

## **Certification Test Report**

**FCC ID: AZ489FT7088**  
**IC: 109U-89FT7088**

**FCC Rule Part: 15.247**  
**IC Radio Standards Specification: RSS-247**

**ACS Report Number: 15-2124.W06.3A**

Applicant: Motorola Solutions, Inc.  
Model(s): HK2062A

Test Begin Date: **December 2, 2015**  
Test End Date: **February 15, 2016**

Report Issue Date: February 16, 2016



FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ANAB, ANSI, or any agency of the Federal Government.

**Project Manager:**

A handwritten signature in black ink, appearing to read "Thierry Jean-Charles".

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**EMC Engineer**  
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**Reviewed by:**

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**Kirby Munroe**  
**Director, Wireless Certifications**  
**Advanced Compliance Solutions, Inc.**

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**This report contains 81 pages**

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## 1 GENERAL

### 1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-247.

### 1.2 Applicant Information

Motorola Solutions, Inc.  
8000 West Sunrise Blvd.  
Fort Lauderdale, FL 33322

### 1.3 Product Description

The Motorola Solutions, Inc. Si500 model HK2062A is a video speaker microphone. The unit includes a dual band WLAN transceiver as well as a Bluetooth radio supporting both Bluetooth Classic (2.1+EDR) and BLE. This test report documents the results for the WiFi 2.4 GHz transceiver only.

#### Technical Details

|                     |  |
|---------------------|--|
| Mode of Operation:  | WLAN IEEE 802.11b/g/n  |
| Frequency Range:    | 802.11b/g: 2412 MHz - 2462 MHz<br>802.11n 20 MHz: 2412 MHz - 2462 MHz<br>802.11n 40 MHz: 2422 MHz - 2452 MHz |
| Number of Channels: | 802.11b/g: 11<br>802.11n 20 MHz: 11<br>802.11n 40 MHz: 7   |
| Channel Separation: | 5 MHz  |
| Modulations:        | 802.11b: DSSS<br>802.11n: OFDM   |
| Antenna Type/Gain:  | Ceramic Chip Antenna, 3.2dBi   |
| Input Power:        | 5 VDC USB, 3.7 VDC Lithium Ion Battery   |
| Model Number:       | HK2062A  |

Test Sample Serial Number(s): ATP1B083 (RF Conducted Emissions), ATP1B104 (Radiated and Power Line Conducted Emissions).

Test Sample Condition: The equipment was provided in good condition without any physical damage.

### 1.4 Test Methodology and Considerations

The EUT was evaluated for radiated, RF conducted and power line conducted emissions for the WLAN IEEE 802.11 radio. The EUT was evaluated using the QUALCOMM Remote Evaluation Tool (QRCT) using the self-calibrated power control (SCPC) power setting option. For the 802.11g/n modes of operation, the output power setting was reduced at the band-edge per the Table below per the manufacturer's request. Preliminary power measurements were performed for all the available data rates for all the modes of operations. The final measurements were performed using the data rates leading to the highest conducted output power.

For the radiated emission investigation, preliminary evaluation was performed for the EUT standalone, set in three orthogonal orientations. Additional measurements were performed for the EUT powered via a wall adapter, for the EUT powered using a car battery and a vehicle power adapter (VPA), for the EUT connected to a computer and a multi-charger and for the EUT connected with a computer and an

APX8000 radio. The EUT standalone, flat on the table top, was determined to be the configuration leading to the highest emissions as compared to the limits. That configuration was used for all the radiated emissions reported in this document.

The RF conducted emissions were investigated with the EUT configured with a temporary SMA connector at the antenna port.

The power line conducted emission test was performed for the EUT constantly transmitting while powered via a 5VDC AC power adapter. Preliminary measurements were performed for all the modes of operation of the 802.11 transceiver. The EUT transmitting in the 802.11b mode at channel 6 was determined to be the worst case and is documented in this report.

**Table 1.4-1: IEEE 802.11b/g/n Radio Test Configuration**

| Mode of Operation | Frequency (MHz) | Channel | Test Software Power Setting | Data Rate Setting       |
|-------------------|-----------------|---------|-----------------------------|-------------------------|
| 802.11b           | 2412            | 1       | 13                          | 1/5.5 Mbps <sup>1</sup> |
|                   | 2437            | 6       |                             |                         |
|                   | 2462            | 11      |                             |                         |
| 802.11g           | 2412            | 1       | 13                          | 6 Mbps                  |
|                   | 2437            | 6       | 16                          |                         |
|                   | 2462            | 11      | 13                          |                         |
| 802.11n 20 MHz    | 2412            | 1       | 11                          | 19.5 Mbps               |
|                   | 2437            | 6       | 14                          |                         |
|                   | 2462            | 11      | 11                          |                         |
| 802.11n 40 MHz    | 2422            | 3       | 11                          | 27 Mbps                 |
|                   | 2437            | 6       | 14                          |                         |
|                   | 2452            | 9       | 11                          |                         |

The EUT was also evaluated for unintentional emissions. The results are documented separately in a Declaration of Conformity/Verification test report.

<sup>1</sup> The 1 Mbps data rate was observed to lead to the highest spurious emissions while the 5.5 Mbps data rate led slightly to the highest output power. All the measurements were performed using the 5.5 Mbps data rate except for the spurious emissions which were evaluated using 1 Mbps.

## **2 TEST FACILITIES**

### **2.1 Location**

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.  
3998 FAU Blvd, Suite 310  
Boca Raton, Florida 33431  
Phone: (561) 961-5585  
Fax: (561) 961-5587  
[www.acstestlab.com](http://www.acstestlab.com)

FCC Test Firm Registration #: 475089  
Industry Canada Lab Code: 4175C

### **2.2 Laboratory Accreditations/Recognitions/Certifications**

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ANAB program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

**2.3 Radiated & Conducted Emissions Test Site Description**

**2.3.1 Semi-Anechoic Chamber Test Site**

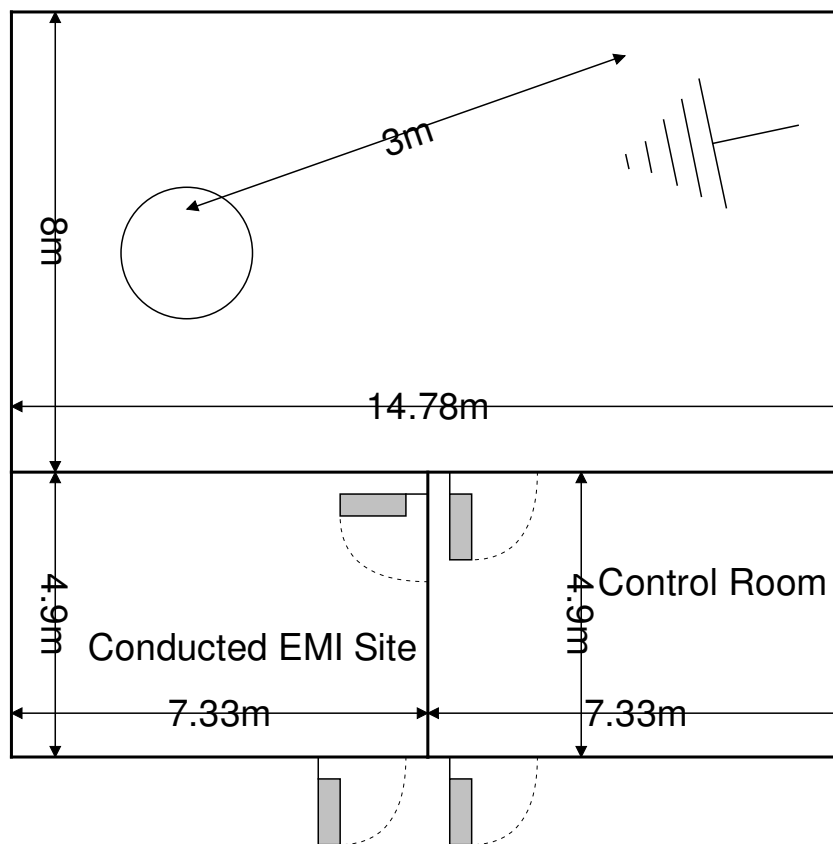
The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl flooring.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flush with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1050 Multi-device controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

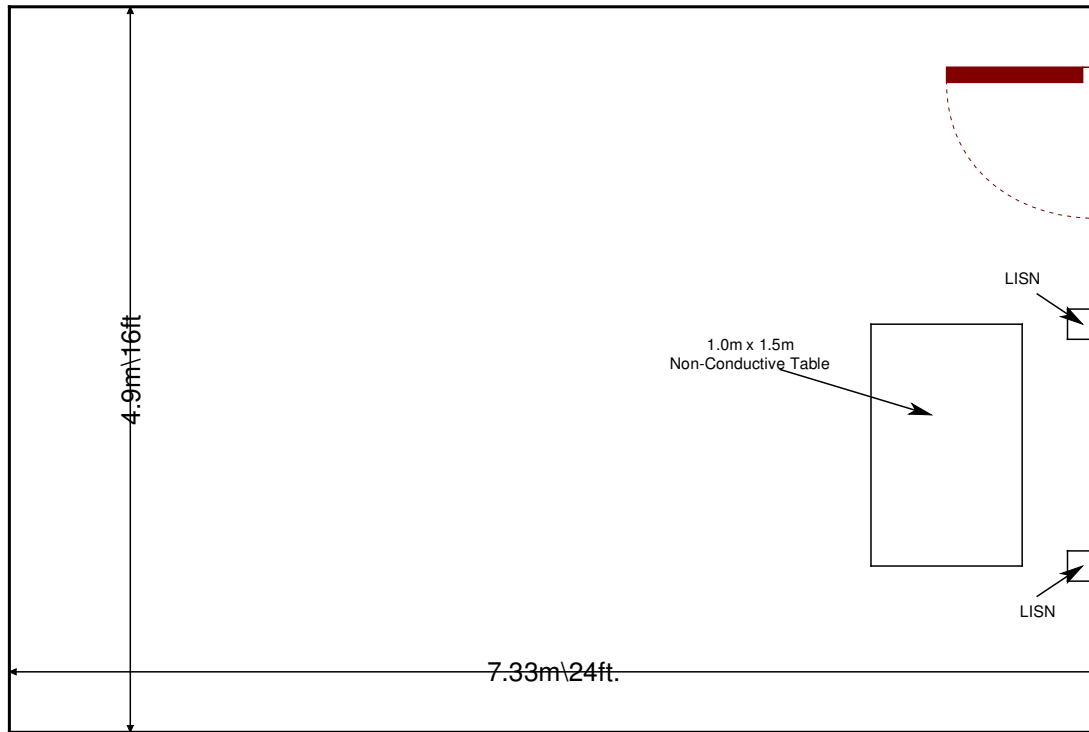


**Figure 2.3.1-1: Semi-Anechoic Chamber Test Site**

**2.3.2 Conducted Emissions Test Site Description**

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m<sup>3</sup>. The power line conducted emission site includes two LISNs: a Solar Model 8028-50 50 Ω/50 μH and an EMCO Model 3825/2R, which are installed as shown in the figure below. For evaluations requiring 230 V, 50 Hz AC input, a Polarad LISN (S/N 879341/048) is used in conjunction with a California Instruments signal generator Model 2001RP-OP1.

A diagram of the room is shown below in figure 2.3.2-1:



**Figure 2.3.2-1: AC Mains Conducted EMI Site**

### **3 APPLICABLE STANDARD REFERENCES**

The following standards were used:

- ❖ ANSI C63.4-2014: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 kHz to 40 GHz.
- ❖ ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2016.
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2016
- ❖ Industry Canada Radio Standards Specification: RSS-247 — Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices, Issue 1, May 2015.
- ❖ Industry Canada Radio Standards Specification: RSS-GEN – General Requirements for Compliance of Radio Apparatus, Issue 4, November 2014.

#### 4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

**Table 4-1: Test Equipment**

| AssetID | Manufacturer            | Model #                | Equipment Type     | Serial #   | Last Calibration Date | Calibration Due Date |
|---------|-------------------------|------------------------|--------------------|------------|-----------------------|----------------------|
| 22      | Agilent                 | 8449B                  | Amplifiers         | 3008A00526 | 5/18/2015             | 5/18/2016            |
| 283     | Rohde & Schwarz         | FSP40                  | Spectrum Analyzers | 1000033    | 7/1/2015              | 7/1/2016             |
| 479     | Electro-Metrics         | ALP-70                 | Antennas           | 158        | 12/2/2013             | 12/2/2015            |
| 479     | Electro-Metrics         | ALP-70                 | Antennas           | 158        | 12/3/2015             | 12/3/2017            |
| 523     | Agilent                 | E7405                  | Spectrum Analyzers | MY45103293 | 12/26/2014            | 12/26/2016           |
| 653     | Suhner                  | SF-102A                | Cables             | 0944/2A    | 4/13/2015             | 4/13/2016            |
| 2003    | EMCO                    | 3108                   | Antennas           | 2148       | 2/18/2014             | 2/18/2016            |
| 2004    | EMCO                    | 3146                   | Antennas           | 1385       | 11/19/2015            | 11/19/2017           |
| 2006    | EMCO                    | 3115                   | Antennas           | 2573       | 4/14/2015             | 4/14/2017            |
| 2008    | COM-Power               | AH-826                 | Antennas           | 81009      | NCR                   | NCR                  |
| 2011    | Hewlett-Packard         | HP 8447D               | Amplifiers         | 2443A03952 | 11/18/2015            | 11/18/2016           |
| 2022    | EMCO                    | LISN3825/2R            | LISN               | 1095       | 9/14/2015             | 9/14/2017            |
| 2045    | ACS Boca                | Conducted Cable Set    | Cable Set          | 2045       | 11/11/2015            | 11/11/2016           |
| 2070    | Mini Circuits           | VHF-8400+              | Filter             | 2070       | 11/17/2015            | 11/17/2016           |
| 2072    | Mini Circuits           | VHF-3100+              | Filter             | 30737      | 11/17/2015            | 11/17/2016           |
| 2082    | Teledyne Storm Products | 90-010-048             | Cables             | 2082       | 4/22/2015             | 4/22/2016            |
| 2086    | Merrimac                | FAN-6-10K              | Attenuators        | 23148-83-1 | 11/16/2015            | 11/16/2016           |
| 2095    | ETS Lindgren            | TILE4! - Version 4.2.A | Software           | 85242      | NCR                   | NCR                  |
| 2111    | Aeroflex Inmet          | 40AH2W-20              | Attenuator         | 2111       | 7/22/2015             | 7/22/2016            |
| 2121    | ACS Boca                | Radiated Cable Set     | Cable Set          | 2121       | 8/22/2015             | 8/22/2016            |
| 3004    | Teseq                   | CFL 9206A              | Attenuators        | 34720      | 10/7/2015             | 10/7/2016            |

**Notes:**

**NCR=No Calibration Required**

The calibration information cycle for asset 479 is provided to cover the entire test period. The asset was only used during the active period of the calibration cycle.

## 5 SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment (Radiated Emissions)

| Item # | Type Device | Manufacturer             | Model/Part # | Serial # |
|--------|-------------|--------------------------|--------------|----------|
| 1      | EUT         | Motorola Solutions, Inc. | HK2062A      | ATP1B104 |
| 2      | Earpiece    | Motorola Solutions, Inc. | RLN4941A     | N/A      |

Table 5-2: Cable Description (Radiated Emissions)

| Cable # | Cable Type | Length | Shield | Termination     |
|---------|------------|--------|--------|-----------------|
| A       | Audio      | 0.55 m | No     | Earpiece to EUT |

Table 5-3: EUT and Support Equipment (Power Line Conducted Emissions)

| Item # | Type Device        | Manufacturer             | Model/Part #    | Serial #   |
|--------|--------------------|--------------------------|-----------------|------------|
| 1      | EUT                | Motorola Solutions, Inc. | HK2062A         | ATP1B104   |
| 2      | Earpiece           | Motorola Solutions, Inc. | RLN4941A        | N/A        |
| 3      | I.T.E Power Supply | Motorola Solutions, Inc. | MU08-L050150-A1 | 1538000119 |

Table 5-4: Cable Description (Power Line Conducted Emissions)

| Cable # | Cable Type     | Length | Shield | Termination              |
|---------|----------------|--------|--------|--------------------------|
| A       | Audio          | 0.55 m | No     | Earpiece to EUT          |
| B       | USB            | 1 m    | No     | Power Supply to EUT      |
| C       | Extension Cord | 1.82 m | No     | Power Supply to AC Mains |

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

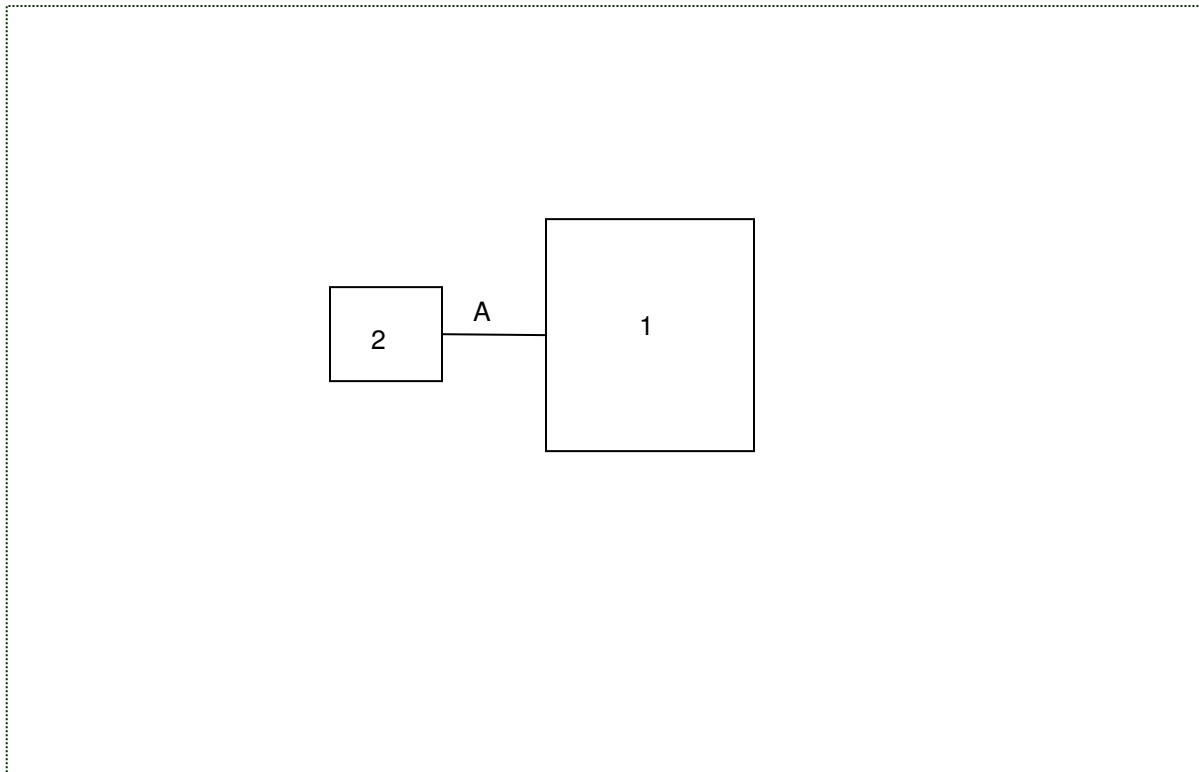


Figure 6-1: EUT Test Setup (Radiated Emissions)

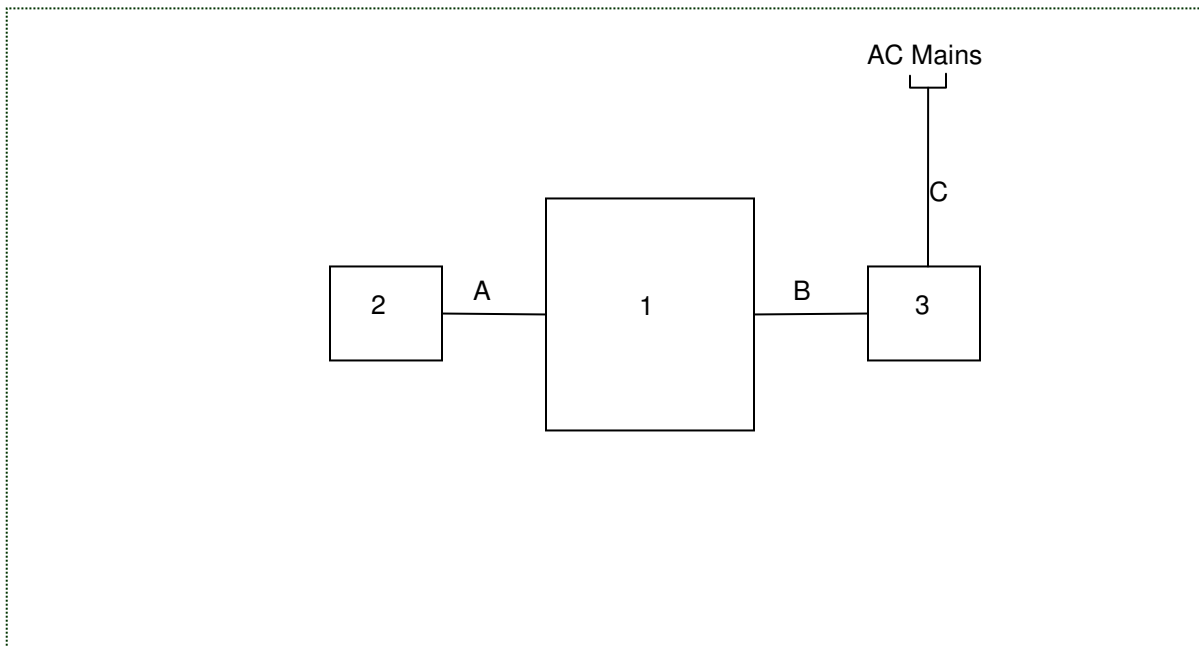


Figure 6-2: EUT Test Setup (Power Line Conducted Emissions)

## 7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

### 7.1 Antenna Requirement – FCC: Section 15.203

The Si500 model HK2062A uses an internal surface mount BT/WLAN antenna which is soldered directly to the PCB. The antenna is not removable and the port is not accessible externally. The EUT meets the requirements of FCC Section 15.203.

### 7.2 6 dB Bandwidth - FCC: Section 15.247(a)(2) IC: RSS-247 5.5(1); 99% Bandwidth IC: RSS-GEN 6.6

#### 7.2.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with ANSI C63.10:2013 Section 11.8 DTS Bandwidth Option 1. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. Span was set large enough to capture the emissions and  $\gg$  RBW.

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission. The RBW was set to 1% to 5% of the approximated bandwidth. The occupied 99% bandwidth was measured by using 99% bandwidth equipment function of the spectrum analyzer.

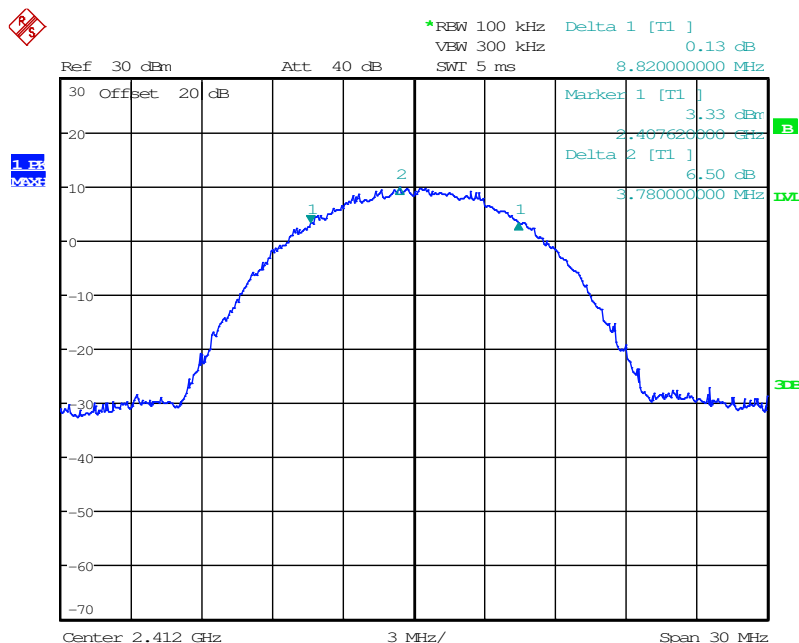
#### 7.2.2 Measurement Results

Results are shown below.

