



JAPAN RADIO TEST REPORT

Applicant: Shenzhen TFIRETEK Technology Co., Ltd.
Address: 204, Building 2, Stech Park, Taoyuan Community, Dalang Street, LongHua District, ShenZhen
Manufacturer: Shenzhen TFIRETEK Technology Co., Ltd.
Address: 204, Building 2, Stech Park, Taoyuan Community, Dalang Street, LongHua District, ShenZhen
Product Name: Projector
Trade Mark: N/A
Model Number: HA109
HA109-A, HA109-N
Date of Receipt: Aug. 21, 2025
Test Date: Aug. 21, 2025 - Aug. 28, 2025
Date of Report: Aug. 28, 2025
Prepared By: Shenzhen DL Testing Technology Co., Ltd.
Address: 101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China
Applicable Standards: ARIB STD T-66 Ver.3.7
Article2 Paragraph 1, item 19
MIC Notice No.88 Appendix No.43
Test Result: Pass
Report Number: DLE-250821053R

Prepared (Test Engineer): Alisa Song

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



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1. TECHNICAL INFORMATION

Note: the following data is based on the information by the applicant.

1.1 EUT DESCRIPTION

Product Name:	Projector
Trade Mark:	N/A
Model Number:	HA109 HA109-A, HA109-N
Test Model:	HA109
Model Difference:	All models are same as the samples except model name and appearance color, they have the same structure and circuit.
Bit Rate of Transmitter:	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: 6M/9M/12M/18M/24M/36M/48M/65M
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n(20/40): OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
Operation Frequency:	2412~2472 MHz for 802.11b/g/nHT20 2422~2462 MHz for 802.11nHT40
Antenna Designation:	Internal Antenna (Antenna Gain: 1.08dBi)
Channel No.:	13 Channels for 802.11b/g/n(HT20) 9 channels for 802.11nHT40
channel space	5MHz
Power supply:	100-240VAC 50/60Hz
Test Channel:	For 802.11b/g/nHT20:2.412GHz (CH01)/2.442GHz (CH07)/2.472GHz (CH13) For 802.11nHT40:2.422GHz (CH03)/2.442GHz (CH07)/2.462GHz (CH11)
Hardware Version:	HV01
Software Version:	SV01

Note:

1. Only the WIFI was tested according the standard requirement.
2. CH01~CH13 are Operating within 2412~2472MHz.
3. Please refer to Appendix I for the photographs of the EUT. For more details, please refer to the User's manual of the EUT.

**1.2 CHANNEL LIST(802.11B/G/N20)**

Channel	Frequency (GHz)	Channel	Frequency (GHz)
01	2.412	08	2.447
02	2.417	09	2.452
03	2.422	10	2.457
04	2.427	11	2.462
05	2.432	12	2.467
06	2.437	13	2.472
07	2.442		
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CHANNEL LIST (802.11N40)

Channel	Frequency (GHz)	Channel	Frequency (GHz)
03	2.422	08	2.447
04	2.427	09	2.452
05	2.432	10	2.457
06	2.437	11	2.462
07	2.442		

1.3 DESCRIPTION OF TEST MODES

The WIFI module was tested while in a continuous transmitter/receiver mode.

The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all

Modes to determine worst case levels.

Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input DC Power	100V	110V	90V
RF Chip	3.3V	3.3V	3.3V

Note:

Voltage Variation (%)

= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

The RF Chip voltage on the motherboard inside the product does not change more than 1%.



2.TEST ITEMS AND THE RESULTS

Part	Rule Section	Description of Test	Result
4.1	3	Frequency Error	Complies
4.2	4	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Complies
4.3	5	Unwanted Emission Intensity	Complies
4.4	6	Antenna Power Error	Complies
4.5	7	Limitation of Collateral Emission of Receiver	Complies
4.6	8	Transmission Antenna Gain (EIRP Antenna Power)	N/A
4.7	9	Transmission Radiation Angle Width (3dB Beamwidth)	N/A
4.8	10	Radio Interference Prevention Capability	Complies
4.9	Note1	Carrier Sense Capability 1	N/A
4.9	Note2	Carrier Sense Capability 2	Complies
4.10	Note3	Construction Protection Confirmation	Complies

Note 1: Application to transmitting devices which EIRP is less than [2.14dBi + antenna power limit] and the shortage of EIRP is compensated by the antenna power. Not applicable to this product.

Note 2: Apply for 802.11n40 which the Occupied bandwidth within 26MHz-40MHz.

Note 3: MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20

2.1 TEST FACILITY

Shenzhen DL Testing Technology Co., Ltd.

Add.: 101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: 27485

CAB ID.: CN0118

CNAS: L11567



2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.2\text{dB}$
2	Radiated Emission Test	$\pm 4.7\text{dB}$
3	RF power, conducted	$\pm 0.16\text{dB}$
4	Spurious emissions, conducted	$\pm 0.21\text{dB}$
5	All emissions, radiated (<1G)	$\pm 4.68\text{dB}$
6	All emissions, radiated(>1G)	$\pm 5.0\text{dB}$
7	frequency error ppm	$\pm 0.5\text{ppm}$
8	Occupied Bandwidth	$\pm 0.32\text{MHz}$



3. DETAILS OF TEST

3.1 LIST OF TEST EQUIPMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated until
1	SPECTRUM ANALYZER	AGILENT	E4407B	160400005	Nov. 01, 2024	Oct. 31, 2025
2	TEST RECEIVER	R&S	ESPI	101318	Nov. 01, 2024	Oct. 31, 2025
3	BILOG ANTENNA	TESEQ	CBL6111D	31216	Nov. 01, 2024	Oct. 31, 2025
4	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200264416	Nov. 01, 2024	Oct. 31, 2025
5	SPECTRUM ANALYZER	ADVANTEST	R3132	150900201	Nov. 01, 2024	Oct. 31, 2025
6	HORN ANTENNA	EM	EM-AH-10180	2011071402	Nov. 01, 2024	Oct. 31, 2025
7	HORN ANT	SCHWARZBECK	BBHA 9170	9170-181	Nov. 01, 2024	Oct. 31, 2025
8	AMPLIFIER	EM	EM-30180	060538	Nov. 01, 2024	Oct. 31, 2025
9	LOOP ANTENNA	ARA	PLA-1030/B	1029	Nov. 01, 2024	Oct. 31, 2025
10	POWER METER	R&S	NRVS	100696	Nov. 01, 2024	Oct. 31, 2025
11	TEST RECEIVER	R&S	ESCI	101160	Nov. 01, 2024	Oct. 31, 2025
12	SPECTRUM ANALYZER	AGILENT	N9020A	MY55370280	Nov. 01, 2024	Oct. 31, 2025
13	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	106504	Nov. 01, 2024	Oct. 31, 2025
14	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200264417	Nov. 01, 2024	Oct. 31, 2025

Note: All Equipments Calibration In Guangzhou GRE Metrology & Test Co., Ltd

(a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1) in JRL.

(b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992) .

(c) Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).

(d) Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (a) to (C) From JRL Article 24-2, paragraph 4, Item 2

3.2 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 24.6°C
- Humidity: 55.4%
- Atmospheric pressure: 101 kPa



4. TEST RESULTS

4.1 FREQUENCY ERROR MEASUREMENT

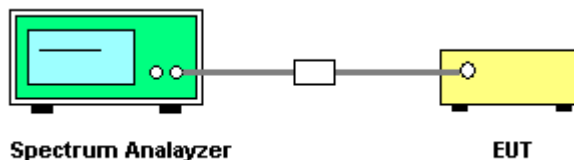
4.1.1. LIMIT

Item	Limits
Frequency Tolerance (2402~2483.5MHz)	$\leq \pm 50\text{ppm}$

4.1.2. TEST PROCEDURES

1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm)
2. Setting of SA is following as: RB:10kHz / VB:10kHz / SPAN: auto/
AT: 10dB / Ref: 0dBm
3. Center Frequency: The center frequency of testing for EUT
4. Sweep time: Auto
5. Sweep mode: Continuous sweep
6. Detect mode: Positive peak
7. Mark function: Frequency Counter (Resolution 100Hz)
8. EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value, f_c is declaring of channel frequency.
Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than $\pm 50\text{ppm}$

4.1.3. TEST SETUP LAYOUT



4.1.4. TEST DEVIATION

There is no deviation with the original standard.

4.1.5. EUT OPERATION DURING TEST

The EUT was placed on the test table and programmed in un-modulation function.

**4.1.6. RESULTS OF FREQUENCY ERROR**

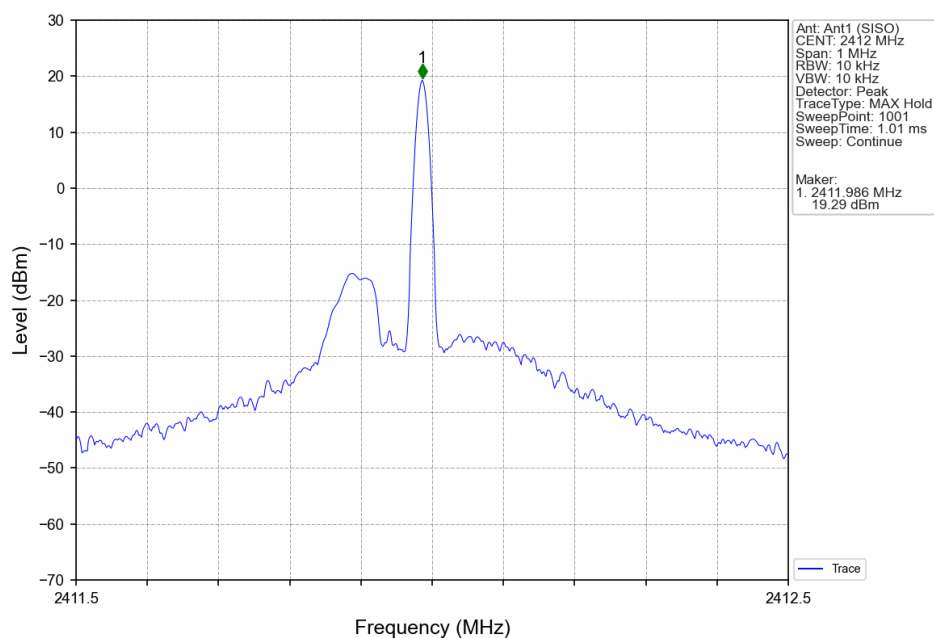
Temperature:	25.6 °C	Relative Humidity:	55.8%	Pressure:	1010mbar
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Operation Mode:	Normal Voltage
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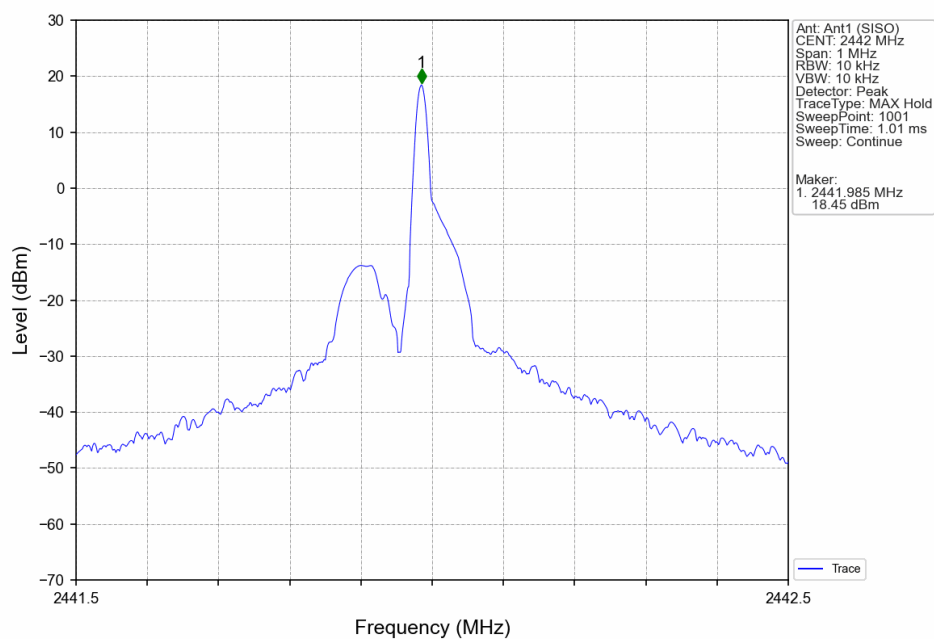
Test Voltage	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Normal Voltage	2412	2411.986	-5.80	$\cong \pm 50$	PASS
	2442	2441.985	-6.14	$\cong \pm 50$	PASS
	2472	2471.985	-6.07	$\cong \pm 50$	PASS
	2422	2421.984	-6.61	$\cong \pm 50$	PASS
	2462	2461.984	-6.50	$\cong \pm 50$	PASS



Frequency Error_NTNV_Carrier Wave_2412MHz_Ant1 (SISO)_NTNV

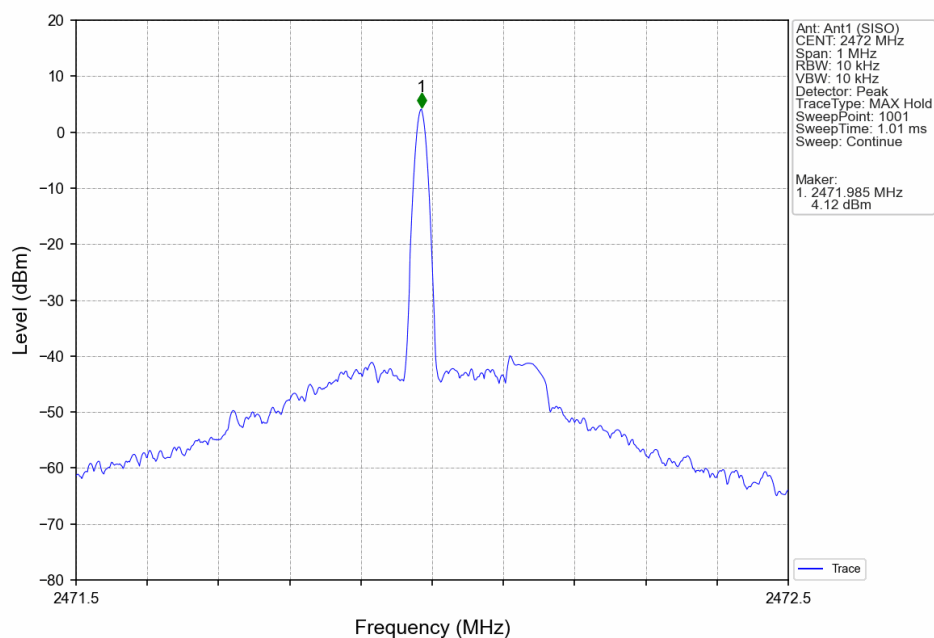


Frequency Error_NTNV_Carrier Wave_2442MHz_Ant1 (SISO)_NTNV

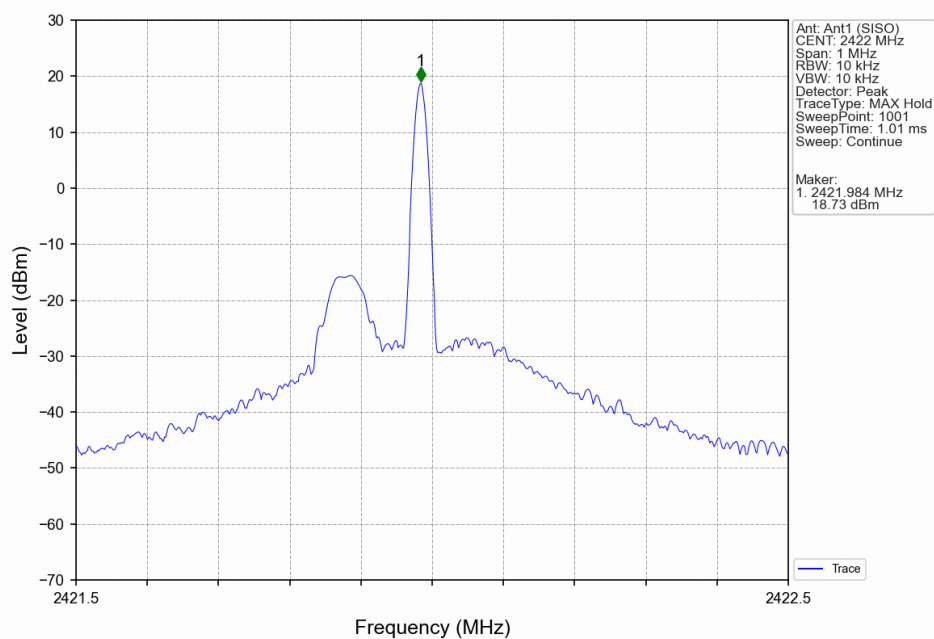


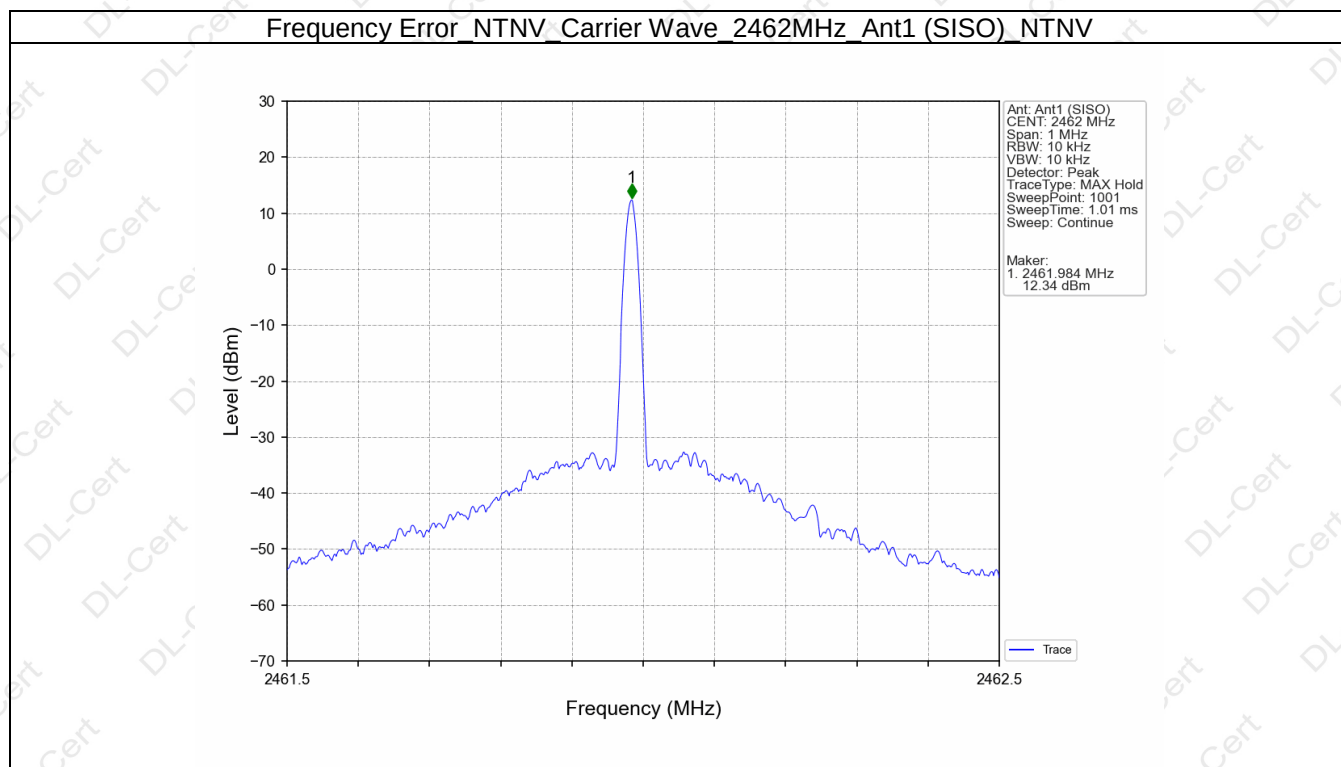


Frequency Error_NTNV_Carrier Wave_2472MHz_Ant1 (SISO)_NTNV



Frequency Error_NTNV_Carrier Wave_2422MHz_Ant1 (SISO)_NTNV





4.2. OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH MEASUREMENT

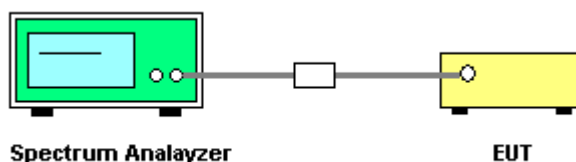
4.2.1. LIMIT

Item	Limits
Occupied Bandwidth:	$\leq 26\text{MHz DSSS}(802.11\text{b/g/n}20)$ $\geq 26 \leq 40\text{MHz OFDM}(802.11\text{n}40),$

4.2.2. TEST PROCEDURES

- Setting of SA is following as: RB: 300kHz / VB:300kHz / SPAN: 40MHz(802.11n40 is 80MHz) / AT: 10dB Ref:-20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).

4.2.3. TEST SETUP LAYOUT



4.2.4. TEST DEVIATION

There is no deviation with the original standard.

4.2.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

**4.2.7. RESULTS OF OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH**

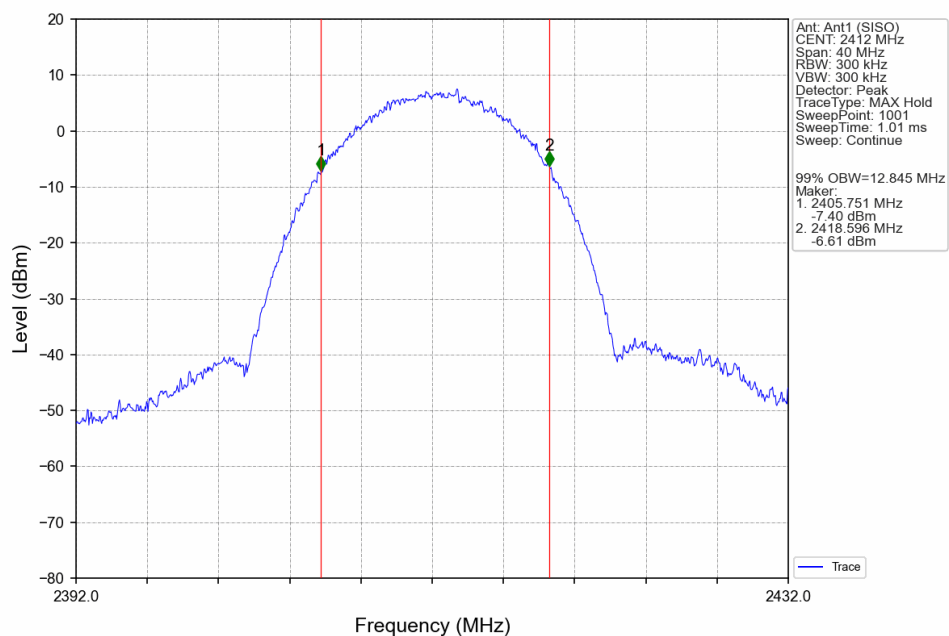
Temperature:	25.6 °C	Relative Humidity:	55.8%	Pressure:	1010mbar
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Test Voltage	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
Normal Voltage 802.11b	2412	12.845	≤26MHz	Pass
	2442	12.850	≤26MHz	Pass
	2472	11.591	≤26MHz	Pass
Normal Voltage 802.11g	2412	16.671	≤26MHz	Pass
	2442	16.636	≤26MHz	Pass
	2472	14.981	≤26MHz	Pass
Normal Voltage 802.11n(HT20)	2412	17.952	≤26MHz	Pass
	2442	17.883	≤26MHz	Pass
	2472	15.556	≤26MHz	Pass
Normal Voltage 802.11n(HT40)	2422	35.719	≥ 26 ≤40MHz	Pass
	2442	36.127	≥ 26 ≤40MHz	Pass
	2462	32.188	≥ 26 ≤40MHz	Pass

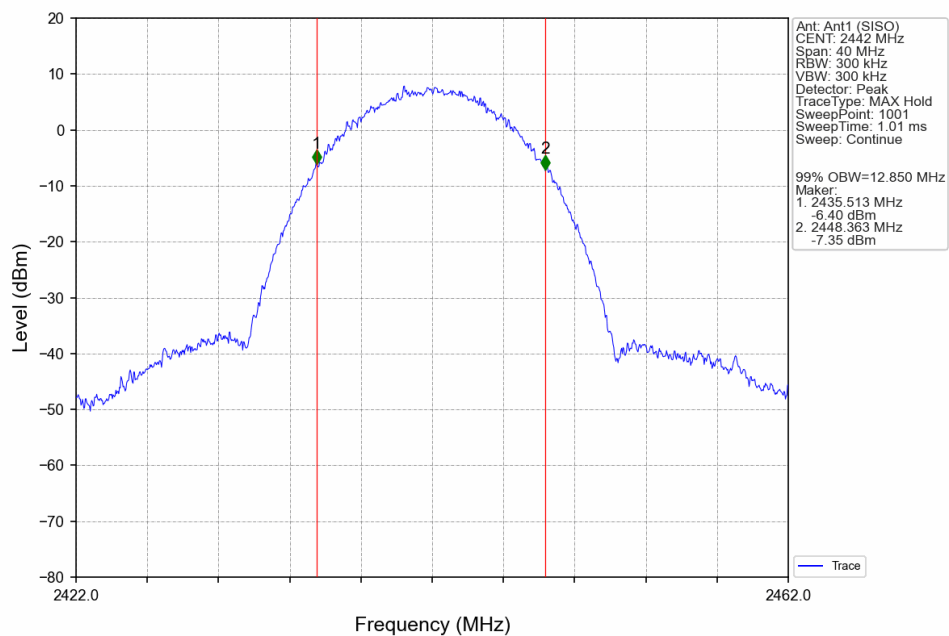
Test Voltage	Test Frequency (MHz)	90% Occupied Bandwidth(Spreading Bandwidth) (MHz)	Result
Normal Voltage 802.11b	2412	8.537	Pass
	2442	8.491	Pass
	2472	7.488	Pass
Normal Voltage 802.11g	2412	14.438	Pass
	2442	14.278	Pass
	2472	11.244	Pass
Normal Voltage 802.11n(HT20)	2412	15.335	Pass
	2442	15.254	Pass
	2472	11.468	Pass
Normal Voltage 802.11n(HT40)	2422	28.628	Pass
	2442	31.661	Pass
	2462	25.017	Pass



802.11b_2412MHz_Ant1 (SISO)_NTNV

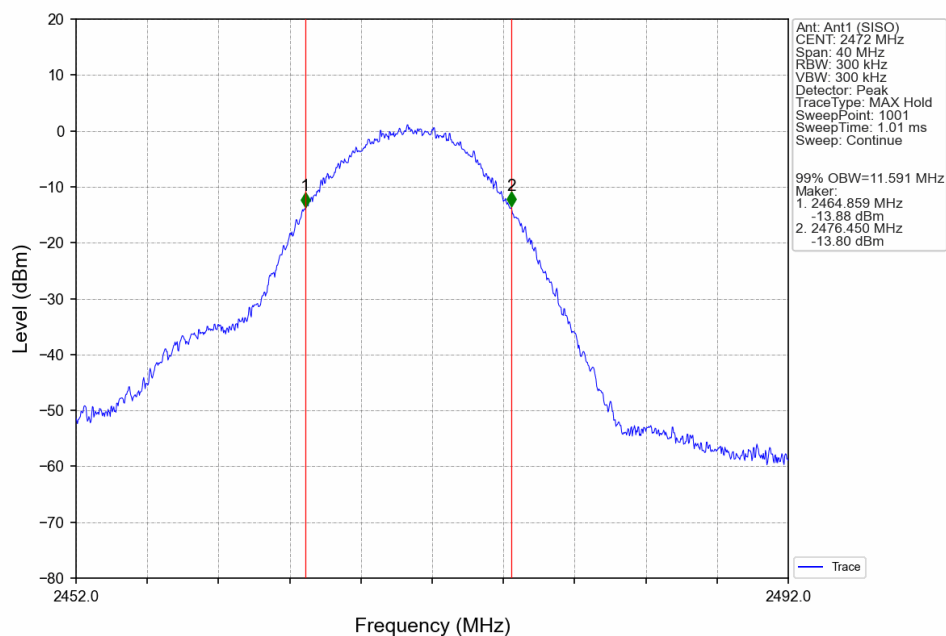


802.11b_2442MHz_Ant1 (SISO)_NTNV

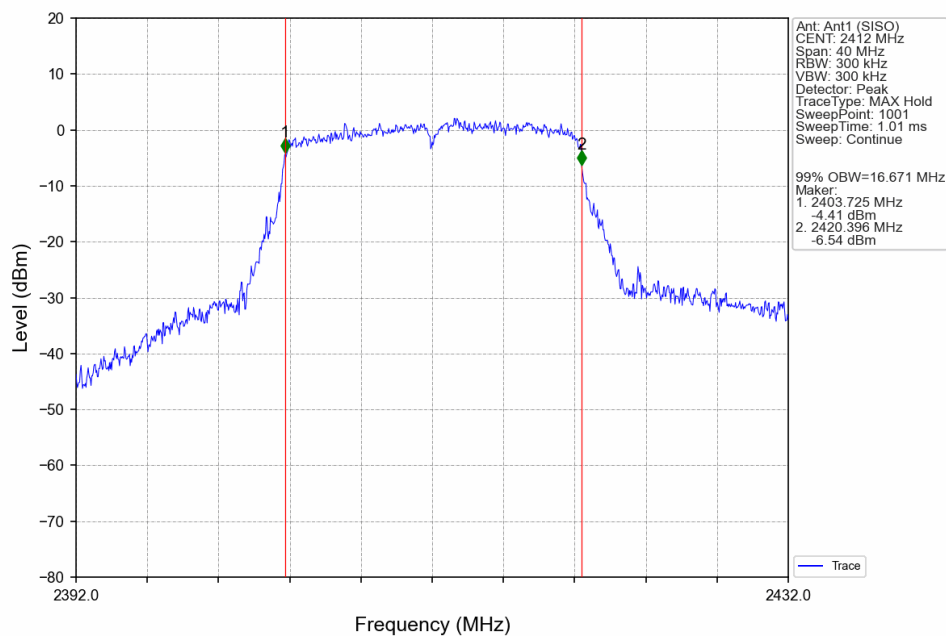




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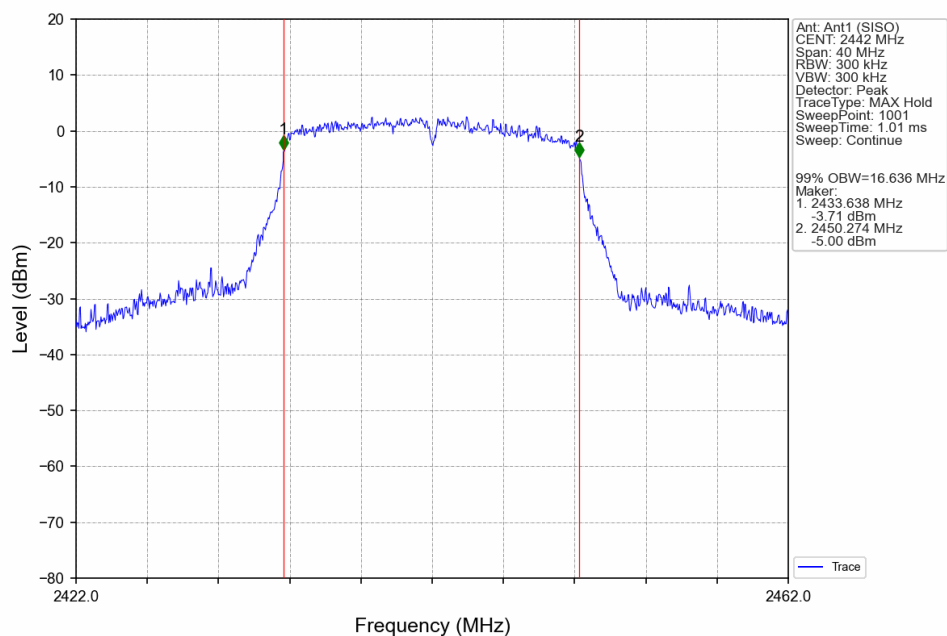


