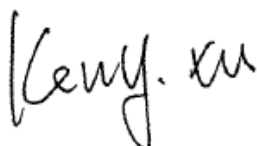


TEST REPORT

Application No.: SZEM2102002038CR
Applicant: Winegard Company
Address of Applicant: 3000 Kirkwood Street, Burlington, Iowa 52601, United States
Manufacturer: Winegard Company
Address of Manufacturer: 3000 Kirkwood Street, Burlington, Iowa 52601, United States
Factory: 1. Aztech Communication Device (DG) Ltd
2. IOT Manufacturing SDN.BHD.
Address of Factory: 1. Jiu Jiang Shui Village, Chang Ping Town, Dong Guan City, Guang Dong Province, China
2. No. 8 & 10, Setia Business Park, Jalan Laman Setia 7/4, Taman Laman Setia, 81550 Gelang Patah, Johor Bahru, Malaysia
Equipment Under Test (EUT):
EUT Name: 1. Gateway PRO
2. WiFi Access Point/Extender with Bridge Mode 2.4/5Ghz
Model No.: WG04, WG02 ♣
♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: Winegard
FCC ID: C3D-AZ1333300
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2021-02-24
Date of Test: 2021-04-07 to 2021-04-28
Date of Issue: 2021-04-29

Test Result:	Pass*
---------------------	--------------

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



Keny Xu
EMC Laboratory Manager



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

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-04-29		Original

Authorized for issue by:				
		Edison Li		
		Edison Li/Project Engineer		
		Eric Fu		
		Eric Fu/Reviewer		

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 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Duty Cycle		KDB 558074 D01 v05r02 section 6	KDB 558074 D01 v05r02 section 6	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 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass



Remark:

Model No.: WG04, WG02

Since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, only the difference as below:

	WG02	WG04
Product Board Configuration Name:	WiFi Access Point/Extender with Bridge Mode 2.4/5Ghz	Gateway PRO
5G 3x3 WiFi	Yes	Yes
2.4G 3x3 WiFi	Yes	Yes
LTE Module	No	Yes
mPCIE Slot	Yes	Yes
MicroSD Slot	No	Yes
Accelerometer and Temp Sensor	No	Yes
GE WAN port	Yes	No
POE Sink	Yes	No
POE Source	No	No
GE LAN port	No	Yes
Spare connectors	No	Yes
Power Analysis MCU	No	Yes
USB Ports	None, 0	Yes, 1 USB A
SIM Card Slot	/	1 through Dual SIM connector
	/	1 through flat flex selectable
Mains Power	Through WAN/PPOE only	12V vehicle power path.

Both models WG04 and WG02 was tested, this report only recorded the worst data.



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4 General Information

4.1 Details of E.U.T. for WG04

Power supply:	DC 12V
Internal source:	More than 108MHz
Type of Modulation:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Channel Number:	802.11b/g/11n(HT20): 11 Channels 802.11n(HT40): 7 Channels
Channels Step:	Channels with 5MHz step
Sample Type:	Fixed devices
Antenna Type:	PCB antenna
Antenna Gain:	Antenna1/Antenna2/Antenna3: 3.2dBi Note: Three antennas can simultaneous transmission.

4.2 Details of E.U.T. for WG02

Power supply:	POE Adapter Model: WM024SP-240-A REV 1MM Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 24V, 1.0A 10/100/1000Mbps
Internal source:	More than 108MHz
Type of Modulation:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Channel Number:	802.11b/g/11n(HT20): 11 Channels 802.11n(HT40): 7 Channels
Channels Step:	Channels with 5MHz step
Sample Type:	Fixed devices
Antenna Type:	PCB antenna
Antenna Gain:	Antenna1/Antenna2/Antenna3: 3.2dBi Note: Three antennas can simultaneous transmission.

4.3 Description of Support Units for WG04

Description	Manufacturer	Model No.	Serial No.
DC power	ZHAOXIN	RXN-305D	REF. No.SEA2700
Network Cable	SGS	N/A	REF. No.SEA1100

4.4 Description of Support Units for WG02

Description	Manufacturer	Model No.	Serial No.
Network Cable	SGS	N/A	REF. No.SEA1100

4.5 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
Conducted Peak Output Power	$\pm 0.75\text{dB}$
Minimum 6dB Bandwidth	$\pm 3\%$
Power Spectrum Density	$\pm 2.84\text{dB}$
Conducted Band Edges Measurement	$\pm 0.75\text{dB}$
Conducted Spurious Emissions	$\pm 0.75\text{dB}$
Radiated Emissions which fall in the restricted bands	$\pm 4.5\text{dB}$ (Below 1GHz); $\pm 4.8\text{dB}$ (Above 1GHz)
Radiated Spurious Emissions	$\pm 4.5\text{dB}$



4.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.7 Test Facility

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

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2019-06-13	2022-06-12
LISN	Rohde & Schwarz	ENV216	SEM007-01	2020-09-23	2021-09-22
LISN	ETS-LINDGREN	3816/2	SEM007-02	2021-03-24	2022-03-23
EMI Test Receiver(9kHz-3GHz)	Rohde & Schwarz	ESCI	SEM004-02	2021-03-24	2022-03-23
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2020-07-10	2021-07-09
Power Sensor	KEYSIGHT	U2021XA	SEM009-16	2021-03-24	2022-03-23

RF Conducted Test					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2021-03-23	2022-03-22
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-17	2020-04-10 2021-04-08	2021-04-09 2022-04-07
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2020-04-10 2021-04-08	2021-04-09 2022-04-07

Radiated Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2020-11-02	2021-11-01
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2021-03-24	2022-03-23
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09



Radiated Spurious Emissions (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2021-03-26	2024-03-25
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2021-02-01	2022-01-31
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
				2021-04-11	2024-04-10
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021-03-24	2022-03-23

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2021-03-26	2024-03-25
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2021-02-01	2022-01-31
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
				2021-04-11	2024-04-10
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021-03-24	2022-03-23



General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2020-09-15	2021-09-14
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2020-09-15	2021-09-14
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2021-03-30	2022-03-29



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 connector is a IPEX type that comply with Part15.203, the best case gain of the antenna1/antenna2/antenna3 is 3.2dBi.

Antenna location: Refer to Internal photos.



7 Radio Spectrum Matter Test Results

7.1 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

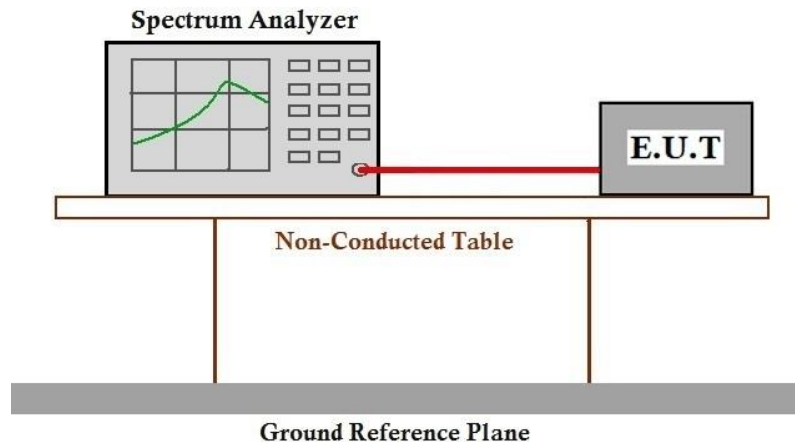
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 40.0 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

Please Refer To Appendix For Details

7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ 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: 25.5 °C

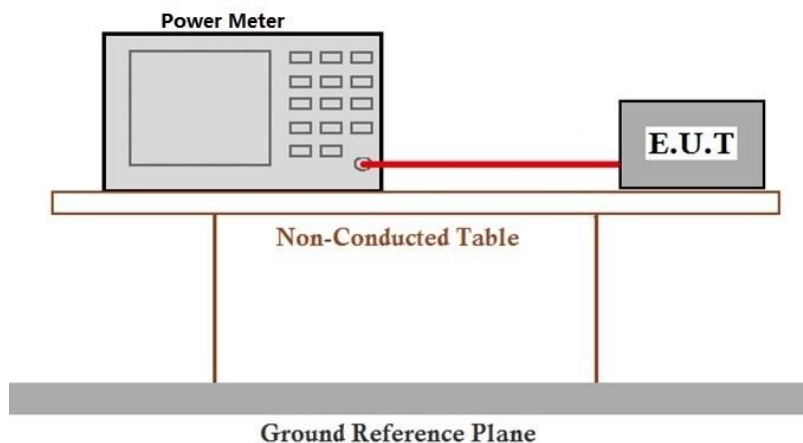
Humidity: 40.0 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer To Appendix For Details



7.3 Duty Cycle

Test Requirement KDB 558074 D01 v05r02 section 6
Test Method: KDB 558074 D01 v05r02 section 6

7.3.1 E.U.T. Operation

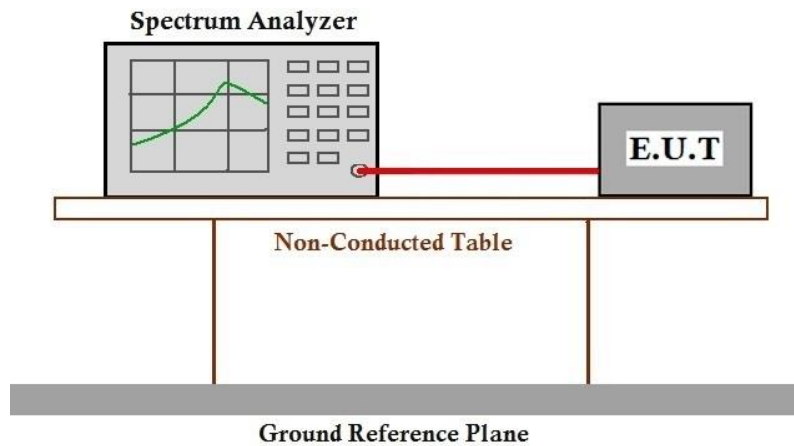
Operating Environment:

Temperature: 25.5 °C Humidity: 40.0 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer To Appendix For Details

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

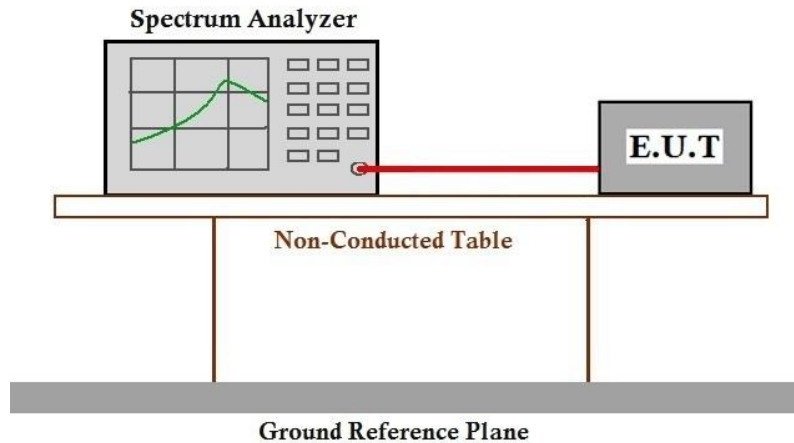
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 40.0 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer To Appendix For Details



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)).

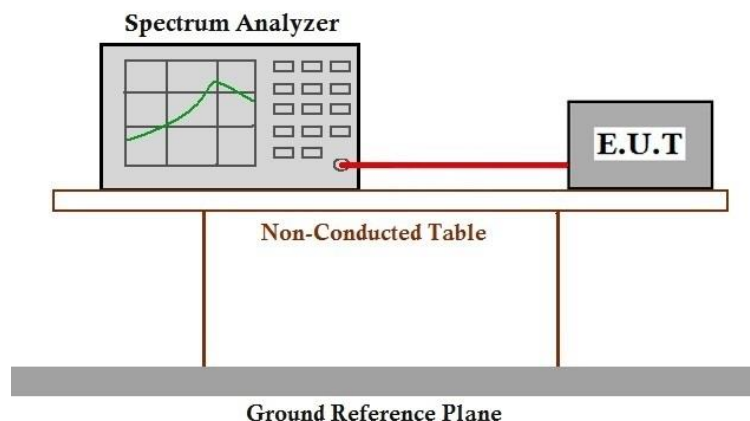
7.5.1 E.U.T. Operation

Operating Environment:			
Temperature:	25.5 °C	Humidity:	40.0 % RH
		Atmospheric Pressure:	1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer To Appendix For Details



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)).

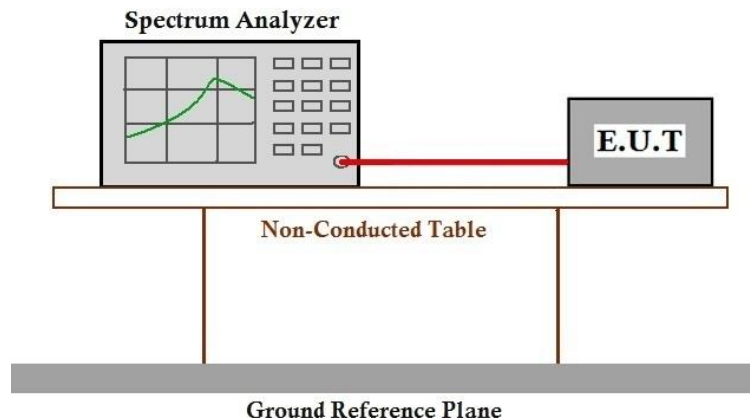
7.6.1 E.U.T. Operation

Operating Environment:					
Temperature:	25.5 °C	Humidity:	40.0 % RH	Atmospheric Pressure:	1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer To Appendix For Details



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

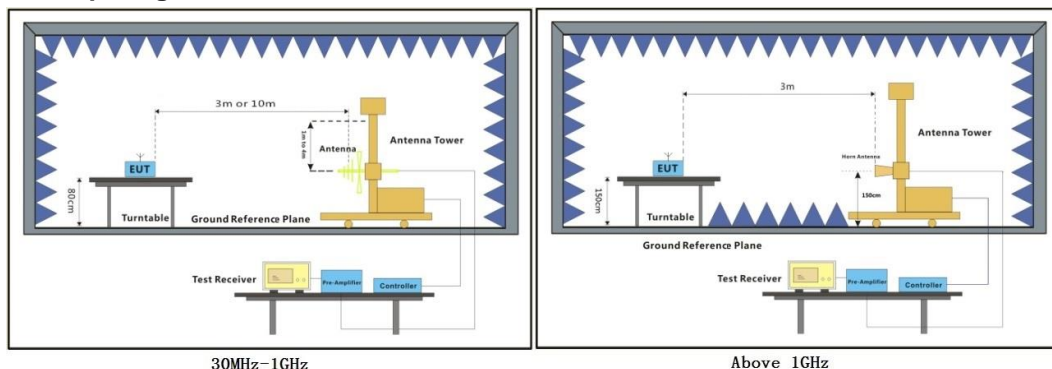
Operating Environment:

Temperature: 23.5 °C Humidity: 56.3 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



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

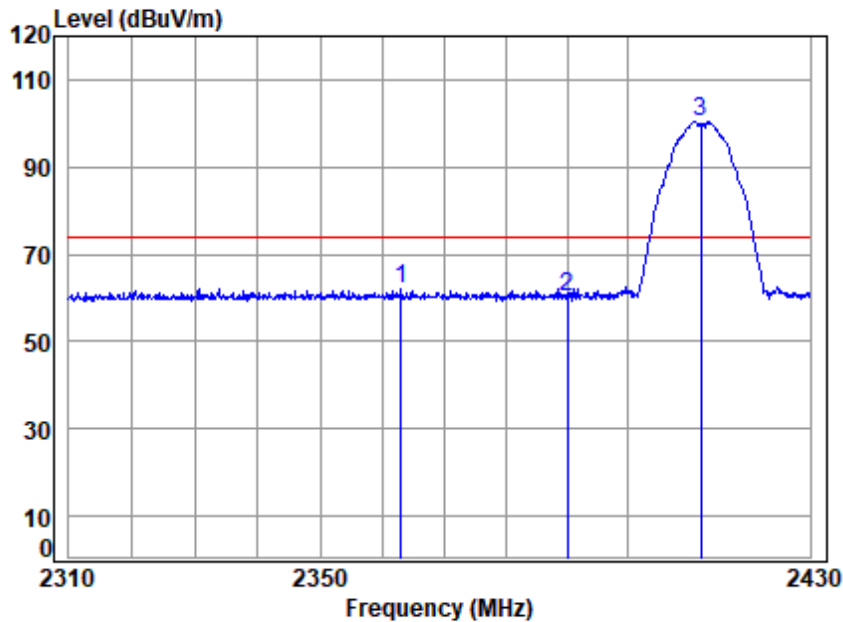
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level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

Remark 3: Pretest the EUT at antenna1, antenna2 and antenna3, found the antenna 1 which is worst case for 802.11b/g mode; Pretest the EUT at antenna1, antenna2, antenna3 and MIMO mode, found the MIMO mode which is worst case for 802.11n mode; So, Only the worst test data is recorded in the report.



