

# EMC Test Report

**Project Number:** 4148120

**Report Number:** 4148120EMC02

**Revision Level:** 0

**Client:** Arris Group, Inc.

**Equipment Under Test:** Digital Gateway Modem

**Model:** DG3450

**FCC ID:** UIDDG3450

**IC ID:** 6670A-DG3450

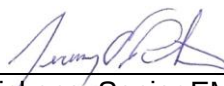
**Applicable Standards:** FCC Part 15 Subpart C, § 15.407

**ANSI C63.10: 2013**

**Report issued on:** 13 July 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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## 1 Summary of Test Results

| Test Description                | Test Specification   | Test Result  |
|---------------------------------|----------------------|--------------|
| Emission Bandwidth              | 15.407(a), 15.407(e) | Compliant(1) |
| Spectral Density                | 15.407(a)            | Compliant(1) |
| Peak Power Output               | 15.407(a)            | Compliant(1) |
| Unwanted Emissions              | 15.407(b)            | Compliant    |
| AC Powerline Conducted Emission | 15.107, 15.207       | Compliant    |

(1) Note: The DG3450 hardware is identical to that of the model TG3452 which has been tested and certified under FCC ID UIDTG3452 and IC ID: 6670A-TG3452. Therefore the antenna port conducted measurement data from the TG3452 filing also applies to the DG3450.

### 1.1 Modifications Required for Compliance

None

## 2 General Information

### 2.1 Client Information

Name: ARRIS Group, Inc.  
Address: 3871 Lakefield Drive, Suite 300  
City, State, Zip, Country: Suwanee, GA 30024, 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: Digital Gateway Modem  
Model Number: DG3450  
Serial Number: 73R2XC333301541  
Power Supply: M/N: NBS36H120300VU, P/N: AREP05681

Frequency Range: 5150 to 5250 MHz and 5725 to 5825MHz  
Data Modes: 802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT20), 802.11ac (VHT40), 802.11ac (VHT80)  
Antenna: Internal, 4x4 MIMO

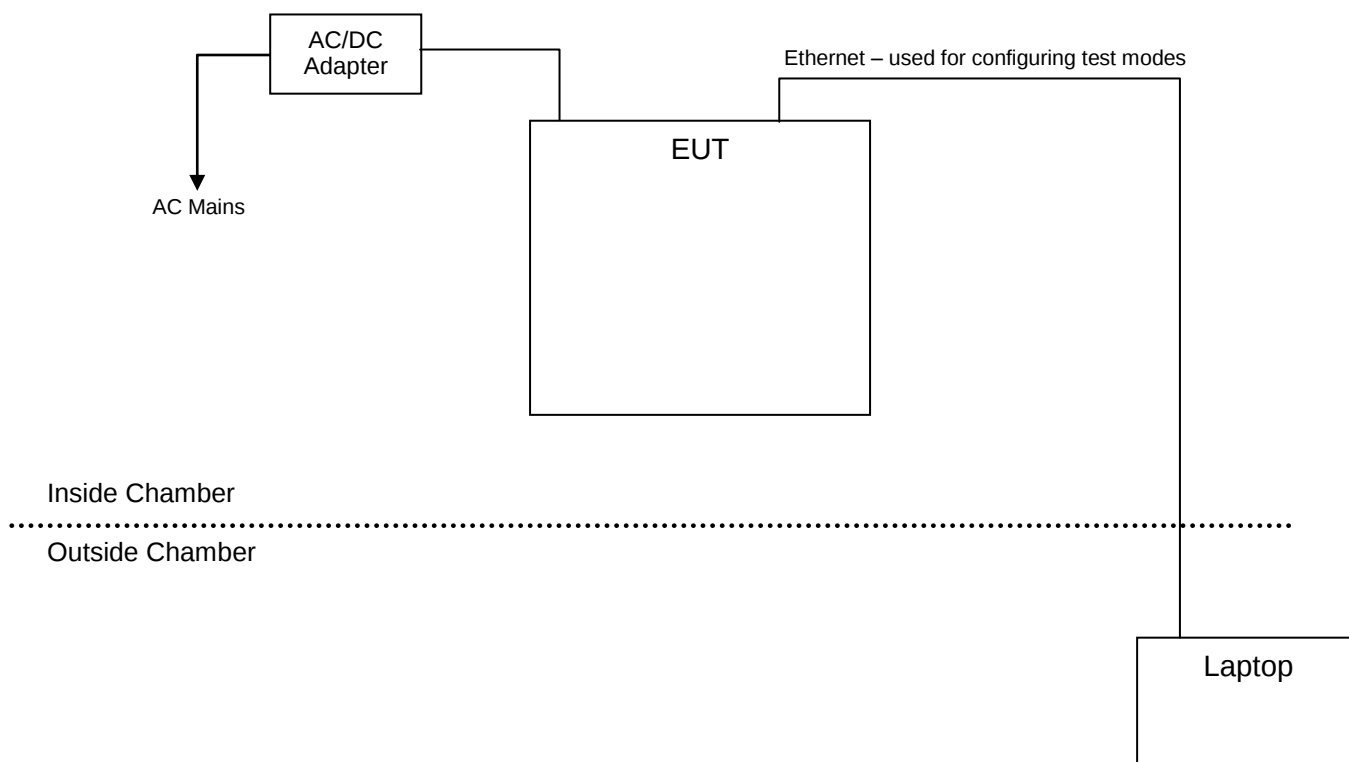
Rated Voltage: 100-240Vac, 50/60Hz (AC to 12VDC Adapter)  
Test Voltage: 120Vac, 60Hz

Sample Received Date: 24 May 2017  
Dates of testing: 30 May - 29 June 2017

### 2.4 Operating Modes and Conditions

Using test commands, the EUT would transmit continuously on any of the UNII Band 1 or UNII Band 3 channels at full power. Worst-case power and PSD were achieved at the lowest data rate. For radiated spurious emissions measurements, only the worst-case mode with respect to peak power was investigated.

## 2.5 EUT Connection Block Diagram – Radiated Measurements



## 2.6 System Configurations

| Device reference | Manufacturer | Description           | Model Number                     | Serial Number   |
|------------------|--------------|-----------------------|----------------------------------|-----------------|
| A                | Arris        | Digital Gateway Modem | DG3450                           | 73R2XC333301541 |
| B                | NetBit       | AC/DC Supply          | NBS36H120300VU<br>P/N: AREP05681 | Not Labeled     |

### 3 Unwanted Emissions

#### 3.1 Test Result

| Test Description   | Test Specification             | Test Result |
|--------------------|--------------------------------|-------------|
| Spurious Emissions | 15.407(b)<br>ANSI C63.10: 2013 | Compliant   |

#### 3.2 Test Method

Testing was performed using the radiated and conducted methods defined in ANSI C63.10: 2013 clause 12.7 and KDB 789033 D02 General UNII Test Procedures New Rules v01r03. In lieu of the marker-delta or integration methods, band edge compliance was shown using a peak detector and a 1MHz resolution bandwidth.

Lowest, middle, and highest channels were investigated for each band. Only the modulation providing the worst-case power was reported except at the band edges where all modulations and bandwidths were measured. The frequency range examined was 9kHz to 40GHz. A pre-scan was performed in the 9kHz-30MHz range and no emissions associated with the radio were observed.

For this evaluation, only the fundamental and harmonics were investigated due to the layout differences of the antennas relative to the radio modules relative to the certified TG3452. Measurements below 1GHz were not repeated.

##### Limit:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

#### 3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

##### Environmental Conditions

Temperature: 23.5 °C

Relative Humidity: 43.5 %

### 3.4 Test Equipment – Radiated Measurements

Test End Date: 5-Jun-2017

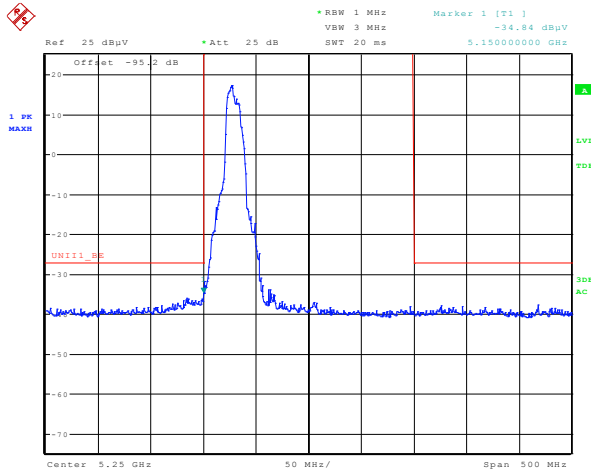
Tester: JOP/FN

| Equipment                  | Model             | Manufacturer    | Asset Number | Cal Due Date |
|----------------------------|-------------------|-----------------|--------------|--------------|
| EMI TEST RECEIVER          | ESU40             | ROHDE & SCHWARZ | B079629      | 25-Apr-2018  |
| ANTENNA, DRG HORN (MEDIUM) | 3117              | ETS LINDGREN    | B079691      | 27-Jul-2017  |
| RF CABLE                   | SF106             | HUBER & SUHNER  | B079661      | 29-Jul-2017  |
| RF CABLE                   | NFS-290-78.7-NFS  | FLORIDA RF LABS | B095019      | 28-Jul-2017  |
| RF CABLE                   | NMS-290-236.2-NMS | FLORIDA RF LABS | B095020      | 29-Jul-2017  |
| RF CABLE                   | SUCOFLEX 100      | HUBER & SUHNER  | B108523      | 4-Aug-2017   |
| HORN(SMALL)                | LB-180400-20-C-KF | A-INFO          | 15007        | 21-Mar-2018  |
| RF CABLE                   | SF102             | HUBER & SUHNER  | B079822      | 27-Jul-2017  |
| RF CABLE                   | SF102             | HUBER & SUHNER  | B079824      | 27-Jul-2017  |
| LOW NOISE AMPLIFIER        | NSP1840-HG        | MITEQ           | B087572      | 29-Jul-2017  |

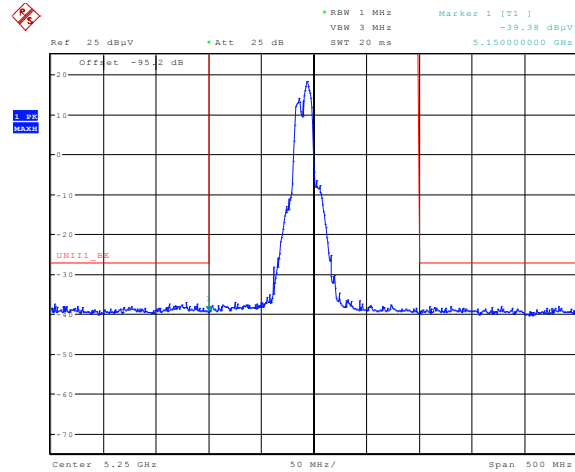
Note: The equipment calibration period is 1 year.

### 3.5 Test Data - UNII Band 1 – Radiated Band Edge

802.11a  
Channels 36 and 48

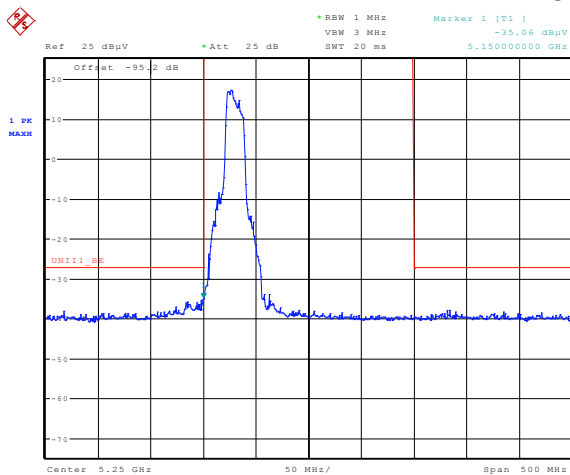


Date: 22.JUN.2017 10:04:45

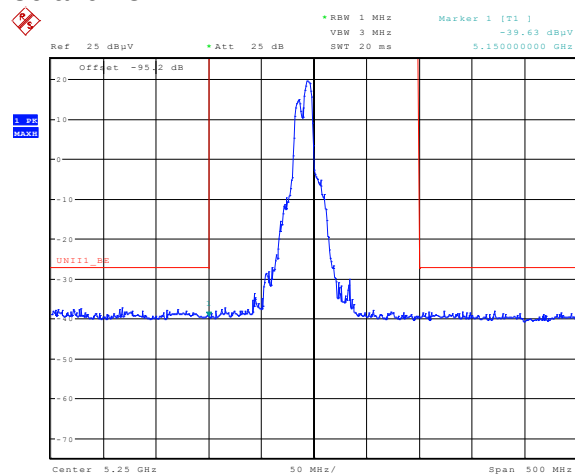


Date: 22.JUN.2017 10:08:44

802.11n (HT20)  
Channels 36 and 48

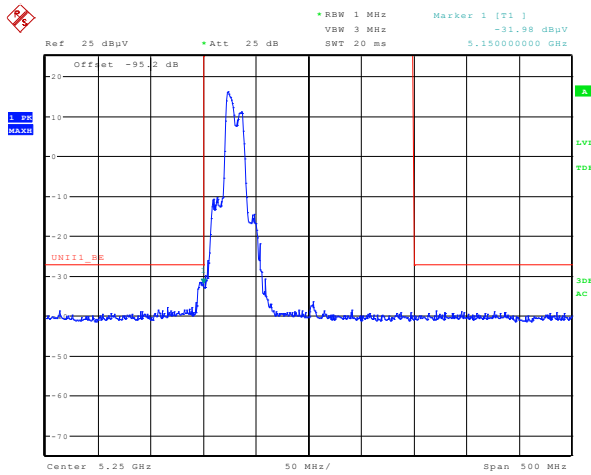


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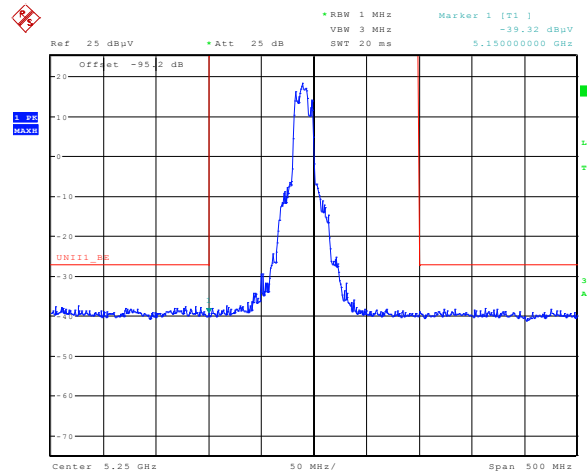


