FCC / ISED Test Report

For:
Axon Enterprise, Inc.

Brand:
Axon

Marketing Name:
Axon Fleet 2, Front Camera

Model #:
AX1014

Product Description:
In-car Camera System

FCC ID: X4GS00947C
IC ID: 8803A-S00947B

Applied Rules and Standards:
47 CFR Part 15.247 (DTS)
RSS-247 Issue 2 (DTSs) & RSS-Gen Issue 5

REPORT #: EMC_AXONN_016_21001_FCC_15.247_ISED_Wi-Fi_DTS

DATE: 2/10/2022

A2LA Accredited

IC recognized # 3462B

***CETECOM* Inc.**
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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.

No deviations were ascertained.

According to section 5 of this report, the overall result is Pass.

Company	Description	Model #
Axon Enterprise, Inc.	In-car Camera System	AX1014

Responsible for Testing Laboratory:

Date	Section	Name	Signature
02/10/2022	Compliance	Wang, Kevin (EMC Lab Manager)	kevin.wang@cetecom.com Digitally signed by: kevin.wang@cetecom.com DN: CN = kevin.wang@cetecom.com Date: 2022.02.15 09:20:59 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
02/10/2022	Compliance	Ghanma, Issa (EMC Engineer)	Digitally signed by: Issa W Ghanma DN: CN = Issa W Ghanma email = issa.ghanma@cetecom.com C = US O = CETECOM Inc. OU = EMC Date: 2022.02.15 19:45:57 -08'00'

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:	Wang, Kevin
Responsible Project Leader:	Sivaraman, Sangeetha

2.2 Identification of the Client

Applicant's Name:	Axon Enterprise, Inc.
Street Address:	17800 N. 85th St
City/Zip Code	Scottsdale, AZ 85255
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

Model No:	AX1014
Marketing name:	Axon Fleet 2, Front Camera
FCC-ID :	X4GS00947C
IC ID:	8803A-S00947B
HW Version :	REV B
SW Version :	Skytest_ab2_v2_mfgtest
FWIN:	1.26.XX
HVIN:	AX1014
PMN:	Axon Fleet 2, Front Camera
Product Description:	In-car Camera System
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; Center to center: 2412 MHz (ch 1) – 2462 MHz (ch 11), 11 channels
Module name/number:	Chipset: Cypress/CYW43340XKUBG
Type(s) of Modulation:	DSSS, OFDM
Modes of Operation:	802.11b/g/n
Maximum Measured Conducted Output Power:	+12.51 dBm
Power Supply/ Rated Operating Voltage Range:	• The Axon Fleet 2 Front Camera is powered by the vehicle's 12V power supply. The power is regulated from a separate battery box, mounted elsewhere in the vehicle, which supplies temporary power to the camera if the vehicle ignition is shut off. • Constant Power Voltage: 9V - 18V | Nominal 12V
Operating Temperature Range:	Low -30º C, High +60º C

Antenna Information as declared:	Metal stamped antenna, Max antenna gain @ 2.4 GHz is 5.8 dBi
Other Radios included in the device:	❖ Bluetooth 4.0 Low Energy ❖ Wi-Fi 5 GHz a/n UNII-1, UNII-3
Sample Revision:	□ Prototype Unit; ■ Production Unit; □ Pre-Production
Product dimensions [mm]:	10.46 x 5.87 x 9.17

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	X54113059	Rev B	Skytest_ab2_v2_mfgtest	Conducted measurement
2	X54113099	Rev B	Skytest_ab2_v2_mfgtest	Radiated measurement

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Serial Number
N/A	-	-	-	-

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for the test set up	Comments
1	EUT#1	The measurement equipment was connected to the 50 ohm RF port of the EUT.
2	EUT#2	The internal antenna was connected.

3.5 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	Wi-Fi 2.4 GHz	❖ Putty terminal used to communicate with the device, and sending commands provided by client, that will not available to end-user, to configure the Wi-Fi radio: ▪ Power level : 10 dBm ▪ Mode : 802.11b/g/n ▪ Transmit mode : Continuous TX ▪ Duty cycle : 100% ▪ Hopping : No ▪ Hopping Type : Single Frequency ▪ Channel # : 1, 6, 11 ▪ Data rate : o 802.11b : 1Mbps o 802.11g : 6Mbps o 802.11n : MCS0 ❖ The measurement equipment was connected to the 50 ohm RF port of the EUT.
Op. 2	Wi-Fi 2.4 GHz	❖ Putty terminal used to communicate with the device, and sending commands provided by client, that will not be available to end-user, to configure the Wi-Fi radio: ▪ Power level : 10 dBm ▪ Mode : 802.11b ▪ Transmit mode : Continuous TX ▪ Duty cycle : 100% ▪ Hopping : No ▪ Hopping Type : Single Frequency ▪ Channel : 1, 6, 11 ▪ Data rate : 1Mbps

3.6 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 and output power.

For radiated measurements;

- All data in this report show the worst case of Wi-Fi radio, transmitting at the highest output power band representing worst case transmission mode.
- 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:

- FCC ID: X4GS00947C
- IC ID: 8803A-S00947B

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

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.247(a)(1)	Emission Bandwidth	Nominal	O.p1	■	□	□	Complies
§15.247(e)	Power Spectral Density	Nominal	O.p1	■	□	□	Complies
§15.247(b)(1)	Maximum Conducted Output Power and EIRP	Nominal	O.p1	■	□	□	Complies
§15.247(d)	Band edge compliance Unrestricted Band Edges	Nominal	O.p1	■	□	□	Complies
§15.247; 15.209; 15.205	Band edge compliance Restricted Band Edges	Nominal	O.p1	■	□	□	Complies
§15.247(d); §15.209	TX Spurious emissions-Radiated	Nominal	O.p2	■	□	□	Complies
§15.207(a)	AC Conducted Emissions	Nominal	-	□	■	□	Note 1 Note 2

Note1: NA= Not Applicable; NP= Not Performed.
Note2: This device will be installed in vehicles powered by 12 V DC; Hens this test is not applicable.

6 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=1.

Radiated measurement

9 kHz to 30 MHz	±2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	±2.0 dB (Biconilog Antenna)
1 GHz to 40 GHz	±2.3 dB (Horn Antenna)

According to TR 102 273 a multiplicative propagation of error is assumed for RF measurement systems. For this reason the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: http://physics.nist.gov/cuu/Uncertainty/typeb.html. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3 dB to the limit.

6.1 Environmental Conditions During Testing:

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

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

6.2 Dates of Testing:

4/12/2021 – 4/15/2021

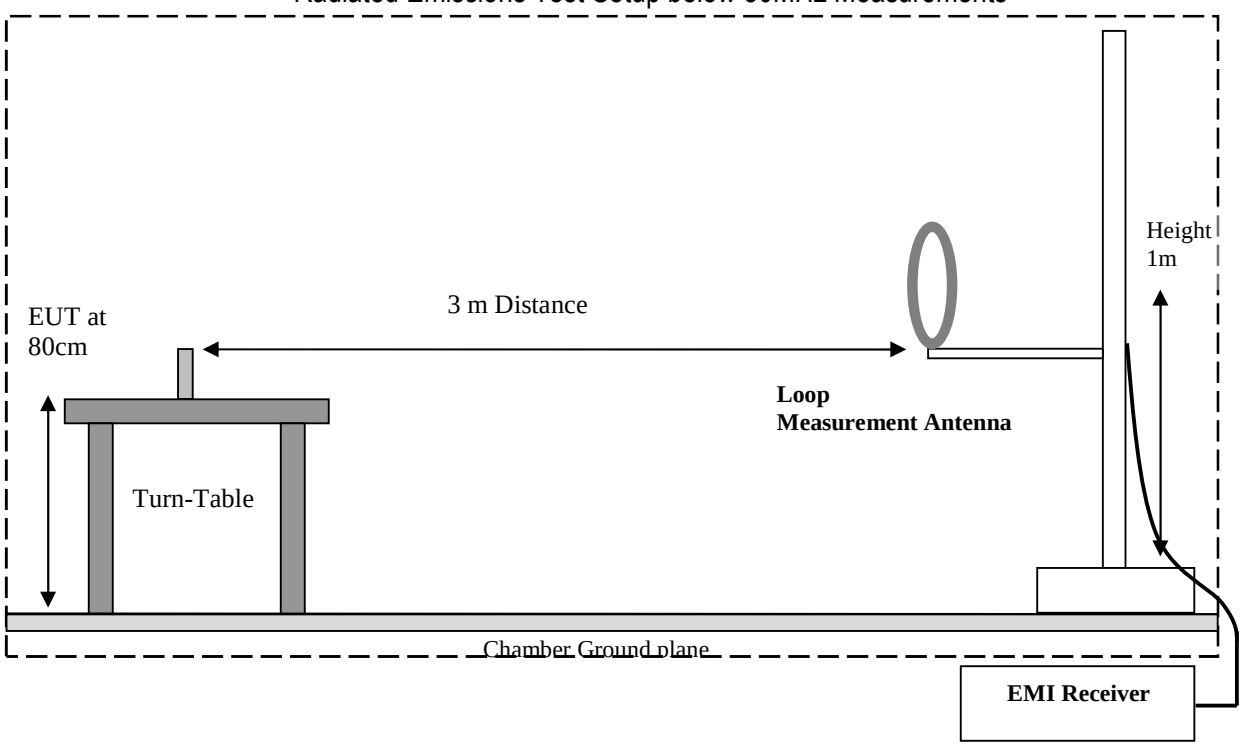
7 Measurement Procedures

7.1 Radiated Measurement

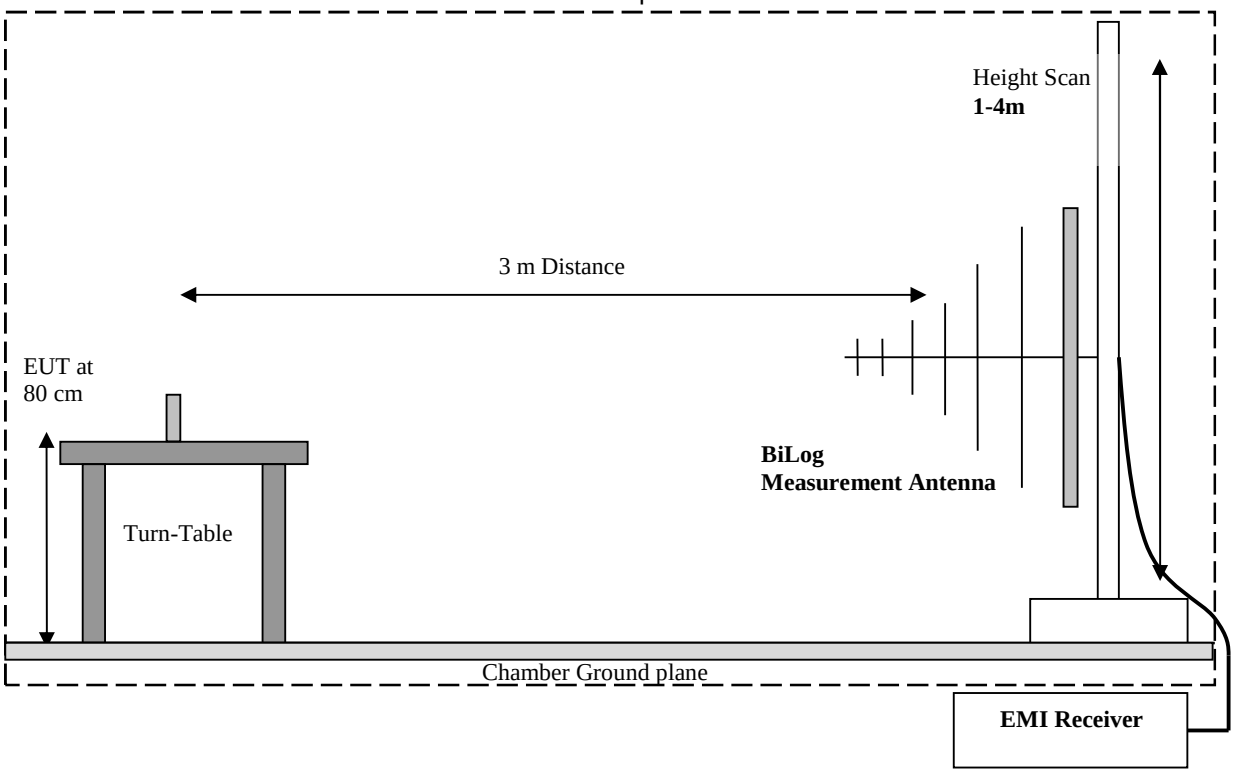
The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 360º continuous measurement 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.

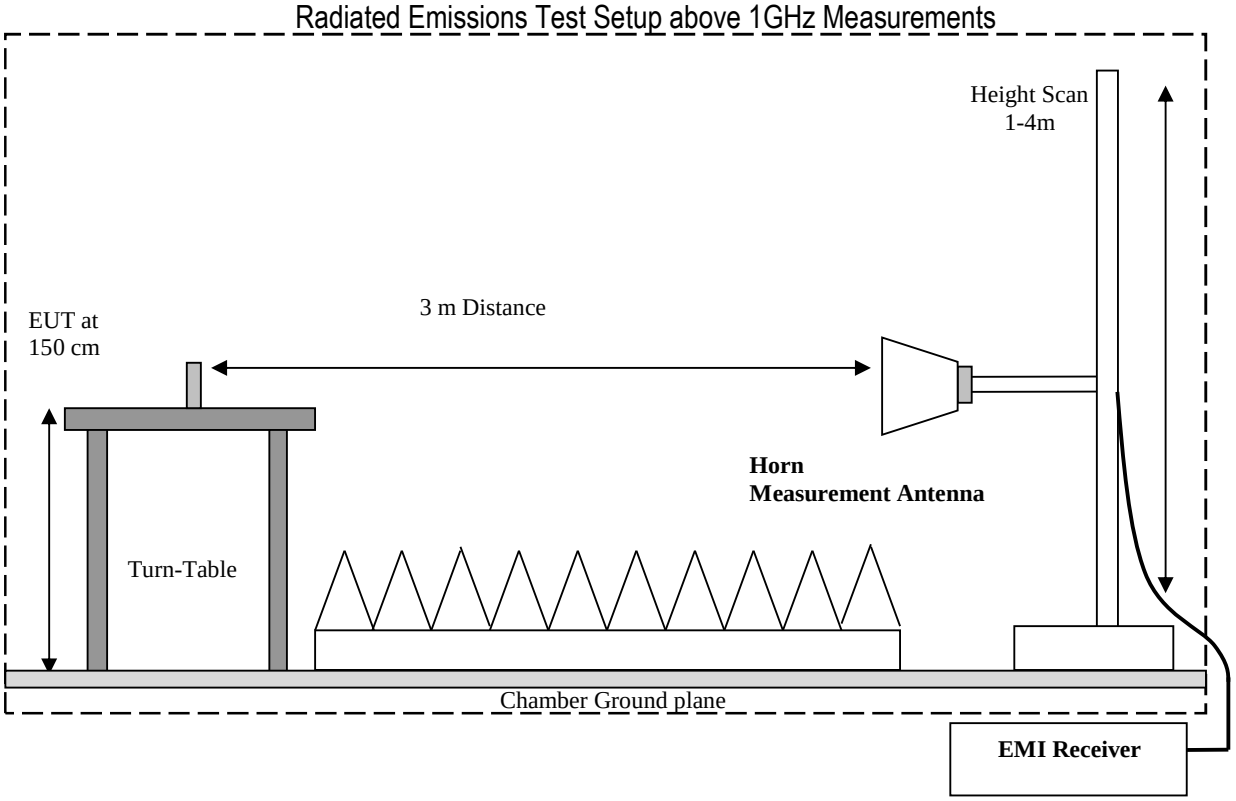
Radiated Emissions Test Setup below 30MHz Measurements



Radiated Emissions Test Setup 30MHz-1GHz Measurements



Radiated Emissions Test Setup above 1GHz Measurements



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 dBµV
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:

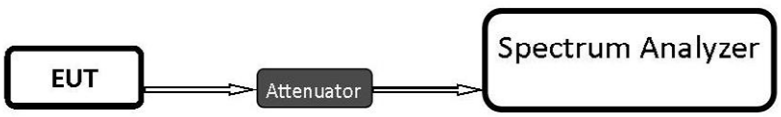
FS (dBµV/m) = Measured Value on SA (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m)

Example:

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

7.2 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 Duty Cycle

8.1.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02;

Section 6. DUTY CYCLE, TRANSMISSION FURATION AND MAXIMUM POWER CONROL LEVEL

Measurements of duty cycle and transmission duration shall be performed using one of the following technique:

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on-and off-times of transmitted signal.

1. Set the center frequency of the instrument to the center frequency of the transmission.
2. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
3. Set detector = peak or average.
4. The zero-span measurement method shall not be used unless both RBW and VBW are >50/T and the number of sweep points across duration T exceeds 100.

(For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≥ 16.7 microseconds.)

8.1.2 Test conditions and setup:

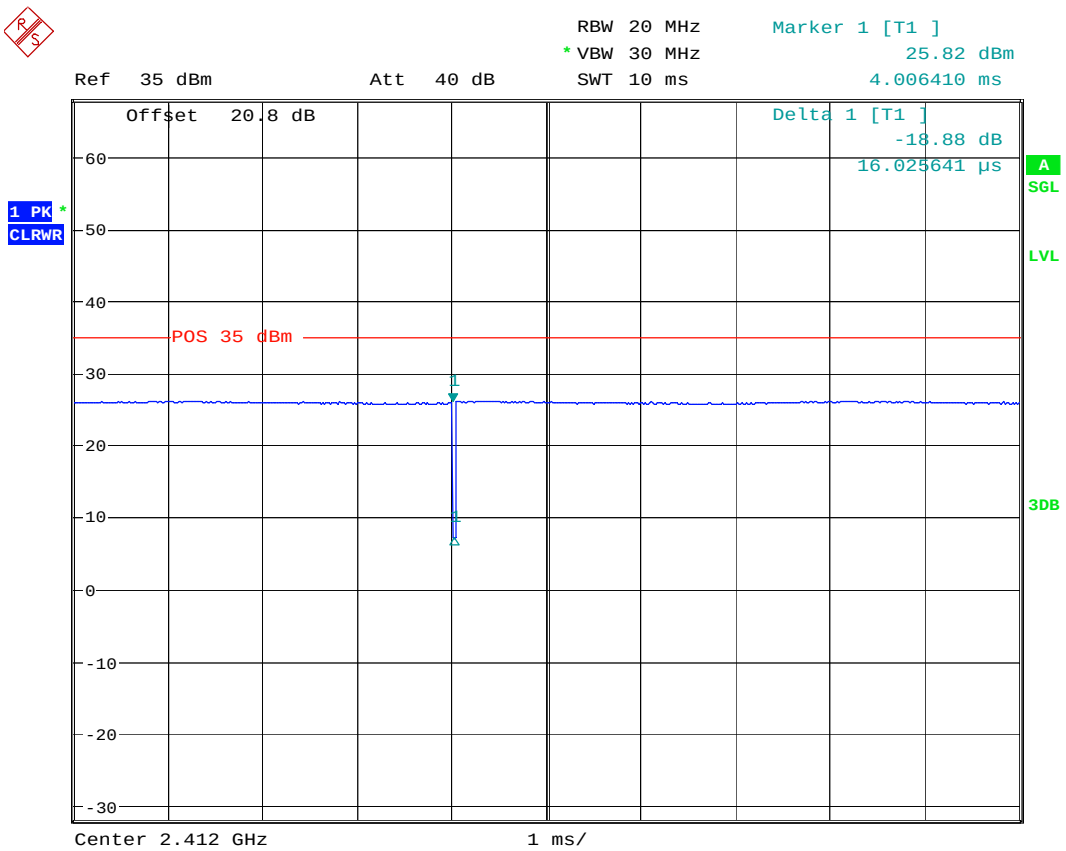
Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
23.8°C	1	Op.1	12 V DC

8.1.3 Measurement result:

Plot #	Mode	TX Frequency	Data Rate	Duty cycle
1	802.11b	2437 MHz	1 Mb/s	≥ 98.0 %
2	802.11g	2437 MHz	6 Mb/s	≥ 98.0 %
3	802.11n	2437 MHz	MCS0 6.5 Mb/s	≥ 98.0 %

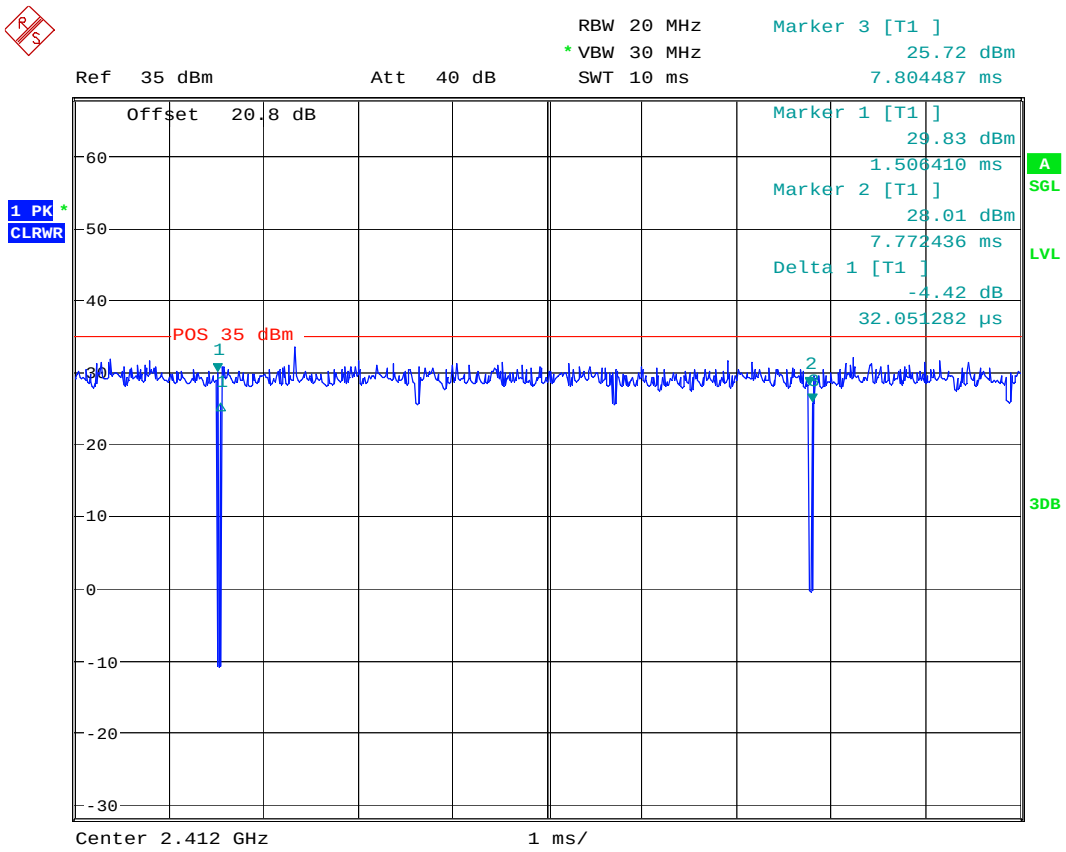
8.1.4 Measurement plots:

Plot # 1	
Tx Frequency: 2412 MHz	Mode: 802.11b



Plot # 2

Tx Frequency: 2412 MHz	Mode: 802.11g



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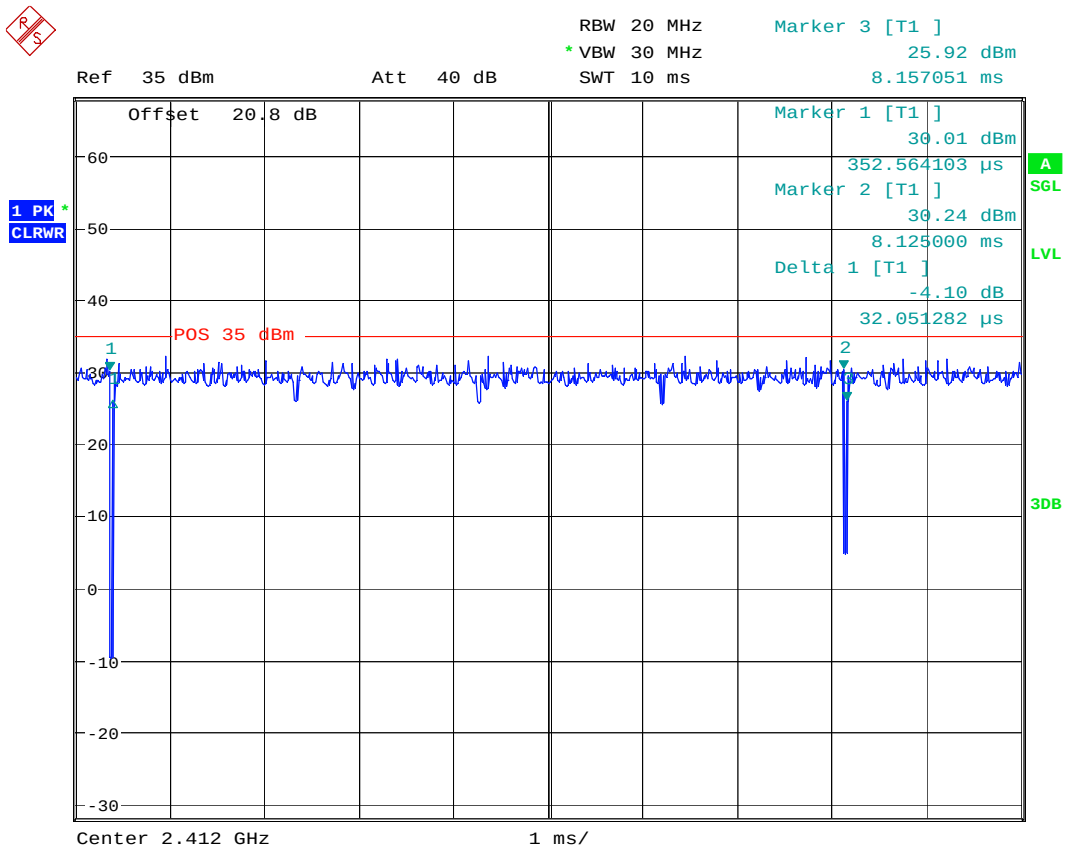
Plot # 3

Tx Frequency: 2412 MHz	Mode: 802.11n



8.2 Emission Bandwidth 6dB and 99% Occupied Bandwidth

8.2.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02 Subclause 8.2

ANSI_C63.10-2013 Subclause 11.8 DTS bandwidth

Spectrum Analyzer settings:

6dB (DTS) Bandwidth:

- Set RBW = 100 kHz
- Set the video bandwidth (VBW) ≥ 3 x 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) ≈ 3 x 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.

