

Test Report No.: <i>Prüfbericht-Nr.:</i>	US24GBVA.002 Rev.02	Order No.: <i>Auftrags-Nr.:</i>	234207130 P01051904	Page 1 of 123 Seite 1 von 123
Client Reference No.: <i>Kunden-Referenz-Nr.:</i>	2503932	Order date: <i>Auftragsdatum:</i>	04/17/2023	
Client: <i>Auftraggeber:</i>	Omnifi Inc. 6801 Koll Center Pkwy. Ste. 145 Pleasanton, CA 94566 U.S.A.			
Test item: <i>Prüfgegenstand:</i>	Omnifi Wi-Fi Node			
Identification/ Type No.: <i>Bezeichnung / Typ-Nr.</i>	OWI2GB-55			
Order content: <i>Auftrags-Inhalt:</i>	Test Report			
Test specification: <i>Prüfgrundlage:</i>	CFR 47 Part 15.247: 2024 Emissions: ANSI C63.10-2013, KDB 558074 D01 DTS Measurement Guidance v05r02, KDB 662911 D01 Multiple Transmitter Output v02r01			
Date of sample receipt: <i>Wareneingangsdatum:</i>	September 27th, 2023			
Test sample No.: <i>Prüfmuster-Nr.:</i>	0M0003, 0M0011			
Testing period: <i>Prüfzeitraum:</i>	November 27th, 2023 - February 9th, 2024			
Place of testing: <i>Ort der Prüfung:</i>	5015 Brandin Ct. Fremont, CA 94538			
Testing laboratory: <i>Prüflaboratorium:</i>	TUV Rheinland of North America			
Test result*: <i>Prüfergebnis*:</i>	Pass			
compiled by: zusammengestellt von:	Osvaldo Casorla	authorized by: genehmigt von:	Isaac Aguilar	
Date: January 13, 2025 Datum:		Date: January 13, 2025 Ausstellungsdatum:		
Position / Stellung:	Expert	Position / Stellung:	Expert	
Others / <i>Sonstiges:</i>				
Condition of the test item at delivery: <i>Zustand des Prüfgegenstandes bei Anlieferung:</i>		Test item complete and undamaged		
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark. <i>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser</i> <i>Prüfbericht ist nicht zur Verwendung eines Prüfzeichens.</i>				

Test report no.: US24GBVA.002 Rev.02
Prüfbericht-Nr.:

Page 2 of 123
Seite 2 von 123

Remarks Anmerkungen

1	The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request. <i>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.</i> <i>Detaillierte Informationen bezüglich Prüfbedingungen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</i>
2	As contractually agreed, this document has been signed digitally only. TÜV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TÜV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. <i>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.</i>
3	Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report. <i>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.</i> <i>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</i>
4	Electromagnetic Compatibility Test Report. The above product was found to be Compliant to the above test standard(s).

Test report no.: US24GBVA.002 Rev.02
Prüfbericht-Nr.:

Page 3 of 123
 Seite 3 von 123

Remarks
Anmerkungen

1	Product details: <i>Produktdetails:</i>	Wi-Fi Access Point functionality in a strip
2	Dimensions / Weight: <i>Maße / Gewicht:</i>	43 mm x 19.1 mm x 454.5 mm / 3 kg
3	Operating elements: <i>Bedienelemente:</i>	12 VDC-60 VDC, 15 W: 1.25 A at 12V, 250 mA at 60 V
4	Equipment / Accessories: <i>Ausstattung / Zubehör:</i>	None
5	Used materials: <i>Verwendete Materialien:</i>	AC/DC Power Supply model: SDI65-24-U was provided to comply with AC Conducted Emissions requirements.
6	Other: <i>Sonstiges:</i>	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
7	Test sample obtaining: <i>Prüfmusterbereitstellung:</i>	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

Statement of Compliance

Revisions

Revision No.	Date MM/DD/YYYY	Reason for Change	Author
1	11/05/2024	Original Report	OC
2	11/13/2025	Added Antenna: Molex 208482-0200 in Section 6.3	OC

Table of Contents

1	Executive Summary	7
1.1	Scope	7
1.2	Purpose	7
1.3	Summary of Test Results	8
1.4	Special Accessories	8
1.5	Equipment Modifications	8
2	Laboratory Information	9
2.1	Accreditations & Endorsements	9
2.1.1	US Federal Communications Commission	9
2.1.2	NIST / A2LA	9
2.1.3	Canada – Industry Canada	9
2.1.4	Japan – VCCI	9
2.1.5	Acceptance by Mutual Recognition Arrangement	10
2.2	Test Facilities	10
2.2.1	Emission Test Facility	10
2.3	Measurement Uncertainty	10
2.3.1	Sample Calculation – radiated & conducted emissions	10
2.3.2	Measurement Uncertainty	11
2.3.3	Measurement Uncertainty Immunity	11
2.4	Calibration Traceability	12
3	Product Information	13
3.1	Product Description	13
3.2	Equipment Configuration	13
3.3	Operating Mode	13
3.4	Unique Antenna Connector	13
3.4.1	Results	13
3.5	Duty Cycle	14
3.5.1	Results	14
4	Emissions	15
4.1	Output Power Requirements	15
4.1.1	Test Method	15
4.1.2	Results	16
4.2	DTS Bandwidth (6dB) and Occupied Bandwidth	18
4.2.1	Test Method	18
4.2.2	Results	18
4.3	Power Spectral Density	45
4.3.1	Test Method	45
4.3.2	Results	46
4.4	Out of Band Emissions: Non-Restricted Bands	50
4.4.1	Test Method	50
4.4.2	Results	51

Table of Contents

4.5	Out of Band Emissions: Restricted Band Edge	62
4.5.1	Test Method	62
4.5.2	Non-BF Test Results	63
4.5.3	BF Test Results	79
4.6	Transmitter Spurious Emissions	93
4.6.1	Test Methodology	93
4.6.2	Test Setup:	94
4.6.3	Transmitter Spurious Emission Limit	95
4.6.4	Non-BF Test Results	96
4.6.5	BF Test Results	105
4.7	AC Conducted Emissions	114
4.7.1	Test Methodology	114
4.7.2	Test Results	115
5	Test Equipment List	117
5.1	Equipment List	117
6	EMC Test Plan	118
6.1	Introduction	118
6.2	Customer	118
6.3	Equipment Under Test (EUT)	119
6.4	Test Specifications	122

Index of Tables

Table 1: Summary of Test Results	8
Table 2: RF Output Power at the Antenna Port – Test Results	16
Table 3: Occupied Bandwidth – Test Results	19
Table 4: Peak Power Spectral Density – Test Results	46
Table 5: Customer Information	118
Table 6: Technical Contact Information	118
Table 7: EUT Specifications *	119
Table 8: EUT Channel Power Specifications	120
Table 9: Antenna Information	121
Table 10: Interface Specifications	121
Table 11: Support Equipment	121
Table 12: Description of Sample used for testing	121
Table 13: Description of Test Configuration used for Radiated Measurement	121
Table 14: Test Specifications	122

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.247: 2024 based on the results of testing performed on November 27th, 2023 to February 9th, 2024 on the Omnifi Wi-Fi Node Model OWI2GB-55 manufactured by Omnifi Inc.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report. The 2412 MHz to 2462 MHz frequency band for WiFi are covered in this document.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C 63.10 & C63.4	Worse Case (Measured)	Results
Maximum Output Power	CFR47 15.247 (b)	29.90 dBm	Complied
DTS Bandwidth (6dB)	CFR47 15.247 (a)(2)	7.10 MHz	Complied
Peak Power Spectral Density	CFR47 15.247 (e)	4.80 dBm/3kHz	Complied
Out of Band Emissions: Non-Restricted	CFR47 15.247 (d)	0.30 dB Margin	Complied
Out of Band Emissions: Restricted	CFR47 15.247 (d)	0.13 dB Margin	Complied
Transmitter Spurious Emissions	CFR47 15.247 (d)	0.98 dB Margin	Complied
AC Power Conducted Emission	CFR47 15.207	15.05 dB Margin	Complied

Note 1: This test report covers 2400 MHz to 2483.5 MHz band. * = summed power.

Note 2: Class B limits were applied where applicable.

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission



TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA 94538, are recognized by the Commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No. US1131). The laboratory Scopes of Accreditation include Title 47 CFR Parts 15, 18 and 90. The accreditations are updated every three years.

2.1.2 NIST / A2LA



TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2017. The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada



Industry
Canada Industrie
Canada

The Pleasanton 5-meter Semi-Anechoic Chamber, Registration No. 2932M-1, has been accepted by Industry Canada to perform testing to 3 and 5 meters based on the test procedures described in ANSI C63.4-2014. The Fremont 10-meter Semi-Anechoic Chamber, Registration No. 2932D-1, has been accepted by Industry Canada to perform testing to 3 and 10 meters based on the test procedures described in ANSI C63.4-2014.

2.1.4 Japan – VCCI



The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA 94538, have been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0399

VCCI Registration No. for Fremont: A-0409

2.1.5 Acceptance by Mutual Recognition Arrangement



The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member

country.

2.2 Test Facilities

Test facilities are located at 5015 Brandin Ct, Fremont, California, 94538, USA and 1279 Quarry Lane, Pleasanton, California 94566, USA (Fremont is the Pleasanton Annex).

2.2.1 Emission Test Facility

The Semi-Anechoic Chambers and AC Line Conducted measurement facilities used to collect radiated and conducted emissions data have been constructed in accordance with ANSI C63.7:1992. The Fremont 10 meter semi-anechoic chamber has been measured in accordance with and verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2014 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04), at test distances of 3 and 10 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02). The Pleasanton 5 meter semi-anechoic chamber has been verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2009 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04) at a test distance of 3 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02).

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurement and the fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

$$25 \text{ dBuV/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dBuV/m}$$

2.3.2 Measurement Uncertainty

Per CISPR 16-4-2	U _{lab}	U _{cispr}
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.3 dB

Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 5.0%.	Per CISPR 16-4-2 Methods
--	--------------------------

2.3.3 Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is ± 8.2%.	Per IEC 61000-4-2
The estimated combined standard uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated combined standard uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6

The estimated combined standard uncertainty for power frequency magnetic field immunity is $\pm 2.9\%$.

Per IEC 61000-4-8

Thermo KeyTek EMC Pro

The estimated combined standard uncertainty for EFT fast transient immunity measurements is $\pm 2.6\%$.

The estimated combined standard uncertainty for surge immunity measurements is $\pm 2.6\%$.

The estimated combined standard uncertainty for voltage variation and interruption measurements is $\pm 1.74\%$.

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2017. Equipment calibration records are kept on file at the test facility.

3 Product Information

3.1 Product Description

The Model OWI2GB-55, Omnifi Wi-Fi Node, is a 2x2 2.4GHz / 5GHz Wi-Fi Access Point functionality in a strip. It is intended to operate as a 2.4GHz band wireless over 20 MHz, 40 MHz channels. The node will be in compliance with regulatory standards of regions it will be operating in.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing.

3.4 Unique Antenna Connector

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 shall be considered sufficient to comply with the provisions of this Section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

The OWI2GB-55 has internal antennas, professional installed and no access to end-user. 2 Omni Antennas dedicated for WiFi in the band 2.4 GHz that has a maximum gain of 3 dBi.

Refer to Table 10 for additional antenna information.

3.5 Duty Cycle

The OWI2GB-55 was measured using Power Meter for the duty cycle.

Calculation of transmit duty cycle. Duty cycle (%) = (ON time / Period) * 100%

3.5.1 Results

Mode	Measured Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11b 20 MHz	57.52	-2.40
802.11g 20 MHz	49.51	-3.05
802.11n HT20 20 MHz	49.76	-3.03
802.11ax 20 MHz	39.77	-4.00
802.11ac 20 MHz	73.95	-1.31
802.11n HT40	48.89	-3.11
802.11ax HT40	22.71	-6.44
802.11ac VHT40	62.14	-2.07

4 Emissions

Testing was performed in accordance with CFR 47 Part 15.247: 2024. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in section 8 of the standard were used.

The EUT is a 2x2 MIMO mode, and the in-band and out-band measurements were also made in accordance with KDB 662911 D01 v02r01.

4.1 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b).

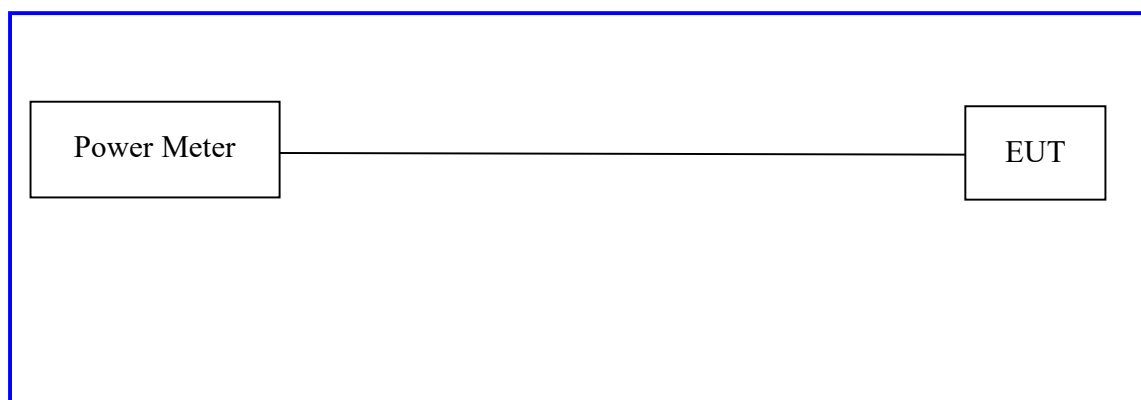
The maximum transmitted power in the band 2400-2483.5 MHz: 1 W

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

4.1.1 Test Method

Conducted method was used to measure the channel power output. The preliminary investigation was performed at different data rate / chain to determine the highest power output for each mode. The worst findings were conducted on 3 channels in each operating range per CFR47 Part 15.247(b); 2400 MHz to 2483.5 MHz. The worst mode results indicated below.