Date: 22.JUN.2017 11:03:12

### 802.11ac (VHT20) Channels 36 and 48

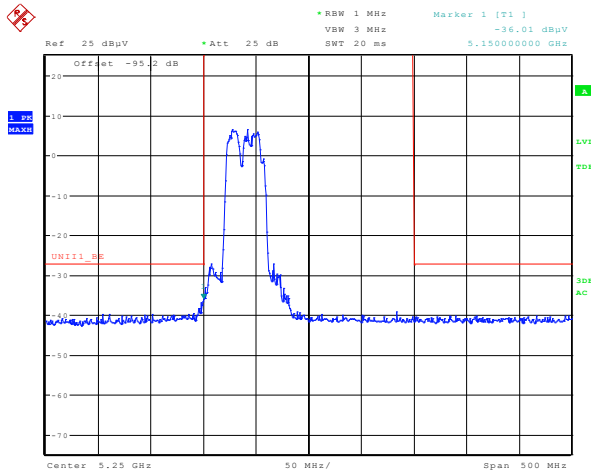


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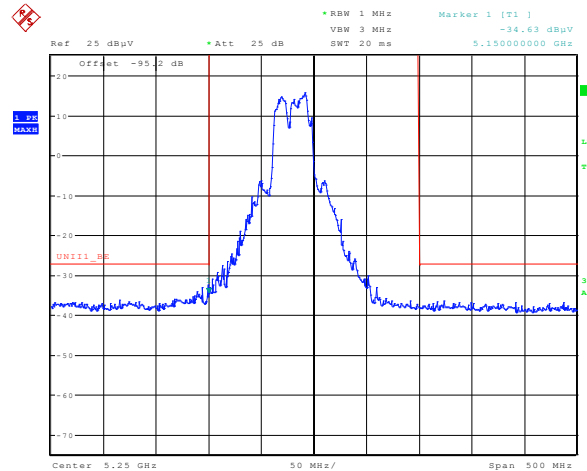


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### 802.11n (HT40) Channels 38 and 46

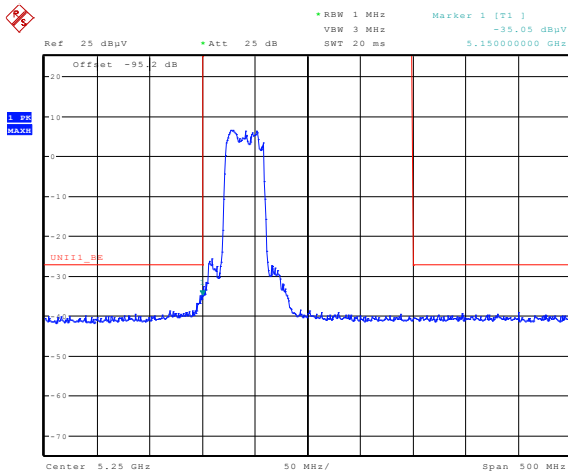


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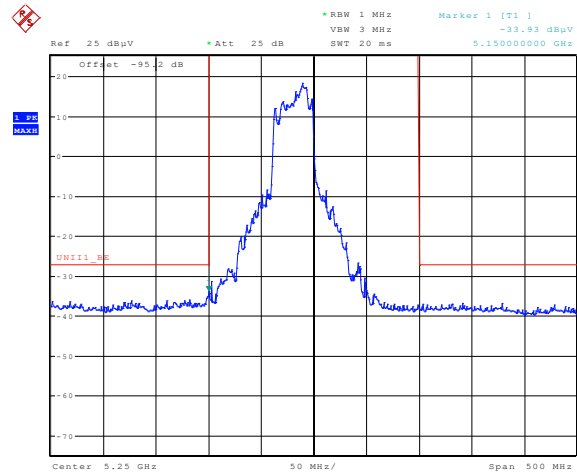


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## 802.11ac (VHT40) Channels 38 and 46

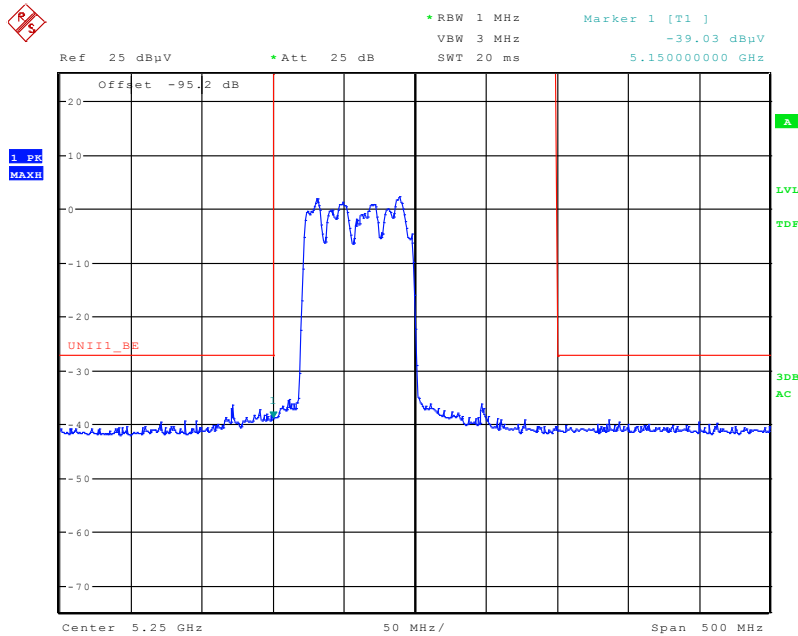


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Date: 22.JUN.2017 11:20:00

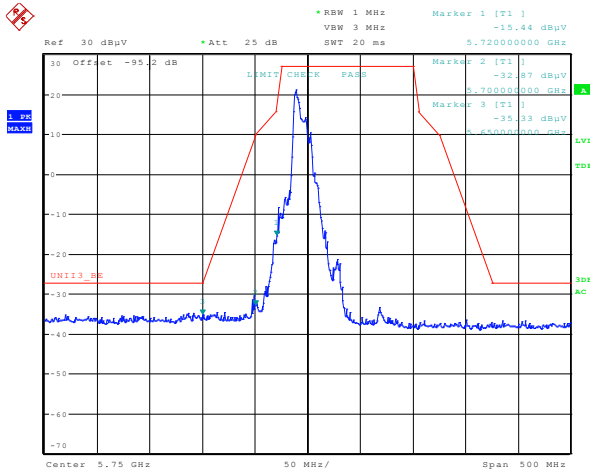
## 802.11ac (VHT80) Channel 42



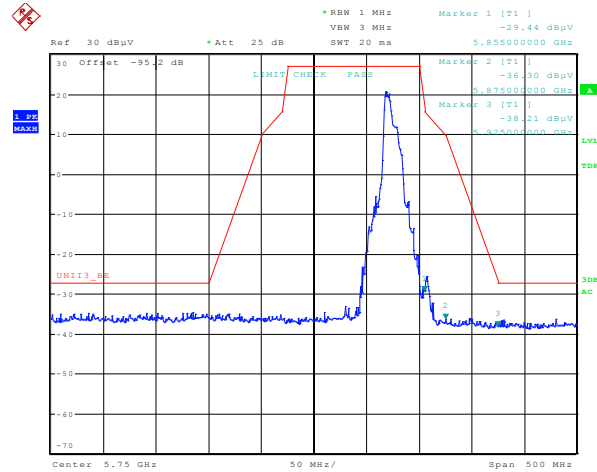
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### 3.6 Test Data - UNII Band 1 – Radiated Band Edge

802.11a  
Channels 149 and 165

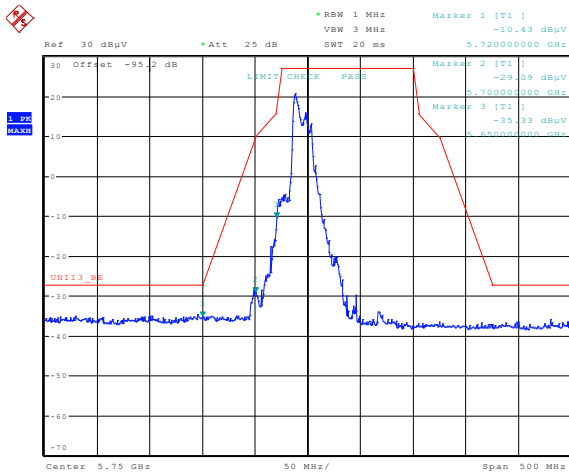


Date: 22 JUN 2017 13:34:33

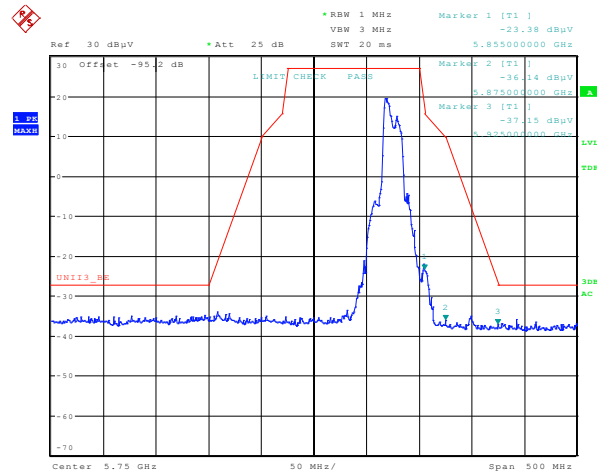


Date: 22 JUN 2017 13:36:17

802.11n (HT20)  
Channels 149 and 165

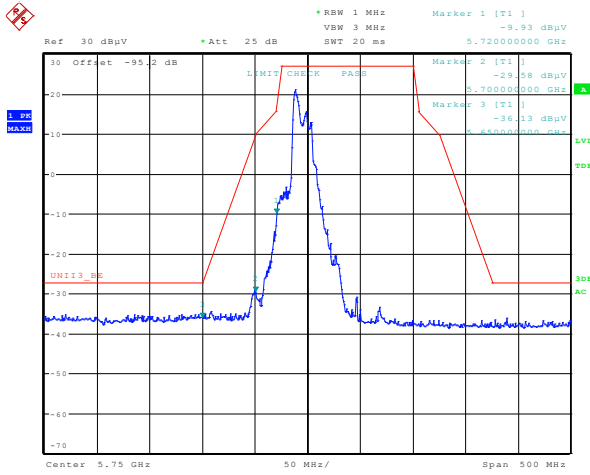


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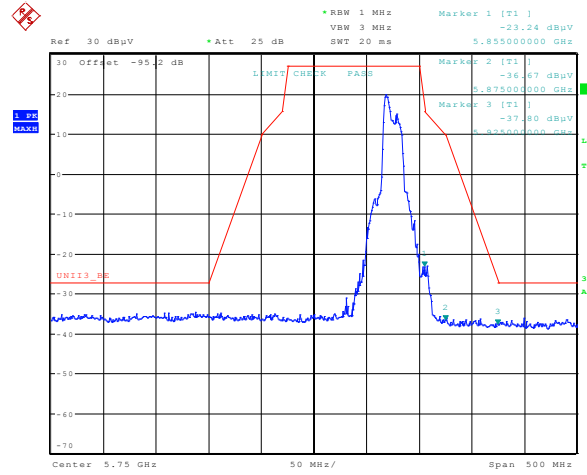


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## 802.11ac (VHT20) Channels 149 and 165

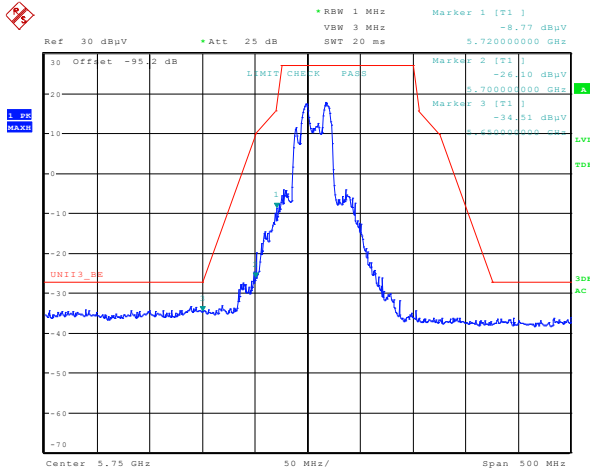


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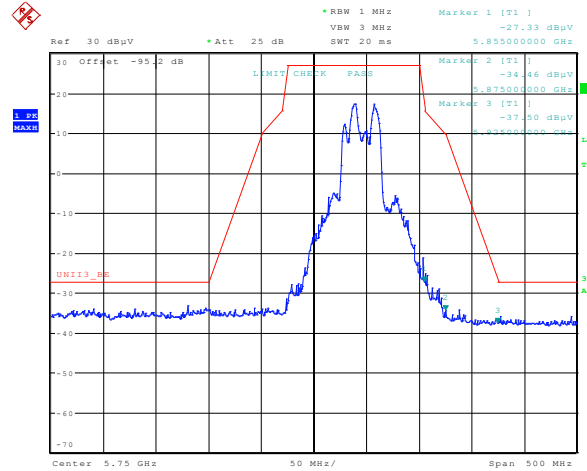


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## 802.11n (HT40) Channels 151 and 159

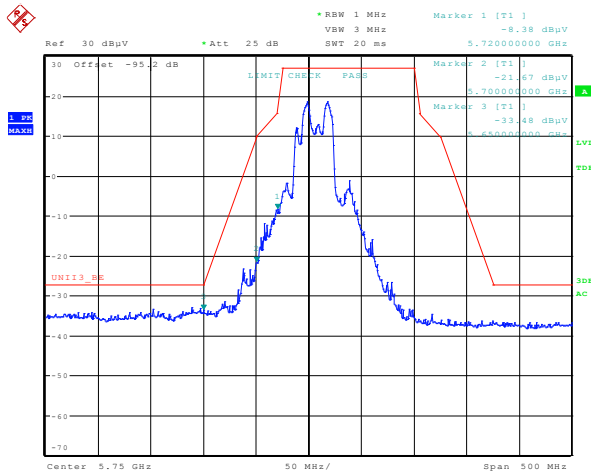


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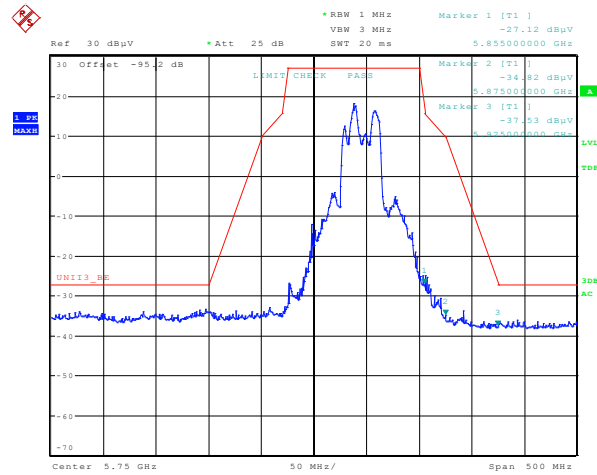


