



# Regulatory Test Report

## Prepared for Harman International

This report presents detailed information on

**INFO3.7-3.8 CSM**

Automotive Infotainment Unit

Prepared by

Aravind Buddana

Engineer II

Approved by

Jason Kanakry

General Manager

Issue date: 09/03/2021

Report No: AH20110901-HAR-279-TR1 v5

This test result relates only to the described test object.

This document shall not be reproduced, except in full, without the written approval of Bureau Veritas Test Lab.

Customer must not use this test report as the product certification of each accreditation body or each national organization.

The test is traceable to national standard or related international standard

## Contents

- **Test Request Information**.....3
- **Test Laboratory Information**.....4
- **Statement of Conformity**.....5
- **Conducted Testing** .....6
- **Radiated Testing** .....34

- **Test Request Information**

**Test Request #:** 7700040166

**Test Requested By:** Mark Bowman  
Harman International Industries, Inc.  
30001 Cabot Drive, Novi, MI 48377

**Test item Description:** INFO3.7-3.8 CSM (Automotive Infotainment Unit with Bluetooth/WLAN)

**Part Number:** 84375197

**DUT Sample Number:** AH20110901-HAR-279-08, AH20110901-HAR-279-10

**Hardware Version of DUT:** PV

**Software Version of DUT:** W156

**Component Category of DUT:** N/A

**FCC ID:** 2AHPN-BE2854

**IC:** 6434C-BE2854

**Type of Test:** FCC/ISED Certification

**Test Method:** CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2,  
ISED Canada RSS-Gen Issue 5, FCC KDB 558074 D01 15.247 Measurement  
Guidance v05 and ANSI C63.10-2013

**Deviations from standard:** None

**Approved Test Plan Number:** N/A

**Test Plan Revision:** N/A

**Date test sample received:** 01/14/2021

**Date test started:** 02/05/2021

**Date test finished:** 09/03/2021

- **Test Laboratory Information**

**Location of Test Lab:** The radiated and conducted emissions test sites are located at  
Bureau Veritas  
815 N. Opdyke Rd #100,  
Auburn Hills, MI 48326,  
Phone: +1-248-836-4700

**Key Contact:** Jason Kanakry (General Manager)  
Jason.Kanakry@BureauVeritas.com  
Phone: +1-248-836-4747

**Laboratory Accreditations:** BUREAU VERITAS CONSUMER PRODUCTS SERVICES, INC is  
accredited in accordance with the recognized International Standard  
ISO/IEC 17025:2017 General requirements for the competence of testing  
and calibration laboratories.

**ISO/IEC 17025:2017:** 5678.01

**FCC Test Site Number:** US1278 (242530)

**IC Test Site Number:** US0229 (26240)

- **Statement of Conformity**

| RSS-GEN | RSS 247 | Part 15          | Comments   |
|---------|---------|------------------|--|
| 6.4     |         | 15.15(b)         | There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.  |
|         |         | 15.19            | The label is shown in the label exhibit.   |
|         |         | 15.21            | Information to the user is shown in the instruction manual exhibit.  |
|         |         | 15.27            | No special accessories are required for compliance.  |
| 3.2     |         | 15.31            | The EUT was tested in accordance with the measurement standards in this section.   |
| 6.13.2  |         | 15.33            | Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.  |
| 6.13.1  |         | 15.35            | The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.      |
| 6.8     |         | 15.203           | EUT employs detachable external antenna with 5.98dBi gain.   |
| 8.10    |         | 15.205<br>15.209 | The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable |
| 8.8     |         | 15.207           | N/A. EUT is vehicle battery powered only.  |

## CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2

- **Conducted Testing**

### Test Summary

This test report supports an application for certification of a transmitter operating pursuant to:  
**CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 558074 D01 15.247 Measurement Guidance v05 and ANSI C63.10-2013**

The product is the INFO3.7-3.8 CSM, It is a direct sequence spread spectrum transmitter that operates in the 2412-2462MHz frequency range.

| Details               | Description                           |
|-----------------------|---------------------------------------|
| Frequency Range (MHz) | 2412 – 2462                           |
| Tested Modes          | 802.11b<br>802.11g<br>802.11n (HT20). |
| Number of Channels    | 11                                    |
| Tested Channels       | 1, 6 ,11                              |
| DUT Antenna Type      | External detachable                   |
| DUT Antenna Gain      | 5.98dBi                               |

We found that the product met the requirements.

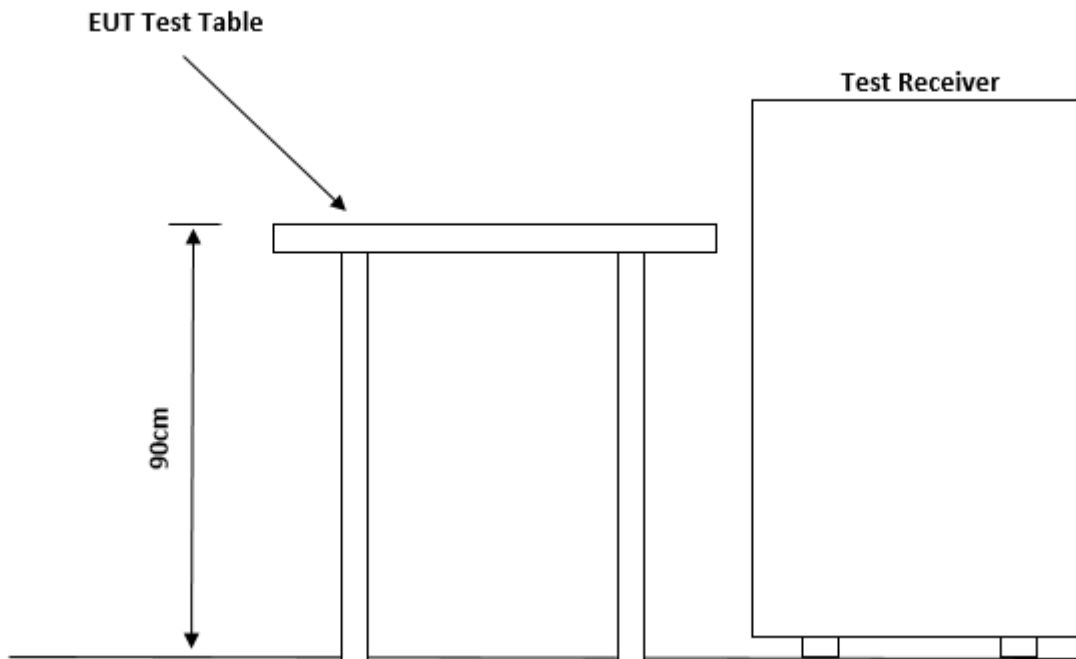
Test samples were received in good condition and remains good and functional post testing.

| Test Item                            | Sample #              | Result             |
|--------------------------------------|-----------------------|--------------------|
| <a href="#">FCC 15.247 2.4G WLAN</a> | AH20110901-HAR-279-10 | Meets Requirements |

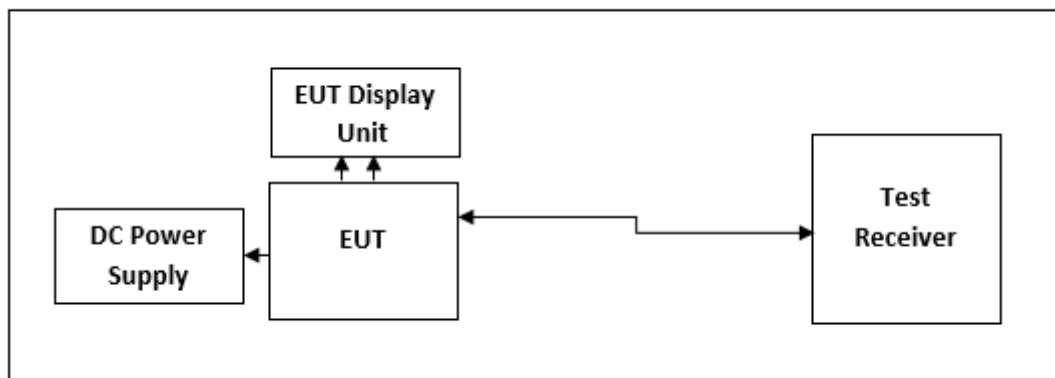
## Test Setup

### Conducted Test Site Description

The site is accommodated to test tabletop and floor standing test equipment.



TEST SETUP DIAGRAM



## Test Equipment Used

| ID #    | Equipment                                     | Manufacturer             | Model #      | Serial # | Cal Due    |
|---------|---|--------------------------|--------------|----------|------------|
| BVD0226 | Spectrum Analyzer 10Hz-44GHz                  | Rohde & Schwarz          | FSV3044      | 101018   | 1/14/2022  |
| BVD0227 | 8 port switch unit for Wireless Test system   | Rohde & Schwarz          | OSP150       | 101100   | N/A        |
| BVD0228 | 8 port switch unit for Wireless Test system   | Rohde & Schwarz          | OSP220       | 101632   | N/A        |
| BVD0224 | Signal Generator 100kHz-40GHz                 | Rohde & Schwarz          | SMB100A      | 181741   | 11/19/2021 |
| BVD0225 | Signal Generator 100k-6GHz with GPS simulator | Rohde & Schwarz          | SMW200A      | 107664   | 11/18/2021 |
| BVD0250 | Wireless Connectivity Tester 70M-6GHz         | Rohde & Schwarz          | CMW270       | 102113   | 11/18/2021 |
| BVD0343 | DC Regulated Power Supply                     | Circuit Specialists, INC | CSI3020X     | 595215   | N/A        |
| BVD0321 | Fixed Attenuator 2W 20dB - 40GHz              | Mini-Circuits            | BW-K20-2W44+ | 2103     | N/A        |
| BVD0477 | 10db Attenuator -18GHz                        | Mouser                   | BW-S10W2+    | 2043     | N/A        |
| BVD0229 | Temp and Humidity Meter                       | Fluke                    | 971          | 12001009 | 3/26/2022  |

## Customer Supplied Equipment

| ID # | Equipment                    | Manufacturer | Model | Serial #  | Version No. |
|------|------------------------------|--------------|-------|-----------|-------------|
| N/A  | DUT Display                  | Harman       | N/A   | 2133      | N/A         |
| N/A  | Display Harness              | Harman       | N/A   | N/A       | N/A         |
| N/A  | Blue Molex Connector Harness | Harman       | N/A   | N/A       | N/A         |
| N/A  | DUT 1M Harness               | Harman       | N/A   | N/A       | N/A         |
| N/A  | USB to DUT Harness           | Harman       | N/A   | 102161025 | N/A         |

## Equipment List (Software)

| ID # | Equipment         | Manufacturer    | Model | Version No. |     |
|------|-------------------|-----------------|-------|-------------|-----|
| N/A  | EMC Test Software | Rodhe & Schwarz | EMC32 | 11.20.00    | N/A |



## FCC 15.247 2.4G WLAN

Channels and modes available

802.11b, 802.11g and 802.11n (HT20)

| Channel  | Freq. (MHz) | Channel   | Freq. (MHz) |
|----------|-------------|-----------|-------------|
| 1        | <b>2412</b> | 8         | 2447        |
| 2        | 2417        | 9         | 2452        |
| 3        | 2422        | 10        | 2457        |
| 4        | 2427        | <b>11</b> | <b>2462</b> |
| 5        | 2432        |           |             |
| <b>6</b> | <b>2437</b> |           |             |
| 7        | 2442        |           |             |

### Notes:

- Channels which were marked bold were tested.
- Output power measurements were performed at the lowest and highest data rate of each supported 802.11 mode.

|                           |   |
|---------------------------|---|
| Antenna Gain              | 5.98dBi   |
| Number of transmit Chains | 1   |
| Equipment Type            | Equipment with wideband modulation other than frequency hopping |

## Power Settings

| 802.11b        |               | 802.11g  |               |
|----------------|---------------|----------|---------------|
| Channel        | Power Setting | Channel  | Power Setting |
| 1              | Default       | 1        | Default       |
| <b>6</b>       | Default       | <b>6</b> | Default       |
| 11             | Default       | 11       | Default       |
| 802.11n (HT20) |               |          |               |
| Channel        | Power Setting |          |               |
| 1              | Default       |          |               |
| <b>6</b>       | Default       |          |               |
| 11             | Default       |          |               |

## Test Results Summary

| Test                           | Frequency (MHz) | 802.11b | 802.11g | 802.11n (HT20) |
|--------------------------------|-----------------|---------|---------|----------------|
| RF Output Power                | 2412/2437/2462  | PASS    | PASS    | PASS           |
| Power Spectral Density         | 2412/2437/2462  | PASS    | PASS    | PASS           |
| DTS Bandwidth (6dB)            | 2412/2437/2462  | PASS    | PASS    | PASS           |
| Occupied Channel Bandwidth 99% | 2412/2437/2462  | PASS    | PASS    | PASS           |
| Band Edges Low                 | 2412            | PASS    | PASS    | PASS           |
| Band Edges High                | 2462            | PASS    | PASS    | PASS           |
| Conducted Spurious Emissions   | 2412/2437/2462  | PASS    | PASS    | PASS           |

## RF Output Power

RF output power is defined as the mean equivalent isotropic radiated power (e.i.r.p.) of the equipment during a transmission burst.

### 802.11b

| Data Rate | Gated RMS (dBm)<br>2412 MHz | Gated RMS (dBm)<br>2437 MHz | Gated RMS (dBm)<br>2462 MHz | Limit (dBm) | Duty Cycle (%) | Power Setting |
|-----------|-----------------------------|-----------------------------|-----------------------------|-------------|----------------|---------------|
| 1 Mbps    | 9.950                       | 11.012                      | 10.822                      | 30          | 99.422         | Default       |
| 11 Mbps   | 11.252                      | 10.658                      | 10.872                      | 30          | 94.350         | Default       |

### 802.11g

| Data Rate | Gated RMS (dBm)<br>2412 MHz | Gated RMS (dBm)<br>2437 MHz | Gated RMS (dBm)<br>2462 MHz | Limit (dBm) | Duty Cycle (%) | Power Setting |
|-----------|-----------------------------|-----------------------------|-----------------------------|-------------|----------------|---------------|
| 6 Mbps    | 12.025                      | 11.267                      | 11.616                      | 30          | 96.281         | Default       |
| 54 Mbps   | 11.607                      | 11.029                      | 10.972                      | 30          | 75.874         | Default       |

### 802.11n (HT20)

| Data Rate | Gated RMS (dBm)<br>2412 MHz | Gated RMS (dBm)<br>2437 MHz | Gated RMS (dBm)<br>2462 MHz | Limit (dBm) | Duty Cycle (%) | Power Setting |
|-----------|-----------------------------|-----------------------------|-----------------------------|-------------|----------------|---------------|
| MCS0      | 11.683                      | 11.107                      | 11.572                      | 30          | 96.015         | Default       |
| MCS7      | 11.532                      | 10.903                      | 10.870                      | 30          | 74.235         | Default       |

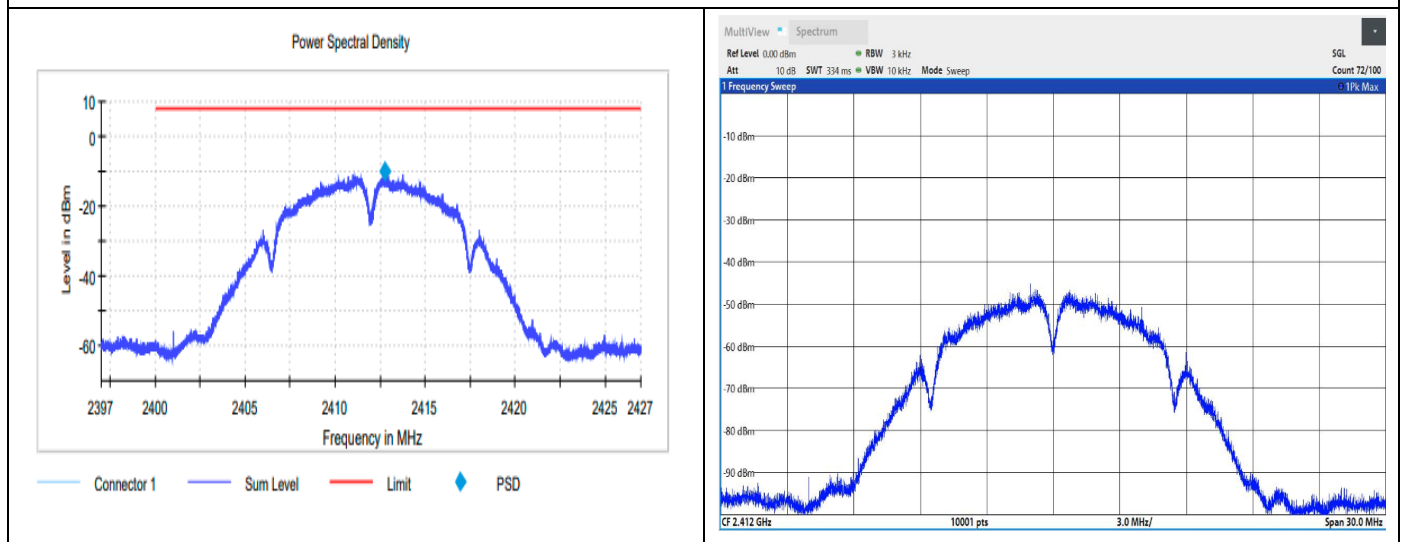
## Power Spectral Density

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

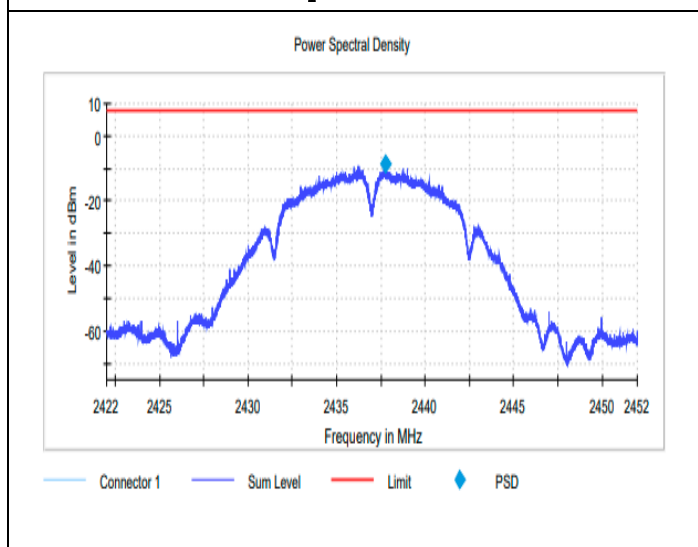
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

| Mode    | Data Rate | PSD (dBm) 2412 MHz | PSD (dBm) 2437 MHz | PSD (dBm) 2462 MHz | Limit (dBm) |
|---------|-----------|--------------------|--------------------|--------------------|-------------|
| 802.11b | 1Mbps     | -9.972             | -8.823             | -10.101            | 8.0         |
|         | 11Mbps    | -10.290            | -10.731            | -10.468            | 8.0         |

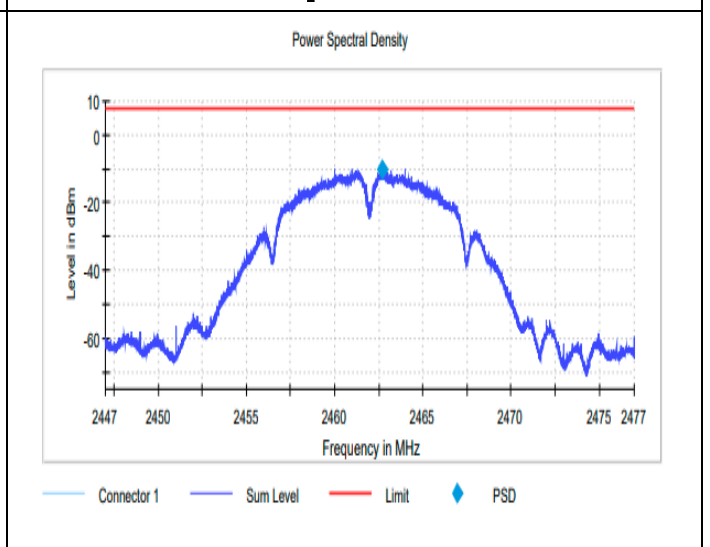
802.11b 2412MHz 1Mbps



802.11b 2437MHz 1Mbps

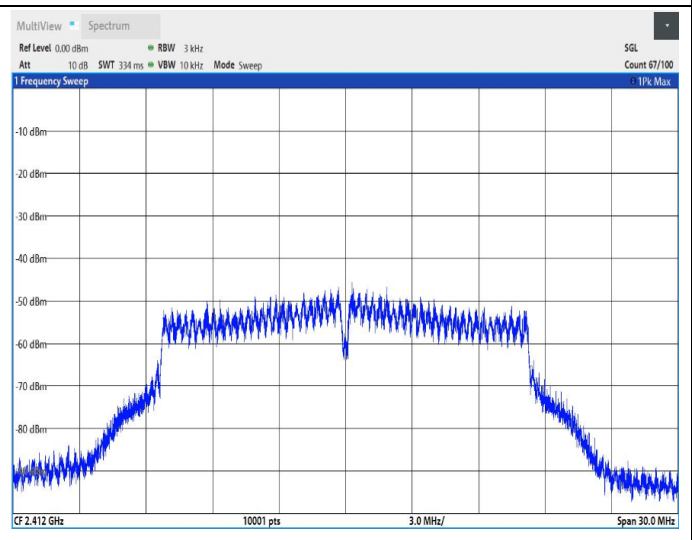
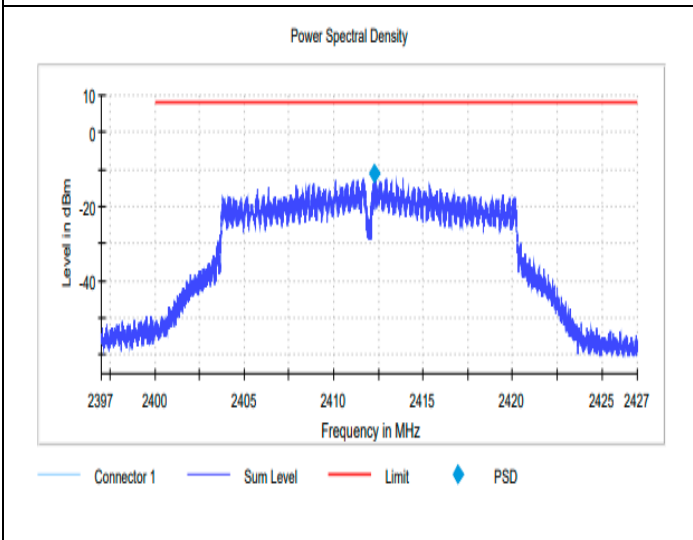


802.11b 2462MHz 1Mbps

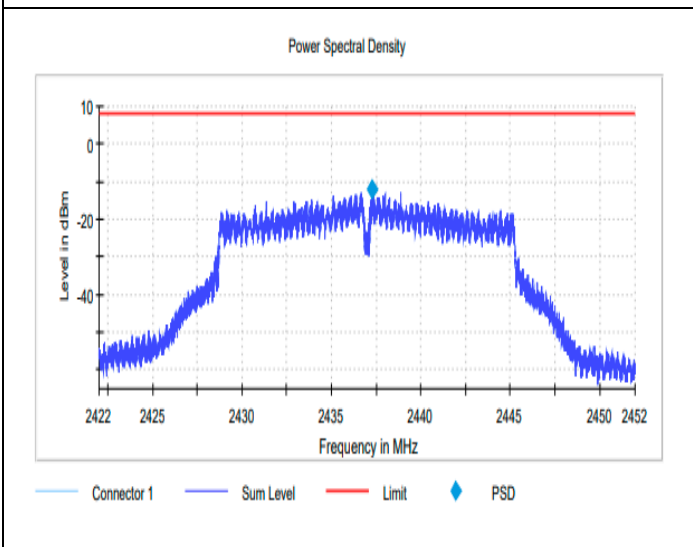


| Mode    | Data Rate | PSD (dBm)<br>2412 MHz | PSD (dBm)<br>2437 MHz | PSD (dBm)<br>2462 MHz | Limit (dBm) |
|---------|-----------|-----------------------|-----------------------|-----------------------|-------------|
| 802.11g | 6 Mbps    | -11.322               | -12.016               | -11.524               | 8.0         |
|         | 54 Mbps   | -15.223               | -15.778               | -15.877               | 8.0         |

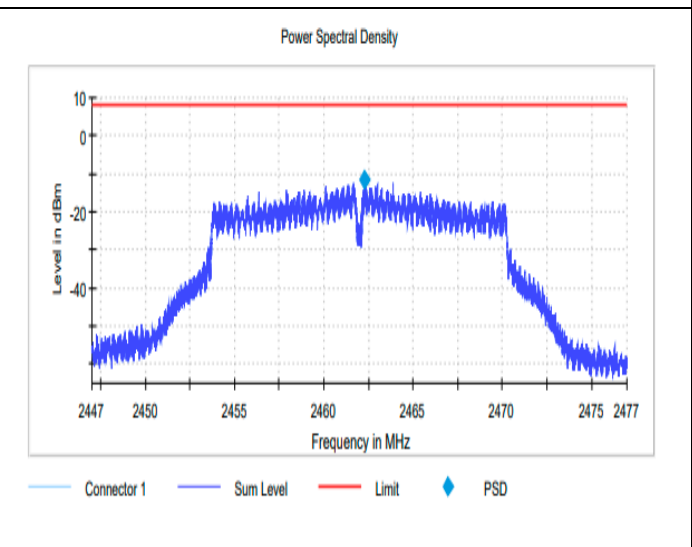
802.11g 2412MHz 6Mbps



802.11g 2437MHz 6Mbps

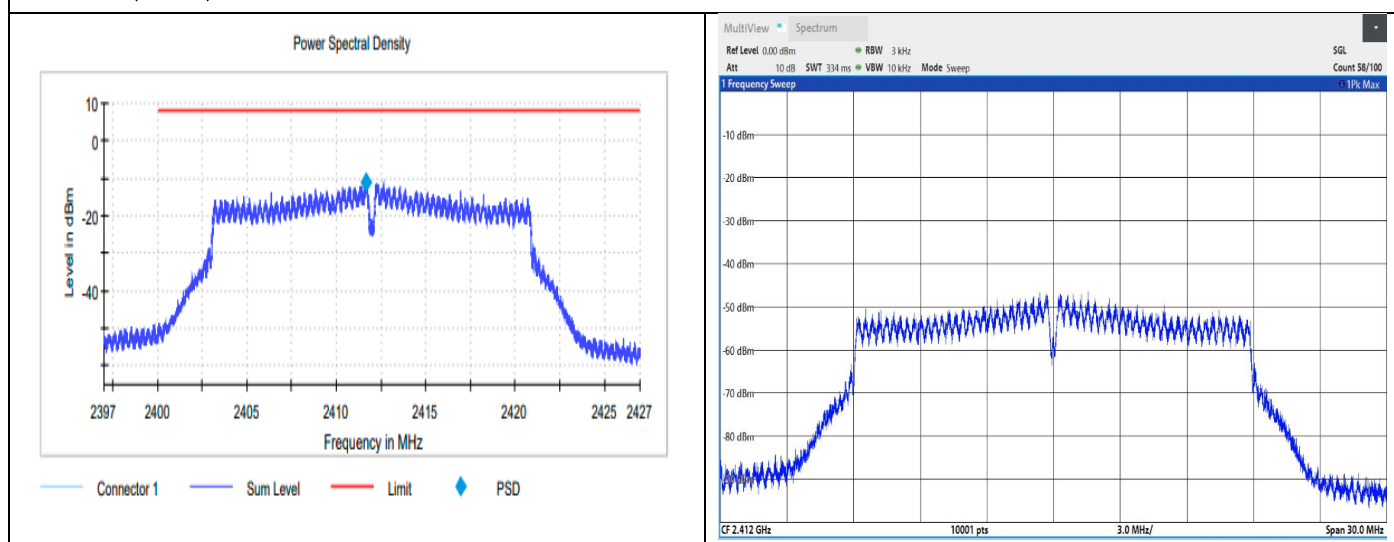


802.11g 2462MHz 6Mbps

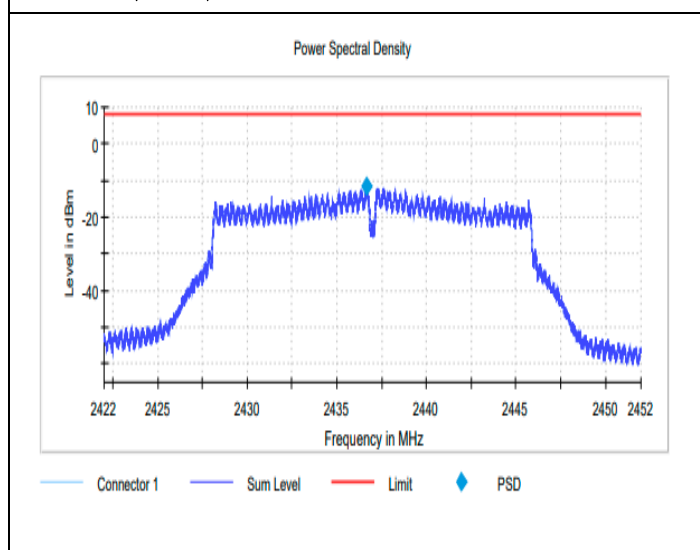


| Mode           | Data Rate | PSD (dBm)<br>2412 MHz | PSD (dBm)<br>2437 MHz | PSD (dBm)<br>2462 MHz | Limit (dBm) |
|----------------|-----------|-----------------------|-----------------------|-----------------------|-------------|
| 802.11n (HT20) | MCS0      | -10.919               | -11.447               | -11.370               | 8.0         |
|                | MCS7      | -13.907               | -14.167               | -14.116               | 8.0         |