Test data for WG04

Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

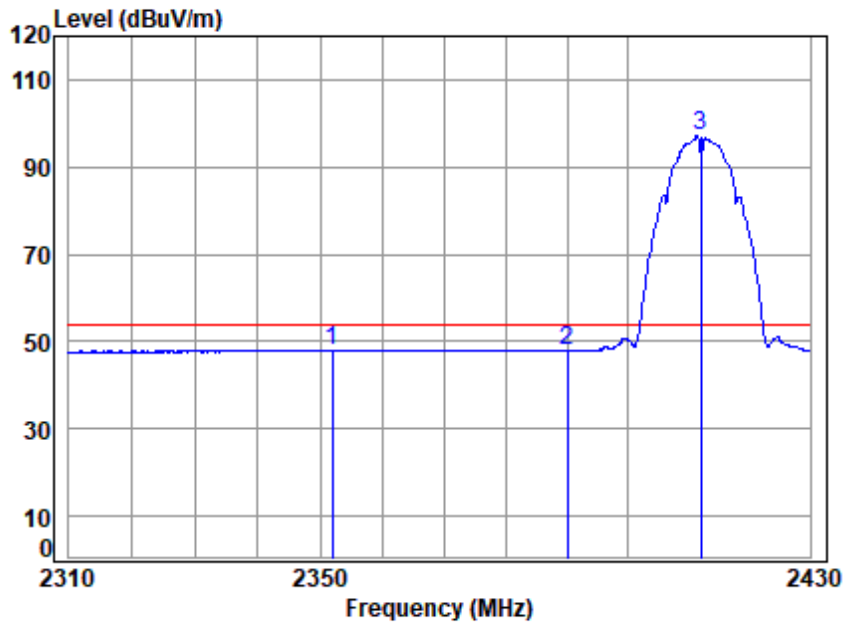


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2363.009	4.30	28.47	40.41	69.79	62.15	74.00	-11.85 peak
2 2390.000	4.34	28.52	40.42	67.93	60.37	74.00	-13.63 peak
3 * 2412.000	4.38	28.56	40.43	107.79	100.30	74.00	26.30 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

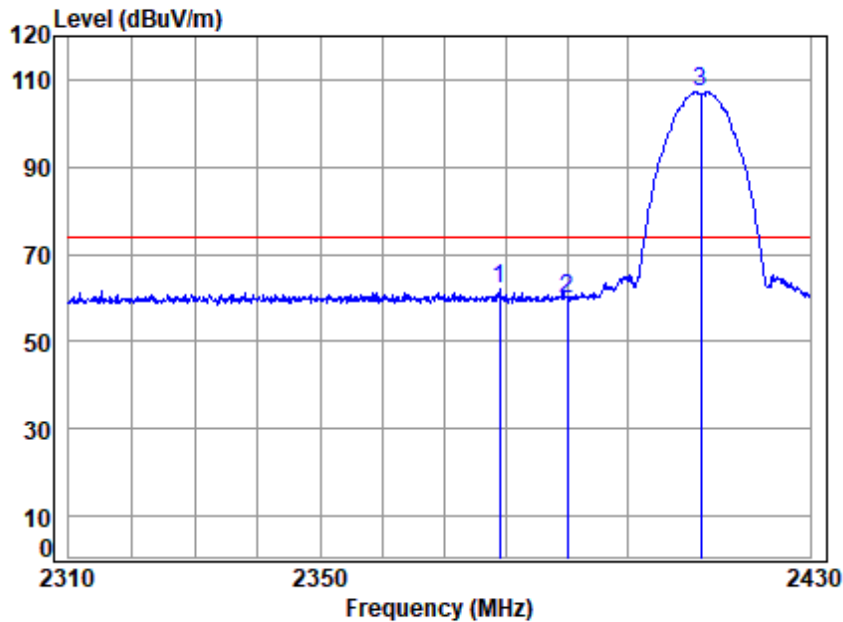


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2352.025	4.28	28.45	40.40	55.75	48.08	54.00	-5.92 Average
2 2390.000	4.34	28.52	40.42	55.48	47.92	54.00	-6.08 Average
3 * 2412.000	4.38	28.56	40.43	104.58	97.09	54.00	43.09 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

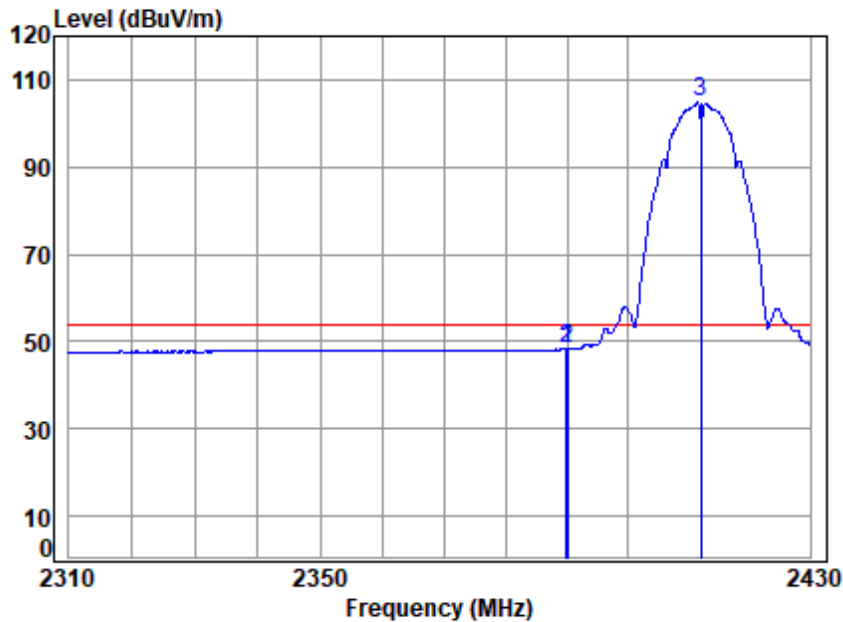


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2378.979	4.33	28.50	40.41	69.80	62.22	74.00	-11.78 Peak
2	2390.000	4.34	28.52	40.42	67.14	59.58	74.00	-14.42 Peak
3 *	2412.000	4.38	28.56	40.43	114.85	107.36	74.00	33.36 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

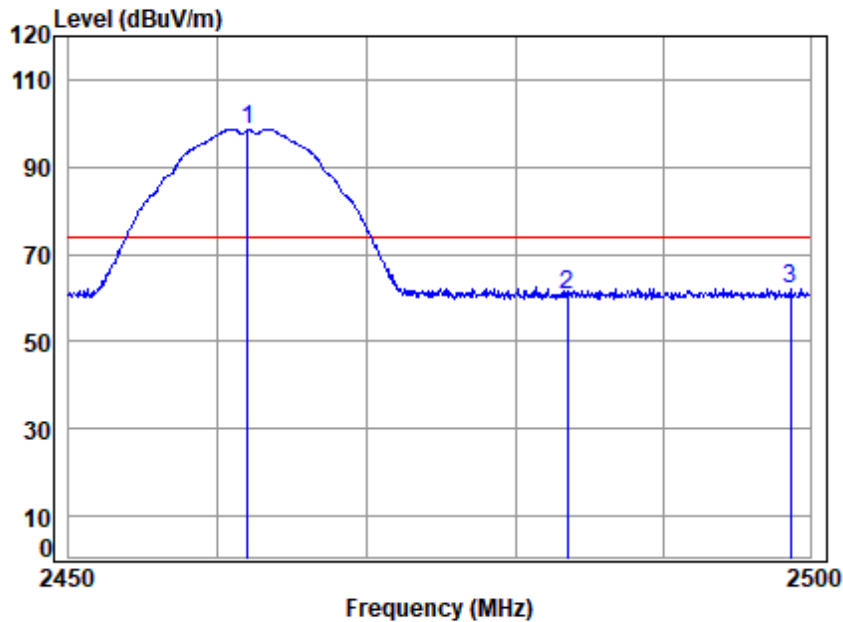


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.847	4.34	28.52	40.42	56.04	48.48	54.00	-5.52 Average
2	2390.000	4.34	28.52	40.42	56.00	48.44	54.00	-5.56 Average
3 *	2412.000	4.38	28.56	40.43	112.21	104.72	54.00	50.72 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High

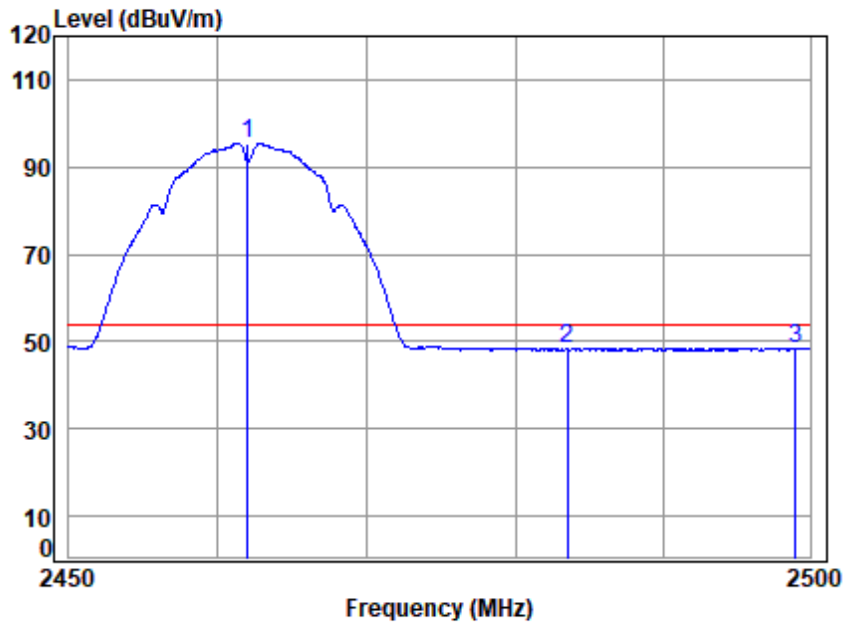


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	105.94	98.58	74.00	24.58 peak
2 2483.500	4.49	28.67	40.47	68.14	60.83	74.00	-13.17 peak
3 2498.687	4.52	28.70	40.47	69.48	62.23	74.00	-11.77 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High

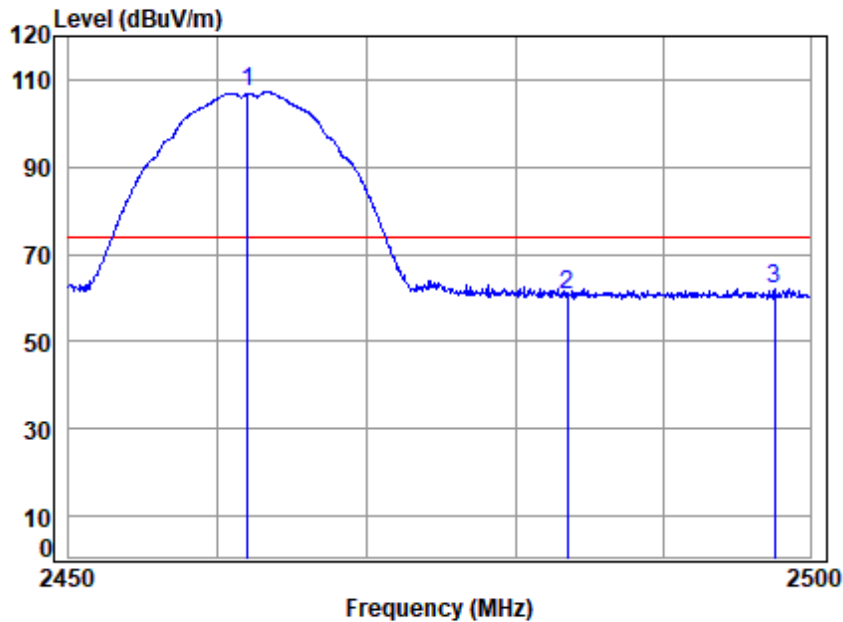


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	102.84	95.48	54.00	41.48 Average
2 2483.500	4.49	28.67	40.47	55.47	48.16	54.00	-5.84 Average
3 2499.041	4.52	28.70	40.47	55.57	48.32	54.00	-5.68 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High

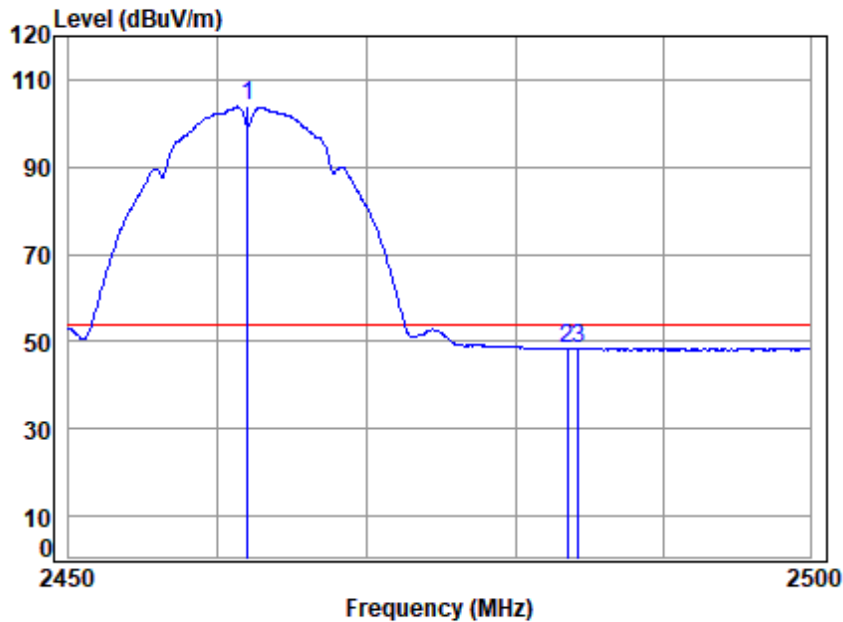


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	114.45	107.09	74.00	33.09 Peak
2 2483.500	4.49	28.67	40.47	68.20	60.89	74.00	-13.11 Peak
3 2497.577	4.52	28.70	40.47	69.42	62.17	74.00	-11.83 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High

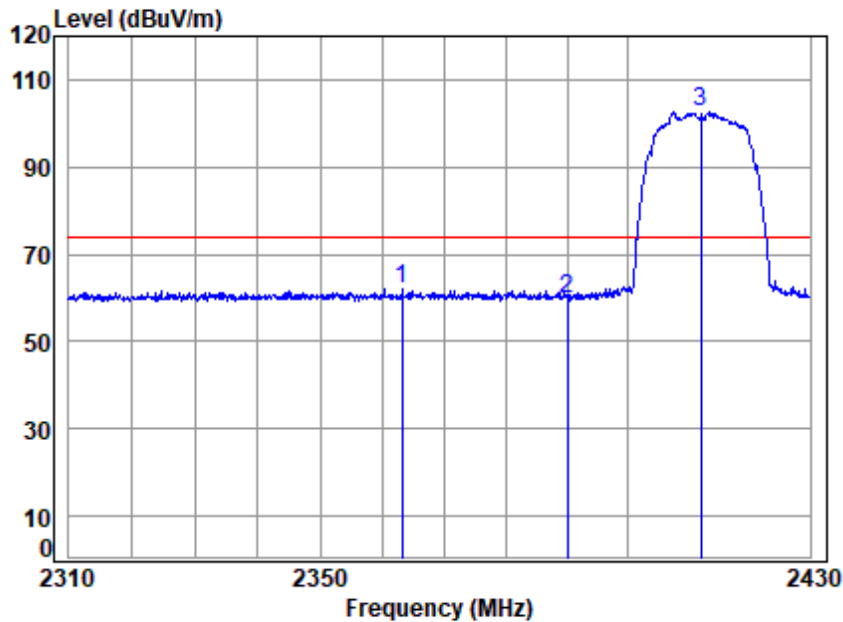


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	111.19	103.83	54.00	49.83 Average
2 2483.500	4.49	28.67	40.47	55.55	48.24	54.00	-5.76 Average
3 2484.241	4.50	28.67	40.47	55.67	48.37	54.00	-5.63 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low

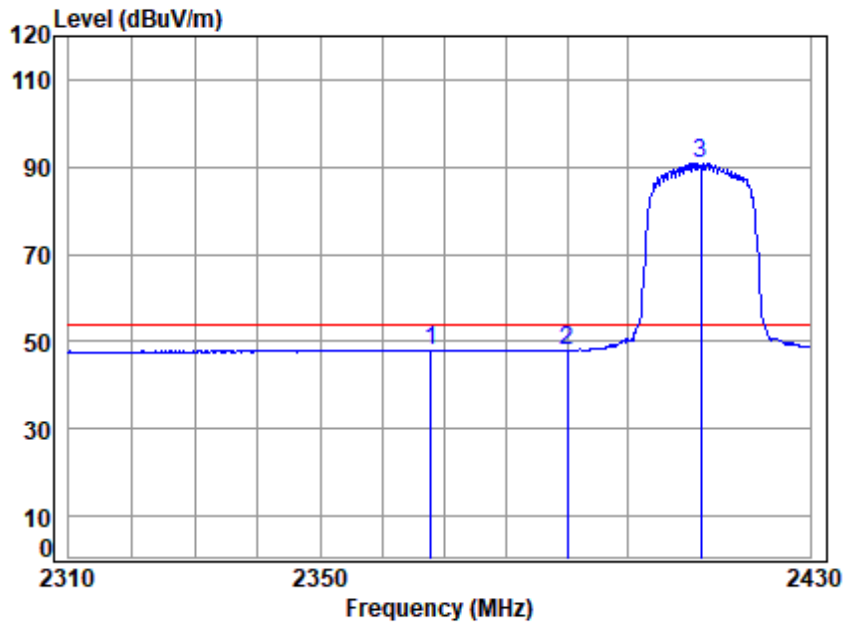


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2363.129	4.30	28.47	40.41	69.85	62.21	74.00	-11.79 peak
2 2390.000	4.34	28.52	40.42	67.52	59.96	74.00	-14.04 peak
3 * 2412.000	4.38	28.56	40.43	110.06	102.57	74.00	28.57 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low

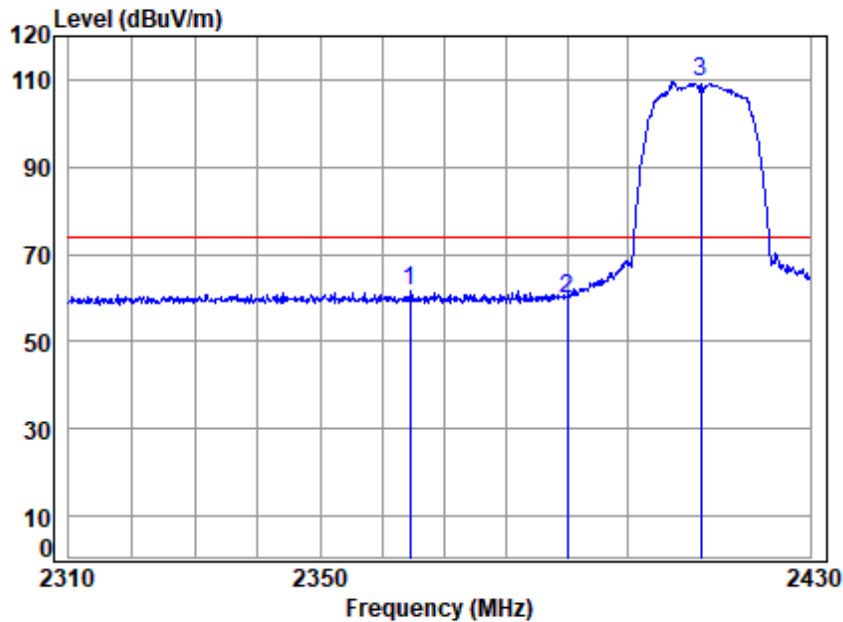


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2367.921	4.31	28.48	40.41	55.63	48.01	54.00	-5.99 Average
2	2390.000	4.34	28.52	40.42	55.43	47.87	54.00	-6.13 Average
3 *	2412.000	4.38	28.56	40.43	98.51	91.02	54.00	37.02 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low

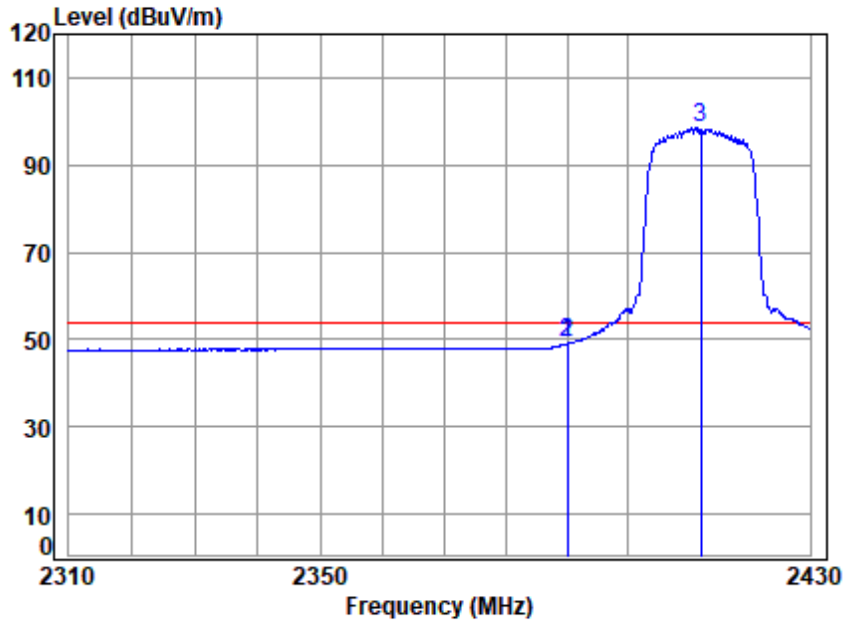


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2364.446	4.30	28.48	40.41	69.18	61.55	74.00	-12.45 Peak
2 2390.000	4.34	28.52	40.42	67.46	59.90	74.00	-14.10 Peak
3 * 2412.000	4.38	28.56	40.43	117.18	109.69	74.00	35.69 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low

