

# Report on the FCC and IC Testing of: Apple Inc. Model: A1932

In accordance with FCC 47 CFR Part 15C and  
Industry Canada RSS-247 and Industry Canada  
RSS-GEN

Prepared for: Apple Inc.  
One Apple Park Way  
Cupertino, California 95014, USA

FCC ID: BCGA1932

IC: 579C-A1932



Product Service

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## COMMERCIAL-IN-CONFIDENCE

Document Number: 75942371-12 | Issue: 01

### SIGNATURE

| NAME            | JOB TITLE      | RESPONSIBLE FOR      | ISSUE DATE      |
|-----------------|----------------|----------------------|-----------------|
| Matthew Russell | RF Team Leader | Authorised Signatory | 18 October 2018 |

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

### ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C and Industry Canada RSS-247 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

### SIGNATURE

| NAME                | JOB TITLE       | RESPONSIBLE FOR | ISSUE DATE      |
|---------------------|-----------------|-----------------|-----------------|
| Graeme Lawler       | Test Engineer   | Testing         | 18 October 2018 |
| Tony Hubbard        | Test Engineer   | Testing         | 18 October 2018 |
| Cristian Onaca      | Engineer        | Testing         | 18 October 2018 |
| Sharif Sendagire    | Shift Engineer  | Testing         | 18 October 2018 |
| Phillip Harrison    | Senior Engineer | Testing         | 18 October 2018 |
| Nandhini Mathivanan | Engineer        | Testing         | 18 October 2018 |

FCC Accreditation  
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation  
IC2932B-1 Octagon House, Fareham Test Laboratory

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C: 2017, Industry Canada RSS-247: Issue 2 (2017-02) and Industry Canada RSS-GEN: Issue 5 (2018-04).



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# Contents

- 1      Report Summary .....2**
- 1.1    Report Modification Record.....2
- 1.2    Introduction.....2
- 1.3    Brief Summary of Results .....3
- 1.4    Product Information .....4
- 1.5    Deviations from the Standard.....4
- 1.6    EUT Modification Record .....4
- 1.7    Test Location .....5
- 2      Test Details .....6**
- 2.1    Maximum Conducted Output Power .....6
- 2.2    Power Spectral Density ..... 10
- 2.3    Emission Bandwidth ..... 14
- 2.4    Authorised Band Edges ..... 53
- 2.5    Restricted Band Edges..... 61
- 2.6    Spurious Radiated Emissions ..... 88
- 3      Measurement Uncertainty ..... 100**



## 1 Report Summary

### 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue   |
|-------|-----------------------|-----------------|
| 1     | First Issue           | 18 October 2018 |

**Table 1**

### 1.2 Introduction

|                               |                                                                                                                       |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Applicant                     | Apple Inc.                                                                                                            |
| Manufacturer                  | Apple Inc.                                                                                                            |
| Model Number(s)               | A1932                                                                                                                 |
| Serial Number(s)              | C02X5003L3J0, C02X5003L3J3,<br>C02X5003JL8Y & C02X5004L3FP                                                            |
| Hardware Version(s)           | EVT2                                                                                                                  |
| Software Version(s)           | 18B2034                                                                                                               |
| Number of Samples Tested      | 4                                                                                                                     |
| Test Specification/Issue/Date | FCC 47 CFR Part 15C: 2017<br>Industry Canada RSS-247: Issue 2 (2017-02)<br>Industry Canada RSS-GEN: Issue 5 (2018-04) |
| Order Number                  | 0540166213                                                                                                            |
| Date                          | 06-April-2018                                                                                                         |
| First Date of Receipt of EUT  | 23-August 2018                                                                                                        |
| Start of Test                 | 07-September-2018                                                                                                     |
| Finish of Test                | 17-October-2018                                                                                                       |
| Name of Engineer(s)           | Sharif Sendagire, Graeme Lawler, Tony Hubbard, Cristian Onaca, Nandhini Mathivanan, Phillip Harrison                  |
| Related Document(s)           | ANSI C63.10 (2013)<br>KDB 662911 D01 v02r01                                                                           |



Product Service

### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, Industry Canada RSS-247 and Industry Canada RSS-GEN is shown below.

| Section                              | Specification Clause  |         |         | Test Description               | Result | Comments/Base Standard               |
|--------------------------------------|-----------------------|---------|---------|--------------------------------|--------|--------------------------------------|
|                                      | Part 15C              | RSS-247 | RSS-GEN |                                |        |                                      |
| Configuration and Mode: 802.11 b/g/n |                       |         |         |                                |        |                                      |
| 2.1                                  | 15.247 (b)(3)         | 5.4     | 6.12    | Maximum Conducted Output Power | Pass   | ANSI C63.10<br>KDB 662911 D01 v02r01 |
| 2.2                                  | 15.247 (e)            | 5.2     | -       | Power Spectral Density         | Pass   | ANSI C63.10<br>KDB 662911 D01 v02r01 |
| 2.3                                  | 15.247 (a)(2)         | 5.2     | 6.7     | Emission Bandwidth             | Pass   | ANSI C63.10                          |
| 2.4                                  | 15.247 (d)            | 5.5     | -       | Authorised Band Edges          | Pass   | ANSI C63.10                          |
| 2.5                                  | 15.205                | -       | 8.10    | Restricted Band Edges          | Pass   | ANSI C63.10                          |
| 2.6                                  | 15.247 (d),<br>15.205 | 5.5     | 6.13    | Spurious Radiated Emissions    | Pass   | ANSI C63.10                          |

**Table 2**



## 1.4 Product Information

### 1.4.1 Technical Description

The Equipment Under Test (EUT) was a Laptop computer, with Bluetooth, Bluetooth Low Energy and 802.11 b/g/n/ac capabilities in the 2.4GHz and 5GHz bands.

### 1.4.2 Details of Antenna Assembly

| Frequency (MHz)     | Peak Gain (dBi) | Conducted Cable Loss (dB) |
|---------------------|-----------------|---------------------------|
| 2400 – 2480 (Core0) | 2.3             | 1.00                      |
| 2400 – 2480 (Core1) | 3.9             | 1.00                      |

Table 3

## 1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

## 1.6 EUT Modification Record

The table below details modifications made to the EUT during the test programme.  
The modifications incorporated during each test are recorded on the appropriate test pages.

| Modification State          | Description of Modification still fitted to EUT                          | Modification Fitted By | Date Modification Fitted |
|-----------------------------|--------------------------------------------------------------------------|------------------------|--------------------------|
| Serial Number: C02X5003L3J0 |                                                                          |                        |                          |
| 0                           | As supplied by the customer                                              | Not Applicable         | Not Applicable           |
| Serial Number: C02X5003L3J3 |                                                                          |                        |                          |
| 0                           | As supplied by the customer                                              | Not Applicable         | Not Applicable           |
| 1                           | Maximum conducted output power and PSD tests repeated at reduced powers. | Not Applicable         | 15 October 2018          |
| Serial Number: C02X5003JL8Y |                                                                          |                        |                          |
| 0                           | As supplied by the customer                                              | Not Applicable         | Not Applicable           |
| Serial Number: C02X5004L3FP |                                                                          |                        |                          |
| 0                           | As supplied by the customer                                              | Not Applicable         | Not Applicable           |

Table 4



## 1.7 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

| Test Name                            | Name of Engineer(s)                                                                       | Accreditation |
|--------------------------------------|-------------------------------------------------------------------------------------------|---------------|
| Configuration and Mode: 802.11 b/g/n |                                                                                           |               |
| Maximum Conducted Output Power       | Philip Harrison                                                                           | UKAS          |
| Power Spectral Density               | Philip Harrison                                                                           | UKAS          |
| Emission Bandwidth                   | Philip Harrison                                                                           | UKAS          |
| Authorised Band Edges                | Sharifu Sendagire, Graeme Lawler,<br>Tony Hubbard, Cristian Onaca,<br>Nandhini Mathivanan | UKAS          |
| Restricted Band Edges                |                                                                                           | UKAS          |
| Spurious Radiated Emissions          |                                                                                           | UKAS          |

**Table 5**

Office Address:

Octagon House  
Concorde Way  
Segensworth North  
Fareham  
Hampshire  
PO15 5RL  
United Kingdom



## 2 Test Details

### 2.1 Maximum Conducted Output Power

#### 2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)  
Industry Canada RSS-247, 5.4  
Industry Canada RSS-GEN, 6.12

#### 2.1.2 Equipment Under Test and Modification State

A1932, S/N: C02X5003L3J3 - Modification State 0  
A1932, S/N: C02X5003L3J3 - Modification State 1  
A1932, S/N: C02X5003JL8Y - Modification State 0

#### 2.1.3 Date of Test

26-September-2018 to 17-October-2018

#### 2.1.4 Test Method

The test was performed in accordance with ANSI C63.10 clause 11.9.2.3.2 Method AVGPM-G

The conducted output power was verified as being the same from each transmit chain, but the antenna gains were not identical, therefore the modes reported for SISO operation are those giving the highest EIRP and/or lowest conducted limit based on the antenna giving highest total directional gain.

MIMO output port summing was performed in accordance with KDB 662911 D01. Cyclic delay diversity (CDD) modes had the output chains summed using clause F)2)f)(i) with an array gain of 0 dB (802.11 devices with  $\leq 4$  antennas). Transmit beamforming (TxBF) modes were summed as per F)2)d)(i).

#### 2.1.5 Environmental Conditions

|                     |            |
|---------------------|------------|
| Ambient Temperature | 21 to 24°C |
| Relative Humidity   | 36 to 68%  |

## 2.1.6 Test Results

### 802.11b / 1 Mbps / SISO / Core 1

| Channel                             | Bottom | Middle | Top   |
|-------------------------------------|--------|--------|-------|
| Frequency (MHz)                     | 2412   | 2437   | 2472  |
| Antenna Directional Gain (dBi)      | 3.90   | 3.90   | 3.90  |
| 15.407 Conducted Power Limit (dBm)  | 30.00  | 30.00  | 30.00 |
| RSS-247 Conducted Power Limit (dBm) | 30.00  | 30.00  | 30.00 |
| Conducted Power (dBm)               | 19.20  | 19.96  | 12.86 |
| RSS-247 EIRP Limit (dBm)            | 36.00  | 36.00  | 36.00 |
| EIRP Power (dBm)                    | 23.10  | 23.86  | 16.76 |

Table 6

### 802.11b / 1 Mbps / MIMO CDD / Cores 0+1

| Channel                             | Bottom | Middle | Top   |
|-------------------------------------|--------|--------|-------|
| Frequency (MHz)                     | 2412   | 2437   | 2472  |
| Conducted Power Core 0 (dBm)        | 18.27  | 19.89  | 12.35 |
| Conducted Power Core 1 (dBm)        | 18.24  | 19.66  | 12.43 |
| Antenna Directional Gain (dBi)      | 3.90   | 3.90   | 3.90  |
| 15.407 Conducted Power Limit (dBm)  | 30.00  | 30.00  | 30.00 |
| RSS-247 Conducted Power Limit (dBm) | 30.00  | 30.00  | 30.00 |
| Total Conducted Power (dBm)         | 21.27  | 22.79  | 15.40 |
| RSS-247 EIRP Limit (dBm)            | 36.00  | 36.00  | 36.00 |
| EIRP Power (dBm)                    | 25.17  | 26.69  | 19.30 |

Table 7

### 802.11g / 6 Mbps / SISO / Core 1

| Channel                             | Bottom | Middle | Top   |
|-------------------------------------|--------|--------|-------|
| Frequency (MHz)                     | 2412   | 2437   | 2472  |
| Antenna Directional Gain (dBi)      | 3.90   | 3.90   | 3.90  |
| 15.407 Conducted Power Limit (dBm)  | 30.00  | 30.00  | 30.00 |
| RSS-247 Conducted Power Limit (dBm) | 30.00  | 30.00  | 30.00 |
| Conducted Power (dBm)               | 13.79  | 19.88  | 1.17  |
| RSS-247 EIRP Limit (dBm)            | 36.00  | 36.00  | 36.00 |
| EIRP Power (dBm)                    | 17.69  | 23.78  | 5.07  |

Table 8

### 802.11n / HT20 MCS0 / SISO / Core 1

| Channel                             | Bottom | Middle | Top   |
|-------------------------------------|--------|--------|-------|
| Frequency (MHz)                     | 2412   | 2437   | 2472  |
| Antenna Directional Gain (dBi)      | 3.90   | 3.90   | 3.90  |
| 15.407 Conducted Power Limit (dBm)  | 30.00  | 30.00  | 30.00 |
| RSS-247 Conducted Power Limit (dBm) | 30.00  | 30.00  | 30.00 |
| Conducted Power (dBm)               | 13.65  | 19.95  | 1.40  |
| RSS-247 EIRP Limit (dBm)            | 36.00  | 36.00  | 36.00 |
| EIRP Power (dBm)                    | 17.55  | 23.85  | 5.30  |

Table 9



**802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1**

| Channel                             | Bottom | Middle | Top   |
|-------------------------------------|--------|--------|-------|
| Frequency (MHz)                     | 2412   | 2437   | 2472  |
| Conducted Power Core 0 (dBm)        | 13.69  | 19.58  | -2.17 |
| Conducted Power Core 1 (dBm)        | 13.69  | 19.72  | -2.32 |
| Antenna Directional Gain (dBi)      | 3.90   | 3.90   | 3.90  |
| 15.407 Conducted Power Limit (dBm)  | 30.00  | 30.00  | 30.00 |
| RSS-247 Conducted Power Limit (dBm) | 30.00  | 30.00  | 30.00 |
| Total Conducted Power (dBm)         | 16.70  | 22.66  | 0.77  |
| RSS-247 EIRP Limit (dBm)            | 36.00  | 36.00  | 36.00 |
| EIRP Power (dBm)                    | 20.60  | 26.56  | 4.67  |

**Table 10**

**802.11n / HT20 MCS0 / MIMO TxBF / Cores 0+1**

| Channel                             | Bottom | Middle | Top   |
|-------------------------------------|--------|--------|-------|
| Frequency (MHz)                     | 2412   | 2437   | 2472  |
| Conducted Power Core 0 (dBm)        | 13.24  | 19.69  | -3.07 |
| Conducted Power Core 1 (dBm)        | 13.27  | 19.55  | -3.01 |
| Antenna Directional Gain (dBi)      | 6.15   | 6.15   | 6.15  |
| 15.407 Conducted Power Limit (dBm)  | 29.85  | 29.85  | 29.85 |
| RSS-247 Conducted Power Limit (dBm) | 30.00  | 30.00  | 30.00 |
| Total Conducted Power (dBm)         | 16.27  | 22.63  | -0.03 |
| RSS-247 EIRP Limit (dBm)            | 36.00  | 36.00  | 36.00 |
| EIRP Power (dBm)                    | 22.41  | 28.78  | 6.12  |

**Table 11**

Remarks

In cases where the directional gain exceeded 6 dBi the conducted output power limit was reduced in accordance with 15.247(b)(4).

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Industry Canada RSS-247, Limit Clause 5.4 (b)

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e) of the specification.



### 2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 3.

| Instrument                          | Manufacturer           | Type No      | TE No | Calibration Period (months) | Calibration Due |
|-------------------------------------|------------------------|--------------|-------|-----------------------------|-----------------|
| 20dB/2W Attenuator                  | Narda                  | 4772-20      | 462   | -                           | O/P Mon         |
| Hygrometer                          | Rotronic               | I-1000       | 2891  | 12                          | 18-Sept-2019    |
| Calibration Unit                    | Rohde & Schwarz        | ZV-Z54       | 4368  | 12                          | 06-Mar-2019     |
| Directional Coupler                 | Hewlett Packard        | 11692D       | 451   | -                           | O/P Mon         |
| Attenuator (20dB, 2W)               | Pasternack             | PE7004-20    | 2943  | 12                          | 18-Jul-2019     |
| Attenuator (20dB, 150W)             | Narda                  | 769-20       | 3367  | 12                          | 17-Jul-2019     |
| Attenuator (10dB, 150W)             | Narda                  | 769-10       | 3368  | 12                          | 17-Jul-2019     |
| Network Analyser                    | Rohde & Schwarz        | ZVA 40       | 3548  | 12                          | 09-Oct-2018     |
| DC - 12.4 GHz 10 dB Attenuator      | Suhner                 | 6810.17.A    | 3965  | 12                          | 18-Jul-2019     |
| P-Series Power Meter                | Agilent Technologies;  | N1911A       | 3981  | 12                          | 29-Sep-2019     |
| 50 MHz-18 GHz Wideband Power Sensor | Agilent Technologies;  | N1921A       | 3983  | 12                          | 29-Sep-2019     |
| Power splitter - 2 port             | Mini-Circuits          | ZN2PD-63-S+  | 4742  | 12                          | 29-Sep-2019     |
| Power splitter - 2 port             | Mini-Circuits          | ZN2PD-63-S+  | 4743  | 12                          | 29-Sep-2019     |
| Power splitter - 4 port             | Mini-Circuits          | ZN4PD1-63-S+ | 4744  | 12                          | 29-Sep-2019     |
| EMI Receiver                        | Keysight Technologies; | N9038A MXE   | 4628  | 12                          | 4-July-2019     |

**Table 12**

All test equipment was in calibration at the time of use.

O/P Mon – Output Monitored using calibrated equipment



## **2.2 Power Spectral Density**

### **2.2.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (e)  
Industry Canada RSS-247, Clause 5.2  
Industry Canada RSS-GEN, Clause 6.12

### **2.2.2 Equipment Under Test and Modification State**

A1932, S/N: C02X5003L3J3 - Modification State 0  
A1932, S/N: C02X5003L3J3 - Modification State 1  
A1932, S/N: C02X5003JL8Y - Modification State 0

### **2.2.3 Date of Test**

26-September-2018 to 17-October-2018

### **2.2.4 Test Method**

This test was performed in accordance with ANSI C63.10, clause 11.10.3, 11.10.5 or 11.10.7.

The output power was verified as being the same from each transmit chain, but the antenna gains were not identical. Therefore the modes reported here for SISO or 2x2 MIMO operation are those giving the highest EIRP and/or lowest conducted limit based on the combination of antennas giving highest total directional gain.

MIMO output port summing was performed in accordance with KDB 662911 D01. Cyclic delay diversity (CDD) modes had the output chains summed using clause F)2)f)(ii) Transmit beamforming (TxBF) modes were summed as per F)2)d)(i).

### **2.2.5 Environmental Conditions**

|                     |            |
|---------------------|------------|
| Ambient Temperature | 21 to 24°C |
| Relative Humidity   | 36 to 68%  |

## 2.2.6 Test Results

### 802.11b / 1 Mbps / SISO / Core 1

| Channel                                | Bottom   | Middle   | Top      |
|----------------------------------------|----------|----------|----------|
| Frequency (MHz)                        | 2412     | 2437     | 2472     |
| Raw Conducted PSD (dBm/30kHz)          | -2.34    | -1.53    | -8.93    |
| Duty Cycle Correction (dB)             | N/A SA-1 | N/A SA-1 | N/A SA-1 |
| 15.247 Conducted PSD Limit (dBm/3kHz)  | 8.00     | 8.00     | 8.00     |
| RSS-247 Conducted PSD Limit (dBm/3kHz) | 8.00     | 8.00     | 8.00     |
| Conducted PSD Result (dBm/30kHz)       | -2.34    | -1.53    | -8.93    |

Table 13

### 802.11b / 1 Mbps / MIMO CDD / Cores 0+1

| Channel                                | Bottom   | Middle   | Top      |
|----------------------------------------|----------|----------|----------|
| Frequency (MHz)                        | 2412     | 2437     | 2472     |
| Conducted PSD Core 0 (dBm/30kHz)       | -3.34    | -1.82    | -9.51    |
| Conducted PSD Core 1 (dBm/30kHz)       | -3.58    | -1.43    | -9.42    |
| Duty Cycle Correction (dB)             | N/A SA-1 | N/A SA-1 | N/A SA-1 |
| 15.247 Conducted PSD Limit (dBm/3kHz)  | 8.00     | 8.00     | 8.00     |
| RSS-247 Conducted PSD Limit (dBm/3kHz) | 8.00     | 8.00     | 8.00     |
| Conducted PSD Result (dBm/30kHz)       | -0.45    | 1.39     | -6.45    |

Table 14

### 802.11g / 6 Mbps / SISO / Core 1

| Channel                                | Bottom   | Middle   | Top      |
|----------------------------------------|----------|----------|----------|
| Frequency (MHz)                        | 2412     | 2437     | 2472     |
| Raw Conducted PSD (dBm/30kHz)          | -10.42   | -4.18    | -22.99   |
| Duty Cycle Correction (dB)             | N/A SA-1 | N/A SA-1 | N/A SA-1 |
| 15.247 Conducted PSD Limit (dBm/3kHz)  | 8.00     | 8.00     | 8.00     |
| RSS-247 Conducted PSD Limit (dBm/3kHz) | 8.00     | 8.00     | 8.00     |
| Conducted PSD Result (dBm/30kHz)       | -10.42   | -4.18    | -22.99   |

Table 15

### 802.11n / HT20 MCS0 / SISO / Core 1

| Channel                                | Bottom   | Middle   | Top      |
|----------------------------------------|----------|----------|----------|
| Frequency (MHz)                        | 2412     | 2437     | 2472     |
| Raw Conducted PSD (dBm/30kHz)          | -10.22   | -4.21    | -23.32   |
| Duty Cycle Correction (dB)             | N/A SA-1 | N/A SA-1 | N/A SA-1 |
| 15.247 Conducted PSD Limit (dBm/3kHz)  | 8.00     | 8.00     | 8.00     |
| RSS-247 Conducted PSD Limit (dBm/3kHz) | 8.00     | 8.00     | 8.00     |
| Conducted PSD Result (dBm/30kHz)       | -10.22   | -4.21    | -23.32   |

Table 16



**802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1**

| Channel                                | Bottom   | Middle   | Top      |
|----------------------------------------|----------|----------|----------|
| Frequency (MHz)                        | 2412     | 2437     | 2472     |
| Conducted PSD Core 0 (dBm/30kHz)       | -9.78    | -4.73    | -26.69   |
| Conducted PSD Core 1 (dBm/30kHz)       | -10.64   | -4.62    | -26.92   |
| Duty Cycle Correction (dB)             | N/A SA-1 | N/A SA-1 | N/A SA-1 |
| 15.247 Conducted PSD Limit (dBm/3kHz)  | 8.00     | 8.00     | 8.00     |
| RSS-247 Conducted PSD Limit (dBm/3kHz) | 8.00     | 8.00     | 8.00     |
| Conducted PSD Result (dBm/30kHz)       | -7.18    | -1.67    | -23.79   |

**Table 17**

**802.11n / HT20 MCS0 / MIMO TxBF / Cores 0+1**

| Channel                                | Bottom   | Middle   | Top      |
|----------------------------------------|----------|----------|----------|
| Frequency (MHz)                        | 2412     | 2437     | 2472     |
| Conducted PSD Core 0 (dBm/30kHz)       | -4.73    | 1.12     | -21.68   |
| Conducted PSD Core 1 (dBm/30kHz)       | -5.49    | 2.46     | -20.55   |
| Duty Cycle Correction (dB)             | N/A SA-3 | N/A SA-3 | N/A SA-3 |
| 15.247 Conducted PSD Limit (dBm/3kHz)  | 8.00     | 8.00     | 8.00     |
| RSS-247 Conducted PSD Limit (dBm/3kHz) | 8.00     | 8.00     | 8.00     |
| Conducted PSD Result (dBm/30kHz)       | -2.08    | 4.85     | -18.07   |

**Table 18**

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Industry Canada RSS-247, Limit Clause 5.2(b)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission



## 2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 3.

| Instrument                     | Manufacturer           | Type No      | TE No | Calibration Period (months) | Calibration Due |
|--------------------------------|------------------------|--------------|-------|-----------------------------|-----------------|
| 20dB/2W Attenuator             | Narda                  | 4772-20      | 462   | -                           | O/P Mon         |
| Hygrometer                     | Rotronic               | I-1000       | 2891  | 12                          | 18-Sept-2019    |
| Calibration Unit               | Rohde & Schwarz        | ZV-Z54       | 4368  | 12                          | 06-Mar-2019     |
| Directional Coupler            | Hewlett Packard        | 11692D       | 451   | -                           | O/P Mon         |
| Attenuator (20dB, 2W)          | Pasternack             | PE7004-20    | 2943  | 12                          | 18-Jul-2019     |
| Attenuator (20dB, 150W)        | Narda                  | 769-20       | 3367  | 12                          | 17-Jul-2019     |
| Attenuator (10dB, 150W)        | Narda                  | 769-10       | 3368  | 12                          | 17-Jul-2019     |
| Network Analyser               | Rohde & Schwarz        | ZVA 40       | 3548  | 12                          | 09-Oct-2018     |
| DC - 12.4 GHz 10 dB Attenuator | Suhner                 | 6810.17.A    | 3965  | 12                          | 18-Jul-2019     |
| PXA Signal Analyser            | Keysight Technologies; | N9030A       | 4653  | 12                          | 05-Feb-2019     |
| Power splitter - 2 port        | Mini-Circuits          | ZN2PD-63-S+  | 4742  | 12                          | 29-Sep-2019     |
| Power splitter - 2 port        | Mini-Circuits          | ZN2PD-63-S+  | 4743  | 12                          | 29-Sep-2019     |
| Power splitter - 4 port        | Mini-Circuits          | ZN4PD1-63-S+ | 4744  | 12                          | 29-Sep-2019     |
| EMI Receiver                   | Keysight Technologies; | N9038A MXE   | 4628  | 12                          | 4-July-2019     |

**Table 19**

All test equipment was in calibration at the time of use.  
O/P Mon – Output Monitored using calibrated equipment



Product Service

## **2.3 Emission Bandwidth**

### **2.3.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (a)(2)  
Industry Canada RSS-247, 5.2  
Industry Canada RSS-GEN, 6.6

### **2.3.2 Equipment Under Test and Modification State**

A1932, S/N: C02X5003L3J3 - Modification State 0  
A1932, S/N: C02X5003JL8Y - Modification State 0

### **2.3.3 Date of Test**

15-October-2018 to 17-October-2018

### **2.3.4 Test Method**

This test was performed in accordance with ANSI C63.10, 11.8.1 and RSS-Gen, clause 6.7

### **2.3.5 Environmental Conditions**

|                     |            |
|---------------------|------------|
| Ambient Temperature | 21 to 24°C |
| Relative Humidity   | 36 to 68%  |



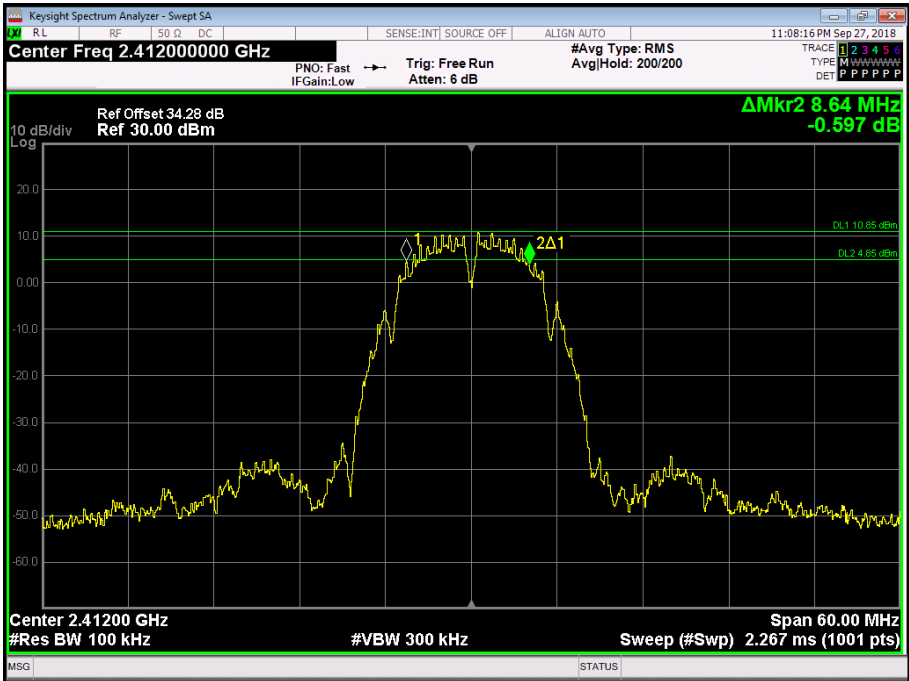
Product Service

2.3.6 Test Results

802.11b / 1 Mbps / SISO / Core 1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 8.640  | 8.160  | 8.160  |
| 99% Bandwidth (MHz)  | 10.410 | 10.809 | 10.430 |

Table 20





Product Service

Figure 1 - 2412 MHz - 6 dB DTS Bandwidth

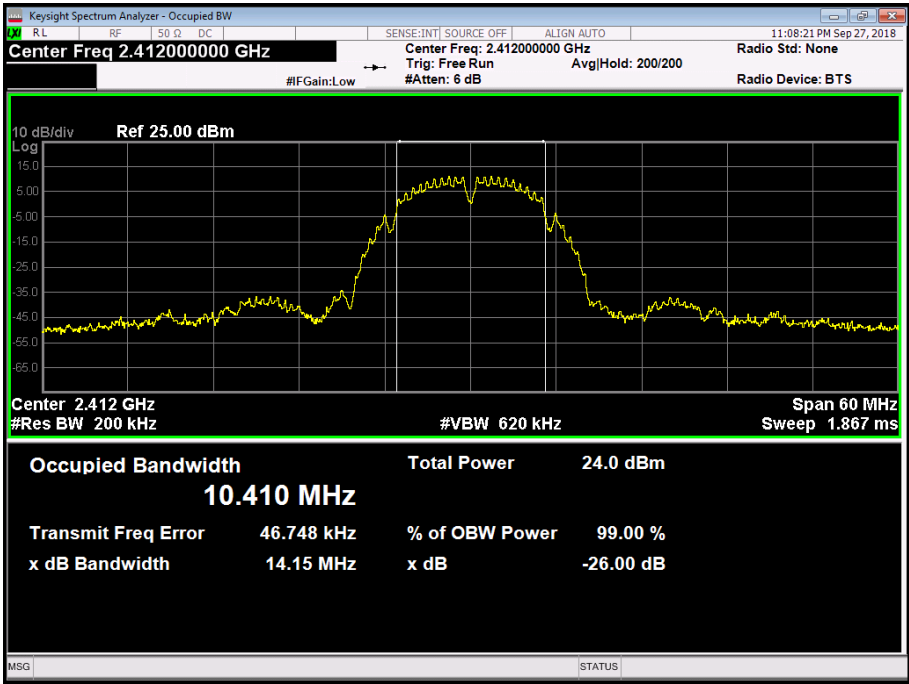


Figure 2 - 2412 MHz - 99% Occupied Bandwidth

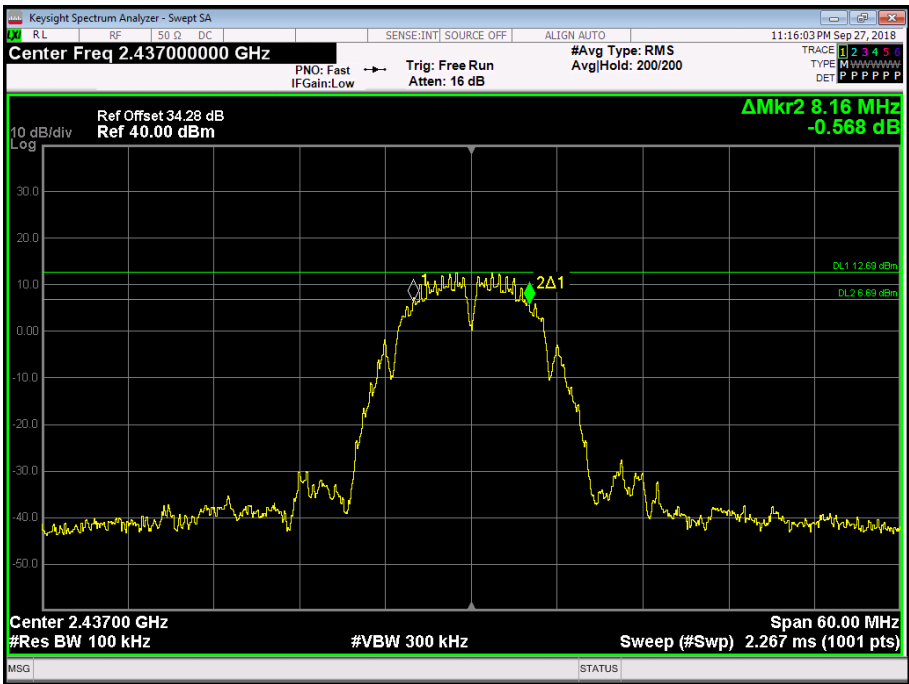


Figure 3 - 2437 MHz - 6 dB DTS Bandwidth



Product Service

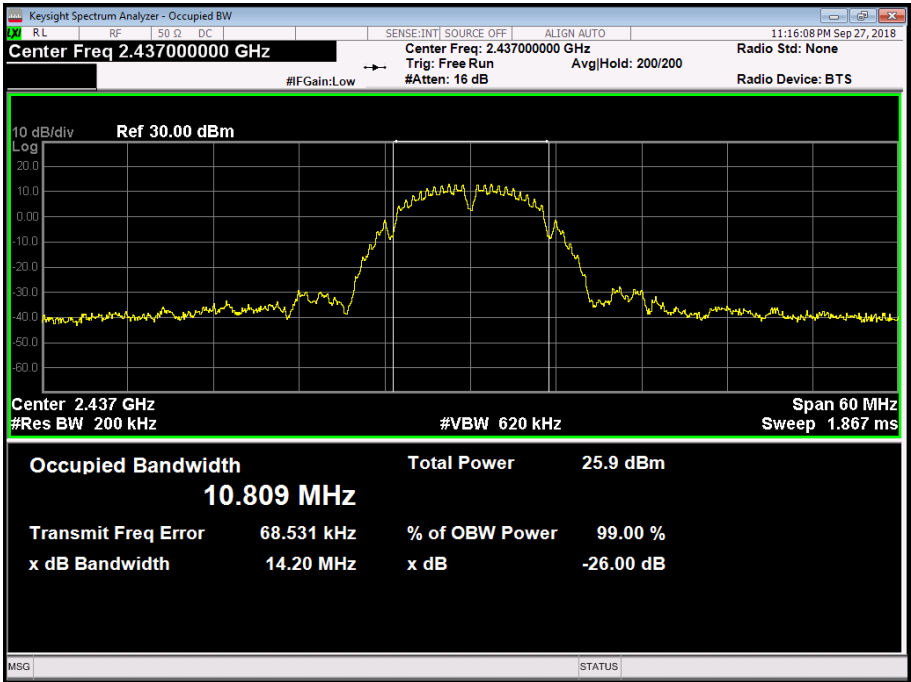


Figure 4 - 2437 MHz - 99% Occupied Bandwidth

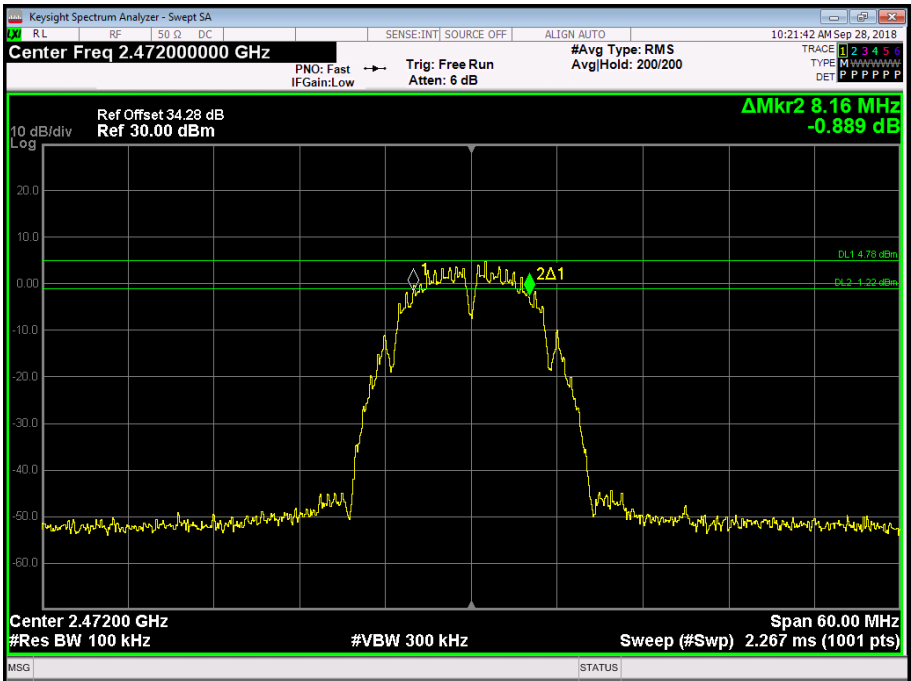


Figure 5 - 2472 MHz - 6 dB DTS Bandwidth

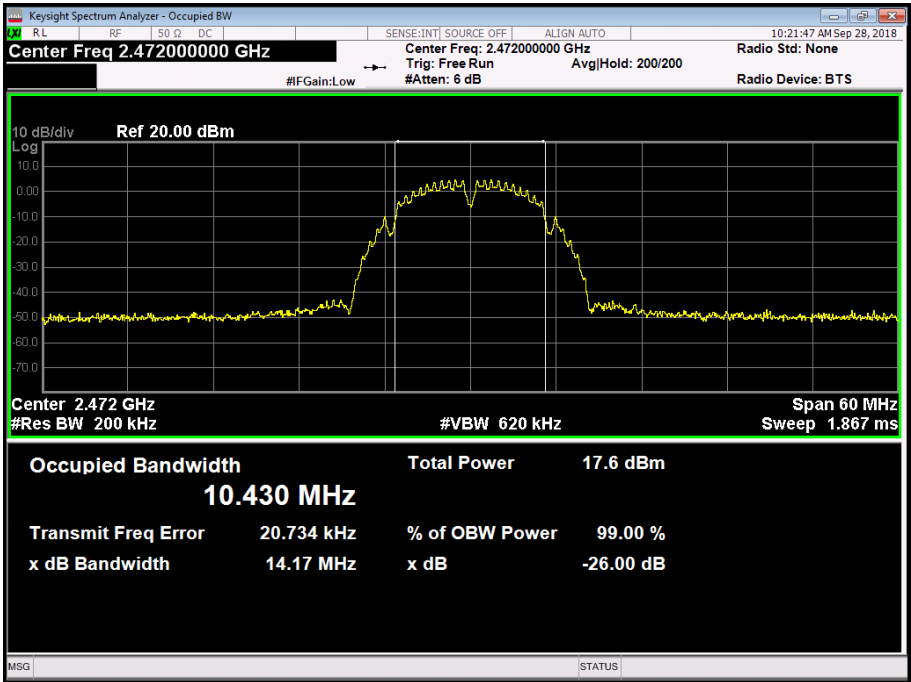


Figure 6 - 2472 MHz - 99% Occupied Bandwidth

802.11b / 1 Mbps / MIMO CDD / Cores 0+1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 8.160  | 7.680  | 8.160  |
| 99% Bandwidth (MHz)  | 10.455 | 10.633 | 10.435 |