Test Setup:



4.1.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s). Worst case data for each mode reported below. Plots of highest power included for 802.11b (CCK 1Mbps) at 2437MHz. Total Power refers to both chains summed and corrected for duty cycle if necessary.

Each chain was measured individually using a Spectrum Analyzer channel power per 11.9.1. Method and then summed per ANSI 63.10 section 14.3.1.

Table 2: RF Output Power at the Antenna Port – Test Results

Table 2: RF Output Power at the Antenna Port - Test Results							
Date: November 27th, 2023 to February 9th, 2024				Tested By: Osvaldo Casorla			
Test Method: Conducted Measurements				Power Setting: See test plan.			
Antenna Type: Omni				Max Antenna Gain: 3 dBi			
Operating Mode: Uncorrelated				Signal State: See Section 3.5.1			
Ambient Temp.: 22 - 23 °C				Relative Humidity: 35 - 38%			
Freq Band	Bandwidth (MHz)	Mode	Frequency (MHz)	Power (dBm)		Power Limit	Margin
				Port 1	Port 2	(dBm)	(dB)
2400-2483.5MHz	20	802.11b	2412	27.68	27.23	30.00	2.77
			2437	27.80	27.59	30.00	2.20
			2462	27.13	26.52	30.00	2.87
2400-2483.5MHz	20	802.11g	2412	24.96	24.52	30.00	5.04
			2437	25.64	25.61	30.00	4.36
			2462	25.06	24.31	30.00	4.94
Freq Band	Bandwidth (MHz)	Mode	Frequency (MHz)	Total Power (dBm)		Power Limit (dBm)	Margin (dB)
2400-2483.5MHz	20	802.11n	2412	27.75		30.00	2.25
			2437	28.57		30.00	1.43
			2462	27.76		30.00	2.24
		802.11ax	2412	29.42		30.00	0.59
			2437	29.89		30.00	0.11
			2462	29.35		30.00	0.65
		802.11ac	2412	29.80		30.00	0.20
			2437	29.90		30.00	0.10
			2462	29.10		30.00	0.90
2400-2483.5MHz	40	802.11n	2422	29.24		30.00	0.76
			2437	29.48		30.00	0.52
			2452	29.41		30.00	0.59
		802.11ax	2422	27.54		30.00	2.46
			2437	27.69		30.00	2.31
			2452	27.93		30.00	2.08
		802.11ac	2422	29.17		30.00	0.83
			2437	29.29		30.00	0.71
			2452	29.28		30.00	0.72
Note. Total Power = 10*Log10 (10a/10 + 10b/10)							

Date: November 27th, 2023 to February 9th, 2024				Tested By: Osvaldo Casorla			
--	--	--	--	-----------------------------------	--	--	--

Test Method: Conducted Measurements				Power Setting: See test plan.			
Antenna Type: Omni				Max Antenna Gain: 6 dBi			
Operating Mode: Beamforming				Signal State: See Section 3.5.1			
Ambient Temp.: 22 - 23 °C				Relative Humidity: 35 - 38%			
Freq Band	Bandwidth (MHz)	Mode	Frequency (MHz)	Power (dBm)		Power Limit	Margin
				Port 1	Port 2	(dBm)	(dB)
2400-2483.5MHz	20	802.11g	2412	24.92	24.56	30.00	5.08
			2437	25.62	25.43	30.00	4.38
			2462	25.17	24.44	30.00	4.83
Freq Band	Bandwidth (MHz)	Mode	Frequency (MHz)	Total Power		Power Limit	Margin
				(dBm)		(dBm)	(dB)
2400-2483.5MHz	20	802.11n	2412	29.41		30.00	0.59
			2437	29.87		30.00	0.14
			2462	29.20		30.00	0.80
		802.11ax	2412	29.20		30.00	0.80
			2437	29.80		30.00	0.20
			2462	29.00		30.00	1.00
		802.11ac	2412	29.24		30.00	0.76
			2437	29.85		30.00	0.15
			2462	29.30		30.00	0.70
2400-2483.5MHz	40	802.11n	2422	27.10		30.00	2.90
			2437	27.20		30.00	2.80
			2452	27.40		30.00	2.60
		802.11ax	2422	27.44		30.00	2.56
			2437	27.58		30.00	2.42
			2452	27.71		30.00	2.29
		802.11ac	2422	27.53		30.00	2.47
			2437	27.80		30.00	2.20
			2452	27.85		30.00	2.15
Note. Total Power = 10*Log10 (10a/10 + 10b/10)							

4.2 DTS Bandwidth (6dB) and Occupied Bandwidth

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

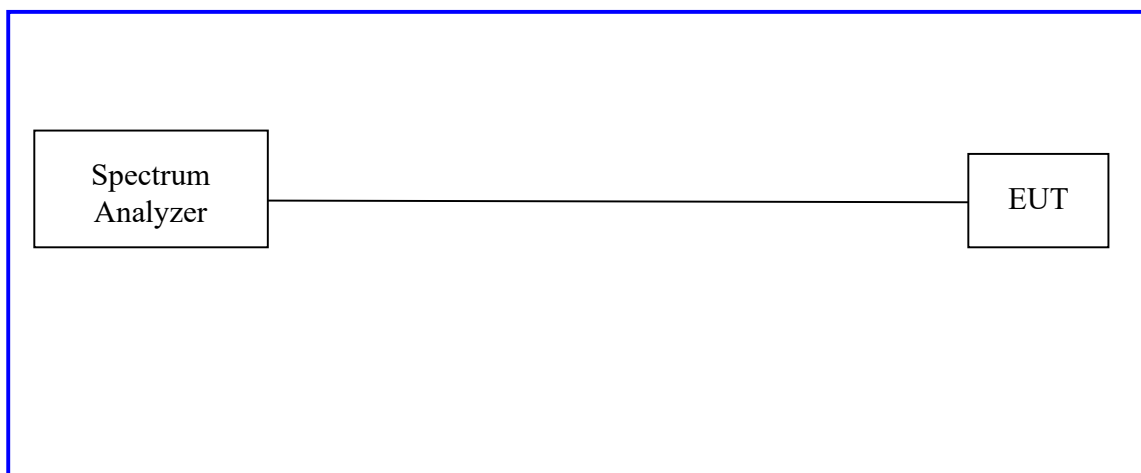
The minimum 6 dB bandwidth shall be at least 500 kHz.

4.2.1 Test Method

The conducted method was used to measure the occupied bandwidth according to ANSI C63.10:2013 Section 11.8 and 6.9. The measurement was performed with modulation per CFR47 15.247 (a) (2). Measurements were performed on the low, middle and high channels of the operating frequency range; 2400 MHz to 2483.5 MHz.

Chain 0 was tested as worse case (Section 3.5.1).

Test Setup:



4.2.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

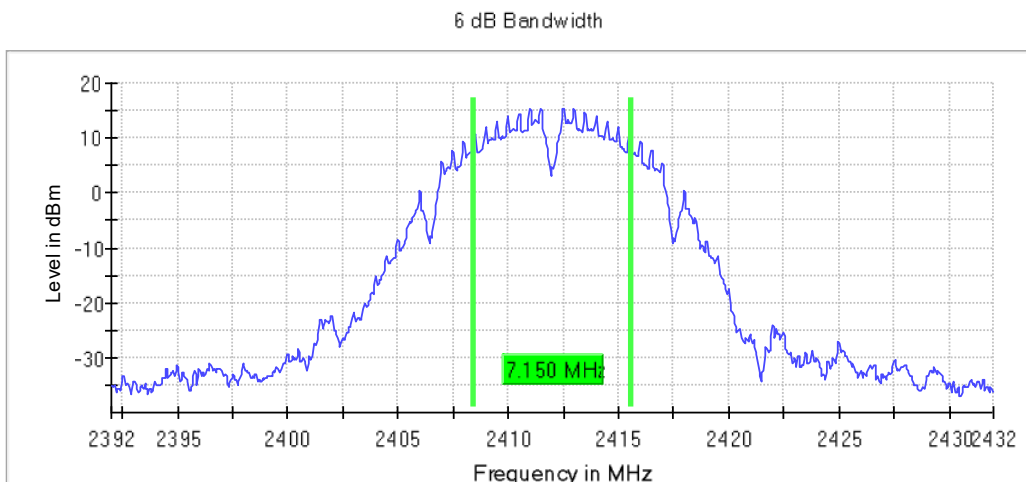
Table 3: Occupied Bandwidth – Test Results

Test Conditions: Conducted Measurement, Normal Temperature						
Date: November 27th, 2023 to February 9th, 2024				Tested By: Osvaldo Casorla		
Test Method: Conducted Measurements				Power Setting: See test plan.		
Antenna Type: Omni				Max Antenna Gain: 3 dBi		
Operating Mode: Uncorrelated				Signal State: See Section 3.5.1		
Ambient Temp.: 22 - 23 °C				Relative Humidity: 35 - 38%		
Freq Band	Bandwidth (MHz)	Mode	Frequency (MHz)	99% Bandwidth	6dB Bandwidth	Limit ≥
				(MHz)	(MHz)	(kHz)
2400-2483.5MHz	20	802.11b	2412	11.20	7.15	500
			2437	11.30	7.60	500
			2462	11.30	7.10	500
		802.11g	2412	20.30	16.40	500
			2437	20.50	16.05	500
			2462	18.40	15.85	500
		802.11n	2412	20.00	17.65	500
			2437	20.40	17.65	500
			2462	19.20	16.45	500
		802.11ax	2412	20.90	17.50	500
			2437	21.70	17.60	500
			2462	19.90	17.45	500
		802.11ac	2412	19.10	18.95	500
			2437	19.20	19.00	500
			2462	19.00	18.80	500
2400-2483.5MHz	40	802.11n	2422	44.25	35.20	500
			2437	46.50	36.40	500
			2452	40.75	35.25	500
		802.11ax	2422	39.25	35.60	500
			2437	39.00	36.75	500
			2452	40.00	36.65	500
		802.11ac	2422	42.50	35.50	500
			2437	42.00	37.75	500
			2452	43.75	36.05	500

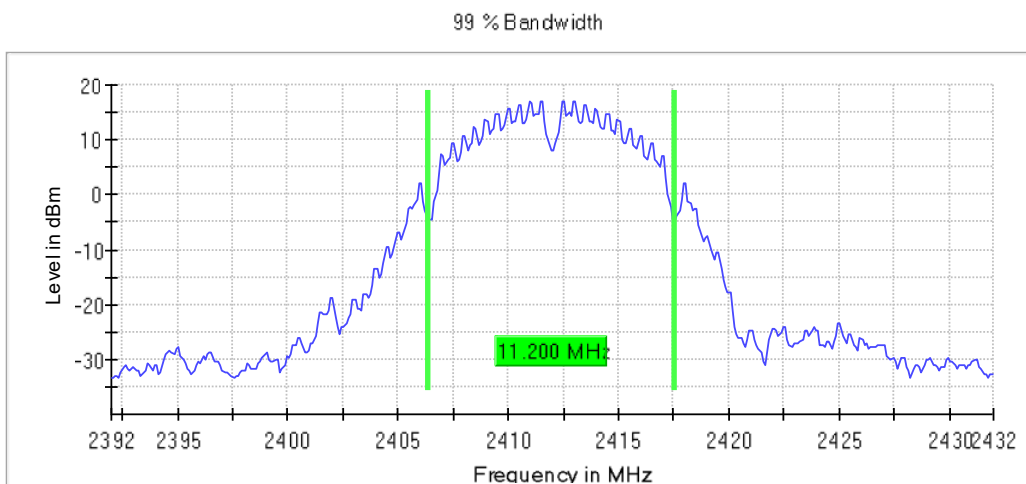
Note: 1. Plots for all the measurements stated above were taken. To reduce complexity and bulkiness of the Report, portion of plots are placed in the report.

