

PELTON INTERACTIVE, INC.

TEST REPORT

SCOPE OF WORK:

47 CFR FCC Part 15.247 – Radio Spectrum report

Model:

PLTN-RB1VO-2

REPORT NUMBER

210400310THC-001

ISSUE DATE

Jun. 23, 2021

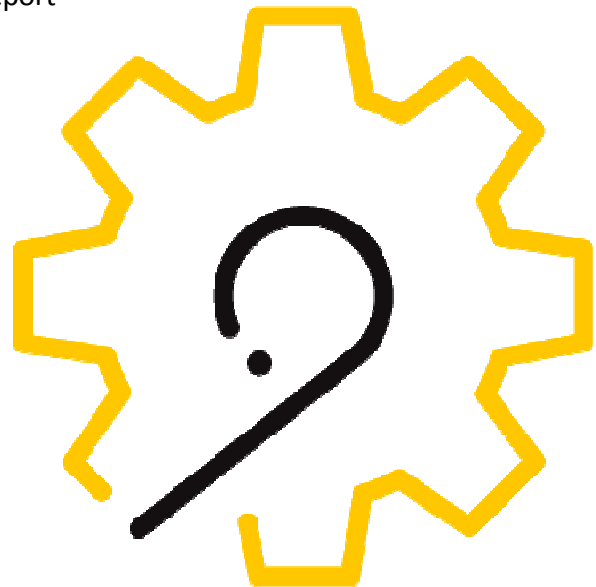
PAGES

68

DOCUMENT CONTROL NUMBER

GFT-OP-10h (28-Nov-2018)

© 2020 Intertek



Radio Spectrum TEST REPORT

Applicant:	PELTON INTERACTIVE, INC. 125 West 25th street, FL11, New York, NY 10001, USA
Product:	Peloton Console Tablet
Model No.:	PLTN-RB1VO-2
FCC ID:	2AA3N-RB1VO2
Test Method/ Standard:	47 CFR FCC Part 15.247 & ANSI C63.10 2013 KDB 558074 D01 v05r02
Test By:	Intertek Testing Services Taiwan Ltd., Hsinchu Laboratory No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan



Zero Chen

Zero Chen
Engineer

Durant Wei

Durant Wei
Reviewer

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT**Revision History**

Report No.	Issue Date	Revision Summary
210400310THC-001	Jun. 23, 2021	Original report

Table of Contents

Summary of Test Data	5
1. General Information	6
1.1 Identification of the EUT	6
1.2 Description of the EUT	6
1.3 Antenna description	6
1.4 Operation mode	7
1.5 Peripherals equipment	7
2. Minimum 6 dB Bandwidth	8
2.1 Instrument Setting.....	8
2.2 Test Procedure	8
2.3 Test Diagram	8
2.4 Limit.....	8
2.5 Test Results	9
3. Maximum Peak Conducted Output Power.....	16
3.1 Instrument Setting.....	16
3.2 Test Procedure.....	16
3.3 Test Diagram	16
3.4 Limit.....	16
3.5 Test Results	17
4. Power Spectral Density.....	18
4.1 Instrument Setting.....	18
4.2 Test Procedure	18
4.3 Test Diagram	18
4.4 Limit.....	18
4.5 Test Results	19
5. Emissions in Non-Restricted Frequency Bands	26
5.1 Instruments Setting	26
5.2 Test Procedure	26
5.3 Test Diagram	26
5.4 Limit.....	26
5.5 Test Results	26
6. Emissions in Restricted Frequency Bands (Radiated emission measurements)	45
6.1 Instrument Setting.....	45
6.2 Test setup & procedure	45
6.3 Limit.....	47
6.4 Test Result.....	48
7. Emission on Band Edge.....	53
7.1 Instrument Setting.....	53

TEST REPORT

7.2 Test Procedure 53
7.3 Test Results 54

8. AC Power Line Conducted Emission 62
8.1 Measuring instrument setting..... 62
8.2 Test Procedure 62
8.3 Test Diagram 62
8.4 Limit..... 63
8.5 Test Results 64

Appendix A: Test equipment list..... 66
Appendix B: Measurement Uncertainty..... 68

Summary of Test Data

Test Requirement	Applicable Rule (Section 15.247)	Result
Minimum 6 dB Bandwidth	15.247(a)(2)	Pass
Maximum Peak Conducted Output Power	15.247(b)(3)	Pass
Power Spectral Density	15.247(e)	Pass
Emissions In Non-Restricted Frequency Bands	15.247(d)	Pass
Emissions In Restricted Frequency Bands (Radiated emission measurements)	15.247(d), 15.205, 15.209	Pass
Emission On The Band Edge	15.247(d), 15.205	Pass
AC Power Line Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.

Other Testing: the specification, standard and not taking into account the measurement uncertainty.

1. General Information

1.1 Identification of the EUT

Product:	Peloton Console Tablet
Model No.:	PLTN-RB1VO-2
Operating Frequency:	2412 MHz ~ 2462 MHz for 802.11b, 802.11g, 802.11n HT20
Channel Number:	11 channels
Frequency of Each Channel:	2412+5 k, k=0 ~ 10 for 802.11b, 802.11g, 802.11n HT20
Rated Power:	DC 12V from adapter
Power Cord:	N/A
Sample receiving date:	2021/04/26
Sample condition:	Workable
Test Date(s):	2021/04/26 ~ 2021/05/11

1.2 Description of the EUT

Modulation mode	Transmit path	
	Chain 0	Chain 1
802.11b	V	V
802.11g	V	V
802.11n (HT20)	V	V

1.3 Antenna description

Antenna 1

Antenna Gain : 2.92 dBi
 Antenna Type : PCB antenna
 Connector Type : I-Pex

Antenna 2

Antenna Gain : 4.16 dBi
 Antenna Type : PCB antenna
 Connector Type : I-Pex

TEST REPORT

1.4 Operation mode

The EUT connected to Notebook USB port , executing “AMPK RFTestTool.apk” and select different frequency and modulation.

With individual verifying, the maximum output power were found out 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n(HT20) mode , the final tests were executed under these conditions recorded in this report individually.

Mode	Channel	Frequency (MHz)	Data rate (Mbps)	Signal on time (ms)	Signal on+off time (ms)	Duty cycle	Duty factor (dB)	1/T Minimum VBW (kHz)
802.11b	6	2437	1	8.41	8.45	99.59%	0.02	0.01
802.11g	6	2437	6	1.39	1.44	96.52%	0.15	0.72
802.11nHT20	6	2437	6.5	1.30	1.35	95.93%	0.18	0.77

1.5 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	HP	HP Probook 440 G3	5CD8021S9H	Micro USB shielded cable 1 meter
Adapter	EDAC	EA10681G-120	N/A	N/A

2. Minimum 6 dB Bandwidth

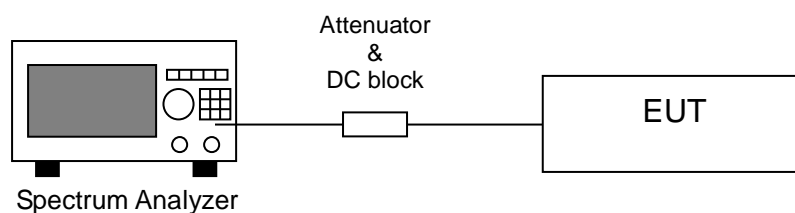
2.1 Instrument Setting

Spectrum Parameter	Setting
Detector	Peak
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Sweep	Auto couple
Trace	Allow the trace to stabilize.
Span	Between two times and five times the occupied bandwidth
Attenuation	Auto

2.2 Test Procedure

Step 1	The transmitter output was connected to the spectrum analyzer.
Step 2	Test was performed accordance with ANSI C63.10.
Step 3	Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

2.3 Test Diagram



2.4 Limit

The minimum 6 dB bandwidth shall be at least 500 kHz.

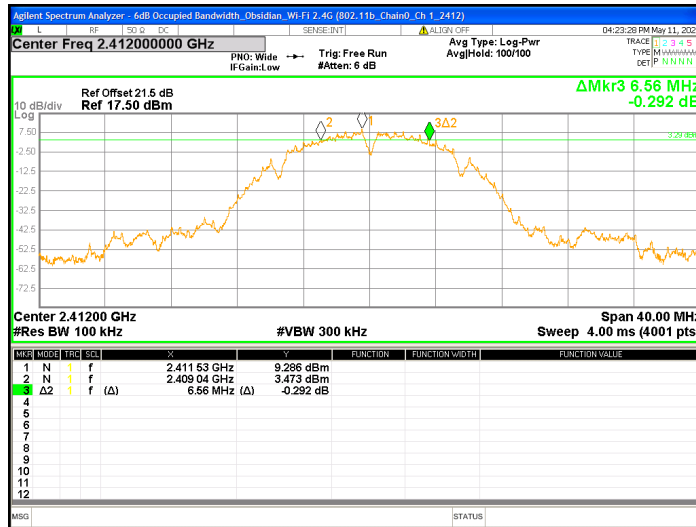
TEST REPORT

2.5 Test Results

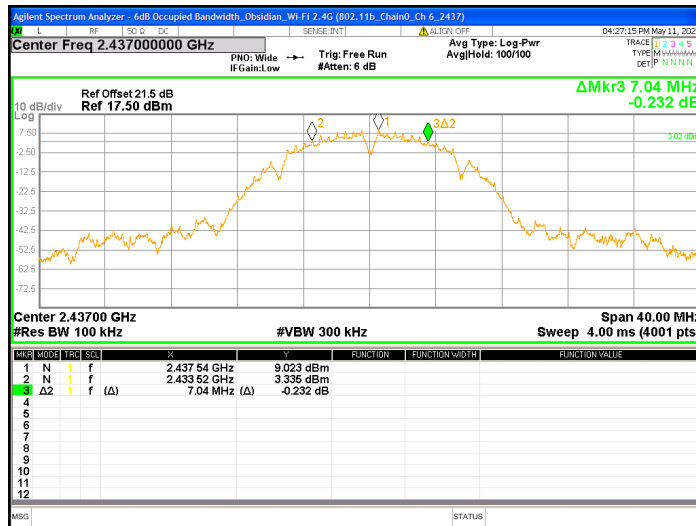
Temperature (°C) :	26
Relative Humidity (%) :	55
Test date :	2021/5/12

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b Chain0	1	2412	6.56	>0.5	Pass
	6	2437	7.04	>0.5	Pass
	11	2462	7.05	>0.5	Pass
802.11b Chain1	1	2412	7.08	>0.5	Pass
	6	2437	8.03	>0.5	Pass
	11	2462	7.05	>0.5	Pass
802.11g Chain0	1	2412	16.35	>0.5	Pass
	6	2437	16.34	>0.5	Pass
	11	2462	16.34	>0.5	Pass
802.11g Chain1	1	2412	16.35	>0.5	Pass
	6	2437	16.33	>0.5	Pass
	11	2462	16.35	>0.5	Pass
802.11n(HT20) Chain0	1	2412	17.58	>0.5	Pass
	6	2437	17.59	>0.5	Pass
	11	2462	17.57	>0.5	Pass
802.11n(HT20) Chain1	1	2412	17.59	>0.5	Pass
	6	2437	17.58	>0.5	Pass
	11	2462	17.59	>0.5	Pass

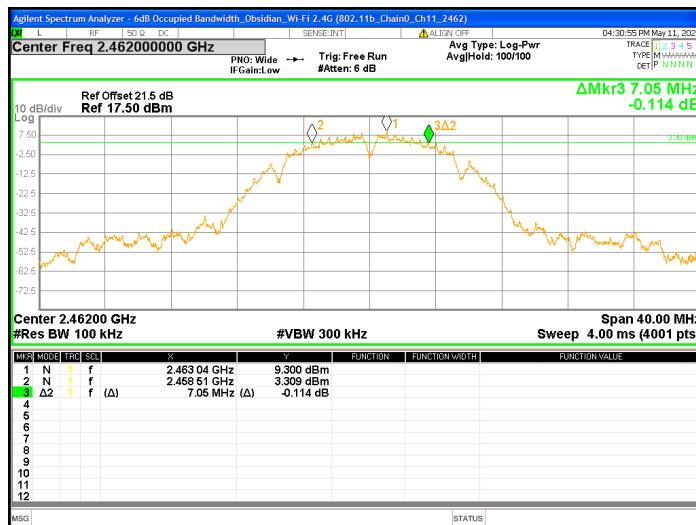
Chain0 : 6dB Bandwidth @ 802.11b Mode Ch 1



Chain0 : 6dB Bandwidth @ 802.11b Mode Ch 6



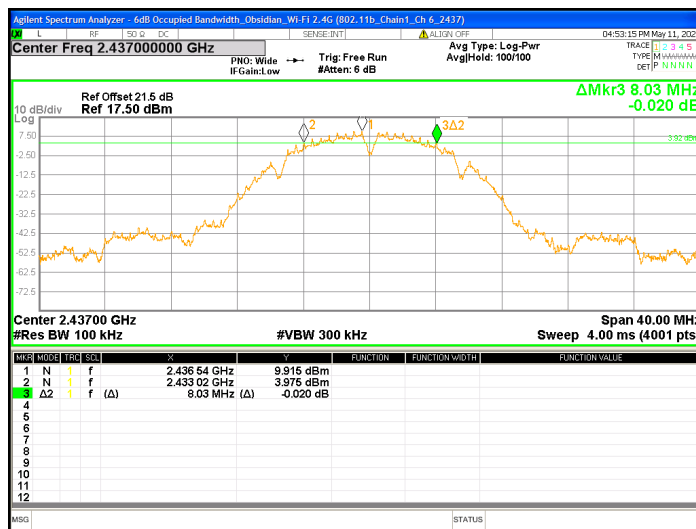
Chain0 : 6dB Bandwidth @ 802.11b Mode Ch11



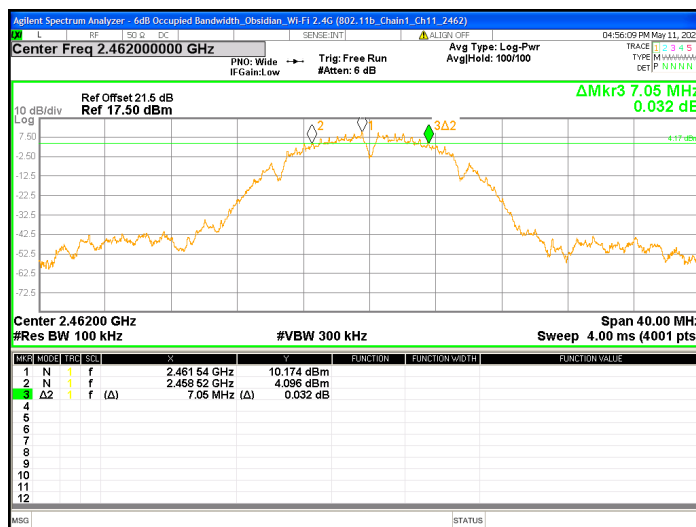
Chain1 : 6dB Bandwidth @ 802.11b Mode Ch 1



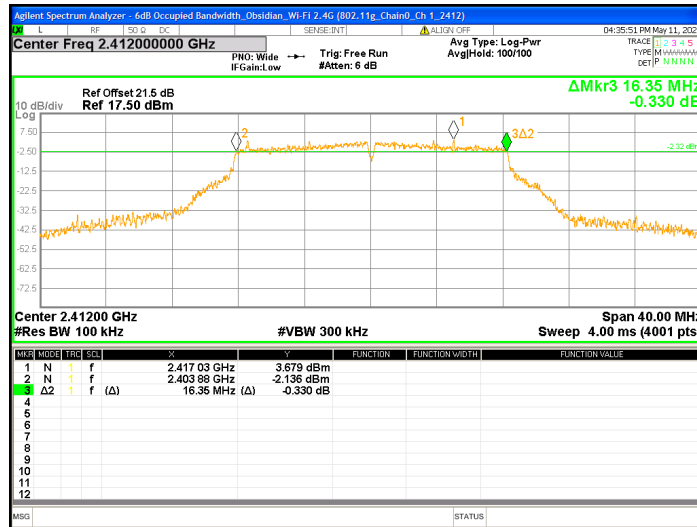
Chain1 : 6dB Bandwidth @ 802.11b Mode Ch 6



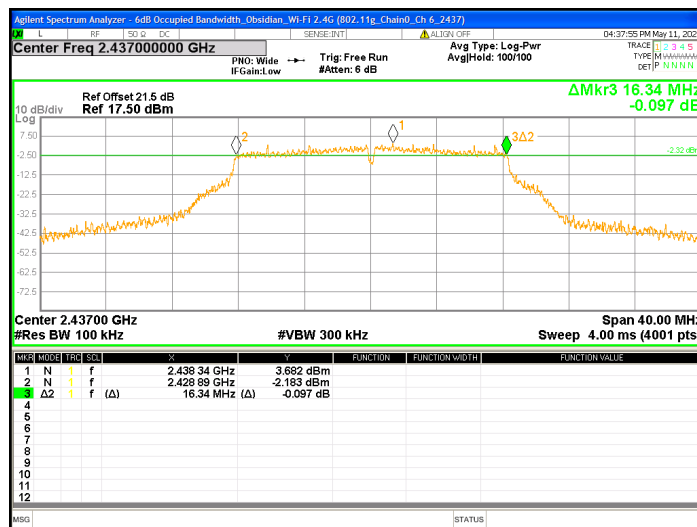
Chain1 : 6dB Bandwidth @ 802.11b Mode Ch11



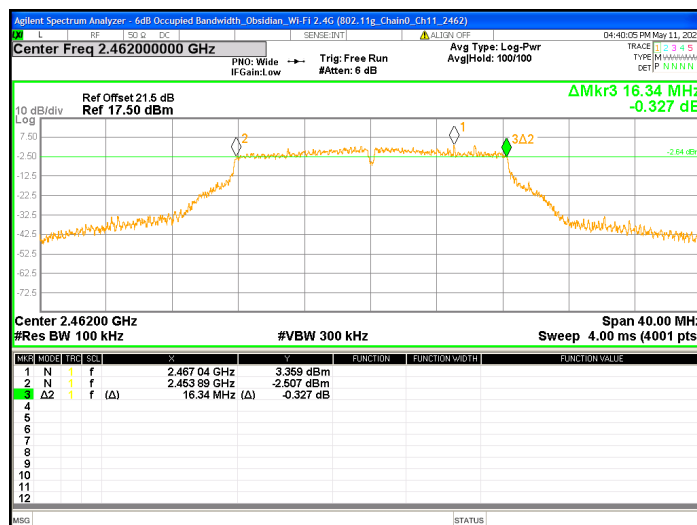
Chain0 : 6dB Bandwidth @ 802.11g Mode Ch 1



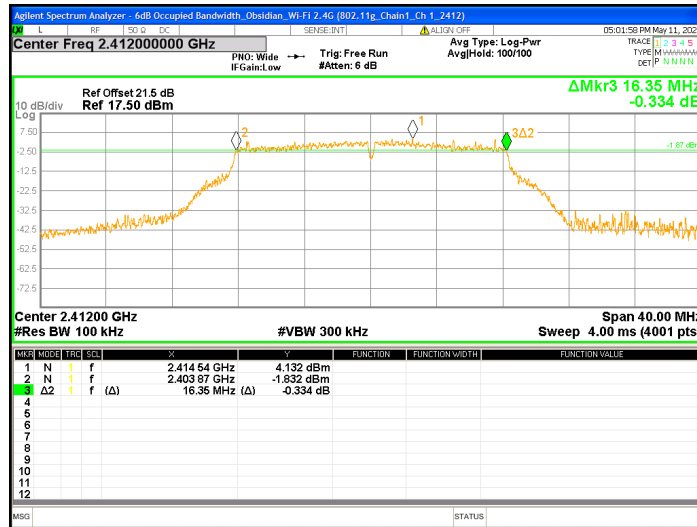
Chain0 : 6dB Bandwidth @ 802.11g Mode Ch 6



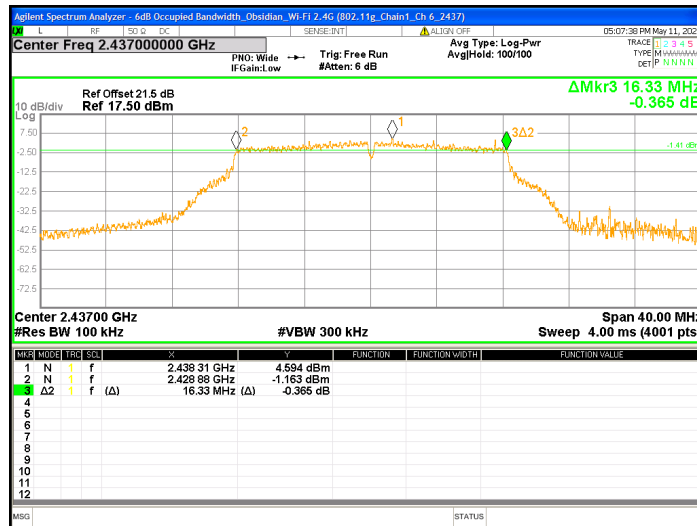
Chain0 : 6dB Bandwidth @ 802.11g Mode Ch11



