



# FCC TEST REPORT

**Application No:** ZR/2020/60017  
**Applicant:** LG Electronics USA, Inc.  
**Address of Applicant:** 111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632  
**Manufacturer:** Huaqin Telecom Technology Co.,Ltd.  
**Address of Manufacturer:** No.1 Building, No.9 Building, No.399,Keyuan Road,Zhangjiang Hi-tech Park,Shanghai,P.R.China  
**EUT Description:** Mobile handset  
**Model No.:** LM-K420EMW  
**Trade Mark:** LG  
**FCC ID:** ZNFK420EMW  
**Standards:** 47 CFR FCC Part 2, Subpart J  
47 CFR Part 15, Subpart C  
**Test Method:** KDB558074 D01 15.247 Meas Guidance v05r02  
ANSI C63.10 (2013)  
**Date of Receipt:** 2020/6/22  
**Date of Test:** 2020/7/22 to 2020/7/29  
**Date of Issue:** 2020/7/29

|                     |               |
|---------------------|---------------|
| <b>Test Result:</b> | <b>PASS *</b> |
|---------------------|---------------|

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang

Wireless Laboratory Manager

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## Version

| Revision Record |         |           |          |          |
|-----------------|---------|-----------|----------|----------|
| Version         | Chapter | Date      | Modifier | Remark   |
| 01              |         | 2020/7/29 |          | Original |
|                 |         |           |          |          |
|                 |         |           |          |          |

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## Test Summary

| Test Item                                                               | Test Requirement            | Test method      | Test Result | Result |
|-------------------------------------------------------------------------|-----------------------------|------------------|-------------|--------|
| AC Power Line<br>Conducted Emission                                     | 15.207                      | ANSI C63.10 2013 | Clause 4.2  | PASS   |
| Duty Cycle                                                              | --                          | --               | Clause 4.3  | PASS   |
| Conducted Output Power                                                  | 15.247 (b)(3)               | ANSI C63.10 2013 | Clause 4.4  | PASS   |
| DTS (6 dB) Bandwidth & 99%<br>Occupied Bandwidth                        | 15.247 (a)(2)               | ANSI C63.10 2013 | Clause 4.5  | PASS   |
| Power Spectral Density                                                  | 15.247 (e)                  | ANSI C63.10 2013 | Clause 4.6  | PASS   |
| Band-edge for RF<br>Conducted Emissions                                 | 15.247(d)                   | ANSI C63.10 2013 | Clause 4.7  | PASS   |
| RF Conducted Spurious<br>Emissions                                      | 15.247(d)                   | ANSI C63.10 2013 | Clause 4.8  | PASS   |
| Radiated Spurious Emissions                                             | 15.247(d);<br>15.205/15.209 | ANSI C63.10 2013 | Clause 4.9  | PASS   |
| Restricted bands around<br>fundamental frequency (Radiated<br>Emission) | 15.247(d);<br>15.205/15.209 | ANSI C63.10 2013 | Clause 4.10 | PASS   |

Checked By

David Chen

David Chen  
Reviewer

Test By

Daniel Wang

Daniel Wang  
Project Engineer

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## 1 General Information

### 1.1 Client Information

|                          |                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------|
| Applicant:               | LG Electronics USA, Inc.                                                                    |
| Address of Applicant:    | 111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632                                |
| Manufacturer:            | Huaqin Telecom Technology Co.,Ltd.                                                          |
| Address of Manufacturer: | No.1 Building, No.9 Building, No.399,Keyuan Road,Zhangjiang Hi-tech Park,Shanghai,P.R.China |

### 1.2 Test Location

|            |                                                                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Company:   | SGS-CSTC Standards Technical Services Co., Ltd. Xi'an Branch                                                                                          |
| Address:   | Single floor D, building 1, Kanghong orange square science and technology park, No.137 keyuan 3rd road, fengdong new town, Xi 'an city, Shaanxi China |
| Post code: | 710000                                                                                                                                                |
| Telephone: | +86 (0) 29 6282 7885                                                                                                                                  |
| Fax:       | +86 (0) 29 6282 7885                                                                                                                                  |
| E-mail:    | ee.xian@sgs.com                                                                                                                                       |

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### 1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### A2LA (Certificate No. 4854.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES CO., LTD. XI'AN BRANCH is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

|                |                    |           |                     |
|----------------|--------------------|-----------|---------------------|
| Test Site No.: | SGS Xi'an Site No. |           | FCC Designation No. |
|                | CO01-XA            | 03CH01-XA | CN1271              |

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## 1.4 General Description of EUT

|                                 |                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Description::               | Mobile handset                                                                                                                                                                                                                                                                              |
| Model No.:                      | LM-K420EMW                                                                                                                                                                                                                                                                                  |
| Trade Mark:                     | LG                                                                                                                                                                                                                                                                                          |
| IEEE 802.11 WLAN Mode Supported | <input checked="" type="checkbox"/> 802.11B (20 MHz channel bandwidth),<br><input checked="" type="checkbox"/> 802.11G (20 MHz channel bandwidth)<br><input checked="" type="checkbox"/> 802.11N (20 MHz channel bandwidth),<br><input type="checkbox"/> 802.11N (40 MHz channel bandwidth) |
| Operation Frequency:            | 2400 MHz -2483.5MHz<br>$f_c = 2407 \text{ MHz} + N * 5 \text{ MHz}$ , where:<br>- $f_c$ = "Operating Frequency" in MHz,<br>- $N$ = "Channel Number" with the range from 1 to 11 for the 20 MHz channel bandwidth, or 3 to 9 for the 40 MHz channel bandwidth.                               |
| Type of Modulation:             | IEEE for 802.11B: DSSS<br>IEEE for 802.11G : OFDM<br>IEEE for 802.11N(HT20) : OFDM<br>IEEE for 802.11N(HT40) : OFDM                                                                                                                                                                         |
| Sample Type:                    | <input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module                                                                                                                                                                                                        |
| Antenna Type:                   | <input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated                                                                                                                                                                                                           |
| Antenna Ports                   | <input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3                                                                                                                                                                                   |
| Smart System                    | <input checked="" type="checkbox"/> SISO (for 802.11B/G/N),<br><input type="checkbox"/> MIMO (for 802.11N): 2 Tx & 2 Rx,<br><input type="checkbox"/> Diversity (for 802.11B/G) :       Tx &       Rx                                                                                        |
| Antenna Gain:                   | -3.8dBi                                                                                                                                                                                                                                                                                     |
| Power Supply                    | <input checked="" type="checkbox"/> AC/DC Adapter; <input checked="" type="checkbox"/> Battery <input type="checkbox"/> PoE;; <input type="checkbox"/> Other:                                                                                                                               |

| Operation Frequency of each channel (802.11B/G/N HT20) |           |         |           |         |           |         |           |
|--------------------------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                                                | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1                                                      | 2412MHz   | 4       | 2427MHz   | 7       | 2442MHz   | 10      | 2457MHz   |
| 2                                                      | 2417MHz   | 5       | 2432MHz   | 8       | 2447MHz   | 11      | 2462MHz   |
| 3                                                      | 2422MHz   | 6       | 2437MHz   | 9       | 2452MHz   | 12      | 2467MHz   |
| 13                                                     | 2472MHz   |         |           |         |           |         |           |

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Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the three highest frequency of channels were selected to perform the test, and the selected

channel see below:

| Channel | Frequency for 802.11B/G/N (HT20) |
|---------|----------------------------------|
| CH 1    | 2412MHz                          |
| CH 6    | 2437MHz                          |
| CH 11   | 2462MHz                          |
| CH 12   | 2467MHz                          |
| CH 13   | 2472MHz                          |

## 1.5 Test Environment and Mode

| Operating Environment: |                                                                                          |
|------------------------|------------------------------------------------------------------------------------------|
| Temperature:           | 25.0 °C                                                                                  |
| Humidity:              | 50 % RH                                                                                  |
| Atmospheric Pressure:  | 101.30KPa                                                                                |
| Test mode:             |                                                                                          |
| Transmitting mode:     | Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate. |

## 1.6 Description of Support Units

The EUT has been tested independent unit.

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## 1.7 MCC Country code detection mechanism specification

| Network mode                                                                              | Description                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No country code received                                                                  | The device only operates with the default country code. (12/13 channels enable)                                                                                                                                                                              |
| Invalid country code received                                                             | The device can't get invalid country code.<br>If the network is connected, the country code is set in US. (12/13 channels disable)<br>Otherwise, if the network is not connected, the device operates with the default country code. (12/13 channels enable) |
| US country code                                                                           | If the network is connected, the country code is set in US. (12/13 channels disable)<br>Otherwise, if the network is not connected, the device operates with the default country code. (12/13 channels enable)                                               |
| US territories country code (Guam, Puerto Rico)                                           | If the network is connected, the country code is set according to the network service.<br>Otherwise, if the network is not connected, the device operates with the default country code. (12/13 channels enable)                                             |
| Airplane mode                                                                             | The device only operates with the default country code. (12/13 channels enable)                                                                                                                                                                              |
| On loss of non-US country code (drop the link any verify device returns to default state) | The device only operates with the default country code. (12/13 channels enable)                                                                                                                                                                              |

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Remark:

1.Channel 12 and 13 are enable in default mode for this device. Channel 12 and 13 use lower target power.

2.The device always use country code as geo-location information and it is determined only when the device is attached to 2G/3G/LTE network. Additionally, in case of the invalid country code, Wi-Fi driver will revert to the NV Binary code in which channels 1-13 are enabled. Therefore there will be no problem with those scenarios.

3.The device always use the country code as location information and it periodically checks the information in a few seconds until the device is attached to 2G/3G/LTE network. For the multiple cell network environment with different MCC codes, there will be network roam search with intervals below and the device will get the updated country code when the device is attached to the different network.

For 2G/3G/LTE network: Every 2 seconds

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## 2 Test results and Measurement Data

### 2.1 Antenna Requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 47 CFR Part 15C Section 15.203 /247(c) |
| <p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(b) (4) requirement:</p> <p>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -3.8dBi.</p> |                                        |

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## 2.2 AC Power Line Conducted Emissions

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |           |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| Test Requirement:                                | 47 CFR Part 15C Section 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |           |
| Test Method:                                     | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |           |
| Test Frequency Range:                            | 150kHz to 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |           |
| Limit:                                           | Frequency range (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Limit (dBuV) |           |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quasi-peak   | Average   |
|                                                  | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 66 to 56*    | 56 to 46* |
|                                                  | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 56           | 46        |
|                                                  | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 60           | 50        |
| * Decreases with the logarithm of the frequency. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |           |
| Test Procedure:                                  | <p>1) The mains terminal disturbance voltage test was conducted in a shielded room.</p> <p>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</p> <p>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</p> <p>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</p> <p>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</p> |              |           |

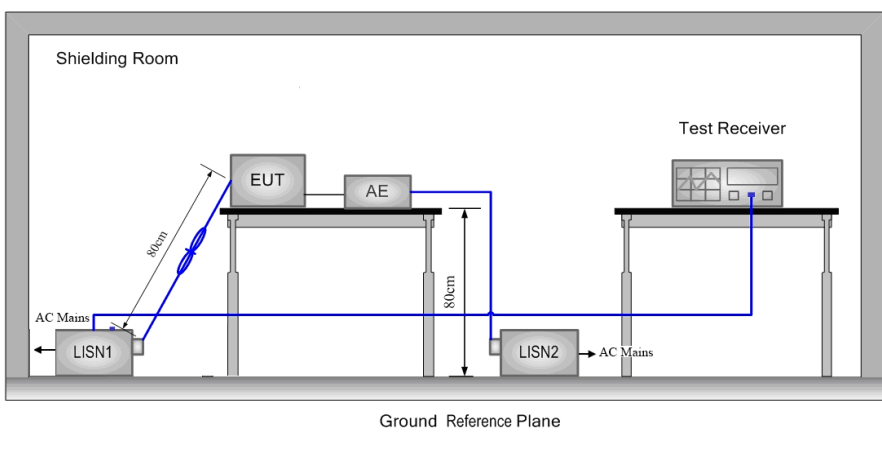
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|                        |                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Setup:            |                                                                                                        |
| Exploratory Test Mode: | <p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.</p> <p>Charge + Transmitting mode.</p>                                                   |
| Final Test Mode:       | <p>Through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case.</p> <p>Charge + Transmitting mode.</p> <p>Only the worst case is recorded in the report.</p> |
| Instruments Used:      | Refer to section 5.10 for details                                                                                                                                                        |
| Test Results:          | Pass                                                                                                                                                                                     |

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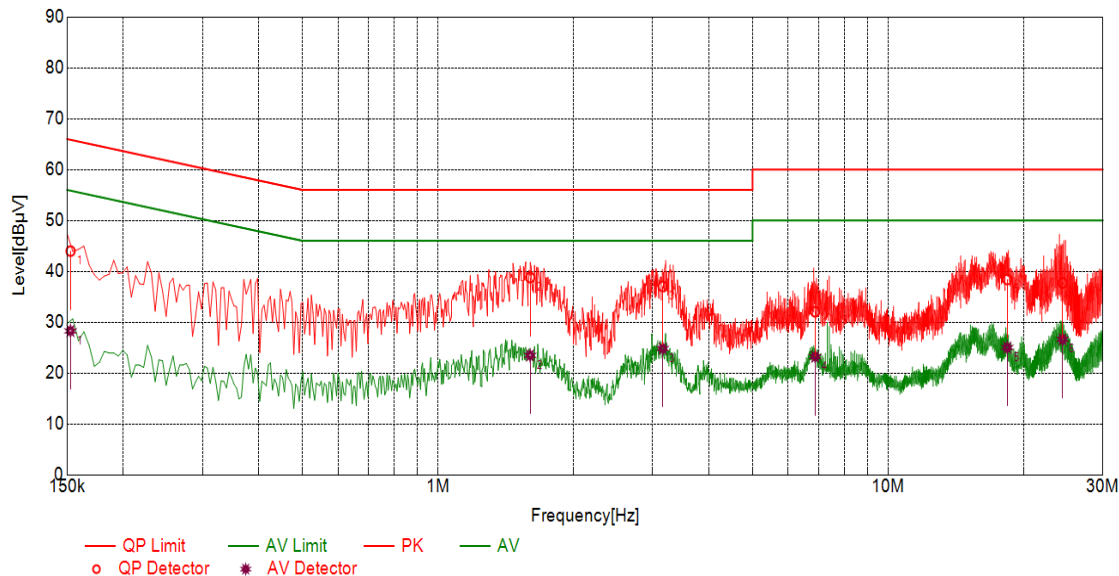


## Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

### Live Line:



## Test Graph

| Final Data List |             |             |                 |                 |                |                 |                 |                |      |
|-----------------|-------------|-------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|------|
| NO.             | Freq. [MHz] | Factor [dB] | QP Value [dBμV] | QP Limit [dBμV] | QP Margin [dB] | AV Value [dBμV] | AV Limit [dBμV] | AV Margin [dB] | Type |
| 1               | 0.1527      | 10.10       | 43.98           | 65.85           | 21.87          | 28.28           | 55.85           | 27.57          | L    |
| 2               | 1.6027      | 10.10       | 38.78           | 56.00           | 17.22          | 23.47           | 46.00           | 22.53          | L    |
| 3               | 3.1575      | 10.10       | 37.03           | 56.00           | 18.97          | 24.82           | 46.00           | 21.18          | L    |
| 4               | 6.8872      | 10.10       | 32.04           | 60.00           | 27.96          | 23.23           | 50.00           | 26.77          | L    |
| 5               | 18.3952     | 10.11       | 38.40           | 60.00           | 21.60          | 25.01           | 50.00           | 24.99          | L    |
| 6               | 24.4146     | 10.11       | 37.72           | 60.00           | 22.28          | 26.62           | 50.00           | 23.38          | L    |