Date: November 27th, 2023 to February 9th, 2024				Tested By: Osvaldo Casorla		
Test Method: Conducted Measurements				Power Setting: See test plan.		
Antenna Type: Omni				Max Antenna Gain: 6 dBi		
Operating Mode: Beamforming				Signal State: See Section 3.5.1		
Ambient Temp.: 22 - 23 °C				Relative Humidity: 35 - 38%		
Freq Band	Bandwidth (MHz)	Mode	Frequency (MHz)	99% Bandwidth	6dB Bandwidth	Limit ≥
				(MHz)	(MHz)	(kHz)
2400-2483.5MHz	20	802.11g	2412	20.70	16.45	500
			2437	21.10	16.45	500
			2462	19.30	16.15	500
		802.11n	2412	17.90	17.70	500
			2437	17.90	17.75	500
			2462	17.80	17.35	500
		802.11ax	2412	19.10	18.30	500
			2437	19.00	18.90	500
			2462	19.00	17.85	500
		802.11ac	2412	19.10	18.95	500
			2437	19.20	18.85	500
			2462	19.00	17.80	500
2400-2483.5MHz	40	802.11n	2422	37.25	35.80	500
			2437	37.25	36.15	500
			2452	37.00	35.70	500
		802.11ax	2422	39.50	35.95	500
			2437	39.00	37.65	500
			2452	39.75	36.45	500
		802.11ac	2422	42.50	35.45	500
			2437	43.75	37.75	500
			2452	43.75	36.70	500

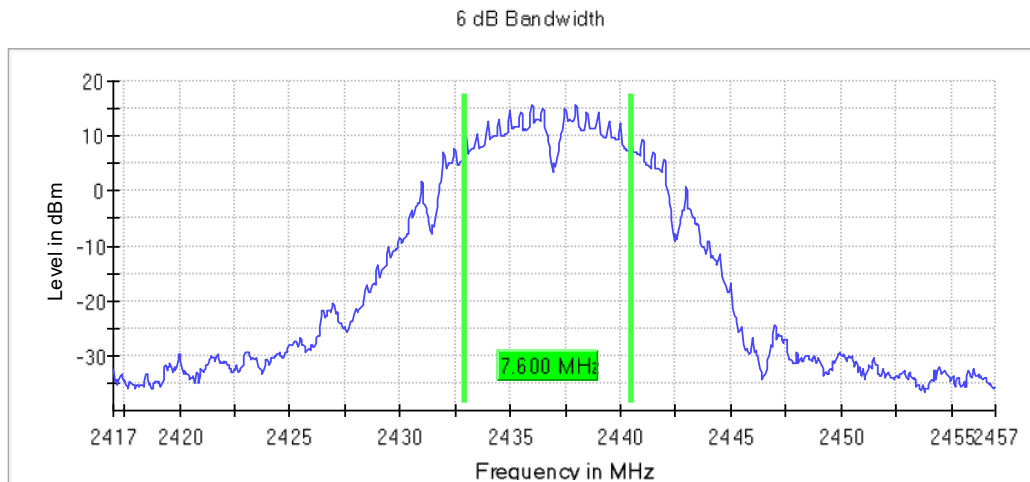
Note: 1. Plots for all the measurements stated above were taken. To reduce complexity and bulkiness of the Report, portion of plots are placed in the report.



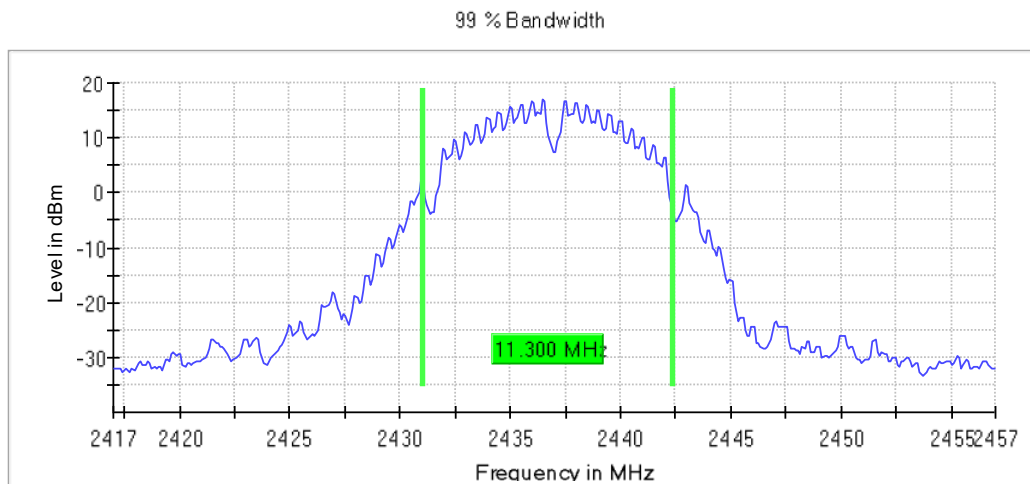
Plot 3. 802.11b(CCK), 2412MHz, 6dB Bandwidth



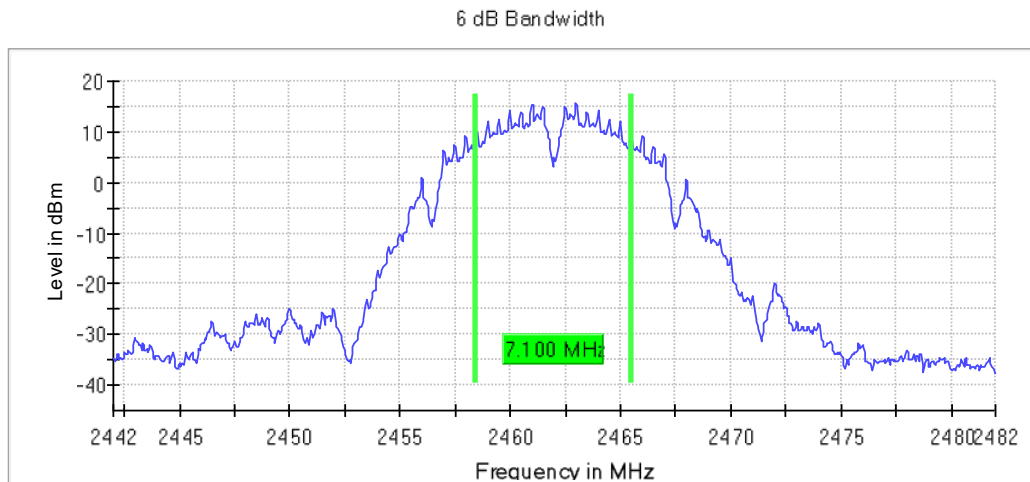
Plot 4. 802.11b(CCK), 2412MHz, 99% Bandwidth



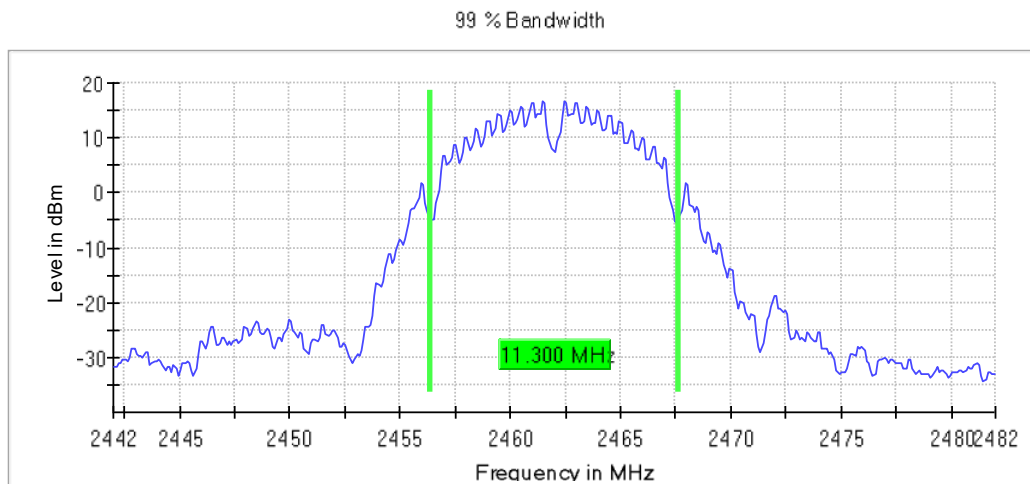
Plot 3. 802.11b(CCK), 2437MHz, 6dB Bandwidth



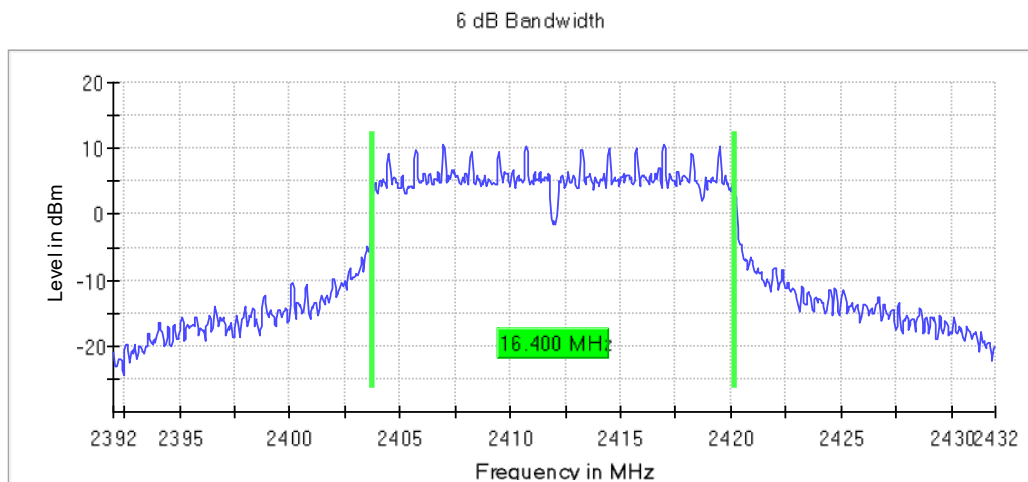
Plot 4. 802.11b(CCK), 2437MHz, 99% Bandwidth



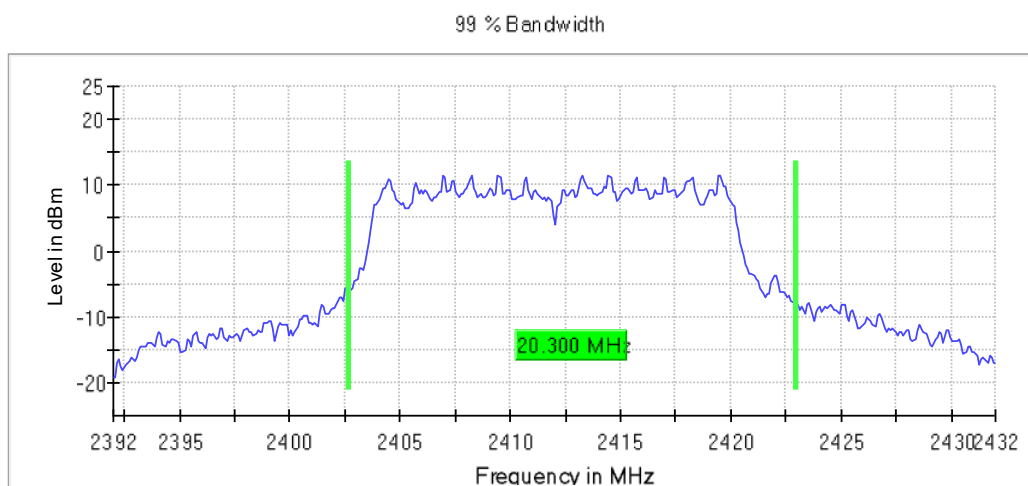
Plot 3. 802.11b(CCK), 2462MHz, 6dB Bandwidth



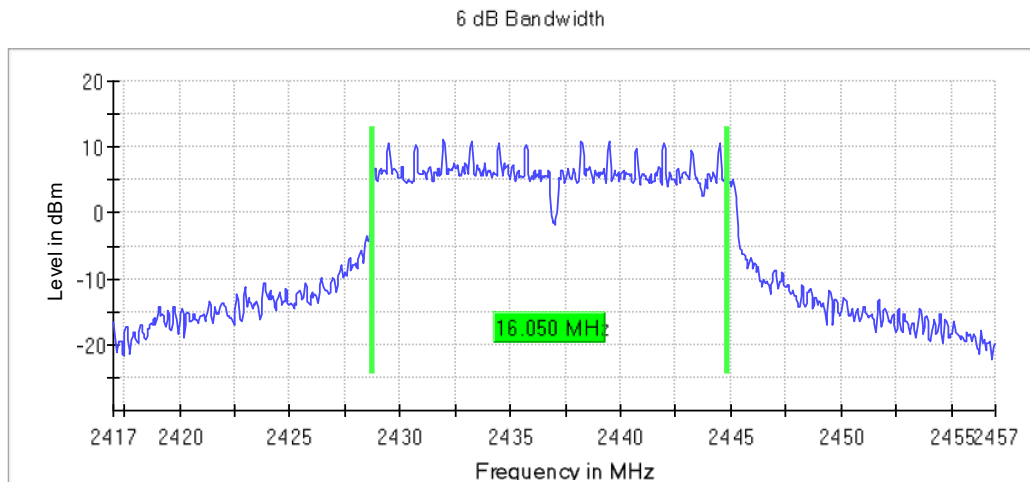
Plot 4. 802.11b(CCK), 2462MHz, 99% Bandwidth



