TEST REPORT

Application No.:	SZCR2406002116AT
Applicant:	94275906 QUEBEC INC.
Address of Applicant:	1288 Avenue des Canadiens de Montreal, unit 3414, Montreal, Quebec, H3B 3B3, Canada
Manufacturer:	94275906 QUÉBEC INC.
Address of Manufacturer:	1288 Avenue des Canadiens de Montreal, unit 3414, H3B3B3, Montreal, Quebec, Canada
Factory:	EVERWIN TOYS(DONGGUAN) CO., LTD
Address of Factory:	Xiekeng Village, Qingxi Town, Dongguan City, Guangdong Province, China
Equipment Under Test (EUT):	
EUT Name:	Tokidos PlayCubes
Model No.:	T001
Trade Mark:	Tokidos
FCC ID:	2BGNQ-2024001
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2024-06-04
Date of Test:	2024-06-21 to 2024-07-17
Date of Issue:	2024-08-09
Test Result:	**Pass***

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

Keny Xu
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2024-08-09		Original

Authorized for issue by:				
		Gebin Sun		
		Gebin Sun/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**
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	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
Conducted Average Output Power		ANSI C63.10 (2013) Section 11.9.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass

Model No.: T001

The model T001 contains five play cubes, which were identical on electrical circuit design, layout, components used and internal wiring, only difference is in one of the play cubes with NFC function, and the remaining four play cubes without NFC function. Only the play cube with NFC function were tested.

This report is prepared for an FCC class II permissive change to install the granted module (FCC ID: 2BGNQ-2024001, Granted on :08/08/2024) into a host product, and change information as below:

1. The antenna was changed.
2. the RF power of the host product was reduced by software.
3. Classic Bluetooth function was disabled by software.

Therefore in this report the section 2 items were fully retested on model T001 and shown the data in this report.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Rechargeable battery DC3.7V, 2000mAh, Charge by DC 5V
Cable(s):	USB cable:115cm unshielded
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz, 802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK), 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	5MHz
Number of Channels:	802.11b/g/n(HT20): 11, 802.11n(HT40):7
Antenna Type:	FPC Antenna
Antenna Gain:	3.22dBi

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
RF cable	supplied by SGS	N/A(cable loss:0.6dB)	REF. No.SEL000089

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Radiated Emissions which fall in the restricted bands	± 6.0dB (Below 1GHz);± 4.6dB (Above 1GHz)
Radiated Spurious Emissions Below 1GHz	± 6.0dB for 3m; ± 5.0dB for 10m
Radiated Spurious Emissions Above 1GHz	± 4.6dB (1-18GHz);± 4.8dB (18-40GHz)
Conducted Average Output Power	± 0.75dB

Remark:
The U_{lab} (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

4.4 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, Nanshan District, Shenzhen, Guangdong, China. 518057.

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

No tests were sub-contracted.

4.5 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 (Member No. 1937)

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. Shenzhen EMC laboratory 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: CN1336

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

Designation Number: CN1336. Test Firm Registration Number: 787754.

• 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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2023-07-07	2024-07-06
				2024-07-06	2025-07-05
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2022-08-10	2024-08-09
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14

Radiated Spurious Emissions Below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2023-10-19	2024-10-18
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2024-03-14	2025-03-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2023-07-07	2024-07-06
				2024-07-06	2025-07-05

Radiated Spurious Emissions Above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2023-07-07	2024-07-06
				2024-07-06	2025-07-05
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2022-08-10	2024-08-09
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14

RF Conducted Test					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2023-10-19	2024-10-18
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2024-03-14	2025-03-13
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2023-07-07	2024-07-06
				2024-07-06	2025-07-05
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2024-03-27	2025-03-26

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2023-07-28	2024-07-27
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2023-07-28	2024-07-27
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2024-03-18	2025-03-17

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.

EUT Antenna:
The antenna connector is a IPEX type that comply with standard requirement. The best case gain of the antenna is 3.22dBi.

Antenna location: Refer to internal photo.

7 Radio Spectrum Matter Test Results

7.1 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
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.		

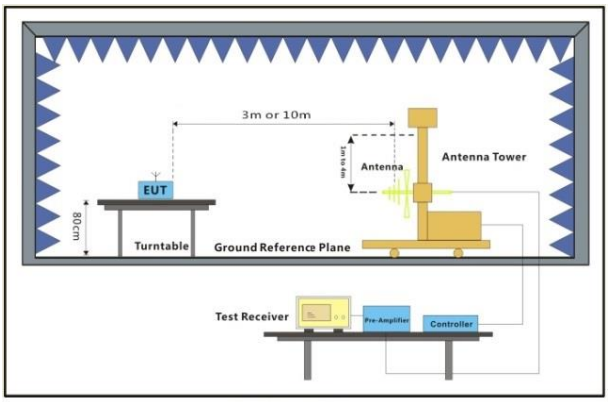
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.9 °C Humidity: 55.9 % RH Atmospheric Pressure: 1020 mbar

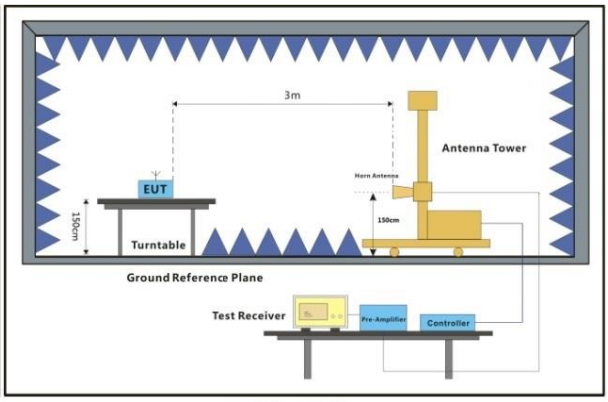
7.1.2 Test Mode Description

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), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.1.4 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.

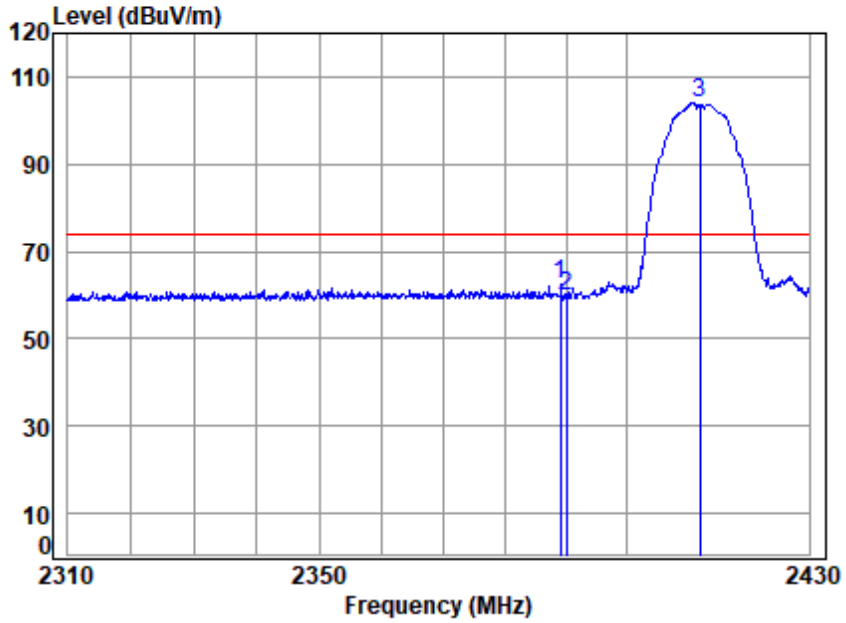
j. Repeat above procedures until all frequencies measured was complete.

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:For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s). Only the worst case mode with the widest bandwidth which can be covered the same channel (center frequency) on modes with narrower bandwidth that have the same or lower output power for each modulation family (e.g., OFDM and direct sequence spread spectrum) is recorded in the test report.

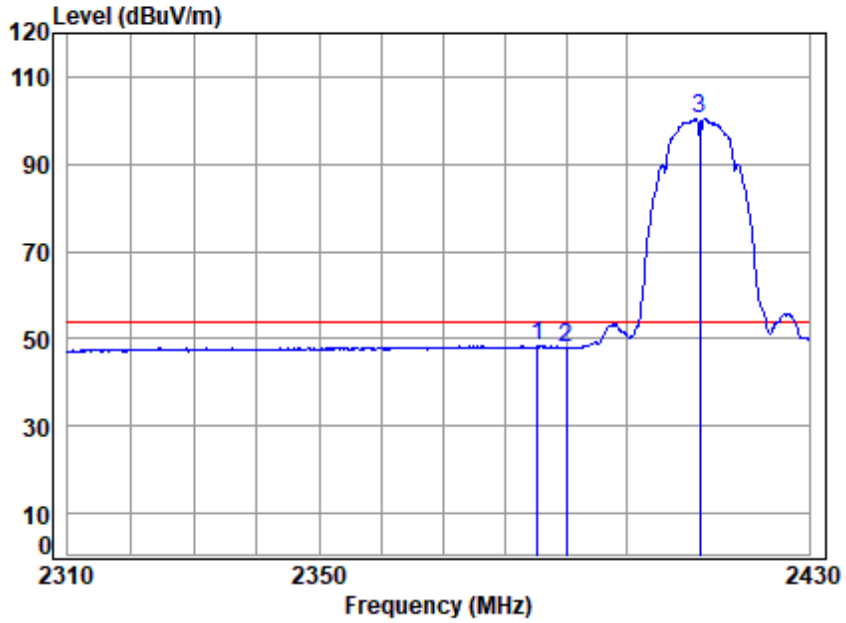
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2389.121	25.99	29.10	52.13	59.47	62.43	74.00	-11.57	peak
2	2390.000	25.99	29.10	52.13	56.98	59.94	74.00	-14.06	peak
3 p	2412.000	26.00	29.05	52.13	100.95	103.87	74.00	29.87	peak

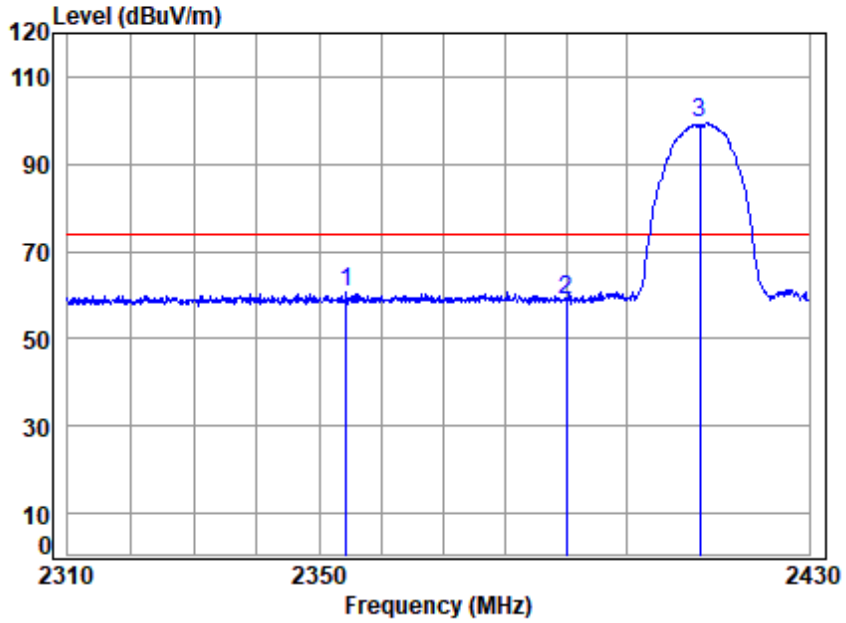
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2385.373	25.99	29.10	52.13	45.31	48.27	54.00	-5.73	Average
2	2390.000	25.99	29.10	52.13	44.79	47.75	54.00	-6.25	Average
3 q	2412.000	26.00	29.05	52.13	97.63	100.55	54.00	46.55	Average

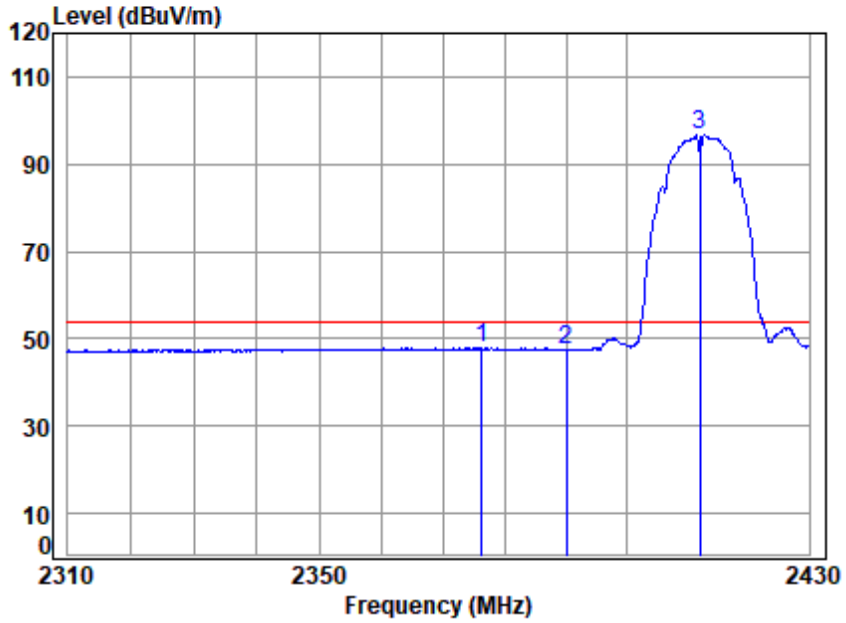
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2354.409	25.97	29.10	52.12	57.67	60.62	74.00	-13.38	Peak
2	2390.000	25.99	29.10	52.13	55.72	58.68	74.00	-15.32	Peak
3 p	2412.000	26.00	29.05	52.13	96.45	99.37	74.00	25.37	Peak

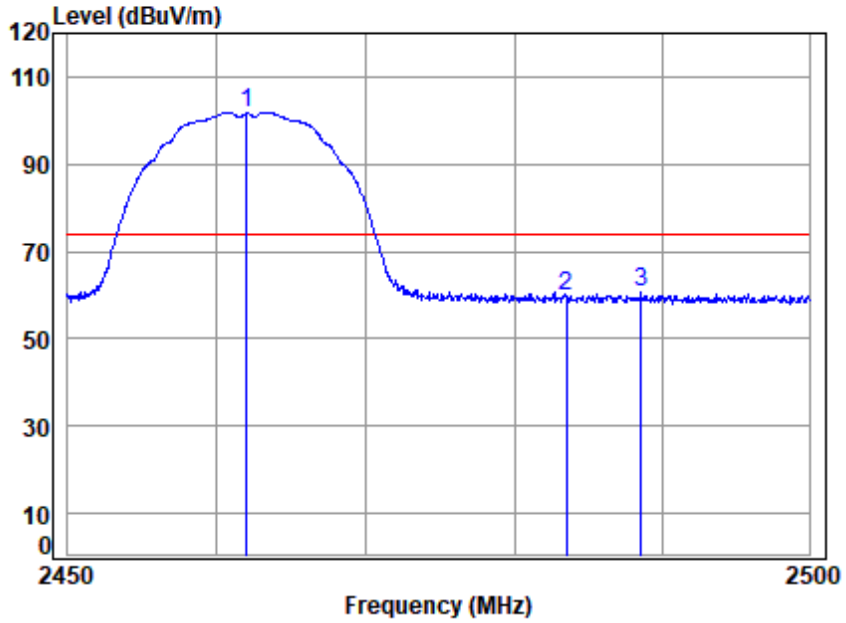
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2376.210	25.98	29.10	52.13	44.96	47.91	54.00	-6.09	Average
2	2390.000	25.99	29.10	52.13	44.52	47.48	54.00	-6.52	Average
3 q	2412.000	26.00	29.05	52.13	93.74	96.66	54.00	42.66	Average