802.11g_2412MHz_Ant1 (SISO)_NTNV

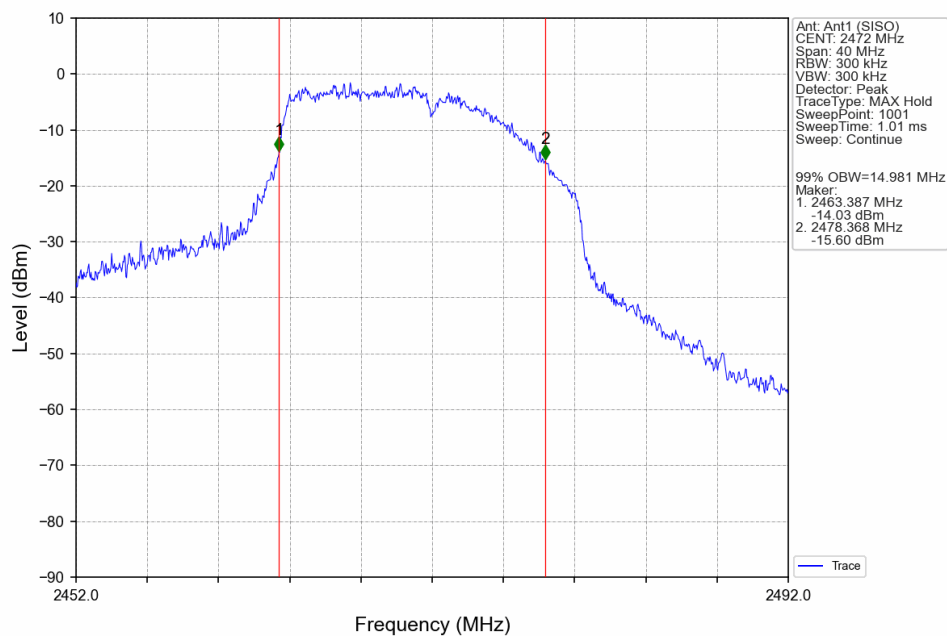




802.11g_2442MHz_Ant1 (SISO)_NTNV

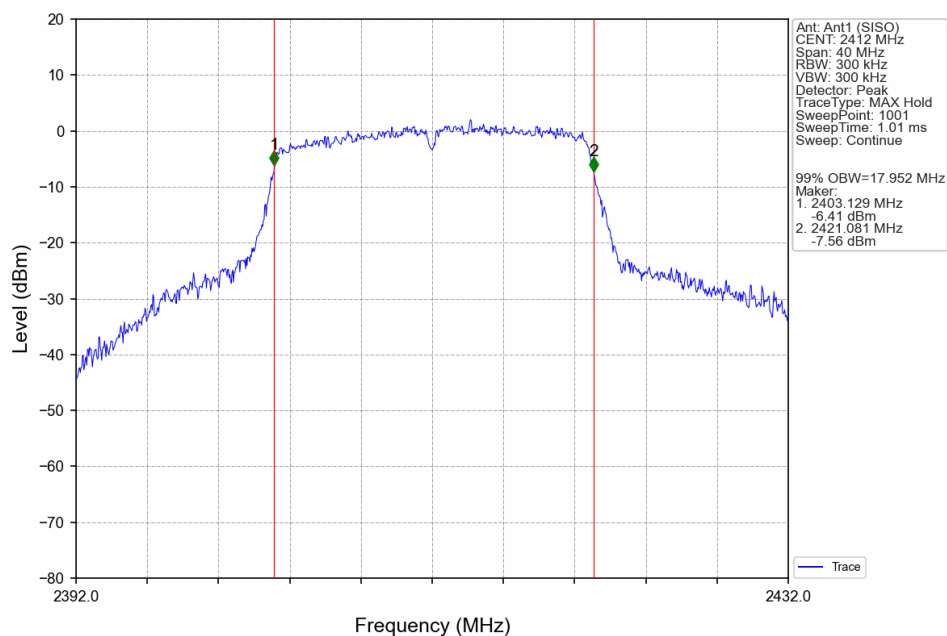


802.11g_2472MHz_Ant1 (SISO)_NTNV

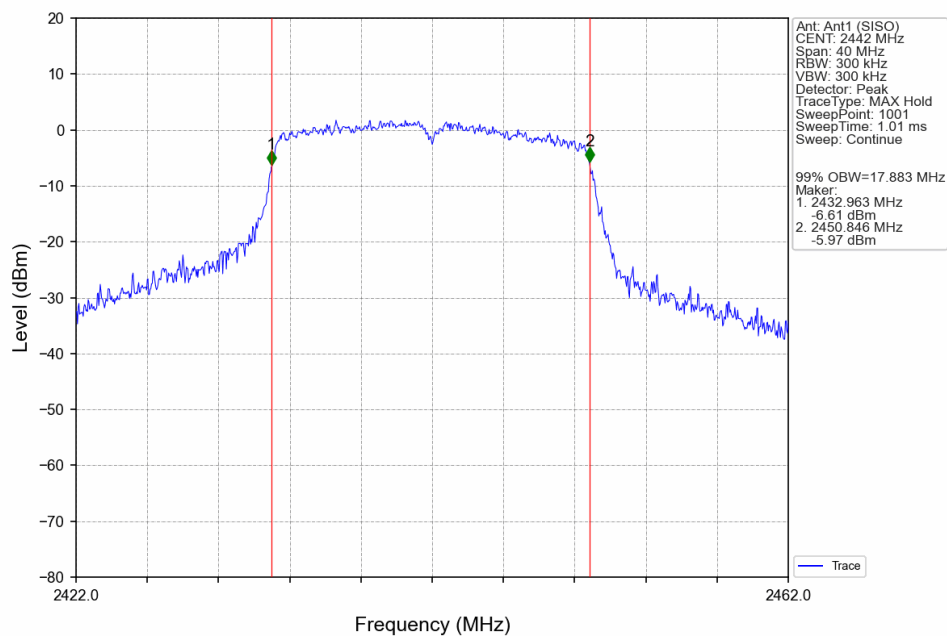




802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV

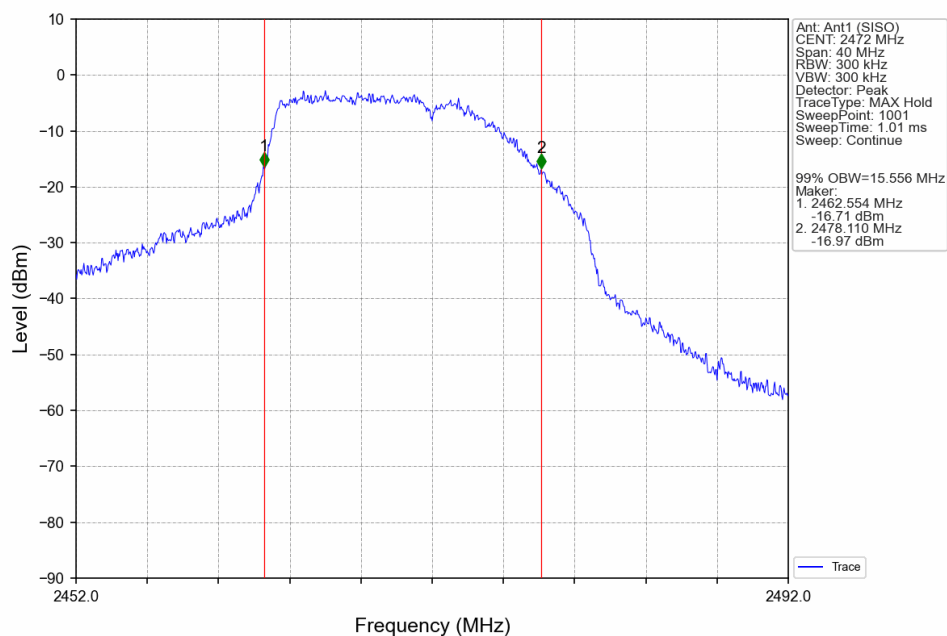


802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV

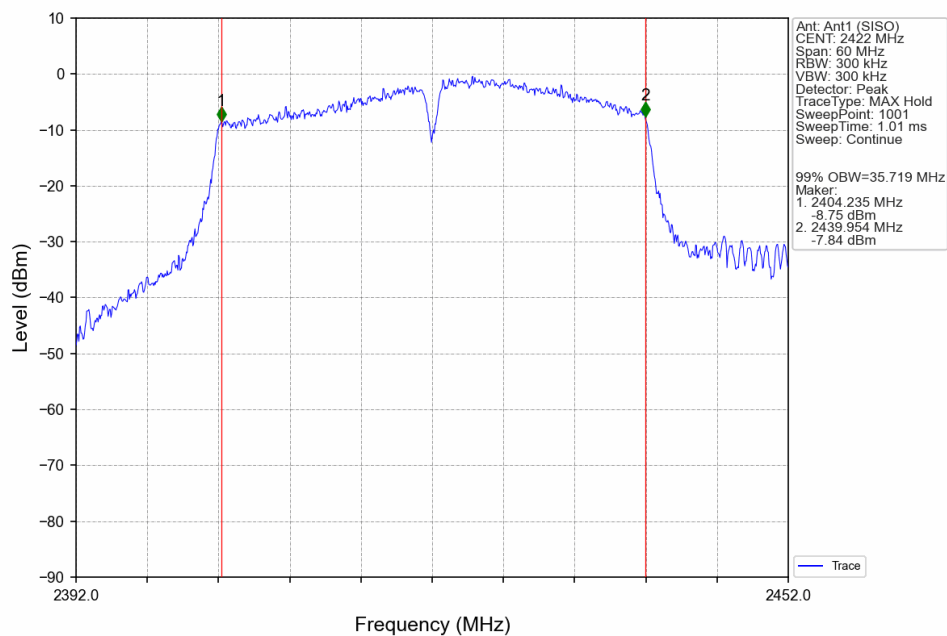




802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV

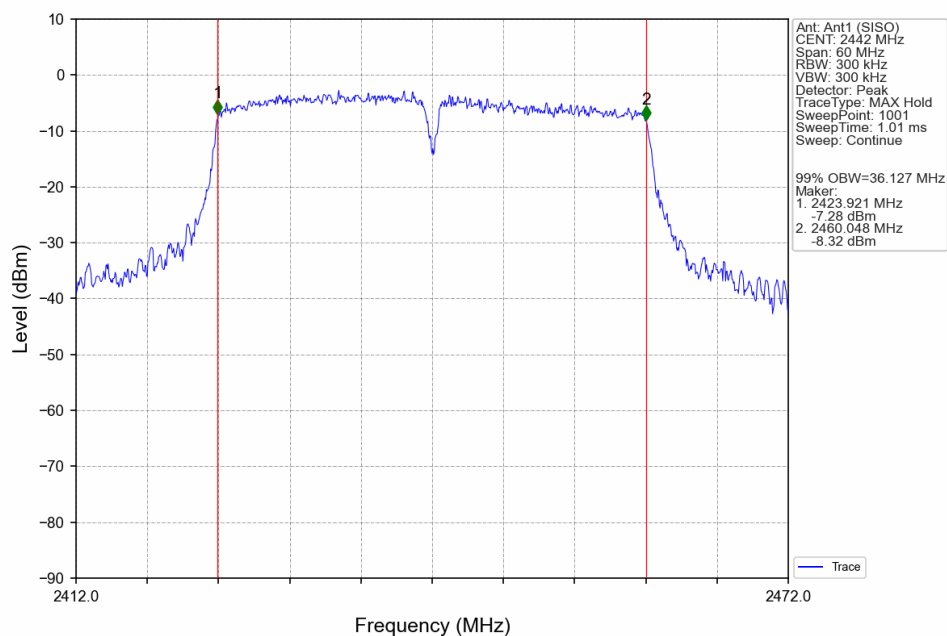


802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV

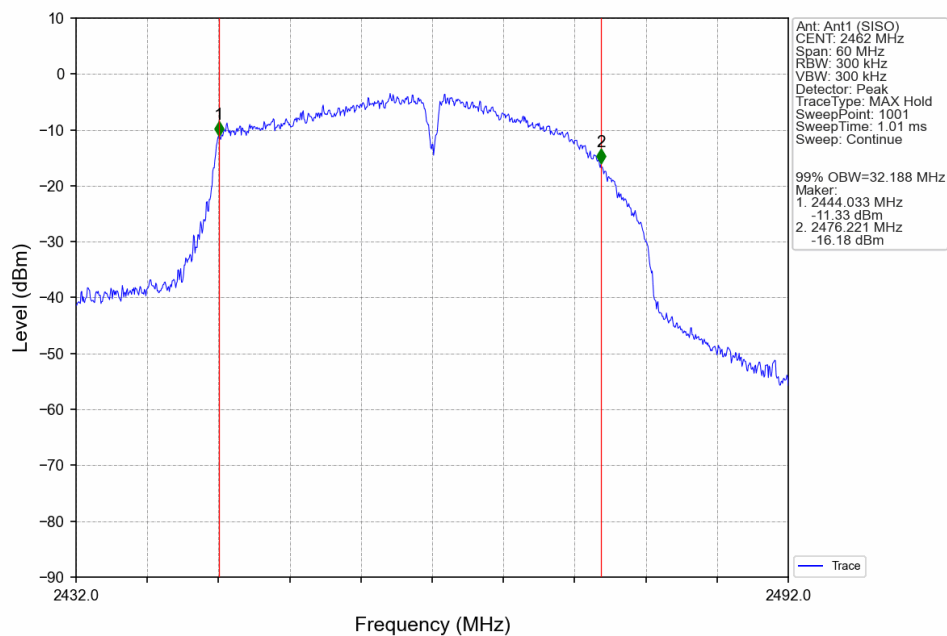




802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV

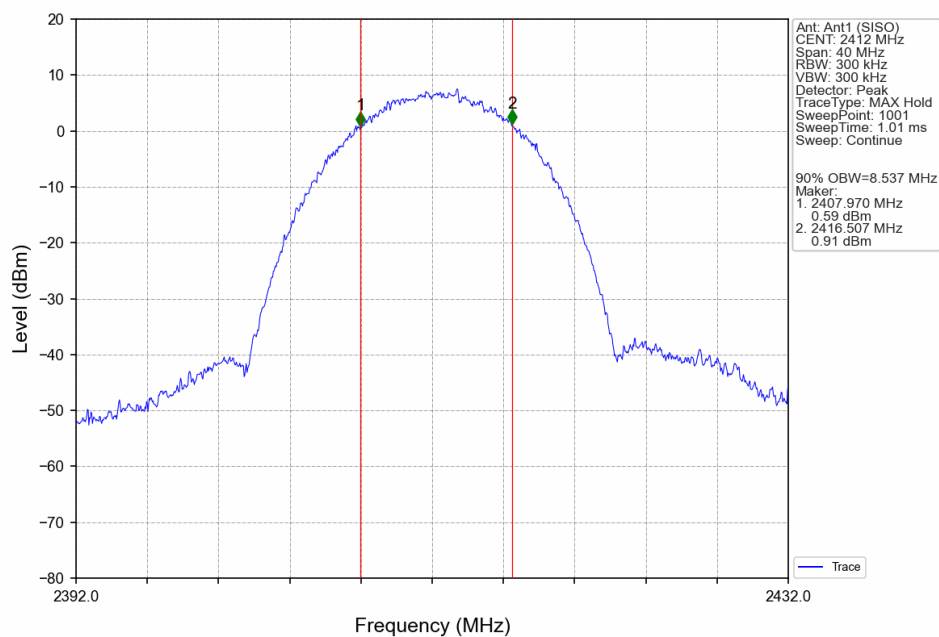


802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV

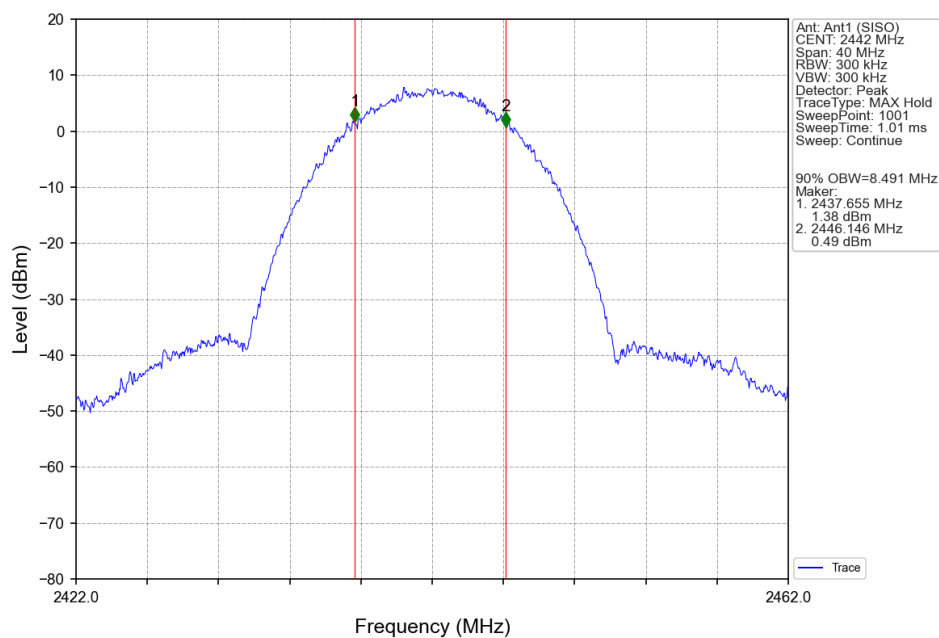




802.11b_2412MHz_Ant1 (SISO)_NTNV

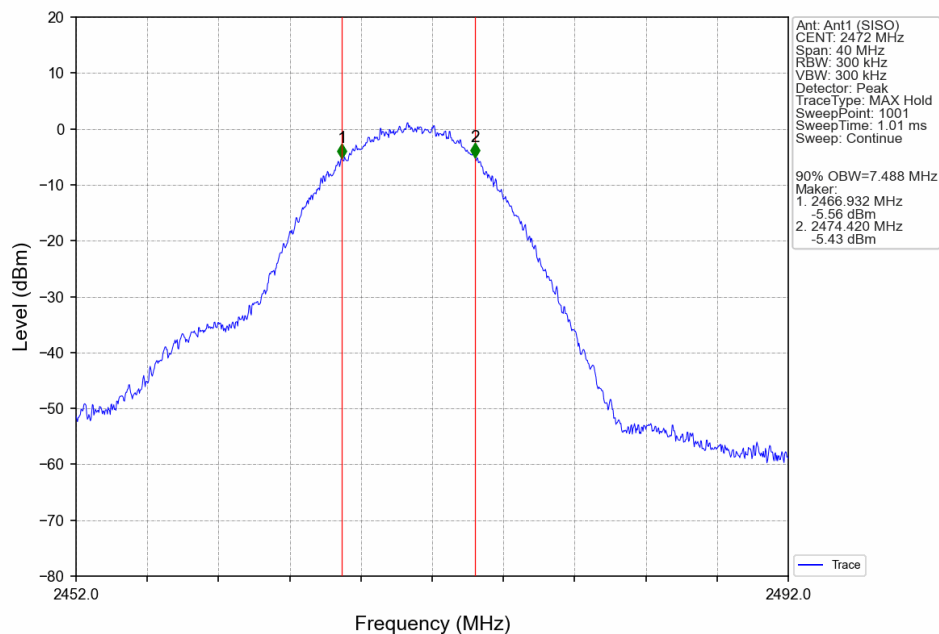


802.11b_2442MHz_Ant1 (SISO)_NTNV

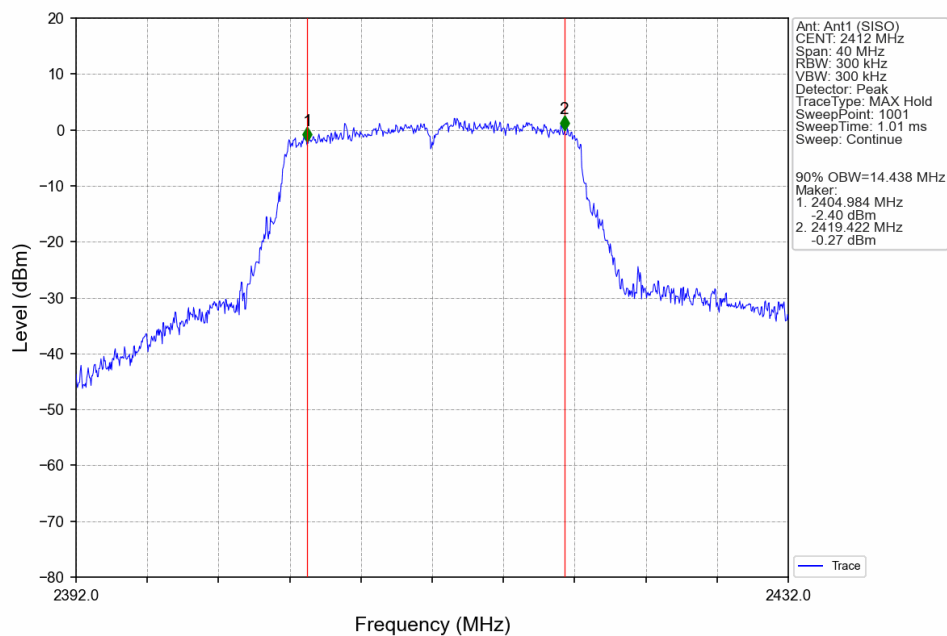




802.11b_2472MHz_Ant1 (SISO)_NTNV

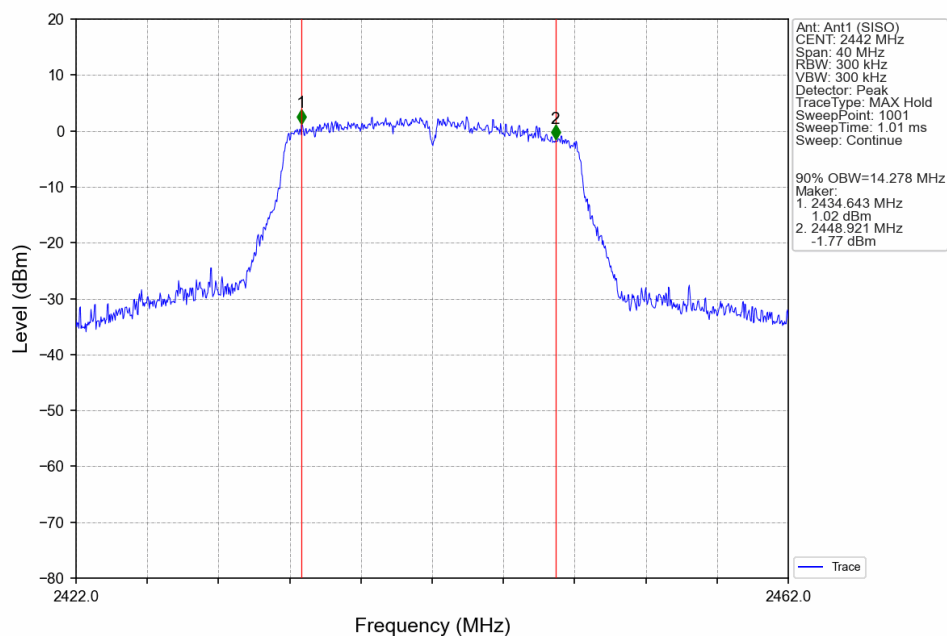


802.11g_2412MHz_Ant1 (SISO)_NTNV

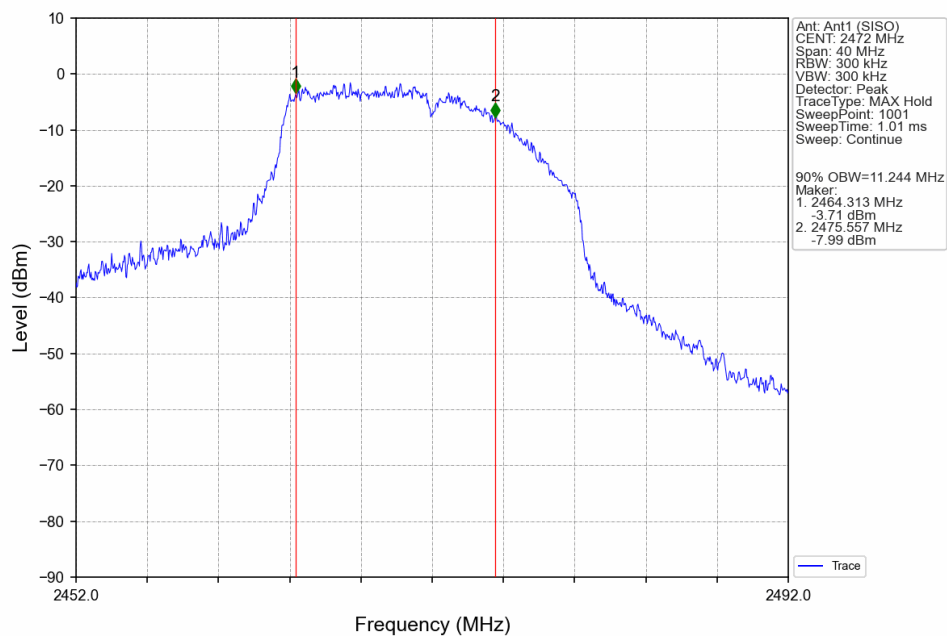




802.11g_2442MHz_Ant1 (SISO)_NTNV

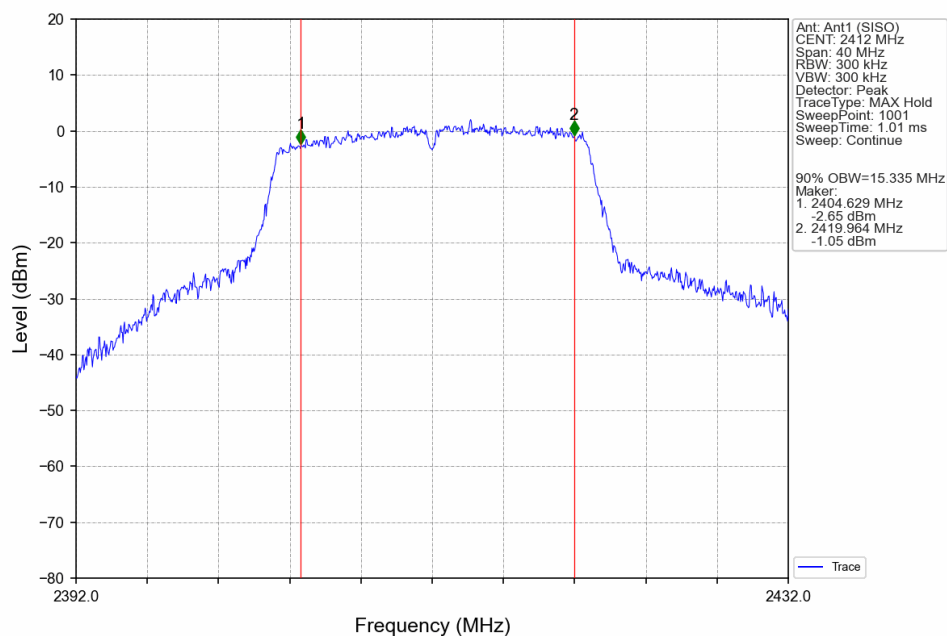


802.11g_2472MHz_Ant1 (SISO)_NTNV

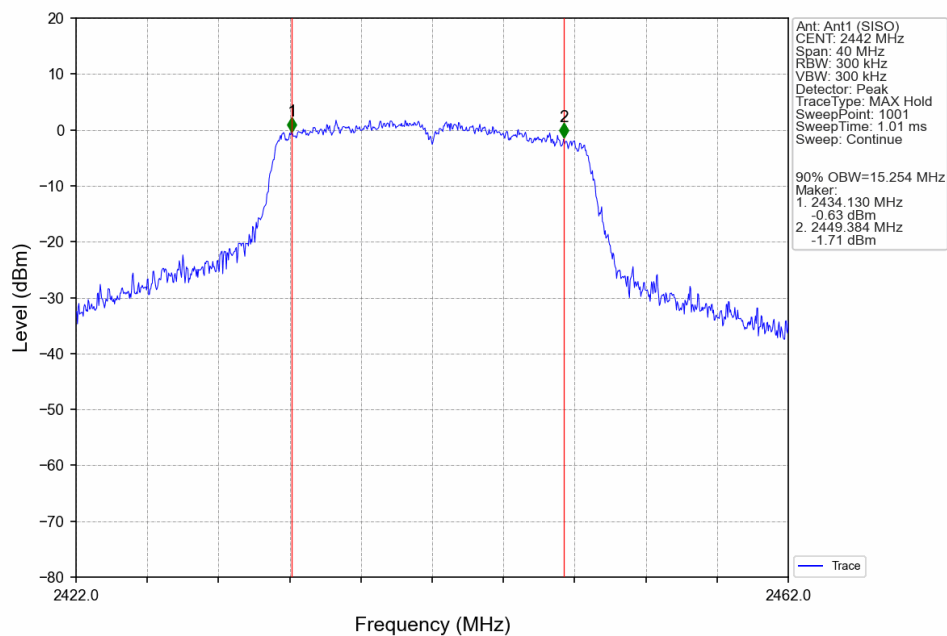




802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV

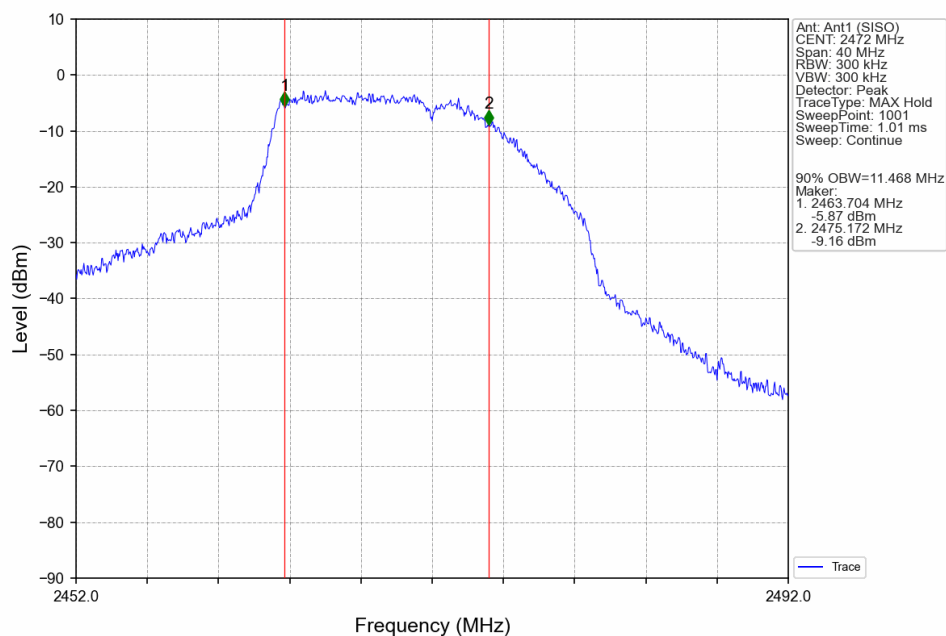


802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV

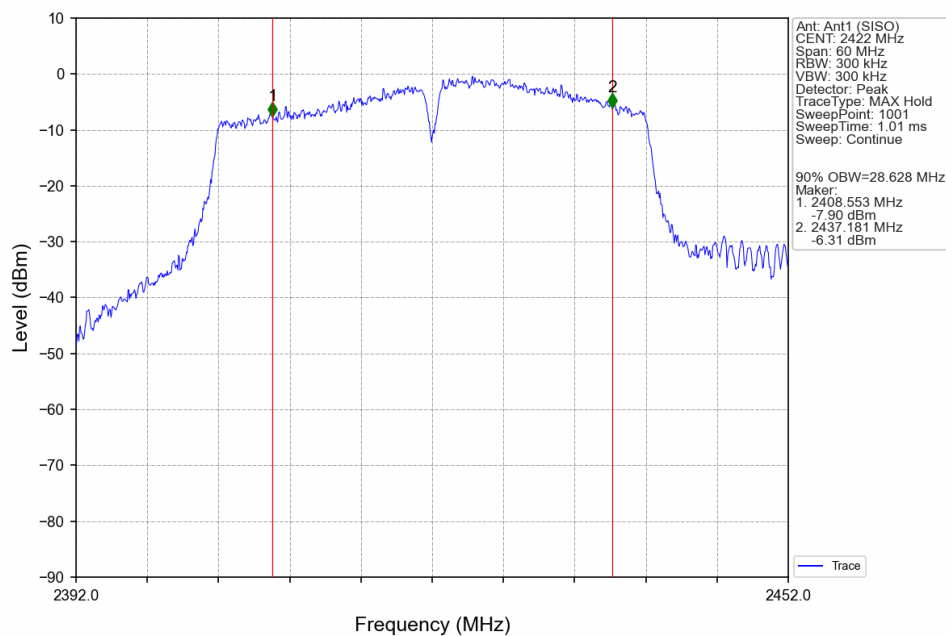




802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV

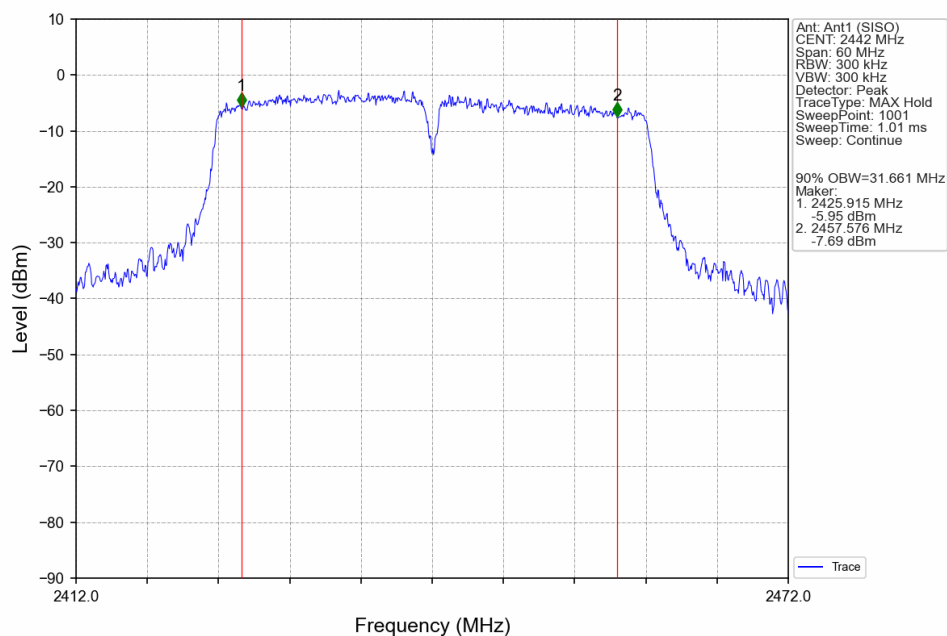


802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV

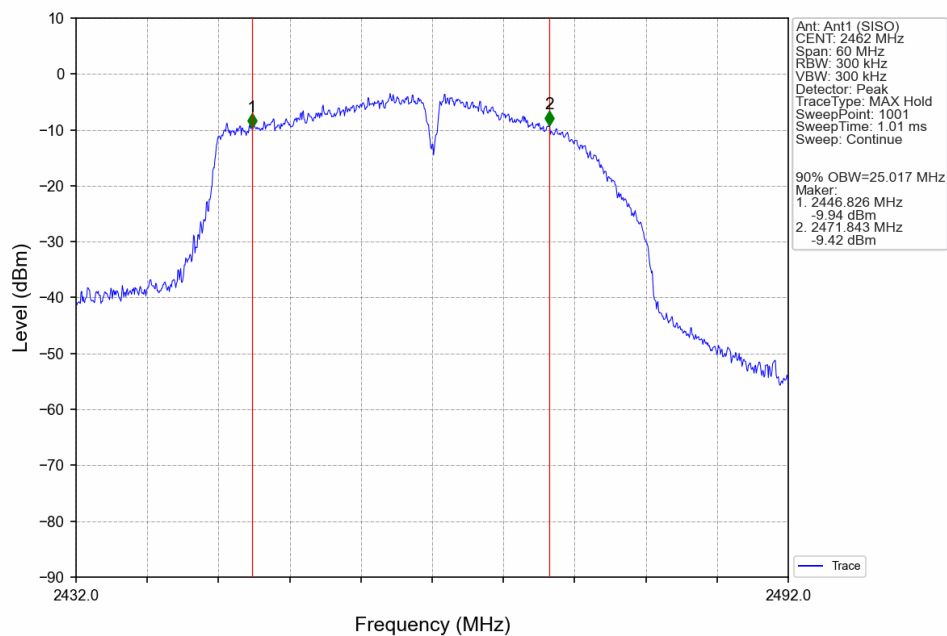




802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV





4.3. UNWANTED EMISSION INTENSITY MEASUREMENT

4.3.1 LIMIT

Item	Limits
TX Spurious Emission(2402~2483.5MHz)	$\leq 2.5 \mu\text{W}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq -26 \text{ dBm}/100\text{kHz}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq -26 \text{ dBm}$ ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq -16 \text{ dBm}$ ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)
	$\leq -16 \text{ dBm}$ ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($2496.5\text{MHz} \leq f < 12500\text{MHz}$)
	$\leq -26 \text{ dBm}$ ($2496.5\text{MHz} \leq f < 12500\text{MHz}$)

4.3.2. MEASURING INSTRUMENTS AND SETTING

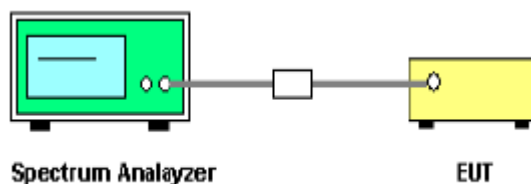
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. TEST PROCEDURES

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:1MHz / VB:1MHz
Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto
Sweep Mode: Continuous sweep / Detect mode: Positive peak
Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 2.5 μ W.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5 μ W.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25 μ W.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25 μ W
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5 μ W
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Measured_Value + 15.2 [dBm]
9. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

4.3.4. TEST SETUP LAYOUT



4.3.5. TEST DEVIATION

There is no deviation with the original standard.

4.3.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.



4.3.7. TEST RESULT OF UNWANTED EMISSION INTENSITY

Temperature:	25.6 °C	Relative Humidity:	55.8%	Pressure:	1010mbar
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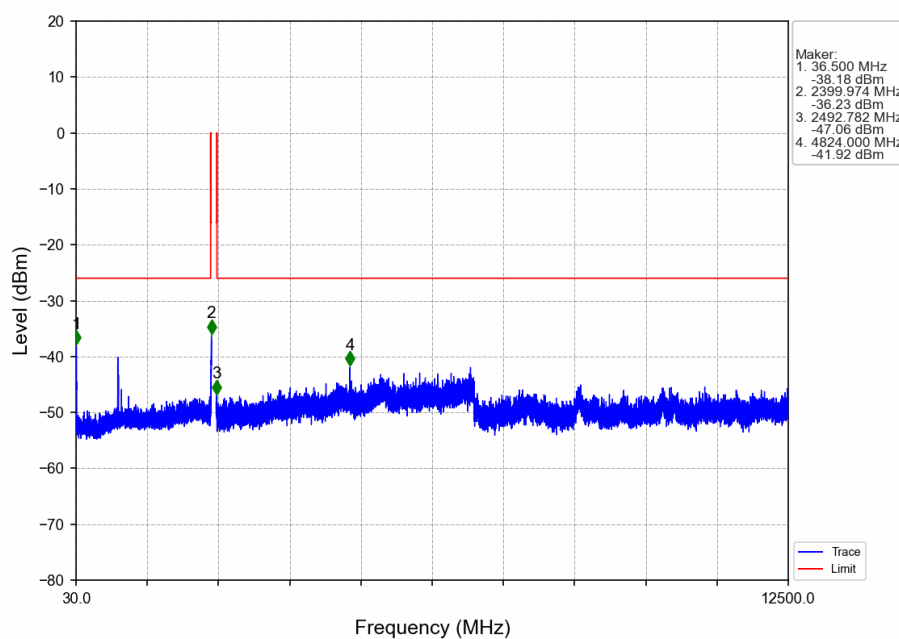
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
802.11b	SISO	2412	1	30	2387	36.5	-38.18	0.152	/	/	2.5	Pass
				2387	2400	2399.974	-36.23	0.238	/	/	25	Pass
				2483.5	2496.5	2492.782	-47.06	0.020	/	/	25	Pass