802.11b

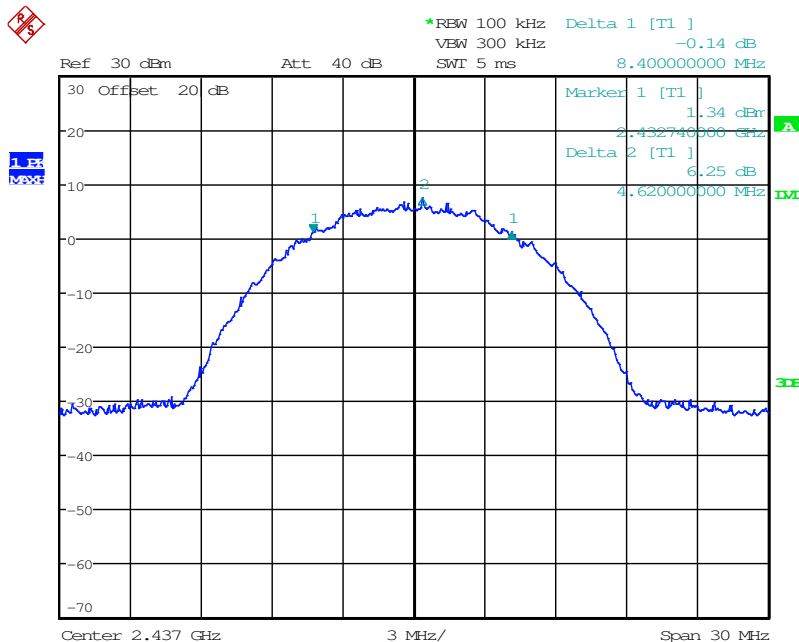
**Table 7.2.2-1: 6dB / 99% Bandwidth**

| Frequency [MHz] | 6dB Bandwidth [MHz] | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 2412            | 8.82                | 12.90               |
| 2437            | 8.40                | 13.10               |
| 2462            | 8.82                | 12.90               |



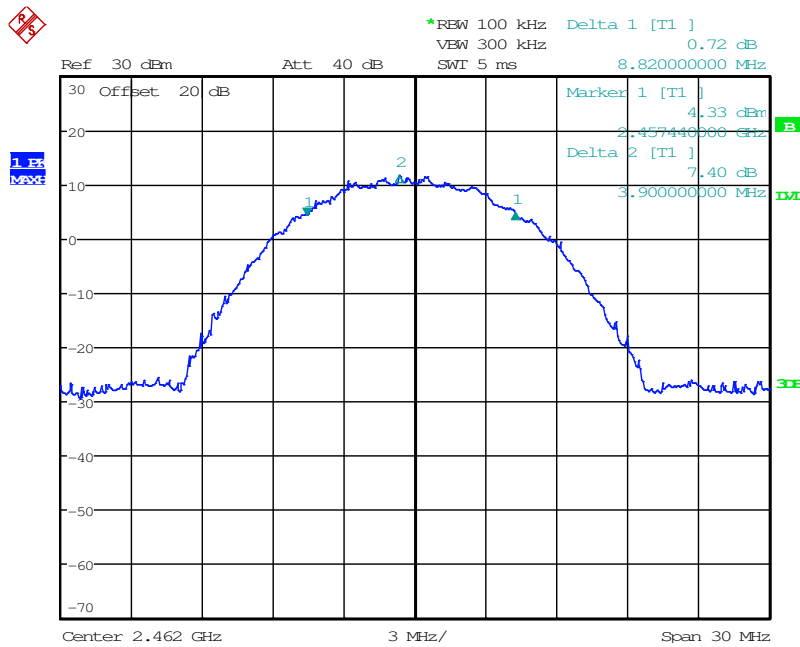
Date: 11.DEC.2015 17:14:43

Figure 7.2.2-1: 6dB BW - Low Channel



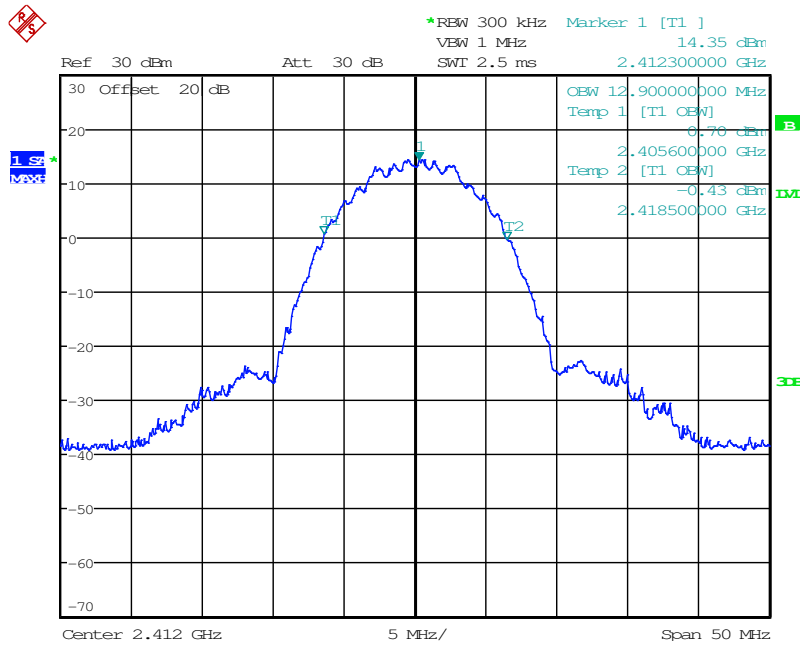
Date: 1.JAN.2016 15:32:29

Figure 7.2.2-2: 6dB BW - Middle Channel



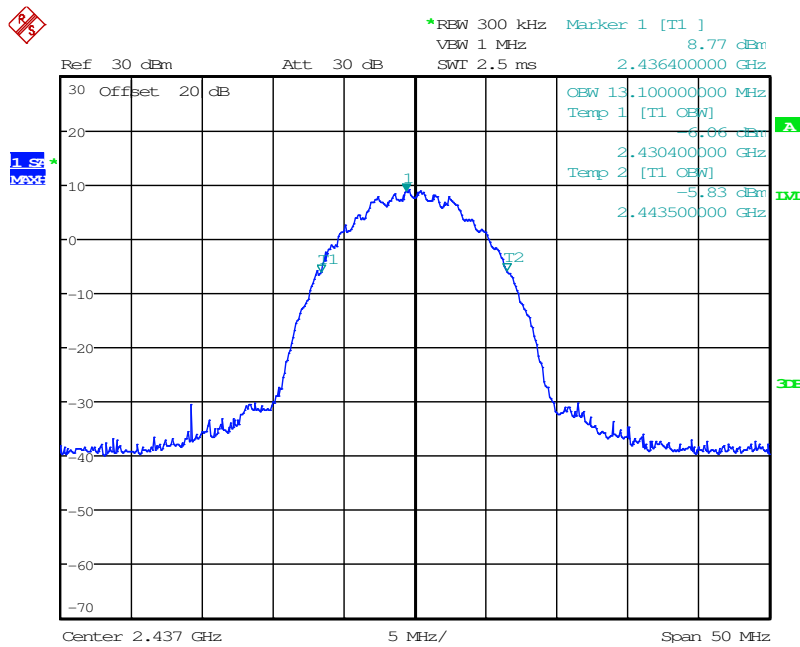
Date: 11.DEC.2015 16:44:01

Figure 7.2.2-3: 6dB BW - High Channel



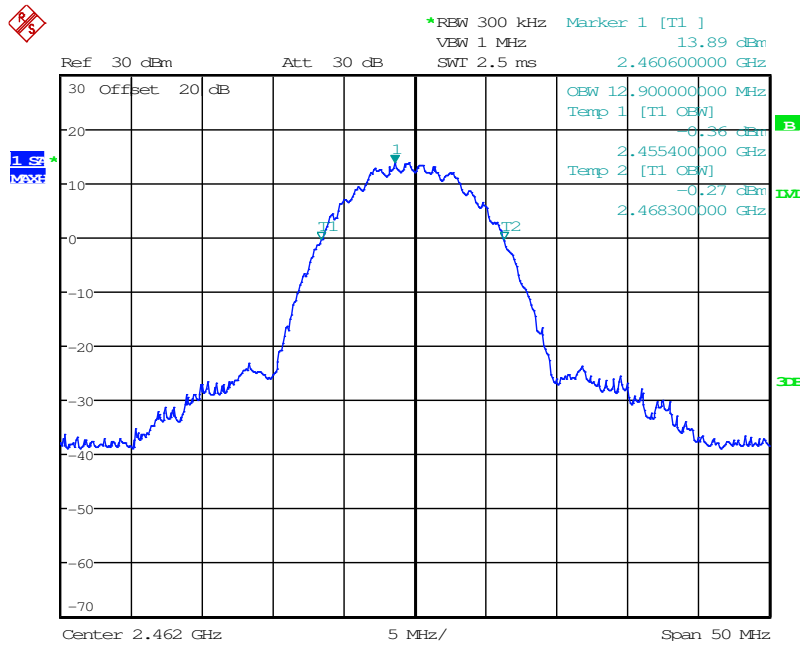
Date: 11.DEC.2015 13:29:15

Figure 7.2.2-4: 99% OBW - Low Channel



Date: 1.JAN.2016 15:10:21

Figure 7.2.2-5: 99% OBW - Middle Channel



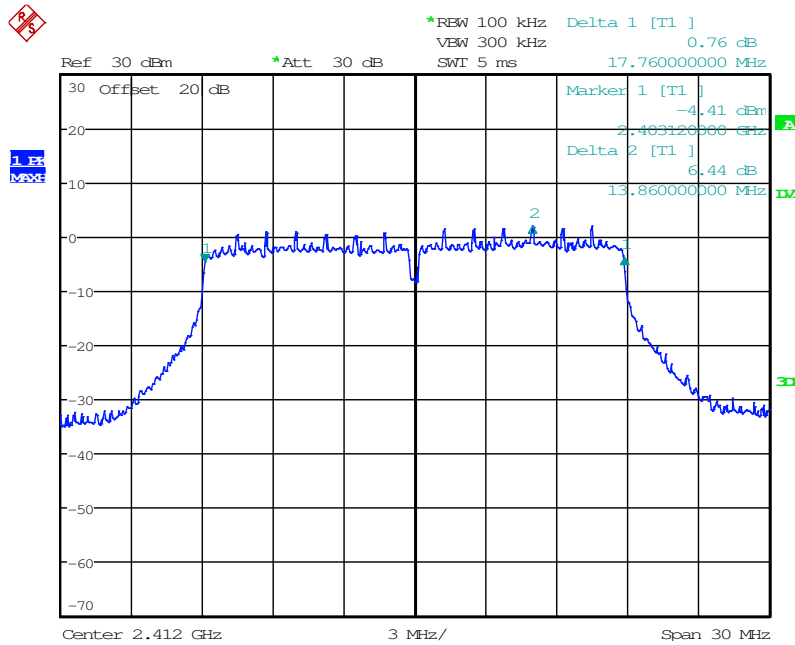
Date: 11.DEC.2015 13:34:42

Figure 7.2.2-6: 99% OBW - High Channel

802.11g

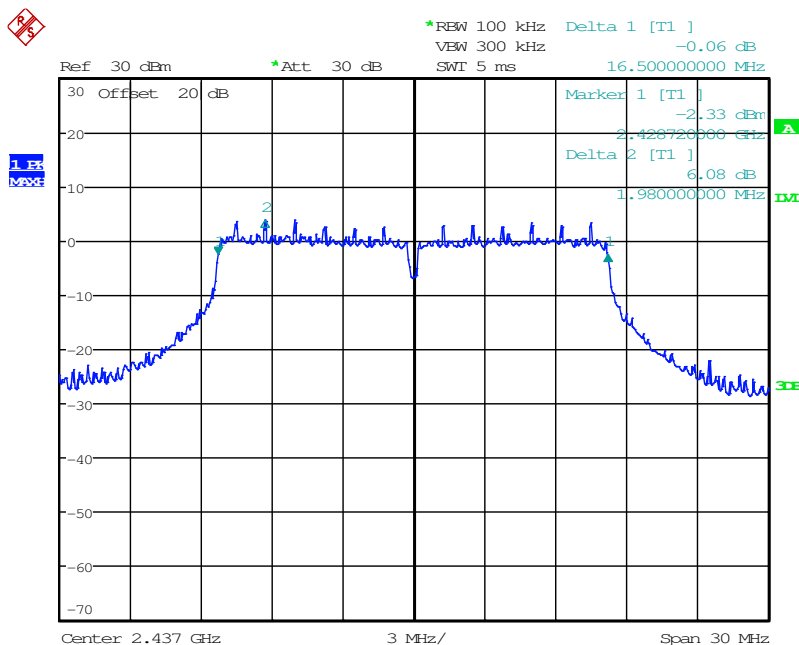
Table 7.2.2-2: 6dB / 99% Bandwidth

| Frequency [MHz] | 6dB Bandwidth [MHz] | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 2412            | 17.76               | 17.60               |
| 2437            | 16.50               | 17.90               |
| 2462            | 16.50               | 17.70               |



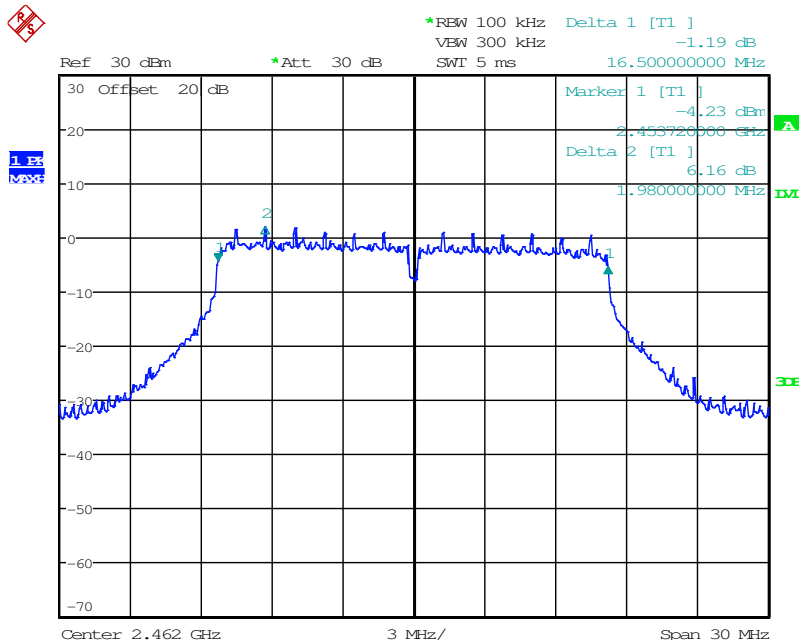
Date: 30.DEC.2015 10:00:43

Figure 7.2.2-7: 6dB BW - Low Channel



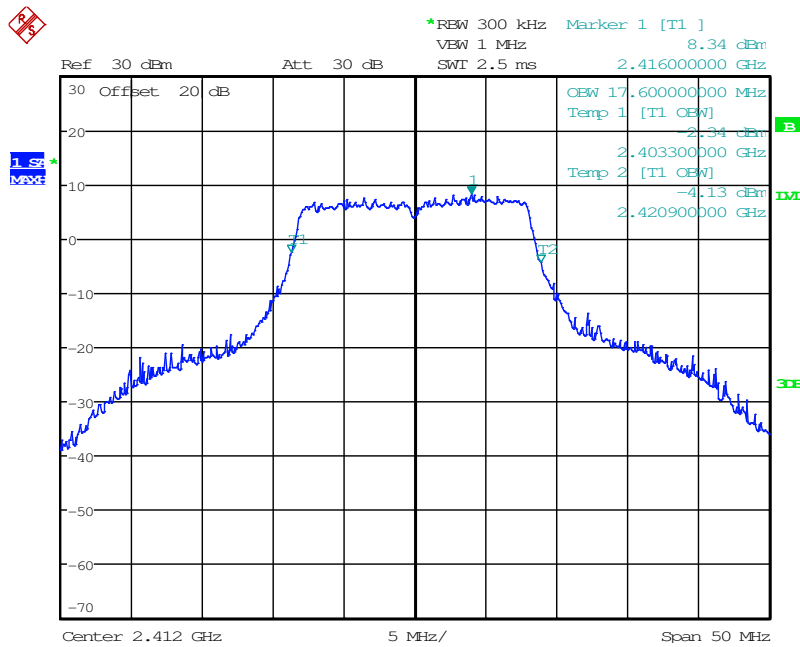
Date: 30.DEC.2015 09:52:45

Figure 7.2.2-8: 6dB BW - Middle Channel



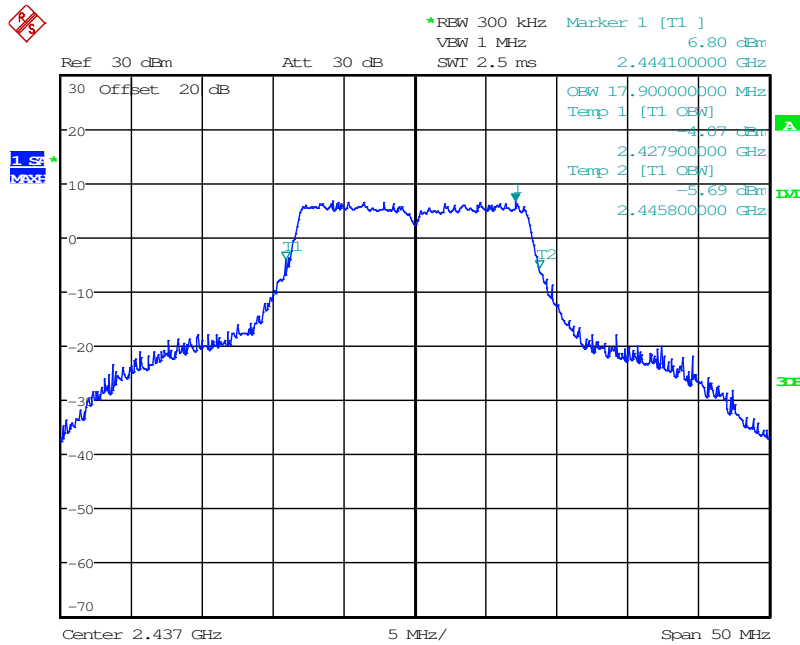
Date: 30.DEC.2015 10:12:43

Figure 7.2.2-9: 6dB BW - High Channel



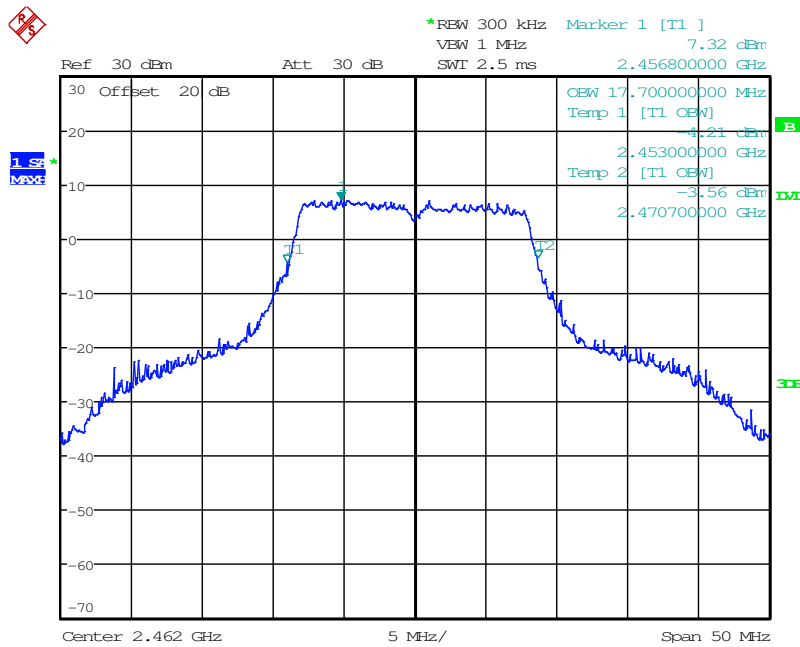
Date: 11.DEC.2015 13:47:00

Figure 7.2.2-10: 99% OBW - Low Channel



Date: 1.JAN.2016 16:37:05

Figure 7.2.2-11: 99% OBW - Middle Channel



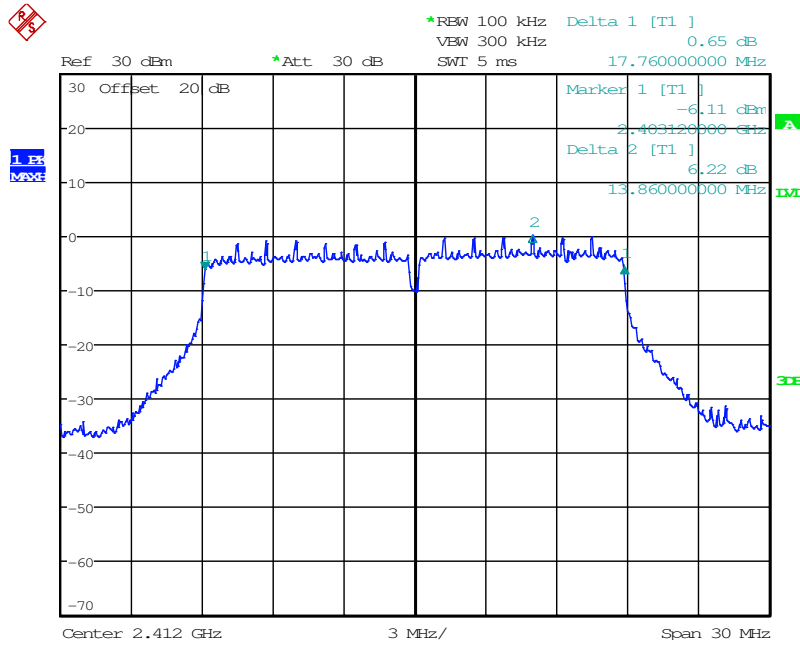
Date: 11.DEC.2015 13:43:26

Figure 7.2.2-12: 99% OBW - High Channel

802.11n 20 MHz

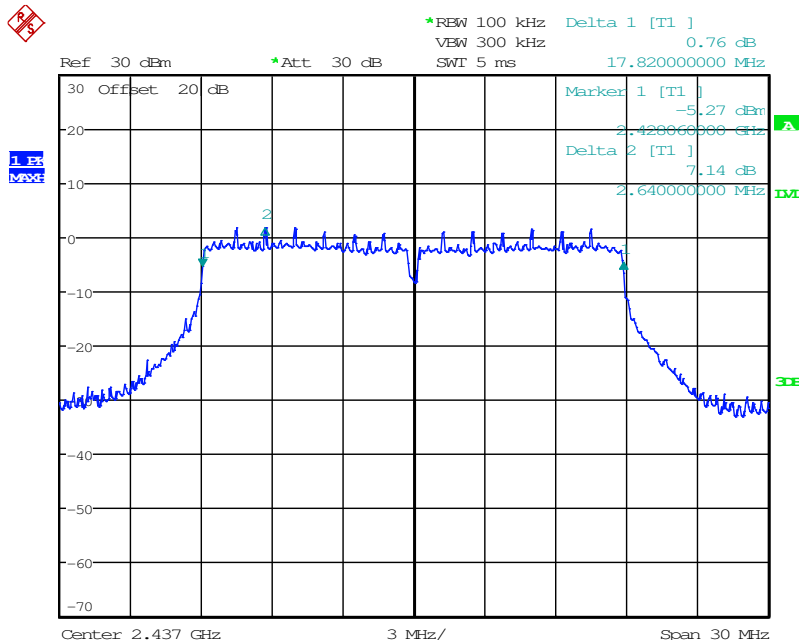
Table 7.2.2-3: 6dB / 99% Bandwidth

| Frequency [MHz] | 6dB Bandwidth [MHz] | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 2412            | 17.76               | 18.10               |
| 2437            | 17.82               | 18.20               |
| 2462            | 17.76               | 18.20               |



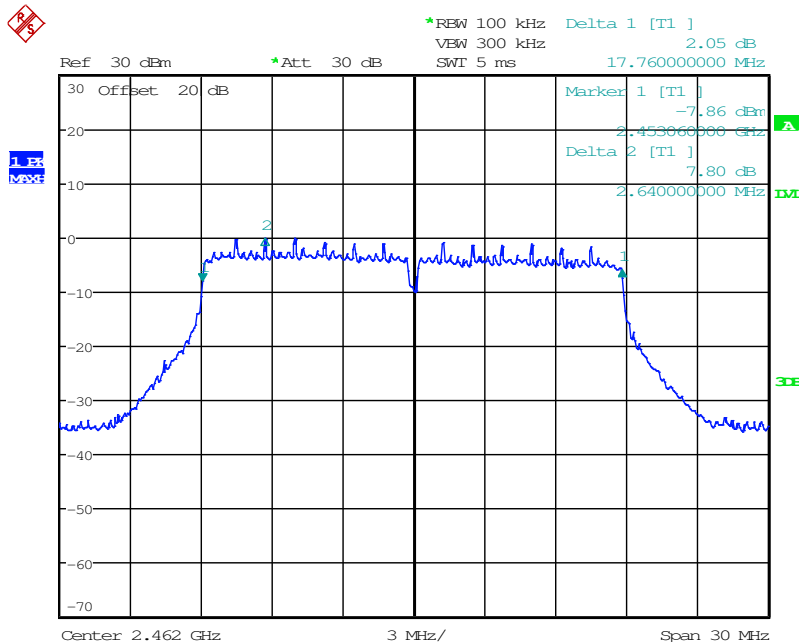
Date: 30.DEC.2015 10:05:32

Figure 7.2.2-13: 6dB BW - Low Channel



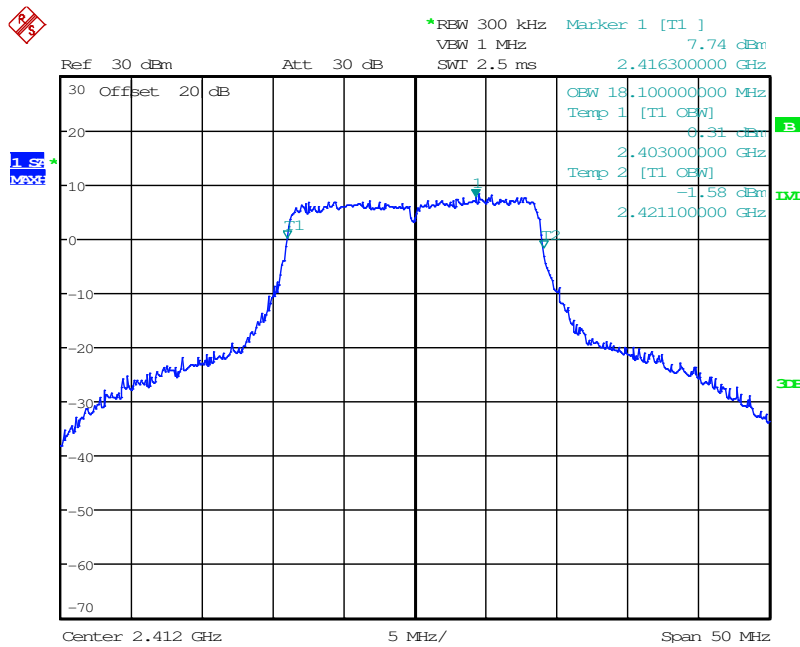
Date: 30.DEC.2015 09:56:41

Figure 7.2.2-14: 6dB BW - Middle Channel



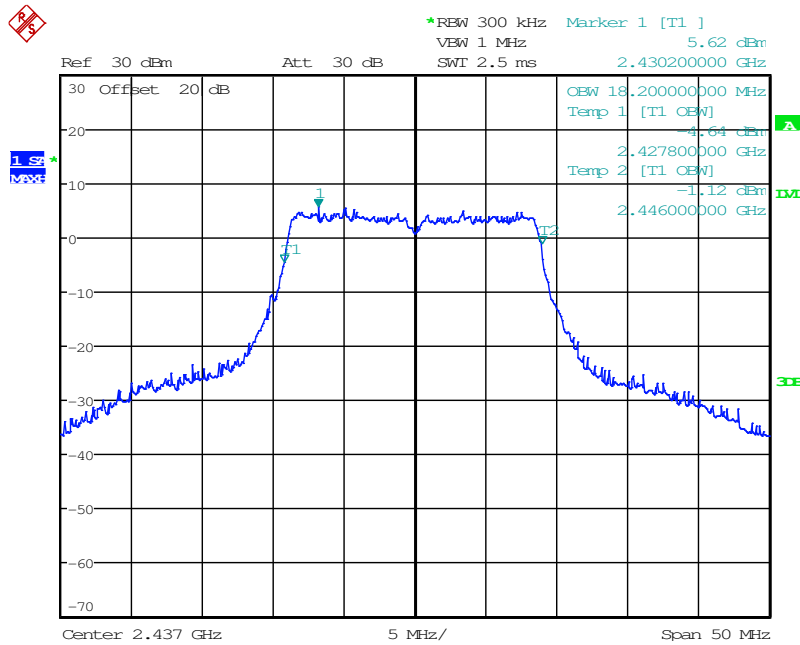
Date: 30.DEC.2015 10:19:04

Figure 7.2.2-15: 6dB BW - High Channel



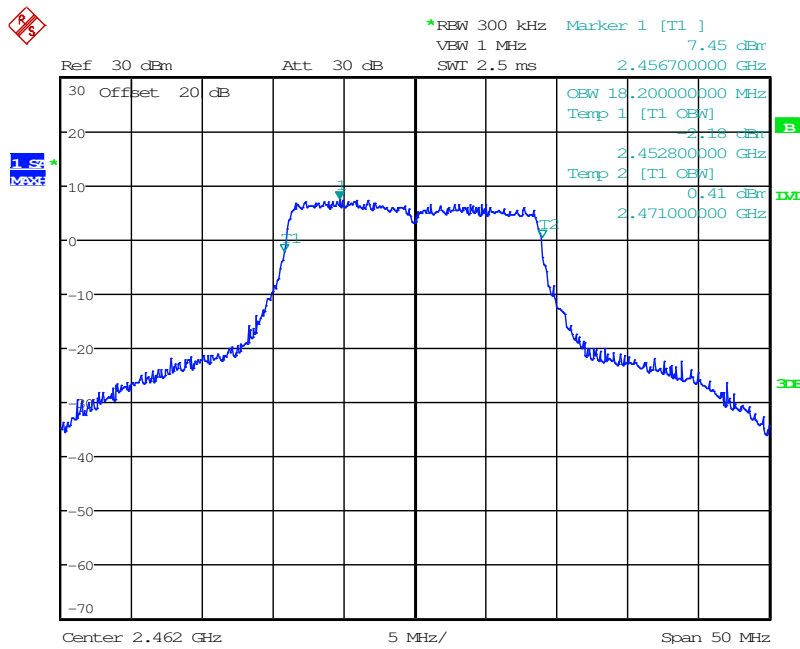
Date: 11.DEC.2015 13:49:42

Figure 7.2.2-16: 99% OBW - Low Channel



Date: 1.JAN.2016 16:39:04

Figure 7.2.2-17: 99% OBW - Middle Channel



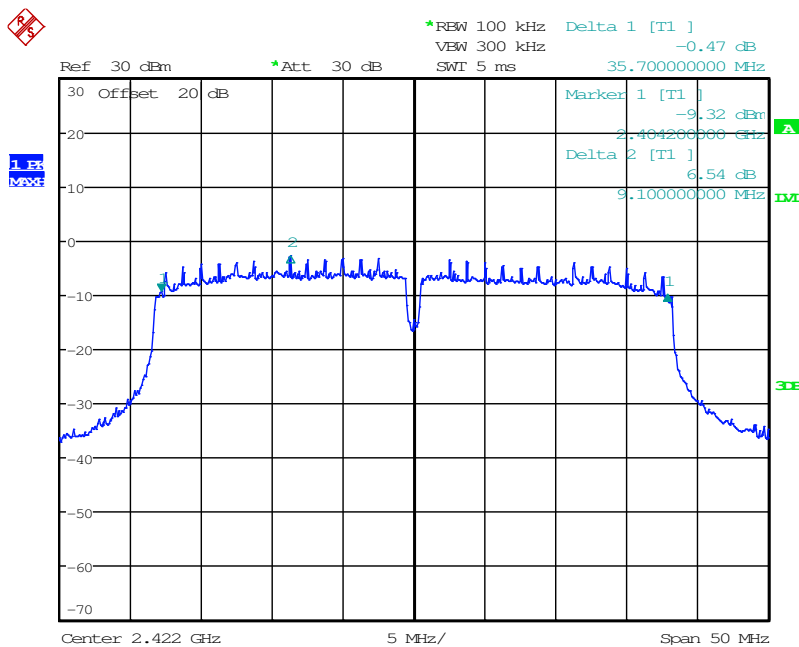
Date: 11.DEC.2015 13:52:15

Figure 7.2.2-18: 99% OBW - High Channel

802.11n 40 MHz

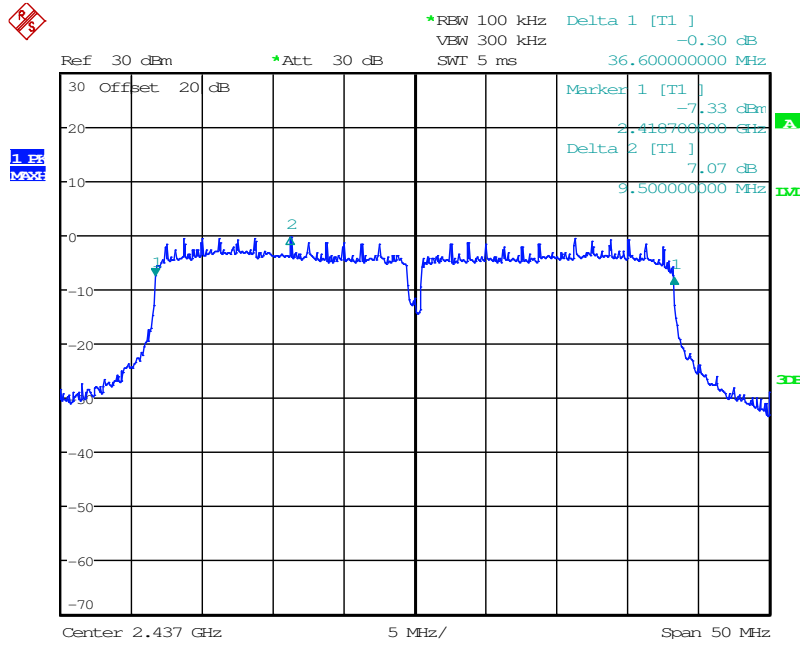
Table 7.2.2-4: 6dB / 99% Bandwidth

| Frequency [MHz] | 6dB Bandwidth [MHz] | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 2422            | 35.70               | 37.20               |
| 2437            | 36.60               | 37.40               |
| 2452            | 35.90               | 37.40               |