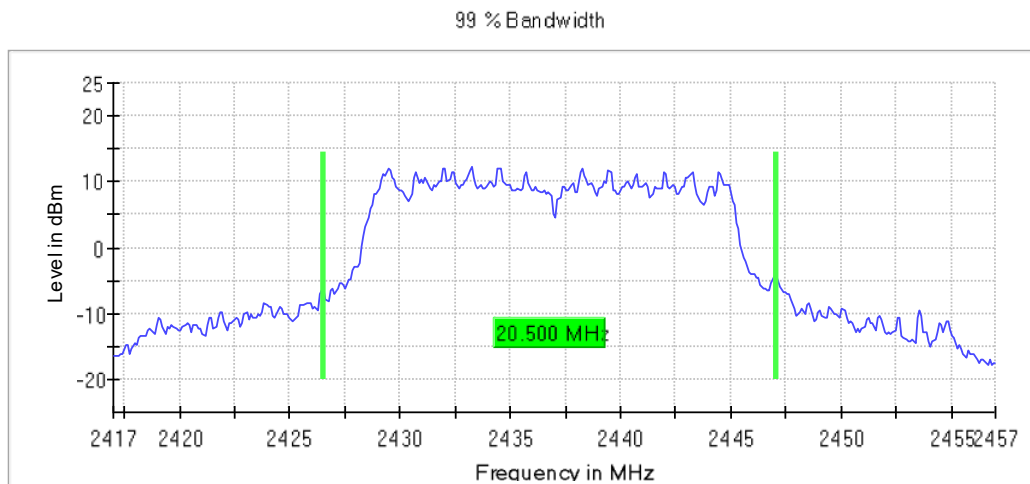
Plot 3. 802.11g, 2412MHz, 6dB Bandwidth



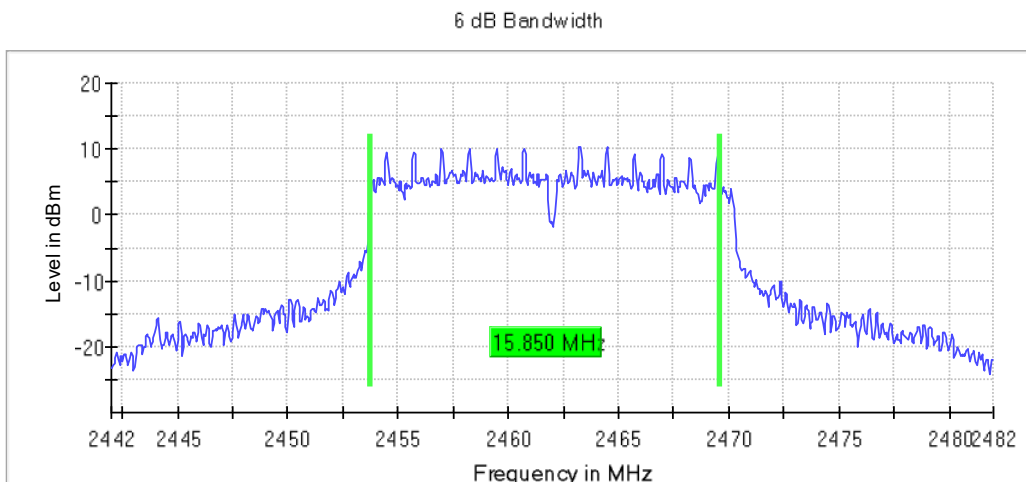
Plot 4. 802.11g, 2412MHz, 99% Bandwidth



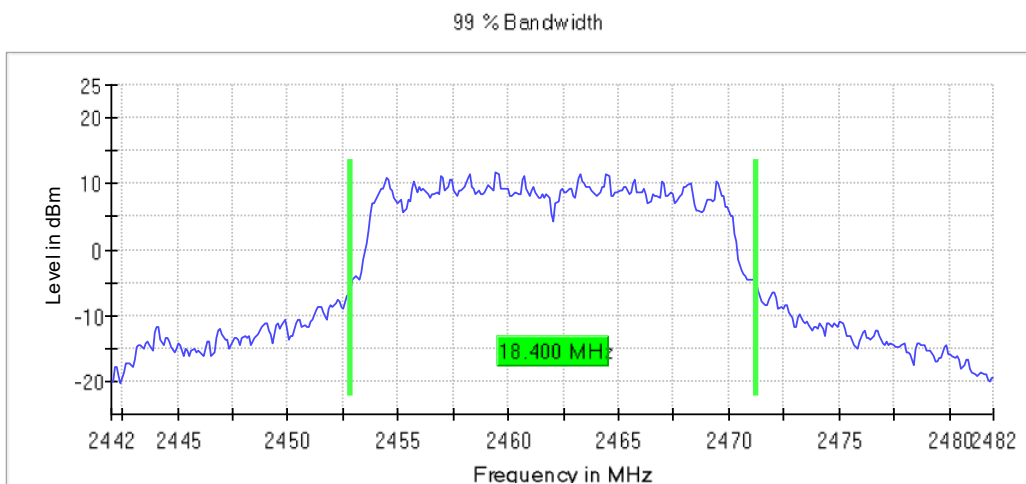
Plot 3. 802.11g, 2437MHz, 6dB Bandwidth



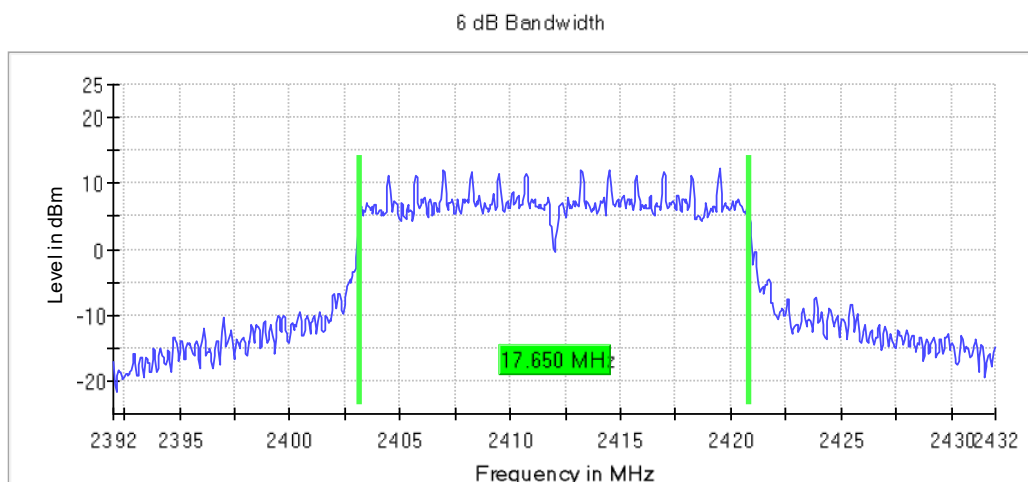
Plot 4. 802.11g, 2437MHz, 99% Bandwidth



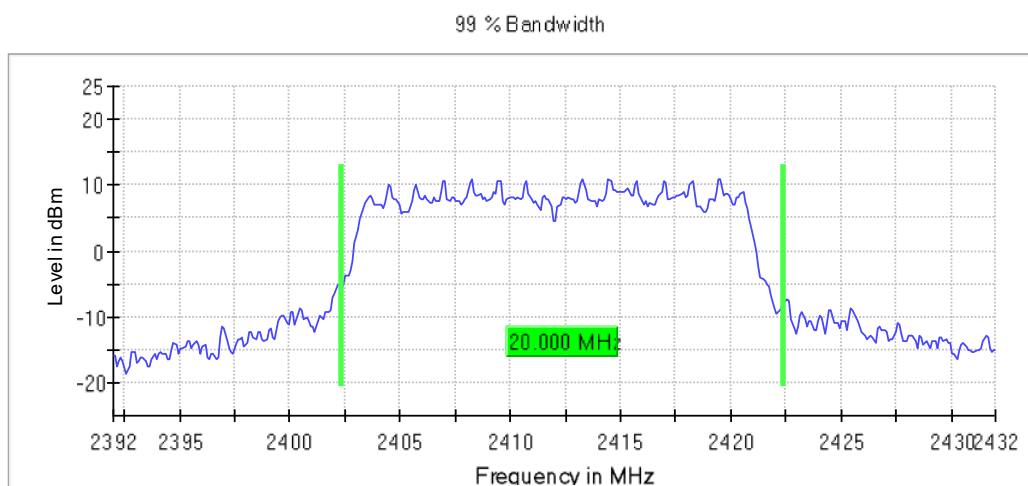
Plot 3. 802.11g, 2462MHz, 6dB Bandwidth



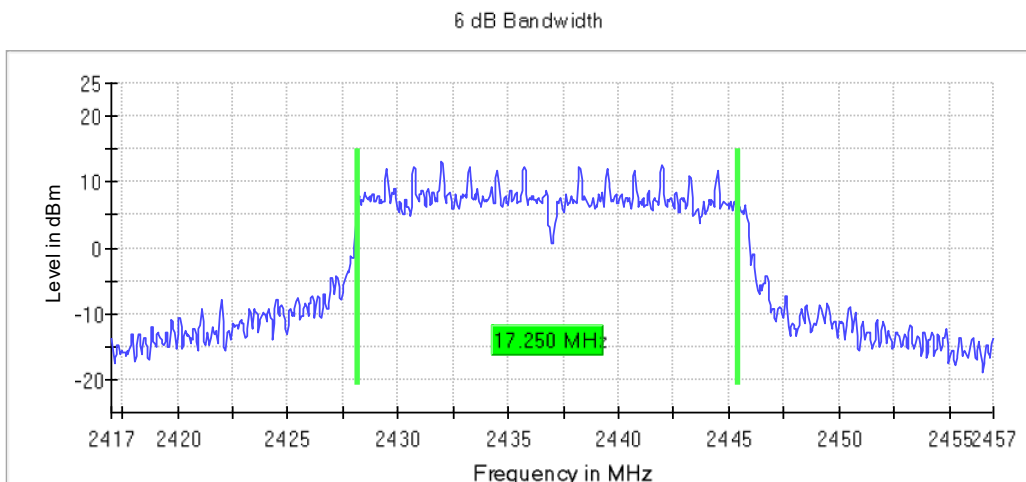
Plot 4. 802.11g, 2462MHz, 99% Bandwidth



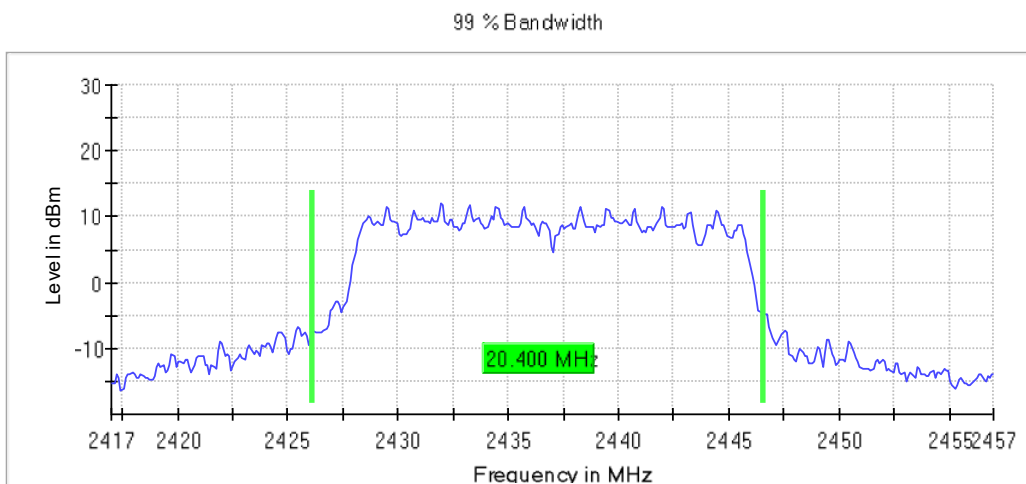
Plot 3. 802.11n HT20, 2412MHz, 6dB Bandwidth



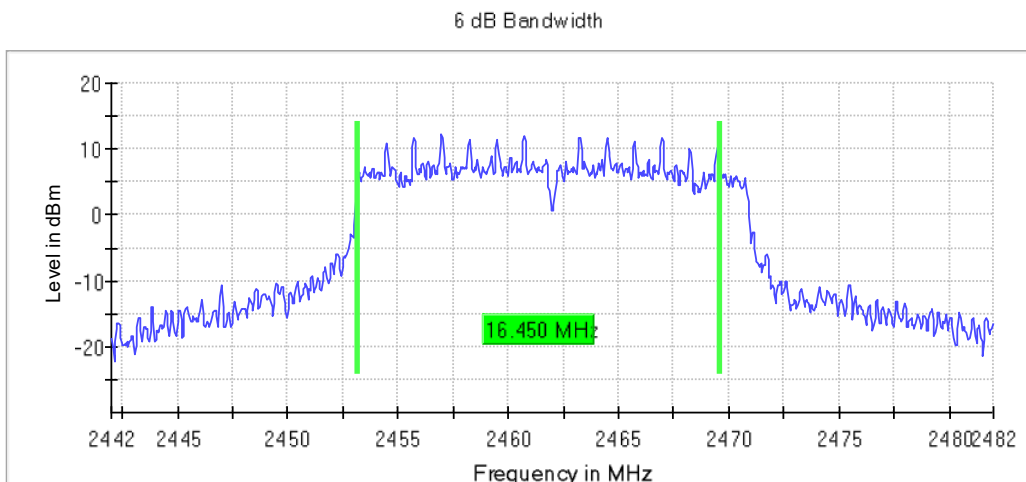
Plot 4. 802.11n HT20, 2412MHz, 99% Bandwidth



