

# EMC Test Report

**Project Number:** 4227659

**Report Number:** 4227659EMC01

**Revision Level:** 0

**Client:** Technicolor Connected Home USA LLC

**Equipment Under Test:** Channel Master Android TV

**Model:** CM-7600

**FCC ID:** G95-CM-7600

**IC ID:** 431C-DWT765CHA

**Applicable Standards:** ANSI C63.10: 2013 (FCC Part 15 Subpart C, § 15.247)

RSS-247, Issue 2

RSS-GEN Issue 4

**Report issued on:** 20 December 2017

**Test Result:** Compliant

Tested by:

  
\_\_\_\_\_  
Jeremy Pickens, Senior EMC Engineer

Reviewed by:

  
\_\_\_\_\_  
David Schramm, Operations Manager

*Remarks: This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.*

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## Table of Contents

|          |                                                                |           |
|----------|----------------------------------------------------------------|-----------|
| <b>1</b> | <b>SUMMARY OF TEST RESULTS .....</b>                           | <b>4</b>  |
| 1.1      | MODIFICATIONS REQUIRED FOR COMPLIANCE .....                    | 4         |
| <b>2</b> | <b>GENERAL INFORMATION.....</b>                                | <b>5</b>  |
| 2.1      | CLIENT INFORMATION .....                                       | 5         |
| 2.2      | TEST LABORATORY .....                                          | 5         |
| 2.3      | GENERAL INFORMATION OF EUT .....                               | 5         |
| 2.4      | OPERATING MODES AND CONDITIONS .....                           | 5         |
| 2.5      | EUT CONNECTION BLOCK DIAGRAM – CONDUCTED MEASUREMENTS.....     | 6         |
| 2.6      | EUT CONNECTION BLOCK DIAGRAM – RADIATED MEASUREMENTS .....     | 6         |
| 2.7      | SYSTEM CONFIGURATIONS .....                                    | 7         |
| <b>3</b> | <b>BANDWIDTH .....</b>                                         | <b>8</b>  |
| 3.1      | TEST RESULT.....                                               | 8         |
| 3.2      | TEST METHOD.....                                               | 8         |
| 3.3      | TEST SITE .....                                                | 8         |
| 3.4      | TEST EQUIPMENT .....                                           | 8         |
| 3.5      | TEST DATA.....                                                 | 8         |
| <b>4</b> | <b>OUTPUT POWER .....</b>                                      | <b>10</b> |
| 4.1      | TEST RESULT.....                                               | 10        |
| 4.2      | TEST METHOD.....                                               | 10        |
| 4.3      | TEST SITE .....                                                | 10        |
| 4.4      | TEST EQUIPMENT .....                                           | 10        |
| 4.5      | TEST DATA.....                                                 | 11        |
| <b>5</b> | <b>POWER SPECTRAL DENSITY .....</b>                            | <b>12</b> |
| 5.1      | TEST RESULT.....                                               | 12        |
| 5.2      | TEST METHOD.....                                               | 12        |
| 5.3      | TEST SITE .....                                                | 12        |
| 5.4      | TEST EQUIPMENT .....                                           | 12        |
| 5.5      | TEST DATA.....                                                 | 12        |
| <b>6</b> | <b>CONDUCTED SPURIOUS EMISSIONS .....</b>                      | <b>14</b> |
| 6.1      | TEST RESULT.....                                               | 14        |
| 6.2      | TEST METHOD.....                                               | 14        |
| 6.3      | TEST SITE .....                                                | 14        |
| 6.4      | TEST EQUIPMENT .....                                           | 14        |
| 6.5      | TEST DATA – DTS BANDEDGE .....                                 | 15        |
| 6.6      | TEST DATA – CONDUCTED SPURIOUS EMISSIONS .....                 | 17        |
| <b>7</b> | <b>FIELD STRENGTH OF SPURIOUS RADIATION.....</b>               | <b>19</b> |
| 7.1      | TEST RESULT.....                                               | 19        |
| 7.2      | TEST METHOD.....                                               | 19        |
| 7.3      | TEST SITE .....                                                | 19        |
| 7.4      | TEST EQUIPMENT .....                                           | 20        |
| 7.5      | PEAK PLOTS .....                                               | 21        |
| 7.6      | TABULAR DATA .....                                             | 31        |
| <b>8</b> | <b>RADIATED EMISSIONS AT BAND EDGE / RESTRICTED BAND .....</b> | <b>32</b> |
| 8.1      | TEST RESULT.....                                               | 32        |
| 8.2      | TEST SITE .....                                                | 32        |
| 8.3      | TEST EQUIPMENT .....                                           | 32        |
| 8.4      | TEST DATA – BAND EDGE .....                                    | 33        |



**9 CONDUCTED EMISSIONS ..... 36**

9.1 TEST RESULT..... 36

9.2 TEST METHOD..... 36

9.3 TEST SITE ..... 36

9.4 TEST EQUIPMENT ..... 36

9.5 TEST DATA..... 37

**10 REVISION HISTORY ..... 39**

## 1 Summary of Test Results

| Test Description                                  | Test Specification |                                  | Test Result   |
|---------------------------------------------------|--------------------|----------------------------------|---------------|
| Bandwidth                                         | 15.247(d)          | RSS-247 S5.2 (1)<br>RSS-GEN S6.6 | Compliant     |
| Transmitter Output Power                          | 15.247(b)(3)       | RSS-247 S5.4 (4)                 | Compliant     |
| Power Spectral Density                            | 15.247(e)          | RSS-247 S5.2 (2)                 | Compliant     |
| Conducted Spurious Emissions /<br>Band edge       | 15.247(d)          | RSS-247 S5.5                     | Compliant     |
| Radiated Spurious Emissions /<br>Restricted Bands | 15.35(b),15.209    | RSS-GEN S6.13<br>RSS-GEN S8.10   | Compliant     |
| Antenna Requirement                               | 15.203             | RSS-GEN S8.3                     | Compliant (1) |
| AC Powerline Conducted<br>Emission                | 15.107, 15.207     | RSS-GEN S8.8                     | Compliant     |

1) Internal PCB trace antenna

### 1.1 Modifications Required for Compliance

None

## 2 General Information

### 2.1 Client Information

Name: Technicolor Connected Home USA LLC  
Address: 5030 Sugarloaf Parkway Building 6  
City, State, Zip, Country: Lawrenceville, GA 30044, USA

### 2.2 Test Laboratory

Name: SGS North America, Inc.  
Address: 620 Old Peachtree Road NW, Suite 100  
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA  
Type of lab: Testing Laboratory  
Certificate Number: 3212.01

### 2.3 General Information of EUT

Type of Product: Channel Master Android TV  
Model Number: CM-7600  
Serial Number: 211930007386700018

Frequency Range: 2400-2483.5MHz  
Data Modes: 802.11b, 802.11g, 802.11n (HT20)  
Antenna: 2x Internal PCB Trace, Cross-Polarized  
          #1 3.5 dBi Max Gain  
          #2 2.4 dBi Max Gain

Rated Voltage: 12Vdc (Supplied via 100-120Vac, 60Hz AC Adapter)  
Test Voltage: 12Vdc, (120Vac, 60Hz)

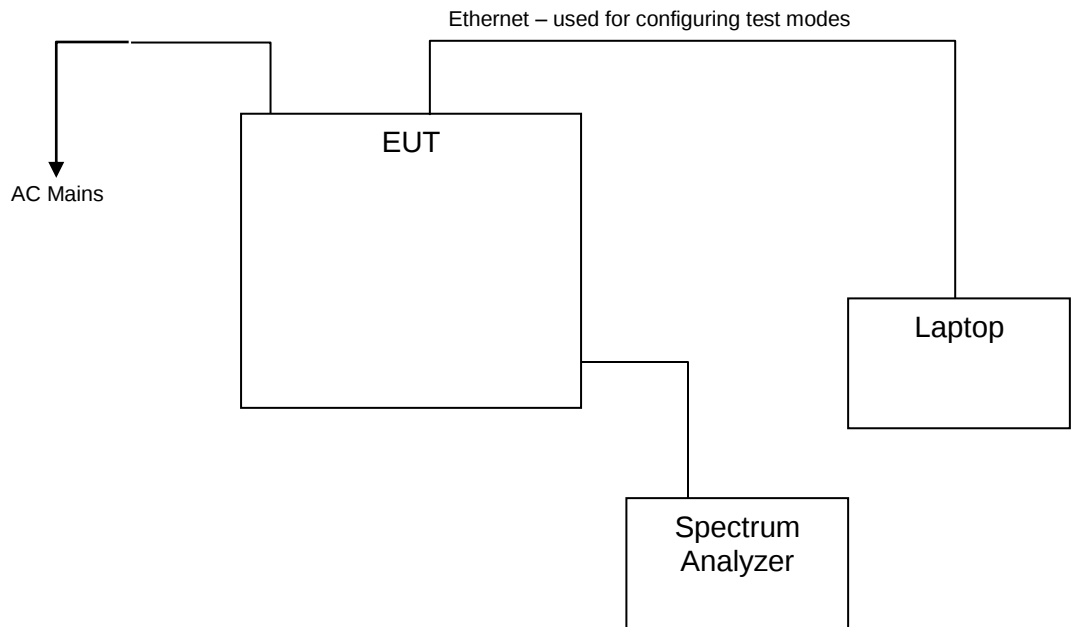
Sample Received Date: 30 October 2017  
Dates of testing: 08 November - 08 December 2017

### 2.4 Operating Modes and Conditions

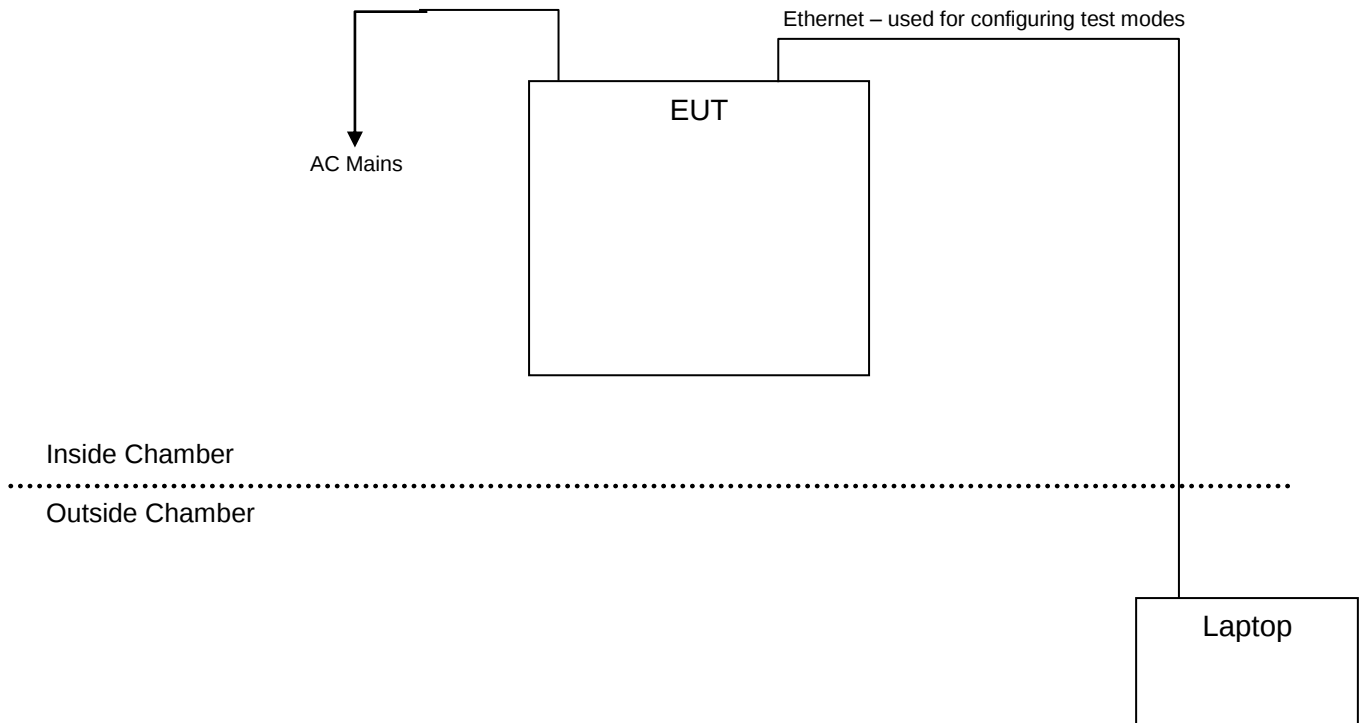
For spurious emissions measurements, only the worst-case mode with respect to peak power was investigated: 802.11b, 1Mbps. Investigations covered the low, middle, and high channels in the 2400-2483.5MHz band.

Continuous traffic was generated using test commands. Where the duty cycle measured below 99% and an RMS detector was employed, corrections of  $10 \cdot \text{LOG}(1/D)$  were applied according to KDB publication 558074 D01 DTS Meas Guidance v04.

## 2.5 EUT Connection Block Diagram – Conducted Measurements



## 2.6 EUT Connection Block Diagram – Radiated Measurements



## 2.7 System Configurations

| Device reference | Manufacturer | Description               | Model Number | Serial Number      |
|------------------|--------------|---------------------------|--------------|--------------------|
| A                | Technicolor  | Channel Master Android TV | CM-7600      | 211930007386700018 |
| B                | Lenovo       | ThinkPad Laptop           | T400         | 276731U            |

### 3 Bandwidth

#### 3.1 Test Result

| Test Description         | Test Specification |                                  | Test Result |
|--------------------------|--------------------|----------------------------------|-------------|
| 6 dB bandwidth / 99% OBW | 15.247(d)          | RSS-247 S5.2 (1)<br>RSS-GEN S6.6 | Compliant   |

#### 3.2 Test Method

The procedures from ANSI C63.10: 2013 clause 11.8 and 558074 D01 DTS Meas Guidance v04 were used to determine the 6 dB bandwidth and 99% OBW.

