

FCC / ISED Test Report

For:
TZ Medical

Model Name:
H30M

Product Description:
Ambulatory electrocardiograph monitor with onboard ECG analysis and wireless connection via Wi-Fi and BLE

FCC ID: ZIMH30M
ISED: 9647A-H30M

Applied Rules and Standards:
47 CFR Part 15.247 (DTS)
RSS-247 Issue 4 (DTS) & RSS-Gen Issue 5

REPORT #: EMC_TZMED_023_24001_15247_WIFI_DTS_Rev2

DATE: 2026-06-04



A2LA Accredited

IC recognized #
3462B

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1 Assessment

The following device was evaluated against the applicable criteria specified in FCC rules Parts 15.247 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-247.

There were no additions, deviations, or exclusions made from the test method.

Company	Description	Model #
TZ Medical	Ambulatory electrocardiograph monitor with onboard ECG analysis and wireless connection via Wi-Fi and BLE	H30M

Report Reviewer:

2026-06-04	Compliance	Art Thammanavarat (Lead Engineer)	Art Thammanavarat Digitally signed by: Art Thammanavarat DN: CN = Art Thammanavarat email = art.thammanavarat@cetecom.com C = AD Date: 2026.06.07 20:39:10 -07'00'
Date	Section	Name	Signature

Responsible for the Report:

2026-06-04	Compliance	Guangcheng Huang (Senior EMC Test Engineer)	Guangcheng Huang Digitally signed by: Guangcheng Huang DN: CN = Guangcheng Huang email = guangcheng.huang@cetecom.com C = US O = cetecom OU = EMC Date: 2026.06.04 15:39:06 -07'00'
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3. CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Alvin Ilarina
Responsible Project Leader:	Ruby Hall

2.2 Identification of the Client

Client Firm/Name:	TZ Medical
Street Address:	20497 SW Teton Ave Suite A
City/Zip Code	Tualatin, OR 97062
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Product Description:	Ambulatory electrocardiograph monitor with onboard ECG analysis and wireless connection via Wi-Fi and BLE
Model Name:	H30M
HW Version:	H30M
SW Version:	V1.78
FCC-ID:	ZIMH30M
ISED:	9647A-H30M
Bands/Modes Supported	<u>Wi-Fi & Bluetooth Modules</u> Model Name: ATWINC3400 Model Number: ATWINC3400A-MU-T <u>Wireless Technologies</u> Wi-Fi 2.4GHz
Frequency Range	<u>Wi-Fi 2.4GHz</u> Nominal band: 2412 MHz – 2462 MHz; Center to center: 2412 MHz (ch 1) – 2462 MHz (ch 11), 11 channels
Max. Output Power (All Radios):	Wi-Fi-2.4GHz (Avg): 802.11b: 16 dBm, 802.11g: 13.2 dBm, 802.11n (HT20): 13 dBm
Max. declared antenna gain	Name: TAOGLAS Type: 2.4GHz High Efficiency Loop Antenna Part No: WLA.01 Location: Internal Peak Gain: Wi-Fi 2.4GHz: 1.0 dBi
Modes of Operation / Type(s) of Modulation (All Radios):	802.11b: DSSS 802.11g/n: OFDM
Power Supply/ Rated Operating Voltage Range	3.3-4.2Vdc
Operating Temperature Range	Low: 0 °C - High 45 °C
Sample Revision	☒ Production ☐ Pre-Production
EUT Dimensions	6.6cm x 3.95cm x 0.85cm
Weight	28 grams
EUT Diameter	☒ < 60 cm ☐ Other _____
Note: The information of the EUT specifications in the table above is provided by the client.	

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	002	H30M	V1.8	Conducted sample
2	001	H30M	V1.8	Radiated sample

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	S/N	Notes/Comments
1	Charging Cable	HPR-1032	-	-	HPR Wireless Test Charging Cable
2	SAM4S Xplained Pro	ATSAM4S-XPRO	Microchip Technology	-	-
3	Modem Adapter	HPR-1015	-	-	SAM4S to HPRM Modem Adapter (modified and soldered direct to device)
4	Patient simulator	-	AMC	2896	-
5	Wall Charger	-	GlobTek	469382105/19	

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT#1+AE#1+AE#2+AE#3+AE#4+AE#5	Conducted test setup The client provides a USB cable to communicate with the device and send commands for configuring the Wi-Fi radios into a specific test mode. This test mode configuration, designed for worst-case scenarios, is not intended for end-user application and is outlined as follows: Wi-Fi: continuous modulated transmission at the maximum power settings, highest duty cycle, and fixed channel.
2	EUT#2+AE#1+AE#2+AE#3+AE#4+AE#5	Radiated test setup The client provides a USB cable to communicate with the device and send commands for configuring the Wi-Fi radios into a specific test mode. This test mode configuration, designed for worst-case scenarios, is not intended for end-user application and is outlined as follows: Wi-Fi: continuous modulated transmission at the maximum power settings, highest duty cycle, and fixed channel.

3.5 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels, and highest possible duty cycle. For radiated measurements, all data in this report show the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to assess the performance of the EUT according to the relevant requirements specified in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-247 of ISED Canada.

This test report is to support a request for new equipment authorization under the FCC ID: ZIMH30M IC ID: 9647A-H30M

Testing procedures are based on 558074 D01 15.247 Meas Guidance v05r02 – “GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES” - April 2, 2019, by the Federal Communications Commission, Office of Engineering and Technology, Laboratory Division.

5 Measurement Results Summary

Measurement Results Summary				
Test Specification	Test Case	Measurement	Limited	Result
§15.247(a) RSS-247 5.2(a)	Emission Bandwidth	11.200 MHz	>500kHz	PASS
§15.247(e) RSS-247 5.2(b)	Power Spectral Density	-2.699 dBm / 3kHz	8dBm / 3kHz	PASS
§15.247(b) RSS-247 5.4(d)	Maximum Conducted Output Power	Peak: 16 dBm Peak: 0.0398 Watts	1 Watt (30 dBm)	PASS
	Maximum Radiated Output Power (EIRP)	EIRP: 17 dBm EIRP: 0.0501 Watts	4 Watt (36 dBm)	PASS
§15.247(d) RSS-247 5.5	Band edge compliance Unrestricted Band Edges	-23.10 dBm	Peak <20 dBc Avg. <30 dBc	PASS
§15.247; 15.209; 15.205 RSS-Gen 8.9; 8.10	Band edge compliance Restricted Band Edges	Peak:56.959 dBµV/m AVG: 40.265 dBµV/m	*PEAK LIMIT= 74 dBµV/m @3m *AVG. LIMIT= 54 dBµV/m @3m	PASS
Test Specification	Test Case	Lowest Margin Emission		Result
§15.247(d); §15.209 RSS-Gen 6.13	TX Spurious Emissions- Radiated	45.499 dBµV/m (QPK)		PASS
§15.207(a) RSS Gen 8.8	AC Conducted Emissions	29.95 dBµV (AVG)		PASS
Note: Pass=Complies, NA=Not Applicable, NP=Not Performed				

6 Measurement Uncertainty

6.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=2.

Measurement System		EMC Lab 1	EMC Lab 2
Conducted emissions (mains port)	150 kHz – 30 MHz	2.47 dB	N/A
Radiated emissions	9 kHz – 30 MHz	2.68 dB	2.53 dB
	30 – 100 MHz	4.39 dB	3.85 dB
	100 MHz – 1 GHz	5.65 dB	5.24 dB
	1 – 6 GHz	5.0 dB	4.88 dB
	6 – 18 GHz	4.76 dB	4.58 dB
	18 – 40 GHz	4.65 dB	4.61 dB

6.2 Environmental Conditions during Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25°C
- Relative humidity: 40-60%

Deviating test conditions are indicated at individual test description where applicable.

6.3 Date of Testing

2025-03-05 – 2025-03-28

6.4 Decision Rule:

Cetecom Inc follows ILAC G8:09/2019 chapter 4.2.1 (Simple Acceptance Rule).

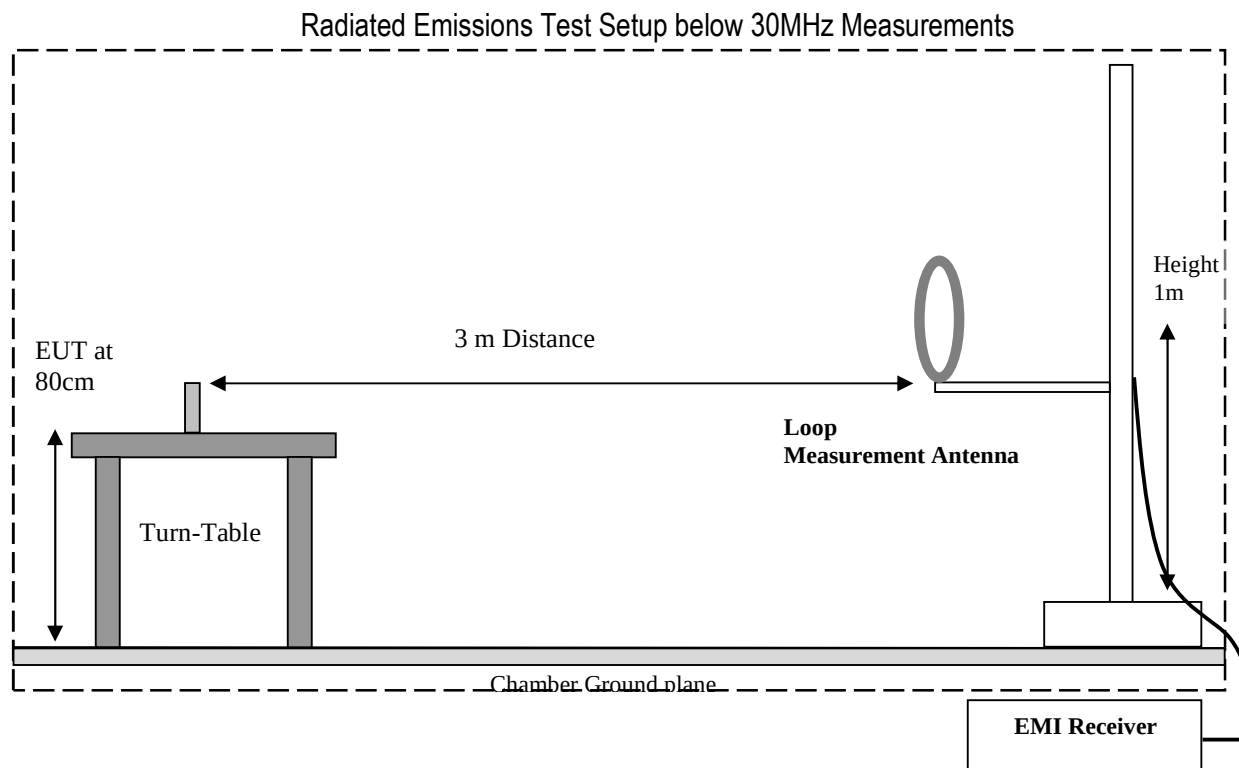
Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

7 Measurement Procedures

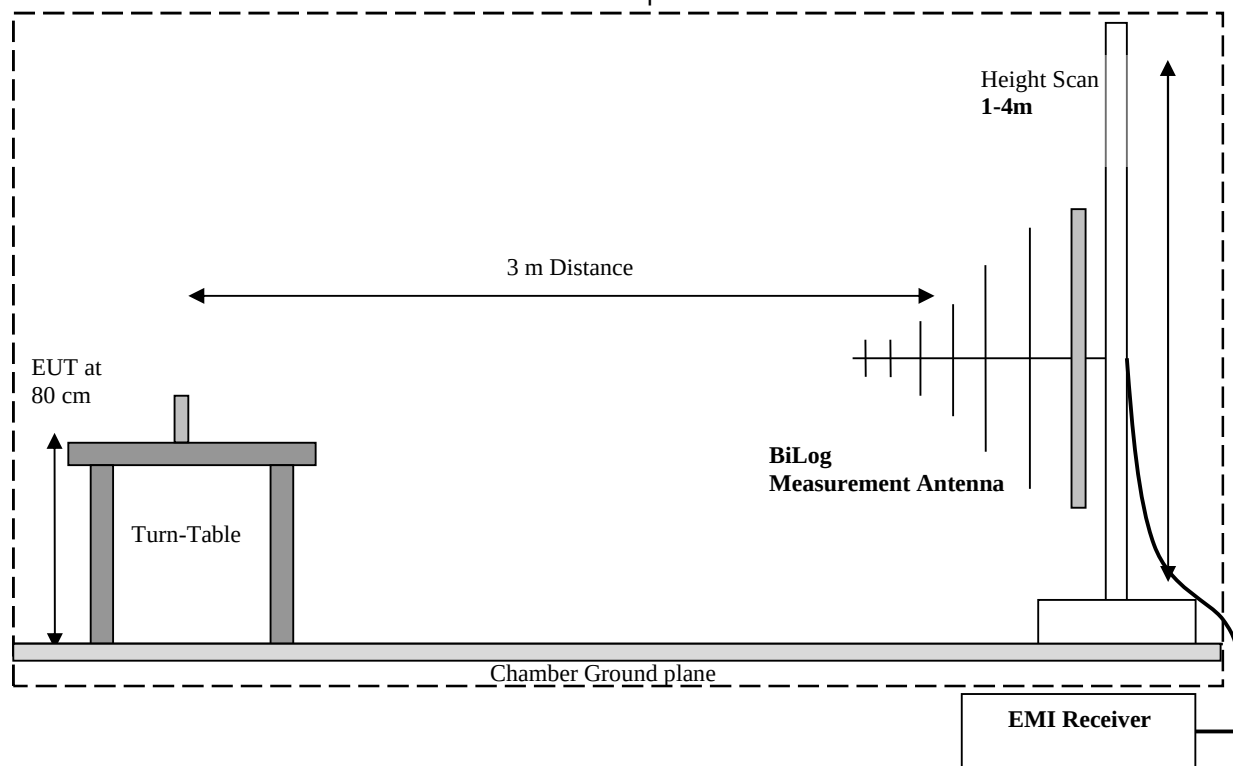
7.1 Radiated Measurement

The radiated measurement is performed according to ANSI C63.10 (2020)

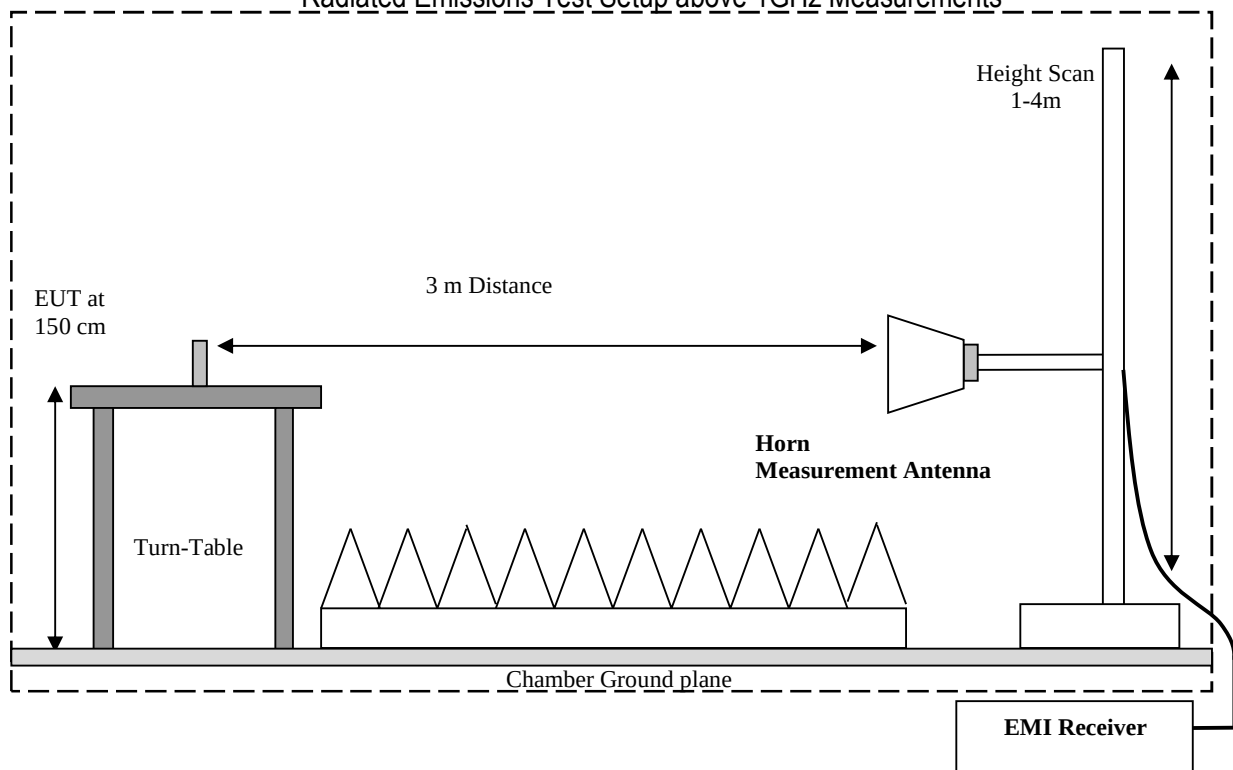
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.



Radiated Emissions Test Setup 30MHz-1GHz Measurements



Radiated Emissions Test Setup above 1GHz Measurements



Note: for measurement above 18 GHz at 1 m distance

7.1.1 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

1. Measured reading in dB μ V
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

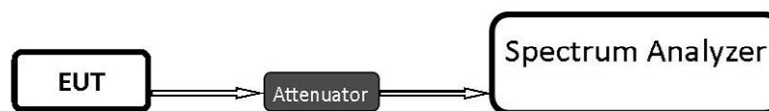
Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

7.2 Power Line Conducted Measurement Procedure

AC Power Line conducted emissions measurements performed according to: ANSI C63.4 (2014)

7.3 RF Conducted Measurement Procedure

Testing procedures are based on 558074 D01 15.247 Meas Guidance v05r02 – “GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES” - April 2, 2019, by the Federal Communications Commission, Office of Engineering and Technology, Laboratory Division.



- Connect the equipment as shown in the above diagram.
- Adjust the settings of the SA (Rohde-Schwarz Spectrum Analyzer) to connect the EUT at the required mode of test.
- Measurements are to be performed with the EUT set to the low, middle and high channels and for worst case modulation schemes.

8 Test Result Data

8.1 Maximum Conducted (Average) Output Power

8.1.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02

Spectrum Analyzer settings according to mentioned ANSI, sec.11.9.2.2.2 Method AVGSA-1:

Spectrum Analyzer settings:

- RBW = 1% to 5% of the OBW, not to exceed 1 MHz
- VBW $\geq 3 \times$ RBW
- Span = at least 1.5 times the OBW
- Sweep = Auto couple
- Detector function = RMS
- Trace = Average (at least 100 traces in power averaging (rms) mode)
- Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges
- Add $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times

8.1.2 Limits:

Maximum Output Power:

- FCC §15.247 (b)(1): 1 W
- IC RSS-247: 1 W

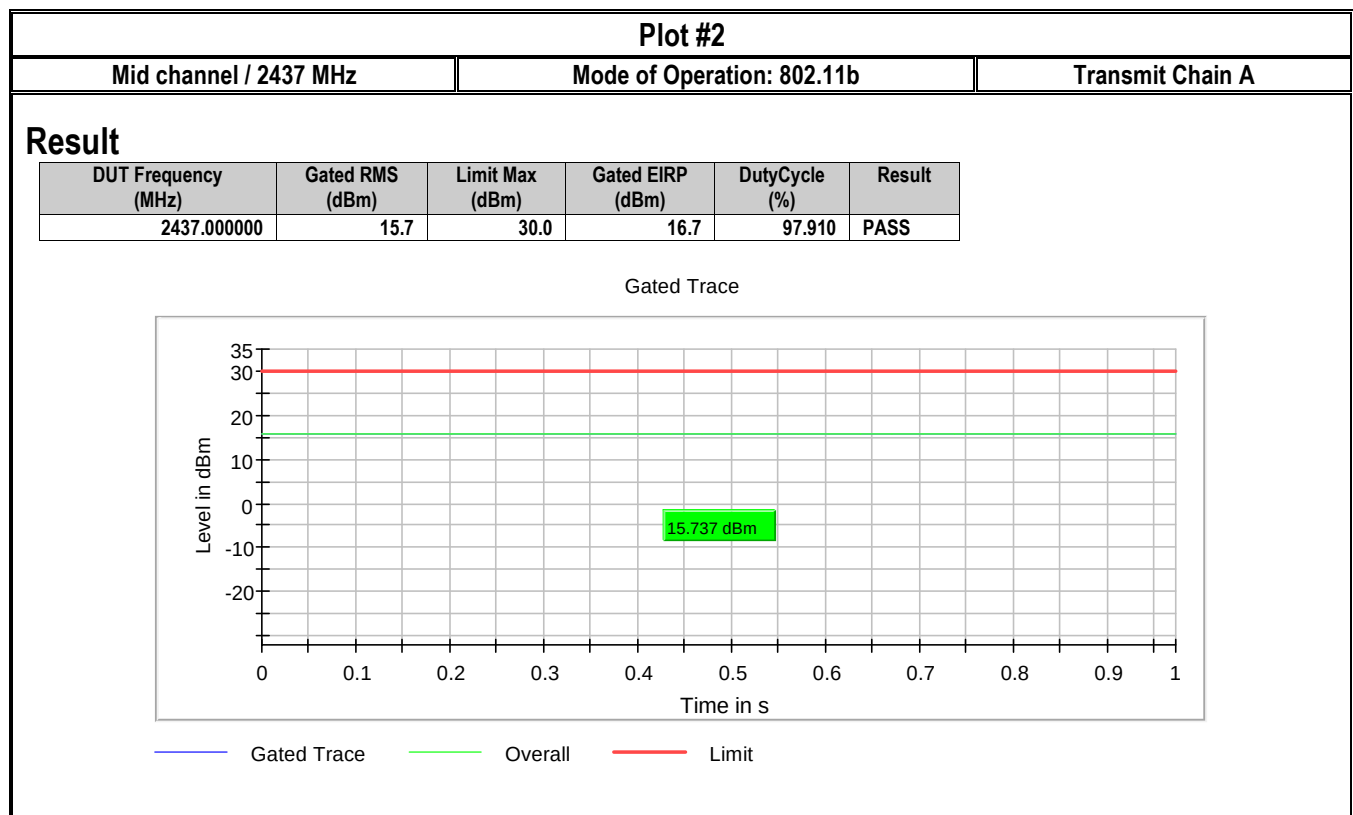
8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.2°C	1	802.11 b,g,n	120 VAC	1 dBi

8.1.4 Measurement result:

Plot #	Frequency (MHz)	EUT Operating Mode	Output Power (dBm)	EIRP (dBm)	Limit (dBm)	Result
1	2412	802.11b	16.00	17.00	30 (Avg) / 36 (EIRP)	Pass
2	2437	802.11b	15.70	16.70	30 (Avg) / 36 (EIRP)	Pass
3	2462	802.11b	15.90	16.90	30 (Avg) / 36 (EIRP)	Pass
4	2412	802.11g	13.20	14.20	30 (Avg) / 36 (EIRP)	Pass
5	2437	802.11g	12.70	13.70	30 (Avg) / 36 (EIRP)	Pass
6	2462	802.11g	12.80	13.80	30 (Avg) / 36 (EIRP)	Pass
7	2412	802.11n HT20	13.00	14.00	30 (Avg) / 36 (EIRP)	Pass
8	2437	802.11n HT20	12.60	13.60	30 (Avg) / 36 (EIRP)	Pass
9	2462	802.11n HT20	12.70	13.70	30 (Avg) / 36 (EIRP)	Pass

