22	14.22	0.00	44.00	53.98	-9.98
*	15600.00	Peak	V	110	37	-61.99	14.22	0.00	59.23	73.98	-14.75
*	20800.00	Average	V	-	-	-66.81	3.40	-9.54	34.05	53.98	-19.93
*	20800.00	Peak	V	-	-	-56.99	3.40	-9.54	43.87	73.98	-30.11
	26000.00	Peak	V	-	-	-57.00	4.39	-9.54	44.84	68.20	-23.36

Table 7-30. Radiated Measurements MIMO (242 Tones)

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Worst Case Transfer Rate: MCS0

RU Index:

61

Distance of Measurements:

1 & 3 Meters

Operating Frequency: Channel:

5240MHz 48

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10480.00	Peak	V	212	31	-68.84	13.08	0.00	51.24	68.20	-16.96
*	15720.00	Average	V	113	36	-76.08	14.65	0.00	45.57	53.98	-8.41
*	15720.00	Peak	V	113	36	-60.32	14.65	0.00	61.33	73.98	-12.65
*	20960.00	Average	V	-	-	-67.22	3.41	-9.54	33.65	53.98	-20.33
*	20960.00	Peak	V	-	-	-57.51	3.41	-9.54	43.36	73.98	-30.62
	26200.00	Peak	V	-	-	-56.81	4.35	-9.54	45.00	68.20	-23.20

Table 7-31. Radiated Measurements MIMO (242 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT			
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MIMO Radiated Spurious Emission Measurements (242 Tones) - UNII 2A

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5260MHz

Channel: 52

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10520.00	Peak	V	116	43	-67.02	12.95	0.00	52.93	68.20	-15.27
*	15780.00	Average	V	110	34	-77.96	14.23	0.00	43.27	53.98	-10.71
*	15780.00	Peak	V	110	34	-63.13	14.23	0.00	58.10	73.98	-15.88
*	21040.00	Average	V	-	-	-67.35	3.53	-9.54	33.64	53.98	-20.34
*	21040.00	Peak	V	-	-	-57.55	3.53	-9.54	43.44	73.98	-30.54
	26300.00	Peak	V	-	-	-56.81	4.27	-9.54	44.91	68.20	-23.29

Table 7-32. Radiated Measurements MIMO (242 Tones)

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements:

1 & 3 Meters Operating Frequency: 5280MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10560.00	Peak	V	120	39	-68.57	12.97	0.00	51.40	68.20	-16.80
*	15840.00	Average	V	112	35	-77.78	14.09	0.00	43.31	53.98	-10.67
*	15840.00	Peak	V	112	35	-63.69	14.09	0.00	57.40	73.98	-16.58
*	21120.00	Average	V	-	-	-67.13	3.66	-9.54	33.99	53.98	-19.99
*	21120.00	Peak	V	-	-	-56.99	3.66	-9.54	44.13	73.98	-29.85
ĺ	26400.00	Peak	V	-	-	-57.33	4.21	-9.54	44.33	68.20	-23.87

Table 7-33. Radiated Measurements MIMO (242 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager
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Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5320MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	10640.00	Average	V	127	47	-78.26	12.51	0.00	41.25	53.98	-12.73
*	10640.00	Peak	V	127	47	-67.78	12.51	0.00	51.73	73.98	-22.25
*	15960.00	Average	V	125	37	-79.86	15.27	0.00	42.41	53.98	-11.57
*	15960.00	Peak	V	125	37	-65.50	15.27	0.00	56.77	73.98	-17.21
*	21280.00	Average	V	-	-	-67.55	3.75	-9.54	33.66	53.98	-20.32
*	21280.00	Peak	V	-	-	-57.46	3.75	-9.54	43.75	73.98	-30.23
	26600.00	Peak	V	-	-	-57.77	4.20	-9.54	43.89	68.20	-24.31

Table 7-34. Radiated Measurements MIMO (242 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager	
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MIMO Radiated Spurious Emission Measurements (242 Tones) - UNII 2C

Worst Case Mode: 802.11ax (20MHz BW) Worst Case Transfer Rate: MCS0 RU Index: 61

Distance of Measurements: 1 & 3 Meters Operating Frequency: 5500MHz

Channel: 100

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11000.00	Average	V	208	1	-77.10	12.66	0.00	42.56	53.98	-11.42
*	11000.00	Peak	V	208	1	-66.57	12.66	0.00	53.09	73.98	-20.89
	16500.00	Peak	V	152	322	-67.22	15.81	0.00	55.59	68.20	-12.61
	22000.00	Peak	V	-	-	-57.12	3.75	-9.54	44.09	68.20	-24.11
	27500.00	Peak	V	-	-	-56.84	4.29	-9.54	44.90	68.20	-23.30

