TEST REPORT

Application No.:	SHCR2308001677AT
FCC ID:	2AWSZ-PRO310
IC:	25341-PRO310
Applicant:	INTAMSYS TECHNOLOGY CO., LTD.
Address of Applicant:	1st and 4th Floor, Building 2, No. 24 and 26, Gubo Road, Pudong New District, Shanghai, P.R.China
Manufacturer:	INTAMSYS TECHNOLOGY CO., LTD.
Address of Manufacturer:	1st and 4th Floor, Building 2, No. 24 and 26, Gubo Road, Pudong New District, Shanghai, P.R.China
Factory:	INTAMSYS TECHNOLOGY CO., LTD.
Address of Factory:	1st and 4th Floor, Building 2, No. 24 and 26, Gubo Road, Pudong New District, Shanghai, P.R.China
Equipment Under Test (EUT):	
EUT Name:	3D Printer
Model No.:	FUNMAT PRO 310
Standard(s) :	47 CFR Part 15, Subpart C 15.247 RSS-247 Issue 2, February 2017 RSS-Gen Issue 5 Amendment 2 (February 2021)
Date of Receipt:	2022-11-07
Date of Test:	2023-08-14 to 2023-08-18
Date of Issue:	2023-08-21
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan
Laboratory Manager

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Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2023-08-21	/

Authorized for issue by:				
		Micheal Niu **Micheal Niu /Project Engineer**		
		Parlam Zhan **Parlam Zhan/Reviewer**		

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**FCC Requirement**	**IC Requirement**	**Method**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**FCC Requirement**	**IC Requirement**	**Method**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.207	RSS-Gen Clause 8.8	ANSI C63.10 (2013) Section 6.2	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247a(2)	RSS-247 Clause 5.2(a)	ANSI C63.10 (2013) Section 11.8.1	Pass
Conducted Average Output Power	47 CFR Part 15, Subpart C 15.247(b)(3)	RSS-247 Clause 5.4(d)	ANSI C63.10 (2013) Section 11.9.2	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247(e)	RSS-247 Clause 5.2(b)	ANSI C63.10 (2013) Section 11.10.2	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.13.3.2	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.11	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass
99% Bandwidth	-	RSS-Gen Section 6.7	ANSI C63.10 Section 6.9.3	Pass

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3 Contents

Page

1 COVER PAGE 1

2 TEST SUMMARY 3

3 CONTENTS 4

4 GENERAL INFORMATION 6

4.1 DETAILS OF E.U.T. 6
4.2 DESCRIPTION OF SUPPORT UNITS 6
4.3 MEASUREMENT UNCERTAINTY 7
4.4 TEST LOCATION 8
4.5 TEST FACILITY 8
4.6 DEVIATION FROM STANDARDS 8
4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8

5 EQUIPMENT LIST 9

6 RADIO SPECTRUM TECHNICAL REQUIREMENT 11

6.1 ANTENNA REQUIREMENT 11
6.1.1 Test Requirement: 11
6.1.2 Conclusion 11

7 RADIO SPECTRUM MATTER TEST RESULTS 12

7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 12
7.1.1 E.U.T. Operation 12
7.1.2 Test Mode Description 12
7.1.3 Test Setup Diagram 13
7.1.4 Measurement Procedure and Data 13
7.2 CONDUCTED AVERAGE OUTPUT POWER 16
7.2.1 E.U.T. Operation 16
7.2.2 Test Mode Description 16
7.2.3 Test Setup Diagram 17
7.2.4 Measurement Procedure and Data 17
7.3 MINIMUM 6DB BANDWIDTH 18
7.3.1 E.U.T. Operation 18
7.3.2 Test Mode Description 18
7.3.3 Test Setup Diagram 18
7.3.4 Measurement Procedure and Data 18
7.4 POWER SPECTRUM DENSITY 19
7.4.1 E.U.T. Operation 19
7.4.2 Test Mode Description 19
7.4.3 Test Setup Diagram 19
7.4.4 Measurement Procedure and Data 19
7.5 CONDUCTED BAND EDGES MEASUREMENT 20

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7.5.1 E.U.T. Operation 20
7.5.2 Test Mode Description 20
7.5.3 Test Setup Diagram 21
7.5.4 Measurement Procedure and Data 21
7.6 CONDUCTED SPURIOUS EMISSIONS 22
7.6.1 E.U.T. Operation 22
7.6.2 Test Mode Description 22
7.6.3 Test Setup Diagram 23
7.6.4 Measurement Procedure and Data 23
7.7 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS 24
7.7.1 E.U.T. Operation 24
7.7.2 Test Mode Description 24
7.7.3 Test Setup Diagram 25
7.7.4 Measurement Procedure and Data 26
7.8 RADIATED SPURIOUS EMISSIONS BELOW 1GHZ 51
7.8.1 E.U.T. Operation 51
7.8.2 Test Mode Description 51
7.8.3 Test Setup Diagram 52
7.8.4 Measurement Procedure and Data 53
7.9 RADIATED SPURIOUS EMISSIONS ABOVE 1GHZ 56
7.9.1 E.U.T. Operation 56
7.9.2 Test Mode Description 56
7.9.3 Test Setup Diagram 56
7.9.4 Measurement Procedure and Data 57

8 TEST SETUP PHOTO 82

9 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS) 82

10 APPENDIX 83

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4 General Information

4.1 Details of E.U.T.

Power supply:	AC 100-120V, 50/60Hz
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11;802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	Dipole Antenna
Antenna Gain:	2.36dBi (Provided by the manufacturer)
Serial Number:	ITM0910112300001
Firmware Version:	PRO310_V1.3.2_2160_B

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Notebook	Lenovo	/	/

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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

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

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4.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 8617A

• VCCI (Member No.: 3061)

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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2022-12-20	2023-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2023-08-01	2024-07-31
Signal Generator	R&S	SMR20	SHEM006-1	2023-08-01	2024-07-31
Signal Generator	Agilent	N5182A	SHEM182-1	2023-08-01	2024-07-31
Communication Tester	R&S	CMW270	SHEM183-1	2023-06-01	2024-05-31
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2023-08-01	2024-07-31
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2022-11-08	2024-11-07
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2022-12-20	2023-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2022-12-20	2023-12-19
Conducted test Cable	/	RF01~RF04	/	2022-12-20	2023-12-19
Switcher	Tonscend	JS0806	SHEM184-1	2023-08-01	2024-07-31
Test software	Tonscend	JS Tonscend BT/WIFI System	Version: 2.6	/	/
Coaxial Cable	TST		SHEM263-1	2023-08-01	2024-07-31
Test software	TST	TST PASS	Version: 2.0	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2022-12-20	2023-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2022-12-20	2023-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2022-05-07	2024-05-06
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2023-08-01	2024-07-31
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2022-12-20	2023-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2021-05-25	2024-05-24
RE test Cable	/	RE01, RE02, RE06	/	2023-01-07	2024-01-06
Test software	FARAD	EZ_EMC	1.1.4.2	/	/

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Conducted Emissions at AC Mains Power Port (150kHz-30MHz)					
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2022/12/20	2023/12/19
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2022/12/20	2023/12/19
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2022/12/20	2023/12/19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020/12/20	2023/12/19
CE test Cable	/	/	SHEM172-1	2022/12/20	2023/12/19
Test Software	ESE	e3	Version: 6.111221a	N/A	N/A

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

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

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Dipole Antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.36 dBi.

Antenna location: Refer to internal photo.

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7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

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
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.6 °C Humidity: 37.7 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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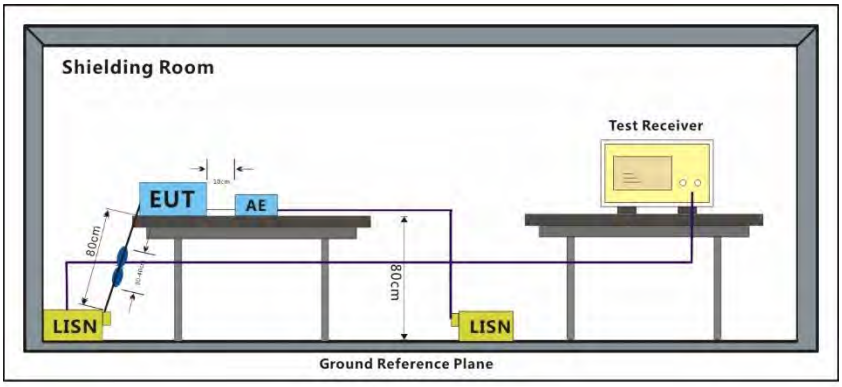
7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor

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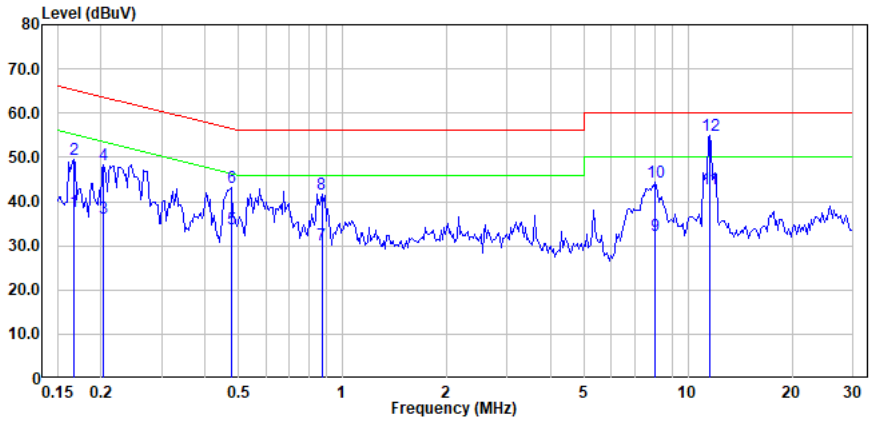
Test Mode: 00; Line: Live line



Antenna Polarity :Line

No.	Freq (MHz)	Read level (dBuV)	Antenna Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	18.11	19.56	37.67	55.12	-17.45	Average
2	0.17	30.07	19.56	49.63	65.12	-15.49	QP
3	0.20	16.63	19.56	36.19	53.45	-17.26	Average
4	0.20	28.78	19.56	48.34	63.45	-15.11	QP
5	0.48	14.33	19.57	33.90	46.41	-12.51	Average
6	0.48	23.66	19.57	43.23	56.41	-13.18	QP
7	0.87	10.59	19.58	30.17	46.00	-15.83	Average
8	0.87	22.02	19.58	41.60	56.00	-14.40	QP
9	8.06	12.54	19.74	32.28	50.00	-17.72	Average
10	8.06	24.64	19.74	44.38	60.00	-15.62	QP
11	11.56	23.22	19.77	42.99	50.00	-7.01	Average
12	11.56	35.28	19.77	55.05	60.00	-4.95	QP

Notes: Emission Level = Read Level +Antenna Factor

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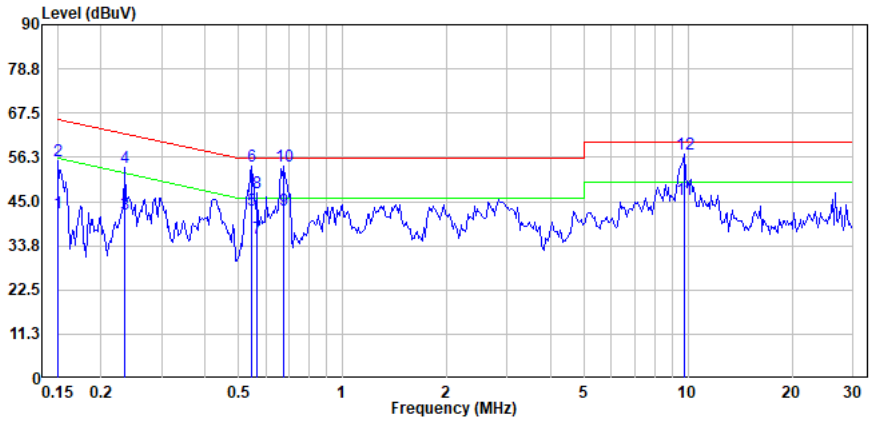
Test Mode: 00; Line: Neutral Line



Antenna Polarity :Neutral

No.	Freq (MHz)	Read level (dBuV)	Antenna Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	22.56	19.56	42.12	56.00	-13.88	Average
2	0.15	35.73	19.56	55.29	66.00	-10.71	QP
3	0.23	22.09	19.56	41.65	52.30	-10.65	Average
4	0.23	34.02	19.56	53.58	62.30	-8.72	QP
5	0.55	23.09	19.57	42.66	46.00	-3.34	Average
6	0.55	34.27	19.57	53.84	56.00	-2.16	QP
7	0.56	16.14	19.57	35.71	46.00	-10.29	Average
8	0.56	27.58	19.57	47.15	56.00	-8.85	QP
9	0.68	23.25	19.58	42.83	46.00	-3.17	Average
10	0.68	34.48	19.58	54.06	56.00	-1.94	QP
11	9.76	25.88	19.76	45.64	50.00	-4.36	Average
12	9.76	37.34	19.76	57.10	60.00	-2.90	QP

Notes: Emission Level = Read Level +Antenna Factor

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7.2 Conducted Average Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.2

Limit:

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

7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 22.6 °C Humidity: 37.7 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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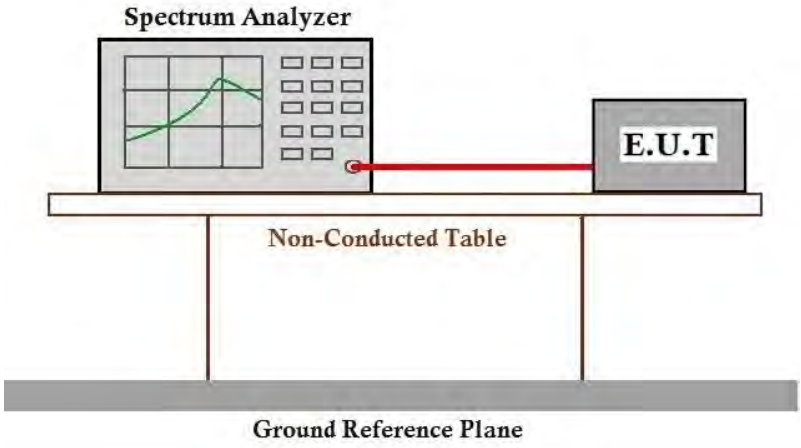
7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

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

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7.3 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit: ≥500 kHz

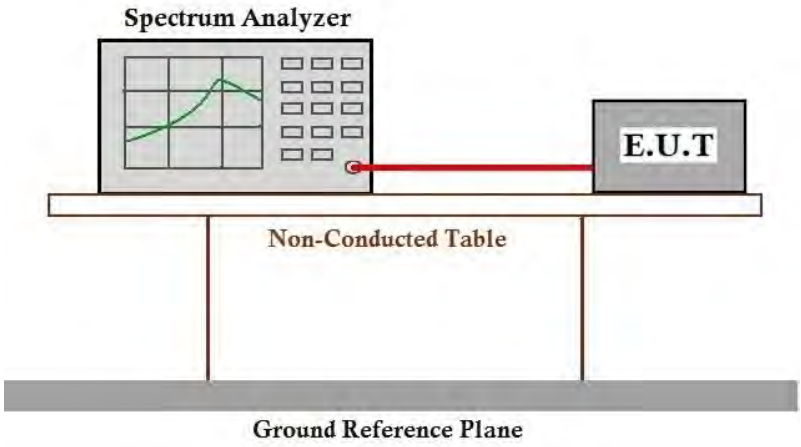
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 22.6 °C Humidity: 37.7 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

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7.4 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

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

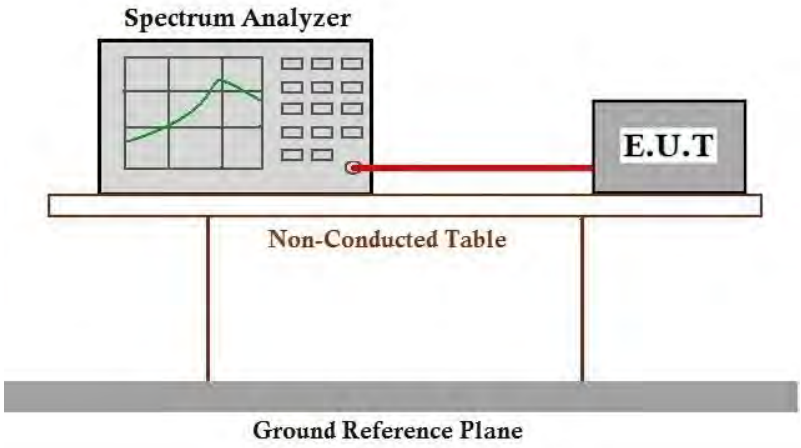
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 22.6 °C Humidity: 37.7 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

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7.5 Conducted Band Edges Measurement

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

Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

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

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 37.7 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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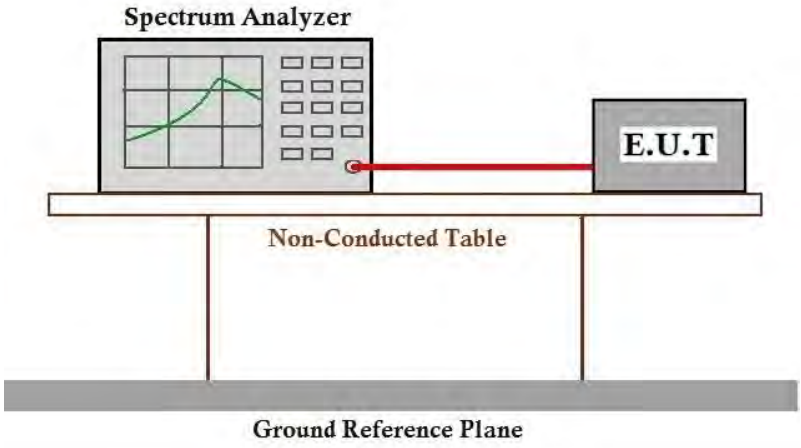
7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

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7.6 Conducted Spurious Emissions

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

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

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

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 37.7 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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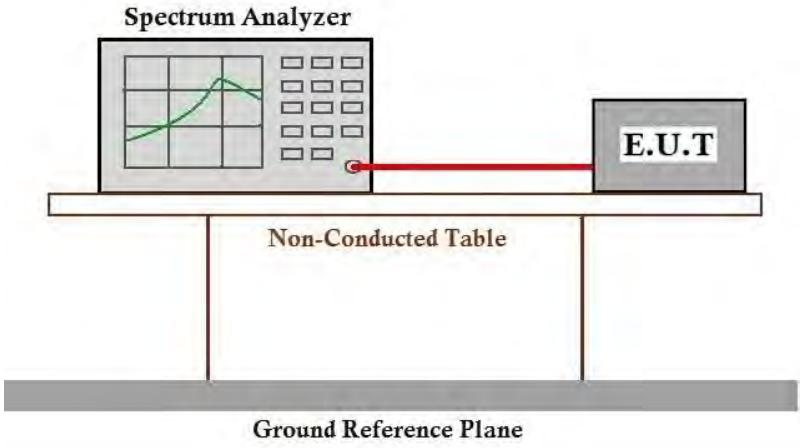
7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

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7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 48.6 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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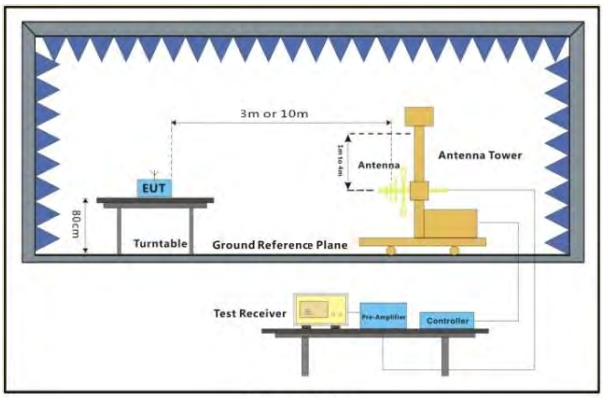
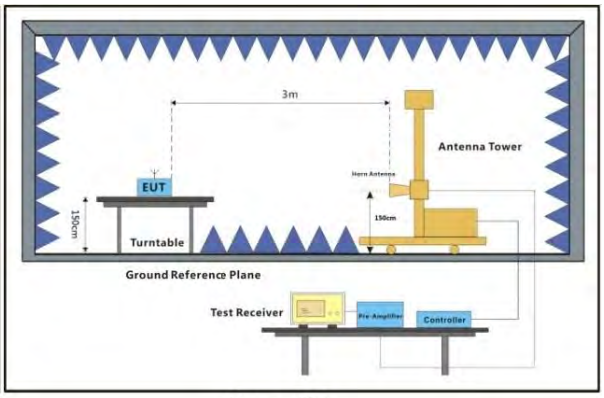
7.7.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

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7.7.4 Measurement Procedure and Data