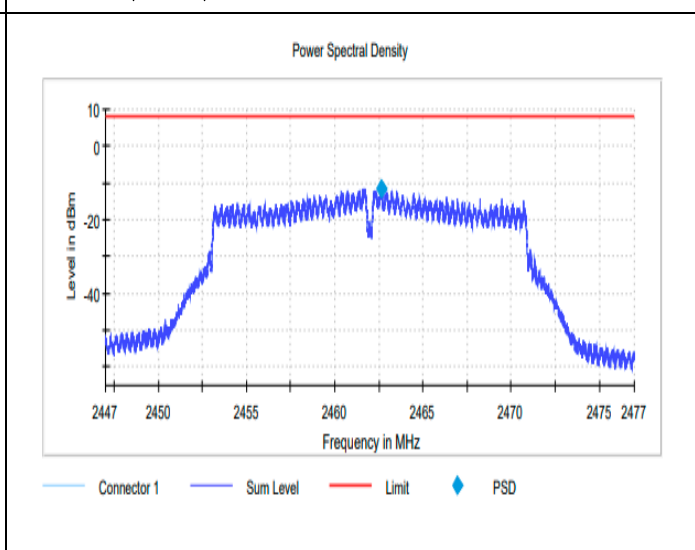
802.11n (HT20) 2412MHz MCS0



802.11n (HT20) 2437MHz MCS0



802.11n (HT20) 2462MHz MCS0



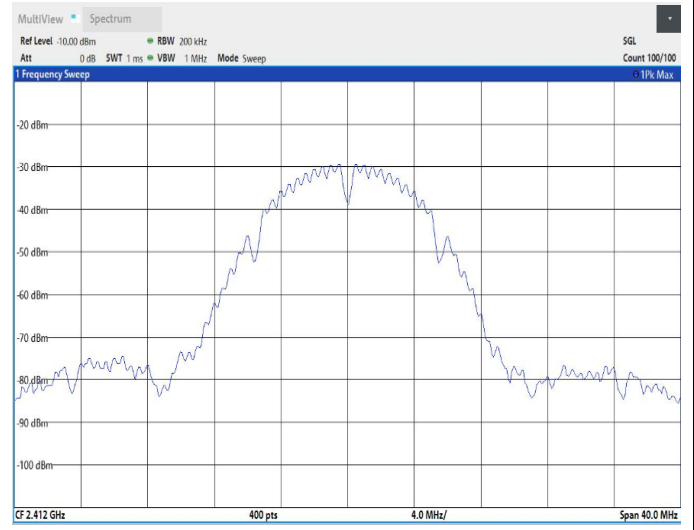
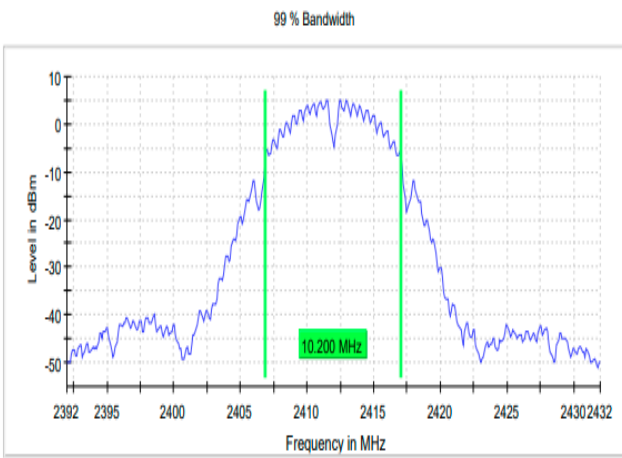
## Occupied Channel Bandwidth

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

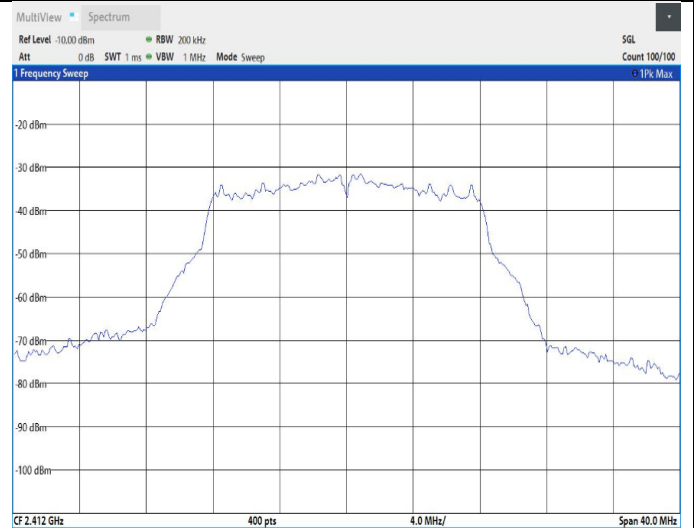
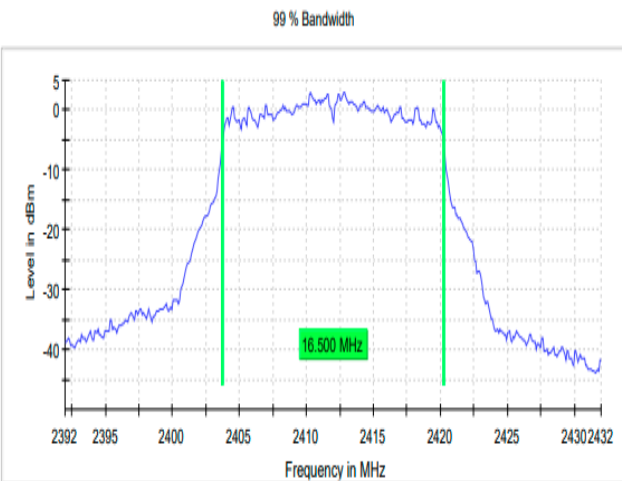
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

| Data Rate           | DUT Frequency (MHz) | Bandwidth (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|---------------------|-----------------|----------------------|-----------------------|
| 802.11b 1Mbps       | 2412.000            | 10.200000       | 2406.850000          | 2417.050000           |
| 802.11g 6Mbps       | 2412.000            | 16.500000       | 2403.750000          | 2420.250000           |
| 802.11n (HT20) MCS0 | 2412.000            | 17.700000       | 2403.150000          | 2420.850000           |
| 802.11b 1Mbps       | 2437.000            | 10.200000       | 2431.850000          | 2442.050000           |
| 802.11g 6Mbps       | 2437.000            | 16.500000       | 2428.750000          | 2445.250000           |
| 802.11n (HT20) MCS0 | 2437.000            | 17.800000       | 2428.050000          | 2445.850000           |
| 802.11b 1Mbps       | 2462.000            | 10.200000       | 2456.850000          | 2467.050000           |
| 802.11g 6Mbps       | 2462.000            | 16.500000       | 2453.750000          | 2470.250000           |
| 802.11n (HT20) MCS0 | 2462.000            | 17.700000       | 2453.150000          | 2470.850000           |

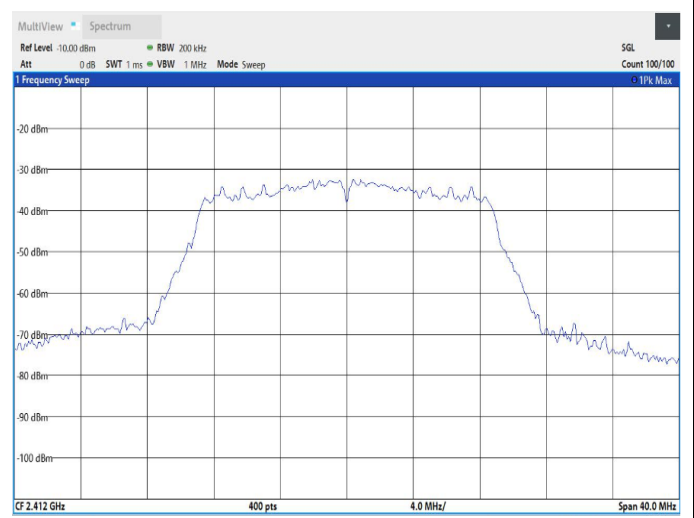
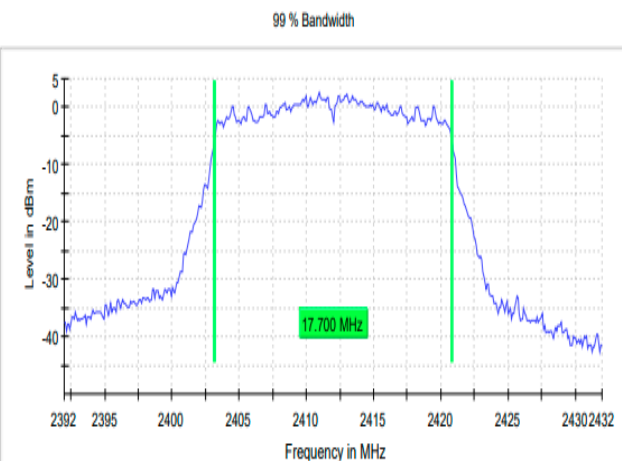
**802.11b 2412MHz 1Mbps**



**802.11g 2412MHz 6Mbps**



**802.11n (HT20) 2412MHz MCS0**





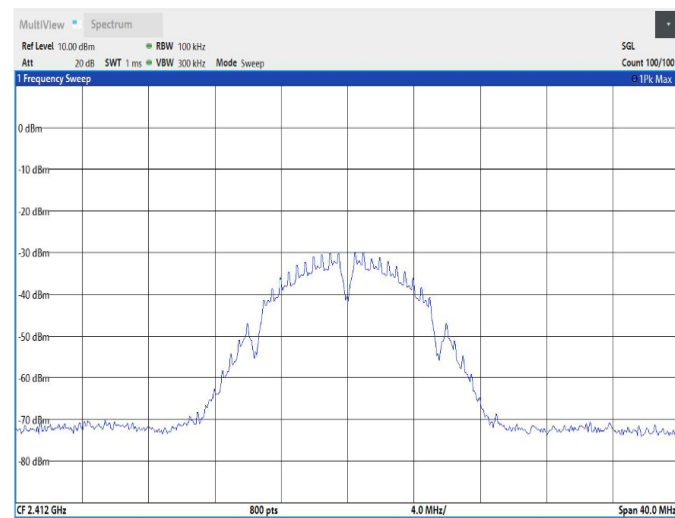
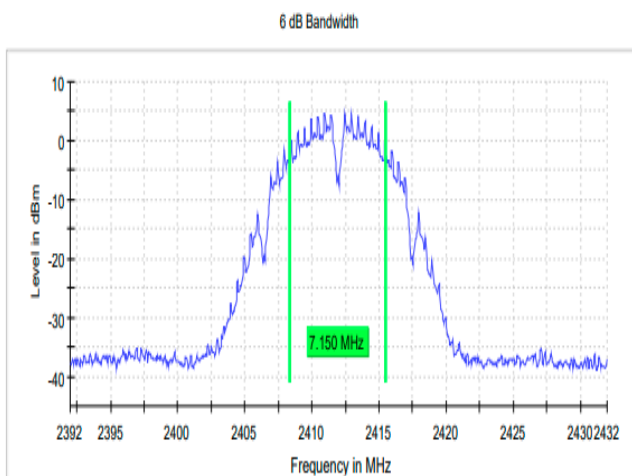
## DTS Bandwidth (6dB)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

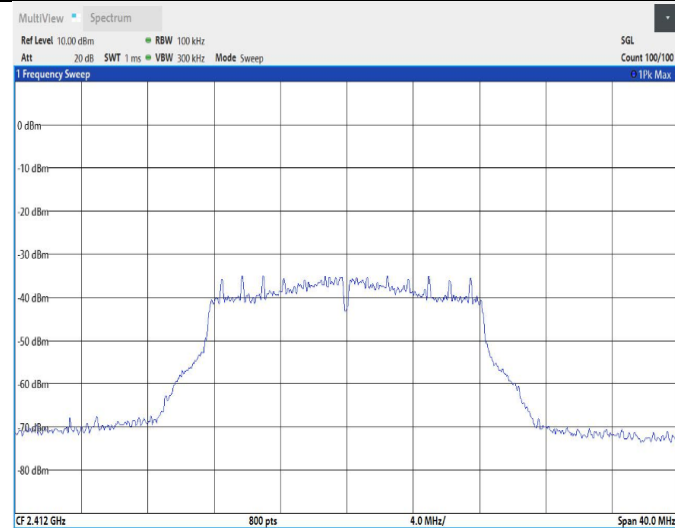
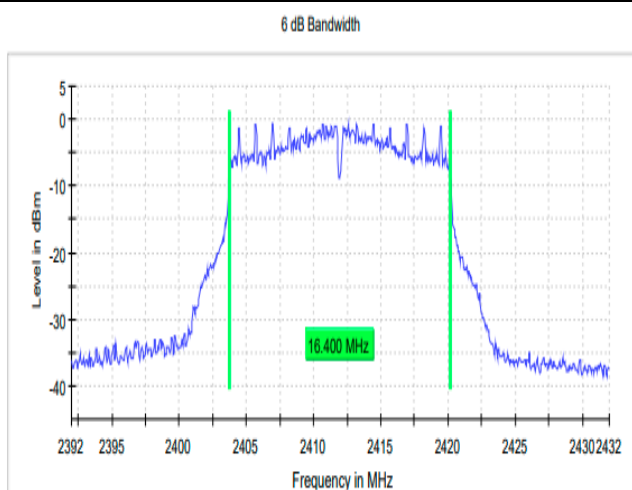
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

| Data Rate           | DUT Frequency (MHz) | Bandwidth (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Minimum Limit (MHz) |
|---------------------|---------------------|-----------------|----------------------|-----------------------|---------------------|
| 802.11b 1Mbps       | 2412.000            | 7.150000        | 2408.375000          | 2415.525000           | 0.5                 |
| 802.11g 6Mbps       | 2412.000            | 16.400000       | 2403.775000          | 2420.175000           | 0.5                 |
| 802.11n (HT20) MCS0 | 2412.000            | 17.650000       | 2403.125000          | 2420.775000           | 0.5                 |
| 802.11b 1Mbps       | 2437.000            | 7.150000        | 2433.375000          | 2440.525000           | 0.5                 |
| 802.11g 6Mbps       | 2437.000            | 16.400000       | 2428.775000          | 2445.175000           | 0.5                 |
| 802.11n (HT20) MCS0 | 2437.000            | 17.650000       | 2428.125000          | 2445.775000           | 0.5                 |
| 802.11b 1Mbps       | 2462.000            | 7.150000        | 2458.375000          | 2465.525000           | 0.5                 |
| 802.11g 6Mbps       | 2462.000            | 16.400000       | 2453.775000          | 2470.175000           | 0.5                 |
| 802.11n (HT20) MCS0 | 2462.000            | 17.650000       | 2453.125000          | 2470.775000           | 0.5                 |

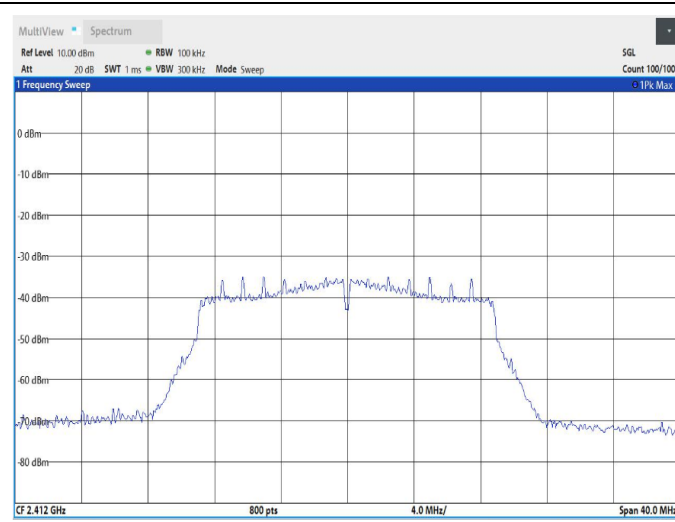
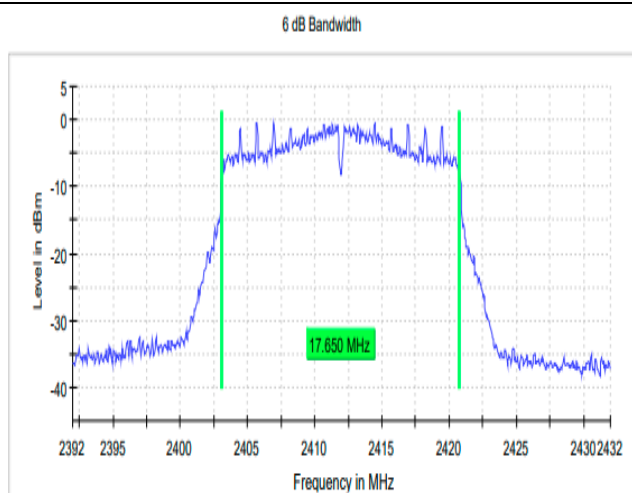
**802.11b 2412MHz 1Mbps**



**802.11g 2412MHz 6Mbps**



**802.11n (HT20) 2412MHz MCS0**



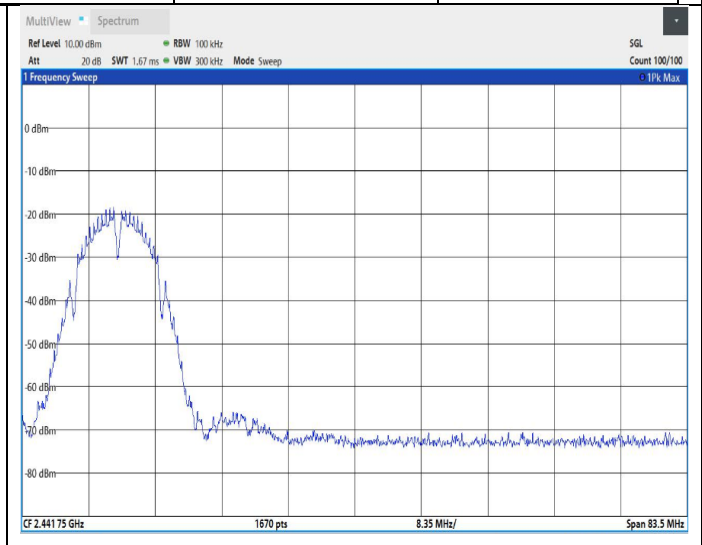
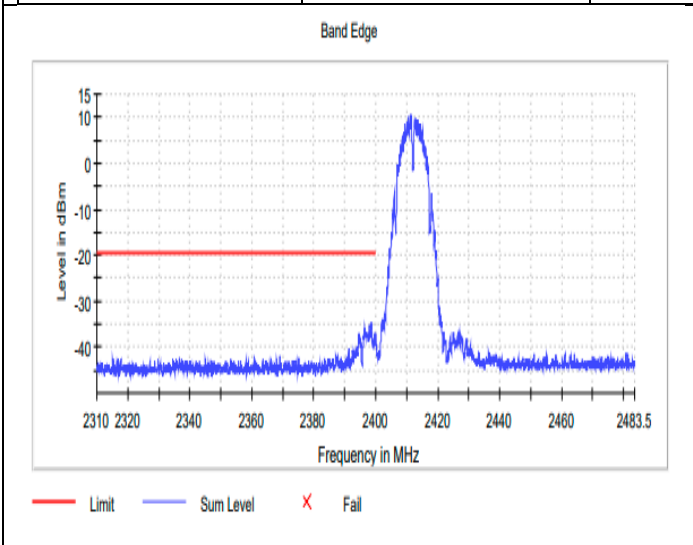
## Conducted Band Edge

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.7 and ANSI C63.10-2013

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 0.8 dB

| Band Edge Low 802.11b 2412MHz 1Mbps |             |
|-------------------------------------|-------------|
| Frequency (MHz)                     | Level (dBm) |
| 2411.475000                         | 10.6        |

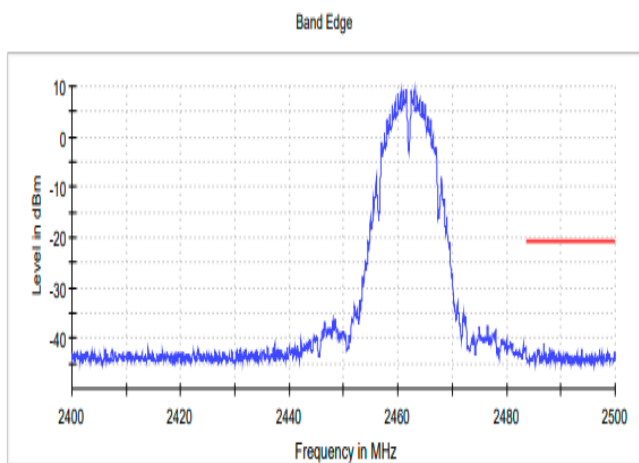
| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2398.525000     | -34.7       | 15.3        | -19.4       | PASS   |
| 2398.475000     | -34.8       | 15.4        | -19.4       | PASS   |
| 2397.975000     | -35.2       | 15.8        | -19.4       | PASS   |
| 2398.025000     | -35.2       | 15.8        | -19.4       | PASS   |
| 2396.475000     | -35.9       | 16.5        | -19.4       | PASS   |
| 2396.525000     | -36.0       | 16.5        | -19.4       | PASS   |
| 2397.925000     | -36.0       | 16.6        | -19.4       | PASS   |
| 2398.375000     | -36.1       | 16.6        | -19.4       | PASS   |
| 2396.325000     | -36.3       | 16.9        | -19.4       | PASS   |
| 2398.075000     | -36.3       | 16.9        | -19.4       | PASS   |
| 2398.425000     | -36.3       | 16.9        | -19.4       | PASS   |
| 2396.275000     | -36.3       | 16.9        | -19.4       | PASS   |
| 2398.175000     | -36.6       | 17.2        | -19.4       | PASS   |
| 2398.225000     | -36.6       | 17.2        | -19.4       | PASS   |
| 2398.325000     | -36.7       | 17.2        | -19.4       | PASS   |



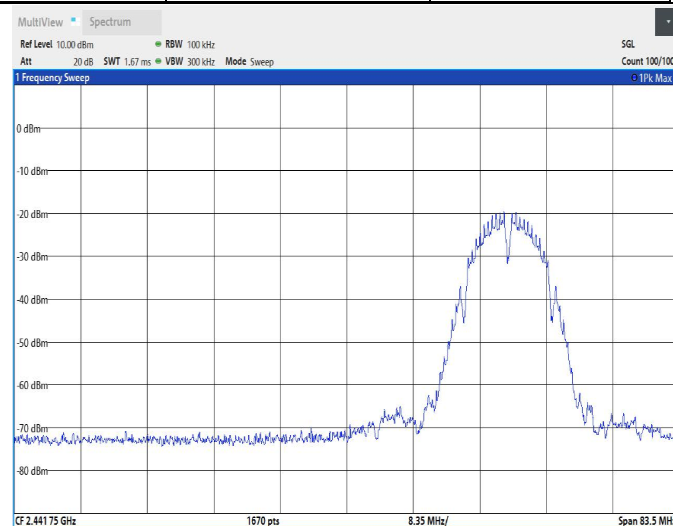
**Band Edge High 802.11b 2412MHz 1Mbps**

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2461.475000     | 9.4         |

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2486.875000     | -40.9       | 20.4        | -20.6       | PASS   |
| 2486.825000     | -41.1       | 20.6        | -20.6       | PASS   |
| 2487.975000     | -42.0       | 21.4        | -20.6       | PASS   |
| 2485.825000     | -42.3       | 21.7        | -20.6       | PASS   |
| 2493.825000     | -42.3       | 21.7        | -20.6       | PASS   |
| 2485.875000     | -42.4       | 21.9        | -20.6       | PASS   |
| 2488.025000     | -42.5       | 21.9        | -20.6       | PASS   |
| 2488.725000     | -42.5       | 21.9        | -20.6       | PASS   |
| 2487.925000     | -42.5       | 22.0        | -20.6       | PASS   |
| 2485.975000     | -42.5       | 22.0        | -20.6       | PASS   |
| 2497.175000     | -42.6       | 22.0        | -20.6       | PASS   |
| 2488.575000     | -42.6       | 22.0        | -20.6       | PASS   |
| 2497.125000     | -42.6       | 22.1        | -20.6       | PASS   |
| 2485.725000     | -42.7       | 22.1        | -20.6       | PASS   |
| 2489.625000     | -42.7       | 22.1        | -20.6       | PASS   |



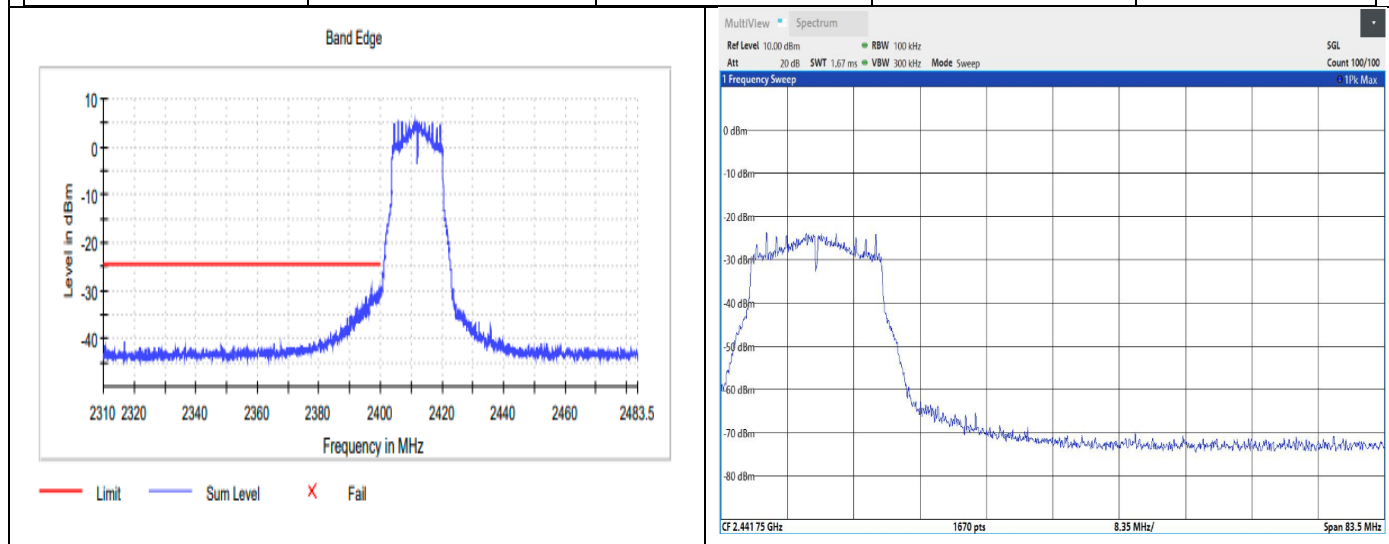
— Limit — Sum Level × Fail



**Band Edge Low 802.11g 2412MHz 6Mbps**

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2405.725000     | 5.3         |

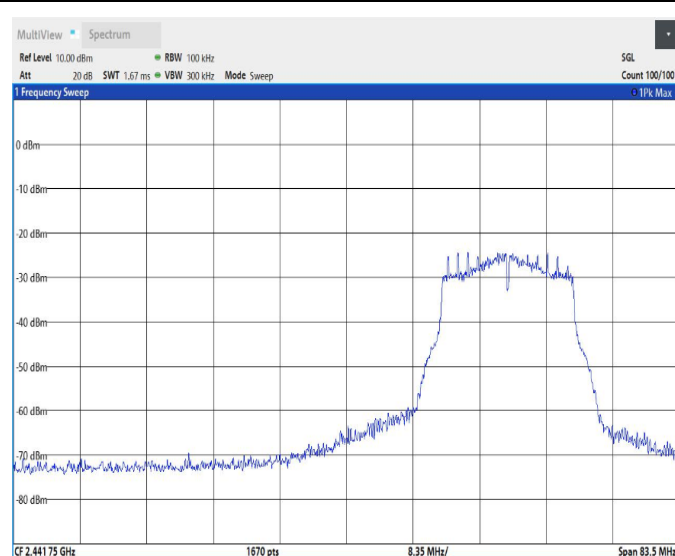
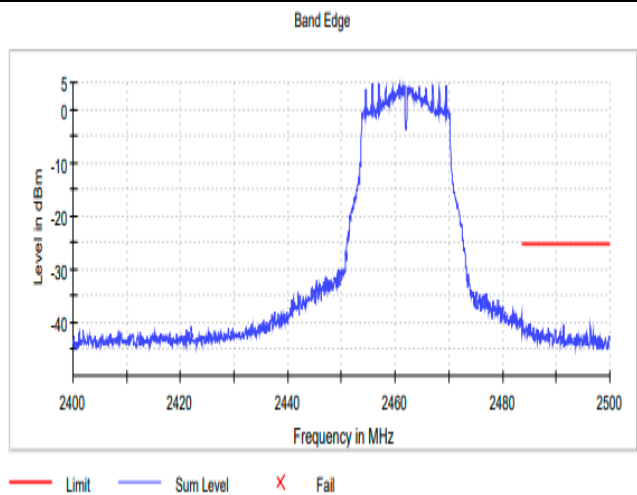
| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2399.525000     | -29.3       | 4.6         | -24.7       | PASS   |
| 2399.475000     | -29.3       | 4.7         | -24.7       | PASS   |
| 2397.025000     | -29.5       | 4.8         | -24.7       | PASS   |
| 2396.975000     | -29.5       | 4.8         | -24.7       | PASS   |
| 2399.875000     | -29.7       | 5.0         | -24.7       | PASS   |
| 2399.775000     | -29.9       | 5.2         | -24.7       | PASS   |
| 2399.825000     | -29.9       | 5.3         | -24.7       | PASS   |
| 2399.725000     | -30.0       | 5.3         | -24.7       | PASS   |
| 2398.825000     | -30.2       | 5.6         | -24.7       | PASS   |
| 2398.875000     | -30.3       | 5.7         | -24.7       | PASS   |
| 2399.425000     | -30.4       | 5.8         | -24.7       | PASS   |
| 2398.225000     | -30.5       | 5.8         | -24.7       | PASS   |
| 2399.575000     | -30.6       | 5.9         | -24.7       | PASS   |
| 2399.225000     | -30.8       | 6.1         | -24.7       | PASS   |
| 2396.725000     | -30.8       | 6.1         | -24.7       | PASS   |



**Band Edge High 802.11g 2462MHz 6Mbps**

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2456.975000     | 4.7         |

