

7.8 Radiated Spurious Emissions (Below 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2013) Section 6.4,6.5
 Measurement 3m
 Distance:
 Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 42 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

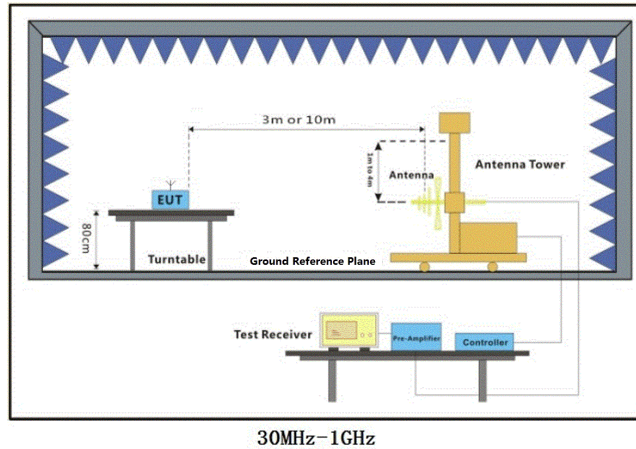
Pre-scan / Final test	Mode Code	Description
Pre-scan	05	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.
Final test	06	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). Only the data of worst case is recorded in the report.



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7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 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, quasi-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:

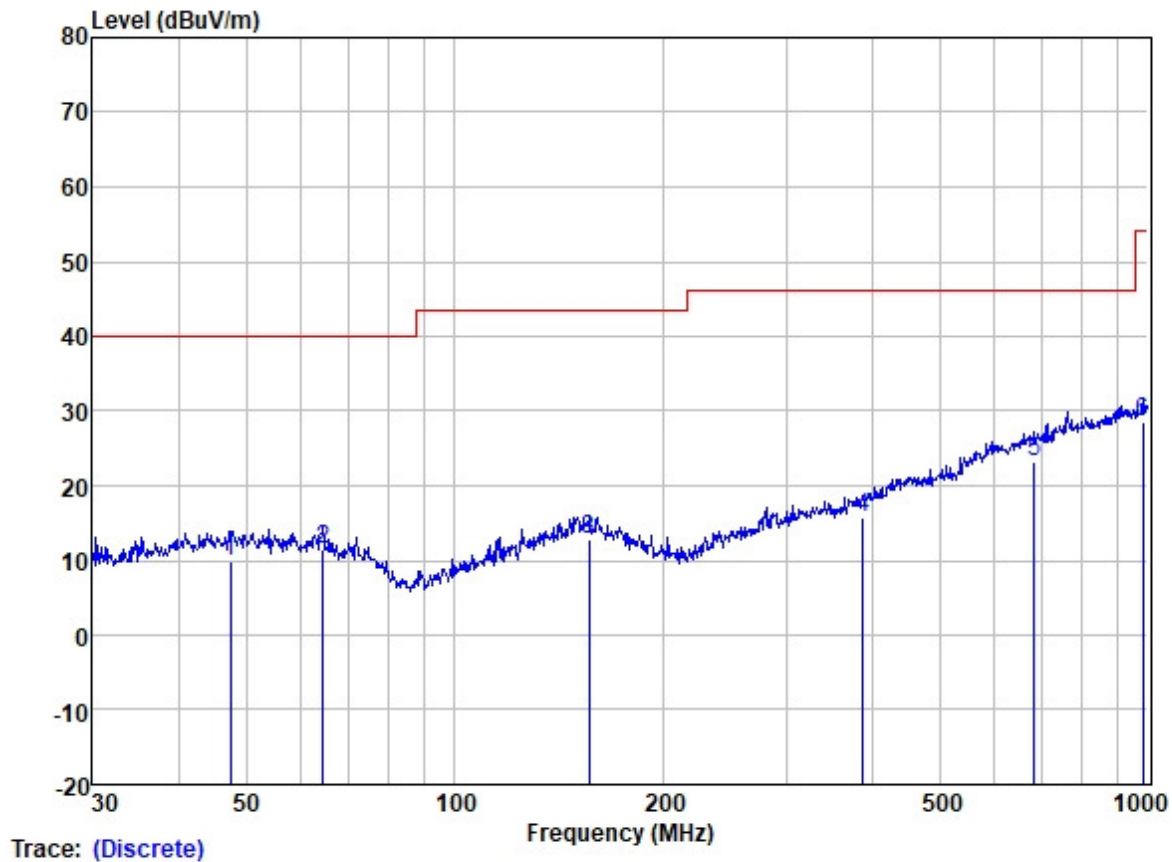
1) Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

3) Scan from 9kHz to 1 GHz, the disturbance below 30MHz 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.

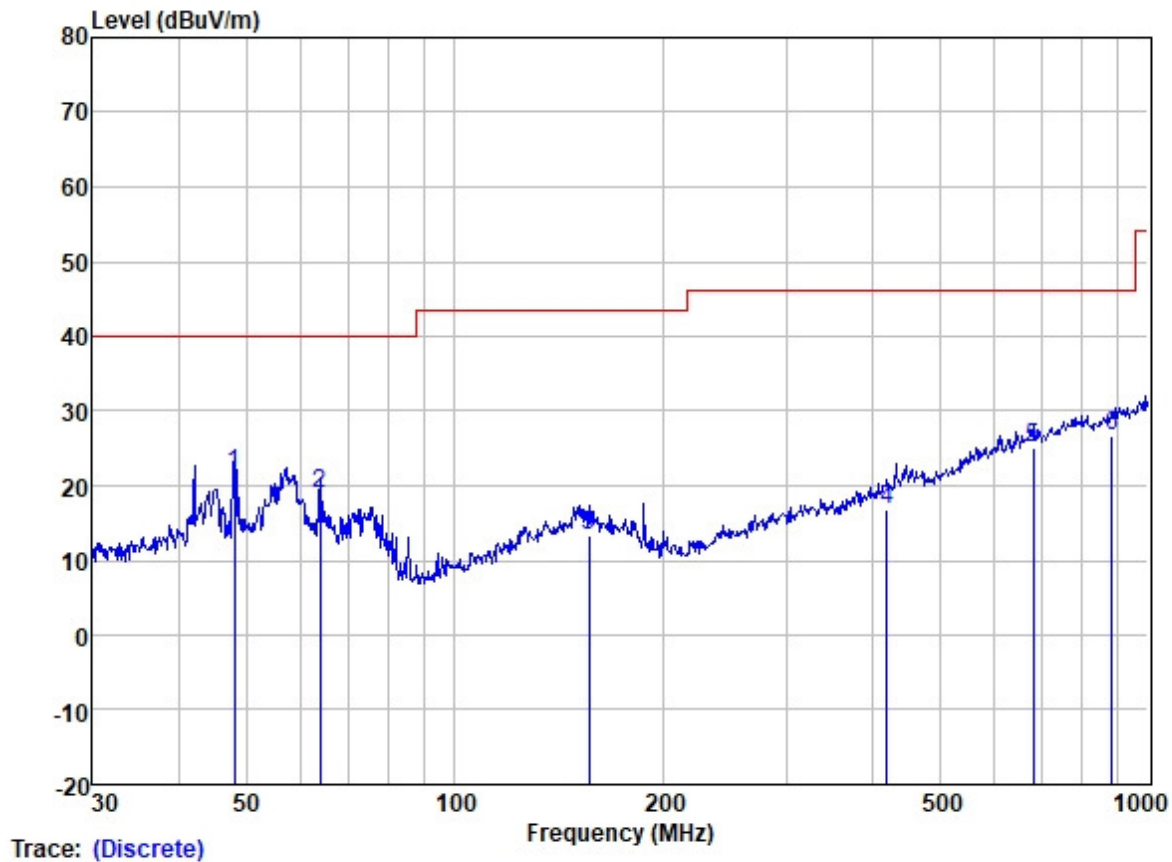
Test Mode: 06; Polarity: Horizontal



Site : SGS
Job :
Model :
Power :
Test Mode : 2.4GWIFI

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	47.492	22.26	13.70	1.13	27.17	9.92	40.00	-30.08	HORIZONTAL	QP
2	64.433	24.06	13.35	1.34	27.15	11.60	40.00	-28.40	HORIZONTAL	QP
3	155.910	23.99	13.44	2.30	26.81	12.92	43.50	-30.58	HORIZONTAL	QP
4	387.992	23.78	15.28	3.89	27.28	15.67	46.00	-30.33	HORIZONTAL	QP
5	684.745	24.97	20.60	5.70	28.17	23.10	46.00	-22.90	HORIZONTAL	QP
6	982.620	25.13	23.82	7.31	27.68	28.58	54.00	-25.42	HORIZONTAL	QP

Test Mode: 06; Polarity: Vertical



Site : SGS
Job :
Model :
Power :
Test Mode : 2.4GWIFI

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	47.994	33.98	13.70	1.13	27.17	21.64	40.00	-18.36	VERTICAL	QP
2	63.983	31.24	13.60	1.32	27.15	19.01	40.00	-20.99	VERTICAL	QP
3	155.910	24.45	13.44	2.30	26.81	13.38	43.50	-30.12	VERTICAL	QP
4	419.108	24.27	16.02	4.01	27.42	16.88	46.00	-29.12	VERTICAL	QP
5	682.348	27.04	20.55	5.70	28.17	25.12	46.00	-20.88	VERTICAL	QP
6	887.610	24.81	22.80	6.86	27.86	26.61	46.00	-19.39	VERTICAL	QP

7.9 Radiated Spurious Emissions (Above 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 46 % RH Atmospheric Pressure: 1010 mbar

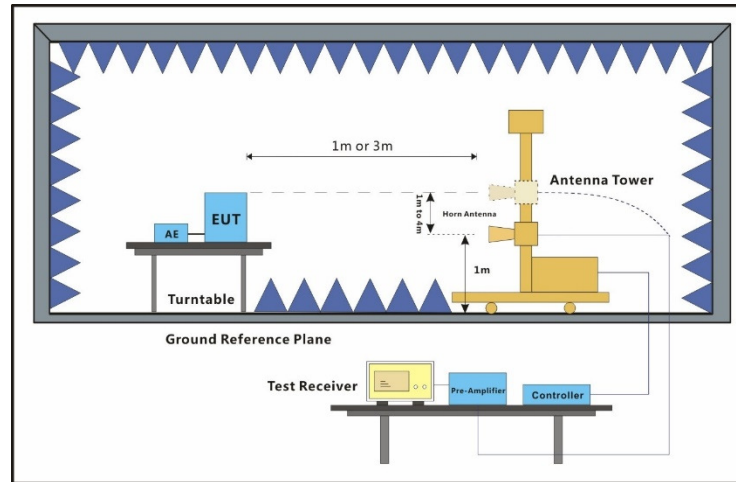
7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	05	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). Only the data of worst case is recorded in the report.
Final test	06	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). Only the data of worst case is recorded in the report.



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7.9.3 Test Setup Diagram



7.9.4 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 fully-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 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, quasi-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) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier 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.

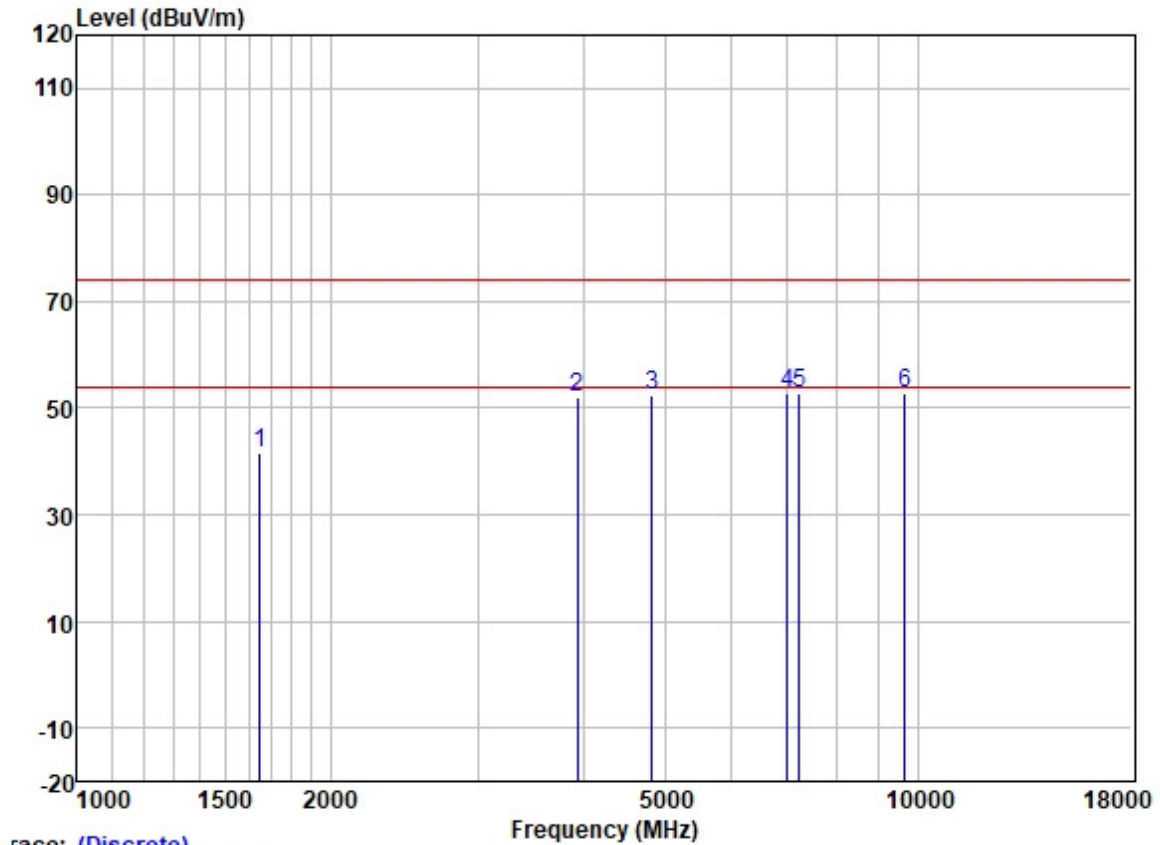
3) The field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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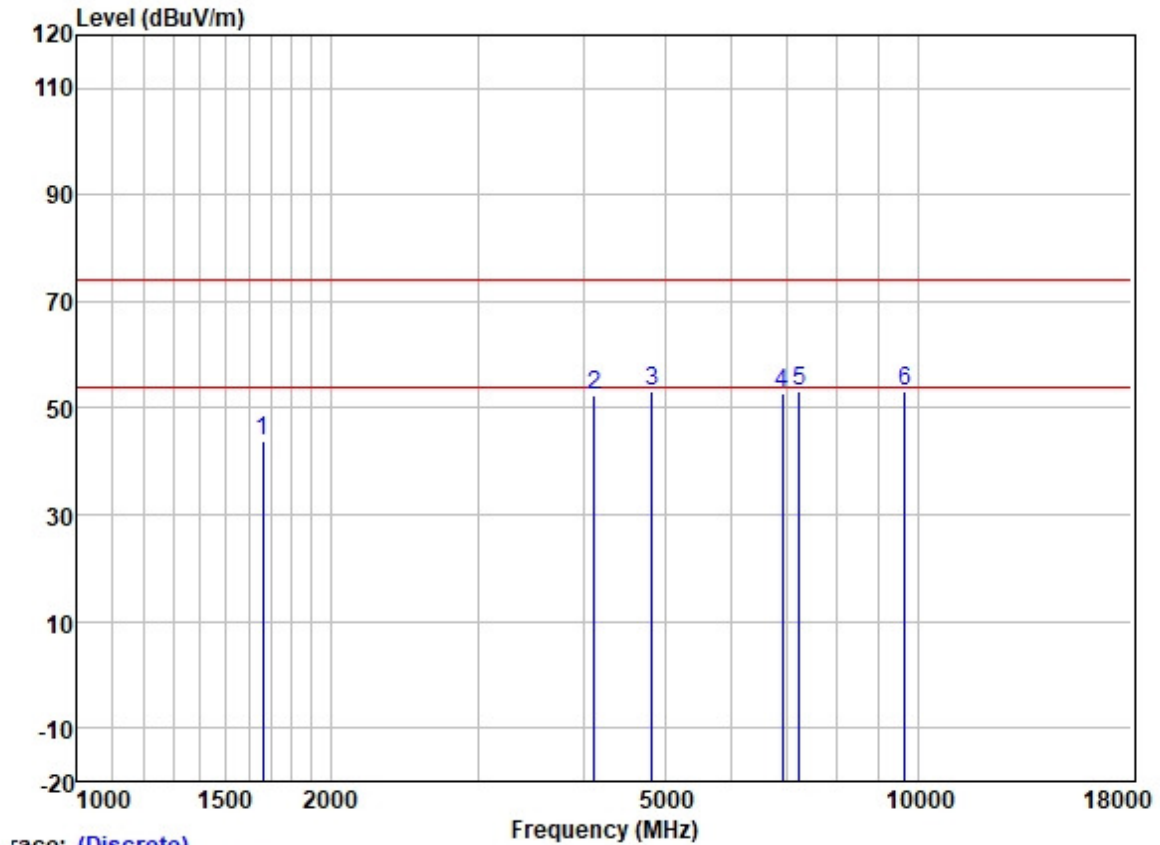
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Test Mode: 06; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



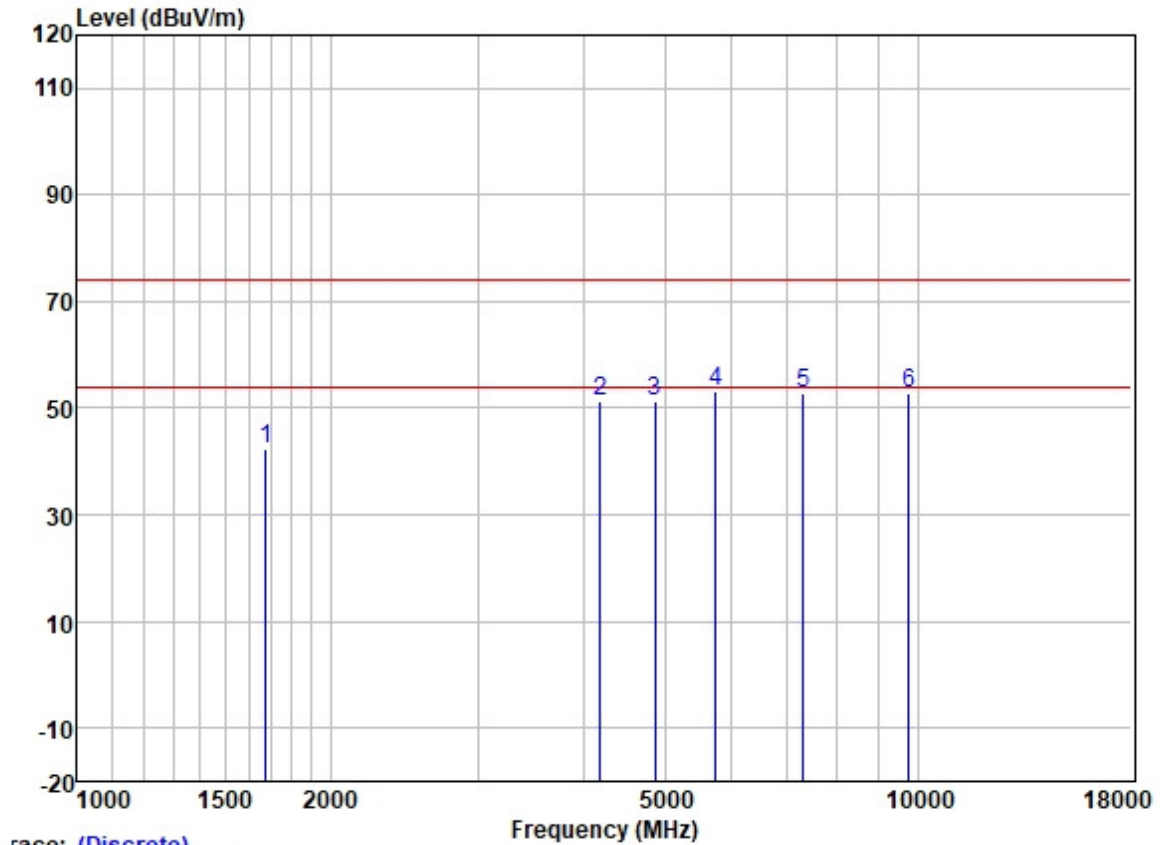
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1648.778	50.95	25.63	2.80	37.93	41.45	74.00	-32.55	HORIZONTAL	Peak
2	3935.493	54.42	29.73	4.60	36.82	51.93	74.00	-22.07	HORIZONTAL	Peak
3	4824.000	52.52	31.45	5.42	36.83	52.56	74.00	-21.44	HORIZONTAL	Peak
4	6995.172	49.36	35.00	5.81	37.25	52.92	74.00	-21.08	HORIZONTAL	Peak
5	7236.000	48.56	35.70	6.03	37.39	52.90	74.00	-21.10	HORIZONTAL	Peak
6	9648.000	44.74	38.40	7.06	37.42	52.78	74.00	-21.22	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