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

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

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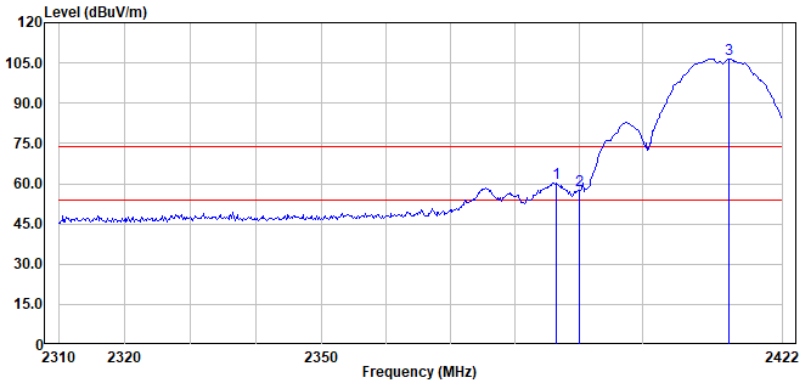
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2386.45	74.55	32.05	3.72	50.14	60.18	74.00	-13.82	Peak
	2390.00	71.77	32.06	3.73	50.13	57.43	74.00	-16.57	Peak
	2413.56	120.55	32.14	3.75	50.04	106.40	74.00	32.40	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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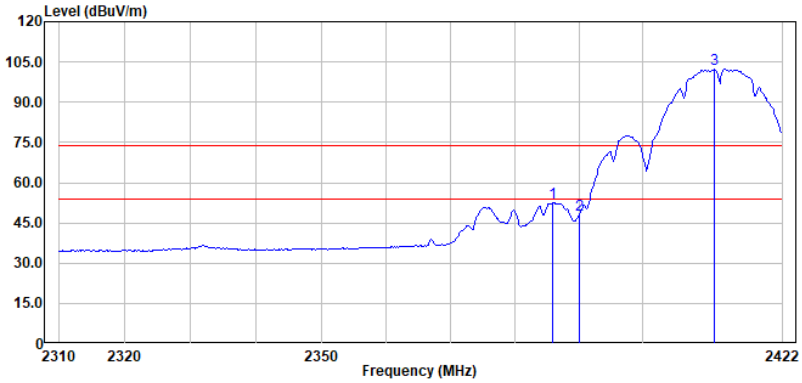
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2385.80	66.81	32.05	3.72	50.14	52.44	54.00	-1.56	Average
	2390.00	62.49	32.06	3.73	50.13	48.15	54.00	-5.85	Average
	2411.29	116.45	32.13	3.75	50.05	102.28	54.00	48.28	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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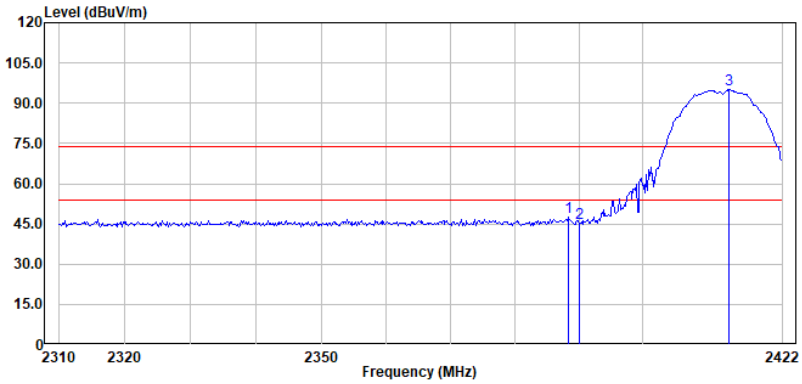
Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2388.24	61.72	32.06	3.73	50.13	47.38	74.00	-26.62	Peak
	2390.00	59.70	32.06	3.73	50.13	45.36	74.00	-28.64	Peak
	2413.56	109.10	32.14	3.75	50.04	94.95	74.00	20.95	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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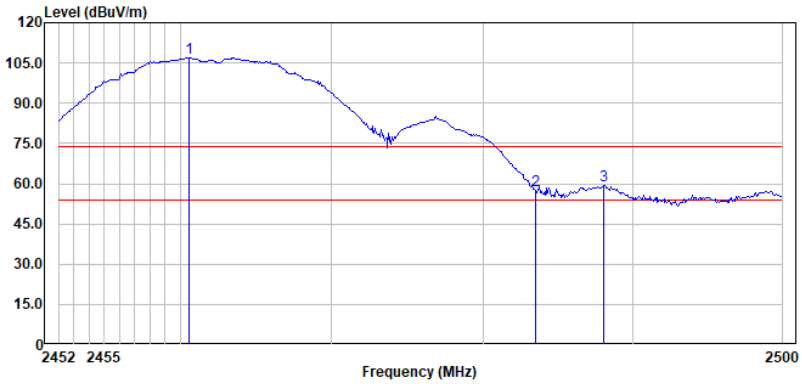
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2460.56	120.71	32.16	3.79	49.85	106.81	74.00	32.81	Peak
	2483.50	71.37	32.16	3.81	49.90	57.44	74.00	-16.56	Peak
	2488.04	73.22	32.16	3.81	49.91	59.28	74.00	-14.72	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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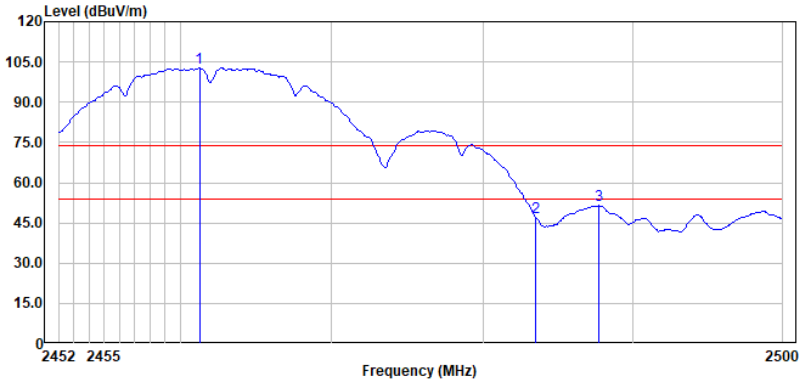
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2461.25	116.62	32.16	3.79	49.85	102.72	54.00	48.72	Average
	2483.50	61.05	32.16	3.81	49.90	47.12	54.00	-6.88	Average
	2487.76	65.34	32.16	3.81	49.91	51.40	54.00	-2.60	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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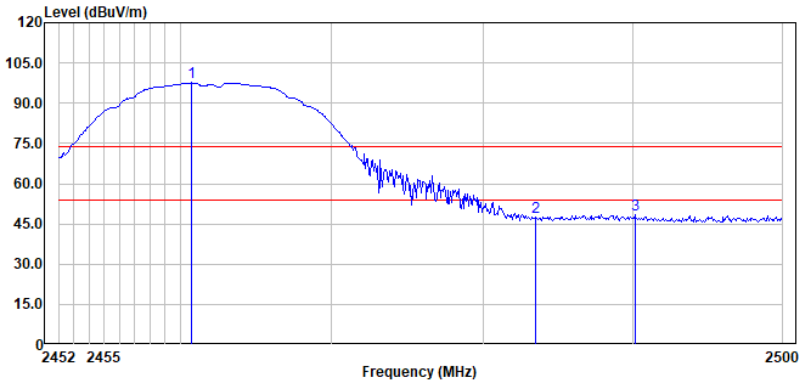
Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2460.77	111.69	32.16	3.79	49.85	97.79	74.00	23.79	Peak
	2483.50	61.60	32.16	3.81	49.90	47.67	74.00	-26.33	Peak
	2490.12	62.22	32.16	3.81	49.92	48.27	74.00	-25.73	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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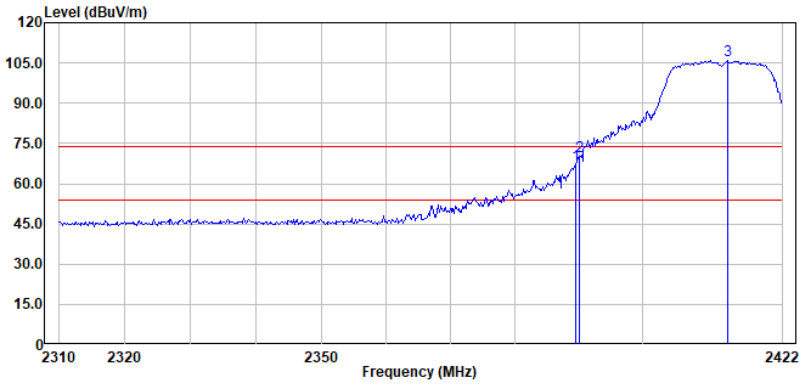
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2389.37	81.28	32.06	3.73	50.13	66.94	74.00	-7.06	Peak
	2390.00	84.65	32.06	3.73	50.13	70.31	74.00	-3.69	Peak
	2413.40	119.99	32.14	3.75	50.04	105.84	74.00	31.84	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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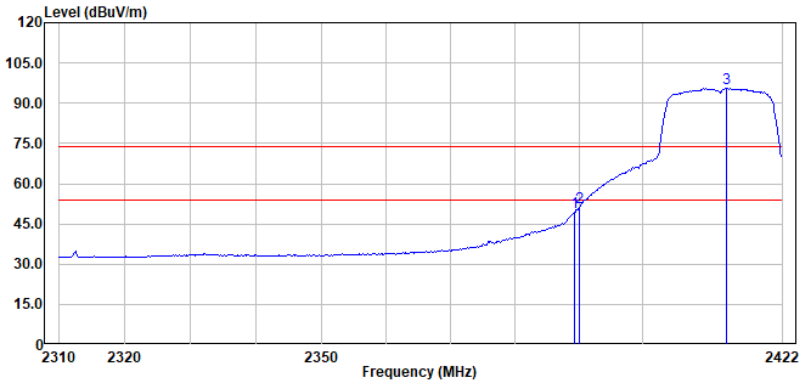
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2389.21	63.70	32.06	3.73	50.13	49.36	54.00	-4.64	Average
	2390.00	65.61	32.06	3.73	50.13	51.27	54.00	-2.73	Average
	2413.07	109.69	32.14	3.75	50.04	95.54	54.00	41.54	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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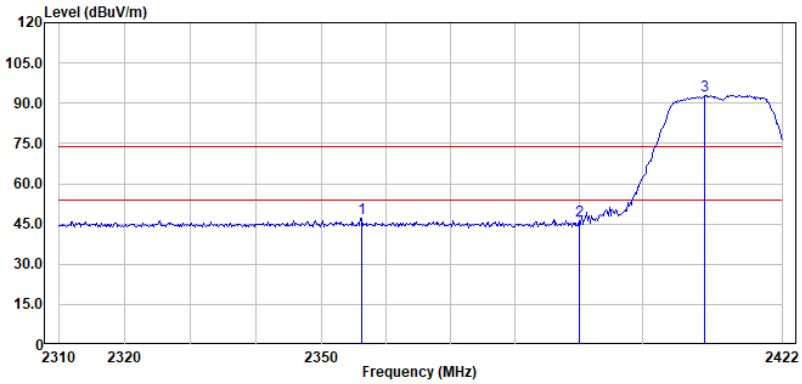
Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2356.26	61.54	31.96	3.70	50.17	47.03	74.00	-26.97	Peak
	2390.00	60.62	32.06	3.73	50.13	46.28	74.00	-27.72	Peak
	2409.66	107.18	32.13	3.74	50.06	92.99	74.00	18.99	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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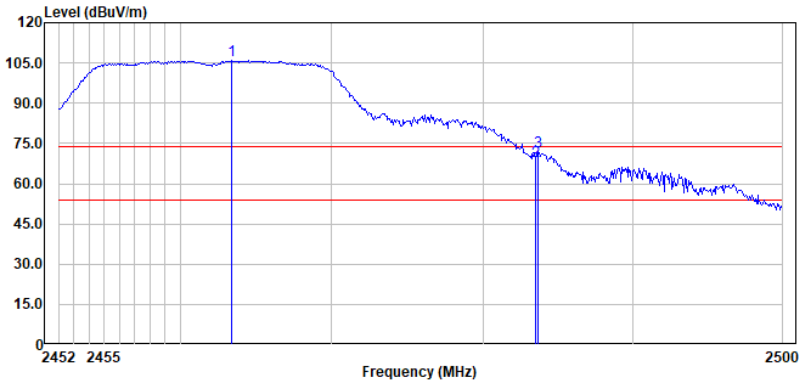
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2463.34	119.71	32.16	3.79	49.86	105.80	74.00	31.80	Peak
	2483.50	82.21	32.16	3.81	49.90	68.28	74.00	-5.72	Peak
	2483.65	85.71	32.16	3.81	49.90	71.78	74.00	-2.22	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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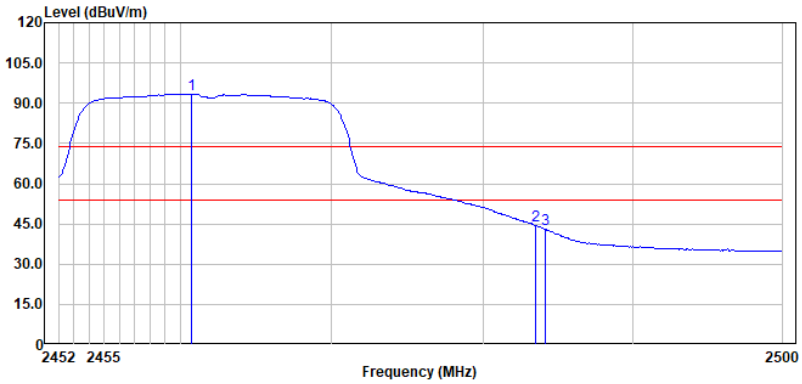
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2460.70	107.37	32.16	3.79	49.85	93.47	54.00	39.47	Average
	2483.50	58.35	32.16	3.81	49.90	44.42	54.00	-9.58	Average
	2484.14	56.91	32.16	3.81	49.91	42.97	54.00	-11.03	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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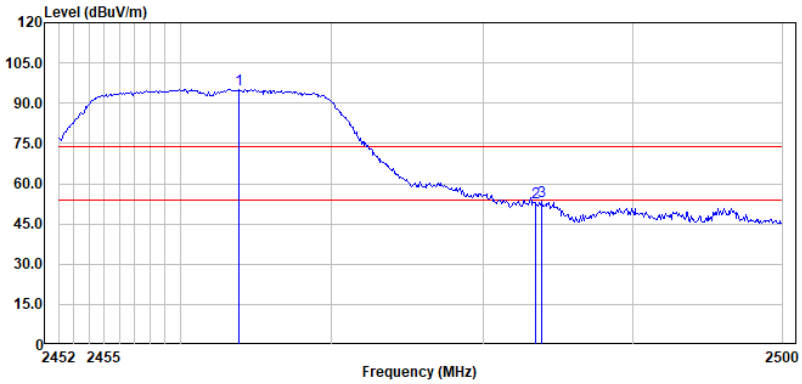
Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2463.90	108.98	32.16	3.79	49.86	95.07	74.00	21.07	Peak
	2483.50	67.07	32.16	3.81	49.90	53.14	74.00	-20.86	Peak
	2483.93	67.37	32.16	3.81	49.90	53.44	74.00	-20.56	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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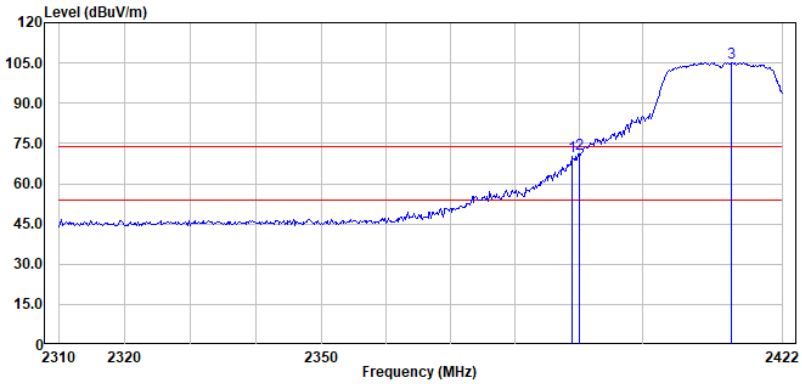
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2388.89	84.69	32.06	3.73	50.13	70.35	74.00	-3.65	Peak
	2390.00	85.39	32.06	3.73	50.13	71.05	74.00	-2.95	Peak
	2413.88	119.35	32.14	3.75	50.04	105.20	74.00	31.20	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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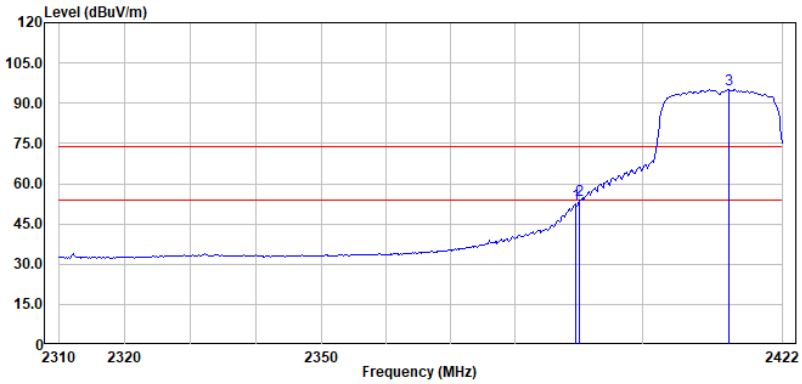
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2389.54	66.96	32.06	3.73	50.13	52.62	54.00	-1.38	Average
	2390.00	68.04	32.06	3.73	50.13	53.70	54.00	-0.30	Average
	2413.56	109.21	32.14	3.75	50.04	95.06	54.00	41.06	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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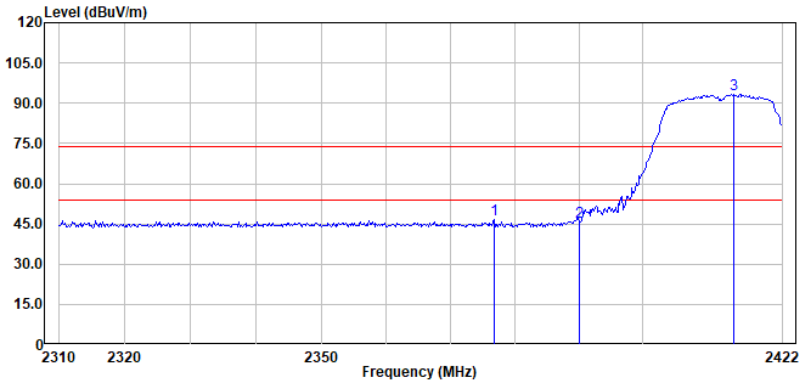
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2376.71	61.01	32.02	3.72	50.15	46.60	74.00	-27.40	Peak
	2390.00	60.27	32.06	3.73	50.13	45.93	74.00	-28.07	Peak
	2414.21	107.33	32.14	3.75	50.04	93.18	74.00	19.18	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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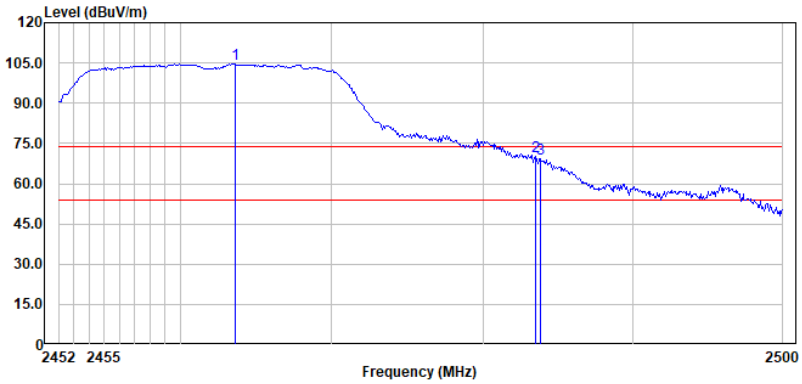
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2463.62	118.48	32.16	3.79	49.86	104.57	74.00	30.57	Peak
	2483.50	83.96	32.16	3.81	49.90	70.03	74.00	-3.97	Peak
	2483.86	83.18	32.16	3.81	49.90	69.25	74.00	-4.75	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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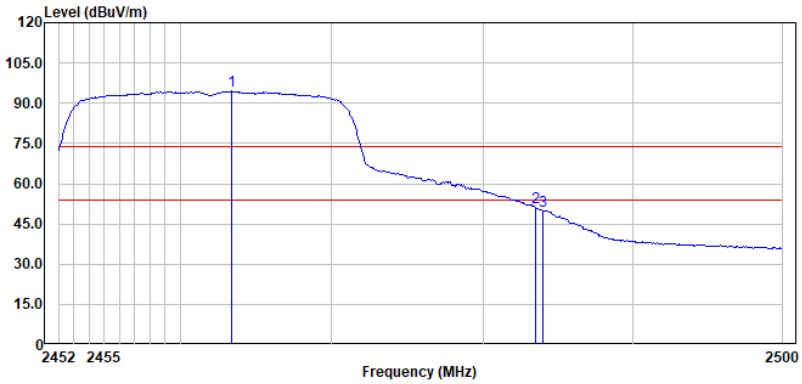
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2463.41	108.34	32.16	3.79	49.86	94.43	54.00	40.43	Average
	2483.50	65.18	32.16	3.81	49.90	51.25	54.00	-2.75	Average
	2484.00	63.90	32.16	3.81	49.90	49.97	54.00	-4.03	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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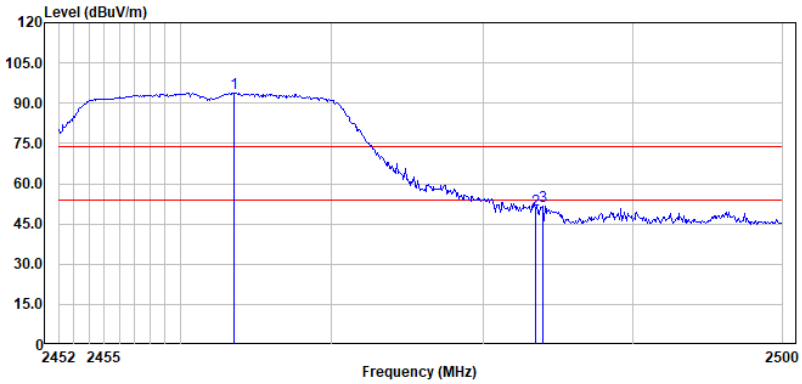
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2463.55	107.69	32.16	3.79	49.86	93.78	74.00	19.78	Peak
	2483.50	64.17	32.16	3.81	49.90	50.24	74.00	-23.76	Peak
	2484.00	65.71	32.16	3.81	49.90	51.78	74.00	-22.22	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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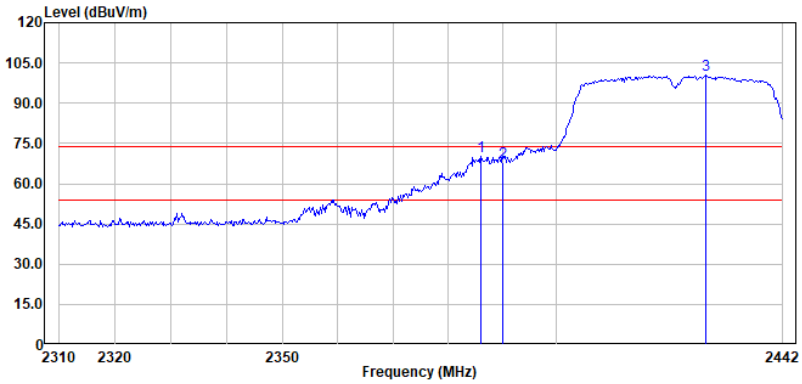
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2386.14	84.37	32.05	3.72	50.14	70.00	74.00	-4.00	Peak
	2390.00	82.41	32.06	3.73	50.13	68.07	74.00	-5.93	Peak
	2427.65	114.44	32.16	3.76	49.96	100.40	74.00	26.40	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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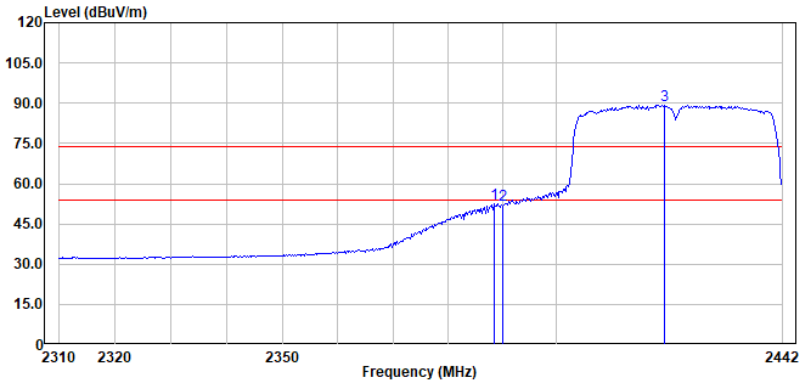
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2388.63	66.82	32.06	3.73	50.13	52.48	54.00	-1.52	Average
	2390.00	66.33	32.06	3.73	50.13	51.99	54.00	-2.01	Average
	2420.00	103.38	32.16	3.75	50.00	89.29	54.00	35.29	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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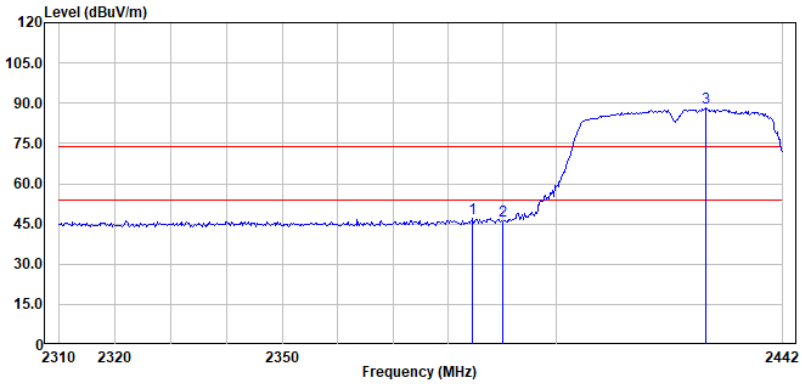
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2384.61	61.32	32.05	3.72	50.14	46.95	74.00	-27.05	Peak
	2390.00	60.36	32.06	3.73	50.13	46.02	74.00	-27.98	Peak
	2427.65	102.45	32.16	3.76	49.96	88.41	74.00	14.41	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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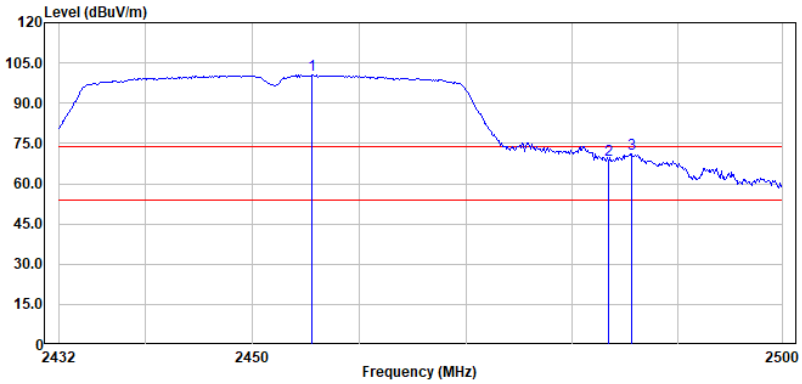
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2455.55	114.26	32.16	3.78	49.84	100.36	74.00	26.36	Peak
	2483.50	82.70	32.16	3.81	49.90	68.77	74.00	-5.23	Peak
	2485.71	85.24	32.16	3.81	49.91	71.30	74.00	-2.70	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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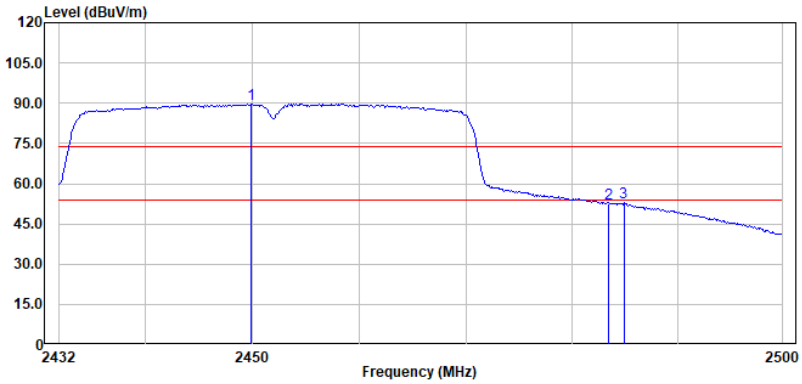
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2449.84	103.58	32.16	3.78	49.83	89.69	54.00	35.69	Average
	2483.50	66.61	32.16	3.81	49.90	52.68	54.00	-1.32	Average
	2484.92	66.71	32.16	3.81	49.91	52.77	54.00	-1.23	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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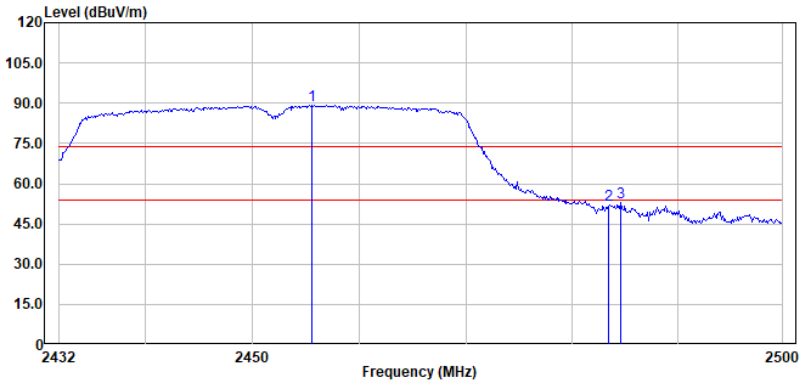
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2455.55	102.98	32.16	3.78	49.84	89.08	74.00	15.08	Peak
	2483.50	65.82	32.16	3.81	49.90	51.89	74.00	-22.11	Peak
	2484.63	66.73	32.16	3.81	49.91	52.79	74.00	-21.21	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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7.8 Radiated Spurious Emissions Below 1GHz

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

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

7.8.1 E.U.T. Operation

Operating Environment:
Temperature: 22.4 °C Humidity: 48.6 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

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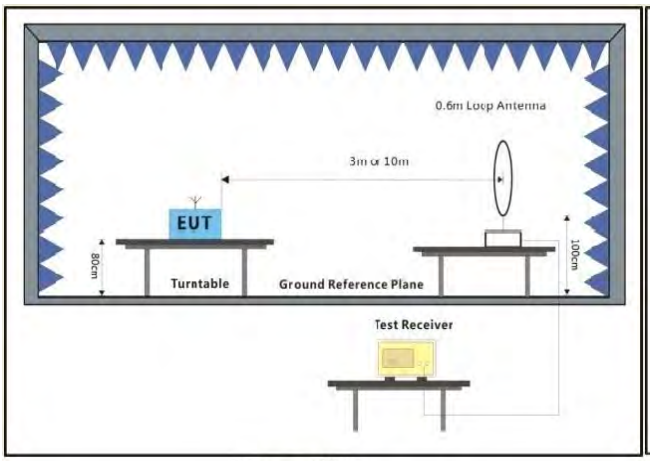
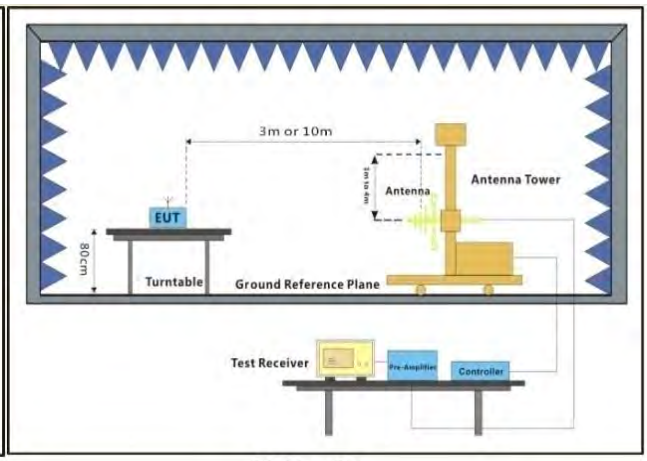
7.8.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

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7.8.4 Measurement Procedure and Data

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

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

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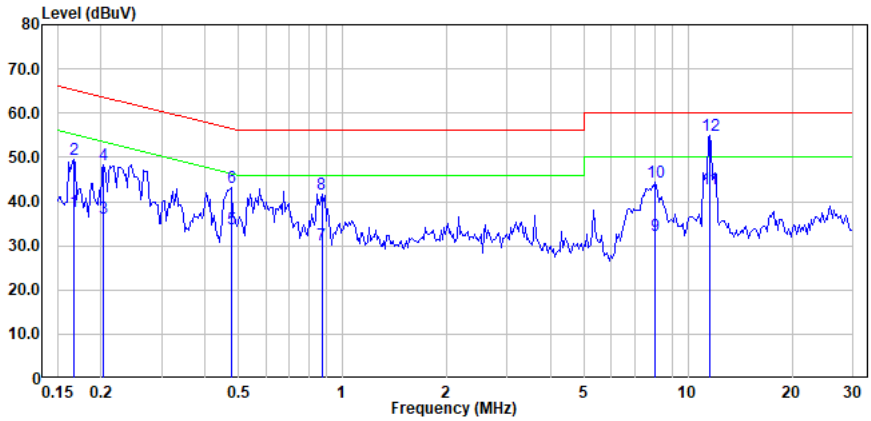
Test Mode: 00; Polarity: Horizontal



Antenna Polarity :Line

No.	Freq (MHz)	Read level (dBuV)	Antenna Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	18.11	19.56	37.67	55.12	-17.45	Average
2	0.17	30.07	19.56	49.63	65.12	-15.49	QP
3	0.20	16.63	19.56	36.19	53.45	-17.26	Average
4	0.20	28.78	19.56	48.34	63.45	-15.11	QP
5	0.48	14.33	19.57	33.90	46.41	-12.51	Average
6	0.48	23.66	19.57	43.23	56.41	-13.18	QP
7	0.87	10.59	19.58	30.17	46.00	-15.83	Average
8	0.87	22.02	19.58	41.60	56.00	-14.40	QP
9	8.06	12.54	19.74	32.28	50.00	-17.72	Average
10	8.06	24.64	19.74	44.38	60.00	-15.62	QP
11	11.56	23.22	19.77	42.99	50.00	-7.01	Average
12	11.56	35.28	19.77	55.05	60.00	-4.95	QP

Notes: Emission Level = Read Level +Antenna Factor

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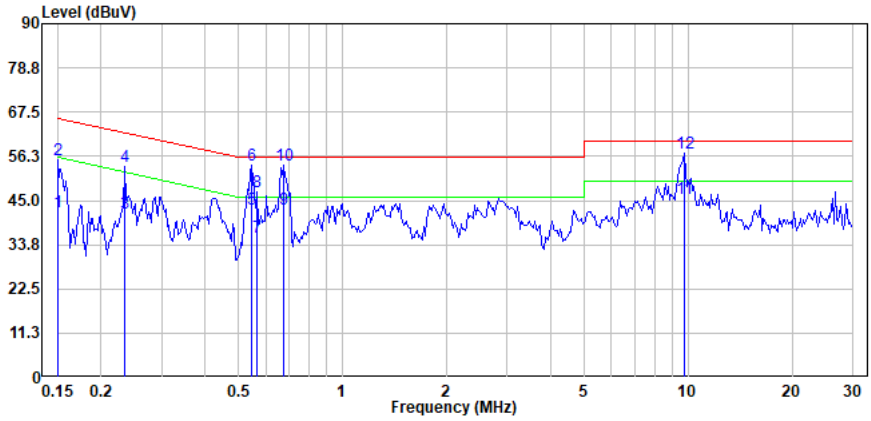
Test Mode: 00; Polarity: Vertical



Antenna Polarity :Neutral

No.	Freq (MHz)	Read level (dBuV)	Antenna Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	22.56	19.56	42.12	56.00	-13.88	Average
2	0.15	35.73	19.56	55.29	66.00	-10.71	QP
3	0.23	22.09	19.56	41.65	52.30	-10.65	Average
4	0.23	34.02	19.56	53.58	62.30	-8.72	QP
5	0.55	23.09	19.57	42.66	46.00	-3.34	Average
6	0.55	34.27	19.57	53.84	56.00	-2.16	QP
7	0.56	16.14	19.57	35.71	46.00	-10.29	Average
8	0.56	27.58	19.57	47.15	56.00	-8.85	QP
9	0.68	23.25	19.58	42.83	46.00	-3.17	Average
10	0.68	34.48	19.58	54.06	56.00	-1.94	QP
11	9.76	25.88	19.76	45.64	50.00	-4.36	Average
12	9.76	37.34	19.76	57.10	60.00	-2.90	QP

Notes: Emission Level = Read Level +Antenna Factor

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7.9 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

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

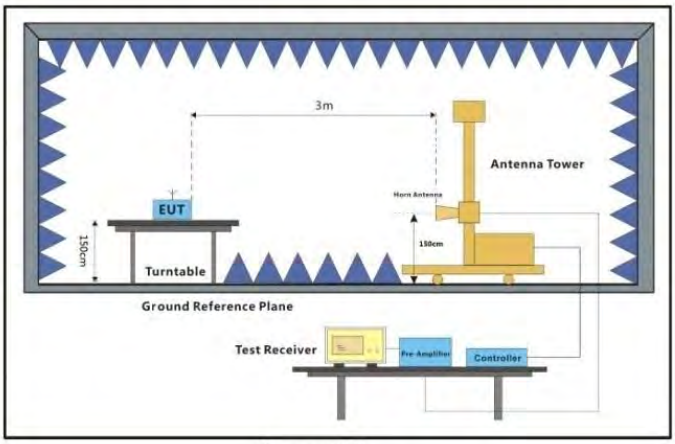
7.9.1 E.U.T. Operation

Operating Environment:
Temperature: 22.5 °C Humidity: 48.6 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



