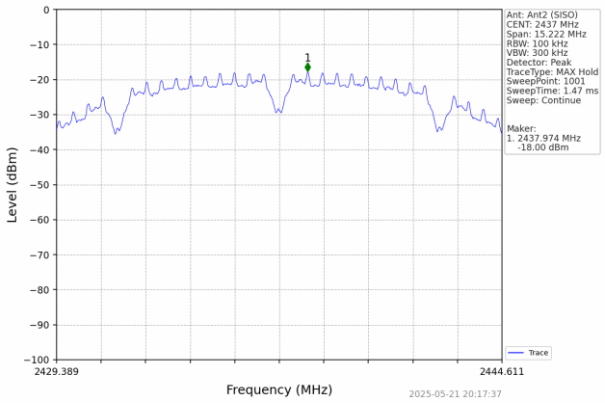
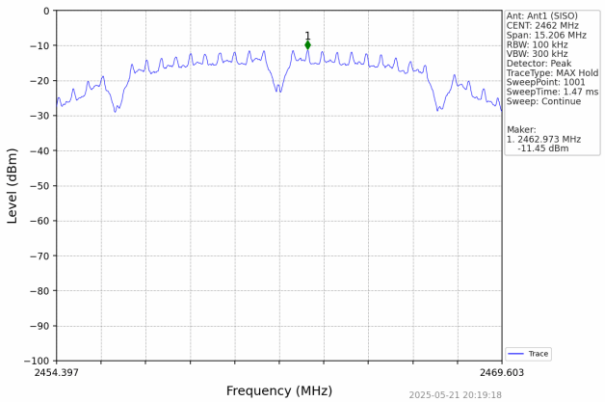
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



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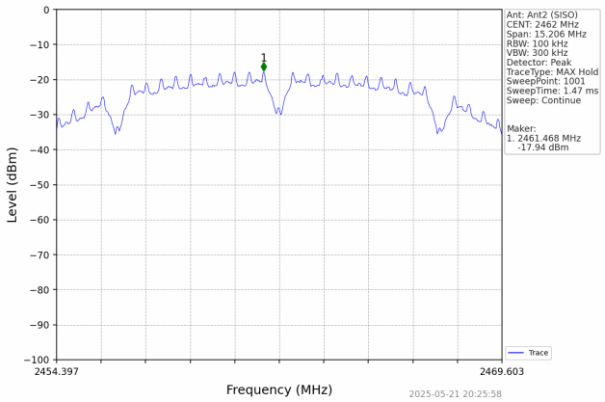

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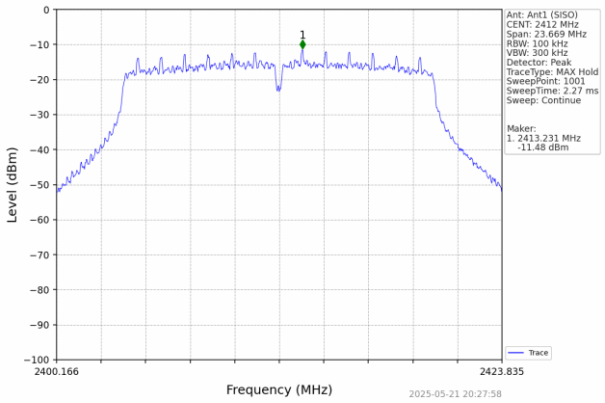

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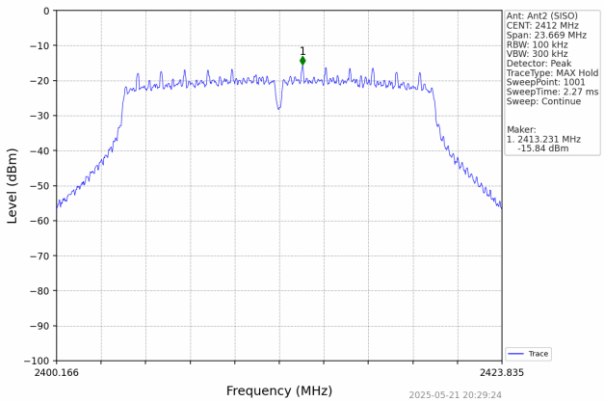

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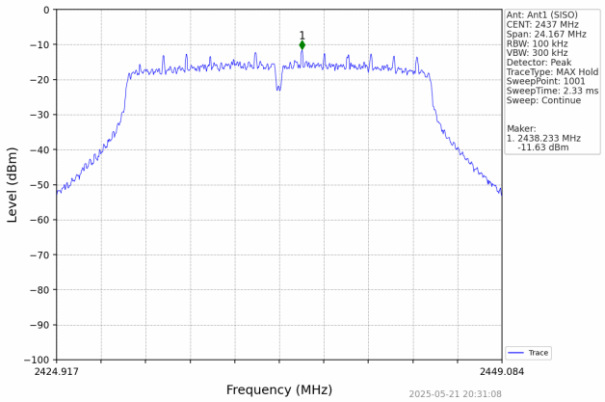

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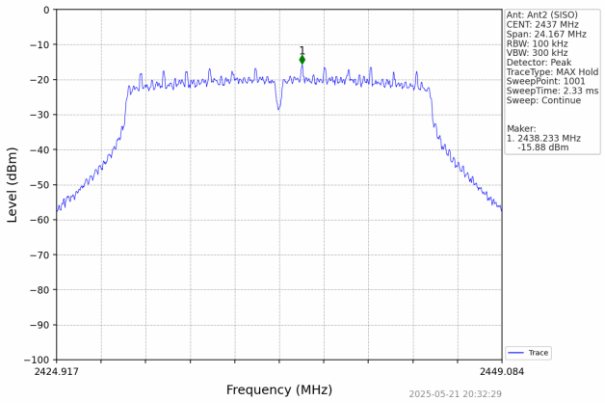