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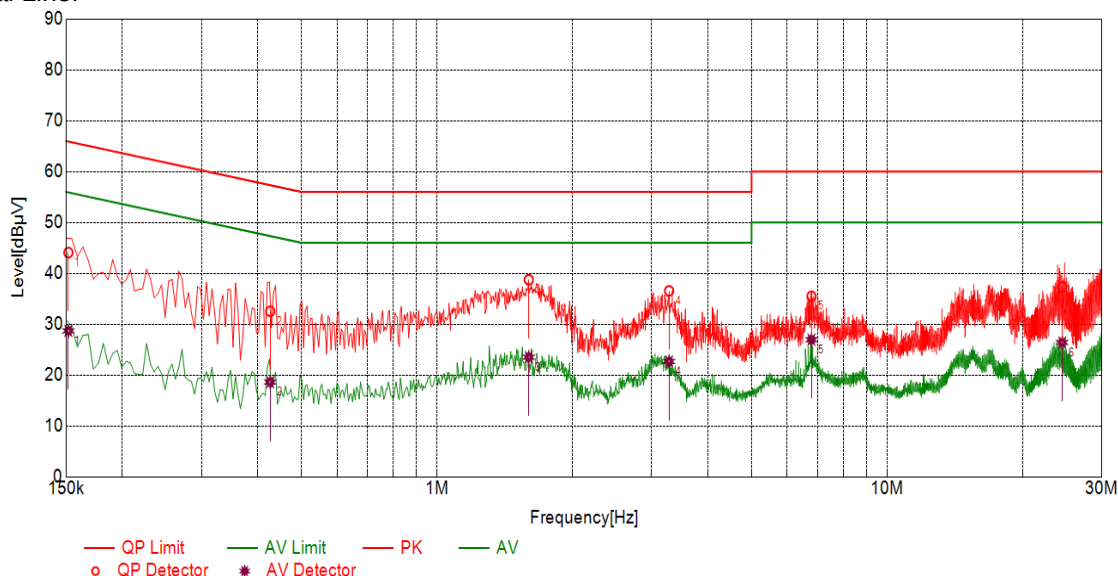
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Neutral Line:



Test Graph

| Final Data List |             |             |                 |                 |                |                 |                 |                |      |
|-----------------|-------------|-------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|------|
| NO.             | Freq. [MHz] | Factor [dB] | QP Value [dBμV] | QP Limit [dBμV] | QP Margin [dB] | AV Value [dBμV] | AV Limit [dBμV] | AV Margin [dB] | Type |
| 1               | 0.1518      | 10.10       | 44.08           | 65.90           | 21.82          | 28.69           | 55.90           | 27.21          | N    |
| 2               | 0.4262      | 10.10       | 32.55           | 57.33           | 24.78          | 18.62           | 47.33           | 28.71          | N    |
| 3               | 1.5996      | 10.10       | 38.74           | 56.00           | 17.26          | 23.52           | 46.00           | 22.48          | N    |
| 4               | 3.2791      | 10.10       | 36.55           | 56.00           | 19.45          | 22.67           | 46.00           | 23.33          | N    |
| 5               | 6.7908      | 10.10       | 35.48           | 60.00           | 24.52          | 26.95           | 50.00           | 23.05          | N    |
| 6               | 24.4988     | 10.11       | 37.29           | 60.00           | 22.71          | 26.41           | 50.00           | 23.59          | N    |

Remarks:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

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## 2.3 Duty Cycle

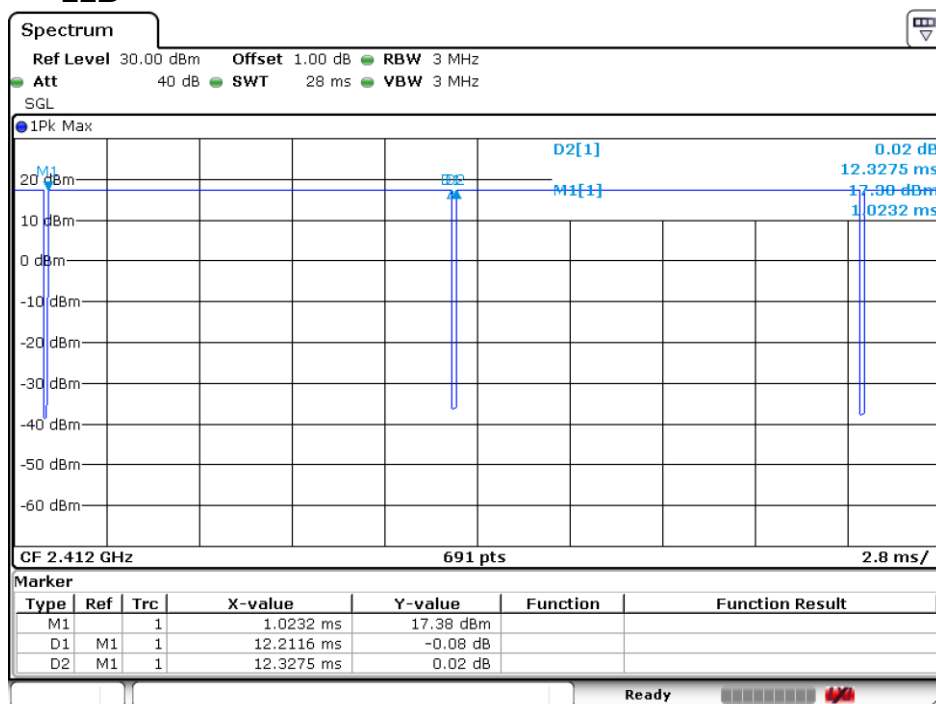
### 2.3.1 Test Results

| Test Mode | TX Freq. [MHz] | Duty cycle [%] |
|-----------|----------------|----------------|
| 11B       | CH1            | 99.06          |
| 11G       | CH1            | 95.94          |
| 11N20     | CH1            | 95.65          |

### 2.3.1 Test Plots

#### 2.3.1.1

#### 11B



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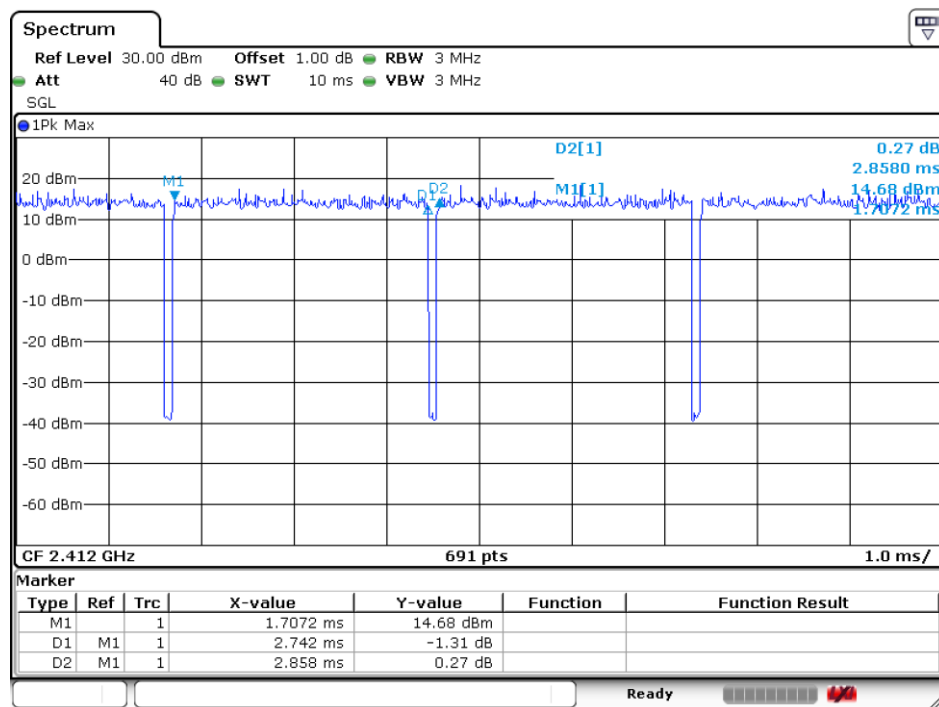
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### 2.3.1.2

### 11G



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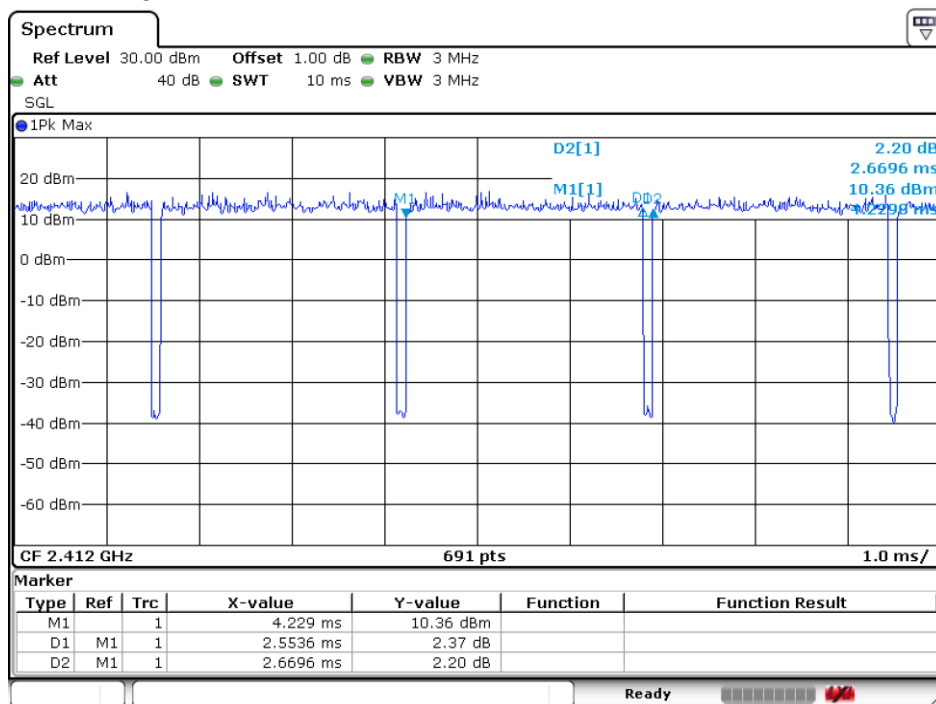
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### 2.3.1.3

### 11N20



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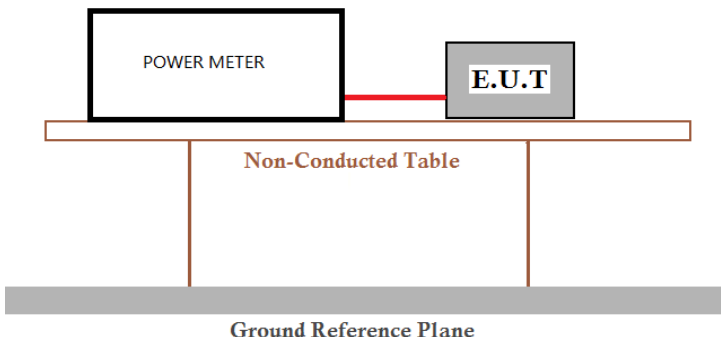
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## 2.4 Conducted Output Power

|                        |                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (b)(3)                                                                                                                                            |
| Test Method:           | ANSI C63.10 :2013 Section 11.9.1.3                                                                                                                                               |
| Test Setup:            |                                                                                                |
| Test Instruments:      | Refer to section 5.10 for details                                                                                                                                                |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                            |
| Final Test Mode:       | Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G ;<br>6.5Mbps of rate is the worst case of 802.11N(HT20); |
| Limit:                 | 30dBm                                                                                                                                                                            |
| Test Results:          | Pass                                                                                                                                                                             |

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## 2.4.1 Test Results

### Measurement Data of Peak Power:

| Mode      | Test Channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|-----------|--------------|-------------------------|-------------|--------|
| 802.11B   | CH1          | 17.20                   | 30.00       | Pass   |
|           | CH6          | 17.14                   | 30.00       | Pass   |
|           | CH11         | 17.22                   | 30.00       | Pass   |
|           | CH12         | 5.59                    | 30.00       | Pass   |
|           | CH13         | 5.33                    | 30.00       | Pass   |
| 802.11G   | CH1          | 15.25                   | 30.00       | Pass   |
|           | CH6          | 16.03                   | 30.00       | Pass   |
|           | CH11         | 15.07                   | 30.00       | Pass   |
|           | CH12         | 5.17                    | 30.00       | Pass   |
|           | CH13         | 5.20                    | 30.00       | Pass   |
| 802.11N20 | CH1          | 14.22                   | 30.00       | Pass   |
|           | CH6          | 15.94                   | 30.00       | Pass   |
|           | CH11         | 13.78                   | 30.00       | Pass   |
|           | CH12         | 5.14                    | 30.00       | Pass   |
|           | CH13         | 4.93                    | 30.00       | Pass   |

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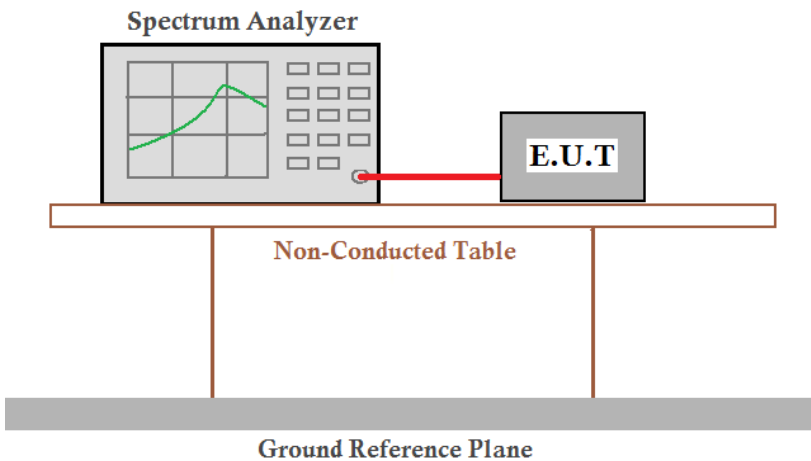
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## 2.5 DTS (6 dB) Bandwidth&99% Occupied Bandwidth

|                        |                                                                                                                                                                                                                                                                                                                                                              |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (a)(2)                                                                                                                                                                                                                                                                                                                        |
| Test Method:           | ANSI C63.10: 2013 Section 11.8.1 Option 1                                                                                                                                                                                                                                                                                                                    |
| Test Setup:            |  <p>The diagram illustrates the test setup. A Spectrum Analyzer and an E.U.T. (Equipment Under Test) are connected by a red cable. They are positioned on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane.</p> |
| Instruments Used:      | Refer to section 5.10 for details                                                                                                                                                                                                                                                                                                                            |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                                                                                                                                                                                                        |
| Final Test Mode:       | Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G;<br>6.5Mbps of rate is the worst case of 802.11N(HT20);                                                                                                                                                                              |
| Limit:                 | ≥ 500 kHz                                                                                                                                                                                                                                                                                                                                                    |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                         |

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### 2.5.1 Test Results For DTS (6 dB) Bandwidth&99% Occupied Bandwidth

| Mode      | Test Channel | Occupied Bandwidth (MHz) | 6dB Emission Bandwidth (MHz) | Limit (kHz) | Result |
|-----------|--------------|--------------------------|------------------------------|-------------|--------|
| 802.11B   | CH1          | 12.98                    | 9.03                         | ≥500        | Pass   |
|           | CH6          | 12.89                    | 9.03                         | ≥500        | Pass   |
|           | CH11         | 12.98                    | 9.03                         | ≥500        | Pass   |
|           | CH12         | 12.55                    | 8.51                         | ≥500        | Pass   |
|           | CH13         | 12.63                    | 8.55                         | ≥500        | Pass   |
| 802.11G   | CH1          | 16.85                    | 16.02                        | ≥500        | Pass   |
|           | CH6          | 17.06                    | 16.32                        | ≥500        | Pass   |
|           | CH11         | 16.89                    | 16.23                        | ≥500        | Pass   |
|           | CH12         | 16.58                    | 15.41                        | ≥500        | Pass   |
|           | CH13         | 16.67                    | 15.72                        | ≥500        | Pass   |
| 802.11N20 | CH1          | 17.80                    | 17.15                        | ≥500        | Pass   |
|           | CH6          | 17.97                    | 17.58                        | ≥500        | Pass   |
|           | CH11         | 17.84                    | 17.54                        | ≥500        | Pass   |
|           | CH12         | 17.58                    | 16.02                        | ≥500        | Pass   |
|           | CH13         | 17.67                    | 16.32                        | ≥500        | Pass   |