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## 802.11ac (VHT40) Channels 151 and 159

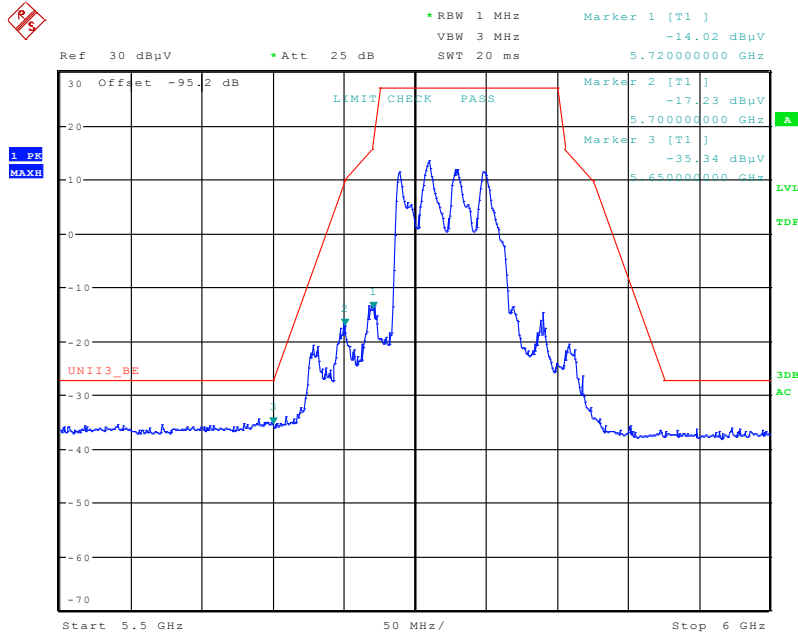


Date: 22.JUN.2017 13:24:13



Date: 22.JUN.2017 13:44:40

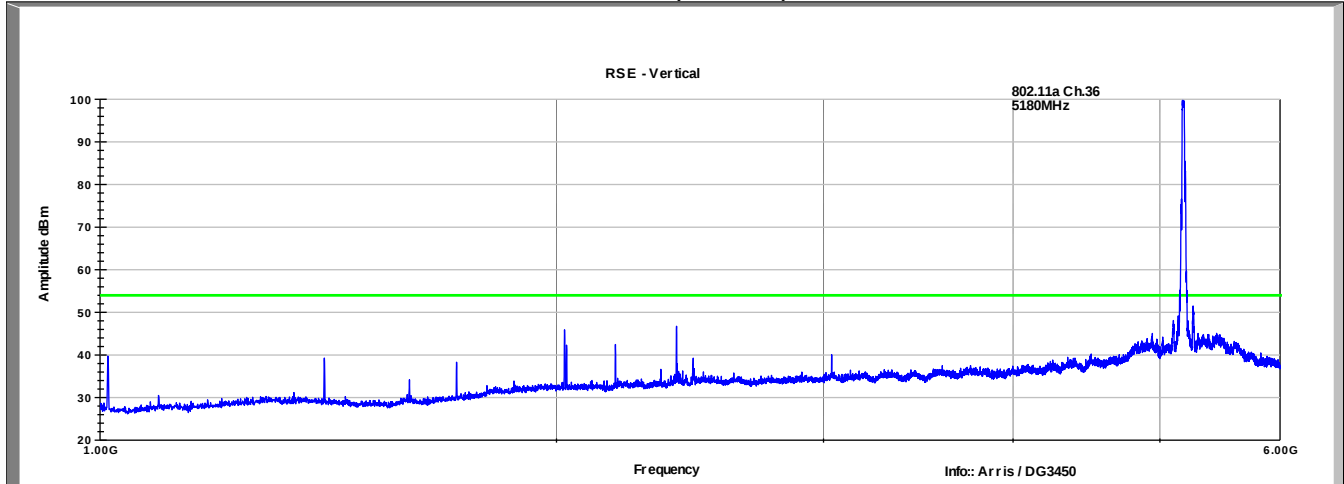
## 802.11ac (VHT80) Channel 155



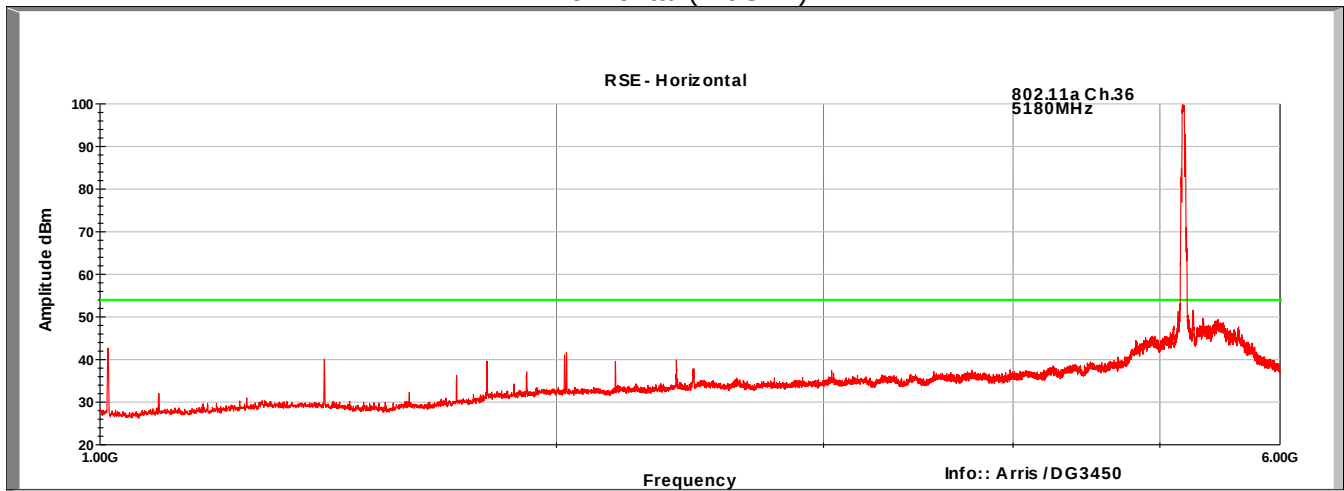
Date: 22.JUN.2017 13:21:18

### 3.7 Unwanted Emissions – Cabinet Radiation

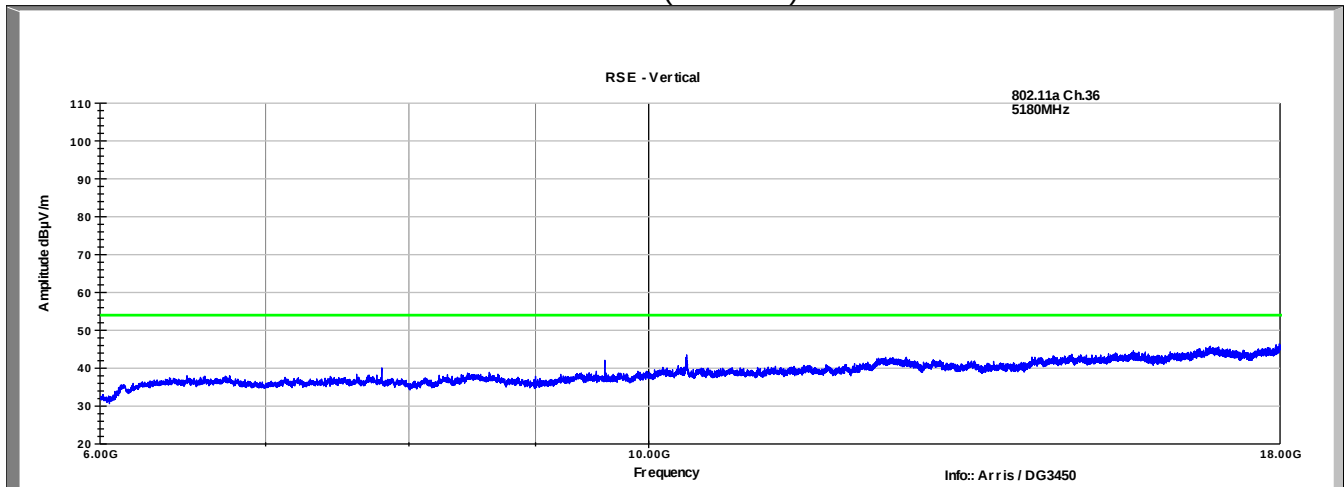
Channel 36  
Vertical (1-6GHz)



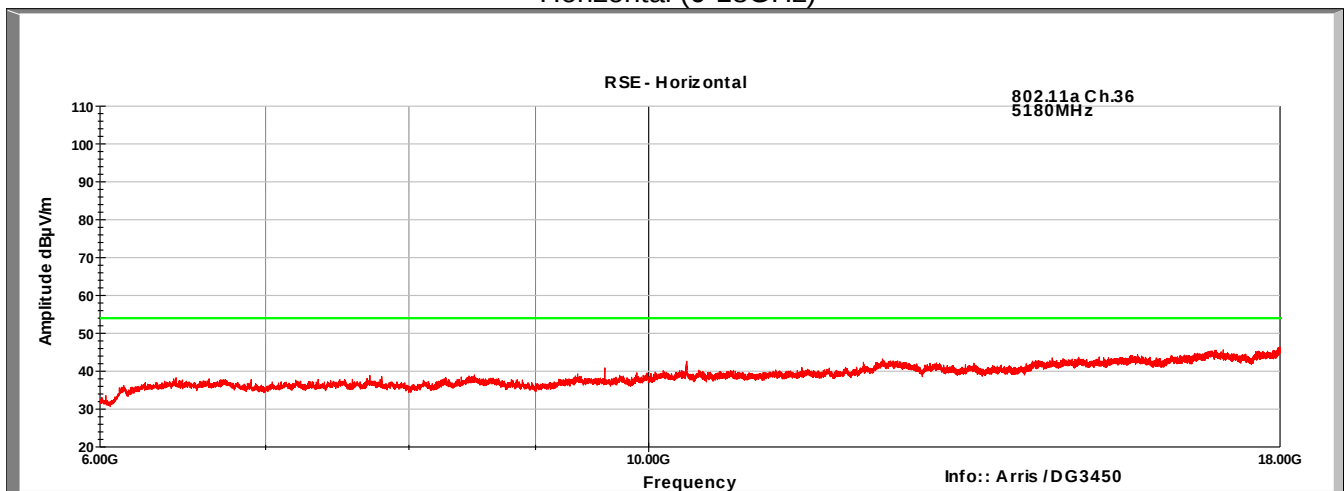
Channel 36  
Horizontal (1-6GHz)



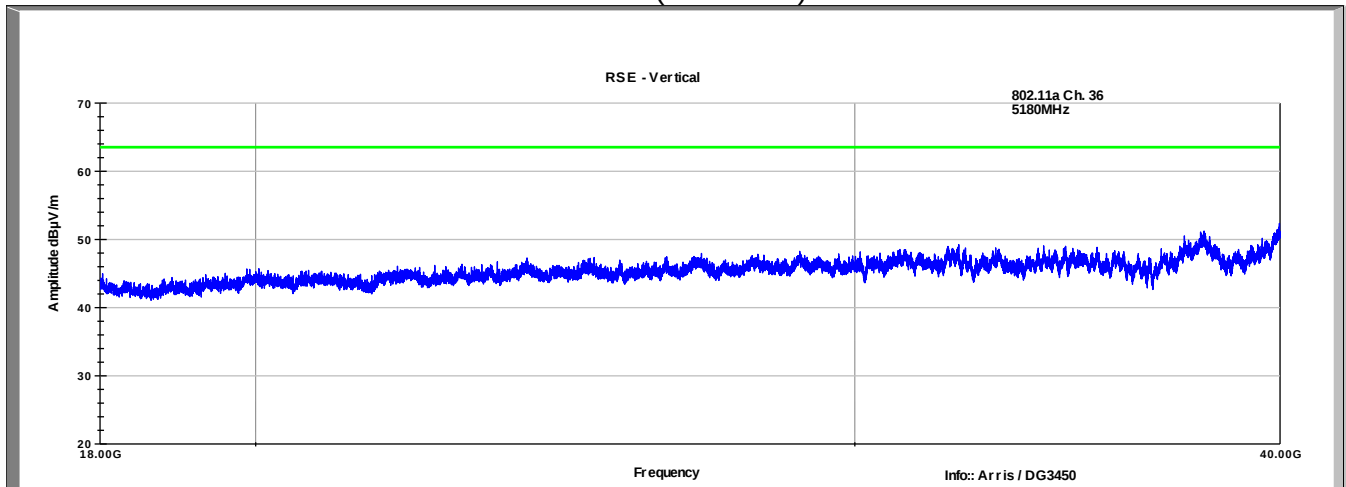
Channel 36  
Vertical (6-18GHz)



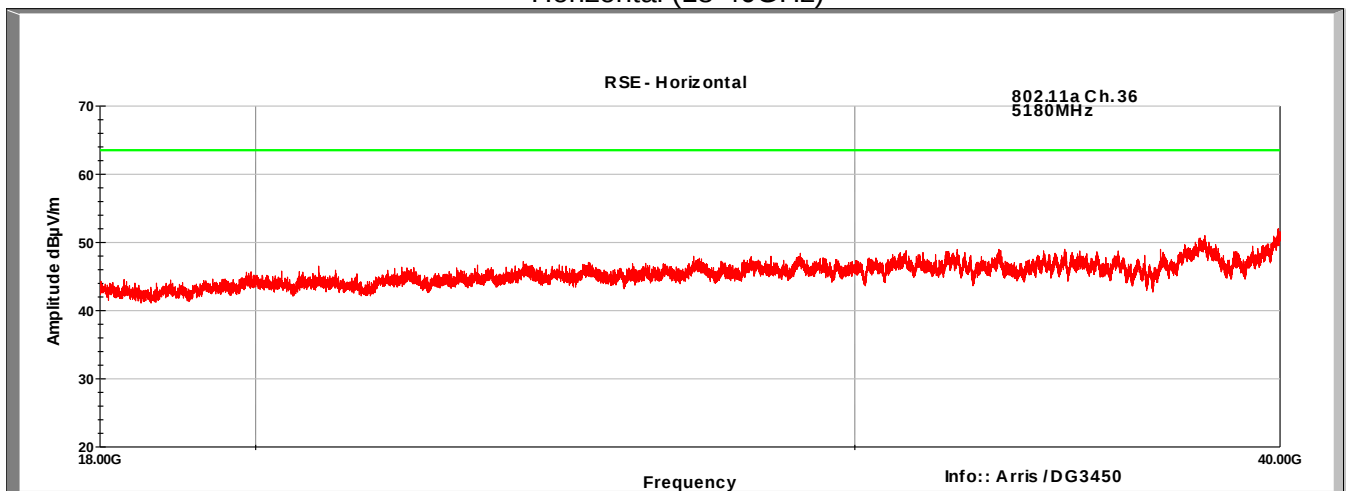
Channel 36  
Horizontal (6-18GHz)