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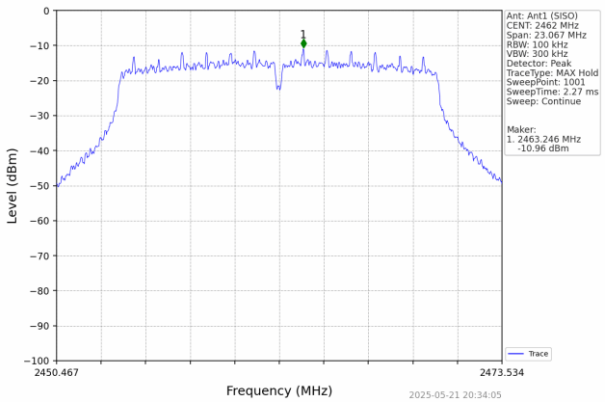

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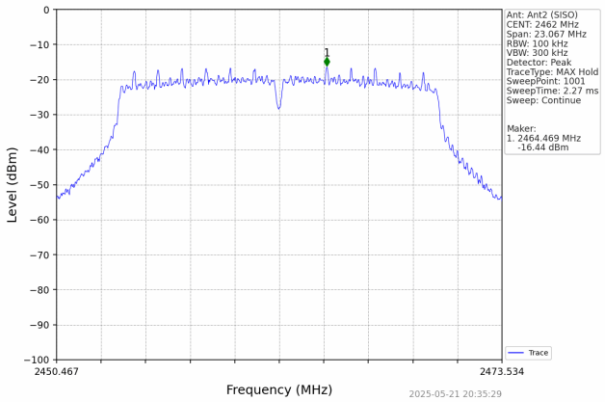

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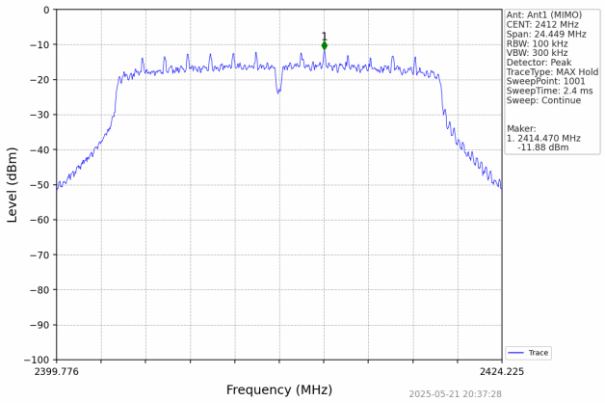

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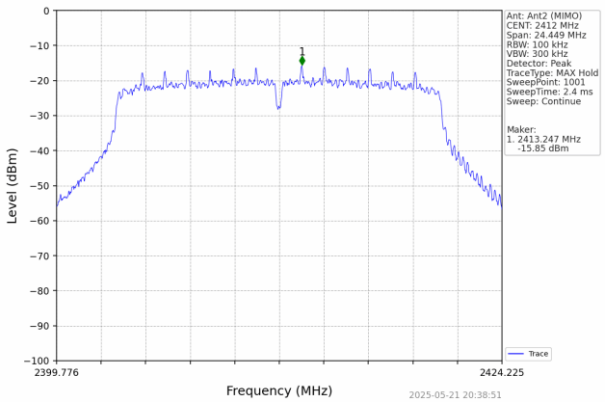

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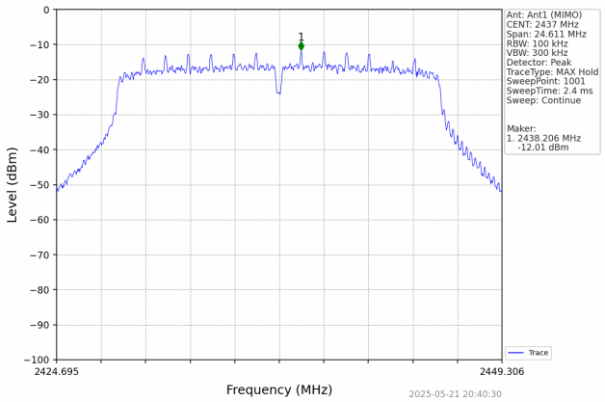

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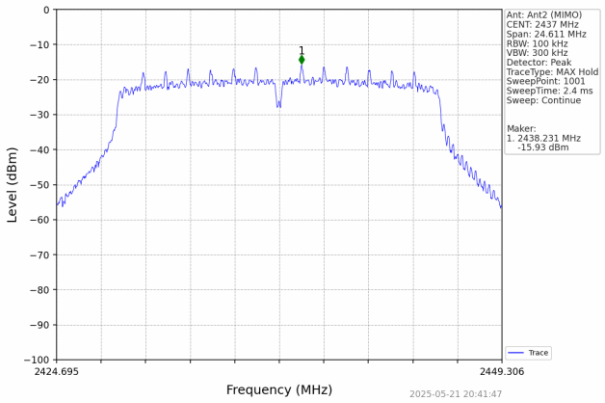

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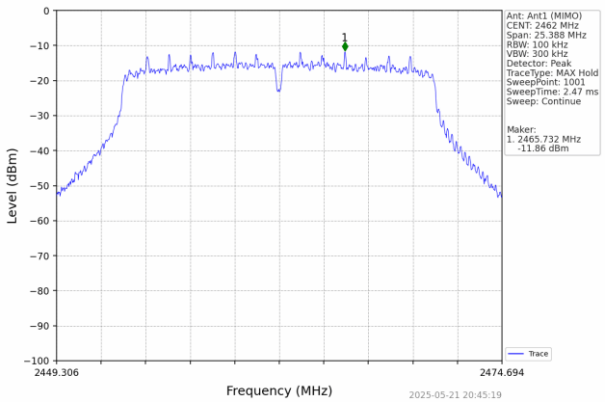