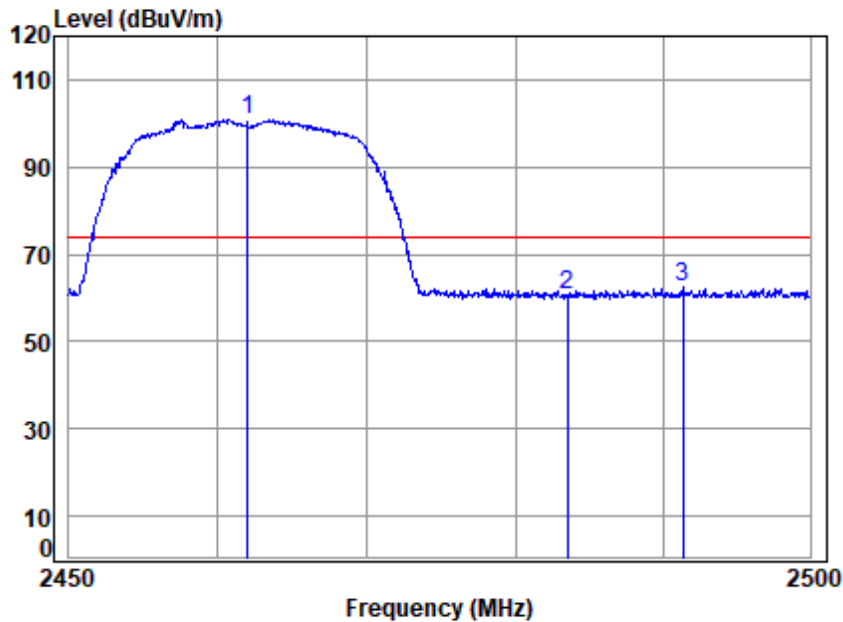


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.968	4.34	28.52	40.42	56.65	49.09	54.00	-4.91 Average
2	2390.000	4.34	28.52	40.42	56.65	49.09	54.00	-4.91 Average
3 *	2412.000	4.38	28.56	40.43	105.87	98.38	54.00	44.38 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	108.33	100.97	74.00	26.97 peak
2 2483.500	4.49	28.67	40.47	67.84	60.53	74.00	-13.47 peak
3 2491.328	4.51	28.69	40.47	69.55	62.28	74.00	-11.72 peak

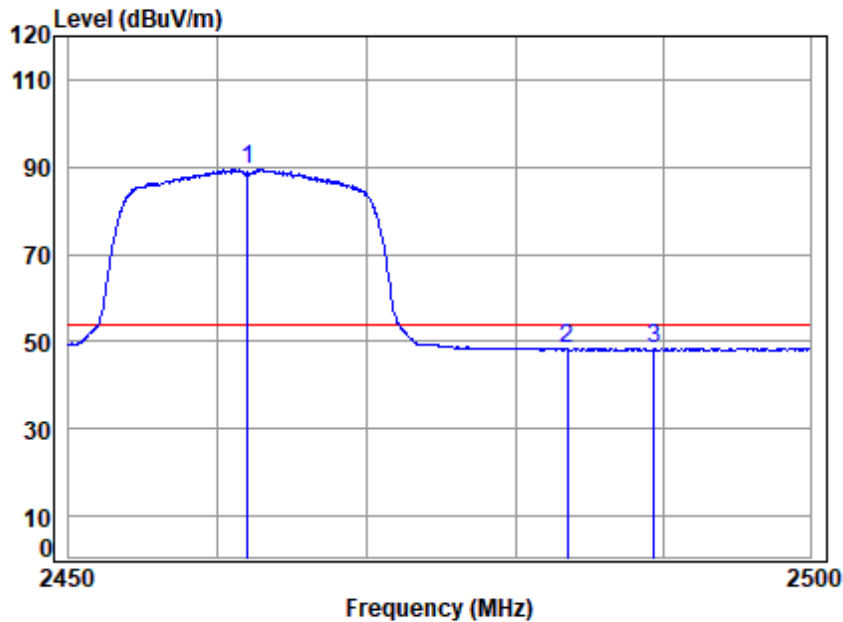


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Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High

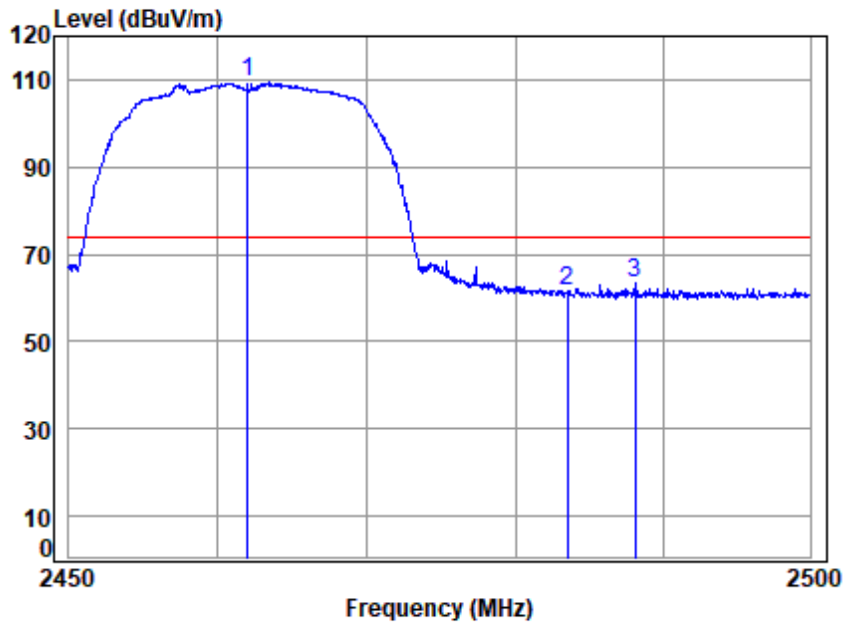


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	96.84	89.48	54.00	35.48 Average
2 2483.500	4.49	28.67	40.47	55.50	48.19	54.00	-5.81 Average
3 2489.366	4.50	28.68	40.47	55.56	48.27	54.00	-5.73 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High

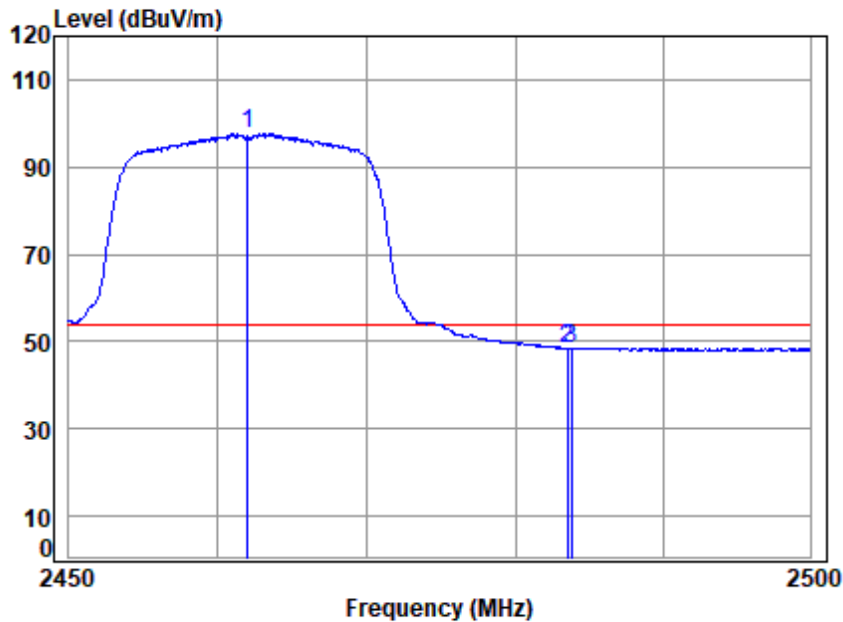


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	116.77	109.41	74.00	35.41 Peak
2 2483.500	4.49	28.67	40.47	68.77	61.46	74.00	-12.54 Peak
3 2488.109	4.50	28.68	40.47	70.74	63.45	74.00	-10.55 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High

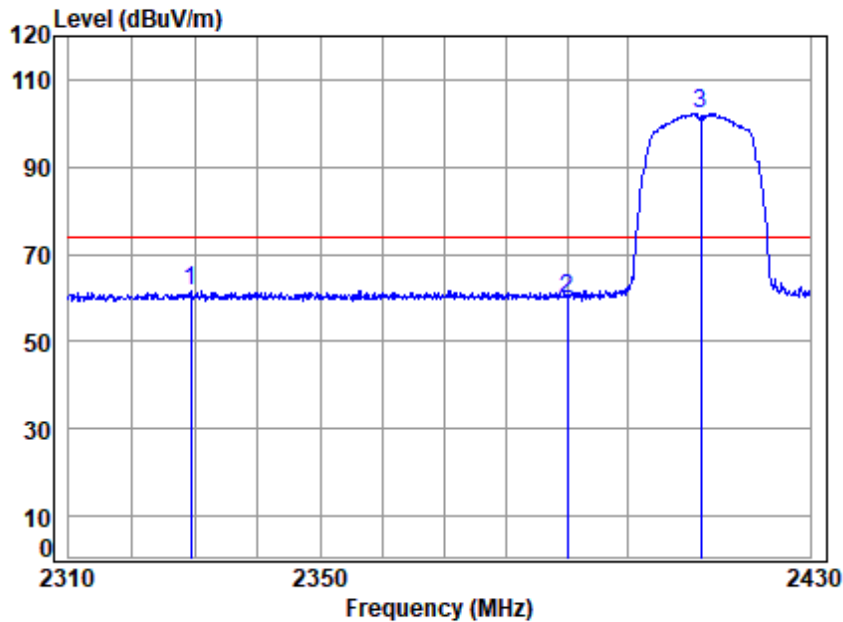


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	104.98	97.62	54.00	43.62 Average
2 2483.500	4.49	28.67	40.47	55.81	48.50	54.00	-5.50 Average
3 2483.790	4.49	28.67	40.47	55.83	48.52	54.00	-5.48 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low

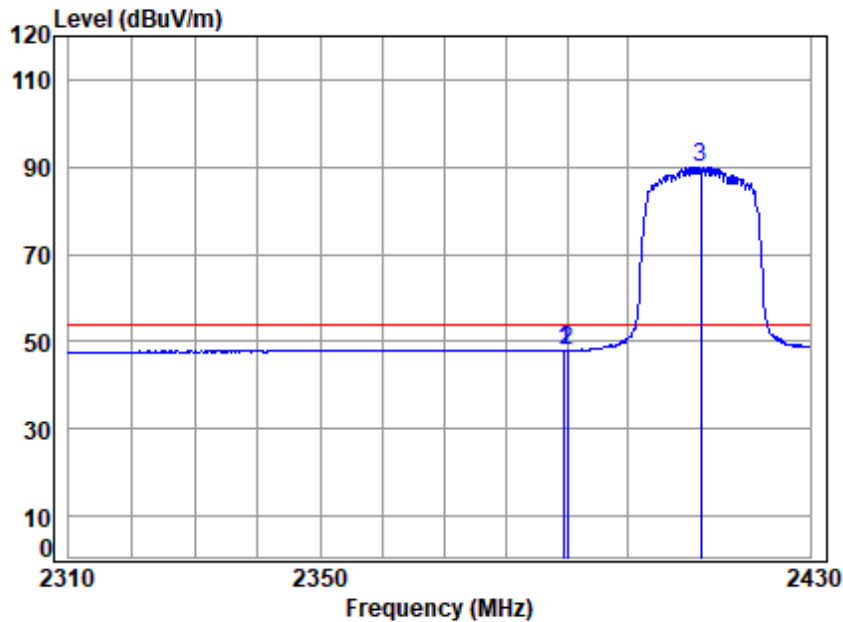


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2329.384	4.24	28.41	40.39	69.42	61.68	74.00	-12.32 peak
2 2390.000	4.34	28.52	40.42	67.55	59.99	74.00	-14.01 peak
3 * 2412.000	4.38	28.56	40.43	109.87	102.38	74.00	28.38 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low

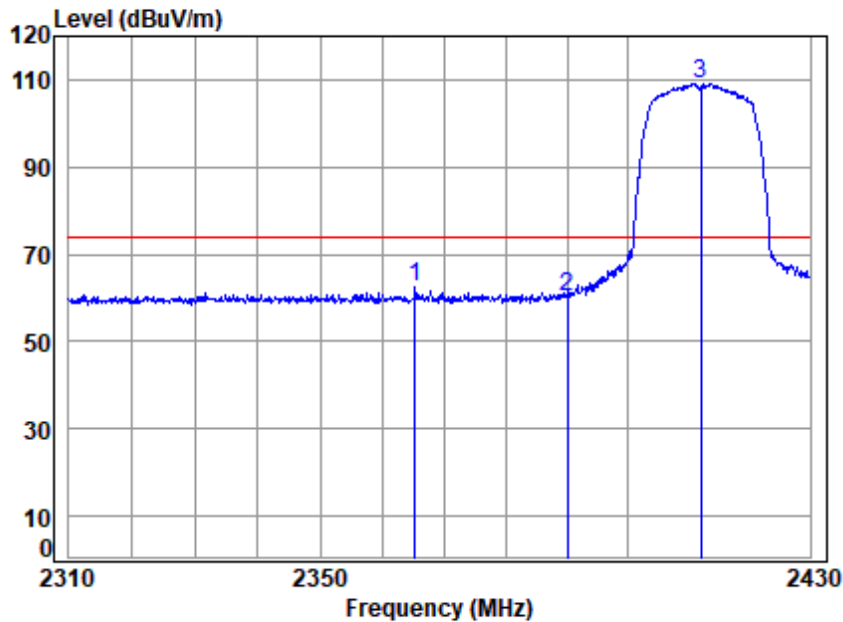


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.605	4.34	28.52	40.42	55.60	48.04	54.00	-5.96 Average
2	2390.000	4.34	28.52	40.42	55.51	47.95	54.00	-6.05 Average
3 *	2412.000	4.38	28.56	40.43	97.59	90.10	54.00	36.10 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low

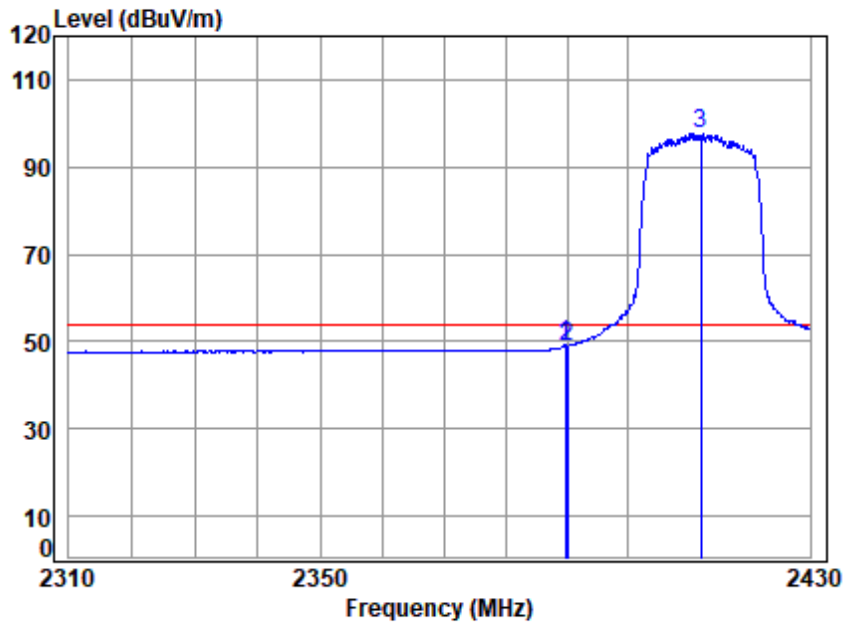


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2365.284	4.30	28.48	40.41	69.91	62.28	74.00	-11.72 Peak
2 2390.000	4.34	28.52	40.42	67.58	60.02	74.00	-13.98 Peak
3 * 2412.000	4.38	28.56	40.43	116.59	109.10	74.00	35.10 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low

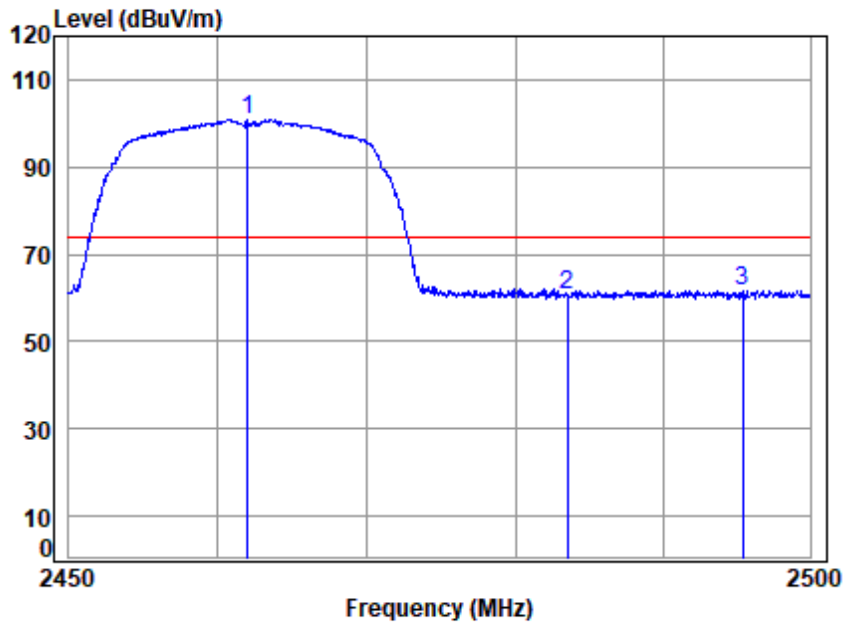


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.726	4.34	28.52	40.42	56.64	49.08	54.00	-4.92 Average
2	2390.000	4.34	28.52	40.42	56.51	48.95	54.00	-5.05 Average
3 *	2412.000	4.38	28.56	40.43	105.01	97.52	54.00	43.52 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High

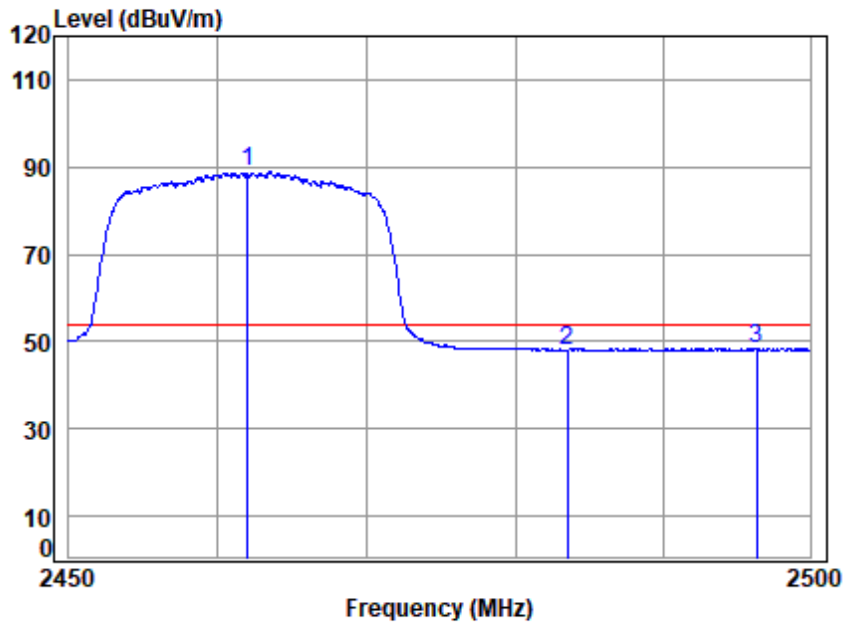


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	108.16	100.80	74.00	26.80 peak
2 2483.500	4.49	28.67	40.47	68.05	60.74	74.00	-13.26 peak
3 2495.408	4.51	28.69	40.47	68.99	61.72	74.00	-12.28 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High