Table 21

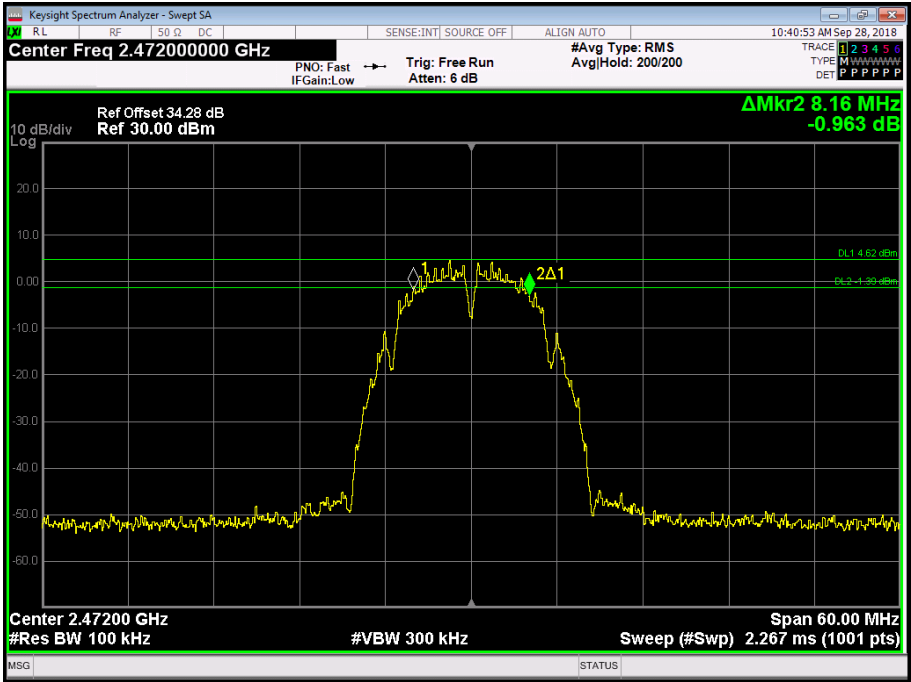


Figure 7 - 2412 MHz - 6 dB DTS Bandwidth



Product Service

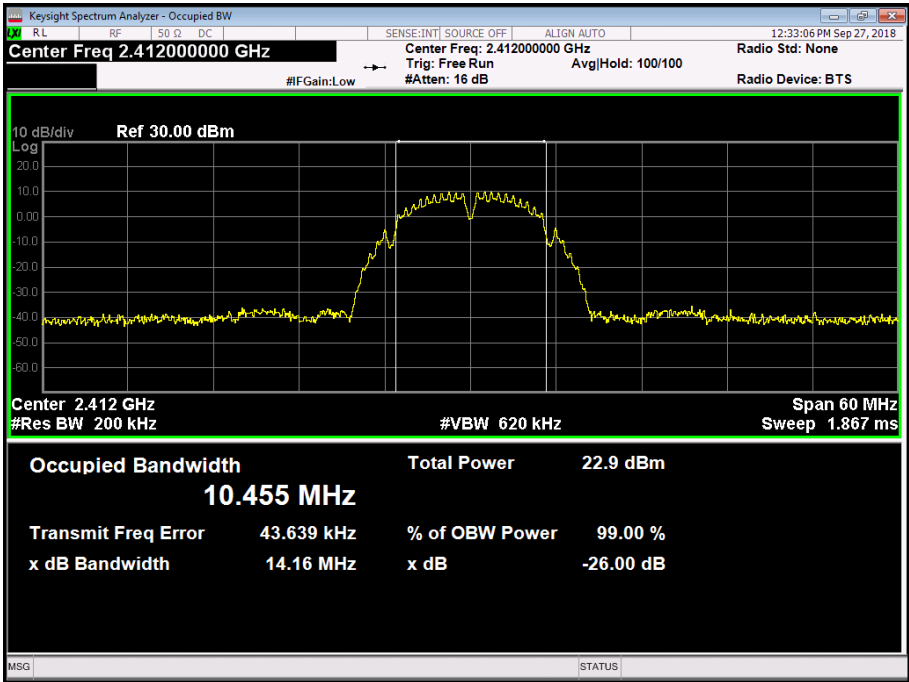


Figure 8 - 2412 MHz - 99% Occupied Bandwidth

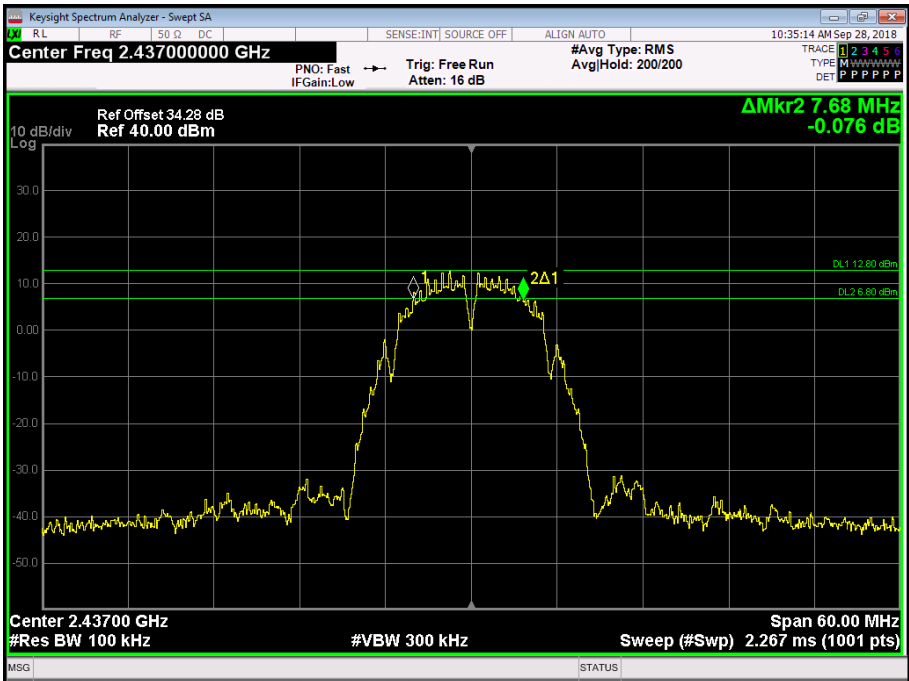


Figure 9 - 2437 MHz - 6 dB DTS Bandwidth



Product Service

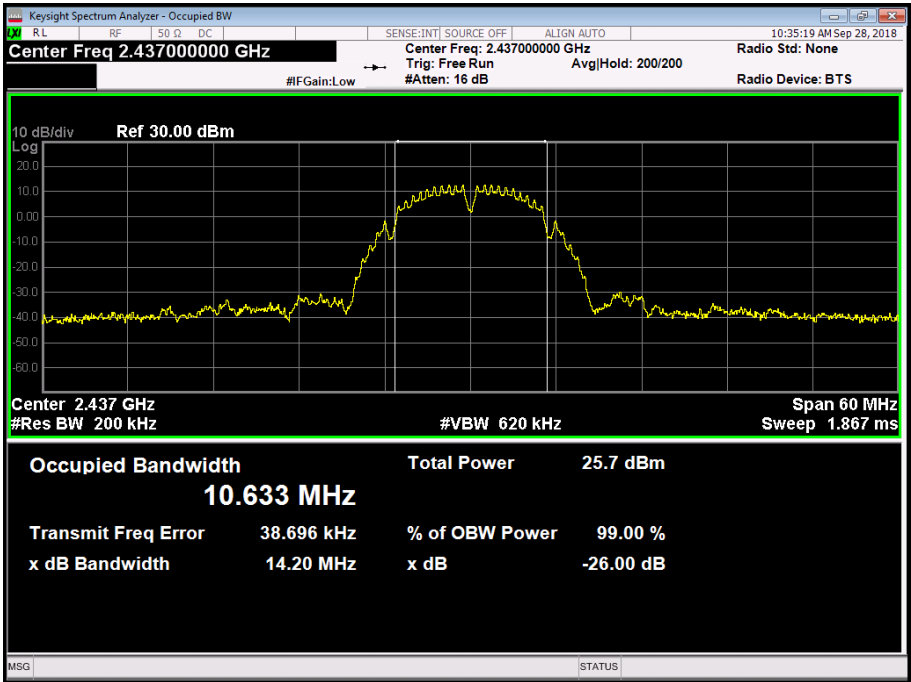


Figure 10 - 2437 MHz - 99% Occupied Bandwidth

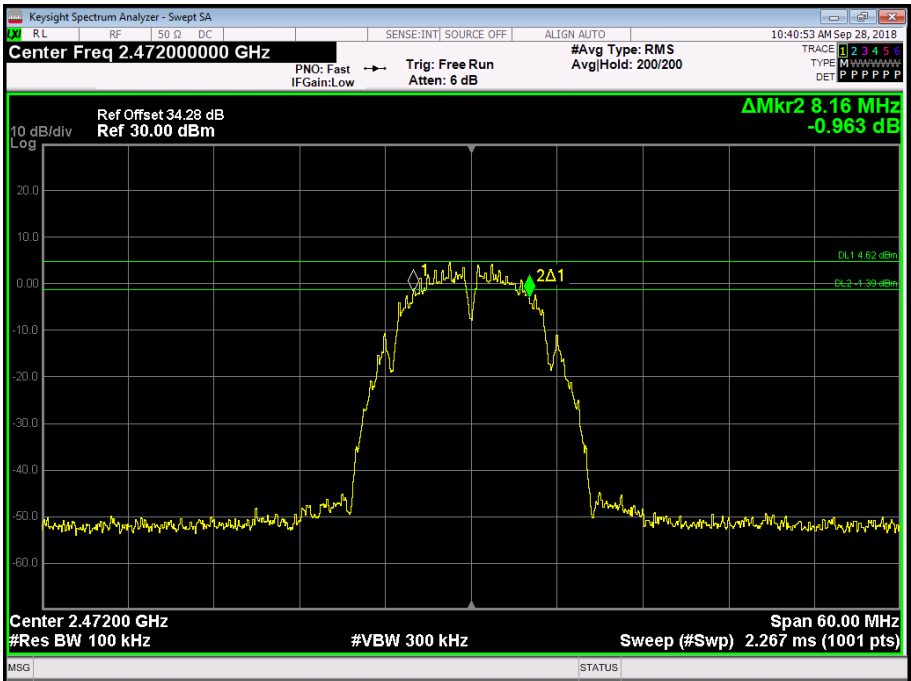


Figure 11 - 2472 MHz - 6 dB DTS Bandwidth



Product Service

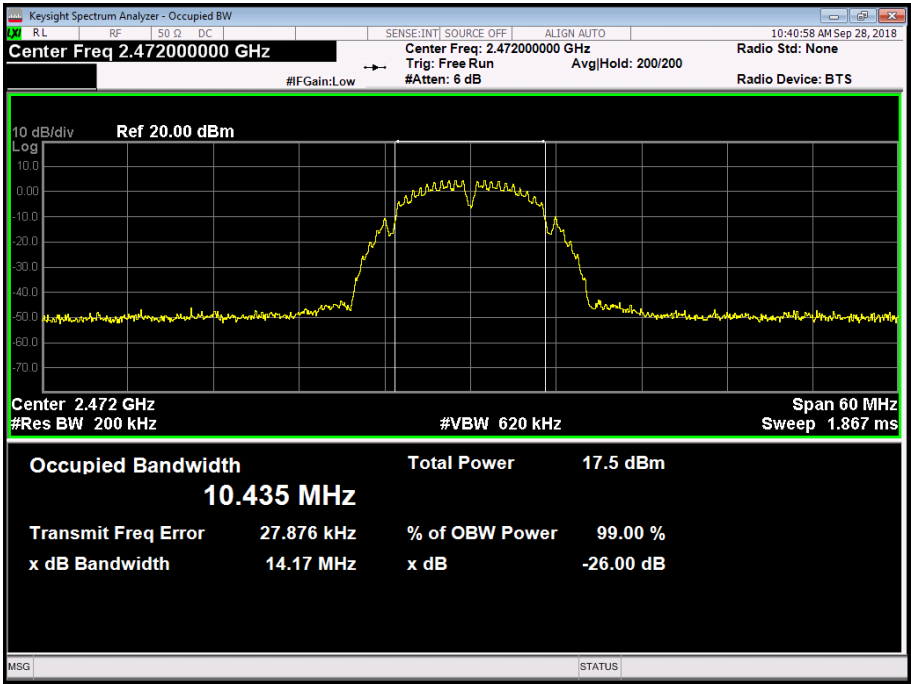


Figure 12 - 2472 MHz - 99% Occupied Bandwidth

802.11g / 6 Mbps / SISO / Core 1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 16.440 | 16.380 | 16.440 |
| 99% Bandwidth (MHz)  | 16.515 | 16.636 | 16.551 |

Table 22

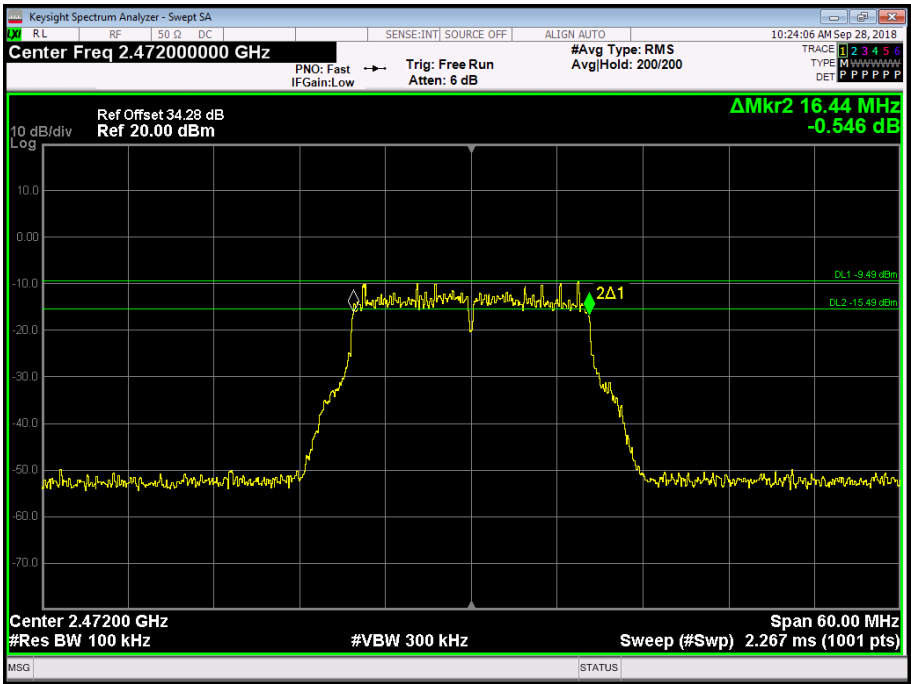


Figure 13 - 2412 MHz - 6 dB DTS Bandwidth



Product Service

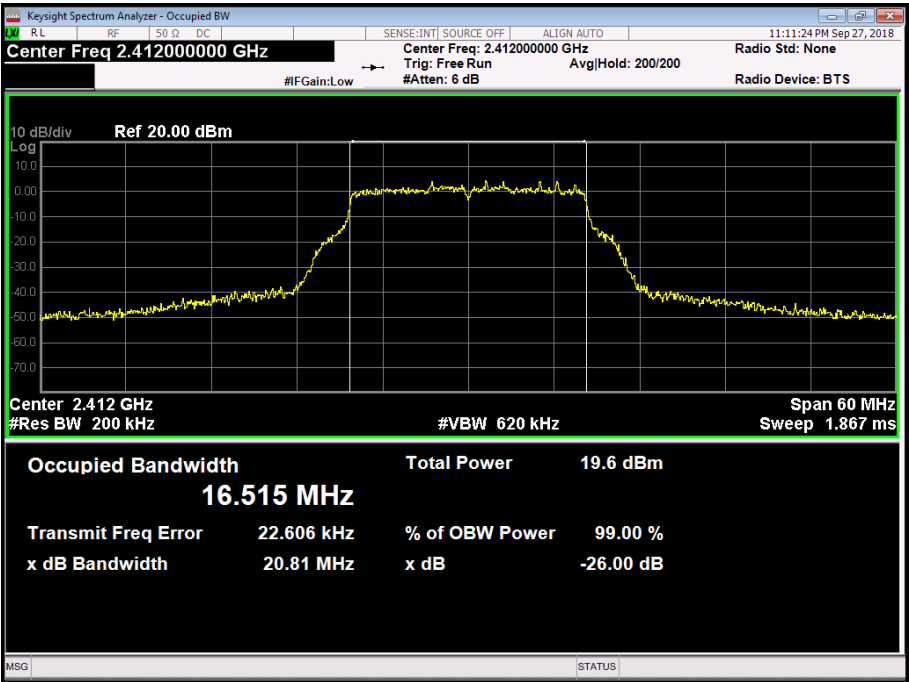


Figure 14 - 2412 MHz - 99% Occupied Bandwidth

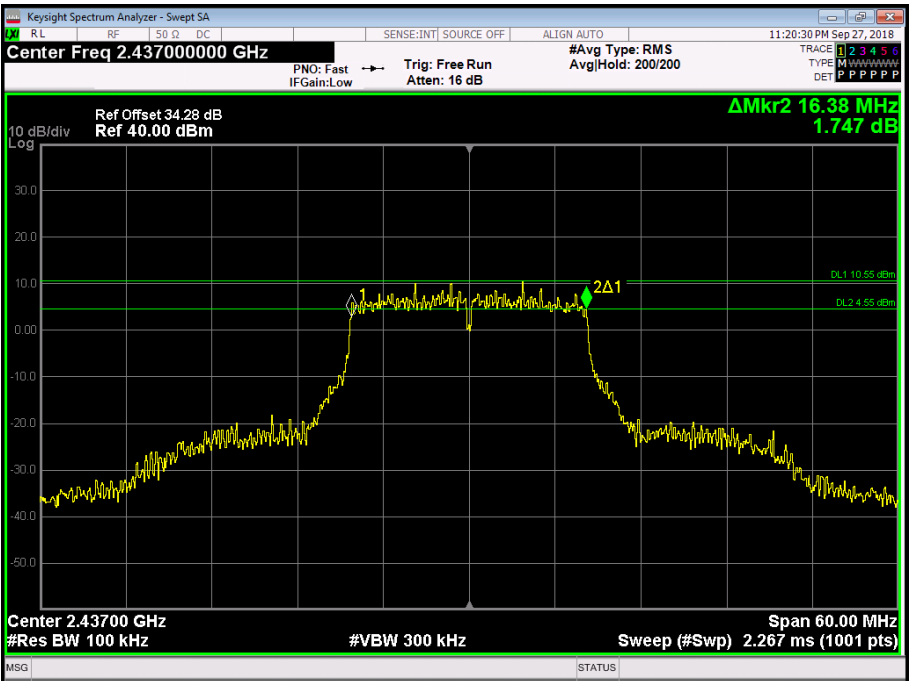


Figure 15 - 2437 MHz - 6 dB DTS Bandwidth



Product Service

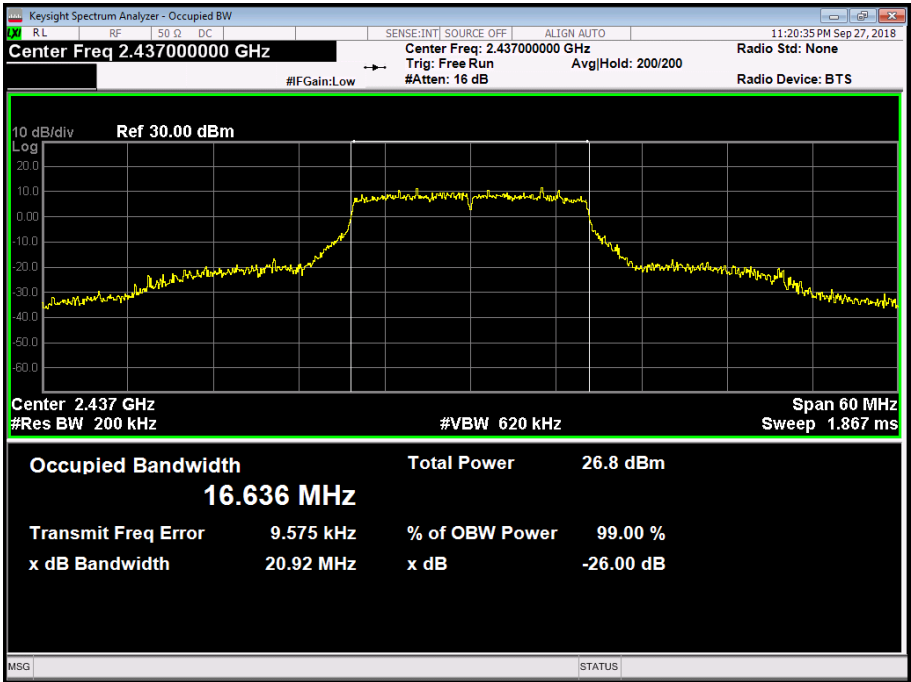


Figure 16 - 2437 MHz - 99% Occupied Bandwidth

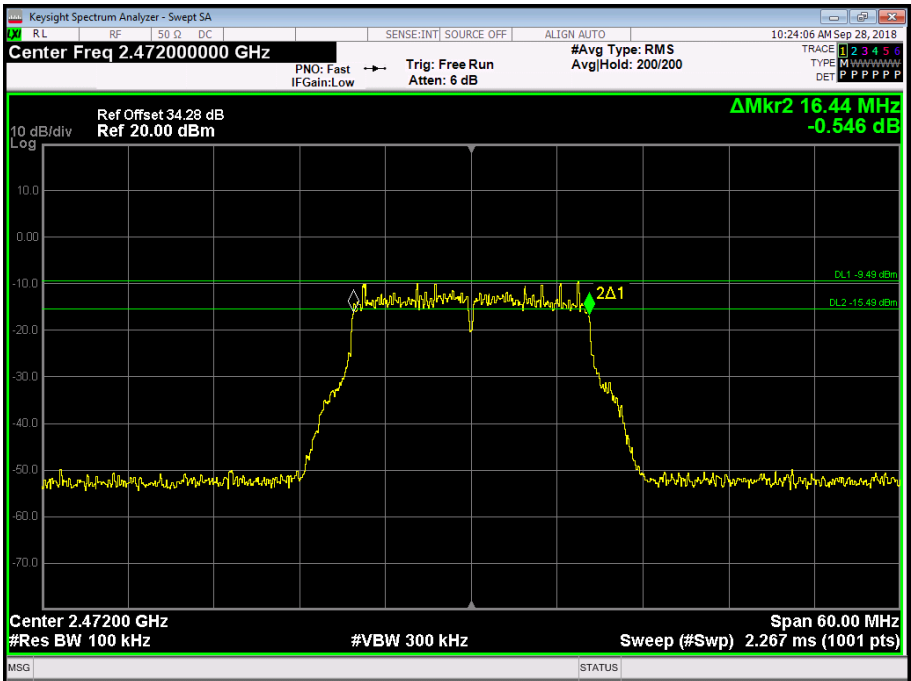


Figure 17 - 2472 MHz - 6 dB DTS Bandwidth

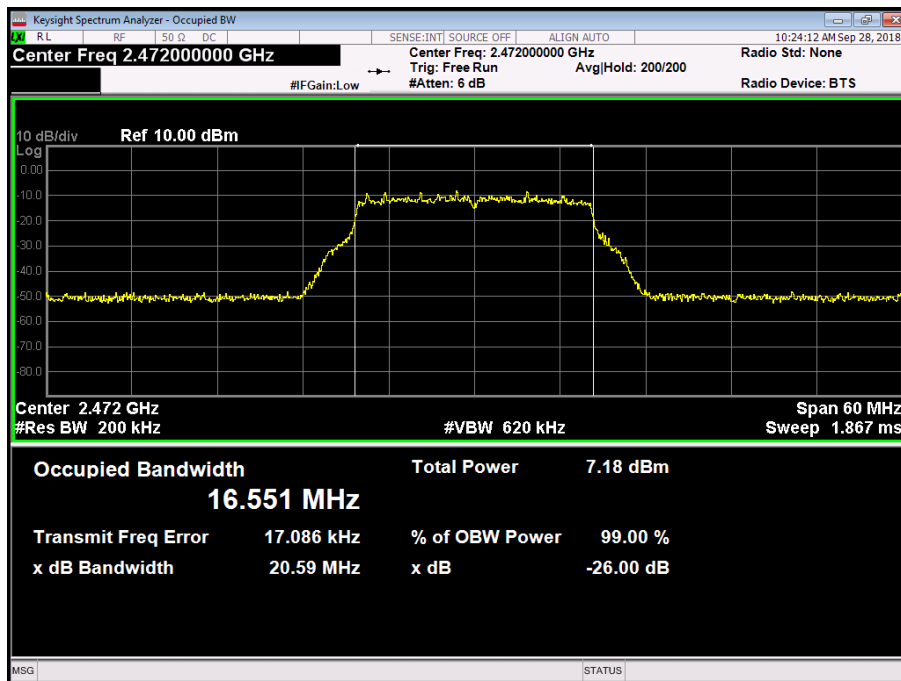


Figure 18 - 2472 MHz - 99% Occupied Bandwidth

802.11n / HT20 MCS0 / SISO / Core 1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 17.700 | 17.640 | 17.700 |
| 99% Bandwidth (MHz)  | 17.696 | 17.843 | 17.703 |

Table 23

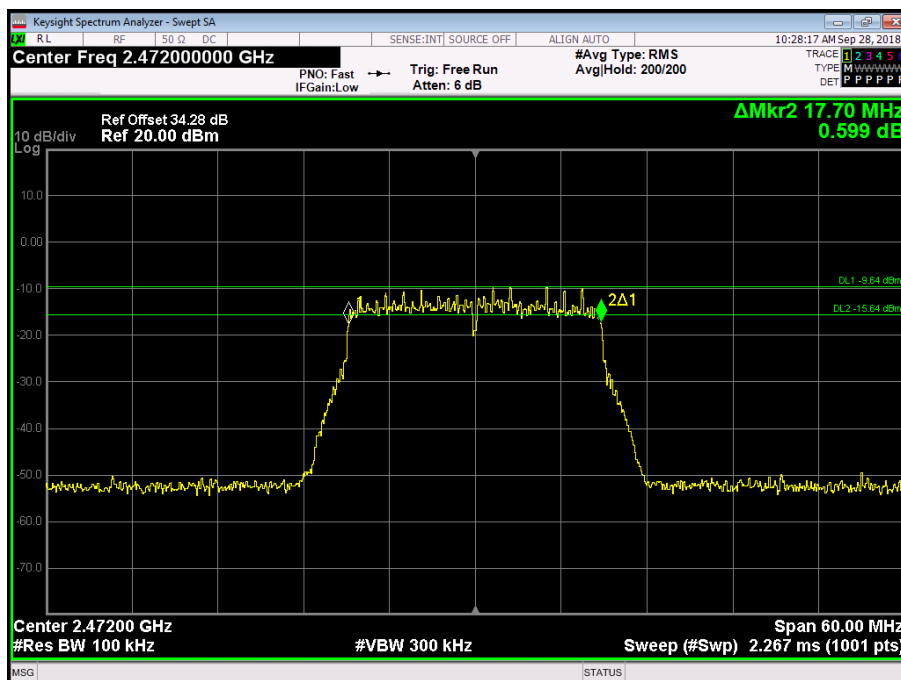


Figure 19 - 2412 MHz - 6 dB DTS Bandwidth



Product Service

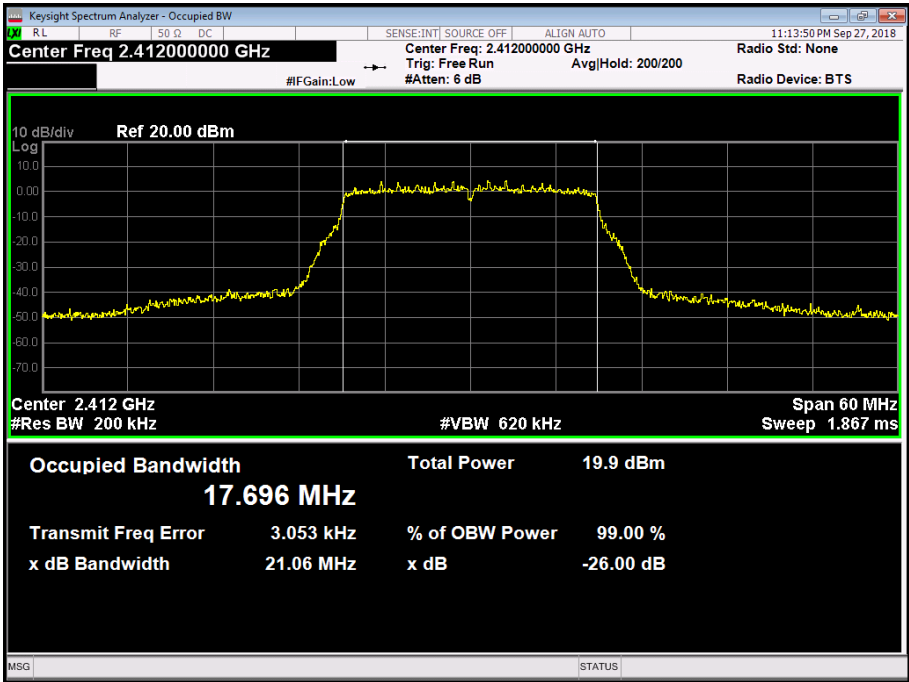


Figure 20 - 2412 MHz - 99% Occupied Bandwidth

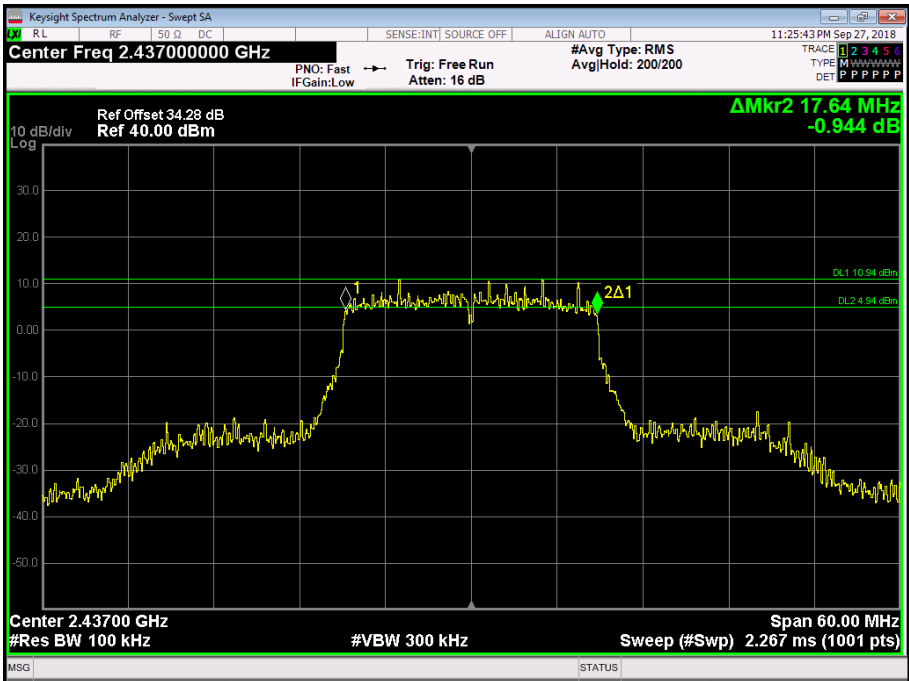


Figure 21 - 2437 MHz - 6 dB DTS Bandwidth



Product Service

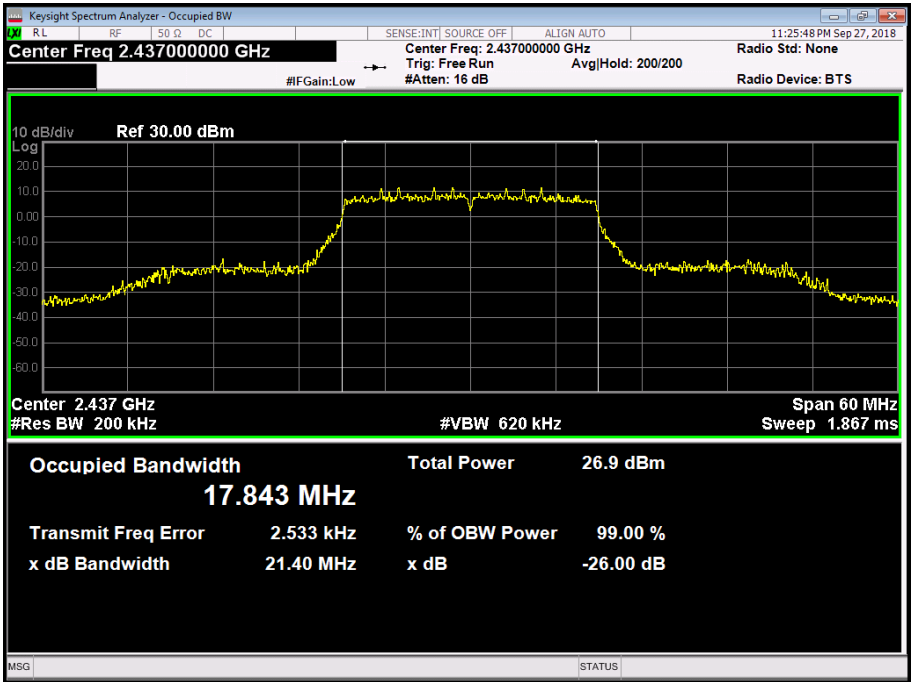


Figure 22 - 2437 MHz - 99% Occupied Bandwidth

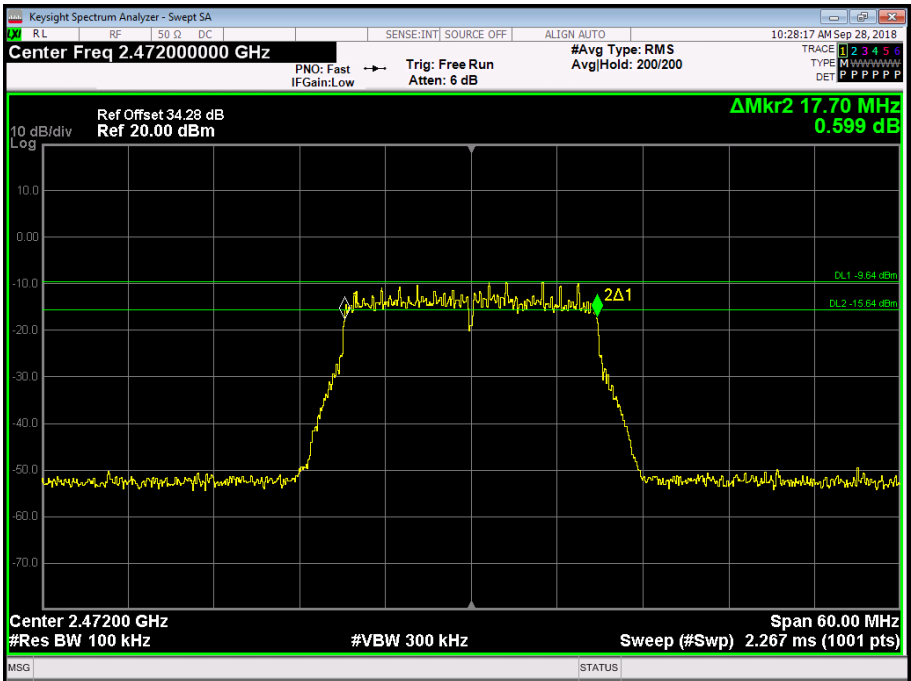


Figure 23 - 2472 MHz - 6 dB DTS Bandwidth

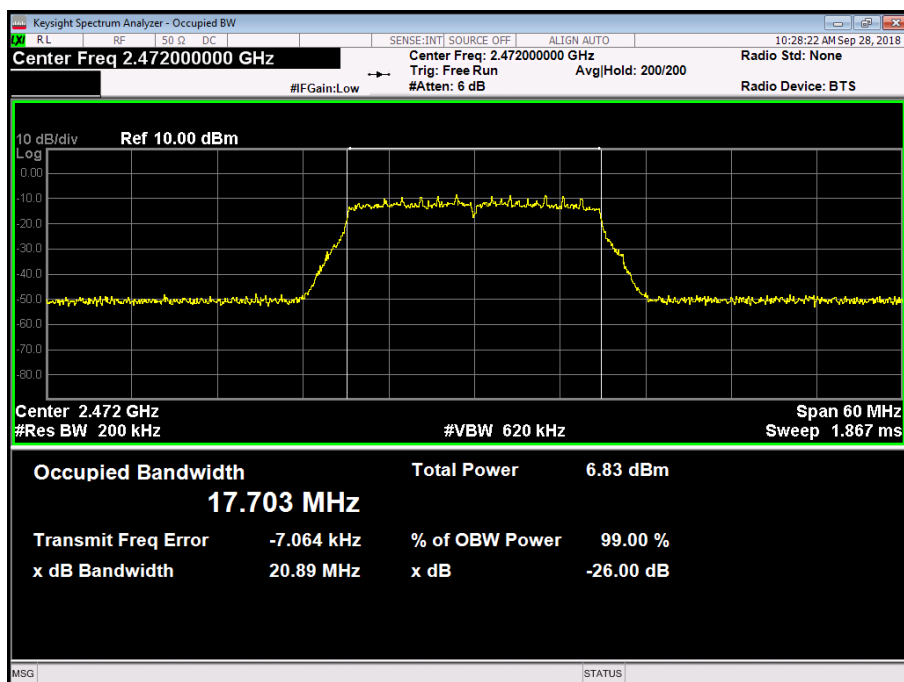


Figure 24 - 2472 MHz - 99% Occupied Bandwidth

802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 17.640 | 16.080 | 17.640 |
| 99% Bandwidth (MHz)  | 17.786 | 17.776 | 17.811 |