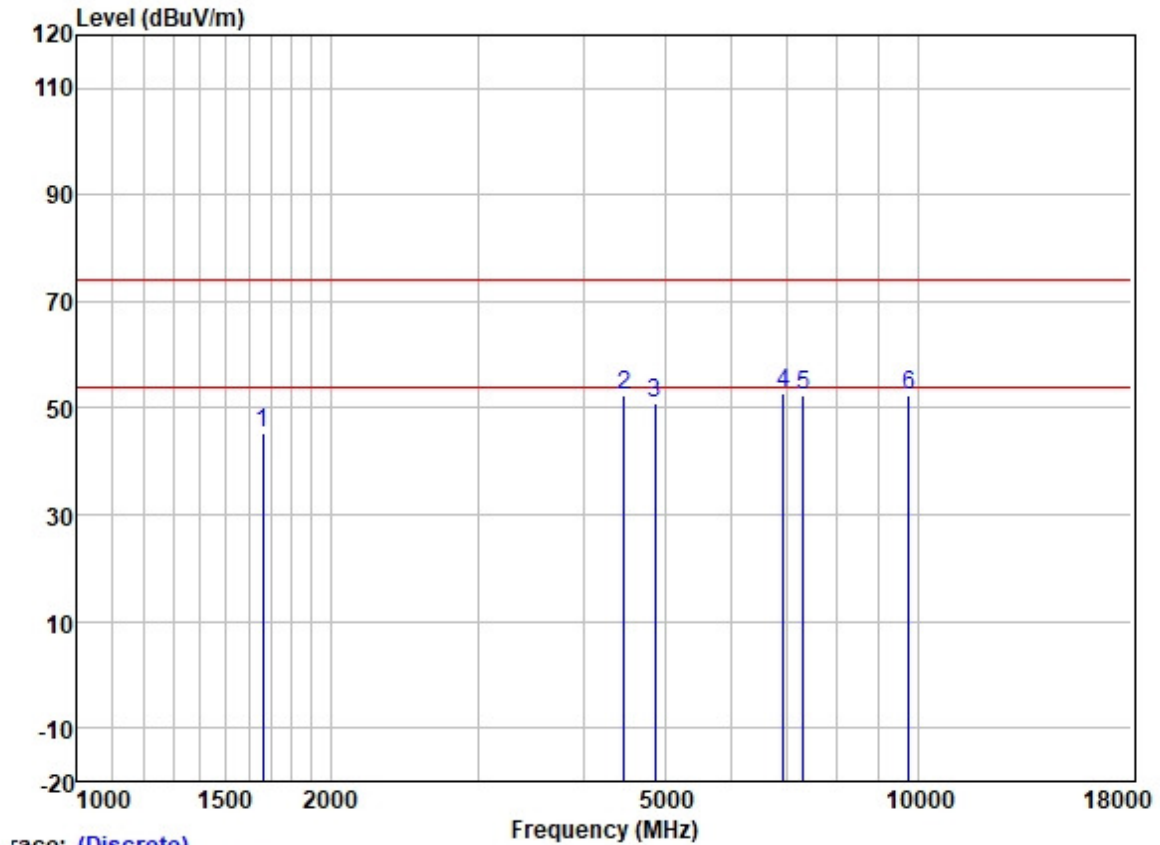
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	53.25	25.65	2.80	37.91	43.79	74.00	-30.21	VERTICAL	Peak
2	4121.768	54.50	29.98	4.60	36.80	52.28	74.00	-21.72	VERTICAL	Peak
3	4824.000	53.08	31.45	5.42	36.83	53.12	74.00	-20.88	VERTICAL	Peak
4	6894.806	49.34	34.85	5.81	37.18	52.82	74.00	-21.18	VERTICAL	Peak
5	7236.000	48.67	35.70	6.03	37.39	53.01	74.00	-20.99	VERTICAL	Peak
6	9648.000	45.22	38.40	7.06	37.42	53.26	74.00	-20.74	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



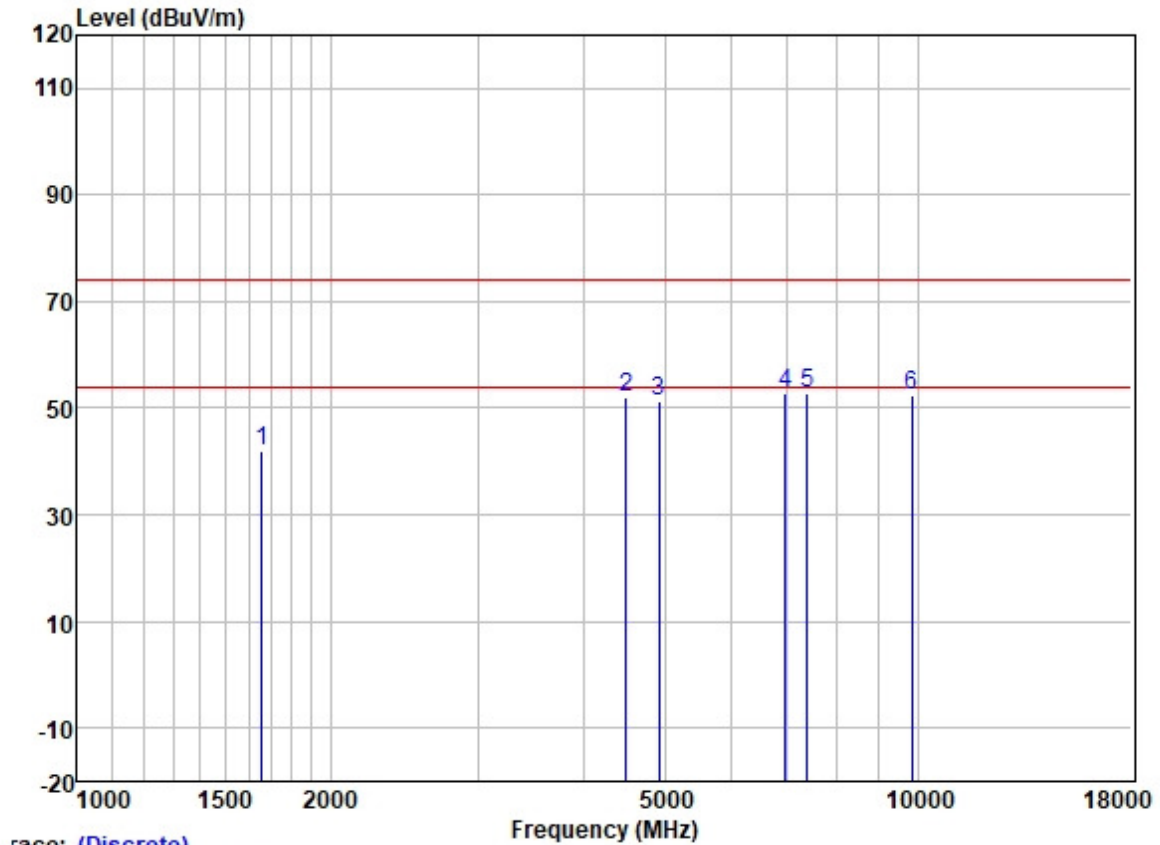
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1677.621	51.88	25.68	2.80	37.91	42.45	74.00	-31.55	HORIZONTAL	Peak
2	4193.872	53.50	30.15	4.60	36.81	51.44	74.00	-22.56	HORIZONTAL	Peak
3	4874.000	51.19	31.54	5.50	36.84	51.39	74.00	-22.61	HORIZONTAL	Peak
4	5746.982	51.84	32.10	6.20	36.89	53.25	74.00	-20.75	HORIZONTAL	Peak
5	7311.000	48.08	35.93	6.11	37.42	52.70	74.00	-21.30	HORIZONTAL	Peak
6	9748.000	44.55	38.50	7.02	37.41	52.66	74.00	-21.34	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



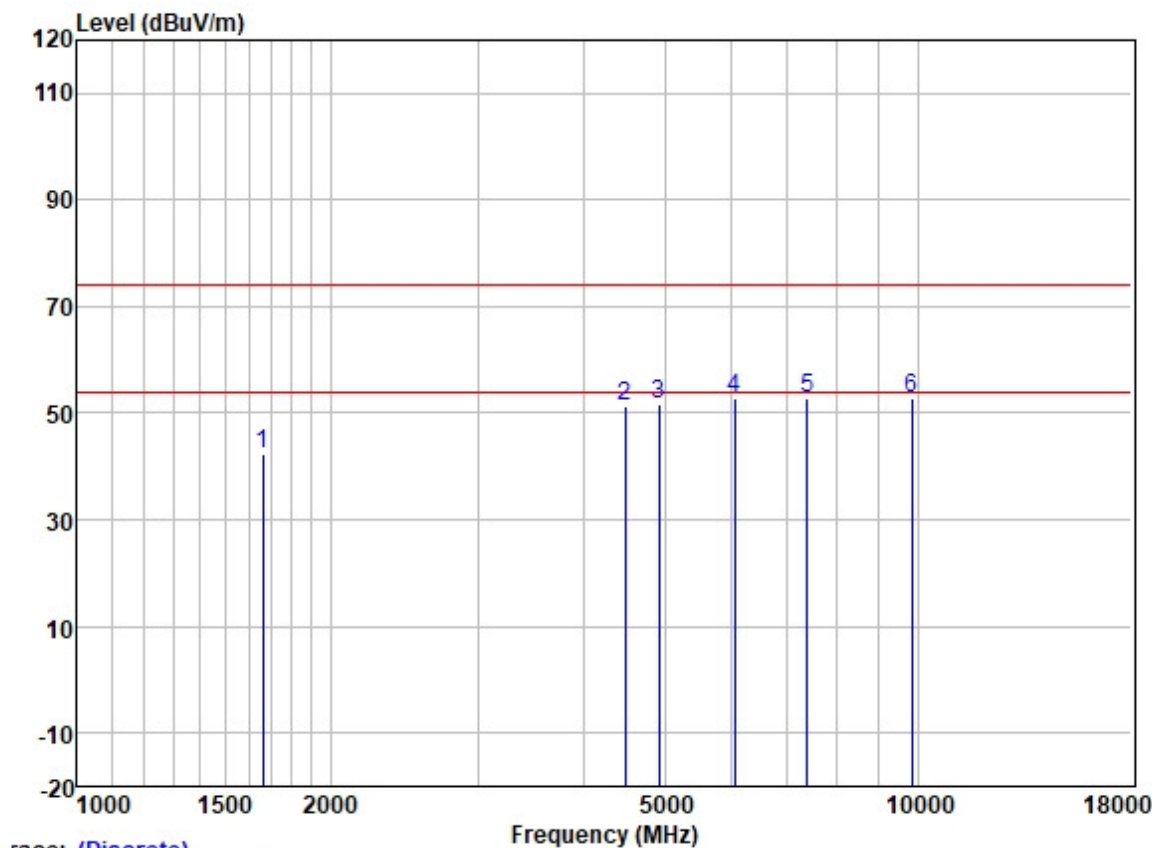
		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	54.73	25.65	2.80	37.91	45.27	74.00	-28.73	VERTICAL	Peak
2	4469.214	53.65	30.77	4.93	36.81	52.54	74.00	-21.46	VERTICAL	Peak
3	4874.000	50.75	31.54	5.50	36.84	50.95	74.00	-23.05	VERTICAL	Peak
4	6914.763	49.11	34.89	5.81	37.19	52.62	74.00	-21.38	VERTICAL	Peak
5	7311.000	47.99	35.93	6.11	37.42	52.61	74.00	-21.39	VERTICAL	Peak
6	9748.000	44.42	38.50	7.02	37.41	52.53	74.00	-21.47	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High

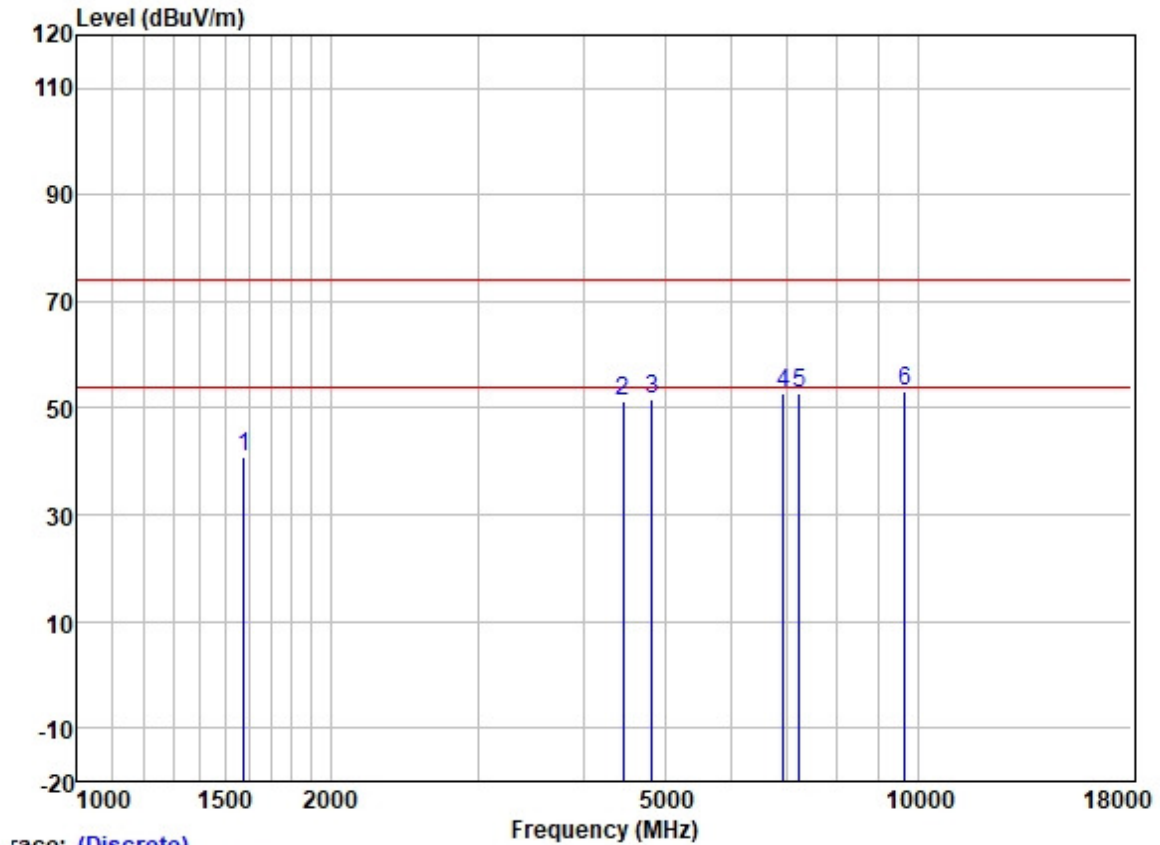


	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1658.337	51.37	25.65	2.80	37.93	41.89	74.00	-32.11	HORIZONTAL	Peak
2	4495.125	53.16	30.80	5.05	36.82	52.19	74.00	-21.81	HORIZONTAL	Peak
3	4924.000	50.76	31.62	5.60	36.84	51.14	74.00	-22.86	HORIZONTAL	Peak
4	6954.852	49.32	34.95	5.81	37.21	52.87	74.00	-21.13	HORIZONTAL	Peak
5	7386.000	47.80	36.17	6.19	37.45	52.71	74.00	-21.29	HORIZONTAL	Peak
6	9848.000	44.27	38.58	6.99	37.41	52.43	74.00	-21.57	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High

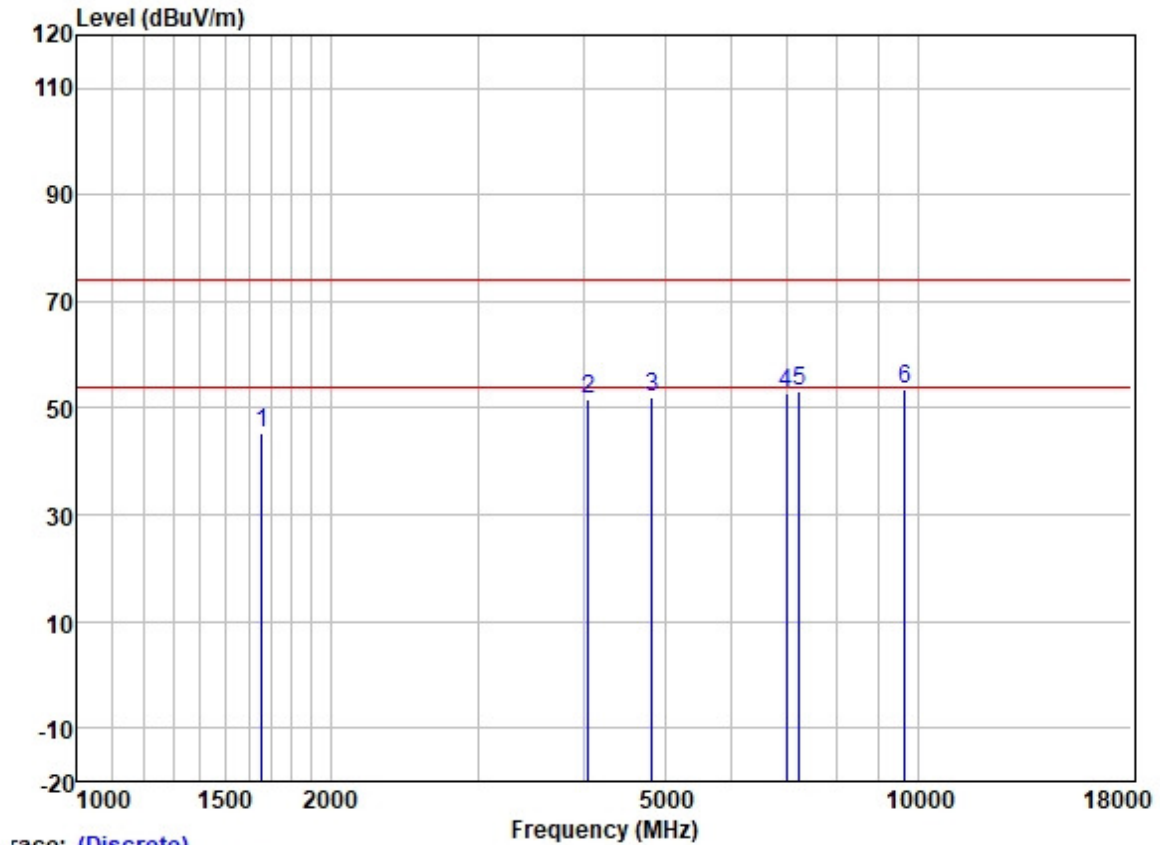


Test Mode: 06; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



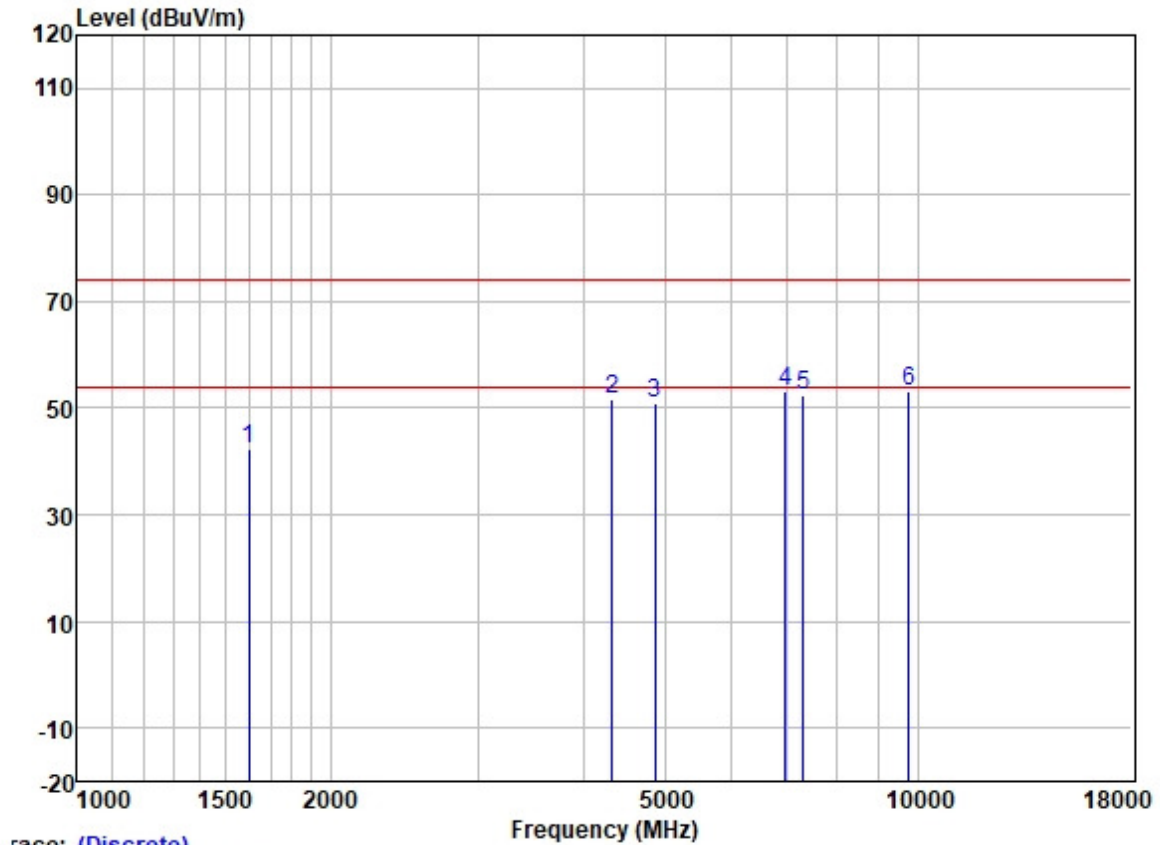
	Freq	ReadAntenna	Cable	Preamp		Limit	Over		
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1578.822	50.63	25.56	2.80	38.00	40.99	74.00	-33.01	HORIZONTAL Peak
2	4456.315	52.48	30.75	4.88	36.81	51.30	74.00	-22.70	HORIZONTAL Peak
3	4824.000	51.52	31.45	5.42	36.83	51.56	74.00	-22.44	HORIZONTAL Peak
4	6914.763	49.27	34.89	5.81	37.19	52.78	74.00	-21.22	HORIZONTAL Peak
5	7236.000	48.52	35.70	6.03	37.39	52.86	74.00	-21.14	HORIZONTAL Peak
6	9648.000	45.30	38.40	7.06	37.42	53.34	74.00	-20.66	HORIZONTAL Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1658.337	54.73	25.65	2.80	37.93	45.25	74.00	-28.75	VERTICAL	Peak
2	4050.904	53.98	29.87	4.60	36.80	51.65	74.00	-22.35	VERTICAL	Peak
3	4824.000	52.02	31.45	5.42	36.83	52.06	74.00	-21.94	VERTICAL	Peak
4	6974.982	49.29	34.97	5.81	37.23	52.84	74.00	-21.16	VERTICAL	Peak
5	7236.000	48.67	35.70	6.03	37.39	53.01	74.00	-20.99	VERTICAL	Peak
6	9648.000	45.34	38.40	7.06	37.42	53.38	74.00	-20.62	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



race: (Discrete)