#### 3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.8 °C  
Relative Humidity: 38.5 %

#### 3.4 Test Equipment

Test End Date: 13-Nov-2017

Tester: JOP

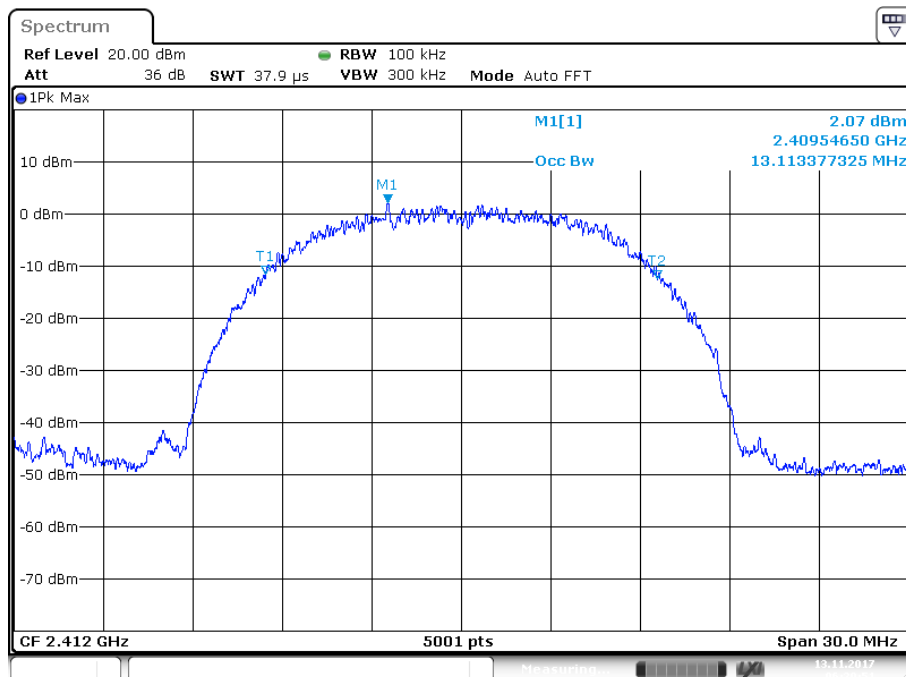
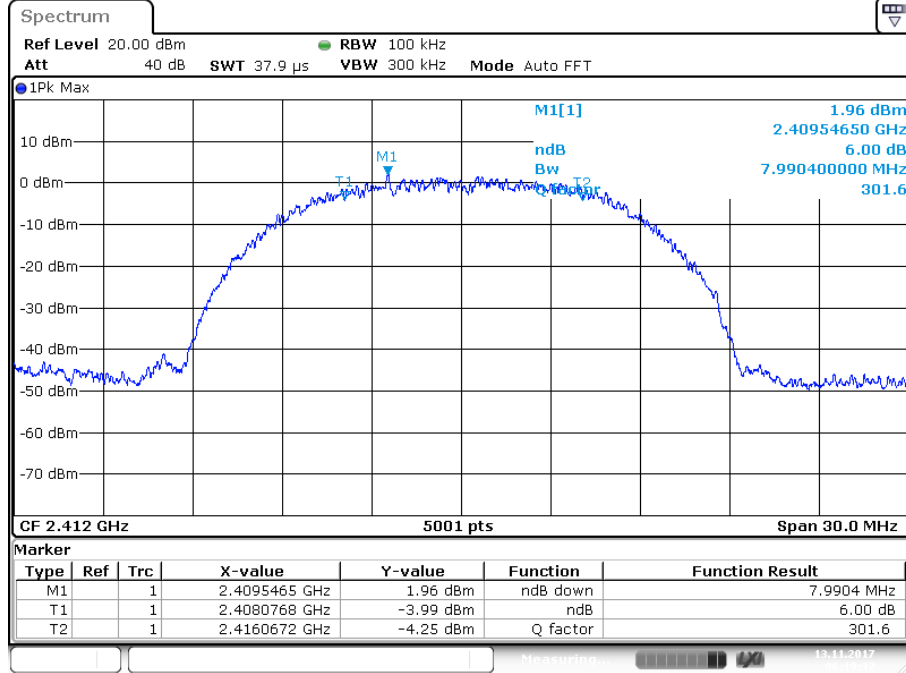
| Equipment        | Model | Manufacturer    | Asset Number | Cal Due Date |
|------------------|-------|-----------------|--------------|--------------|
| SPCTRUM ANALYZER | FSV30 | ROHDE & SCHWARZ | S/N: 103106  | 24-Jul-2018  |
| RF CABLE         | SF102 | HUBER & SUHNER  | B079823      | 26-Jul-2018  |

Note: The equipment calibration period is 1 year.

#### 3.5 Test Data

| Protocol       | Channel | Data Rate | 6dB Bandwidth (MHz) | Occupied Bandwidth (99%) (MHz) |
|----------------|---------|-----------|---------------------|--------------------------------|
| 802.11b        | 1       | 11 Mbps   | 7.990               | 13.113                         |
| 802.11b        | 6       | 11 Mbps   | 7.968               | 13.057                         |
| 802.11b        | 11      | 11 Mbps   | 7.948               | 13.047                         |
| 802.11g        | 1       | 54 Mbps   | 16.157              | 16.347                         |
| 802.11g        | 6       | 54 Mbps   | 16.33               | 16.327                         |
| 802.11g        | 11      | 54 Mbps   | 16.341              | 16.326                         |
| 802.11n (HT20) | 1       | MCS7      | 17.536              | 17.526                         |
| 802.11n (HT20) | 6       | MCS7      | 17.512              | 17.532                         |
| 802.11n (HT20) | 11      | MCS7      | 16.933              | 17.582                         |

## Sample Plots



## 4 Output Power

### 4.1 Test Result

| Test Description  | Test Specification |                  | Test Result |
|-------------------|--------------------|------------------|-------------|
| Peak Output Power | 15.247(b) (3)      | RSS-247 S5.4 (4) | Compliant   |

### 4.2 Test Method

Fundamental power measurements were recorded using the peak power procedures from ANSI C63.10: 2013 clause 11.9 and KDB 558074 D01 Measurement Guidance v04. The lowest data rate for each modulation was found to be the worst-case.

#### Limit

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. For using antennas with greater than 6dBi of gain, the limit is reduced in dB by the amount the gain exceeds 6dBi (e.g. for a 7.4dBi antenna, the limit is reduced from 30dBm to 28.6dBm)

### 4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

#### Environmental Conditions

Temperature: 22.8 °C  
 Relative Humidity: 38.5 %

### 4.4 Test Equipment

Test End Date: 13-Nov-2017

Tester: JOP

| Equipment        | Model | Manufacturer    | Asset Number | Cal Due Date |
|------------------|-------|-----------------|--------------|--------------|
| SPCTRUM ANALYZER | FSV30 | ROHDE & SCHWARZ | S/N: 103106  | 24-Jul-2018  |
| RF CABLE         | SF102 | HUBER & SUHNER  | B079823      | 26-Jul-2018  |

Note: The equipment calibration period is 1 year.

#### 4.5 Test Data

| 802.11b 20MHz   |                |               |               |                   |             |             |
|-----------------|----------------|---------------|---------------|-------------------|-------------|-------------|
| Frequency (MHz) | Channel (WLAN) | Chain 0 (dBm) | Chain 1 (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
| 2412            | 1              | 14.1          | 13.9          | 17.02             | 30          | -13.0       |
| 2437            | 6              | 14            | 14.4          | 17.22             | 30          | -12.78      |
| 2462            | 11             | 14.2          | 14.3          | 17.27             | 30          | -12.73      |

| 802.11g 20MHz   |                |               |               |             |                 |        |
|-----------------|----------------|---------------|---------------|-------------|-----------------|--------|
| Frequency (MHz) | Channel (WLAN) | Chain 0 (dBm) | Chain 1 (dBm) | Total Power | Power Limit dBm | Margin |
| 2412            | 1              | 13.7          | 13.3          | 16.52       | 30              | -13.48 |
| 2437            | 6              | 13.7          | 13            | 16.38       | 30              | -13.62 |
| 2462            | 11             | 13.5          | 13.3          | 16.42       | 30              | -13.58 |

| 802.11n 20MHz   |                |               |               |             |                 |        |
|-----------------|----------------|---------------|---------------|-------------|-----------------|--------|
| Frequency (MHz) | Channel (WLAN) | Chain 0 (dBm) | Chain 1 (dBm) | Total Power | Power Limit dBm | Margin |
| 2412            | 1              | 13.5          | 13.4          | 16.47       | 30              | -13.53 |
| 2437            | 6              | 13.7          | 13.4          | 16.57       | 30              | -13.43 |
| 2462            | 11             | 13.9          | 13.4          | 16.67       | 30              | -13.33 |

Antenna Gains are 3.5dBi and 2.4dBi respectively (Cross-Polarized)

## 5 Power Spectral Density

### 5.1 Test Result

| Test Description       | Test Specification |                  | Test Result |
|------------------------|--------------------|------------------|-------------|
| Power Spectral Density | 15.247(e)          | RSS-247 S5.2 (2) | Compliant   |

### 5.2 Test Method

Fundamental power measurements were recorded using the peak PSD procedures from ANSI C63.10: 2013 clause 11.10 and KDB 558074 D01 Measurement Guidance v04. The lowest data rate for each modulation was determined to be the worst-case.

#### Limit

The limit is 8 dBm.

### 5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

#### Environmental Conditions

Temperature: 22.8 °C  
Relative Humidity: 38.5 %

### 5.4 Test Equipment

Test End Date: 13-Nov-2017

Tester: JOP

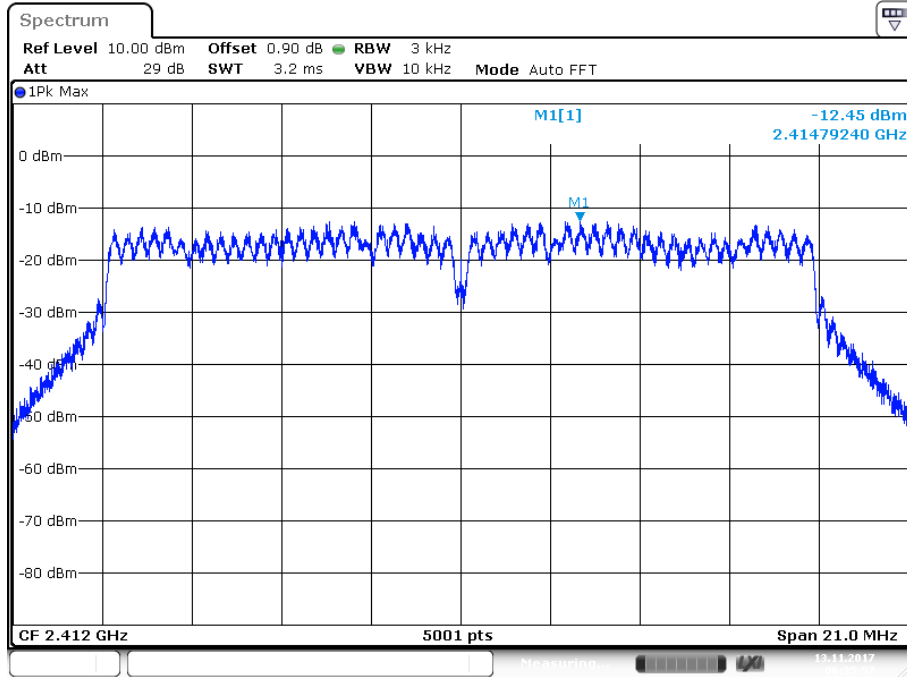
| Equipment        | Model | Manufacturer    | Asset Number | Cal Due Date |
|------------------|-------|-----------------|--------------|--------------|
| SPCTRUM ANALYZER | FSV30 | ROHDE & SCHWARZ | S/N: 103106  | 24-Jul-2018  |
| RF CABLE         | SF102 | HUBER & SUHNER  | B079823      | 26-Jul-2018  |

Note: The equipment calibration period is 1 year.

### 5.5 Test Data

| Protocol       | Channel | PSD Chain 0 (dBm/3kHz) | PSD Chain 1 (dBm/3kHz) | PSD Summed (dBm/3kHz) | Limit (dBm) | Margin (dB) |
|----------------|---------|------------------------|------------------------|-----------------------|-------------|-------------|
| 802.11b        | 1       | -10.5                  | -10.4                  | -7.4                  | 8           | -15.4       |
| 802.11b        | 6       | -10.1                  | -10.3                  | -7.2                  | 8           | -15.2       |
| 802.11b        | 11      | -10.3                  | -10.0                  | -7.1                  | 8           | -15.1       |
| 802.11g        | 1       | -12.5                  | -14.9                  | -10.5                 | 8           | -18.5       |
| 802.11g        | 6       | -12.1                  | -13.3                  | -9.6                  | 8           | -17.6       |
| 802.11g        | 11      | -12.7                  | -13.1                  | -9.9                  | 8           | -17.9       |
| 802.11n (HT20) | 1       | -11.9                  | -13.9                  | -9.8                  | 8           | -17.8       |
| 802.11n (HT20) | 6       | -11.8                  | -12.5                  | -9.1                  | 8           | -17.1       |
| 802.11n (HT20) | 11      | -11.5                  | -12.0                  | -8.7                  | 8           | -16.7       |

### Sample Plot



Date: 13 NOV 2017 06:35:57

## 6 Conducted Spurious Emissions

### 6.1 Test Result

| Test Description             | Test Specification |              | Test Result |
|------------------------------|--------------------|--------------|-------------|
| Conducted Spurious Emissions | 15.247(d)          | RSS-247 S5.5 | Compliant   |

### 6.2 Test Method

Spurious emissions in non-restricted frequency bands were recorded using the methods defined in ANSI C63.10: 2013 clause 11.11 and KDB 558074 D01 Measurement Guidance v04.

Lowest, middle, and highest channels were investigated. Only the worst-case (lowest data rate) for each modulation was reported.

Because the peak conducted output power was used to determine compliance with the output power limits, the limit is 20 dB below the maximum in-band peak PSD level in 100 kHz.