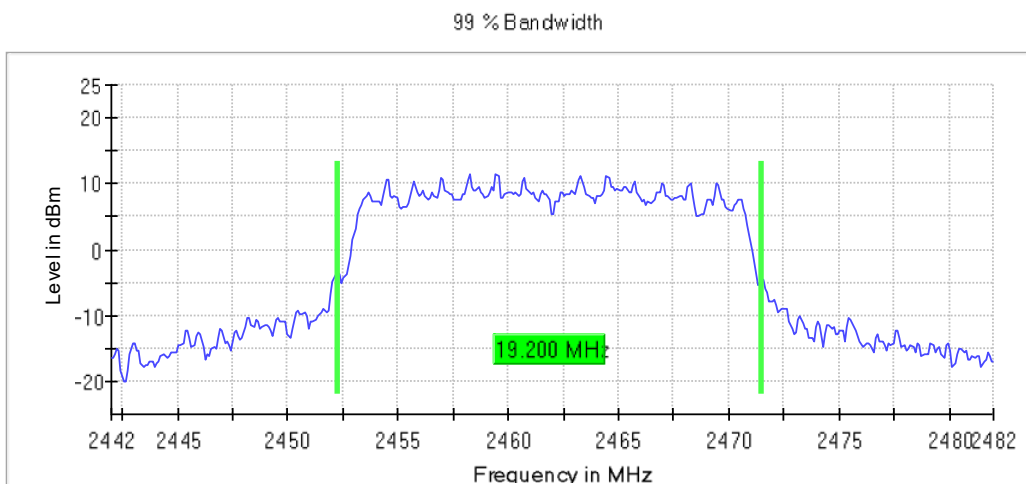
Plot 3. 802.11n HT20, 2437MHz, 6dB Bandwidth



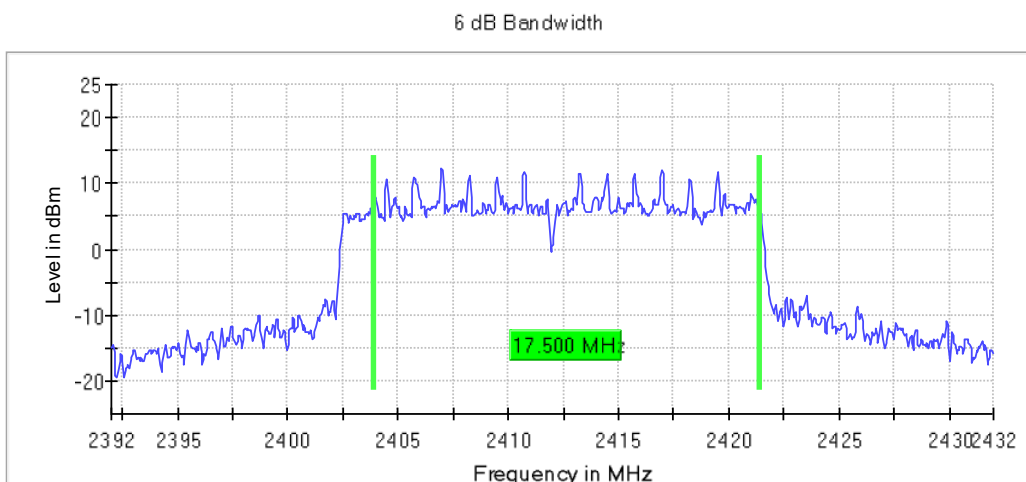
Plot 4. 802.11n HT20, 2437MHz, 99% Bandwidth



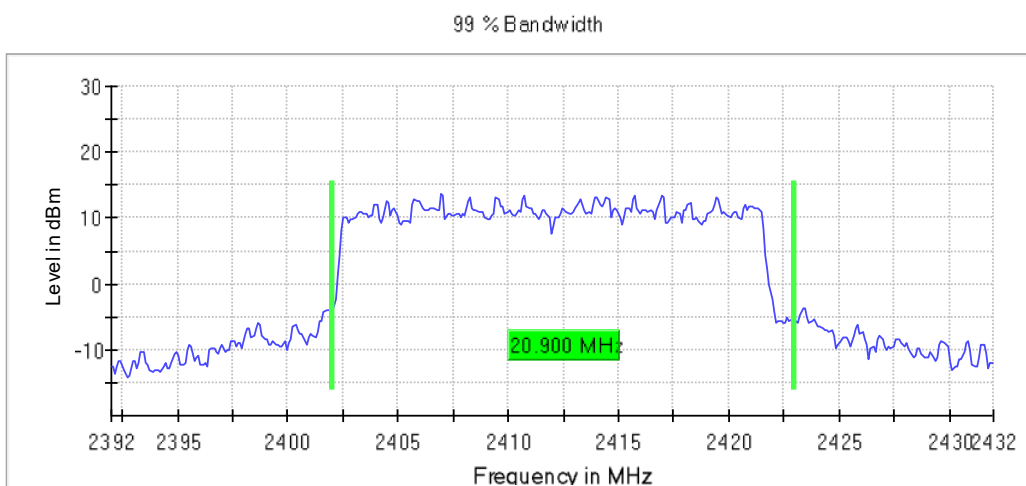
Plot 3. 802.11n HT20, 2462MHz, 6dB Bandwidth



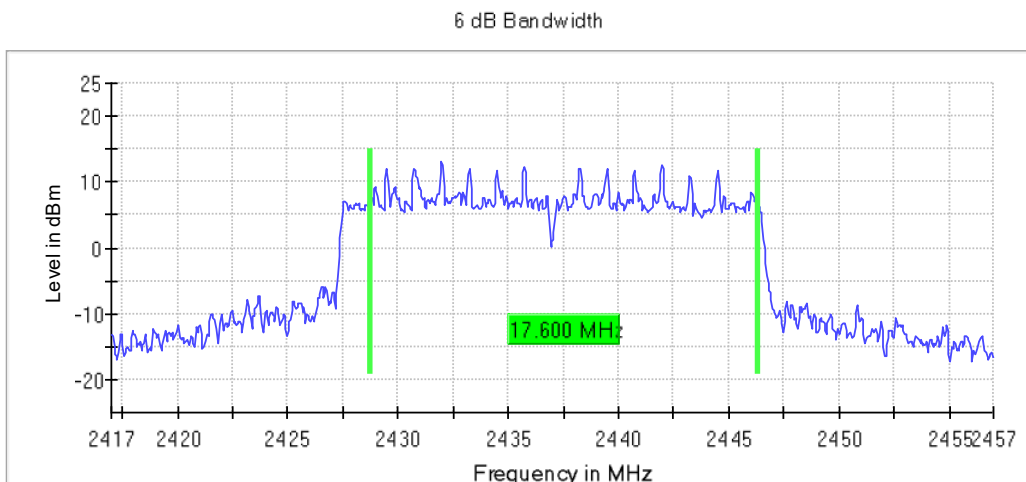
Plot 4. 802.11n HT20, 2462MHz, 99% Bandwidth



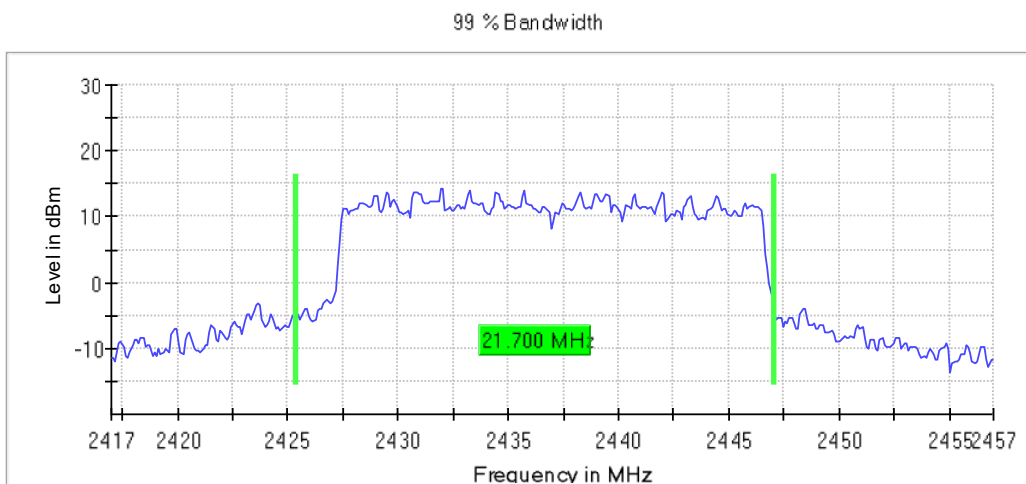
Plot 3. 802.11ax20, 2412MHz, 6dB Bandwidth



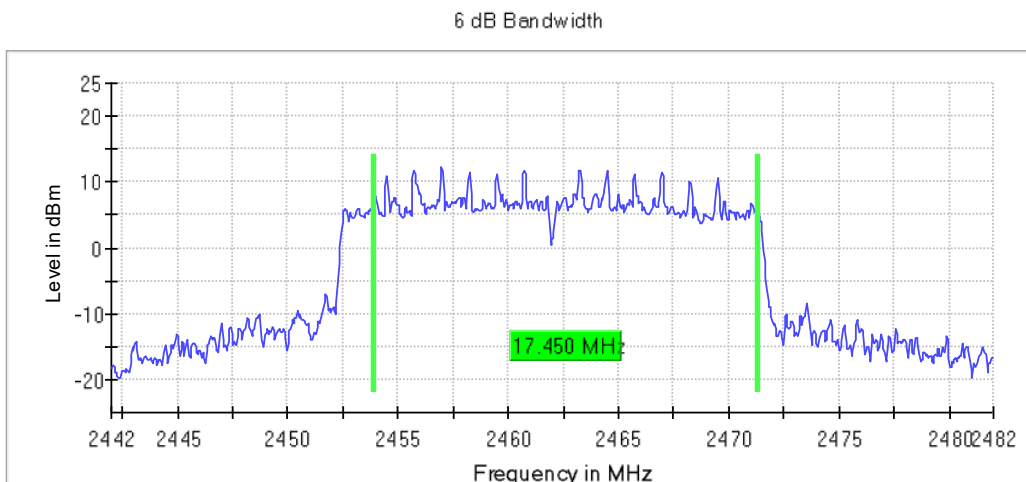
Plot 4. 802.11ax20, 2412MHz, 99% Bandwidth



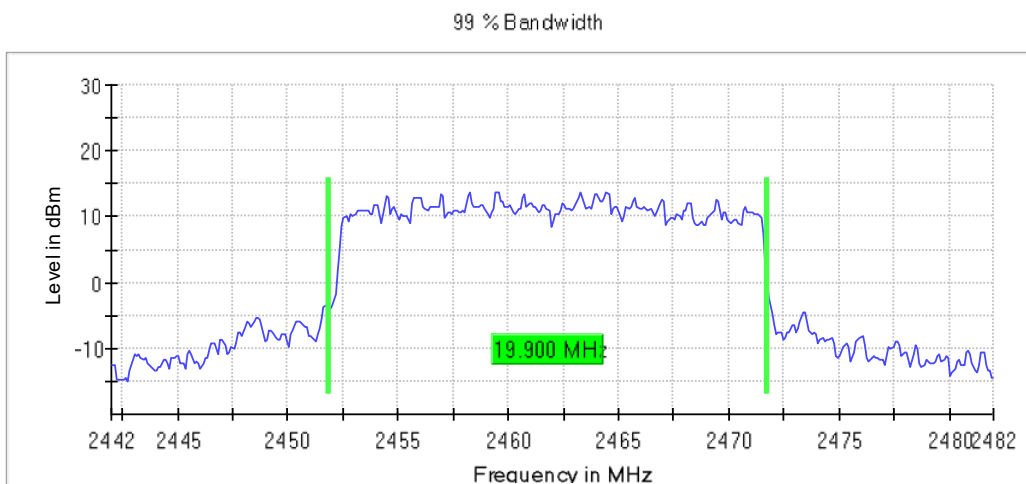
Plot 3. 802.11ax20, 2437MHz, 6dB Bandwidth



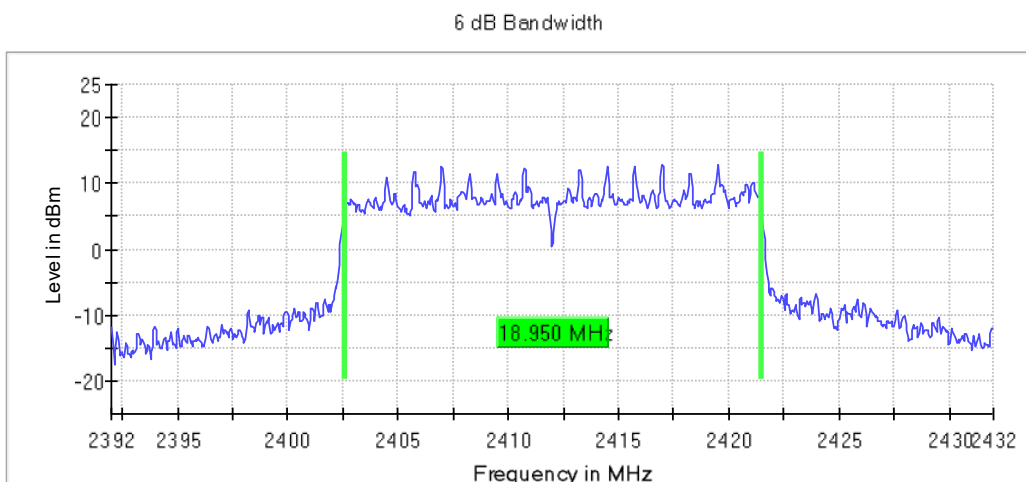
Plot 4. 802.11ax20, 2437MHz, 99% Bandwidth