8.2.2 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.

8.2.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
23.8°C	1	Op.1	12 V DC

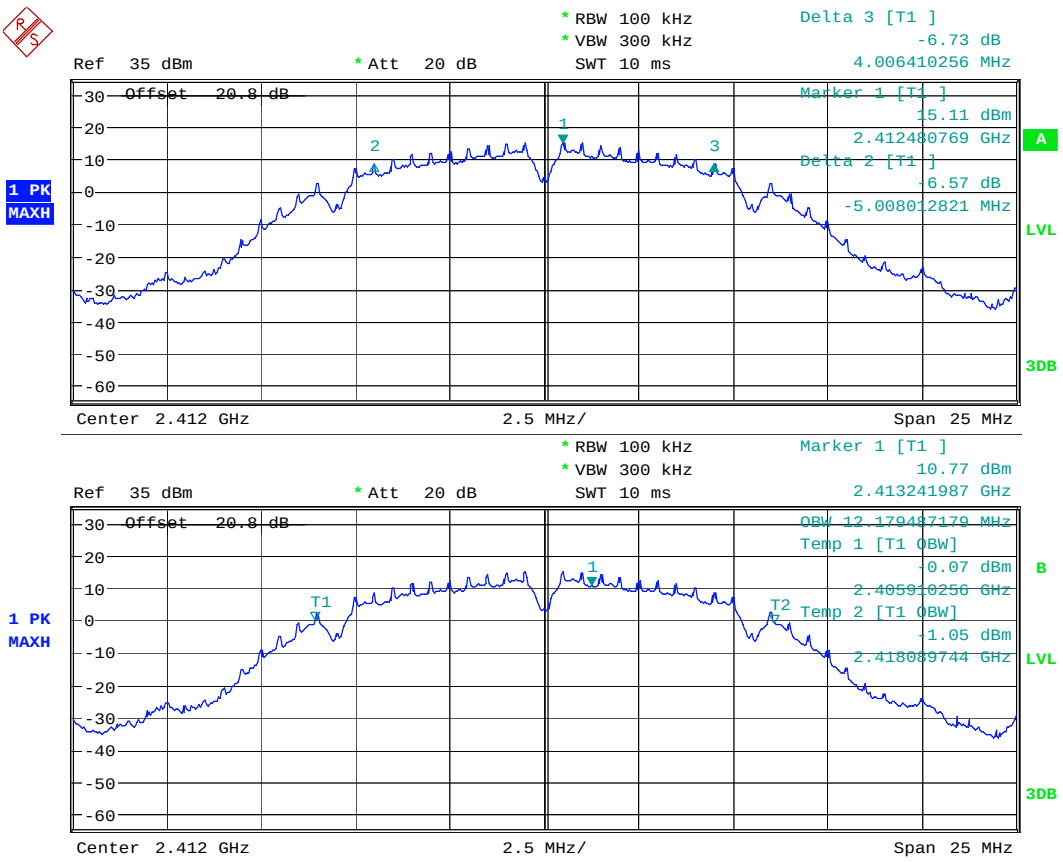
8.2.4 Measurement result:

Plot #	Frequency (MHz)	EUT Operating Mode	6dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
4	2412	802.11b	9.01	12.8	> 0.5	Pass
5	2437	802.11b	8.53	12.14	> 0.5	Pass
6	2462	802.11b	8.53	12.1	> 0.5	Pass
7	2412	802.11g	15.34	16.35	> 0.5	Pass
8	2442	802.11g	15.46	16.35	> 0.5	Pass
9	2462	802.11g	15.50	16.35	> 0.5	Pass
10	2412	802.11n	16.87	17.51	> 0.5	Pass
11	2442	802.11n	16.11	17.51	> 0.5	Pass
12	2462	802.11n	16.91	17.51	> 0.5	Pass

8.2.5 Measurement Plots:

Plot # 4

Tx Frequency: 2412 MHz	Mode: 802.11b



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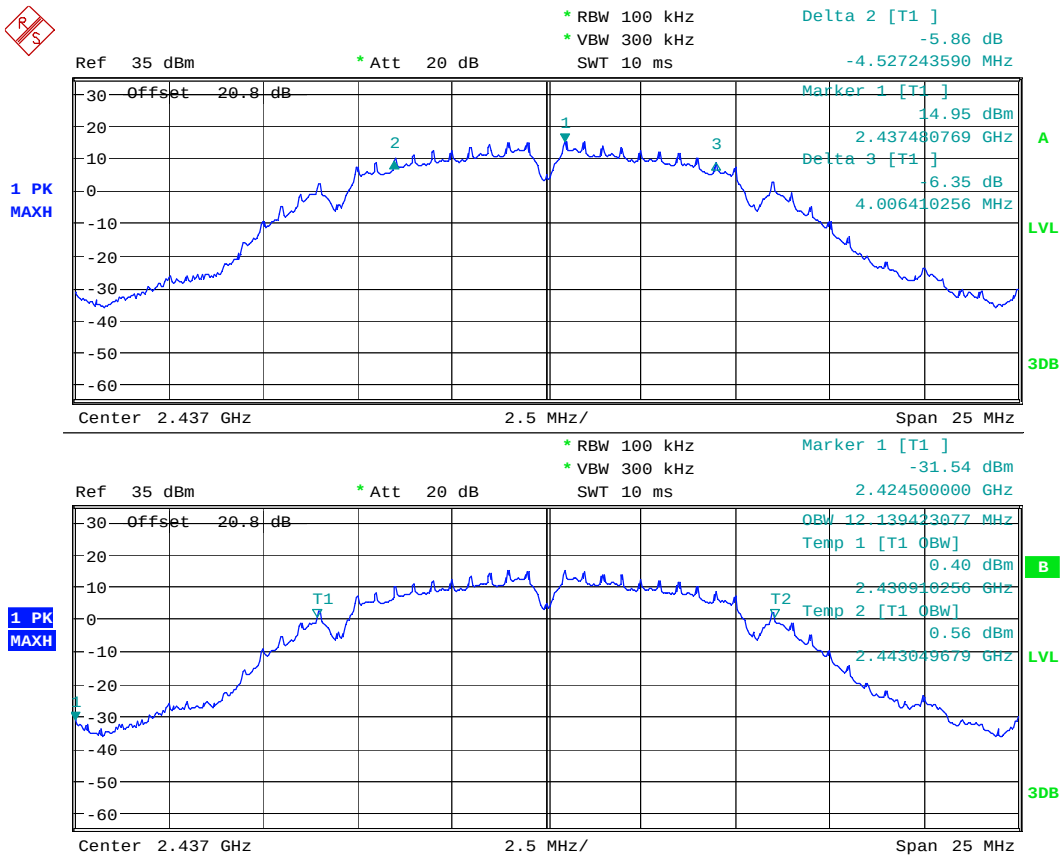
Plot # 5

Tx Frequency: 2437 MHz	Mode: 802.11b



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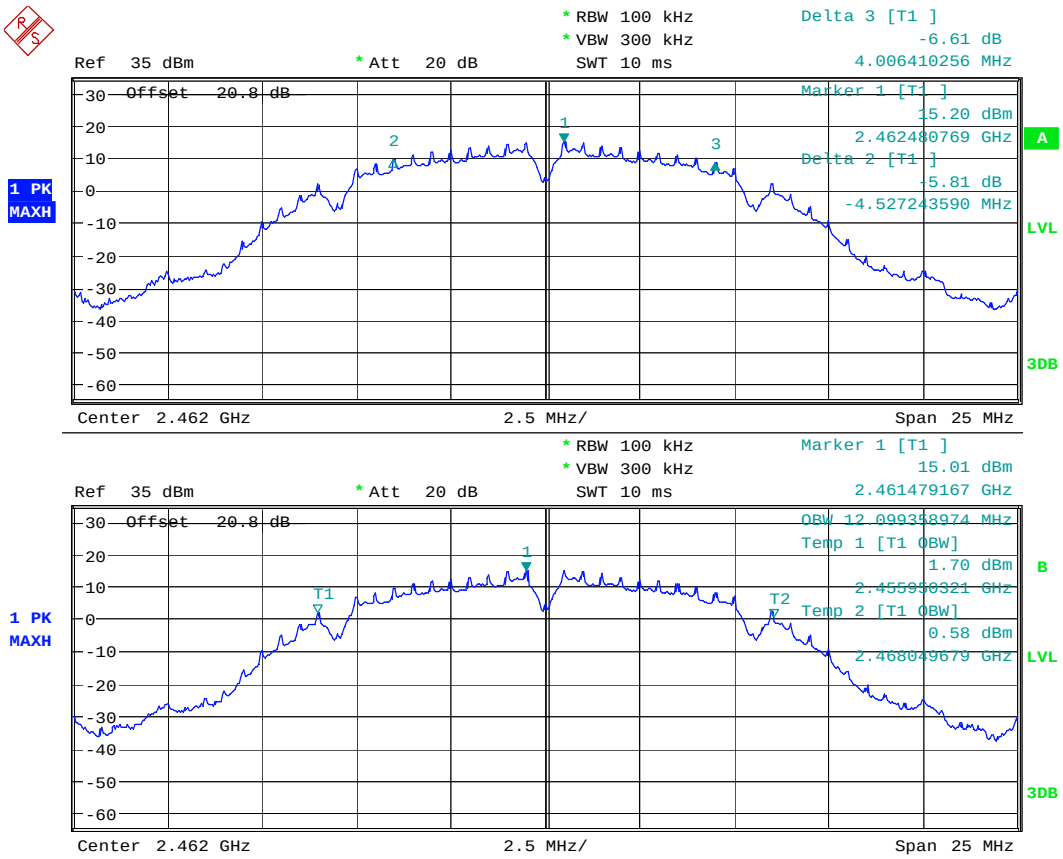
Plot # 6

Tx Frequency: 2462 MHz	Mode: 802.11b



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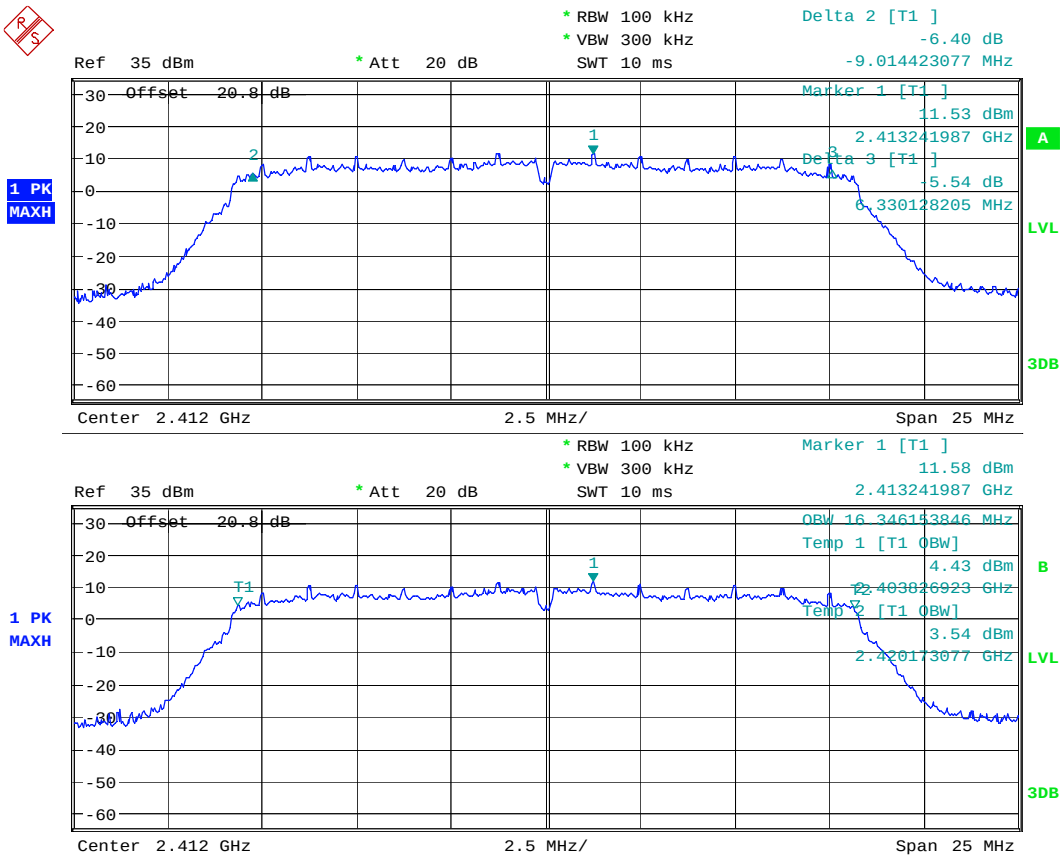
Plot # 7

Tx Frequency: 2412 MHz	Mode: 802.11g



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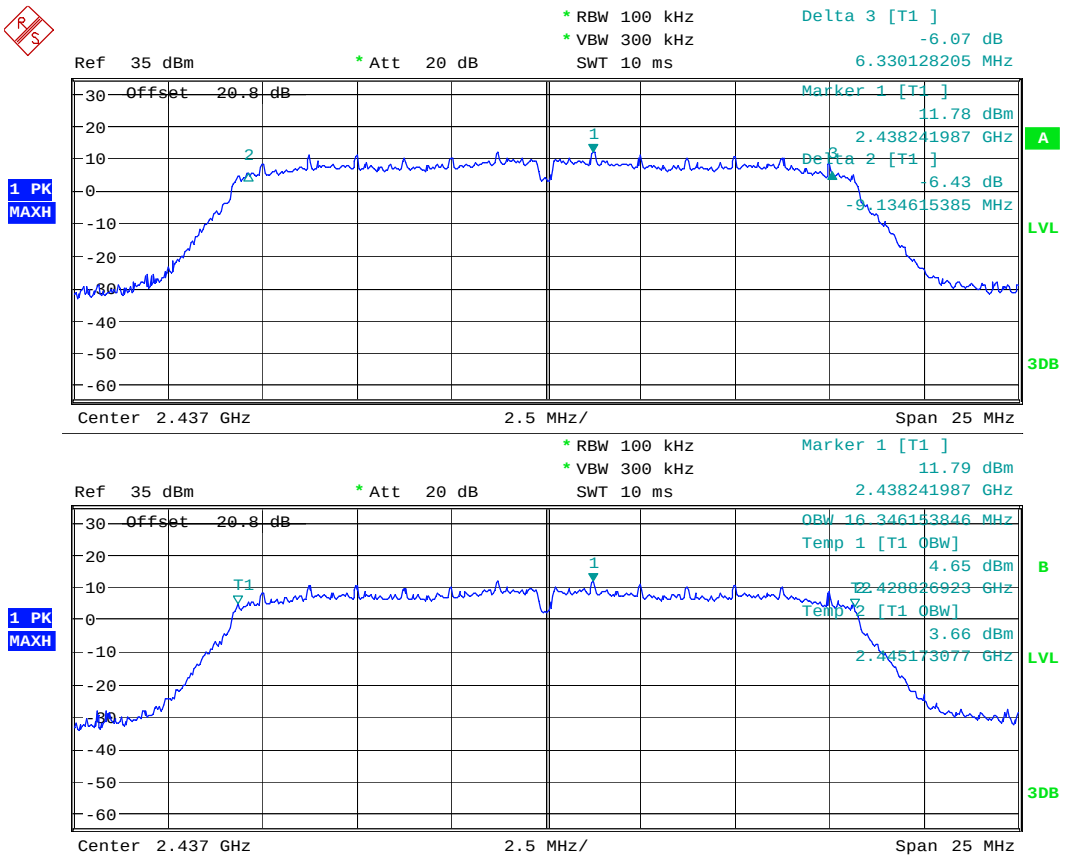
Plot # 8

Tx Frequency: 2437 MHz	Mode: 802.11g



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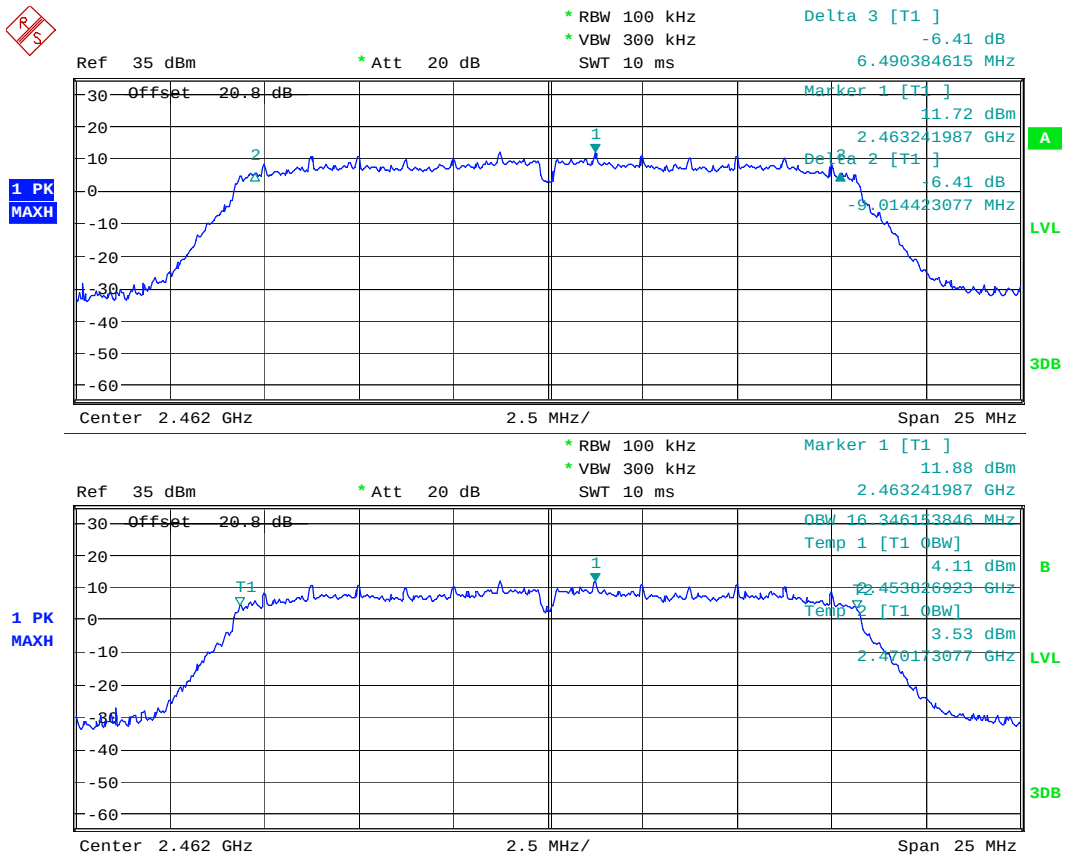
Plot # 9

Tx Frequency: 2462 MHz	Mode: 802.11g



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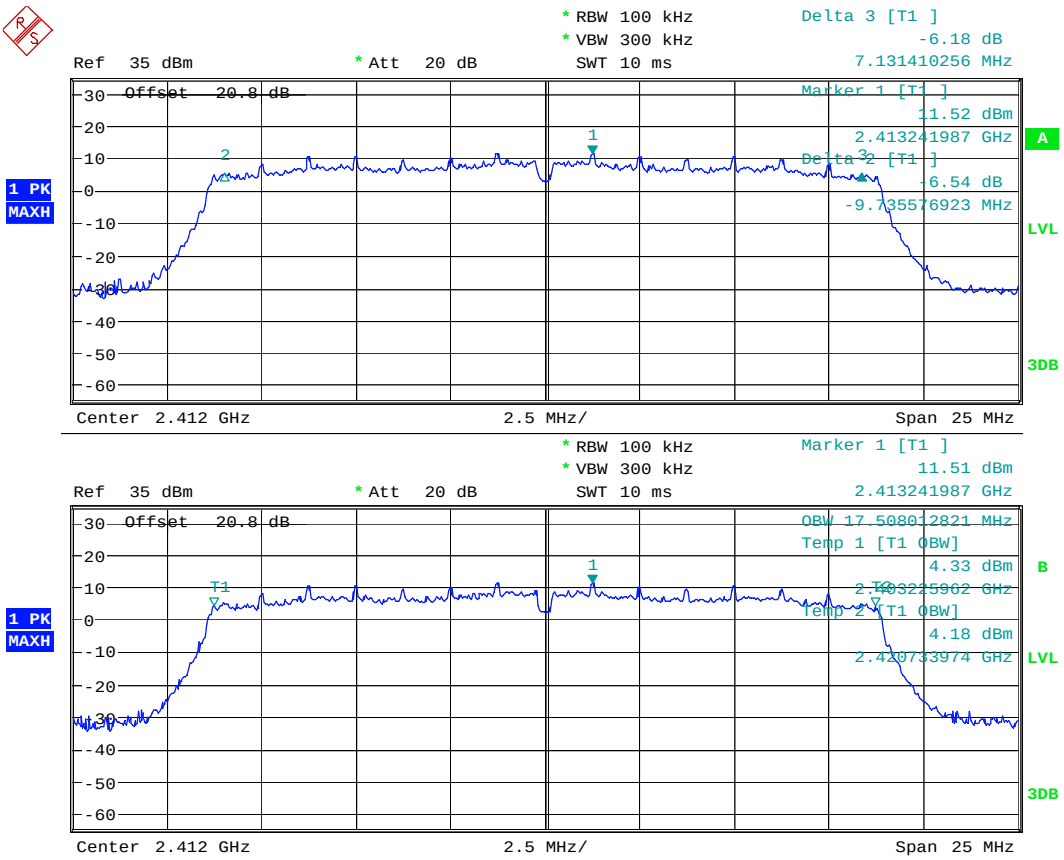
Plot # 10

Tx Frequency: 2412 MHz	Mode: 802.11n



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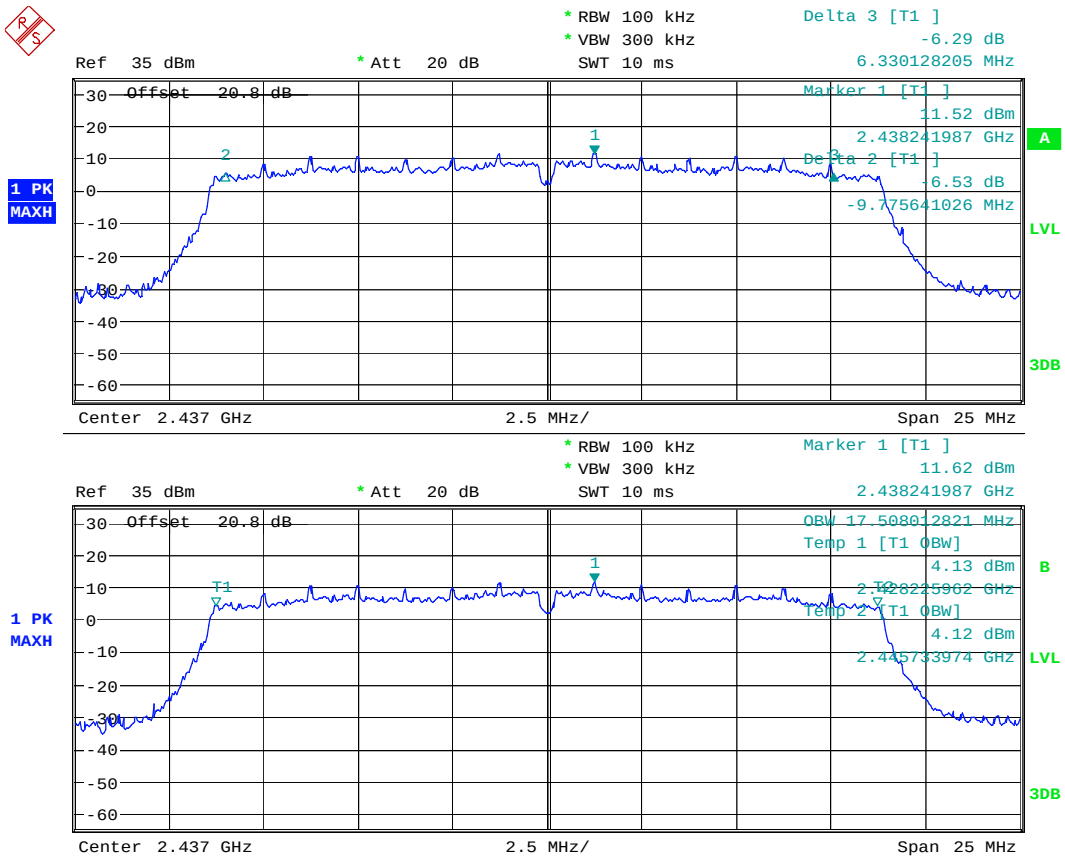
Plot # 11