### 6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.8 °C  
Relative Humidity: 38.5 %

### 6.4 Test Equipment

Test End Date: 13-Nov-2017

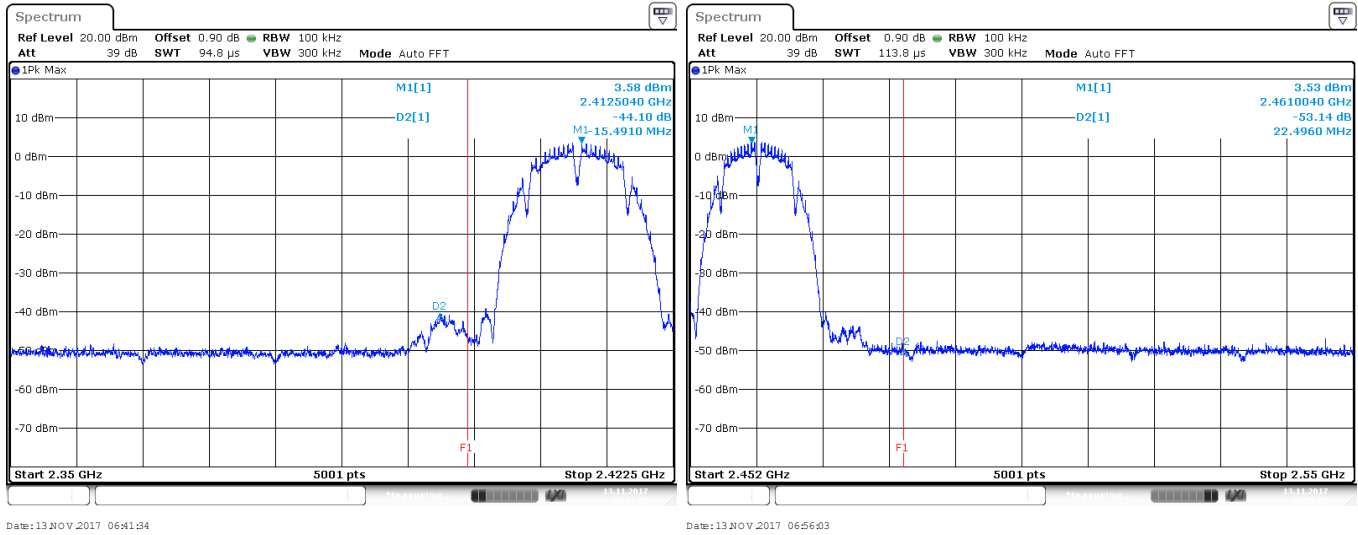
Tester: JOP

| Equipment        | Model | Manufacturer    | Asset Number | Cal Due Date |
|------------------|-------|-----------------|--------------|--------------|
| SPCTRUM ANALYZER | FSV30 | ROHDE & SCHWARZ | S/N: 103106  | 24-Jul-2018  |
| RF CABLE         | SF102 | HUBER & SUHNER  | B079823      | 26-Jul-2018  |

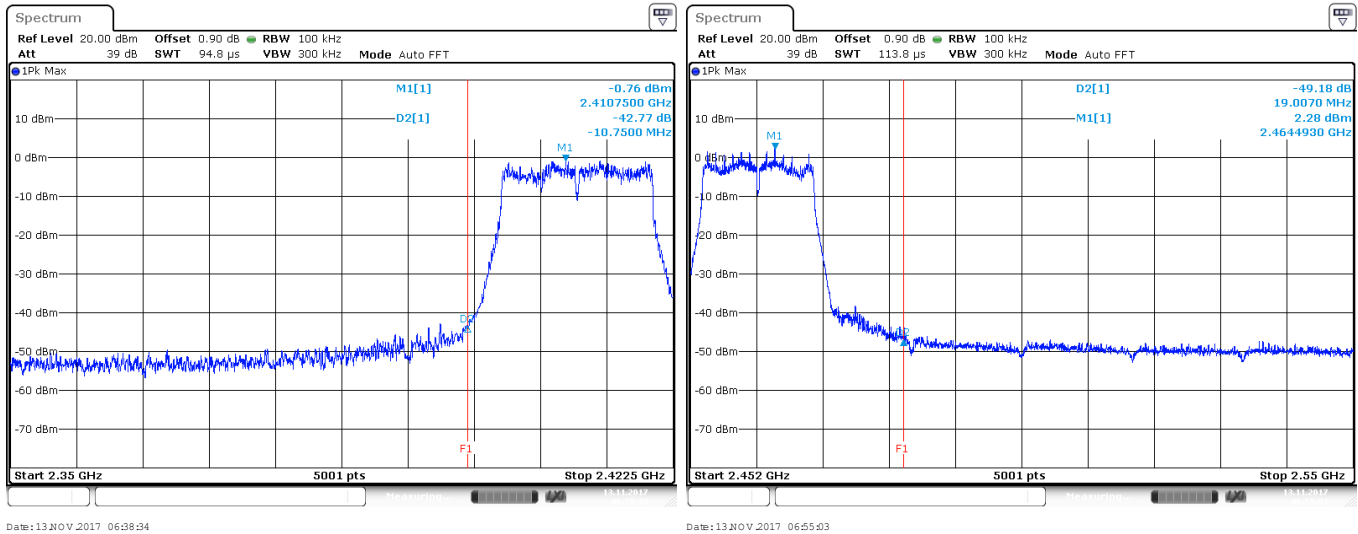
Note: The equipment calibration period is 1 year.

## 6.5 Test Data – DTS Bandedge

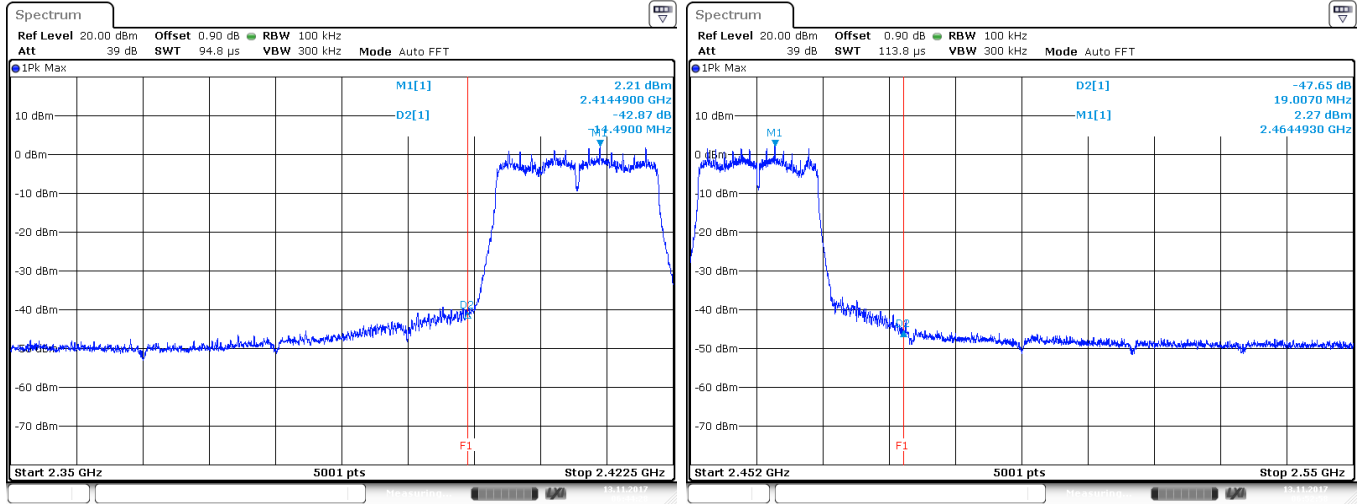
802.11b / 1Mbps  
Lower band edge / Upper band edge  
Channel 1 / Channel 11



802.11g / 6Mbps  
Lower band edge / Upper band edge  
Channel 1 / Channel 11



802.11n (HT20) / MCS0  
 Lower band edge / Upper band edge  
 Channel 1 / Channel 11

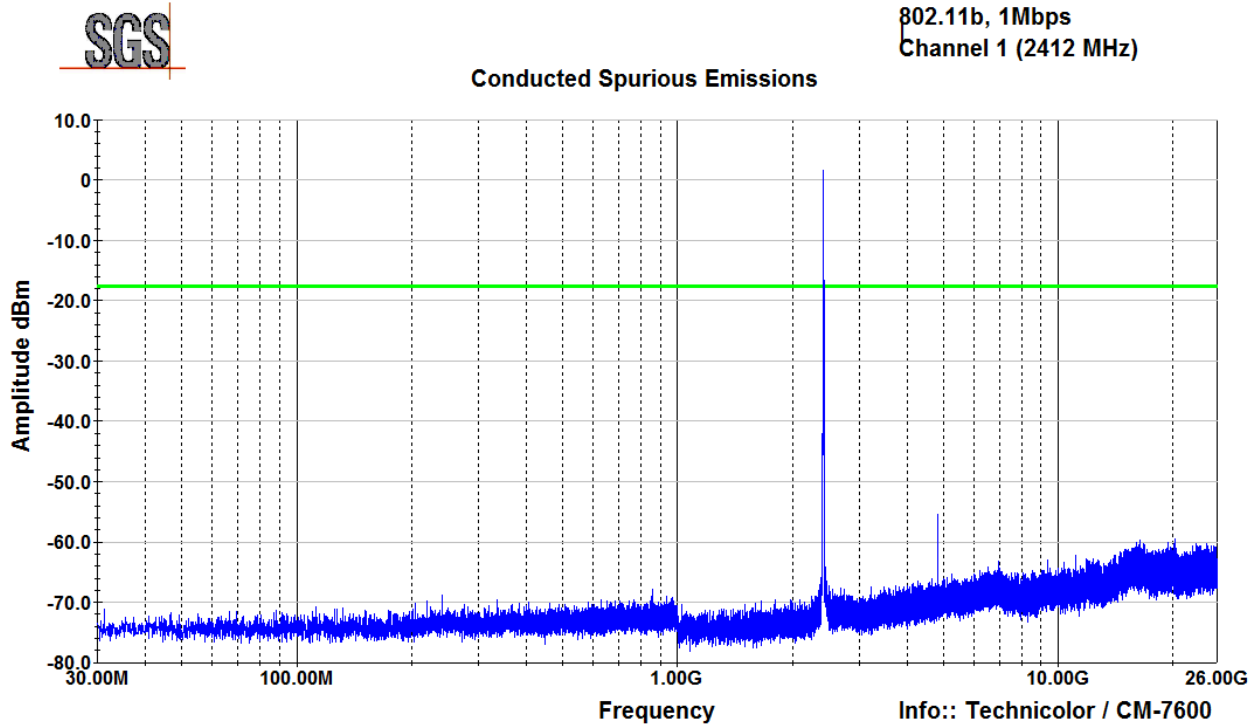


Date: 13 NOV 2017 06:44:29

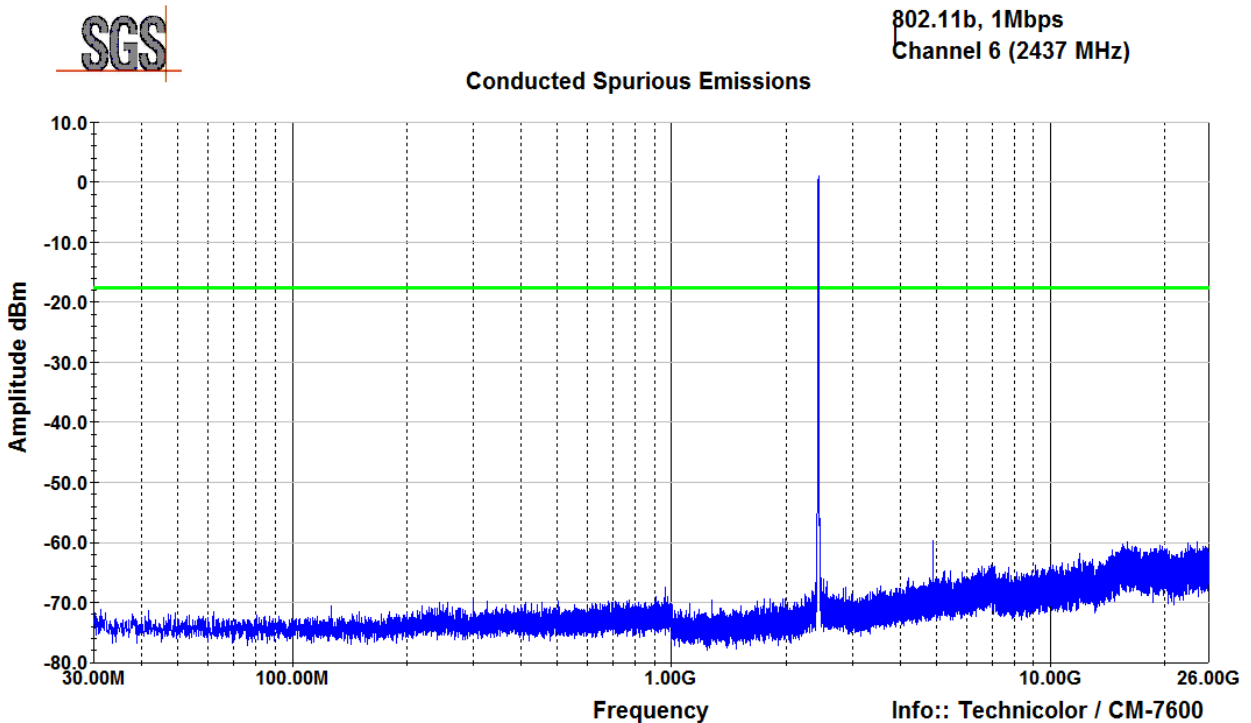
Date: 13 NOV 2017 06:52:59

## 6.6 Test Data – Conducted Spurious Emissions

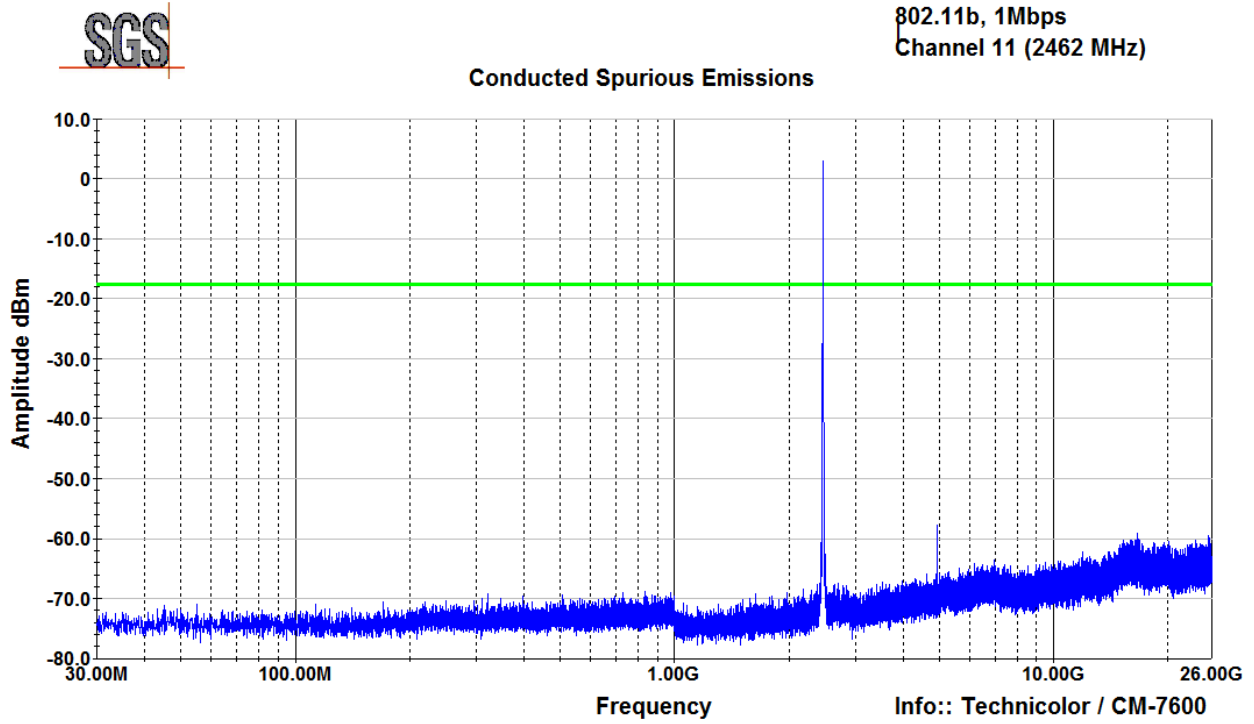
Conducted Spurs –Channel 1



Conducted Spurs –Channel 6



### Conducted Spurs –Channel 11



## 7 Field Strength of Spurious Radiation

### 7.1 Test Result

| Test Description   | Test Specification    |              | Test Result |
|--------------------|-----------------------|--------------|-------------|
| Spurious Emissions | 15.247 (d) and 15.209 | RSS-247 S5.5 | Compliant   |

### 7.2 Test Method

Radiated spurious emissions measurements were recorded with the device configured to transmit at the lowest, middle, and highest channels. The frequency range investigated was up through the 10<sup>th</sup> harmonic of the fundamental transmit frequency. The methods defined in ANSI C63.10: 2013 were used.

Lowest, middle, and highest channels were investigated. Only the worst-case (802.11b, 1Mbps) was reported except at the restricted band edges where all three modulations were measured.

