

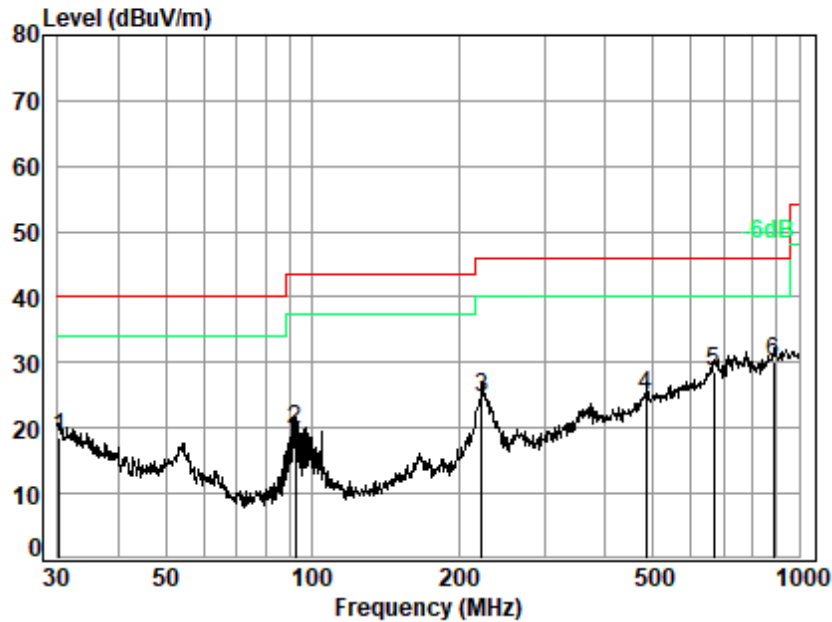
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

Page: 62 of 252

Test Mode: 14; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : 04390WM
Test Mode: 14

	Ant	Cable	Preamp	Read		Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.211	21.10	0.74	27.65	24.37	18.56	40.00	-21.44 QP
2	92.139	11.92	1.19	27.60	34.13	19.64	43.50	-23.86 QP
3	222.950	15.49	1.81	27.72	35.18	24.76	46.00	-21.24 QP
4	485.609	22.88	2.77	27.92	27.28	25.01	46.00	-20.99 QP
5	668.142	25.49	3.32	27.91	27.61	28.51	46.00	-17.49 QP
6 q	884.503	27.84	3.94	27.06	25.38	30.10	46.00	-15.90 QP



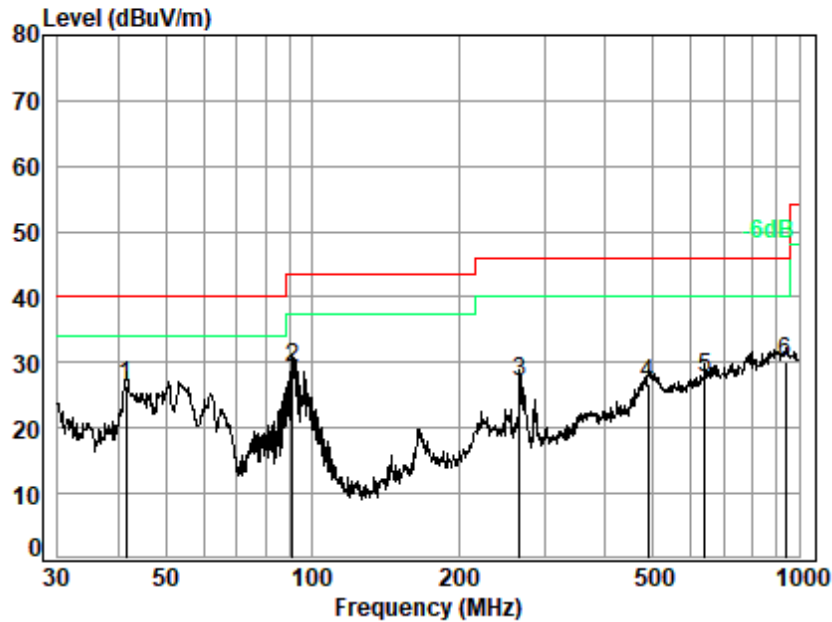
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Test Mode: 14; Polarity: Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : 04390WM
Test Mode: 14

		Ant	Cable	Preamp	Read	Limit	Over	
	Freq	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1	q	41.422	15.69	0.83	27.64	37.68	26.56	40.00 -13.44 QP
2		90.855	11.80	1.18	27.60	43.80	29.18	43.50 -14.32 QP
3		266.609	17.08	1.99	27.59	35.51	26.99	46.00 -19.01 QP
4		489.027	22.85	2.78	27.92	29.07	26.78	46.00 -19.22 QP
5		640.611	24.56	3.23	27.99	27.86	27.66	46.00 -18.34 QP
6		938.833	28.15	4.06	26.74	24.73	30.20	46.00 -15.80 QP



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7.4 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2020) Section 6.6
 Measurement Distance: 3m
 Test Engineer: Xing Guo

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.4.1 E.U.T. Operation

Operating Environment:

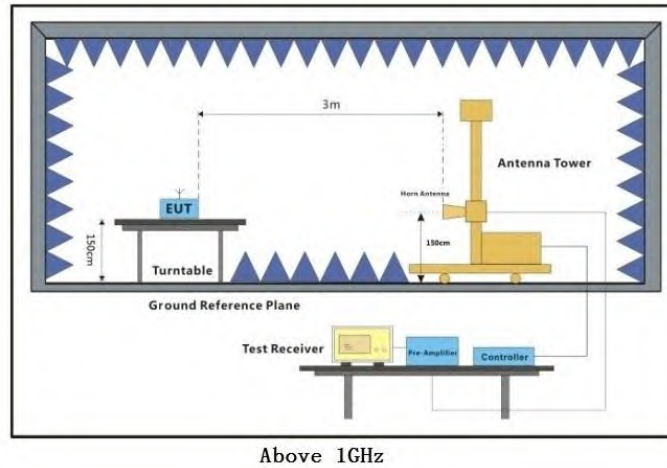
Temperature: 21.5 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	13	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.
Pre-scan	14	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.



7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.
- 5:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle<98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.



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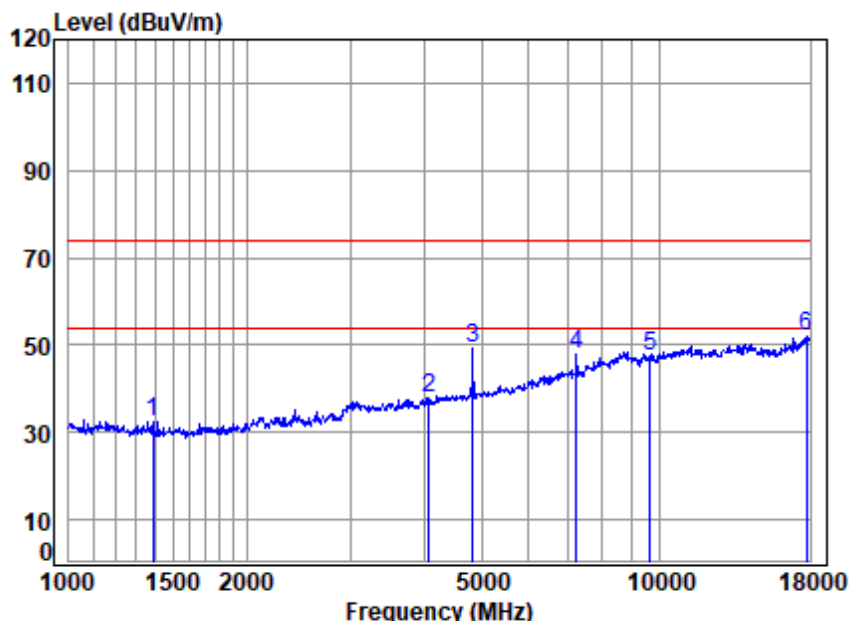
SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

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Remark: Only retain the data of the worst-case 11b and 11n and 11ax(full RU) modes.

Test Mode: 13; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2412 TX RSE

: 2.4G Wi-Fi 11B

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1390.276	7.20	25.02	54.70	55.07	32.59	74.00	-41.41 peak
2	4074.388	8.30	30.35	55.65	54.93	37.93	74.00	-36.07 peak
3	4824.000	8.92	32.00	56.18	64.54	49.28	74.00	-24.72 peak
4	7236.000	11.10	36.60	56.51	56.59	47.78	74.00	-26.22 peak
5	9648.000	12.49	38.70	54.42	50.64	47.41	74.00	-26.59 peak
6	pp17741.740	19.02	42.09	54.45	45.44	52.10	74.00	-21.90 peak



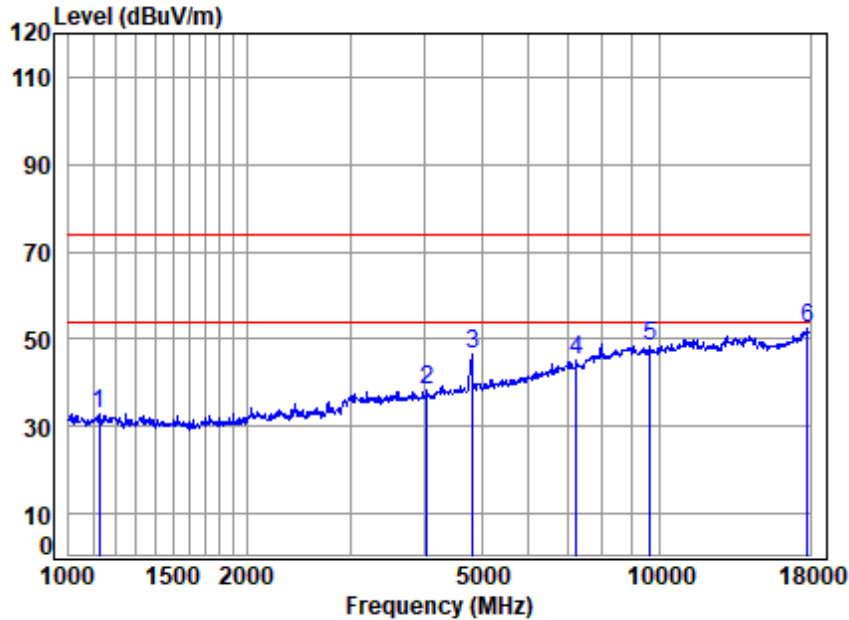
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Test Mode: 13; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Condition: 3m VERTICAL

Job No : 04390WM

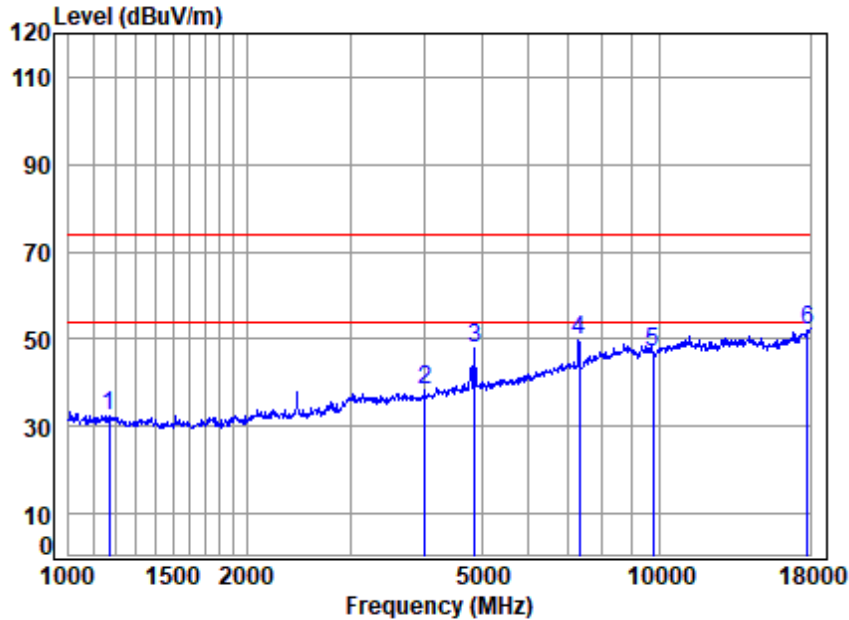
Mode : 2412 TX RSE

: 2.4G Wi-Fi 11B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1125.813	7.12	25.50	54.70	54.92	32.84	74.00	-41.16	peak
2	4039.212	8.21	30.28	55.63	55.28	38.14	74.00	-35.86	peak
3	4824.000	8.92	32.00	56.18	61.74	46.48	74.00	-27.52	peak
4	7236.000	11.10	36.60	56.51	53.86	45.05	74.00	-28.95	peak
5	9648.000	12.49	38.70	54.42	51.51	48.28	74.00	-25.72	peak
6	pp17844.590	19.02	42.77	54.47	44.96	52.28	74.00	-21.72	peak



Test Mode: 13; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Condition: 3m HORIZONTAL

Job No : 04390WM

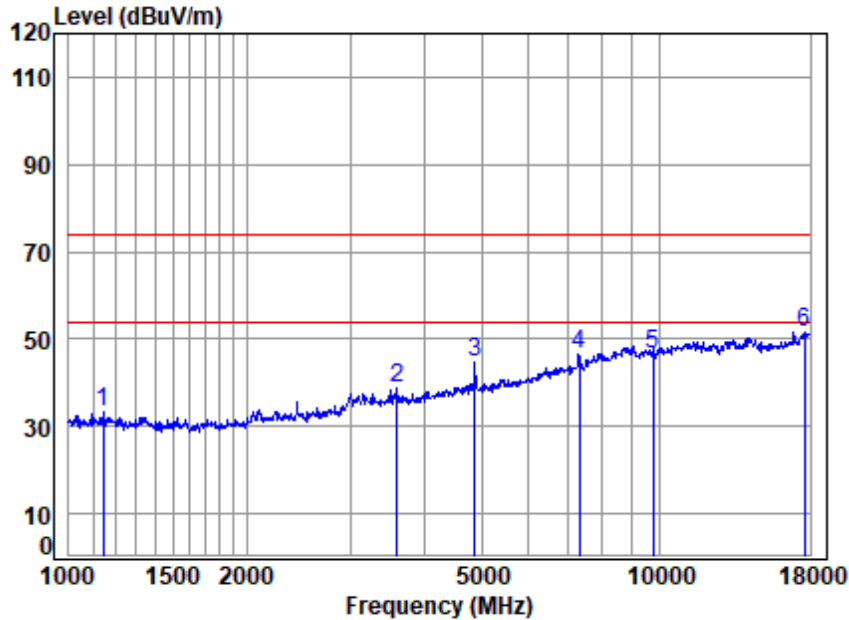
Mode : 2437 TX RSE

: 2.4G Wi-Fi 11B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1168.920	7.16	25.36	54.70	54.62	32.44	74.00	-41.56	peak
2	4004.339	8.13	30.21	55.60	55.69	38.43	74.00	-35.57	peak
3	4874.000	8.97	32.15	56.21	62.92	47.83	74.00	-26.17	peak
4	7311.000	11.11	36.72	56.45	58.56	49.94	74.00	-24.06	peak
5	9748.000	12.80	38.60	54.33	50.06	47.13	74.00	-26.87	peak
6	pp17844.590	19.02	42.77	54.47	44.47	51.79	74.00	-22.21	peak



Test Mode: 13; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Condition: 3m VERTICAL