Table 24

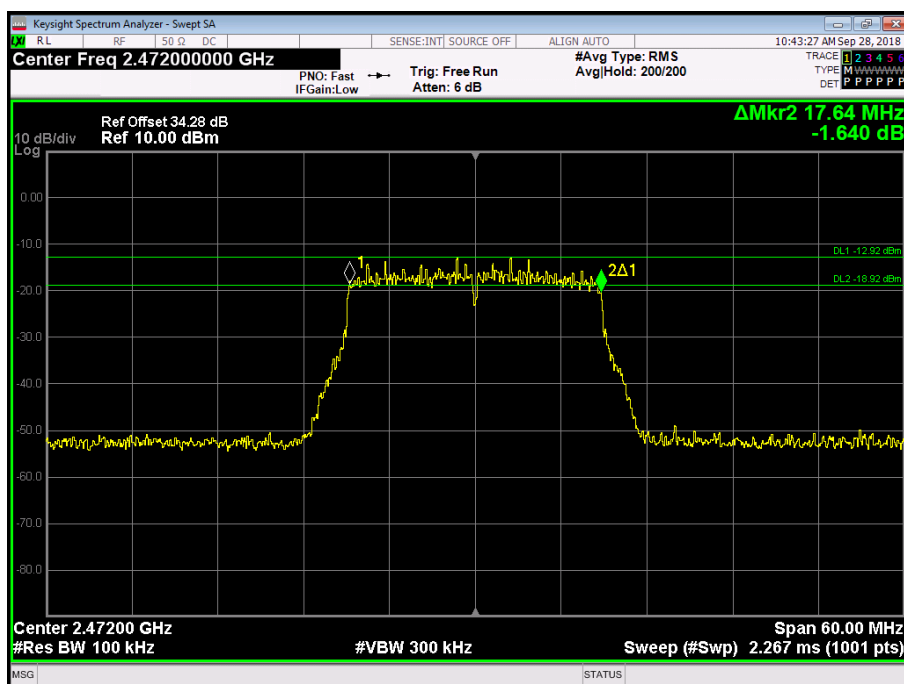


Figure 25 - 2412 MHz - 6 dB DTS Bandwidth



Product Service

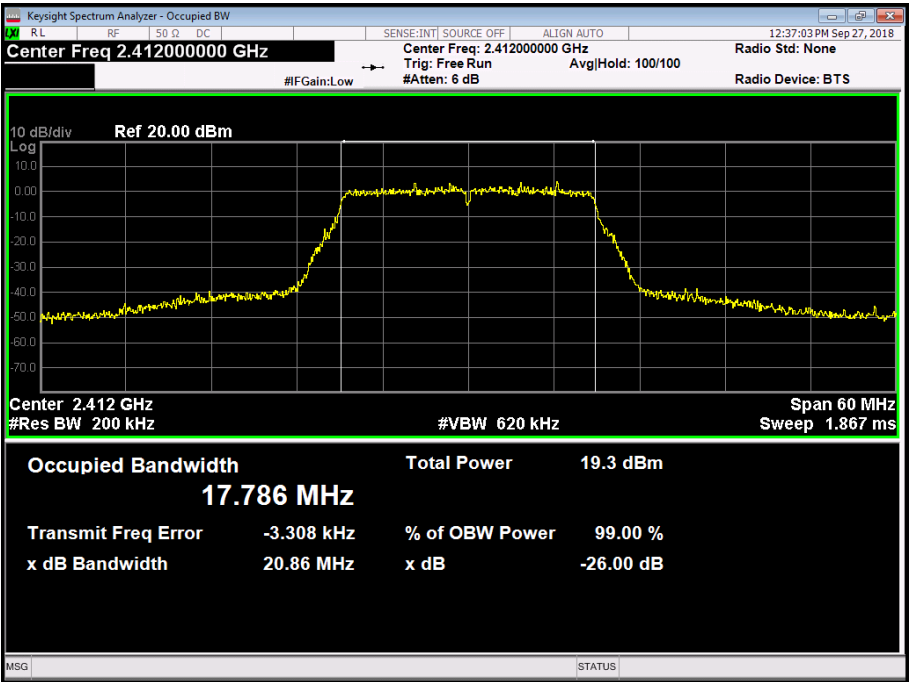


Figure 26 - 2412 MHz - 99% Occupied Bandwidth

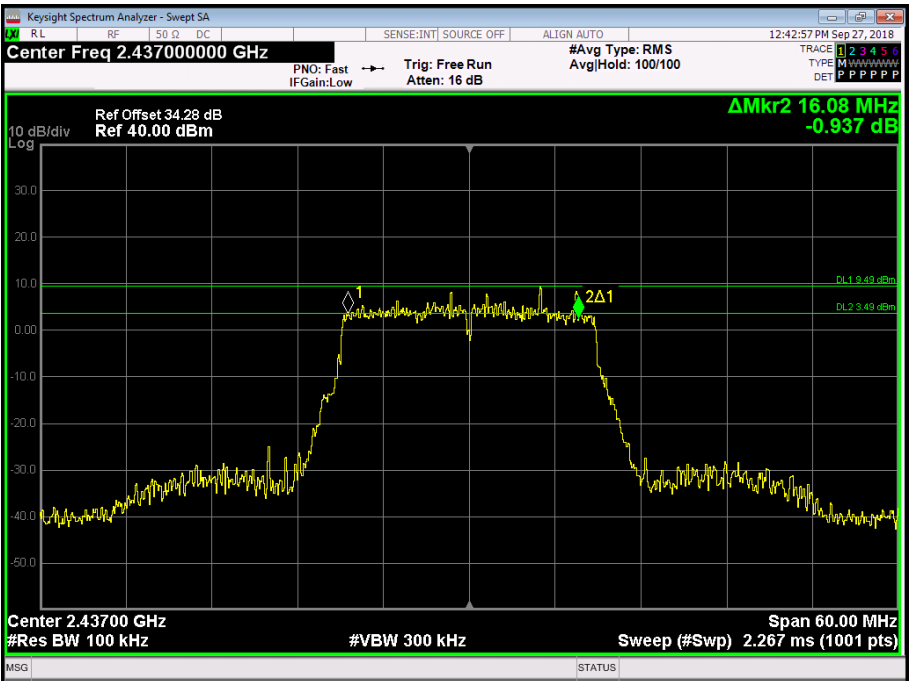


Figure 27 - 2437 MHz - 6 dB DTS Bandwidth



Product Service

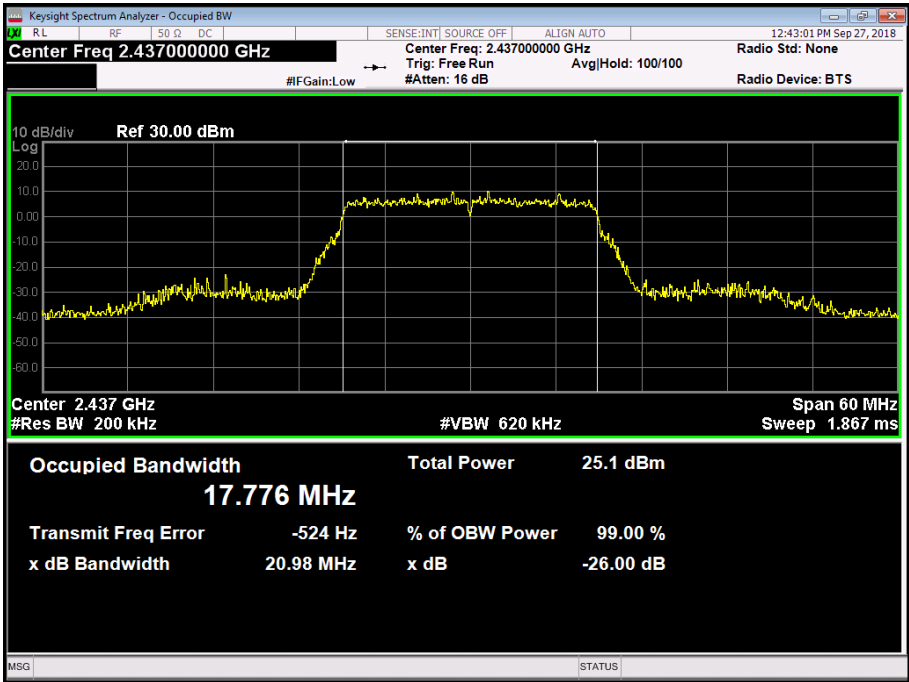


Figure 28 - 2437 MHz - 99% Occupied Bandwidth

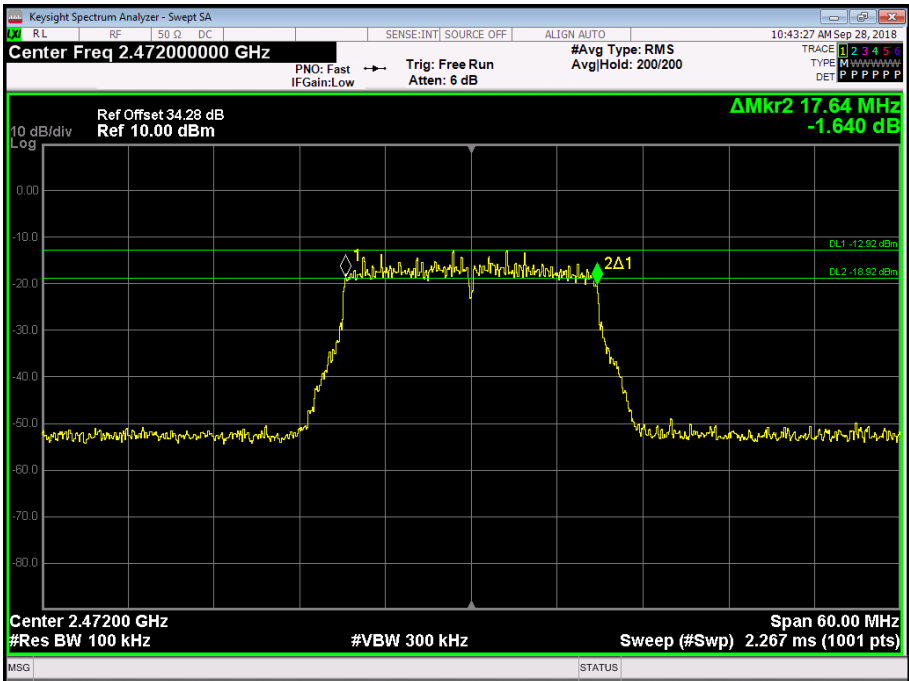


Figure 29 - 2472 MHz - 6 dB DTS Bandwidth



Product Service

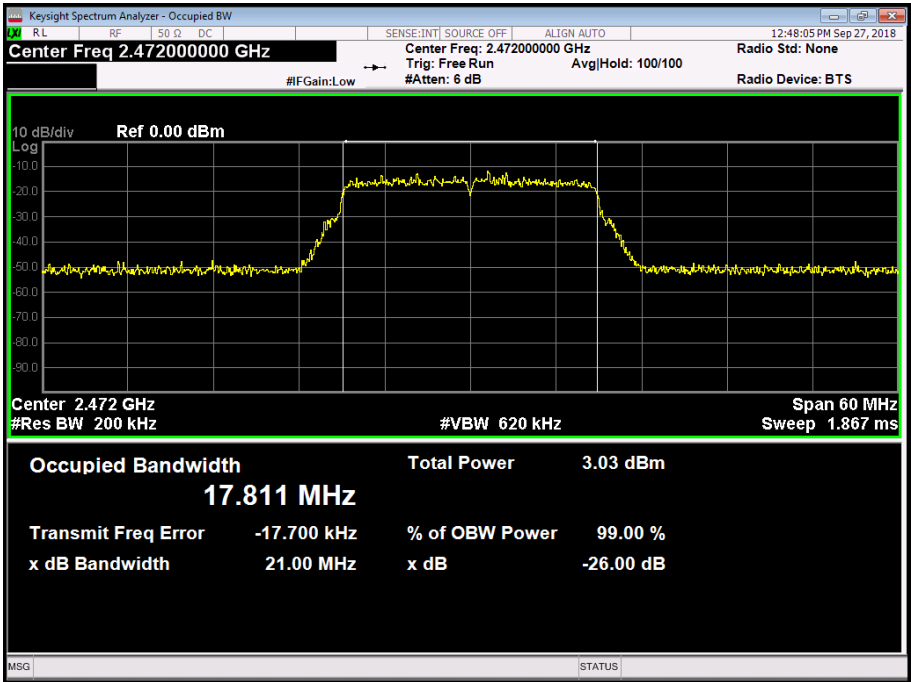


Figure 30 - 2472 MHz - 99% Occupied Bandwidth

802.11n / HT20 MCS0 / MIMO TxBF / Cores 0+1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 17.640 | 16.380 | 17.700 |
| 99% Bandwidth (MHz)  | 17.790 | 17.746 | 17.727 |

Table 25

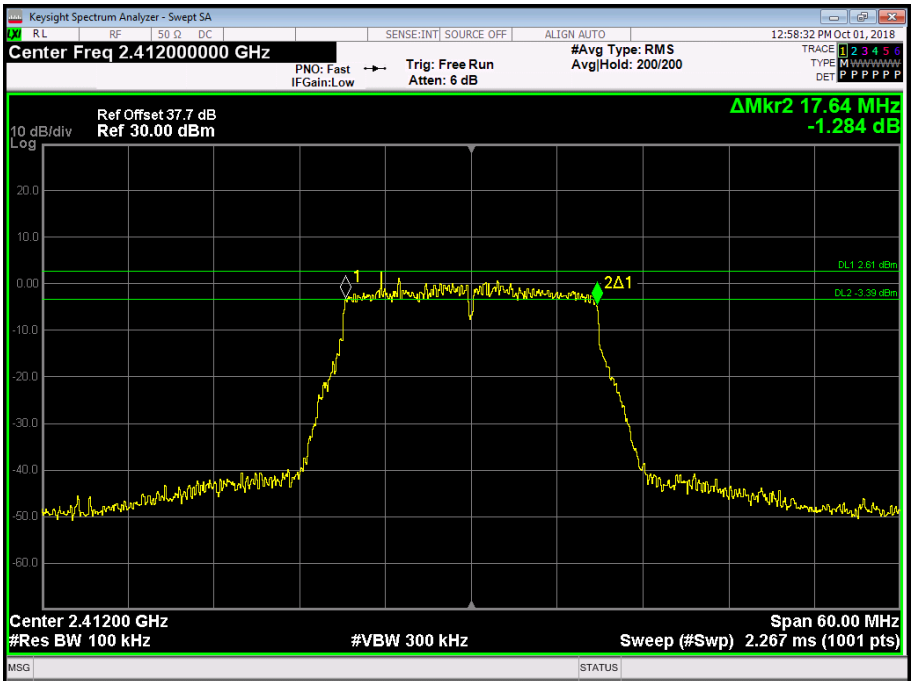


Figure 31 - 2412 MHz - 6 dB DTS Bandwidth



Product Service

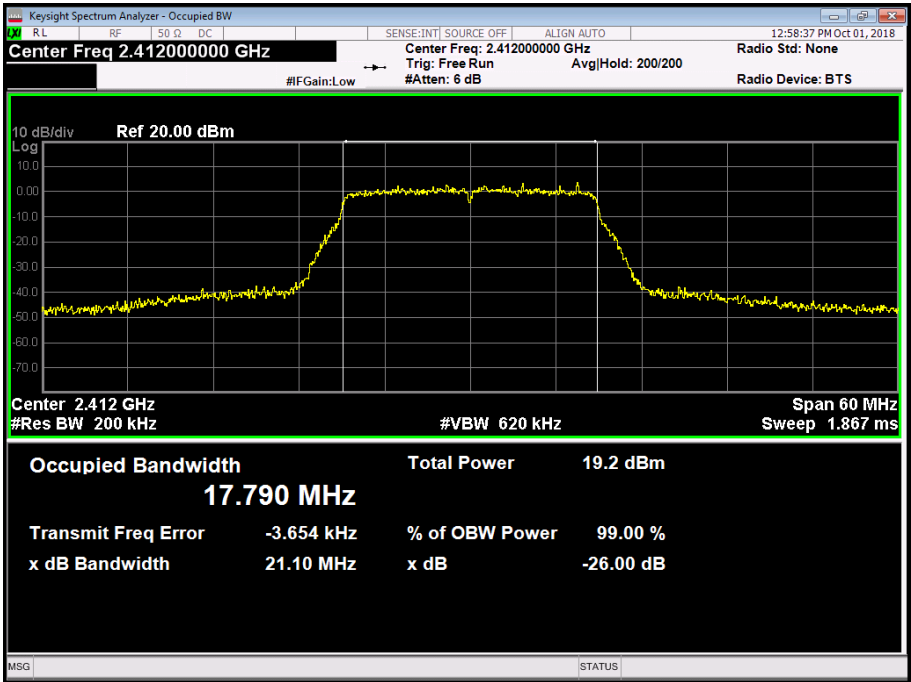


Figure 32 - 2412 MHz - 99% Occupied Bandwidth

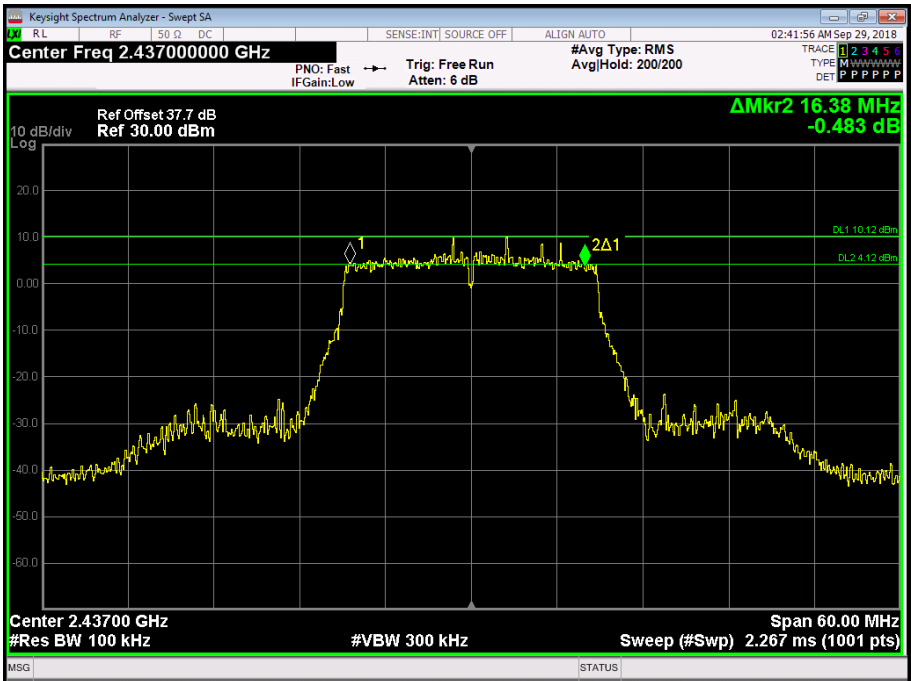


Figure 33 - 2437 MHz - 6 dB DTS Bandwidth



Product Service

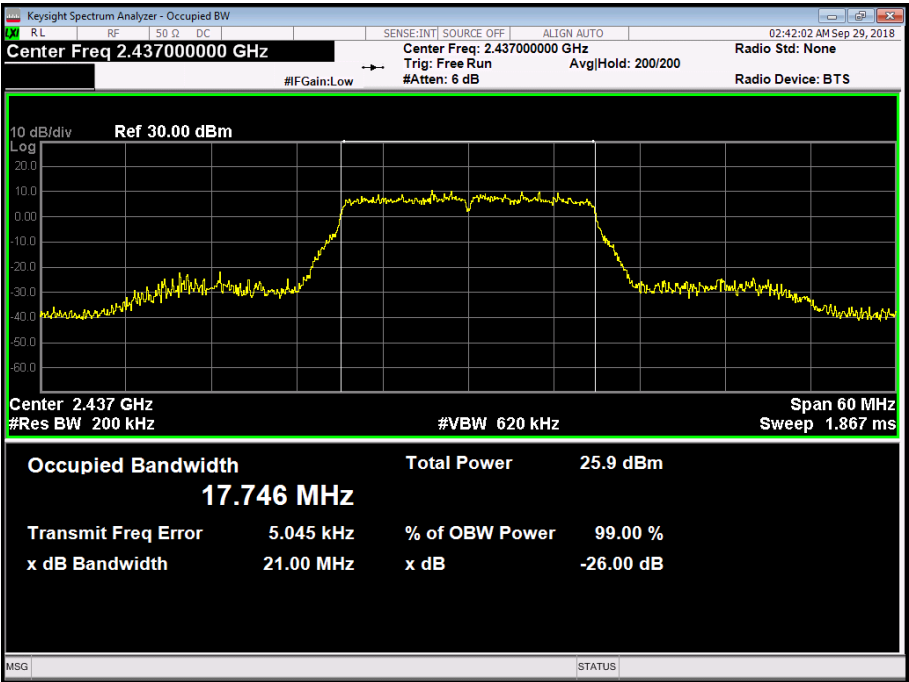


Figure 34 - 2437 MHz - 99% Occupied Bandwidth

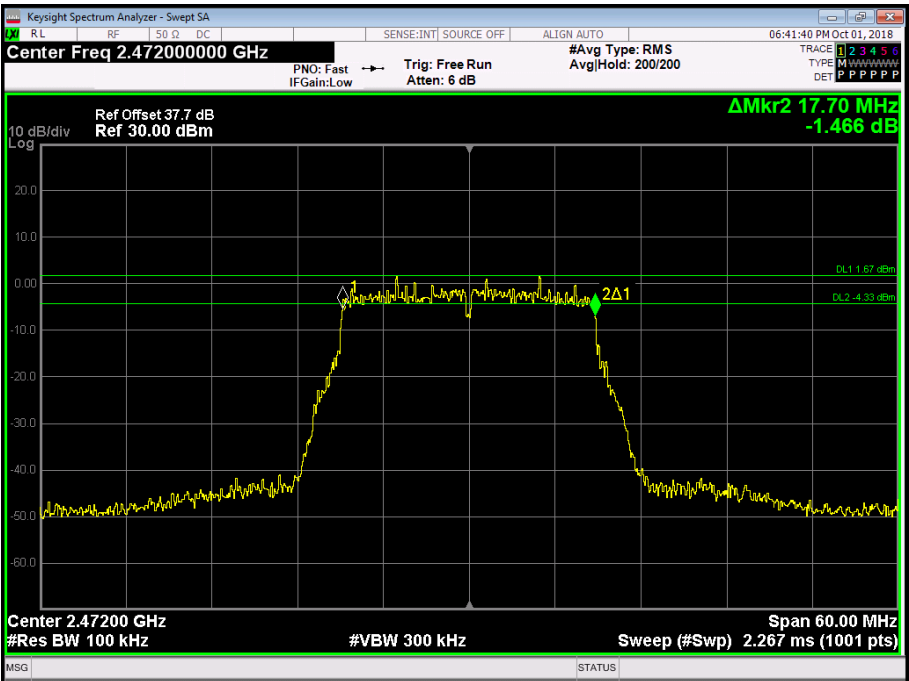


Figure 35 - 2472 MHz - 6 dB DTS Bandwidth



Product Service

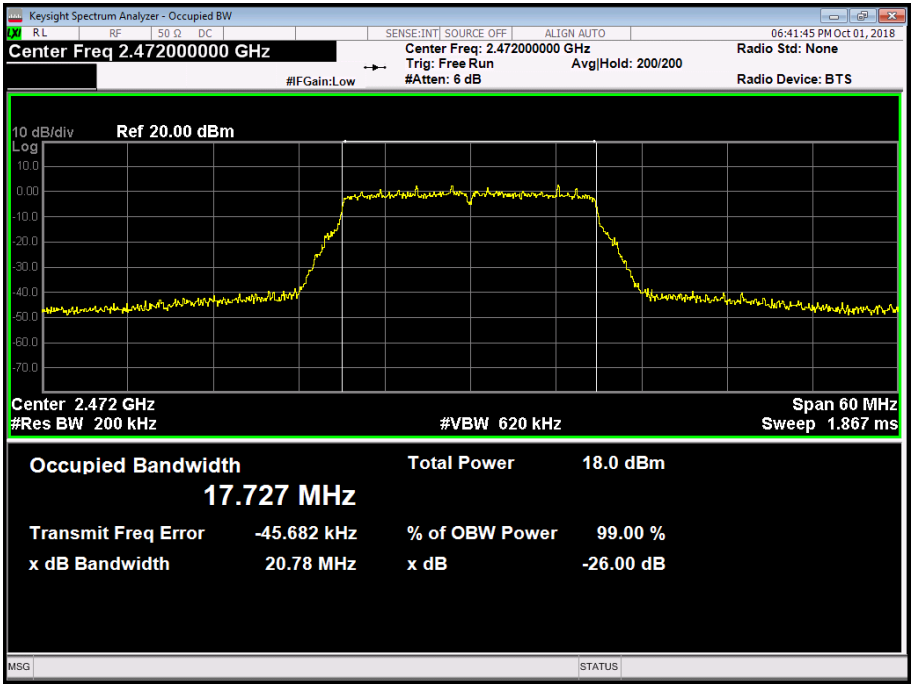


Figure 36 - 2472 MHz - 99% Occupied Bandwidth



### 802.11b / 1 Mbps / SISO / Core 1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 8.160  | 7.680  | 8.640  |
| 99% Bandwidth (MHz)  | 10.385 | 10.416 | 10.431 |

