FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France

Manufacturer or Supplier:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France
Product:	telematics embedded system
Brand Name:	MUNIC
Model Name:	C4D-4G4USAA_V8+
FCC ID:	A6GC4D-4G4USV8
Date of tests:	Nov. 15, 2021 ~ Dec. 01, 2021

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang	Approved by Luke Lu
Engineer / Mobile Department	Manager / Mobile Department
Simon	Luke Lu
Date: Dec. 02, 2021	Date: Dec. 02, 2021

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21090018RF02	Original release	Dec. 02, 2021

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)		
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**
15.207	Conducted Emission	Compliance
15.205 15.209	Radiated Emissions	Compliance
15.247(d)	Out of band Emission Measurement	Compliance
15.247(a)(2)	6dB bandwidth	Compliance
15.247(b)	Conducted Output power	Compliance
15.247(e)	Power Spectral Density	Compliance
15.203	Antenna Requirement	Compliance

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	telematics embedded system
BRAND NAME	MUNIC
MODEL NAME	C4D-4G4USAA_V8+
NOMINAL VOLTAGE	DC13.7V
MODULATION	DSSS, OFDM, GFSK
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n20: up to 65 Mbps 802.11n40: up to 135 Mbps BT_LE: 1 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20)/n(HT40) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 288.40mW (Maximum) BT-LE: 1.01mW (Maximum)
ANTENNA TYPE	Fixed Internal Antenna with 2.7dBi gain
HW VERSION	HW.01
SW VERSION	SW.01
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. C4D-4G4USAA_V8+ have ESIM and SIM two modes, respectively corresponding to MFF2 SIM and 4FF SIM detail describe in PED , pre-scan two models. worst case mode MFF2 SIM is reflected in this report

3. The EUT incorporates a SISO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n (20MHz)	1TX /1RX
802.11n (40MHz)	1TX /1RX
BT_LE(1MHz)	1TX /1RX

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery 1	Howell	Li-polymer 552535H	Capacity：Li-ion, 450mAh
Battery 2	Akkutronics	382530-PTL	Capacity：Li-ion, 450mAh

2.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

40 channels are provided for BT-LE (GFSK):

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.
The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11g	1 to 11	11	OFDM	6M
BT-LE	0 to 39	39	GFSK	1.0

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1

POWER LINE CONDUCTED EMISSION TEST

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11g	1 to 11	11	OFDM	6M

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	1.0
802.11g	1 to 11	1, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0, 39	GFSK	1

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC 13.7V	Star Le
RE≥1G	23deg. C, 70%RH	DC 13.7V	Star Le
PLC	25deg. C, 52%RH	DC 13.7V	Chase Zhou
APCM	25deg. C, 60%RH	DC 13.7V	Chase Zhou

2.3 Duty Cycle of Test Signal

Please Refer to Appendix A Of this test report.

WORST-CASE DATA:

Measured Duty Cycle		
Mode		Duty Cycle [%]
		ANT1
WIFI 2.4GHz	11B	98.99
	11G	92.02
	11N20	91.49
	11N40	87.70
BT LE	BT4.0	64.96

Note:

Duty cycle of test signal is < 98%, duty factor shall be considered.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, Section 15.247

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2013

Note：

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC Source	Kikusui/JP	PMX18-5A	N/A	N/A
2	DC Cable	kistler	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m
3	AC Line: Unshielded, Detachable 1.5m

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 a CLASS B)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 b CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

NOTE: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors

and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 03,21	Mar. 02, 22
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 25,21	Feb. 24, 22

NOTE: 1. The test was performed in CE shielded room.

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3.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

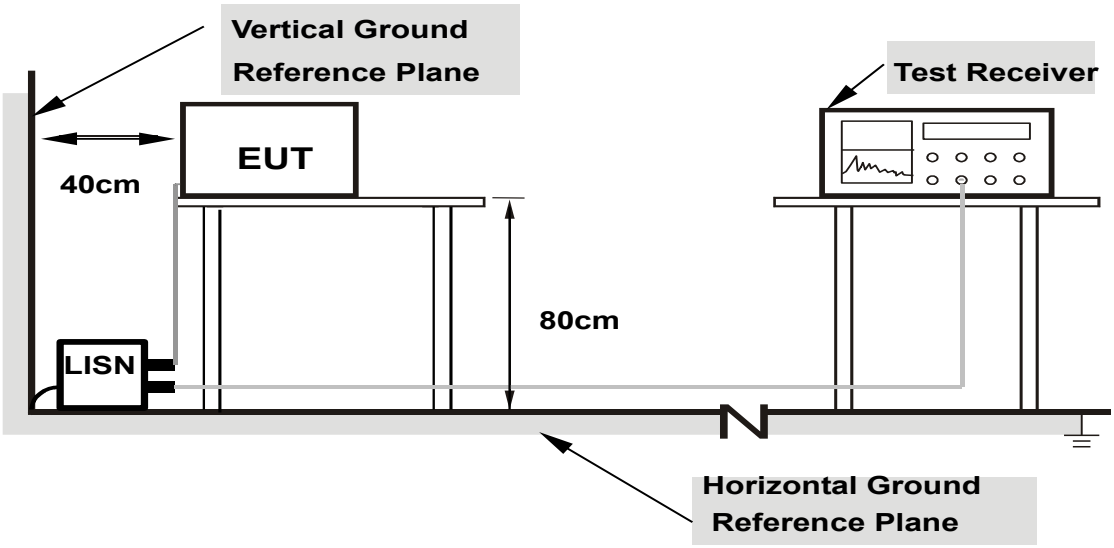
c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

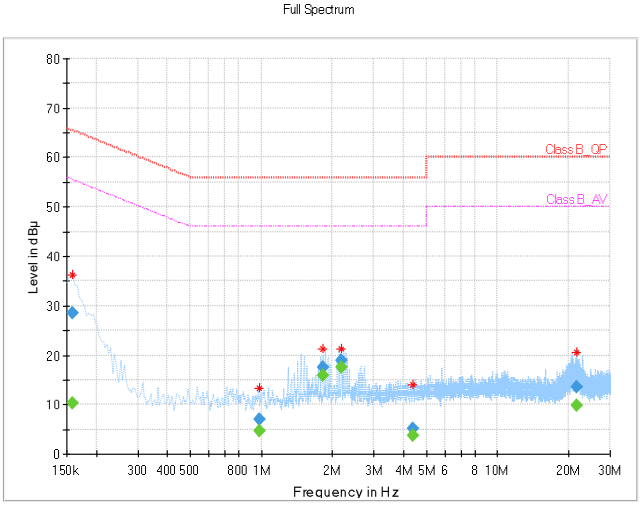
a. Turned on the power and connected of all equipment.
b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.

3.1.7 TEST RESULTS

TEST VOLTAGE	Input 120 Vac, 60 Hz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	**TESTED BY**	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	---	10.20	55.57	45.37	L1	ON	9.7
0.158000	28.62	---	65.57	36.95	L1	ON	9.7
0.980000	---	4.66	46.00	41.34	L1	ON	9.7
0.980000	6.99	---	56.00	49.01	L1	ON	9.7
1.828000	---	15.96	46.00	30.04	L1	ON	9.7
1.828000	17.44	---	56.00	38.56	L1	ON	9.7
2.184000	---	17.46	46.00	28.54	L1	ON	9.7
2.184000	18.88	---	56.00	37.12	L1	ON	9.7
4.372000	---	3.80	46.00	42.20	L1	ON	9.7
4.372000	5.16	---	56.00	50.84	L1	ON	9.7
21.660000	---	9.81	50.00	40.19	L1	ON	9.8
21.660000	13.59	---	60.00	46.41	L1	ON	9.8

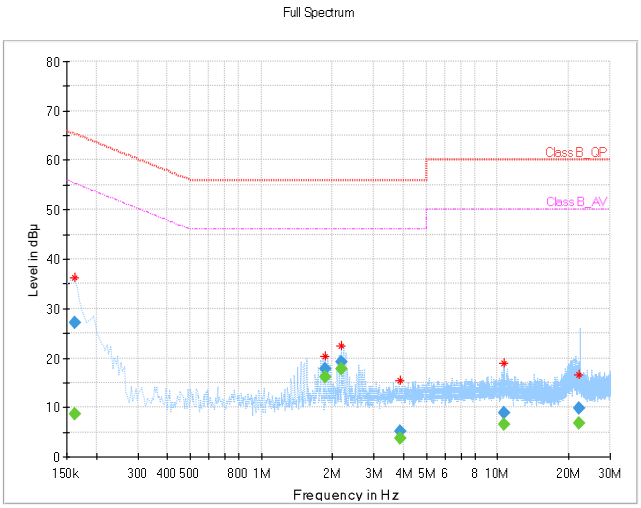
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



TEST VOLTAGE	Input 120 Vac, 60 Hz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	**TESTED BY**	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	---	8.61	55.36	46.75	N	ON	9.7
0.162000	27.13	---	65.36	38.23	N	ON	9.7
1.872000	---	16.26	46.00	29.74	N	ON	9.8
1.872000	17.72	---	56.00	38.28	N	ON	9.8
2.184000	---	17.82	46.00	28.18	N	ON	9.8
2.184000	19.30	---	56.00	36.70	N	ON	9.8
3.880000	---	3.85	46.00	42.15	N	ON	9.8
3.880000	5.16	---	56.00	50.84	N	ON	9.8
10.608000	---	6.49	50.00	43.51	N	ON	9.8
10.608000	8.87	---	60.00	51.13	N	ON	9.8
22.236000	---	6.89	50.00	43.11	N	ON	9.9
22.236000	9.87	---	60.00	50.13	N	ON	9.9

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 02, 21	Apr. 01, 22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 27,21	Apr. 26,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 30,21	Apr. 29,22
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 25,21	Aug. 24,22

NOTE: 1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 is a broadband antenna, and its 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. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

Note:

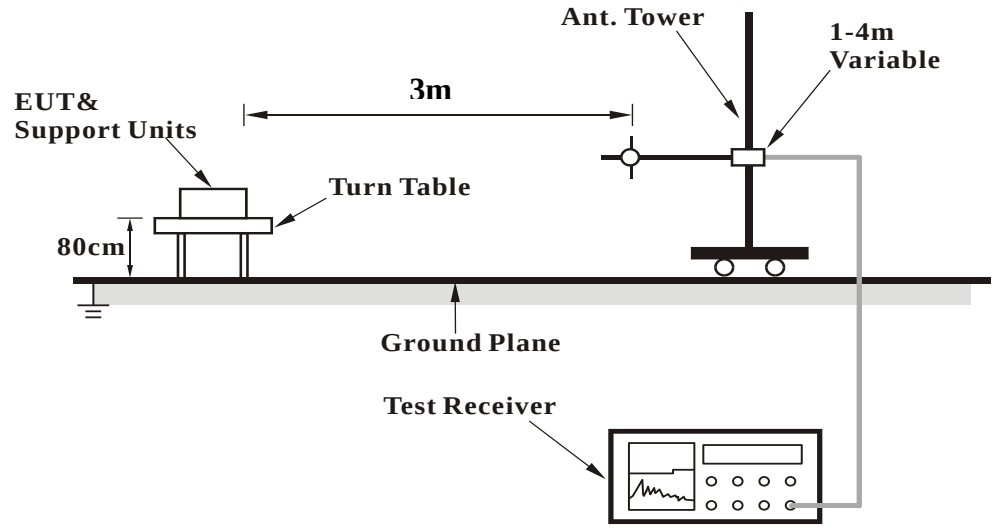
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 DEVIATION FROM TEST STANDARD

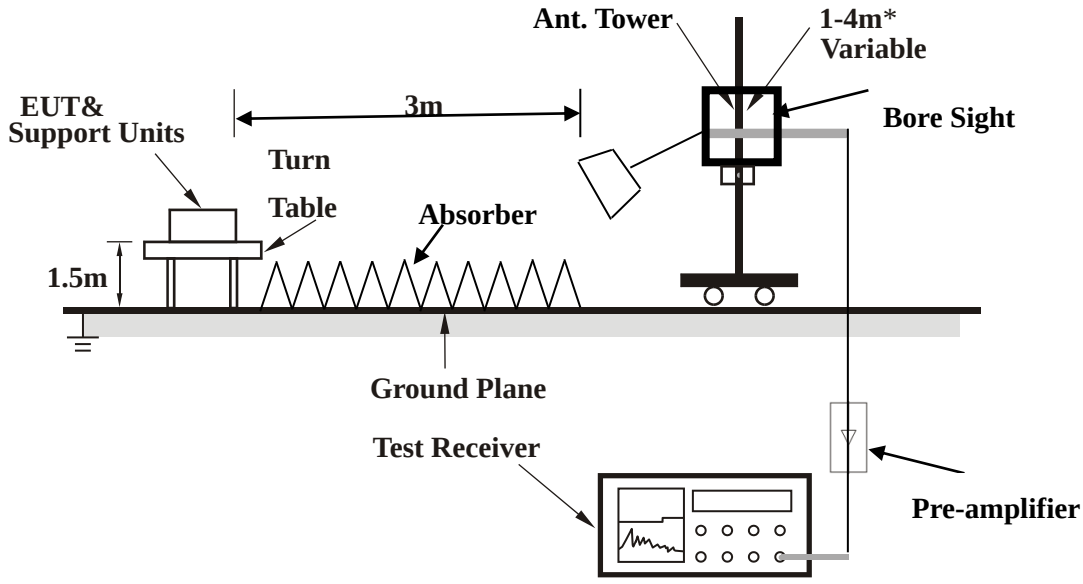
No deviation

3.2.5 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.6 EUT OPERATING CONDITIONS

a. Set the EUT under full load condition and placed them on a testing table.

b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

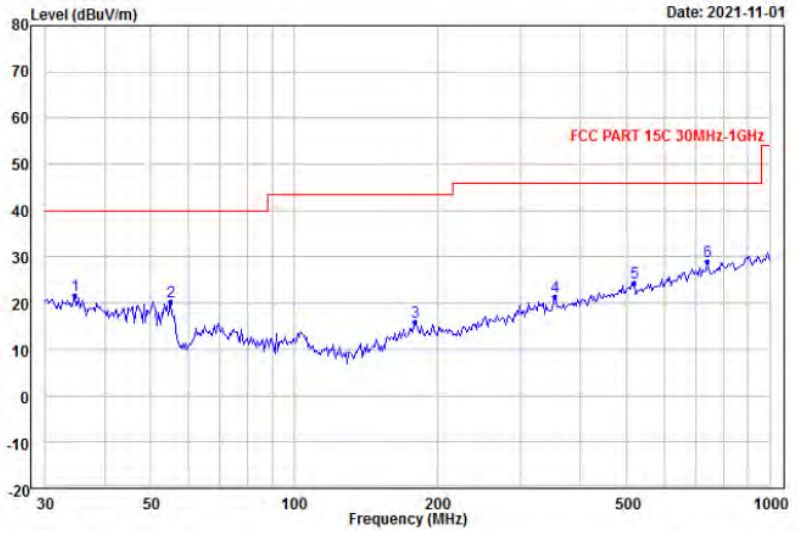
802.11g

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
34.527	21.59	26.57	40	-18.41	23.09	0.74	28.81	100	285	QP
54.901	20.40	37.43	40	-19.60	10.92	0.82	28.77	100	187	QP
180.030	15.96	26.12	43.5	-27.54	16.80	1.35	28.31	100	70	QP
353.447	21.33	26.44	46	-24.67	21.44	1.78	28.33	100	310	QP
520.208	24.44	27.07	46	-21.56	24.60	2.10	29.33	100	351	QP
739.214	28.97	27.04	46	-17.03	28.78	2.45	29.30	100	1	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.

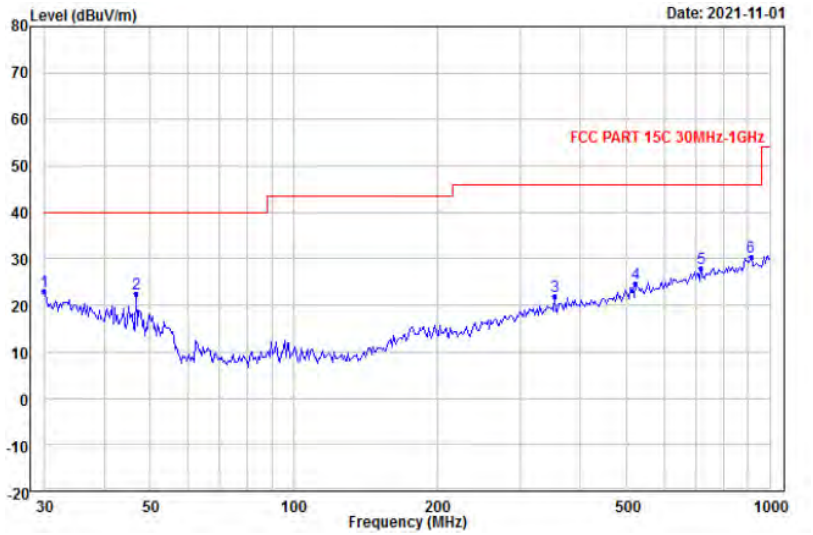


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
30.000	23.14	2744	40.00	-16.86	23.90	0.62	28.82	200	134	QP
46.708	22.47	34.75	40.00	-17.53	15.69	0.82	28.79	200	251	QP
353.447	22.07	27.18	46.00	-23.93	21.44	1.78	28.33	200	216	QP
523.876	24.75	27.30	46.00	-21.25	24.68	2.11	29.34	200	85	QP
718.825	27.88	26.38	46.00	-18.12	28.43	2.41	29.34	200	2	QP
912.695	30.37	26.00	46.00	-15.63	30.39	2.83	28.85	200	131	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.



ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

802.11b:

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2390	45.68	54.46	74	-28.32	32.25	6.90	48.03	143	200	Peak
2390	32.00	40.78	54	-22.00	32.25	6.90	48.03	143	200	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2390	46.13	55.34	74	-27.87	31.92	6.90	48.03	100	158	Peak
2390	31.58	40.79	54	-22.42	31.92	6.90	48.03	100	158	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	40.40	43.22	74	-33.60	34.17	9.58	46.57	143	200	Peak
7311	44.22	42.96	74	-29.78	35.90	11.55	46.19	143	200	Peak
4874	27.82	30.64	54	-26.18	34.17	9.58	46.57	143	200	Average
7311	32.77	31.51	54	-21.23	35.90	11.55	46.19	143	200	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	42.29	44.93	74	-31.71	34.35	9.58	46.57	100	158	Peak
7311	44.09	42.73	74	-29.91	36.00	11.55	46.19	100	158	Peak
4874	28.90	31.54	54	-25.10	34.35	9.58	46.57	100	158	Average
7311	33.09	31.73	54	-20.91	36.00	11.55	46.19	100	158	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	48.11	56.69	74	-25.89	32.48	7.03	48.09	143	200	Peak
2483.5	34.78	43.36	54	-19.22	32.48	7.03	48.09	143	200	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	47.36	56.35	74	-26.64	32.07	7.03	48.09	100	158	Peak
2483.5	33.00	41.99	54	-21.00	32.07	7.03	48.09	100	158	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.25	60.03	74	-22.75	32.25	6.90	48.03	173	190	Peak
2390	33.95	42.73	54	-20.05	32.25	6.90	48.03	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	54.38	63.59	74	-19.62	31.92	6.90	48.03	100	173	Peak
2390	36.83	46.04	54	-17.17	31.92	6.90	48.03	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	41.23	44.05	74	-32.77	34.17	9.58	46.57	173	190	Peak
7311	42.93	41.67	74	-31.07	35.90	11.55	46.19	173	190	Peak
4874	29.51	32.33	54	-24.49	34.17	9.58	46.57	173	190	Average
7311	32.72	31.46	54	-21.28	35.90	11.55	46.19	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	40.65	43.29	74	-33.35	34.35	9.58	46.57	100	173	Peak
7311	44.60	43.24	74	-29.40	36.00	11.55	46.19	100	173	Peak
4874	28.75	31.39	54	-25.25	34.35	9.58	46.57	100	173	Average
7311	33.03	31.67	54	-20.97	36.00	11.55	46.19	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.

802.11g

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	67.01	75.59	74	-6.99	32.48	7.03	48.09	173	190	Peak
2483.5	49.52	58.10	54	-4.48	32.48	7.03	48.09	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	64.18	73.17	74	-9.82	32.07	7.03	48.09	100	173	Peak
2483.5	47.19	56.18	54	-6.81	32.07	7.03	48.09	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.

802.11n (20MHz)

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2390	50.69	59.47	74	-23.31	32.25	6.90	48.03	173	190	Peak
2390	34.44	43.22	54	-19.56	32.25	6.90	48.03	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2390	50.39	59.60	74	-23.61	31.92	6.90	48.03	100	173	Peak
2390	34.50	43.71	54	-19.50	31.92	6.90	48.03	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

802.11n (20MHz)

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	39.87	42.69	74	-34.13	34.17	9.58	46.57	173	190	Peak
7311	43.16	41.90	74	-30.84	35.90	11.55	46.19	173	190	Peak
4874	27.89	30.71	54	-26.11	34.17	9.58	46.57	173	190	Average
7311	32.04	30.78	54	-21.96	35.90	11.55	46.19	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	39.58	42.22	74	-34.42	34.35	9.58	46.57	100	173	Peak
7311	43.66	42.30	74	-30.34	36.00	11.55	46.19	100	173	Peak
4874	29.05	31.69	54	-24.95	34.35	9.58	46.57	100	173	Average
7311	32.93	31.57	54	-21.07	36.00	11.55	46.19	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.

802.11n (20MHz)

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	59.13	67.71	74	-14.87	32.48	7.03	48.09	173	190	Peak
2483.5	43.23	51.81	54	-10.77	32.48	7.03	48.09	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	57.20	66.19	74	-16.80	32.07	7.03	48.09	100	173	Peak
2483.5	41.67	50.66	54	-12.33	32.07	7.03	48.09	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	60.61	69.36	74	-13.39	32.35	690	48.03	173	190	Peak
2390	38.18	46.96	54	-15.82	32.35	690	48.03	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	60.68	69.89	74	-13.32	31.92	6.90	48.03	100	173	Peak
2390	42.77	51.98	54	-11.23	31.92	6.90	48.03	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2422MHz: Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	39.80	42.62	74	-34.20	34.17	9.58	46.57	173	190	Peak
7311	43.76	42.50	74	-30.24	35.90	11.55	46.19	173	190	Peak
4874	28.66	31.48	54	-25.34	34.17	9.58	46.57	173	190	Average
7311	32.83	31.57	54	-21.17	35.90	11.55	46.19	173	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4874	39.45	42.09	74	-34.55	34.35	9.58	46.57	100	173	Peak
7311	43.75	42.39	74	-30.25	36.00	11.55	46.19	100	173	Peak
4874	27.98	30.62	54	-26.02	34.35	9.58	46.57	100	173	Average
7311	31.93	30.57	54	-22.07	36.00	11.55	46.19	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 9	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2483.5	67.00	75.58	74	-7.00	32.48	7.03	48.09	143	190	Peak
2483.5	52.38	60.96	54	-1.62	32.48	7.03	48.09	143	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2483.5	66.33	75.32	74	-7.67	32.07	7.03	48.09	100	173	Peak
2483.5	51.47	60.46	54	-2.53	32.07	7.03	48.09	100	173	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

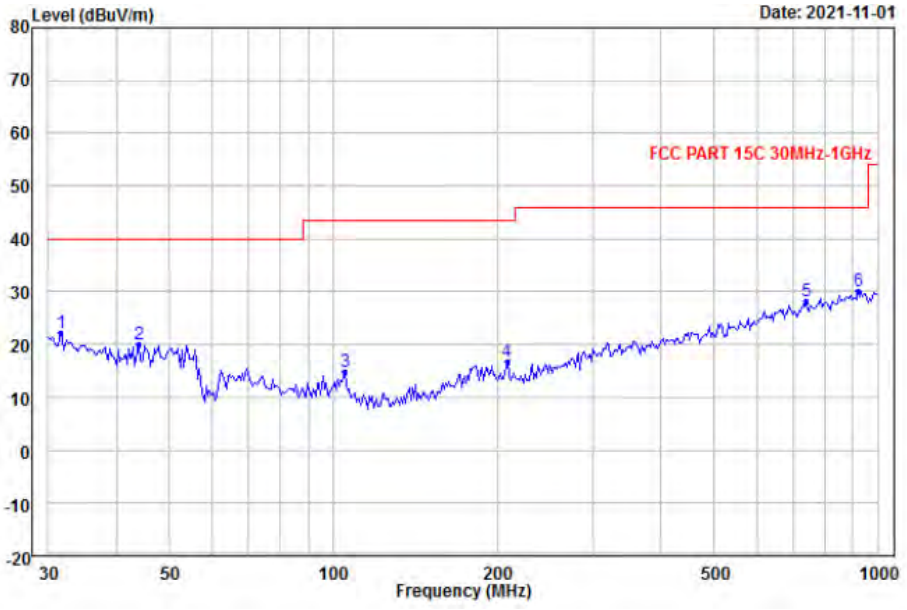
BT-LE _1M

CHANNEL	TX Channel 39	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
31.513	22.18	26.98	40.00	-17.82	23.35	0.66	28.81	300	360	QP
43.845	20.16	30.68	40.00	-19.84	17.42	0.85	28.79	300	360	QP
104.798	14.88	30.73	43.50	-28.62	11.72	1.07	28.64	300	360	QP
208.658	16.89	27.74	43.50	-26.61	15.90	1.45	28.20	300	360	QP
739.214	28.33	26.40	46.00	-17.67	28.78	2.45	29.30	300	360	QP
919.132	30.08	25.84	46.00	-15.92	30.22	2.86	28.84	300	360	QP

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

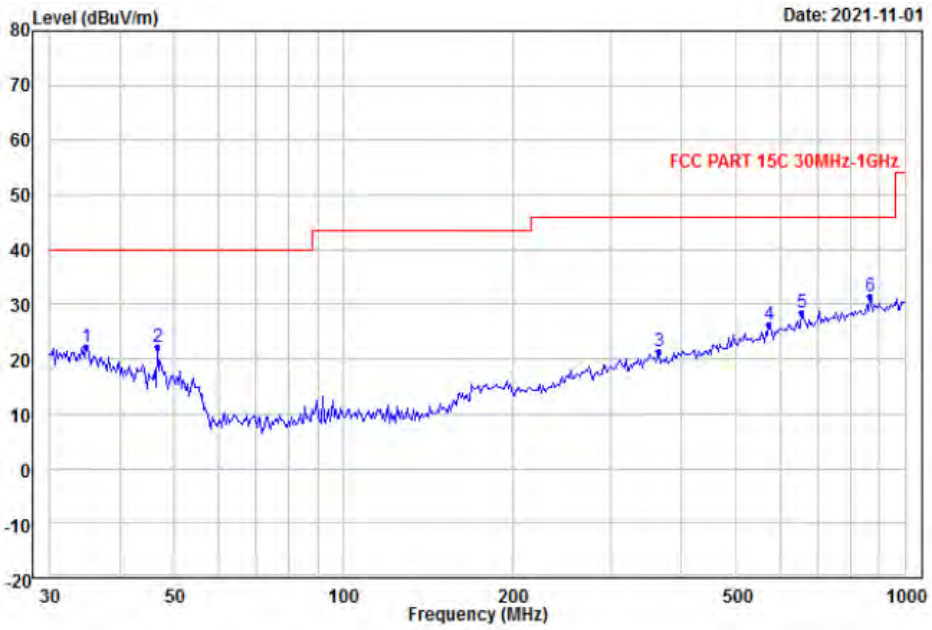


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
34.770	22.26	27.34	40.00	-17.74	22.99	0.74	28.81	200	0	QP
46.708	22.21	34.49	40.00	-17.79	15.69	0.82	29.79	200	0	QP
363.523	21.50	26.72	46.00	-24.50	21.37	1.81	28.40	200	0	QP
573.988	26.25	27.72	46.00	-19.75	25.72	2.22.	29.41	200	0	QP
655.977	28.56	28.22	46.00	-17.44	27.42	2.33	29.41	200	0	QP
868.886	31.44	27.93	46.00	-14.56	29.78	2.71	28.98	200	0	QP

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



ABOVE 1GHz TEST DATA

Note: For higher frequency, the emission is too low to be detected.

BT-LE _1M

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2390	42.83	51.61	74	-31.17	32.35	6.90	48.03	100	195	Peak
2390	28.30	37.08	54	-25.70	32.35	6.90	48.03	100	195	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2390	42.76	51.97	74	-31.24	31.92	6.90	48.03	100	175	Peak
2390	30.33	39.54	54	-23.67	31.92	6.90	48.03	100	175	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2402MHz: Fundamental frequency.

BT-LE _1M

CHANNEL	TX Channel 19	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
4880	38.58	41.40	74	-35.42	34.18	9.58	46.58	100	195	Peak
7320	42.55	41.29	74	-31.45	35.90	11.55	46.19	100	195	Peak
4880	26.44	29.26	54	-27.56	34.18	9.58	46.58	100	195	Average
7320	31.50	30.24	54	-22.50	35.90	11.55	46.19	100	195	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
4880	38.53	41.17	74	-35.47	34.36	9.58	46.58	100	175	Peak
7320	43.15	41.79	74	-30.85	36.00	11.55	46.19	100	175	Peak
4880	26.48	29.12	54	-27.52	34.36	9.58	46.58	100	175	Average
7320	31.51	30.15	54	-22.49	36.00	11.55	46.19	100	175	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2440MHz: Fundamental frequency.

BT-LE _1M

CHANNEL	TX Channel 39	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2483.5	46.21	54.79	74	-27.79	32.48	7.03	48.09	100	195	Peak
2483.5	39.36	47.94	54	-14.64	32.48	7.03	48.09	100	195	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
2483.5	45.06	54.05	74	-28.94	32.07	7.03	48.09	100	175	Peak
2483.5	37.38	46.37	54	-16.62	32.07	7.03	48.09	100	175	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2480MHz: Fundamental frequency.

3.3 6 dB BANDWIDTH MEASUREMENT

3.3.2 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 25,21	Feb. 24,22
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 25,21	Feb. 24,22
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 25,21	Feb. 24,22

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

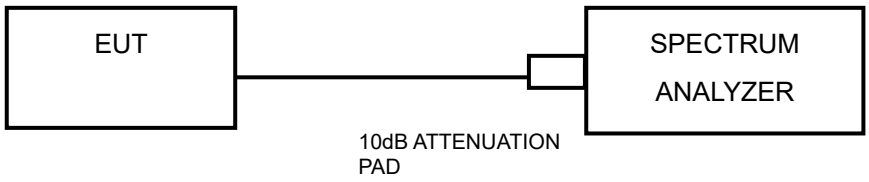
3.3.4 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 TEST SETUP



3.3.7 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.3.8 TEST RESULTS

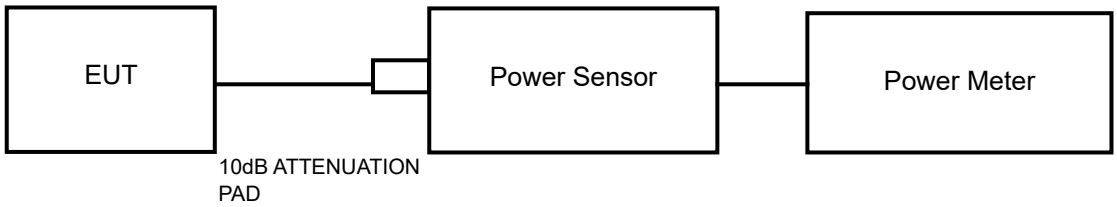
Please Refer to Appendix A Of this test report.

3.4 CONDUCTED OUTPUT POWER

3.4.2 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

3.4.3 TEST SETUP



3.4.4 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.4.5 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

3.4.6 DEVIATION FROM TEST STANDARD

No deviation.

3.4.7 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.4.8 TEST RESULTS

3.4.9 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix A Of this test report.

3.4.10 Average Output Power (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

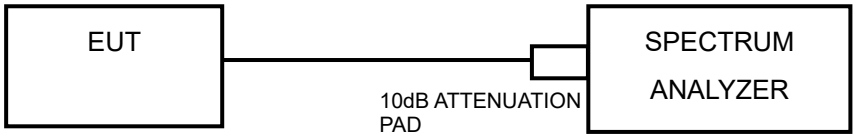
Please Refer to Appendix A Of this test report.