8.1.5 Measurement Plots:



Plot #3

High channel / 2462 MHz

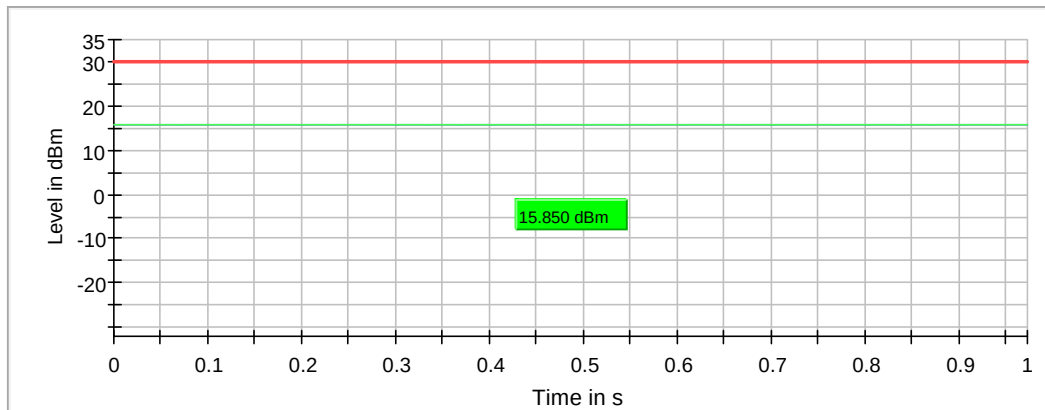
Mode of Operation: 802.11b

Transmit Chain A

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	15.9	30.0	16.9	97.825	PASS

Gated Trace



Gated Trace Overall Limit

Plot #4

Low channel / 2412 MHz

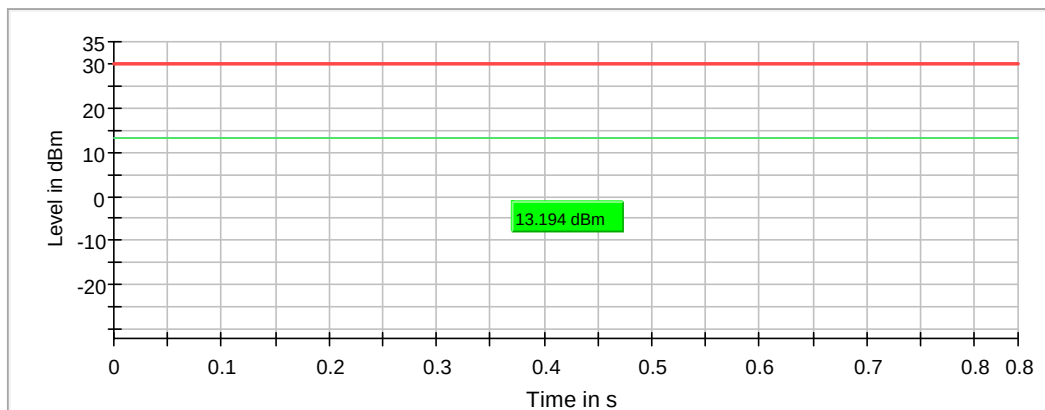
Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	13.2	30.0	14.2	84.236	PASS

Gated Trace



Gated Trace Overall Limit

Plot #5

Mid channel / 2437 MHz

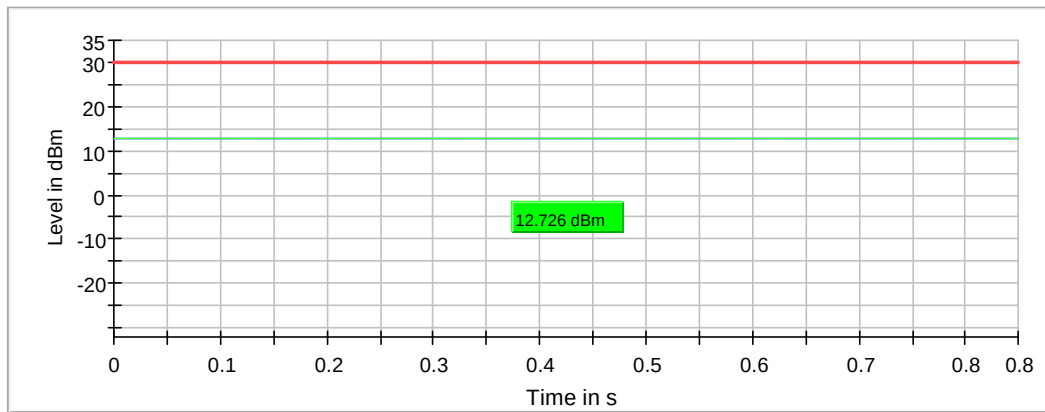
Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	12.7	30.0	13.7	85.122	PASS

Gated Trace



— Gated Trace — Overall — Limit

Plot #6

High channel / 2462 MHz

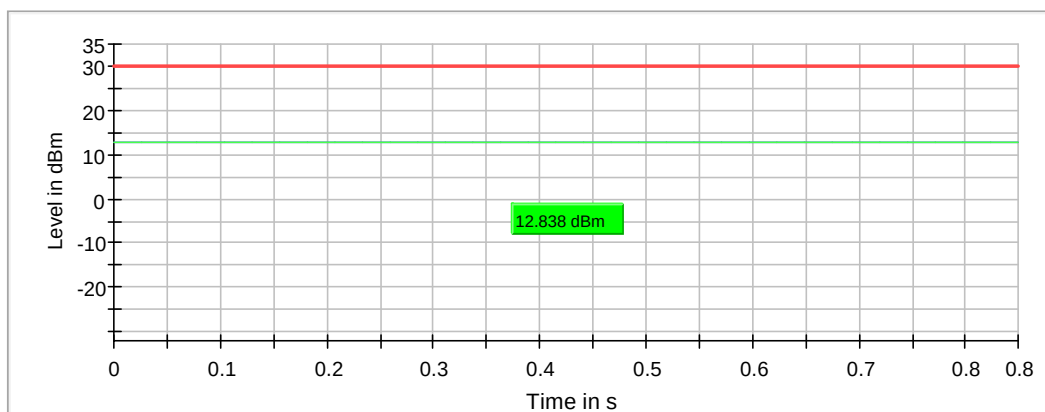
Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	12.8	30.0	13.8	85.120	PASS

Gated Trace



— Gated Trace — Overall — Limit

Plot #7

Low channel / 2412 MHz

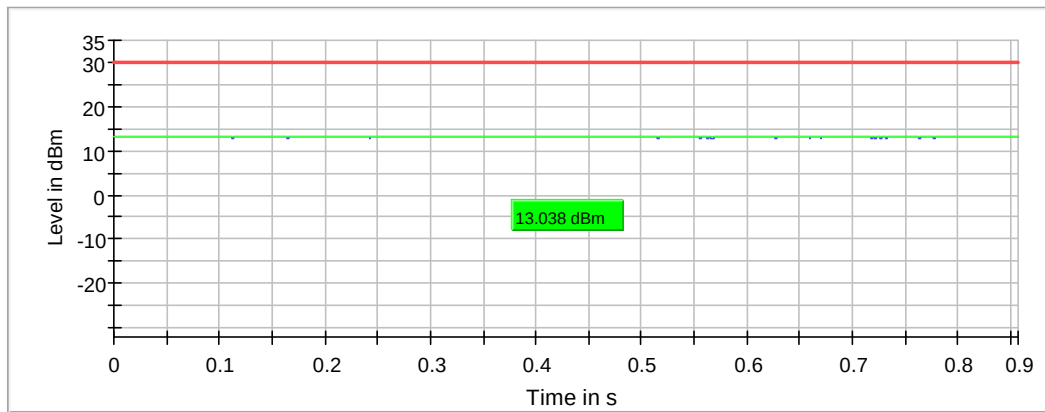
Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	13.0	30.0	14.0	85.841	PASS

Gated Trace



Gated Trace Overall Limit

Plot #8

Mid channel / 2437 MHz

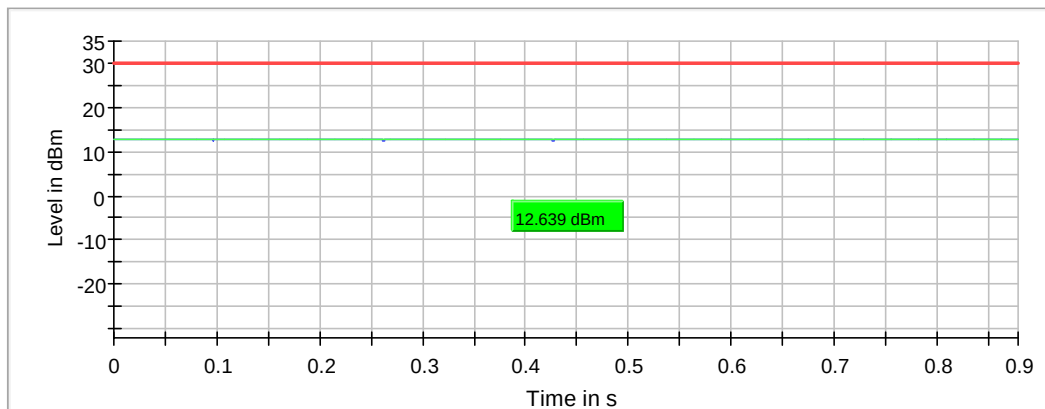
Mode of Operation: 802.11n HT20

Transmit Chain A

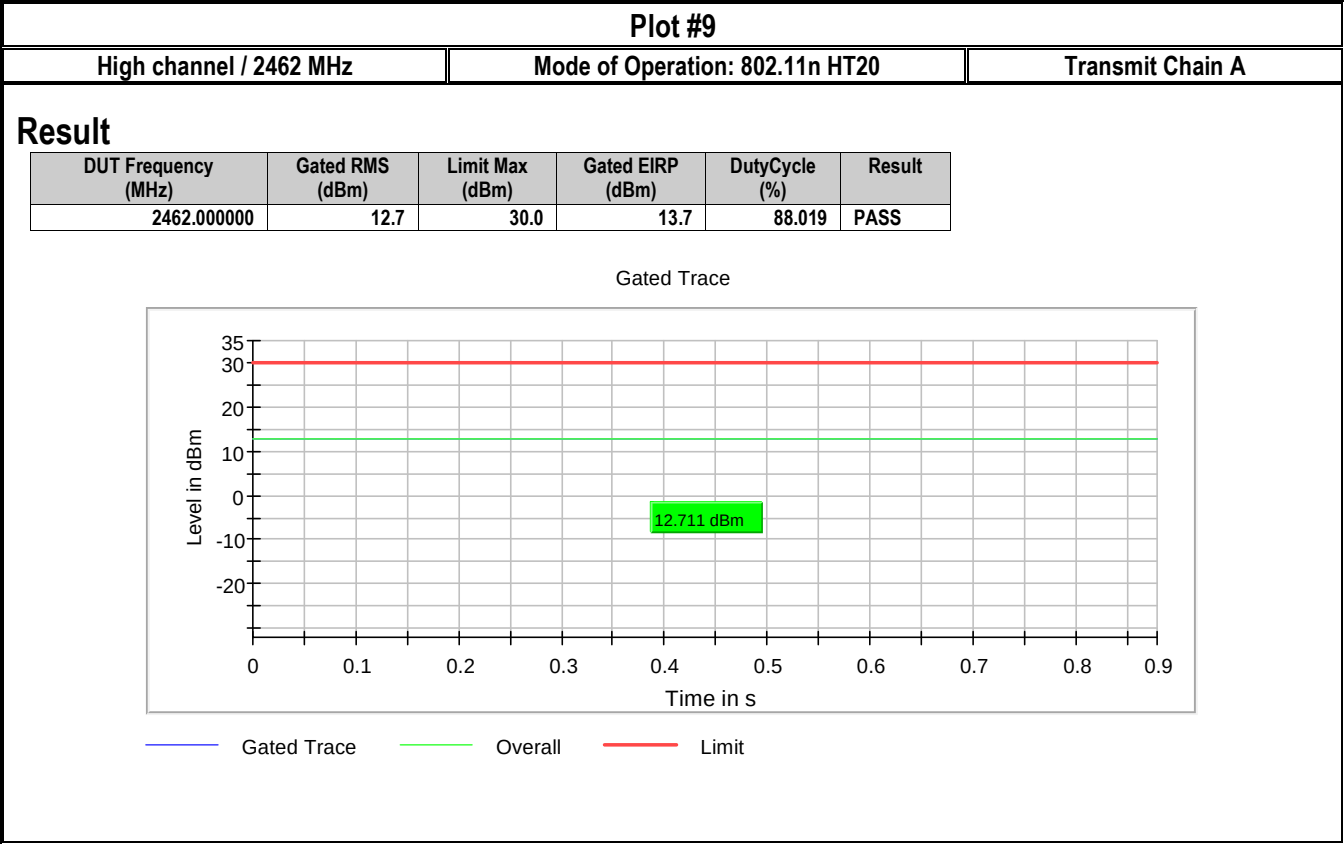
Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	12.6	30.0	13.6	88.127	PASS

Gated Trace



Gated Trace Overall Limit



8.2 Power Spectral Density

8.2.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02, and ANSI C63.10 Clause 11.

Spectrum Analyzer settings for AVGPS-1 PSD method:

- Set analyzer center frequency to DTS channel center frequency
- Set the span to $> 1.5 \times \text{DTS bandwidth}$
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
- Set the VBW $\geq (3 \times \text{RBW})$
- Detector = RMS
- Sweep time = Auto couple
- Trace mode = Employ trace averaging (RMS)
- Allow trace to fully stabilize
- Use the peak marker function to determine the maximum amplitude level within the RBW
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

8.2.2 Limits:

FCC §15.247(e) & RSS-247 5.2(b):

- For digitally modulated systems, the peak 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.

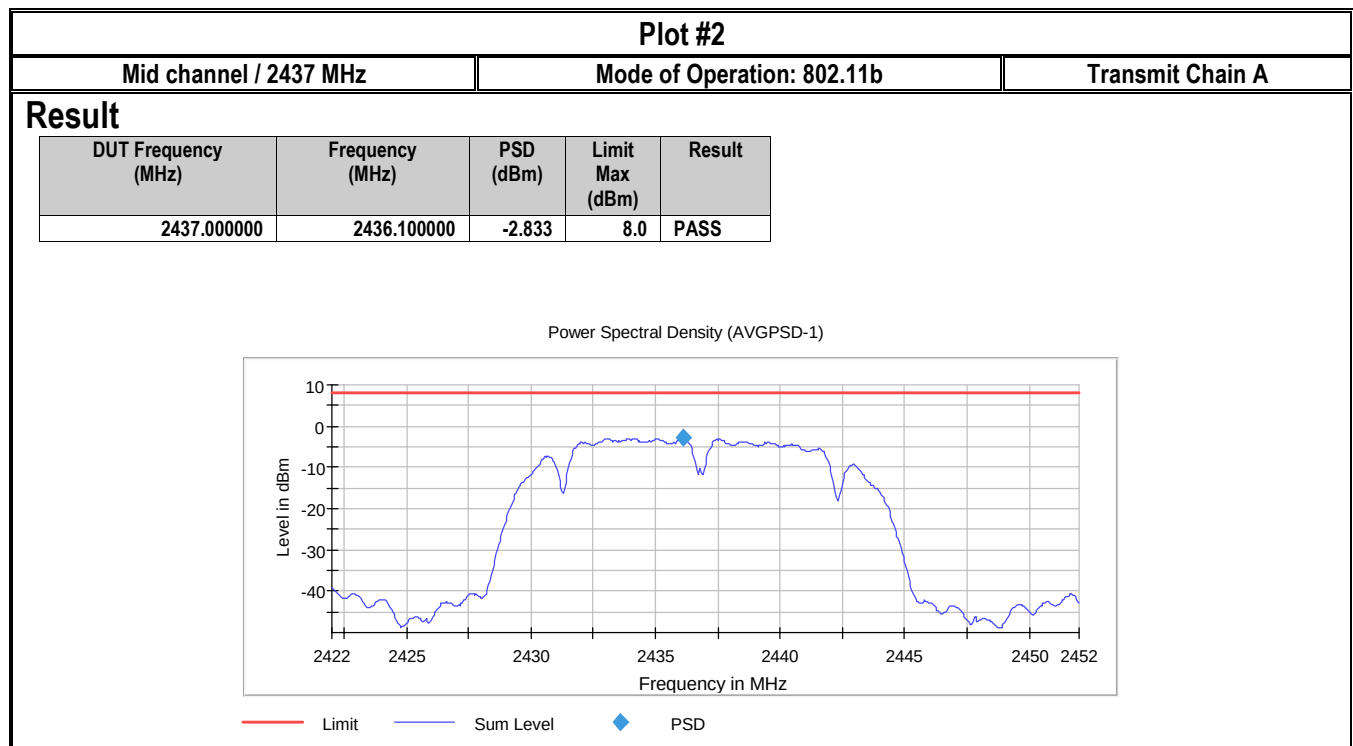
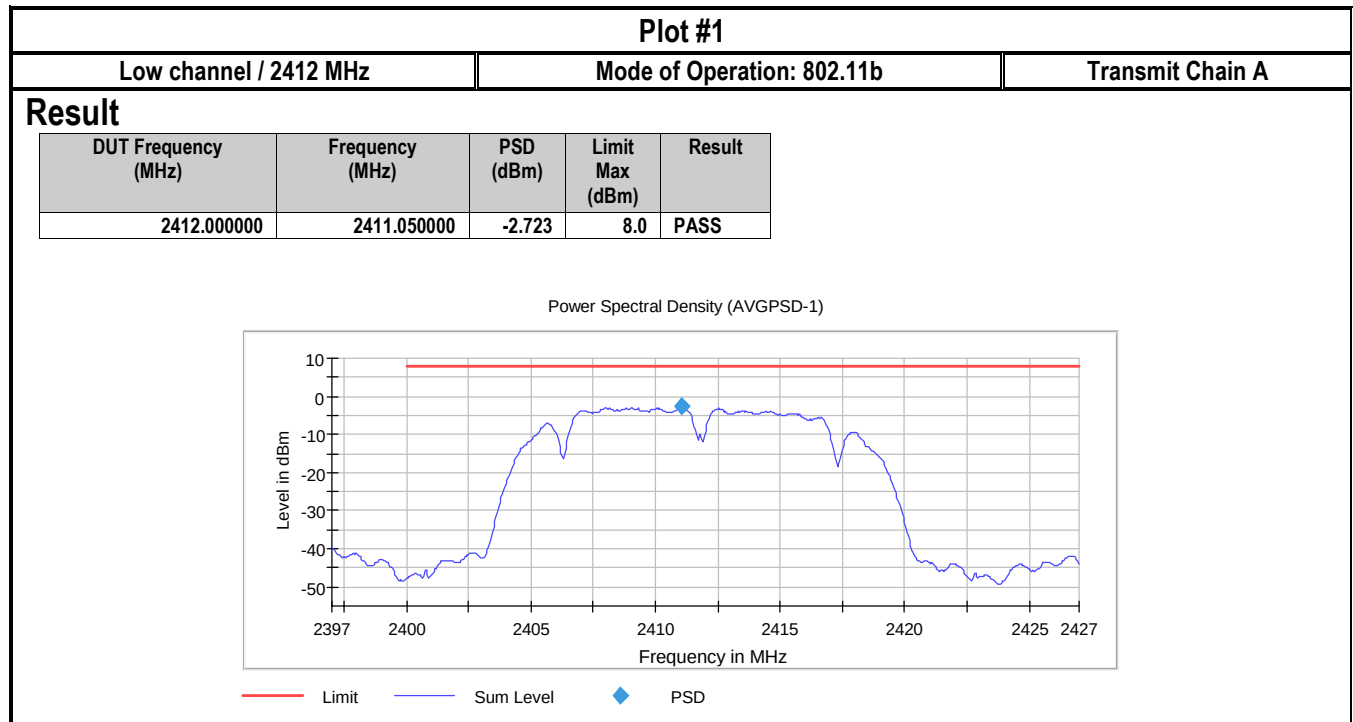
8.2.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.2°C	1	802.11 b,g,n	120 VAC	1 dBi

8.2.4 Measurement result:

Plot #	Frequency (MHz)	EUT Operating Mode	PSD (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
1	2412	802.11b	-2.723	8	Pass
2	2437	802.11b	-2.833	8	Pass
3	2462	802.11b	-2.699	8	Pass
4	2412	802.11g	-7.666	8	Pass
5	2437	802.11g	-7.689	8	Pass
6	2462	802.11g	-7.712	8	Pass
7	2412	802.11n HT20	-7.697	8	Pass
8	2437	802.11n HT20	-7.966	8	Pass
9	2462	802.11n HT20	-7.851	8	Pass

8.2.5 Measurement Plots:



Plot #3

Mid channel / 2462 MHz

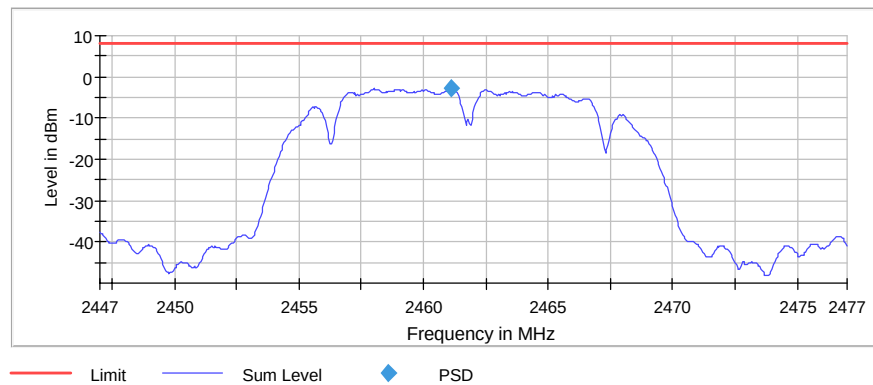
Mode of Operation: 802.11b

Transmit Chain A

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2461.100000	-2.699	8.0	PASS

Power Spectral Density (AVGPSD-1)



Plot #4

Low channel / 2412 MHz

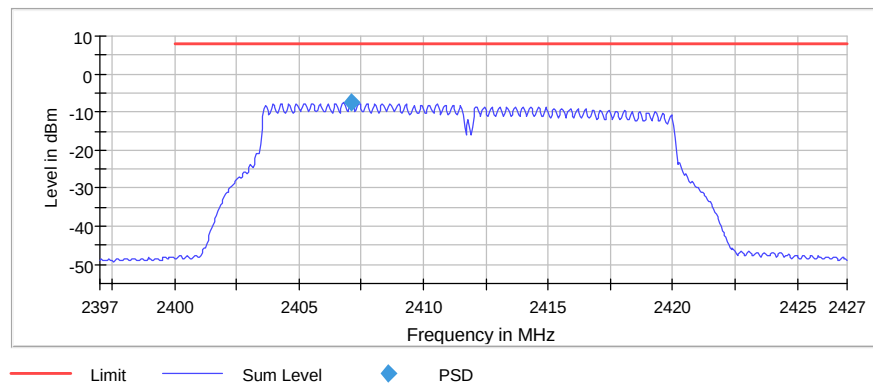
Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2407.100000	-7.666	8.0	PASS

Power Spectral Density (AVGPSD-1)



Plot #5

Mid channel / 2437 MHz

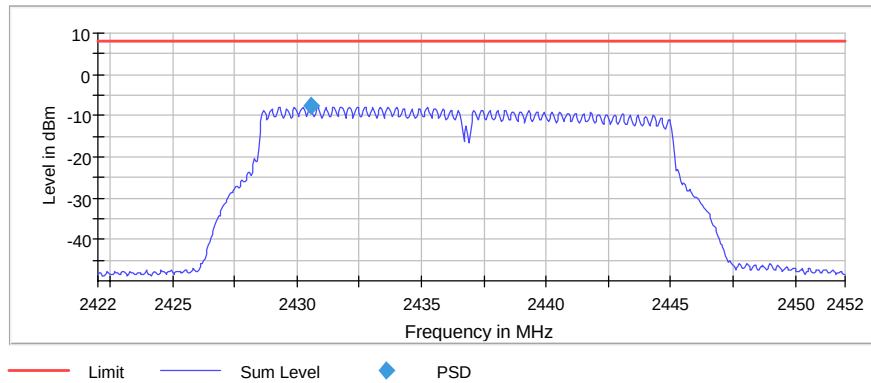
Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2430.550000	-7.689	8.0	PASS

Power Spectral Density (AVGSPD-1)



Plot #6

Mid channel / 2462 MHz

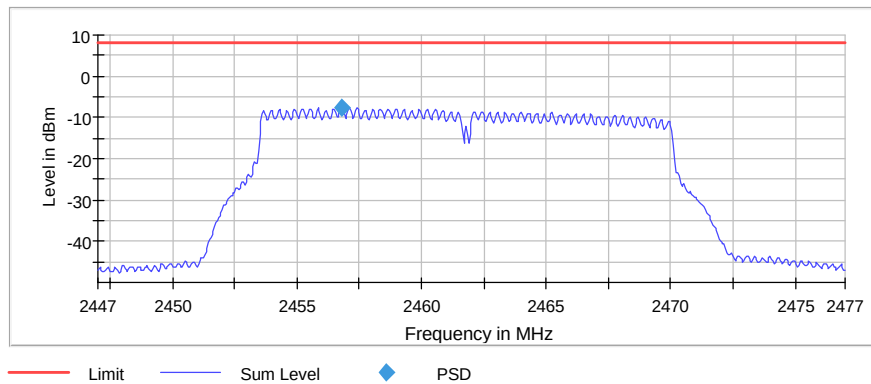
Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2456.800000	-7.712	8.0	PASS