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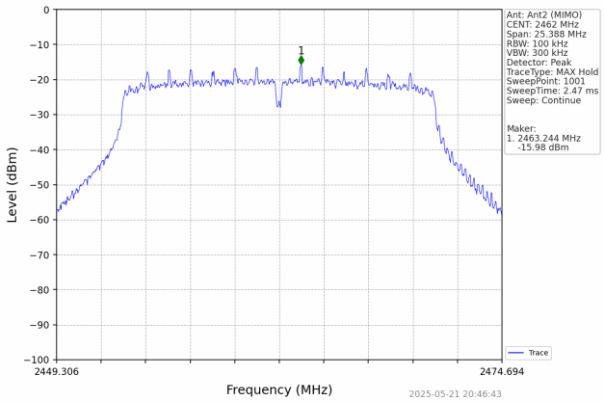
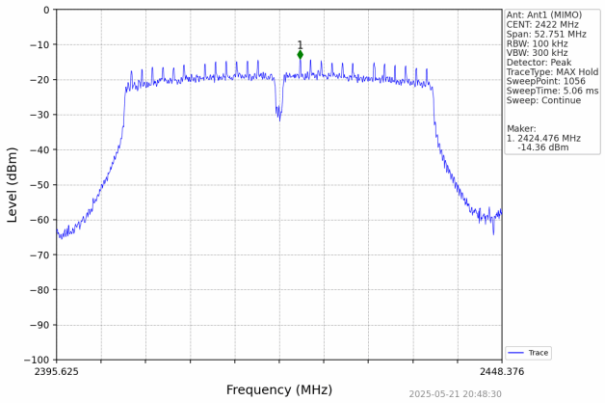


802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



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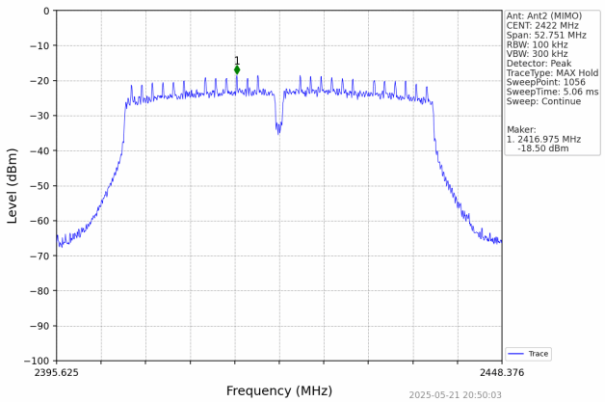

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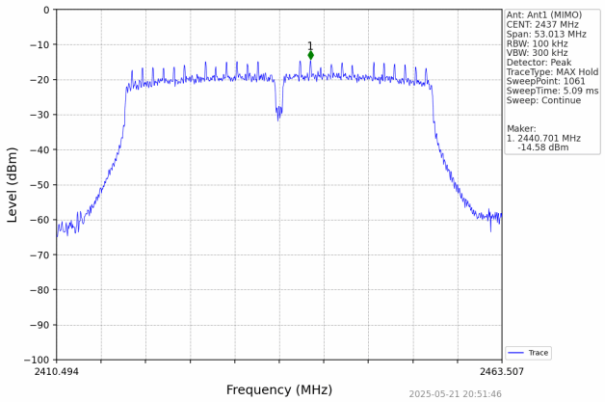

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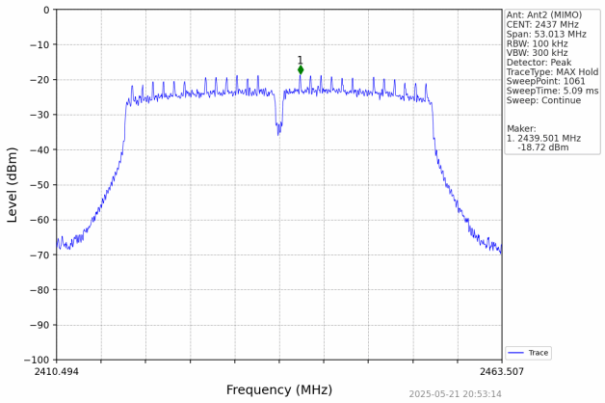
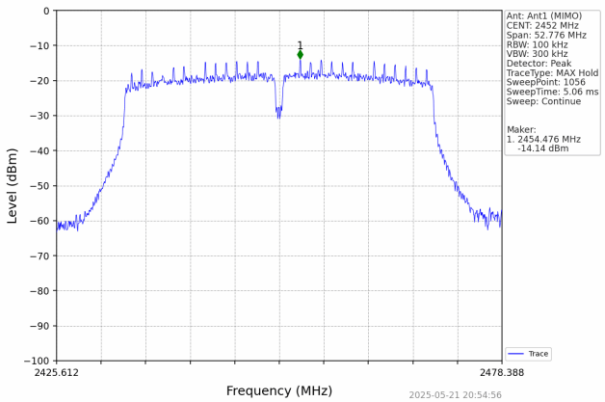


802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



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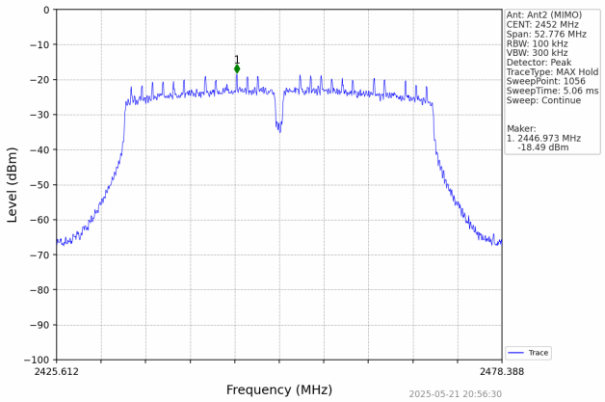
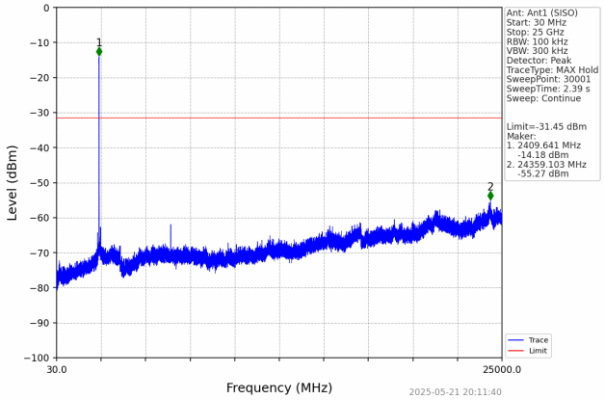