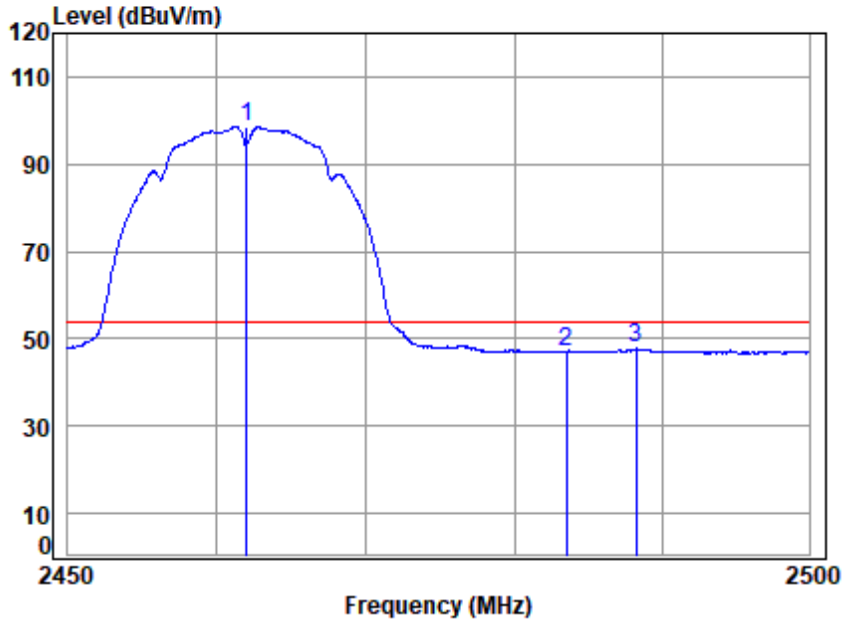
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 p	2462.000	26.03	28.90	52.14	99.12	101.91	74.00	27.91	peak
2	2483.500	26.04	28.90	52.14	56.78	59.58	74.00	-14.42	peak
3	2488.561	26.04	28.90	52.14	58.11	60.91	74.00	-13.09	peak

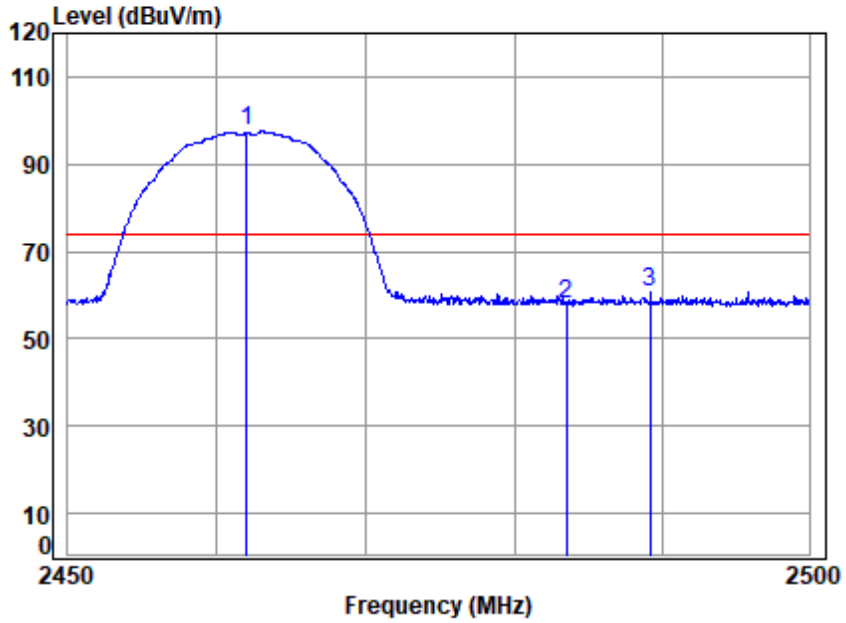
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 q	2462.000	26.03	28.90	52.14	95.76	98.55	54.00	44.55	Average
2	2483.500	26.04	28.90	52.14	44.21	47.01	54.00	-6.99	Average
3	2488.260	26.04	28.90	52.14	44.89	47.69	54.00	-6.31	Average

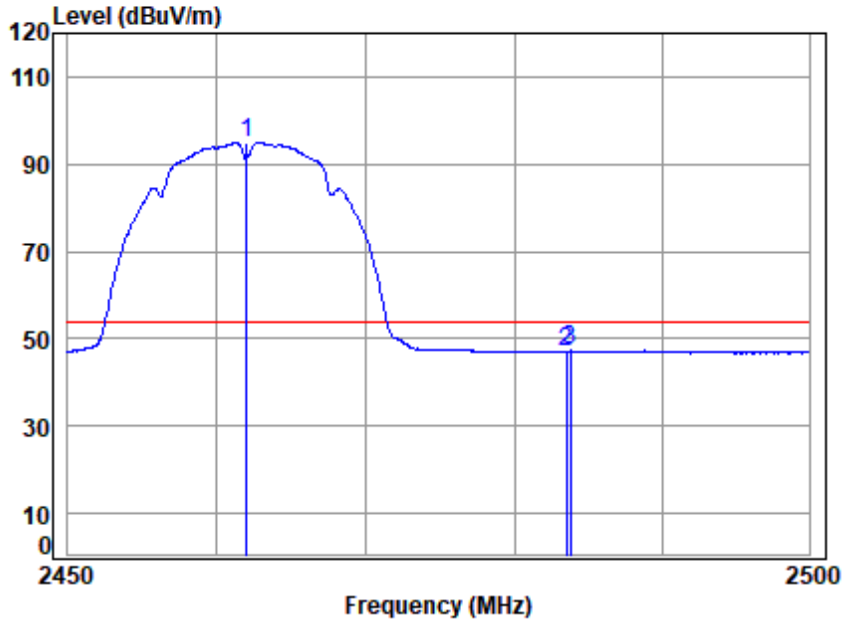
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 p	2462.000	26.03	28.90	52.14	94.75	97.54	74.00	23.54	Peak
2	2483.500	26.04	28.90	52.14	55.21	58.01	74.00	-15.99	Peak
3	2489.215	26.04	28.90	52.14	58.11	60.91	74.00	-13.09	Peak

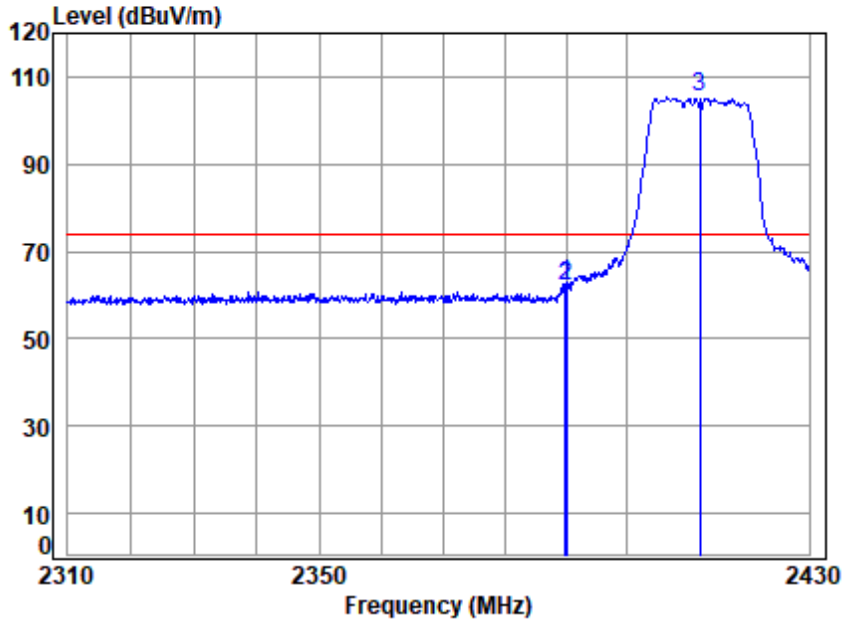
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 q	2462.000	26.03	28.90	52.14	92.27	95.06	54.00	41.06	Average
2	2483.500	26.04	28.90	52.14	44.22	47.02	54.00	-6.98	Average
3	2483.790	26.04	28.90	52.14	44.46	47.26	54.00	-6.74	Average

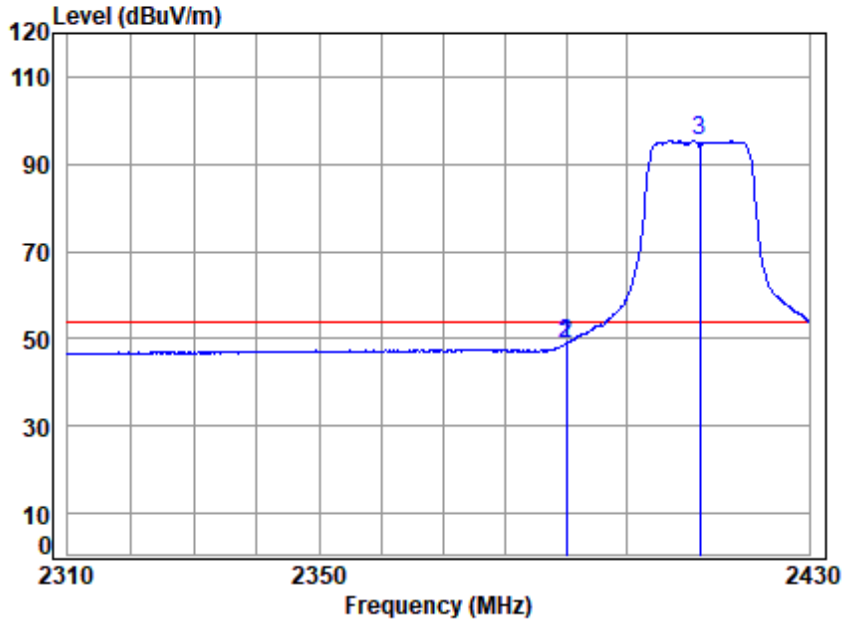
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2389.847	25.99	29.10	52.13	59.68	62.64	74.00	-11.36	peak
2	2390.000	25.99	29.10	52.13	58.90	61.86	74.00	-12.14	peak
3 p	2412.000	26.00	29.05	52.13	102.39	105.31	74.00	31.31	peak

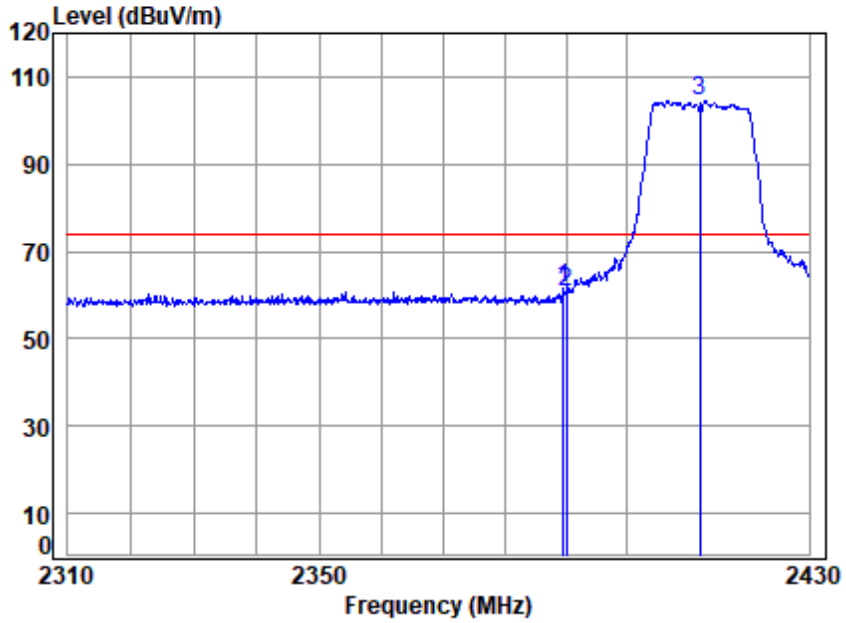
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2389.968	25.99	29.10	52.13	46.02	48.98	54.00	-5.02	Average
2	2390.000	25.99	29.10	52.13	46.02	48.98	54.00	-5.02	Average
3 q	2412.000	26.00	29.05	52.13	92.41	95.33	54.00	41.33	Average

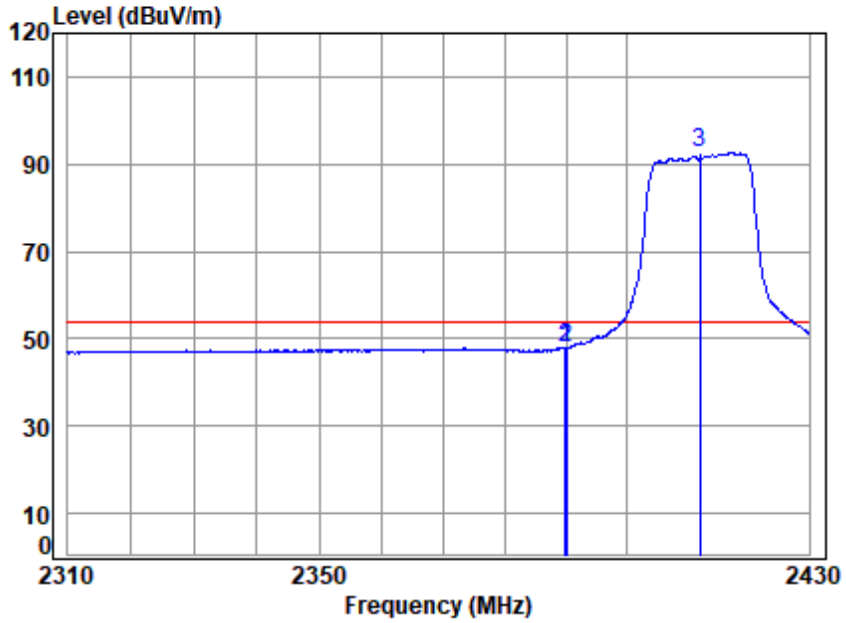
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2389.484	25.99	29.10	52.13	58.80	61.76	74.00	-12.24	Peak
2	2390.000	25.99	29.10	52.13	57.79	60.75	74.00	-13.25	Peak
3 p	2412.000	26.00	29.05	52.13	101.42	104.34	74.00	30.34	Peak

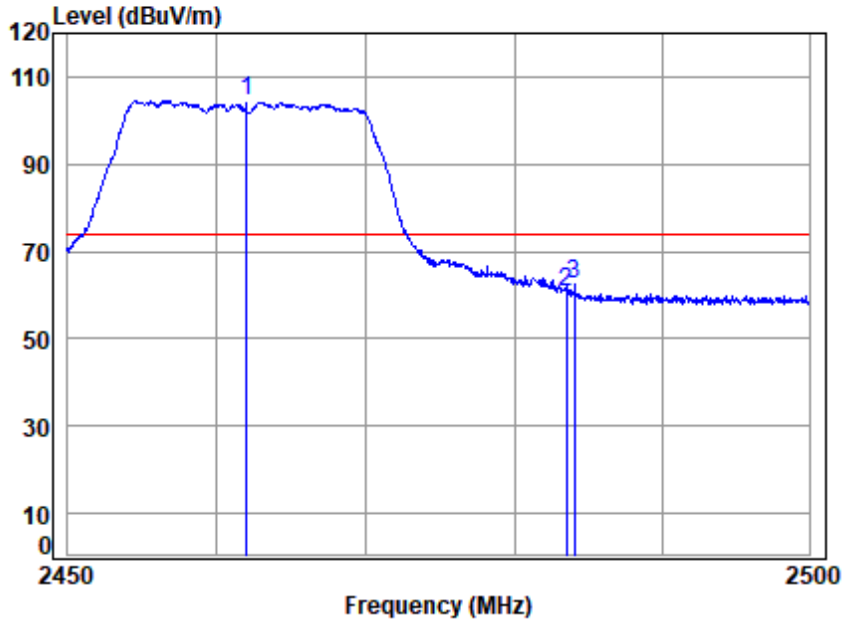
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2412 Band edge
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	2389.847	25.99	29.10	52.13	45.07	48.03	54.00	-5.97	Average
2	2390.000	25.99	29.10	52.13	45.01	47.97	54.00	-6.03	Average
3 q	2412.000	26.00	29.05	52.13	89.73	92.65	54.00	38.65	Average