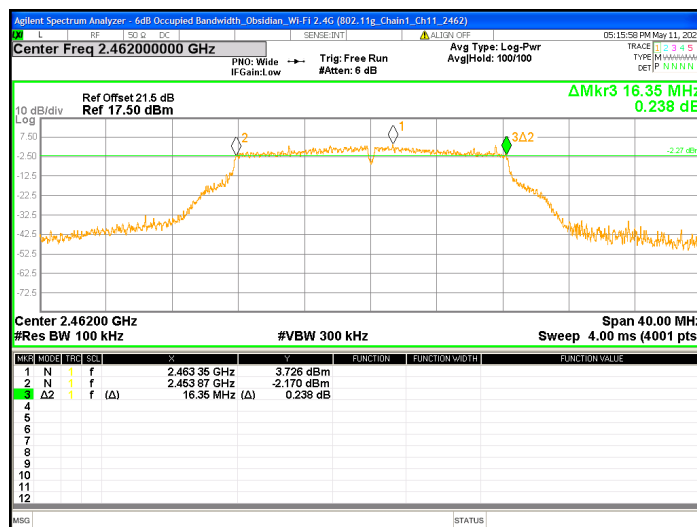
Chain1 : 6dB Bandwidth @ 802.11g Mode Ch 1



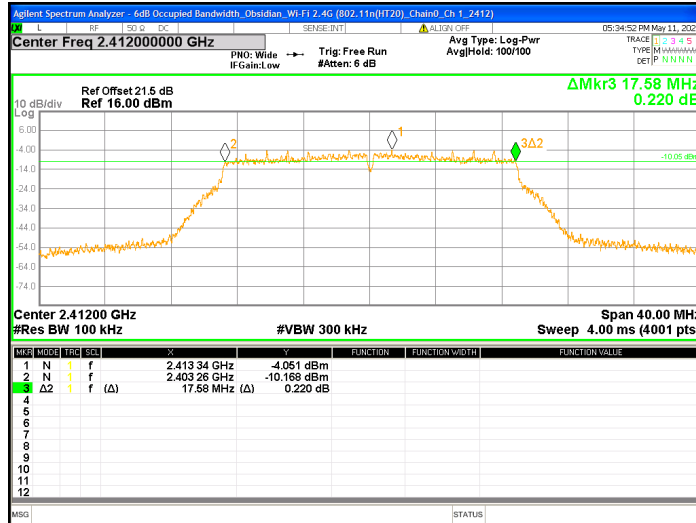
Chain1 : 6dB Bandwidth @ 802.11g Mode Ch 6



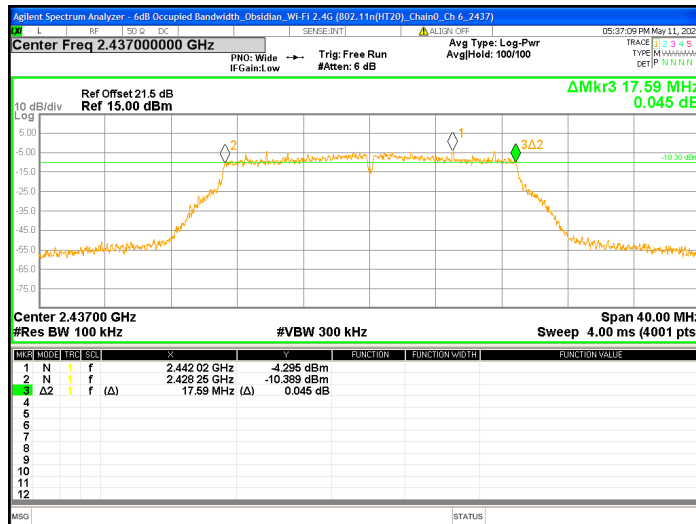
Chain1 : 6dB Bandwidth @ 802.11g Mode Ch11



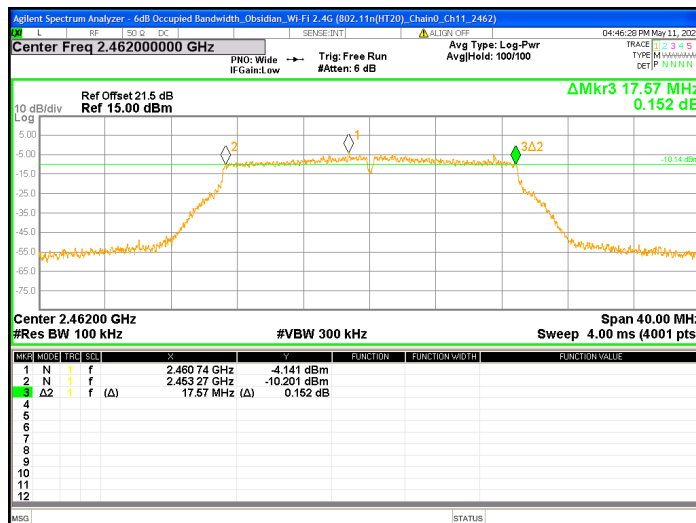
Chain0 : 6dB Bandwidth @ 802.11n(HT20) Mode Ch 1



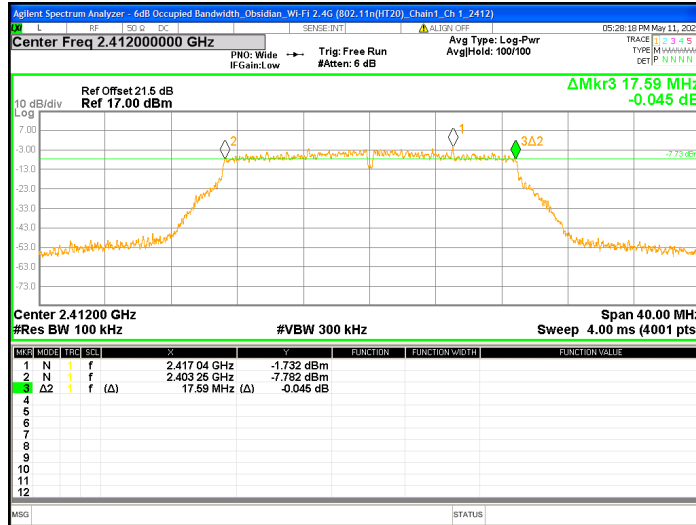
Chain0 : 6dB Bandwidth @ 802.11n(HT20) Mode Ch 6



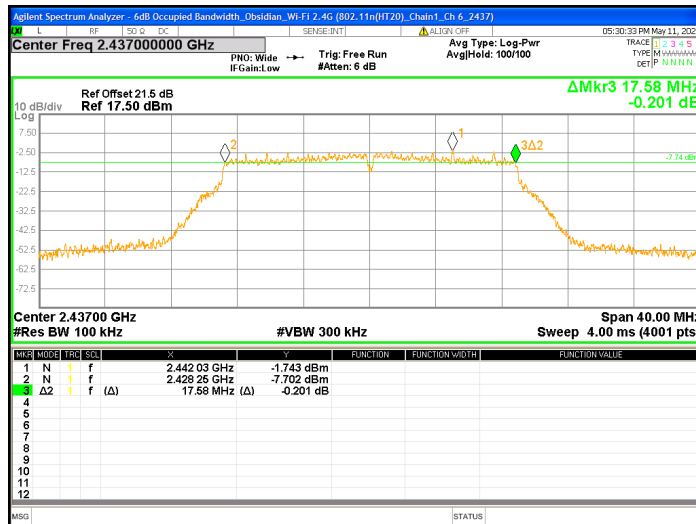
Chain0 : 6dB Bandwidth @ 802.11n(HT20) Mode Ch11



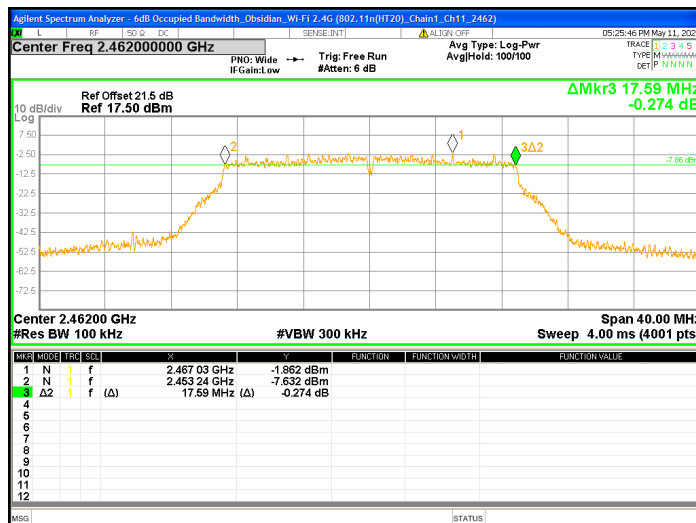
Chain1 : 6dB Bandwidth @ 802.11n(HT20) Mode Ch 1



Chain1 : 6dB Bandwidth @ 802.11n(HT20) Mode Ch 6



Chain1 : 6dB Bandwidth @ 802.11n(HT20) Mode Ch11



3. Maximum Peak Conducted Output Power

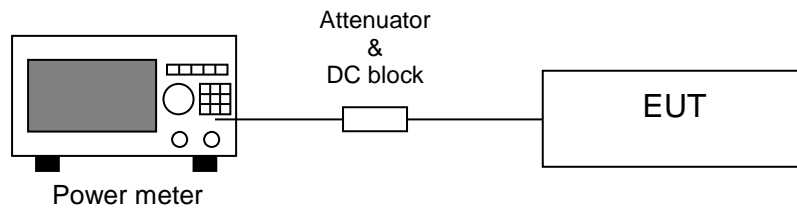
3.1 Instrument Setting

Power Meter Parameter	Setting
Bandwidth	65MHz bandwidth is greater than the EUT emission bandwidth
Detector	Peak & Average

3.2 Test Procedure

The preferred methodology is to use integrated average power measurements, as described in 11.9.2 and 11.13.3 of ANSI C63.10. The peak integrated band power methods of 11.9.1.2 and 11.13.3.2 of ANSI C63.10 are not applicable for FCC compliance testing purposes.

3.3 Test Diagram



3.4 Limit

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

TEST REPORT

3.5 Test Results

Temperature (°C) :	26
Relative Humidity (%) :	55
Test date :	2021/5/12

Mode	Channel	Frequency (MHz)	Output Power (AV) (dBm)	Total Power (AV) (mW)	Maximum power (PK) (dBm)	Maximum power (PK) (mW)	Limit (dBm)	Margin (dB)
802.11b Chain0	1	2412	17.05	50.70	19.99	99.77	30	-10.01
	6	2437	17.01	50.23	19.86	96.83	30	-10.14
	11	2462	16.92	49.20	19.73	93.97	30	-10.27
802.11b Chain1	1	2412	18.32	67.92	21.09	128.53	30	-8.91
	6	2437	18.11	64.71	21.01	126.18	30	-8.99
	11	2462	17.81	60.39	20.72	118.03	30	-9.28

Mode	Channel	Frequency (MHz)	Output Power (AV) (dBm)	Total Power (AV) (mW)	Maximum power (PK) (dBm)	Maximum power (PK) (mW)	Limit (dBm)	Margin (dB)
802.11g Chain0	1	2412	16.10	40.74	25.00	316.23	30	-5.00
	6	2437	15.83	38.28	24.87	306.90	30	-5.13
	11	2462	15.58	36.14	24.69	294.44	30	-5.31
802.11g Chain1	1	2412	16.28	42.46	25.15	327.34	30	-4.85
	6	2437	16.12	40.93	24.96	313.33	30	-5.04
	11	2462	15.68	36.98	24.78	300.61	30	-5.22

Mode	Channel	Frequency (MHz)	Output Power (dBm)				Output Power (mW)				Total Power (dBm)				Limit (dBm)	Margin (dB)
			Chain 0		Chain 1		Chain 0		Chain 1		AV		PK			
			AV	PK	AV	PK	AV	PK	AV	PK	0+1 (mW)	0+1 (dBm)	0+1 (mW)	0+1 (dBm)		
802.11n (HT20) Chain0+1	1	2412	8.02	16.93	10.16	19.68	6.34	49.32	10.38	92.90	16.71	12.23	142.21	21.53	30	-8.47
	6	2437	7.91	16.78	9.89	19.15	6.18	47.64	9.75	82.22	15.93	12.02	129.87	21.14	30	-8.86
	11	2462	7.82	16.64	9.52	18.57	6.05	46.13	8.95	71.94	15.01	11.76	118.08	20.72	30	-9.28

TEST REPORT

4. Power Spectral Density

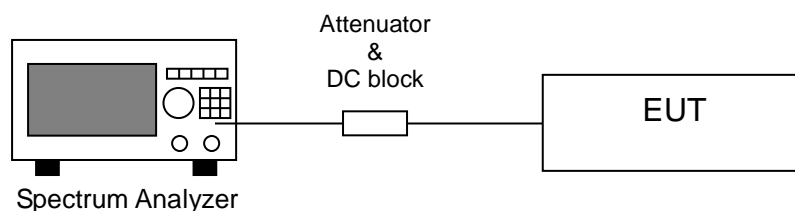
4.1 Instrument Setting

Spectrum Function	Setting
Detector	Peak
RBW	≥ 3 kHz
VBW	≥ 3 x RBW
Sweep	Auto couple
Trace	Max hold
Span	1.5 times x 6dB bandwidth
Attenuation	Auto

4.2 Test Procedure

Step 1	Test procedure refer to subclause 11.10 of ANSI C63.10.
Step 2	Using the maximum conducted output power in the fundamental emission demonstrates compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
Step 3	Use the peak marker function to determine the maximum amplitude level within the RBW.

4.3 Test Diagram



4.4 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

TEST REPORT

4.5 Test Results

Temperature (°C) :	26
Relative Humidity (%) :	55
Test date :	2021/5/12

SISO

Mode	Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
802.11b Chain0	1	2412	0.90	8	-12.33
	6	2437	1.43	8	-11.80
	11	2462	2.03	8	-11.19
802.11b Chain1	1	2412	3.46	8	-9.77
	6	2437	2.07	8	-11.16
	11	2462	2.54	8	-10.69

Mode	Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
802.11g Chain0	1	2412	-2.30	8	-15.53
	6	2437	-2.43	8	-15.66
	11	2462	-2.56	8	-15.78
802.11g Chain1	1	2412	-2.19	8	-15.41
	6	2437	-0.50	8	-13.72
	11	2462	-2.43	8	-15.66

MIMO

Mode	Channel	Freq. (MHz)	PSD (dBm)		Total PSD		MIMO (dBm)		Limit (dBm)	Margin (dB)
			chain0	chain1	mW	dBm	Corr.n	Result		
802.11n (HT20)	1	2412	-11.25	-8.40	0.22	-6.58	3.01	-3.57	8	-11.57
	6	2437	-11.35	-8.10	0.23	-6.41	3.01	-3.40	8	-11.40
	11	2462	-11.22	-7.55	0.25	-6.00	3.01	-2.99	8	-10.99

Note: MIMO Correction: $10\log(Nant) = 10\log(2) = 3.01$

Chain0 : Power Spectral Density @ 802.11b Mode Ch 1



Chain0 : Power Spectral Density @ 802.11b Mode Ch 6



Chain0 : Power Spectral Density @ 802.11b Mode Ch11



Chain1 : Power Spectral Density @ 802.11b Mode Ch 1



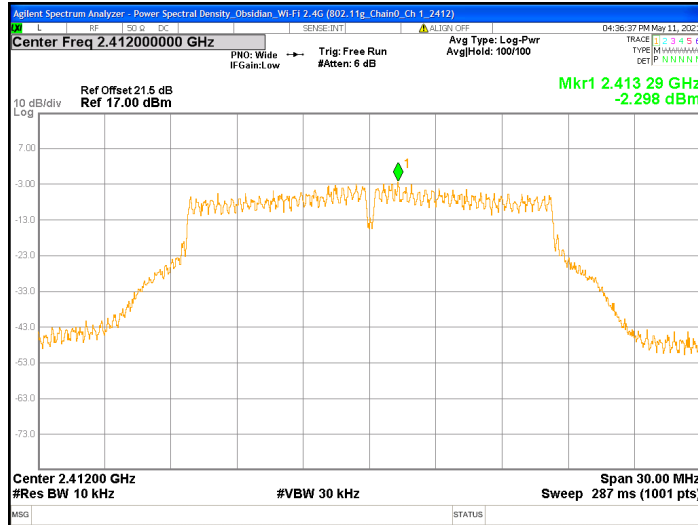
Chain1 : Power Spectral Density @ 802.11b Mode Ch 6



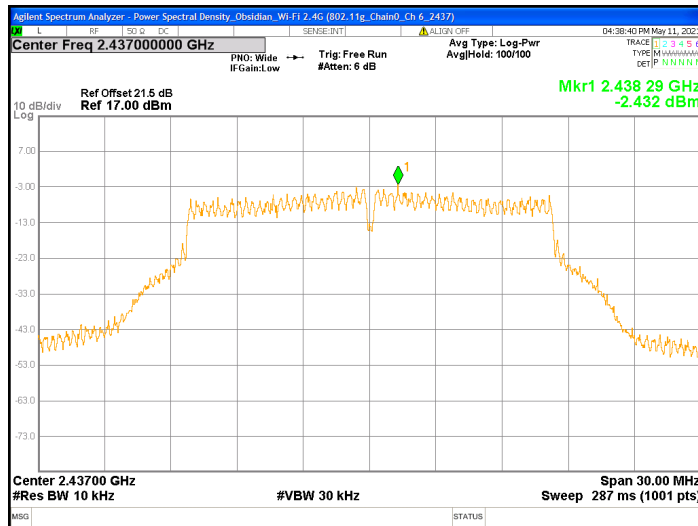
Chain1 : Power Spectral Density @ 802.11b Mode Ch11



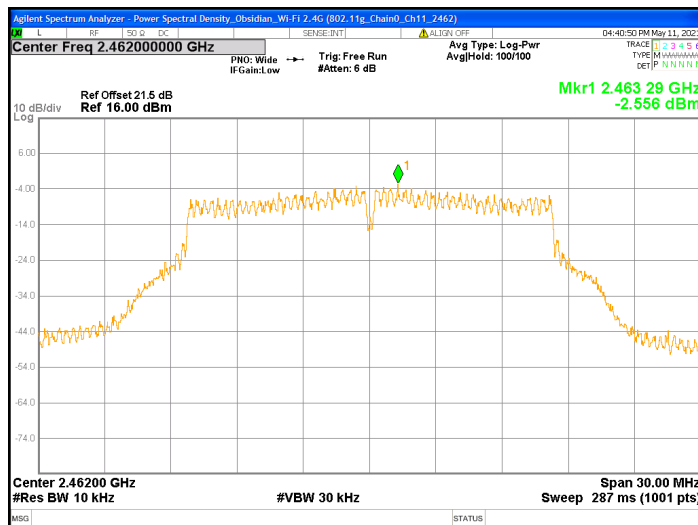
Chain0 : Power Spectral Density @ 802.11g Mode Ch 1



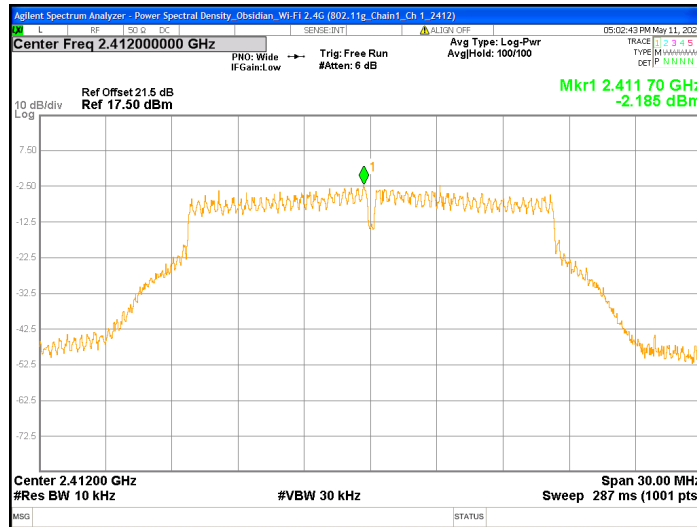
Chain0 : Power Spectral Density @ 802.11g Mode Ch 6



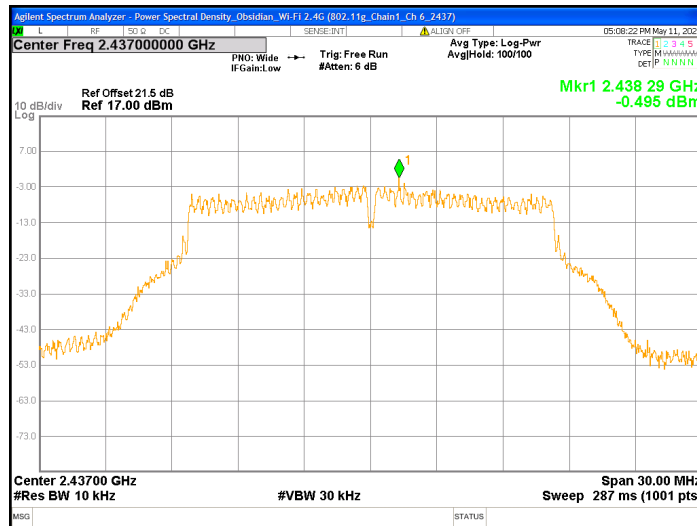
Chain0 : Power Spectral Density @ 802.11g Mode Ch 1