3.5 POWER SPECTRAL DENSITY MEASUREMENT

3.5.2 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.3 TEST SETUP



3.5.4 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.5.5 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW ≥ 3 x RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.5.6 DEVIATION FROM TEST STANDARD

No deviation.

3.5.7 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.5.8 TEST RESULTS

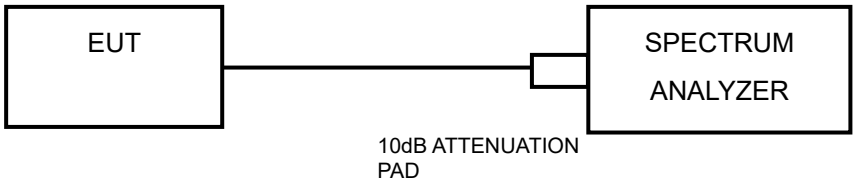
Please Refer to Appendix A Of this test report.

3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.2 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.3 TEST SETUP



3.6.4 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.6.5 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

3.6.6 DEVIATION FROM TEST STANDARD

No deviation.

3.6.7 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.6.8 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix A Of this test report.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

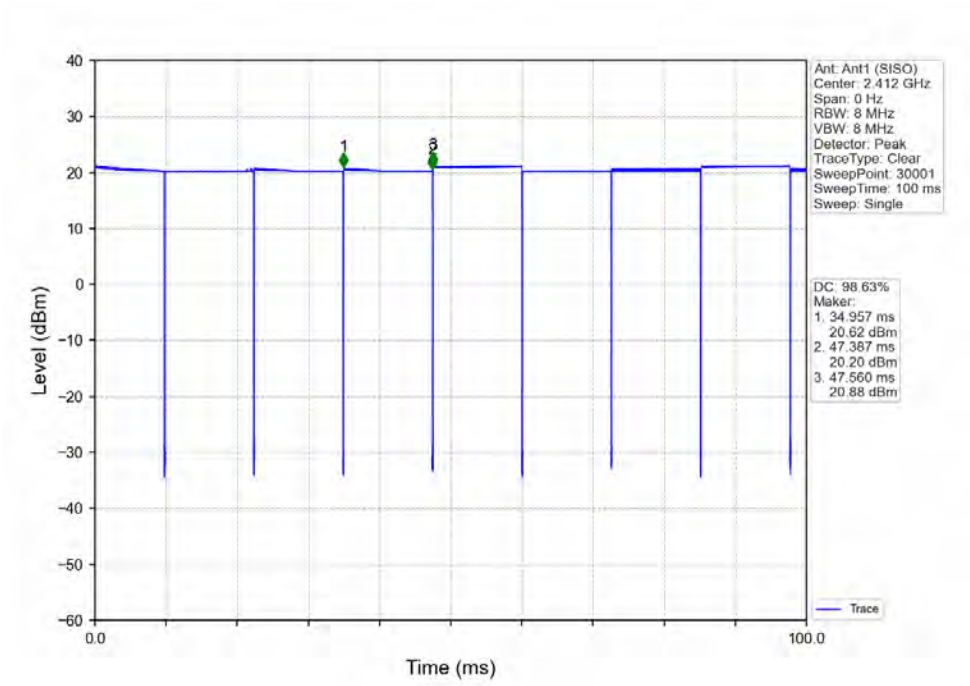
APPENDIX A: 2.4G WLAN

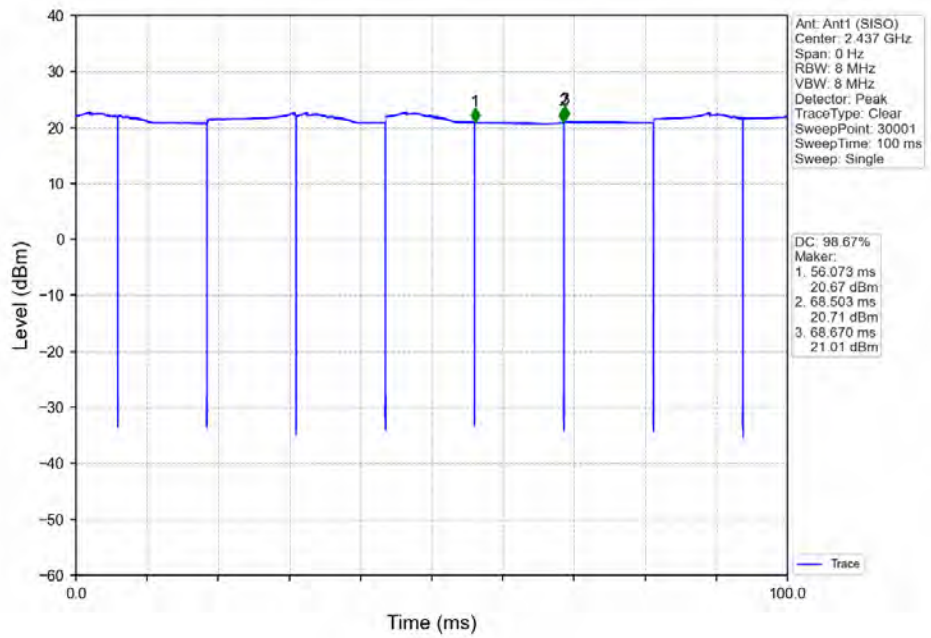
DUTY CYCLE

TEST RESULT

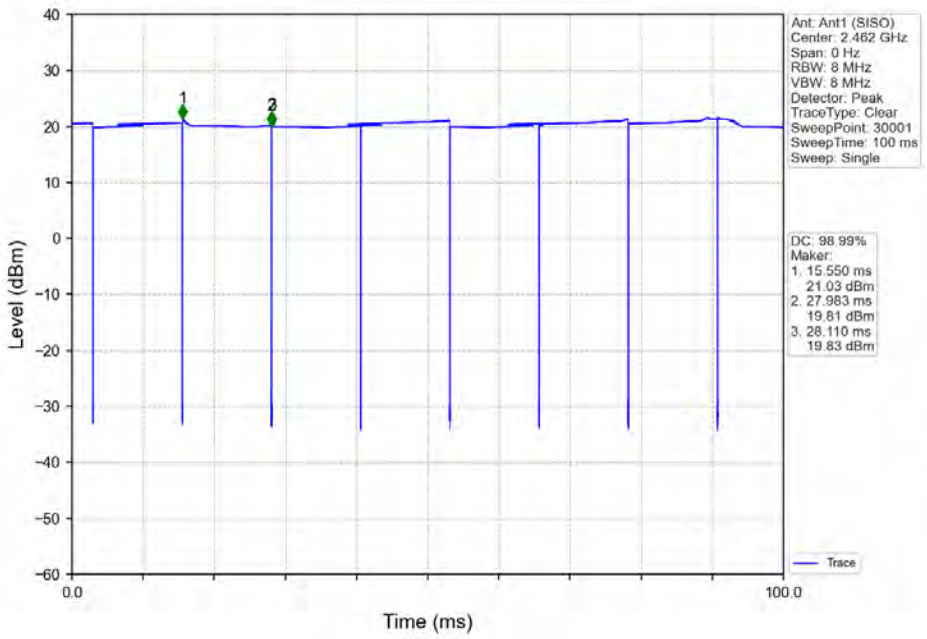
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	12.430	12.603	98.63	0.06	0.50
		2437	12.430	12.597	98.67	0.06	0.53
		2462	12.433	12.560	98.99	0.04	0.21
802.11g	SISO	2412	2.064	2.394	86.22	0.64	8.52
		2437	2.064	2.243	92.02	0.36	3.08
		2462	2.064	2.243	92.02	0.36	3.08
802.11n (HT20)	SISO	2412	1.924	2.126	90.50	0.43	3.84
		2437	1.923	2.102	91.48	0.39	3.28
		2462	1.924	2.103	91.49	0.39	3.27
802.11n (HT40)	SISO	2422	0.948	1.117	84.87	0.71	5.08
		2437	0.948	1.117	84.87	0.71	5.08
		2452	0.948	1.081	87.70	0.57	2.26

TEST GRAPH

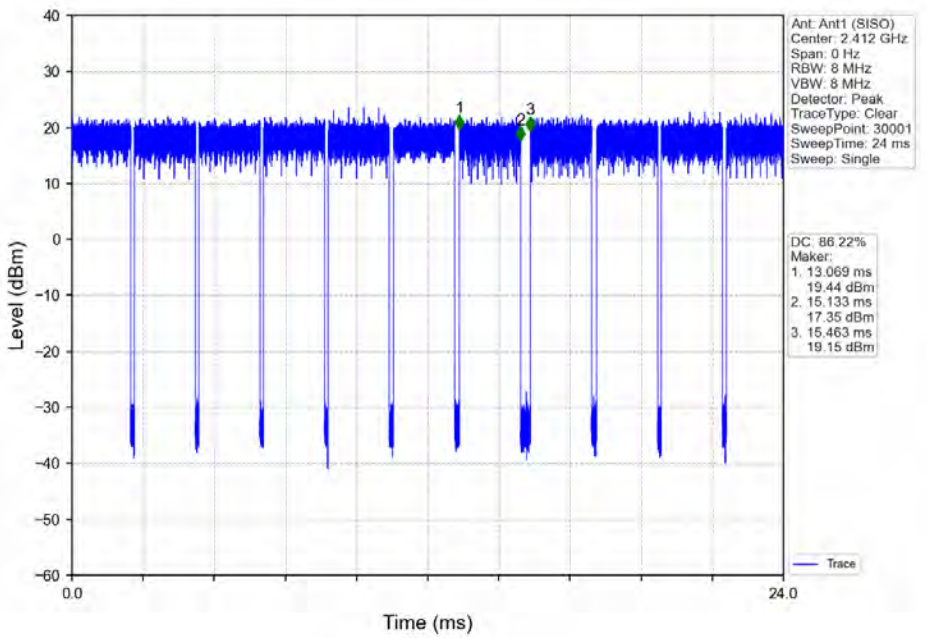
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV

802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV


Ant: Ant1 (SISO)
Center: 2.437 GHz
Span: 0 Hz
RBW: 8 MHz
VBW: 8 MHz
Detector: Peak
TraceType: Clear
SweepPoint: 30001
SweepTime: 100 ms
Sweep: Single
DC: 98.67%
Maker:
1. 56.073 ms
20.67 dBm
2. 68.503 ms
20.71 dBm
3. 68.670 ms
21.01 dBm
Trace
Level (dBm)
Time (ms)
40
30
20
10
0
-10
-20
-30
-40
-50
-60
0.0
100.0

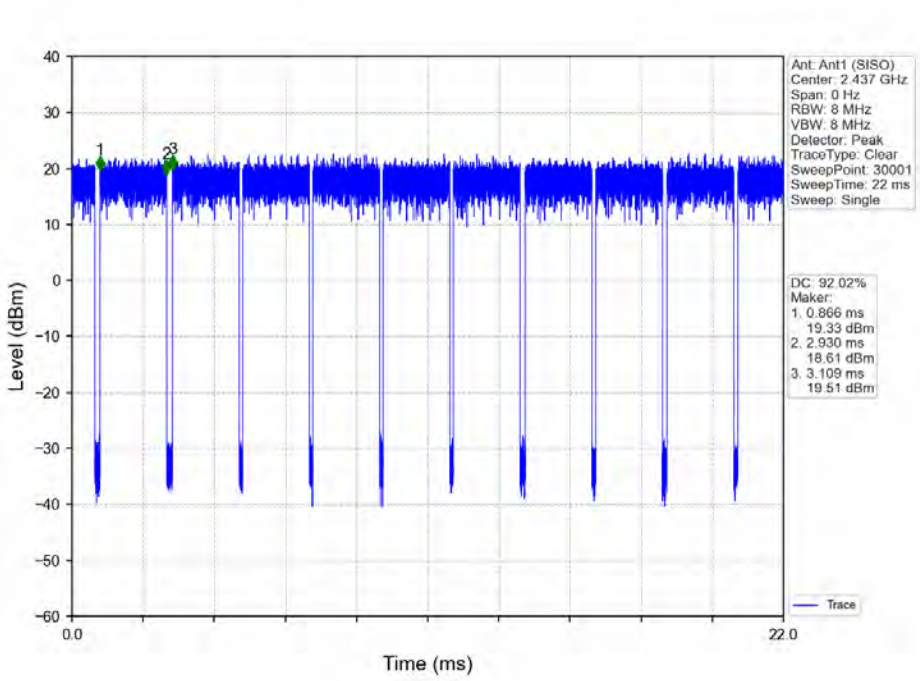
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



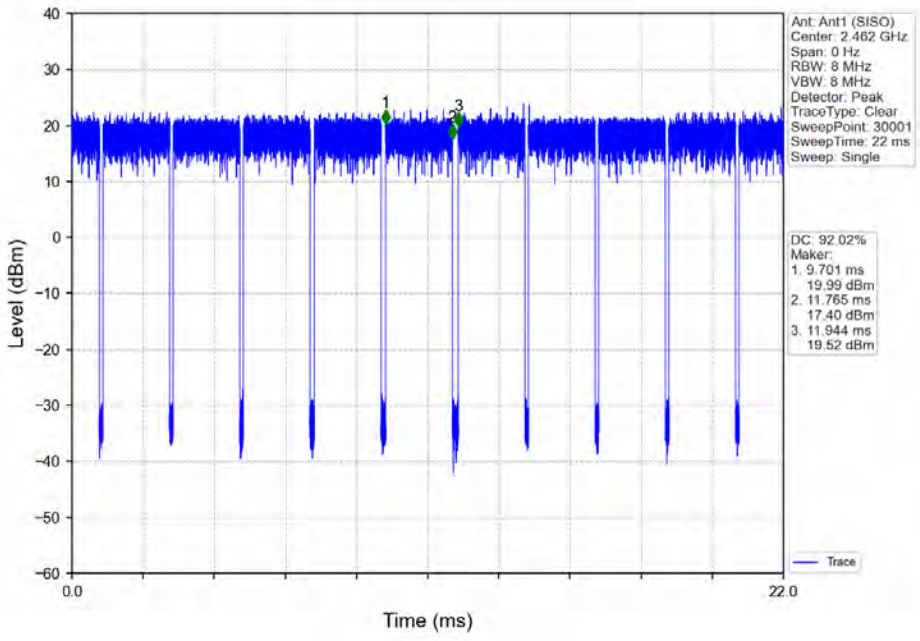
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



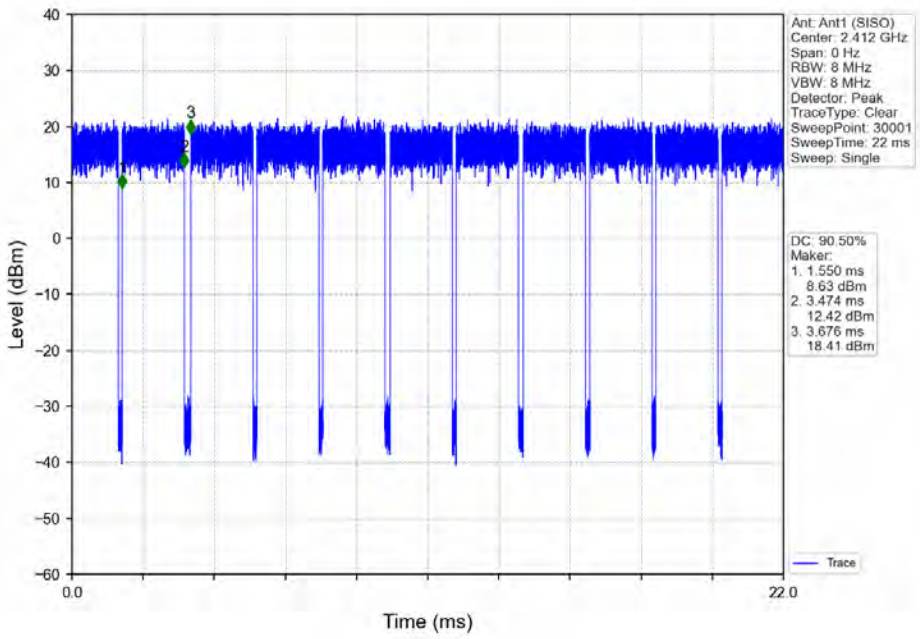
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



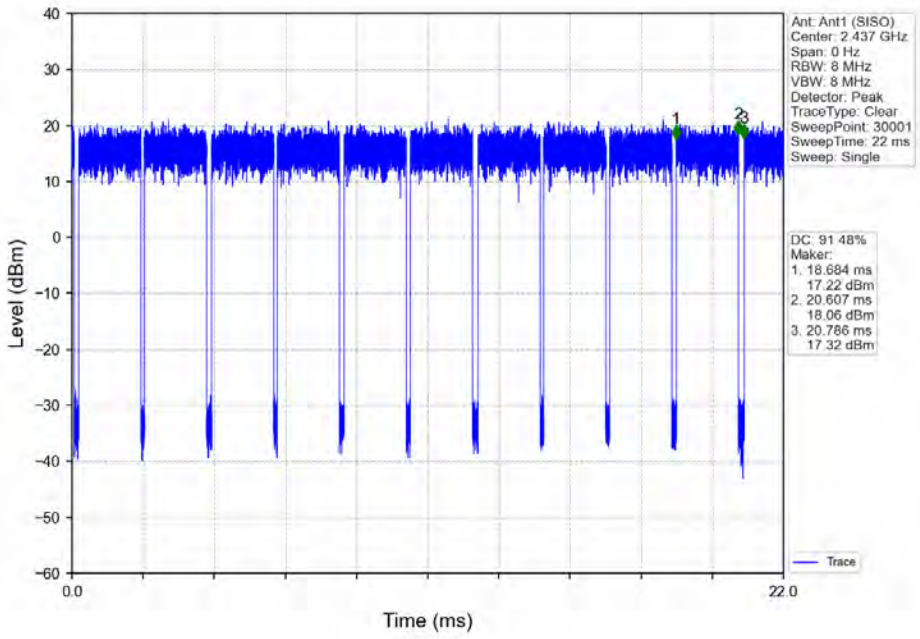
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



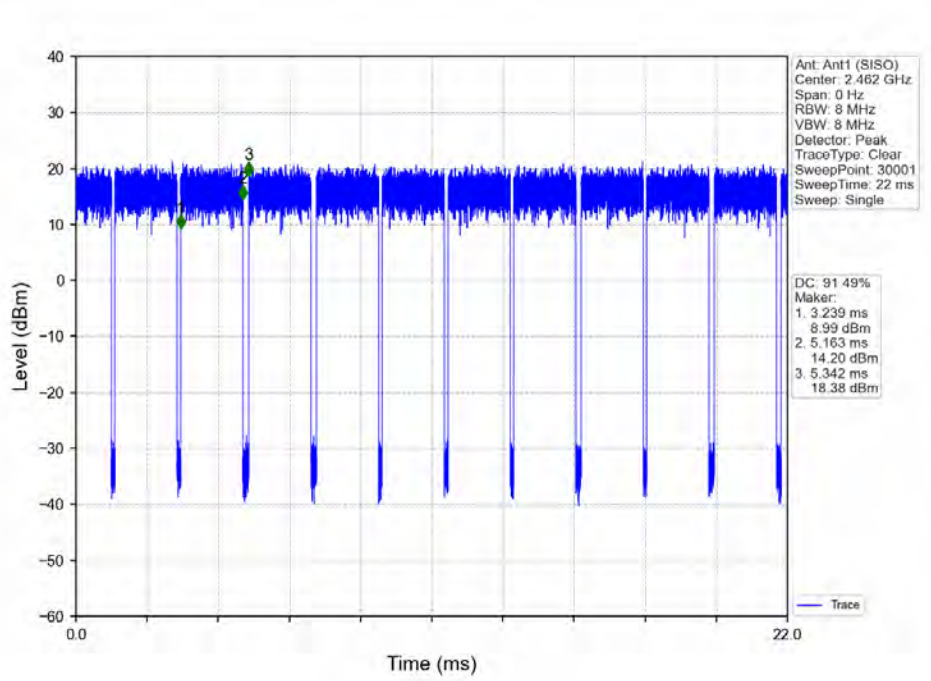
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



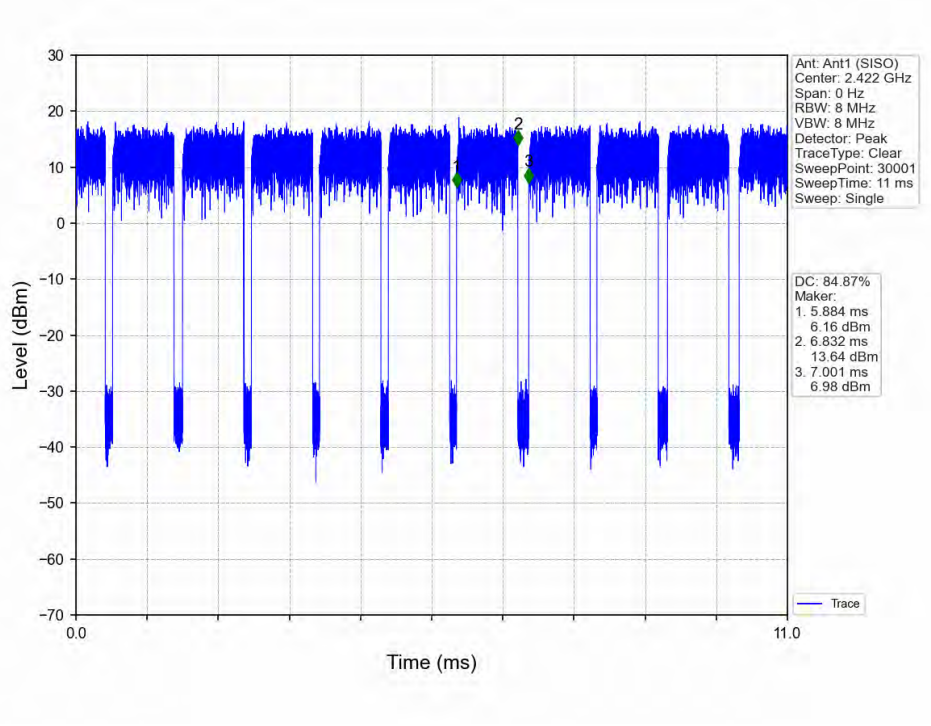
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



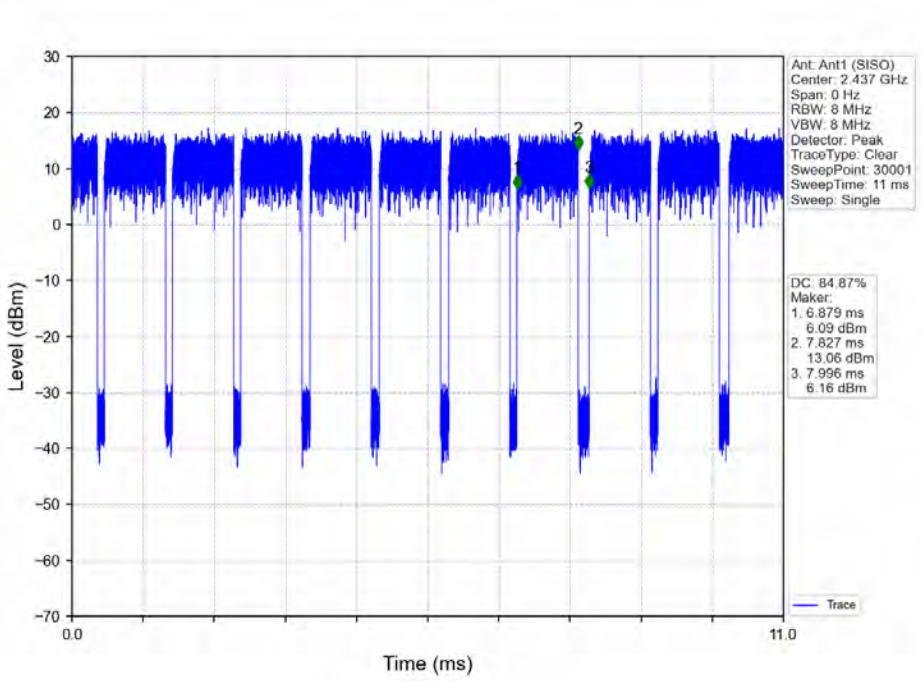
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



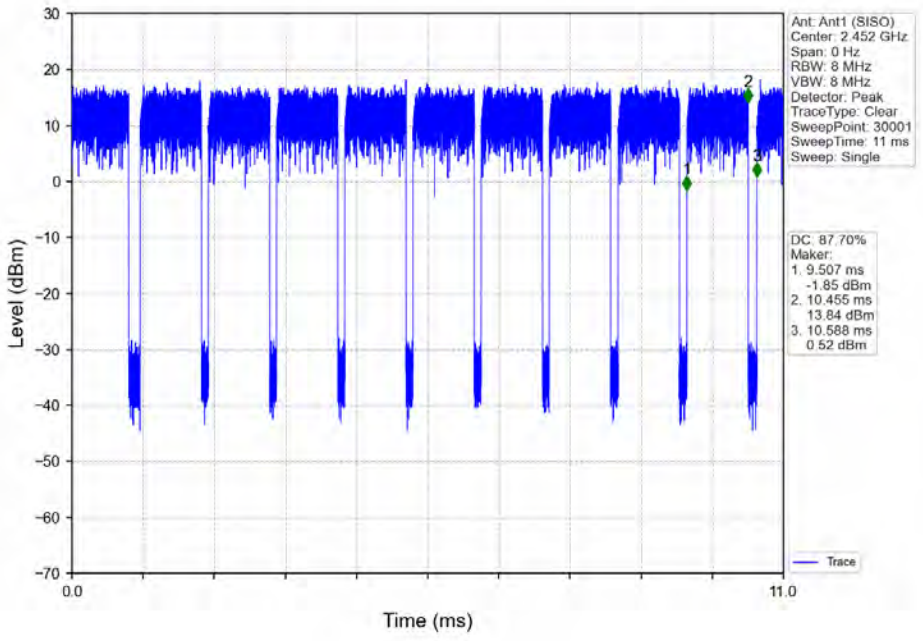
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV

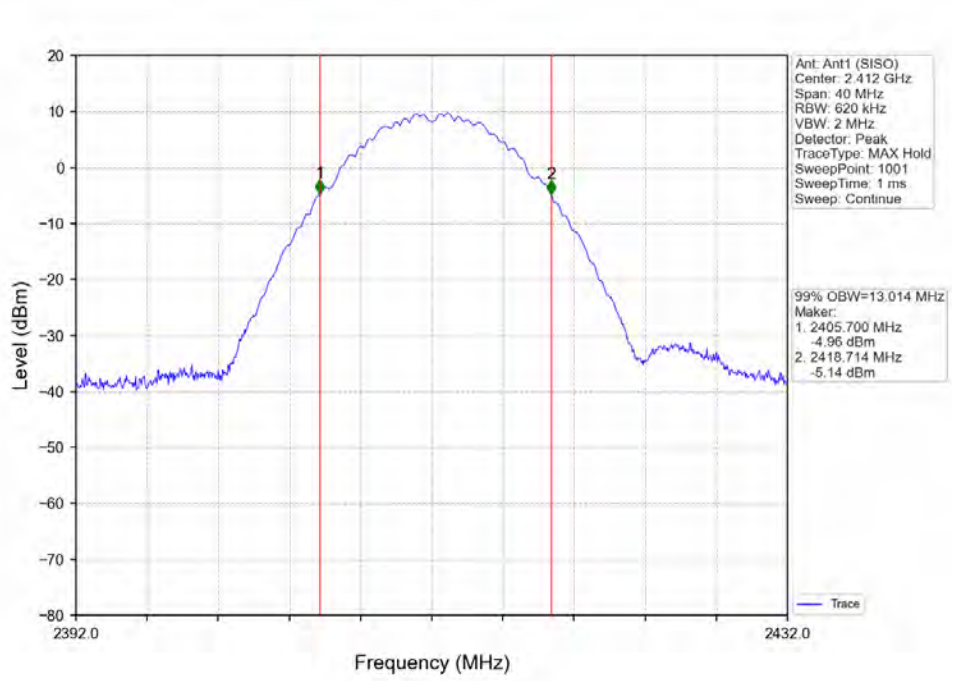


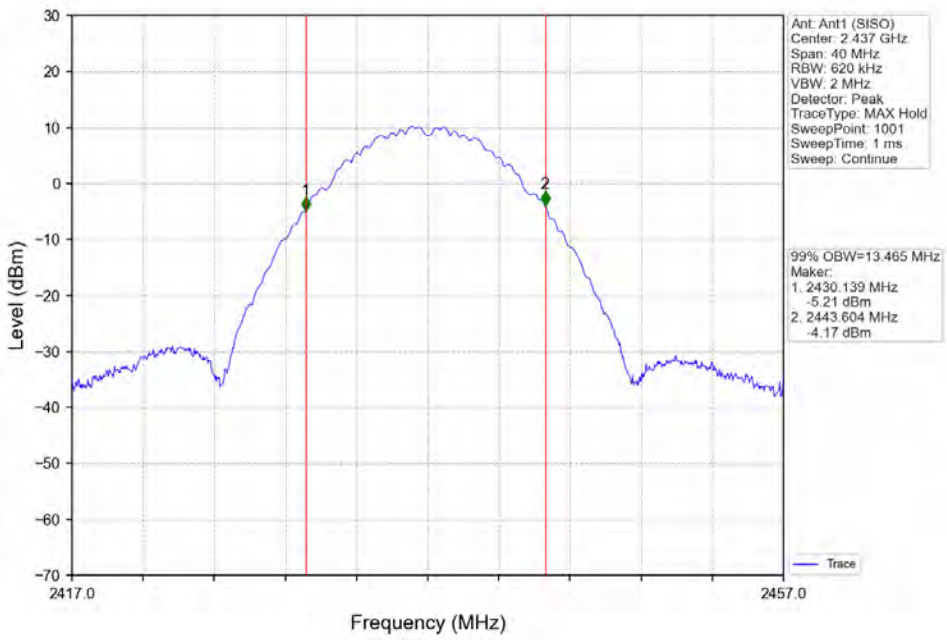
OBW_BANDWIDTH

TEST RESULT

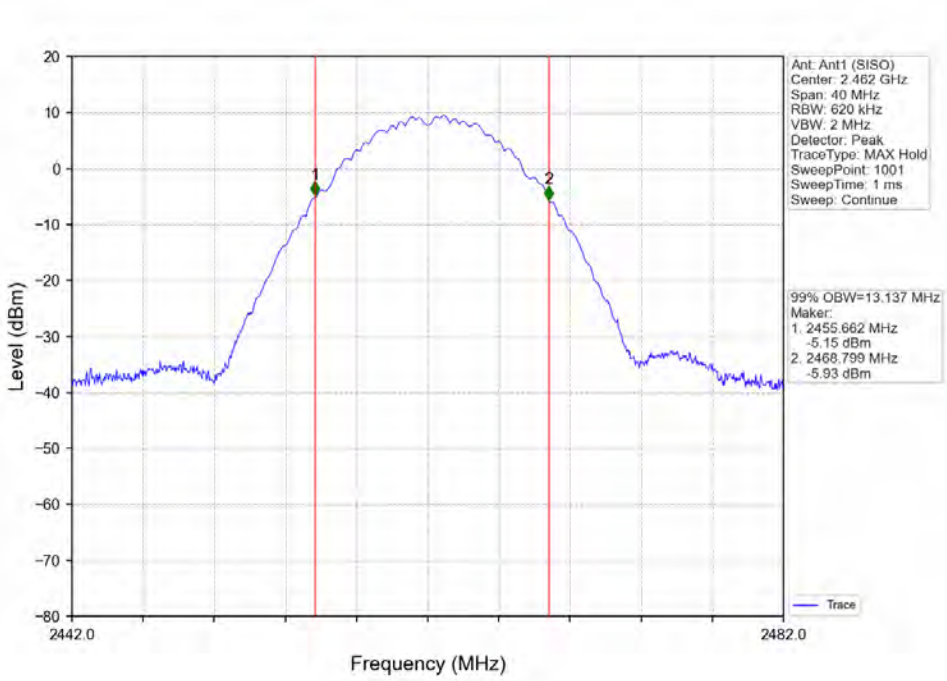
Mode	TX Type	Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz) Result	Verdict
802.11b	SISO	2412	1	13.014	Pass
		2437	1	13.465	Pass
		2462	1	13.137	Pass
802.11g	SISO	2412	1	16.573	Pass
		2437	1	16.834	Pass
		2462	1	16.623	Pass
802.11n (HT20)	SISO	2412	1	17.524	Pass
		2437	1	17.733	Pass
		2462	1	17.576	Pass
802.11n (HT40)	SISO	2422	1	35.817	Pass
		2437	1	36.702	Pass
		2452	1	36.429	Pass