Job No : 04390WM

Mode : 2437 TX RSE

: 2.4G Wi-Fi 11B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1145.507	7.14	25.42	54.70	55.41	33.27	74.00	-40.73	peak
2	3598.203	7.76	29.90	55.36	56.30	38.60	74.00	-35.40	peak
3	4874.000	8.97	32.15	56.21	59.88	44.79	74.00	-29.21	peak
4	7311.000	11.11	36.72	56.45	55.14	46.52	74.00	-27.48	peak
5	9748.000	12.80	38.60	54.33	49.55	46.62	74.00	-27.38	peak
6	pp17639.470	18.53	40.89	54.43	46.47	51.46	74.00	-22.54	peak



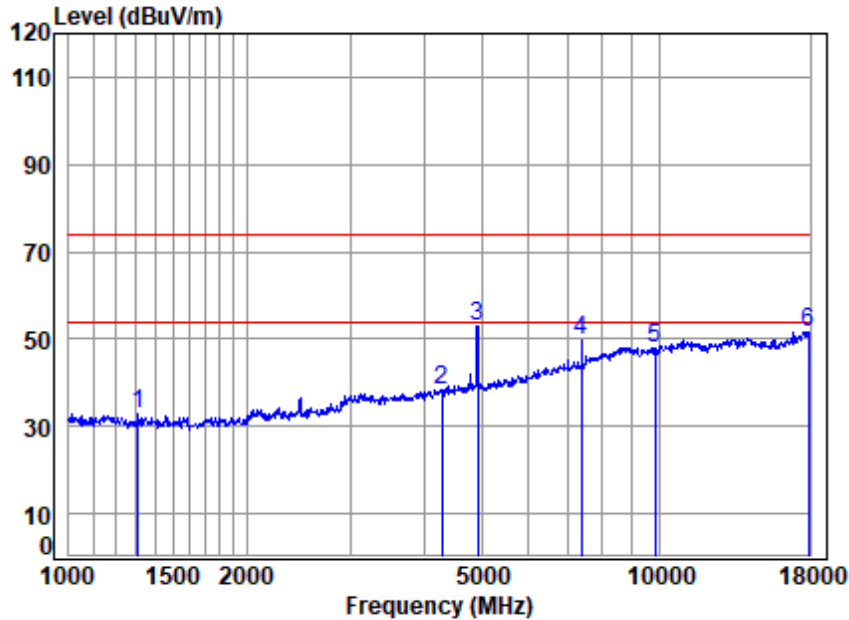
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

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Test Mode: 13; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2462 TX RSE

: 2.4G Wi-Fi 11B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1312.187	7.16	25.18	54.70	55.25	32.89	74.00	-41.11	peak
2	4279.589	8.46	31.22	55.80	54.63	38.51	74.00	-35.49	peak
3 pp	4924.000	9.03	32.20	56.25	67.75	52.73	74.00	-21.27	peak
4	7386.000	11.19	36.73	56.39	58.12	49.65	74.00	-24.35	peak
5	9848.000	12.84	37.83	54.24	51.36	47.79	74.00	-26.21	peak
6	17896.250	18.87	43.08	54.48	44.28	51.75	74.00	-22.25	peak



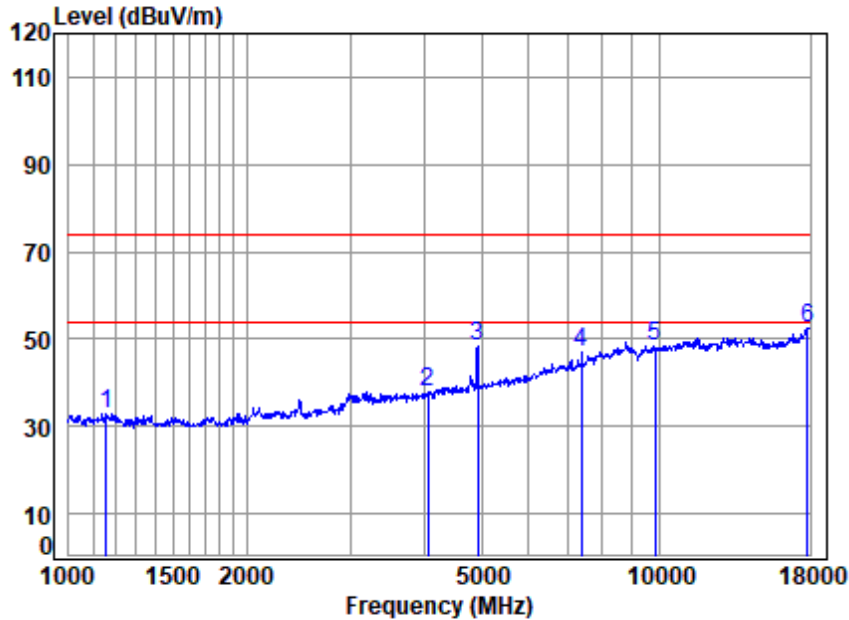
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Test Mode: 13; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Condition: 3m VERTICAL

Job No : 04390WM

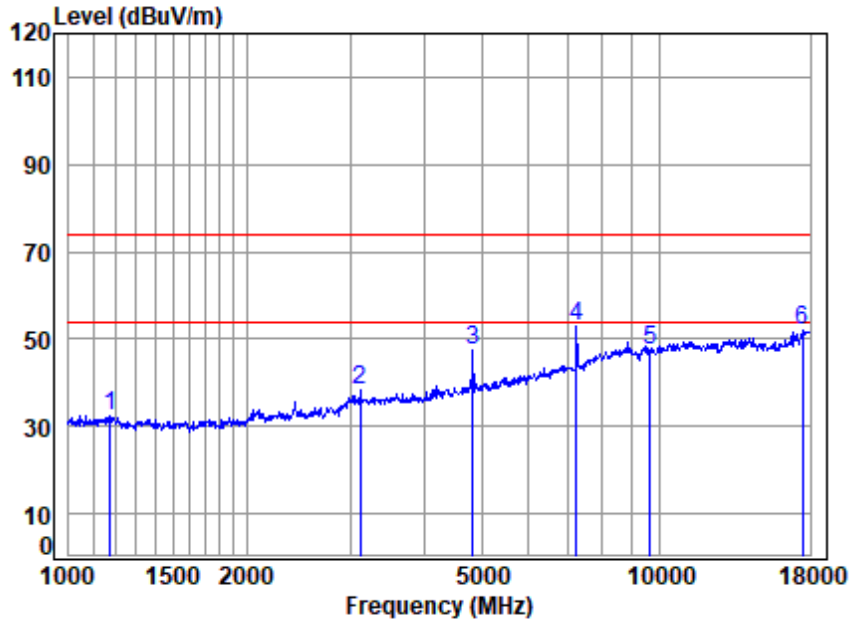
Mode : 2462 TX RSE

: 2.4G Wi-Fi 11B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1155.483	7.15	25.39	54.70	55.15	32.99	74.00	-41.01	peak
2	4062.629	8.27	30.33	55.64	55.00	37.96	74.00	-36.04	peak
3	4924.000	9.03	32.20	56.25	63.55	48.53	74.00	-25.47	peak
4	7386.000	11.19	36.73	56.39	55.36	46.89	74.00	-27.11	peak
5	9848.000	12.84	37.83	54.24	51.76	48.19	74.00	-25.81	peak
6	pp17844.590	19.02	42.77	54.47	45.28	52.60	74.00	-21.40	peak



Test Mode: 13; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Condition: 3m HORIZONTAL

Job No : 04390WM

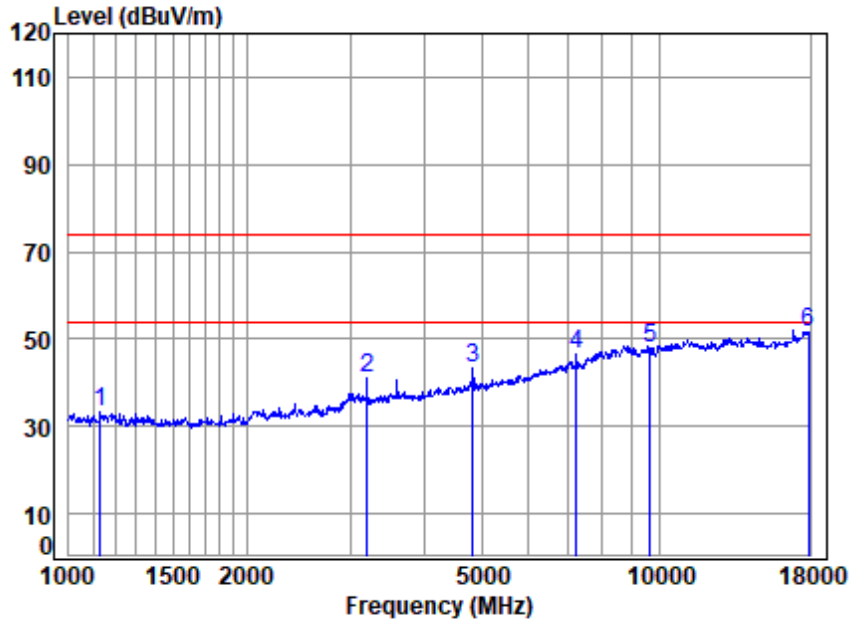
Mode : 2412 TX RSE

: 2.4G Wi-Fi 11N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1175.697	7.17	25.35	54.70	54.48	32.30	74.00	-41.70	peak
2	3114.025	7.71	29.13	55.07	56.56	38.33	74.00	-35.67	peak
3	4824.000	8.92	32.00	56.18	62.65	47.39	74.00	-26.61	peak
4 pp	7236.000	11.10	36.60	56.51	61.54	52.73	74.00	-21.27	peak
5	9648.000	12.49	38.70	54.42	50.67	47.44	74.00	-26.56	peak
6	17487.180	18.28	40.84	54.40	47.17	51.89	74.00	-22.11	peak



Test Mode: 13; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Condition: 3m VERTICAL

Job No : 04390WM

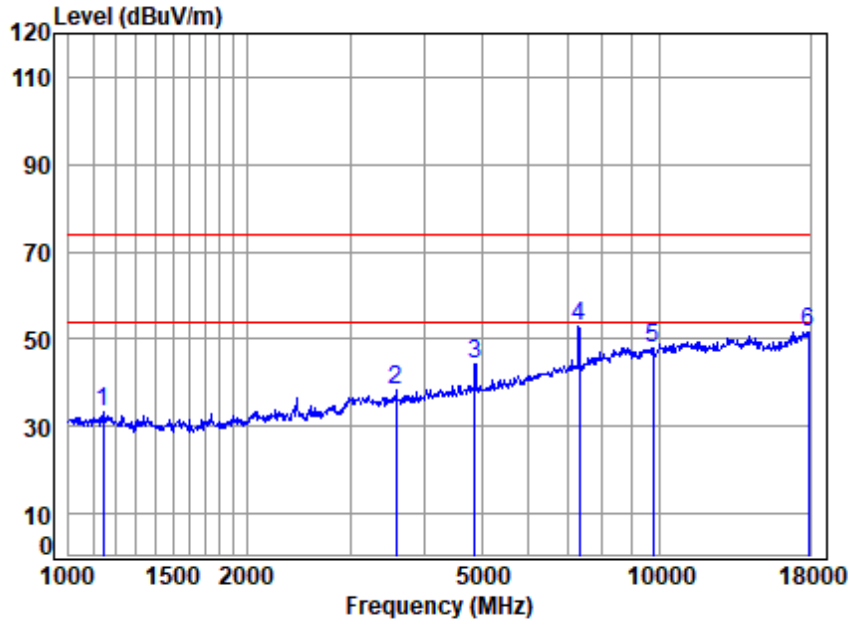
Mode : 2412 TX RSE

: 2.4G Wi-Fi 11N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1132.340	7.13	25.47	54.70	55.47	33.37	74.00	-40.63	peak
2	3196.094	7.70	29.20	55.12	59.10	40.88	74.00	-33.12	peak
3	4824.000	8.92	32.00	56.18	58.61	43.35	74.00	-30.65	peak
4	7236.000	11.10	36.60	56.51	55.15	46.34	74.00	-27.66	peak
5	9648.000	12.49	38.70	54.42	51.13	47.90	74.00	-26.10	peak
6	pp17896.250	18.87	43.08	54.48	44.29	51.76	74.00	-22.24	peak



Test Mode: 13; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2437 TX RSE

: 2.4G Wi-Fi 11N20

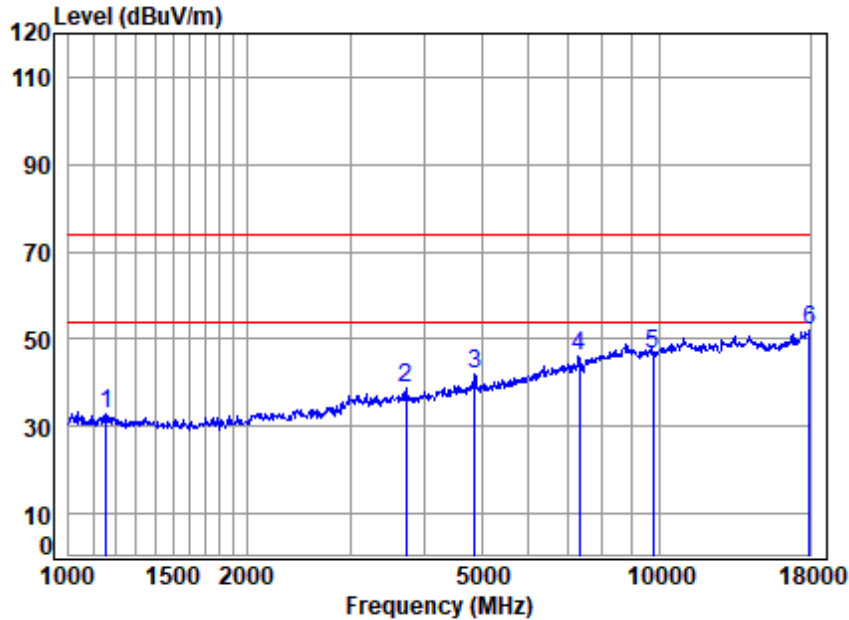
		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1145.507	7.14	25.42	54.70	55.60	33.46	74.00	-40.54	peak
2	3577.463	7.75	29.85	55.35	55.93	38.18	74.00	-35.82	peak
3	4874.000	8.97	32.15	56.21	59.45	44.36	74.00	-29.64	peak
4 pp	7311.000	11.11	36.72	56.45	61.41	52.79	74.00	-21.21	peak
5	9748.000	12.80	38.60	54.33	50.67	47.74	74.00	-26.26	peak
6	17896.250	18.87	43.08	54.48	44.32	51.79	74.00	-22.21	peak



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Test Mode: 13; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Condition: 3m VERTICAL

