TEST REPORT

Application No.:	GZCR2303000316AT
Applicant:	Vision IOT Inc.
Address of Applicant:	22994 LAVENDER VALLEY CT, ASHBURN, VA 20148
Manufacturer:	Vision IOT Inc.
Address of Manufacturer:	22994 LAVENDER VALLEY CT, ASHBURN, VA 20148
Factory:	SHI JIAZHUANG OURPCB Tech. Ltd
Address of Factory:	3RD FLOOR NANHAI PLAZA, NO.505 XINHUA ROAD, XINHUA DISTRICT, SHIJIAZHUANG, HEBEI, CHINA
Equipment Under Test (EUT):	
EUT Name:	Smart Tag AON
Model No.:	STONET2A433H, STONET2B433H ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	Vision IoT
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2023-03-27
Date of Test:	2023-04-13 to 2023-04-24
Date of Issue:	2023-05-15
Test Result:	**Pass***

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

Ricky Liu
Manager

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Revision Record			
Version	**Report No.**	**Date**	**Remark**
01	GZCR230300031603	2023-05-15	Original

Authorized for issue by				
		Curry Wu **Curry Wu/Project Engineer**		
		Vico Cui **Vico Cui/Reviewer**		

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

♣ **Declaration of EUT Family Grouping:**

Model No.: STONET2A433H, STONET2B433H

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on the sensor type:

Model	Sensor
STONET2A433H	On board
STONET2B433H	External wired door sensor

Therefore only one model **STONET2A433H** was tested in this report.

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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 6
4.4 Test Location 6
4.5 Test Facility 7
4.6 Deviation from Standards 7
4.7 Abnormalities from Standard Conditions 7

5 Equipment List 8

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 Peak Output Power 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 Minimum 6dB Bandwidth 14
7.2.1 E.U.T. Operation 14
7.2.2 Test Mode Description 14
7.2.3 Test Setup Diagram 14
7.2.4 Measurement Procedure and Data 14
7.3 Power Spectrum Density 15
7.3.1 E.U.T. Operation 15
7.3.2 Test Mode Description 15
7.3.3 Test Setup Diagram 15
7.3.4 Measurement Procedure and Data 15
7.4 Conducted Band Edges Measurement 16
7.4.1 E.U.T. Operation 16
7.4.2 Test Mode Description 16
7.4.3 Test Setup Diagram 16
7.4.4 Measurement Procedure and Data 16
7.5 Conducted Spurious Emissions 17
7.5.1 E.U.T. Operation 17
7.5.2 Test Mode Description 17
7.5.3 Test Setup Diagram 17

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7.5.4 Measurement Procedure and Data....17
7.6 Radiated Emissions which fall in the restricted bands....18
7.6.1 E.U.T. Operation....18
7.6.2 Test Mode Description....18
7.6.3 Test Setup Diagram....19
7.6.4 Measurement Procedure and Data....19
7.7 Radiated Spurious Emissions Below 1GHz....32
7.7.1 E.U.T. Operation....32
7.7.2 Test Mode Description....32
7.7.3 Test Setup Diagram....33
7.7.4 Measurement Procedure and Data....33
7.8 Radiated Spurious Emissions Above 1GHz....36
7.8.1 E.U.T. Operation....36
7.8.2 Test Mode Description....36
7.8.3 Test Setup Diagram....36
7.8.4 Measurement Procedure and Data....37

8 Test Setup Photo 56

9 EUT Constructional Details (EUT Photos) 57

10 Appendix....58

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 7.2V =Size 'A' battery x2
Test Voltage:	DC 7.2V
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
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
Channel Spacing:	5MHz
Antenna Type:	Chip Antenna
Antenna Gain:	4.25 dBi
Power setting	default

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--
The EUT has been tested as an independent unit.			

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Radiated Emissions which fall in the restricted bands	±5.00dB (30MHz-1GHz; 3m);±4.38dB (30MHz-1GHz; 10m);± 5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	±5.00dB (3m); ±4.38dB (10m)
Radiated Spurious Emissions Above 1GHz	±5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

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No tests were sub-contracted.

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4.5 Test Facility

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

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Conducted Peak Output Power					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
4X4 Power sensor Unit	TST	TSPS2023R	EMC2257	2022-09-08	2023-09-07
MXG Vector Signal Generator	Keysight	N5182B	EMC2258	2022-09-08	2023-09-07
Test Software	TST	V2.0	GZE100-82	N/A	N/A

Minimum 6dB Bandwidth					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
4X4 Power sensor Unit	TST	TSPS2023R	EMC2257	2022-09-08	2023-09-07
MXG Vector Signal Generator	Keysight	N5182B	EMC2258	2022-09-08	2023-09-07
Test Software	TST	V2.0	GZE100-82	N/A	N/A

Power Spectrum Density					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
4X4 Power sensor Unit	TST	TSPS2023R	EMC2257	2022-09-08	2023-09-07
MXG Vector Signal Generator	Keysight	N5182B	EMC2258	2022-09-08	2023-09-07
Test Software	TST	V2.0	GZE100-82	N/A	N/A

Conducted Band Edges Measurement					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
4X4 Power sensor Unit	TST	TSPS2023R	EMC2257	2022-09-08	2023-09-07
MXG Vector Signal Generator	Keysight	N5182B	EMC2258	2022-09-08	2023-09-07
Test Software	TST	V2.0	GZE100-82	N/A	N/A

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Conducted Spurious Emissions					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
4X4 Power sensor Unit	TST	TSPS2023R	EMC2257	2022-09-08	2023-09-07
MXG Vector Signal Generator	Keysight	N5182B	EMC2258	2022-09-08	2023-09-07
Test Software	TST	V2.0	GZE100-82	N/A	N/A

Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2022-12-16	2023-12-15
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2022-12-16	2023-12-15
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2022-10-21	2023-10-20
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Spurious Emissions Below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2022-10-16	2025-10-15
Chamber cable	HangTianXing	N/A	EMC0542	2022-08-24	2023-08-23
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2022-06-21	2023-06-20
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2022-05-20	2023-05-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	EMC2174	2022-06-19	2025-06-18

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Radiated Spurious Emissions Above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2022-12-16	2023-12-15
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2022-12-16	2023-12-15
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2022-12-16	2023-12-15
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2022-10-21	2023-10-20
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2022-08-24	2023-08-23
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2022-06-24	2023-06-23

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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 Chip antenna and integrated on the main PCB and no consideration of replacement. The maximum gain of the antenna is 4.25dBi.

Antenna location: Refer to internal photo.

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7 Radio Spectrum Matter Test Results

7.1 Conducted Peak 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

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23.1 °C Humidity: 58.0 % RH Atmospheric Pressure: 1008 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), 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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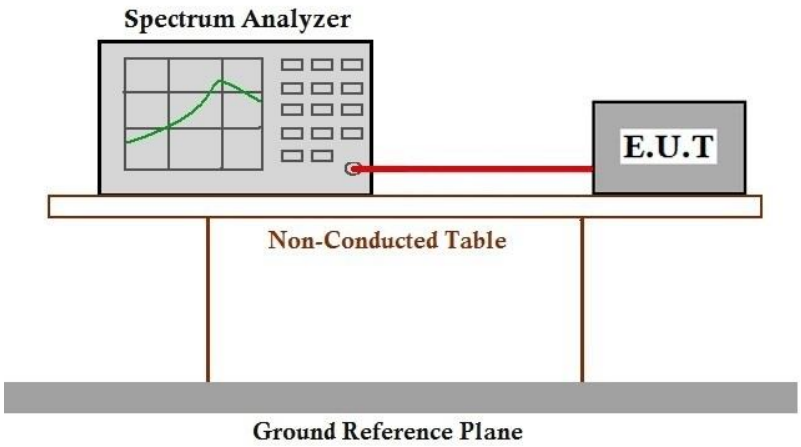
7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

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

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7.2 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

7.2.1 E.U.T. Operation

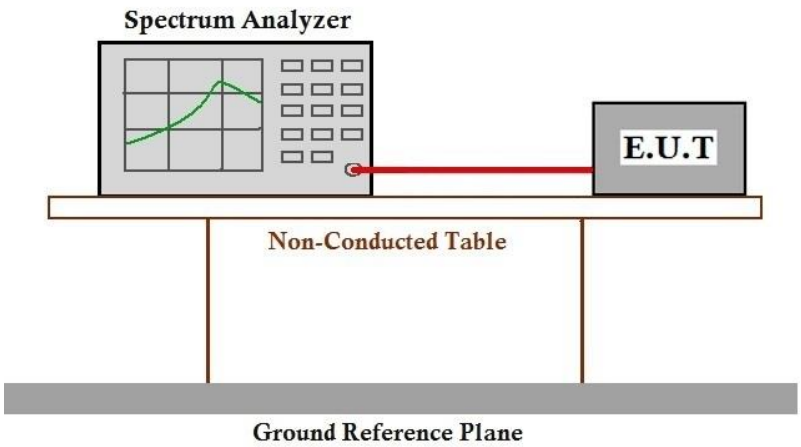
Operating Environment:

Temperature: 23.1 °C Humidity: 58.0 % RH Atmospheric Pressure: 1008 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

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7.3 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

7.3.1 E.U.T. Operation

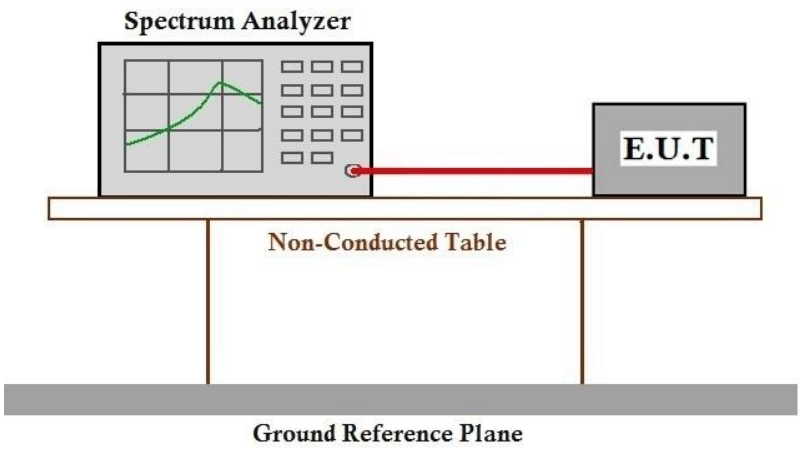
Operating Environment:

Temperature: 23.1 °C Humidity: 58.0 % RH Atmospheric Pressure: 1008 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), 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 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).

7.4.1 E.U.T. Operation

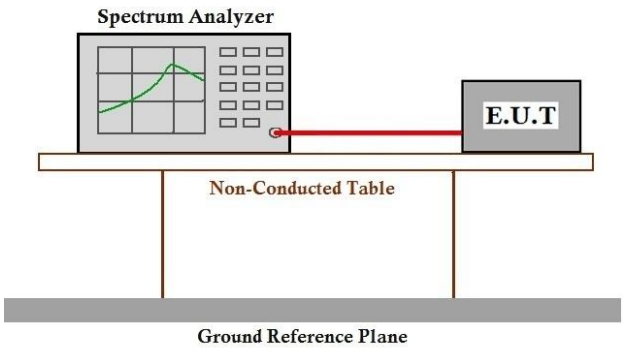
Operating Environment:

Temperature: 23.1 °C Humidity: 58.0 % RH Atmospheric Pressure: 1008 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), 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 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).

7.5.1 E.U.T. Operation

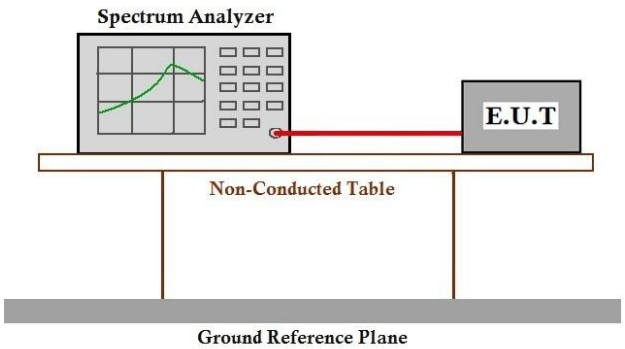
Operating Environment:

Temperature: 23.1 °C Humidity: 58.0 % RH Atmospheric Pressure: 1008 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



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7.6 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 11.12

Limit:

Test Distance: 3 m

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.		

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24.8 °C Humidity: 64.6 % RH Atmospheric Pressure: 1008 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), 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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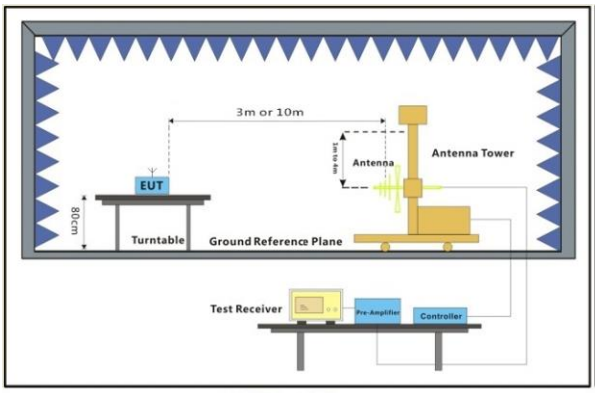
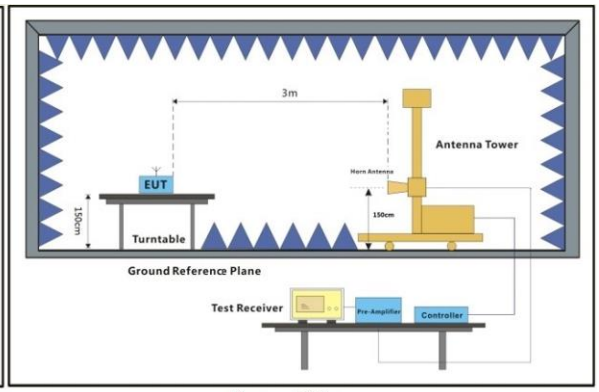
7.6.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.6.4 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 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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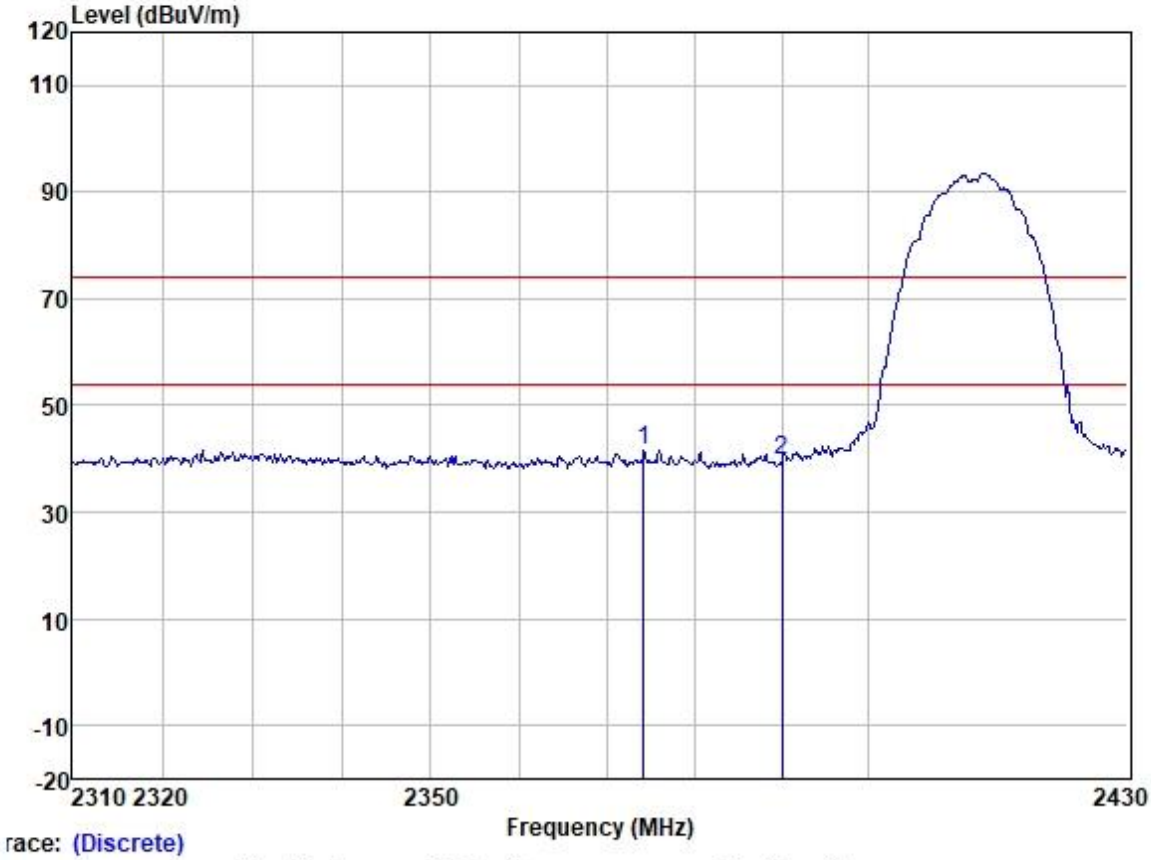
Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2374.165	47.50	27.66	4.33	37.77	41.72	74.00	-32.28	VERTICAL	Peak
2	2390.000	45.78	27.68	4.22	37.76	39.92	74.00	-34.08	VERTICAL	Peak

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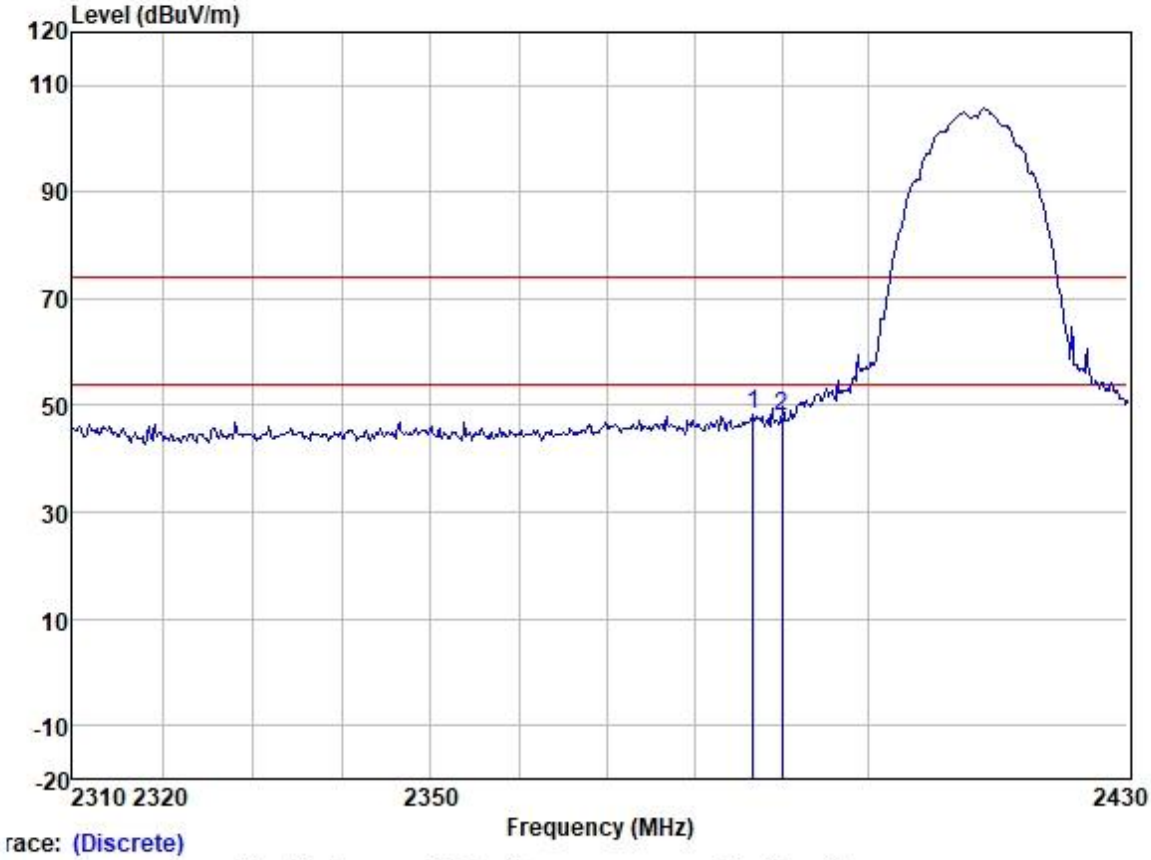
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2386.703	54.25	27.68	4.22	37.77	48.38	74.00	-25.62	HORIZONTAL	Peak
2	2390.000	53.82	27.68	4.22	37.76	47.96	74.00	-26.04	HORIZONTAL	Peak

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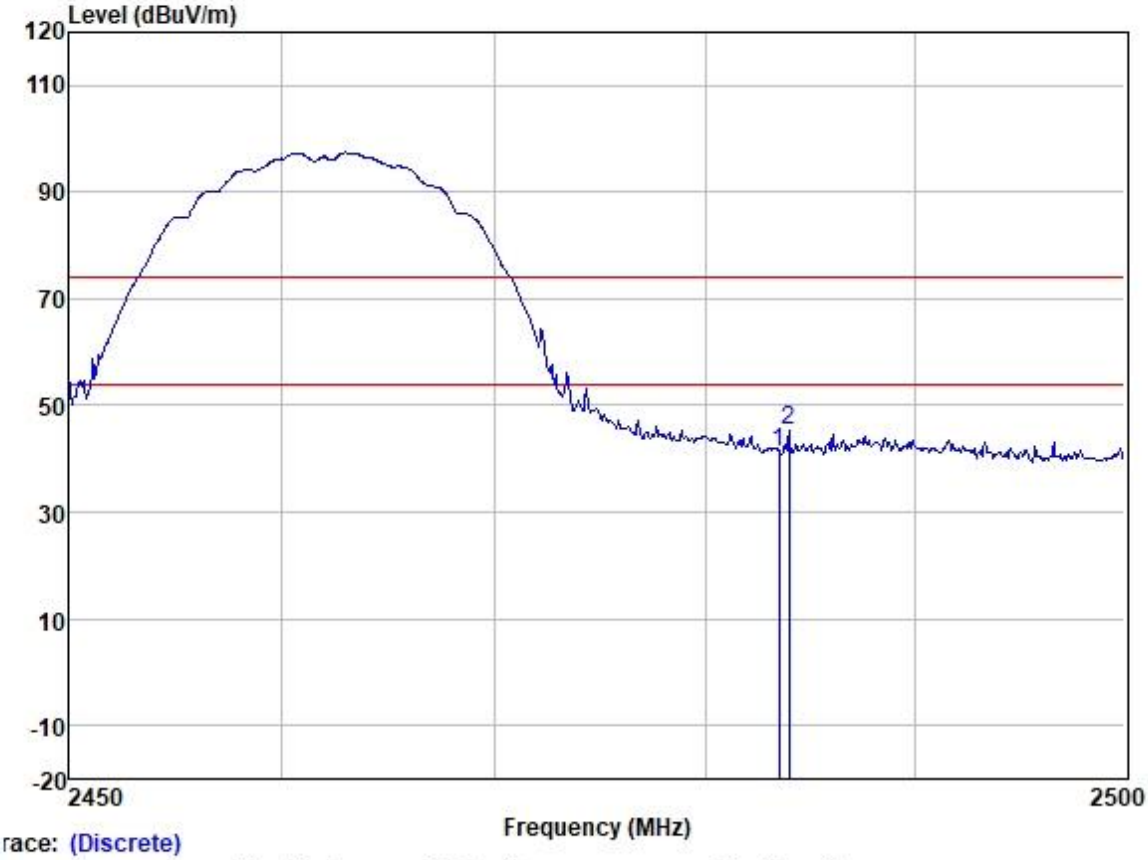

race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	47.77	27.85	3.42	37.73	41.31	74.00	-32.69	VERTICAL	Peak
2	2483.990	51.67	27.85	3.42	37.73	45.21	74.00	-28.79	VERTICAL	Peak

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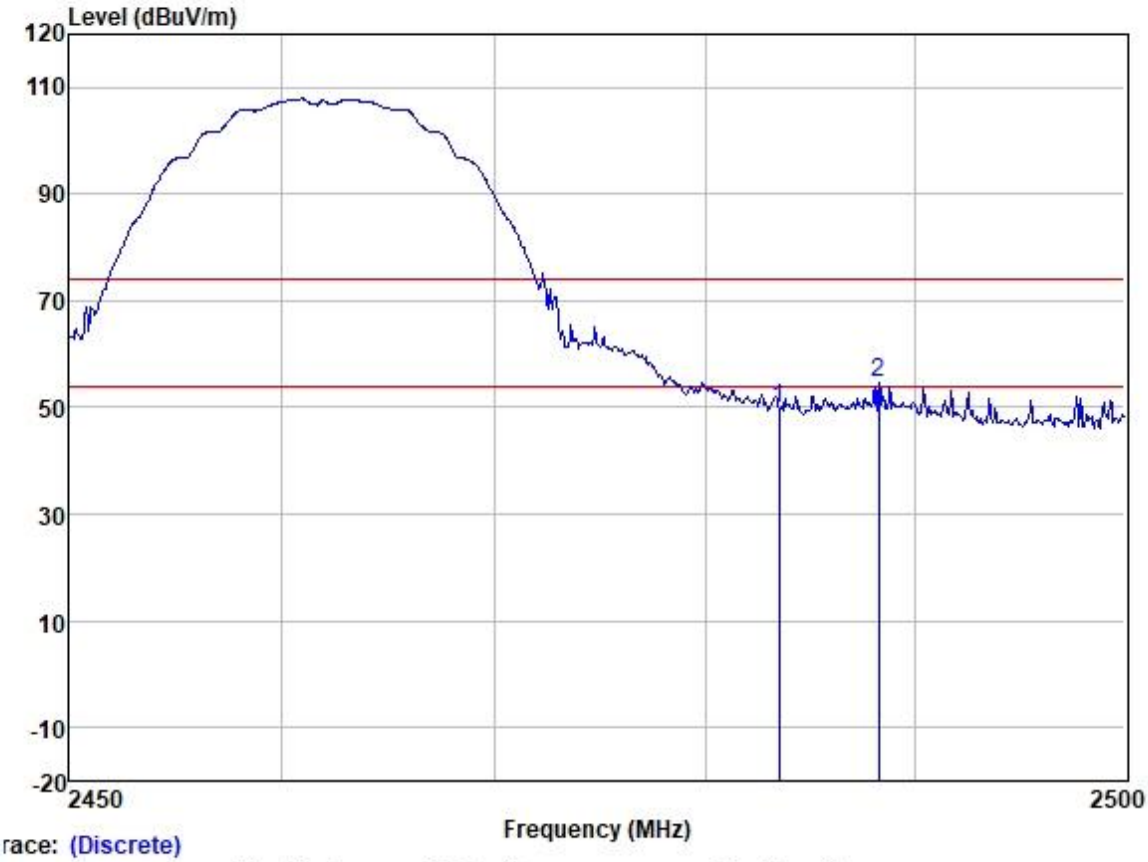
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	56.45	27.85	3.42	37.73	49.99	74.00	-24.01	HORIZONTAL	Peak
2	2488.260	61.22	27.85	3.42	37.73	54.76	74.00	-19.24	HORIZONTAL	Peak