Table 26

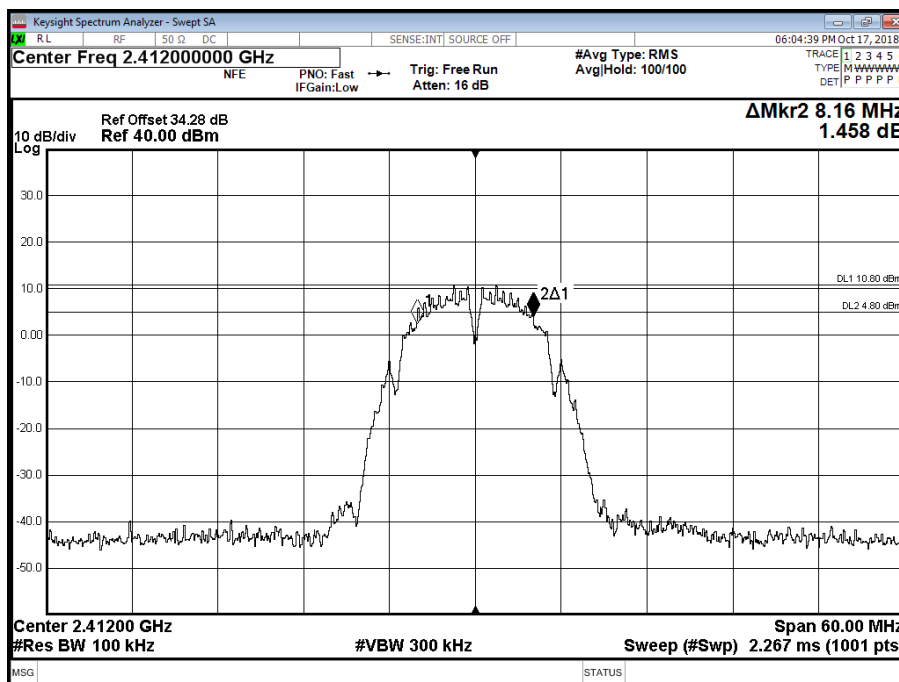


Figure 37 - 2412 MHz - 6 dB DTS Bandwidth

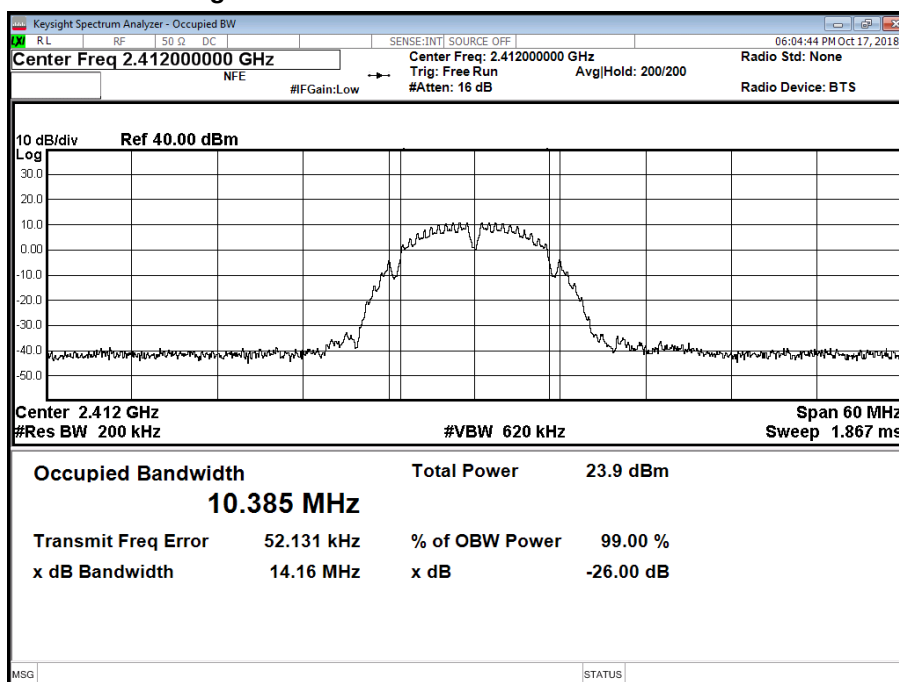


Figure 38 - 2412 MHz - 99% Occupied Bandwidth



Product Service

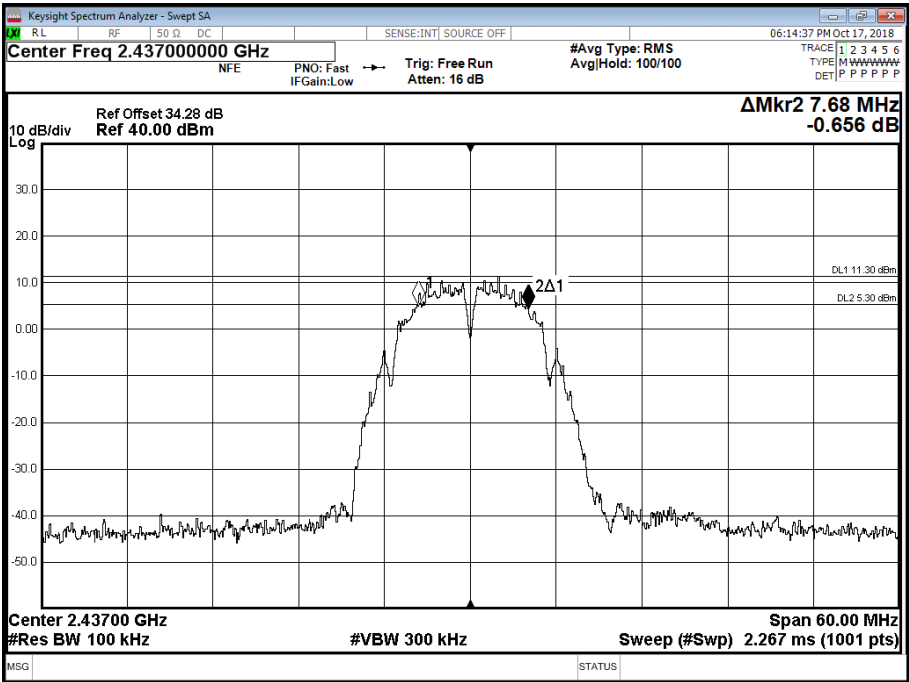


Figure 39 - 2437 MHz - 6 dB DTS Bandwidth

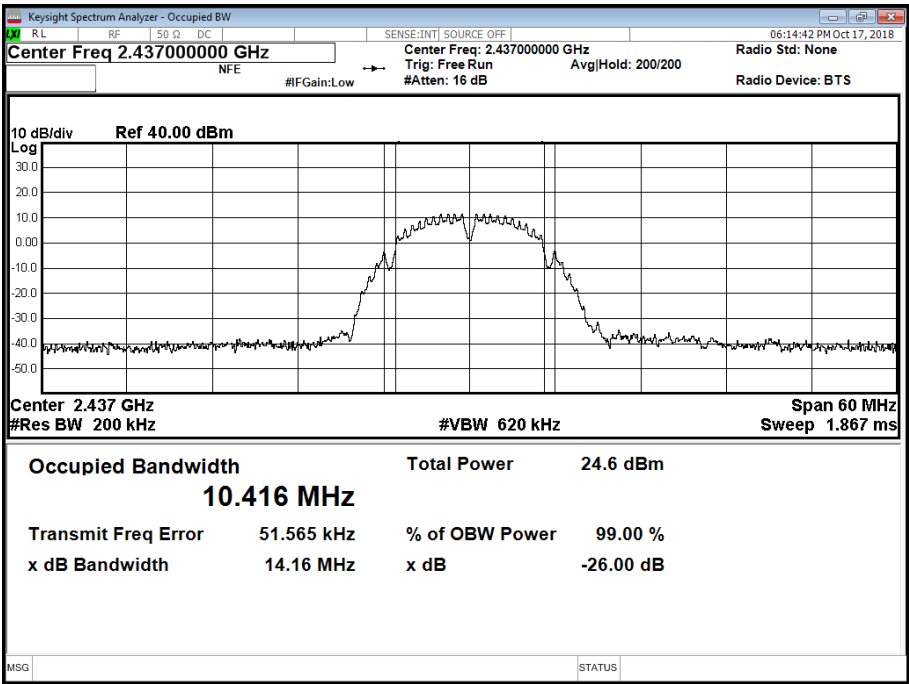


Figure 40 - 2437 MHz - 99% Occupied Bandwidth



Product Service

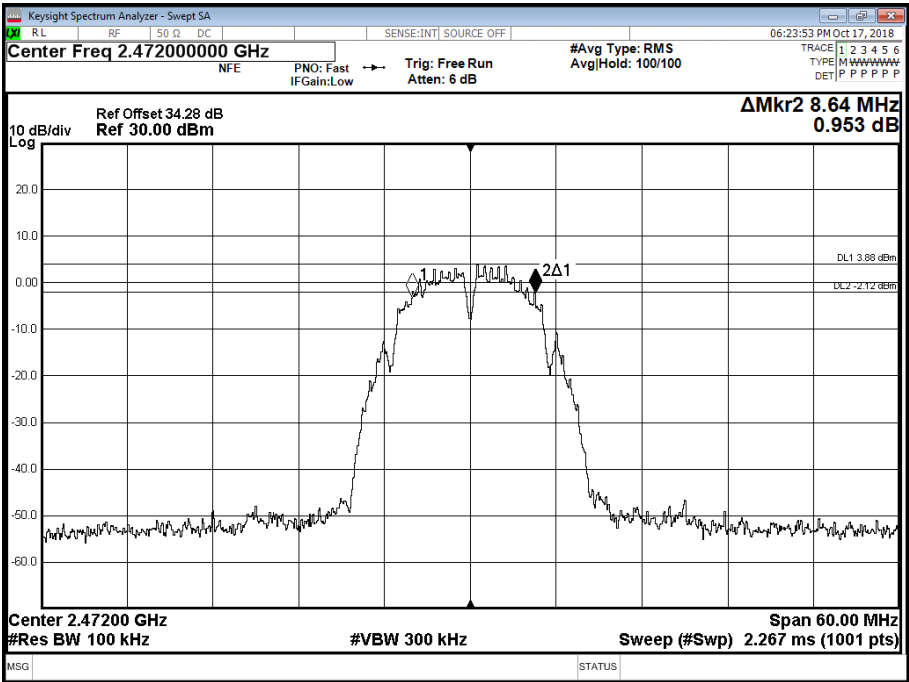


Figure 41 - 2472 MHz - 6 dB DTS Bandwidth

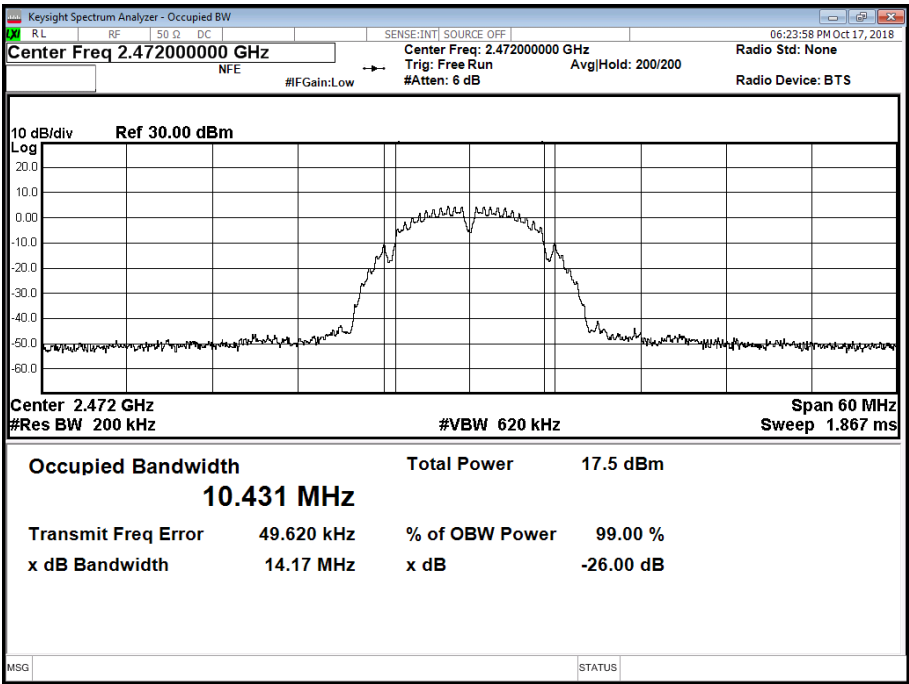


Figure 42 - 2472 MHz - 99% Occupied Bandwidth



802.11b / 1 Mbps / MIMO CDD / Cores 0+1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 8.160  | 7.740  | 7.680  |
| 99% Bandwidth (MHz)  | 10.368 | 10.444 | 10.417 |

Table 27

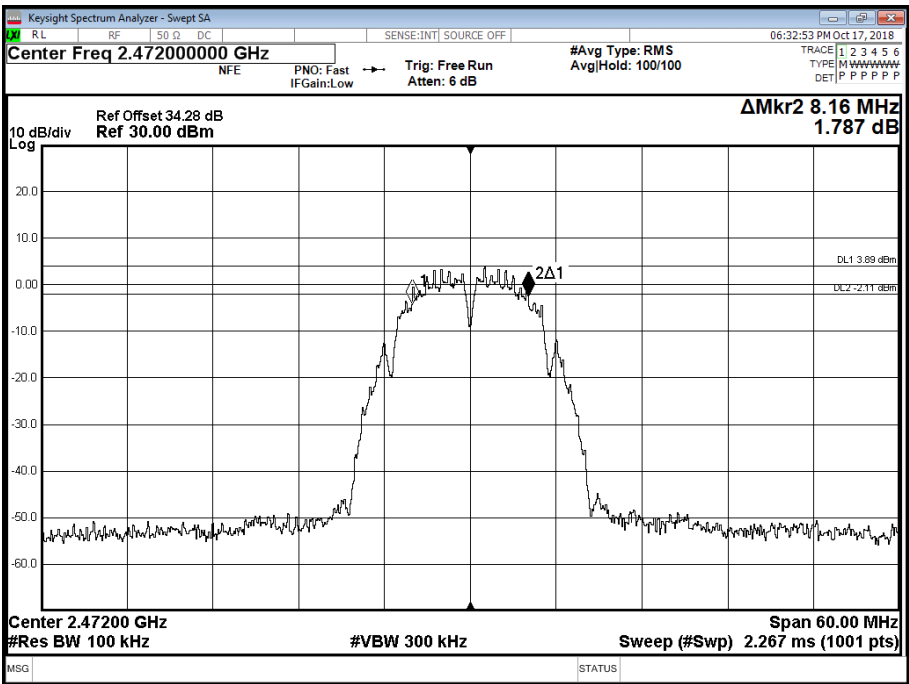


Figure 43 - 2412 MHz - 6 dB DTS Bandwidth

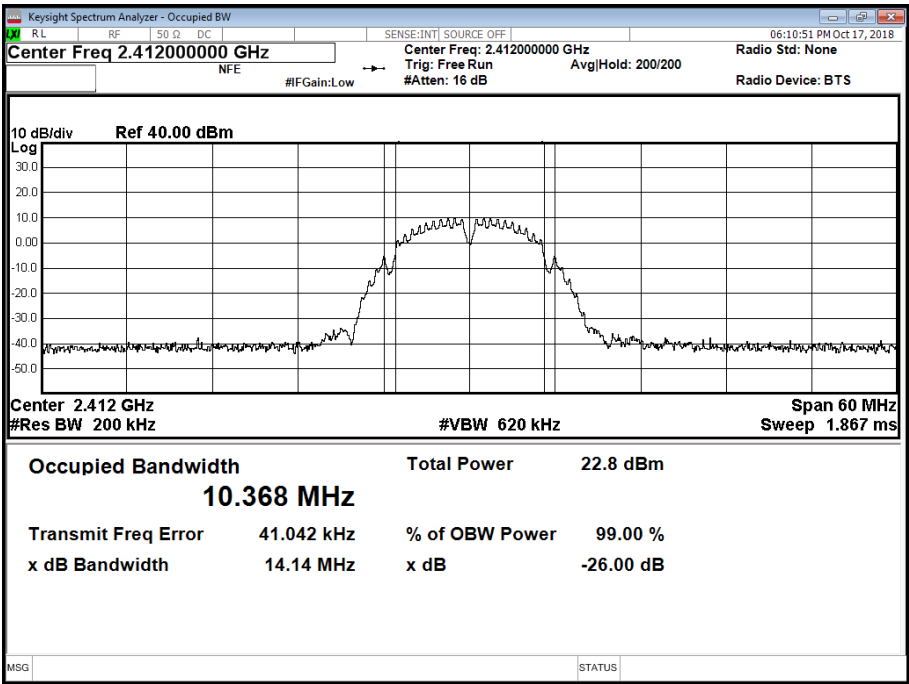


Figure 44 - 2412 MHz - 99% Occupied Bandwidth



Product Service

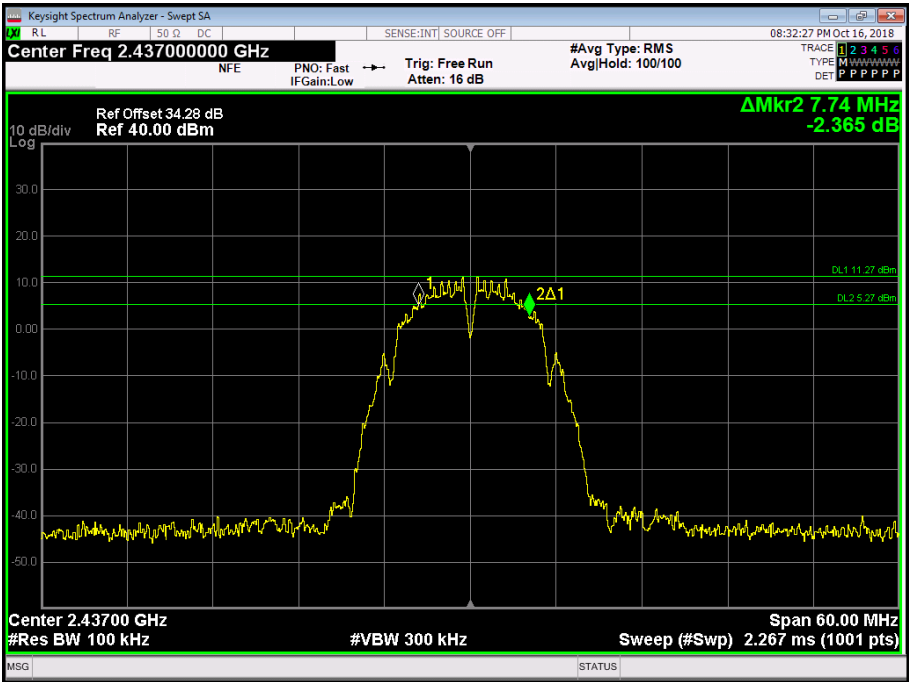


Figure 45 - 2437 MHz - 6 dB DTS Bandwidth

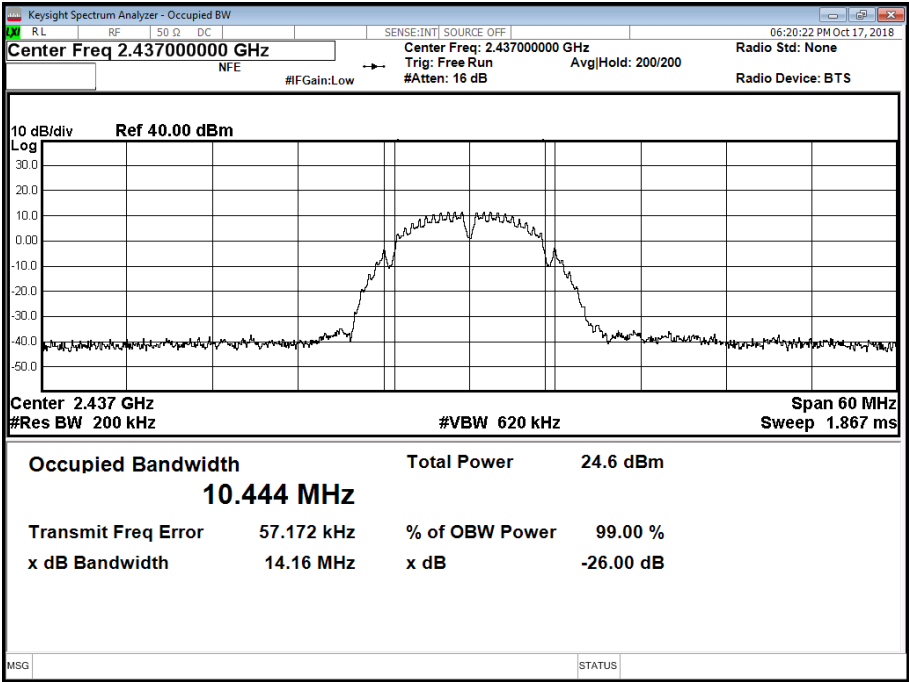


Figure 46 - 2437 MHz - 99% Occupied Bandwidth



Product Service

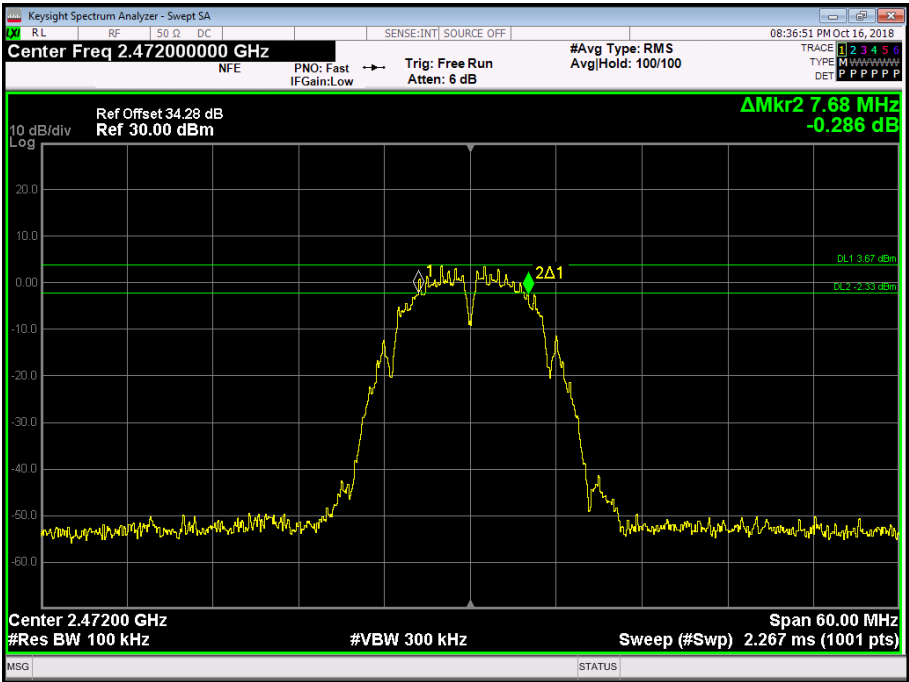


Figure 47 - 2472 MHz - 6 dB DTS Bandwidth

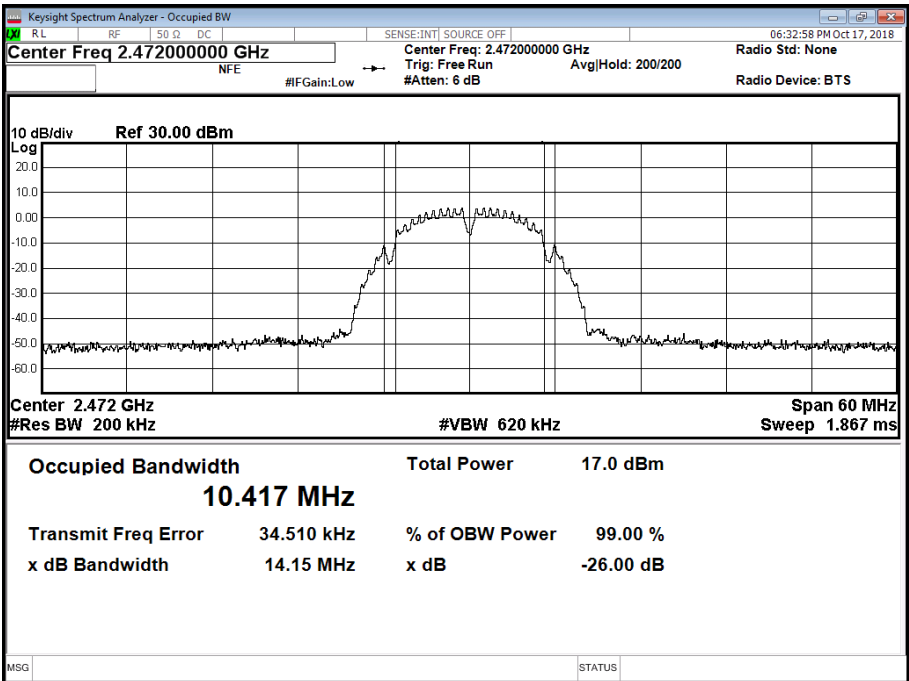


Figure 48 - 2472 MHz - 99% Occupied Bandwidth



802.11g / 6 Mbps / SISO / Core 1

|                      |        |        |        |
|----------------------|--------|--------|--------|
| Channel              | Bottom | Middle | Top    |
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 16.080 | 16.440 | 16.440 |
| 99% Bandwidth (MHz)  | 16.545 | 16.539 | 16.557 |

Table 28

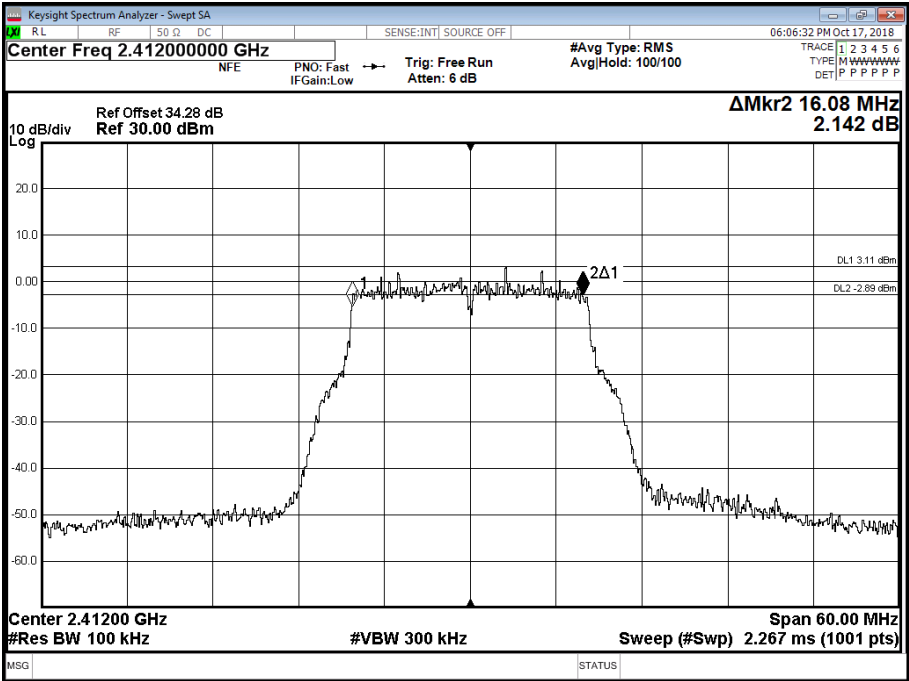


Figure 49 - 2412 MHz - 6 dB DTS Bandwidth

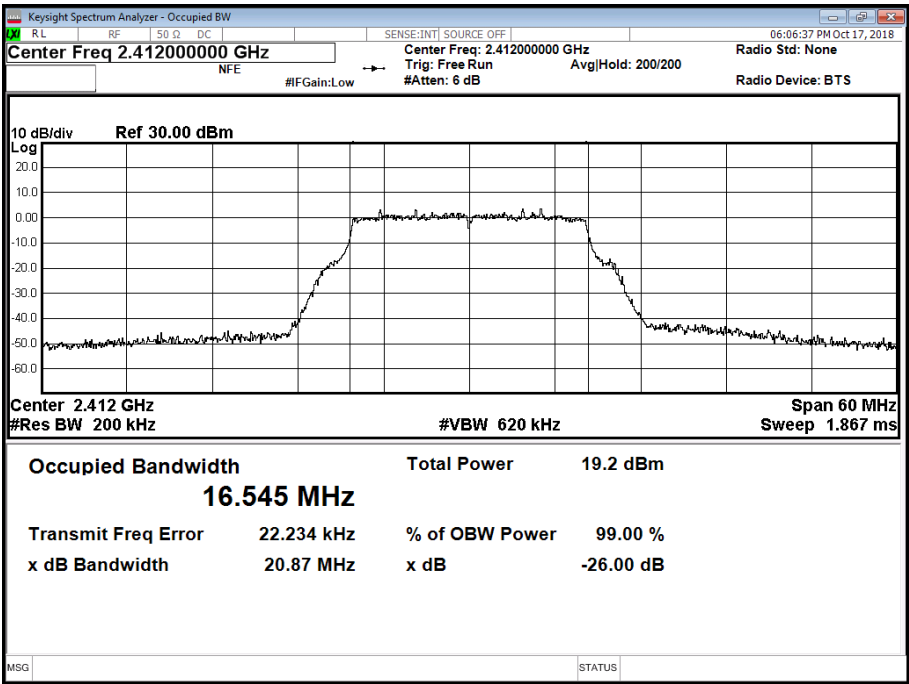


Figure 50 - 2412 MHz - 99% Occupied Bandwidth



Product Service

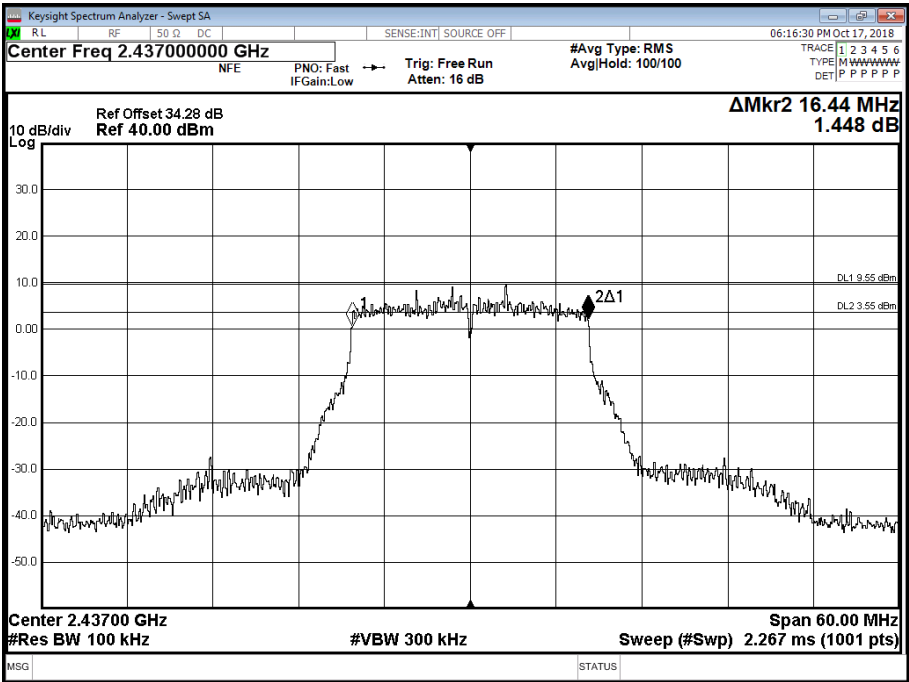


Figure 51 - 2437 MHz - 6 dB DTS Bandwidth

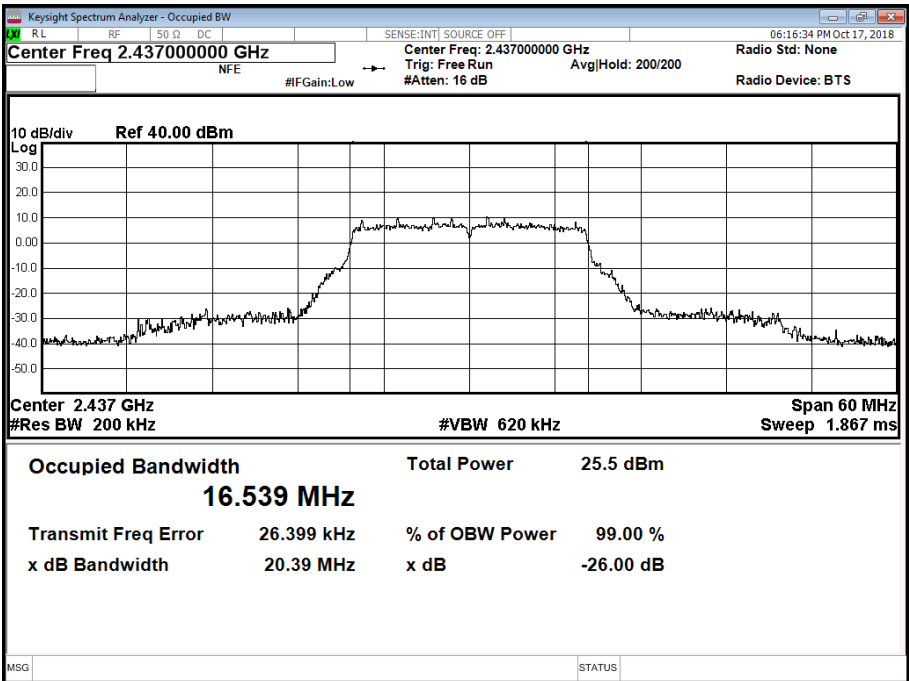


Figure 52 - 2437 MHz - 99% Occupied Bandwidth



Product Service

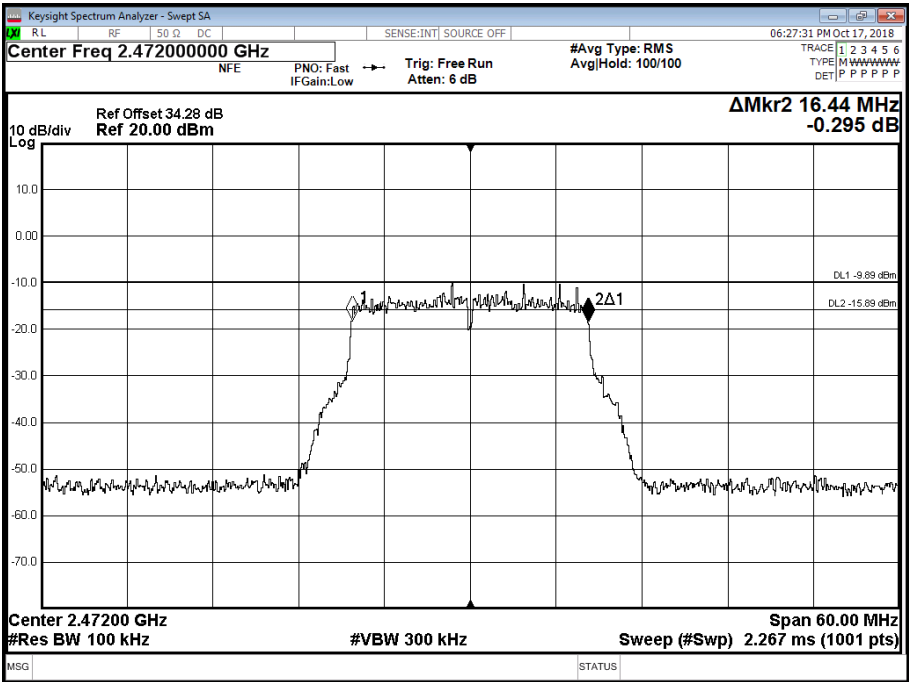


Figure 53 - 2472 MHz - 6 dB DTS Bandwidth

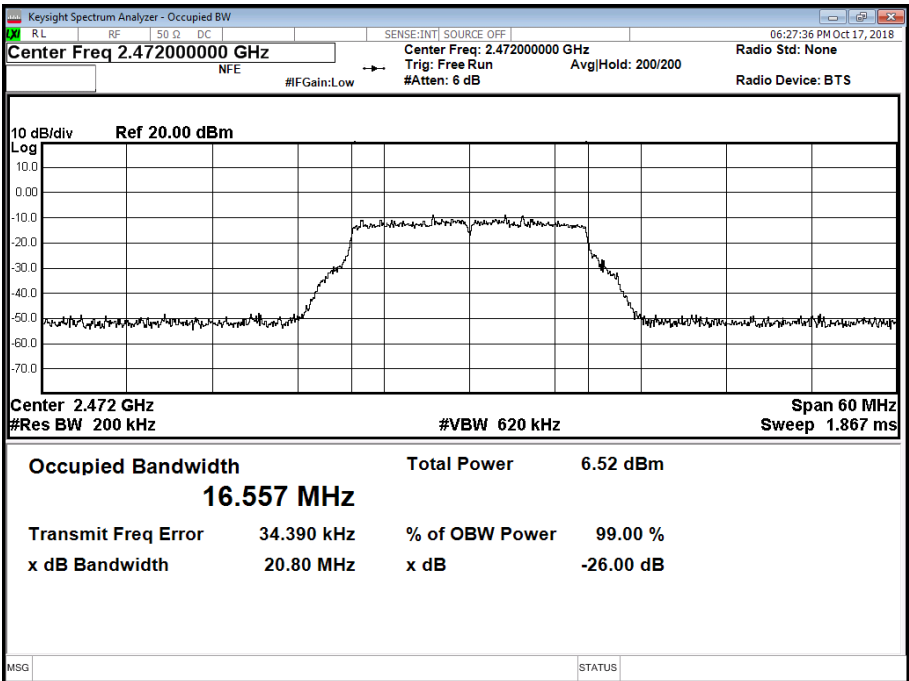


Figure 54 - 2472 MHz - 99% Occupied Bandwidth



Product Service

802.11n / HT20 MCS0 / SISO / Core 1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 17.640 | 17.700 | 17.700 |
| 99% Bandwidth (MHz)  | 17.714 | 17.743 | 17.733 |