Tx Frequency: 2437 MHz	Mode: 802.11n



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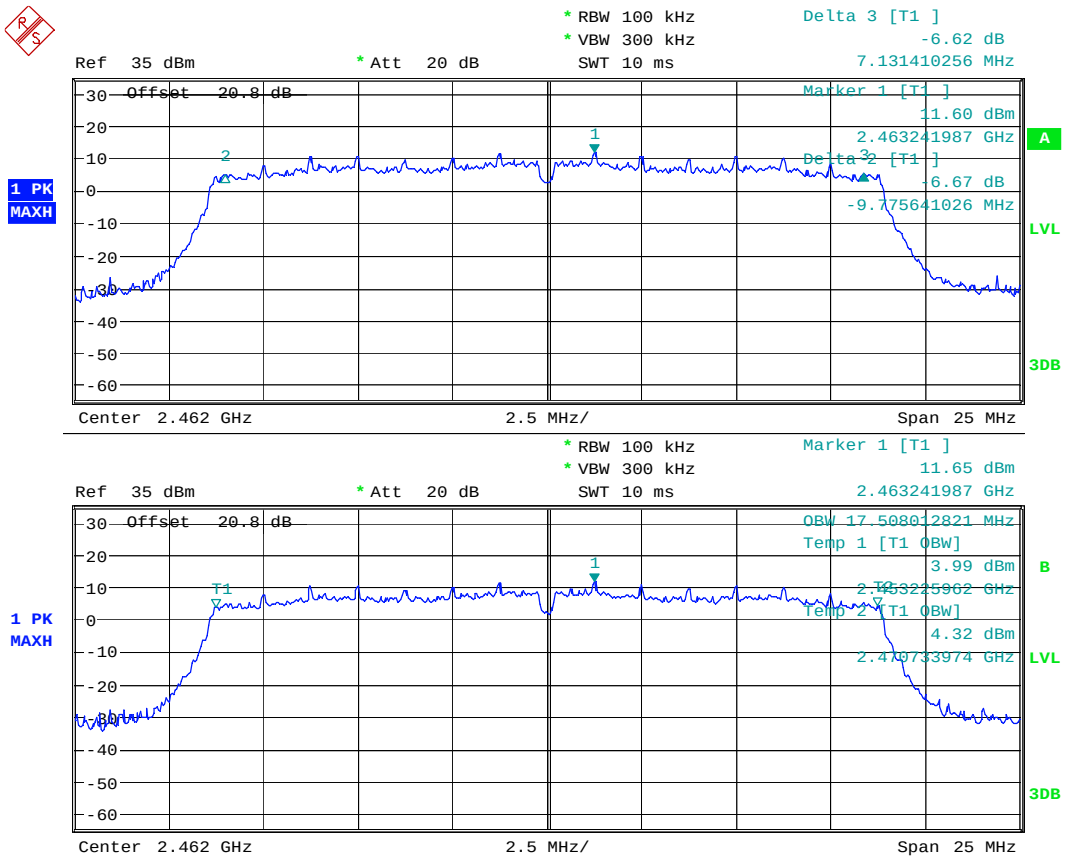
Plot # 12

Tx Frequency: 2462 MHz	Mode: 802.11n



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8.3 Maximum conducted (average) output power

8.3.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02 Subclause 8.3.2

ANSI_C63.10-2013 Subclause 11.9.2.2.2 Method AVGSA-1

Method AVGSA-1 uses trace averaging with the EUT transmitting at full power throughout each sweep. The procedure for this method is as follows:

a) Set span to at least 1.5 times the OBW.

b) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.

c) Set VBW ~ [3 x RBW].

d) Number of points in sweep ~ [2 x span / RBW]. (This gives bin-to-bin spacing < RBW / 2, so that narrowband signals are not lost between frequency bins.)

e) Sweep time = auto.

f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

g) If transmit duty cycle < 98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle ~ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."

h) 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. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum

8.3.2 Limits:

Maximum Output Power:

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

8.3.3 Test conditions and setup:

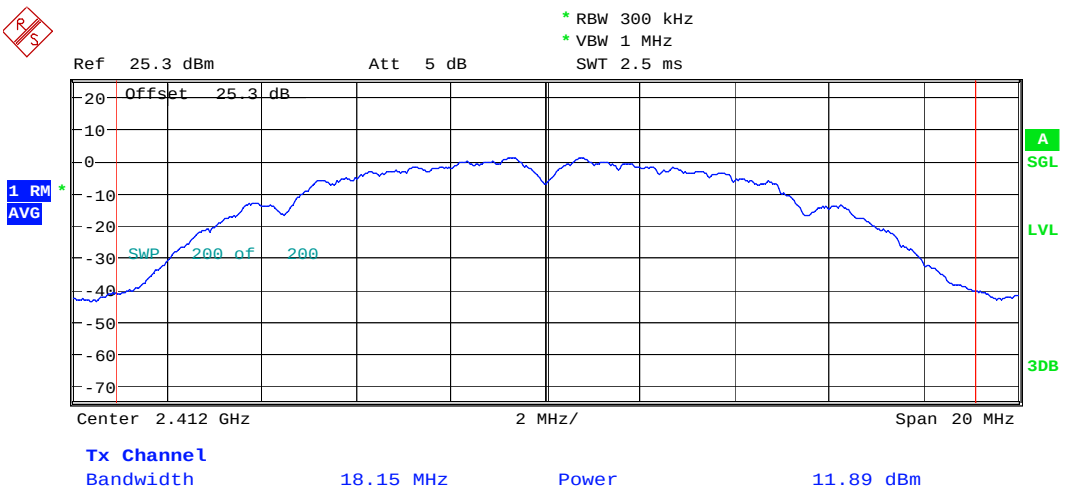
Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.8°C	1	Op.1	12 V DC	5.8 dBi

8.3.4 Measurement result:

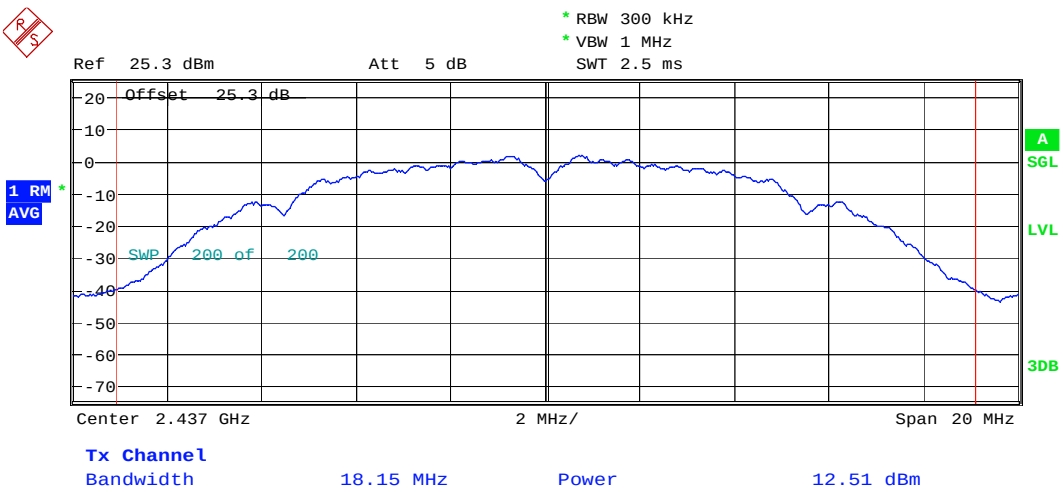
Plot #	Frequency (MHz)	EUT Operating Mode	Measured conducted Output Power (dBm)	EIRP (dBm)	Limit (dBm)	Result
13	2412	802.11b	11.89	17.69	30 (Pk) / 36 (EIRP)	Pass
14	2437	802.11b	12.51	18.31	30 (Pk) / 36 (EIRP)	Pass
15	2462	802.11b	11.88	17.68	30 (Pk) / 36 (EIRP)	Pass
16	2412	802.11g	11.57	17.37	30 (Pk) / 36 (EIRP)	Pass
17	2437	802.11g	12.42	18.22	30 (Pk) / 36 (EIRP)	Pass
18	2462	802.11g	11.66	17.46	30 (Pk) / 36 (EIRP)	Pass
19	2412	802.11n	11.12	16.92	30 (Pk) / 36 (EIRP)	Pass
20	2437	802.11n	11.9	17.7	30 (Pk) / 36 (EIRP)	Pass
21	2462	802.11n	11.41	17.21	30 (Pk) / 36 (EIRP)	Pass

8.3.5 Measurement Plots:

Plot # 13	
Tx Frequency: 2412 MHz	Mode: 802.11b

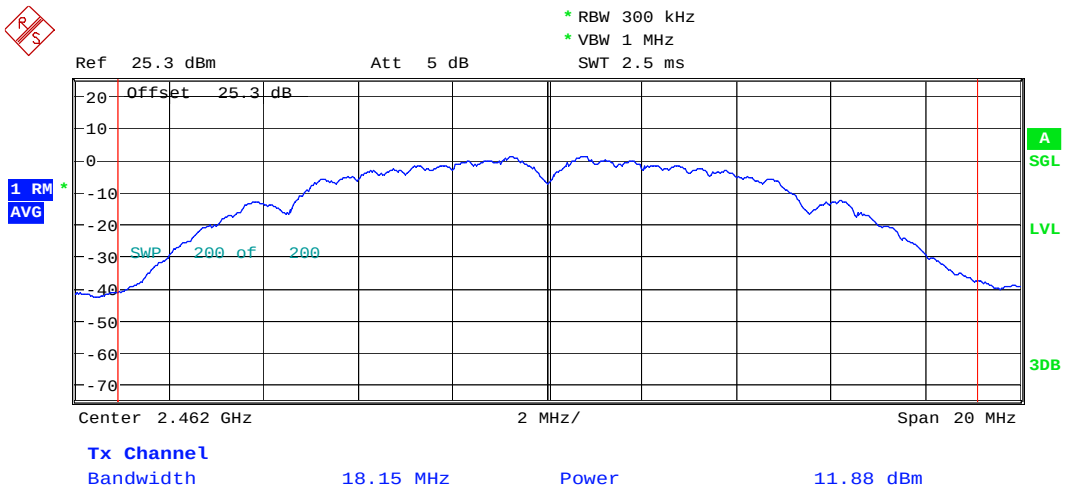


Plot # 14	
Tx Frequency: 2437 MHz	Mode: 802.11b



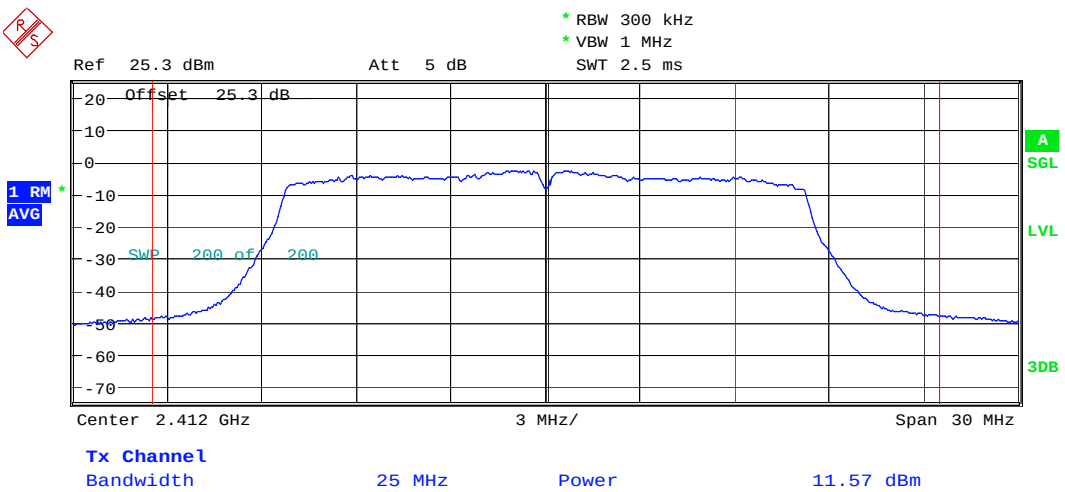
Plot # 15

Tx Frequency: 2462 MHz	Mode: 802.11b



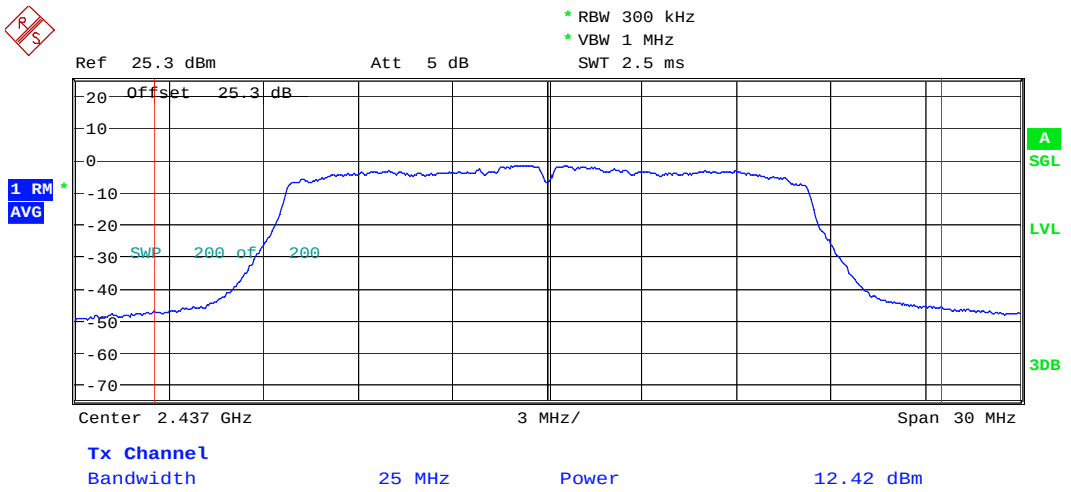
Plot # 16

Tx Frequency: 2412 MHz	Mode: 802.11g	Primary



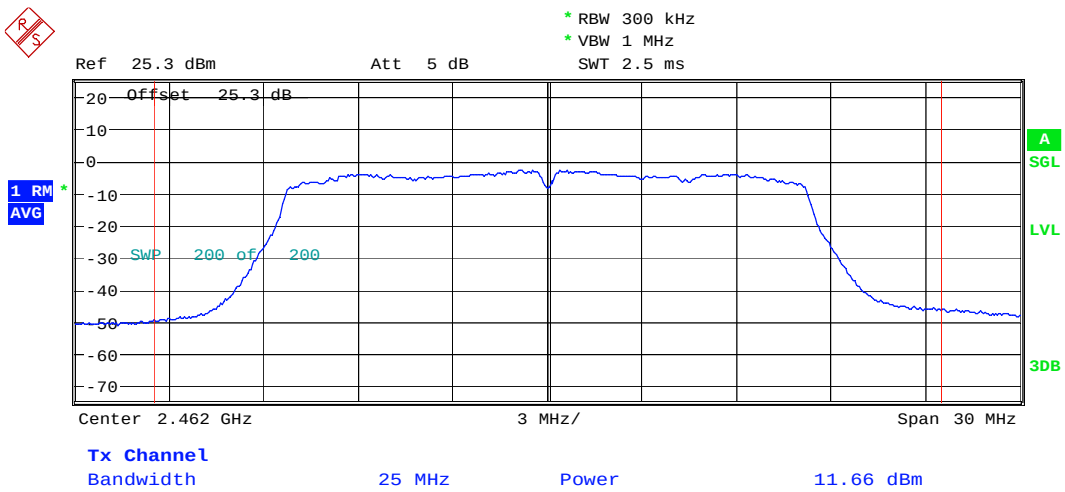
Plot # 17

Tx Frequency: 2437 MHz	Mode: 802.11g



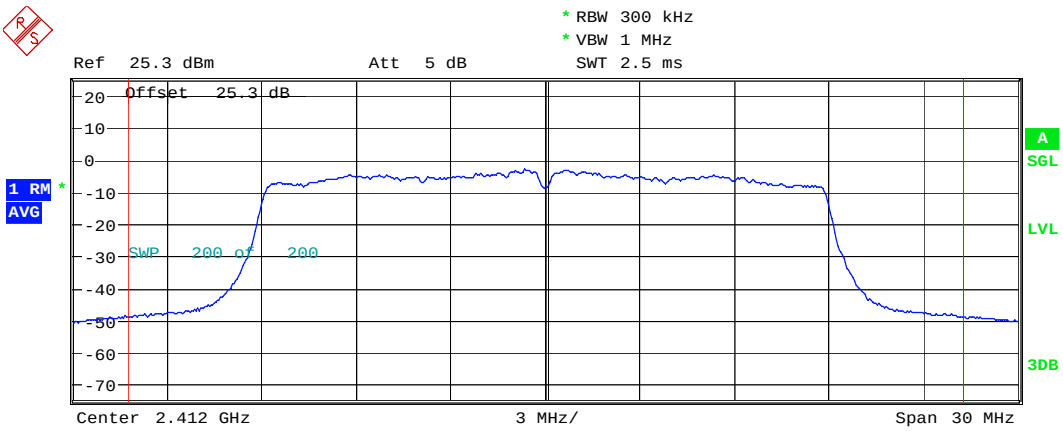
Plot # 18

Tx Frequency: 2462 MHz	Mode: 802.11g



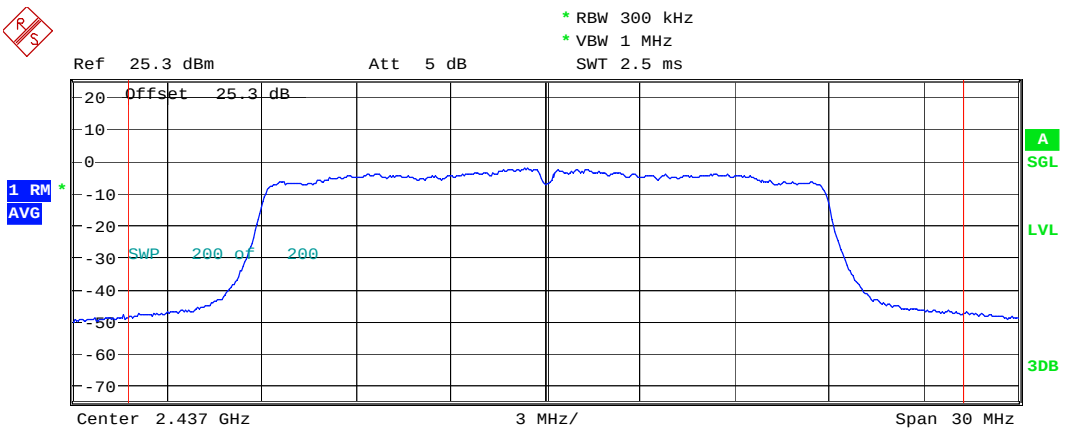
Plot # 19

Tx Frequency: 2412 MHz	Mode: 802.11n



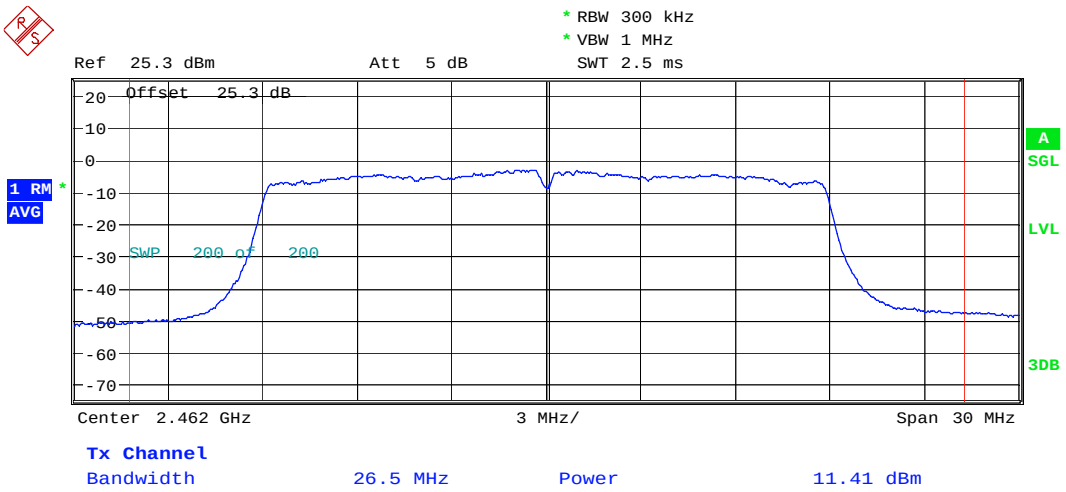
Plot # 20

Tx Frequency: 2437 MHz	Mode: 802.11n



Plot # 21

Tx Frequency: 2462 MHz	Mode: 802.11n



8.4 Power Spectral Density

8.4.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02 Subclause 8.4

ANSI C63.10 Subclause 11.10.3 Method AVGPSD-1

Method AVGPSD-1 uses trace averaging with EUT transmitting at full power throughout each sweep.

The following procedure may be used when the maximum (average) conducted output power was used to determine compliance to the fundamental output power limit. This is the baseline method for determining the maximum (average) conducted PSD level. If the instrument has a power averaging (rms) detector, then it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously (D ~ 98%), or else sweep triggering/signal gating must be implemented to ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter OFF time to be considered):

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz < RBW < 100 kHz.
d) Set VBW ~ [3 □ RBW].
e) Detector = power averaging (rms) or sample detector (when rms not available).
f) Ensure that the number of measurement points in the sweep ~ [2 □ span / RBW].
g) Sweep time = auto couple.
h) Employ trace averaging (rms) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.
j) If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

8.4.2 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.

8.4.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23.8°C	1	Op.1	12 V DC	5.8 dBi

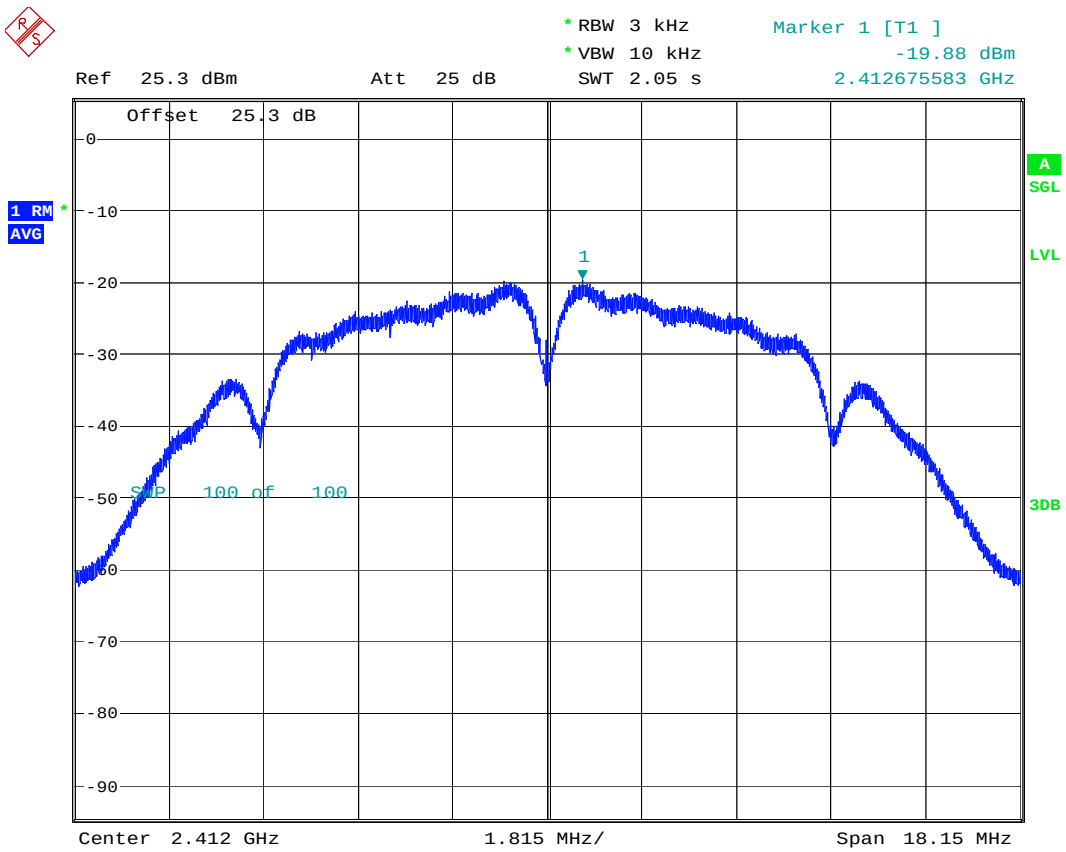
8.4.4 Measurement result:

Plot #	Frequency (MHz)	EUT Operating Mode	Measured power spectral density (dBm/3 KHz)	Limit (dBm / 3 kHz)	Result
22	2412	802.11b	-19.88	8	Pass
23	2437	802.11b	-18.75	8	Pass
24	2462	802.11b	-19.71	8	Pass
25	2412	802.11g	-22.32	8	Pass
26	2437	802.11g	-21.34	8	Pass
27	2462	802.11g	-22.14	8	Pass
28	2412	802.11n	-22.7	8	Pass
29	2437	802.11n	-21.54	8	Pass
30	2462	802.11n	-23.34	8	Pass

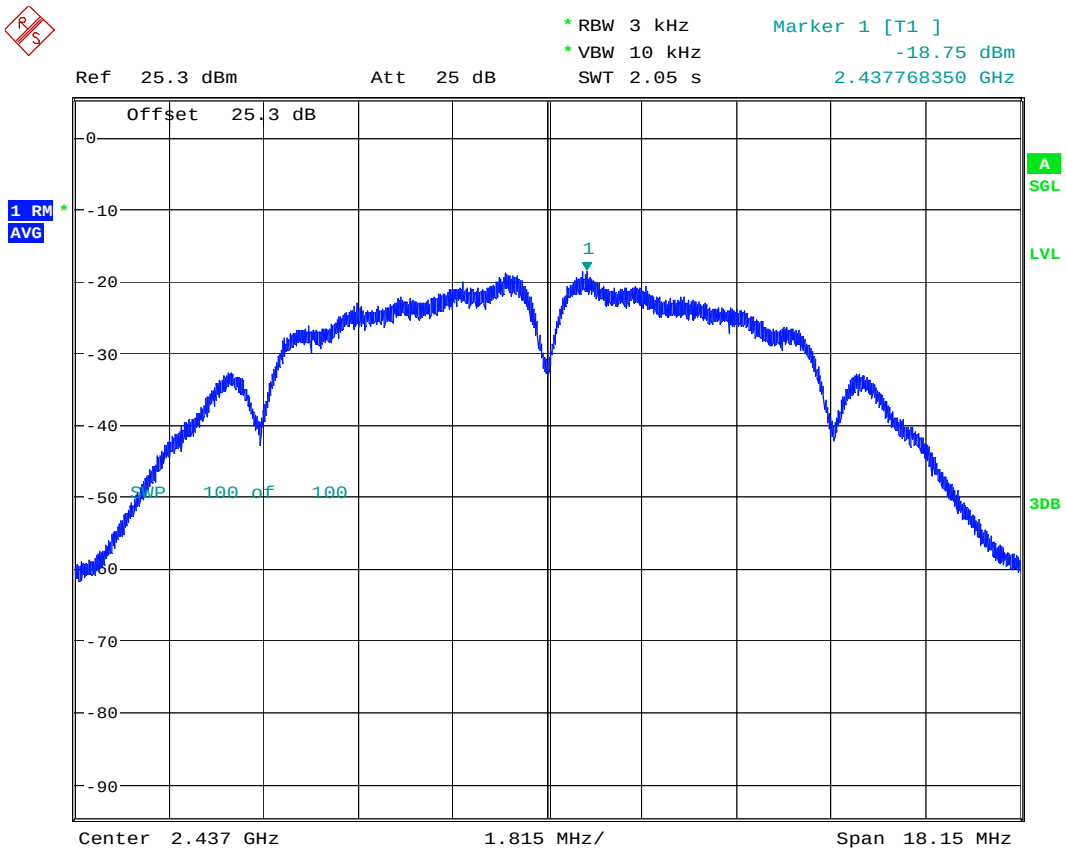
8.4.5 Measurement Plots:

Plot # 22

Tx Frequency: 2412 MHz	Mode: 802.11b



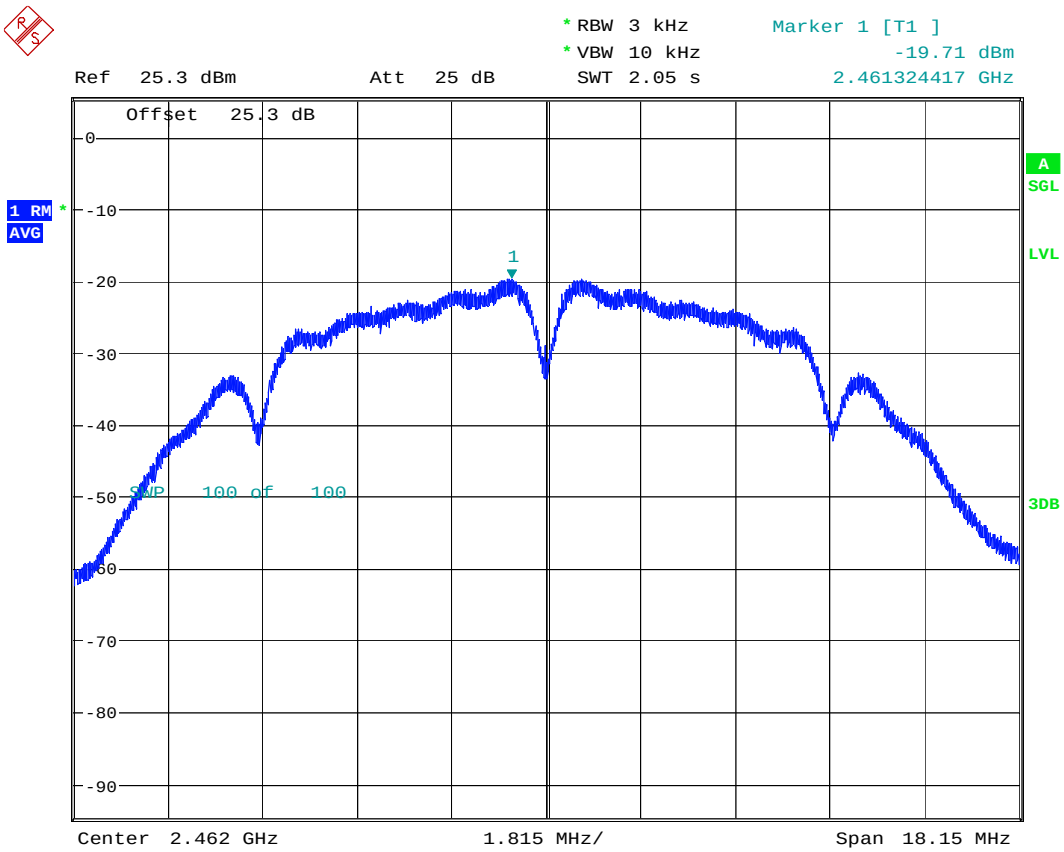
Plot # 23	
Tx Frequency: 2437 MHz	Mode: 802.11b



Date: 13.APR.2021 14:45:06

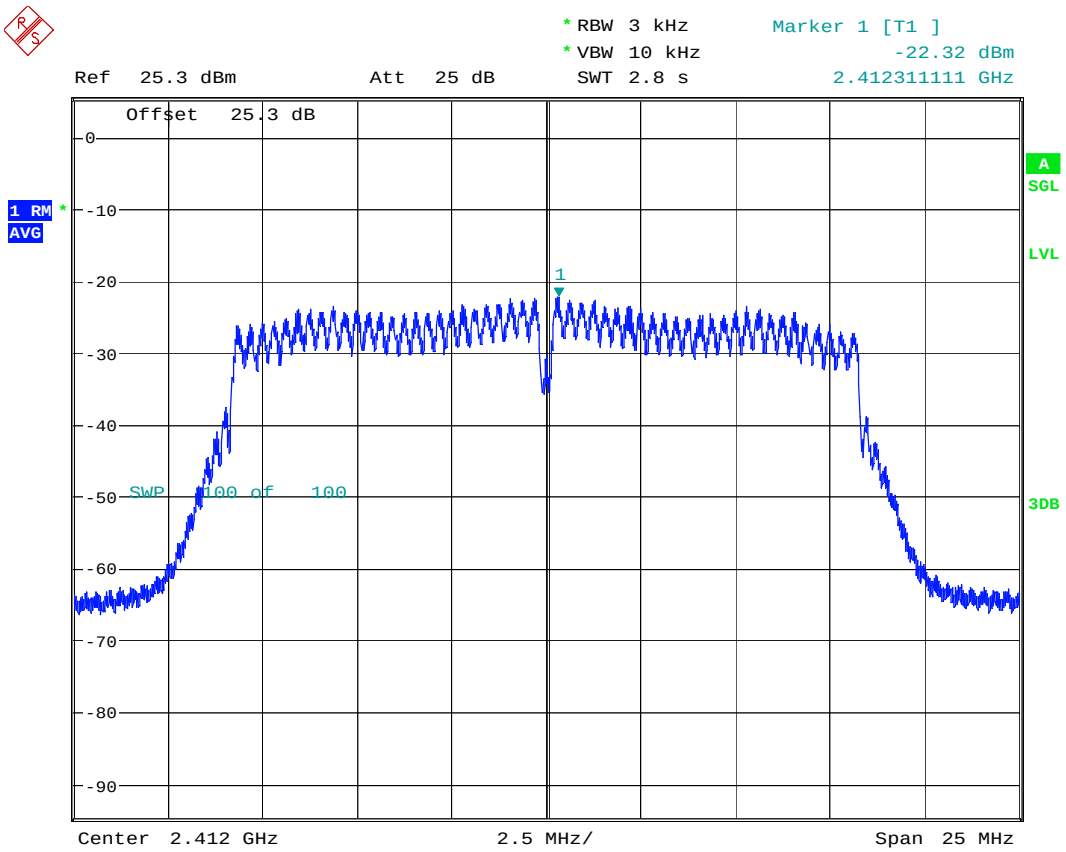
Plot # 24

Tx Frequency: 2462 MHz	Mode: 802.11b



Plot # 25

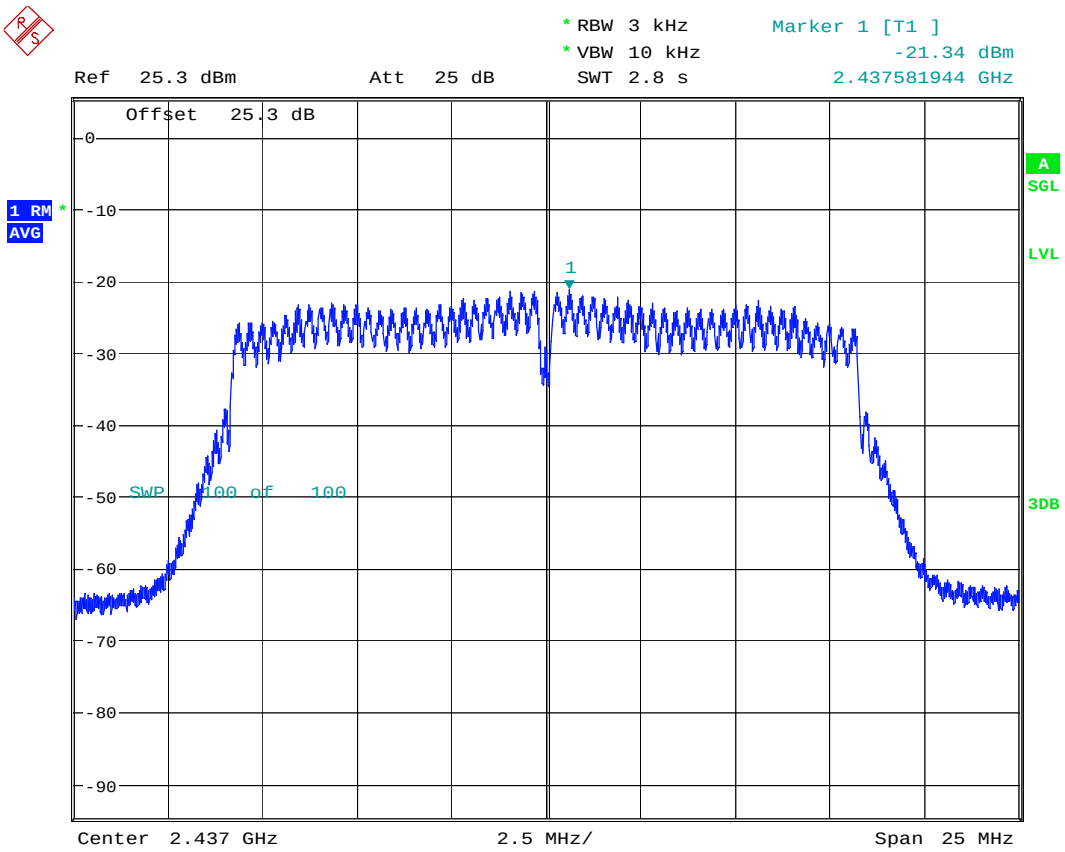
Tx Frequency: 2412 MHz	Mode: 802.11g	Primary



Date: 13.APR.2021 15:09:30

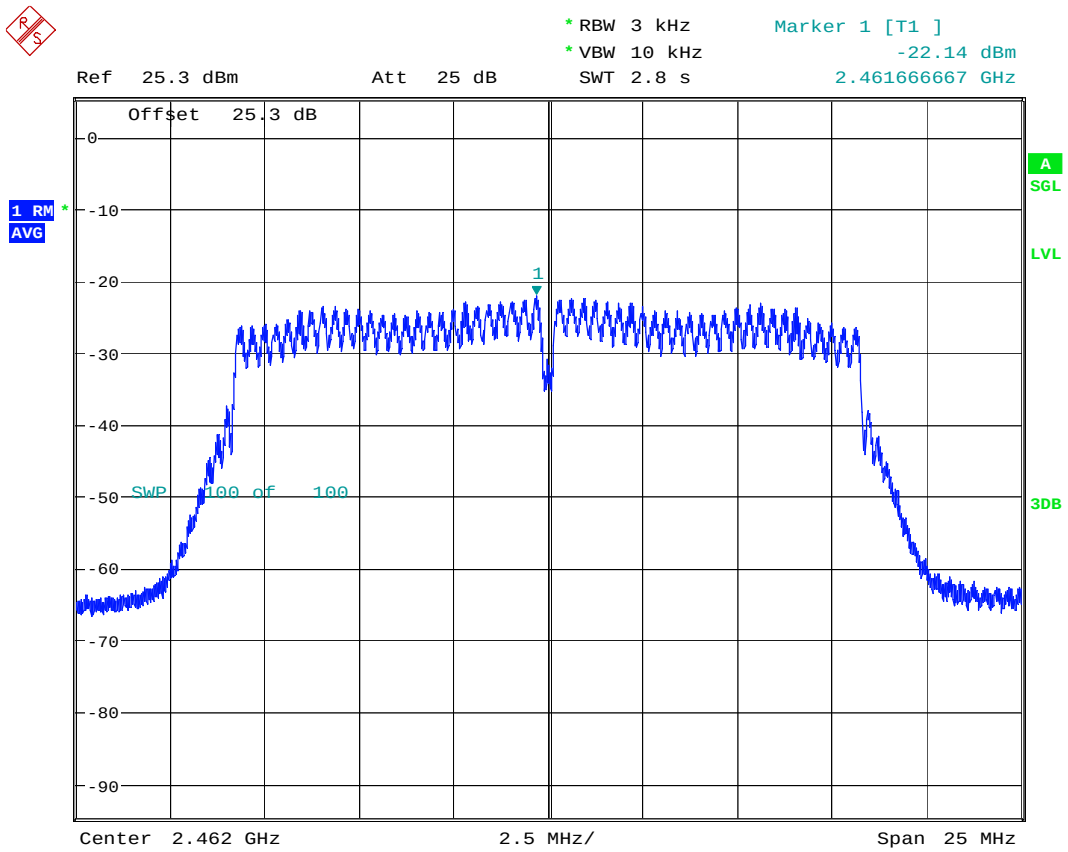
Plot # 26

Tx Frequency: 2437 MHz	Mode: 802.11g



Plot # 27

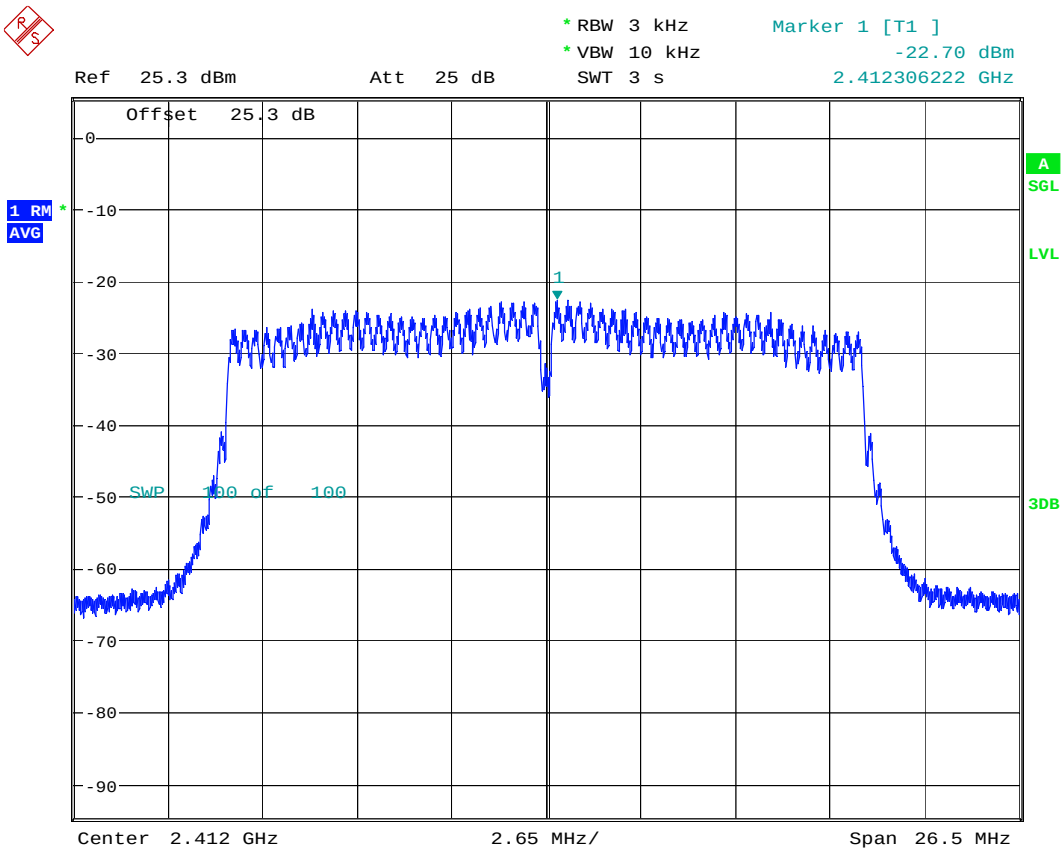
Tx Frequency: 2462 MHz	Mode: 802.11g



Date: 13.APR.2021 14:56:01

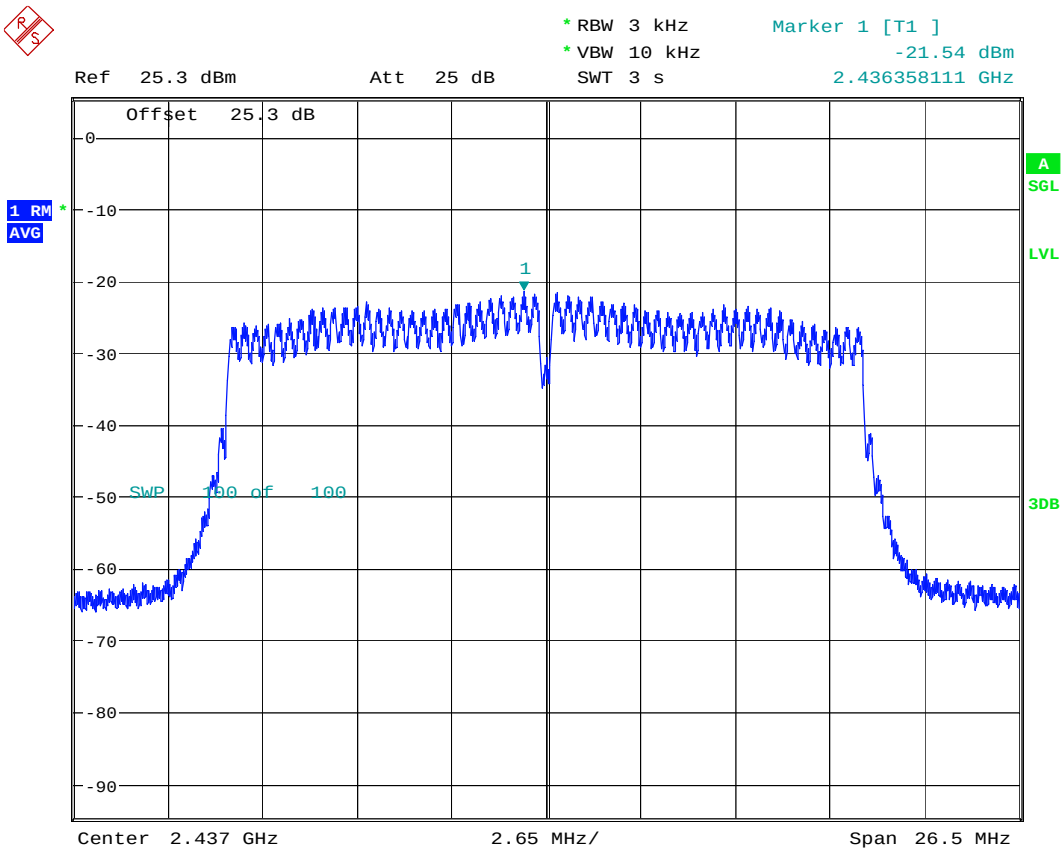
Plot # 28

Tx Frequency: 2412 MHz	Mode: 802.11n



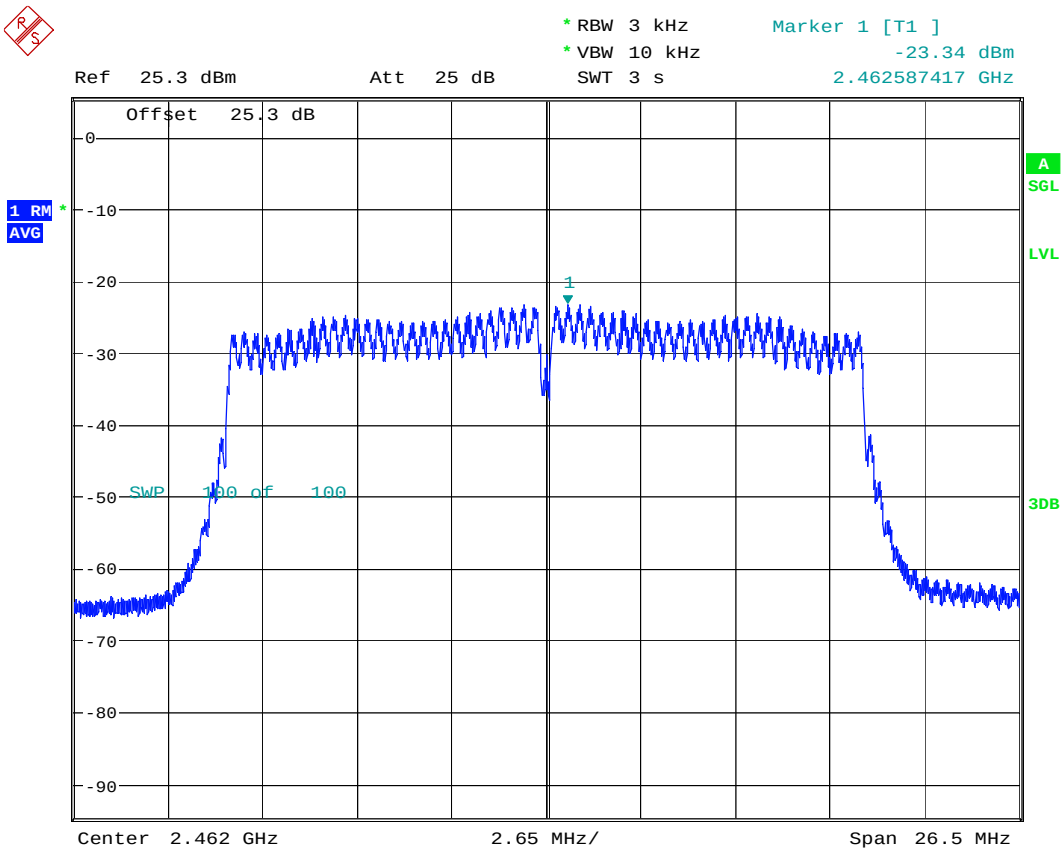
Plot # 29

Tx Frequency: 2437 MHz	Mode: 802.11n



Plot # 30

Tx Frequency: 2462 MHz	Mode: 802.11n



8.5 Band Edge Compliance

8.5.1 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 ≥ 3 x 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

8.5.2 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

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

- *PEAK LIMIT= 74 dBµV/m @3m =-21.23 dBm
- *AVG. LIMIT= 54 dBµV/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
[1]0.495-0.505	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			

8.5.4 Test conditions and setup:

Restricted and Non-Restricted Band:

Ambient Temperature	EUT #	EUT operating mode	Power Input	Antenna Gain
23.8°C	1	Op.1	12 V DC	5.8 dBi

8.5.5 Measurement result:

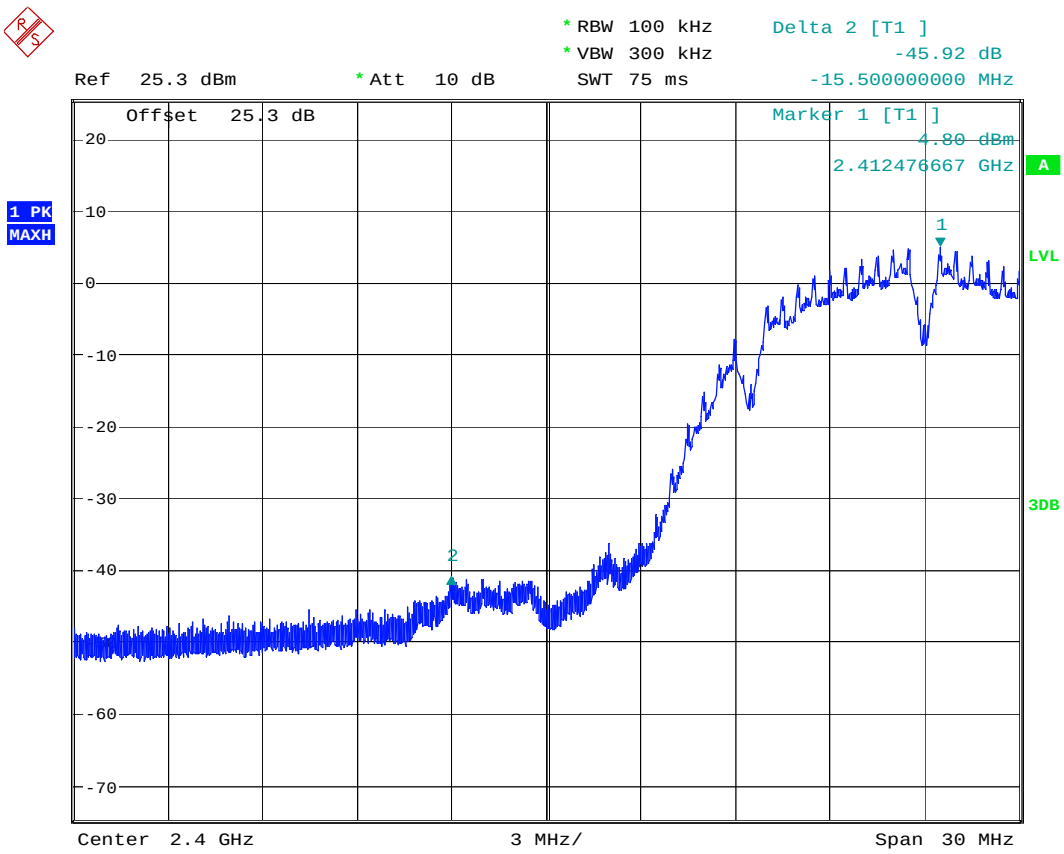
Plot #	EUT operating mode	Band Edge	Marker delta (dB)	Limit (dBc)	Result
31	802.11b	Lower Non-restricted	45.92	> 30	Pass
32	802.11g	Lower Non-restricted	39.18	> 30	Pass
33	802.11n	Lower Non-restricted	40.62	> 30	Pass