Job No : 04390WM

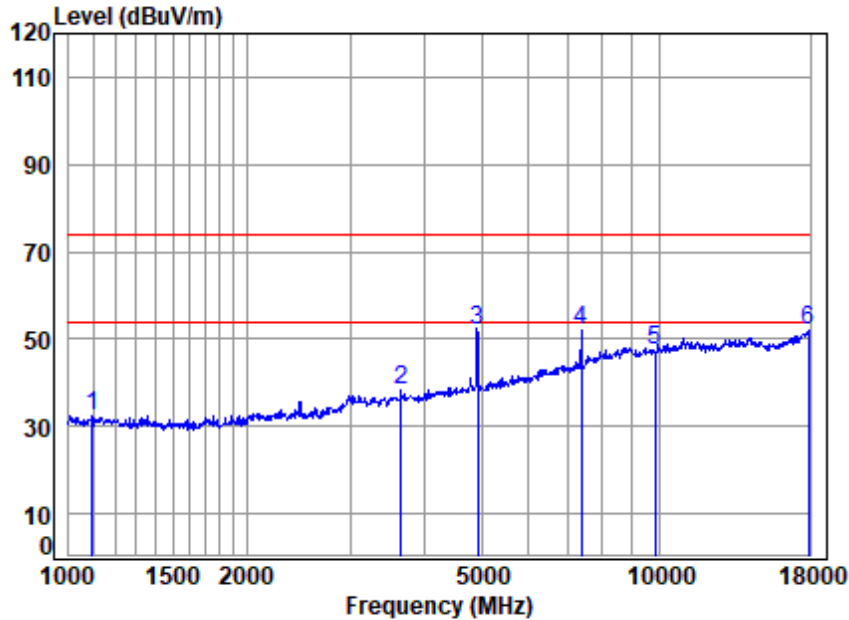
Mode : 2437 TX RSE

: 2.4G Wi-Fi 11N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1155.483	7.15	25.39	54.70	55.13	32.97	74.00	-41.03	peak
2	3725.195	7.92	29.85	55.44	56.29	38.62	74.00	-35.38	peak
3	4874.000	8.97	32.15	56.21	57.11	42.02	74.00	-31.98	peak
4	7311.000	11.11	36.72	56.45	54.60	45.98	74.00	-28.02	peak
5	9748.000	12.80	38.60	54.33	49.55	46.62	74.00	-27.38	peak
6	pp17948.050	18.75	43.44	54.49	44.09	51.79	74.00	-22.21	peak



Test Mode: 13; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2462 TX RSE

: 2.4G Wi-Fi 11N20

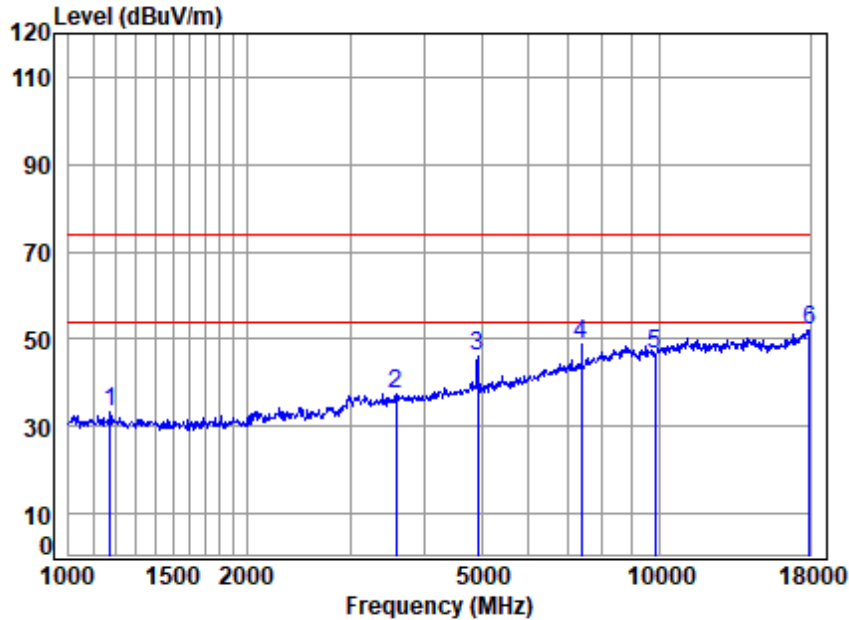
		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1096.904	7.10	25.59	54.70	54.61	32.60	74.00	-41.40	peak
2	3650.582	7.83	29.80	55.39	56.11	38.35	74.00	-35.65	peak
3	4924.000	9.03	32.20	56.25	66.81	51.79	74.00	-22.21	peak
4 pp	7386.000	11.19	36.73	56.39	60.53	52.06	74.00	-21.94	peak
5	9848.000	12.84	37.83	54.24	51.22	47.65	74.00	-26.35	peak
6	17896.250	18.87	43.08	54.48	44.50	51.97	74.00	-22.03	peak



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Test Mode: 13; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Condition: 3m VERTICAL

Job No : 04390WM

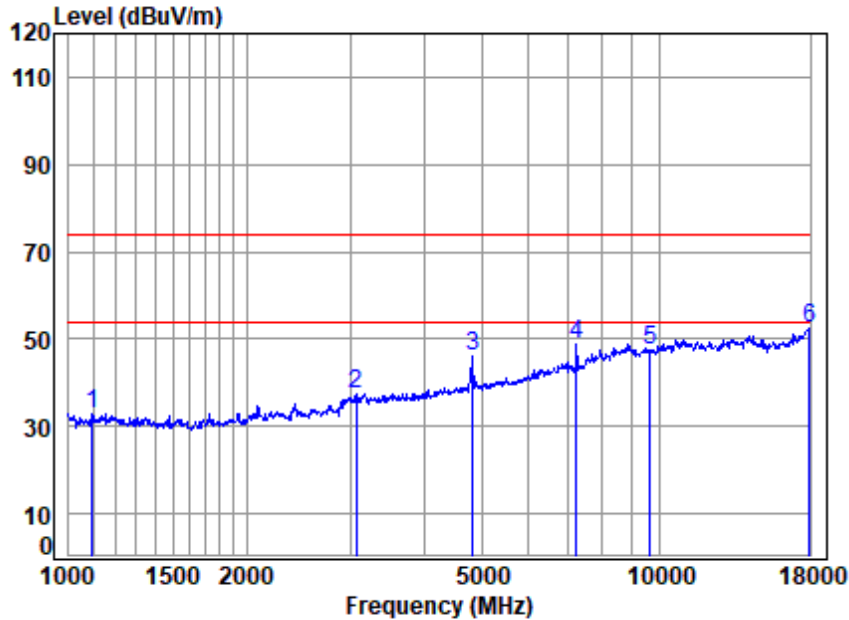
Mode : 2462 TX RSE

: 2.4G Wi-Fi 11N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1175.697	7.17	25.35	54.70	55.28	33.10	74.00	-40.90	peak
2	3587.818	7.76	29.88	55.35	55.02	37.31	74.00	-36.69	peak
3	4924.000	9.03	32.20	56.25	61.02	46.00	74.00	-28.00	peak
4	7386.000	11.19	36.73	56.39	57.20	48.73	74.00	-25.27	peak
5	9848.000	12.84	37.83	54.24	49.91	46.34	74.00	-27.66	peak
6	pp17948.050	18.75	43.44	54.49	44.17	51.87	74.00	-22.13	peak



Test Mode: 13; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2412 TX RSE

: 2.4G Wi-Fi 11AX20

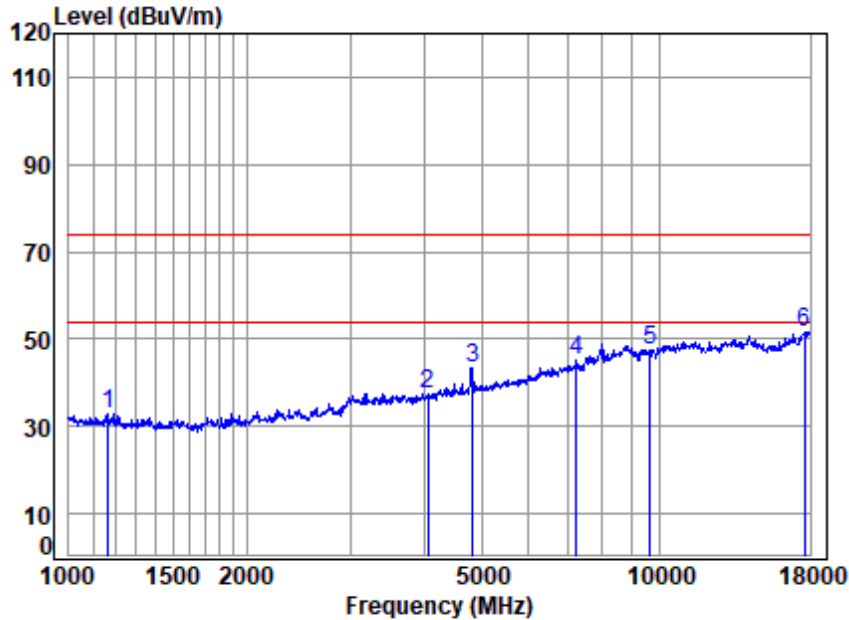
		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1096.904	7.10	25.59	54.70	54.93	32.92	74.00	-41.08	peak
2	3069.345	7.86	29.16	55.04	55.64	37.62	74.00	-36.38	Peak
3	4824.000	8.92	32.00	56.18	61.54	46.28	74.00	-27.72	peak
4	7236.000	11.10	36.60	56.51	57.51	48.70	74.00	-25.30	peak
5	9648.000	12.49	38.70	54.42	50.73	47.50	74.00	-26.50	peak
6	pp17948.050	18.75	43.44	54.49	44.57	52.27	74.00	-21.73	peak



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Test Mode: 13; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



Condition: 3m VERTICAL

Job No : 04390WM

Mode : 2412 TX RSE

: 2.4G Wi-Fi 11AX20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1165.546	7.16	25.37	54.70	54.88	32.71	74.00	-41.29	peak
2	4062.629	8.27	30.33	55.64	54.51	37.47	74.00	-36.53	peak
3	4824.000	8.92	32.00	56.18	58.68	43.42	74.00	-30.58	peak
4	7236.000	11.10	36.60	56.51	53.89	45.08	74.00	-28.92	peak
5	9648.000	12.49	38.70	54.42	50.89	47.66	74.00	-26.34	peak
6	pp17639.470	18.53	40.89	54.43	46.79	51.78	74.00	-22.22	peak



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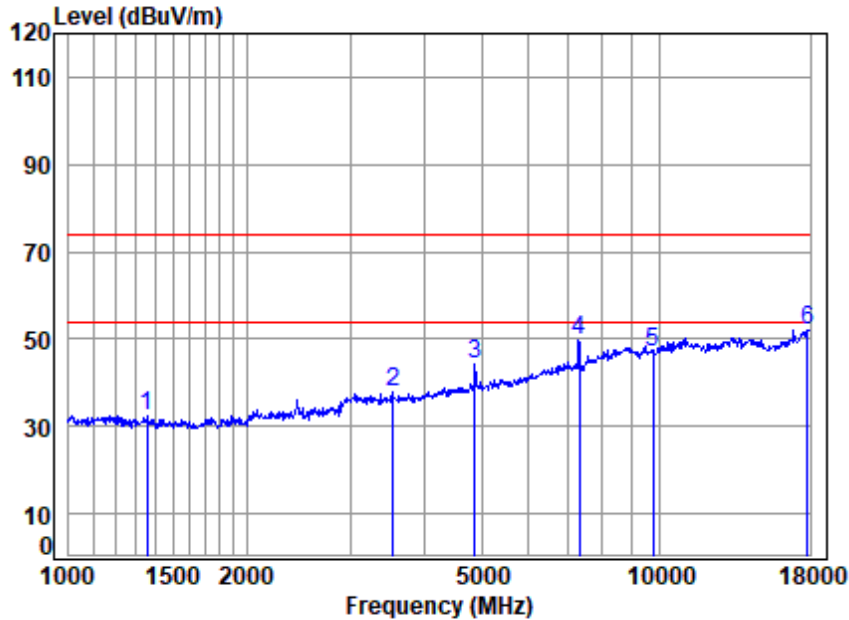
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

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Test Mode: 13; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2437 TX RSE

: 2.4G Wi-Fi 11AX20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1354.577	7.18	25.09	54.70	54.99	32.56	74.00	-41.44	peak
2	3536.341	7.74	29.75	55.32	55.89	38.06	74.00	-35.94	peak
3	4874.000	8.97	32.15	56.21	59.37	44.28	74.00	-29.72	peak
4	7311.000	11.11	36.72	56.45	58.13	49.51	74.00	-24.49	peak
5	9748.000	12.80	38.60	54.33	49.90	46.97	74.00	-27.03	peak
6	pp17844.590	19.02	42.77	54.47	44.89	52.21	74.00	-21.79	peak



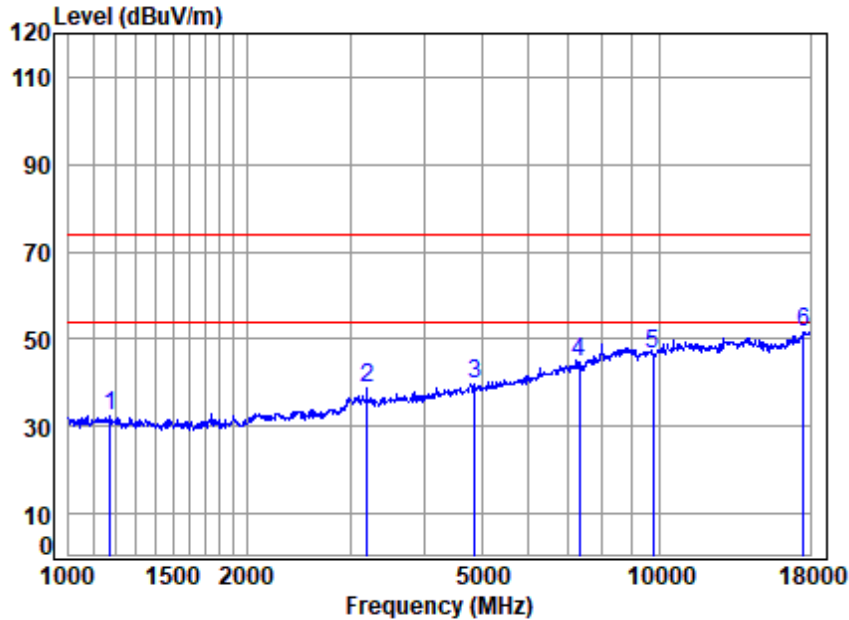
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

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Test Mode: 13; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



Condition: 3m VERTICAL

Job No : 04390WM

Mode : 2437 TX RSE

: 2.4G Wi-Fi 11AX20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1175.697	7.17	25.35	54.70	54.66	32.48	74.00	-41.52	peak
2	3196.094	7.70	29.20	55.12	57.10	38.88	74.00	-35.12	peak
3	4874.000	8.97	32.15	56.21	54.77	39.68	74.00	-34.32	peak
4	7311.000	11.11	36.72	56.45	53.48	44.86	74.00	-29.14	peak
5	9748.000	12.80	38.60	54.33	49.52	46.59	74.00	-27.41	peak
6	pp17537.800	18.31	40.67	54.41	47.08	51.65	74.00	-22.35	peak



