7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

7.5.2. Test Procedure Used

KDB 558074 D01 v05r02 - Section 8.5 & Section 8.6

ANSI C63.10 – Section 11.11&11.12

7.5.3. Test Settitng

(a) Set the center frequency and span to encompass frequency range to be measured

(b) RBW = 100kHz

(c) VBW = 300kHz

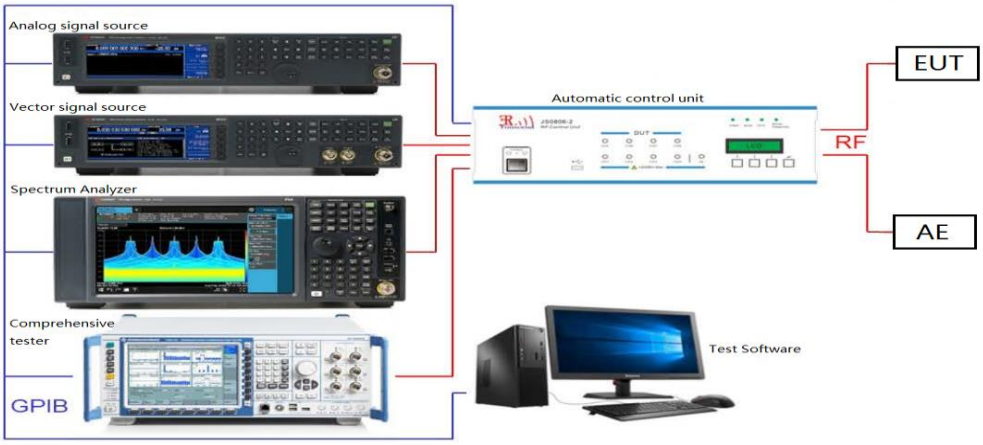
(d) Detector = Peak

(e) Trace mode = max hold

(f) Sweep time = auto couple

(g) The trace was allowed to stabilize

7.5.4. Test Setup

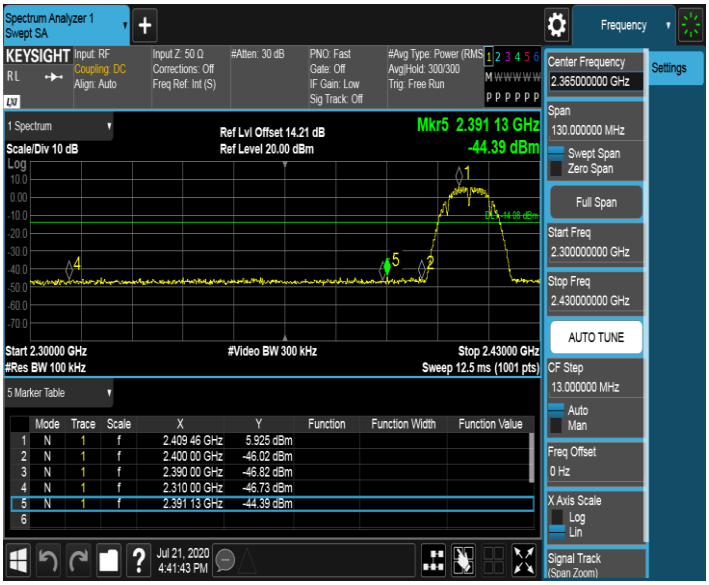


7.5.5. Test Result

Test Mode	Antenna	Channel	Freq Range [Mhz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	9.38	9.38	---	PASS
			30~1000	30~1000	-51.007	<=-10.624	PASS
			1000~26500	1000~26500	-45.806	<=-10.624	PASS
		2437	Reference	9.58	9.58	---	PASS
			30~1000	30~1000	-50.781	<=-10.422	PASS
			1000~26500	1000~26500	-47.556	<=-10.422	PASS
		2462	Reference	10.00	10.00	---	PASS
			30~1000	30~1000	-50.851	<=-10.004	PASS
			1000~26500	1000~26500	-48.018	<=-10.004	PASS
11G	Ant1	2412	Reference	3.86	3.86	---	PASS
			30~1000	30~1000	-54.216	<=-16.145	PASS
			1000~26500	1000~26500	-31.331	<=-16.145	PASS
		2437	Reference	3.94	3.94	---	PASS
			30~1000	30~1000	-53.645	<=-16.065	PASS
			1000~26500	1000~26500	-47.756	<=-16.065	PASS
		2462	Reference	3.56	3.56	---	PASS
			30~1000	30~1000	-53.715	<=-16.443	PASS
			1000~26500	1000~26500	-41.862	<=-16.443	PASS
11N20SISO	Ant1	2412	Reference	3.40	3.40	---	PASS
			30~1000	30~1000	-53.378	<=-16.6	PASS
			1000~26500	1000~26500	-32.103	<=-16.6	PASS
		2437	Reference	3.30	3.30	---	PASS
			30~1000	30~1000	-53.163	<=-16.705	PASS
			1000~26500	1000~26500	-47.735	<=-16.705	PASS
		2462	Reference	3.45	3.45	---	PASS
			30~1000	30~1000	-54.366	<=-16.552	PASS
			1000~26500	1000~26500	-41.861	<=-16.552	PASS
11N40SISO	Ant1	2422	Reference	0.61	0.61	---	PASS
			30~1000	30~1000	-49.962	<=-19.386	PASS
			1000~26500	1000~26500	-24.893	<=-19.386	PASS
		2437	Reference	0.26	0.26	---	PASS
			30~1000	30~1000	-48.499	<=-19.737	PASS
			1000~26500	1000~26500	-41.733	<=-19.737	PASS

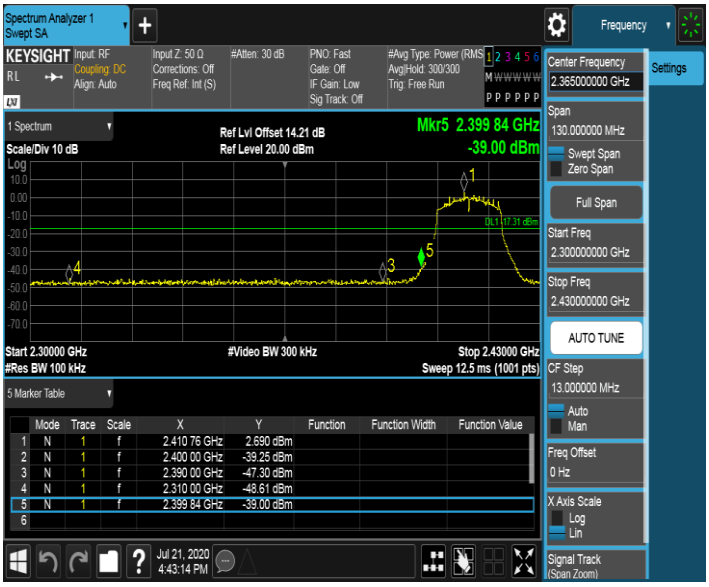
		2452	Reference	0.48	0.48	---	PASS
			30~1000	30~1000	-48.12	<=-19.522	PASS
			1000~26500	1000~26500	-33.959	<=-19.522	PASS

11B_Ant1_Low_2412



11B_Ant1_High_2462

11G_Ant1_Low_2412



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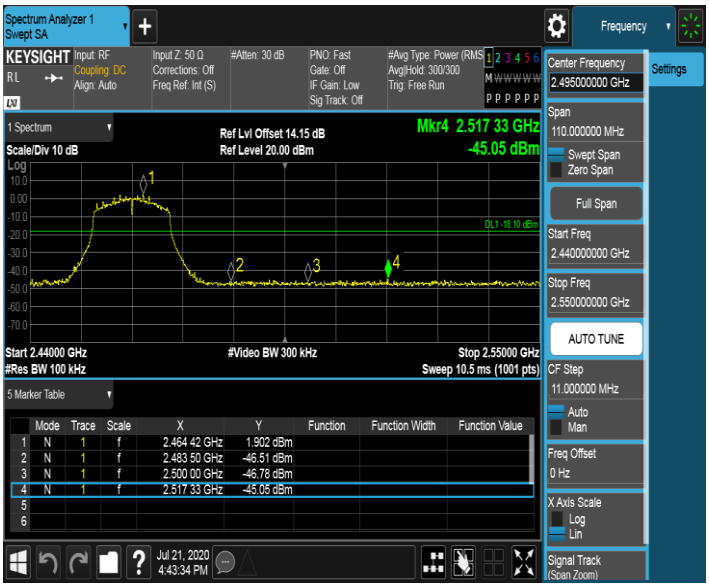

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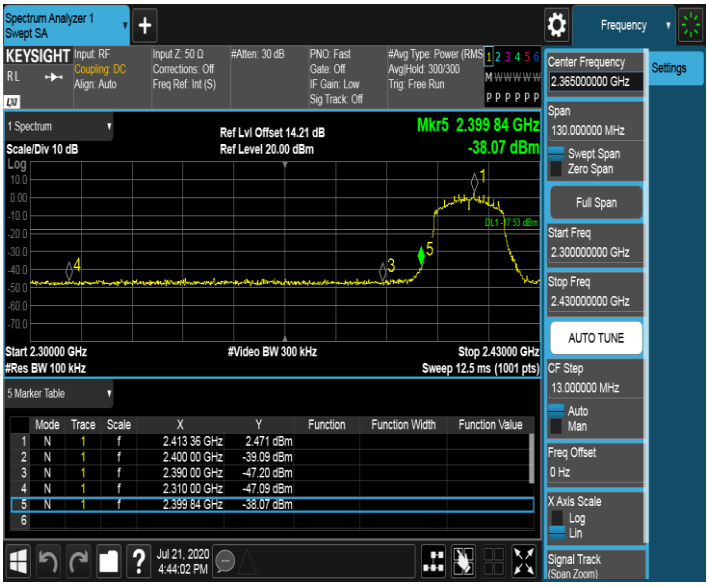