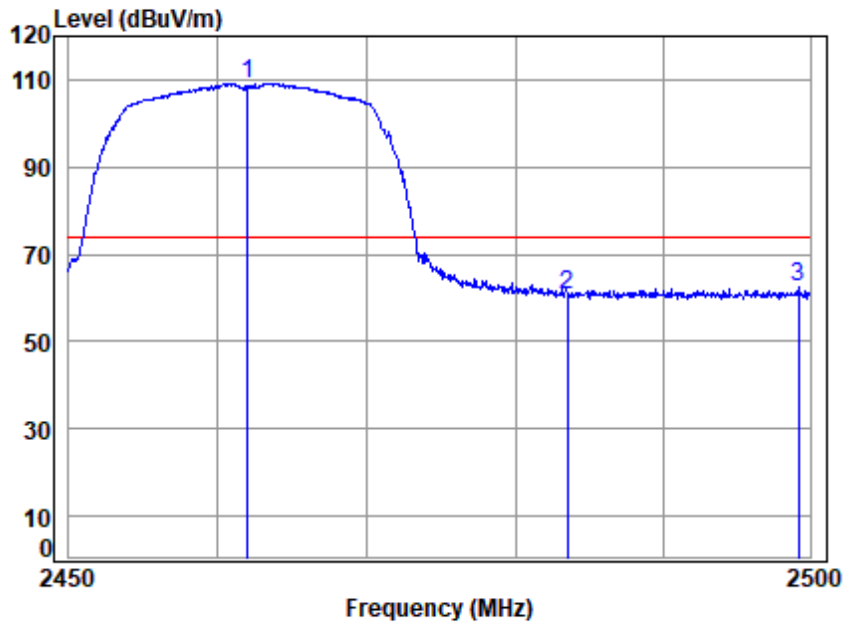


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	96.18	88.82	54.00	34.82 Average
2 2483.500	4.49	28.67	40.47	55.39	48.08	54.00	-5.92 Average
3 2496.366	4.51	28.69	40.47	55.55	48.28	54.00	-5.72 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High

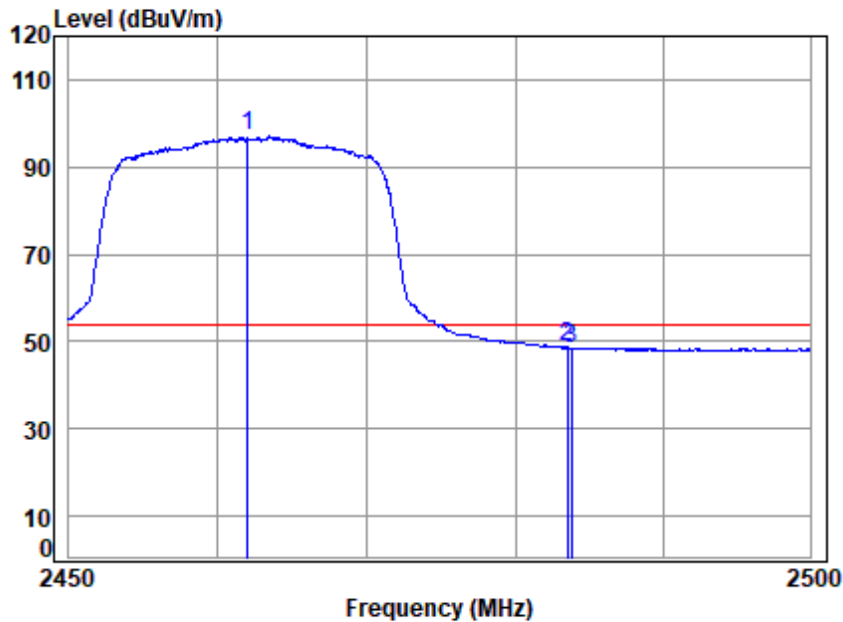


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	116.56	109.20	74.00	35.20 Peak
2 2483.500	4.49	28.67	40.47	67.86	60.55	74.00	-13.45 Peak
3 2499.192	4.52	28.70	40.47	69.58	62.33	74.00	-11.67 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High

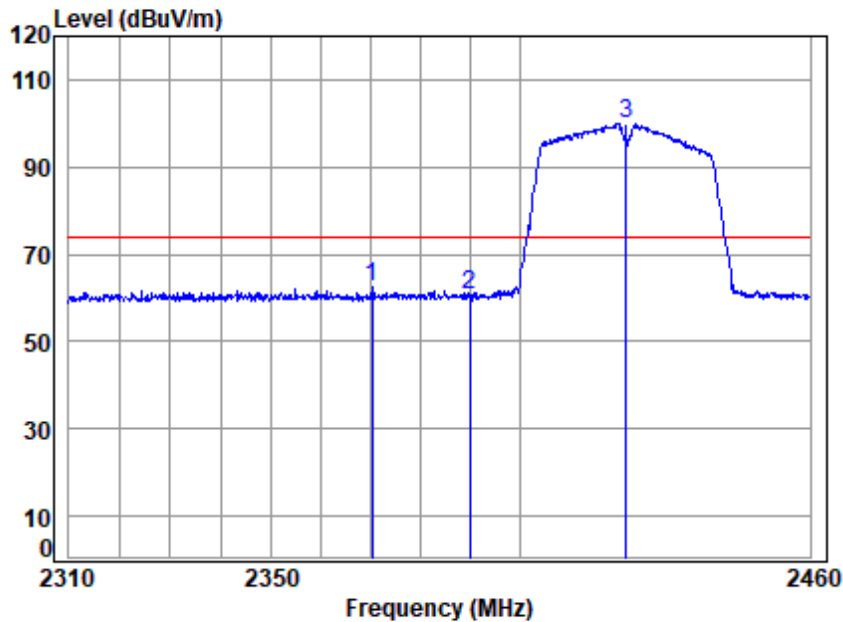


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2462.000	4.46	28.64	40.46	104.32	96.96	54.00	42.96 Average
2 2483.500	4.49	28.67	40.47	55.92	48.61	54.00	-5.39 Average
3 2483.790	4.49	28.67	40.47	55.88	48.57	54.00	-5.43 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low

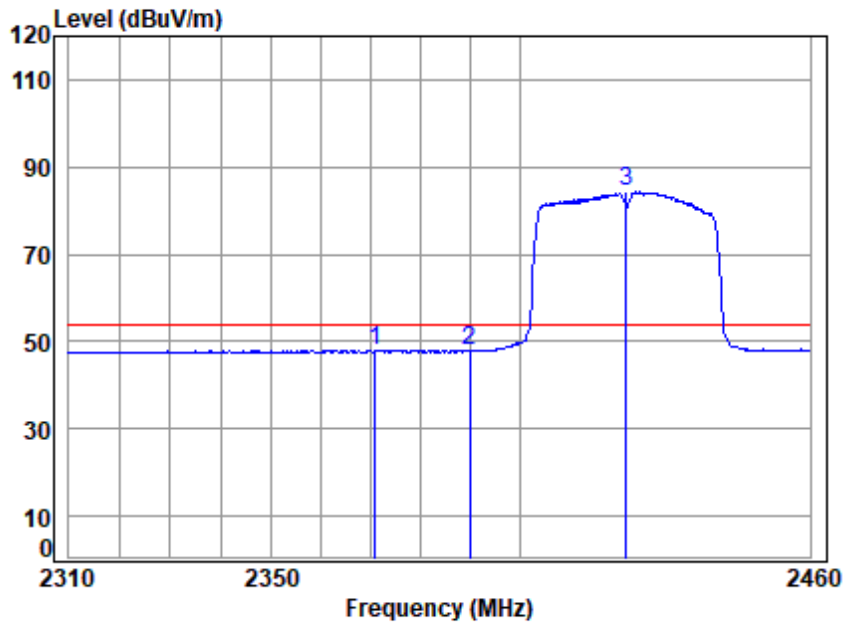


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2422 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2370.212	4.31	28.48	40.41	69.98	62.36	74.00	-11.64 peak
2 2390.000	4.34	28.52	40.42	68.25	60.69	74.00	-13.31 peak
3 * 2422.000	4.40	28.57	40.44	107.28	99.81	74.00	25.81 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low

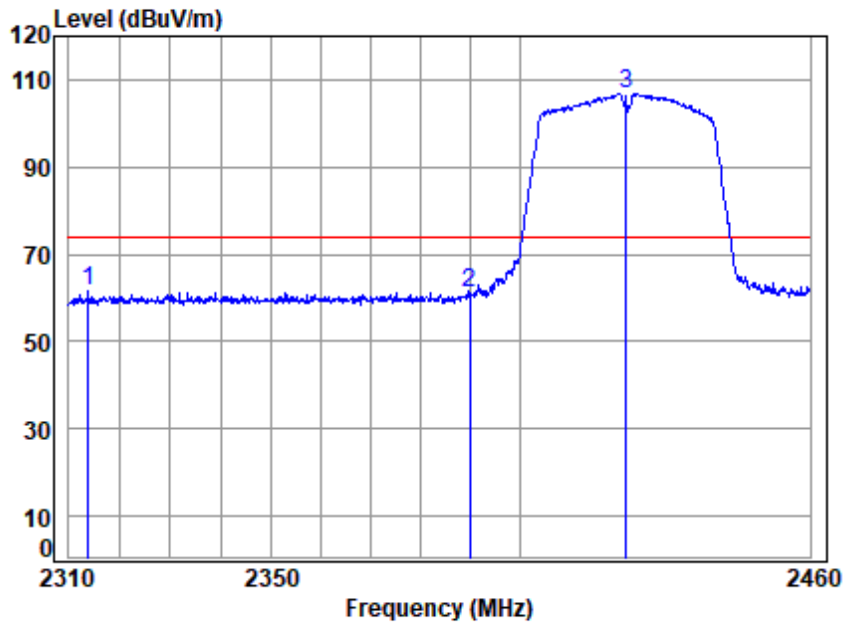


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2422 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2370.808	4.31	28.49	40.41	55.51	47.90	54.00	-6.10 Average
2 2390.000	4.34	28.52	40.42	55.32	47.76	54.00	-6.24 Average
3 * 2422.000	4.40	28.57	40.44	91.90	84.43	54.00	30.43 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low

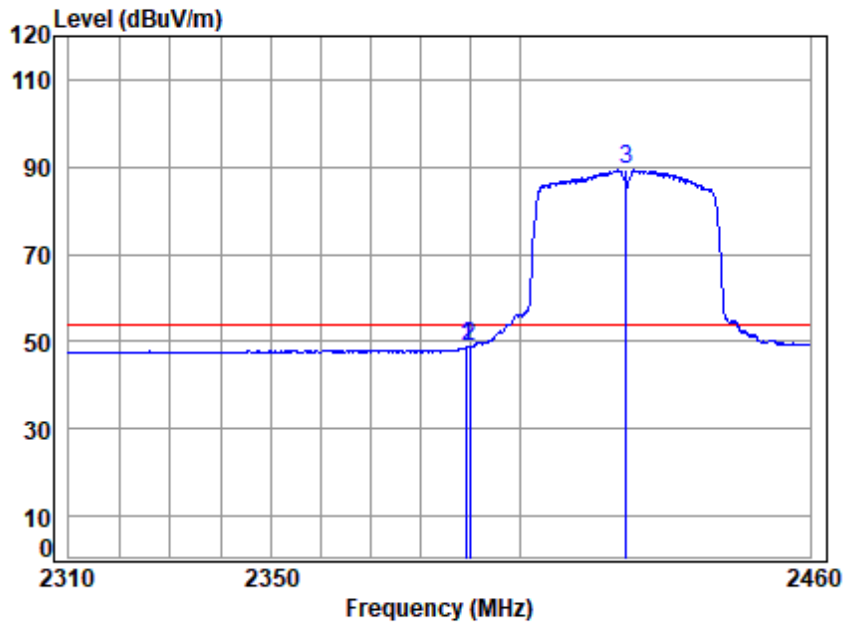


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2422 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2313.782	4.22	28.39	40.38	69.43	61.66	74.00	-12.34 Peak
2 2390.000	4.34	28.52	40.42	68.78	61.22	74.00	-12.78 Peak
3 * 2422.000	4.40	28.57	40.44	114.32	106.85	74.00	32.85 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low

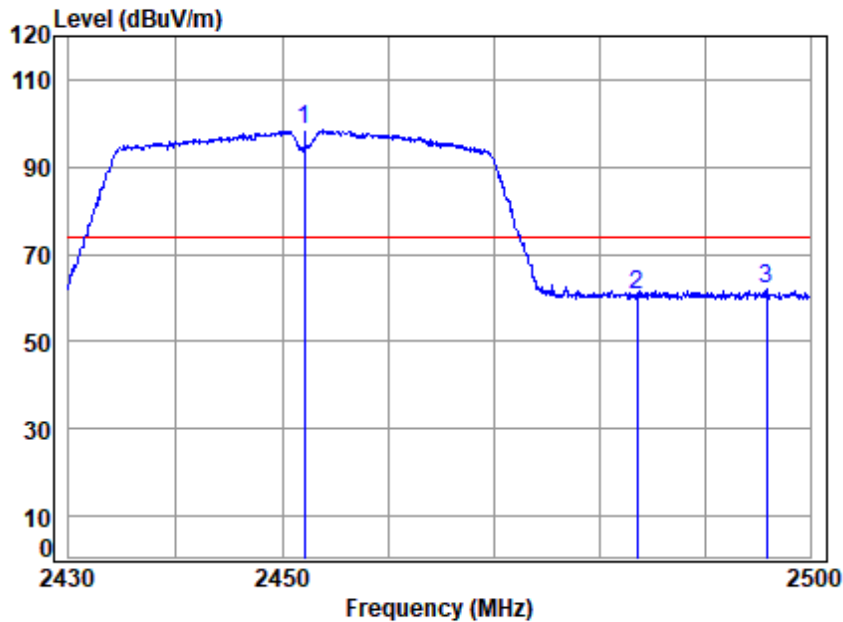


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2422 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2389.376	4.34	28.52	40.42	56.37	48.81	54.00	-5.19 Average
2 2390.000	4.34	28.52	40.42	56.41	48.85	54.00	-5.15 Average
3 * 2422.000	4.40	28.57	40.44	96.77	89.30	54.00	35.30 Average



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High

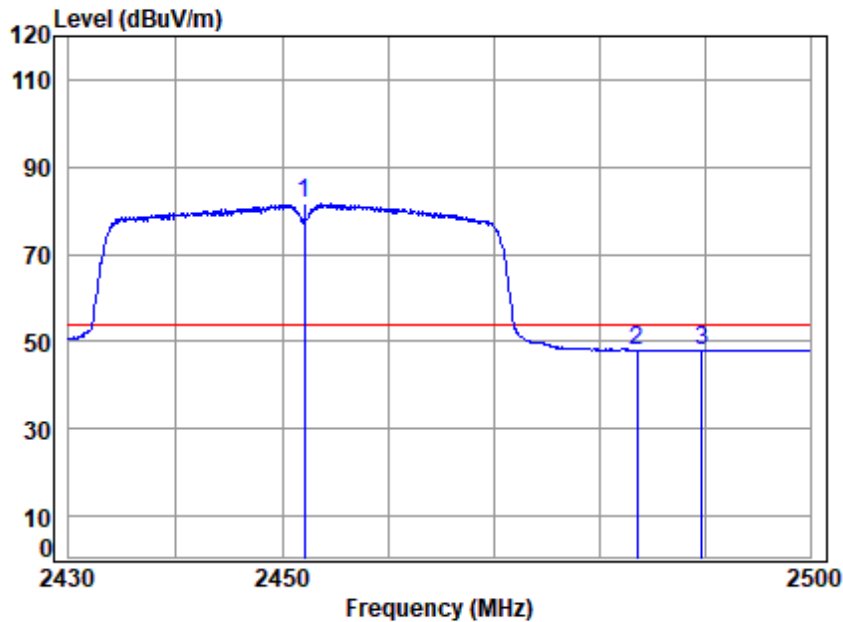


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2452 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2452.000	4.44	28.62	40.45	105.82	98.43	74.00	24.43 peak
2 2483.500	4.49	28.67	40.47	68.19	60.88	74.00	-13.12 peak
3 2495.815	4.51	28.69	40.47	69.14	61.87	74.00	-12.13 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High

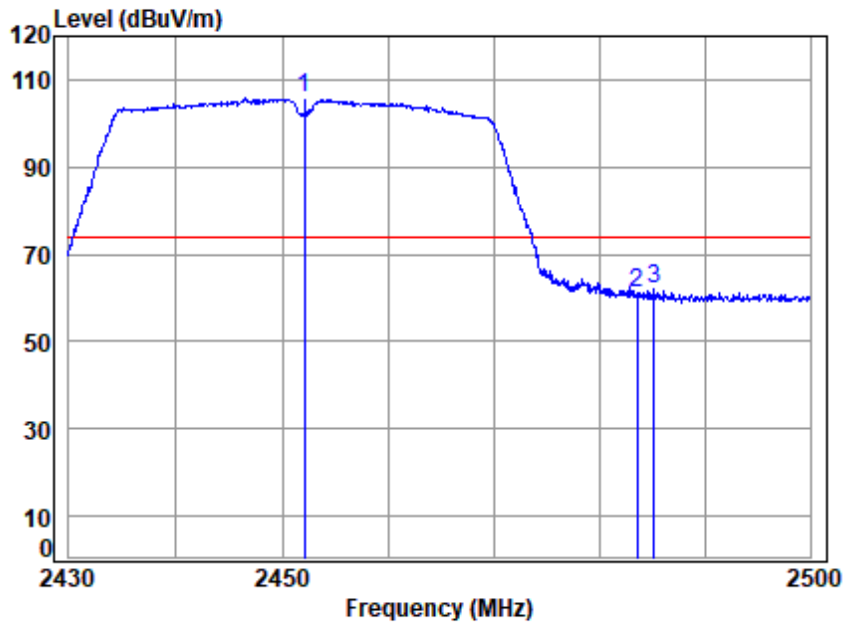


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2452 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2452.000	4.44	28.62	40.45	88.88	81.49	54.00	27.49 Average
2 2483.500	4.49	28.67	40.47	55.29	47.98	54.00	-6.02 Average
3 2489.656	4.50	28.68	40.47	55.39	48.10	54.00	-5.90 Average



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High

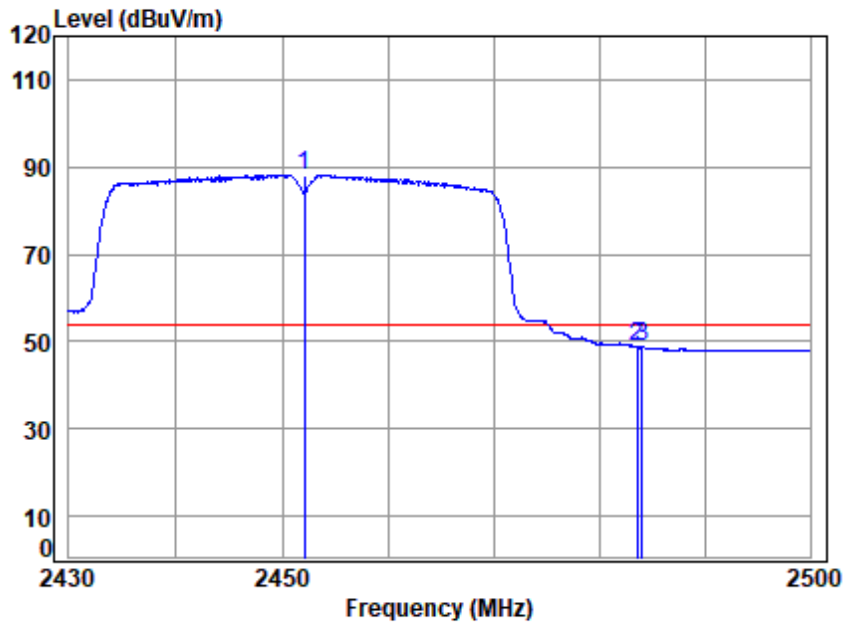


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2452 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2452.000	4.44	28.62	40.45	113.41	106.02	74.00	32.02 Peak
2 2483.500	4.49	28.67	40.47	68.35	61.04	74.00	-12.96 Peak
3 2485.135	4.50	28.68	40.47	69.27	61.98	74.00	-12.02 Peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2452 Band edge
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2452.000	4.44	28.62	40.45	95.65	88.26	54.00	34.26 Average
2 2483.500	4.49	28.67	40.47	56.31	49.00	54.00	-5.00 Average
3 2483.935	4.49	28.67	40.47	56.03	48.72	54.00	-5.28 Average



7.8 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6
Measurement Distance: 3m
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.