Table 29

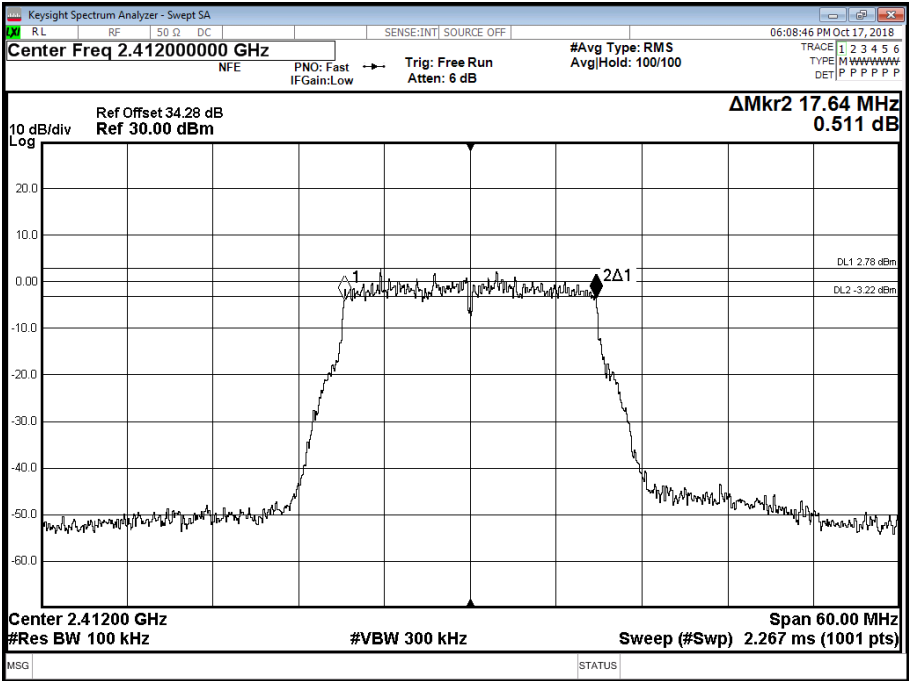


Figure 55 - 2412 MHz - 6 dB DTS Bandwidth

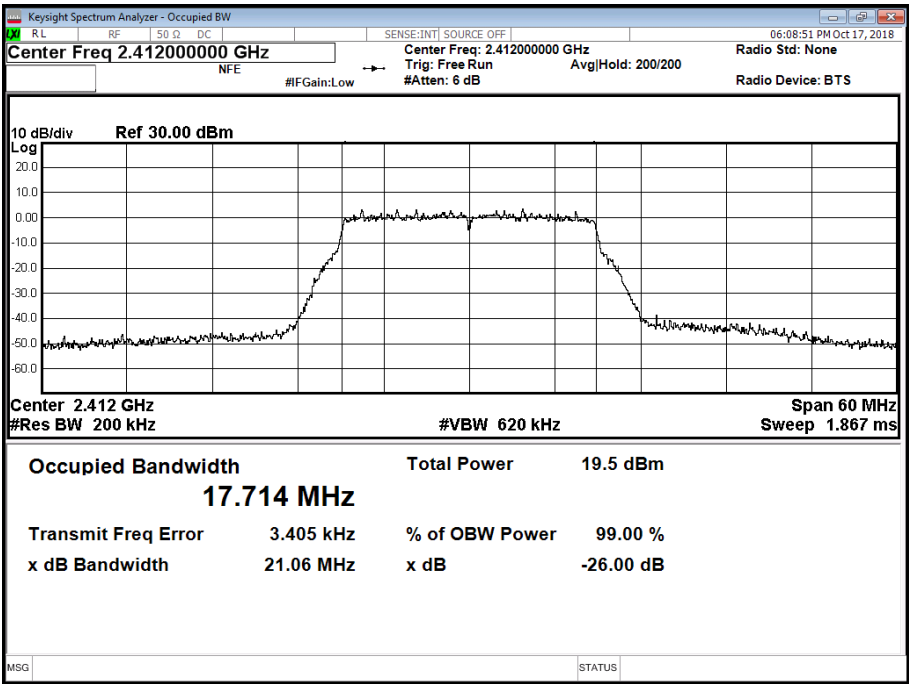


Figure 56 - 2412 MHz - 99% Occupied Bandwidth



Product Service

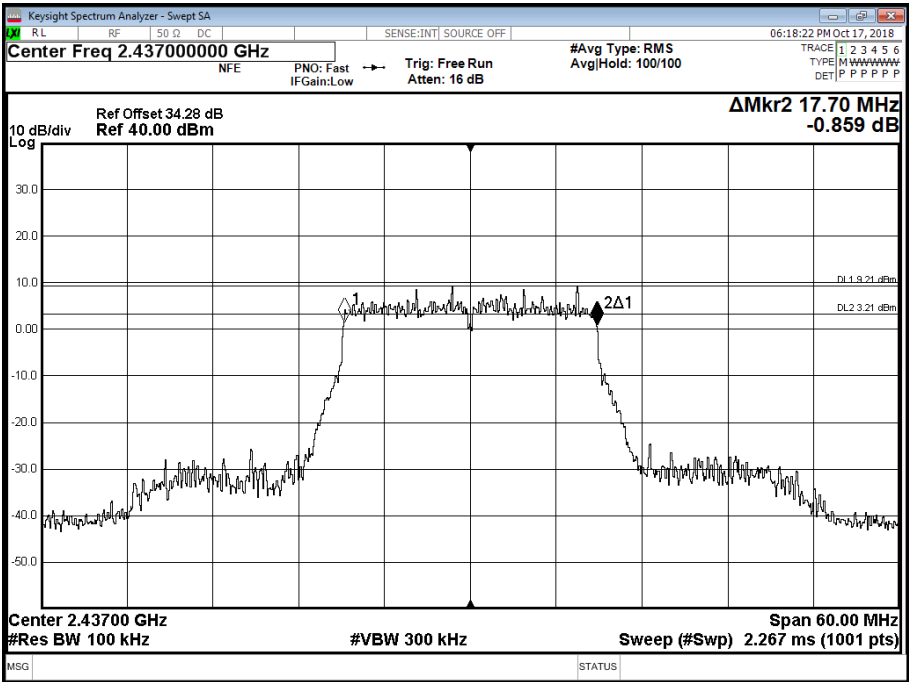


Figure 57 - 2437 MHz - 6 dB DTS Bandwidth

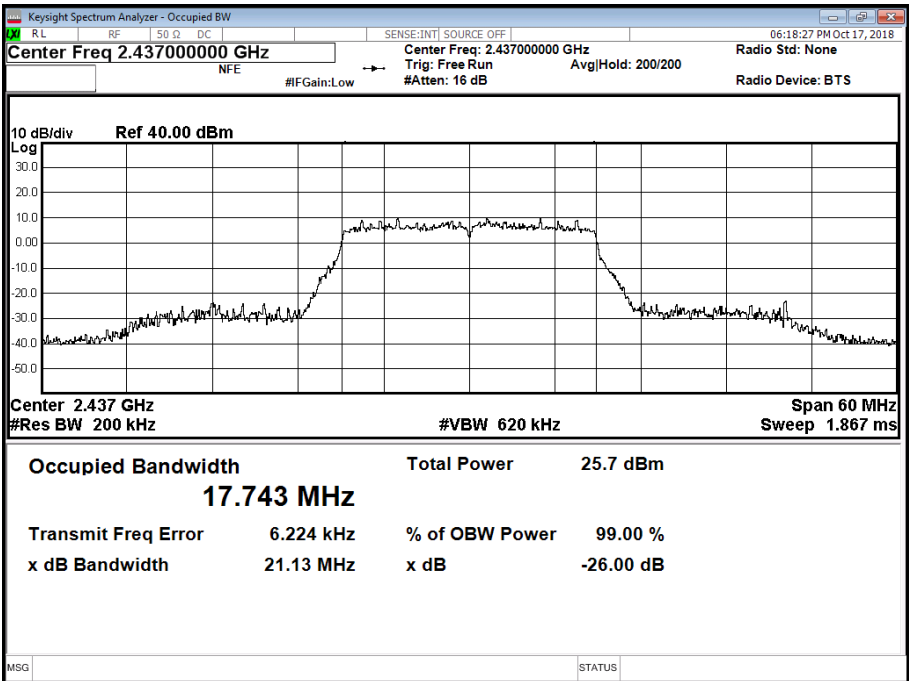


Figure 58 - 2437 MHz - 99% Occupied Bandwidth



Product Service

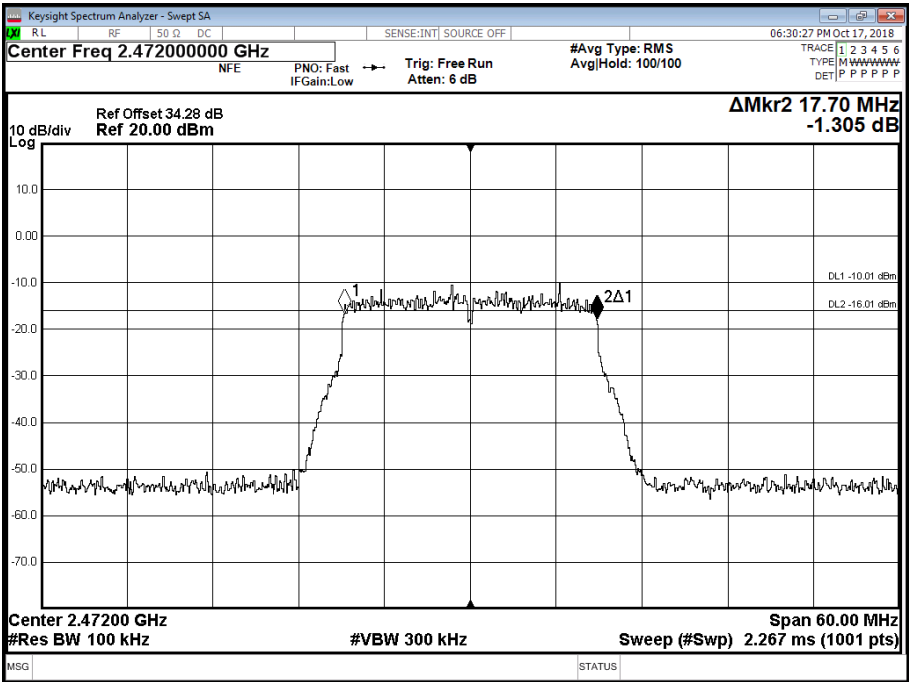


Figure 59 - 2472 MHz - 6 dB DTS Bandwidth

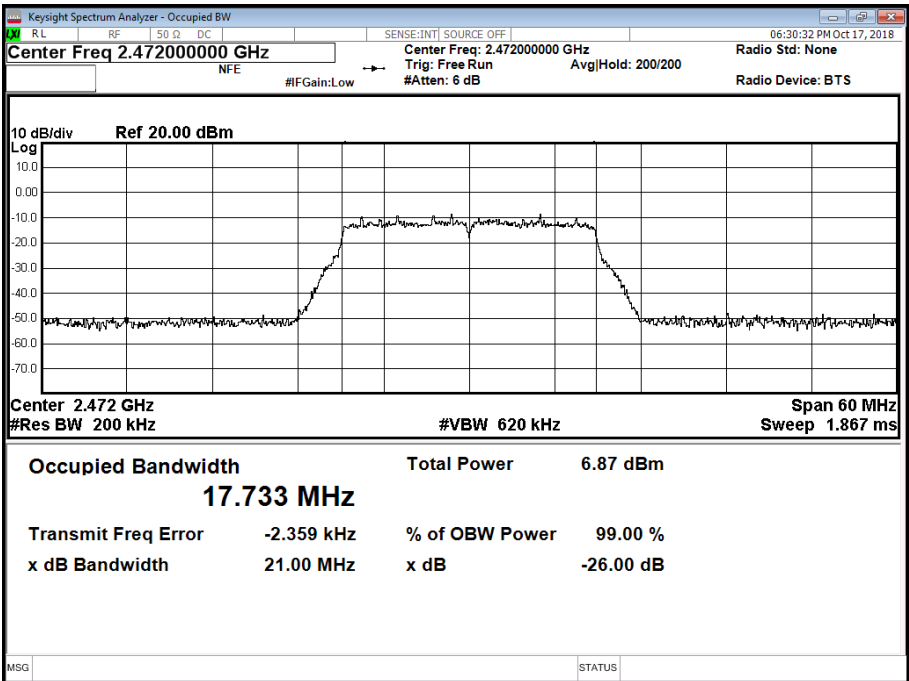


Figure 60 - 2472 MHz - 99% Occupied Bandwidth



802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 17.640 | 17.640 | 17.400 |
| 99% Bandwidth (MHz)  | 17.779 | 17.770 | 17.785 |

Table 30

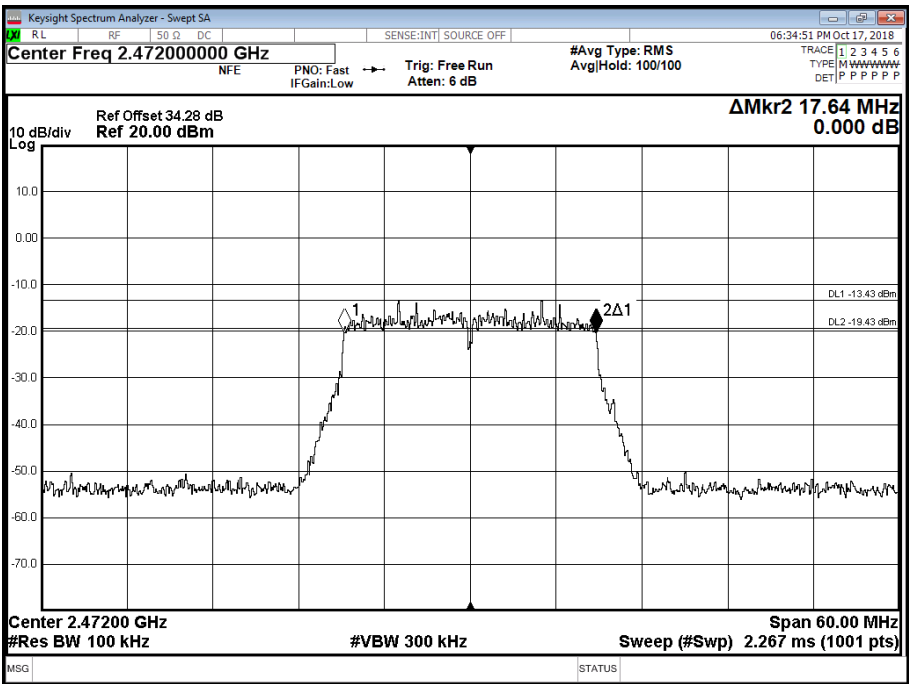


Figure 61 - 2412 MHz - 6 dB DTS Bandwidth

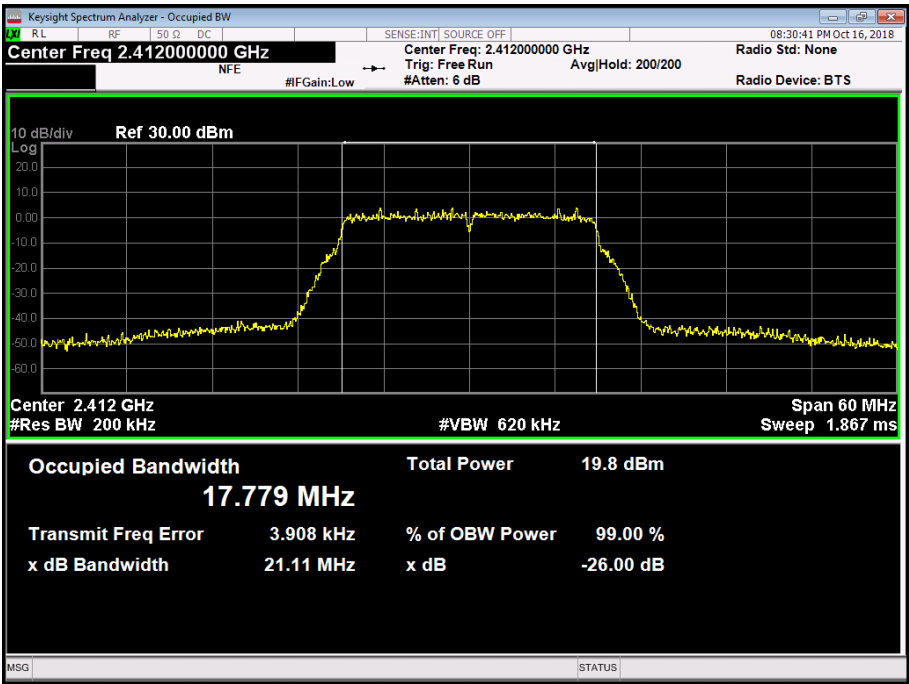


Figure 62 - 2412 MHz - 99% Occupied Bandwidth



Product Service



Figure 63 - 2437 MHz - 6 dB DTS Bandwidth

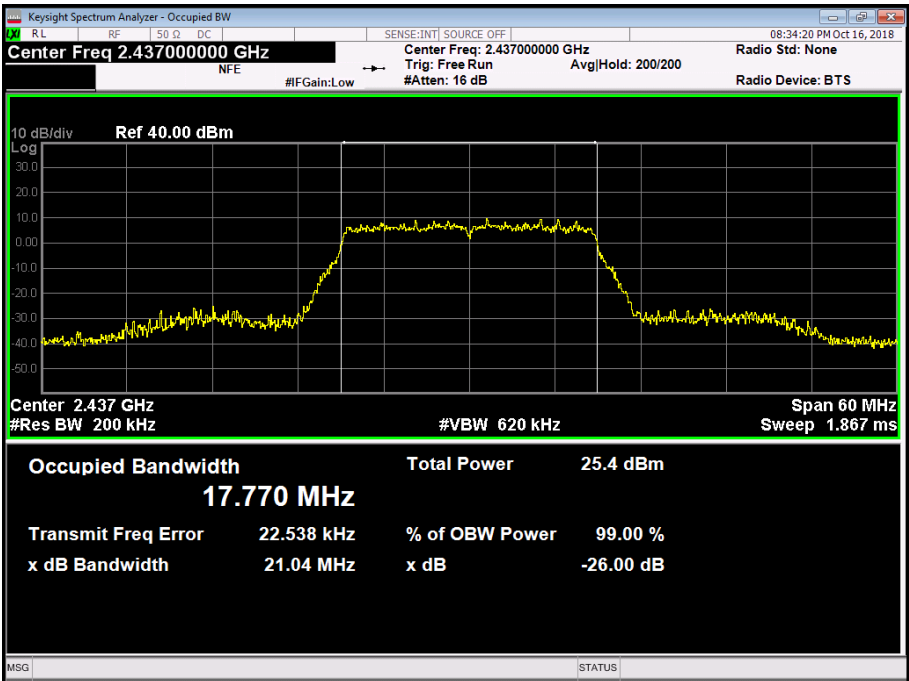


Figure 64 - 2437 MHz - 99% Occupied Bandwidth



Product Service

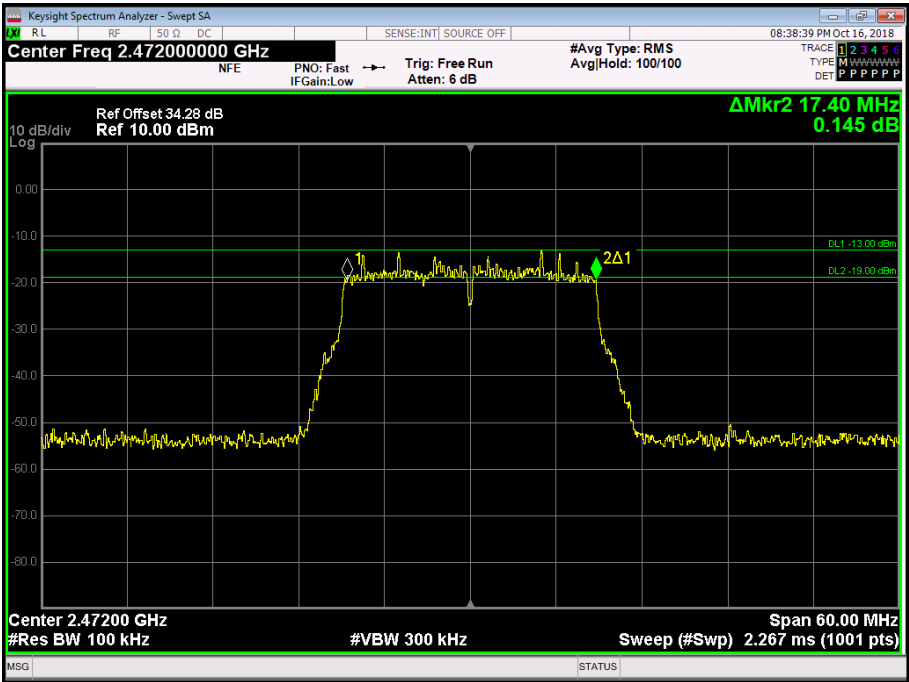


Figure 65 - 2472 MHz - 6 dB DTS Bandwidth

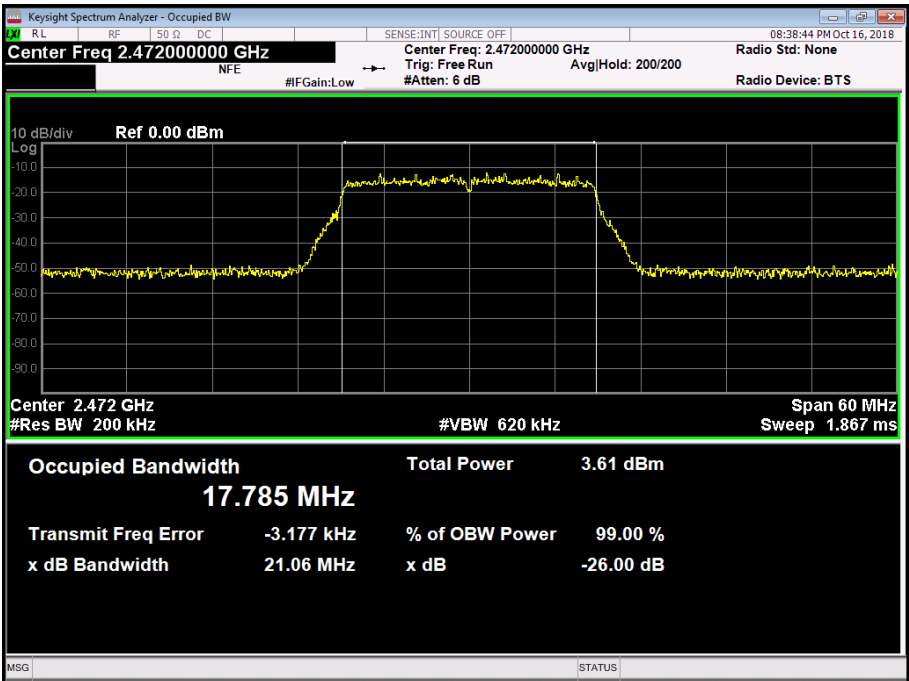


Figure 66 - 2472 MHz - 99% Occupied Bandwidth



802.11n / HT20 MCS0 / MIMO TxBF / Cores 0+1

| Channel              | Bottom | Middle | Top    |
|----------------------|--------|--------|--------|
| Frequency (MHz)      | 2412   | 2437   | 2472   |
| 6 dB Bandwidth (MHz) | 17.640 | 16.680 | 16.800 |
| 99% Bandwidth (MHz)  | 17.782 | 17.779 | 17.850 |

Table 31

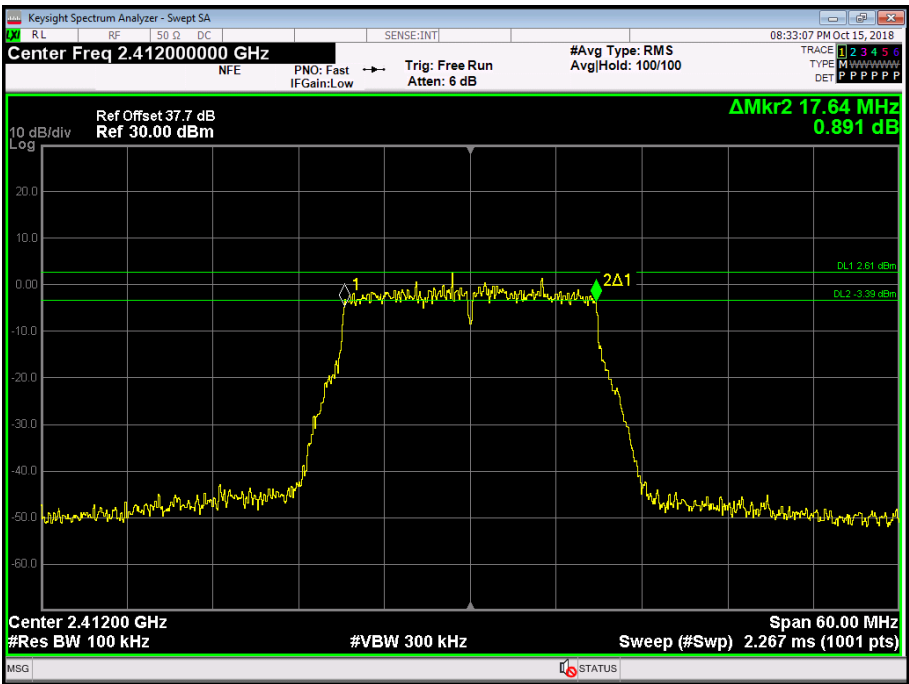


Figure 67 - 2412 MHz - 6 dB DTS Bandwidth

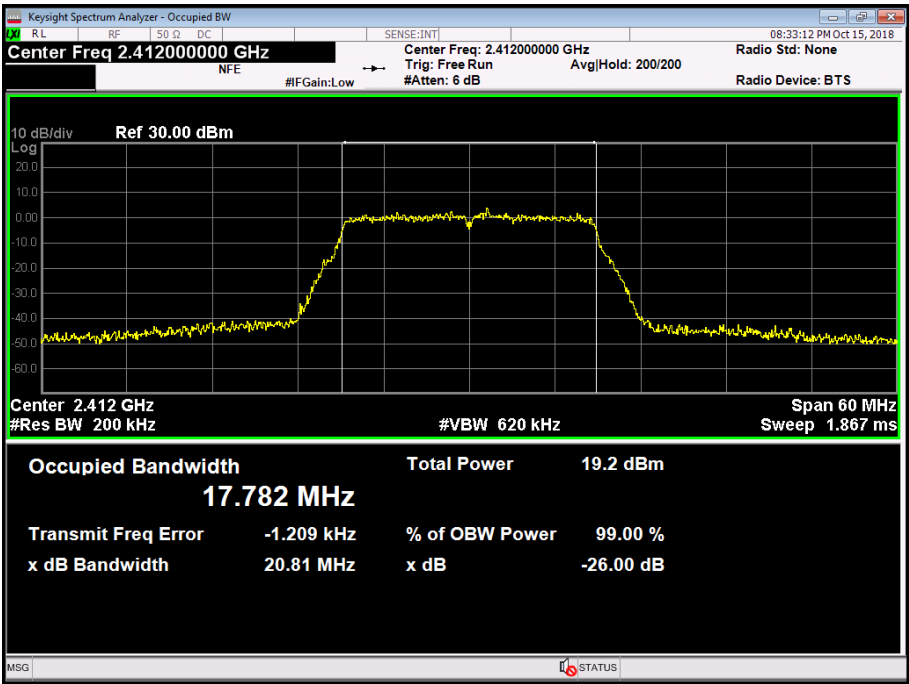


Figure 68 - 2412 MHz - 99% Occupied Bandwidth



Product Service

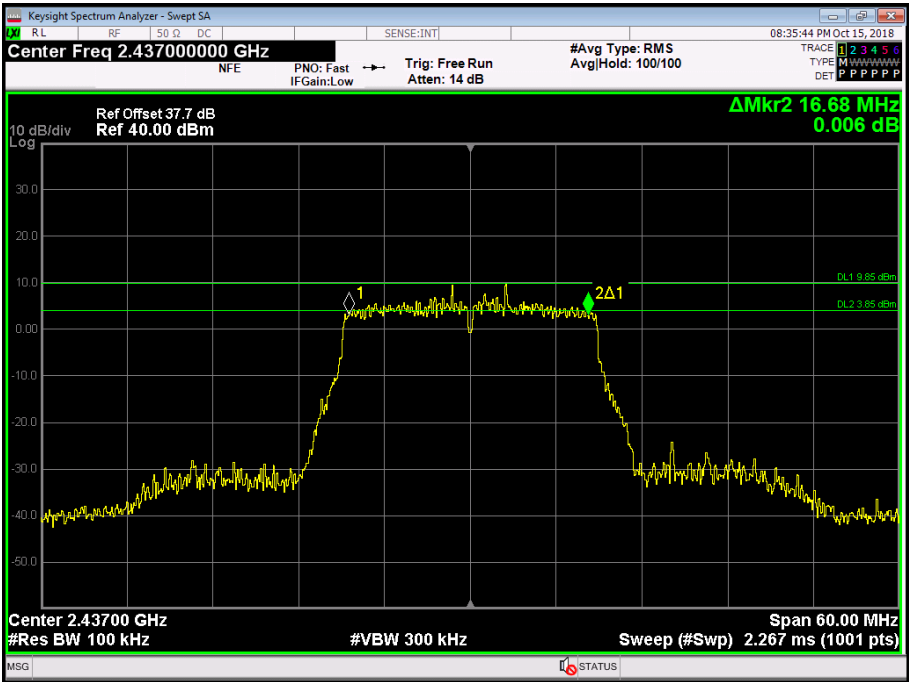


Figure 69 - 2437 MHz - 6 dB DTS Bandwidth

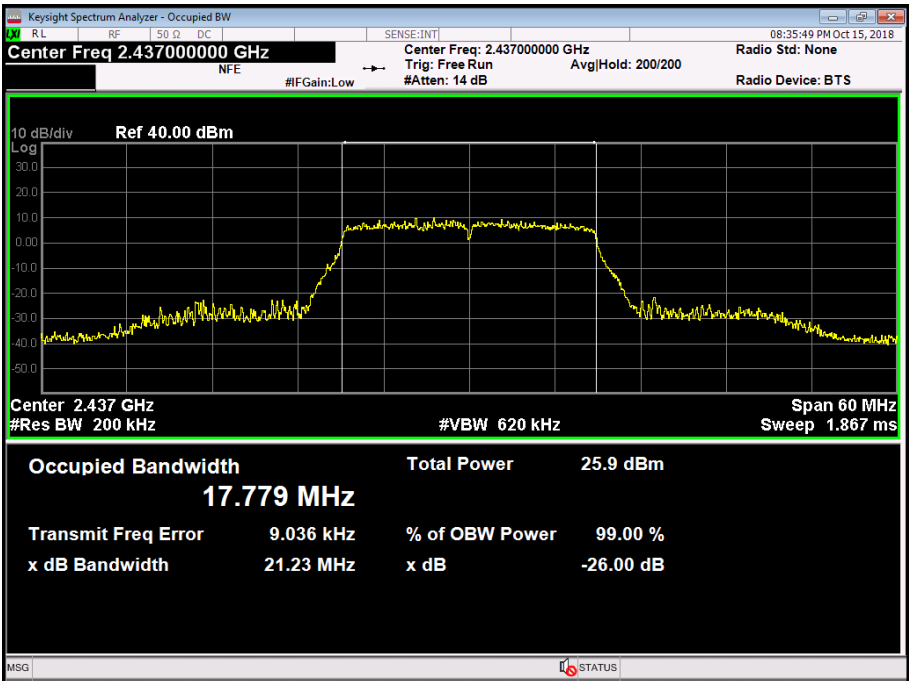


Figure 70 - 2437 MHz - 99% Occupied Bandwidth



Product Service



Figure 71 - 2472 MHz - 6 dB DTS Bandwidth

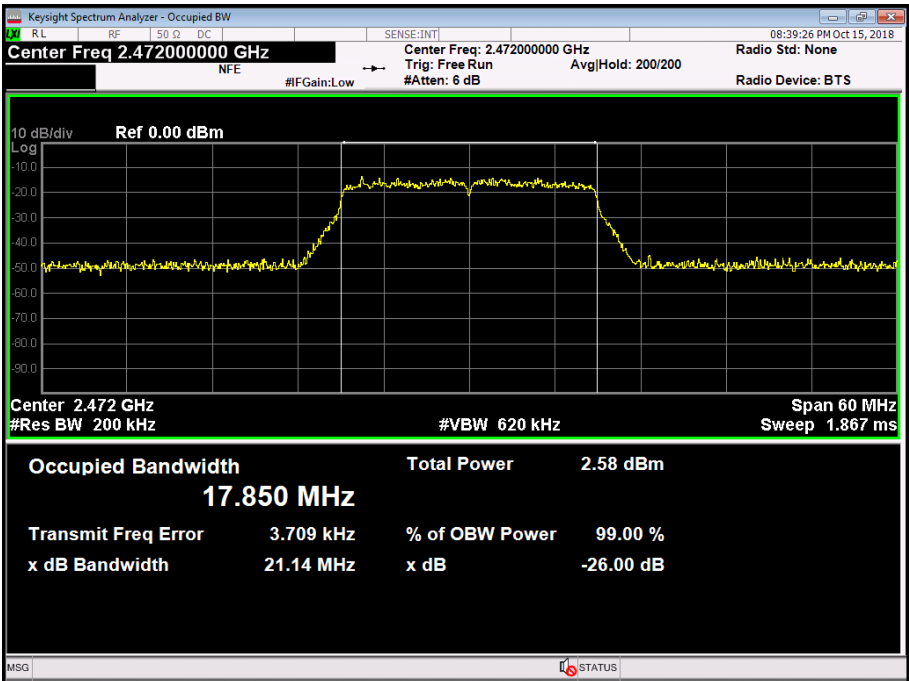


Figure 72 - 2472 MHz - 99% Occupied Bandwidth

FCC 47 CFR Part 15, Limit Clause 15.247(a)(2) and Industry Canada RSS-247, Clause 5.2(a)

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



### 2.3.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 3.

| Instrument              | Manufacturer           | Type No      | TE No | Calibration Period (months) | Calibration Due |
|-------------------------|------------------------|--------------|-------|-----------------------------|-----------------|
| 20dB/2W Attenuator      | Narda                  | 4772-20      | 462   | -                           | O/P Mon         |
| Hygrometer              | Rotronic               | I-1000       | 2891  | 12                          | 18-Sept-2019    |
| Network Analyser        | Rohde & Schwarz        | ZVA 40       | 3548  | 12                          | 09-Oct-2018     |
| Calibration Unit        | Rohde & Schwarz        | ZV-Z54       | 4368  | 12                          | 06-Mar-2019     |
| Directional Coupler     | Hewlett Packard        | 11692D       | 451   | -                           | O/P Mon         |
| Attenuator (20dB, 2W)   | Pasternack             | PE7004-20    | 2943  | 12                          | 18-Jul-2019     |
| Attenuator (20dB, 150W) | Narda                  | 769-20       | 3367  | 12                          | 17-Jul-2019     |
| Attenuator (10dB, 150W) | Narda                  | 769-10       | 3368  | 12                          | 17-Jul-2019     |
| Network Analyser        | Rohde & Schwarz        | ZVA 40       | 3548  | 12                          | 02-Oct-2018     |
| Attenuator (10 dB)      | Suhner                 | 6810.17.A    | 3965  | 12                          | 18-Jul-2019     |
| PXA Signal Analyser     | Keysight Technologies; | N9030A       | 4653  | 12                          | 05-Feb-2019     |
| Power splitter - 2 port | Mini-Circuits          | ZN2PD-63-S+  | 4742  | 12                          | 29-Sep-2019     |
| Power splitter - 2 port | Mini-Circuits          | ZN2PD-63-S+  | 4743  | 12                          | 29-Sep-2019     |
| Power splitter - 4 port | Mini-Circuits          | ZN4PD1-63-S+ | 4744  | 12                          | 29-Sep-2019     |
| EMI Receiver            | Keysight Technologies; | N9038A MXE   | 4628  | 12                          | 04-July-2019    |

**Table 32**

O/P Mon – Output Monitored using calibrated equipment



## **2.4 Authorised Band Edges**

### **2.4.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (d)  
Industry Canada RSS-247 Clause 5.5

### **2.4.2 Equipment Under Test and Modification State**

A1932, S/N: C02X5003L3J0 - Modification State 0

### **2.4.3 Date of Test**

26-August-2018 to 11-Sept-2018

### **2.4.4 Test Method**

The test was performed in accordance with ANSI C63.10, clause 6.10.4.

### **2.4.5 Reported Measurements**

Authorised band edge measurements were performed with the device operating in SISO, MIMO and TxBF, across the various modes supported by the device.

The measurements displayed within this report, have been limited to those modes which have been shown to be worst case. Further measurements are held on file by TÜV SÜD, and are available if required.

Note: 2483.5 MHz is both an Authorised Band edge and Restricted Band Edge. Of the two limits, the Restricted Band Edge is the most stringent and therefore demonstrates compliance with the 20 dBc Authorised Band Edge requirement.