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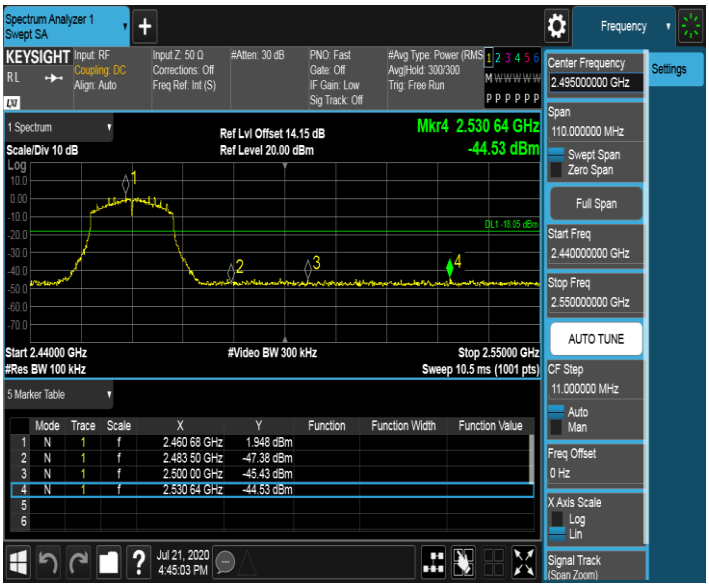

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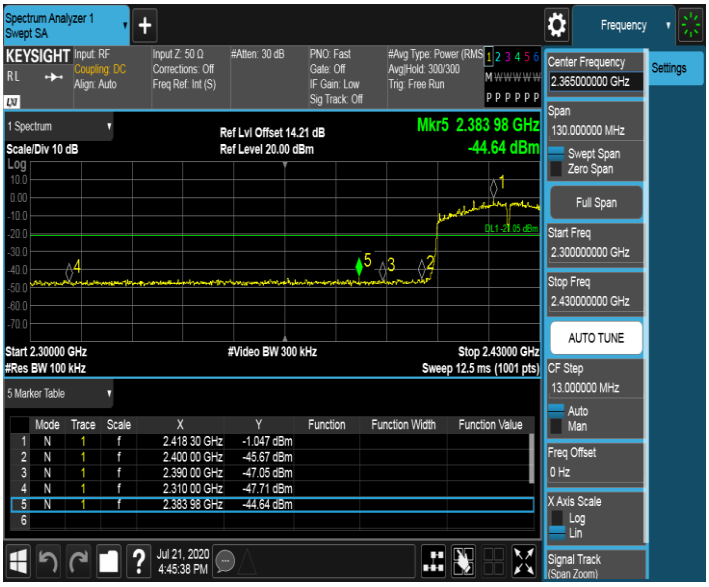

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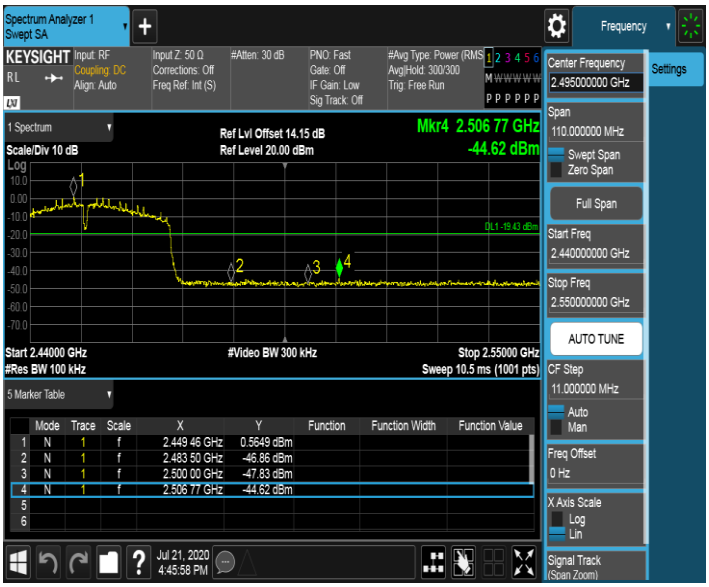
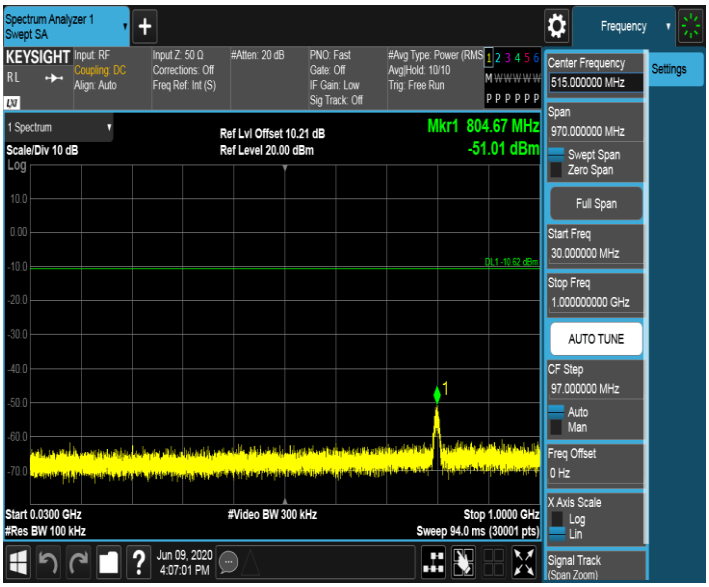
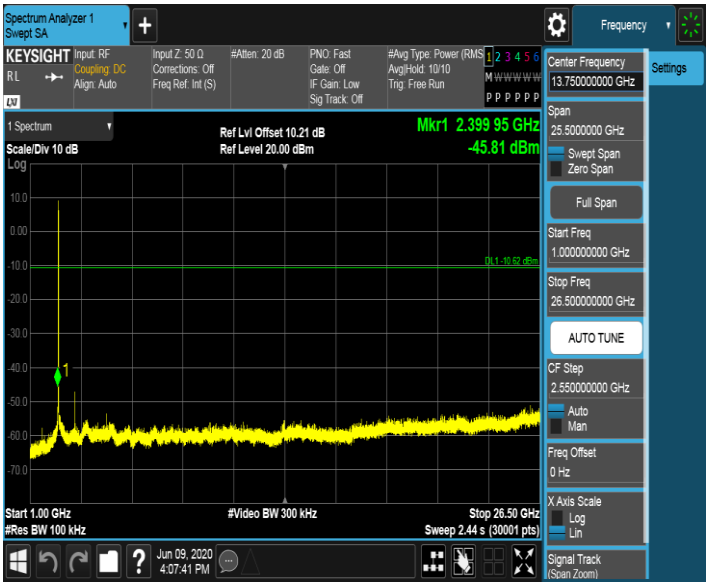


11B_Ant1_2412_0~Reference

11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500



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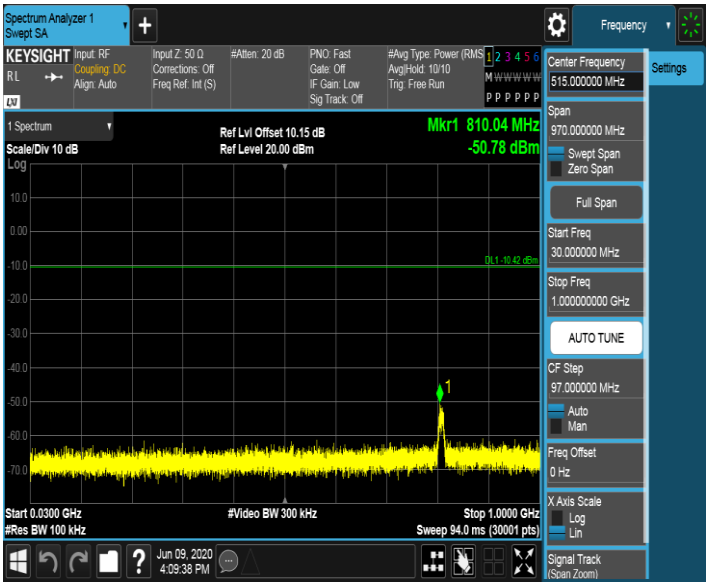

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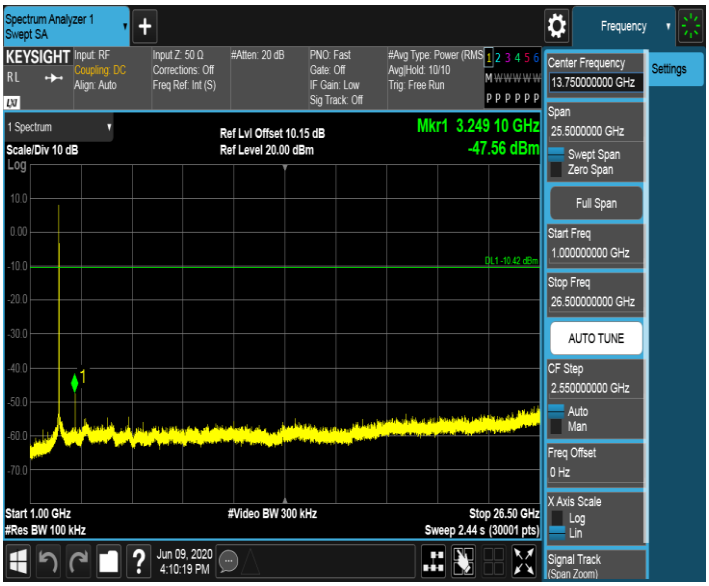