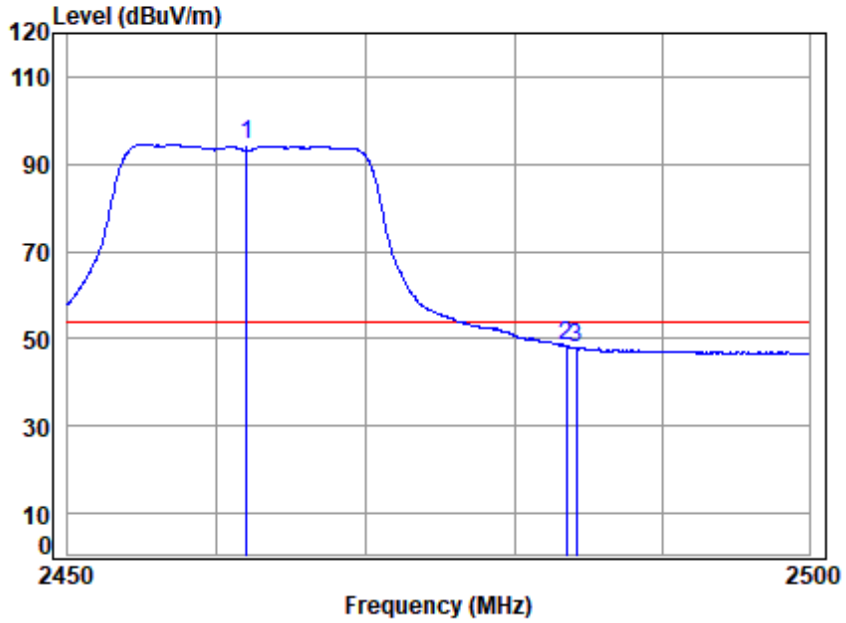
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 p	2462.000	26.03	28.90	52.14	101.83	104.62	74.00	30.62	peak
2	2483.500	26.04	28.90	52.14	57.81	60.61	74.00	-13.39	peak
3	2484.091	26.04	28.90	52.14	59.52	62.32	74.00	-11.68	peak

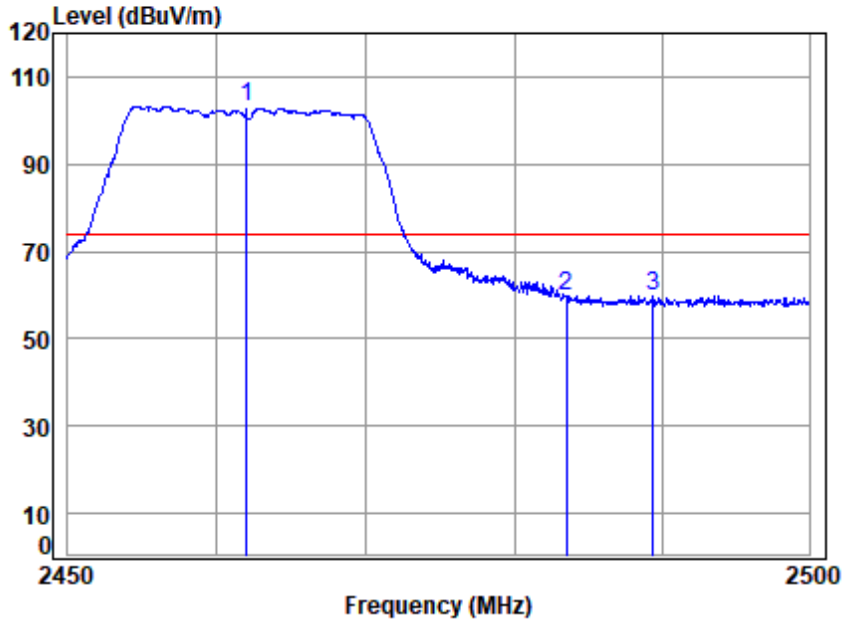
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 q	2462.000	26.03	28.90	52.14	91.88	94.67	54.00	40.67	Average
2	2483.500	26.04	28.90	52.14	45.58	48.38	54.00	-5.62	Average
3	2484.191	26.04	28.90	52.14	45.22	48.02	54.00	-5.98	Average

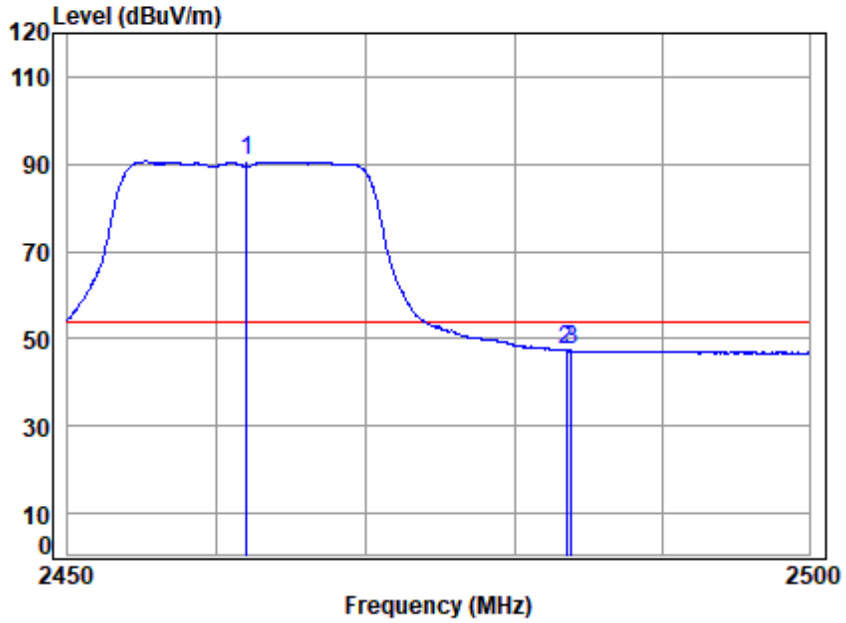
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 p	2462.000	26.03	28.90	52.14	100.52	103.31	74.00	29.31	Peak
2	2483.500	26.04	28.90	52.14	56.75	59.55	74.00	-14.45	Peak
3	2489.366	26.04	28.90	52.14	57.16	59.96	74.00	-14.04	Peak

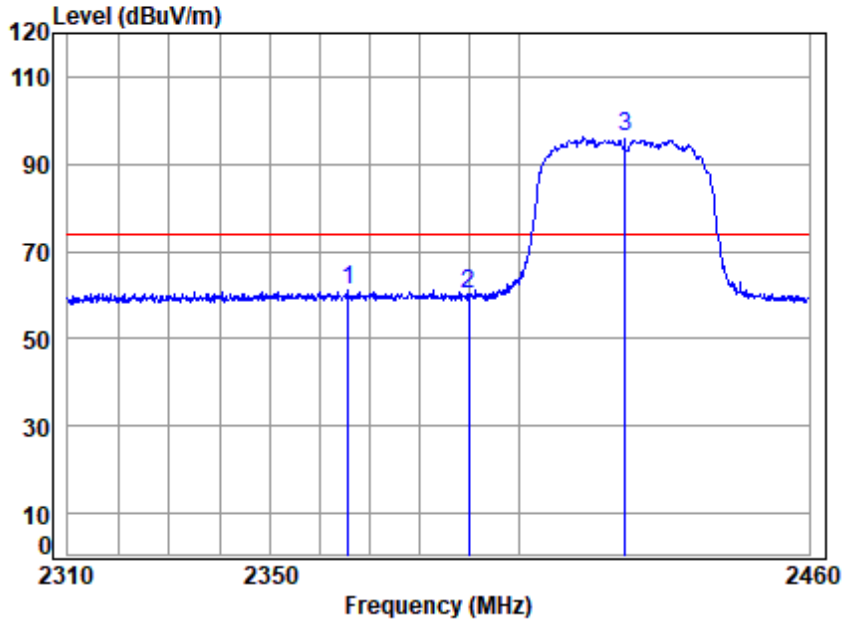
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2462 Band edge
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 q	2462.000	26.03	28.90	52.14	87.84	90.63	54.00	36.63	Average
2	2483.500	26.04	28.90	52.14	44.48	47.28	54.00	-6.72	Average
3	2483.840	26.04	28.90	52.14	44.60	47.40	54.00	-6.60	Average

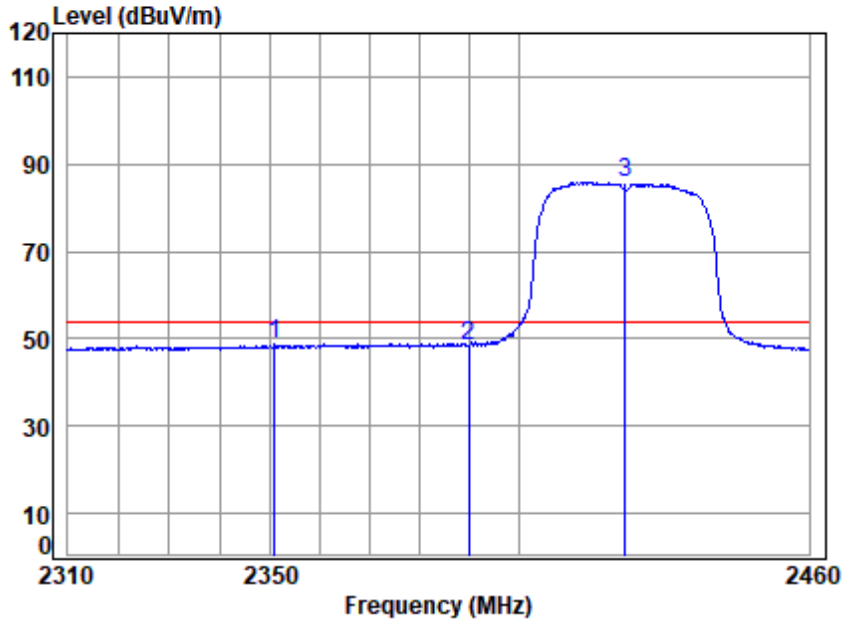
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2422 Band edge
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	2365.742	25.98	29.10	52.13	58.31	61.26	74.00	-12.74	peak
2	2390.000	25.99	29.10	52.13	57.50	60.46	74.00	-13.54	peak
3 p	2422.000	26.01	29.01	52.13	93.22	96.11	74.00	22.11	peak

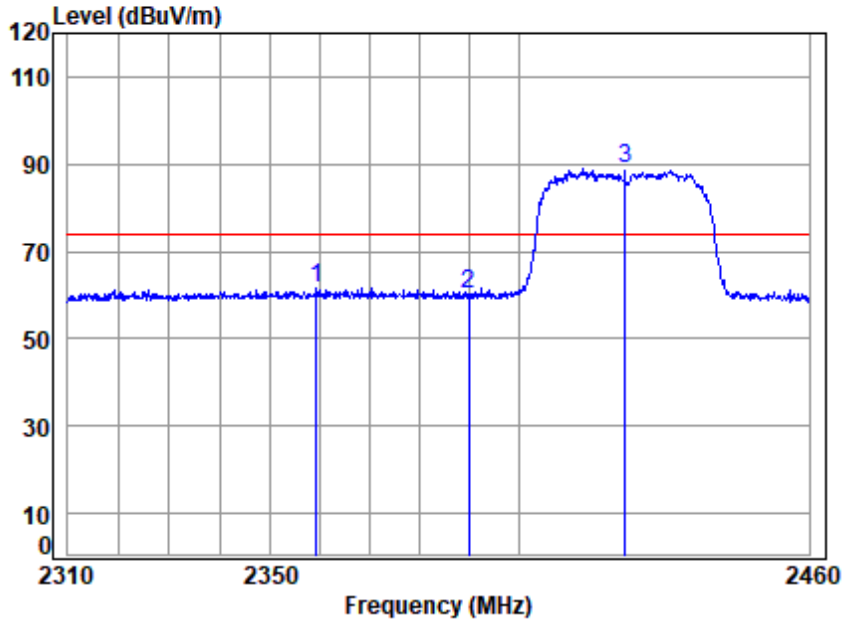
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2422 Band edge
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	2350.905	25.97	29.10	52.12	46.01	48.96	54.00	-5.04	Average
2	2390.000	25.99	29.10	52.13	45.55	48.51	54.00	-5.49	Average
3 q	2422.000	26.01	29.01	52.13	82.96	85.85	54.00	31.85	Average

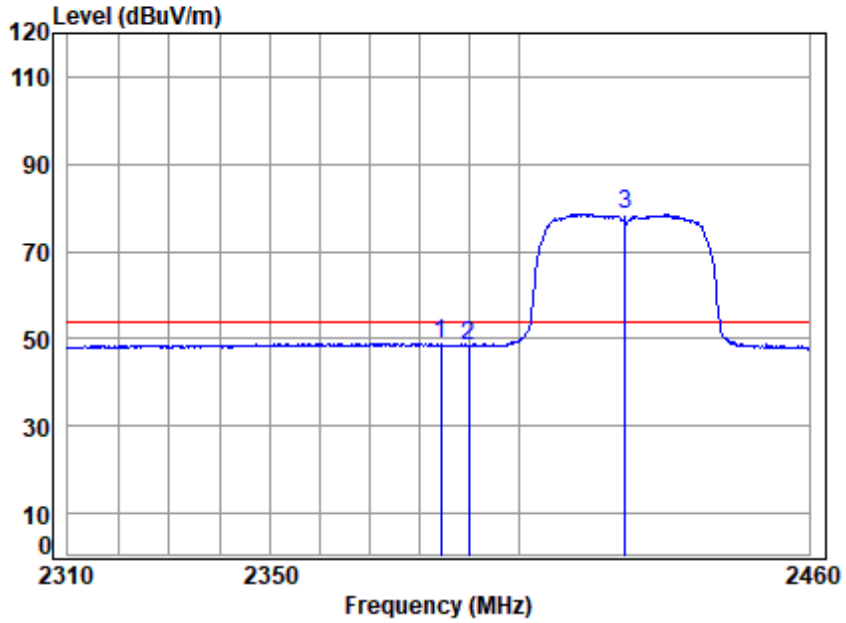
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2422 Band edge
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	2359.351	25.97	29.10	52.12	58.77	61.72	74.00	-12.28	Peak
2	2390.000	25.99	29.10	52.13	57.29	60.25	74.00	-13.75	Peak
3 p	2422.000	26.01	29.01	52.13	85.86	88.75	74.00	14.75	Peak

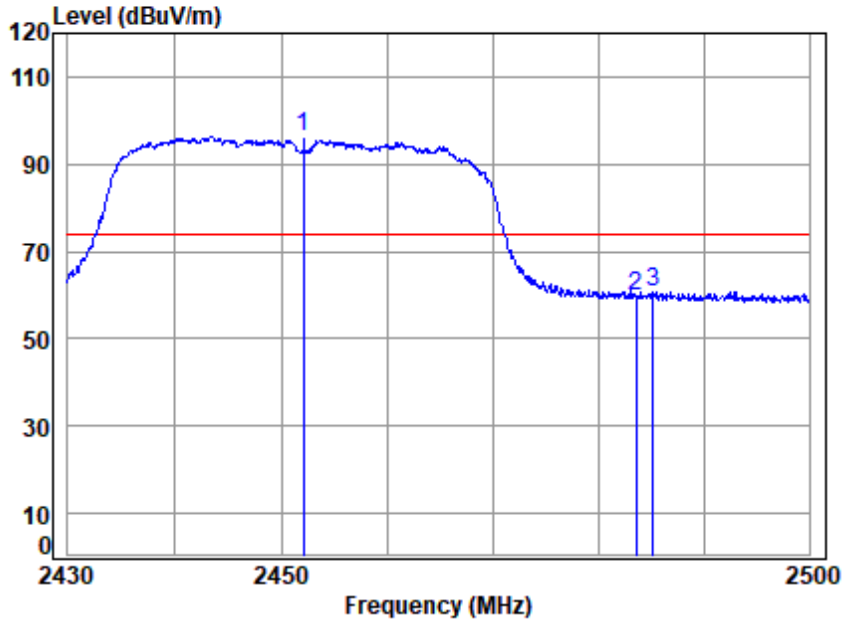
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2422 Band edge
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	2384.420	25.99	29.10	52.13	45.95	48.91	54.00	-5.09	Average
2	2390.000	25.99	29.10	52.13	45.60	48.56	54.00	-5.44	Average
3 q	2422.000	26.01	29.01	52.13	75.74	78.63	54.00	24.63	Average