TEST GRAPH

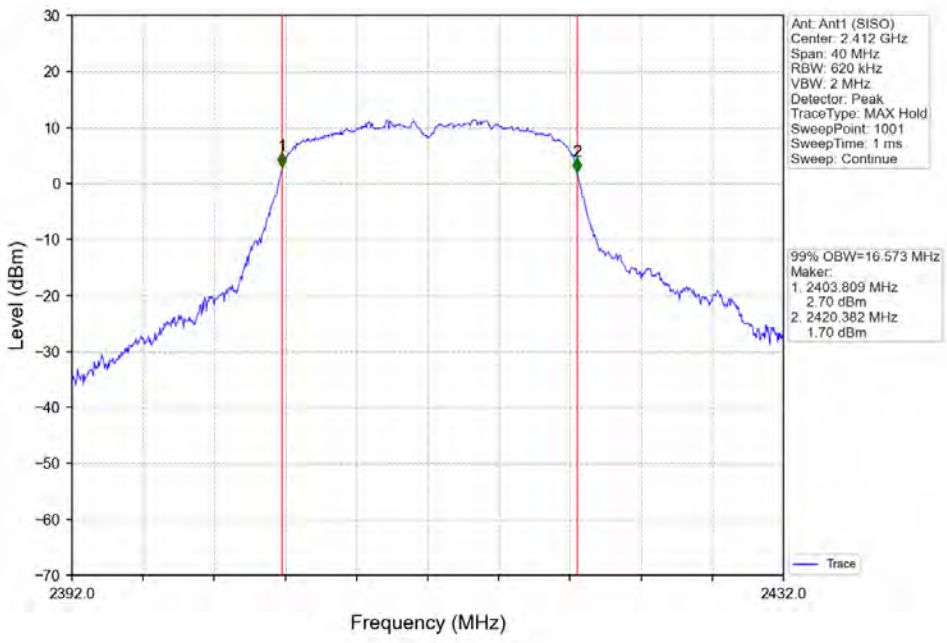
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV

802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV


Ant: Ant1 (SISO)
Center: 2.437 GHz
Span: 40 MHz
RBW: 620 kHz
VBW: 2 MHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
99% OBW=13.465 MHz
Maker:
1. 2430.139 MHz
-5.21 dBm
2. 2443.604 MHz
-4.17 dBm
Trace
Level (dBm)
Frequency (MHz)
2417.0
2457.0

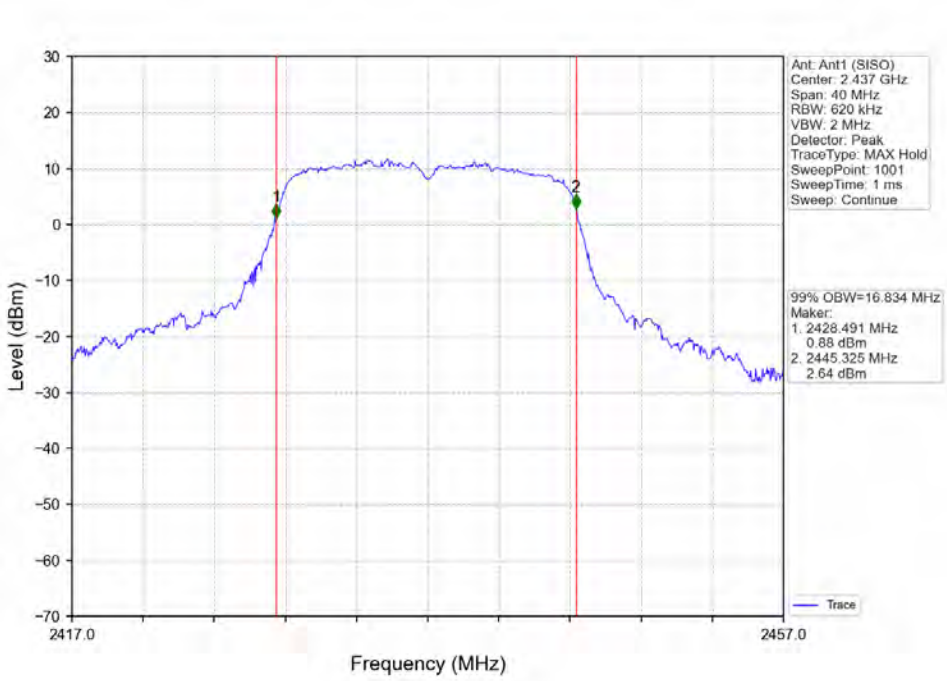
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



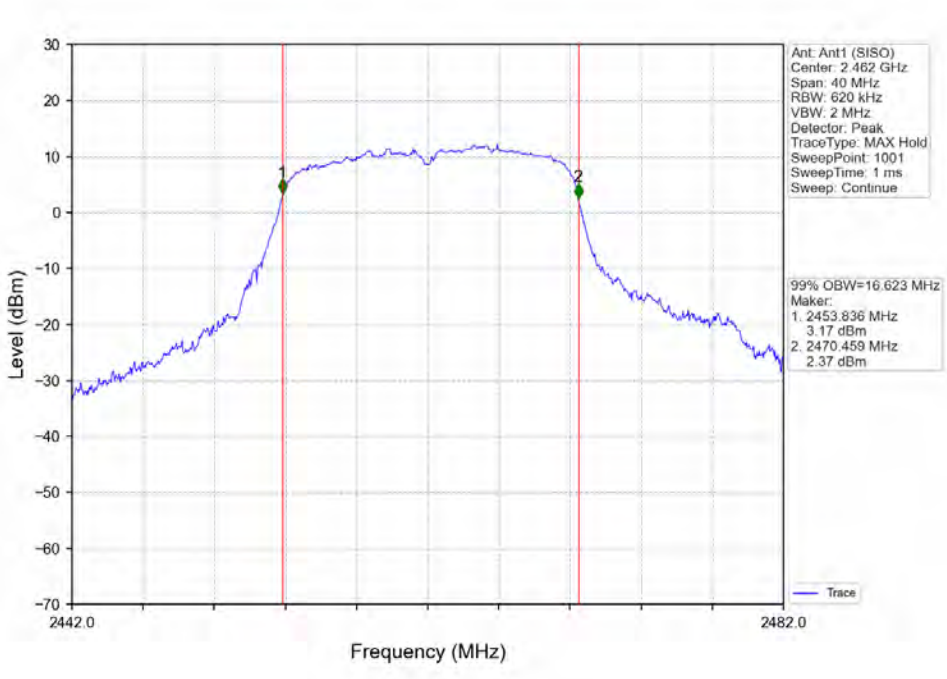
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



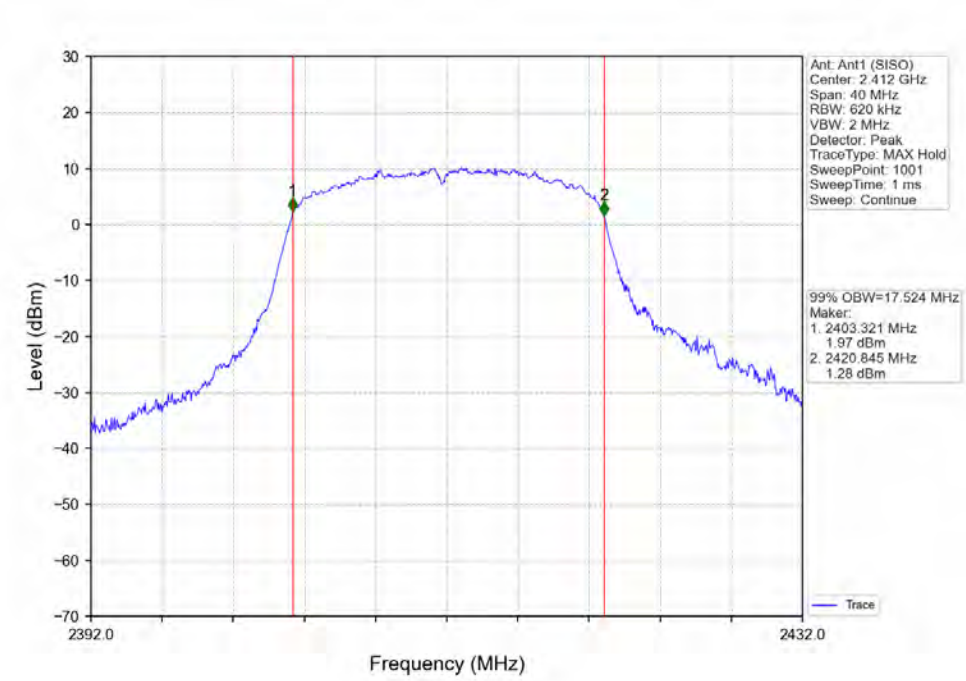
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



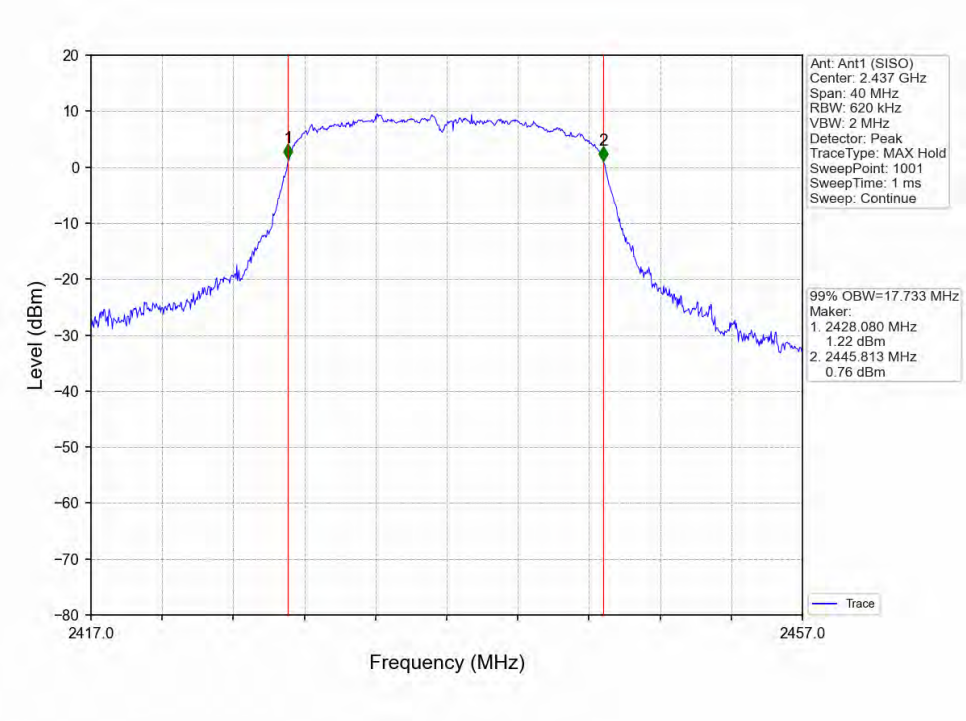
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



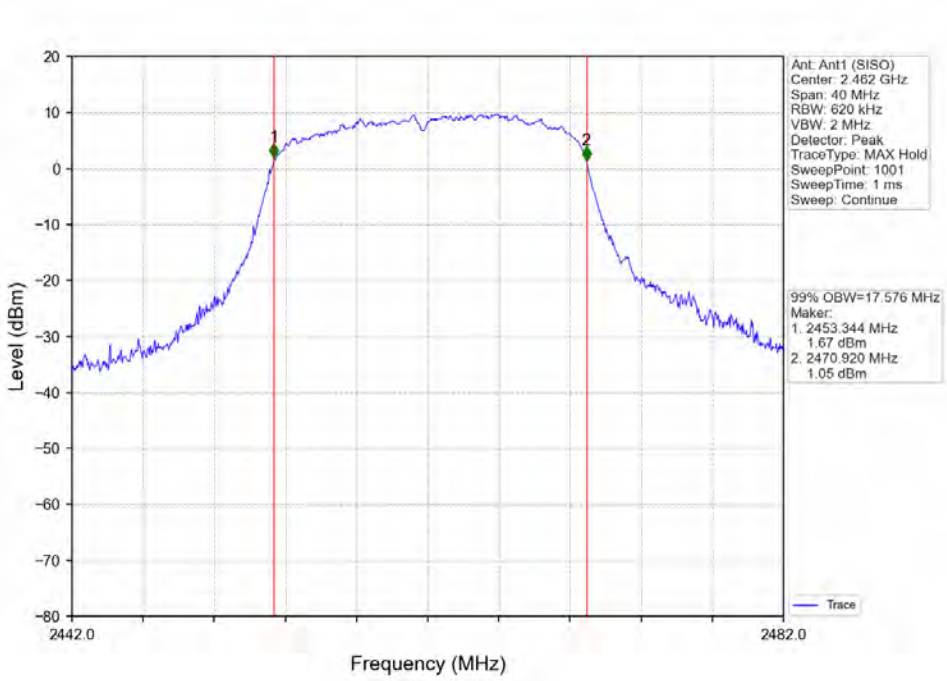
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



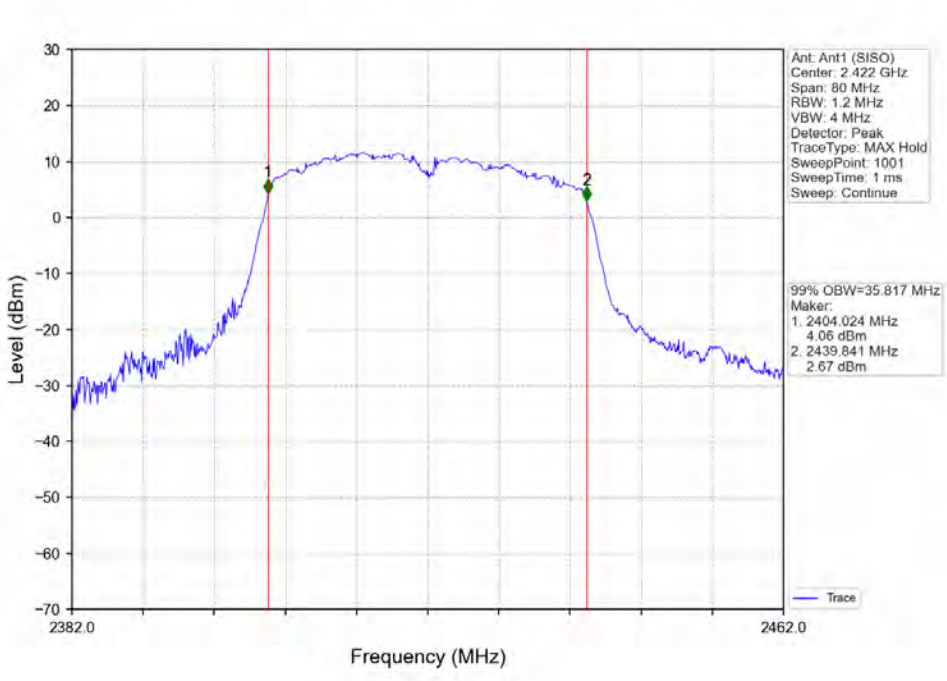
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



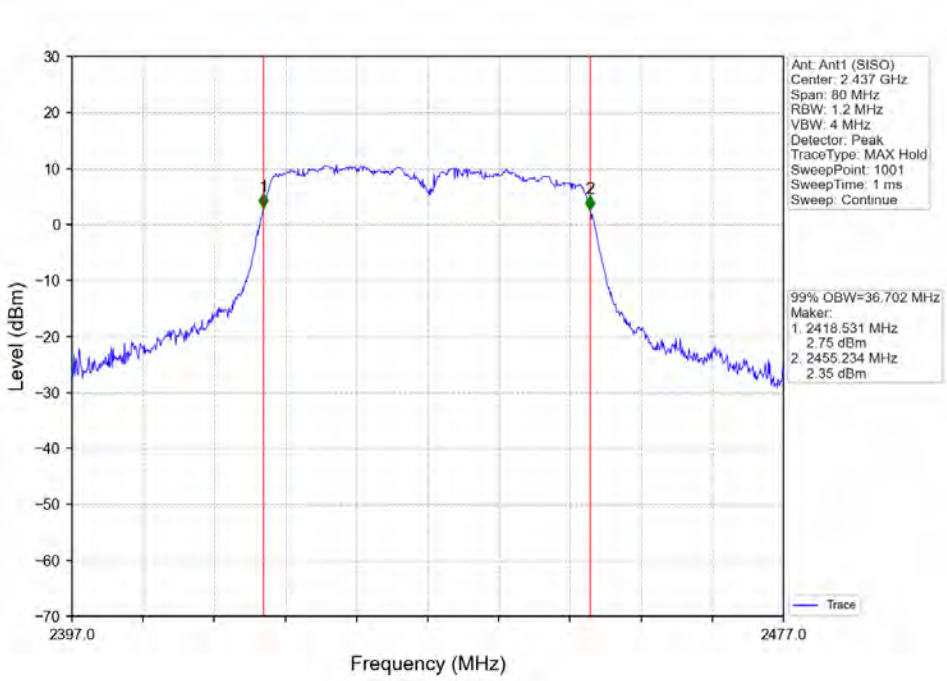
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



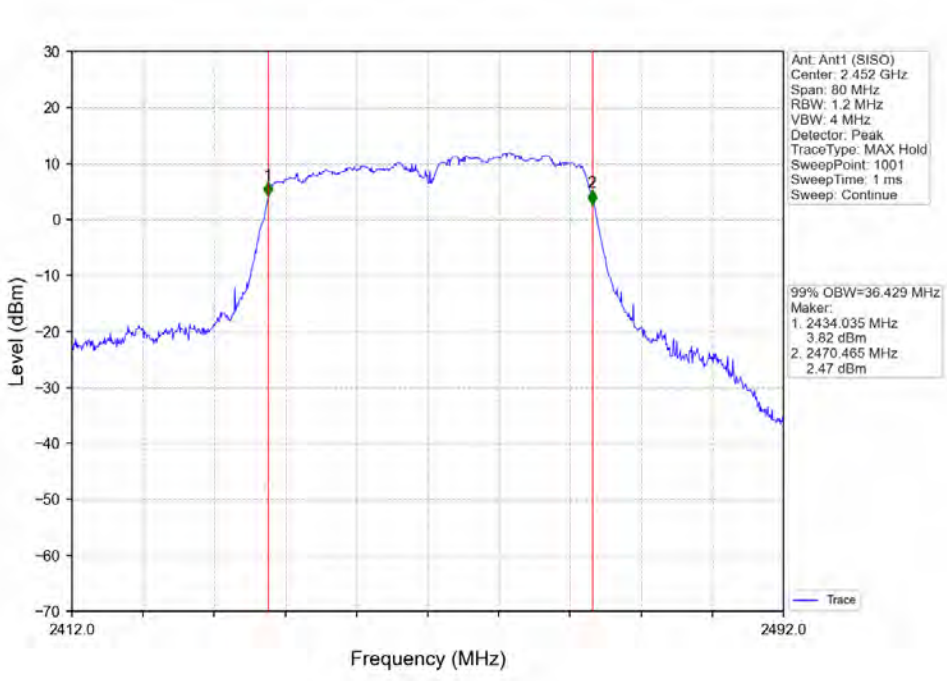
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



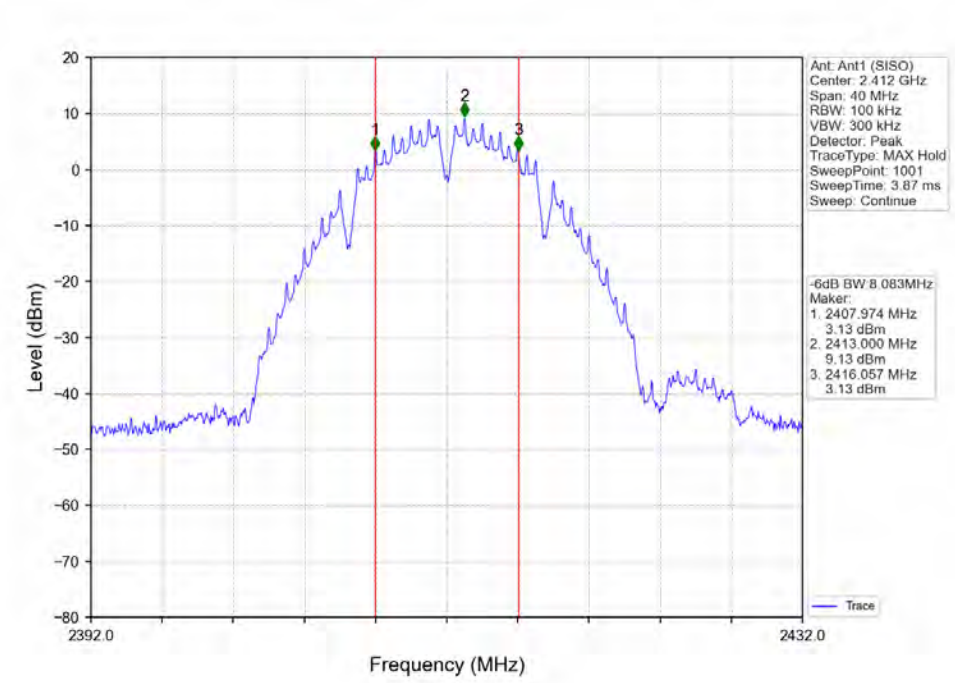
6DB BW

TEST RESULT

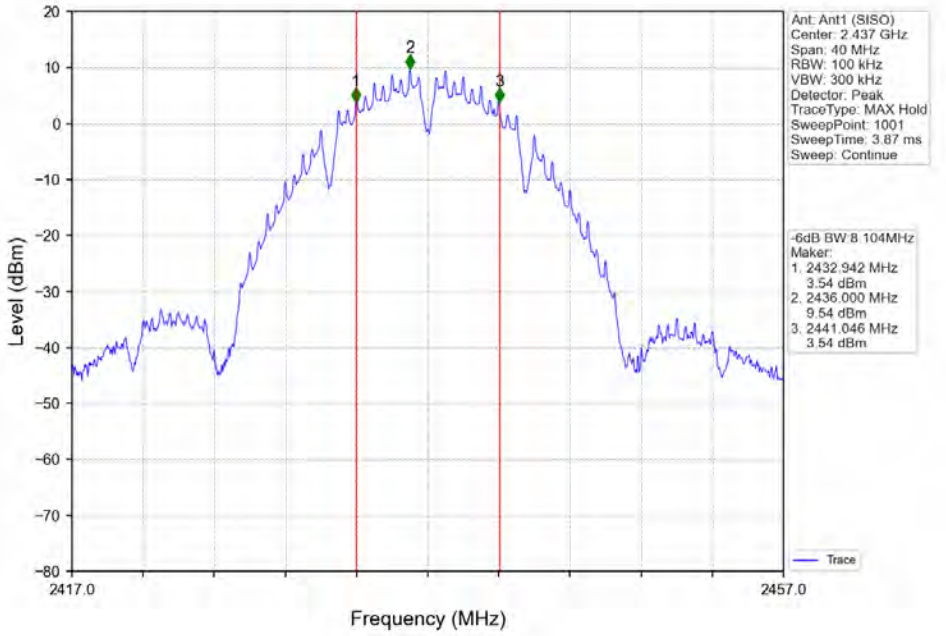
Mode	TX Type	Frequency (MHz)	Ant	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	8.083	>=0.5	Pass
		2437	1	8.104	>=0.5	Pass
		2462	1	8.075	>=0.5	Pass
802.11g	SISO	2412	1	15.144	>=0.5	Pass
		2437	1	15.386	>=0.5	Pass
		2462	1	15.139	>=0.5	Pass
802.11n (HT20)	SISO	2412	1	15.157	>=0.5	Pass
		2437	1	15.967	>=0.5	Pass
		2462	1	15.148	>=0.5	Pass
802.11n (HT40)	SISO	2422	1	32.594	>=0.5	Pass
		2437	1	35.166	>=0.5	Pass
		2452	1	35.112	>=0.5	Pass

TEST GRAPH

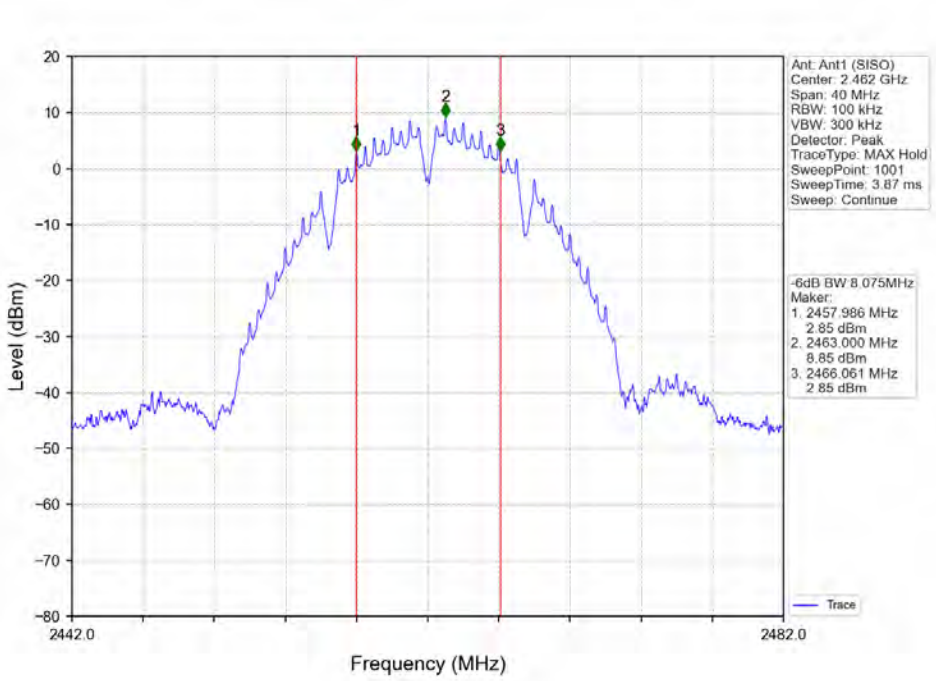
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



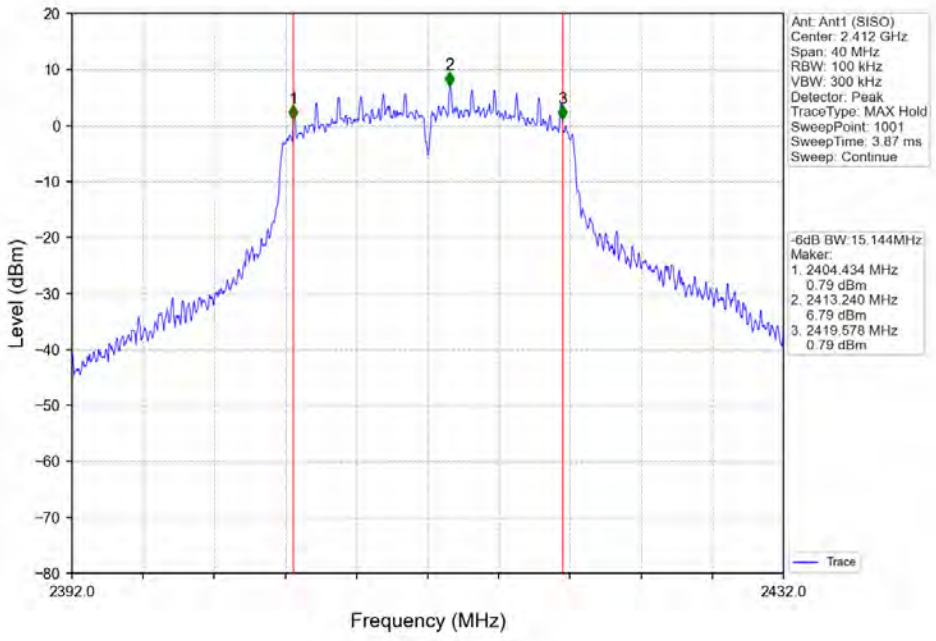
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV


Ant: Ant1 (SISO)
Center: 2.437 GHz
Span: 40 MHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 3.87 ms
Sweep: Continue
-6dB BW 8.104MHz
Maker:
1. 2432.942 MHz
3.54 dBm
2. 2436.000 MHz
9.54 dBm
3. 2441.046 MHz
3.54 dBm
Trace
Level (dBm)
Frequency (MHz)
2417.0
2457.0

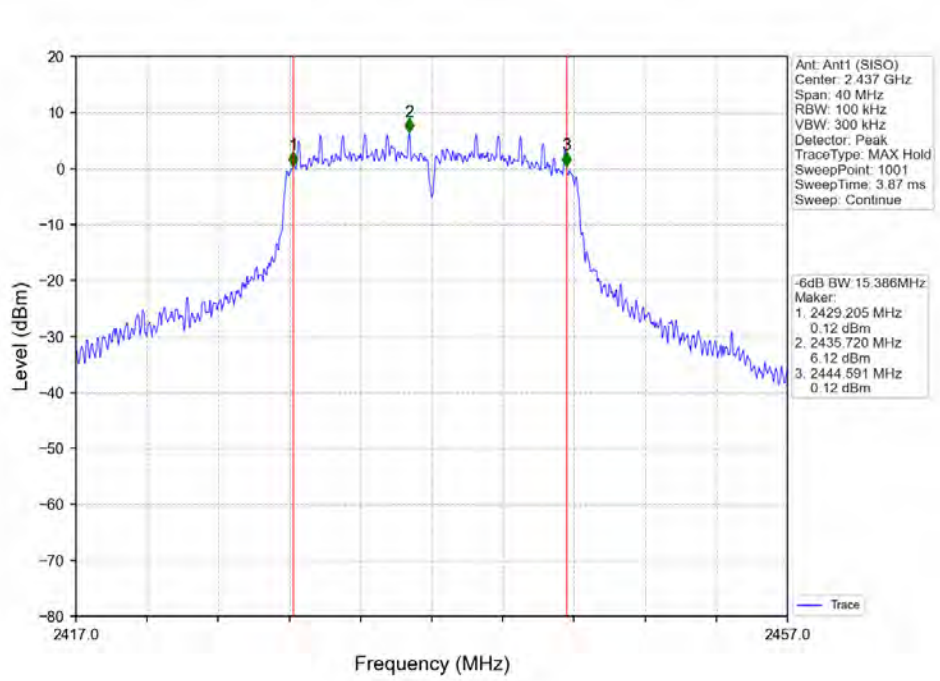
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



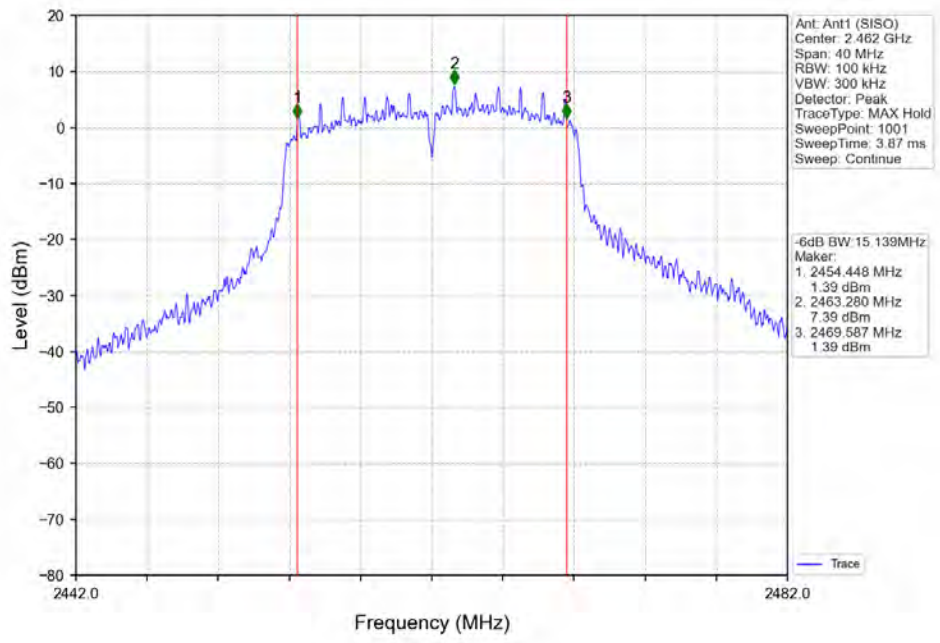
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