802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



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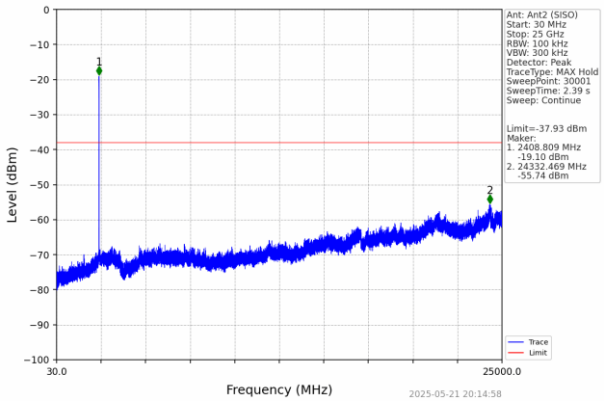
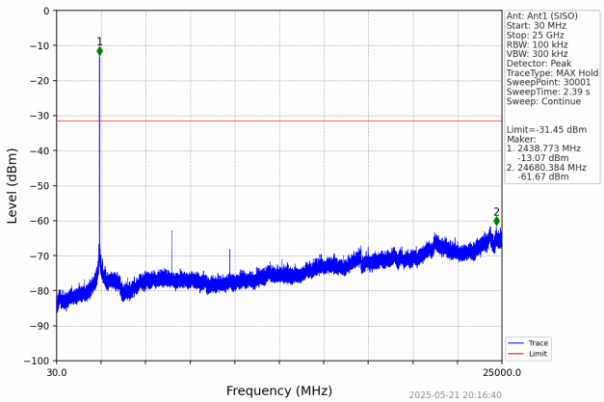


802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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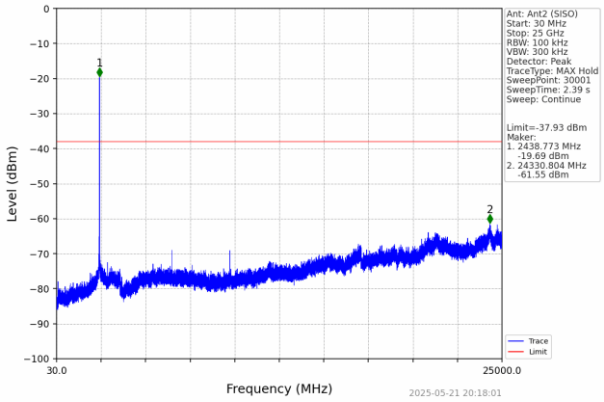

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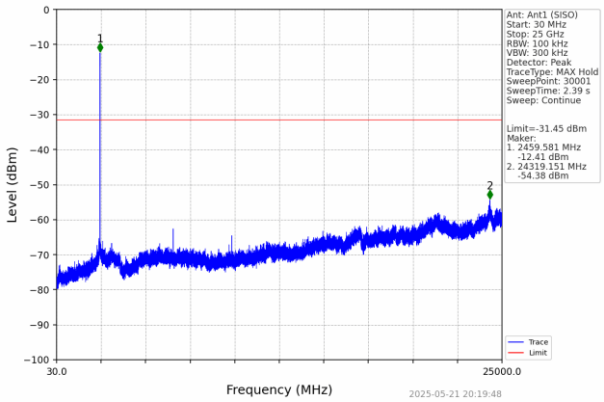

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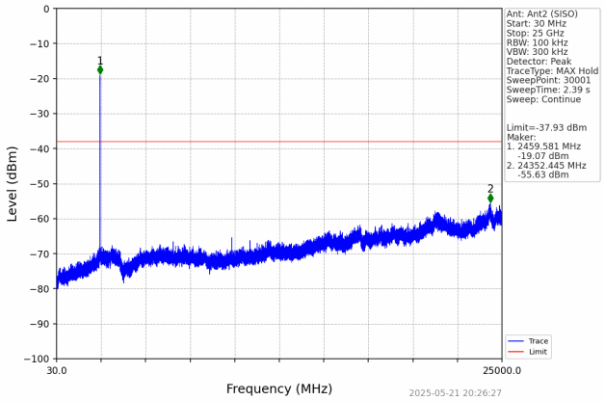
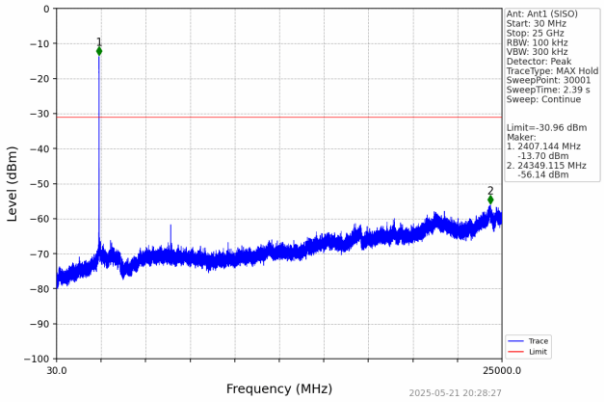


802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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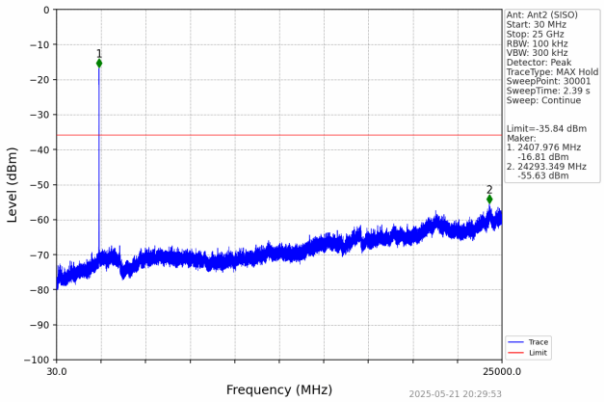