Test distance:

- 9k to 30 MHz – Near field prescan to determine if there were any emissions.
- 30 to 1000 MHz - The EUT to measurement antenna distance was 3 meters
- 1 to 18 GHz - The EUT to measurement antenna distance was 3 meters
- 18 to 26 GHz - The EUT to measurement antenna distance was 1 meter

Limits within restricted bands of operation:

| Frequency      | Limits <sup>(1)</sup> |                     | Peak Limits<br>dBuV/m |
|----------------|-----------------------|---------------------|-----------------------|
|                | Microvolts/m          | dBuV/m              |                       |
| 30 - 88 MHz    | 100                   | 40 <sup>(2)</sup>   | --                    |
| 88 - 216 MHz   | 150                   | 43.5 <sup>(2)</sup> | --                    |
| 216 - 960 MHz  | 200                   | 46 <sup>(2)</sup>   | --                    |
| 960 - 1000 MHz | 500                   | 54 <sup>(2)</sup>   | --                    |
| 1 - 40 GHz     | 500                   | 54 <sup>(3)</sup>   | 74                    |

- (1) These limits are applicable to emissions outside of the intentional transmit frequency band.
- (2) Quasi-peak limit
- (3) Average limit

### 7.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 25.9 °C  
 Relative Humidity: 40.4 %

## 7.4 Test Equipment

Test End Date: 7-Dec-2017

Tester: JOP/AF

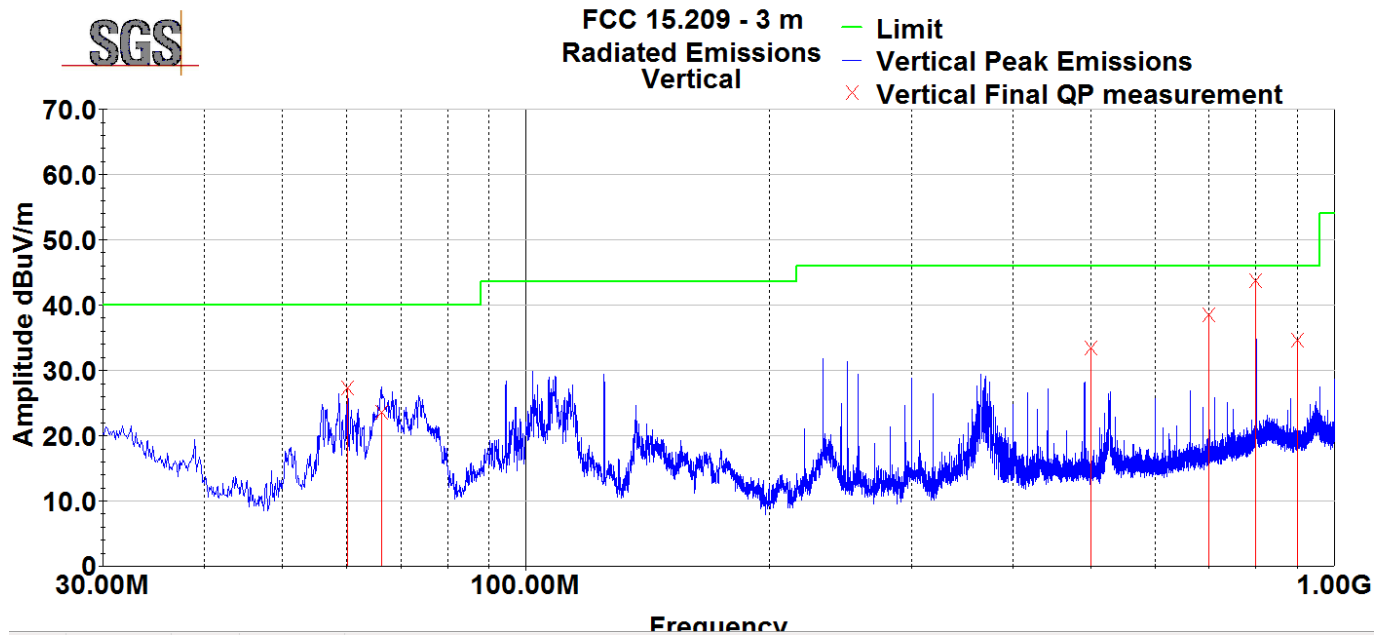
| Equipment                    | Model             | Manufacturer    | Asset Number | Cal Due Date |
|------------------------------|-------------------|-----------------|--------------|--------------|
| EMI TEST RECEIVER            | ESU8              | ROHDE & SCHWARZ | B085759      | 25-Jul-2018  |
| EMI TEST RECEIVER            | ESU40             | ROHDE & SCHWARZ | B079629      | 25-Apr-2018  |
| ANTENNA, BILOG               | JB6               | SUNOL           | B079689      | 16-Oct-2018  |
| RF CABLE                     | SF106             | HUBER & SUHNER  | B079712      | 24-Jul-2018  |
| RF CABLE                     | NFS-290-78.7-NFS  | FLORIDA RF LABS | B095019      | 24-Jul-2018  |
| RF CABLE                     | UC-N-MM-78        | MAURY MICROWAVE | 17017        | 25-Jul-2018  |
| RF CABLE                     | SUCOFLEX 100      | HUBER & SUHNER  | B108523      | 24-Jul-2018  |
| LOW NOISE AMPLIFIER          | TS-PR18           | ROHDE & SCHWARZ | B094463      | 22-Feb-2018  |
| ANTENNA, DRG HORN (MEDIUM)   | 3117              | ETS LINDGREN    | B079691      | 27-Jul-2018  |
| RF CABLE                     | 104PE             | HUBER & SUHNER  | B079793      | 24-Jul-2018  |
| LOW NOISE AMPLIFIER          | TS-PR18           | ROHDE & SCHWARZ | 15003        | 28-Jul-2018  |
| FILTER, HIGH PASS (>2800MHZ) | HPM50111          | MICRO-TRONICS   | B085747      | 27-Jul-2018  |
| HORN(SMALL)                  | LB-180400-20-C-KF | A-INFO          | 15007        | 21-Mar-2018  |
| RF CABLE                     | SF102             | HUBER & SUHNER  | B079822      | 27-Jul-2018  |
| RF CABLE                     | SF102             | HUBER & SUHNER  | B079824      | 26-Jul-2018  |
| LOW NOISE AMPLIFIER          | NSP1840-HG        | MITEQ           | B087572      | 28-Jul-2018  |
| ANTENNA, LOOP, ACTIVE        | 6502              | ETS LINDGREN    | B085752      | 22-Aug-2018  |

Note: The equipment calibration period is 1 year.

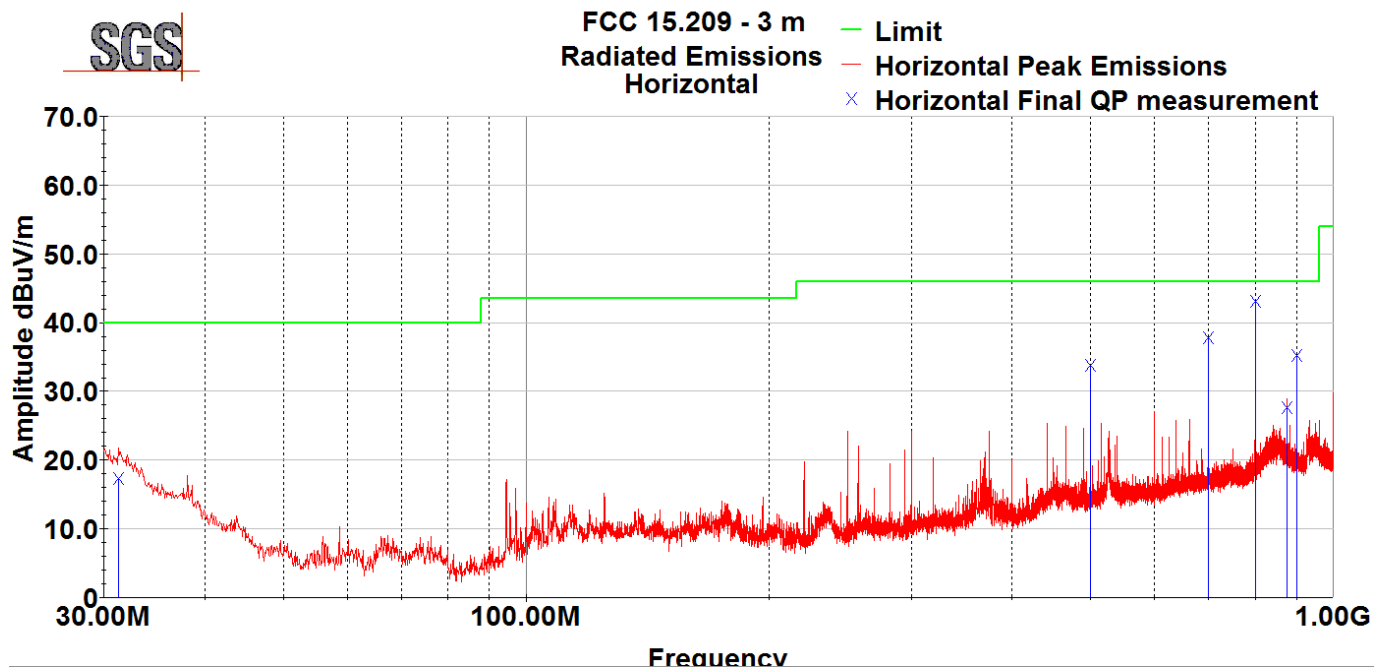
## 7.5 Peak Plots

No emissions were detected in the range 9kHz to 30MHz.

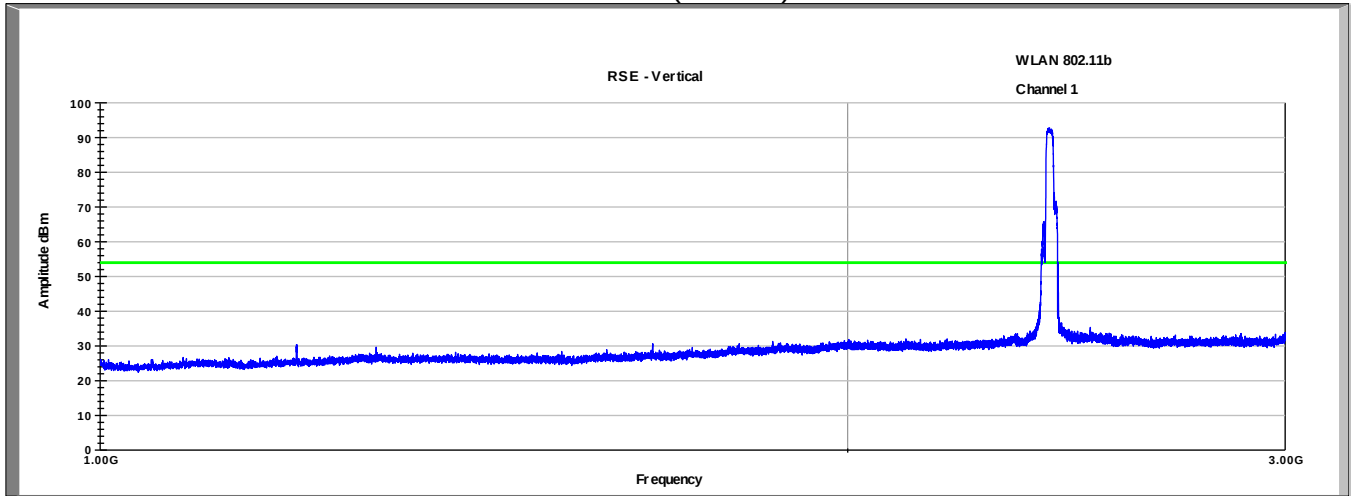
Channel 1  
Vertical (30-1000MHz)



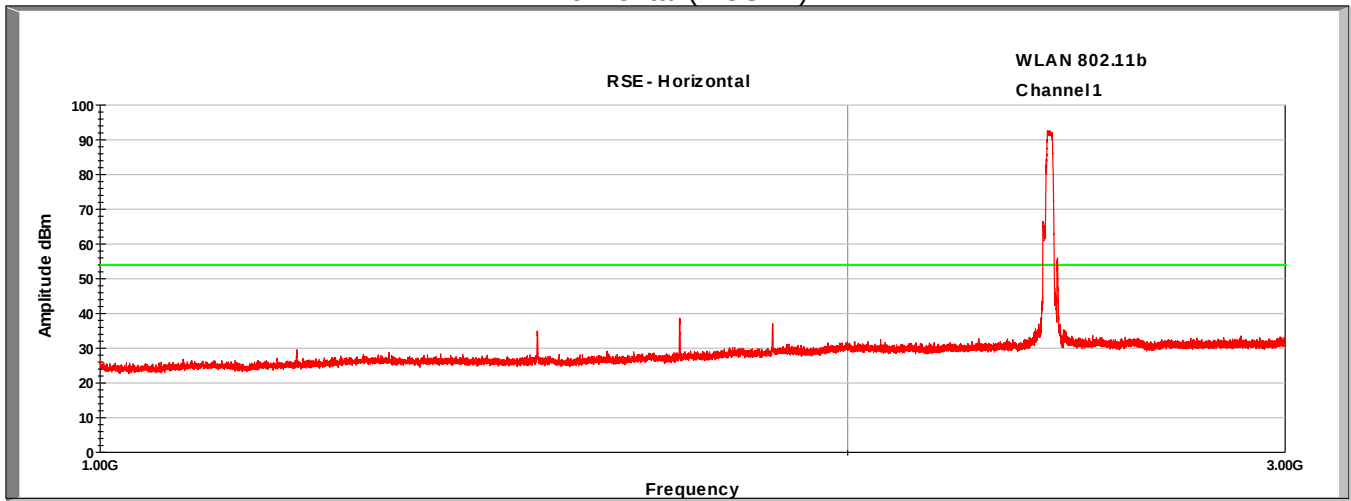
Horizontal (30-1000MHz)



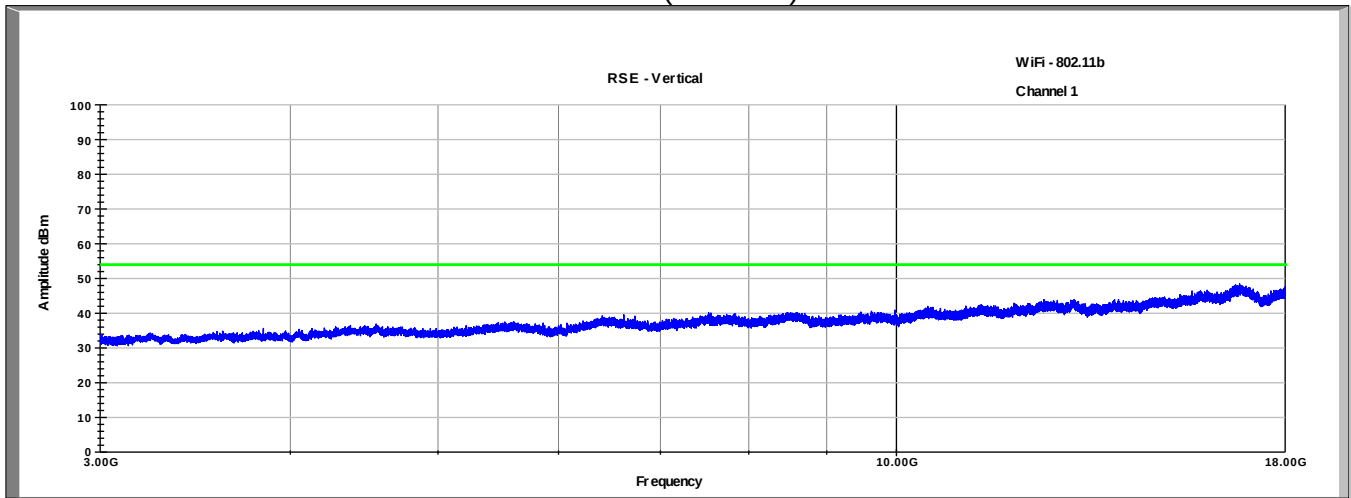
Channel 1  
Vertical (1-3GHz)