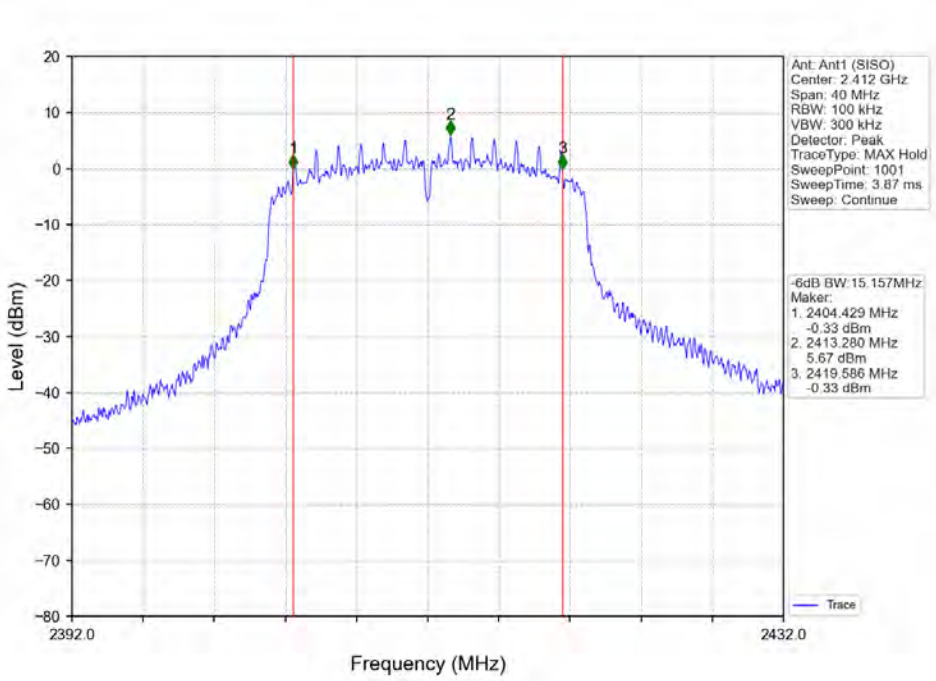
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



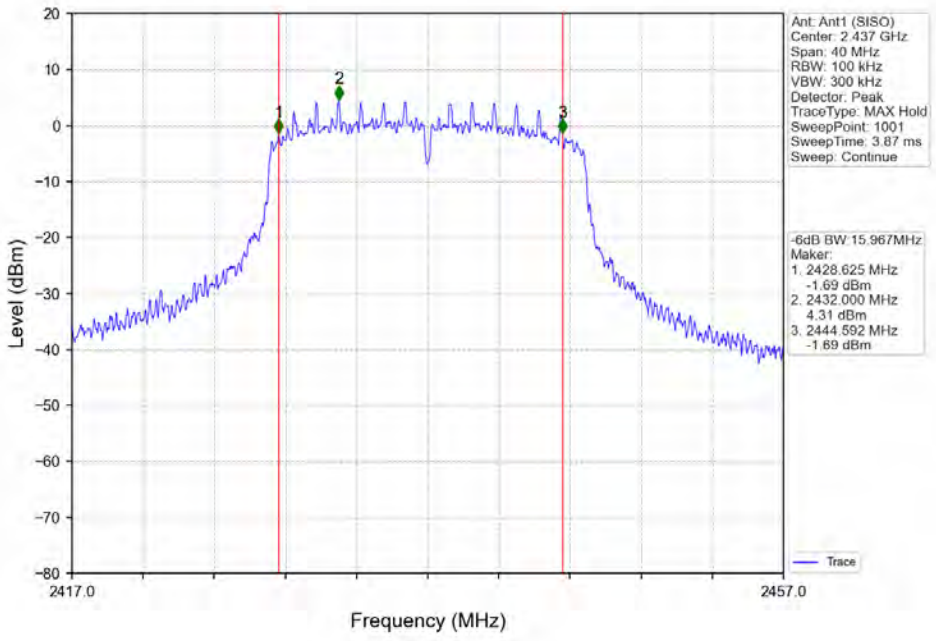
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



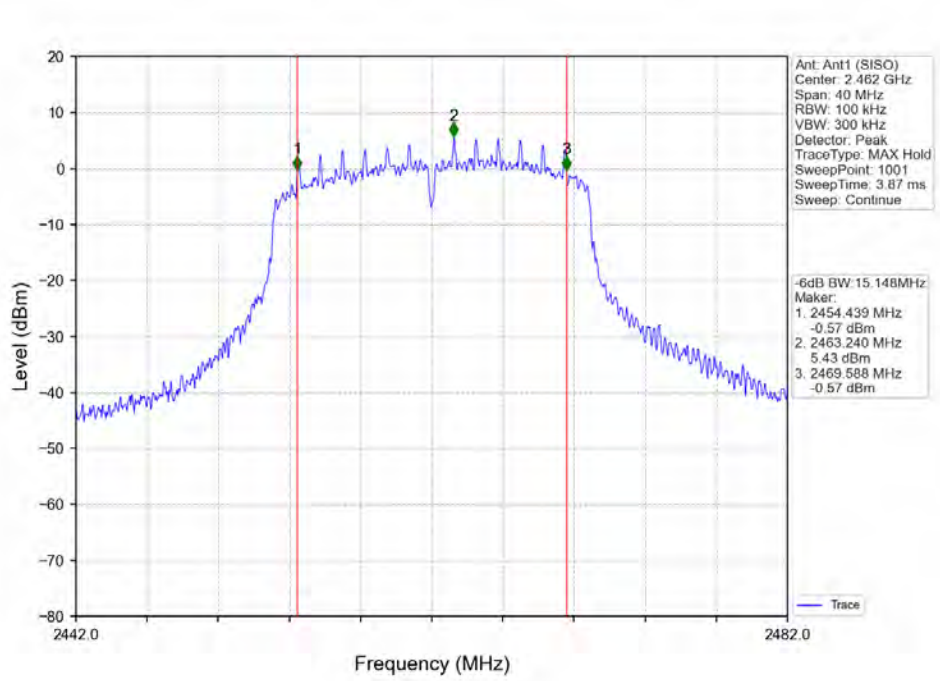
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



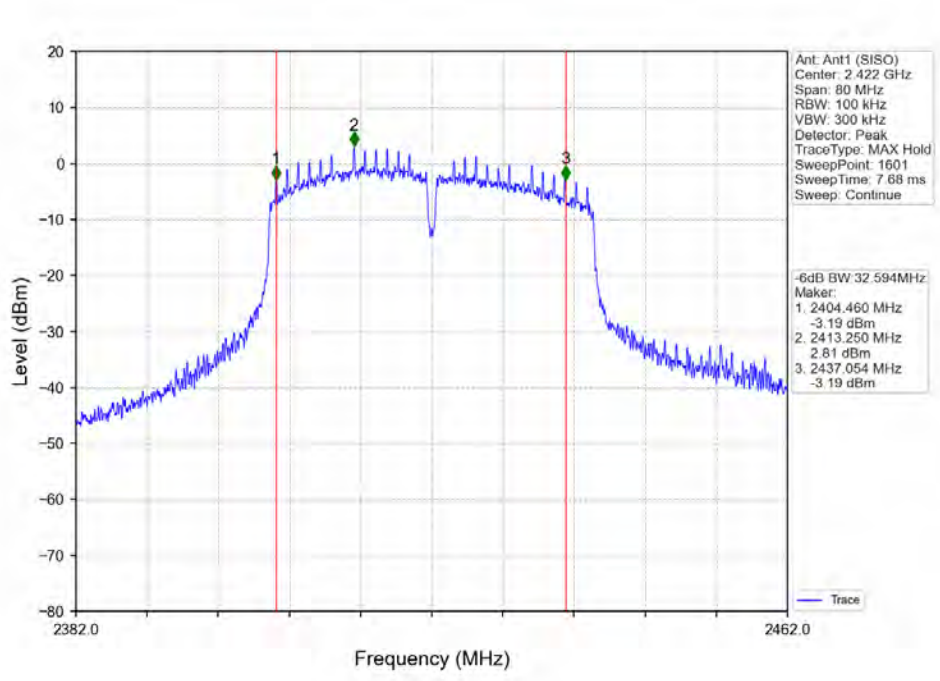
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



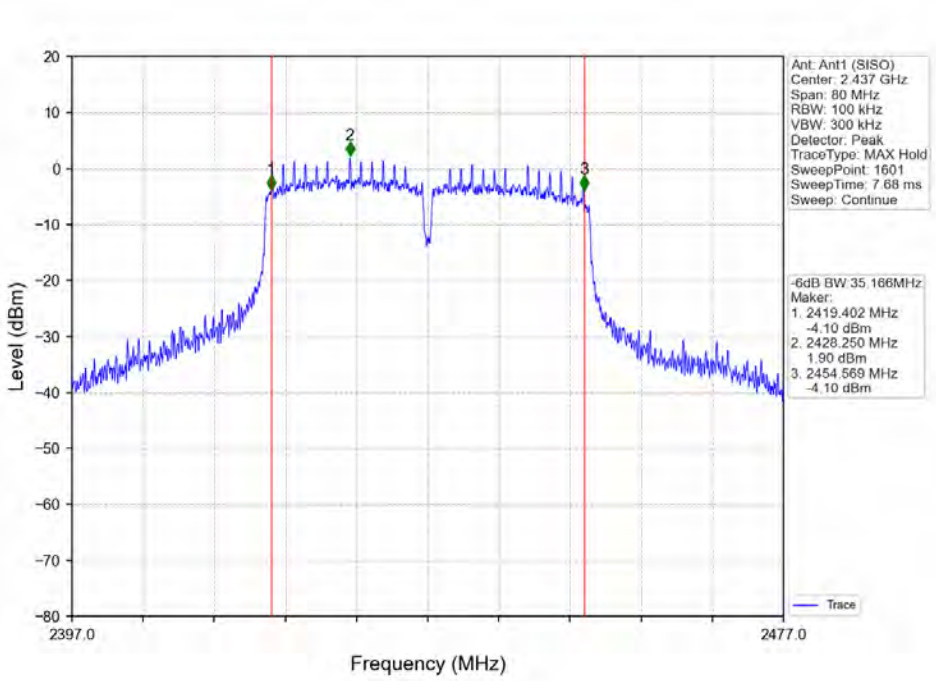
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



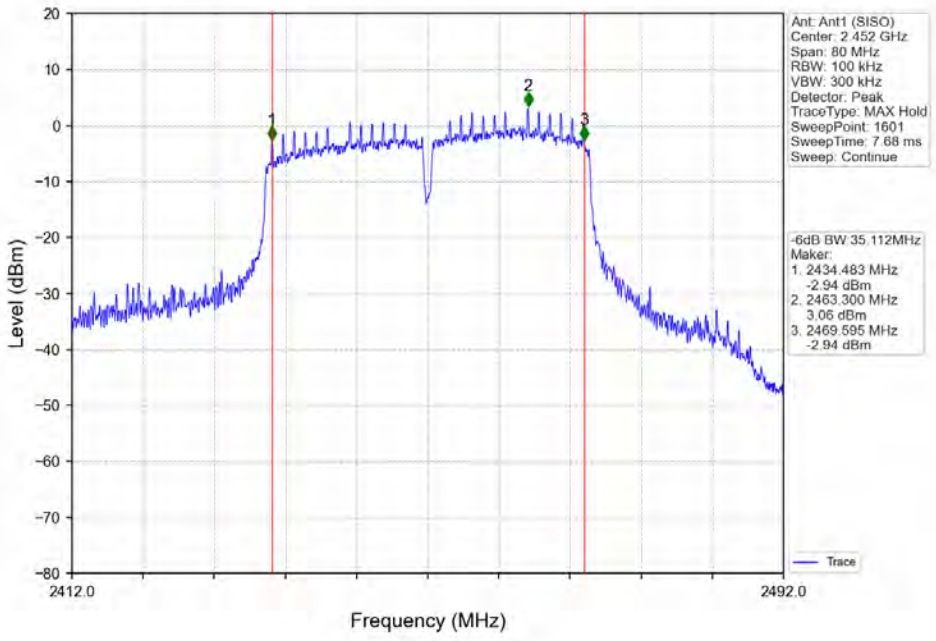
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



MAXIMUM CONDUCTED OUTPUT POWER

PEAK_POWER

TEST RESULT

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power			Verdict
			Ant1(dBm)	Ant1(mw)	Limit(dBm)	
802.11b	SISO	2412	19.41	87.30	<=30	Pass
		2437	19.90	97.72	<=30	Pass
		2462	19.11	81.47	<=30	Pass
802.11g	SISO	2412	24.07	255.27	<=30	Pass
		2437	24.34	271.64	<=30	Pass
		2462	24.60	288.40	<=30	Pass
802.11n (HT20)	SISO	2412	22.80	190.55	<=30	Pass
		2437	22.33	171.00	<=30	Pass
		2462	22.44	175.39	<=30	Pass
802.11n (HT40)	SISO	2422	22.89	194.54	<=30	Pass
		2437	22.88	194.09	<=30	Pass
		2452	23.52	224.91	<=30	Pass

AVERAGE_POWER

TEST RESULT

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			Ant1	Limit	
802.11b	SISO	2412	17.28	/	Pass
		2437	17.34	/	Pass
		2462	16.78	/	Pass
802.11g	SISO	2412	16.26	/	Pass
		2437	16.58	/	Pass
		2462	16.82	/	Pass
802.11n (HT20)	SISO	2412	15.08	/	Pass
		2437	14.70	/	Pass
		2462	14.75	/	Pass

802.11n (HT40)	SISO	2422	14.02	/	Pass
		2437	14.82	/	Pass
		2452	13.38	/	Pass

MAXIMUM POWER SPECTRAL DENSITY

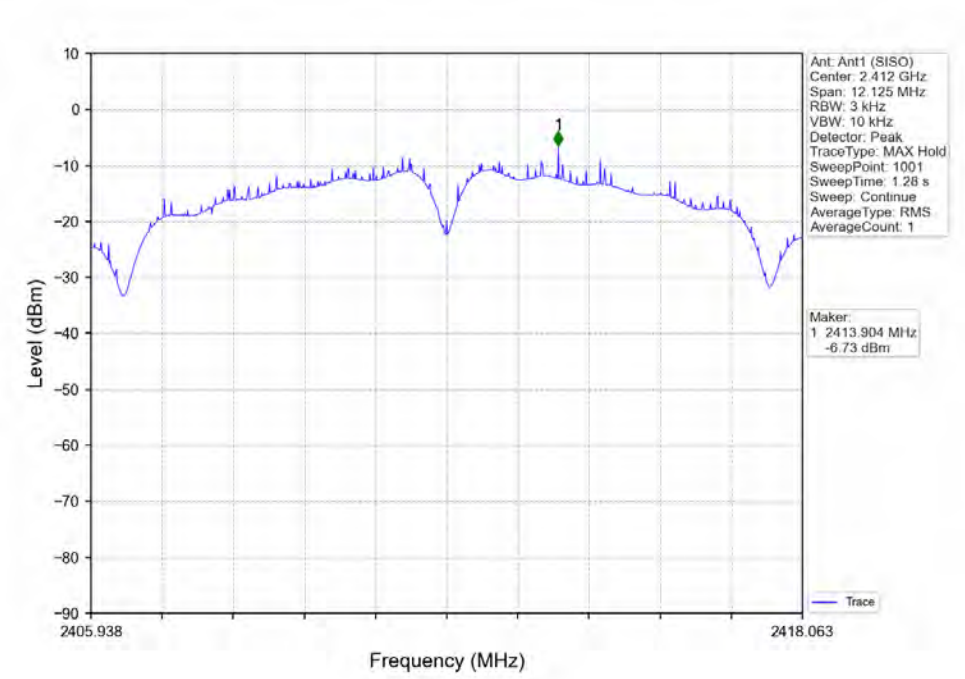
PSD

TEST RESULT

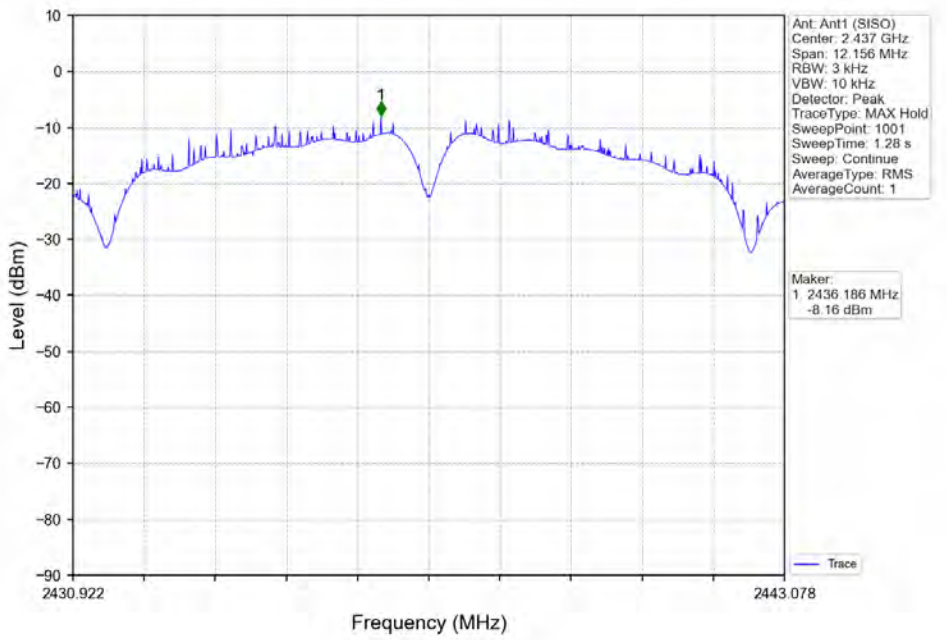
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			Ant1	Limit	
802.11b	SISO	2412	-6.73	<=8	Pass
		2437	-8.16	<=8	Pass
		2462	-6.70	<=8	Pass
802.11g	SISO	2412	-10.88	<=8	Pass
		2437	-10.35	<=8	Pass
		2462	-8.73	<=8	Pass
802.11n (HT20)	SISO	2412	-11.66	<=8	Pass
		2437	-12.71	<=8	Pass
		2462	-12.07	<=8	Pass
802.11n (HT40)	SISO	2422	-13.26	<=8	Pass
		2437	-14.28	<=8	Pass
		2452	-11.91	<=8	Pass

TEST GRAPH

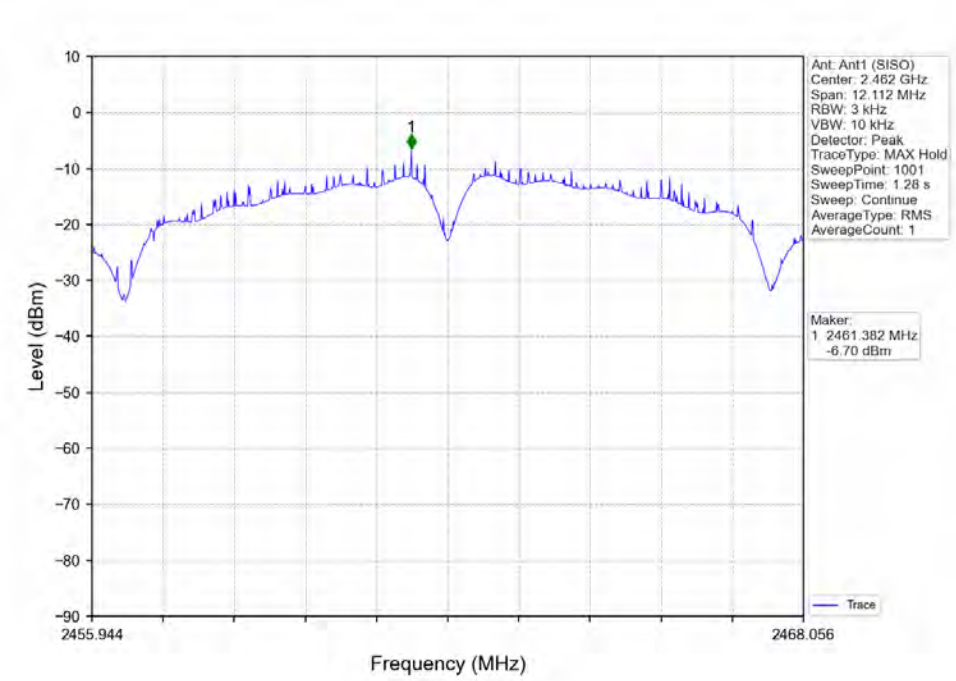
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



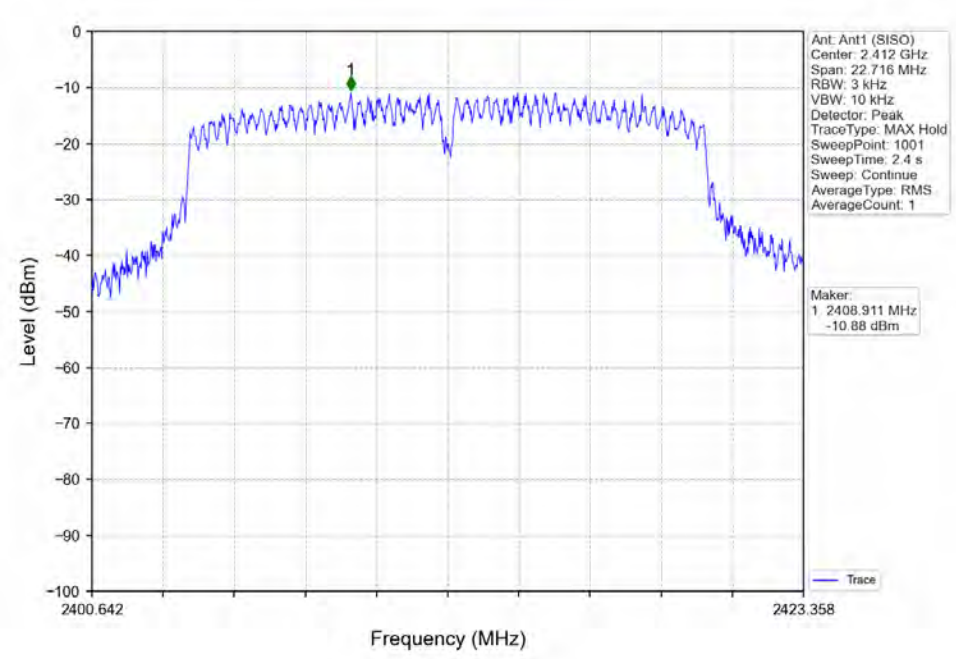
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV


Ant: Ant1 (SISO)
Center: 2.437 GHz
Span: 12.156 MHz
RBW: 3 kHz
VBW: 10 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1.28 s
Sweep: Continue
AverageType: RMS
AverageCount: 1
Maker:
1 2436.186 MHz
-8.16 dBm
Trace
Level (dBm)
Frequency (MHz)
2430.922
2443.078

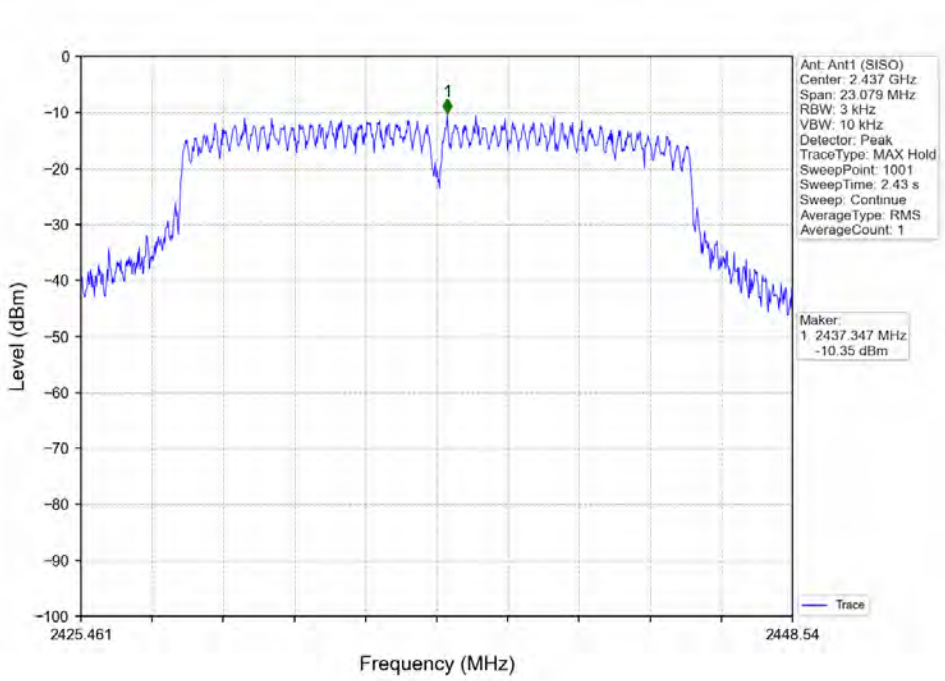
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



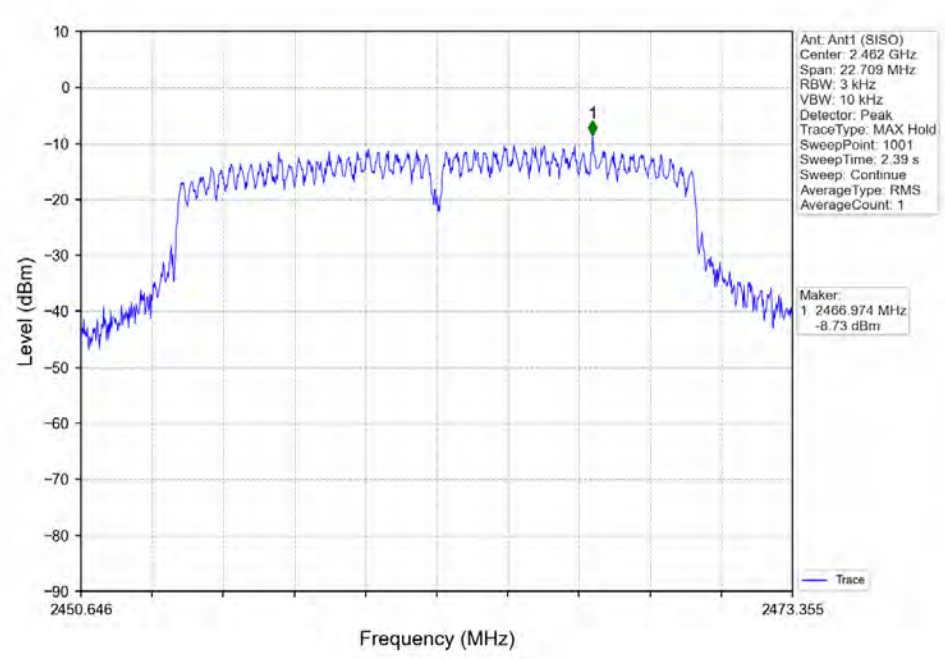
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



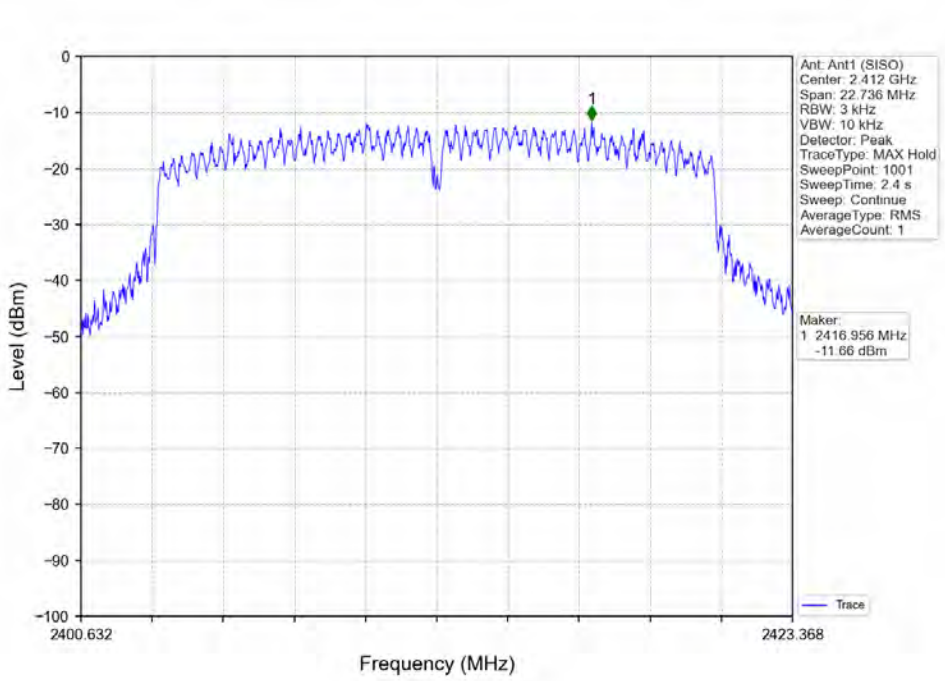
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



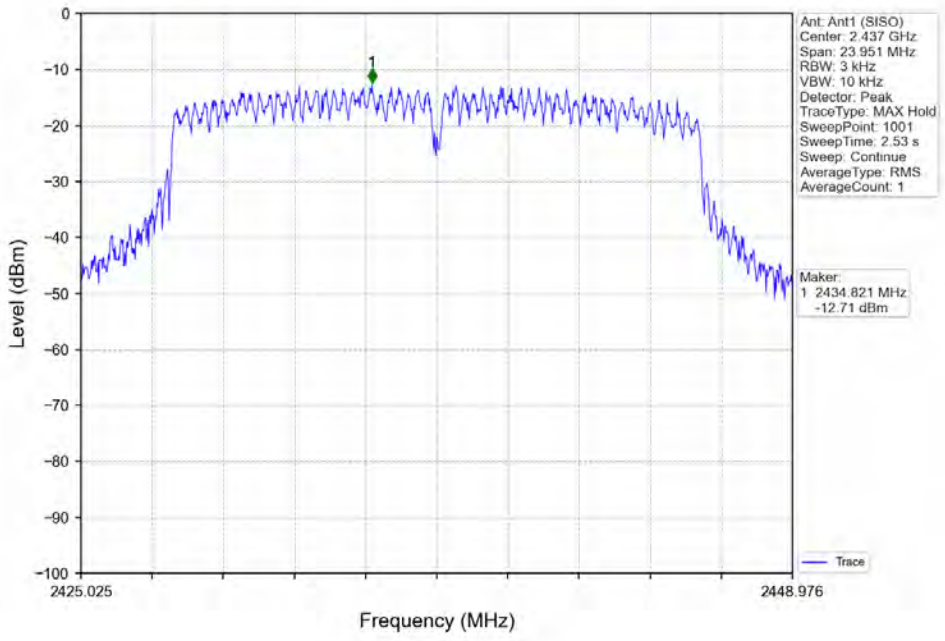
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