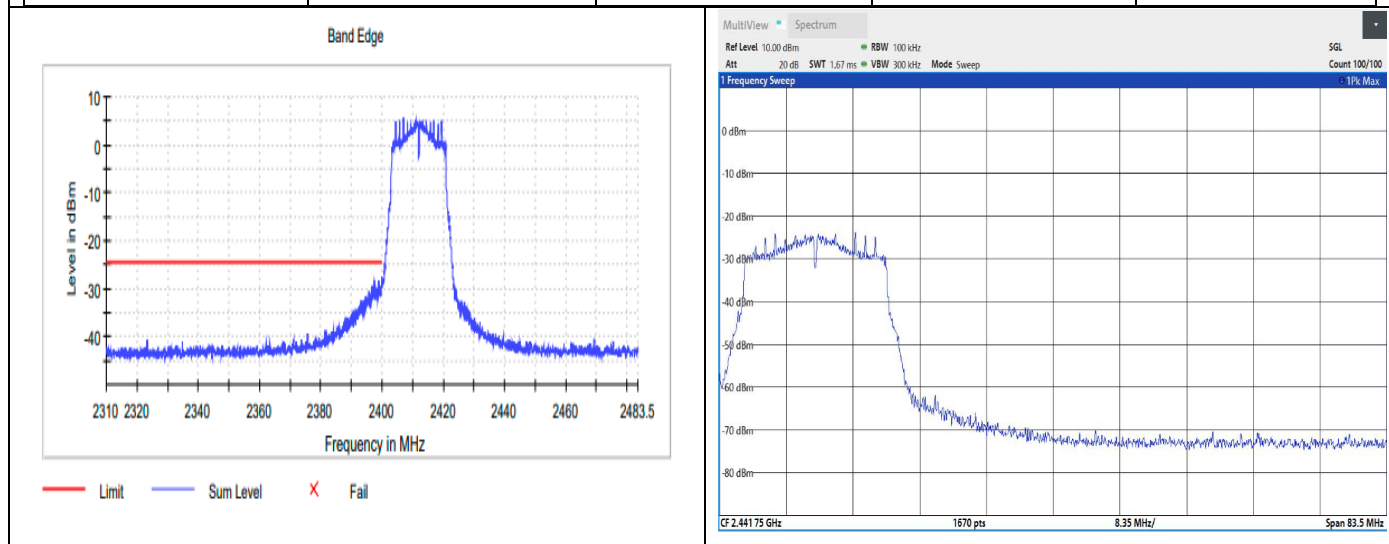
| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2483.775000     | -39.6       | 14.2        | -25.3       | PASS   |
| 2483.825000     | -39.7       | 14.3        | -25.3       | PASS   |
| 2483.525000     | -40.0       | 14.7        | -25.3       | PASS   |
| 2485.125000     | -40.4       | 15.0        | -25.3       | PASS   |
| 2484.775000     | -40.4       | 15.1        | -25.3       | PASS   |
| 2491.375000     | -40.4       | 15.1        | -25.3       | PASS   |
| 2491.425000     | -40.4       | 15.1        | -25.3       | PASS   |
| 2485.025000     | -40.5       | 15.2        | -25.3       | PASS   |
| 2485.075000     | -40.6       | 15.3        | -25.3       | PASS   |
| 2496.375000     | -40.7       | 15.3        | -25.3       | PASS   |
| 2496.325000     | -40.8       | 15.5        | -25.3       | PASS   |
| 2483.875000     | -40.8       | 15.5        | -25.3       | PASS   |
| 2485.175000     | -40.9       | 15.5        | -25.3       | PASS   |
| 2485.775000     | -40.9       | 15.6        | -25.3       | PASS   |
| 2485.725000     | -41.0       | 15.6        | -25.3       | PASS   |



**Band Edge Low 802.11n (HT20) 2412MHz MCS0**

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2406.975000     | 5.3         |

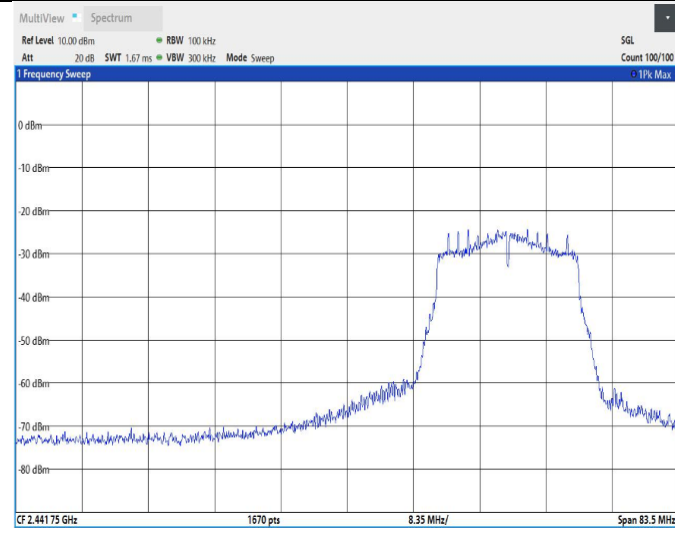
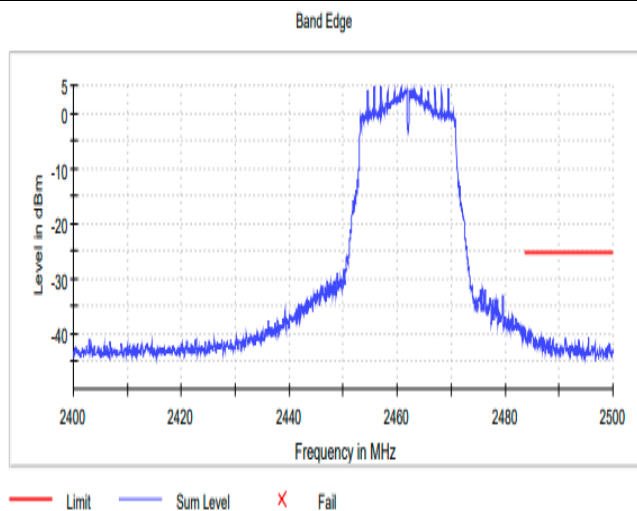
| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2397.625000     | -28.3       | 3.6         | -24.7       | PASS   |
| 2398.875000     | -28.3       | 3.6         | -24.7       | PASS   |
| 2398.825000     | -28.3       | 3.7         | -24.7       | PASS   |
| 2397.575000     | -28.6       | 3.9         | -24.7       | PASS   |
| 2399.825000     | -28.8       | 4.2         | -24.7       | PASS   |
| 2399.875000     | -28.9       | 4.2         | -24.7       | PASS   |
| 2398.925000     | -29.2       | 4.5         | -24.7       | PASS   |
| 2397.675000     | -29.4       | 4.7         | -24.7       | PASS   |
| 2399.175000     | -29.5       | 4.9         | -24.7       | PASS   |
| 2396.725000     | -29.6       | 4.9         | -24.7       | PASS   |
| 2397.925000     | -29.6       | 5.0         | -24.7       | PASS   |
| 2399.125000     | -29.6       | 5.0         | -24.7       | PASS   |
| 2397.025000     | -29.6       | 5.0         | -24.7       | PASS   |
| 2396.975000     | -29.6       | 5.0         | -24.7       | PASS   |
| 2399.975000     | -29.7       | 5.0         | -24.7       | PASS   |



**Band Edge High 802.11n (HT20) 2462MHz MCS0**

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2464.475000     | 4.7         |

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2483.525000     | -38.7       | 13.4        | -25.3       | PASS   |
| 2483.575000     | -39.0       | 13.6        | -25.3       | PASS   |
| 2484.475000     | -39.3       | 14.0        | -25.3       | PASS   |
| 2484.825000     | -39.3       | 14.0        | -25.3       | PASS   |
| 2483.825000     | -39.3       | 14.0        | -25.3       | PASS   |
| 2484.425000     | -39.3       | 14.0        | -25.3       | PASS   |
| 2483.625000     | -39.4       | 14.1        | -25.3       | PASS   |
| 2484.675000     | -39.8       | 14.5        | -25.3       | PASS   |
| 2484.175000     | -39.8       | 14.5        | -25.3       | PASS   |
| 2484.225000     | -40.0       | 14.7        | -25.3       | PASS   |
| 2483.875000     | -40.0       | 14.7        | -25.3       | PASS   |
| 2483.675000     | -40.1       | 14.8        | -25.3       | PASS   |
| 2484.925000     | -40.1       | 14.8        | -25.3       | PASS   |
| 2484.775000     | -40.1       | 14.8        | -25.3       | PASS   |
| 2484.975000     | -40.2       | 14.9        | -25.3       | PASS   |



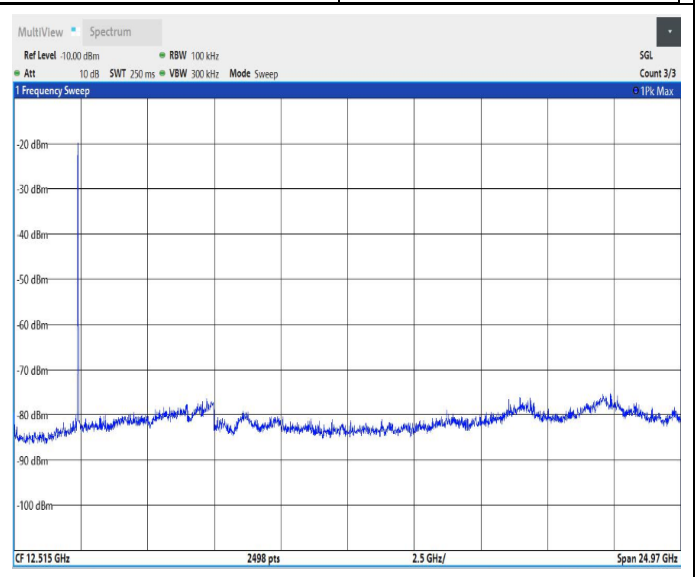
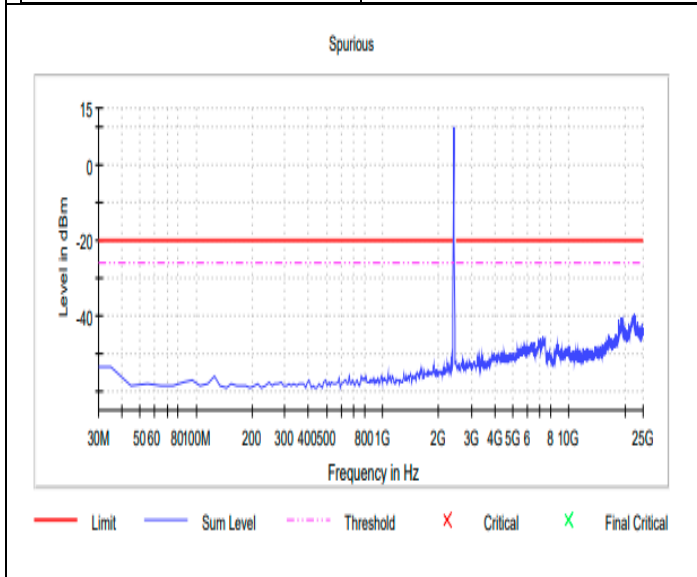


## Tx Spurious Emissions

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.5 and ANSI C63.10-2013 11.11.2 & 11.11.3

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.8 dB

| 802.11b 2412MHz 1Mbps |             |             |             |
|-----------------------|-------------|-------------|-------------|
| Pre Measurement       |             |             |             |
| Frequency (MHz)       | Level (dBm) | Margin (dB) | Limit (dBm) |
| 2394.053243           | -36.6       | 16.7        | -20.0       |
| 22366.054844          | -39.7       | 19.7        | -20.0       |
| 22086.166934          | -39.9       | 20.0        | -20.0       |
| 22396.042834          | -40.0       | 20.0        | -20.0       |
| 22625.950761          | -40.1       | 20.1        | -20.0       |
| 22206.118895          | -40.1       | 20.1        | -20.0       |
| 22196.122898          | -40.4       | 20.4        | -20.0       |
| 22156.138911          | -40.5       | 20.5        | -20.0       |
| 21976.210969          | -40.6       | 20.6        | -20.0       |
| 21986.206966          | -40.6       | 20.7        | -20.0       |
| 18977.411930          | -40.7       | 20.7        | -20.0       |
| 19367.255805          | -40.7       | 20.7        | -20.0       |
| 22096.162930          | -40.7       | 20.7        | -20.0       |
| 22416.034828          | -40.7       | 20.7        | -20.0       |
| 22216.114892          | -40.8       | 20.9        | -20.0       |

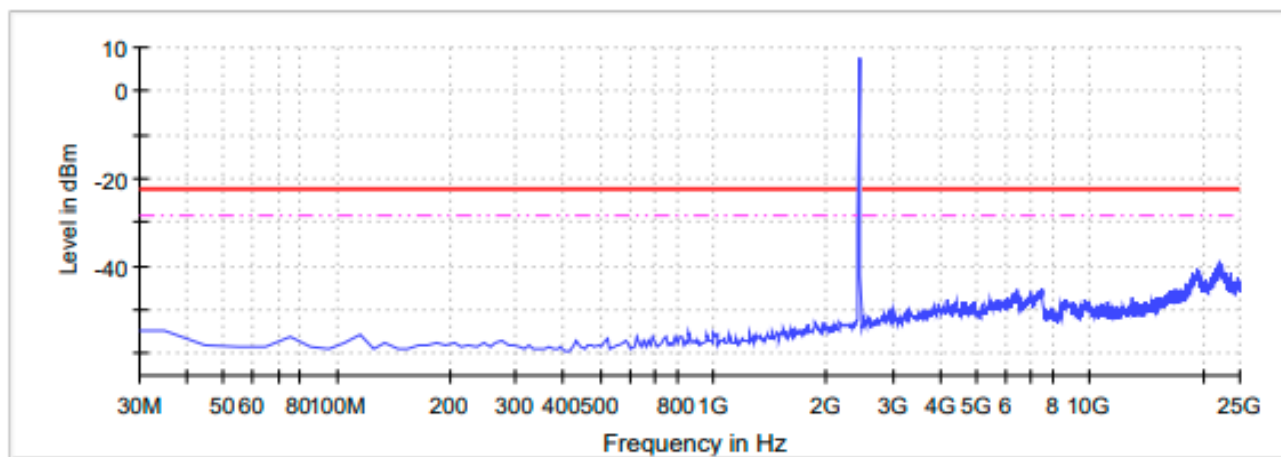


**802.11b 2437MHz 1Mbps**

**Pre Measurement**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 22096.162930    | -38.7       | 16.4        | -22.2       |
| 22066.174940    | -39.1       | 16.8        | -22.2       |
| 22116.154924    | -39.4       | 17.1        | -22.2       |
| 22126.150921    | -39.6       | 17.4        | -22.2       |
| 22226.110889    | -39.6       | 17.4        | -22.2       |
| 22026.190953    | -39.6       | 17.4        | -22.2       |
| 22136.146918    | -39.6       | 17.4        | -22.2       |
| 22246.102882    | -39.8       | 17.6        | -22.2       |
| 22006.198959    | -39.9       | 17.7        | -22.2       |
| 22186.126902    | -39.9       | 17.7        | -22.2       |
| 22106.158927    | -40.0       | 17.7        | -22.2       |
| 22166.134908    | -40.0       | 17.8        | -22.2       |
| 22236.106886    | -40.2       | 18.0        | -22.2       |
| 21886.246998    | -40.2       | 18.0        | -22.2       |
| 22056.178943    | -40.3       | 18.1        | -22.2       |

Spurious



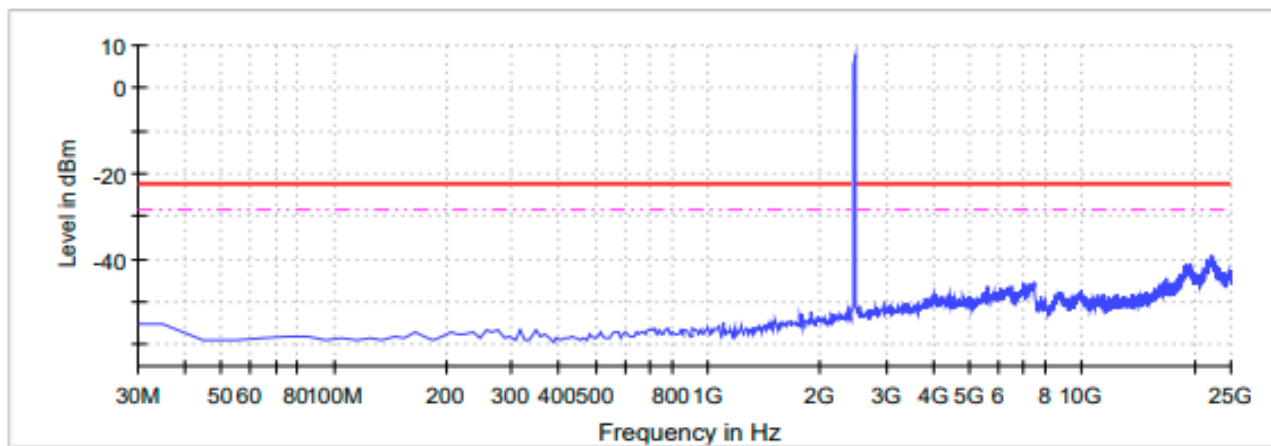
— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

**802.11b 2462MHz 1Mbps**

**Pre Measurement**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 22076.170937    | -39.0       | 16.7        | -22.3       |
| 22266.094876    | -39.2       | 16.8        | -22.3       |
| 22056.178943    | -39.3       | 17.0        | -22.3       |
| 22226.110889    | -39.6       | 17.2        | -22.3       |
| 22086.166934    | -39.8       | 17.4        | -22.3       |
| 22006.198959    | -39.9       | 17.6        | -22.3       |
| 22206.118895    | -39.9       | 17.6        | -22.3       |
| 22146.142914    | -40.0       | 17.6        | -22.3       |
| 21976.210969    | -40.0       | 17.6        | -22.3       |
| 21406.439151    | -40.3       | 17.9        | -22.3       |
| 22176.130905    | -40.3       | 17.9        | -22.3       |
| 22126.150921    | -40.3       | 18.0        | -22.3       |
| 22036.186950    | -40.4       | 18.0        | -22.3       |
| 22116.154924    | -40.4       | 18.0        | -22.3       |
| 22166.134908    | -40.4       | 18.1        | -22.3       |

**Spurious**

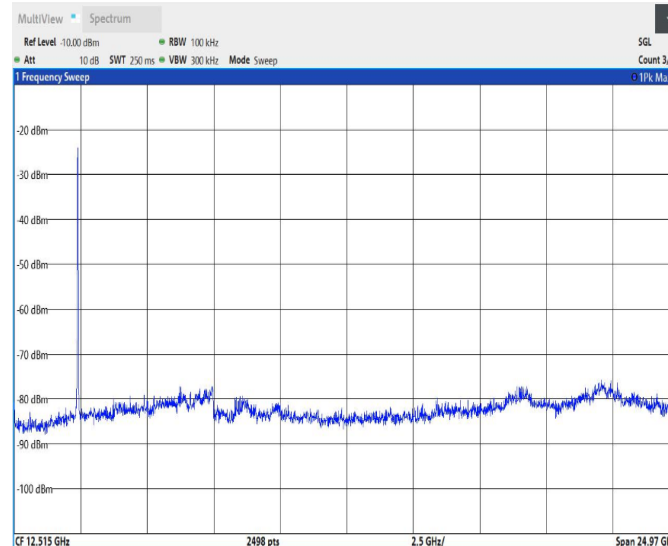
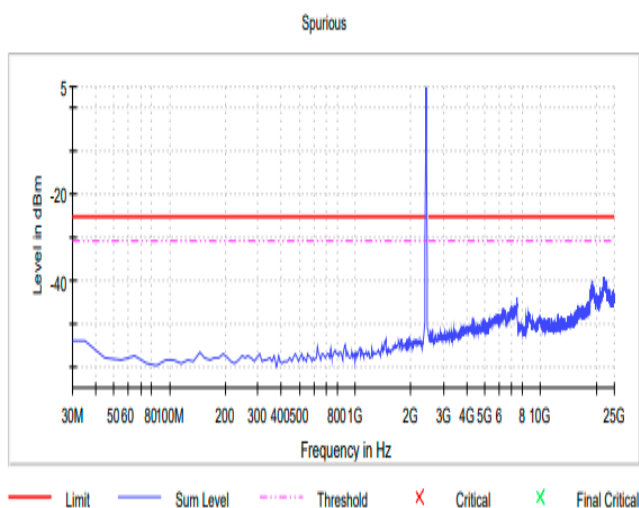


— Limit    — Sum Level    - - - - Threshold    × Critical    × Final Critical

**802.11g 2412MHz 6Mbps**

**Pre Measurement**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 2394.053243     | -32.2       | 7.2         | -25.1       |
| 21906.238991    | -39.0       | 14.0        | -25.1       |
| 22066.174940    | -39.3       | 14.3        | -25.1       |
| 22036.186950    | -39.7       | 14.6        | -25.1       |
| 22575.970777    | -39.9       | 14.8        | -25.1       |
| 22426.030825    | -40.0       | 15.0        | -25.1       |
| 22136.146918    | -40.0       | 15.0        | -25.1       |
| 19077.371898    | -40.2       | 15.1        | -25.1       |
| 22076.170937    | -40.4       | 15.3        | -25.1       |
| 22675.930745    | -40.5       | 15.5        | -25.1       |
| 21986.206966    | -40.5       | 15.5        | -25.1       |
| 22126.150921    | -40.6       | 15.6        | -25.1       |
| 22196.122898    | -40.6       | 15.6        | -25.1       |
| 22496.002802    | -40.7       | 15.7        | -25.1       |
| 2384.057246     | -40.7       | 15.7        | -25.1       |

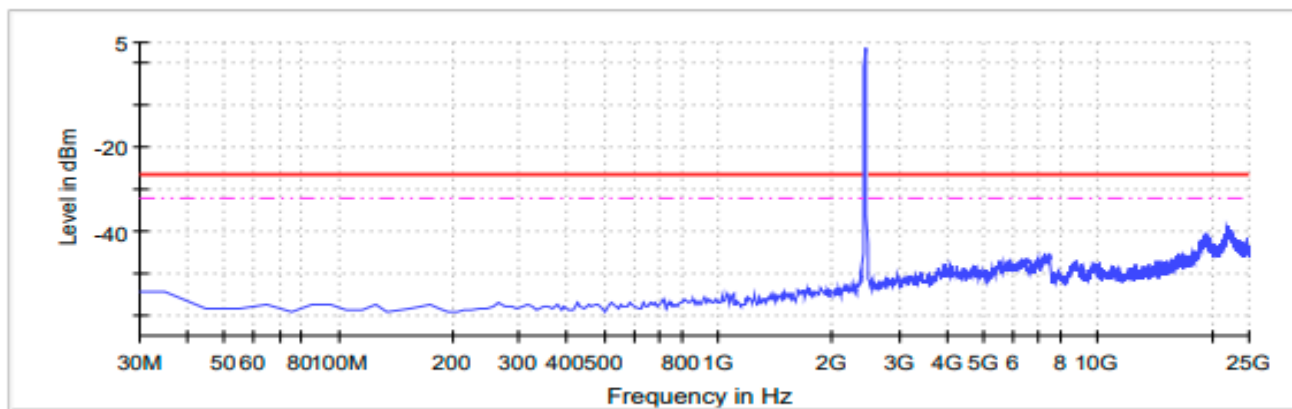


**802.11g 2437MHz 6Mbps**

**Pre Measurement**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 22126.150921    | -38.9       | 12.5        | -26.4       |
| 21936.226982    | -39.2       | 12.8        | -26.4       |
| 22076.170937    | -39.7       | 13.3        | -26.4       |
| 22016.194956    | -39.7       | 13.4        | -26.4       |
| 22266.094876    | -39.8       | 13.4        | -26.4       |
| 22316.074860    | -39.8       | 13.5        | -26.4       |
| 22036.186950    | -39.9       | 13.6        | -26.4       |
| 22196.122898    | -39.9       | 13.6        | -26.4       |
| 21996.202962    | -40.0       | 13.7        | -26.4       |
| 22086.166934    | -40.1       | 13.7        | -26.4       |
| 21986.206966    | -40.2       | 13.8        | -26.4       |
| 21966.214972    | -40.2       | 13.8        | -26.4       |
| 22136.146918    | -40.2       | 13.8        | -26.4       |
| 22146.142914    | -40.2       | 13.9        | -26.4       |
| 22216.114892    | -40.3       | 13.9        | -26.4       |

Spurious



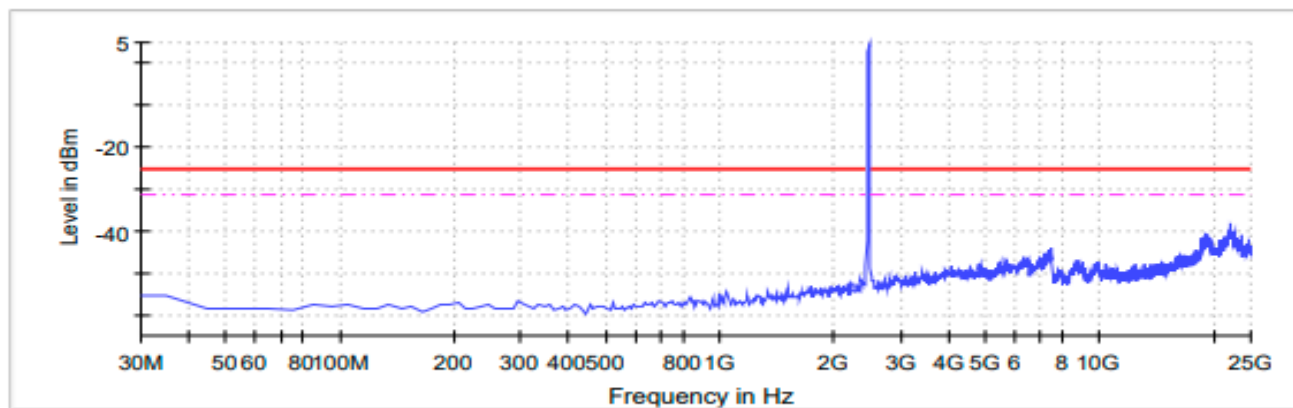
— Limit    
 — Sum Level    
 - - - Threshold    
 × Critical    
 × Final Critical

**802.11g 2462MHz 6Mbps**

**Pre Measurement**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 22146.142914    | -38.3       | 13.0        | -25.3       |
| 21996.202962    | -39.0       | 13.7        | -25.3       |
| 22006.198959    | -39.2       | 13.9        | -25.3       |
| 22106.158927    | -39.3       | 13.9        | -25.3       |
| 22076.170937    | -39.4       | 14.1        | -25.3       |
| 22056.178943    | -39.7       | 14.4        | -25.3       |
| 22236.106886    | -39.8       | 14.5        | -25.3       |
| 22086.166934    | -39.9       | 14.6        | -25.3       |
| 22026.190953    | -39.9       | 14.6        | -25.3       |
| 22166.134908    | -40.0       | 14.7        | -25.3       |
| 22316.074860    | -40.0       | 14.7        | -25.3       |
| 22126.150921    | -40.0       | 14.7        | -25.3       |
| 22016.194956    | -40.1       | 14.8        | -25.3       |
| 21876.251001    | -40.1       | 14.8        | -25.3       |
| 22476.010809    | -40.4       | 15.0        | -25.3       |

Spurious



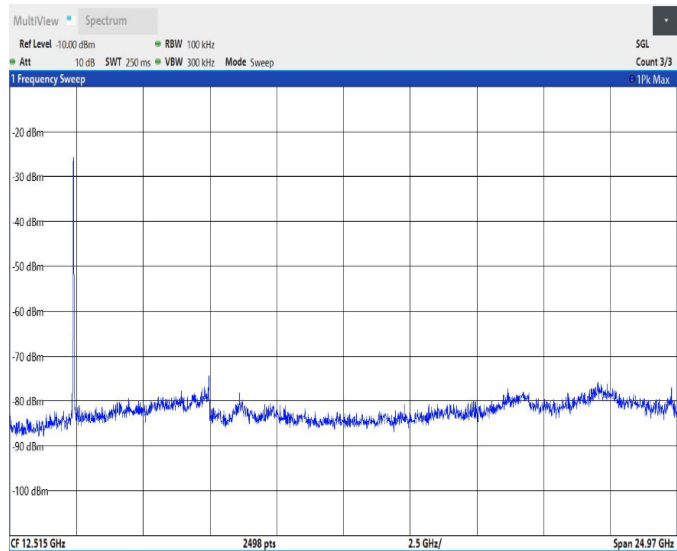
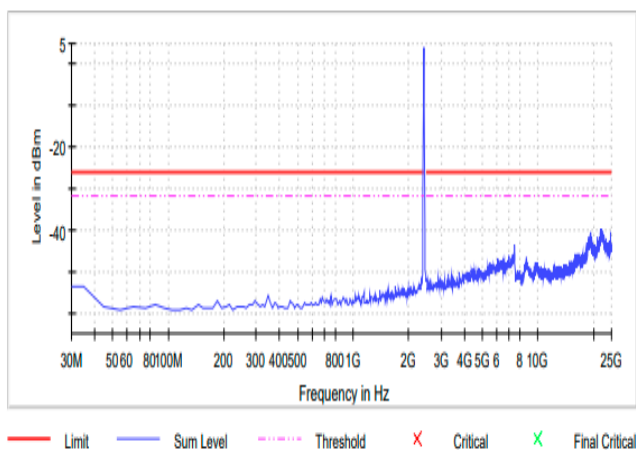
— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

802.11n (HT20) 2412MHz MCS0

Pre Measurement

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 2394.053243     | -32.3       | 6.4         | -25.9       |
| 22086.166934    | -39.6       | 13.7        | -25.9       |
| 22186.126902    | -39.6       | 13.7        | -25.9       |
| 22036.186950    | -39.8       | 13.9        | -25.9       |
| 21846.263010    | -39.8       | 13.9        | -25.9       |
| 21766.295036    | -39.9       | 14.0        | -25.9       |
| 22236.106886    | -40.4       | 14.5        | -25.9       |
| 21876.251001    | -40.4       | 14.5        | -25.9       |
| 22206.118895    | -40.5       | 14.6        | -25.9       |
| 22396.042834    | -40.5       | 14.6        | -25.9       |
| 21916.234988    | -40.5       | 14.6        | -25.9       |
| 22056.178943    | -40.5       | 14.6        | -25.9       |
| 22006.198959    | -40.5       | 14.6        | -25.9       |
| 19307.279824    | -40.6       | 14.7        | -25.9       |
| 21786.287030    | -40.6       | 14.7        | -25.9       |