Table 7-35. Radiated Measurements MIMO (26 Tones)

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5600MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11200.00	Average	V	193	8	-77.14	12.54	0.00	42.40	53.98	-11.58
*	11200.00	Peak	V	193	8	-67.61	12.54	0.00	51.93	73.98	-22.05
	16800.00	Peak	V	137	323	-67.15	16.25	0.00	56.10	68.20	-12.10
*	22400.00	Average	V	-	-	-66.82	3.72	-9.54	34.35	53.98	-19.63
*	22400.00	Peak	V	-	-	-57.23	3.72	-9.54	43.94	73.98	-30.04
	28000.00	Peak	V	-	-	-56.88	4.51	-9.54	45.09	68.20	-23.11

Table 7-36. Radiated Measurements MIMO (26 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager	
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Worst Case Transfer Rate: MCS0

61

RU Index:

1 & 3 Meters

Distance of Measurements: Operating Frequency:

5720MHz

Channel:

144

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11440.00	Average	V	202	352	-78.56	13.54	0.00	41.98	53.98	-12.00
*	11440.00	Peak	V	202	352	-69.23	13.54	0.00	51.31	73.98	-22.67
	17160.00	Peak	V	137	323	-67.40	16.79	0.00	56.39	68.20	-11.81
*	22880.00	Average	V	-	-	-67.13	3.87	-9.54	34.20	53.98	-19.78
*	22880.00	Peak	V	-	-	-57.12	3.87	-9.54	44.21	73.98	-29.77
	28600.00	Peak	V	-	-	-56.55	5.03	-9.54	45.94	68.20	-22.26

Table 7-37. Radiated Measurements MIMO (26 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT	Approved by: Technical Manager	
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MIMO Radiated Spurious Emission Measurements (242 Tones) - UNII 3

Worst Case Mode: 802.11ax (20MHz BW) Worst Case Transfer Rate: MCS0 RU Index: 61

Distance of Measurements: 1 & 3 Meters Operating Frequency: 5745MHz

Channel: 149

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11490.00	Average	V	194	344	-76.89	13.10	0.00	43.21	53.98	-10.77
*	11490.00	Peak	V	194	344	-68.11	13.10	0.00	51.99	73.98	-21.99
	17235.00	Peak	V	230	26	-65.92	16.91	0.00	57.99	68.20	-10.21
*	22980.00	Average	V	-	-	-66.81	3.75	-9.54	34.40	53.98	-19.58
*	22980.00	Peak	V	-	-	-56.23	3.75	-9.54	44.98	73.98	-29.00
	28725.00	Peak	V	-	-	-56.44	5.10	-9.54	46.12	68.20	-22.08

Table 7-38. Radiated Measurements MIMO (242 Tones)

Worst Case Mode: 802.11ax (20MHz BW)

Worst Case Transfer Rate: MCS0

RU Index: 61

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5785MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11570.00	Average	V	197	345	-75.72	12.96	0.00	44.24	53.98	-9.74
*	11570.00	Peak	V	197	345	-67.34	12.96	0.00	52.62	73.98	-21.36
	17355.00	Peak	V	222	27	-67.17	17.83	0.00	57.66	68.20	-10.54
	23140.00	Peak	٧	-	-	-56.91	3.70	-9.54	44.24	68.20	-23.96
	28925.00	Peak	V	-	-	-57.03	5.00	-9.54	45.43	68.20	-22.77

Table 7-39. Radiated Measurements MIMO (242 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		
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Worst Case Transfer Rate: MCS0

61

Distance of Measurements:

1 & 3 Meters

Operating Frequency:

5825MHz

Channel:

RU Index:

165

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11650.00	Average	V	200	339	-76.06	13.39	0.00	44.33	53.98	-9.65
*	11650.00	Peak	V	200	339	-68.38	13.39	0.00	52.01	73.98	-21.97
	17475.00	Peak	٧	224	21	-66.46	17.09	0.00	57.63	68.20	-10.57
	23300.00	Peak	٧	-	-	-56.49	3.73	-9.54	44.70	68.20	-23.50
	29125.00	Peak	V	-	-	-56.11	5.04	-9.54	46.39	68.20	-21.81

Table 7-40. Radiated Measurements MIMO (242 Tones)