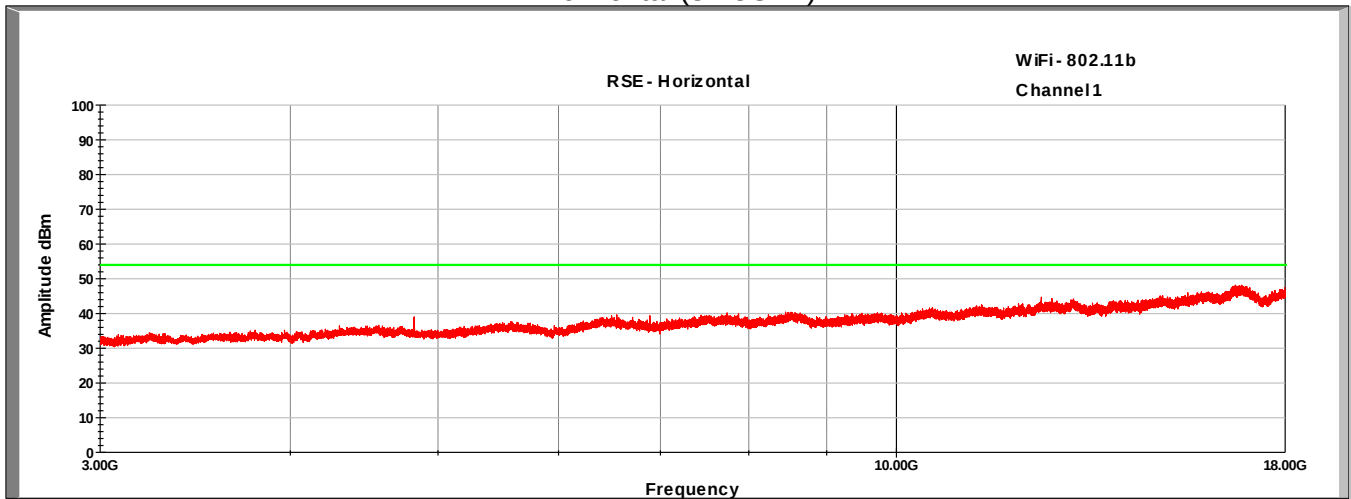
Horizontal (1-3GHz)



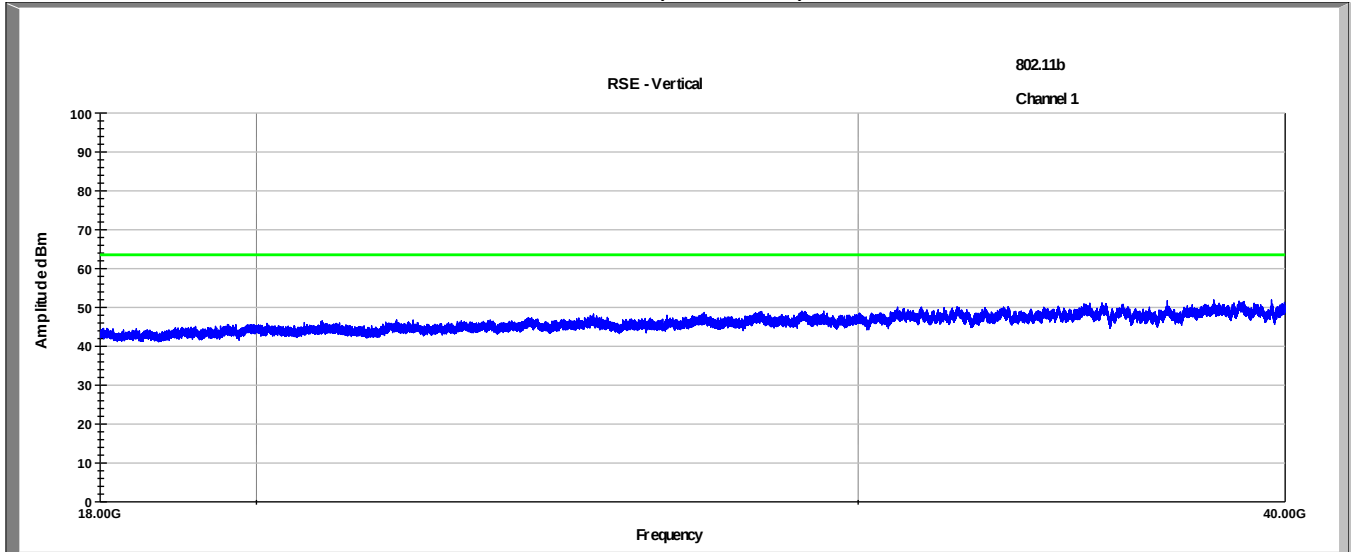
Channel 1  
 Vertical (3-18GHz)



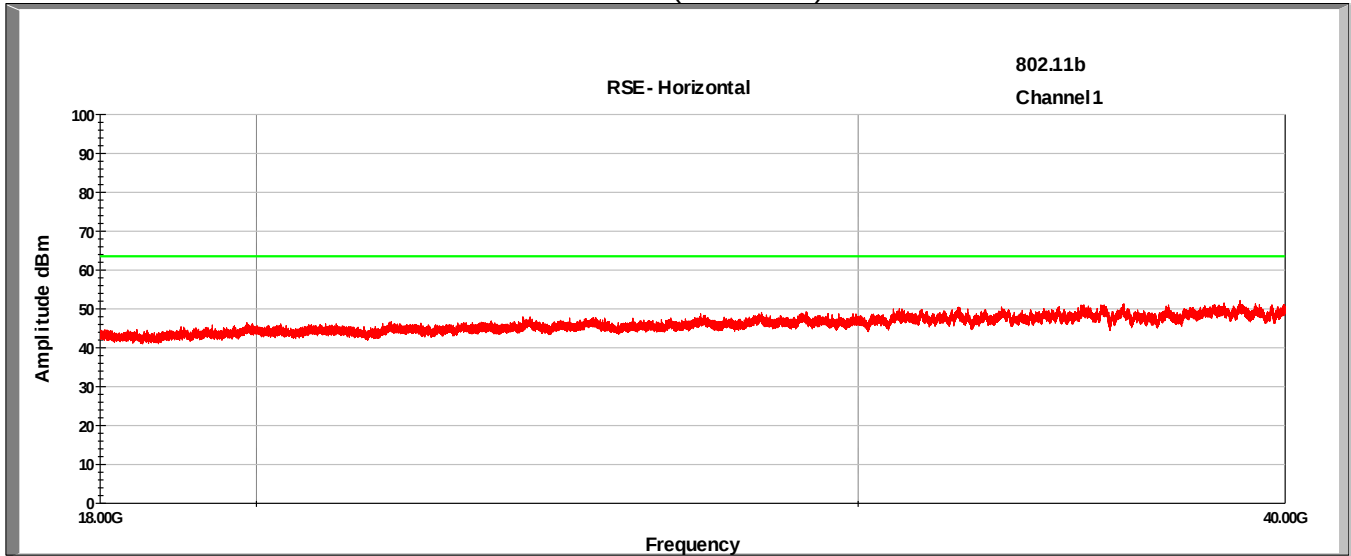
Horizontal (3-18GHz)



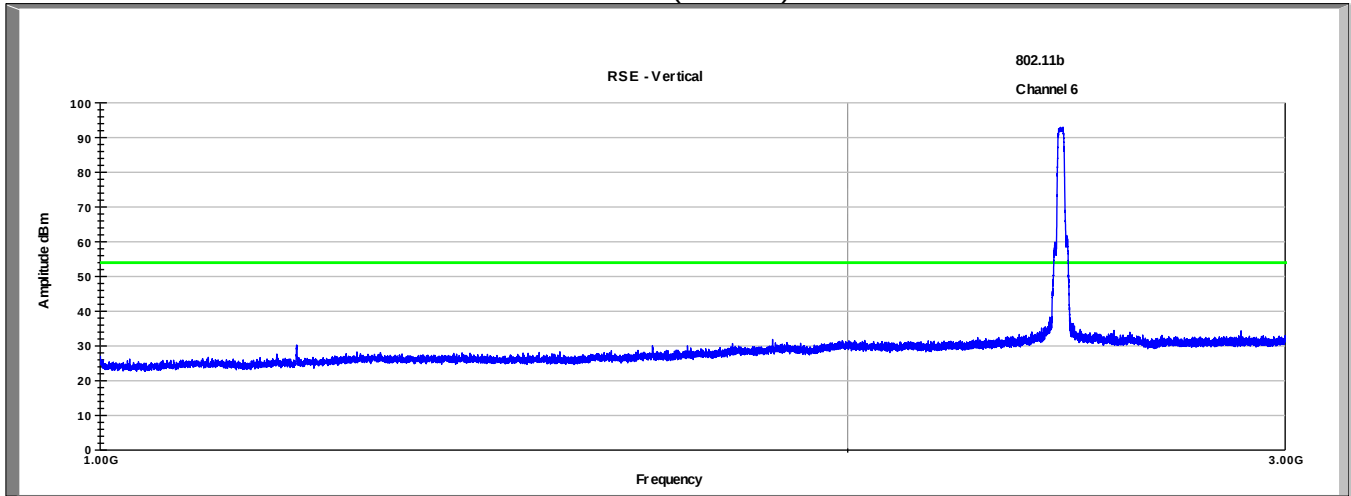
Channel 1  
 Vertical (18-40GHz)



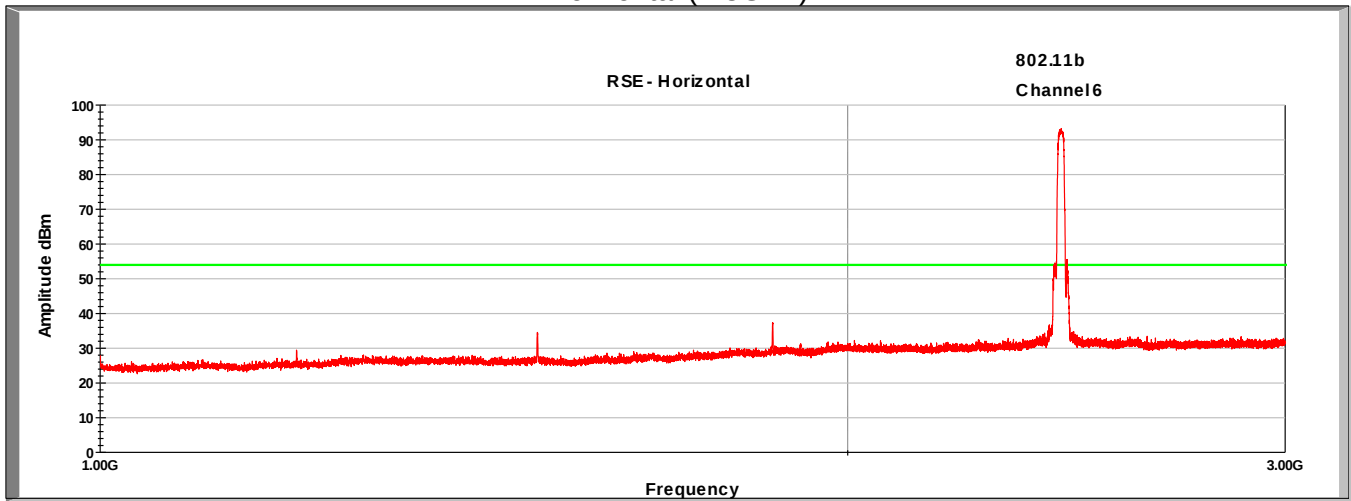
Horizontal (18-40GHz)



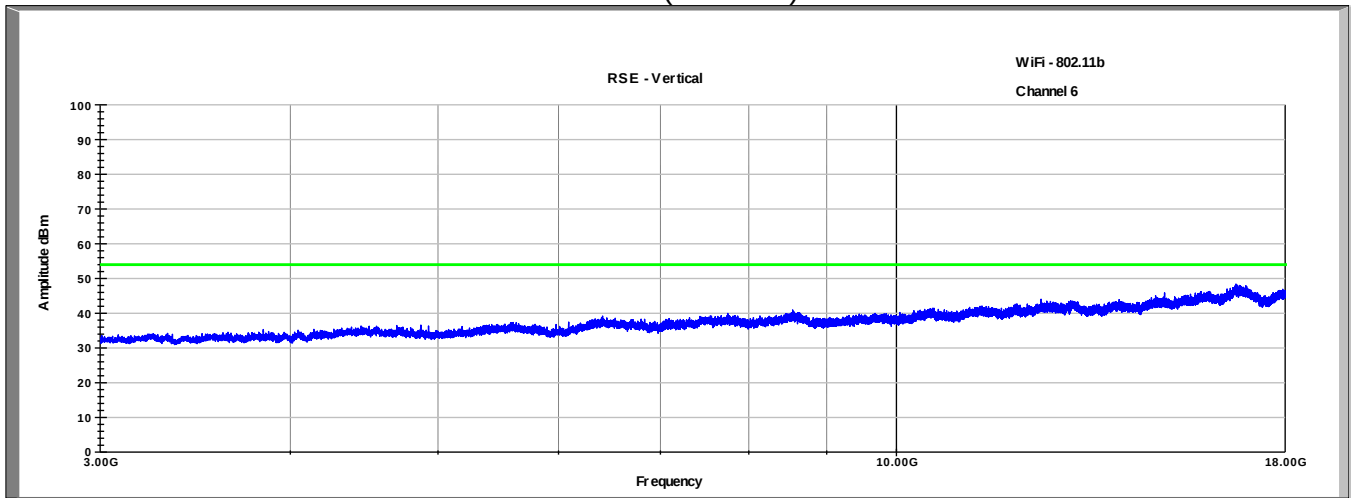
Channel 6  
 Vertical (1-3GHz)