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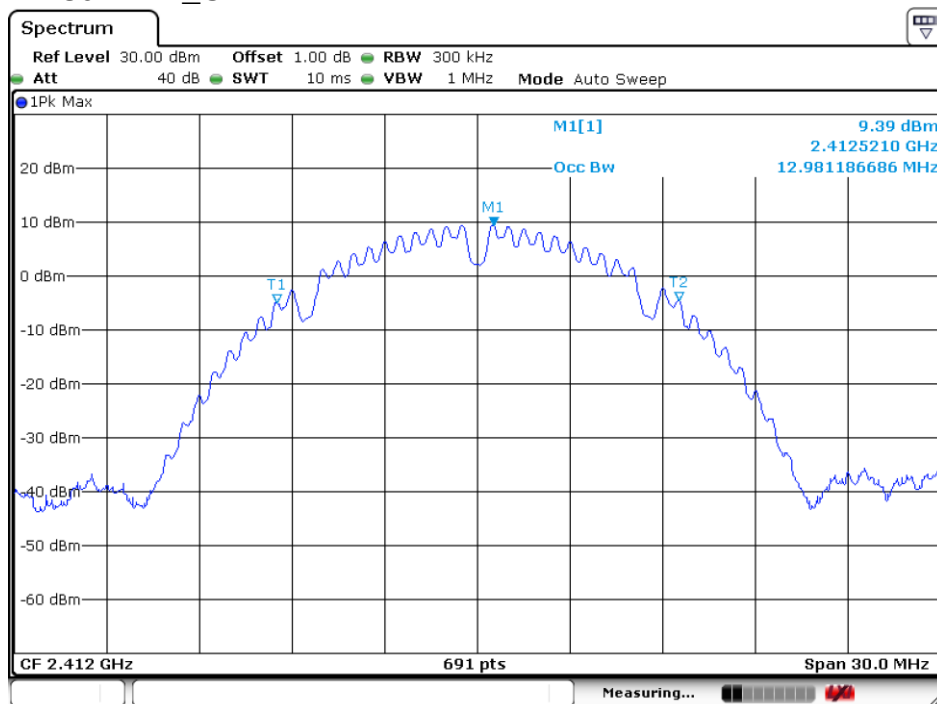
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## 2.5.2 Test plots For Occupied Bandwidth

### 2.5.2.1 802.11B\_CH1



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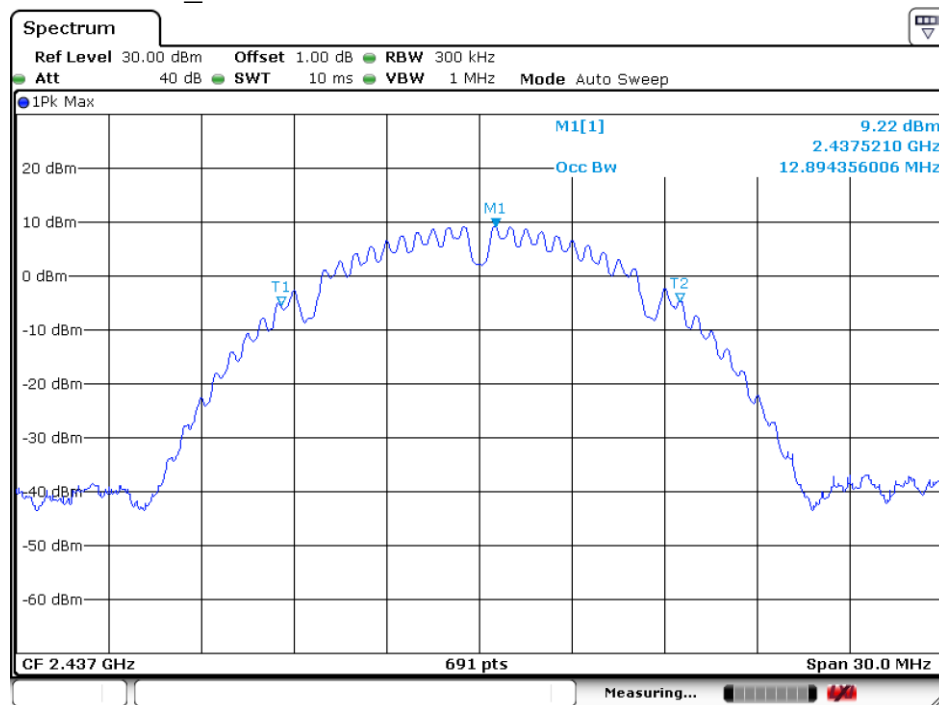
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2.5.2.2

802.11B\_CH6



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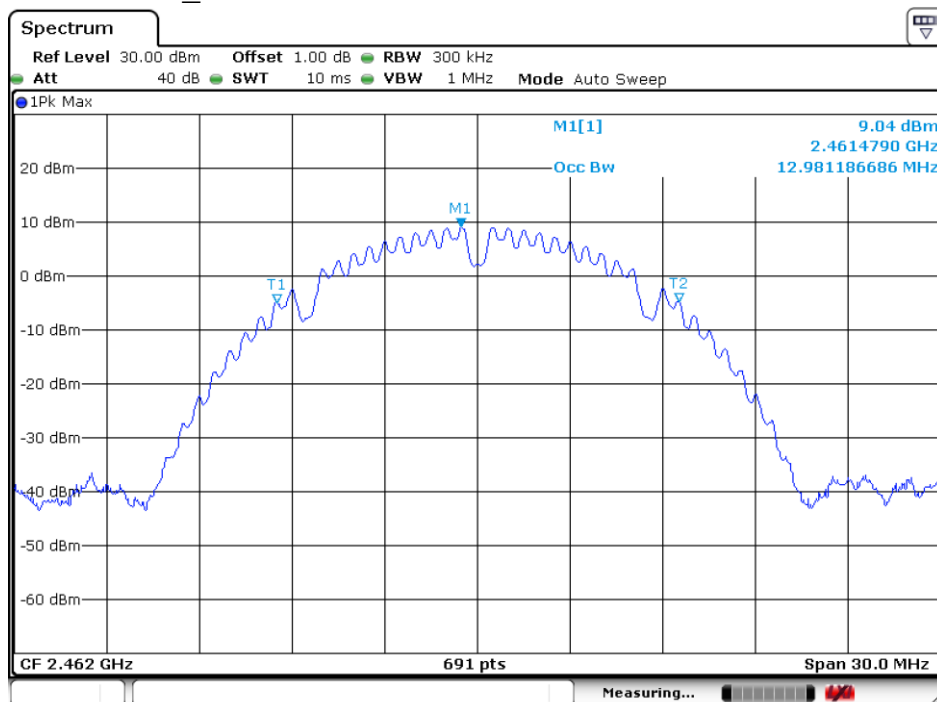
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2.5.2.3

802.11B\_CH11



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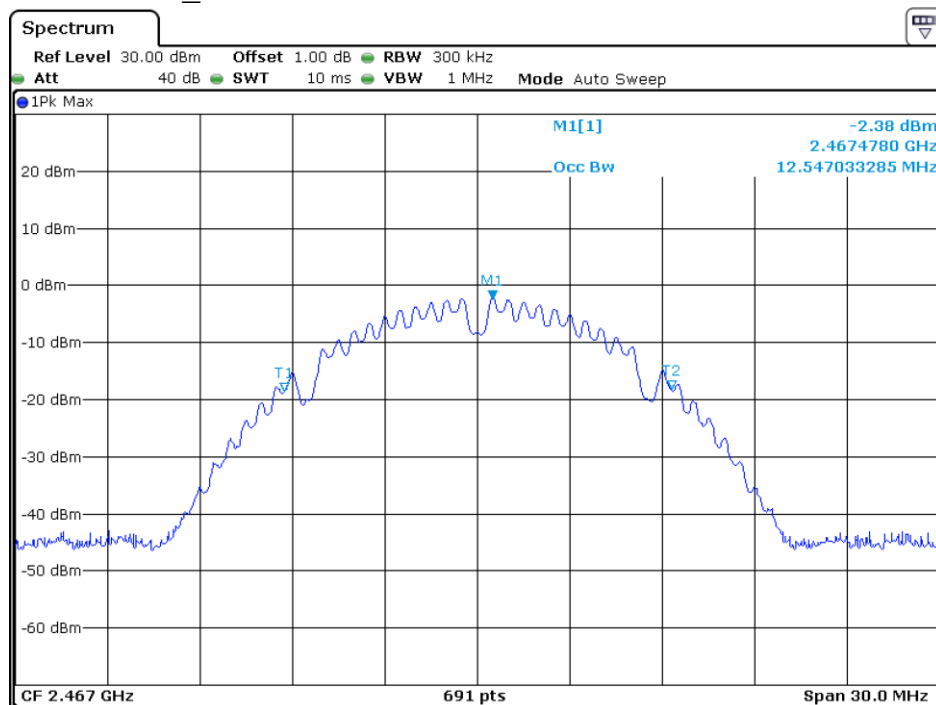
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2.5.2.4

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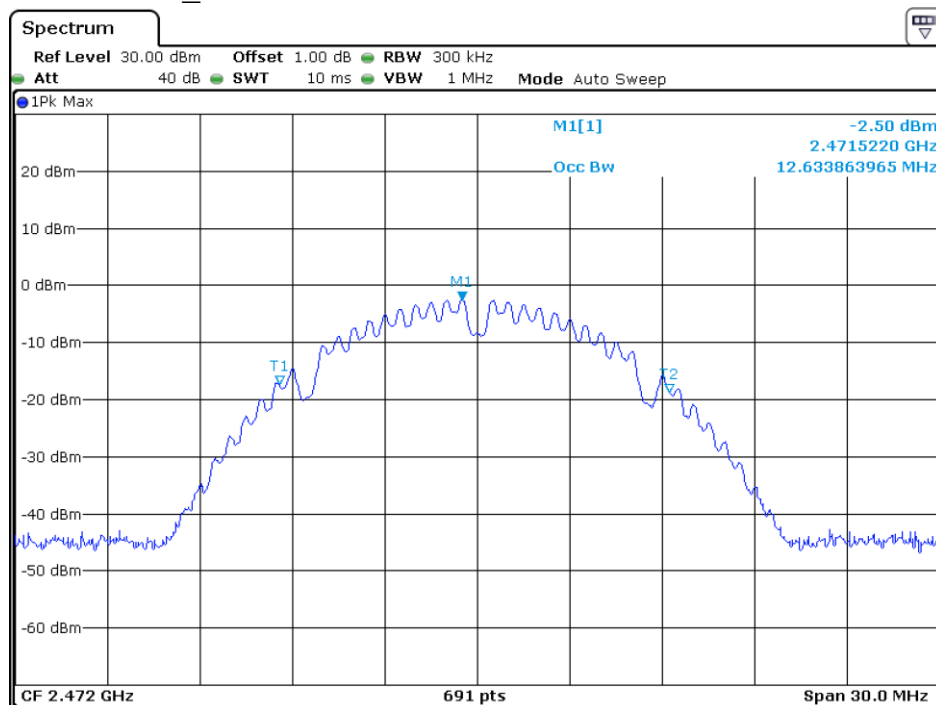
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2.5.2.5

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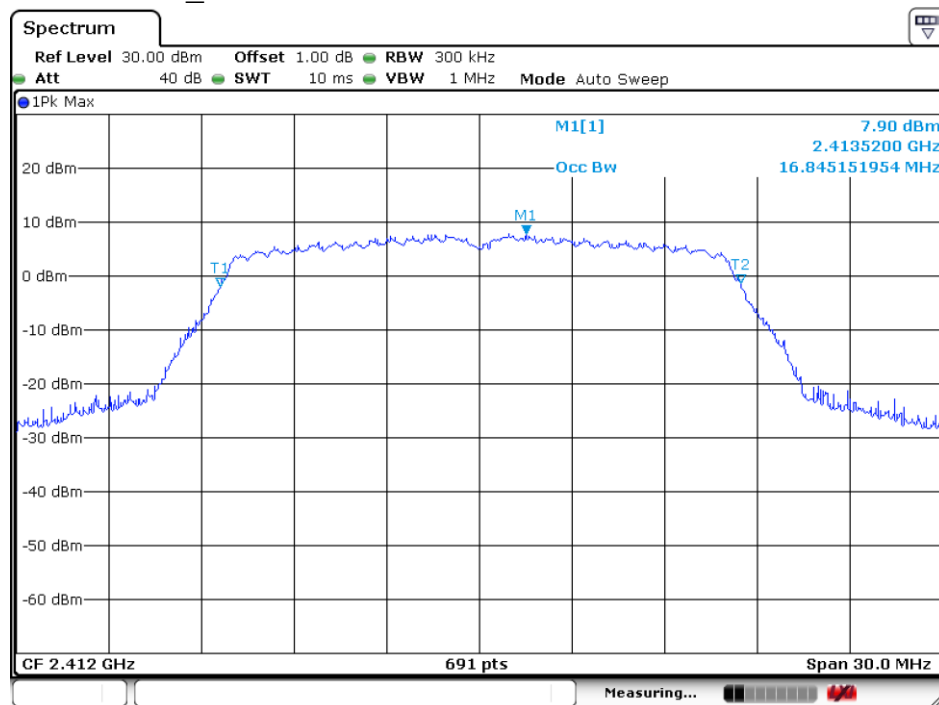
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2.5.2.6

802.11G\_CH1



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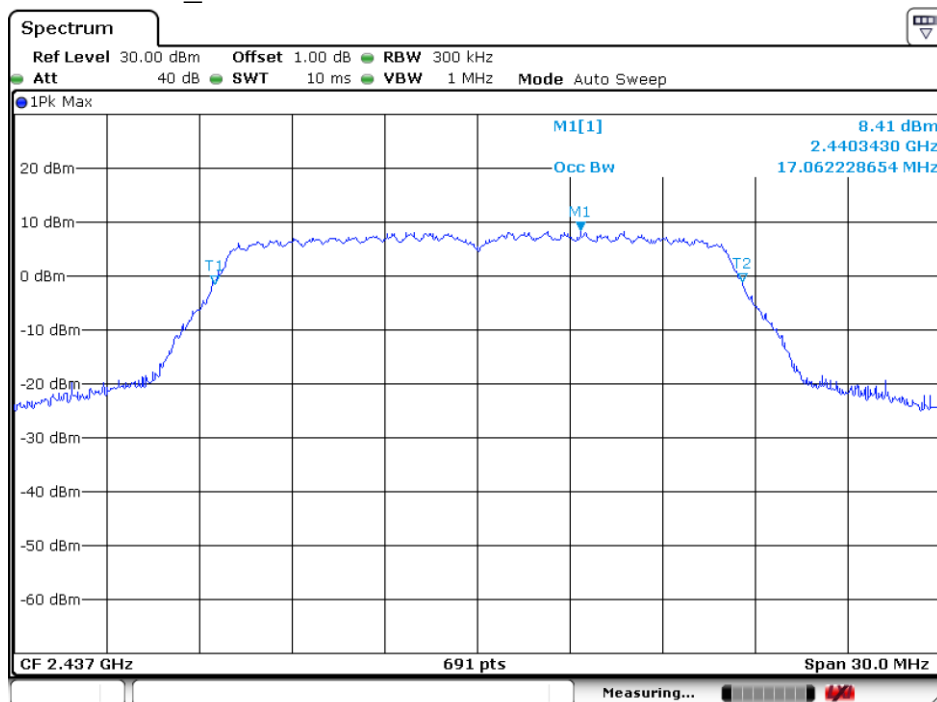
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2.5.2.7