### **2.4.6 Environmental Conditions**

|                     |                |
|---------------------|----------------|
| Ambient Temperature | 20.0 - 23.6 °C |
| Relative Humidity   | 36.3 - 60.2 %  |



2.4.7 Test Results

SISO

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Level (dBc) |
|---------|---------------|-----------------|--------------------------|-------------|
| 802.11b | 1 Mbps        | 2412            | 2400.0                   | -43.62      |

Table 33

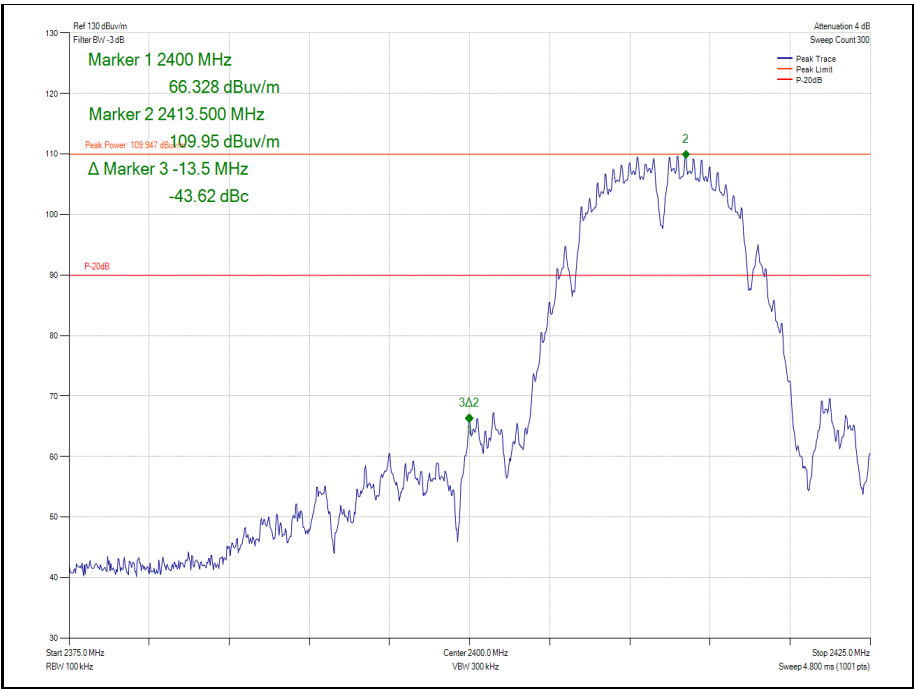


Figure 73 - 2412 MHz - Measured Frequency 2400.0 MHz



SISO

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Level (dBc) |
|---------|---------------|-----------------|--------------------------|-------------|
| 802.11g | 6 Mbps        | 2412            | 2400.0                   | -36.08      |

Table 34

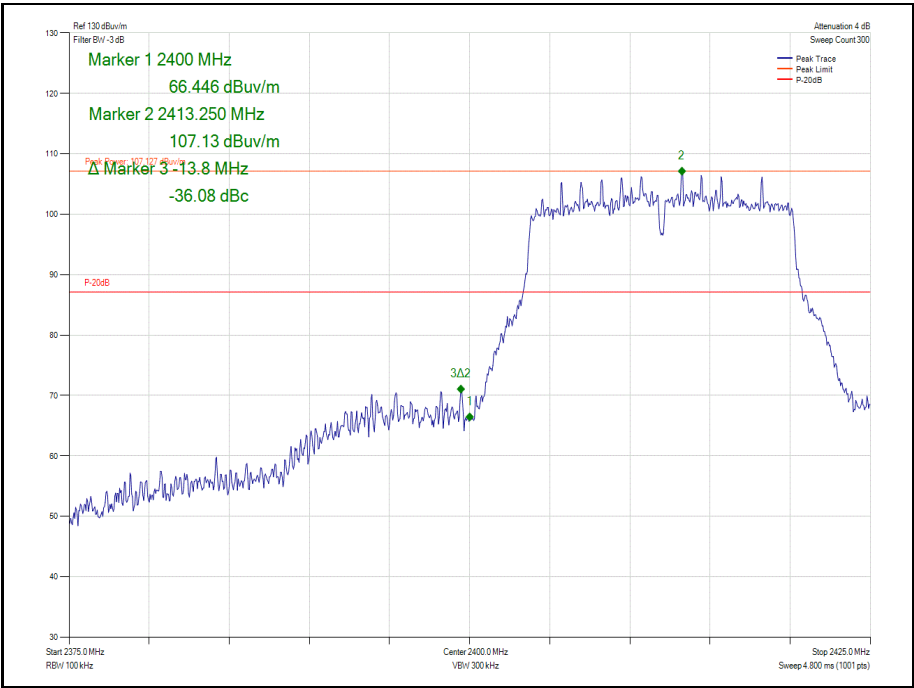


Figure 74 - 2412 MHz - Measured Frequency 2400.0 MHz



SISO

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Level (dBc) |
|---------|---------------|-----------------|--------------------------|-------------|
| 802.11n | MCS0          | 2412            | 2400.0                   | -34.75      |

Table 35

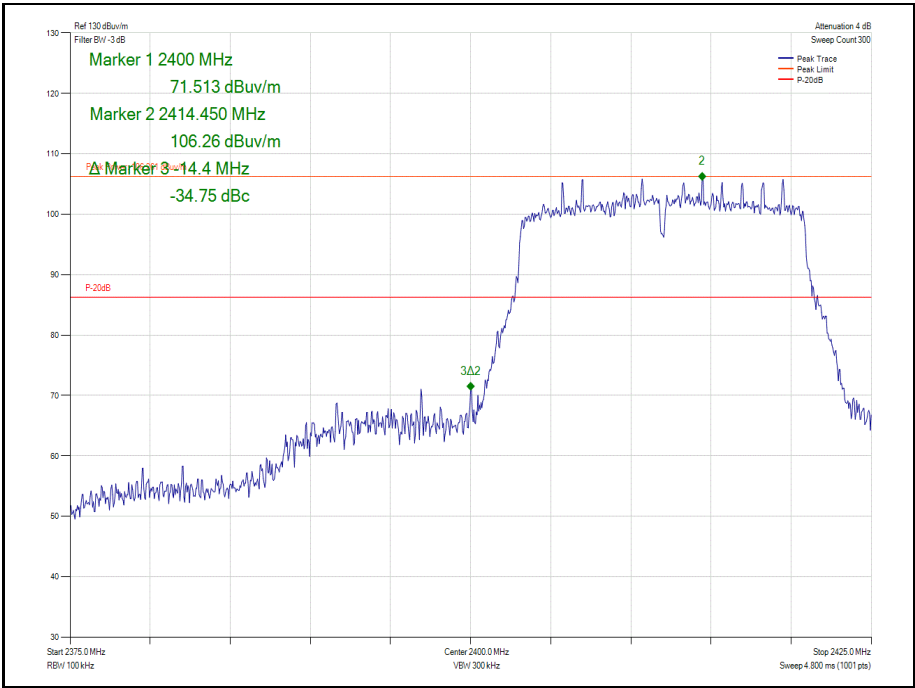


Figure 75 - 2412 MHz - Measured Frequency 2400.0 MHz



MIMO 2 Tx, TXBF

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Level (dBc) |
|---------|---------------|-----------------|--------------------------|-------------|
| 802.11n | MCS0          | 2412            | 2400.0                   | -45.78      |

Table 36

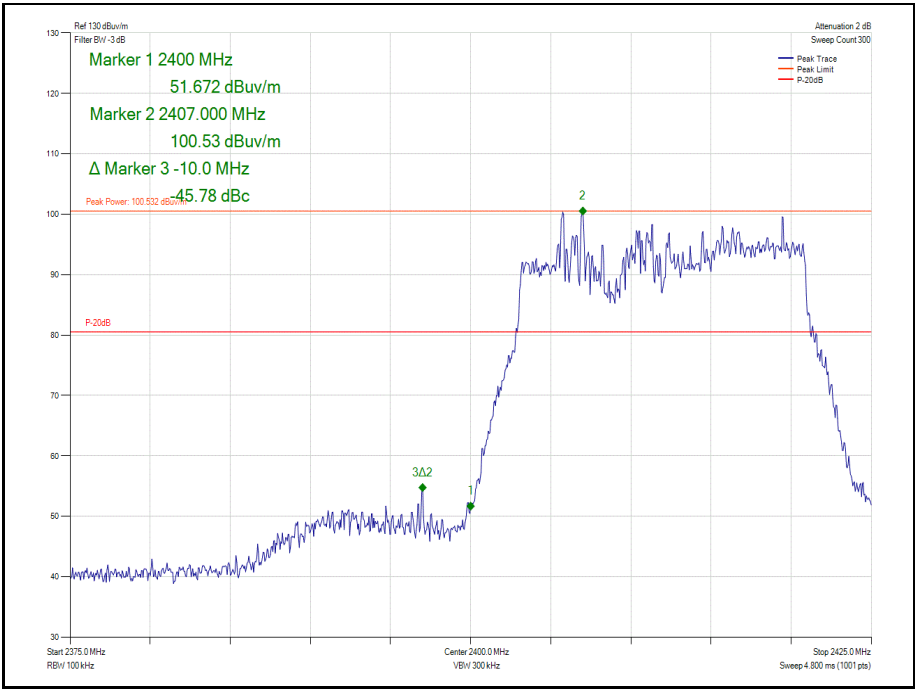


Figure 76 - 2412 MHz - Measured Frequency 2400.0 MHz



MIMO 2Tx

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Level (dBc) |
|---------|---------------|-----------------|--------------------------|-------------|
| 802.11b | 1 Mbps        | 2412            | 2400.0                   | -40.65      |

Table 37

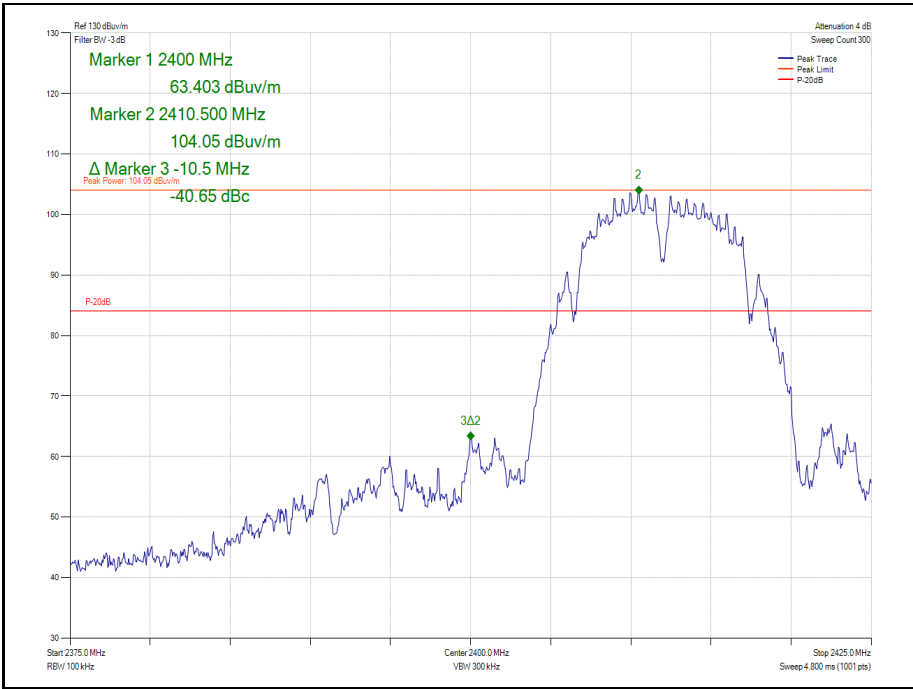


Figure 77 - 2412 MHz - Measured Frequency 2400.0 MHz



MIMO 2Tx

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Level (dBc) |
|---------|---------------|-----------------|--------------------------|-------------|
| 802.11n | MCS0          | 2412            | 2400.0                   | -41.93      |

Table 38

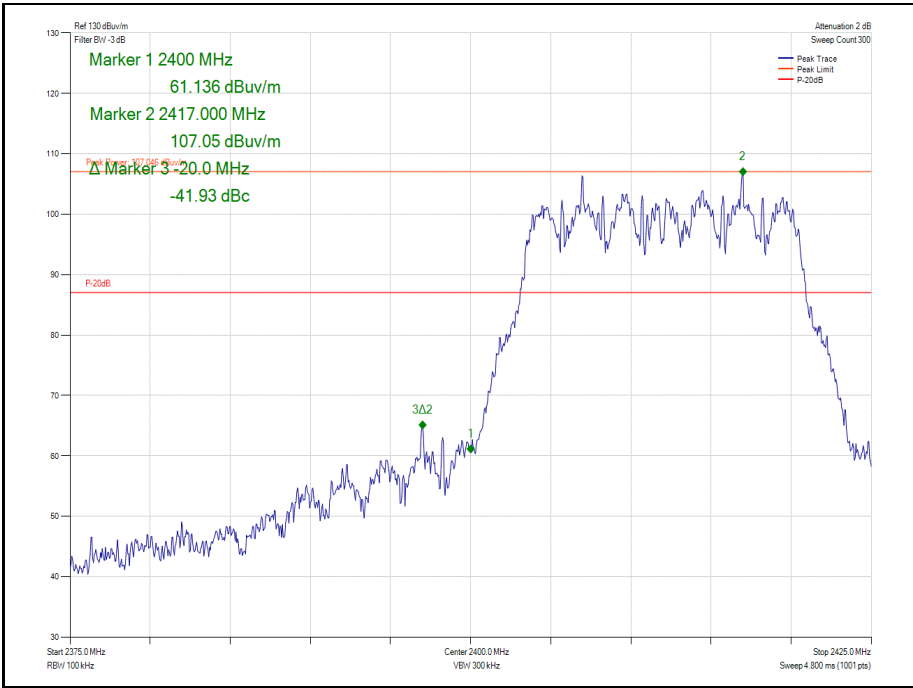


Figure 78 - 2412 MHz - Measured Frequency 2400.0 MHz



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

## 2.4.8 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

| Instrument                          | Manufacturer          | Type No             | TE No | Calibration Period (months) | Calibration Due |
|-------------------------------------|-----------------------|---------------------|-------|-----------------------------|-----------------|
| Hygrometer                          | Rotronic              | HP21                | 4989  | 12                          | 26-April-2019   |
| Double Ridge Broadband Horn Antenna | Schwarzbeck           | BBHA 9120 B         | 4848  | 12                          | 12-Feb-2019     |
| Screened Room (5)                   | Rainford              | Rainford            | 1545  | 36                          | 23-Jan-2021     |
| Turntable Controller                | Inn-Co GmbH           | CO 1000             | 1606  | -                           | TU              |
| Tilt Antenna Mast                   | Maturo GmbH           | TAM 4.0-P           | 4811  | -                           | TU              |
| EMI Test Receiver                   | Rohde & Schwarz       | ESU40               | 3506  | 12                          | 22-Nov-2018     |
| Network Analyser                    | Rohde & Schwarz       | ZVA 40              | 3548  | 12                          | 09-Oct-2018     |
| Calibration Unit                    | Rohde & Schwarz       | ZV-Z54              | 4368  | 12                          | 06-Mar-2019     |
| Cable                               | Rosenberger           | LU7-071-1000        | 5104  | 6                           | 05-Oct-2019     |
| Cable                               | Rosenberger           | LU7-071-2000        | 4528  | -                           | O/P Mon         |
| Cable                               | Rosenberger           | 2303-0 9.0m PNm PNm | 4827  | 12                          | 04-Jan-2019     |
| EMI Receiver                        | Keysight Technologies | N9038A MXE          | 4628  | 12                          | 04-July-2019    |

**Table 39**

TU – Traceability Unscheduled  
O/P Mon – Output Monitored



## **2.5 Restricted Band Edges**

### **2.5.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.205  
Industry Canada RSS-GEN 8.10

### **2.5.2 Equipment Under Test and Modification State**

A1932, S/N: C02X5003L3J0 - Modification State 0

### **2.5.3 Date of Test**

26-August-2018 to 11-September-2018

### **2.5.4 Test Method**

Testing was performed in accordance with ANSI C63.10, clause 6.10.5 and 11.12.1.

The following conversion can be applied to convert from dBμV/m to μV/m:  
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$ .

### **2.5.5 Reported Measurements**

Restricted band edge measurements were performed with the device operating in SISO, MIMO and TxBF, across the various modes supported by the device.

The measurements displayed within this report, have been limited to those modes which have been shown to be worst case. Further measurements are held on file by TÜV SÜD, and are available if required

### **2.5.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 20 - 23.6 °C  |
| Relative Humidity   | 36.3 - 60.2 % |



2.5.7 Test Results

SISO

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11b | 1 Mbps        | 2462            | 2483.5                   | 64.8                | 51.03                  |
| 802.11b | 1 Mbps        | 2412            | 2390.0                   | 59.24               | 51.55                  |

Table 40

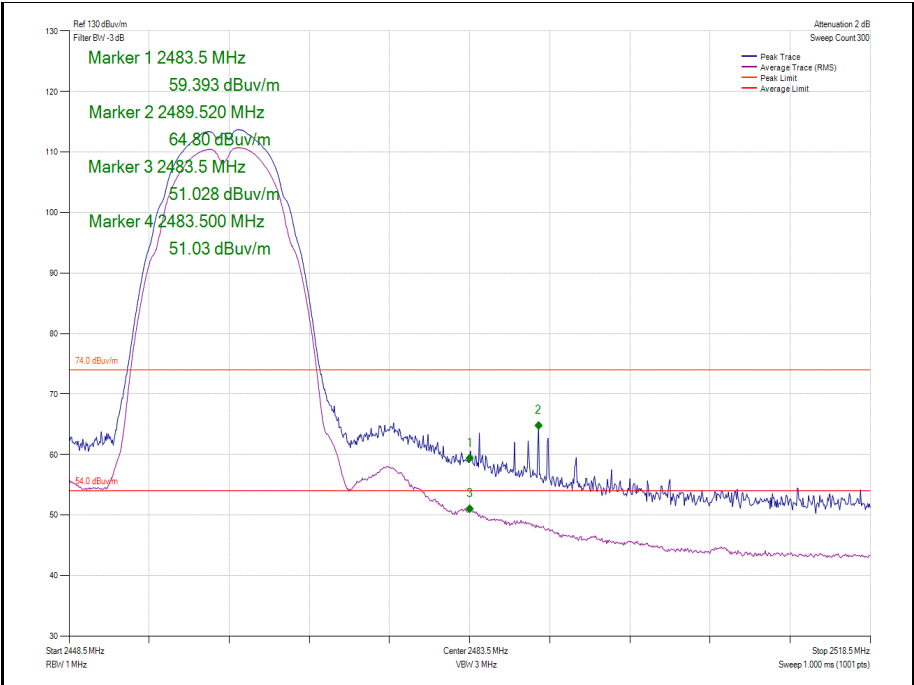


Figure 79 - 2462 MHz - Measured Frequency 2483.5 MHz



Product Service

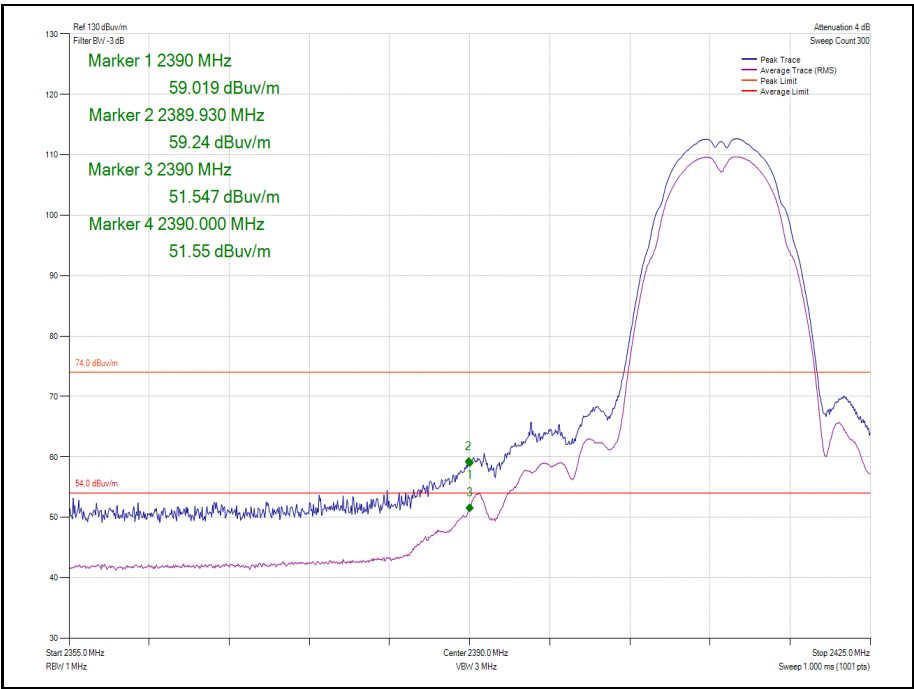


Table 41 Figure 80 - 2412 MHz - Measured Frequency 2390.0 MHz



SISO

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11b | 1 Mbps        | 2467            | 2483.5                   | 67.28               | 51.06                  |
| 802.11b | 1 Mbps        | 2472            | 2483.5                   | 60.2                | 51.09                  |

Table 42

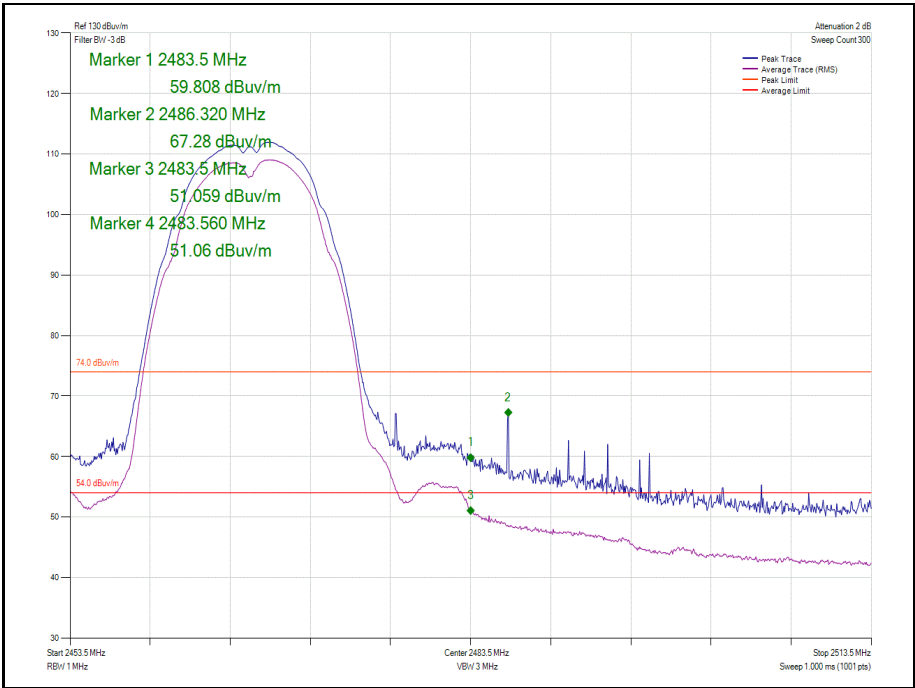


Figure 81 - 2467 MHz - Measured Frequency 2483.5 MHz

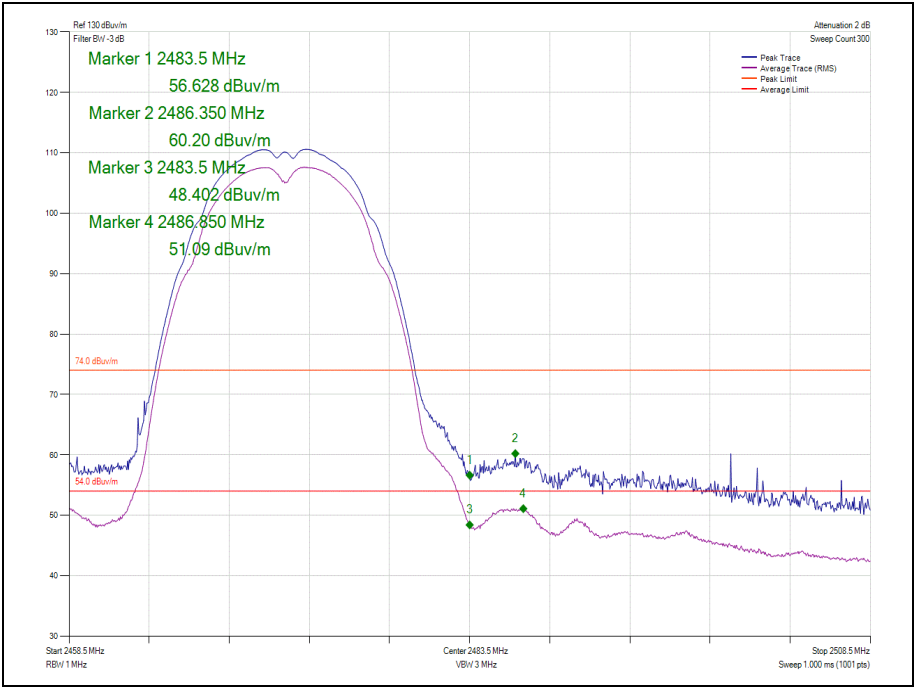


Figure 82 - 2472 MHz - Measured Frequency 2483.5 MHz



(SISO)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11g | 6 Mbps        | 2462            | 2483.5                   | 61.36               | 51.12                  |
| 802.11g | 6 Mbps        | 2412            | 2390.0                   | 64.73               | 50.58                  |

Table 43

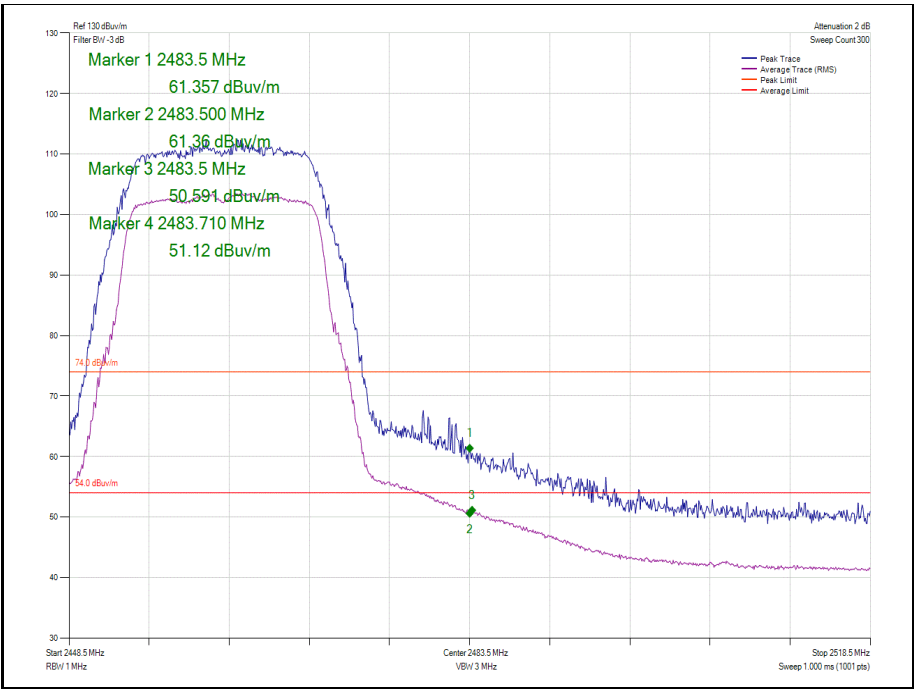


Figure 83 - 2462 MHz - Measured Frequency 2483.5 MHz

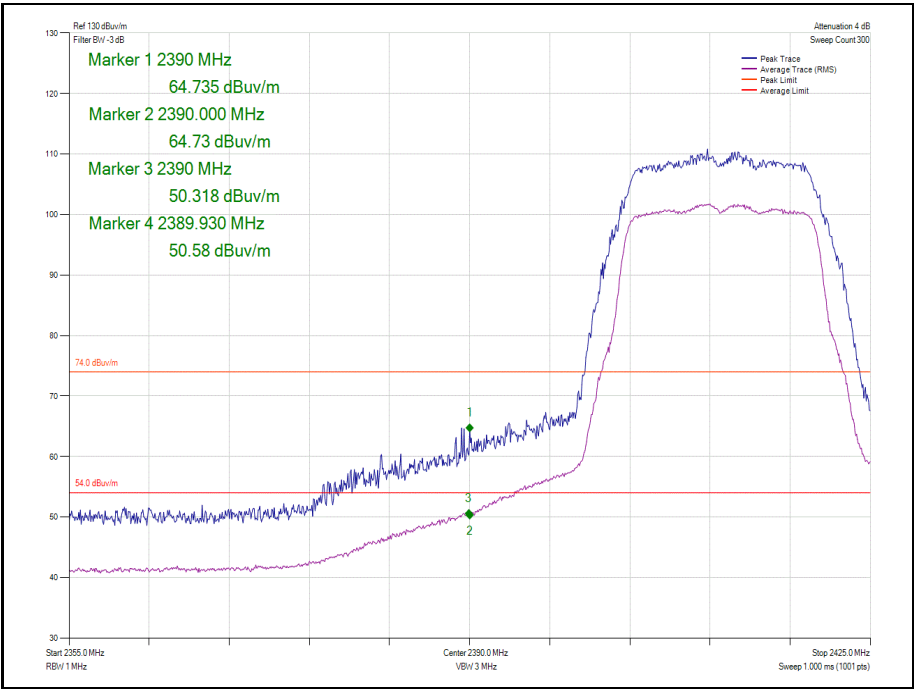


Figure 84 - 2412 MHz - Measured Frequency 2390.0 MHz



(SISO)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11g | 6 Mbps        | 2467            | 2483.5                   | 65.75               | 50.85                  |
| 802.11g | 6 Mbps        | 2472            | 2483.5                   | 65.49               | 51.20                  |

Table 44

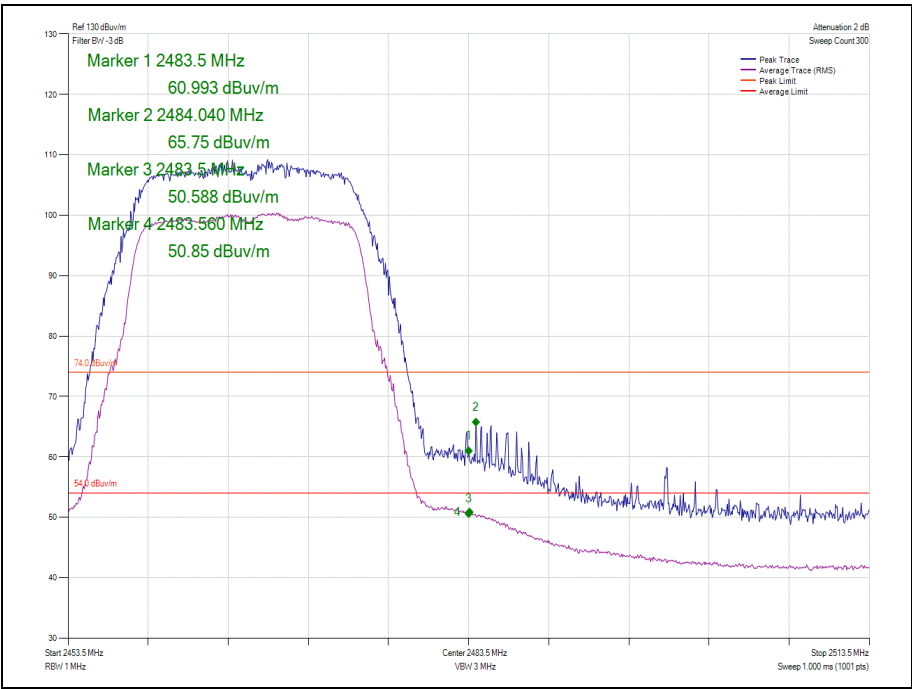


Figure 85 - 2467 MHz - Measured Frequency 2483.5 MHz

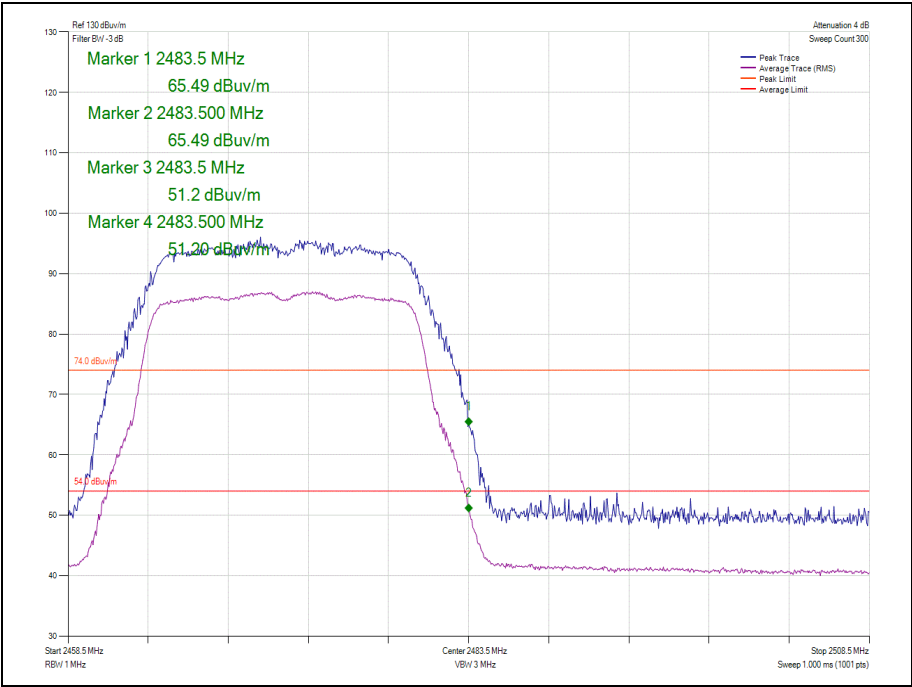


Figure 86 - 2472 MHz - Measured Frequency 2483.5 MHz



(SISO)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11n | MCS0          | 2462            | 2483.5                   | 67.58               | 50.83                  |
| 802.11n | MCS0          | 2412            | 2390.0                   | 66.81               | 51.60                  |

Table 45

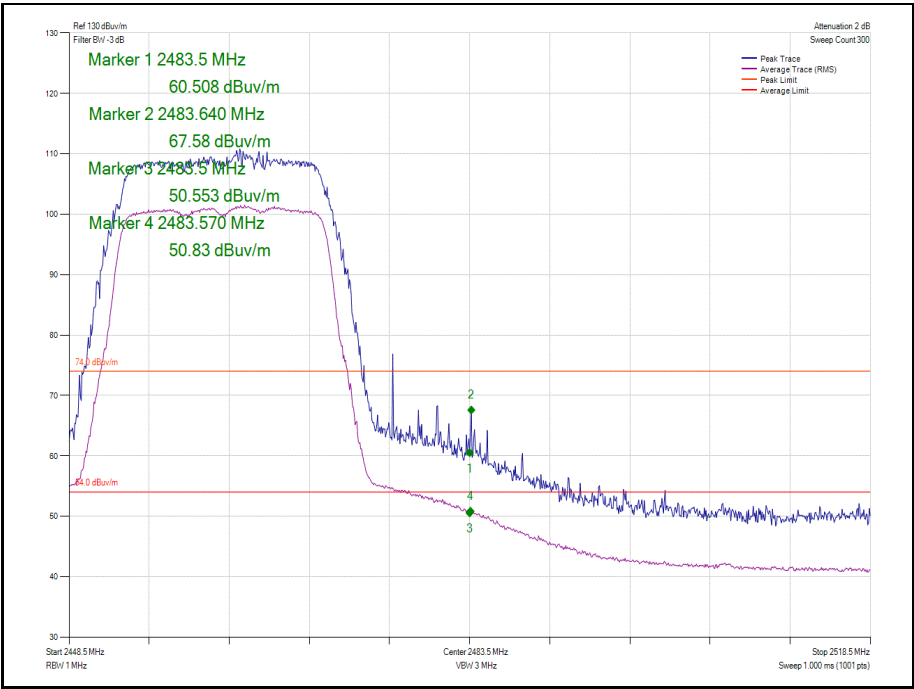


Figure 87 - 2462 MHz - Measured Frequency 2483.5 MHz

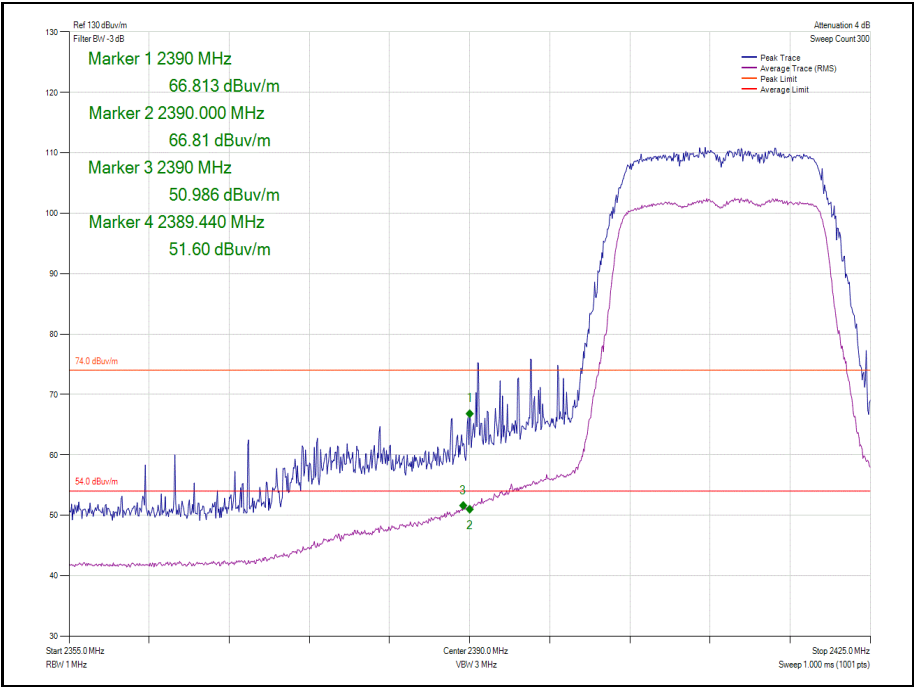
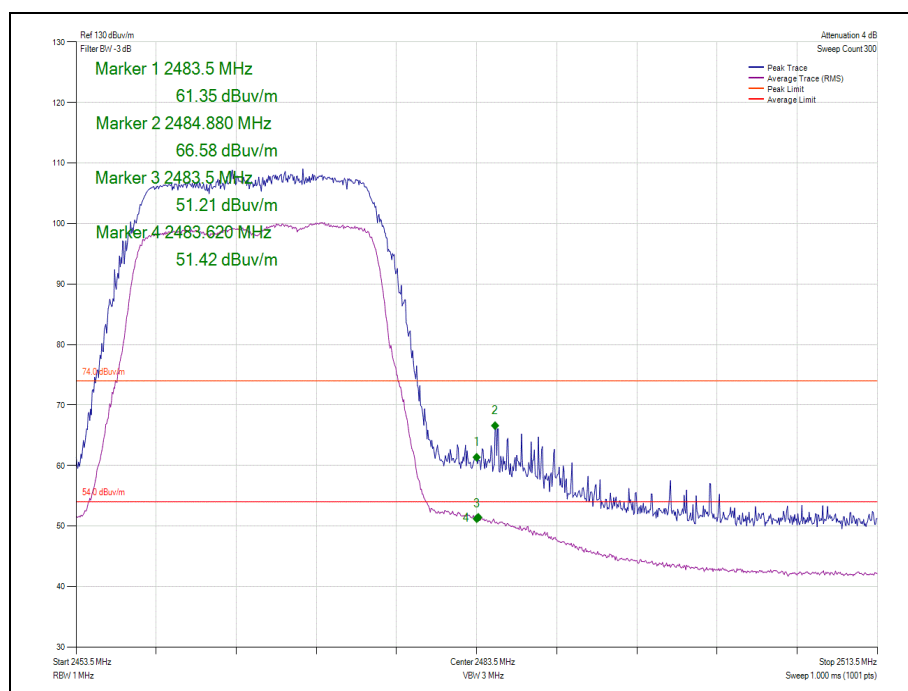