Plot #	EUT operating mode	Band Edge	Measured Peak/AVG Value (dBm)	Corrected by Antenna Gain (dBm)	Limit (dBm)	Result
34	802.11b	Upper Restricted	Peak: -37.9	Peak: -32.10	Peak: -21.23	Pass
			AVG: -52.11	AVG: -46.31	AVG: -41.23	
35	802.11g	Upper Restricted	Peak: -29.43	Peak: -23.63	Peak: -21.23	Pass
			AVG: -48.6	AVG: -42.8	AVG: -41.23	
36	802.11n HT20	Upper Restricted	Peak: -30.44	Peak: -24.64	Peak: -21.23	Pass
			AVG: -49.05	AVG: -43.25	AVG: -41.23	

8.5.6 Measurement Plots:

Plot # 31

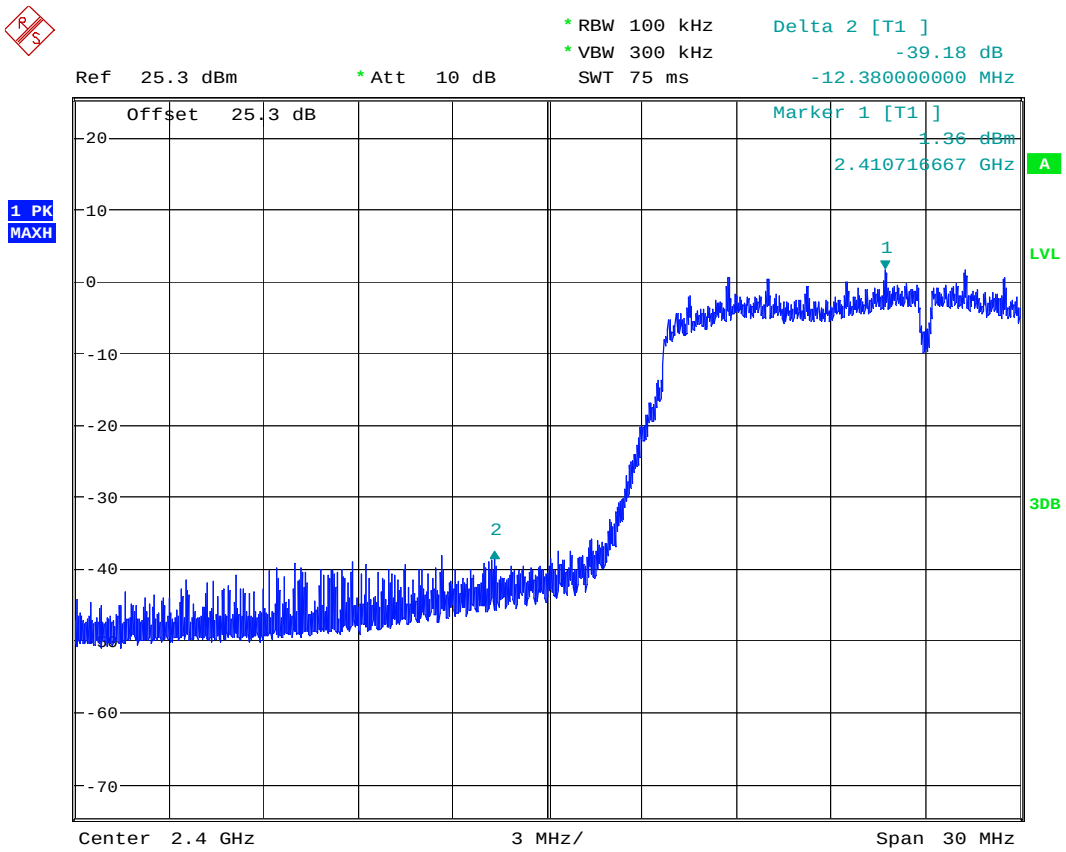
Tx Frequency: 2412 MHz	Mode: 802.11b



Date: 13.APR.2021 15:18:47

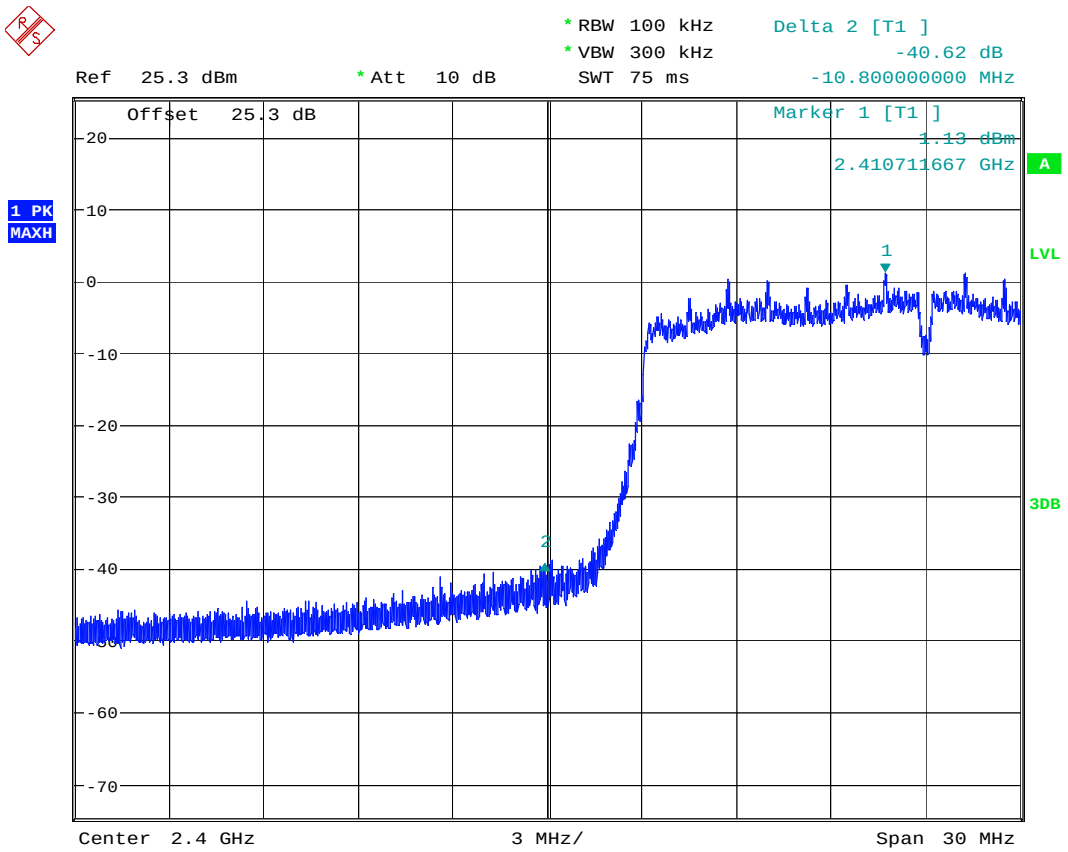
Plot # 32

Tx Frequency: 2412 MHz	Mode: 802.11g



Plot # 33

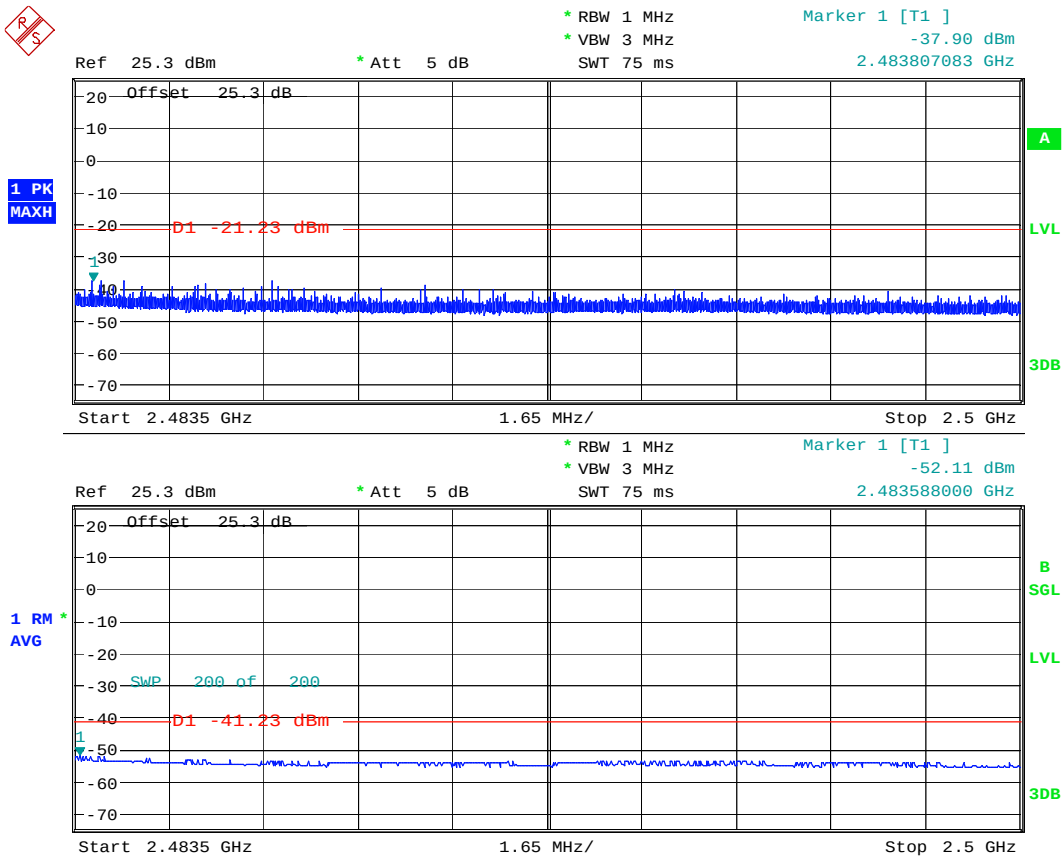
Tx Frequency: 2412 MHz	Mode: 802.11n



Date: 13.APR.2021 15:27:52

Plot # 34

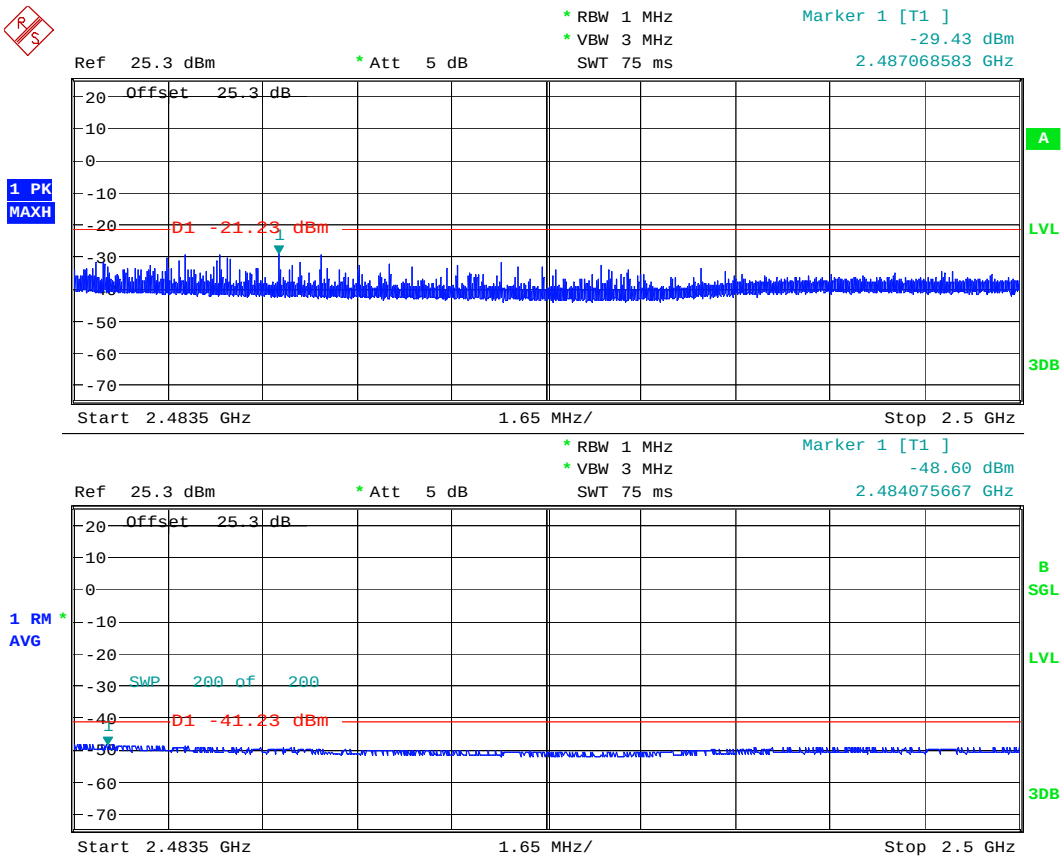
Tx Frequency: 2462 MHz	Mode: 802.11b



Date: 13.APR.2021 15:51:59

Plot # 35

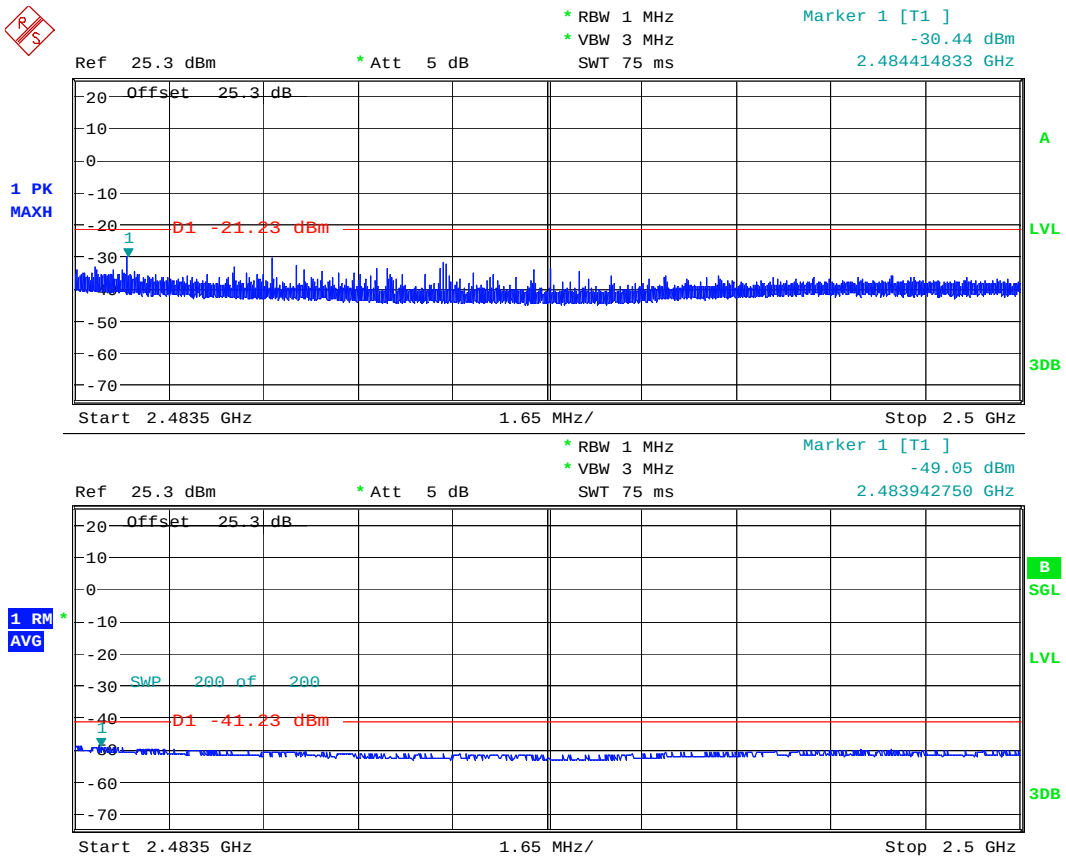
Tx Frequency: 2462 MHz	Mode: 802.11g



Date: 13.APR.2021 15:55:05

Plot # 36

Tx Frequency: 2462 MHz	Mode: 802.11n



Date: 13.APR.2021 16:02:39

8.6 Frequency Stability

8.6.1 Measurement according to:

- **FCC: CFR 47 Part 2.1055 / ISED RSS-Gen 6.11**

- **ANSI C63.10-2013 6.8**
  - **6.8.1 Frequency stability with respect to ambient temperature.**

a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.

If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible.

Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.

b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.

NOTE – An instrument that has an adequate level of accuracy as specified by the procuring or regulatory agency is the recommended measuring instrument.

c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

g) Measure the frequency at each of frequencies specified in 5.6.

h) Switch OFF the EUT but do not switch OFF the oscillator heater.

i) Lower the chamber temperature by not more than 10 °C, and allow the temperature inside the chamber to stabilize.

j) Repeat step f) through step i) down to the lowest specified temperature.

- Spectrum Analyzer settings:
  - RBW =200 kHz
  - VBW ≥ 1 MHz
  - Set span = 10 MHz
  - Sweep time = auto couple
  - Detector = Pk
  - Trace mode = MaxHold
  - Use N dB Down function to set the low and high frequency.

8.6.1.1 Test conditions and setup:

EUT Set-Up #	EUT operating mode	Power Input (V DC)
1	Op. 1	12V DC

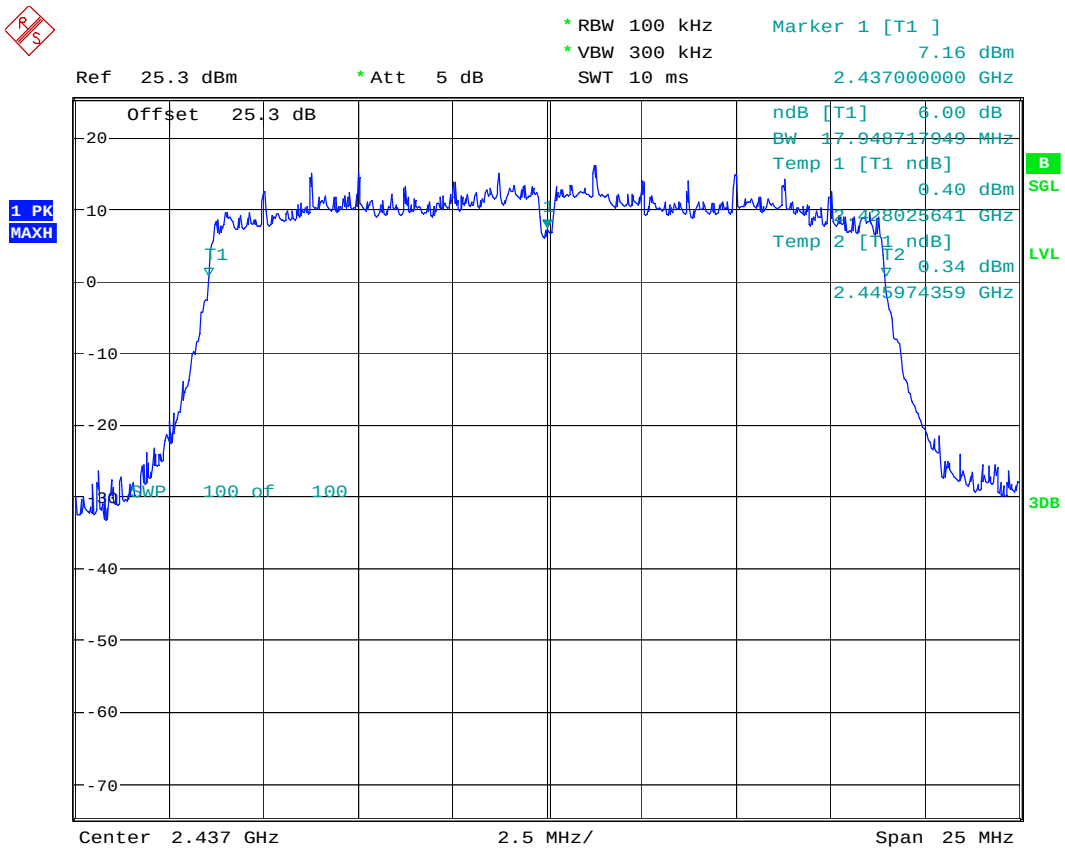
8.6.1.2 Measurement result:

*1 RCF: Reference Center Frequency.
*2 F low: Low frequency; -6 dB
*3 F high: High frequency; +6 dB
*4 CCF: Calculated Center Frequency; CCF = F low + (F high – F low)/2
*5 PPM: [(CCF/RCF)-1] * 10^6

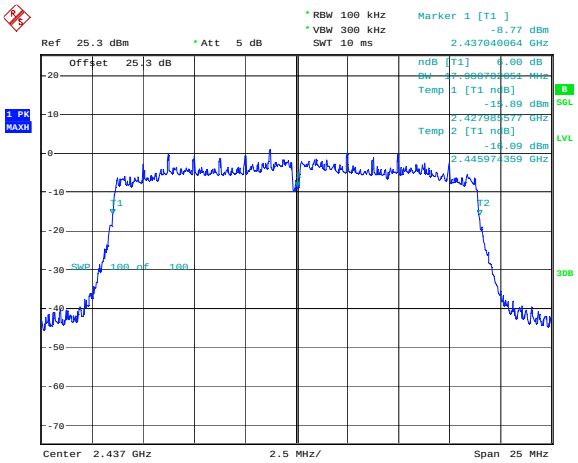
Plot #	Measurement Time (Minutes)	Temperature (°C)	RCF *1 (MHz)	F Low *2 (MHz)	F High *3 (MHz)	CCF *4 (MHz)	PPM *5 (+-)100
23	-	23	-	2428.025	2445.970	2436.998	-
24	0	60	2436.998	2427.985	2445.970	2436.978	-8.207
25	2	60		2427.980	2445.970	2436.975	-9.233
26	5	60		2428.025	2445.970	2436.998	0.000
27	10	60		2428.025	2445.970	2436.998	0.000
28	0	50	2436.998	2427.980	2445.970	2436.975	-9.233
29	2	50		2427.980	2445.970	2436.975	-9.233
30	5	50		2427.980	2445.970	2436.975	-9.233
31	10	50		2428.020	2445.970	2436.995	-1.026
32	0	40	2436.998	2427.980	2445.970	2436.975	-9.233
33	2	40		2428.020	2445.970	2436.995	-1.026
34	5	40		2427.985	2445.970	2436.978	-8.207
35	10	40		2428.020	2445.970	2436.995	-1.026
36	0	30	2436.998	2428.020	2446.010	2437.015	7.181
37	2	30		2427.980	2445.970	2436.975	-9.233
38	5	30		2427.985	2445.970	2436.978	-8.207
39	10	30		2427.985	2445.974	2436.980	-7.386
40	0	10	2436.998	2428.025	2446.014	2437.020	9.028
41	2	10		2427.980	2446.010	2436.995	-1.026
42	5	10		2428.020	2445.970	2436.995	-1.026
43	10	10		2428.020	2445.970	2436.995	-1.026
44	0	0	2436.998	2428.020	2446.010	2437.015	7.181
45	2	0		2428.020	2446.010	2437.015	7.181
46	5	0		2428.020	2446.010	2437.015	7.181
47	10	0		2428.020	2446.010	2437.015	7.181
48	0	-10	2436.998	2428.020	2446.010	2437.015	7.181
49	2	-10		2428.060	2445.970	2437.015	7.181
50	5	-10		2428.020	2446.010	2437.015	7.181
51	10	-10		2428.020	2446.010	2437.015	7.181
52	0	-20	2436.998	2428.020	2446.010	2437.015	7.181
53	2	-20		2428.020	2446.010	2437.015	7.181
54	5	-20		2428.020	2446.010	2437.015	7.181
55	10	-20		2428.060	2445.970	2437.015	7.181
56	0	-30	2436.998	2428.020	2446.010	2437.015	7.181
57	2	-30		2428.060	2446.010	2437.035	15.388
58	5	-30		2428.020	2446.010	2437.015	7.181
59	10	-30		2428.020	2446.010	2437.015	7.181