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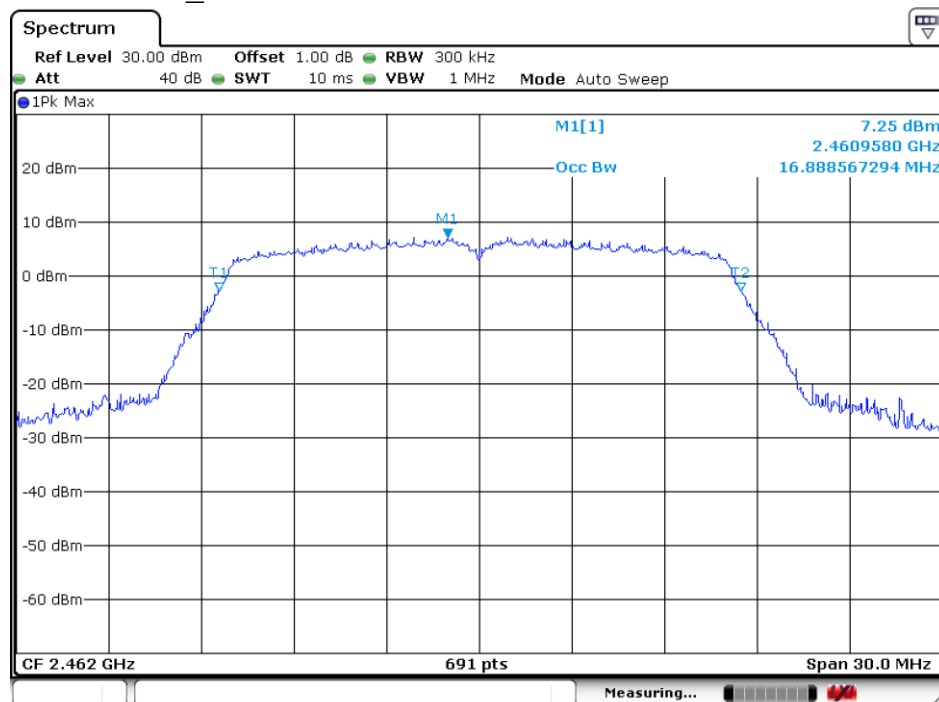
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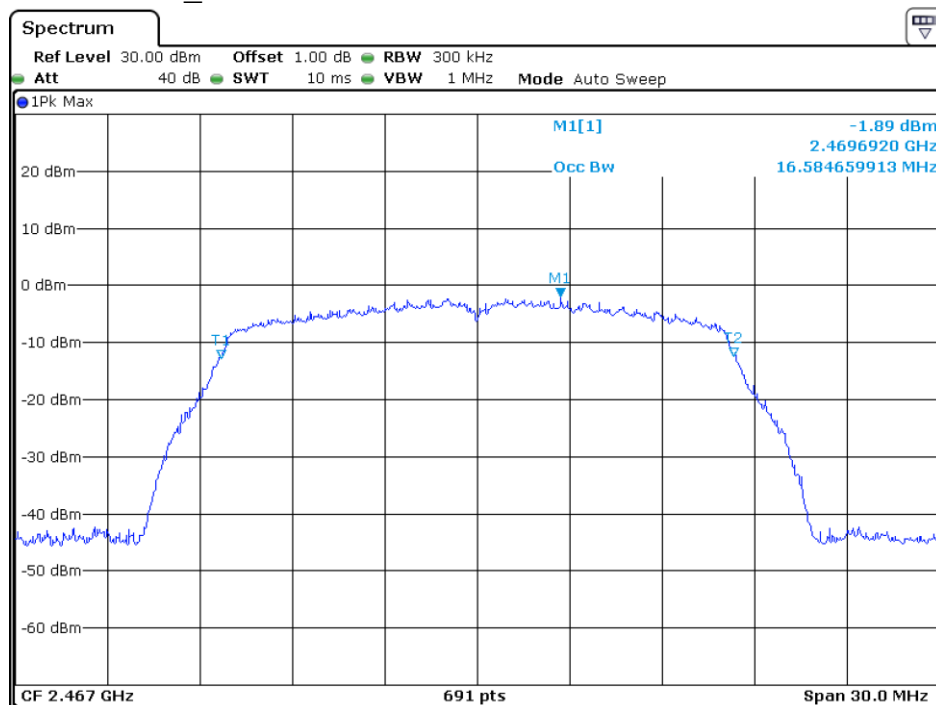
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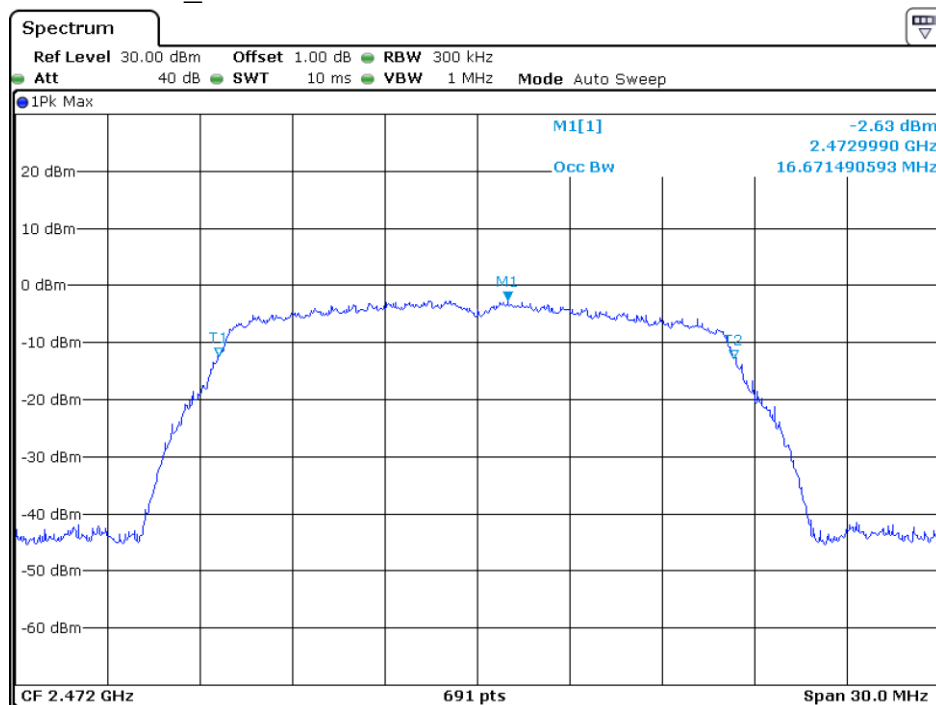
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2.5.2.10

802.11G\_CH13



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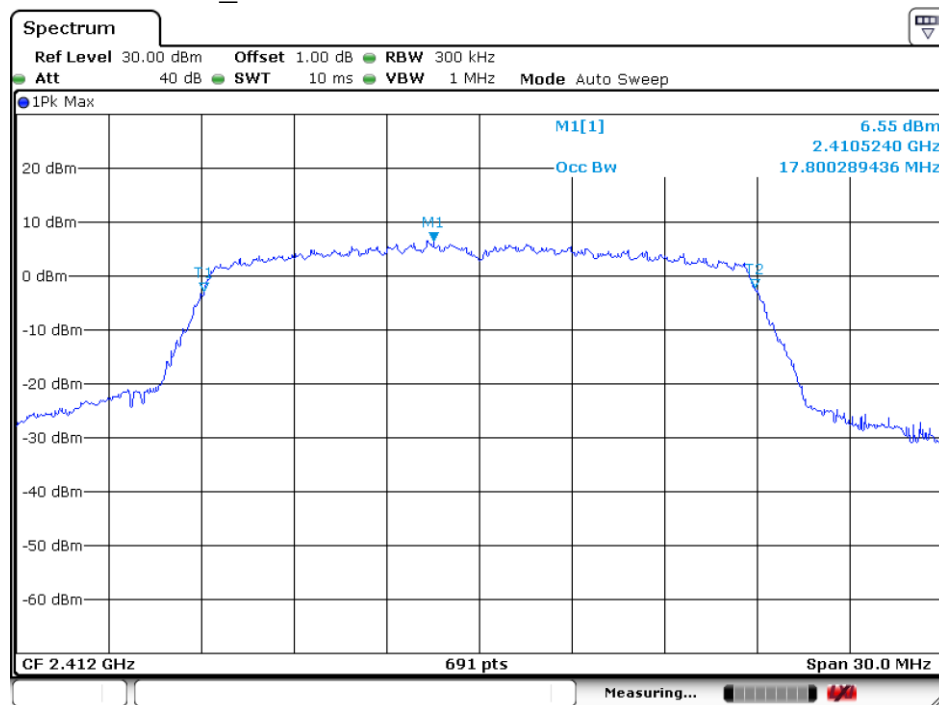
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2.5.2.11 802.11N20\_CH1



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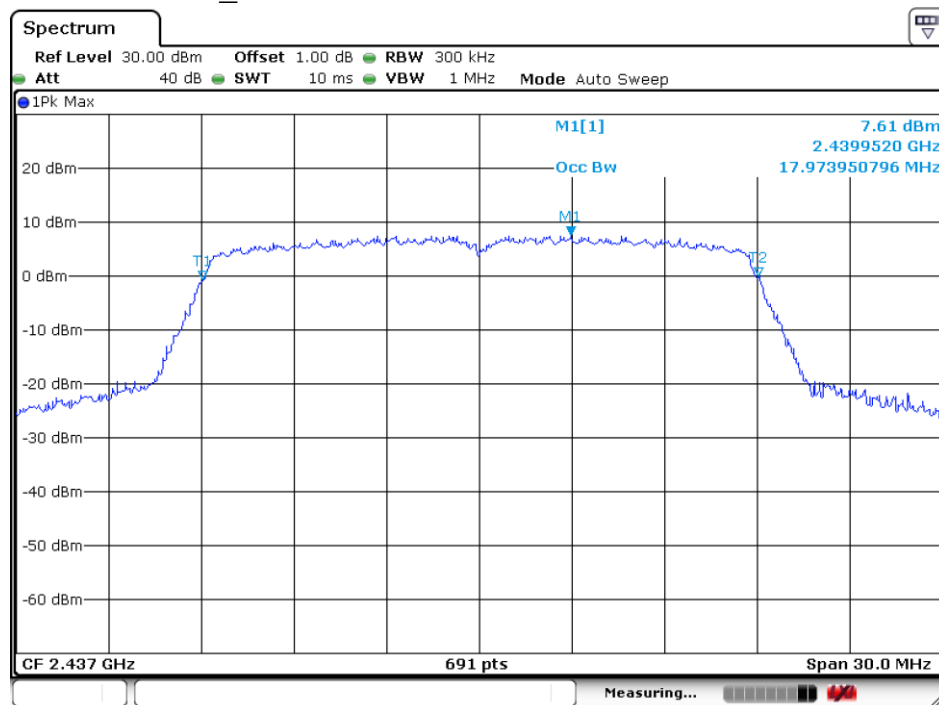
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2.5.2.12

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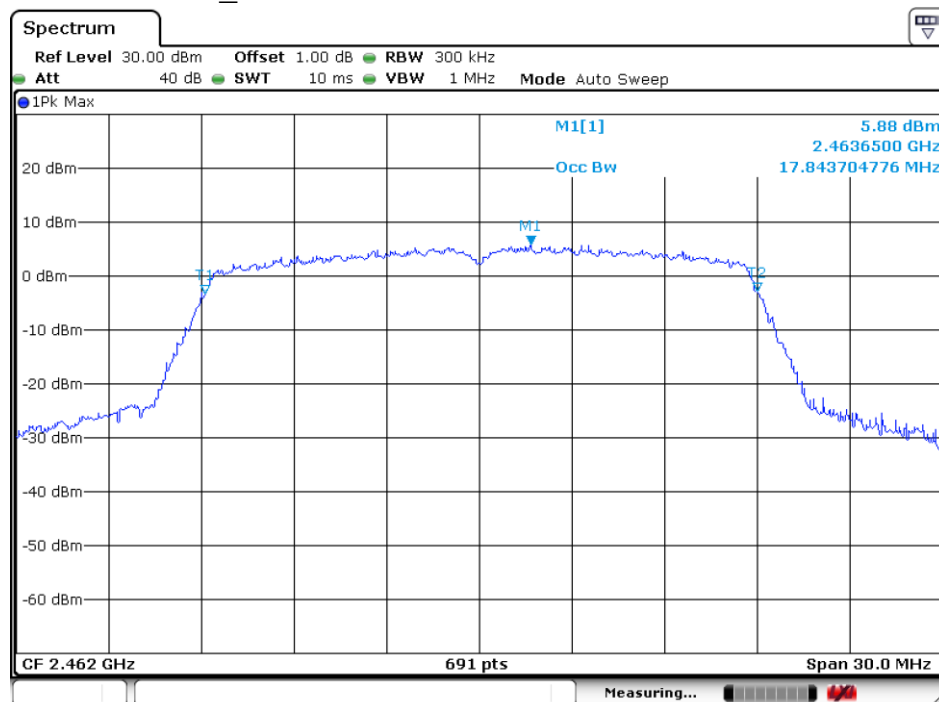
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2.5.2.13