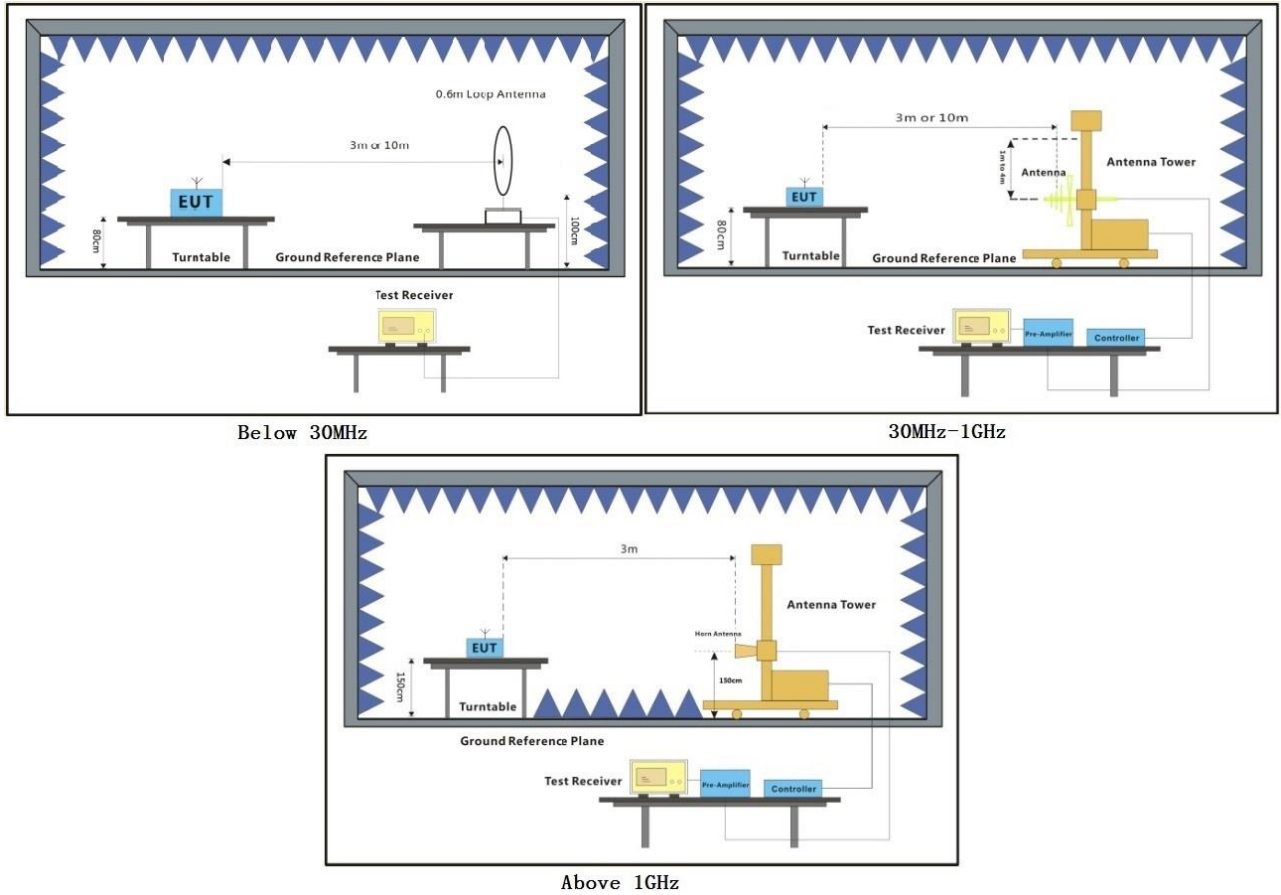
7.8.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 51.4 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



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 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.

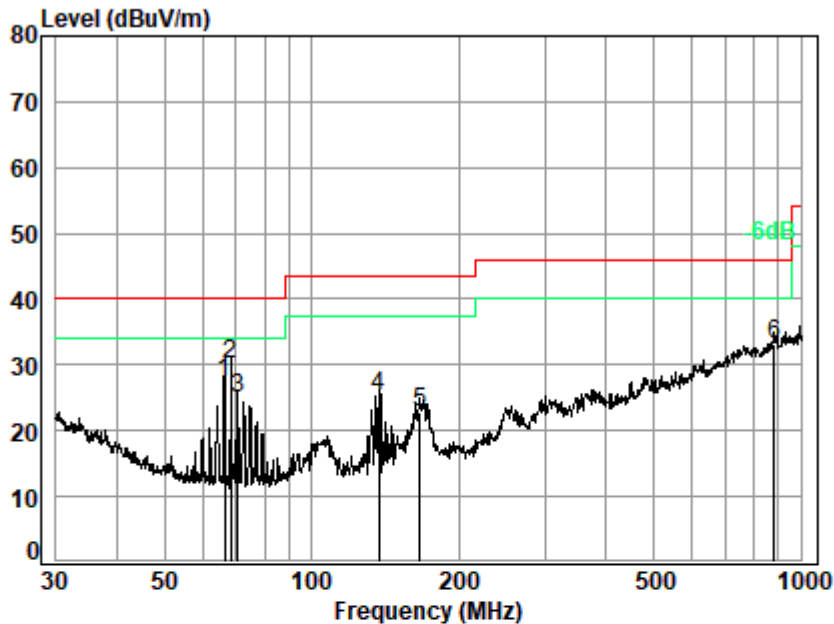
Remark:

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.
4. Pretest the EUT at antenna1, antenna2 and antenna3, found the antenna 1 which is worst case for 802.11b/g mode; Pretest the EUT at antenna1, antenna2, antenna3 and MIMO mode, found the MIMO mode which is worst case for 802.11n mode; So, Only the worst test data is recorded in the report.
5. For disturbance above 1GHz, both models WG04 and WG02 was tested, this report only recorded the worst data.



Test data for WG04

Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

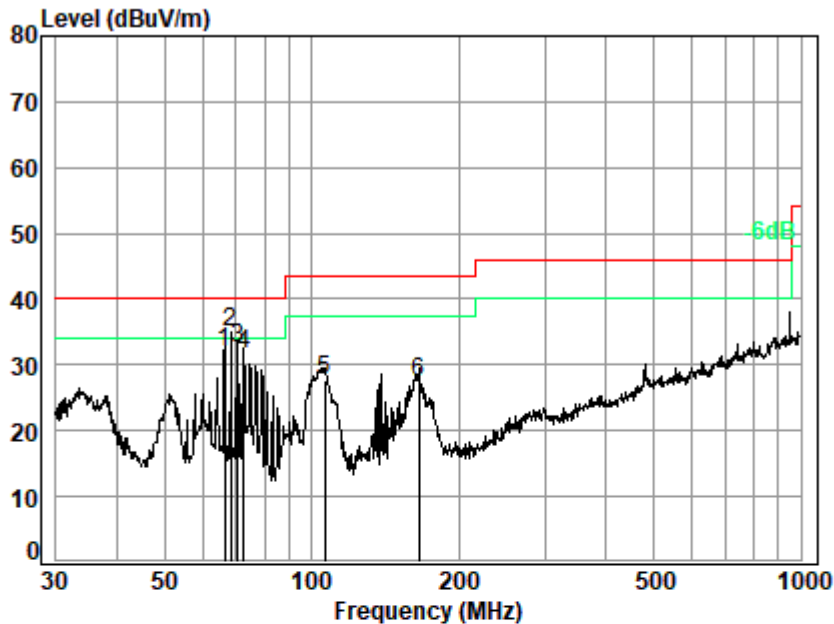


Site : chamber
Condition: 3m HORIZONTAL
Job No. : 02038CR
Test Mode: 01

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	66.27	0.80	12.77	27.65	41.32	27.24	40.00	QP
2	68.39	0.80	12.62	27.65	44.46	30.23	40.00	QP
3	70.58	0.82	12.64	27.65	39.23	25.04	40.00	QP
4	136.94	1.15	13.13	27.40	38.40	25.28	43.50	QP
5	166.07	1.17	15.52	27.27	33.47	22.89	43.50	QP
6	881.41	3.46	29.09	27.27	27.80	33.08	46.00	QP



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



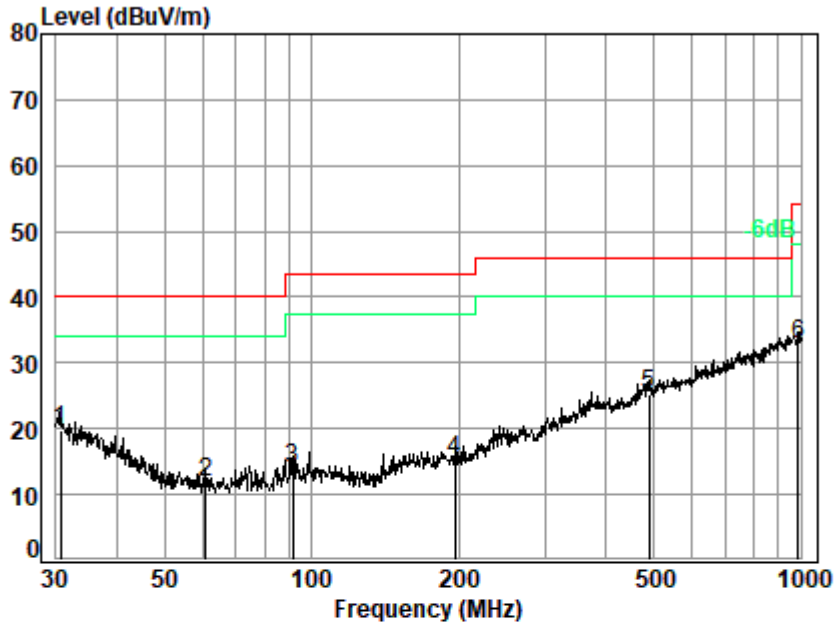
Site : chamber
Condition: 3m VERTICAL
Job No. : 02038CR
Test Mode: 01

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	66.27	0.80	12.77	27.65	45.92	31.84	40.00	-8.16 QP
2	68.39	0.80	12.62	27.65	49.36	35.13	40.00	-4.87 QP
3	70.58	0.82	12.64	27.65	46.77	32.58	40.00	-7.42 QP
4	72.59	0.91	12.47	27.64	45.89	31.63	40.00	-8.37 QP
5	106.39	1.11	13.81	27.57	40.29	27.64	43.50	-15.86 QP
6	165.49	1.17	15.51	27.27	38.04	27.45	43.50	-16.05 QP



Test data for WG02

Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low

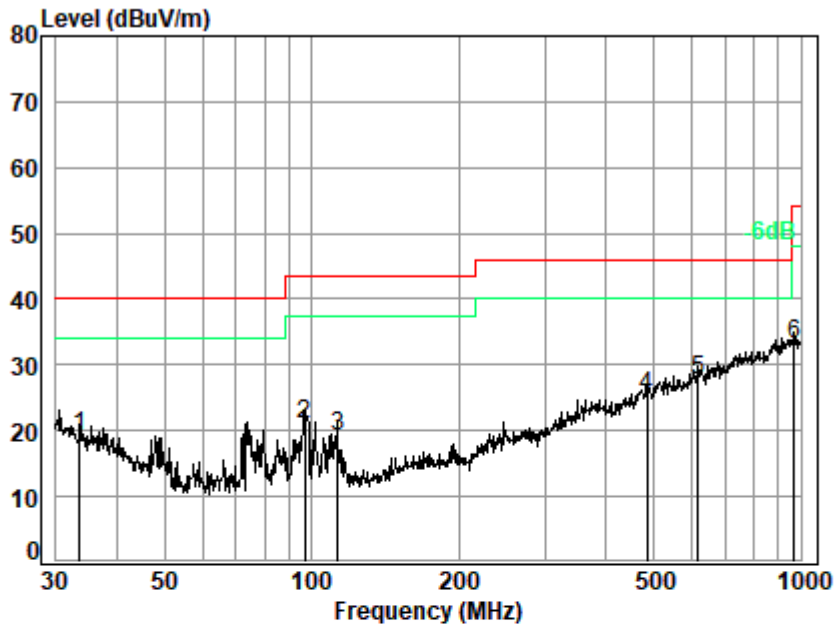


Site : chamber
Condition: 3m HORIZONTAL
Job No. : 02038CR
Test Mode: 01

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	q	30.64	0.61	22.51	27.73	24.28	19.67	40.00 -20.33 QP
2		60.70	0.80	12.87	27.66	25.93	11.94	40.00 -28.06 QP
3		91.49	1.27	13.40	27.62	26.85	13.90	43.50 -29.60 QP
4		195.82	1.20	15.68	27.16	25.54	15.26	43.50 -28.24 QP
5		489.03	2.48	24.30	27.76	26.32	25.34	46.00 -20.66 QP
6		989.54	3.59	29.64	26.71	26.20	32.72	54.00 -21.28 QP



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



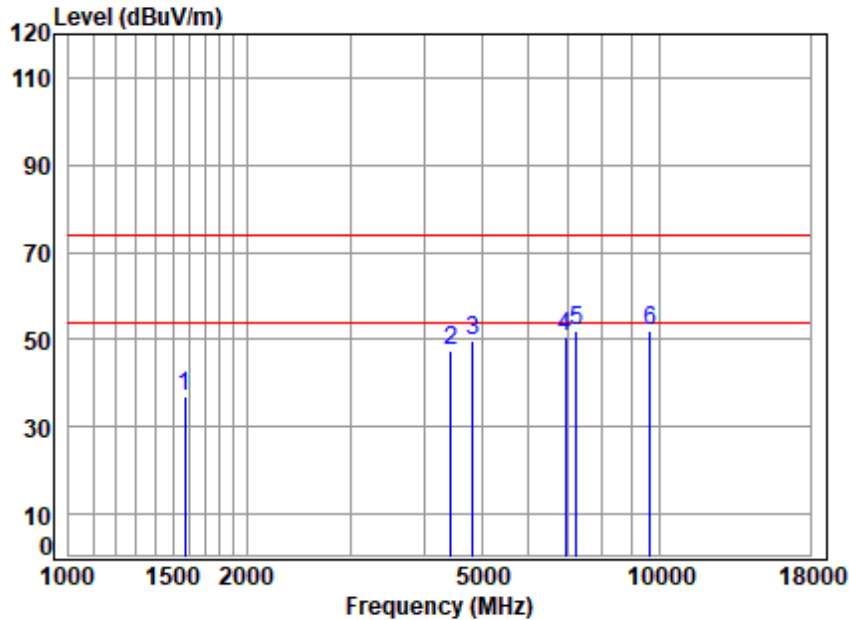
Site : chamber
Condition: 3m VERTICAL
Job No. : 02038CR
Test Mode: 01

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	33.56	0.64	21.03	27.72	25.12	19.07	40.00	-20.93 QP
2	96.77	1.16	13.80	27.61	33.71	21.06	43.50	-22.44 QP
3	112.92	1.12	13.49	27.53	32.14	19.22	43.50	-24.28 QP
4	483.91	2.47	24.30	27.74	26.14	25.17	46.00	-20.83 QP
5 q	616.37	2.73	26.56	28.09	26.63	27.83	46.00	-18.17 QP
6	968.93	3.57	29.50	26.81	26.77	33.03	54.00	-20.97 QP



Test data for WG04

Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1574.265	3.33	26.14	39.99	47.42	36.90	74.00 -37.10 peak
2	4430.628	6.70	33.60	41.81	48.87	47.36	74.00 -26.64 peak
3	4824.000	7.12	34.19	42.16	50.59	49.74	74.00 -24.26 peak
4	6934.778	8.51	36.32	41.74	47.42	50.51	74.00 -23.49 peak
5	7236.000	8.77	36.40	41.48	48.42	52.11	74.00 -21.89 peak
6	9648.000	10.79	37.53	37.69	41.49	52.12	74.00 -21.88 peak



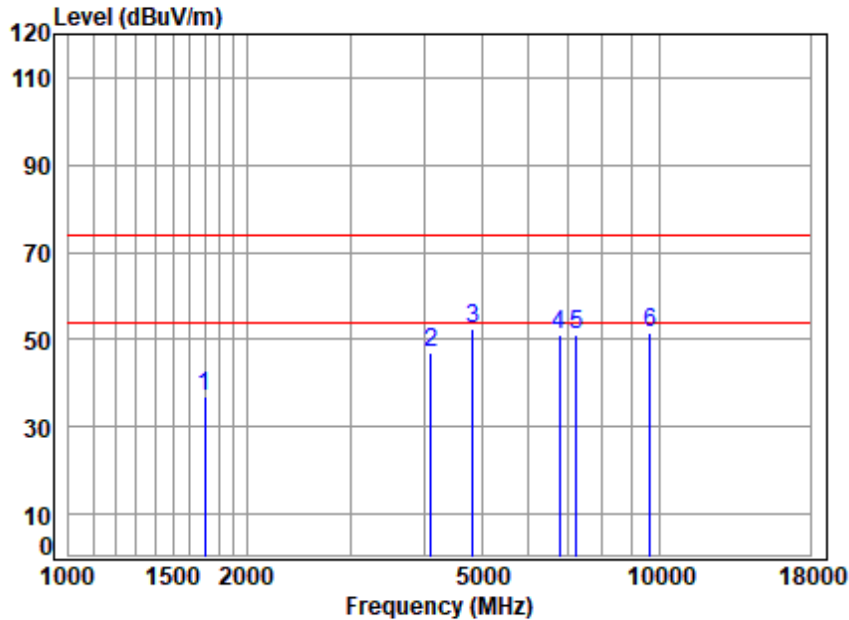
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Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m VERTICAL

Job No : 02038CR

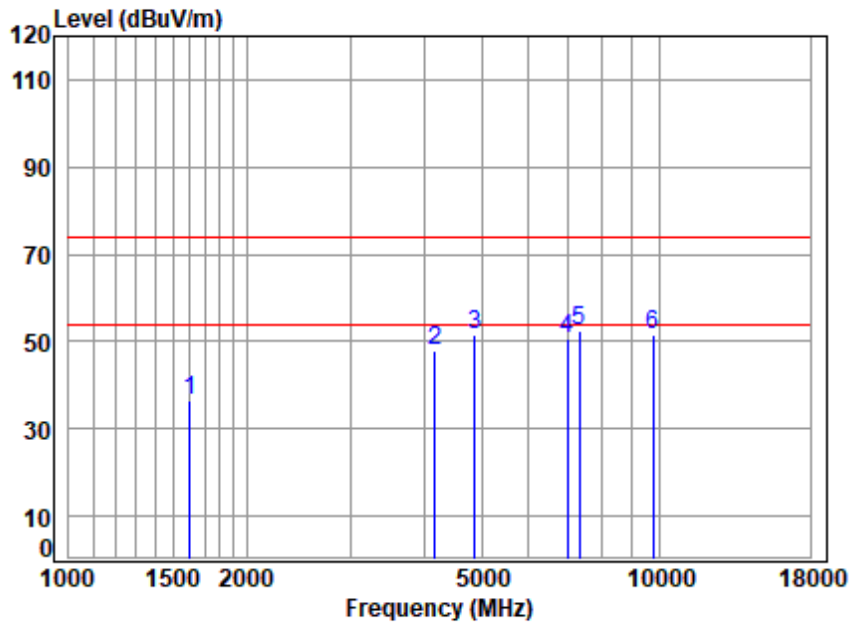
Mode : 2412 TX RSE

Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1697.129	3.43	26.66	40.06	46.76	36.79	74.00	-37.21	peak
2	4098.010	6.38	33.60	41.50	48.31	46.79	74.00	-27.21	peak
3	4824.000	7.12	34.19	42.16	53.42	52.57	74.00	-21.43	peak
4	6776.265	8.43	35.89	41.85	48.82	51.29	74.00	-22.71	peak
5	7236.000	8.77	36.40	41.48	47.26	50.95	74.00	-23.05	peak
6	9648.000	10.79	37.53	37.69	40.90	51.53	74.00	-22.47	peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle