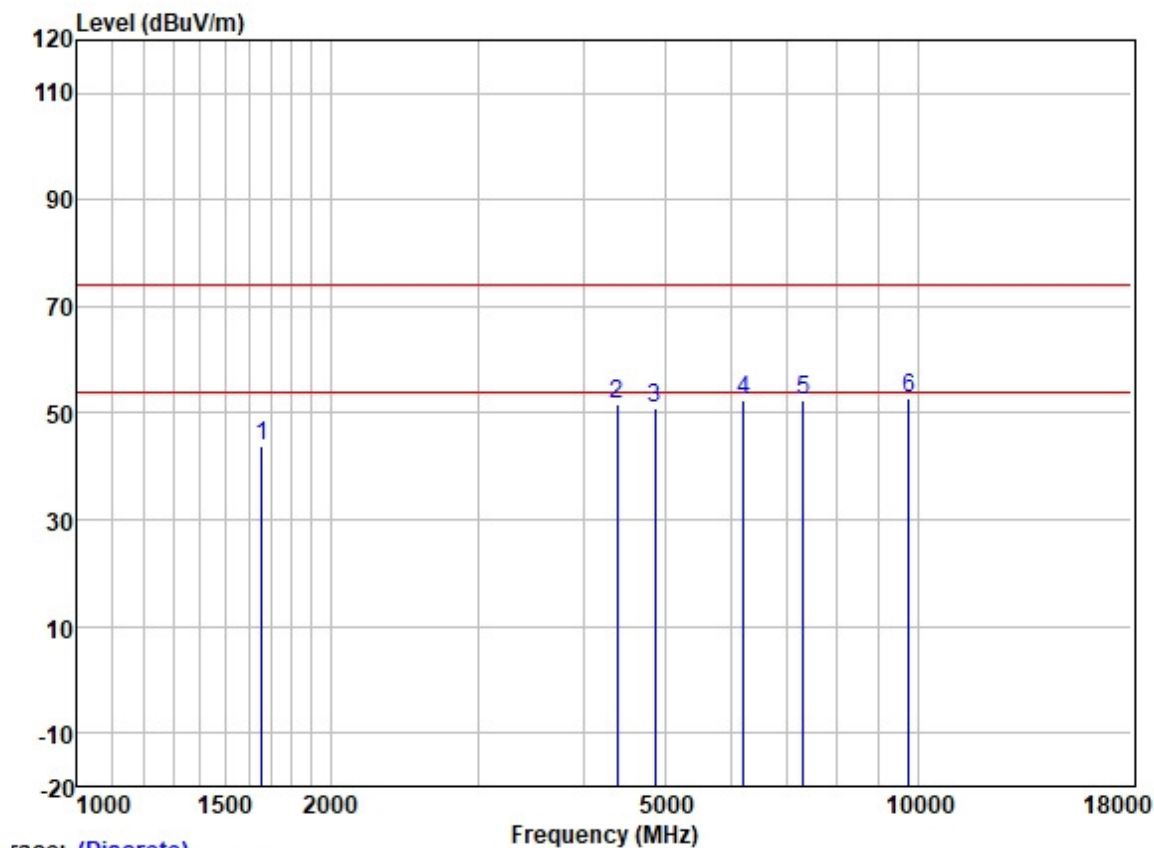
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1601.804	51.80	25.58	2.80	37.98	42.20	74.00	-31.80	HORIZONTAL	Peak
2	4329.354	53.21	30.54	4.67	36.81	51.61	74.00	-22.39	HORIZONTAL	Peak
3	4874.000	50.76	31.54	5.50	36.84	50.96	74.00	-23.04	HORIZONTAL	Peak
4	6954.852	49.64	34.95	5.81	37.21	53.19	74.00	-20.81	HORIZONTAL	Peak
5	7311.000	47.79	35.93	6.11	37.42	52.41	74.00	-21.59	HORIZONTAL	Peak
6	9748.000	44.90	38.50	7.02	37.41	53.01	74.00	-20.99	HORIZONTAL	Peak



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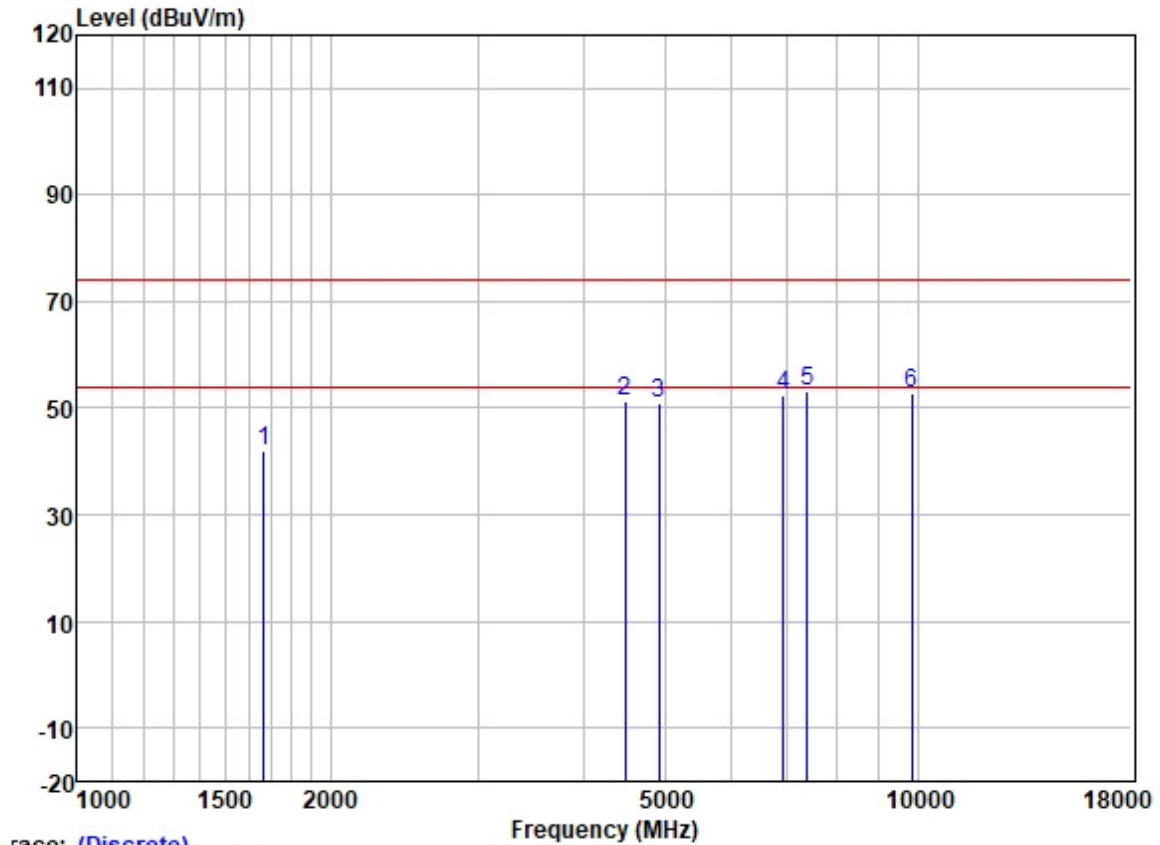
Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

Test Mode: 06; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



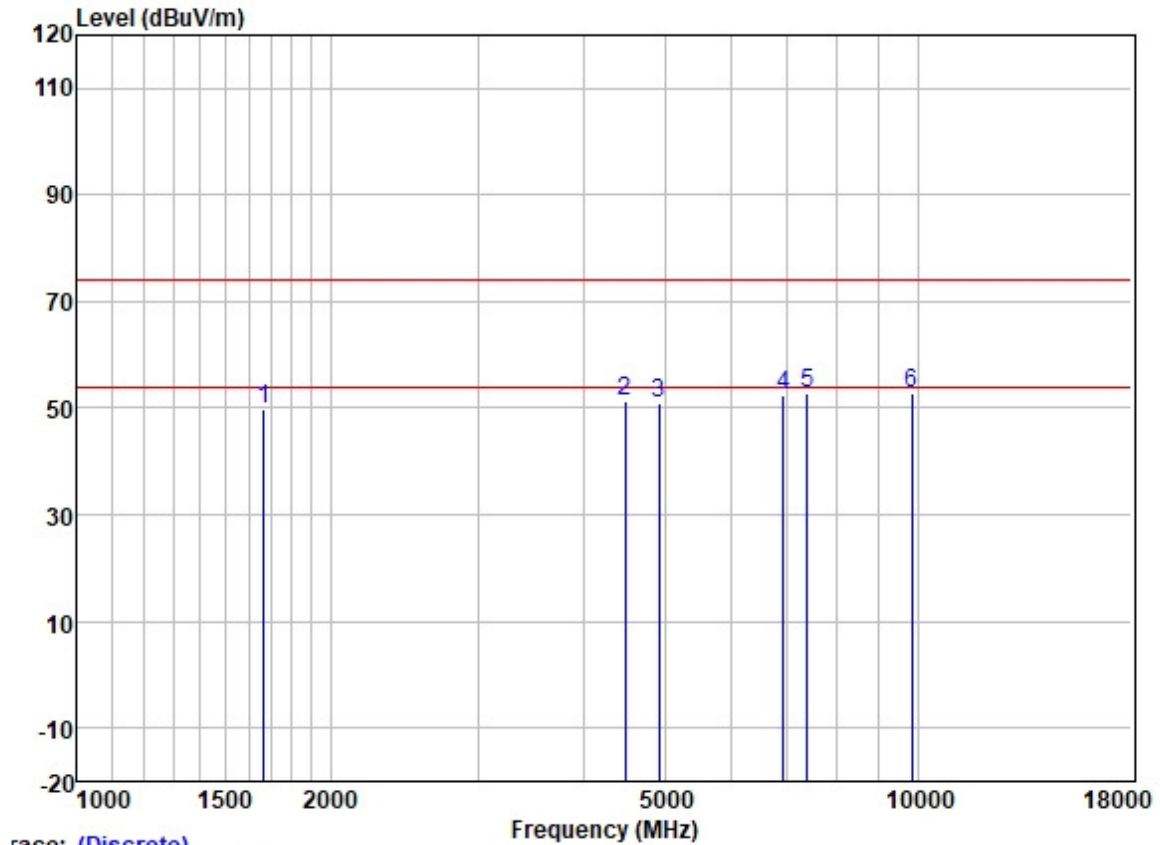
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1658.337	53.31	25.65	2.80	37.93	43.83	74.00	-30.17	VERTICAL	Peak
2	4392.376	53.25	30.66	4.70	36.81	51.80	74.00	-22.20	VERTICAL	Peak
3	4874.000	50.73	31.54	5.50	36.84	50.93	74.00	-23.07	VERTICAL	Peak
4	6213.441	50.24	33.03	6.06	36.94	52.39	74.00	-21.61	VERTICAL	Peak
5	7311.000	47.71	35.93	6.11	37.42	52.33	74.00	-21.67	VERTICAL	Peak
6	9748.000	44.74	38.50	7.02	37.41	52.85	74.00	-21.15	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



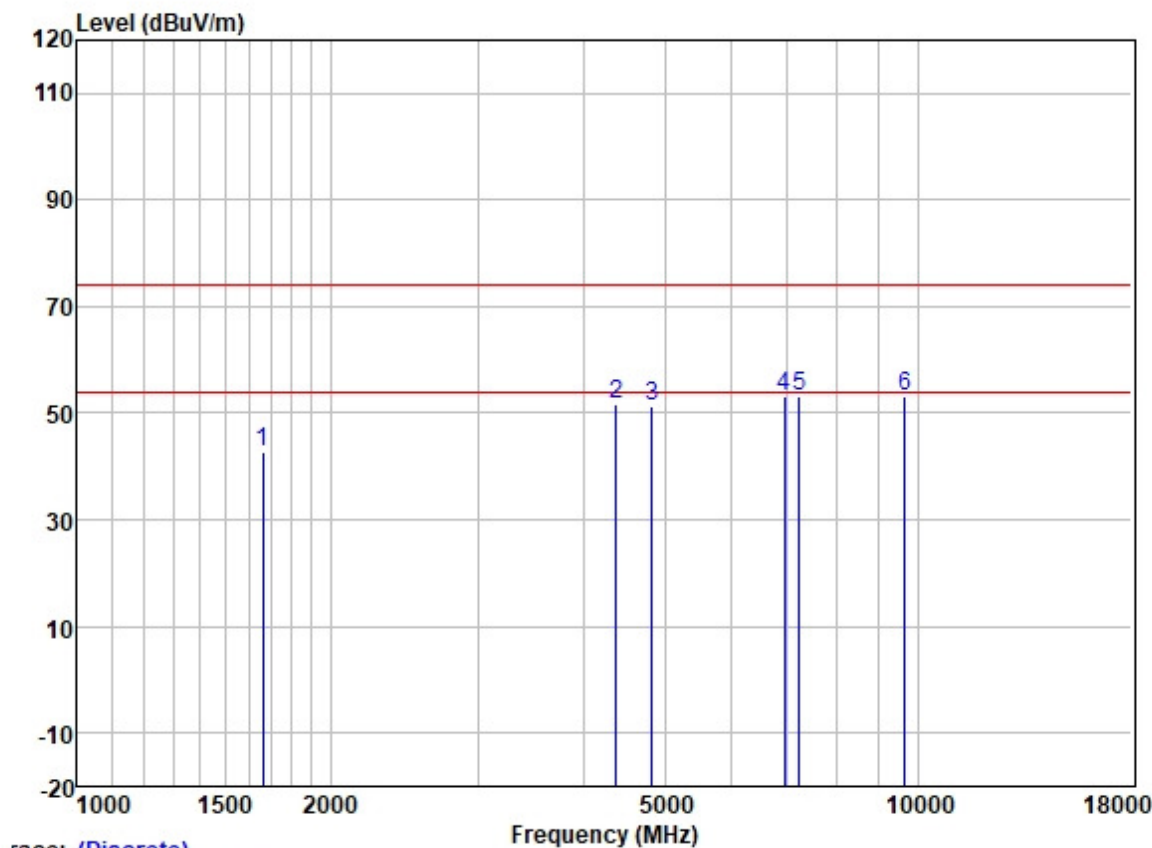
		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1667.951	51.41	25.66	2.80	37.91	41.96	74.00	-32.04	HORIZONTAL	Peak
2	4482.150	52.25	30.78	4.99	36.81	51.21	74.00	-22.79	HORIZONTAL	Peak
3	4924.000	50.72	31.62	5.60	36.84	51.10	74.00	-22.90	HORIZONTAL	Peak
4	6914.763	49.09	34.89	5.81	37.19	52.60	74.00	-21.40	HORIZONTAL	Peak
5	7386.000	48.14	36.17	6.19	37.45	53.05	74.00	-20.95	HORIZONTAL	Peak
6	9848.000	44.62	38.58	6.99	37.41	52.78	74.00	-21.22	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



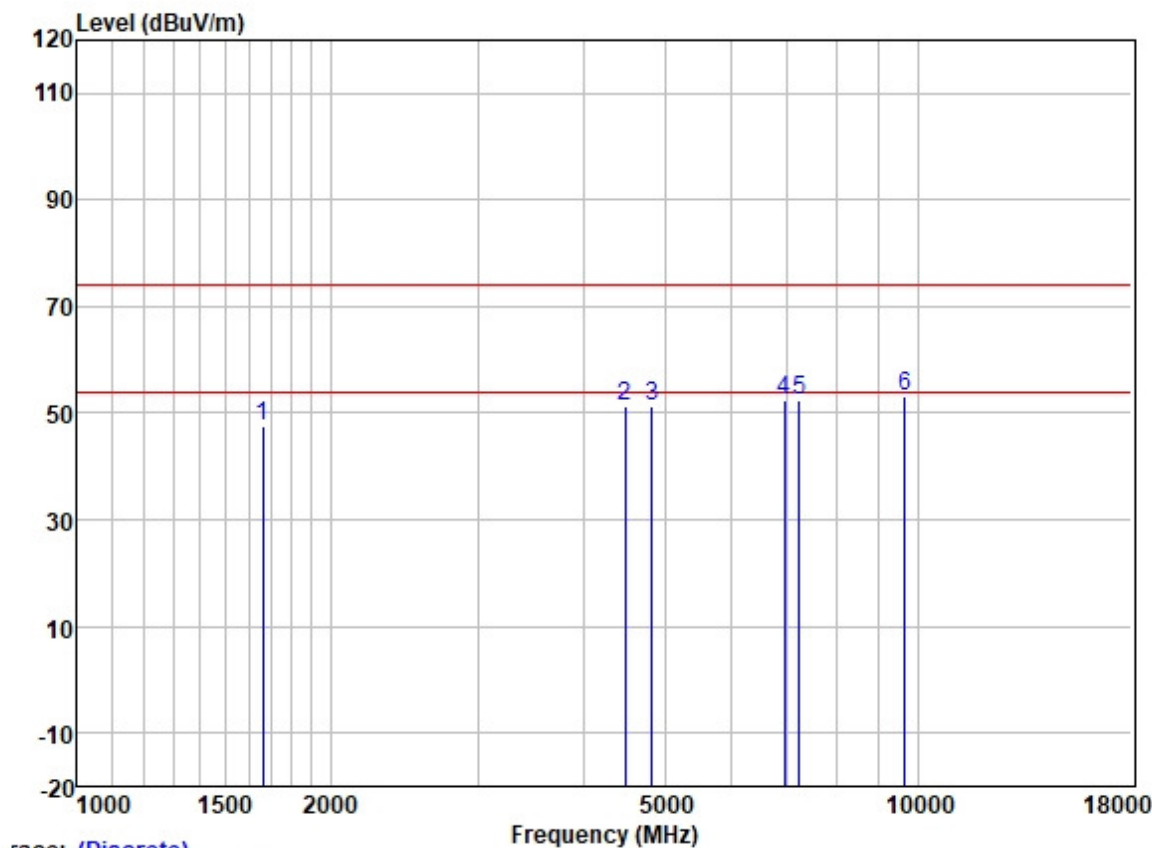
	Freq	Read	Antenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1667.951	59.29	25.66	2.80	37.91	49.84	74.00	-24.16	VERTICAL Peak
2	4482.150	52.37	30.78	4.99	36.81	51.33	74.00	-22.67	VERTICAL Peak
3	4924.000	50.47	31.62	5.60	36.84	50.85	74.00	-23.15	VERTICAL Peak
4	6914.763	48.83	34.89	5.81	37.19	52.34	74.00	-21.66	VERTICAL Peak
5	7386.000	47.73	36.17	6.19	37.45	52.64	74.00	-21.36	VERTICAL Peak
6	9848.000	44.63	38.58	6.99	37.41	52.79	74.00	-21.21	VERTICAL Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



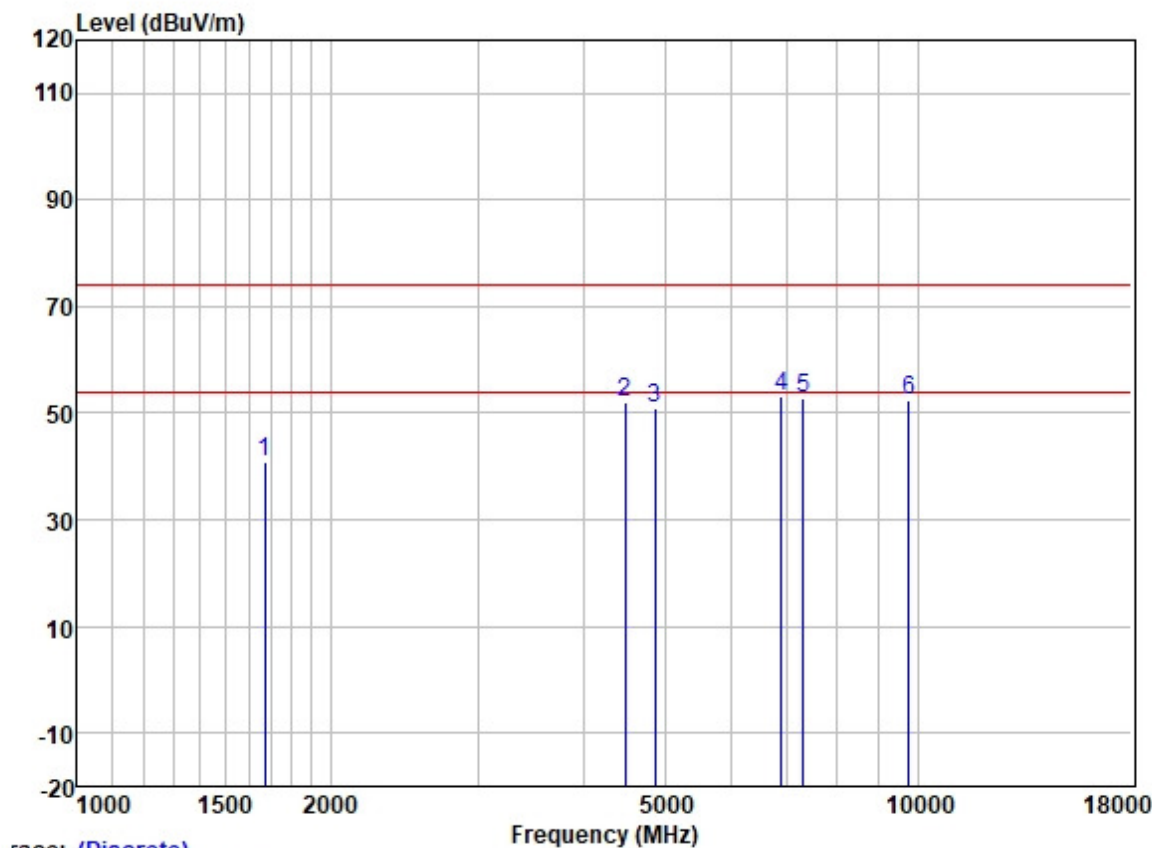
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	52.26	25.65	2.80	37.91	42.80	74.00	-31.20	HORIZONTAL	Peak
2	4379.699	53.28	30.64	4.69	36.81	51.80	74.00	-22.20	HORIZONTAL	Peak
3	4824.000	51.44	31.45	5.42	36.83	51.48	74.00	-22.52	HORIZONTAL	Peak
4	6934.778	49.77	34.92	5.81	37.19	53.31	74.00	-20.69	HORIZONTAL	Peak
5	7236.000	48.74	35.70	6.03	37.39	53.08	74.00	-20.92	HORIZONTAL	Peak
6	9648.000	45.16	38.40	7.06	37.42	53.20	74.00	-20.80	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