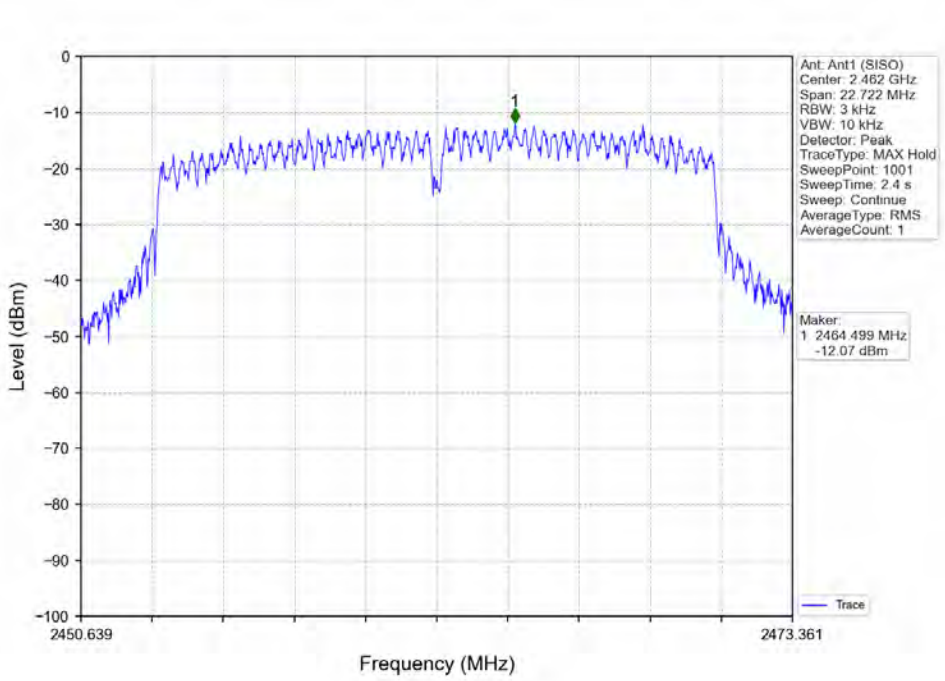
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



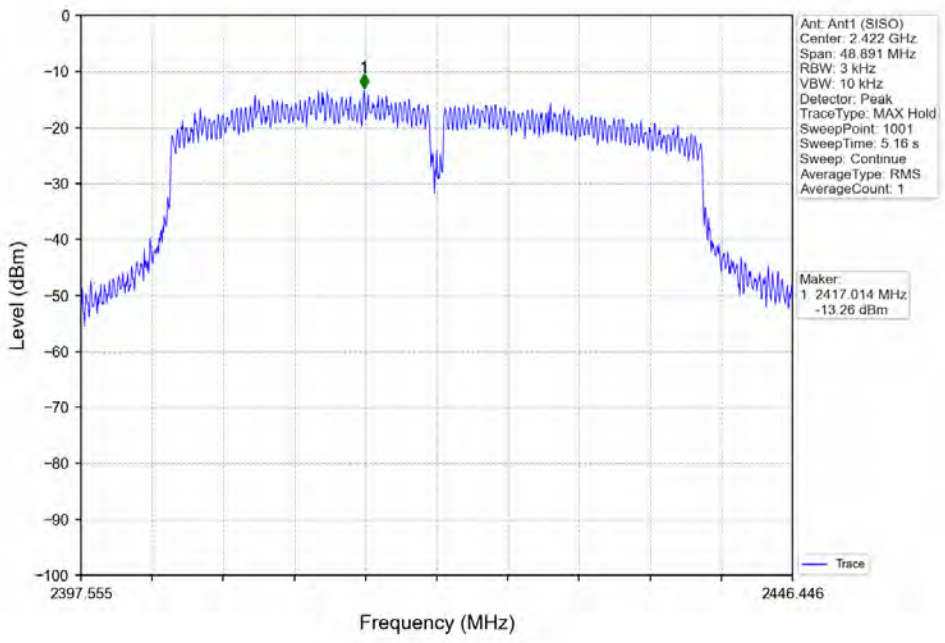
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



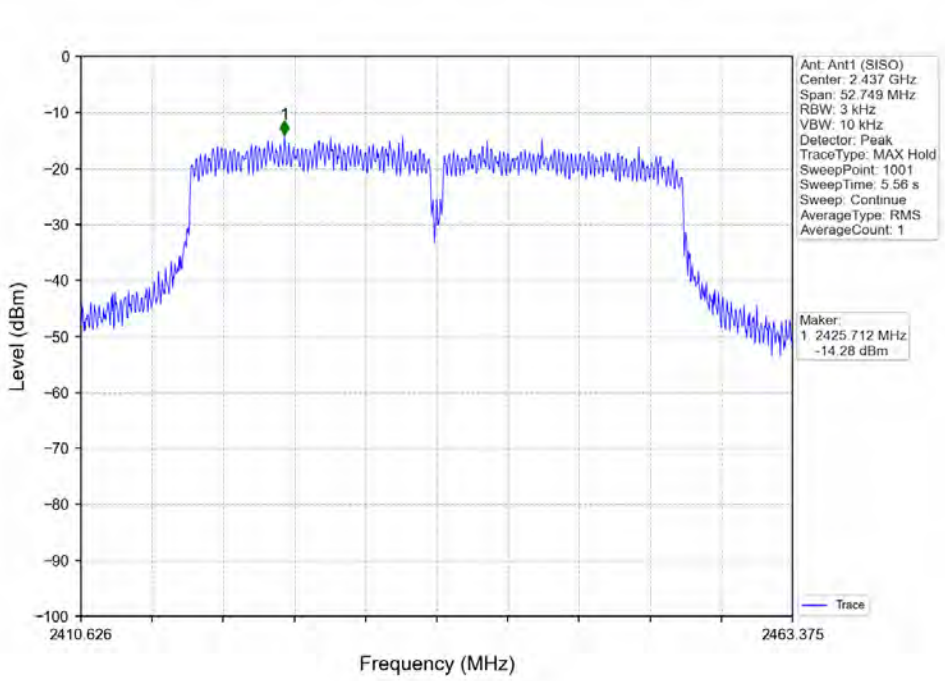
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



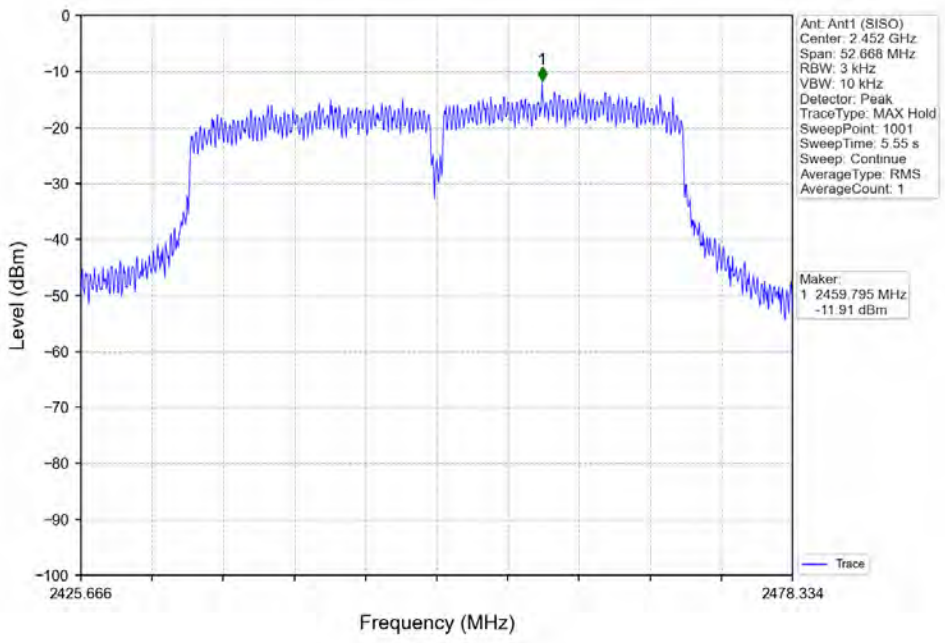
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

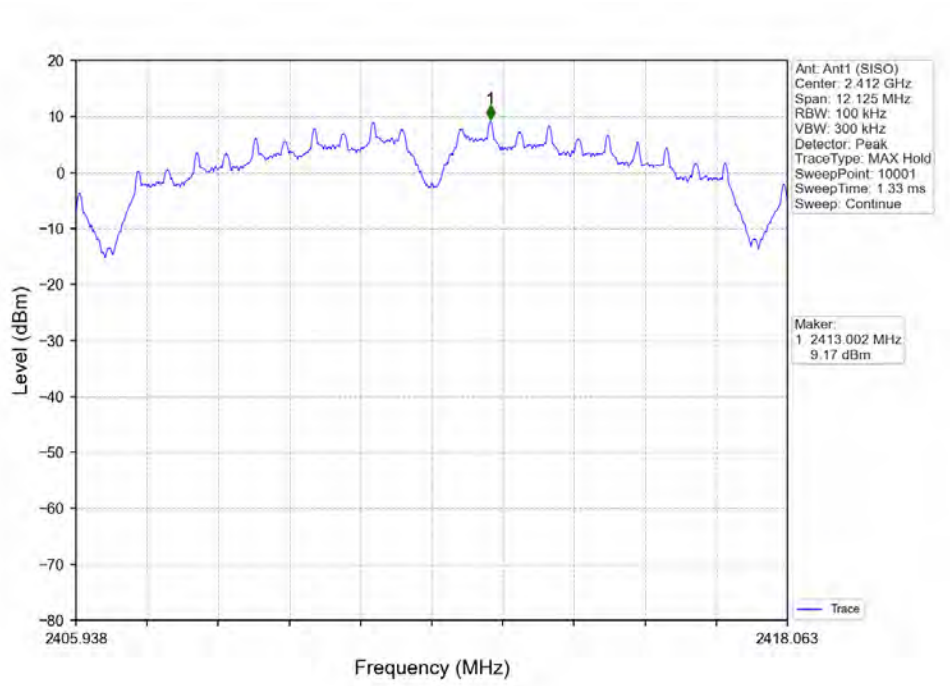
REF

TEST RESULT

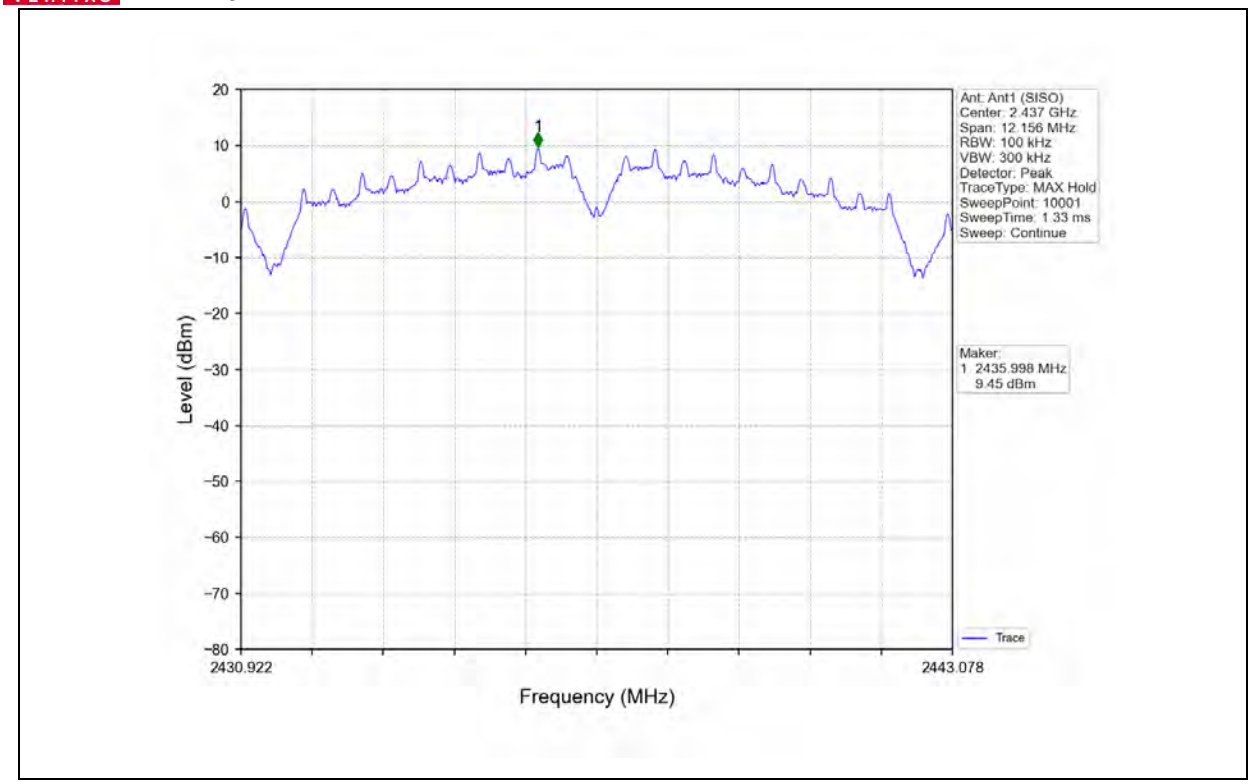
Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)
802.11b	SISO	2412	1	9.17
		2437	1	9.45
		2462	1	8.84
802.11g	SISO	2412	1	6.79
		2437	1	6.29
		2462	1	7.08
802.11n (HT20)	SISO	2412	1	5.38
		2437	1	4.60
		2462	1	5.09
802.11n (HT40)	SISO	2422	1	2.59
		2437	1	1.80
		2452	1	3.09
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

TEST GRAPH

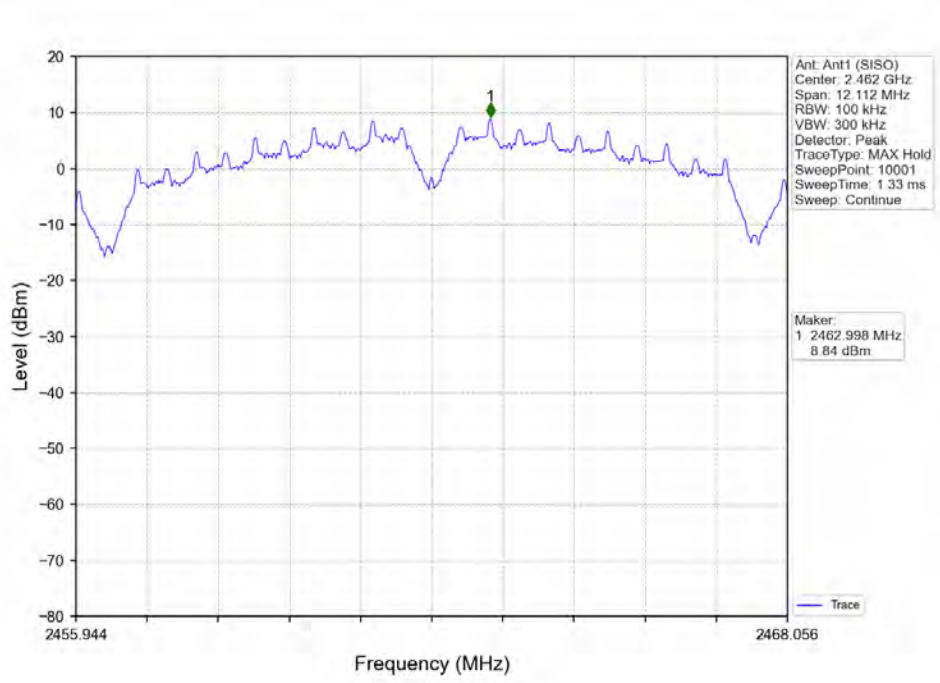
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



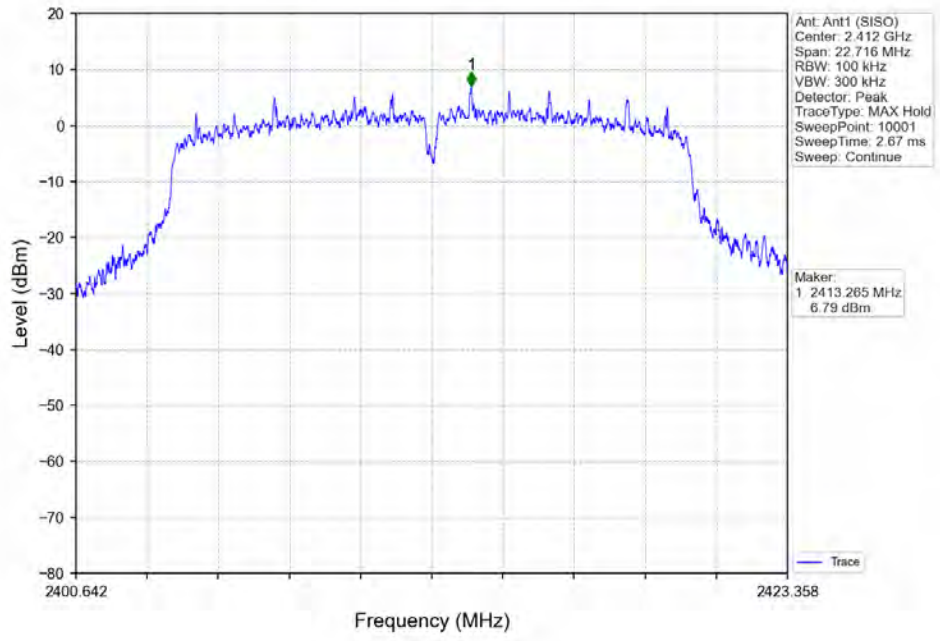
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV


Ant: Ant1 (SISO)
Center: 2.437 GHz
Span: 12.156 MHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 10001
SweepTime: 1.33 ms
Sweep: Continue
Maker:
1 2435.998 MHz
9.45 dBm
Trace
Level (dBm)
Frequency (MHz)
2430.922
2443.078

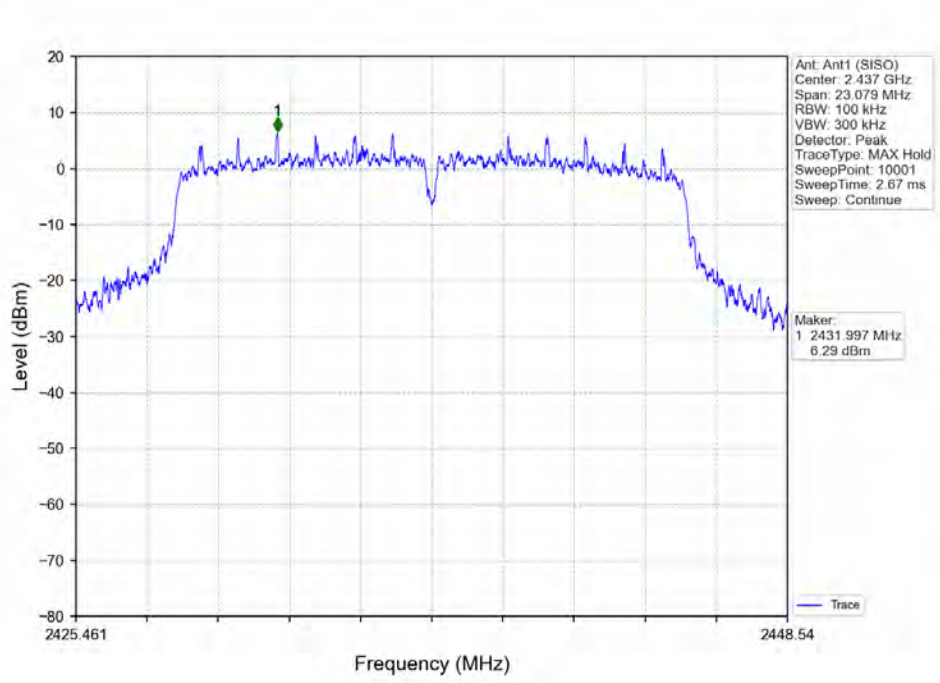
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



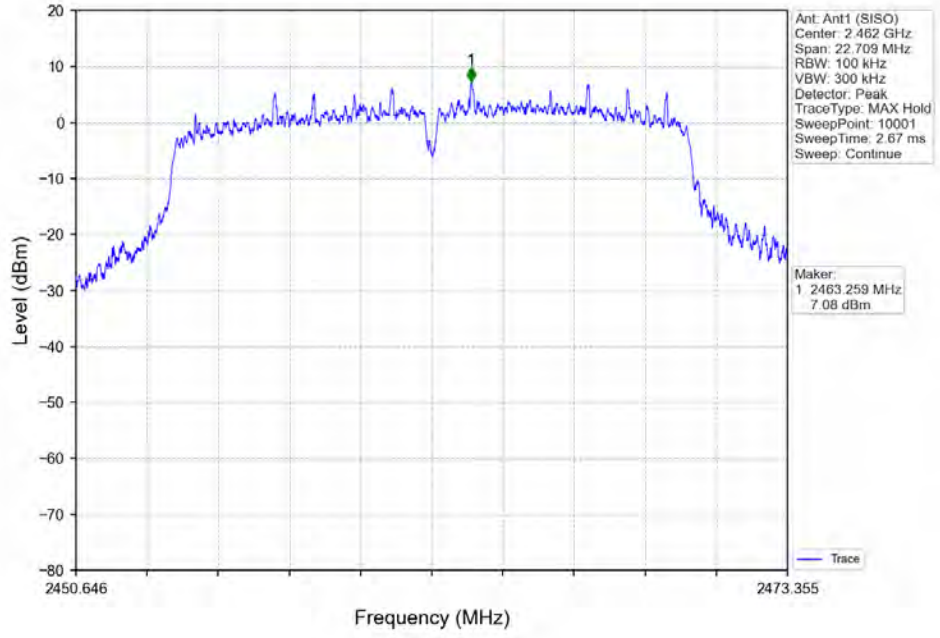
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



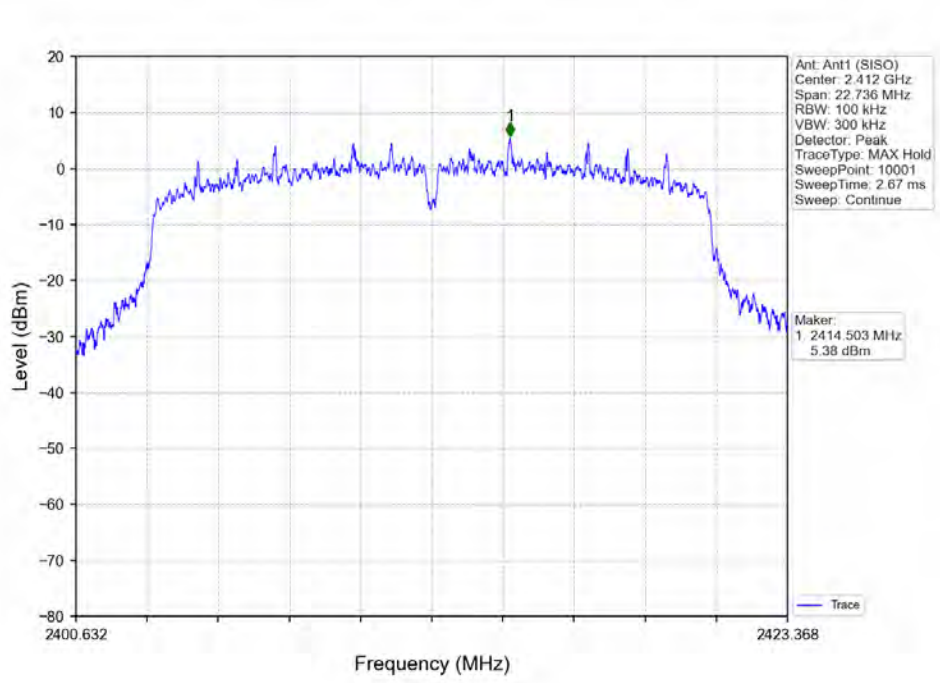
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



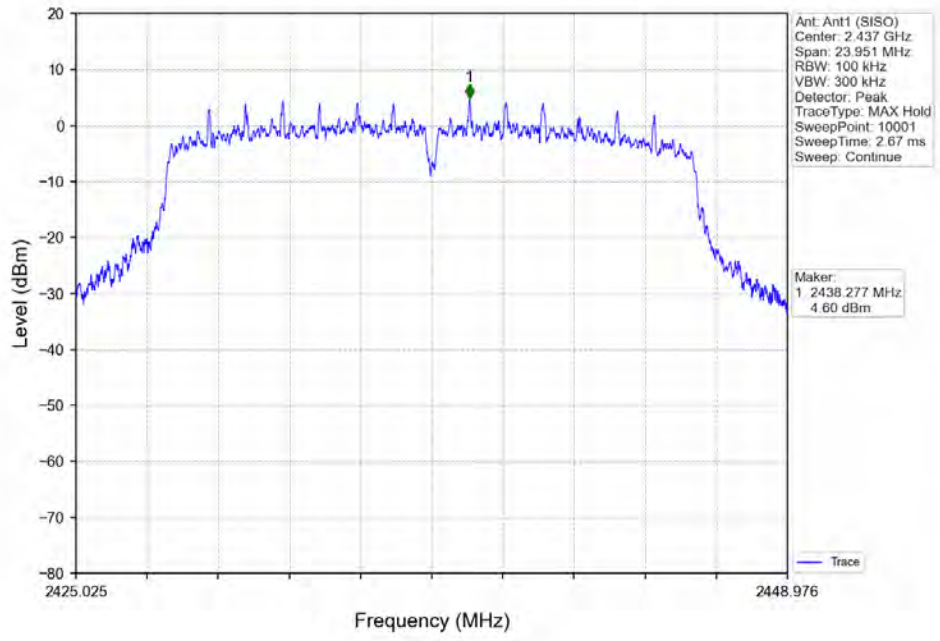
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



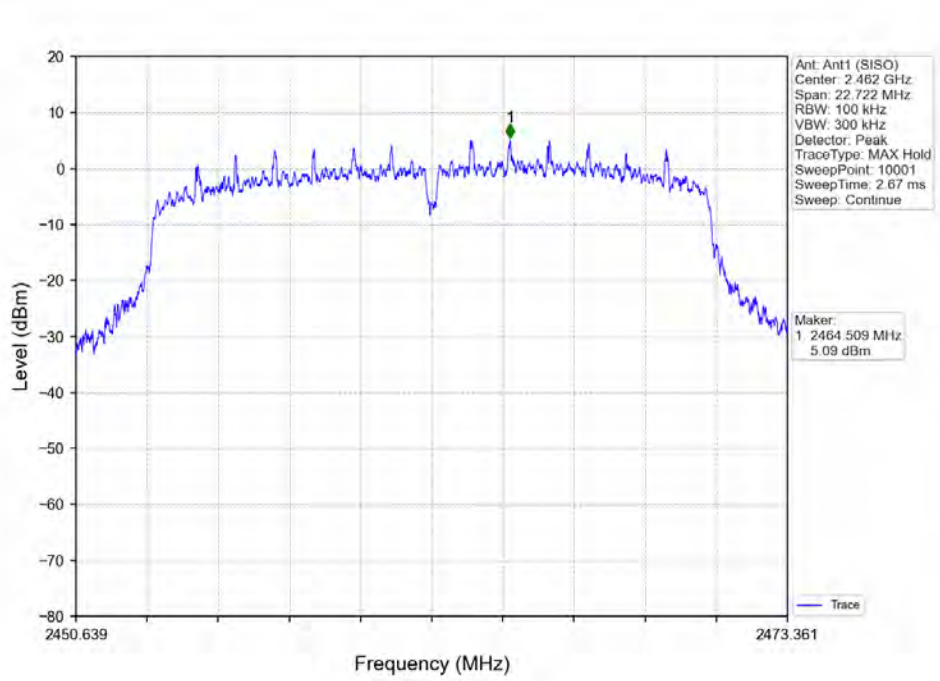
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



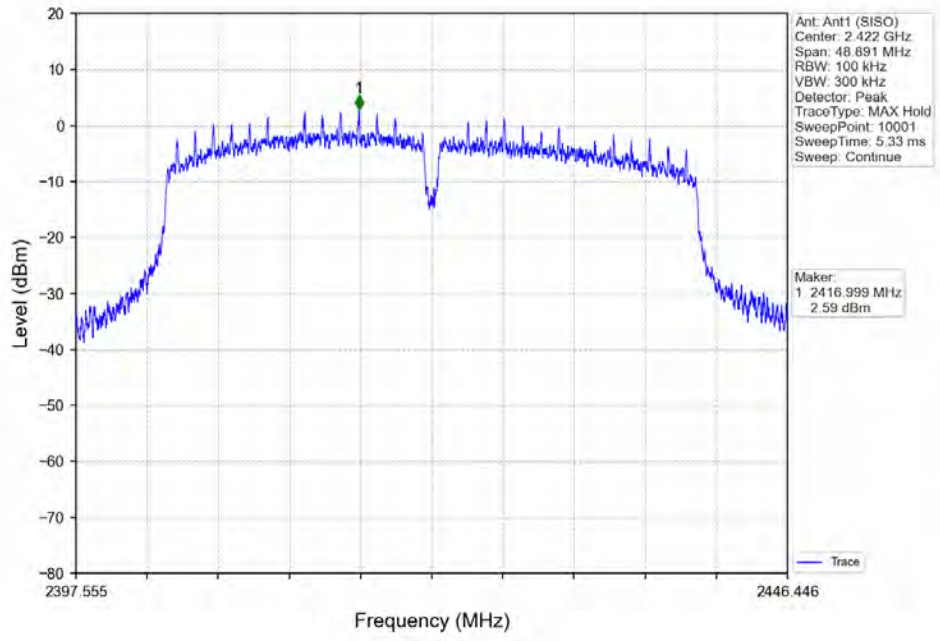
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



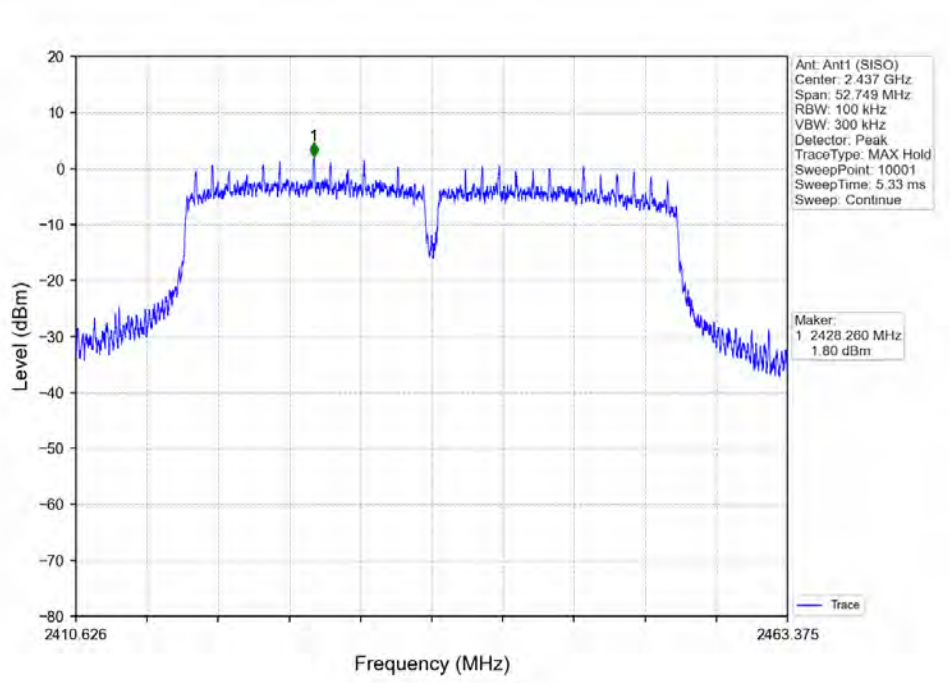
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



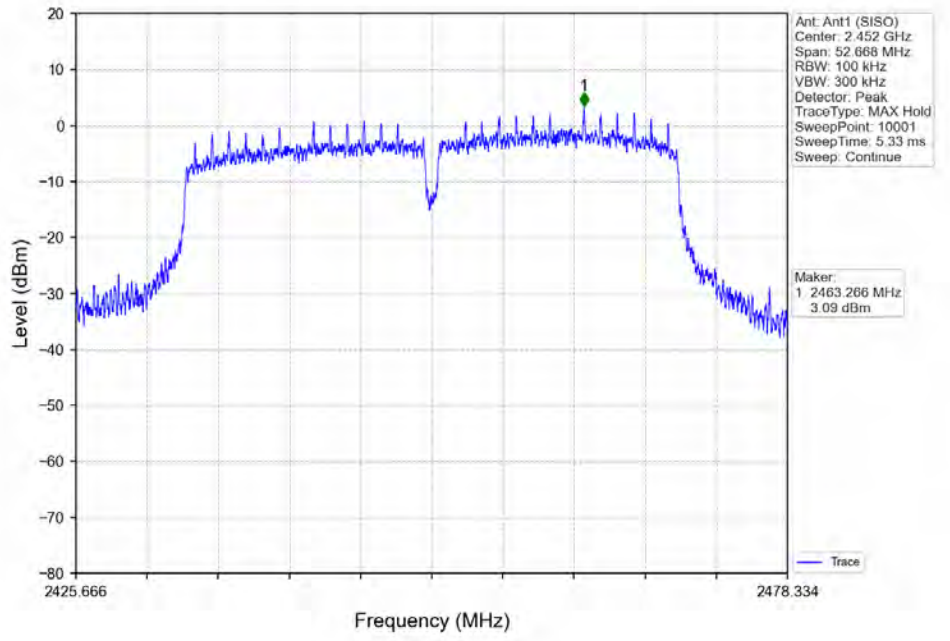
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV