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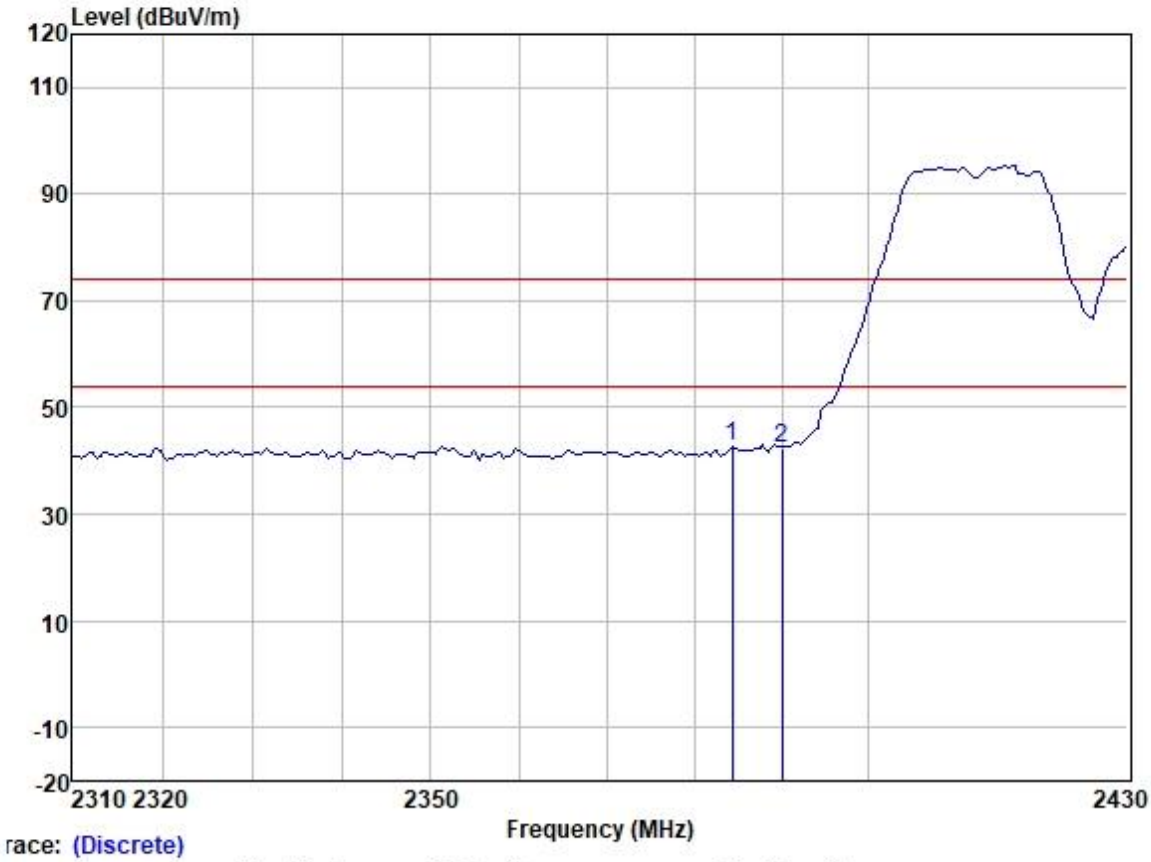
Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2384.326	48.68	27.68	4.22	37.77	42.81	74.00	-31.19	VERTICAL	Peak
2	2390.000	48.30	27.68	4.22	37.76	42.44	74.00	-31.56	VERTICAL	Peak

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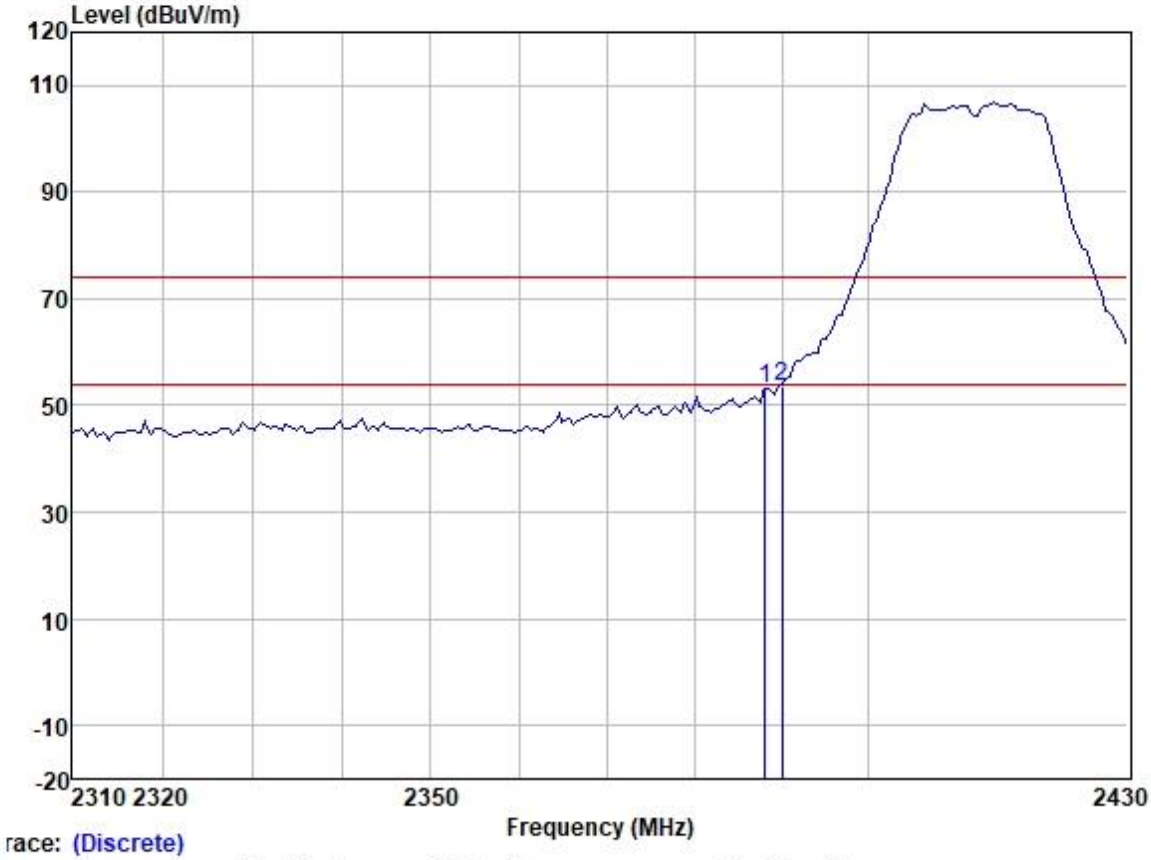

race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2388.099	59.15	27.68	4.22	37.77	53.28	74.00	-20.72	HORIZONTAL	Peak
2	2390.000	59.43	27.68	4.22	37.76	53.57	74.00	-20.43	HORIZONTAL	Peak

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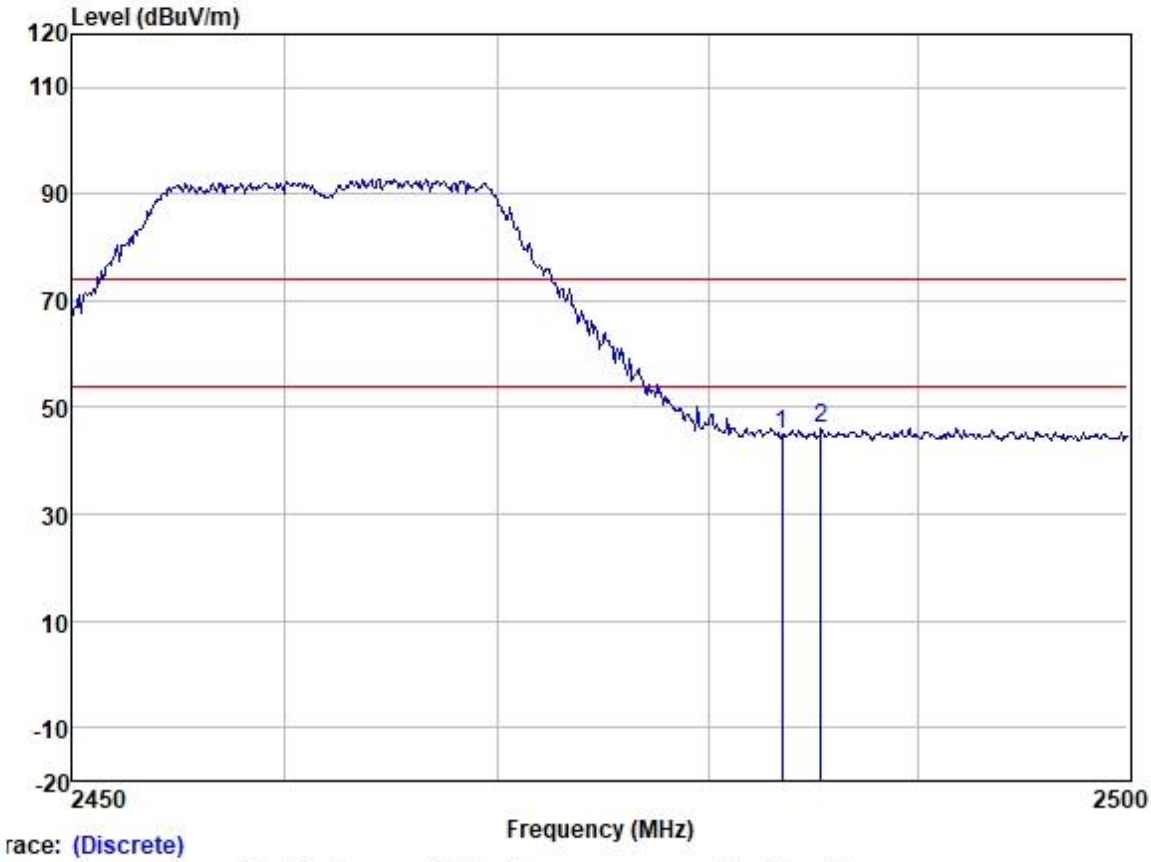

race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	51.55	27.85	3.42	37.73	45.09	74.00	-28.91	VERTICAL	Peak
2	2485.346	52.58	27.85	3.42	37.73	46.12	74.00	-27.88	VERTICAL	Peak

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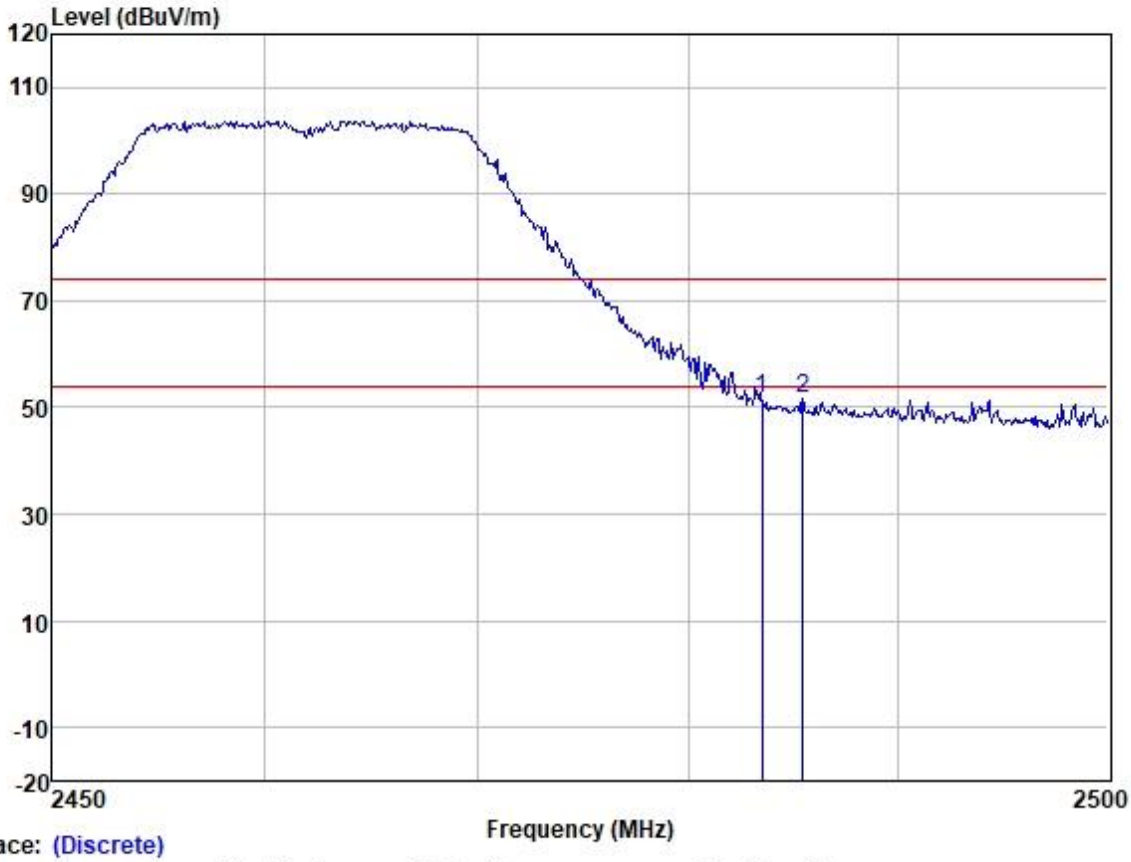
Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	58.12	27.85	3.42	37.73	51.66	74.00	-22.34	HORIZONTAL	Peak
2	2485.446	58.12	27.85	3.42	37.73	51.66	74.00	-22.34	HORIZONTAL	Peak

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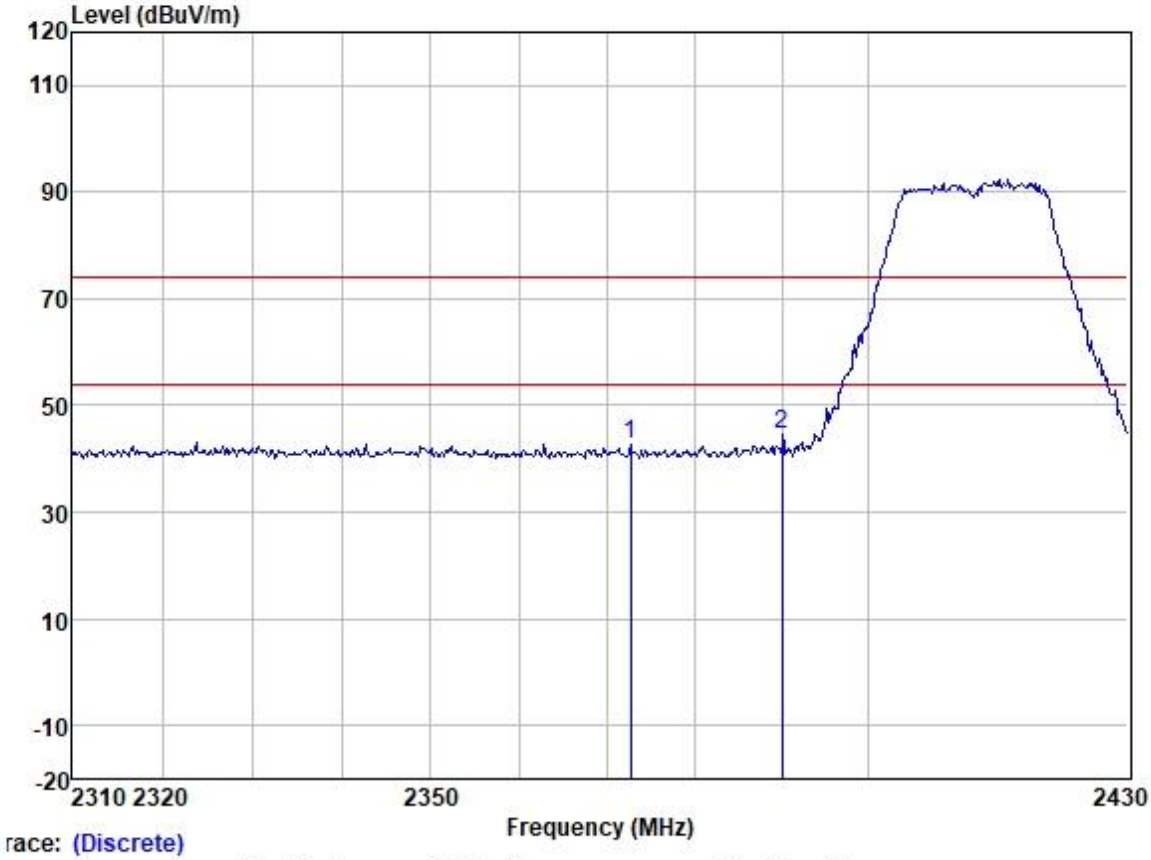
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2372.723	48.58	27.66	4.33	37.77	42.80	74.00	-31.20	VERTICAL	Peak
2	2390.000	50.49	27.68	4.22	37.76	44.63	74.00	-29.37	VERTICAL	Peak

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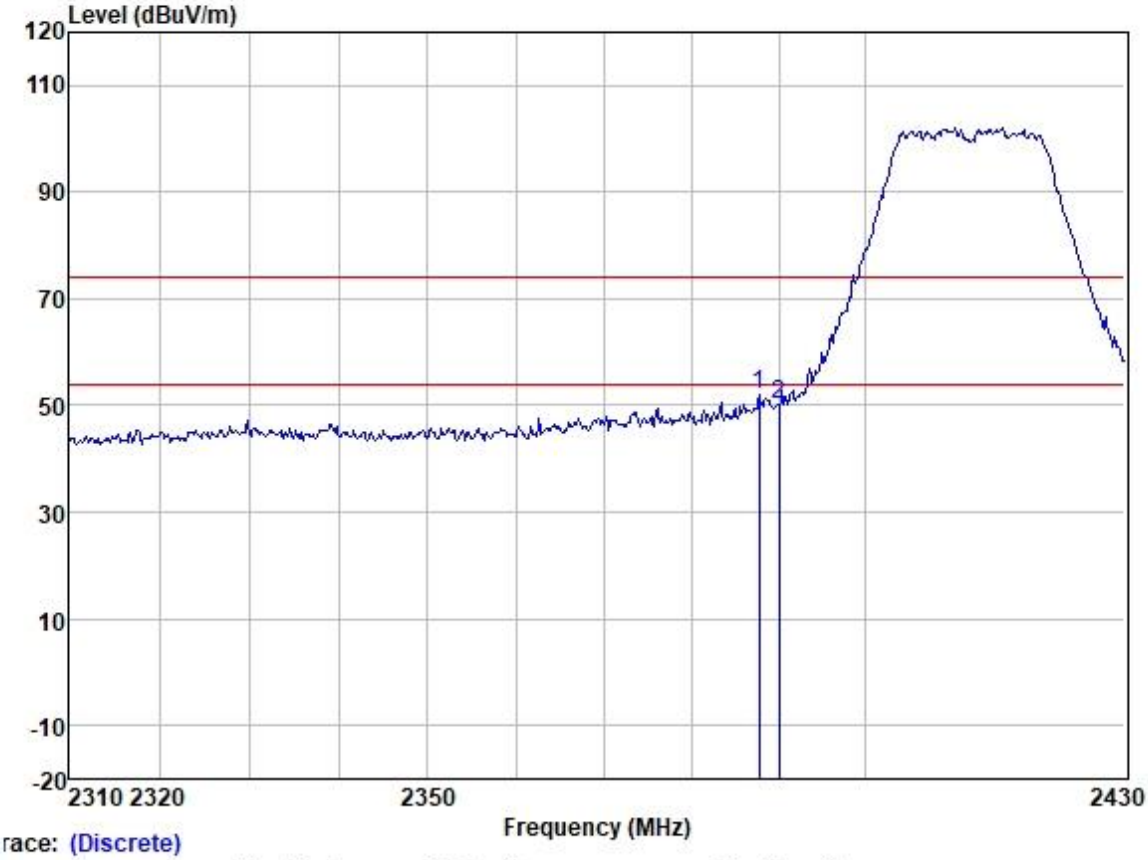
Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2387.670	58.07	27.68	4.22	37.77	52.20	74.00	-21.80	HORIZONTAL	Peak
2	2390.000	55.95	27.68	4.22	37.76	50.09	74.00	-23.91	HORIZONTAL	Peak

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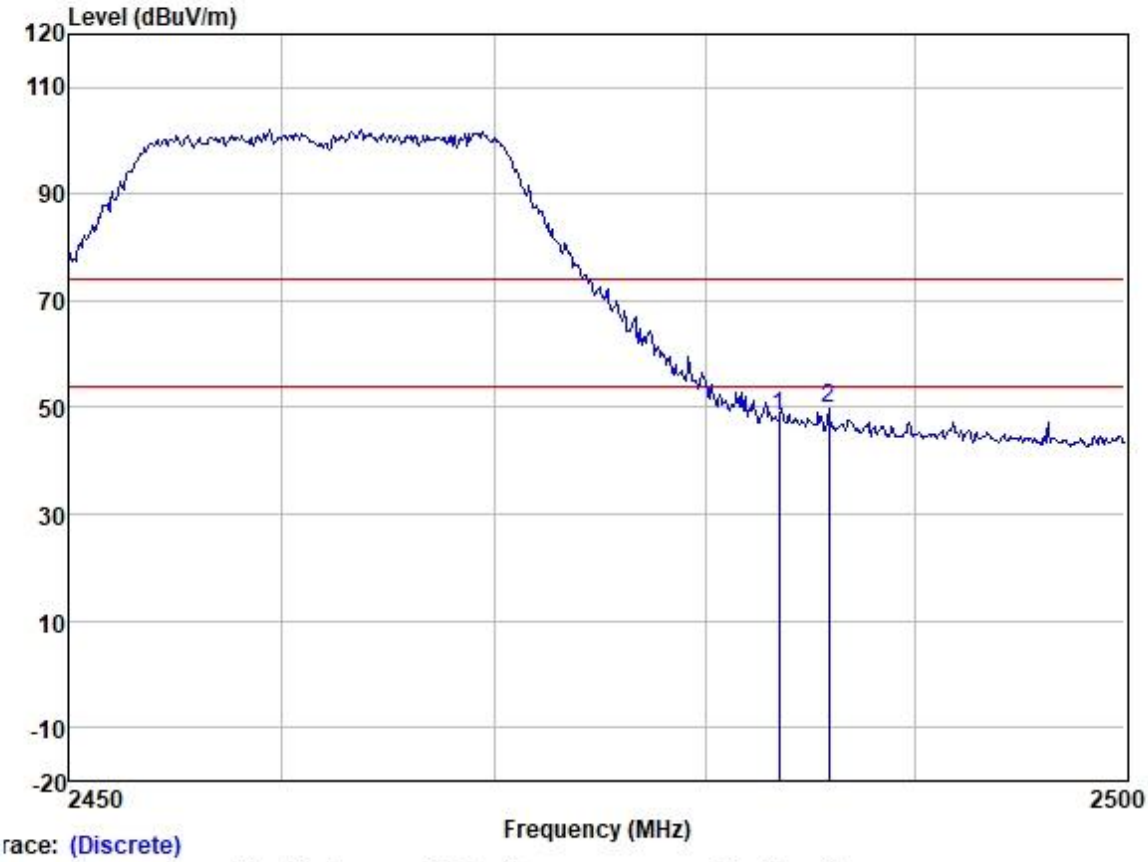
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	54.77	27.85	3.42	37.73	48.31	74.00	-25.69	VERTICAL	Peak
2	2485.848	56.36	27.85	3.42	37.73	49.90	74.00	-24.10	VERTICAL	Peak

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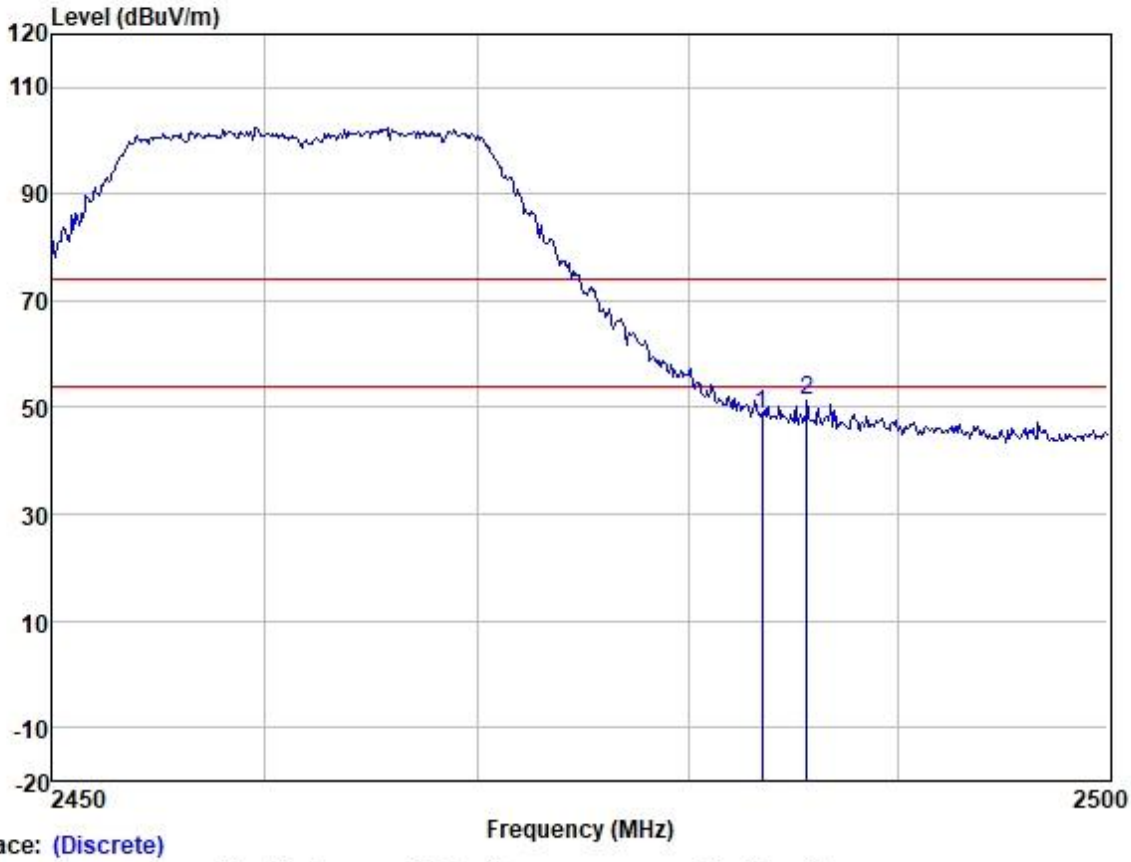
Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	55.31	27.85	3.42	37.73	48.85	74.00	-25.15	HORIZONTAL	Peak
2	2485.647	57.91	27.85	3.42	37.73	51.45	74.00	-22.55	HORIZONTAL	Peak

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7.7 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:

Test Distance: 3 m

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

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C Humidity: 56.3 % RH Atmospheric Pressure: 1008 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), 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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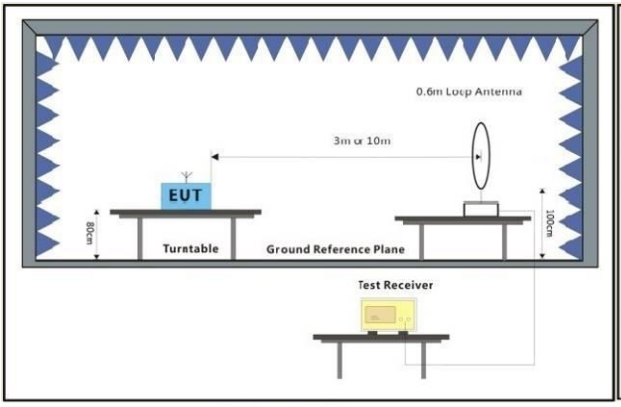
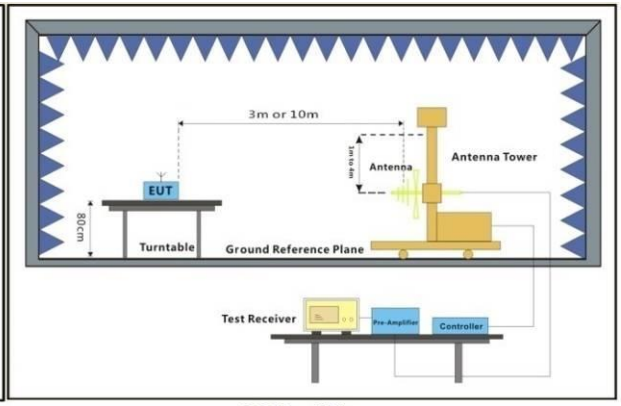
7.7.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