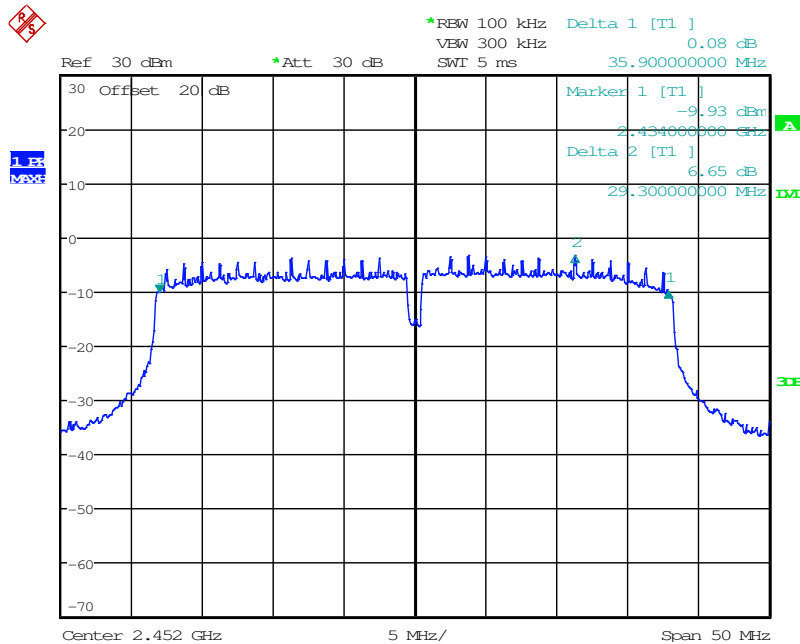
Date: 29.DEC.2015 22:06:37

Figure 7.2.2-19: 6dB BW - Low Channel



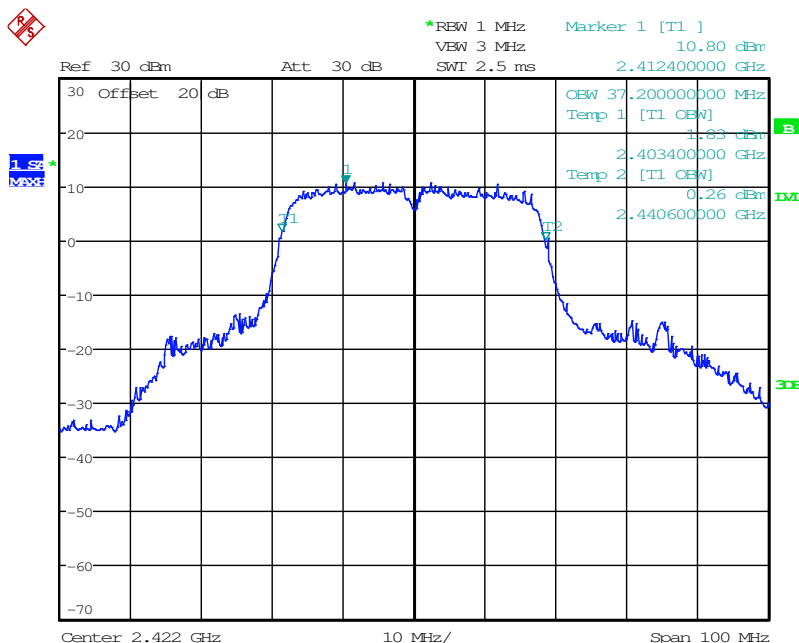
Date: 29.DEC.2015 22:01:59

Figure 7.2.2-20: 6dB BW - Middle Channel



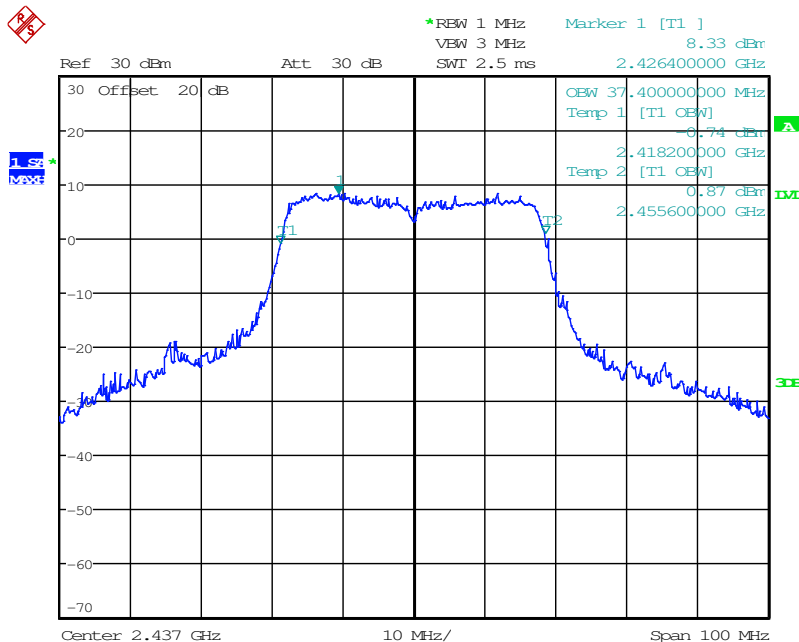
Date: 29.DEC.2015 22:09:35

Figure 7.2.2-21: 6dB BW - High Channel



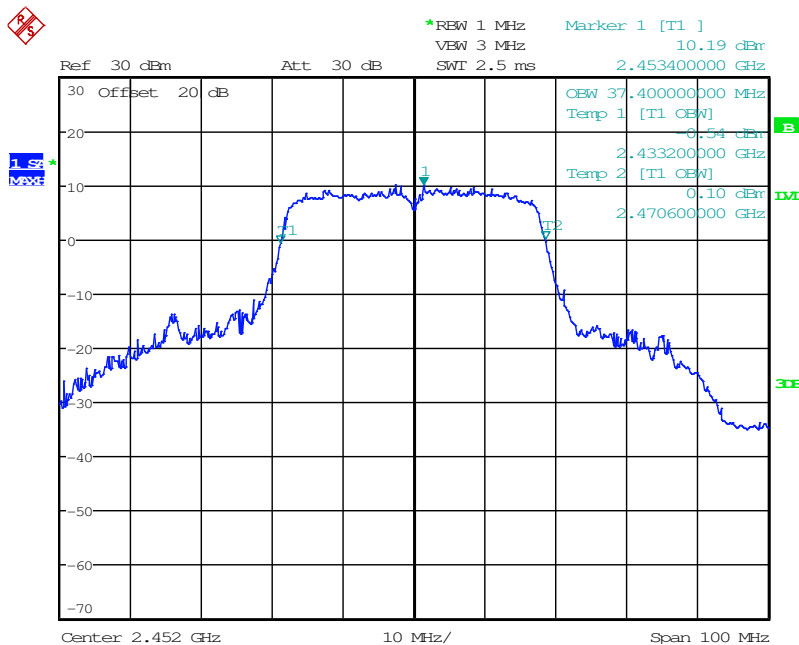
Date: 11.DEC.2015 14:01:05

Figure 7.2.2-22: 99% OBW - Low Channel



Date: 1.JAN.2016 16:42:17

Figure 7.2.2-23: 99% OBW - Middle Channel



Date: 11.DEC.2015 13:57:44

Figure 7.2.2-24: 99% OBW - High Channel

**7.3 Maximum Conducted Output Power - FCC Section 15.247(b)(3) IC: RSS-247 5.4(4)**

**7.3.1 Measurement Procedure (Conducted Method)**

The fundamental emission output power was measured in accordance with ANSI C63.10:2013 Section 11.9.2.2.2 Method AVGSA-1. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer through suitable attenuation.

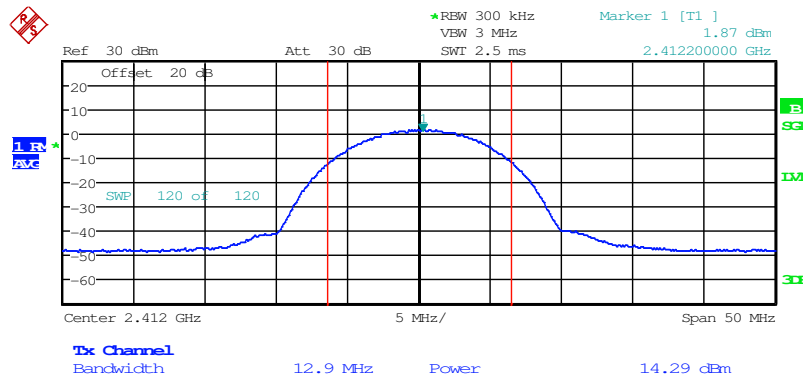
**7.3.2 Measurement Results**

Results are shown below.

802.11b

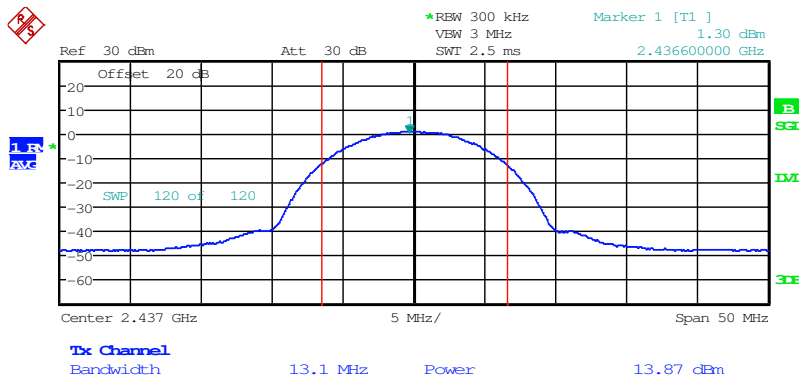
**Table 7.3.2-1: RF Output Power**

| Frequency [MHz] | Level [dBm] |
|-----------------|-------------|
| 2412            | 14.29       |
| 2437            | 13.87       |
| 2462            | 14.40       |



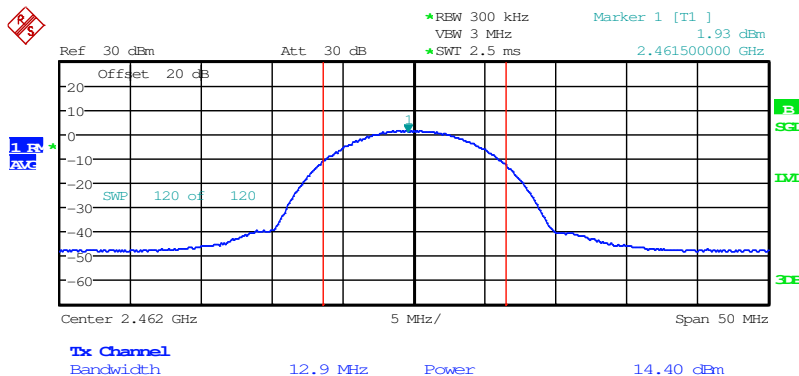
Date: 15.FEB.2016 18:08:57

**Figure 7.3.2-1: RF Output Power - Low Channel**



Date: 1.JAN.2016 15:14:15

Figure 7.3.2-2: RF Output Power - Middle Channel



Date: 1.JAN.2016 17:09:21

Figure 7.3.2-3: RF Output Power - High Channel

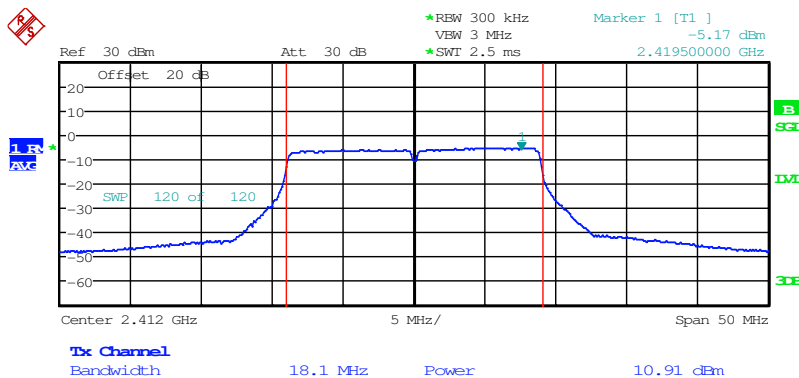




802.11n 20 MHz

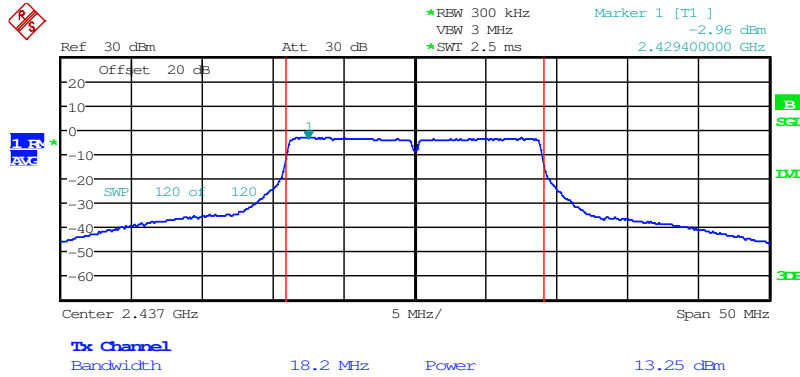
Table 7.3.2-3: RF Output Power

| Frequency [MHz] | Level [dBm] |
|-----------------|-------------|
| 2412            | 10.91       |
| 2437            | 13.25       |
| 2462            | 10.78       |



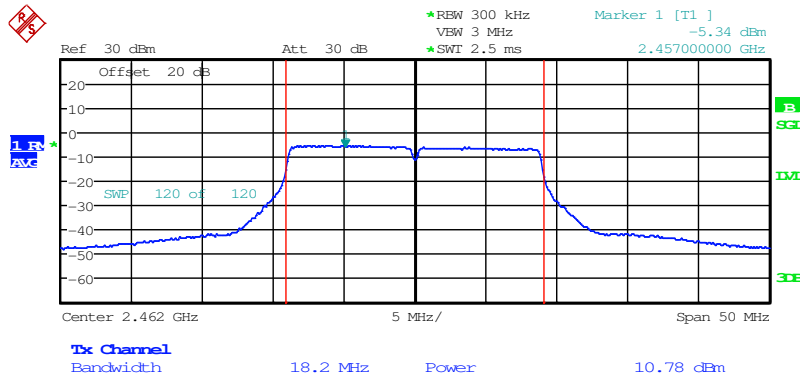
Date: 1.JAN.2016 16:59:53

Figure 7.3.2-7: RF Output Power - Low Channel



Date: 1.JAN.2016 17:08:02

Figure 7.3.2-8: RF Output Power - Middle Channel



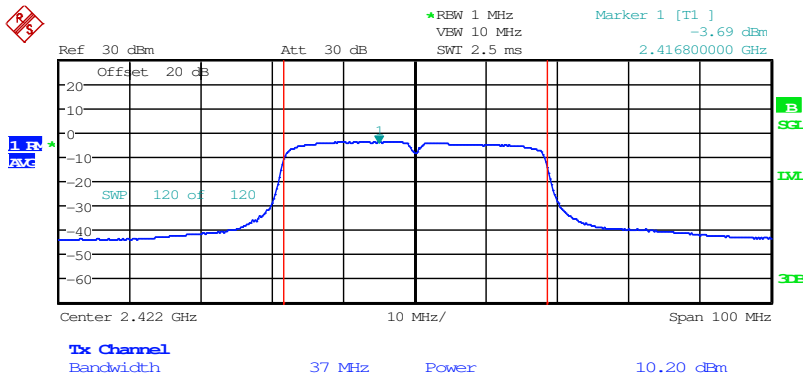
Date: 1.JAN.2016 17:12:01

Figure 7.3.2-9: RF Output Power - High Channel

802.11n 40 MHz

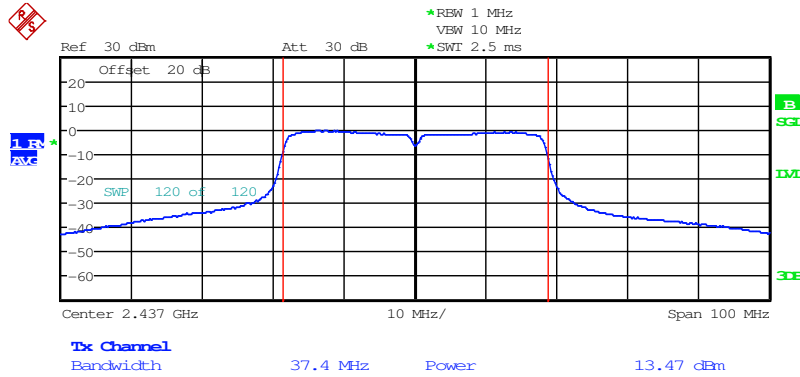
Table 7.3.2-4: RF Output Power

| Frequency [MHz] | Level [dBm] |
|-----------------|-------------|
| 2422            | 10.20       |
| 2437            | 13.47       |
| 2452            | 10.52       |



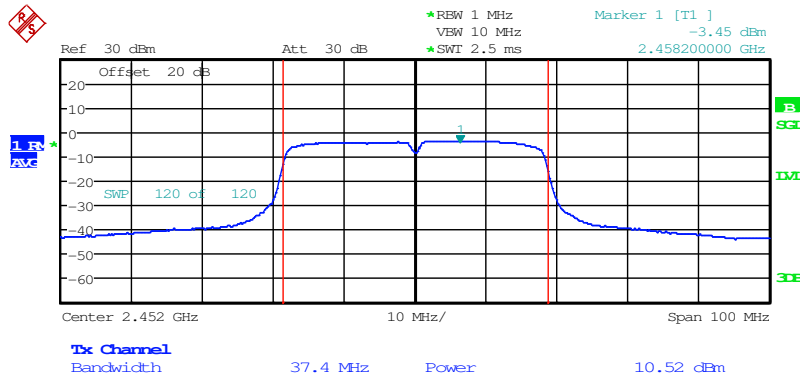
Date: 15.FEB.2016 18:23:12

Figure 7.3.2-10: RF Output Power - Low Channel



Date: 1.JAN.2016 16:53:45

Figure 7.3.2-11: RF Output Power - Middle Channel



Date: 1.JAN.2016 16:56:42

Figure 7.3.2-12: RF Output Power - High Channel

7.4 Band-Edge Compliance and Spurious Emissions-FCC 15.247(d) IC: RSS-247 5.5

7.4.1 Band-Edge Compliance of RF Conducted Emissions

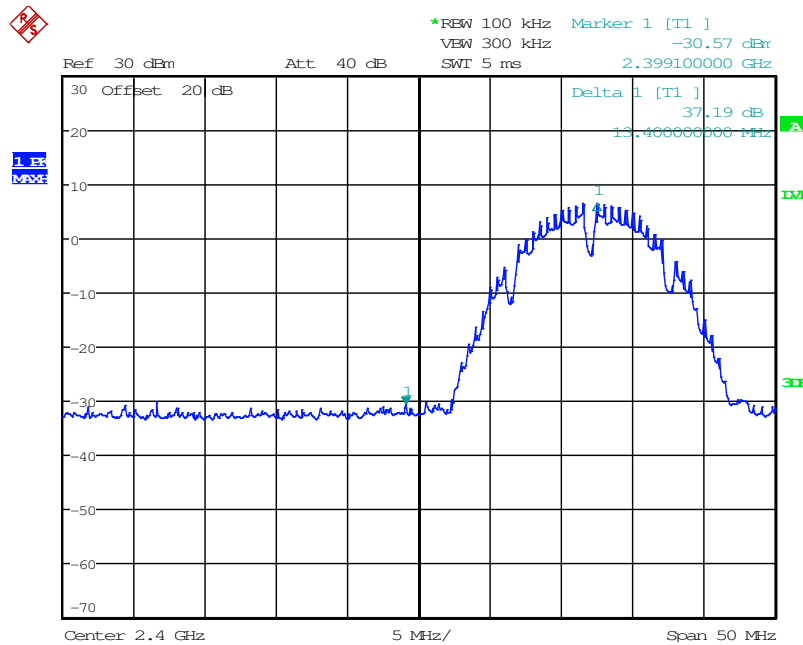
7.4.1.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer via suitable attenuation. The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement the spectrum analyzer's RBW was set to 100 kHz, and the VBW was set to 300 kHz.

7.4.1.2 Measurement Results

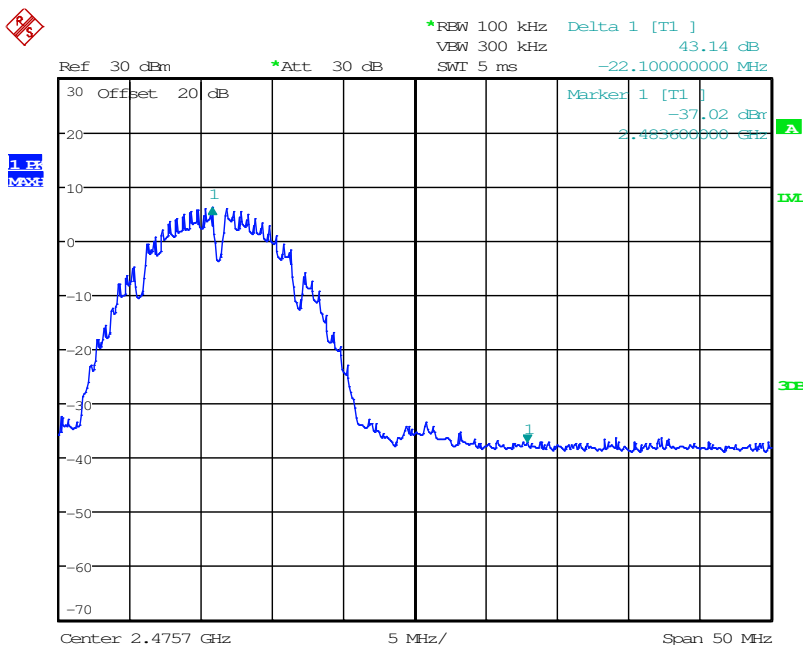
Results are shown below.