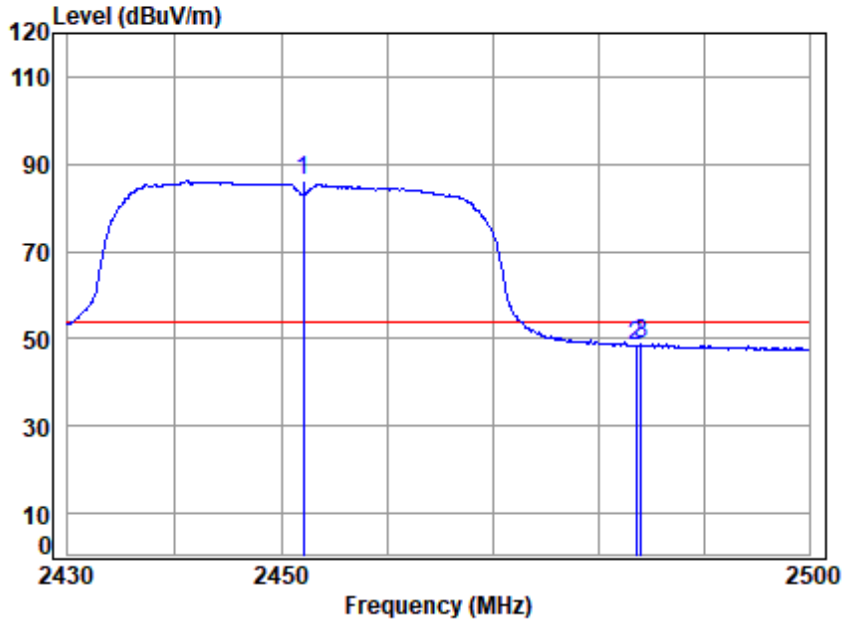
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2452 Band edge
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 p	2452.000	26.02	28.90	52.14	93.52	96.30	74.00	22.30	peak
2	2483.500	26.04	28.90	52.14	57.17	59.97	74.00	-14.03	peak
3	2485.135	26.04	28.90	52.14	57.99	60.79	74.00	-13.21	peak

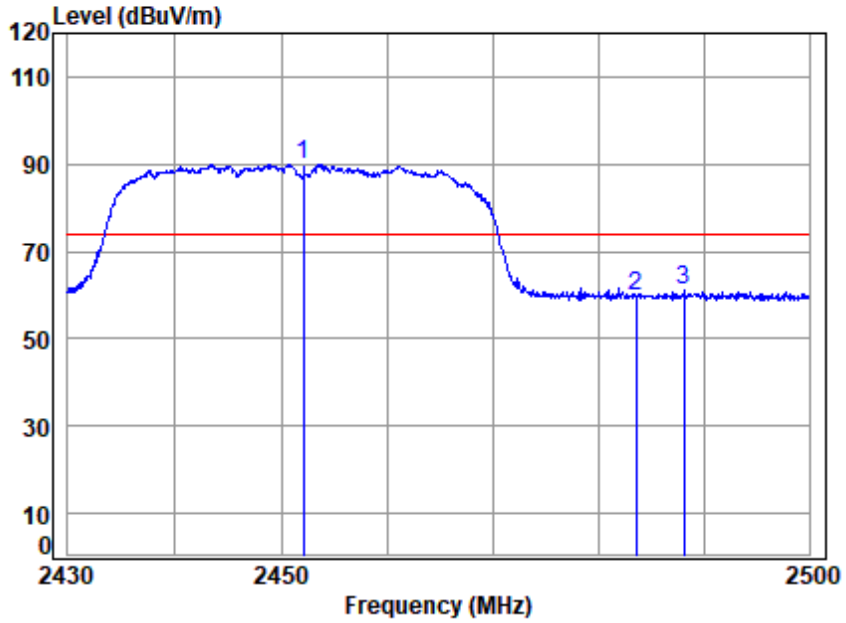
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2452 Band edge
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 q	2452.000	26.02	28.90	52.14	83.32	86.10	54.00	32.10	Average
2	2483.500	26.04	28.90	52.14	45.49	48.29	54.00	-5.71	Average
3	2484.006	26.04	28.90	52.14	45.85	48.65	54.00	-5.35	Average

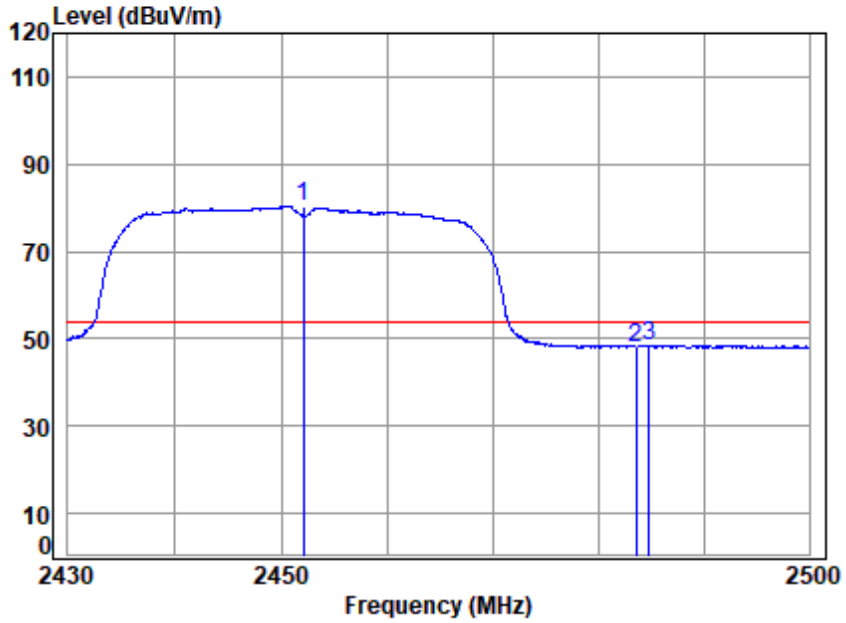
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2452 Band edge
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 p	2452.000	26.02	28.90	52.14	87.29	90.07	74.00	16.07	Peak
2	2483.500	26.04	28.90	52.14	56.76	59.56	74.00	-14.44	Peak
3	2488.030	26.04	28.90	52.14	58.20	61.00	74.00	-13.00	Peak

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



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2452 Band edge
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 q	2452.000	26.02	28.90	52.14	77.56	80.34	54.00	26.34	Average
2	2483.500	26.04	28.90	52.14	45.31	48.11	54.00	-5.89	Average
3	2484.711	26.04	28.90	52.14	45.73	48.53	54.00	-5.47	Average

7.2 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
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
960-1000	500	3

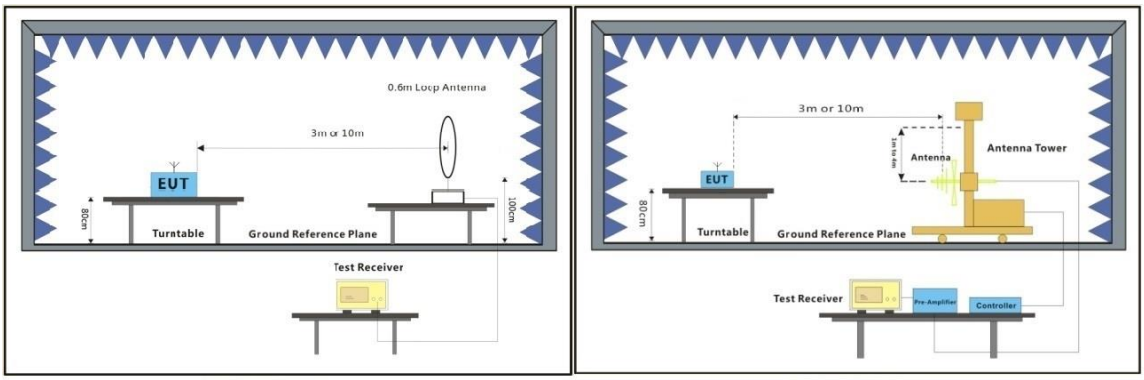
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 23.2 °C Humidity: 45.8 % RH Atmospheric Pressure: 1020 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), 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



Below 30MHz 30MHz-1GHz

7.2.4 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.

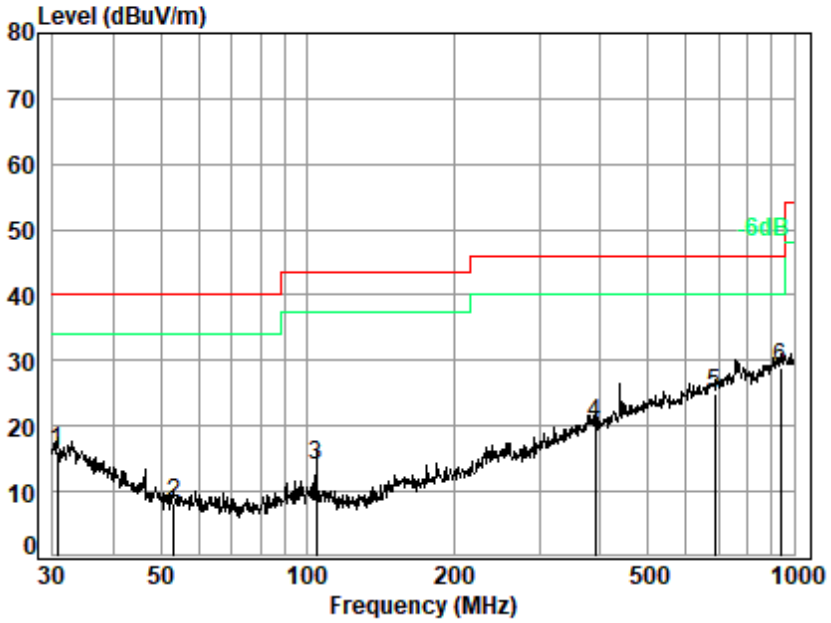
i. Repeat above procedures until all frequencies measured was complete.

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.

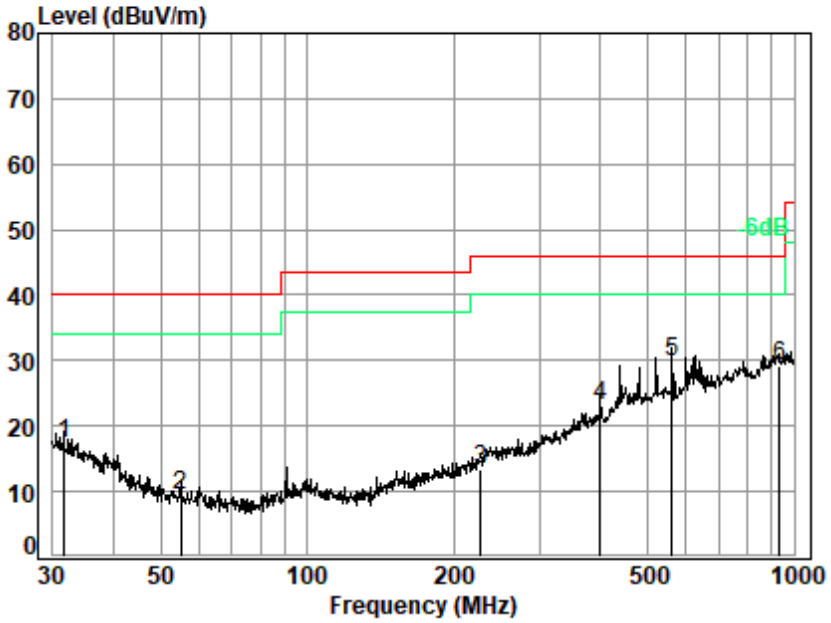
Test Mode: 01; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : 02116AT/02117AT
Test Mode: 01

	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.64	20.90	0.65	27.79	22.46	16.22	40.00	-23.78	QP
2	53.32	12.24	0.86	27.72	22.73	8.11	40.00	-31.89	QP
3	104.17	12.22	1.21	27.57	28.23	14.09	43.50	-29.41	QP
4	390.72	20.75	2.51	27.12	24.19	20.33	46.00	-25.67	QP
5	687.15	25.71	3.47	27.76	23.57	24.99	46.00	-21.01	QP
6 q	938.83	28.15	4.19	26.49	23.15	29.00	46.00	-17.00	QP

Test Mode: 01; Polarity: Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : 02116AT/02117AT
Test Mode: 01

	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	31.62	20.45	0.66	27.79	23.87	17.19	40.00	-22.81	QP
2	55.03	11.96	0.88	27.72	24.31	9.43	40.00	-30.57	QP
3	226.89	16.00	1.85	27.06	22.67	13.46	46.00	-32.54	QP
4	400.43	20.60	2.55	27.16	26.98	22.97	46.00	-23.03	QP
5 q	560.69	23.44	3.08	27.81	31.20	29.91	46.00	-16.09	QP
6	932.27	28.16	4.17	26.53	23.26	29.06	46.00	-16.94	QP

7.3 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
Measurement Distance: 3m

Limit:

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

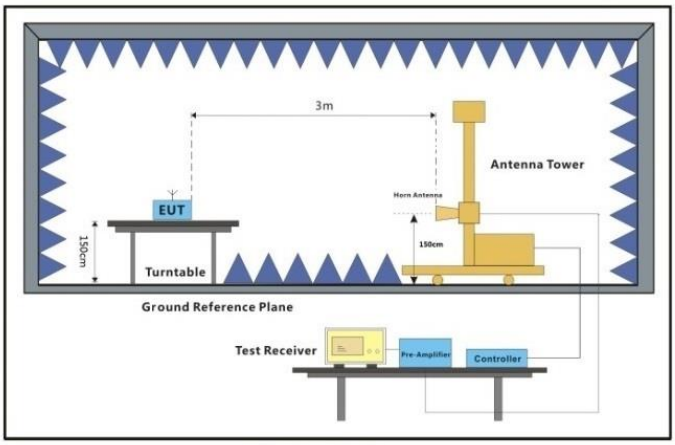
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 21.7 °C Humidity: 58.6 % RH Atmospheric Pressure: 1020 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), 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



Above 1GHz

7.3.4 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:

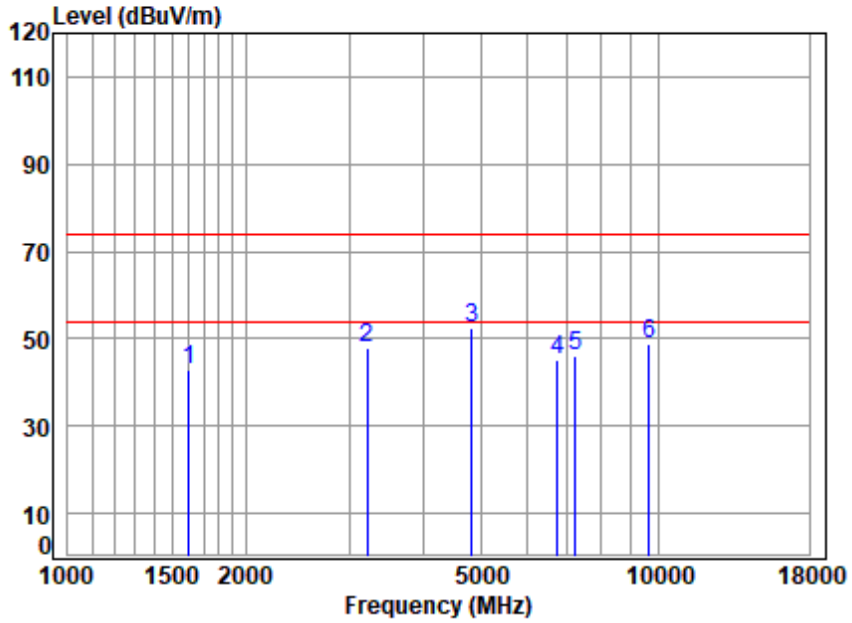
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 1GHz to 25GHz, the disturbance below 1GHz and above 18GHz were 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.

4. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s). Only the worst case mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum) is recorded in the test report.