				2496.5	12500	4824	-41.92	0.064	/	/	2.5	Pass
		2442	1	30	2387	36	-36.52	0.223	/	/	2.5	Pass
				2387	2400	2398.635	-46.02	0.025	/	/	25	Pass
				2483.5	2496.5	2496.409	-47.31	0.019	/	/	25	Pass
				2496.5	12500	4884	-42.27	0.059	/	/	2.5	Pass
		2472	1	30	2387	829	-32.77	0.528	/	/	2.5	Pass
				2387	2400	2397.595	-50.51	0.009	/	/	25	Pass
				2483.5	2496.5	2483.526	-46.29	0.023	/	/	25	Pass
				2496.5	12500	6938	-46.59	0.022	/	/	2.5	Pass
802.11g	SISO	2412	1	30	2387	30	-40.54	0.088	/	/	2.5	Pass
				2387	2400	2399.701	-17.79	16.634	-36.88	0.205	25	Pass
				2483.5	2496.5	2495.642	-46.80	0.021	/	/	25	Pass
				2496.5	12500	5446	-42.72	0.053	/	/	2.5	Pass
		2442	1	30	2387	31.5	-37.96	0.160	/	/	2.5	Pass
				2387	2400	2399.246	-42.78	0.053	/	/	25	Pass
				2483.5	2496.5	2493.042	-46.77	0.021	/	/	25	Pass
				2496.5	12500	6726.5	-42.34	0.058	/	/	2.5	Pass
		2472	1	30	2387	35.5	-38.91	0.129	/	/	2.5	Pass
				2387	2400	2399.766	-47.93	0.016	/	/	25	Pass
				2483.5	2496.5	2484.371	-35.70	0.269	/	/	25	Pass
				2496.5	12500	6716.5	-46.25	0.024	/	/	2.5	Pass
802.11n (HT20)	SISO	2412	1	30	2387	37.5	-38.22	0.151	/	/	2.5	Pass
				2387	2400	2399.935	-15.59	27.606	-31.79	0.662	25	Pass
				2483.5	2496.5	2490.598	-47.06	0.020	/	/	25	Pass
				2496.5	12500	6930.5	-42.99	0.050	/	/	2.5	Pass
		2442	1	30	2387	39	-41.29	0.074	/	/	2.5	Pass
				2387	2400	2398.661	-40.19	0.096	/	/	25	Pass
				2483.5	2496.5	2495.356	-46.96	0.020	/	/	25	Pass
				2496.5	12500	6913.5	-42.18	0.061	/	/	2.5	Pass
		2472	1	30	2387	37	-38.62	0.137	/	/	2.5	Pass
				2387	2400	2398.167	-49.89	0.010	/	/	25	Pass
				2483.5	2496.5	2484.163	-36.60	0.219	/	/	25	Pass
				2496.5	12500	6862.5	-46.26	0.024	/	/	2.5	Pass
802.11n (HT40)	SISO	2422	1	30	2387	36	-38.04	0.157	/	/	2.5	Pass
				2387	2400	2399.181	-25.36	2.911	/	/	25	Pass



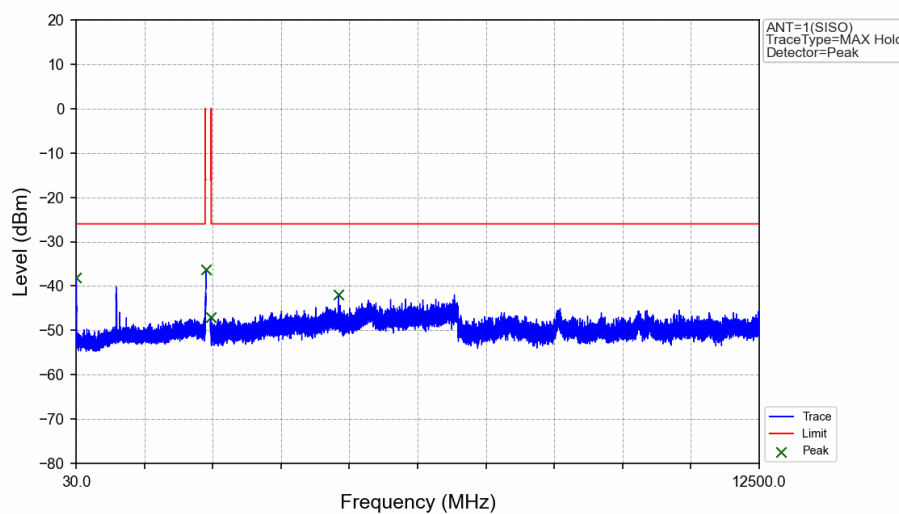
				2483.5	2496.5	2493.081	-47.30	0.019	/	/	25	Pass
				2496.5	12500	6066	-43.16	0.048	/	/	2.5	Pass
		2442	1	30	2387	36.5	-37.69	0.170	/	/	2.5	Pass
				2387	2400	2399.441	-30.00	1.000	/	/	25	Pass
				2483.5	2496.5	2483.812	-44.96	0.032	/	/	25	Pass
				2496.5	12500	6722	-42.42	0.057	/	/	2.5	Pass
		2462	1	30	2387	36.5	-38.69	0.135	/	/	2.5	Pass
				2387	2400	2399.987	-43.40	0.046	/	/	25	Pass
				2483.5	2496.5	2483.578	-37.63	0.173	/	/	25	Pass
				2496.5	12500	6876.5	-45.71	0.027	/	/	2.5	Pass



802.11b_2412MHz_Ant1 (SISO)_NTNV



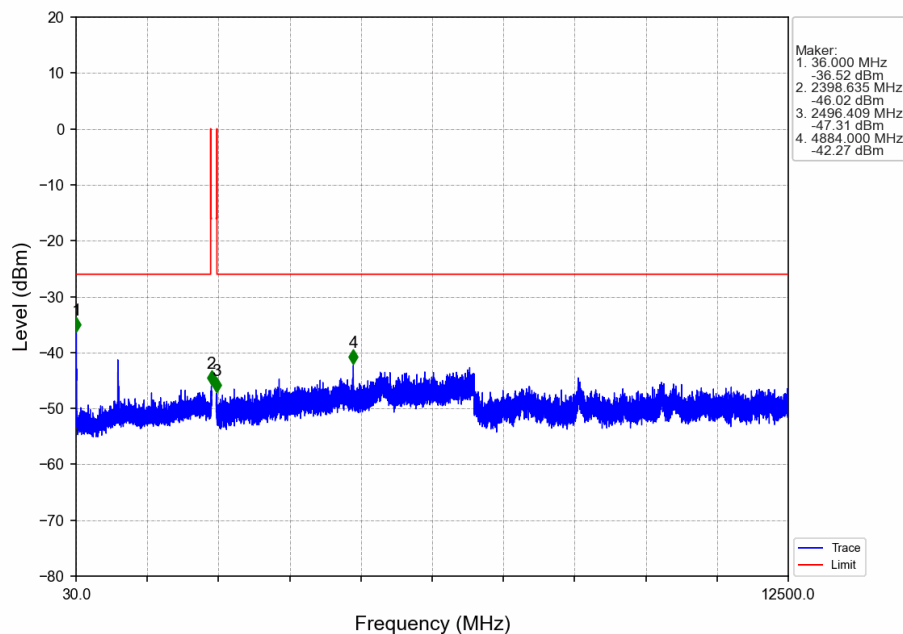
802.11b_2412MHz_Ant1 (SISO)_NTNV



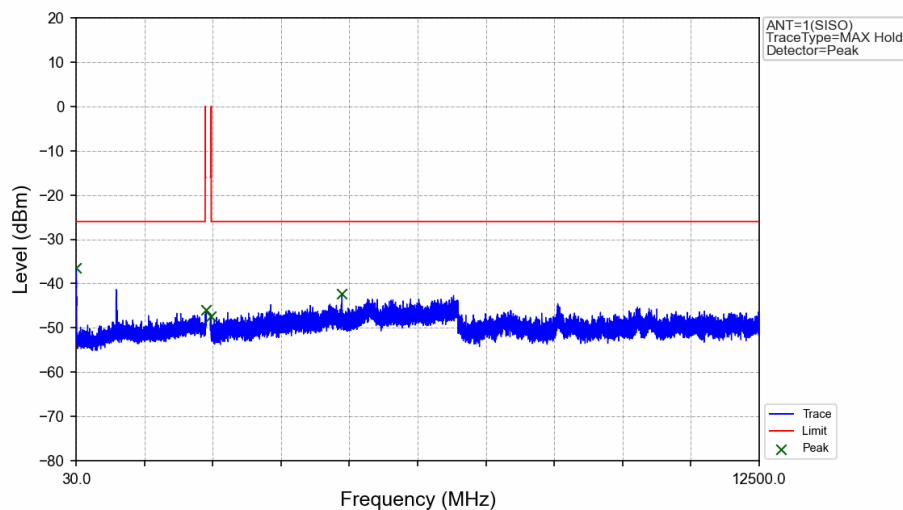
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	36.500	-38.18	/	-26	Pass
2387	2400	1	1	2399.974	-36.23	/	-16	Pass
2483.5	2496.5	1	1	2492.782	-47.06	/	-16	Pass
2496.5	12500	1	1	4824.000	-41.92	/	-26	Pass



802.11b_2442MHz_Ant1 (SISO)_NTNV



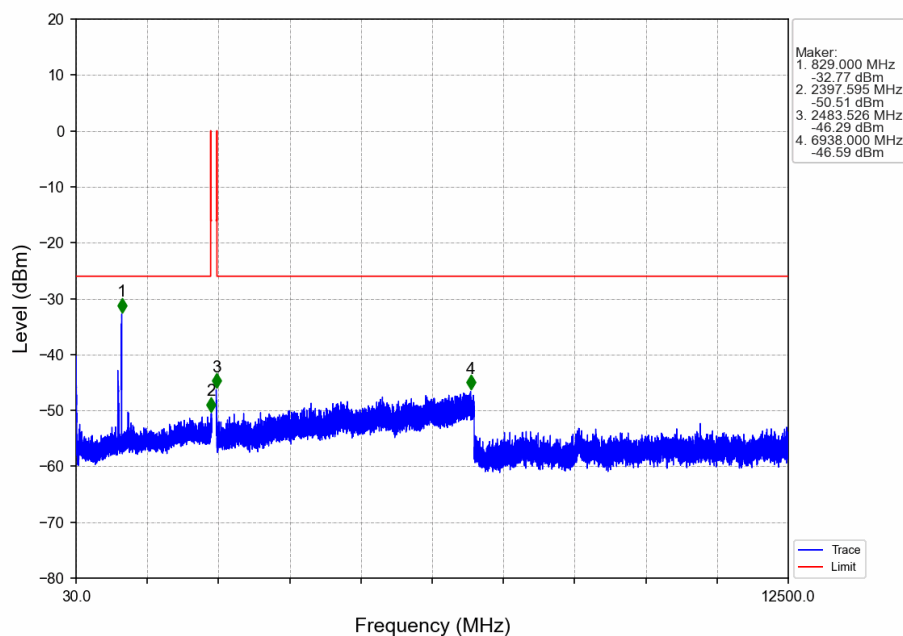
802.11b_2442MHz_Ant1 (SISO)_NTNV



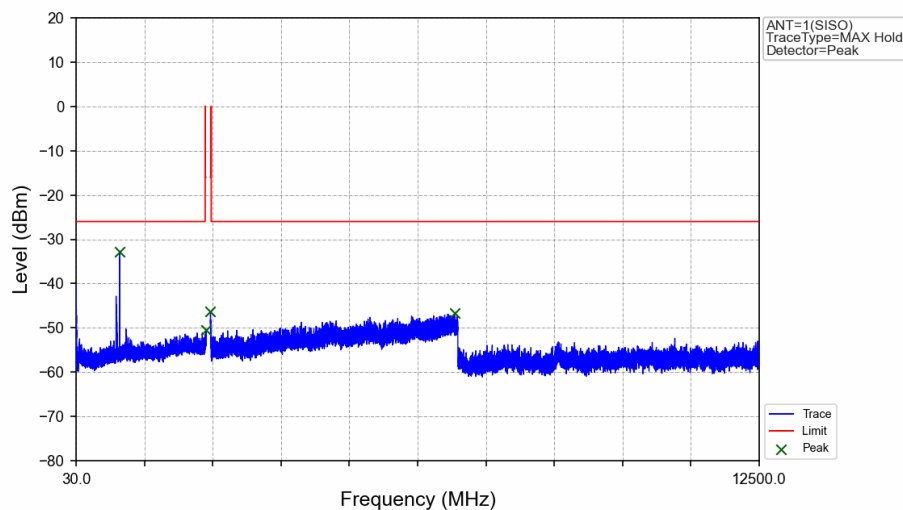
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	36.000	-36.52	/	-26	Pass
2387	2400	1	1	2398.635	-46.02	/	-16	Pass
2483.5	2496.5	1	1	2496.409	-47.31	/	-16	Pass
2496.5	12500	1	1	4884.000	-42.27	/	-26	Pass



802.11b_2472MHz_Ant1 (SISO)_NTNV



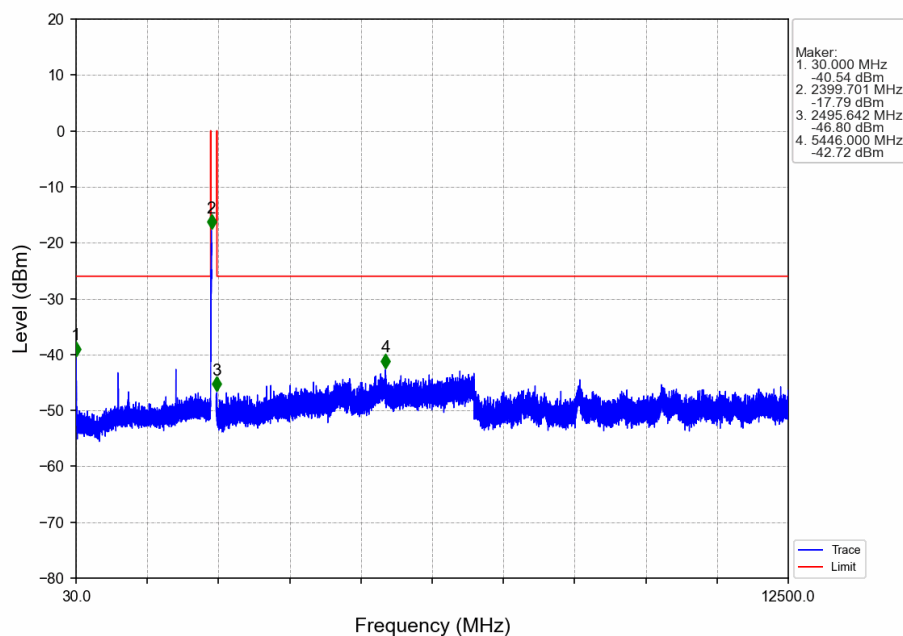
802.11b_2472MHz_Ant1 (SISO)_NTNV



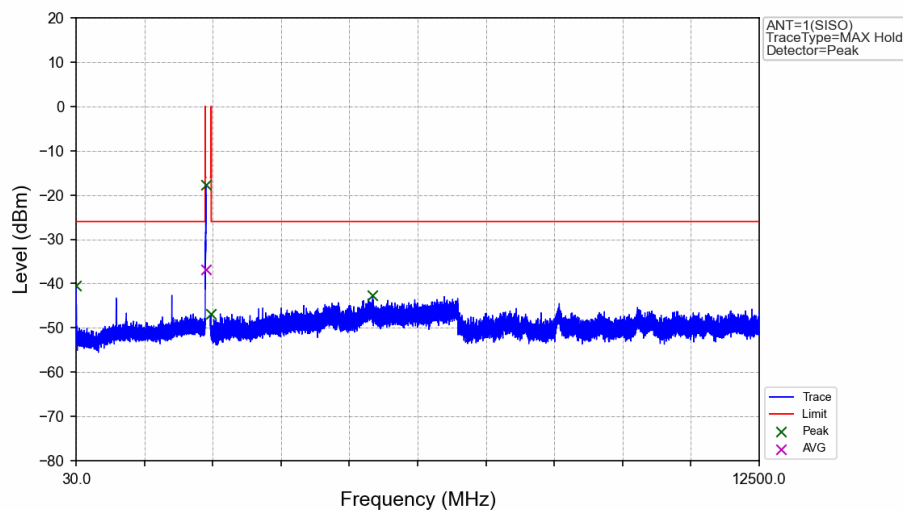
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	829.000	-32.77	/	-26	Pass
2387	2400	1	1	2397.595	-50.51	/	-16	Pass
2483.5	2496.5	1	1	2483.526	-46.29	/	-16	Pass
2496.5	12500	1	1	6938.000	-46.59	/	-26	Pass



802.11g_2412MHz_Ant1 (SISO)_NTNV



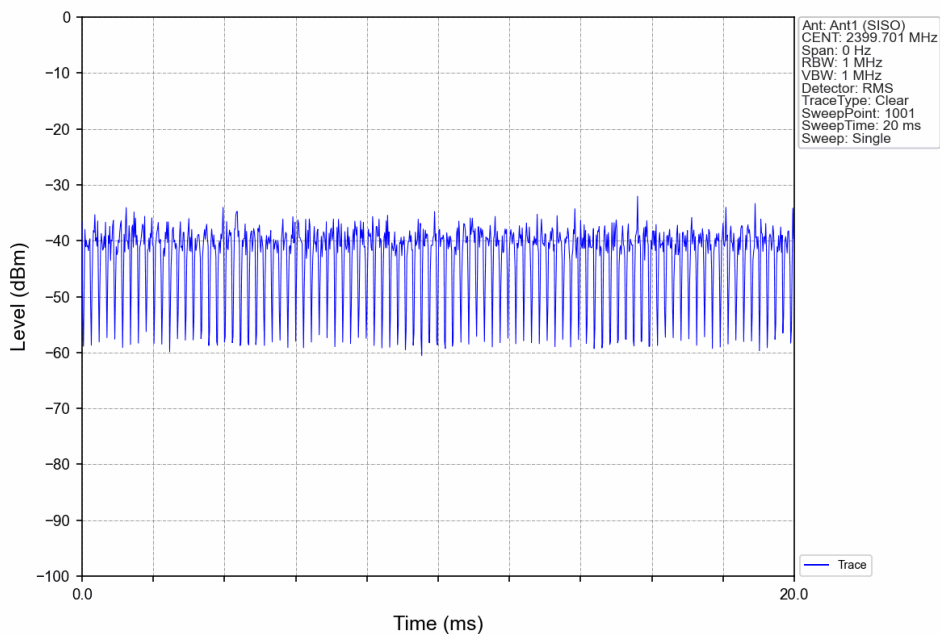
802.11g_2412MHz_Ant1 (SISO)_NTNV



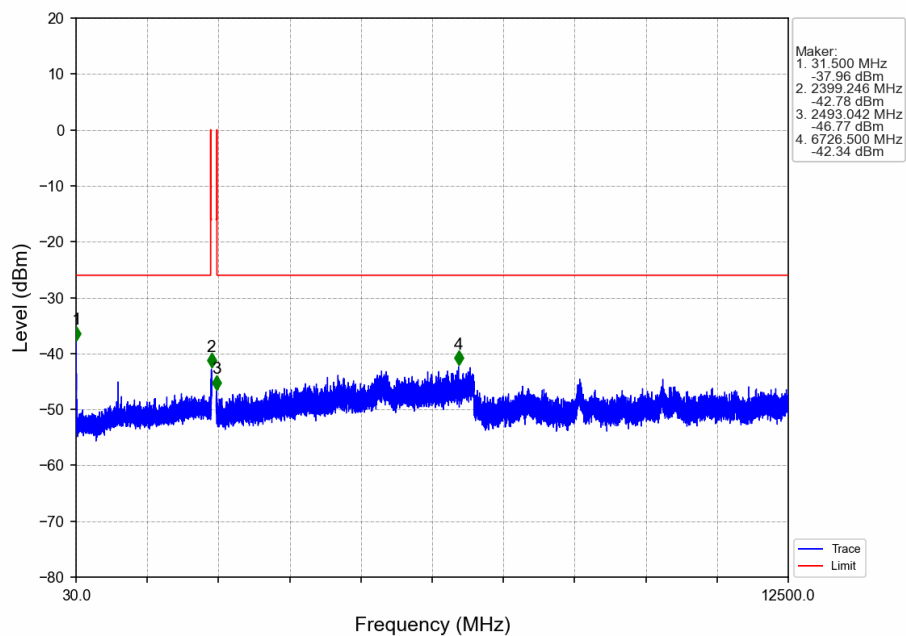
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	30.000	-40.54	/	-26	Pass
2387	2400	1	1	2399.701	-17.79	-36.88	-16	Pass
2483.5	2496.5	1	1	2495.642	-46.80	/	-16	Pass
2496.5	12500	1	1	5446.000	-42.72	/	-26	Pass



