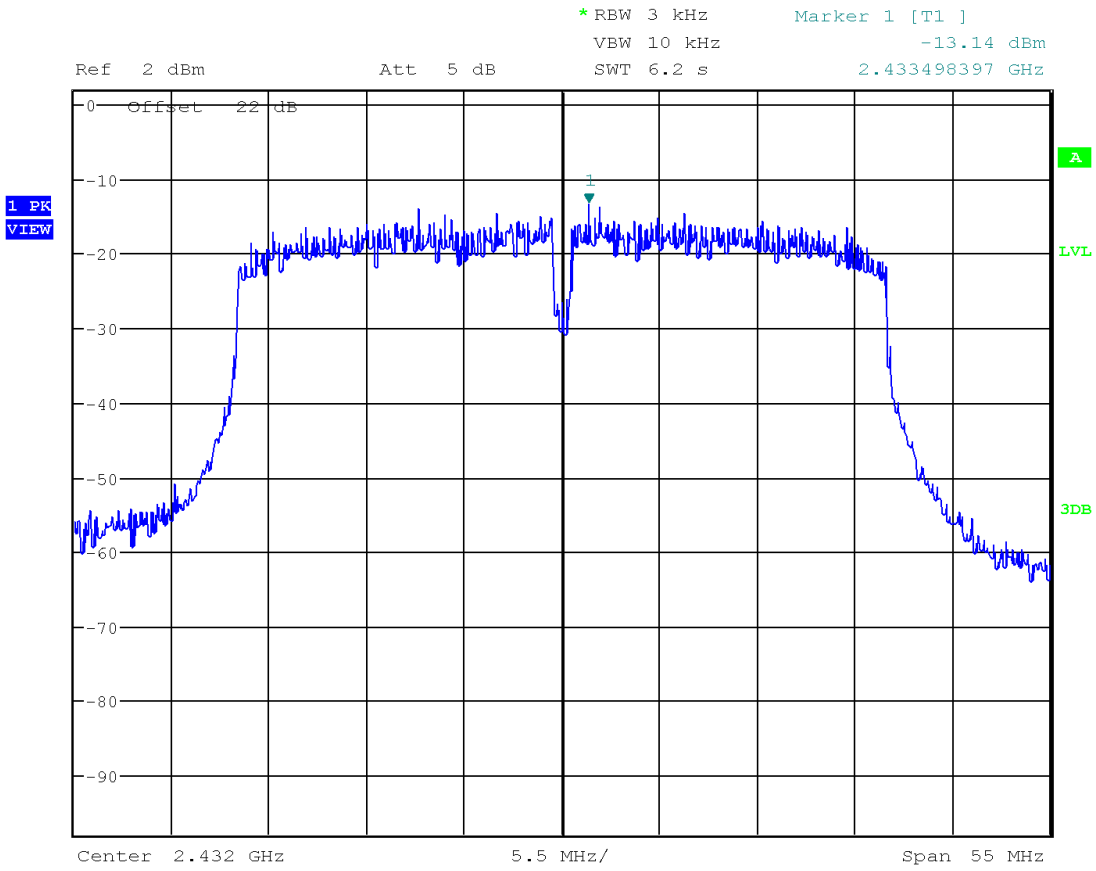
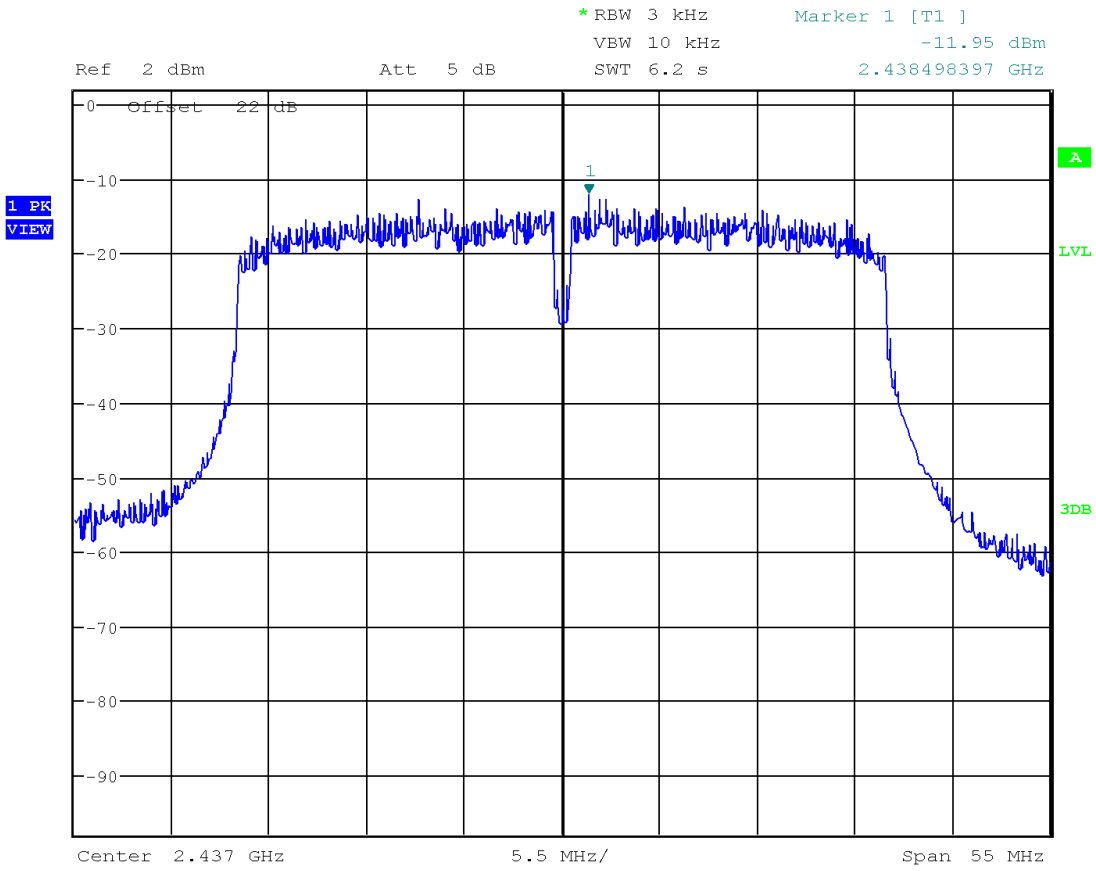
Plot 3. 21