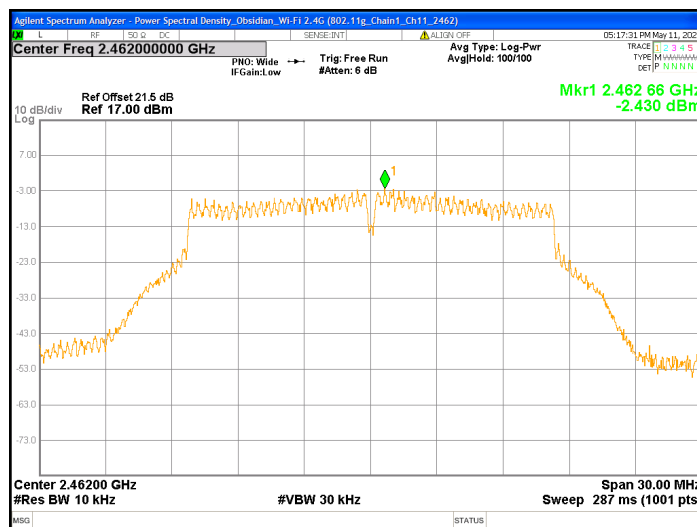
Chain1 : Power Spectral Density @ 802.11g Mode Ch 6



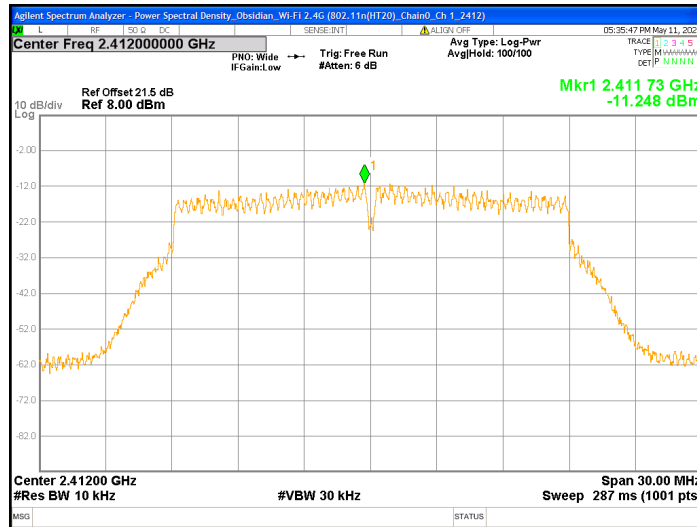
Chain1 : Power Spectral Density @ 802.11g Mode Ch11



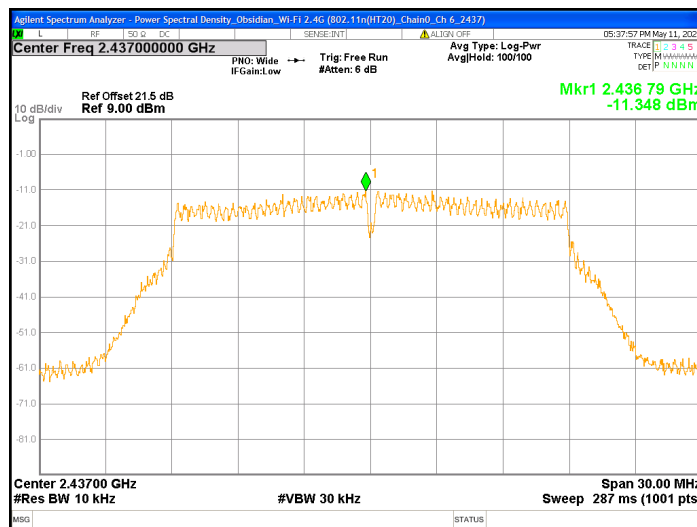
Chain1 : Power Spectral Density @ 802.11g Mode Ch11



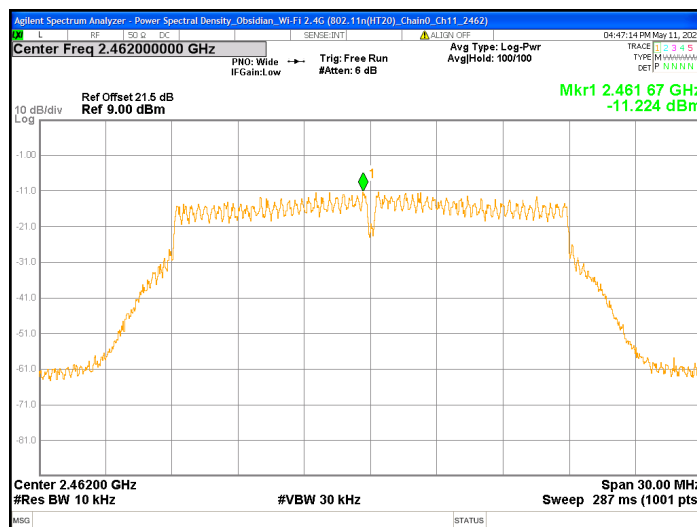
Chain0 : Power Spectral Density @ 802.11n(HT20) Mode Ch 1



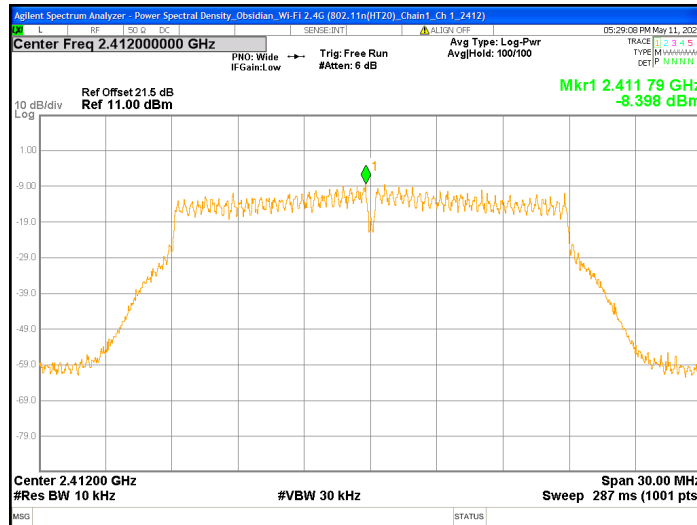
Chain0 : Power Spectral Density @ 802.11n(HT20) Mode Ch 6



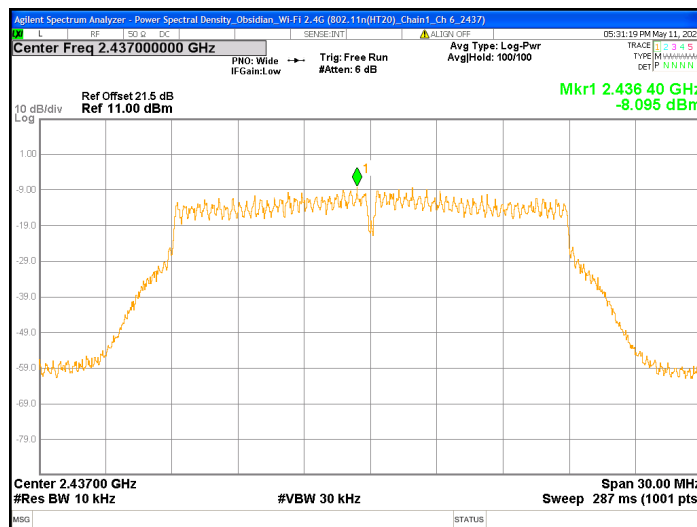
Chain0 : Power Spectral Density @ 802.11n(HT20) Mode Ch11



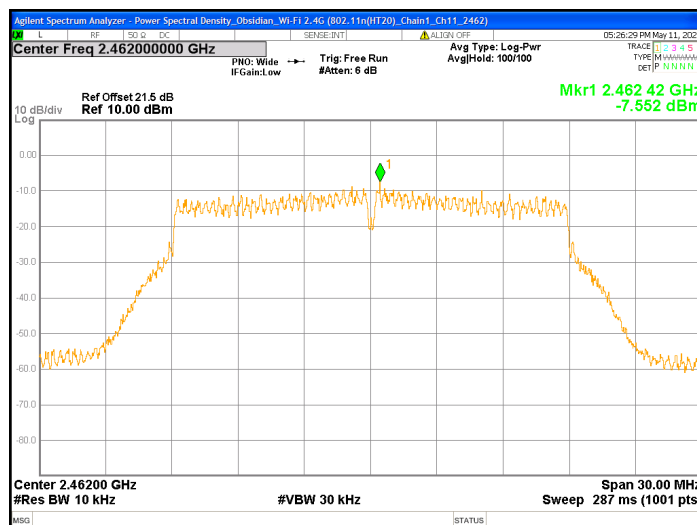
Chain1 : Power Spectral Density @ 802.11n(HT20) Mode Ch 1



Chain1 : Power Spectral Density @ 802.11n(HT20) Mode Ch 6



Chain1 : Power Spectral Density @ 802.11n(HT20) Mode Ch11



5. Emissions in Non-Restricted Frequency Bands

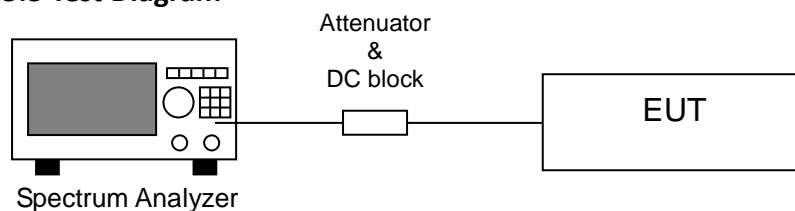
5.1 Instruments Setting

Spectrum Function	Setting (Reference Level)	Setting (Emission Level)
Detector	Peak	Peak
RBW	≥ 100 kHz	≥ 100 kHz
VBW	$\geq 3 \times$ RBW	$\geq 3 \times$ RBW
Sweep	Auto couple	Auto couple
Trace	Max hold	Max hold
Span	≥ 1.5 time 6dB bandwidth	X
Attenuation	Auto	Auto

5.2 Test Procedure

- Step 1 The procedure was used in antenna-port conducted and connected to the spectrum analyzer.
- Step 2 Set instrument center frequency to center frequency.
- Step 3 Use the parameter configured in subclause 11.11 of ANSI C63.10 to measure.
- Step 4 Use the peak marker function to determine the maximum amplitude level.

5.3 Test Diagram



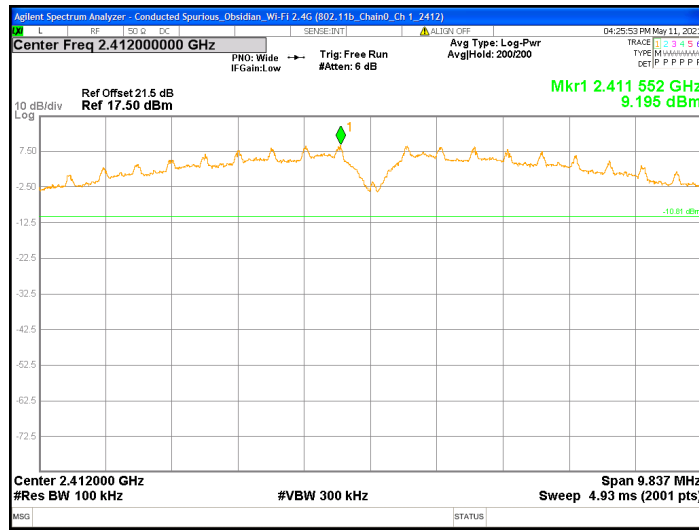
5.4 Limit

The peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

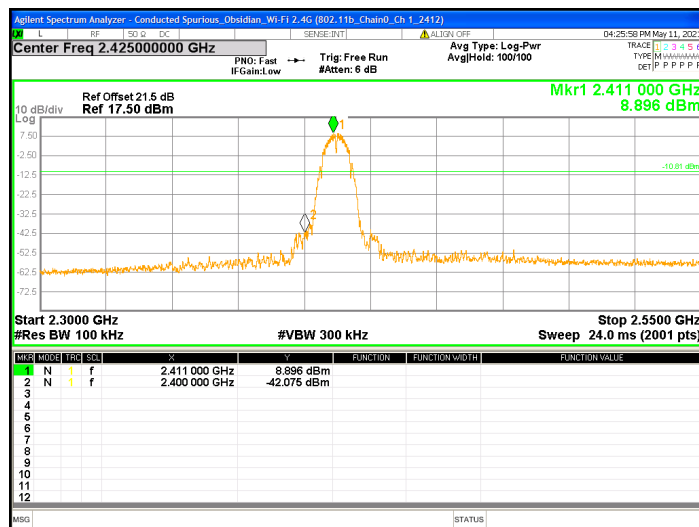
5.5 Test Results

Temperature (°C) :	26
Relative Humidity (%) :	55
Test date :	2021/5/12

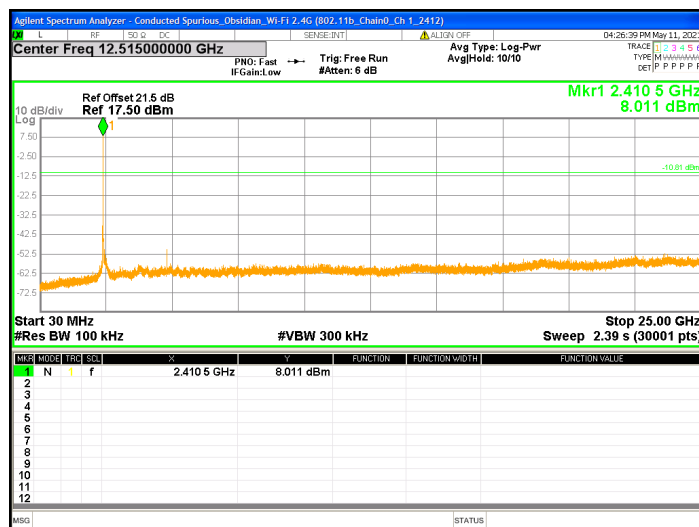
Chain0 : Conducted Spurious @ 802.11b Mode Ch 1



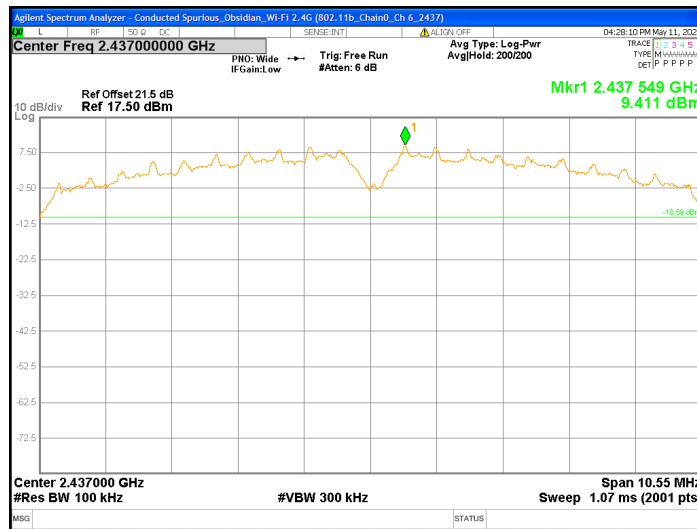
Chain0 : Conducted Spurious @ 802.11b Mode Ch 1



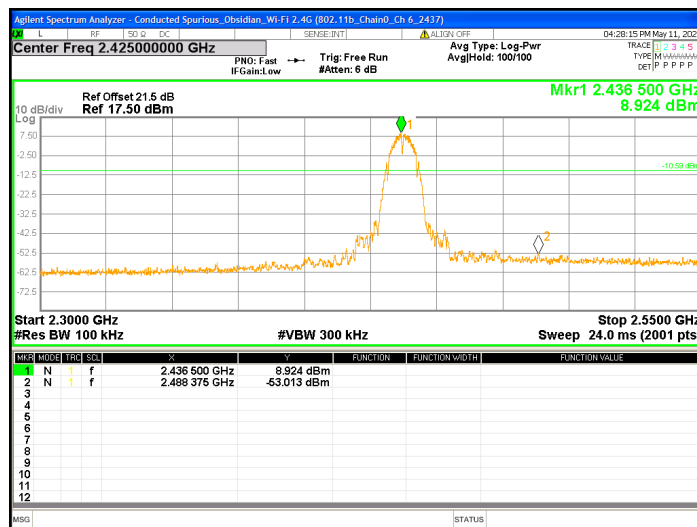
Chain0 : Conducted Spurious @ 802.11b Mode Ch 1



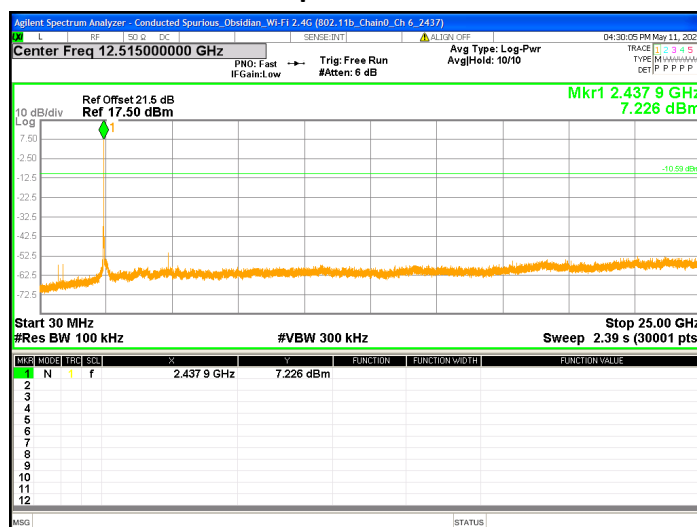
Chain0 : Conducted Spurious @ 802.11b Mode Ch 6



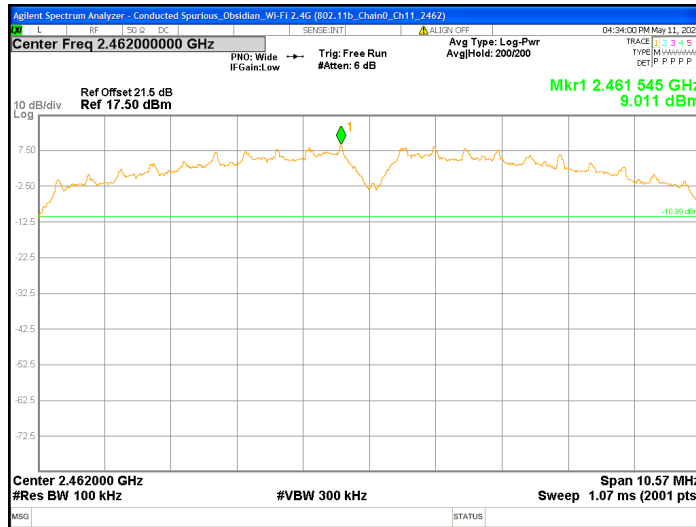
Chain0 : Conducted Spurious @ 802.11b Mode Ch 6



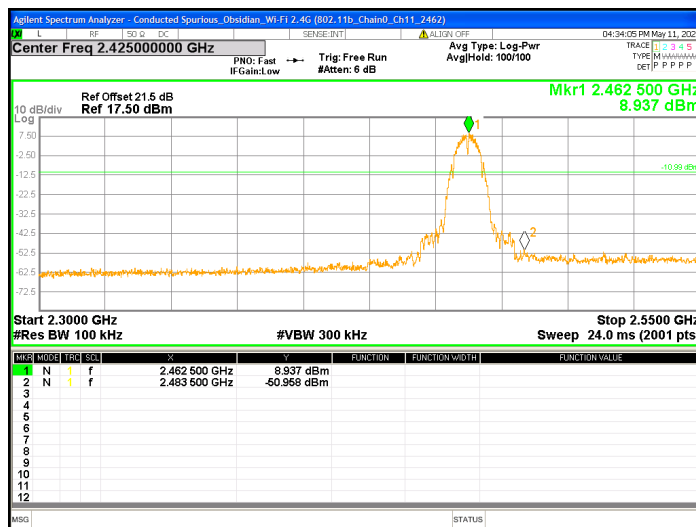
Chain0 : Conducted Spurious @ 802.11b Mode Ch 6



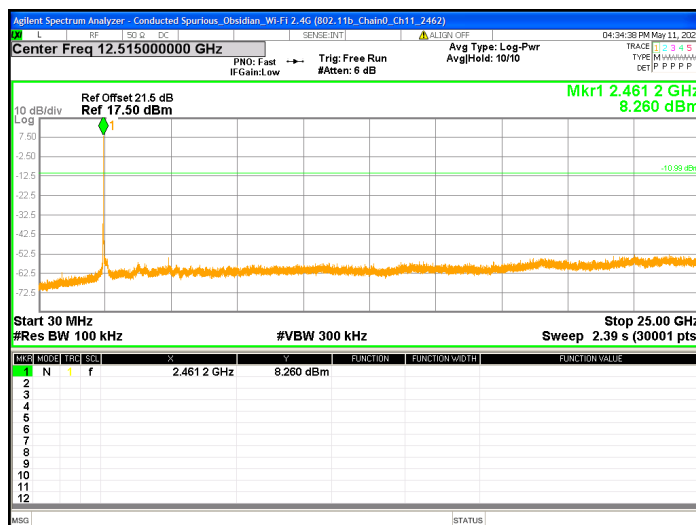
Chain0 : Conducted Spurious @ 802.11b Mode Ch11