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. 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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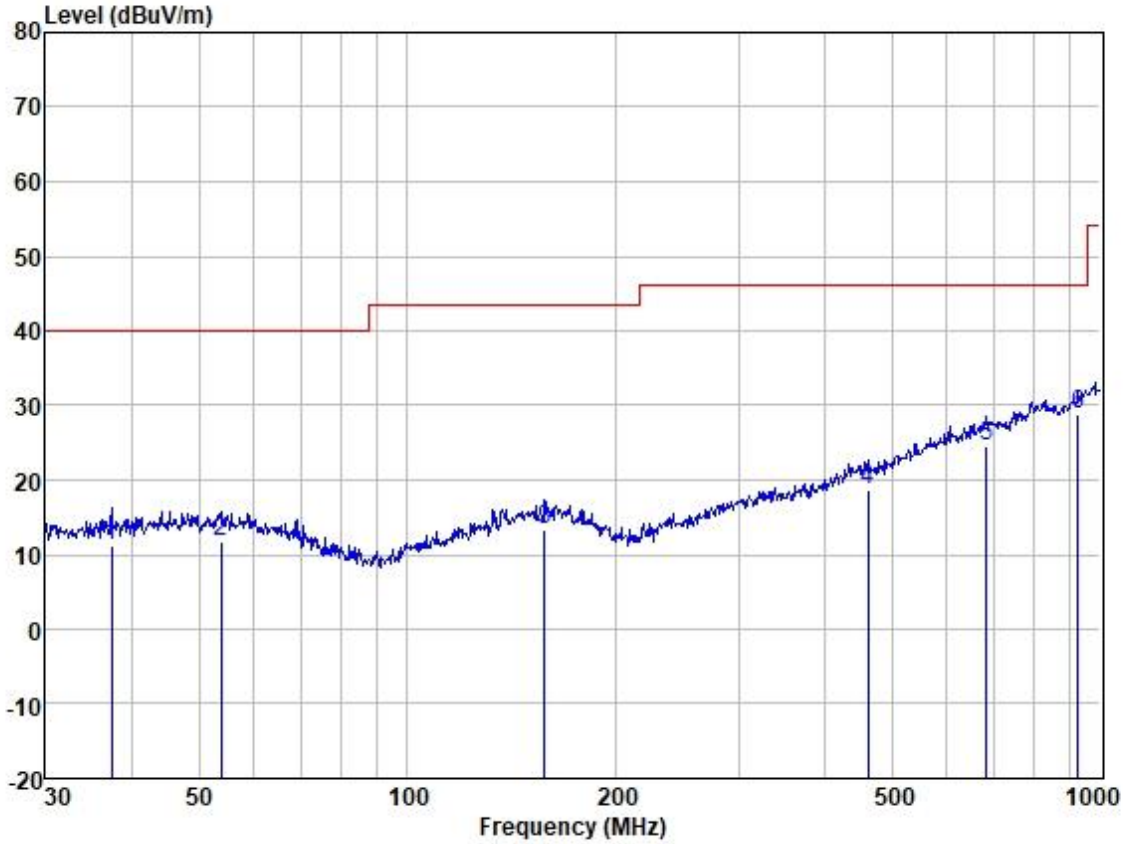
Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



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

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	37.416	24.47	13.31	1.07	27.62	11.23	40.00	-28.77	VERTICAL	QP
2	53.693	24.39	13.90	1.17	27.60	11.86	40.00	-28.14	VERTICAL	QP
3	157.559	24.74	13.64	2.30	27.36	13.32	43.50	-30.18	VERTICAL	QP
4	462.346	25.66	17.15	4.27	28.44	18.64	46.00	-27.36	VERTICAL	QP
5	684.745	26.58	21.24	5.43	28.71	24.54	46.00	-21.46	VERTICAL	QP
6	929.008	26.84	23.61	6.62	28.15	28.92	46.00	-17.08	VERTICAL	QP

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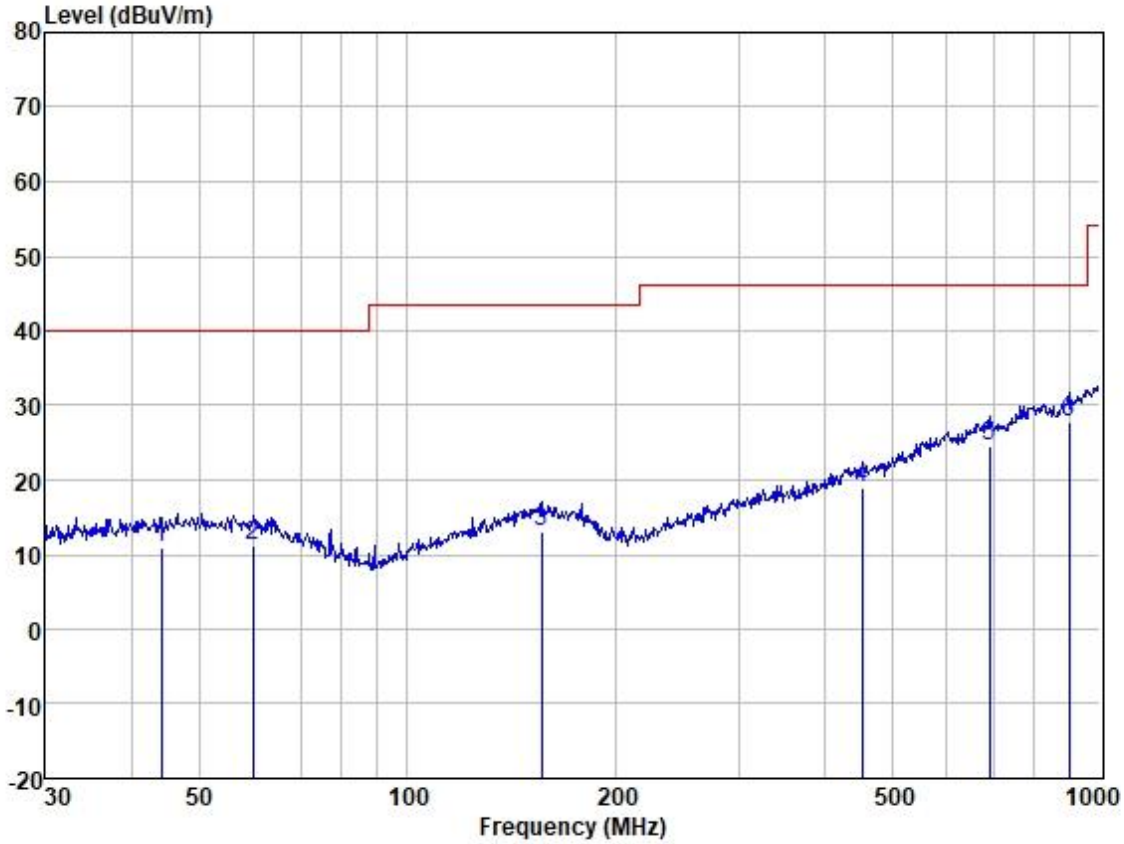
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



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

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	44.120	23.69	13.88	1.11	27.61	11.07	40.00	-28.93	HORIZONTAL	QP
2	59.859	24.29	13.33	1.25	27.60	11.27	40.00	-28.73	HORIZONTAL	QP
3	155.910	24.44	13.61	2.28	27.37	12.96	43.50	-30.54	HORIZONTAL	QP
4	452.720	26.12	17.02	4.21	28.36	18.99	46.00	-27.01	HORIZONTAL	QP
5	691.987	26.49	21.34	5.46	28.70	24.59	46.00	-21.41	HORIZONTAL	QP
6	900.147	26.34	23.08	6.41	28.20	27.63	46.00	-18.37	HORIZONTAL	QP

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7.8 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

7.8.1 E.U.T. Operation

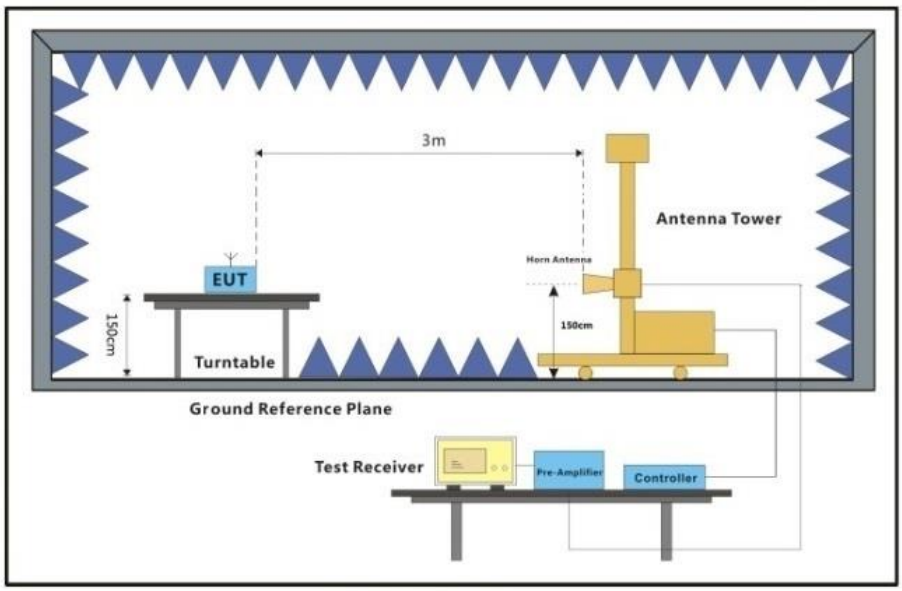
Operating Environment:

Temperature: 24.8 °C Humidity: 64.6 % RH Atmospheric Pressure: 1008 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



Above 1GHz

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7.8.4 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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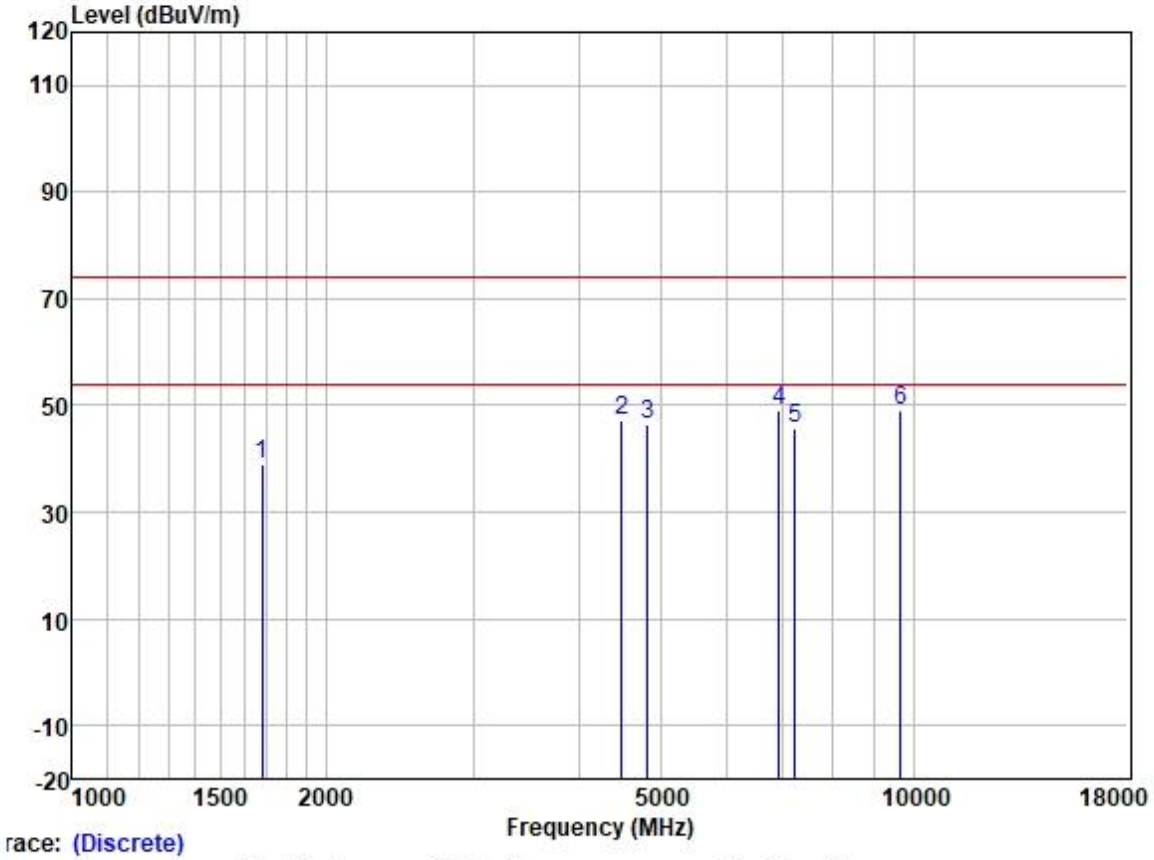
Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	48.48	25.03	3.25	37.93	38.83	74.00	-35.17	VERTICAL	peak
2	4495.125	44.69	34.17	5.33	36.83	47.36	74.00	-26.64	VERTICAL	peak
3	4824.000	43.64	34.16	5.46	36.87	46.39	74.00	-27.61	VERTICAL	peak
4	6914.763	44.70	34.97	6.39	37.08	48.98	74.00	-25.02	VERTICAL	peak
5	7236.000	40.57	35.78	6.35	37.14	45.56	74.00	-28.44	VERTICAL	peak
6	9648.000	39.56	38.70	7.89	37.02	49.13	74.00	-24.87	VERTICAL	peak

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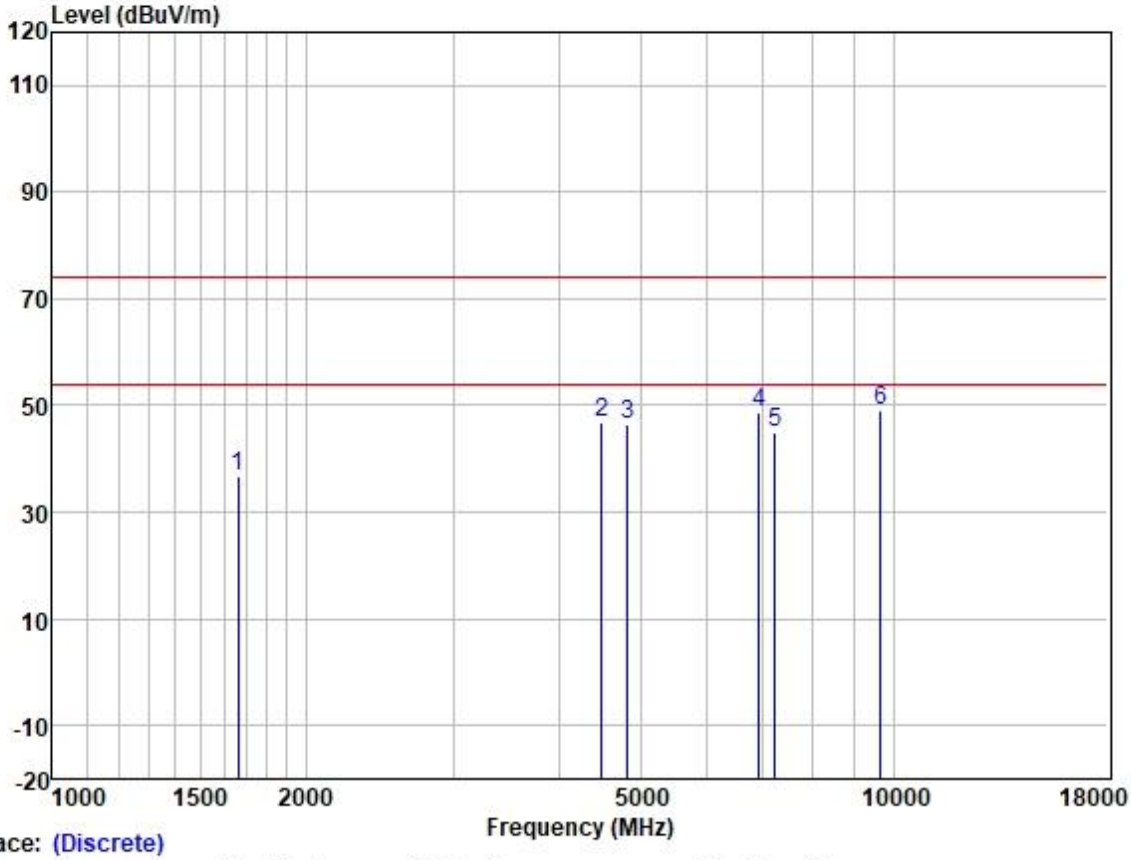
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	46.73	24.93	3.18	37.93	36.91	74.00	-37.09	HORIZONTAL	peak
2	4495.125	44.19	34.17	5.33	36.83	46.86	74.00	-27.14	HORIZONTAL	peak
3	4824.000	43.85	34.16	5.46	36.87	46.60	74.00	-27.40	HORIZONTAL	peak
4	6914.763	44.58	34.97	6.39	37.08	48.86	74.00	-25.14	HORIZONTAL	peak
5	7236.000	40.05	35.78	6.35	37.14	45.04	74.00	-28.96	HORIZONTAL	peak
6	9648.000	39.62	38.70	7.89	37.02	49.19	74.00	-24.81	HORIZONTAL	peak

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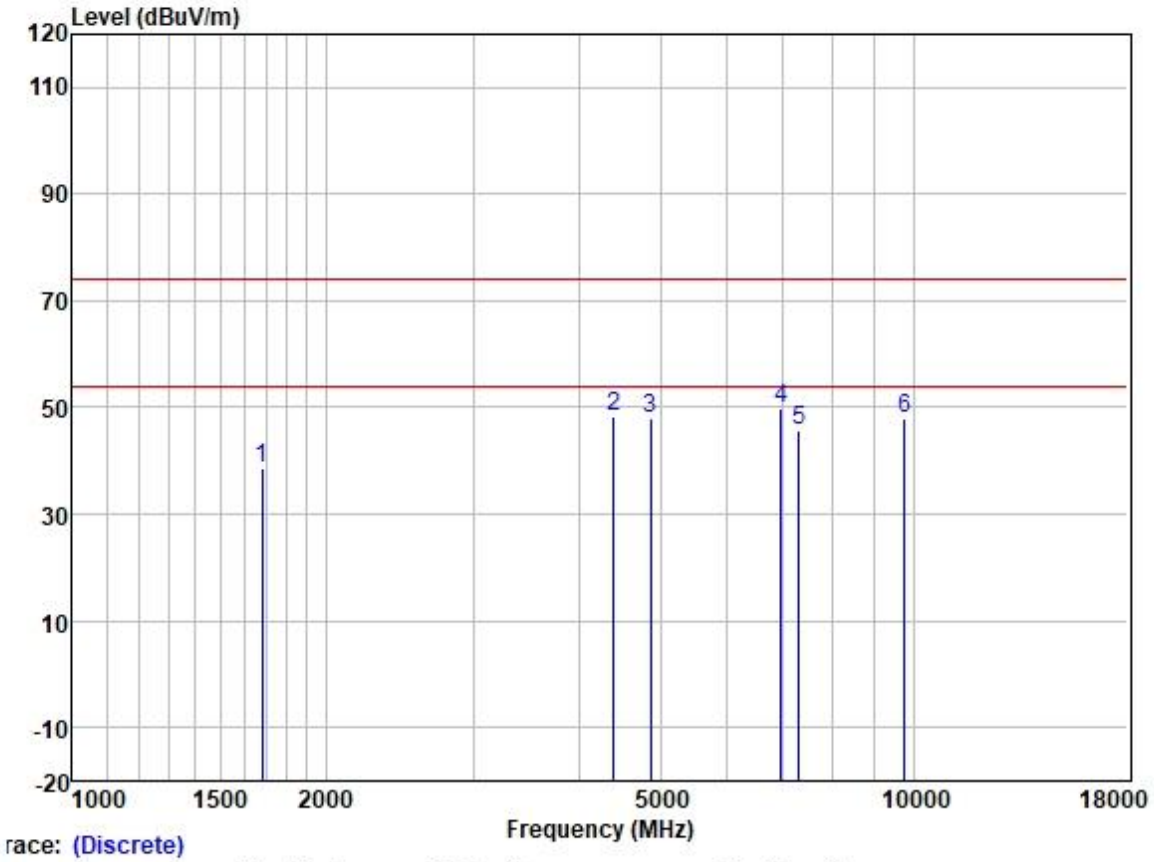
Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	48.32	25.03	3.25	37.93	38.67	74.00	-35.33	VERTICAL	peak
2	4405.090	46.08	33.74	5.37	36.82	48.37	74.00	-25.63	VERTICAL	peak
3	4874.000	45.08	34.15	5.49	36.87	47.85	74.00	-26.15	VERTICAL	peak
4	6954.852	45.64	35.04	6.40	37.09	49.99	74.00	-24.01	VERTICAL	peak
5	7311.000	40.69	36.00	6.32	37.15	45.86	74.00	-28.14	VERTICAL	peak
6	9748.000	38.55	38.81	7.43	37.01	47.78	74.00	-26.22	VERTICAL	peak

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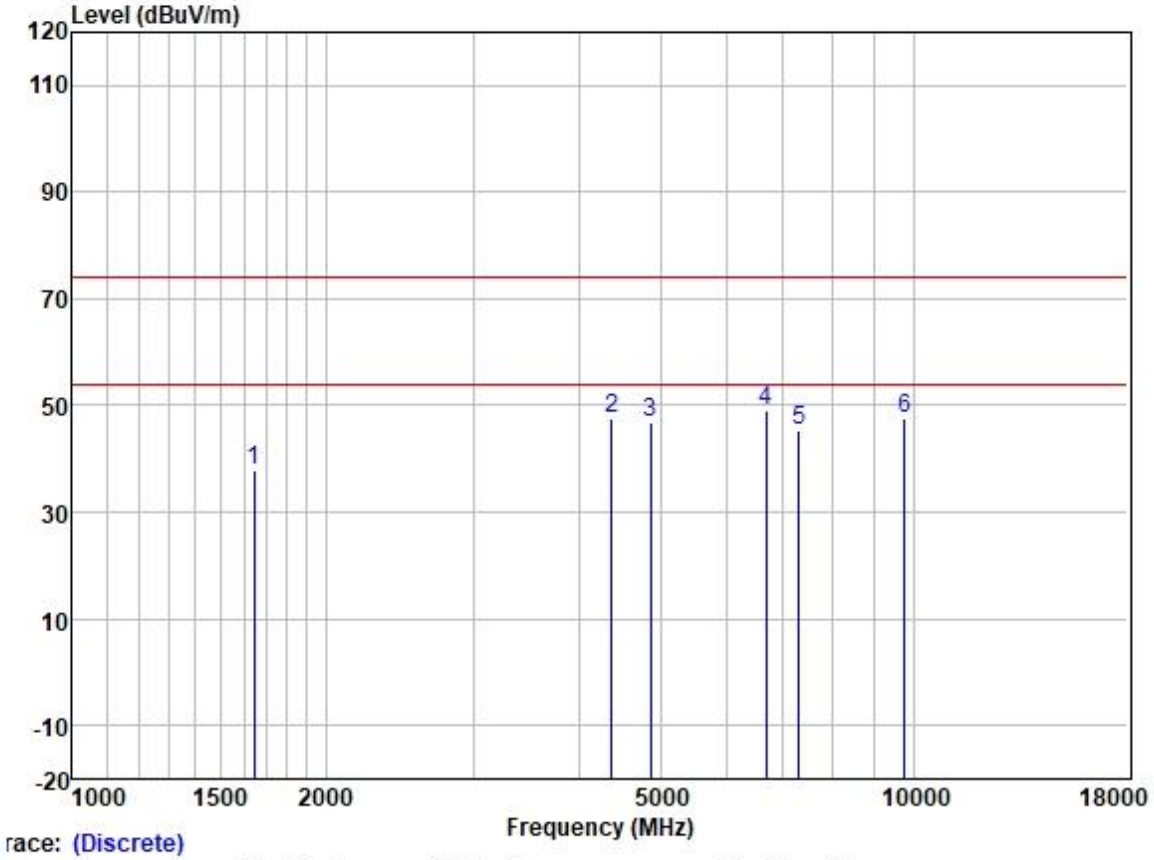
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1644.019	47.76	24.84	3.11	37.93	37.78	74.00	-36.22	HORIZONTAL	peak
2	4379.699	45.50	33.59	5.35	36.82	47.62	74.00	-26.38	HORIZONTAL	peak
3	4874.000	44.19	34.15	5.49	36.87	46.96	74.00	-27.04	HORIZONTAL	peak
4	6679.040	45.53	34.28	6.27	37.05	49.03	74.00	-24.97	HORIZONTAL	peak
5	7311.000	40.14	36.00	6.32	37.15	45.31	74.00	-28.69	HORIZONTAL	peak
6	9748.000	38.32	38.81	7.43	37.01	47.55	74.00	-26.45	HORIZONTAL	peak

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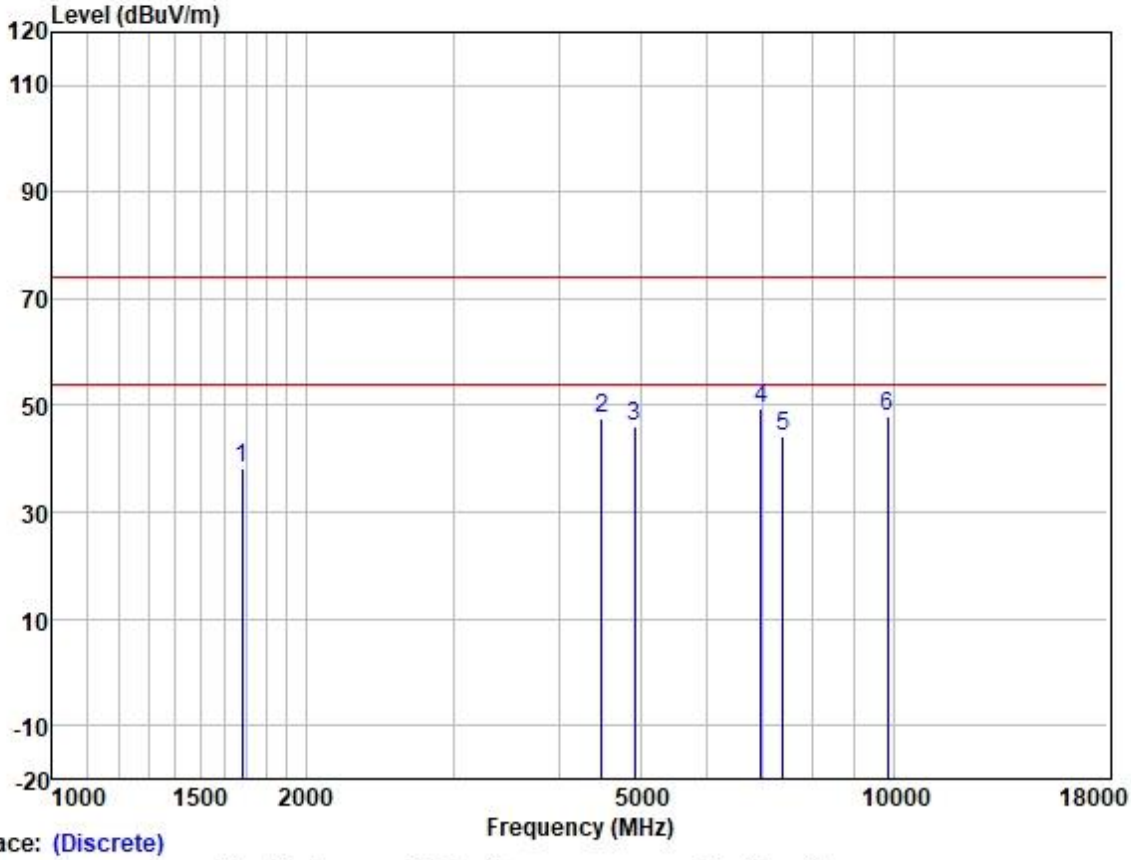
Test Mode: 02; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	47.89	25.03	3.25	37.93	38.24	74.00	-35.76	VERTICAL	peak
2	4495.125	44.75	34.17	5.33	36.83	47.42	74.00	-26.58	VERTICAL	peak
3	4924.000	43.40	34.15	5.51	36.88	46.18	74.00	-27.82	VERTICAL	peak
4	6954.852	45.28	35.04	6.40	37.09	49.63	74.00	-24.37	VERTICAL	peak
5	7386.000	38.97	36.23	6.30	37.16	44.34	74.00	-29.66	VERTICAL	peak
6	9848.000	39.14	38.88	7.06	37.01	48.07	74.00	-25.93	VERTICAL	peak