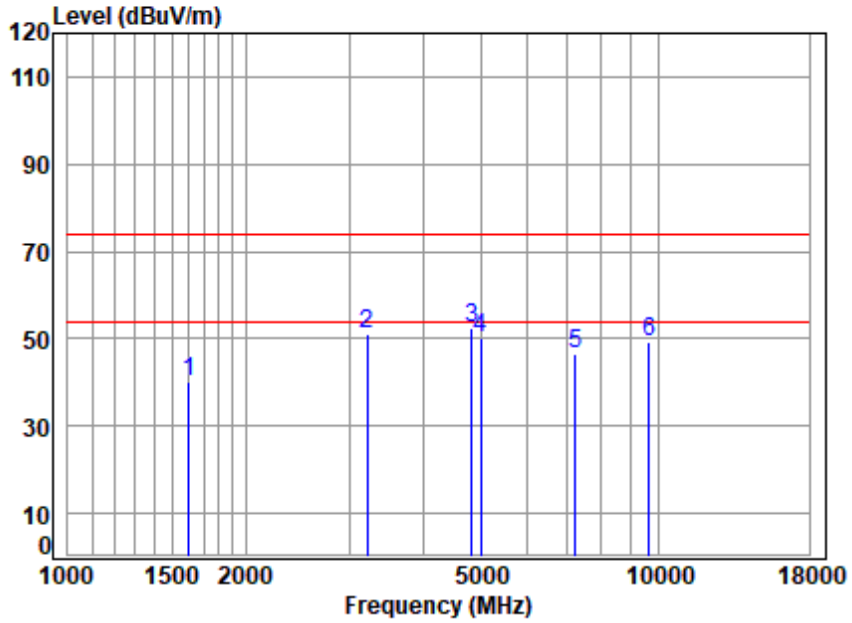
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2412 TX RSE
: 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	1606.441	4.80	26.74	61.69	72.99	42.84	74.00	-31.16	peak
2	3214.623	6.79	32.67	61.36	69.62	47.72	74.00	-26.28	peak
3 p	4824.000	8.01	34.40	61.90	71.90	52.41	74.00	-21.59	peak
4	6737.207	9.33	35.20	62.30	63.16	45.39	74.00	-28.61	peak
5	7236.000	9.29	35.70	62.03	63.18	46.14	74.00	-27.86	peak
6	9648.000	11.38	37.50	62.16	62.09	48.81	74.00	-25.19	peak

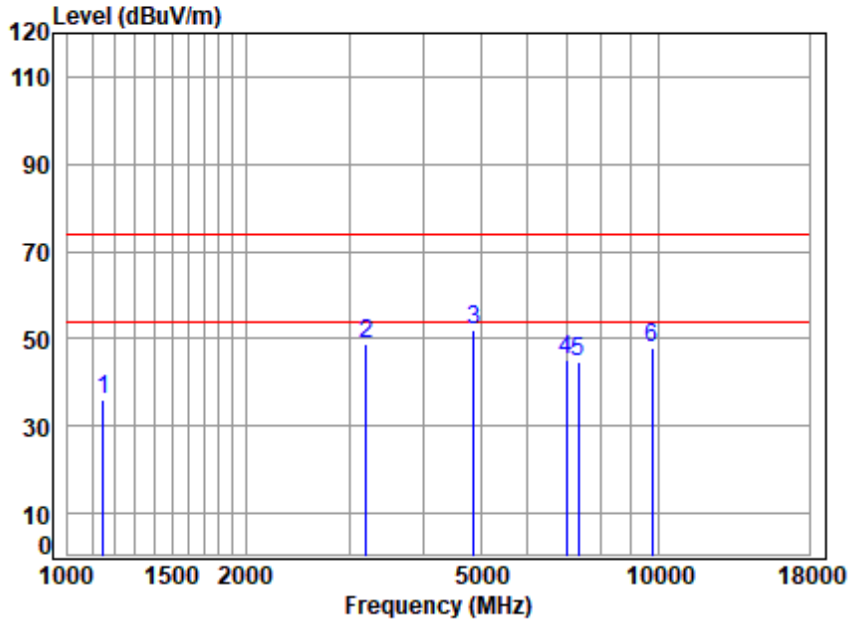
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2412 TX RSE
: 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	1606.441	4.80	26.74	61.69	70.16	40.01	74.00	-33.99	peak
2	3214.623	6.79	32.67	61.36	72.89	50.99	74.00	-23.01	peak
3 p	4824.000	8.01	34.40	61.90	71.99	52.50	74.00	-21.50	peak
4	5002.497	8.09	34.39	62.04	69.59	50.03	74.00	-23.97	peak
5	7236.000	9.29	35.70	62.03	63.69	46.65	74.00	-27.35	peak
6	9648.000	11.38	37.50	62.16	62.40	49.12	74.00	-24.88	peak

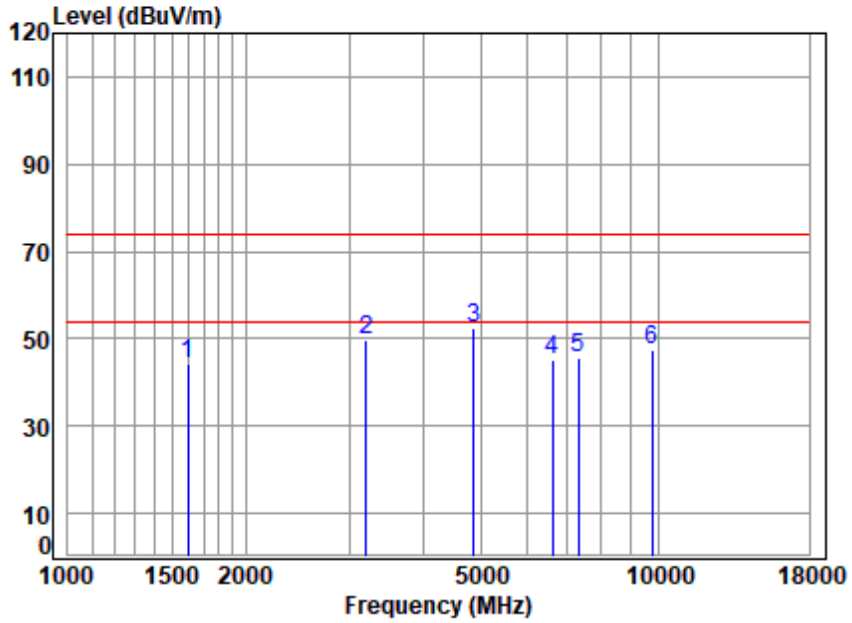
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2437 TX RSE
: 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	1148.823	4.56	23.90	61.53	69.31	36.24	74.00	-37.76	peak
2	3205.345	6.78	32.81	61.36	70.56	48.79	74.00	-25.21	peak
3 p	4874.000	8.03	34.60	61.94	71.37	52.06	74.00	-21.94	peak
4	6995.172	9.53	35.71	62.16	61.95	45.03	74.00	-28.97	peak
5	7311.000	9.21	35.70	61.99	61.93	44.85	74.00	-29.15	peak
6	9748.000	11.32	37.40	62.19	61.21	47.74	74.00	-26.26	peak

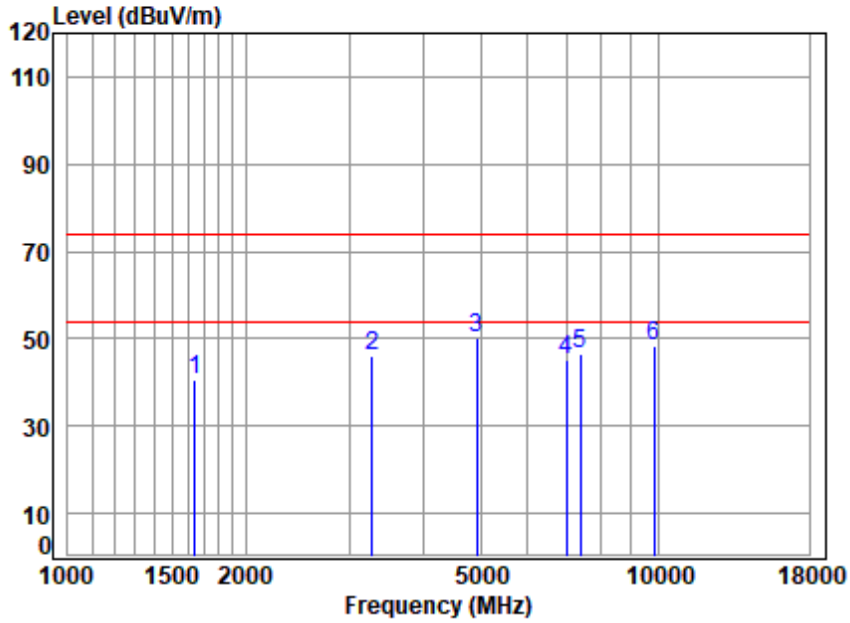
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:middle



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2437 TX RSE
: 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	4.78	26.81	61.69	74.26	44.16	74.00	-29.84	peak
2	3205.345	6.78	32.81	61.36	71.34	49.57	74.00	-24.43	peak
3 p	4874.000	8.03	34.60	61.94	71.59	52.28	74.00	-21.72	peak
4	6621.375	9.24	35.26	62.37	63.05	45.18	74.00	-28.82	peak
5	7311.000	9.21	35.70	61.99	62.71	45.63	74.00	-28.37	peak
6	9748.000	11.32	37.40	62.19	61.06	47.59	74.00	-26.41	peak

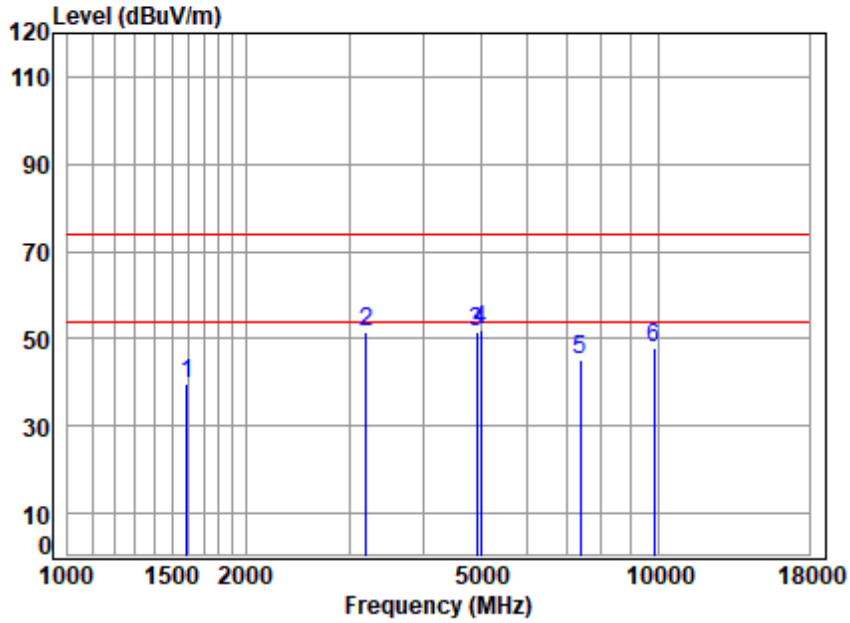
Test Mode: 01; Polarity: Horizontal; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2462 TX RSE
: 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	1644.019	4.88	26.36	61.70	71.13	40.67	74.00	-33.33	peak
2	3280.326	6.81	31.55	61.34	68.90	45.92	74.00	-28.08	peak
3 p	4924.000	8.05	34.65	61.98	69.50	50.22	74.00	-23.78	peak
4	6995.172	9.53	35.71	62.16	62.13	45.21	74.00	-28.79	peak
5	7386.000	9.14	35.77	61.95	63.40	46.36	74.00	-27.64	peak
6	9848.000	11.27	37.20	62.22	61.92	48.17	74.00	-25.83	peak

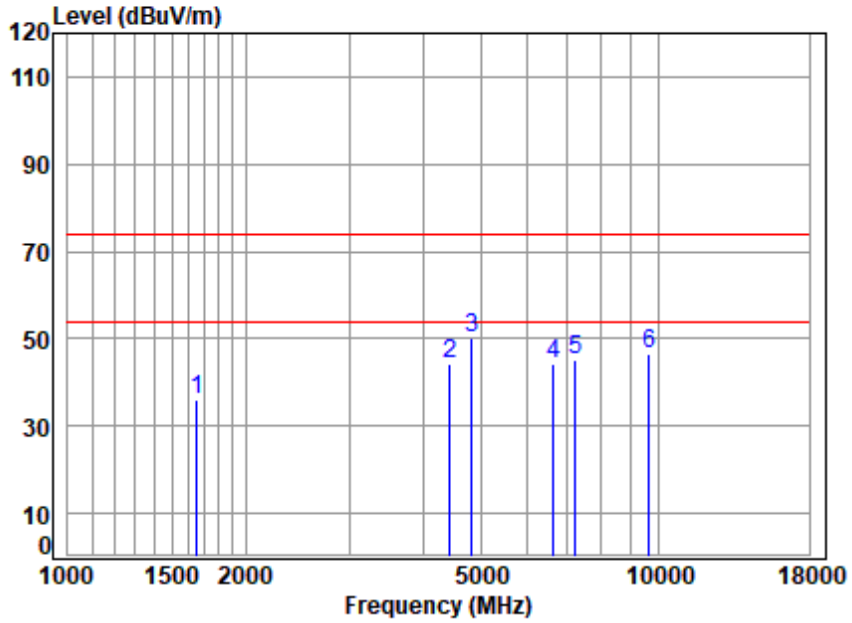
Test Mode: 01; Polarity: Vertical; Modulation:802.11b; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2462 TX RSE
: 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	1592.571	4.77	26.83	61.68	69.97	39.89	74.00	-34.11	peak
2	3196.094	6.78	32.87	61.36	73.17	51.46	74.00	-22.54	peak
3	4924.000	8.05	34.65	61.98	70.81	51.53	74.00	-22.47	peak
4 p	5002.497	8.09	34.39	62.04	71.59	52.03	74.00	-21.97	peak
5	7386.000	9.14	35.77	61.95	62.21	45.17	74.00	-28.83	peak
6	9848.000	11.27	37.20	62.22	61.47	47.72	74.00	-26.28	peak

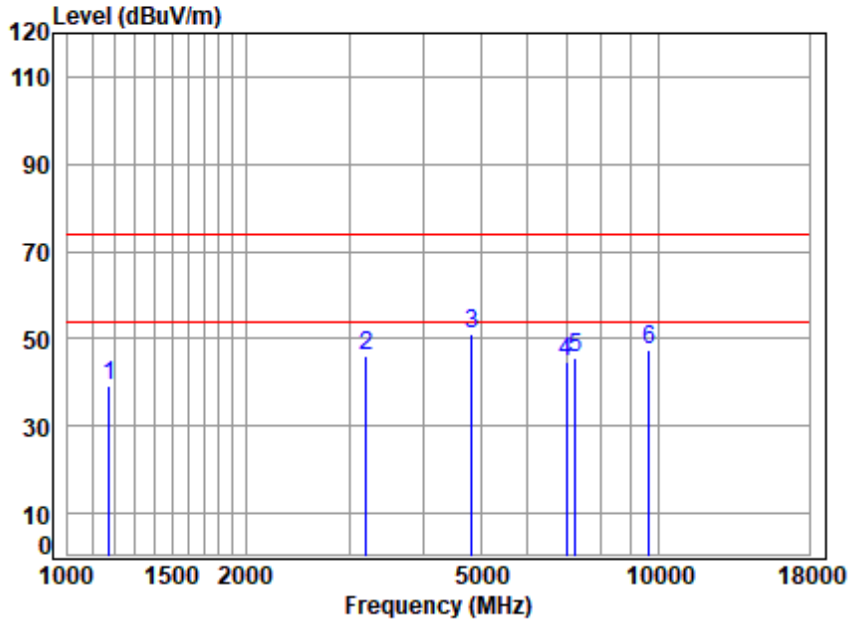
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2412 TX RSE
: 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	1653.550	4.90	26.29	61.70	66.53	36.02	74.00	-37.98	peak
2	4443.453	7.94	34.28	61.58	63.84	44.48	74.00	-29.52	peak
3 p	4824.000	8.01	34.40	61.90	69.69	50.20	74.00	-23.80	peak
4	6640.542	9.25	35.22	62.36	62.25	44.36	74.00	-29.64	peak
5	7236.000	9.29	35.70	62.03	62.18	45.14	74.00	-28.86	peak
6	9648.000	11.38	37.50	62.16	59.73	46.45	74.00	-27.55	peak