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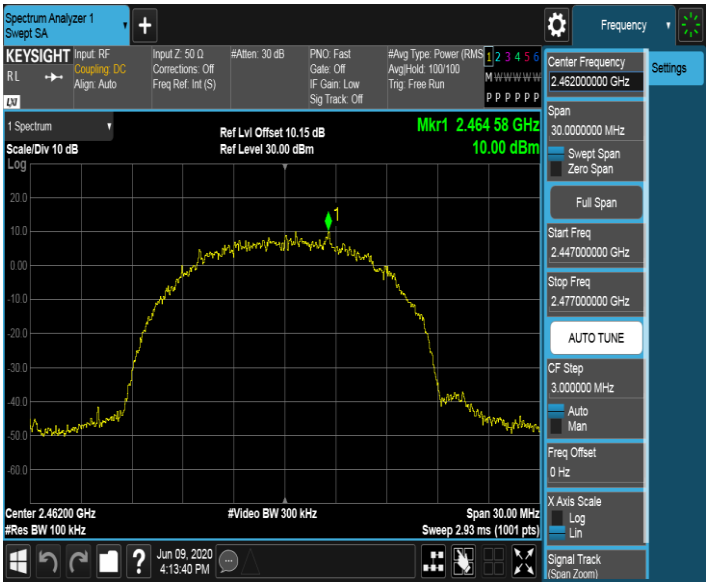

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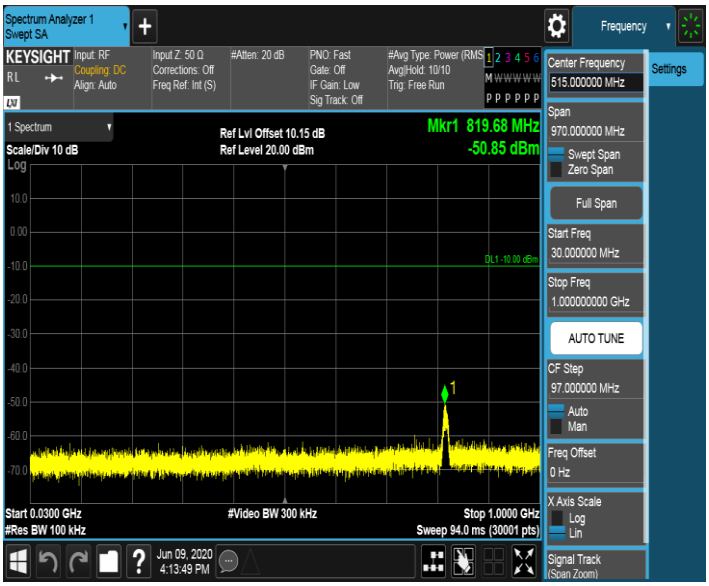

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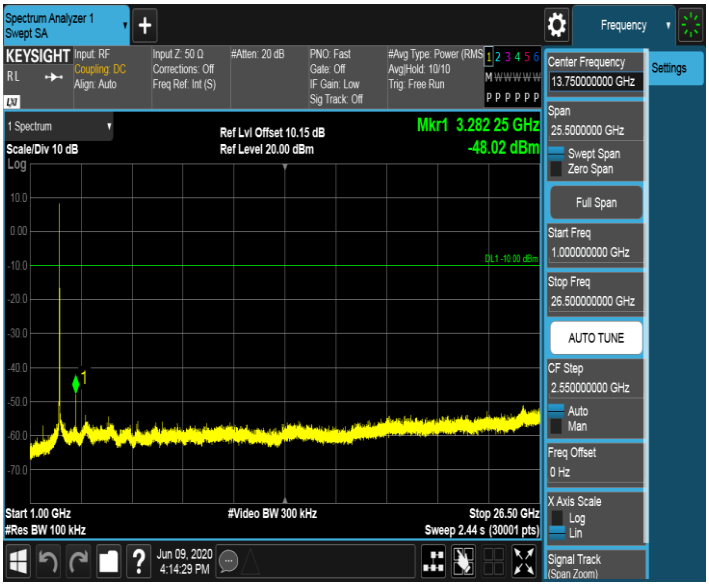

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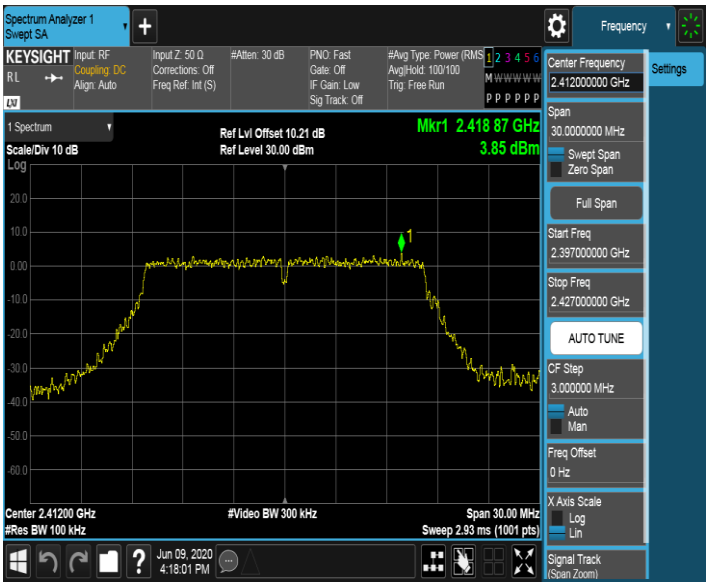

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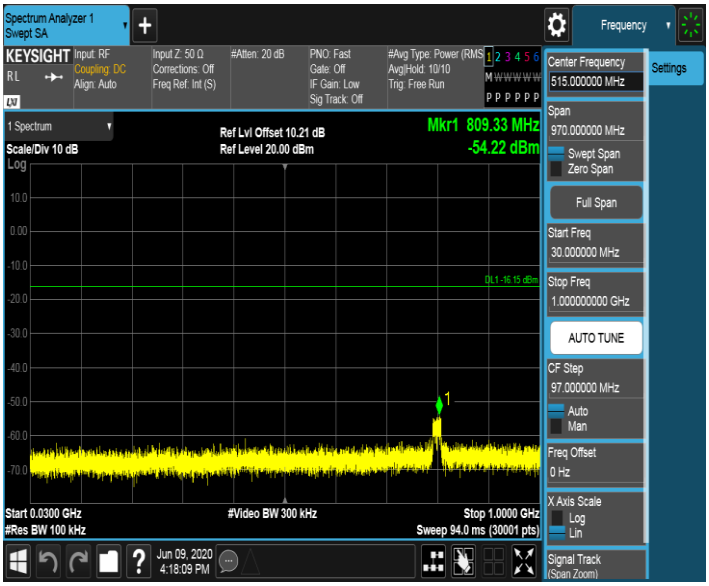

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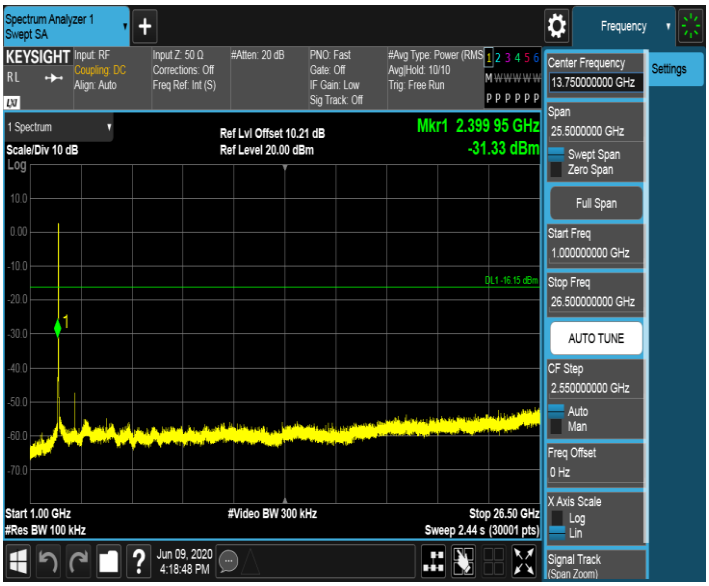

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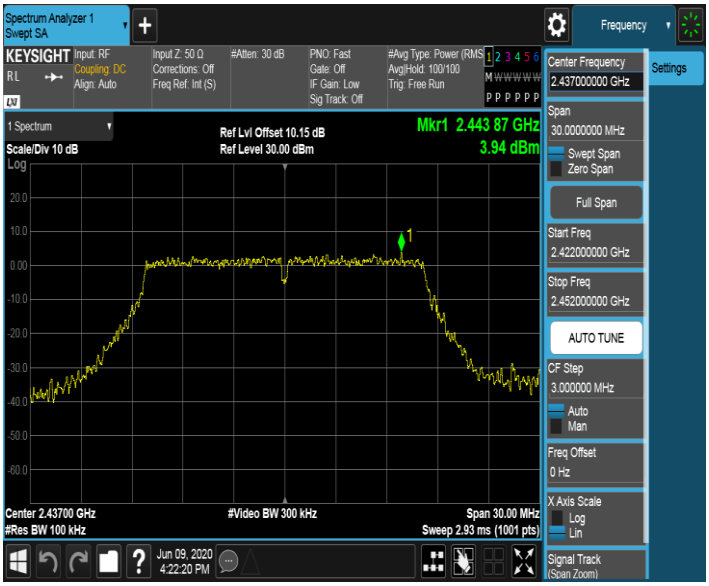