Above 1GHz

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7.9.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

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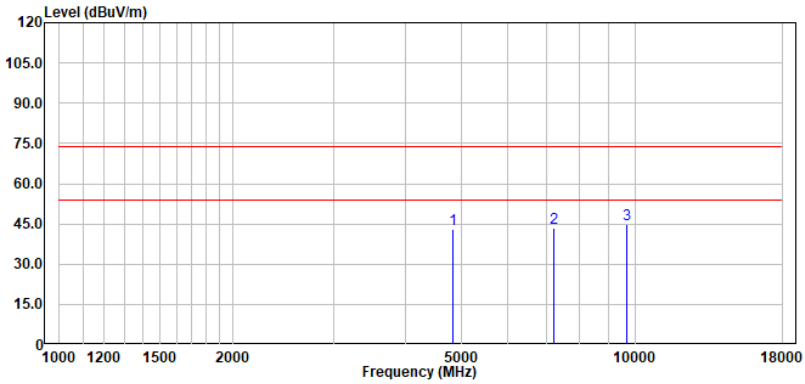
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00	51.40	33.83	5.41	47.80	42.84	74.00	-31.16	Peak
	7236.00	48.24	35.15	6.66	46.63	43.42	74.00	-30.58	Peak
	9648.00	46.30	36.69	7.78	46.15	44.62	74.00	-29.38	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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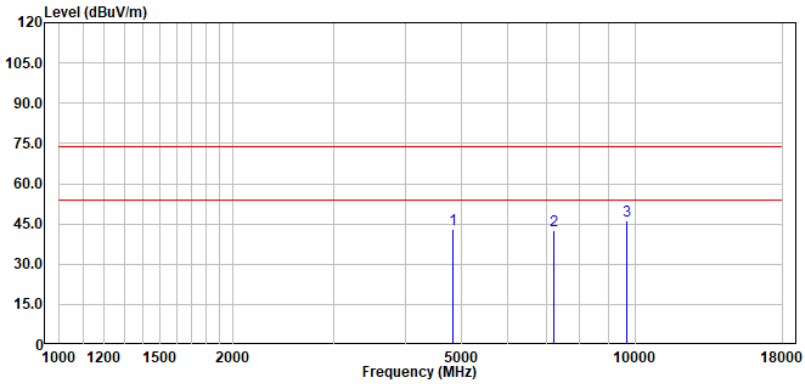
Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00	51.78	33.83	5.41	47.80	43.22	74.00	-30.78	Peak
	7236.00	47.22	35.15	6.66	46.63	42.40	74.00	-31.60	Peak
	9648.00	47.71	36.69	7.78	46.15	46.03	74.00	-27.97	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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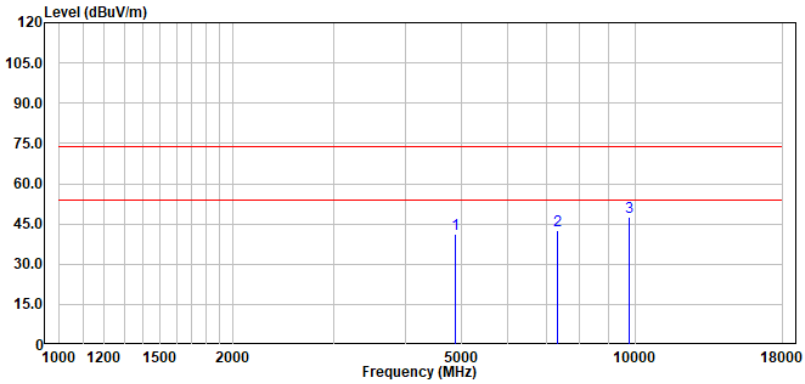
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	49.79	33.70	5.43	47.77	41.15	74.00	-32.85	Peak
	7311.00	47.58	35.18	6.70	46.70	42.76	74.00	-31.24	Peak
	9748.00	49.12	36.77	7.81	46.11	47.59	74.00	-26.41	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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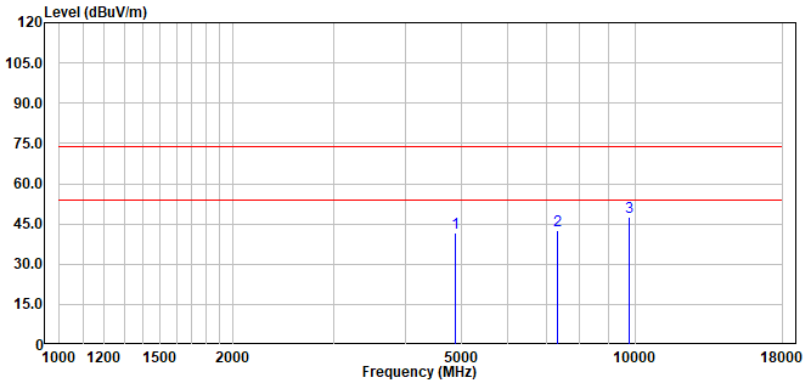
Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	50.14	33.70	5.43	47.77	41.50	74.00	-32.50	Peak
	7311.00	47.42	35.18	6.70	46.70	42.60	74.00	-31.40	Peak
	9748.00	48.88	36.77	7.81	46.11	47.35	74.00	-26.65	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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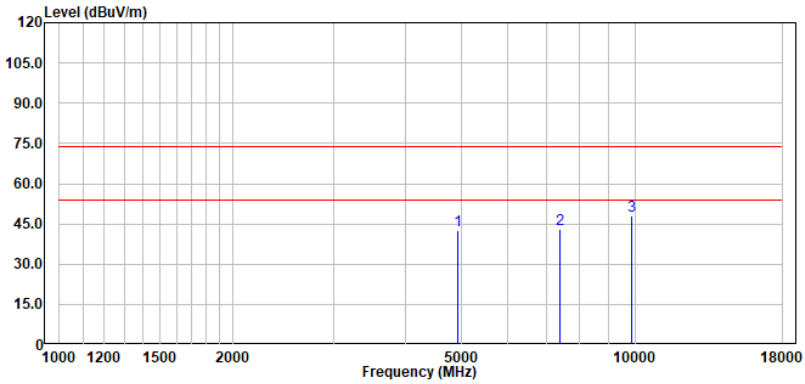
Test Mode: 00; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00	51.26	33.69	5.45	47.74	42.66	74.00	-31.34	Peak
	7386.00	47.94	35.32	6.73	46.78	43.21	74.00	-30.79	Peak
	9848.00	49.54	36.83	7.85	46.06	48.16	74.00	-25.84	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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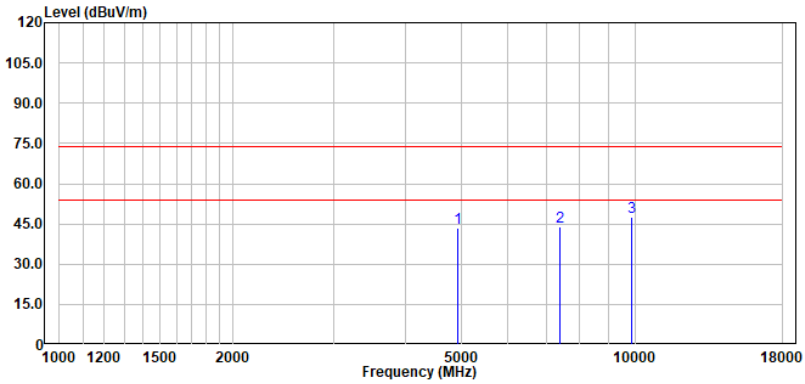
Test Mode: 00; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00	51.90	33.69	5.45	47.74	43.30	74.00	-30.70	Peak
	7386.00	48.88	35.32	6.73	46.78	44.15	74.00	-29.85	Peak
	9848.00	48.80	36.83	7.85	46.06	47.42	74.00	-26.58	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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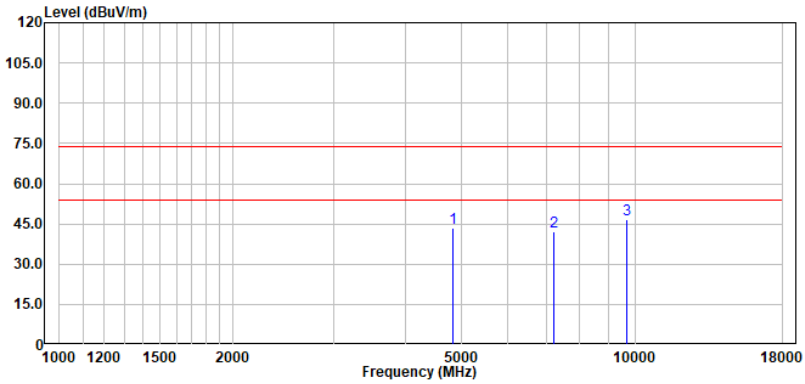
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00	51.99	33.83	5.41	47.80	43.43	74.00	-30.57	Peak
	7236.00	46.92	35.15	6.66	46.63	42.10	74.00	-31.90	Peak
	9648.00	48.27	36.69	7.78	46.15	46.59	74.00	-27.41	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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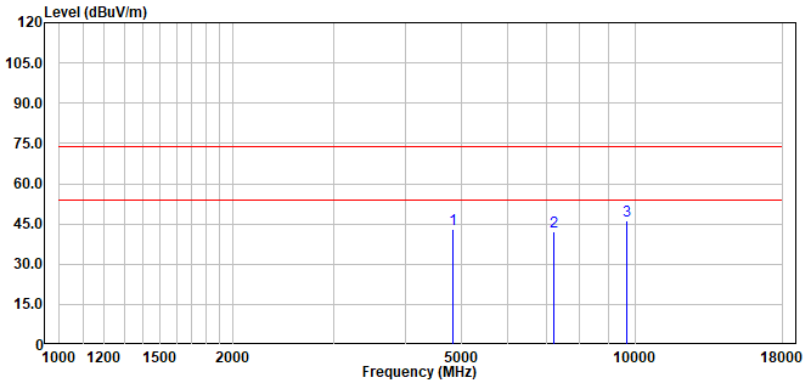
Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00	51.76	33.83	5.41	47.80	43.20	74.00	-30.80	Peak
	7236.00	46.82	35.15	6.66	46.63	42.00	74.00	-32.00	Peak
	9648.00	47.80	36.69	7.78	46.15	46.12	74.00	-27.88	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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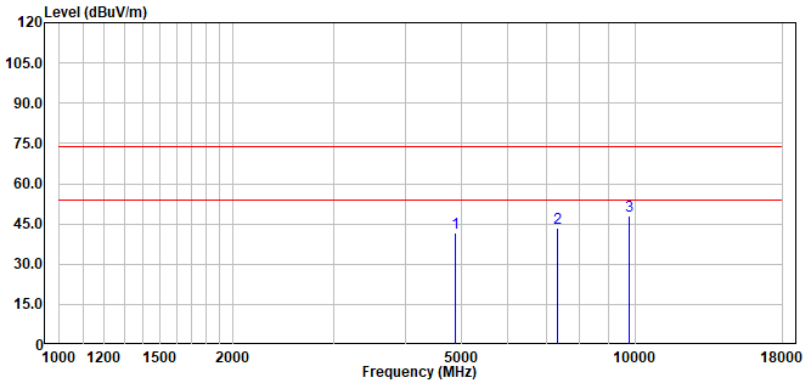
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	50.44	33.70	5.43	47.77	41.80	74.00	-32.20	Peak
	7311.00	48.42	35.18	6.70	46.70	43.60	74.00	-30.40	Peak
	9748.00	49.47	36.77	7.81	46.11	47.94	74.00	-26.06	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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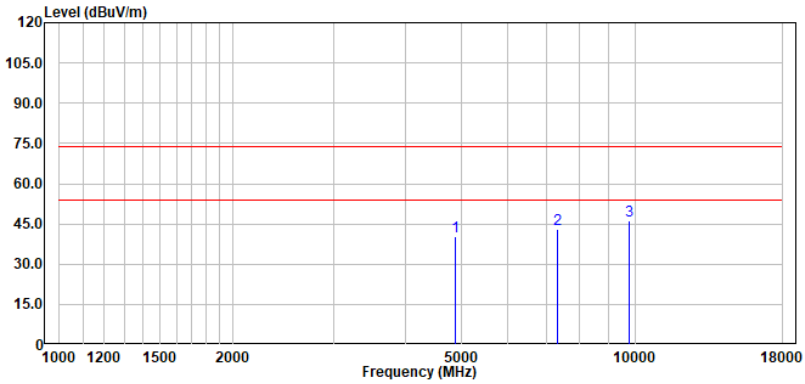
Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	49.11	33.70	5.43	47.77	40.47	74.00	-33.53	Peak
	7311.00	48.02	35.18	6.70	46.70	43.20	74.00	-30.80	Peak
	9748.00	47.65	36.77	7.81	46.11	46.12	74.00	-27.88	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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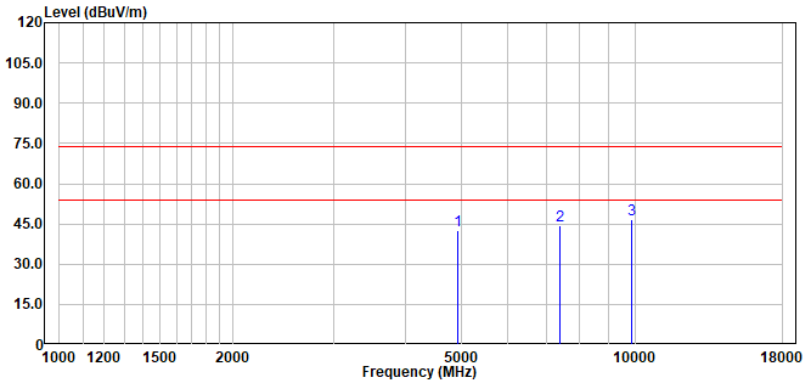
Test Mode: 00; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00	51.03	33.69	5.45	47.74	42.43	74.00	-31.57	Peak
	7386.00	49.16	35.32	6.73	46.78	44.43	74.00	-29.57	Peak
	9848.00	47.99	36.83	7.85	46.06	46.61	74.00	-27.39	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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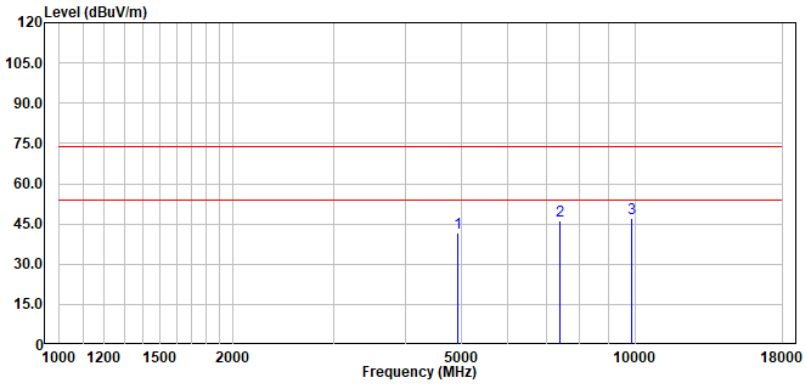
Test Mode: 00; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00	50.35	33.69	5.45	47.74	41.75	74.00	-32.25	Peak
	7386.00	50.72	35.32	6.73	46.78	45.99	74.00	-28.01	Peak
	9848.00	48.36	36.83	7.85	46.06	46.98	74.00	-27.02	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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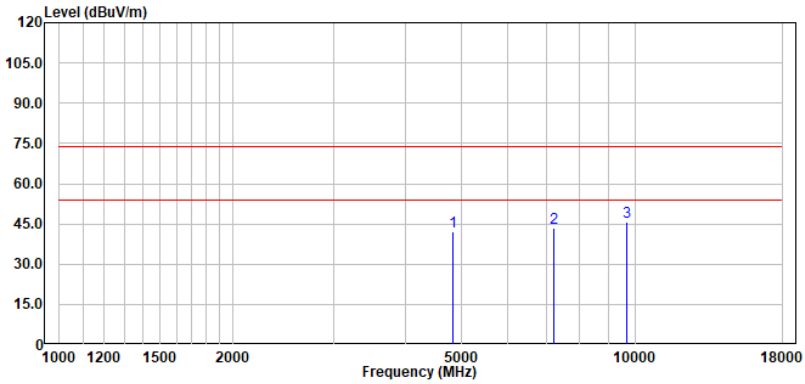
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00	50.78	33.83	5.41	47.80	42.22	74.00	-31.78	Peak
	7236.00	48.10	35.15	6.66	46.63	43.28	74.00	-30.72	Peak
	9648.00	47.40	36.69	7.78	46.15	45.72	74.00	-28.28	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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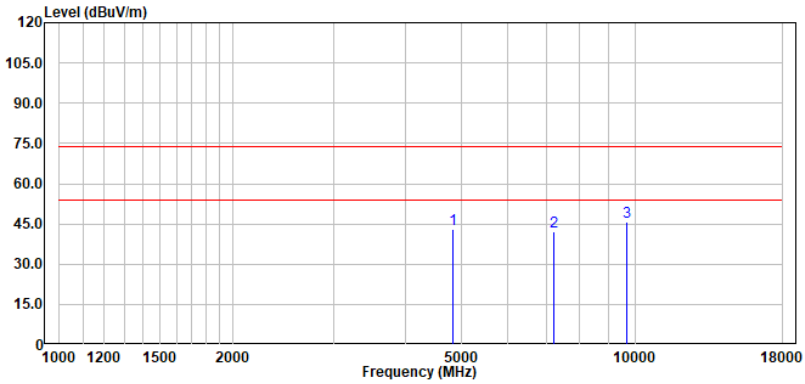
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4824.00	51.62	33.83	5.41	47.80	43.06	74.00	-30.94	Peak
	7236.00	47.08	35.15	6.66	46.63	42.26	74.00	-31.74	Peak
	9648.00	47.38	36.69	7.78	46.15	45.70	74.00	-28.30	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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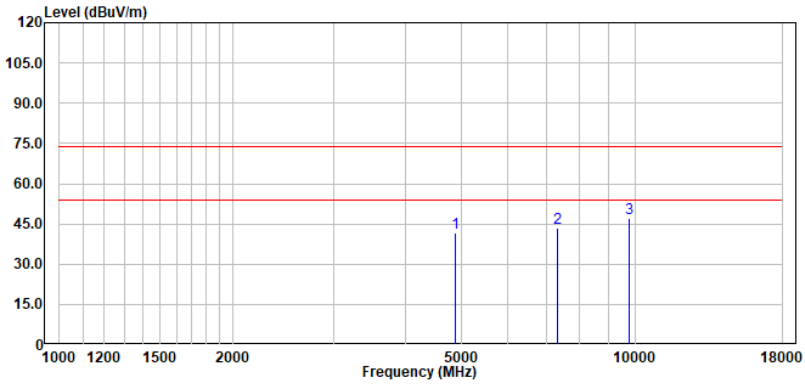
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	50.41	33.70	5.43	47.77	41.77	74.00	-32.23	Peak
	7311.00	48.12	35.18	6.70	46.70	43.30	74.00	-30.70	Peak
	9748.00	48.65	36.77	7.81	46.11	47.12	74.00	-26.88	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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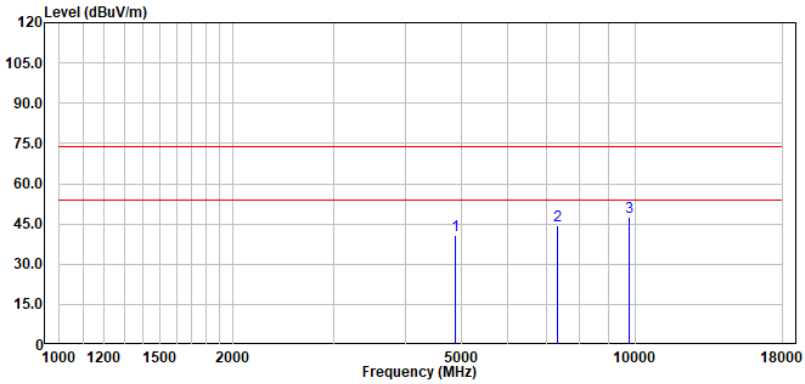
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	49.20	33.70	5.43	47.77	40.56	74.00	-33.44	Peak
	7311.00	49.17	35.18	6.70	46.70	44.35	74.00	-29.65	Peak
	9748.00	49.15	36.77	7.81	46.11	47.62	74.00	-26.38	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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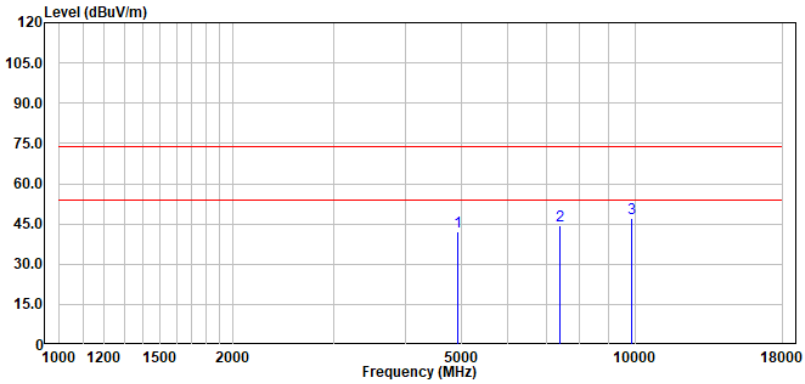
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00	50.70	33.69	5.45	47.74	42.10	74.00	-31.90	Peak
	7386.00	49.32	35.32	6.73	46.78	44.59	74.00	-29.41	Peak
	9848.00	48.48	36.83	7.85	46.06	47.10	74.00	-26.90	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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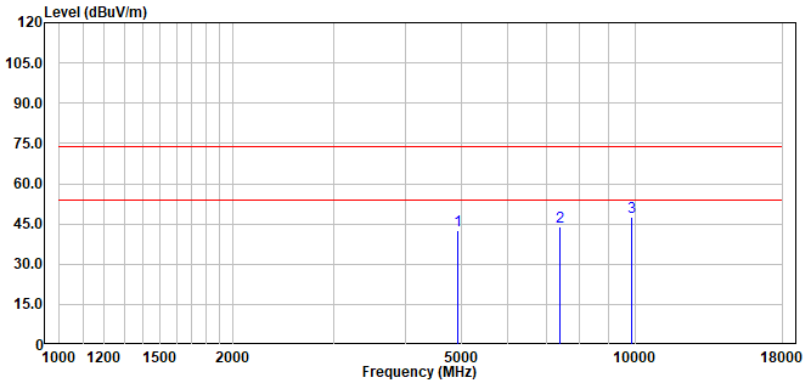
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4924.00	50.95	33.69	5.45	47.74	42.35	74.00	-31.65	Peak
	7386.00	48.77	35.32	6.73	46.78	44.04	74.00	-29.96	Peak
	9848.00	48.96	36.83	7.85	46.06	47.58	74.00	-26.42	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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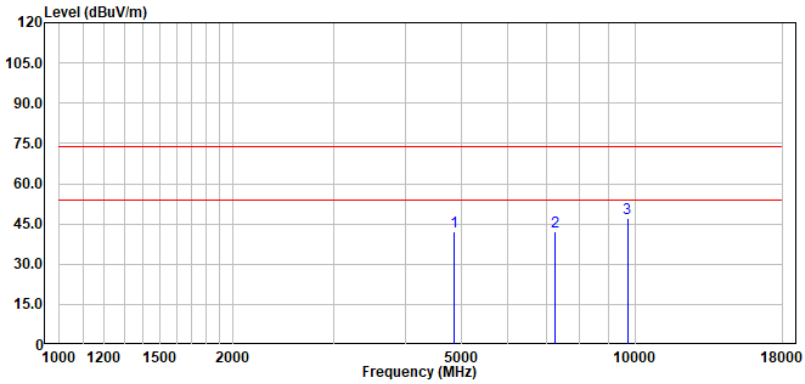
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4844.00	50.63	33.78	5.42	47.79	42.04	74.00	-31.96	Peak
	7266.00	46.78	35.16	6.67	46.66	41.95	74.00	-32.05	Peak
	9688.00	48.78	36.74	7.79	46.13	47.18	74.00	-26.82	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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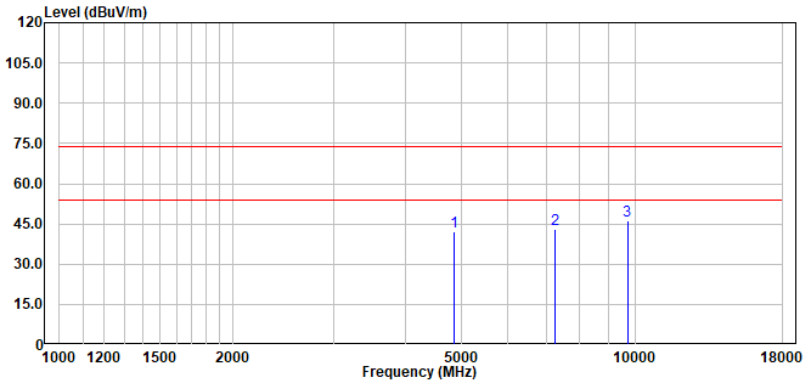
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4844.00	50.76	33.78	5.42	47.79	42.17	74.00	-31.83	Peak
	7266.00	48.07	35.16	6.67	46.66	43.24	74.00	-30.76	Peak
	9688.00	47.99	36.74	7.79	46.13	46.39	74.00	-27.61	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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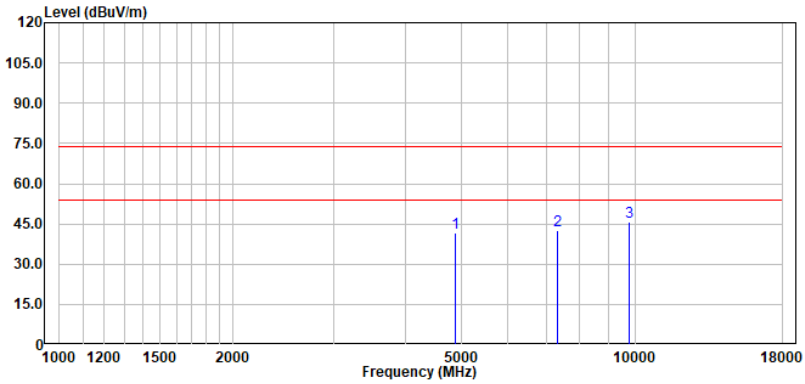
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	50.41	33.70	5.43	47.77	41.77	74.00	-32.23	Peak
	7311.00	47.26	35.18	6.70	46.70	42.44	74.00	-31.56	Peak
	9748.00	47.09	36.77	7.81	46.11	45.56	74.00	-28.44	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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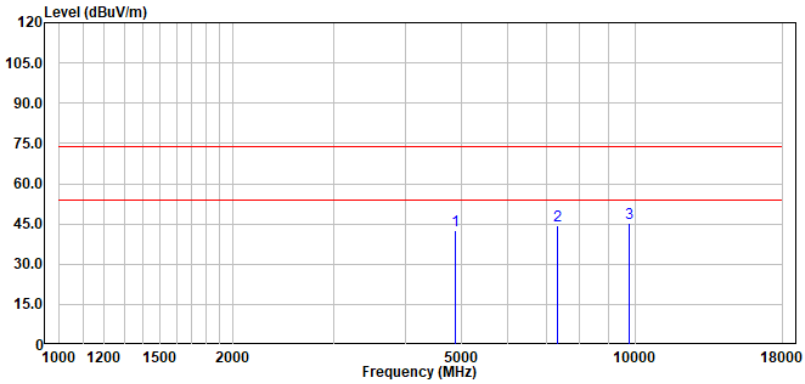
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4874.00	51.39	33.70	5.43	47.77	42.75	74.00	-31.25	Peak
	7311.00	49.37	35.18	6.70	46.70	44.55	74.00	-29.45	Peak
	9748.00	46.84	36.77	7.81	46.11	45.31	74.00	-28.69	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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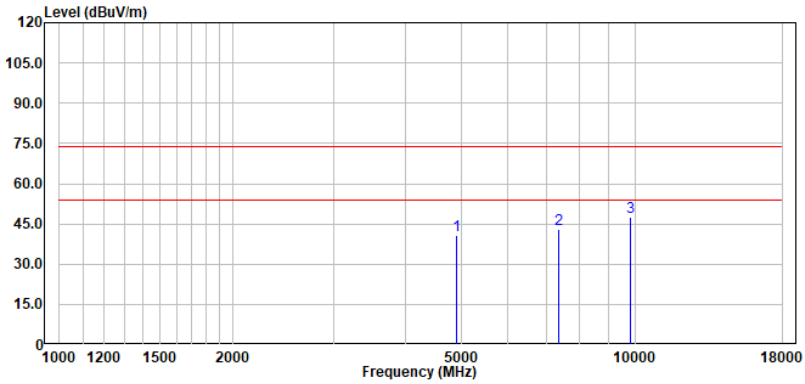
Test Mode: 00; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4904.00	49.65	33.64	5.44	47.76	40.97	74.00	-33.03	Peak
	7356.00	47.98	35.27	6.72	46.75	43.22	74.00	-30.78	Peak
	9808.00	48.86	36.80	7.83	46.08	47.41	74.00	-26.59	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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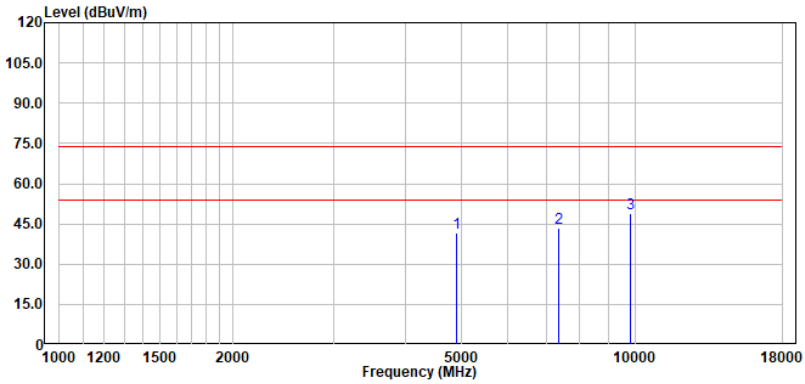
Test Mode: 00; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	4904.00	50.52	33.64	5.44	47.76	41.84	74.00	-32.16	Peak
	7356.00	48.04	35.27	6.72	46.75	43.28	74.00	-30.72	Peak
	9808.00	50.18	36.80	7.83	46.08	48.73	74.00	-25.27	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SHCR2308001677AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2308001677AT