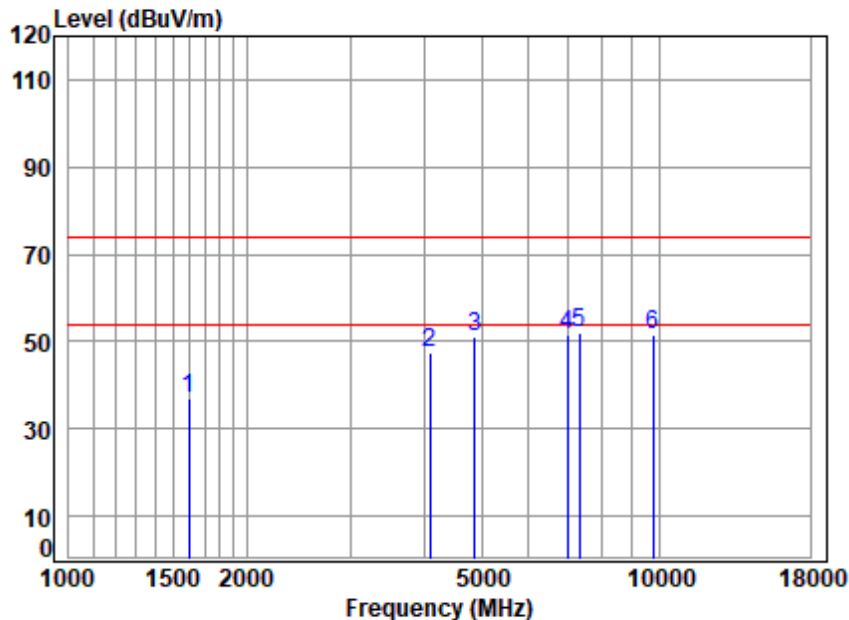


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1606.441	3.35	26.28	40.01	47.09	36.71	74.00 -37.29 peak
2	4169.698	6.45	33.60	41.57	49.57	48.05	74.00 -25.95 peak
3	4874.000	7.17	34.28	42.20	52.09	51.34	74.00 -22.66 peak
4	6995.172	8.54	36.49	41.70	47.33	50.66	74.00 -23.34 peak
5	7311.000	8.84	36.37	41.41	48.52	52.32	74.00 -21.68 peak
6	9748.000	10.76	37.55	37.52	40.54	51.33	74.00 -22.67 peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



```
Site      : chamber
Condition: 3m VERTICAL
Job No    : 02038CR
Mode      : 2437 TX RSE
Note      : 2.4G WIFI 11B
```

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	3.35	26.24	40.01	47.47	37.05	74.00	-36.95	peak
2	4086.182	6.37	33.60	41.49	48.97	47.45	74.00	-26.55	peak
3	4874.000	7.17	34.28	42.20	51.79	51.04	74.00	-22.96	peak
4	6995.172	8.54	36.49	41.70	48.11	51.44	74.00	-22.56	peak
5	7311.000	8.84	36.37	41.41	48.26	52.06	74.00	-21.94	peak
6	9748.000	10.76	37.55	37.52	40.60	51.39	74.00	-22.61	peak



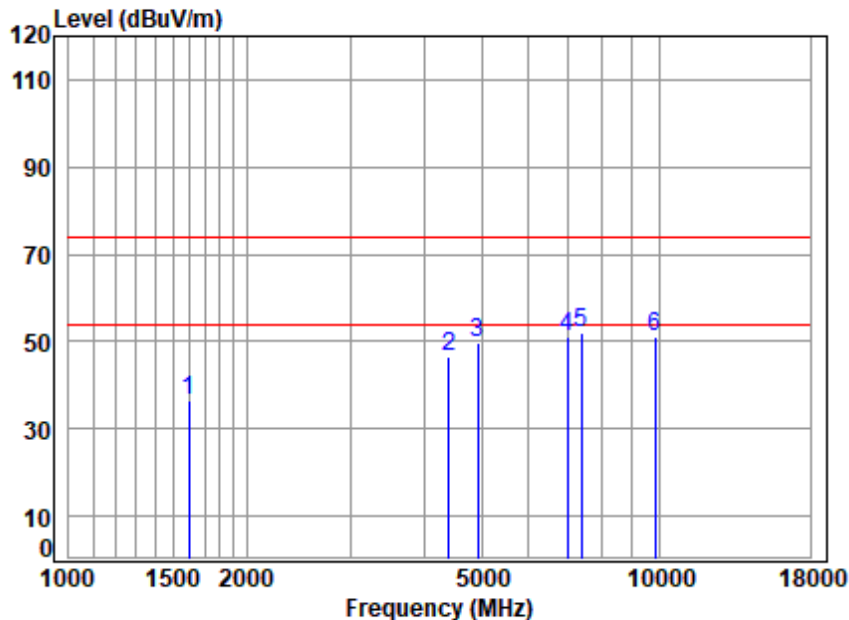
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Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	3.35	26.24	40.01	47.07	36.65	74.00	-37.35	peak
2	4405.090	6.67	33.60	41.79	48.19	46.67	74.00	-27.33	peak
3	4924.000	7.22	34.37	42.24	50.58	49.93	74.00	-24.07	peak
4	6995.172	8.54	36.49	41.70	47.61	50.94	74.00	-23.06	peak
5	7386.000	8.91	36.34	41.34	47.90	51.81	74.00	-22.19	peak
6	9848.000	10.73	37.57	37.35	40.34	51.29	74.00	-22.71	peak



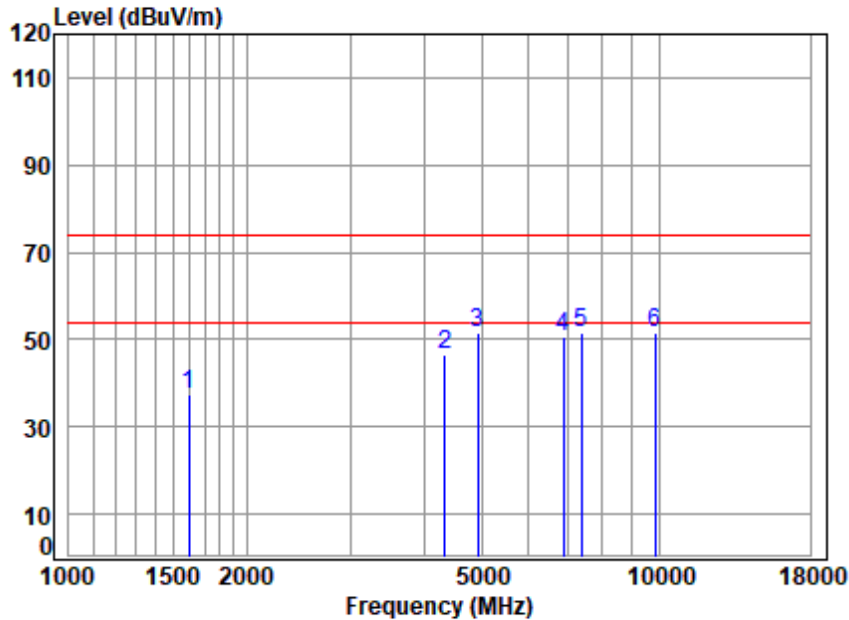
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Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 02038CR

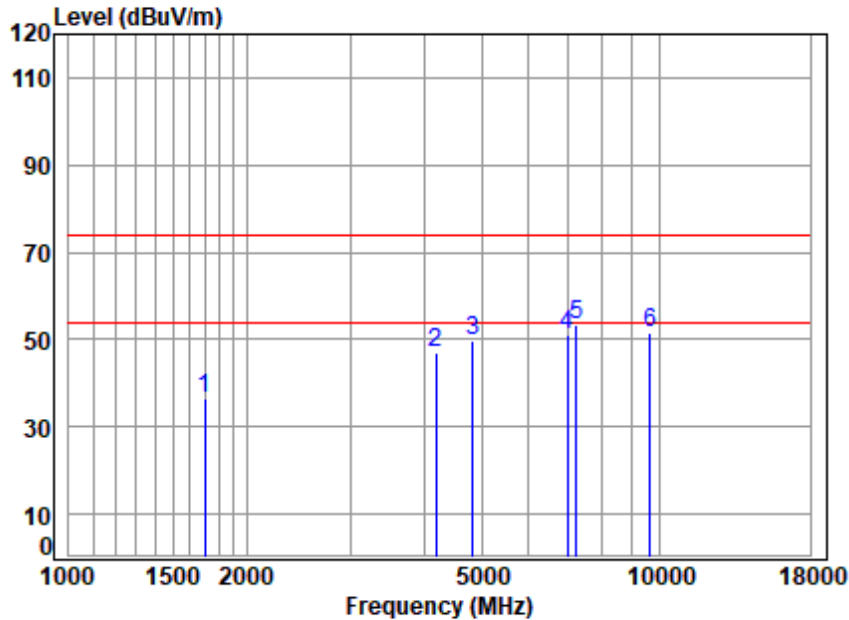
Mode : 2462 TX RSE

Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1597.181	3.35	26.24	40.01	47.78	37.36	74.00 -36.64 peak
2	4329.354	6.60	33.60	41.72	48.29	46.77	74.00 -27.23 peak
3	4924.000	7.22	34.37	42.24	51.99	51.34	74.00 -22.66 peak
4	6874.906	8.48	36.16	41.78	47.90	50.76	74.00 -23.24 peak
5	7386.000	8.91	36.34	41.34	47.46	51.37	74.00 -22.63 peak
6	9848.000	10.73	37.57	37.35	40.68	51.63	74.00 -22.37 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:Low

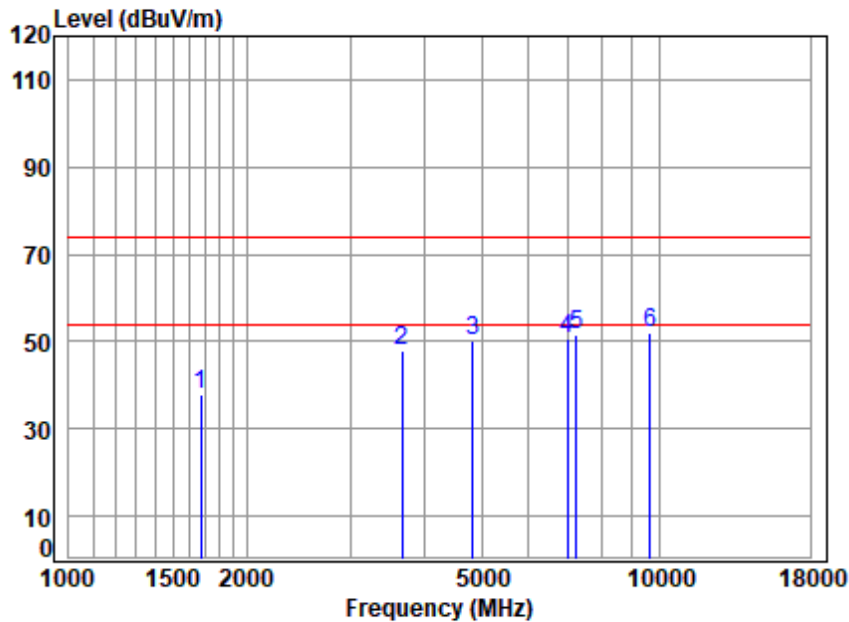


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1697.129	3.43	26.66	40.06	46.37	36.40	74.00 -37.60 peak
2	4181.768	6.46	33.60	41.58	48.47	46.95	74.00 -27.05 peak
3	4824.000	7.12	34.19	42.16	50.75	49.90	74.00 -24.10 peak
4	6995.172	8.54	36.49	41.70	47.92	51.25	74.00 -22.75 peak
5	7236.000	8.77	36.40	41.48	49.49	53.18	74.00 -20.82 peak
6	9648.000	10.79	37.53	37.69	41.04	51.67	74.00 -22.33 peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:Low



Site : chamber

Condition: 3m VERTICAL

Job No : 02038CR

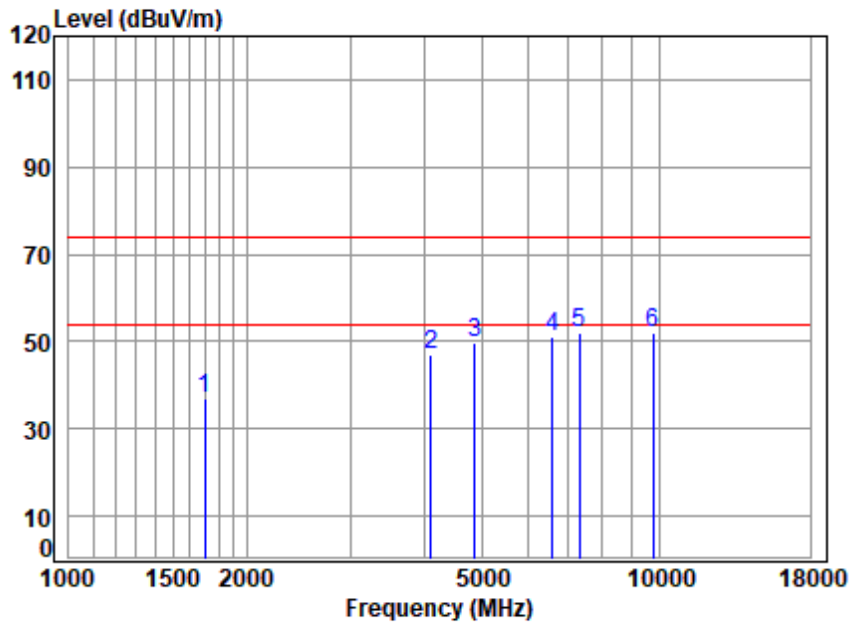
Mode : 2412 TX RSE

Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1672.779	3.41	26.56	40.05	47.74	37.66	74.00 -36.34 peak
2	3671.746	5.79	32.70	41.19	50.48	47.78	74.00 -26.22 peak
3	4824.000	7.12	34.19	42.16	50.86	50.01	74.00 -23.99 peak
4	6995.172	8.54	36.49	41.70	47.17	50.50	74.00 -23.50 peak
5	7236.000	8.77	36.40	41.48	47.67	51.36	74.00 -22.64 peak
6	9648.000	10.79	37.53	37.69	41.40	52.03	74.00 -21.97 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:middle

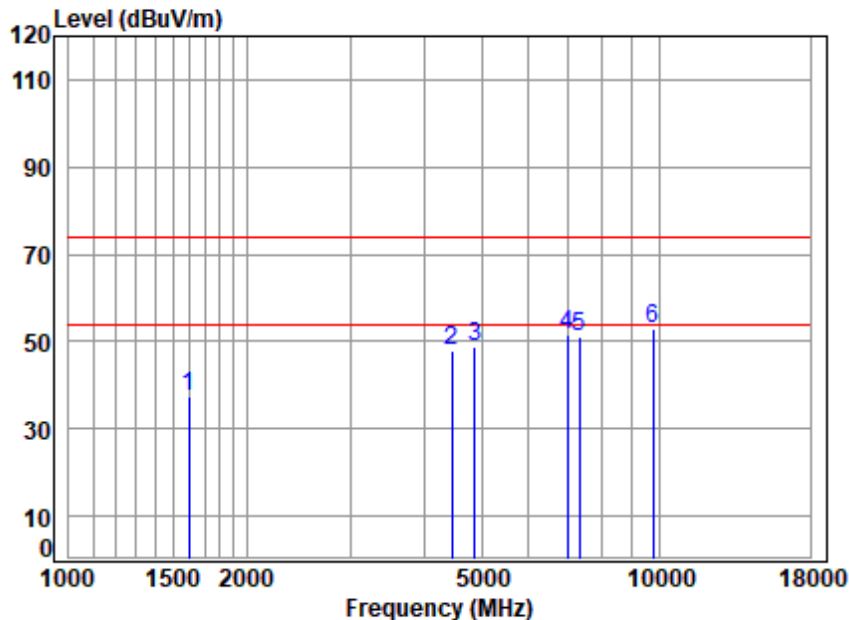


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1697.129	3.43	26.66	40.06	46.83	36.86	74.00 -37.14 peak
2	4098.010	6.38	33.60	41.50	48.68	47.16	74.00 -26.84 peak
3	4874.000	7.17	34.28	42.20	50.57	49.82	74.00 -24.18 peak
4	6602.265	8.33	35.39	41.97	49.23	50.98	74.00 -23.02 peak
5	7311.000	8.84	36.37	41.41	48.28	52.08	74.00 -21.92 peak
6	9748.000	10.76	37.55	37.52	41.25	52.04	74.00 -21.96 peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:middle



```
Site      : chamber
Condition: 3m VERTICAL
Job No    : 02038CR
Mode      : 2437 TX RSE
Note      : 2.4G WIFI 11G
```

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	3.35	26.24	40.01	47.86	37.44	74.00	-36.56	peak
2	4456.315	6.72	33.60	41.84	49.40	47.88	74.00	-26.12	peak
3	4874.000	7.17	34.28	42.20	49.63	48.88	74.00	-25.12	peak
4	6995.172	8.54	36.49	41.70	48.17	51.50	74.00	-22.50	peak
5	7311.000	8.84	36.37	41.41	47.24	51.04	74.00	-22.96	peak
6	9748.000	10.76	37.55	37.52	42.05	52.84	74.00	-21.16	peak



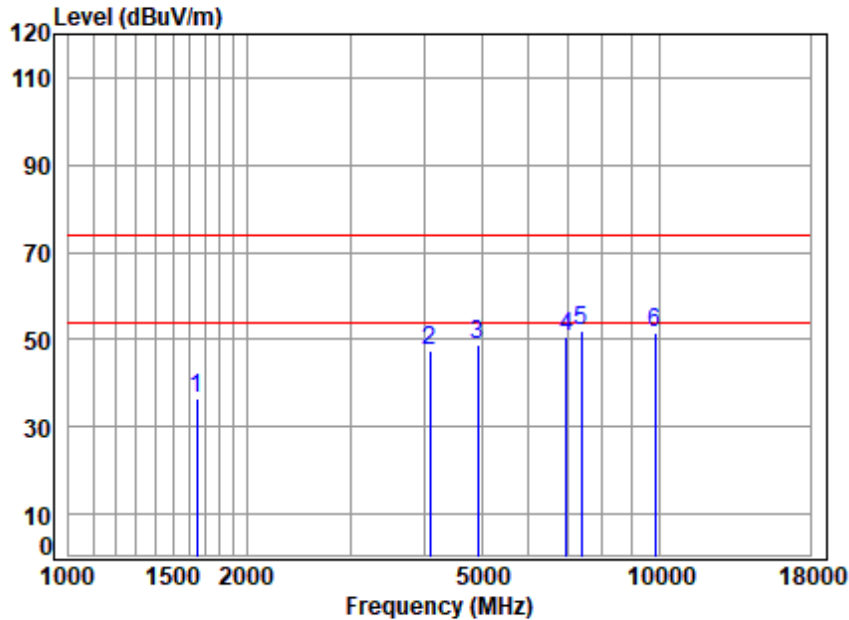
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Test Mode: 01; Polarity: Horizontal; Modulation:802.11g; Bandwidth:20MHz; Channel:High