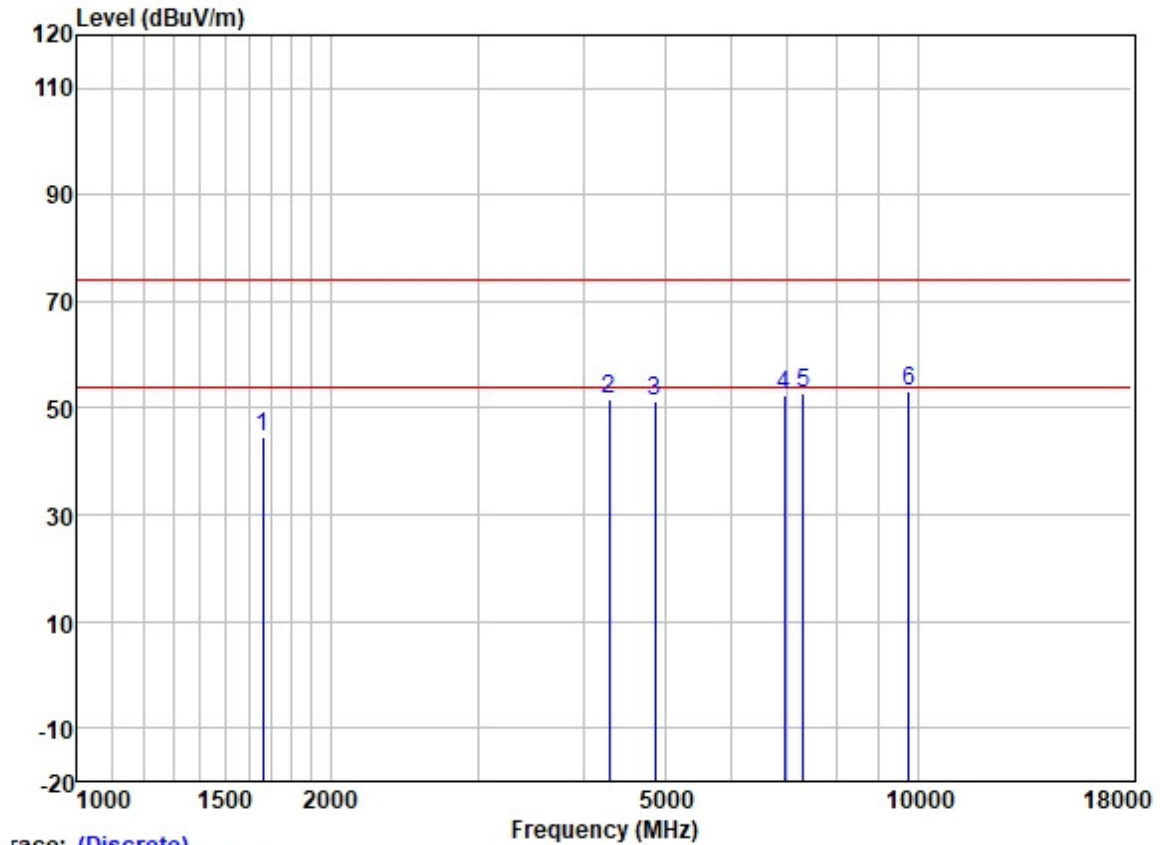
		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	57.20	25.65	2.80	37.91	47.74	74.00	-26.26	VERTICAL	Peak
2	4482.150	52.53	30.78	4.99	36.81	51.49	74.00	-22.51	VERTICAL	Peak
3	4824.000	51.09	31.45	5.42	36.83	51.13	74.00	-22.87	VERTICAL	Peak
4	6934.778	48.95	34.92	5.81	37.19	52.49	74.00	-21.51	VERTICAL	Peak
5	7236.000	48.10	35.70	6.03	37.39	52.44	74.00	-21.56	VERTICAL	Peak
6	9648.000	45.09	38.40	7.06	37.42	53.13	74.00	-20.87	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



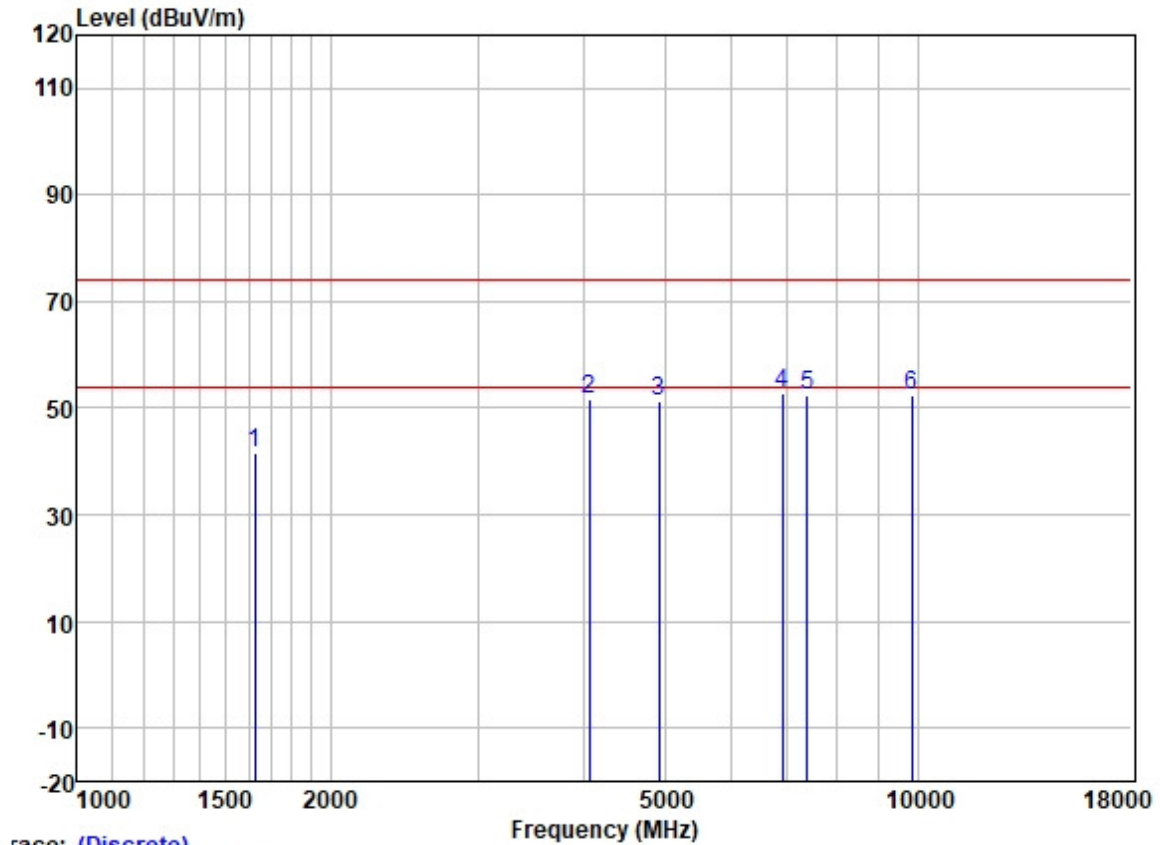
		Read	Antenna	Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1672.779	50.39	25.67	2.80	37.91	40.95	74.00	-33.05	HORIZONTAL	Peak
2	4482.150	53.14	30.78	4.99	36.81	52.10	74.00	-21.90	HORIZONTAL	Peak
3	4874.000	50.87	31.54	5.50	36.84	51.07	74.00	-22.93	HORIZONTAL	Peak
4	6874.906	49.73	34.82	5.82	37.16	53.21	74.00	-20.79	HORIZONTAL	Peak
5	7311.000	48.34	35.93	6.11	37.42	52.96	74.00	-21.04	HORIZONTAL	Peak
6	9748.000	44.45	38.50	7.02	37.41	52.56	74.00	-21.44	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



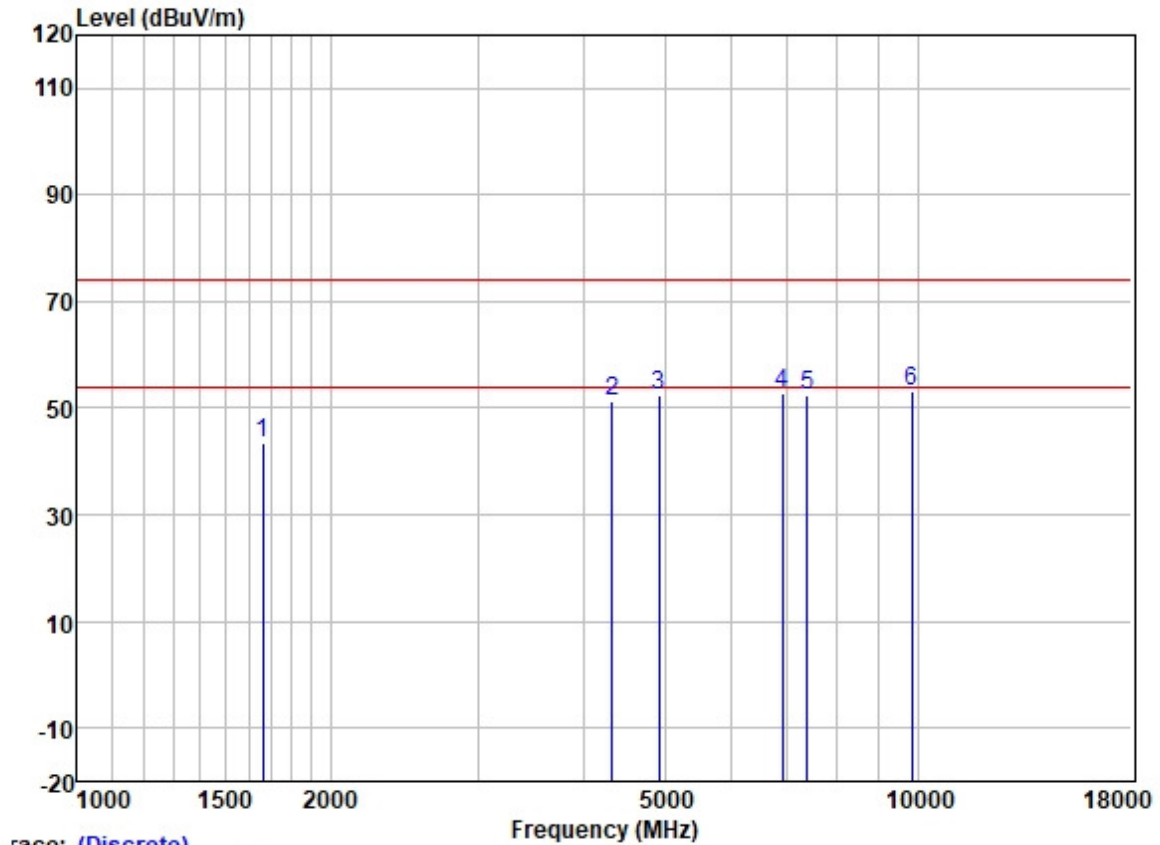
		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	53.87	25.65	2.80	37.91	44.41	74.00	-29.59	VERTICAL	Peak
2	4291.977	53.28	30.45	4.64	36.81	51.56	74.00	-22.44	VERTICAL	Peak
3	4874.000	51.10	31.54	5.50	36.84	51.30	74.00	-22.70	VERTICAL	Peak
4	6934.778	49.01	34.92	5.81	37.19	52.55	74.00	-21.45	VERTICAL	Peak
5	7311.000	48.10	35.93	6.11	37.42	52.72	74.00	-21.28	VERTICAL	Peak
6	9748.000	45.13	38.50	7.02	37.41	53.24	74.00	-20.76	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1625.121	51.09	25.61	2.80	37.95	41.55	74.00	-32.45	HORIZONTAL	Peak
2	4062.629	53.83	29.88	4.60	36.80	51.51	74.00	-22.49	HORIZONTAL	Peak
3	4924.000	51.06	31.62	5.60	36.84	51.44	74.00	-22.56	HORIZONTAL	Peak
4	6894.806	49.18	34.85	5.81	37.18	52.66	74.00	-21.34	HORIZONTAL	Peak
5	7386.000	47.54	36.17	6.19	37.45	52.45	74.00	-21.55	HORIZONTAL	Peak
6	9848.000	44.40	38.58	6.99	37.41	52.56	74.00	-21.44	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	53.04	25.65	2.80	37.91	43.58	74.00	-30.42	VERTICAL	Peak
2	4329.354	52.86	30.54	4.67	36.81	51.26	74.00	-22.74	VERTICAL	Peak
3	4924.000	51.96	31.62	5.60	36.84	52.34	74.00	-21.66	VERTICAL	Peak
4	6894.806	49.17	34.85	5.81	37.18	52.65	74.00	-21.35	VERTICAL	Peak
5	7386.000	47.69	36.17	6.19	37.45	52.60	74.00	-21.40	VERTICAL	Peak
6	9848.000	45.11	38.58	6.99	37.41	53.27	74.00	-20.73	VERTICAL	Peak

7.10 Duty Cycle

Test Requirement KDB 558074 D01 v05r02 section 6
Test Method: ANSI C63.10 (2013) Section 11.6

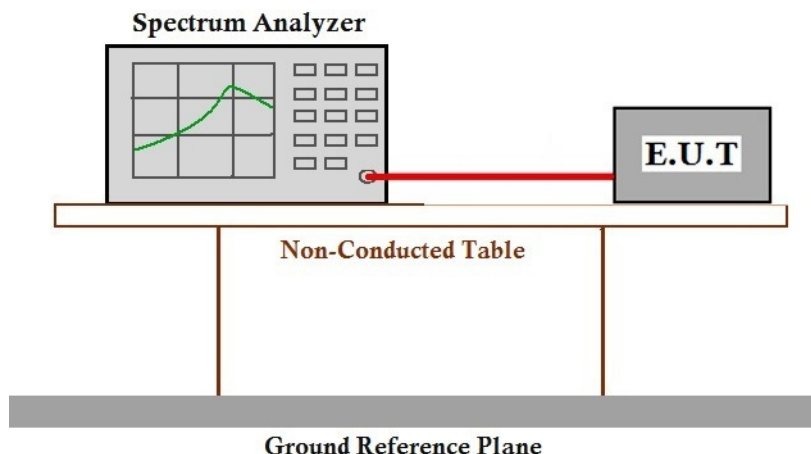
7.10.1 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	05	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). Only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram



7.10.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - MIMO PHONE BT/WIFI Test Setup Photo for GZCR2202000223AT



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9 EUT Constructional Details (EUT Photos)

Refer to Appendix - MIMO PHONE External and Internal Photos for GZCR2202000223AT



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10 Appendix

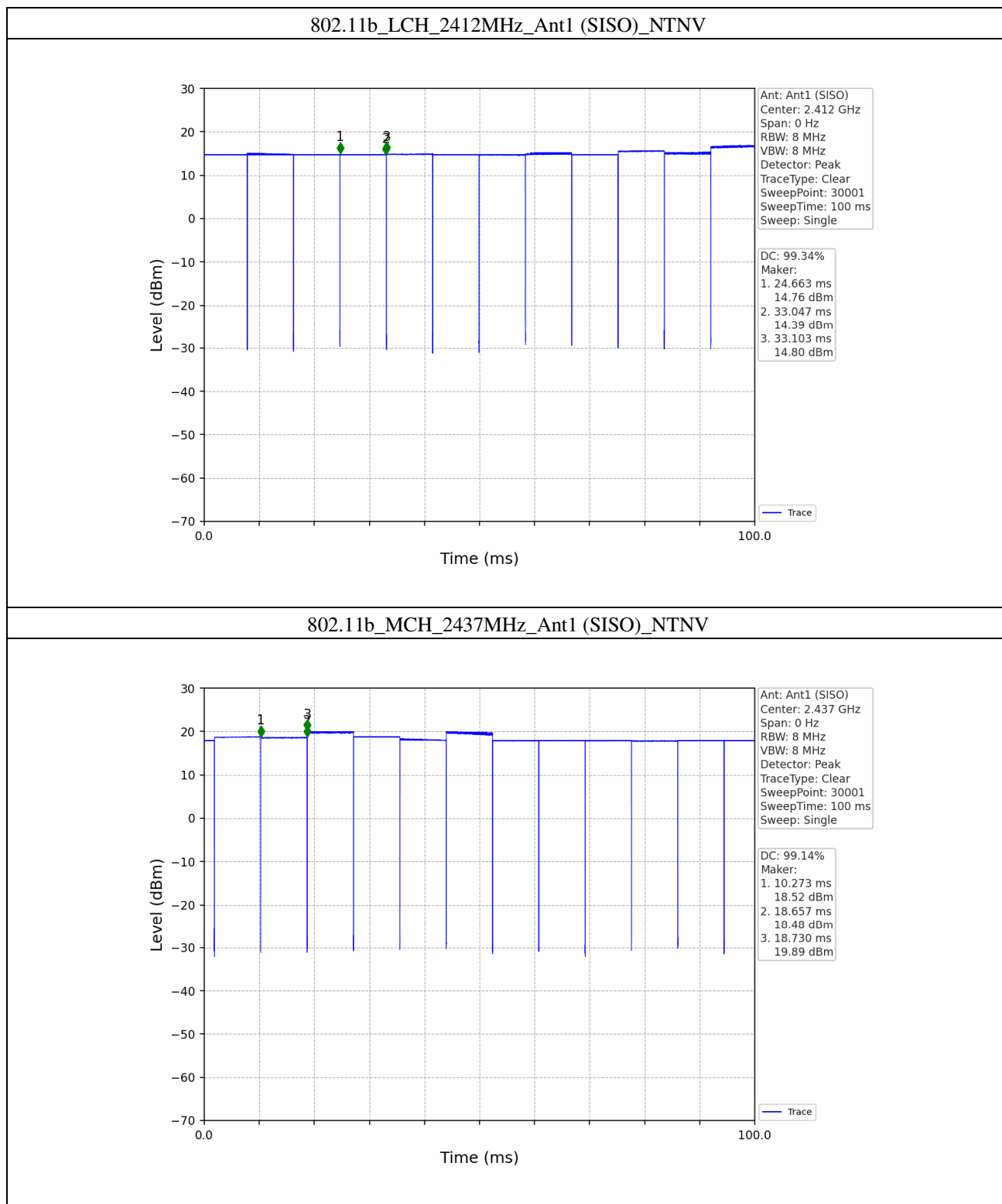
1. Duty Cycle

1.1 Ant1

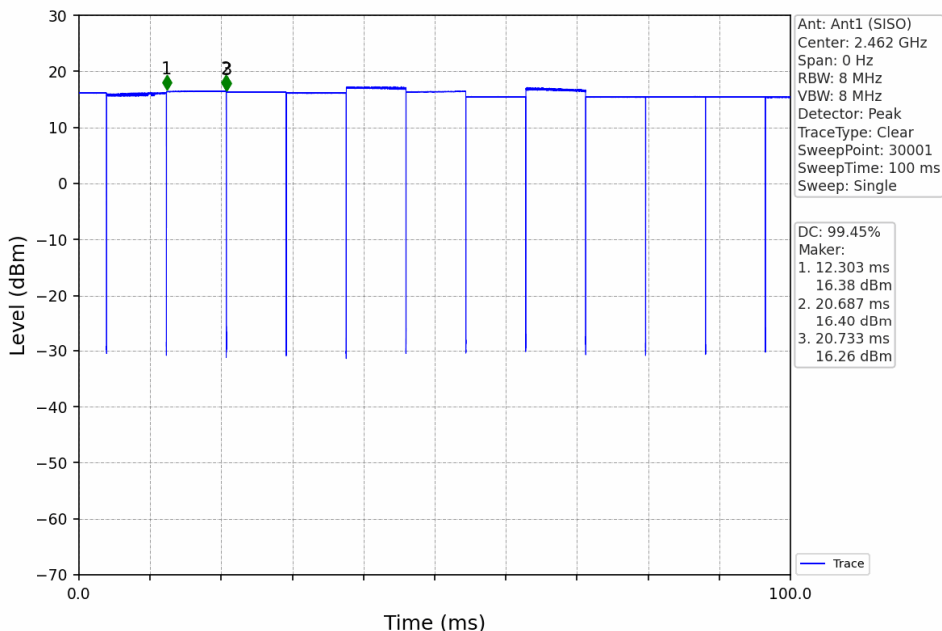
1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	8.384	8.440	99.34	0.03	0.31
		2437	8.384	8.457	99.14	0.04	0.51
		2462	8.384	8.430	99.45	0.02	0.20
802.11g	SISO	2412	1.383	1.489	92.88	0.32	4.17
		2437	1.392	1.453	95.80	0.19	1.82
		2462	1.391	1.435	96.93	0.14	0.64
802.11n (HT20)	SISO	2412	1.300	1.343	96.80	0.14	0.68
		2437	1.300	1.353	96.08	0.17	1.31
		2462	1.300	1.343	96.80	0.14	0.68

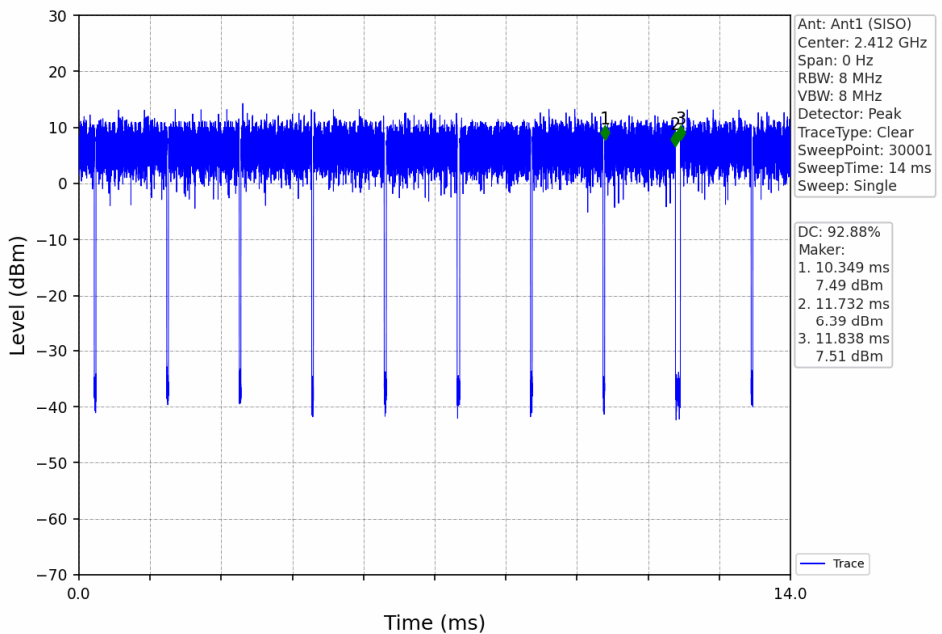
1.1.2 Test Graph



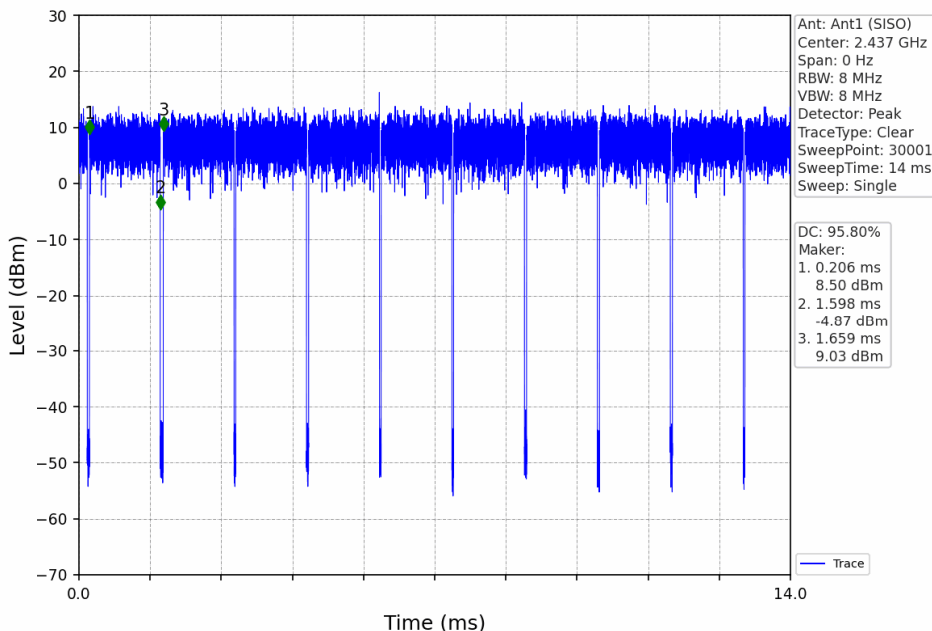
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