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10 Appendix

Channel	802.11b	802.11g	802.11n(HT20)
	Ant 1	Ant 1	Ant 1
1	52	60	58
6	50	61	58
11	48	56	56

Channel	802.11n(HT40)
	Ant 1
3	56
6	56
9	56

1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	100.000	100.000	100.00	0.00	0.00
		2437	100.000	100.000	100.00	0.00	0.00
		2462	100.000	100.000	100.00	0.00	0.00
802.11g	SISO	2412	100.000	100.000	100.00	0.00	0.00
		2437	100.000	100.000	100.00	0.00	0.00
		2462	100.000	100.000	100.00	0.00	0.00
802.11n (HT20)	SISO	2412	100.000	100.000	100.00	0.00	0.00
		2437	100.000	100.000	100.00	0.00	0.00
		2462	100.000	100.000	100.00	0.00	0.00
802.11n (HT40)	SISO	2422	100.000	100.000	100.00	0.00	0.00
		2437	100.000	100.000	100.00	0.00	0.00
		2452	100.000	100.000	100.00	0.00	0.00

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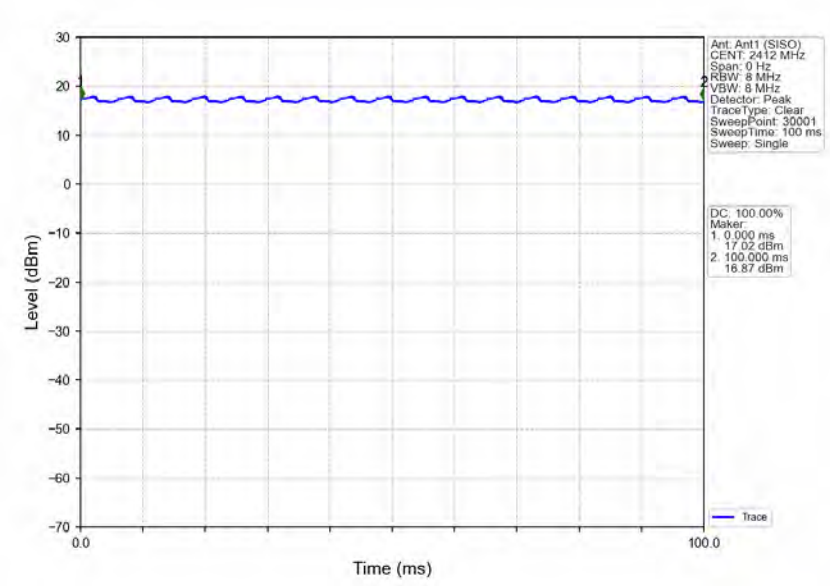
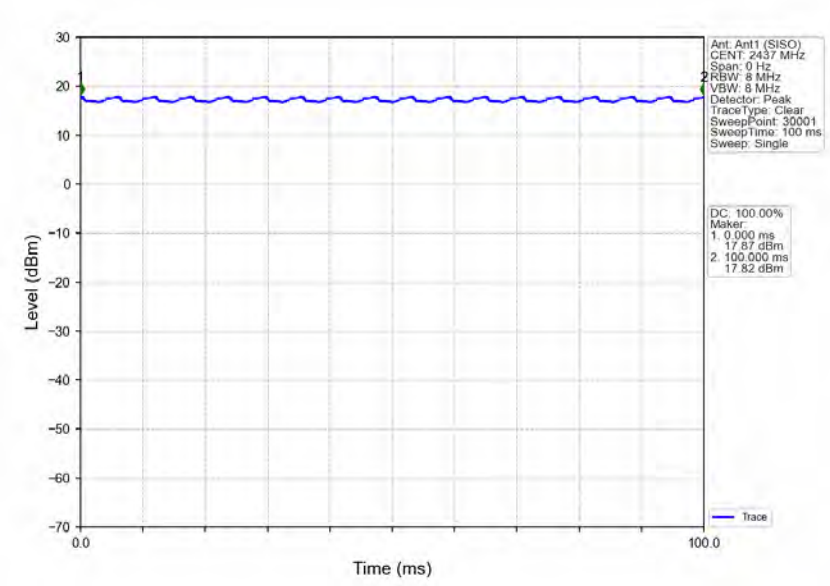
1.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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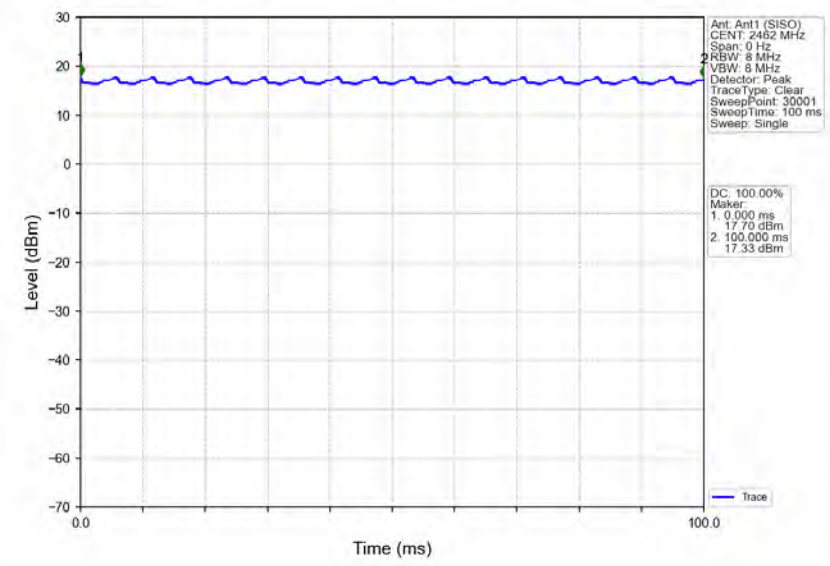
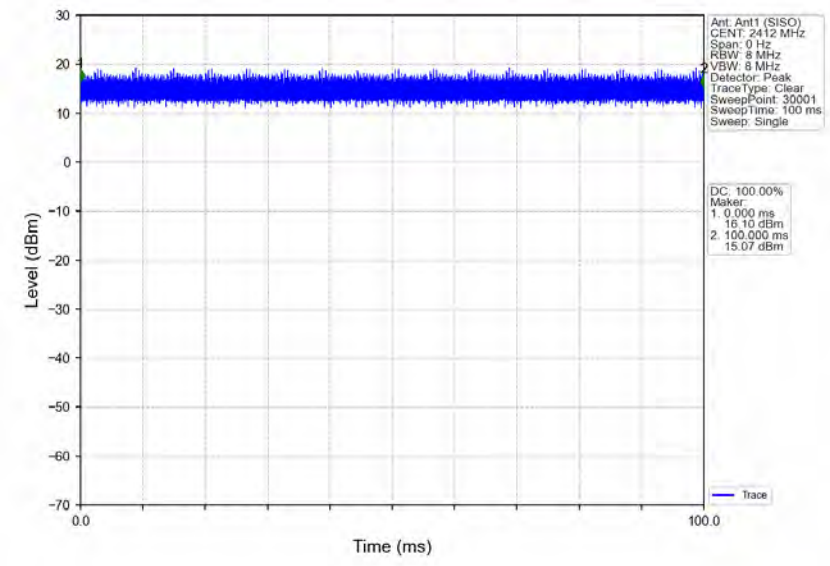
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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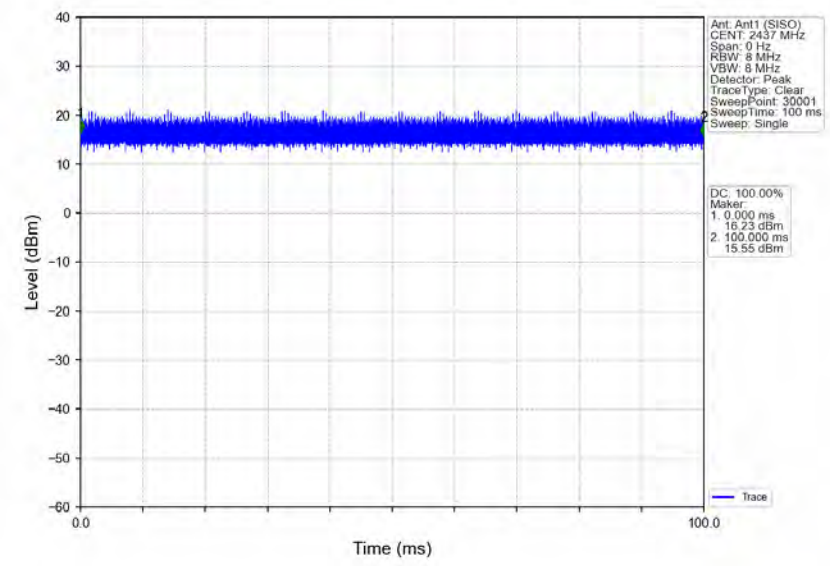
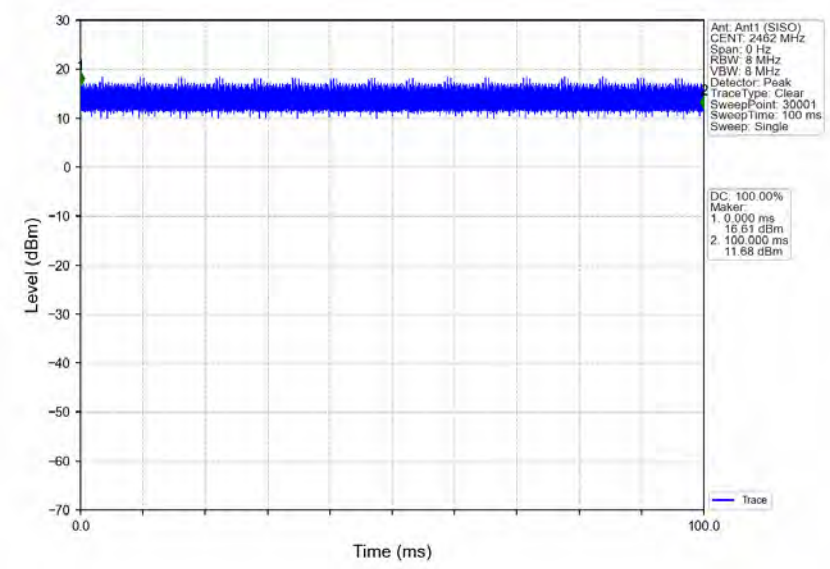
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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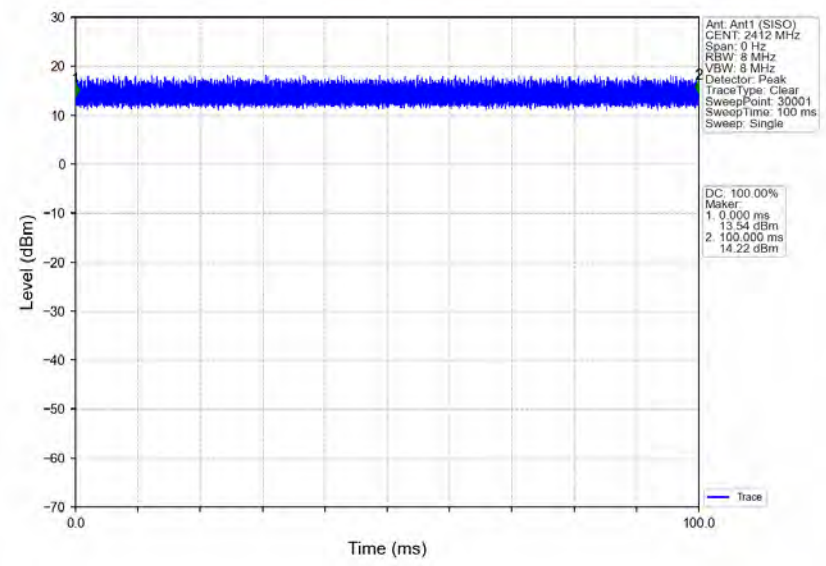
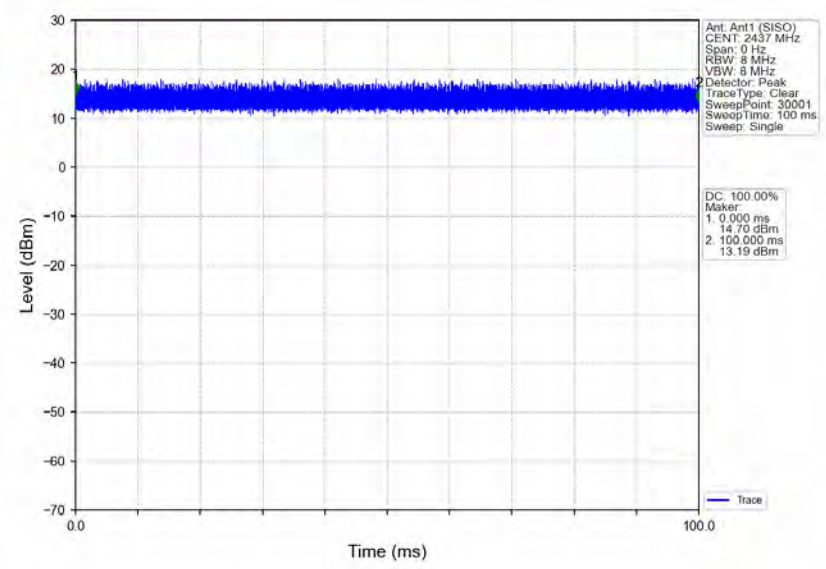
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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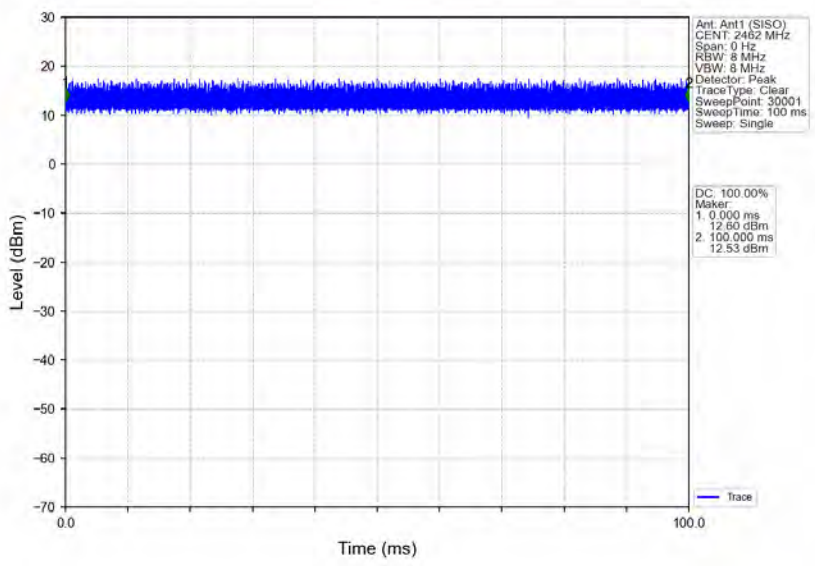
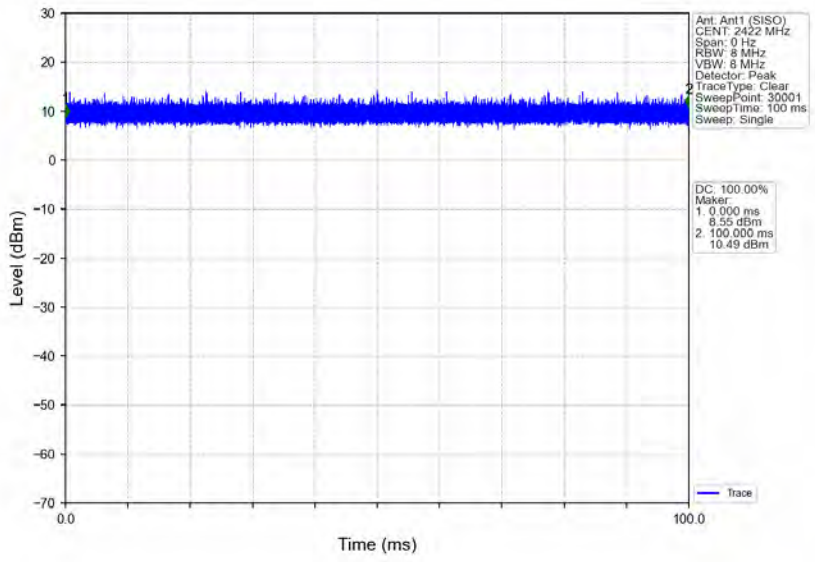
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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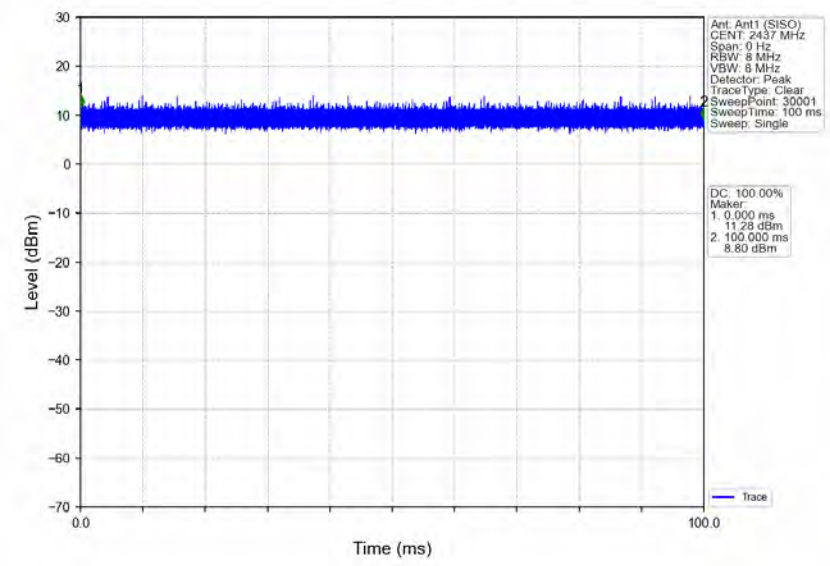
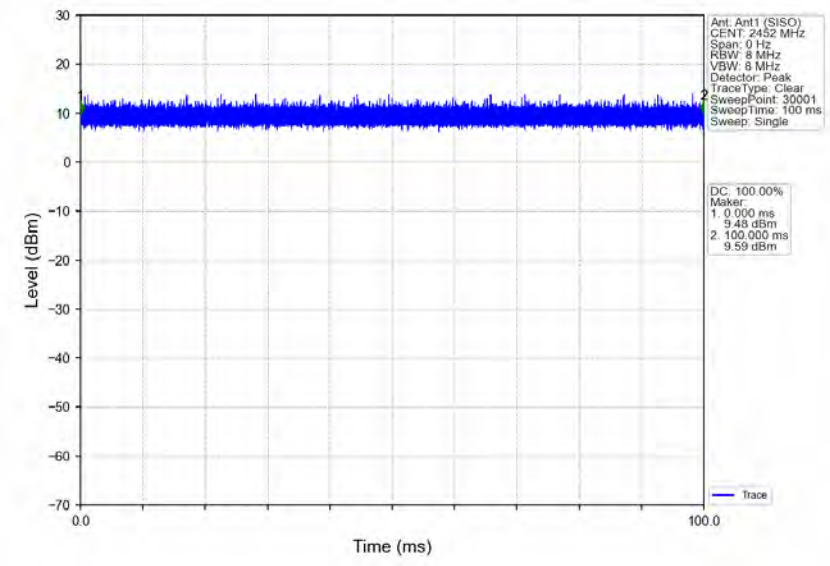
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



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2. Bandwidth

2.1 OBW

2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz) Result	Verdict
802.11b	SISO	2412	1	15.038	Pass
		2437	1	14.954	Pass
		2462	1	14.944	Pass
802.11g	SISO	2412	1	17.849	Pass
		2437	1	17.876	Pass
		2462	1	17.871	Pass
802.11n (HT20)	SISO	2412	1	18.704	Pass
		2437	1	18.718	Pass
		2462	1	18.755	Pass
802.11n (HT40)	SISO	2422	1	36.307	Pass
		2437	1	36.345	Pass
		2452	1	36.383	Pass