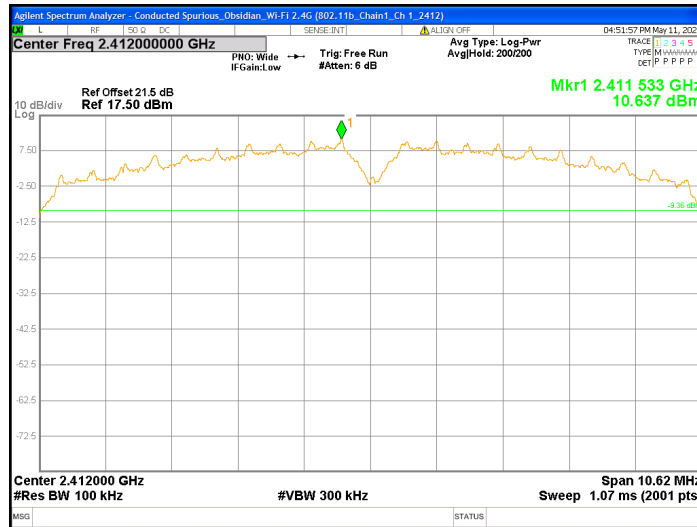
Chain0 : Conducted Spurious @ 802.11b Mode Ch11



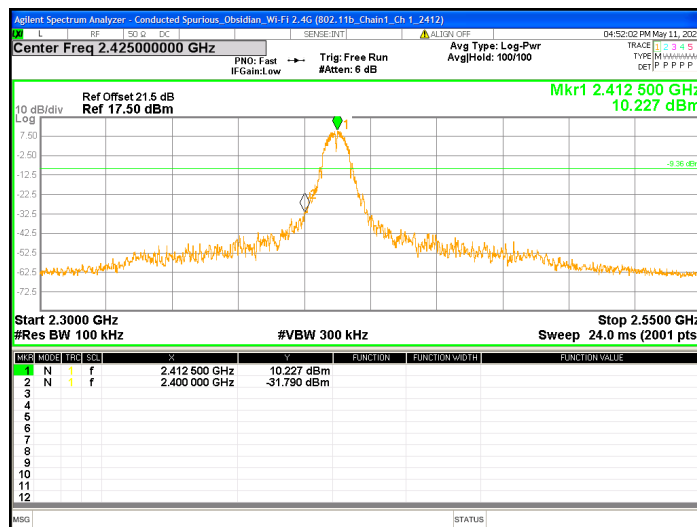
Chain0 : Conducted Spurious @ 802.11b Mode Ch11



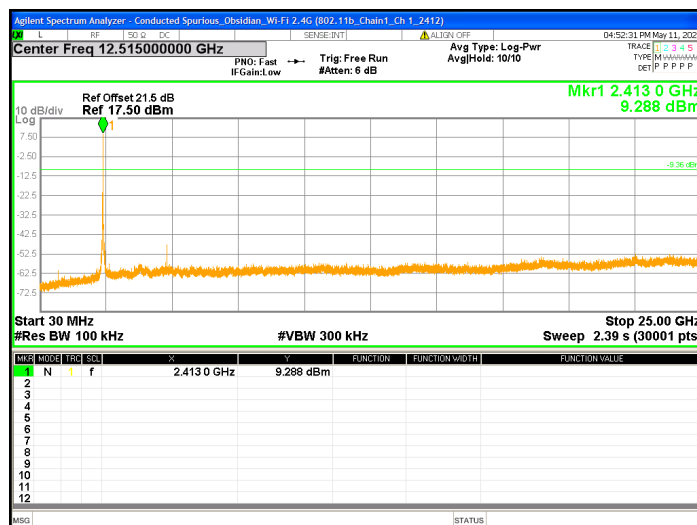
Chain1 : Conducted Spurious @ 802.11b Mode Ch 1



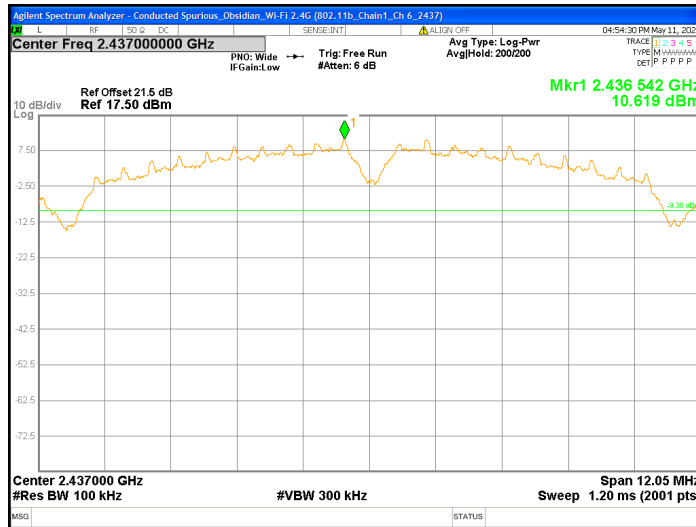
Chain1 : Conducted Spurious @ 802.11b Mode Ch 1



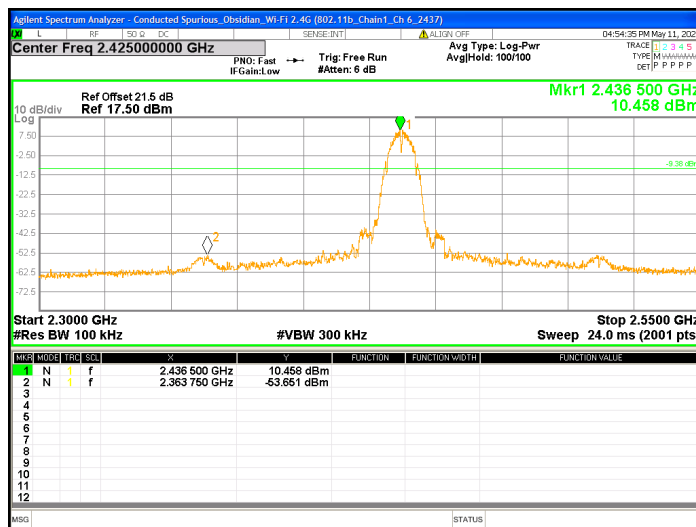
Chain1 : Conducted Spurious @ 802.11b Mode Ch 1



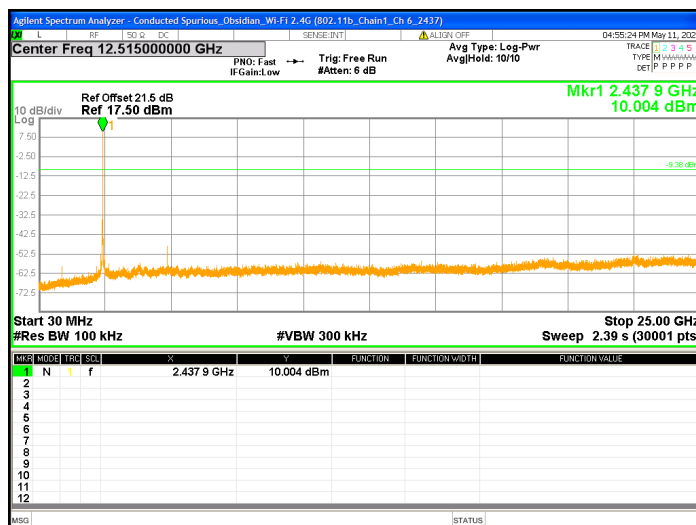
Chain1 : Conducted Spurious @ 802.11b Mode Ch 6



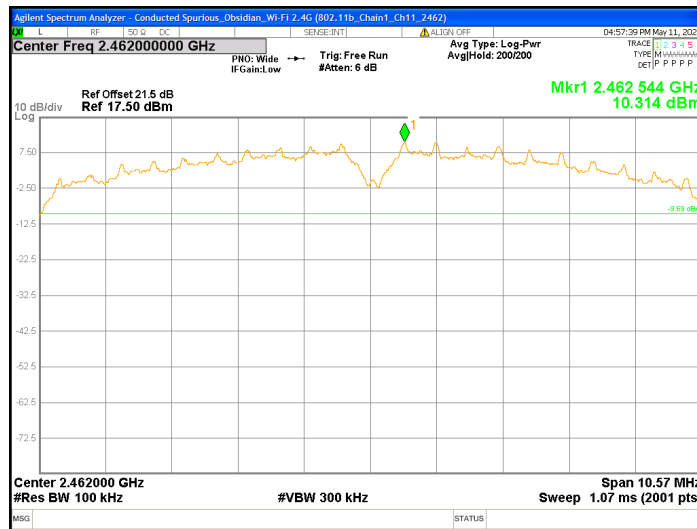
Chain1 : Conducted Spurious @ 802.11b Mode Ch 6



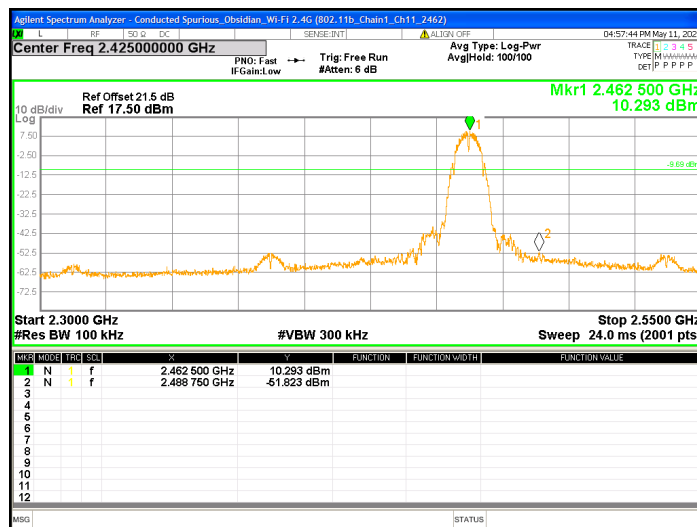
Chain1 : Conducted Spurious @ 802.11b Mode Ch 6



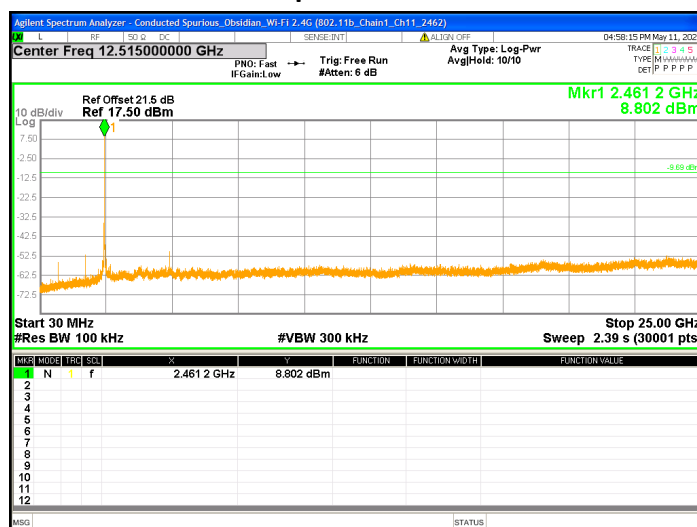
Chain1 : Conducted Spurious @ 802.11b Mode Ch11



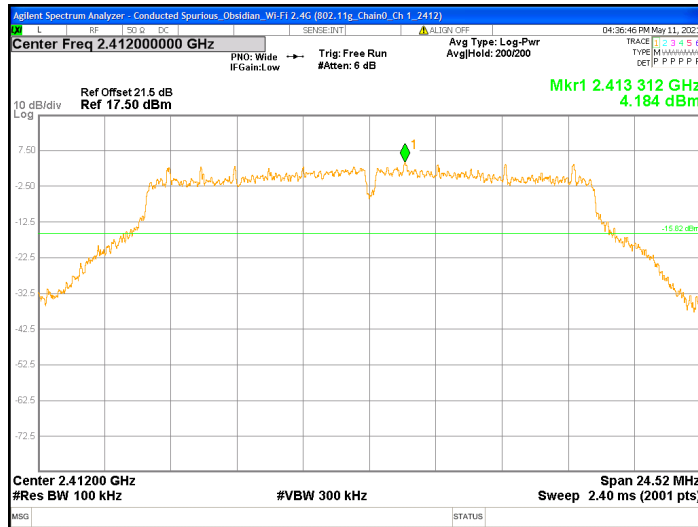
Chain1 : Conducted Spurious @ 802.11b Mode Ch11



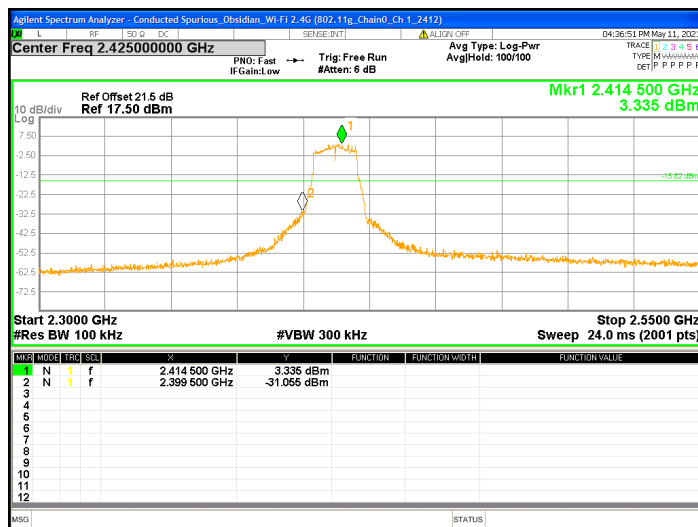
Chain1 : Conducted Spurious @ 802.11b Mode Ch11



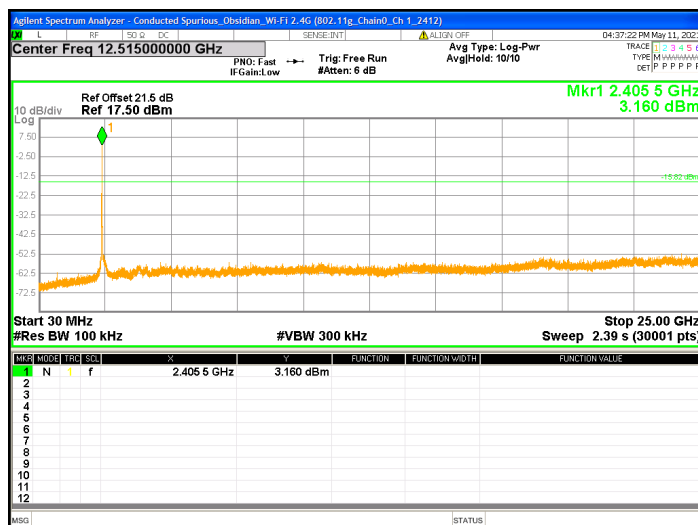
Chain0 : Conducted Spurious @ 802.11g Mode Ch 1



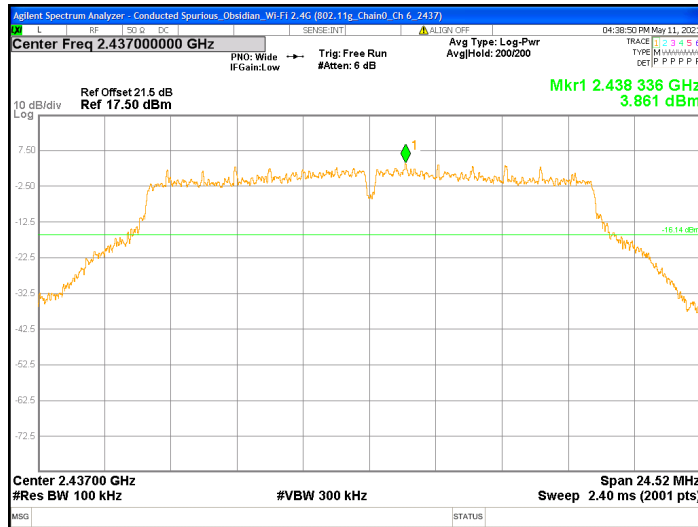
Chain0 : Conducted Spurious @ 802.11g Mode Ch 1



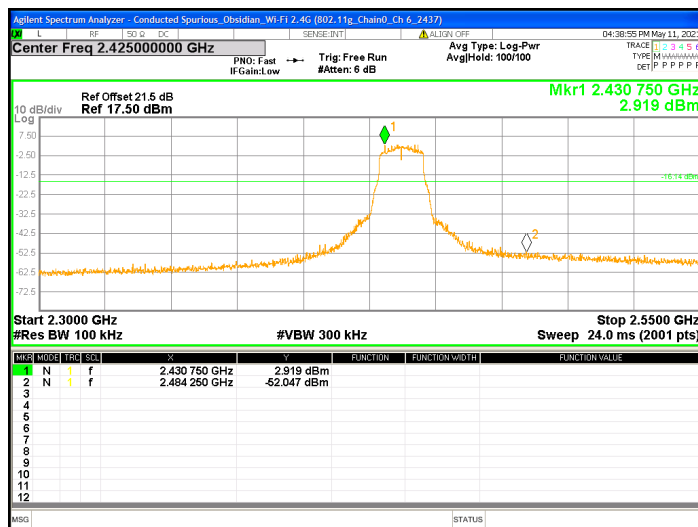
Chain0 : Conducted Spurious @ 802.11g Mode Ch 1



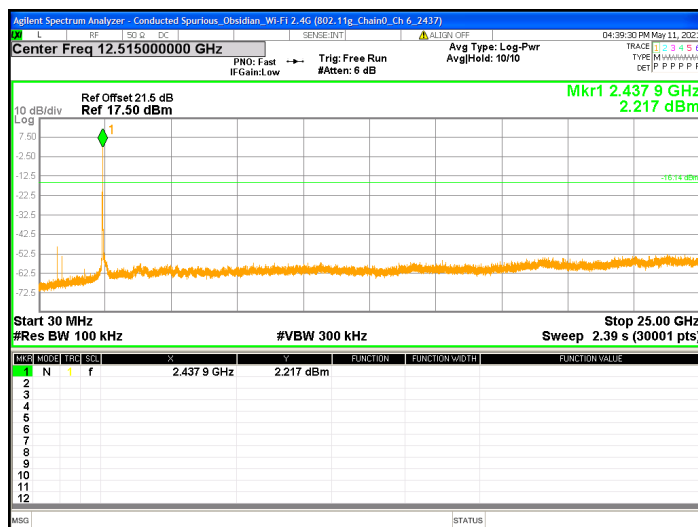
Chain0 : Conducted Spurious @ 802.11g Mode Ch 6



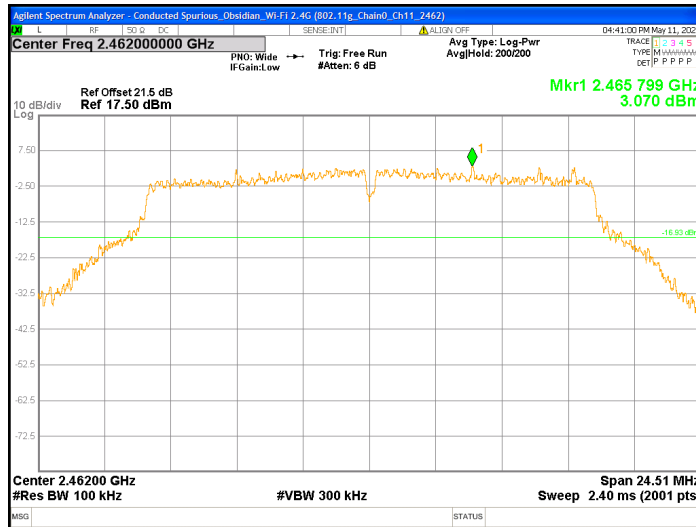
Chain0 : Conducted Spurious @ 802.11g Mode Ch 6



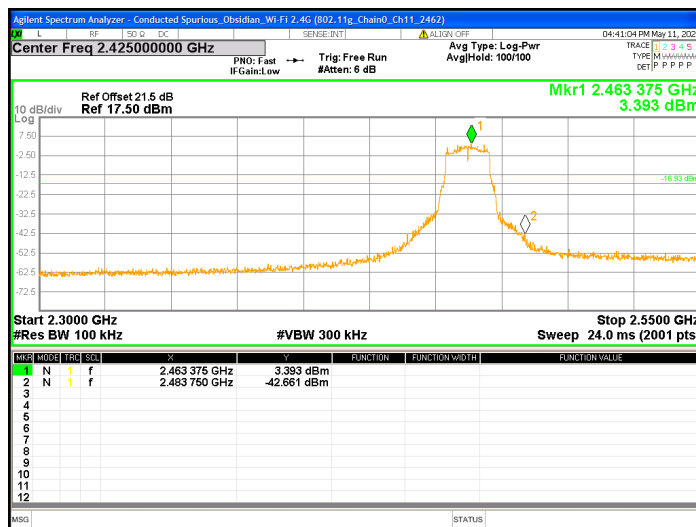
Chain0 : Conducted Spurious @ 802.11g Mode Ch 6



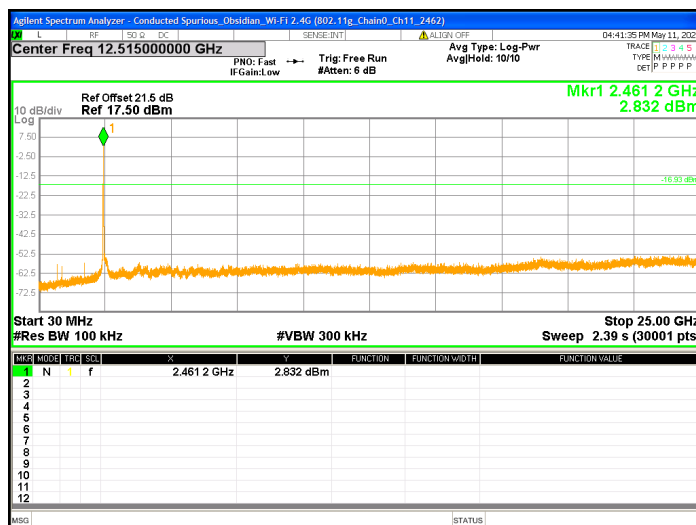
Chain0 : Conducted Spurious @ 802.11g Mode Ch11