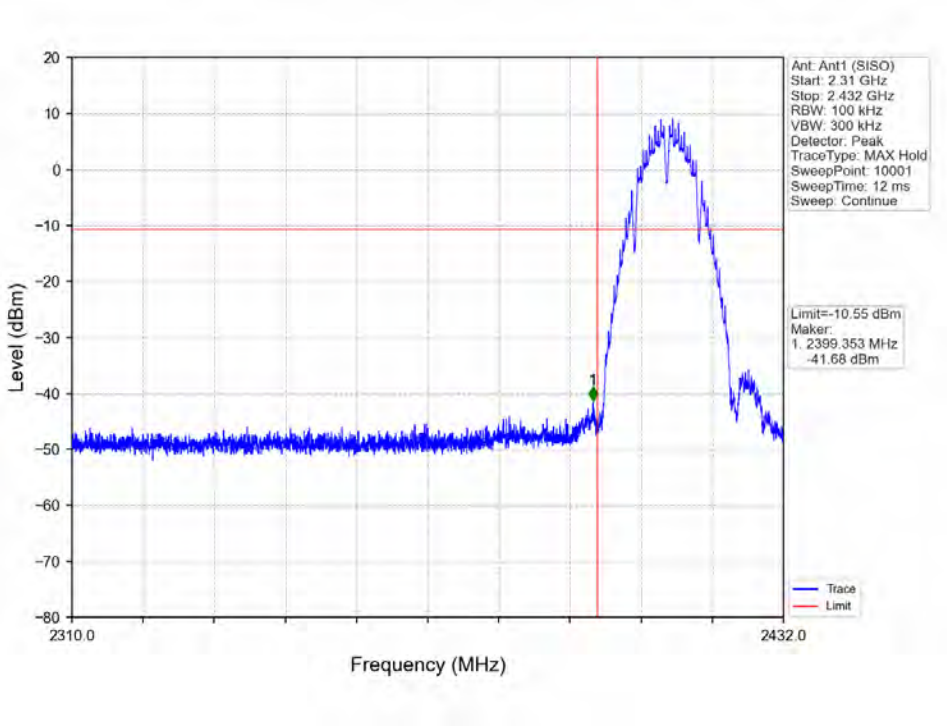


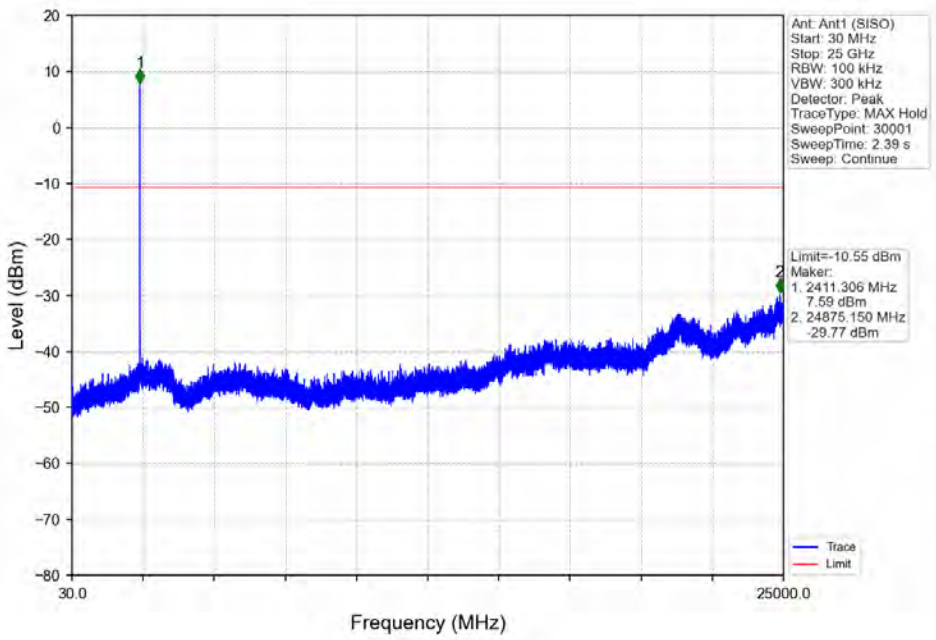
CSE

TEST RESULT

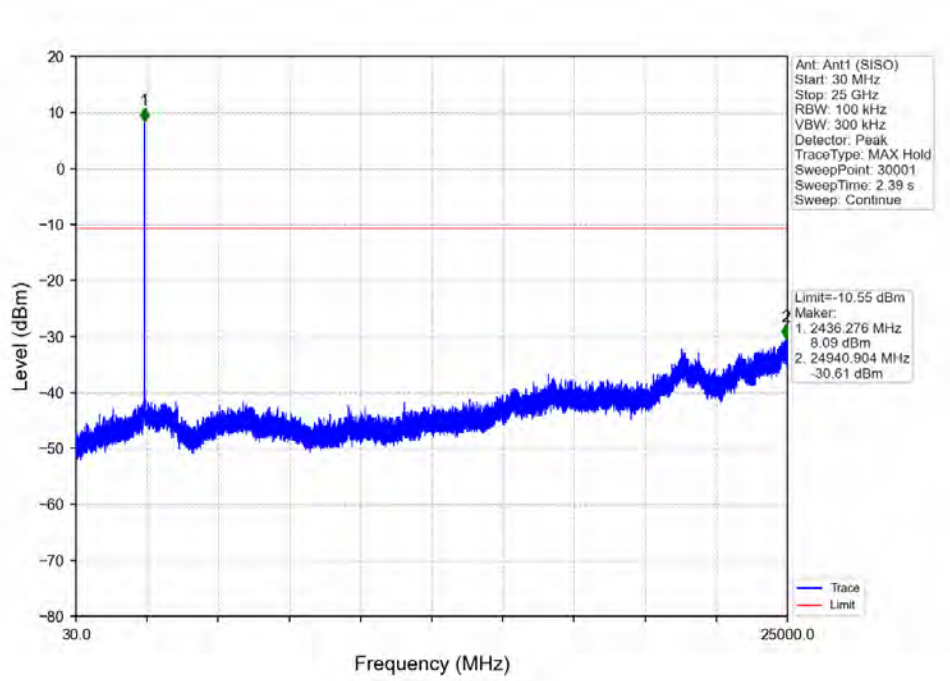
Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	9.45	-10.55	Pass
		2437	1	9.45	-10.55	Pass
		2462	1	9.45	-10.55	Pass
802.11g	SISO	2412	1	7.08	-12.92	Pass
		2437	1	7.08	-12.92	Pass
		2462	1	7.08	-12.92	Pass
802.11n (HT20)	SISO	2412	1	5.38	-14.62	Pass
		2437	1	5.38	-14.62	Pass
		2462	1	5.38	-14.62	Pass
802.11n (HT40)	SISO	2422	1	3.09	-16.91	Pass
		2437	1	3.09	-16.91	Pass
		2452	1	3.09	-16.91	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

Test Graph

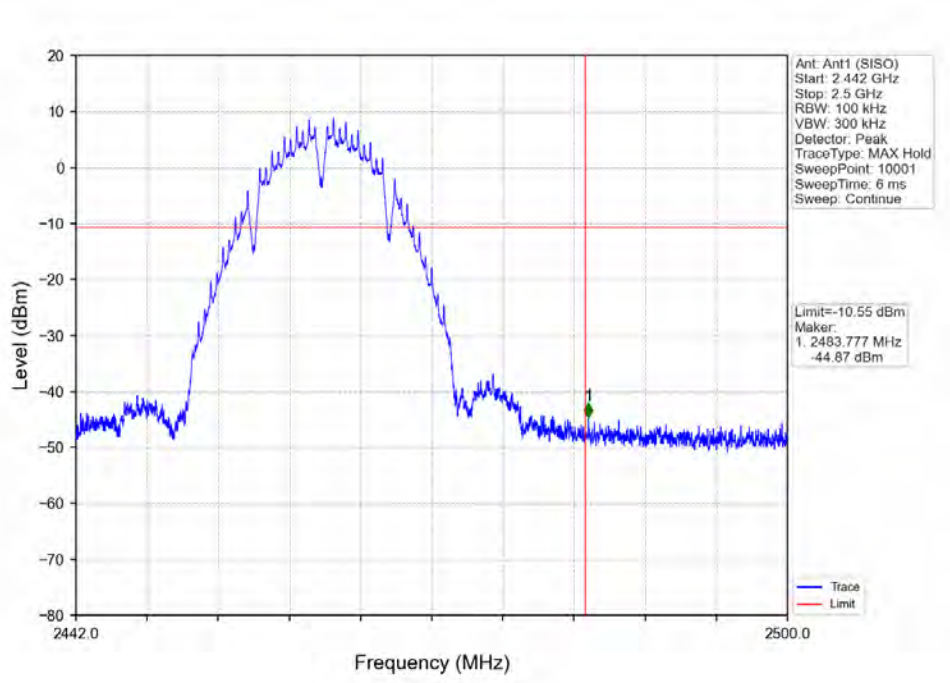
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV


Ant: Ant1 (SISO)
Start: 30 MHz
Stop: 25 GHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 30001
SweepTime: 2.39 s
Sweep: Continue
Limit=-10.55 dBm
Maker:
1. 2411.306 MHz
7.59 dBm
2. 24875.150 MHz
-29.77 dBm
Trace
Limit
Level (dBm)
Frequency (MHz)
30.0
25000.0

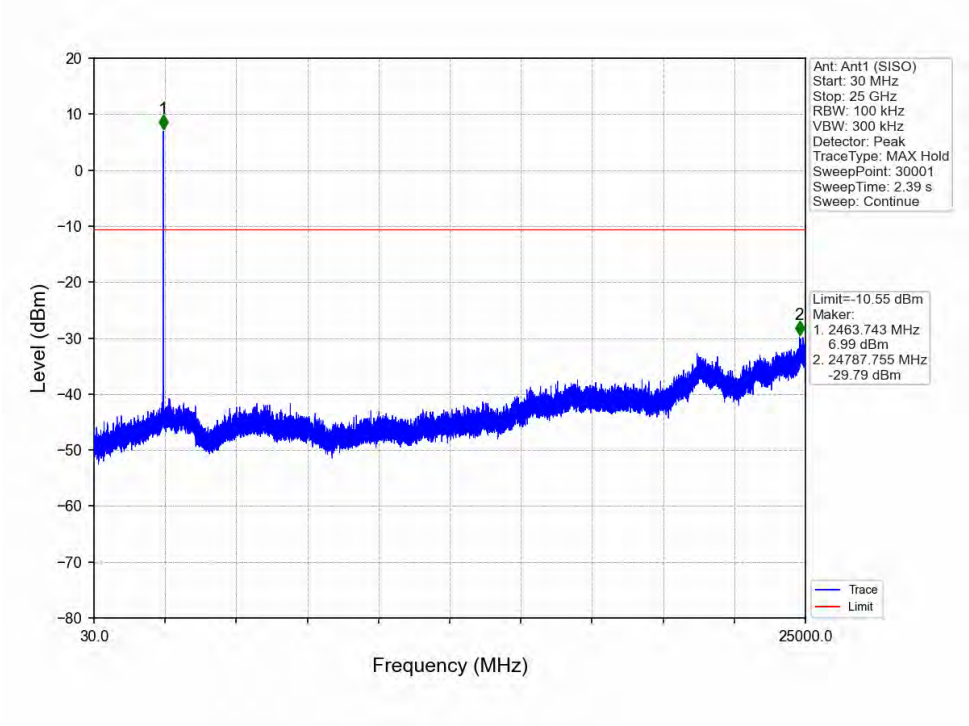
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



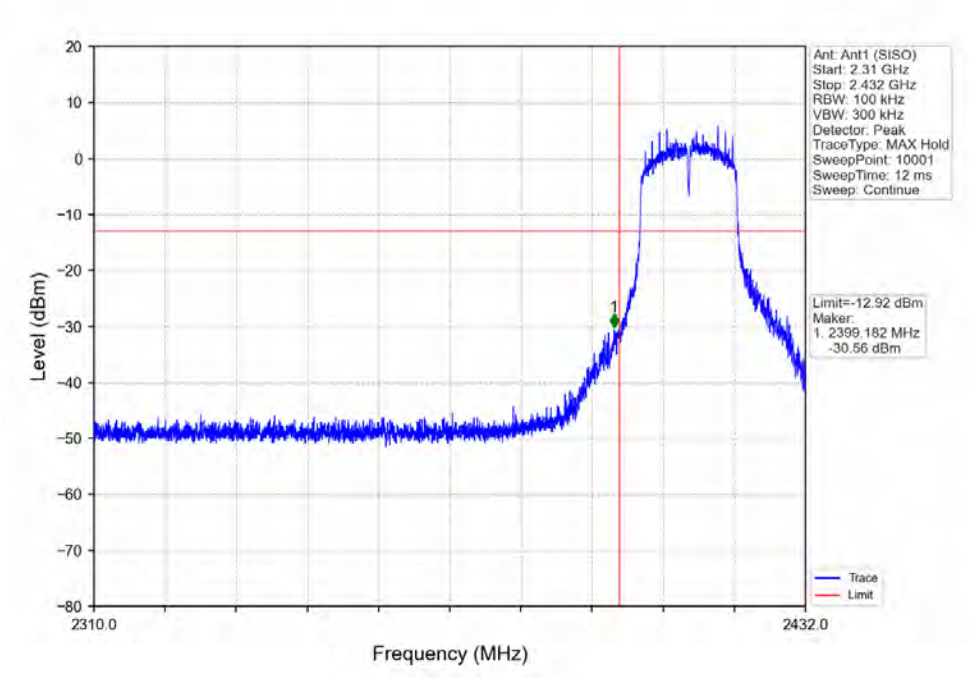
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



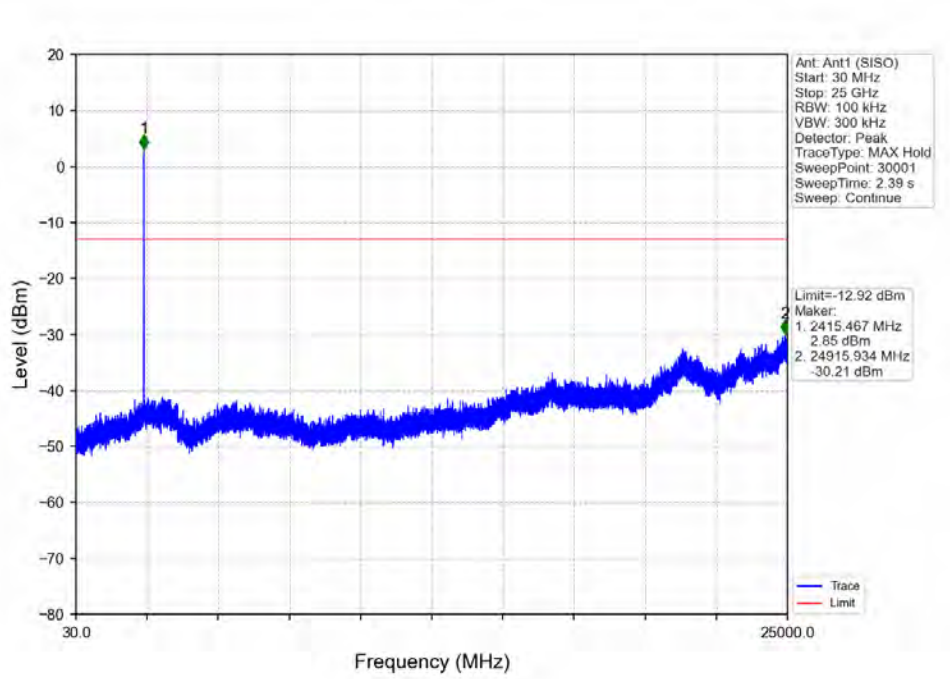
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



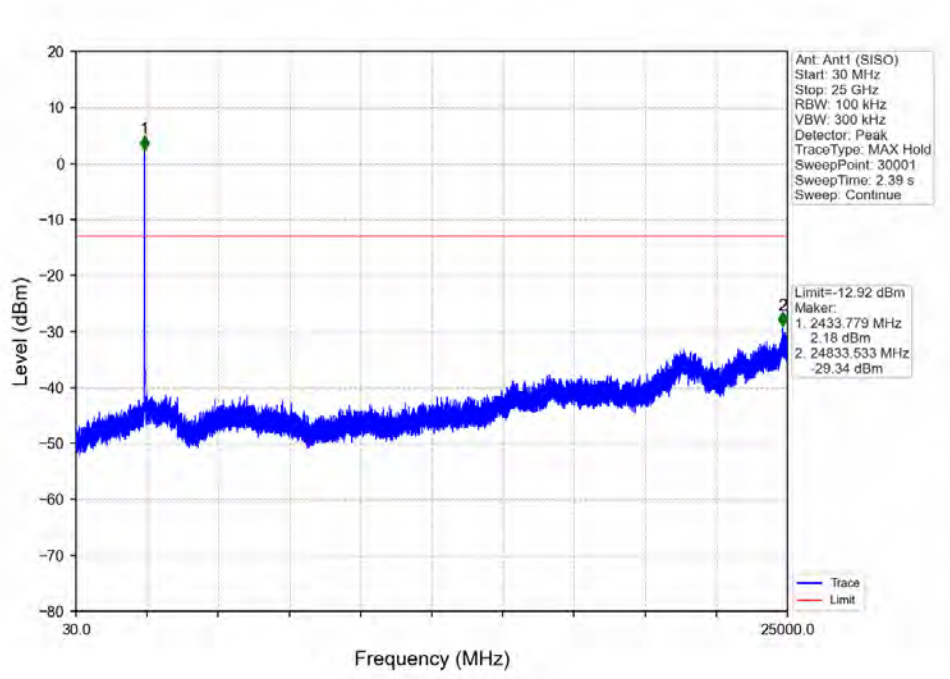
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



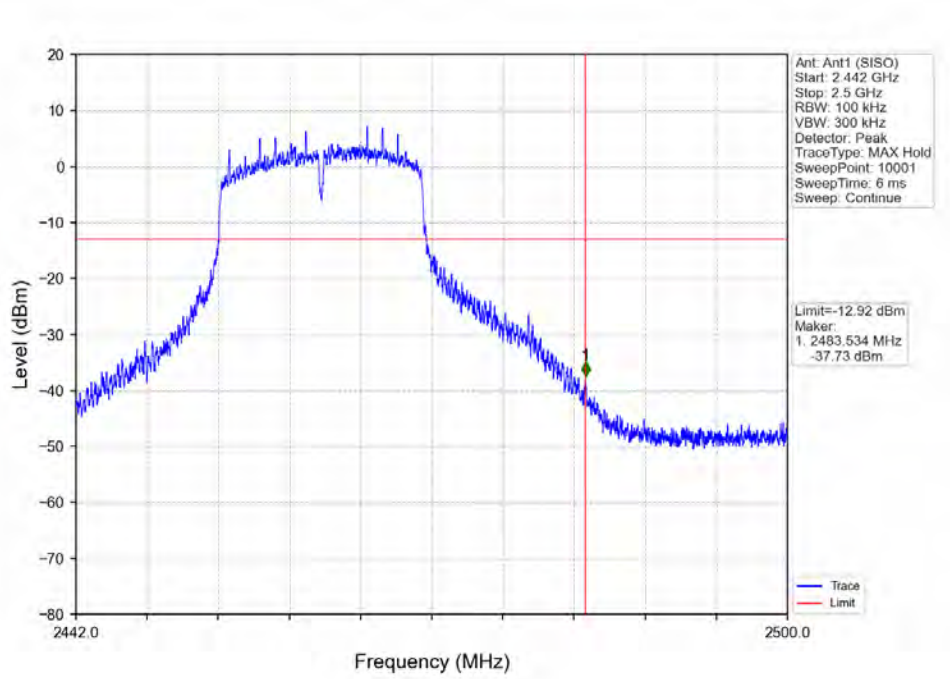
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



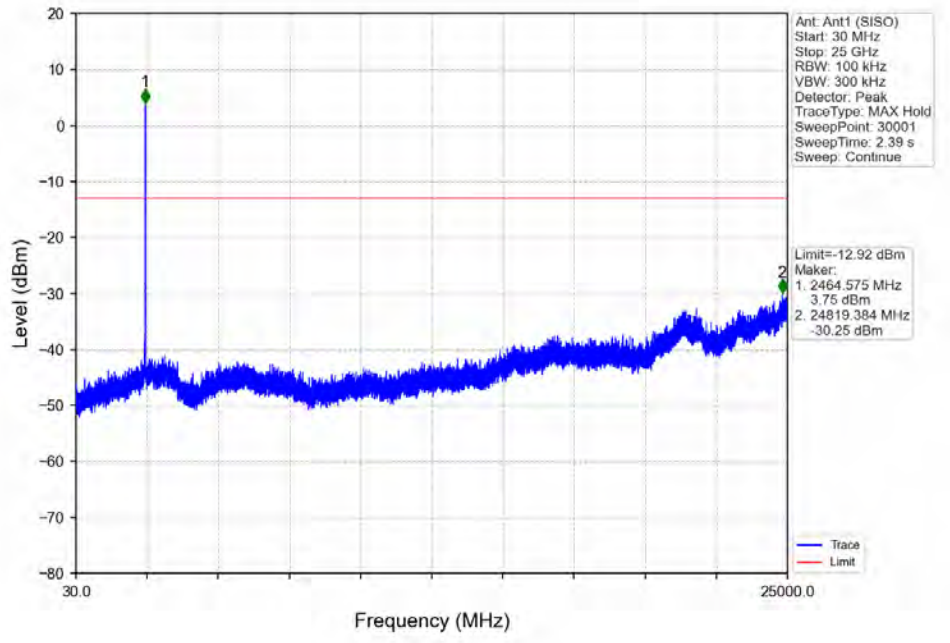
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



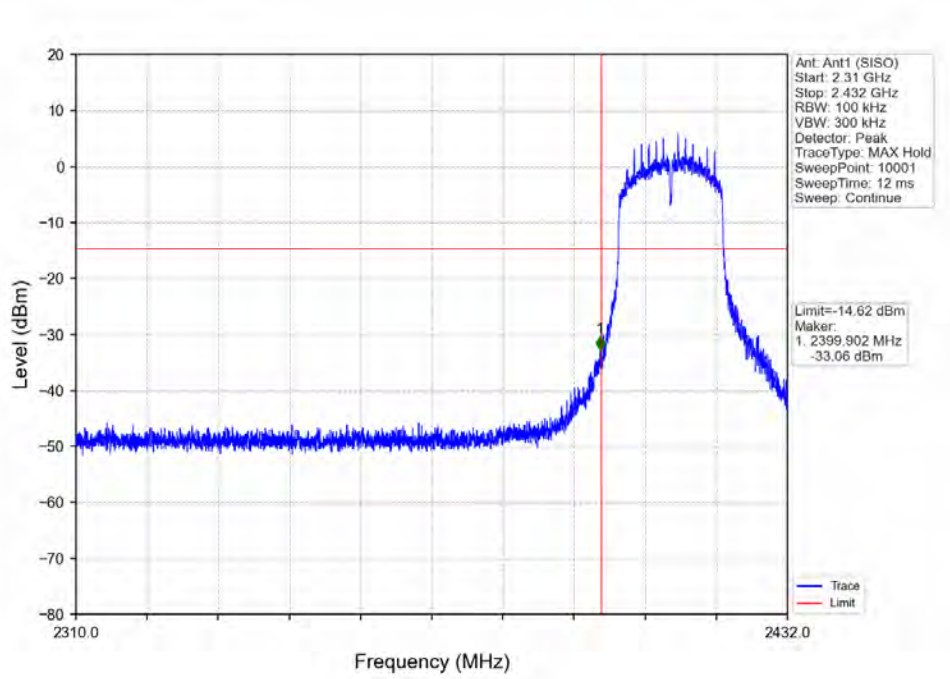
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



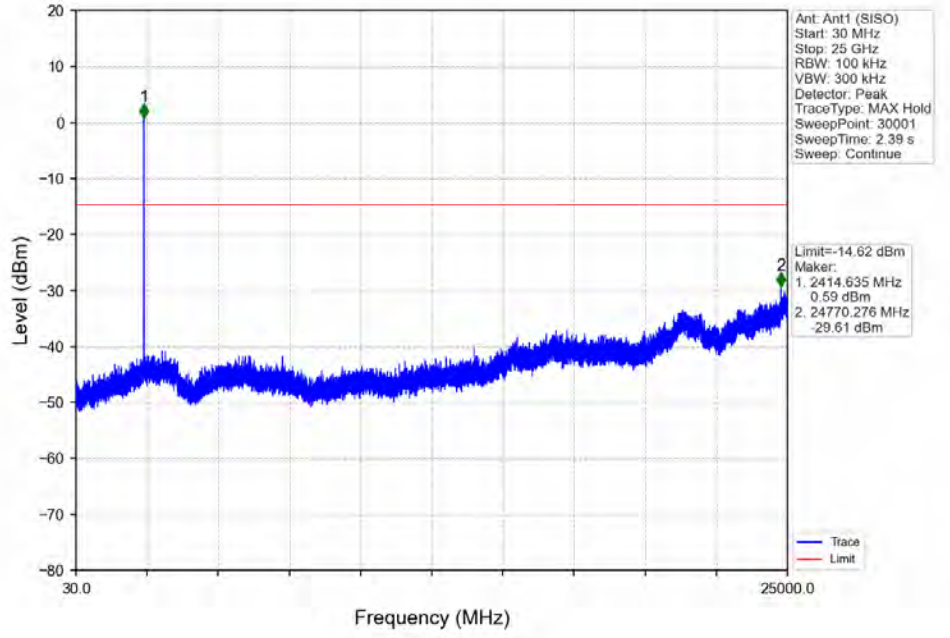
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



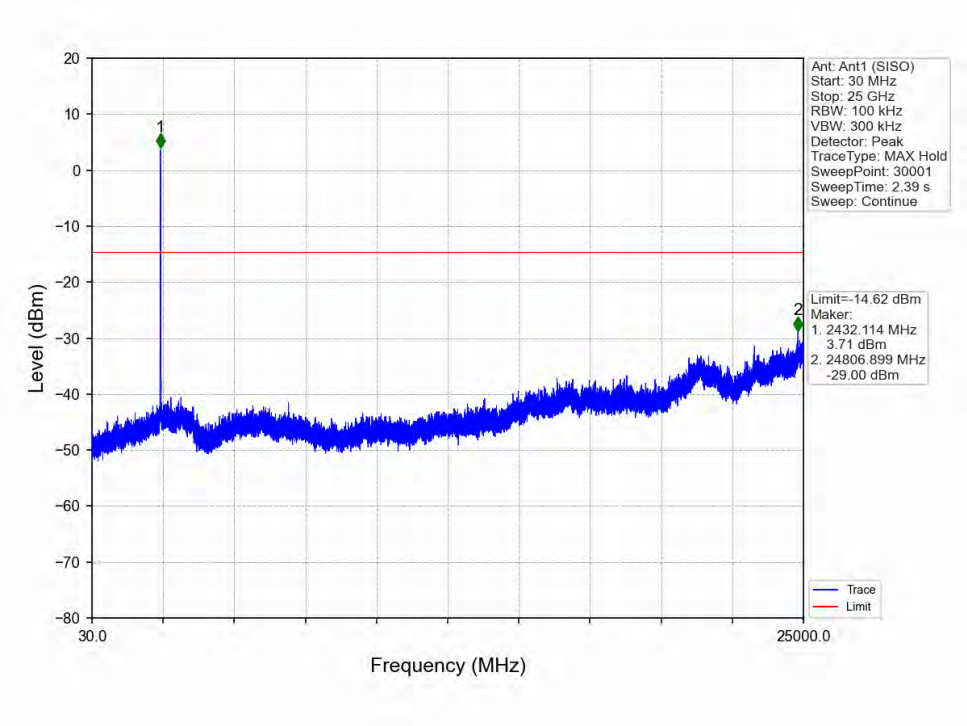
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



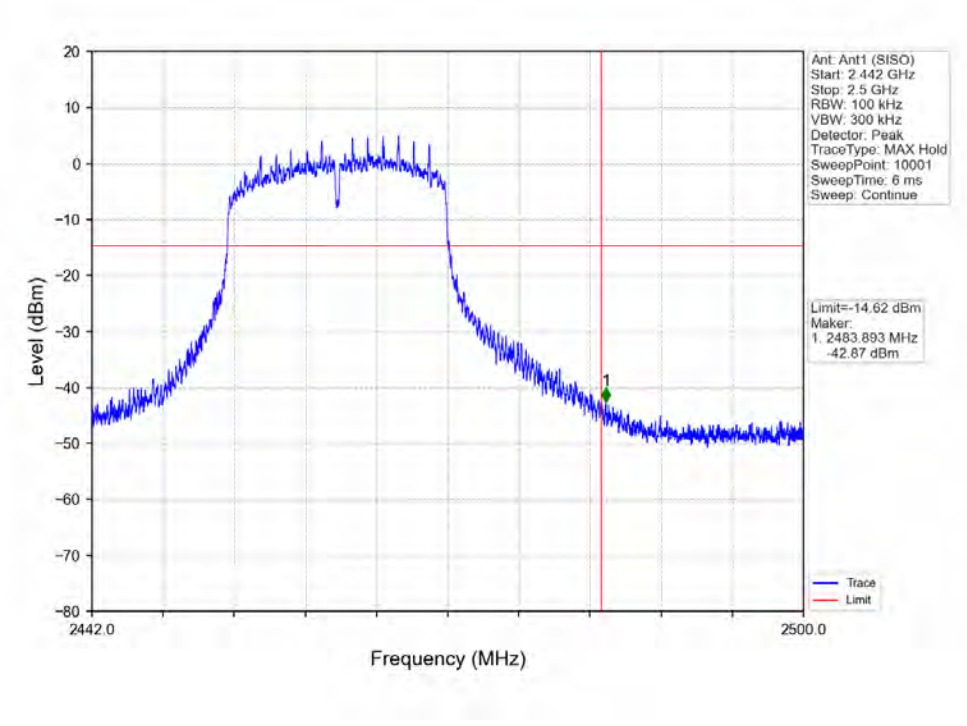
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



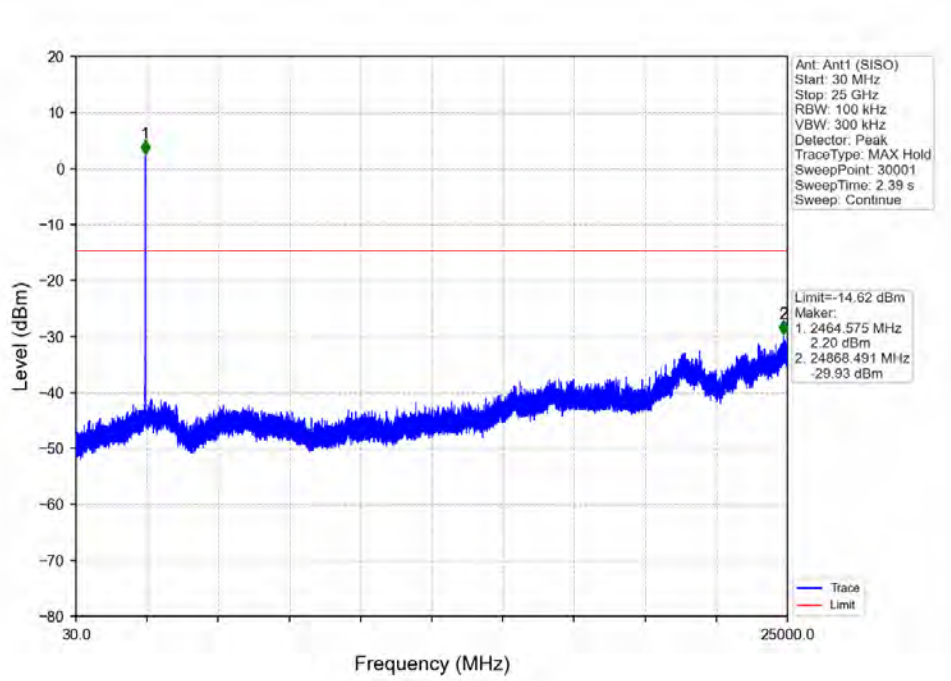
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