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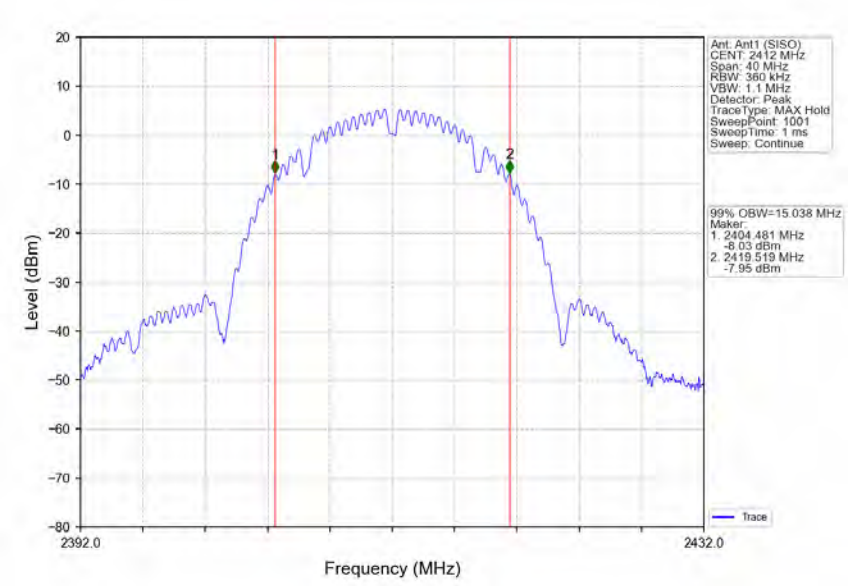
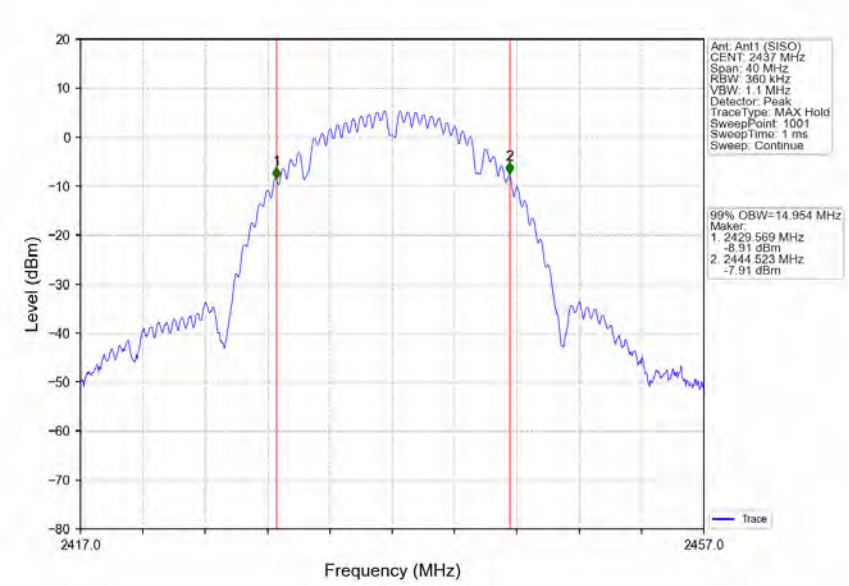
2.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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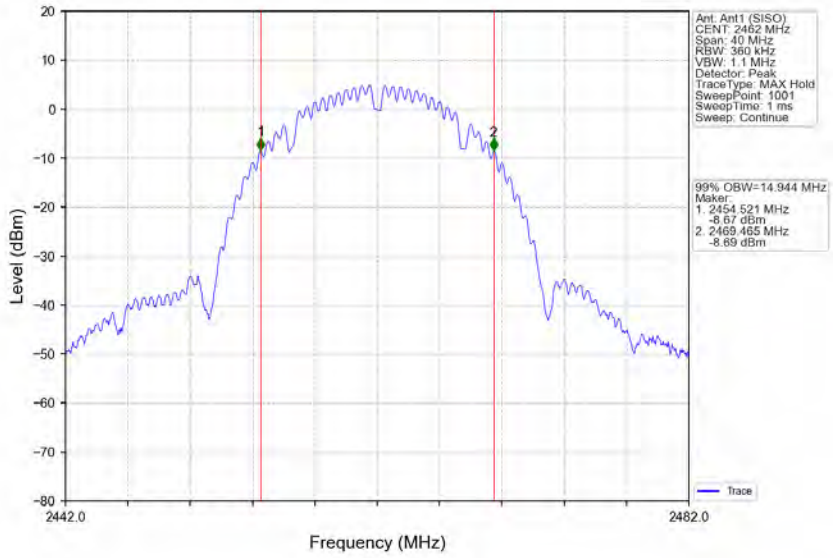
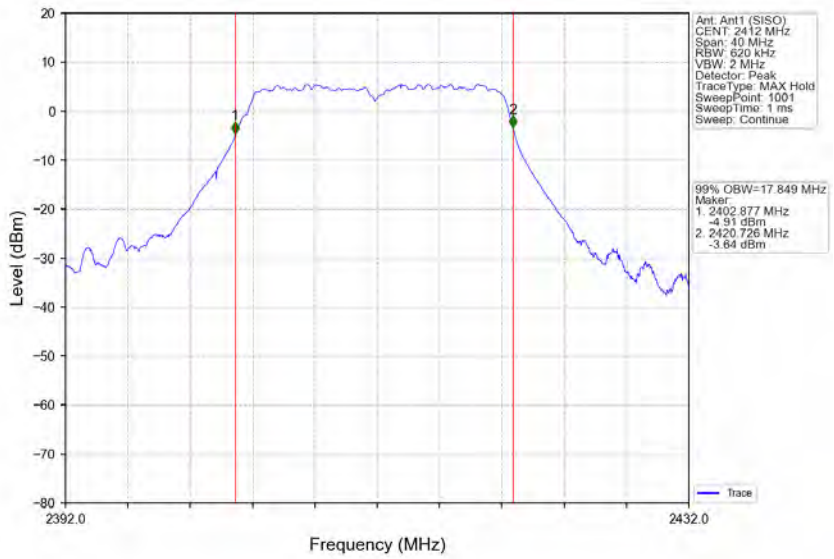
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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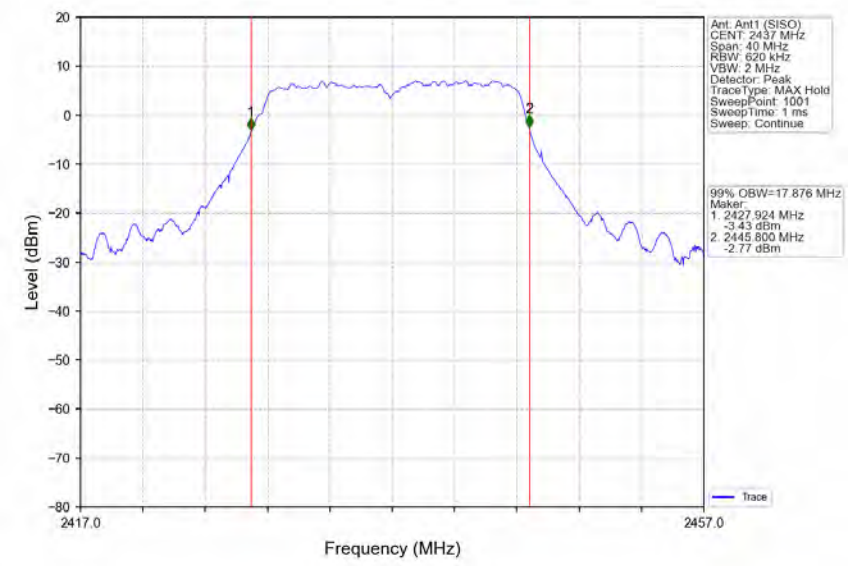
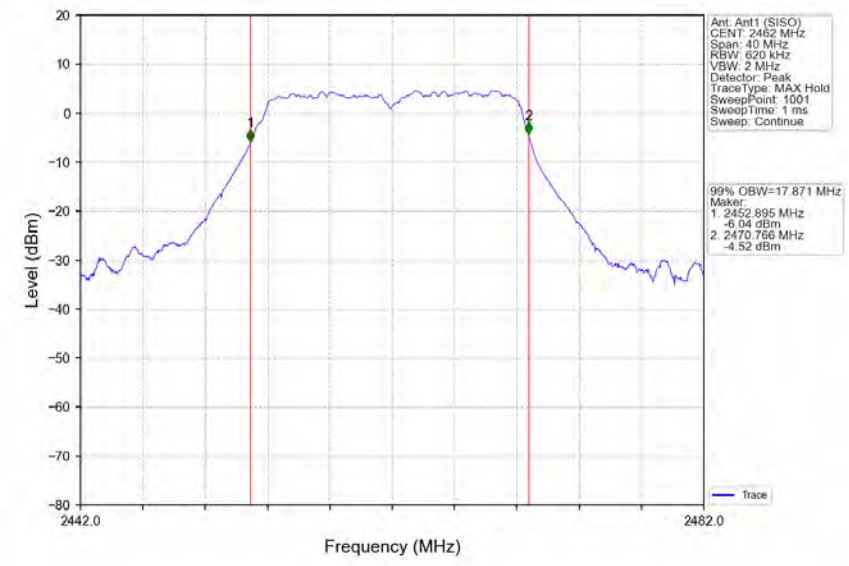
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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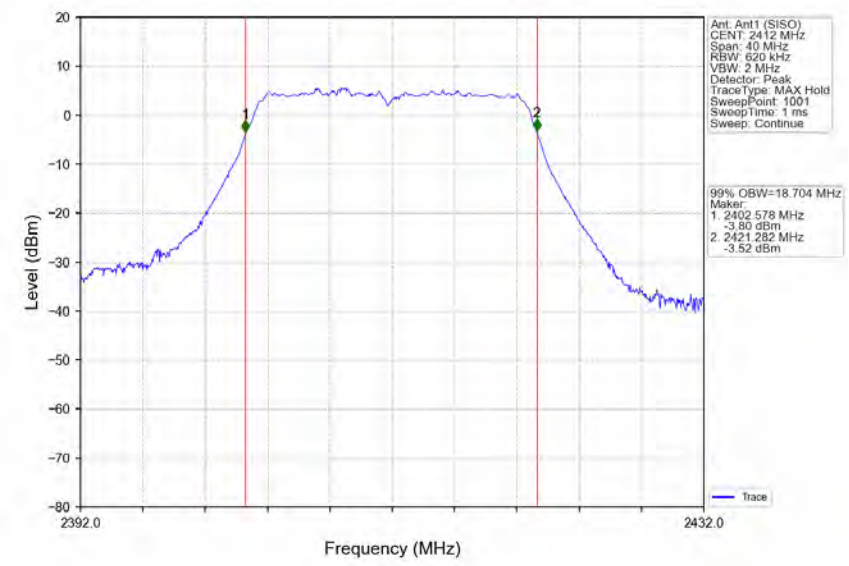
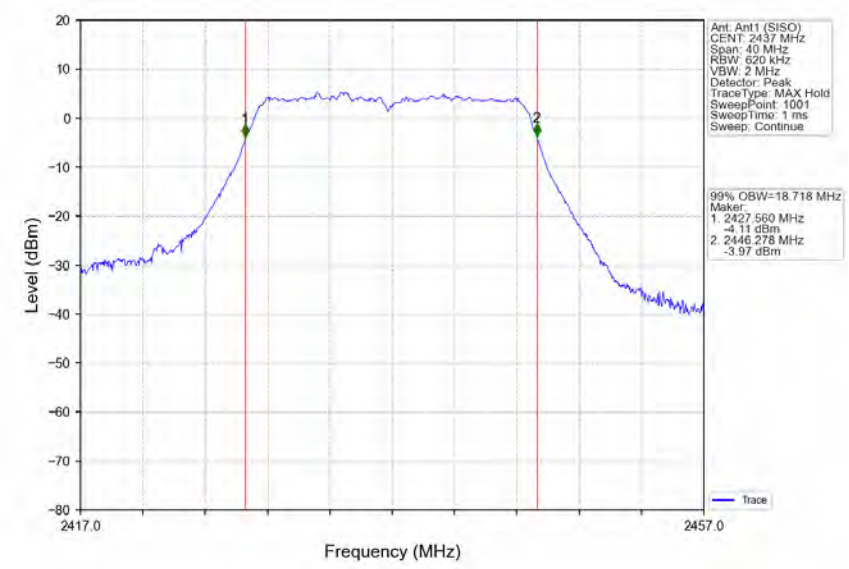
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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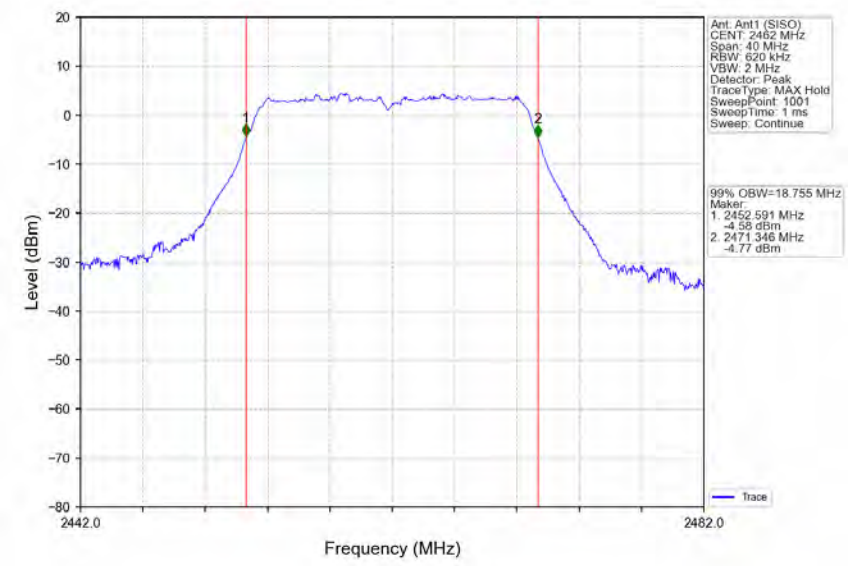
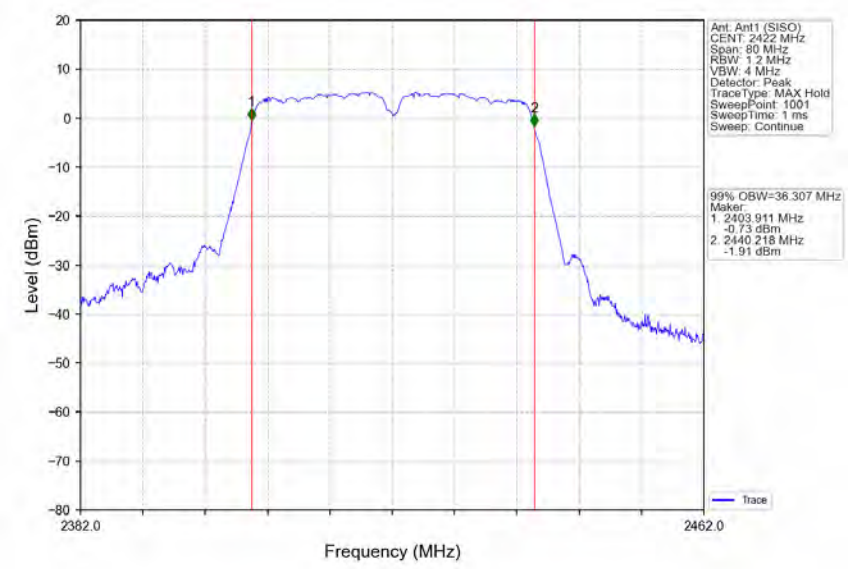
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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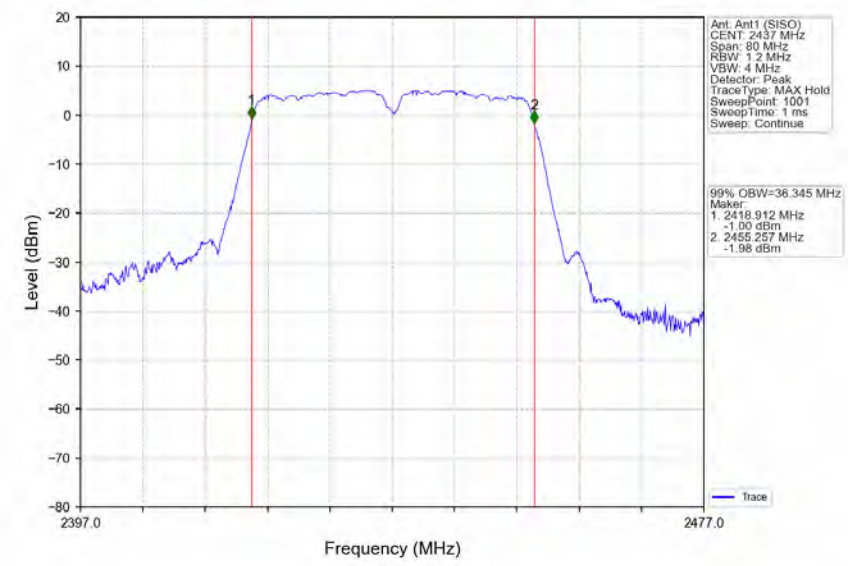
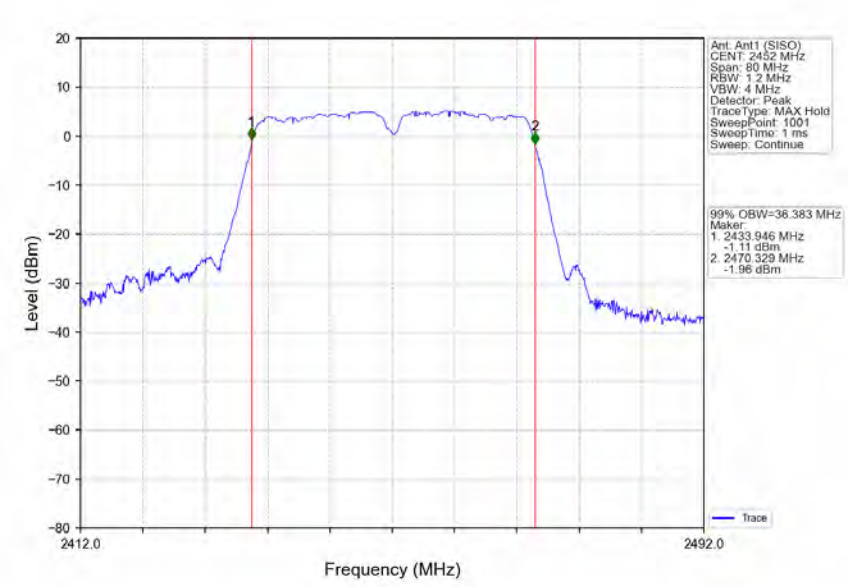
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



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2.2 6dB BW

2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	10.095	>=0.5	Pass
		2437	1	10.090	>=0.5	Pass
		2462	1	10.084	>=0.5	Pass
802.11g	SISO	2412	1	16.609	>=0.5	Pass
		2437	1	16.603	>=0.5	Pass
		2462	1	16.611	>=0.5	Pass
802.11n (HT20)	SISO	2412	1	17.817	>=0.5	Pass
		2437	1	17.816	>=0.5	Pass
		2462	1	17.837	>=0.5	Pass
802.11n (HT40)	SISO	2422	1	36.386	>=0.5	Pass
		2437	1	36.398	>=0.5	Pass
		2452	1	36.407	>=0.5	Pass

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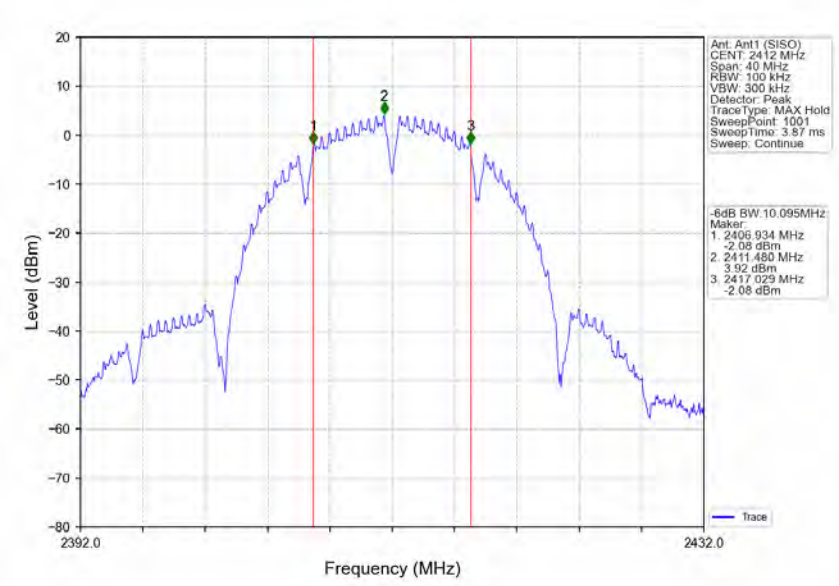
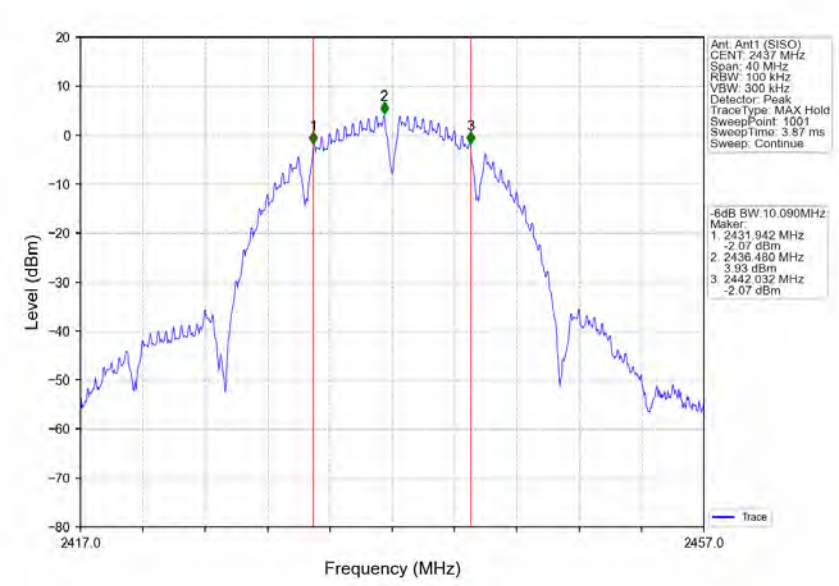
2.2.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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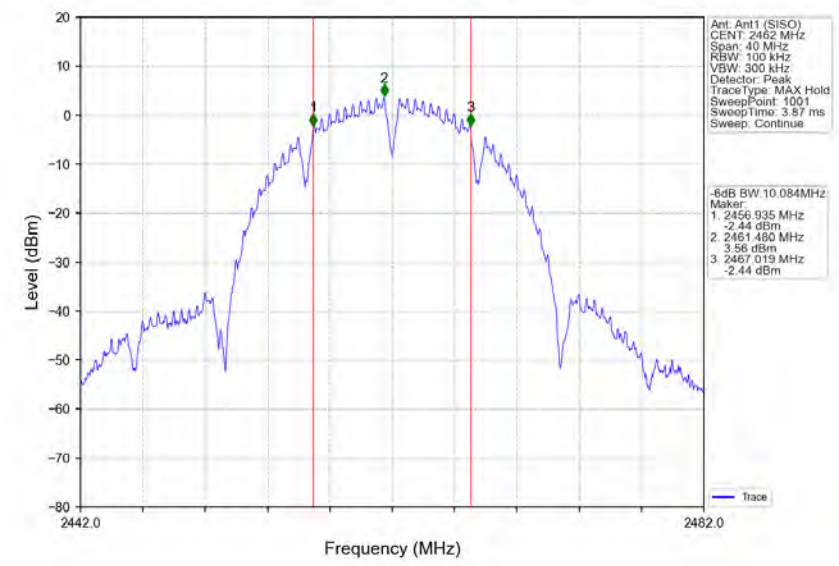
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



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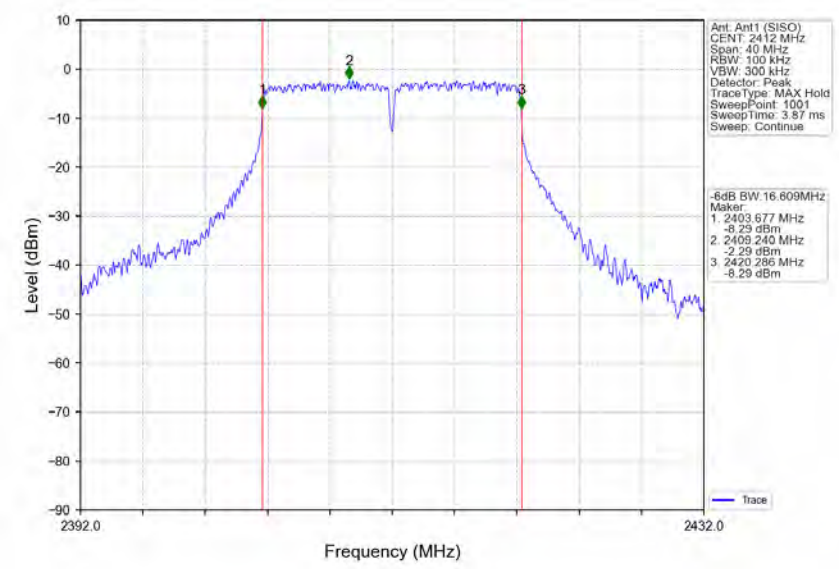

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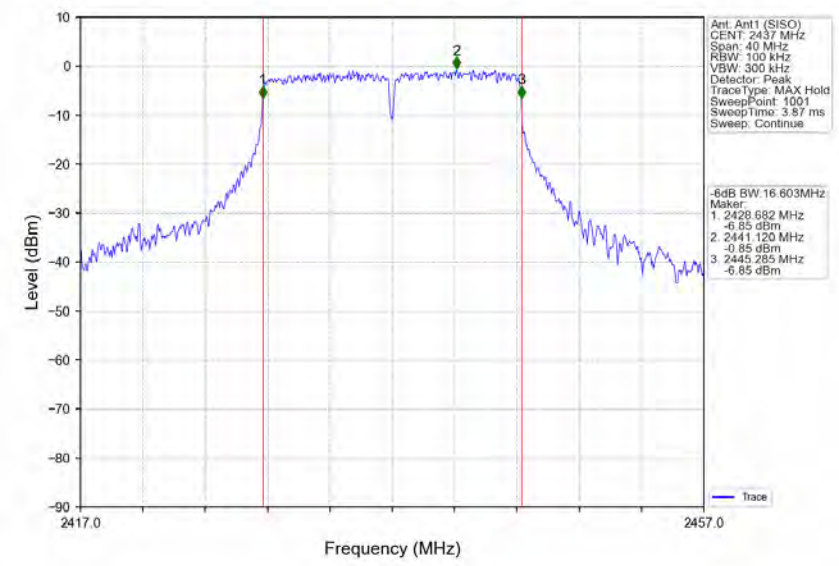
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



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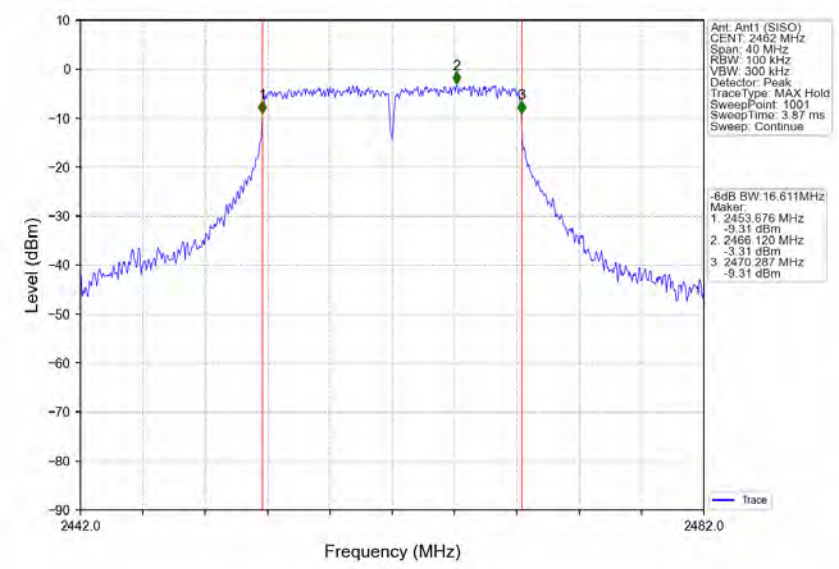

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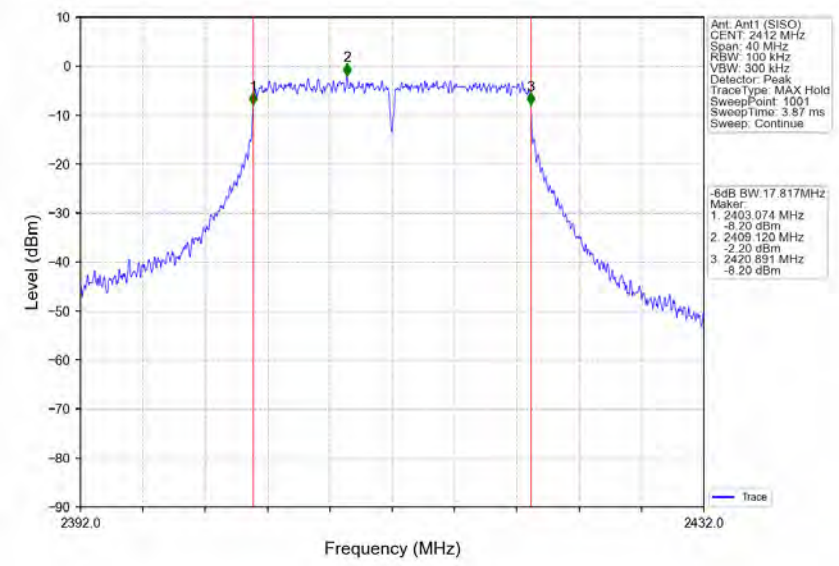
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



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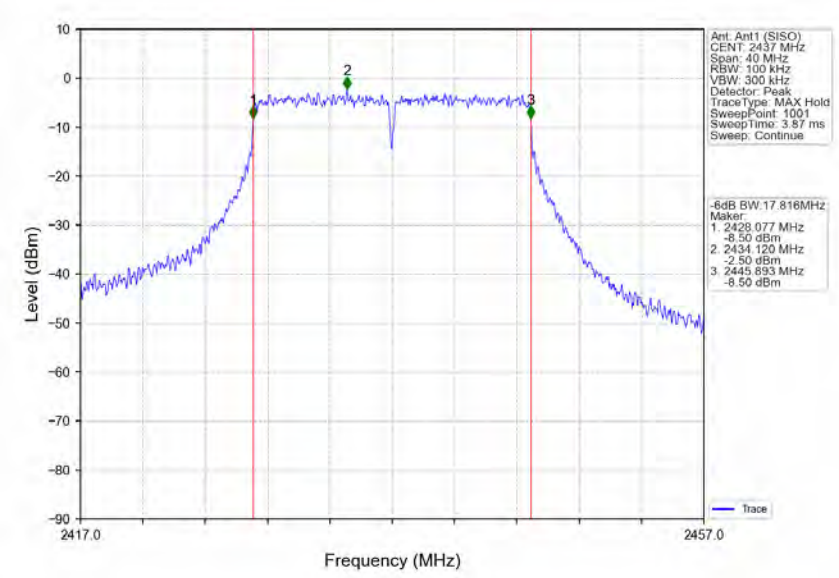

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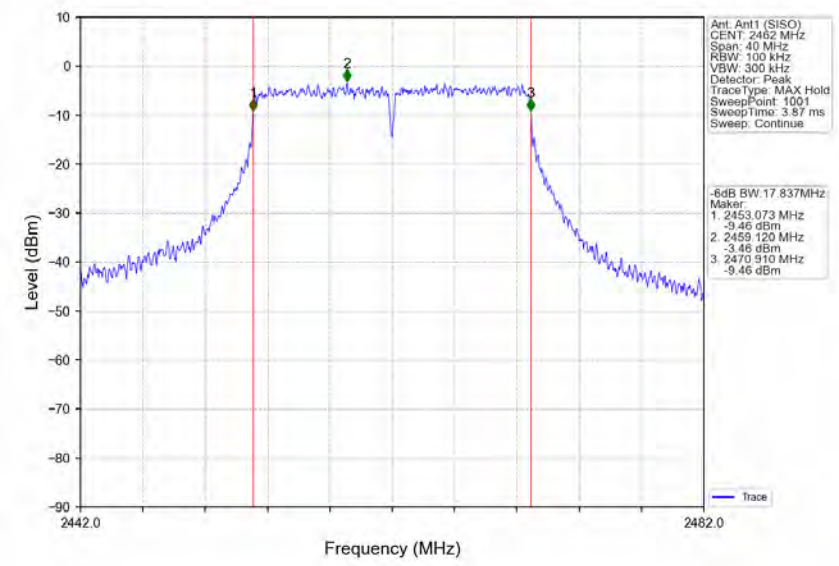
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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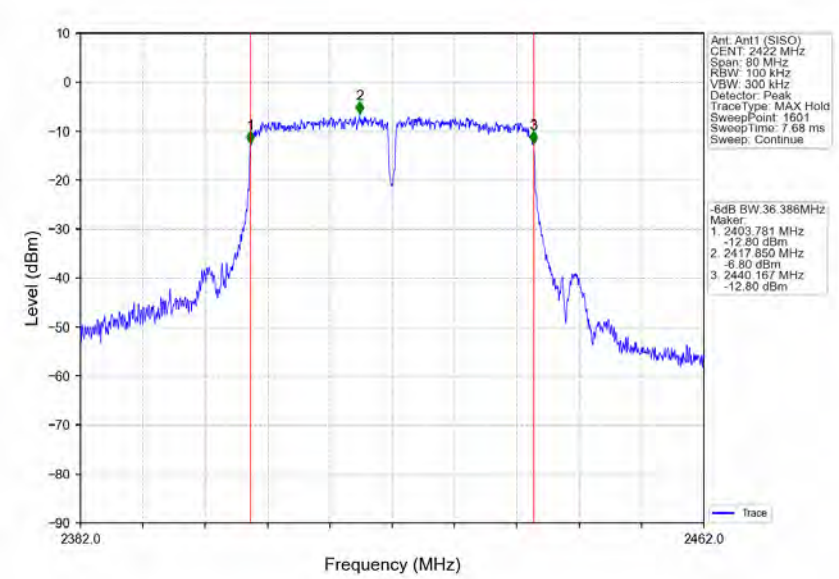

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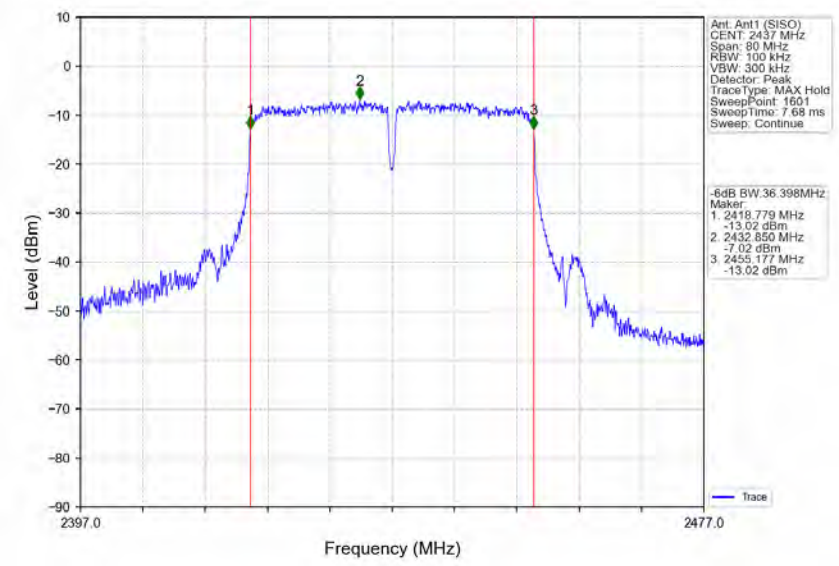

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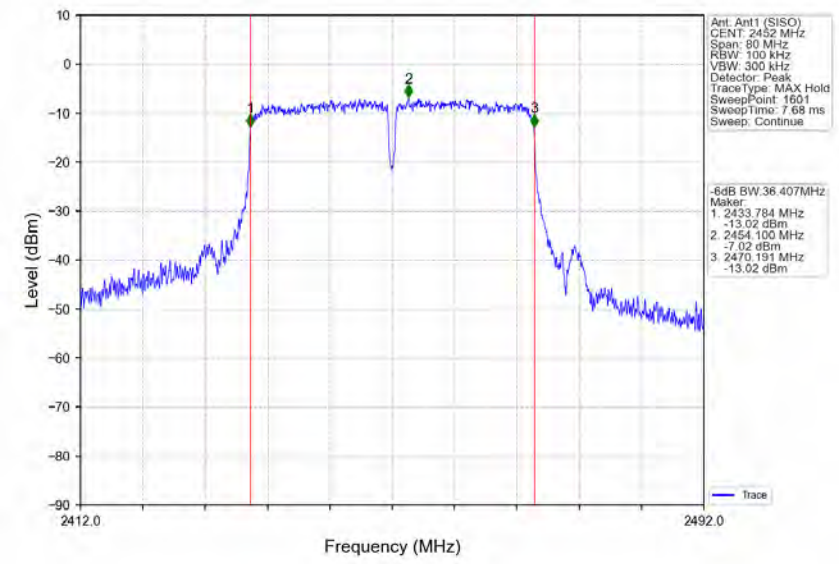