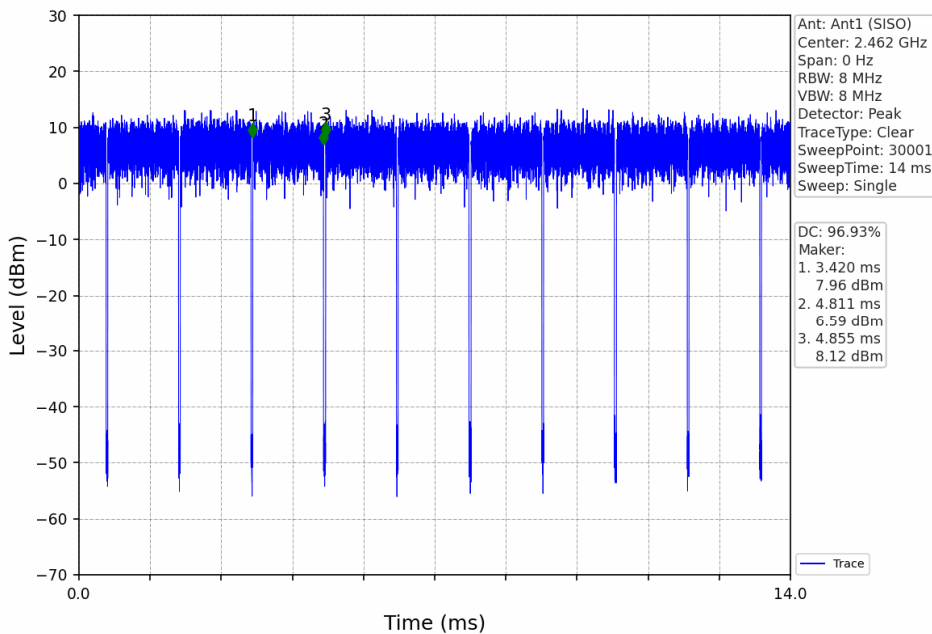
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV

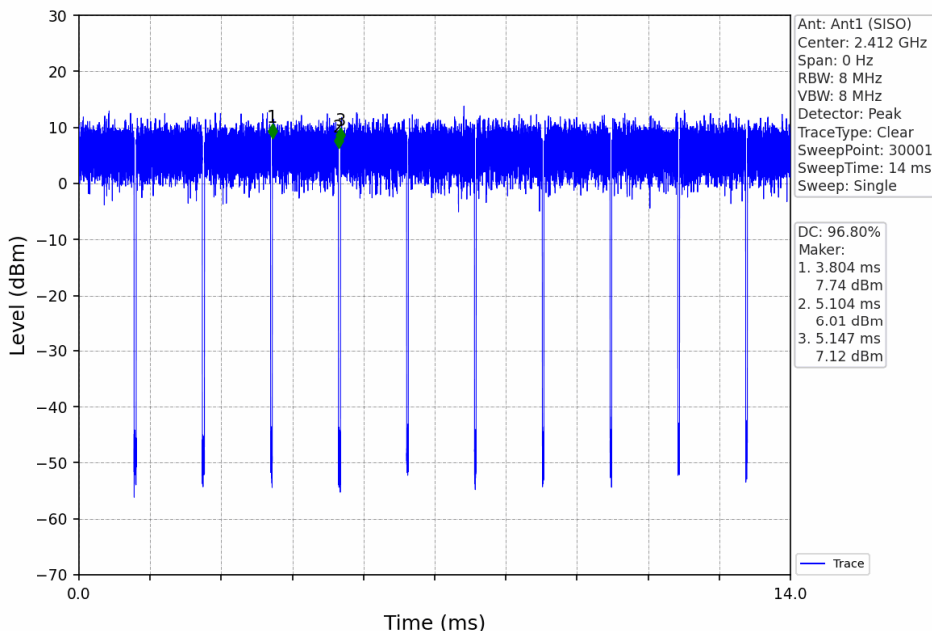


802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

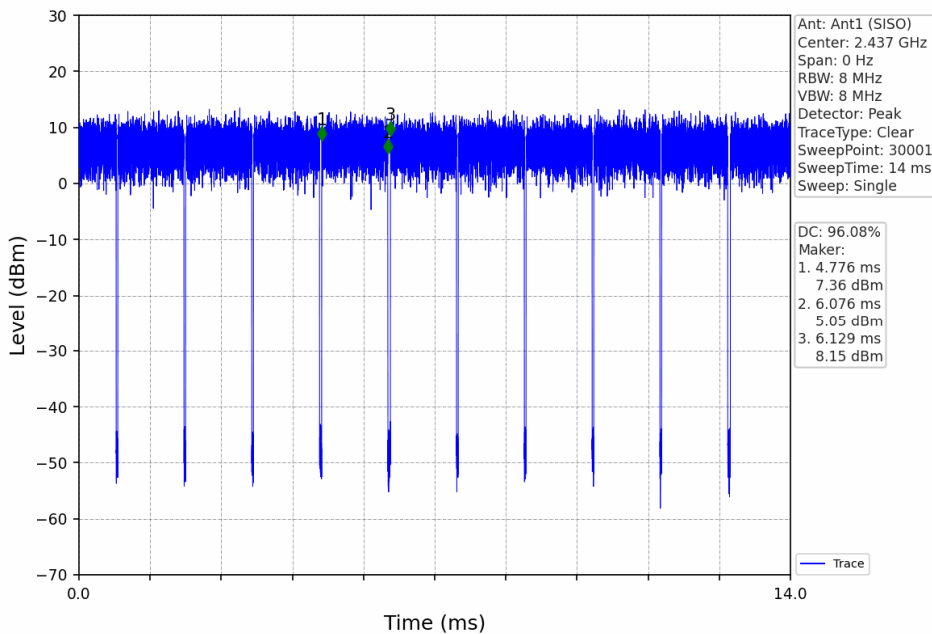


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802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV

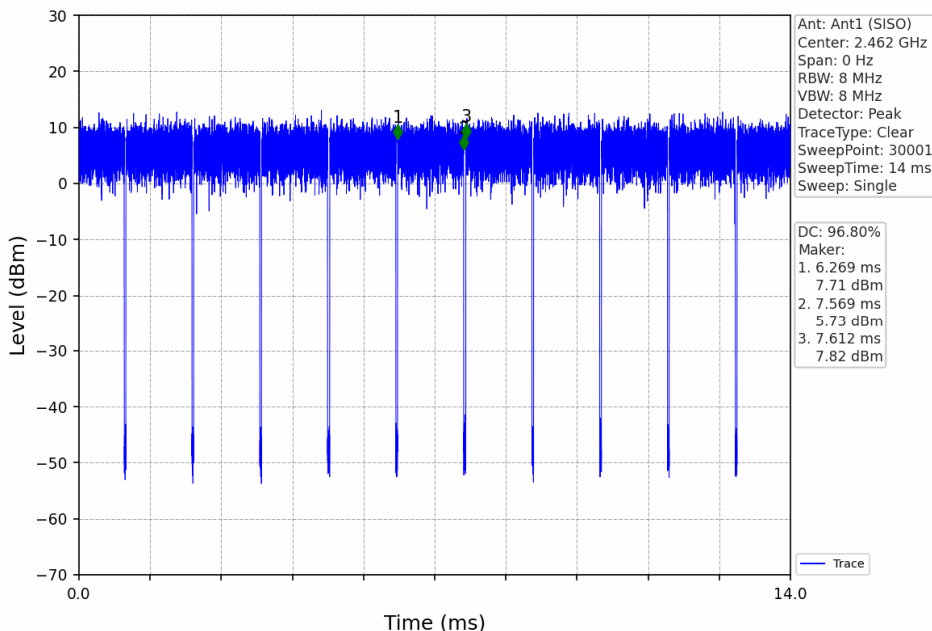


802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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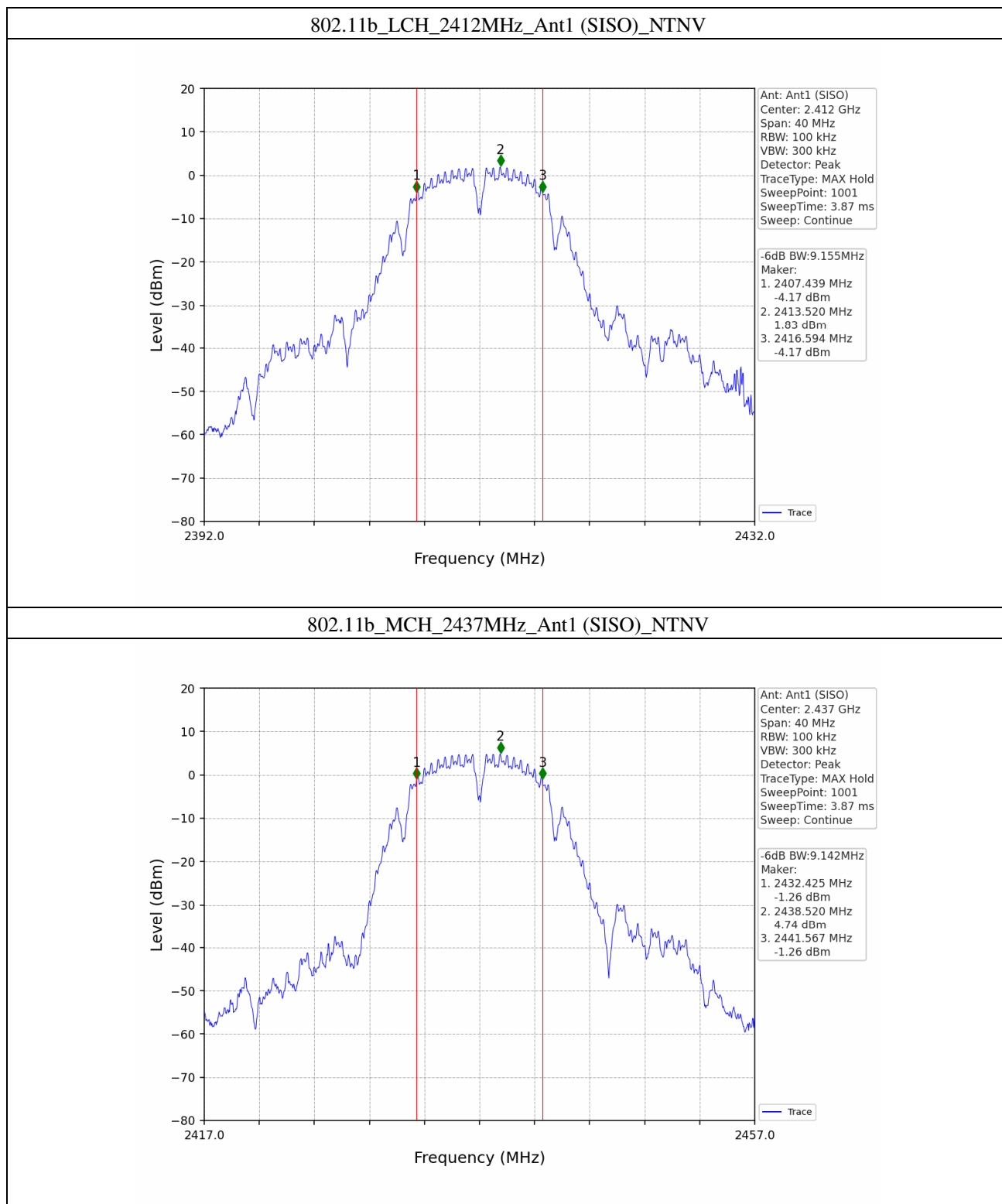
2. Bandwidth

2.1 6dB BW

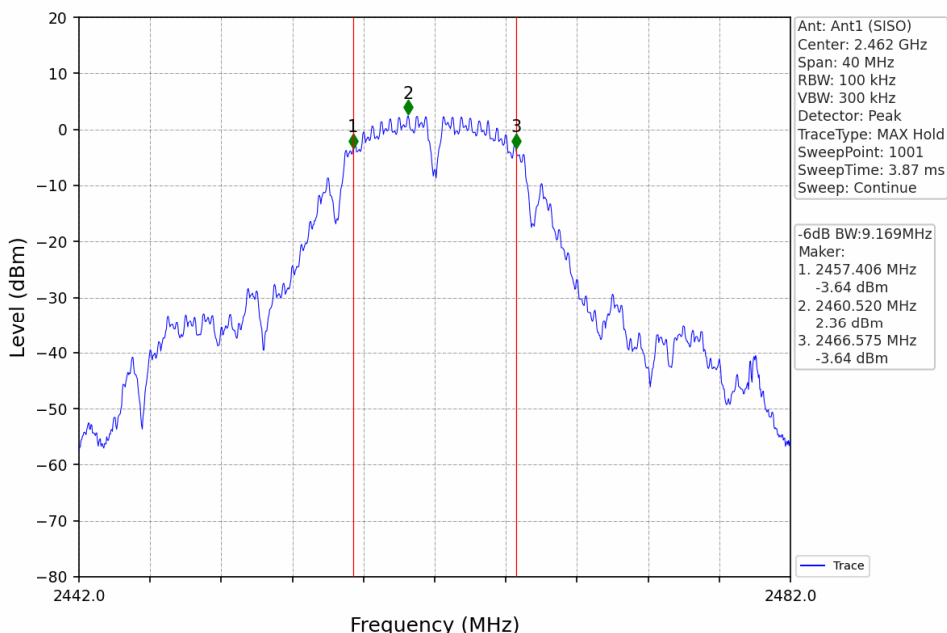
2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	9.155	≥ 0.5	Pass
		2437	1	9.142	≥ 0.5	Pass
		2462	1	9.169	≥ 0.5	Pass
802.11g	SISO	2412	1	16.412	≥ 0.5	Pass
		2437	1	16.309	≥ 0.5	Pass
		2462	1	16.429	≥ 0.5	Pass
802.11n (HT20)	SISO	2412	1	17.392	≥ 0.5	Pass
		2437	1	17.060	≥ 0.5	Pass
		2462	1	17.614	≥ 0.5	Pass

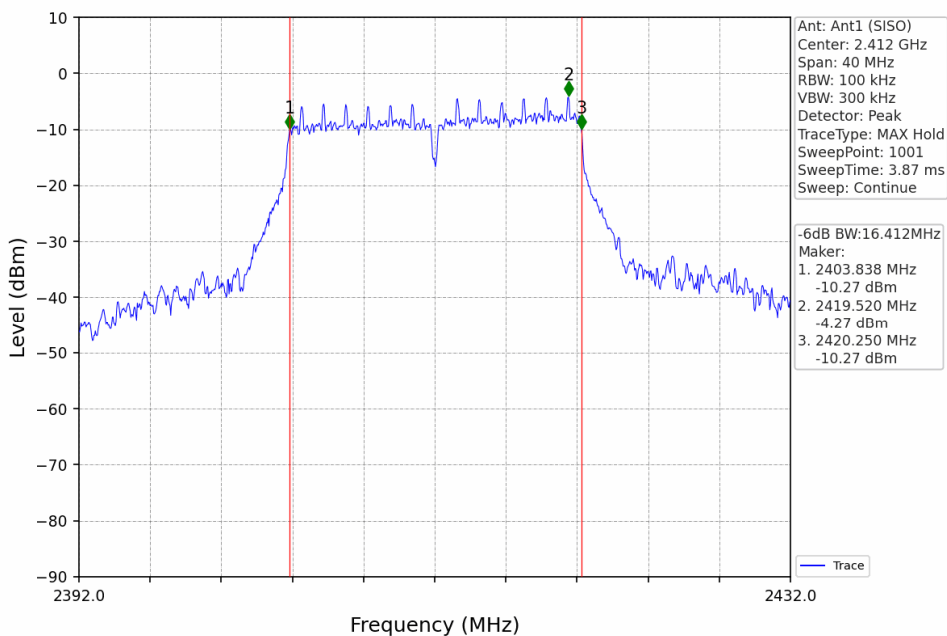
2.2.2 Test Graph



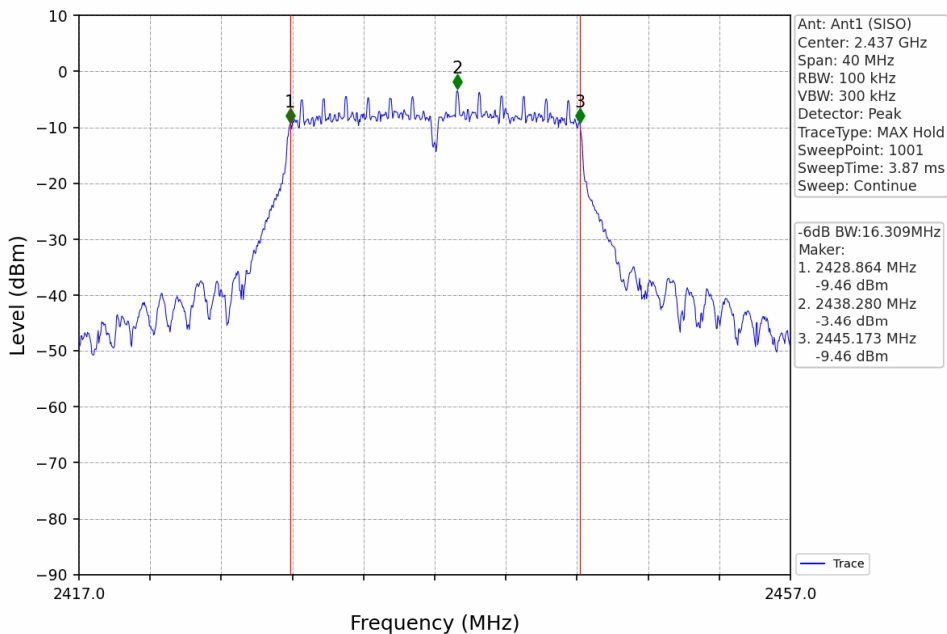
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



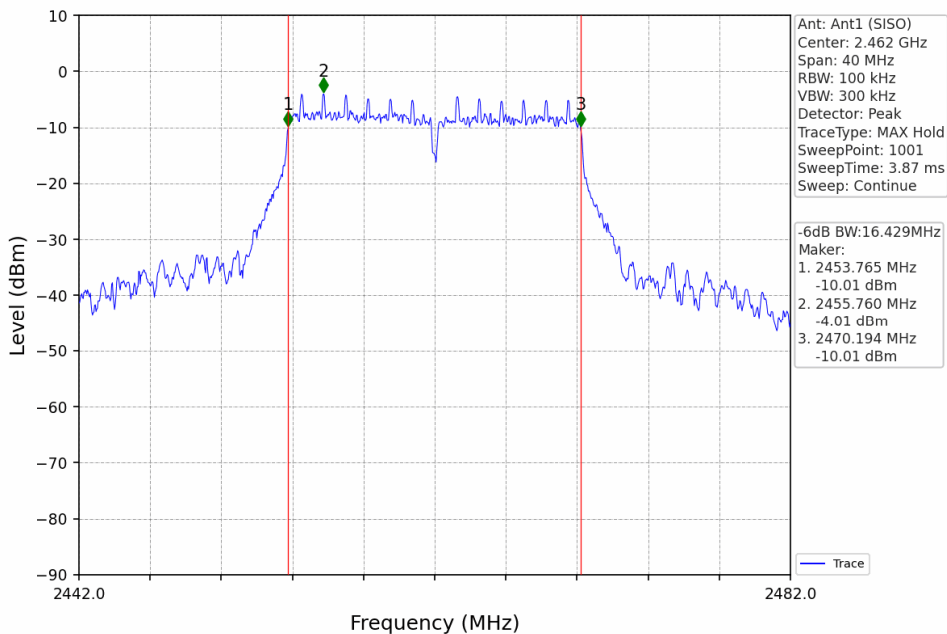
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



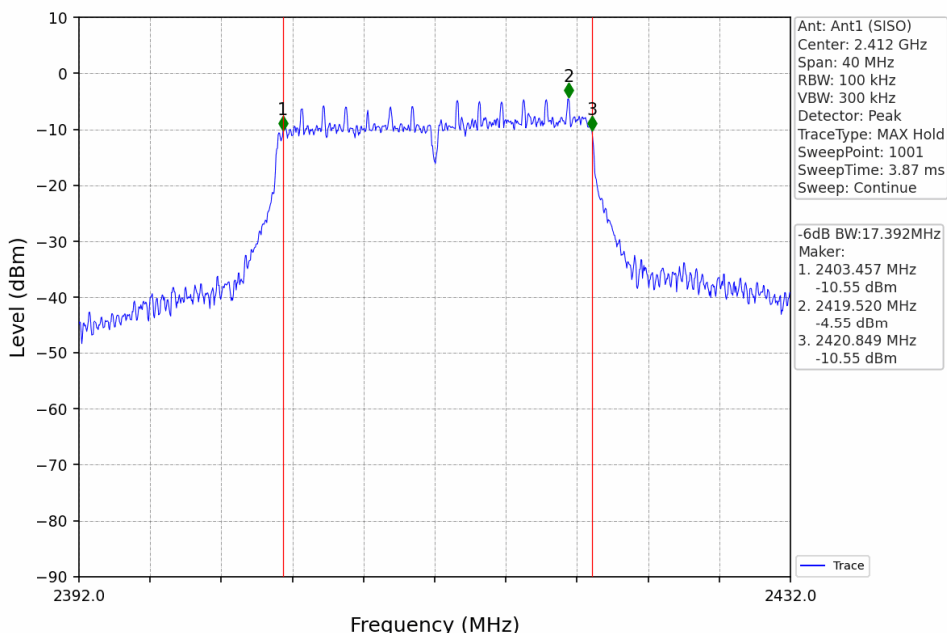
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