Power Spectral Density (AVGSPD-1)



Plot #7

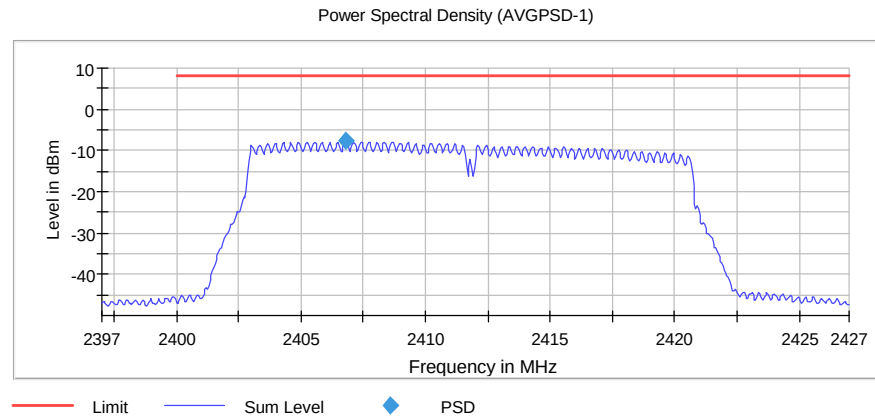
Low channel / 2412 MHz

Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2406.800000	-7.697	8.0	PASS



Plot #8

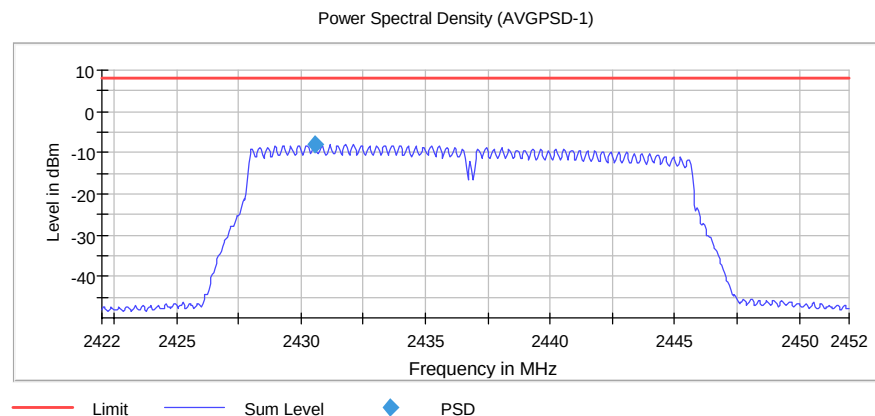
Mid channel / 2437 MHz

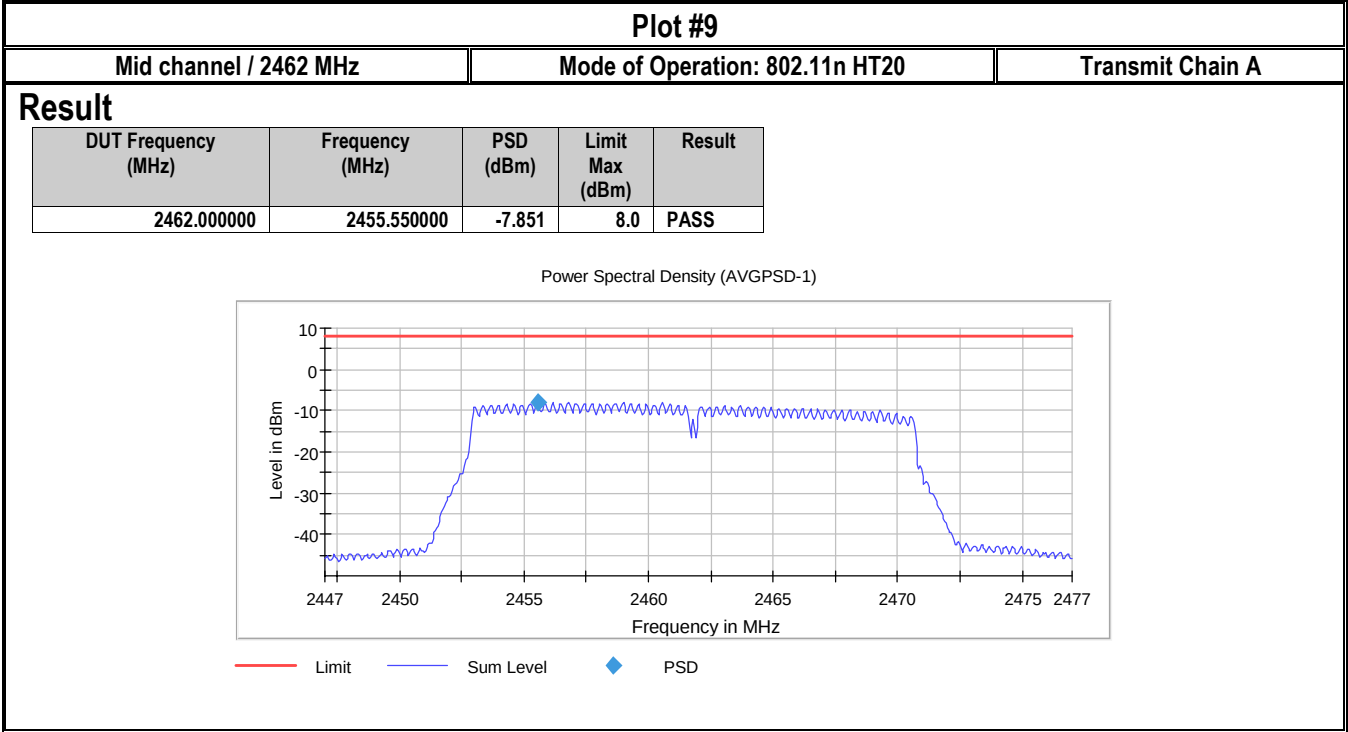
Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2430.550000	-7.966	8.0	PASS





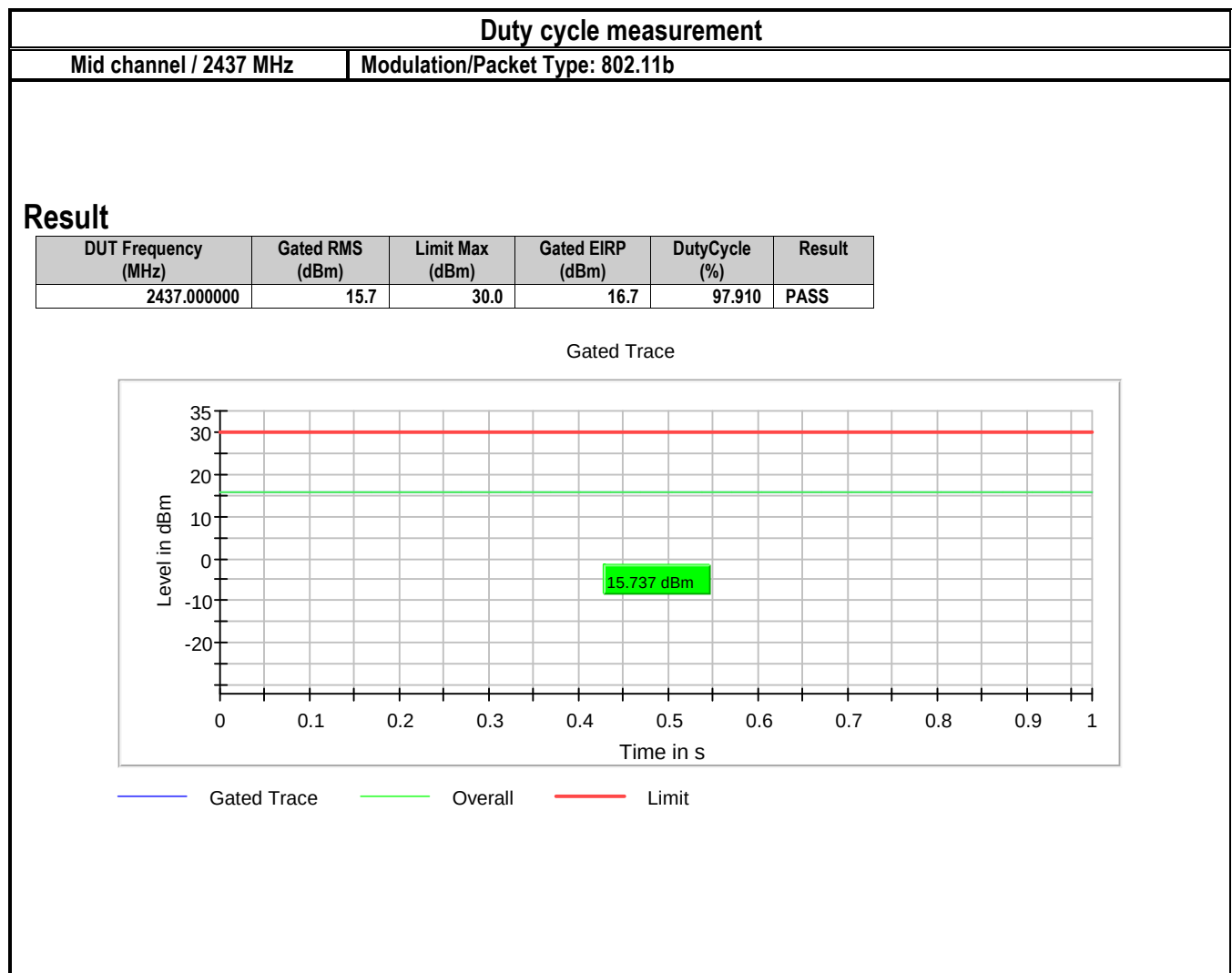
8.3 Duty cycle

8.3.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02

Spectrum Analyzer settings:

- Set the center frequency and of the instrument to the center frequency of the transmission
- Zero span
- Set RBW $\geq$ OBW if possible; otherwise, set RBW to the largest available value
- Detector = Peak or average

8.3.2 Measurement result



Duty cycle = 97.91%

Duty cycle correction factor = $10 \cdot \log(1/0.9791) = 0.09$ dB

Duty cycle measurement

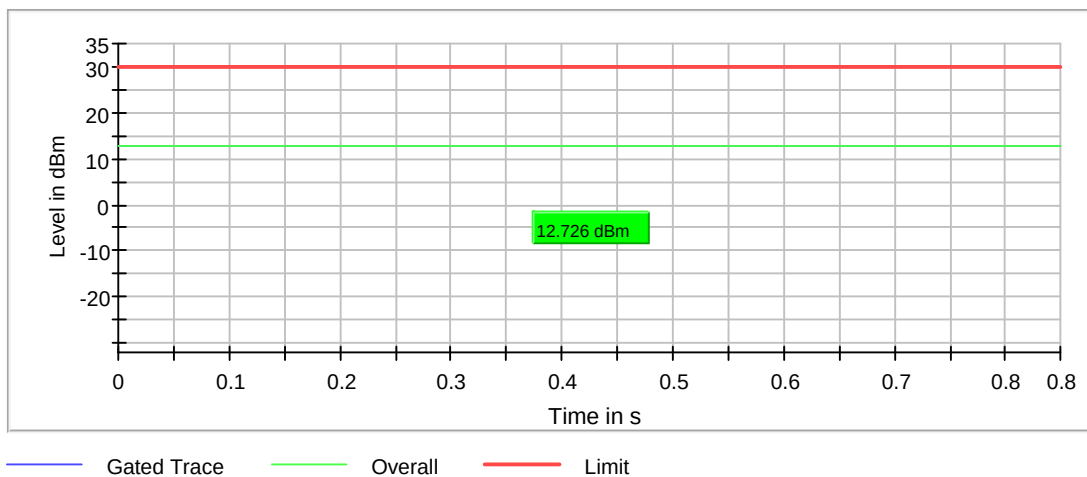
Mid channel / 2437 MHz

Modulation/Packet Type: 802.11g

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	12.7	30.0	13.7	85.122	PASS

Gated Trace



Duty cycle = 85.122%

Duty cycle correction factor = $10 \cdot \log(1/0.8512) = 0.70$ dB

Duty cycle measurement

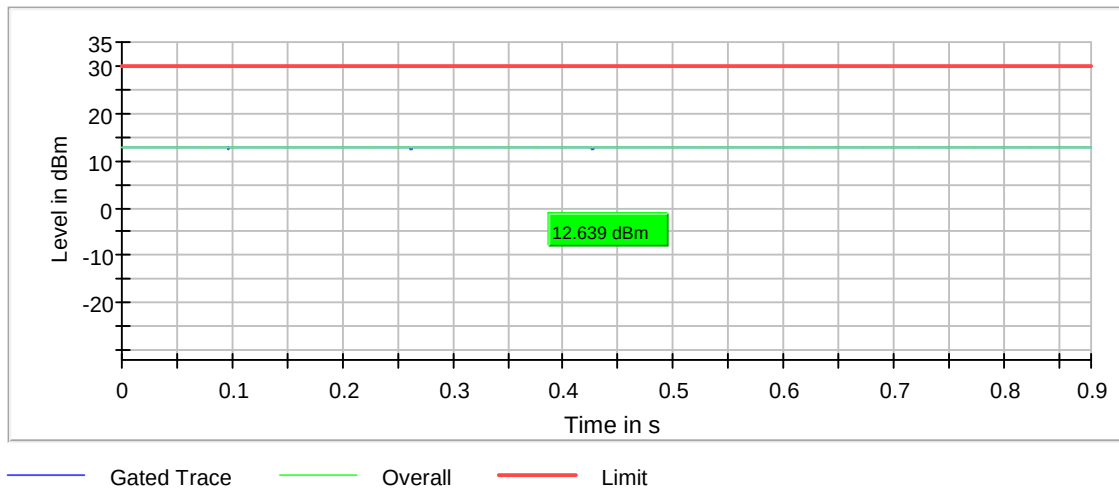
Mid channel / 2437 MHz

Modulation/Packet Type: 802.11n HT20

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	12.6	30.0	13.6	88.127	PASS

Gated Trace



Duty cycle = 88.127%

Duty cycle correction factor = $10 \cdot \log(1/0.8813) = 0.55$ dB

8.4 Band Edge Compliance

8.4.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02

Spectrum Analyzer settings for band edge:

- Set the center frequency and span to encompass frequency range to be measured
- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW
- Sweep Time: Auto couple
- Detector = Peak
- Trace = Max hold
- Allow trace to fully stabilize
- Use the peak marker function to determine the maximum amplitude level
- Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge

8.4.2 Limits non restricted band:

FCC§15.247 (d)

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247 5/5

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB.

Spectrum Analyzer settings for restricted band:

- Peak measurements are made using a peak detector and RBW=1 MHz

8.4.3 Limits restricted band §15.247/15.209/15.205 and RSS-Gen 8.9/8.10

- *PEAK LIMIT= 74 dB μ V/m @3m =-21.23 dBm
- *AVG. LIMIT= 54 dB μ V/m @3m =-41.23 dBm
- Start frequency & stop frequency according to frequency range specified in the restricted band table in FCC section 15.205 & RSS-Gen 8.10
- Measurements with a peak detector were used to show compliance to average limits, thus showing compliance to both peak and average limits.

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

8.4.4 Test conditions and setup:

Non-Restricted Band:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.3°C	1	802.11b,g,n	120 VAC	1 dBi

Restricted Band:

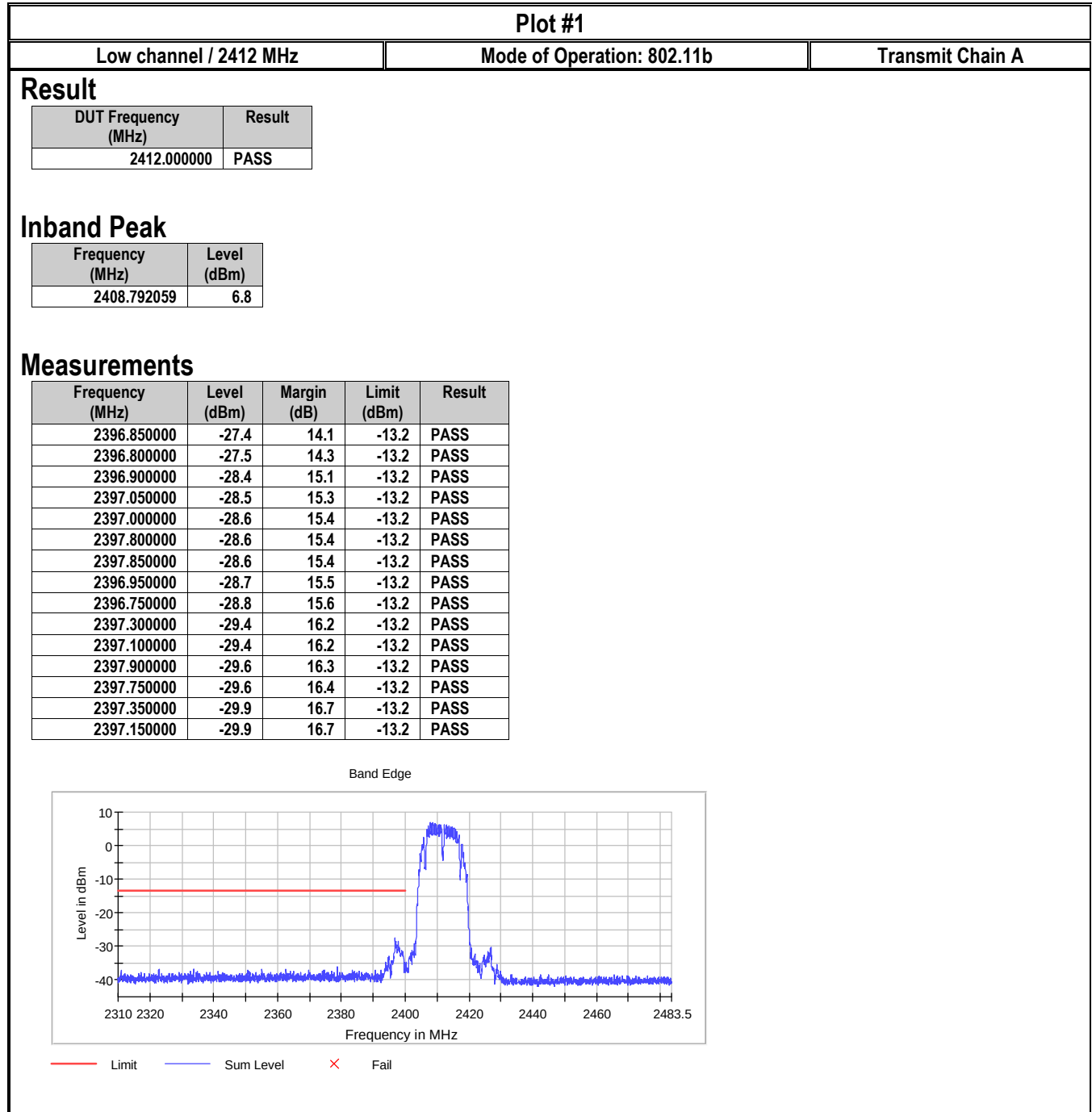
Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.3°C	2	802.11b,g,n	120 VAC	1 dBi

8.4.5 Measurement result:

Plot #	EUT operating mode	Frequency	In band Peak Level	Level	Margin	Limit	Result
		MHz	dBm	dBm	dB	dBm	
1	11.b	2412	6.80	-27.40	14.10	-13.20	Pass
2	11g	2412	2.50	-30.10	12.60	-17.50	Pass
3	11.n-HT20	2412	2.50	-27.40	9.90	-17.50	Pass
4	11.b	2462	6.40	-36.10	22.50	-13.60	Pass
5	11g	2462	2.40	-35.90	18.30	-17.60	Pass
6	11.n-HT20	2462	2.10	-23.10	5.20	-17.90	Pass

Plot #	EUT operating mode	Band Edge	Measured Peak Value (dBμV/m)	Measured Average Value (dBμV/m)	Limit (dBμV/m)	Result
7	802.11b	Lower Restricted Peak and Average	55.096	39.213	See section 8.4.3	Pass
8	802.11g	Lower Restricted Peak and Average	54.790	39.276	See section 8.4.3	Pass
9	802.11n HT20	Lower Restricted Peak and Average	54.780	39.285	See section 8.4.3	Pass
10	802.11b	Upper Restricted Peak and Average	55.171	40.020	See section 8.4.3	Pass
11	802.11g	Upper Restricted Peak and Average	55.621	39.921	See section 8.4.3	Pass
12	802.11n HT20	Upper Restricted Peak and Average	56.959	40.265	See section 8.4.3	Pass

8.4.6 Measurement Plots:



Plot #2

Low channel / 2412 MHz

Mode of Operation: 802.11g

Transmit Chain A

Result

DUT Frequency (MHz)	Result
2412.000000	PASS

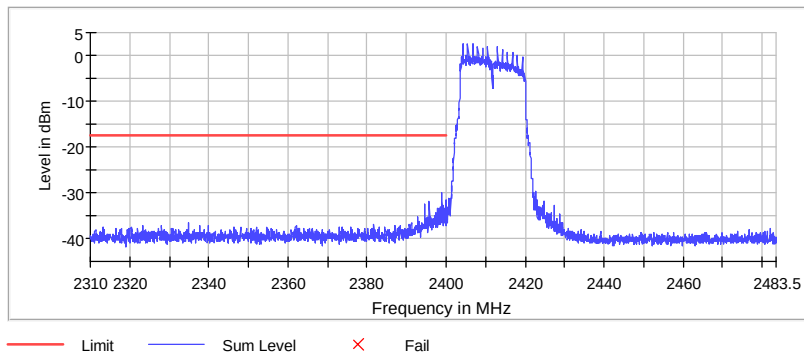
Inband Peak

Frequency (MHz)	Level (dBm)
2406.778235	2.5

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2398.950000	-30.1	12.6	-17.5	PASS
2399.000000	-30.2	12.7	-17.5	PASS
2399.900000	-31.7	14.2	-17.5	PASS
2395.850000	-31.9	14.4	-17.5	PASS
2399.050000	-32.0	14.5	-17.5	PASS
2394.650000	-32.5	15.0	-17.5	PASS
2399.350000	-33.0	15.5	-17.5	PASS
2394.600000	-33.0	15.5	-17.5	PASS
2398.650000	-33.0	15.5	-17.5	PASS
2399.300000	-33.0	15.6	-17.5	PASS
2398.350000	-33.4	15.9	-17.5	PASS
2399.700000	-33.4	15.9	-17.5	PASS
2397.800000	-33.5	16.0	-17.5	PASS
2398.600000	-33.5	16.0	-17.5	PASS
2399.650000	-33.7	16.2	-17.5	PASS

Band Edge



Plot #3

Low channel / 2412 MHz

Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Result
2412.000000	PASS

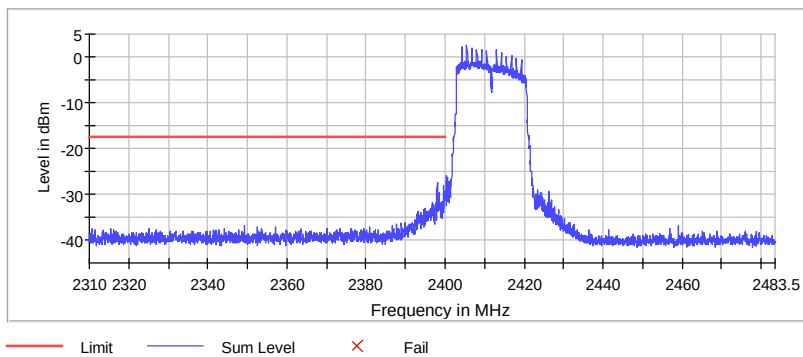
Inband Peak

Frequency (MHz)	Level (dBm)
2405.550294	2.5

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2398.050000	-27.4	9.9	-17.5	PASS
2399.650000	-28.0	10.5	-17.5	PASS
2399.700000	-28.6	11.1	-17.5	PASS
2398.000000	-29.1	11.6	-17.5	PASS
2398.450000	-29.5	12.1	-17.5	PASS
2399.800000	-29.9	12.4	-17.5	PASS
2398.100000	-30.3	12.8	-17.5	PASS
2398.500000	-30.6	13.1	-17.5	PASS
2398.550000	-31.0	13.5	-17.5	PASS
2399.950000	-31.1	13.6	-17.5	PASS
2399.900000	-31.2	13.8	-17.5	PASS
2399.600000	-31.3	13.8	-17.5	PASS
2399.850000	-31.4	13.9	-17.5	PASS
2399.250000	-31.4	14.0	-17.5	PASS
2399.450000	-31.5	14.0	-17.5	PASS