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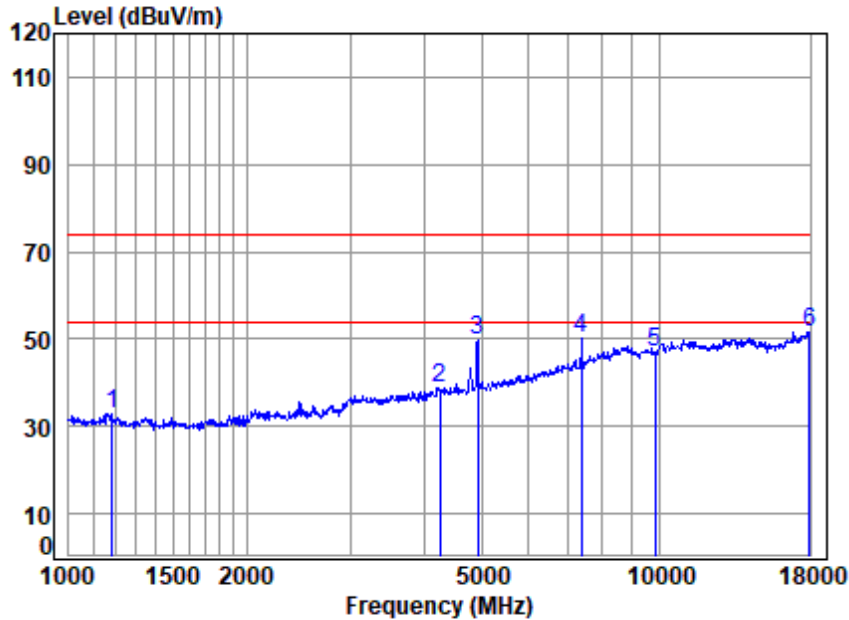
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

Page: 83 of 252

Test Mode: 13; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



Condition: 3m HORIZONTAL

Job No : 04390WM

Mode : 2462 TX RSE

: 2.4G Wi-Fi 11AX20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1182.513	7.17	25.33	54.70	55.14	32.94	74.00	-41.06	peak
2	4242.641	8.48	31.06	55.77	55.01	38.78	74.00	-35.22	peak
3	4924.000	9.03	32.20	56.25	64.60	49.58	74.00	-24.42	peak
4	7386.000	11.19	36.73	56.39	58.81	50.34	74.00	-23.66	peak
5	9848.000	12.84	37.83	54.24	50.77	47.20	74.00	-26.80	peak
6	pp17948.050	18.75	43.44	54.49	44.08	51.78	74.00	-22.22	peak



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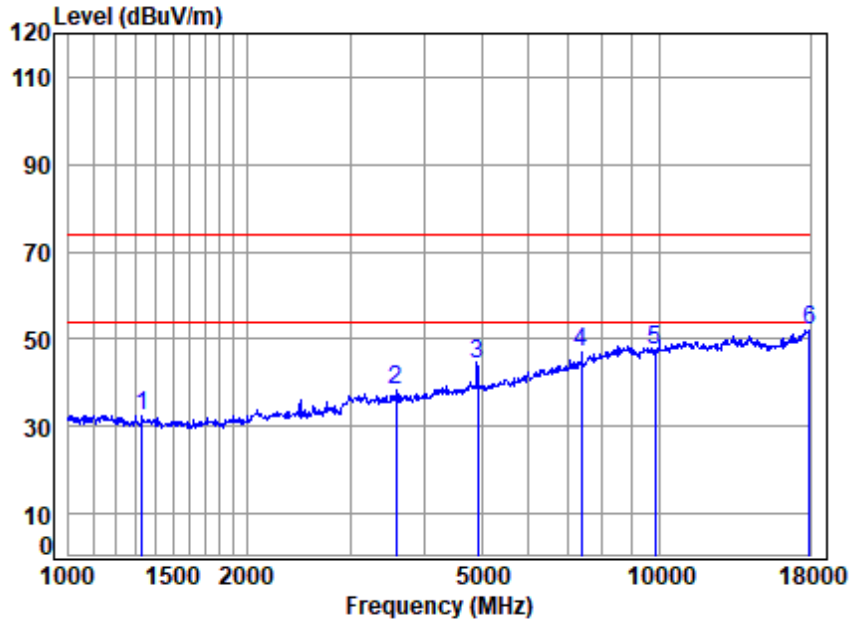
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439005

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Test Mode: 13; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



Condition: 3m VERTICAL

Job No : 04390WM

Mode : 2462 TX RSE

: 2.4G Wi-Fi 11AX20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1331.288	7.17	25.14	54.70	54.79	32.40	74.00	-41.60	peak
2	3587.818	7.76	29.88	55.35	56.22	38.51	74.00	-35.49	peak
3	4924.000	9.03	32.20	56.25	59.38	44.36	74.00	-29.64	peak
4	7386.000	11.19	36.73	56.39	55.58	47.11	74.00	-26.89	peak
5	9848.000	12.84	37.83	54.24	50.79	47.22	74.00	-26.78	peak
6	pp17948.050	18.75	43.44	54.49	44.43	52.13	74.00	-21.87	peak



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Report No.: SZCR251000439005

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7.5 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
 Test Method: ANSI C63.10 (2020) Section 11.9.2
 Test Engineer: Byron Liang

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 27.2 °C Humidity: 30.7 % RH Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	13	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.



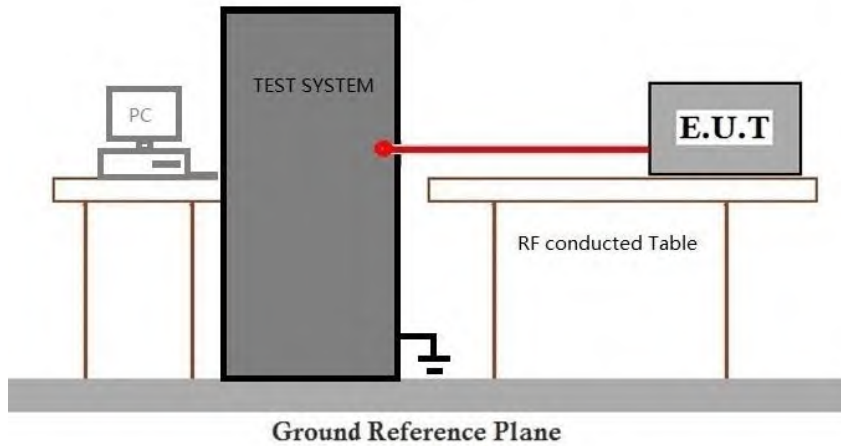
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7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

7.6 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)

Test Method: ANSI C63.10 (2020) Section 11.8.1

Test Engineer: Byron Liang

Limit:

≥500 kHz

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 27.2 °C

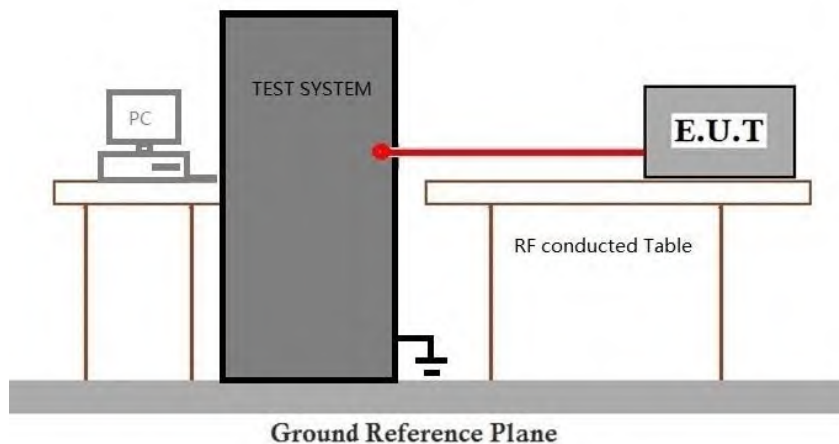
Humidity: 30.7 % RH

Atmospheric Pressure: 1020 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	13	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)

Test Method: ANSI C63.10 (2020) Section 11.10.2

Test Engineer: Byron Liang

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 27.2 °C

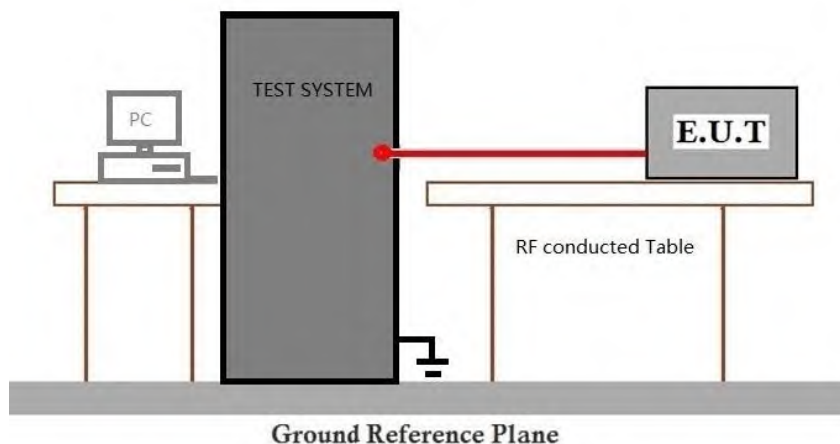
Humidity: 30.7 % RH

Atmospheric Pressure: 1020 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	13	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2020) Section 6.10.4
 Test Engineer: Byron Liang

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.8.1 E.U.T. Operation

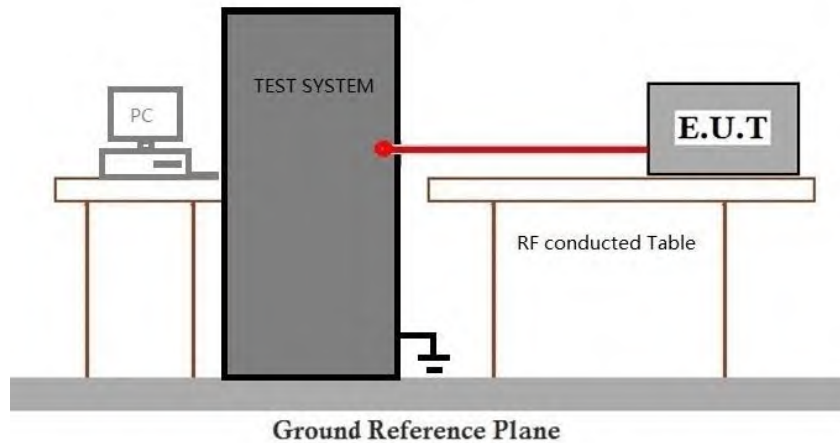
Operating Environment:

Temperature: 27.2 °C Humidity: 30.7 % RH Atmospheric Pressure: 1020 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	13	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.9 Conducted Spurious Emissions

Test Requirement: 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2020) Section 11.11
 Test Engineer: Byron Liang

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.9.1 E.U.T. Operation

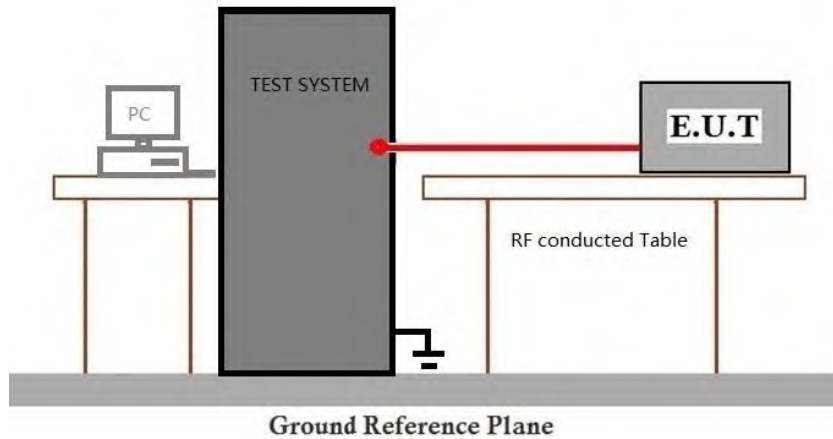
Operating Environment:

Temperature: 27.2 °C Humidity: 30.7 % RH Atmospheric Pressure: 1020 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	13	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Please refer to SZCR2510004390WM Appendix_Setup Photo