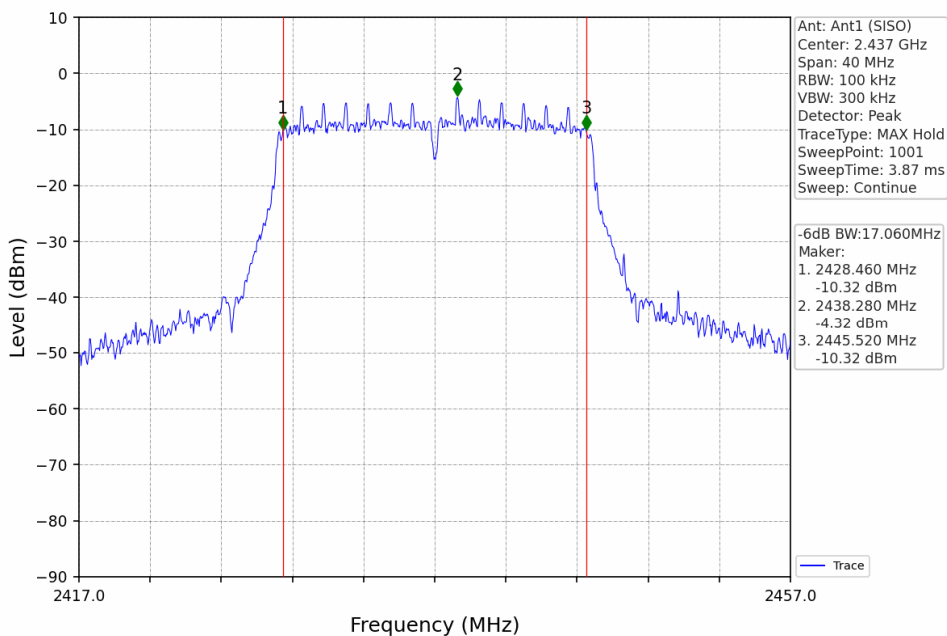
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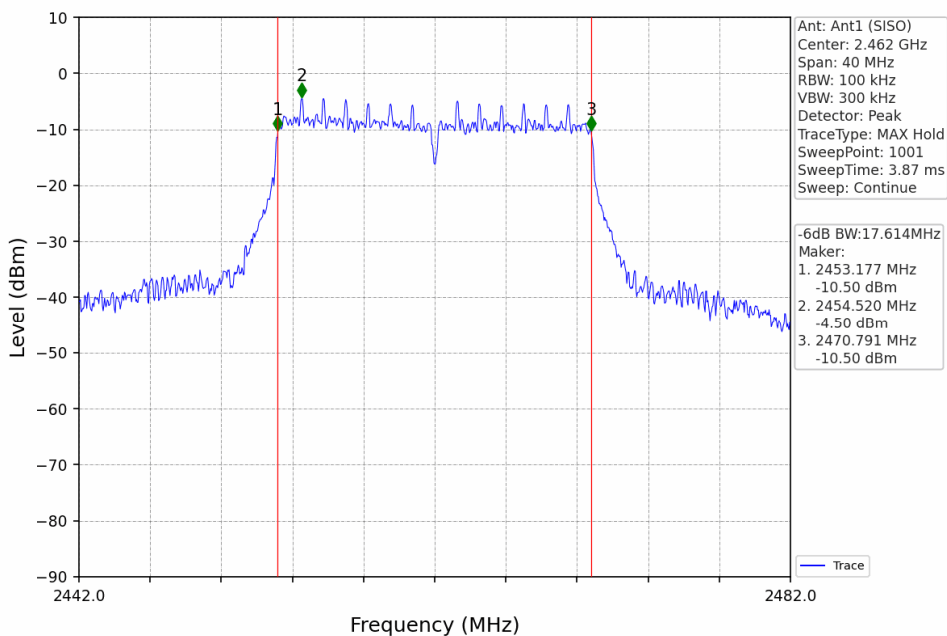
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum AV Conducted Output Power (dBm)		Verdict
			Ant1	Limit	
802.11b	SISO	2412	14.14	<=30	Pass
		2437	15.15	<=30	Pass
		2462	14.57	<=30	Pass
802.11g	SISO	2412	14.43	<=30	Pass
		2437	15.05	<=30	Pass
		2462	14.71	<=30	Pass
802.11n (HT20)	SISO	2412	14.23	<=30	Pass
		2437	14.12	<=30	Pass
		2462	14.36	<=30	Pass

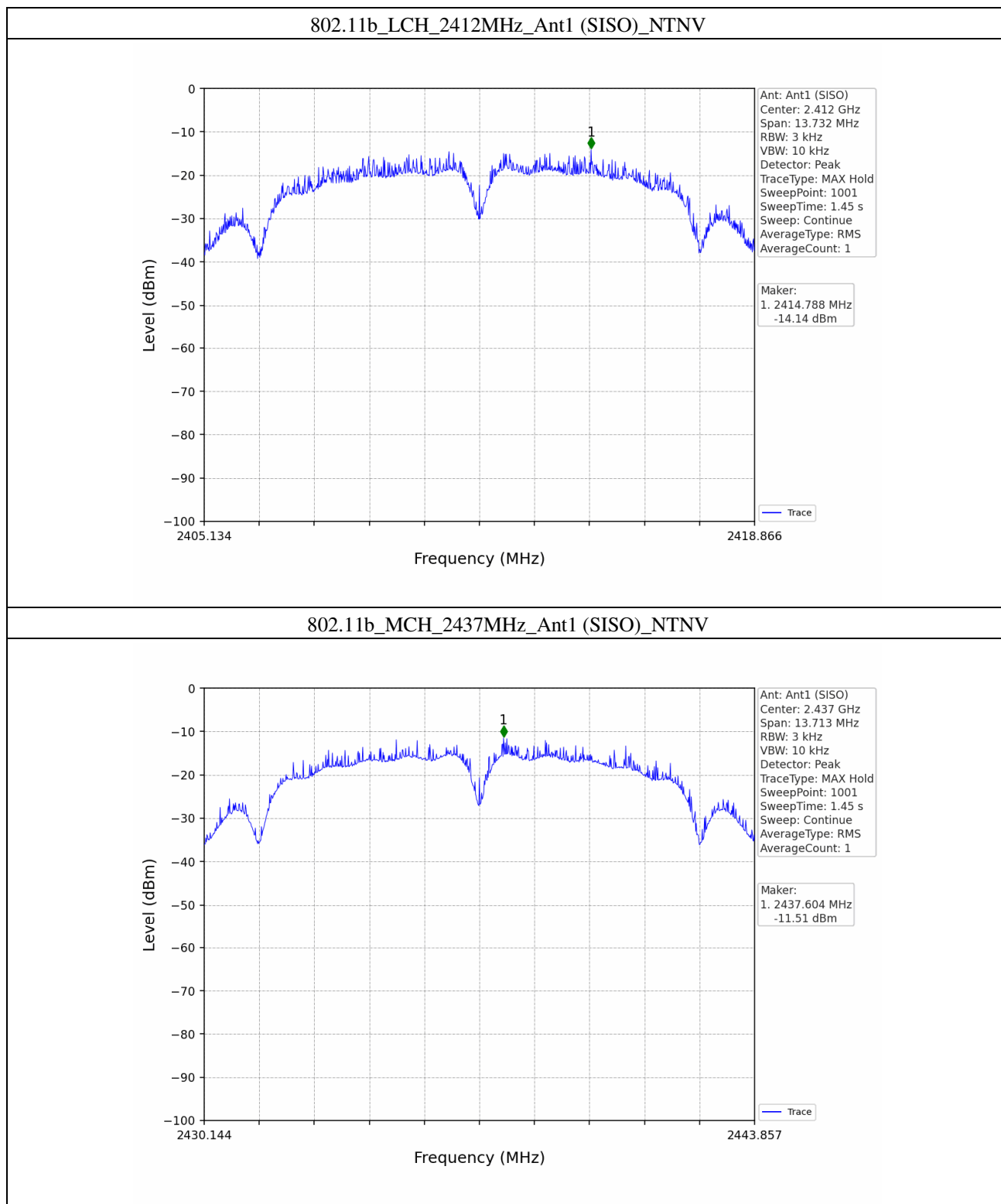
4. Maximum Power Spectral Density

4.1 PSD

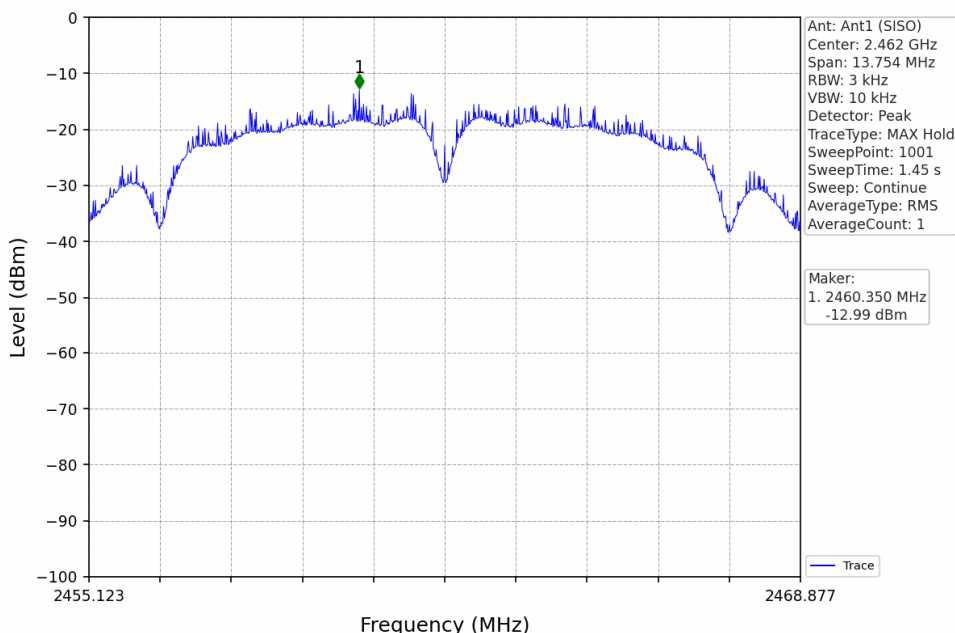
4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			Ant1	Limit	
802.11b	SISO	2412	-14.14	<=8	Pass
		2437	-11.51	<=8	Pass
		2462	-12.99	<=8	Pass
802.11g	SISO	2412	-19.69	<=8	Pass
		2437	-19.61	<=8	Pass
		2462	-19.61	<=8	Pass
802.11n (HT20)	SISO	2412	-19.29	<=8	Pass
		2437	-19.67	<=8	Pass
		2462	-20.59	<=8	Pass

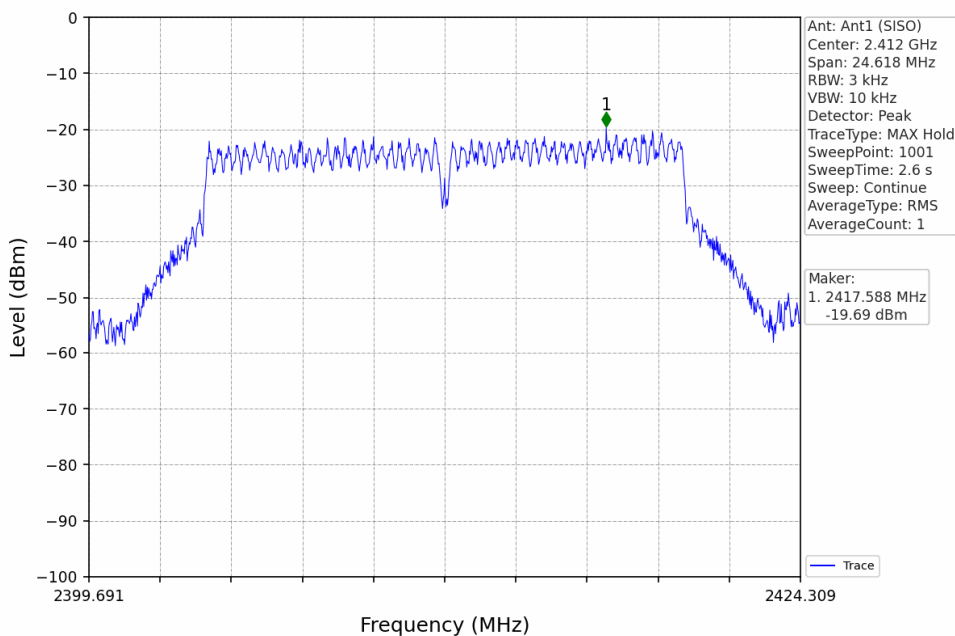
4.1.2 Test Graph



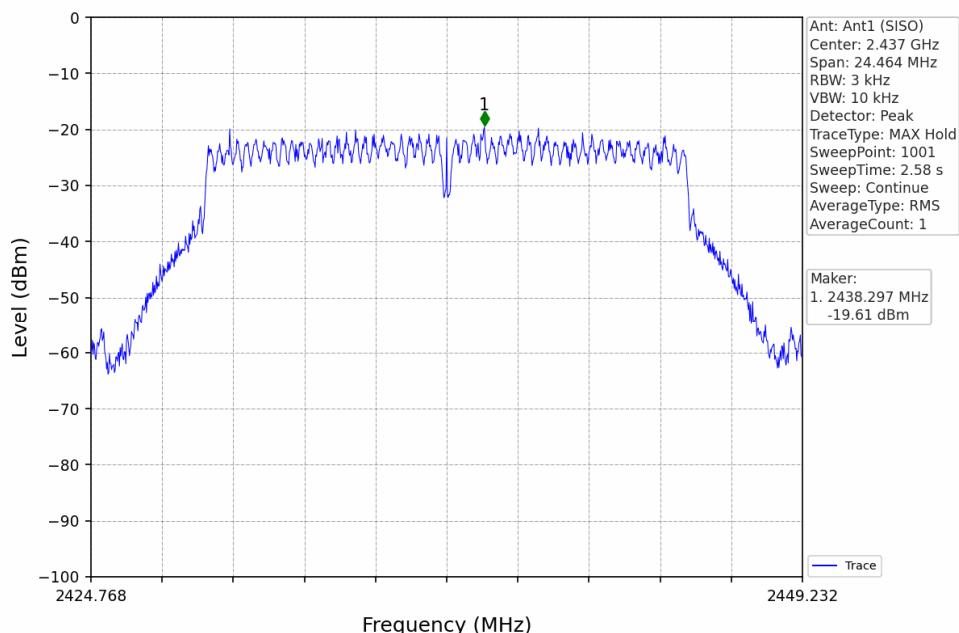
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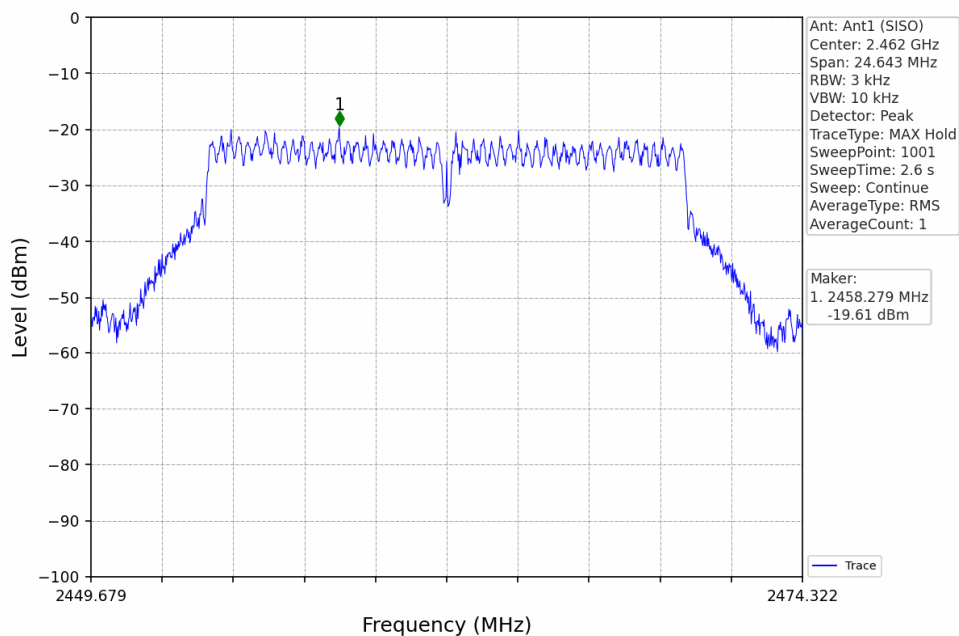
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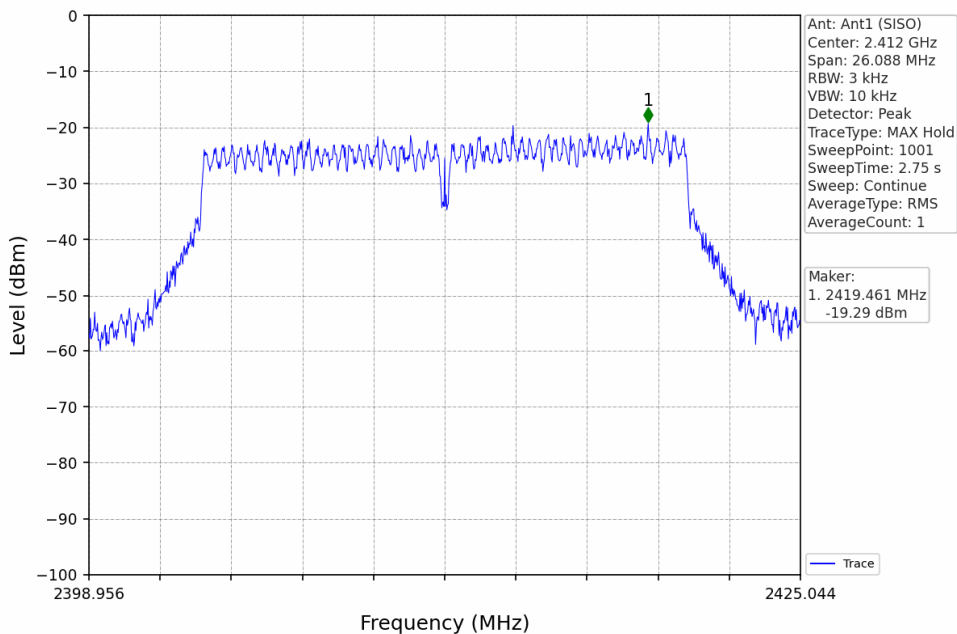
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



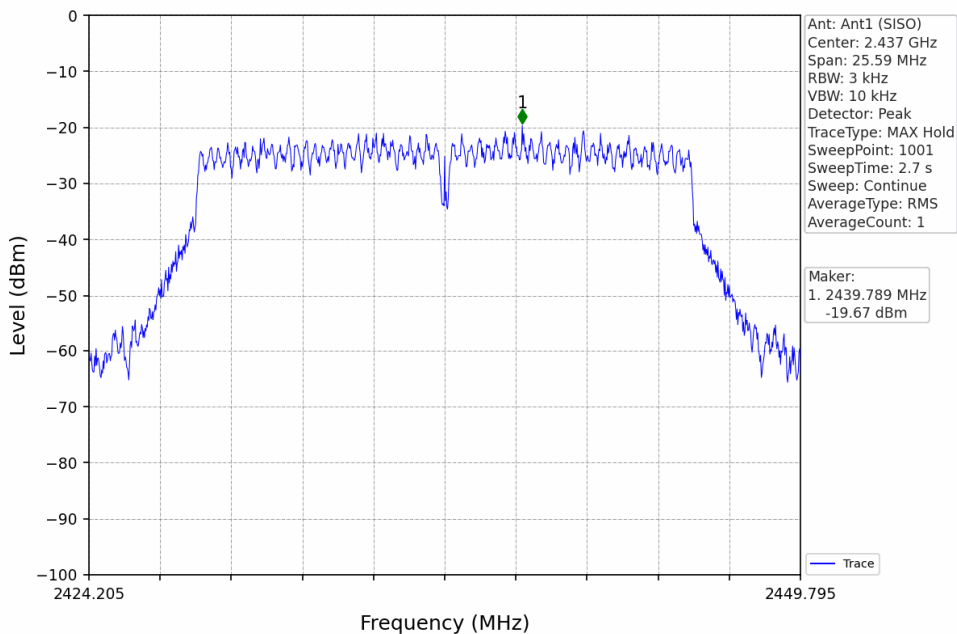
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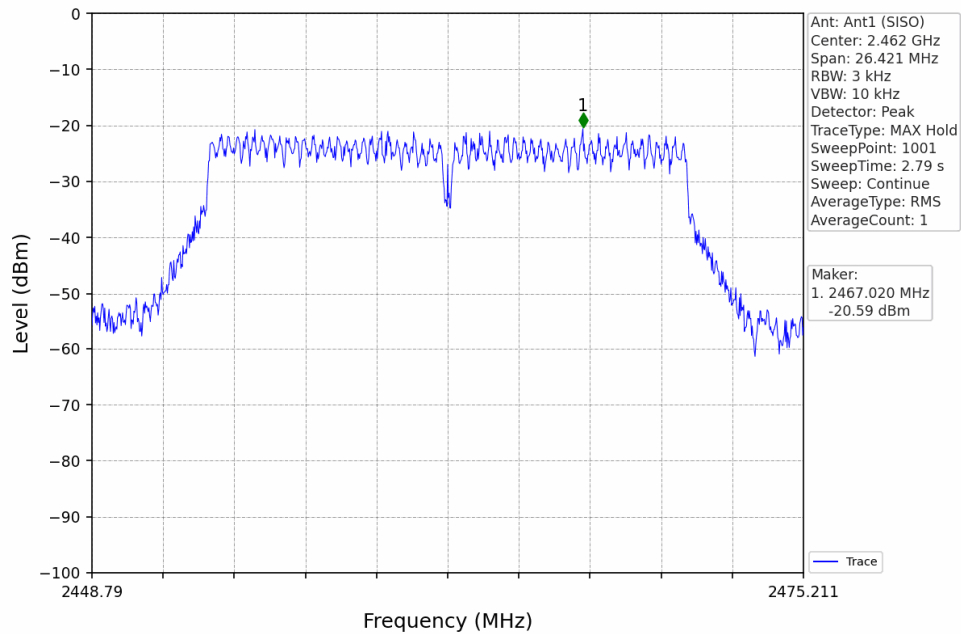
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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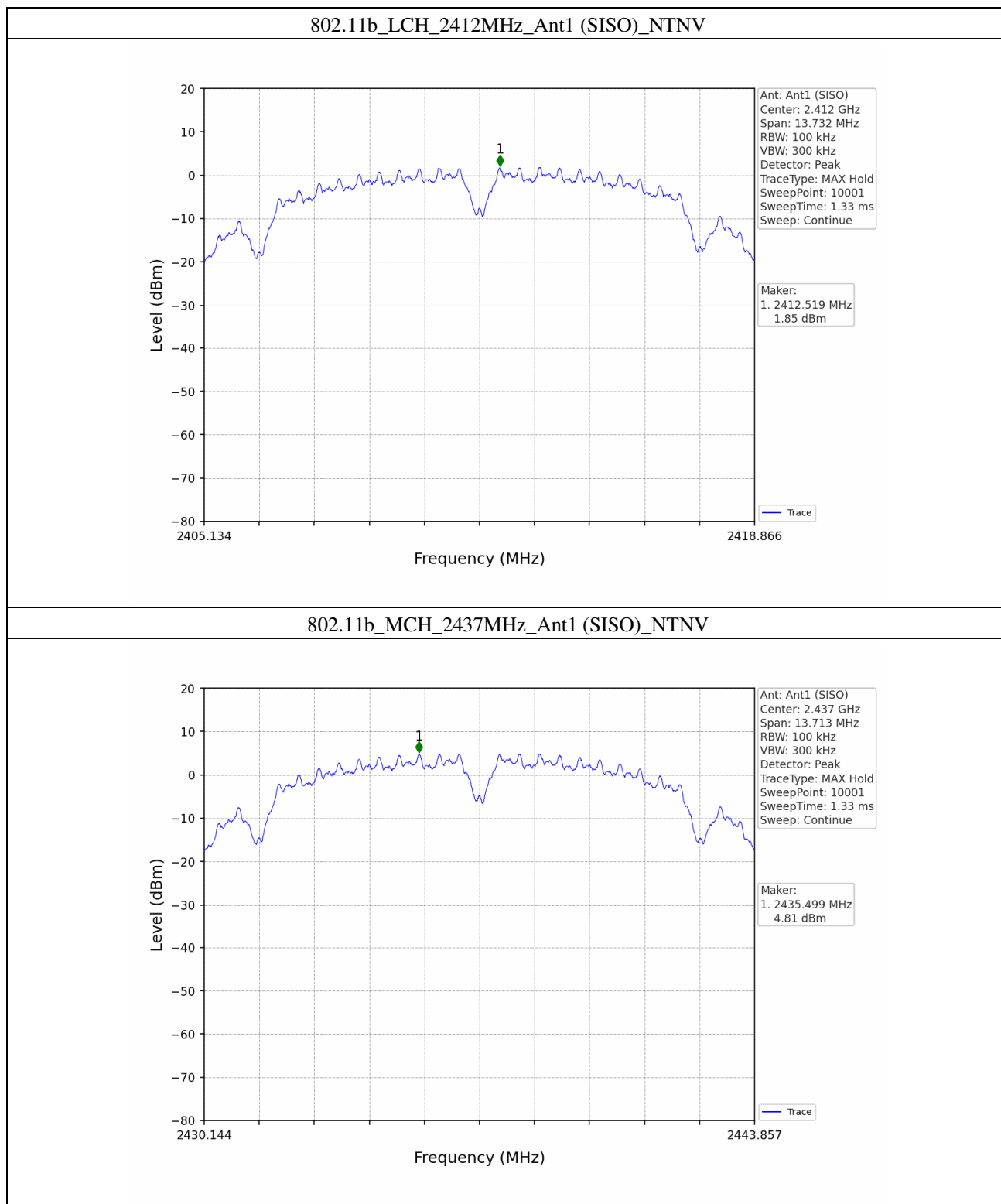
5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Ref