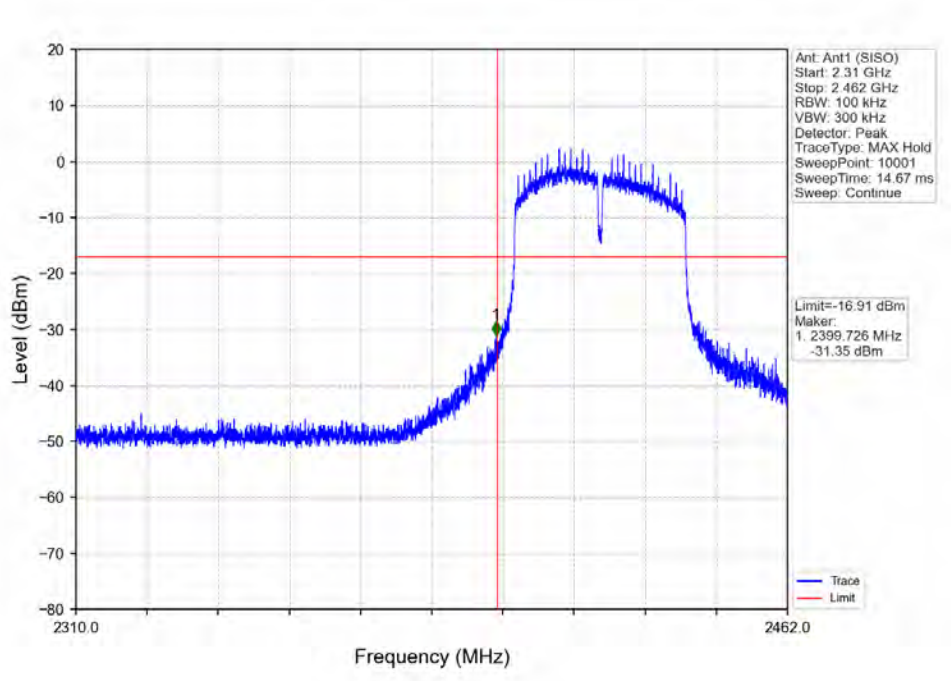
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



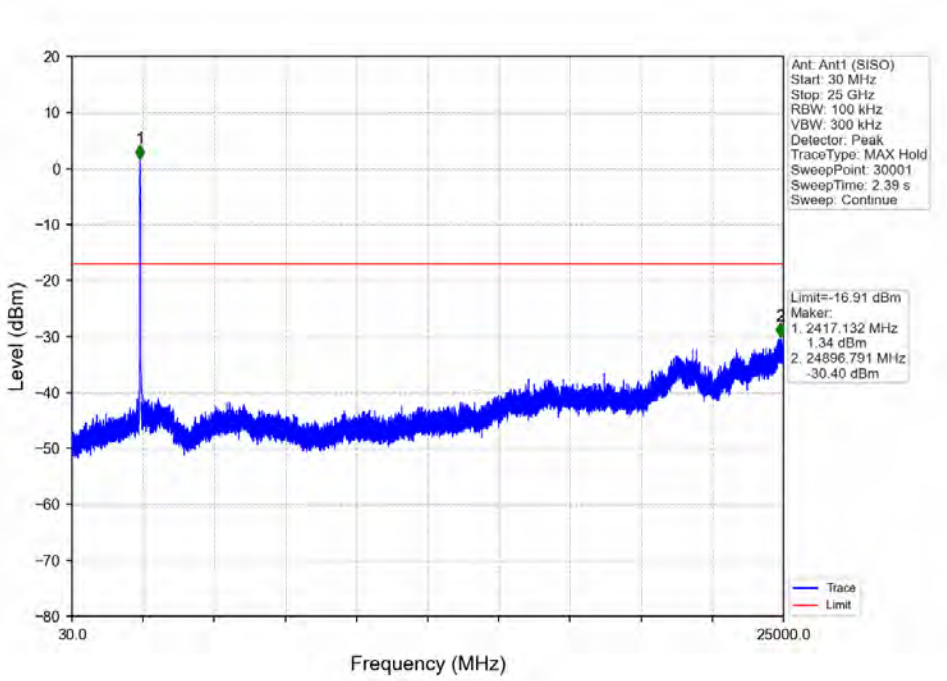
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



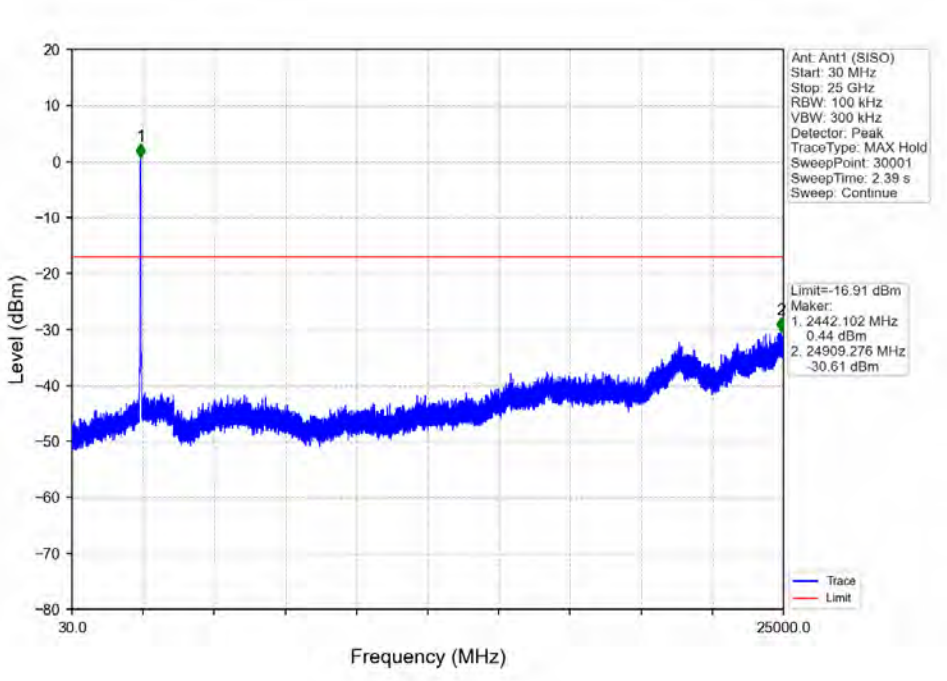
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



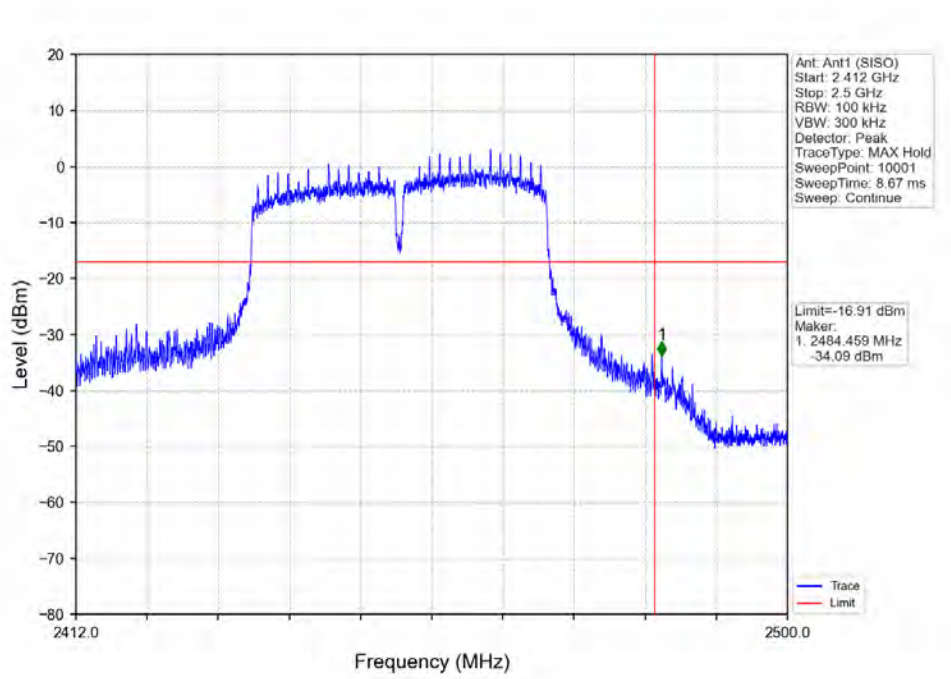
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



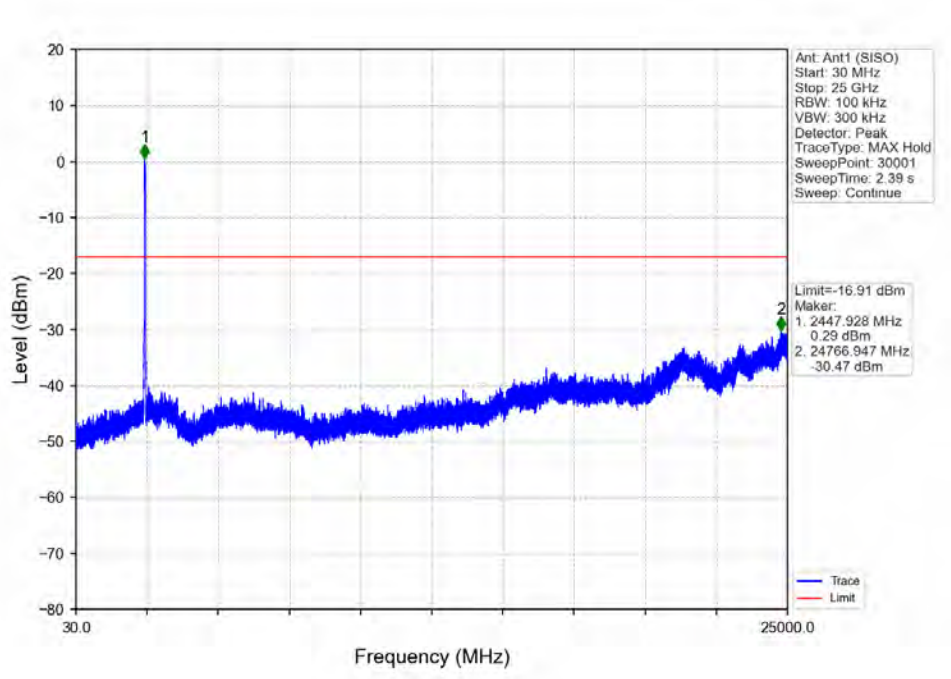
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



APPENDIX B：2.4G BLE

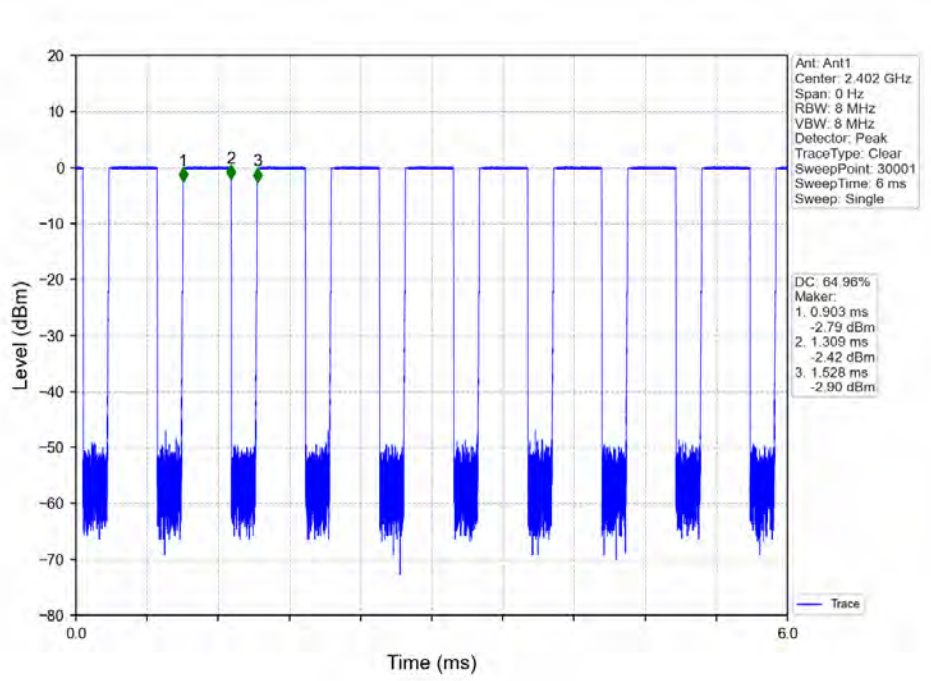
BLE-1M

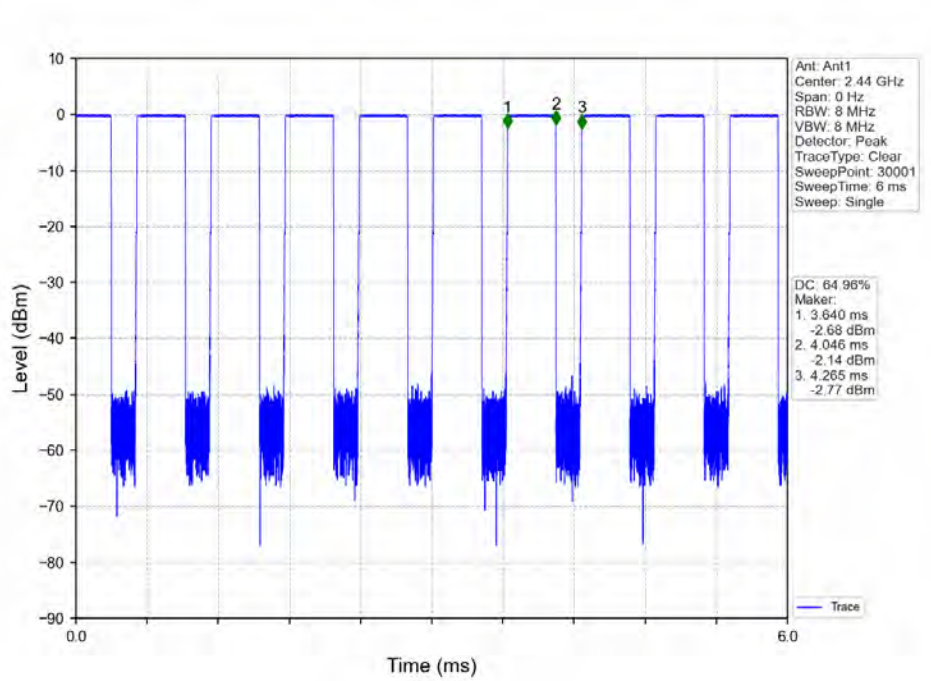
DUTY CYCLE

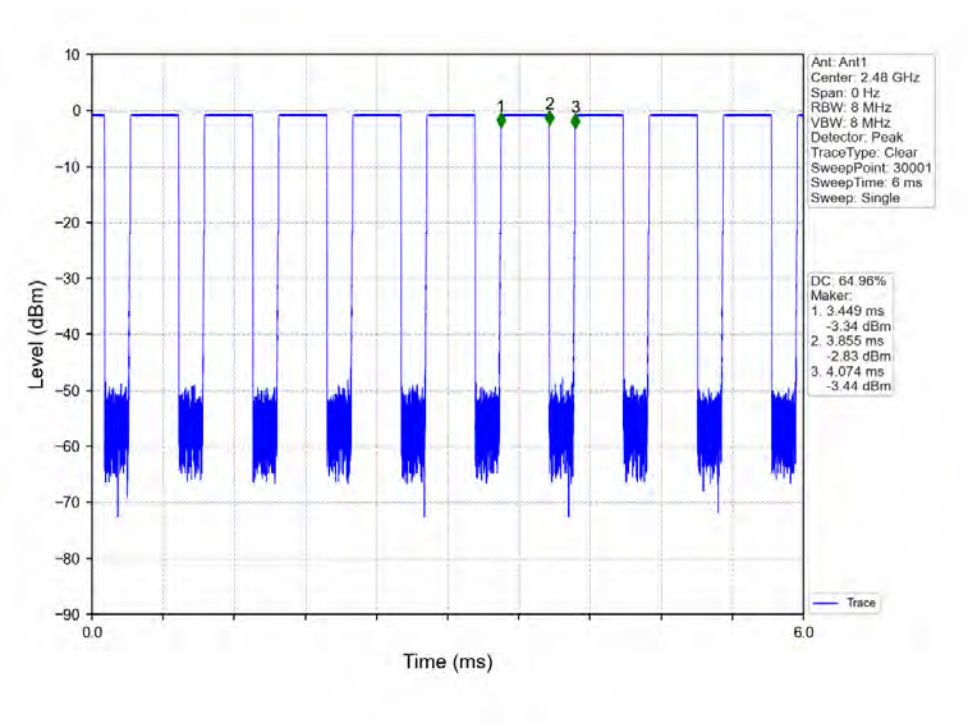
TEST RESULT

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	0.406	0.625	64.96	1.87	0.03
		2440	0.406	0.625	64.96	1.87	0.03
		2480	0.406	0.625	64.96	1.87	0.03

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_MCH_2440MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Center: 2.44 GHz
Span: 0 Hz
RBW: 8 MHz
VBW: 8 MHz
Detector: Peak
TraceType: Clear
SweepPoint: 30001
SweepTime: 6 ms
Sweep: Single
DC: 64.96%
Maker:
1. 3.640 ms
-2.68 dBm
2. 4.046 ms
-2.14 dBm
3. 4.265 ms
-2.77 dBm
Trace
Level (dBm)
Time (ms)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0.0
6.0
1
2
3

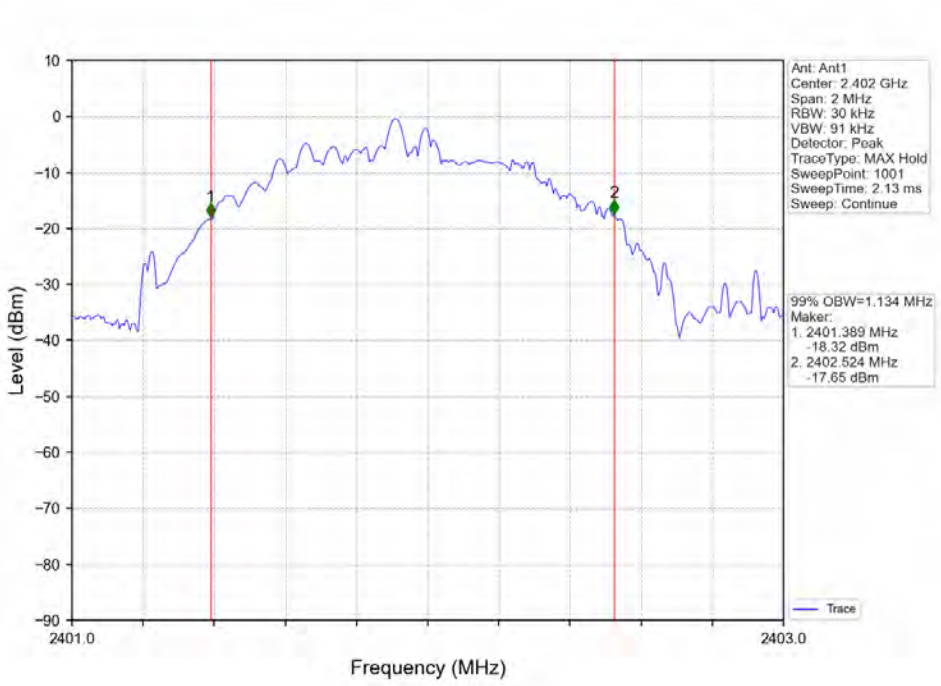
1M_HCH_2480MHz_DataRate=_Ant1_NTNV


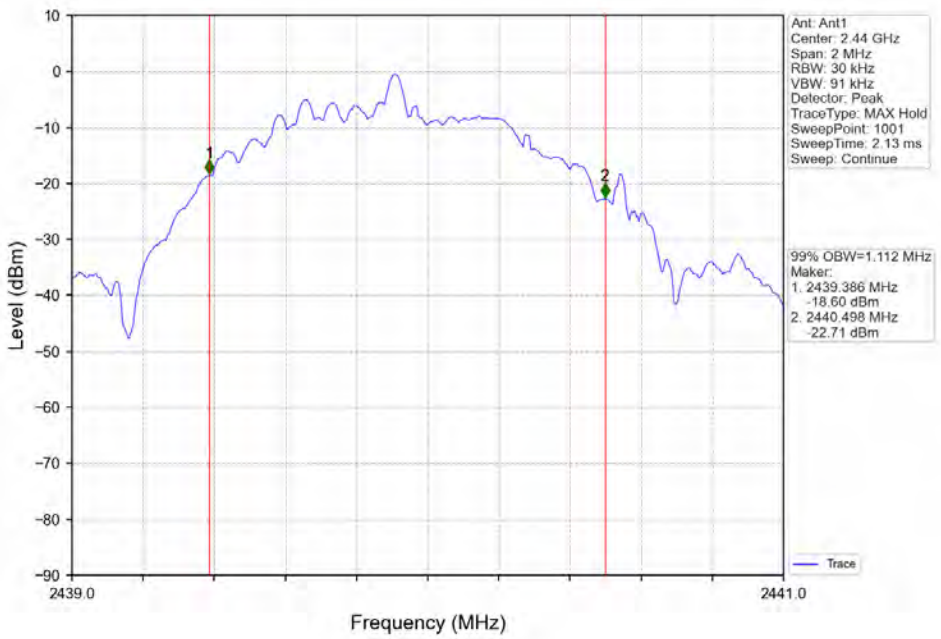
OBW_BANDWIDTH

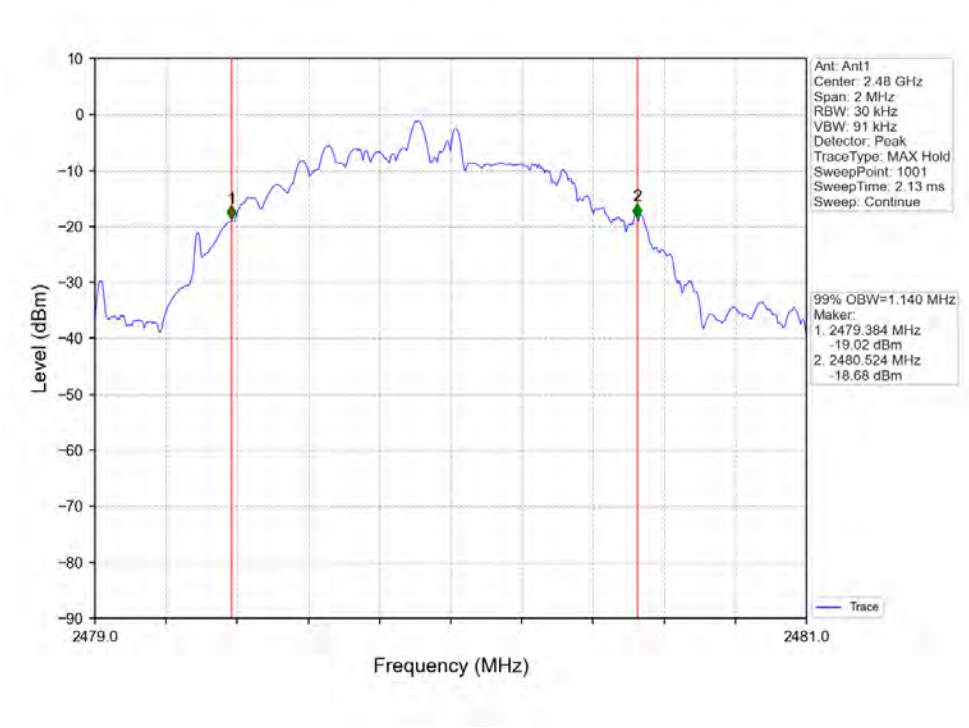
TEST RESULT

Mode	TX Type	Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz) Result	Verdict
1M	SISO	2402	1	1.134	Pass
		2440	1	1.112	Pass
		2480	1	1.140	Pass

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_MCH_2440MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Center: 2.44 GHz
Span: 2 MHz
RBW: 30 kHz
VBW: 91 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 2.13 ms
Sweep: Continue
99% OBW=1.112 MHz
Maker:
1. 2439.386 MHz
-18.60 dBm
2. 2440.498 MHz
-22.71 dBm
Trace
Level (dBm)
Frequency (MHz)
2439.0
2441.0

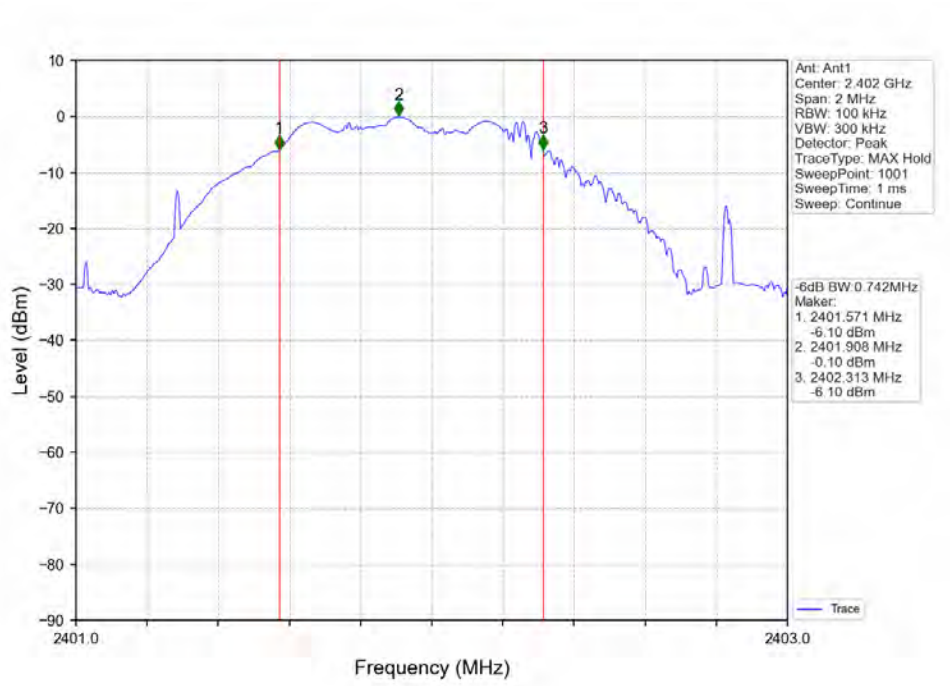
1M_HCH_2480MHz_DataRate=_Ant1_NTNV


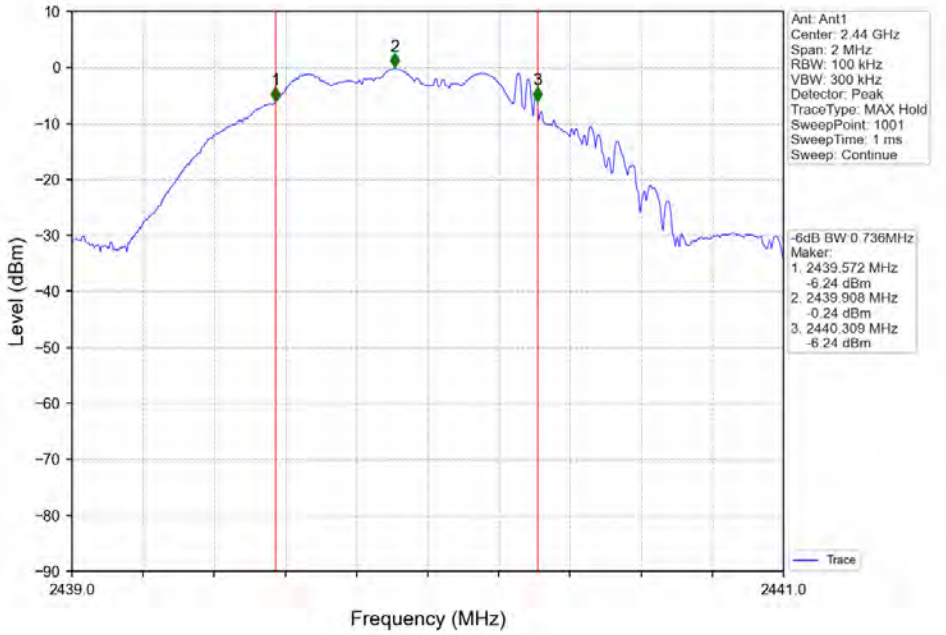
6DB BW

TEST RESULT

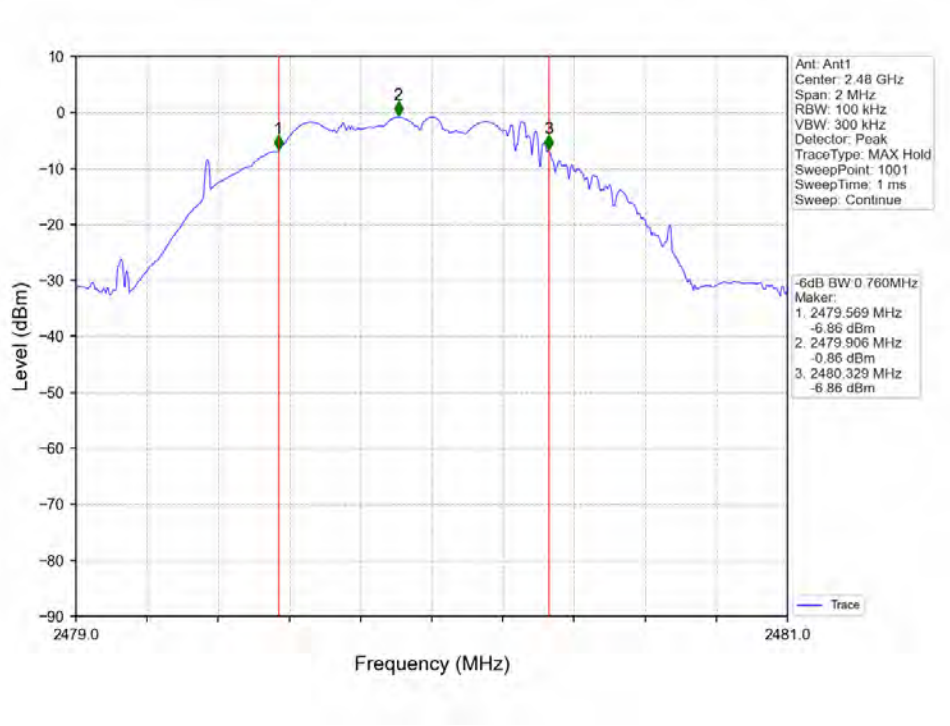
Mode	TX Type	Frequency (MHz)	Ant	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.742	>=0.5	Pass
		2440	1	0.736	>=0.5	Pass
		2480	1	0.760	>=0.5	Pass

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_MCH_2440MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Center: 2.44 GHz
Span: 2 MHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
-6dB BW 0.736MHz
Maker:
1. 2439.572 MHz
-6.24 dBm
2. 2439.908 MHz
-0.24 dBm
3. 2440.309 MHz
-6.24 dBm
Trace
Level (dBm)
Frequency (MHz)
2439.0
2441.0