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3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	13.69	<=30	Pass
		2437	13.69	<=30	Pass
		2462	13.29	<=30	Pass
802.11g	SISO	2412	12.00	<=30	Pass
		2437	13.38	<=30	Pass
		2462	10.95	<=30	Pass
802.11n (HT20)	SISO	2412	11.59	<=30	Pass
		2437	11.30	<=30	Pass
		2462	10.69	<=30	Pass
802.11n (HT40)	SISO	2422	10.14	<=30	Pass
		2437	10.02	<=30	Pass
		2452	10.07	<=30	Pass
Note1: Antenna Gain: Ant1: 2.36dBi;					

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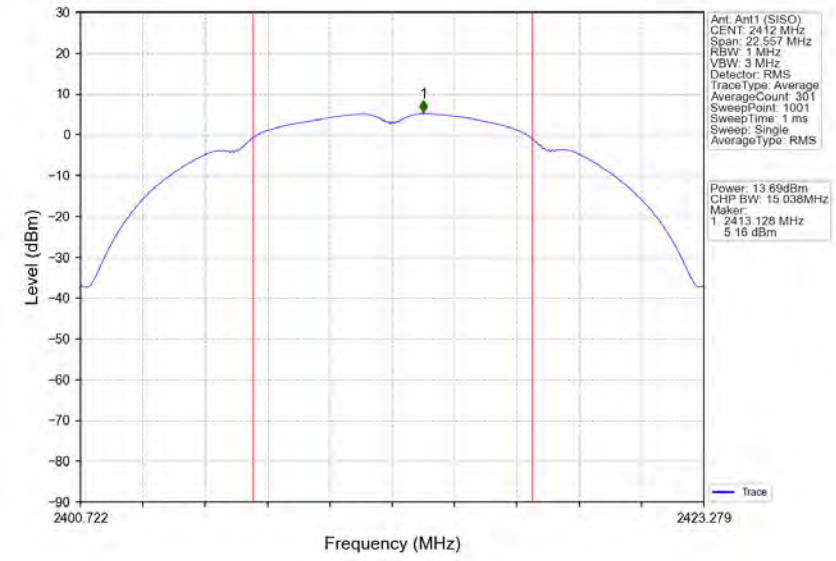
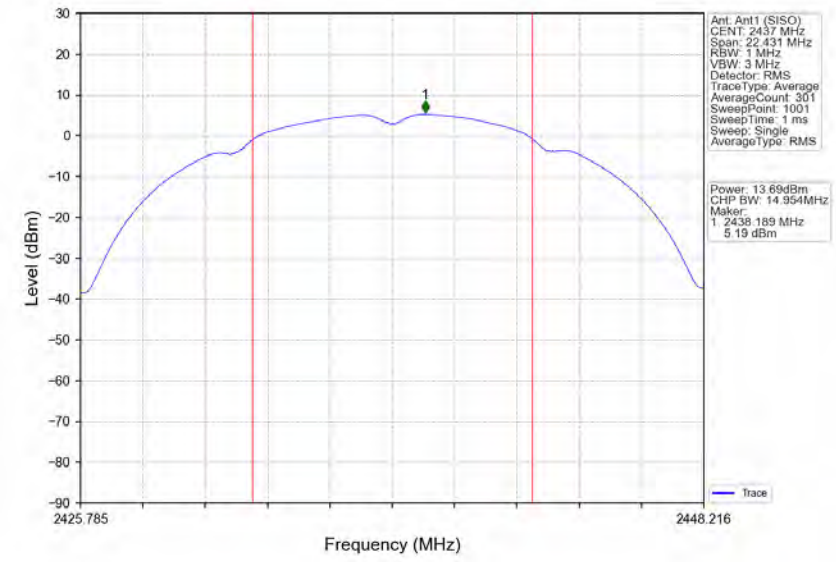
3.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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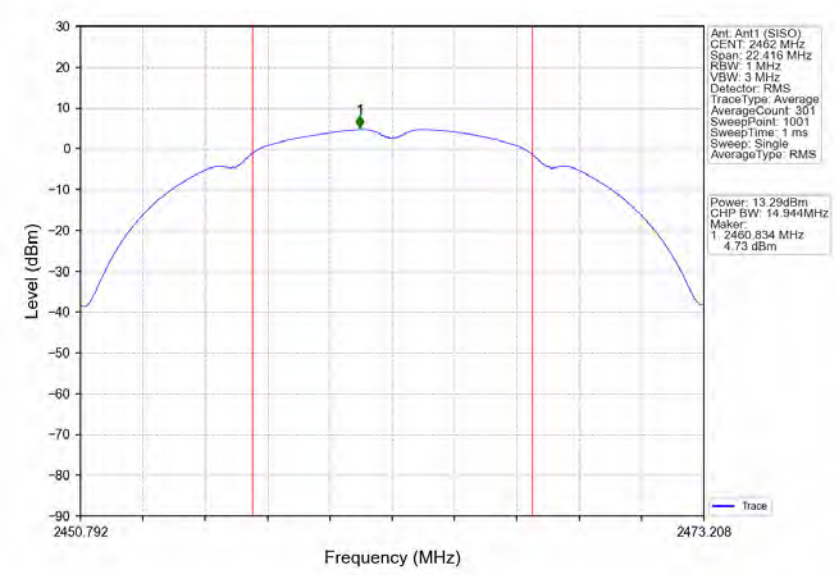
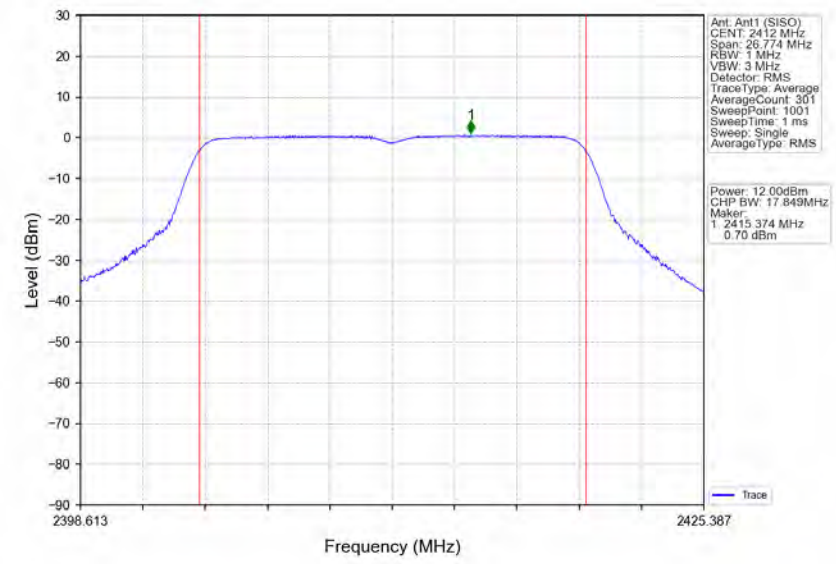
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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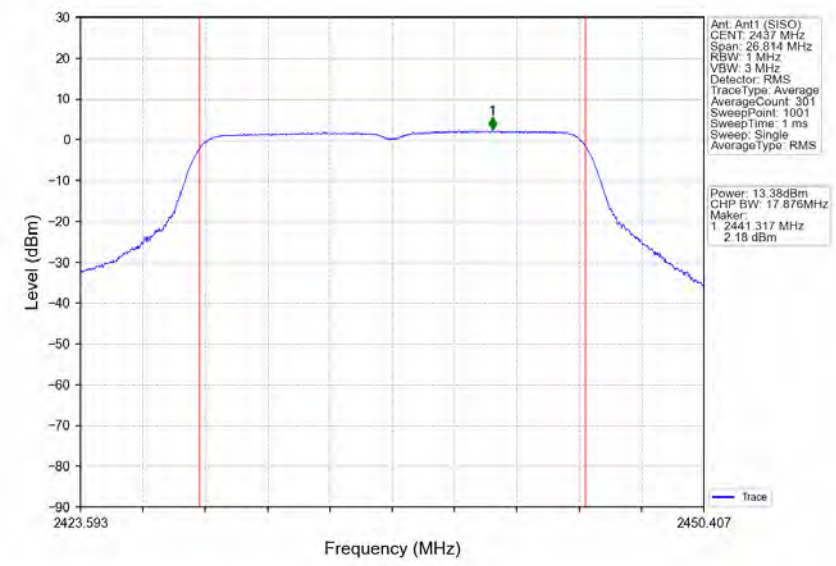
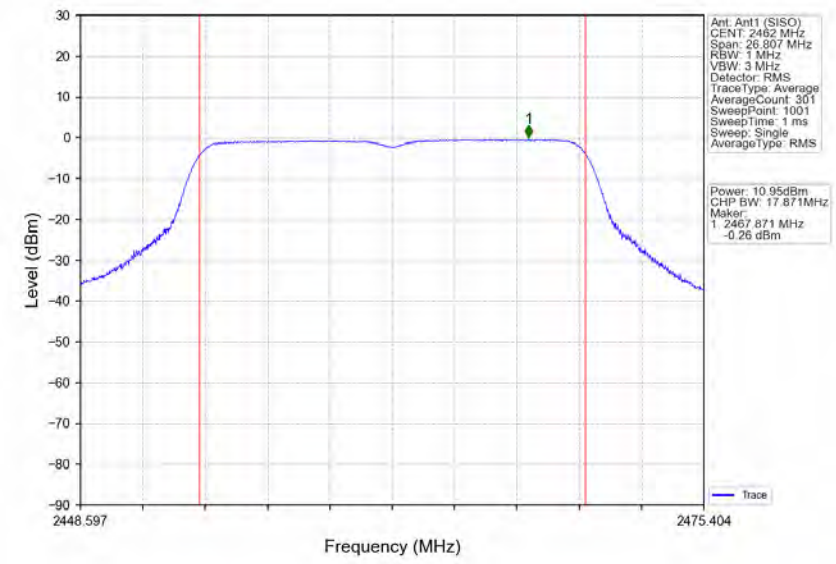
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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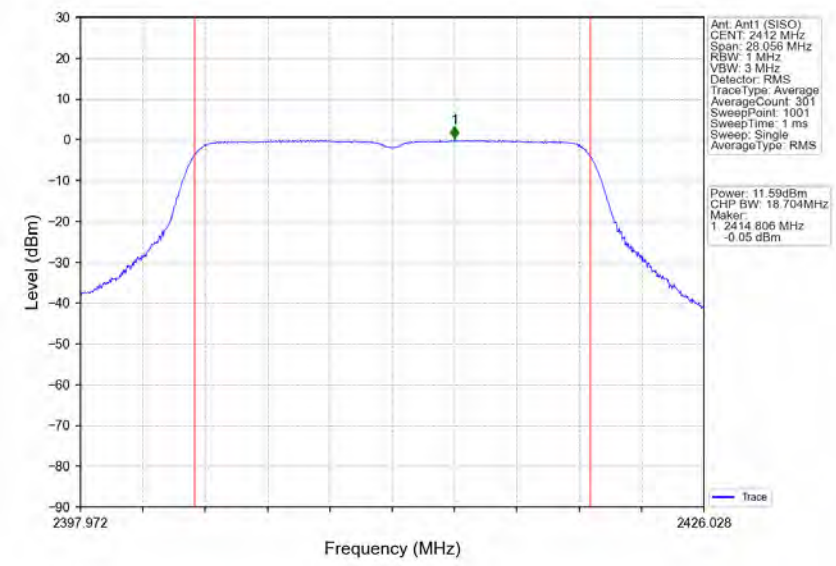
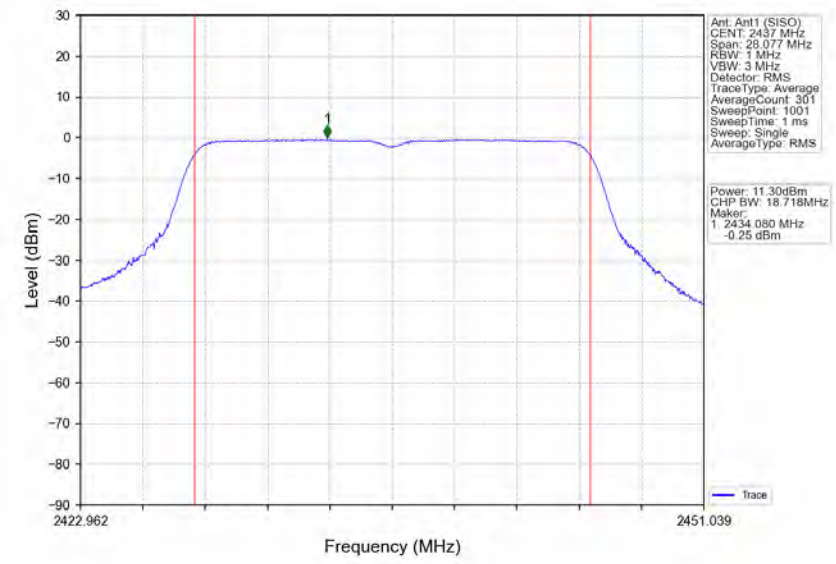
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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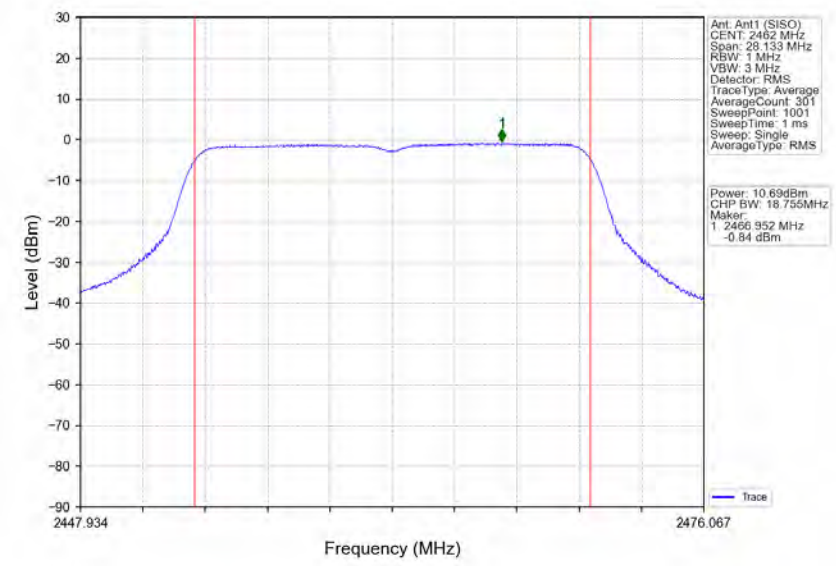
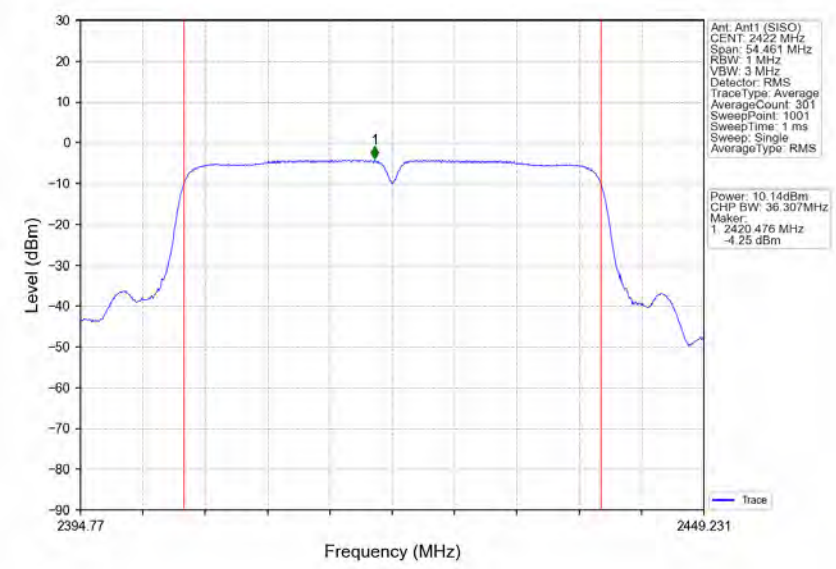
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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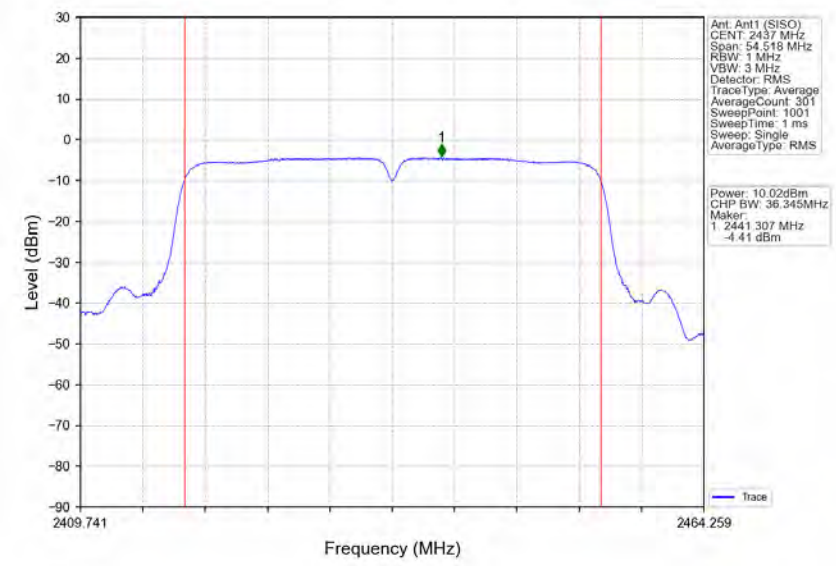
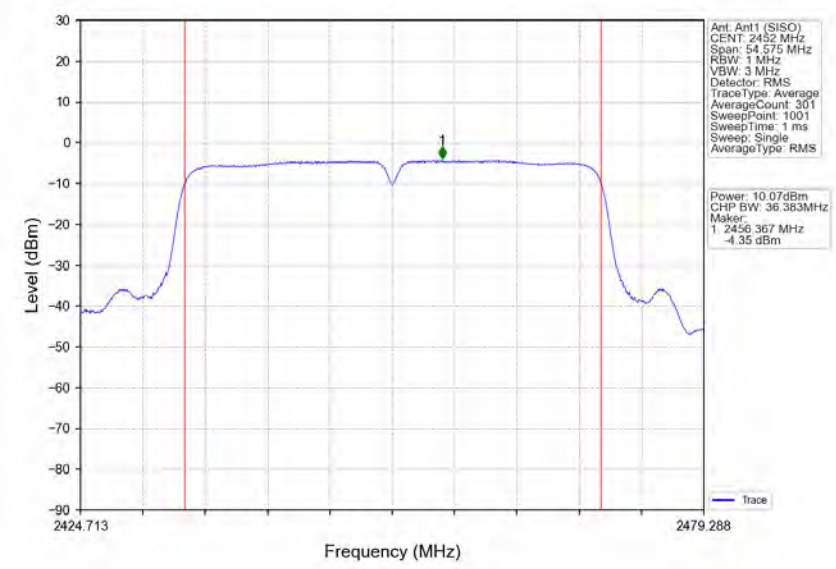
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



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4. Maximum Power Spectral Density

4.1 PSD

4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	-16.09	<=8	Pass
		2437	-16.10	<=8	Pass
		2462	-16.50	<=8	Pass
802.11g	SISO	2412	-16.40	<=8	Pass
		2437	-14.95	<=8	Pass
		2462	-17.53	<=8	Pass
802.11n (HT20)	SISO	2412	-16.11	<=8	Pass
		2437	-16.80	<=8	Pass
		2462	-17.42	<=8	Pass
802.11n (HT40)	SISO	2422	-18.20	<=8	Pass
		2437	-19.78	<=8	Pass
		2452	-19.52	<=8	Pass
Note1: Antenna Gain: Ant1: 2.36dBi;					

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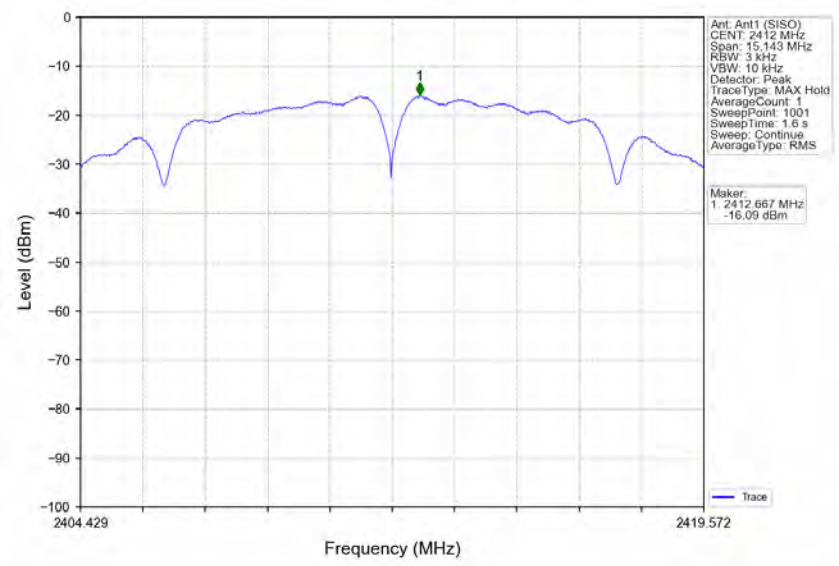
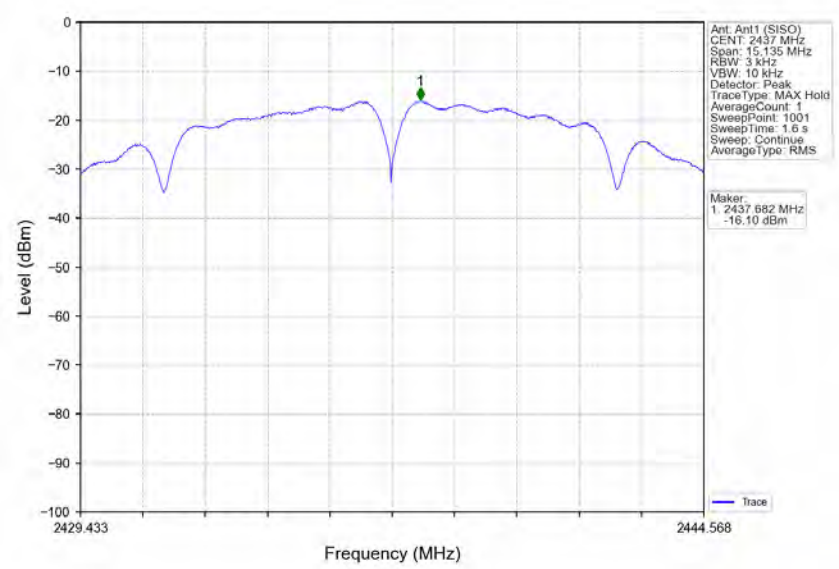
4.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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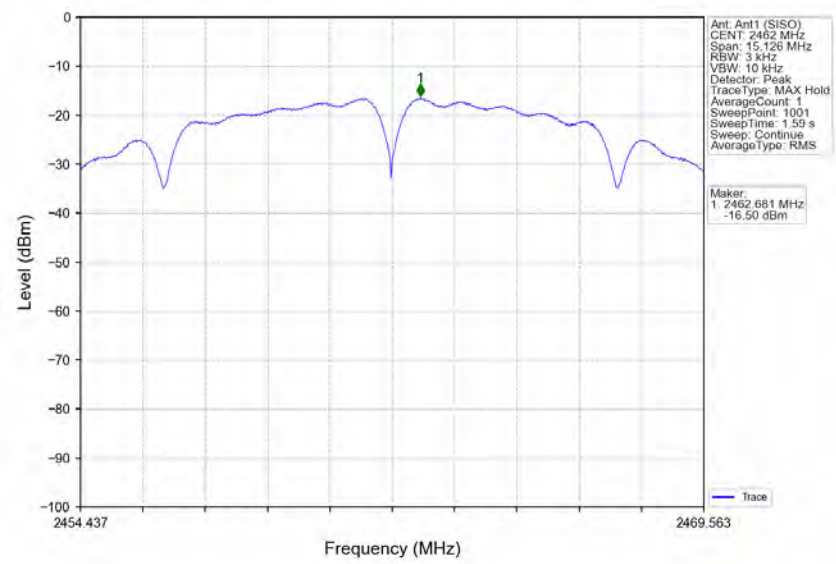
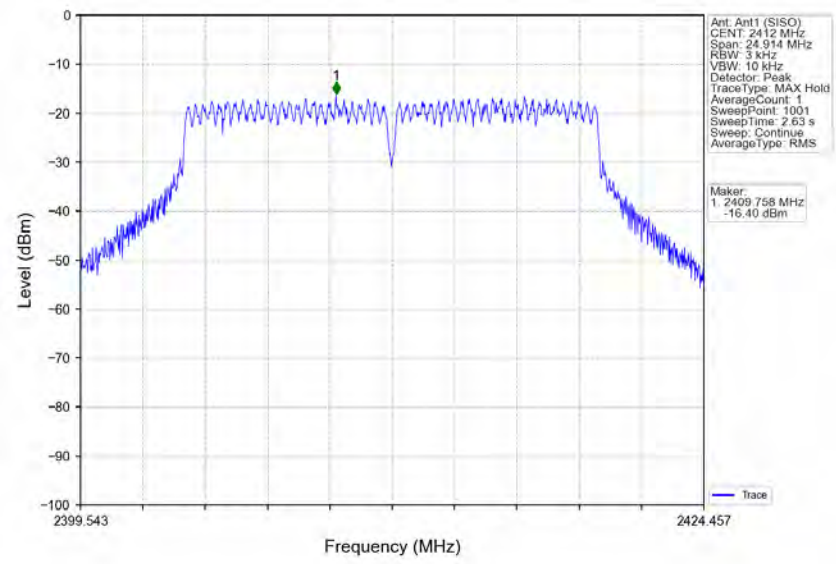
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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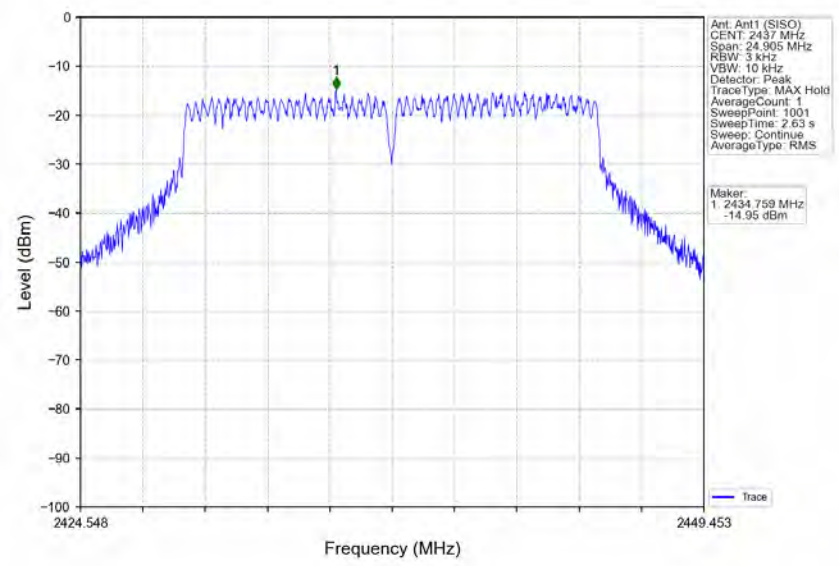
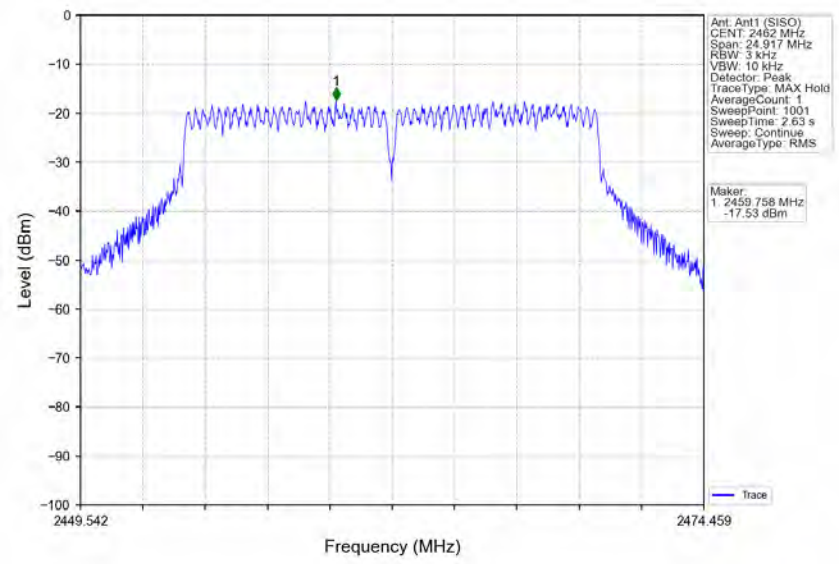
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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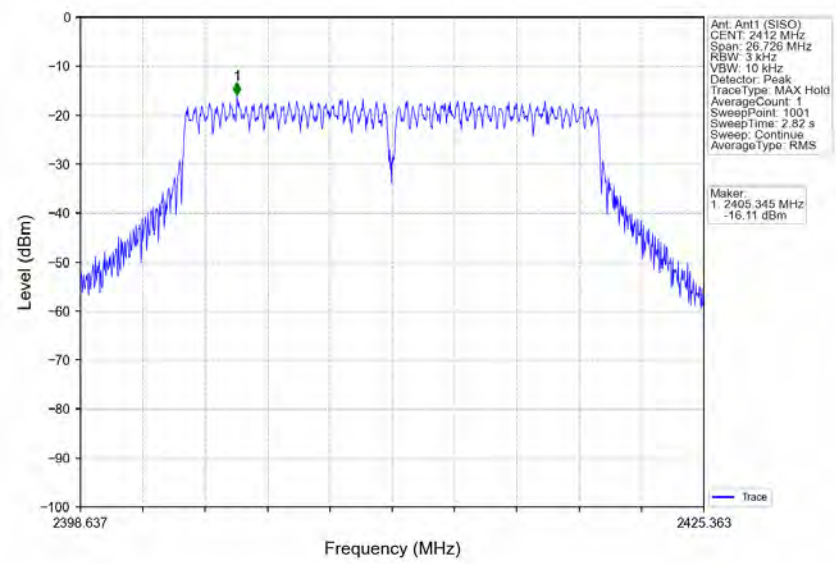
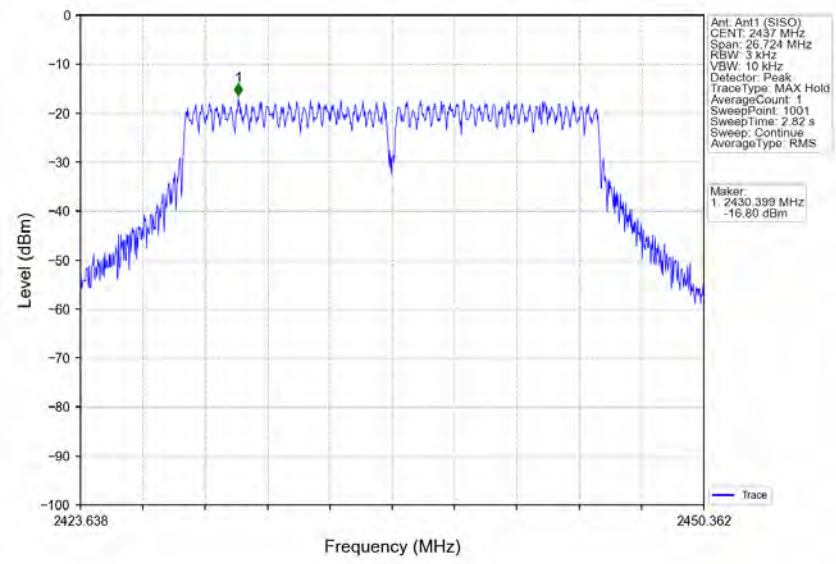
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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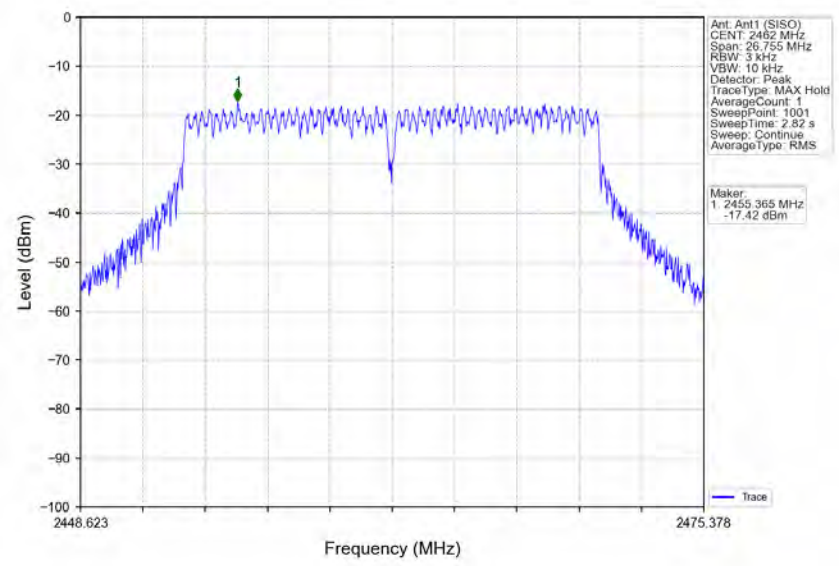
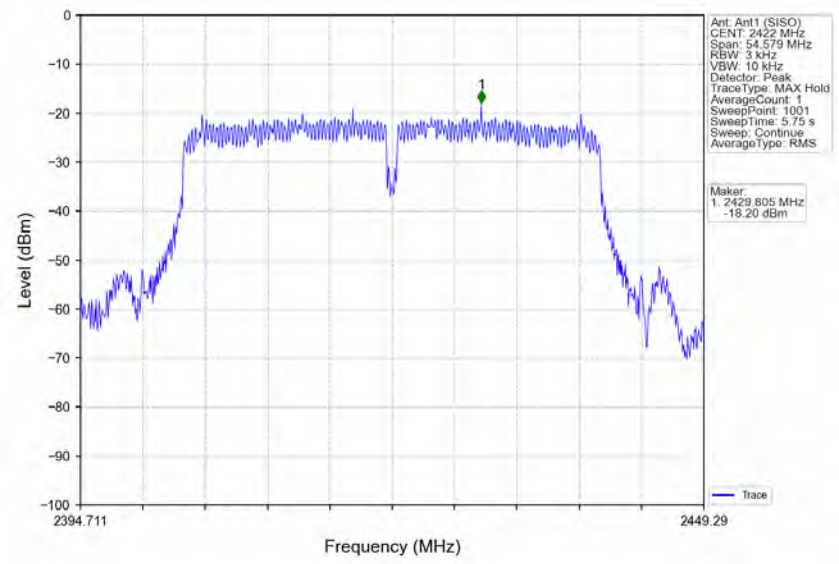
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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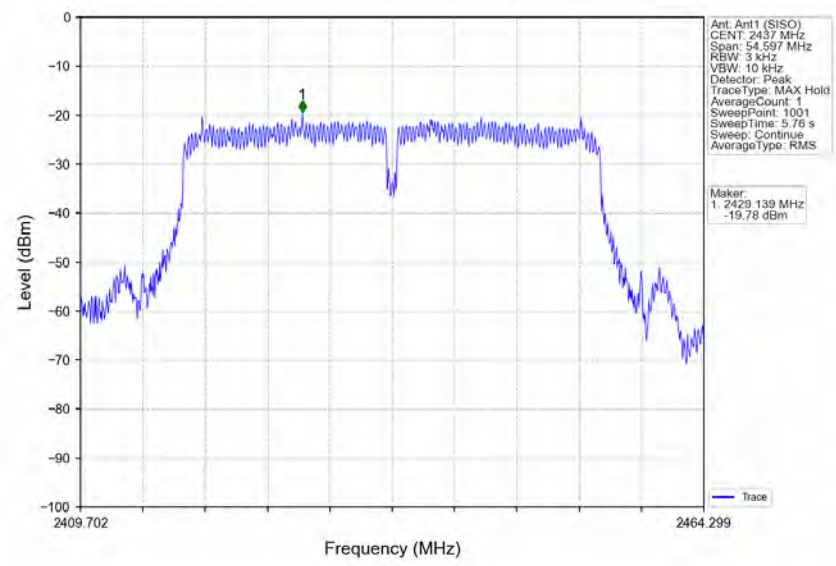
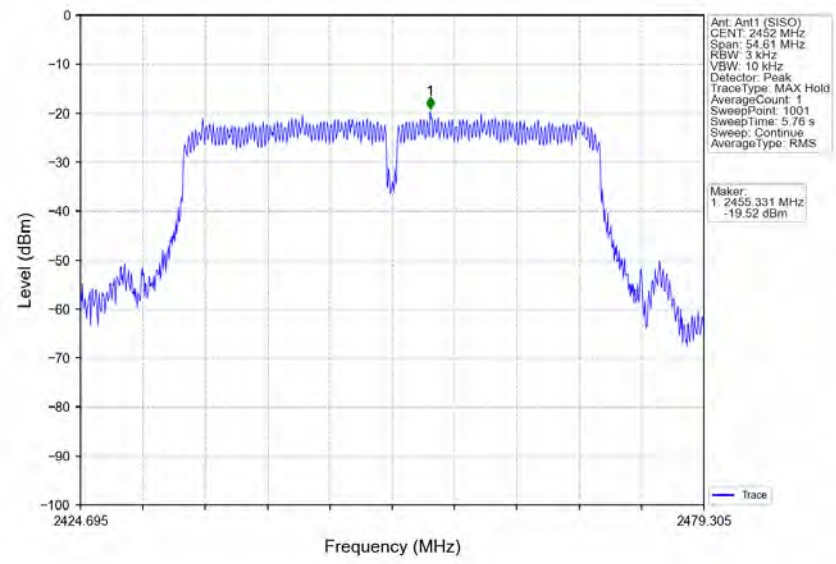
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