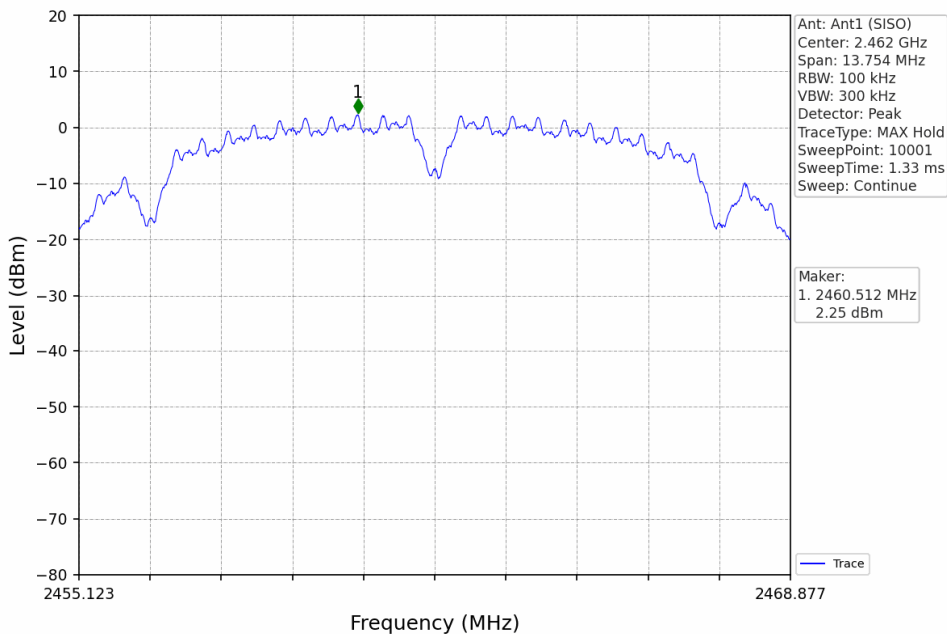
5.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)
802.11b	SISO	2412	1	1.85
		2437	1	4.81
		2462	1	2.25
802.11g	SISO	2412	1	-4.47
		2437	1	-3.60
		2462	1	-4.13
802.11n (HT20)	SISO	2412	1	-4.59
		2437	1	-4.37
		2462	1	-4.44

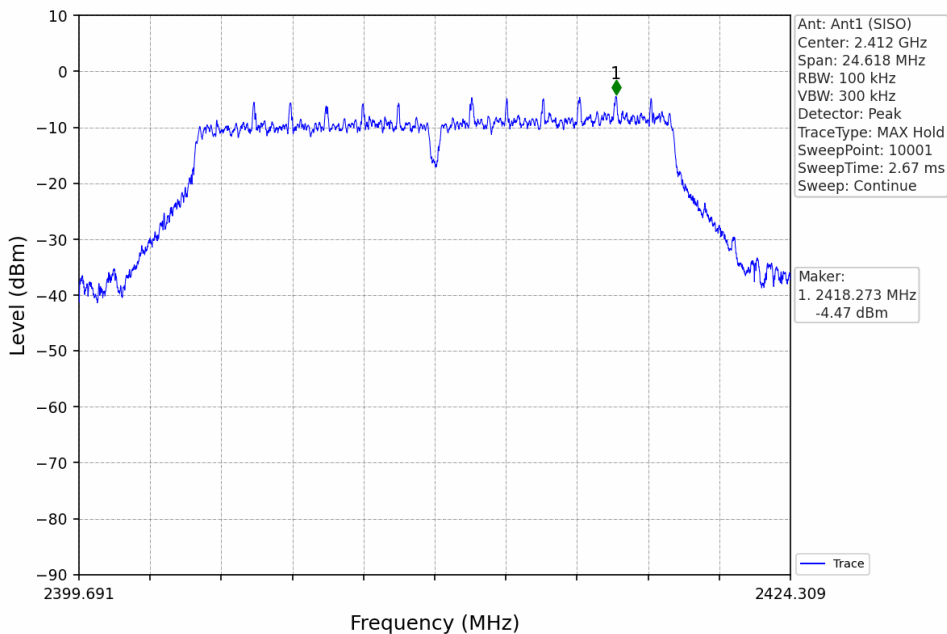
5.1.2 Test Graph



802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



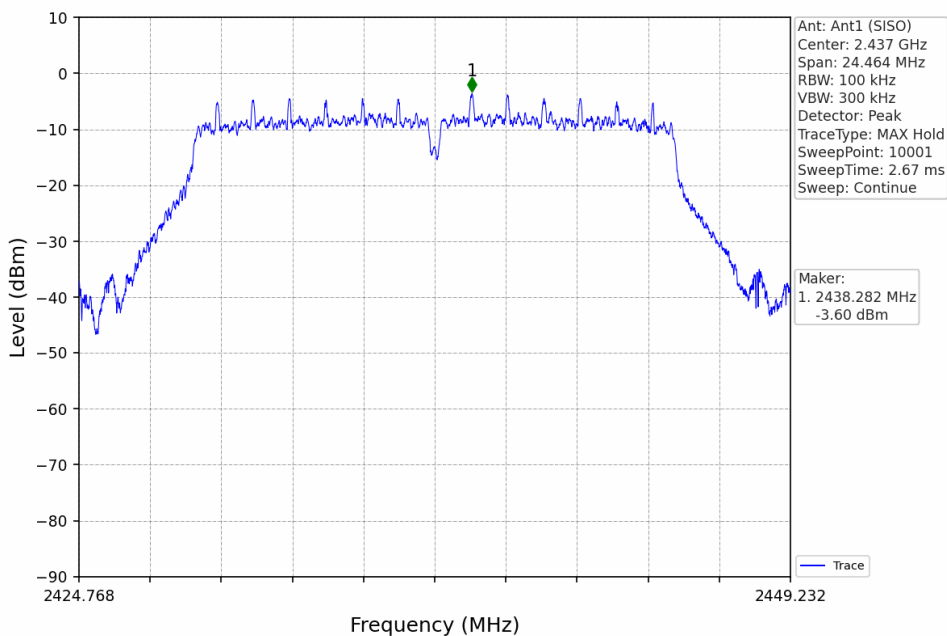
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



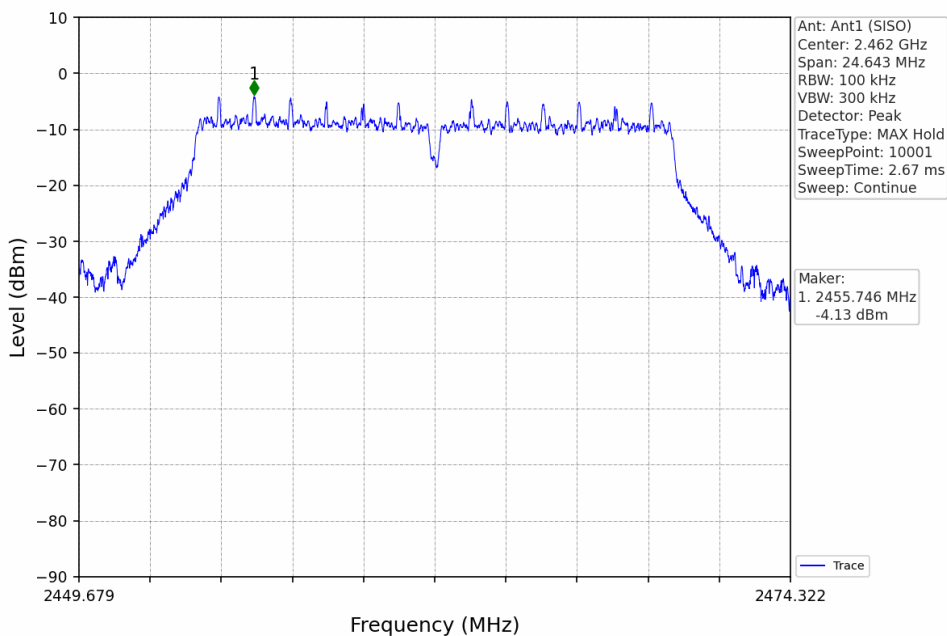
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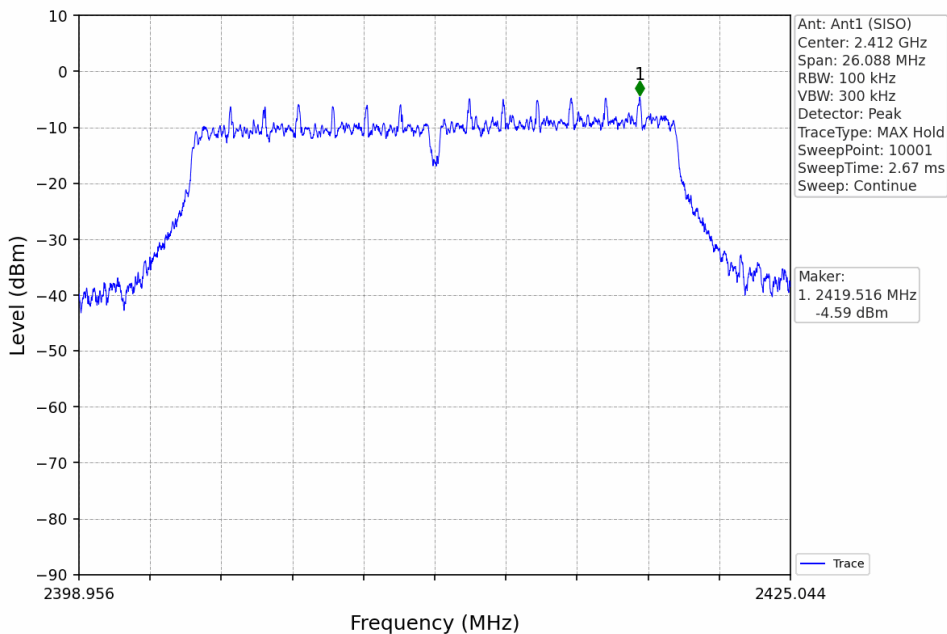
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



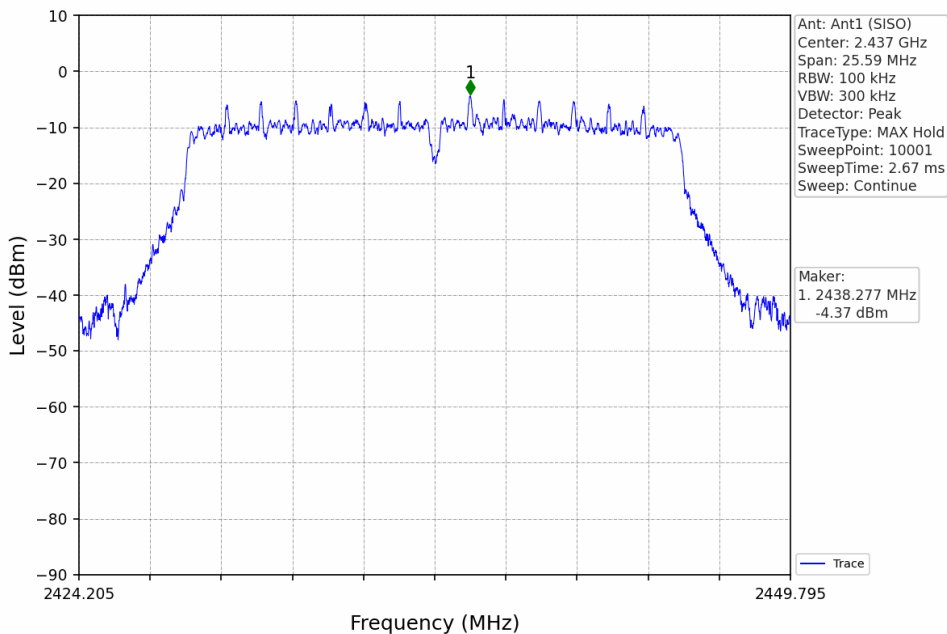
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV

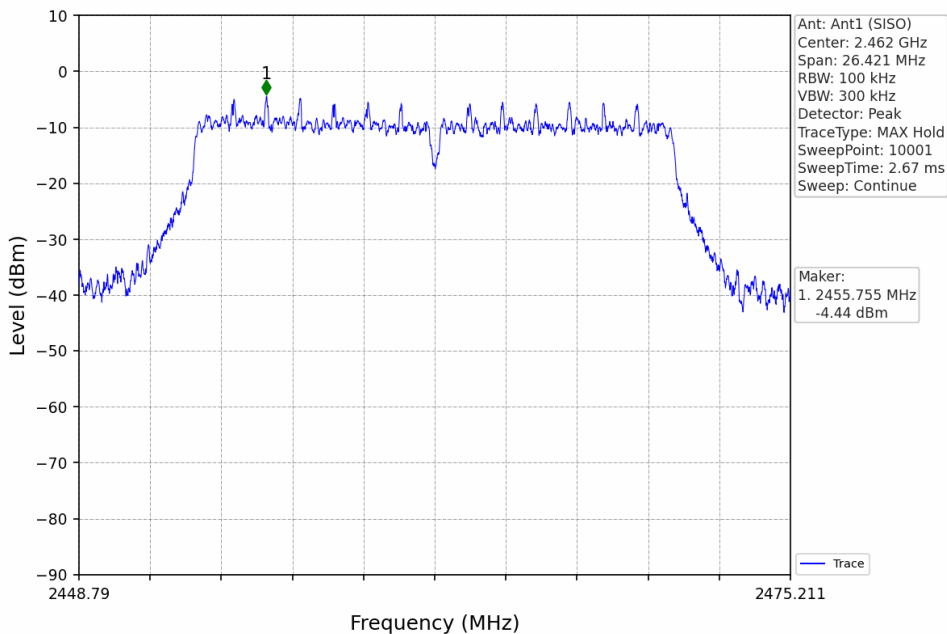


802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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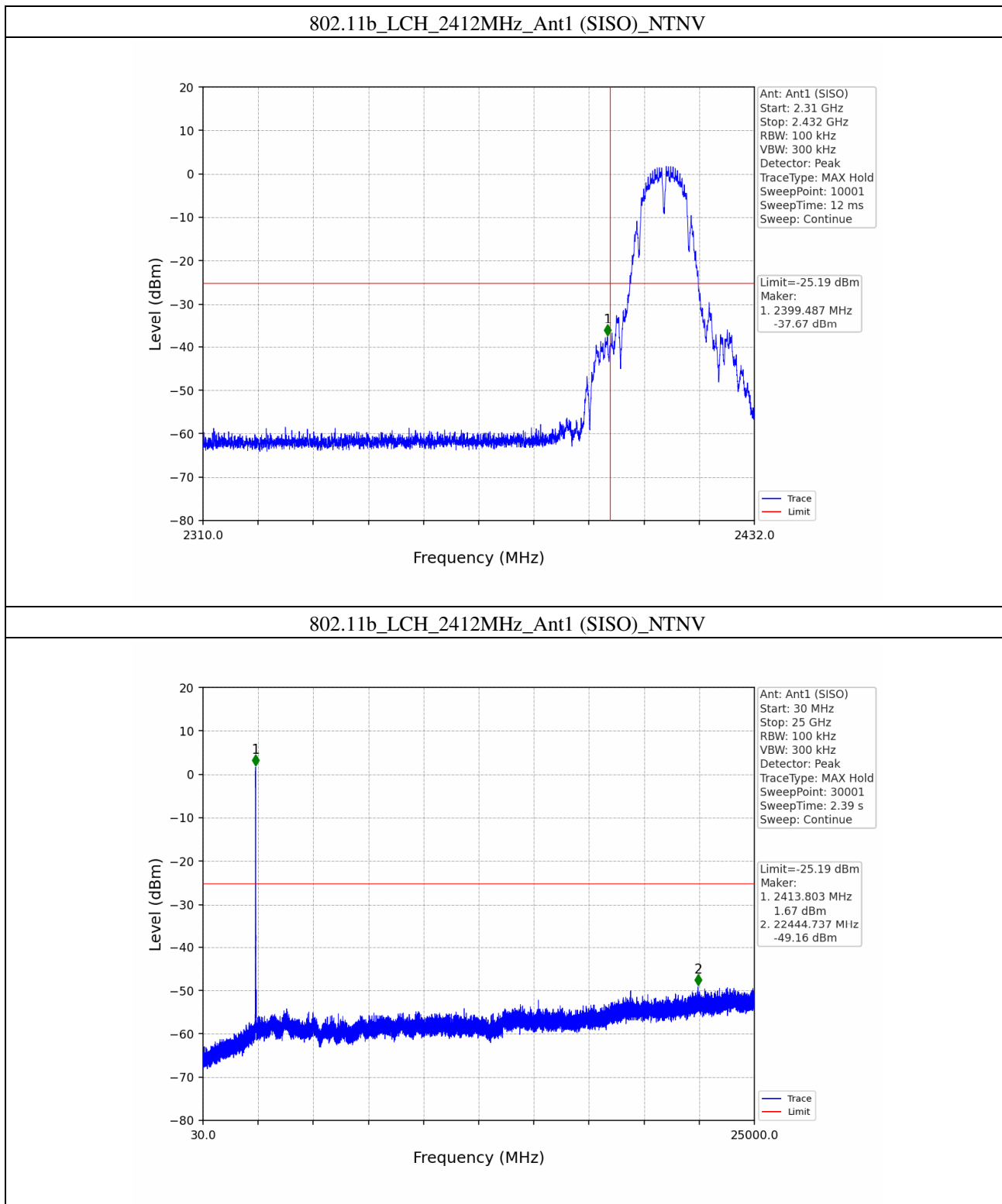
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5.2 CSE

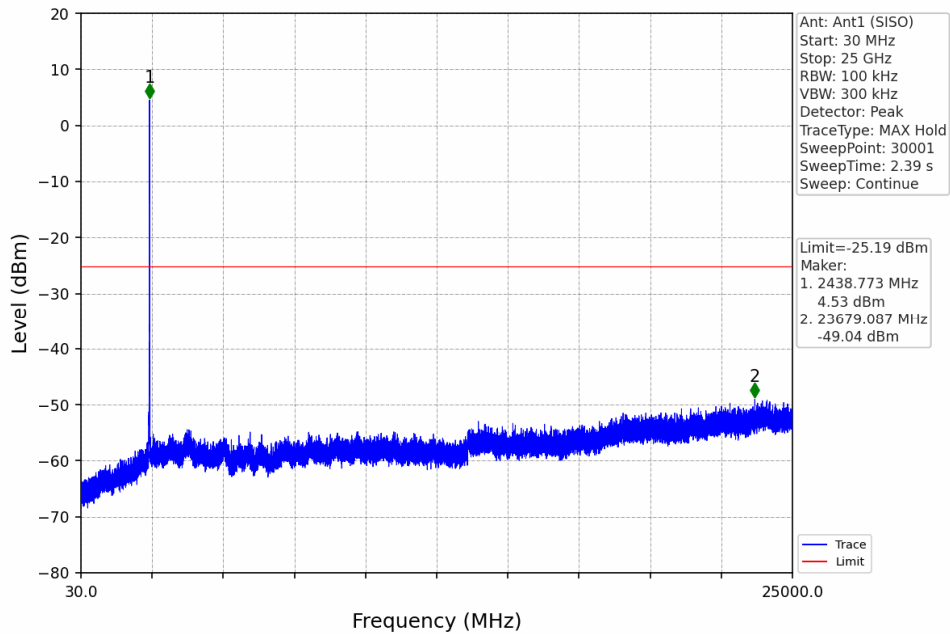
5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	4.81	-25.19	Pass
		2437	1	4.81	-25.19	Pass
		2462	1	4.81	-15.19	Pass
802.11g	SISO	2412	1	-3.60	-33.60	Pass
		2437	1	-3.60	-33.60	Pass
		2462	1	-3.60	-33.60	Pass
802.11n (HT20)	SISO	2412	1	-4.37	-34.37	Pass
		2437	1	-4.37	-34.37	Pass
		2462	1	-4.37	-34.37	Pass