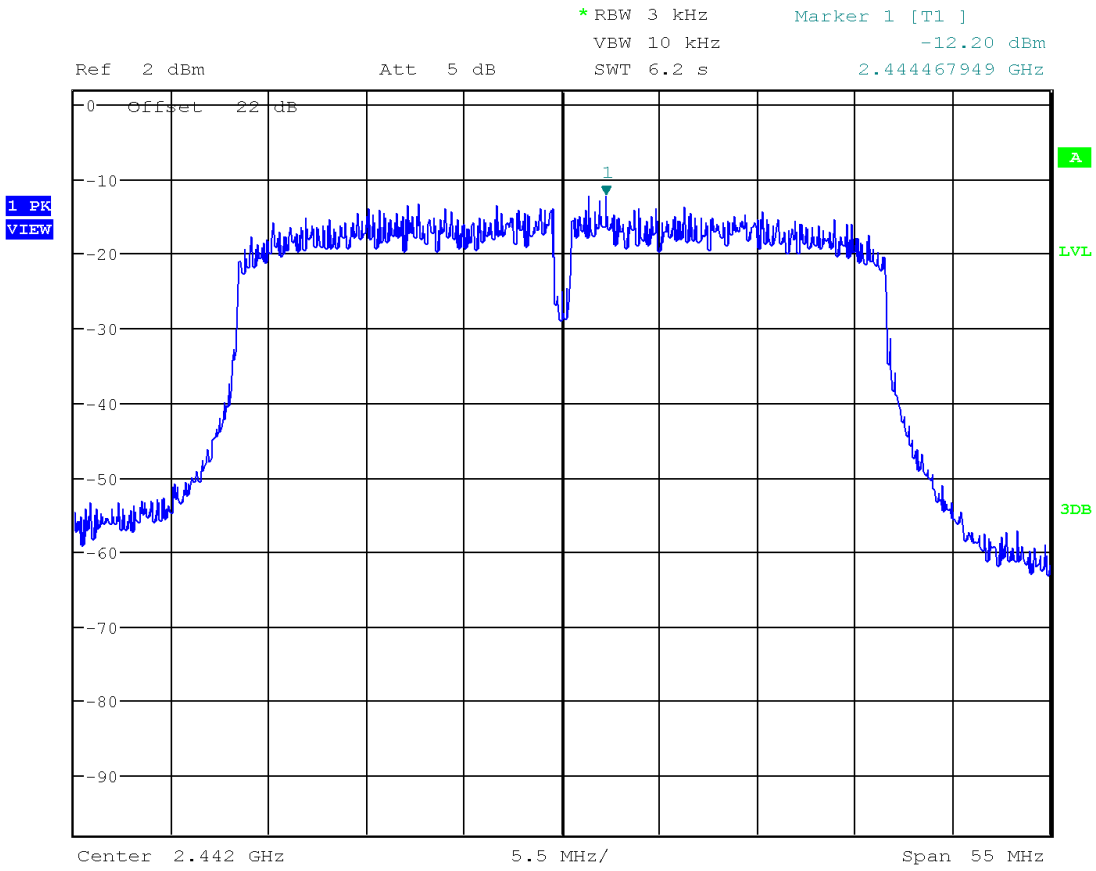

* RBW 3 kHz
VBW 10 kHz
SWT 6.2 s
Marker 1 [T1]
-13.14 dBm
2.433498397 GHz
Ref 2 dBm
Att 5 dB
Offset 22 dB
1 PK
VIEW
A
LVL
3DB
Center 2.432 GHz
5.5 MHz/
Span 55 MHz
Date: 24.JAN.2024 23:13:19

Plot 3. 82



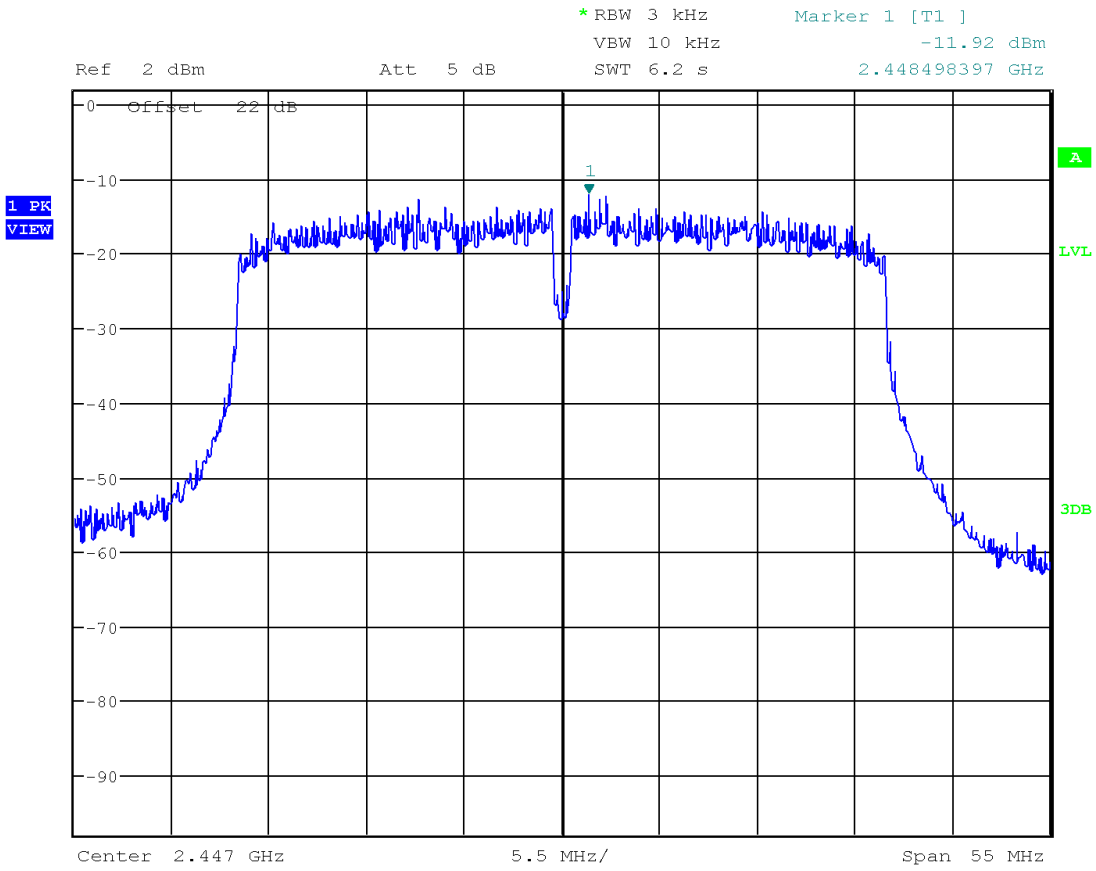
Date: 24.JAN.2024 23:16:31

Plot 3. 23

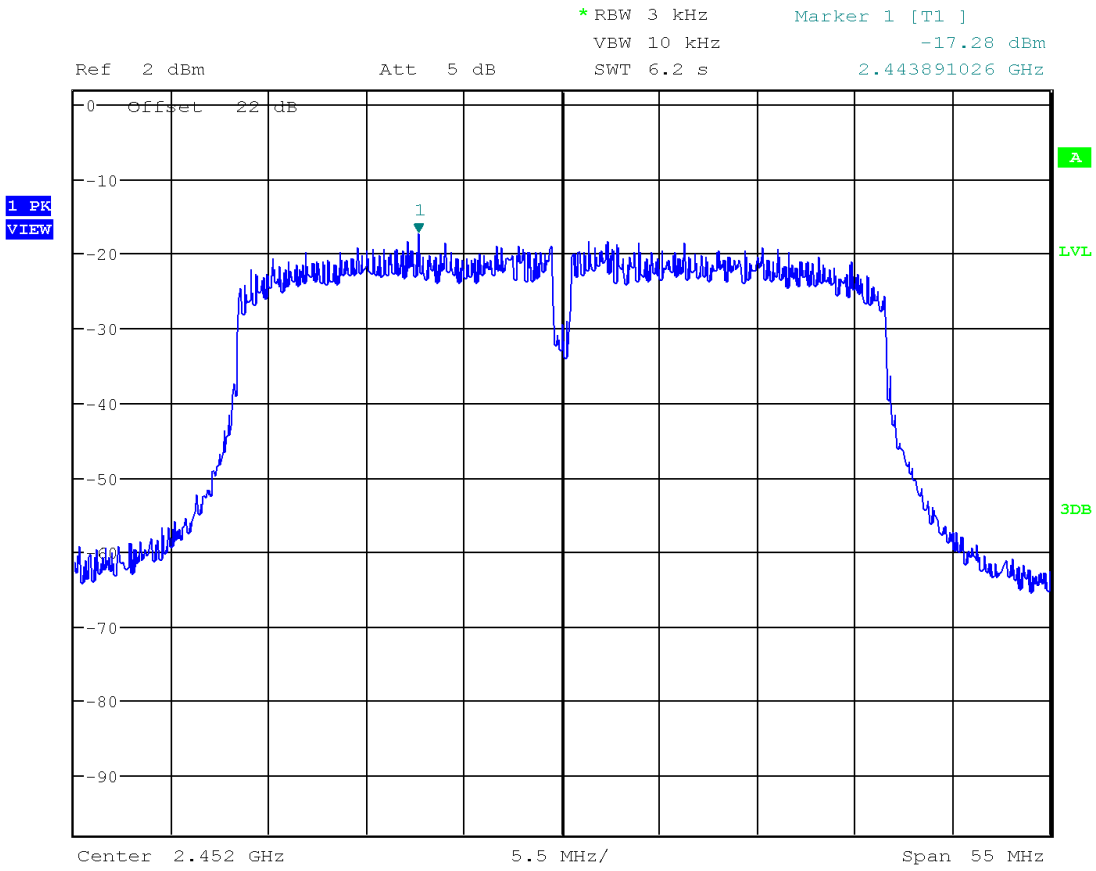


Date: 24.JAN.2024 23:18:37

Plot 3. 24


* RBW 3 kHz
VBW 10 kHz
SWT 6.2 s
Marker 1 [T1]
-11.92 dBm
2.448498397 GHz
Ref 2 dBm
Att 5 dB
Offset 22 dB
1 PK
VIEW
A
LVL
3DB
Center 2.447 GHz
5.5 MHz/
Span 55 MHz
Date: 24.JAN.2024 23:21:28

Plot 3. 25



Date: 24.JAN.2024 23:25:05

4.4 Out-of-Band Conducted Emissions
FCC: 15.247(d); RSS-247, 5.5;

4.4.1 Requirement

In any 100 kHz bandwidth outside the EUT pass-band, the RF power shall be below the maximum in-band 100 kHz emissions by at least 20 dB (if peak power of in-band emission is measured) or 30 dB (if average power of in-band emission is measured).