8.6.1.3 Measurement plots:

Plot #37		
2437 MHz	Reference Measurement	Temperature: 23°C

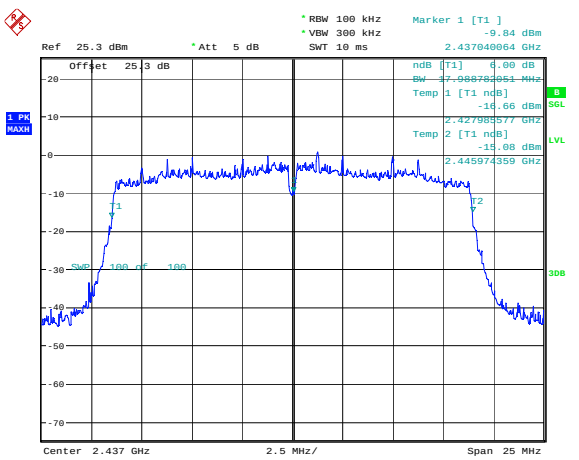


Plot #38		
2437 MHz	Measurement time: 0 min	Temperature: 60°C



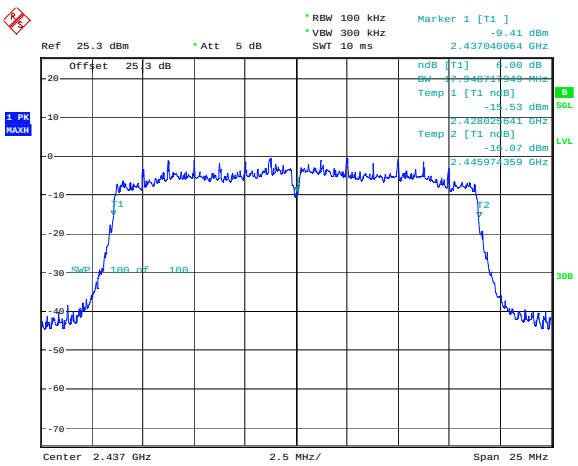
Date: 14.APR.2021 15:56:09

Plot #39		
2437 MHz	Measurement time: 2 min	Temperature: 60°C



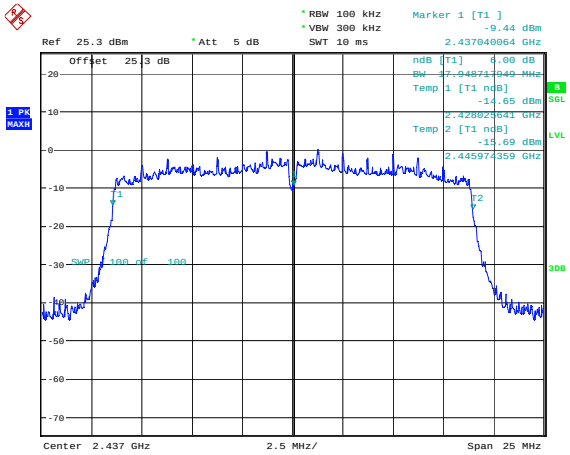
Date: 14.APR.2021 15:58:38

Plot #40		
2437 MHz	Measurement time: 5 min	Temperature: 60°C



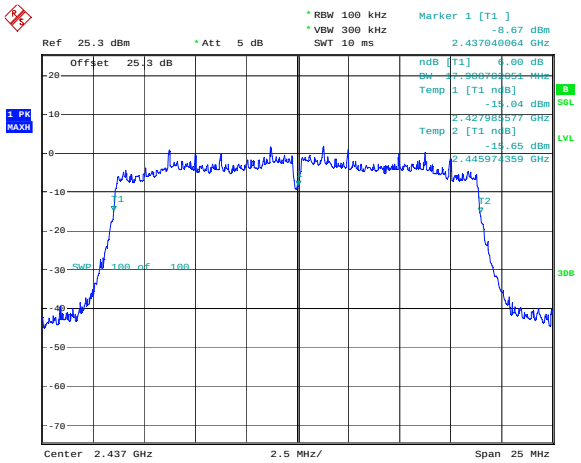
Date: 14.APR.2021 16:03:51

Plot #41		
2437 MHz	Measurement time: 10 min	Temperature: 60°C



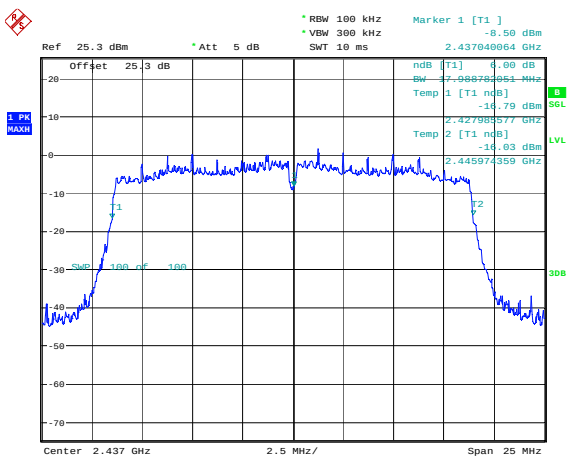
Date: 14.APR.2021 16:14:02

Plot #42		
2437 MHz	Measurement time: 0 min	Temperature: 50°C



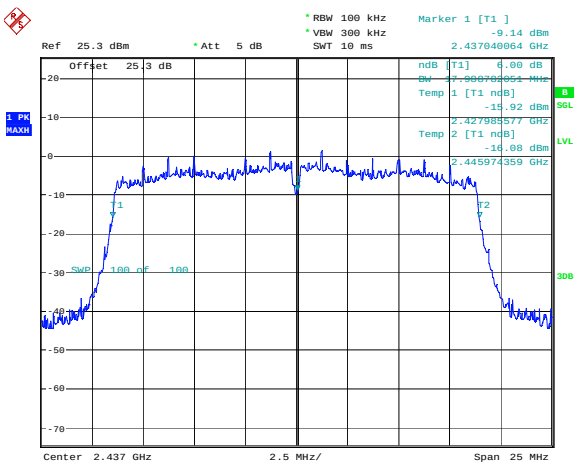
Date: 14.APR.2021 16:27:45

Plot #43		
2437 MHz	Measurement time: 2 min	Temperature: 50°C



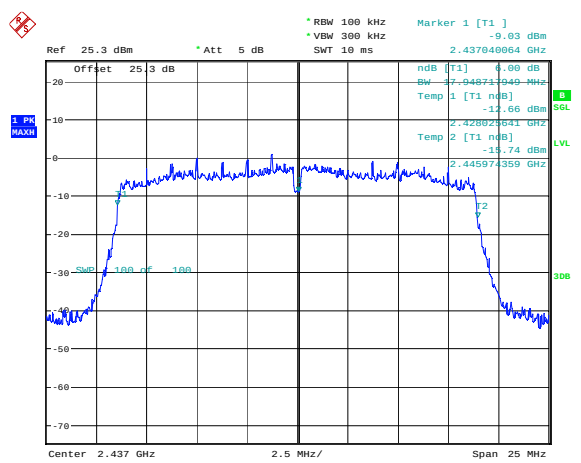
Date: 14.APR.2021 16:29:52

Plot #44		
2437 MHz	Measurement time: 5 min	Temperature: 50°C



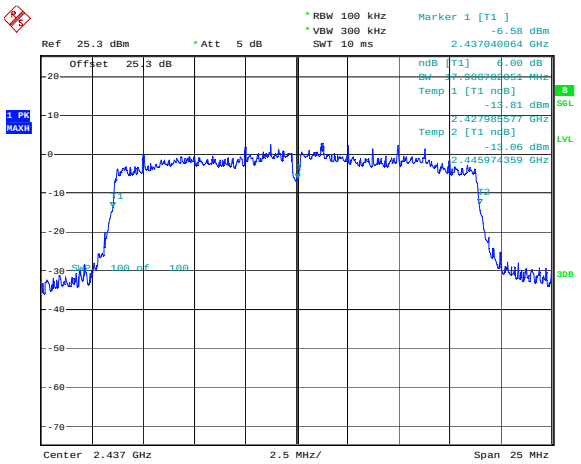
Date: 14.APR.2021 16:35:05

Plot #45		
2437 MHz	Measurement time: 10 min	Temperature: 50°C



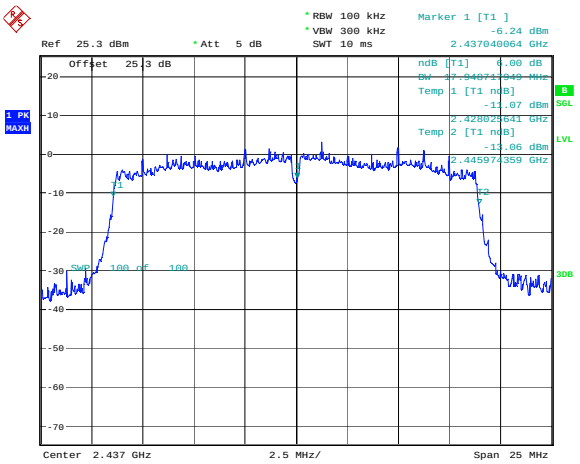
Date: 14.APR.2021 16:45:36

Plot #46		
2437 MHz	Measurement time: 0 min	Temperature: 40°C



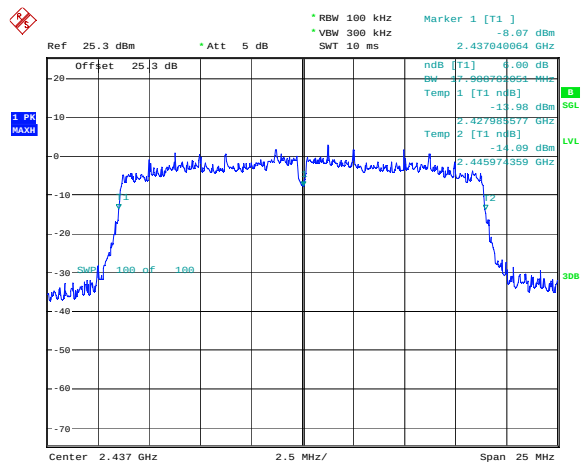
Date: 14.APR.2021 17:48:20

Plot #47		
2437 MHz	Measurement time: 2 min	Temperature: 40°C



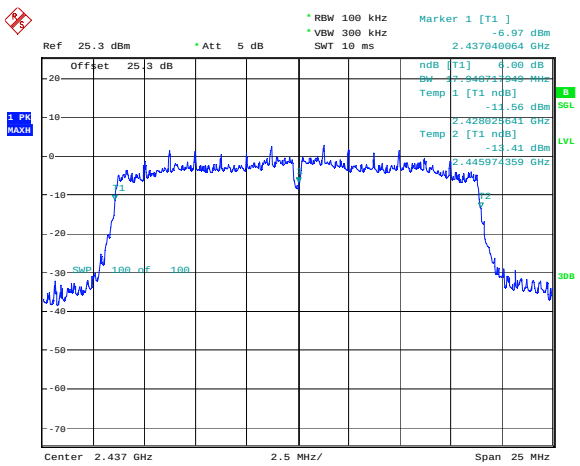
Date: 14.APR.2021 17:50:46

Plot #48		
2437 MHz	Measurement time: 5 min	Temperature: 40°C



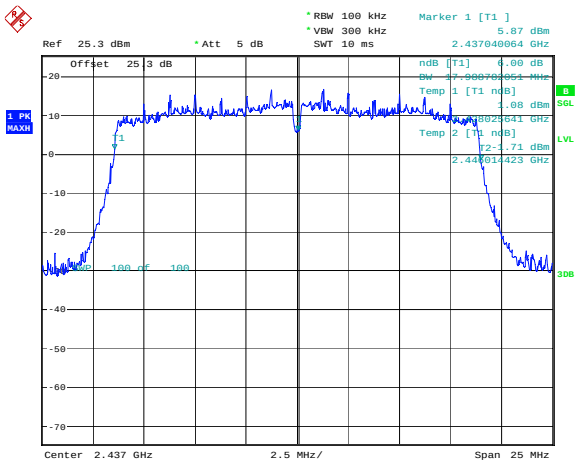
Date: 14.APR.2021 17:56:04

Plot #49		
2437 MHz	Measurement time: 10 min	Temperature: 40°C



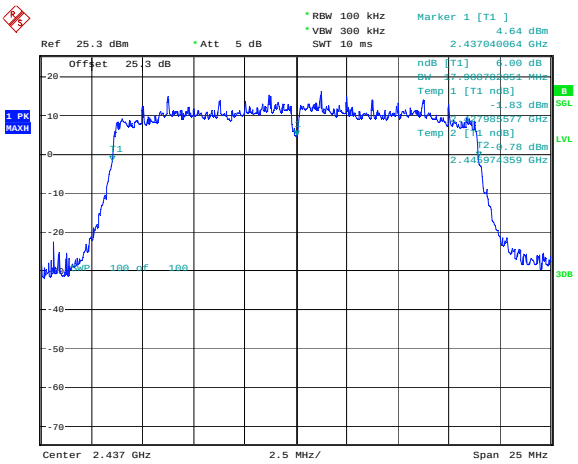
Date: 14.APR.2021 18:06:28

Plot #50		
2437 MHz	Measurement time: 0 min	Temperature: 30°C



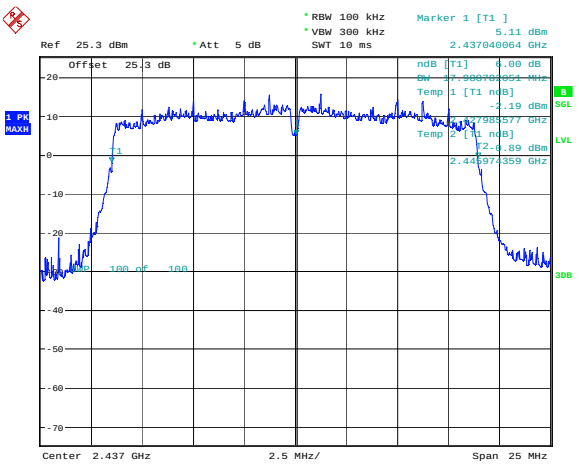
Date: 14.APR.2021 18:23:09

Plot #51		
2437 MHz	Measurement time: 2 min	Temperature: 30°C



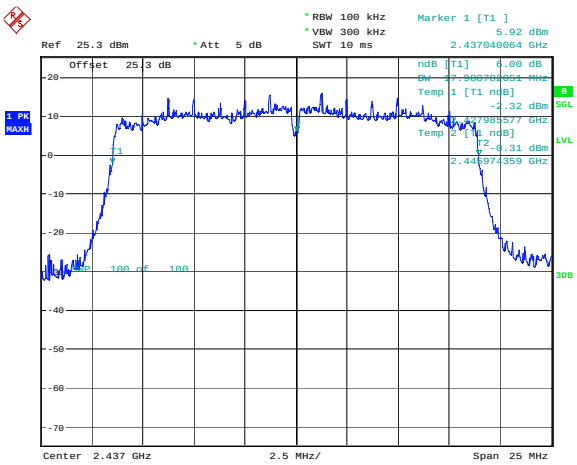
Date: 14.APR.2021 18:25:25

Plot #52		
2437 MHz	Measurement time: 5 min	Temperature: 30°C



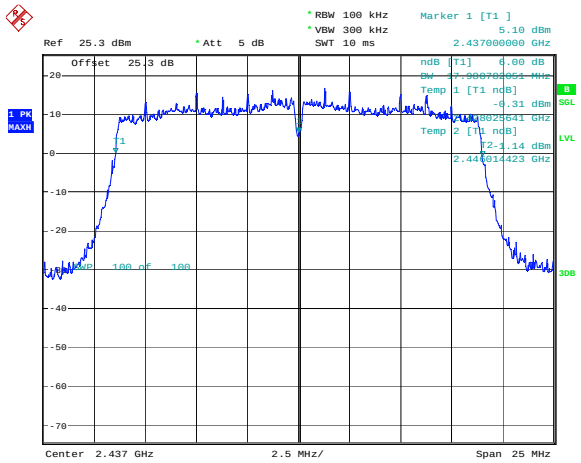
Date: 14.APR.2021 18:30:44

Plot #53		
2437 MHz	Measurement time: 10 min	Temperature: 30°C



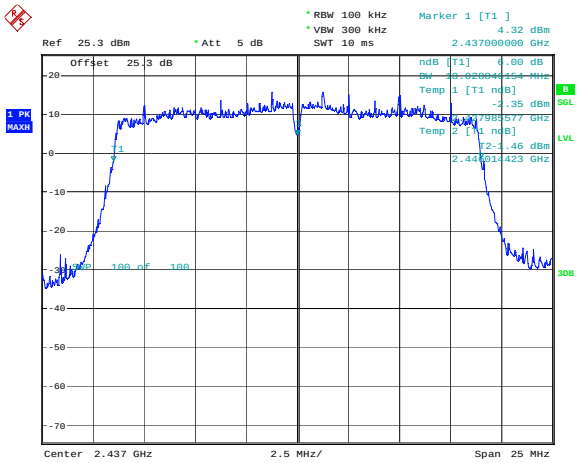
Date: 14.APR.2021 18:41:05

Plot #54		
2437 MHz	Measurement time: 0 min	Temperature: 10°C



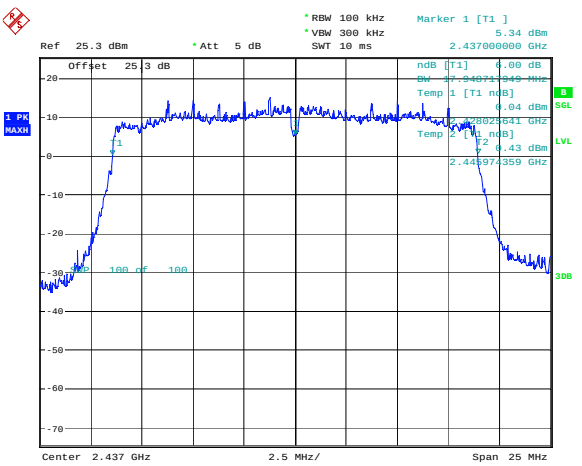
Date: 15.APR.2021 15:51:42

Plot #55		
2437 MHz	Measurement time: 2 min	Temperature: 10°C



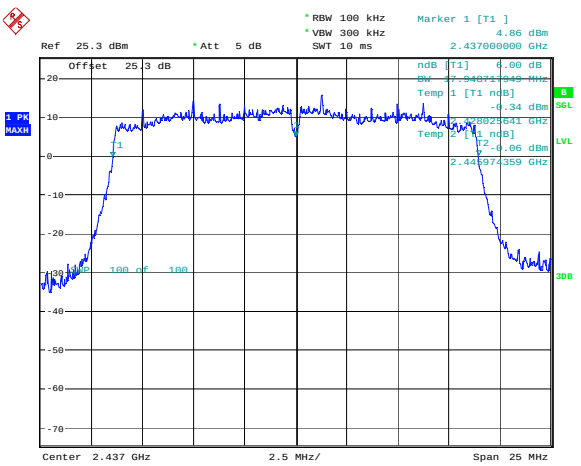
Date: 15.APR.2021 15:54:01

Plot #56		
2437 MHz	Measurement time: 5 min	Temperature: 10°C



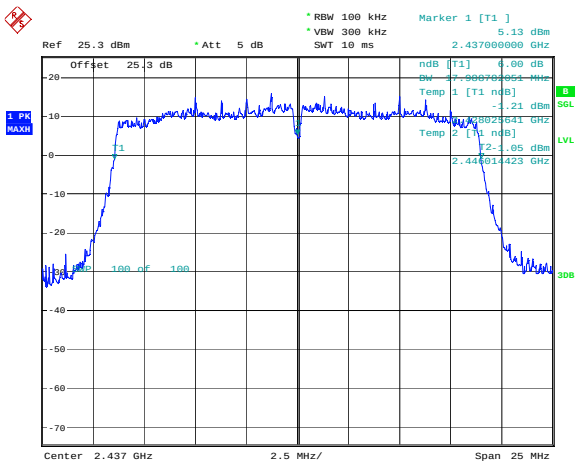
Date: 15.APR.2021 15:59:12

Plot #57		
2437 MHz	Measurement time: 10 min	Temperature: 10°C



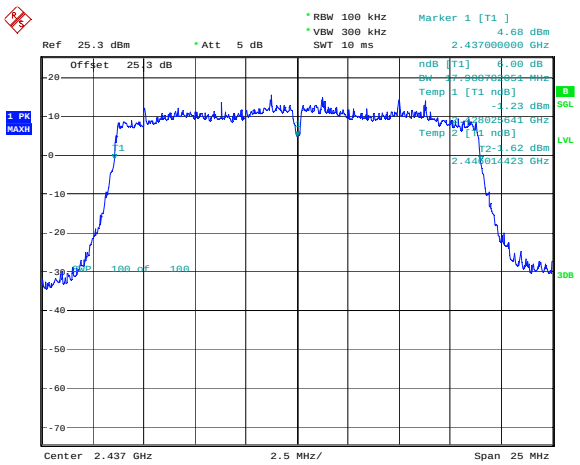
Date: 15.APR.2021 16:09:40

Plot #58		
2437 MHz	Measurement time: 0 min	Temperature: 0°C



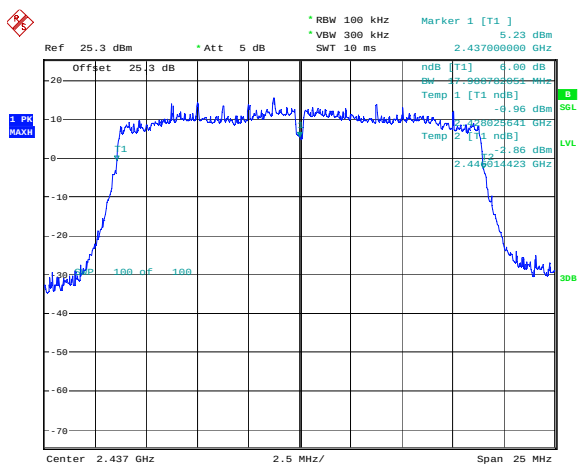
Date: 15.APR.2021 16:32:29

Plot #59		
2437 MHz	Measurement time: 2 min	Temperature: 0°C



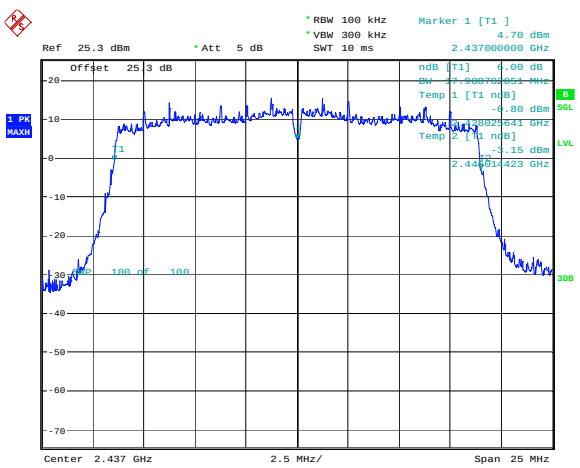
Date: 15.APR.2021 16:34:47

Plot #60		
2437 MHz	Measurement time: 5 min	Temperature: 0°C



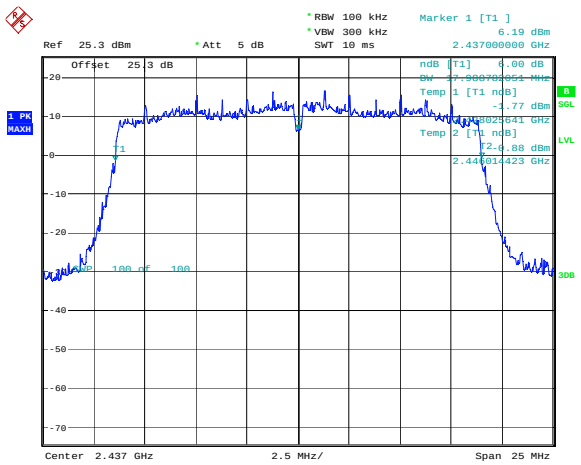
Date: 15.APR.2021 16:40:07

Plot #61		
2437 MHz	Measurement time: 10 min	Temperature: 0°C



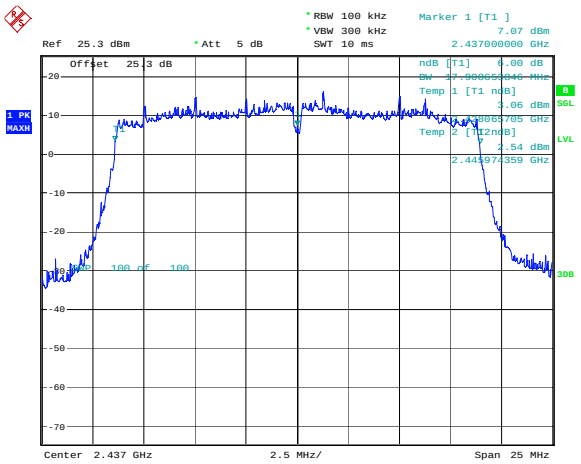
Date: 15.APR.2021 16:50:53

Plot #62		
2437 MHz	Measurement time: 0 min	Temperature: -10°C



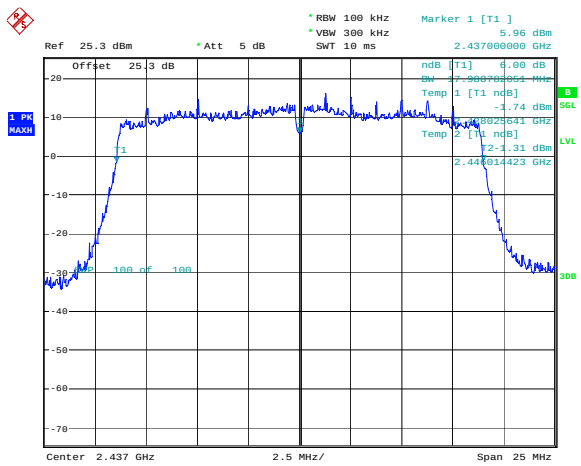
Date: 15.APR.2021 17:11:32

Plot #63		
2437 MHz	Measurement time: 2 min	Temperature: -10°C



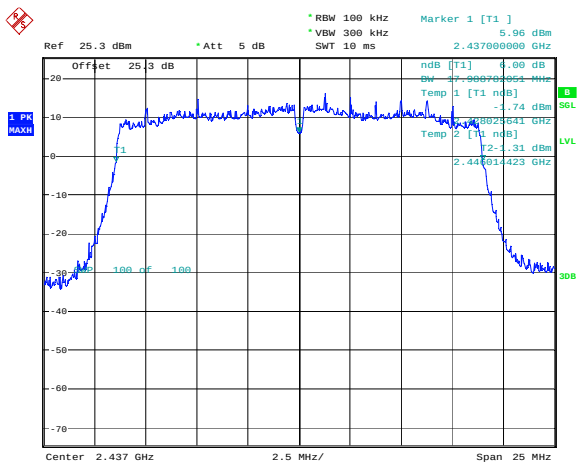
Date: 15.APR.2021 17:13:48

Plot #64		
2437 MHz	Measurement time: 5 min	Temperature: -10°C



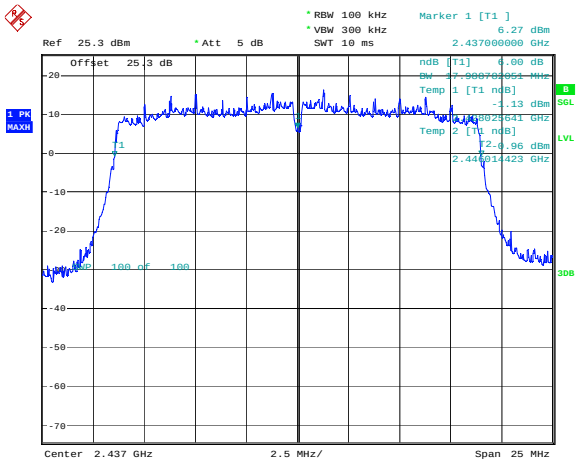
Date: 15.APR.2021 17:19:07

Plot #65		
2437 MHz	Measurement time: 10 min	Temperature: -10°C



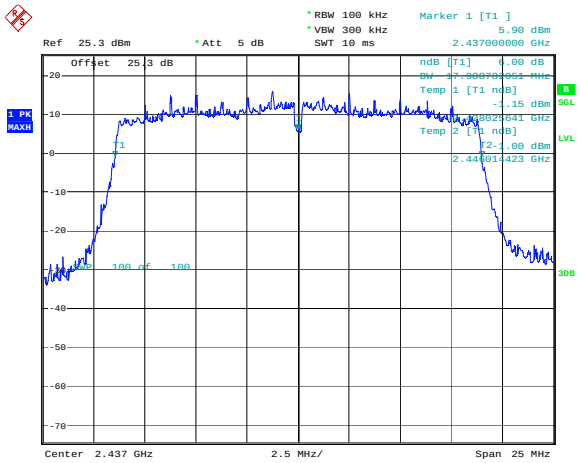
Date: 15.APR.2021 17:29:28

Plot #66		
2437 MHz	Measurement time: 0 min	Temperature: -20°C



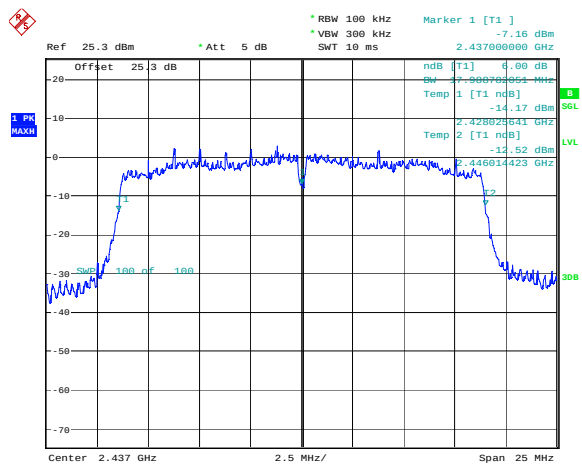
Date: 15.APR.2021 17:45:23