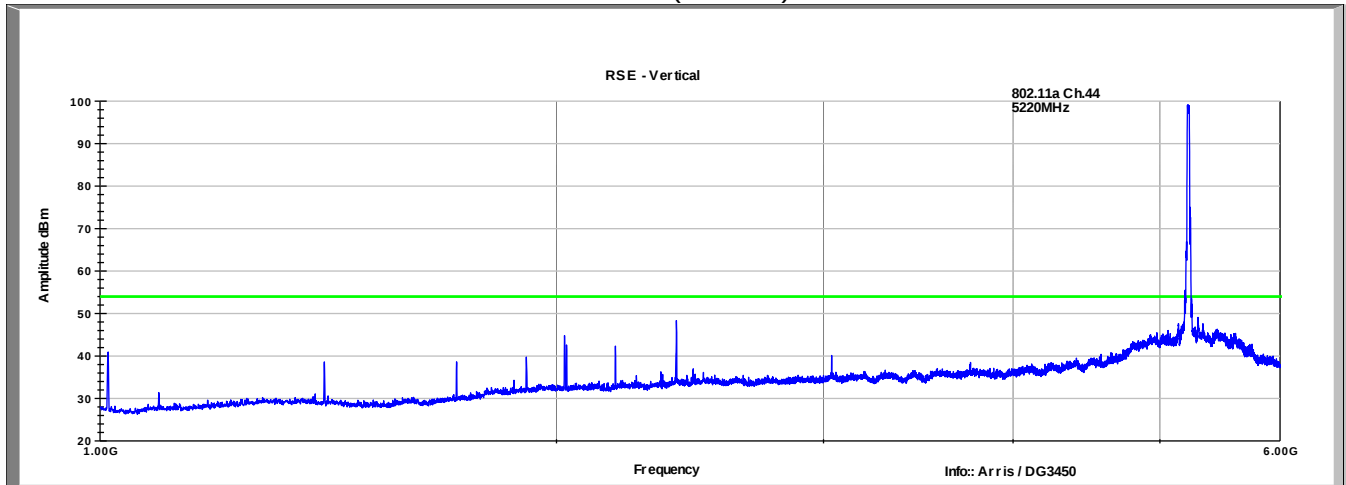
Channel 36  
Vertical (18-40GHz)



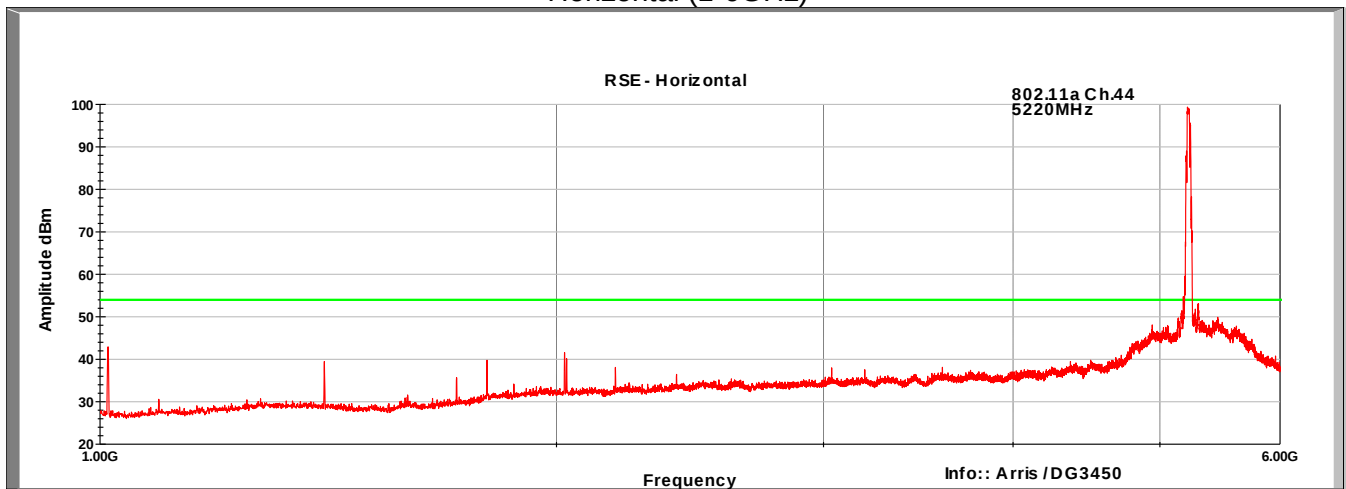
Channel 36  
Horizontal (18-40GHz)



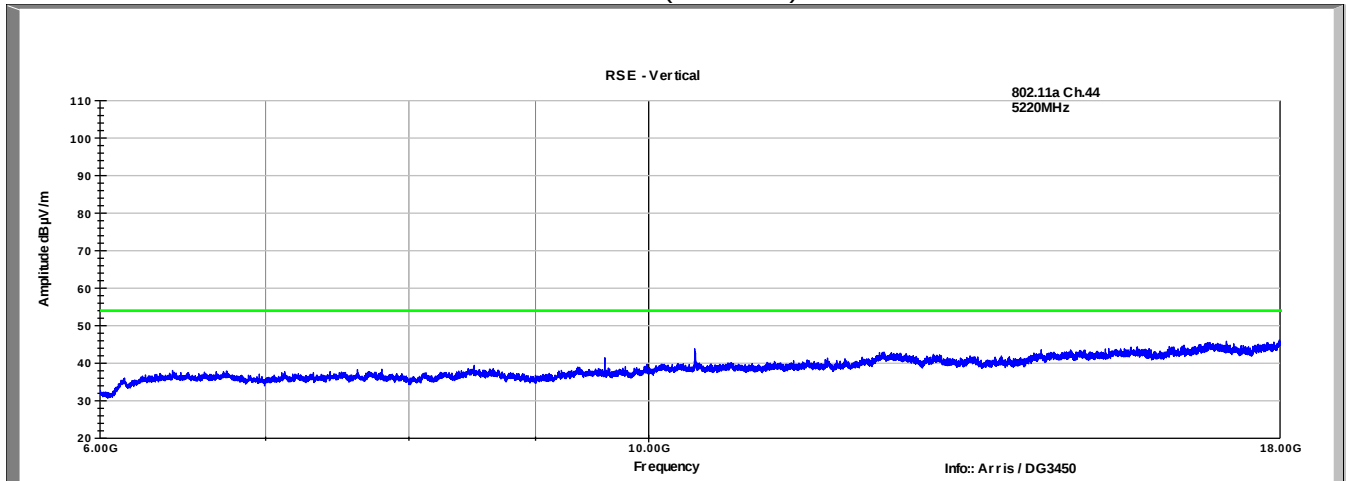
Channel 44  
Vertical (1-6GHz)



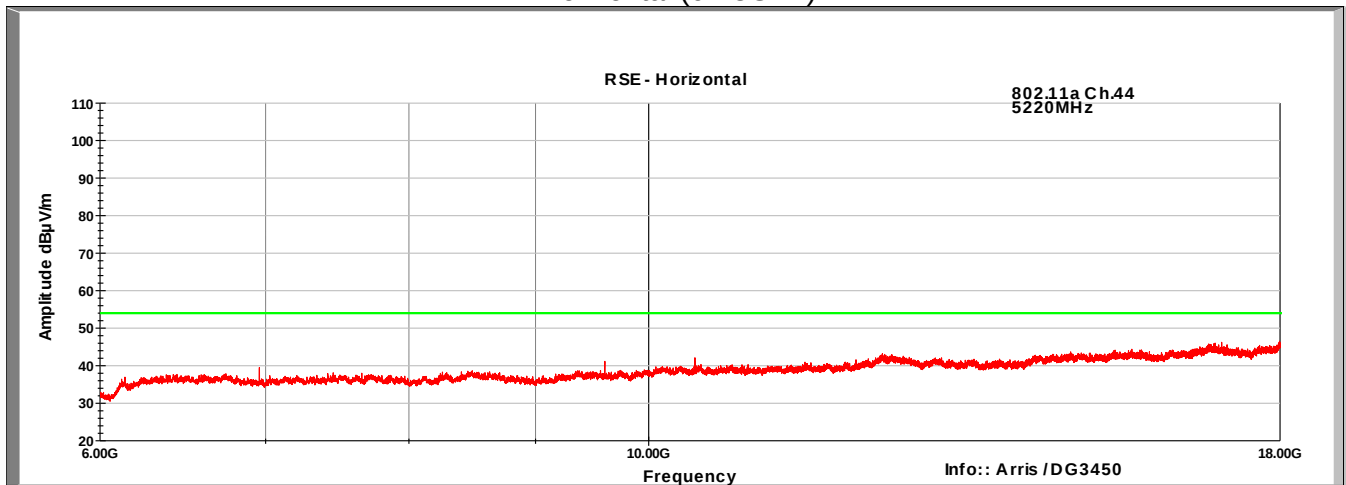
Channel 44  
Horizontal (1-6GHz)



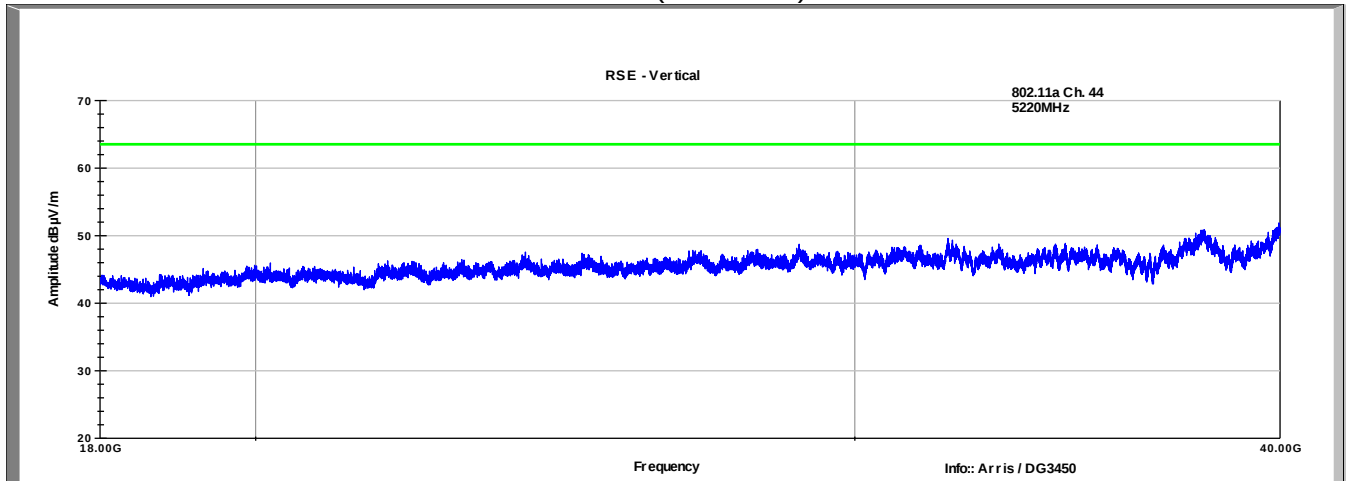
Channel 44  
Vertical (6-18GHz)



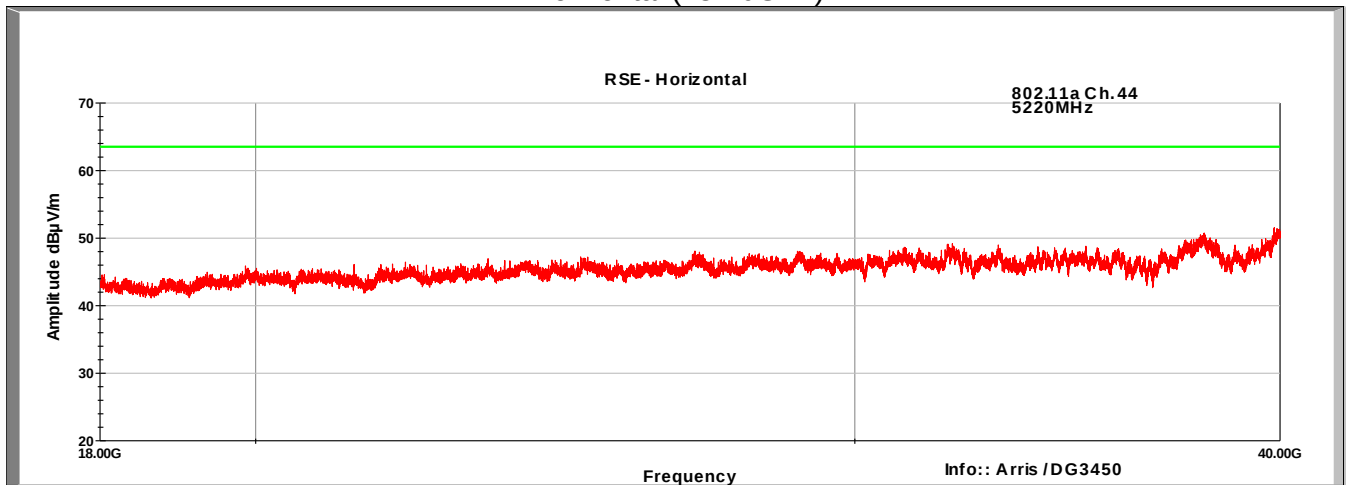
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Horizontal (6-18GHz)



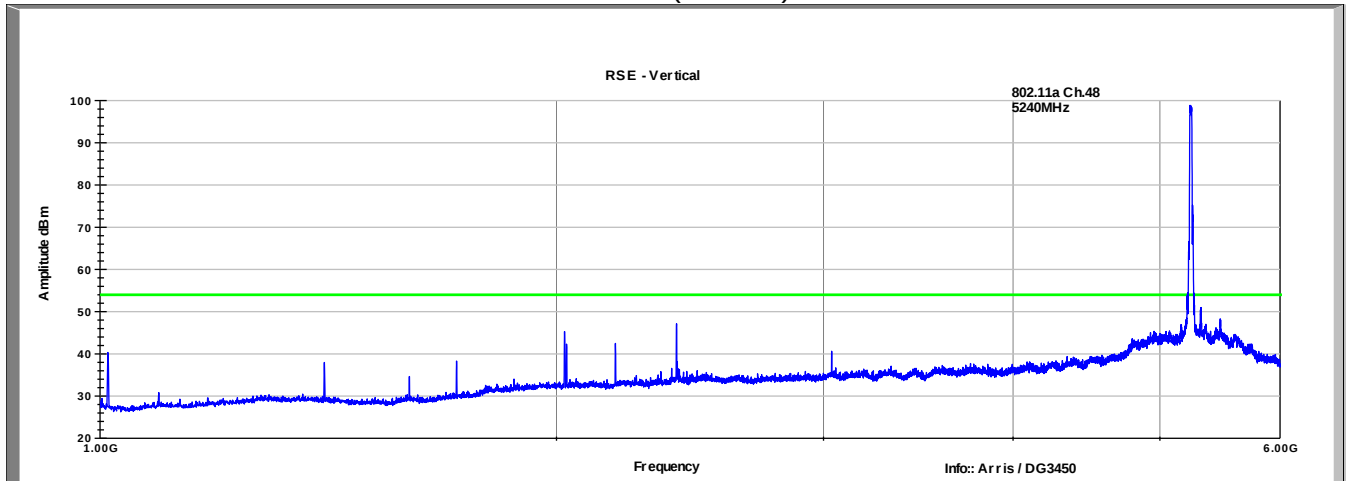
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Vertical (18-40GHz)