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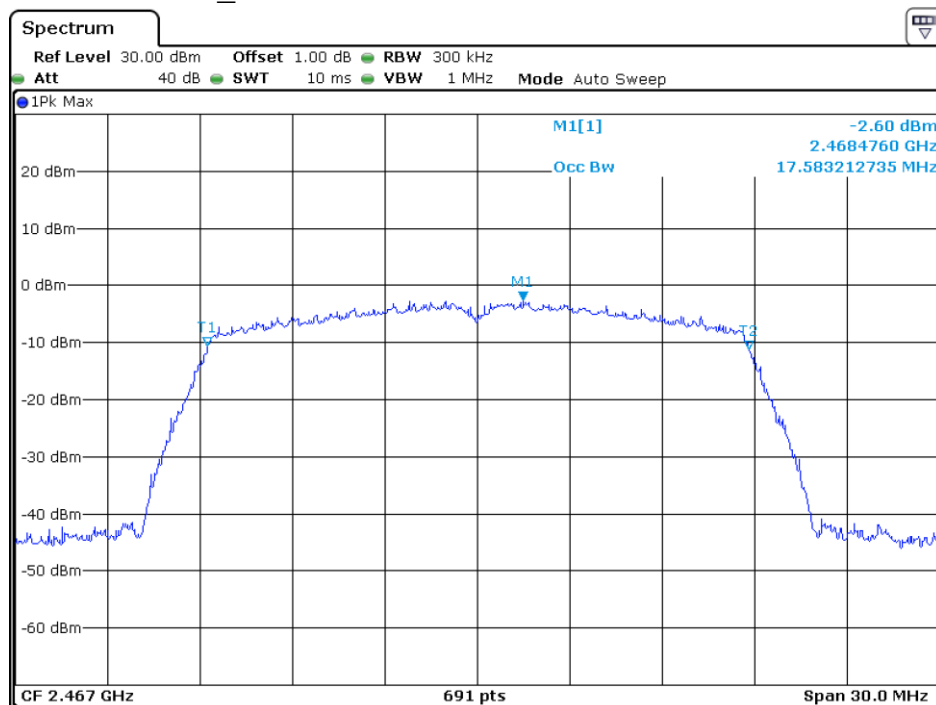
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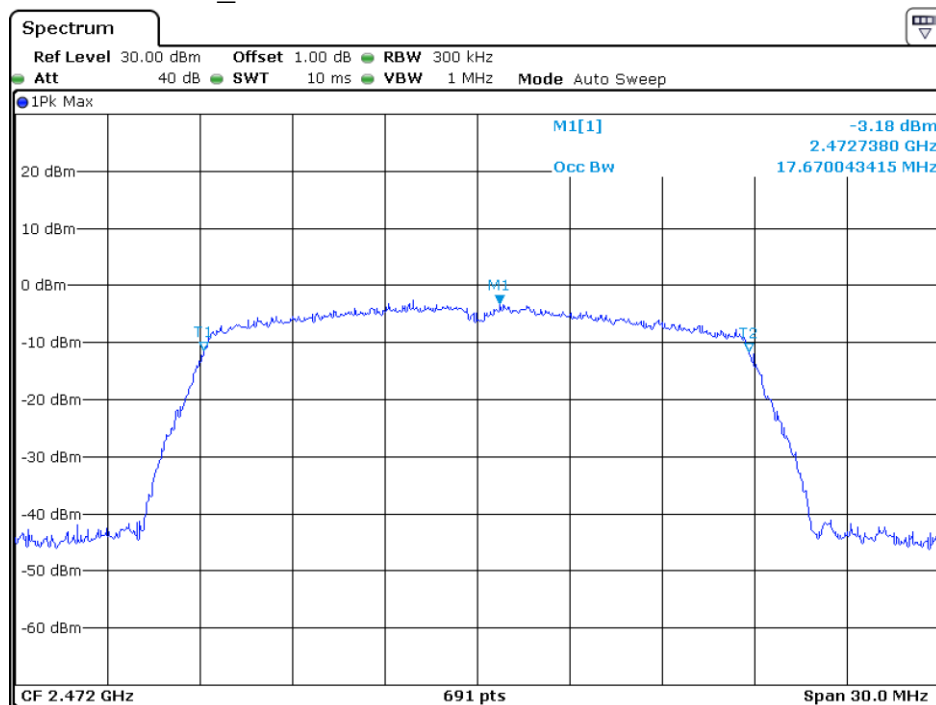
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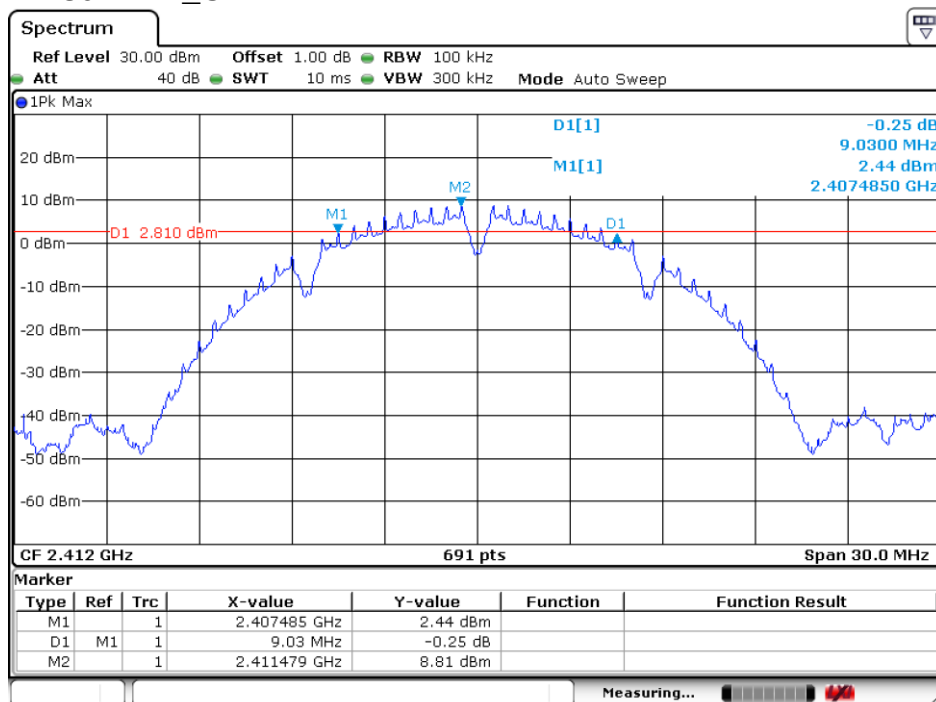
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## 2.5.3 Test plots For 6dB Emission Bandwidth

### 2.5.3.1 802.11B\_CH1



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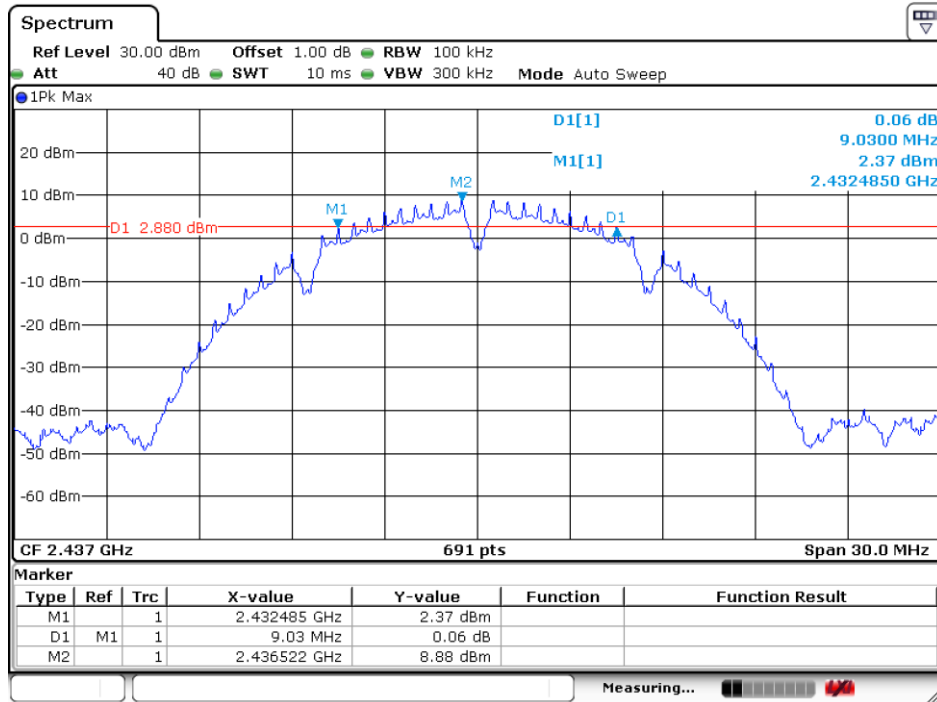
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2.5.3.2

802.11B\_CH6



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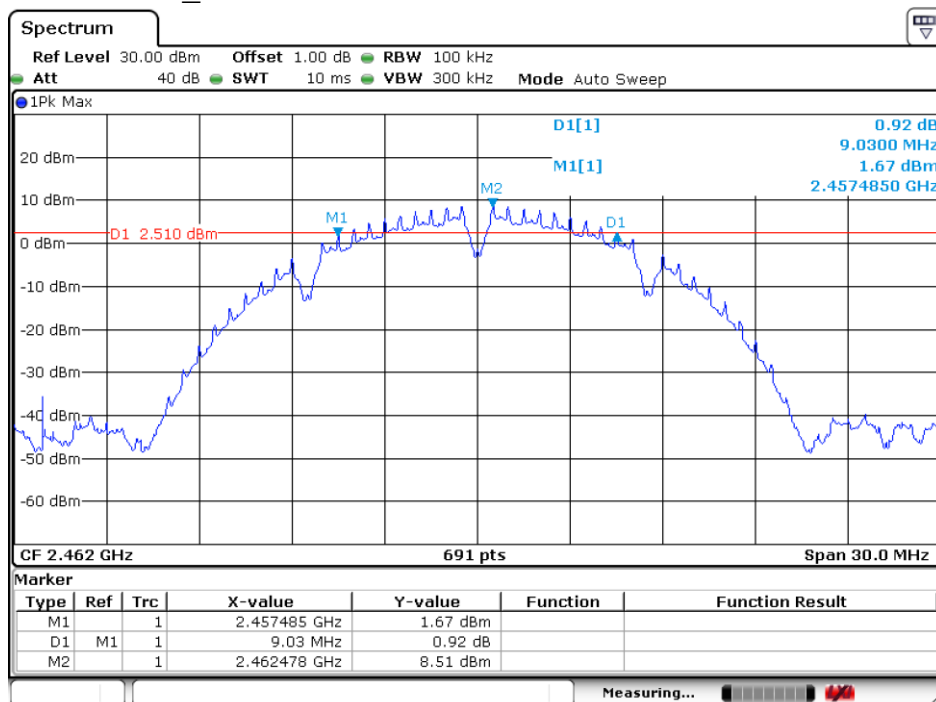
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2.5.3.3

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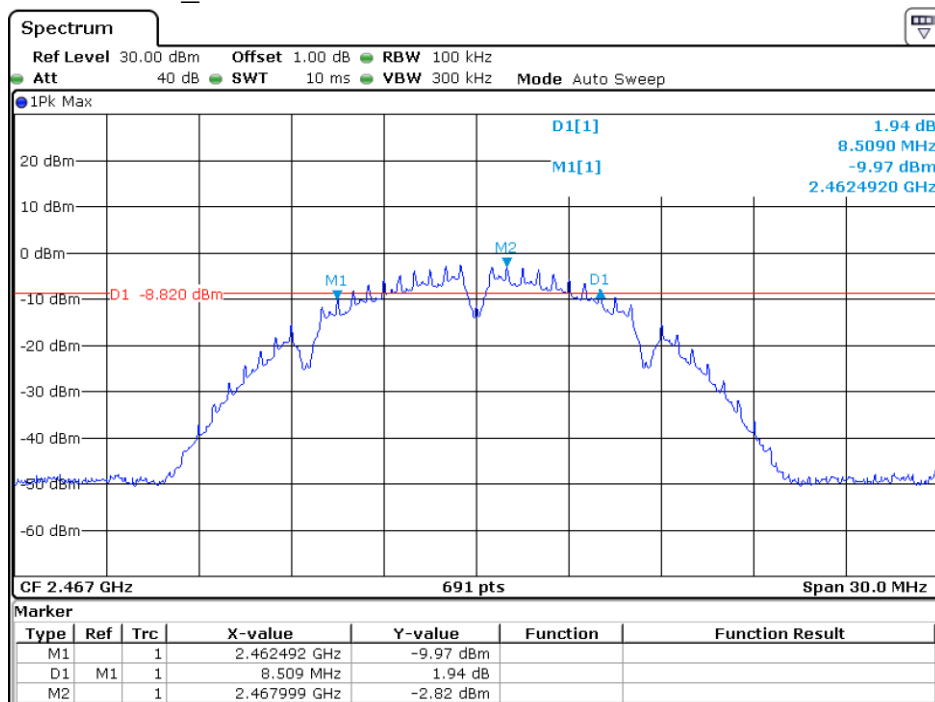
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2.5.3.4

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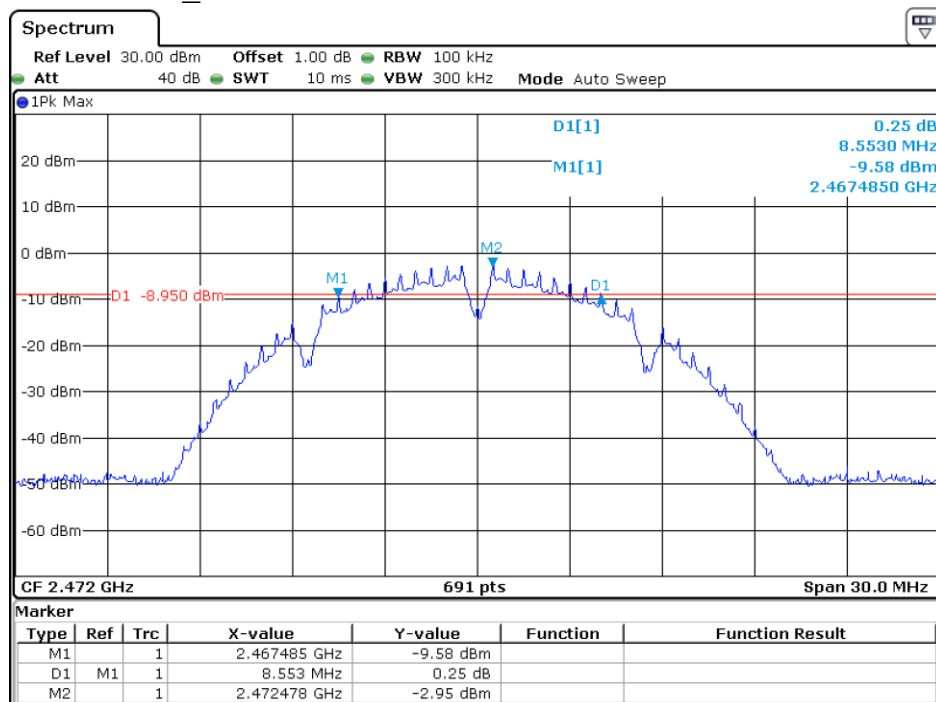
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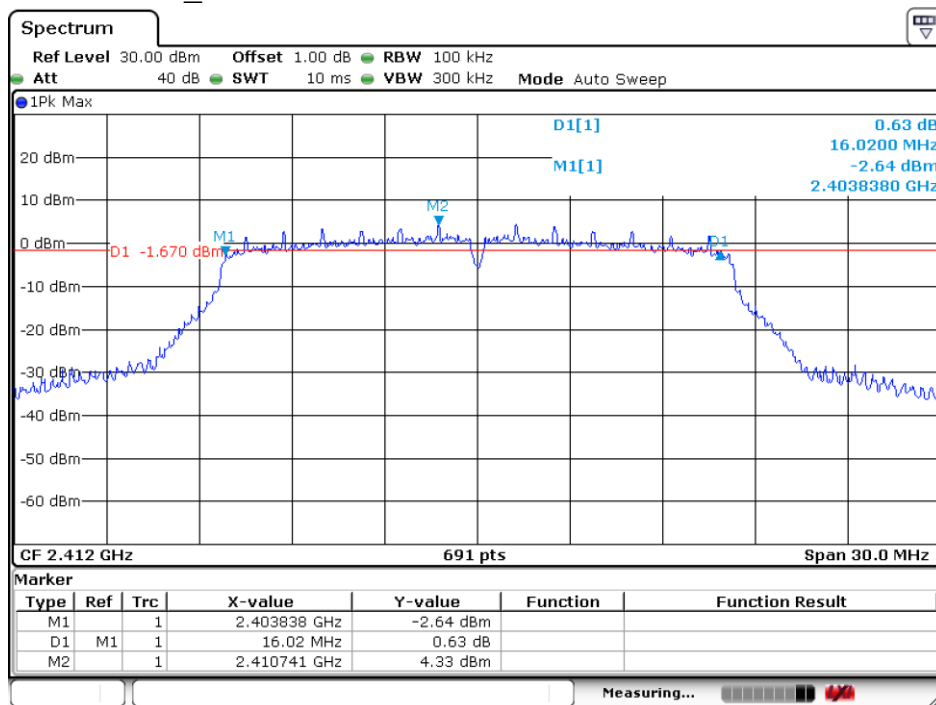
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2.5.3.6