802.11g_2412MHz_Ant1 (SISO)_NTNV

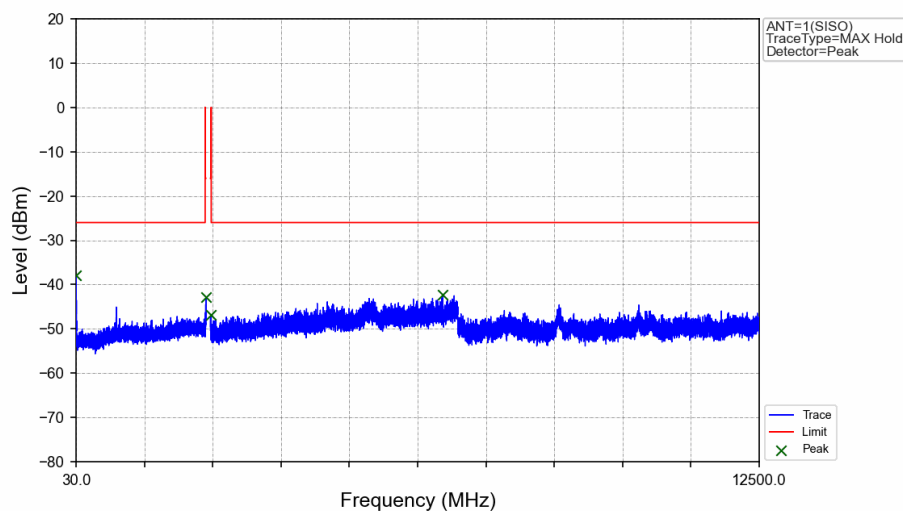


802.11g_2442MHz_Ant1 (SISO)_NTNV



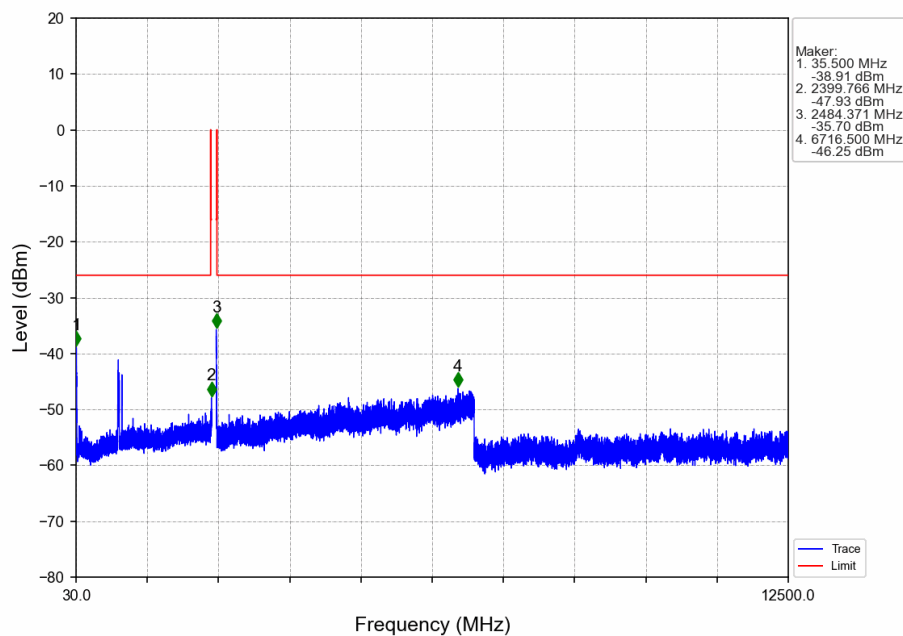


802.11g_2442MHz_Ant1 (SISO)_NTNV



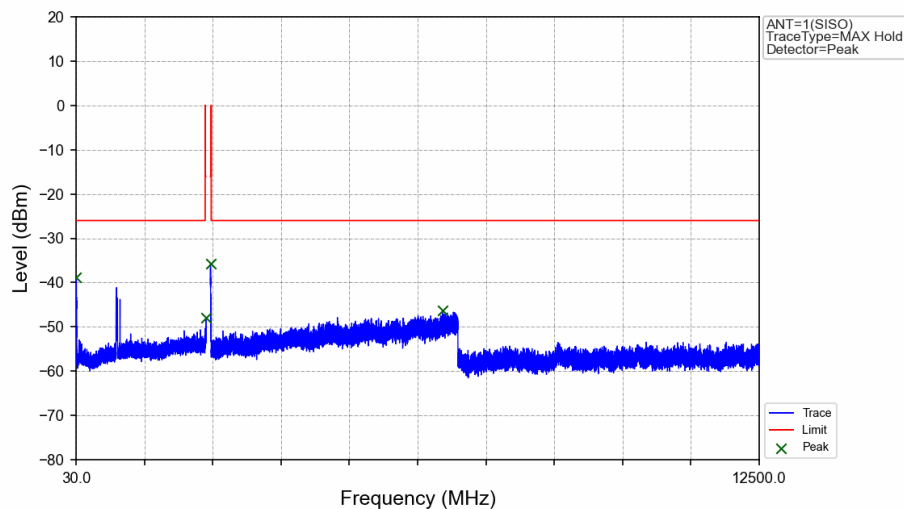
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	31.500	-37.96	/	-26	Pass
2387	2400	1	1	2399.246	-42.78	/	-16	Pass
2483.5	2496.5	1	1	2493.042	-46.77	/	-16	Pass
2496.5	12500	1	1	6726.500	-42.34	/	-26	Pass

802.11g_2472MHz_Ant1 (SISO)_NTNV



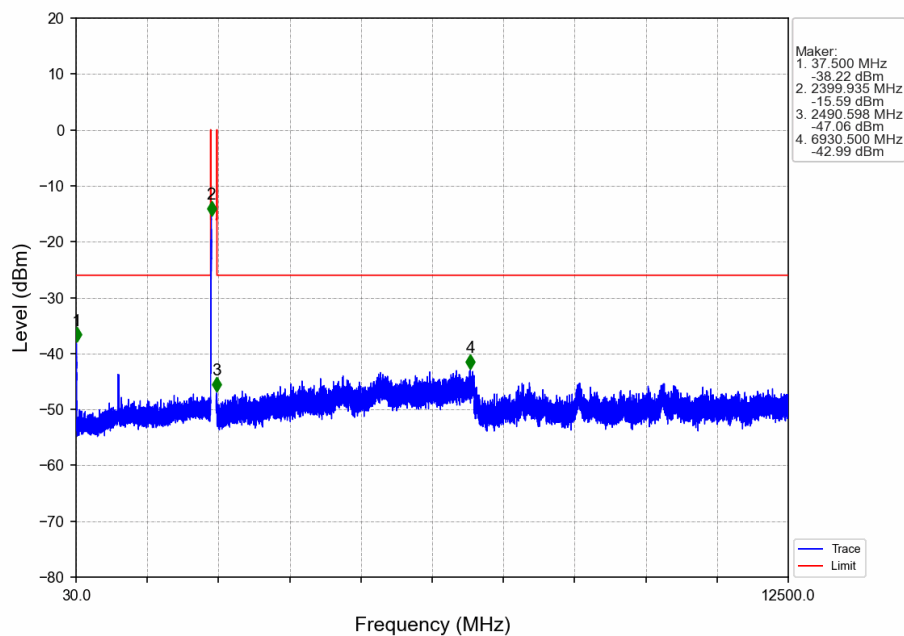


802.11g_2472MHz_Ant1 (SISO)_NTNV



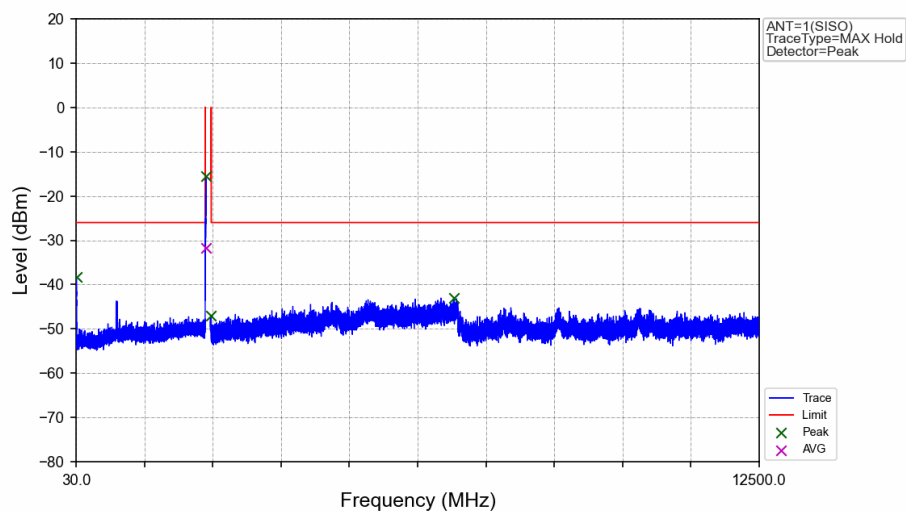
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	35.500	-38.91	/	-26	Pass
2387	2400	1	1	2399.766	-47.93	/	-16	Pass
2483.5	2496.5	1	1	2484.371	-35.70	/	-16	Pass
2496.5	12500	1	1	6716.500	-46.25	/	-26	Pass

802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV



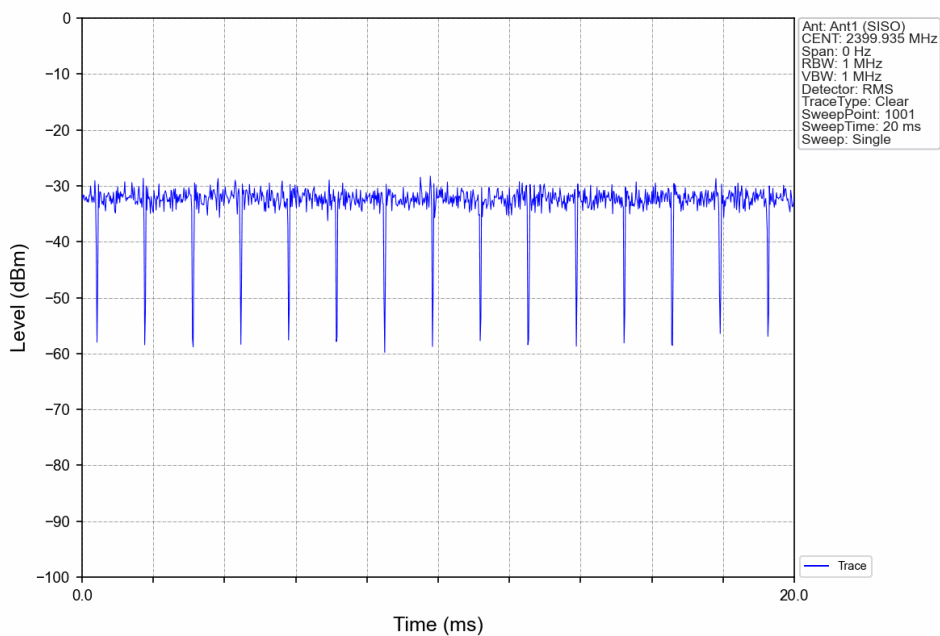


802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV



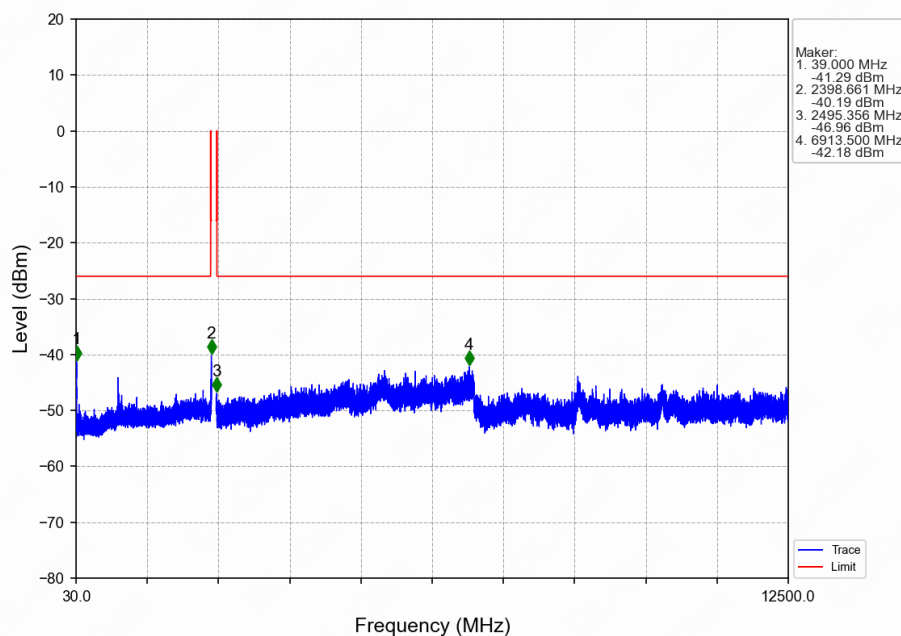
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	37.500	-38.22	/	-26	Pass
2387	2400	1	1	2399.935	-15.59	-31.79	-16	Pass
2483.5	2496.5	1	1	2490.598	-47.06	/	-16	Pass
2496.5	12500	1	1	6930.500	-42.99	/	-26	Pass

802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV

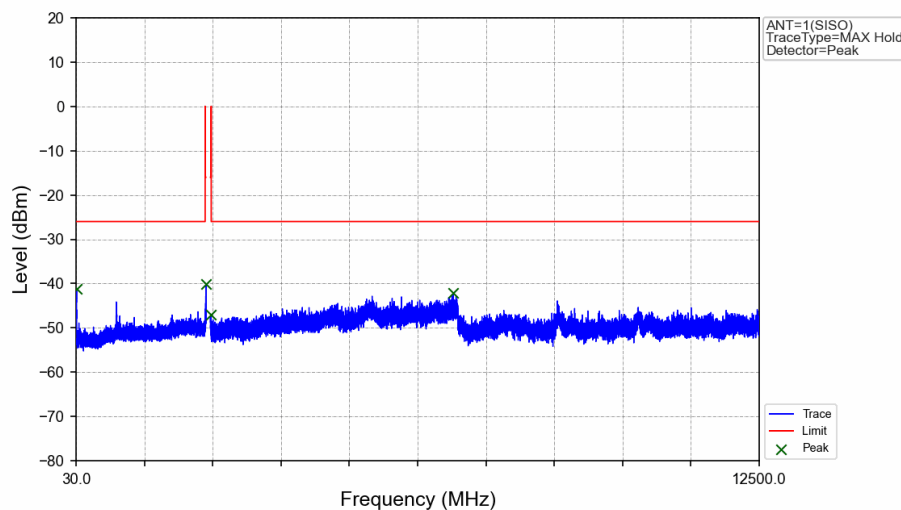




802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV



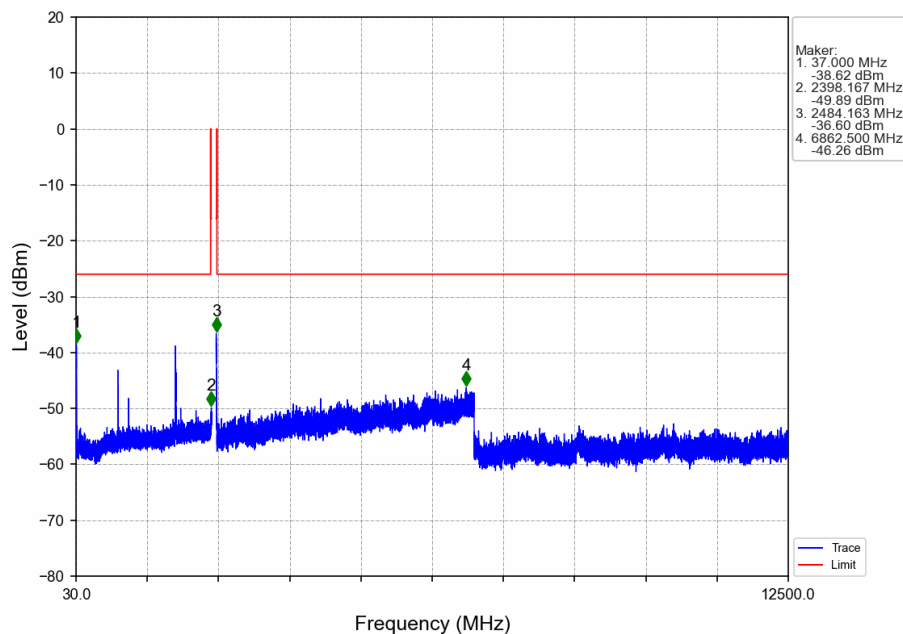
802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV



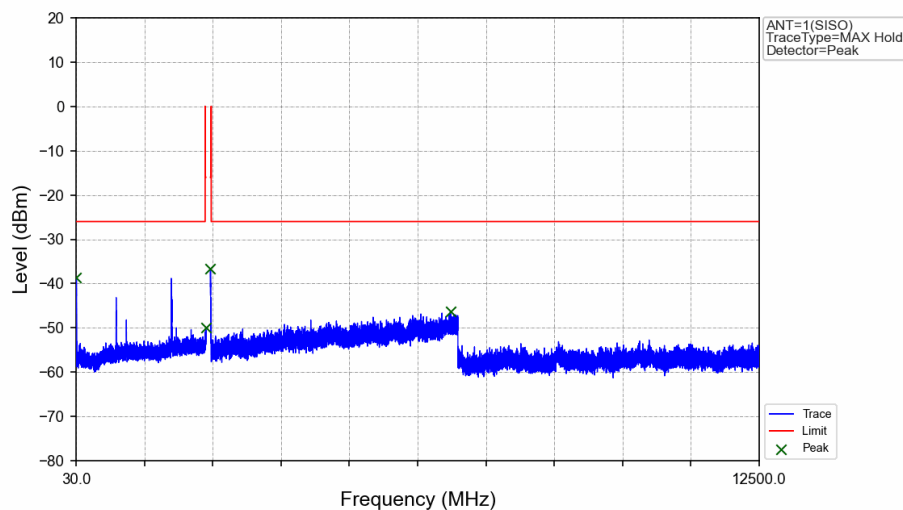
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	39.000	-41.29	/	-26	Pass
2387	2400	1	1	2398.661	-40.19	/	-16	Pass
2483.5	2496.5	1	1	2495.356	-46.96	/	-16	Pass
2496.5	12500	1	1	6913.500	-42.18	/	-26	Pass



802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV



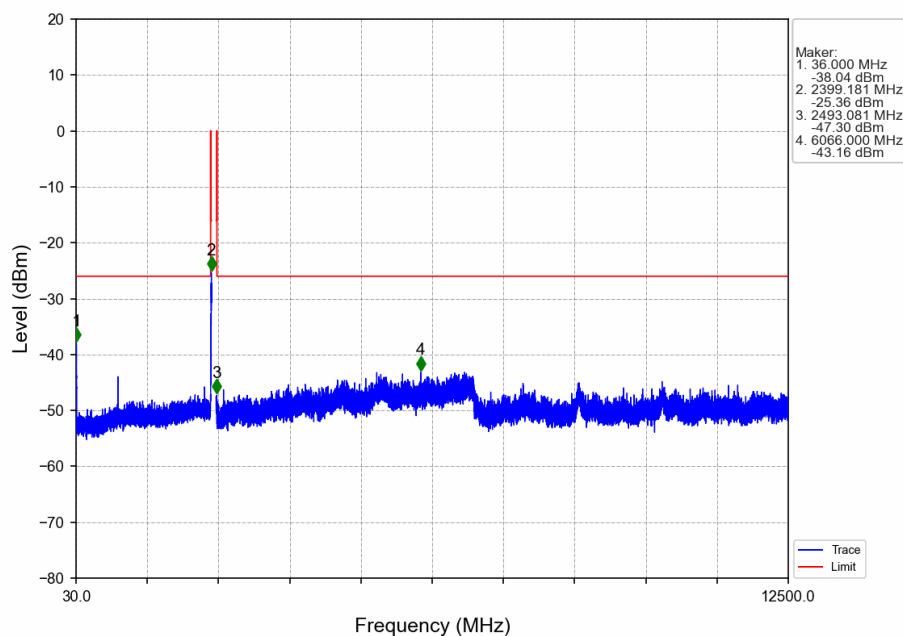
802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV



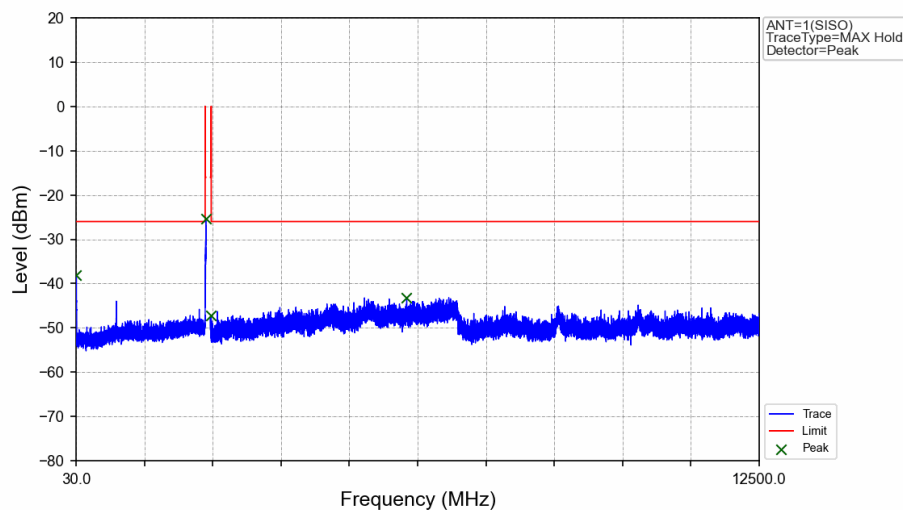
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	37.000	-38.62	/	-26	Pass
2387	2400	1	1	2398.167	-49.89	/	-16	Pass
2483.5	2496.5	1	1	2484.163	-36.60	/	-16	Pass
2496.5	12500	1	1	6862.500	-46.26	/	-26	Pass



802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV



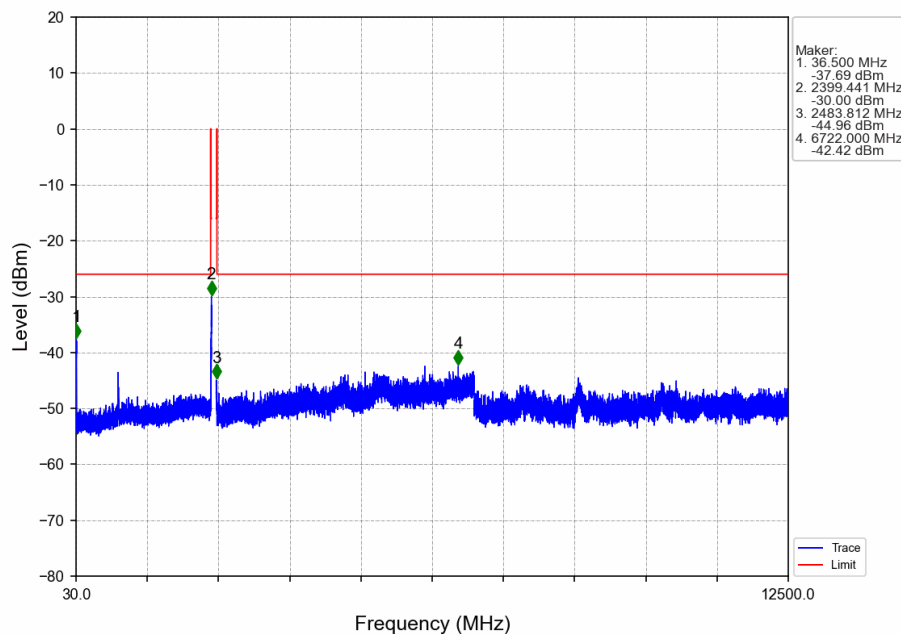
802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV



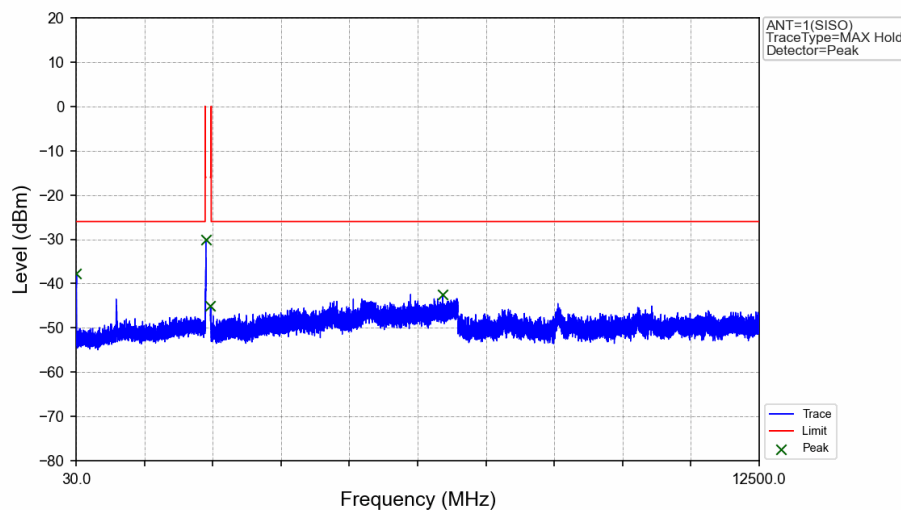
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	36.000	-38.04	/	-26	Pass
2387	2400	1	1	2399.181	-25.36	/	-16	Pass
2483.5	2496.5	1	1	2493.081	-47.30	/	-16	Pass
2496.5	12500	1	1	6066.000	-43.16	/	-26	Pass



802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



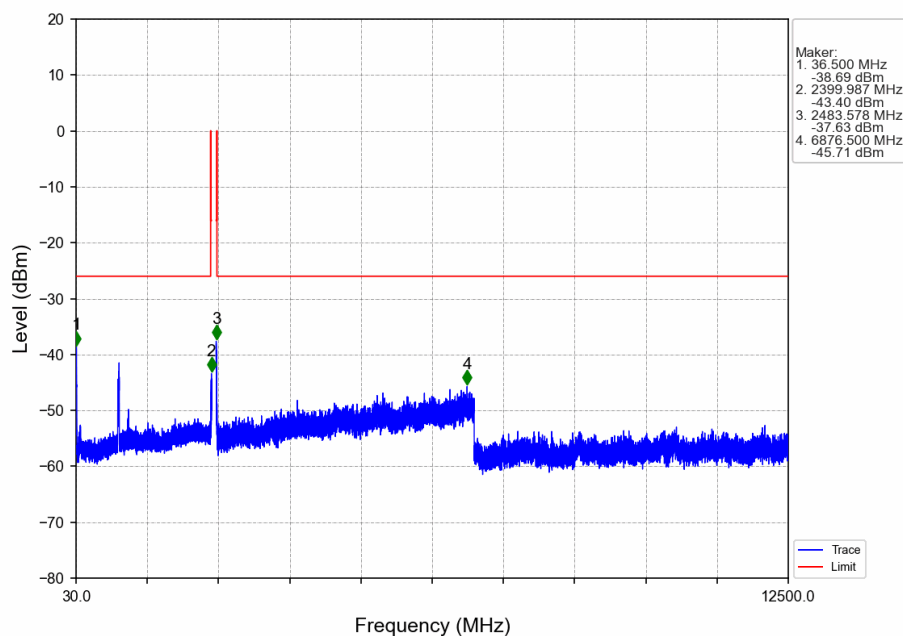
802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



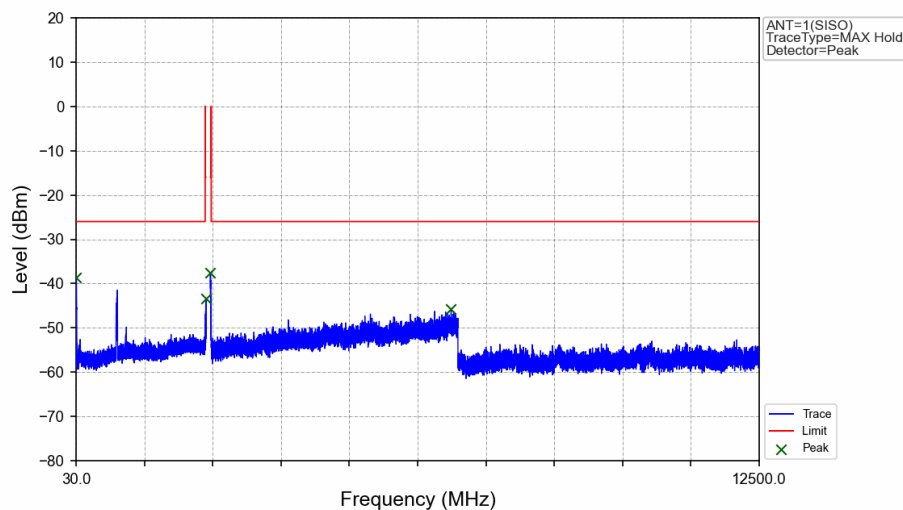
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	36.500	-37.69	/	-26	Pass
2387	2400	1	1	2399.441	-30.00	/	-16	Pass
2483.5	2496.5	1	1	2483.812	-44.96	/	-16	Pass
2496.5	12500	1	1	6722.000	-42.42	/	-26	Pass



802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV



Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	36.500	-38.69	/	-26	Pass
2387	2400	1	1	2399.987	-43.40	/	-16	Pass
2483.5	2496.5	1	1	2483.578	-37.63	/	-16	Pass
2496.5	12500	1	1	6876.500	-45.71	/	-26	Pass



4.4. ANTENNA POWER ERROR MEASUREMENT

4.4.1. LIMIT

Item	Limits
Antenna Power Density	$\leq 3\text{mW/MHz}$ (FHSS, form 2427 - 2470.75 MHz) $\leq 10\text{mW/MHz}$ (OFDM, DSSS from 2400~2483.5MHz) $\leq 10\text{mW}$ (Other from 2400~2483.5MHz)
Antenna Power Error	+20%(Base on manufacturer declare antenna power density)

4.4.3. TEST PROCEDURES

Step 1

Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency: The center frequency of the UUT test channel

RBW: 1MHz

VBW: 1MHz

Span: Wide enough to cover the total power envelope of the signal of the UUT

Detector: Peak

Trance Mode: Max Hold

Find the Peak value for the power envelope and record the frequency.

Step 2

Change the spectrum analyzer and use the following settings:

Center Frequency: Record frequency of step 1.

RBW: 1MHz

VBW: 1MHz

Span: 0Hz

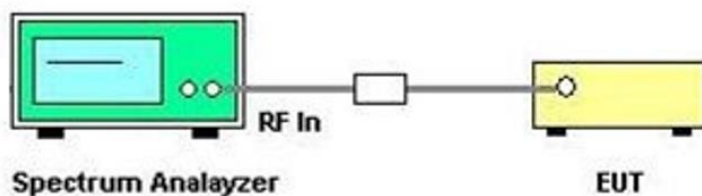
Sweep time: enough to capture the signal burst.

Detector: RMS

Trace Mode: Single

Capture the burst signal power and record it.

4.4.4. TEST SETUP LAYOUT



4.4.5. EST DEVIATION

There is no deviation with the original standard.