Band Edge



Plot #4

High channel / 2462 MHz

Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Result
2462.000000	PASS

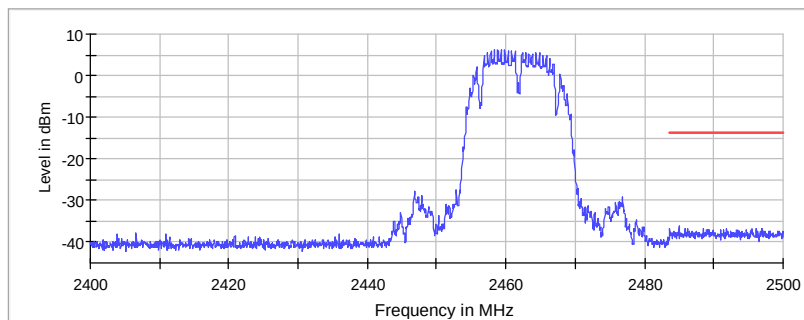
Inband Peak

Frequency (MHz)	Level (dBm)
2458.302647	6.4

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.927885	-36.1	22.5	-13.6	PASS
2496.086538	-36.7	23.1	-13.6	PASS
2485.879808	-36.8	23.2	-13.6	PASS
2495.399038	-36.9	23.3	-13.6	PASS
2496.879808	-36.9	23.3	-13.6	PASS
2486.144231	-36.9	23.3	-13.6	PASS
2483.552885	-36.9	23.3	-13.6	PASS
2488.524038	-36.9	23.3	-13.6	PASS
2491.802885	-36.9	23.3	-13.6	PASS
2489.052885	-36.9	23.3	-13.6	PASS
2489.370192	-37.0	23.3	-13.6	PASS
2493.495192	-37.0	23.4	-13.6	PASS
2493.283654	-37.0	23.4	-13.6	PASS
2491.009615	-37.0	23.4	-13.6	PASS
2483.658654	-37.1	23.5	-13.6	PASS

Band Edge



— Limit — Sum Level × Fail

Plot #5

High channel / 2462 MHz

Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Result
2462.000000	PASS

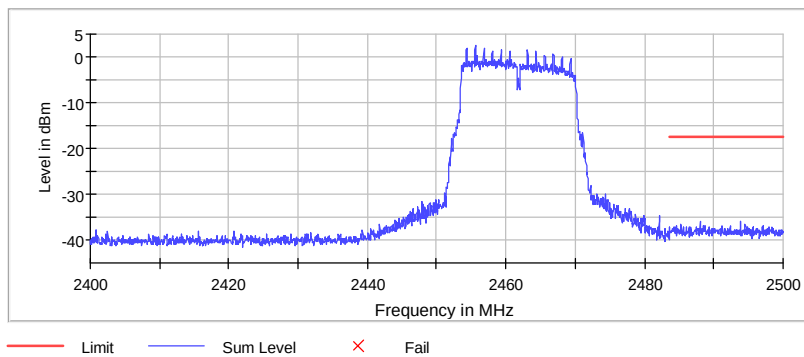
Inband Peak

Frequency (MHz)	Level (dBm)
2455.552059	2.4

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2487.995192	-35.9	18.3	-17.6	PASS
2493.865385	-36.0	18.4	-17.6	PASS
2494.552885	-36.5	18.8	-17.6	PASS
2485.298077	-36.7	19.1	-17.6	PASS
2491.221154	-36.8	19.2	-17.6	PASS
2492.331731	-36.9	19.2	-17.6	PASS
2488.524038	-37.0	19.3	-17.6	PASS
2484.557692	-37.0	19.4	-17.6	PASS
2497.144231	-37.0	19.4	-17.6	PASS
2488.682692	-37.0	19.4	-17.6	PASS
2485.668269	-37.0	19.4	-17.6	PASS
2498.413462	-37.1	19.5	-17.6	PASS
2496.985577	-37.1	19.5	-17.6	PASS
2486.461538	-37.1	19.5	-17.6	PASS
2489.317308	-37.2	19.5	-17.6	PASS

Band Edge



Plot #6

High channel / 2462 MHz

Mode of Operation: 802.11n HT20

Transmit Chain A

Result

DUT Frequency (MHz)	Result
2462.000000	PASS

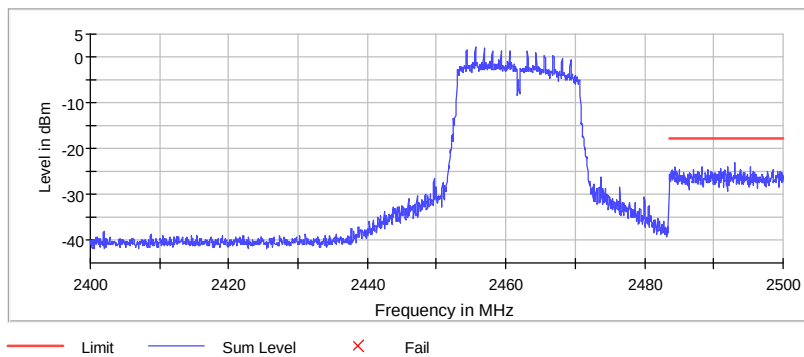
Inband Peak

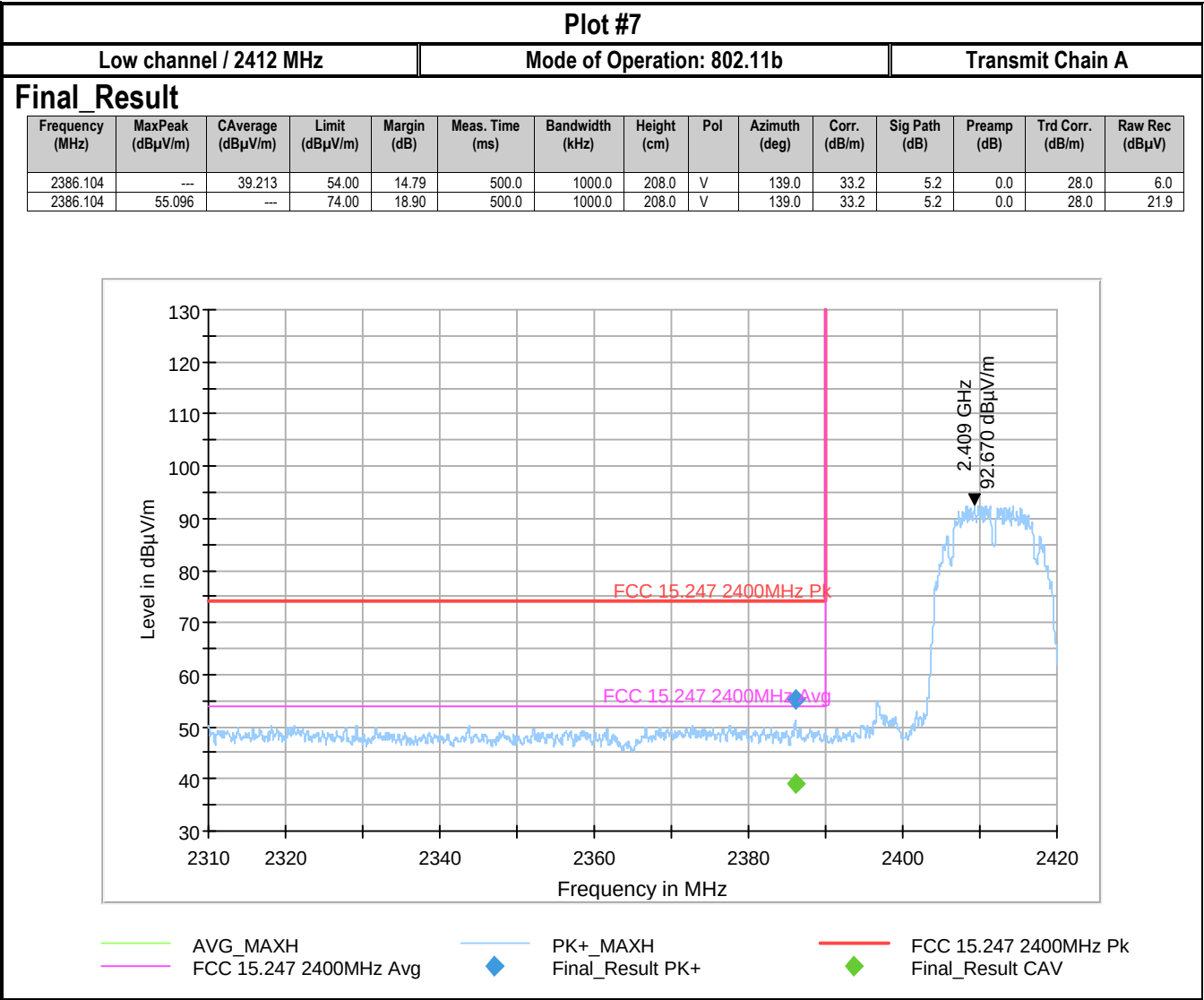
Frequency (MHz)	Level (dBm)
2455.552059	2.1

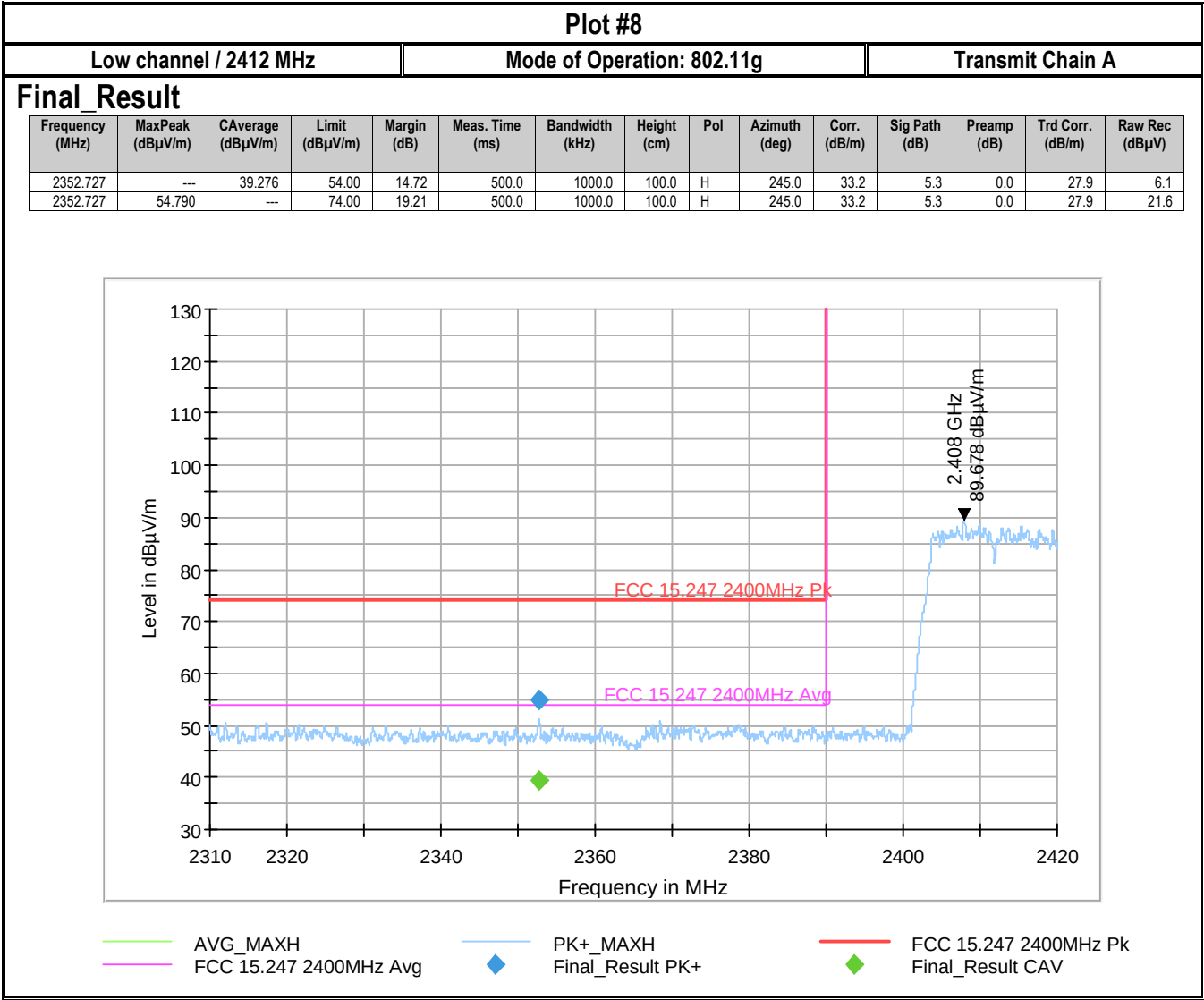
Measurements

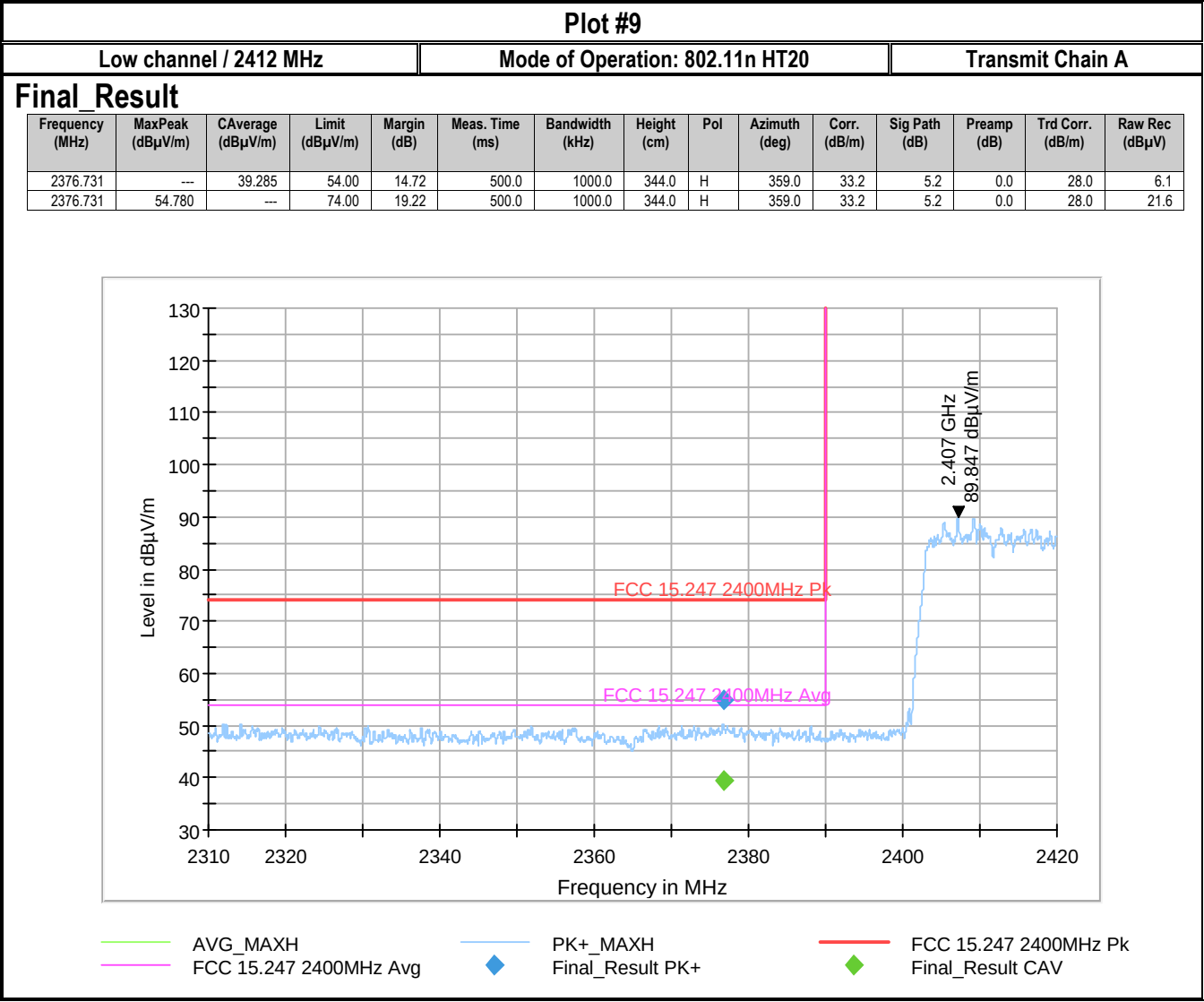
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2493.019231	-23.1	5.2	-17.9	PASS
2488.259615	-23.9	6.1	-17.9	PASS
2484.451923	-24.1	6.2	-17.9	PASS
2491.961538	-24.2	6.3	-17.9	PASS
2495.293269	-24.2	6.3	-17.9	PASS
2490.956731	-24.5	6.6	-17.9	PASS
2485.033654	-24.5	6.7	-17.9	PASS
2483.923077	-24.6	6.7	-17.9	PASS
2491.644231	-24.6	6.7	-17.9	PASS
2489.105769	-24.6	6.7	-17.9	PASS
2493.918269	-24.7	6.8	-17.9	PASS
2493.759615	-24.7	6.8	-17.9	PASS
2498.519231	-24.7	6.9	-17.9	PASS
2487.043269	-24.8	6.9	-17.9	PASS
2490.850962	-24.8	7.0	-17.9	PASS

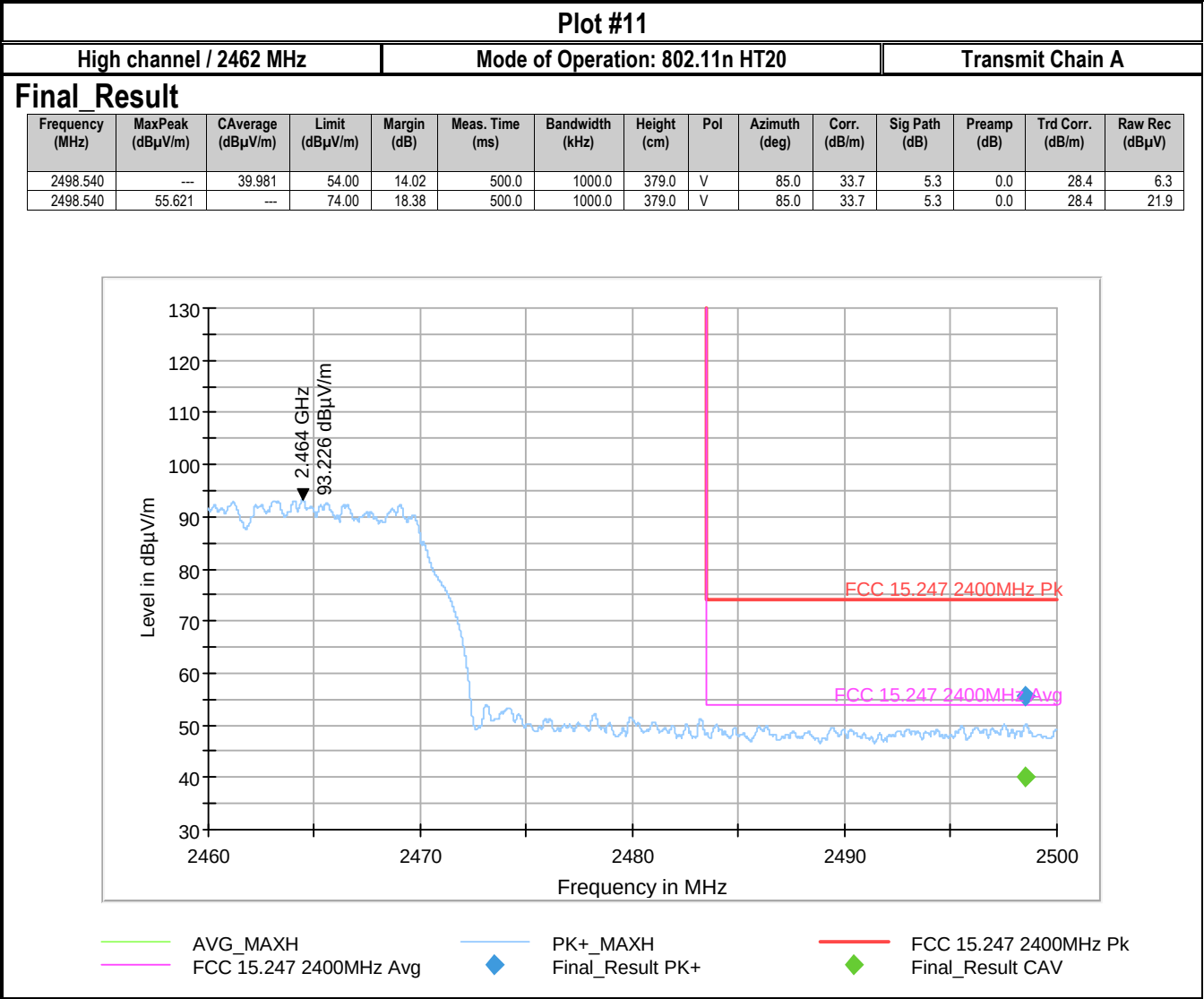
Band Edge

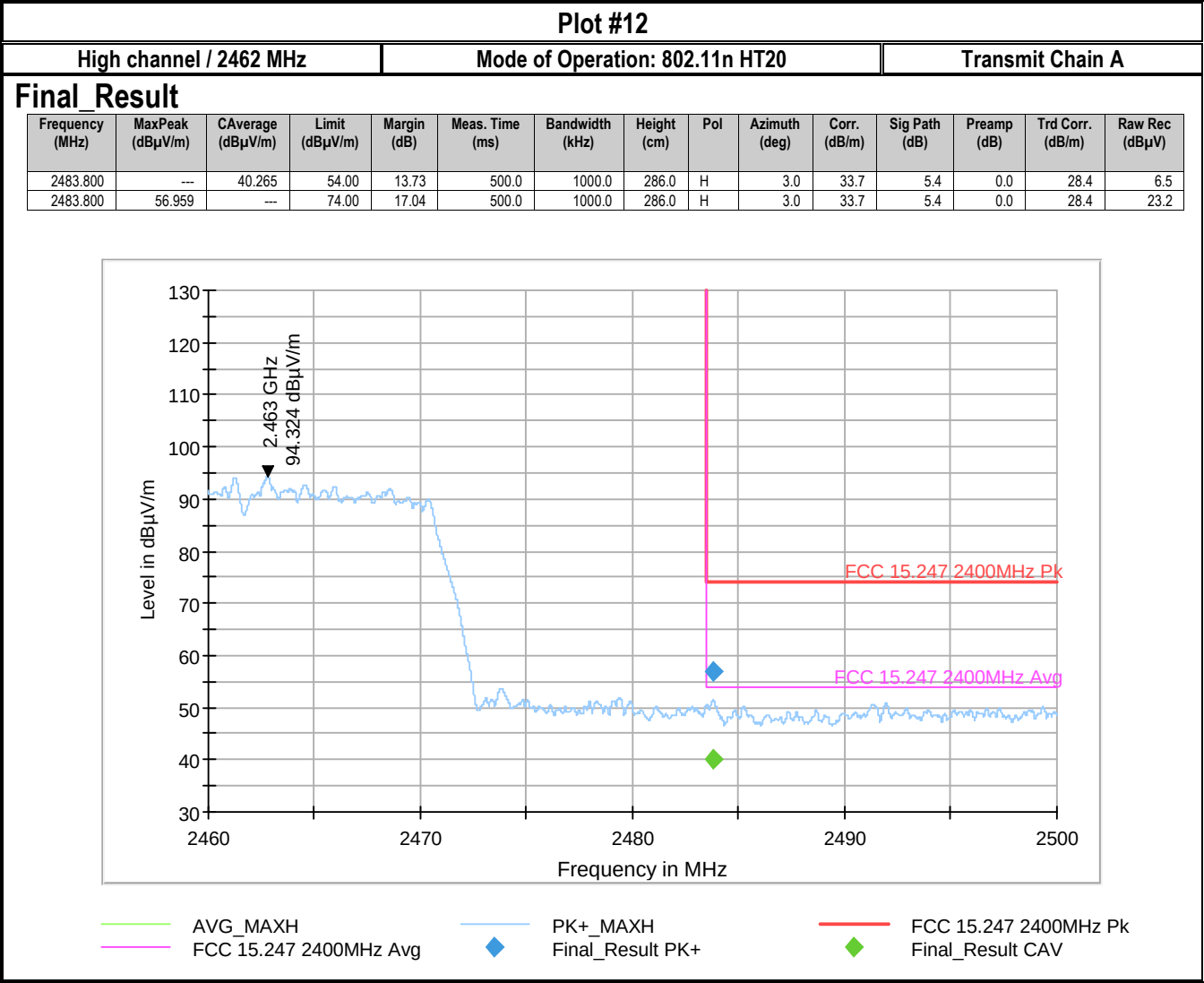












8.5 Emission Bandwidth 6dB and 99% Occupied Bandwidth

8.5.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02

Spectrum Analyzer settings:

6dB (DTS) Bandwidth:

- Set RBW = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep = Auto couple
- Allow the trace to stabilize
- 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.