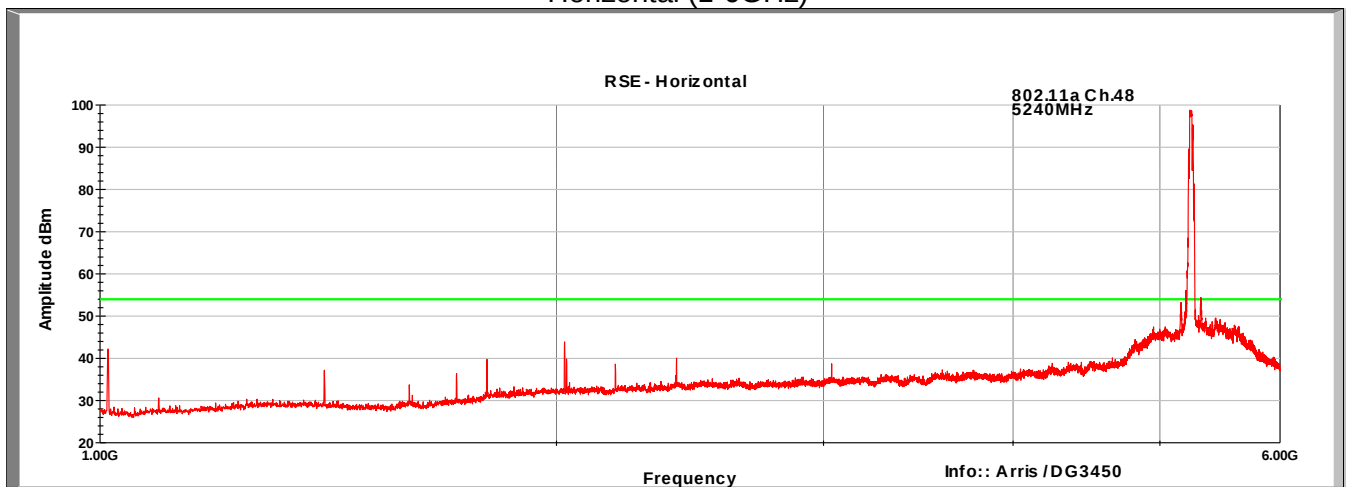
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Horizontal (18-40GHz)



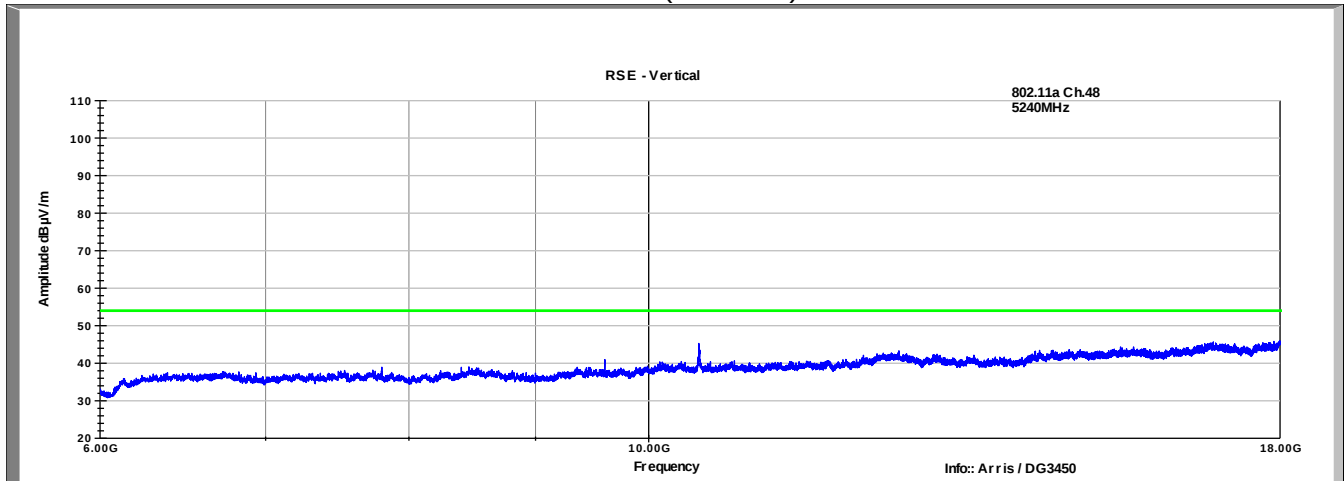
Channel 48  
Vertical (1-6GHz)



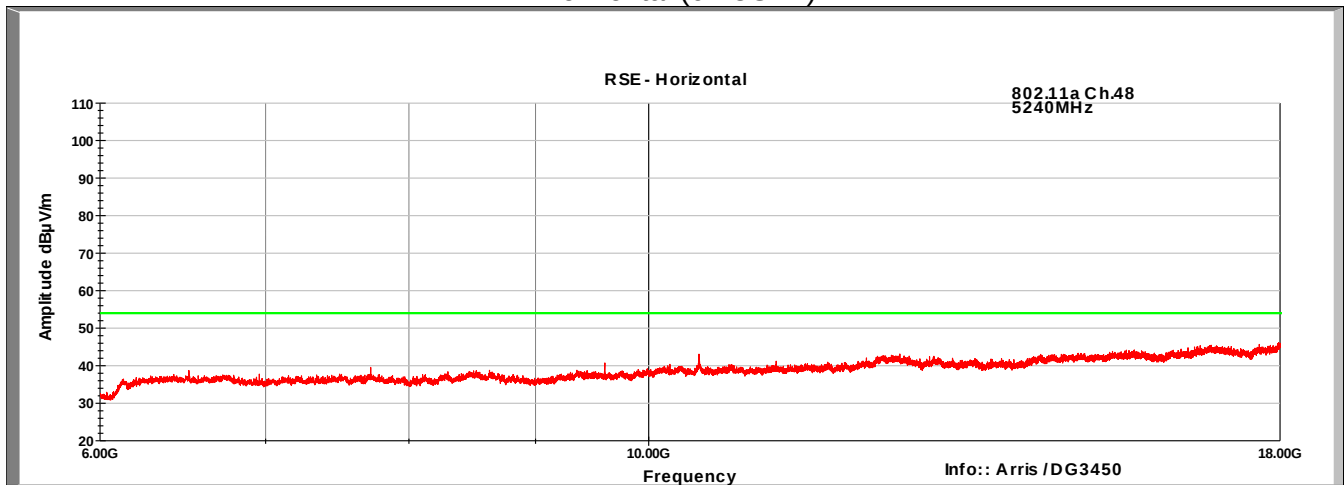
Channel 48  
Horizontal (1-6GHz)



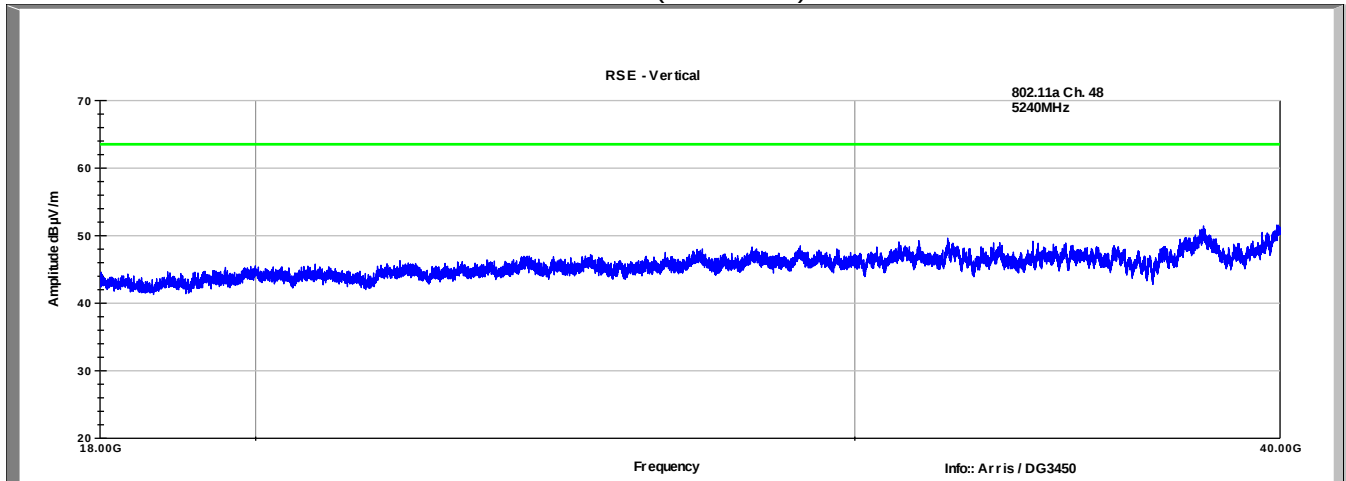
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Vertical (6-18GHz)



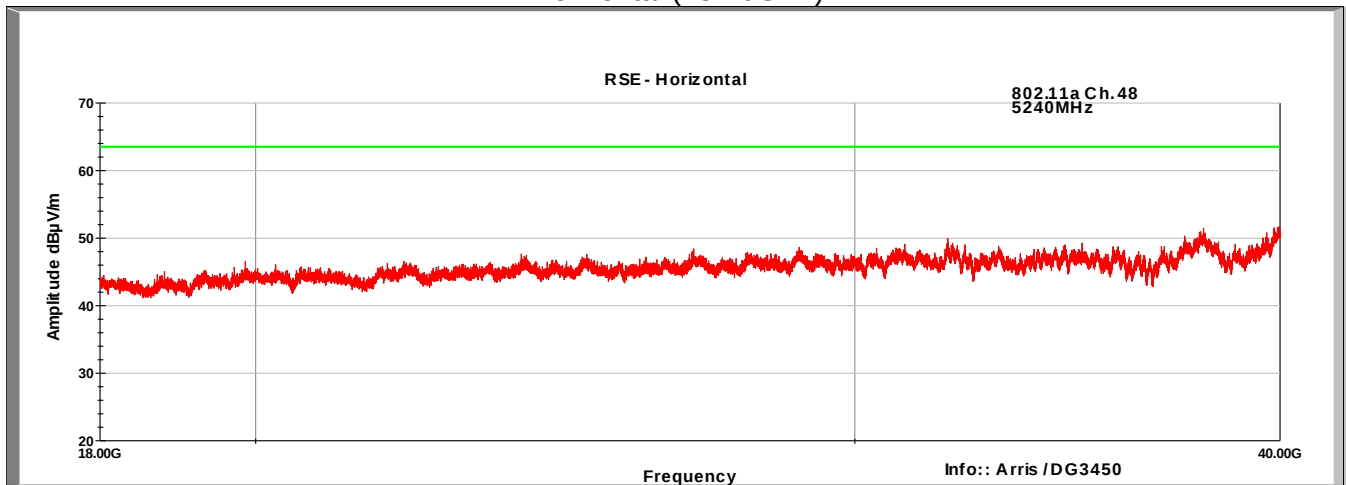
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Horizontal (6-18GHz)



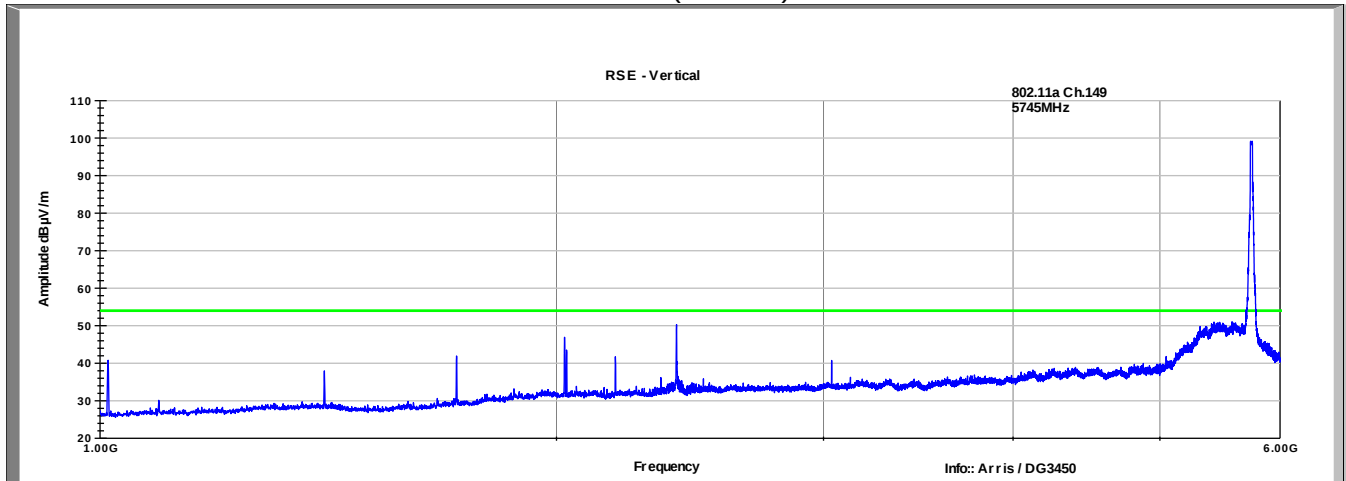
Channel 48  
Vertical (18-40GHz)



Channel 48  
Horizontal (18-40GHz)