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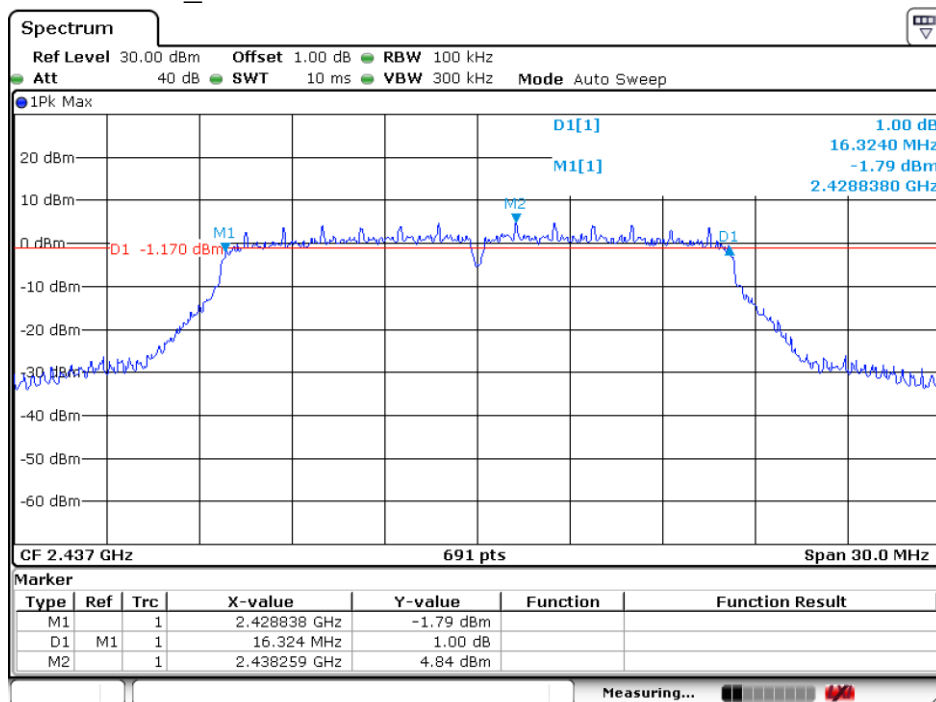
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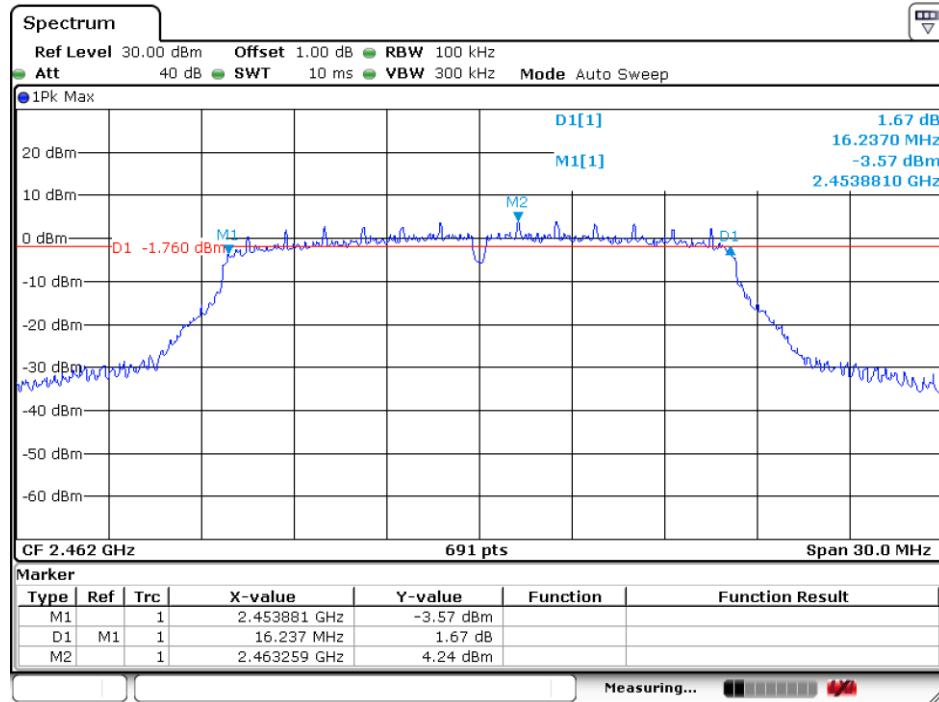
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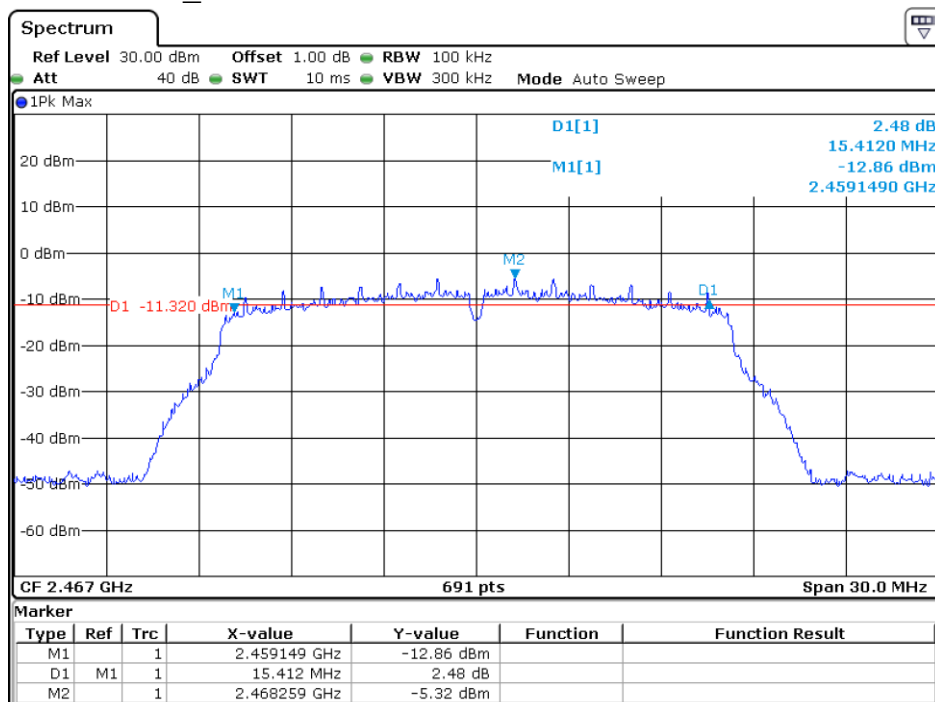
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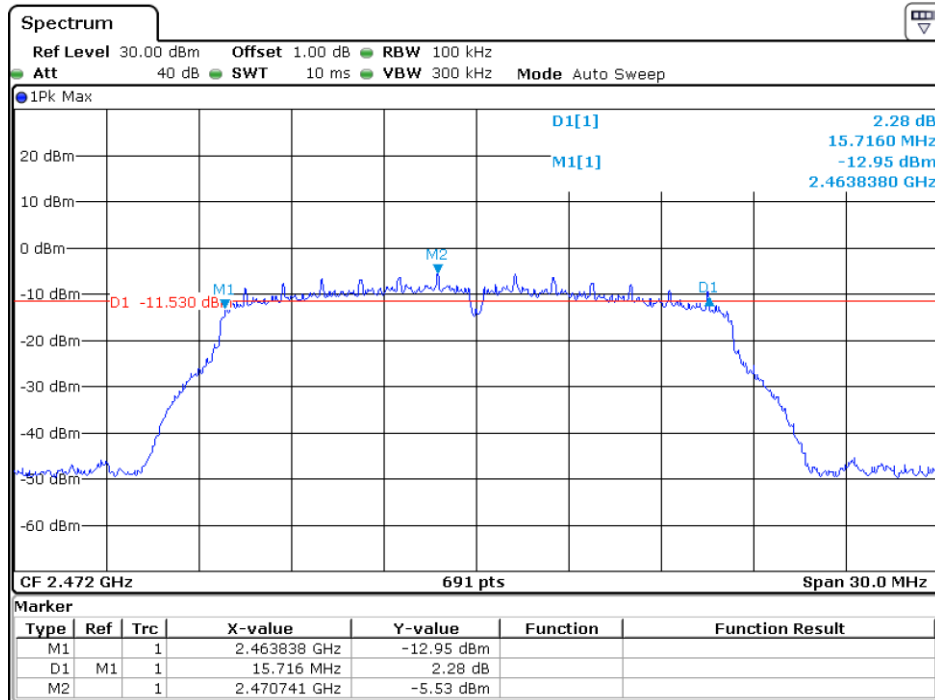
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2.5.3.10 802.11G\_CH13



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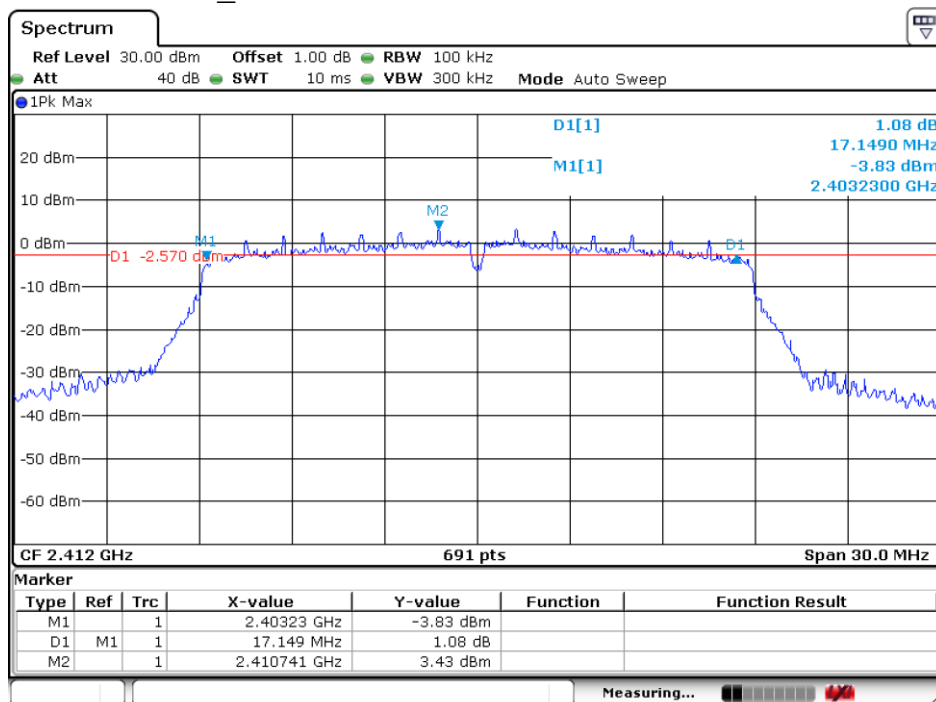
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2.5.3.11 802.11N20\_CH1



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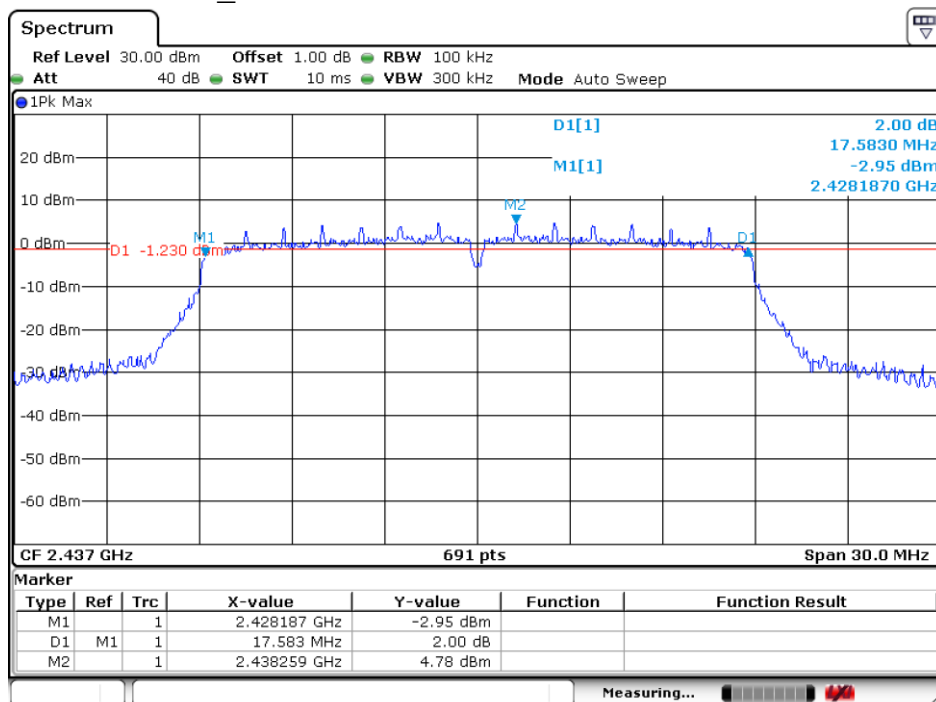
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2.5.3.12

802.11N20\_CH6



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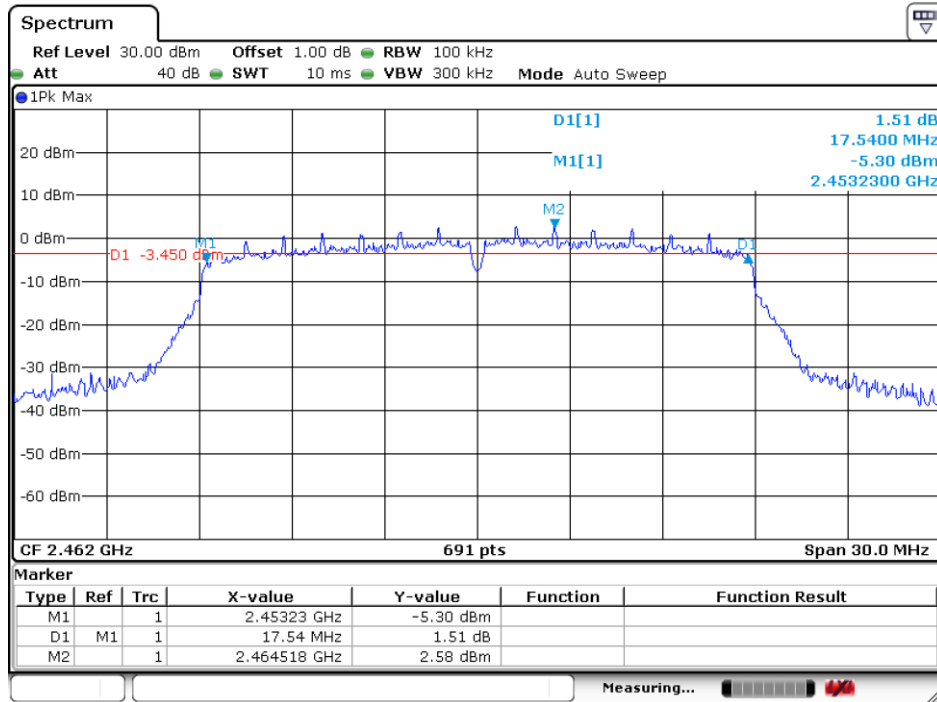
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2.5.3.13 802.11N20\_CH11



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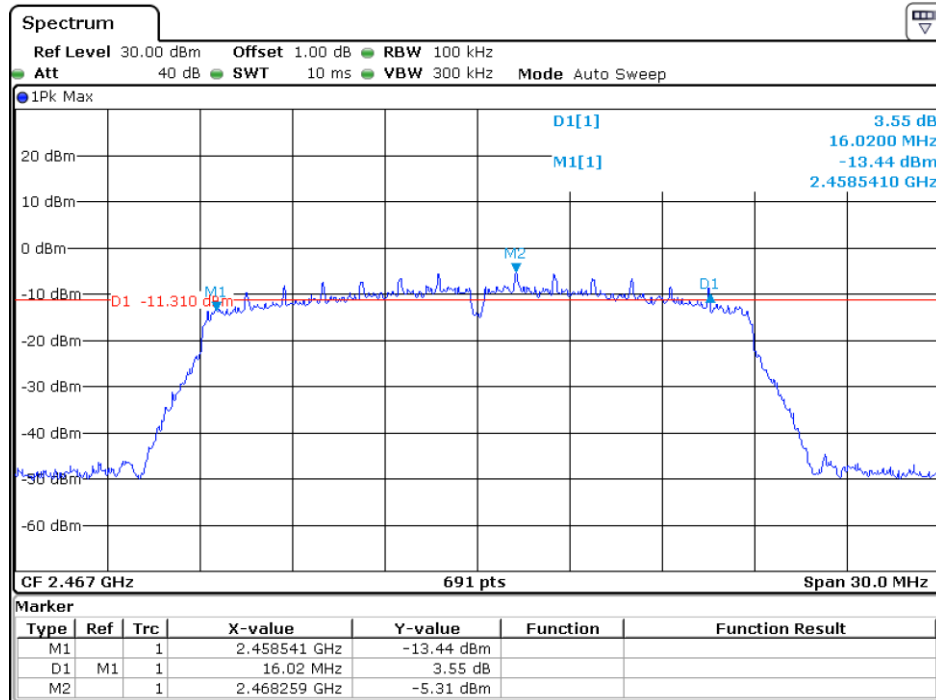
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2.5.3.14 802.11N20\_CH12