9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2510004390WM



10 Appendix

1. Duty Cycle

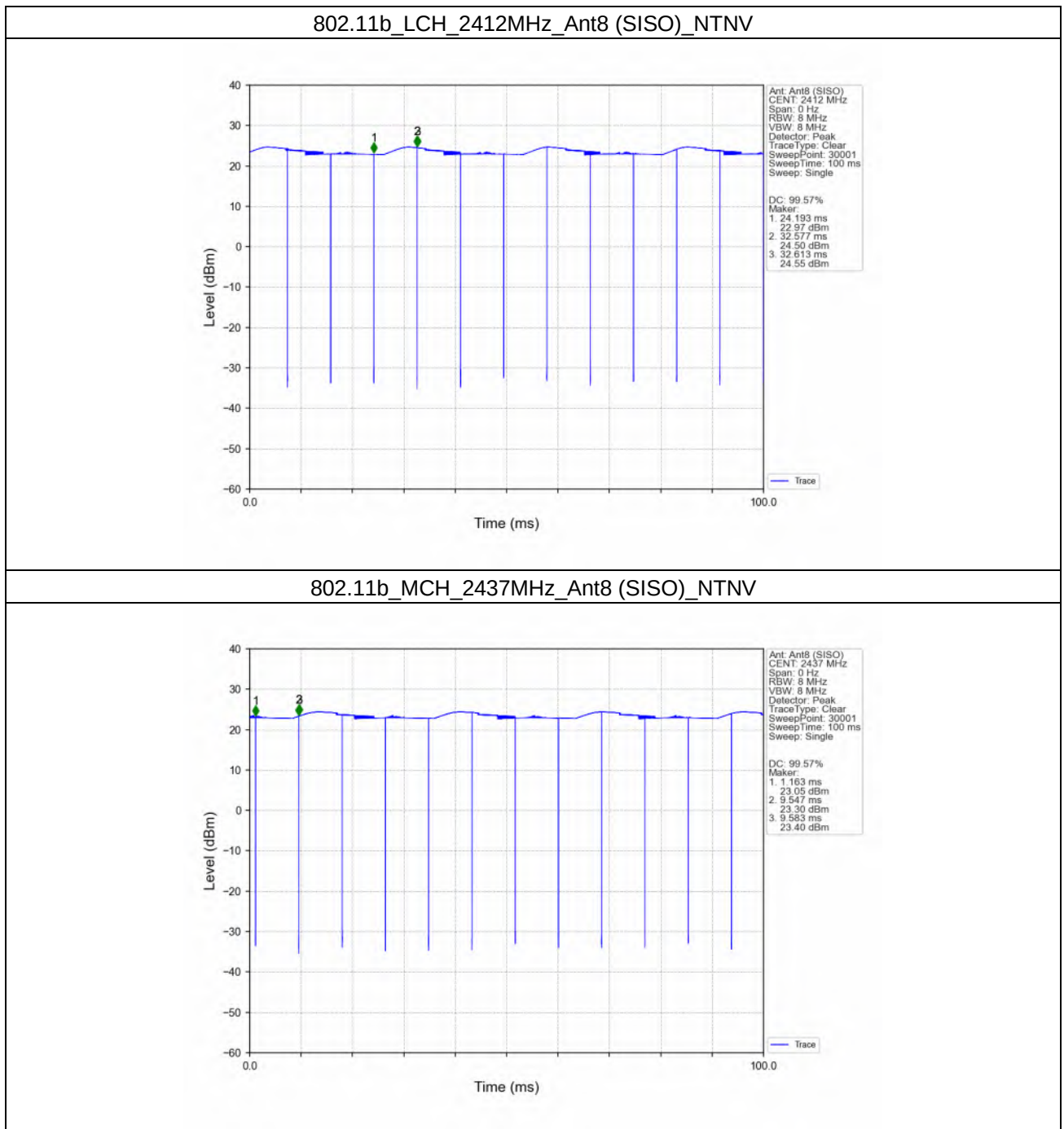
1.1 Test Result

1.1.1 Ant8

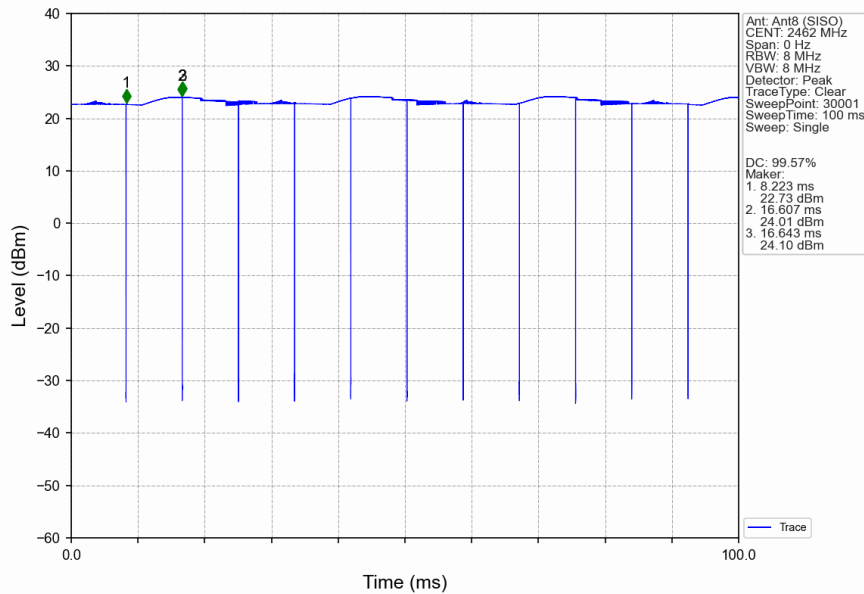
Ant8									
Mode	TX Type	Frequency (MHz)	RU	RU Pos	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	/	/	8.384	8.420	99.57	0.02	0.04
		2437	/	/	8.384	8.420	99.57	0.02	0.04
		2462	/	/	8.384	8.420	99.57	0.02	0.04
802.11g	SISO	2412	/	/	1.392	1.436	96.94	0.14	0.03
		2437	/	/	1.392	1.435	97.00	0.13	0.03
		2462	/	/	1.392	1.436	96.94	0.14	0.03
802.11n (HT20)	MIMO	2412	/	/	1.300	1.344	96.73	0.14	0.03
		2437	/	/	1.300	1.343	96.80	0.14	0.03
		2462	/	/	1.300	1.343	96.80	0.14	0.03
802.11n (HT40)	MIMO	2422	/	/	0.644	0.687	93.74	0.28	0.07
		2437	/	/	0.645	0.687	93.89	0.27	0.03
		2452	/	/	0.644	0.687	93.74	0.28	0.07
802.11ax (HEW20)	MIMO	2412	RU242	Left	1.015	1.057	96.03	0.18	0.03
		2437	RU242	Left	1.014	1.057	95.93	0.18	0.03
		2462	RU242	Left	1.015	1.058	95.94	0.18	0.07
802.11ax (HEW40)	MIMO	2422	RU484	Left	0.535	0.577	92.72	0.33	0.03
		2437	RU484	Left	0.534	0.578	92.39	0.34	0.13
		2452	RU484	Left	0.534	0.577	92.55	0.34	0.10

1.2 Test Graph

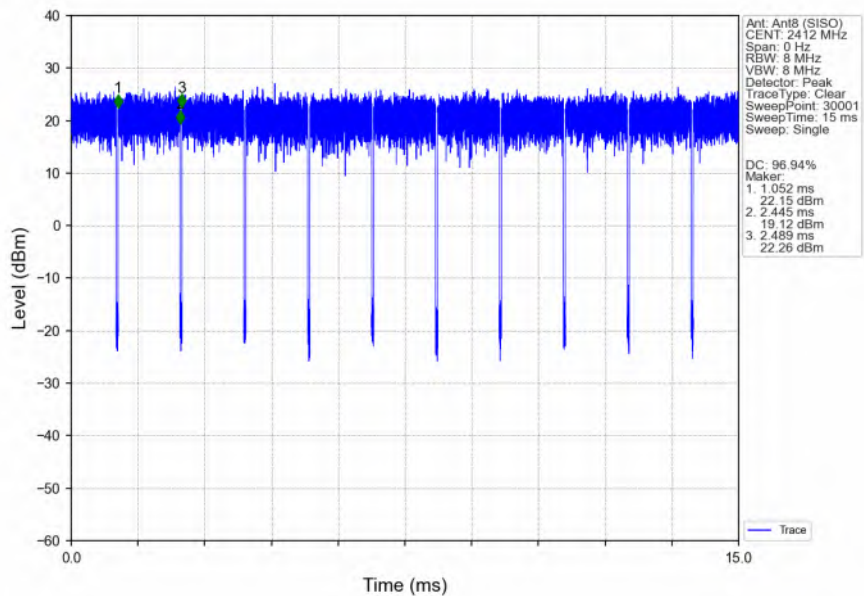
1.2.1 Ant8



802.11b_HCH_2462MHz_Ant8 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant8 (SISO)_NTNV



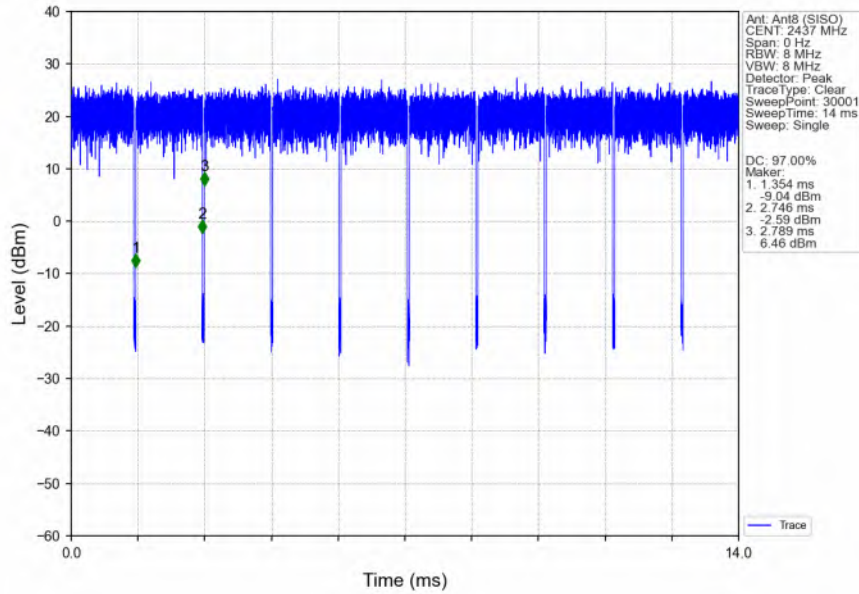
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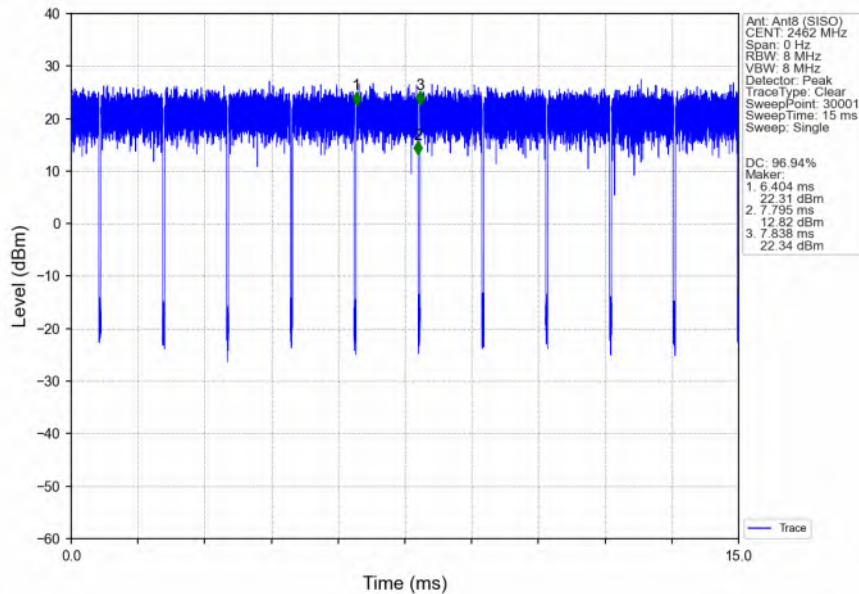
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Shenzhen Branch Inspection & Testing Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

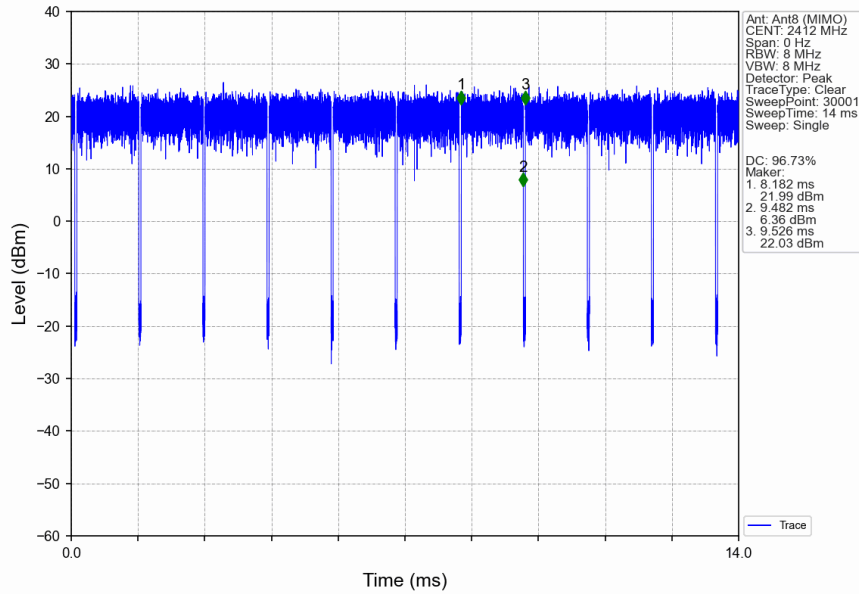
802.11g_MCH_2437MHz_Ant8 (SISO)_NTNV



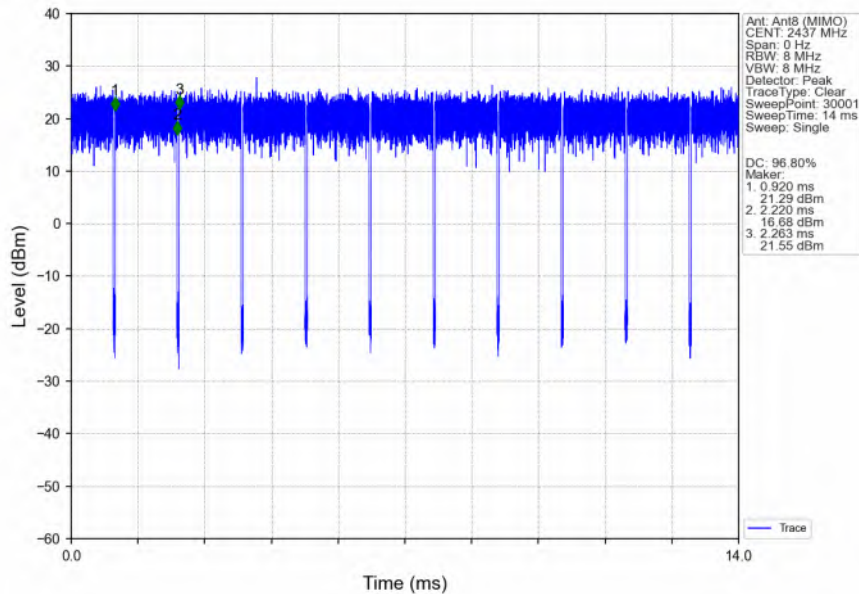
802.11g_HCH_2462MHz_Ant8 (SISO)_NTNV



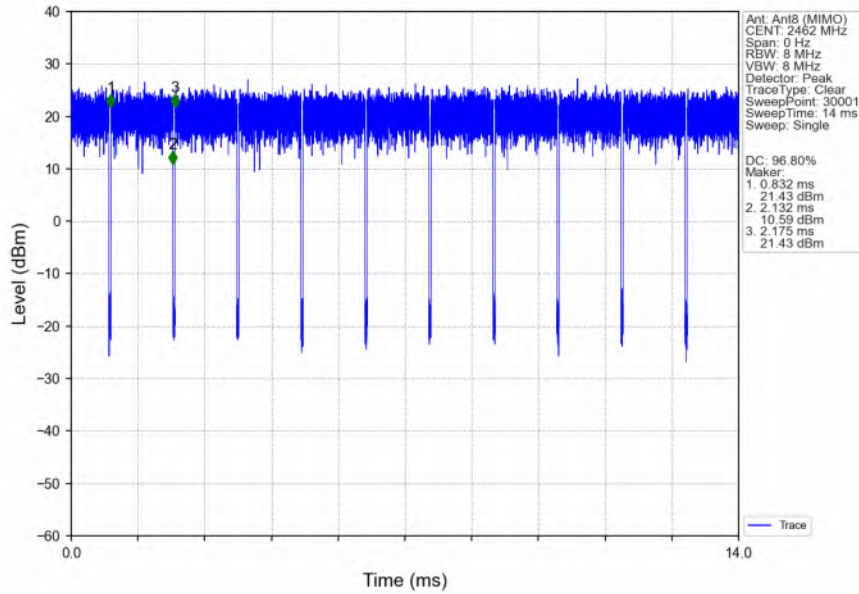
802.11n(HT20)_LCH_2412MHz_Ant8 (MIMO)_NTNV



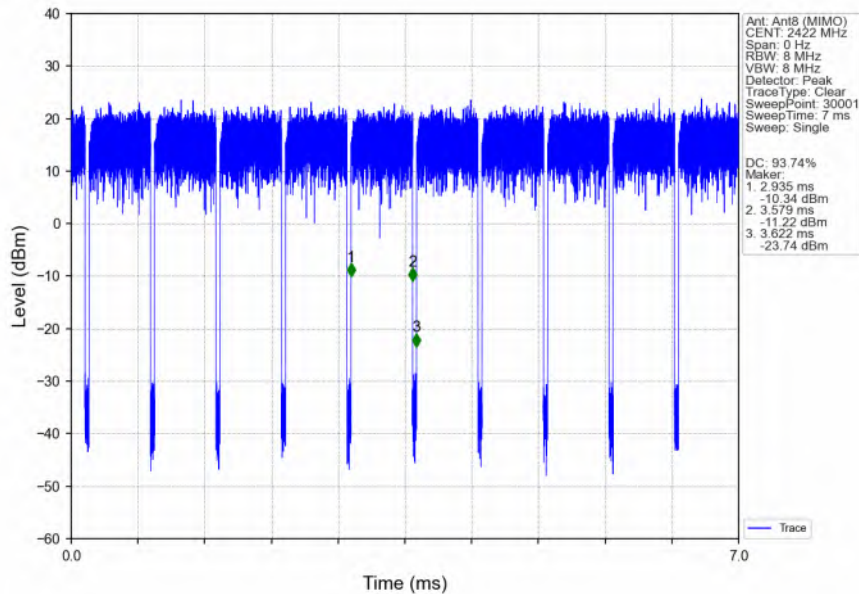
802.11n(HT20)_MCH_2437MHz_Ant8 (MIMO)_NTNV