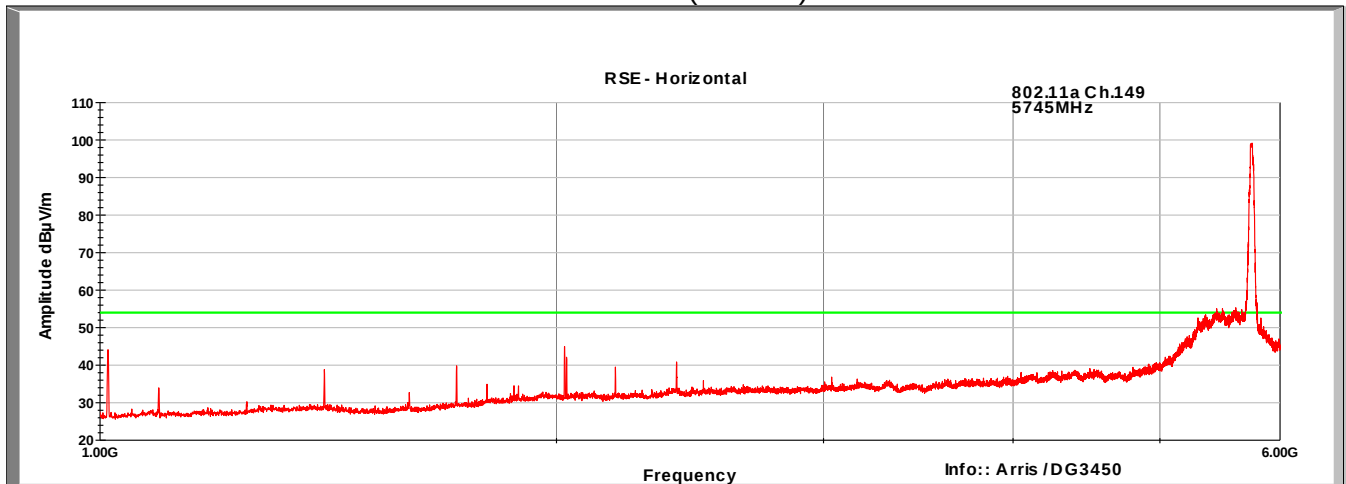


Channel 149  
Vertical (1-6GHz)

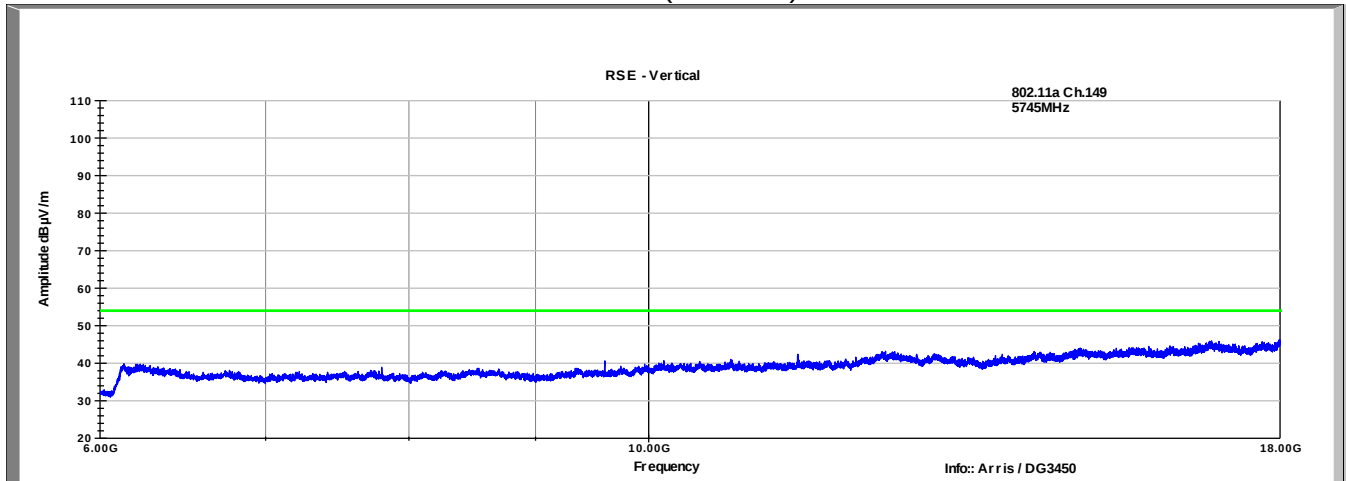


Worst case spur (digital): 50.3dBµV/m @ 2.4GHz

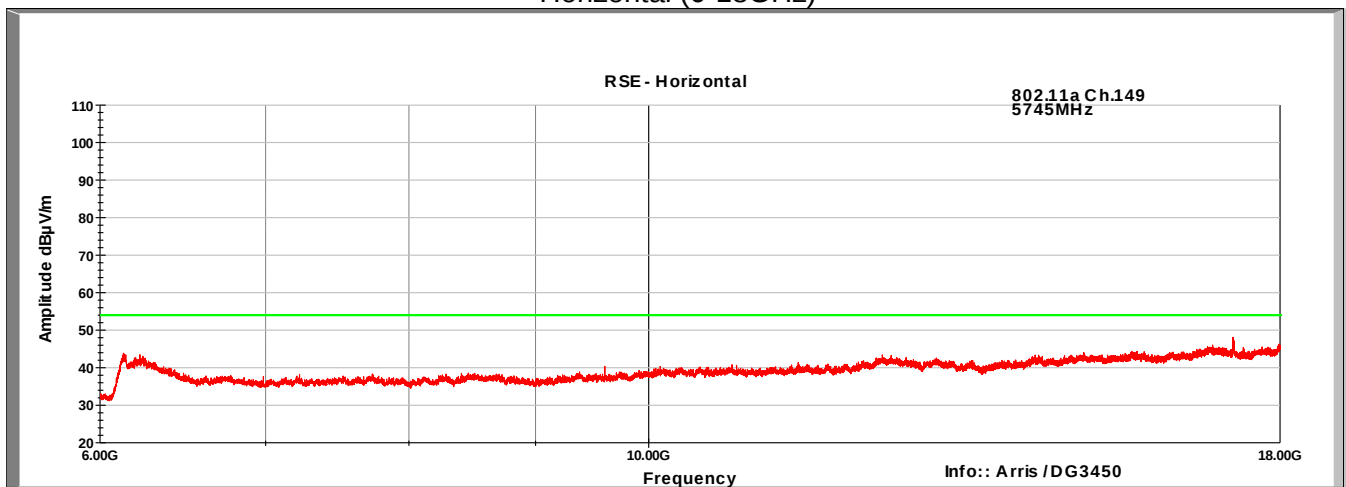
Channel 149  
Horizontal (1-6GHz)



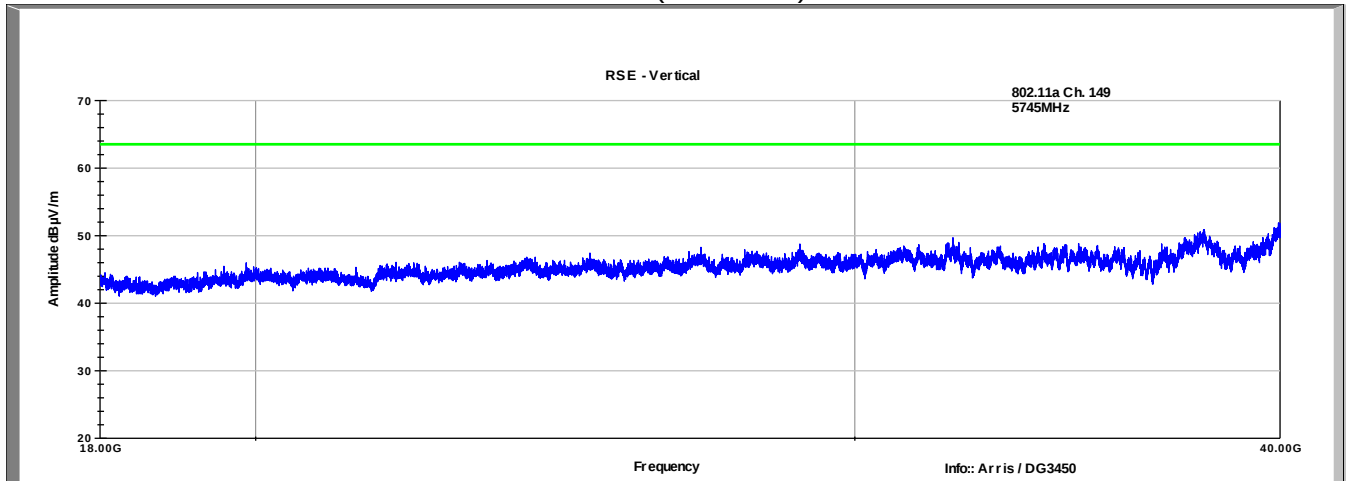
Channel 149  
Vertical (6-18GHz)



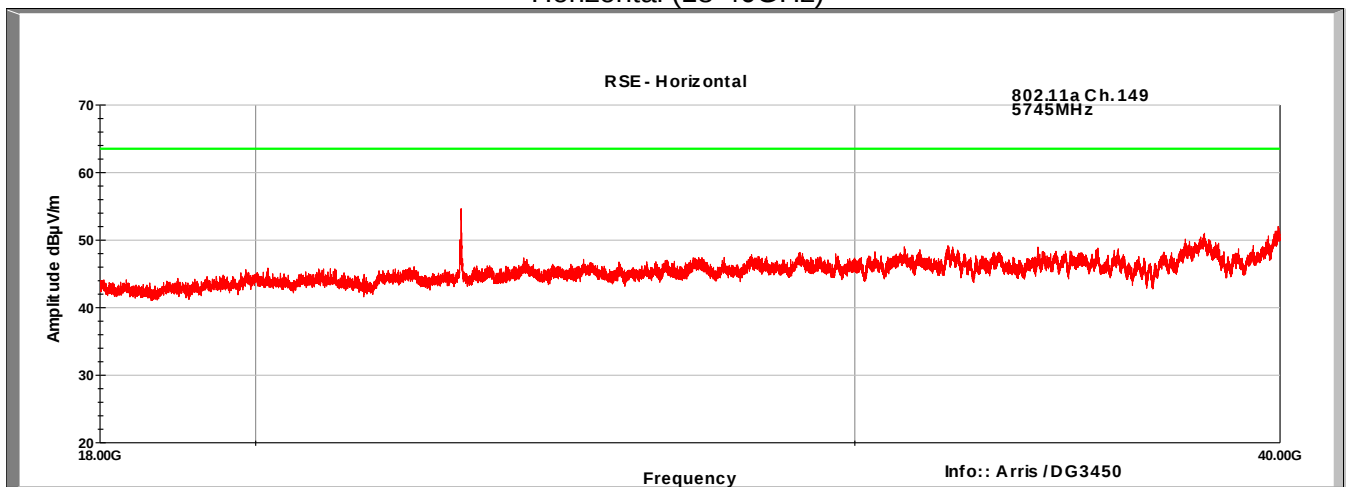
Channel 149  
Horizontal (6-18GHz)



Channel 149  
Vertical (18-40GHz)

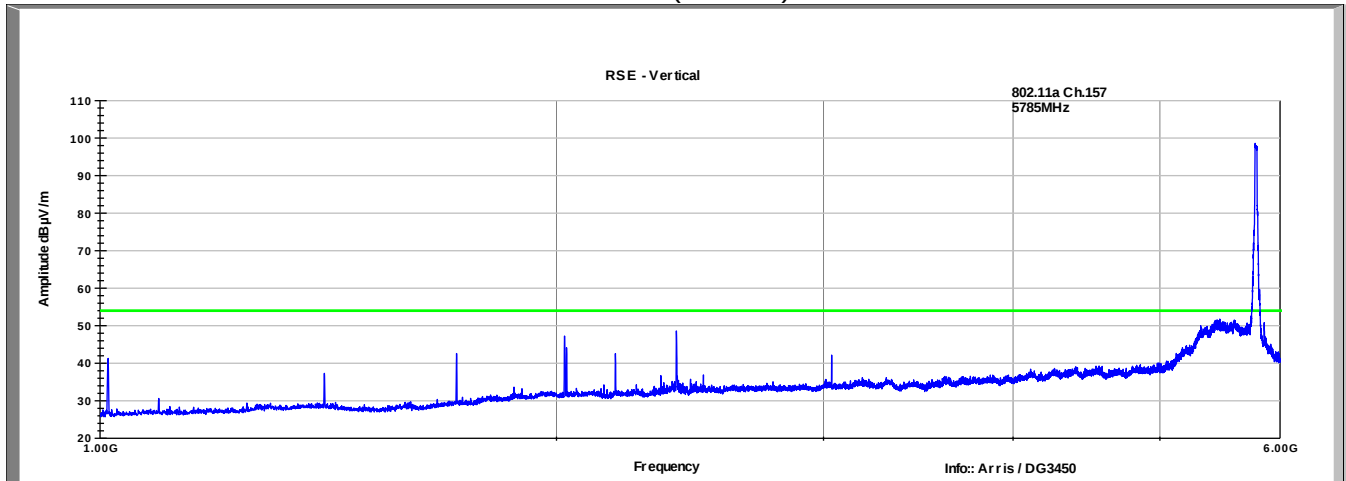


Channel 149  
Horizontal (18-40GHz)