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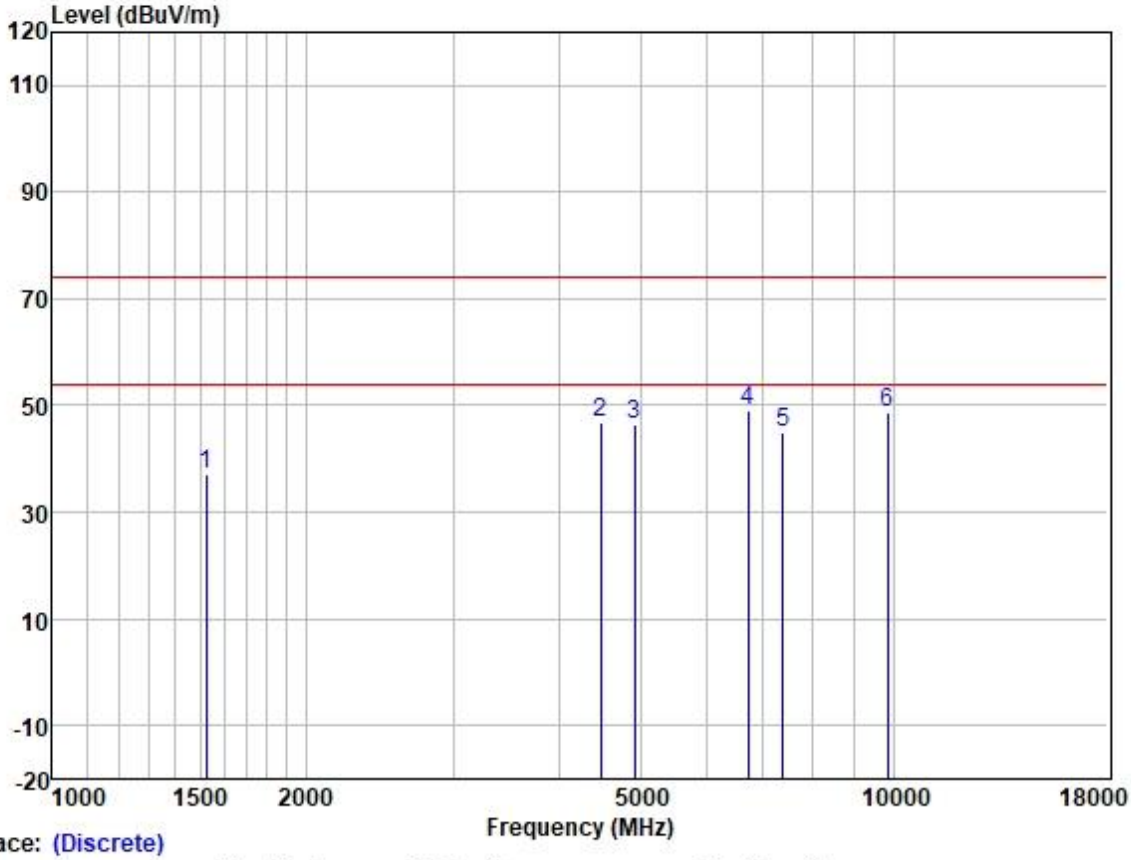
Test Mode: 02; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1525.000	47.82	24.49	2.94	37.95	37.30	74.00	-36.70	HORIZONTAL	peak
2	4482.150	44.06	34.12	5.34	36.83	46.69	74.00	-27.31	HORIZONTAL	peak
3	4924.000	43.56	34.15	5.51	36.88	46.34	74.00	-27.66	HORIZONTAL	peak
4	6717.762	45.59	34.42	6.29	37.05	49.25	74.00	-24.75	HORIZONTAL	peak
5	7386.000	39.46	36.23	6.30	37.16	44.83	74.00	-29.17	HORIZONTAL	peak
6	9848.000	39.75	38.88	7.06	37.01	48.68	74.00	-25.32	HORIZONTAL	peak

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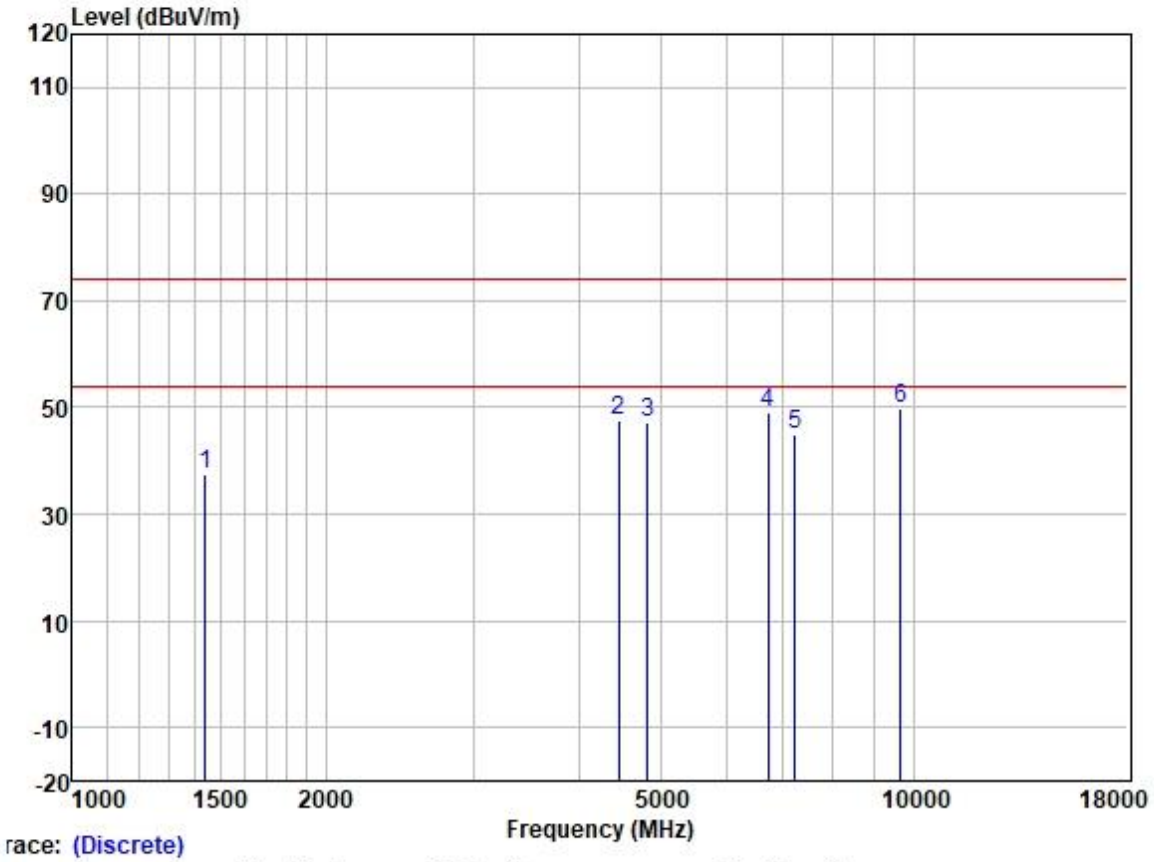
Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1439.343	48.33	24.34	2.80	37.96	37.51	74.00	-36.49	VERTICAL	peak
2	4456.315	45.02	34.00	5.35	36.83	47.54	74.00	-26.46	VERTICAL	peak
3	4824.000	44.36	34.16	5.46	36.87	47.11	74.00	-26.89	VERTICAL	peak
4	6717.762	45.56	34.42	6.29	37.05	49.22	74.00	-24.78	VERTICAL	peak
5	7236.000	40.02	35.78	6.35	37.14	45.01	74.00	-28.99	VERTICAL	peak
6	9648.000	40.19	38.70	7.89	37.02	49.76	74.00	-24.24	VERTICAL	peak

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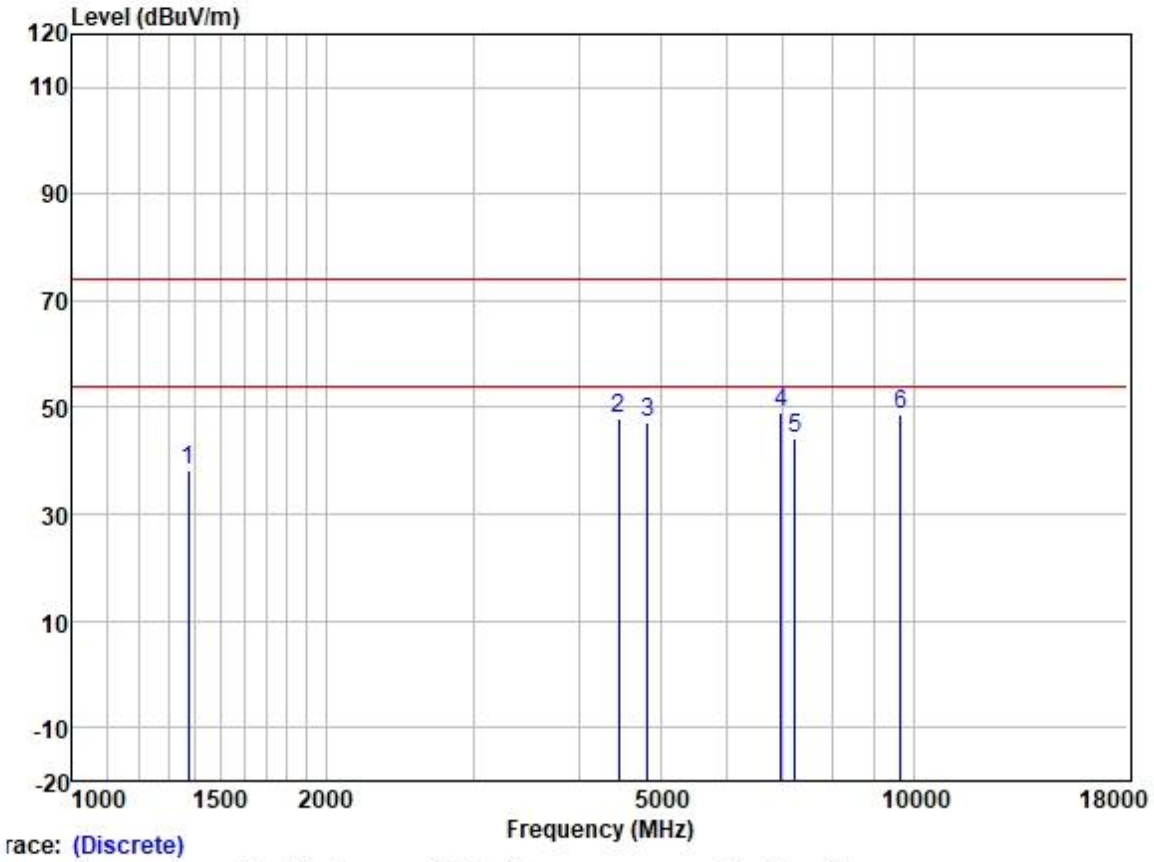
Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1374.295	49.27	24.20	2.76	37.97	38.26	74.00	-35.74	HORIZONTAL	peak
2	4456.315	45.32	34.00	5.35	36.83	47.84	74.00	-26.16	HORIZONTAL	peak
3	4824.000	44.43	34.16	5.46	36.87	47.18	74.00	-26.82	HORIZONTAL	peak
4	6954.852	44.71	35.04	6.40	37.09	49.06	74.00	-24.94	HORIZONTAL	peak
5	7236.000	39.15	35.78	6.35	37.14	44.14	74.00	-29.86	HORIZONTAL	peak
6	9648.000	38.99	38.70	7.89	37.02	48.56	74.00	-25.44	HORIZONTAL	peak

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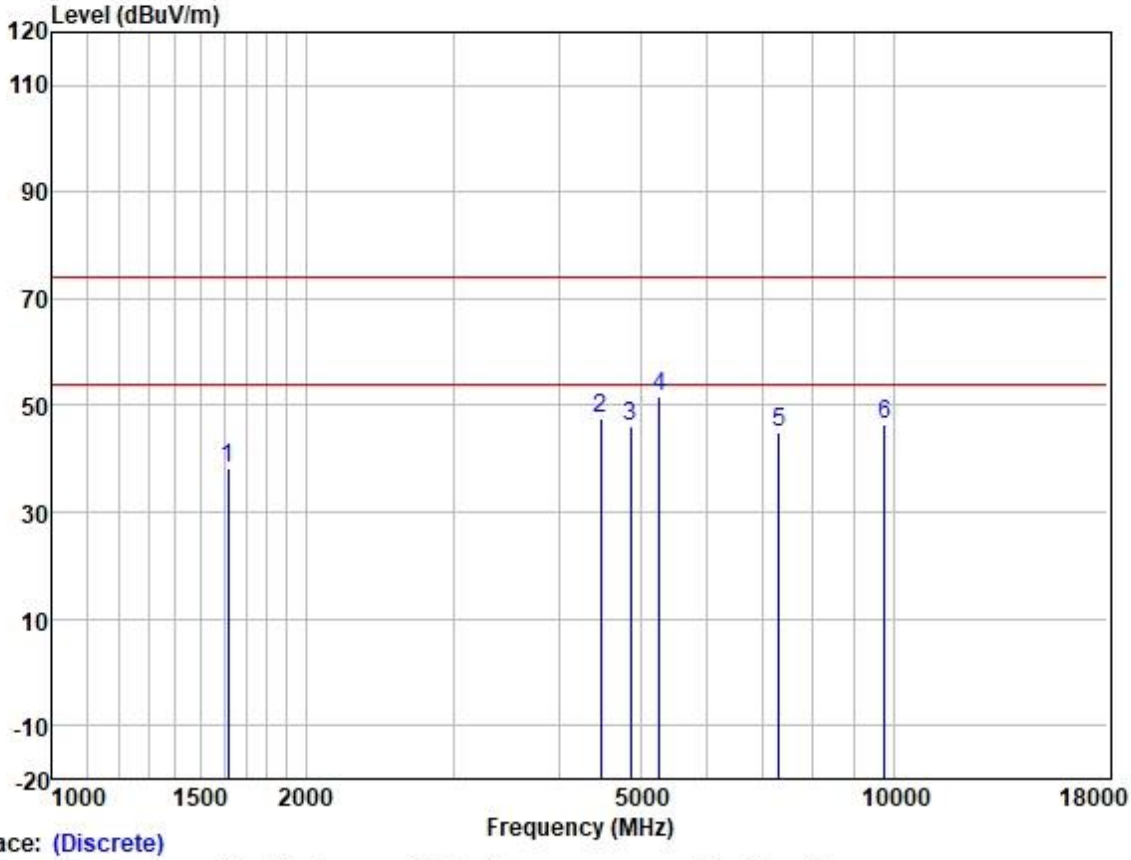
Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1615.754	48.33	24.74	3.04	37.93	38.18	74.00	-35.82	VERTICAL	peak
2	4482.150	44.89	34.12	5.34	36.83	47.52	74.00	-26.48	VERTICAL	peak
3	4874.000	43.48	34.15	5.49	36.87	46.25	74.00	-27.75	VERTICAL	peak
4	5269.649	49.73	33.30	5.42	36.94	51.51	74.00	-22.49	VERTICAL	peak
5	7311.000	39.86	36.00	6.32	37.15	45.03	74.00	-28.97	VERTICAL	peak
6	9748.000	37.27	38.81	7.43	37.01	46.50	74.00	-27.50	VERTICAL	peak

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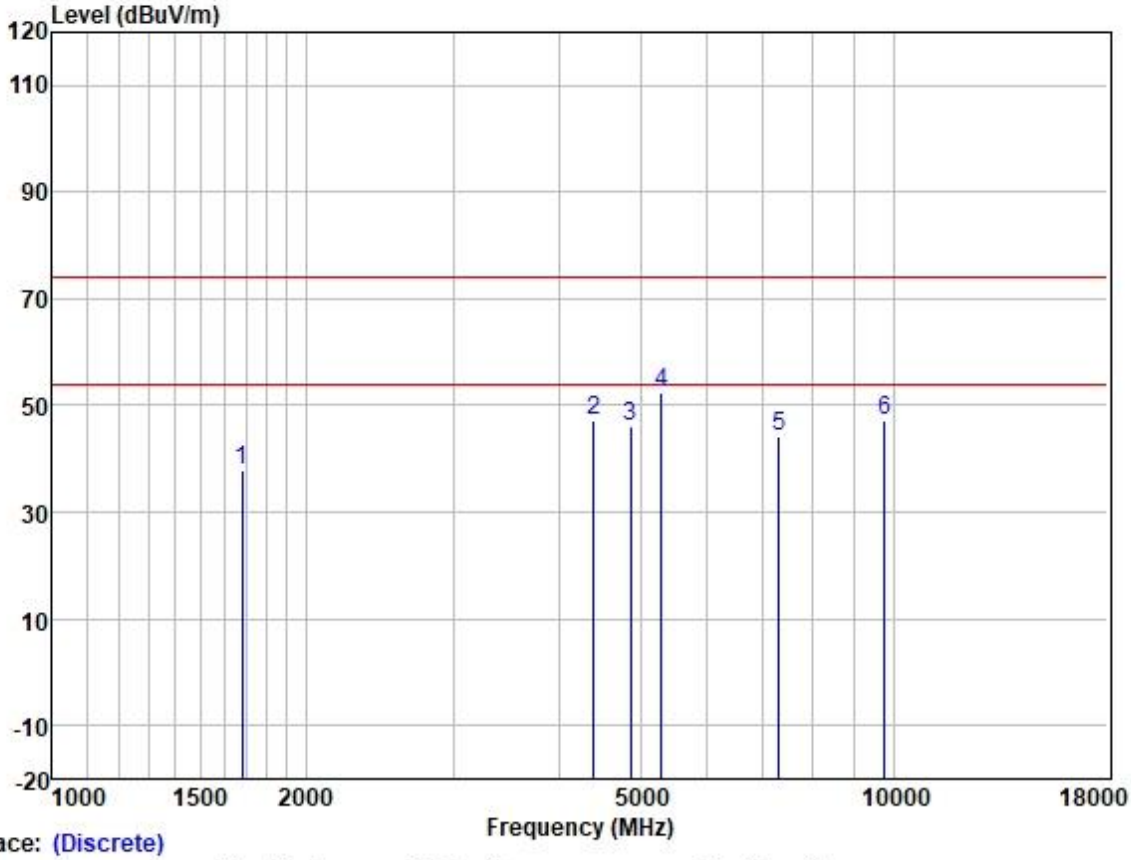
Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	47.51	25.03	3.25	37.93	37.86	74.00	-36.14	HORIZONTAL	peak
2	4405.090	45.01	33.74	5.37	36.82	47.30	74.00	-26.70	HORIZONTAL	peak
3	4874.000	43.26	34.15	5.49	36.87	46.03	74.00	-27.97	HORIZONTAL	peak
4	5300.200	50.90	33.17	5.47	36.95	52.59	74.00	-21.41	HORIZONTAL	peak
5	7311.000	39.18	36.00	6.32	37.15	44.35	74.00	-29.65	HORIZONTAL	peak
6	9748.000	37.84	38.81	7.43	37.01	47.07	74.00	-26.93	HORIZONTAL	peak

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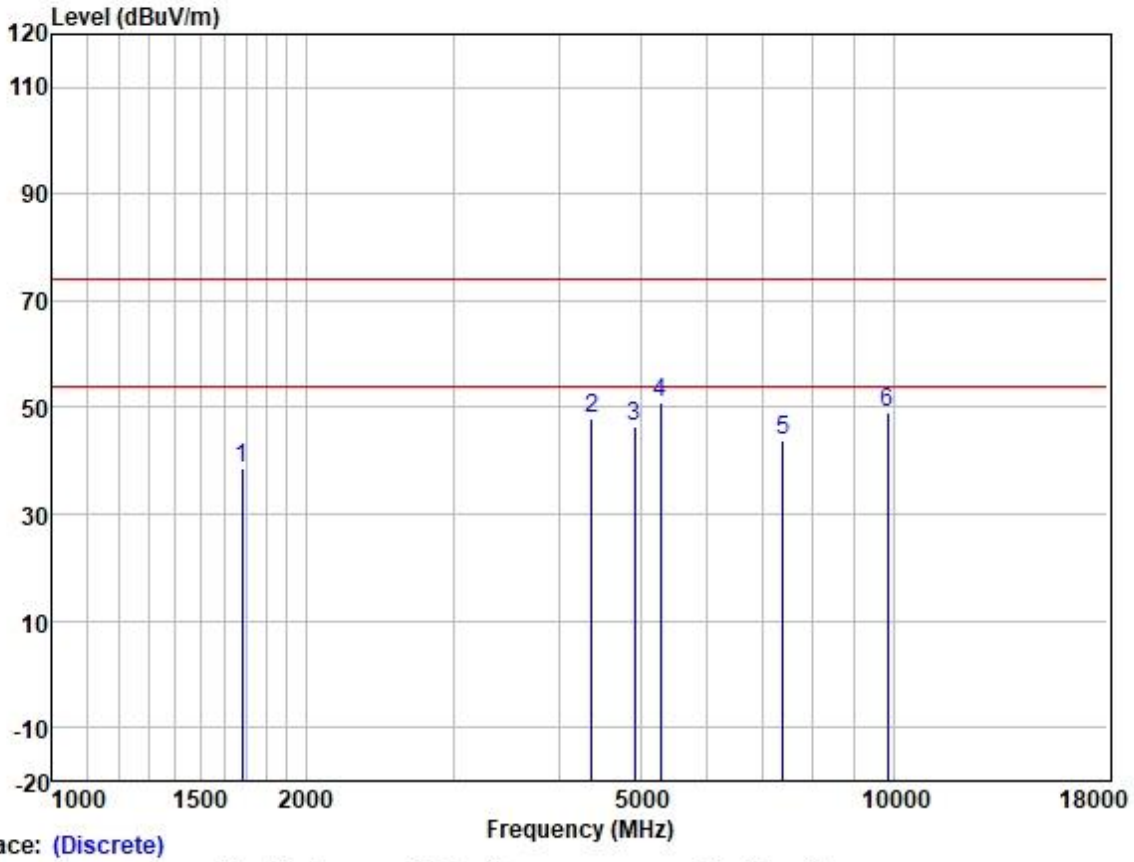
Test Mode: 02; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	48.19	25.03	3.25	37.93	38.54	74.00	-35.46	VERTICAL	peak
2	4379.699	45.82	33.59	5.35	36.82	47.94	74.00	-26.06	VERTICAL	peak
3	4924.000	43.86	34.15	5.51	36.88	46.64	74.00	-27.36	VERTICAL	peak
4	5284.902	49.14	33.23	5.44	36.95	50.86	74.00	-23.14	VERTICAL	peak
5	7386.000	38.61	36.23	6.30	37.16	43.98	74.00	-30.02	VERTICAL	peak
6	9848.000	40.04	38.88	7.06	37.01	48.97	74.00	-25.03	VERTICAL	peak

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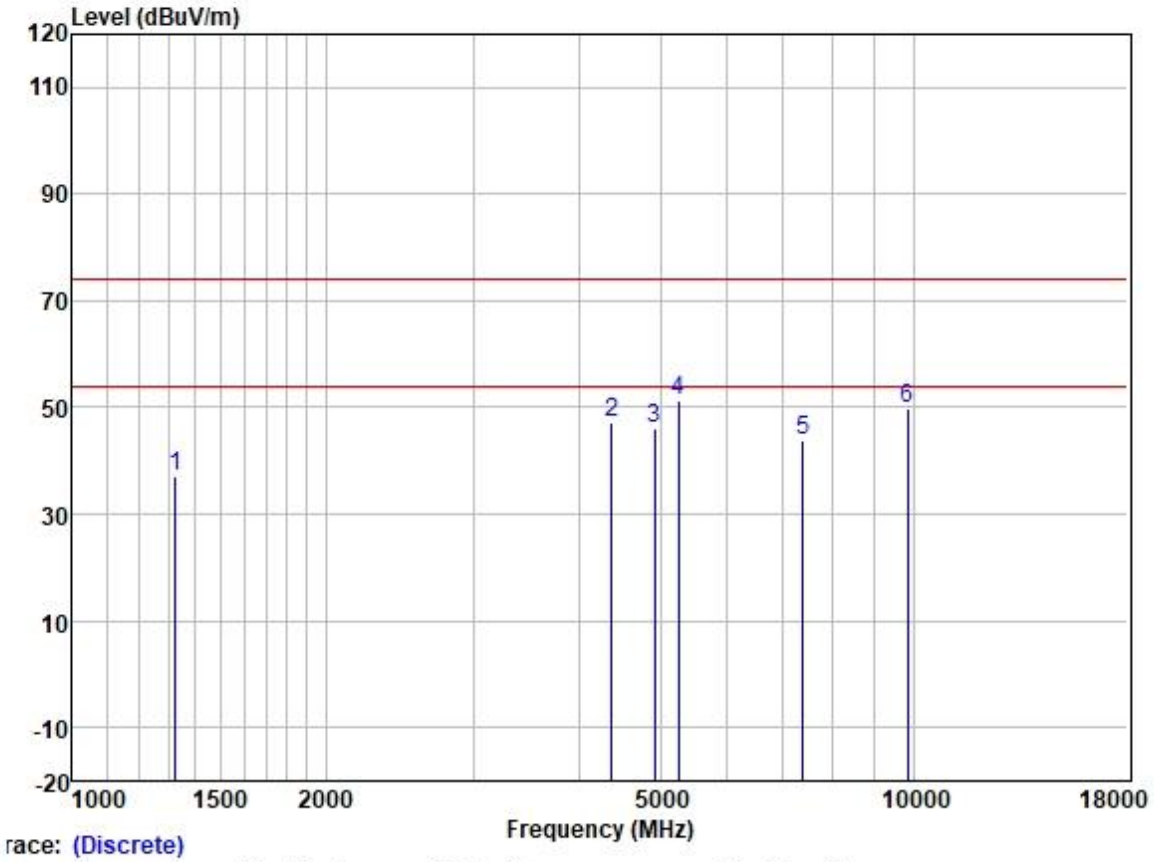
Test Mode: 02; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1327.446	48.48	24.07	2.72	37.97	37.30	74.00	-36.70	HORIZONTAL	peak
2	4379.699	45.23	33.59	5.35	36.82	47.35	74.00	-26.65	HORIZONTAL	peak
3	4924.000	43.13	34.15	5.51	36.88	45.91	74.00	-28.09	HORIZONTAL	peak
4	5254.440	49.59	33.38	5.39	36.94	51.42	74.00	-22.58	HORIZONTAL	peak
5	7386.000	38.41	36.23	6.30	37.16	43.78	74.00	-30.22	HORIZONTAL	peak
6	9848.000	40.92	38.88	7.06	37.01	49.85	74.00	-24.15	HORIZONTAL	peak

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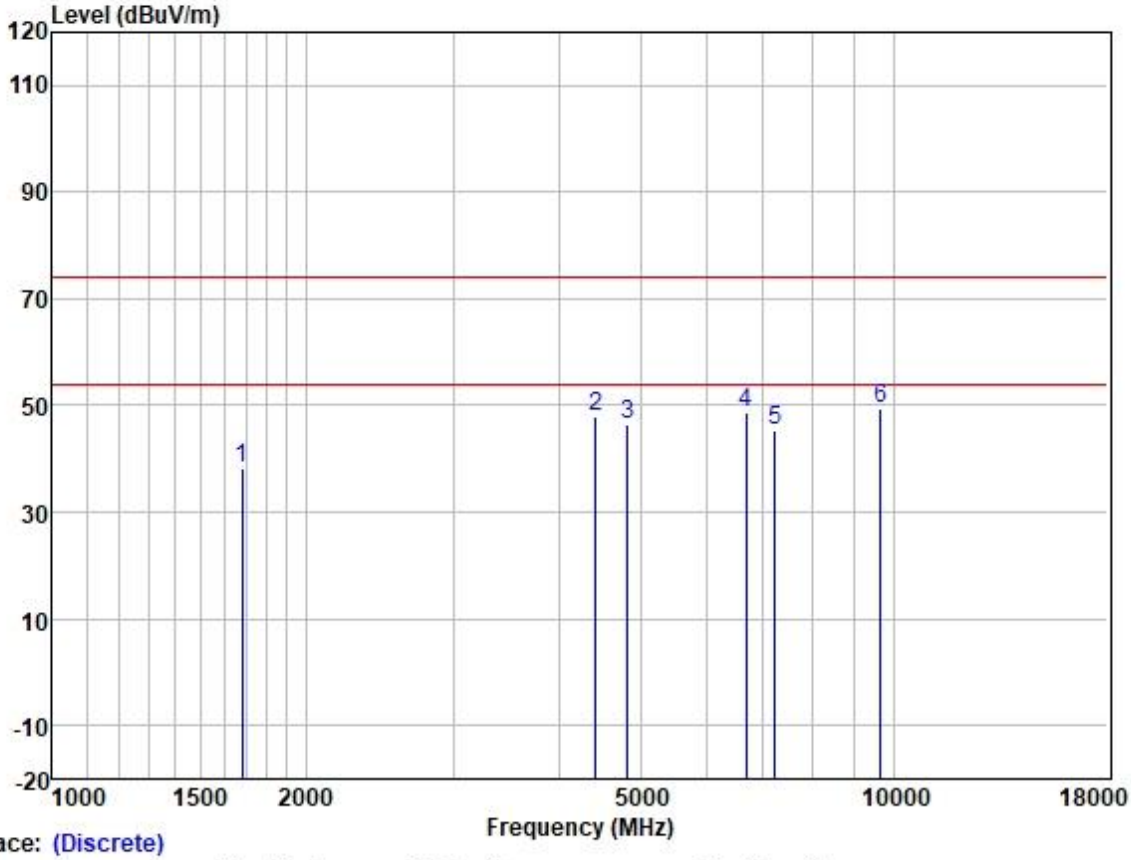
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	47.71	25.03	3.25	37.93	38.06	74.00	-35.94	VERTICAL	peak
2	4430.628	45.49	33.87	5.36	36.83	47.89	74.00	-26.11	VERTICAL	peak
3	4824.000	43.59	34.16	5.46	36.87	46.34	74.00	-27.66	VERTICAL	peak
4	6679.040	45.19	34.28	6.27	37.05	48.69	74.00	-25.31	VERTICAL	peak
5	7236.000	40.22	35.78	6.35	37.14	45.21	74.00	-28.79	VERTICAL	peak
6	9648.000	39.87	38.70	7.89	37.02	49.44	74.00	-24.56	VERTICAL	peak