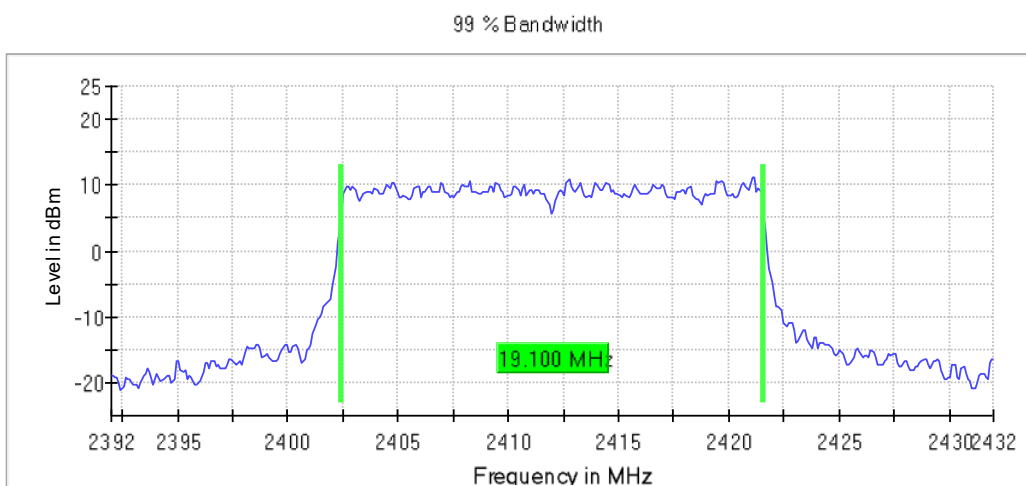
Plot 3. 802.11ax20, 2462MHz, 6dB Bandwidth



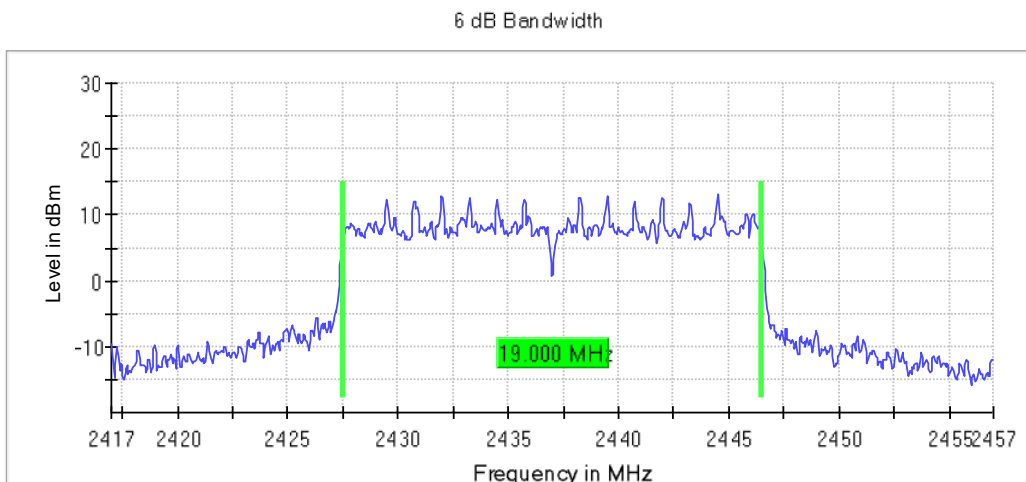
Plot 4. 802.11ax20, 2462MHz, 99% Bandwidth



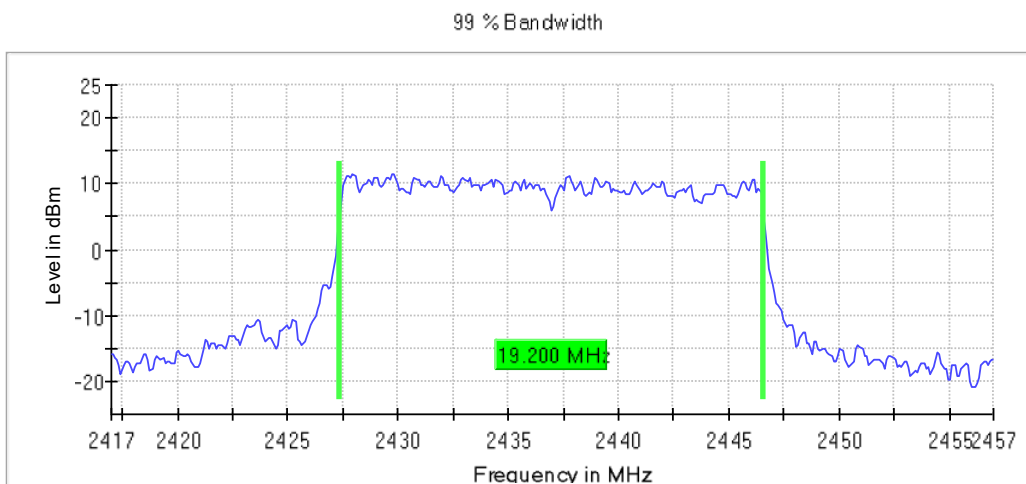
Plot 3. 802.11ac20, 2412MHz, 6dB Bandwidth



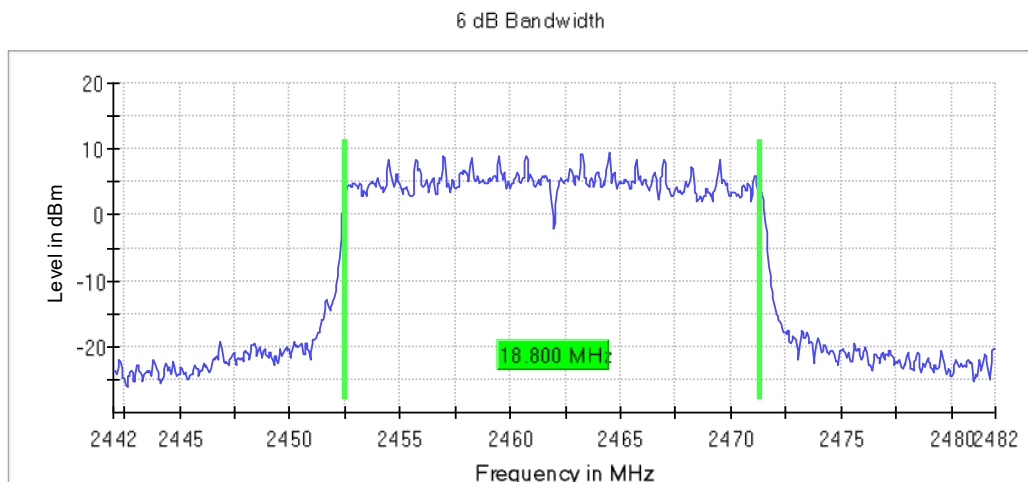
Plot 4. 802.11ac20, 2412MHz, 99% Bandwidth



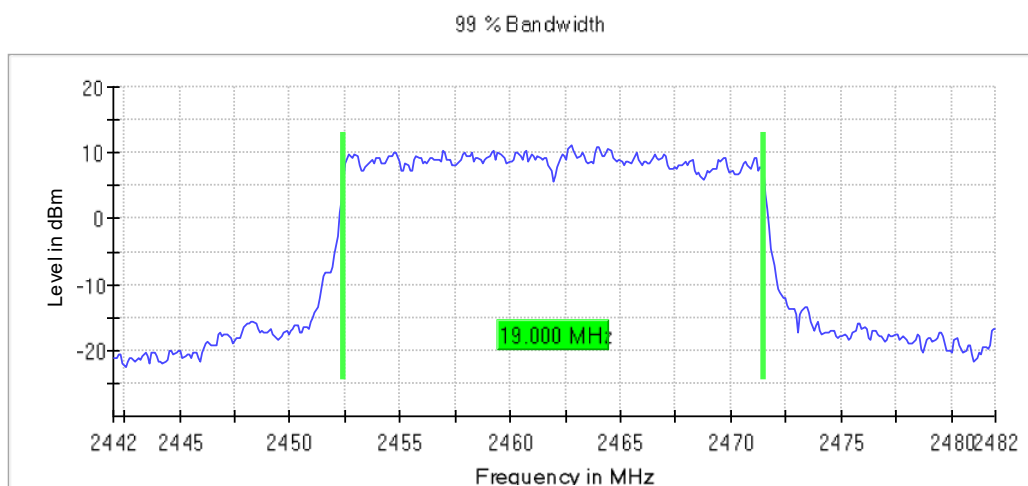
Plot 3. 802.11ac20, 2437MHz, 6dB Bandwidth



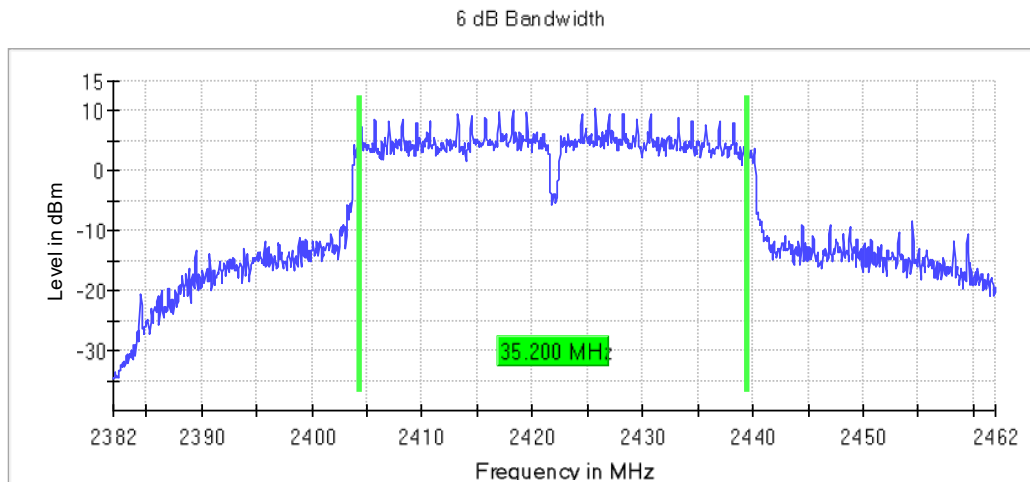
Plot 4. 802.11ac20, 2437MHz, 99% Bandwidth



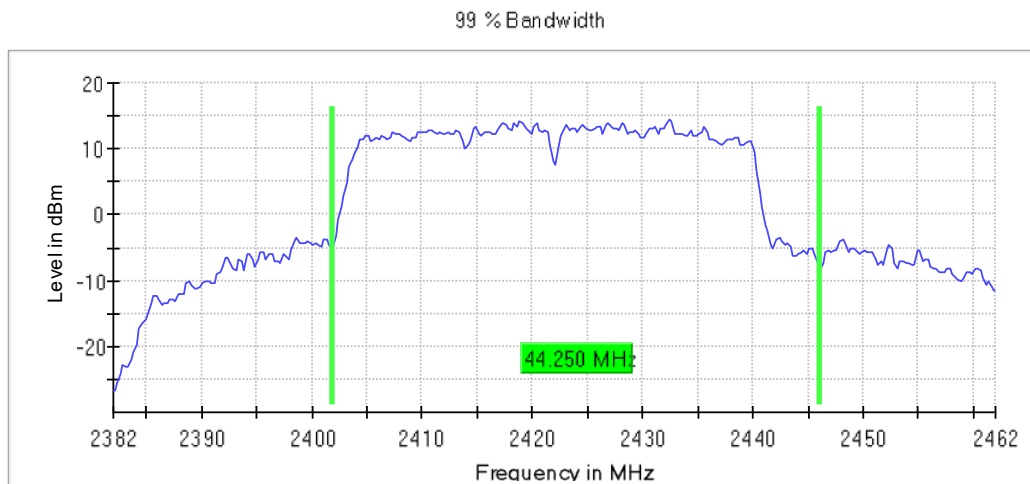
Plot 3. 802.11ac20, 2462MHz, 6dB Bandwidth



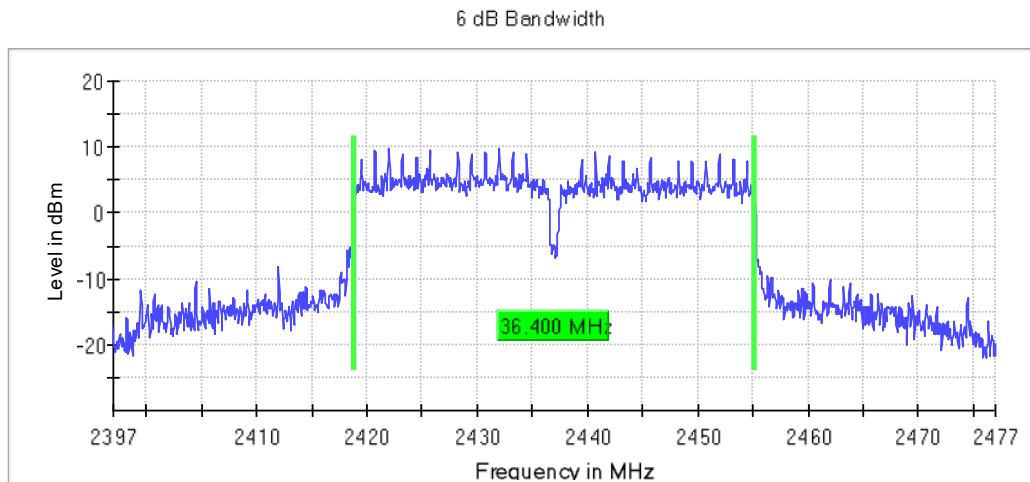
Plot 4. 802.11ac20, 2462MHz, 99% Bandwidth