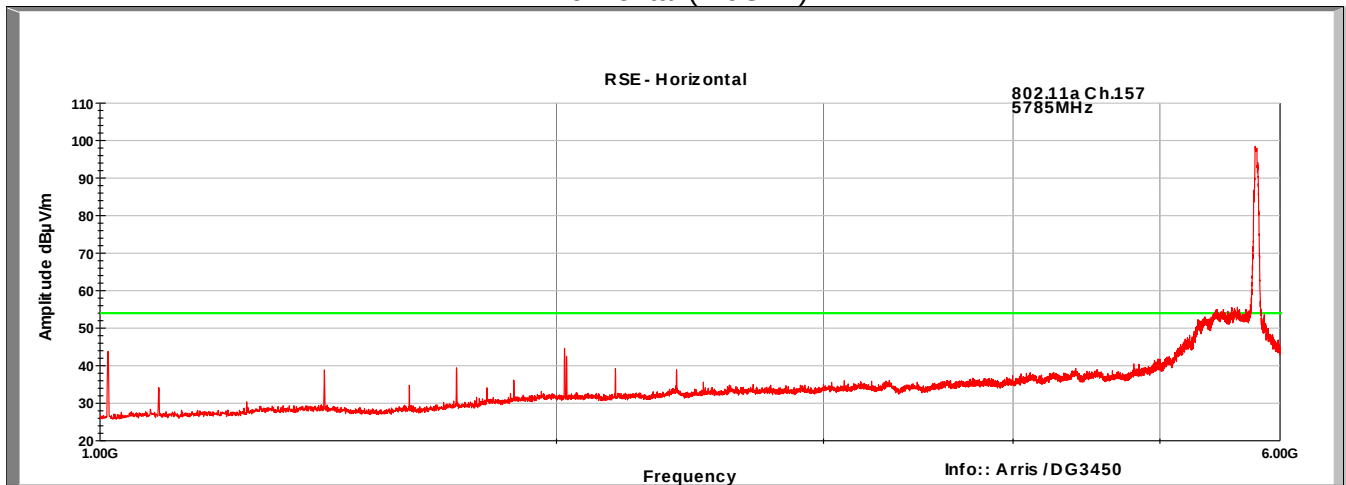


Worst case spur (harmonic): 54.7dBµV/m @ 22.98GHz

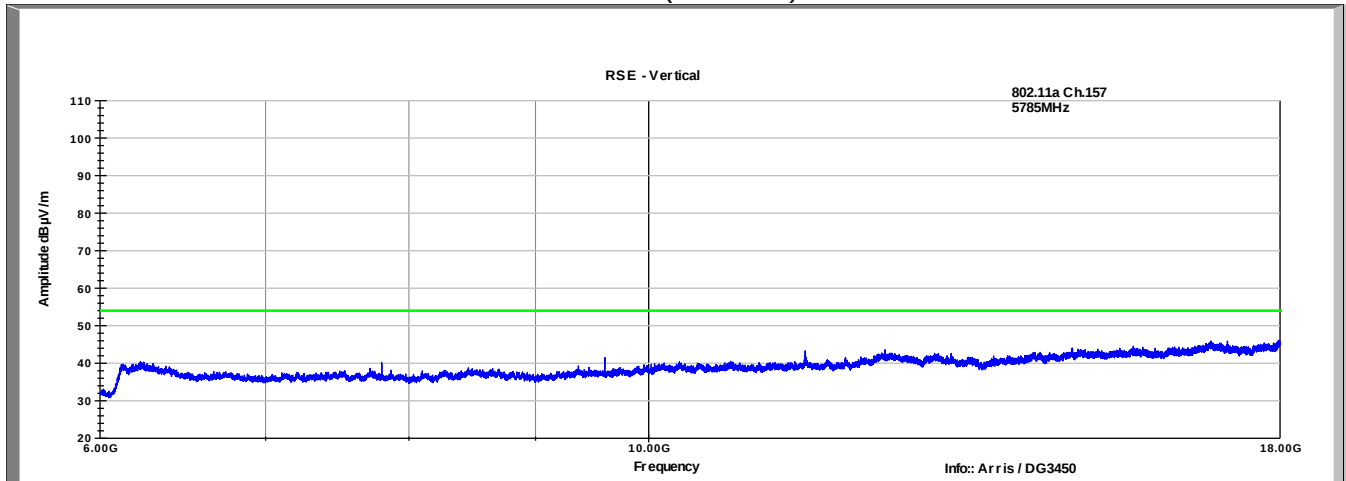
Channel 157  
Vertical (1-6GHz)



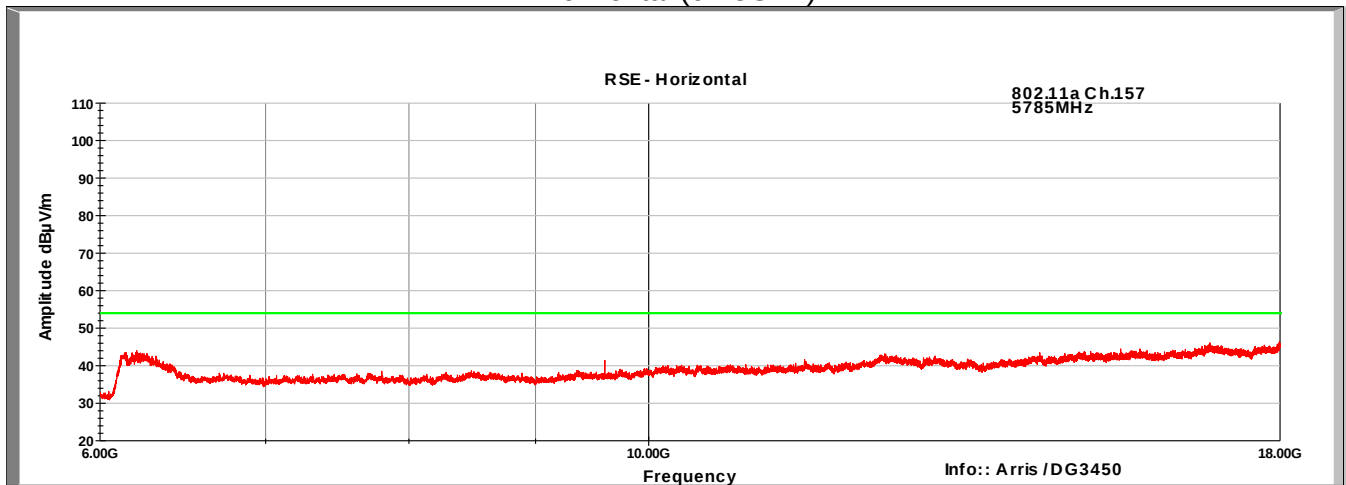
Channel 157  
Horizontal (1-6GHz)



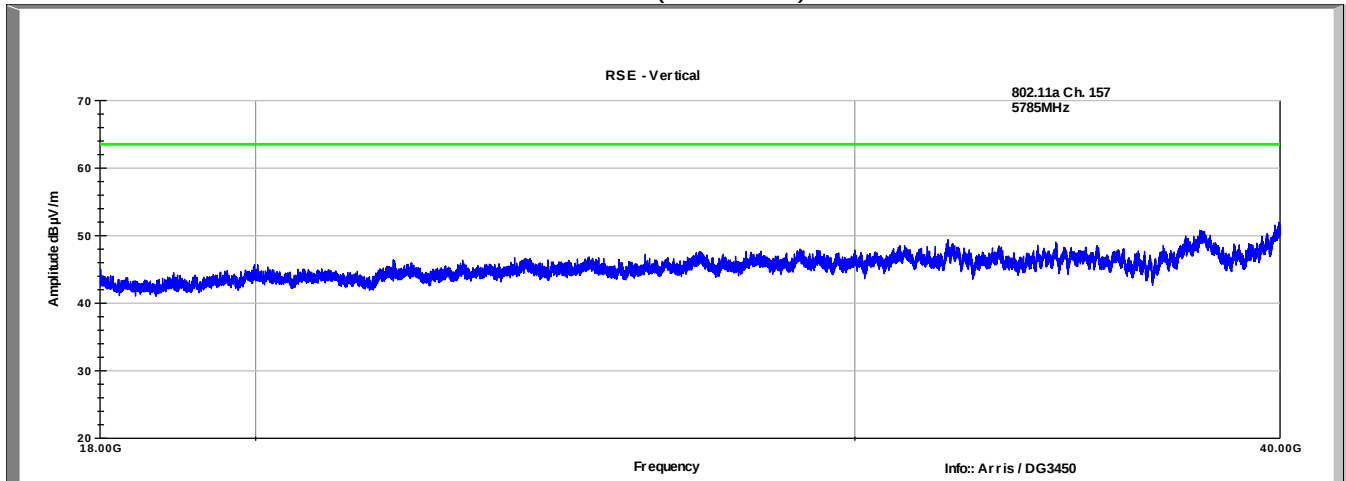
Channel 157  
Vertical (6-18GHz)



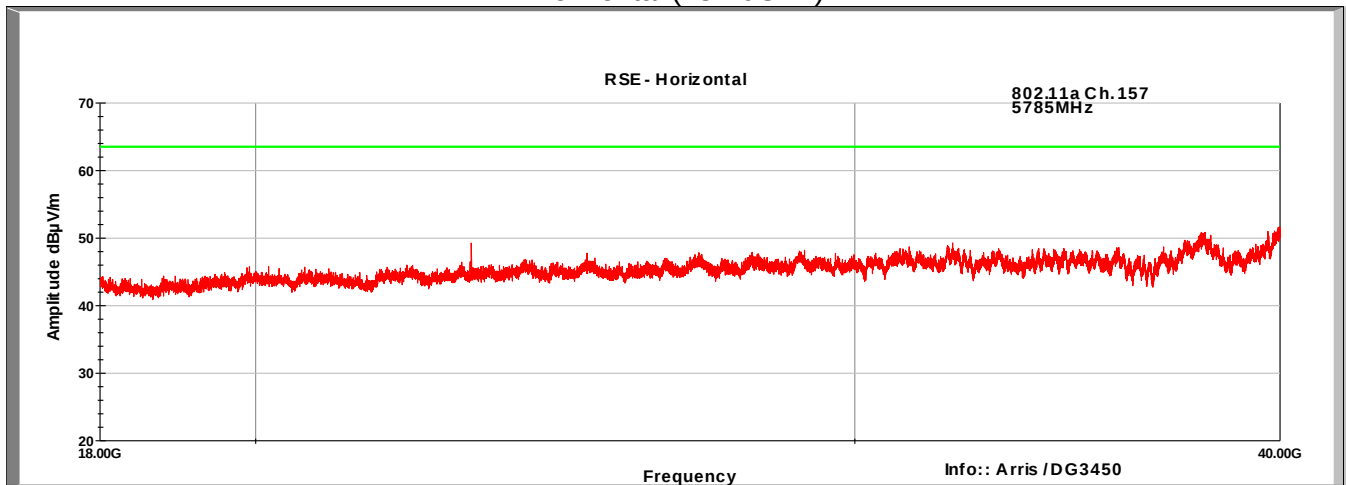
Channel 157  
Horizontal (6-18GHz)



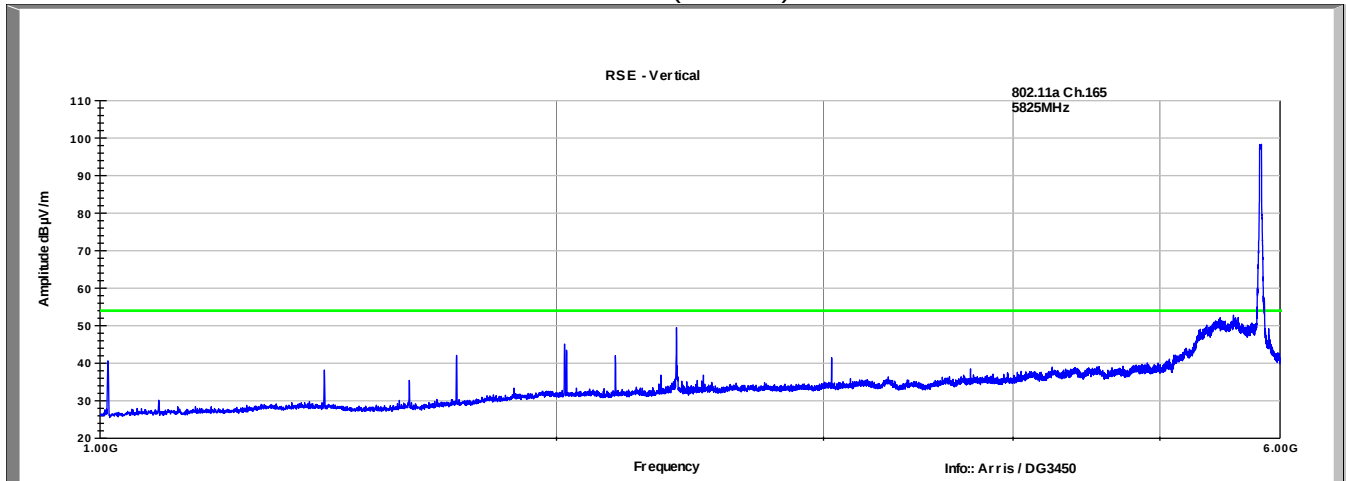
Channel 157  
Vertical (18-40GHz)



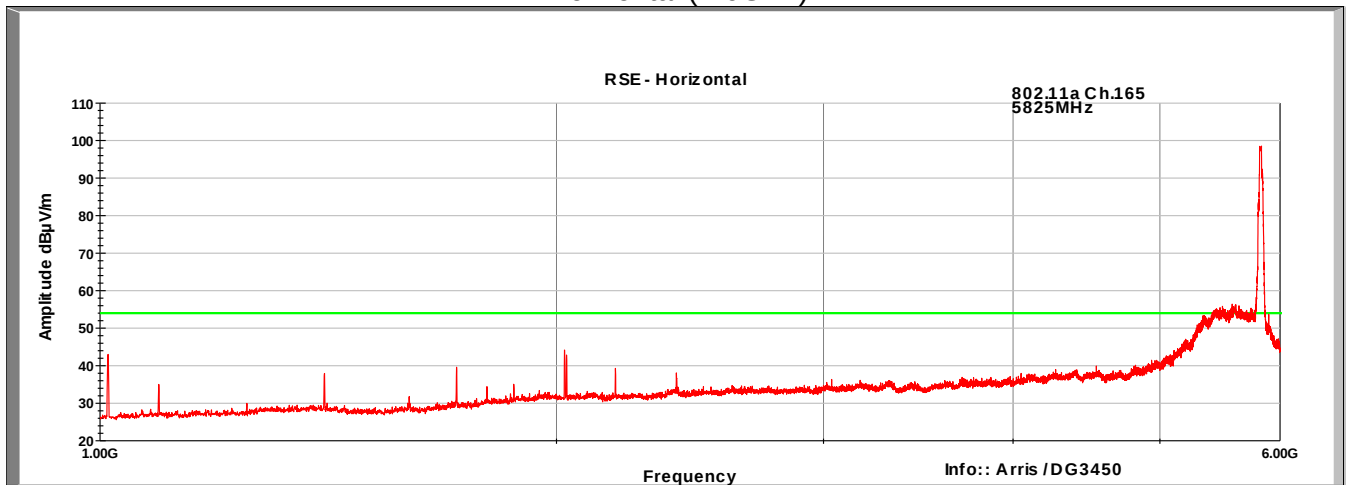
Channel 157  
Horizontal (18-40GHz)



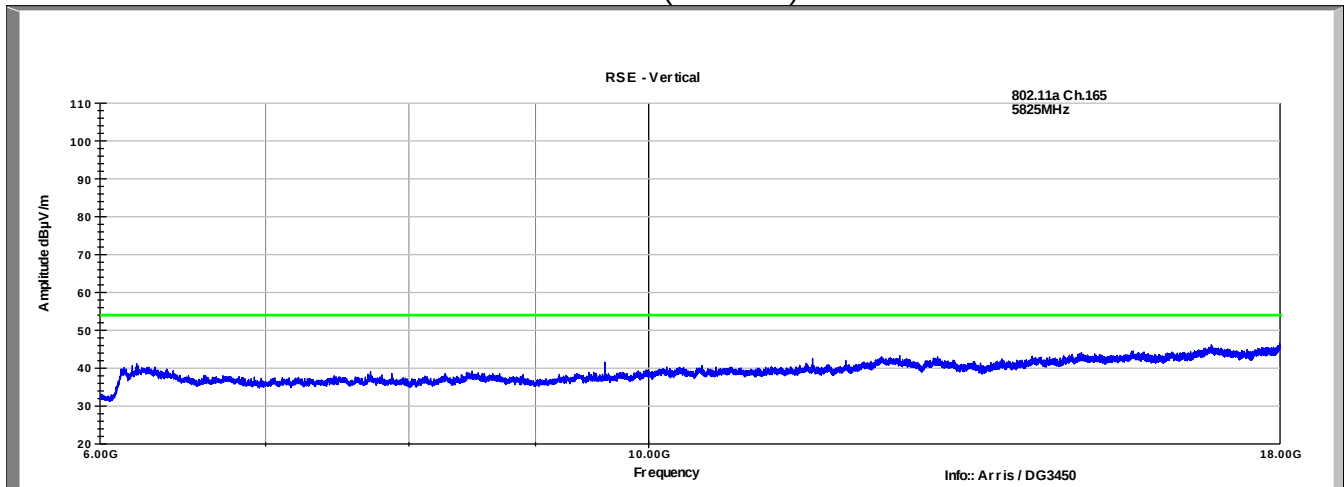
Channel 165  
Vertical (1-6GHz)