802.11n(HT20)_HCH_2462MHz_Ant8 (MIMO)_NTNV



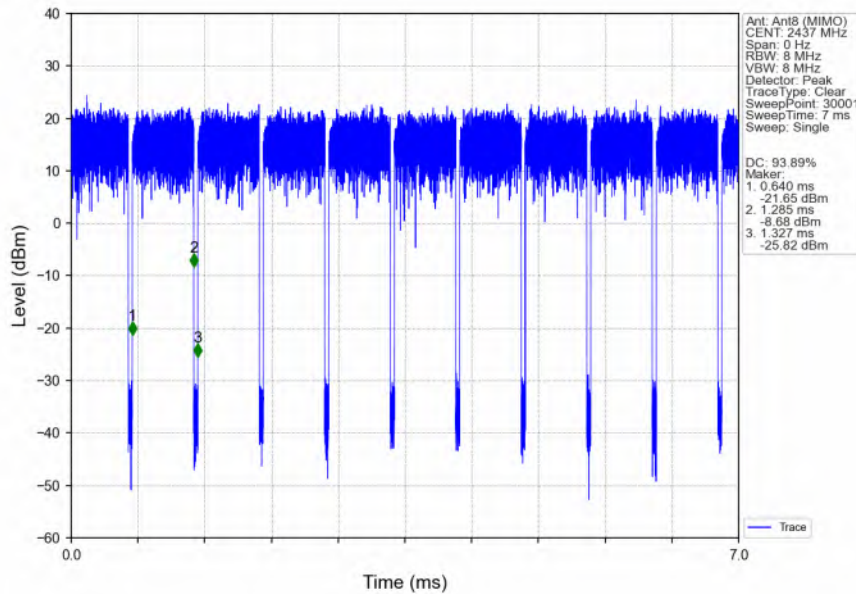
802.11n(HT40)_LCH_2422MHz_Ant8 (MIMO)_NTNV



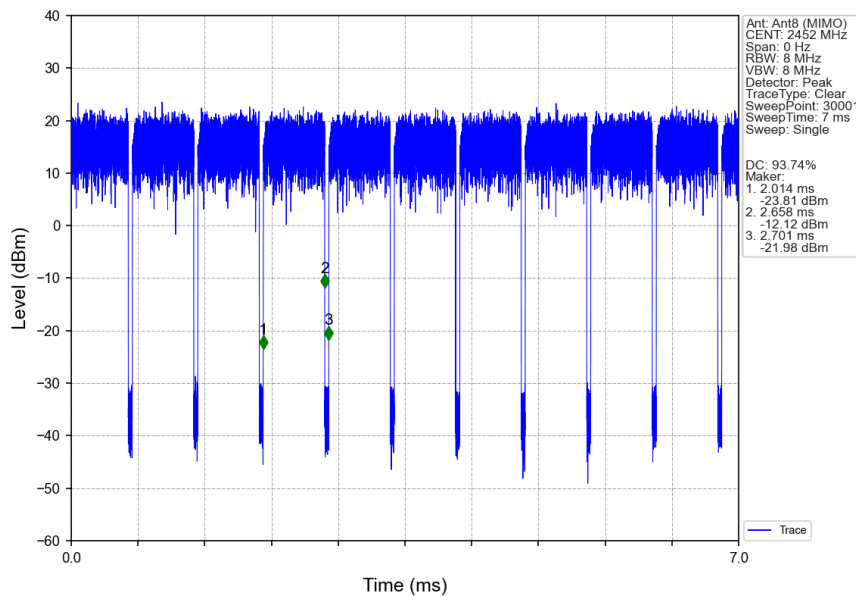
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802.11n(HT40)_MCH_2437MHz_Ant8 (MIMO)_NTNV



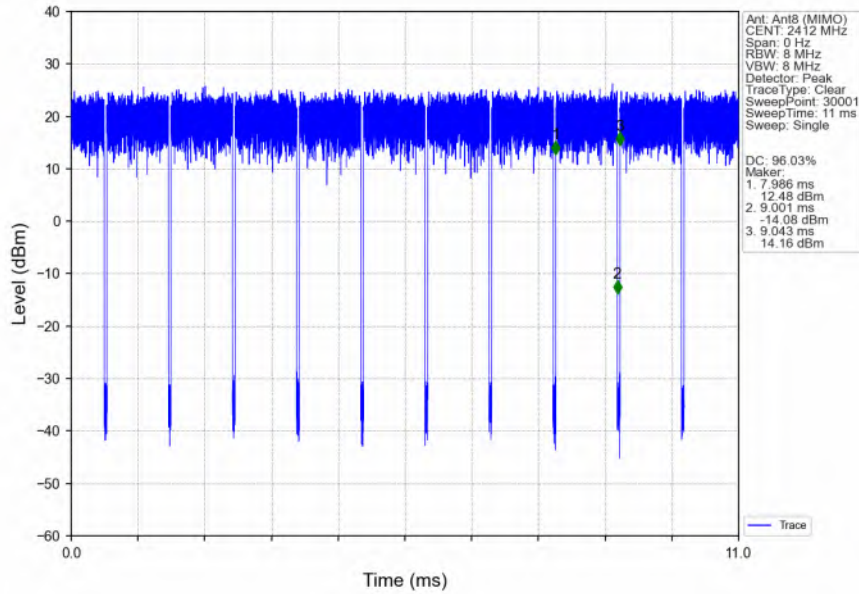
802.11n(HT40)_HCH_2452MHz_Ant8 (MIMO)_NTNV



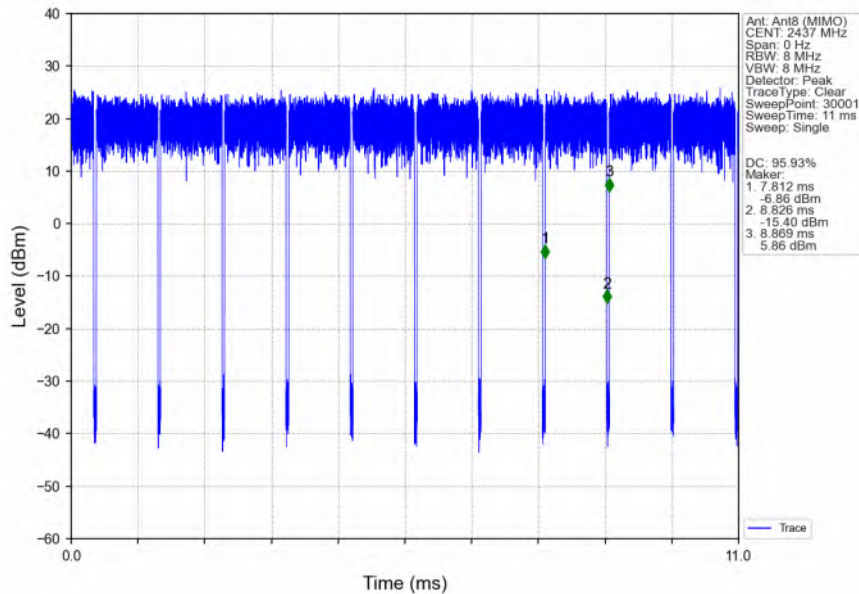
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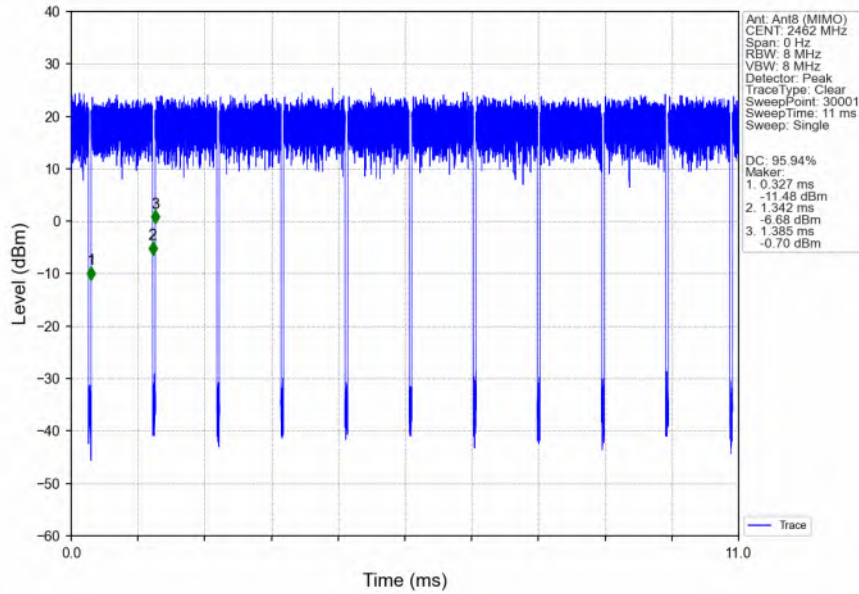
802.11ax(HEW20)_LCH_2412MHz_RU242_Left_Ant8 (MIMO)_NTNV



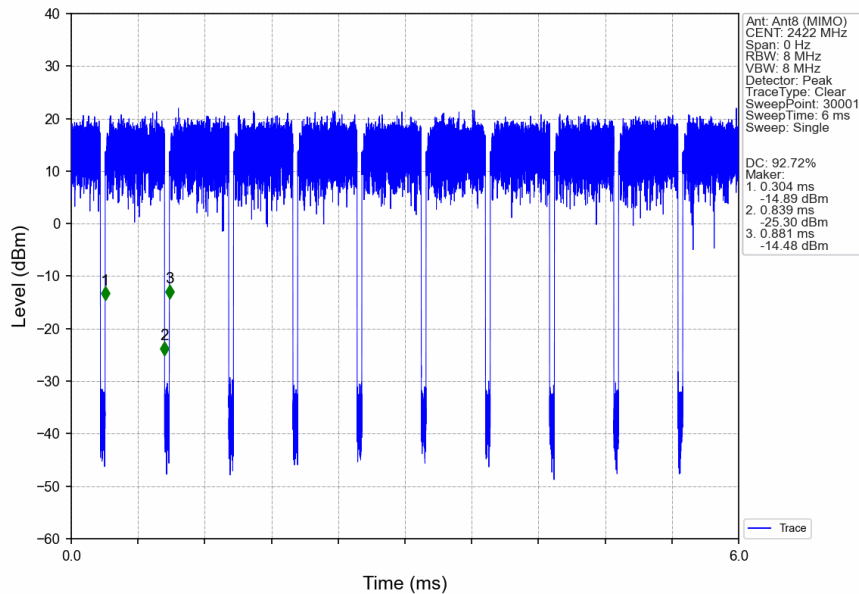
802.11ax(HEW20)_MCH_2437MHz_RU242_Left_Ant8 (MIMO)_NTNV



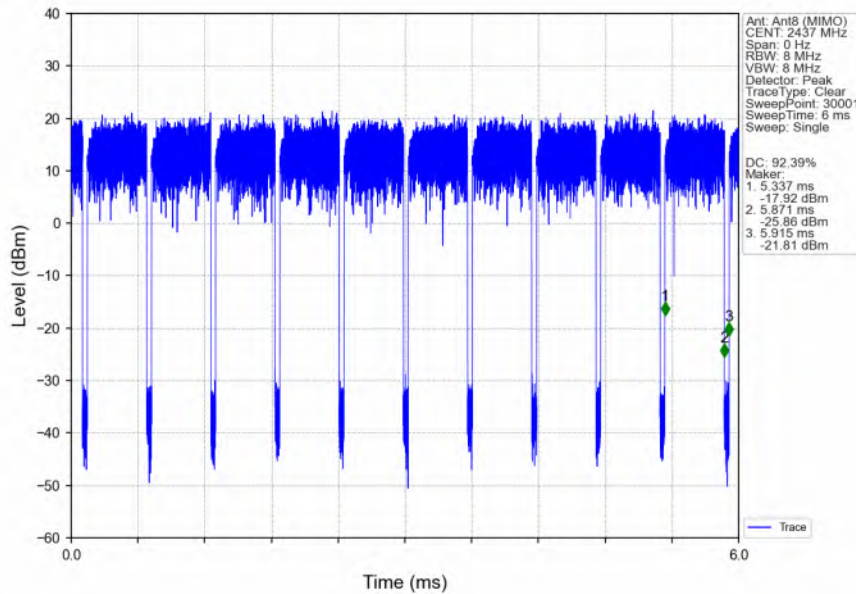
802.11ax(HEW20)_HCH_2462MHz_RU242_Left_Ant8 (MIMO)_NTNV



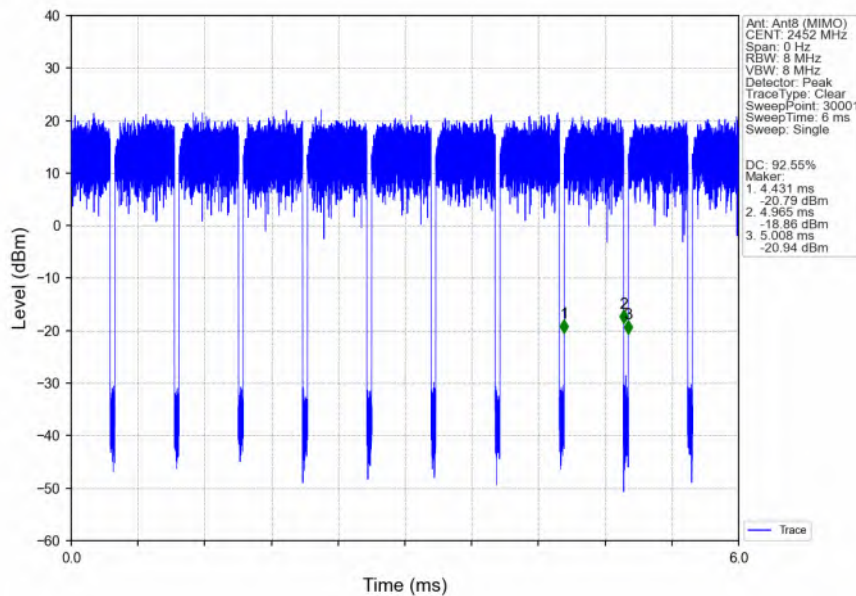
802.11ax(HEW40)_LCH_2422MHz_RU484_Left_Ant8 (MIMO)_NTNV



802.11ax(HEW40)_MCH_2437MHz_RU484_Left_Ant8 (MIMO)_NTNV



802.11ax(HEW40)_HCH_2452MHz_RU484_Left_Ant8 (MIMO)_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
						Result	Limit	
802.11b	SISO	2412	/	/	8	12.949	/	Pass
		2437	/	/	8	12.760	/	Pass
		2462	/	/	8	12.648	/	Pass
802.11g	SISO	2412	/	/	8	18.330	/	Pass
		2437	/	/	8	17.661	/	Pass
		2462	/	/	8	17.347	/	Pass
802.11n (HT20)	MIMO	2412	/	/	8	19.274	/	Pass
		2437	/	/	8	19.068	/	Pass
		2462	/	/	8	18.662	/	Pass
802.11n (HT40)	MIMO	2422	/	/	8	37.213	/	Pass
		2437	/	/	8	37.297	/	Pass
		2452	/	/	8	37.267	/	Pass
802.11ax (HEW20)	MIMO	2412	RU242	Left	8	19.094	/	Pass
		2437	RU242	Left	8	19.315	/	Pass
		2462	RU242	Left	8	19.387	/	Pass
802.11ax (HEW40)	MIMO	2422	RU484	Left	8	38.014	/	Pass
		2437	RU484	Left	8	37.992	/	Pass
		2452	RU484	Left	8	37.999	/	Pass