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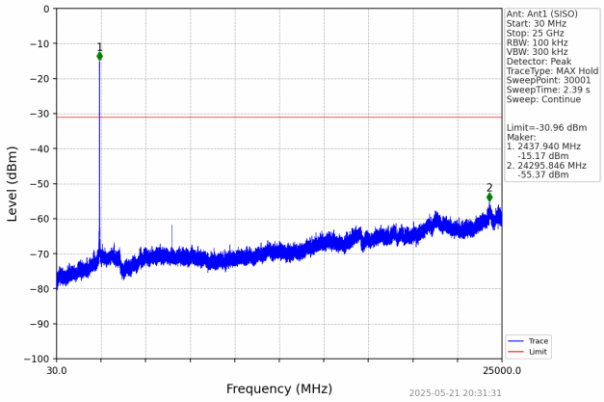

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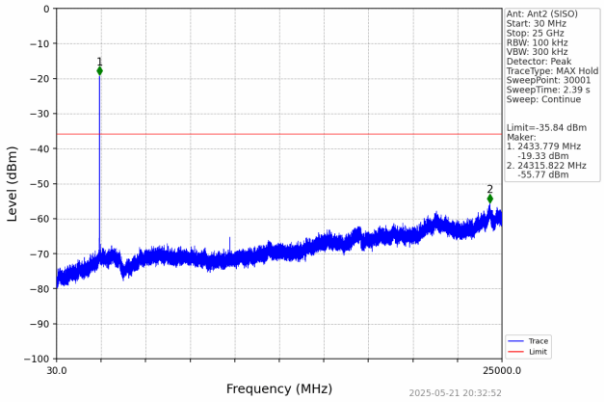
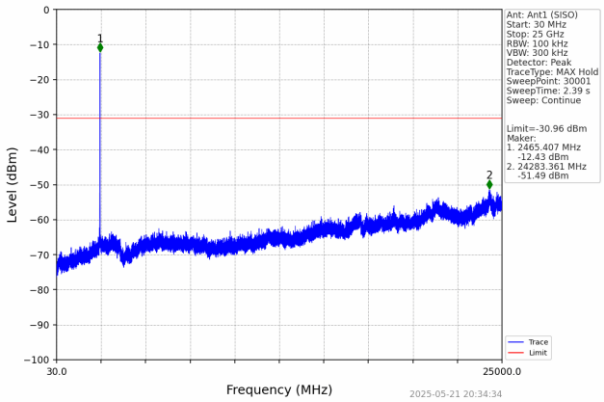


802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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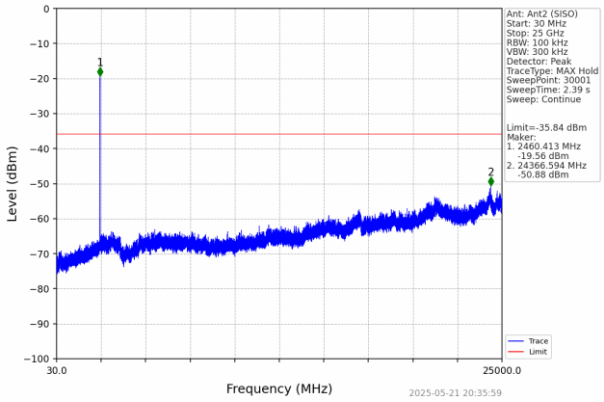

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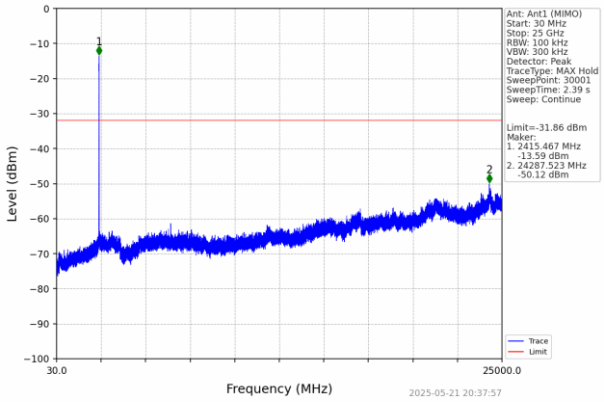

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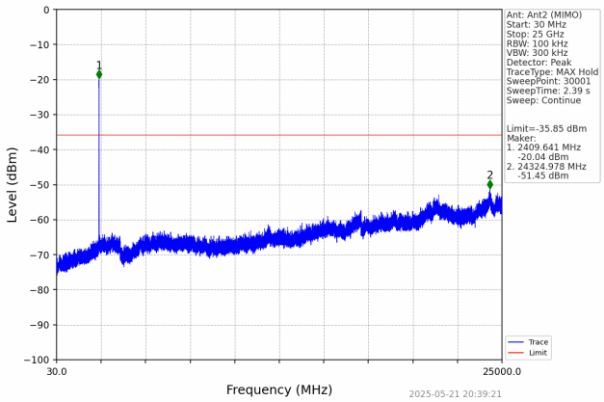
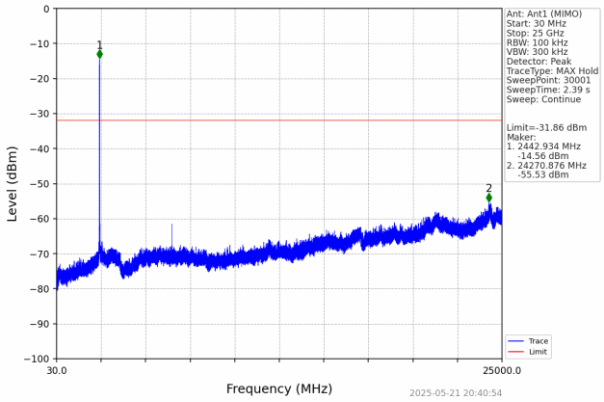