99% Occupied Bandwidth:

- Set frequency = nominal EUT channel center frequency
- Set Span = 1.5 x to 5.0 x OBW
- Set RBW = 1% to 5% of OBW
- Set the video bandwidth (VBW) $\approx 3 \times$ RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep = Auto couple
- Allow the trace to stabilize
- Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth
- If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

8.5.2 Limits:

FCC §15.247(a)(2) and RSS-247 5.2(a)

- Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

8.5.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.3°C	1	802.11b,g,n	120 VAC	1 dBi

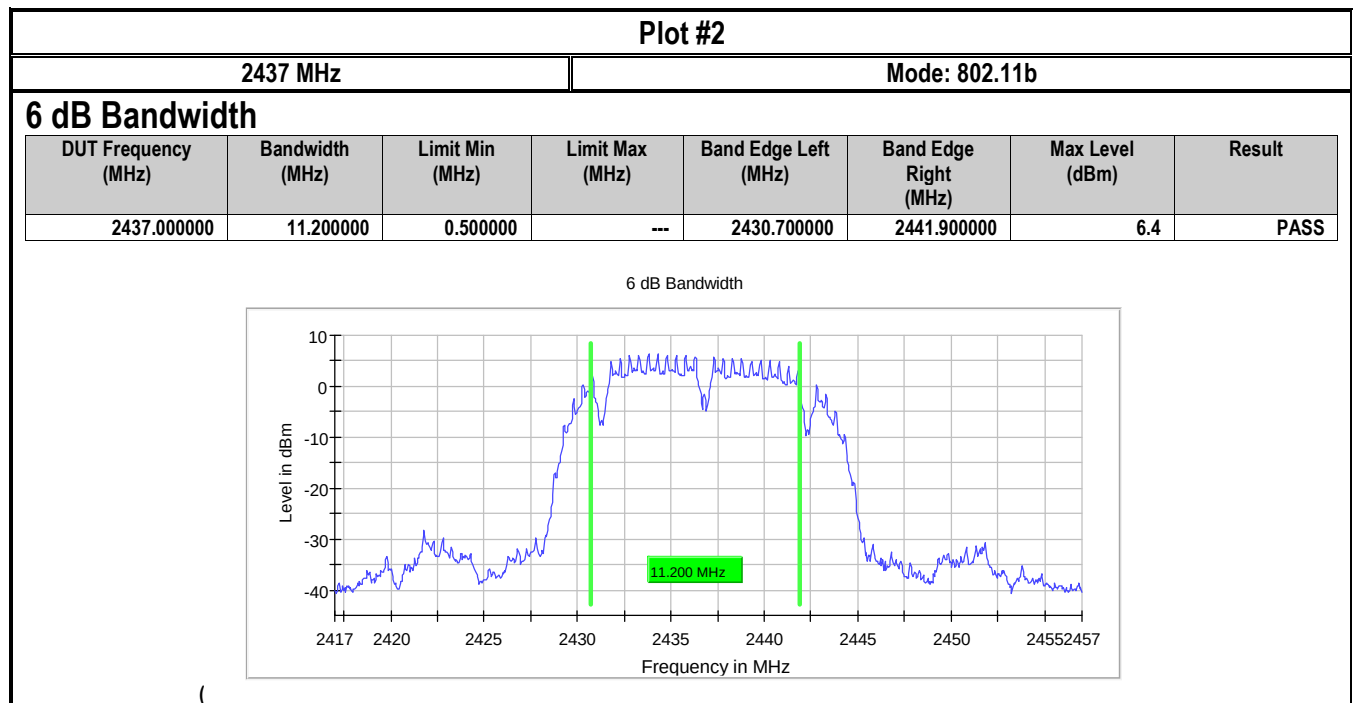
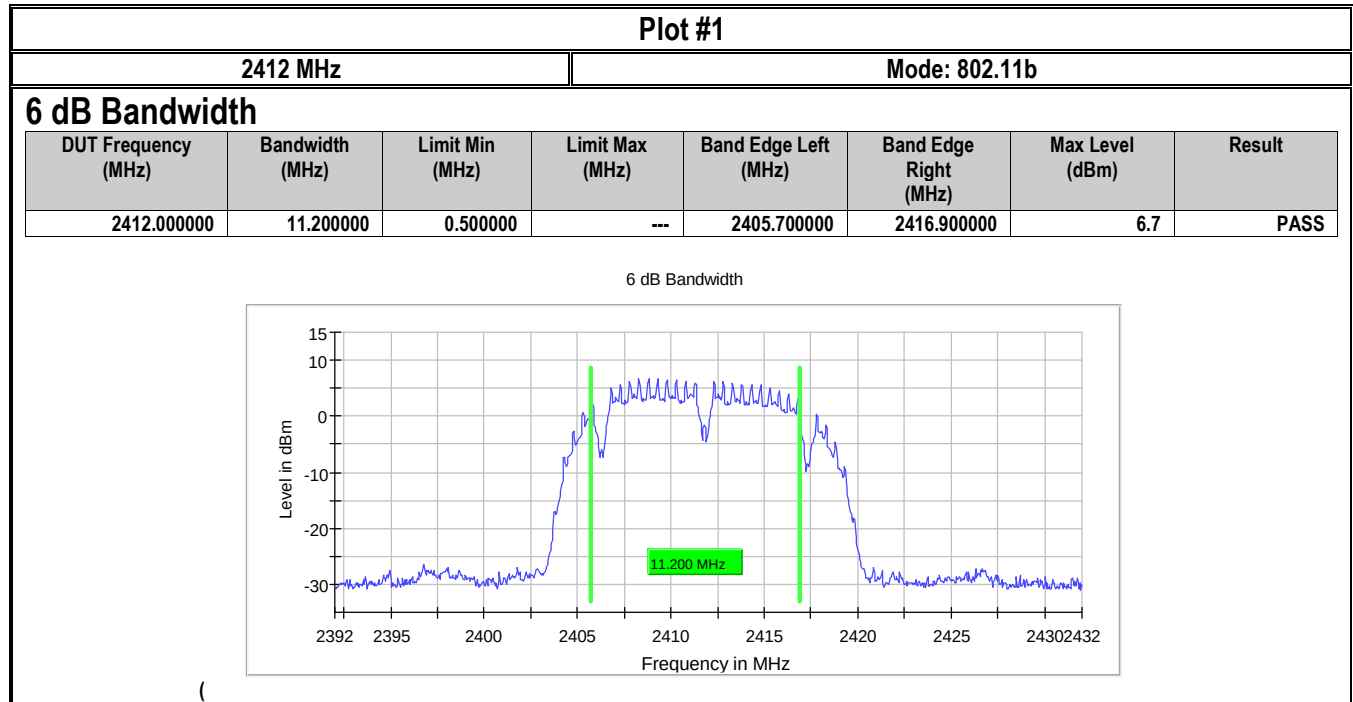
8.5.4 Measurement result:

Plot #	Frequency (MHz)	EUT Operating Mode	6dB Emission Bandwidth (MHz)	Limit (MHz)	Result
1	2412	802.11b	11.200	> 0.5	Pass
2	2437	802.11b	11.200	> 0.5	Pass
3	2462	802.11b	12.150	> 0.5	Pass
4	2412	802.11g	15.900	> 0.5	Pass
5	2437	802.11g	15.850	> 0.5	Pass
6	2462	802.11g	16.050	> 0.5	Pass
7	2412	802.11n HT20	16.500	> 0.5	Pass
8	2437	802.11n HT20	16.650	> 0.5	Pass
9	2462	802.11n HT20	16.750	> 0.5	Pass

Plot #	Frequency (MHz)	EUT Operating Mode	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
10	2412	802.11b	14.100	NA	Pass
11	2437	802.11b	14.100	NA	Pass
12	2462	802.11b	14.100	NA	Pass
13	2412	802.11g	16.800	NA	Pass
14	2437	802.11g	16.800	NA	Pass
15	2462	802.11g	16.900	NA	Pass
16	2412	802.11n HT20	17.900	NA	Pass
17	2437	802.11n HT20	17.900	NA	Pass
18	2462	802.11n HT20	17.900	NA	Pass

8.5.5 Measurement Plots:

6 dB Emission Bandwidth



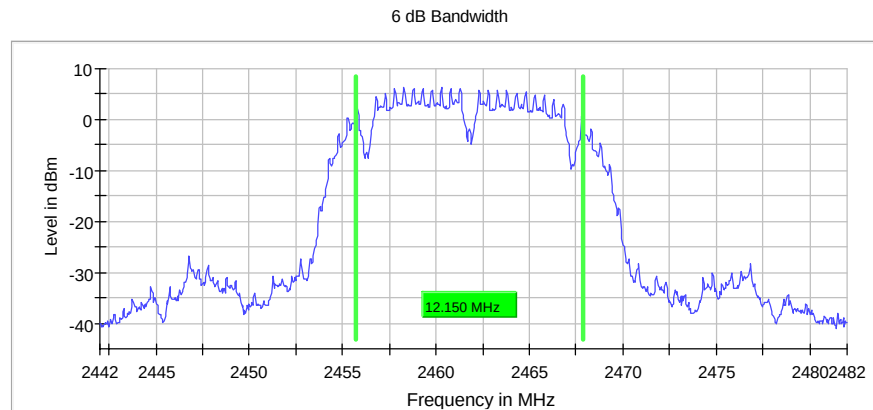
Plot #3

2462 MHz

Mode: 802.11b

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2462.000000	12.150000	0.500000	---	2455.700000	2467.850000	6.4	PASS



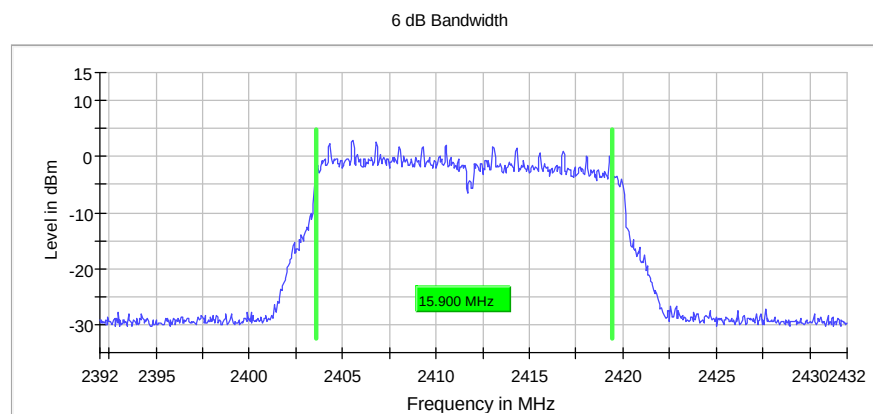
Plot #4

2412 MHz

Mode: 802.11g

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2412.000000	15.900000	0.500000	---	2403.550000	2419.450000	2.9	PASS



Plot #5

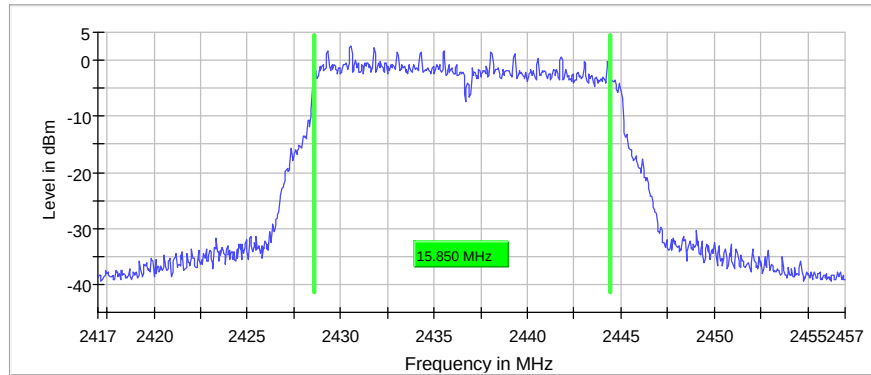
2437 MHz

Mode: 802.11g

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2437.000000	15.850000	0.500000	---	2428.550000	2444.400000	2.5	PASS

6 dB Bandwidth



Plot #6

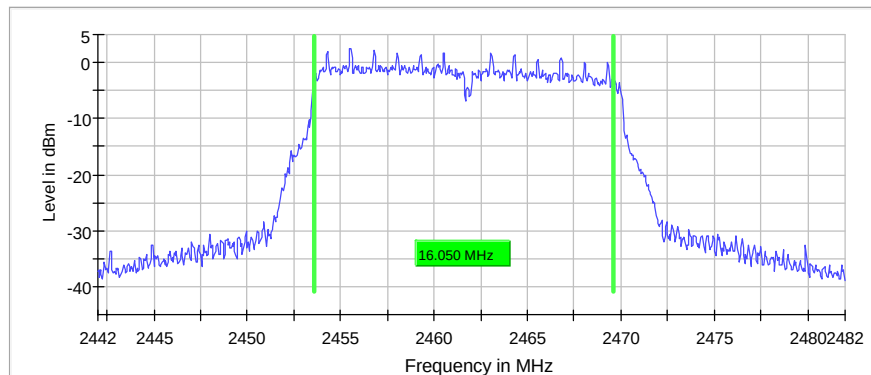
2462 MHz

Mode: 802.11g

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2462.000000	16.050000	0.500000	---	2453.550000	2469.600000	2.6	PASS

6 dB Bandwidth



Plot #7

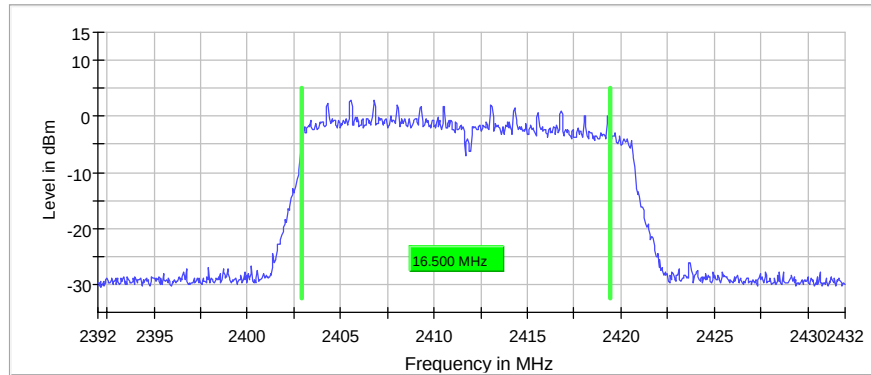
2412 MHz

Mode: 802.11n HT20

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2412.000000	16.500000	0.500000	---	2402.950000	2419.450000	3.0	PASS

6 dB Bandwidth



Plot #8

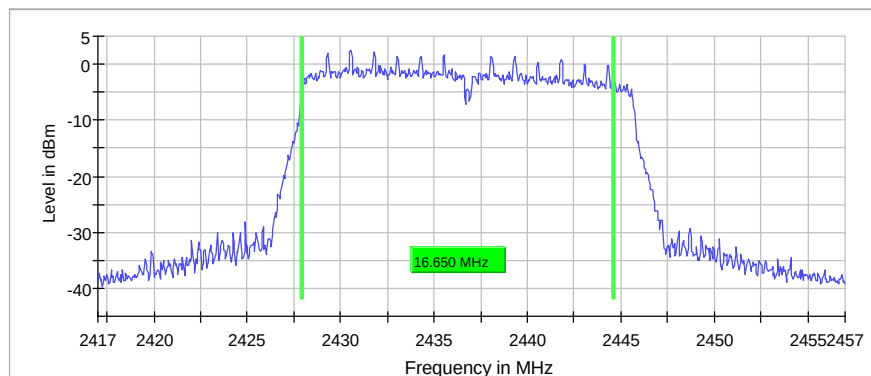
2437 MHz

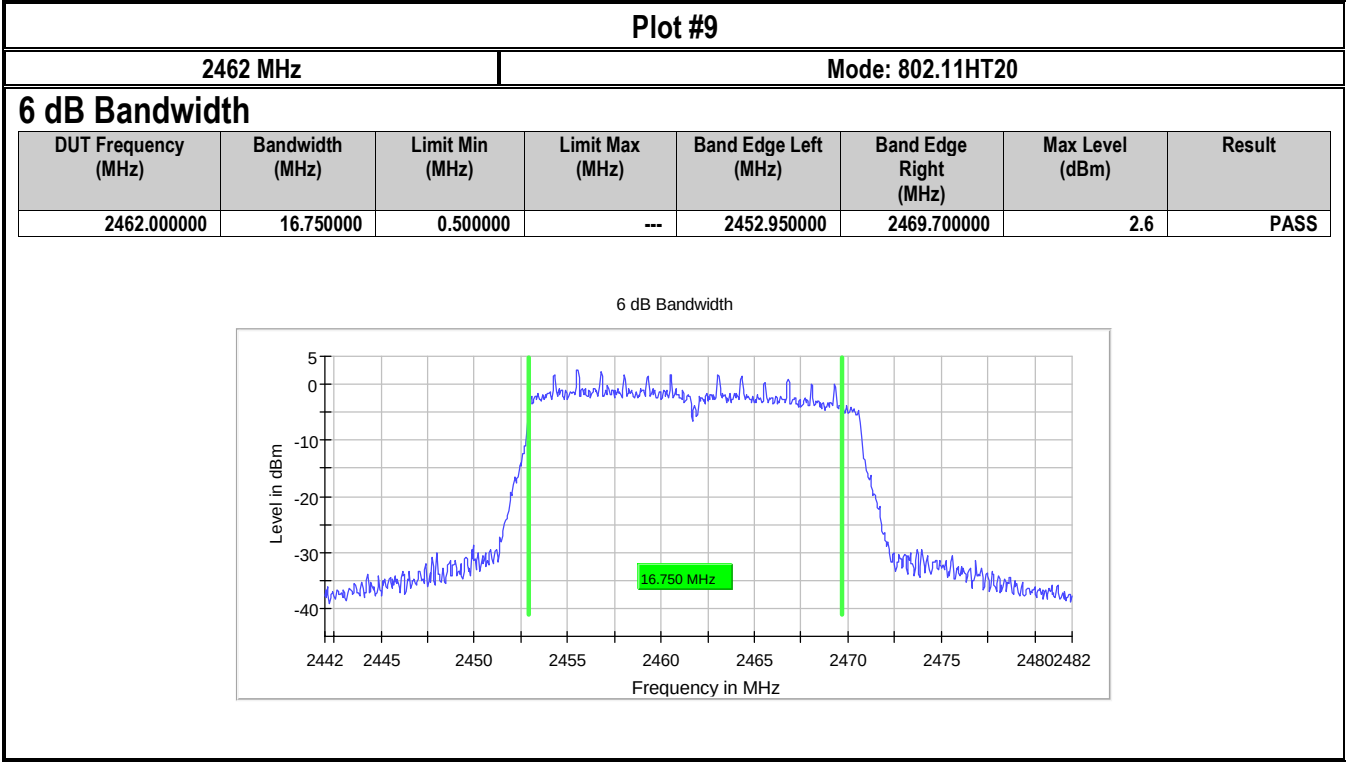
Mode: 802.11n HT20

6 dB Bandwidth

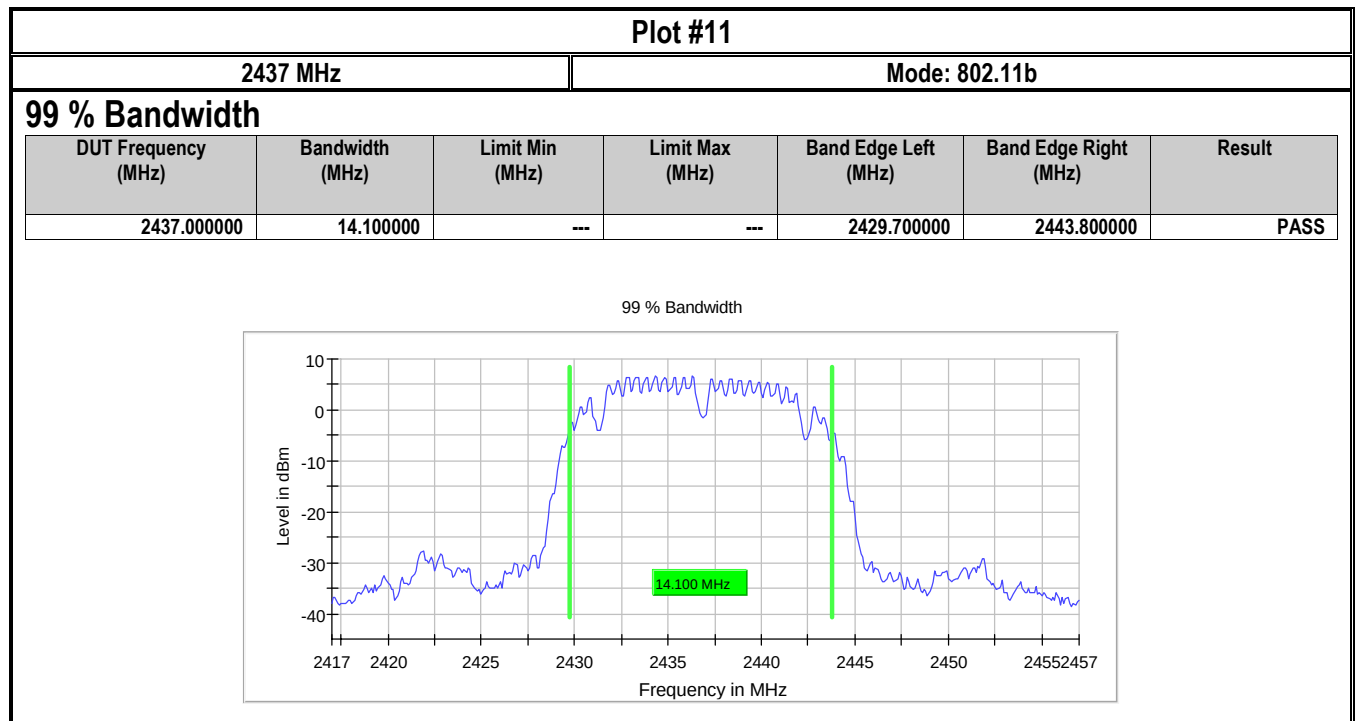
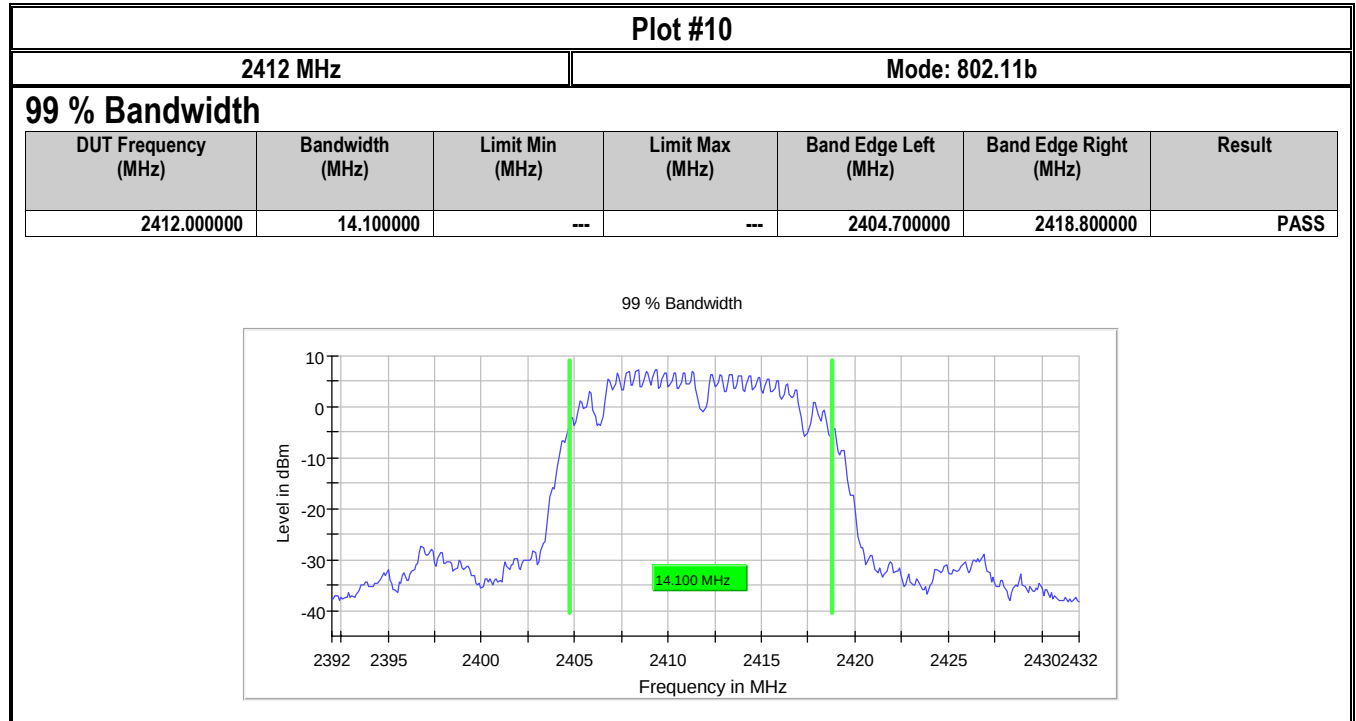
DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2437.000000	16.650000	0.500000	---	2427.950000	2444.600000	2.6	PASS