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)

4.4.2 Procedure

The procedure described in FCC Publication KDB 558074 D01 Meas Guidance v05r02, specifically section 11.11 DTS Emissions in non-restricted frequency bands of ANSI 63.10.

A spectrum analyzer was connected to the antenna port of the transmitter.

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 3 x RBW.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

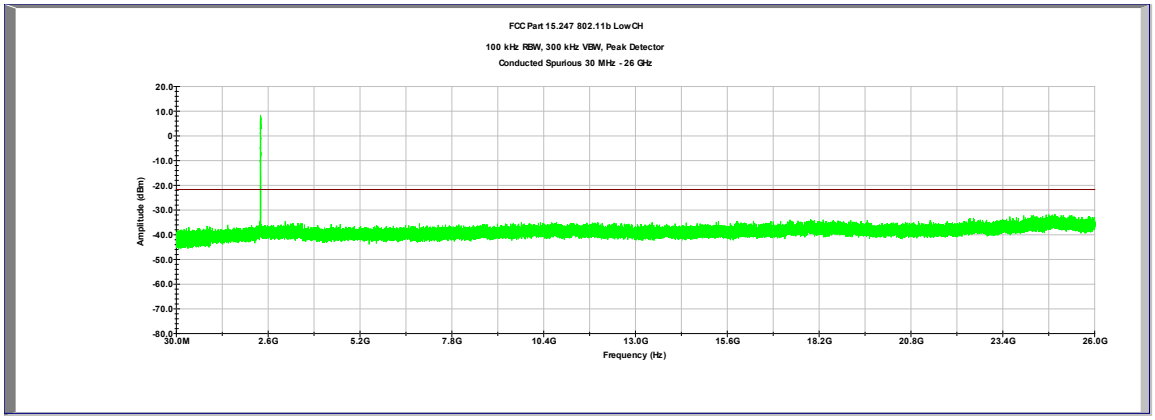
The unwanted emissions were measured from 30 MHz to 25 GHz. Plots below are corrected for cable loss and then compared to the limits.

4.4.3 Test Result

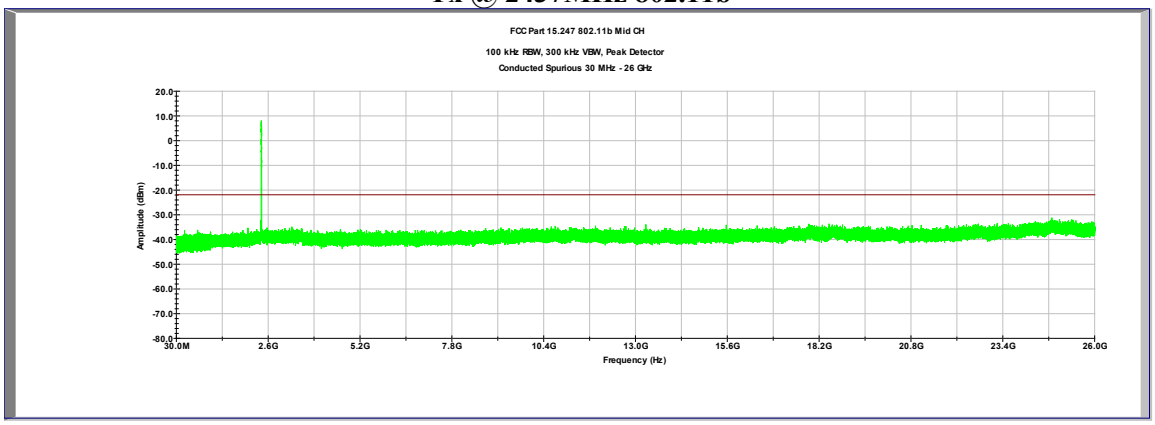
Refer to the following plots 4.1 – 4.20 for unwanted conducted emissions. The plot shows -30dB attenuation limit line.