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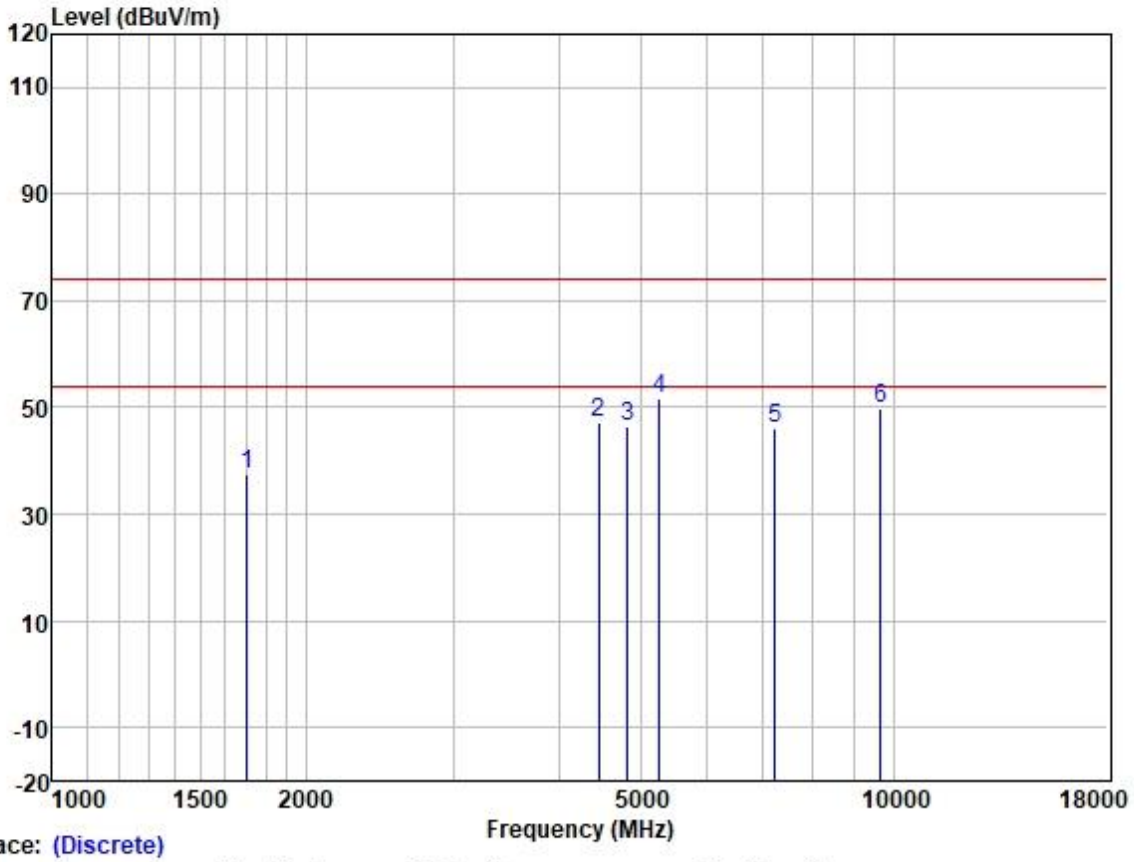
Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1702.042	46.72	25.15	3.36	37.92	37.31	74.00	-36.69	HORIZONTAL	peak
2	4456.315	44.51	34.00	5.35	36.83	47.03	74.00	-26.97	HORIZONTAL	peak
3	4824.000	43.55	34.16	5.46	36.87	46.30	74.00	-27.70	HORIZONTAL	peak
4	5269.649	50.05	33.30	5.42	36.94	51.83	74.00	-22.17	HORIZONTAL	peak
5	7236.000	41.05	35.78	6.35	37.14	46.04	74.00	-27.96	HORIZONTAL	peak
6	9648.000	40.10	38.70	7.89	37.02	49.67	74.00	-24.33	HORIZONTAL	peak

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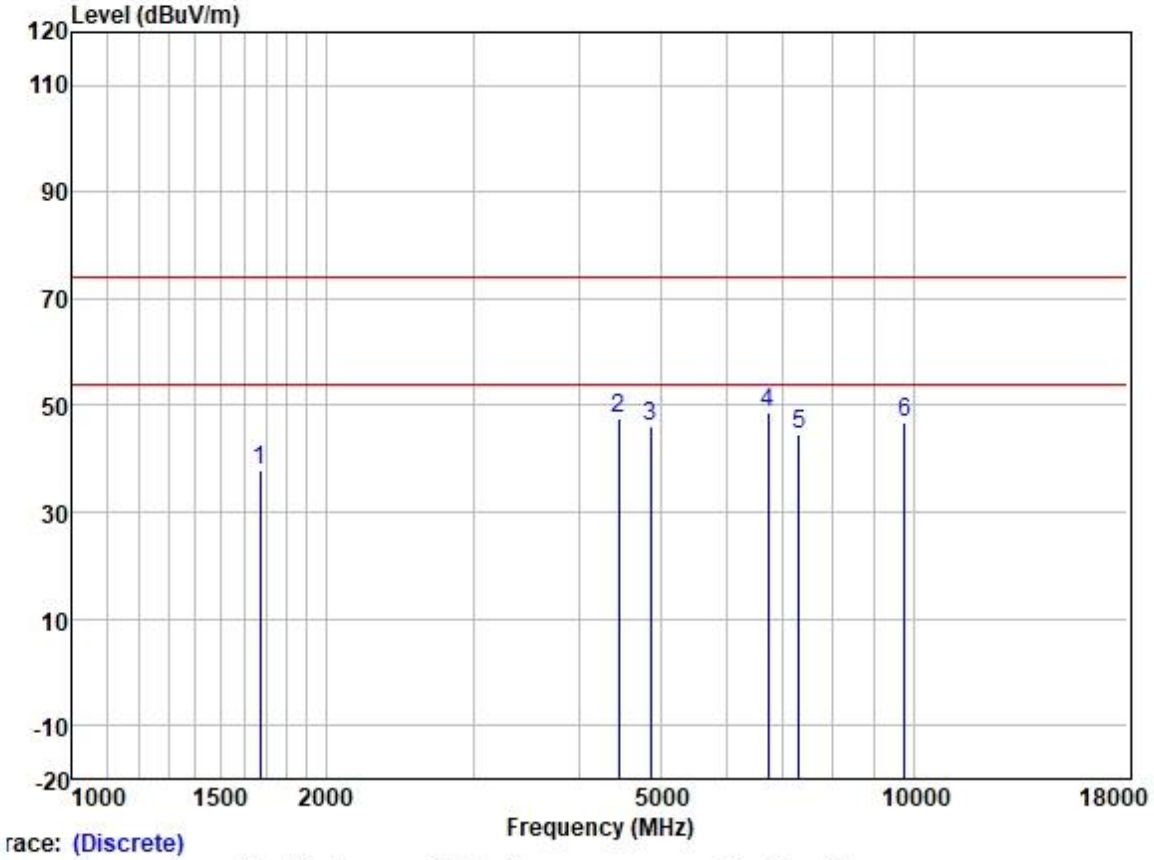
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1672.779	47.77	24.98	3.21	37.93	38.03	74.00	-35.97	VERTICAL	peak
2	4456.315	45.11	34.00	5.35	36.83	47.63	74.00	-26.37	VERTICAL	peak
3	4874.000	43.36	34.15	5.49	36.87	46.13	74.00	-27.87	VERTICAL	peak
4	6717.762	45.20	34.42	6.29	37.05	48.86	74.00	-25.14	VERTICAL	peak
5	7311.000	39.33	36.00	6.32	37.15	44.50	74.00	-29.50	VERTICAL	peak
6	9748.000	37.51	38.81	7.43	37.01	46.74	74.00	-27.26	VERTICAL	peak

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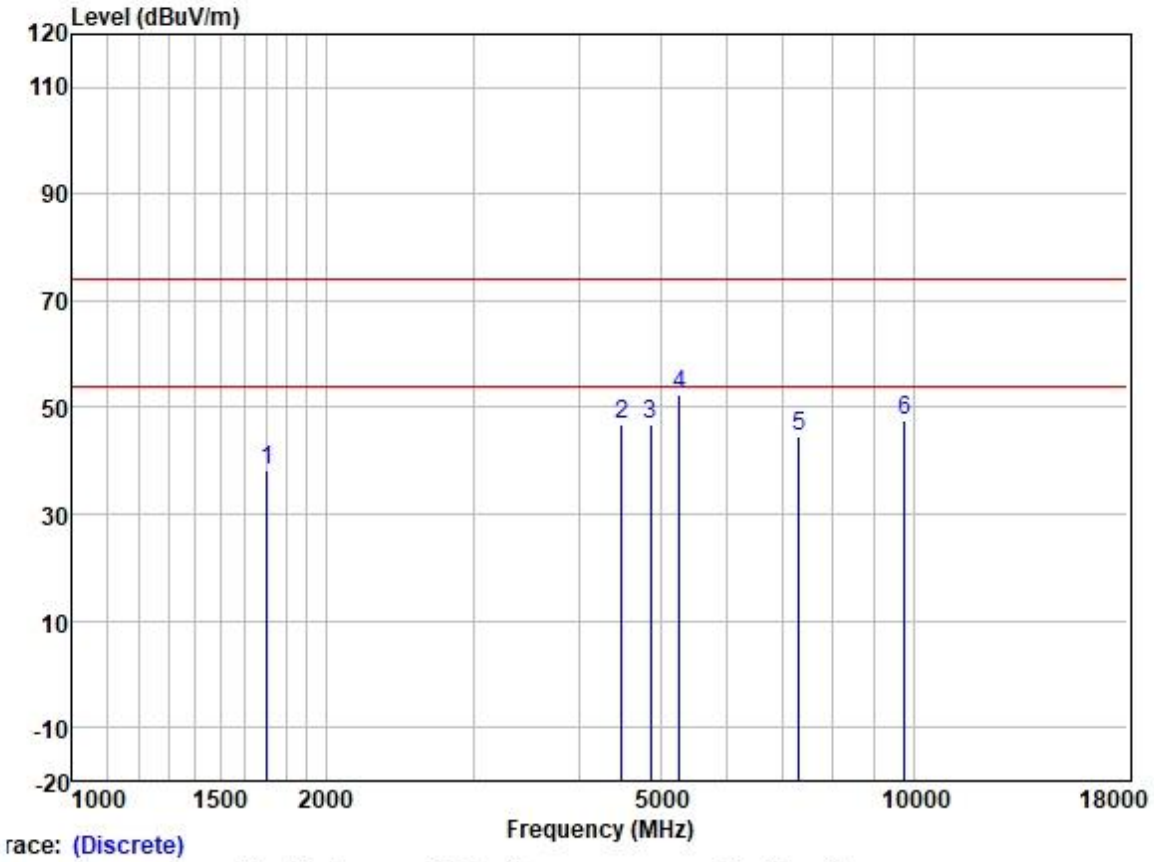
Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1702.042	47.66	25.15	3.36	37.92	38.25	74.00	-35.75	HORIZONTAL	peak
2	4495.125	44.29	34.17	5.33	36.83	46.96	74.00	-27.04	HORIZONTAL	peak
3	4874.000	44.00	34.15	5.49	36.87	46.77	74.00	-27.23	HORIZONTAL	peak
4	5269.649	50.62	33.30	5.42	36.94	52.40	74.00	-21.60	HORIZONTAL	peak
5	7311.000	39.58	36.00	6.32	37.15	44.75	74.00	-29.25	HORIZONTAL	peak
6	9748.000	38.35	38.81	7.43	37.01	47.58	74.00	-26.42	HORIZONTAL	peak

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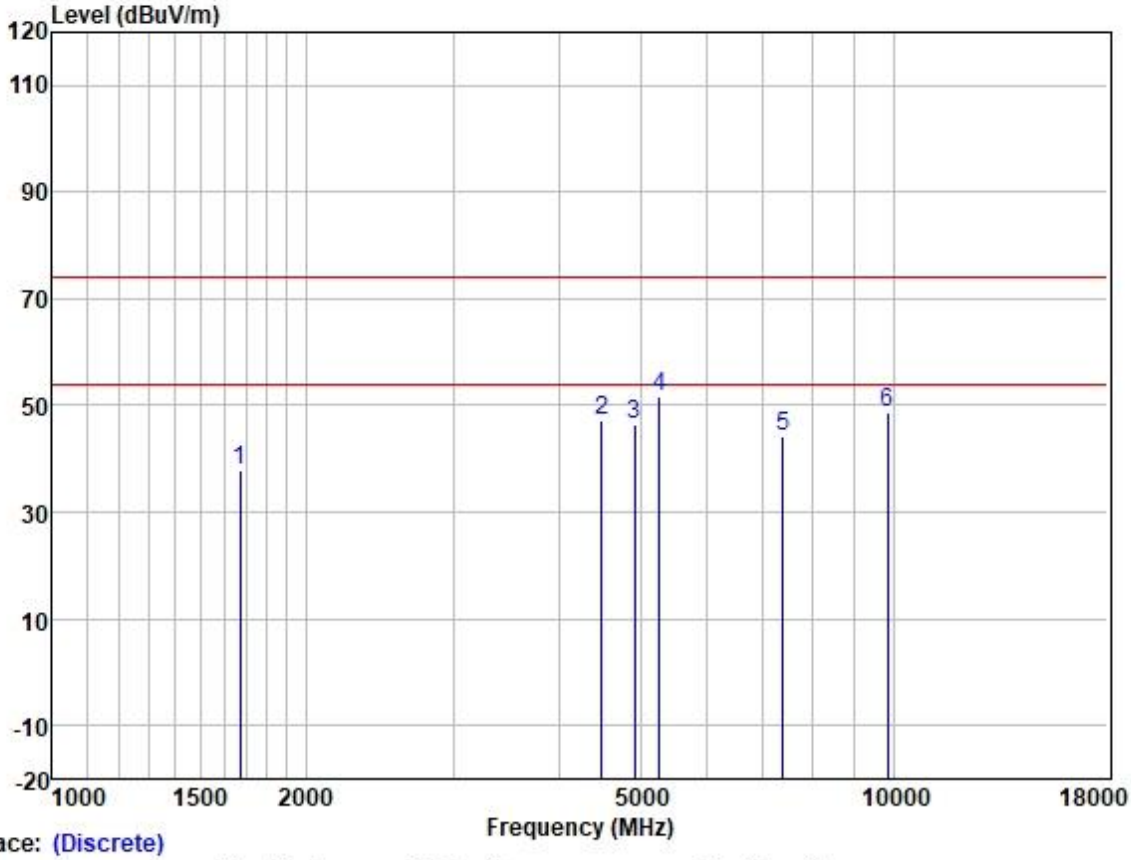
Test Mode: 02; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1672.779	47.68	24.98	3.21	37.93	37.94	74.00	-36.06	VERTICAL	peak
2	4495.125	44.41	34.17	5.33	36.83	47.08	74.00	-26.92	VERTICAL	peak
3	4924.000	43.72	34.15	5.51	36.88	46.50	74.00	-27.50	VERTICAL	peak
4	5269.649	49.89	33.30	5.42	36.94	51.67	74.00	-22.33	VERTICAL	peak
5	7386.000	38.75	36.23	6.30	37.16	44.12	74.00	-29.88	VERTICAL	peak
6	9848.000	39.83	38.88	7.06	37.01	48.76	74.00	-25.24	VERTICAL	peak

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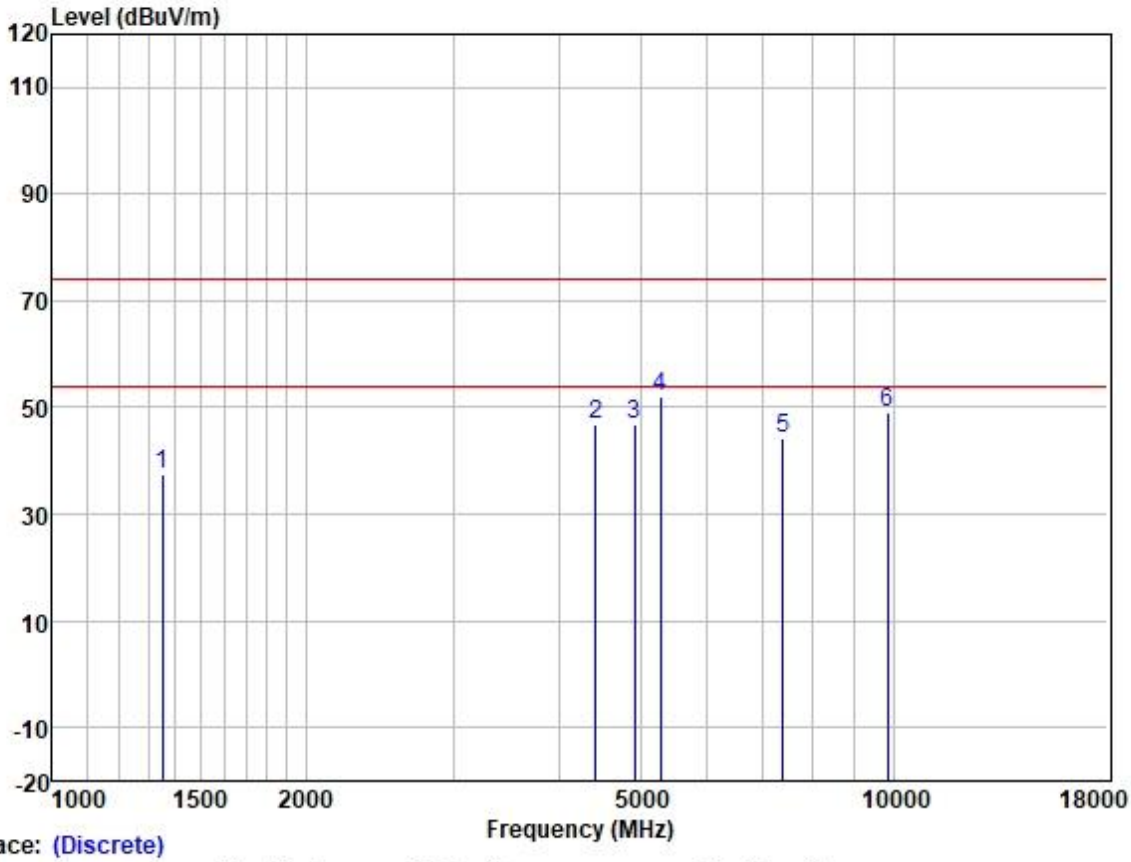
Test Mode: 02; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1350.667	48.72	24.14	2.74	37.97	37.63	74.00	-36.37	HORIZONTAL	peak
2	4430.628	44.51	33.87	5.36	36.83	46.91	74.00	-27.09	HORIZONTAL	peak
3	4924.000	43.97	34.15	5.51	36.88	46.75	74.00	-27.25	HORIZONTAL	peak
4	5284.902	50.24	33.23	5.44	36.95	51.96	74.00	-22.04	HORIZONTAL	peak
5	7386.000	38.68	36.23	6.30	37.16	44.05	74.00	-29.95	HORIZONTAL	peak
6	9848.000	40.18	38.88	7.06	37.01	49.11	74.00	-24.89	HORIZONTAL	peak

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR230300031602

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9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2303000316AT

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10 Appendix

1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	12.416	12.546	98.96	0.05	0.03
		2437	12.417	12.547	98.96	0.05	0.03
		2462	12.420	12.550	98.96	0.05	0.03
802.11g	SISO	2412	2.064	2.194	94.07	0.27	0.04
		2437	2.064	2.195	94.03	0.27	0.04
		2462	2.065	2.195	94.08	0.27	0.04
802.11n (HT20)	SISO	2412	1.921	2.050	93.71	0.28	0.04
		2437	1.920	2.049	93.70	0.28	0.04
		2462	1.920	2.049	93.70	0.28	0.00

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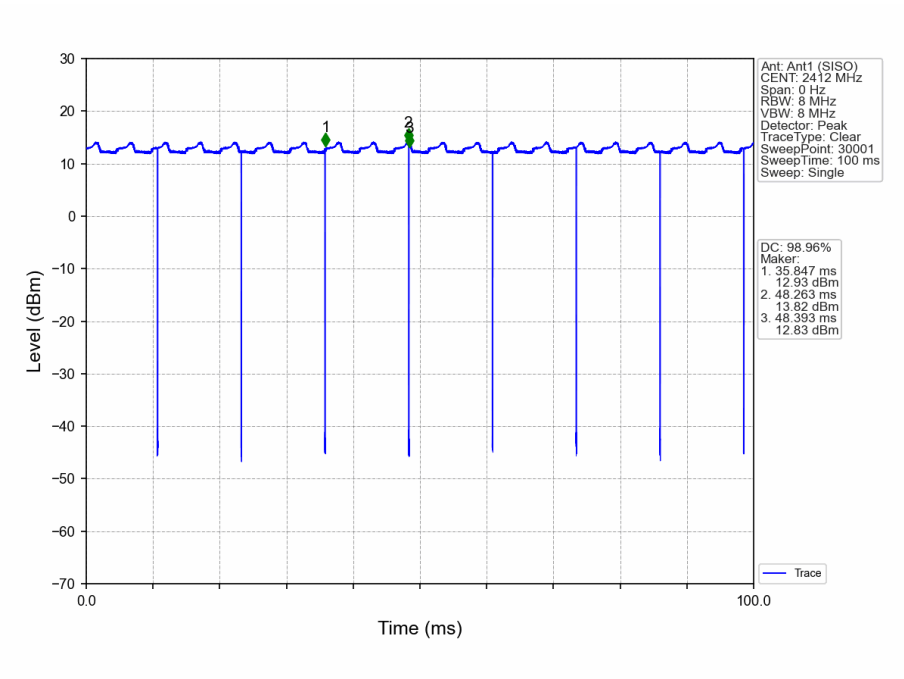
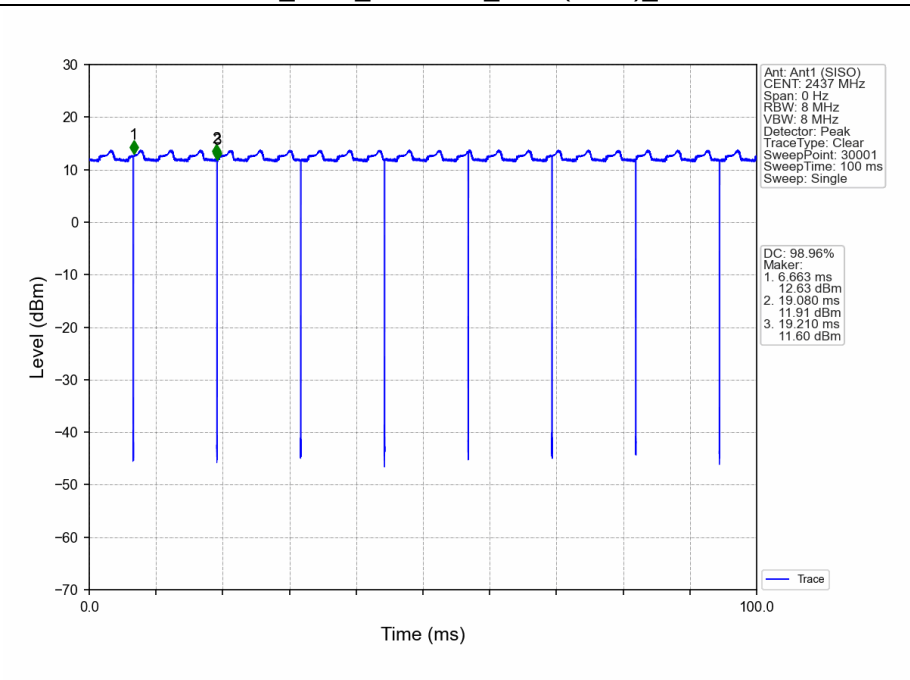
1.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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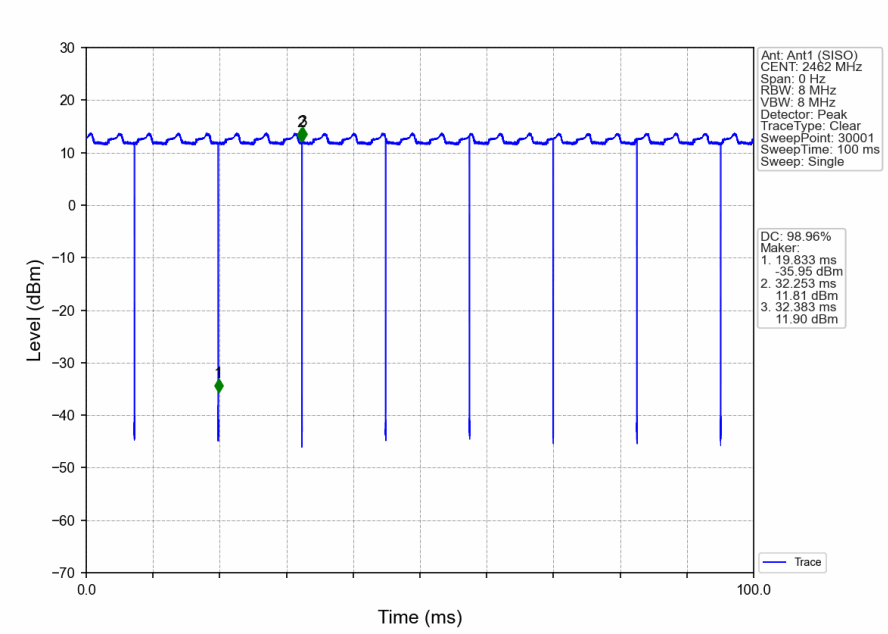
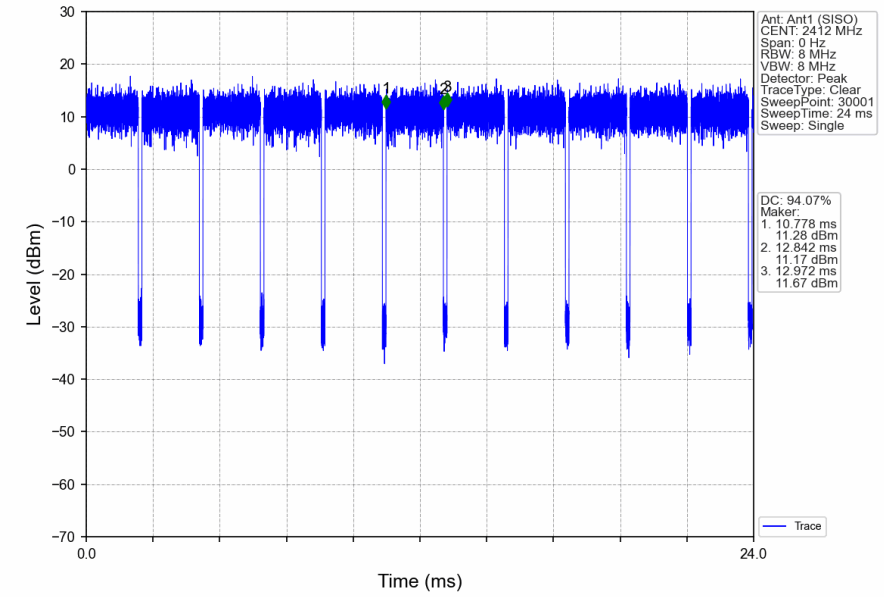
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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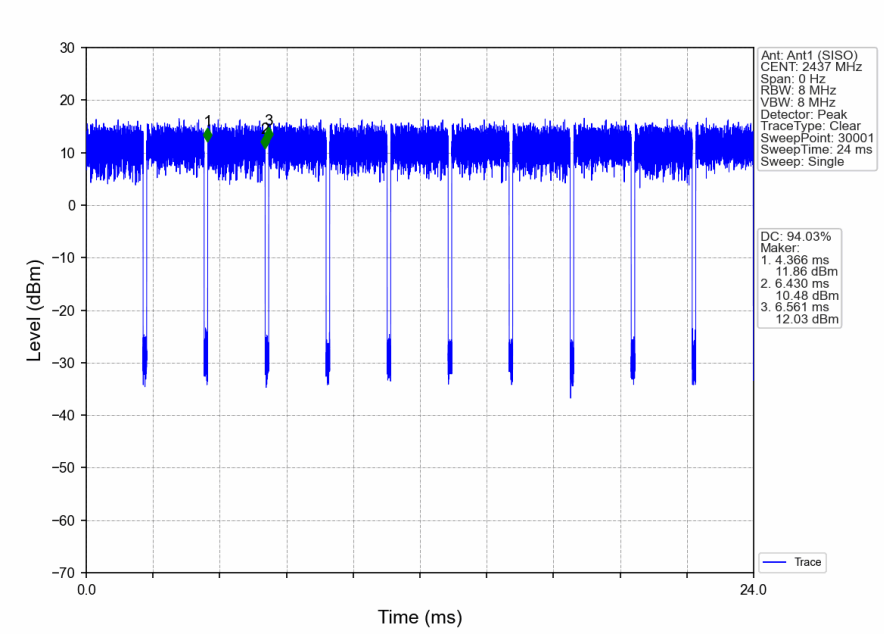
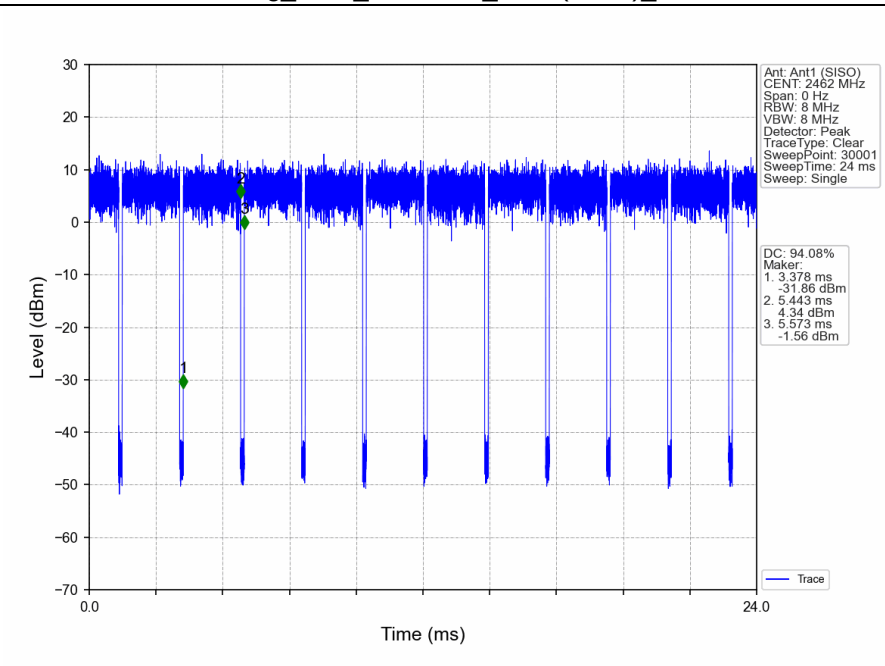
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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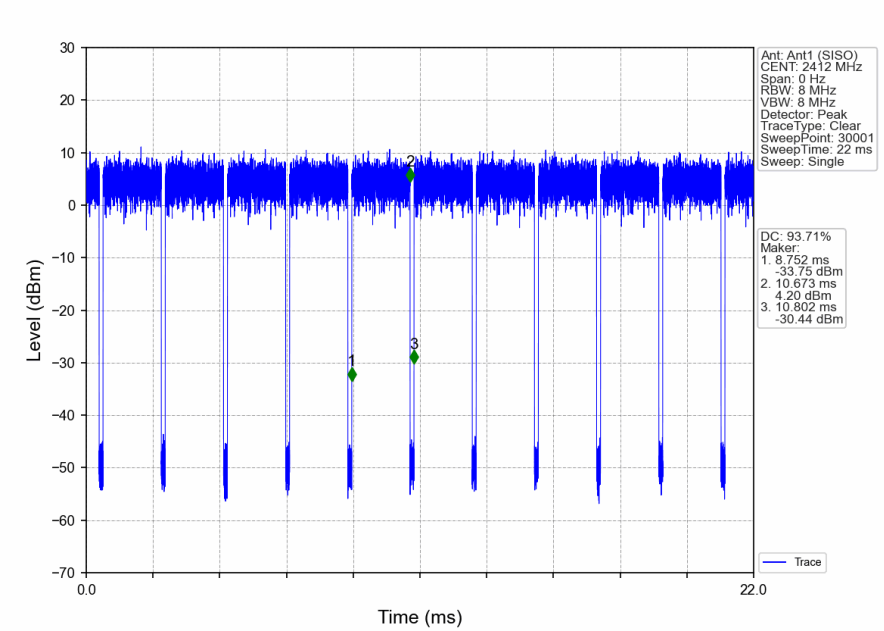
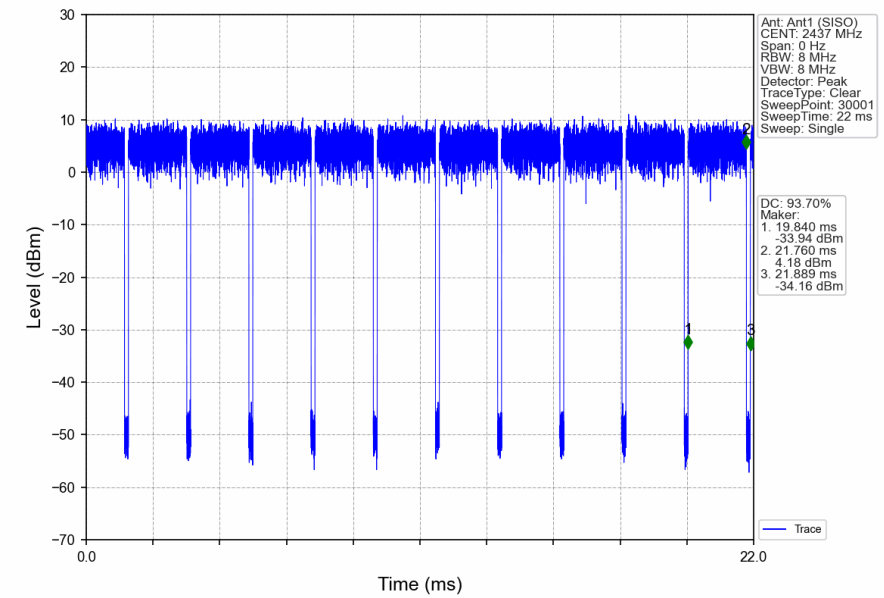
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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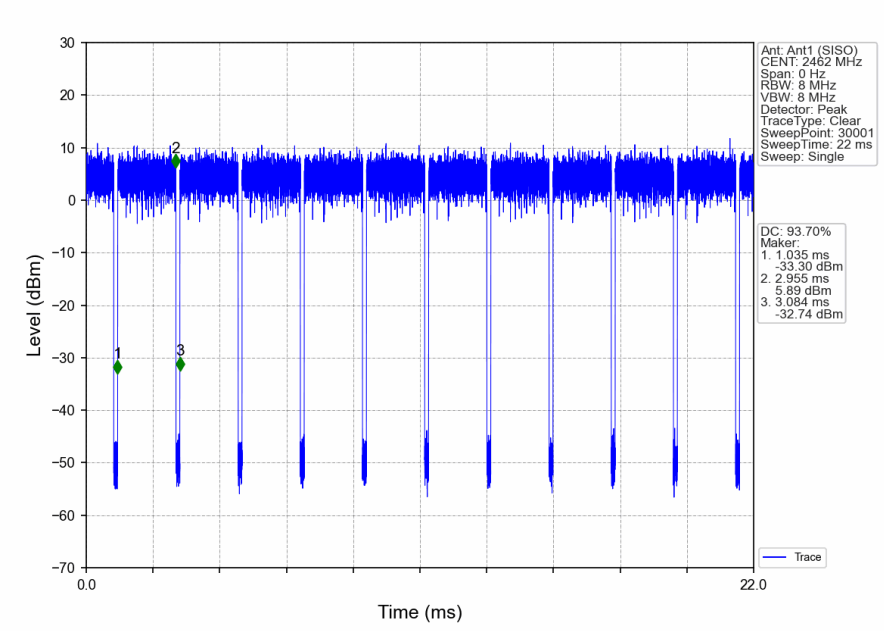
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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2. Bandwidth