802.11b



Date: 29.DEC.2015 20:48:42

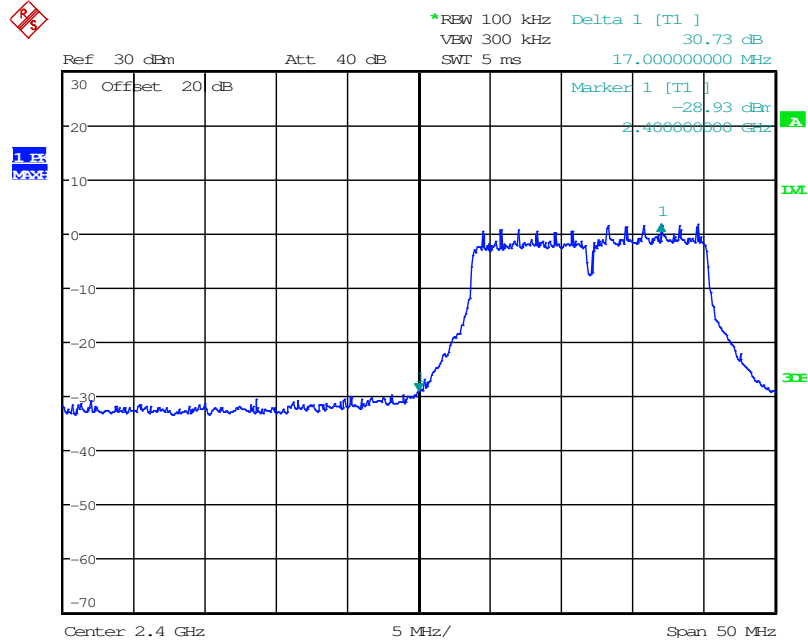
Figure 7.4.1.2-1: Lower Band-edge



Date: 29.DEC.2015 21:26:21

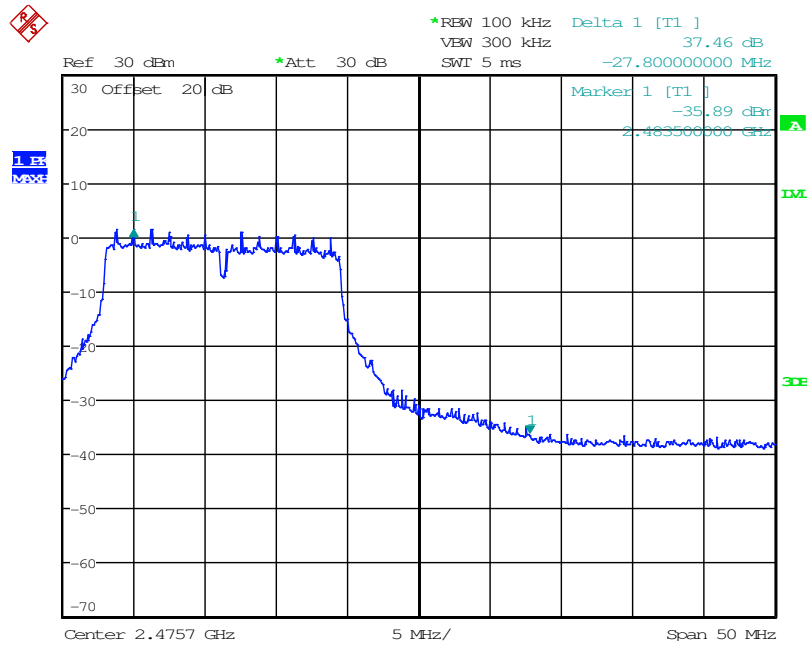
Figure 7.4.1.2-2: Upper Band-edge

802.11g



Date: 29.DEC.2015 20:55:50

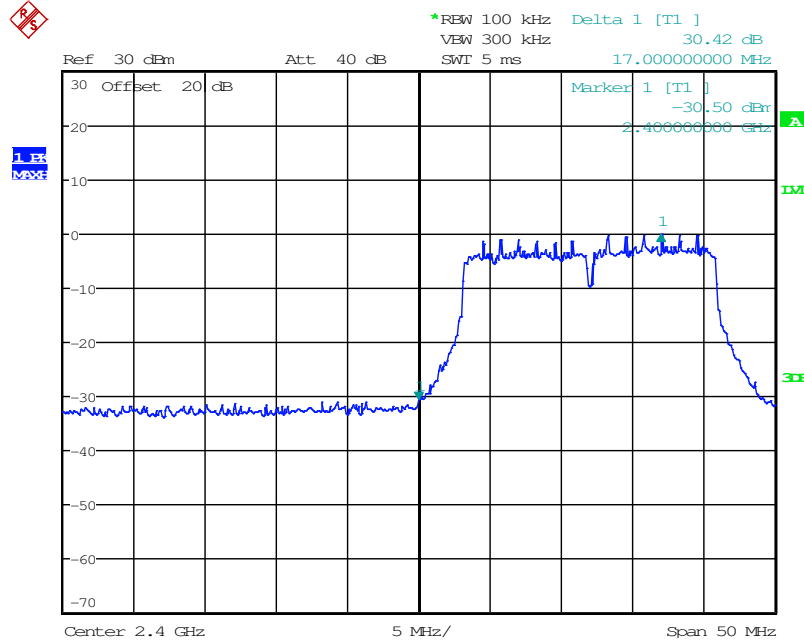
Figure 7.4.1.2-3: Lower Band-edge



Date: 29.DEC.2015 21:21:07

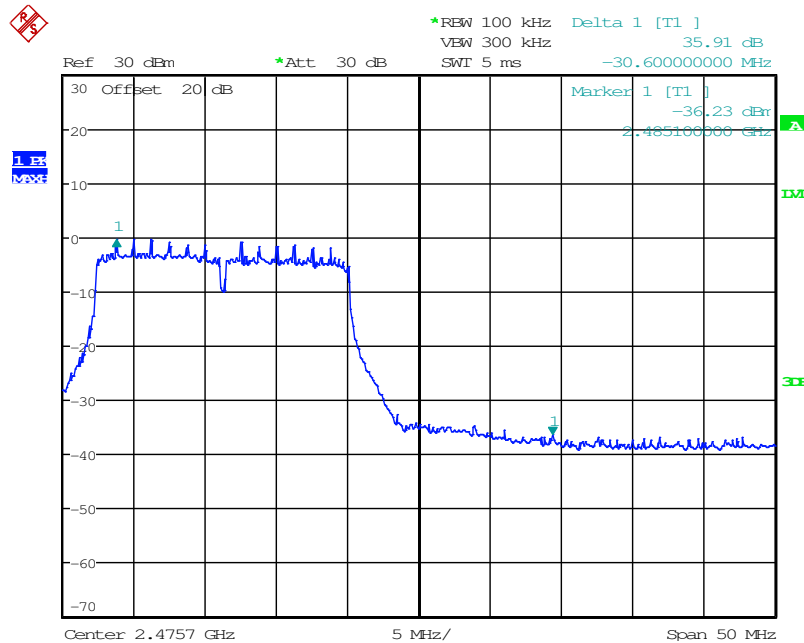
Figure 7.4.1.2-4: Upper Band-edge

802.11n 20 MHz



Date: 29.DEC.2015 21:00:11

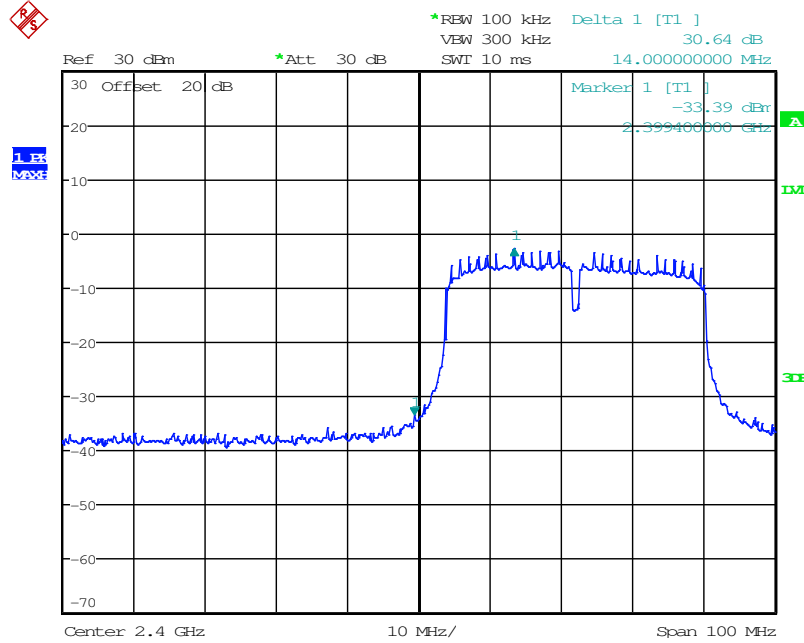
Figure 7.4.1.2-5: Lower Band-edge



Date: 29.DEC.2015 21:14:55

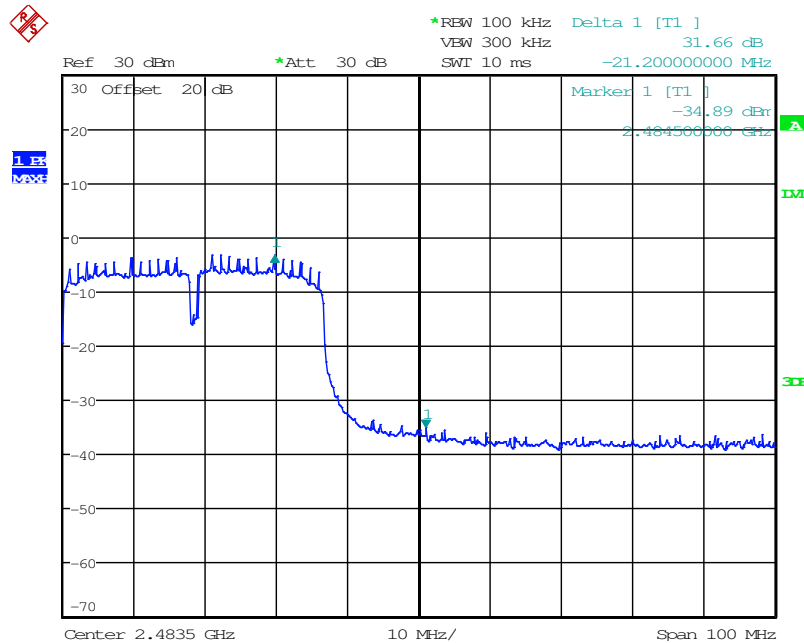
Figure 7.4.1.2-6: Upper Band-edge

802.11n 40 MHz



Date: 29.DEC.2015 21:04:41

Figure 7.4.1.2-7: Lower Band-edge



Date: 29.DEC.2015 21:09:05

Figure 7.4.1.2-8: Upper Band-edge

### 7.4.2 RF Conducted Spurious Emissions

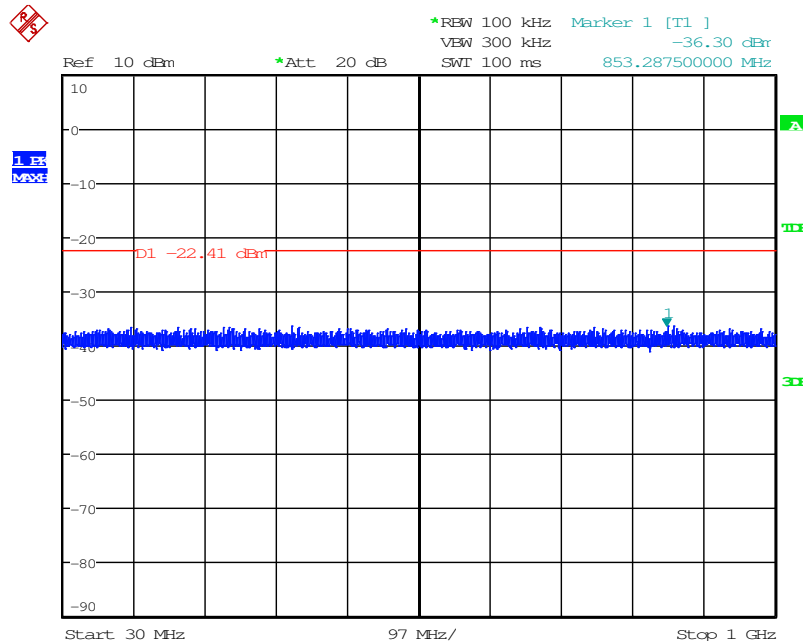
#### 7.4.2.1 Measurement Procedure

The RF Conducted Spurious Emissions were measured in accordance with ANSI C63.10:2013 Section 11.11 Emissions in non-restricted frequency bands. The RF output port of the equipment under test was directly connected to the input of the spectrum analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 26 GHz, 10 times the highest fundamental frequency. Measurements were made at the low, center and high channels of the EUT. For each measurement, the spectrum analyzer's RBW was set to 100 kHz and the VBW was set to 300 kHz. The peak Max Hold function of the analyzer was utilized. The reference level was determined by measuring the Peak PSD level in any 100 kHz bandwidth within the DTS channel bandwidth.

#### 7.4.2.2 Measurement Results

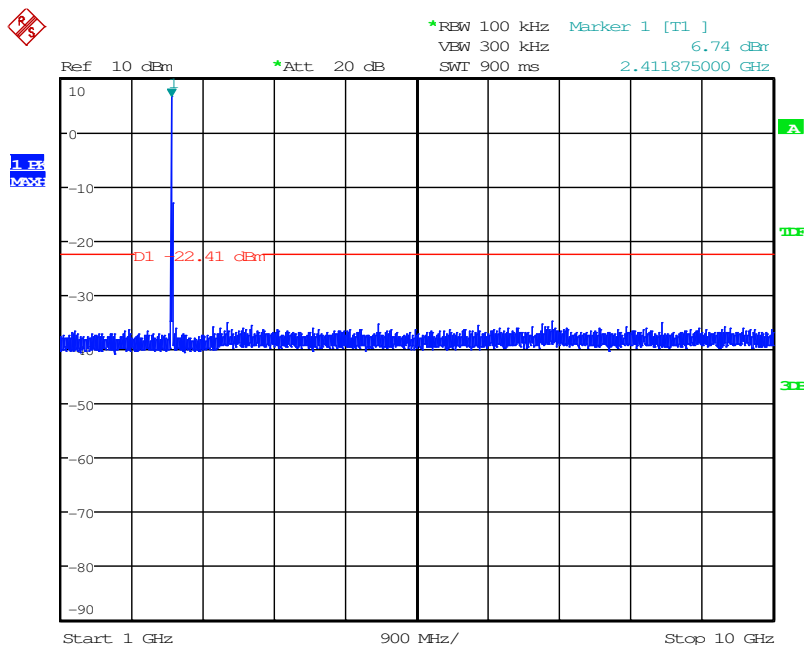
Results are shown below.

#### 802.11b



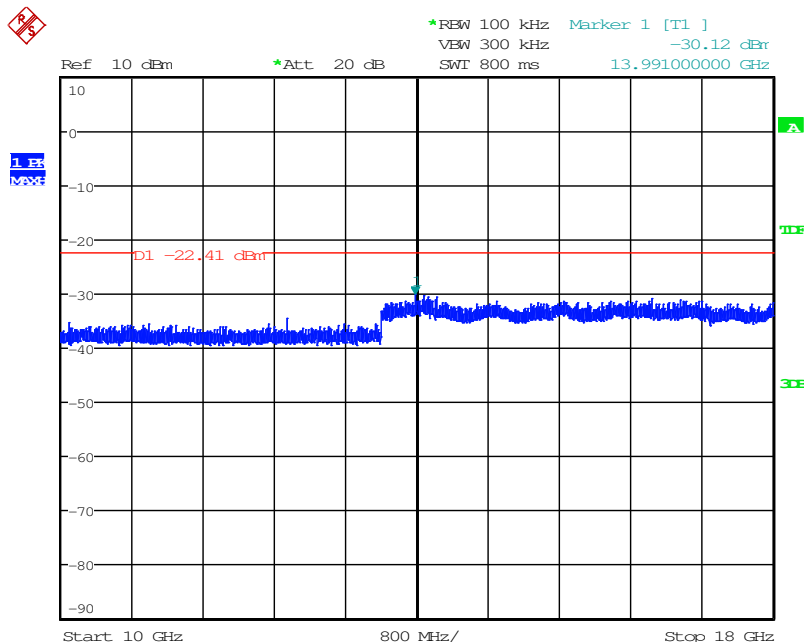
Date: 2.JAN.2016 16:37:56

Figure 7.4.2.2-1: 30 MHz – 1 GHz – Low Channel



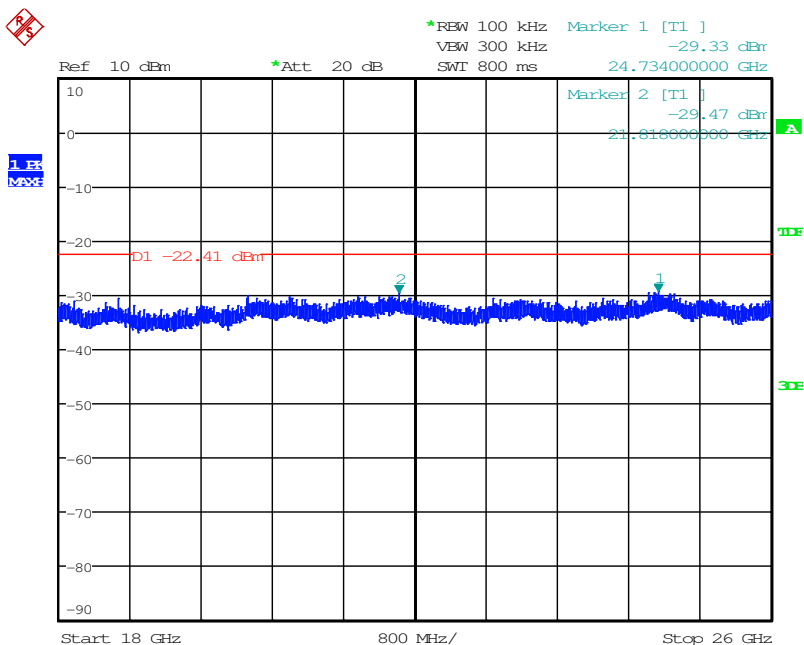
Date: 2.JAN.2016 16:34:56

Figure 7.4.2.2-2: 1 GHz –10 GHz – Low Channel



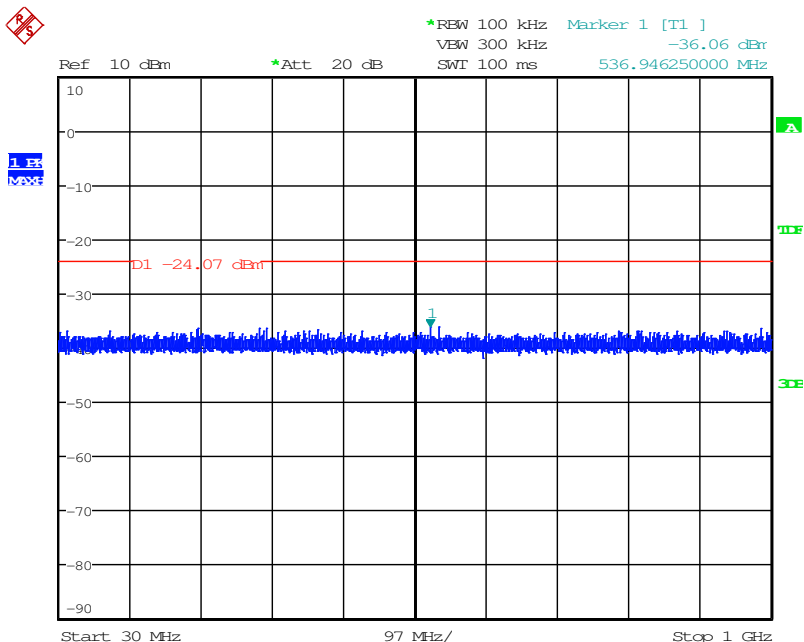
Date: 2.JAN.2016 16:31:59

Figure 7.4.2.2-3: 10 GHz –18 GHz – Low Channel



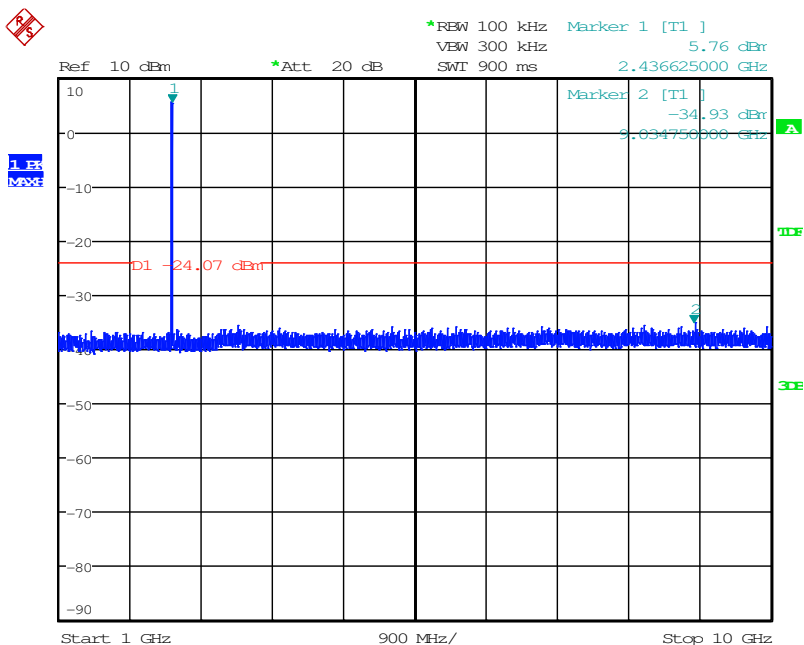
Date: 2.JAN.2016 16:28:01

Figure 7.4.2.2-4: 18 GHz – 26 GHz – Low Channel



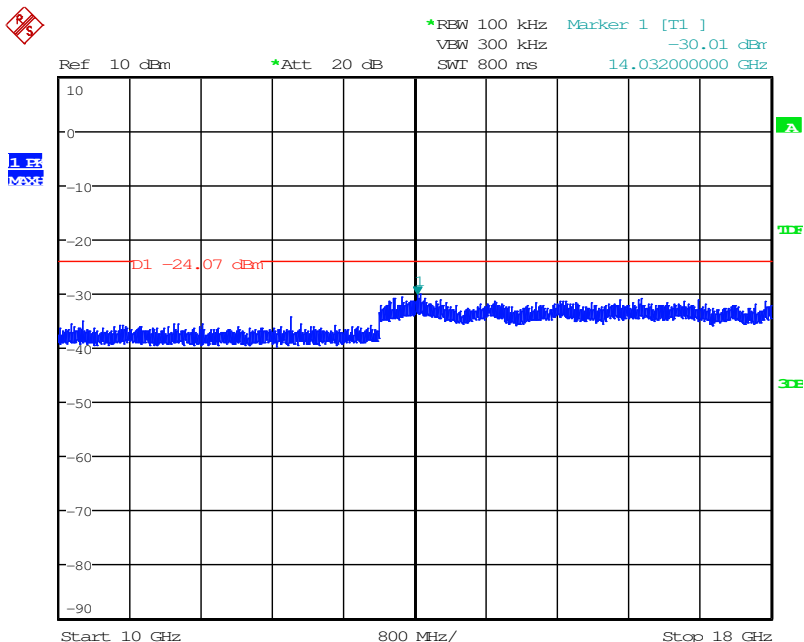
Date: 2.JAN.2016 16:20:54

Figure 7.4.2.2-5: 30 MHz – 1 GHz – Middle Channel



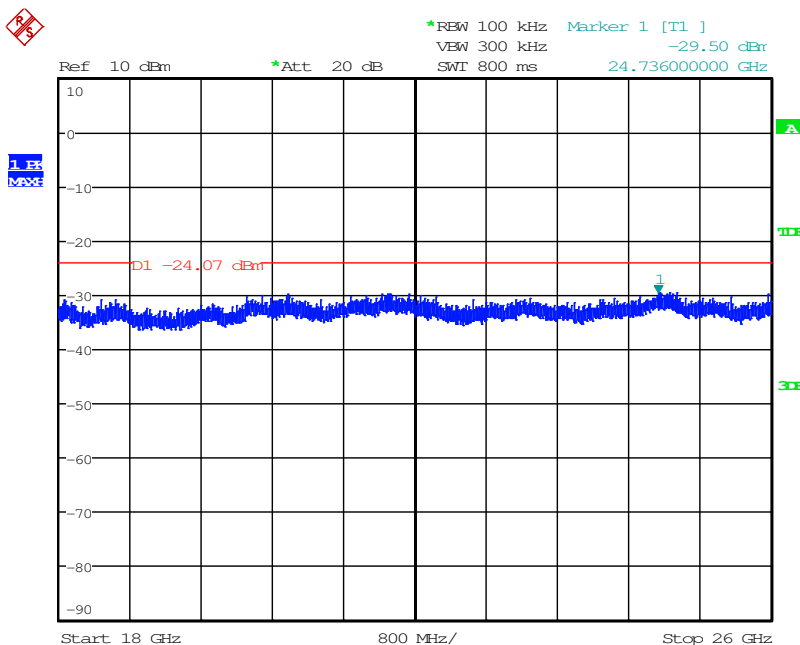
Date: 2.JAN.2016 16:19:10

Figure 7.4.2.2-6: 1 GHz –10 GHz – Middle Channel



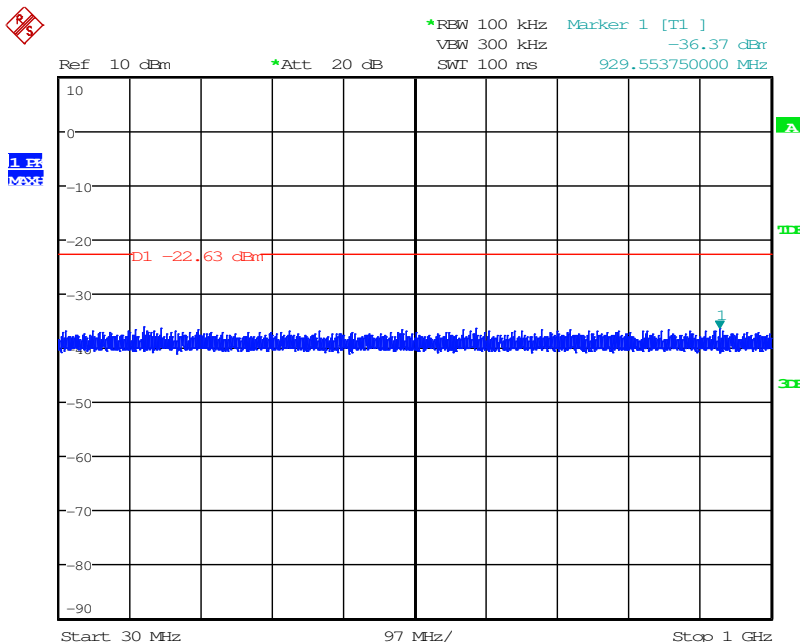
Date: 2.JAN.2016 16:24:31

Figure 7.4.2.2-7: 10 GHz –18 GHz – Middle Channel



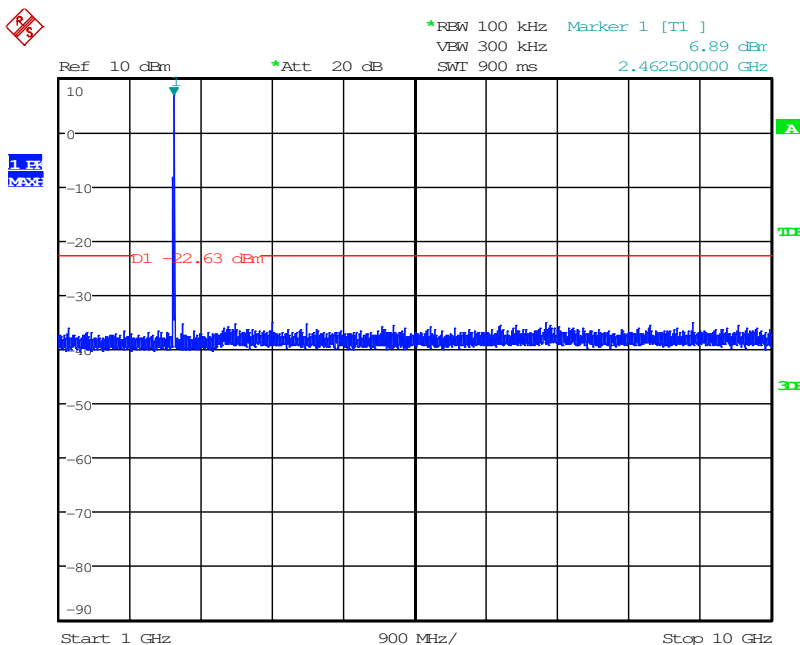
Date: 2.JAN.2016 16:26:10

Figure 7.4.2.2-8: 18 GHz – 26 GHz – Middle Channel



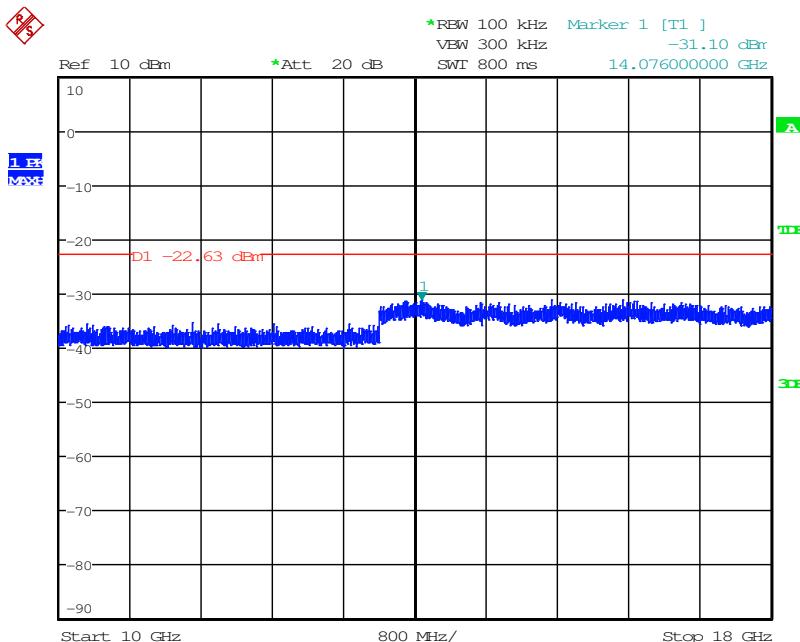
Date: 2.JAN.2016 16:40:42

Figure 7.4.2.2-9: 30 MHz – 1 GHz – High Channel



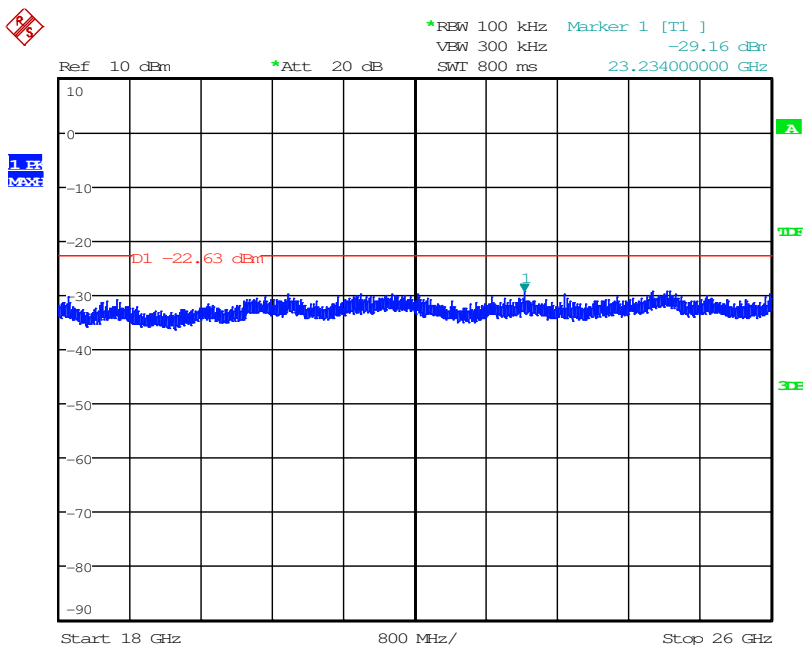
Date: 2.JAN.2016 16:44:13

Figure 7.4.2-10: 1 GHz –10 GHz –High Channel



Date: 2.JAN.2016 16:46:36

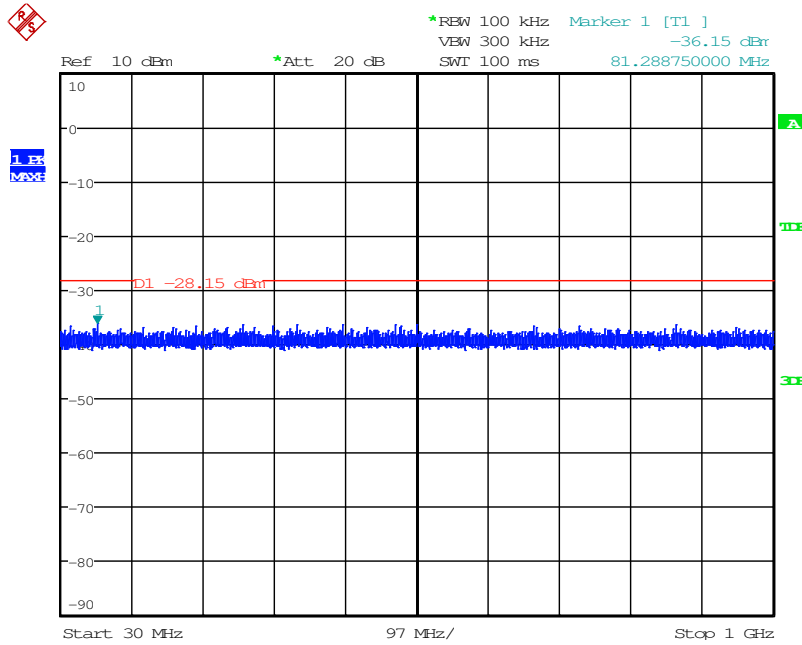
Figure 7.4.2-11: 10 GHz – 18 GHz –High Channel