Tested By	Test Date
Gilberto Gallegos Rangel	January 30, 2024

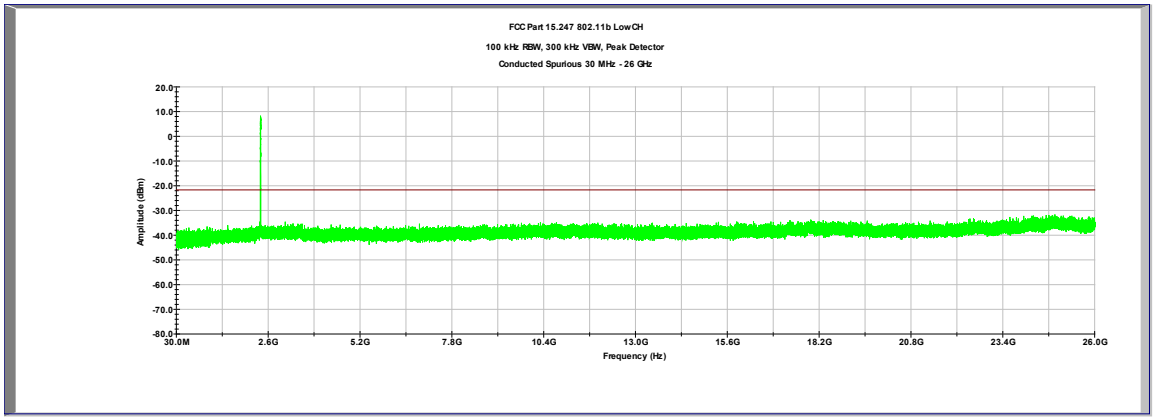
Plot 4.1
Tx @ 2412MHz 802.11b



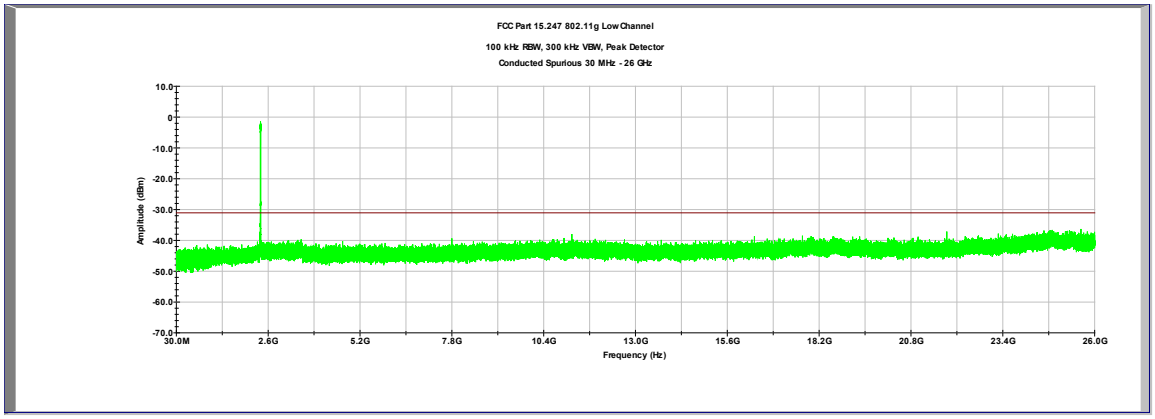
Plot 4.2
Tx @ 2437MHz 802.11b



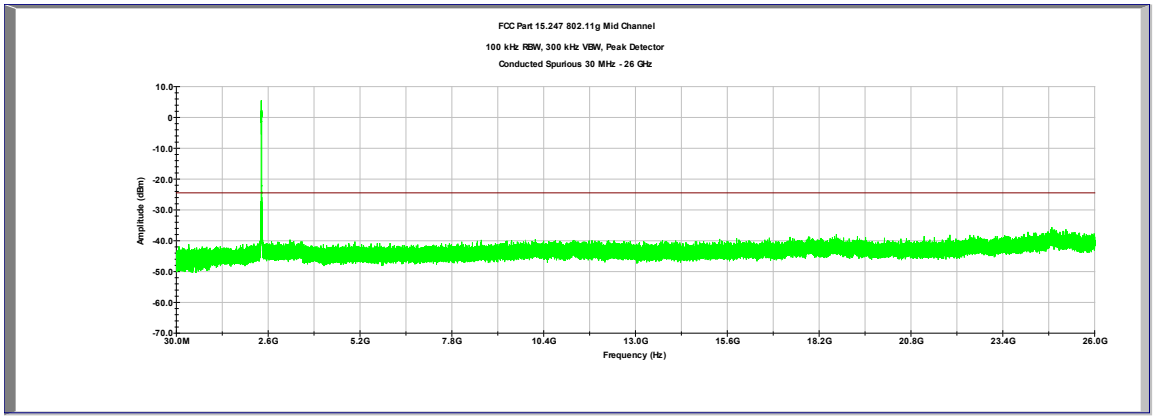
Plot 4.3
Tx @ 2462MHz 802.11b



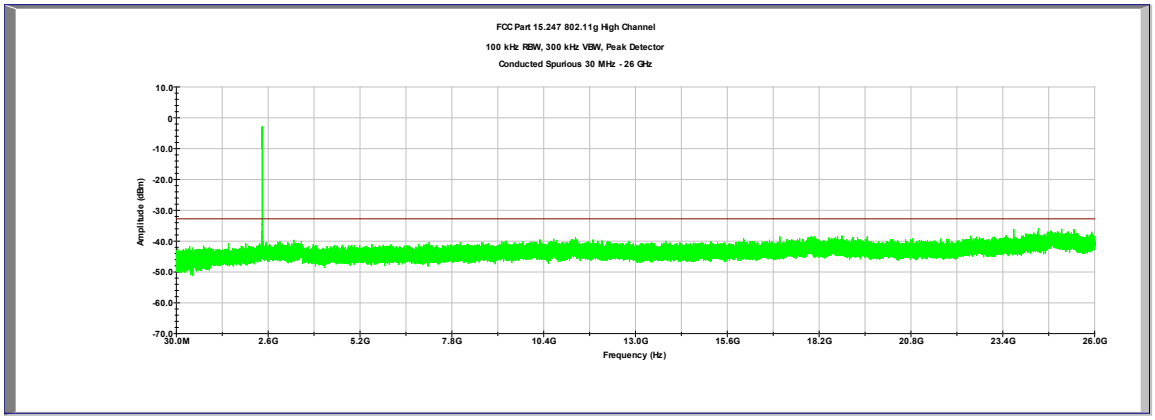
Plot 4.4
Tx @ 2412MHz 802.11g



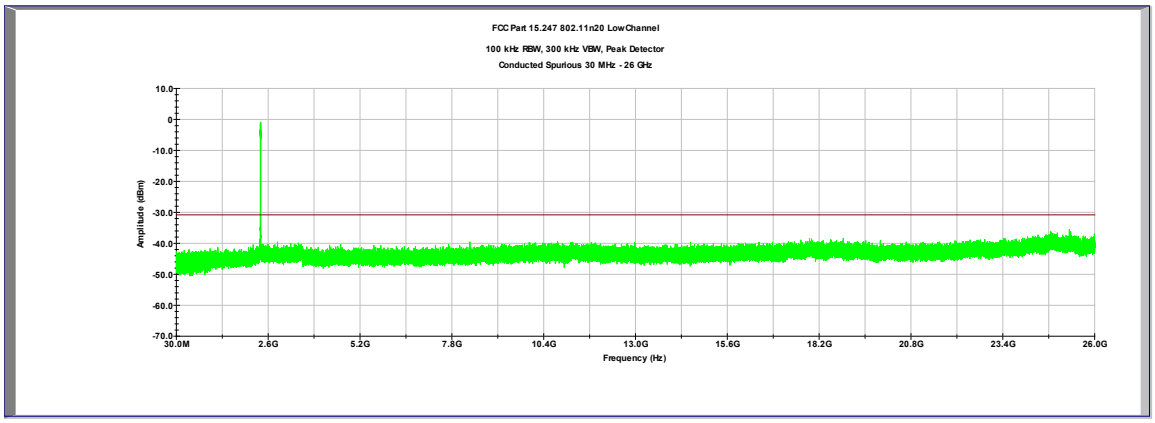
Plot 4.5
Tx @ 2437MHz 802.11g



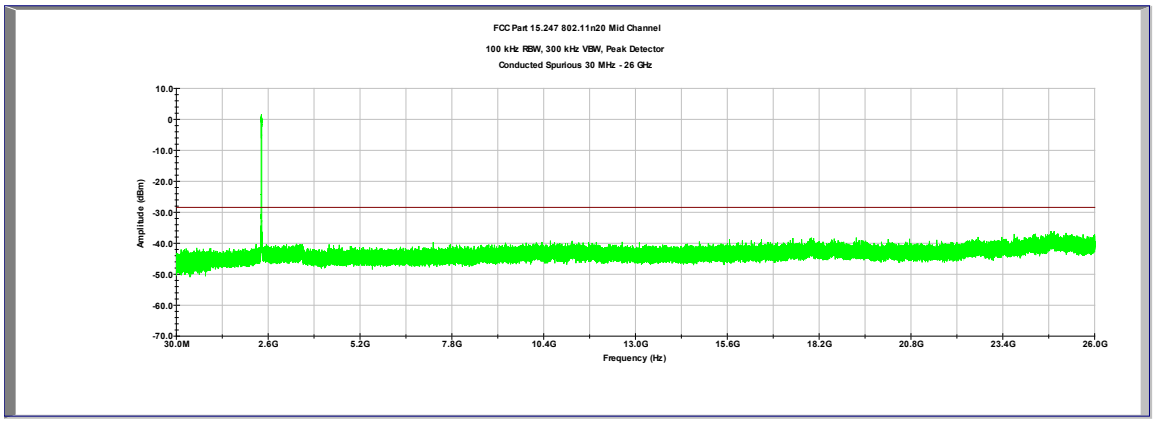