2.1 6dB BW

2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	9.087	>=0.5	Pass
		2437	1	9.561	>=0.5	Pass
		2462	1	9.109	>=0.5	Pass
802.11g	SISO	2412	1	16.354	>=0.5	Pass
		2437	1	16.393	>=0.5	Pass
		2462	1	16.366	>=0.5	Pass
802.11n (HT20)	SISO	2412	1	17.540	>=0.5	Pass
		2437	1	17.572	>=0.5	Pass
		2462	1	17.556	>=0.5	Pass

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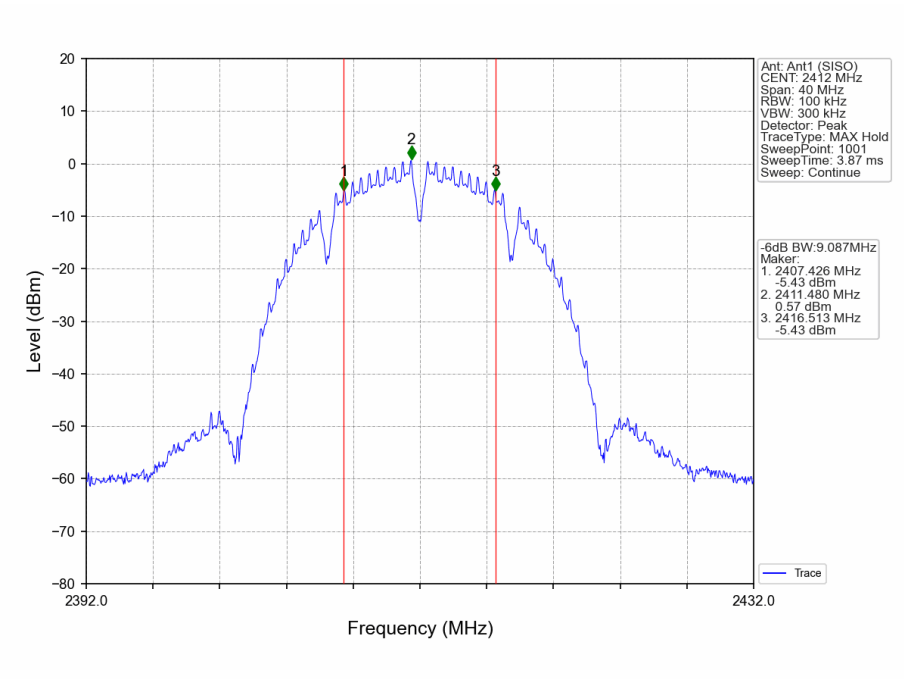
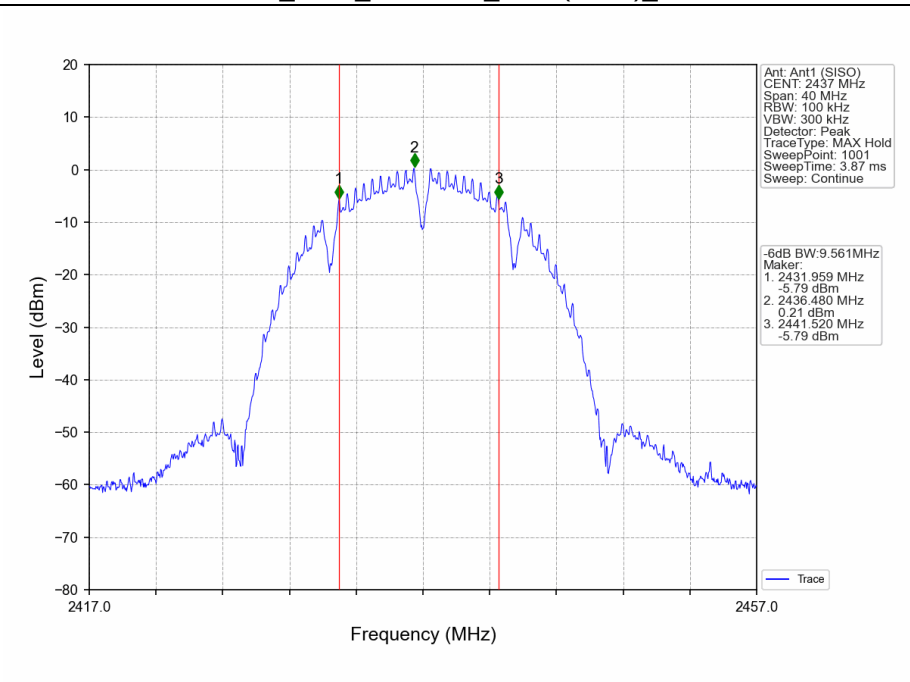
2.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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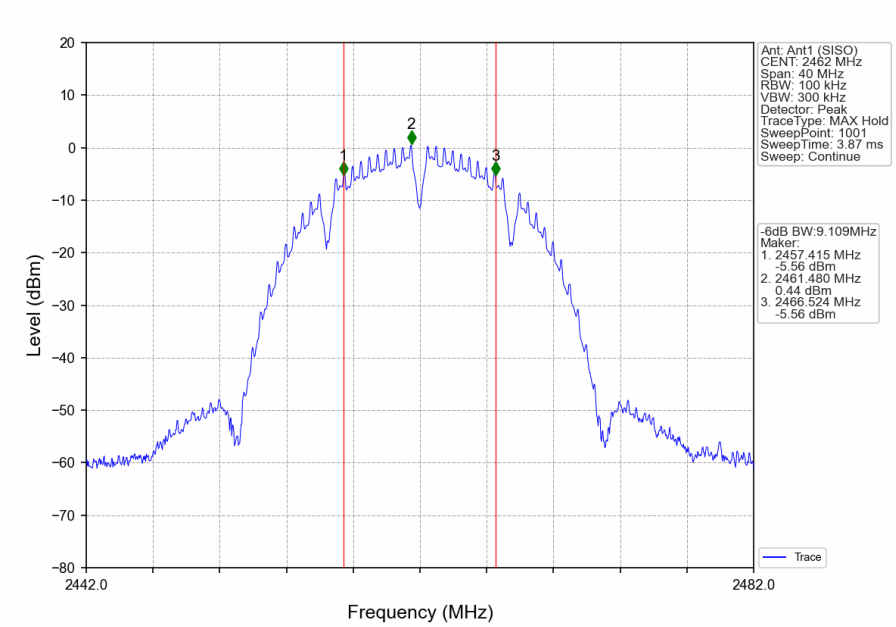
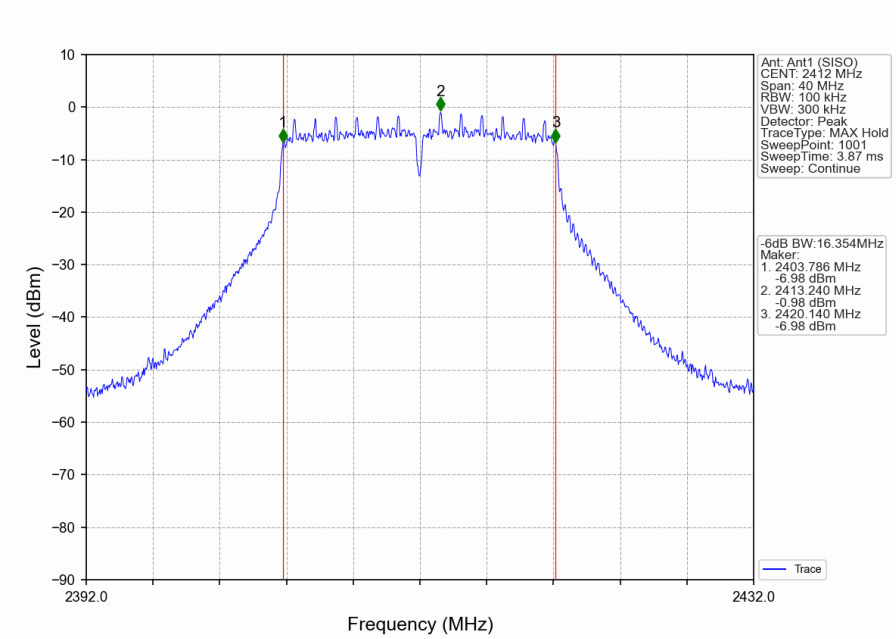
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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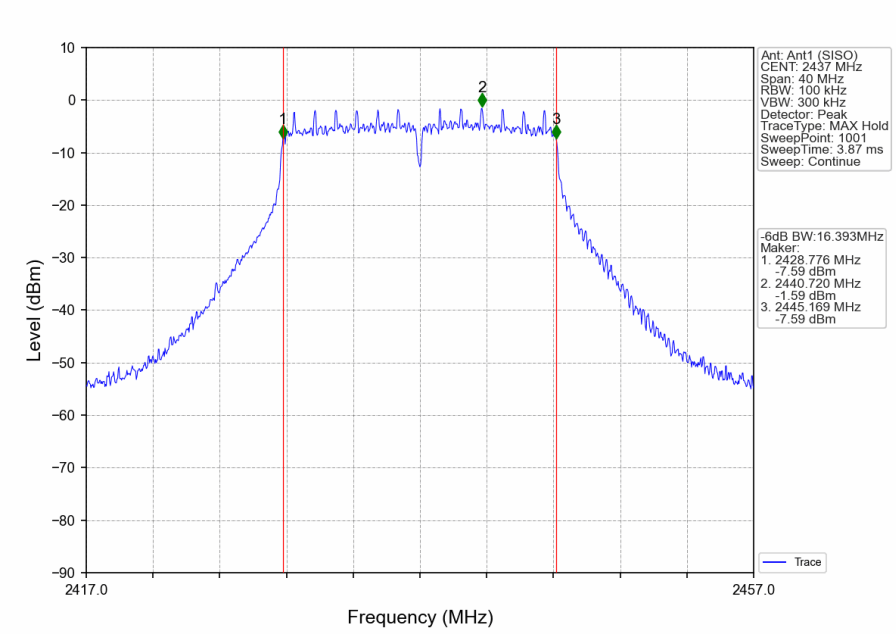
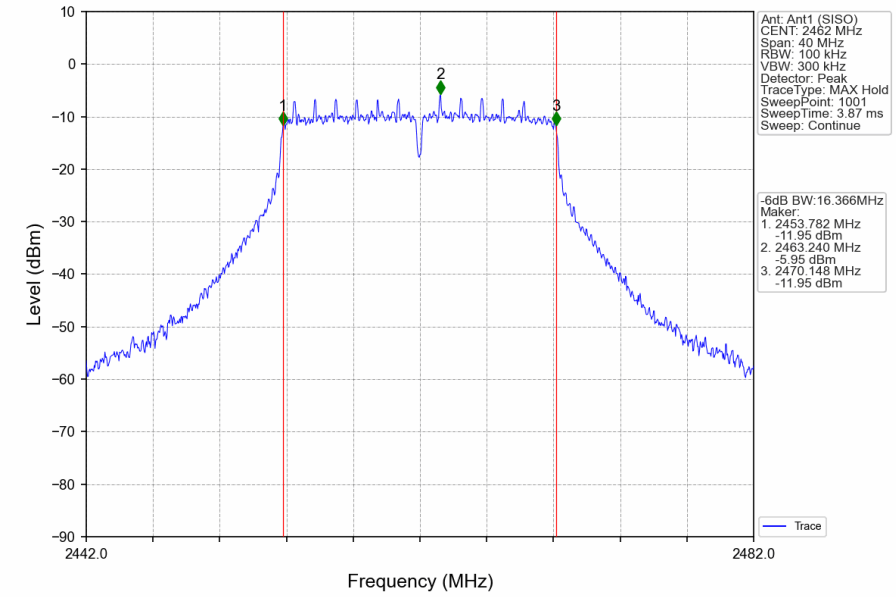
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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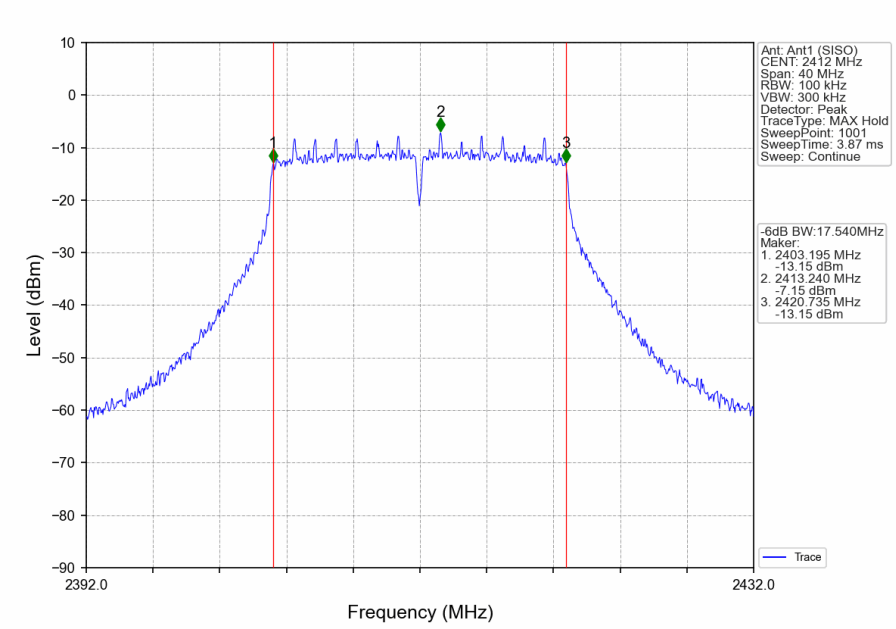
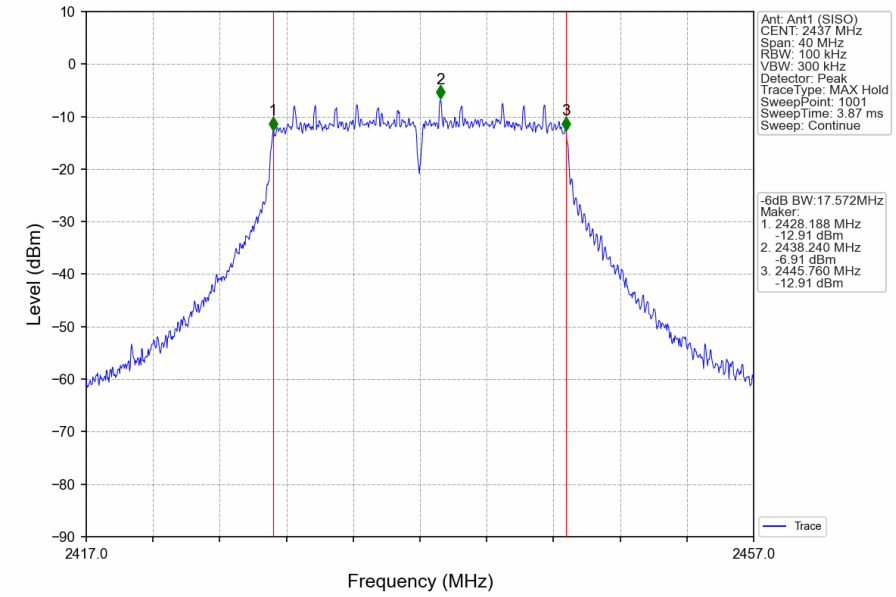
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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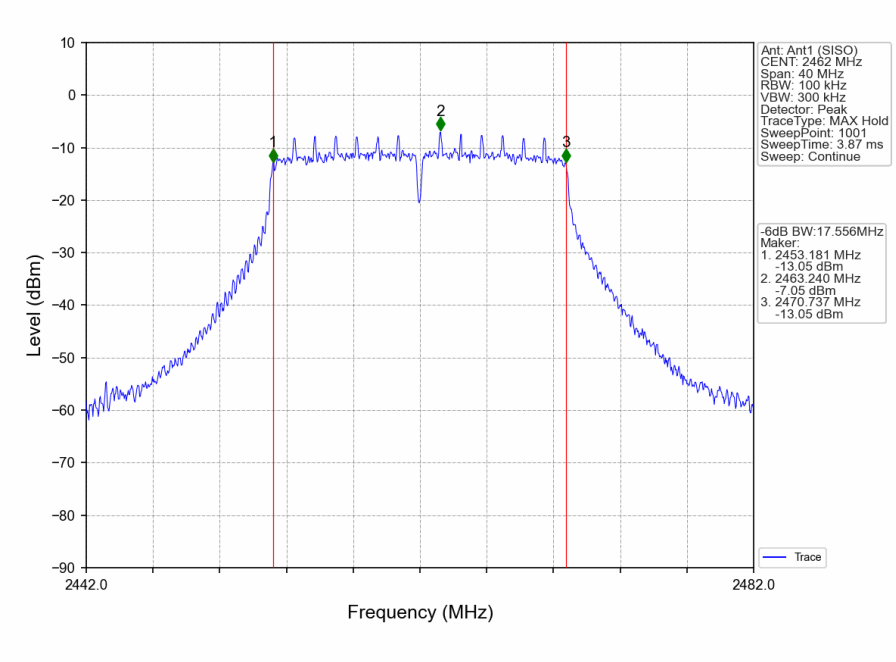
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	11.53	<=30	Pass
		2437	11.51	<=30	Pass
		2462	11.42	<=30	Pass
802.11g	SISO	2412	17.66	<=30	Pass
		2437	17.66	<=30	Pass
		2462	12.77	<=30	Pass
802.11n (HT20)	SISO	2412	11.53	<=30	Pass
		2437	11.82	<=30	Pass
		2462	11.73	<=30	Pass
Note1: Antenna Gain: Ant1: 4.25 dBi;					

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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	-14.36	<=8	Pass
		2437	-14.03	<=8	Pass
		2462	-12.04	<=8	Pass
802.11g	SISO	2412	-15.44	<=8	Pass
		2437	-16.08	<=8	Pass
		2462	-21.17	<=8	Pass
802.11n (HT20)	SISO	2412	-21.33	<=8	Pass
		2437	-19.80	<=8	Pass
		2462	-22.16	<=8	Pass
Note1: Antenna Gain: Ant1: 4.25dBi;					