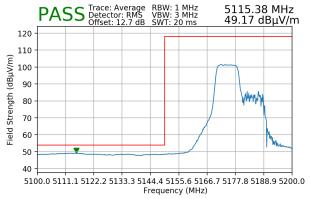
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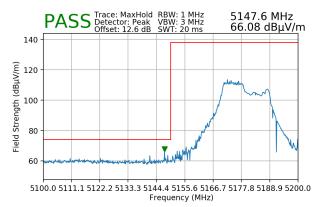
7.6.3 MIMO Radiated Band Edge Measurements (20MHz BW – Partial Tone – 106T)

Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
53
3 Meters
5180MHz
36



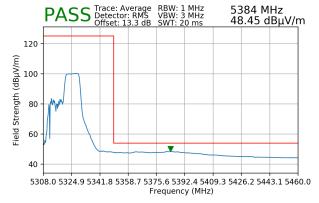
Plot 7-109. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 1 – 106 Tones)



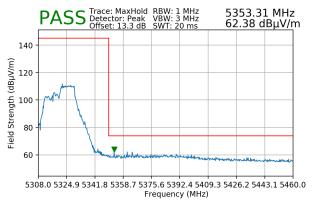
Plot 7-110. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 1 – 106 Tones)

Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
54
3 Meters
5320MHz
64



Plot 7-111. Radiated Upper Band Edge Plot MIMO (Average – UNII Band 2A – 106 Tones)



Plot 7-112. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 2A – 106 Tones)

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Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax

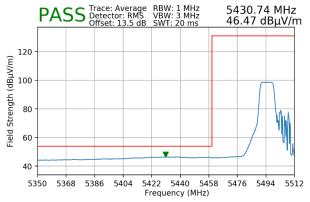
MCS0

53

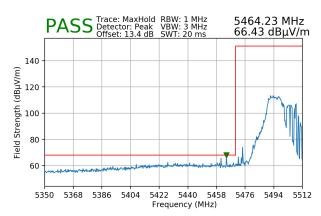
3 Meters

5500MHz

100



Plot 7-113. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 2C – 106 Tones)



Plot 7-114. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 2C – 106 Tones)

Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax

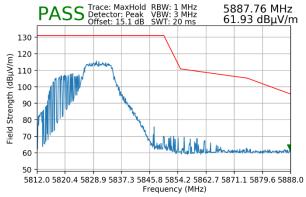
MCS0

54

3 Meters

5825MHz

165



Plot 7-115. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 3 – 106 Tones)

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7.6.4 MIMO Radiated Band Edge Measurements (20MHz BW - Full Tone - 242T)

 Worst Case Mode:
 802.11ax

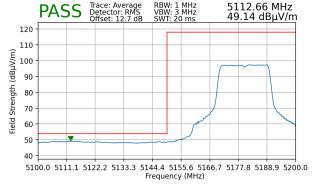
 Worst Case Transfer Rate:
 MCS0

 RU Index:
 61

 Distance of Measurements:
 3 Meters

 Operating Frequency:
 5180MHz

 Channel:
 36



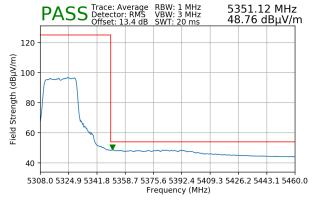
Plot 7-116. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 1 – 242 Tones)



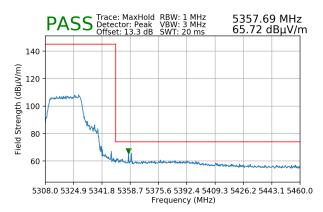
Plot 7-117. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 1 – 242 Tones)

Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
61
3 Meters
5320MHz
64



Plot 7-118. Radiated Upper Band Edge Plot MIMO (Average – UNII Band 2A – 242 Tones)



Plot 7-119. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 2A – 242 Tones)

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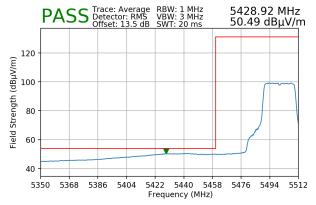


Channel:

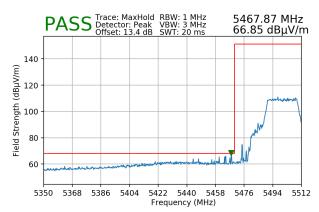
Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:

802.11ax
MCS0
61
3 Meters
5500MHz

100



Plot 7-120. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 2C – 242 Tones)



Plot 7-121. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 2C – 242 Tones)

Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax

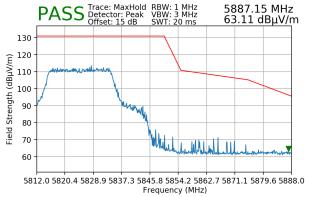
MCS0

61

3 Meters

5825MHz

165



Plot 7-122. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 3 – 242 Tones)