Plot 4.6
Tx @ 2462MHz 802.11g



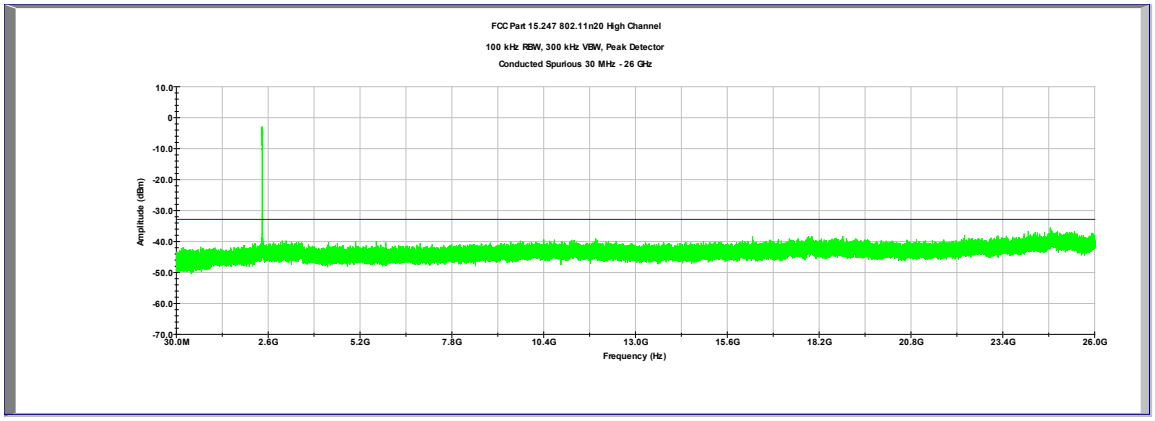
Plot 4.7
Tx @ 2412MHz 802.11n 20MHz



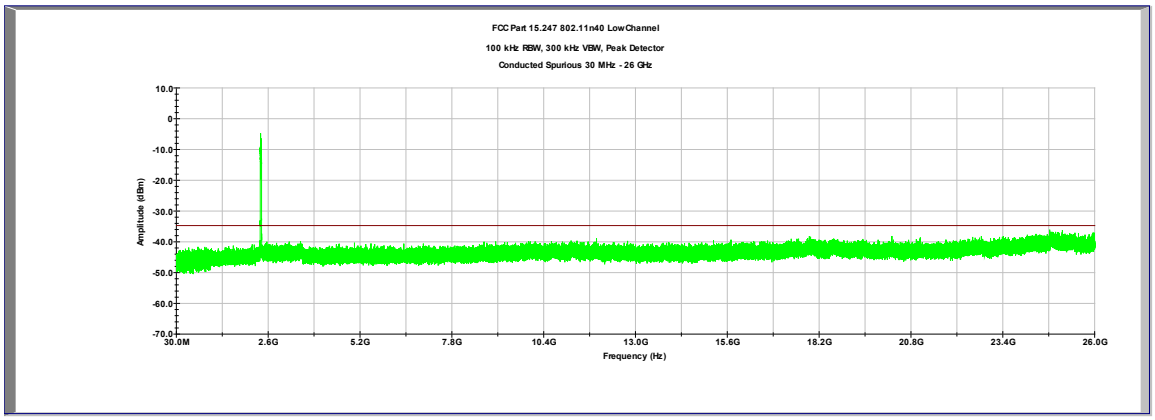
Plot 4.8
Tx @ 2437MHz 802.11n 20MHz



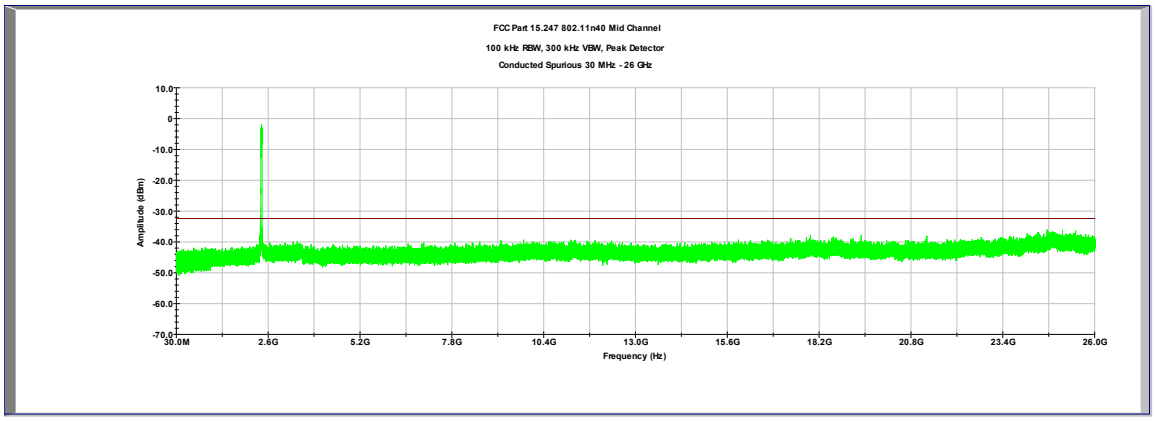
Plot 4.9
Tx @ 2462MHz 802.11n 20MHz



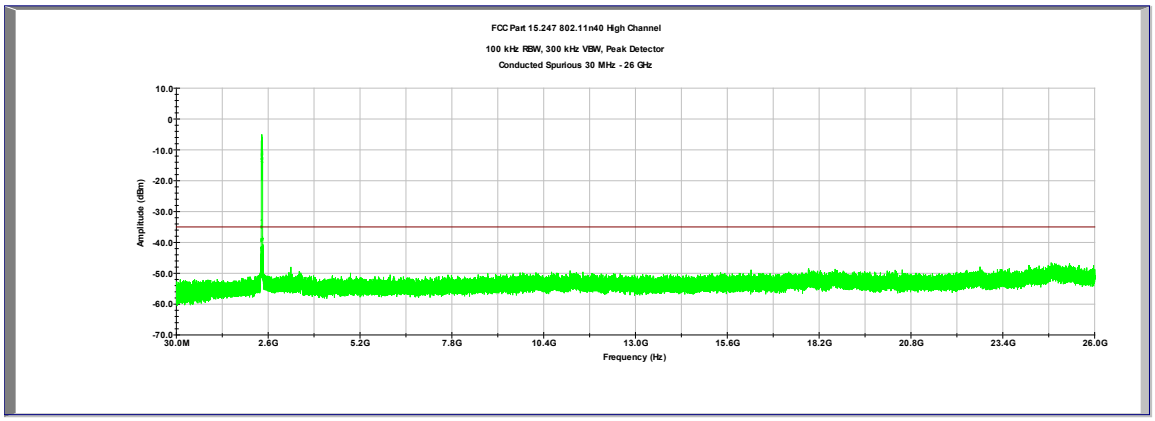
Plot 4.10
Tx @ 2432MHz 802.11n 40MHz



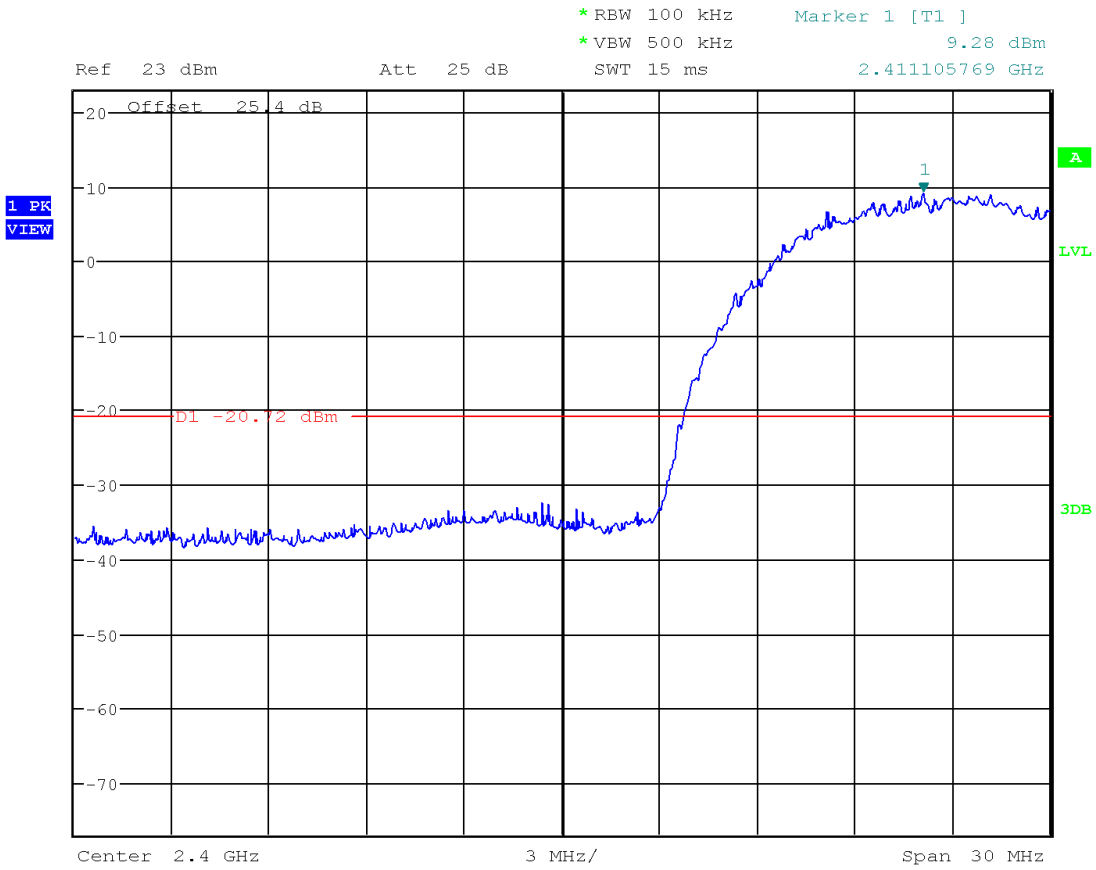
Plot 4.11
Tx @ 2442MHz 802.11n 40MHz



Plot 4.12
Tx @ 2452MHz 802.11n 40MHz