Plot #67		
2437 MHz	Measurement time: 2 min	Temperature: -20°C



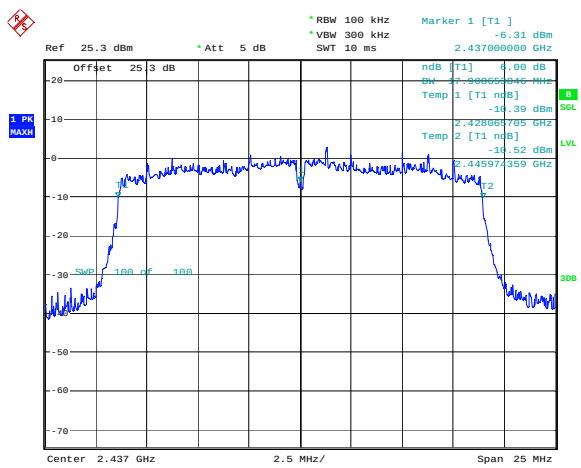
Date: 15.APR.2021 17:47:35

Plot #68		
2437 MHz	Measurement time: 5 min	Temperature: -20°C



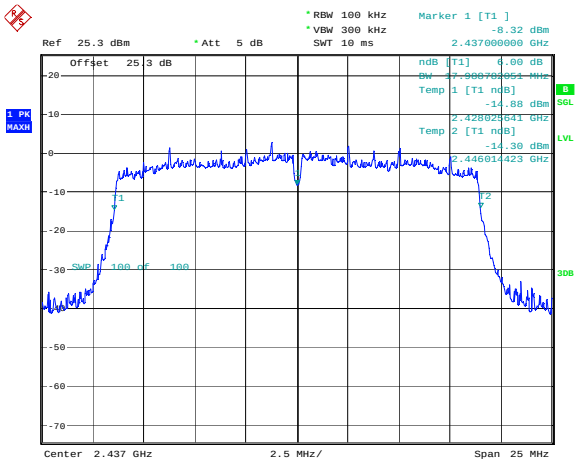
Date: 15.APR.2021 17:54:20

Plot #69		
2437 MHz	Measurement time: 10 min	Temperature: -20°C



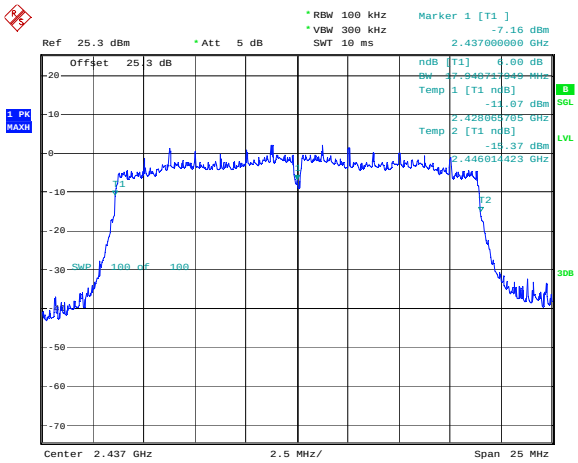
Date: 15.APR.2021 18:05:08

Plot #70		
2437 MHz	Measurement time: 0 min	Temperature: -30°C



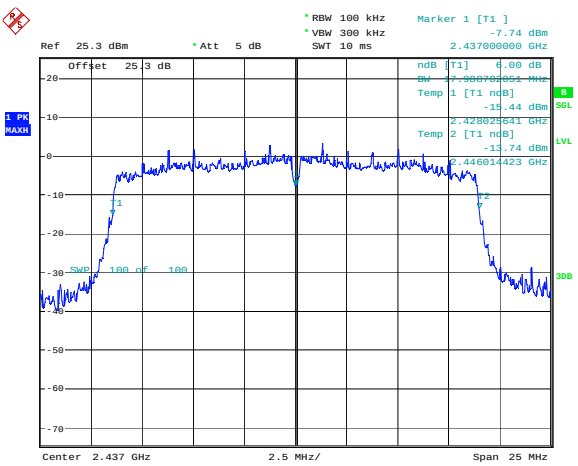
Date: 15.APR.2021 18:34:04

Plot #71		
2437 MHz	Measurement time: 2 min	Temperature: -30°C



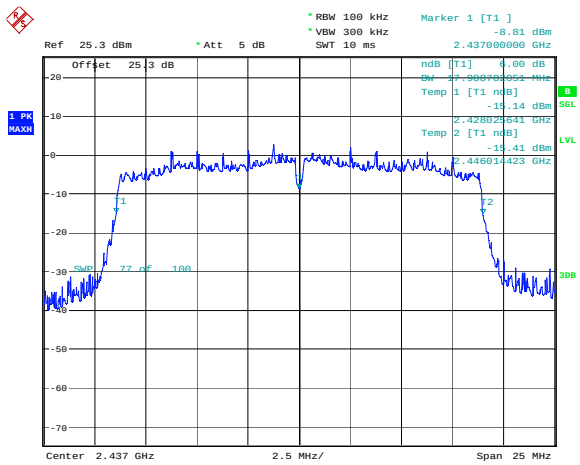
Date: 15.APR.2021 18:36:53

Plot #72		
2437 MHz	Measurement time: 5 min	Temperature: -30°C



Date: 15.APR.2021 18:42:37

Plot #73		
2437 MHz	Measurement time: 10 min	Temperature: -30°C



Date: 15.APR.2021 18:53:06

8.7 Radiated Transmitter Spurious Emissions and Restricted Bands

8.7.1 Measurement according to ANSI C63.10 (2013)

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 at distance other than the specified in the standard, the limit conversion is calculated by using 40 dB/decade extrapolation factor as follow: Conversion factor (CF) = 40 log (D/d) = 40 log (300m / 3m) = 80dB

8.7.2 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)
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

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
[1]0.495-0.505	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
  *AVG. LIMIT= 54 dBµV/m

8.7.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
23.8°C	2	Op. 2	12 V DC

8.7.4 Measurement result:

Plot #	Channel #	Scan Frequency	Lowest emission margin (dBµV/m)	Limit	Result
74 – 76	1	30 MHz – 18 GHz	42.68	See section 8.6.2	Pass
77 – 81	6	9 kHz – 40 GHz	41.88	See section 8.6.2	Pass
82 – 84	11	30 MHz – 18 GHz	41.33	See section 8.6.2	Pass

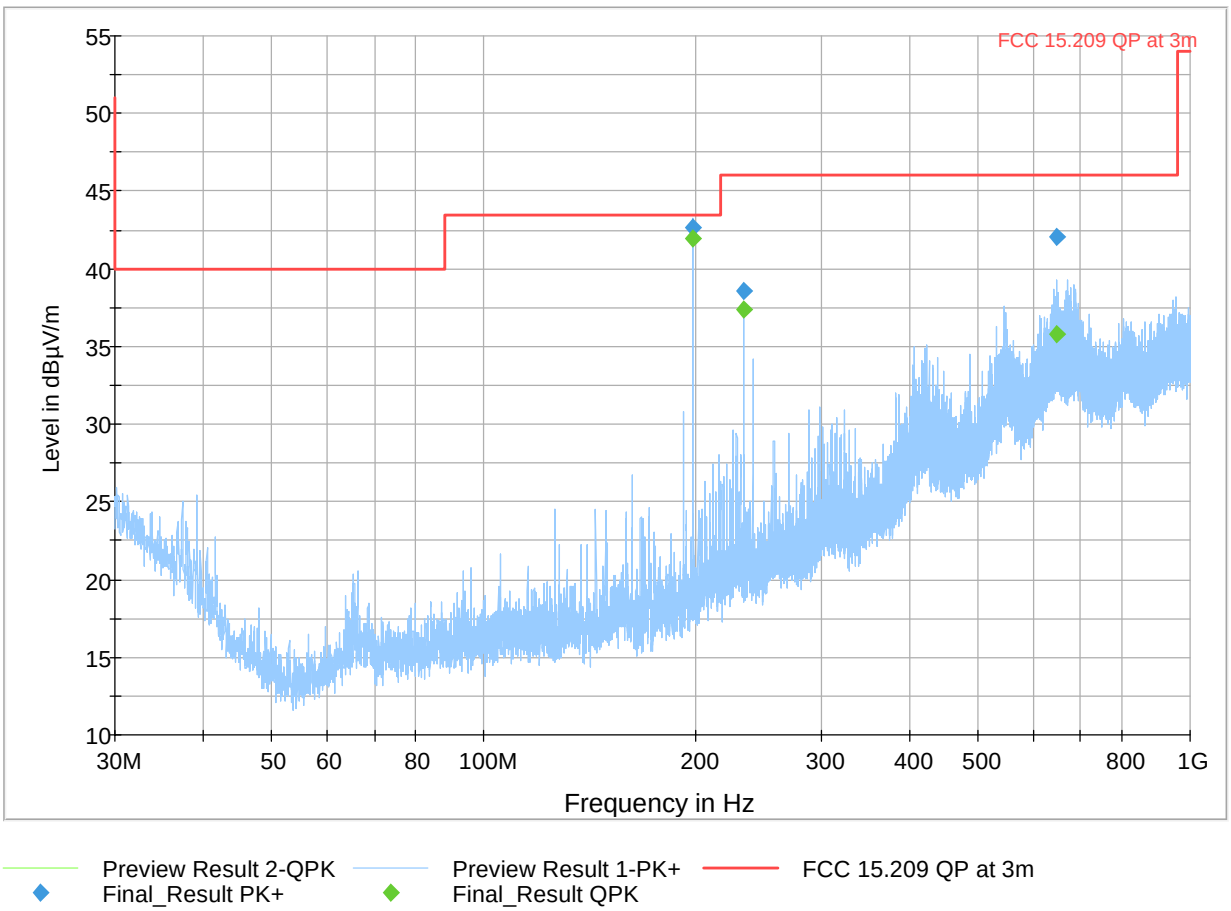
8.7.5 Measurement Plots:

Plot # 74 Radiated Emissions: 30 MHz – 1 GHz

Tx Frequency: 2412 MHz	Mode: 802.11b

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
197.842	---	41.97	---	---	500.0	120.000	140.0	H	236.0	14.5
197.842	42.68	---	43.50	0.82	500.0	120.000	140.0	H	236.0	14.5
233.829	38.57	---	46.02	7.45	500.0	120.000	140.0	H	61.0	16.8
233.829	---	37.36	---	---	500.0	120.000	140.0	H	61.0	16.8
647.599	---	35.75	---	---	500.0	120.000	140.0	V	204.0	27.2
647.599	42.04	---	46.02	3.98	500.0	120.000	140.0	V	204.0	27.2

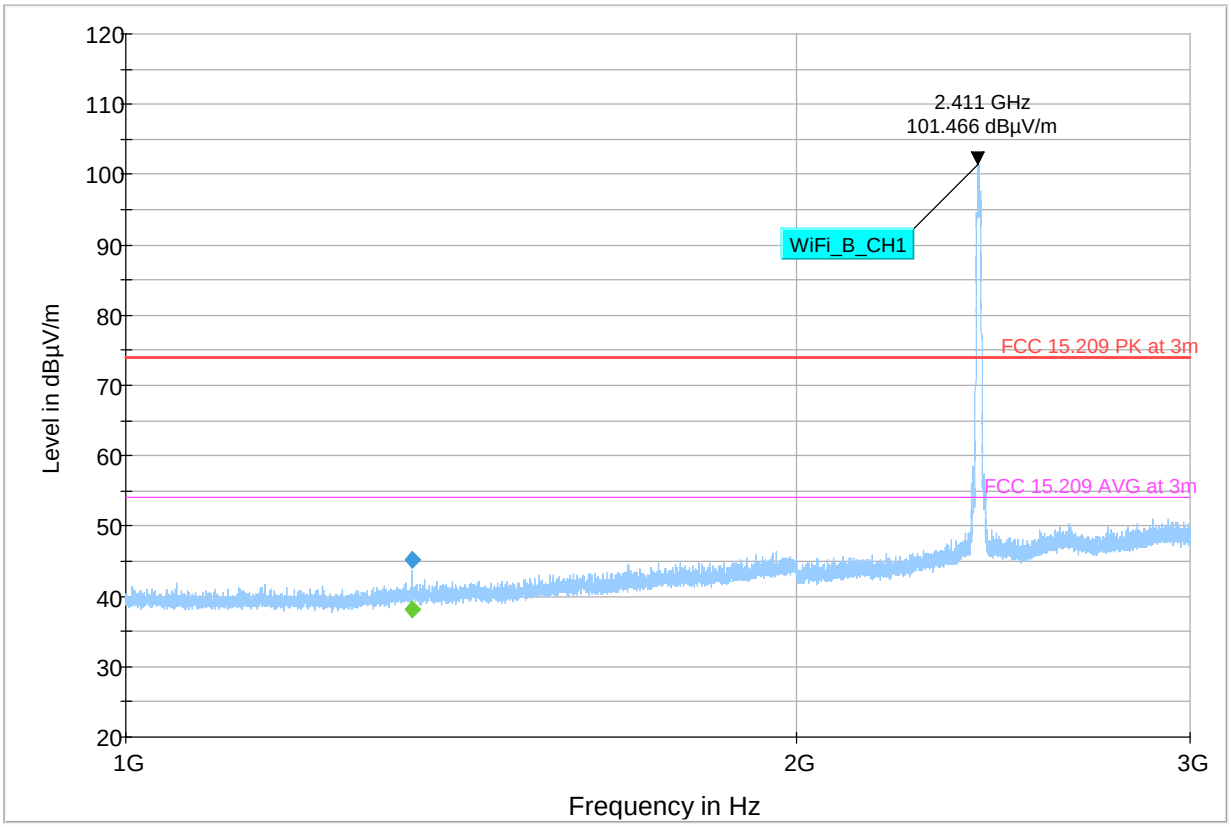


Plot # 75 Radiated Emissions: 1 – 3 GHz

Tx Frequency: 2412 MHz | **Mode: 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)
1344.000	45.15	---	73.98	28.83	500.0	1000.000	140.0	V	78.0	5.1
1344.000	---	38.24	53.98	15.74	500.0	1000.000	140.0	V	78.0	5.1

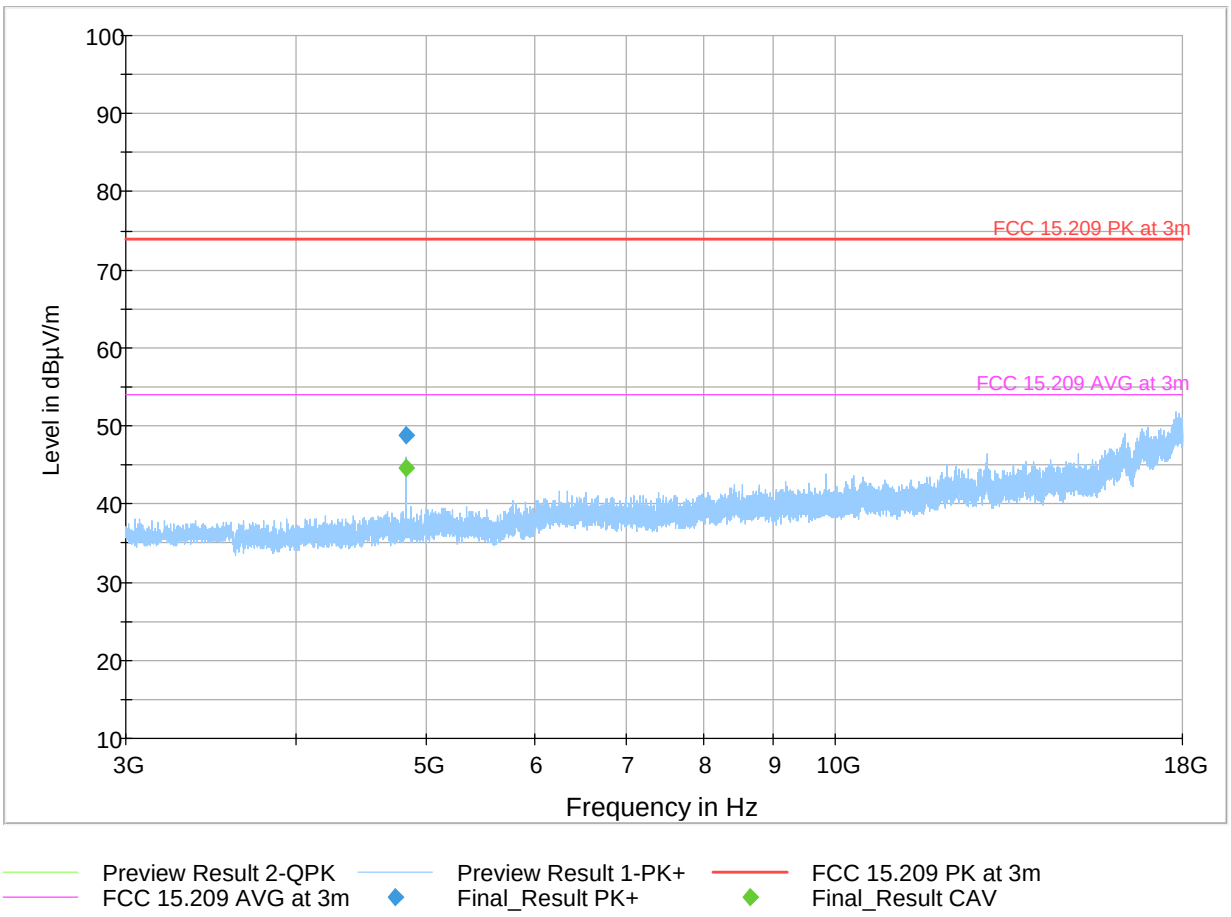


Plot # 76 Radiated Emissions: 3 – 18 GHz

Tx Frequency: 2412 MHz | **Mode: 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)
4824.000	48.84	---	73.98	25.14	500.0	1000.000	140.0	V	149.0	-4.9
4824.000	---	44.62	53.98	9.36	500.0	1000.000	140.0	V	149.0	-4.9

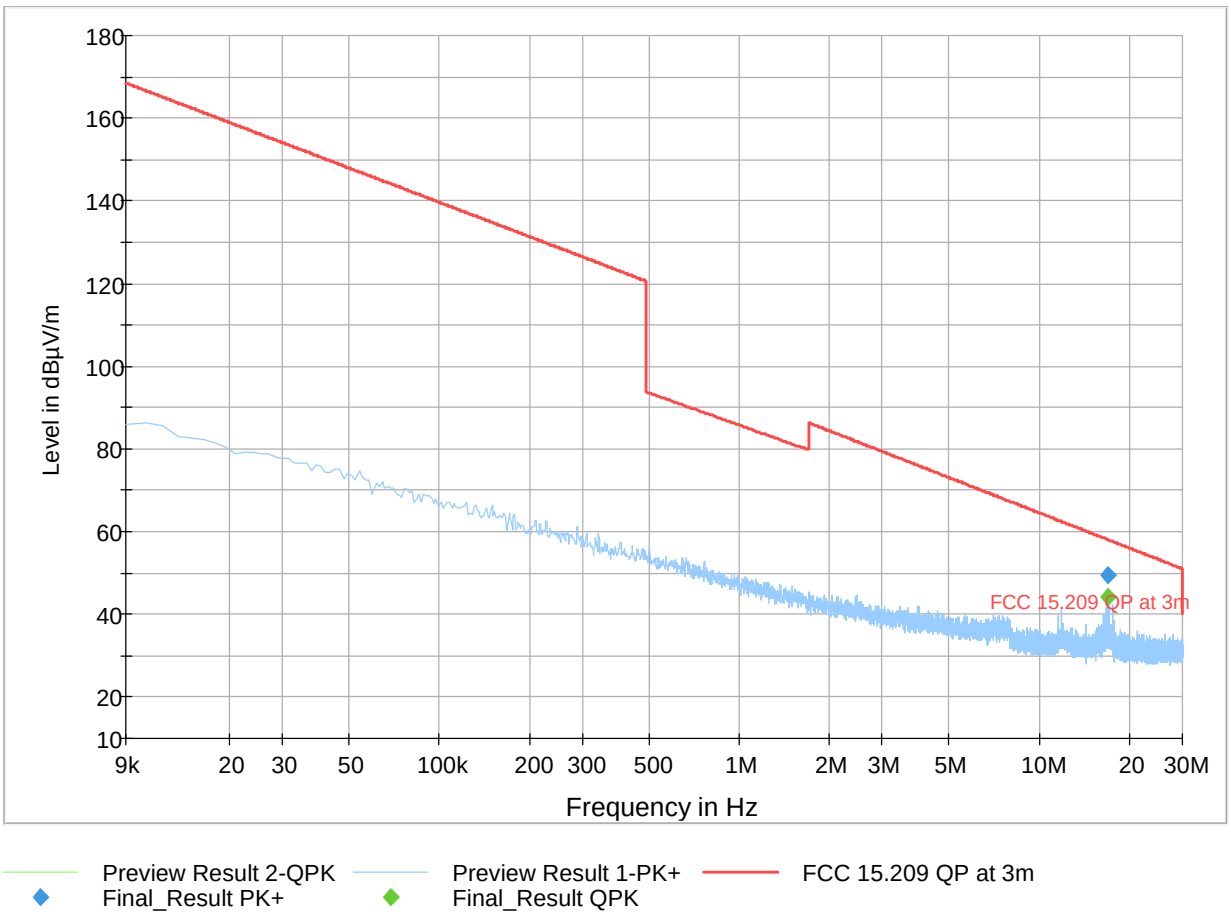


Plot # 77 Radiated Emissions: 9 KHz – 30 MHz

Tx Frequency: 2437 MHz | **Mode: 802.11b**

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
16.982	49.42	---	58.05	8.62	500.0	9.000	140.0	V	316.0	17.0
16.982	---	44.23	58.05	13.82	500.0	9.000	140.0	V	316.0	17.0

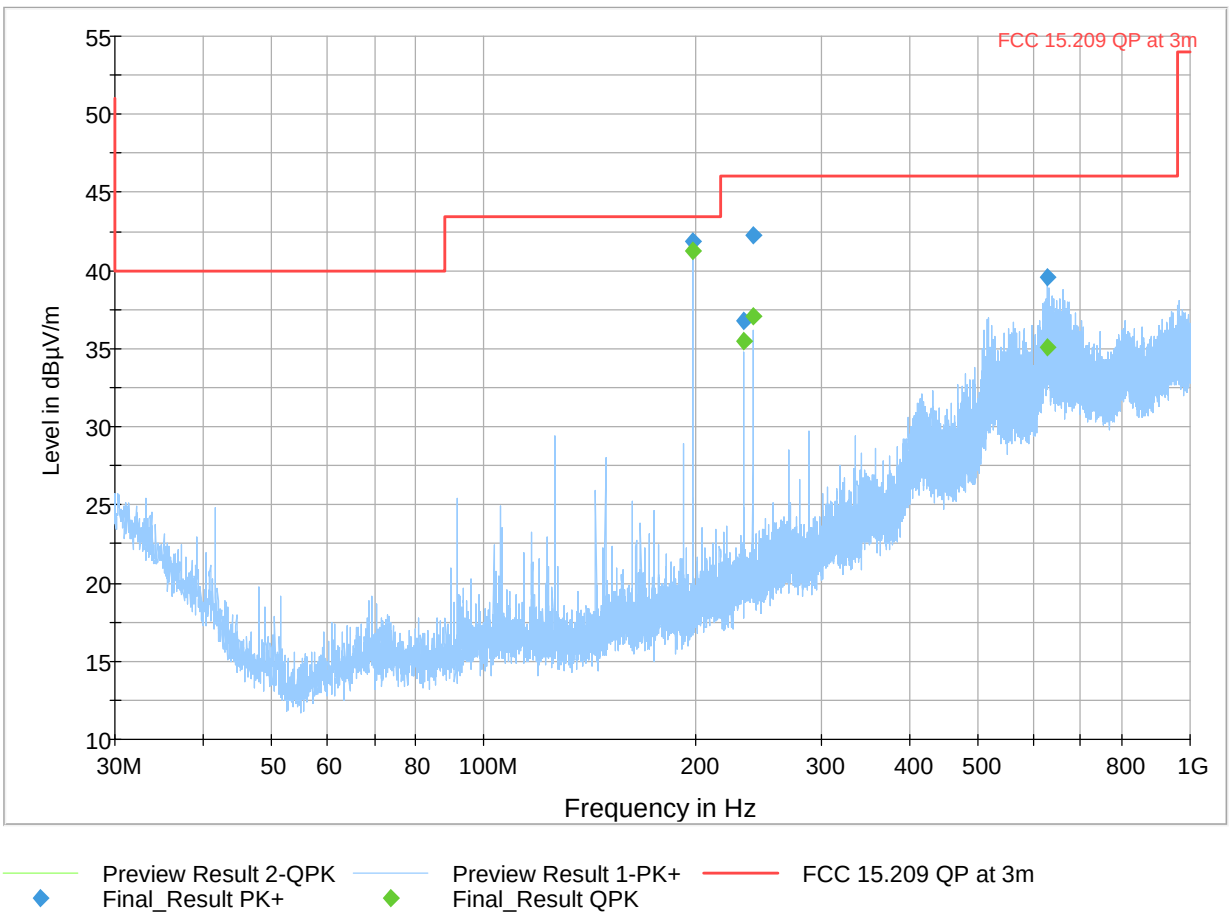


Plot # 78 Radiated Emissions: 30 MHz – 1 GHz

Tx Frequency: 2437 MHz | **Mode: 802.11b**

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
197.842	---	41.22	---	---	500.0	120.000	164.0	H	304.0	14.5
197.842	41.88	---	43.50	1.62	500.0	120.000	164.0	H	304.0	14.5
233.829	---	35.44	---	---	500.0	120.000	140.0	H	277.0	16.8
233.829	36.75	---	46.02	9.27	500.0	120.000	140.0	H	277.0	16.8
240.005	42.27	---	46.02	3.75	500.0	120.000	140.0	H	190.0	17.0
240.005	---	37.04	---	---	500.0	120.000	140.0	H	190.0	17.0
627.552	39.52	---	46.02	6.50	500.0	120.000	174.0	V	199.0	27.8
627.552	---	35.09	---	---	500.0	120.000	174.0	V	199.0	27.8