802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



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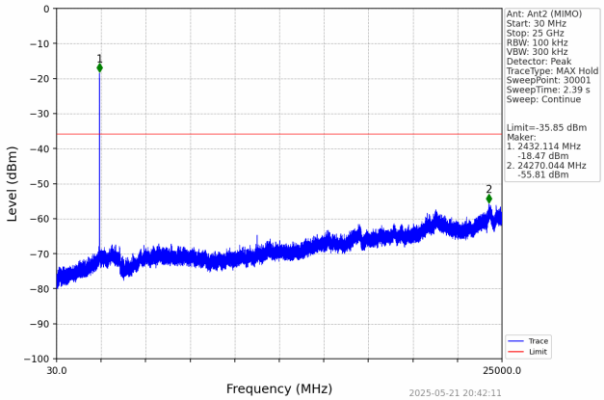
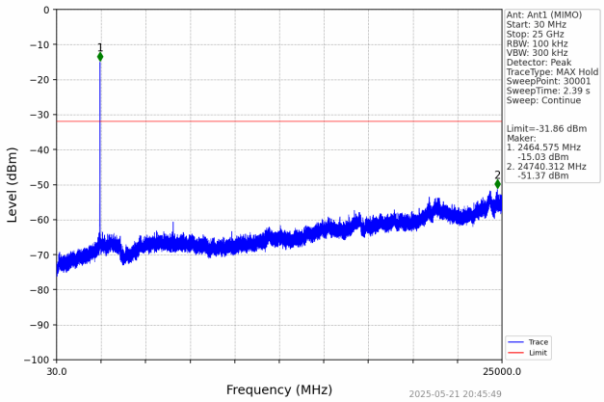


802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



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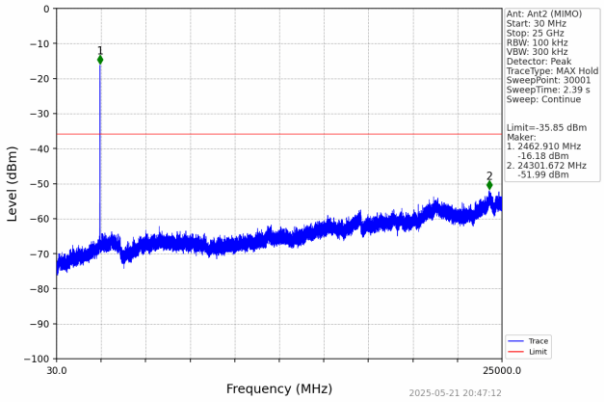
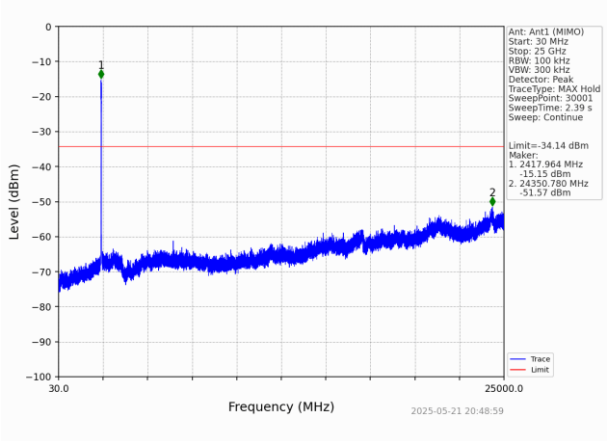


802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



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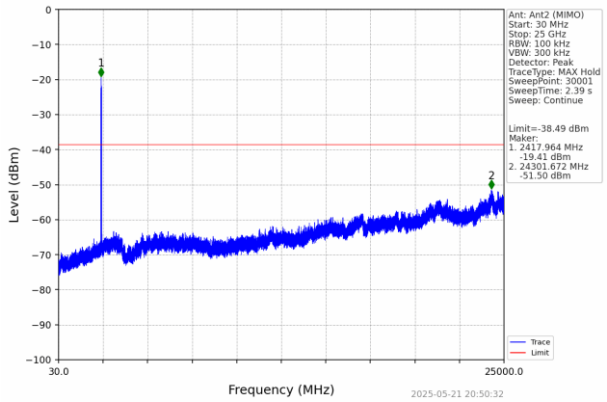
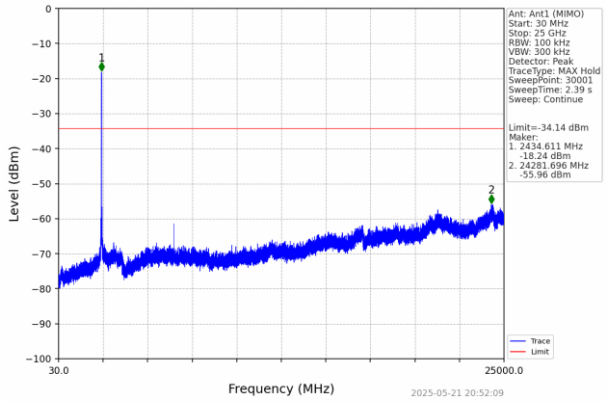
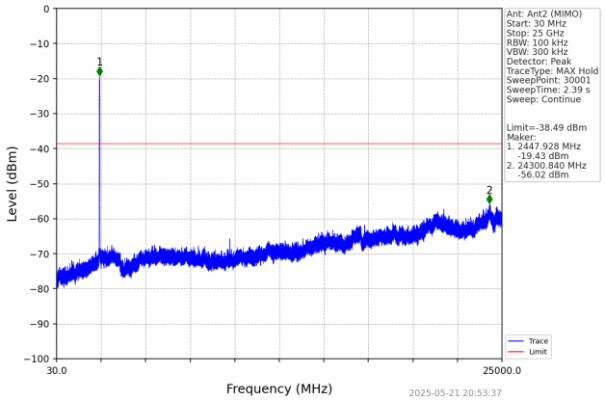


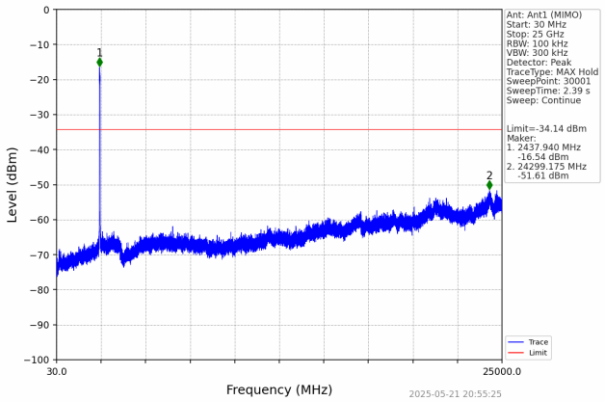
802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