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2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	6dB Bandwidth (MHz)		Verdict
						Result	Limit	
802.11b	SISO	2412	/	/	8	8.256	≥ 0.5	Pass
		2437	/	/	8	8.240	≥ 0.5	Pass
		2462	/	/	8	8.212	≥ 0.5	Pass
802.11g	SISO	2412	/	/	8	16.833	≥ 0.5	Pass
		2437	/	/	8	16.320	≥ 0.5	Pass
		2462	/	/	8	16.229	≥ 0.5	Pass
802.11n (HT20)	MIMO	2412	/	/	8	18.129	≥ 0.5	Pass
		2437	/	/	8	17.680	≥ 0.5	Pass
		2462	/	/	8	17.329	≥ 0.5	Pass
802.11n (HT40)	MIMO	2422	/	/	8	35.933	≥ 0.5	Pass
		2437	/	/	8	36.209	≥ 0.5	Pass
		2452	/	/	8	36.018	≥ 0.5	Pass
802.11ax (HEW20)	MIMO	2412	RU242	Left	8	18.936	≥ 0.5	Pass
		2437	RU242	Left	8	18.906	≥ 0.5	Pass
		2462	RU242	Left	8	18.912	≥ 0.5	Pass
802.11ax (HEW40)	MIMO	2422	RU484	Left	8	37.539	≥ 0.5	Pass
		2437	RU484	Left	8	37.468	≥ 0.5	Pass
		2452	RU484	Left	8	37.654	≥ 0.5	Pass



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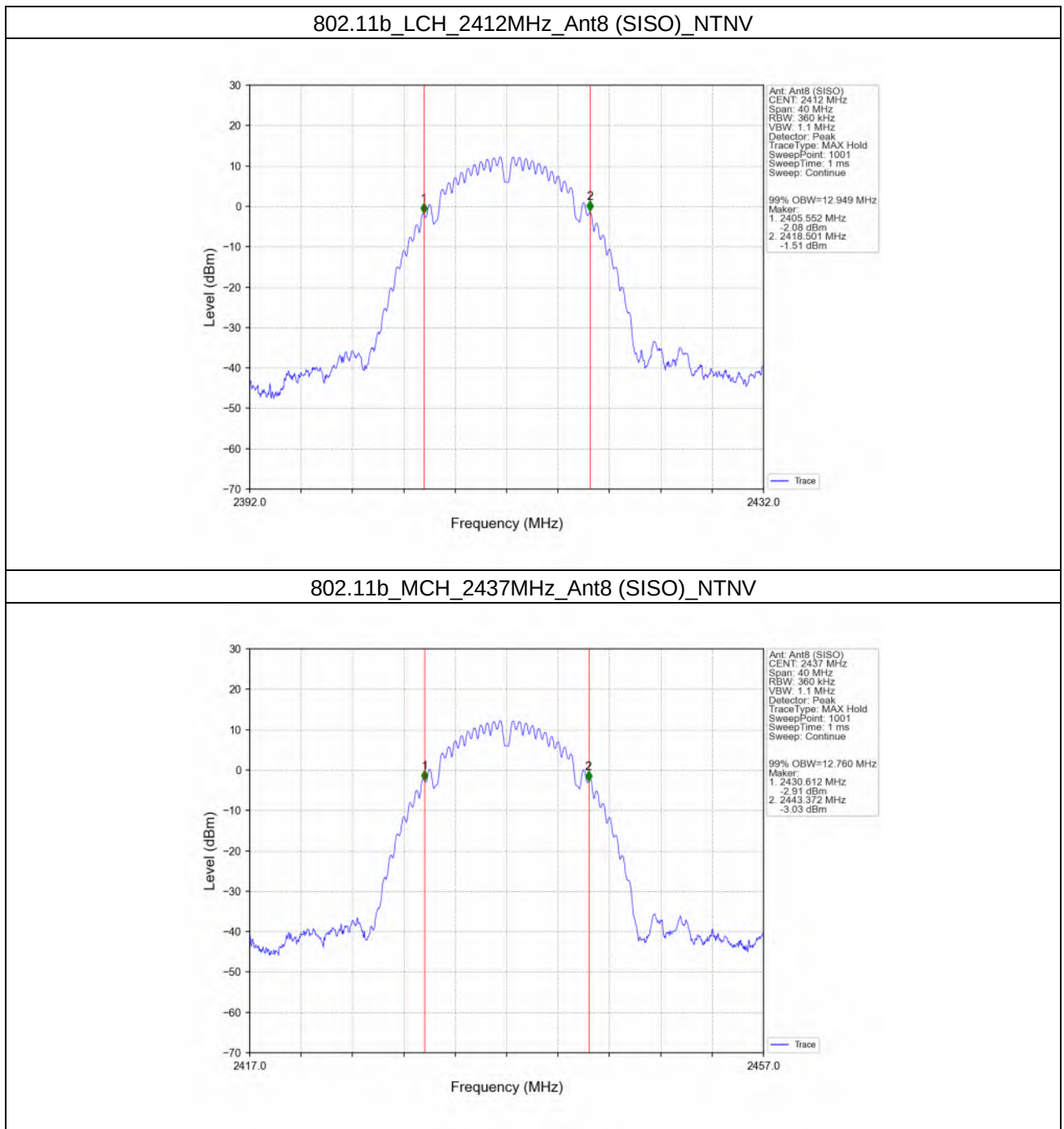
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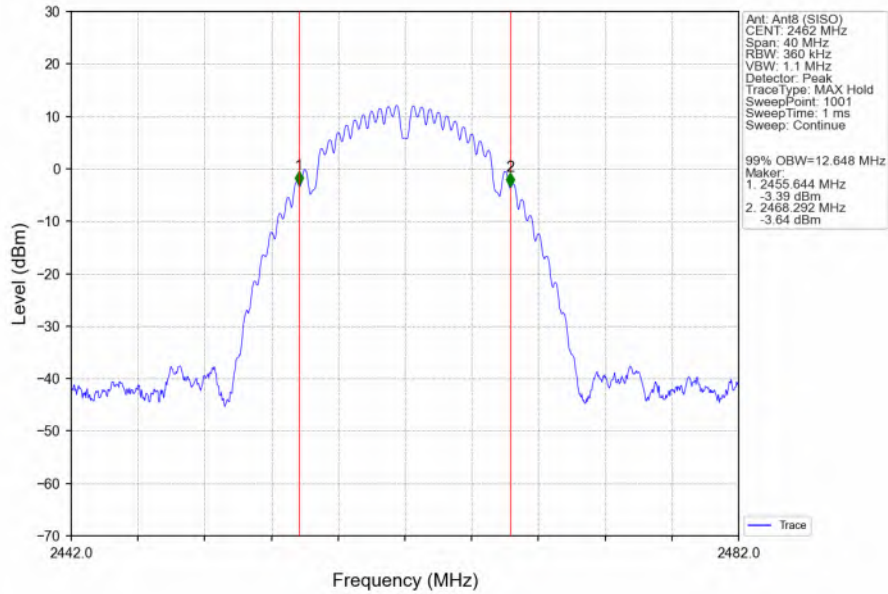
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2.2 Test Graph

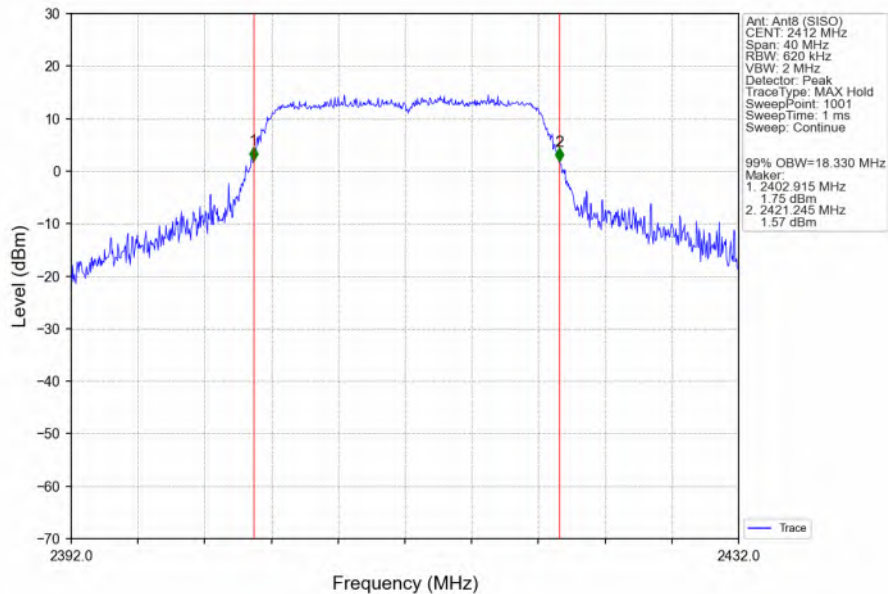
2.2.1 OBW



802.11b_HCH_2462MHz_Ant8 (SISO)_NTNV



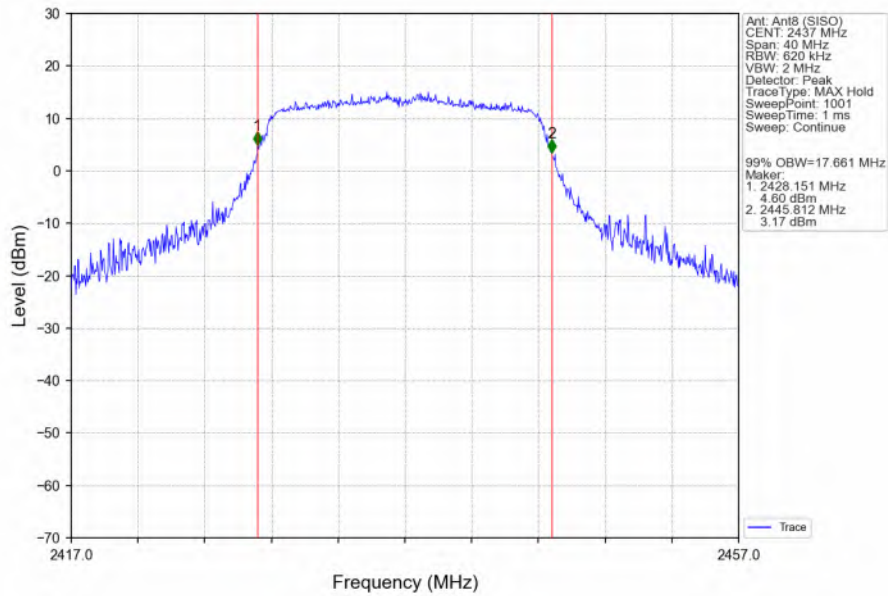
802.11g_LCH_2412MHz_Ant8 (SISO)_NTNV



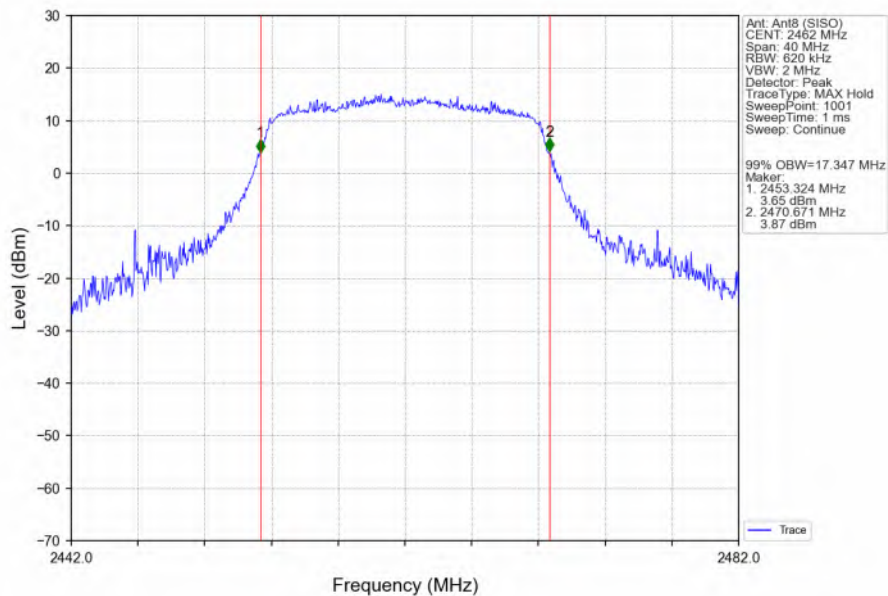
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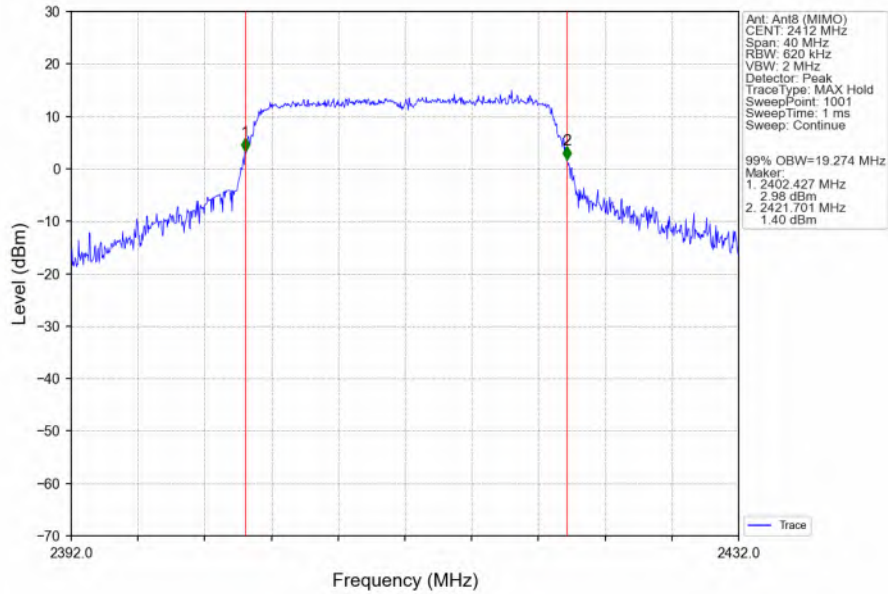
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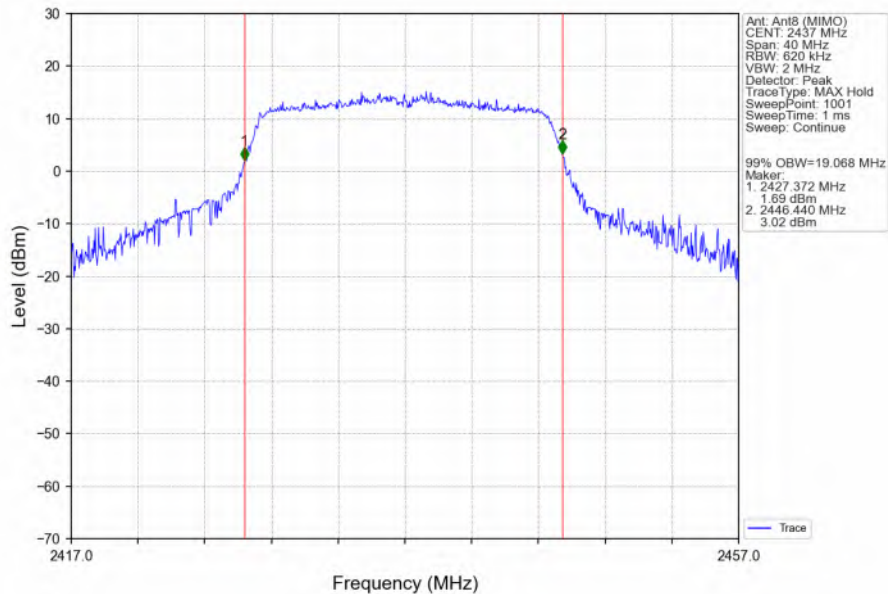
802.11g_HCH_2462MHz_Ant8 (SISO)_NTNV