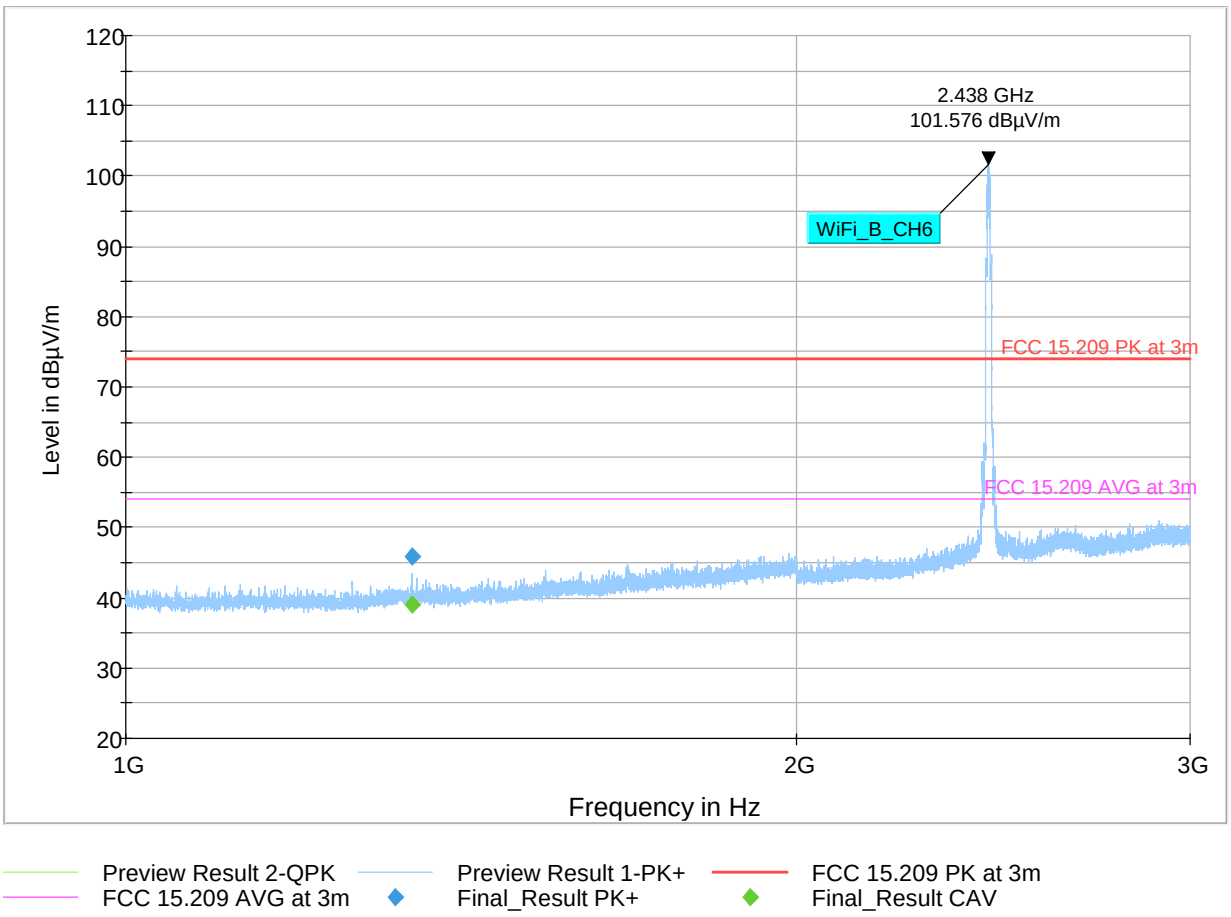


Plot # 79 Radiated Emissions: 1 – 3 GHz

Tx Frequency: 2437 MHz | **Mode: 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)
1344.000	---	39.11	53.98	14.87	500.0	1000.000	163.0	V	16.0	5.1
1344.000	45.84	---	73.98	28.14	500.0	1000.000	163.0	V	16.0	5.1

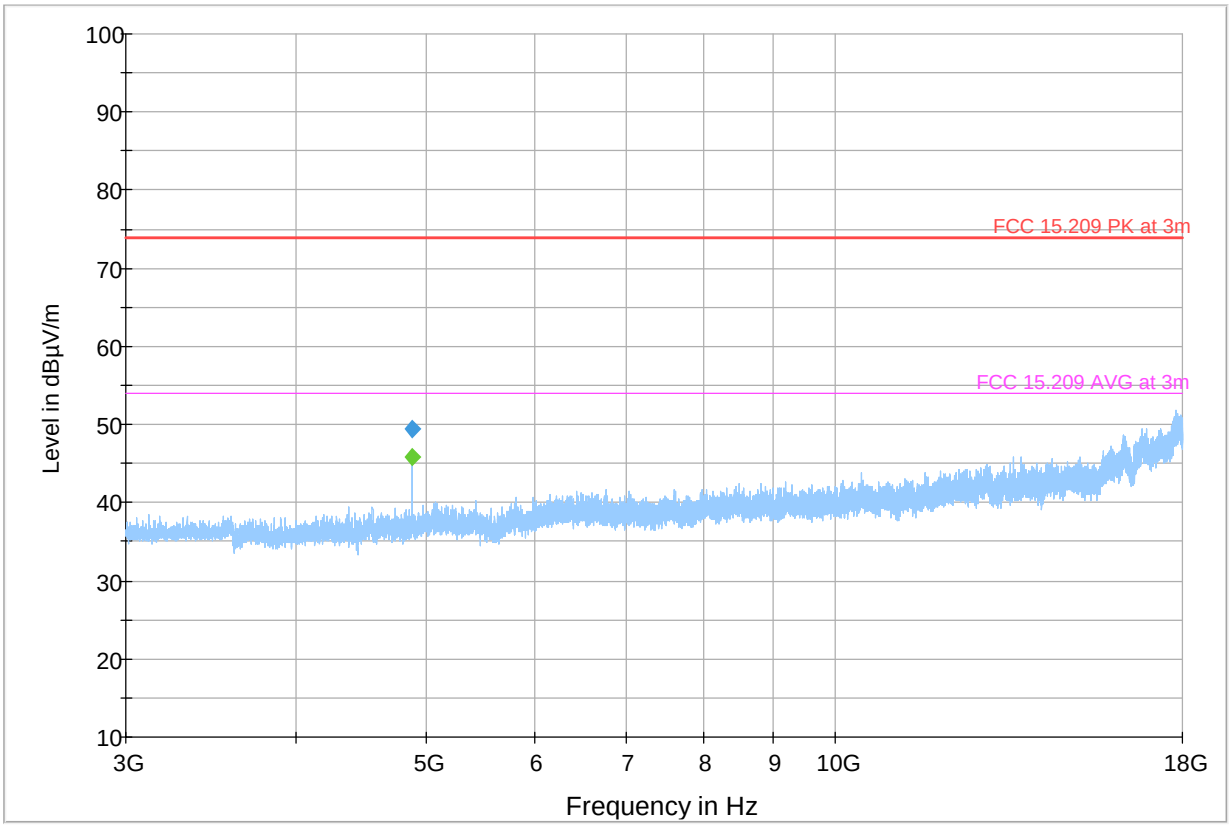


Plot # 80 Radiated Emissions: 3 – 18 GHz

Tx Frequency: 2437 MHz | **Mode: 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)
4874.000	49.50	---	73.98	24.48	500.0	1000.000	140.0	V	141.0	-5.0
4874.000	---	45.83	53.98	8.15	500.0	1000.000	140.0	V	141.0	-5.0

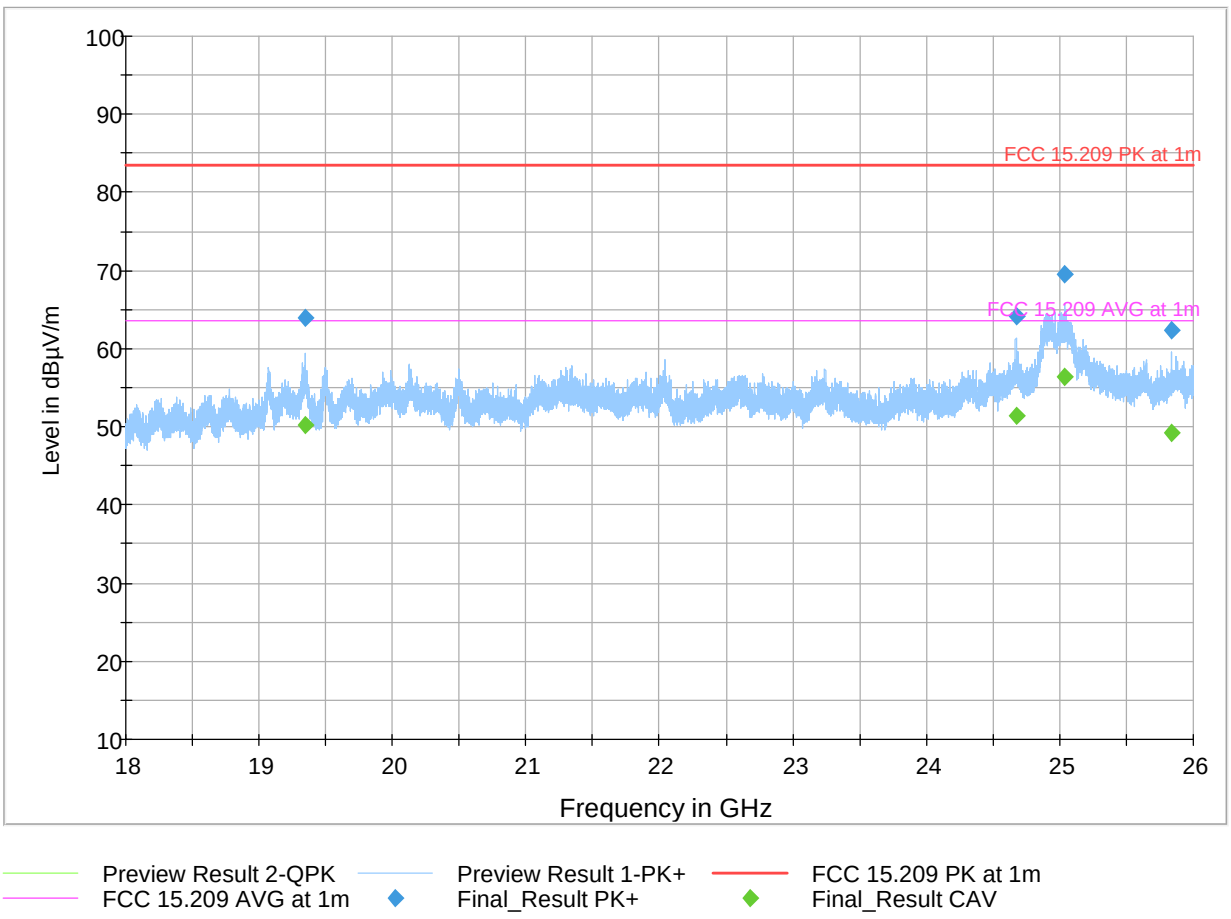


Plot # 81 Radiated Emissions: 18 – 26 GHz

Tx Frequency: 2437 MHz | **Mode: 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)
19342.734	---	50.16	63.50	13.34	500.0	1000.000	100.0	V	352.0	22.7
19342.734	64.04	---	83.50	19.46	500.0	1000.000	100.0	V	352.0	22.7
24670.641	---	51.36	63.50	12.14	500.0	1000.000	208.0	V	335.0	25.1
24670.641	64.09	---	83.50	19.41	500.0	1000.000	208.0	V	335.0	25.1
25041.719	---	56.49	63.50	7.01	500.0	1000.000	208.0	V	247.0	30.4
25041.719	69.45	---	83.50	14.05	500.0	1000.000	208.0	V	247.0	30.4
25841.250	---	49.27	63.50	14.23	500.0	1000.000	211.0	V	248.0	22.8
25841.250	62.39	---	83.50	21.11	500.0	1000.000	211.0	V	248.0	22.8

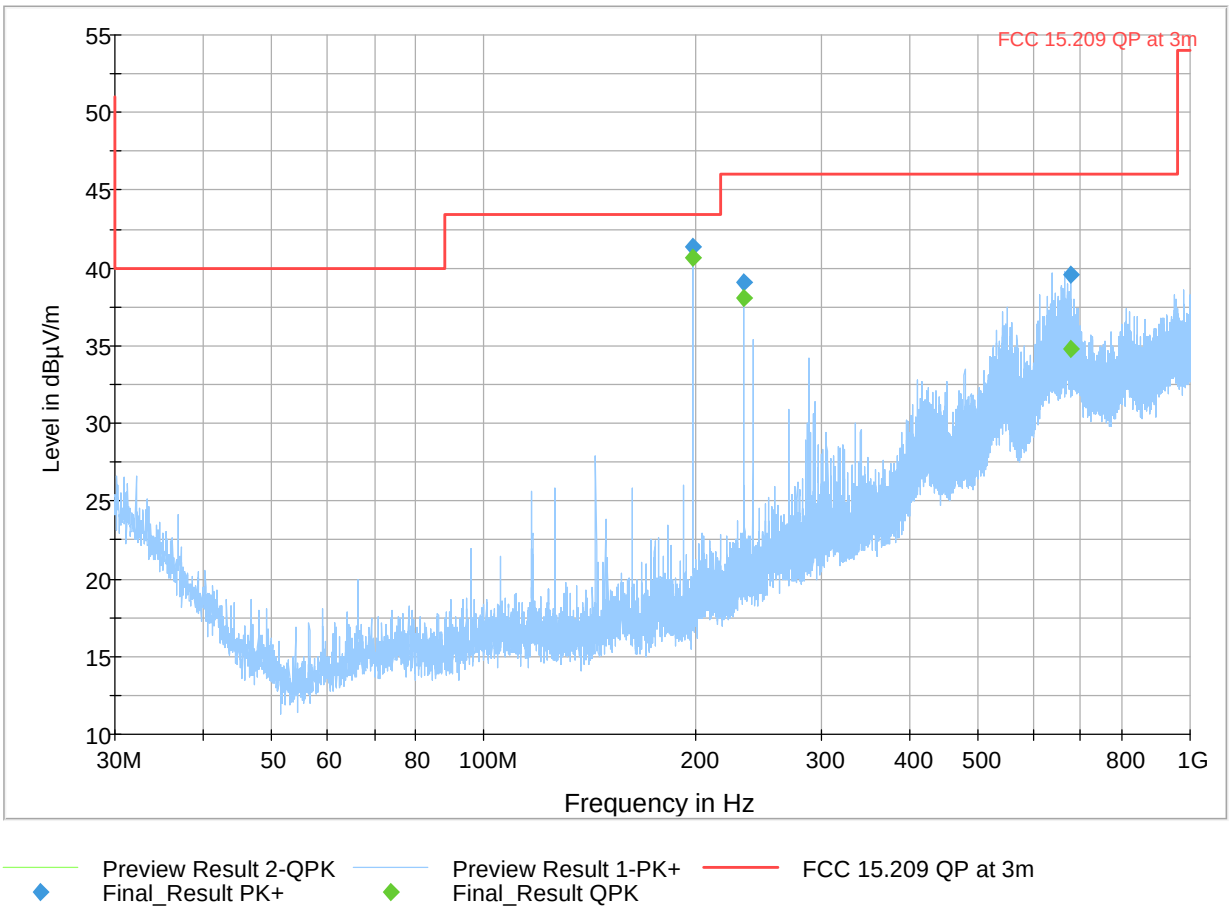


Plot # 82 Radiated Emissions: 30 MHz – 1 GHz

Tx Frequency: 2462 MHz | **Mode: 802.11b**

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
197.842	41.33	---	43.50	2.17	500.0	120.000	152.0	H	263.0	14.5
197.842	---	40.68	---	---	500.0	120.000	152.0	H	263.0	14.5
233.829	39.05	---	46.02	6.97	500.0	120.000	140.0	H	250.0	16.8
233.829	---	38.06	---	---	500.0	120.000	140.0	H	250.0	16.8
678.898	---	34.76	---	---	500.0	120.000	140.0	V	286.0	28.4
678.898	39.60	---	46.02	6.42	500.0	120.000	140.0	V	286.0	28.4

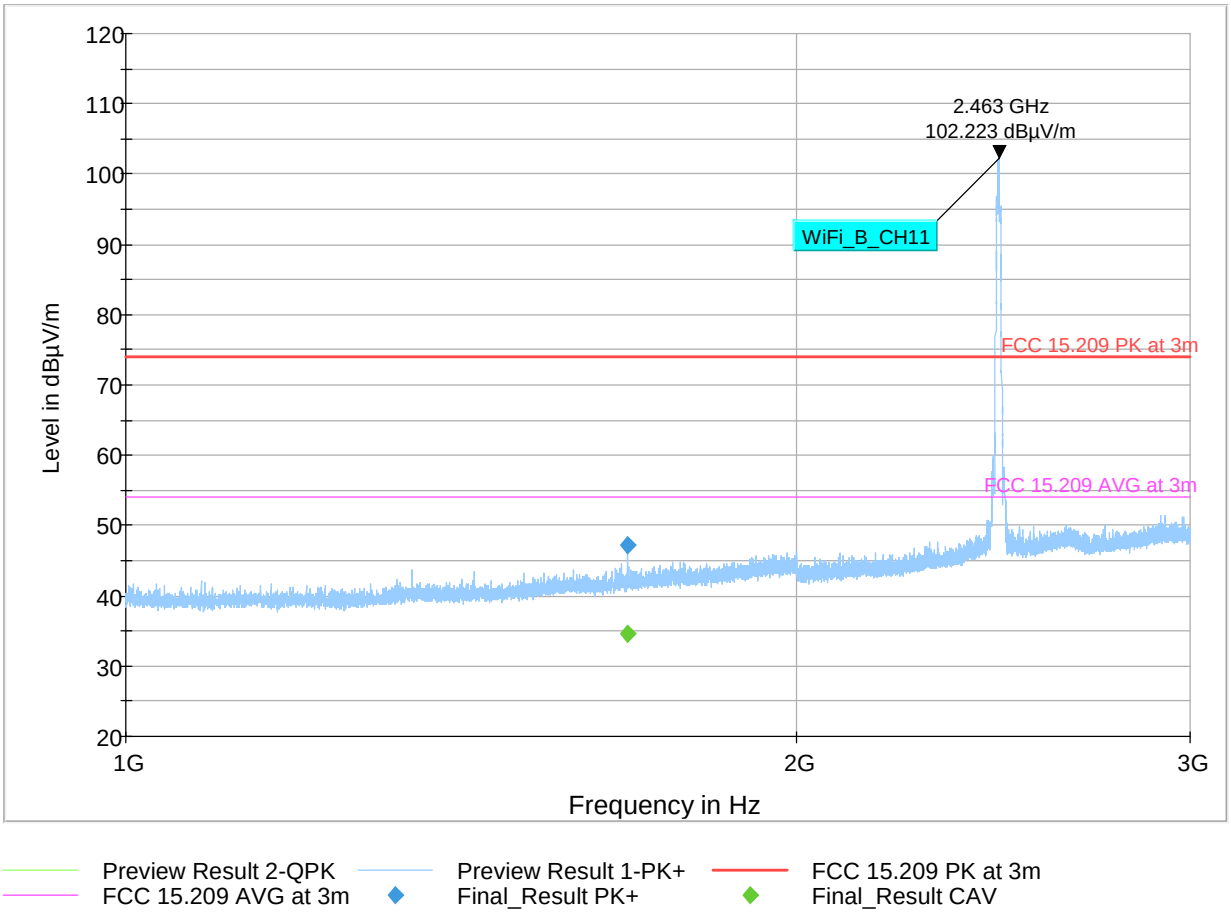


Plot # 83 Radiated Emissions: 1 – 3 GHz

Tx Frequency: 2462 MHz | **Mode: 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)
1680.000	---	34.62	53.98	19.36	500.0	1000.000	231.0	H	177.0	6.3
1680.000	47.27	---	73.98	26.71	500.0	1000.000	231.0	H	177.0	6.3

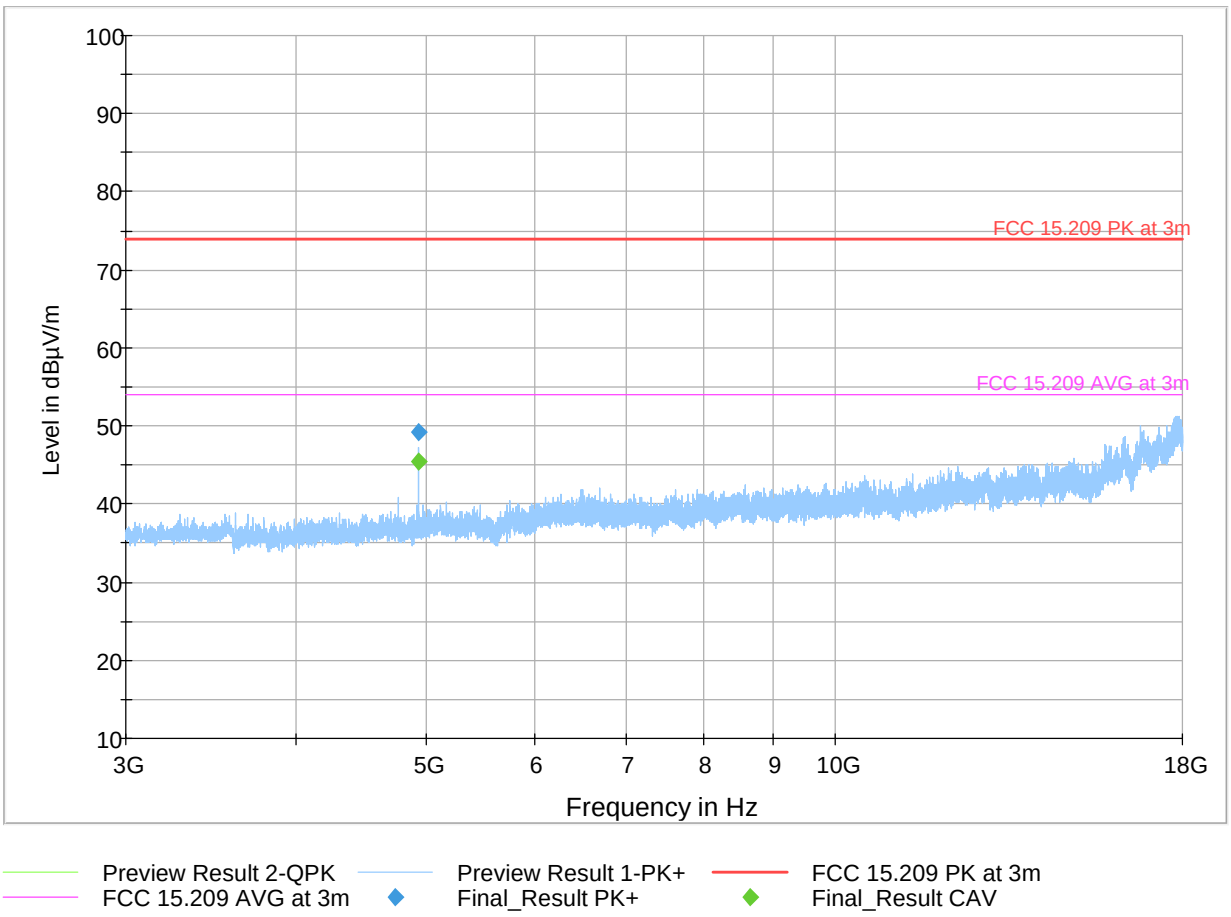


Plot # 84 Radiated Emissions: 3 – 18 GHz

Tx Frequency: 2462 MHz | **Mode: 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)
4924.000	49.20	---	73.98	24.78	500.0	1000.000	140.0	V	142.0	-4.7
4924.000	---	45.52	53.98	8.46	500.0	1000.000	140.0	V	142.0	-4.7



9 Test setup photos

Setup photos are included in supporting file name: "EMC_AXONN_016_21001_FCC_ISED_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
ACTIVE LOOP ANTENNA	ETS LINDGREN	6507	00161344	3 YEARS	10/30/2020
Biconilog Antenna	ETS Lindgren	3142E	00166067	3 YEARS	3/20/2020
HORN ANTENNA	EMCO	3115	00035114	3 YEARS	10/10/2020
HORN ANTENNA	ETS LINDGREN	3117-PA	00215984	3 YEARS	1/31/2021
HORN ANTENNA	ETS LINDGREN	3116C	00169535	3 YEARS	9/23/2020
EMI Receiver	R&S	ESU40	100251	3 YEARS	7/16/2019
Spectrum Analyzer	R&S	FSU26	200065	3 YEARS	07/16/2019
THERMOMETER HUMIDITY MONITOR	CONTROL COMPANY	36934-164	191872028	3 YEARS	01/10/2019

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	Report prepared by
2/10/2022	EMC_AXONN_016_21001_FCC_15.247_ISED_WIFI_DTS	Initial Version	Issa Ghanma

<<< The End >>>