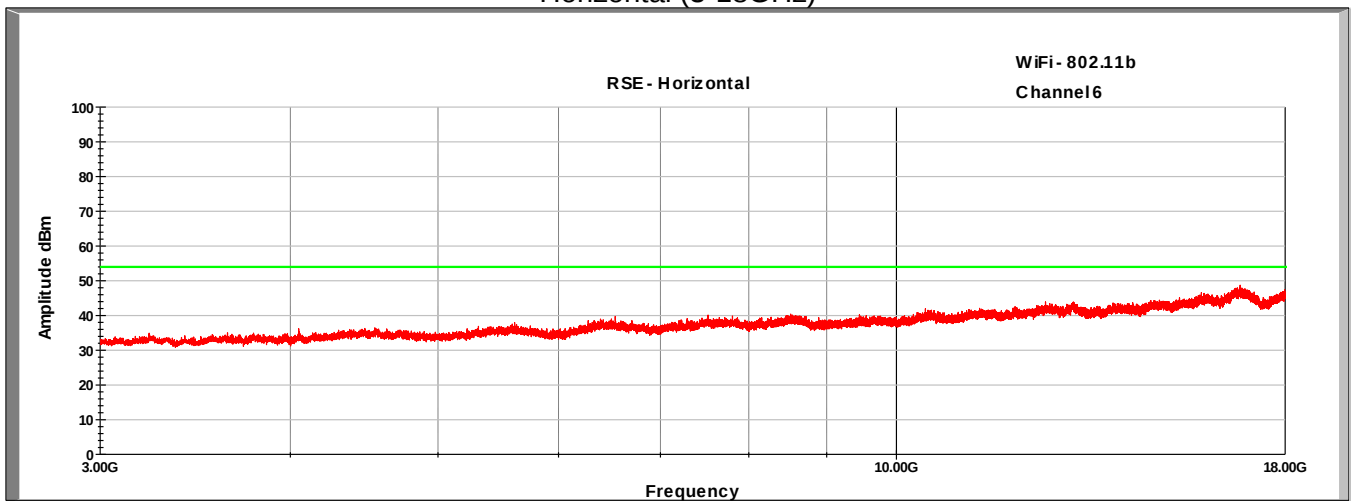
Horizontal (1-3GHz)



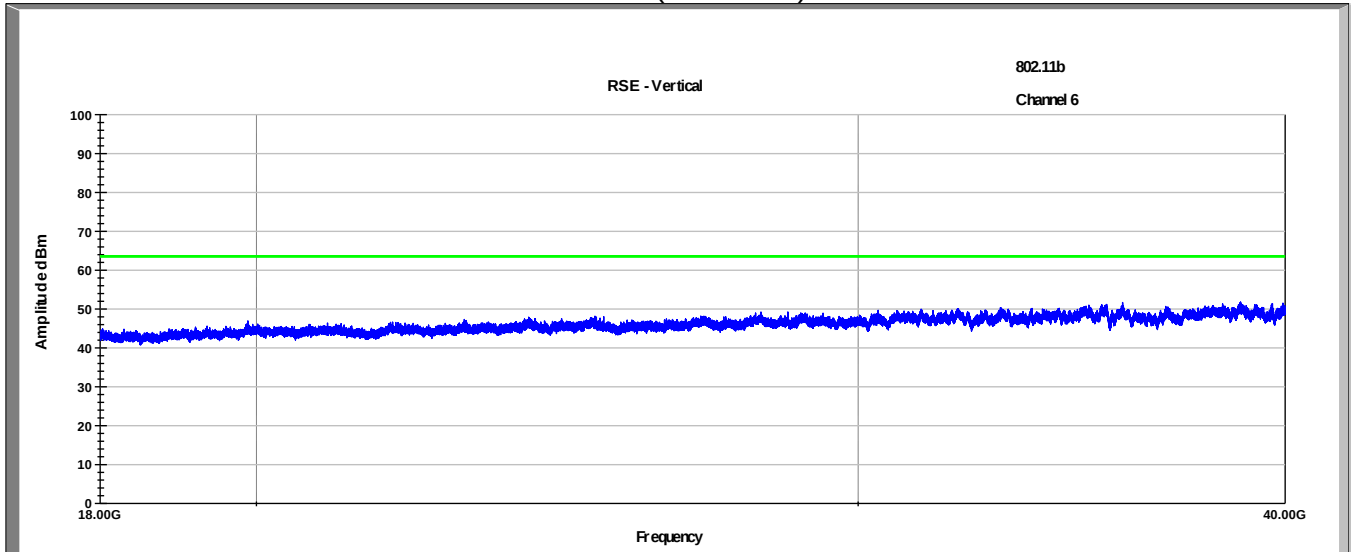
Channel 6  
 Vertical (3-18GHz)



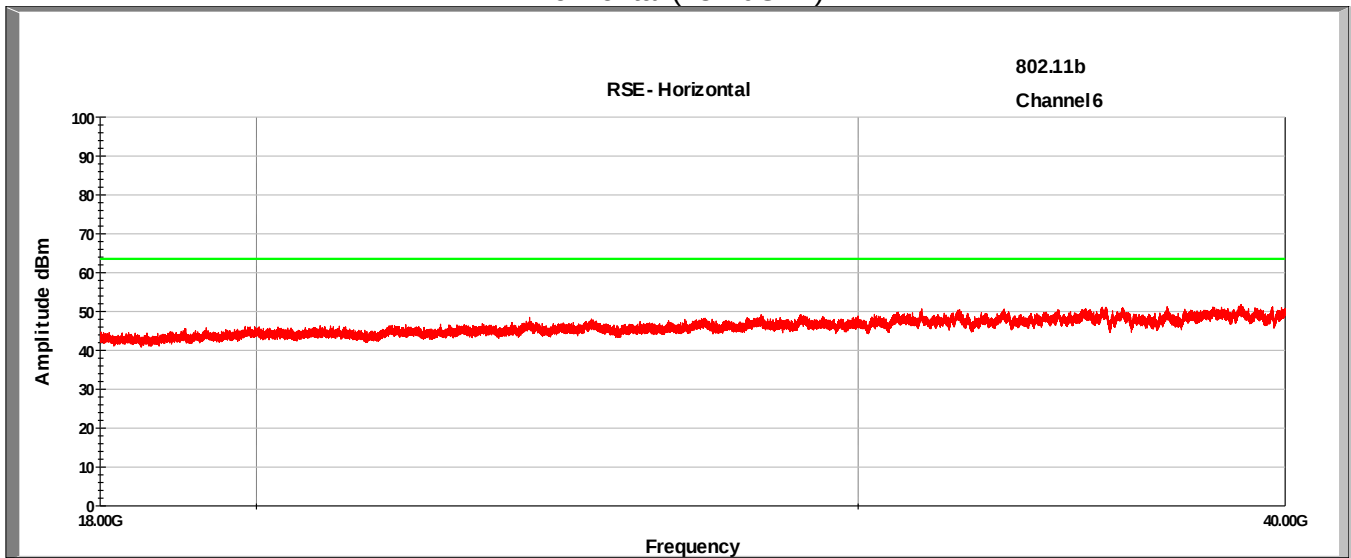
Horizontal (3-18GHz)



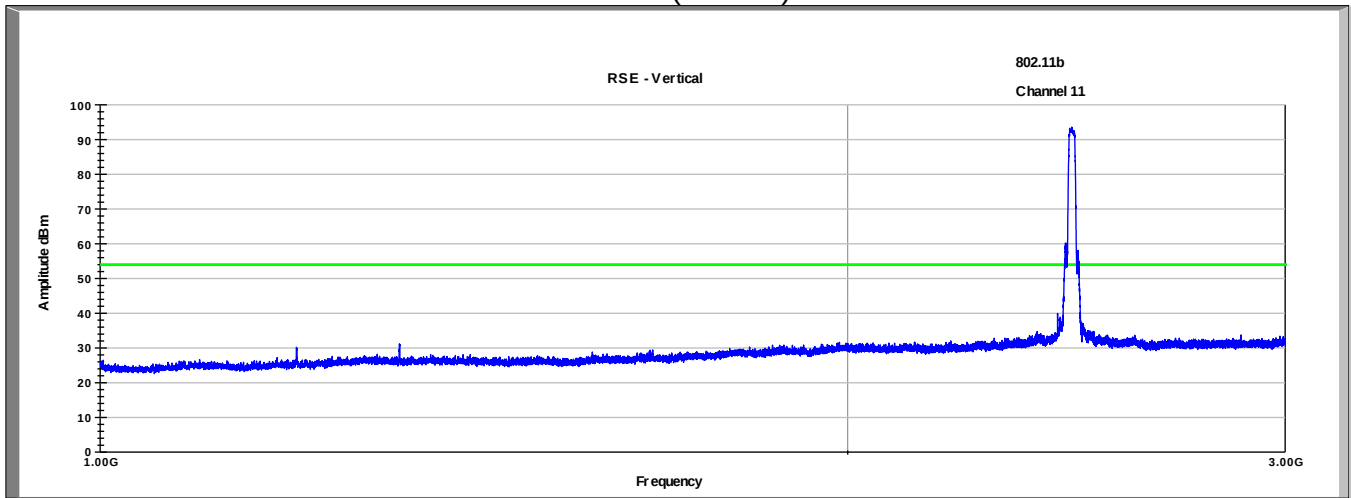
Channel 6  
 Vertical (18-40GHz)



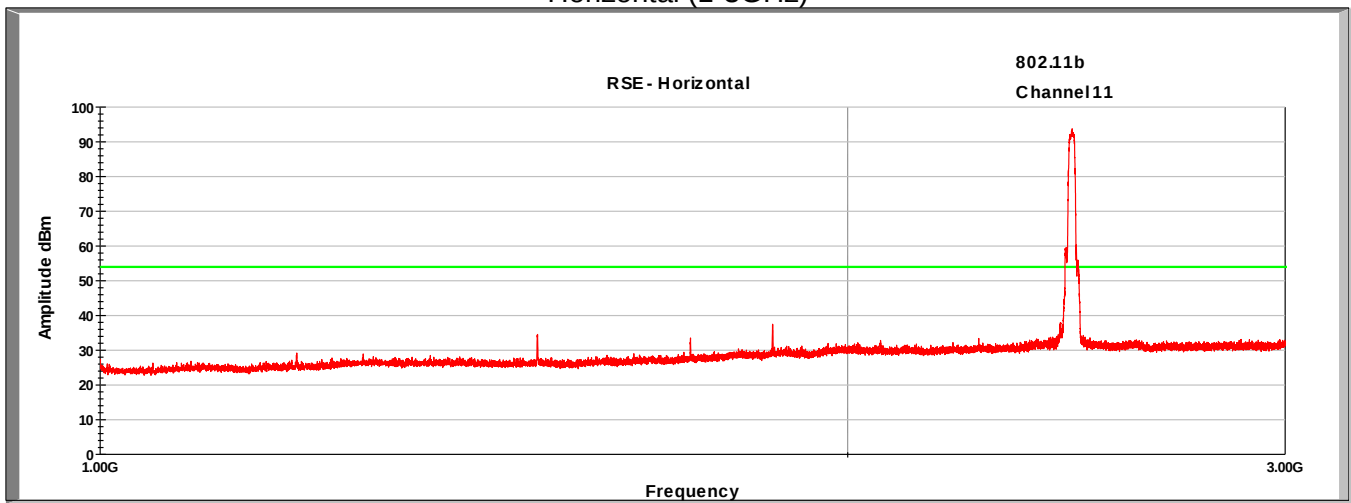
Horizontal (18-40GHz)



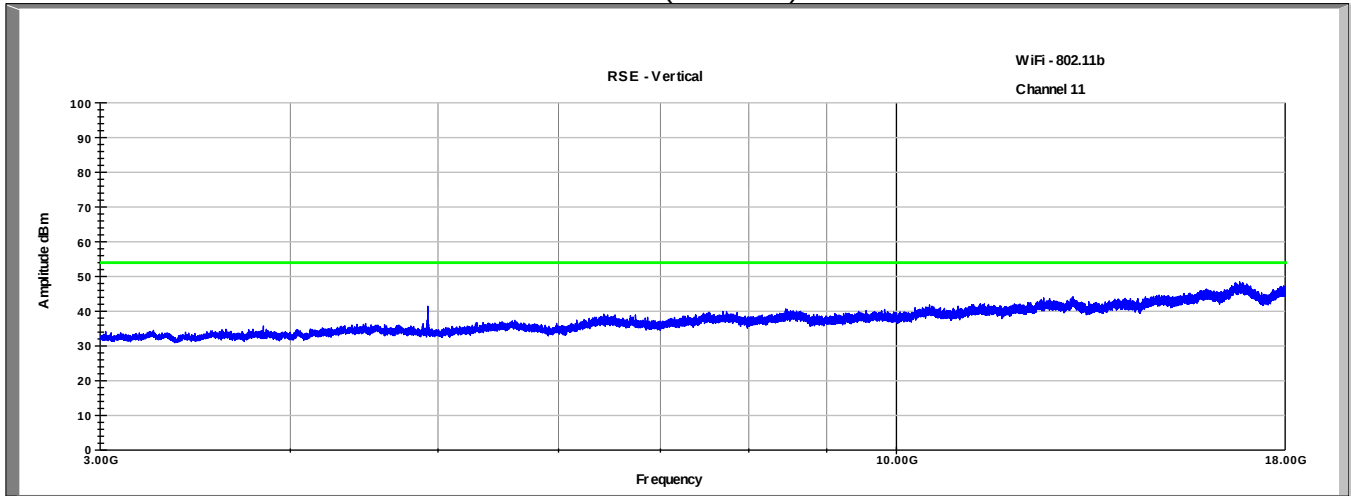
Channel 11  
Vertical (1-3GHz)



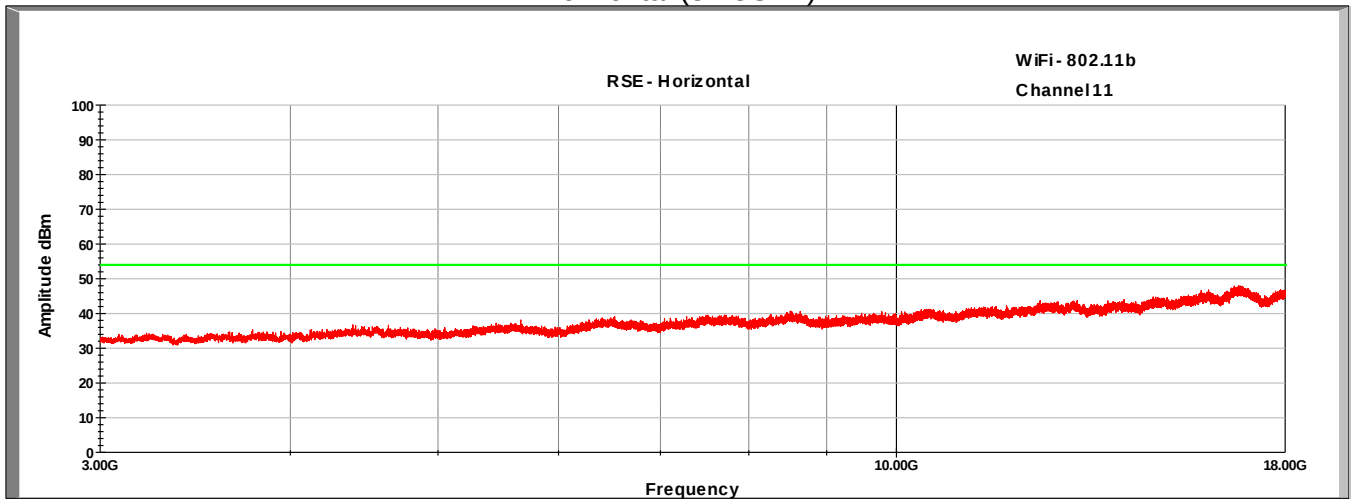
Horizontal (1-3GHz)