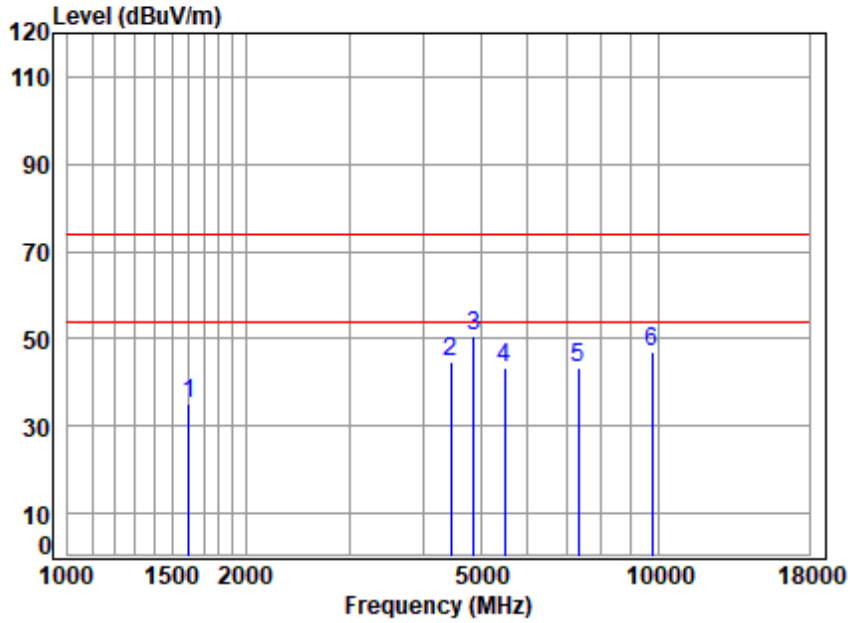
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2412 TX RSE
: 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	1175.697	4.56	24.16	61.54	71.93	39.11	74.00	-34.89	peak
2	3205.345	6.78	32.81	61.36	67.91	46.14	74.00	-27.86	peak
3 p	4824.000	8.01	34.40	61.90	70.57	51.08	74.00	-22.92	peak
4	6995.172	9.53	35.71	62.16	61.69	44.77	74.00	-29.23	peak
5	7236.000	9.29	35.70	62.03	62.69	45.65	74.00	-28.35	peak
6	9648.000	11.38	37.50	62.16	60.70	47.42	74.00	-26.58	peak

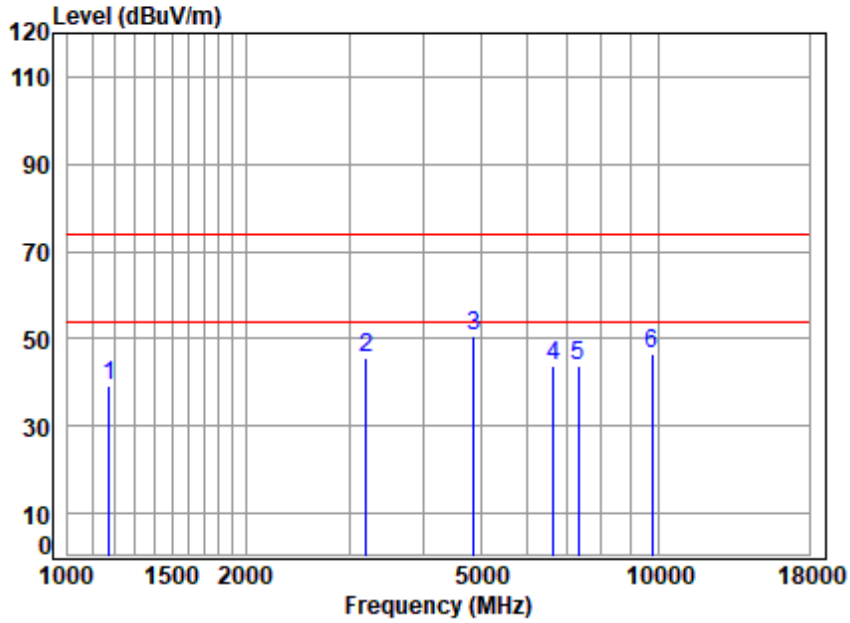
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2437 TX RSE
: 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	1601.804	4.79	26.78	61.69	65.18	35.06	74.00	-38.94	peak
2	4456.315	7.92	34.12	61.59	64.07	44.52	74.00	-29.48	peak
3 p	4874.000	8.03	34.60	61.94	69.97	50.66	74.00	-23.34	peak
4	5487.260	9.27	34.55	62.40	62.11	43.53	74.00	-30.47	peak
5	7311.000	9.21	35.70	61.99	60.64	43.56	74.00	-30.44	peak
6	9748.000	11.32	37.40	62.19	60.30	46.83	74.00	-27.17	peak

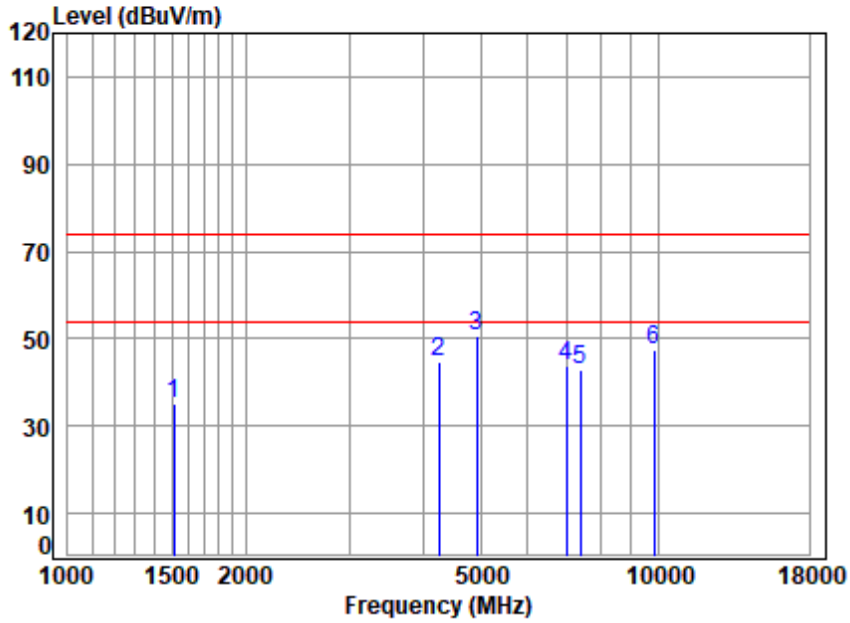
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:middle



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2437 TX RSE
: 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	1175.697	4.56	24.16	61.54	71.90	39.08	74.00	-34.92	peak
2	3205.345	6.78	32.81	61.36	67.46	45.69	74.00	-28.31	peak
3 p	4874.000	8.03	34.60	61.94	70.11	50.80	74.00	-23.20	peak
4	6640.542	9.25	35.22	62.36	61.51	43.62	74.00	-30.38	peak
5	7311.000	9.21	35.70	61.99	60.89	43.81	74.00	-30.19	peak
6	9748.000	11.32	37.40	62.19	60.02	46.55	74.00	-27.45	peak

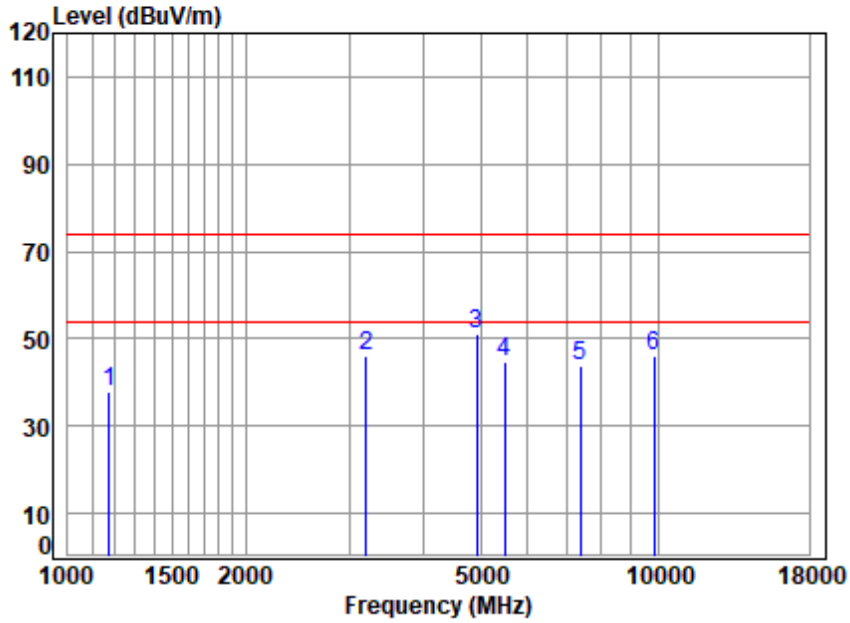
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2462 TX RSE
: 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	1511.833	4.60	26.85	61.66	65.41	35.20	74.00	-38.80	peak
2	4242.641	8.21	33.80	61.40	64.28	44.89	74.00	-29.11	peak
3 p	4924.000	8.05	34.65	61.98	69.86	50.58	74.00	-23.42	peak
4	6995.172	9.53	35.71	62.16	60.76	43.84	74.00	-30.16	peak
5	7386.000	9.14	35.77	61.95	60.06	43.02	74.00	-30.98	peak
6	9848.000	11.27	37.20	62.22	61.38	47.63	74.00	-26.37	peak

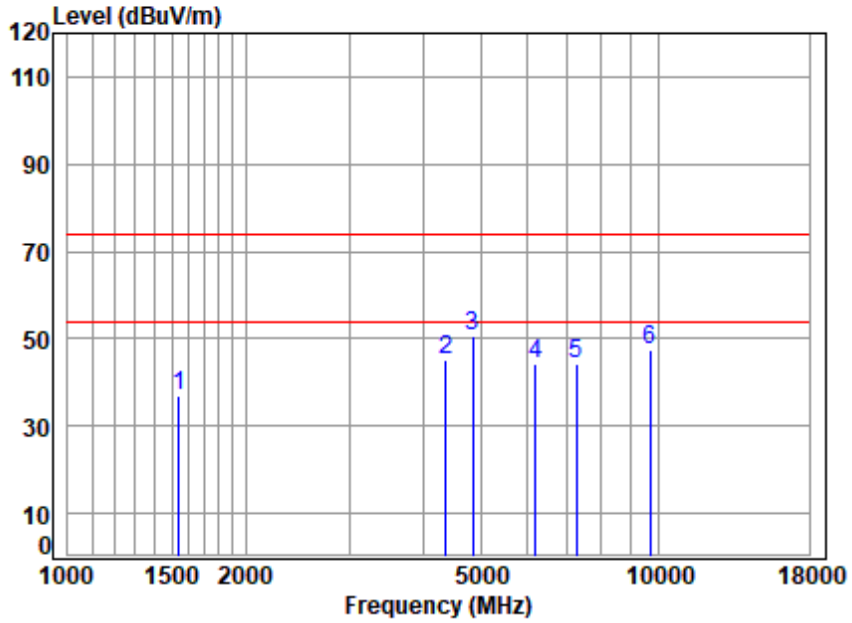
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2462 TX RSE
: 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	1175.697	4.56	24.16	61.54	70.79	37.97	74.00	-36.03	peak
2	3205.345	6.78	32.81	61.36	67.68	45.91	74.00	-28.09	peak
3 p	4924.000	8.05	34.65	61.98	70.39	51.11	74.00	-22.89	peak
4	5487.260	9.27	34.55	62.40	63.28	44.70	74.00	-29.30	peak
5	7386.000	9.14	35.77	61.95	60.99	43.95	74.00	-30.05	peak
6	9848.000	11.27	37.20	62.22	59.94	46.19	74.00	-27.81	peak

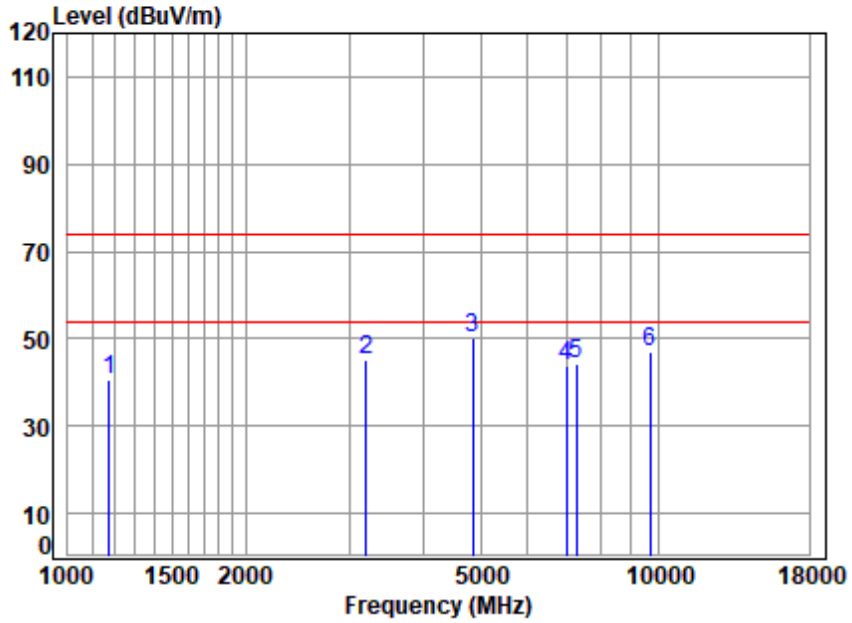
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2422 TX RSE
: 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	1542.733	4.66	26.97	61.67	66.96	36.92	74.00	-37.08	peak
2	4367.058	8.04	34.54	61.51	63.88	44.95	74.00	-29.05	peak
3 p	4844.000	8.01	34.48	61.92	70.15	50.72	74.00	-23.28	peak
4	6195.508	9.37	34.72	62.63	62.98	44.44	74.00	-29.56	peak
5	7266.000	9.26	35.70	62.01	61.37	44.32	74.00	-29.68	peak
6	9688.000	11.36	37.50	62.17	60.93	47.62	74.00	-26.38	peak

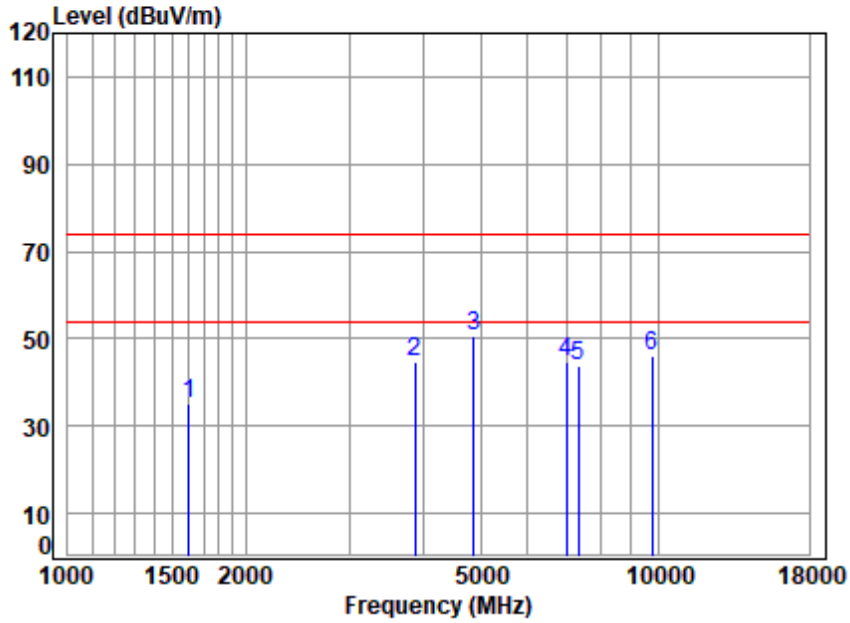
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2422 TX RSE
: 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	1175.697	4.56	24.16	61.54	73.26	40.44	74.00	-33.56	peak
2	3205.345	6.78	32.81	61.36	67.07	45.30	74.00	-28.70	peak
3 p	4844.000	8.01	34.48	61.92	69.56	50.13	74.00	-23.87	peak
4	6995.172	9.53	35.71	62.16	60.78	43.86	74.00	-30.14	peak
5	7266.000	9.26	35.70	62.01	61.20	44.15	74.00	-29.85	peak
6	9688.000	11.36	37.50	62.17	60.32	47.01	74.00	-26.99	peak