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5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Ref

5.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
802.11b	SISO	2412	1	3.91
		2437	1	3.92
		2462	1	3.54
802.11g	SISO	2412	1	-2.40
		2437	1	-0.86
		2462	1	-3.36
802.11n (HT20)	SISO	2412	1	-2.38
		2437	1	-2.52
		2462	1	-3.49
802.11n (HT40)	SISO	2422	1	-6.91
		2437	1	-7.19
		2452	1	-7.02
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.				

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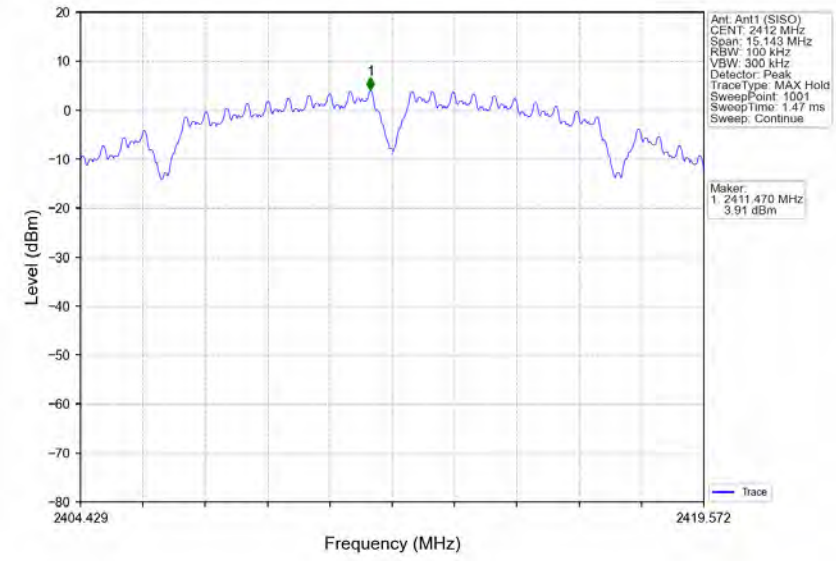
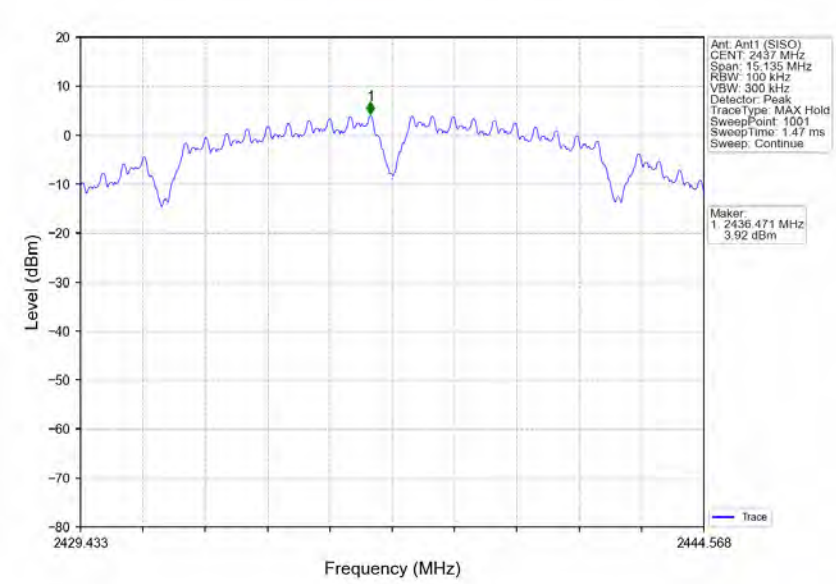
5.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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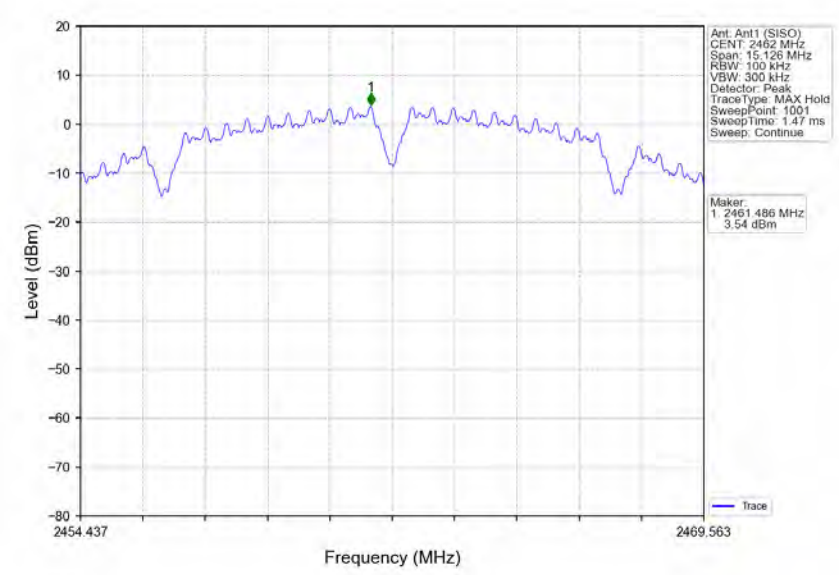
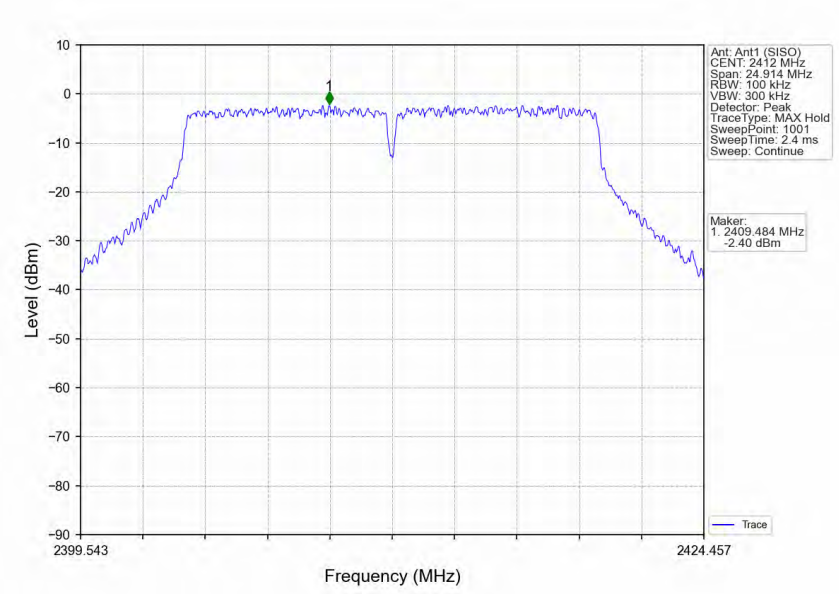
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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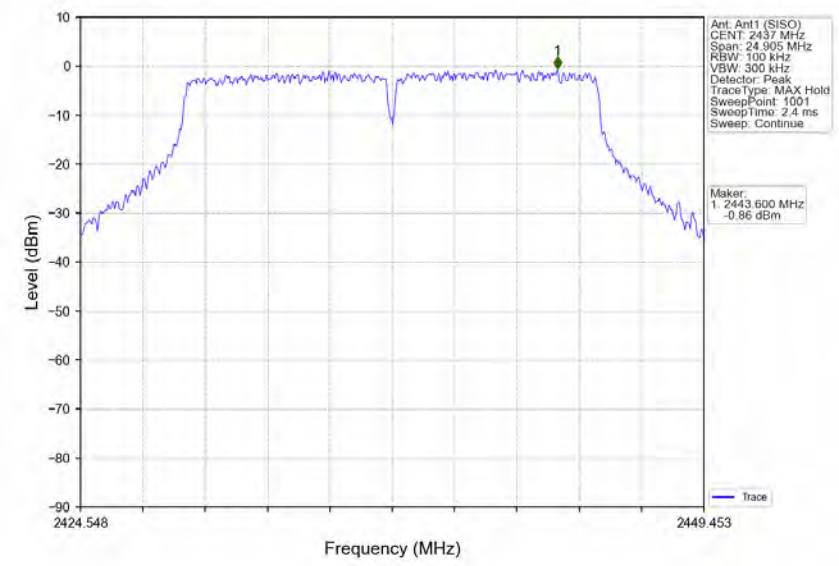
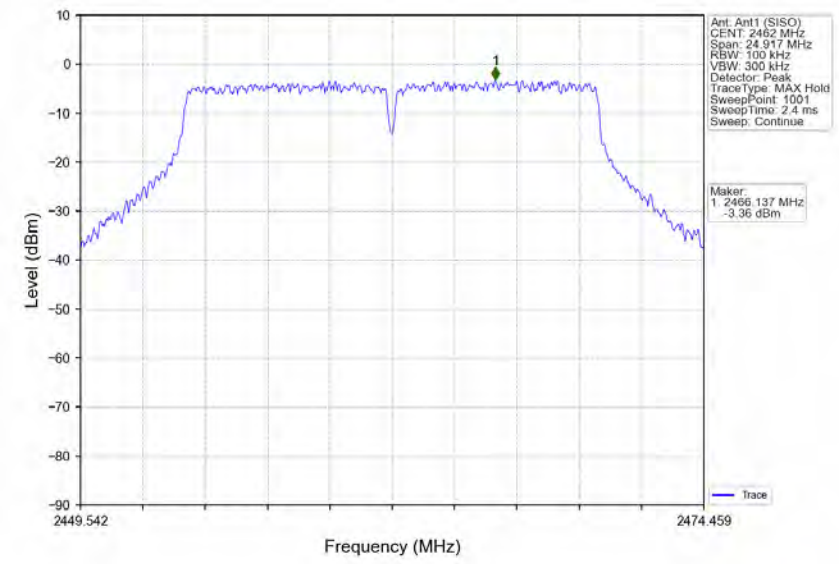
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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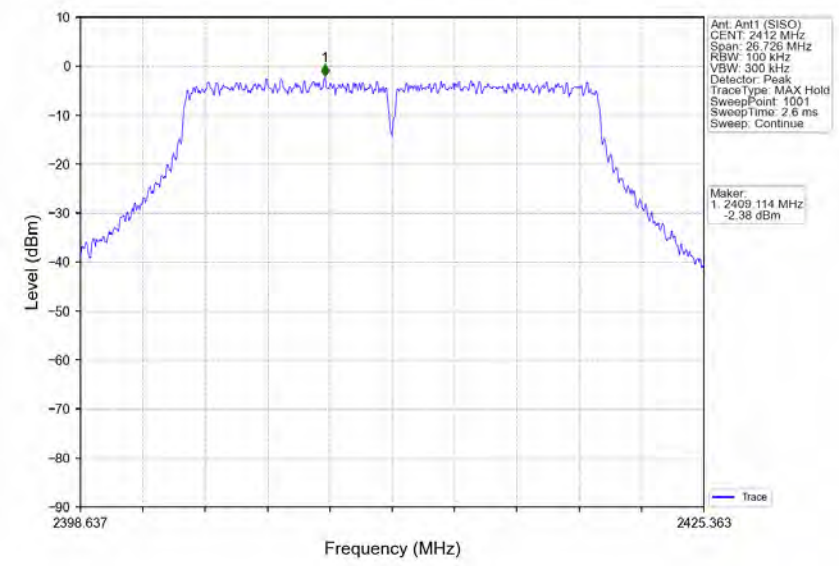
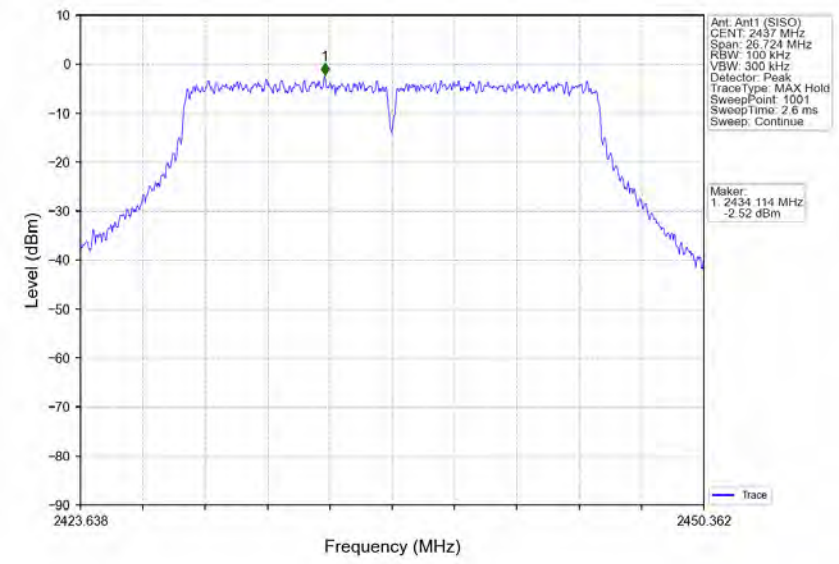
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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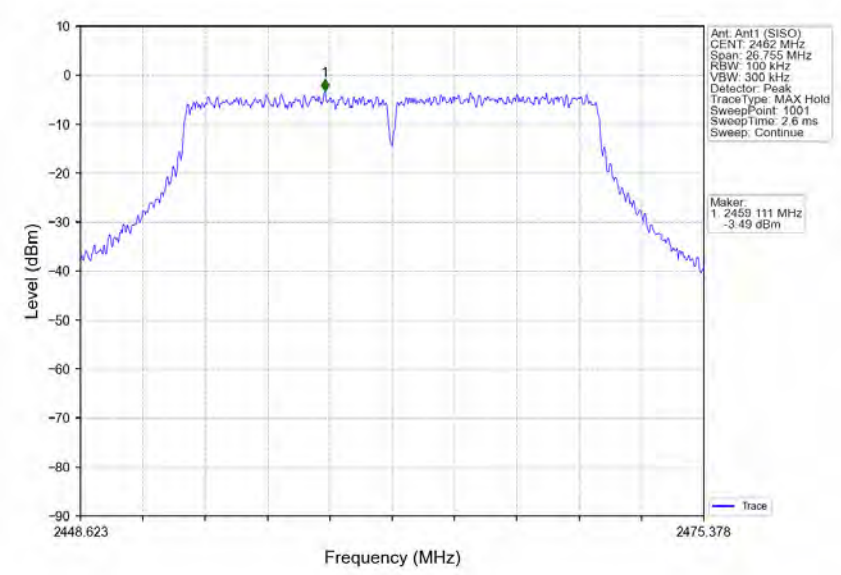
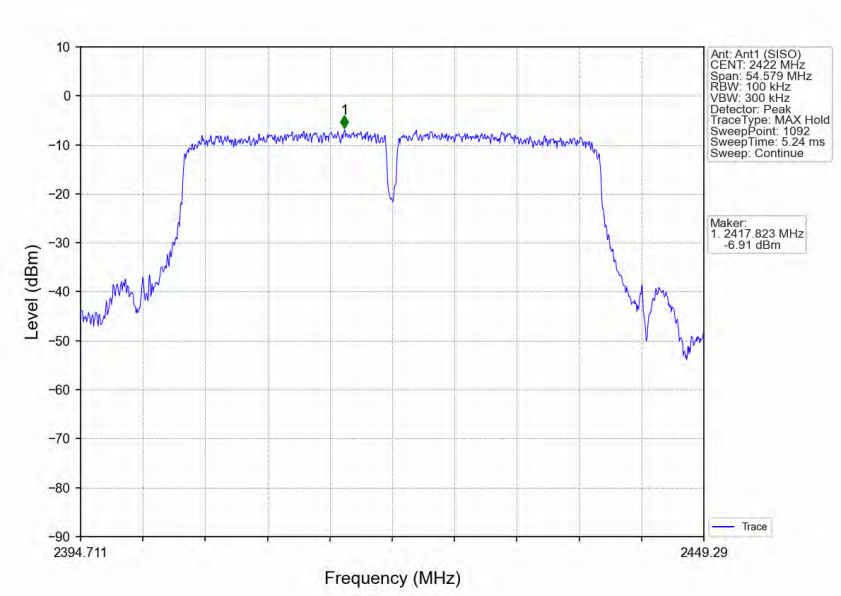
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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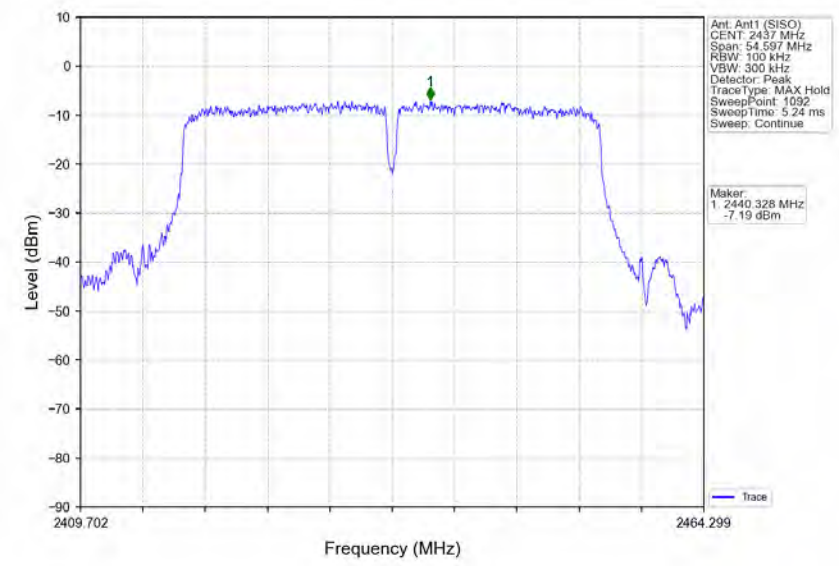
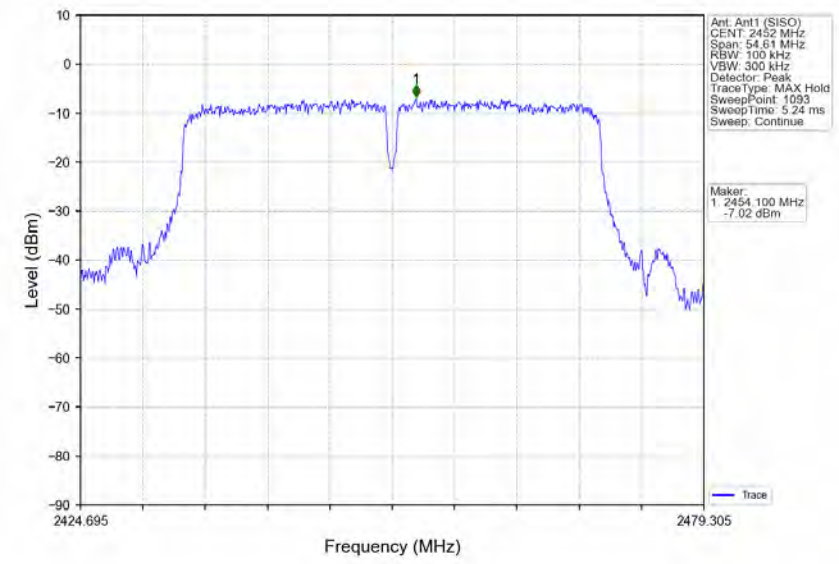
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



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5.2 CSE

5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	3.92	-26.08	Pass
		2437	1	3.92	-26.08	Pass
		2462	1	3.92	-26.08	Pass
802.11g	SISO	2412	1	-0.86	-30.86	Pass
		2437	1	-0.86	-30.86	Pass
		2462	1	-0.86	-30.86	Pass
802.11n (HT20)	SISO	2412	1	-2.38	-32.38	Pass
		2437	1	-2.38	-32.38	Pass
		2462	1	-2.38	-32.38	Pass
802.11n (HT40)	SISO	2422	1	-6.91	-36.91	Pass
		2437	1	-6.91	-36.91	Pass
		2452	1	-6.91	-36.91	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.						