Spurious

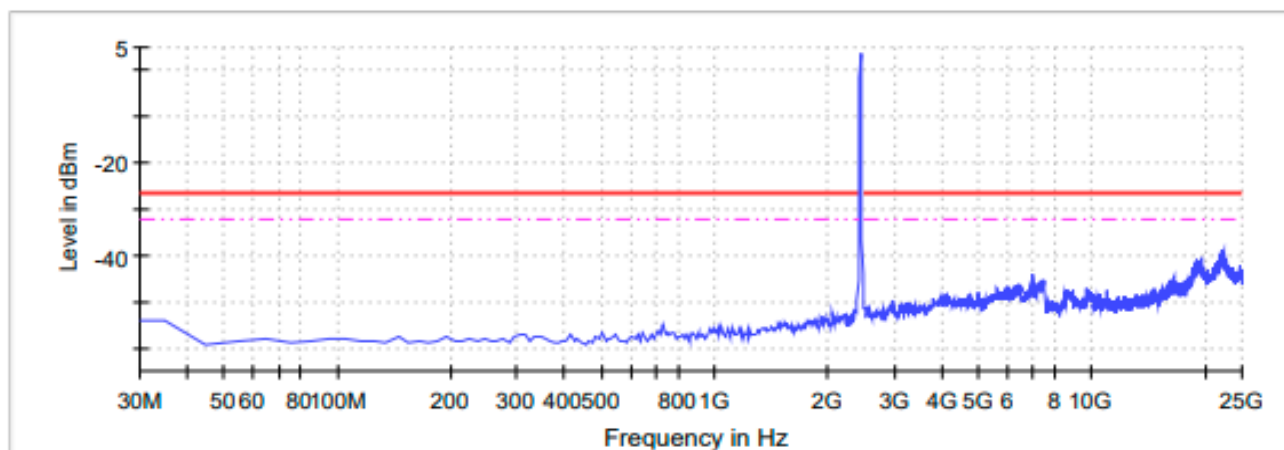


802.11n (HT20) 2437MHz MCS0

Pre Measurement

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 22046.182946    | -38.9       | 12.6        | -26.3       |
| 22246.102882    | -39.2       | 12.9        | -26.3       |
| 22116.154924    | -39.2       | 12.9        | -26.3       |
| 22106.158927    | -39.7       | 13.4        | -26.3       |
| 21886.246998    | -39.7       | 13.4        | -26.3       |
| 22376.050841    | -39.7       | 13.4        | -26.3       |
| 22136.146918    | -39.8       | 13.5        | -26.3       |
| 22126.150921    | -39.9       | 13.6        | -26.3       |
| 22086.166934    | -40.0       | 13.7        | -26.3       |
| 22426.030825    | -40.1       | 13.8        | -26.3       |
| 22196.122898    | -40.2       | 13.9        | -26.3       |
| 22436.026821    | -40.2       | 13.9        | -26.3       |
| 22156.138911    | -40.2       | 13.9        | -26.3       |
| 22026.190953    | -40.3       | 14.0        | -26.3       |
| 21936.226982    | -40.4       | 14.1        | -26.3       |

Spurious



— Limit    — Sum Level    - - - - Threshold    × Critical    × Final Critical

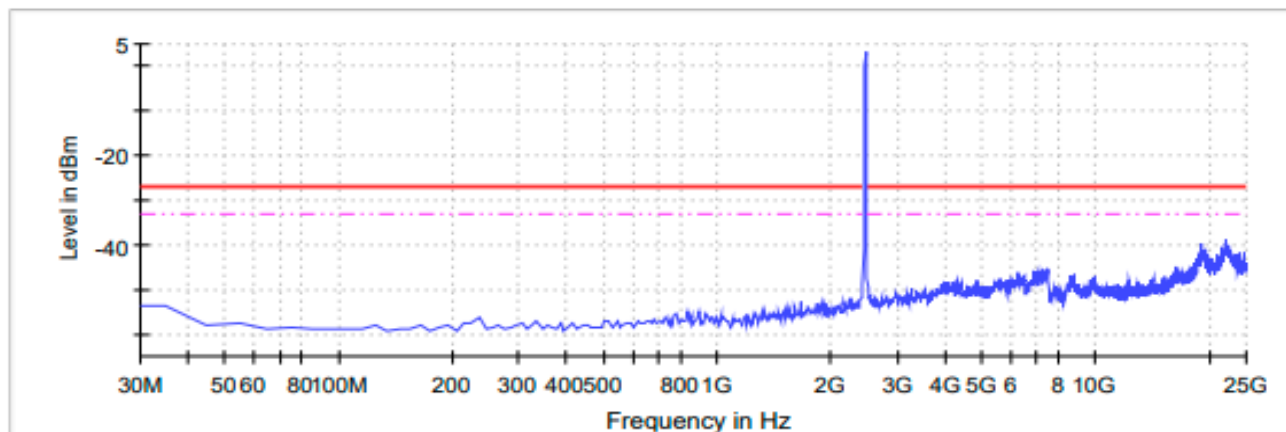


802.11n (HT20) 2462MHz MCS0

Pre Measurement

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 22106.158927    | -38.9       | 11.9        | -27.0       |
| 22206.118895    | -39.5       | 12.5        | -27.0       |
| 2484.017214     | -39.5       | 12.6        | -27.0       |
| 22086.166934    | -39.6       | 12.7        | -27.0       |
| 22096.162930    | -39.7       | 12.8        | -27.0       |
| 19097.363891    | -39.7       | 12.8        | -27.0       |
| 22156.138911    | -39.8       | 12.8        | -27.0       |
| 22066.174940    | -39.8       | 12.8        | -27.0       |
| 22126.150921    | -39.8       | 12.9        | -27.0       |
| 22136.146918    | -39.9       | 13.0        | -27.0       |
| 22166.134908    | -40.0       | 13.1        | -27.0       |
| 22056.178943    | -40.1       | 13.1        | -27.0       |
| 22196.122898    | -40.2       | 13.2        | -27.0       |
| 22406.038831    | -40.2       | 13.2        | -27.0       |
| 22016.194956    | -40.3       | 13.4        | -27.0       |

Spurious



— Limit    — Sum Level    - - - Threshold    × Critical    × Final Critical

• Radiated Testing

**Test Summary**

|                 |                |                   |              |
|-----------------|----------------|-------------------|--------------|
| Start: 8/6/2021 | End: 8/25/2021 | Temperature: 24°C | Initials: RP |
|                 |                | Humidity: 48%     |              |

| DUT S/N      | AH20110901-HAR-279-08 | DUT Operating Mode | WLAN 2.4GHz                   |   |       |
|--------------|-----------------------|--------------------|-------------------------------|---|-------|
| Comment      | 802.11b               |                    |                               |   |       |
| Antenna      | Frequency Range       | Polarization       | Result Over/Under Limit       |   | Notes |
| Loop         | 9kHz-30MHz            | Parallel           | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
|              |                       | Perpendicular      | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
|              |                       | Ground-Parallel    | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
| Log Periodic | 30MHz-1GHz            | Horizontal         | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
|              |                       | Vertical           | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
| Horn         | 1GHz-18GHz            | Horizontal         | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
|              |                       | Vertical           | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
| Horn         | 18GHz-27.5GHz         | Horizontal         | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |
|              |                       | Vertical           | <input type="checkbox"/> Over | <input checked="" type="checkbox"/> Under | √     |

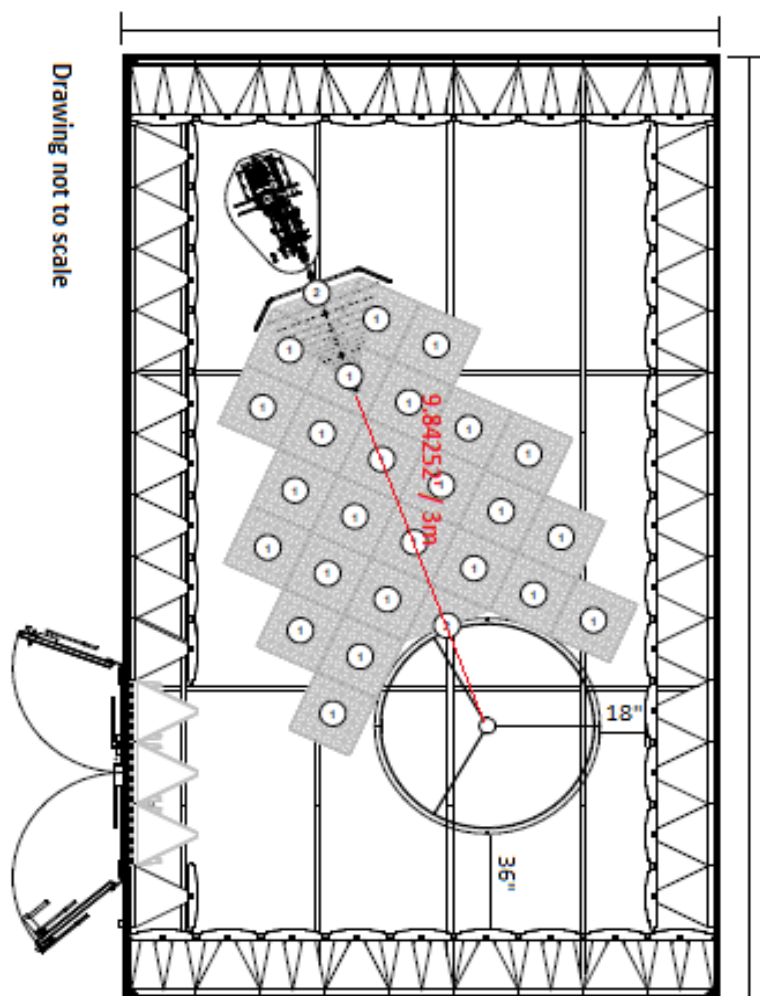
Notes: √ meets the requirements of the acceptance criteria.

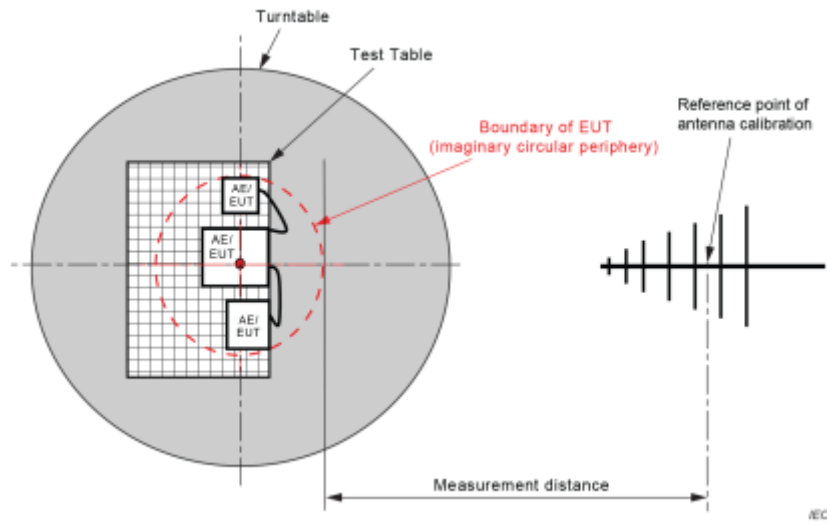
## Test Setup

Semi-Anechoic Chamber Test Site-3 meter

|                                |   |
|--------------------------------|---|
| Chamber Location               | 815 N Opdyke Rd<br>Auburn Hills, Michigan 48326 |
| Chamber Manufacturer:          | ETS-Lindgren                                    |
| Chamber Type                   | Semi-Anechoic                                   |
| Model                          | FACT™ 3-2.0 Plus                                |
| Chamber Dimensions (L x W x H) | 18'x18'x30'                                     |
| Quiet Zone Diameter            | 2.0 meters                                      |
| Quiet Zone Test Heights        | 1 & 2 meters (front only)                       |
| Test Distance                  | 3.0 meters                                      |
| Test Frequency Range           | 1-40 GHz  |
| Measured Performance           | 4.87 dB Site sVSWR                              |
| Test Completion                | December 18 <sup>th</sup> , 2019                |

Chamber Dimensions





## Test Equipment Used

| ID #    | Equipment  | Manufacturer    | Model              | Serial #              | Cal Due    |
|---------|--|-----------------|--------------------|-----------------------|------------|
| BVD0011 | Loop Antenna 9kHz-30MHz                            | Rohde & Schwarz | FMZB1519B          | 145                   | 3/23/2022  |
| BVD0021 | UltraLog Antenna 30-6000 MHz                       | Rohde & Schwarz | HL562E             | 101113                | 7/22/2021  |
| BVD0069 | Bore Sight Tower                                   | ETS             | 2171B              | 226732                | N/A        |
| BVD0111 | 3 Meter Anechoic Chamber                           | ETS             | N/A                | N/A                   | 10/16/2022 |
| BVD0118 | Antenna Mast Position<br>Controller                | ETS             | 7006-001           | 00214778/00<br>214648 | N/A        |
| BVD0165 | Multimeter   | Fluke           | 287                | 46320228              | 2/26/2022  |
| BVD0184 | Preamplifier 29dB 1-18GHz                          | Rohde & Schwarz | TS-PR18            | 101646                | 4/26/2022  |
| BVD0185 | Preamplifier 45dB 18-40GHz                         | Rohde & Schwarz | TS-PR1840          | 100064                | 3/2/2022   |
| BVD0190 | Preamplifier 25dB 30MHz-<br>8GHz                   | Rohde & Schwarz | TS-PR8             | 102351                | 3/5/2022   |
| BVD0218 | Receiver 2Hz-44GHz                                 | Rohde & Schwarz | ESW44              | 101870                | 9/25/2021  |
| BVD0247 | Turn Table   | ETS             | 920250             | N/A                   | N/A        |
| BVD0258 | Optima 12V Blue top Marine<br>battery              | Optima          | D34M               | N/A                   | N/A        |
| BVD0267 | Double Ridge Waveguide<br>800MHz-18GHz             | Rohde & Schwarz | HF907              | 102832                | 8/28/2021  |
| BVD0307 | Optima 12V Blue top Marine<br>battery              | Optima          | D34M               | N/A                   | N/A        |
| BVD0320 | 18-40GHz Horn Antenna                              | L3 Narda ATM    | PNR 180-<br>442-KF | 136164-01             | 3/8/2022   |
| BVD0323 | Foam Test Table For 3 Meter<br>Chamber             | ETS-Lindgren    | LDT-1.5            | N/A                   | N/A        |
| BVD0394 | Double Shielded N-Type Cable<br>6.9 Meter          | Rohde & Schwarz | N-Type             | N/A                   | 12/29/2022 |
| BVD0398 | Double Shielded N-Type Cable 2<br>Meter            | Rohde & Schwarz | N-Type             | N/A                   | 12/29/2022 |
| BVD0407 | Double Shielded N-Type Cable<br>410mm (For PreAmp) | Rohde & Schwarz | N-Type             | N/A                   | 8/5/2022   |
| BVD0480 | Band Reject Filter 50dB from<br>2400 to 2500MHz    | Micro-Tronics   | BRM50702           | G482                  | N/A        |
| BVD0481 | Band Reject Filter 40dB from<br>5150 to 5880MHz    | Micro-Tronics   | BRM50716           | G336                  | N/A        |
| N/A     | Support Laptop                                     | Lenovo          | E560               | LW10USAU<br>H01ABUD   | N/A        |

## Equipment List (Software)

| Equipment         | Manufacturer | Model   | Version No. |
|-------------------|--------------|---------|-------------|
| EMC Test Software | Nexio        | BAT-EMC | 3.20.0.21   |

## Customer Supplied Equipment

| ID # | Equipment                       | Manufacturer | Model | Serial #  | Version No. |
|------|---------------------------------|--------------|-------|-----------|-------------|
| N/A  | Display                         | Harman       | N/A   | 1683      | N/A         |
| N/A  | Display Harness                 | Harman       | N/A   | N/A       | N/A         |
| N/A  | Bluetooth LAN                   | Harman       | N/A   | 84375197  | N/A         |
| N/A  | Antenna                         | Harman       | N/A   | 20072     | N/A         |
| N/A  | Blue Molex Connector<br>Harness | Harman       | N/A   | N/A       | N/A         |
| N/A  | DUT 1M Harness                  | Harman       | N/A   | N/A       | N/A         |
| N/A  | USB to DUT Harness              | Harman       | N/A   | 102161025 | N/A         |

## Radiated Emissions

Radiated emissions were maximized by rotating the EUT and its external antenna around Horizontal and vertical Polarizations.

## Test Plots

### Uncertainty

Radiated Emissions (30MHz to 18GHz)

Test Engineer: Ryan Phillips

The test is to measure the radiated emissions of the EUT. Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

### 30MHz to 1GHZ

| Source of Uncertainty   | Value(dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|---|-----------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading  | 0.12      | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss  | 0.21      | Normal                   | 2        | 1                       | 0.105                |
| Filter Insertion Loss   | 0.25      | Normal                   | 2        | 1                       | 0.125                |
| Antenna Factor  | 0.65      | Normal                   | 2        | 1                       | 0.325                |
| Receiver CW accuracy  | 0.5       | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response  | 1.5       | Rectangular              | 1.732    | 1                       | 0.8660508<br>1       |
| PRF Response  | 1.5       | Rectangular              | 1.732    | 1                       | 0.8660508<br>1       |
| Mismatch Filter - Receiver  | 0.25      | U-Shape                  | 2.449    | 1                       | 0.1768033            |
| NSA Calibration   | 4.0       | Triangular               | 1.414    | 1                       | 1.633332             |
| ETS Foam Table (LDT-1.5)  | 1.8       | Rectangular              | 1.732    | 1                       | 1.039261             |
| Combined Standard Uncertainty (square root of the sum of the squares) |           |                          |          |                         | 2.113781             |
| <b>Expanded Uncertainty (K=2)</b>                                     |           |                          |          |                         | <b>4.227562</b>      |

The total derived measurement uncertainty is +/- 4.228 dB

1GHz to 40GHz

| Source of Uncertainty   | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|---|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading  | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss  | 0.21       | Normal                   | 2        | 1                       | 0.105000             |
| Filter Insertion Loss   | 0.25       | Normal                   | 2        | 1                       | 0.125000             |
| Antenna Factor  | 0.65       | Normal                   | 2        | 1                       | 0.325000             |
| Receiver CW accuracy  | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response  | 1.5        | Rectangular              | 1.732    | 1                       | 0.866051             |
| PRF Response  | 1.5        | Rectangular              | 1.732    | 1                       | 0.866051             |
| Mismatch Filter - Receiver  | 0.25       | U-Shape                  | 1.414    | 1                       | 0.176803             |
| VSWR Calibration  | 2.0        | Triangular               | 2.449    | 1                       | 0.816659             |
| ETS Foam Table (LDT-1.5)  | 1.8        | Rectangular              | 1.732    | 1                       | 1.039261             |
| Combined Standard Uncertainty (square root of the sum of the squares) |            |                          |          |                         | 1.869213             |
| <b>Expanded Uncertainty (K=2)</b>                                     |            |                          |          |                         | <b>3.738426</b>      |

The total derived measurement uncertainty is +/- 3.738 dB.

Remarks:

1. Raw Peak Level (dBuV/m) = Level Peak Reading - Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level – Limit



AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 6\_9kHz-30MHz\_Ground-Parallel

8/25/2021 17:01:01

| No | Frequency    | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Judgement |
|----|--------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|-----------|
| 1. | 1.654456MHz  | 31.21                       | 19.13                  | 63.23        | -32.02      | 1.00       | 314.80    | Passed    |
| 2. | 2.181516MHz  | 29.39                       | 19.10                  | 69.54        | -40.15      | 1.00       | 43.70     | Passed    |
| 3. | 8.386255MHz  | 28.14                       | 19.14                  | 69.54        | -41.40      | 1.00       | 132.50    | Passed    |
| 4. | 12.577024MHz | 28.19                       | 19.57                  | 69.54        | -41.35      | 1.00       | 63.90     | Passed    |
| 5. | 13.395467MHz | 29.37                       | 19.62                  | 69.54        | -40.17      | 1.00       | 123.80    | Passed    |
| 6. | 25.509277MHz | 30.57                       | 20.69                  | 69.54        | -38.98      | 1.00       | 96.50     | Passed    |

AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 6\_9kHz-30MHz\_Parallel

8/25/2021 17:03:04

| No | Frequency    | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Judgement |
|----|--------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|-----------|
| 1. | 1.680166MHz  | 30.30                       | 19.13                  | 63.10        | -32.79      | 1.00       | 231.30    | Passed    |
| 2. | 2.190086MHz  | 28.95                       | 19.10                  | 69.54        | -40.60      | 1.00       | 171.80    | Passed    |
| 3. | 4.126924MHz  | 28.86                       | 19.21                  | 69.54        | -40.69      | 1.00       | 358.10    | Passed    |
| 4. | 12.577024MHz | 28.80                       | 19.57                  | 69.54        | -40.74      | 1.00       | 358.10    | Passed    |
| 5. | 13.374042MHz | 28.46                       | 19.61                  | 69.54        | -41.09      | 1.00       | 192.70    | Passed    |
| 6. | 25.620688MHz | 31.55                       | 20.70                  | 69.54        | -37.99      | 1.00       | 160.00    | Passed    |

AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 6\_9kHz-30MHz\_Perpendicular

8/25/2021 17:05:43

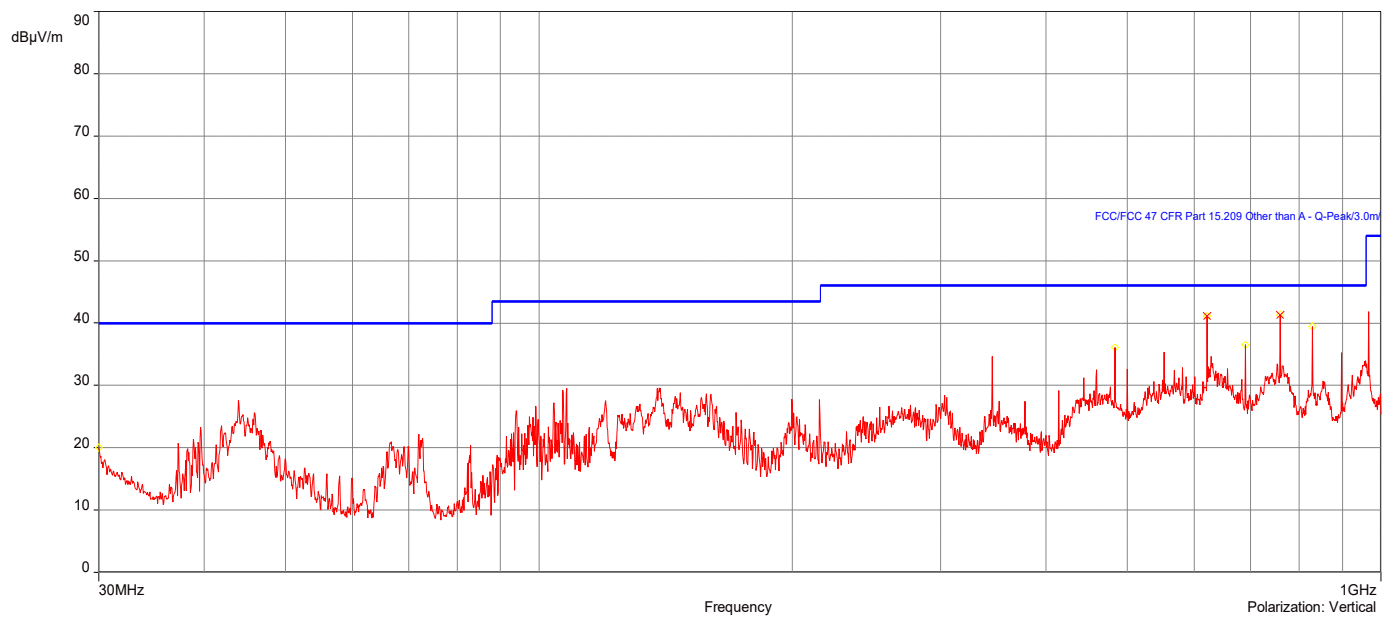
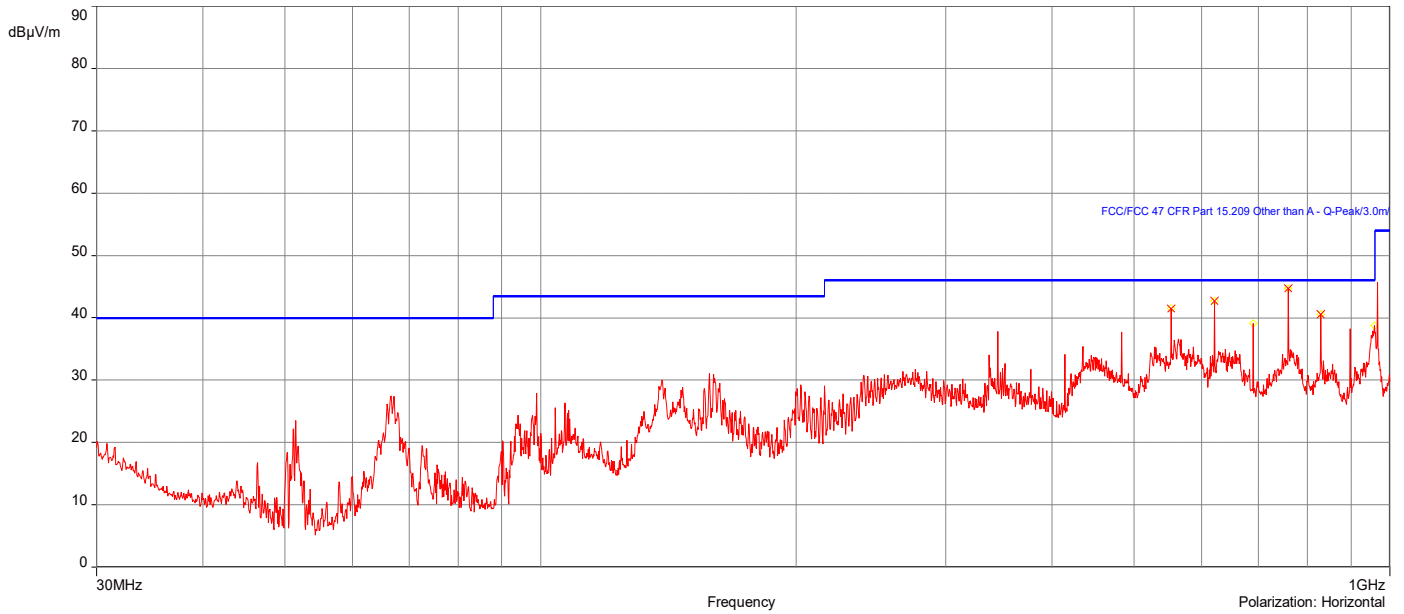
| No | Frequency    | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Judgement |
|----|--------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|-----------|
| 1. | 1.63303MHz   | 31.00                       | 19.13                  | 63.34        | -32.34      | 1.00       | 247.00    | Passed    |
| 2. | 2.177231MHz  | 29.05                       | 19.10                  | 69.54        | -40.50      | 1.00       | 358.90    | Passed    |
| 3. | 4.126924MHz  | 28.44                       | 19.21                  | 69.54        | -41.10      | 1.00       | 160.00    | Passed    |
| 4. | 13.365472MHz | 29.86                       | 19.61                  | 69.54        | -39.68      | 1.00       | 0.90      | Passed    |
| 5. | 16.694949MHz | 28.46                       | 19.70                  | 69.54        | -41.08      | 1.00       | 358.90    | Passed    |
| 6. | 25.590693MHz | 31.40                       | 20.70                  | 69.54        | -38.15      | 1.00       | 271.00    | Passed    |

AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 1\_30MHz-1GHz

8/20/2021 07:30:58

| No | Frequency    | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|--------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1  | 621.50656MHz | 41.20                       | -4.78                  | 46.00        | -4.80       | 2.00       | 332.80    | Vertical     | Passed    |
| 2  | 759.59704MHz | 41.33                       | -2.94                  | 46.00        | -4.67       | 3.00       | 358.90    | Vertical     | Passed    |
| 3  | 552.40426MHz | 41.54                       | -5.30                  | 46.00        | -4.46       | 2.00       | 351.80    | Horizontal   | Passed    |
| 4  | 621.50656MHz | 42.68                       | -3.73                  | 46.00        | -3.32       | 2.00       | 208.10    | Horizontal   | Passed    |
| 5  | 759.59704MHz | 44.76                       | -1.84                  | 46.00        | -1.24       | 2.50       | 337.90    | Horizontal   | Passed    |
| 6  | 828.64227MHz | 40.54                       | -0.51                  | 46.00        | -5.46       | 1.50       | 103.40    | Horizontal   | Passed    |

Overall Graphs:

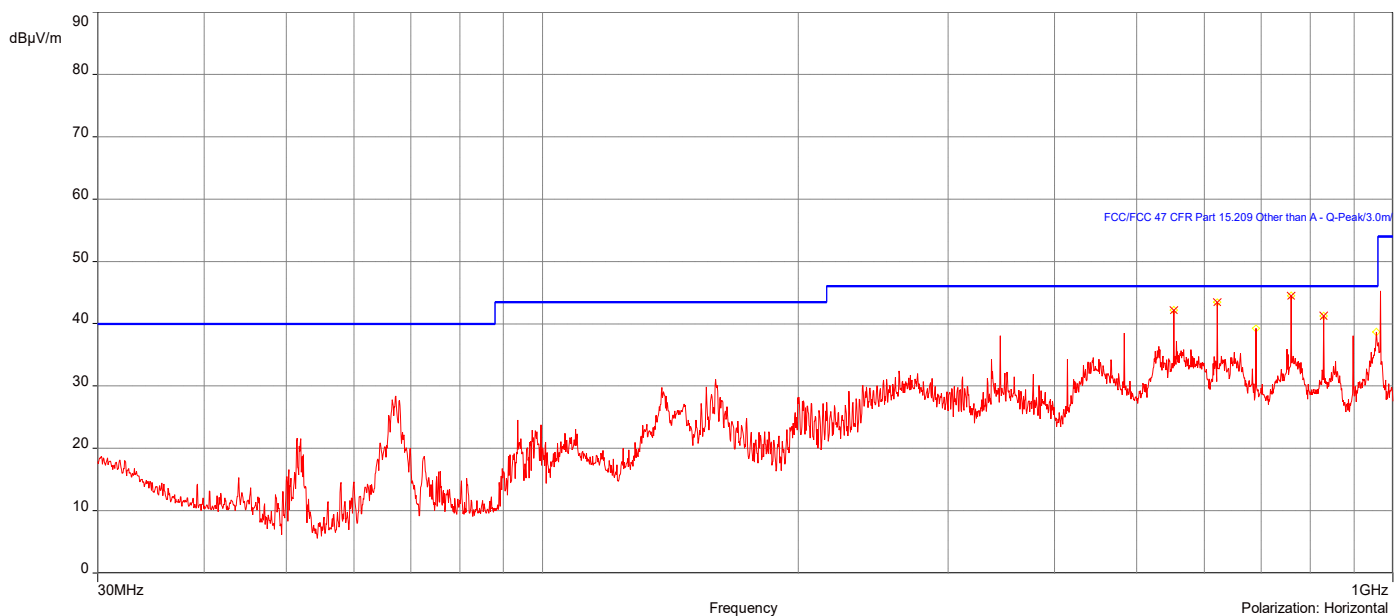


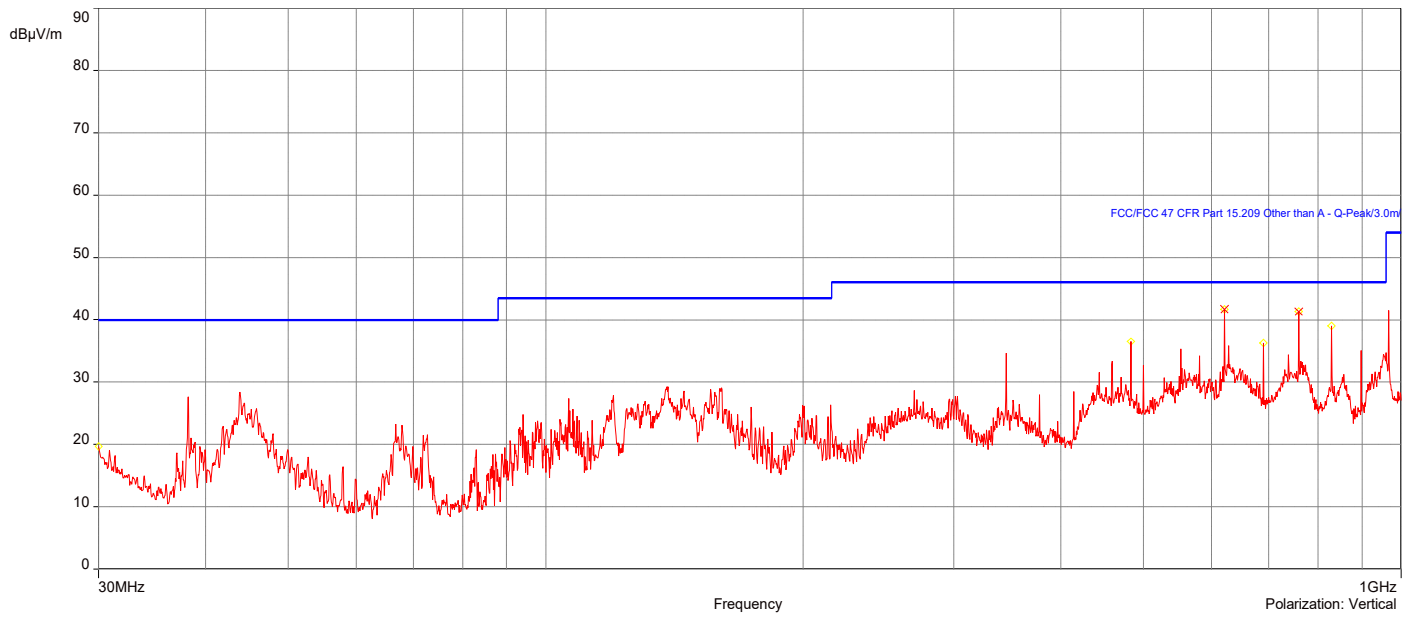
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 6\_30MHz-1GHz

8/20/2021 07:51:57

| No | Frequency    | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|--------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 621.50656MHz | 41.66                       | -4.78                  | 46.00        | -4.34       | 2.00       | 339.10    | Vertical     | Passed    |
| 2. | 759.59704MHz | 41.32                       | -2.94                  | 46.00        | -4.68       | 3.00       | 358.90    | Vertical     | Passed    |
| 3. | 552.40426MHz | 42.20                       | -5.30                  | 46.00        | -3.80       | 2.00       | 357.10    | Horizontal   | Passed    |
| 4. | 621.4495MHz  | 43.45                       | -3.74                  | 46.00        | -2.55       | 2.00       | 210.40    | Horizontal   | Passed    |
| 5. | 759.59704MHz | 44.53                       | -1.84                  | 46.00        | -1.47       | 2.50       | 332.10    | Horizontal   | Passed    |
| 6. | 828.64227MHz | 41.27                       | -0.51                  | 46.00        | -4.73       | 1.50       | 102.60    | Horizontal   | Passed    |

Overall Graphs:



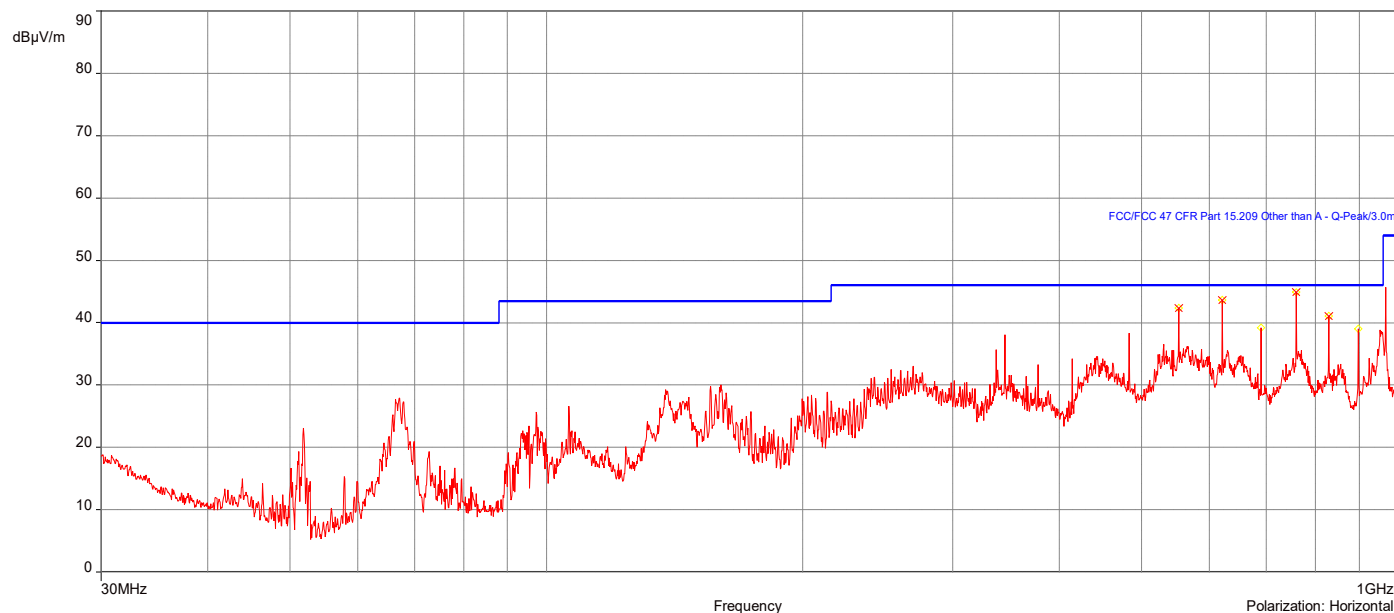


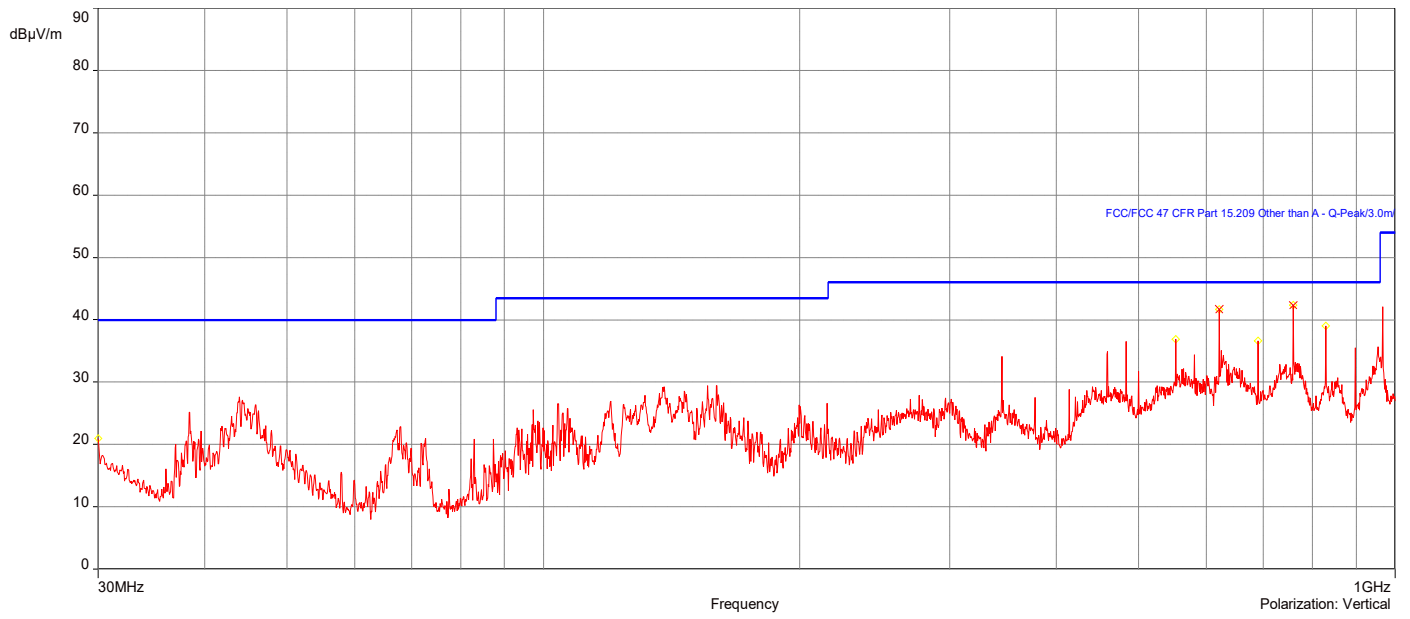
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 11\_30MHz-1GHz

8/20/2021 08:15:53

| No | Frequency    | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|--------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 621.50656MHz | 41.67                       | -4.78                  | 46.00        | -4.33       | 2.00       | 341.40    | Vertical     | Passed    |
| 2. | 759.59704MHz | 42.35                       | -2.94                  | 46.00        | -3.65       | 3.00       | 358.90    | Vertical     | Passed    |
| 3. | 552.40426MHz | 42.34                       | -5.30                  | 46.00        | -3.66       | 2.00       | 351.80    | Horizontal   | Passed    |
| 4. | 621.4495MHz  | 43.61                       | -3.74                  | 46.00        | -2.39       | 2.00       | 206.80    | Horizontal   | Passed    |
| 5. | 759.59704MHz | 44.95                       | -1.84                  | 46.00        | -1.05       | 2.50       | 334.00    | Horizontal   | Passed    |
| 6. | 828.64227MHz | 41.08                       | -0.51                  | 46.00        | -4.92       | 1.50       | 99.90     | Horizontal   | Passed    |

Overall Graphs:





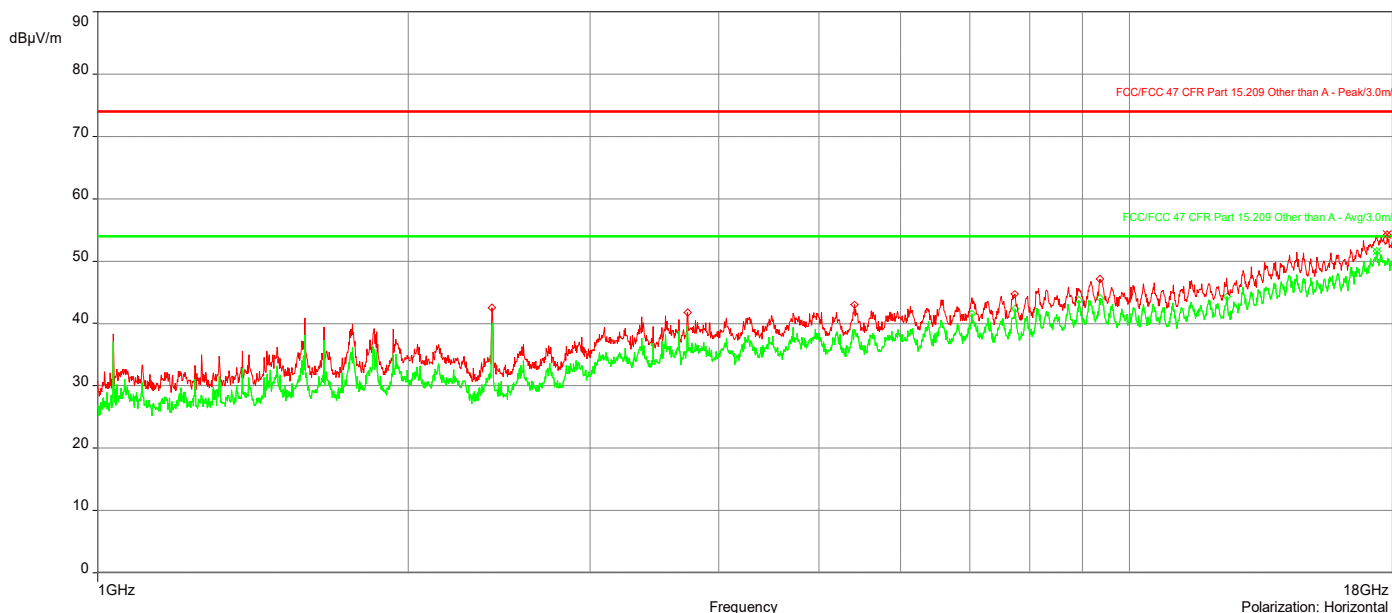
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 1\_1-18GHz

8/17/2021 07:29:24

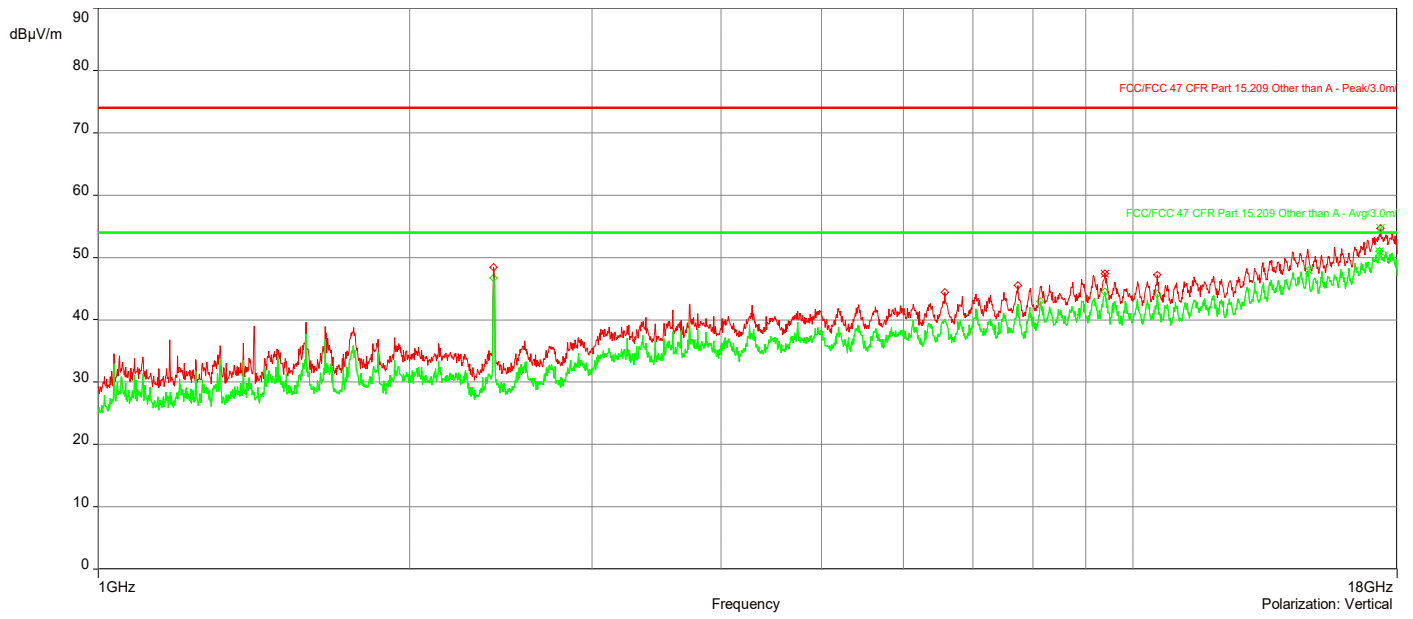
| No | Frequency (MHz) | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 9.3917468GHz    | 47.40                       | 10.20                  | 74.00        | -26.60      | 3.50       | 331.70    | Vertical     | Passed    |
| 2. | 17.346481GHz    | 54.66                       | 19.14                  | 74.00        | -19.34      | 1.50       | 0         | Vertical     | Passed    |
| 3. | 17.780994GHz    | 54.26                       | 19.56                  | 74.00        | -19.74      | 2.50       | 65.40     | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 1. | 14.774405GHz    | 47.95                          | 15.32                  | 54.00        | -6.05       | 2.50       | 353.70    | Vertical     | Passed   |
| 2. | 17.30998GHz     | 51.01                          | 18.99                  | 54.00        | -2.99       | 2.50       | 274.50    | Vertical     | Passed   |
| 3. | 17.367981GHz    | 51.62                          | 19.24                  | 54.00        | -2.38       | 1.50       | 134.30    | Horizontal   | Passed   |

Overall Graphs:







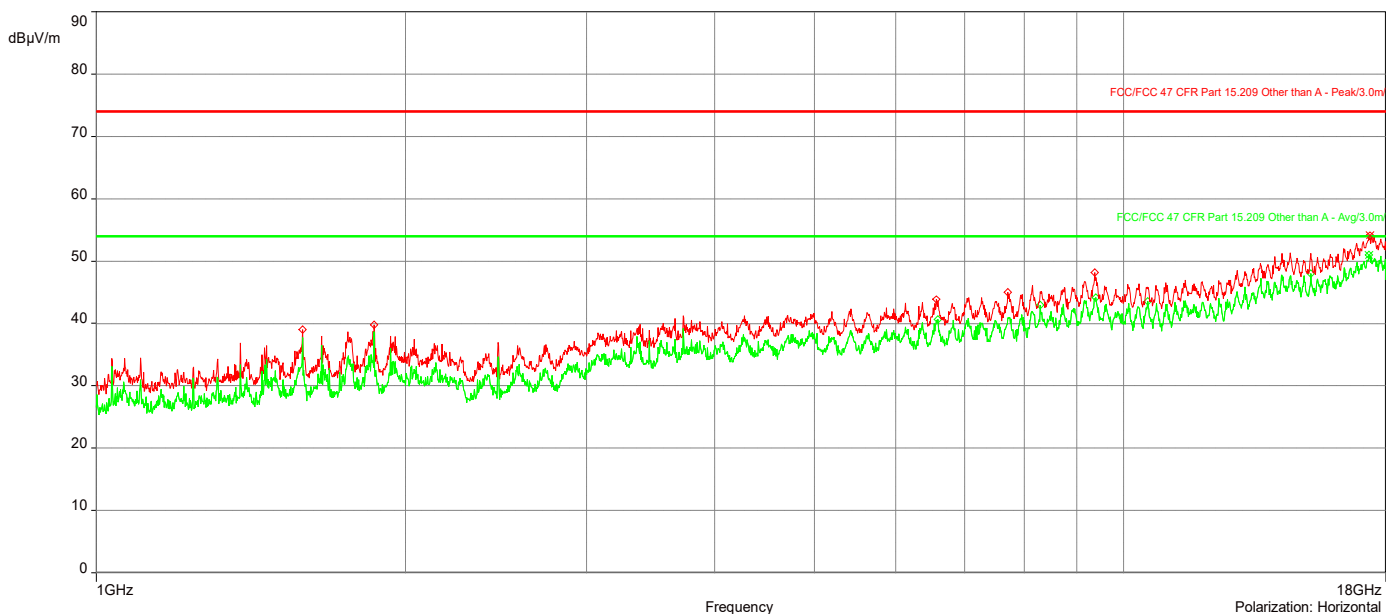
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 11\_1-18GHz

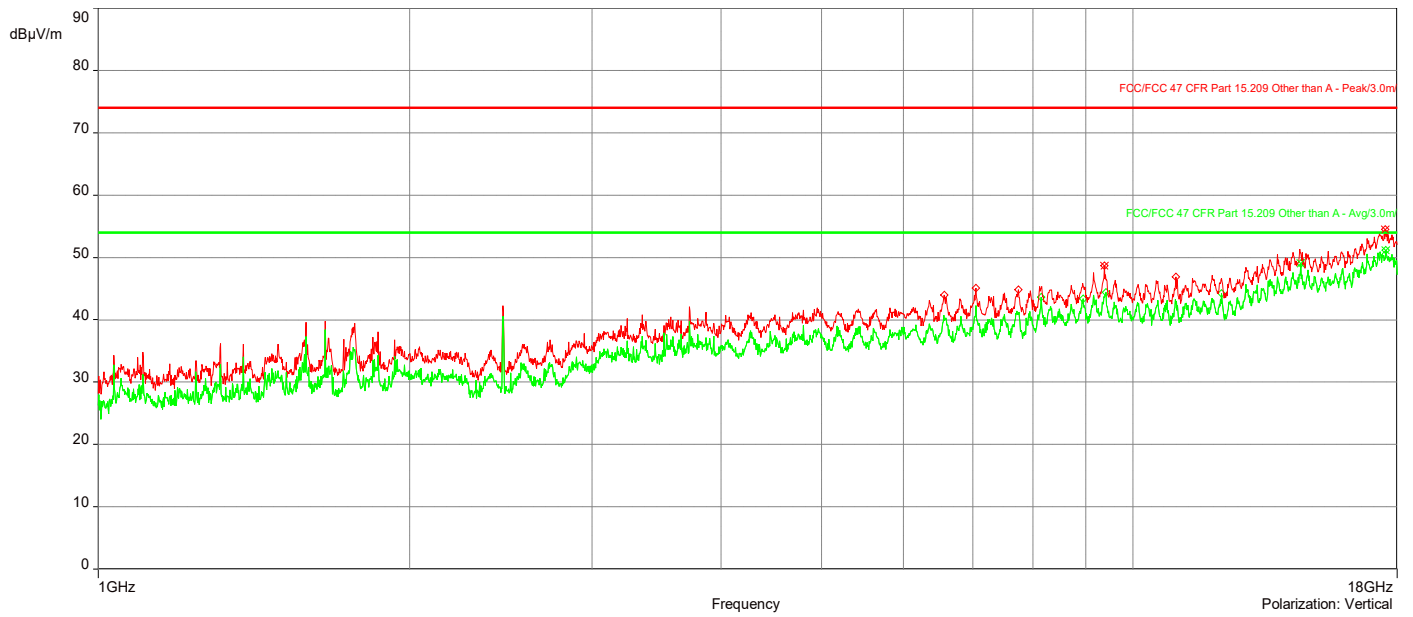
8/17/2021 08:20:20

| No | Frequency (MHz) | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 9.3877467GHz    | 48.69                       | 10.19                  | 74.00        | -25.31      | 1.00       | 122.60    | Vertical     | Passed    |
| 2. | 17.530486GHz    | 54.46                       | 19.54                  | 74.00        | -19.54      | 1.50       | 116.60    | Vertical     | Passed    |
| 3. | 17.359481GHz    | 54.12                       | 19.20                  | 74.00        | -19.88      | 1.00       | 218.10    | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 1. | 14.521398GHz    | 49.01                          | 15.43                  | 54.00        | -4.99       | 4.00       | 238.10    | Vertical     | Passed   |
| 2. | 17.546987GHz    | 51.20                          | 19.57                  | 54.00        | -2.80       | 3.00       | 321.30    | Vertical     | Passed   |
| 3. | 17.32248GHz     | 51.02                          | 19.04                  | 54.00        | -2.98       | 4.00       | 292.80    | Horizontal   | Passed   |

Overall Graphs:





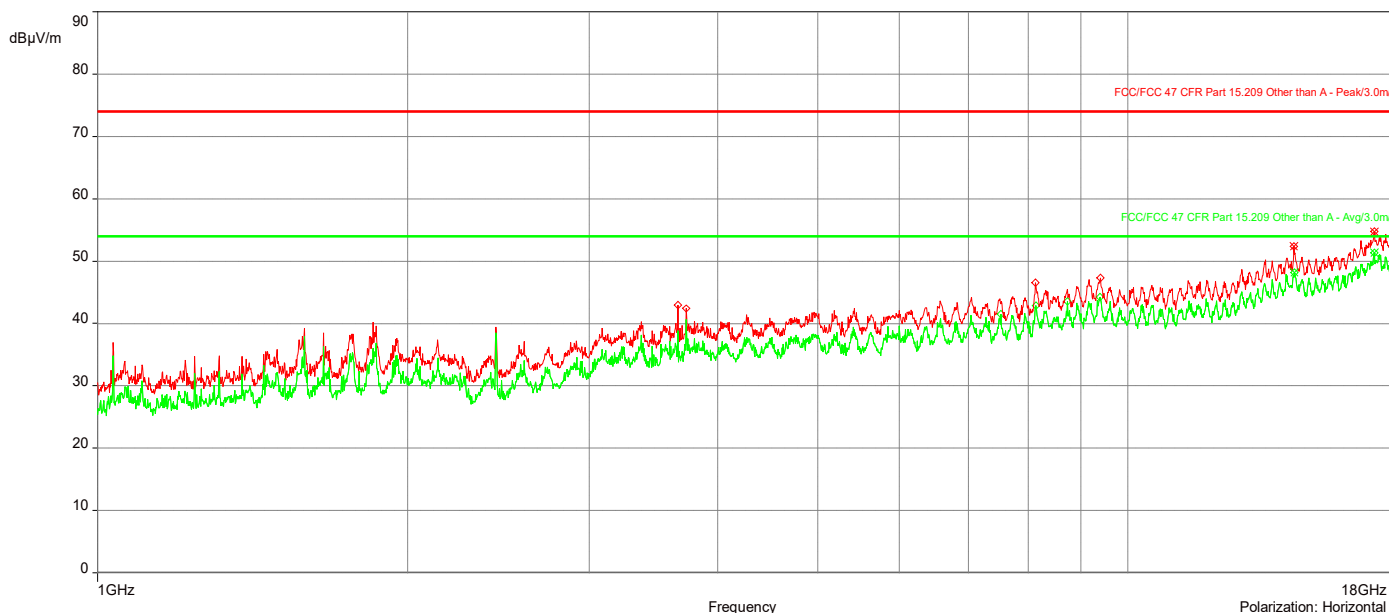
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 6\_1-18GHz

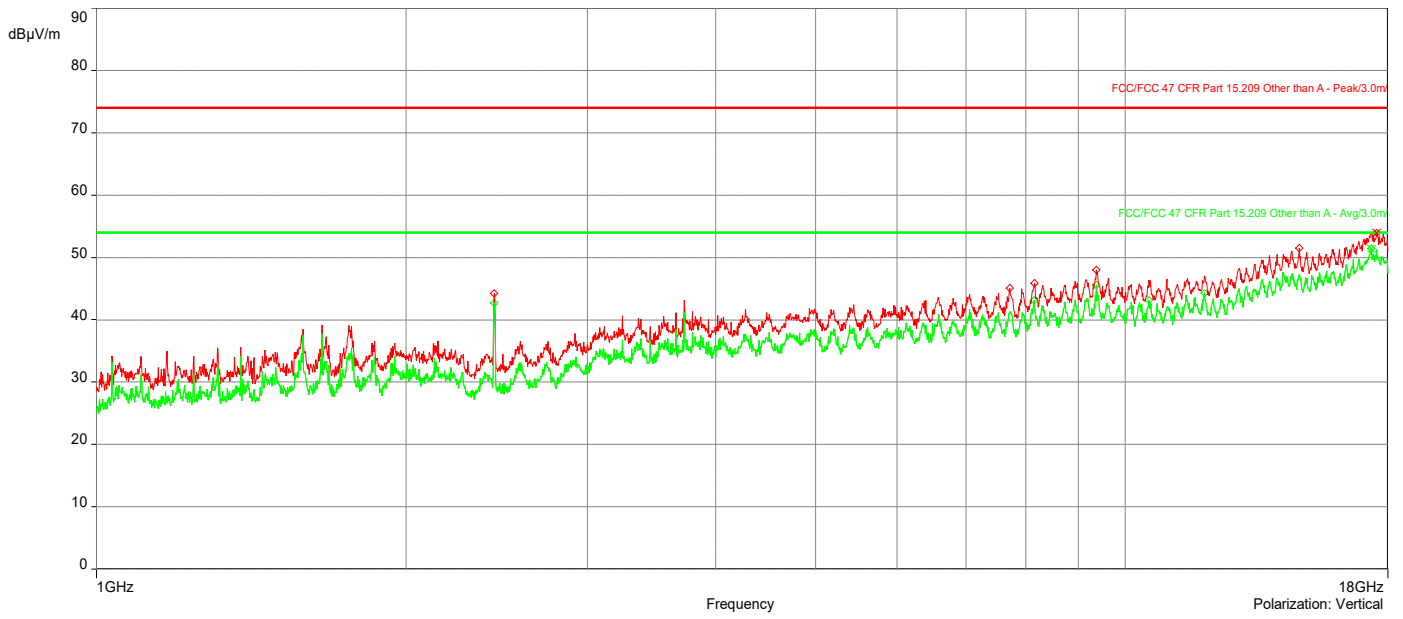
8/17/2021 07:57:29

| No | Frequency (MHz) | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 17.544487GHz    | 54.01                       | 19.57                  | 74.00        | -19.99      | 2.50       | 2.00      | Vertical     | Passed    |
| 2. | 14.491897GHz    | 52.34                       | 15.42                  | 74.00        | -21.66      | 1.50       | 116.60    | Horizontal   | Passed    |
| 3. | 17.342981GHz    | 54.75                       | 19.12                  | 74.00        | -19.25      | 2.50       | 248.60    | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 4. | 17.351981GHz    | 51.45                          | 19.16                  | 54.00        | -2.55       | 3.00       | 176.60    | Vertical     | Passed   |
| 5. | 14.512397GHz    | 48.14                          | 15.43                  | 54.00        | -5.86       | 3.50       | 237.10    | Horizontal   | Passed   |
| 6. | 17.355481GHz    | 51.32                          | 19.18                  | 54.00        | -2.68       | 3.50       | 188.90    | Horizontal   | Passed   |

Overall Graphs:





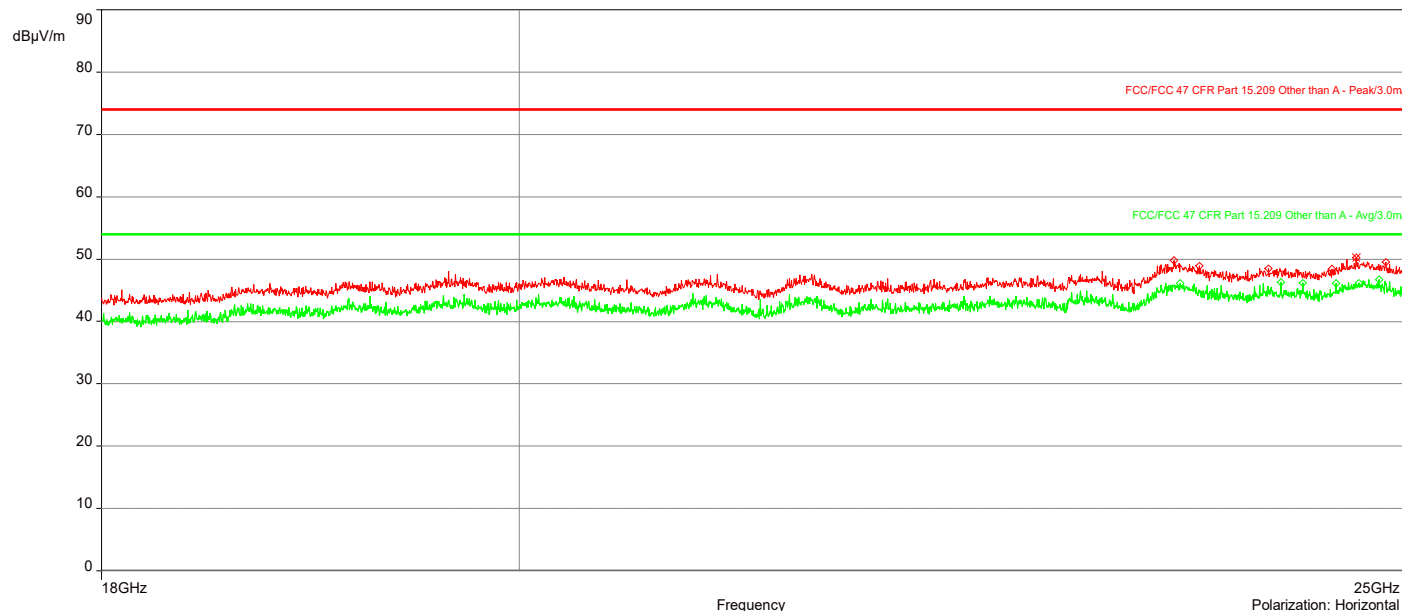
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 1\_18-25GHz

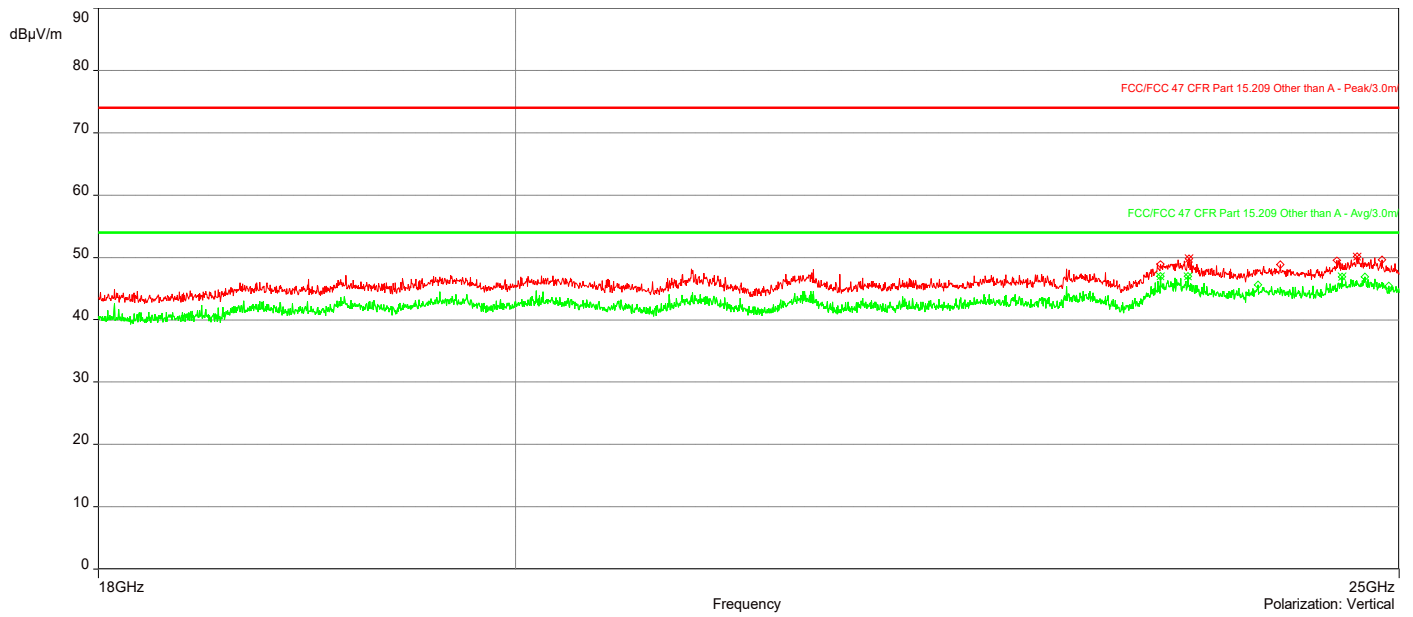
8/17/2021 13:35:09

| No | Frequency (MHz) | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 4. | 23.707908GHz    | 49.79                       | 1.80                   | 74.00        | -24.21      | 2.85       | 134.90    | Vertical     | Passed    |
| 5. | 24.735981GHz    | 50.11                       | 2.92                   | 74.00        | -23.89      | 4.00       | 269.90    | Vertical     | Passed    |
| 6. | 24.700479GHz    | 50.26                       | 2.82                   | 74.00        | -23.74      | 2.43       | 67.40     | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 4. | 23.538396GHz    | 47.00                          | 2.15                   | 54.00        | -7.00       | 4.00       | 224.90    | Vertical     | Passed   |
| 5. | 23.702407GHz    | 46.98                          | 1.82                   | 54.00        | -7.02       | 2.95       | 67.40     | Vertical     | Passed   |
| 6. | 24.640974GHz    | 46.90                          | 2.49                   | 54.00        | -7.10       | 1.61       | 337.40    | Vertical     | Passed   |

Overall Graphs:





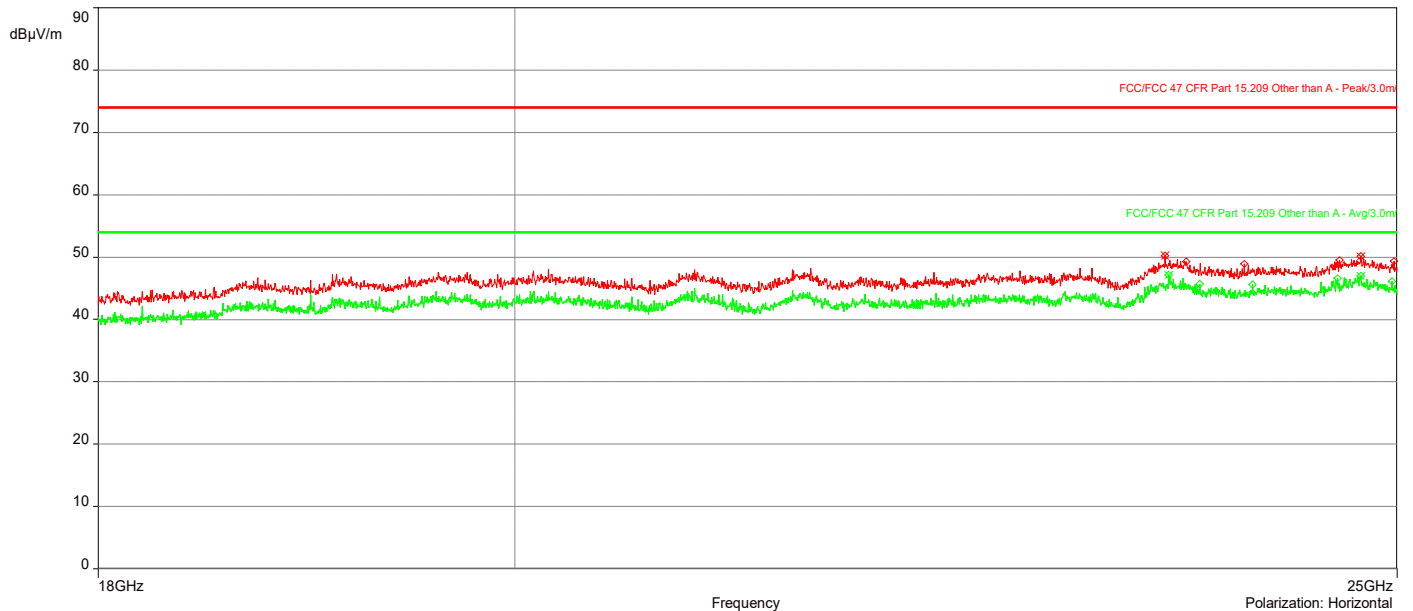
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 6\_18-25GHz

8/19/2021 06:48:56

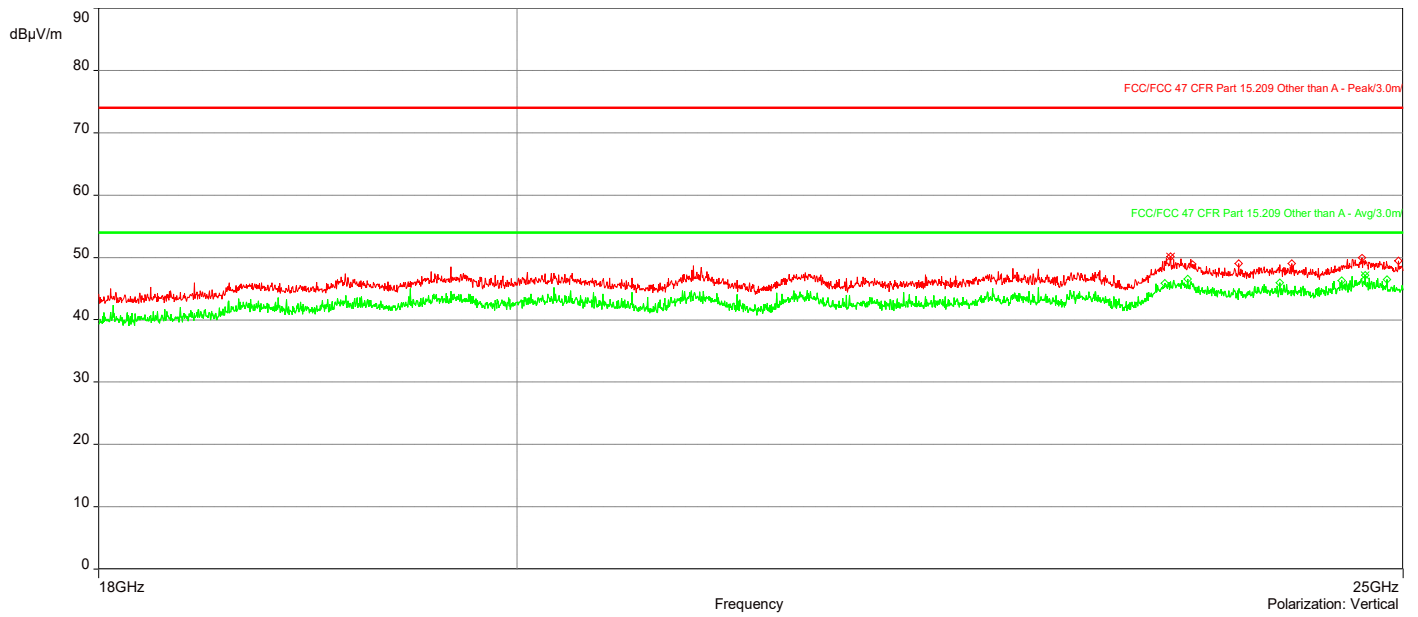
| No | Frequency (MHz) | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 23.578398GHz    | 50.18                       | 2.14                   | 74.00        | -23.82      | 3.53       | 337.40    | Vertical     | Passed    |
| 2. | 23.573898GHz    | 50.26                       | 2.13                   | 74.00        | -23.74      | 3.54       | 337.40    | Horizontal   | Passed    |
| 3. | 24.770984GHz    | 50.11                       | 2.91                   | 74.00        | -23.89      | 3.80       | 202.70    | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 1. | 24.763483GHz    | 47.19                          | 2.91                   | 54.00        | -6.81       | 2.30       | 67.60     | Vertical     | Passed   |
| 2. | 23.5954GHz      | 47.16                          | 2.06                   | 54.00        | -6.84       | 1.74       | 157.60    | Horizontal   | Passed   |
| 3. | 24.770984GHz    | 46.99                          | 2.91                   | 54.00        | -7.01       | 3.80       | 202.70    | Horizontal   | Passed   |

Overall Graphs:







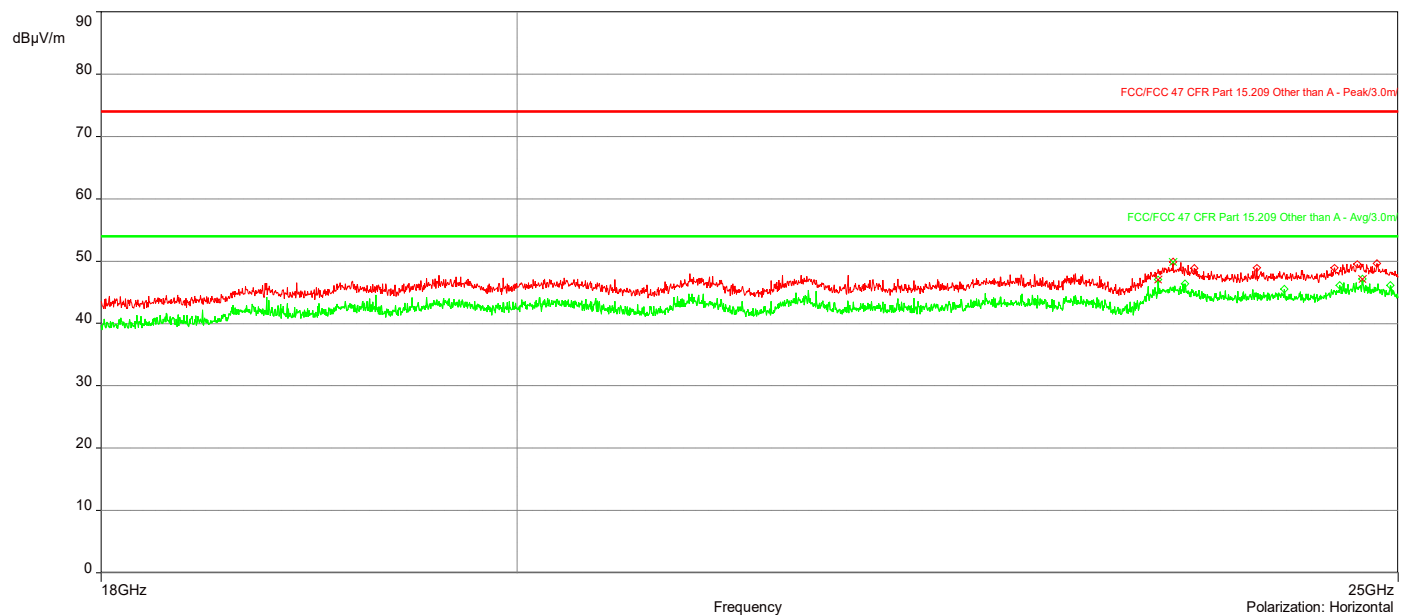
AH20110901-HAR-279-08\_2.4G 802.11b\_Ch 11\_18-25GHz

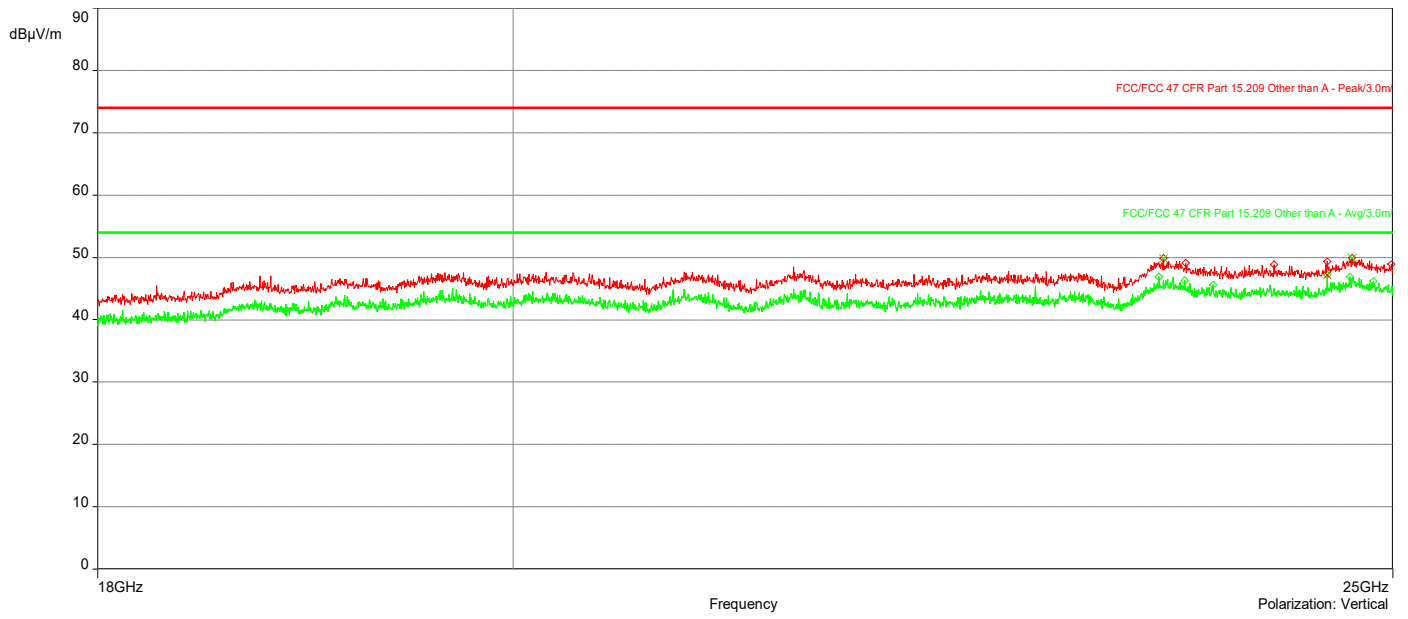
8/19/2021 07:14:35

| No | Frequency (MHz) | Level Peak Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 23.586399GHz    | 49.92                       | 2.11                   | 74.00        | -24.08      | 1.00       | 202.40    | Vertical     | Passed    |
| 2. | 24.743482GHz    | 49.99                       | 2.95                   | 74.00        | -24.01      | 2.70       | 89.90     | Vertical     | Passed    |
| 3. | 23.614901GHz    | 49.84                       | 2.01                   | 74.00        | -24.16      | 1.61       | 0         | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBμV/m) | Correction Factor (dB) | Limit dBμV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 1. | 24.58597GHz     | 47.22                          | 2.22                   | 54.00        | -6.78       | 3.67       | 179.90    | Vertical     | Passed   |
| 2. | 23.524395GHz    | 47.07                          | 1.96                   | 54.00        | -6.93       | 2.80       | 224.90    | Horizontal   | Passed   |
| 3. | 24.775484GHz    | 47.11                          | 2.89                   | 54.00        | -6.89       | 2.45       | 22.40     | Horizontal   | Passed   |

Overall Graphs:





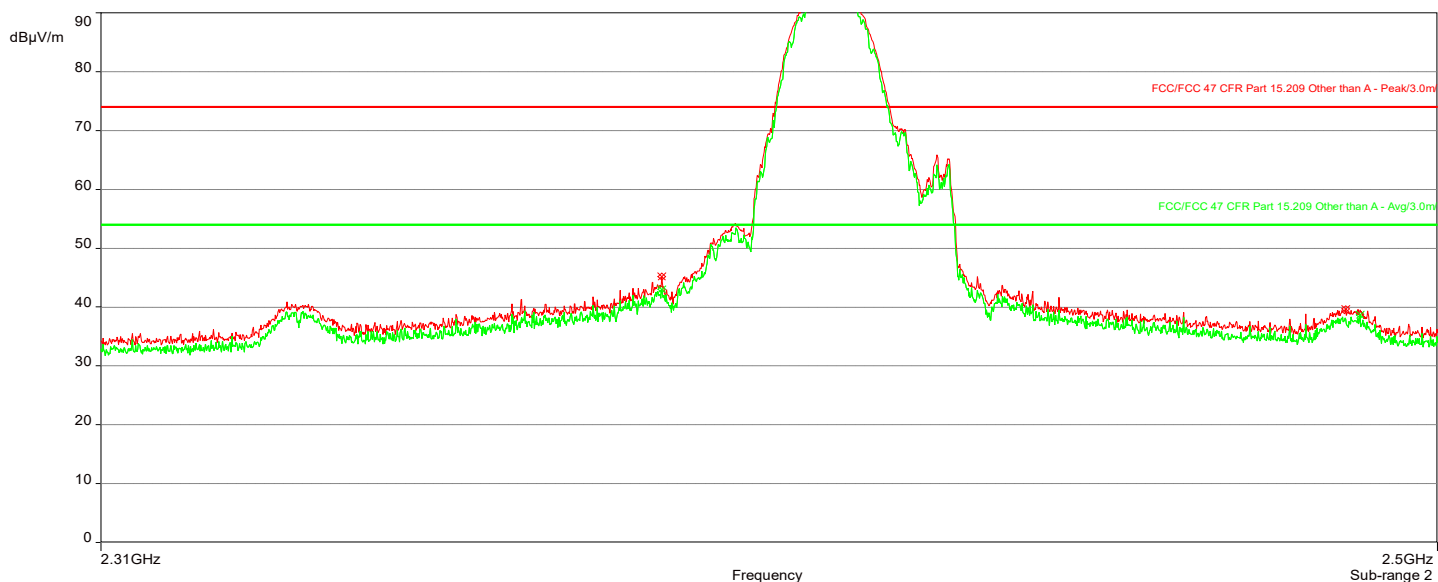
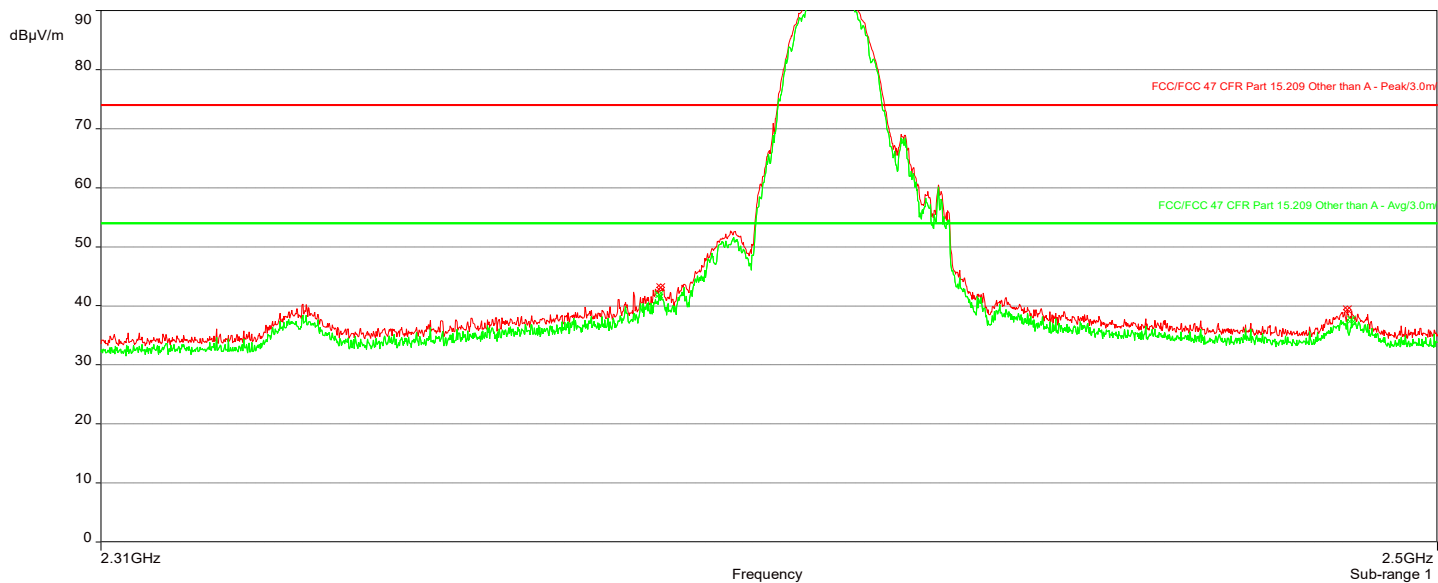
AH20110901-HAR-279-008\_Restricted Bandedge\_2.4G 802.11b\_Ch-1

9/3/2021 11:59:52

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3877489GHz    | 43.16                       | -3.15                  | 74.00        | -30.84      | 2.42       | 202.60    | Vertical     | Passed    |
| 2. | 2.4866933GHz    | 39.37                       | -2.46                  | 74.00        | -34.63      | 3.31       | 0.00      | Vertical     | Passed    |
| 3. | 2.387939GHz     | 45.18                       | -3.15                  | 74.00        | -28.82      | 1.72       | 45.00     | Horizontal   | Passed    |
| 4. | 2.4865033GHz    | 39.70                       | -2.46                  | 74.00        | -34.30      | 1.00       | 67.60     | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------|-------------|------------|-----------|--------------|----------|
| 1. | 2.3875588GHz    | 41.96                          | -3.15                  | 54.00        | -12.04      | 2.42       | 202.60    | Vertical     | Passed   |
| 2. | 2.4873587GHz    | 37.65                          | -2.46                  | 54.00        | -16.35      | 3.83       | 0.00      | Vertical     | Passed   |
| 3. | 2.387939GHz     | 43.04                          | -3.15                  | 54.00        | -10.96      | 1.72       | 45.00     | Horizontal   | Passed   |
| 4. | 2.4885943GHz    | 38.68                          | -2.45                  | 54.00        | -15.32      | 1.62       | 292.60    | Horizontal   | Passed   |

Overall Graphs:



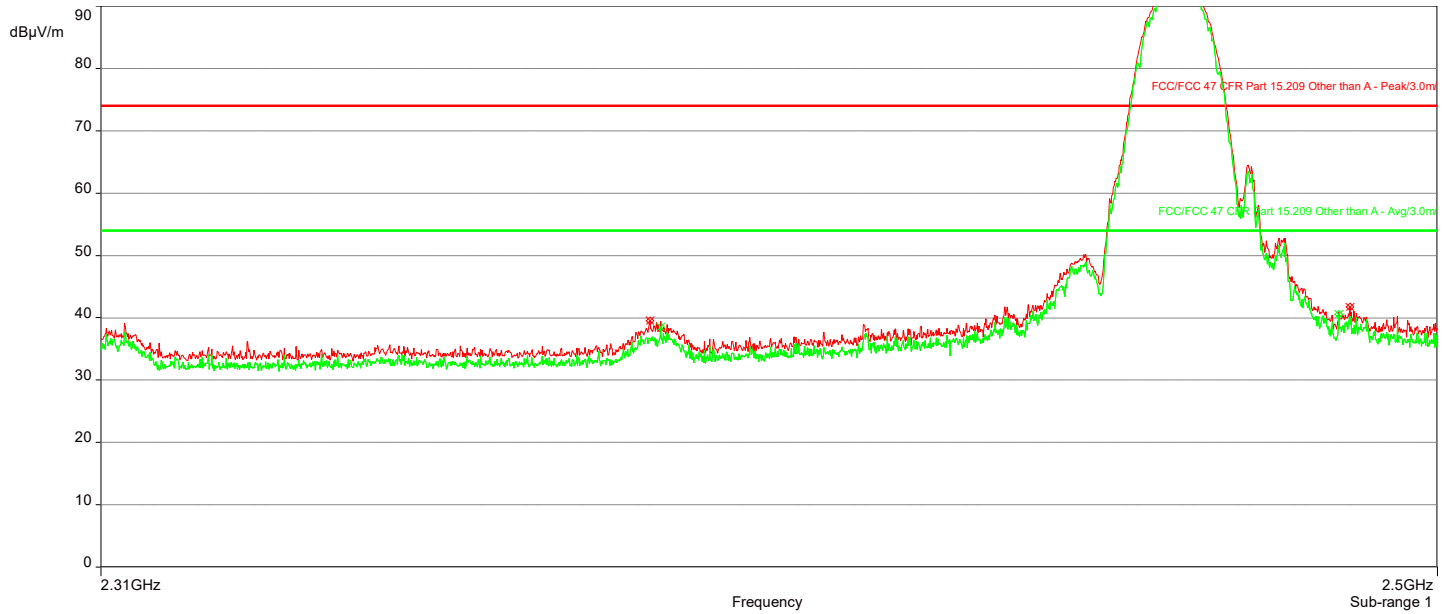
AH20110901-HAR-279-008\_Restricted Bandedge\_2.4G 802.11b\_Ch-11

9/3/2021 12:02:33

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3862281GHz    | 39.51                       | -3.16                  | 74.00              | -34.49      | 2.47       | 202.40    | Vertical     | Passed    |
| 2. | 2.4870735GHz    | 41.77                       | -2.46                  | 74.00              | -32.23      | 2.71       | 202.40    | Vertical     | Passed    |
| 3. | 2.3862281GHz    | 40.31                       | -3.16                  | 74.00              | -33.69      | 3.39       | 247.40    | Horizontal   | Passed    |
| 4. | 2.4836518GHz    | 42.90                       | -2.47                  | 74.00              | -31.10      | 1.14       | 67.40     | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|----------|
| 1. | 2.3877489GHz    | 38.50                          | -3.15                  | 54.00              | -15.50      | 2.47       | 202.40    | Vertical     | Passed   |
| 2. | 2.4854577GHz    | 40.54                          | -2.47                  | 54.00              | -13.46      | 3.27       | 0.00      | Vertical     | Passed   |
| 3. | 2.3861331GHz    | 39.20                          | -3.16                  | 54.00              | -14.80      | 3.39       | 247.40    | Horizontal   | Passed   |
| 4. | 2.4836518GHz    | 41.74                          | -2.47                  | 54.00              | -12.26      | 1.14       | 67.40     | Horizontal   | Passed   |

Overall Graphs:



AH20110901-HAR-279-008\_Restricted Bandedge\_2.4G 802.11g\_Ch-1

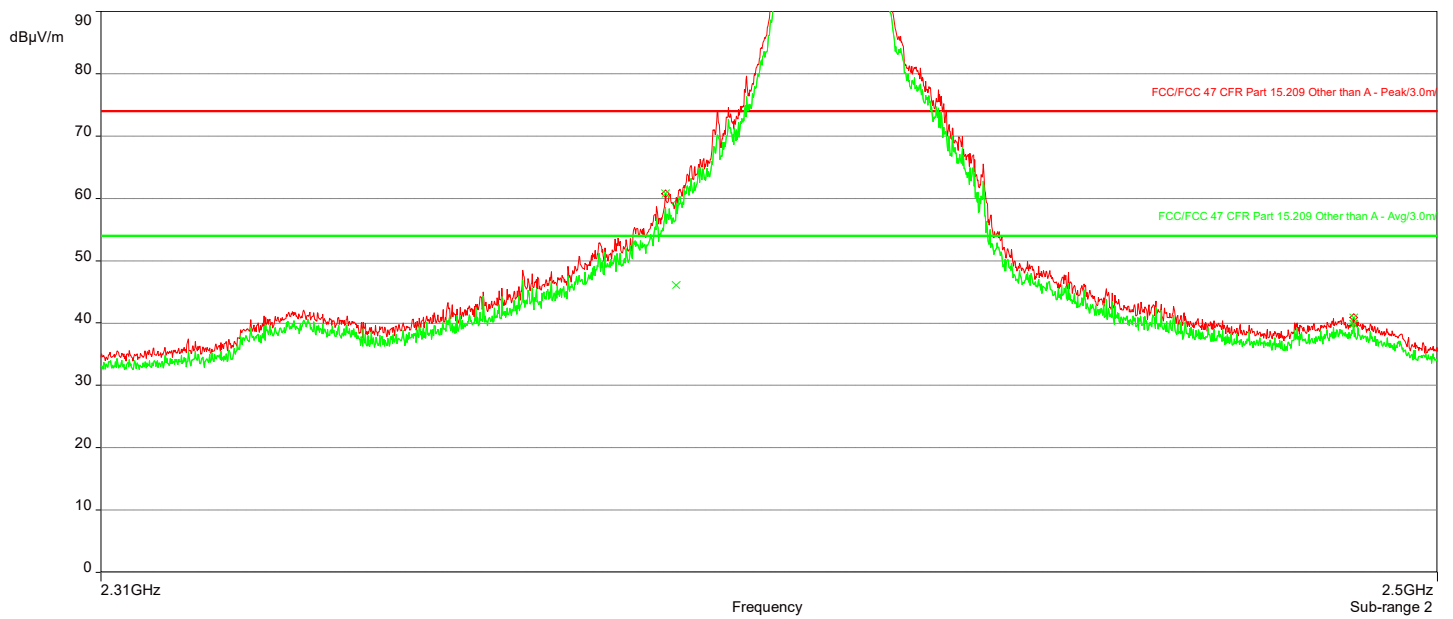
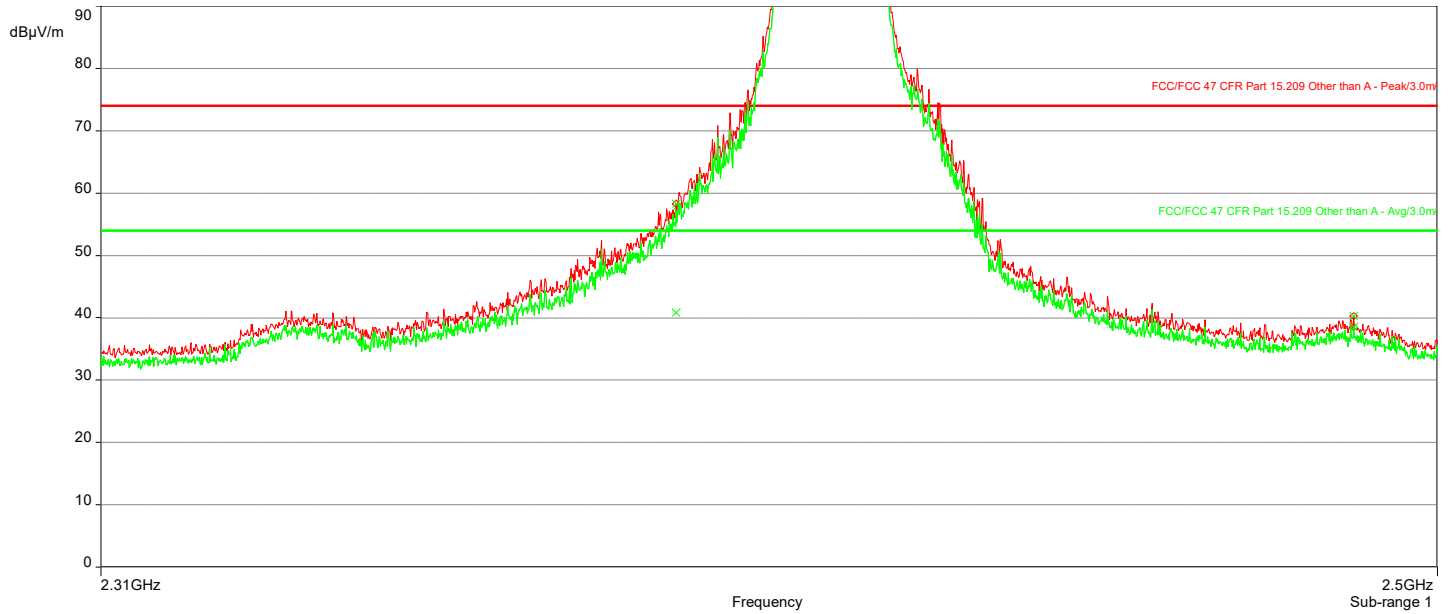
9/3/2021 12:24:03

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.389935GHz     | 58.24                       | -3.13                  | 74.00              | -15.76      | 2.52       | 202.70    | Vertical     | Passed    |
| 2. | 2.4876438GHz    | 40.33                       | -2.46                  | 74.00              | -33.67      | 3.84       | 0.10      | Vertical     | Passed    |
| 3. | 2.3884142GHz    | 60.74                       | -3.14                  | 74.00              | -13.26      | 1.71       | 45.10     | Horizontal   | Passed    |
| 4. | 2.4876438GHz    | 40.90                       | -2.46                  | 74.00              | -33.10      | 1.48       | 292.60    | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|----------|
| 1. | 2.389935GHz     | 40.78                          | -3.13                  | 54.00              | -13.22      | 2.52       | 202.70    | Vertical     | Passed   |
| 2. | 2.4876438GHz    | 38.54                          | -2.46                  | 54.00              | -15.46      | 3.84       | 0.10      | Vertical     | Passed   |
| 3. | 2.389935GHz     | 46.13                          | -3.13                  | 54.00              | -7.87       | 1.60       | 67.90     | Horizontal   | Passed   |
| 4. | 2.4876438GHz    | 39.87                          | -2.46                  | 54.00              | -14.13      | 1.48       | 292.60    | Horizontal   | Passed   |



Overall Graphs:



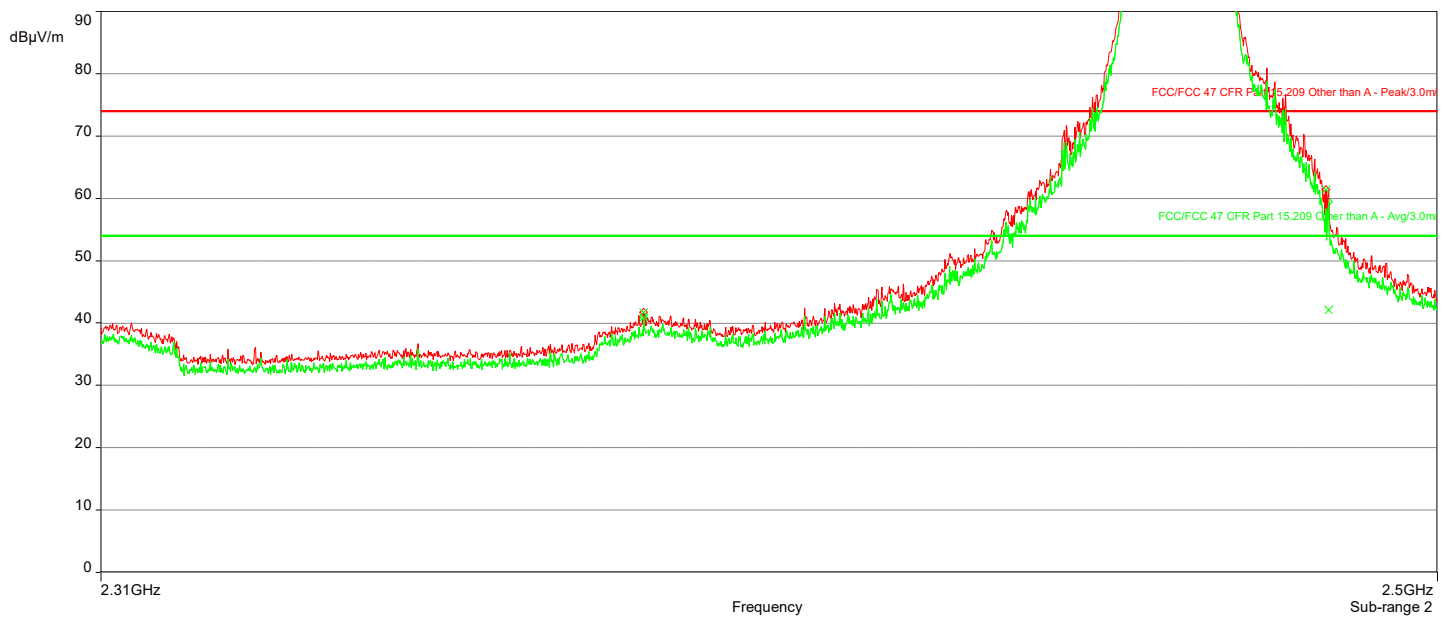
AH20110901-HAR-279-008\_Restricted Bandedge\_2.4G 802.11g\_Ch-11

9/3/2021 12:49:03

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3895548GHz    | 40.66                       | -3.14                  | 74.00              | -33.34      | 2.52       | 202.50    | Vertical     | Passed    |
| 2. | 2.4835568GHz    | 54.65                       | -2.47                  | 74.00              | -19.35      | 3.59       | 180.10    | Vertical     | Passed    |
| 3. | 2.3853727GHz    | 41.80                       | -3.16                  | 74.00              | -32.20      | 1.38       | 45.10     | Horizontal   | Passed    |
| 4. | 2.4835568GHz    | 61.47                       | -2.47                  | 74.00              | -12.53      | 1.30       | 292.60    | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|----------|
| 1. | 2.3863232GHz    | 39.62                          | -3.16                  | 54.00              | -14.38      | 2.52       | 202.50    | Vertical     | Passed   |
| 2. | 2.4836518GHz    | 52.24                          | -2.47                  | 54.00              | -1.76       | 2.64       | 202.50    | Vertical     | Passed   |
| 3. | 2.3853727GHz    | 40.94                          | -3.16                  | 54.00              | -13.06      | 1.38       | 45.10     | Horizontal   | Passed   |
| 4. | 2.483937GHz     | 42.10                          | -2.47                  | 54.00              | -11.90      | 1.42       | 292.90    | Horizontal   | Passed   |

Overall Graphs:



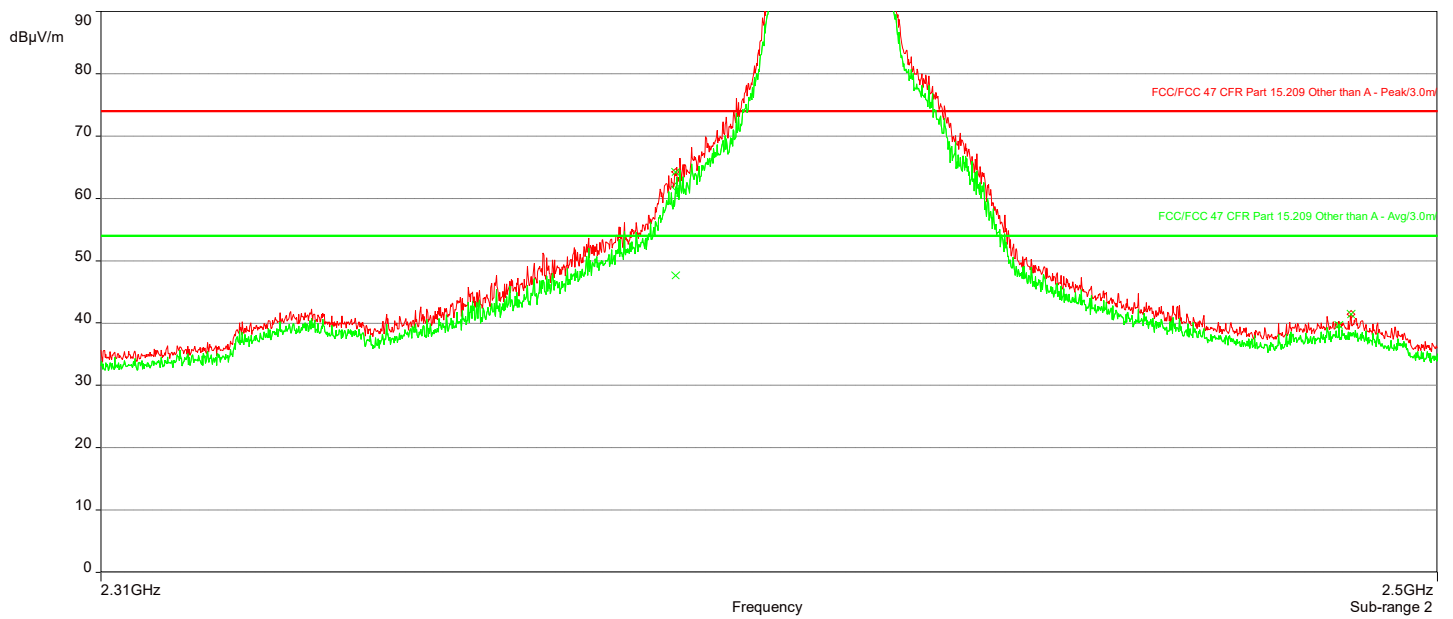
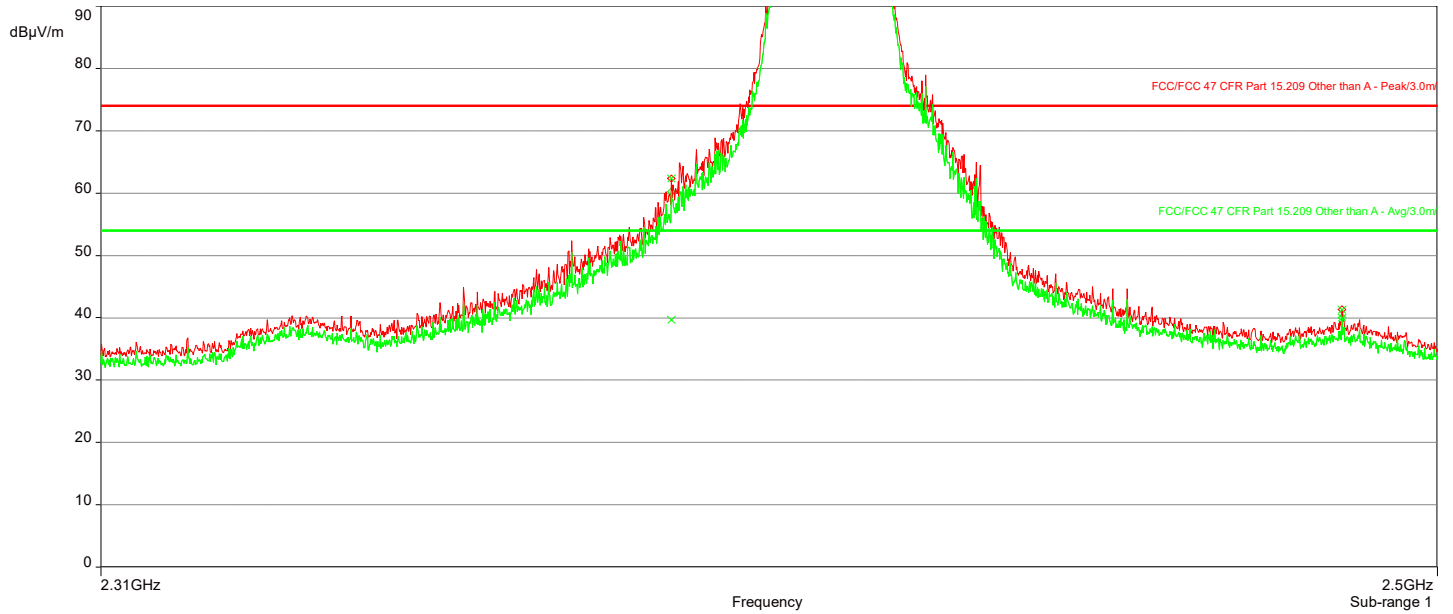
AH20110901-HAR-279-008\_Restricted Bandedge\_2.4G 802.11n\_Ch-1

9/3/2021 13:12:48

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3892696GHz    | 62.40                       | -3.14                  | 74.00              | -11.60      | 2.42       | 202.60    | Vertical     | Passed    |
| 2. | 2.485933GHz     | 41.34                       | -2.46                  | 74.00              | -32.66      | 3.33       | 0.20      | Vertical     | Passed    |
| 3. | 2.3898399GHz    | 64.23                       | -3.13                  | 74.00              | -9.77       | 3.97       | 247.60    | Horizontal   | Passed    |
| 4. | 2.4872636GHz    | 41.41                       | -2.46                  | 74.00              | -32.59      | 1.61       | 292.60    | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|----------|
| 1. | 2.3892696GHz    | 39.72                          | -3.14                  | 54.00              | -14.28      | 2.42       | 202.60    | Vertical     | Passed   |
| 2. | 2.485933GHz     | 40.02                          | -2.46                  | 54.00              | -13.98      | 3.33       | 0.20      | Vertical     | Passed   |
| 3. | 2.3898399GHz    | 47.63                          | -3.13                  | 54.00              | -6.37       | 3.97       | 247.60    | Horizontal   | Passed   |
| 4. | 2.4854577GHz    | 39.70                          | -2.47                  | 54.00              | -14.30      | 3.52       | 45.00     | Horizontal   | Passed   |

Overall Graphs:



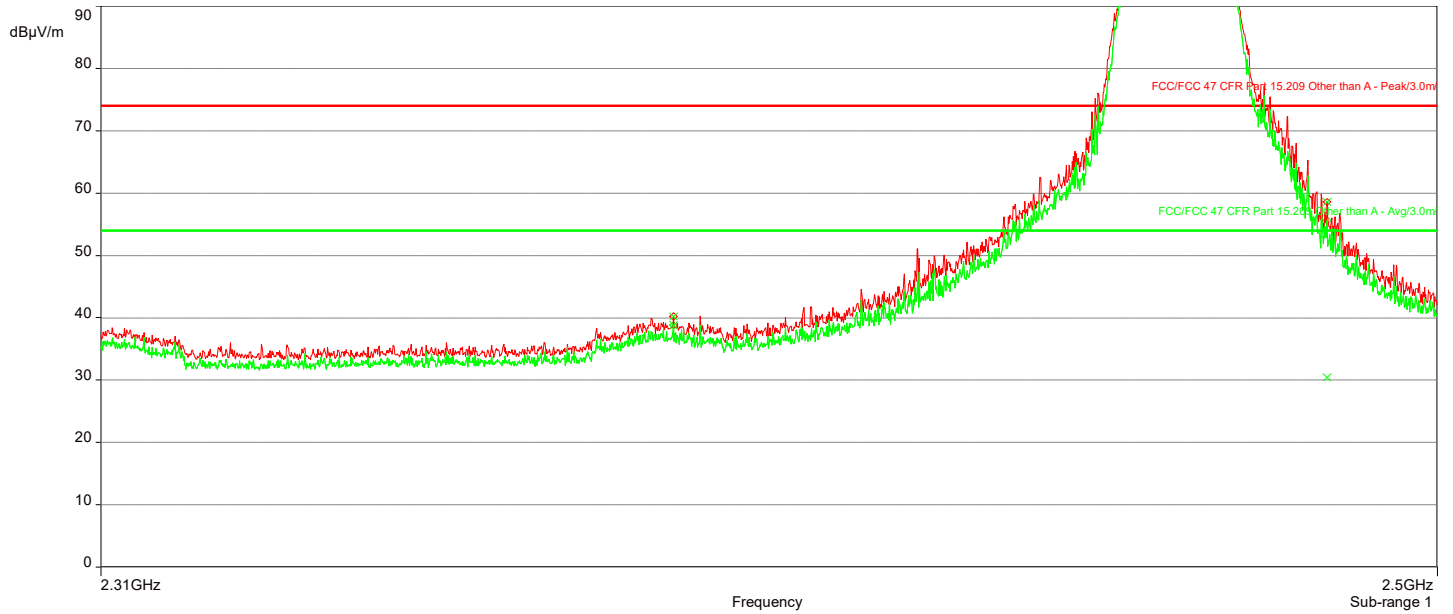
AH20110901-HAR-279-008\_Restricted Bandedge\_2.4G 802.11n\_Ch-11

9/3/2021 13:51:20

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3895548GHz    | 40.25                       | -3.14                  | 74.00              | -33.75      | 2.42       | 202.60    | Vertical     | Passed    |
| 2. | 2.4837469GHz    | 58.59                       | -2.47                  | 74.00              | -15.41      | 2.42       | 202.60    | Vertical     | Passed    |
| 3. | 2.3843272GHz    | 41.77                       | -3.17                  | 74.00              | -32.23      | 1.48       | 45.00     | Horizontal   | Passed    |
| 4. | 2.4835568GHz    | 62.66                       | -2.47                  | 74.00              | -11.34      | 3.13       | 45.00     | Horizontal   | Passed    |

| No | Frequency (MHz) | Level Average Reading (dBuV/m) | Correction Factor (dB) | Limit dB $\mu$ V/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgment |
|----|-----------------|--------------------------------|------------------------|--------------------|-------------|------------|-----------|--------------|----------|
| 1. | 2.3895548GHz    | 38.89                          | -3.14                  | 54.00              | -15.11      | 2.42       | 202.60    | Vertical     | Passed   |
| 2. | 2.4837469GHz    | 30.48                          | -2.47                  | 54.00              | -23.52      | 2.42       | 202.60    | Vertical     | Passed   |
| 3. | 2.3887944GHz    | 39.93                          | -3.14                  | 54.00              | -14.07      | 1.13       | 45.00     | Horizontal   | Passed   |
| 4. | 2.483937GHz     | 40.36                          | -2.47                  | 54.00              | -13.64      | 2.53       | 224.90    | Horizontal   | Passed   |

Overall Graphs:

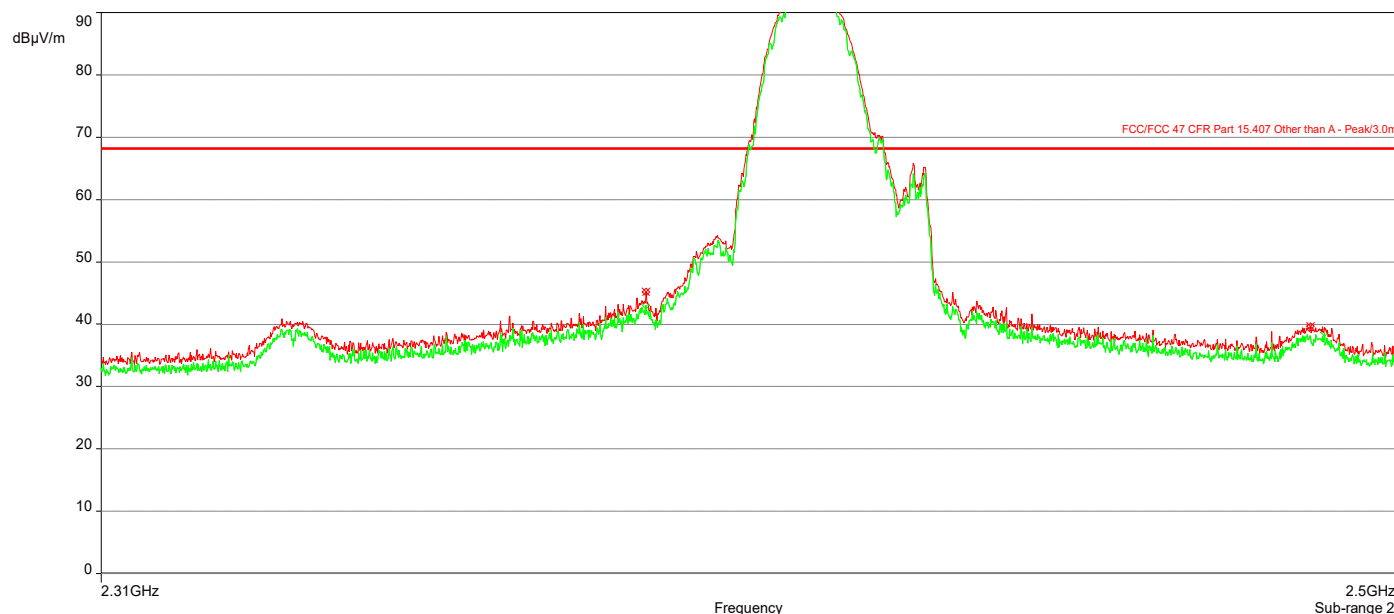
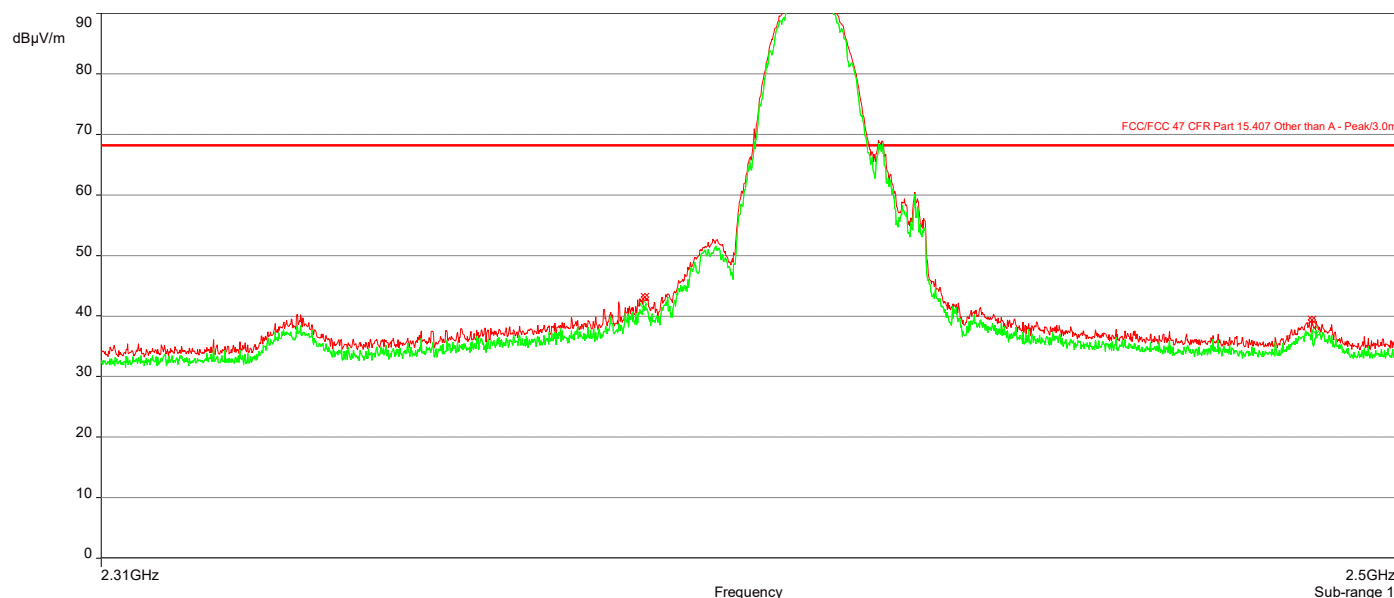


AH20110901-HAR-279-008\_Unrestricted Bandedge\_2.4G 802.11b\_Ch-1

9/3/2021 12:00:42

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3877489GHz    | 43.16                       | -3.15                  | 68.23        | -25.07      | 2.42       | 202.60    | Vertical     | Passed    |
| 2. | 2.4866933GHz    | 39.37                       | -2.46                  | 68.23        | -28.86      | 3.31       | 0.00      | Vertical     | Passed    |
| 3. | 2.387939GHz     | 45.18                       | -3.15                  | 68.23        | -23.05      | 1.72       | 45.00     | Horizontal   | Passed    |
| 4. | 2.4865033GHz    | 39.70                       | -2.46                  | 68.23        | -28.53      | 1.00       | 67.60     | Horizontal   | Passed    |

Graphs:



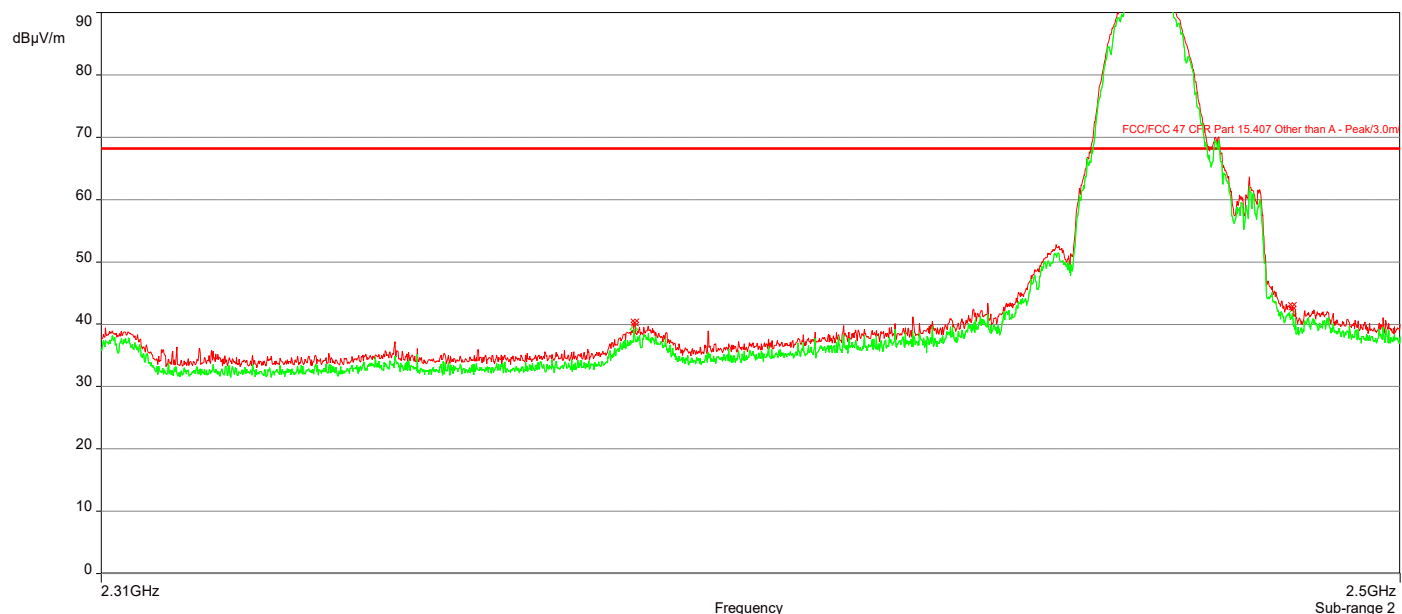
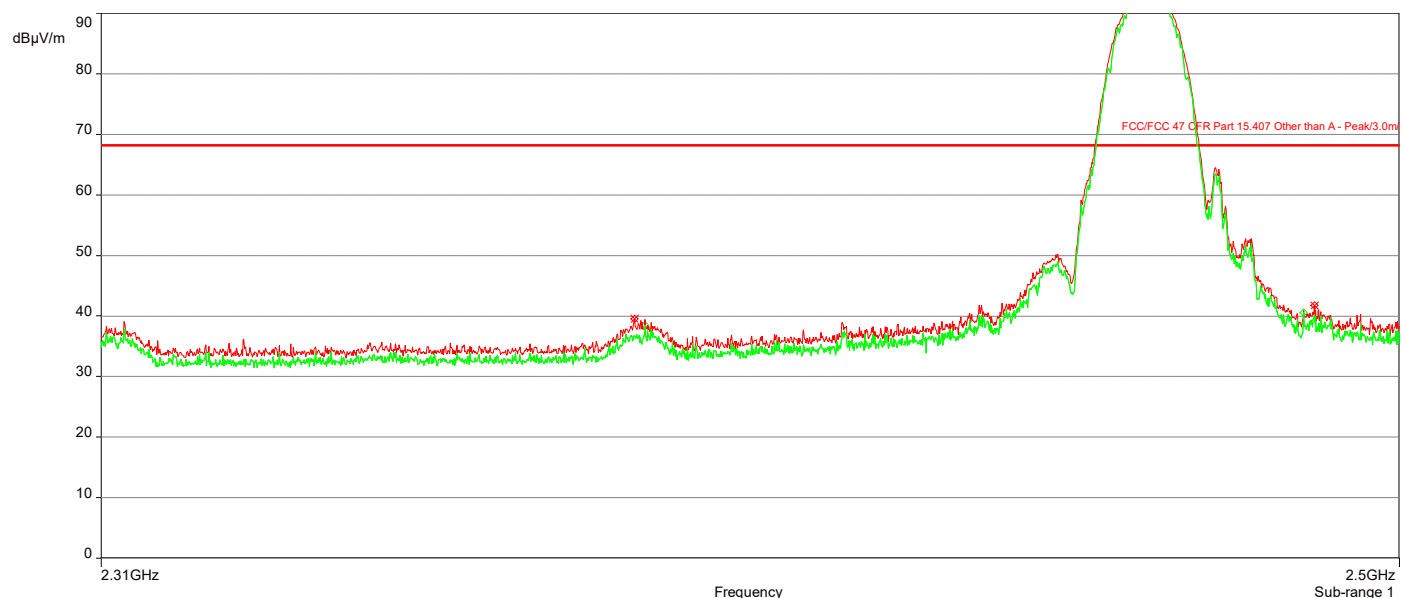


AH20110901-HAR-279-008\_Unrestricted Bandedge\_2.4G 802.11b\_Ch-11

9/3/2021 12:02:33

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3862281GHz    | 39.51                       | -3.16                  | 68.23        | -28.72      | 2.47       | 202.40    | Vertical     | Passed    |
| 2. | 2.4870735GHz    | 41.77                       | -2.46                  | 68.23        | -26.46      | 2.71       | 202.40    | Vertical     | Passed    |
| 3. | 2.3862281GHz    | 40.31                       | -3.16                  | 68.23        | -27.92      | 3.39       | 247.40    | Horizontal   | Passed    |
| 4. | 2.4836518GHz    | 42.90                       | -2.47                  | 68.23        | -25.33      | 1.14       | 67.40     | Horizontal   | Passed    |

Graphs:

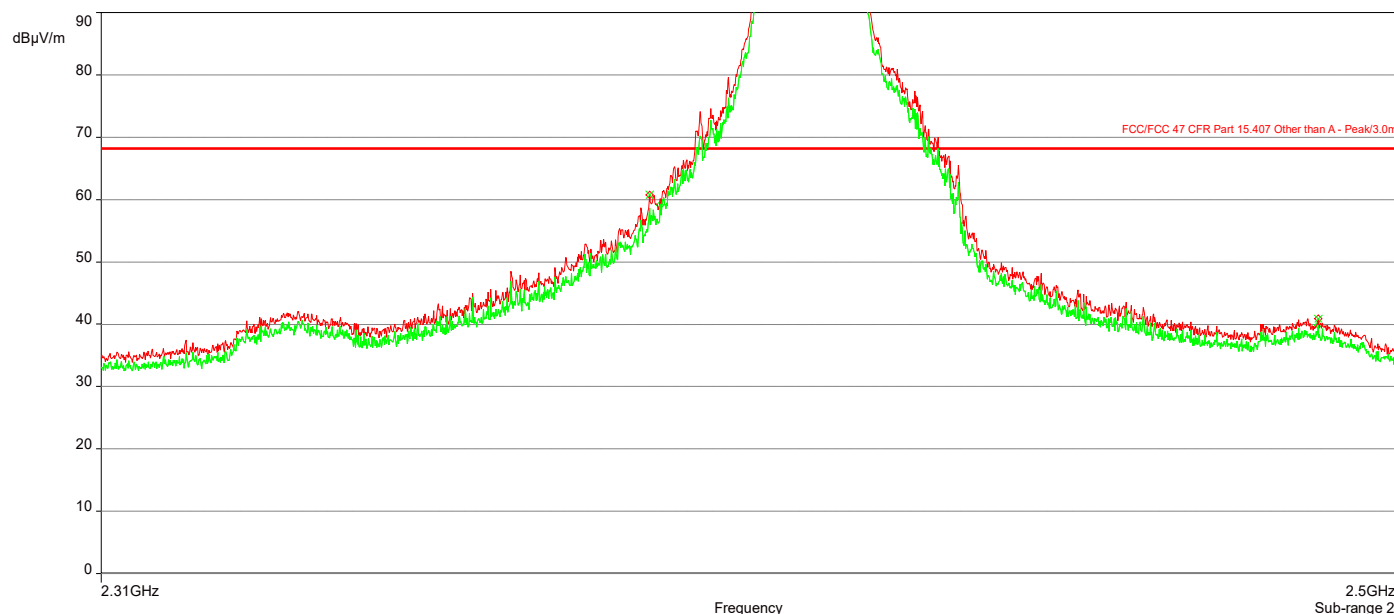
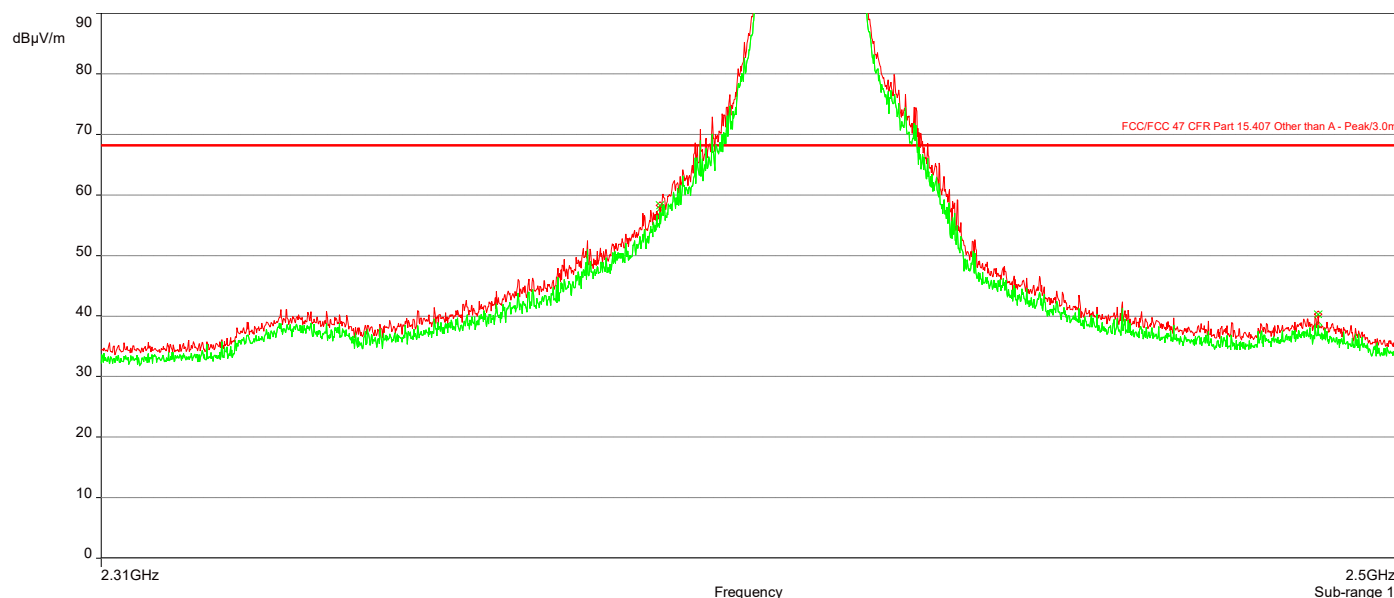


AH20110901-HAR-279-008\_Unrestricted Bandedge\_2.4G 802.11g\_Ch-1

9/3/2021 12:24:03

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.389935GHz     | 58.24                       | -3.13                  | 68.23        | -9.99       | 2.52       | 202.70    | Vertical     | Passed    |
| 2. | 2.4876438GHz    | 40.33                       | -2.46                  | 68.23        | -27.90      | 3.84       | 0.10      | Vertical     | Passed    |
| 3. | 2.3884142GHz    | 60.74                       | -3.14                  | 68.23        | -7.49       | 1.71       | 45.10     | Horizontal   | Passed    |
| 4. | 2.4876438GHz    | 40.90                       | -2.46                  | 68.23        | -27.33      | 1.48       | 292.60    | Horizontal   | Passed    |

Graphs:

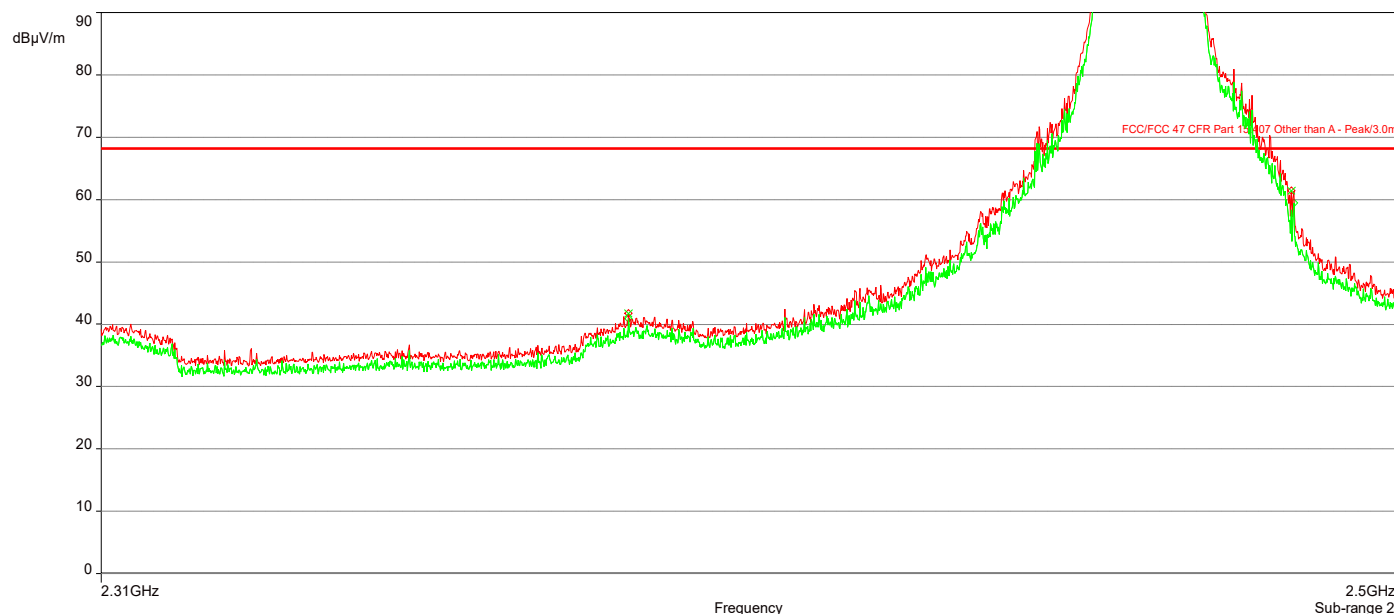
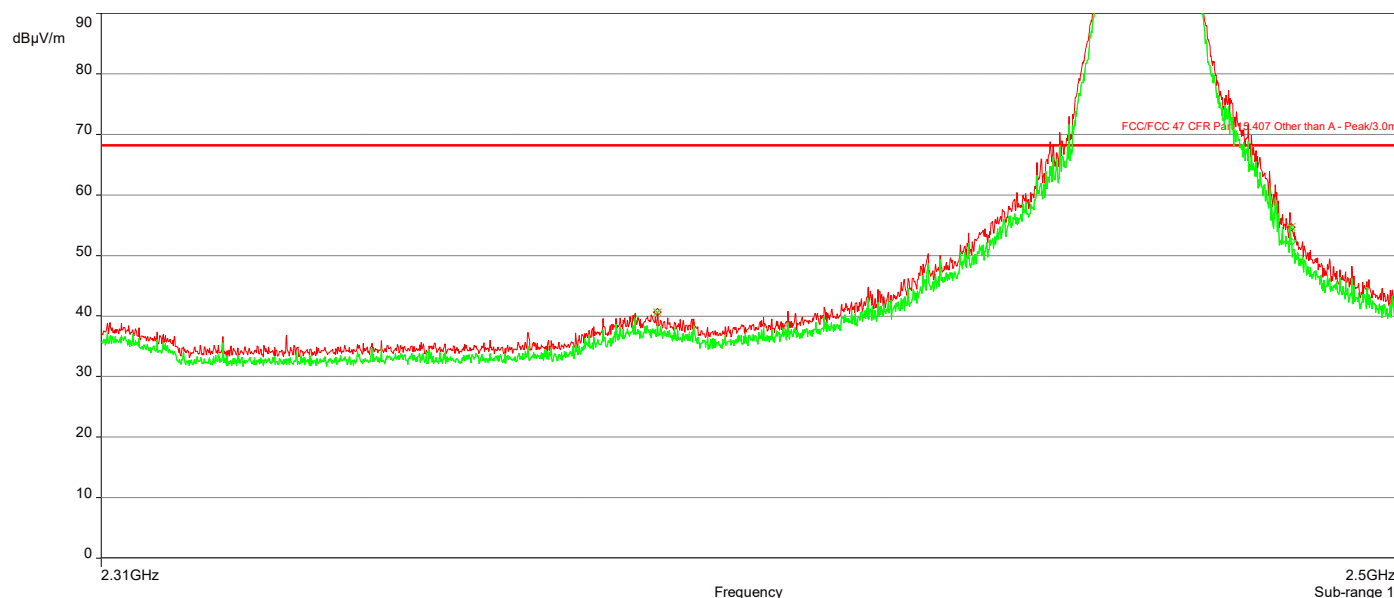


AH20110901-HAR-279-008\_Unrestricted Bandedge\_2.4G 802.11g\_Ch-11

9/3/2021 12:49:03

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3895548GHz    | 40.66                       | -3.14                  | 68.23        | -27.57      | 2.52       | 202.50    | Vertical     | Passed    |
| 2. | 2.4835568GHz    | 54.65                       | -2.47                  | 68.23        | -13.58      | 3.59       | 180.10    | Vertical     | Passed    |
| 3. | 2.3853727GHz    | 41.80                       | -3.16                  | 68.23        | -26.43      | 1.38       | 45.10     | Horizontal   | Passed    |
| 4. | 2.4835568GHz    | 61.47                       | -2.47                  | 68.23        | -6.76       | 1.30       | 292.60    | Horizontal   | Passed    |

Graphs:

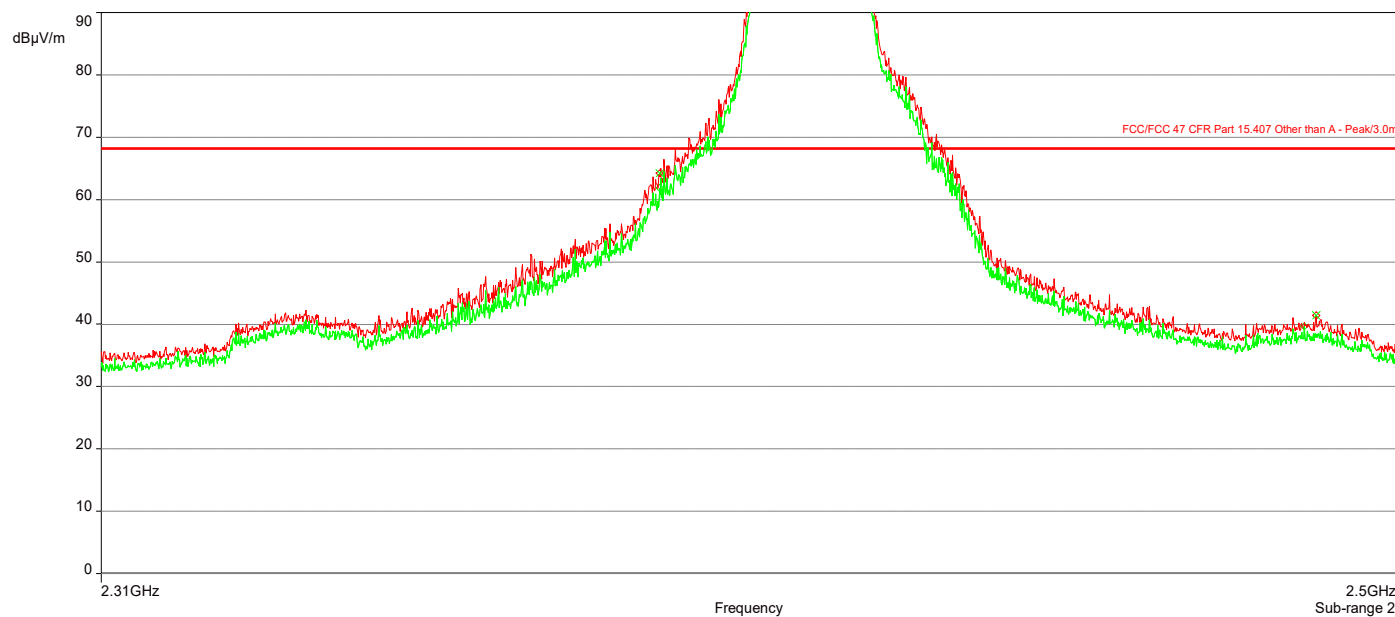
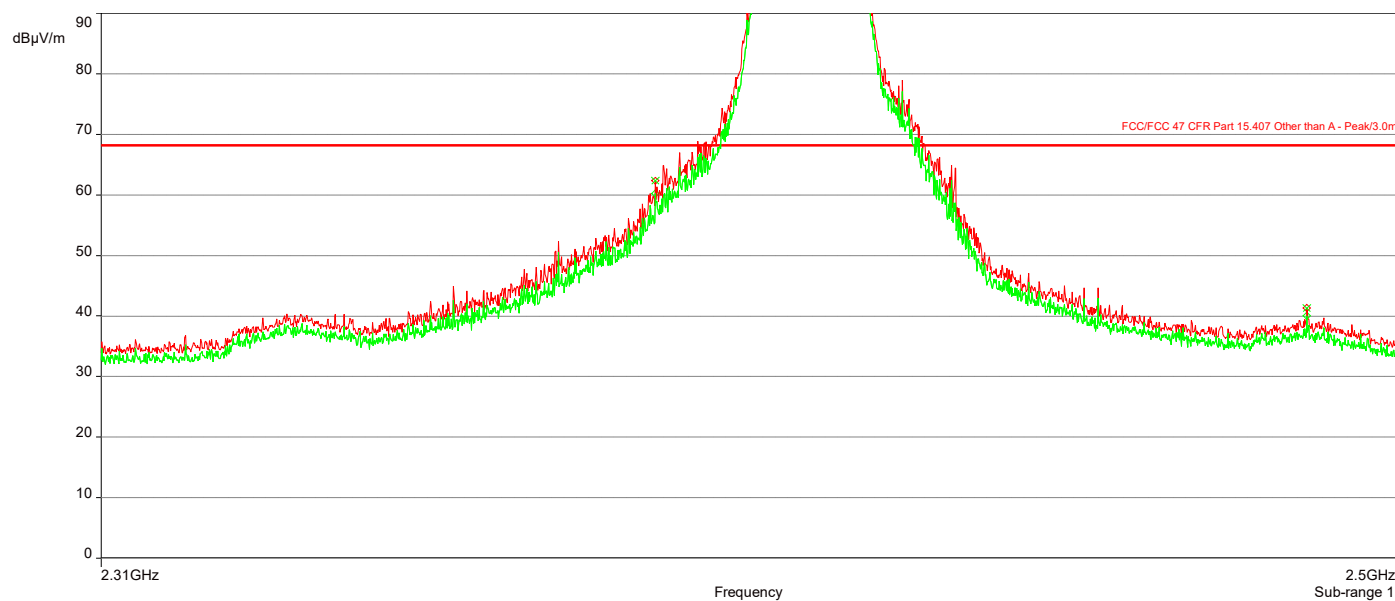


AH20110901-HAR-279-008\_Unrestricted Bandedge\_2.4G 802.11n\_Ch-1

9/3/2021 13:12:48

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3892696GHz    | 62.40                       | -3.14                  | 68.23        | -5.83       | 2.42       | 202.60    | Vertical     | Passed    |
| 2. | 2.485933GHz     | 41.34                       | -2.46                  | 68.23        | -26.89      | 3.33       | 0.20      | Vertical     | Passed    |
| 3. | 2.3898399GHz    | 64.23                       | -3.13                  | 68.23        | -4.00       | 3.97       | 247.60    | Horizontal   | Passed    |
| 4. | 2.4872636GHz    | 41.41                       | -2.46                  | 68.23        | -26.82      | 1.61       | 292.60    | Horizontal   | Passed    |

Graphs:

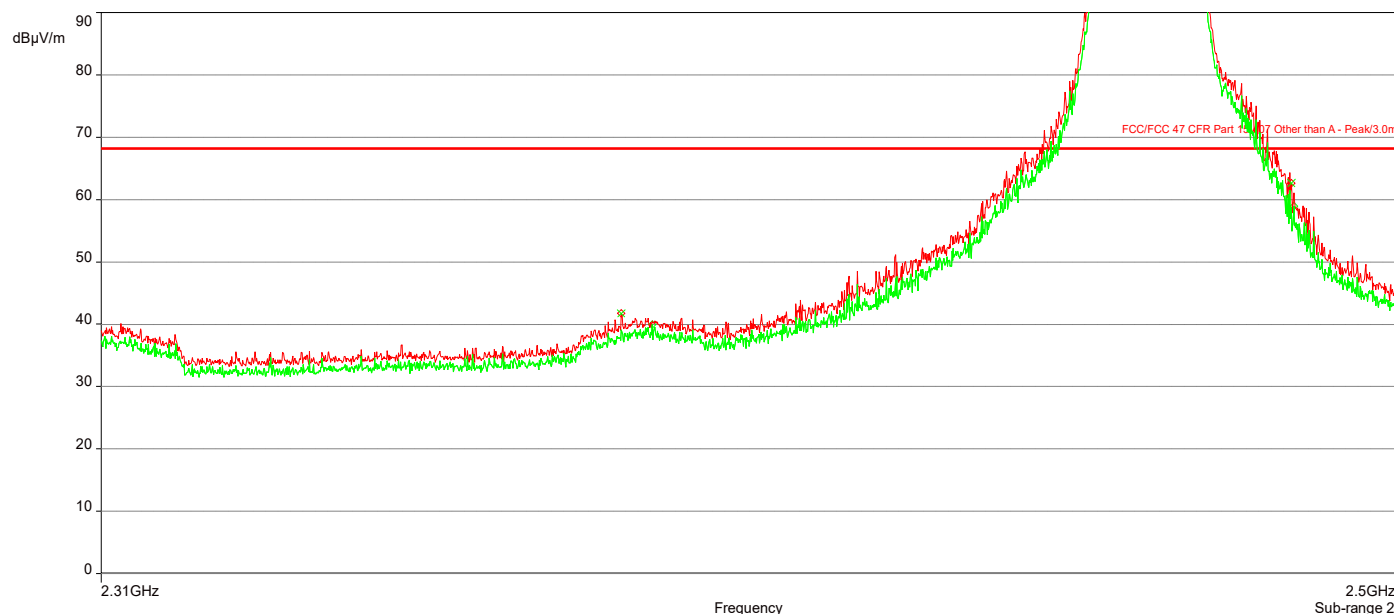
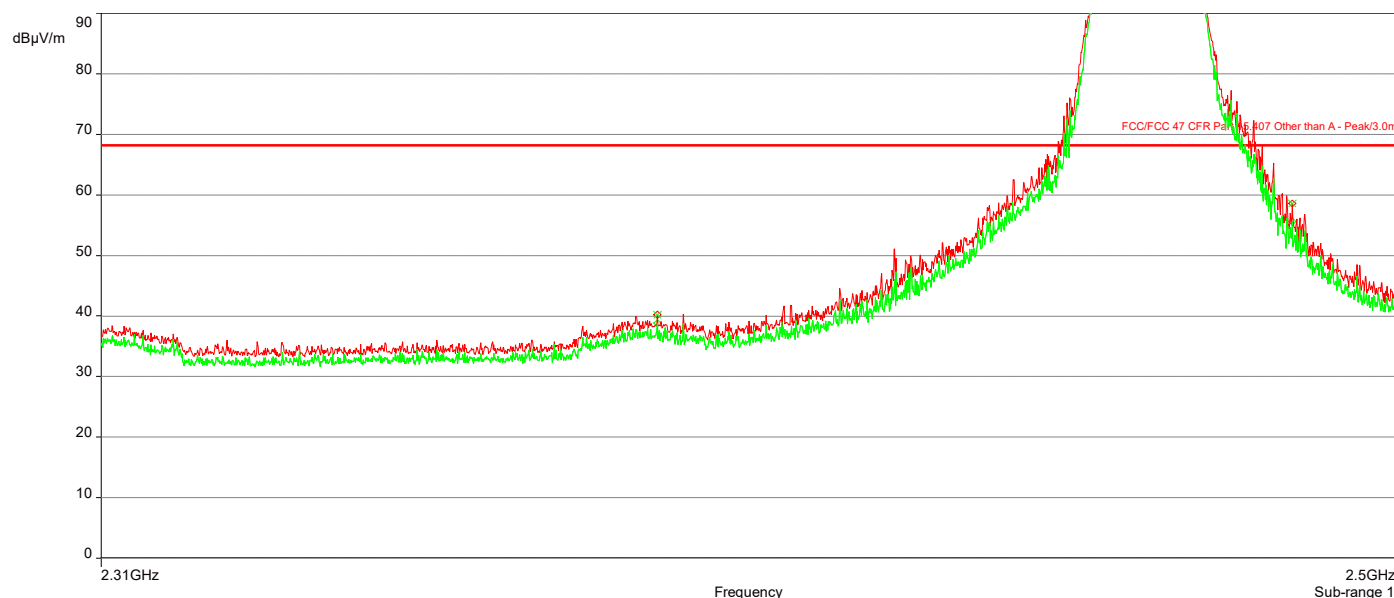


AH20110901-HAR-279-008\_Unrestricted Bandedge\_2.4G 802.11n\_Ch-11

9/3/2021 13:51:20

| No | Frequency (MHz) | Level Peak Reading (dBuV/m) | Correction Factor (dB) | Limit dBuV/m | Margin (dB) | Height (m) | Angle (°) | Polarization | Judgement |
|----|-----------------|-----------------------------|------------------------|--------------|-------------|------------|-----------|--------------|-----------|
| 1. | 2.3895548GHz    | 40.25                       | -3.14                  | 68.23        | -27.98      | 2.42       | 202.60    | Vertical     | Passed    |
| 2. | 2.4837469GHz    | 58.59                       | -2.47                  | 68.23        | -9.64       | 2.42       | 202.60    | Vertical     | Passed    |
| 3. | 2.3843272GHz    | 41.77                       | -3.17                  | 68.23        | -26.46      | 1.48       | 45.00     | Horizontal   | Passed    |
| 4. | 2.4835568GHz    | 62.66                       | -2.47                  | 68.23        | -5.57       | 3.13       | 45.00     | Horizontal   | Passed    |

Graphs:



## Document Revisions

| Version | Date       | Modifier        | Changes   |
|---------|------------|-----------------|---|
| 1.0     | 04-28-2021 | Aravind Buddana | <ul style="list-style-type: none"><li>• Initial Draft</li></ul>   |
| 2.0     | 05-06-2021 | Aravind Buddana | <ul style="list-style-type: none"><li>• Updated Report Number. Test Request Addition Information, Laboratory Additional Information</li><li>• Updated Test Setup Information, Statement of conformity</li><li>• Moved DUT and Test setup pictures to additional document.</li></ul> |
| 3.0     | 07-16-2021 | Aravind Buddana | <ul style="list-style-type: none"><li>• Updated FCC designation and ISED Identifier of Test Firm</li></ul>  |
| 3.0     | 07-16-2021 | Ryan Philips    | <ul style="list-style-type: none"><li>• Updated H-field measurement missing 9kHz – 30MHz</li></ul>  |
| 4.0     | 09-01-2021 | Ryan Philips    | <ul style="list-style-type: none"><li>• Updated the test plots for 9k to 30M</li></ul>  |
| 5.0     | 09-03-2021 | Aravind Buddana | <ul style="list-style-type: none"><li>• Updated Band Edge Tests</li></ul>   |

-End of Report-