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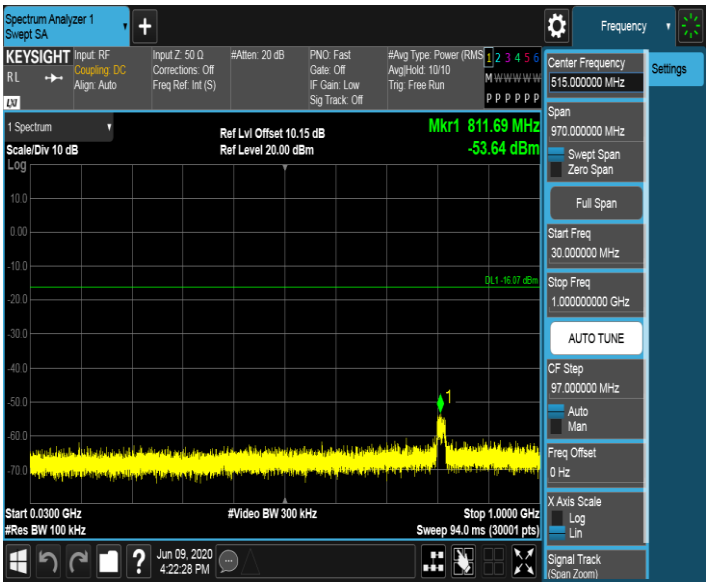

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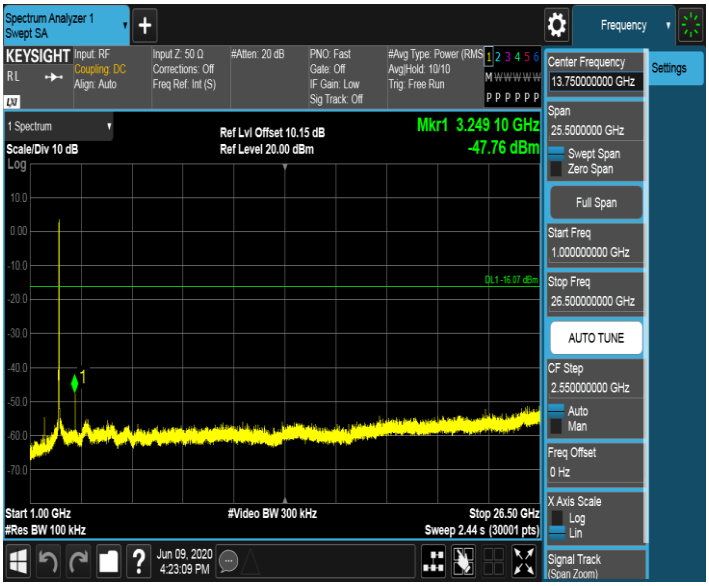

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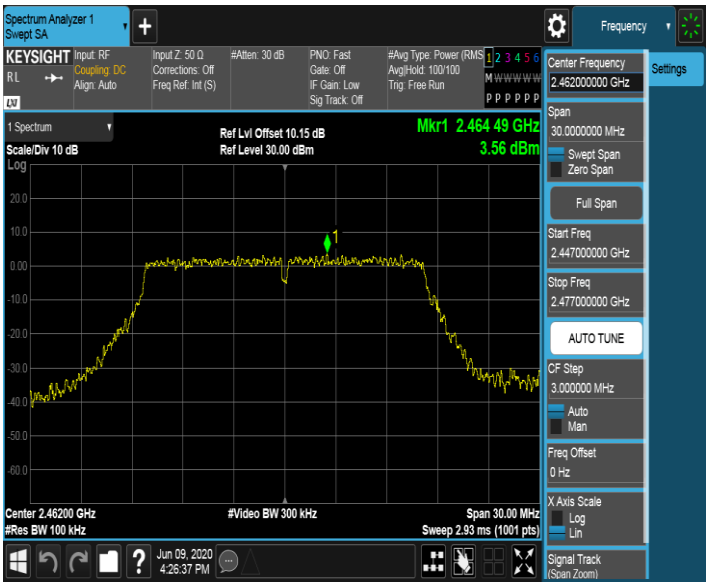

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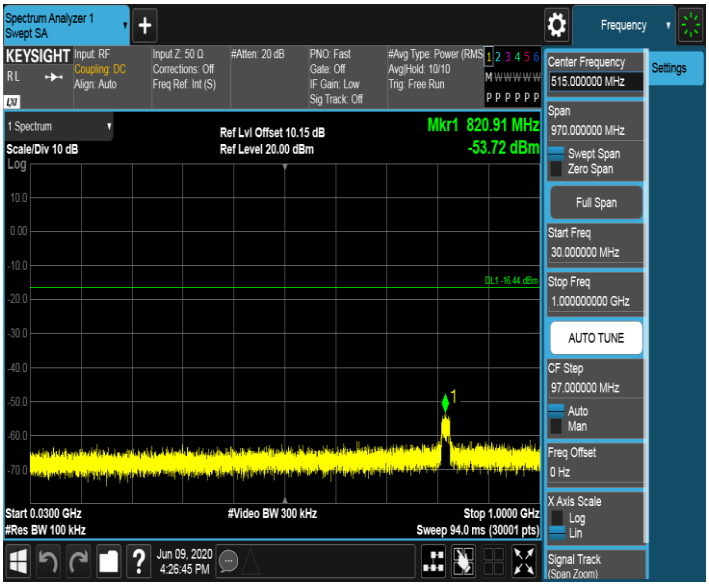

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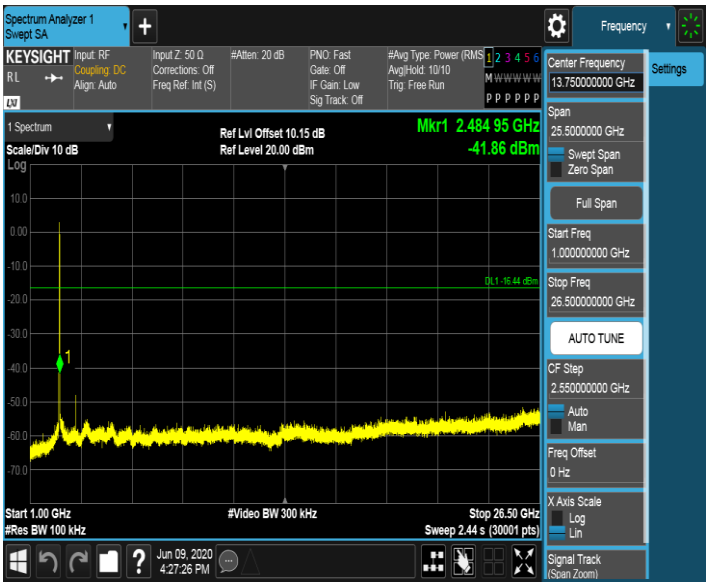

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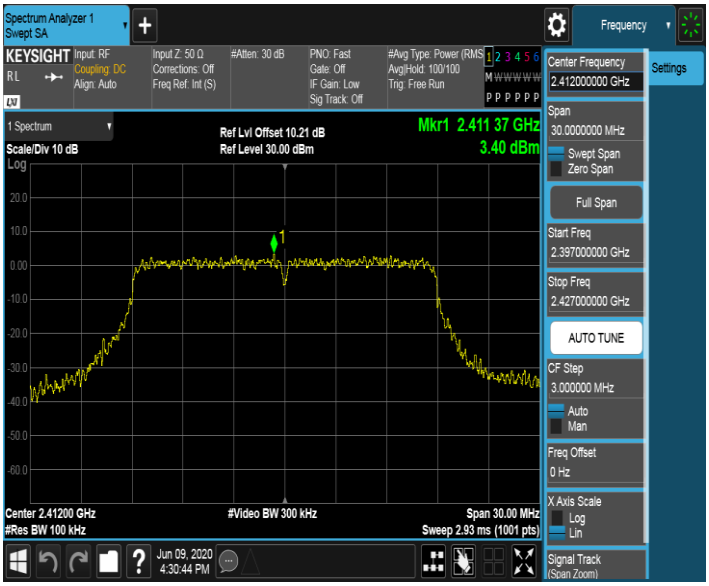

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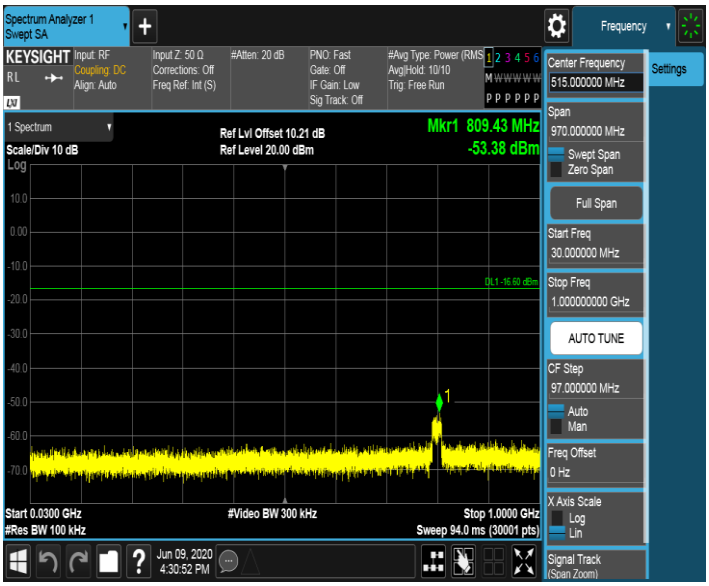

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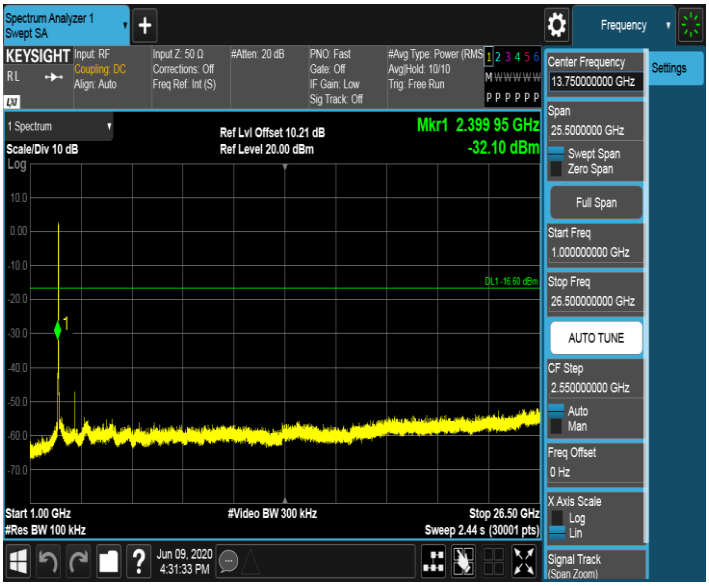