Date: 2.JAN.2016 16:49:22

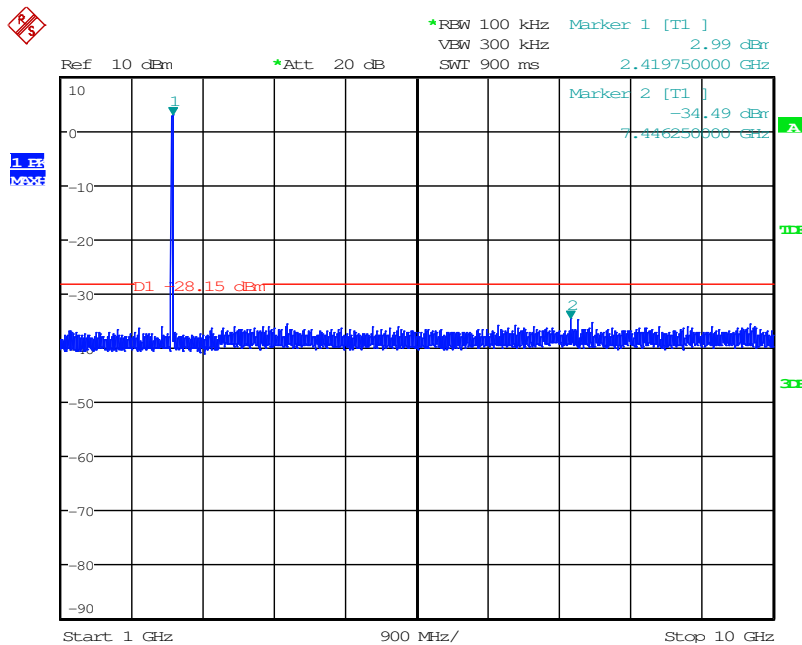
Figure 7.4.2.2-12: 18 GHz – 26 GHz –High Channel

802.11g



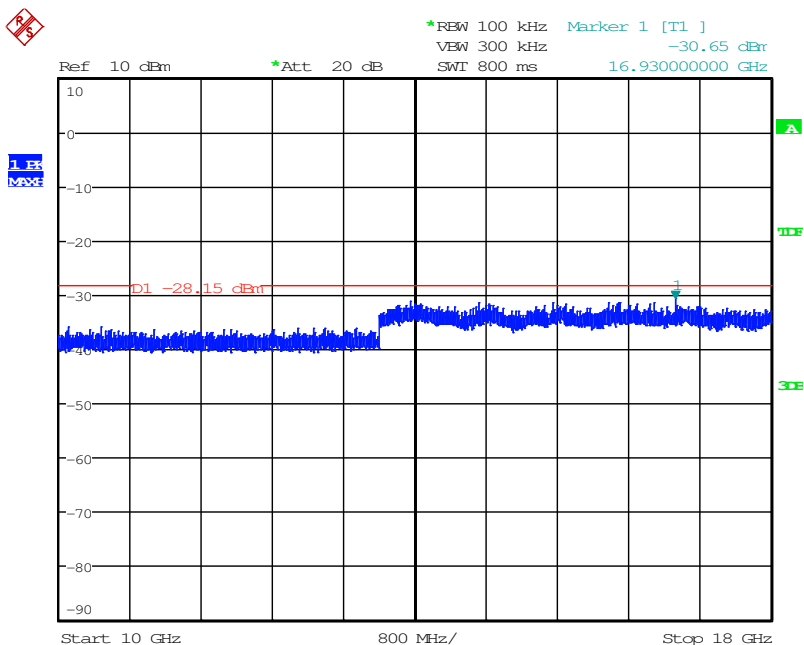
Date: 2.JAN.2016 16:58:29

Figure 7.4.2.2-13: 30 MHz – 1 GHz – Low Channel



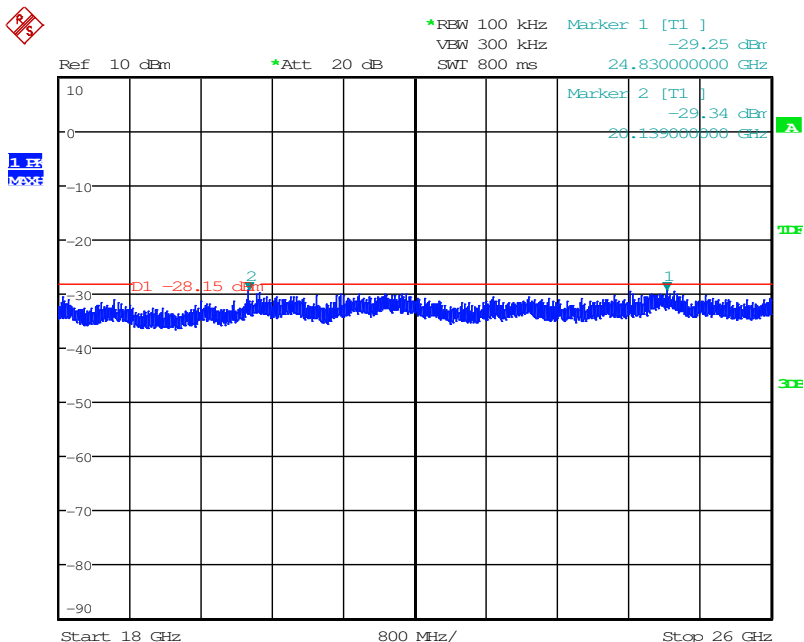
Date: 2.JAN.2016 17:00:37

Figure 7.4.2.2-14: 1 GHz –10 GHz – Low Channel



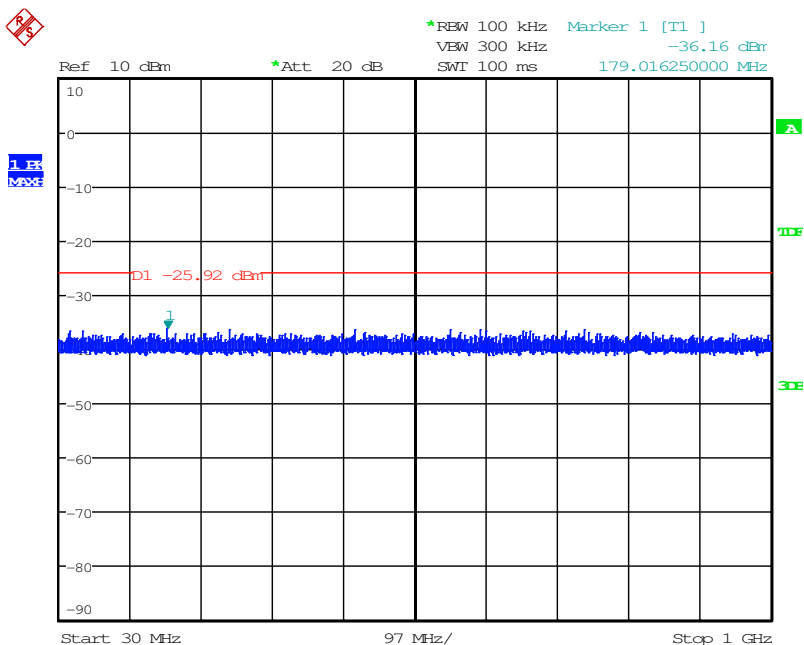
Date: 2.JAN.2016 17:01:56

Figure 7.4.2.2-15: 10 GHz -18 GHz - Low Channel



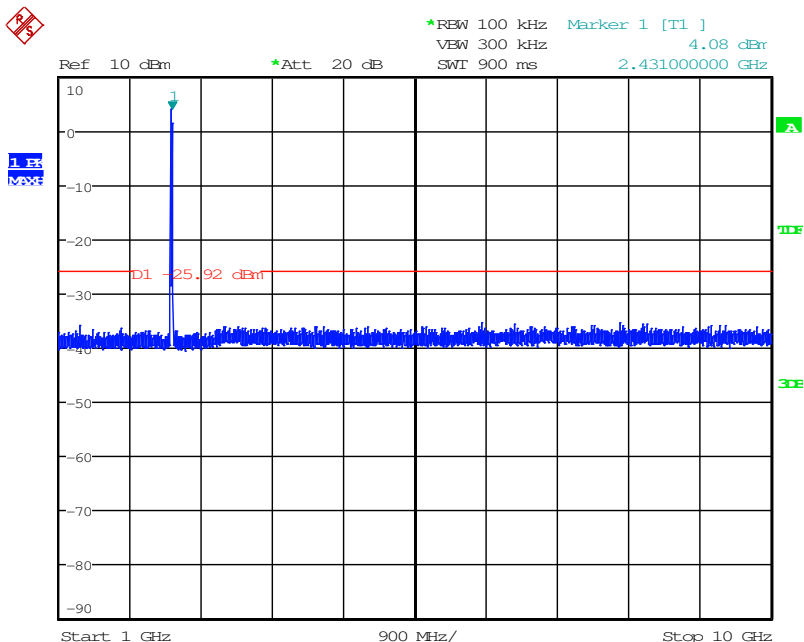
Date: 2.JAN.2016 17:03:22

Figure 7.4.2.2-16: 18 GHz - 26 GHz - Low Channel



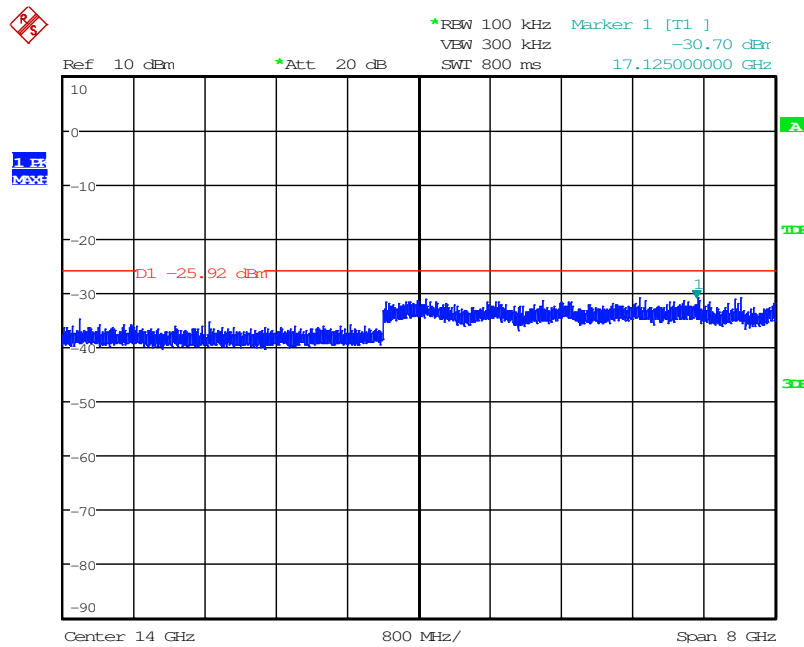
Date: 2.JAN.2016 17:12:04

Figure 7.4.2.2-17: 30 MHz – 1 GHz –Middle Channel



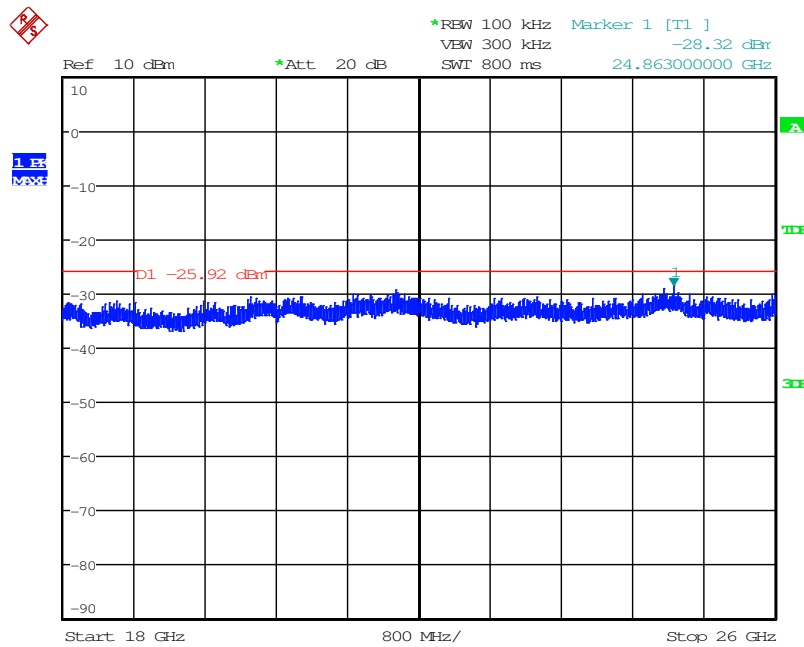
Date: 2.JAN.2016 17:10:14

Figure 7.4.2.2-18: 1 GHz – 10 GHz – Middle Channel



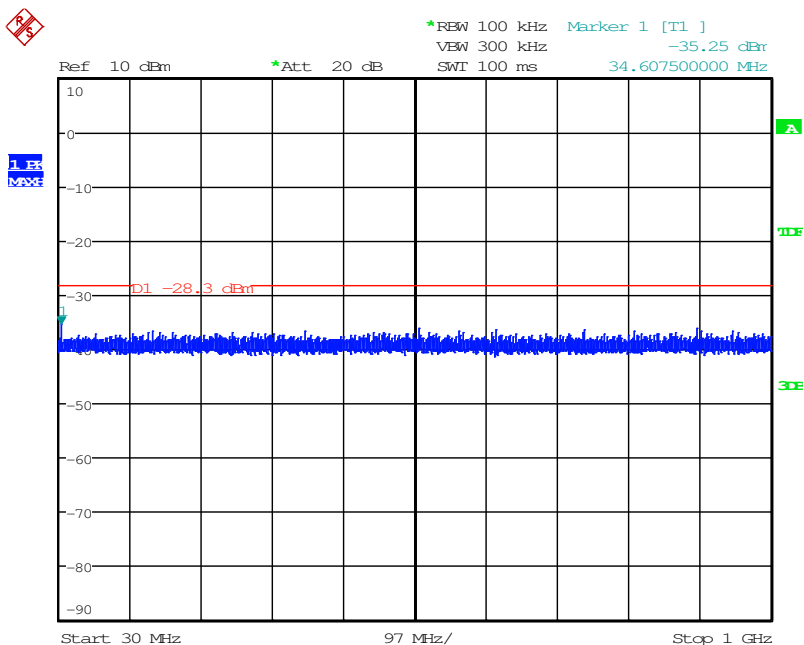
Date: 2.JAN.2016 17:07:01

Figure 7.4.2.2-19: 10 GHz – 18 GHz – Middle Channel



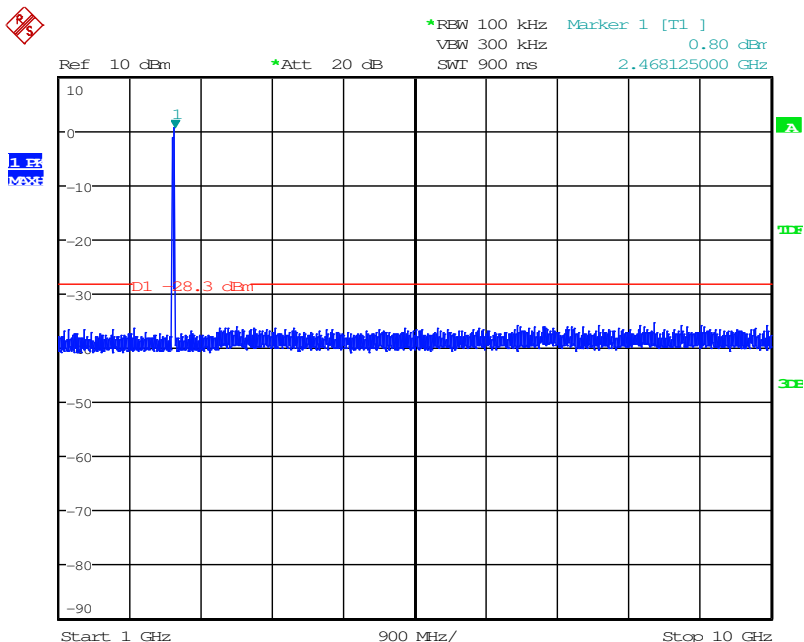
Date: 2.JAN.2016 17:04:51

Figure 7.4.2.2-20: 18 GHz – 26 GHz – Middle Channel



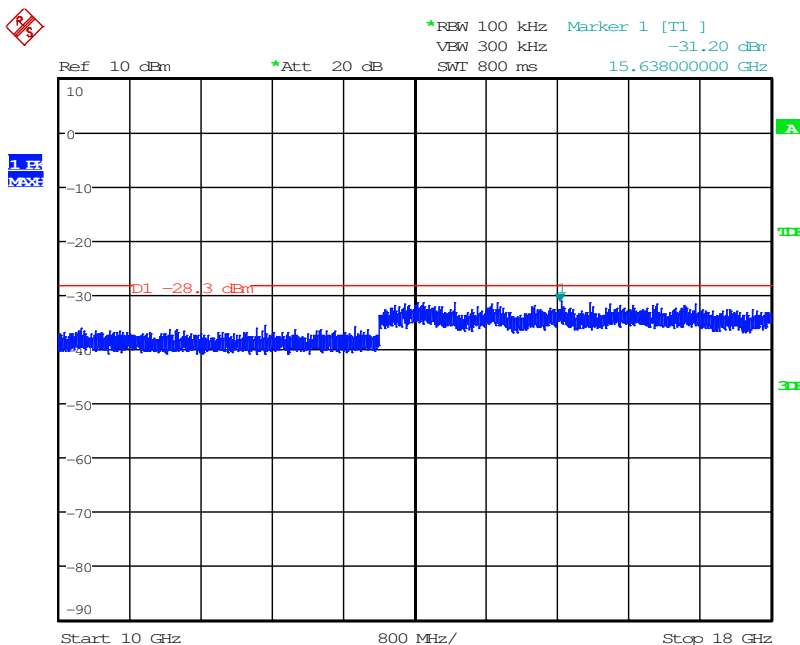
Date: 2.JAN.2016 16:56:11

Figure 7.4.2.2-21: 30 MHz – 1 GHz – High Channel



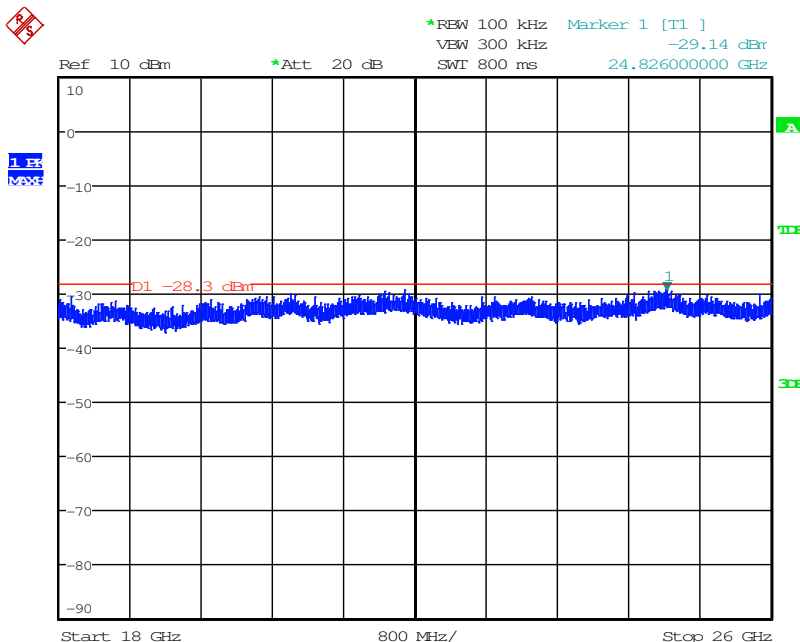
Date: 2.JAN.2016 16:54:19

Figure 7.4.2.2-22: 1 GHz – 10 GHz –High Channel



Date: 2.JAN.2016 16:52:36

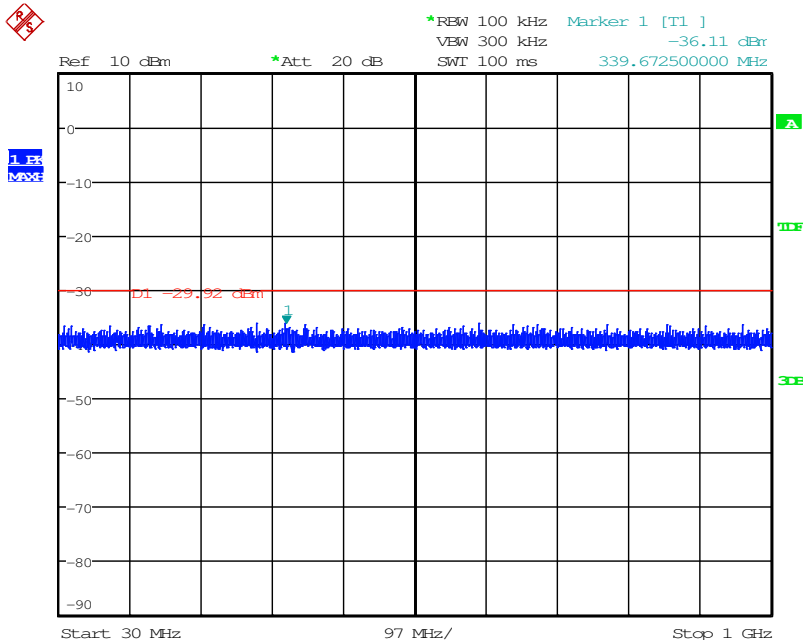
Figure 7.4.2.2-23: 10 GHz – 18 GHz –High Channel



Date: 2.JAN.2016 16:51:37

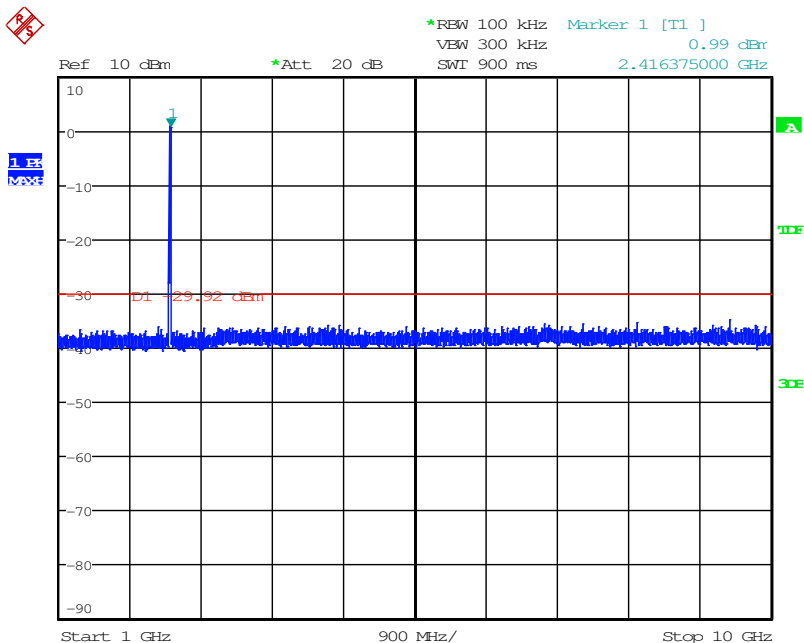
Figure 7.4.2.2-24: 18 GHz – 26 GHz –High Channel