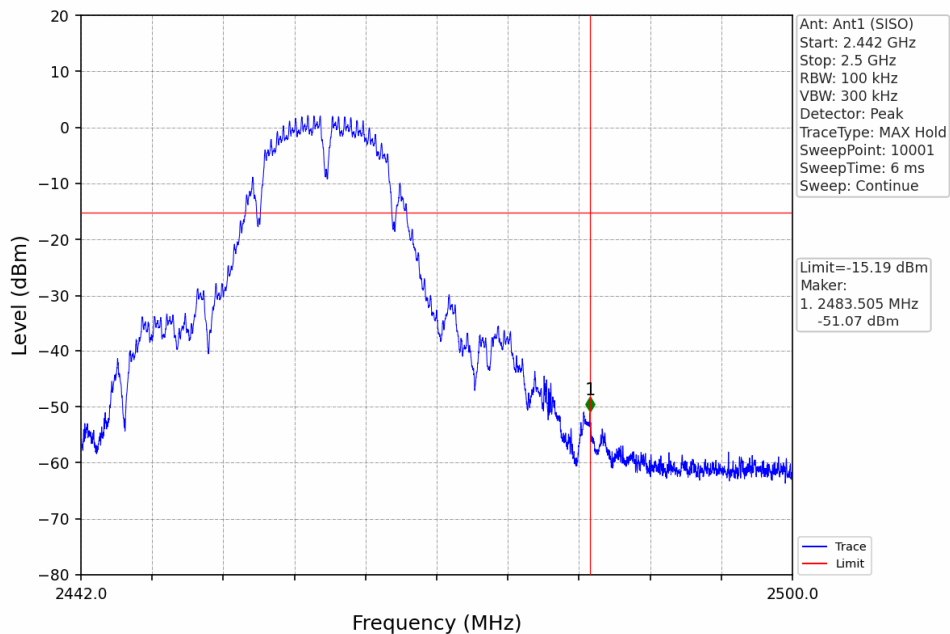
5.2.2 Test Graph



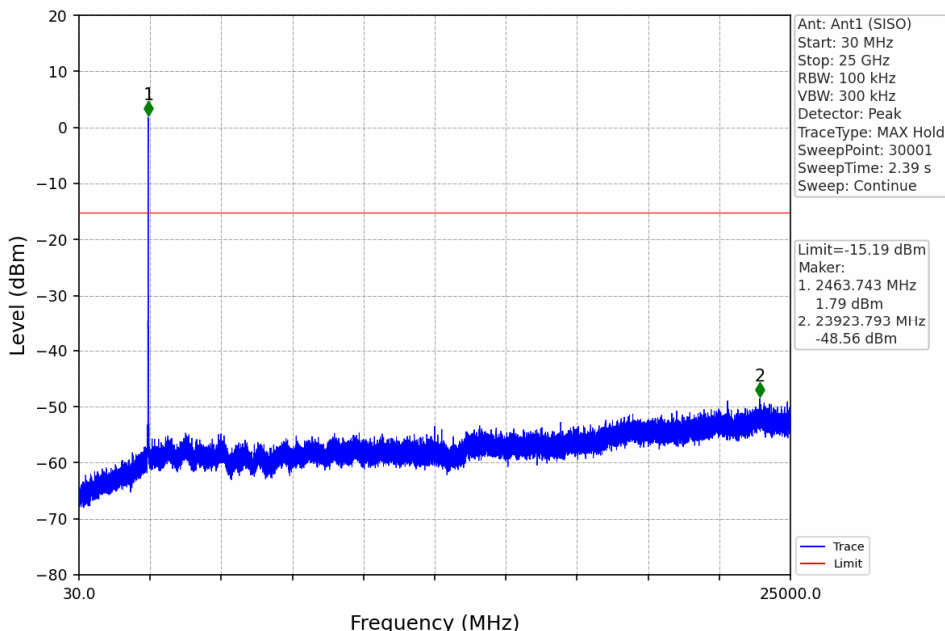
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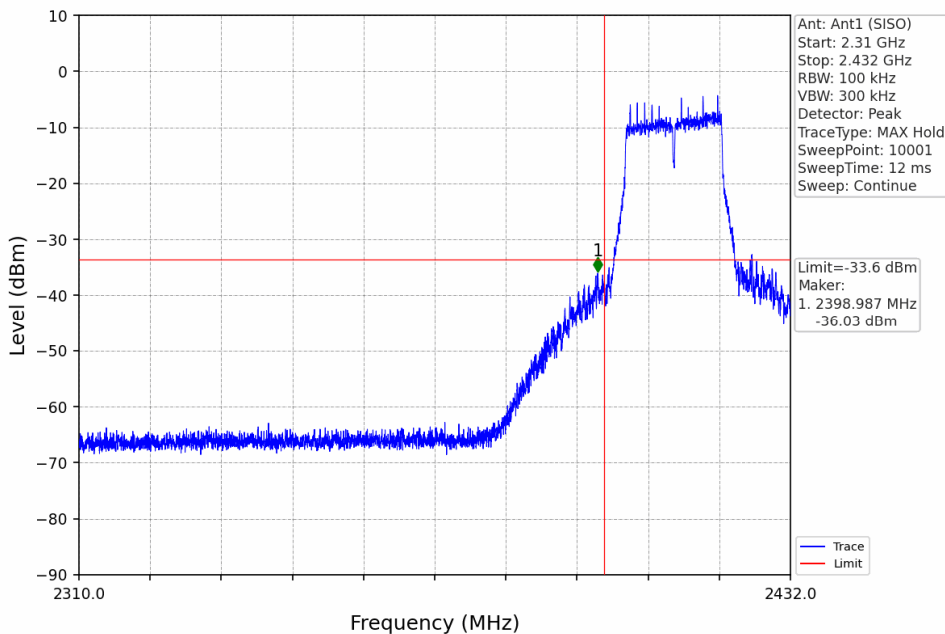
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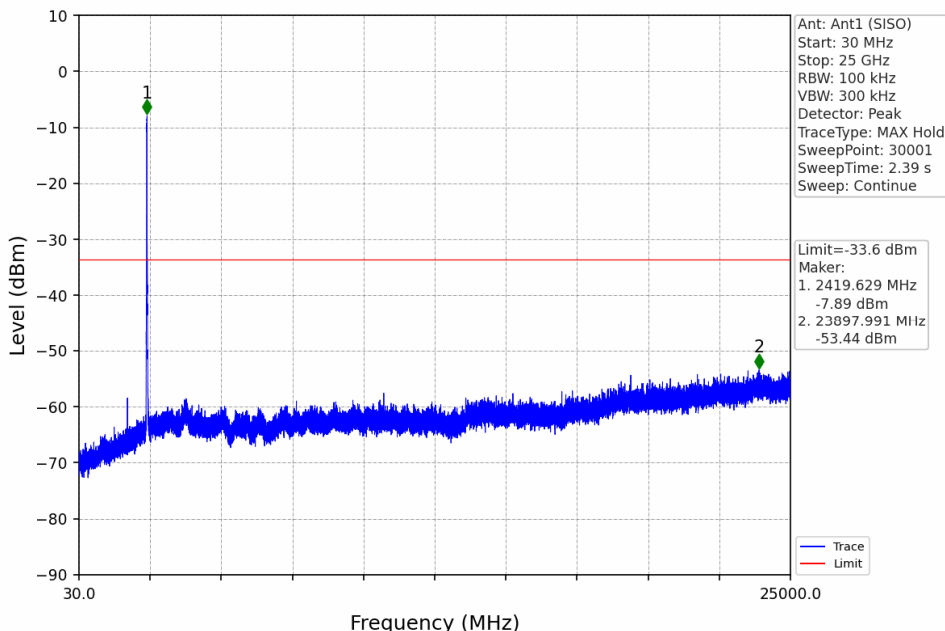
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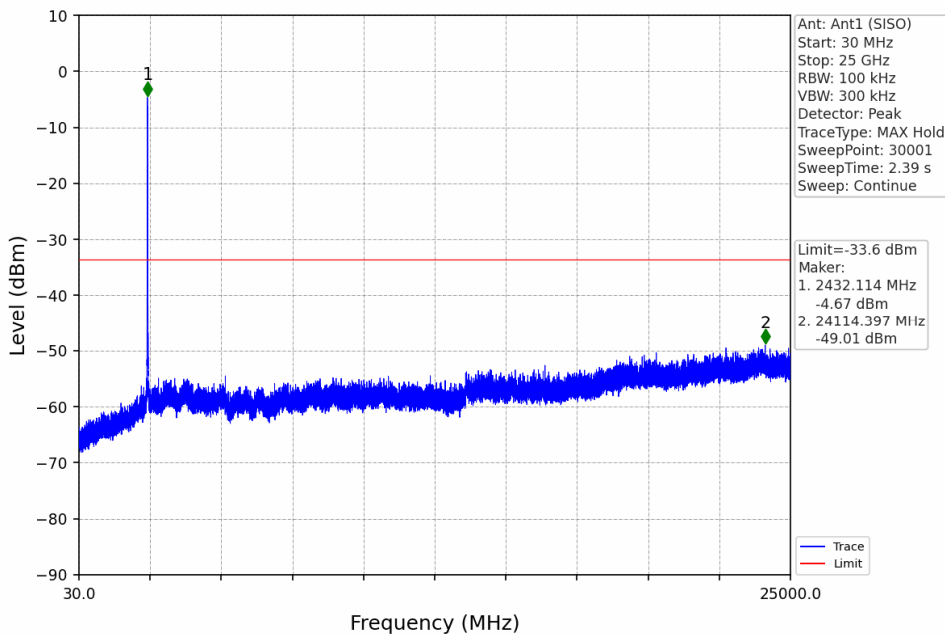
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



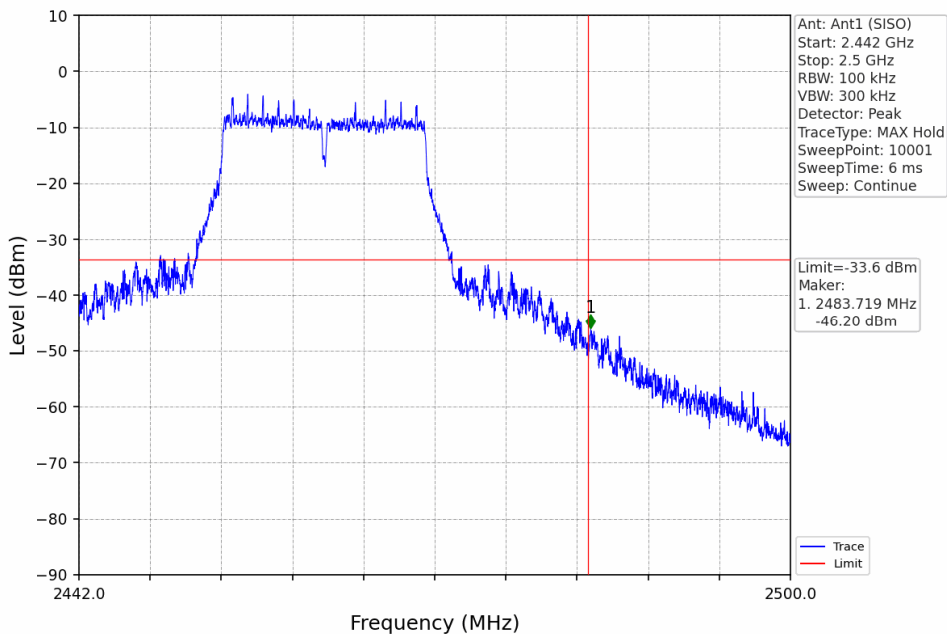
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



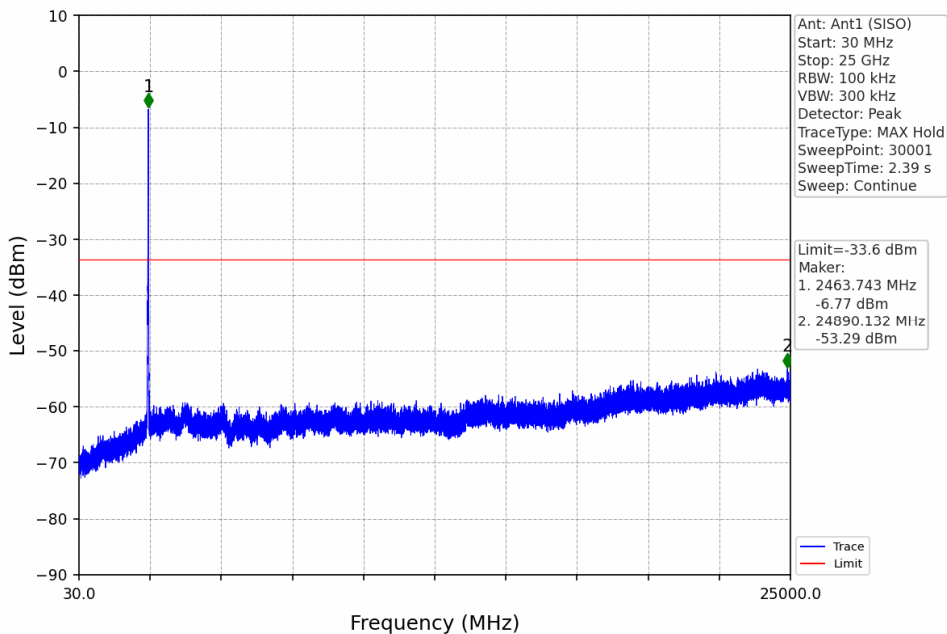
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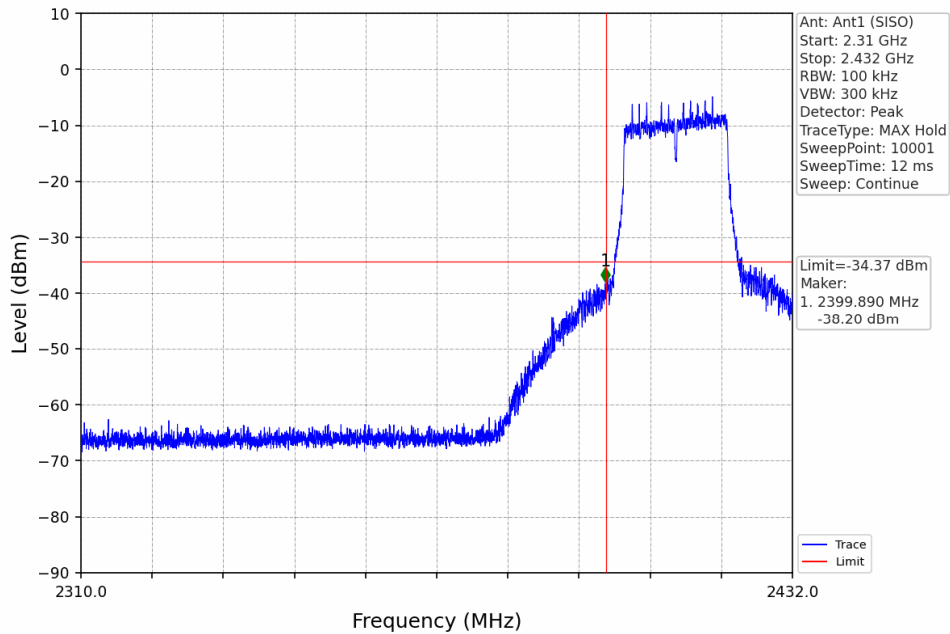
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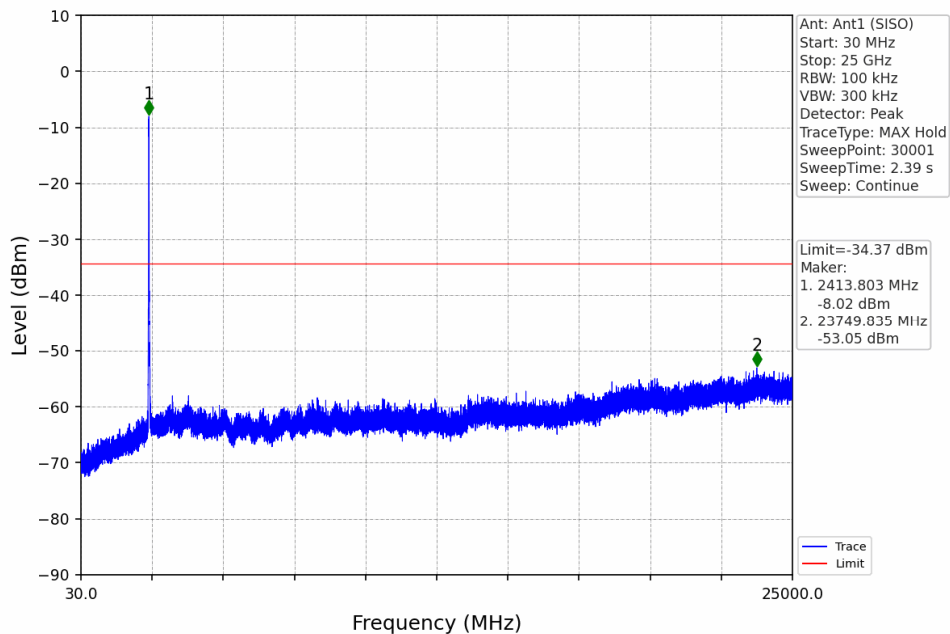
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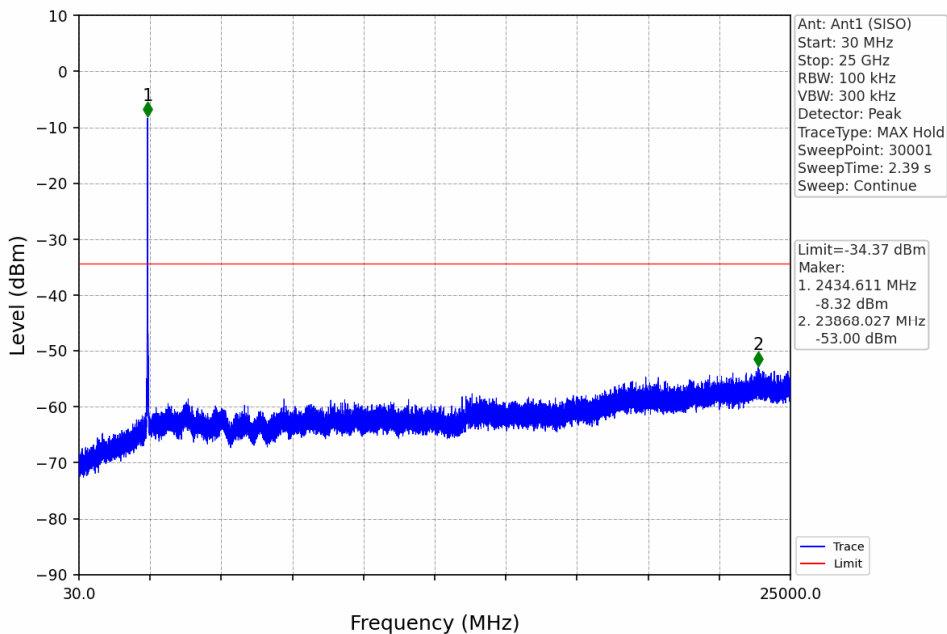
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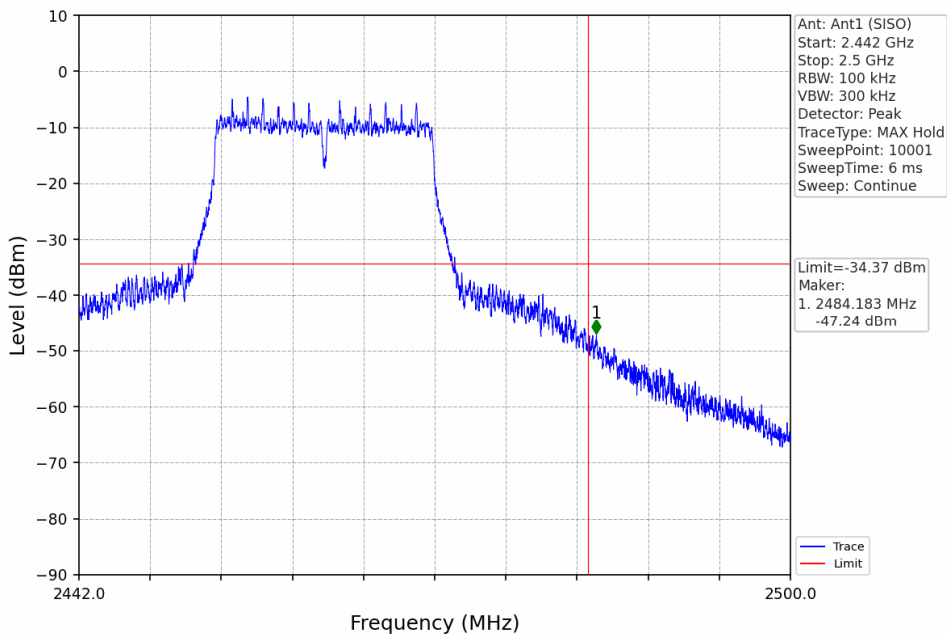
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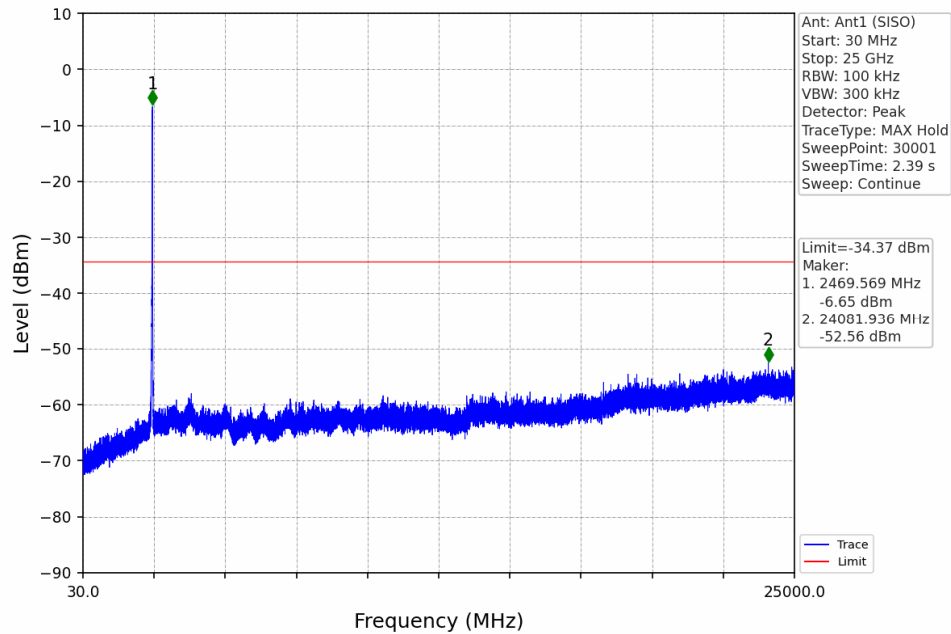
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802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



- End of the Report -