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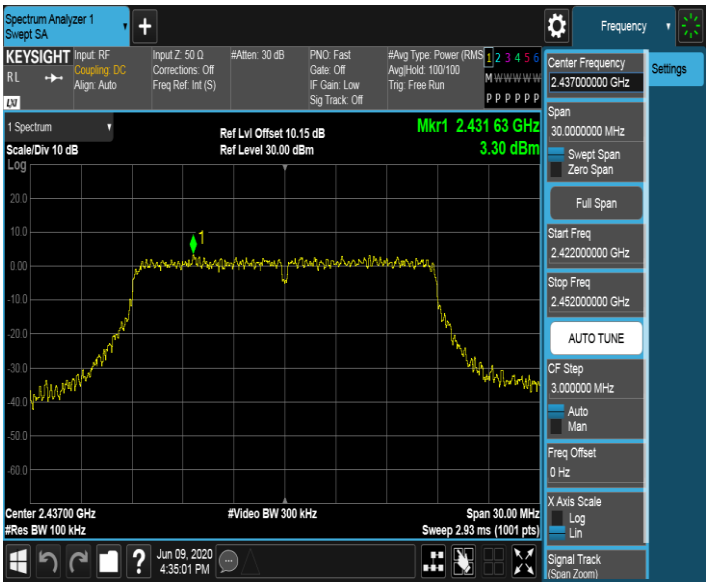

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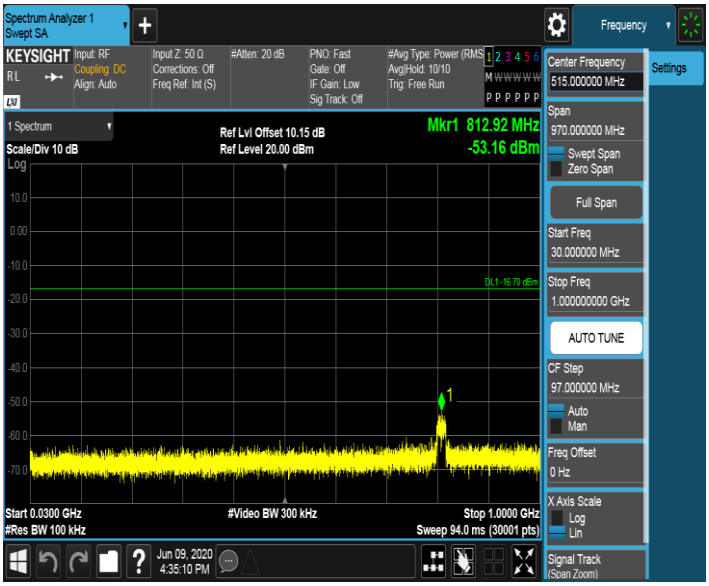

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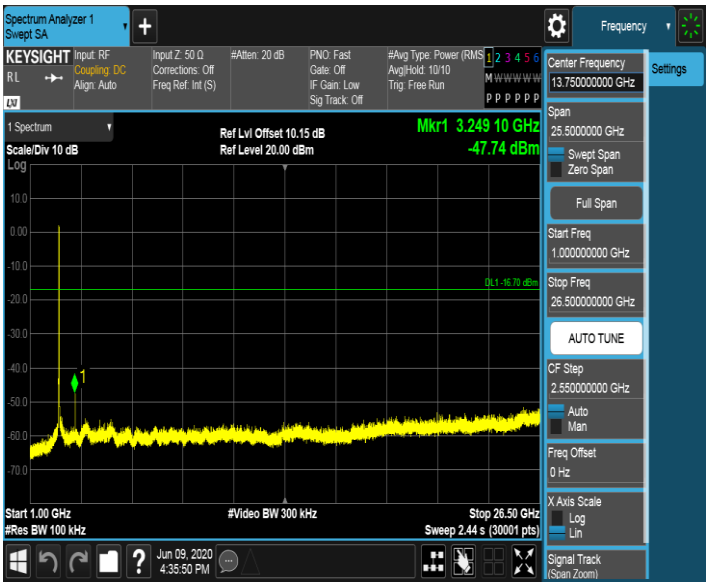

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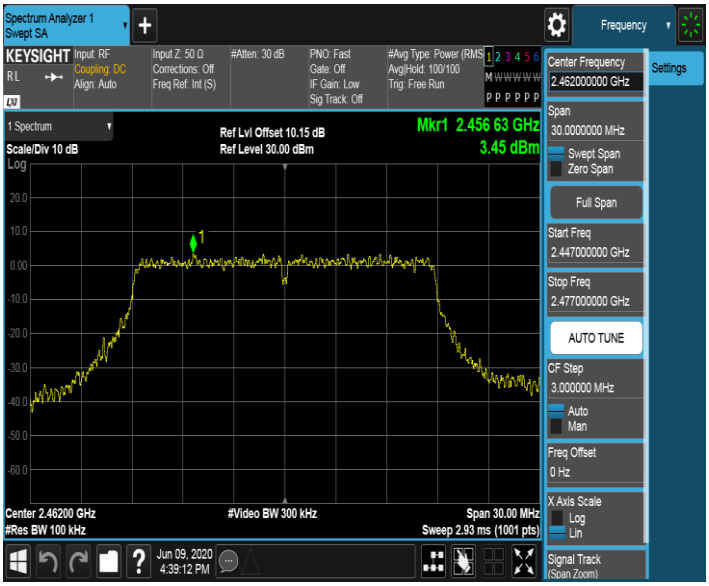

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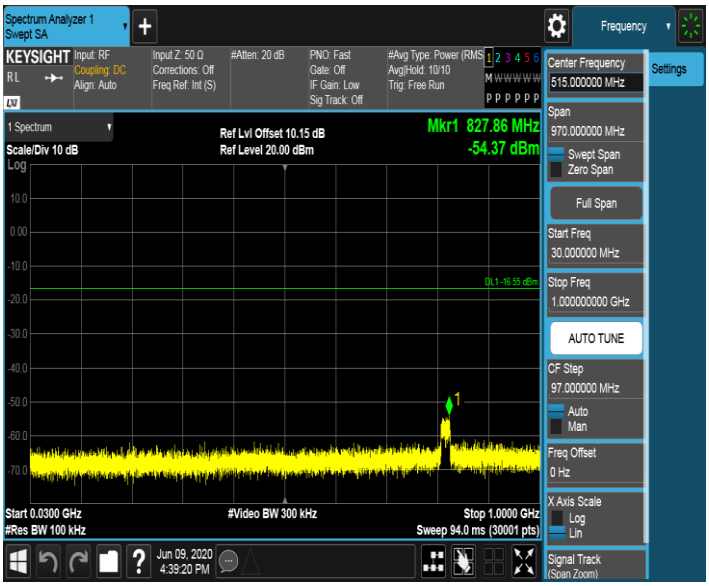

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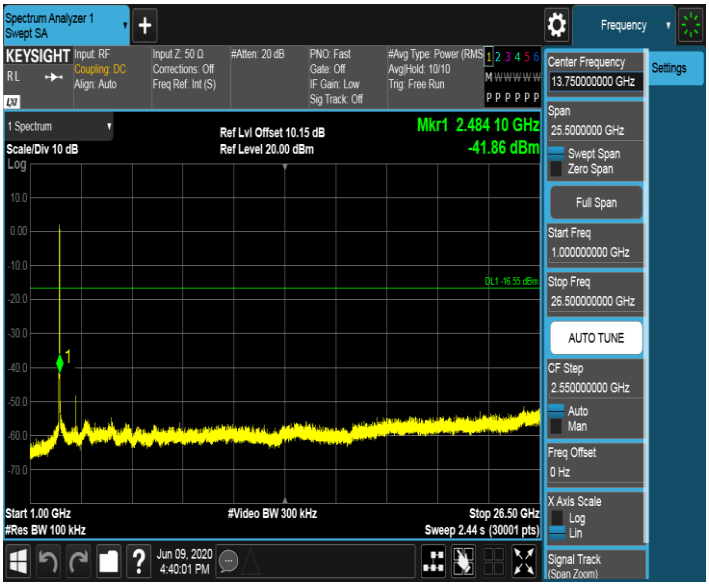

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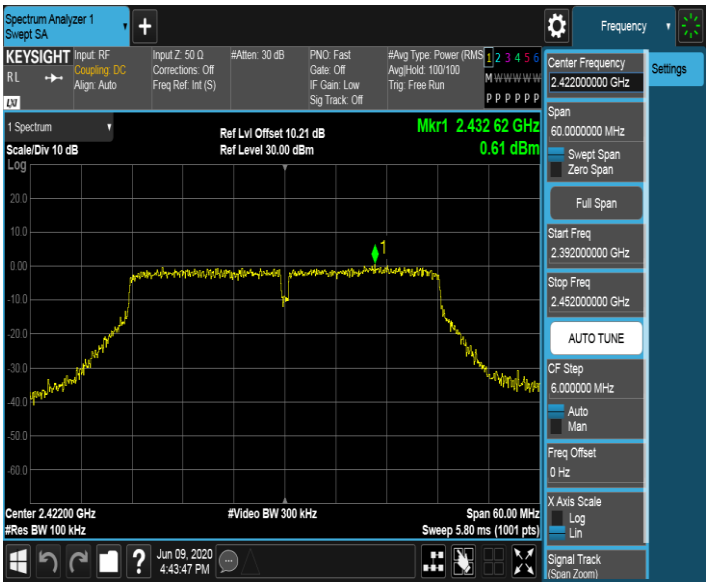