4.4.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

4.4.7. TEST RESULT OF ANTENNA POWER ERROR

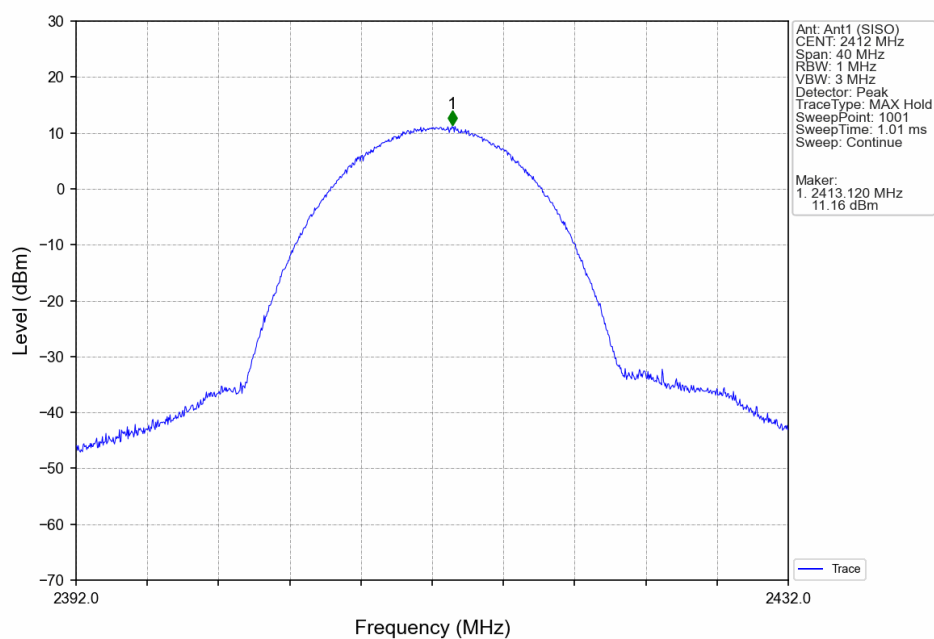
Temperature:	25.6 °C	Relative Humidity:	55.8%	Pressure:	1010mbar
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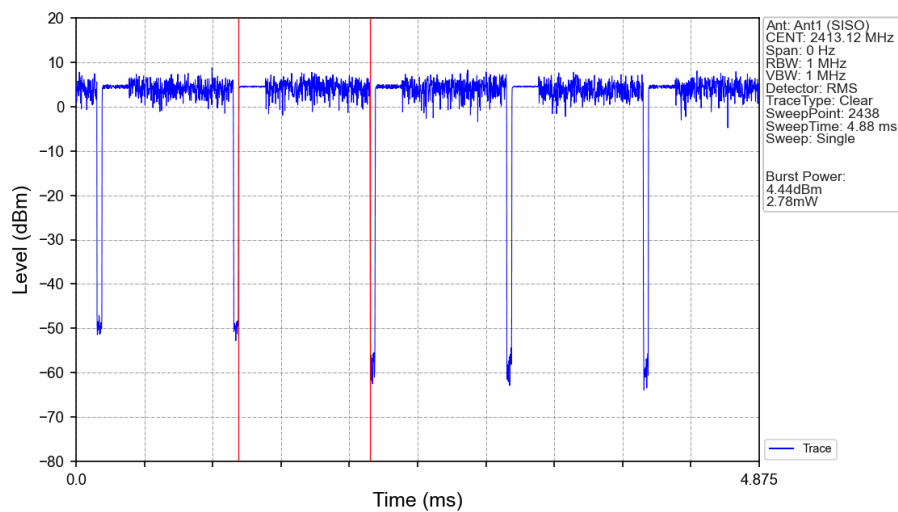
ENV	Mode	TX Type	Frequency (MHz)	ANT	Antenna Power (mW/MHz)		Nominal Power (mW/MHz)	Tolerance (%)		Verdict
					Measured	Limit		Measured	Limit	
NTNV	802.11b	SISO	2412	1	2.783	<=10.00	2.800	-0.61	-80 to 20	Pass
			2442	1	2.943	<=10.00	2.800	5.11	-80 to 20	Pass
			2472	1	0.653	<=10.00	2.800	-76.68	-80 to 20	Pass
	802.11g	SISO	2412	1	0.933	<=10.00	0.930	0.32	-80 to 20	Pass
			2442	1	0.978	<=10.00	0.930	5.16	-80 to 20	Pass
			2472	1	0.313	<=10.00	0.930	-66.34	-80 to 20	Pass
	802.11n (HT20)	SISO	2412	1	0.809	<=10.00	0.810	-0.12	-80 to 20	Pass
			2442	1	0.823	<=10.00	0.810	1.60	-80 to 20	Pass
			2472	1	0.281	<=10.00	0.810	-65.31	-80 to 20	Pass
	802.11n (HT40)	SISO	2422	1	0.518	<=5.00	0.520	-0.38	-80 to 20	Pass
			2442	1	0.279	<=5.00	0.520	-46.35	-80 to 20	Pass
			2462	1	0.233	<=5.00	0.520	-55.19	-80 to 20	Pass



802.11b_2412MHz_Ant1 (SISO)_NTNV



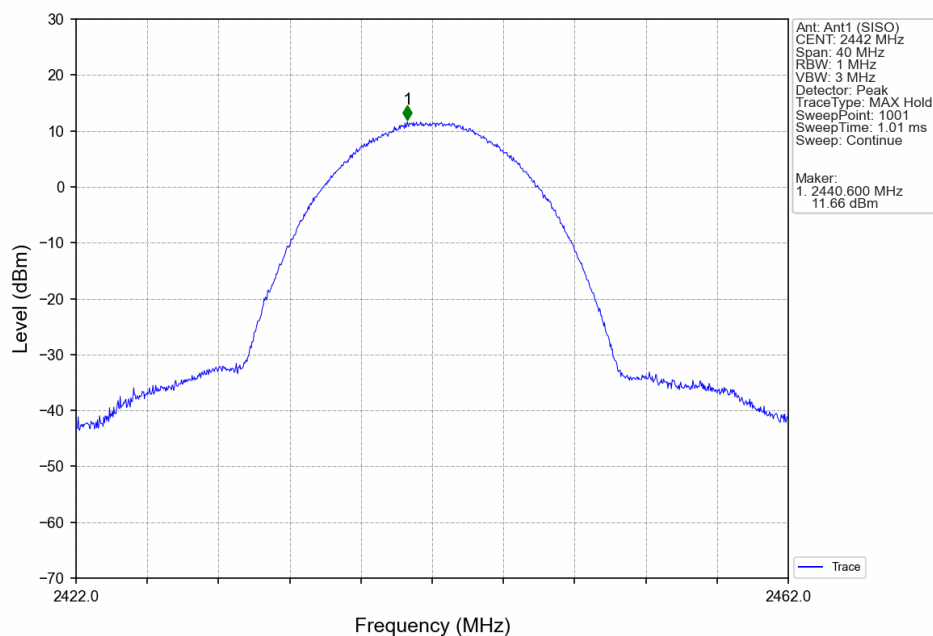
802.11b_2412MHz_Ant1 (SISO)_NTNV



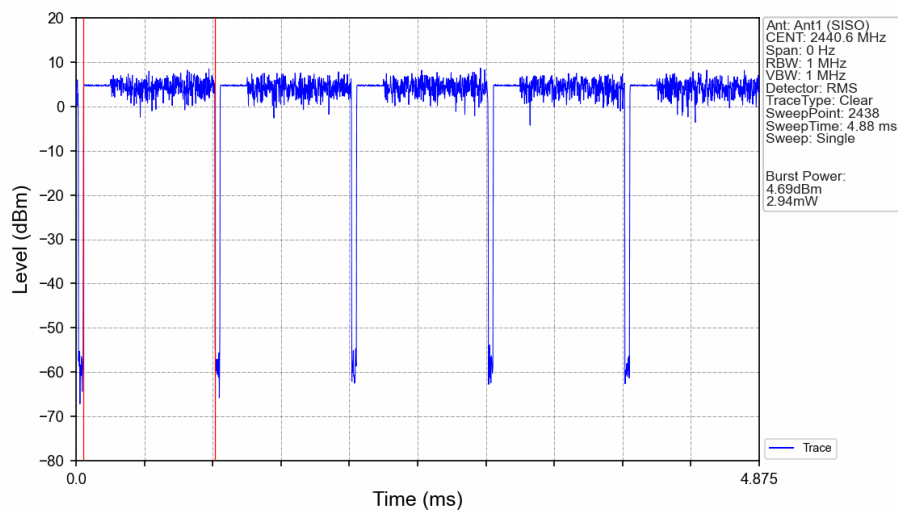
Burst No.	1	2	3	4
Length (ms)	0.938	0.938	0.938	0.936
Power(dBm)	4.34	4.44	4.43	4.18
Power(mW)	2.718	2.783	2.772	2.615
Remark	/	Max	/	/



802.11b_2442MHz_Ant1 (SISO)_NTNV



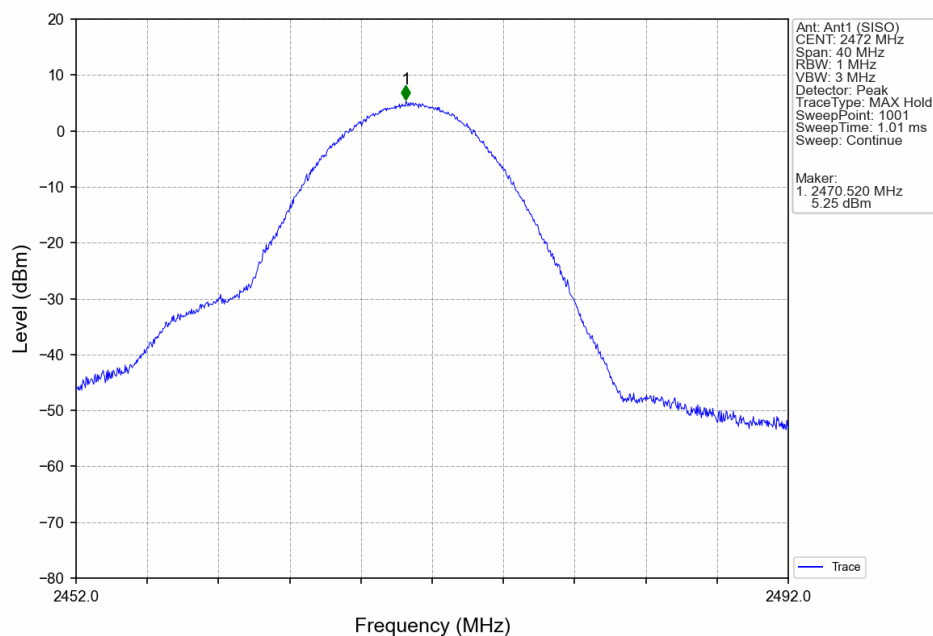
802.11b_2442MHz_Ant1 (SISO)_NTNV



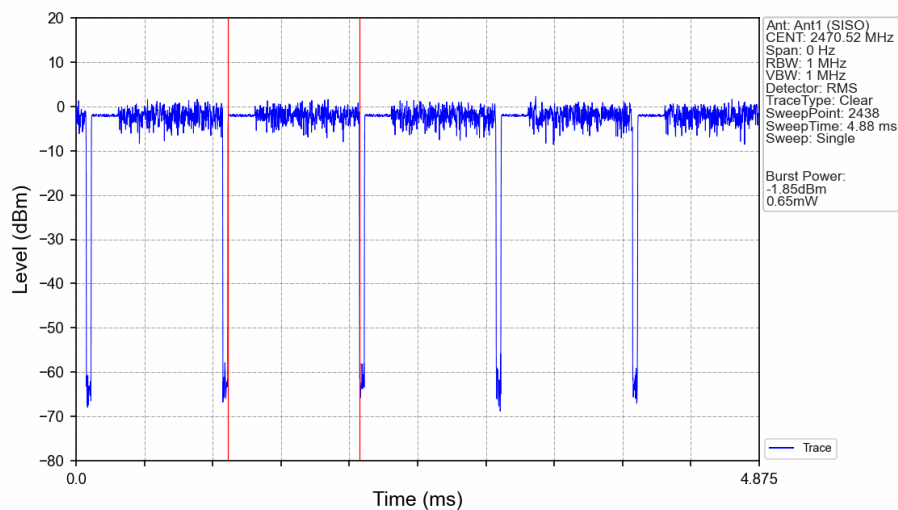
Burst No.	1	2	3	4
Length (ms)	0.938	0.936	0.938	0.938
Power(dBm)	4.69	4.50	4.64	4.63
Power(mW)	2.943	2.819	2.912	2.903
Remark	Max	/	/	/



802.11b_2472MHz_Ant1 (SISO)_NTNV



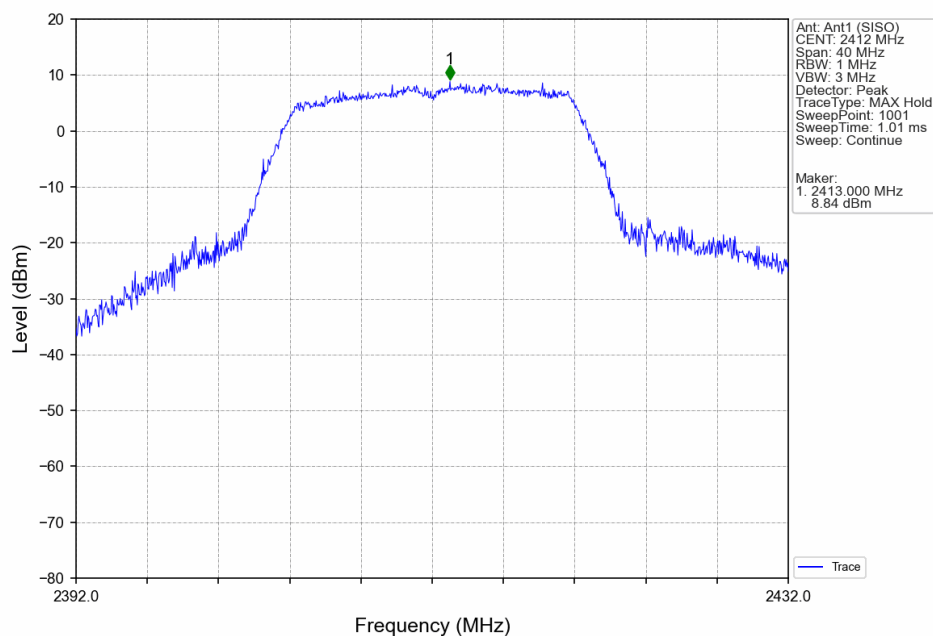
802.11b_2472MHz_Ant1 (SISO)_NTNV



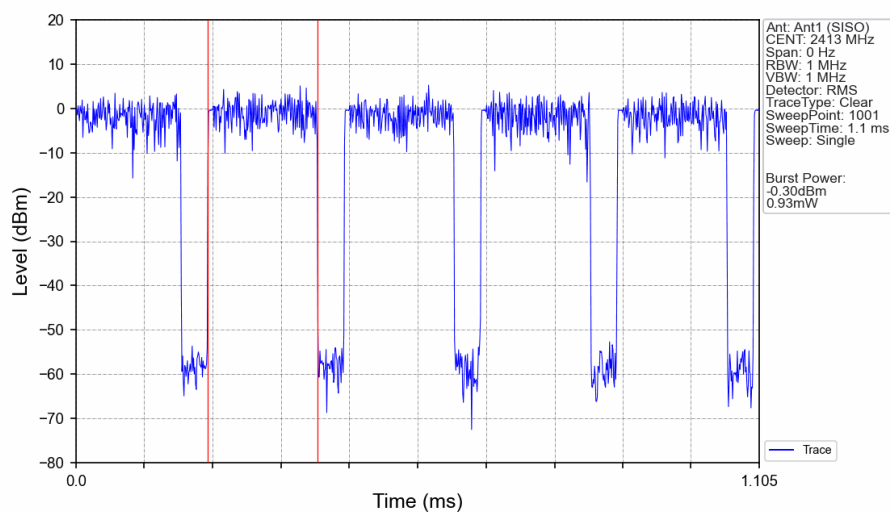
Burst No.	1	2	3	4
Length (ms)	0.938	0.938	0.938	0.938
Power(dBm)	-1.90	-1.85	-1.88	-1.89
Power(mW)	0.646	0.653	0.649	0.647
Remark	/	Max	/	/



802.11g_2412MHz_Ant1 (SISO)_NTNV



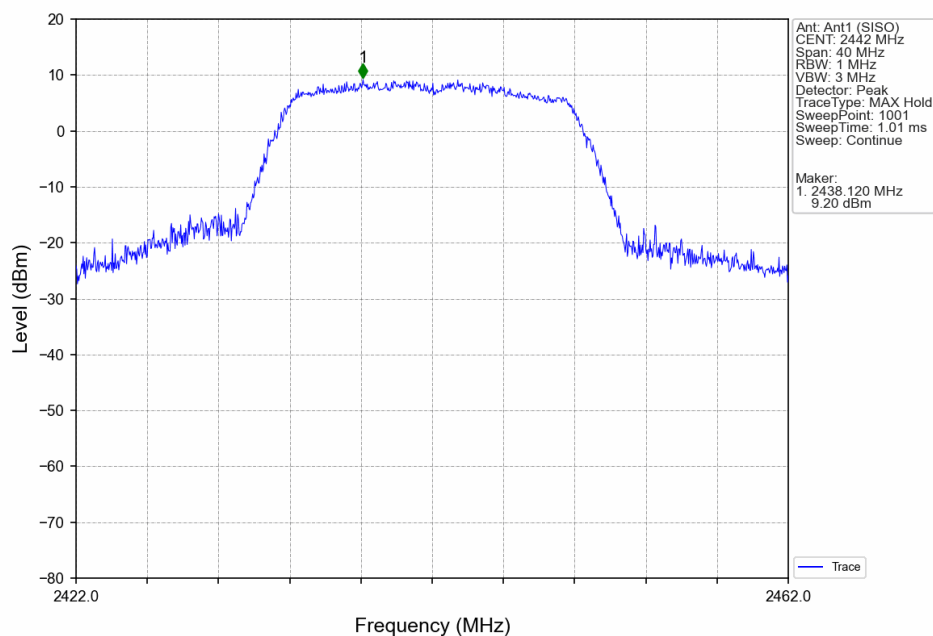
802.11g_2412MHz_Ant1 (SISO)_NTNV



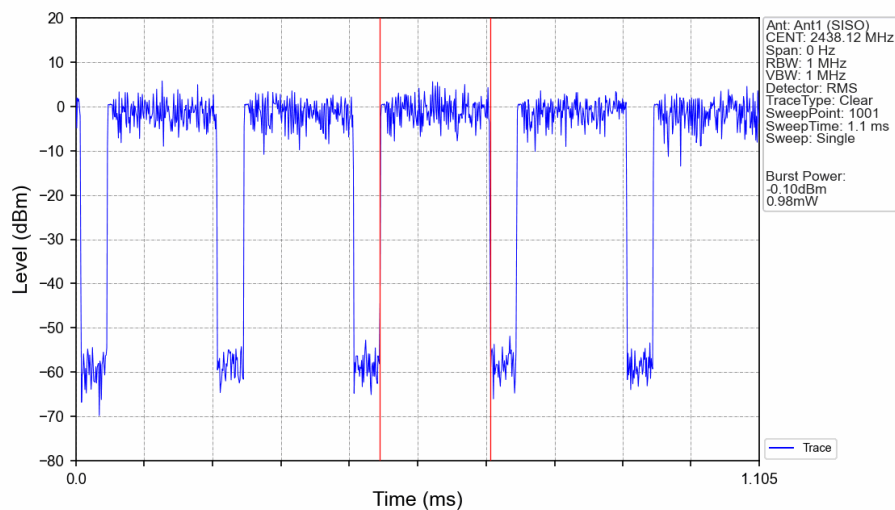
Burst No.	1	2	3	4
Length (ms)	0.177	0.177	0.177	0.178
Power(dBm)	-0.30	-0.83	-0.78	-1.01
Power(mW)	0.933	0.827	0.835	0.792
Remark	Max	/	/	/



802.11g_2442MHz_Ant1 (SISO)_NTNV



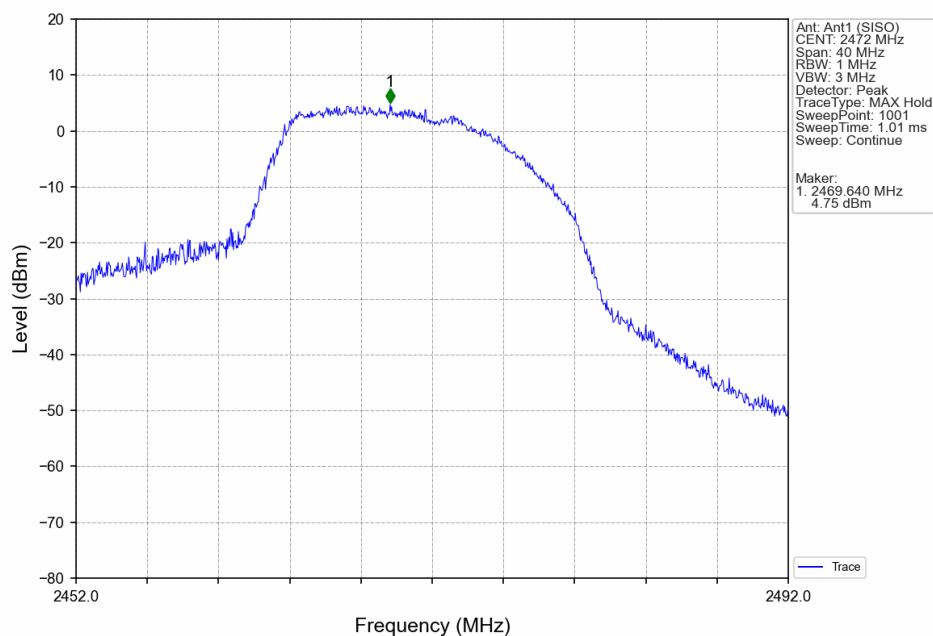
802.11g_2442MHz_Ant1 (SISO)_NTNV



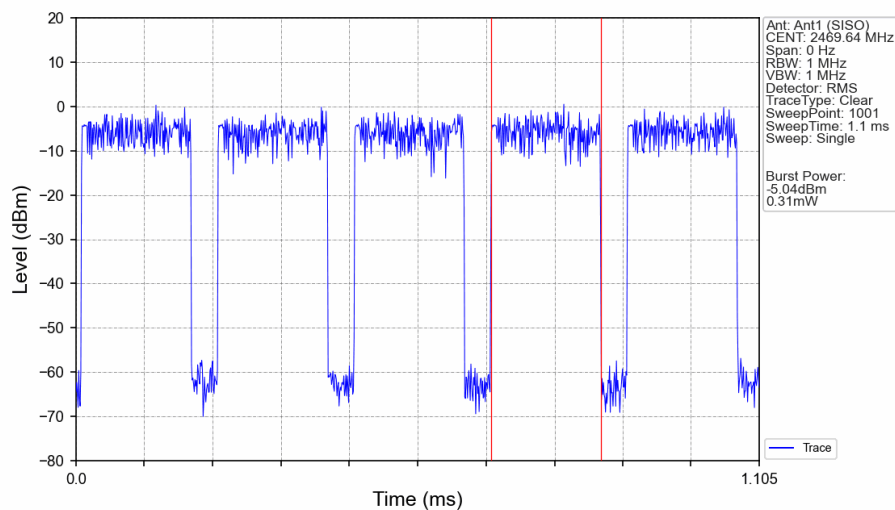
Burst No.	1	2	3	4
Length (ms)	0.177	0.177	0.178	0.178
Power(dBm)	-0.60	-0.66	-0.10	-0.51
Power(mW)	0.871	0.858	0.978	0.890
Remark	/	/	Max	/



802.11g_2472MHz_Ant1 (SISO)_NTNV



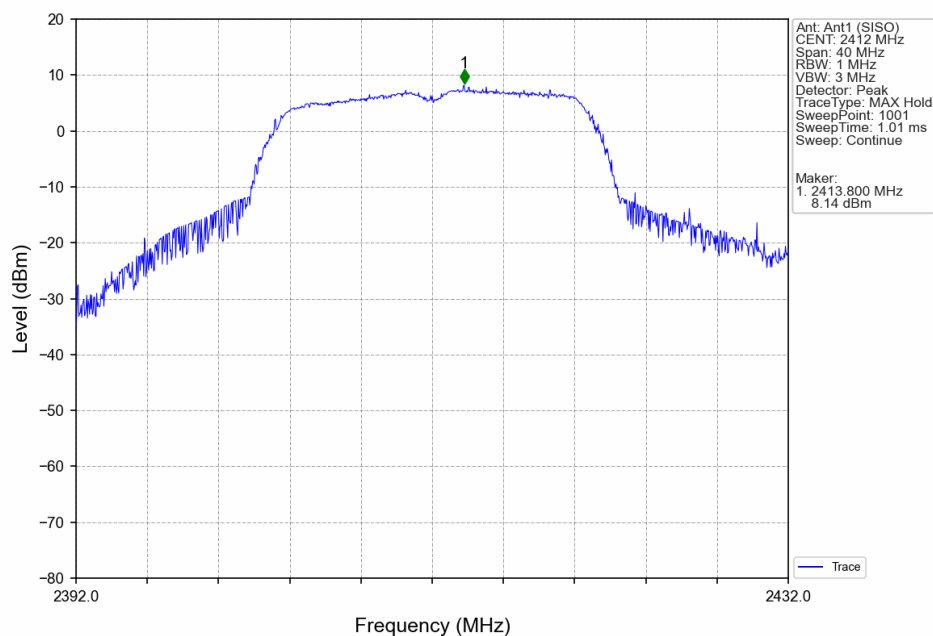
802.11g_2472MHz_Ant1 (SISO)_NTNV



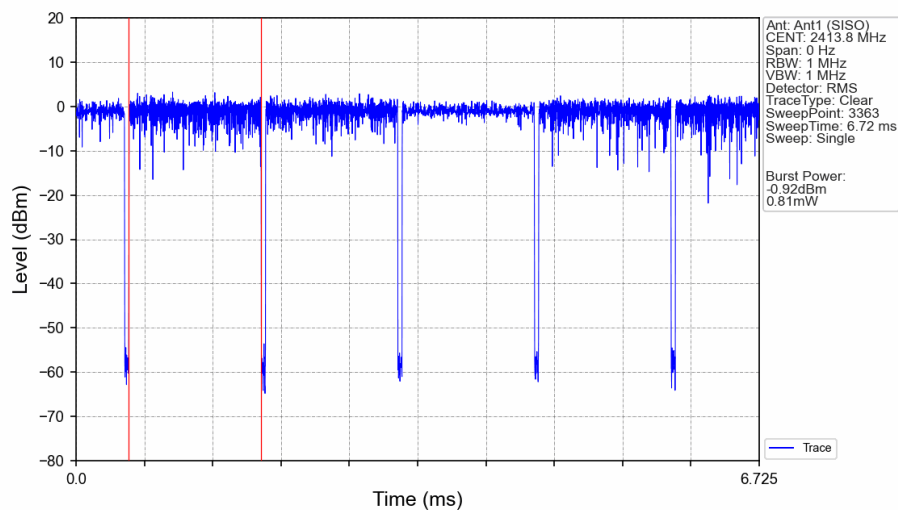
Burst No.	1	2	3	4	5
Length (ms)	0.177	0.177	0.177	0.178	0.178
Power(dBm)	-5.17	-5.41	-5.40	-5.04	-5.08
Power(mW)	0.304	0.288	0.289	0.313	0.310
Remark	/	/	/	Max	/



802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV



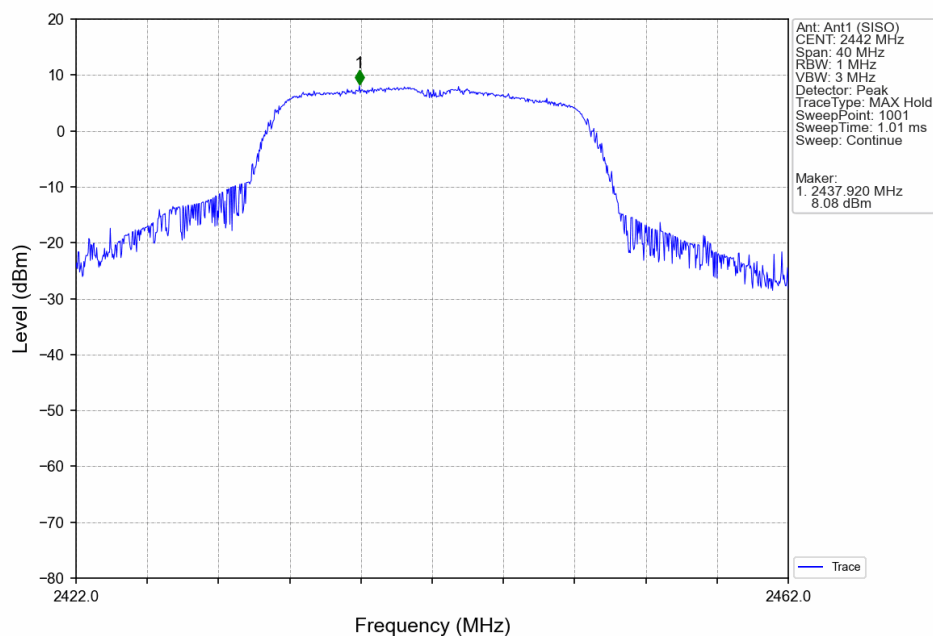
802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV



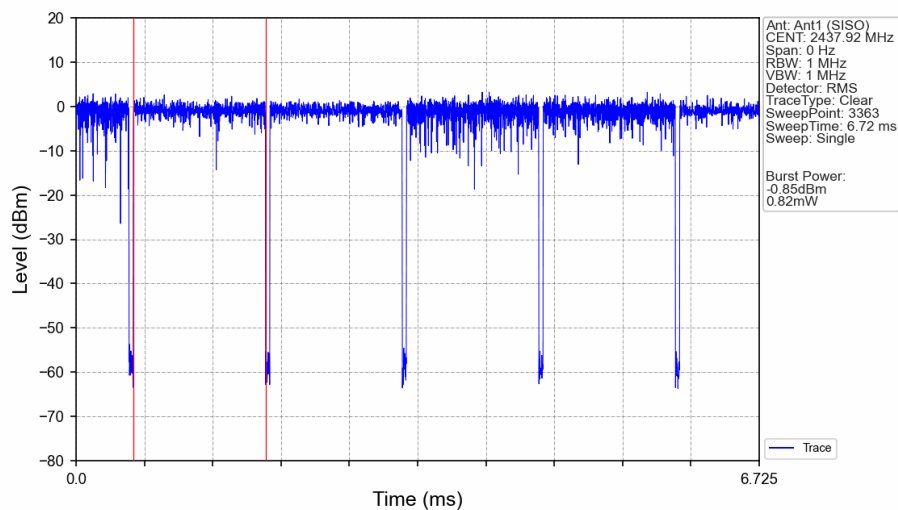
Burst No.	1	2	3	4
Length (ms)	1.302	1.300	1.302	1.302
Power(dBm)	-0.92	-0.93	-0.93	-0.94
Power(mW)	0.809	0.808	0.807	0.806
Remark	Max	/	/	/



802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV



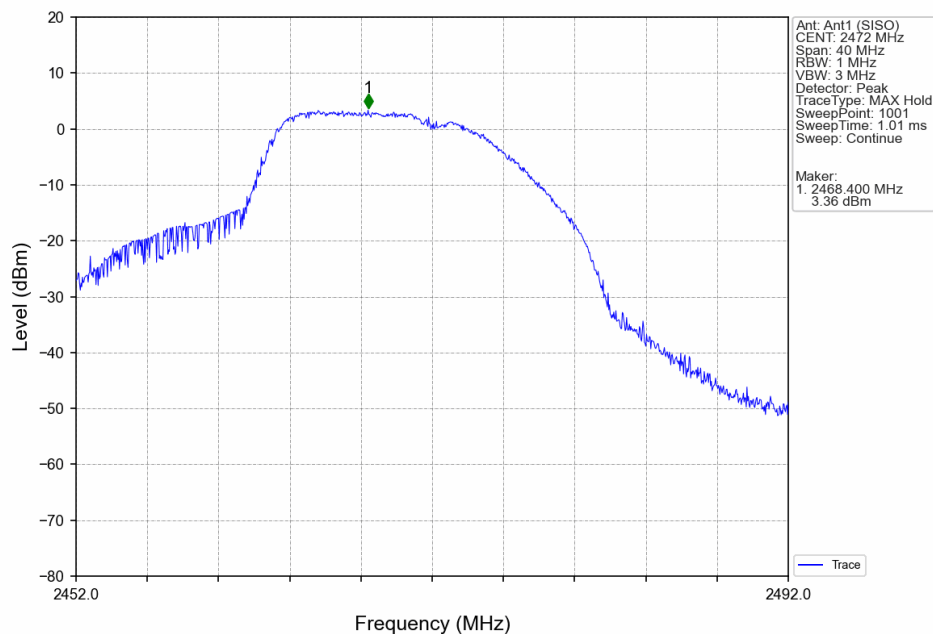
802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV



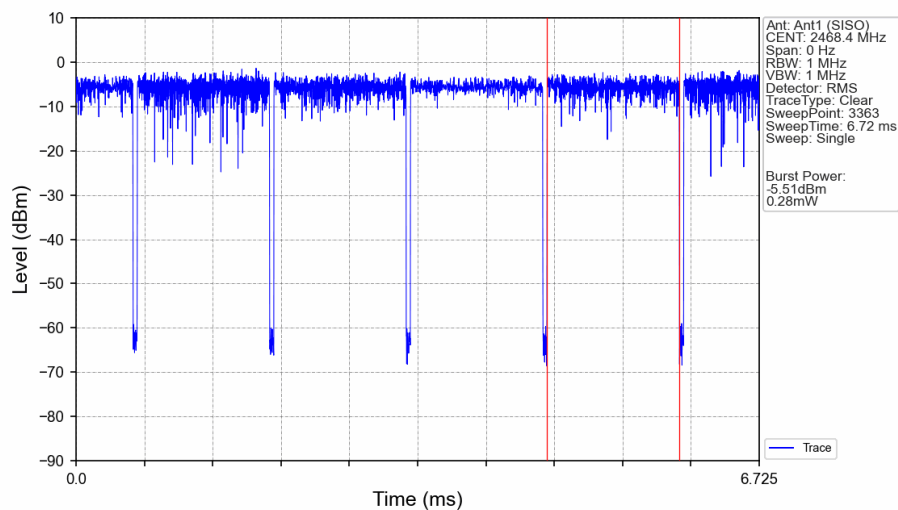
Burst No.	1	2	3	4
Length (ms)	1.300	1.302	1.302	1.300
Power(dBm)	-0.85	-0.90	-0.89	-0.86
Power(mW)	0.823	0.813	0.814	0.820
Remark	Max	/	/	/