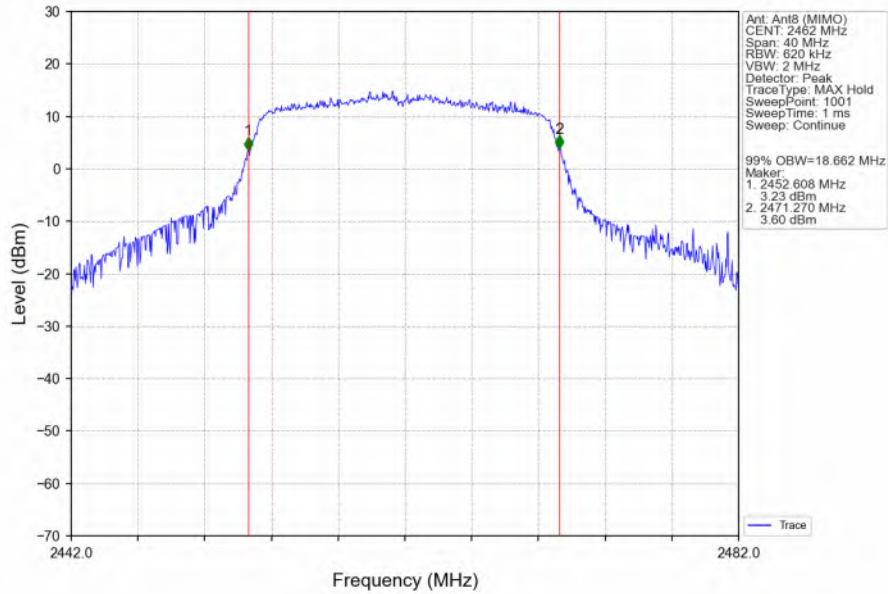
802.11n(HT20)_LCH_2412MHz_Ant8 (MIMO)_NTNV



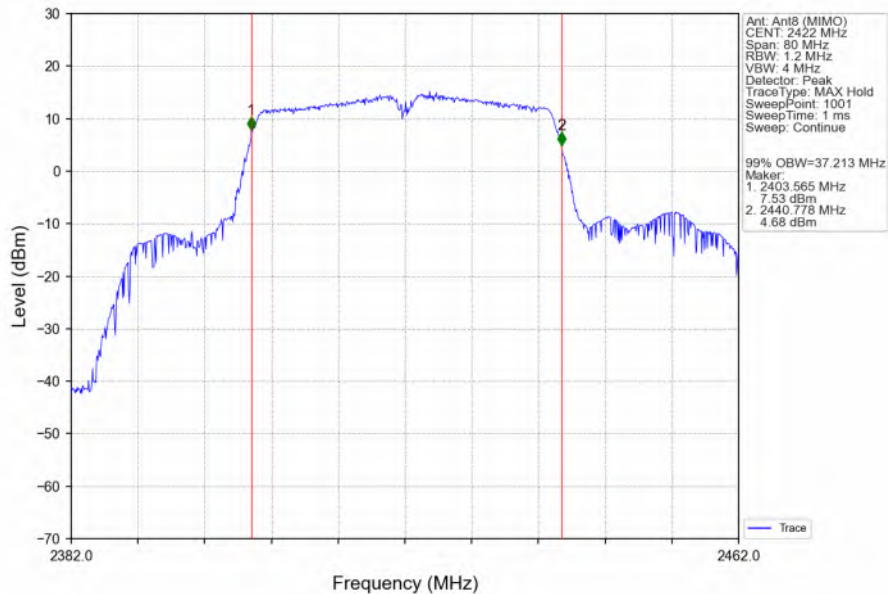
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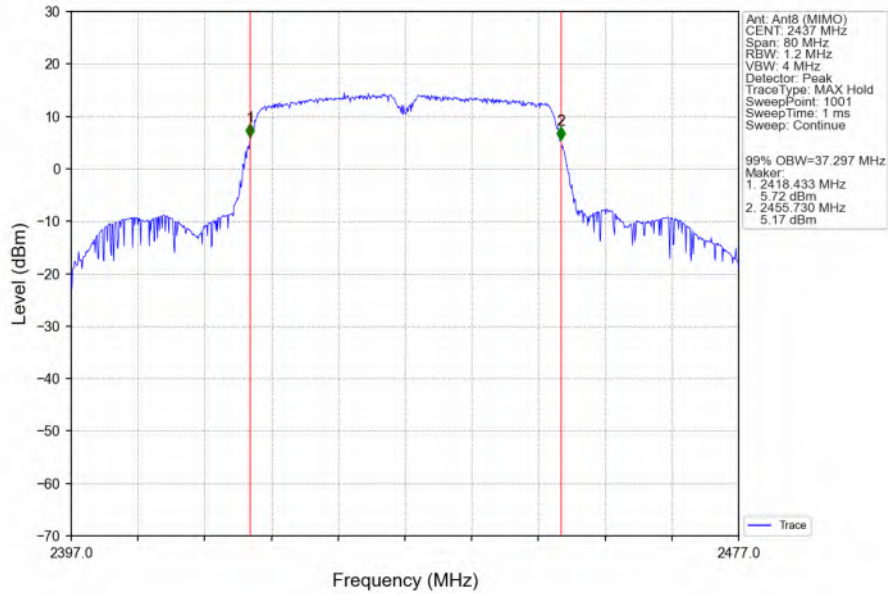
802.11n(HT20)_HCH_2462MHz_Ant8 (MIMO)_NTNV



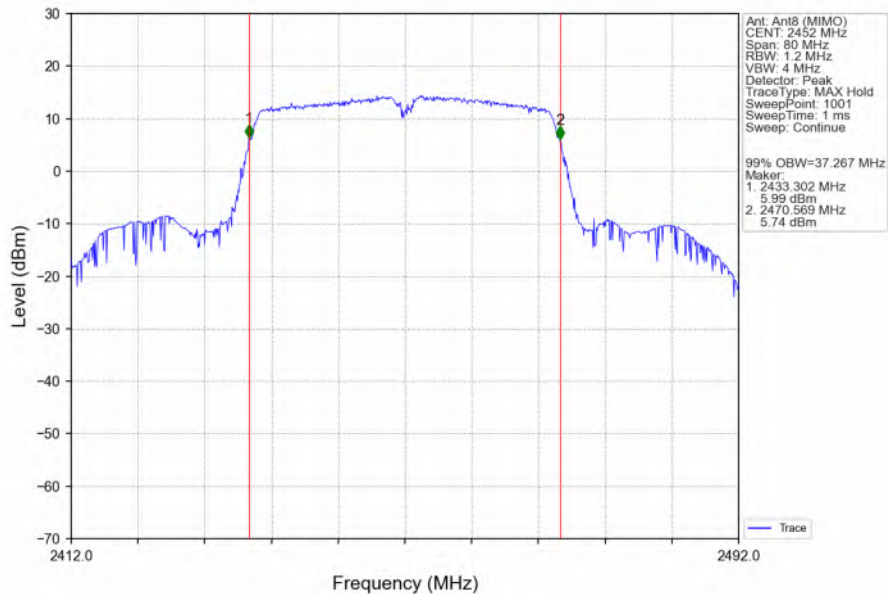
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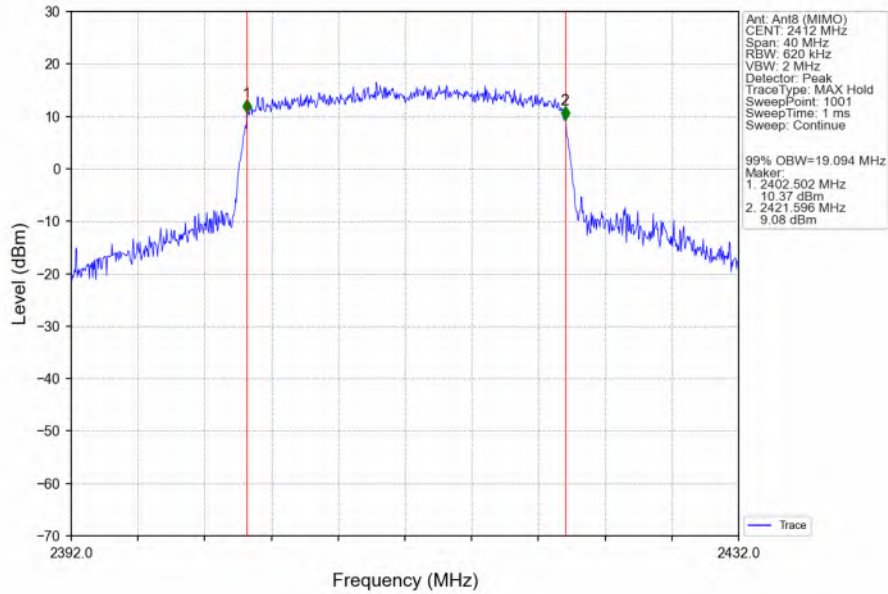
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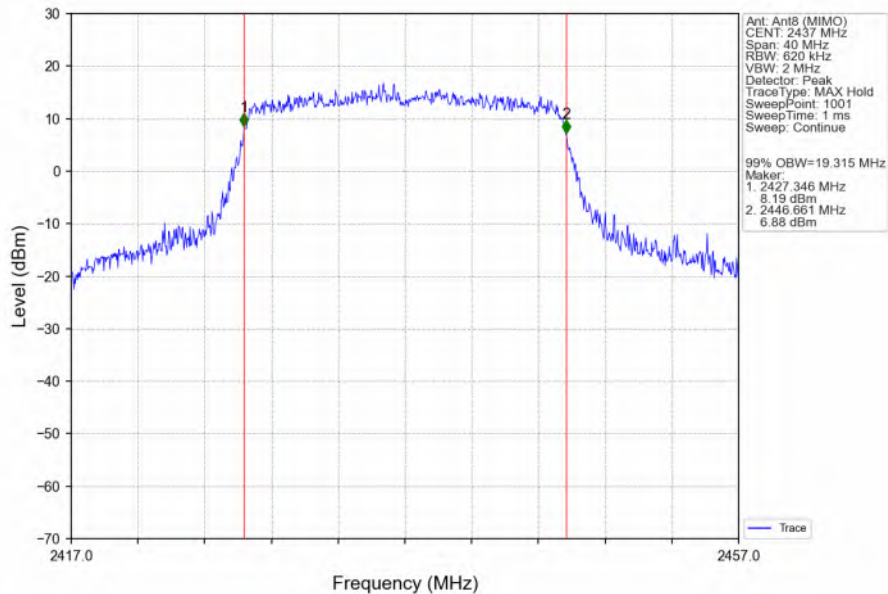
802.11n(HT40)_HCH_2452MHz_Ant8 (MIMO)_NTNV



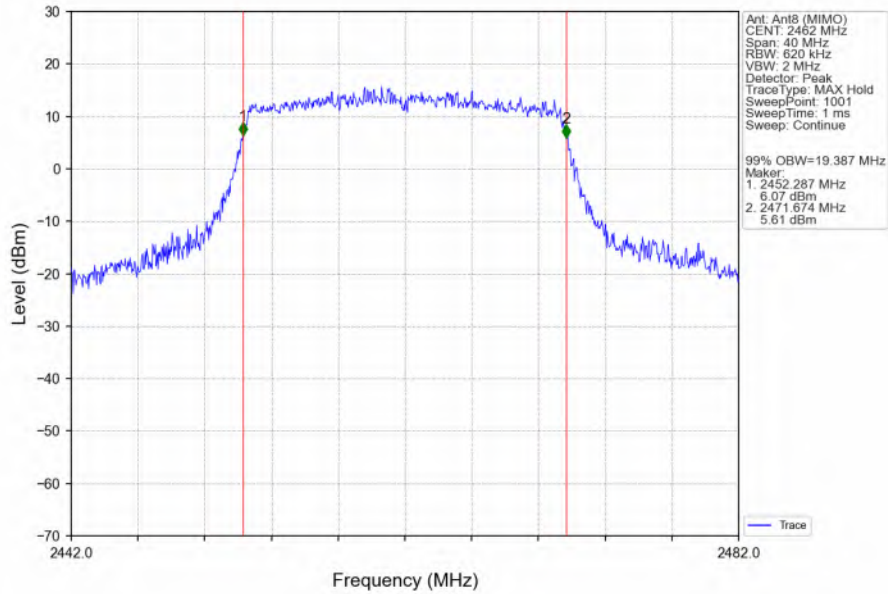
802.11ax(HEW20)_LCH_2412MHz_RU242_Left_Ant8 (MIMO)_NTNV



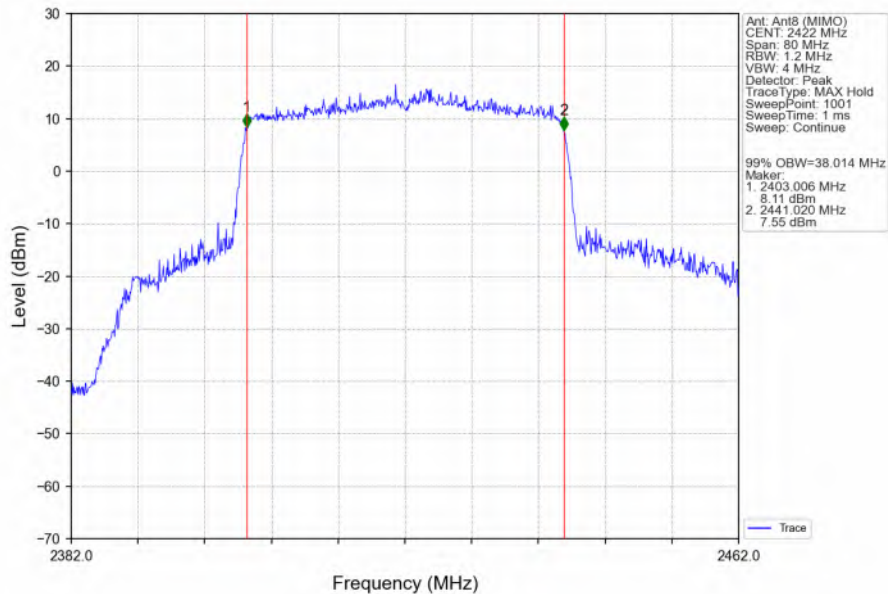
802.11ax(HEW20)_MCH_2437MHz_RU242_Left_Ant8 (MIMO)_NTNV



802.11ax(HEW20)_HCH_2462MHz_RU242_Left_Ant8 (MIMO)_NTNV



802.11ax(HEW40)_LCH_2422MHz_RU484_Left_Ant8 (MIMO)_NTNV



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