Figure 88 - 2412 MHz - Measured Frequency 2390.0 MHz

## Main (SISO)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11n | MCS0          | 2467            | 2483.5                   | 66.58               | 51.42                  |
| 802.11n | MCS0          | 2472            | 2483.5                   | 66.8                | 51.51                  |

Table 46



**Figure 89 - 2467 MHz - Measured Frequency 2483.5 MHz**

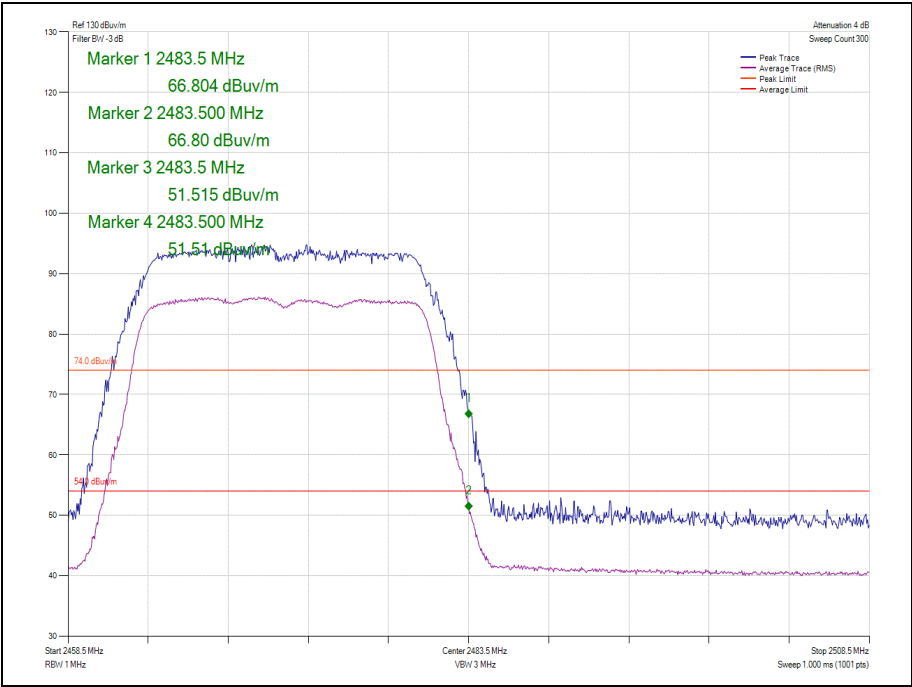


Figure 90 - 2472 MHz - Measured Frequency 2483.5 MHz



(MIMO 2 Tx, TXBF)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11n | MCS0          | 2462            | 2483.5                   | 66.08               | 51.38                  |
| 802.11n | MCS0          | 2412            | 2390.0                   | 62.0                | 47.65                  |

Table 47

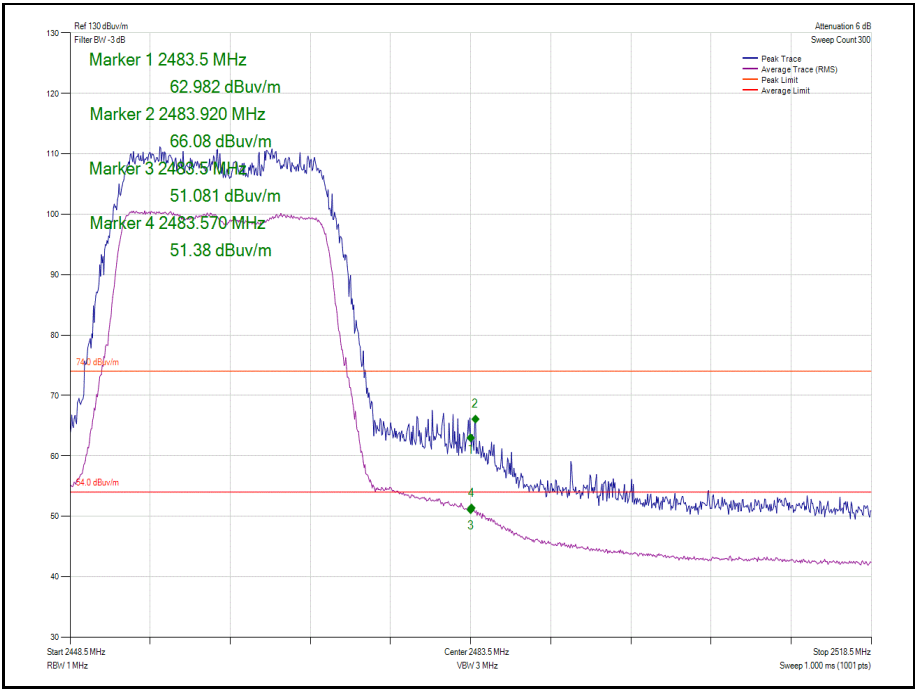


Figure 91 - 2462 MHz - Measured Frequency 2483.5 MHz

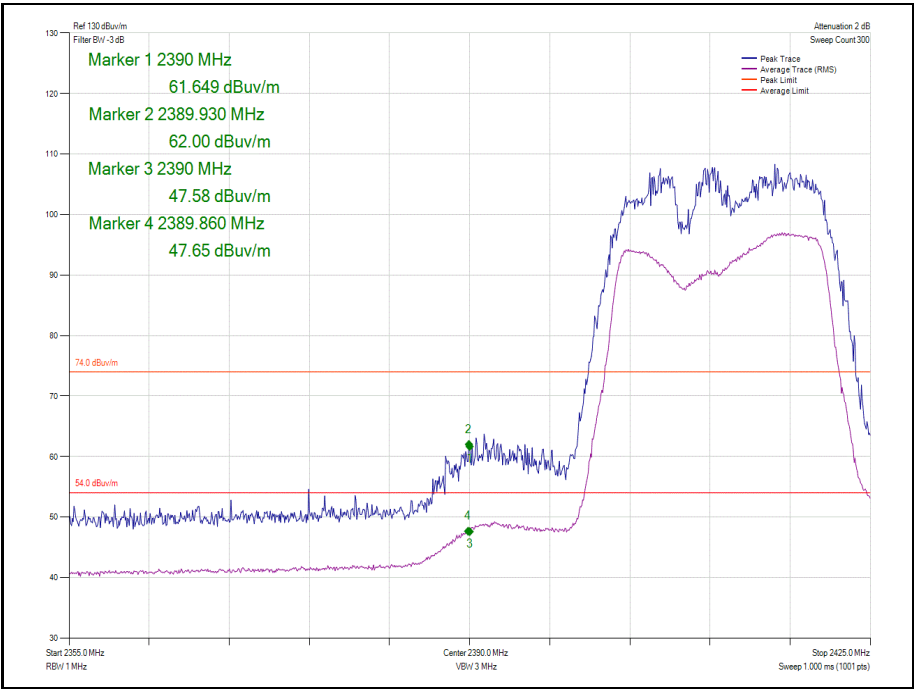


Figure 92 - 2412 MHz - Measured Frequency 2390.0 MHz



(MIMO 2 Tx, TXBF)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11n | MCS0          | 2467            | 2483.5                   | 64.69               | 51.23                  |
| 802.11n | MCS0          | 2472            | 2483.5                   | 68.22               | 51.17                  |

Table 48

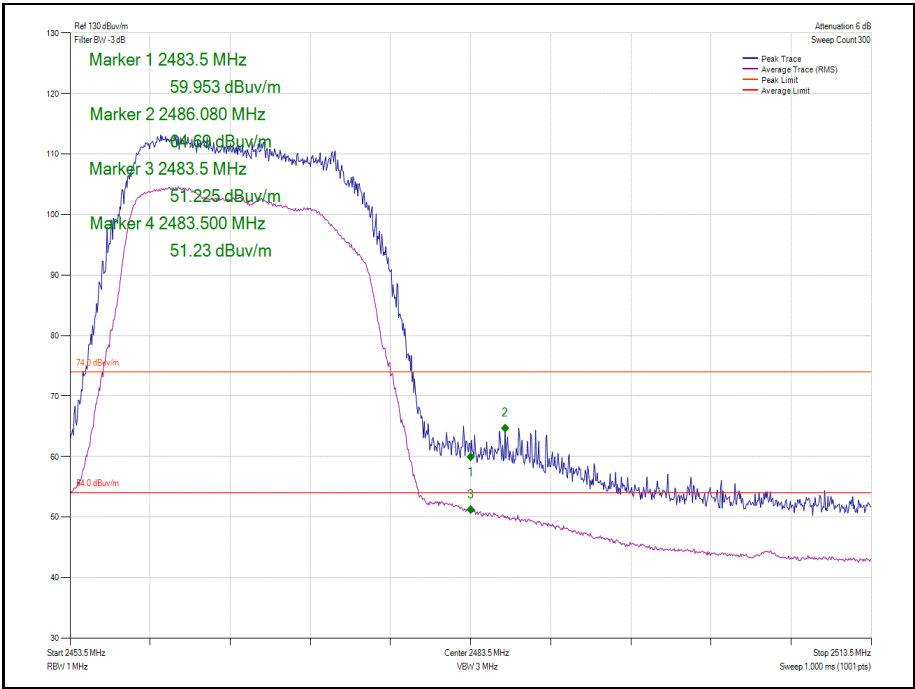


Figure 93 - 2467 MHz - Measured Frequency 2483.5 MHz

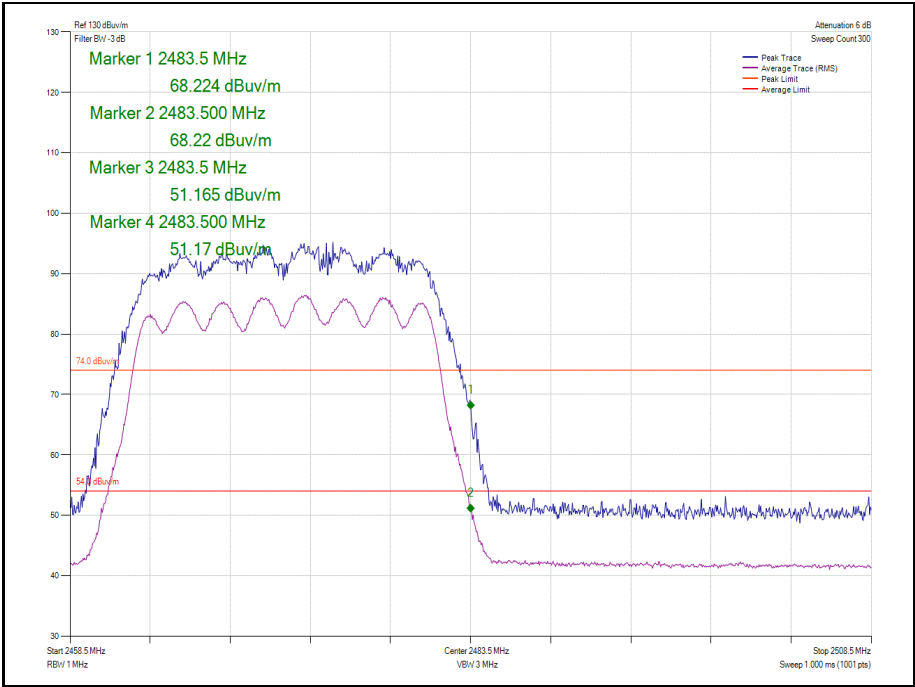


Figure 94 - 2472 MHz - Measured Frequency 2483.5 MHz



(MIMO 2Tx)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11b | 1 Mbps        | 2462            | 2483.5                   | 67.24               | 51.20                  |
| 802.11b | 1 Mbps        | 2412            | 2390.0                   | 59.62               | 49.48                  |

Table 49

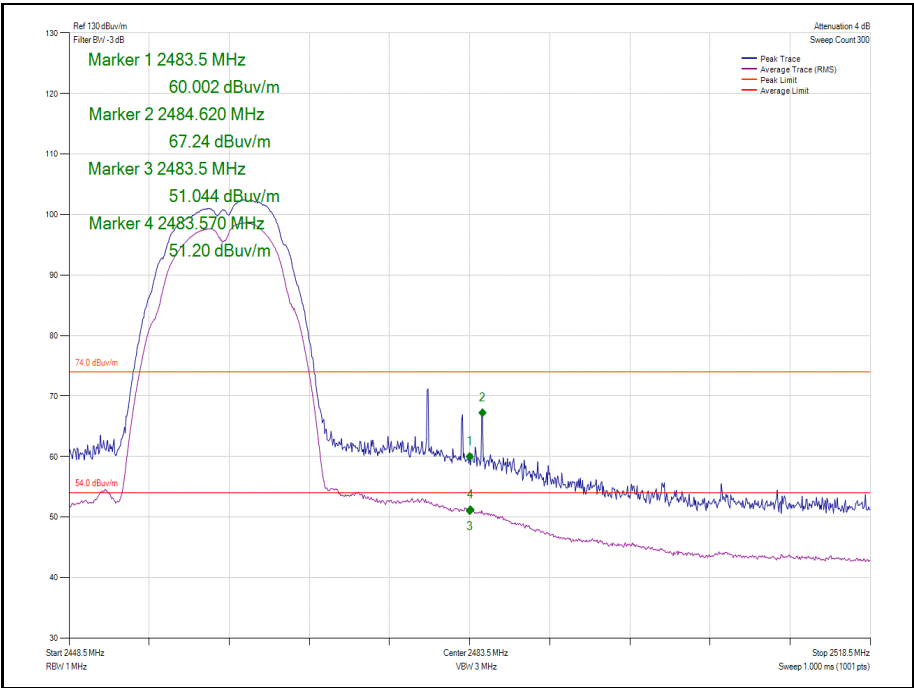


Figure 95 - 2462 MHz - Measured Frequency 2483.5 MHz

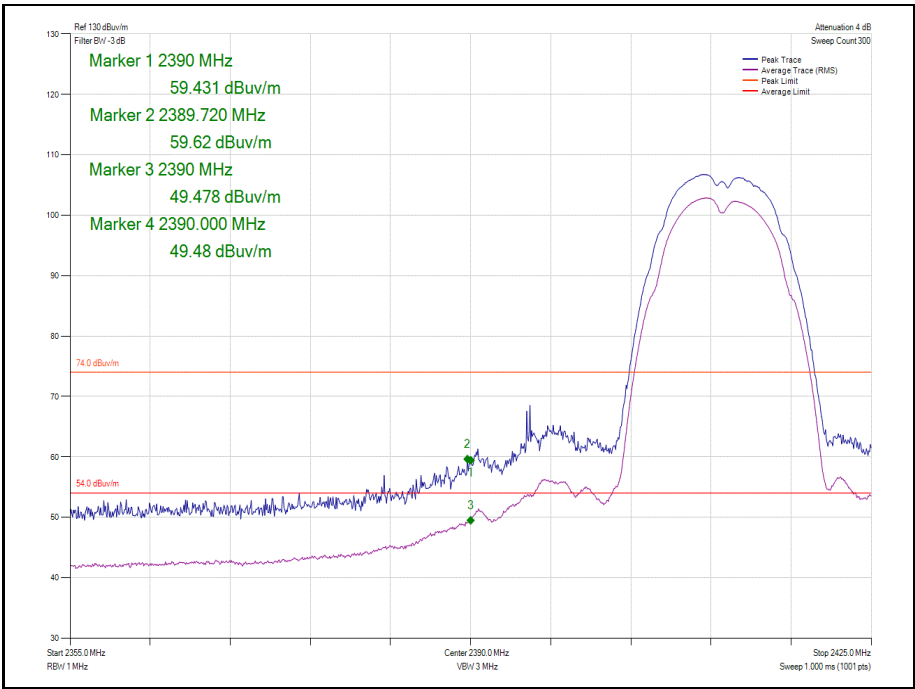


Figure 96 - 2412 MHz - Measured Frequency 2390.0 MHz



(MIMO 2Tx)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11b | 1 Mbps        | 2467            | 2483.5                   | 62.22               | 50.98                  |
| 802.11b | 1 Mbps        | 2472            | 2483.5                   | 58.96               | 47.16                  |

Table 50

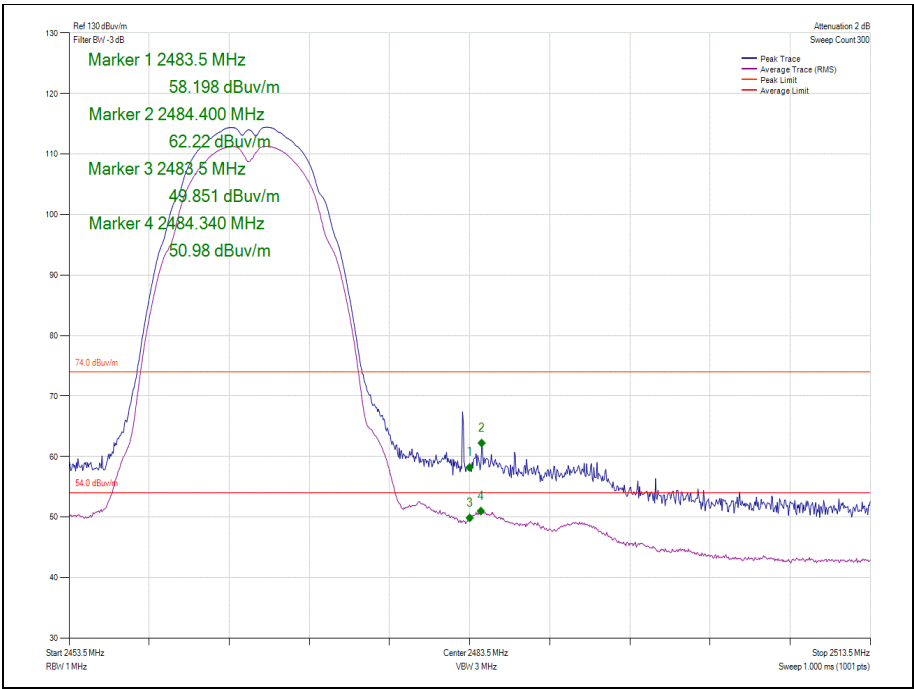


Figure 97 - 2467 MHz - Measured Frequency 2483.5 MHz

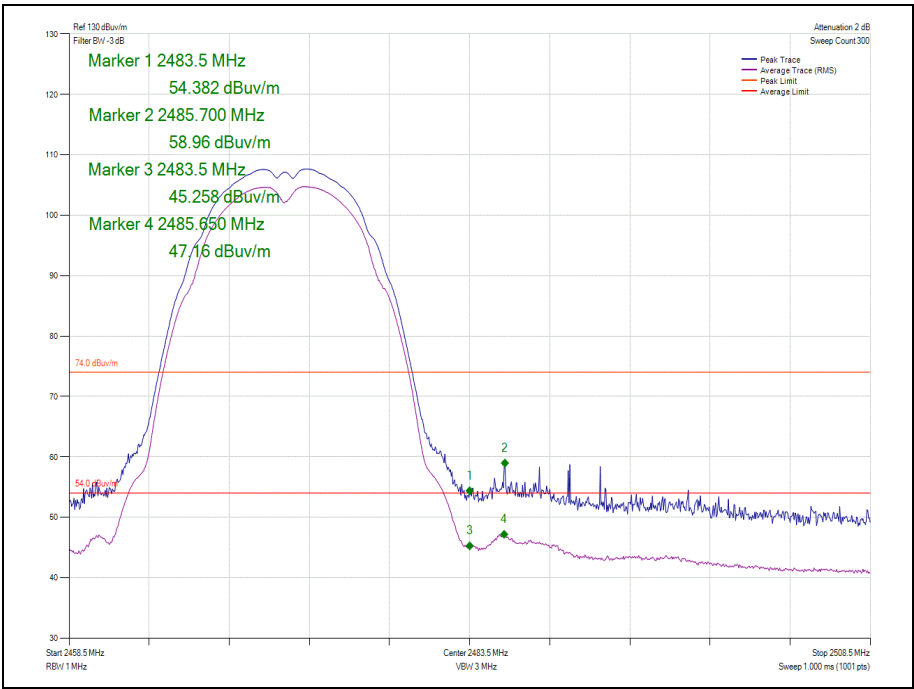


Figure 98 - 2472 MHz - Measured Frequency 2483.5 MHz



(MIMO 2Tx)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11n | MCS0          | 2462            | 2483.5                   | 64.05               | 51.57                  |
| 802.11n | MCS0          | 2412            | 2390.0                   | 64.47               | 51.25                  |

Table 51

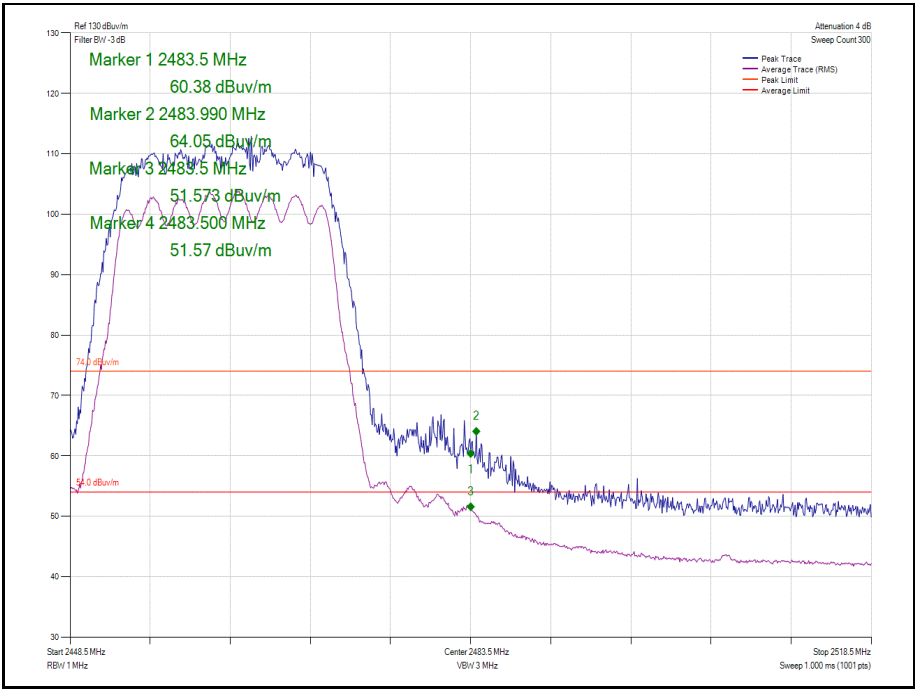


Figure 99 - 2462 MHz - Measured Frequency 2483.5 MHz

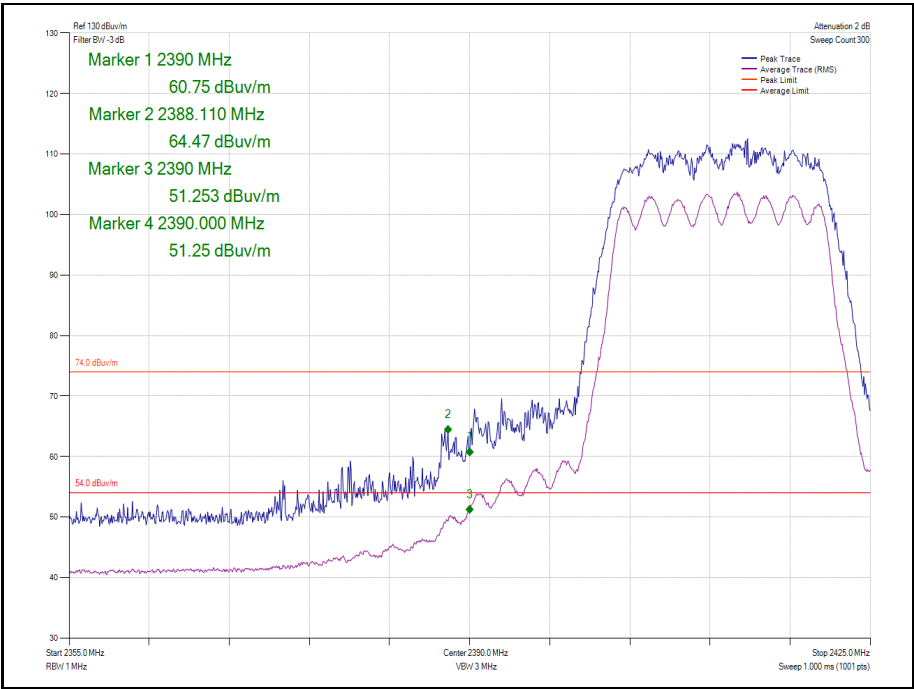


Figure 100 - 2412 MHz - Measured Frequency 2390.0 MHz



(MIMO 2Tx)

| Mode    | Data Rate/MCS | Frequency (MHz) | Measured Frequency (MHz) | Peak Level (dBμV/m) | Average Level (dBμV/m) |
|---------|---------------|-----------------|--------------------------|---------------------|------------------------|
| 802.11n | MCS0          | 2467            | 2483.5                   | 63.84               | 49.40                  |
| 802.11n | MCS0          | 2472            | 2483.5                   | 66.76               | 51.27                  |

Table 52

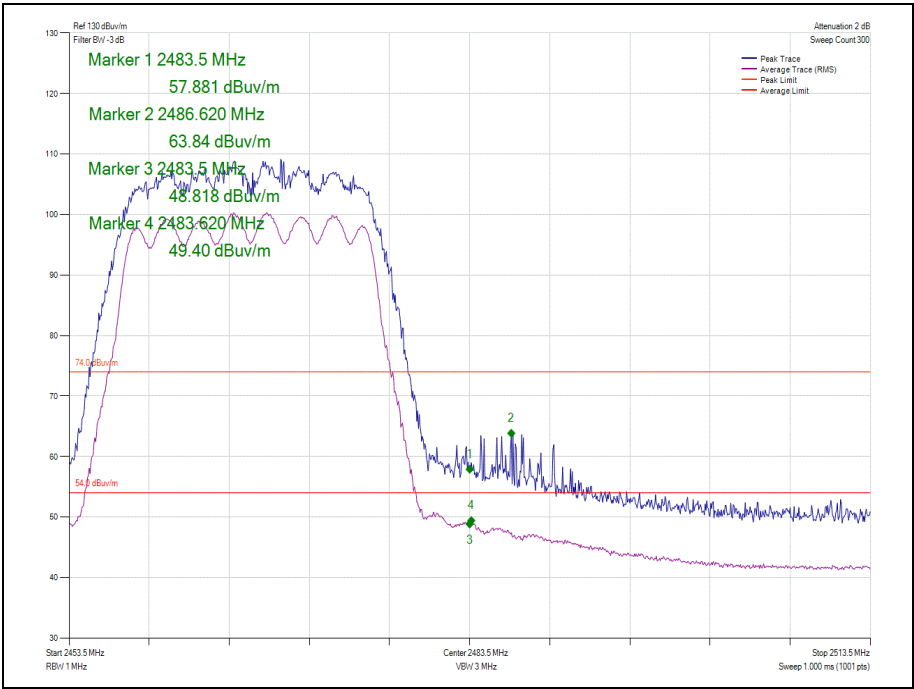


Figure 101 - 2467 MHz - Measured Frequency 2483.5 MHz

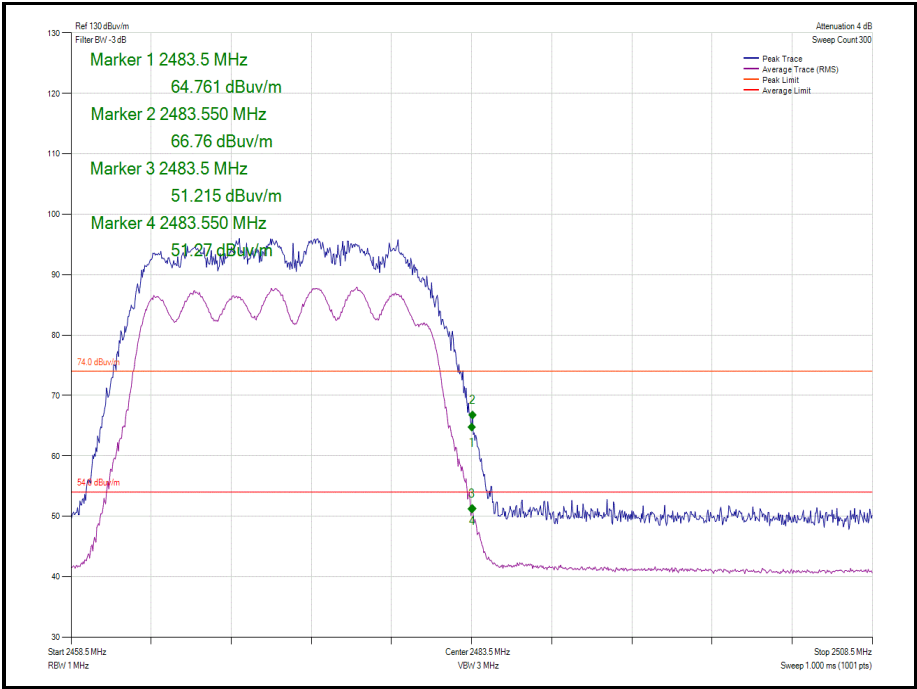


Figure 102 - 2472 MHz - Measured Frequency 2483.5 MHz



FCC 47 CFR Part 15, Limit Clause 15.209

| Frequency (MHz) | Field Strength ( $\mu\text{V}/\text{m}$ at 3 m) |
|-----------------|-------------------------------------------------|
| 30 to 88        | 100                                             |
| 88 to 216       | 150                                             |
| 216 to 960      | 200                                             |
| Above 960       | 500                                             |

**Table 53**

Industry Canada RSS-GEN, Limit Clause 8.9

| Frequency (MHz) | Field Strength ( $\mu\text{V}/\text{m}$ at 3 metres) |
|-----------------|------------------------------------------------------|
| 30-88           | 100                                                  |
| 88-216          | 150                                                  |
| 216-960         | 200                                                  |
| Above 960*      | 500                                                  |

**Table 54**

\*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.



## 2.5.8 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

| Instrument                          | Manufacturer          | Type No             | TE No | Calibration Period (months) | Calibration Due |
|-------------------------------------|-----------------------|---------------------|-------|-----------------------------|-----------------|
| Hygrometer                          | Rotronic              | HP21                | 4989  | 12                          | 26-April-2019   |
| Double Ridge Broadband Horn Antenna | Schwarzbeck           | BBHA 9120 B         | 4848  | 12                          | 12-Feb-2019     |
| Screened Room (5)                   | Rainford              | Rainford            | 1545  | 36                          | 23-Jan-2021     |
| Turntable Controller                | Inn-Co GmbH           | CO 1000             | 1606  | -                           | TU              |
| Tilt Antenna Mast                   | Maturo GmbH           | TAM 4.0-P           | 4811  | -                           | TU              |
| EMI Test Receiver                   | Rohde & Schwarz       | ESU40               | 3506  | 12                          | 22-Nov-2018     |
| Network Analyser                    | Rohde & Schwarz       | ZVA 40              | 3548  | 12                          | 09-Oct-2018     |
| Calibration Unit                    | Rohde & Schwarz       | ZV-Z54              | 4368  | 12                          | 06-Mar-2019     |
| Cable                               | Rosenberger           | LU7-071-1000        | 5104  | 6                           | 05-Oct-2019     |
| Cable                               | Rosenberger           | LU7-071-2000        | 4528  | -                           | O/P Mon         |
| Cable                               | Rosenberger           | 2303-0 9.0m PNm PNm | 4827  | 12                          | 04-Jan-2019     |
| EMI Receiver                        | Keysight Technologies | N9038A MXE          | 4628  | 12                          | 04-July-2019    |

**Table 55**

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



## **2.6 Spurious Radiated Emissions**

### **2.6.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (d) & 15.205  
Industry Canada RSS-247 Clause 5.5  
Industry Canada RSS-GEN Clause 6.13

### **2.6.2 Equipment Under Test and Modification State**

A1932, S/N: C02X5003L3J0 - Modification State 0  
A1932, S/N: C02X5004L3FP - Modification State 0

### **2.6.3 Date of Test**

09-September-2018 to 05-October 2018

### **2.6.4 Test Method**

Testing was performed in accordance with ANSI C63.10 clause 6.3, 6.5 and 6.6.

In the 30MHz to 1GHz range pre scans were only performed on mid channel (2441 MHz) and any emissions identified then measured on bottom (2402 MHz) and top (2480 MHz).

The plots shown are the characterization of the EUT. The limits on the plots represent the most stringent case for restricted bands, (54/74 dBuV/m @ 3m and 64/84 dBuV/m @ 1m) when compared to 20 dBc outside restricted bands. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

The following conversion can be applied to convert from dBμV/m to μV/m:  
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$ .

### **2.6.5 Reported Measurements**

Spurious Radiated Emissions measurements were performed, with the device operating in MIMO 2TX during tests on the Main Radio, as this was defined as worst case.

The measurements displayed within this report, have been limited to the mode which was shown to be worst case.

Further measurements are held on file by TÜV SÜD, and are available if required

Pre-scans were performed on two separate samples, C02X5003L3J0 and C02X5004L3FP.

The plots shown with this report are limited to C02X5003L3J0, however any final emissions identified were performed on both samples and are detailed in table 50 to 53 below.