802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV



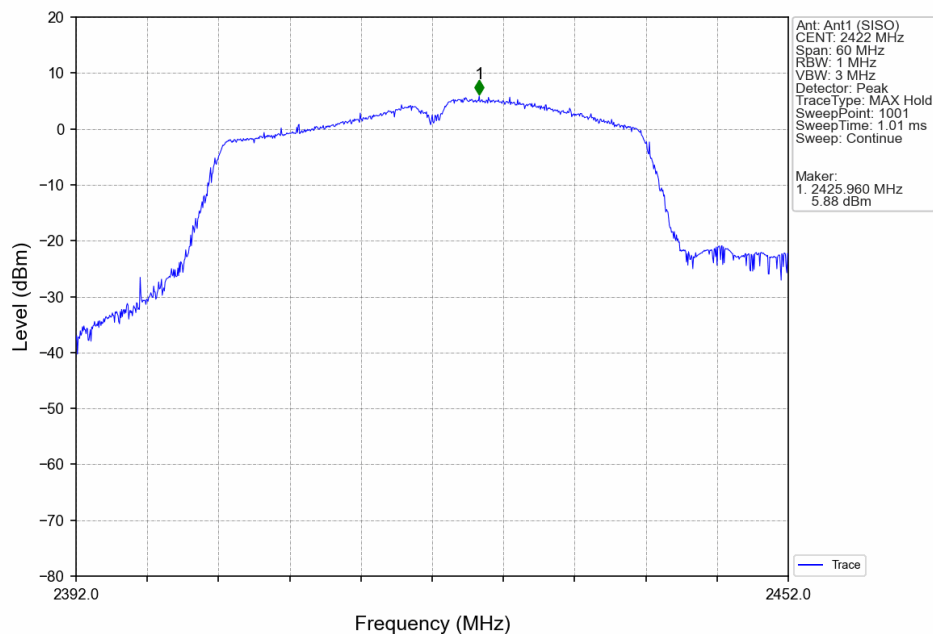
802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV



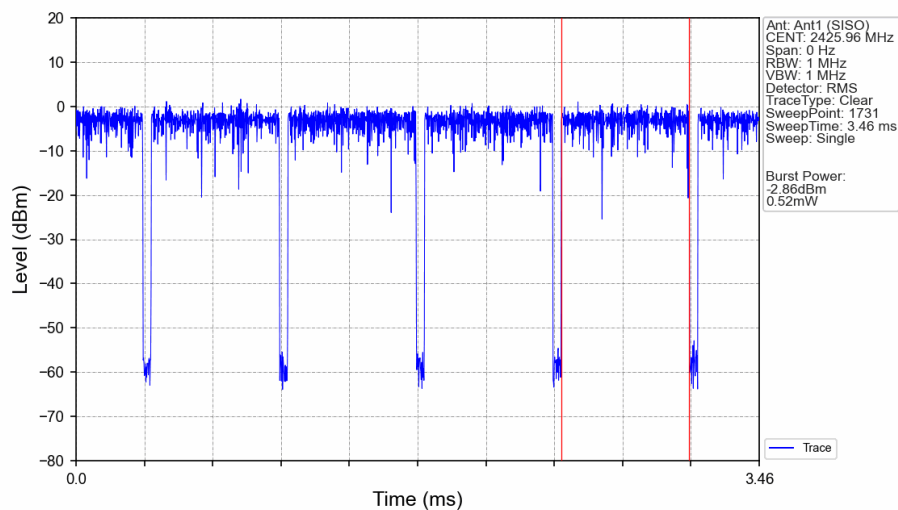
Burst No.	1	2	3	4
Length (ms)	1.302	1.300	1.302	1.302
Power(dBm)	-5.54	-5.61	-5.51	-5.51
Power(mW)	0.279	0.275	0.281	0.281
Remark	/	/	/	Max



802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV



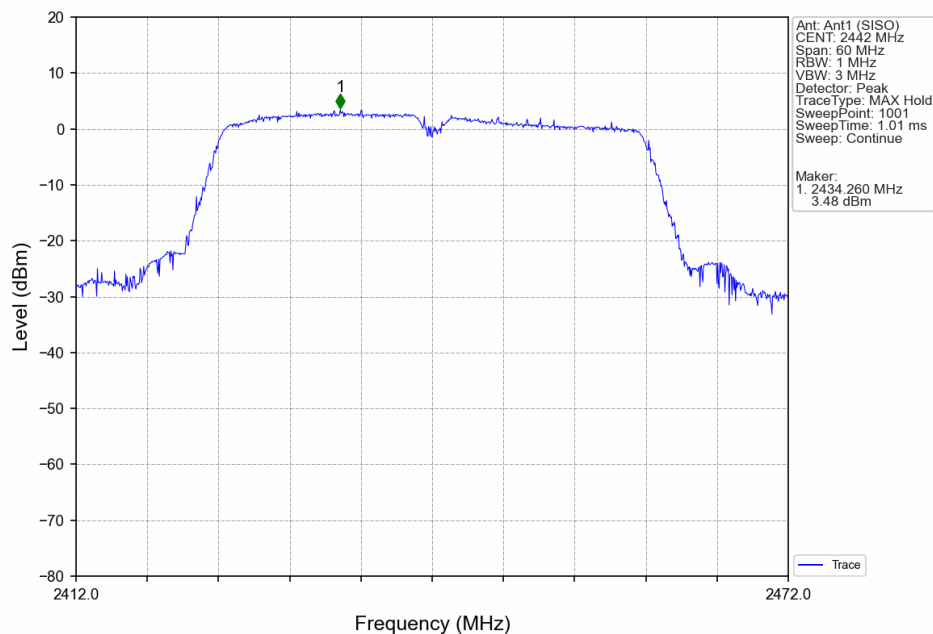
802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV



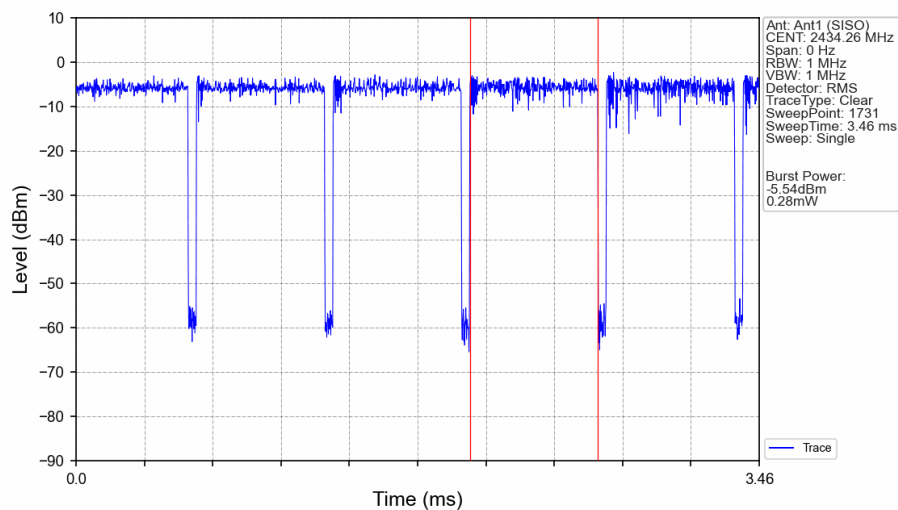
Burst No.	1	2	3	4
Length (ms)	0.650	0.648	0.648	0.648
Power(dBm)	-2.89	-2.93	-2.96	-2.86
Power(mW)	0.514	0.509	0.506	0.518
Remark	/	/	/	Max



802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



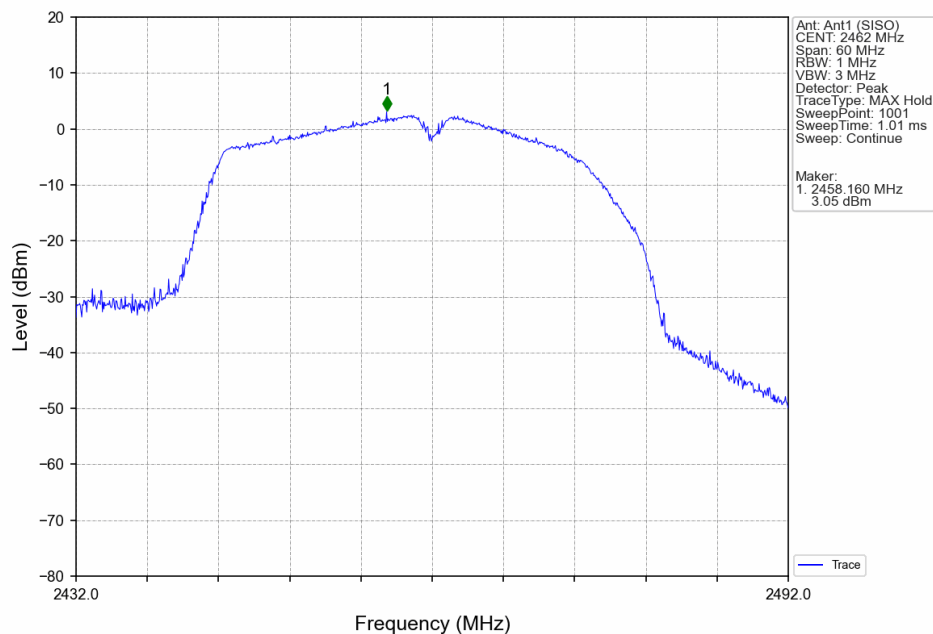
802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



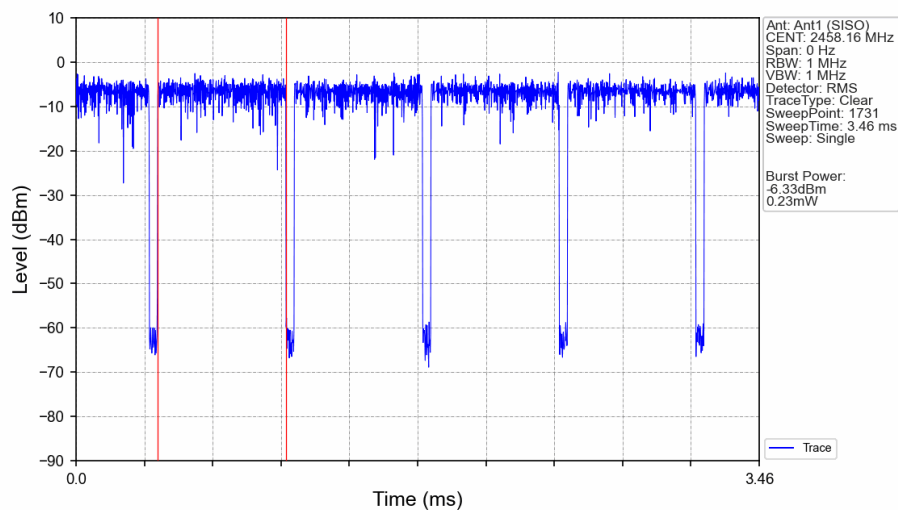
Burst No.	1	2	3	4
Length (ms)	0.650	0.650	0.650	0.650
Power(dBm)	-5.68	-5.60	-5.54	-5.66
Power(mW)	0.270	0.276	0.279	0.272
Remark	/	/	Max	/



802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV



Burst No.	1	2	3	4
Length (ms)	0.648	0.648	0.648	0.648
Power(dBm)	-6.33	-6.50	-6.45	-6.48
Power(mW)	0.233	0.224	0.227	0.225
Remark	Max	/	/	/



4.5. SECONDARY RADIATED EMISSIONS TEST

4.5.1. LIMIT

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq -54\text{ dBm}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)
	$\leq -47\text{ dBm}$ ($1\text{GHz} \leq f$)

4.5.2. MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

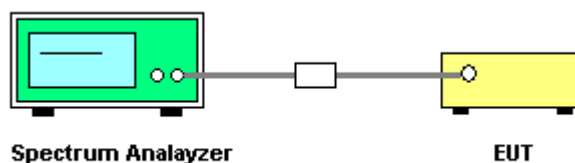
Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.5.3. TEST PROCEDURES

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) / AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.



4.5.4. TEST SETUP LAYOUT



4.5.6. TEST DEVIATION

There is no deviation with the original standard.

4.5.7. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously reception mode.

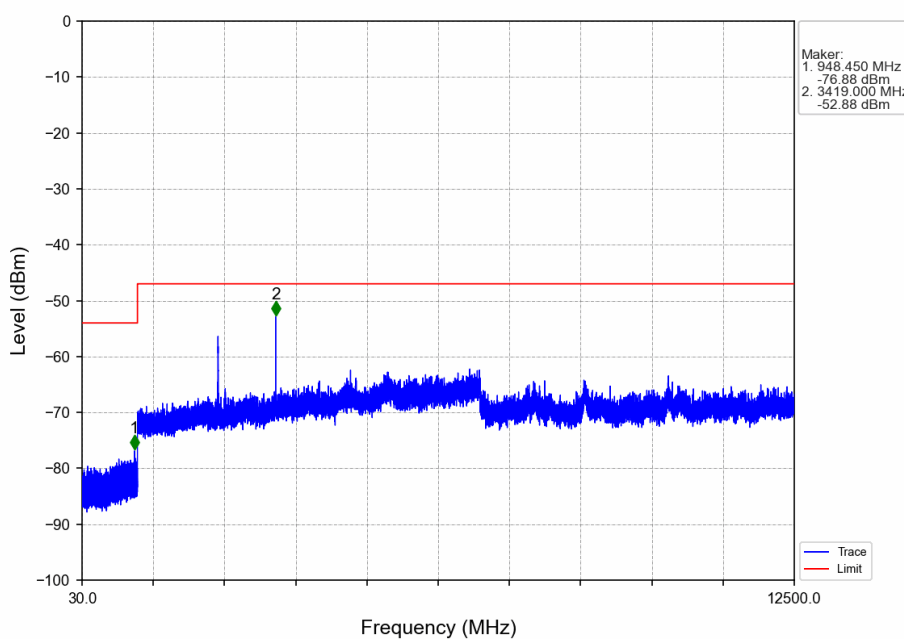
4.5.8. TEST RESULT

Temperature:	25.6 °C	Relative Humidity:	55.8%	Pressure:	1010mbar
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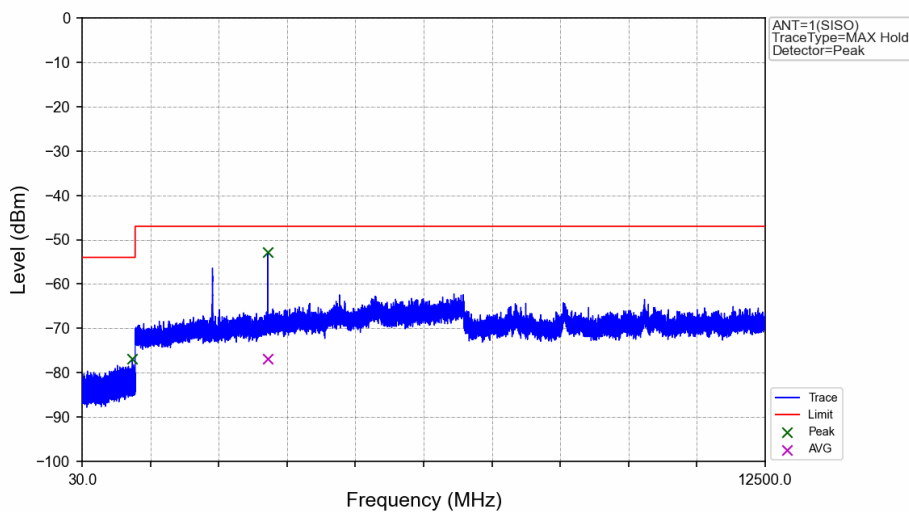
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
802.11b	SISO	2412	1	30	1000	948.45	-76.88	0.021	/	/	4	Pass
				1000	12500	3419	-52.88	5.152	-76.87	0.021	20	Pass
		2442	1	30	1000	948.4	-77.62	0.017	/	/	4	Pass
				1000	12500	2428.5	-59.54	1.112	/	/	20	Pass
		2472	1	30	1000	938.35	-77.93	0.016	/	/	4	Pass
				1000	12500	2413	-54.16	3.837	/	/	20	Pass
802.11g	SISO	2412	1	30	1000	862.4	-77.50	0.018	/	/	4	Pass
				1000	12500	6739	-61.89	0.647	/	/	20	Pass
		2442	1	30	1000	947.85	-78.25	0.015	/	/	4	Pass
				1000	12500	6993.5	-62.33	0.585	/	/	20	Pass
		2472	1	30	1000	993.5	-78.16	0.015	/	/	4	Pass
				1000	12500	2411.5	-50.66	8.590	-55.17	3.041	20	Pass
802.11n (HT20)	SISO	2412	1	30	1000	948.4	-76.42	0.023	/	/	4	Pass
				1000	12500	2612.5	-48.93	12.794	-52.28	5.916	20	Pass
		2442	1	30	1000	948.45	-77.91	0.016	/	/	4	Pass
				1000	12500	5410.5	-62.43	0.571	/	/	20	Pass
		2472	1	30	1000	854.4	-77.89	0.016	/	/	4	Pass
				1000	12500	3418.5	-59.48	1.127	/	/	20	Pass
802.11n (HT40)	SISO	2422	1	30	1000	899.65	-77.83	0.016	/	/	4	Pass
				1000	12500	2411	-56.17	2.415	/	/	20	Pass
		2442	1	30	1000	809.2	-77.54	0.018	/	/	4	Pass
				1000	12500	2402.5	-59.71	1.069	/	/	20	Pass
		2462	1	30	1000	948.4	-76.86	0.021	/	/	4	Pass
				1000	12500	2410	-57.88	1.629	/	/	20	Pass



802.11b_2412MHz_Ant1 (SISO)_NTNV



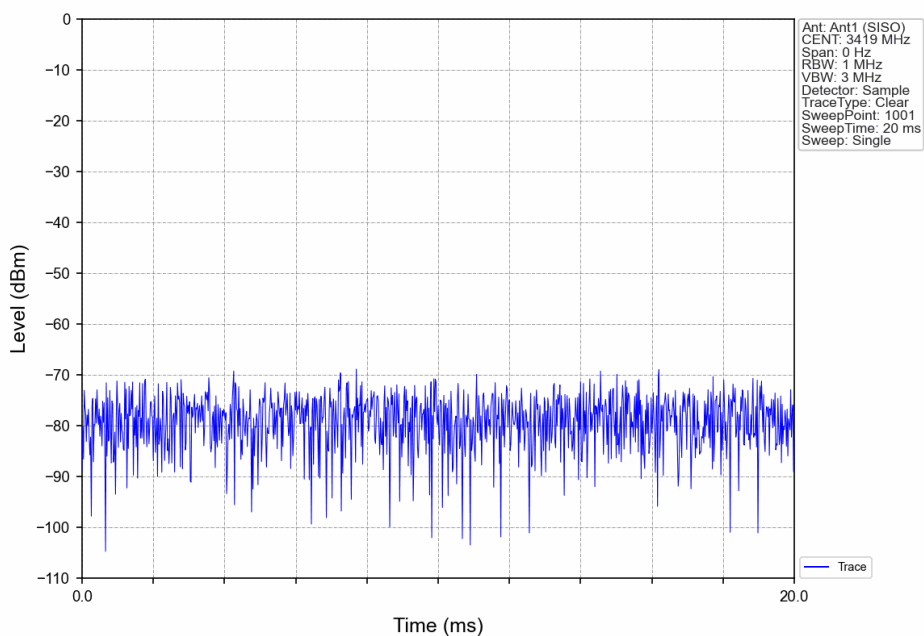
802.11b_2412MHz_Ant1 (SISO)_NTNV



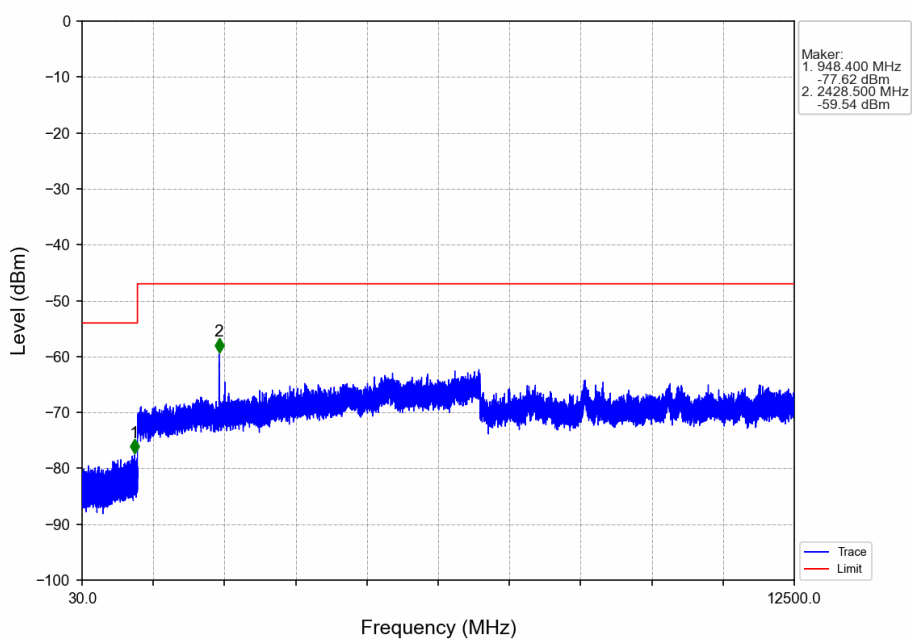
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	948.450	-76.88	/	-54	Pass
1000	12500	1	1	3419.000	-52.88	-76.87	-47	Pass



802.11b_2412MHz_Ant1 (SISO)_NTNV

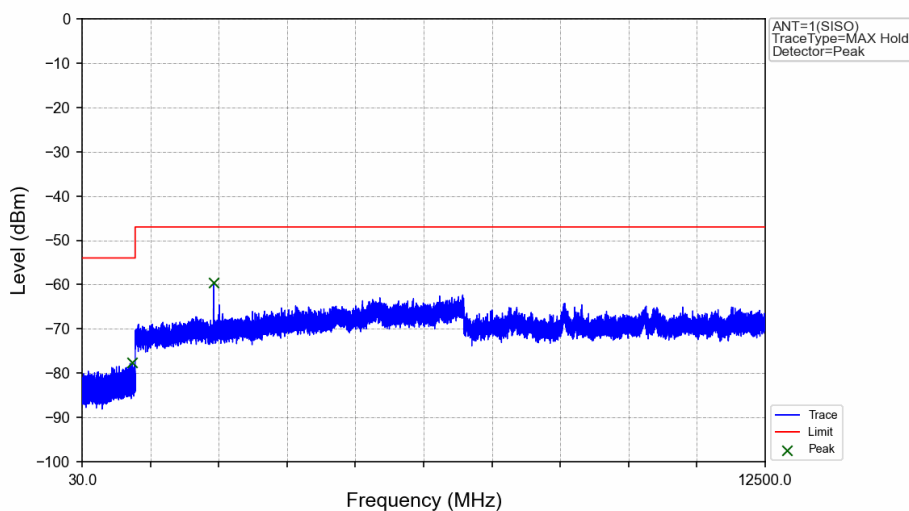


802.11b_2442MHz_Ant1 (SISO)_NTNV



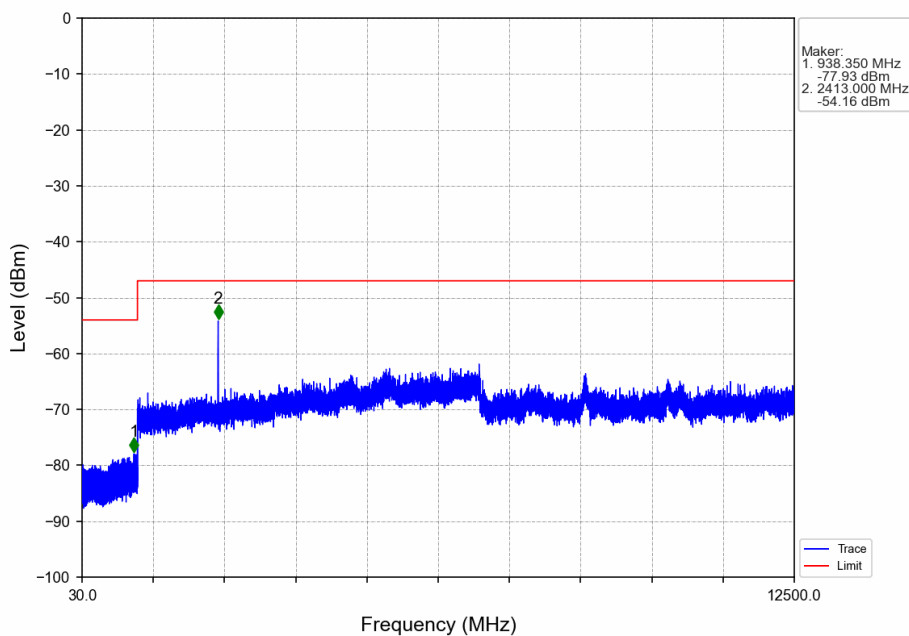


802.11b_2442MHz_Ant1 (SISO)_NTNV



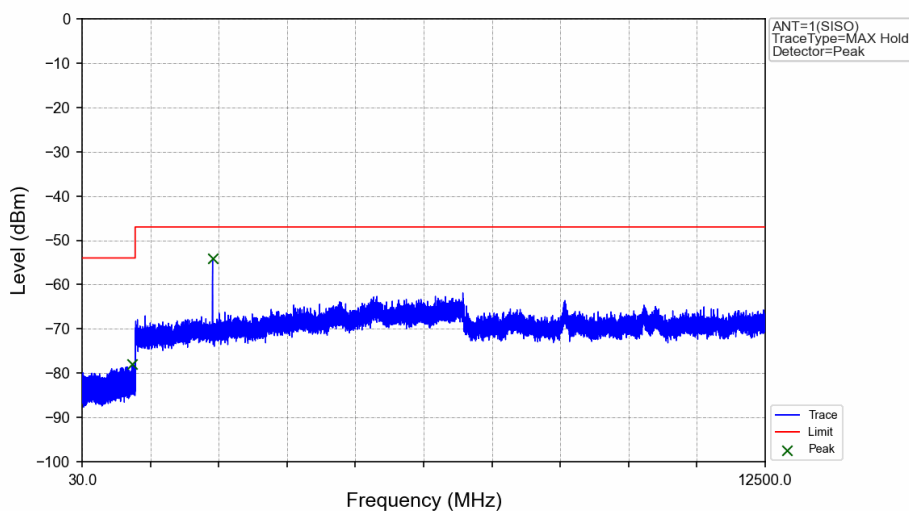
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	948.400	-77.62	/	-54	Pass
1000	12500	1	1	2428.500	-59.54	/	-47	Pass

802.11b_2472MHz_Ant1 (SISO)_NTNV



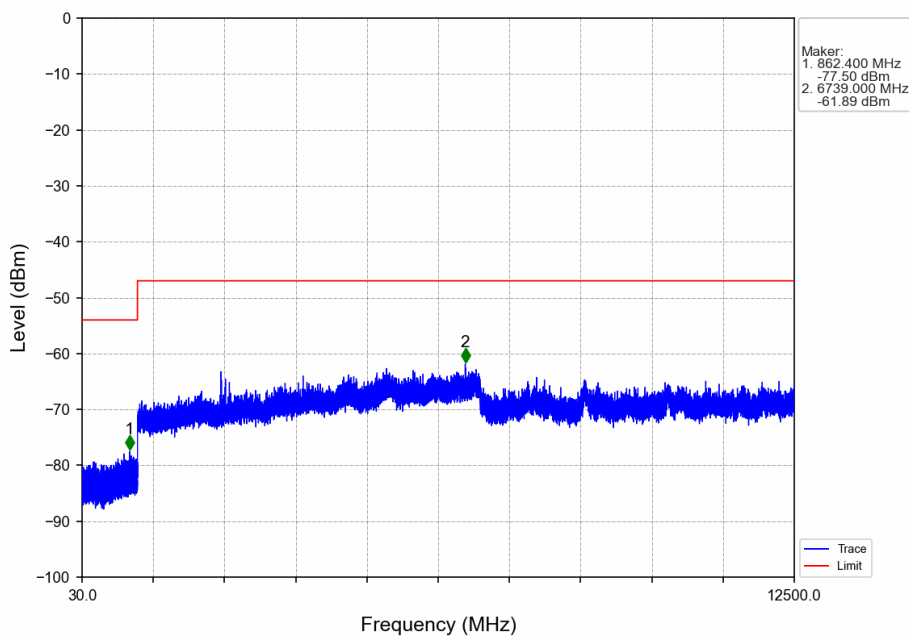


802.11b_2472MHz_Ant1 (SISO)_NTNV



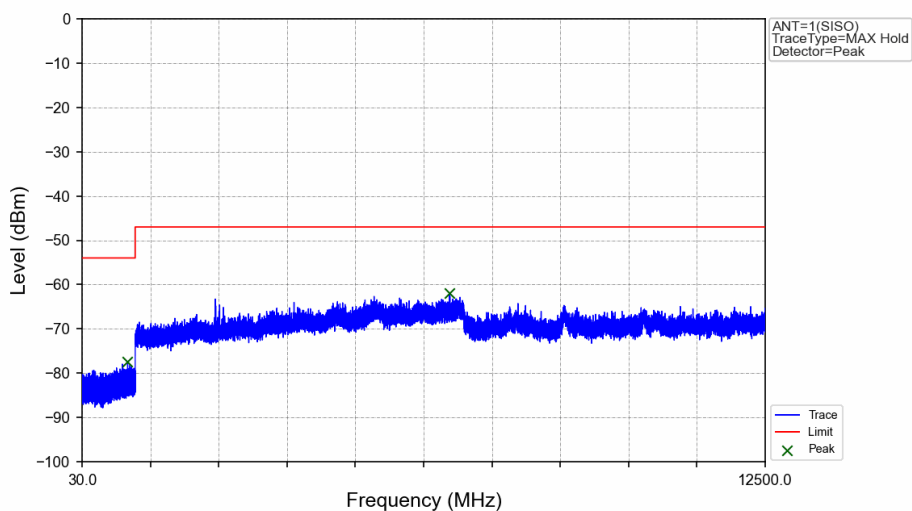
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	938.350	-77.93	/	-54	Pass
1000	12500	1	1	2413.000	-54.16	/	-47	Pass

802.11g_2412MHz_Ant1 (SISO)_NTNV



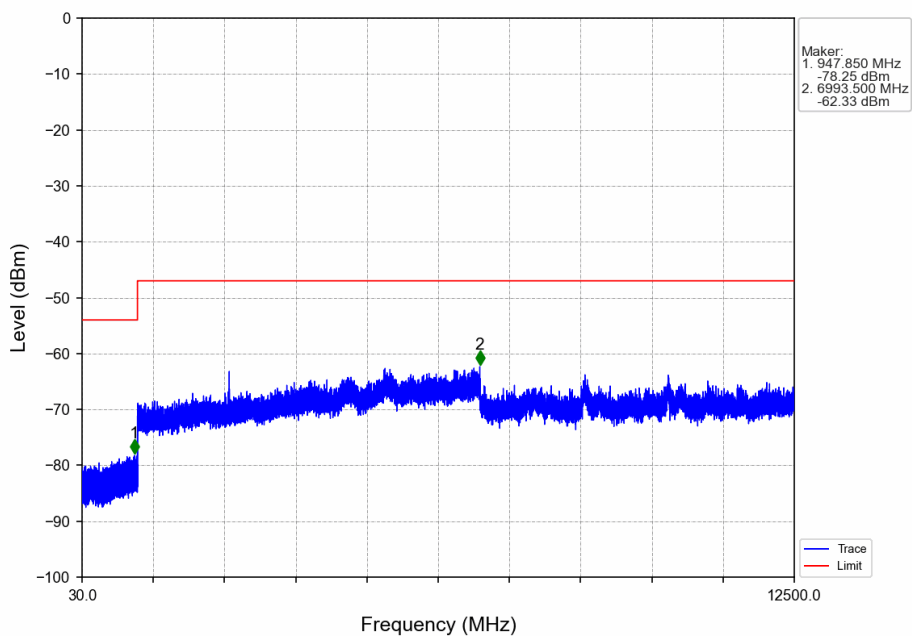


802.11g_2412MHz_Ant1 (SISO)_NTNV



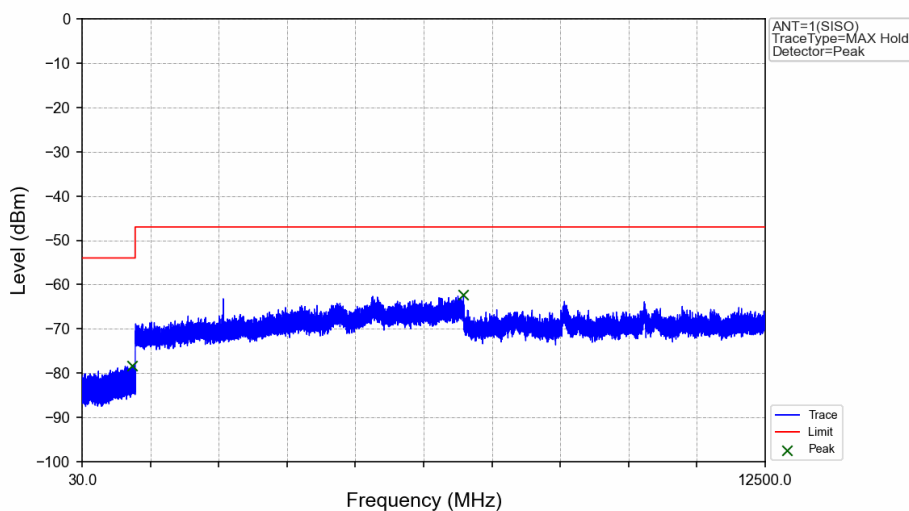
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	862.400	-77.50	/	-54	Pass
1000	12500	1	1	6739.000	-61.89	/	-47	Pass