6 dB Bandwidth





99% Occupied Bandwidth



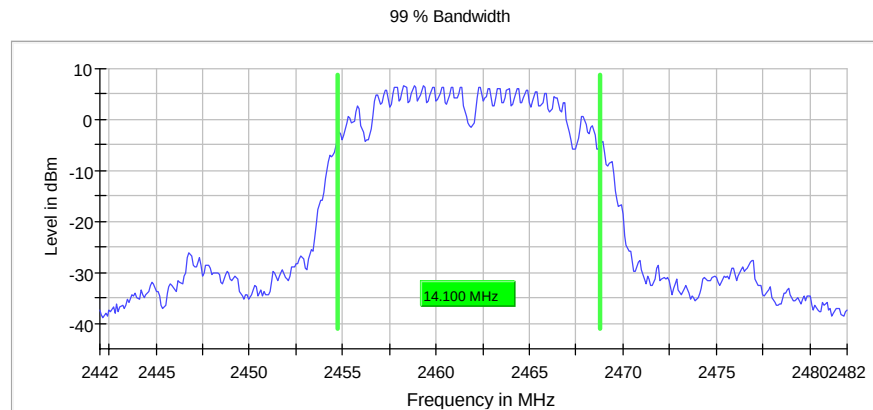
Plot #12

2462 MHz

Mode: 802.11b

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2462.000000	14.100000	---	---	2454.700000	2468.800000	PASS



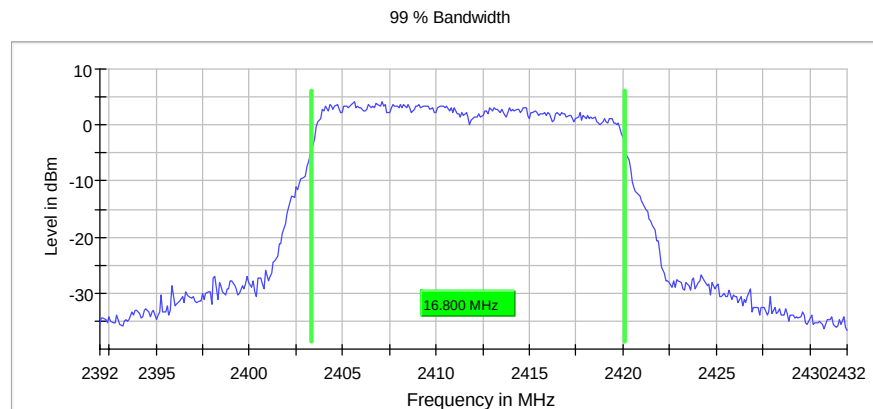
Plot #13

2412 MHz

Mode: 802.11g

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2412.000000	16.800000	---	---	2403.300000	2420.100000	PASS



Plot #14

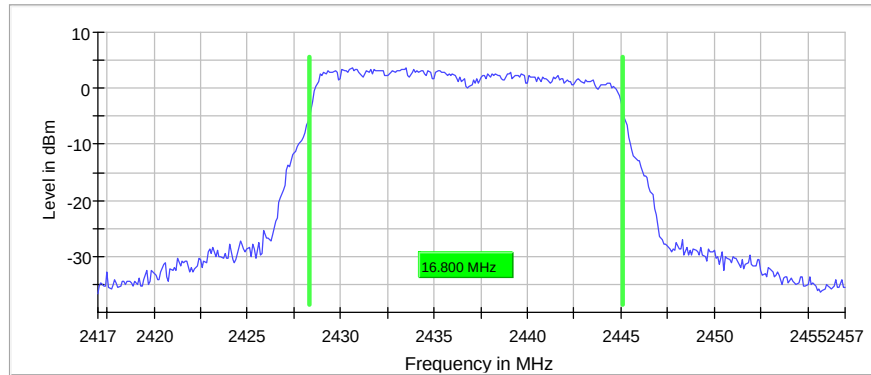
2437 MHz

Mode: 802.11g

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2437.000000	16.800000	---	---	2428.300000	2445.100000	PASS

99 % Bandwidth



Plot #15

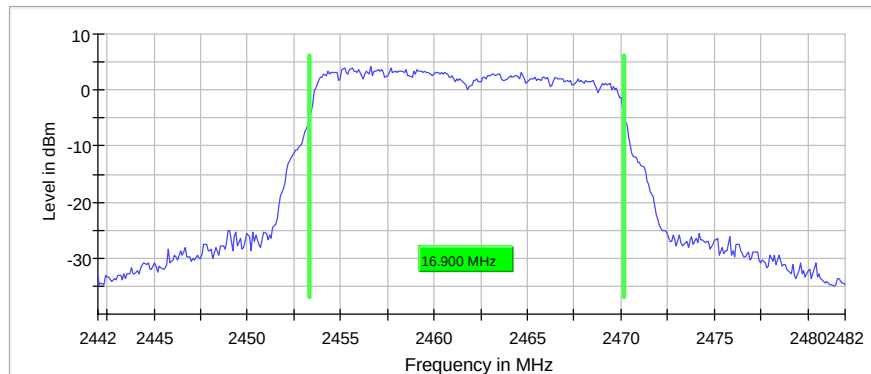
2462 MHz

Mode: 802.11g

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2462.000000	16.900000	---	---	2453.300000	2470.200000	PASS

99 % Bandwidth



Plot #16

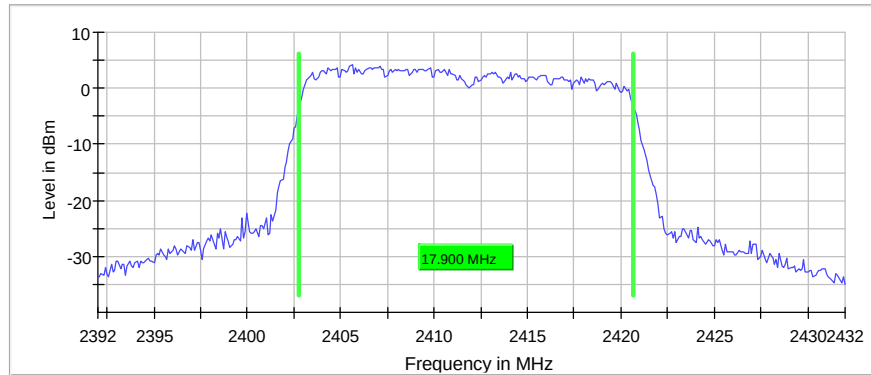
2412 MHz

Mode: 802.11n HT20

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2412.000000	17.900000	---	---	2402.800000	2420.700000	PASS

99 % Bandwidth



Plot #17

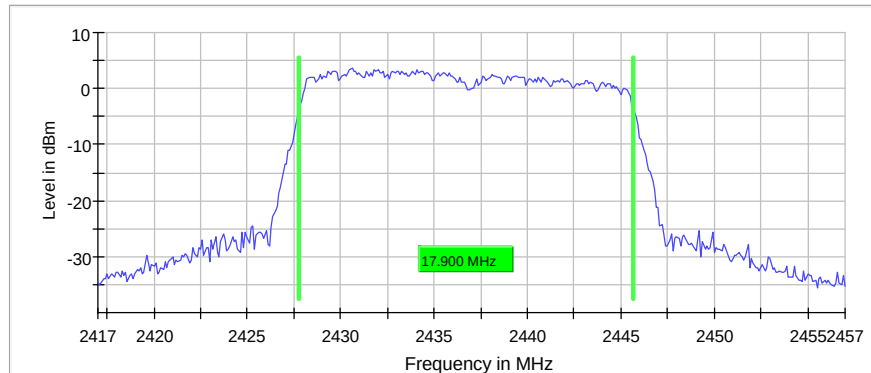
2437 MHz

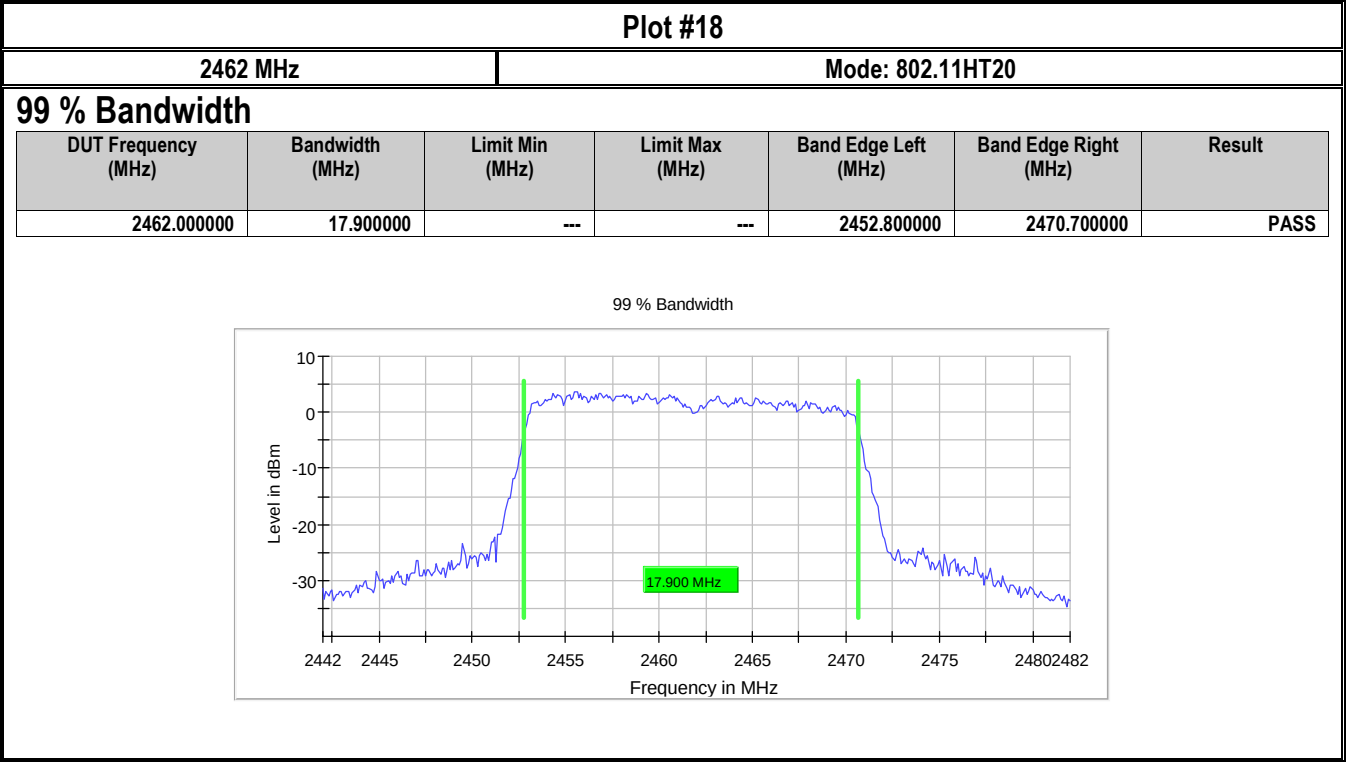
Mode: 802.11n HT20

99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2437.000000	17.900000	---	---	2427.800000	2445.700000	PASS

99 % Bandwidth





8.6 Radiated Transmitter Spurious Emissions and Restricted Bands

8.6.1 Measurement according to ANSI C63.10 (2020)

Spectrum Analyzer Settings:

- Frequency = 9 KHz – 30 MHz
- RBW = 9 KHz
- Detector: Peak

- Frequency = 30 MHz – 1 GHz
- Detector = Peak / Quasi-Peak
- RBW= 120 KHz (<1GHz)

- Frequency > 1 GHz
- Detector = Peak / Average
- RBW = 1 MHz

- Radiated spurious emissions shall be measured for the transmit frequencies, transmit power, and data rate for the lowest, middle and highest channel in each frequency band of operation and for the highest gain antenna for each antenna type, and using the appropriate parameters and test requirements.
- The highest (or worst-case) data rate shall be recorded for each measurement.
- For testing frequencies below 30 MHz at distance other than the specified in the standard, the limit conversion is calculated by using the FCC materials for the ANSI 63 committee issued on January, 27 1991.

8.6.2 Limits:

FCC §15.247

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

FCC §15.209 & RSS-Gen 8.9

- Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field strength (μV/m)	Measurement Distance (m)	Field strength @ 3m (dBμV/m)	Field strength @ 1m (dBμV/m)
0.009–0.490	2400/F(kHz) / -----	300	-	-
0.490–1.705	24000/F(kHz) / -----	30	-	-
1.705–30.0	30 / (29.5)	30	-	-
30–88	100	3	40 dBμV/m	-
88–216	150	3	43.5 dBμV/m	-
216–960	200	3	46 dBμV/m	-
Above 960	500	3	54 dBμV/m	63.5 dBμV/m

Note: Field strength conversion = $54 \text{ dB}\mu\text{V/m} + 20 \cdot \text{Log}(3\text{m}/1\text{m}) = 63.5 \text{ dB}\mu\text{V/m}$.

FCC §15.205 & RSS-Gen 8.10

- Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
 - *PEAK LIMIT= 74 dBμV/m at 3 m
 - *AVG. LIMIT= 54 dBμV/m at 3 m
 - *PEAK LIMIT= 83.5 dBμV/m at 1 m
 - *AVG. LIMIT= 63.5 dBμV/m at 1 m

8.6.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
23.0° C	2	802.11b	120 VAC

8.6.4 Measurement result:

Plot #	Channel #	Scan Frequency	Limit	Result
1-5	Low	9 kHz – 26 GHz	See section 8.6.2	Pass
6-10	Mid	9 kHz – 26 GHz	See section 8.6.2	Pass
11-15	High	9 kHz – 26 GHz	See section 8.6.2	Pass

8.6.5 Measurement Plots:

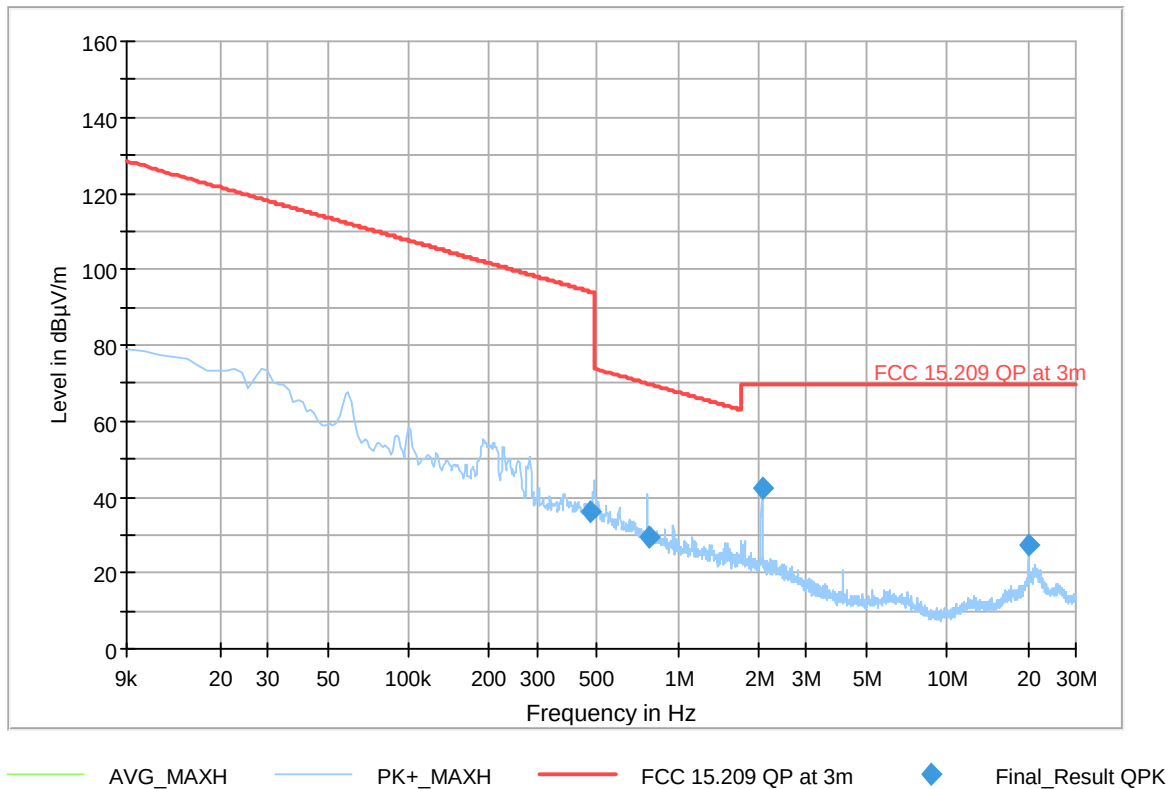
Plot # 1 Radiated Emissions: 9kHz - 30 MHz

Tx Frequency: 2412 MHz

802.11b

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
0.476	36.318	94.05	57.73	500.0	9.0	100.0	V	-17.0	25.1	0.2	-28.7	53.6	11.2
0.786	29.662	69.71	40.05	500.0	9.0	100.0	H	94.0	20.7	0.2	-28.7	49.2	9.0
2.060	42.194	69.50	27.31	500.0	9.0	100.0	V	242.0	13.1	0.3	-28.7	41.6	29.1
19.998	27.437	69.50	42.06	500.0	9.0	100.0	V	47.0	5.6	0.5	-28.9	34.1	21.9



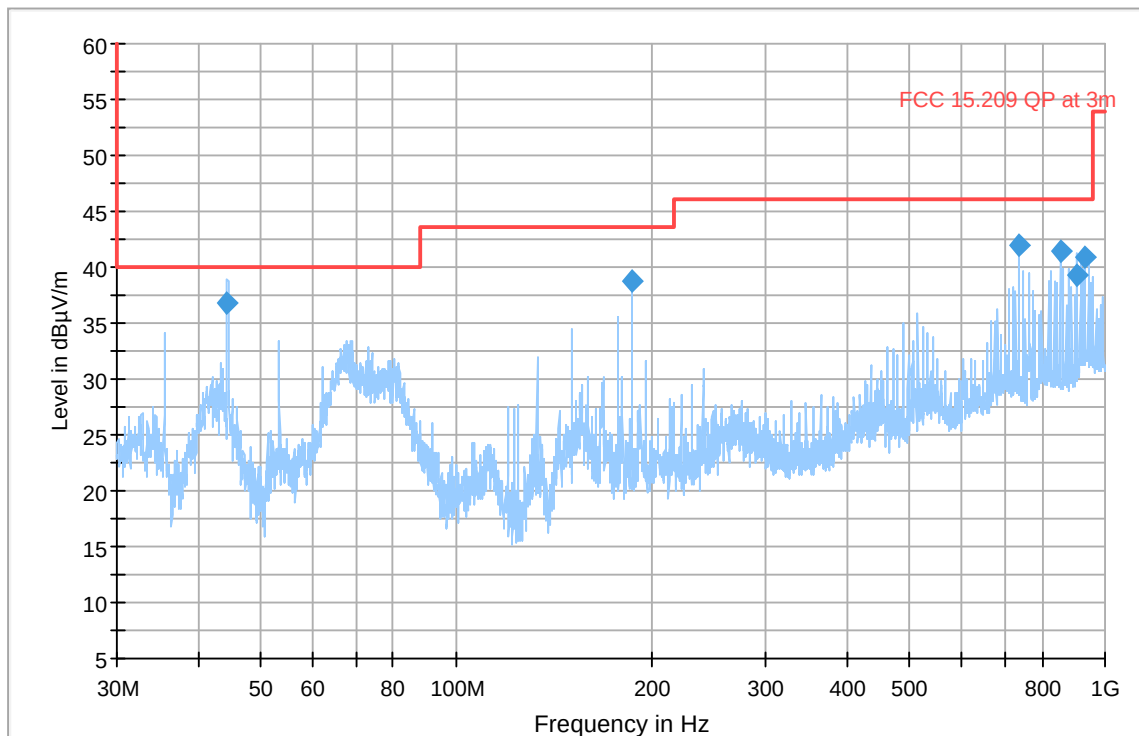
Plot # 2 Radiated Emissions: 30 MHz – 1 GHz

Tx Frequency: 2412 MHz

802.11b

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
44.429	36.85	---	40.00	3.15	500.0	120.0	123.0	V	31.0	-20.2	
186.655	38.83	---	43.50	4.67	500.0	120.0	100.0	V	206.0	-17.9	
737.736	41.88	---	46.02	4.14	500.0	120.0	112.0	H	333.0	-3.1	
853.263	41.43	---	46.02	4.59	500.0	120.0	100.0	H	234.0	-2.8	
906.613	39.27	---	46.02	6.75	500.0	120.0	100.0	V	264.0	-2.0	
933.264	40.89	---	46.02	5.13	500.0	120.0	100.0	H	-1.0	-0.6	



Preview Result 1-PK+ FCC 15.209 QP at 3m Final_Result QPK

Plot # 3 Radiated Emissions: 1 – 3 GHz

Tx Frequency: 2412 MHz

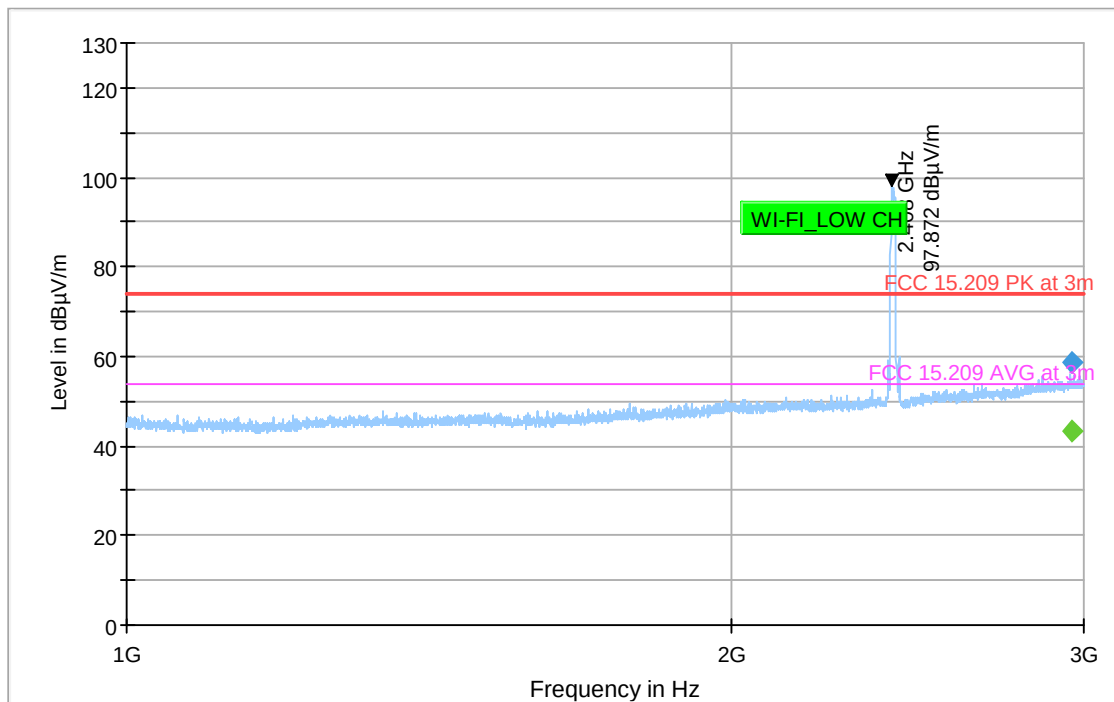
802.11b

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
2956.513	---	43.448	53.98	10.53	500.0	1000.0	151.0	V	308.0	35.6	5.9	0.0	29.7
2956.513	58.515	---	73.98	15.46	500.0	1000.0	151.0	V	308.0	35.6	5.9	0.0	29.7

(continuation of the "Final_Result" table from column 19 ...)