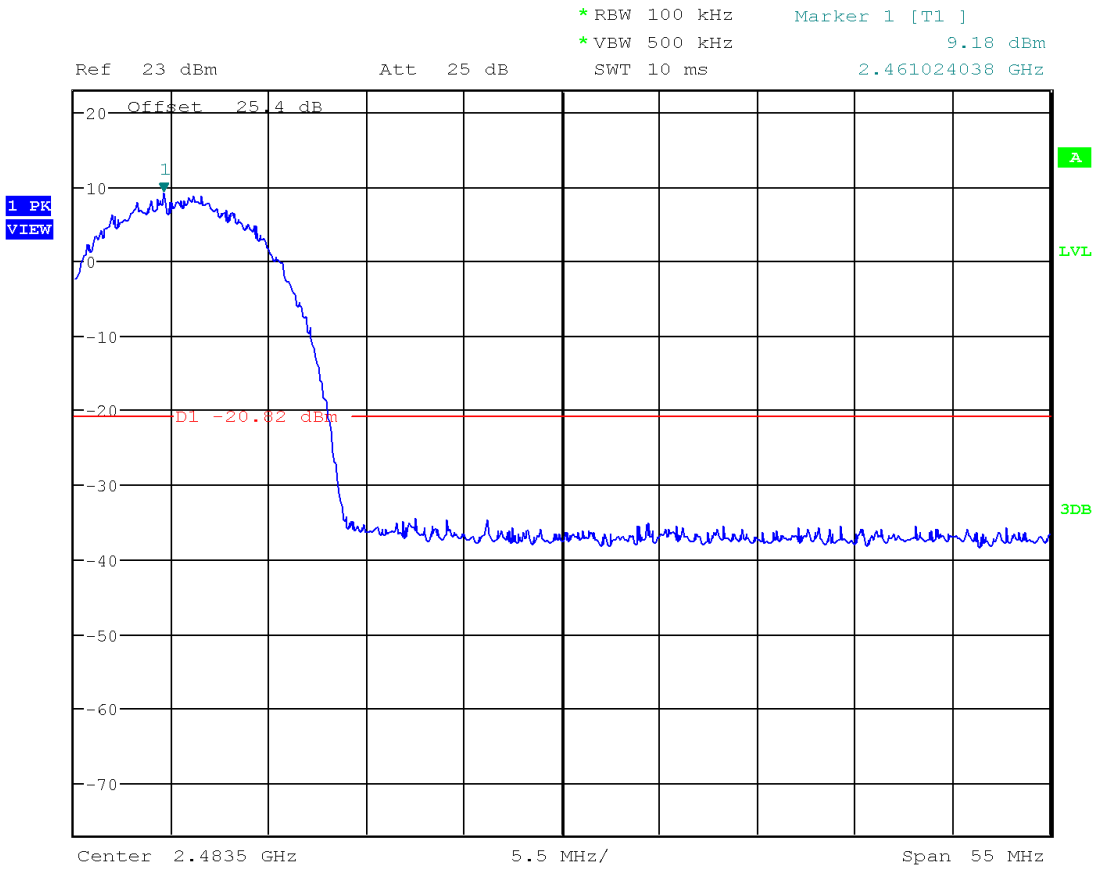


Plot 4.13
Conducted Band Edge, Tx @ 2412MHz 802.11b



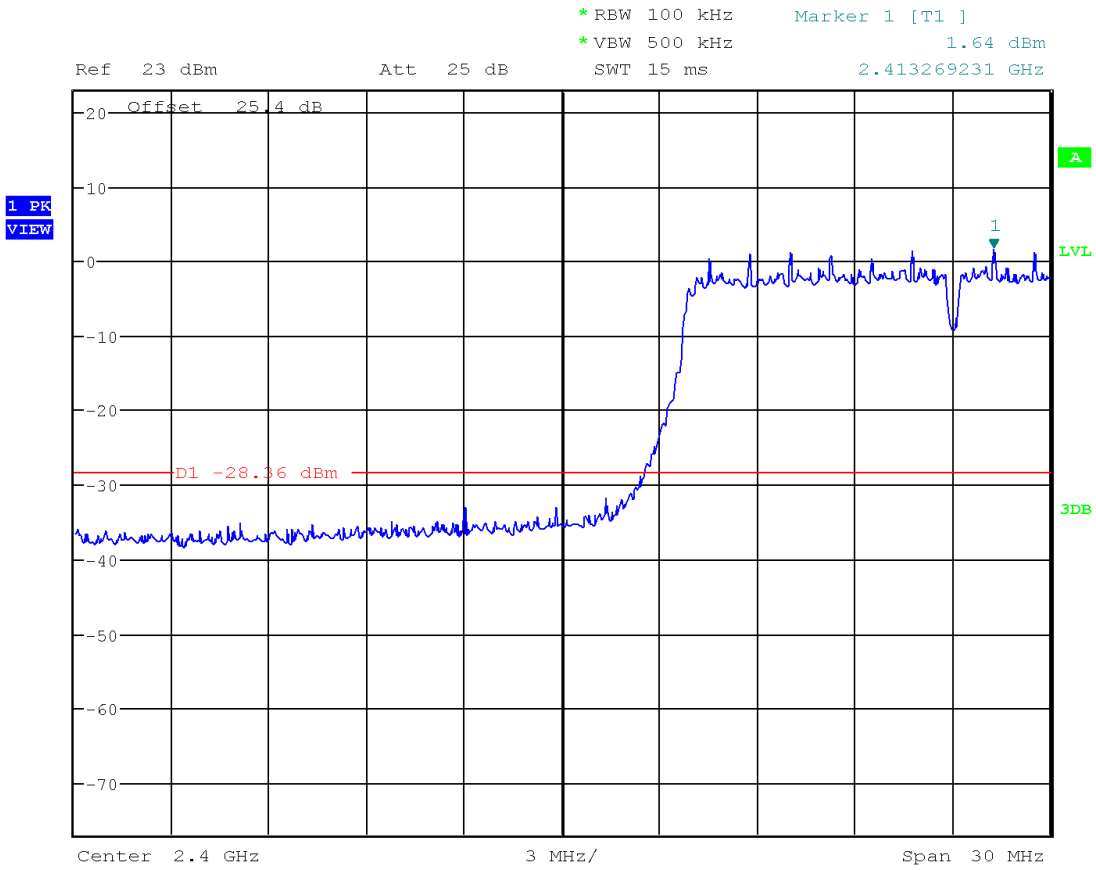
The emission values were at least 40 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.14
Conducted Band Edge, Tx @ 2462MHz 802.11b



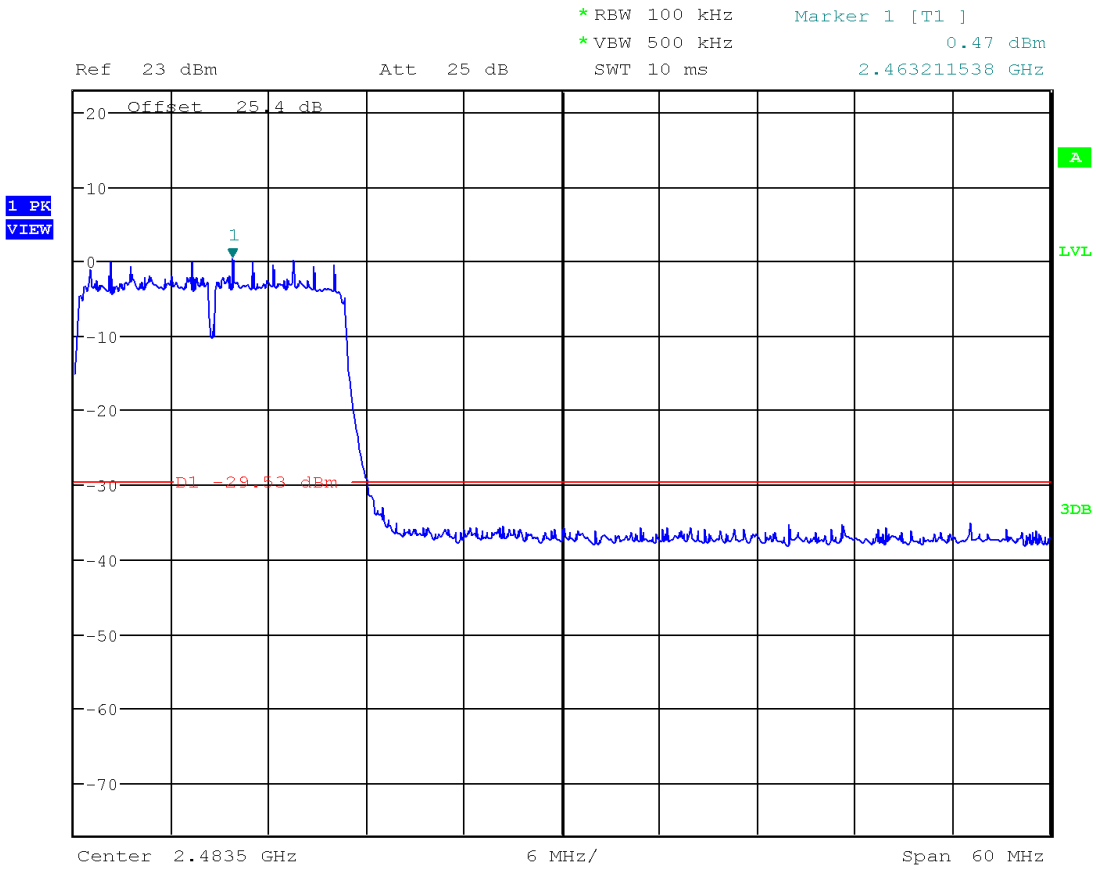
The emission values were at least 40 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.15
Conducted Band Edge, Tx @ 2412MHz 802.11g