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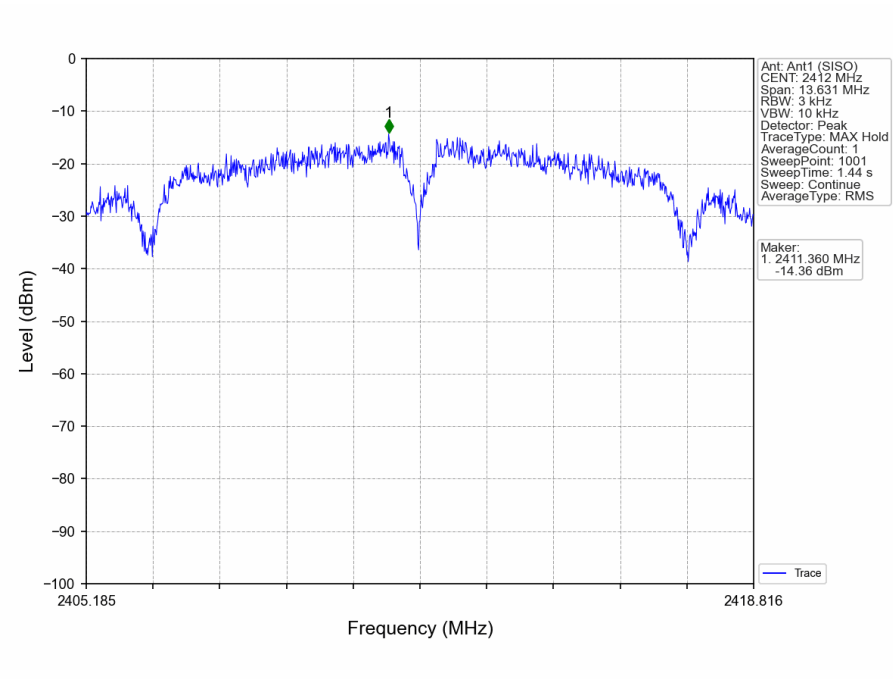
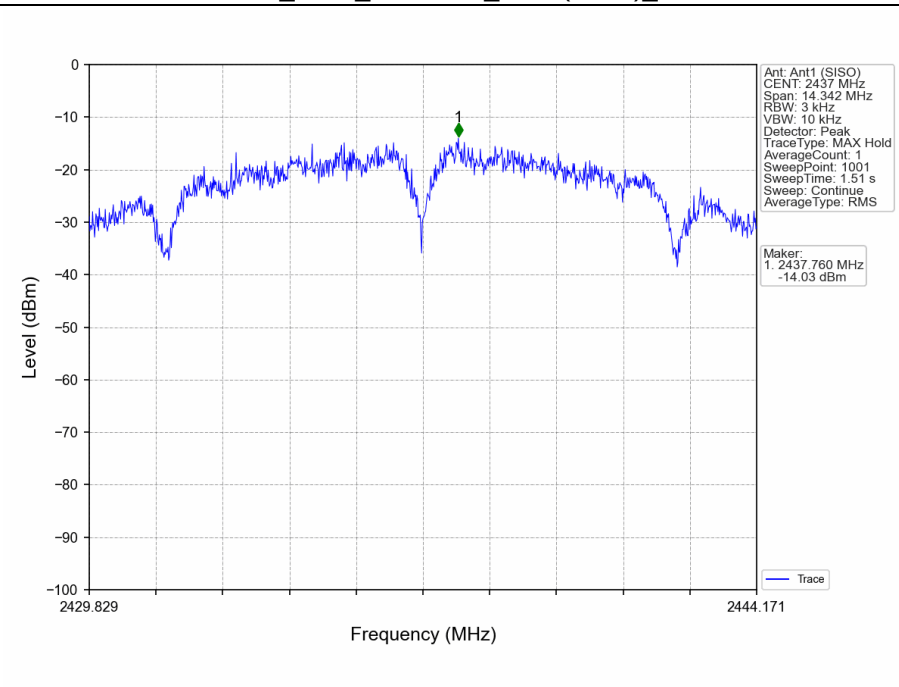
4.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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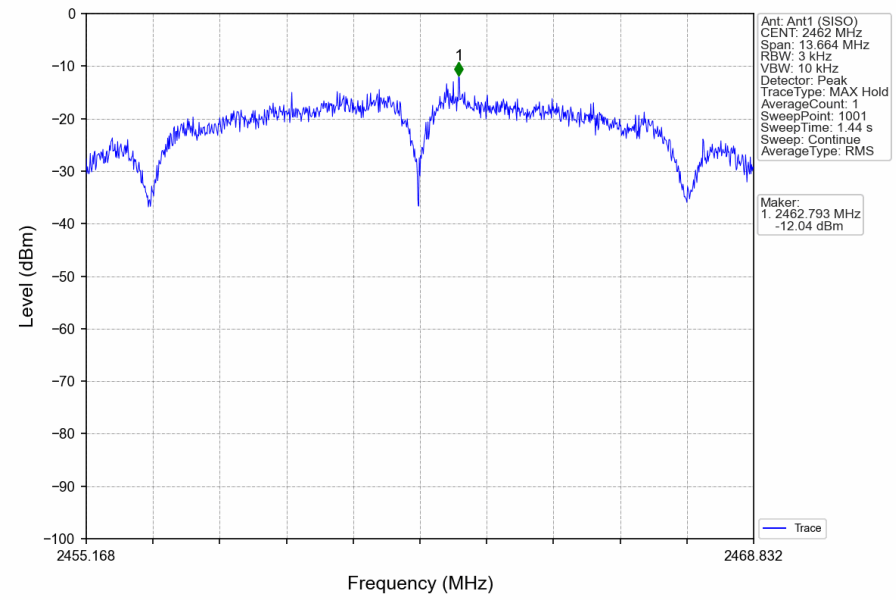
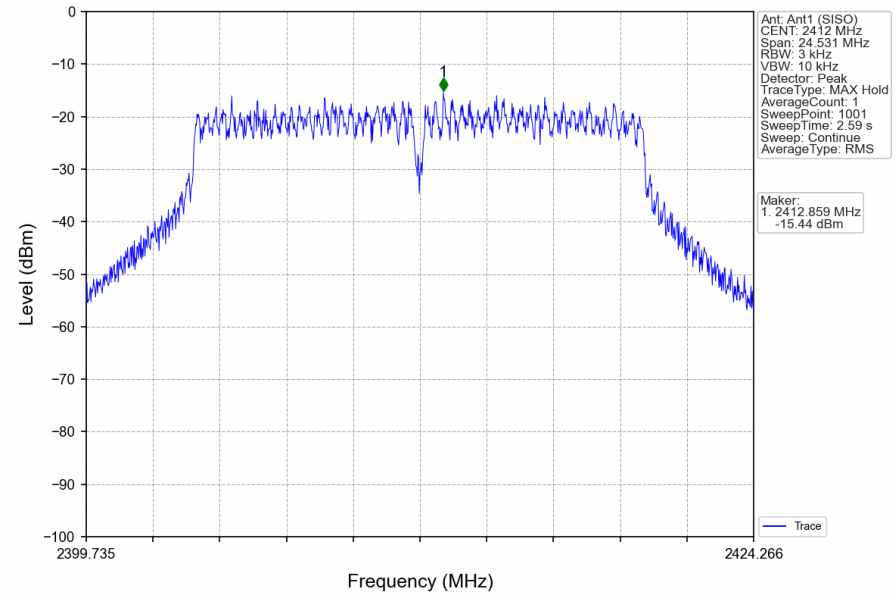
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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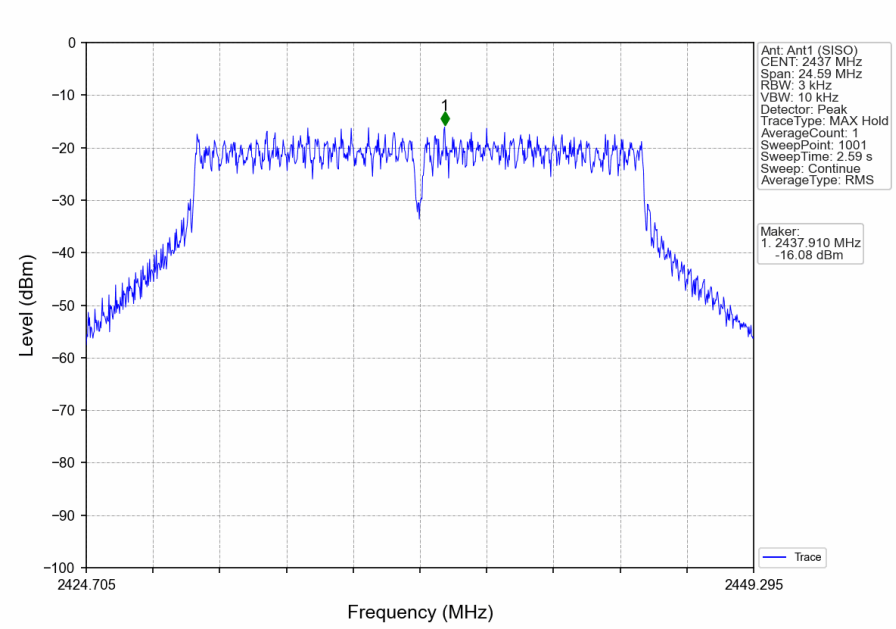
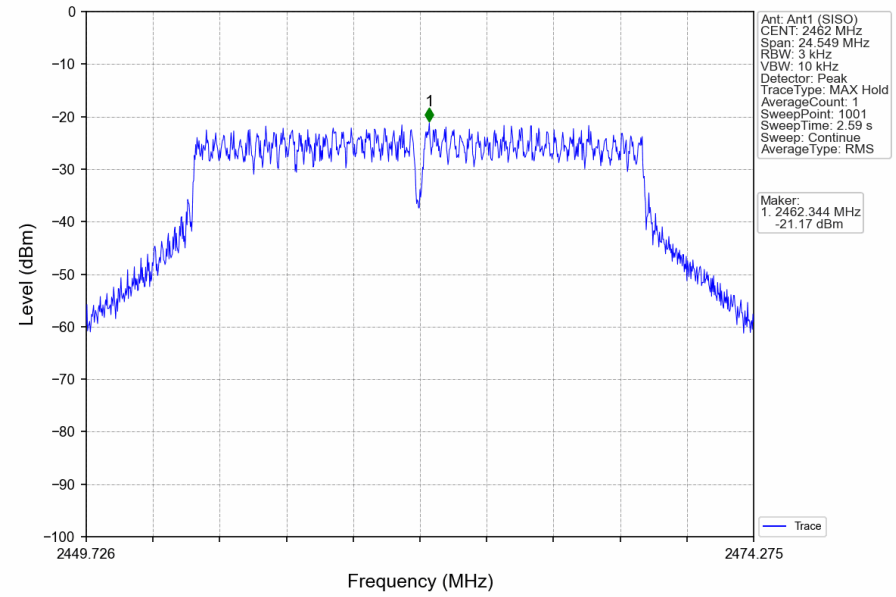
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



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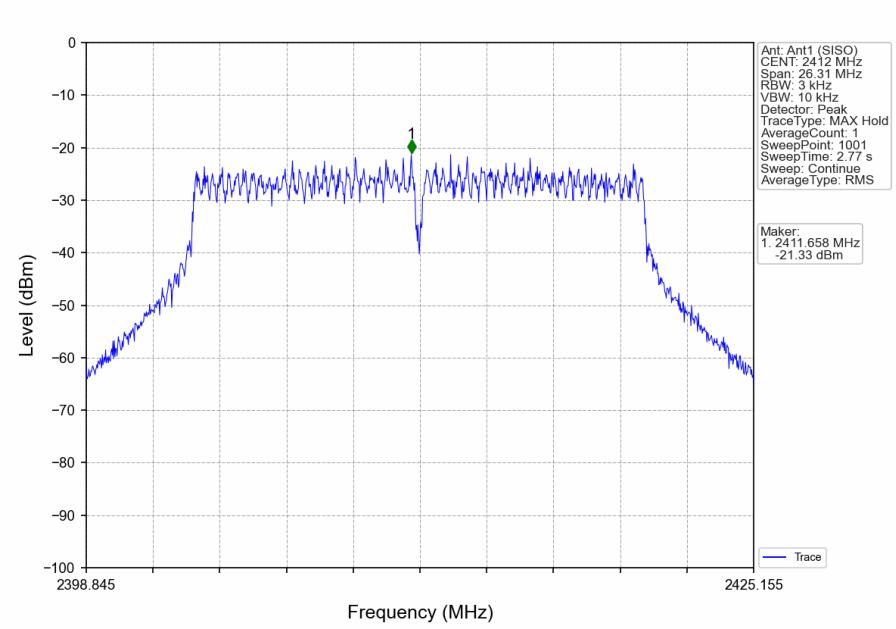
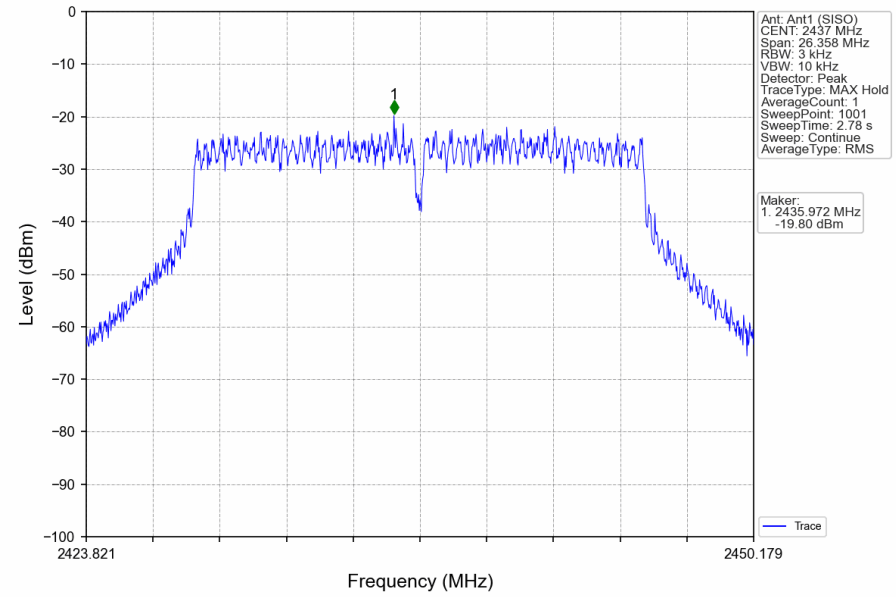
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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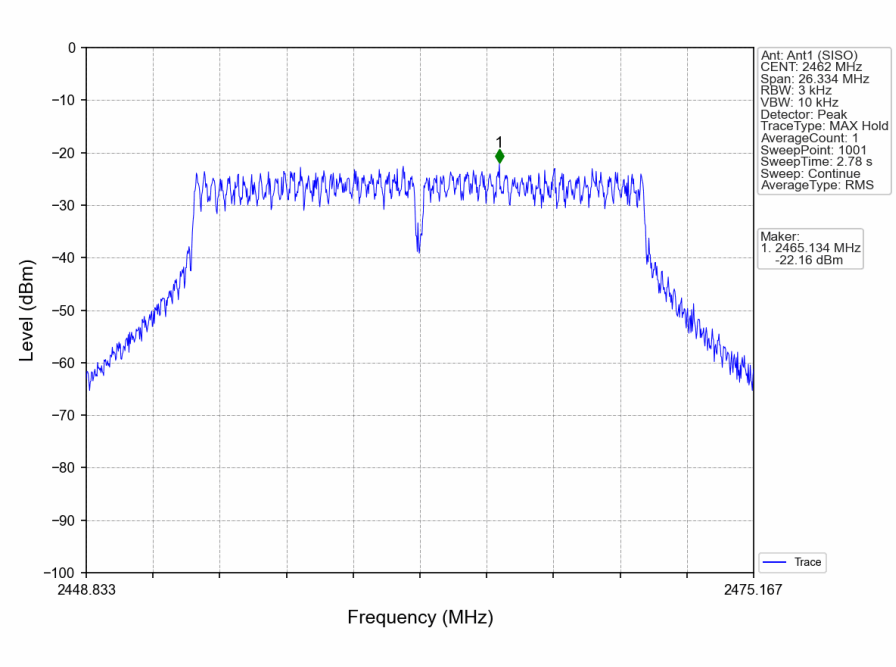
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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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	0.22
		2437	1	0.36
		2462	1	0.11
802.11g	SISO	2412	1	-1.20
		2437	1	-1.36
		2462	1	-6.63
802.11n (HT20)	SISO	2412	1	-7.16
		2437	1	-6.94
		2462	1	-7.15
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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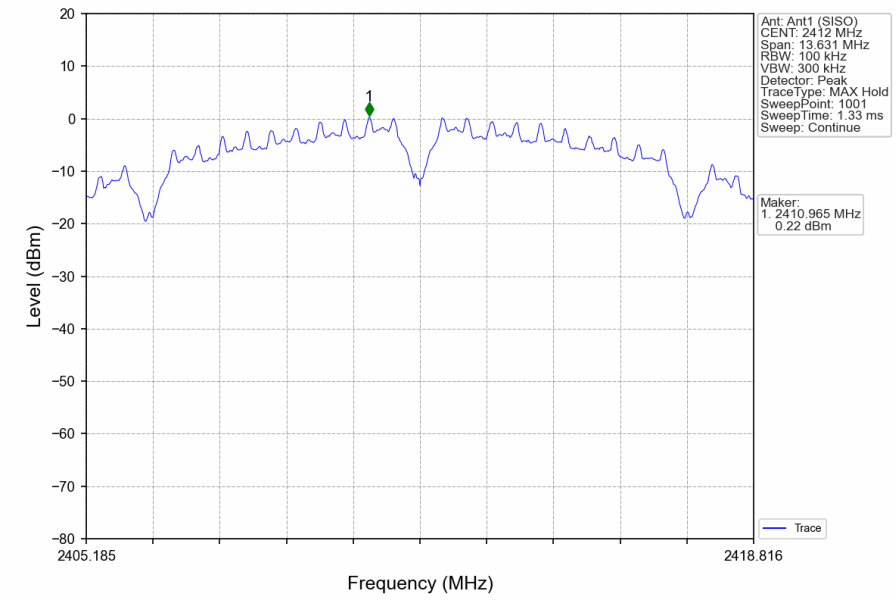
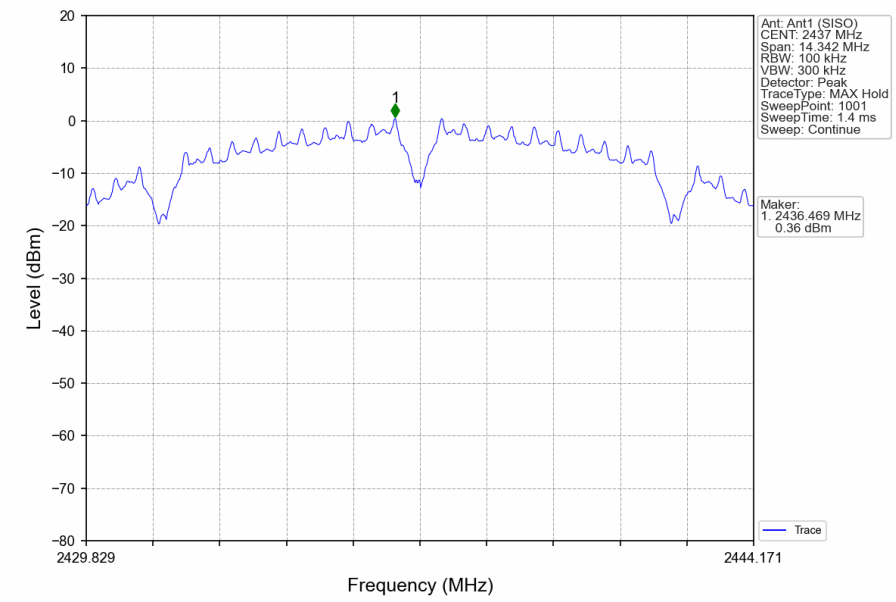
5.1.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



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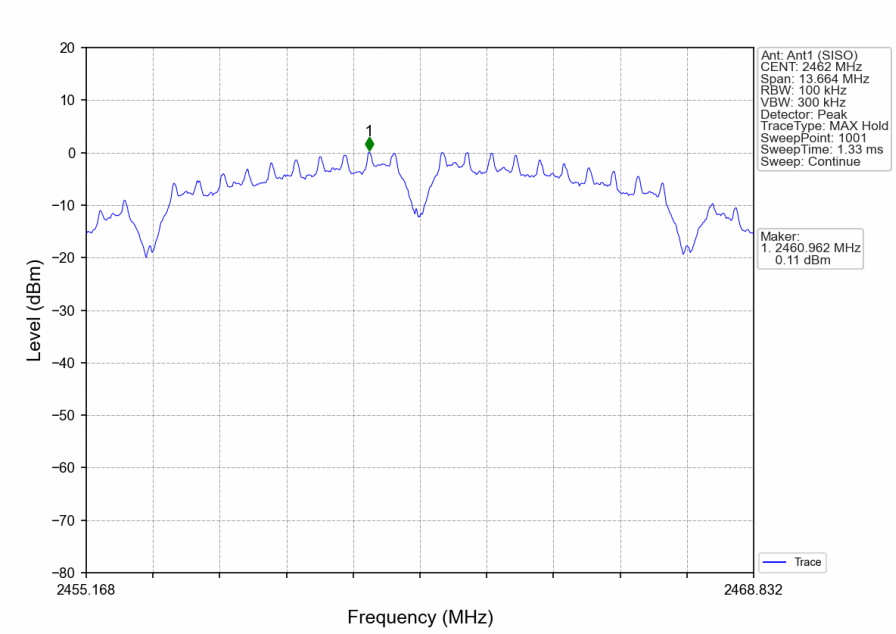
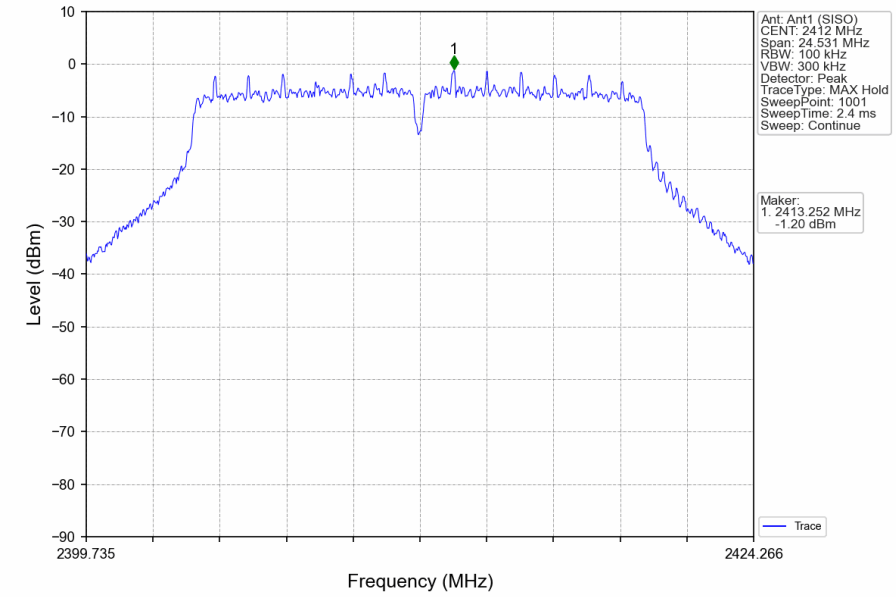
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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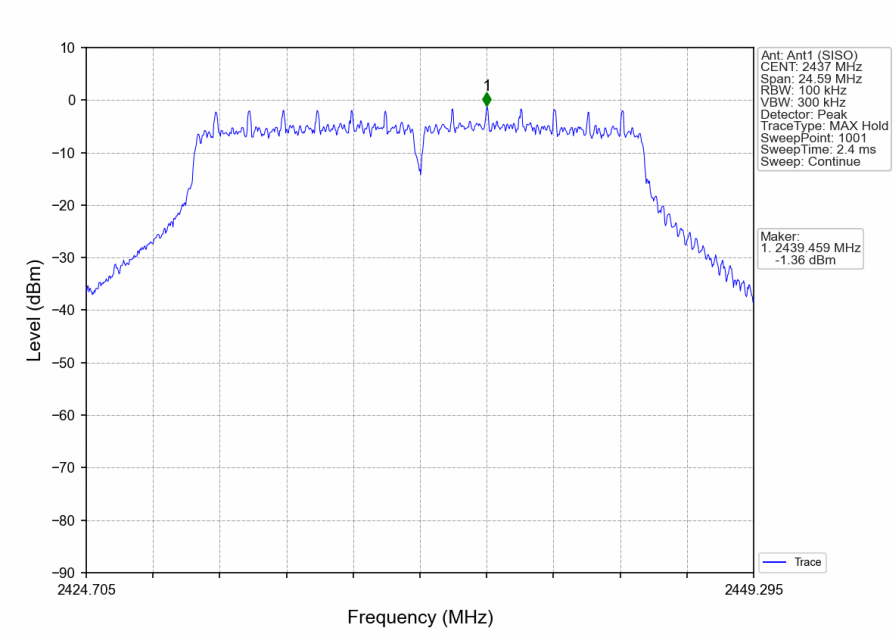
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



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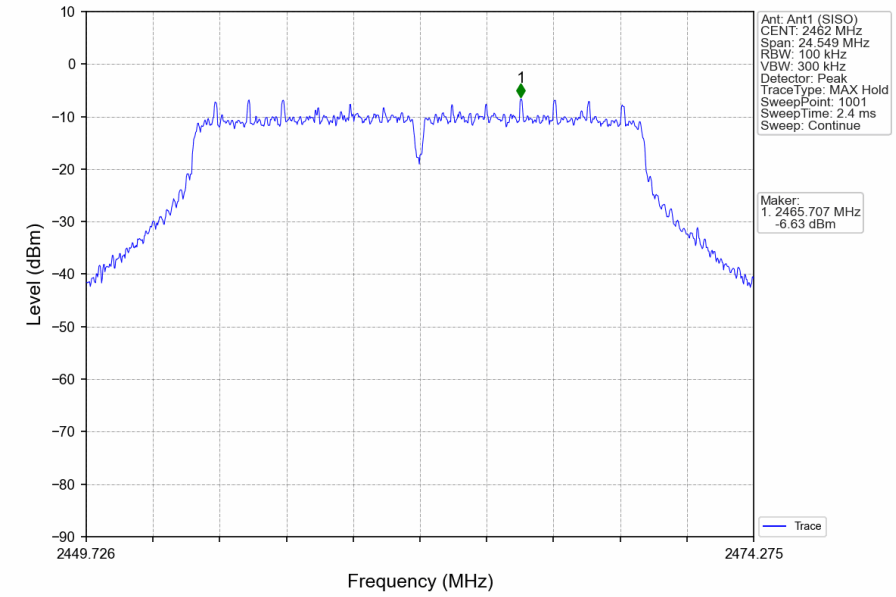

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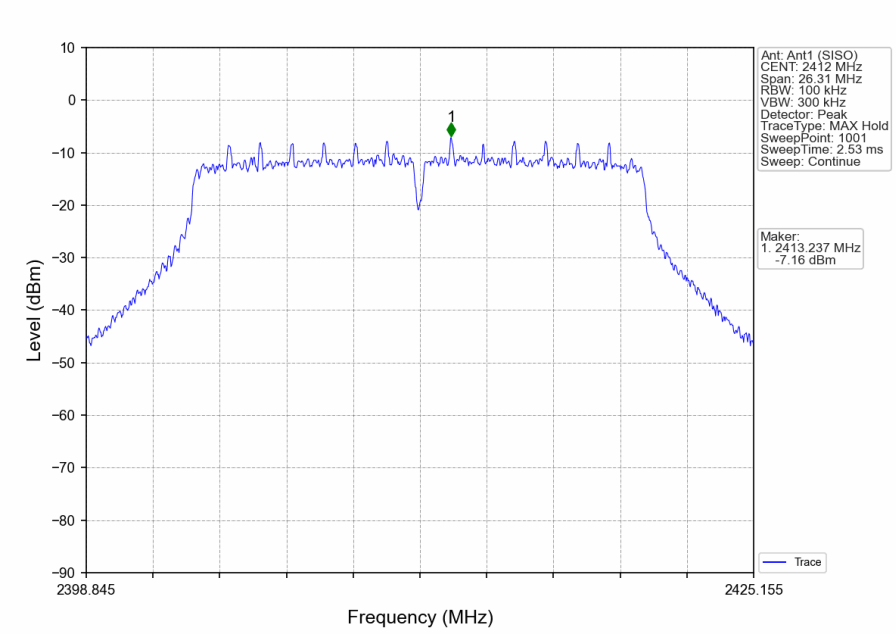
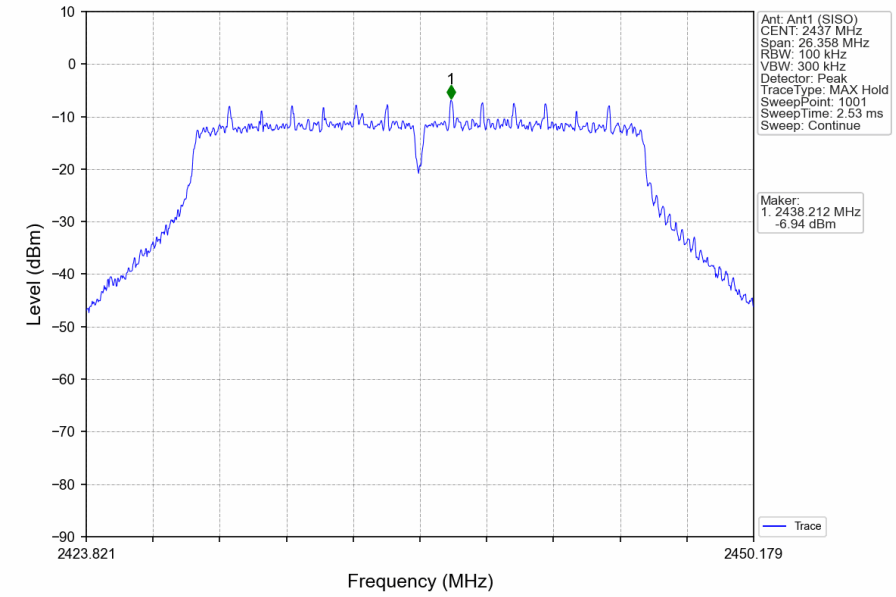
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