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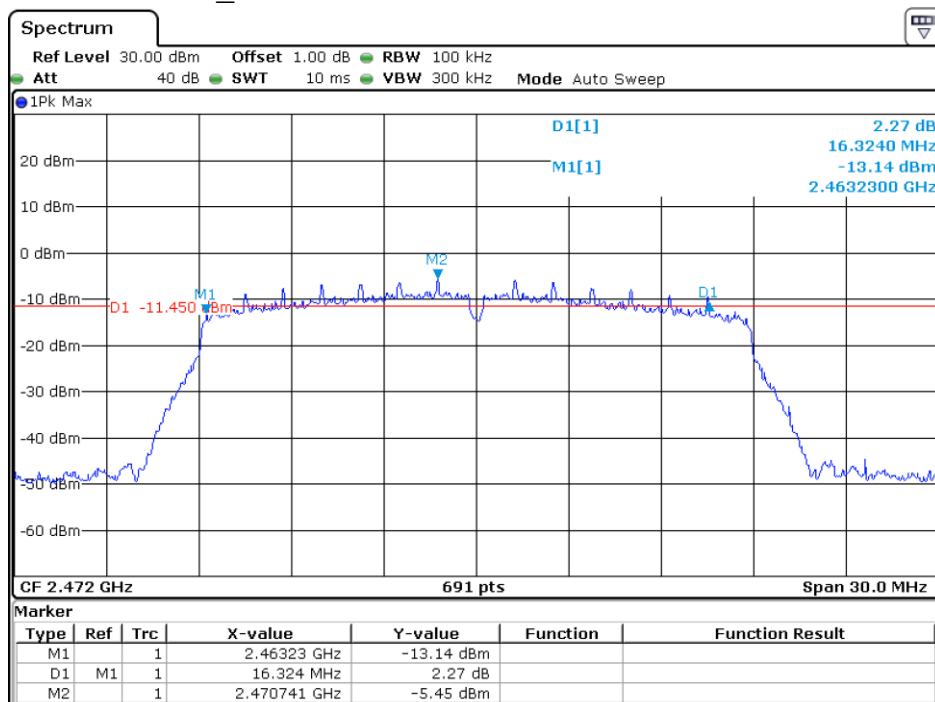
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2.5.3.15

802.11N20\_CH13



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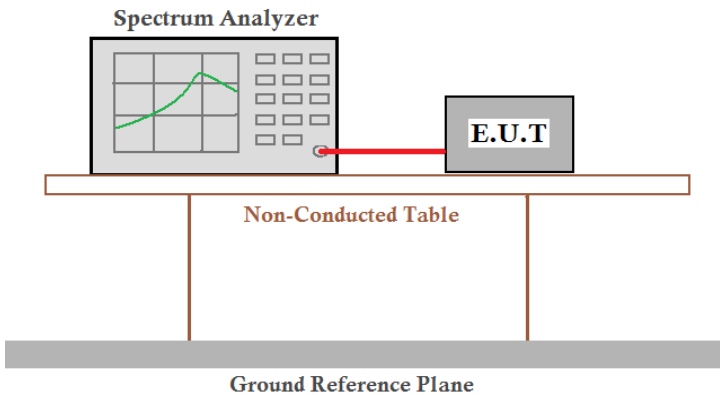
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## 2.6 Power Spectral Density

|                        |                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (e)                                                                                                                                               |
| Test Method:           | ANSI C63.10 :2013 Section 11.10.2                                                                                                                                                |
| Test Setup:            |                                                                                                |
| Test Instruments:      | Refer to section 5.10 for details                                                                                                                                                |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                            |
| Final Test Mode:       | Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G ;<br>6.5Mbps of rate is the worst case of 802.11N(HT20); |
| Limit:                 | ≤8.00dBm/3kHz                                                                                                                                                                    |
| Test Results:          | Pass                                                                                                                                                                             |

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## 2.6.1 Test Results

| Mode      | Test Channel | Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|-----------|--------------|-----------------------------------|------------------|--------|
| 802.11B   | CH1          | -3.20                             | ≤8.00            | Pass   |
|           | CH6          | -4.03                             | ≤8.00            | Pass   |
|           | CH11         | -4.33                             | ≤8.00            | Pass   |
|           | CH12         | -16.53                            | ≤8.00            | Pass   |
|           | CH13         | -17.09                            | ≤8.00            | Pass   |
| 802.11G   | CH1          | -8.41                             | ≤8.00            | Pass   |
|           | CH6          | -7.56                             | ≤8.00            | Pass   |
|           | CH11         | -8.36                             | ≤8.00            | Pass   |
|           | CH12         | -18.01                            | ≤8.00            | Pass   |
|           | CH13         | -18.54                            | ≤8.00            | Pass   |
| 802.11N20 | CH1          | -7.64                             | ≤8.00            | Pass   |
|           | CH6          | -7.64                             | ≤8.00            | Pass   |
|           | CH11         | -10.50                            | ≤8.00            | Pass   |
|           | CH12         | -18.91                            | ≤8.00            | Pass   |
|           | CH13         | -19.22                            | ≤8.00            | Pass   |

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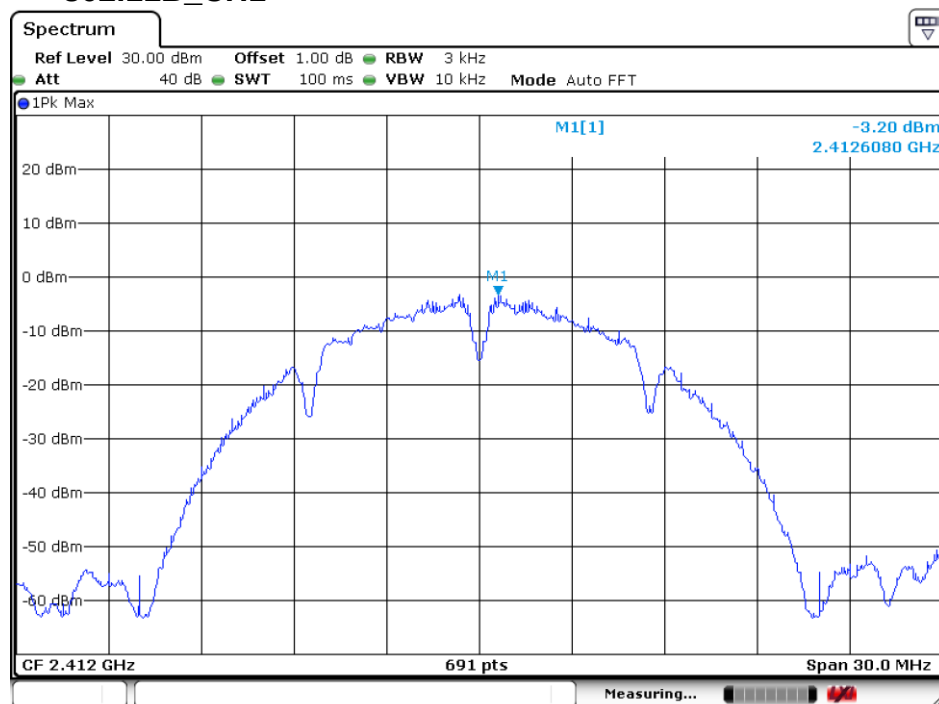
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## 2.6.2 Test plots

### 2.6.2.1 802.11B\_CH1



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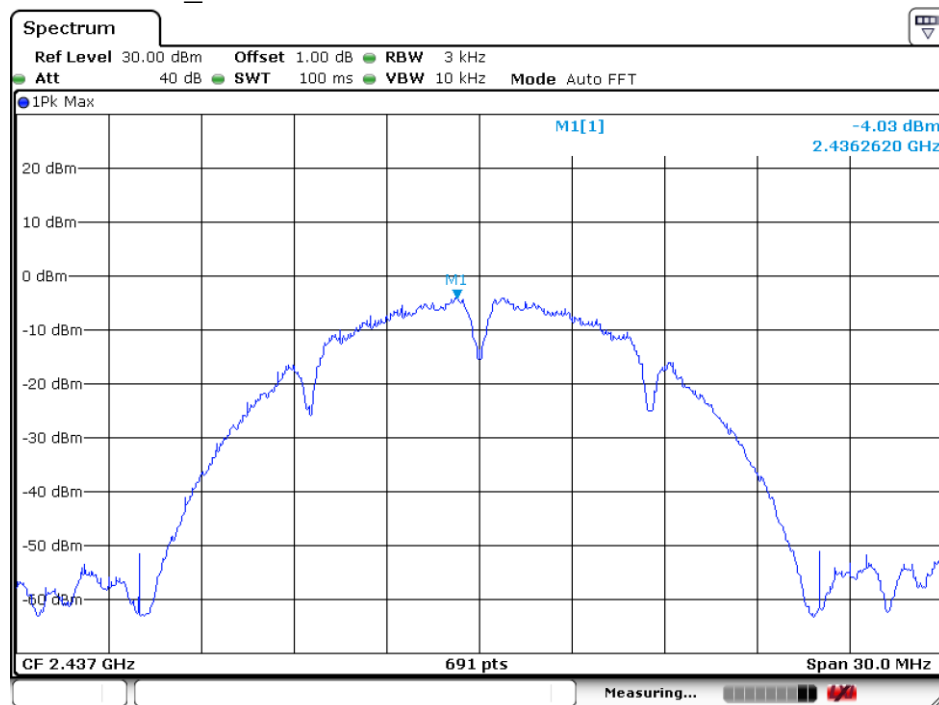
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## 2.6.2.2

## 802.11B\_CH6



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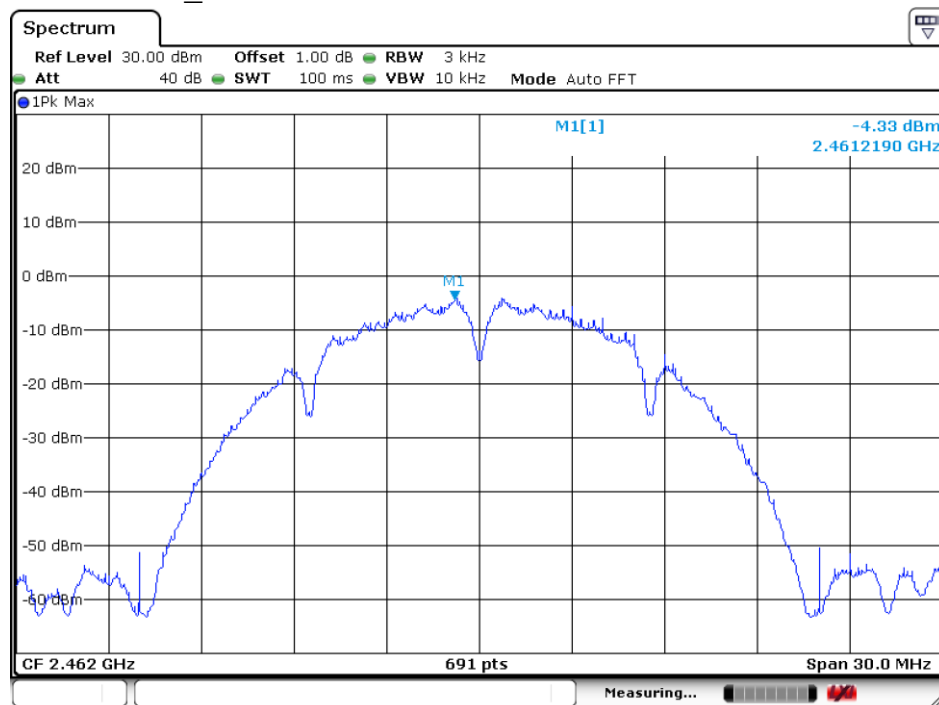
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## 2.6.2.3

## 802.11B\_CH11



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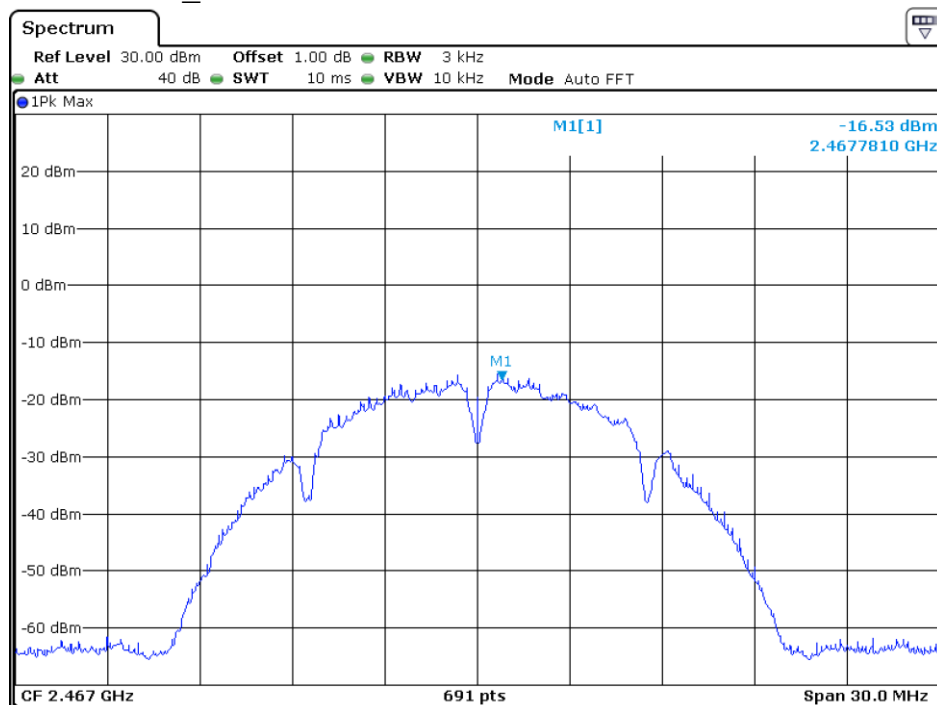
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2.6.2.4

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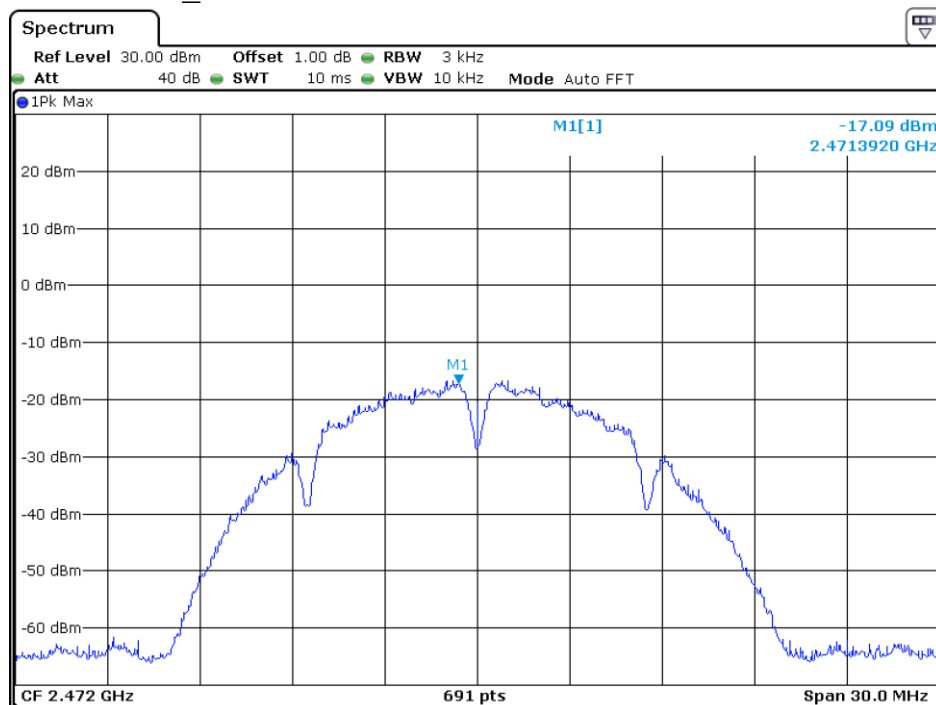
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2.6.2.5