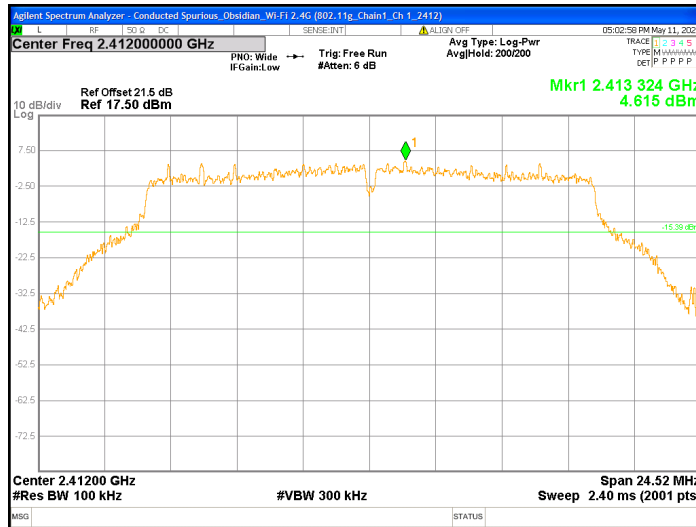
Chain0 : Conducted Spurious @ 802.11g Mode Ch11



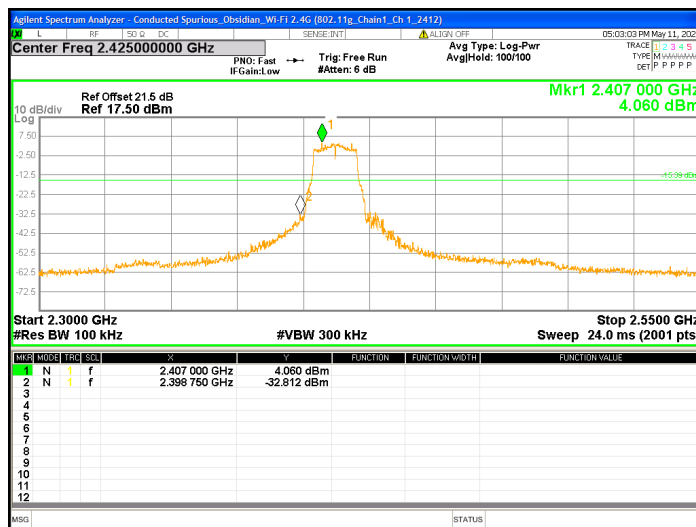
Chain0 : Conducted Spurious @ 802.11g Mode Ch11



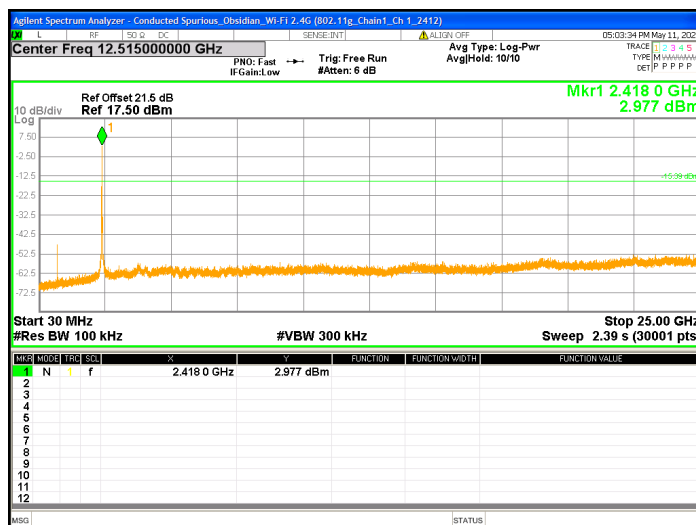
Chain1 : Conducted Spurious @ 802.11g Mode Ch 1



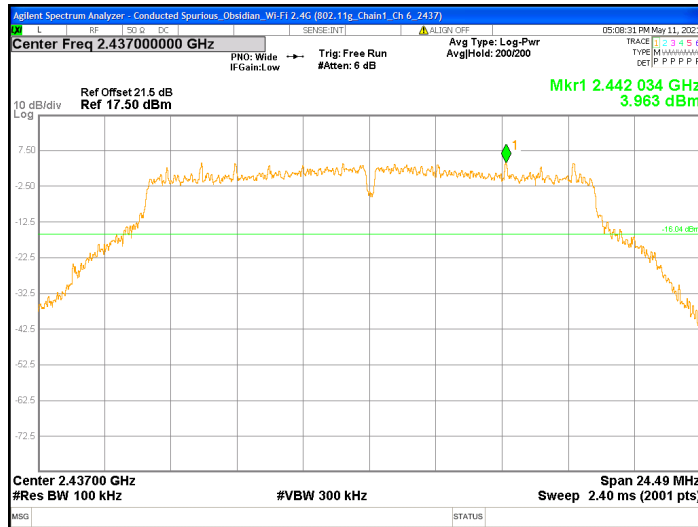
Chain1 : Conducted Spurious @ 802.11g Mode Ch 1



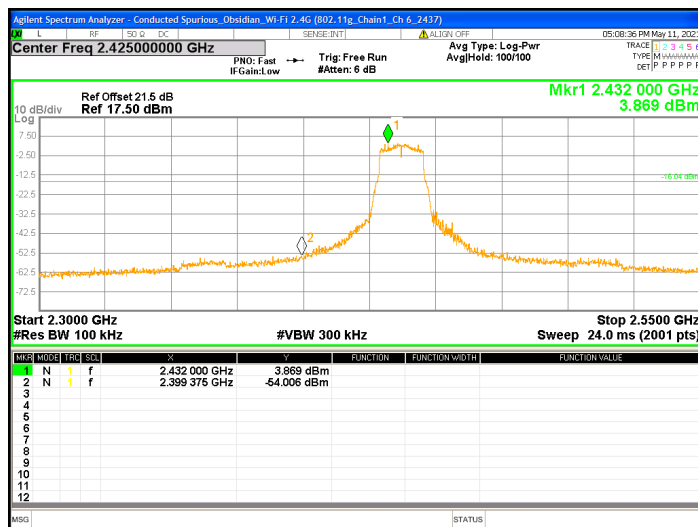
Chain1 : Conducted Spurious @ 802.11g Mode Ch 1



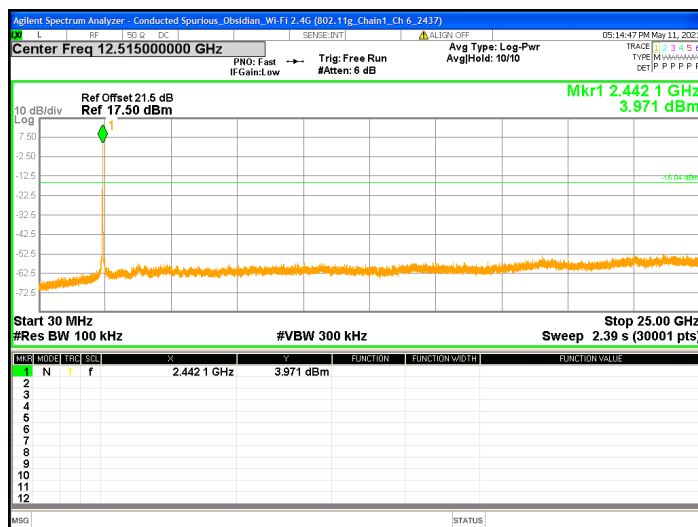
Chain1 : Conducted Spurious @ 802.11g Mode Ch 6



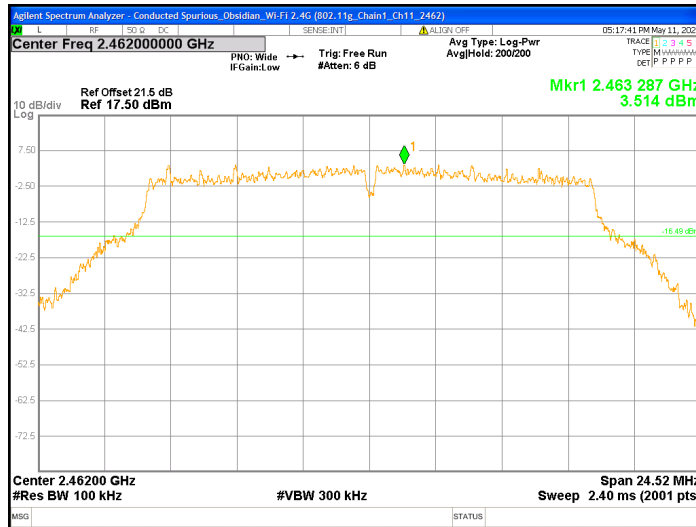
Chain1 : Conducted Spurious @ 802.11g Mode Ch 6



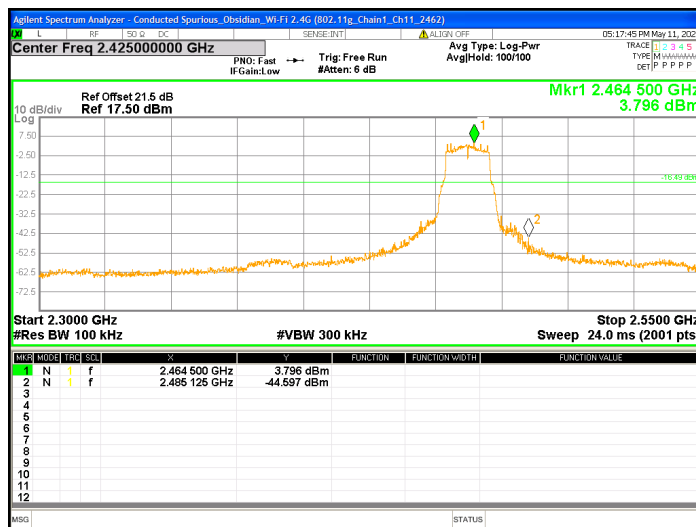
Chain1 : Conducted Spurious @ 802.11g Mode Ch 6



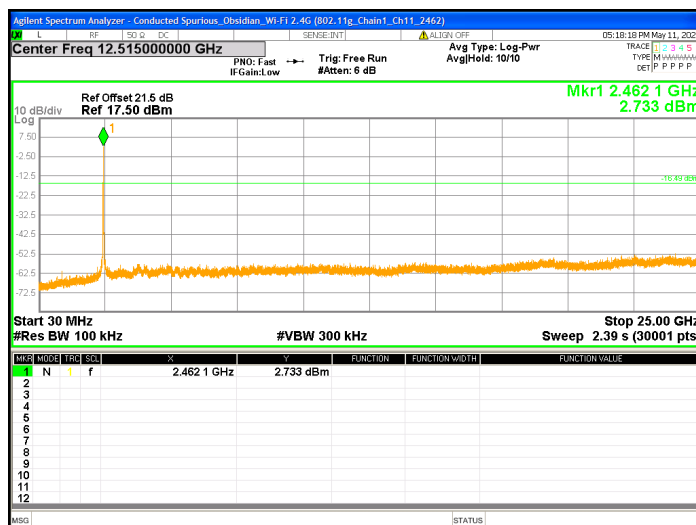
Chain1 : Conducted Spurious @ 802.11g Mode Ch11



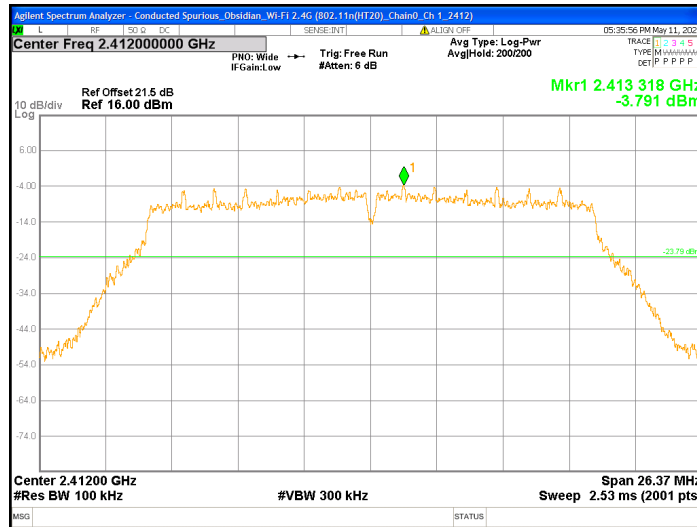
Chain1 : Conducted Spurious @ 802.11g Mode Ch11



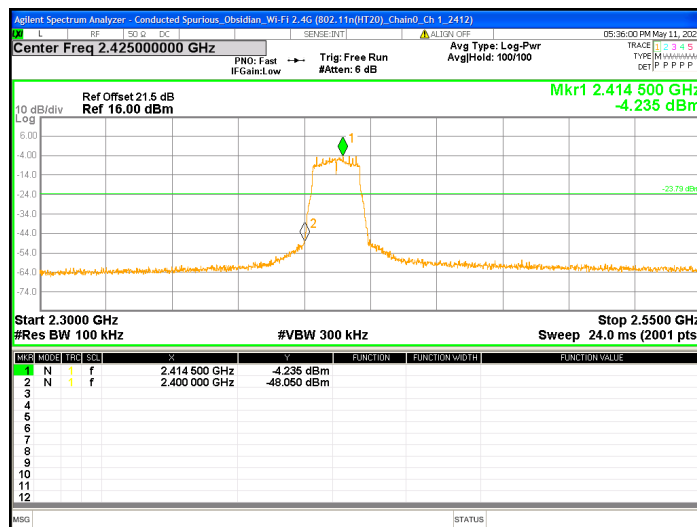
Chain1 : Conducted Spurious @ 802.11g Mode Ch11



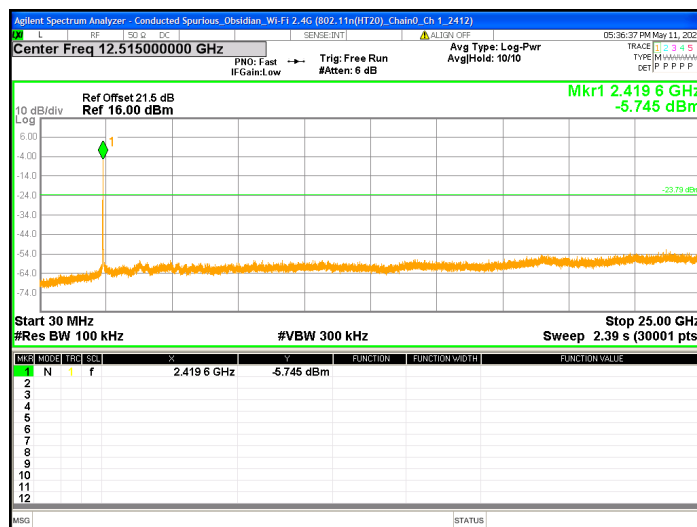
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch 1



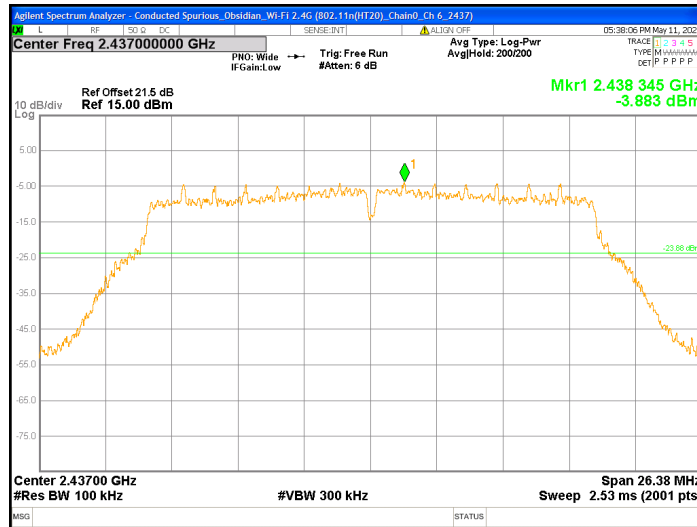
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch 1



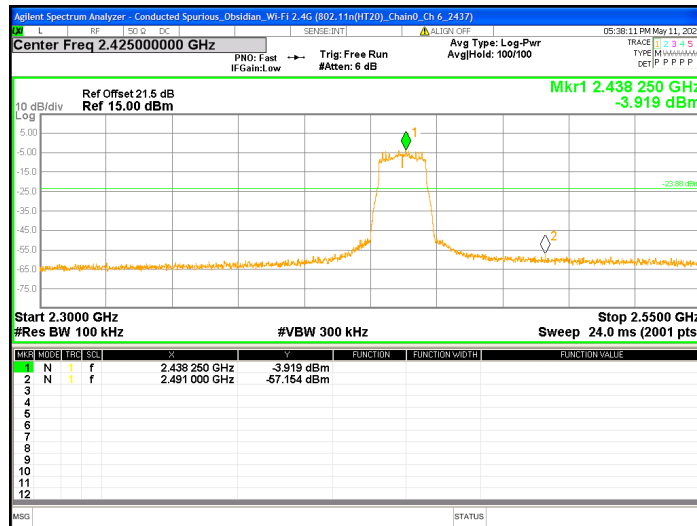
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch 1



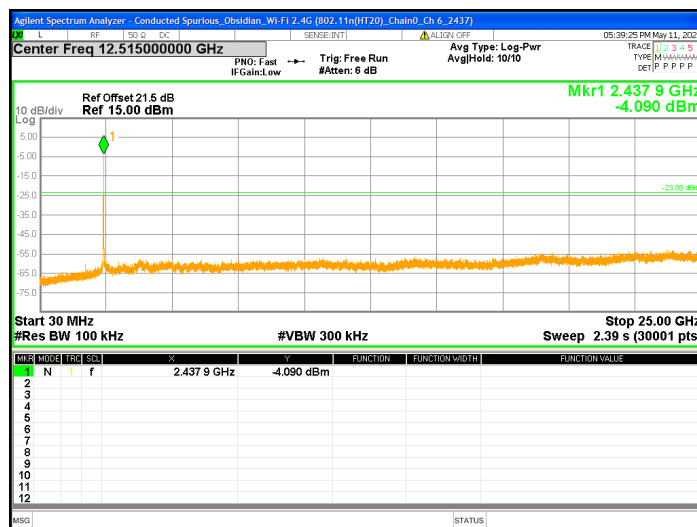
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch 6



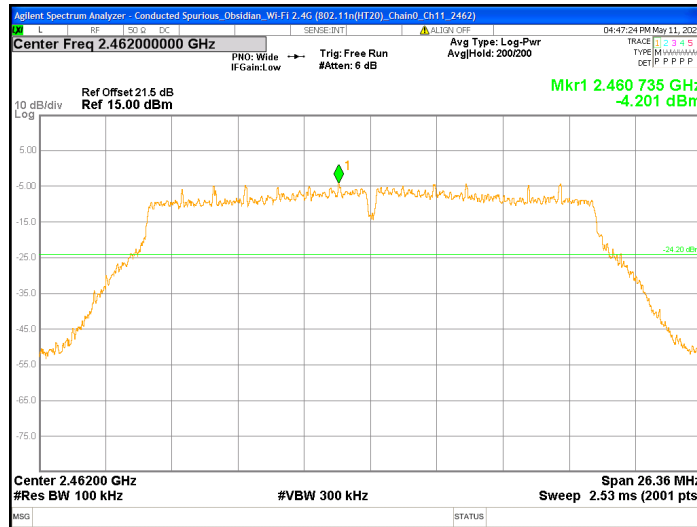
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch 6



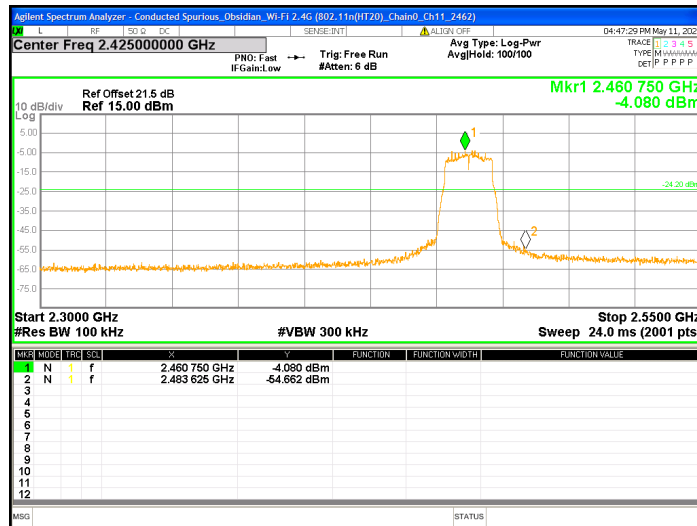
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch 6



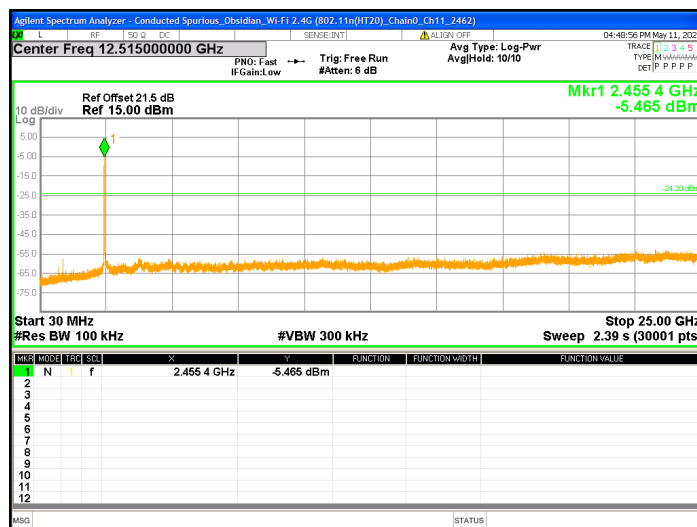
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch11