802.11g_2442MHz_Ant1 (SISO)_NTNV



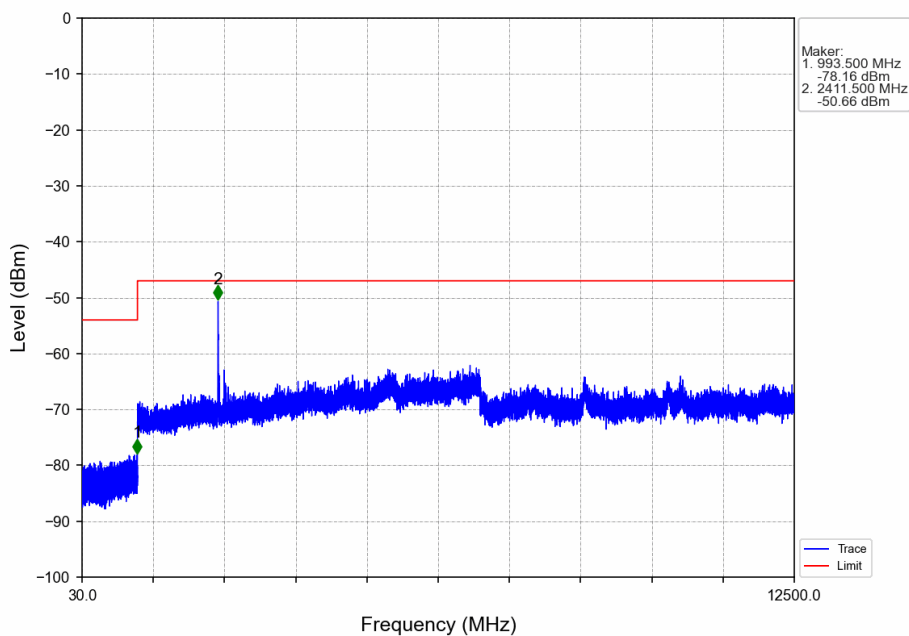


802.11g_2442MHz_Ant1 (SISO)_NTNV



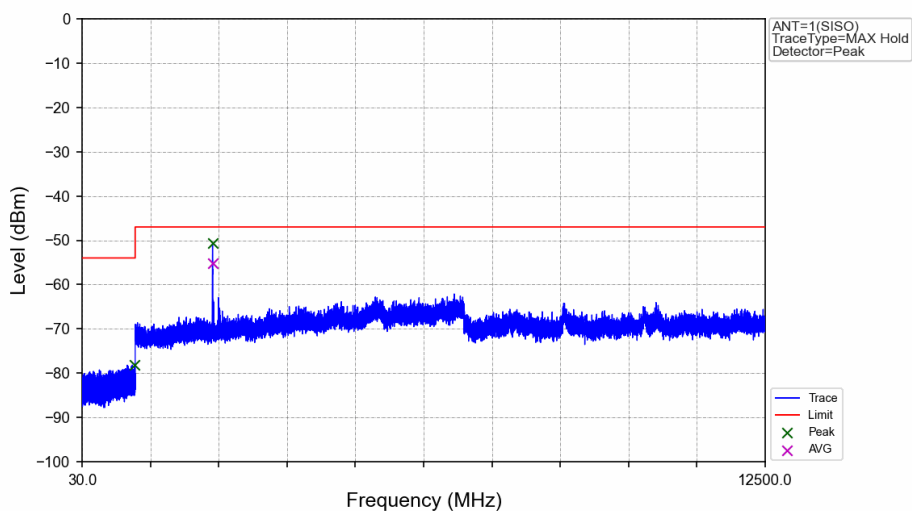
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	947.850	-78.25	/	-54	Pass
1000	12500	1	1	6993.500	-62.33	/	-47	Pass

802.11g_2472MHz_Ant1 (SISO)_NTNV



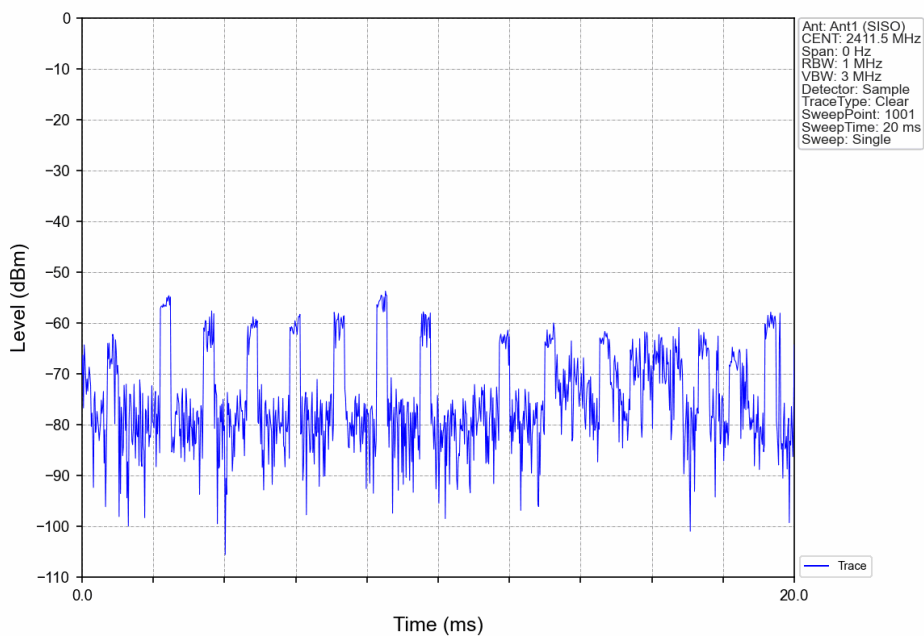


802.11g_2472MHz_Ant1 (SISO)_NTNV



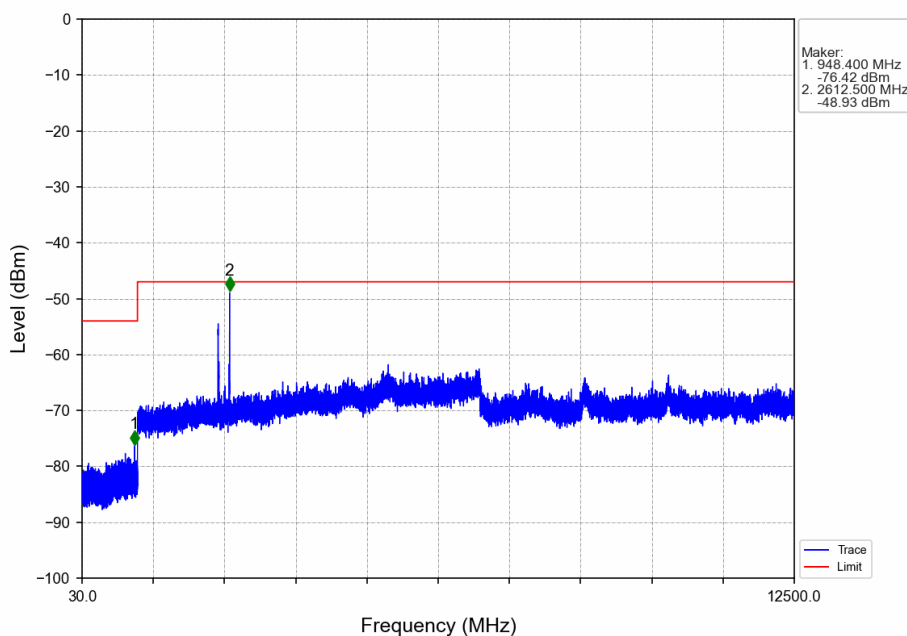
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	993.500	-78.16	/	-54	Pass
1000	12500	1	1	2411.500	-50.66	-55.17	-47	Pass

802.11g_2472MHz_Ant1 (SISO)_NTNV

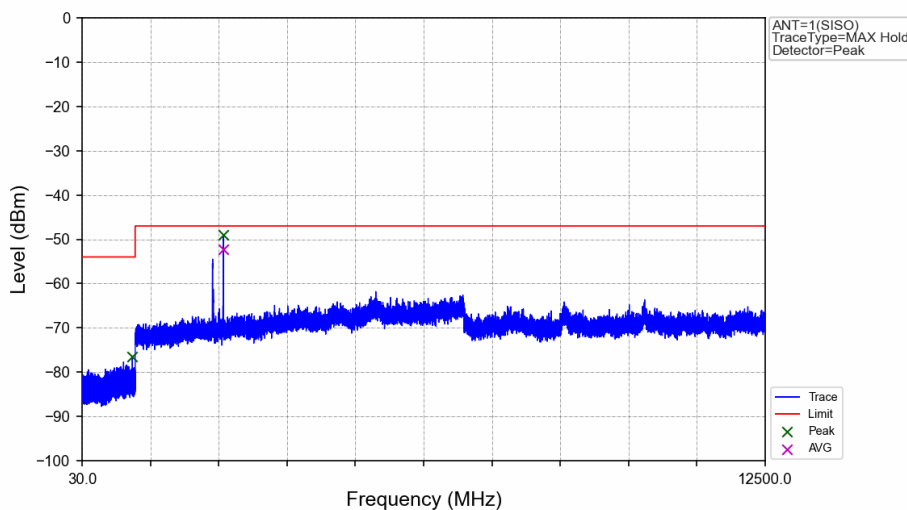




802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV



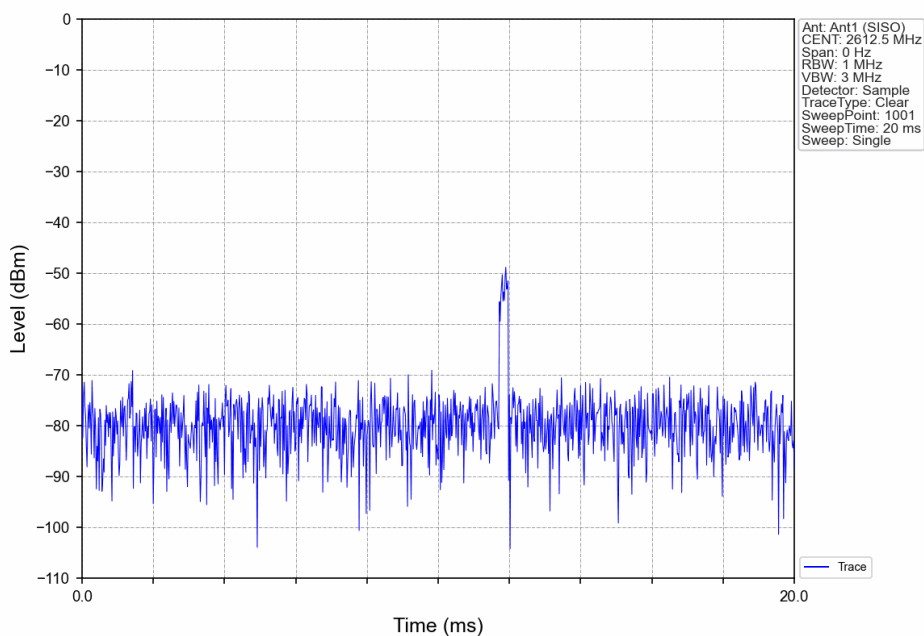
802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV



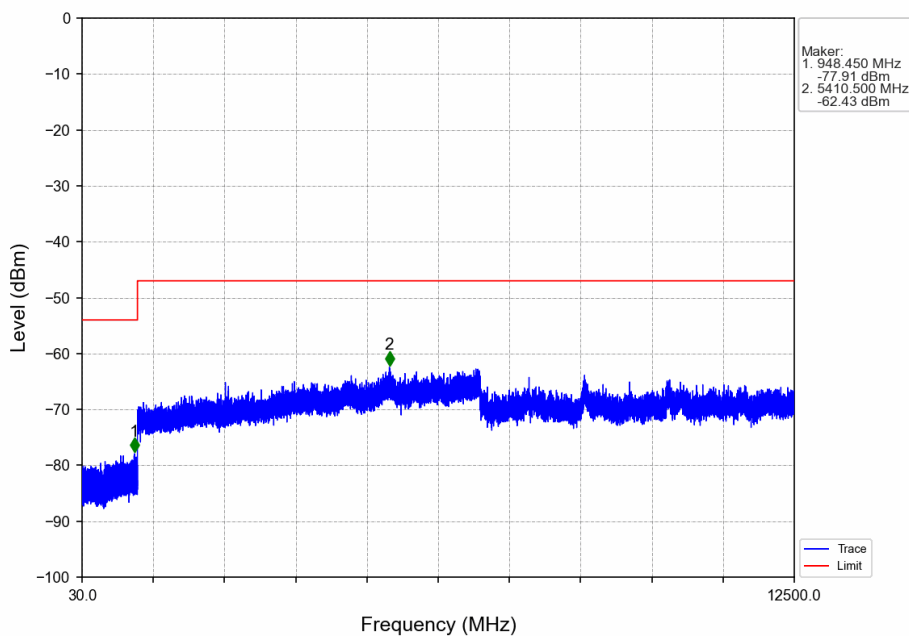
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	948.400	-76.42	/	-54	Pass
1000	12500	1	1	2612.500	-48.93	-52.28	-47	Pass



802.11n(HT20)_2412MHz_Ant1 (SISO)_NTNV

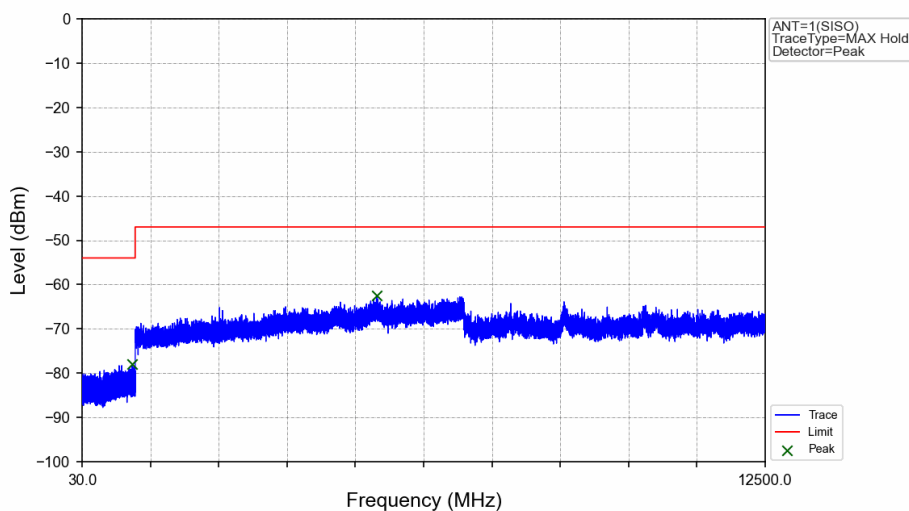


802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV



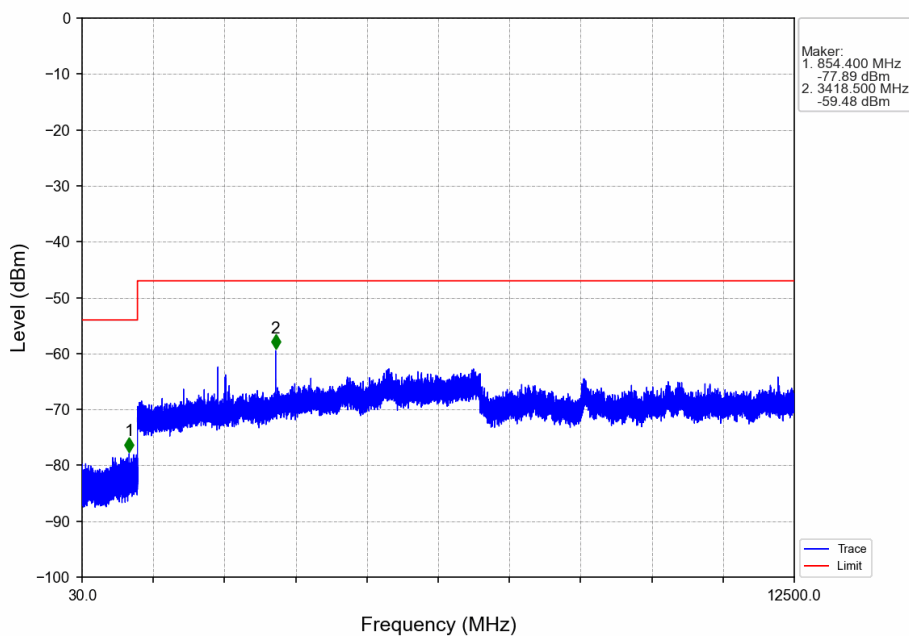


802.11n(HT20)_2442MHz_Ant1 (SISO)_NTNV



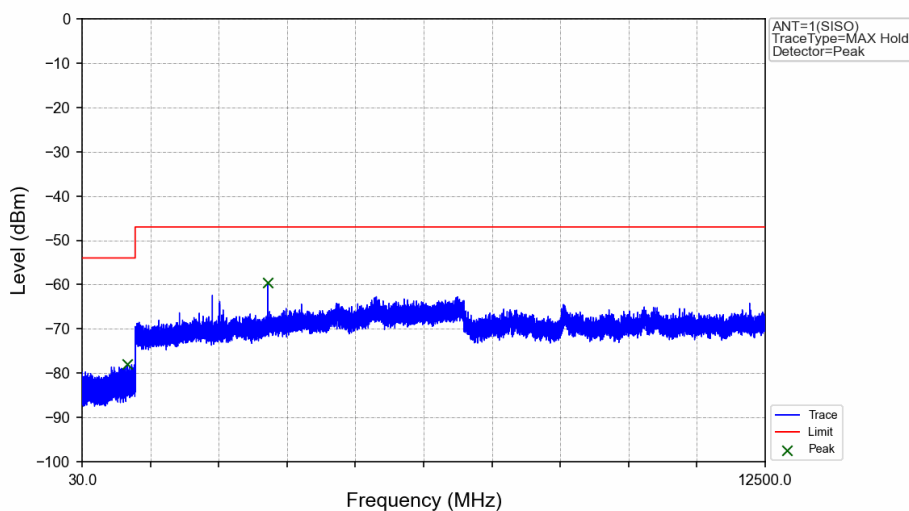
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	948.450	-77.91	/	-54	Pass
1000	12500	1	1	5410.500	-62.43	/	-47	Pass

802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV



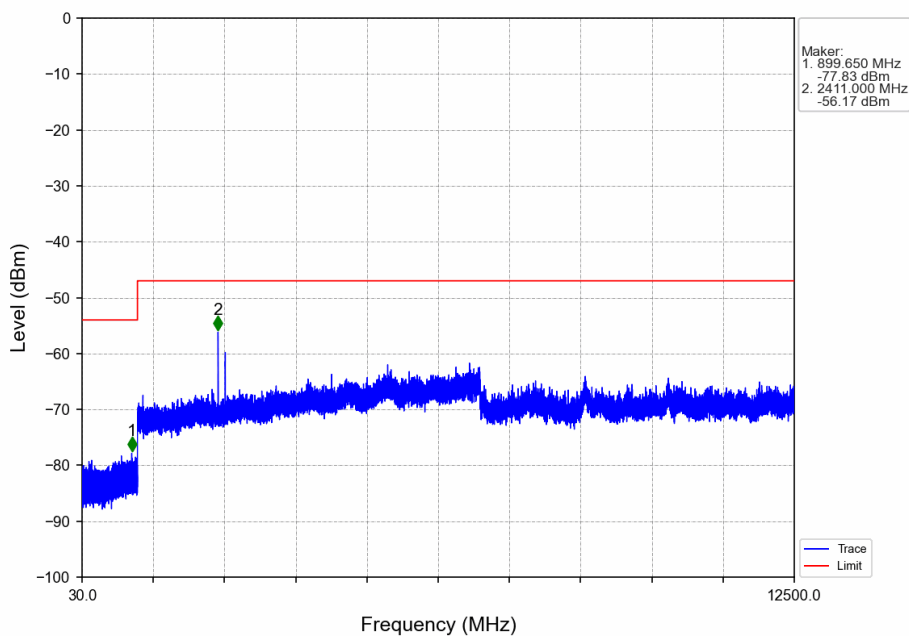


802.11n(HT20)_2472MHz_Ant1 (SISO)_NTNV



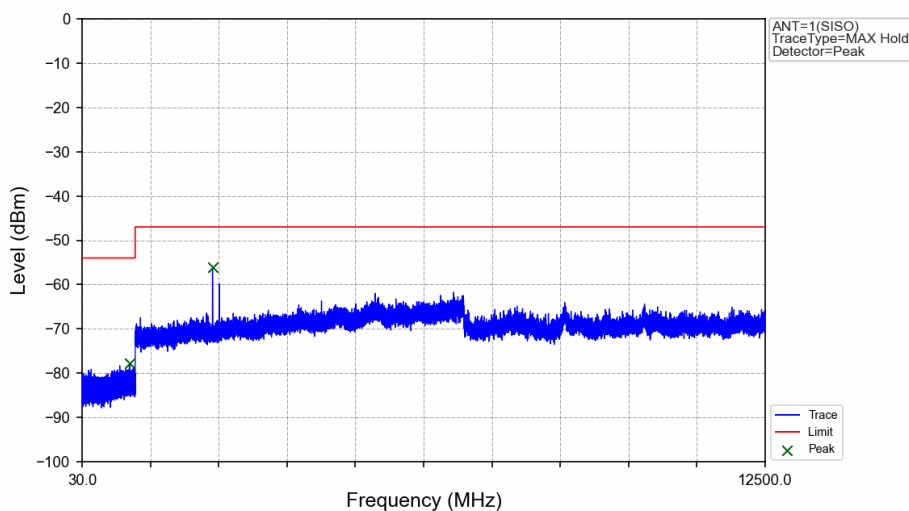
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	854.400	-77.89	/	-54	Pass
1000	12500	1	1	3418.500	-59.48	/	-47	Pass

802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV



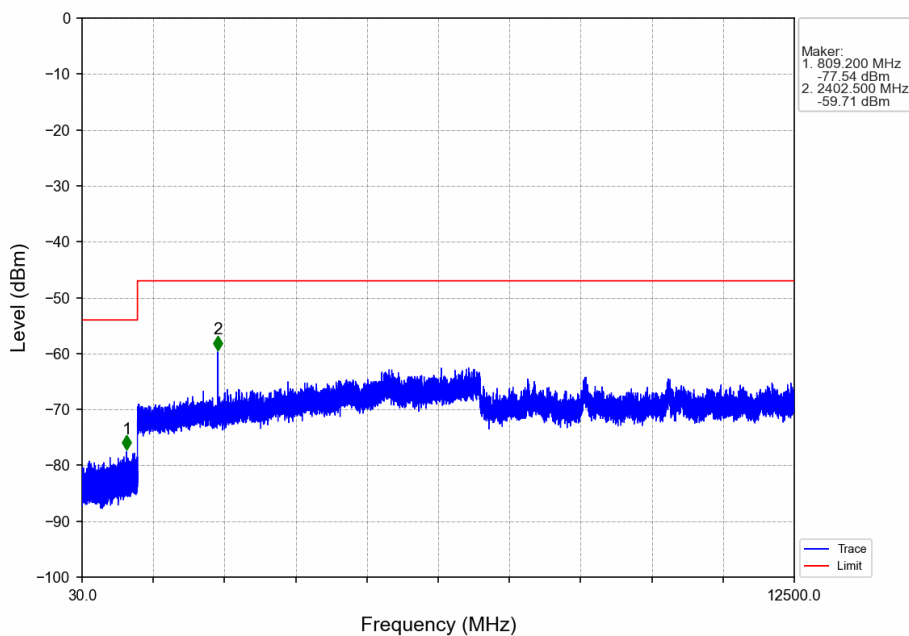


802.11n(HT40)_2422MHz_Ant1 (SISO)_NTNV



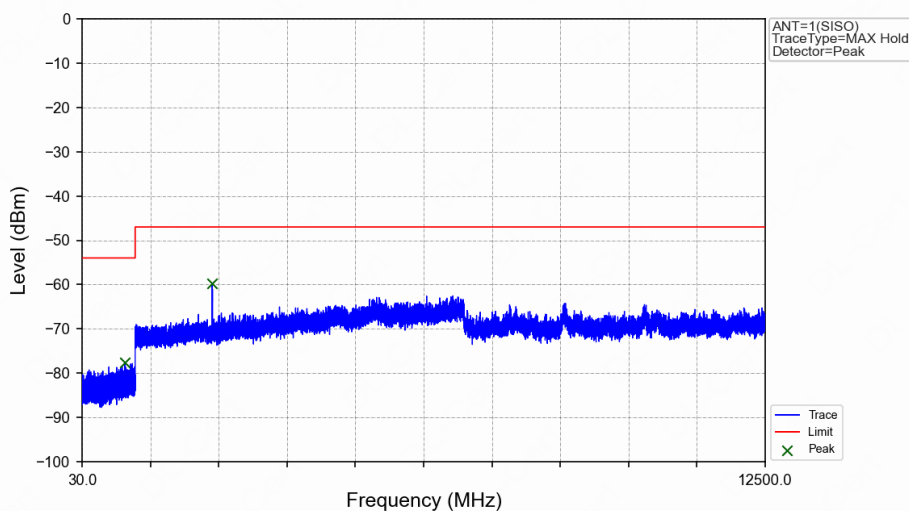
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	899.650	-77.83	/	-54	Pass
1000	12500	1	1	2411.000	-56.17	/	-47	Pass

802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



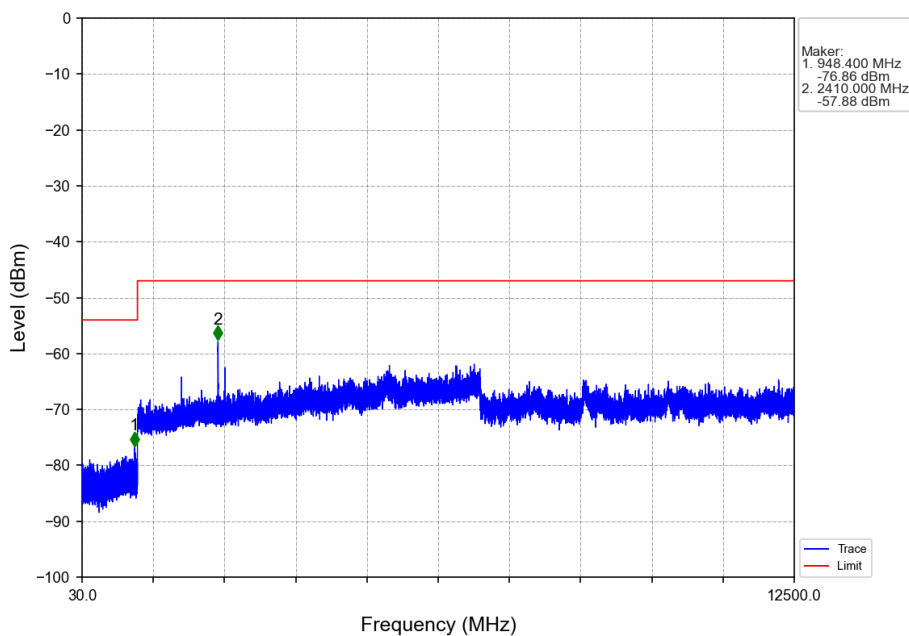


802.11n(HT40)_2442MHz_Ant1 (SISO)_NTNV



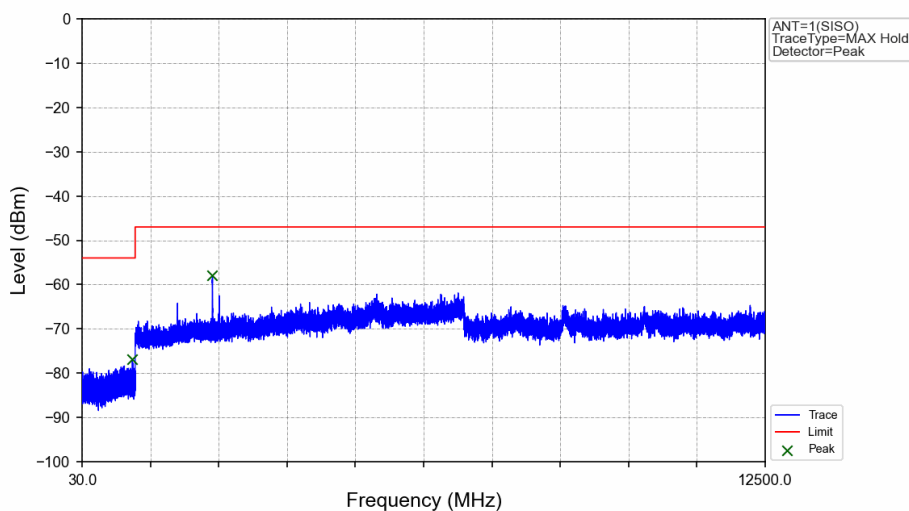
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	809.200	-77.54	/	-54	Pass
1000	12500	1	1	2402.500	-59.71	/	-47	Pass

802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV





802.11n(HT40)_2462MHz_Ant1 (SISO)_NTNV



Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	948.400	-76.86	/	-54	Pass
1000	12500	1	1	2410.000	-57.88	/	-47	Pass



4.6. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

4.6.1. LIMIT

Item	Limits
EIRP Power Density	$\leq 16.91 \text{ dBm/MHz}$ (FH form 2427 - 2470.75 MHz) $\leq 22.14 \text{ dBm/MHz}$ (OFDM, DS from 2400~2483.5MHz) $\leq 22.14 \text{ dBm}$ (Other from 2400~2483.5MHz)

4.6.2. MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

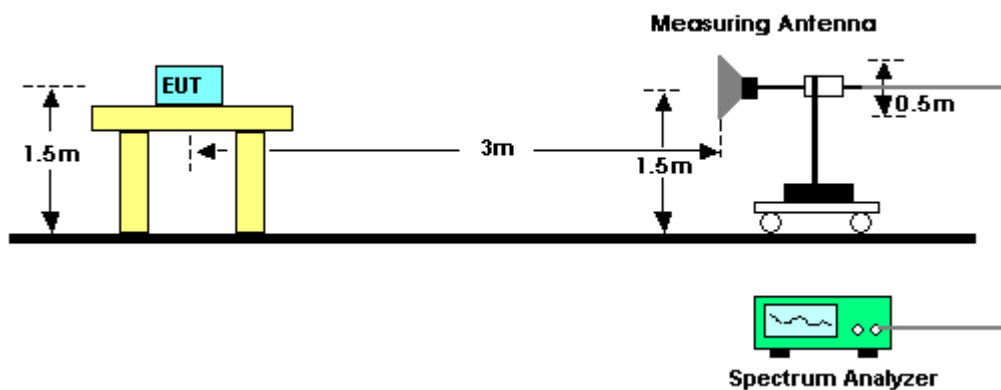
Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.6.3. TEST PROCEDURES

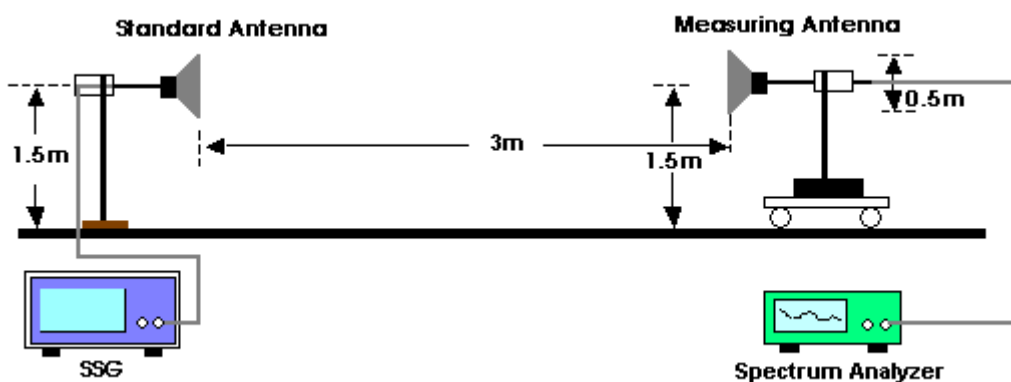
1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within $\pm 50 \text{ cm}$ of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read as "E".
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within $\pm 50 \text{ cm}$ of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at P_t to give the equivalent output level of "E" or calculate P_t with SSG output which gives the nearest of "E" and difference ($\pm 1 \text{ dB}$). Record the P_t .
7. Calculate EIRP by the formula below $\text{EIRP} = G_t - L + P_t$.
 G_t : gain of replacing antenna (dBi)
 L : feeder loss between SSG and replacing antenna
 P_t : Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

4.6.4. TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



4.6.5. TEST DEVIATION

There is no deviation with the original standard.