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7.6.5 MIMO Radiated Band Edge Measurements (40MHz BW - Full Tone - 484T)

Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax

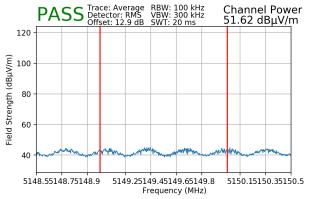
MCS0

65

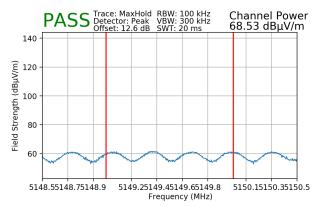
3 Meters

5190MHz

38



Plot 7-123. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 1 – 484 Tones)



Plot 7-124. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 1 – 484 Tones)

Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax

MCS0

65

3 Meters

5310MHz

62



Plot 7-125. Radiated Upper Band Edge Plot MIMO (Average – UNII Band 2A – 484 Tones)



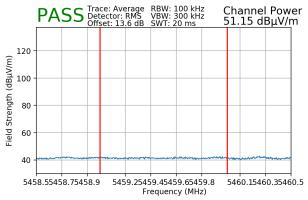
Plot 7-126. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 2A – 484 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		
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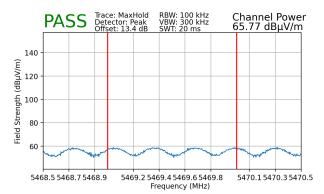


Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
65
3 Meters
5510MHz
102



Plot 7-127. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 2C – 484 Tones)



Plot 7-128. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 2C – 484 Tones)

Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
65
3 Meters
5795MHz
159



Plot 7-129. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 3 – 484 Tones)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		
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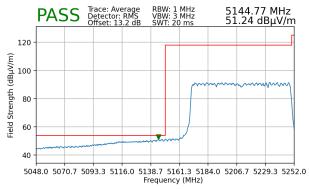
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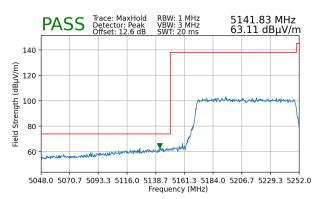
7.6.6 MIMO Radiated Band Edge Measurements (80MHz BW - Full Tone - 996T)

Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
67
3 Meters
5210MHz
42



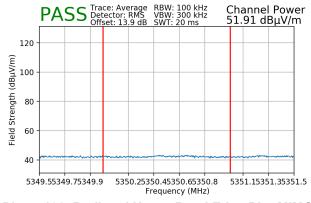
Plot 7-130. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 1 – 996 Tones)



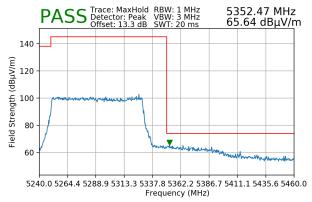
Plot 7-131. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 1 – 996 Tones)

Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:
Channel:

802.11ax
MCS0
67
3 Meters
5290MHz
58



Plot 7-132. Radiated Upper Band Edge Plot MIMO (Average – UNII Band 2A – 996 Tones)



Plot 7-133. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 2A – 996 Tones)

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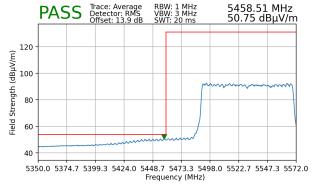


Channel:

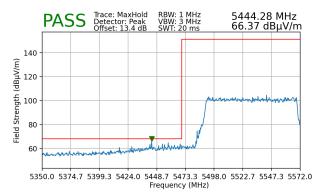
Worst Case Mode:
Worst Case Transfer Rate:
RU Index:
Distance of Measurements:
Operating Frequency:

802.11ax
MCS0
67
3 Meters
5530MHz

106



Plot 7-134. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 2C – 996 Tones)



Plot 7-135. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 2C – 996 Tones)

Worst Case Mode:

Worst Case Transfer Rate:

RU Index:

Distance of Measurements:

Operating Frequency:

Channel:

802.11ax

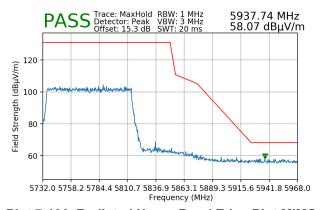
MCS0

67

3 Meters

5775MHz

155



Plot 7-136. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 3 – 996 Tones)

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8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC: A3LSMA356U** is in compliance with FCC Part Subpart E (15.407) of the FCC rules.

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