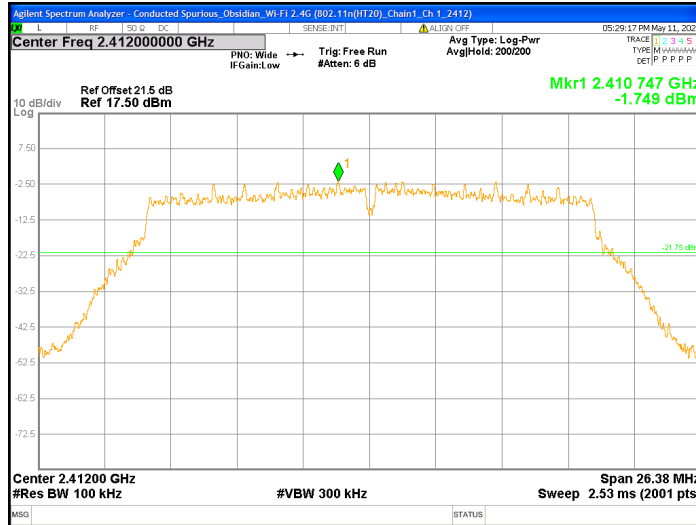
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch11



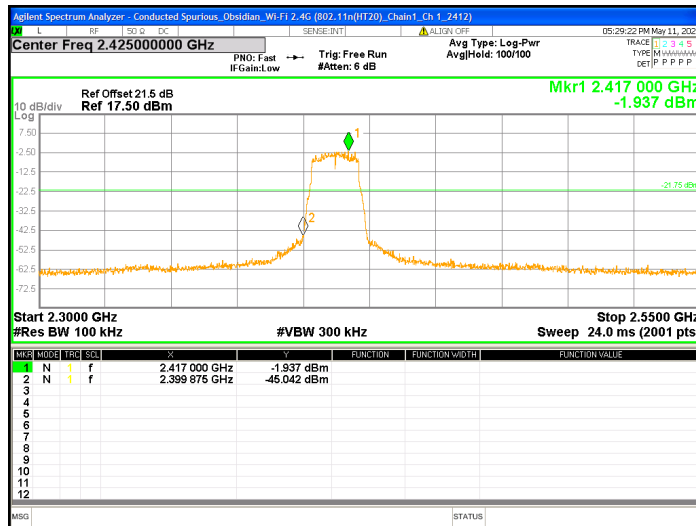
Chain0 : Conducted Spurious @ 802.11n(HT20) Mode Ch11



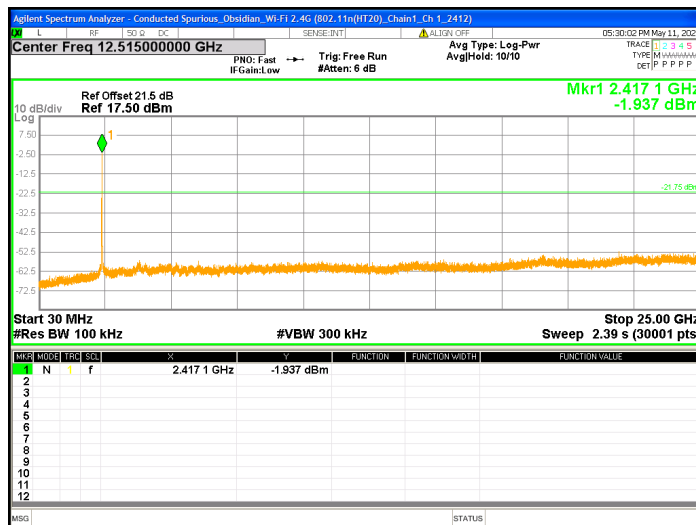
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch 1



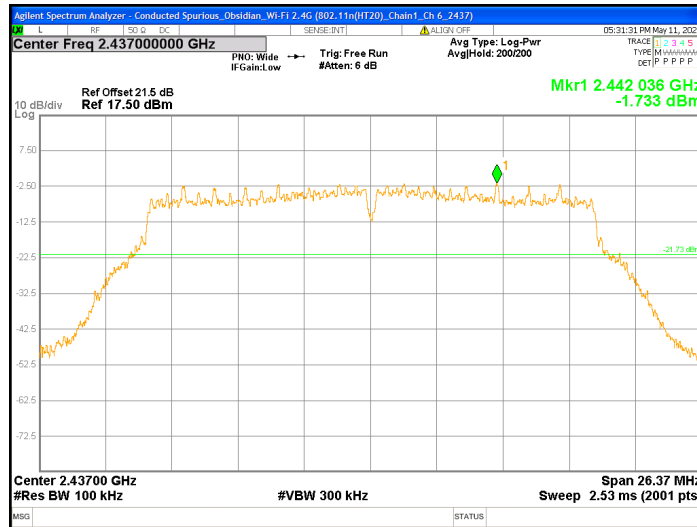
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch 1



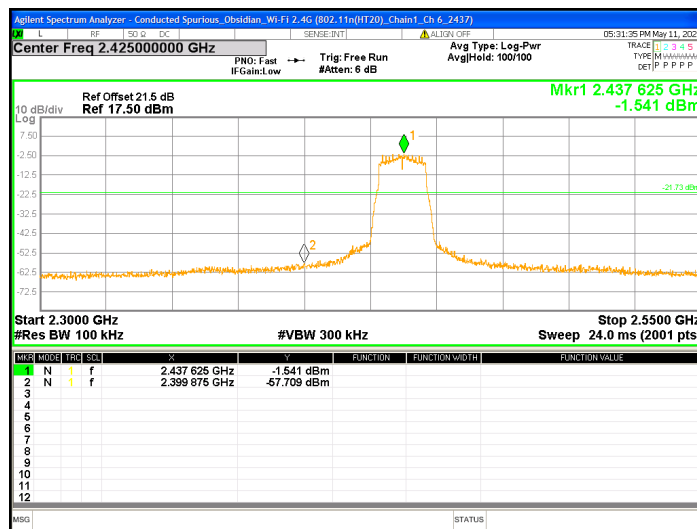
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch 1



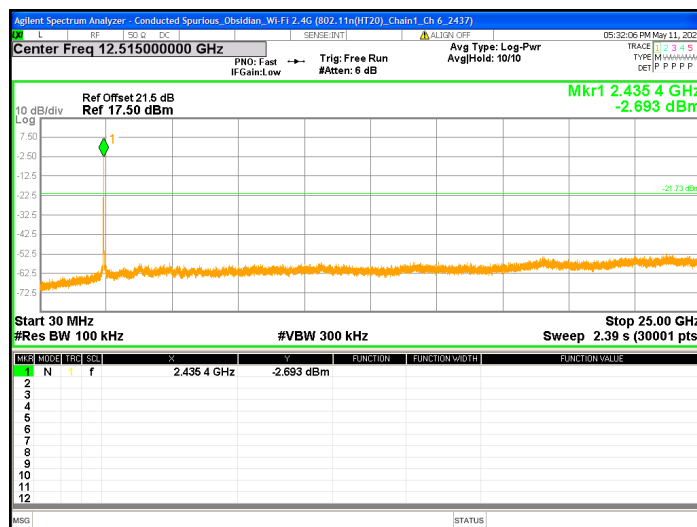
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch 6



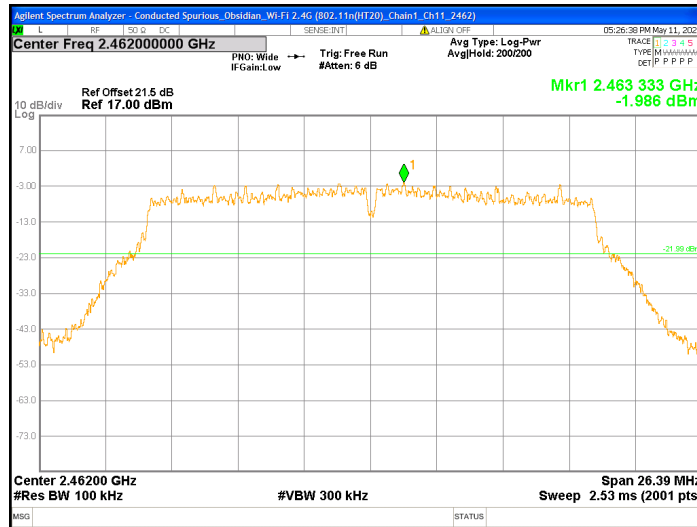
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch 6



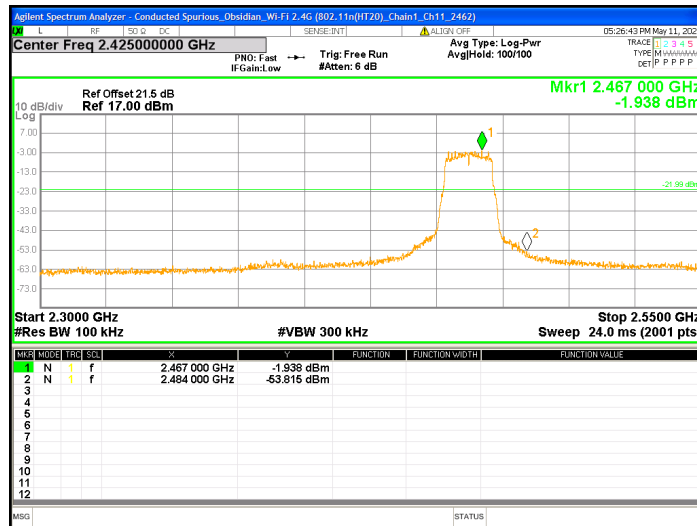
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch 6



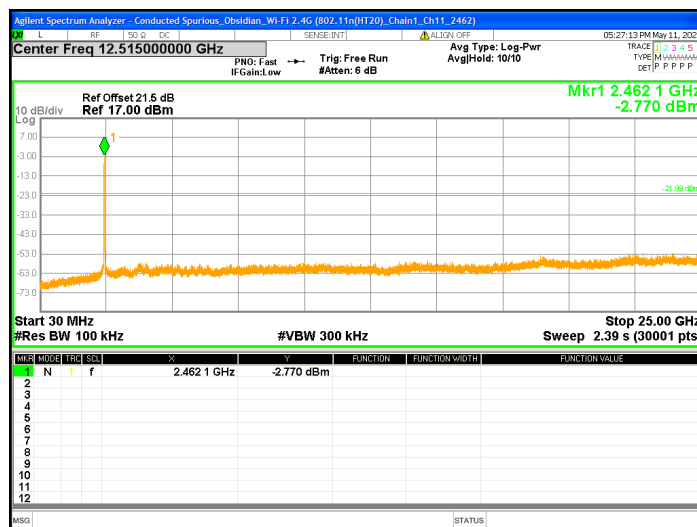
Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch11



Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch11



Chain1 : Conducted Spurious @ 802.11n(HT20) Mode Ch11



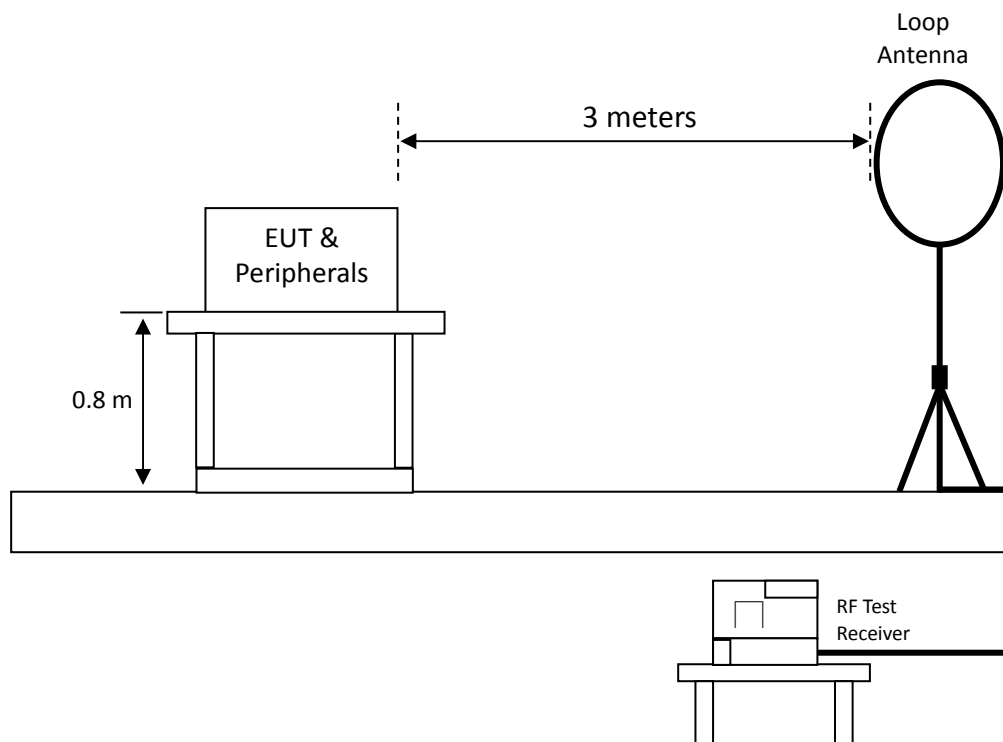
6. Emissions in Restricted Frequency Bands (Radiated emission measurements)

6.1 Instrument Setting

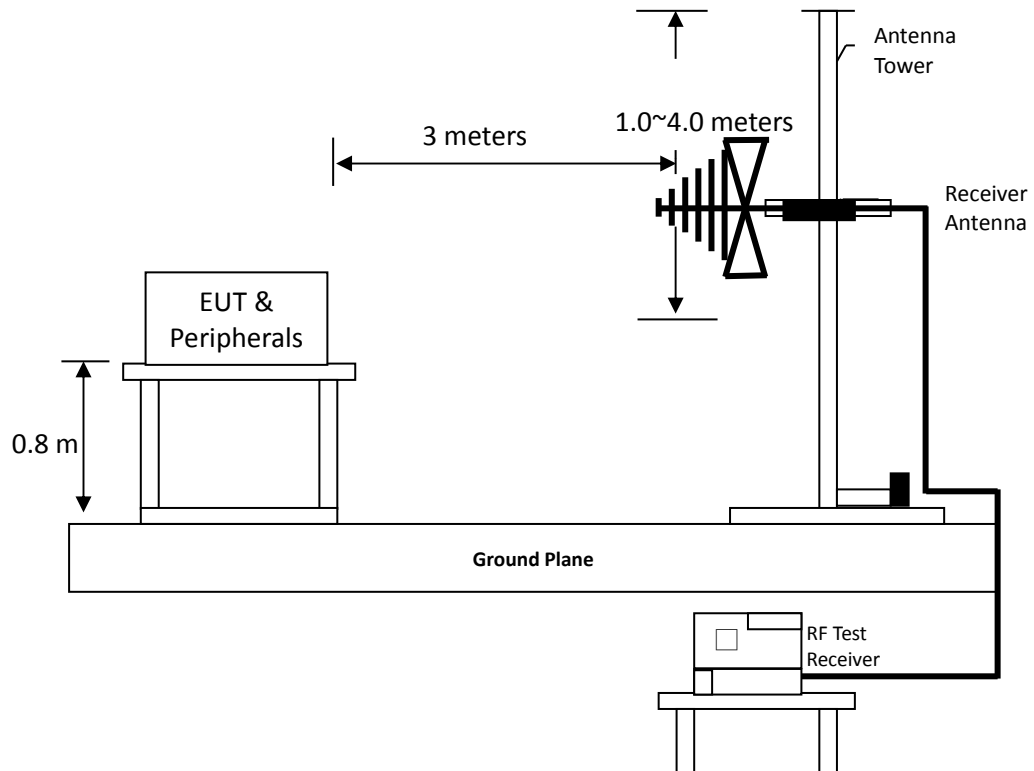
Receiver Function	Setting (Below 1GHz)	Setting (Above 1GHz)
Detector	QP	Peak and Average
RBW	9-150 kHz ; 200-300 Hz 0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz	1MHz
VBW	$\geq 3 \times \text{RBW}$	3MHz & 1/T minimum kHz
Sweep	Auto couple	Auto couple
Start Frequency	9 kHz	1GHz
Stop Frequency	1 GHz	Tenth harmonic
Attenuation	Auto	Auto

6.2 Test setup & procedure

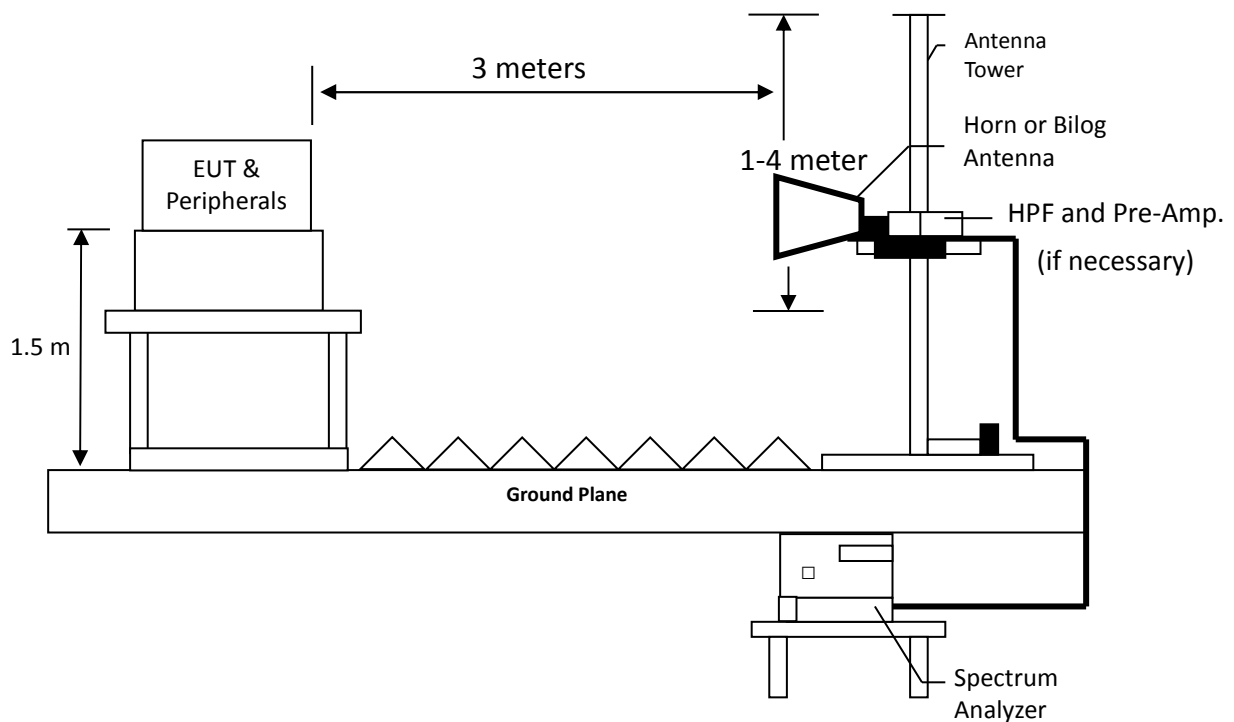
Radiated emission from 9kHz to 30MHz uses Loop Antenna:



Radiated emission below 1GHz using Bilog Antenna



Radiated emission above 1GHz using Horn Antenna



TEST REPORT

Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 1/T minimum kHz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/ 3 MHz VBW) recorded also on the report.

The EUT for testing is arranged on a turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

6.3 Limit

Frequency(MHz)	Field Strength(uV/m)	Measurement distance(m)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

TEST REPORT

6.4 Test Result

6.4.1 Measurement results: frequencies 9kHz to 30MHz

Temperature (°C) :	26
Relative Humidity (%) :	55
Test date :	2021/5/11

The test was performed on EUT under continuously transmitting mode. The worst case occurred at 802.11g Chain1 Ch1.

Antenna Polarity	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Perpendicular	0.01	AV	18.20	54.86	73.06	128.52	-55.46
Perpendicular	0.04	AV	19.54	49.48	69.02	115.78	-46.76
Perpendicular	0.16	AV	18.57	51.58	70.15	103.58	-33.43
Perpendicular	0.22	AV	18.75	49.24	67.99	100.80	-32.81
Perpendicular	0.49	AV	19.34	38.28	57.62	93.82	-36.20
Perpendicular	0.82	QP	19.65	33.10	52.75	69.34	-16.59

Antenna Polarity	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Parallel	0.01	AV	18.20	54.96	73.16	128.52	-55.36
Parallel	0.07	AV	19.08	50.84	69.92	110.83	-40.91
Parallel	0.16	AV	18.57	51.89	70.46	103.58	-33.12
Parallel	0.28	AV	18.72	44.01	62.73	98.69	-35.96
Parallel	0.49	AV	19.34	39.18	58.52	93.82	-35.30
Parallel	0.85	QP	19.64	33.04	52.68	69.03	-16.35

TEST REPORT

Antenna Polarity	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Ground-parallel	0.01	AV	18.20	56.22	74.42	128.52	-54.10
Ground-parallel	0.07	AV	19.08	50.84	69.92	110.83	-40.91
Ground-parallel	0.16	AV	18.57	51.68	70.25	103.58	-33.33
Ground-parallel	0.22	AV	18.75	48.74	67.49	100.80	-33.31
Ground-parallel	0.49	AV	19.34	38.27	57.61	93.82	-36.21
Ground-parallel	0.82	QP	19.65	32.20	51.85	69.34	-17.49

TEST REPORT

6.5.2 Measurement results: frequencies below 1 GHz

Temperature (°C) :	26
Relative Humidity (%) :	55
Test date :	2021/5/11

The test was performed on EUT under continuously transmitting mode. The worst case occurred at 802.11g Chain1 Ch1.