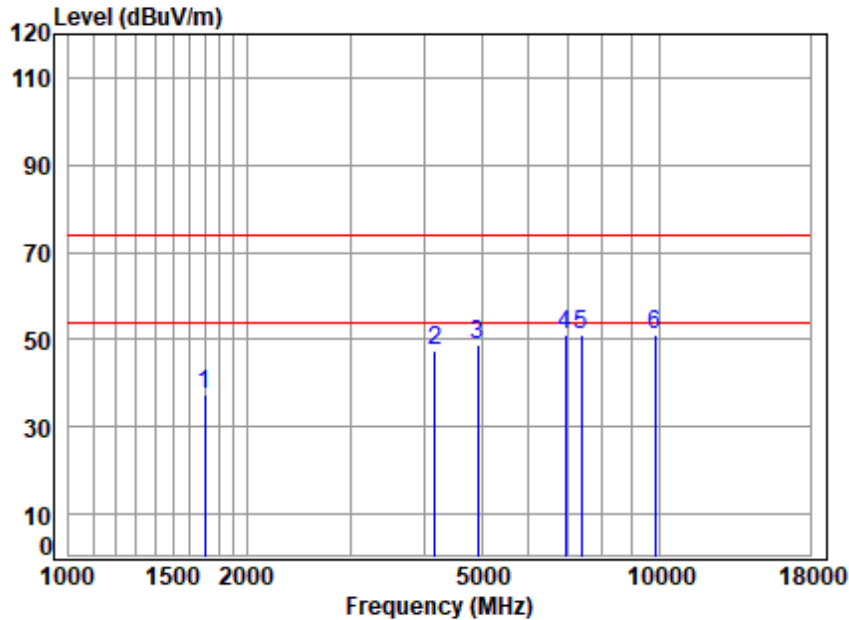


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	3.39	26.46	40.03	46.89	36.71	74.00	-37.29
2	6.37	33.60	41.49	48.93	47.41	74.00	-26.59
3	7.22	34.37	42.24	49.38	48.73	74.00	-25.27
4	8.52	36.38	41.73	47.61	50.78	74.00	-23.22
5	8.91	36.34	41.34	48.06	51.97	74.00	-22.03
6	10.73	37.57	37.35	40.75	51.70	74.00	-22.30



Test Mode: 01; Polarity: Vertical; Modulation:802.11g; Bandwidth:20MHz; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 02038CR

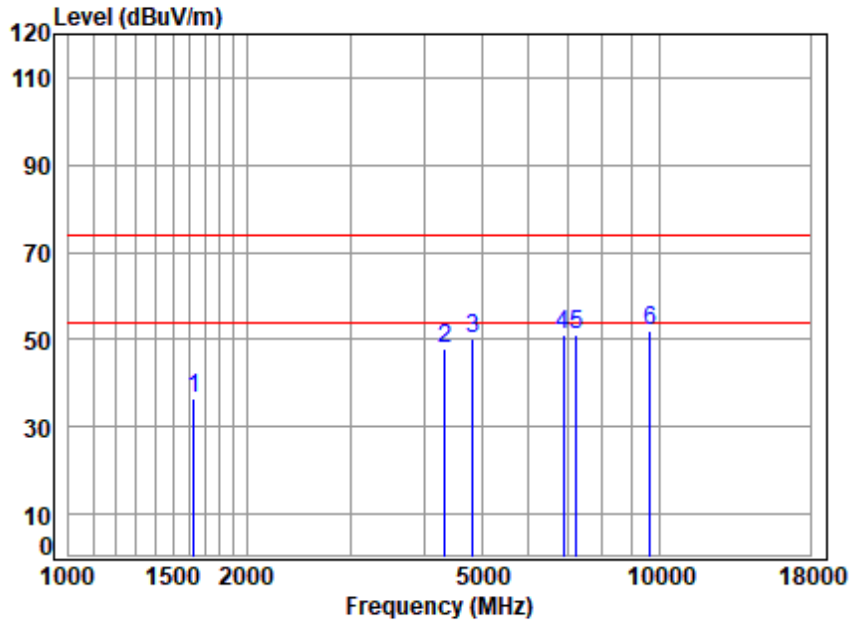
Mode : 2462 TX RSE

Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1697.129	3.43	26.66	40.06	47.26	37.29	74.00 -36.71 peak
2	4169.698	6.45	33.60	41.57	49.07	47.55	74.00 -26.45 peak
3	4924.000	7.22	34.37	42.24	49.45	48.80	74.00 -25.20 peak
4	6934.778	8.51	36.32	41.74	48.10	51.19	74.00 -22.81 peak
5	7386.000	8.91	36.34	41.34	47.26	51.17	74.00 -22.83 peak
6	9848.000	10.73	37.57	37.35	40.08	51.03	74.00 -22.97 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low

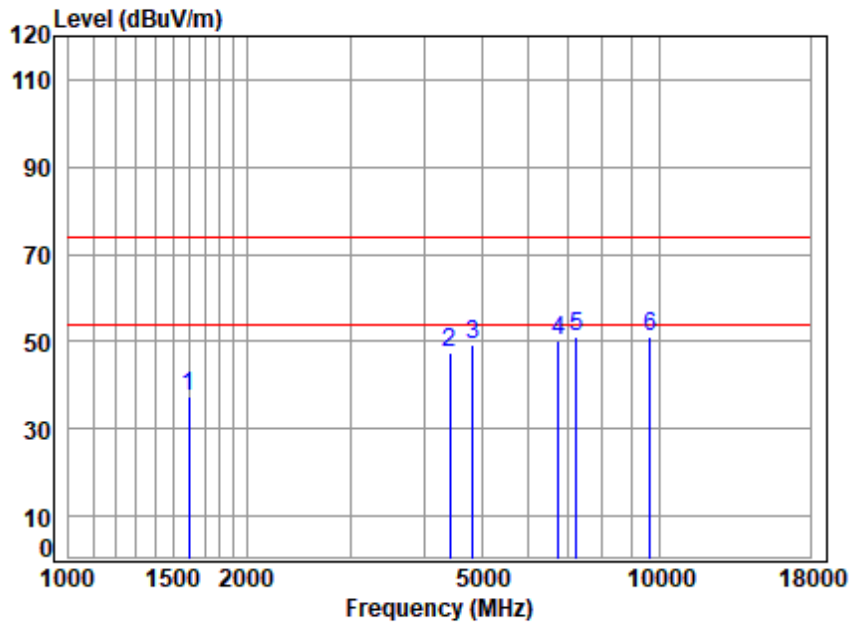


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1629.825	3.37	26.38	40.02	46.87	36.60	74.00	-37.40	peak
2	4341.886	6.61	33.60	41.73	49.44	47.92	74.00	-26.08	peak
3	4824.000	7.12	34.19	42.16	50.96	50.11	74.00	-23.89	peak
4	6874.906	8.48	36.16	41.78	48.31	51.17	74.00	-22.83	peak
5	7236.000	8.77	36.40	41.48	47.37	51.06	74.00	-22.94	peak
6	9648.000	10.79	37.53	37.69	41.18	51.81	74.00	-22.19	peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low

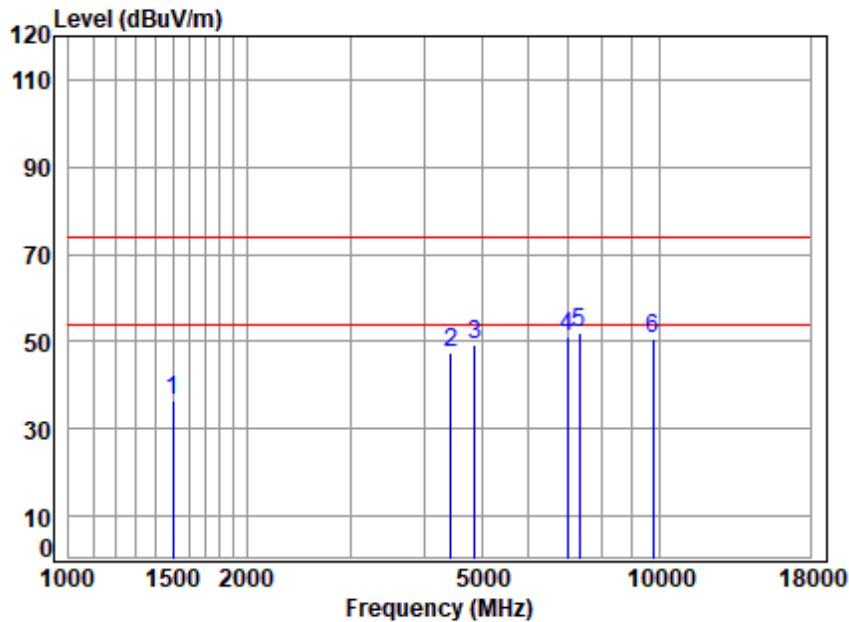


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1597.181	3.35	26.24	40.01	47.62	37.20	74.00 -36.80 peak
2	4417.841	6.68	33.60	41.80	48.81	47.29	74.00 -26.71 peak
3	4824.000	7.12	34.19	42.16	50.00	49.15	74.00 -24.85 peak
4	6756.708	8.42	35.83	41.86	47.95	50.34	74.00 -23.66 peak
5	7236.000	8.77	36.40	41.48	47.19	50.88	74.00 -23.12 peak
6	9648.000	10.79	37.53	37.69	40.43	51.06	74.00 -22.94 peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle

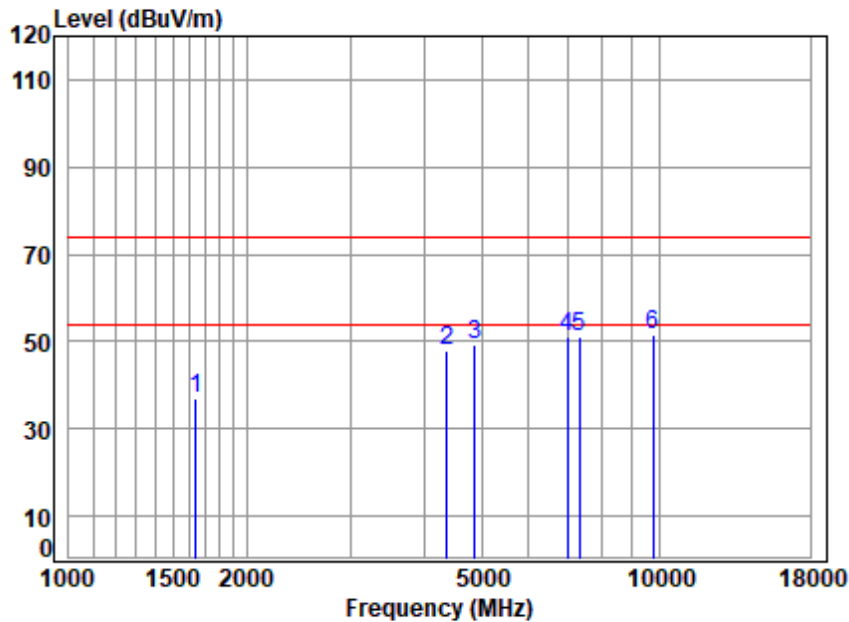


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1498.781	3.26	25.80	39.95	47.19	36.30	74.00 -37.70 peak
2	4443.453	6.71	33.60	41.82	48.75	47.24	74.00 -26.76 peak
3	4874.000	7.17	34.28	42.20	50.19	49.44	74.00 -24.56 peak
4	6995.172	8.54	36.49	41.70	47.82	51.15	74.00 -22.85 peak
5	7311.000	8.84	36.37	41.41	48.22	52.02	74.00 -21.98 peak
6	9748.000	10.76	37.55	37.52	40.07	50.86	74.00 -23.14 peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle

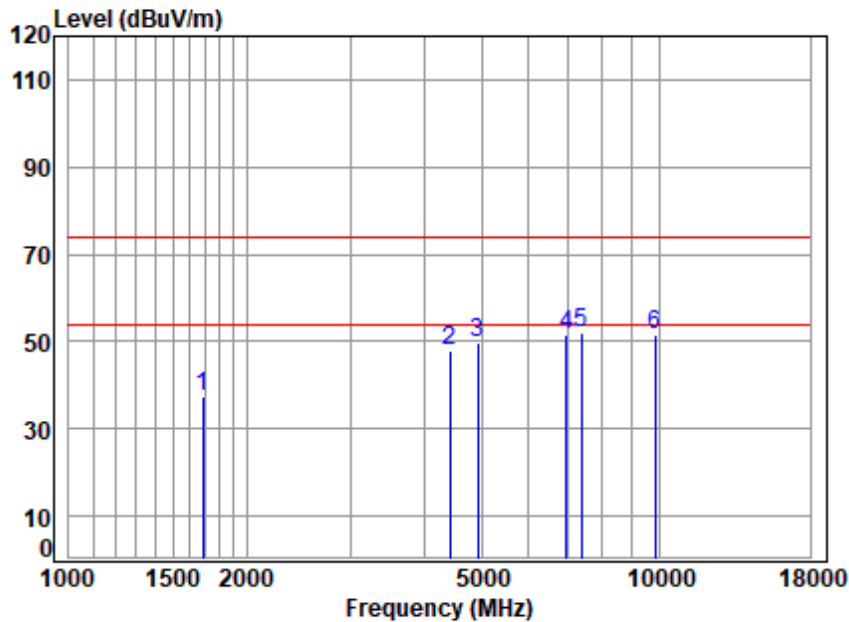


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1639.274	3.38	26.42	40.03	47.00	36.77	74.00	-37.23	peak
2	4367.058	6.64	33.60	41.75	49.46	47.95	74.00	-26.05	peak
3	4874.000	7.17	34.28	42.20	49.90	49.15	74.00	-24.85	peak
4	6995.172	8.54	36.49	41.70	47.61	50.94	74.00	-23.06	peak
5	7311.000	8.84	36.37	41.41	47.16	50.96	74.00	-23.04	peak
6	9748.000	10.76	37.55	37.52	40.77	51.56	74.00	-22.44	peak



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High

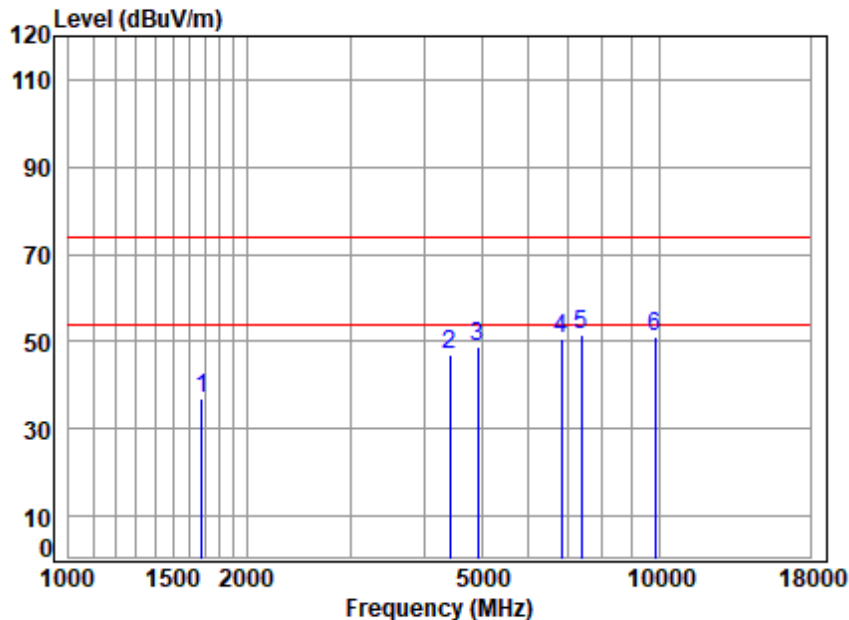


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 1687.347	3.42	26.62	40.05	47.47	37.46	74.00	-36.54 peak
2 4417.841	6.68	33.60	41.80	49.35	47.83	74.00	-26.17 peak
3 4924.000	7.22	34.37	42.24	50.44	49.79	74.00	-24.21 peak
4 6954.852	8.52	36.38	41.73	48.31	51.48	74.00	-22.52 peak
5 7386.000	8.91	36.34	41.34	47.89	51.80	74.00	-22.20 peak
6 9848.000	10.73	37.57	37.35	40.72	51.67	74.00	-22.33 peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



```
Site      : chamber
Condition: 3m VERTICAL
Job No    : 02038CR
Mode      : 2462 TX RSE
Note      : 2.4G WIFI 11N20
```

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	3.41	26.58	40.05	46.84	36.78	74.00	-37.22	peak
2	4417.841	6.68	33.60	41.80	48.56	47.04	74.00	-26.96	peak
3	4924.000	7.22	34.37	42.24	49.67	49.02	74.00	-24.98	peak
4	6835.278	8.46	36.05	41.81	47.86	50.56	74.00	-23.44	peak
5	7386.000	8.91	36.34	41.34	47.75	51.66	74.00	-22.34	peak
6	9848.000	10.73	37.57	37.35	40.19	51.14	74.00	-22.86	peak



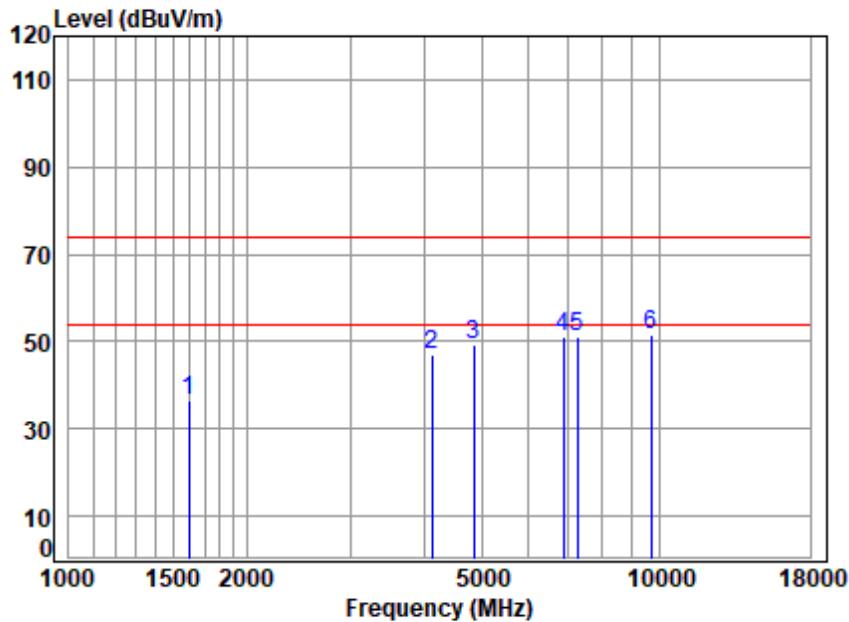
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Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low