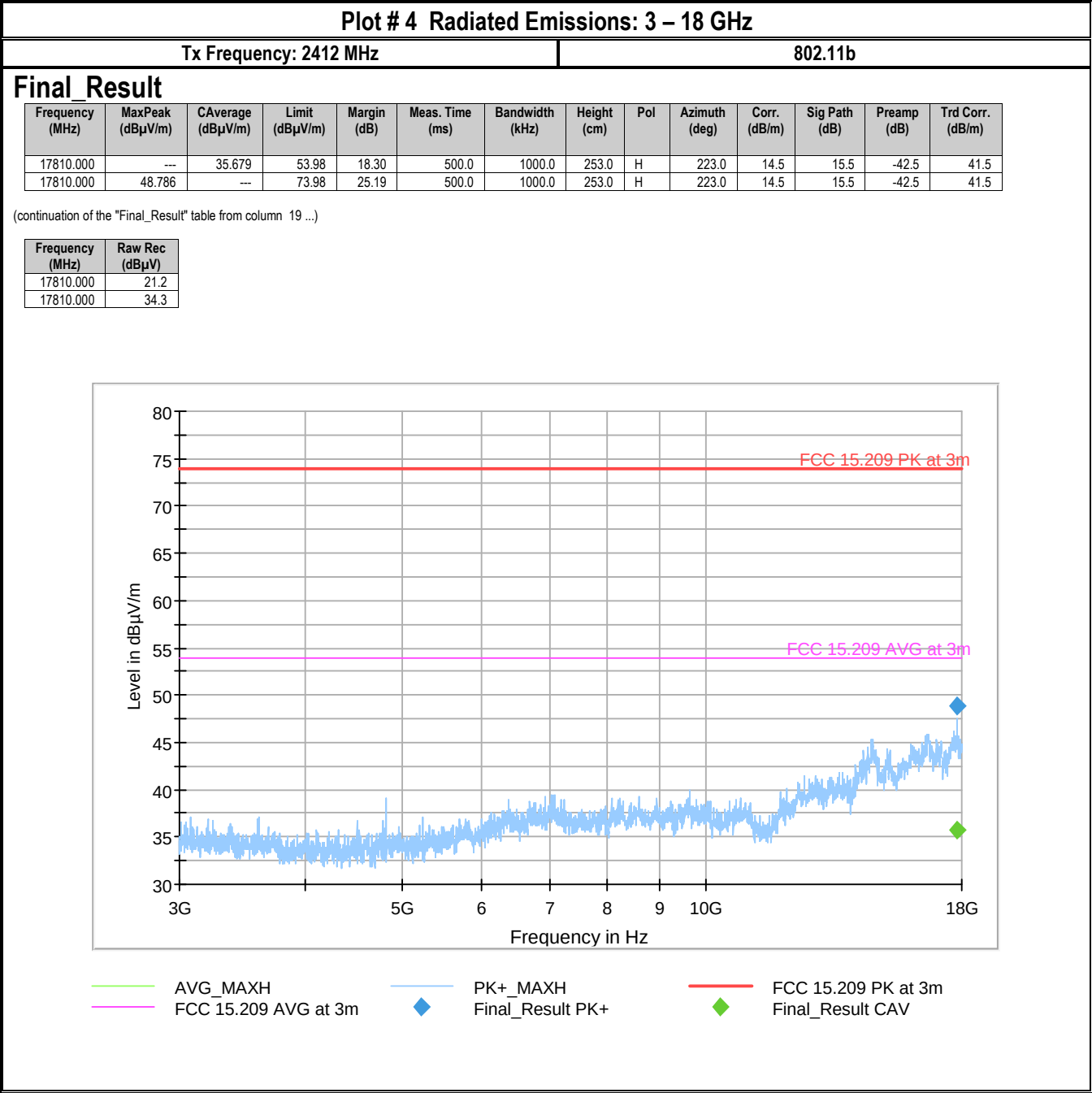
Frequency (MHz)	Raw Rec (dBμV)
2956.513	7.9
2956.513	23.0



AVG_MAXH
 FCC 15.209 AVG at 3m

PK+_MAXH
 Final_Result PK+

FCC 15.209 PK at 3m
 Final_Result CAV



Plot # 5 Radiated Emissions: 18GHz - 26 GHz

Tx Frequency: 2412 MHz

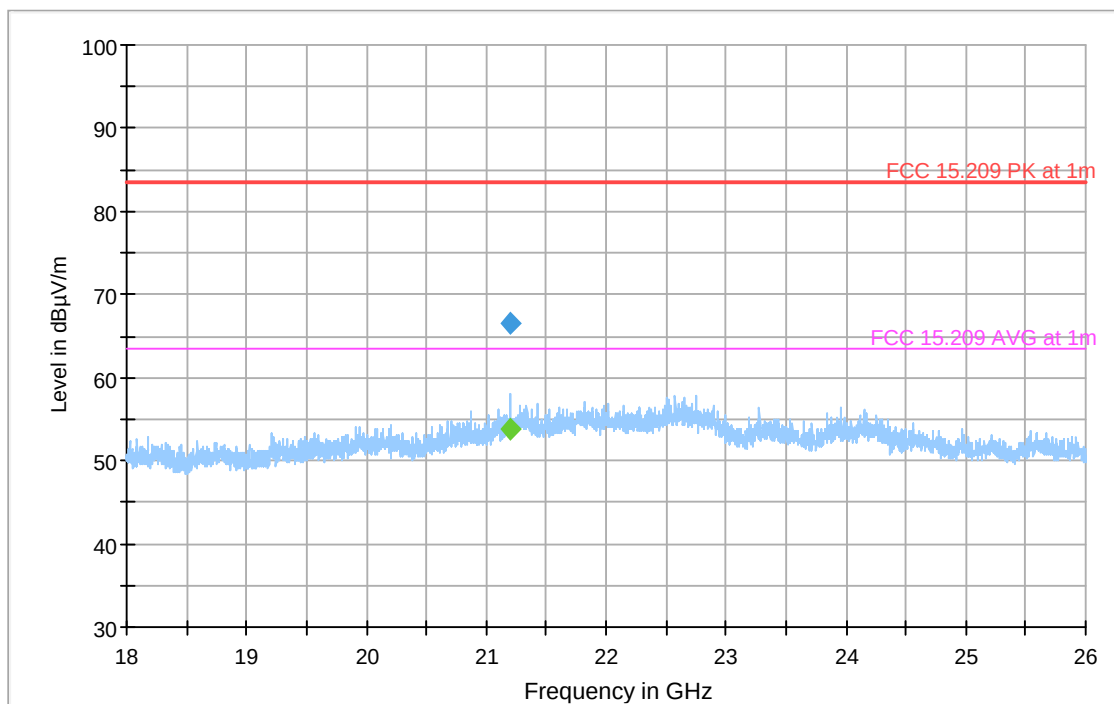
802.11b

Final_Result

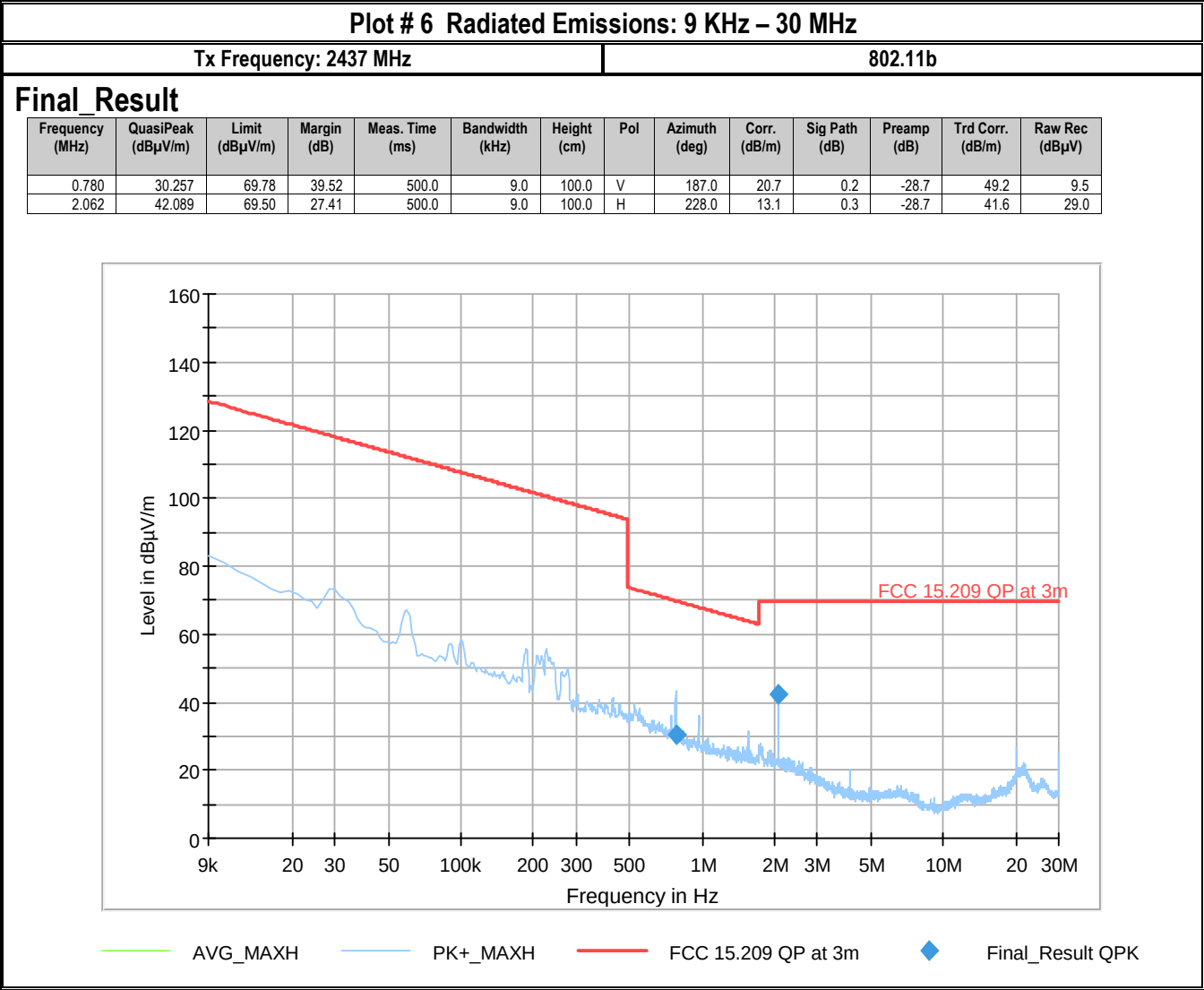
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
21200.500	---	53.899	63.50	9.60	500.0	1000.0	325.0	V	319.0	18.6	9.3	0.0	9.3
21200.500	66.489	---	83.50	17.01	500.0	1000.0	325.0	V	319.0	18.6	9.3	0.0	9.3

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBµV)
21200.500	35.3
21200.500	47.9



AVG_MAXH PK+_MAXH FCC 15.209 PK at 1m
FCC 15.209 AVG at 1m Final_Result PK+ Final_Result CAV



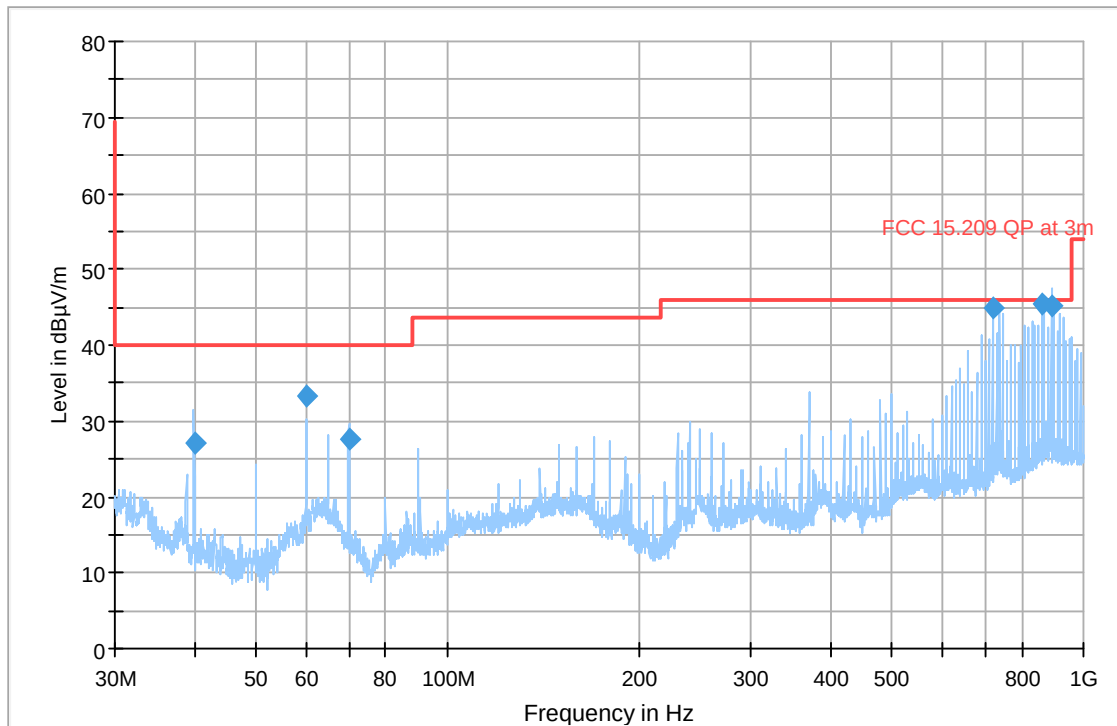
Plot # 7 Radiated Emissions: 30 MHz – 1 GHz

Tx Frequency: 2437 MHz

802.11b

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
39.992	27.058	40.00	12.94	500.0	120.0	100.0	V	81.0	-16.3	-34.9	0.0	18.6	43.4
59.994	33.253	40.00	6.75	500.0	120.0	100.0	V	326.0	-22.9	-34.8	0.0	11.9	56.2
69.989	27.498	40.00	12.50	500.0	120.0	134.0	V	35.0	-23.1	-34.8	0.0	11.7	50.6
719.937	44.829	46.02	1.19	500.0	120.0	107.0	H	124.0	-5.9	-32.5	0.0	26.6	50.7
859.927	45.499	46.02	0.52	500.0	120.0	100.0	H	74.0	-3.4	-32.0	0.0	28.6	48.9
889.923	45.040	46.02	0.98	500.0	120.0	100.0	H	70.0	-3.2	-32.0	0.0	28.8	48.2



AVG_MAXH PK+_MAXH FCC 15.209 QP at 3m Final_Result QPK

Plot # 8 Radiated Emissions: 1 – 3 GHz

Tx Frequency: 2437 MHz

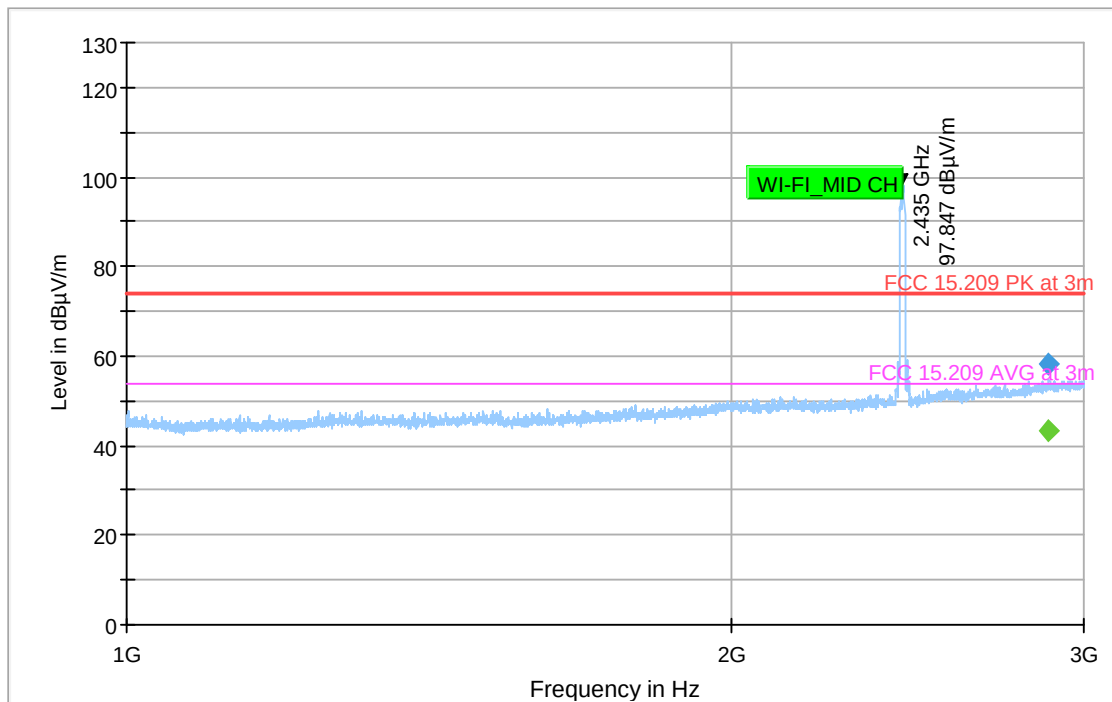
802.11b

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
2884.184	---	43.348	53.98	10.63	500.0	1000.0	265.0	V	182.0	35.2	6.0	0.0	29.3
2884.184	58.365	---	73.98	15.61	500.0	1000.0	265.0	V	182.0	35.2	6.0	0.0	29.3

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
2884.184	8.1
2884.184	23.1



AVG_MAXH
FCC 15.209 AVG at 3m

PK+_MAXH
Final_Result PK+

FCC 15.209 PK at 3m
Final_Result CAV

Plot # 9 Radiated Emissions: 3 – 18 GHz

Tx Frequency: 2437 MHz

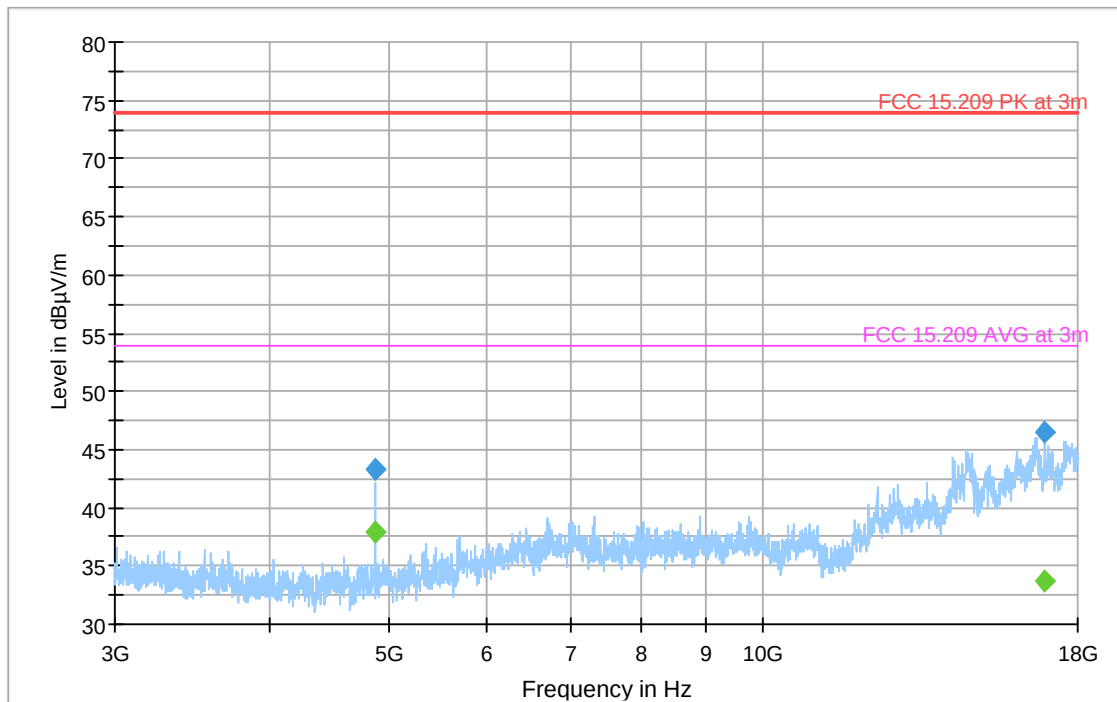
802.11b

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
4873.580	---	37.947	53.98	16.03	500.0	1000.0	116.0	H	178.0	-4.7	7.0	-45.9	34.1
4873.580	43.332	---	73.98	30.65	500.0	1000.0	116.0	H	178.0	-4.7	7.0	-45.9	34.1
16945.500	---	33.739	53.98	20.24	500.0	1000.0	215.0	V	207.0	11.6	14.9	-44.5	41.2
16945.500	46.417	---	73.98	27.56	500.0	1000.0	215.0	V	207.0	11.6	14.9	-44.5	41.2

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBµV)
4873.580	42.7
4873.580	48.1
16945.500	22.1
16945.500	34.8



AVG_MAXH
FCC 15.209 AVG at 3m

PK+_MAXH
Final_Result PK+

FCC 15.209 PK at 3m
Final_Result CAV

Plot # 10 Radiated Emissions: 18 – 26 GHz

Tx Frequency: 2437 MHz

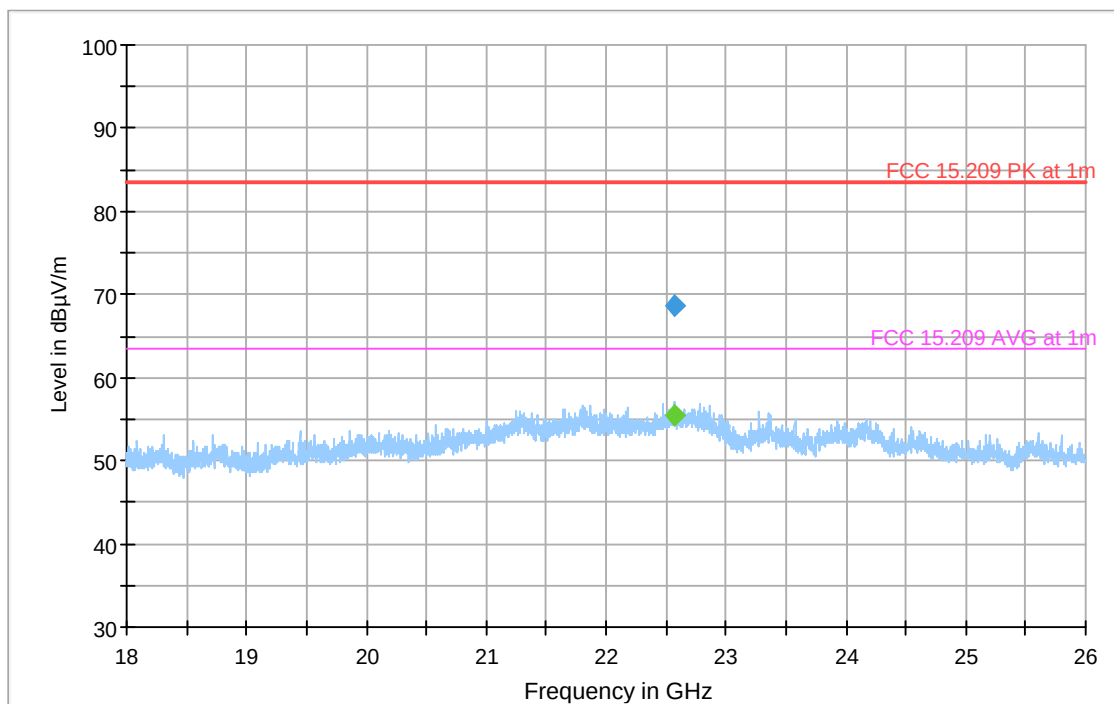
802.11b

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
22573.000	---	55.563	63.50	7.94	500.0	1000.0	100.0	V	228.0	20.2	9.8	0.0	10.4
22573.000	68.542	---	83.50	14.96	500.0	1000.0	100.0	V	228.0	20.2	9.8	0.0	10.4