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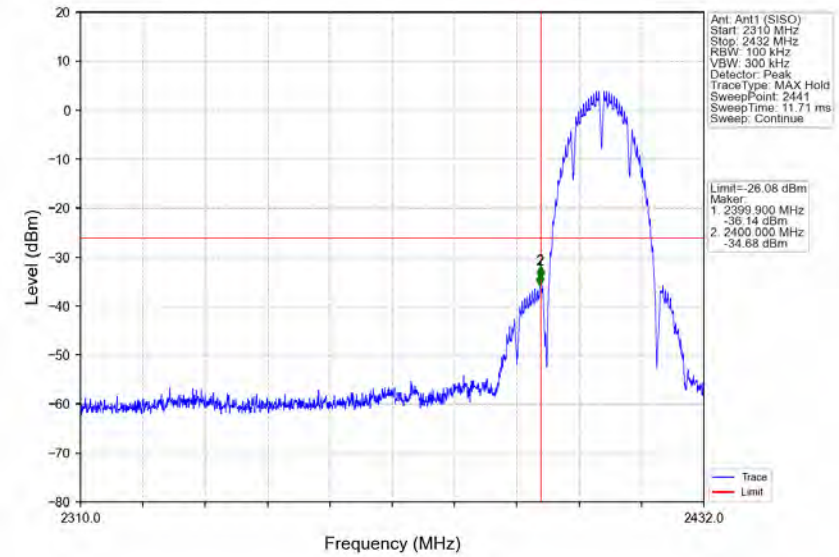
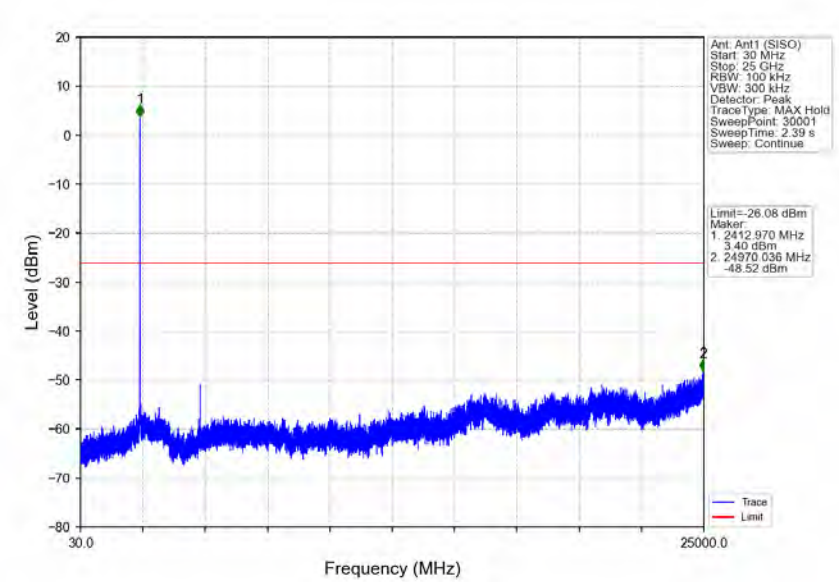
5.2.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



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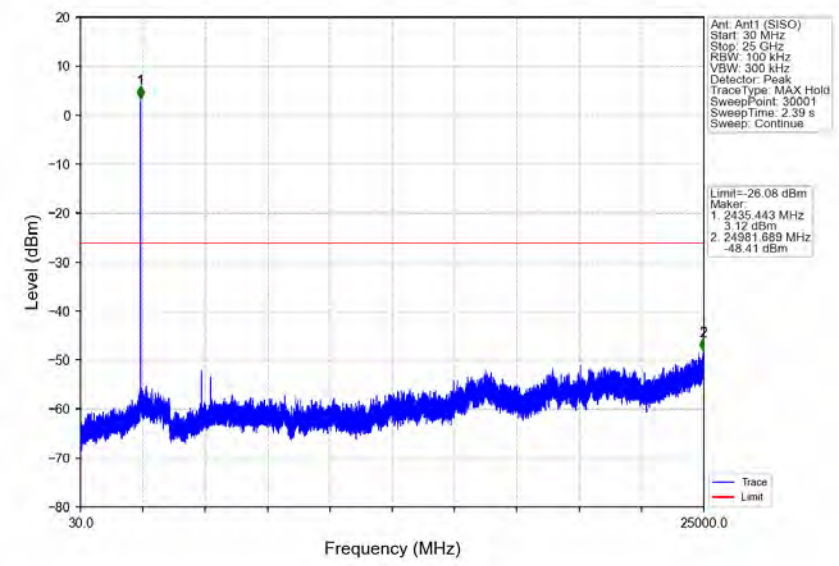
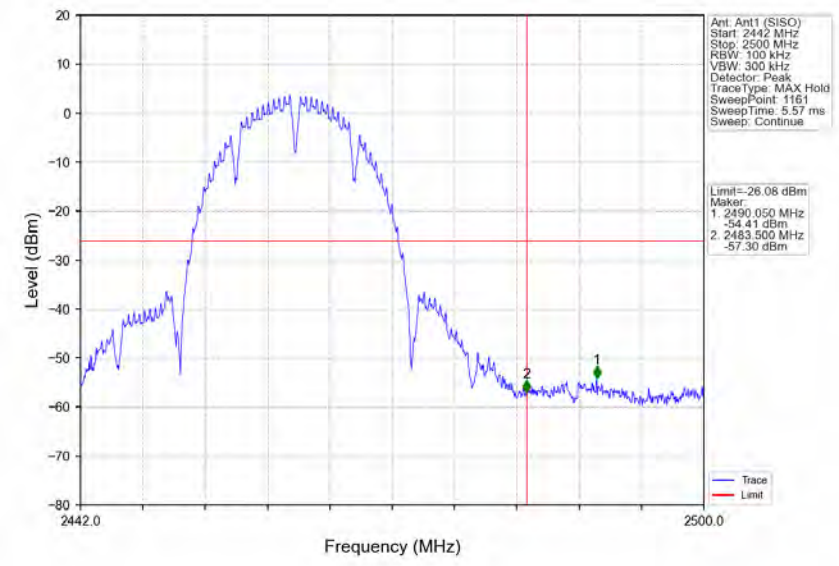
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



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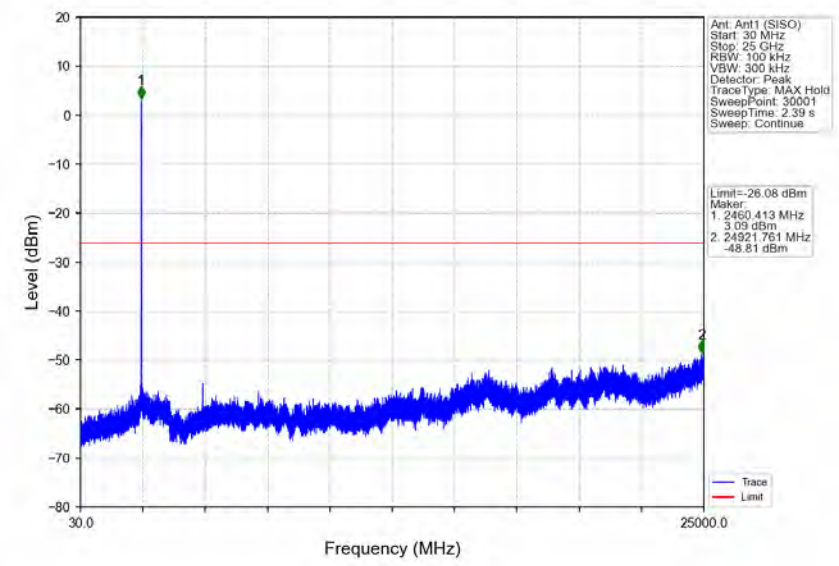
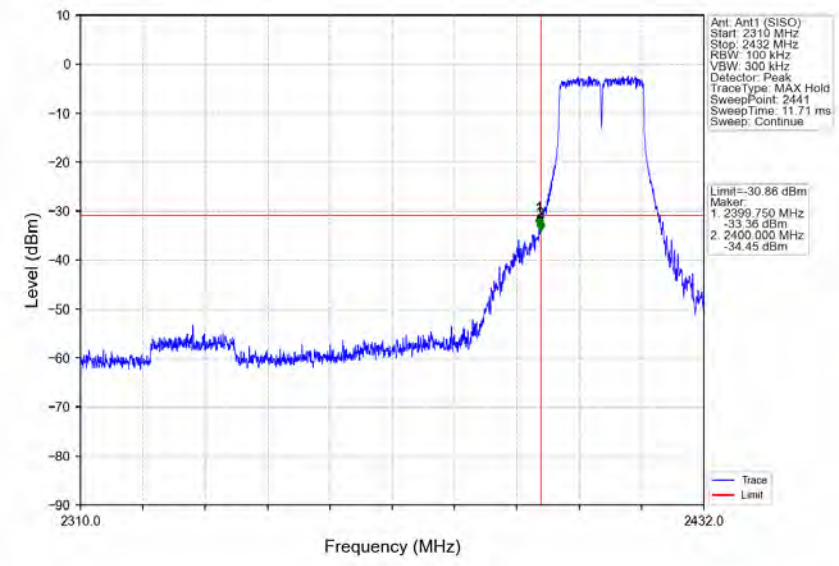
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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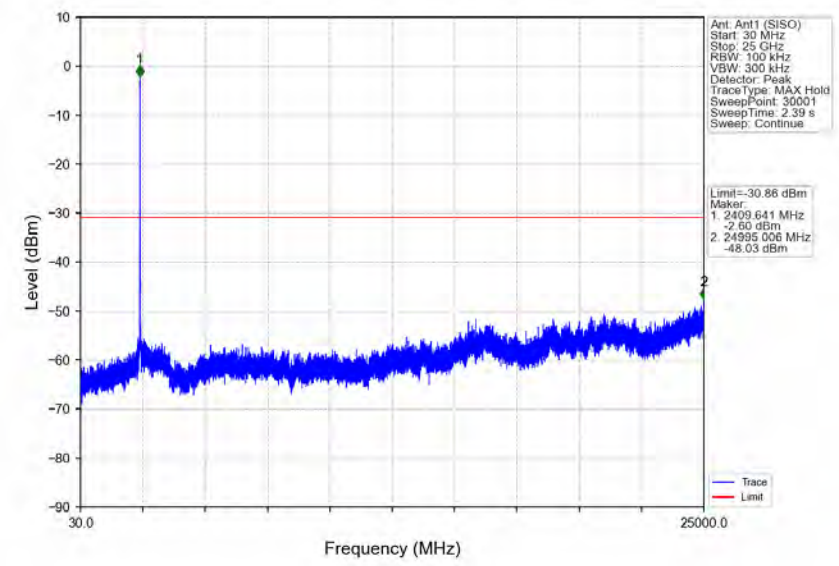
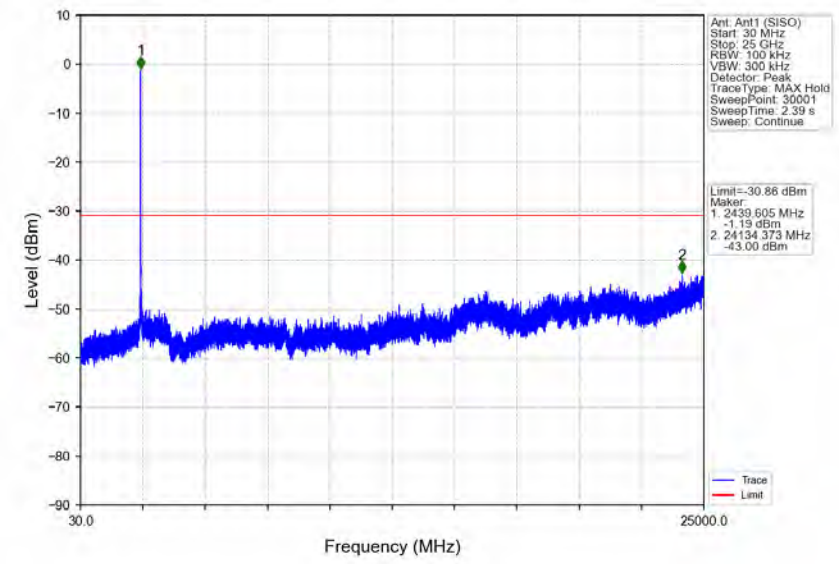
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



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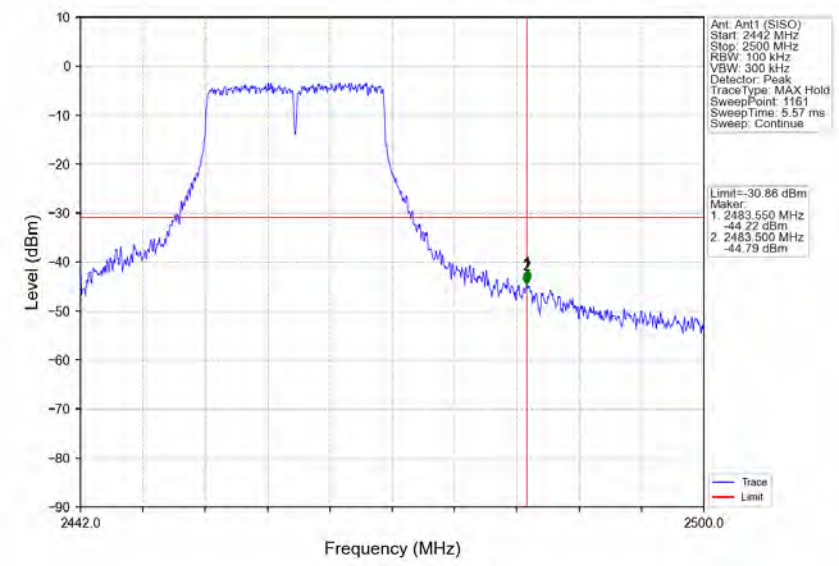
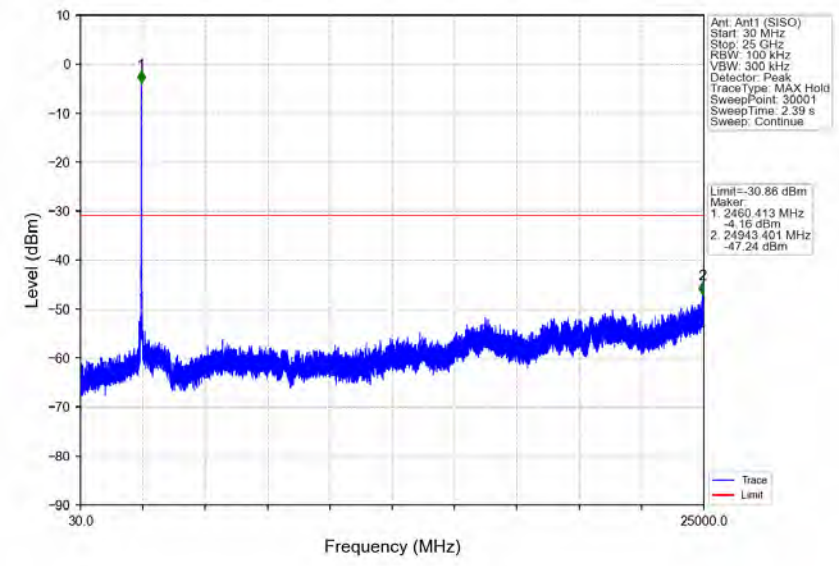
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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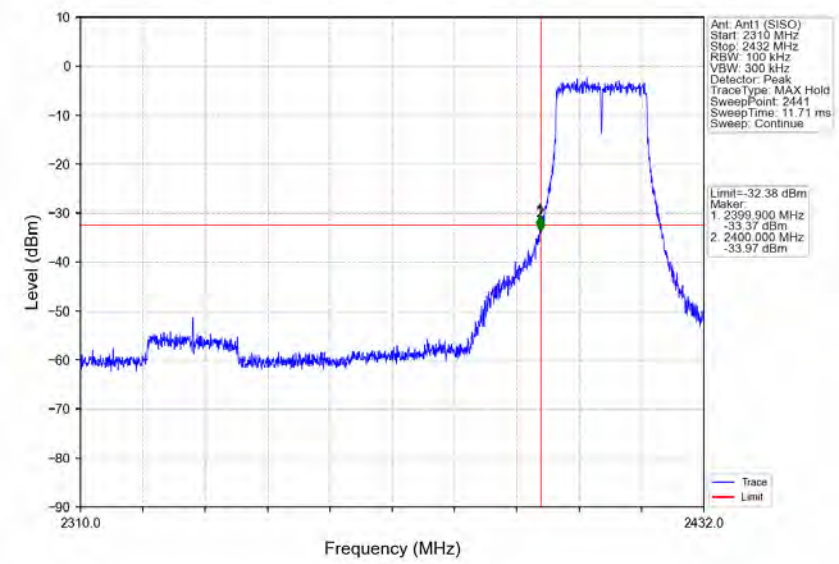
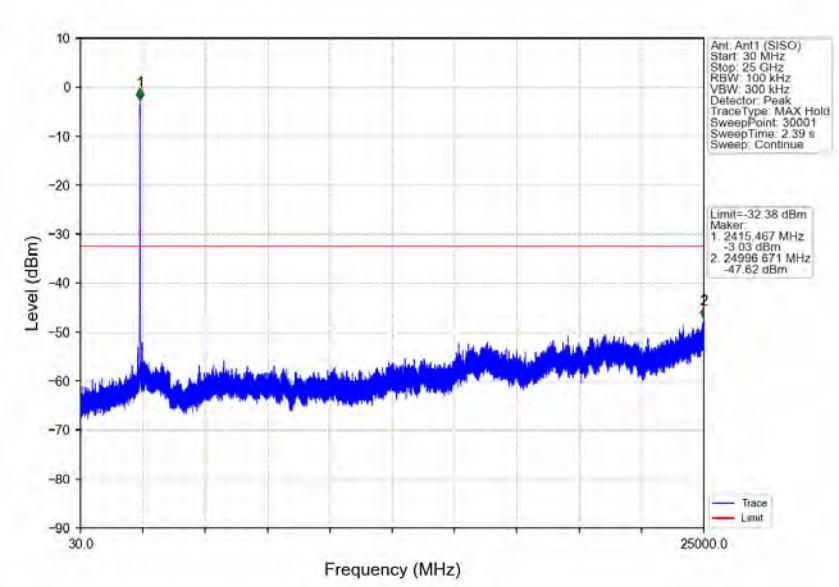
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



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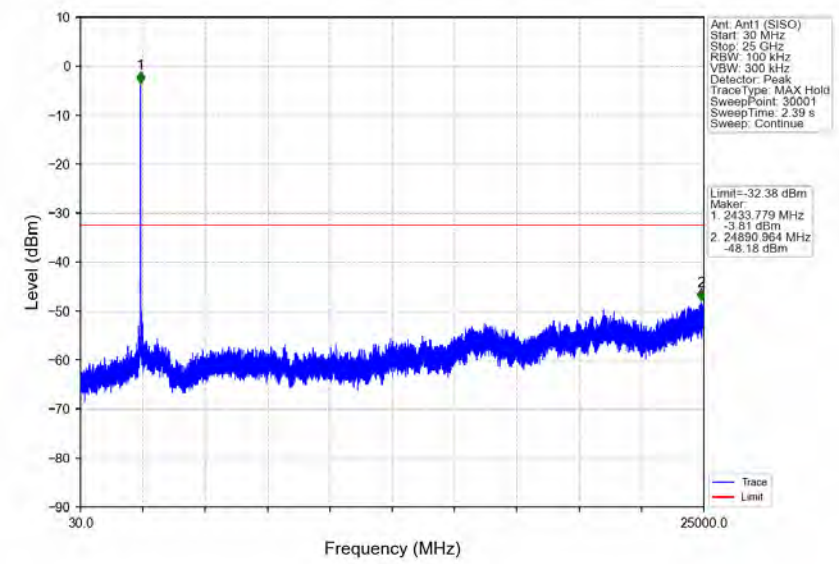
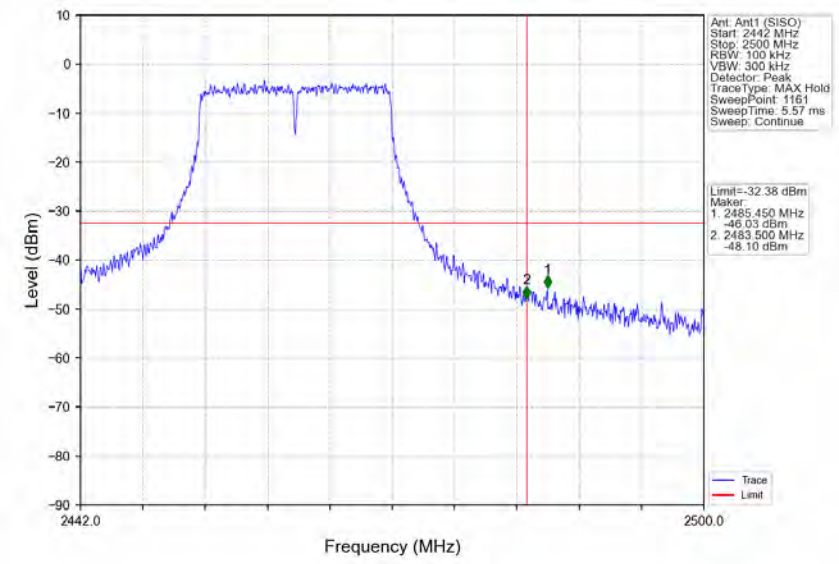
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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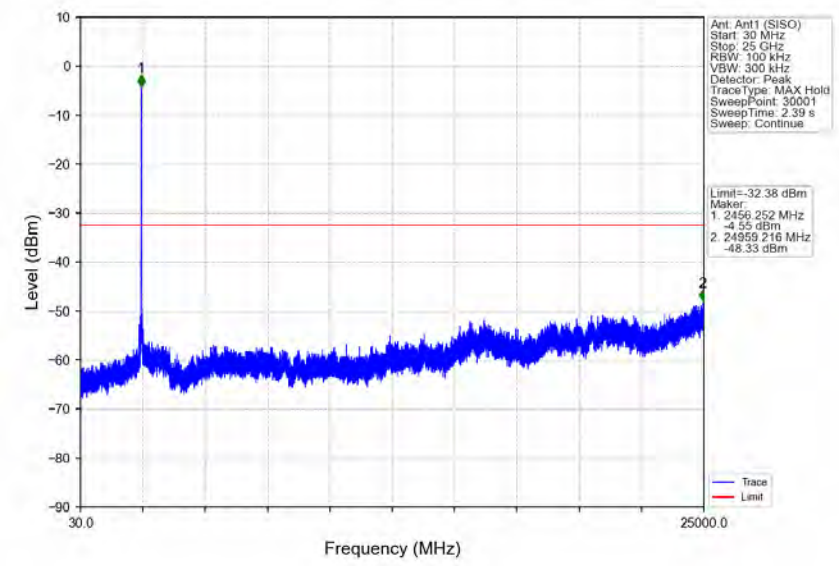
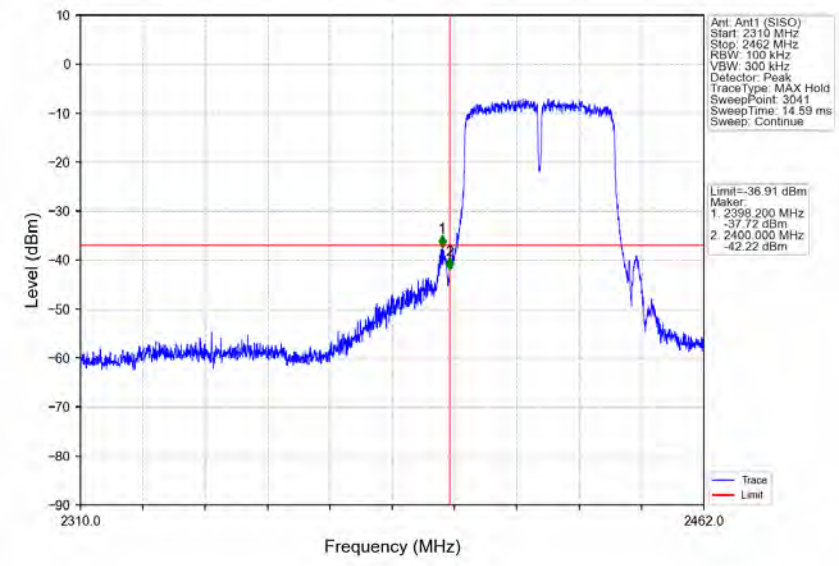
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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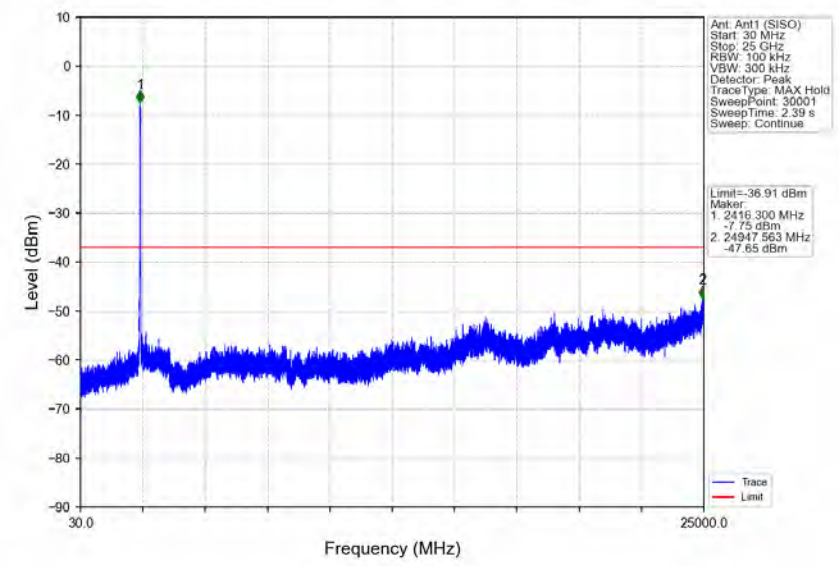
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



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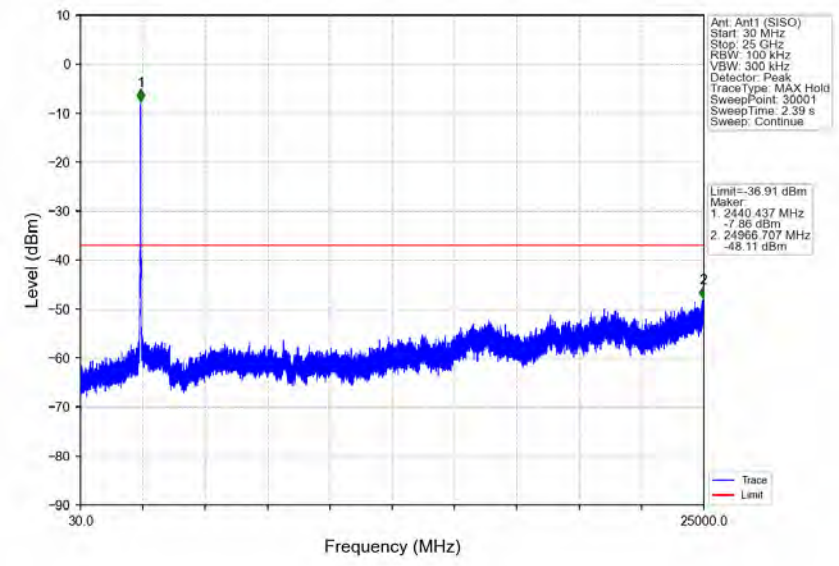

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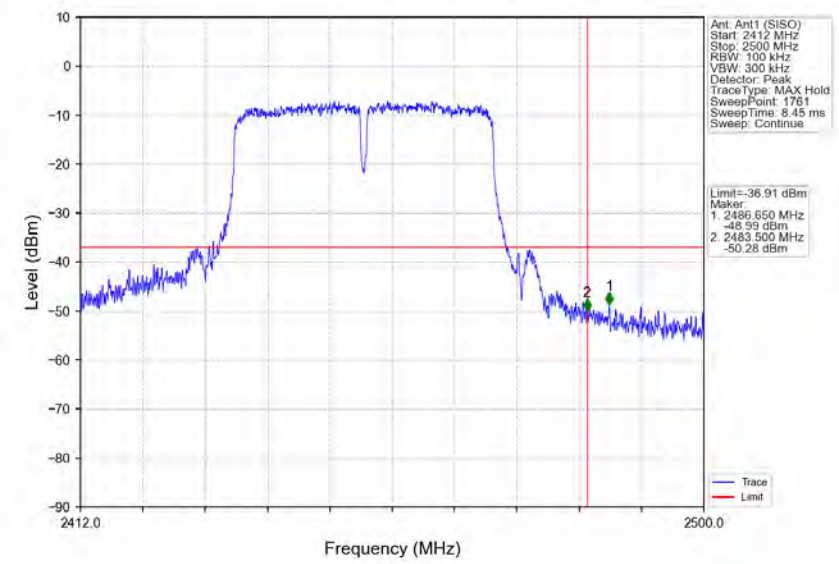
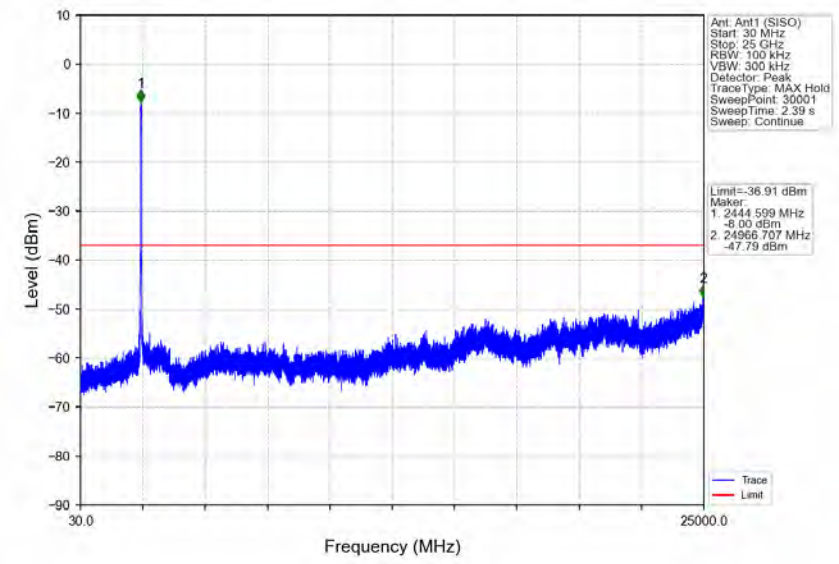
802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



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