4.6.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

4.6.7. RESULTS OF TRANSMISSION ANTENNA GAIN

Note: This test item will not be applied to the transmission antenna which has a gain of 2.14 dBi or less.



4.7. TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

4.7.1. LIMIT

Item	Limits
3dB antenna beam width	$360/A$ (If $A < 1$; then $A=1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$

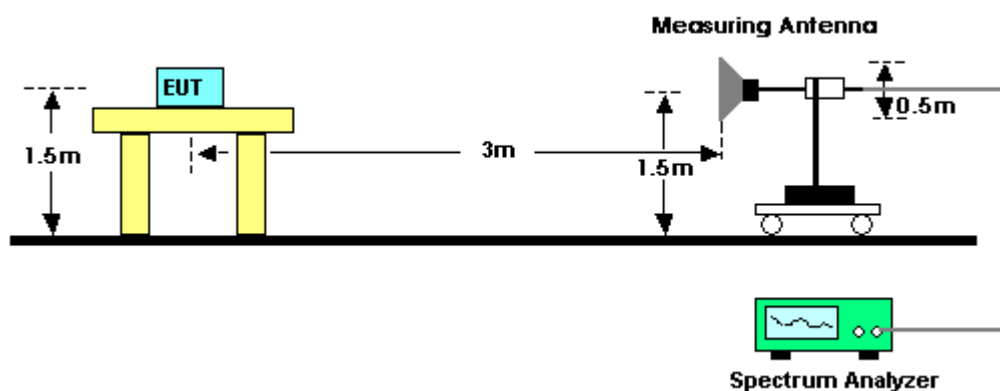
4.7.2. MEASURING INSTRUMENTS AND SETTING

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.7.3. TEST PROCEDURES

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E"
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A=1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or
 $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$

4.7.4. TEST SETUP LAYOUT



4.7.5. TEST DEVIATION

There is no deviation with the original standard.

4.7.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

4.7.7. TEST RESULT OF TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH)

This test item will not be applied to the transmission antenna which has a gain of 2.14 dBi or less.



4.8. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

4.8.1. LIMIT

Item	Limits
Identification code	≥ 48 bits

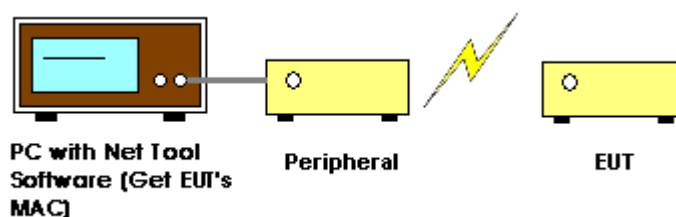
4.8.2. MEASURING ID CODE SOFTWARE

Item	Limits
MAC IP List	MAC Scan

4.8.3. TEST PROCEDURES

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the signals other than predetermined ID codes from the counterpart. d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

4.8.4. TEST SETUP LAYOUT



4.8.5. TEST DEVIATION

There is no deviation with the original standard.

4.8.6. EUT OPERATION DURING TEST

The EUT was programmed to be in normal transmitting mode.

4.8.7. TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILITY

Test result:	CONFORM
MAC address:	00:E0:4E:88:22:56



5.9. CARRIER SENSE CAPABILITY MEASUREMENT

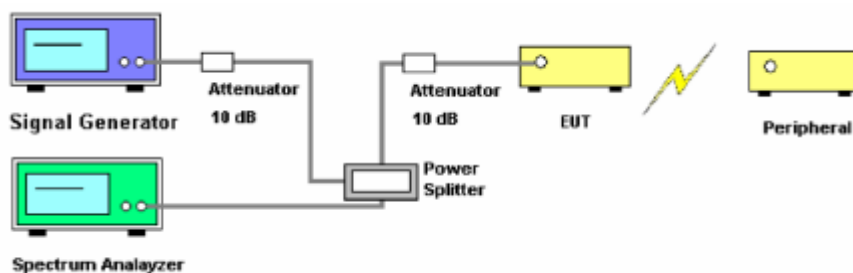
5.9.1. LIMIT

EUT stop RF transmission signal after carrier inject to EUT

5.9.2. TEST PROCEDURES

1. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is (on $22.79+G-20\log(f)\text{dBm}$)(G is the antenna gain, f is the test frequency).
2. turn off the RF signal of the SG.
3. EUT have transmitted the maximum modulation signal and fixed channelize.
4. Setting of SA :RBW/VBW=1MHz/1MHz, Span=50MHz, Sweep time=auto, Sweep mode=continuous, Detect mode=positive peak
5. SG RF signal on.
6. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous transmitted signal.

5.9.3. TEST SETUP LAYOUT



5.9.4. TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILIT

Temperature:	25.6 °C	Relative Humidity:	55.8%	Pressure:	1010mbar
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Mode	Frequency (MHz)	Test Result
802.11n40	2422	Pass
	2442	Pass
	2462	Pass

Note: For this test just evaluate the mode which bandwidth $\geq$ 26MHz.

$P_{in}=22.79+G-20\log(\text{freq_MHz})[\text{dBm}]$

Limit:100mw/m eirp.

Confirmed at -44dBm



4.9. CONSTRUCTION PROTECTION CONFIRMATION METHOD

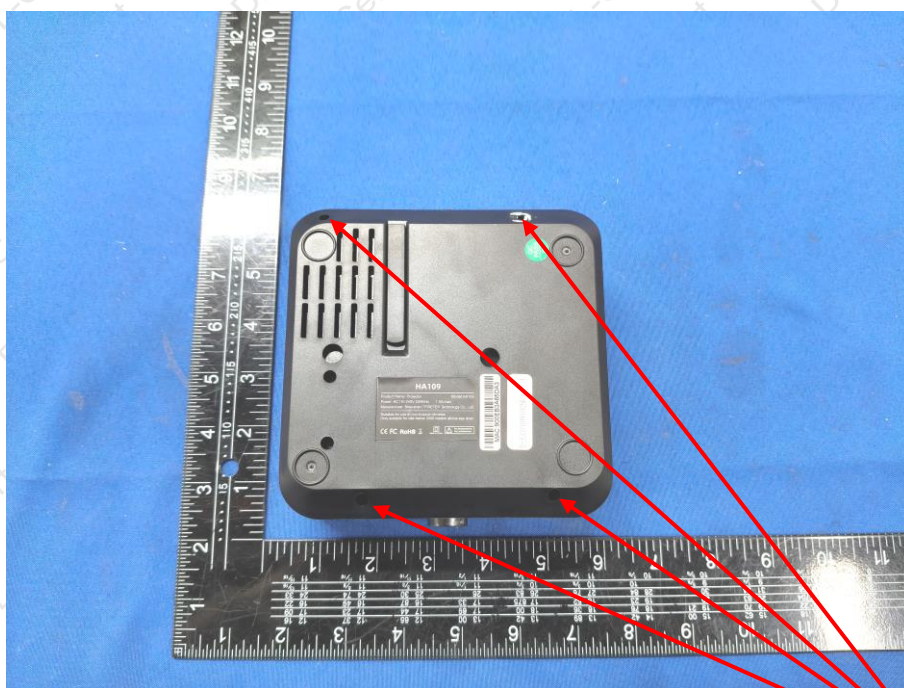
4.9.1. LIMIT

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

4.9.2. CONFIRMATION METHOD

Enclosure:

the product structure is stuck by special screws, If you do not use a special tool, you will not be able to open it. See below the structure:



Special screws is used on red line for cannot be open easily structure.



Model Name: PA3X10

Name: Sokcet Flat Head Cap Screw

Specification: KA1.5*3

Product requirements: PA $\phi 3$ *L10

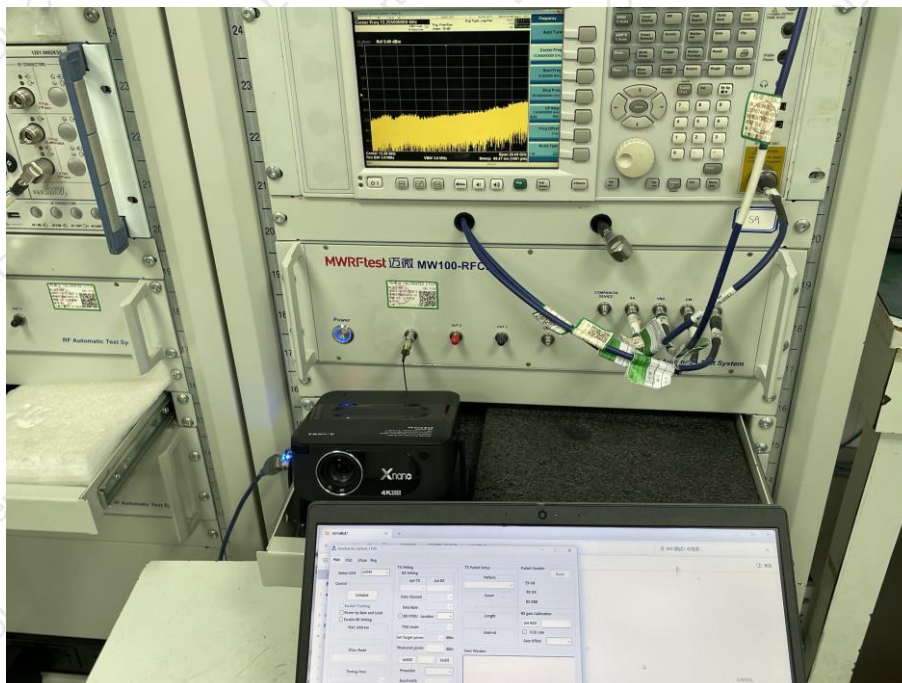
Outer diameter: 2.5mm-3.5mm

Length: 8mm-10mm



APPENDIX A

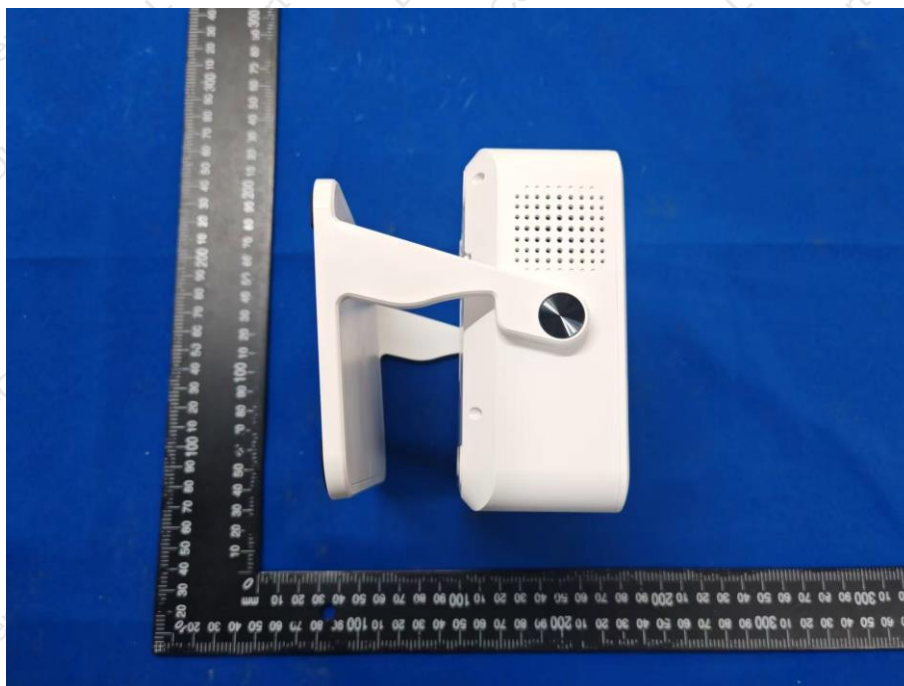
PHOTOGRAPHS OF THE TEST SETUP

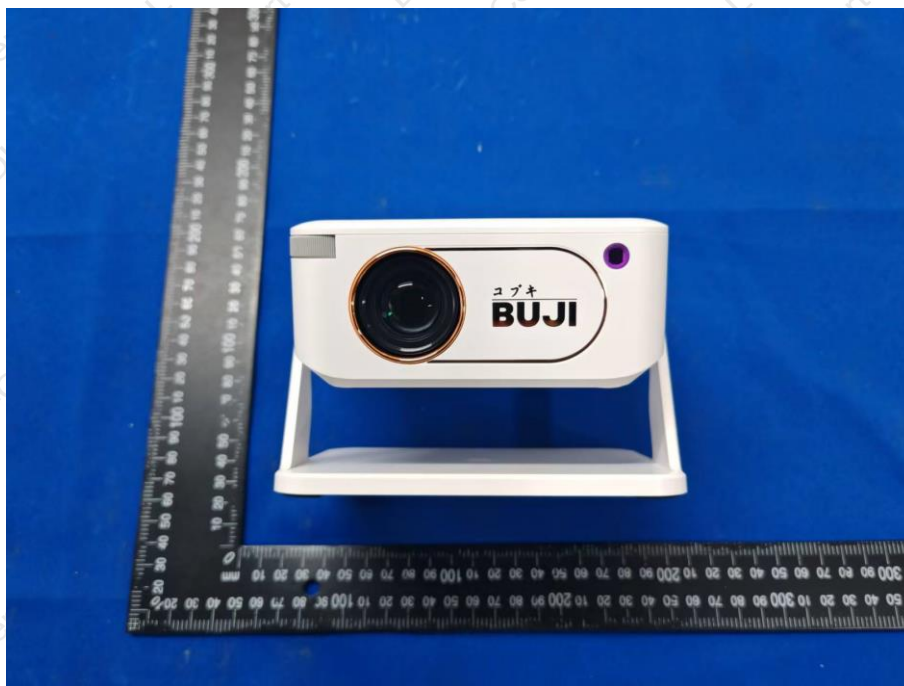


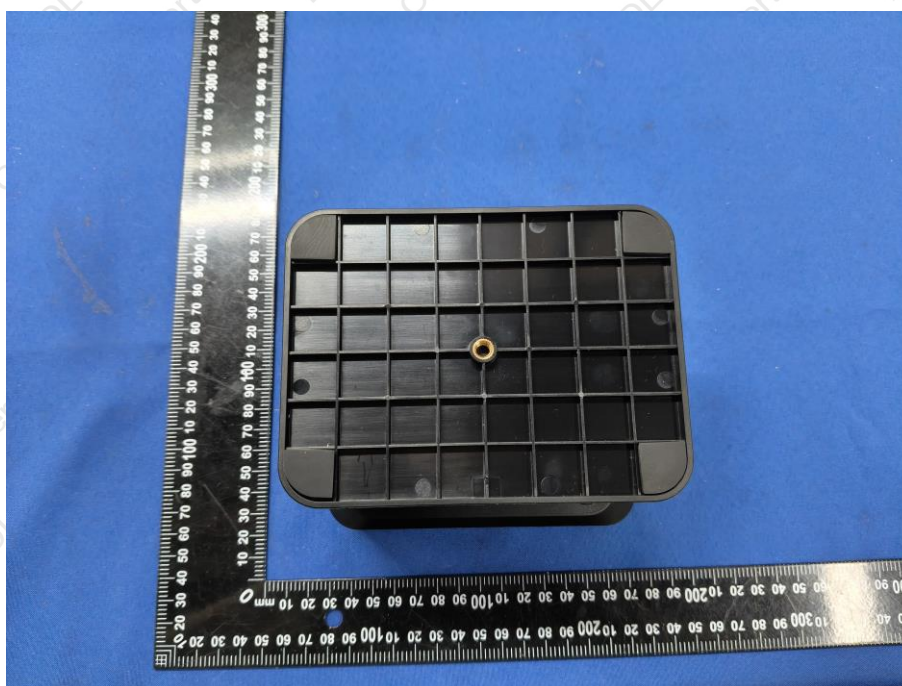
APPENDIX B

PHOTOGRAPHS OF THE EUT



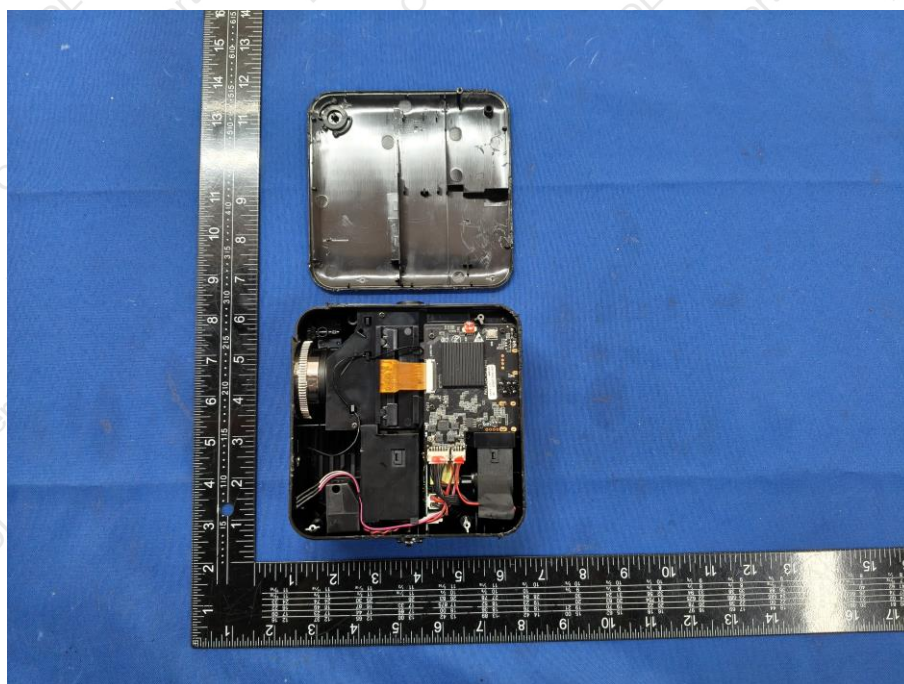


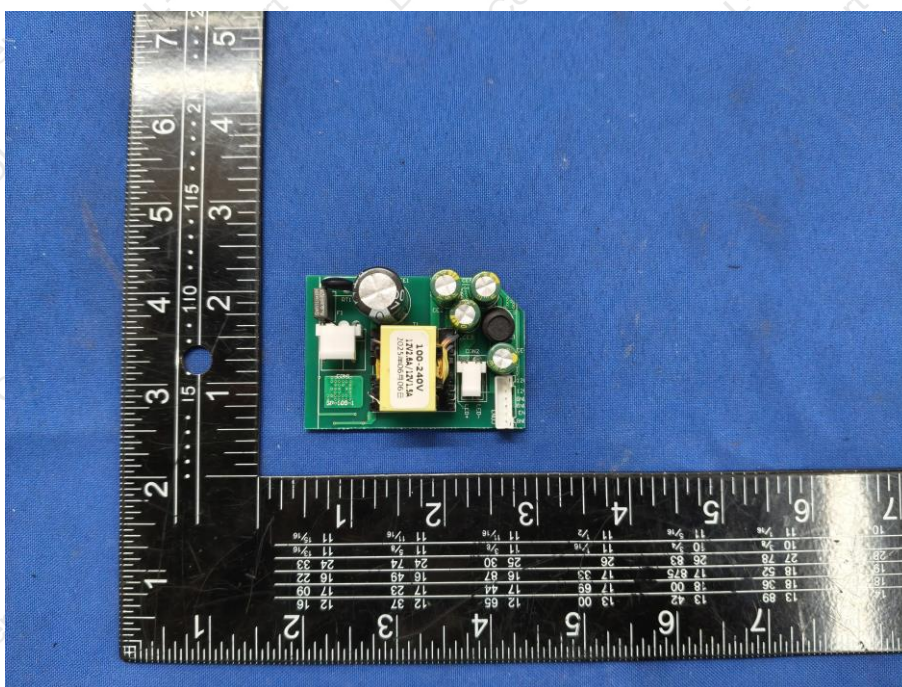
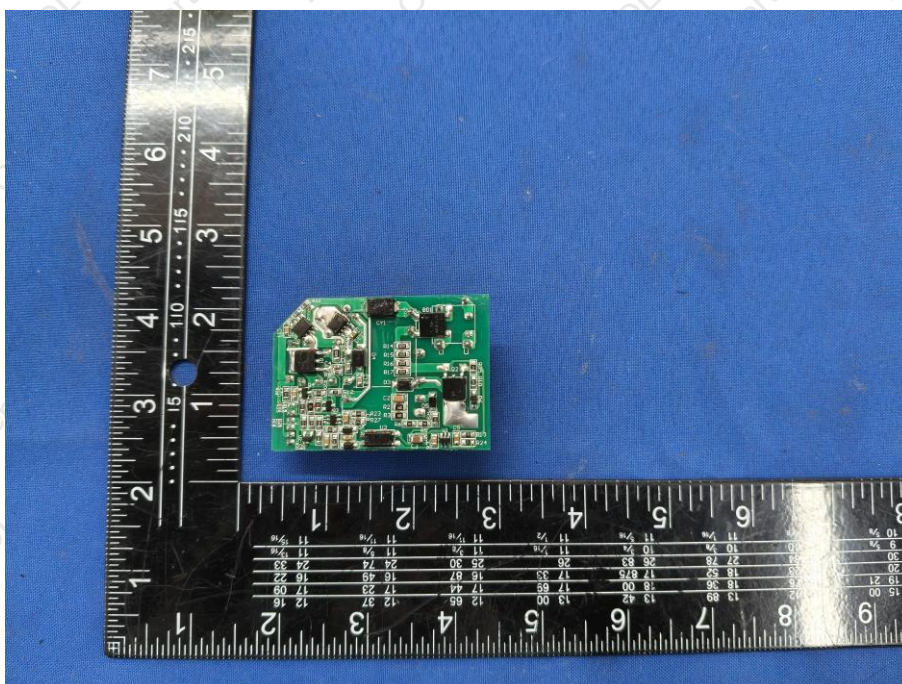


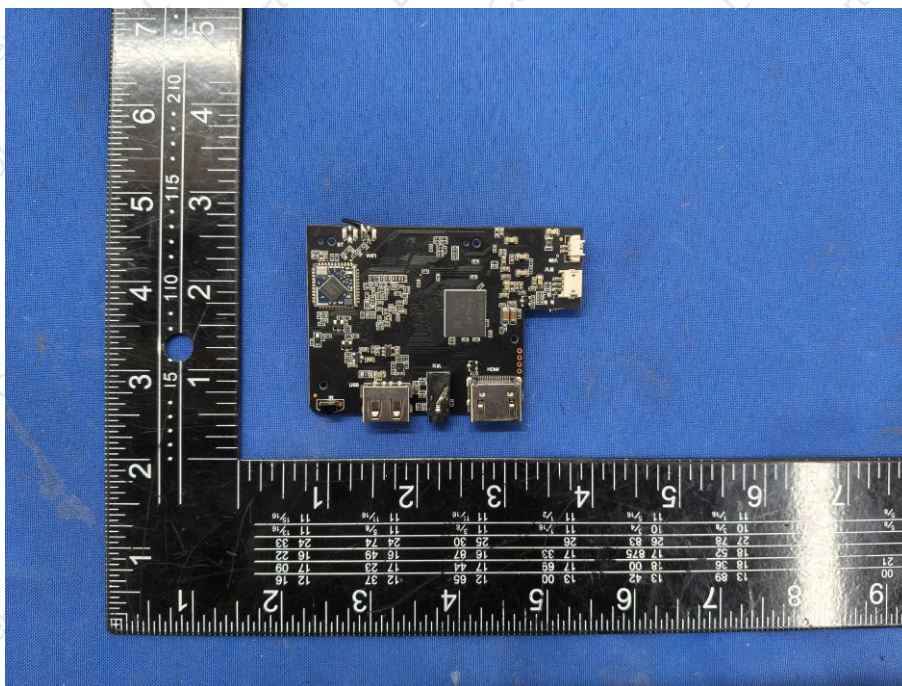
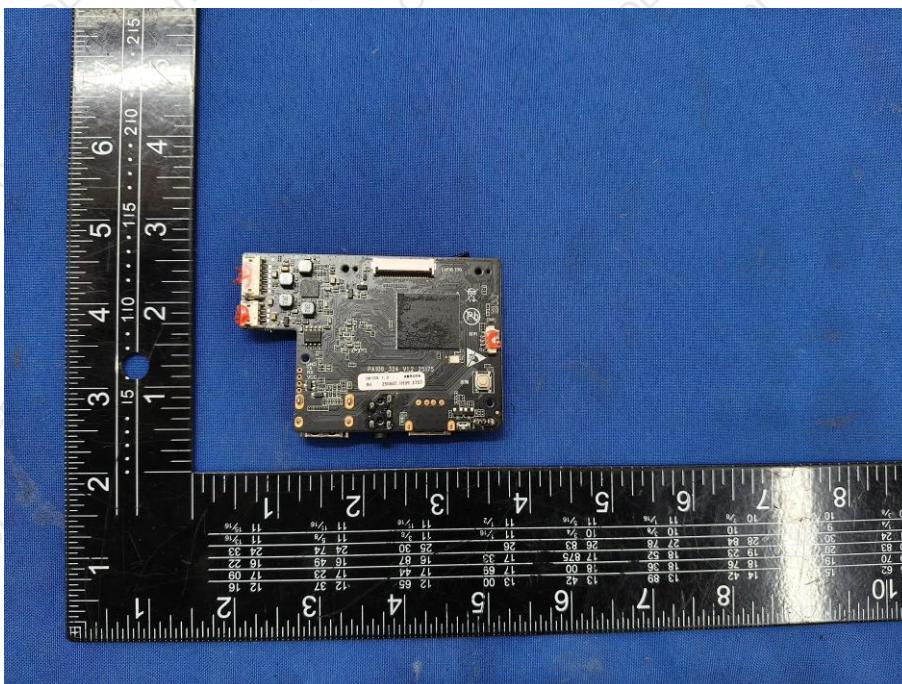


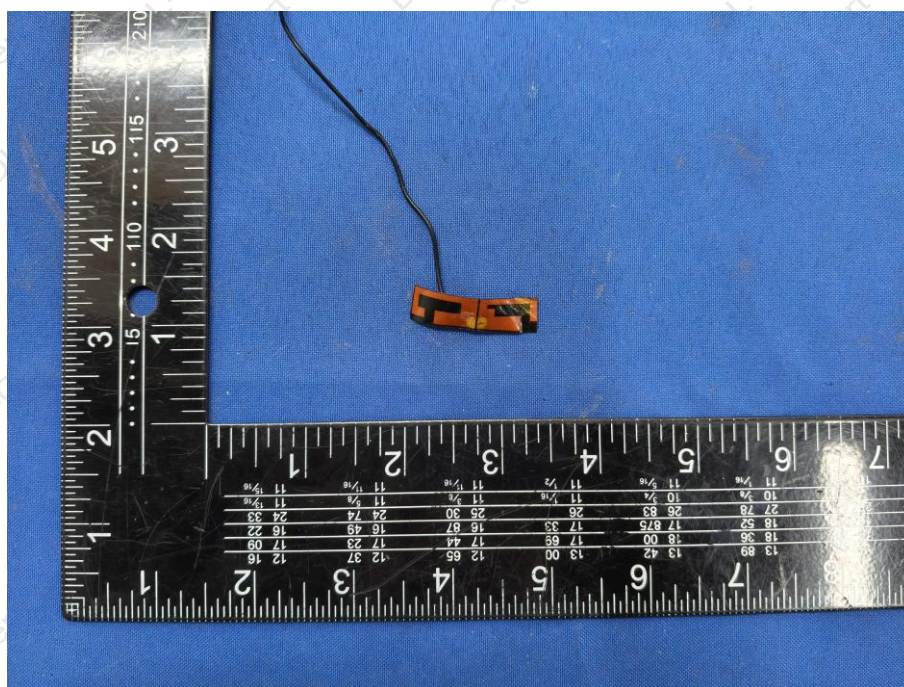
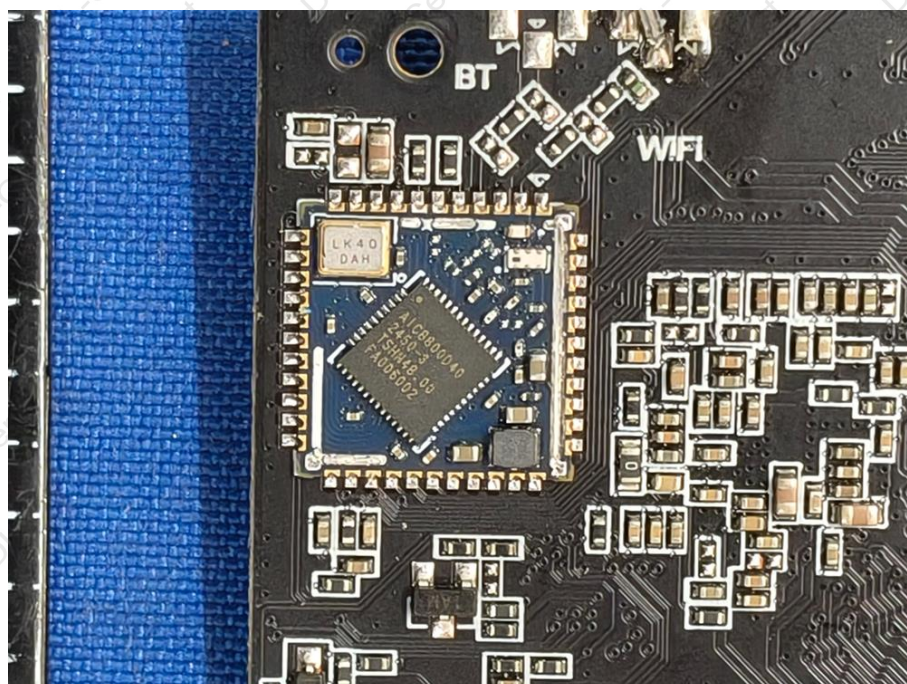












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