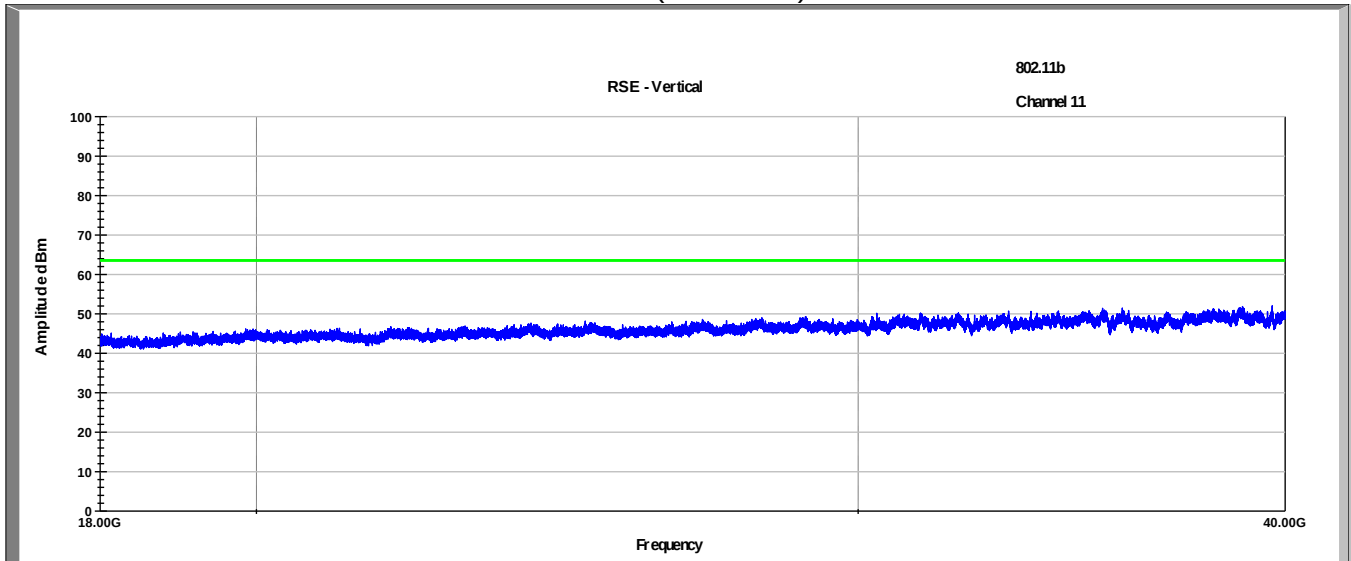
Channel 11  
Vertical (3-18GHz)



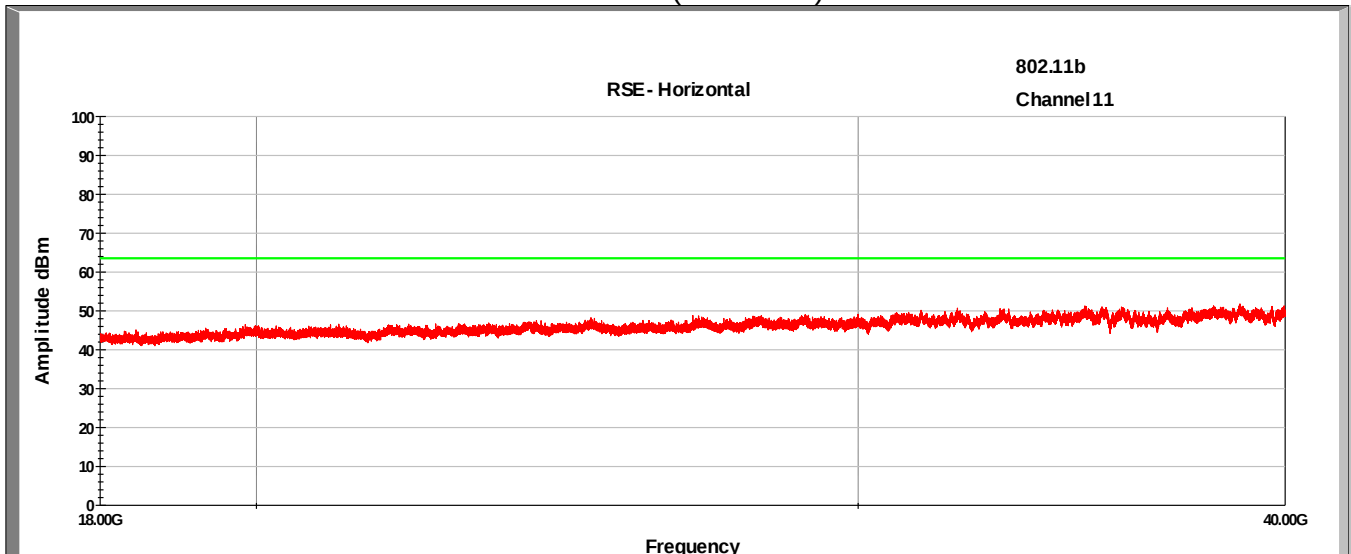
Horizontal (3-18GHz)



Channel 11  
 Vertical (18-40GHz)



Horizontal (18-40GHz)



## 7.6 Tabular Data

| Frequency<br>MHz                 | Raw QP<br>(dBuV) | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | QP Value<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|----------------------------------|------------------|-------------------|----------------------|----------------|--------------|--------------|-------------|----------------------|-------------------|----------------|
| 60.21                            | 52.2             | V                 | 24.0                 | 108.0          | 7.3          | 0.7          | 33.0        | 27.2                 | 40.0              | -12.8          |
| 66.21                            | 48.2             | V                 | 281.0                | 100.0          | 7.9          | 0.7          | 33.2        | 23.6                 | 40.0              | -16.4          |
| 500.00                           | 47.0             | V                 | 52.0                 | 206.0          | 17.9         | 2.1          | 33.4        | 33.5                 | 46.0              | -12.5          |
| 699.99                           | 49.1             | V                 | 340.0                | 190.0          | 20.4         | 2.5          | 33.4        | 38.5                 | 46.0              | -7.5           |
| 800.00                           | 53.0             | V                 | 339.0                | 277.0          | 21.5         | 2.6          | 33.4        | 43.7                 | 46.0              | -2.3           |
| 899.99                           | 42.9             | V                 | 334.0                | 377.0          | 22.3         | 2.8          | 33.5        | 34.6                 | 46.0              | -11.4          |
| 31.24                            | 27.3             | H                 | 253.0                | 396.0          | 20.6         | 0.5          | 31.2        | 17.3                 | 40.0              | -22.7          |
| 500.00                           | 47.2             | H                 | 282.0                | 196.0          | 17.9         | 2.1          | 33.4        | 33.7                 | 46.0              | -12.3          |
| 700.00                           | 48.3             | H                 | 244.0                | 287.0          | 20.4         | 2.5          | 33.4        | 37.8                 | 46.0              | -8.2           |
| 799.99                           | 52.3             | H                 | 60.0                 | 216.0          | 21.5         | 2.6          | 33.4        | 43.0                 | 46.0              | -3.0           |
| 875.09                           | 36.2             | H                 | 138.0                | 362.0          | 22.1         | 2.8          | 33.5        | 27.6                 | 46.0              | -18.4          |
| 899.99                           | 43.5             | H                 | 39.0                 | 198.0          | 22.3         | 2.8          | 33.5        | 35.2                 | 46.0              | -10.8          |
|                                  |                  |                   |                      |                |              |              |             |                      |                   |                |
|                                  |                  |                   |                      |                |              |              |             |                      |                   |                |
| QP Value = Level + AF + CL - Amp |                  |                   |                      |                |              |              |             |                      |                   |                |
| Margin = QP Value - Limit        |                  |                   |                      |                |              |              |             |                      |                   |                |

Note: There was no discernible difference in the measurement data below 1GHz when transmitting at different channels. QP measurements were only recorded with the device transmitting on Channel 1.

No other spurious emissions associated with the radio were detected.

## 8 Radiated Emissions at Band Edge / Restricted Band

### 8.1 Test Result

| Test Description                     | Test Specification    | Test Result |
|--------------------------------------|-----------------------|-------------|
| Field strength of spurious radiation | 15.247 (d) and 15.209 | Compliant   |

Peak and average field strength measurements were performed at the restricted band edges of 2390MHz and 2483.5MHz. Measurements were made using the radiated methods defined ANSI C63.10, Clause 11.12.2.

#### Offset Calculations (at restricted band edges):

Offset calculations so that conducted measurements on the spectrum analyzer in dBμV represent field strength measurements in dBμV/m.

$$\text{Offset}_{3m} = CF + DC$$

|                                |                                               |
|--------------------------------|-----------------------------------------------|
| D = 3m                         | Distance                                      |
| CF = 2.3 dB                    | Antenna Factor, Cable Loss, Preamplifier Gain |
| DC (802.11b) = 3.1 dB (49.5%)  | Duty Cycle Correction Factor                  |
| DC (802.11g) = 3.7 dB (42.4%)  | Duty Cycle Correction Factor                  |
| DC (802.11n) = 2.0 dB (63.72%) | Duty Cycle Correction Factor                  |

Offset (802.11b) = 5.4 dB  
 Offset (802.11g) = 6.0 dB  
 Offset (802.11n) = 4.3 dB

### 8.2 Test Site

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

#### Environmental Conditions

Temperature: 24.1°C  
 Relative Humidity: 39.8 %

### 8.3 Test Equipment

Test End Date: 13-Dec-2017

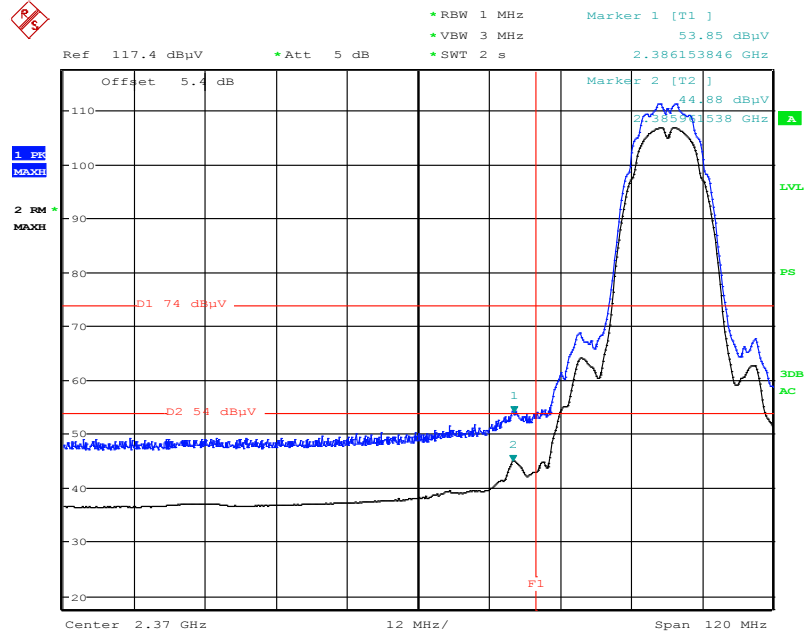
Tester: JOP

| Equipment                  | Model            | Manufacturer    | Asset Number | Cal Due Date |
|----------------------------|------------------|-----------------|--------------|--------------|
| EMI TEST RECEIVER          | ESU40            | ROHDE & SCHWARZ | B079629      | 25-Apr-2018  |
| RF CABLE                   | SF106            | HUBER & SUHNER  | B079712      | 24-Jul-2018  |
| RF CABLE                   | NFS-290-78.7-NFS | FLORIDA RF LABS | B095019      | 24-Jul-2018  |
| RF CABLE                   | UC-N-MM-78       | MAURY MICROWAVE | 17016        | 25-Jul-2018  |
| ANTENNA, DRG HORN (MEDIUM) | 3117             | ETS LINDGREN    | B079699      | 16-May-2018  |
| RF CABLE                   | 104PE            | HUBER & SUHNER  | B079793      | 24-Jul-2018  |
| LOW NOISE AMPLIFIER        | TS-PR18          | ROHDE & SCHWARZ | 15003        | 28-Jul-2018  |

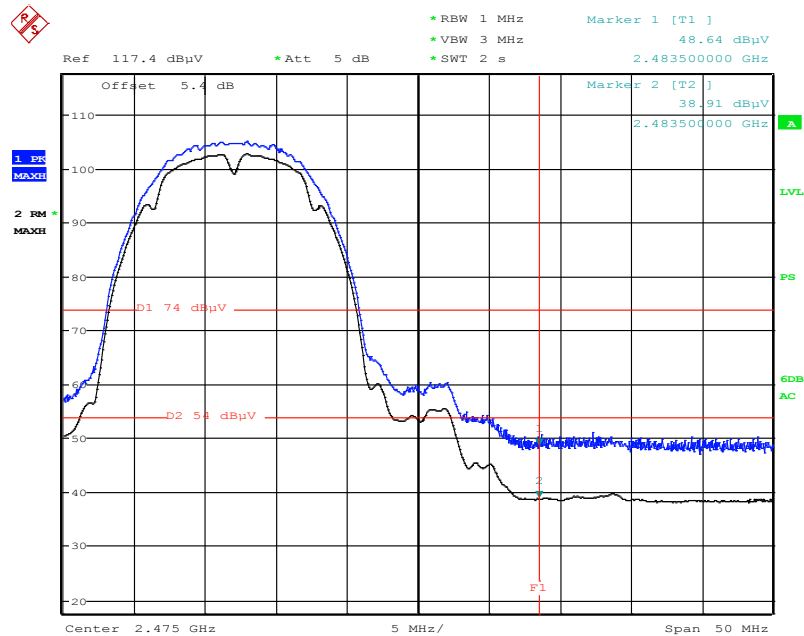
Note: The equipment calibration period is 1 year.