Antenna Polarity	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Vertical	77.53	QP	17.68	10.03	27.71	40.00	-12.29
Vertical	214.30	QP	18.41	13.01	31.42	43.50	-12.08
Vertical	428.67	QP	25.61	14.48	40.09	46.00	-5.91
Vertical	714.82	QP	30.86	11.15	42.01	46.00	-3.99
Vertical	858.30	QP	33.02	11.96	44.98	46.00	-1.02
Vertical	930.16	QP	34.22	7.90	42.12	46.00	-3.88

Antenna Polarity	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Horizontal	214.30	QP	18.41	20.85	39.26	43.50	-4.24
Horizontal	428.67	QP	25.61	13.74	39.35	46.00	-6.65
Horizontal	572.23	QP	28.54	9.76	38.30	46.00	-7.70
Horizontal	714.82	QP	30.86	11.75	42.61	46.00	-3.39
Horizontal	786.60	QP	32.30	10.68	42.98	46.00	-3.02
Horizontal	858.38	QP	33.02	6.61	39.63	46.00	-6.37

Remark: Corr. Factor = Antenna Factor + Cable Loss

TEST REPORT

6.5.3 Measurement results: frequency above 1GHz to 25GHz

Temperature (°C) :	25
Relative Humidity (%) :	51
Test date :	2021/5/4

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11b_Chain0_Ch1	4824	PK	V	8.99	34.66	43.65	74.00	-30.35
	4824	PK	H	8.99	36.06	45.05	74.00	-28.95
802.11b_Chain0_Ch6	4874	PK	V	9.22	35.20	44.42	74.00	-29.58
	4874	PK	H	9.22	35.73	44.95	74.00	-29.05
802.11b_Chain0_Ch11	4924	PK	V	9.45	32.10	41.55	74.00	-32.45
	4924	PK	H	9.45	33.35	42.80	74.00	-31.20
802.11b_Chain1_Ch1	4824	PK	V	8.99	37.13	46.12	74.00	-27.88
	4824	PK	H	8.99	38.83	47.82	74.00	-26.18
802.11b_Chain1_Ch6	7311	PK	V	15.96	48.97	64.93	74.00	-9.07
	7311	AV	V	15.96	25.17	41.13	54.00	-12.87
	7311	PK	H	15.96	42.73	58.69	74.00	-15.31
	7311	AV	H	15.96	32.00	47.96	54.00	-6.04
802.11b_Chain1_Ch11	7386	PK	V	16.29	42.15	58.44	74.00	-15.56
	7386	AV	V	16.29	23.19	39.48	54.00	-14.52
	7386	PK	H	16.29	41.63	57.92	74.00	-16.08
	7386	AV	H	16.29	27.69	43.98	54.00	-10.02
802.11g_Chain0_Ch1	4824	PK	V	8.99	33.45	42.44	74.00	-31.56
	4824	PK	H	8.99	33.36	42.35	74.00	-31.65
802.11g_Chain0_Ch6	4874	PK	V	9.22	30.84	40.06	74.00	-33.94
	4874	PK	H	9.22	31.69	40.91	74.00	-33.09
802.11g_Chain0_Ch11	4924	PK	V	9.45	31.75	41.20	74.00	-32.80
	4924	PK	H	9.45	30.53	39.98	74.00	-34.02
802.11g_Chain1_Ch1	4824	PK	V	8.99	31.68	40.67	74.00	-33.33
	4824	PK	H	8.99	35.16	44.15	74.00	-29.85
802.11g_Chain1_Ch6	4874	PK	V	9.22	32.28	41.50	74.00	-32.50
	4874	PK	H	9.22	33.82	43.04	74.00	-30.96

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

TEST REPORT

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11g_Chain1_Ch11	4924	PK	V	9.45	33.08	42.53	74.00	-31.47
	4924	PK	H	9.45	33.85	43.30	74.00	-30.70
802.11n20_Chain0+1_Ch1	4824	PK	V	8.99	33.14	42.13	74.00	-31.87
	4824	PK	H	8.99	33.39	42.38	74.00	-31.62
802.11n20_Chain0+1_Ch6	4874	PK	V	9.22	33.10	42.32	74.00	-31.68
	4874	PK	H	9.22	33.15	42.37	74.00	-31.63
802.11n20_Chain0+1_Ch11	4924	PK	V	9.45	31.11	40.56	74.00	-33.44
	4924	PK	H	9.45	31.30	40.75	74.00	-33.25

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

7. Emission on Band Edge**7.1 Instrument Setting**

Spectrum Function	Setting
Detector	Peak and Average
RBW	1MHz
VBW	3MHz & 1/T minimum kHz
Sweep	Auto couple
Restrict bands	2310 MHz ~ 2390 MHz 2483.5 MHz ~ 2500 MHz
Attenuation	Auto

7.2 Test Procedure

The test procedure is the same as Emissions in Restricted Frequency Bands (Radiated emission measurements).

TEST REPORT

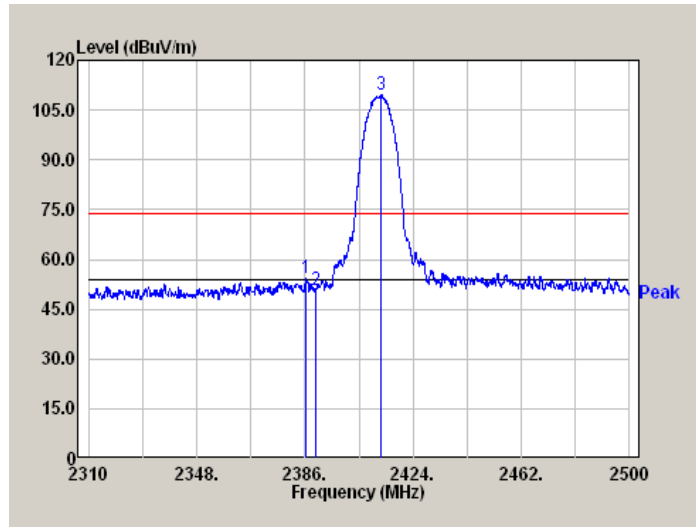
7.3 Test Results

Temperature (°C) :	25
Relative Humidity (%) :	51
Test date :	2021/5/4

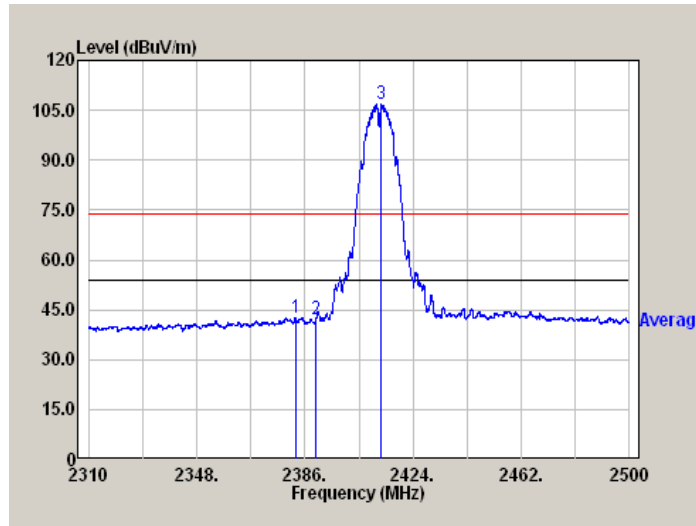
Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
802.11b Chain0	2386.38	PK	V	34.29	19.92	54.21	74	-19.79	2310~2390
	2382.68	AV	V	34.28	8.40	42.68	54	-11.32	
	2486.56	PK	V	34.74	19.87	54.61	74	-19.39	2483.5~2500
	2491.74	AV	V	34.77	10.47	45.24	54	-8.76	
802.11b Chain1	2340.31	PK	H	34.09	17.88	51.97	74	-22.03	2310~2390
	2362.68	AV	H	34.19	6.44	40.63	54	-13.37	
	2497.86	PK	H	34.79	17.26	52.05	74	-21.95	2483.5~2500
	2495.77	AV	H	34.78	6.55	41.33	54	-12.67	
802.11g Chain0	2389.99	PK	V	34.31	28.76	63.07	74	-10.93	2310~2390
	2390.00	AV	V	34.31	17.01	51.32	54	-2.68	
	2483.50	PK	V	34.72	31.71	66.43	74	-7.57	2483.5~2500
	2483.50	AV	V	34.72	17.93	52.65	54	-1.35	
802.11g Chain1	2390.00	PK	V	34.31	22.67	56.98	74	-17.02	2310~2390
	2390.00	AV	V	34.31	9.49	43.80	54	-10.20	
	2484.09	PK	V	34.73	19.09	53.82	74	-20.18	2483.5~2500
	2483.50	AV	V	34.72	7.93	42.65	54	-11.35	
802.11n(HT20) Chain0+1	2390.00	PK	H	34.31	29.62	63.93	74	-10.07	2310~2390
	2390.00	AV	H	34.31	18.97	53.28	54	-0.72	
	2483.50	PK	H	34.72	28.89	63.61	74	-10.39	2483.5~2500
	2483.52	AV	H	34.72	18.64	53.36	54	-0.64	

Remark: Correction Factor = Antenna Factor + Cable Loss

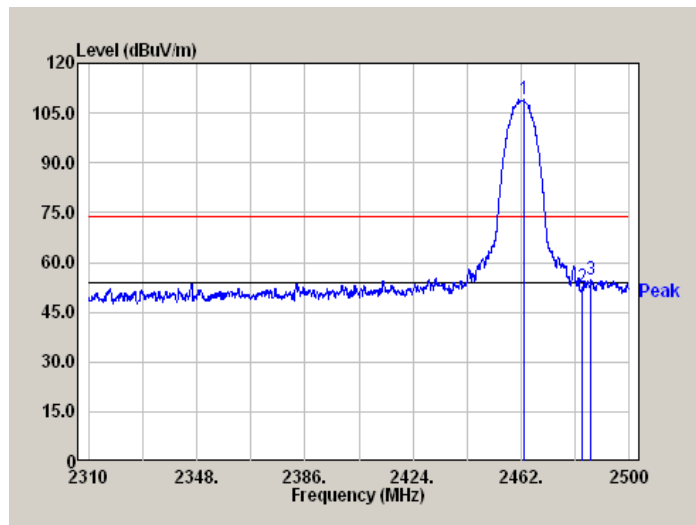
Chain0 : Restricted Band Bandedge @ 802.11b Mode Ch1 PK



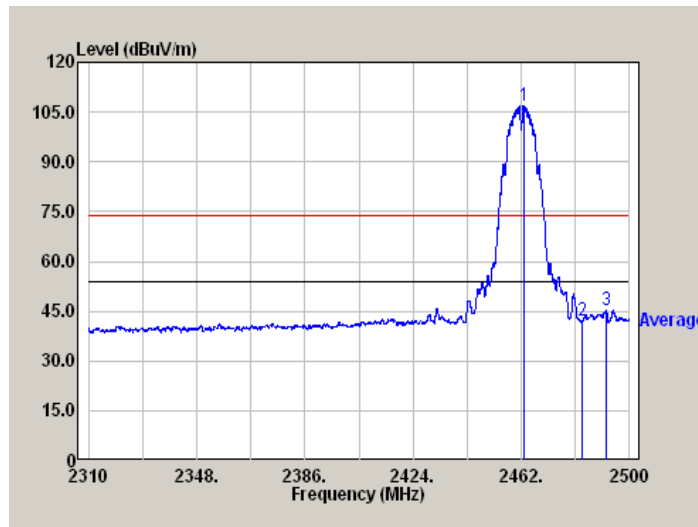
Chain0 : Restricted Band Bandedge @ 802.11b Mode Ch1 AV



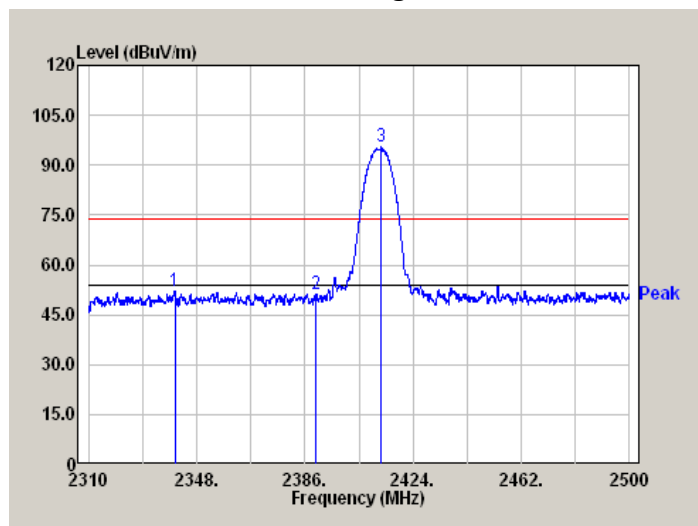
Chain0 : Restricted Band Bandedge @ 802.11b Mode Ch11 PK



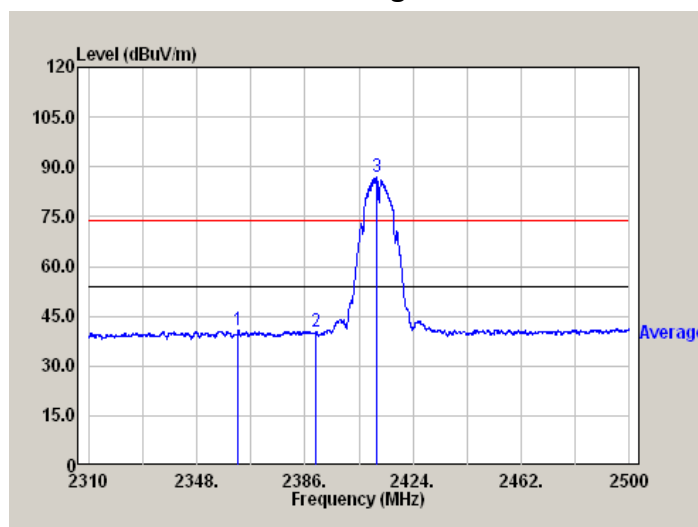
Chain0 : Restricted Band Bandedge @ 802.11b Mode Ch11 AV



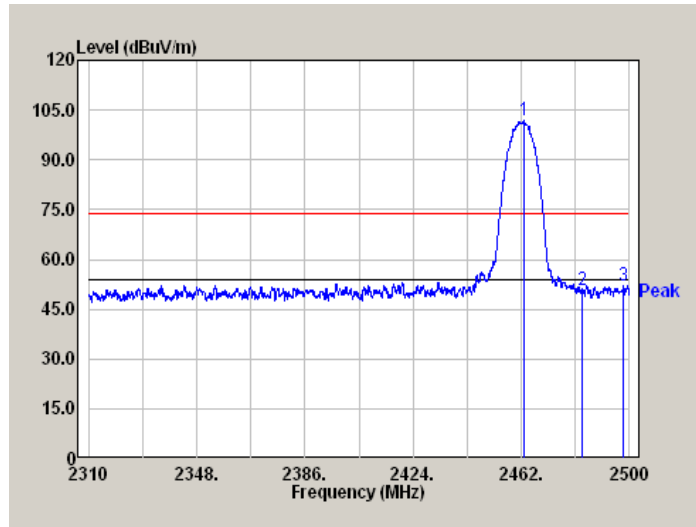
Chain1 : Restricted Band Bandedge @ 802.11b Mode Ch1 PK



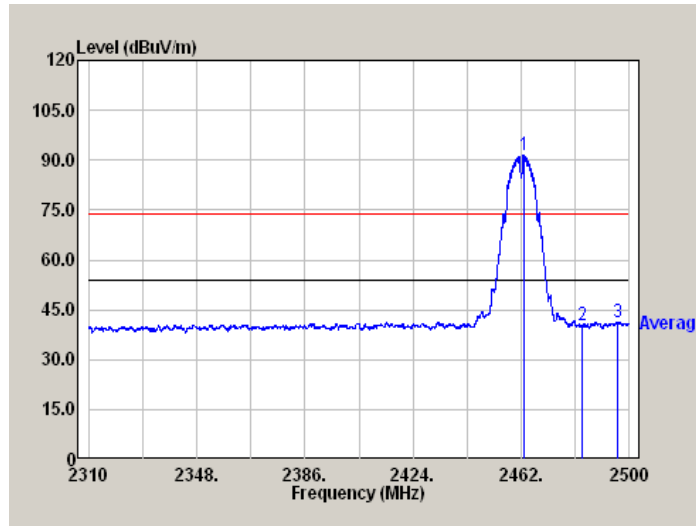
Chain1 : Restricted Band Bandedge @ 802.11b Mode Ch1 AV



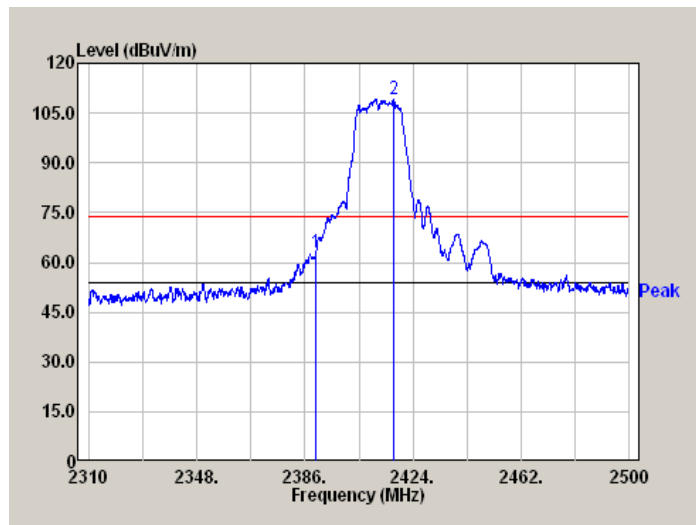
Chain1 : Restricted Band Bandedge @ 802.11b Mode Ch11 PK



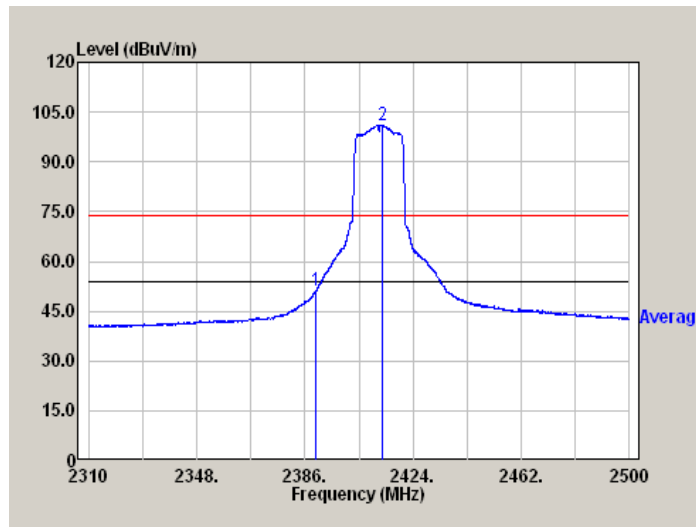
Chain1 : Restricted Band Bandedge @ 802.11b Mode Ch11 AV



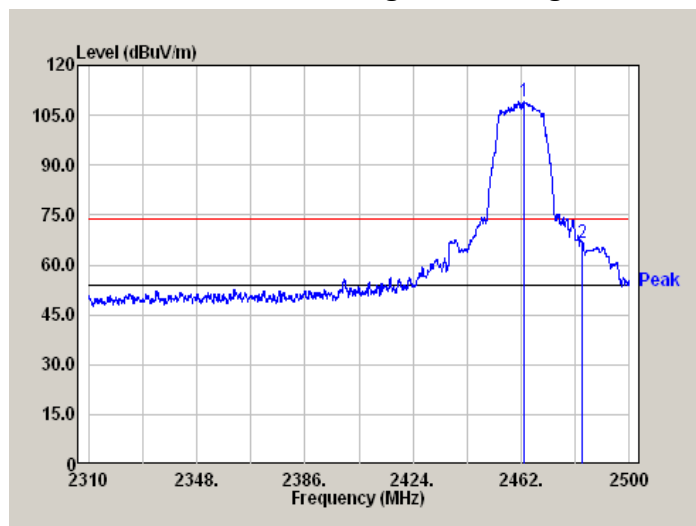
Chain0 : Restricted Band Bandedge @ 802.11g Mode Ch1 PK