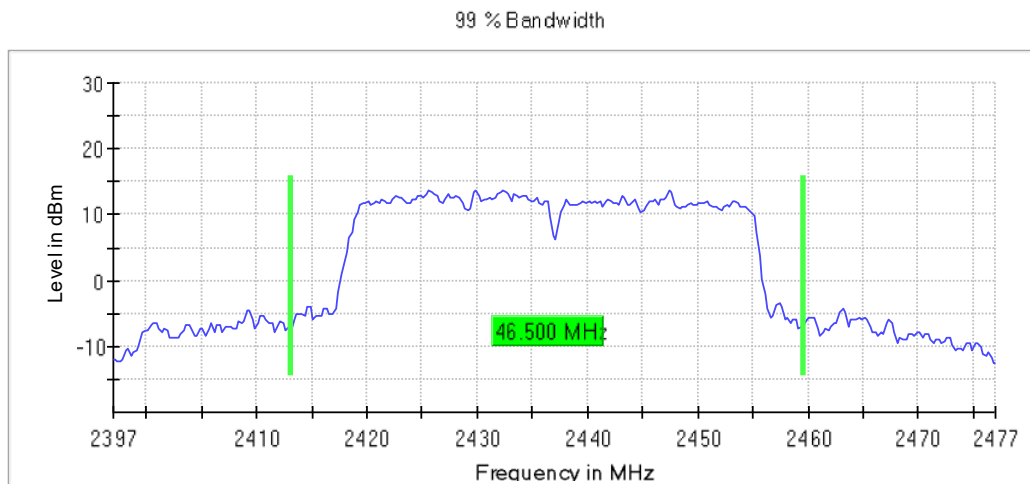
Plot 3. 802.11n40, 2422MHz, 6dB Bandwidth



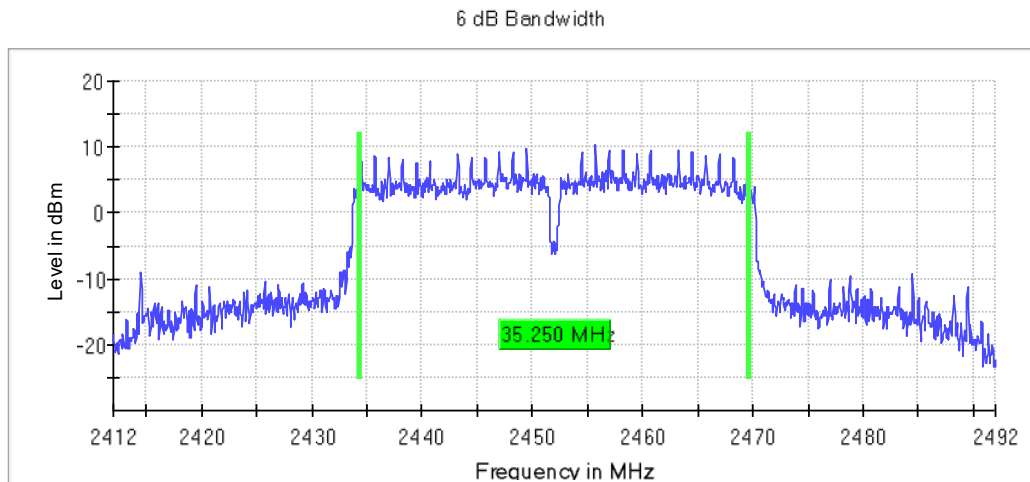
Plot 4. 802.11n40, 2422MHz, 99% Bandwidth



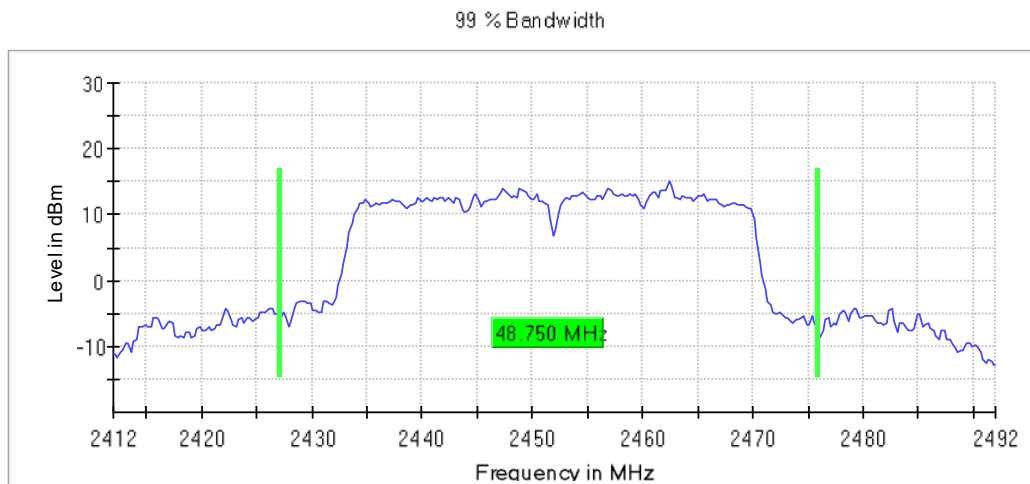
Plot 3. 802.11n40, 2437MHz, 6dB Bandwidth



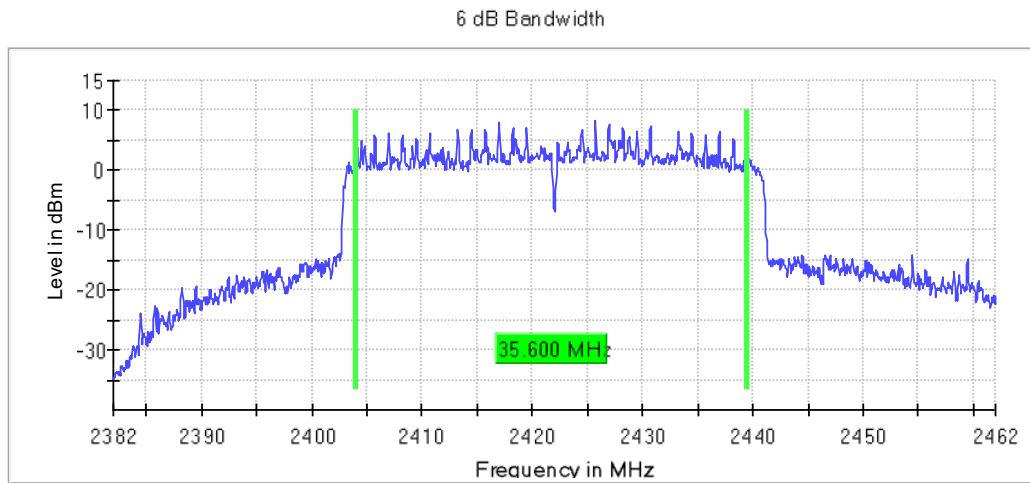
Plot 4. 802.11n40, 2437MHz, 99% Bandwidth



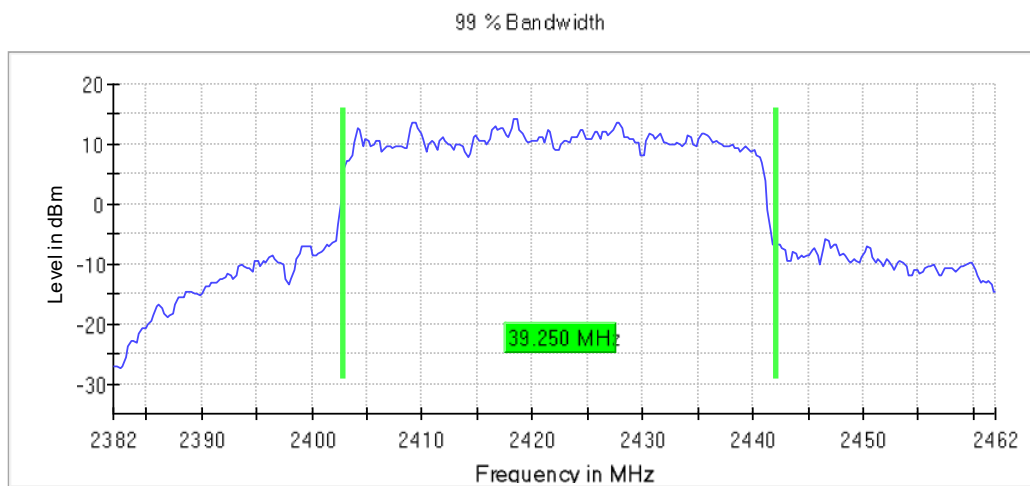
Plot 3. 802.11n40, 2452MHz, 6dB Bandwidth



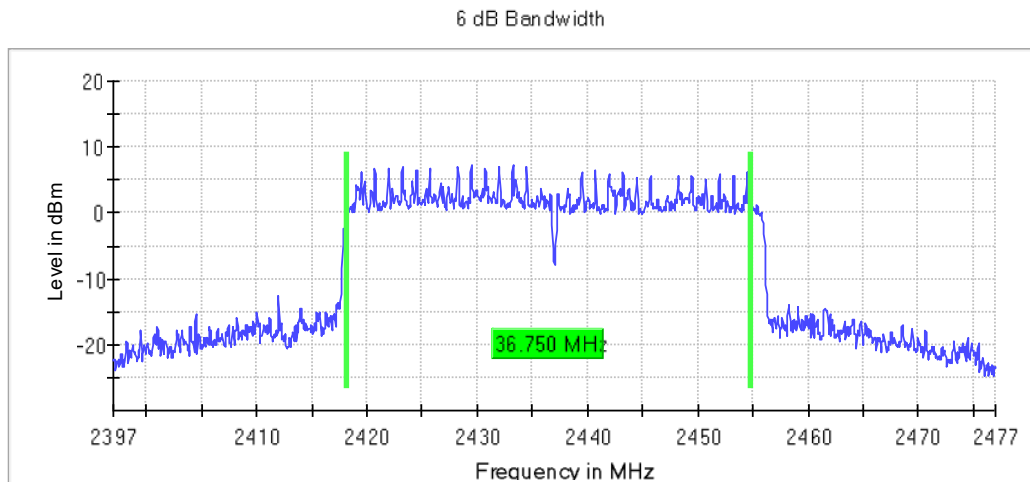
Plot 4. 802.11n40, 2452MHz, 99% Bandwidth



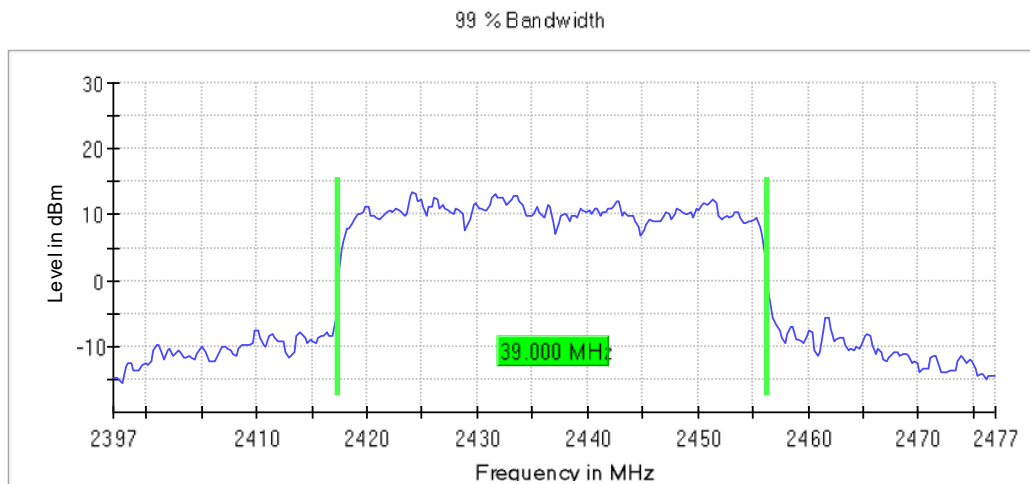
Plot 3. 802.11ax40, 2422MHz, 6dB Bandwidth