802.11n 20MHz



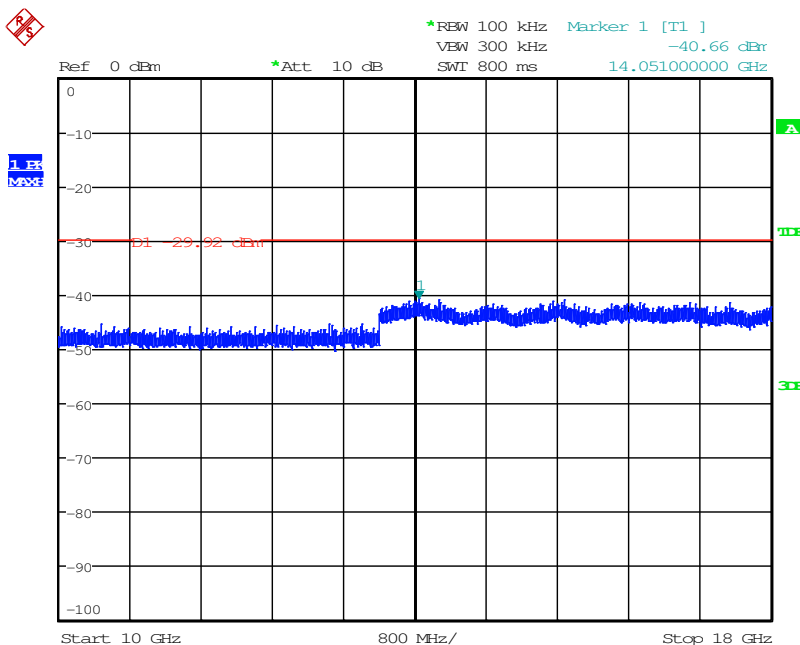
Date: 4.JAN.2016 16:32:17

Figure 7.4.2.2-25: 30 MHz – 1 GHz – Low Channel



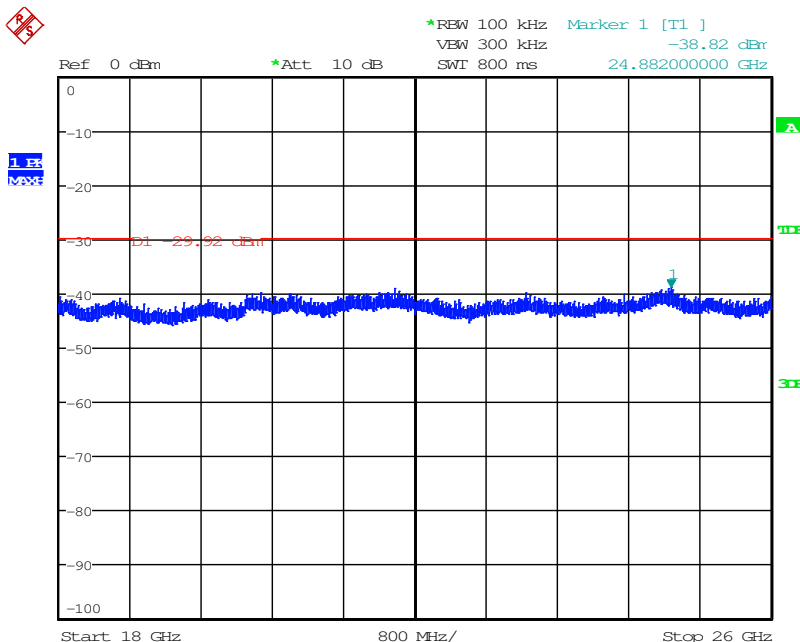
Date: 4.JAN.2016 16:30:28

Figure 7.4.2.2-26: 1 GHz –10 GHz – Low Channel



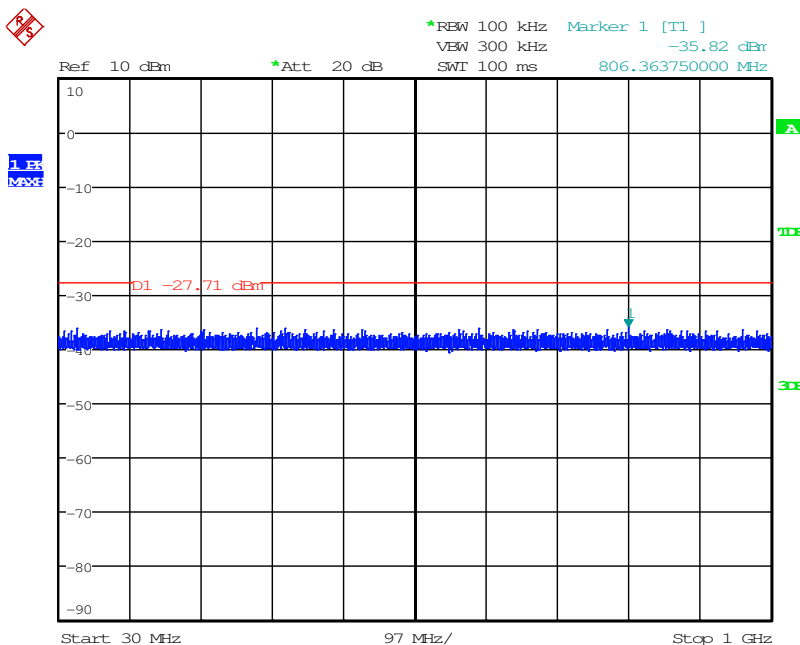
Date: 4.JAN.2016 16:27:02

Figure 7.4.2.2-27: 10 GHz -18 GHz - Low Channel



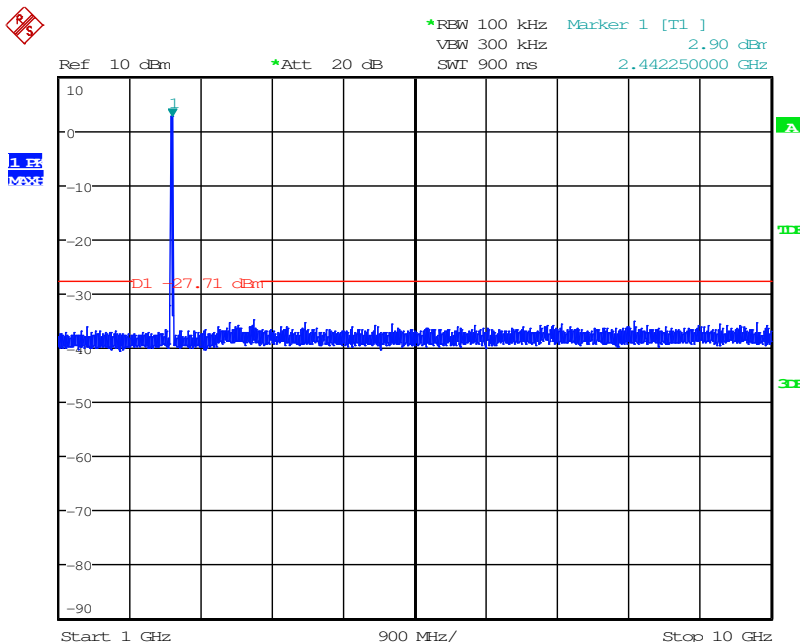
Date: 4.JAN.2016 16:24:30

Figure 7.4.2.2-28: 18 GHz - 26 GHz - Low Channel



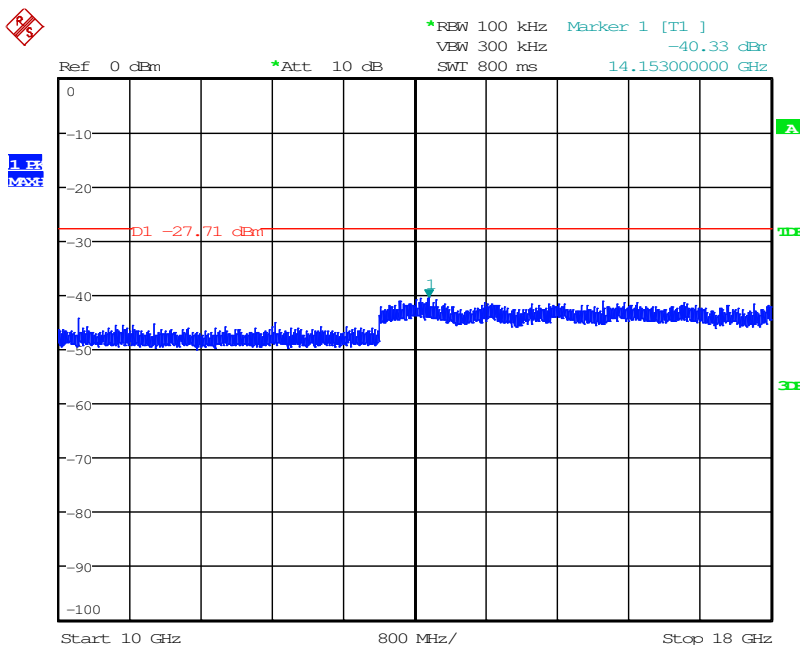
Date: 4.JAN.2016 16:34:55

Figure 7.4.2.2-29: 30 MHz – 1 GHz –Middle Channel



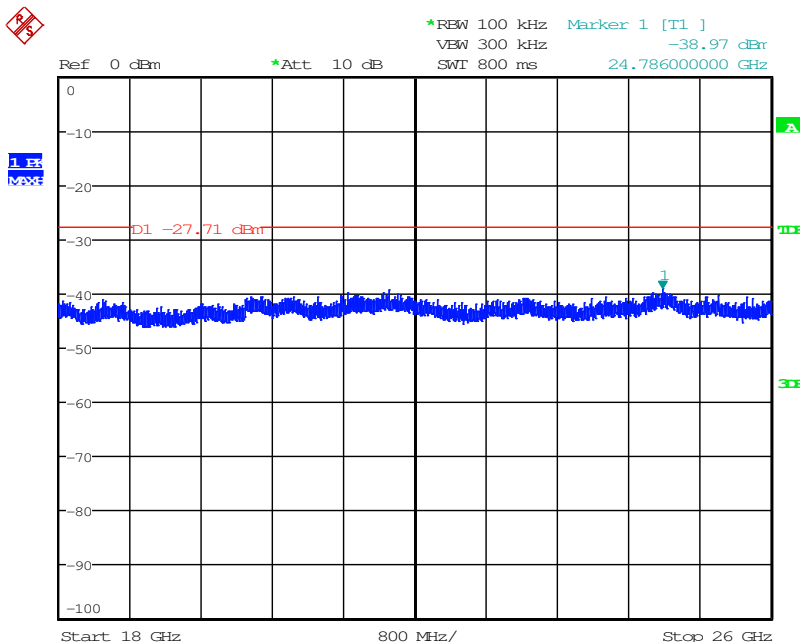
Date: 4.JAN.2016 17:39:13

Figure 7.4.2.2-30: 1 GHz –10 GHz – Middle Channel



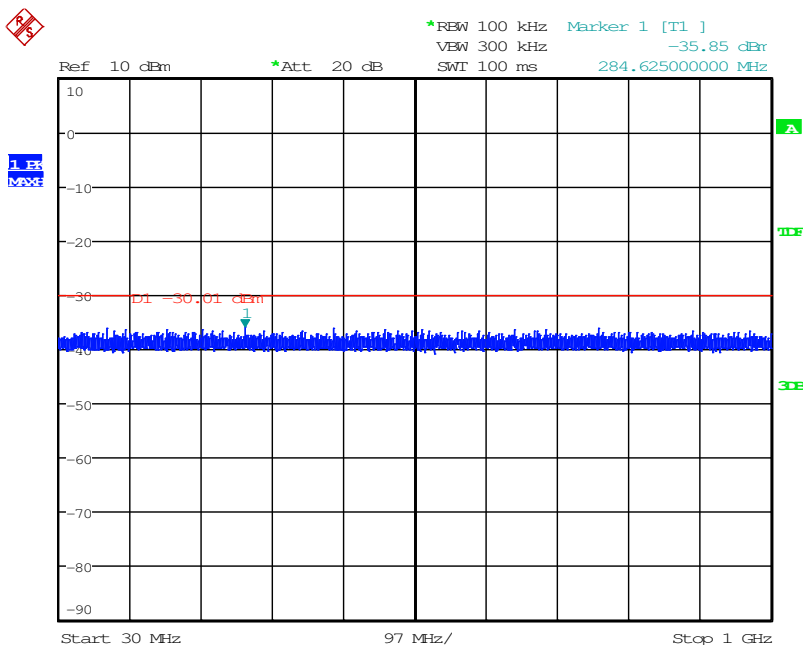
Date: 4.JAN.2016 16:44:08

Figure 7.4.2.2-31: 10 GHz –18 GHz – Middle Channel



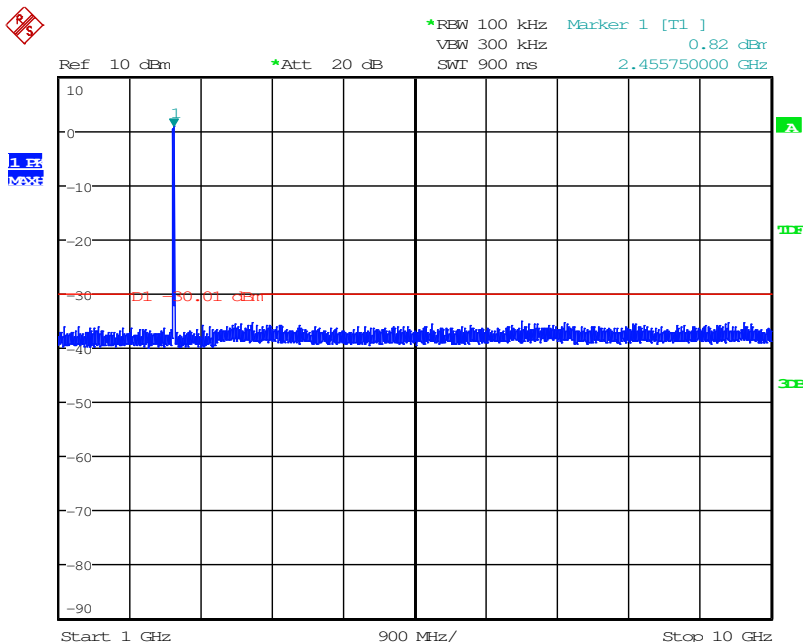
Date: 4.JAN.2016 16:46:18

Figure 7.4.2.2-32: 18 GHz – 26 GHz – Middle Channel



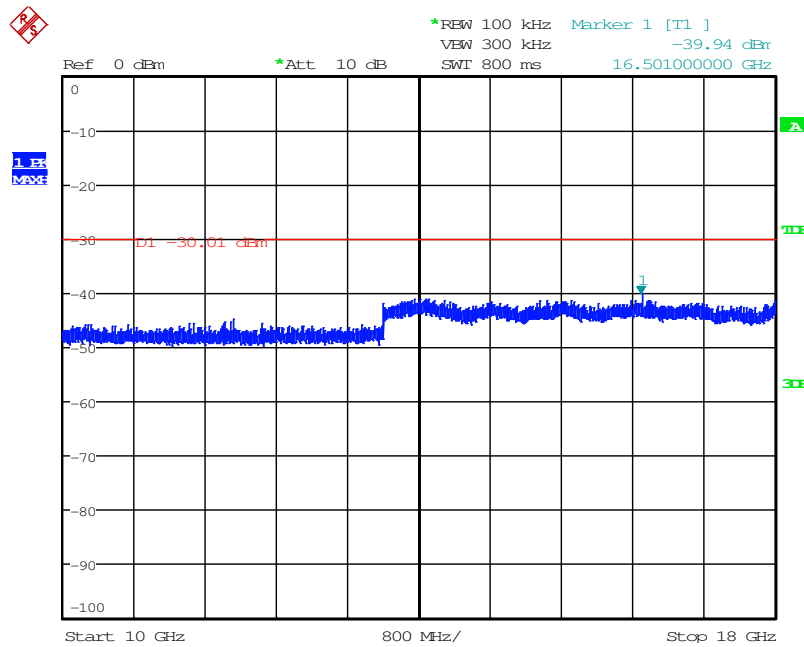
Date: 4.JAN.2016 17:08:19

Figure 7.4.2.2-33: 30 MHz – 1 GHz – High Channel



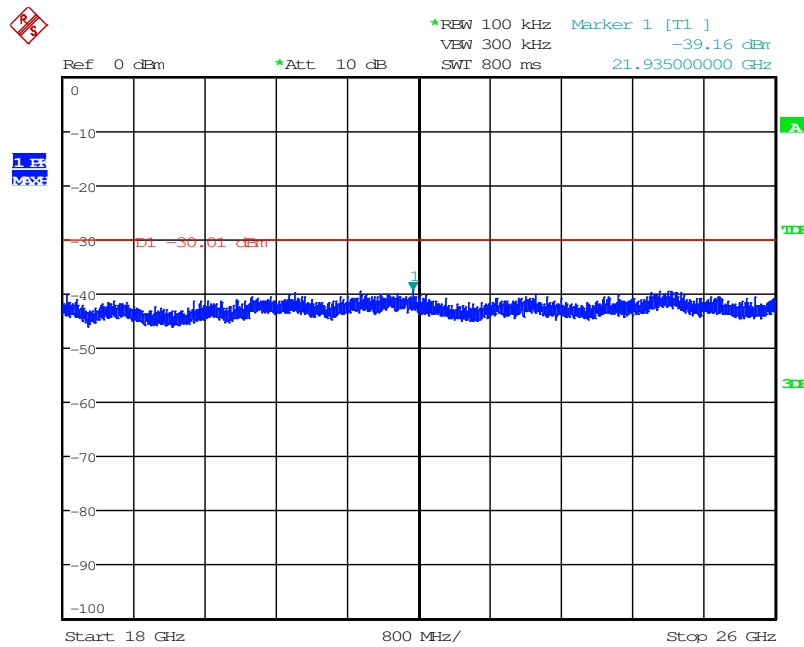
Date: 4.JAN.2016 17:45:59

Figure 7.4.2.2-34: 1 GHz –10 GHz –High Channel



Date: 4.JAN.2016 16:53:26

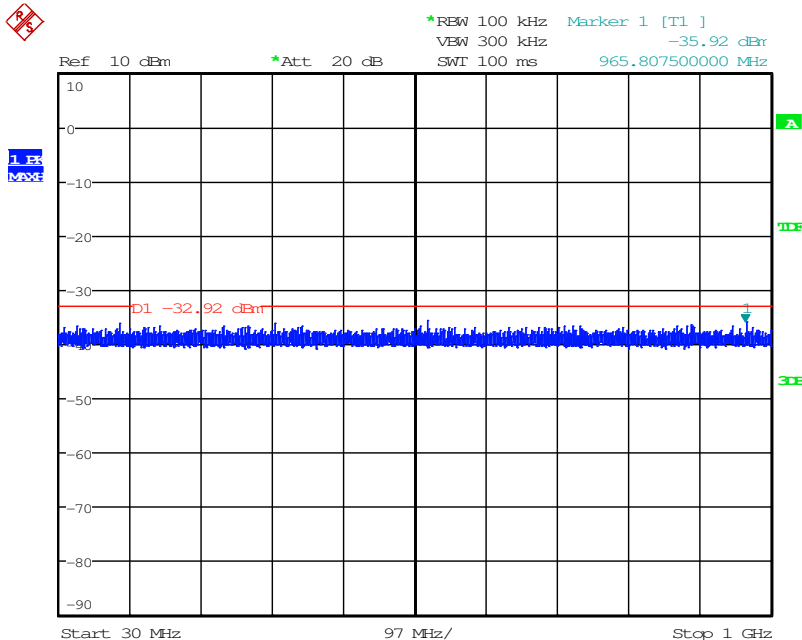
Figure 7.4.2.2-35: 10 GHz – 18 GHz –High Channel



Date: 4.JAN.2016 16:49:59

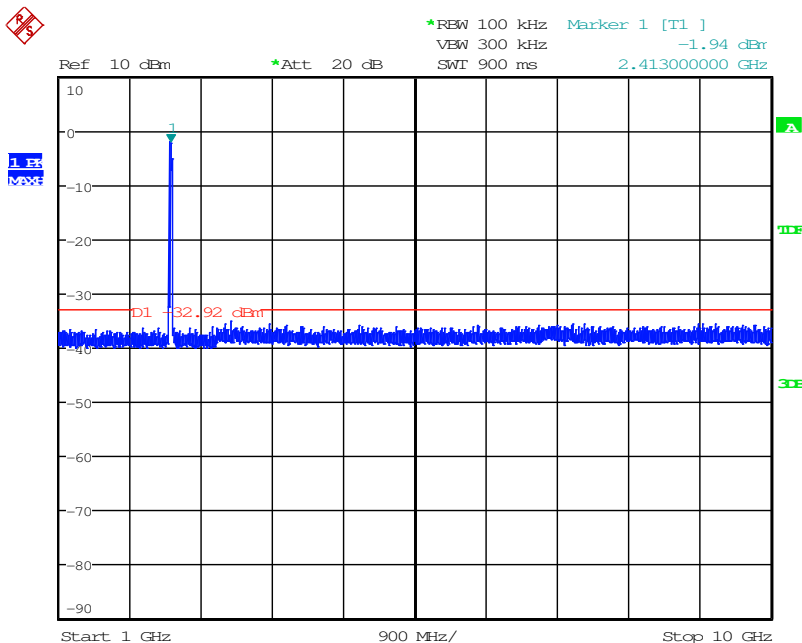
Figure 7.4.2.2-36: 18 GHz – 26 GHz –High Channel