### **2.6.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 20 - 23.6 °C  |
| Relative Humidity   | 36.3 - 60.2 % |



## 2.6.7 Test Results

### MIMO 2Tx, 802.11b

| Frequency (GHz) | Result (dBμV/m) |         | Limit (dBμV/m) |         | Margin (dB) |         |
|-----------------|-----------------|---------|----------------|---------|-------------|---------|
|                 | Peak            | Average | Peak           | Average | Peak        | Average |
| 4.824           | -               | 49.81   | 74.0           | 54.0    | -           | 4.19    |

**Table 56 – 2412 MHz - 1 GHz to 26 GHz – Radiated**

No other emissions were detected within 10 dB of the limit

| Frequency (MHz) | QP Level (dBuV/m) | QP Limit (dBuV/m) | QP Margin (dB) | Angle(Deg) | Height(m) | Polarity |
|-----------------|-------------------|-------------------|----------------|------------|-----------|----------|
| *               |                   |                   |                |            |           |          |

**Table 57 – 2442 MHz - 30 MHz to 1 GHz – Radiated**

\*No emissions were detected within 10 dB of the limit

| Frequency (GHz) | Result (dBμV/m) |         | Limit (dBμV/m) |         | Margin (dB) |         |
|-----------------|-----------------|---------|----------------|---------|-------------|---------|
|                 | Peak            | Average | Peak           | Average | Peak        | Average |
| 4.883           | -               | 50.04   | 74.0           | 54.0    | -           | 3.96    |

**Table 58 – 2442 MHz – 1 GHz to 26 GHz – Radiated**

No other emissions were detected within 10 dB of the limit

| Frequency (GHz) | Result (dBμV/m) |         | Limit (dBμV/m) |         | Margin (dB) |         |
|-----------------|-----------------|---------|----------------|---------|-------------|---------|
|                 | Peak            | Average | Peak           | Average | Peak        | Average |
| 4.943           | -               | 46.71   | 74.0           | 54.0    | -           | 7.29    |

**Table 59 - 2472 MHz - 1 GHz to 26 GHz – Radiated**

No other emissions were detected within 10 dB of the limit



MIMO 2Tx, 802.11b

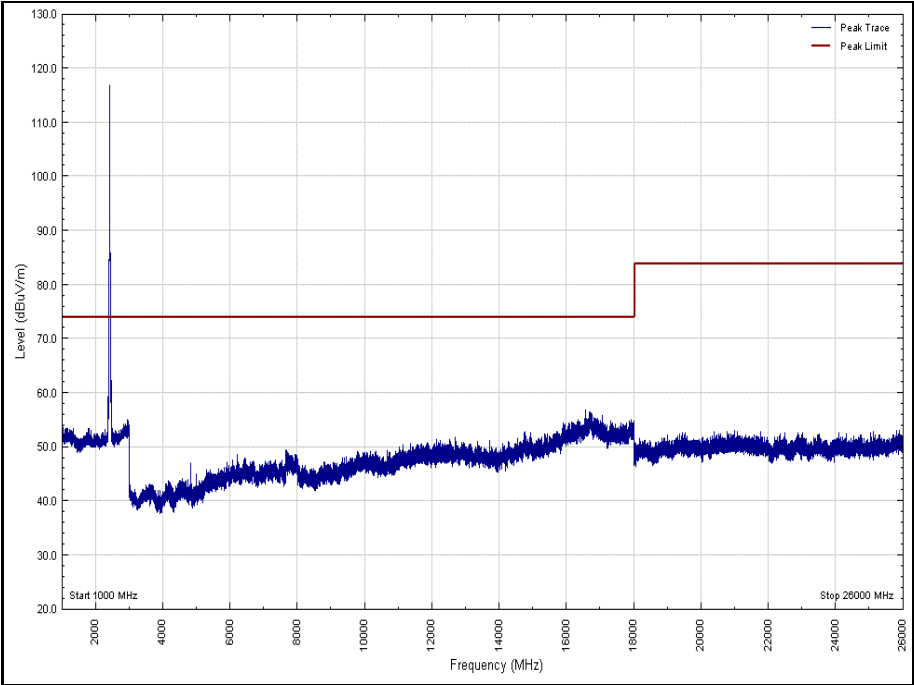


Figure 103 - 2412 MHz - 1 GHz to 26 GHz (Peak)  
Polarity: Horizontal

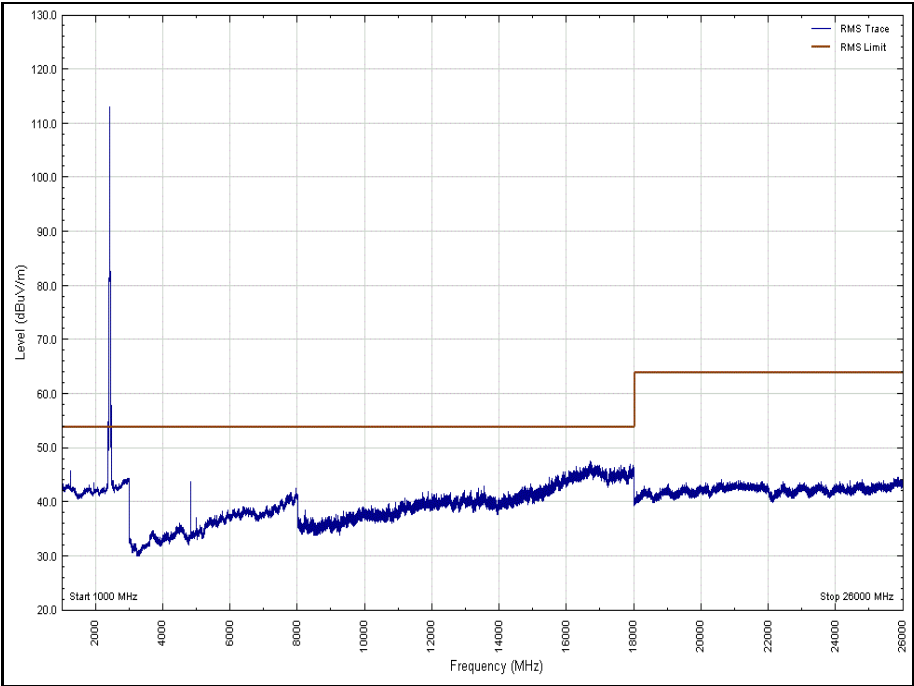


Figure 104 - 2412 MHz - 1 GHz to 26 GHz (Average)  
Polarity: Horizontal

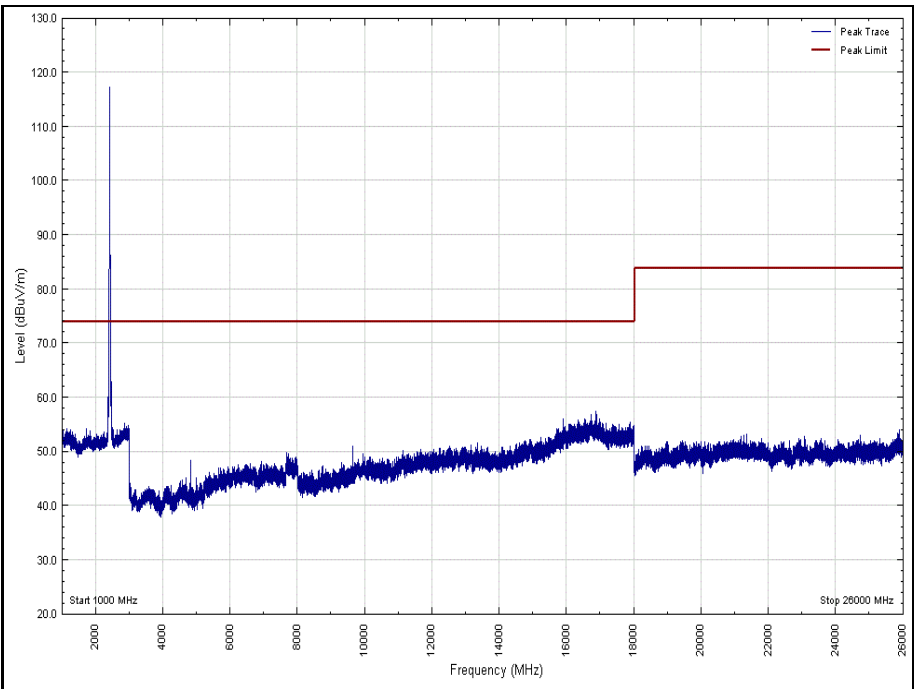


Figure 105 - 2412 MHz - 1 GHz to 26 GHz (Peak)  
Polarity: Vertical

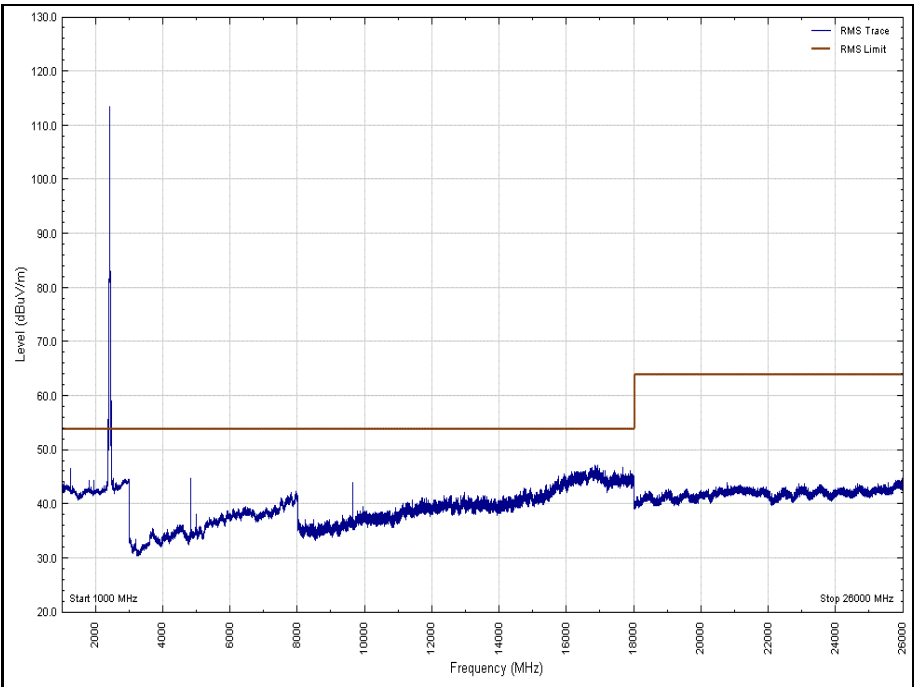


Figure 106 - 2412 MHz - 1 GHz to 26 GHz (Average)  
Polarity: Vertical

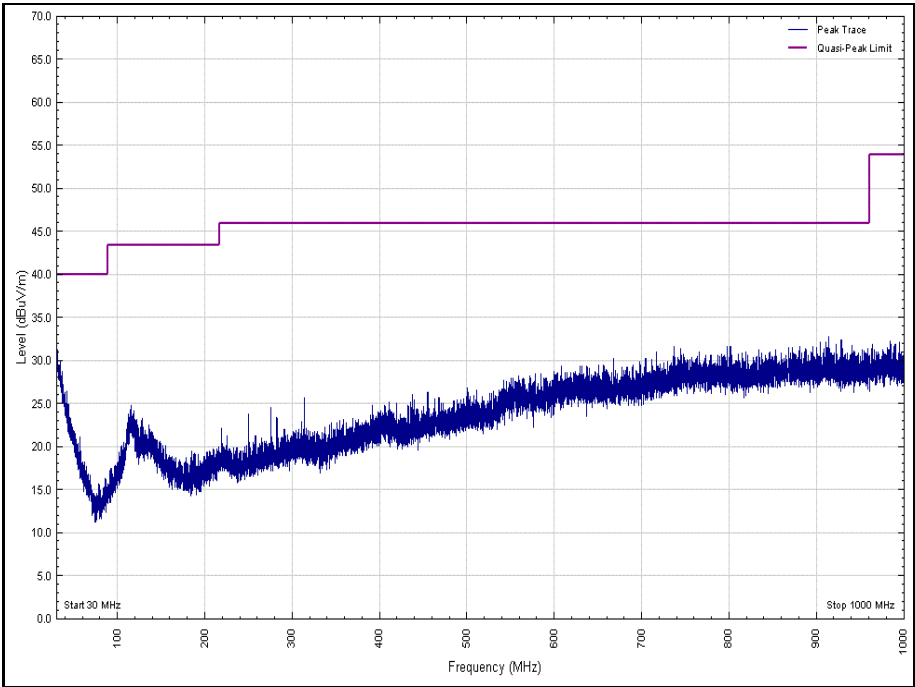


Figure 107 - 2442 MHz - 30 MHz to 1 GHz  
Polarity: Horizontal

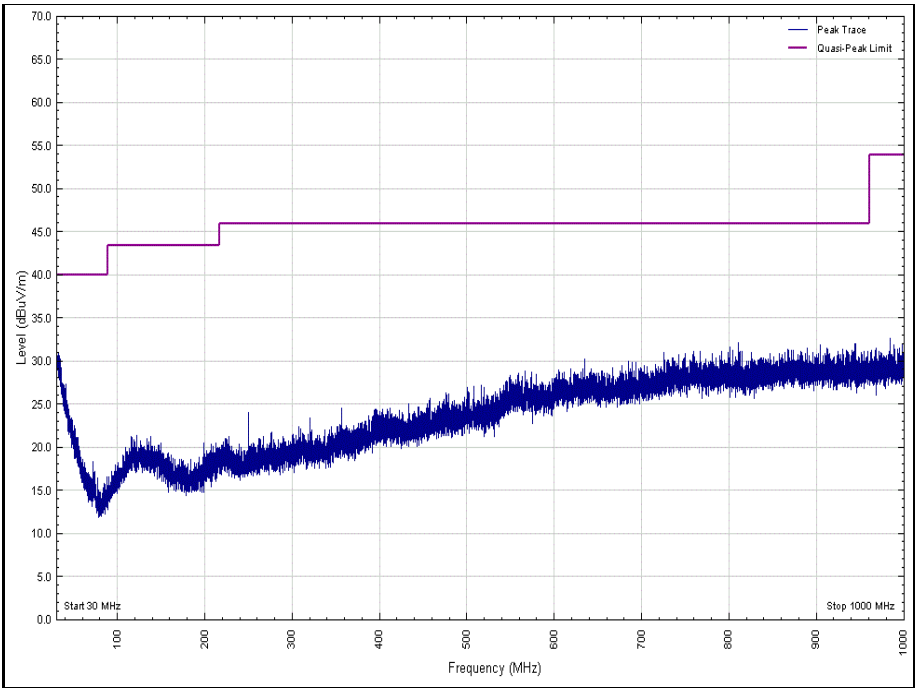


Figure 108 - 2442 MHz - 30 MHz to 1 GHz  
Polarity: Vertical

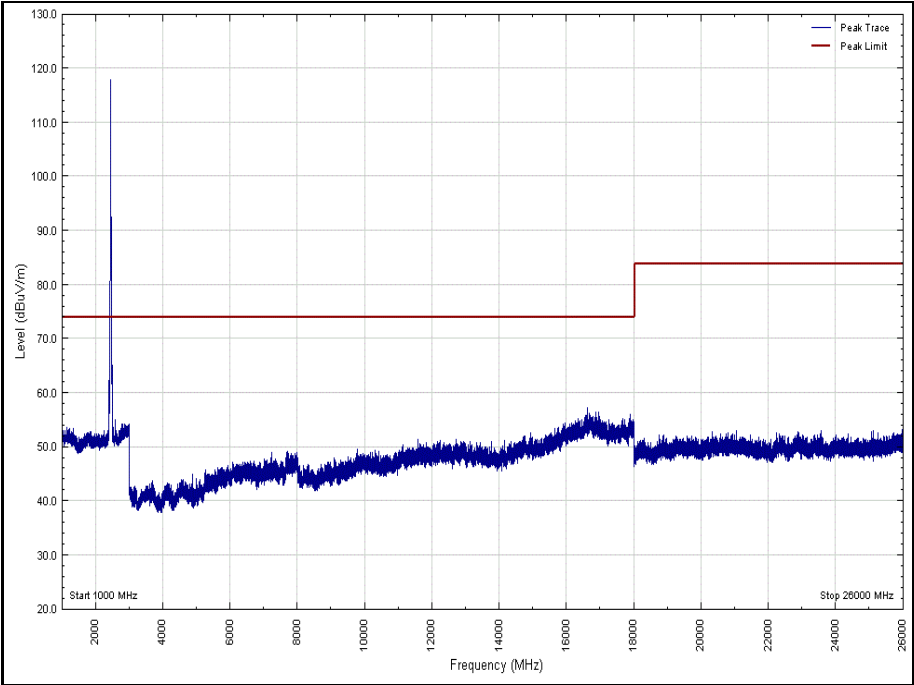


Figure 109 - 2442 MHz - 1 GHz to 26 GHz  
Polarity: Horizontal (Peak)

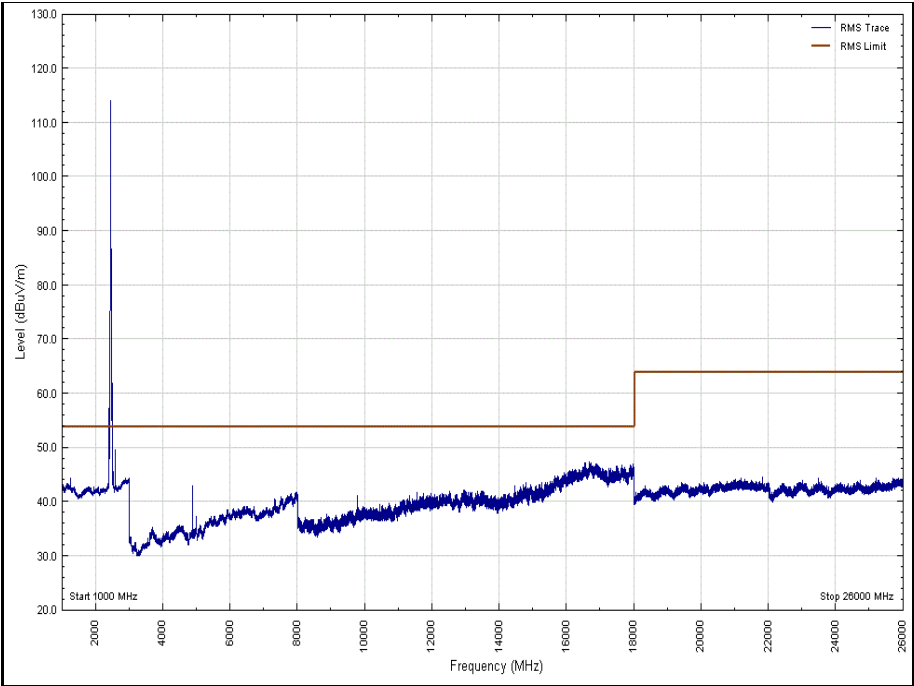


Figure 110 - 2442 MHz - 1 GHz to 26 GHz  
Polarity: Horizontal (Average)

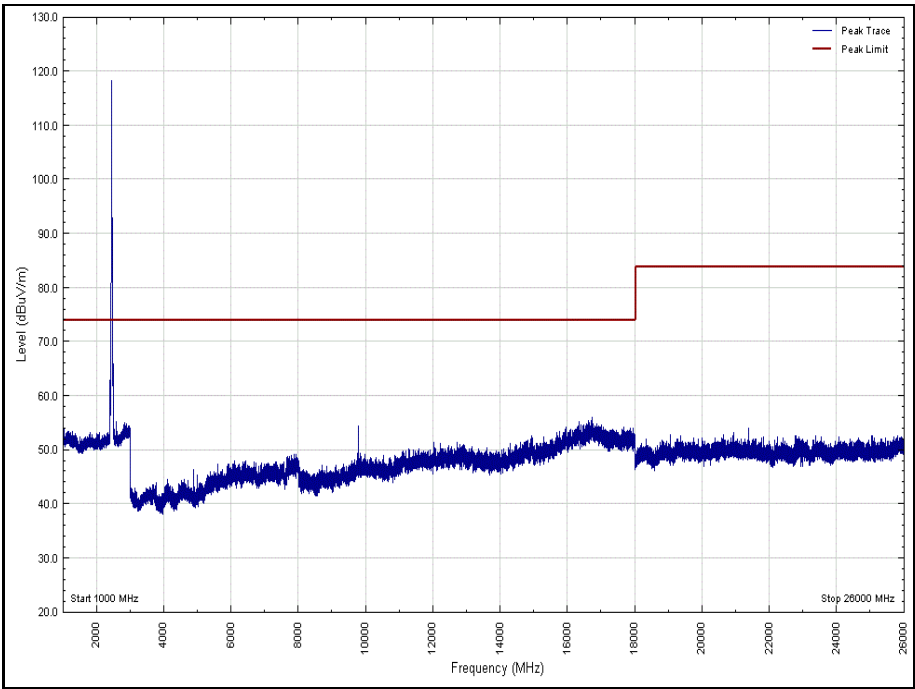


Figure 111 - 2442 MHz - 1 GHz to 26 GHz  
Polarity: Vertical (Peak)

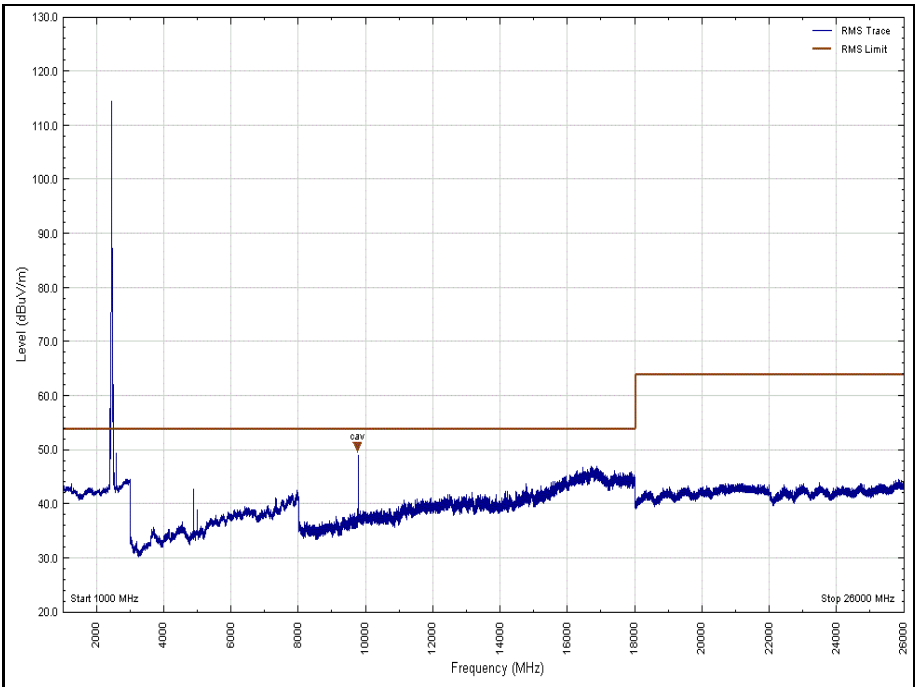


Figure 112 - 2442 MHz - 1 GHz to 26 GHz  
Polarity: Vertical (Average)

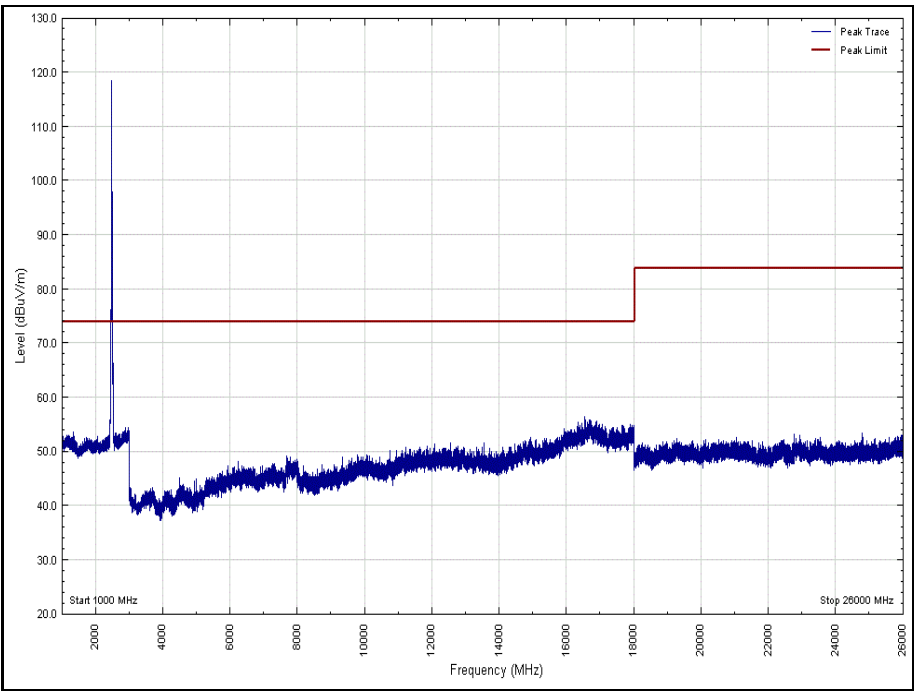


Figure 113 - 2472 MHz 1 GHz to 26 GHz  
Polarity: Horizontal (Peak)

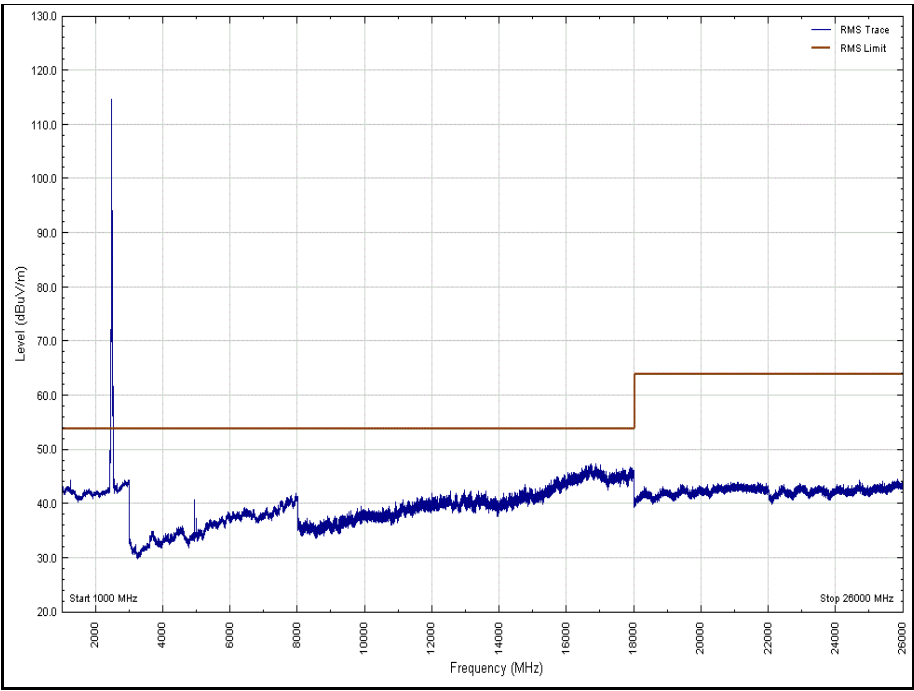


Figure 114 - 2472 MHz - 1 GHz to 26 GHz  
Polarity: Horizontal (Average)

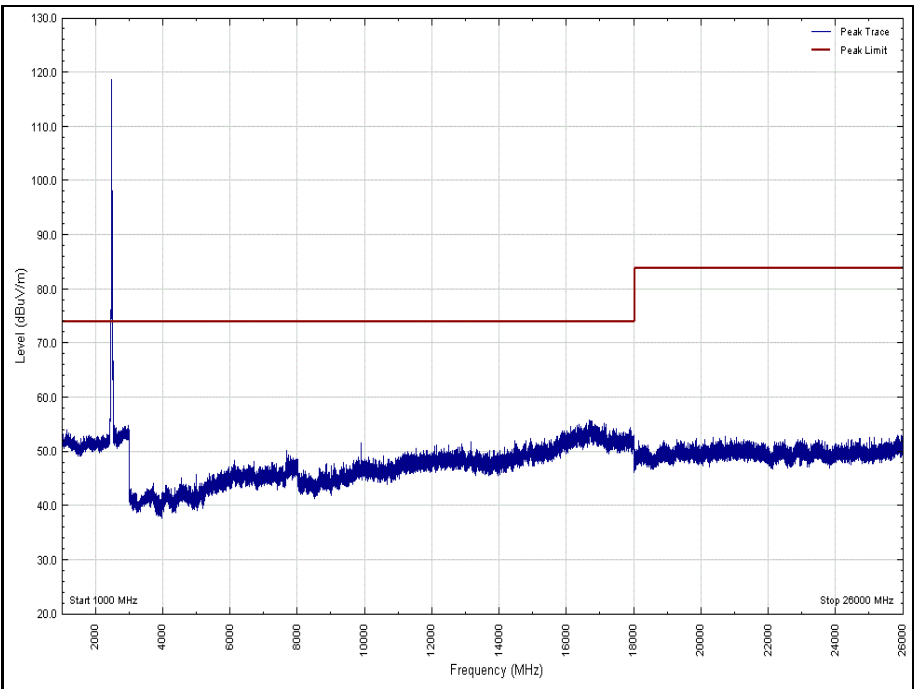


Figure 115 - 2472 MHz 1 GHz to 26 GHz  
Polarity: Vertical (Peak)

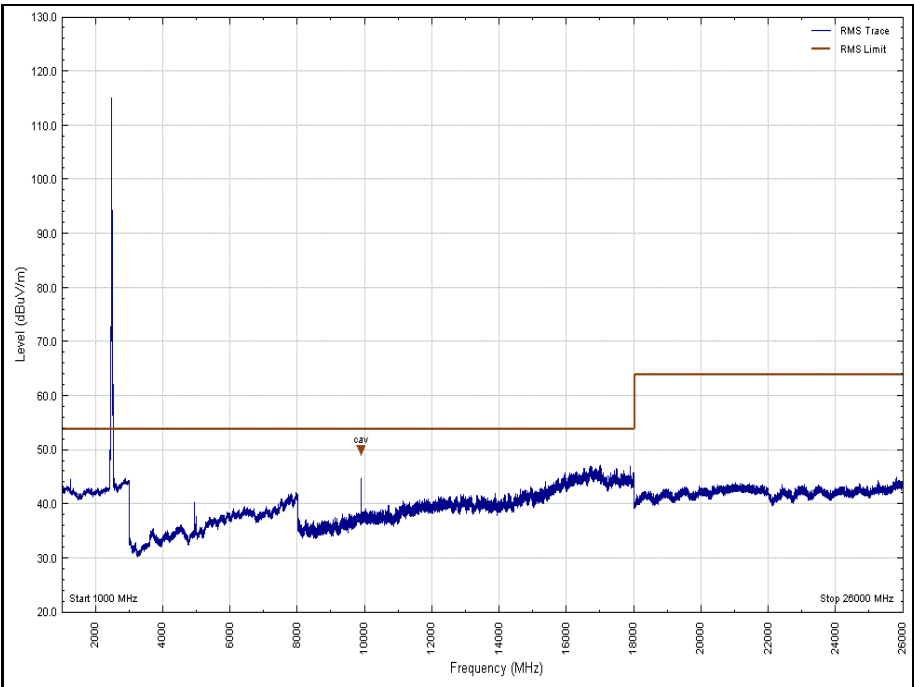


Figure 116 - 2472 MHz - 1 GHz to 26 GHz  
Polarity: Vertical (Average)



Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

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

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

Industry Canada RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.



## 2.6.8 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

| Instrument                           | Manufacturer          | Type No             | TE No | Calibration Period (months) | Calibration Due |
|--------------------------------------|-----------------------|---------------------|-------|-----------------------------|-----------------|
| Multimeter                           | White Gold            | WG022               | 190   | 12                          | 24-Nov-2018     |
| Pre-Amplifier                        | Agilent               | 8494B               | -     | -                           | O/P Mon         |
| Hygrometer                           | Rotronic              | HP21                | 4989  | 12                          | 26-April-2019   |
| Double Ridge Broadband Horn Antenna  | Schwarzbeck           | BBHA 9120 B         | 4848  | 12                          | 12-Feb-2019     |
| Antenna (Bilog)                      | Schaffner             | CBL6143             | 287   | 24                          | 15-May-2020     |
| Dual Power Supply Unit               | Thurlby               | PL320               | 288   | -                           | TU              |
| Filter (High Pass)                   | Lorch                 | SHP7-7000-SR        | 566   | 12                          | 10-May-2019     |
| Pre-Amplifier                        | Phase One             | PS04-0086           | 1533  | 12                          | 12-Jan-2019     |
| 18GHz - 40GHz Pre-Amplifier          | Phase One             | PS04-0087           | 1534  | 12                          | 02-Feb-2019     |
| Screened Room (5)                    | Rainford              | Rainford            | 1545  | 36                          | 23-Jan-2021     |
| Turntable Controller                 | Inn-Co GmbH           | CO 1000             | 1606  | -                           | TU              |
| Antenna (Bilog)                      | Chase                 | CBL6143             | 2904  | 24                          | 08-Aug-2019     |
| Cable (N-N, 8m)                      | Rhophase              | NPS-2302-8000-NPS   | 3248  | -                           | O/P Mon         |
| EMI Test Receiver                    | Rohde & Schwarz       | ESU40               | 3506  | 12                          | 22-Nov-2018     |
| Network Analyser                     | Rohde & Schwarz       | ZVA 40              | 3548  | 12                          | 09-Oct-2018     |
| 1501A 4.0M Km Km Cable               | Rhophase              | KPS-1501A-4000-KPS  | 4301  | 12                          | 19-Feb-2019     |
| 1GHz to 8GHz Low Noise Amplifier     | Wright Technologies   | APS04-0085          | 4365  | 12                          | 18-Oct-2018     |
| Calibration Unit                     | Rohde & Schwarz       | ZV-Z54              | 4368  | 12                          | 06-Mar-2019     |
| Cable                                | Rosenberger           | LU7-071-1000        | 5104  | 12                          | 05-Oct-2019     |
| Cable                                | Rosenberger           | LU7-071-2000        | 4528  | -                           | O/P Mon         |
| Cable                                | Rosenberger           | 2303-0 9.0m PNm PNm | 4827  | 12                          | 04-Jan-2019     |
| EMI Receiver                         | Keysight Technologies | N9038A MXE          | 4628  | 12                          | 04-July-2019    |
| Double Ridged Waveguide Horn Antenna | ETS-Lindgren          | 3117                | 4722  | 12                          | 01-Mar-2019     |



|                   |             |              |      |    |             |
|-------------------|-------------|--------------|------|----|-------------|
| Mast Controller   | Maturo Gmbh | NCD          | 4810 | -  | TU          |
| Tilt Antenna Mast | Maturo Gmbh | TAM 4.0-P    | 4811 | -  | TU          |
| Hygrometer        | Rotronic    | HP21         | 4989 | 12 | 26-Apr-2019 |
| Cable (26.5GHz    | Rosenberger | LU7-133-5000 | 5019 | -  | O/P Mon     |
| Cable (40GHz      | Rosenberger | LU1-001-2000 | 5020 | -  | O/P Mon     |

**Table 60**

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



### 3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

| Test Name                      | Measurement Uncertainty                                |
|--------------------------------|--------------------------------------------------------|
| Maximum Conducted Output Power | ± 3.2 dB                                               |
| Power Spectral Density         | ± 3.2 dB                                               |
| Emission Bandwidth             | ± 358.561 kHz                                          |
| Authorised Band Edges          | 30 MHz to 1 GHz: ± 5.2 dB<br>1 GHz to 40 GHz: ± 6.3 dB |
| Restricted Band Edges          | 30 MHz to 1 GHz: ± 5.2 dB<br>1 GHz to 40 GHz: ± 6.3 dB |
| Spurious Radiated Emissions    | 30 MHz to 1 GHz: ± 5.2 dB<br>1 GHz to 40 GHz: ± 6.3 dB |

Table 61