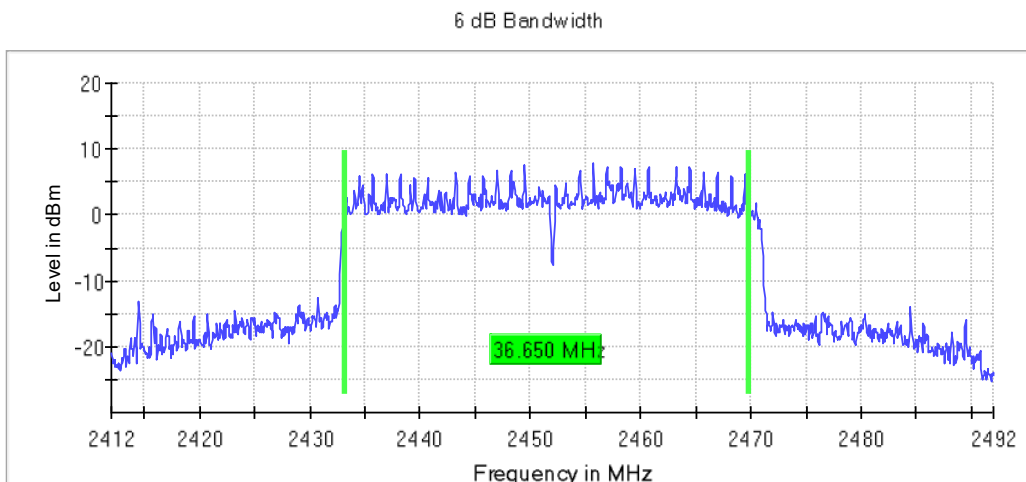
Plot 4. 802.11ax40, 2422MHz, 99% Bandwidth



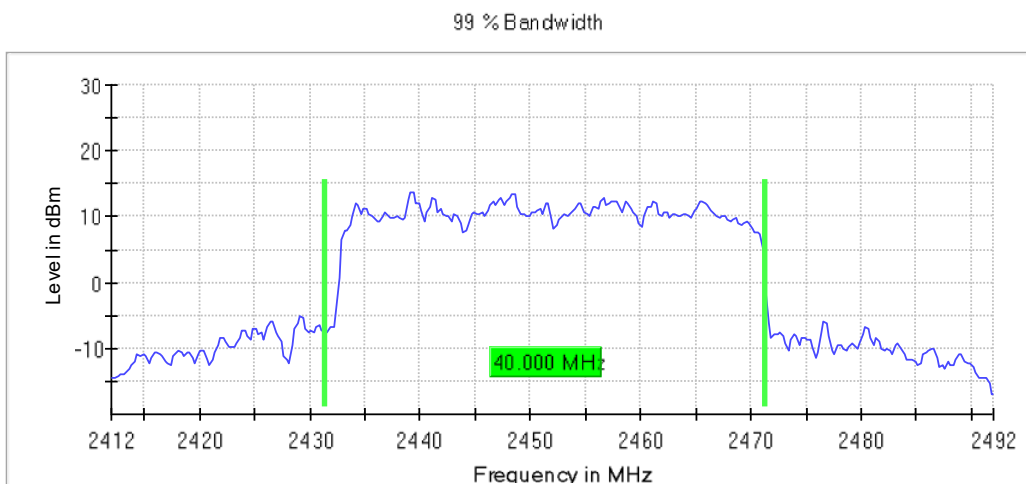
Plot 3. 802.11ax40, 2437MHz, 6dB Bandwidth



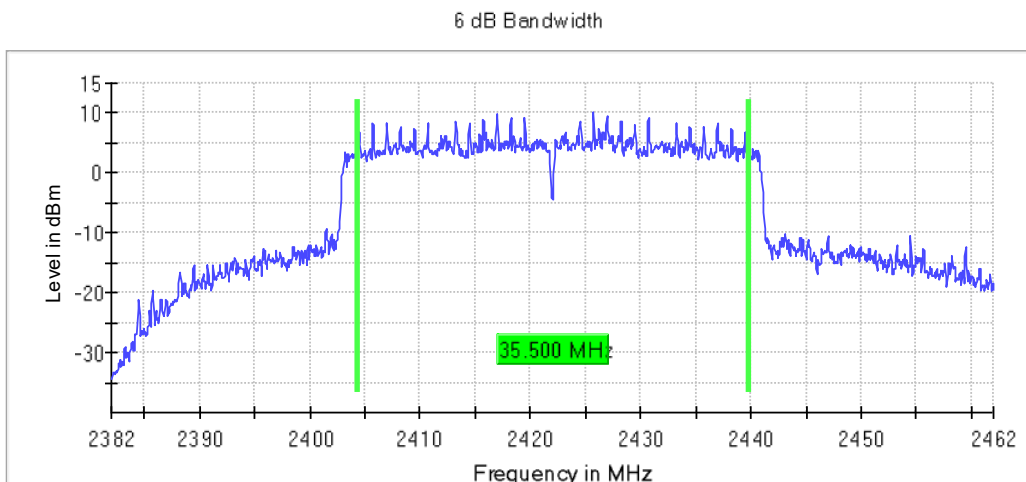
Plot 4. 802.11ax40, 2437MHz, 99% Bandwidth



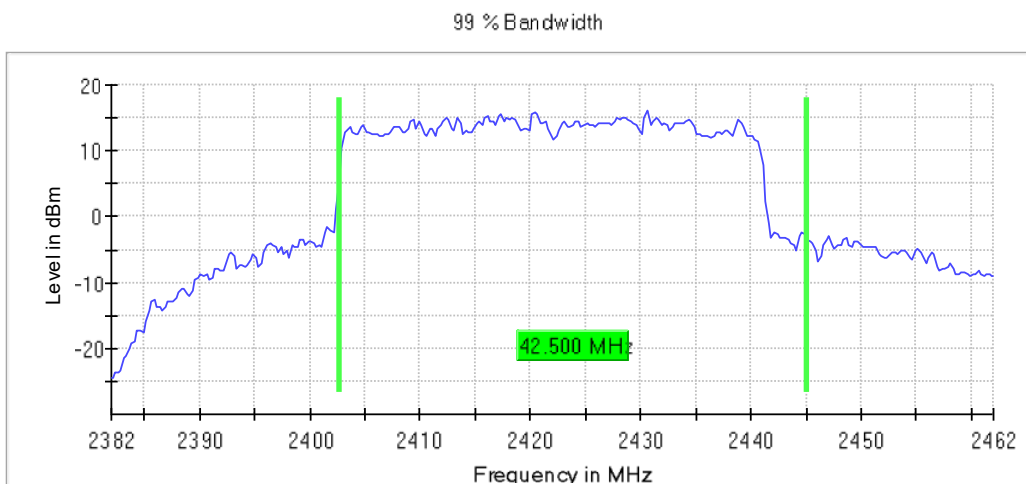
Plot 3. 802.11ax40, 2452MHz, 6dB Bandwidth



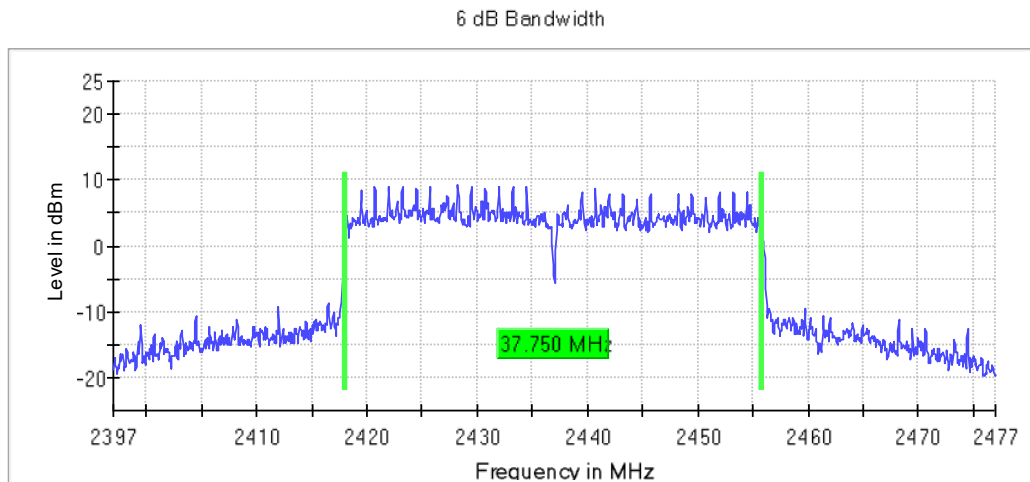
Plot 4. 802.11ax40, 2452MHz, 99% Bandwidth



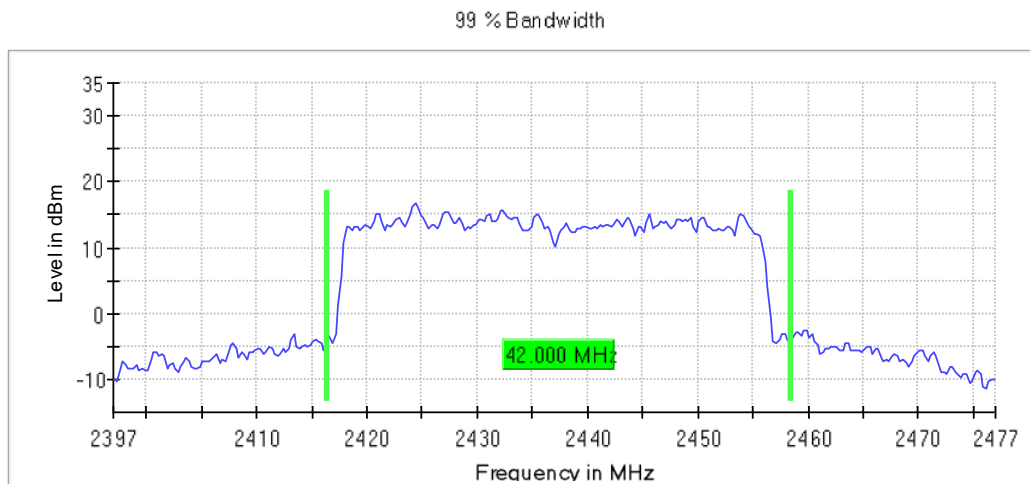
Plot 3. 802.11ac40, 2422MHz, 6dB Bandwidth



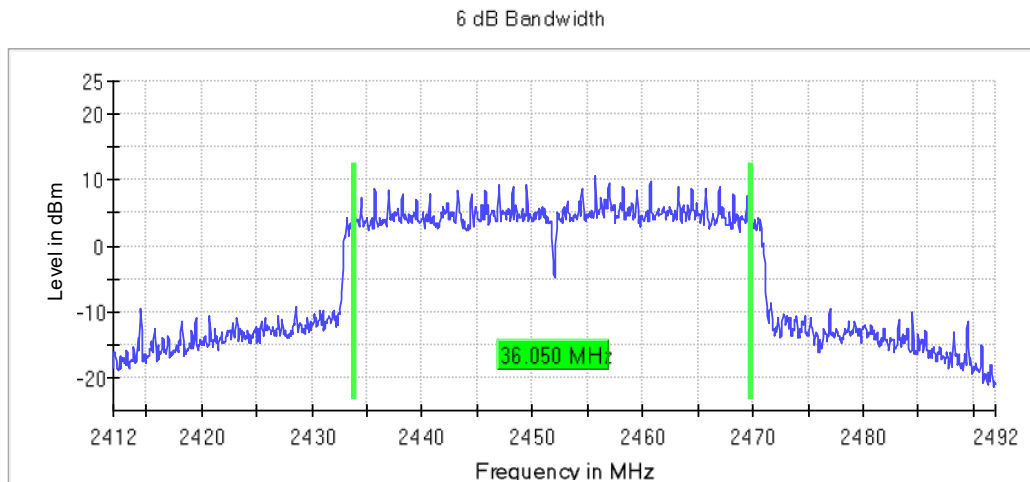
Plot 4. 802.11ac40, 2422MHz, 99% Bandwidth



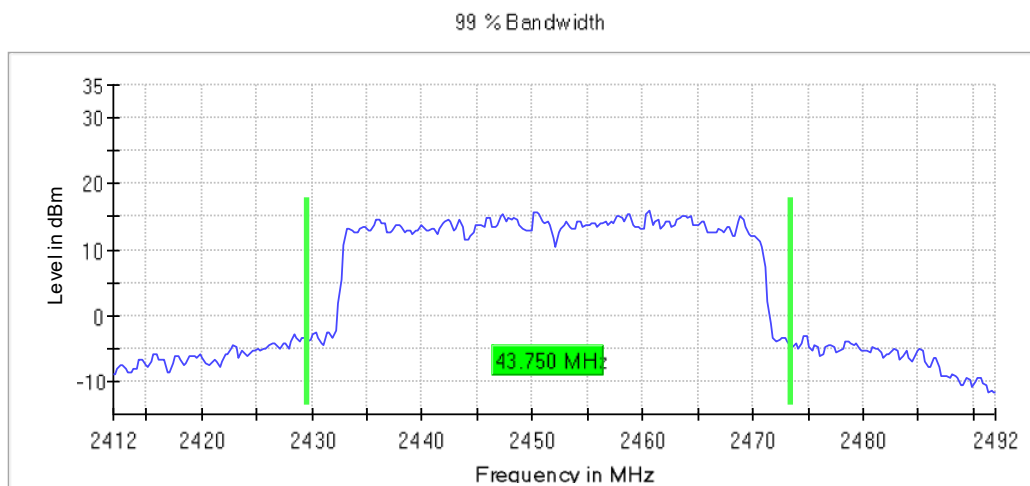
Plot 3. 802.11ac40, 2437MHz, 6dB Bandwidth



Plot 4. 802.11ac40, 2437MHz, 99% Bandwidth



Plot 3. 802.11ac40, 2452MHz, 6dB Bandwidth



Plot 4. 802.11ac40, 2452MHz, 99% Bandwidth