802.11n 40MHz



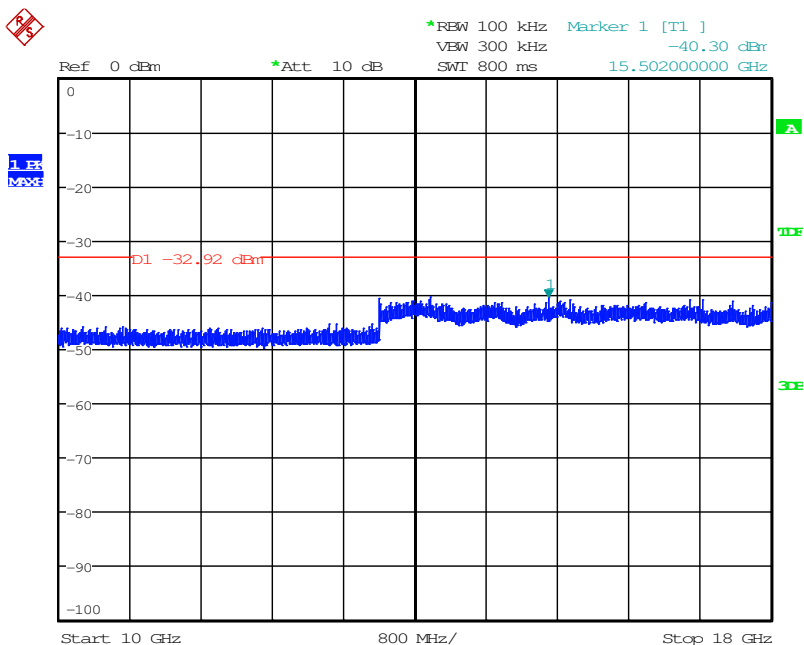
Date: 4.JAN.2016 17:53:52

Figure 7.4.2.2-37: 30 MHz – 1 GHz – Low Channel



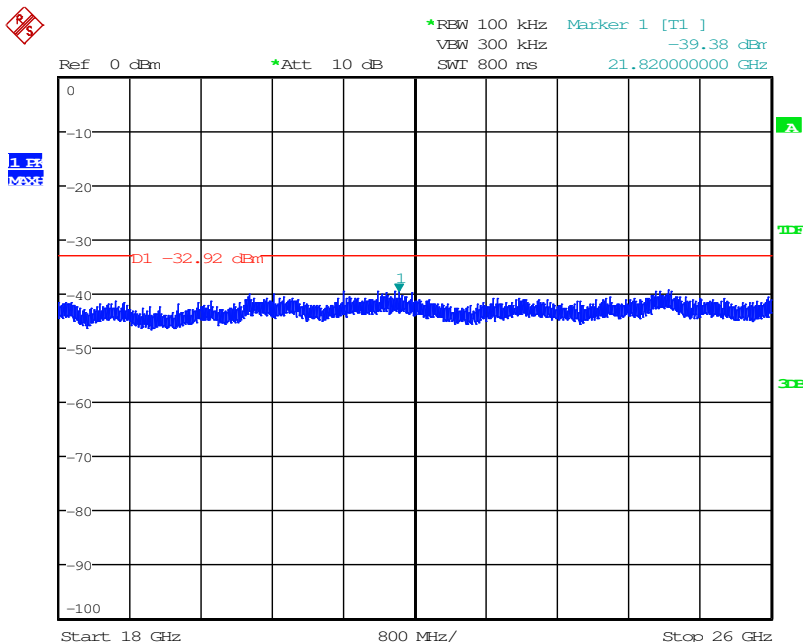
Date: 4.JAN.2016 17:51:05

Figure 7.4.2.2-38: 1 GHz –10 GHz – Low Channel



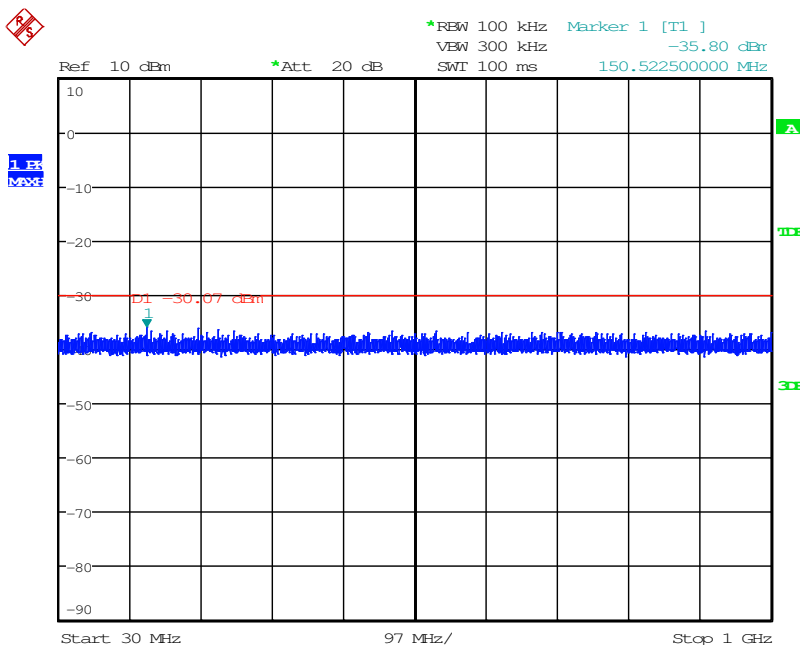
Date: 4.JAN.2016 17:57:36

Figure 7.4.2.2-39: 10 GHz - 18 GHz - Low Channel



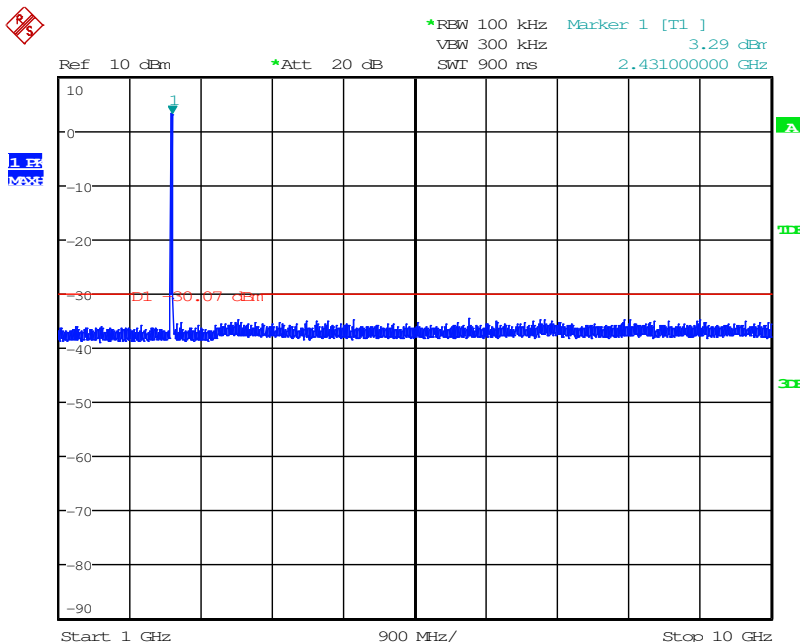
Date: 4.JAN.2016 17:59:21

Figure 7.4.2.2-40: 18 GHz - 26 GHz - Low Channel



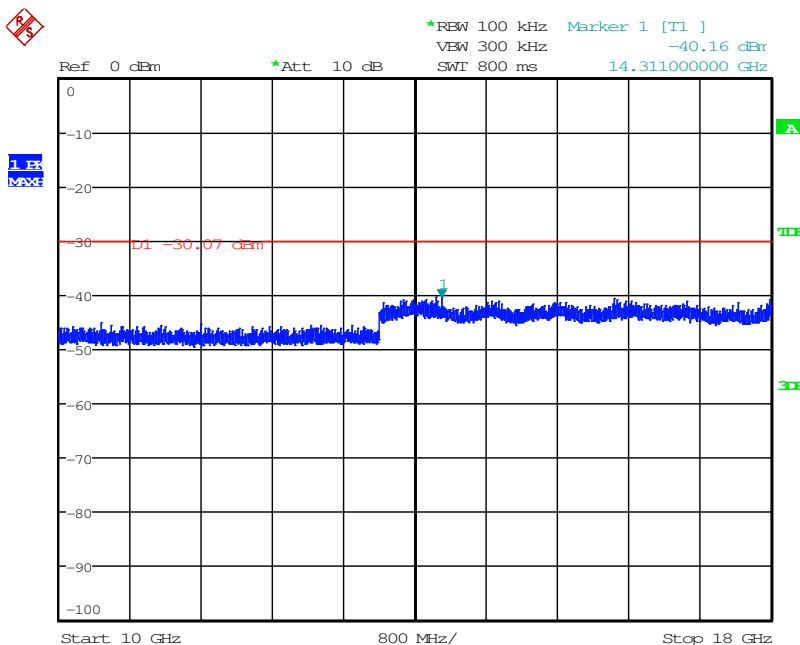
Date: 4.JAN.2016 18:47:24

Figure 7.4.2.2-41: 30 MHz – 1 GHz –Middle Channel



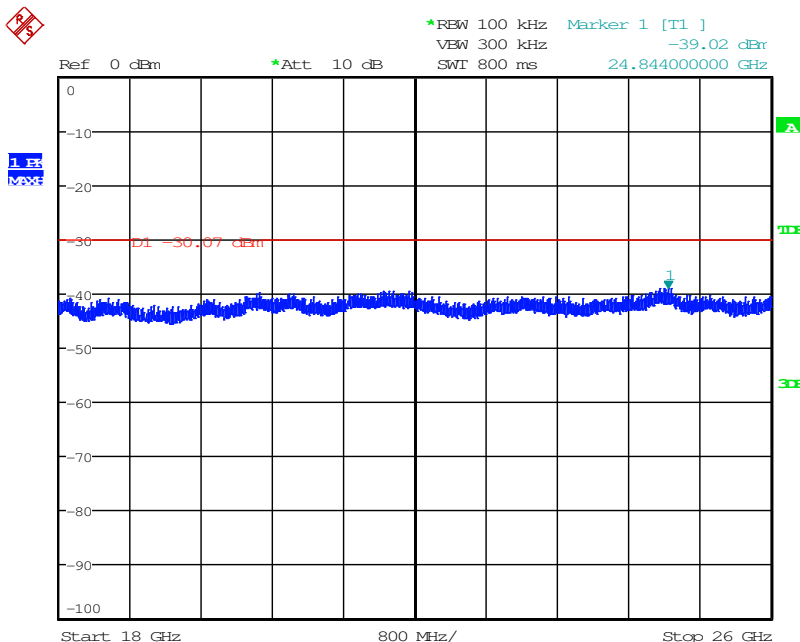
Date: 4.JAN.2016 18:45:35

Figure 7.4.2.2-42: 1 GHz –10 GHz – Middle Channel



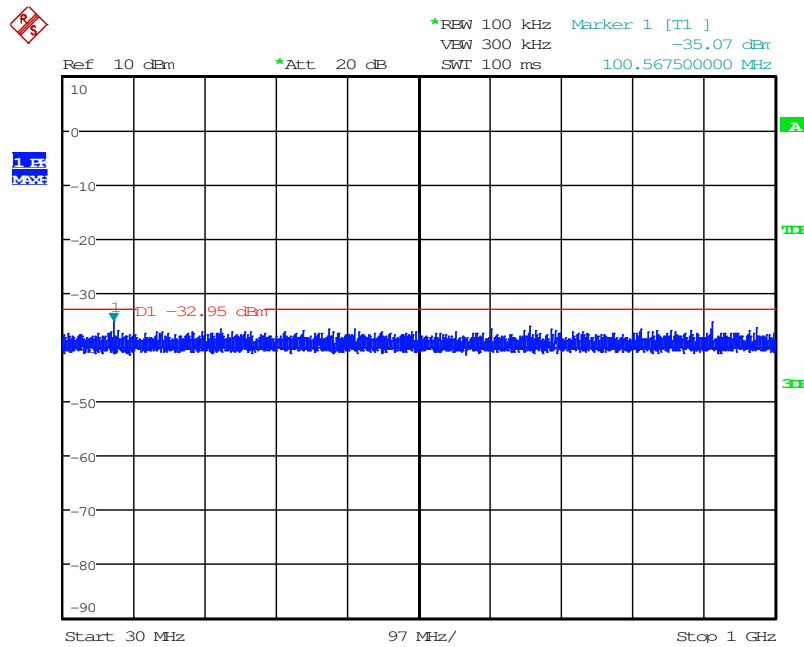
Date: 4.JAN.2016 18:11:30

Figure 7.4.2.2-43: 10 GHz - 18 GHz - Middle Channel



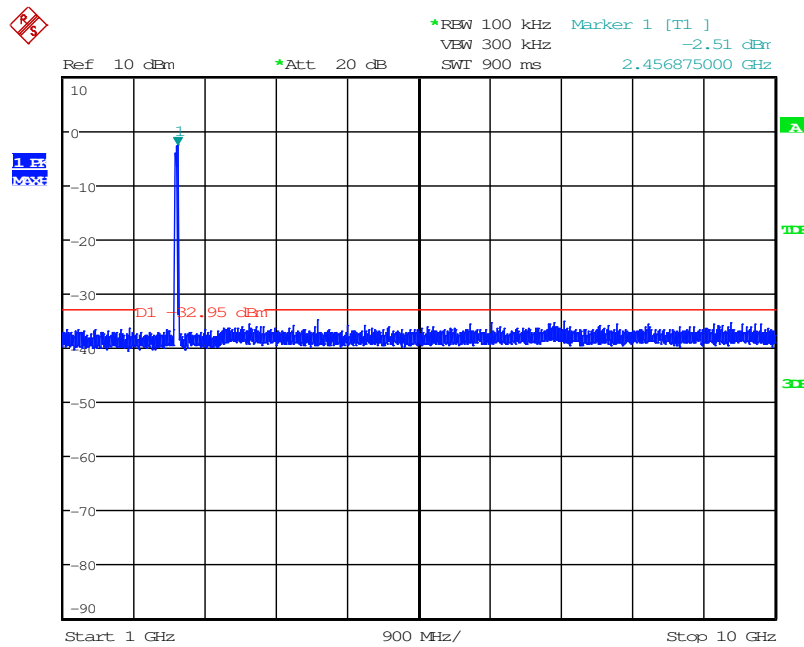
Date: 4.JAN.2016 18:06:37

Figure 7.4.2.2-44: 18 GHz - 26 GHz - Middle Channel



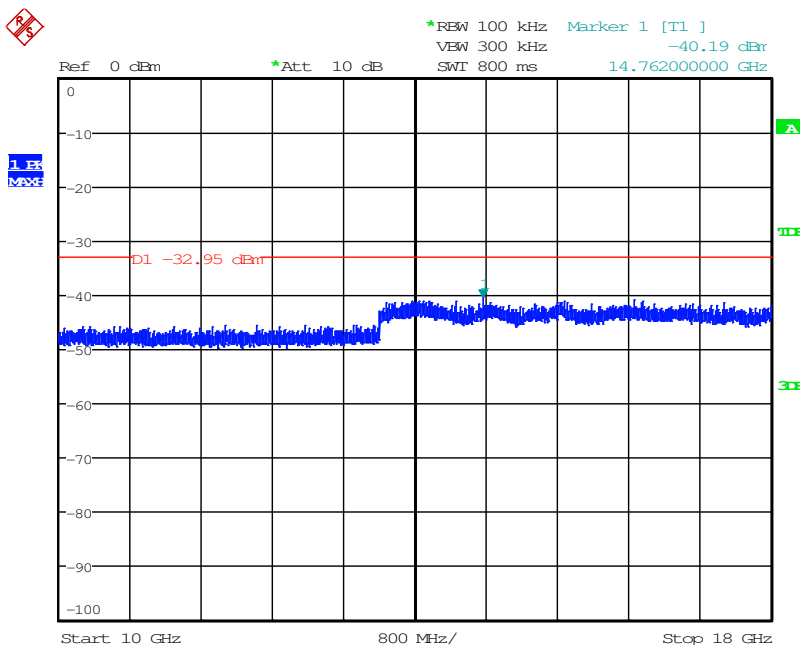
Date: 4.JAN.2016 18:50:01

Figure 7.4.2.2-45: 30 MHz – 1 GHz – High Channel



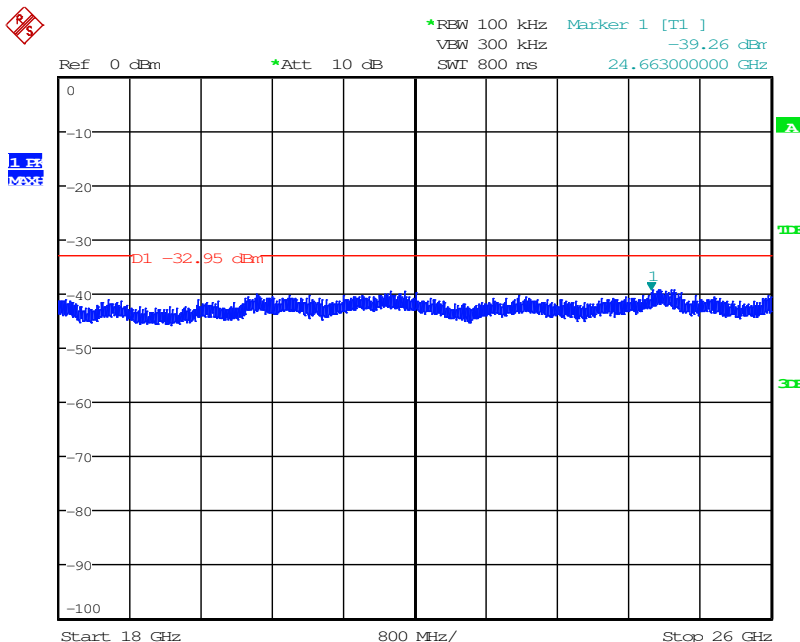
Date: 4.JAN.2016 19:05:46

Figure 7.4.2.2-46: 1 GHz –10 GHz –High Channel



Date: 4.JAN.2016 19:09:34

Figure 7.4.2.2-47: 10 GHz – 18 GHz –High Channel



Date: 4.JAN.2016 19:13:29

Figure 7.4.2.2-48: 18 GHz – 26 GHz –High Channel

**7.4.3 Radiated Spurious Emissions into Restricted Frequency Bands - FCC 15.205, 15.209; IC: RSS-210 2.2, RSS-Gen 8.9, 8.10**

**7.4.3.1 Measurement Procedure**

Radiated emissions tests were made over the frequency range of 9 kHz to 26 GHz, 10 times the highest fundamental frequency. Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in section 15.209.

For measurements below 30 MHz, the receive antenna height was set to 1m and the EUT was rotated through 360 degrees. The resolution bandwidth was set to 200 Hz below 150 kHz and to 9 kHz above 150 kHz.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak measurements are made with RBW of 1 MHz and VBW of 3 MHz. Average measurements are performed in the linear scale using VBW of 30 Hz over a 5 second sweep.

**7.4.3.2 Measurement Results**

Radiated band-edge and spurious emissions found in the restricted frequency bands of 9 kHz to 26 GHz are reported in the tables below.

**802.11b**

**Table 7.4.3.2-1: Radiated Spurious Emissions Tabulated Data**

| Frequency (MHz)                | Level (dBuV) |         | Antenna Polarity (H/V) | Correction Factors (dB) | Corrected Level (dBuV/m) |         | Limit (dBuV/m) |         | Margin (dB) |         |
|--------------------------------|--------------|---------|------------------------|-------------------------|--------------------------|---------|----------------|---------|-------------|---------|
|                                | pk           | Qpk/Avg |                        |                         | pk                       | Qpk/Avg | pk             | Qpk/Avg | pk          | Qpk/Avg |
| <b>Low Channel 2412 MHz</b>    |              |         |                        |                         |                          |         |                |         |             |         |
| 4824                           | 44.23        | 40.53   | H                      | 8.60                    | 52.83                    | 49.13   | 74.0           | 54.0    | 21.2        | 4.9     |
| 4824                           | 40.86        | 34.35   | V                      | 8.60                    | 49.46                    | 42.95   | 74.0           | 54.0    | 24.5        | 11.0    |
| <b>Middle Channel 2437 MHz</b> |              |         |                        |                         |                          |         |                |         |             |         |
| 4874                           | 45.51        | 41.66   | H                      | 8.78                    | 54.29                    | 50.44   | 74.0           | 54.0    | 19.7        | 3.6     |
| 4874                           | 43.03        | 36.91   | V                      | 8.78                    | 51.81                    | 45.69   | 74.0           | 54.0    | 22.2        | 8.3     |
| <b>High Channel 2462 MHz</b>   |              |         |                        |                         |                          |         |                |         |             |         |
| 2483.5                         | 52.50        | 40.34   | H                      | 0.79                    | 53.29                    | 41.13   | 74.0           | 54.0    | 20.7        | 12.9    |
| 2483.5                         | 50.64        | 37.97   | V                      | 0.79                    | 51.43                    | 38.76   | 74.0           | 54.0    | 22.6        | 15.2    |
| 4924                           | 44.43        | 39.62   | H                      | 8.96                    | 53.39                    | 48.58   | 74.0           | 54.0    | 20.6        | 5.4     |
| 4924                           | 41.19        | 34.12   | V                      | 8.96                    | 50.15                    | 43.08   | 74.0           | 54.0    | 23.8        | 10.9    |

**Note: The emissions above 4.93 GHz were attenuated below the limits and the noise floor of the measurement equipment.**

802.11g

**Table 7.4.3.2-2: Radiated Spurious Emissions Tabulated Data**

| Frequency (MHz)                | Level (dBuV) |         | Antenna Polarity (H/V) | Correction Factors (dB) | Corrected Level (dBuV/m) |         | Limit (dBuV/m) |         | Margin (dB) |         |
|--------------------------------|--------------|---------|------------------------|-------------------------|--------------------------|---------|----------------|---------|-------------|---------|
|                                | pk           | Qpk/Avg |                        |                         | pk                       | Qpk/Avg | pk             | Qpk/Avg | pk          | Qpk/Avg |
| <b>Low Channel 2412 MHz</b>    |              |         |                        |                         |                          |         |                |         |             |         |
| 2390                           | 63.69        | 43.43   | H                      | 0.31                    | 64.00                    | 43.74   | 74.0           | 54.0    | 10.0        | 10.3    |
| 2390                           | 59.74        | 42.19   | V                      | 0.31                    | 60.05                    | 42.50   | 74.0           | 54.0    | 14.0        | 11.5    |
| 4824                           | 41.71        | 28.65   | H                      | 8.60                    | 50.31                    | 37.25   | 74.0           | 54.0    | 23.7        | 16.7    |
| 4824                           | 39.80        | 26.50   | V                      | 8.60                    | 48.40                    | 35.10   | 74.0           | 54.0    | 25.6        | 18.9    |
| <b>Middle Channel 2437 MHz</b> |              |         |                        |                         |                          |         |                |         |             |         |
| 4874                           | 44.85        | 32.15   | H                      | 8.78                    | 53.63                    | 40.93   | 74.0           | 54.0    | 20.4        | 13.1    |
| 4874                           | 42.80        | 29.73   | V                      | 8.78                    | 51.58                    | 38.51   | 74.0           | 54.0    | 22.4        | 15.5    |
| <b>High Channel 2462 MHz</b>   |              |         |                        |                         |                          |         |                |         |             |         |
| 2483.5                         | 64.62        | 46.23   | H                      | 0.79                    | 65.41                    | 47.02   | 74.0           | 54.0    | 8.6         | 7.0     |
| 2483.5                         | 58.63        | 41.13   | V                      | 0.79                    | 59.42                    | 41.92   | 74.0           | 54.0    | 14.6        | 12.1    |
| 4924                           | 41.43        | 27.85   | H                      | 8.96                    | 50.39                    | 36.81   | 74.0           | 54.0    | 23.6        | 17.2    |
| 4924                           | 38.25        | 25.74   | V                      | 8.96                    | 47.21                    | 34.70   | 74.0           | 54.0    | 26.8        | 19.3    |

**Note:** The emissions above 4.93 GHz were attenuated below the limits and the noise floor of the measurement equipment.

802.11n 20 MHz

**Table 7.4.3.2-3: Radiated Spurious Emissions Tabulated Data**

| Frequency (MHz)                | Level (dBuV) |         | Antenna Polarity (H/V) | Correction Factors (dB) | Corrected Level (dBuV/m) |         | Limit (dBuV/m) |         | Margin (dB) |         |
|--------------------------------|--------------|---------|------------------------|-------------------------|--------------------------|---------|----------------|---------|-------------|---------|
|                                | pk           | Qpk/Avg |                        |                         | pk                       | Qpk/Avg | pk             | Qpk/Avg | pk          | Qpk/Avg |
| <b>Low Channel 2412 MHz</b>    |              |         |                        |                         |                          |         |                |         |             |         |
| 2390                           | 56.42        | 41.98   | H                      | 0.31                    | 56.73                    | 42.29   | 74.0           | 54.0    | 17.3        | 11.7    |
| 2390                           | 55.72        | 41.61   | V                      | 0.31                    | 56.03                    | 41.92   | 74.0           | 54.0    | 18.0        | 12.1    |
| 4824                           | 40.07        | 27.27   | H                      | 8.60                    | 48.67                    | 35.87   | 74.0           | 54.0    | 25.3        | 18.1    |
| <b>Middle Channel 2437 MHz</b> |              |         |                        |                         |                          |         |                |         |             |         |
| 4874                           | 42.69        | 30.97   | H                      | 8.78                    | 51.47                    | 39.75   | 74.0           | 54.0    | 22.5        | 14.2    |
| 4874                           | 39.46        | 27.62   | V                      | 8.78                    | 48.24                    | 36.40   | 74.0           | 54.0    | 25.8        | 17.6    |
| <b>High Channel 2462 MHz</b>   |              |         |                        |                         |                          |         |                |         |             |         |
| 2483.5                         | 60.90        | 44.94   | H                      | 0.79                    | 61.69                    | 45.73   | 74.0           | 54.0    | 12.3        | 8.3     |
| 2483.5                         | 53.70        | 40.18   | V                      | 0.79                    | 54.49                    | 40.97   | 74.0           | 54.0    | 19.5        | 13.0    |
| 4924                           | 38.82        | 26.58   | H                      | 8.96                    | 47.78                    | 35.54   | 74.0           | 54.0    | 26.2        | 18.5    |

**Note:** The emissions above 4.93 GHz were attenuated below the limits and the noise floor of the measurement equipment.

802.11n 40 MHz

**Table 7.4.3.2-4: Radiated Spurious Emissions Tabulated Data**

| Frequency (MHz)                | Level (dBuV) |         | Antenna Polarity (H/V) | Correction Factors (dB) | Corrected Level (dBuV/m) |         | Limit (dBuV/m) |         | Margin (dB) |         |
|--------------------------------|--------------|---------|------------------------|-------------------------|--------------------------|---------|----------------|---------|-------------|---------|
|                                | pk           | Qpk/Avg |                        |                         | pk                       | Qpk/Avg | pk             | Qpk/Avg | pk          | Qpk/Avg |
| <b>Low Channel 2422 MHz</b>    |              |         |                        |                         |                          |         |                |         |             |         |
| 2390                           | 60.30        | 45.89   | H                      | 0.31                    | 60.61                    | 46.20   | 74.0           | 54.0    | 13.4        | 7.8     |
| 2390                           | 59.46        | 44.50   | V                      | 0.31                    | 59.77                    | 44.81   | 74.0           | 54.0    | 14.2        | 9.2     |
| 4844                           | 39.67        | 26.56   | H                      | 8.67                    | 48.34                    | 35.23   | 74.0           | 54.0    | 25.7        | 18.8    |
| <b>Middle Channel 2437 MHz</b> |              |         |                        |                         |                          |         |                |         |             |         |
| 4874                           | 41.86        | 29.07   | H                      | 8.78                    | 50.64                    | 37.85   | 74.0           | 54.0    | 23.4        | 16.1    |
| 4874                           | 39.82        | 26.85   | V                      | 8.78                    | 48.60                    | 35.63   | 74.0           | 54.0    | 25.4        | 18.4    |
| <b>High Channel 2452 MHz</b>   |              |         |                        |                         |                          |         |                |         |             |         |
| 2483.5                         | 63.39        | 48.96   | H                      | 0.79                    | 64.18                    | 49.75   | 74.0           | 54.0    | 9.8         | 4.3     |
| 2483.5                         | 55.23        | 38.69   | V                      | 0.79                    | 56.02                    | 39.48   | 74.0           | 54.0    | 18.0        | 14.5    |
| 4904                           | 39.30        | 25.89   | H                      | 8.89                    | 48.19                    | 34.78   | 74.0           | 54.0    | 25.8        | 19.2    |

**Note:** The emissions above 4.91 GHz were attenuated below the limits and the noise floor of the measurement equipment.

**7.4.3.3 Sample Calculation:**

$$R_C = R_U + CF_T$$

Where:

|        |   |   |
|--------|---|---|
| $CF_T$ | = | Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only) |
| $R_U$  | = | Uncorrected Reading   |
| $R_C$  | = | Corrected Level   |
| AF     | = | Antenna Factor  |
| CA     | = | Cable Attenuation   |
| AG     | = | Amplifier Gain  |
| DC     | = | Duty Cycle Correction Factor                                      |

**Example Calculation: Peak**Corrected Level:  $44.23 + 8.6 = 52.83 \text{ dB}\mu\text{V/m}$ Margin:  $74 \text{ dB}\mu\text{V/m} - 52.83 \text{ dB}\mu\text{V/m} = 21.2 \text{ dB}$ **Example Calculation: Average**Corrected Level:  $40.53 + 8.6 = 49.13 \text{ dB}\mu\text{V/m}$ Margin:  $54 \text{ dB}\mu\text{V/m} - 49.13 \text{ dB}\mu\text{V/m} = 4.9 \text{ dB}$

7.5 Power Spectral Density - FCC Section 15.247(e) IC: RSS-210 A8.2(b)

7.5.1 PSD Measurement Procedure (Conducted Method)

The power spectral density was measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)" Section 10.2 Method PKPSD (peak PSD). The RF output port of the EUT was directly connected to the input of the spectrum analyzer. Offset values were input for cable and external attenuation. The spectrum analyzer RBW was set to 100 kHz and VBW 300 kHz. Span was adjusted to 1.5 times the 6 dB bandwidth and the sweep time was set to auto.

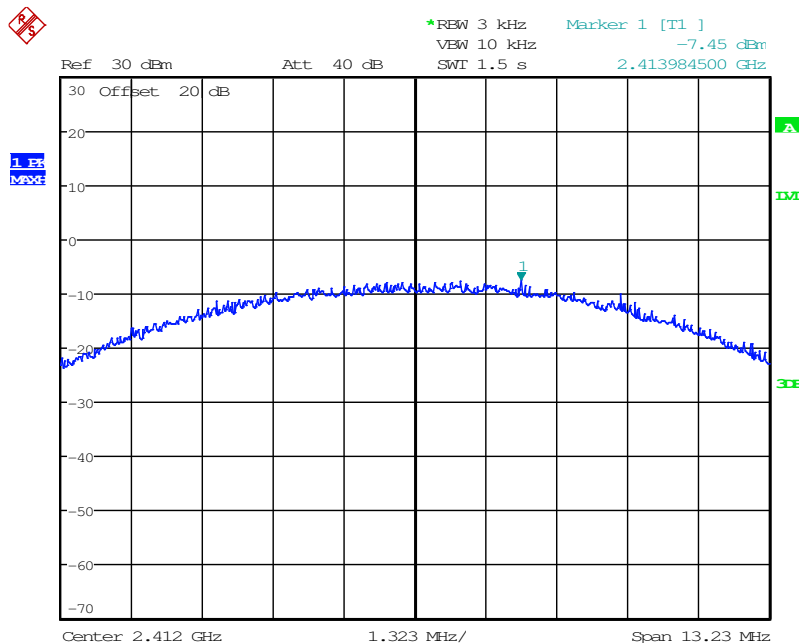
7.5.2 Measurement Results

Results are shown below.