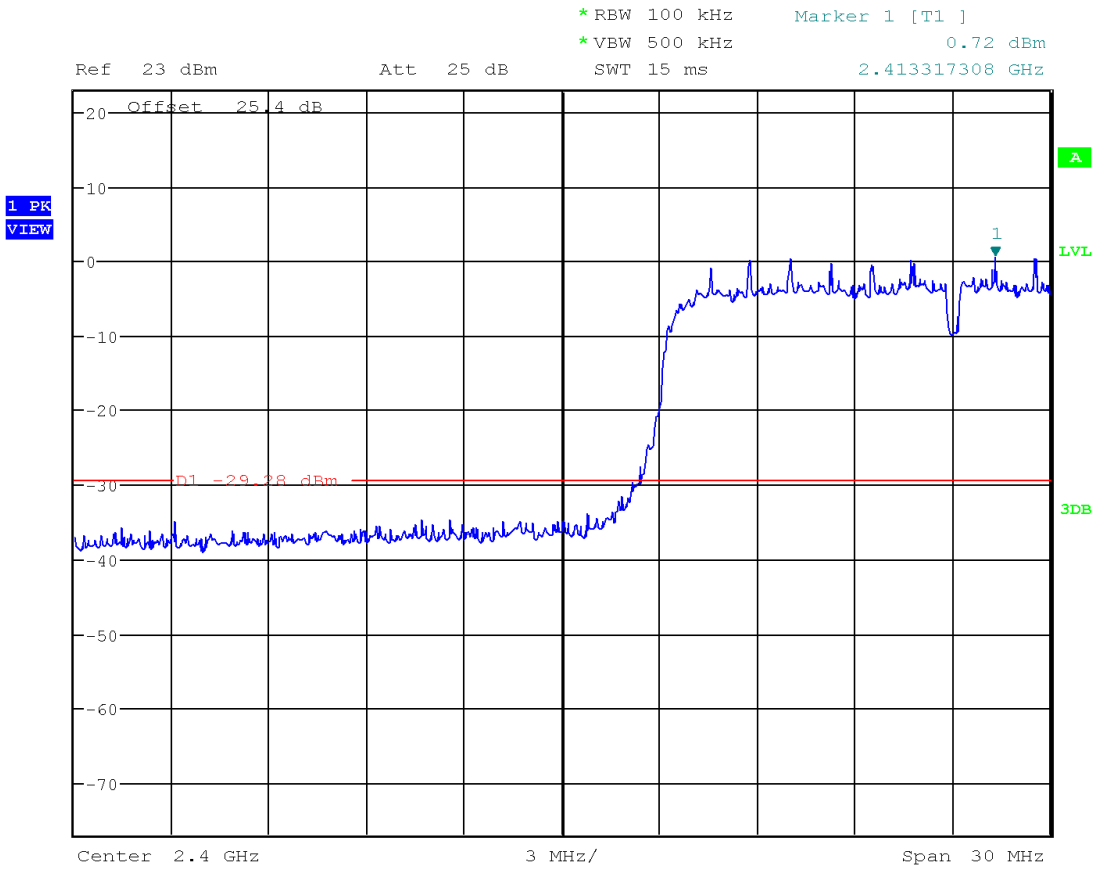
The emission values were at least 33 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.16
Conducted Band Edge, Tx @ 2462MHz 802.11g



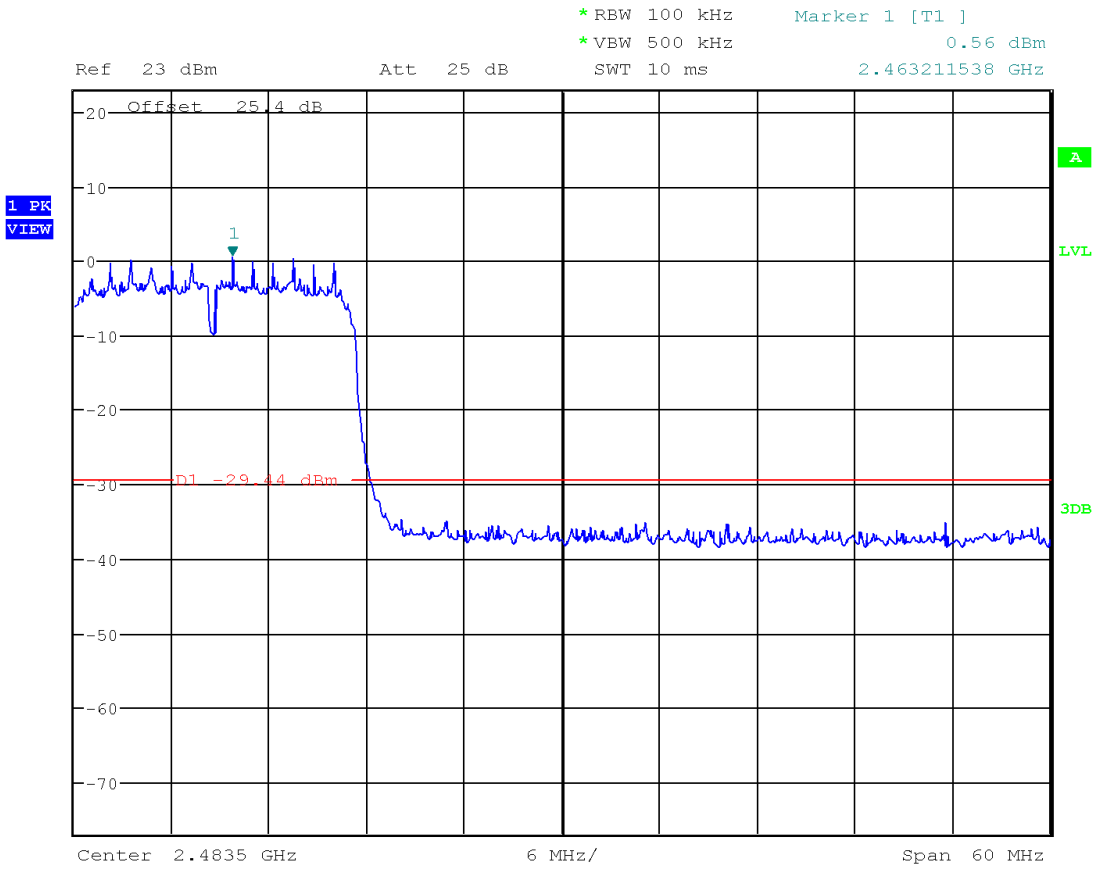
The emission values were at least 33 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.17
Conducted Band Edge, Tx @ 2412MHz 802.11n 20MHz