## 8.4 Test Data – Band Edge

802.11b

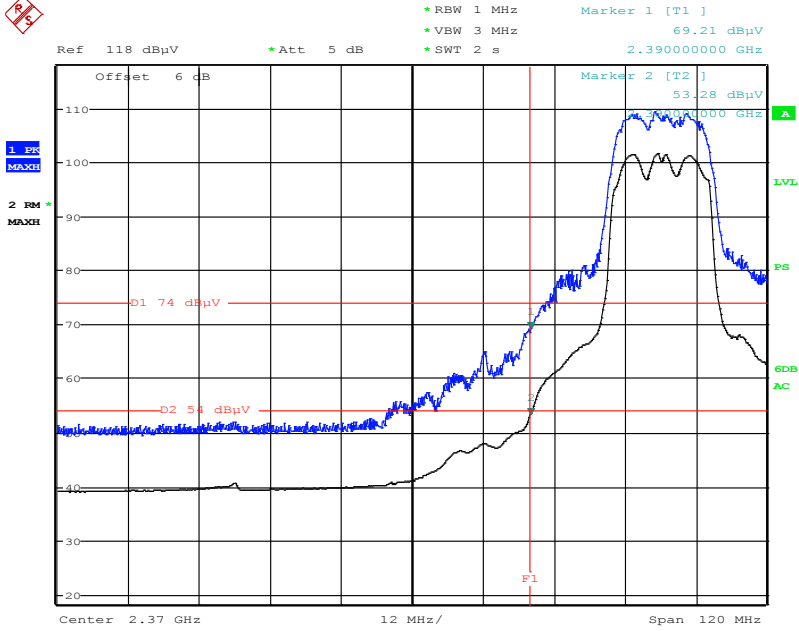


Date: 13.DEC.2017 16:40:56

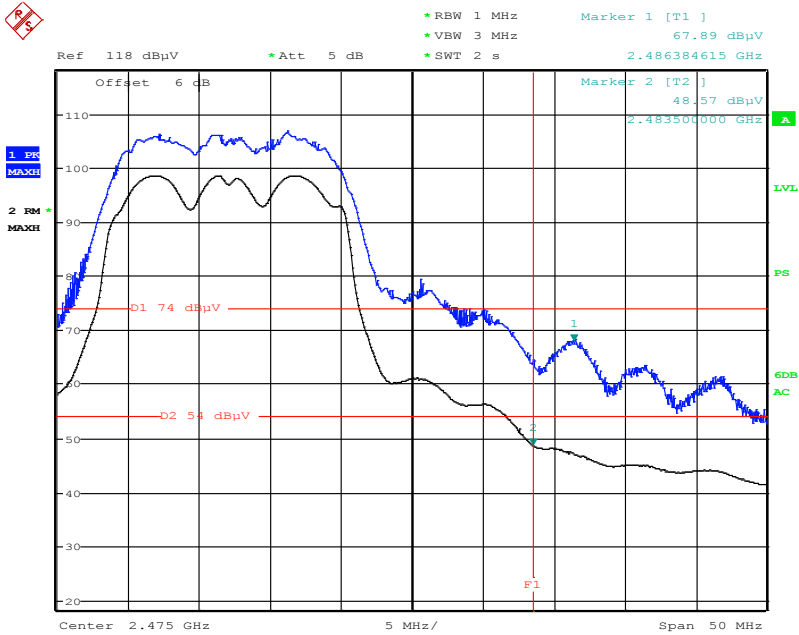


Date: 13.DEC.2017 17:16:31

802.11g

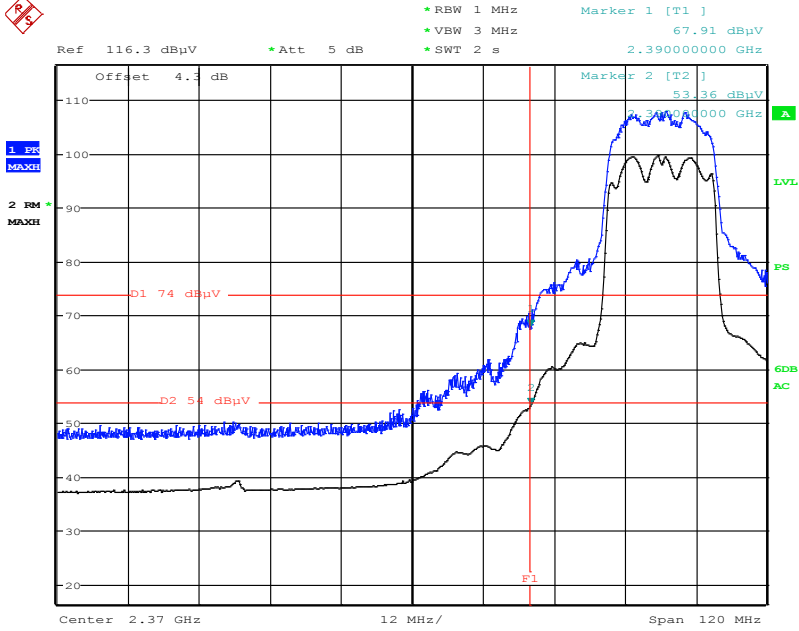


Date: 13.DEC.2017 16:57:19

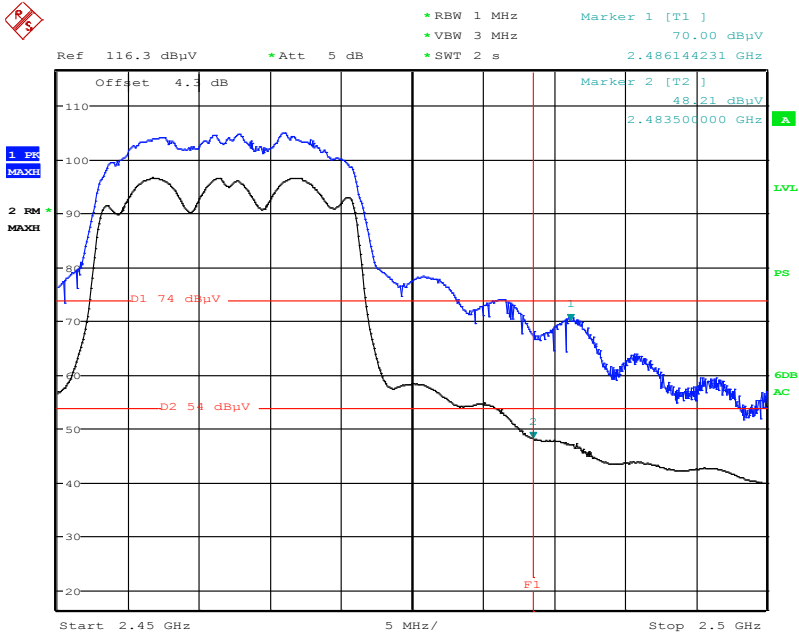


Date: 13.DEC.2017 17:14:47

## 802.11n (HT20)



Date: 13.DEC.2017 17:01:17



Date: 13.DEC.2017 17:11:33

## 9 Conducted Emissions

### 9.1 Test Result

| Test Description             | Basic Standards                     | Test Result |
|------------------------------|-------------------------------------|-------------|
| Conducted Emissions, Class B | RSS-GEN, Issue 4<br>ANSI C63.4:2014 | Compliant   |

### 9.2 Test Method

With the receiver's resolution bandwidth was set to 9 kHz the exploratory scans were performed over the measuring frequency range (0.15MHz to 30MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

| Frequency Range | Class A Limits (dBuV) | Class B Limits (dBuV)<br>CISPR |
|-----------------|-----------------------|--------------------------------|
| 0.15 to 0.5 MHz | Avg 66<br>QP 79       | Avg 56 to 46<br>QP 66 to 56    |
| 0.5 to 5 MHz    | Avg 60<br>QP 73       | Avg 46<br>Pk 56                |
| 5 to 30 MHz     | Avg 60<br>QP 73       | Avg 50<br>Pk 60                |

### 9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.8°C  
 Relative Humidity: 21.2%

### 9.4 Test Equipment

Test End Date: 12-Dec-2017

Tester: JOP

| Equipment                            | Model         | Manufacturer    | Asset Number | Cal Due Date |
|--------------------------------------|---------------|-----------------|--------------|--------------|
| EMI TEST RECEIVER                    | ESU8          | ROHDE & SCHWARZ | B085759      | 25-Jul-2018  |
| LINE IMPEDANCE STABILIZATION NETWORK | NNB 51        | TESEQ           | B085882      | 8-Nov-2018   |
| RF CABLE                             | CBL-25FT-NMNM | MINI-CIRCUITS   | B094941      | 25-Jul-2018  |

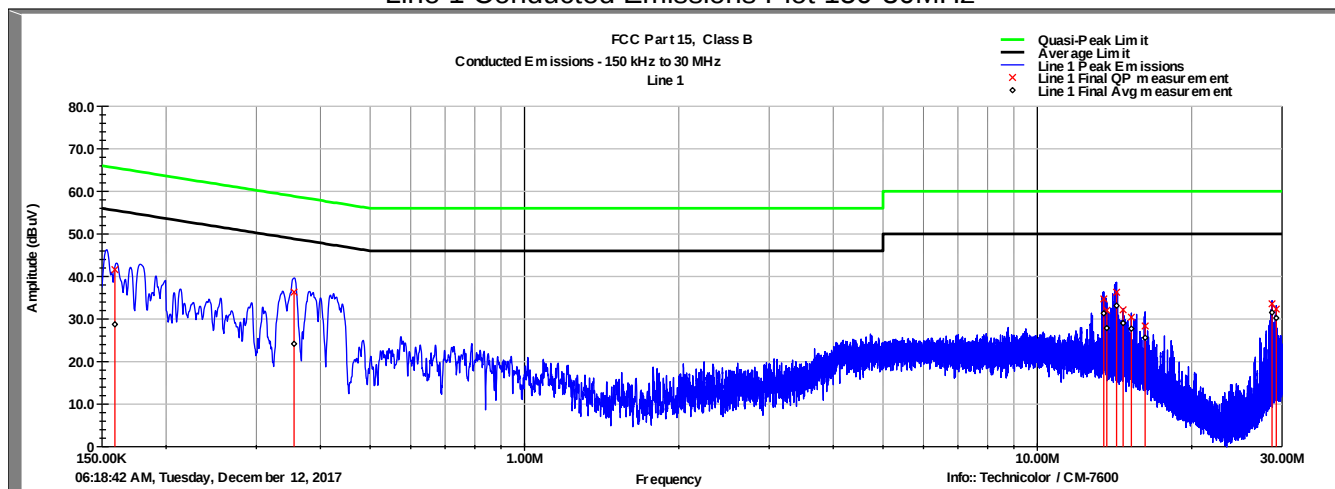
Note: The equipment calibration period is 1 year.

Software:

"Conducted Emissions" TILE! profile dated Dec 2015

## 9.5 Test Data

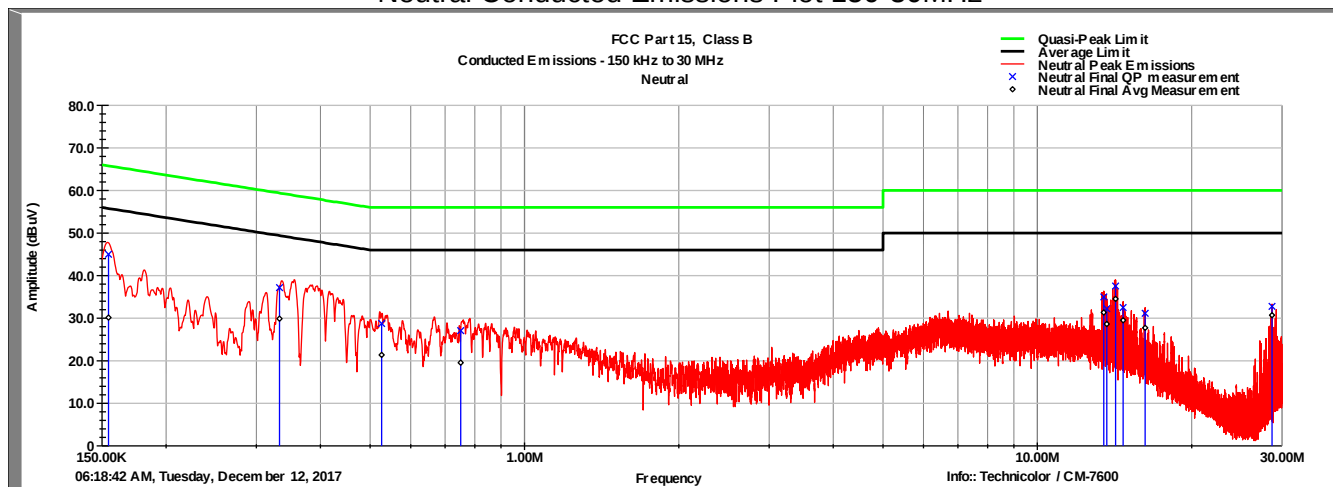
Line 1 Conducted Emissions Plot 150-30MHz



Line 1 Conducted Emissions Data 150-30MHz

| Frequency<br>MHz | QP Value<br>dBuV | QP Limit<br>dBuV | QP Margin<br>dB | Avg Value<br>dBuV | Avg Limit<br>dBuV | Avg Margin<br>dB |
|------------------|------------------|------------------|-----------------|-------------------|-------------------|------------------|
| 0.159            | 41.6             | 65.5             | -24.0           | 28.7              | 55.5              | -26.8            |
| 0.355            | 36.3             | 58.8             | -22.5           | 24.2              | 48.8              | -24.6            |
| 13.479           | 34.7             | 60.0             | -25.3           | 31.3              | 50.0              | -18.7            |
| 13.662           | 32.0             | 60.0             | -28.0           | 27.9              | 50.0              | -22.1            |
| 14.273           | 36.3             | 60.0             | -23.7           | 33.1              | 50.0              | -16.9            |
| 14.701           | 32.2             | 60.0             | -27.8           | 29.0              | 50.0              | -21.0            |
| 15.251           | 30.4             | 60.0             | -29.6           | 27.7              | 50.0              | -22.3            |
| 16.231           | 28.3             | 60.0             | -31.7           | 25.6              | 50.0              | -24.4            |
| 28.685           | 33.6             | 60.0             | -26.4           | 31.5              | 50.0              | -18.5            |
| 29.234           | 32.3             | 60.0             | -27.7           | 30.2              | 50.0              | -19.8            |

## Neutral Conducted Emissions Plot 150-30MHz



## Neutral Conducted Emissions Data 150-30MHz

| Frequency MHz | QP Value dBuV | QP Limit dBuV | QP Margin dB | Avg Value dBuV | Avg Limit dBuV | Avg Margin dB |
|---------------|---------------|---------------|--------------|----------------|----------------|---------------|
| 0.155         | 45.0          | 65.7          | -20.7        | 30.1           | 55.7           | -25.6         |
| 0.333         | 37.2          | 59.4          | -22.2        | 29.9           | 49.4           | -19.5         |
| 0.527         | 28.7          | 56.0          | -27.3        | 21.4           | 46.0           | -24.6         |
| 0.751         | 27.1          | 56.0          | -28.9        | 19.5           | 46.0           | -26.5         |
| 13.481        | 35.0          | 60.0          | -25.0        | 31.3           | 50.0           | -18.7         |
| 13.661        | 32.2          | 60.0          | -27.8        | 28.6           | 50.0           | -21.4         |
| 14.212        | 37.6          | 60.0          | -22.4        | 34.5           | 50.0           | -15.5         |
| 14.700        | 32.5          | 60.0          | -27.5        | 29.5           | 50.0           | -20.5         |
| 16.227        | 31.1          | 60.0          | -28.9        | 27.7           | 50.0           | -22.3         |
| 28.685        | 32.8          | 60.0          | -27.2        | 30.7           | 50.0           | -19.3         |

## 10 Revision History

| Revision Level | Description of changes | Revision Date    |
|----------------|------------------------|------------------|
| 0              | Initial release        | 20 December 2017 |
|                |                        |                  |
|                |                        |                  |
|                |                        |                  |
|                |                        |                  |
|                |                        |                  |
|                |                        |                  |
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