802.11b

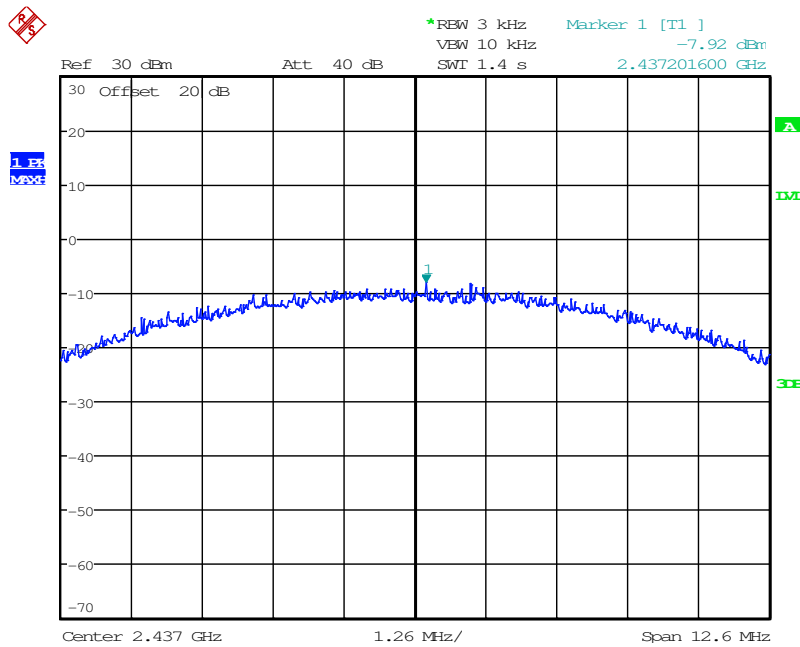
Table 7.5.2-1: Power Spectral Density

| Frequency (MHz) | PSD (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-----------|-------------|-------------|
| 2412            | -7.45     | 8           | 15.45       |
| 2437            | -7.92     | 8           | 15.92       |
| 2462            | -7.22     | 8           | 15.22       |



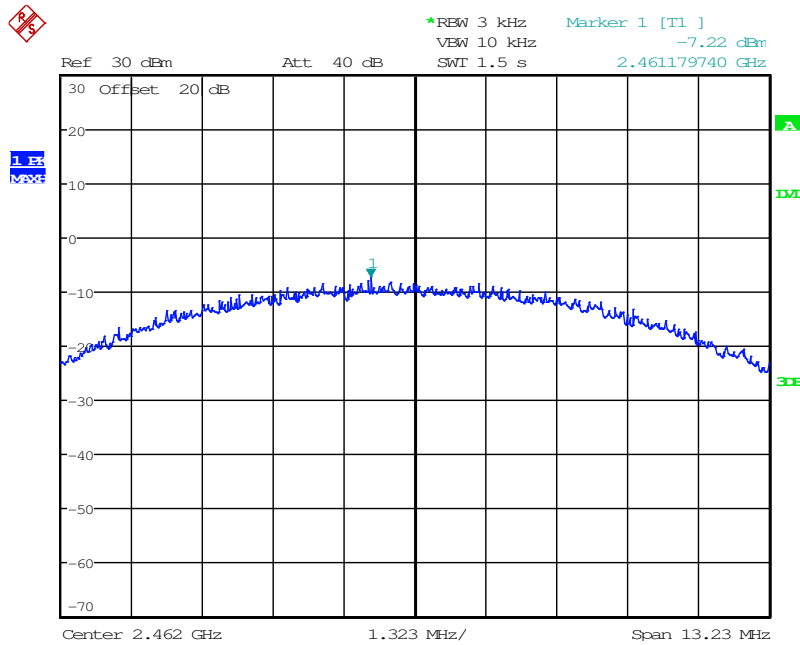
Date: 1.JAN.2016 17:28:12

Figure 7.5.2-1: Power Spectral Density - Low Channel



Date: 1.JAN.2016 16:01:58

Figure 7.5.2-2: Power Spectral Density - Middle Channel



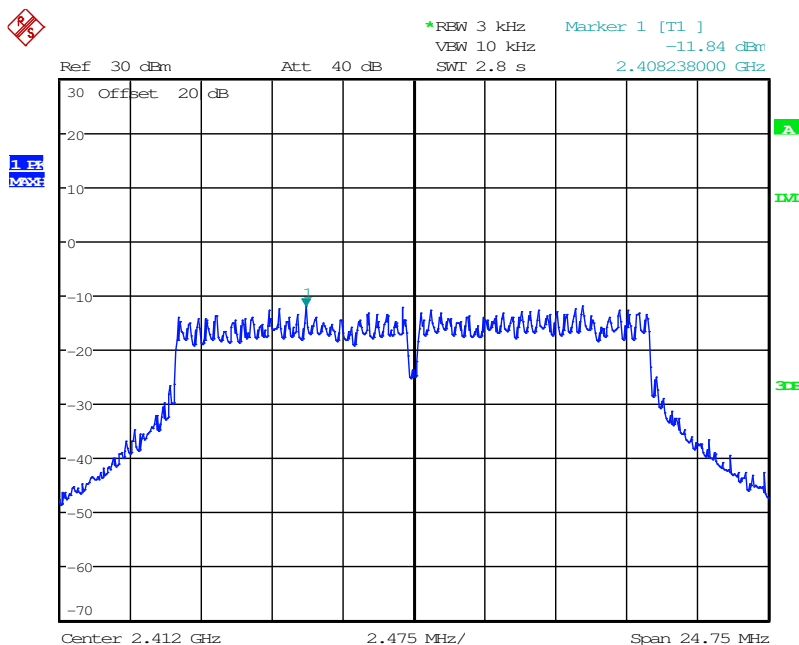
Date: 1.JAN.2016 17:23:20

Figure 7.5.2-3: Power Spectral Density – High Channel

802.11g

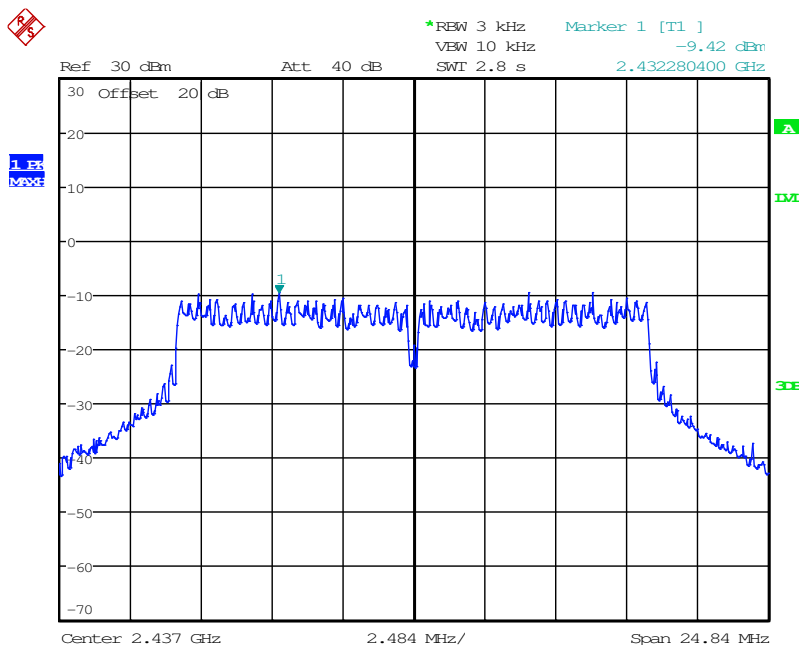
Table 7.5.2-2: Power Spectral Density

| Frequency (MHz) | PSD (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-----------|-------------|-------------|
| 2412            | -11.84    | 8           | 19.84       |
| 2437            | -9.42     | 8           | 17.42       |
| 2462            | -11.02    | 8           | 19.02       |



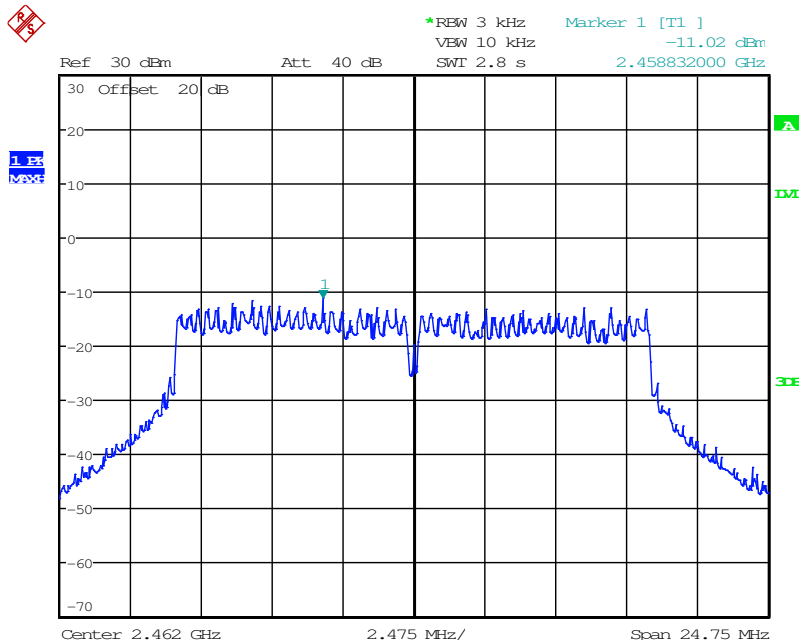
Date: 1.JAN.2016 17:33:04

Figure 7.5.2-4: Power Spectral Density - Low Channel



Date: 1.JAN.2016 17:56:05

Figure 7.5.2-5: Power Spectral Density - Middle Channel



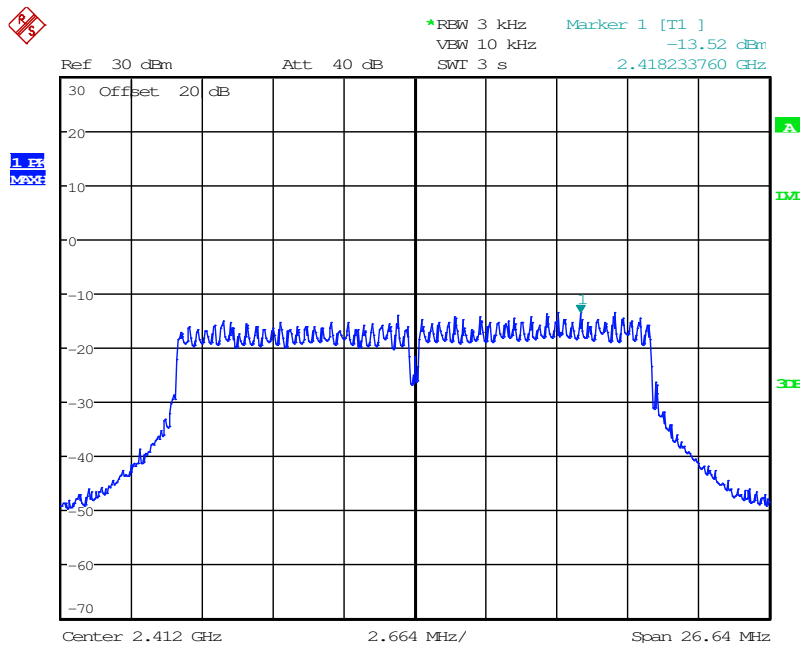
Date: 1.JAN.2016 17:17:37

Figure 7.5.2-6: Power Spectral Density – High Channel

802.11n 20MHz

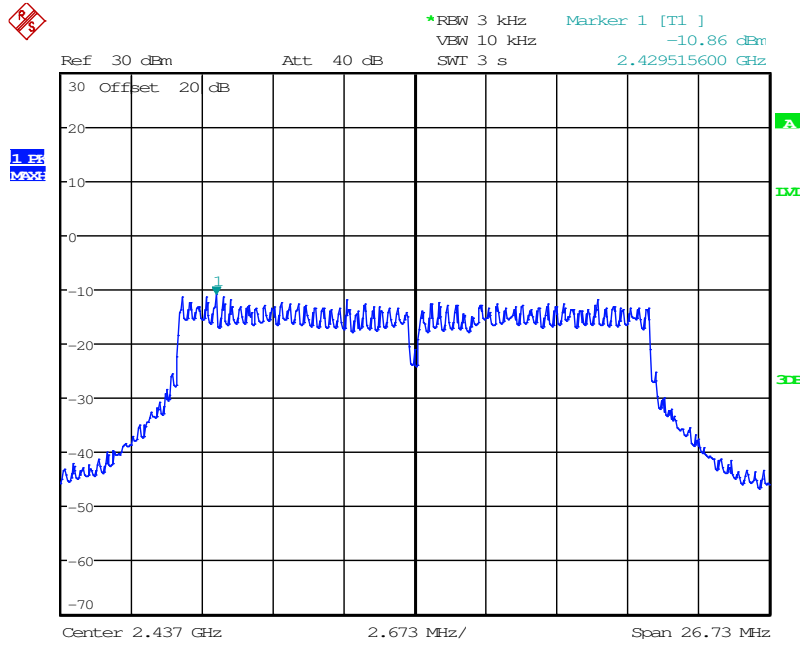
Table 7.5.2-3: Power Spectral Density

| Frequency (MHz) | PSD (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-----------|-------------|-------------|
| 2412            | -13.52    | 8           | 21.52       |
| 2437            | -10.86    | 8           | 18.86       |
| 2462            | -14.33    | 8           | 22.33       |



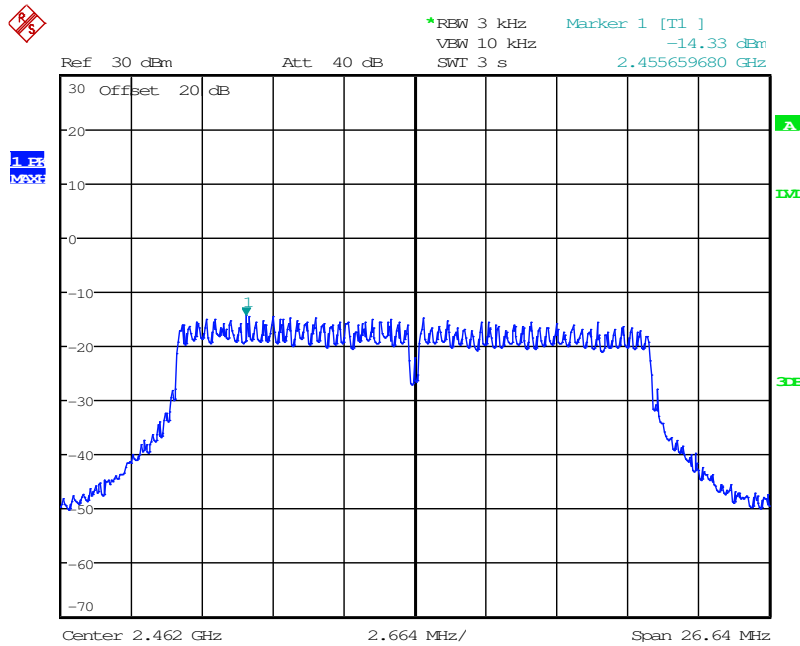
Date: 1.JAN.2016 17:37:55

Figure 7.5.2-7: Power Spectral Density - Low Channel



Date: 1.JAN.2016 17:46:03

Figure 7.5.2-8: Power Spectral Density - Middle Channel



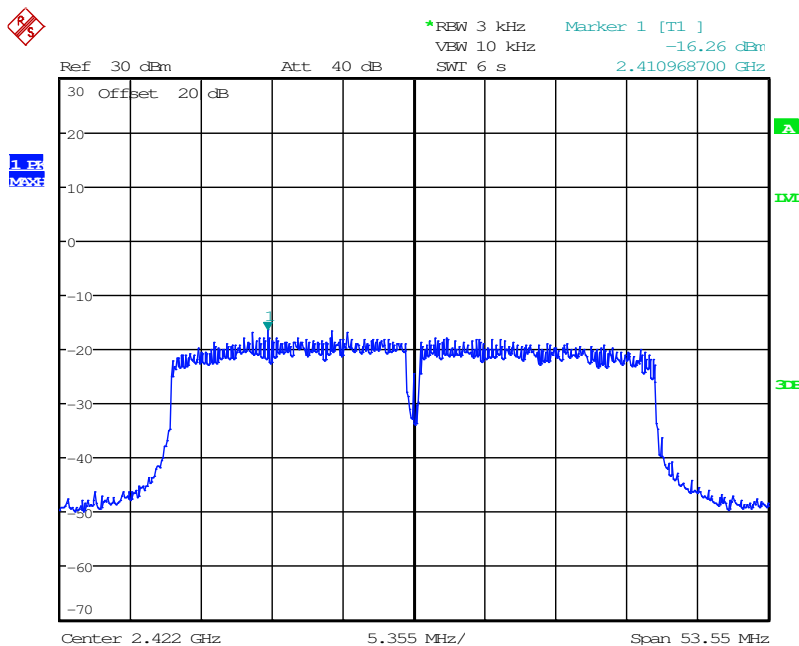
Date: 1.JAN.2016 17:16:04

Figure 7.5.2-9: Power Spectral Density – High Channel

802.11n 40MHz

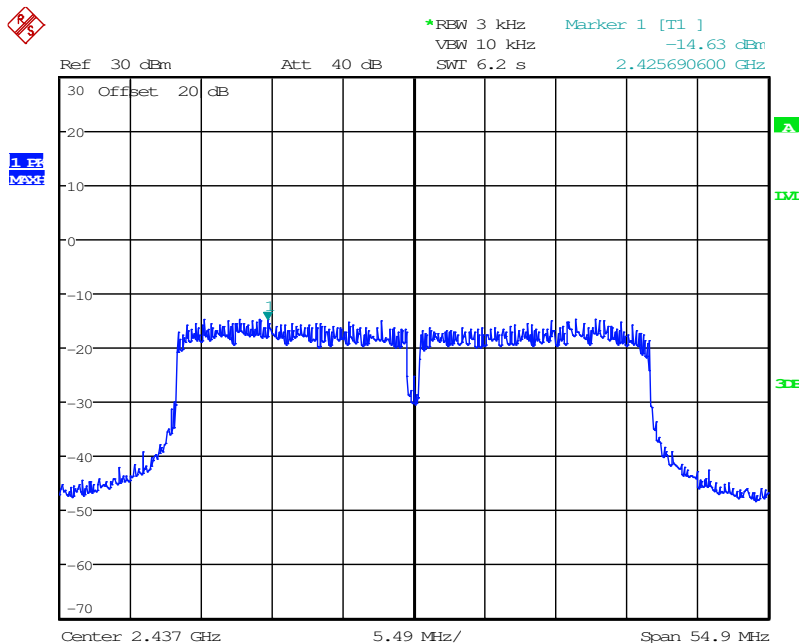
Table 7.5.2-4: Power Spectral Density

| Frequency (MHz) | PSD (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-----------|-------------|-------------|
| 2422            | -16.26    | 8           | 24.26       |
| 2437            | -14.63    | 8           | 22.63       |
| 2452            | -17.13    | 8           | 25.13       |



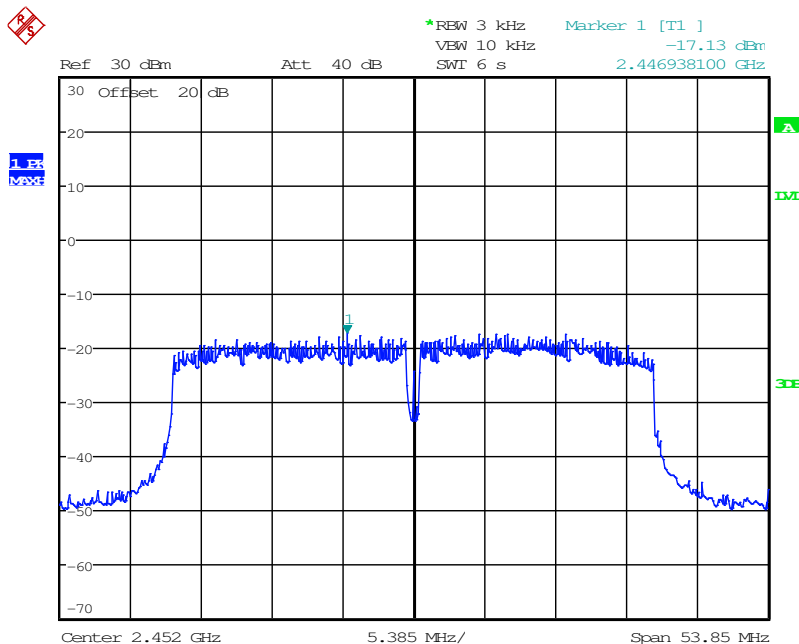
Date: 1.JAN.2016 18:02:20

Figure 7.5.2-10: Power Spectral Density - Low Channel



Date: 1.JAN.2016 18:11:39

Figure 7.5.2-11: Power Spectral Density - Middle Channel



Date: 1.JAN.2016 18:09:03

Figure 7.5.2-12: Power Spectral Density – High Channel

### 7.6 Power Line Conducted Emissions – FCC: Section 15.207 IC: RSS-Gen 8.8

#### 7.6.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150 kHz to 30 MHz with the spectrum analyzer’s resolution bandwidth set to 9 kHz and the video bandwidth set to 30 kHz. The calculation for the conducted emissions is as follows:

$$\text{Corrected Reading} = \text{Analyzer Reading} + \text{LISN Loss} + \text{Cable Loss}$$
$$\text{Margin} = \text{Applicable Limit} - \text{Corrected Reading}$$

#### 7.6.2 Measurement Results

Results are shown below.

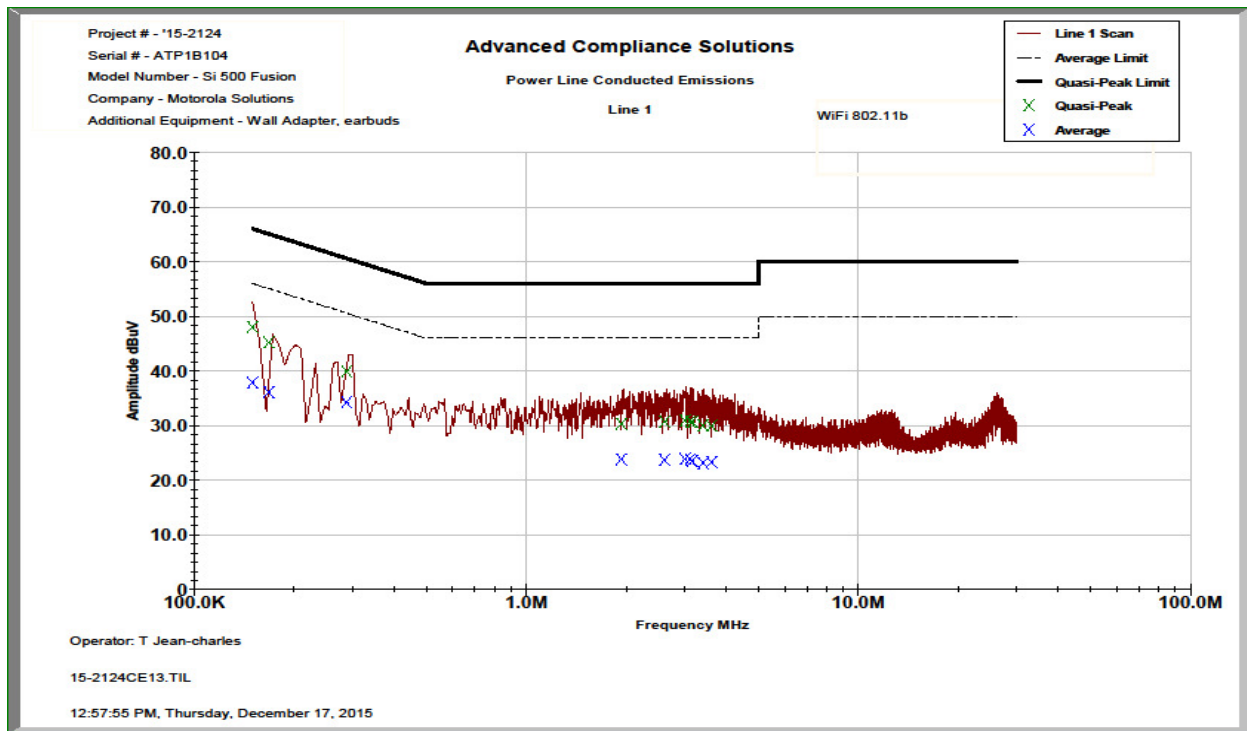


Figure 7.6.2-1: Conducted Emissions Results – Line 1

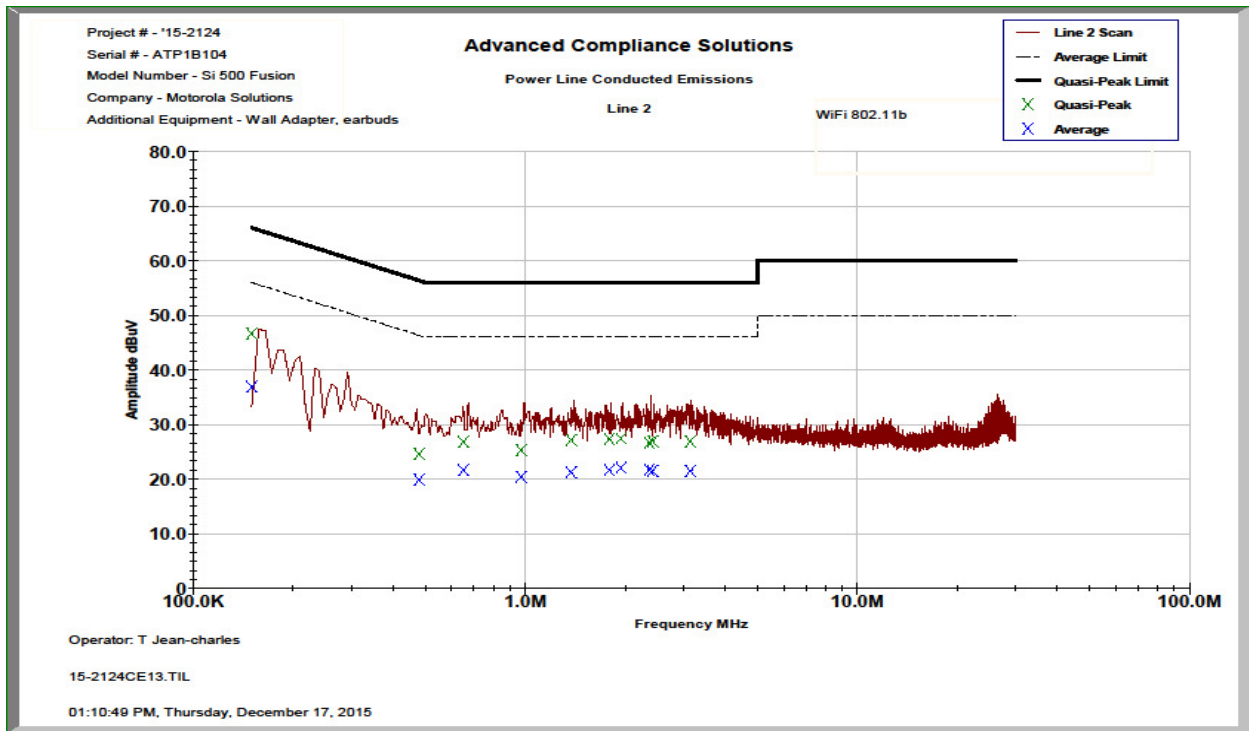


Figure 7.6.2-2: Conducted Emissions Results – Line 2

Table 7.6.2-1: Conducted EMI Results

Line 1    Line 2    Line 3  
 Line 4  
 To Ground    Floating  
 Telecom Port \_\_\_\_\_  
 dBµV    dBµA  
  
 Plot Number: 15-2124CE13  
 Power Supply Description: 5 VDC

| Frequency (MHz) | Uncorrected Reading |         | Total Correction Factor (dB) | Corrected Level |         | Limit      |         | Margin (dB) |         |
|-----------------|---------------------|---------|------------------------------|-----------------|---------|------------|---------|-------------|---------|
|                 | Quasi-Peak          | Average |                              | Quasi-Peak      | Average | Quasi-Peak | Average | Quasi-Peak  | Average |
| <b>Line 1</b>   |                     |         |                              |                 |         |            |         |             |         |
| 0.150183        | 37.827              | 27.645  | 10.22                        | 48.05           | 37.87   | 65.99      | 55.99   | 17.9        | 18.1    |
| 0.168087        | 35.031              | 25.913  | 10.22                        | 45.25           | 36.14   | 65.05      | 55.05   | 19.8        | 18.9    |
| 0.288337        | 29.717              | 24.054  | 10.20                        | 39.92           | 34.25   | 60.57      | 50.57   | 20.7        | 16.3    |
| 1.93592         | 20.067              | 13.604  | 10.20                        | 30.27           | 23.81   | 56.00      | 46.00   | 25.7        | 22.2    |
| 2.61501         | 20.421              | 13.411  | 10.28                        | 30.70           | 23.69   | 56.00      | 46.00   | 25.3        | 22.3    |
| 3.01052         | 20.614              | 13.552  | 10.35                        | 30.97           | 23.90   | 56.00      | 46.00   | 25.0        | 22.1    |
| 3.115           | 20.407              | 13.515  | 10.35                        | 30.76           | 23.87   | 56.00      | 46.00   | 25.2        | 22.1    |
| 3.16724         | 20.319              | 13.18   | 10.35                        | 30.67           | 23.53   | 56.00      | 46.00   | 25.3        | 22.5    |
| 3.4135          | 19.671              | 12.795  | 10.35                        | 30.02           | 23.15   | 56.00      | 46.00   | 26.0        | 22.9    |
| 3.62245         | 19.577              | 12.974  | 10.35                        | 29.93           | 23.33   | 56.00      | 46.00   | 26.1        | 22.7    |
| <b>Line 2</b>   |                     |         |                              |                 |         |            |         |             |         |
| 0.150347        | 36.419              | 26.68   | 10.23                        | 46.65           | 36.91   | 65.98      | 55.98   | 19.3        | 19.1    |
| 0.479999        | 14.443              | 9.715   | 10.21                        | 24.65           | 19.93   | 56.34      | 46.34   | 31.7        | 26.4    |
| 0.652375        | 16.637              | 11.42   | 10.21                        | 26.85           | 21.63   | 56.00      | 46.00   | 29.2        | 24.4    |
| 0.973263        | 15.107              | 10.218  | 10.21                        | 25.32           | 20.43   | 56.00      | 46.00   | 30.7        | 25.6    |
| 1.37624         | 16.94               | 10.98   | 10.25                        | 27.19           | 21.23   | 56.00      | 46.00   | 28.8        | 24.8    |
| 1.79414         | 17.029              | 11.383  | 10.25                        | 27.28           | 21.63   | 56.00      | 46.00   | 28.7        | 24.4    |
| 1.94339         | 17.133              | 11.764  | 10.25                        | 27.38           | 22.01   | 56.00      | 46.00   | 28.6        | 24.0    |
| 2.36875         | 16.35               | 11.374  | 10.32                        | 26.67           | 21.69   | 56.00      | 46.00   | 29.3        | 24.3    |
| 2.42099         | 16.626              | 11.219  | 10.32                        | 26.94           | 21.54   | 56.00      | 46.00   | 29.1        | 24.5    |
| 3.14485         | 16.538              | 11.14   | 10.39                        | 26.93           | 21.53   | 56.00      | 46.00   | 29.1        | 24.5    |

## **8 CONCLUSION**

In the opinion of ACS, Inc., the model HK2062A manufactured by Motorola Solutions, Inc. meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-247 for the test procedures documented in the test report.

**END REPORT**