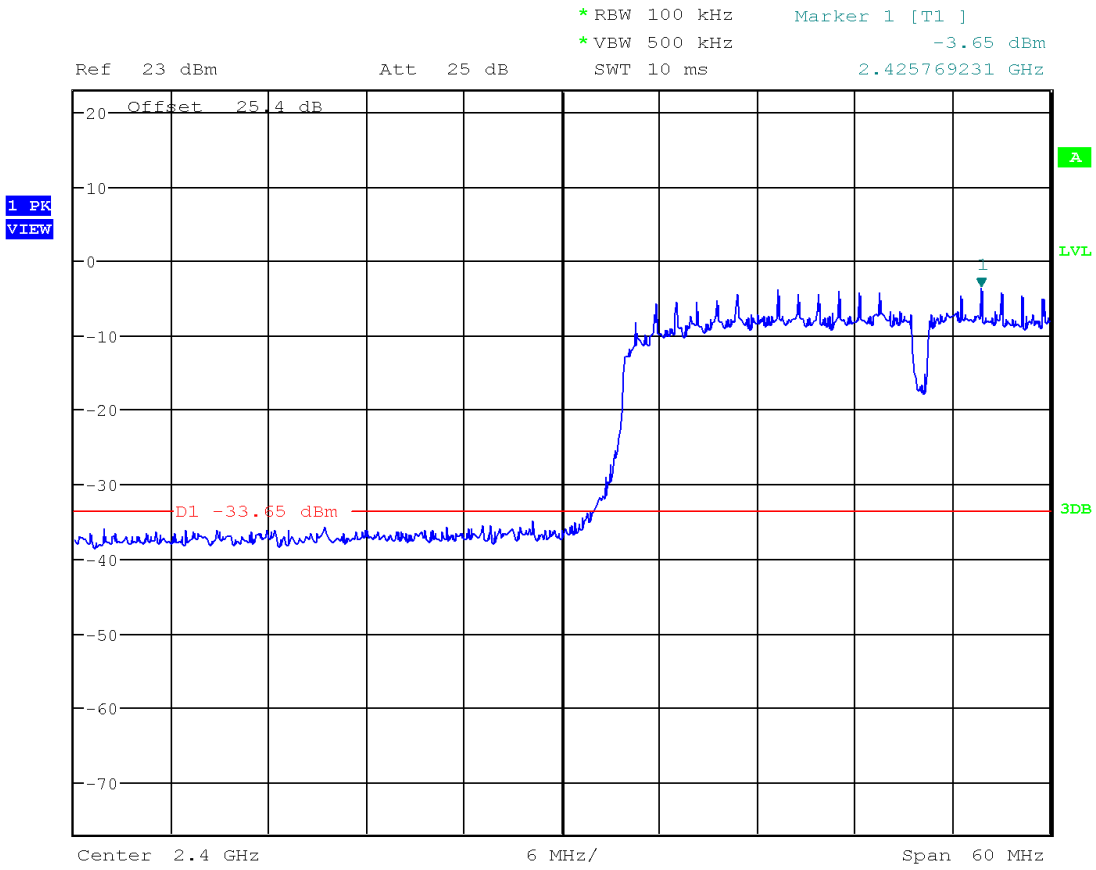
The emission values were at least 33 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.18
Conducted Band Edge, Tx @ 2462MHz 802.11n 20MHz



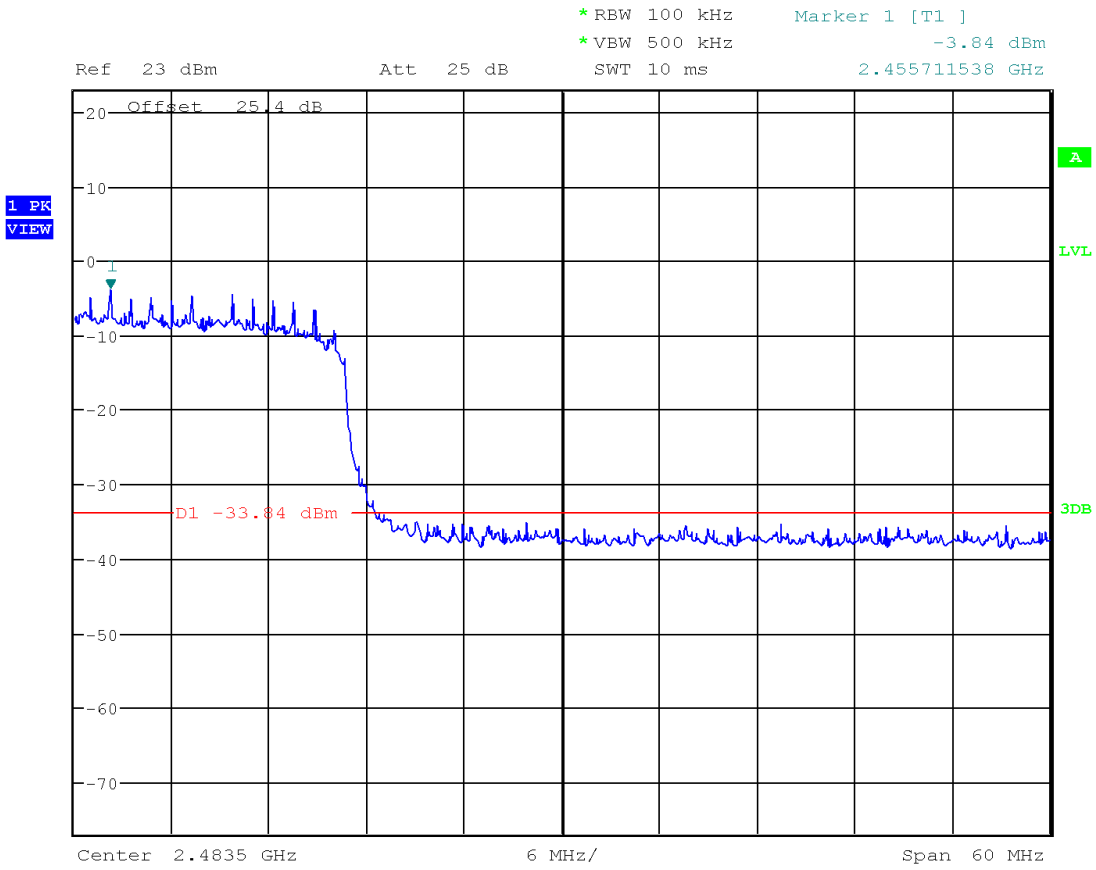
The emission values were at least 33 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.19
Conducted Band Edge, Tx @ 2412MHz 802.11n 40MHz



The emission values were at least 31 dB below the peak emission as measured with a 100 kHz BW.

Plot 4.20
Conducted Band Edge, Tx @ 2462MHz 802.11n 40MHz



The emission values were at least 31 dB below the peak emission as measured with a 100 kHz BW.

4.5 Transmitter Radiated Emissions
FCC Rules: 15.247(d), 15.209, 15.205; RSS-247, 5.5;

4.5.1 Requirement

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)).

For out of band radiated emissions (except for frequencies in restricted bands), in any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20dB (peak) or 30 dB (average) below that of the maximum in-band 100 kHz emissions.

4.5.2 Procedure – Radiated Emissions

Radiated emission measurements were performed from 9 kHz to 26.5 GHz according to the procedure described in ANSI C63.10: 2013. Spectrum Analyzer Resolution Bandwidth is 200Hz or greater for frequencies 9kHz to 30MHz, 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz for frequencies above 1000 MHz. Above 1000 MHz Peak and Average measurements were performed.

The EUT is placed on a plastic turntable that is 80 cm in height for below 1000MHz and 1.5m in height for above 1GHz. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at 3 meters for frequencies above 1 GHz and at 10 meters for frequencies below 1 GHz.

Measurements made from 1 GHz to 18GHz had a 2.4-2.5GHz notch filter in place. A preamp was used from 30MHz to 26GHz.

All measurements were made with a Peak Detector and compared to QP limits for 30MHz – 1GHz and Average limits for 1GHz – 26GHz.

Correlation measurements were performed below 30MHz between 10m ALSE and Open Field site according to FCC KDB 414788 D01 Radiated Test Site v01r01 section 2. All readings were within the acceptable tolerance.

EUT was tested in both horizontal and upright position. Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels).

4.5.3 Field Strength Calculation

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(µV/m)
RA = Receiver Amplitude (including preamplifier) in dB(µV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(µV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(µV/m). This value in dB(µV/m) was converted to its corresponding level in µV/m.
RA = 52.0 dB(µV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(µV/m).
Level in µV/m = Com
mon Antilogarithm [(32 dBµV/m)/20] = 39.8 µV/m.

4.5.4 Test Results

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Tested By	Test Date
Gilberto Gallegos Rangel & Erica Chan	January 22-30, 2024