1M_HCH_2480MHz_DataRate=_Ant1_NTNV



MAXIMUM CONDUCTED OUTPUT POWER

PEAK_POWER

TEST RESULT

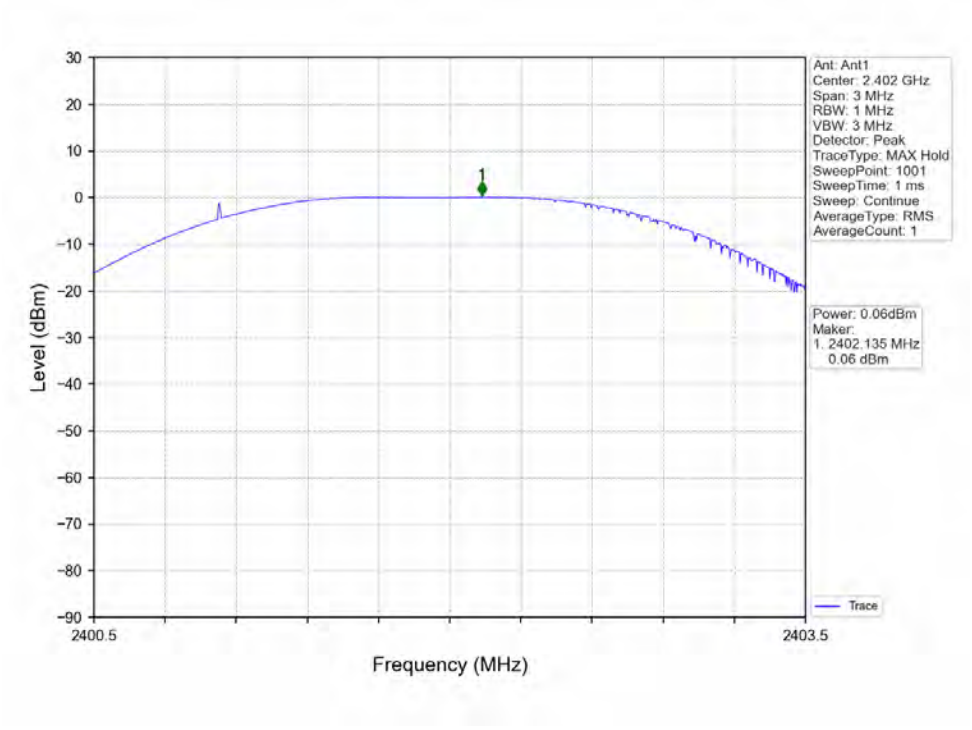
Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power			Verdict
			Ant1(dBm)	Ant1(mw)	Limit(dBm)	
1M	SISO	2402	0.06	1.01	<=30	Pass
		2440	-0.02	1.00	<=30	Pass
		2480	-0.72	0.85	<=30	Pass

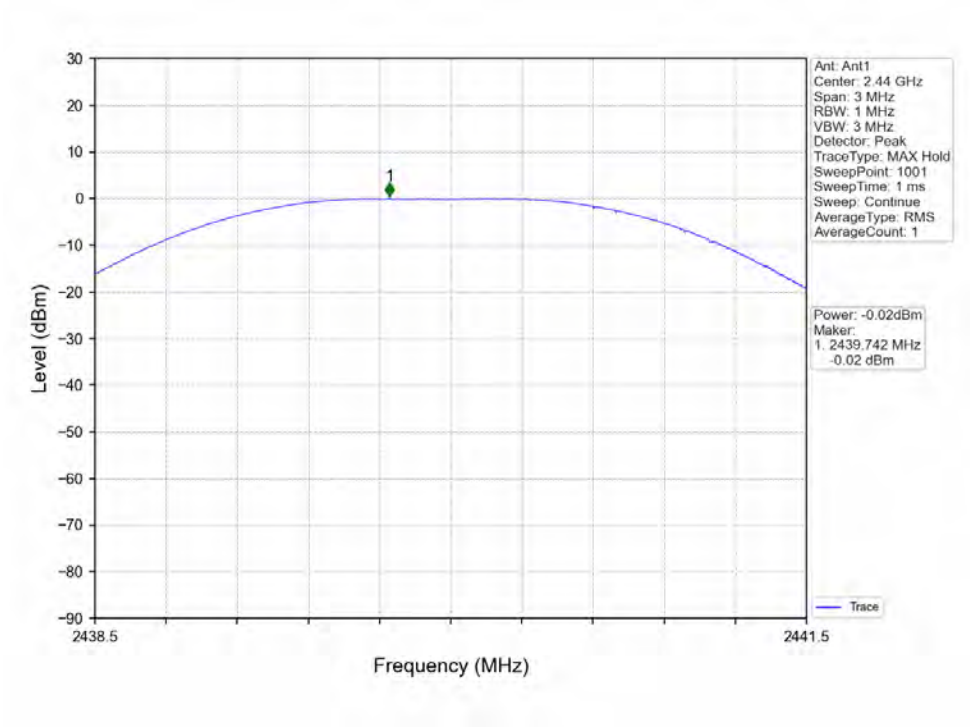
AVERAGE_POWER

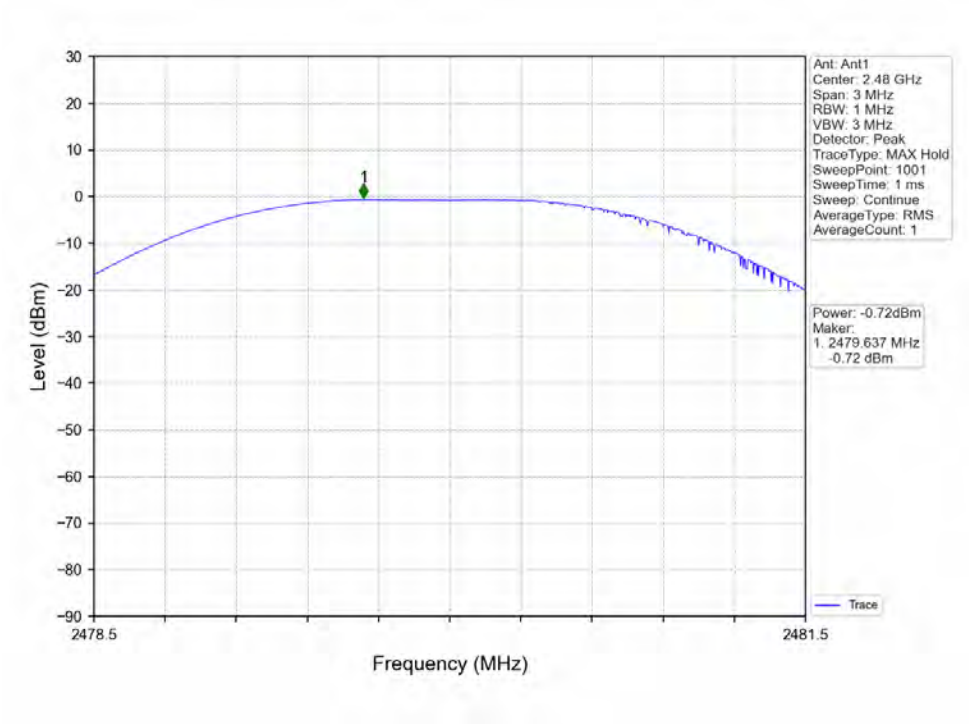
TEST RESULT

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power		Verdict
			Ant1(dBm)	Limit(dBm)	
1M	SISO	2402	-1.92	/	Pass
		2440	-2.00	/	Pass
		2480	-2.80	/	Pass

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_MCH_2440MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Center: 2.44 GHz
Span: 3 MHz
RBW: 1 MHz
VBW: 3 MHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
AverageType: RMS
AverageCount: 1
Power: -0.02dBm
Maker:
1. 2439.742 MHz
-0.02 dBm
Trace
Level (dBm)
Frequency (MHz)
2438.5
2441.5

1M_HCH_2480MHz_DataRate=_Ant1_NTNV


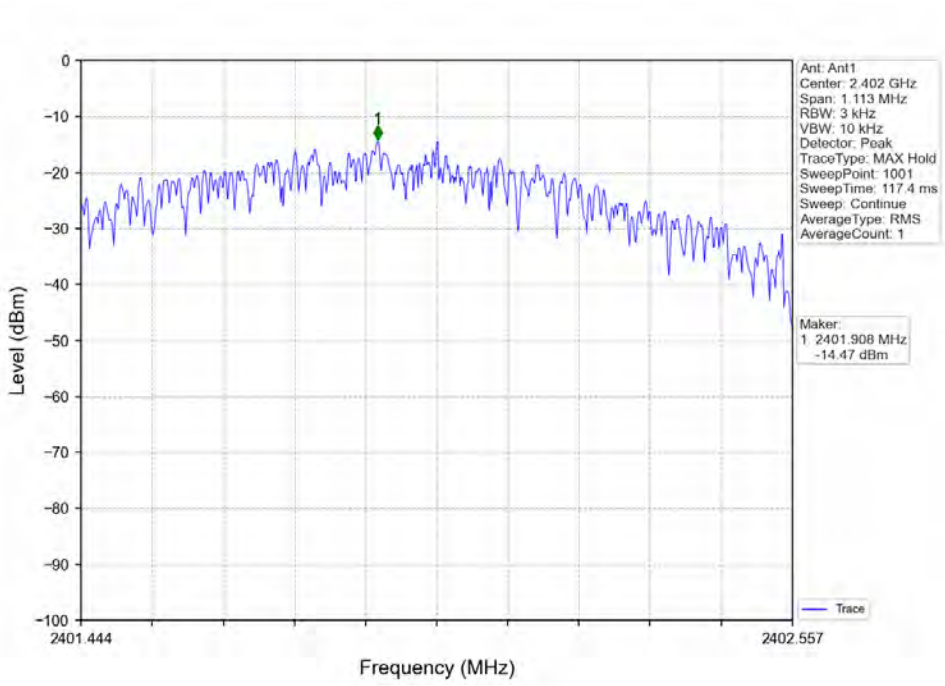
MAXIMUM POWER SPECTRAL DENSITY

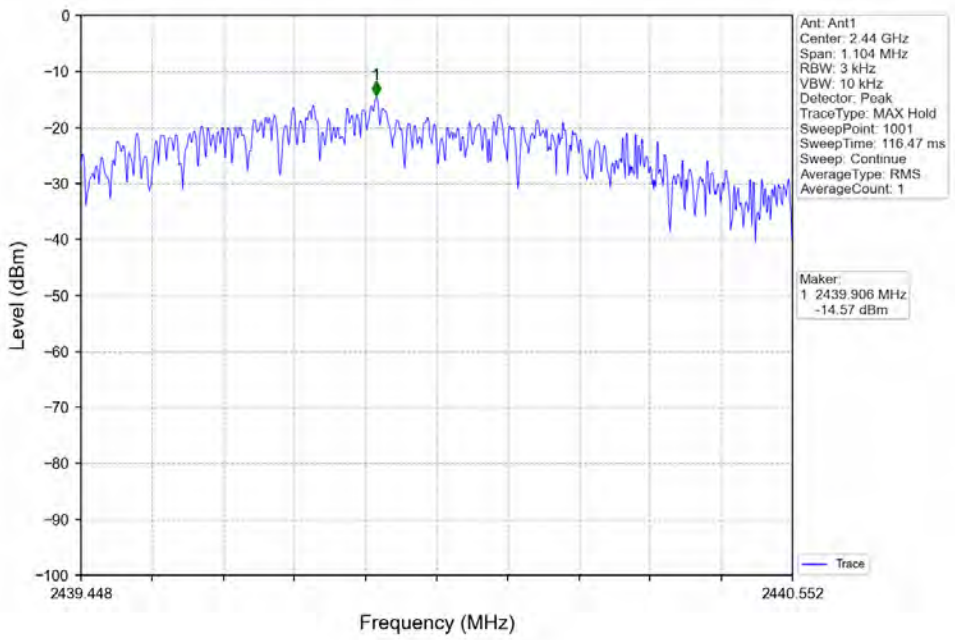
PSD

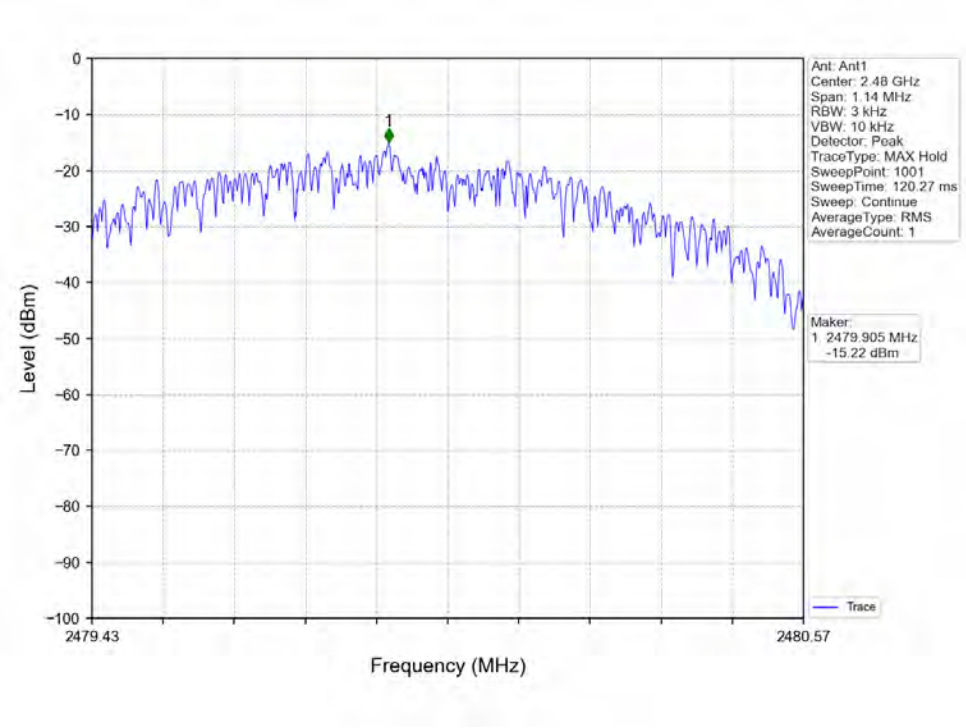
TEST RESULT

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			Ant1	Limit	
1M	SISO	2402	-14.47	<=8	Pass
		2440	-14.57	<=8	Pass
		2480	-15.22	<=8	Pass

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_MCH_2440MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Center: 2.44 GHz
Span: 1.104 MHz
RBW: 3 kHz
VBW: 10 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 116.47 ms
Sweep: Continue
AverageType: RMS
AverageCount: 1
Maker:
1 2439.906 MHz
-14.57 dBm
Trace
Level (dBm)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
2439.448
2440.552
Frequency (MHz)

1M_HCH_2480MHz_DataRate=_Ant1_NTNV


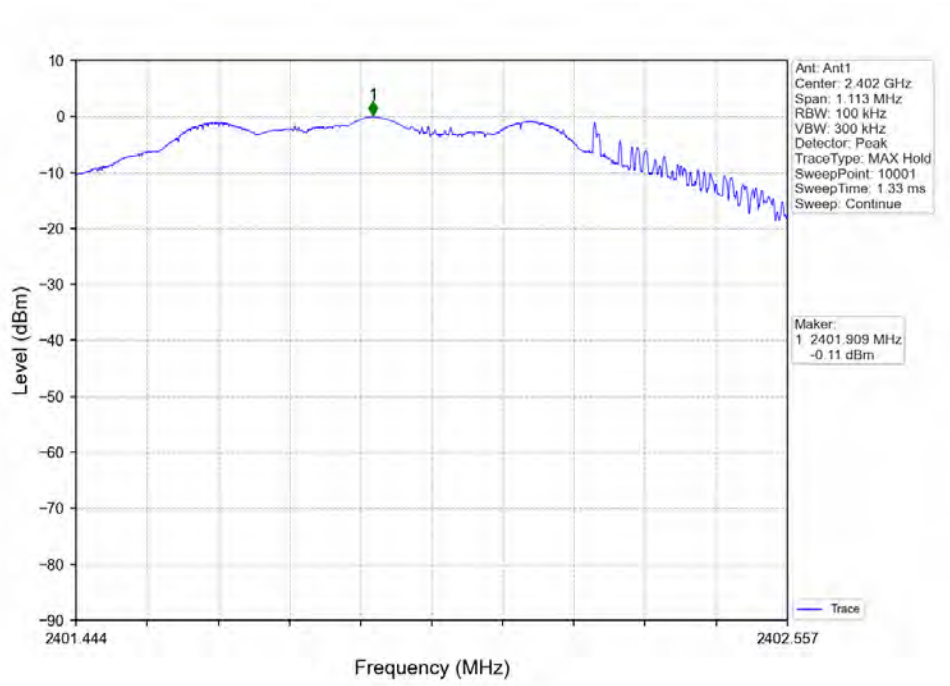
UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

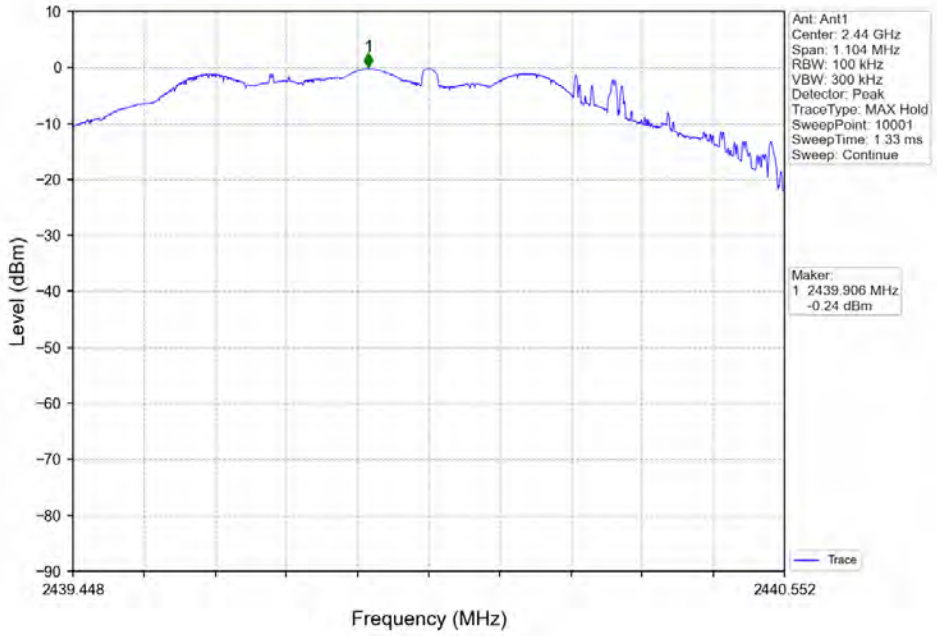
REF

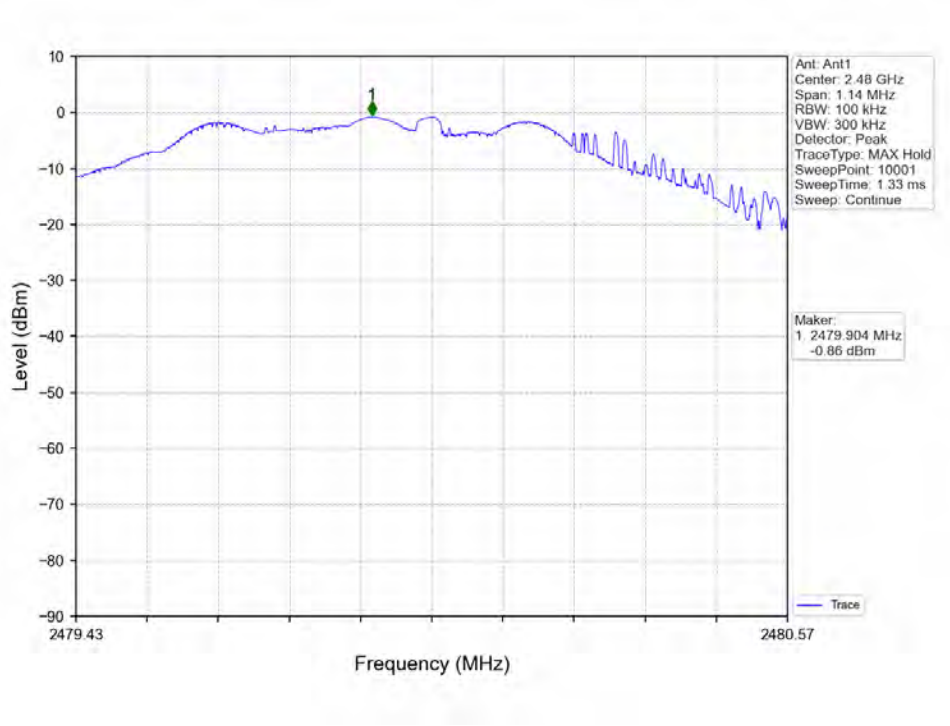
TEST RESULT

Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)
1M	SISO	2402	1	-0.11
		2440	1	-0.24
		2480	1	-0.86
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_MCH_2440MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Center: 2.44 GHz
Span: 1.104 MHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 10001
SweepTime: 1.33 ms
Sweep: Continue
Maker:
1 2439.906 MHz
-0.24 dBm
Trace
Level (dBm)
Frequency (MHz)
2439.448
2440.552

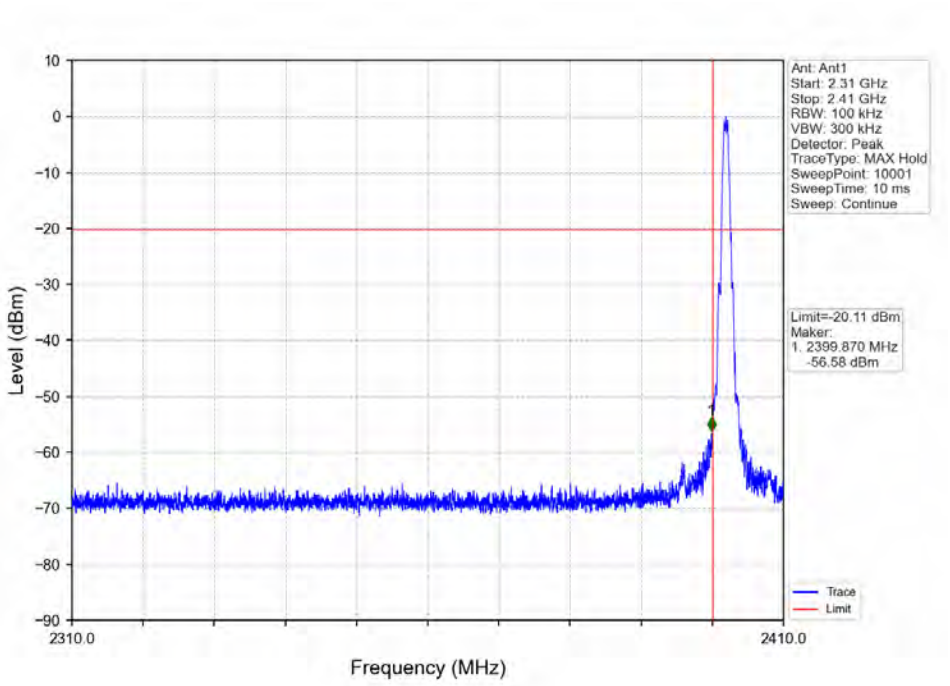
1M_HCH_2480MHz_DataRate=_Ant1_NTNV


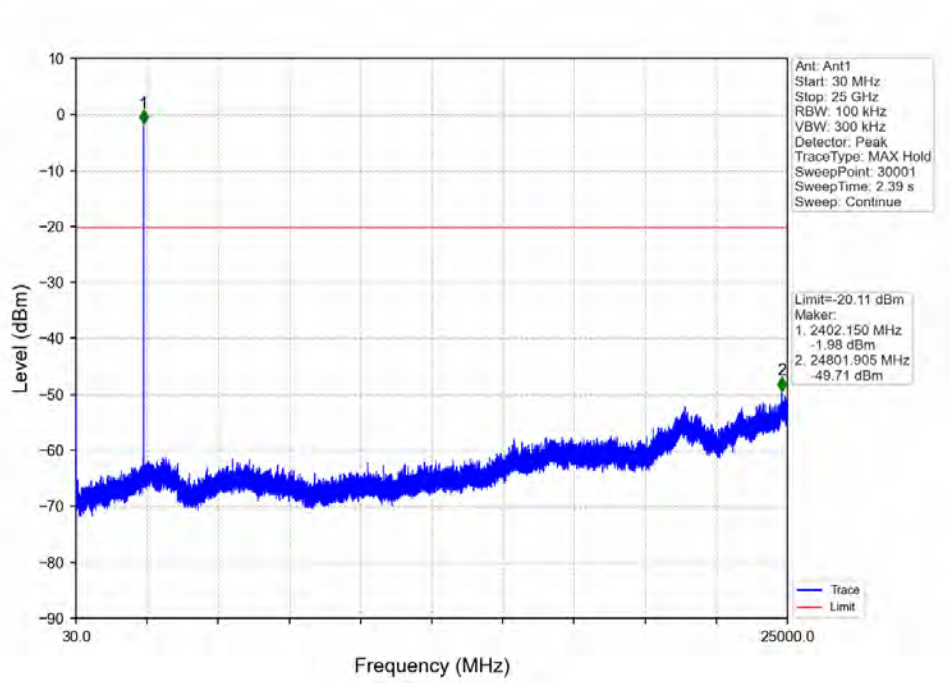
CSE

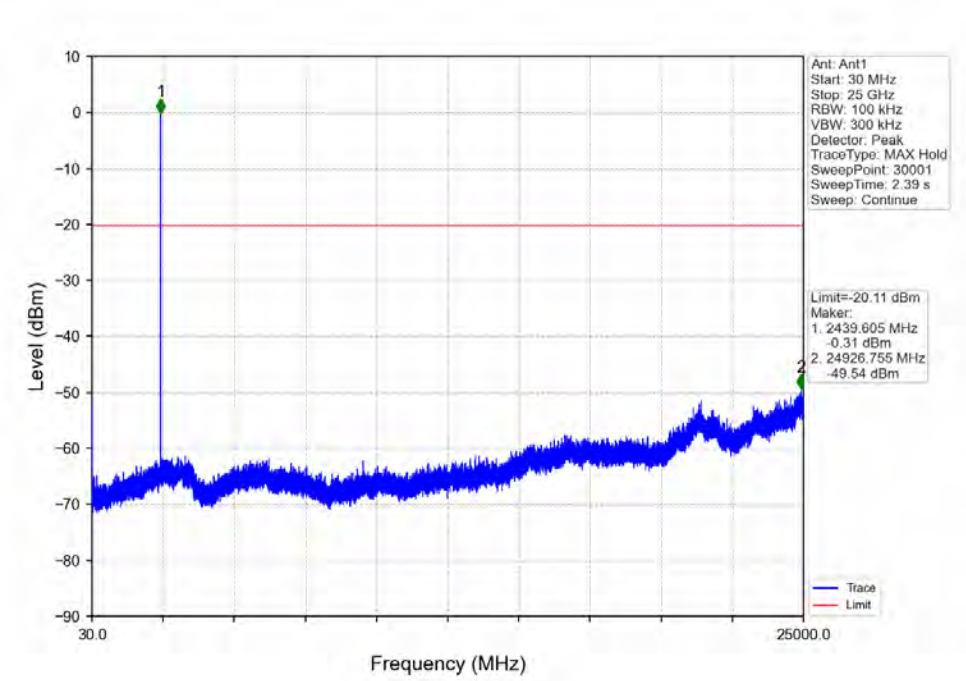
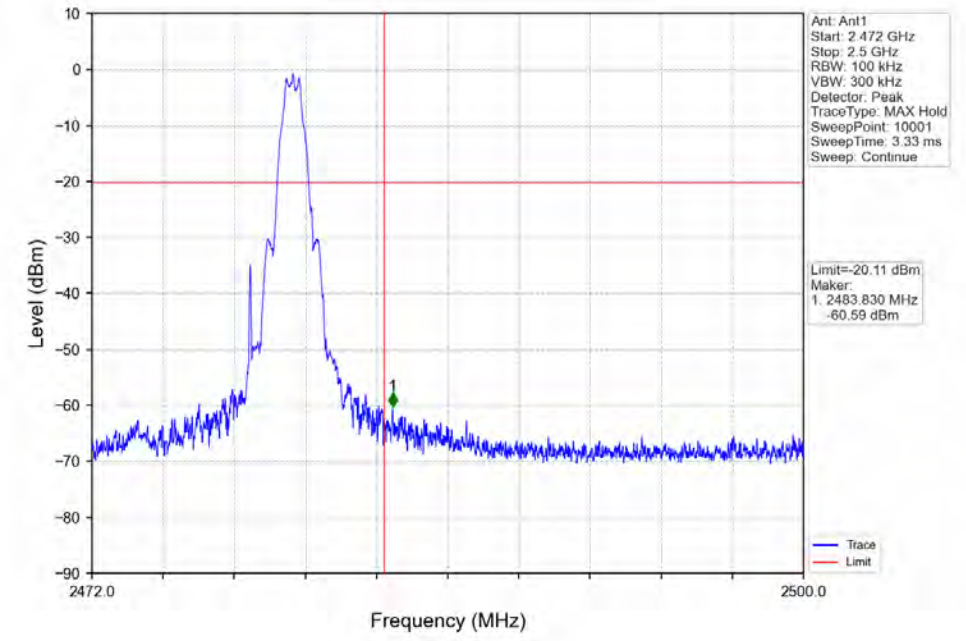
TEST RESULT

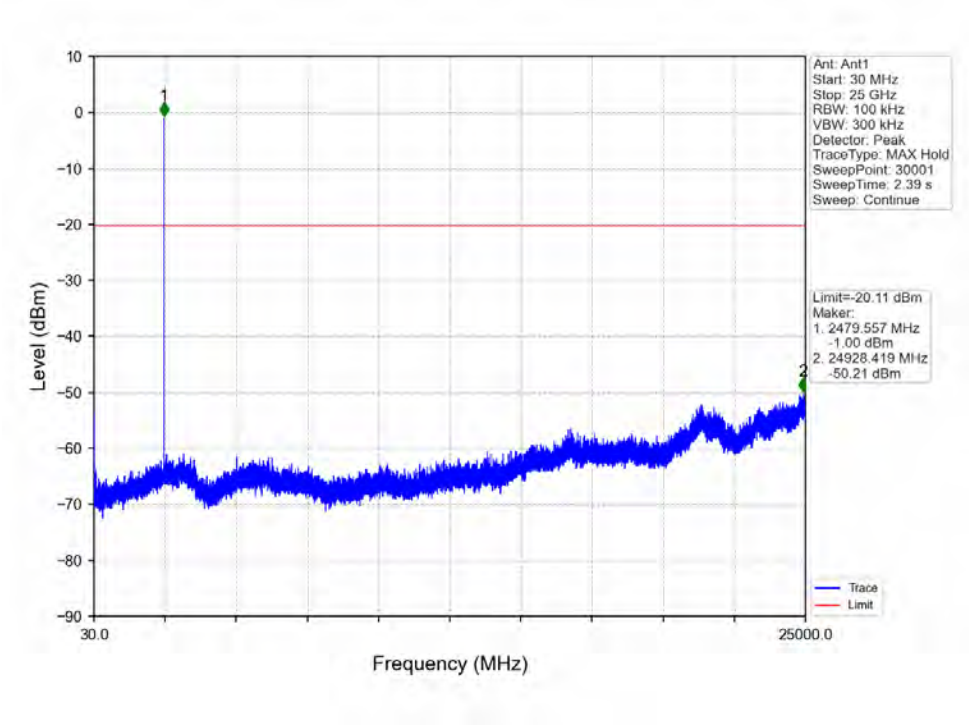
Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-0.11	-20.11	Pass
		2440	1	-0.11	-20.11	Pass
		2480	1	-0.11	-20.11	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

TEST GRAPH

1M_LCH_2402MHz_DataRate=_Ant1_NTNV

1M_LCH_2402MHz_DataRate=_Ant1_NTNV


Ant: Ant1
Start: 30 MHz
Stop: 25 GHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 30001
SweepTime: 2.39 s
Sweep: Continue
Limit=-20.11 dBm
Maker:
1. 2402.150 MHz
-1.98 dBm
2. 24801.905 MHz
-49.71 dBm
Trace
Limit
Level (dBm)
Frequency (MHz)
30.0
25000.0

1M_MCH_2440MHz_DataRate=_Ant1_NTNV

1M_HCH_2480MHz_DataRate=_Ant1_NTNV


1M_HCH_2480MHz_DataRate=_Ant1_NTNV


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