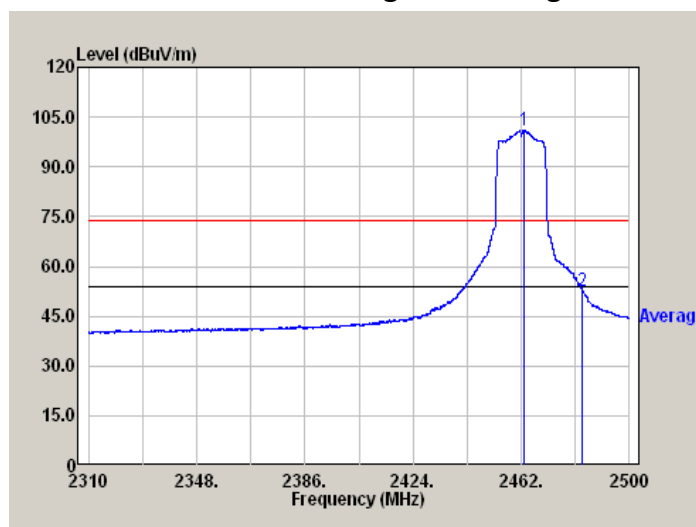
Chain0 : Restricted Band Bandedge @ 802.11g Mode Ch1 AV



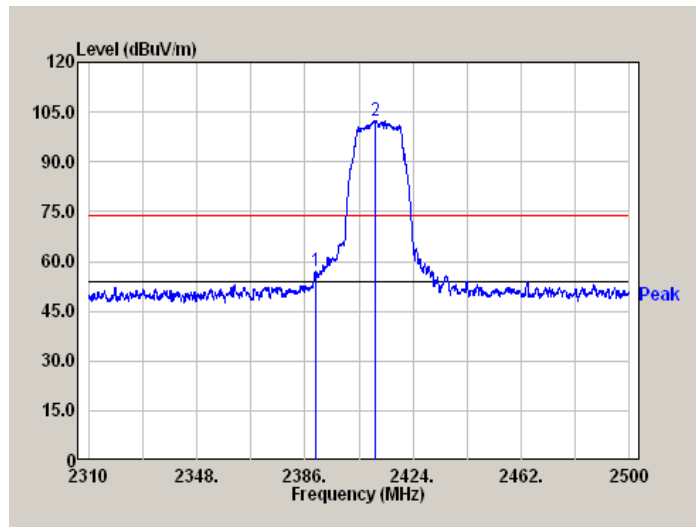
Chain0 : Restricted Band Bandedge @ 802.11g Mode Ch11 PK



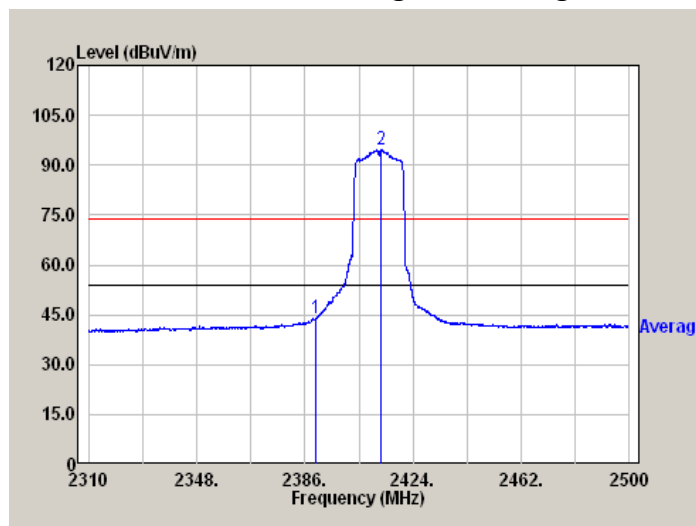
Chain0 : Restricted Band Bandedge @ 802.11g Mode Ch11 AV



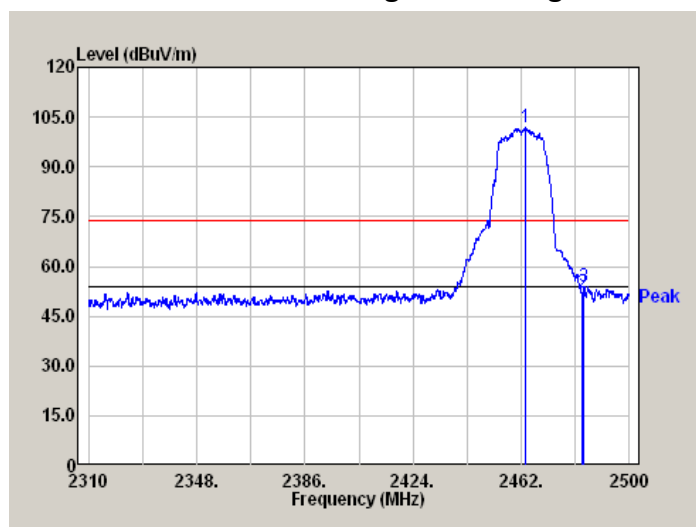
Chain1 : Restricted Band Bandedge @ 802.11g Mode Ch1 PK



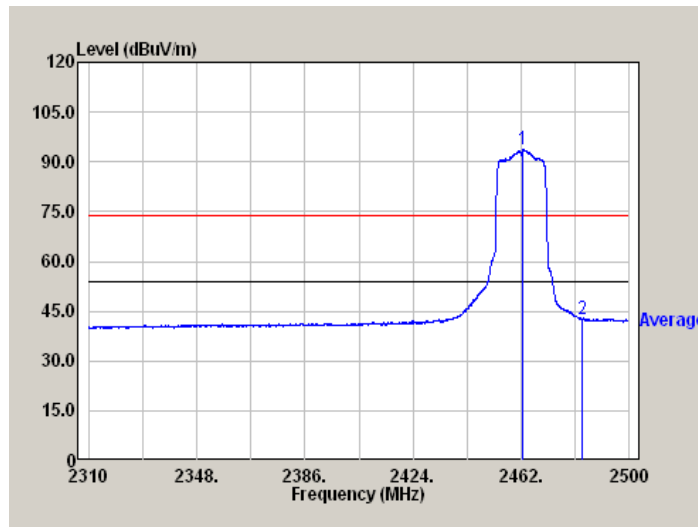
Chain1 : Restricted Band Bandedge @ 802.11g Mode Ch1 AV



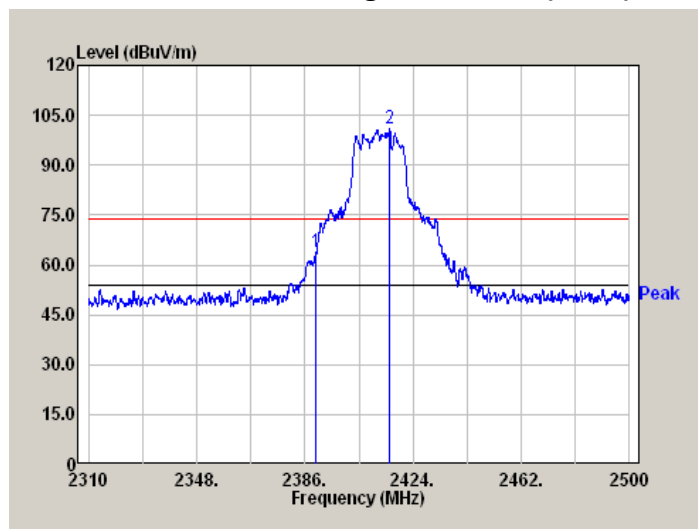
Chain1 : Restricted Band Bandedge @ 802.11g Mode Ch11 PK



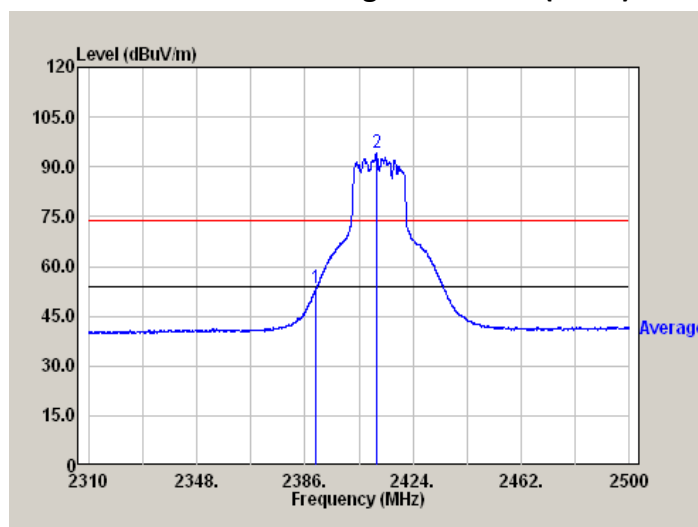
Chain1 : Restricted Band Bandedge @ 802.11g Mode Ch11 AV



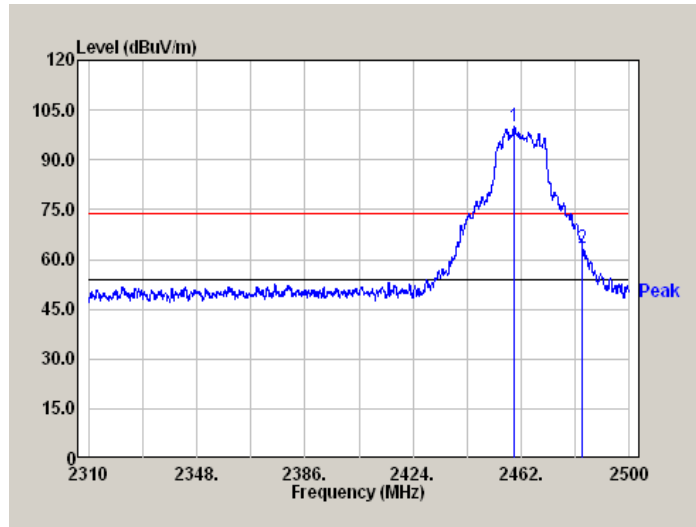
Chain0+1 : Restricted Band Bandedge @ 802.11n(HT20) Mode Ch1 PK



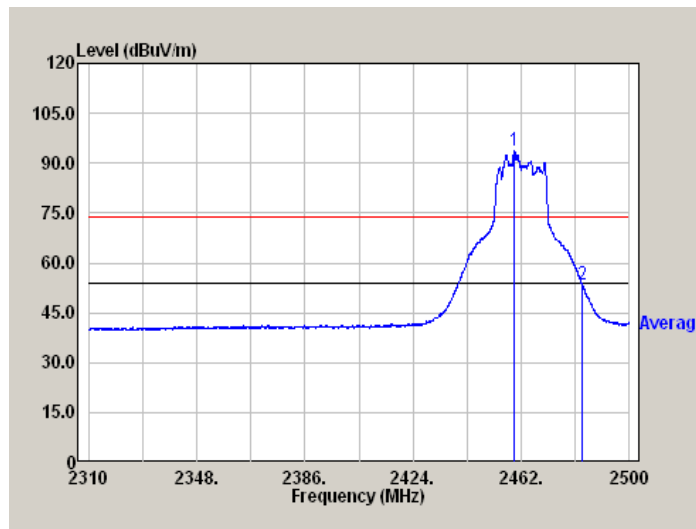
Chain0+1 : Restricted Band Bandedge @ 802.11n(HT20) Mode Ch1 AV



Chain0+1 : Restricted Band Bandedge @ 802.11 n(HT20) Mode Ch11 PK



Chain0+1 : Restricted Band Bandedge @ 802.11 n(HT20) Mode Ch11 AV



8. AC Power Line Conducted Emission

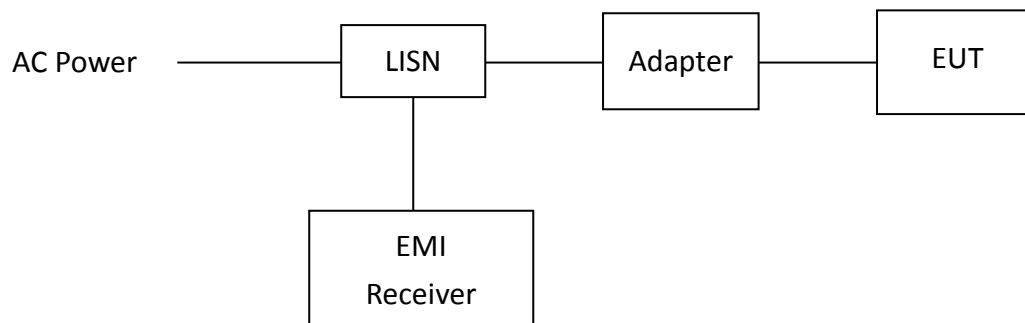
8.1 Measuring instrument setting

Receiver Function	Setting
Detector	QP
Start frequency	0.15MHz
Stop frequency	30MHz
IF bandwidth	9 kHz
Attenuation	10dB

8.2 Test Procedure

Step 1	Configure the EUT according to ANSI C63.10:2013. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
Step 2	Connect EUT or host of EUT to the power mains through a line impedance stabilization network.
Step 3	All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance.
Step 4	The frequency range from 150 kHz to 30MHz was searched.
Step 5	Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
Step 6	The measurement has to be done between each power line and ground at the power terminal.

8.3 Test Diagram



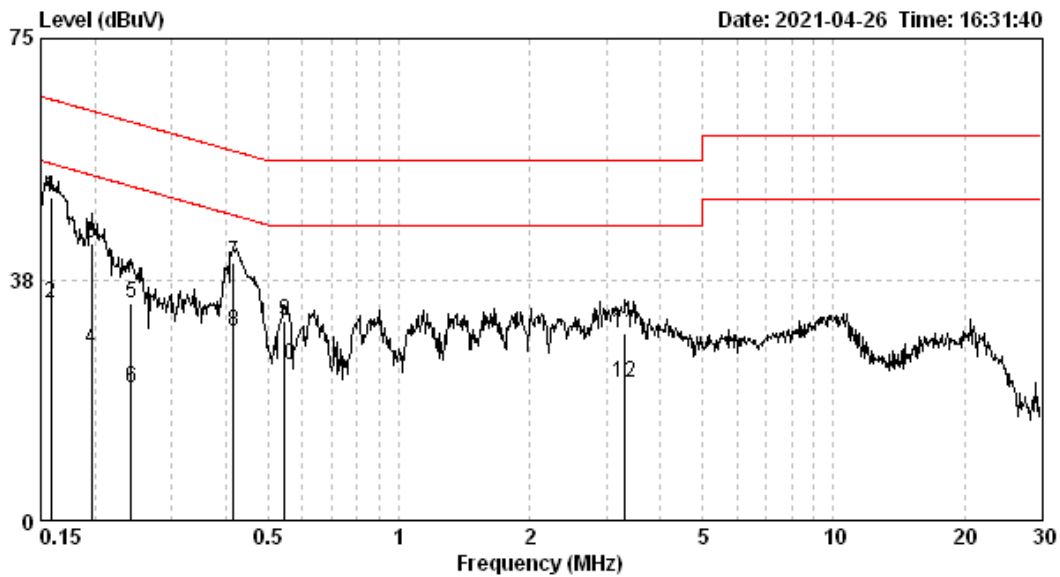
8.4 Limit

Frequency (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56	56 – 46
0.50~5.00	56	46
5.00~30.0	60	50

TEST REPORT

8.5 Test Results

Phase: Live Line
 Test Condition: Tx mode



Test voltage : AC 120V / 60Hz
 Temp. / R.H. : 26 / 65
 Atmospheric pressure : 1009

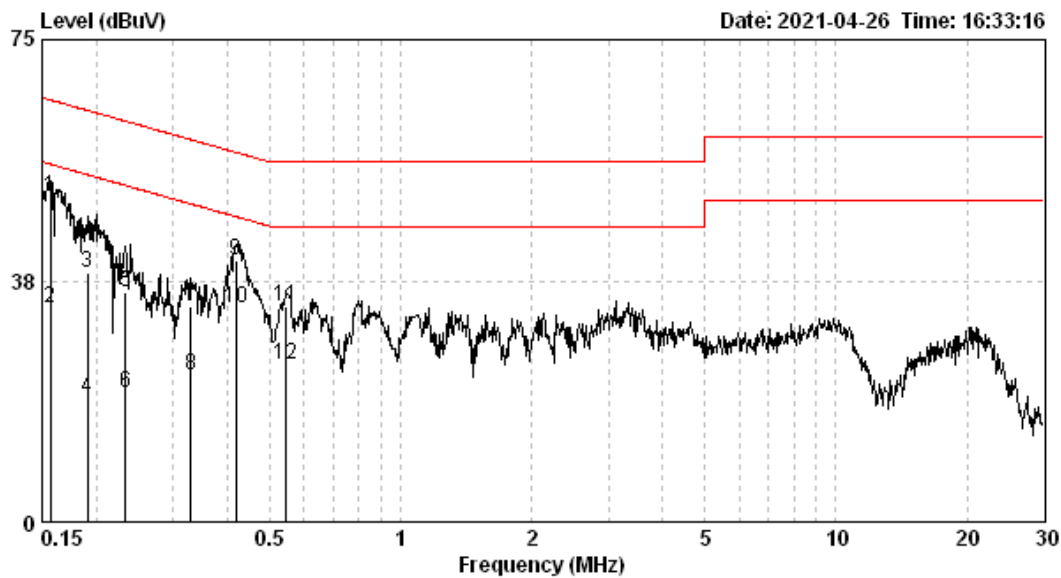
Phase	Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB)	
									QP	AV
LINE	0.158	0.08	50.09	50.17	65.56	33.71	33.79	55.56	-15.39	-21.77
LINE	0.197	0.08	43.06	43.14	63.76	26.46	26.54	53.76	-20.62	-27.22
LINE	0.242	0.08	33.64	33.72	62.04	20.49	20.57	52.04	-28.32	-31.47
LINE	0.417	0.08	39.93	40.01	57.51	29.29	29.37	47.51	-17.50	-18.14
LINE	0.546	0.09	30.99	31.08	56.00	24.21	24.30	46.00	-24.92	-21.70
LINE	3.310	0.17	29.05	29.22	56.00	21.24	21.41	46.00	-26.78	-24.59

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)

TEST REPORT

Phase: Neutral Line
 Test Condition: Tx mode



Test voltage :AC 120V / 60Hz
 Temp. / R.H. :26 / 65
 Atmospheric pressure :1009

Phase	Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB)	
									QP	AV
NEUTRAL	0.156	0.08	50.41	50.49	65.65	33.09	33.17	55.65	-15.16	-22.48
NEUTRAL	0.190	0.08	38.61	38.69	64.02	19.05	19.13	54.02	-25.33	-34.89
NEUTRAL	0.233	0.08	35.61	35.69	62.35	19.89	19.97	52.35	-26.66	-32.38
NEUTRAL	0.330	0.08	33.40	33.48	59.44	22.69	22.77	49.44	-25.96	-26.67
NEUTRAL	0.419	0.08	40.70	40.78	57.46	33.04	33.12	47.46	-16.68	-14.34
NEUTRAL	0.546	0.09	33.43	33.52	56.00	24.48	24.57	46.00	-22.48	-21.43

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)

Appendix A: Test equipment list

Test Equipment/ Test site	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	Rohde & Schwarz	ESR7	101822	2020/08/18	2021/08/17
Spectrum Analyzer	Rohde & Schwarz	FSP30	100137	2020/08/25	2021/08/24
Signal Analyzer	Agilent	N9030A	MY51380492	2020/08/17	2021/08/16
Active Loop Antenna	SCHWARZBECK MESS-ELEKTRONIC	FMZB1519	1519-067	2021/04/14	2022/04/13
Broadband Antenna	SHWARZBECK	VULB 9168	9168-172	2021/01/29	2022/01/28
Horn Antenna	SHWARZBECK	BBHA 9120 D	9120D-456	2021/01/11	2022/01/10
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170159	2020/08/20	2023/08/19
Pre-Amplifier	EMC Co.	EMC12635SE	980205	2021/01/13	2022/01/12
Pre-amplifier	SGH	SGH184	20201124-1	2020/12/16	2021/12/15
Power Meter	Anritsu	ML2495A	0844001	2020/10/28	2021/10/27
Power Sensor	Anritsu	MA2411B	0738452	2020/10/28	2021/10/27
966-2(A) Cable	SUHNER	SUCOLEX 104	295105/4	2021/03/08	2022/03/07
966-2(B) Cable	SUHNER	SUCOFLEX 104P	CB0005	2021/03/08	2022/03/07
RF Cable	SUHNER	SUCOFLEX 104P	CB0006	2021/04/29	2022/04/28
966-2_3m Semi-Anechoic Chamber	966_2	CEM-966_2	N/A	2021/01/15	2022/01/14
Hight Pass Filter	Reactel	7HS-3G/18G-S11	N/A	2020/05/27	2021/05/26
20dB Attenuator	Mini-Circuits	BW-S20W5+	N/A	2020/05/27	2021/05/26
Test software	Audix	e3	V9	NCR	NCR

Note: No Calibration Required (NCR).

TEST REPORT

Test Equipment/ Test site	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	R&S	ESCS30	833364/011	2020/05/08	2021/05/07
LISN	R&S	ESH3-Z5	825562/003	2020/08/26	2021/08/25
CON-3 Cable	SUHNER	SUCOFLEX 106	27222 /6	2021/01/13	2022/01/12
Test software	Audix	e3	V4.20040112L	NCR	NCR

Note: No Calibration Required (NCR).

Appendix B: Measurement Uncertainty

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

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.16 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.02 dB
Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	5.17 dB
Vertically polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m	2.39 dB
Horizontally polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m	2.39 dB
Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m	3.70 dB
Emission on the Band Edge Test	4.32 dB
RF Antenna Conducted Spurious Test	1.27 dB
Maximum Output Power Test	0.44 dB
Occupied Bandwidth Test	7.78 %
Carrier Frequency Separation Test	1.27 dB
Number of Hopping Frequencies Test	1.27 dB
Time of Occupancy (Dwell Time) Test	1.27 dB
AC Power Line Conducted Emission	3.08 dB