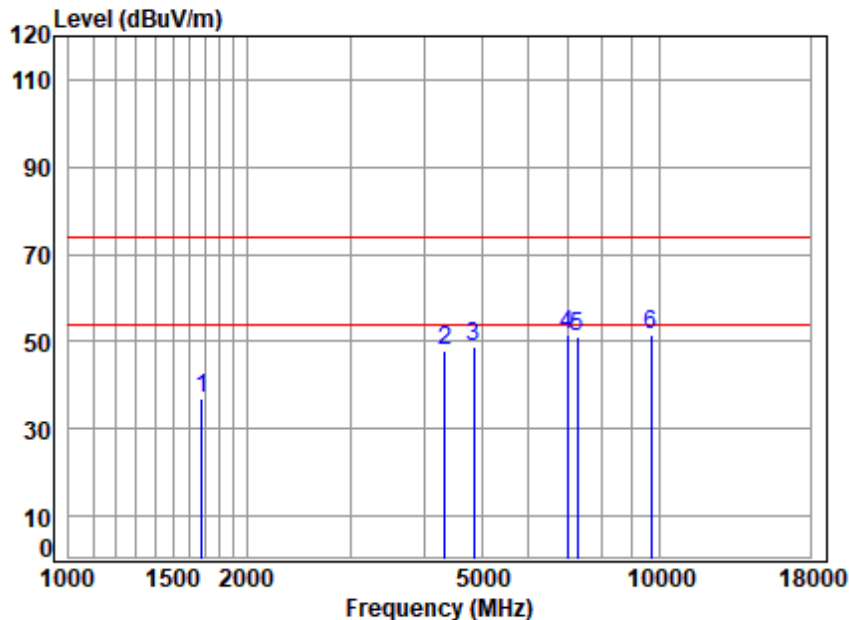


Site : chamber
Condition: 3m HORIZONTAL
Job No : 02038CR
Mode : 2422 TX RSE
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 1597.181	3.35	26.24	40.01	46.82	36.40	74.00	-37.60 peak
2 4121.768	6.40	33.60	41.52	48.42	46.90	74.00	-27.10 peak
3 4844.000	7.14	34.23	42.17	49.99	49.19	74.00	-24.81 peak
4 6874.906	8.48	36.16	41.78	48.25	51.11	74.00	-22.89 peak
5 7266.000	8.79	36.39	41.45	47.37	51.10	74.00	-22.90 peak
6 9688.000	10.78	37.54	37.63	40.70	51.39	74.00	-22.61 peak



Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



```
Site      : chamber
Condition: 3m VERTICAL
Job No    : 02038CR
Mode      : 2422 TX RSE
Note      : 2.4G WIFI 11N40
```

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	3.41	26.58	40.05	46.82	36.76	74.00	-37.24	peak
2	4341.886	6.61	33.60	41.73	49.41	47.89	74.00	-26.11	peak
3	4844.000	7.14	34.23	42.17	49.65	48.85	74.00	-25.15	peak
4	6995.172	8.54	36.49	41.70	48.03	51.36	74.00	-22.64	peak
5	7266.000	8.79	36.39	41.45	47.16	50.89	74.00	-23.11	peak
6	9688.000	10.78	37.54	37.63	40.82	51.51	74.00	-22.49	peak



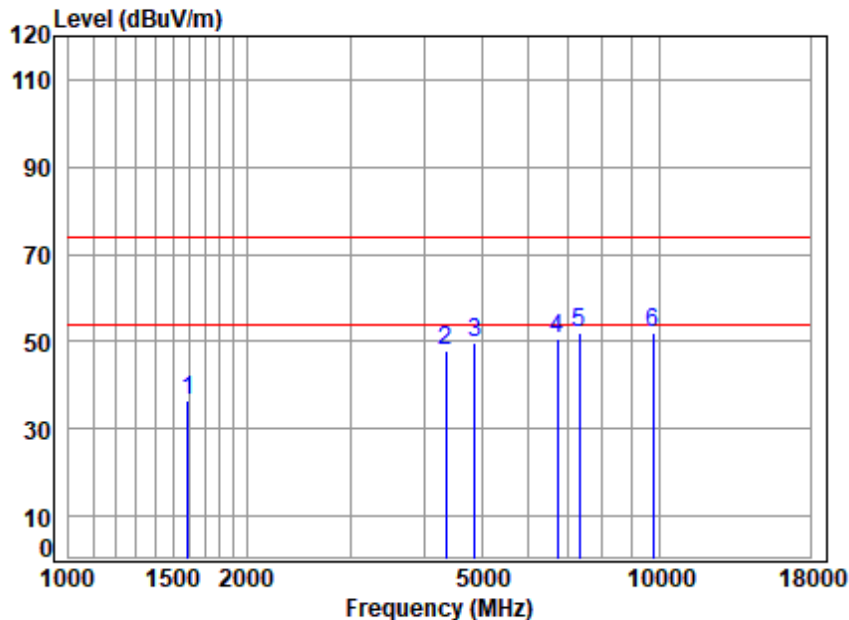
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Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



```
Site      : chamber
Condition: 3m HORIZONTAL
Job No    : 02038CR
Mode      : 2437 TX RSE
Note      : 2.4G WIFI 11N40
```

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1592.571	3.34	26.22	40.00	46.95	36.51	74.00	-37.49	peak
2	4354.454	6.63	33.60	41.74	49.61	48.10	74.00	-25.90	peak
3	4874.000	7.17	34.28	42.20	50.60	49.85	74.00	-24.15	peak
4	6717.762	8.40	35.72	41.89	48.43	50.66	74.00	-23.34	peak
5	7311.000	8.84	36.37	41.41	48.01	51.81	74.00	-22.19	peak
6	9748.000	10.76	37.55	37.52	41.07	51.86	74.00	-22.14	peak



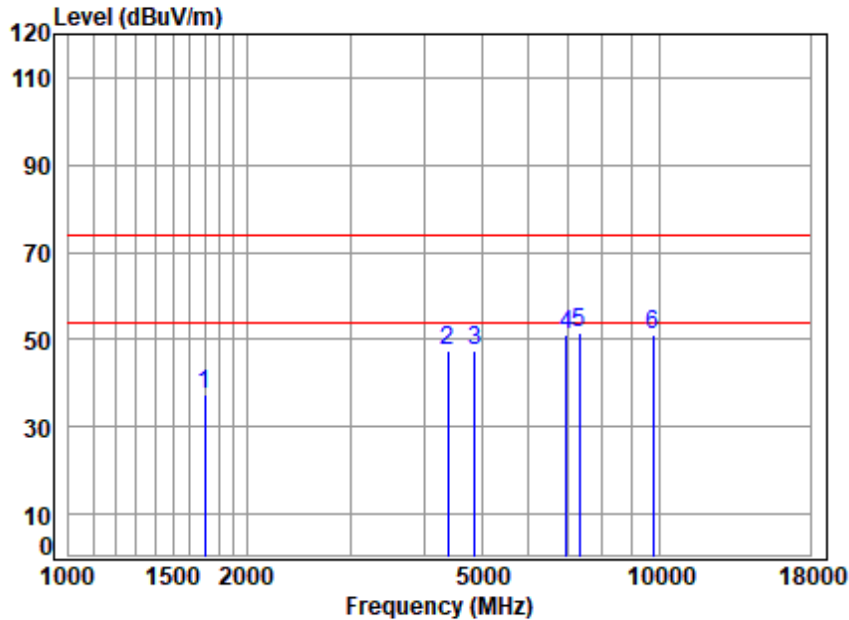
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Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:middle

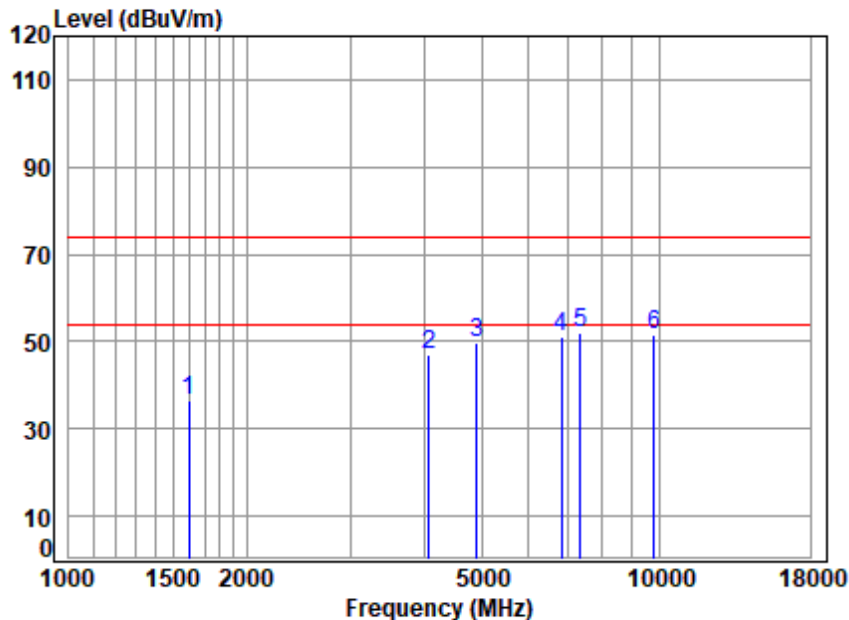


Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	3.43	26.66	40.06	47.55	37.58	74.00	-36.42
2	6.66	33.60	41.78	48.85	47.33	74.00	-26.67
3	7.17	34.28	42.20	48.13	47.38	74.00	-26.62
4	8.52	36.38	41.73	47.76	50.93	74.00	-23.07
5	8.84	36.37	41.41	47.79	51.59	74.00	-22.41
6	10.76	37.55	37.52	40.51	51.30	74.00	-22.70



Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



```
Site      : chamber
Condition: 3m HORIZONTAL
Job No    : 02038CR
Mode      : 2452 TX RSE
Note      : 2.4G WIFI 11N40
```

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	3.35	26.24	40.01	46.73	36.31	74.00	-37.69	peak
2	4074.388	6.36	33.60	41.47	48.61	47.10	74.00	-26.90	peak
3	4904.000	7.20	34.33	42.22	50.38	49.69	74.00	-24.31	peak
4	6815.551	8.45	36.00	41.82	48.47	51.10	74.00	-22.90	peak
5	7356.000	8.88	36.36	41.37	48.09	51.96	74.00	-22.04	peak
6	9808.000	10.75	37.56	37.42	40.89	51.78	74.00	-22.22	peak



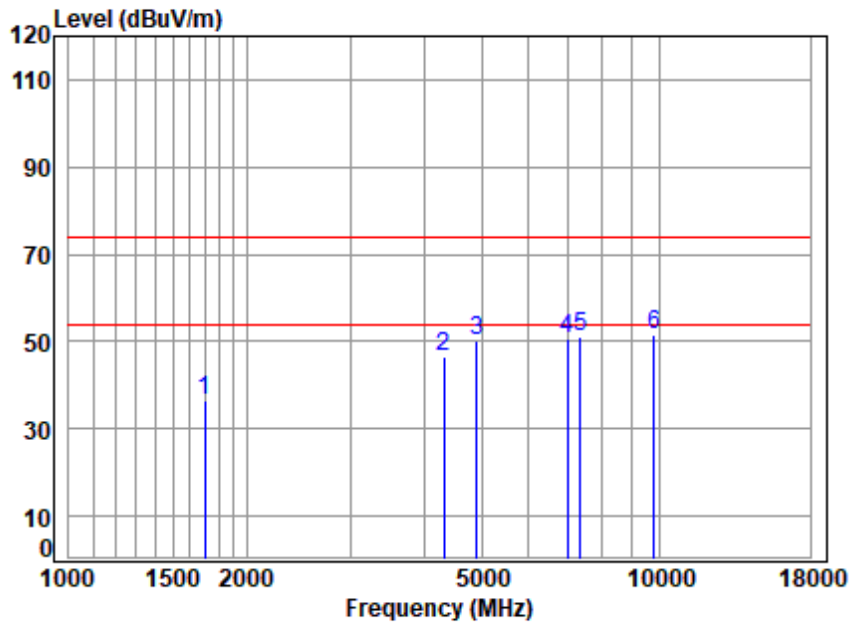
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Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02038CR
Mode : 2452 TX RSE
Note : 2.4G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1697.129	3.43	26.66	40.06	46.67	36.70	74.00 -37.30 peak
2	4316.859	6.59	33.60	41.71	48.22	46.70	74.00 -27.30 peak
3	4904.000	7.20	34.33	42.22	51.07	50.38	74.00 -23.62 peak
4	6974.982	8.53	36.43	41.72	47.40	50.64	74.00 -23.36 peak
5	7356.000	8.88	36.36	41.37	47.37	51.24	74.00 -22.76 peak
6	9808.000	10.75	37.56	37.42	40.71	51.60	74.00 -22.40 peak



8 Emission Test Results

8.1 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

8.1.1 E.U.T. Operation

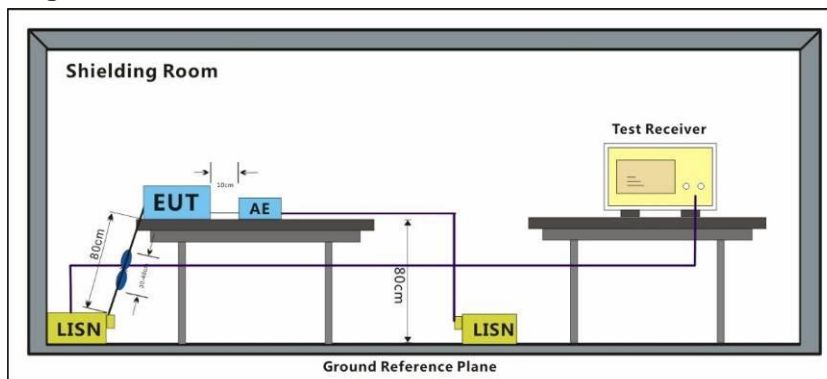
Operating Environment:

Temperature: 25.5 °C Humidity: 51.4 % RH Atmospheric Pressure: 1010 mbar

8.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	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). Only the data of worst case is recorded in the report.

8.1.3 Test Setup Diagram



8.1.4 Measurement Procedure and Data

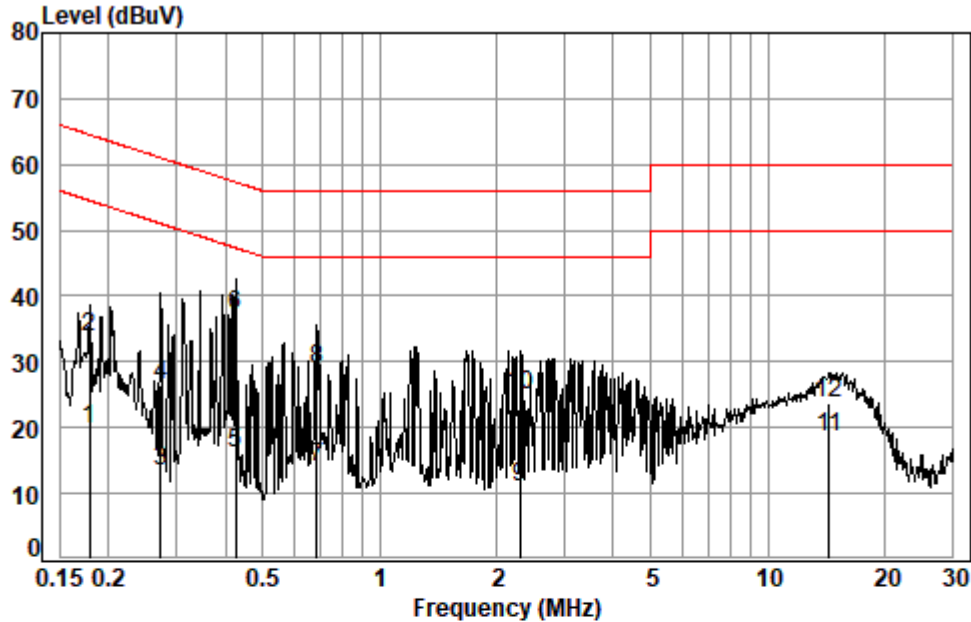
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to 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: LISN=Read Level+ Cable Loss+ LISN Factor



Test data for WG02

Test Mode: 01; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 02038CR
Test mode: 01

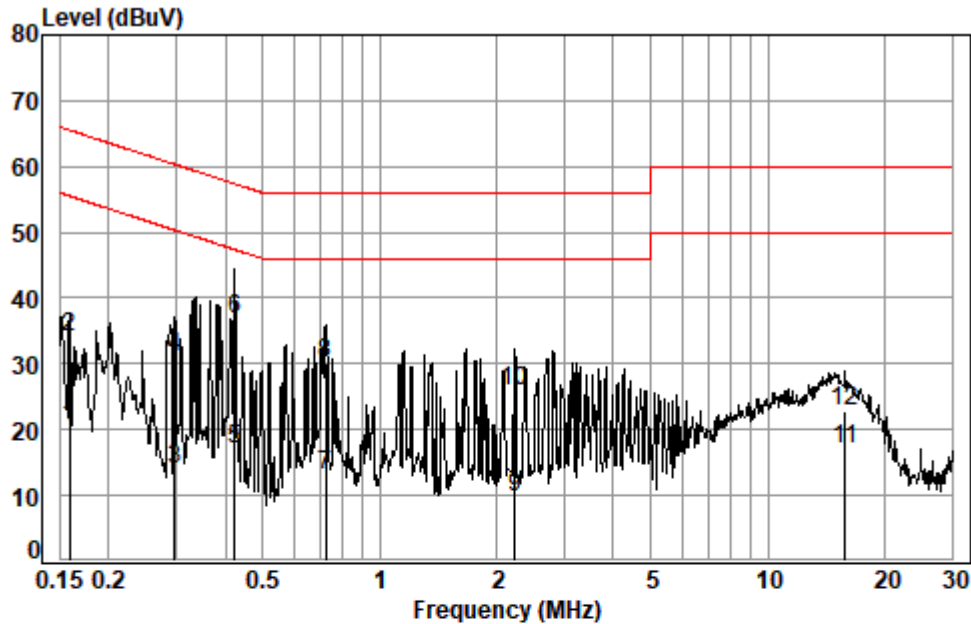
	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1787	0.03	9.71	9.97	19.71	54.55	-34.84	Average
2	0.1787	0.03	9.71	23.88	33.62	64.55	-30.93	QP
3	0.2730	0.05	9.74	3.53	13.32	51.03	-37.71	Average
4	0.2730	0.05	9.74	16.57	26.36	61.03	-34.67	QP
5	0.4260	0.07	9.76	6.16	15.99	47.33	-31.34	Average
6	0.4260	0.07	9.76	27.17	37.00	57.33	-20.33	QP
7	0.6899	0.09	9.77	4.21	14.07	46.00	-31.93	Average
8	0.6899	0.09	9.77	19.07	28.93	56.00	-27.07	QP
9	2.2968	0.13	9.82	0.89	10.84	46.00	-35.16	Average
10	2.2968	0.13	9.82	15.06	25.01	56.00	-30.99	QP
11	14.3641	0.16	10.48	7.88	18.52	50.00	-31.48	Average
12	14.3641	0.16	10.48	13.06	23.70	60.00	-36.30	QP



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Test Mode: 01; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 02038CR
Test mode: 01

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1590	0.03	9.71	10.66	20.40	55.52	-35.12	Average
2	0.1590	0.03	9.71	24.45	34.19	65.52	-31.33	QP
3	0.2971	0.05	9.74	4.13	13.92	50.32	-36.40	Average
4	0.2971	0.05	9.74	21.38	31.17	60.32	-29.15	QP
5	0.4237	0.07	9.75	7.30	17.12	47.37	-30.25	Average
6	0.4237	0.07	9.75	27.04	36.86	57.37	-20.51	QP
7	0.7274	0.09	9.77	3.07	12.93	46.00	-33.07	Average
8	0.7274	0.09	9.77	20.40	30.26	56.00	-25.74	QP
9	2.2367	0.13	9.82	-0.18	9.77	46.00	-36.23	Average
10	2.2367	0.13	9.82	15.95	25.90	56.00	-30.10	QP
11	15.8014	0.16	10.58	6.33	17.07	50.00	-32.93	Average
12	15.8014	0.16	10.58	11.94	22.68	60.00	-37.32	QP



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9 Photographs

9.1 Test Setup

Please refer to setup photos.

9.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