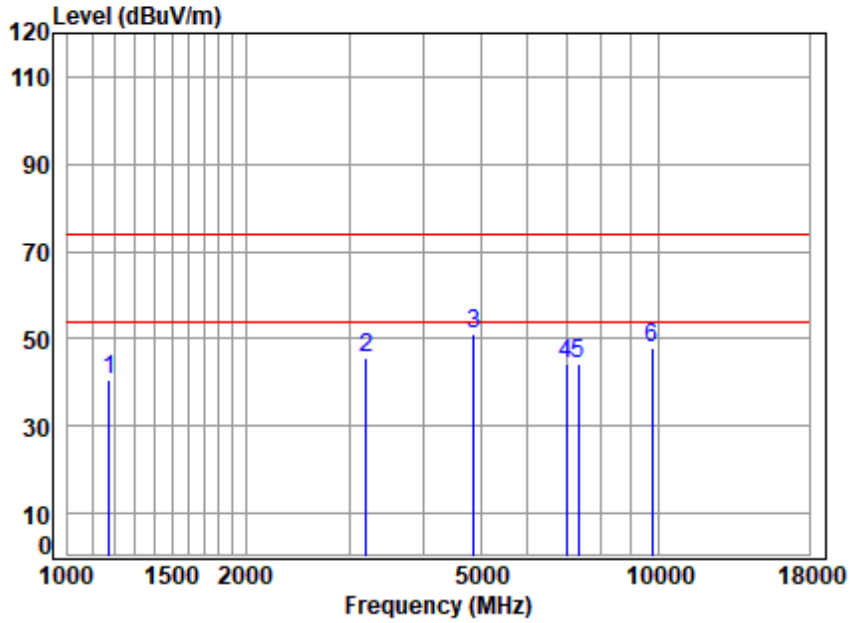
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2437 TX RSE
: 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	1601.804	4.79	26.78	61.69	65.38	35.26	74.00	-38.74	peak
2	3867.831	8.14	33.35	61.20	64.20	44.49	74.00	-29.51	peak
3 p	4874.000	8.03	34.60	61.94	69.83	50.52	74.00	-23.48	peak
4	6995.172	9.53	35.71	62.16	61.47	44.55	74.00	-29.45	peak
5	7311.000	9.21	35.70	61.99	61.00	43.92	74.00	-30.08	peak
6	9748.000	11.32	37.40	62.19	59.68	46.21	74.00	-27.79	peak

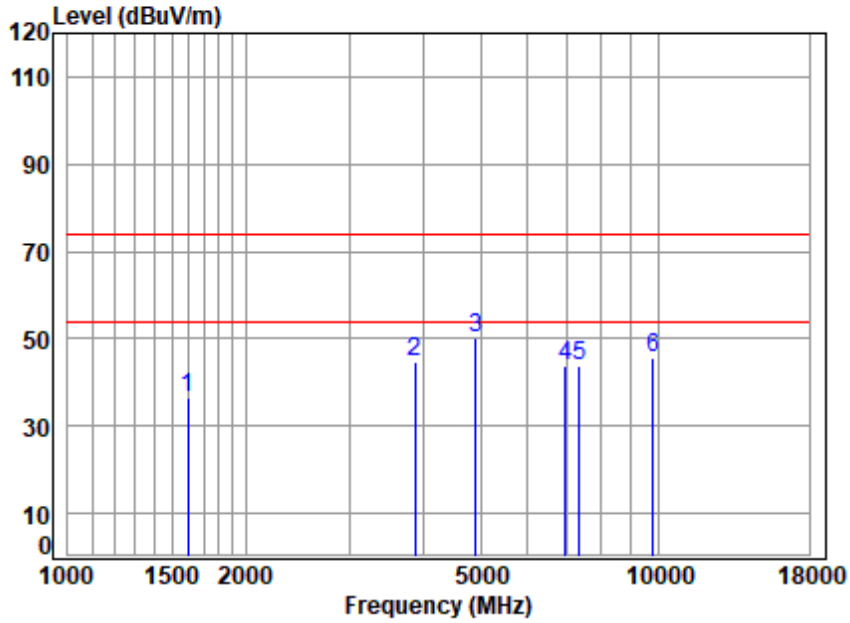
Test Mode: 01; Polarity: Vertical; Modulation:802.11n; Bandwidth:40MHz; Channel:middle



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2437 TX RSE
: 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	1175.697	4.56	24.16	61.54	73.29	40.47	74.00	-33.53	peak
2	3205.345	6.78	32.81	61.36	67.52	45.75	74.00	-28.25	peak
3 p	4874.000	8.03	34.60	61.94	70.28	50.97	74.00	-23.03	peak
4	6995.172	9.53	35.71	62.16	61.05	44.13	74.00	-29.87	peak
5	7311.000	9.21	35.70	61.99	61.17	44.09	74.00	-29.91	peak
6	9748.000	11.32	37.40	62.19	61.43	47.96	74.00	-26.04	peak

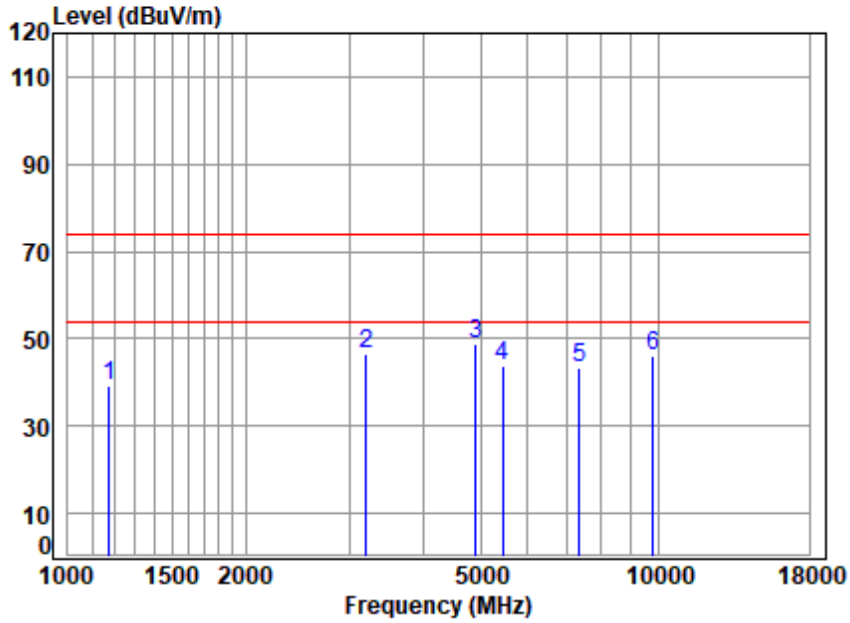
Test Mode: 01; Polarity: Horizontal; Modulation:802.11n; Bandwidth:40MHz; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 02116AT/02117AT
Mode : 2452 TX RSE
: 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	4.78	26.81	61.69	66.60	36.50	74.00	-37.50	peak
2	3879.027	8.18	33.51	61.20	64.09	44.58	74.00	-29.42	peak
3 p	4904.000	8.04	34.69	61.96	69.28	50.05	74.00	-23.95	peak
4	6954.852	9.50	35.79	62.18	60.48	43.59	74.00	-30.41	peak
5	7356.000	9.17	35.71	61.96	61.08	44.00	74.00	-30.00	peak
6	9808.000	11.29	37.28	62.21	59.37	45.73	74.00	-28.27	peak

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



Site : chamber
Condition: 3m VERTICAL
Job No : 02116AT/02117AT
Mode : 2452 TX RSE
: 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	1175.697	4.56	24.16	61.54	72.06	39.24	74.00	-34.76	peak
2	3205.345	6.78	32.81	61.36	68.34	46.57	74.00	-27.43	peak
3 p	4904.000	8.04	34.69	61.96	67.95	48.72	74.00	-25.28	peak
4	5455.631	9.20	34.68	62.38	62.52	44.02	74.00	-29.98	peak
5	7356.000	9.17	35.71	61.96	60.32	43.24	74.00	-30.76	peak
6	9808.000	11.29	37.28	62.21	59.67	46.03	74.00	-27.97	peak

7.4 Conducted Average Output Power

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

Test Method: ANSI C63.10 (2013) Section 11.9.2

Limit:

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

7.4.1 E.U.T. Operation

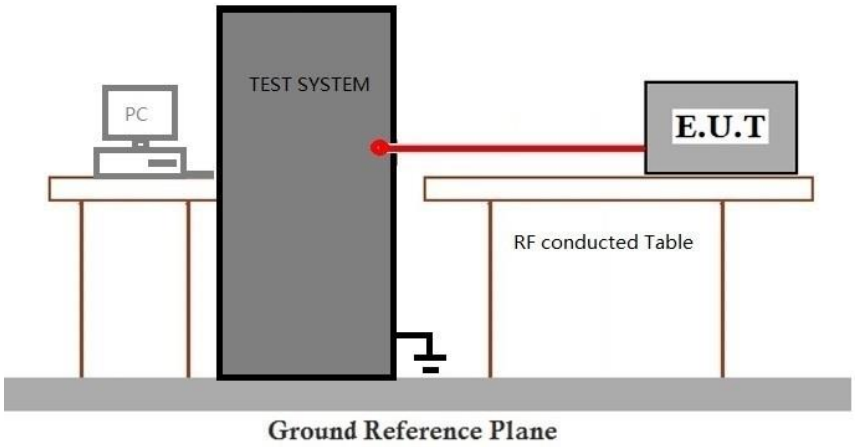
Operating Environment:

Temperature: 22.0 °C Humidity: 43.9 % RH Atmospheric Pressure: 1020 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), 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

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

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2406002116AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - external and internal photos for SZCR2406002116AT

10 Appendix

1. Duty Cycle

1.1 Test Result

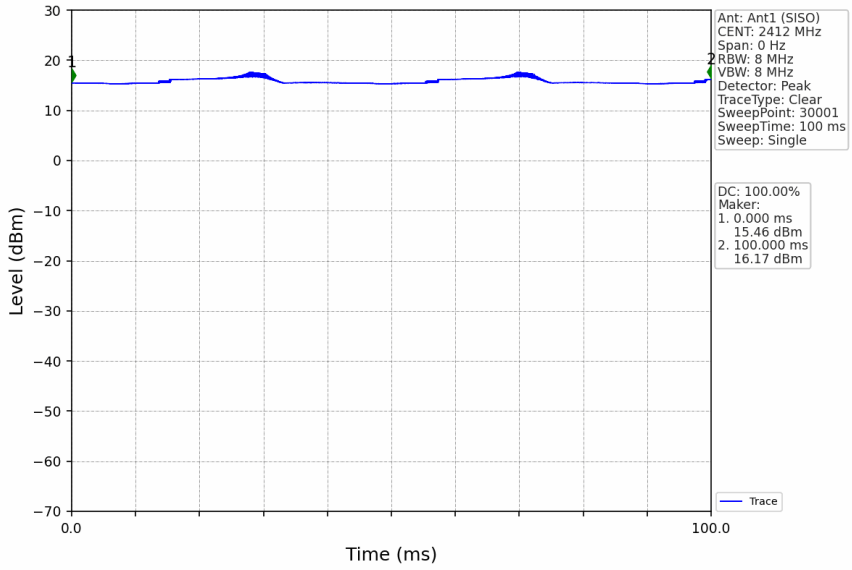
1.1.1 Ant1

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

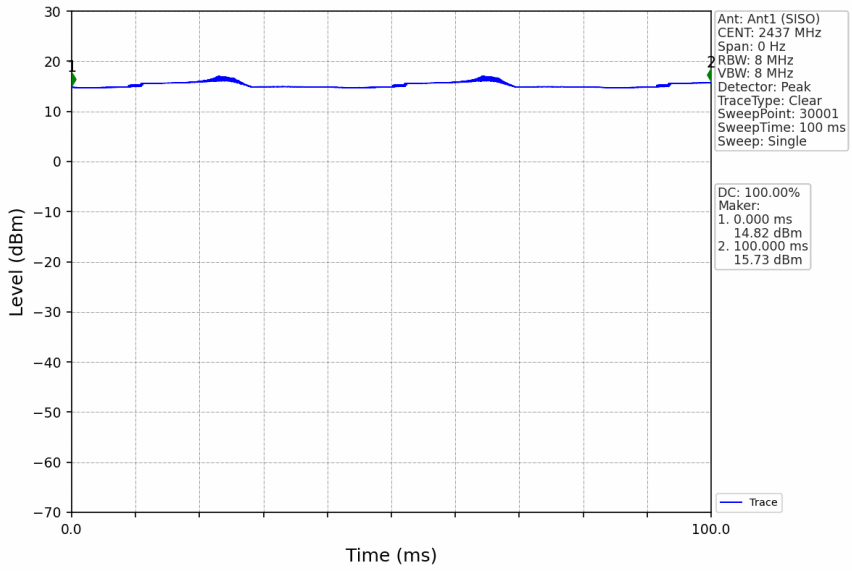
1.2 Test Graph

1.2.1 Ant1

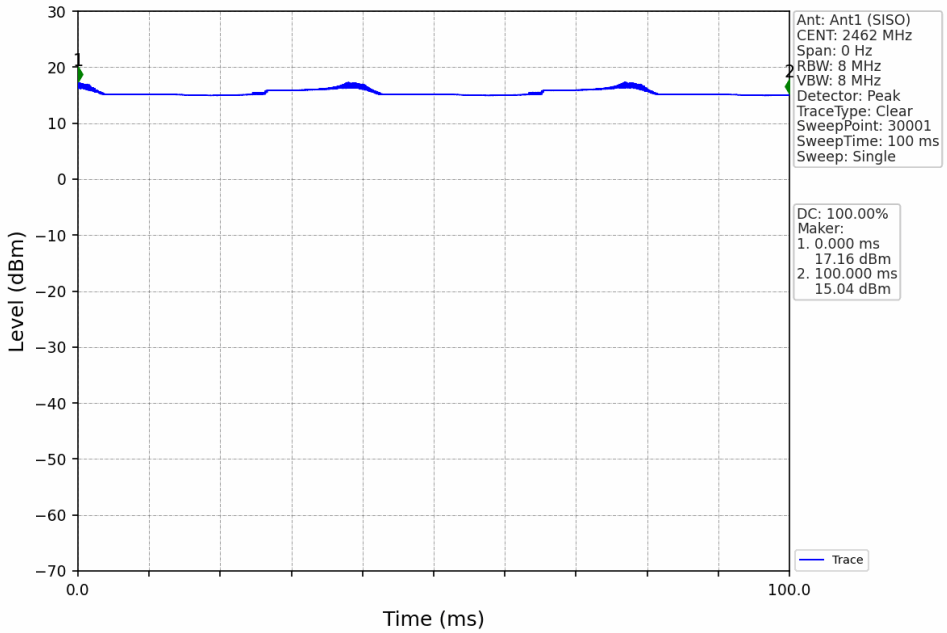
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



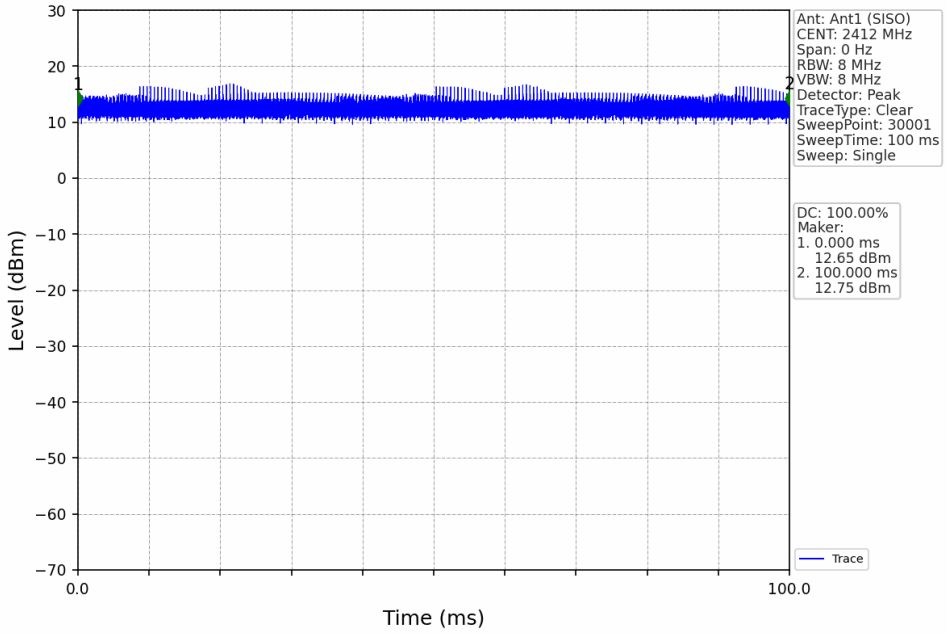
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