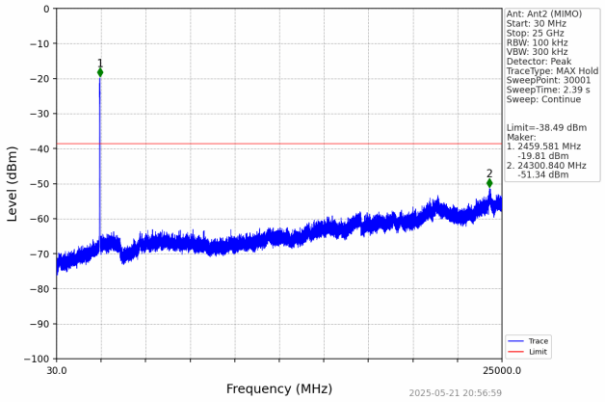
802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



6.6.2. Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

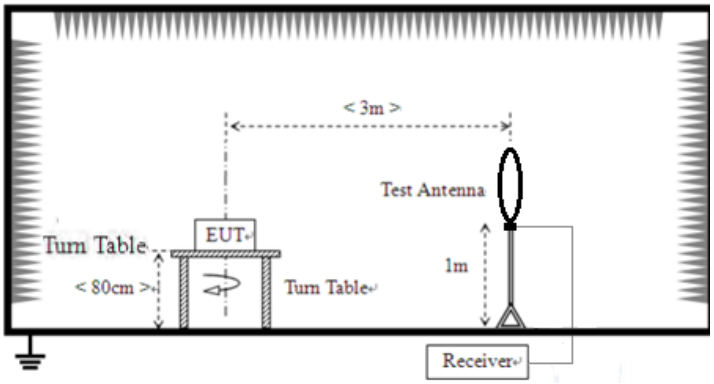
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

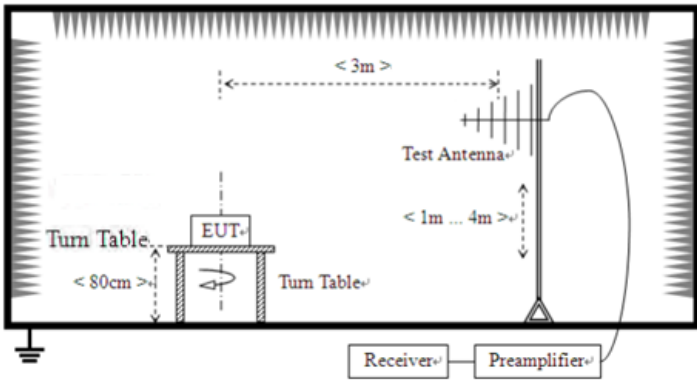
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

Test setup:

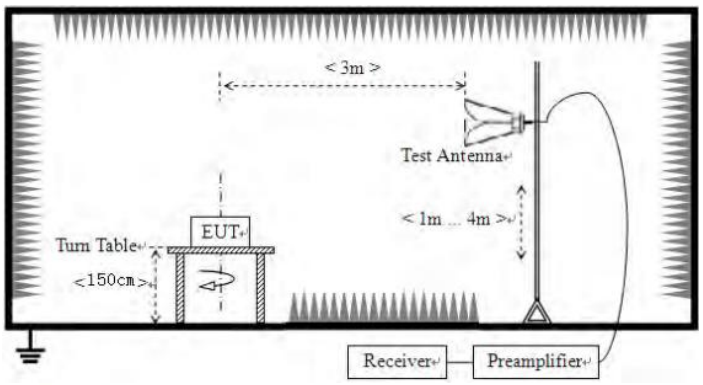
For radiated emissions from 9kHz to 30MHz

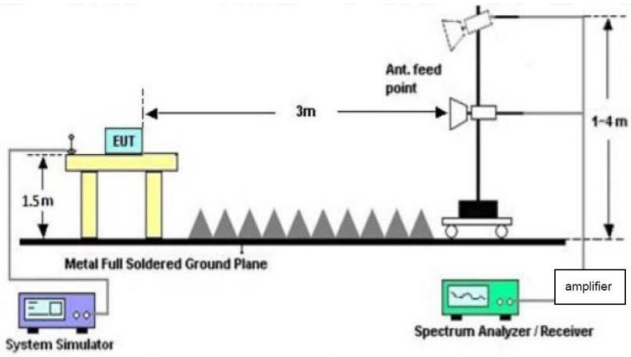


For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz





Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

	5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:
1.Only the worst case Main Antenna test data.
2.Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement data:

- **9kHz~30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

■ **Below 1GHz**

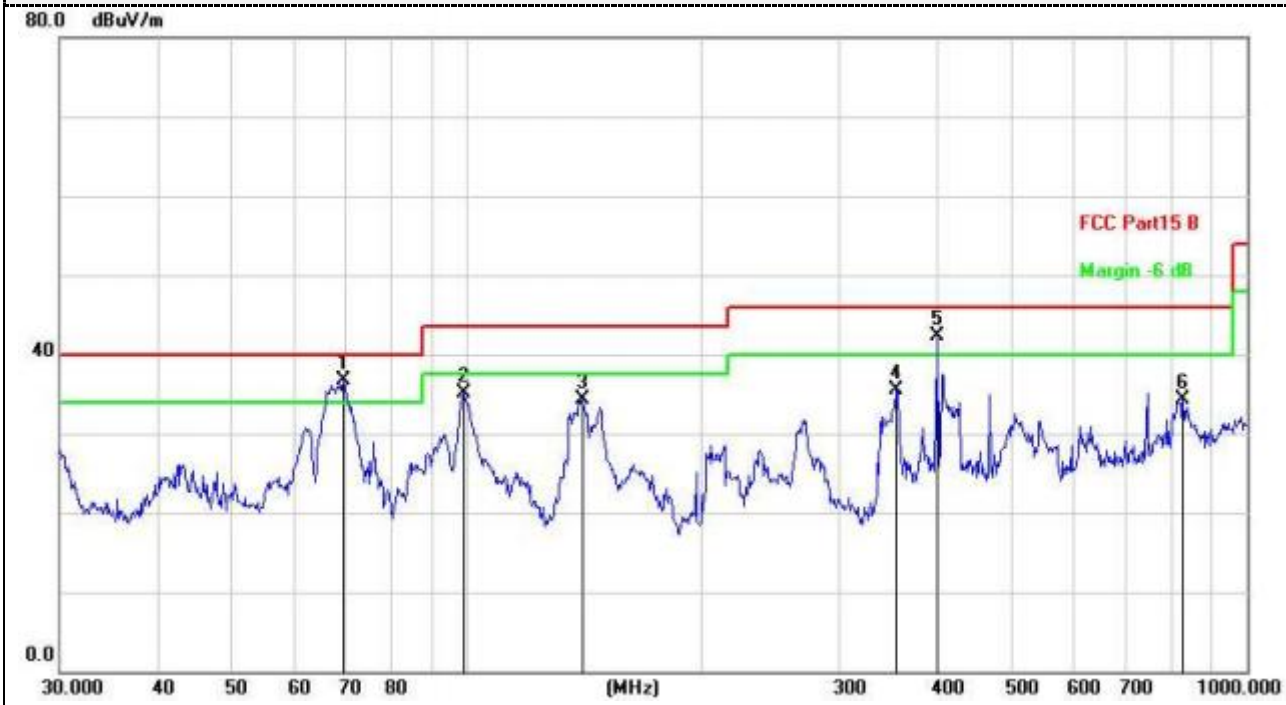
Pre-scan all test modes, found worst case at 802.11b 2437MHz antenna 1, and so only show the test result of 802.11b 2437MHz antenna 1.

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		67.9129	39.31	-12.97	26.34	40.00	-13.66	peak
2		148.4410	39.89	-10.76	29.13	43.50	-14.37	peak
3		211.5265	47.27	-13.29	33.98	43.50	-9.52	peak
4		270.3748	45.79	-11.38	34.41	46.00	-11.59	peak
5	*	400.4319	47.66	-8.04	39.62	46.00	-6.38	peak
6		801.7863	39.09	0.24	39.33	46.00	-6.67	peak

Final Level =Receiver Read level + Correct Factor

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1	*	69.3568	50.01	-13.22	36.79	40.00	-3.21	peak
2		98.8326	50.07	-14.92	35.15	43.50	-8.35	peak
3		140.3421	46.19	-11.85	34.34	43.50	-9.16	peak
4		354.1831	45.63	-10.16	35.47	46.00	-10.53	peak
5	!	400.4319	50.35	-8.04	42.31	46.00	-3.69	peak
6		827.4934	33.71	0.63	34.34	46.00	-11.66	peak

Final Level =Receiver Read level + Correct Factor

■ **Above 1-25GHz**

Note: During the test, pre-scan the 802.11b/802.11g/802.11n (H20)/802.11n (H40) modulation, and found the 802.11b modulation antenna 1 which it is worse case.

802.11b:

Frequency(MHz):			**2412**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	59.91	PK	74	14.09	54.09	31.05	6.52	31.75	5.82
4824.00	44.37	AV	54	9.63	38.55	31.05	6.52	31.75	5.82
7236.00	57.56	PK	74	16.44	44.75	36.08	8.18	31.45	12.81
7236.00	46.97	AV	54	7.03	34.16	36.08	8.18	31.45	12.81

Frequency(MHz):			**2412**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	60.72	PK	74	13.28	54.90	31.05	6.52	31.75	5.82
4824.00	44.12	AV	54	9.88	38.30	31.05	6.52	31.75	5.82
7236.00	56.32	PK	74	17.68	43.51	36.08	8.18	31.45	12.81
7236.00	46.96	AV	54	7.04	34.15	36.08	8.18	31.45	12.81

Frequency(MHz):			**2437**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	61.65	PK	74	12.35	55.21	31.25	6.7	31.51	6.44
4874.00	45.55	AV	54	8.45	39.11	31.25	6.7	31.51	6.44
7311.00	55.56	PK	74	18.44	42.42	36.25	8.31	31.42	13.14
7311.00	46.69	AV	54	7.31	33.55	36.25	8.31	31.42	13.14

Frequency(MHz):			2437		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	60.58	PK	74	13.42	54.14	31.25	6.7	31.51	6.44
4874.00	44.98	AV	54	9.02	38.54	31.25	6.7	31.51	6.44
7311.00	56.48	PK	74	17.52	43.34	36.25	8.31	31.42	13.14
7311.00	46.33	AV	54	7.67	33.19	36.25	8.31	31.42	13.14

Frequency(MHz):			2462		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	61.51	PK	74	12.49	54.64	31.52	6.8	31.45	6.87
4924.00	46.23	AV	54	7.77	39.36	31.52	6.8	31.45	6.87
7386.00	56.61	PK	74	17.39	43.05	36.51	8.4	31.35	13.56
7386.00	47.09	AV	54	6.91	33.53	36.51	8.4	31.35	13.56

Frequency(MHz):			2462		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	59.98	PK	74	14.02	53.11	31.52	6.8	31.45	6.87
4924.00	44.01	AV	54	9.99	37.14	31.52	6.8	31.45	6.87
7386.00	55.59	PK	74	18.41	42.03	36.51	8.4	31.35	13.56
7386.00	47.39	AV	54	6.61	33.83	36.51	8.4	31.35	13.56

Remark：
(1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

6.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Antenna Connected Construction

The maximum gain of antenna was 3.86 dBi for ANT 1 and 2.92 dBi for ANT 2.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen HTT Technology Co.,Ltd. does not assume any responsibility.

7. Test Setup Photo

Reference to the **appendix I** for details.

8. EUT Constructional Details

Reference to the **appendix II** for details.

------End------