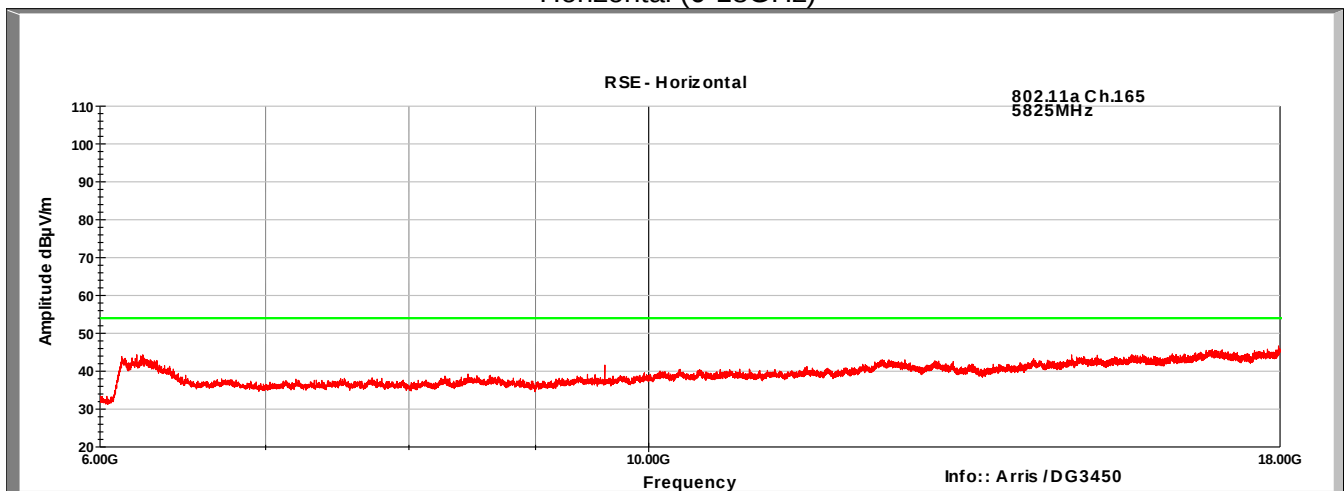
Channel 165  
Horizontal (1-6GHz)



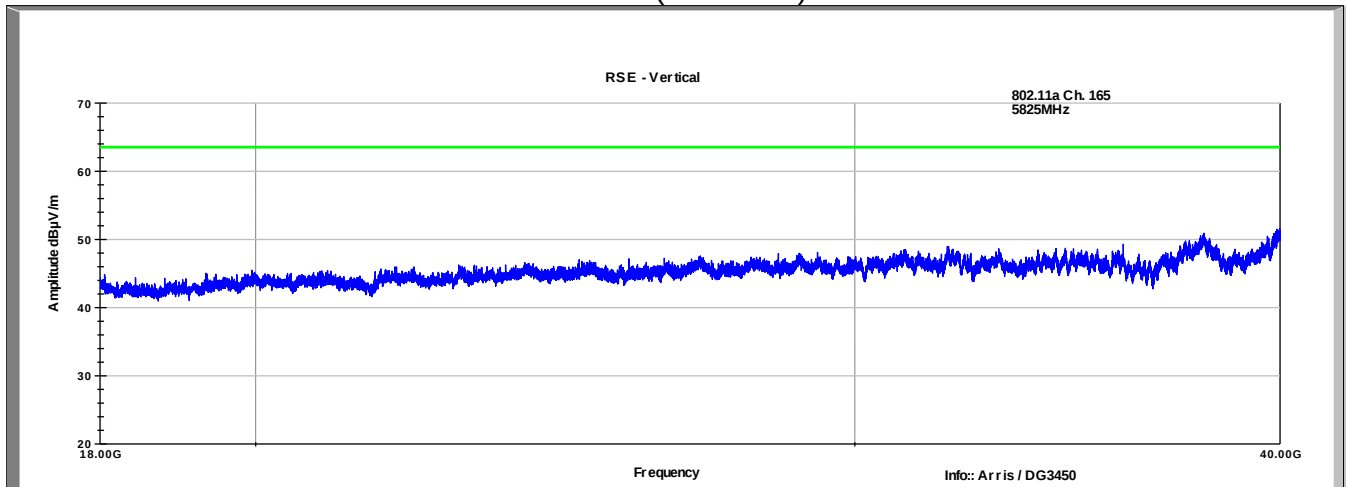
Channel 165  
Vertical (6-18GHz)



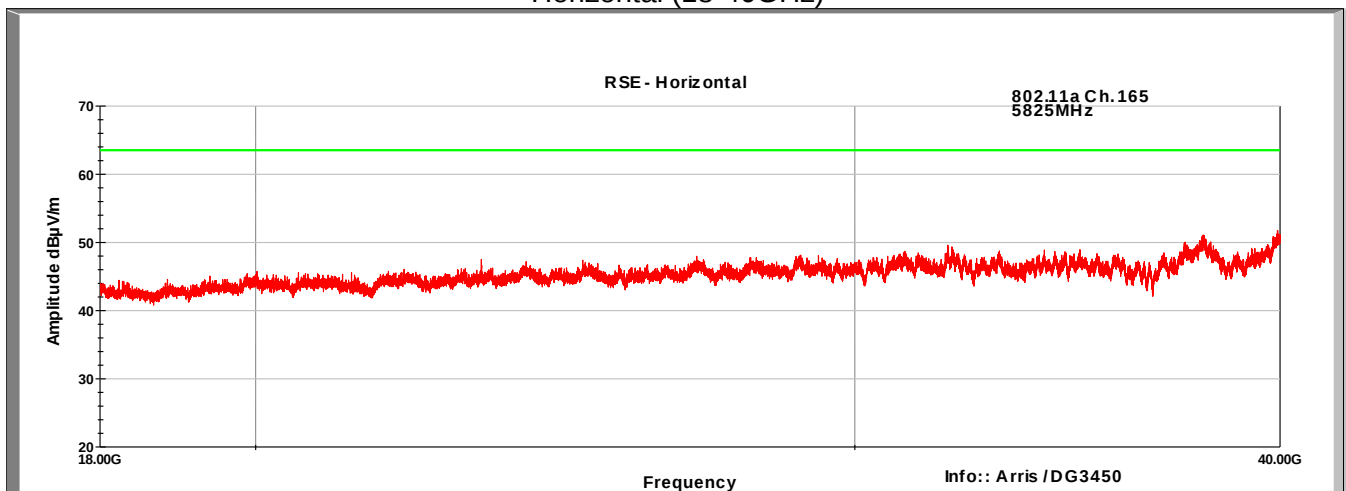
Channel 165  
Horizontal (6-18GHz)



Channel 165  
Vertical (18-40GHz)



Channel 165  
Horizontal (18-40GHz)



## 4 Conducted Emissions

### 4.1 Test Result

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

### 4.2 Test Method

With the receivers resolution bandwidth was set to 9 kHz the initial preliminary 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                |

### 4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.7°C

Relative Humidity: 47.8%

### 4.4 Test Equipment

Test Date: 29-Jun-2017

Tester: FL

| Equipment                               | Model  | Manufacturer    | Asset Number | Cal Due Date |
|-----------------------------------------|--------|-----------------|--------------|--------------|
| EMI TEST RECEIVER                       | ESU8   | ROHDE & SCHWARZ | B085759      | 21-Jul-2017  |
| LINE IMPEDANCE<br>STABILIZATION NETWORK | NNB 51 | TESEQ           | B087573      | 16-Nov-2017  |
| RF CABLE                                | SF106  | HUBER & SUHNER  | B079660      | 25-Jul-2017  |

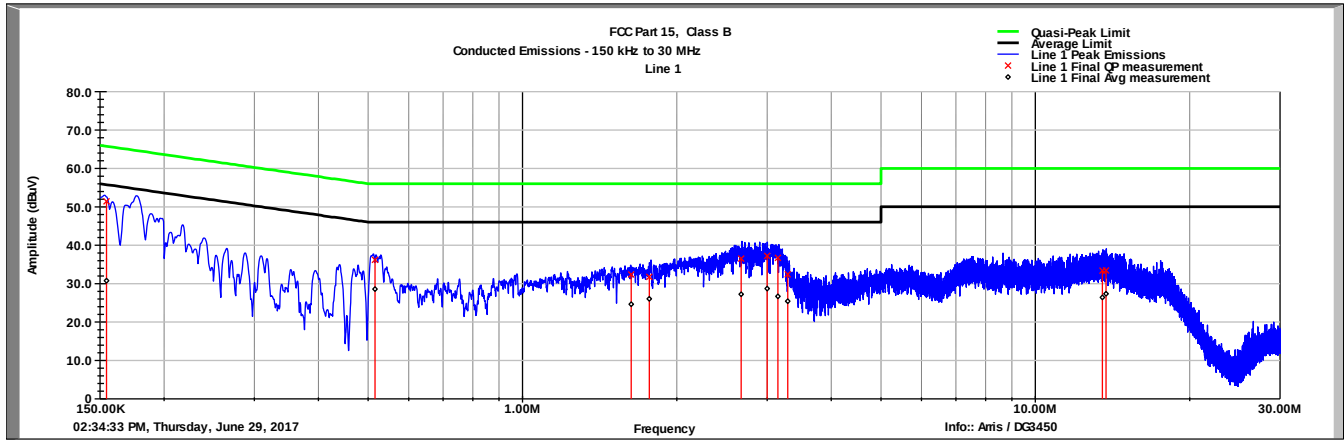
Note: The equipment calibration period is 1 year.

Software:

"Conducted Emissions" TILE! profile dated Dec 2015

## 4.5 Test Data

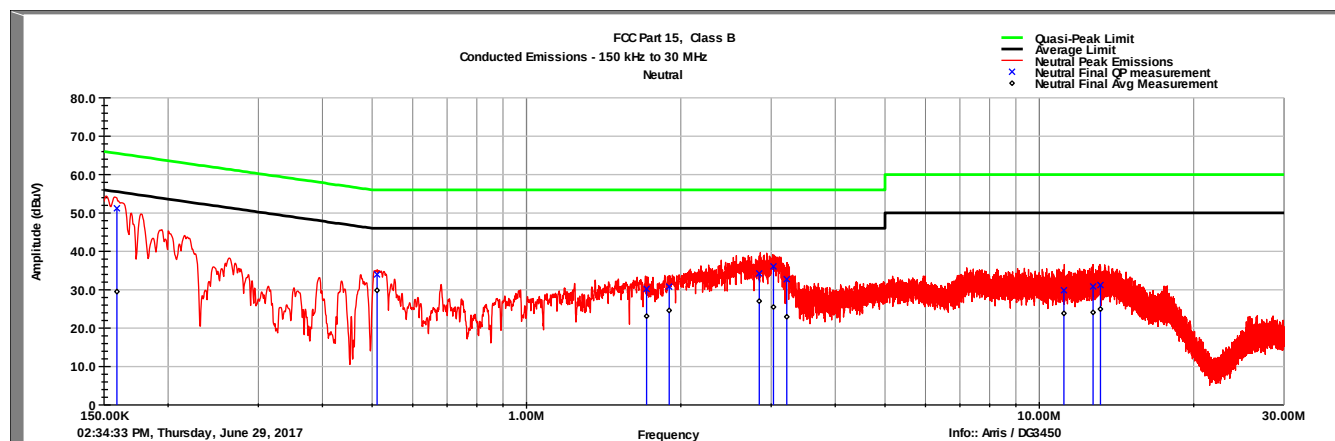
Line 1 Conducted Emissions Plot 150-30MHz



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 |
|------------------|------------------|------------------|-----------------|-------------------|-------------------|------------------|
| 0.155            | 51.4             | 65.7             | -14.3           | 30.7              | 55.7              | -25.0            |
| 0.516            | 36.2             | 56.0             | -19.8           | 28.6              | 46.0              | -17.4            |
| 1.630            | 32.4             | 56.0             | -23.6           | 24.6              | 46.0              | -21.4            |
| 1.767            | 31.8             | 56.0             | -24.2           | 26.0              | 46.0              | -20.0            |
| 2.669            | 36.5             | 56.0             | -19.5           | 27.2              | 46.0              | -18.8            |
| 3.000            | 37.2             | 56.0             | -18.8           | 28.7              | 46.0              | -17.3            |
| 3.148            | 36.7             | 56.0             | -19.3           | 26.7              | 46.0              | -19.3            |
| 3.290            | 32.4             | 56.0             | -23.6           | 25.4              | 46.0              | -20.6            |
| 13.515           | 33.4             | 60.0             | -26.6           | 26.4              | 50.0              | -23.6            |
| 13.734           | 33.4             | 60.0             | -26.6           | 27.4              | 50.0              | -22.6            |

### Neutral Conducted Emissions Plot 150-30MHz



### Neutral 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            | 51.2             | 65.5             | -14.3           | 29.5              | 55.5              | -26.0            |
| 0.511            | 34.0             | 56.0             | -22.0           | 29.8              | 46.0              | -16.2            |
| 1.715            | 30.2             | 56.0             | -25.8           | 23.1              | 46.0              | -22.9            |
| 1.898            | 30.8             | 56.0             | -25.2           | 24.6              | 46.0              | -21.4            |
| 2.843            | 34.2             | 56.0             | -21.8           | 27.0              | 46.0              | -19.0            |
| 3.031            | 36.1             | 56.0             | -19.9           | 25.5              | 46.0              | -20.5            |
| 3.217            | 32.7             | 56.0             | -23.3           | 23.0              | 46.0              | -23.0            |
| 11.167           | 29.9             | 60.0             | -30.1           | 23.9              | 50.0              | -26.1            |
| 12.734           | 30.8             | 60.0             | -29.2           | 24.1              | 50.0              | -25.9            |
| 13.158           | 31.2             | 60.0             | -28.8           | 25.0              | 50.0              | -25.0            |

## 5 Revision History

| Revision Level | Description of changes | Revision Date |
|----------------|------------------------|---------------|
| --             | Initial release        | 13 July 2017  |
|                |                        |               |
|                |                        |               |
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