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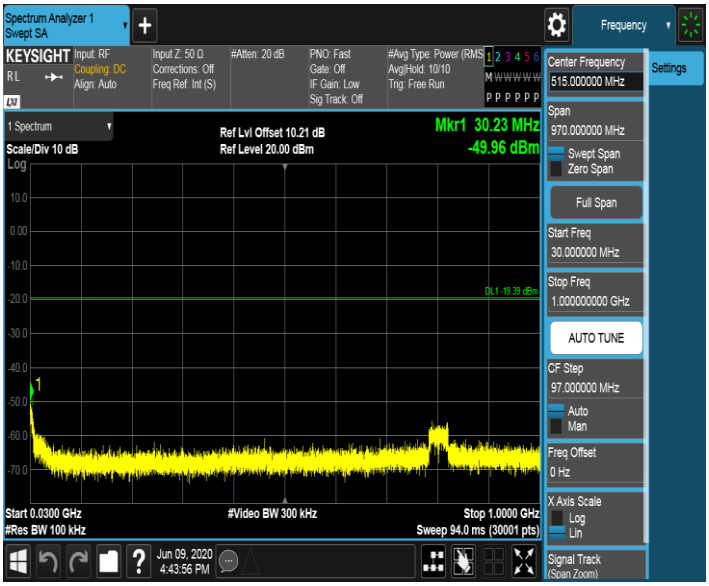

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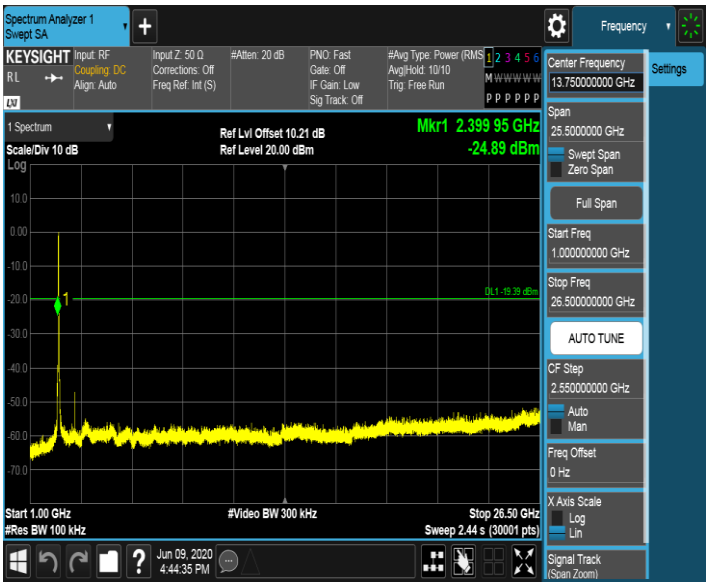

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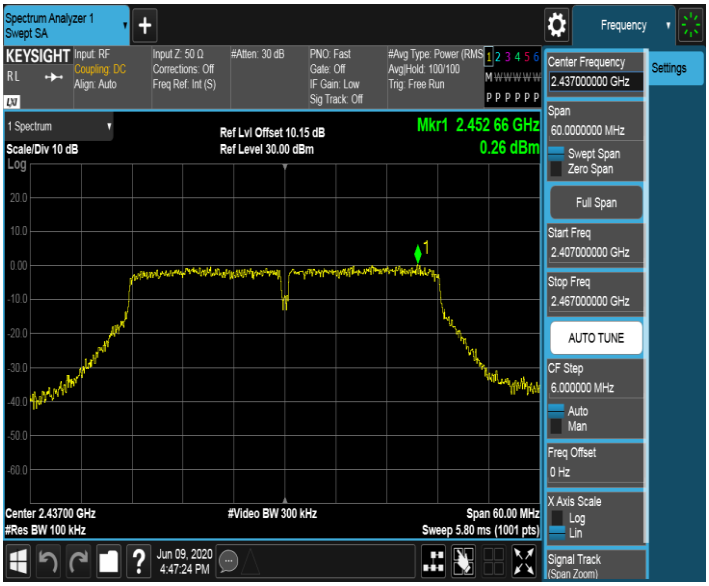

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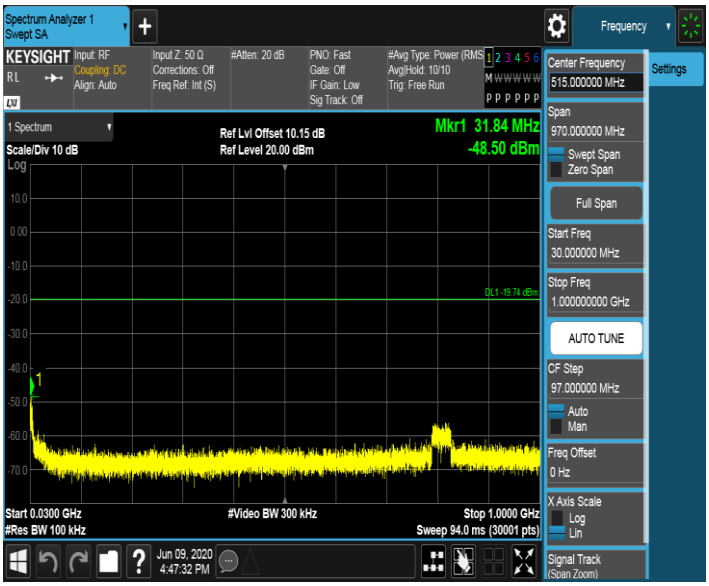

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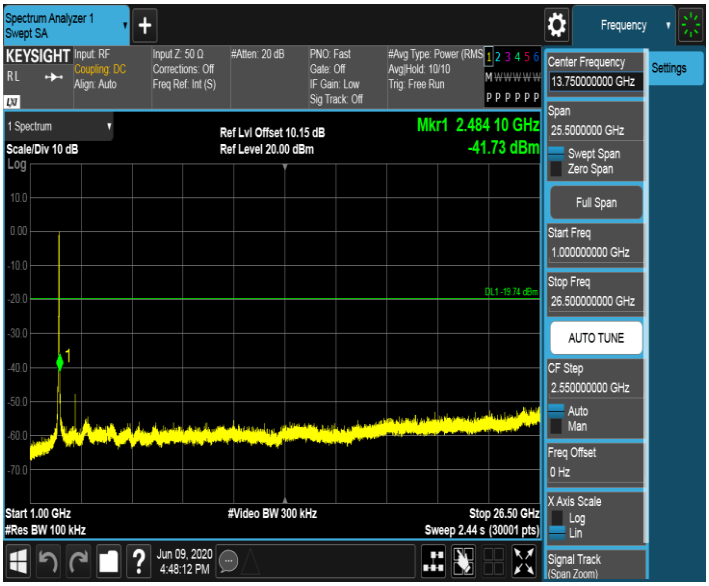

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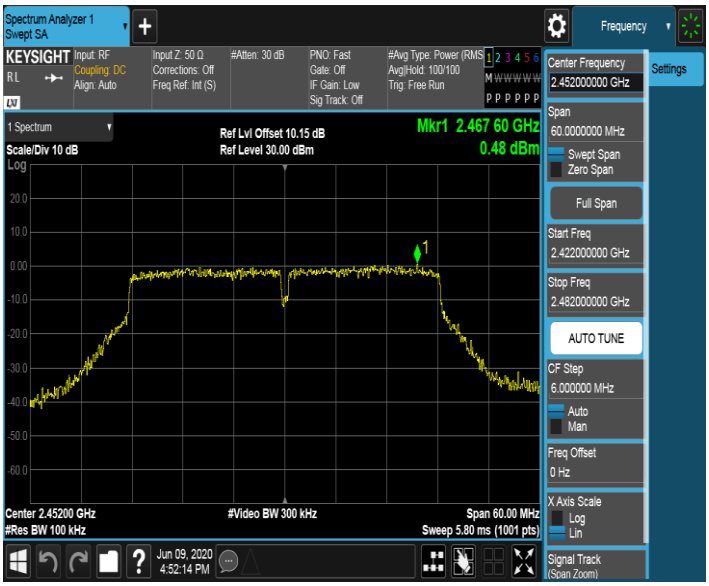

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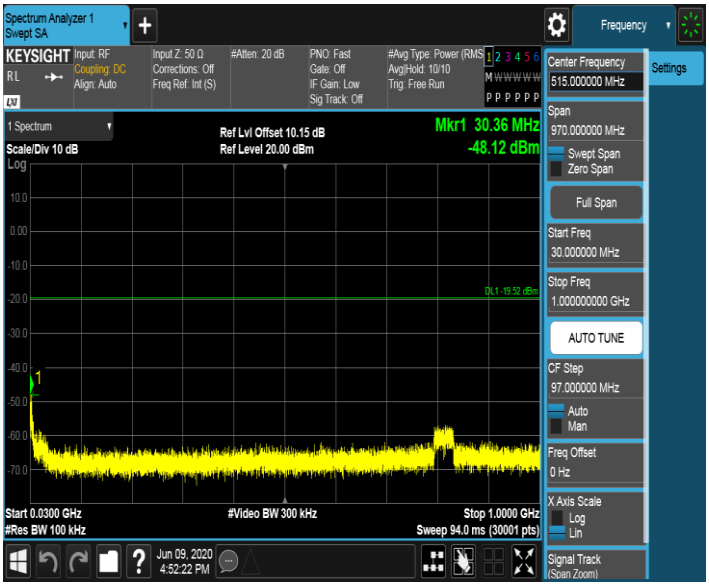