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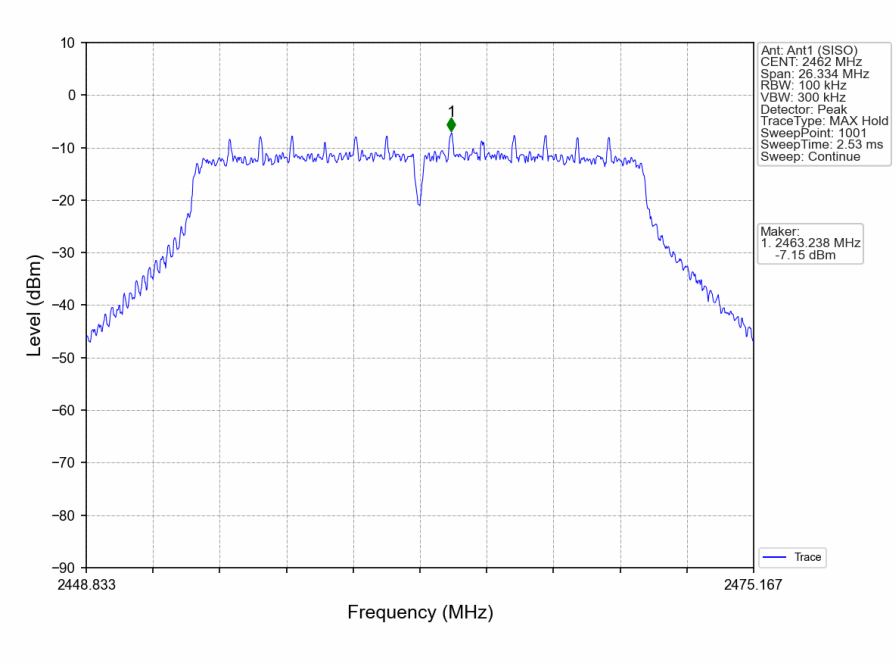
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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5.2 CSE and Band Edges

5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	0.36	-19.64	Pass
		2437	1	0.36	-19.64	Pass
		2462	1	0.36	-19.64	Pass
802.11g	SISO	2412	1	-1.20	-21.20	Pass
		2437	1	-1.20	-21.20	Pass
		2462	1	-1.20	-21.20	Pass
802.11n (HT20)	SISO	2412	1	-6.94	-26.94	Pass
		2437	1	-6.94	-26.94	Pass
		2462	1	-6.94	-26.94	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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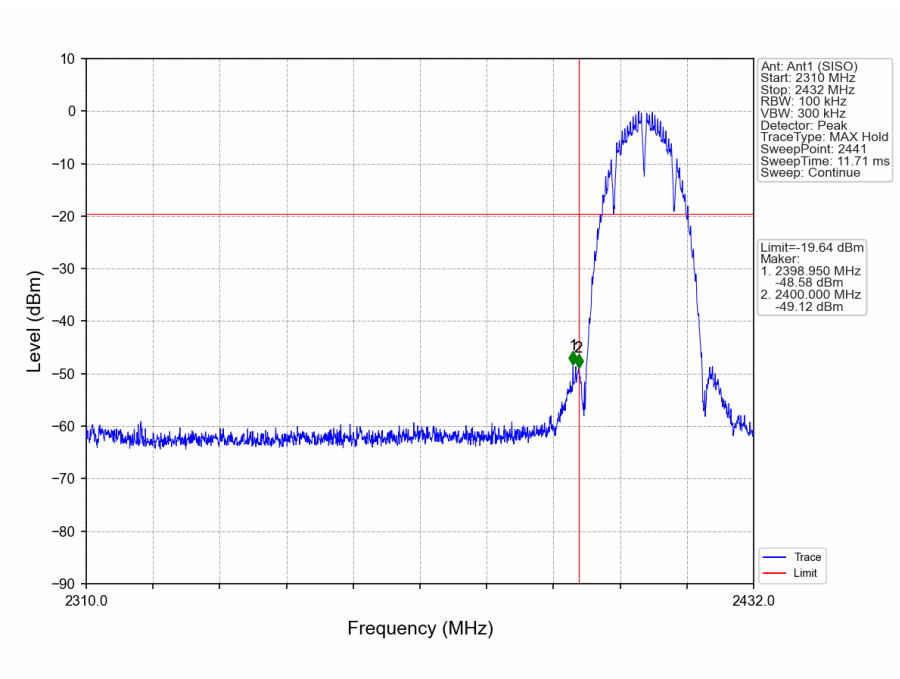
5.2.2 Test Graph

802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



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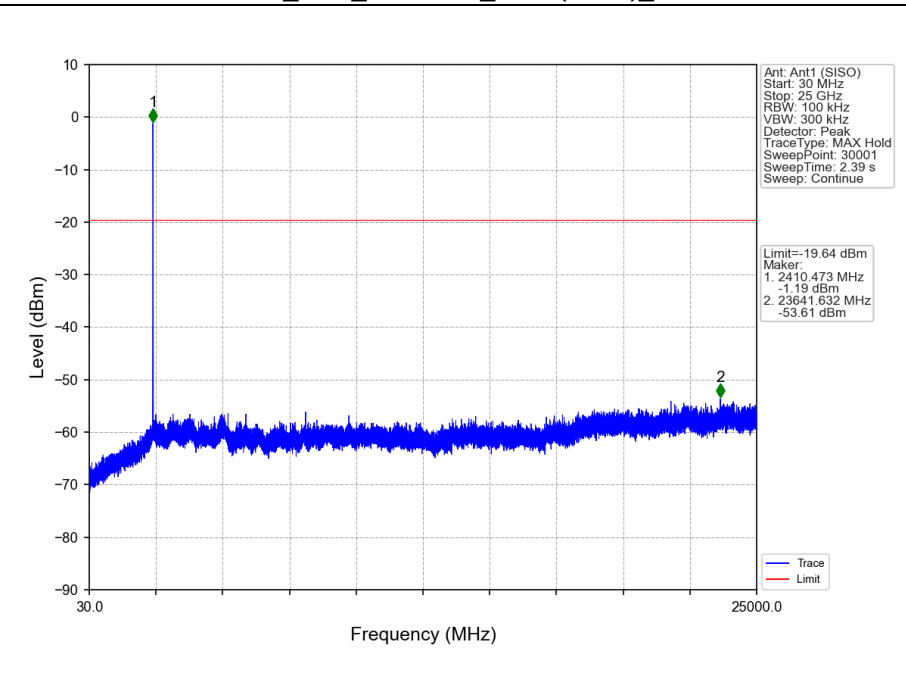

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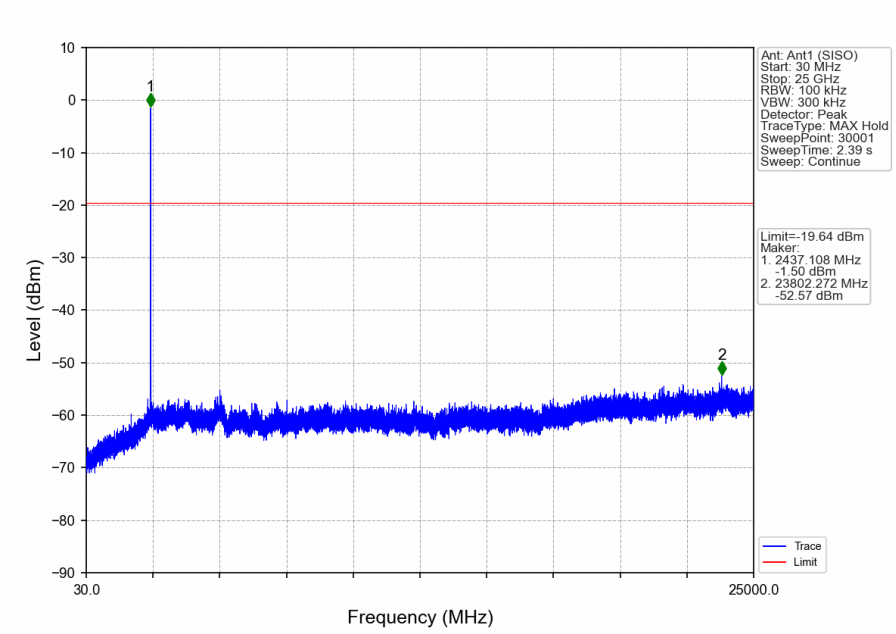

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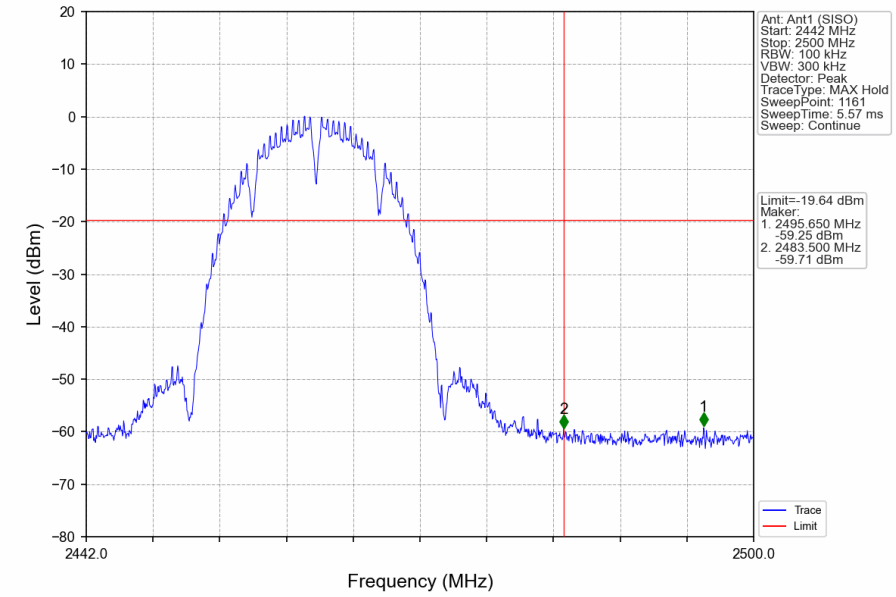

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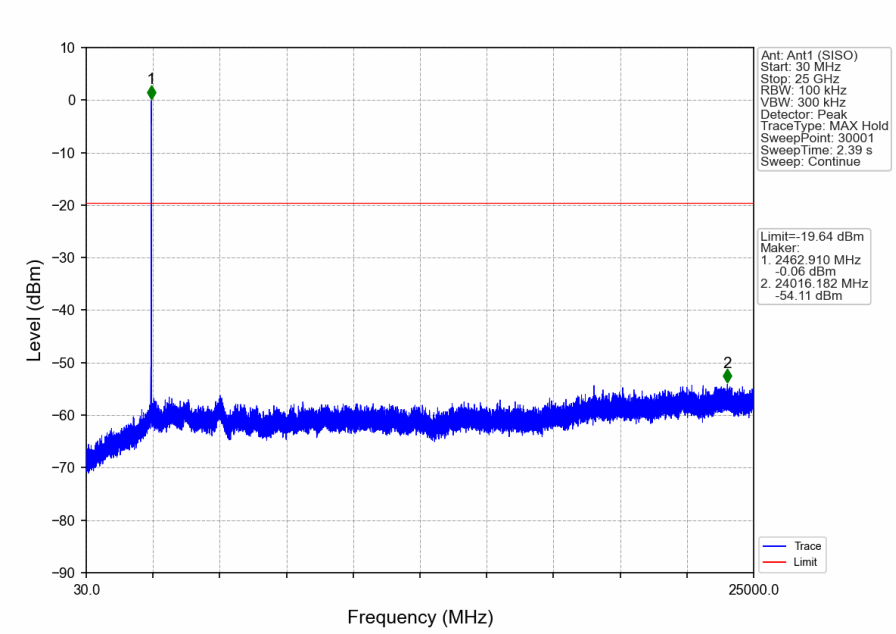
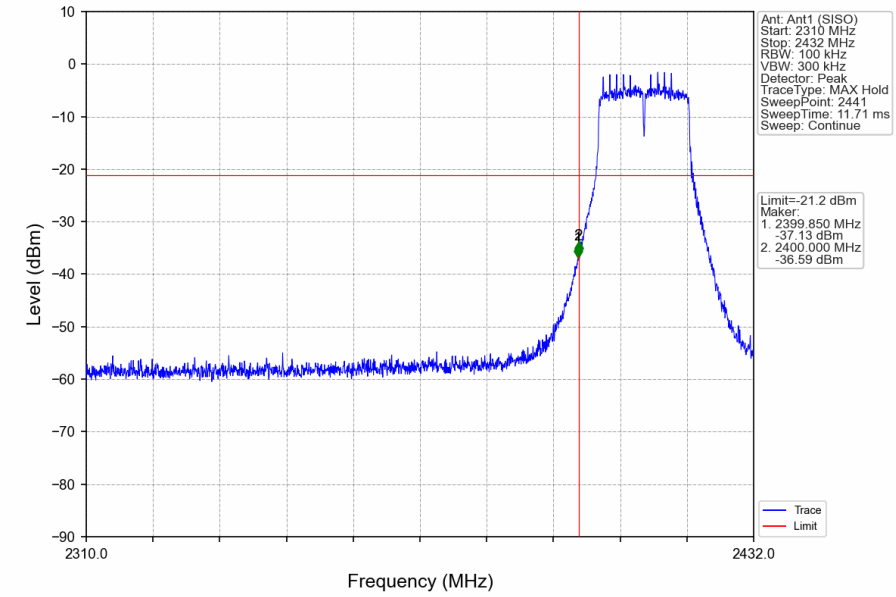


802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



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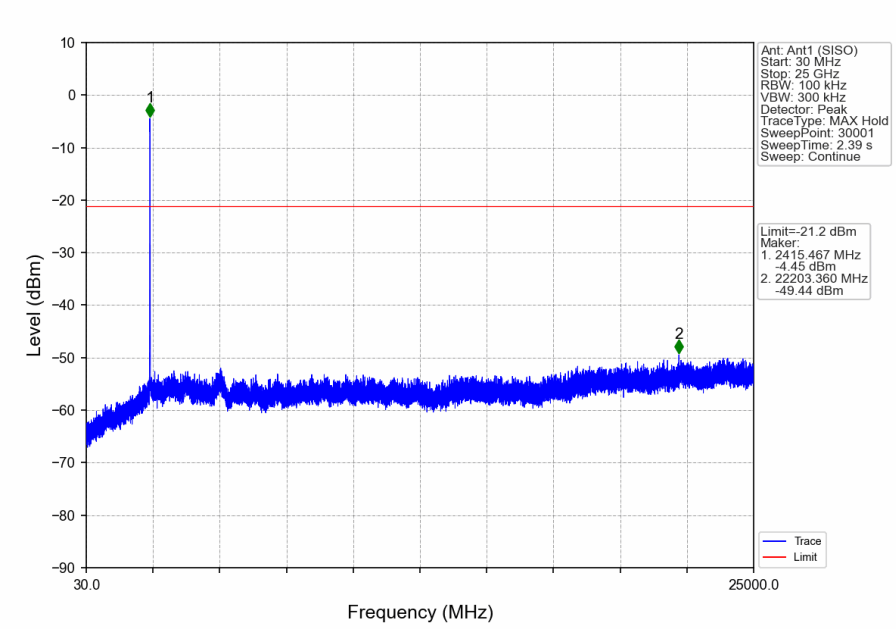

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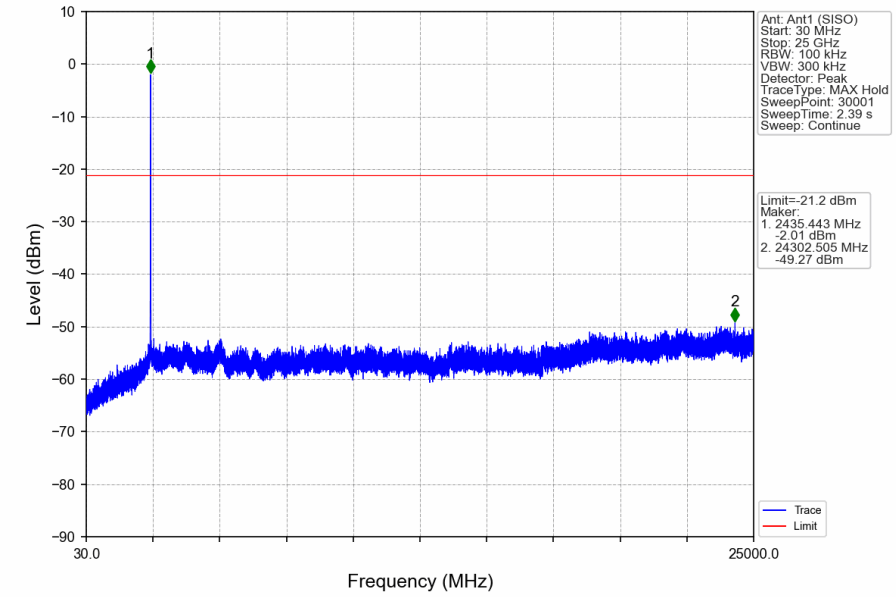

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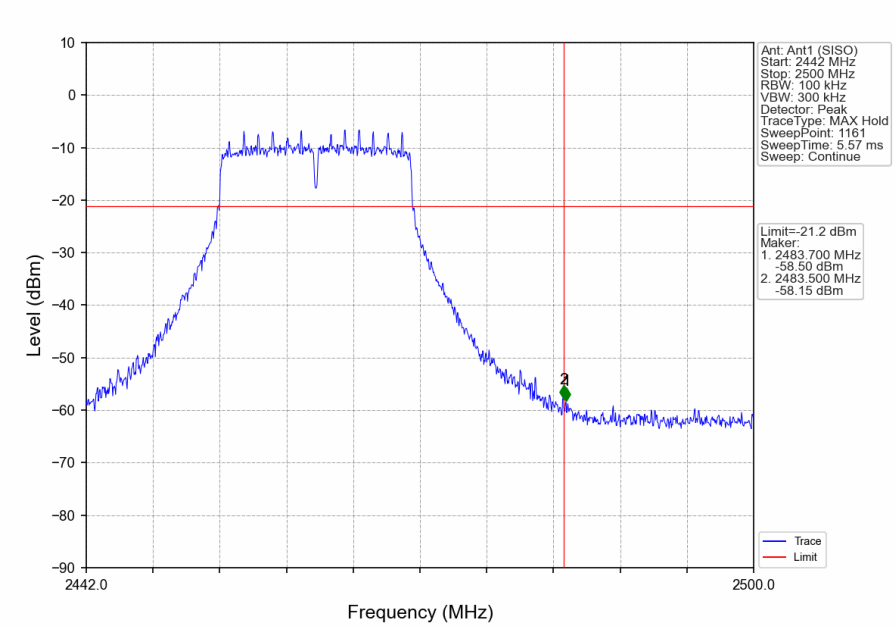

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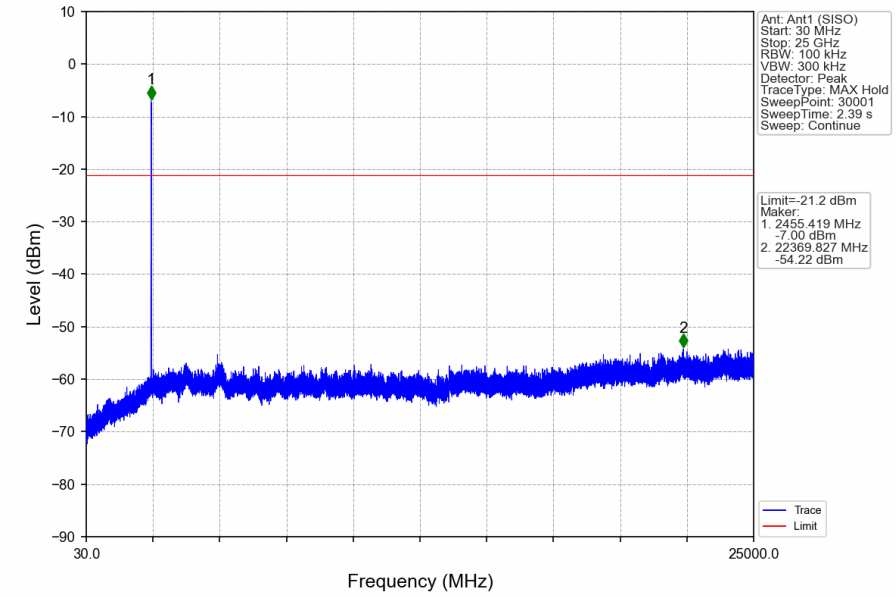

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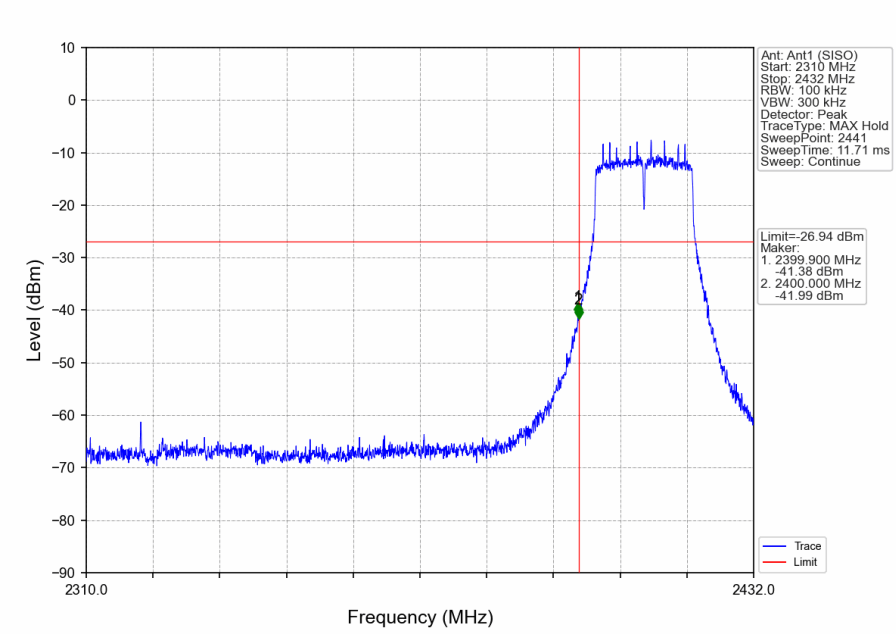
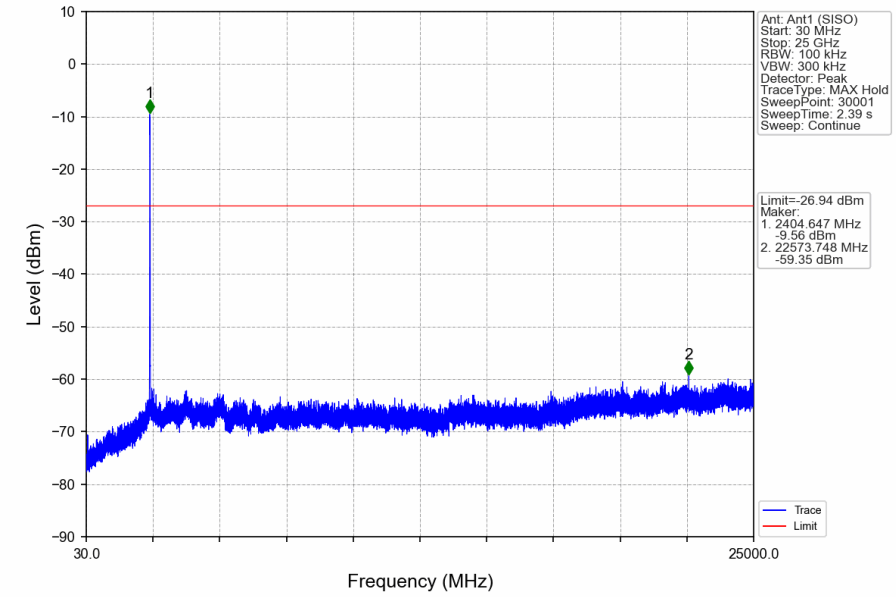


802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



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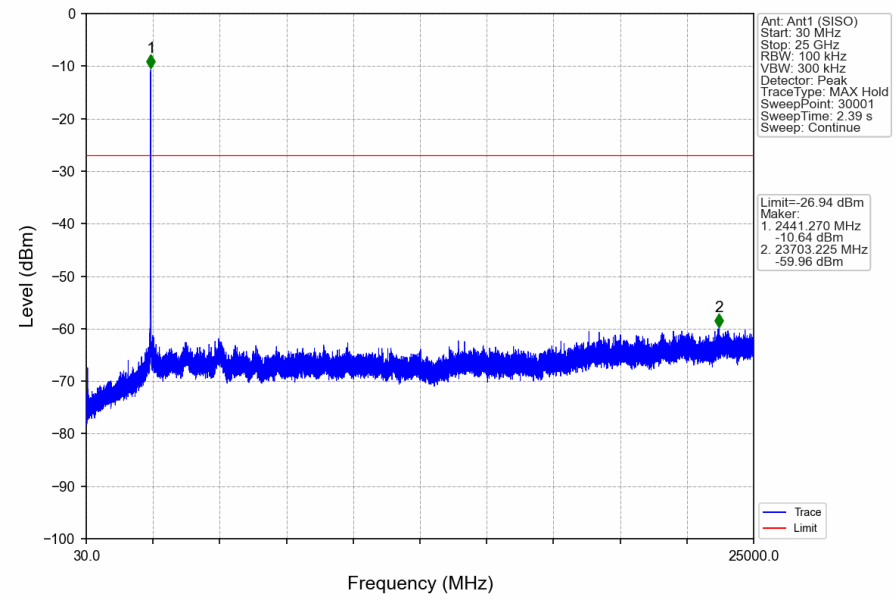
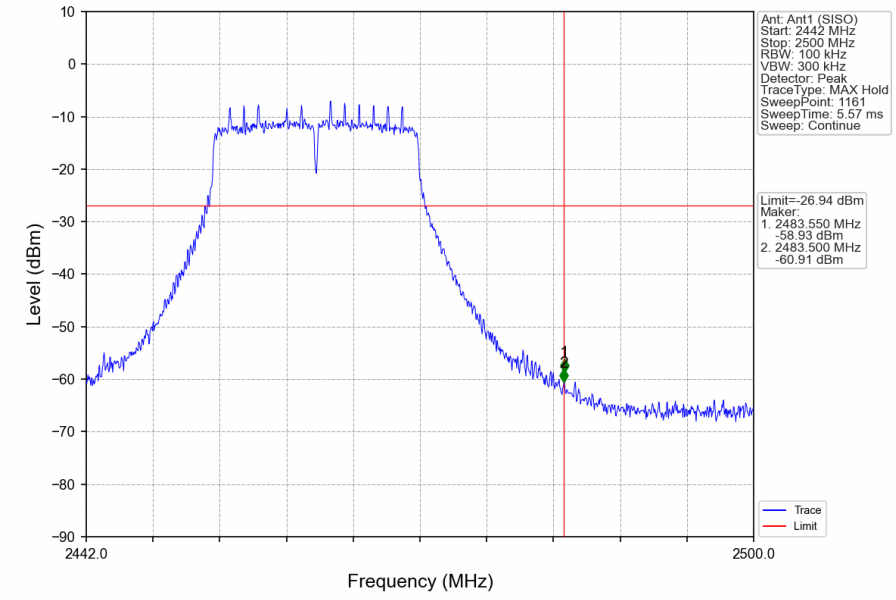
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



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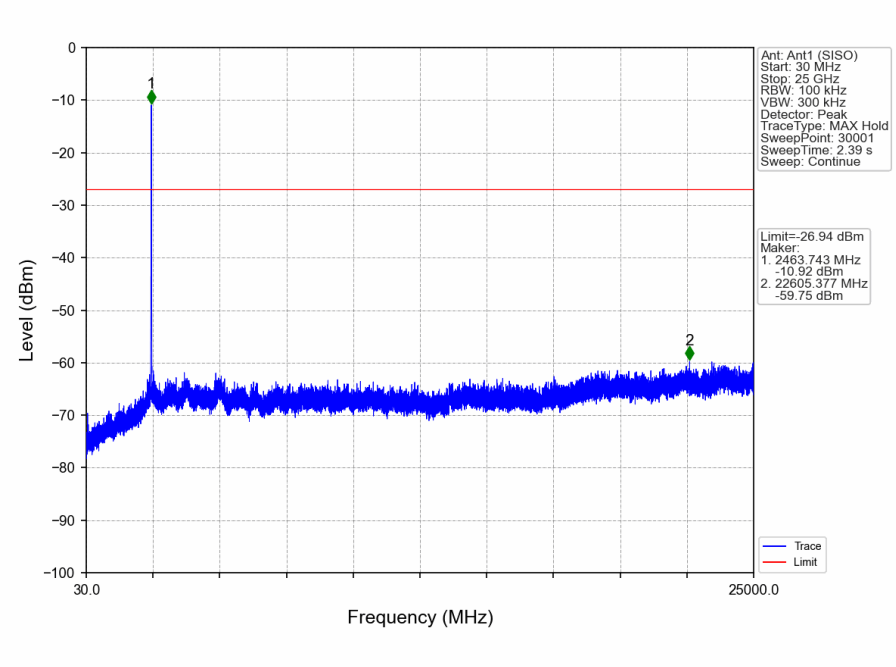
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



- End of the Report -

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