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
22573.000	35.4
22573.000	48.4



— AVG_MAXH
 — PK+_MAXH
 — FCC 15.209 PK at 1m
— FCC 15.209 AVG at 1m
 ◆ Final_Result PK+
 ◆ Final_Result CAV

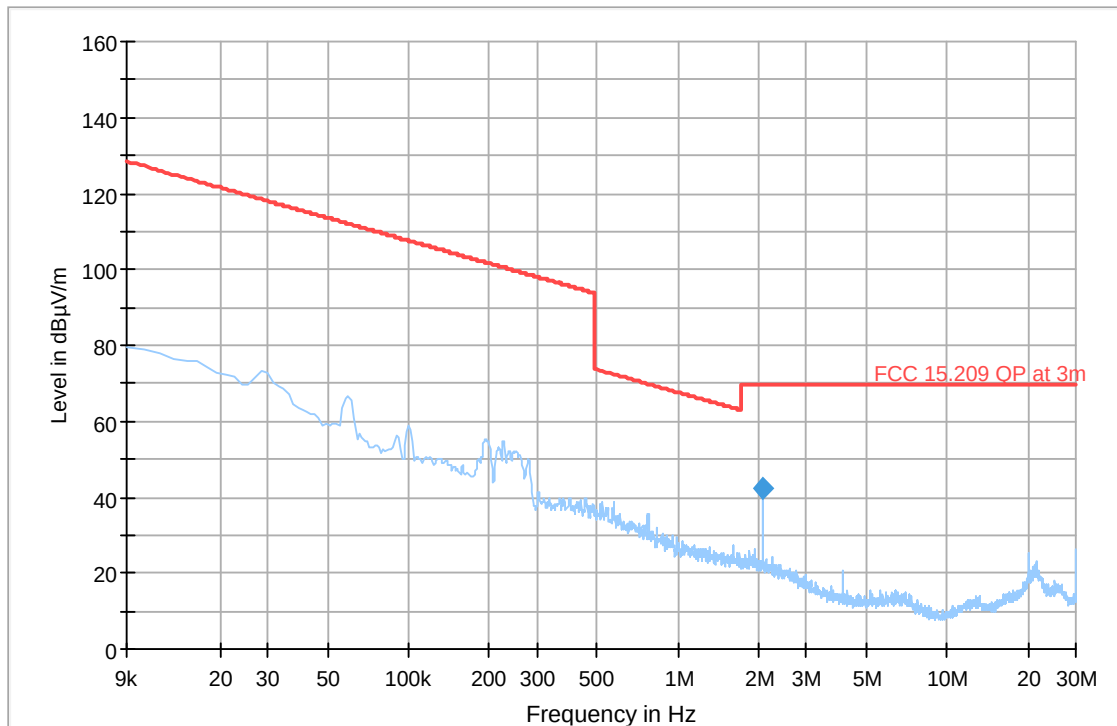
Plot # 11 Radiated Emissions: 9 KHz – 30 MHz

Tx Frequency: 2462 MHz

802.11b

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
2.066	42.173	69.50	27.33	500.0	9.0	100.0	V	355.0	13.1	0.3	-28.7	41.6	29.1



— AVG_MAXH — PK+_MAXH — FCC 15.209 QP at 3m ◆ Final Result QPK

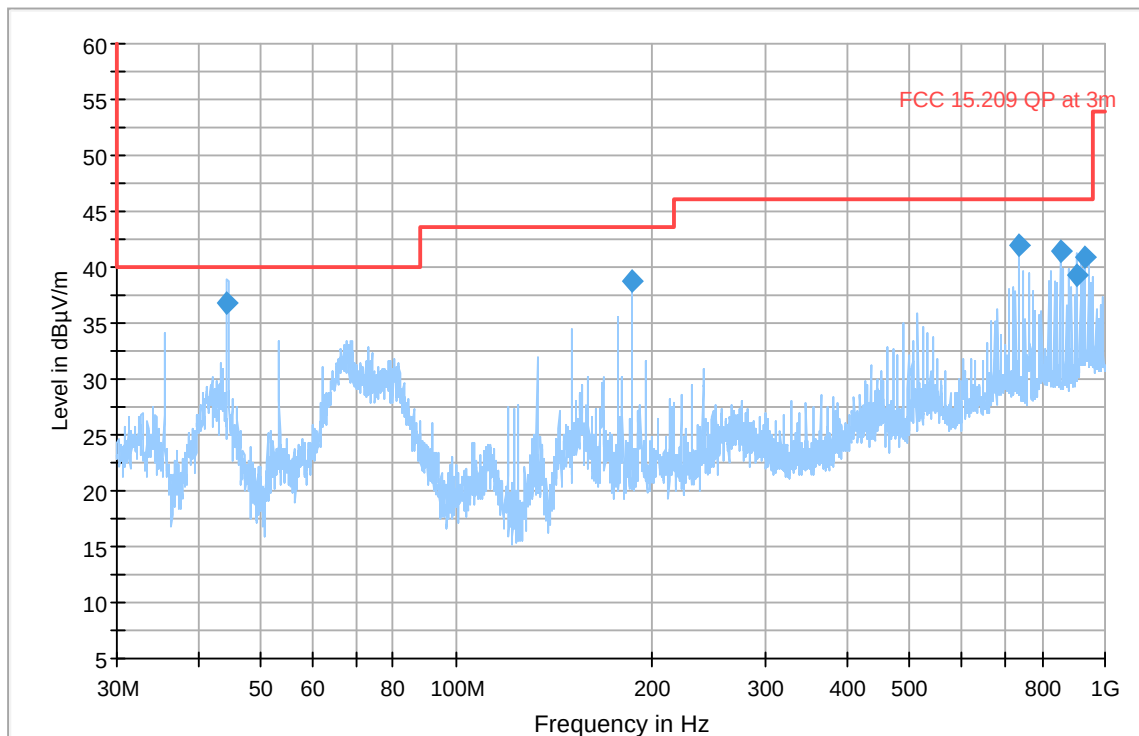
Plot # 12 Radiated Emissions: 30 MHz – 1 GHz

Tx Frequency: 2462 MHz

802.11b

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
44.429	36.85	---	40.00	3.15	500.0	120.0	123.0	V	31.0	-20.2	
186.655	38.83	---	43.50	4.67	500.0	120.0	100.0	V	206.0	-17.9	
737.736	41.88	---	46.02	4.14	500.0	120.0	112.0	H	333.0	-3.1	
853.263	41.43	---	46.02	4.59	500.0	120.0	100.0	H	234.0	-2.8	
906.613	39.27	---	46.02	6.75	500.0	120.0	100.0	V	264.0	-2.0	
933.264	40.89	---	46.02	5.13	500.0	120.0	100.0	H	-1.0	-0.6	



Preview Result 1-PK+ FCC 15.209 QP at 3m Final_Result QPK

Plot # 13 Radiated Emissions: 1 – 3 GHz

Tx Frequency: 2462 MHz

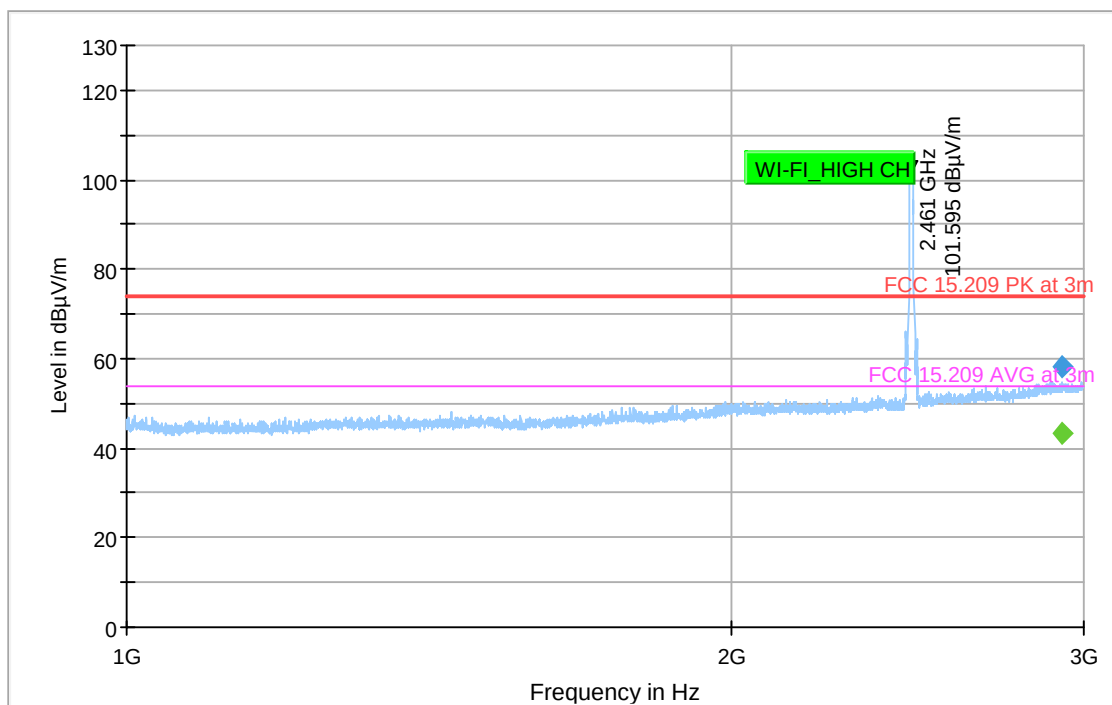
802.11b

Final_Result

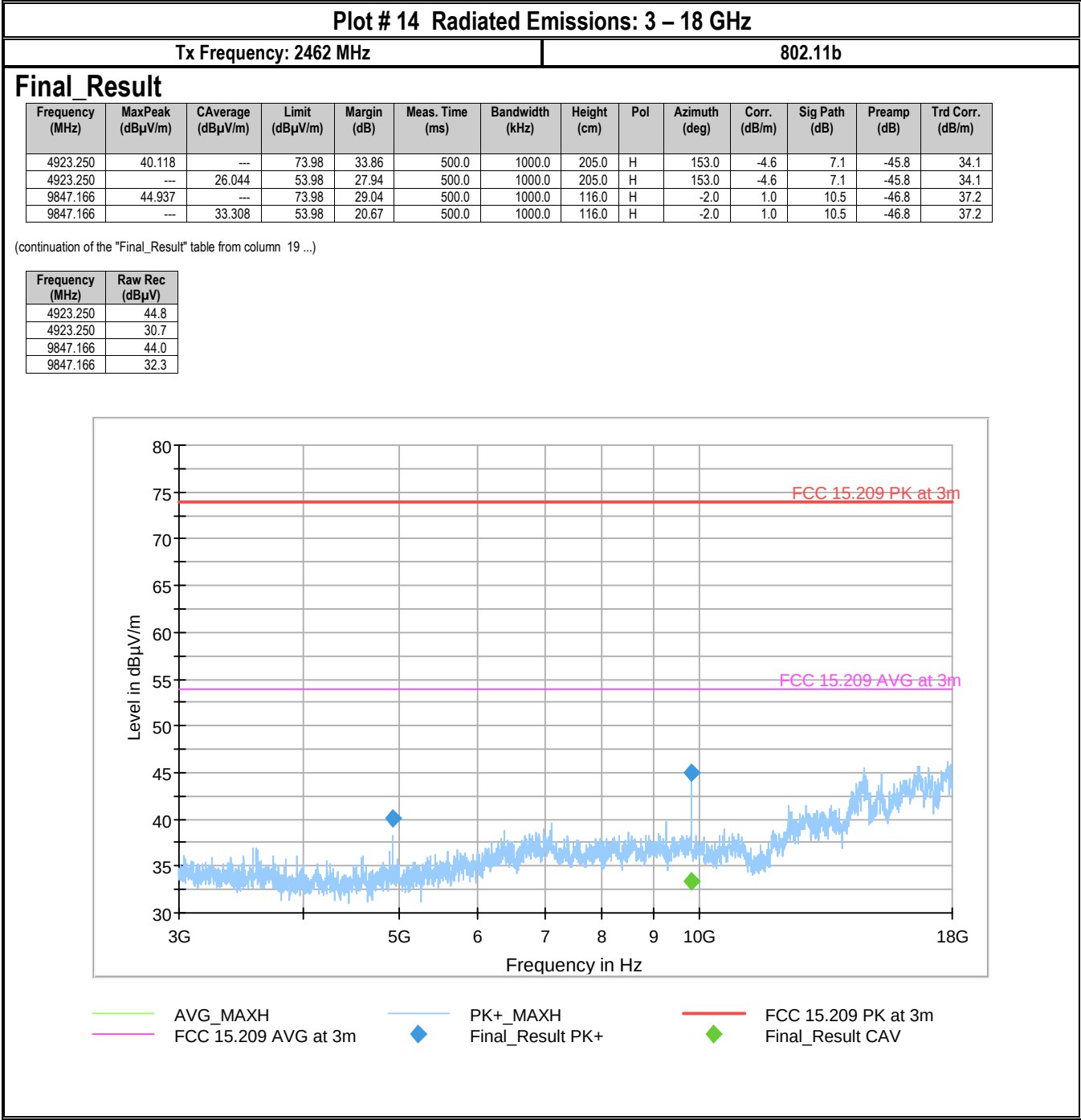
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preampl (dB)	Trd Corr. (dB/m)
2929.293	---	43.472	53.98	10.51	500.0	1000.0	269.0	V	220.0	35.4	5.9	0.0	29.5
2929.293	58.429	---	73.98	15.55	500.0	1000.0	269.0	V	220.0	35.4	5.9	0.0	29.5

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBµV)
2929.293	8.0
2929.293	23.0



AVG_MAXH PK+_MAXH FCC 15.209 PK at 3m
FCC 15.209 AVG at 3m Final_Result PK+ Final_Result CAV



Plot # 15 Radiated Emissions: 18 – 26 GHz

Tx Frequency: 2462 MHz

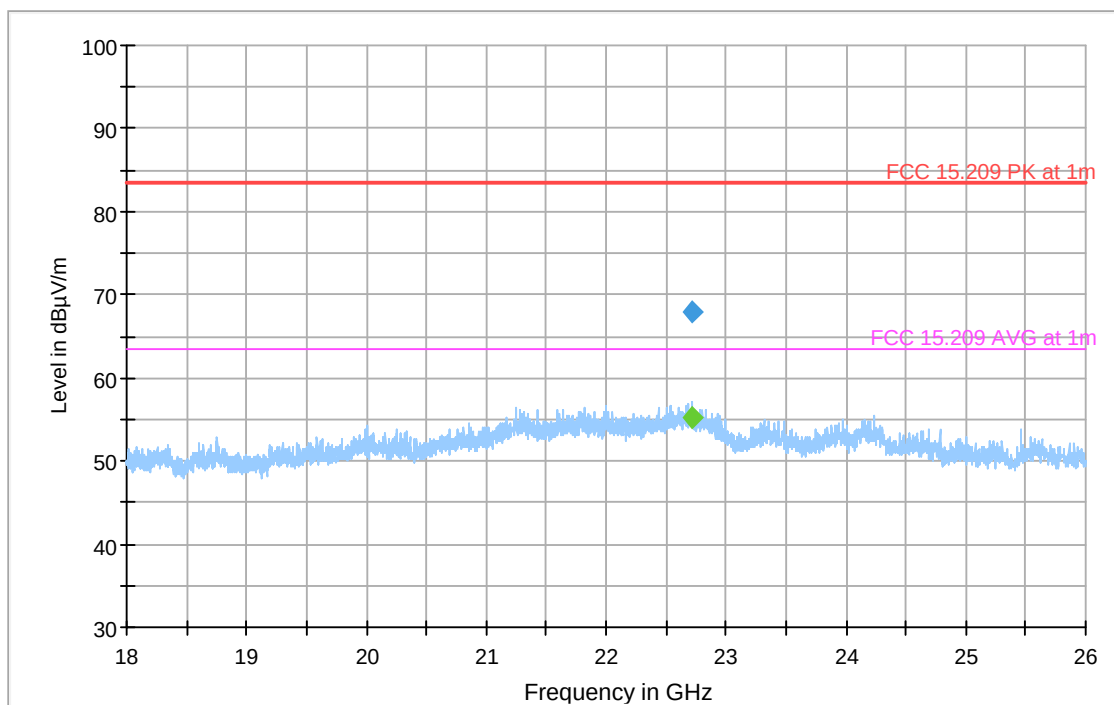
802.11b

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
22716.500	---	55.310	63.50	8.19	500.0	1000.0	325.0	H	272.0	20.4	9.8	0.0	10.6
22716.500	68.049	---	83.50	15.45	500.0	1000.0	325.0	H	272.0	20.4	9.8	0.0	10.6

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBµV)
22716.500	34.9
22716.500	47.7



AVG_MAXH PK+_MAXH FCC 15.209 PK at 1m
FCC 15.209 AVG at 1m Final_Result PK+ Final_Result CAV

8.7 AC Power Line Conducted Emissions

8.7.1 Measurement according to ANSI C63.4

Analyzer Settings:

- RBW = 9 KHz (CISPR Bandwidth)
- Detector: Peak / Average for Pre-scan
- Quasi-Peak/Average for Final Measurements

8.7.2 Limits: §15.207 & RSS-Gen 8.8

FCC §15.207(a) & RSS-Gen 8.8

- Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

8.7.3 Test conditions and setup:

Ambient Temperature $^{\circ}$ C	EUT Set-Up #	EUT operating mode	Power line (L1, L2, L3, N)	Power Input
23.0 $^{\circ}$ C	1	802.11b	Line & Neutral	110V / 60Hz

8.7.4 Measurement Result:

Plot #	Port	EUT Set-Up #:	EUT operating mode	Scan Frequency	Limit	Result
1	AC Mains	2	802.11b	150 kHz – 30 MHz	See section 8.7.2	Pass

8.7.5 Measurement Plots:

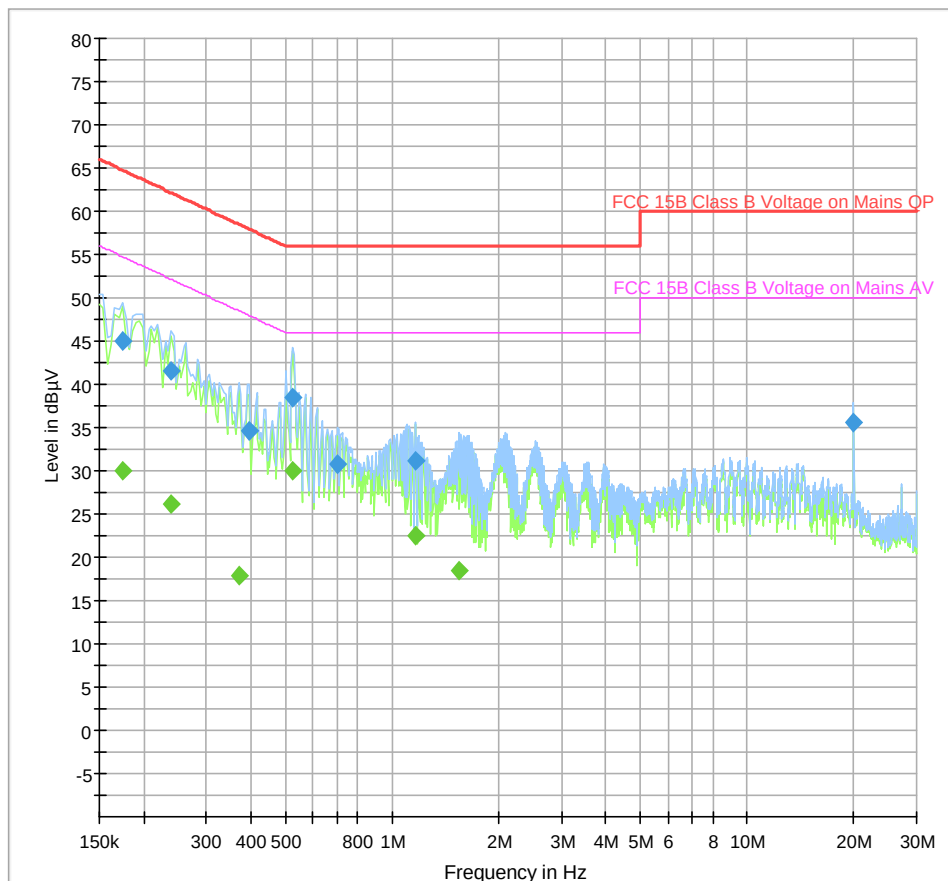
Plot # 1 Conducted Emissions: 150 kHz – 30 MHz

Tx Frequency: 2437MHz

802.11b

Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.174	45.06	---	64.76	19.70	1000.0	9.0	N	GND	10.1
0.174	---	30.01	54.76	24.75	1000.0	9.0	N	GND	10.1
0.239	---	26.14	52.14	26.00	1000.0	9.0	N	GND	10.1
0.239	41.59	---	62.14	20.55	1000.0	9.0	N	GND	10.1
0.372	---	17.97	48.46	30.49	1000.0	9.0	N	GND	10.0
0.396	34.69	---	57.94	23.24	1000.0	9.0	N	GND	10.0
0.525	---	29.95	46.00	16.05	1000.0	9.0	N	GND	9.9
0.525	38.47	---	56.00	17.53	1000.0	9.0	N	GND	9.9
0.703	30.76	---	56.00	25.24	1000.0	9.0	N	GND	9.9
1.167	---	22.47	46.00	23.53	1000.0	9.0	N	GND	9.9
1.167	31.16	---	56.00	24.84	1000.0	9.0	N	GND	9.9
1.542	---	18.52	46.00	27.48	1000.0	9.0	N	GND	9.9
20.000	35.63	---	60.00	24.37	1000.0	9.0	L1	GND	10.0



— AVG_MAXH
 — FCC 15B Class B Voltage on Mains QP
 ◆ Final_Result QPK
 — PK+ _MAXH
 — FCC 15B Class B Voltage on Mains AV
 ◆ Final_Result CAV

9 Test setup photos

Setup photos are included in supporting file name: "EMC_TZMED_023_24001_15_247_Setup_Photos_Rev1.pdf"

10 Test Equipment And Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
TEST RECEIVER	R&S	ESW44	103143	2 Years	09/12/2024
DIGITAL THERMOMETER	CONTROL COMPANY	4410,90080-03	230713059	3 Years	10/18/2023
PULSE LIMITER	R&S	ESH3-Z2	102473	3 Years	11/02/2023
LISN	FCC	FCC-LISN-50-25-2-08	08014	2 Years	10/06/2023
Multimeter	Fluke	115	56090717MV	3 Years	09/26/2023
Software	EMC32	Version 11.40.00	-	-	-

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
PASSIVE LOOP ANTENNA	ETS LINDGREN	6512	000164698	3 Years	09/06/2023
BILOG ANTENNA	A.H. SYSTEMS	BiLA2G	569	3 Years	10/30/2023
HORN ANTENNA	EMCO	3115	00035111	3 Years	10/26/2023
HORN ANTENNA	ETS LINDGREN	3117-PA	00167061	3 Years	9/25/2023
HORN ANTENNA	ETS LINDGREN	3116C-PA	00166821	3 Years	10/26/2023
ESW.EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	101715	3 Years	10/24/2023
DIGITAL THERMOMETER	Control Company	4410,90080-03	230712972	3 Years	10/18/2023
Signal Analyzer	R&S	FSV40	101022	3 Years	09/25/2023
Multimeter	Fluke	115	56090717MV	3 Years	09/26/2023
Software	EMC32	Version 10.50.40	-	-	-

Note: Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.

Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
Spectrum Analyzer	ROHDE & SCHWARZ	FSU	200302	3 Years	01/25/2024
Switch	ROHDE & SCHWARZ	OSP 120	100083	3 Years	12/14/2023
Software	WMS32	12.00.01			

Note: Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.

Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

11 History

Date	Report Name	Changes to report	Prepared by
2025-10-17	EMC_TZMED_023_24001_FCC_15247_WIFI_DTS	Initial Version	Guangcheng Huang
2026-03-19	EMC_TZMED_023_24001_FCC_15247_WIFI_DTS_Rev1	Update FCC ID, module model name, HW version	Guangcheng Huang
2026-06-04	EMC_TZMED_023_24001_FCC_15247_WIFI_DTS_Rev2	Cover page/sec.1/3.1, update EUT product description	Guangcheng Huang

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