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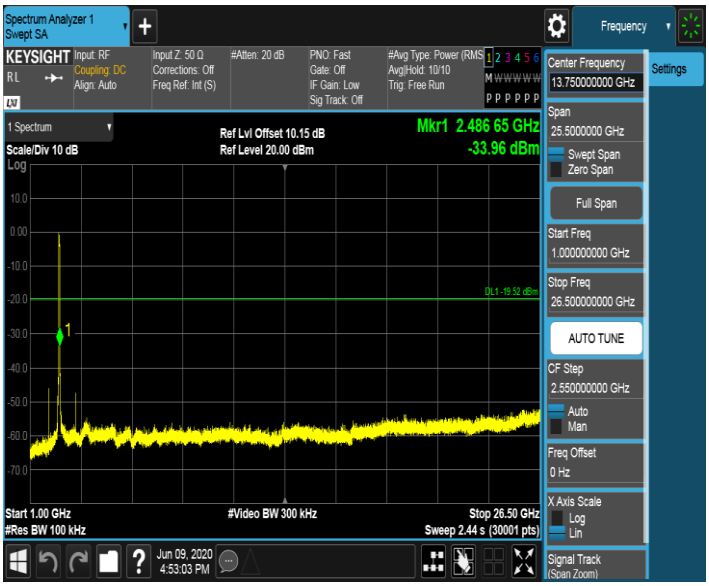


7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

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

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2. Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3

7.6.3. Test Setting

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Table 1 - RBW as a function of frequency

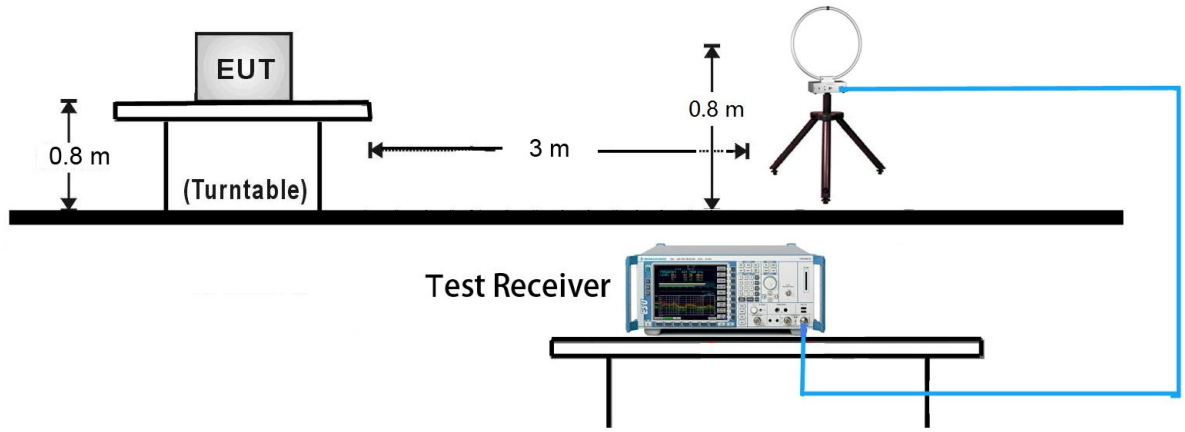
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements

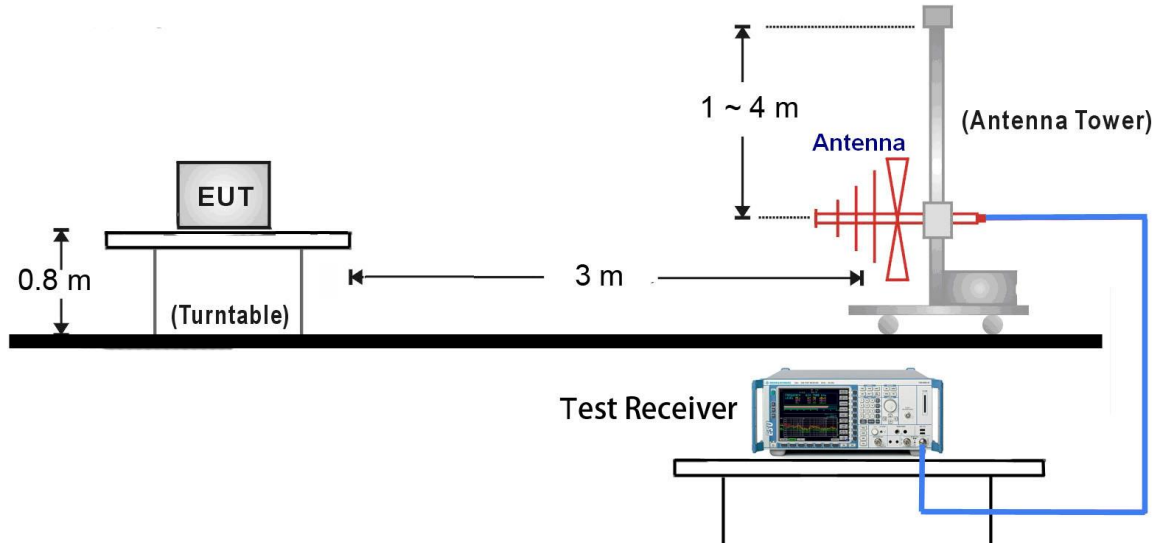
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Power Average (RMS)
5. Number of sweep point = 2001 (Number of sweep points must be ≥ 2 x span / RBW)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces.

7.6.4. Test Setup

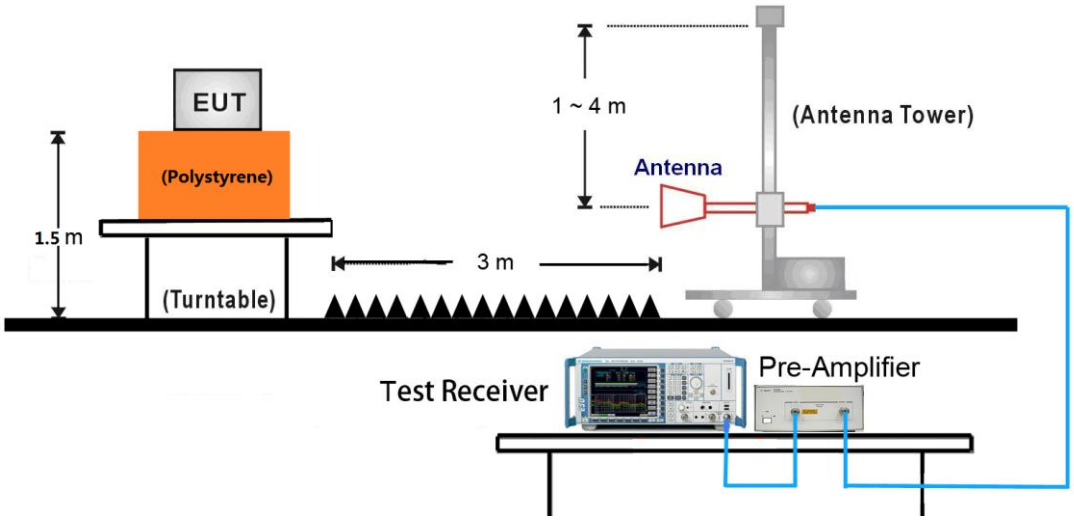
9kHz ~ 30MHz Test Setup:



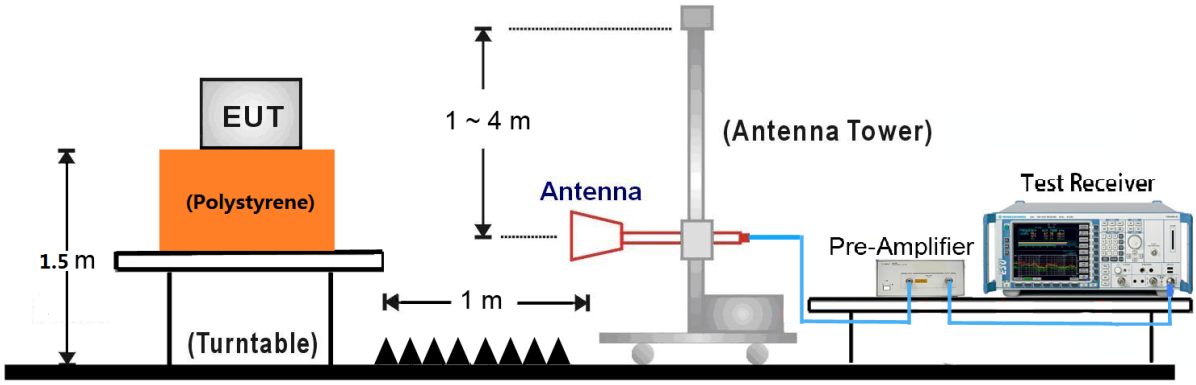
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



18GHz ~25GHz Test Setup:



7.6.5. Test Result

Test Mode:	802.11b - Ant 1	Test Date:	2020-06-18
Test Channel:	01	Test Engineer:	Line Chen
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4822.5000	46.39	7.63	74.00	27.61	Peak	Horizontal
	5010.0000	45.11	8.44	74.00	28.89	Peak	Horizontal
*	6307.5000	47.86	12.56	88.71	40.85	Peak	Horizontal
*	6915.0000	47.35	13.50	88.71	41.36	Peak	Horizontal
	4822.5000	51.08	7.63	74.00	22.92	Peak	Vertical
	5040.0000	45.96	8.38	74.00	28.04	Peak	Vertical
*	6127.5000	47.19	12.10	88.71	41.52	Peak	Vertical
*	6352.5000	47.82	12.73	88.71	40.89	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (108.71dBμV/m) or 15.209 which is higher.