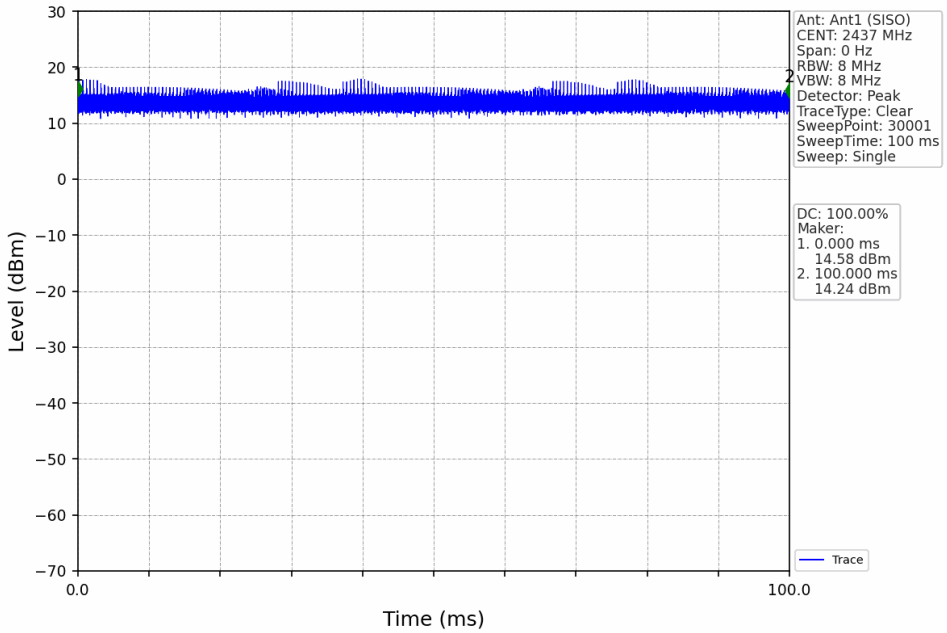
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



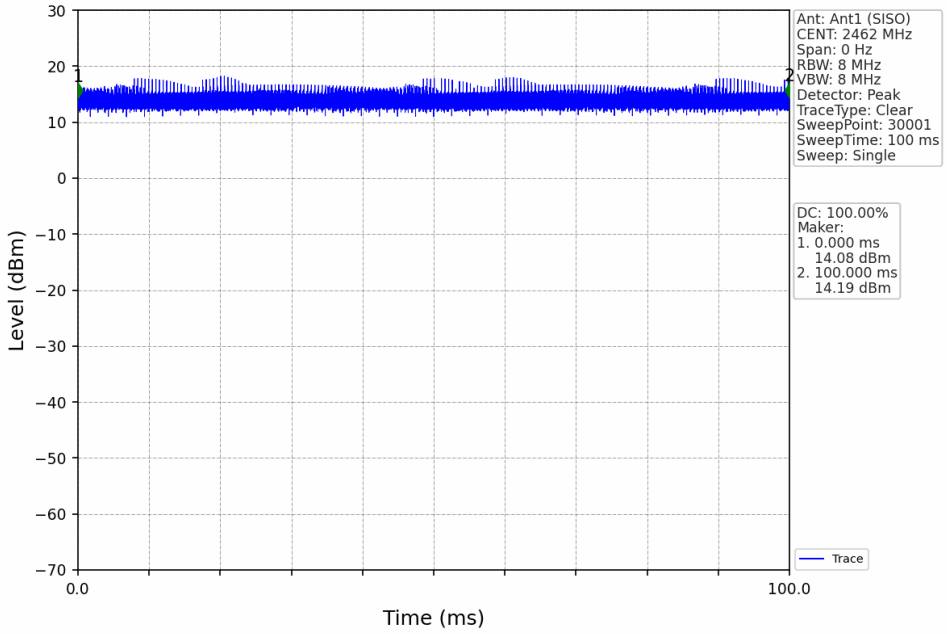
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



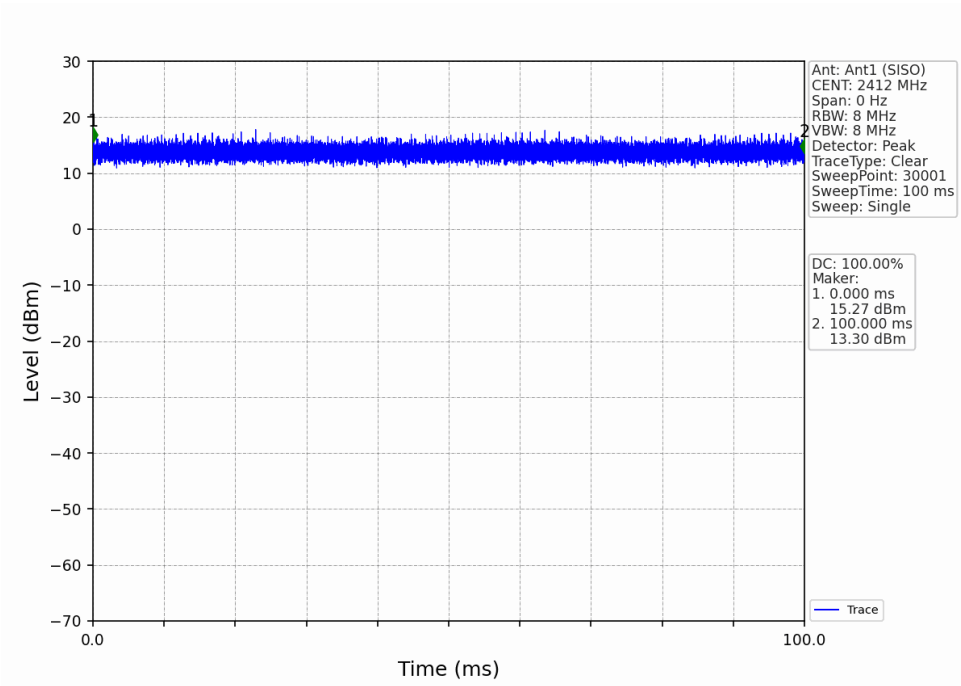
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



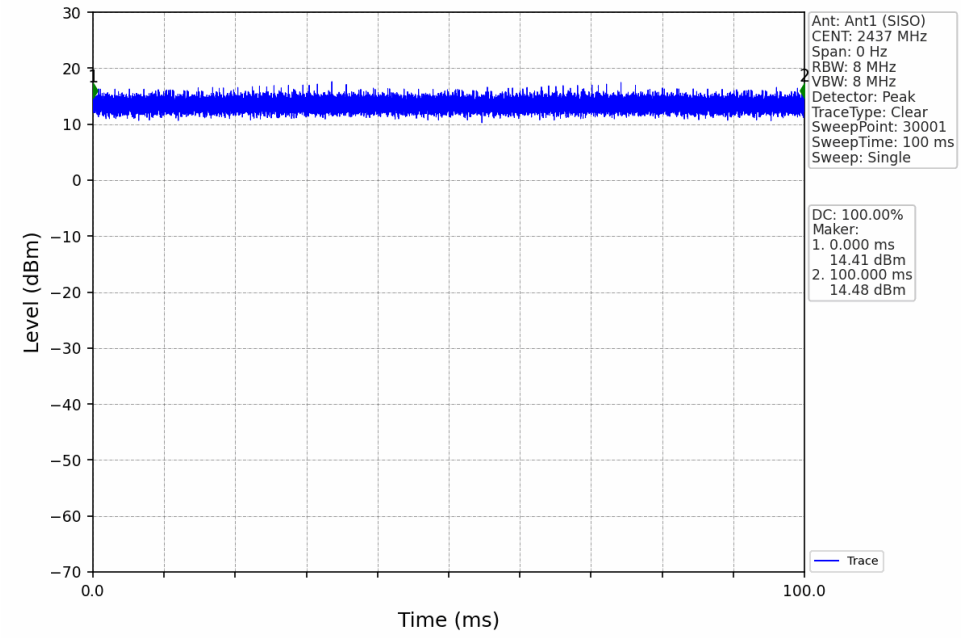
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



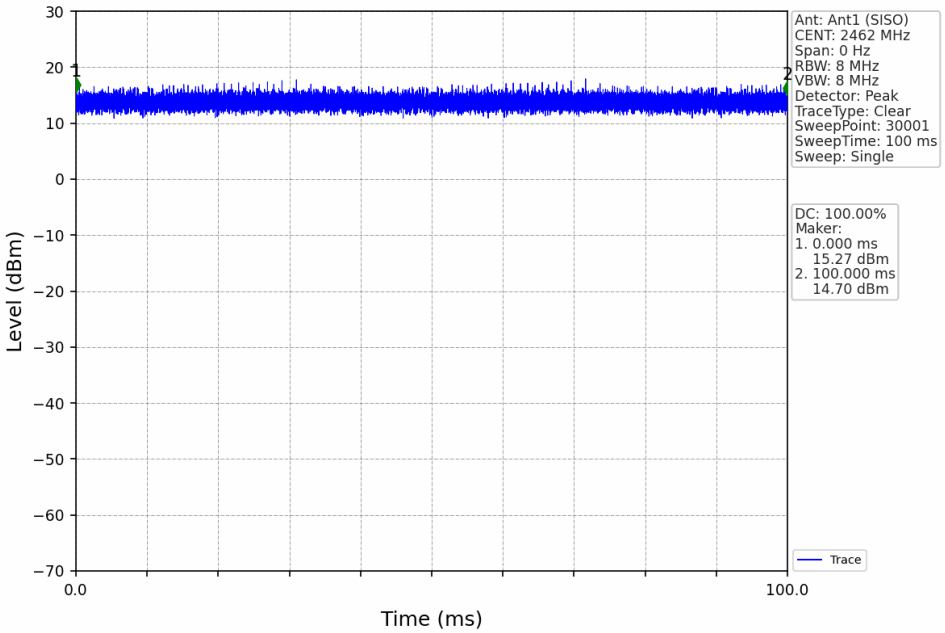
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



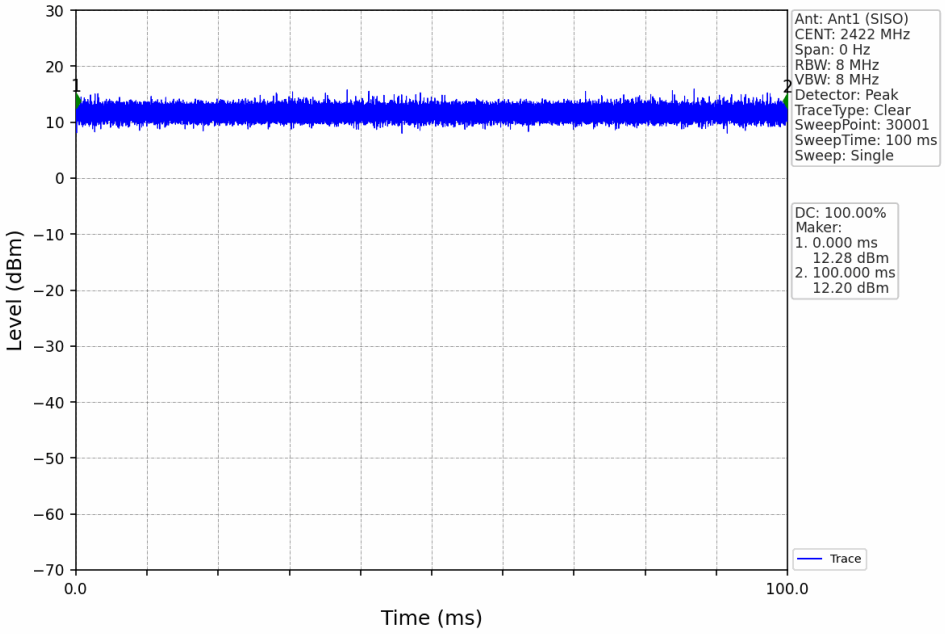
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



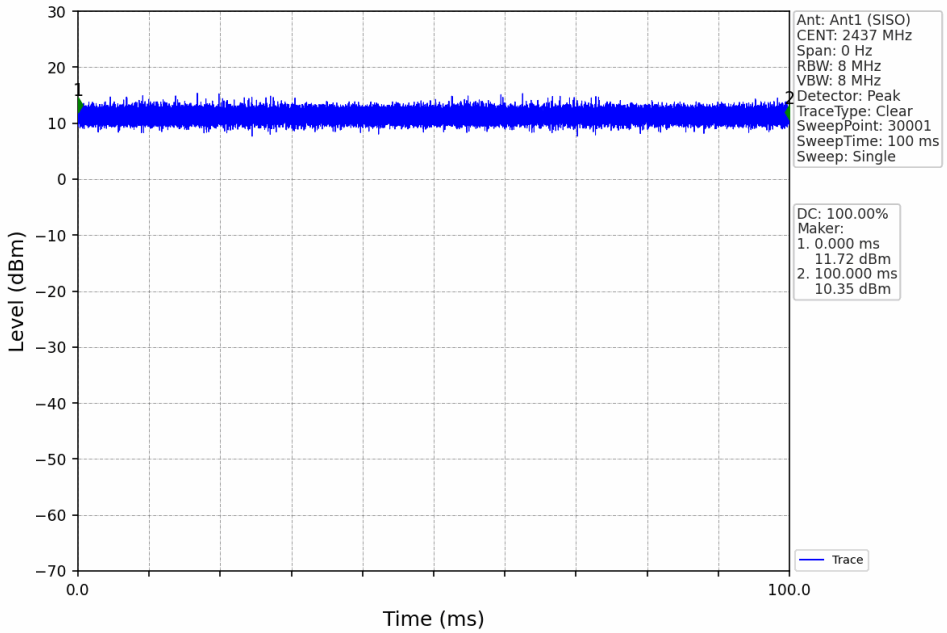
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



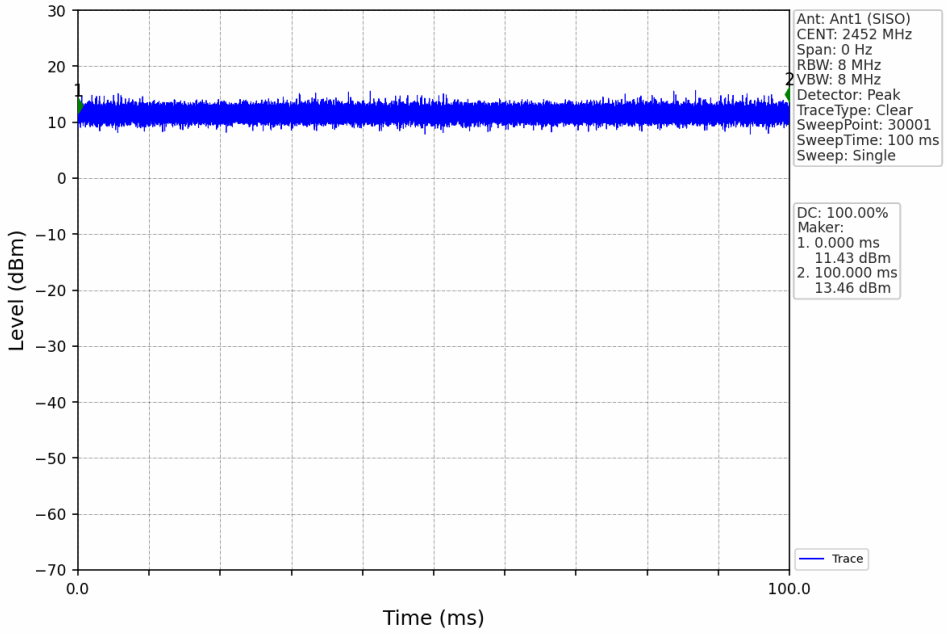
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



2. Maximum Conducted Output Power

2.1 Test Result

2.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	12.11	<=30	Pass
		2437	11.53	<=30	Pass
		2462	11.79	<=30	Pass
802.11g	SISO	2412	11.86	<=30	Pass
		2437	11.58	<=30	Pass
		2462	11.85	<=30	Pass
802.11n (HT20)	SISO	2412	11.63	<=30	Pass
		2437	11.36	<=30	Pass
		2462	11.67	<=30	Pass
802.11n (HT40)	SISO	2422	6.85	<=30	Pass
		2437	6.44	<=30	Pass
		2452	6.46	<=30	Pass

- End of the Report -