Test Mode:	802.11b - Ant 1	Test Date:	2020-06-18
Test Channel:	06	Test Engineer:	Line Chen
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3487.5000	42.35	5.78	74.00	31.65	Peak	Horizontal
	3592.5000	42.43	5.99	74.00	31.57	Peak	Horizontal
*	6052.5000	47.18	11.90	90.62	43.44	Peak	Horizontal
*	6360.0000	47.92	12.75	90.62	42.70	Peak	Horizontal
	4867.5000	53.92	7.77	74.00	20.08	Peak	Vertical
	4987.5000	45.07	8.35	74.00	28.93	Peak	Vertical
*	6345.0000	48.17	12.70	90.62	42.45	Peak	Vertical
*	6870.0000	48.14	13.50	90.62	42.48	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (110.62dBμV/m) or 15.209 which is higher.

Test Mode:	802.11b - Ant 1	Test Date:	2020-06-18
Test Channel:	11	Test Engineer:	Line Chen
Remark:	3. Average measurement was not performed if peak level lower than average limit. 4. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3277.5000	48.71	4.77	74.00	25.29	Peak	Horizontal
	3412.5000	41.74	5.38	74.00	32.26	Peak	Horizontal
*	6112.5000	47.84	12.00	92.46	44.62	Peak	Horizontal
*	6307.5000	47.74	12.56	92.46	44.72	Peak	Horizontal
	4920.0000	56.20	7.99	74.00	17.80	Peak	Vertical
	5077.5000	45.64	8.46	74.00	28.36	Peak	Vertical
*	6022.5000	47.15	11.81	92.46	45.31	Peak	Vertical
*	6382.5000	47.73	12.81	92.46	44.73	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (112.46dBμV/m) or 15.209 which is higher.

Test Mode:	802.11g - Ant 1	Test Date:	2020-06-18
Test Channel:	01	Test Engineer:	Line Chen
Remark:	5. Average measurement was not performed if peak level lower than average limit. 6. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4552.5000	42.90	7.21	74.00	31.10	Peak	Horizontal
	4822.5000	44.16	7.63	74.00	29.84	Peak	Horizontal
*	6337.5000	46.79	12.67	84.90	38.11	Peak	Horizontal
*	6660.0000	46.80	13.09	84.90	38.10	Peak	Horizontal
	3982.5000	47.53	6.48	74.00	26.47	Peak	Vertical
	4822.5000	48.83	7.63	74.00	25.17	Peak	Vertical
*	6120.0000	47.36	12.05	84.90	37.54	Peak	Vertical
*	6540.0000	47.52	12.83	84.90	37.38	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (104.90dBμV/m) or 15.209 which is higher.

Test Mode:	802.11g - Ant 1	Test Date:	2020-06-18
Test Channel:	06	Test Engineer:	Line Chen
Remark:	7. Average measurement was not performed if peak level lower than average limit. 8. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	7320.0000	47.80	13.60	74.00	26.20	Peak	Horizontal
	7732.5000	47.91	13.86	74.00	26.09	Peak	Horizontal
*	3172.5000	41.36	4.28	86.34	44.98	Peak	Horizontal
*	3247.5000	47.66	4.73	86.34	38.68	Peak	Horizontal
	4875.0000	50.89	7.82	74.00	23.11	Peak	Vertical
	5385.0000	45.59	10.11	74.00	28.41	Peak	Vertical
*	6307.5000	47.45	12.56	86.34	38.89	Peak	Vertical
*	6555.0000	46.80	12.87	86.34	39.54	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (106.34dBμV/m) or 15.209 which is higher.

Test Mode:	802.11g - Ant 1	Test Date:	2020-06-18
Test Channel:	11	Test Engineer:	Line Chen
Remark:	9. Average measurement was not performed if peak level lower than average limit. 10. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	7305.0000	47.61	13.50	74.00	26.39	Peak	Horizontal
	7672.5000	47.53	13.67	74.00	26.47	Peak	Horizontal
*	3090.0000	41.04	4.06	87.75	46.71	Peak	Horizontal
*	3277.5000	48.11	4.77	87.75	39.64	Peak	Horizontal
	3982.5000	49.53	6.48	74.00	24.47	Peak	Vertical
	4110.0000	43.01	6.47	74.00	30.99	Peak	Vertical
*	6112.5000	48.29	12.00	87.75	39.46	Peak	Vertical
*	6405.0000	47.58	12.83	87.75	40.17	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (107.75dBμV/m) or 15.209 which is higher.

Test Mode:	802.11n20 - Ant 1	Test Date:	2020-06-18
Test Channel:	01	Test Engineer:	Line Chen
Remark:	11. Average measurement was not performed if peak level lower than average limit. 12. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4590.0000	43.14	7.10	74.00	30.86	Peak	Horizontal
	4822.5000	44.05	7.63	74.00	29.95	Peak	Horizontal
*	6247.5000	46.94	12.23	86.30	39.36	Peak	Horizontal
*	6607.5000	47.38	13.01	86.30	38.92	Peak	Horizontal
	4815.0000	47.01	7.63	74.00	26.99	Peak	Vertical
	5122.5000	44.68	8.64	74.00	29.32	Peak	Vertical
*	6247.5000	47.08	12.23	86.30	39.22	Peak	Vertical
*	6427.5000	47.49	12.72	86.30	38.81	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (106.30dBμV/m) or 15.209 which is higher.

Test Mode:	802.11n20 - Ant 1	Test Date:	2020-06-18
Test Channel:	06	Test Engineer:	Line Chen
Remark:	13. Average measurement was not performed if peak level lower than average limit. 14. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4560.0000	43.29	7.19	74.00	30.71	Peak	Horizontal
	4867.5000	44.71	7.77	74.00	29.29	Peak	Horizontal
*	6322.5000	47.56	12.62	87.25	39.69	Peak	Horizontal
*	6652.5000	46.85	13.11	87.25	40.40	Peak	Horizontal
	4875.0000	49.59	7.82	74.00	24.41	Peak	Vertical
	5002.5000	44.46	8.46	74.00	29.54	Peak	Vertical
*	6442.5000	47.30	12.64	87.25	39.95	Peak	Vertical
*	6630.0000	46.84	13.06	87.25	40.41	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (107.25dBμV/m) or 15.209 which is higher.

Test Mode:	802.11n20 - Ant 1	Test Date:	2020-06-18
Test Channel:	11	Test Engineer:	Line Chen
Remark:	15. Average measurement was not performed if peak level lower than average limit. 16. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4567.5000	43.52	7.17	74.00	30.48	Peak	Horizontal
	4920.0000	46.94	7.99	74.00	27.06	Peak	Horizontal
*	6240.0000	46.82	12.20	87.86	41.04	Peak	Horizontal
*	6570.0000	47.23	12.91	87.86	40.63	Peak	Horizontal
	4777.5000	43.31	7.51	74.00	30.69	Peak	Vertical
	4927.5000	53.39	8.00	74.00	20.61	Peak	Vertical
*	6330.0000	47.13	12.64	87.86	40.73	Peak	Vertical
*	6547.5000	47.76	12.85	87.86	40.10	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (107.86dBμV/m) or 15.209 which is higher.

Test Mode:	802.11n40 - Ant 1	Test Date:	2020-06-18
Test Channel:	03	Test Engineer:	Line Chen
Remark:	17. Average measurement was not performed if peak level lower than average limit. 18. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4837.5000	43.23	7.65	74.00	30.77	Peak	Horizontal
	4927.5000	44.20	8.00	74.00	29.80	Peak	Horizontal
*	6277.5000	47.78	12.40	83.98	36.20	Peak	Horizontal
*	6562.5000	47.00	12.89	83.98	36.98	Peak	Horizontal
	4777.5000	44.21	7.51	74.00	29.79	Peak	Vertical
	4860.0000	46.82	7.72	74.00	27.18	Peak	Vertical
*	6225.0000	47.51	12.15	83.98	36.47	Peak	Vertical
*	6615.0000	46.82	13.03	83.98	37.16	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (103.98dBμV/m) or 15.209 which is higher.

Test Mode:	802.11n40 - Ant 1	Test Date:	2020-06-18
Test Channel:	06	Test Engineer:	Line Chen
Remark:	19. Average measurement was not performed if peak level lower than average limit. 20. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4687.5000	43.03	7.28	74.00	30.97	Peak	Horizontal
	4852.5000	44.59	7.68	74.00	29.41	Peak	Horizontal
*	6142.5000	47.90	12.19	83.51	35.61	Peak	Horizontal
*	6480.0000	47.29	12.66	83.51	36.22	Peak	Horizontal
	4770.0000	43.21	7.48	74.00	30.79	Peak	Vertical
	4867.5000	47.81	7.77	74.00	26.19	Peak	Vertical
*	6427.5000	48.21	12.72	83.51	35.30	Peak	Vertical
*	6577.5000	47.20	12.93	83.51	36.31	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (103.51dBμV/m) or 15.209 which is higher.

Test Mode:	802.11n40 - Ant 1	Test Date:	2020-06-18
Test Channel:	09	Test Engineer:	Line Chen
Remark:	21. Average measurement was not performed if peak level lower than average limit. 22. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Level (dBμV)	Factor (dB)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4635.0000	42.97	7.13	74.00	31.03	Peak	Horizontal
	4905.0000	44.85	7.98	74.00	29.15	Peak	Horizontal
*	6495.0000	47.76	12.69	83.38	35.62	Peak	Horizontal
*	6802.5000	46.60	13.08	83.38	36.78	Peak	Horizontal
	4620.0000	42.61	7.10	74.00	31.39	Peak	Vertical
	4905.0000	48.84	7.98	74.00	25.16	Peak	Vertical
*	6352.5000	47.12	12.73	83.38	36.26	Peak	Vertical
*	6495.0000	46.78	12.69	83.38	36.60	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (103.38dBμV/m) or 15.209 which is higher.