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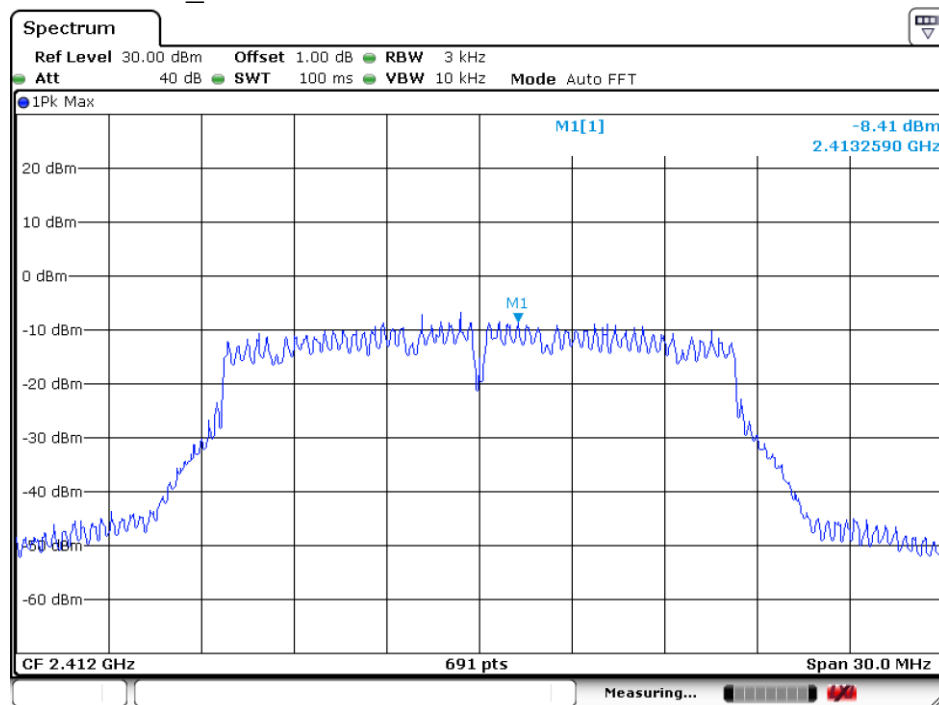
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2.6.2.6

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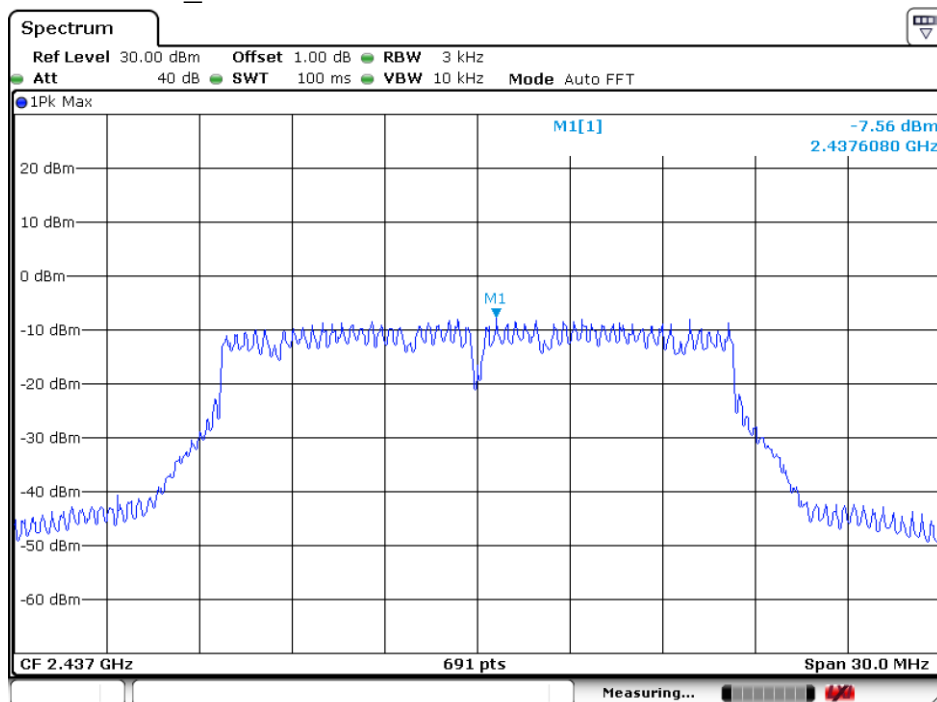
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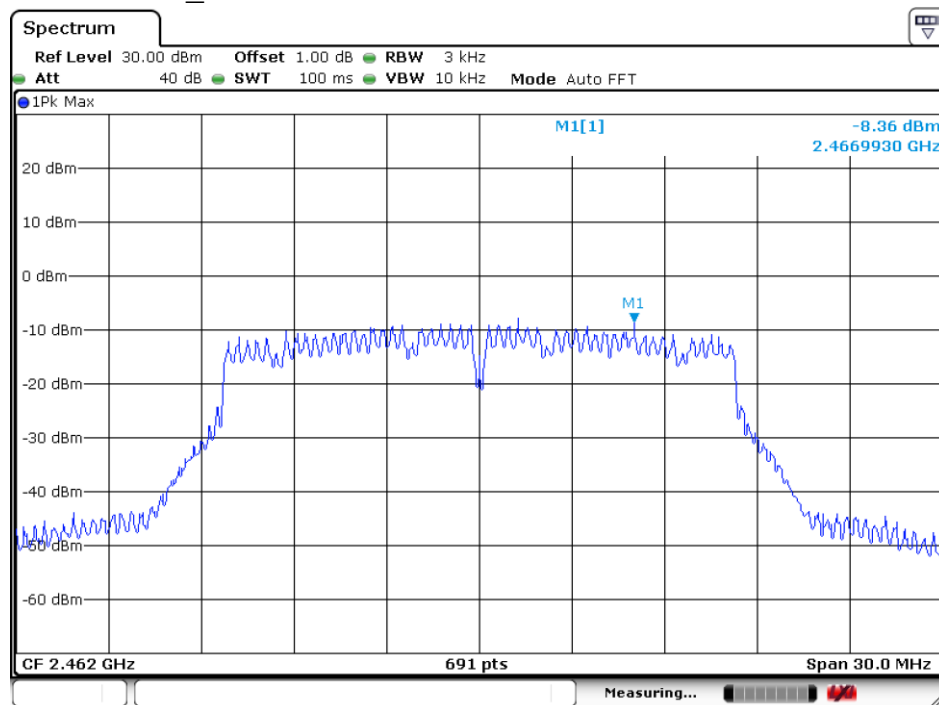
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## 2.6.2.8

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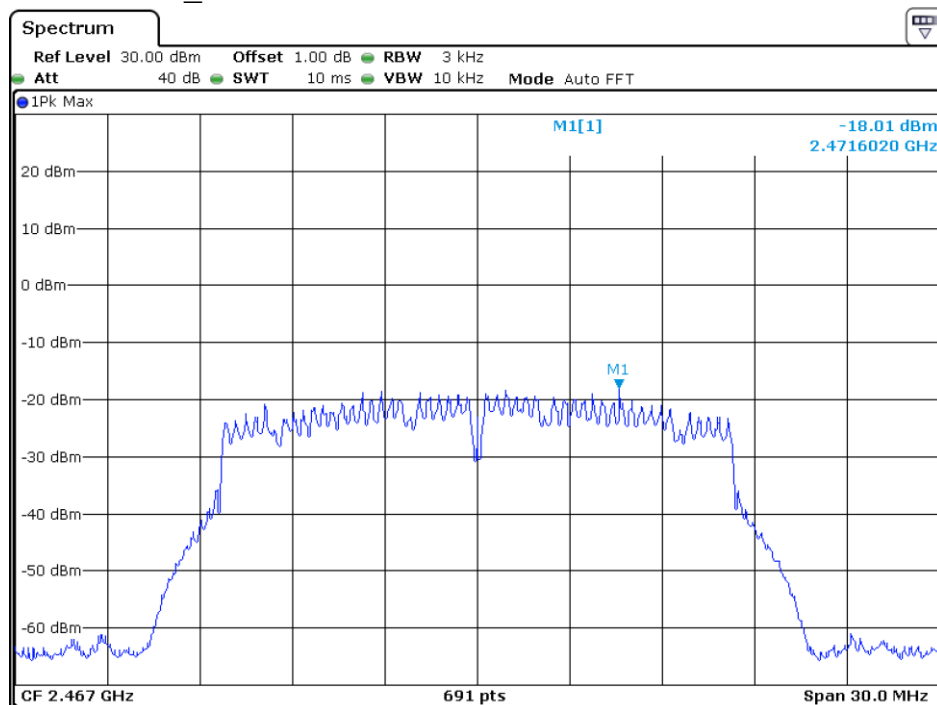
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2.6.2.9

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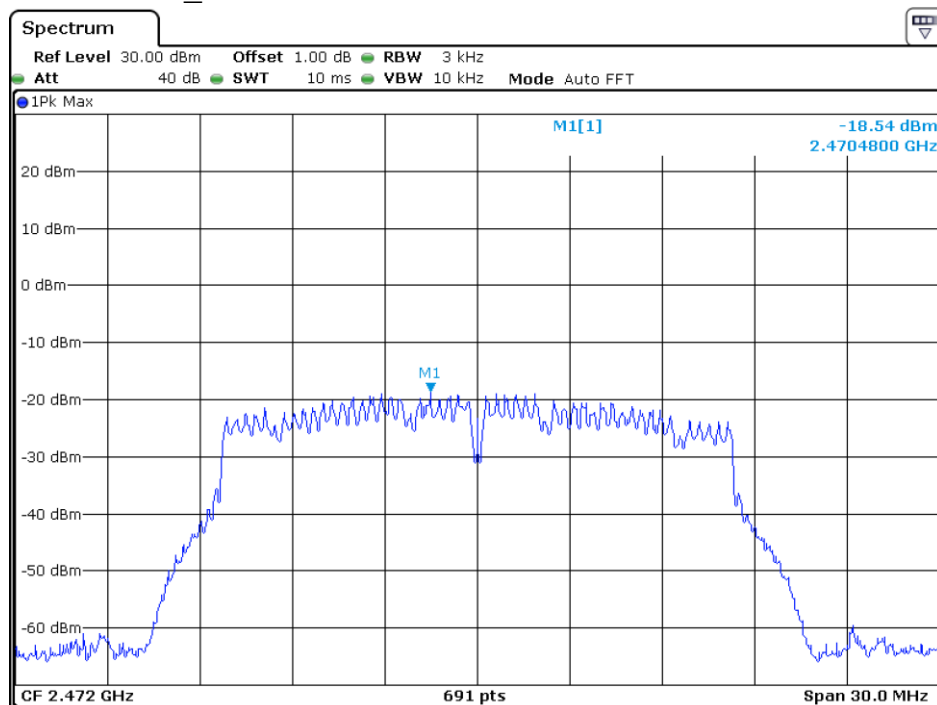
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2.6.2.10

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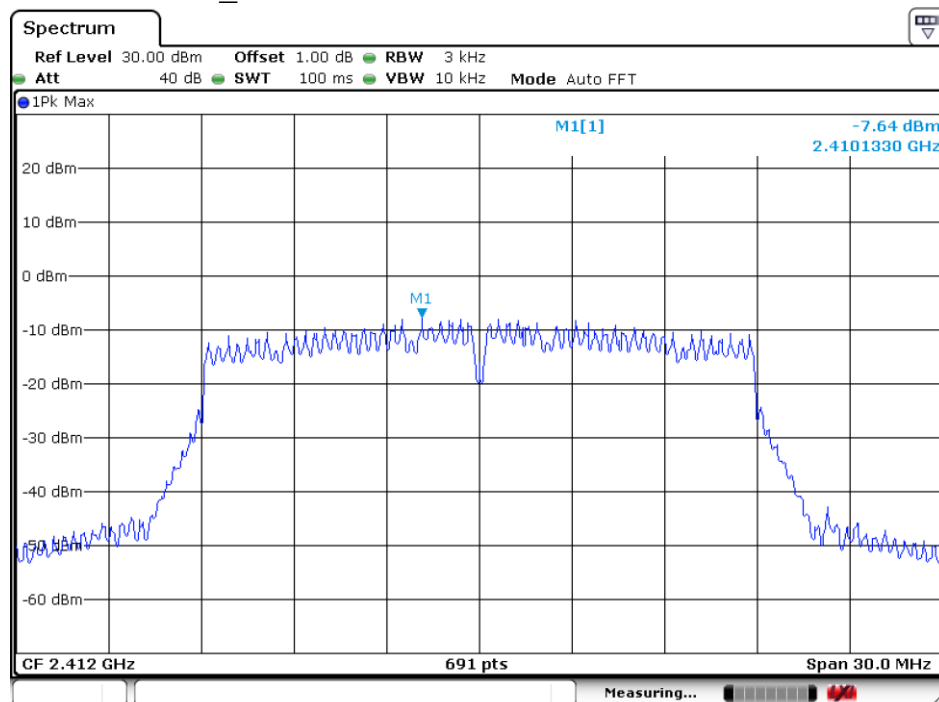
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2.6.2.11

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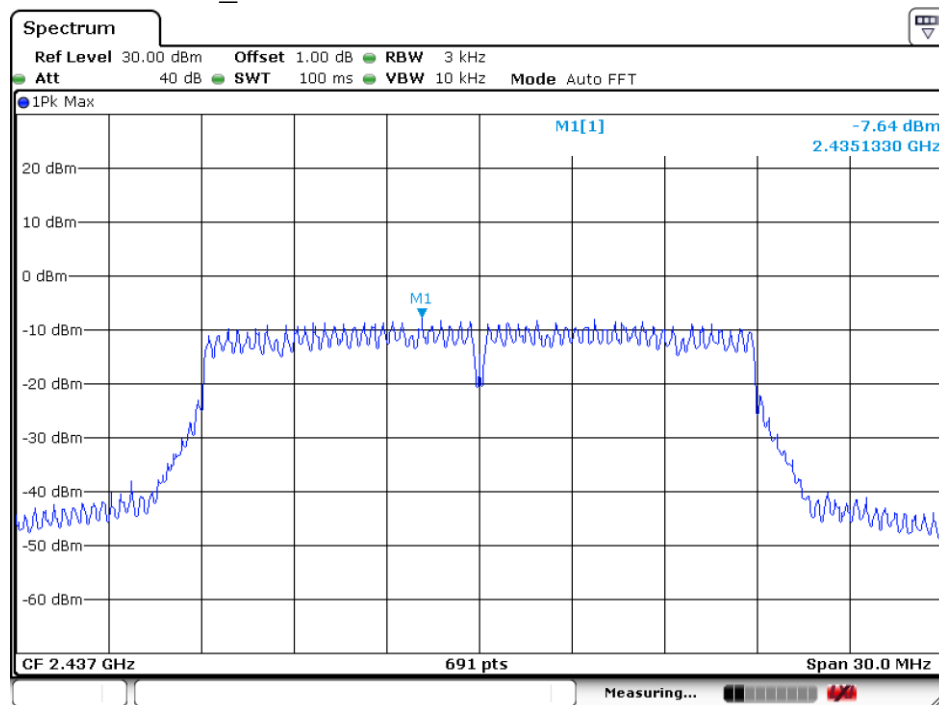
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### 2.6.2.12

### 802.11N20\_CH6



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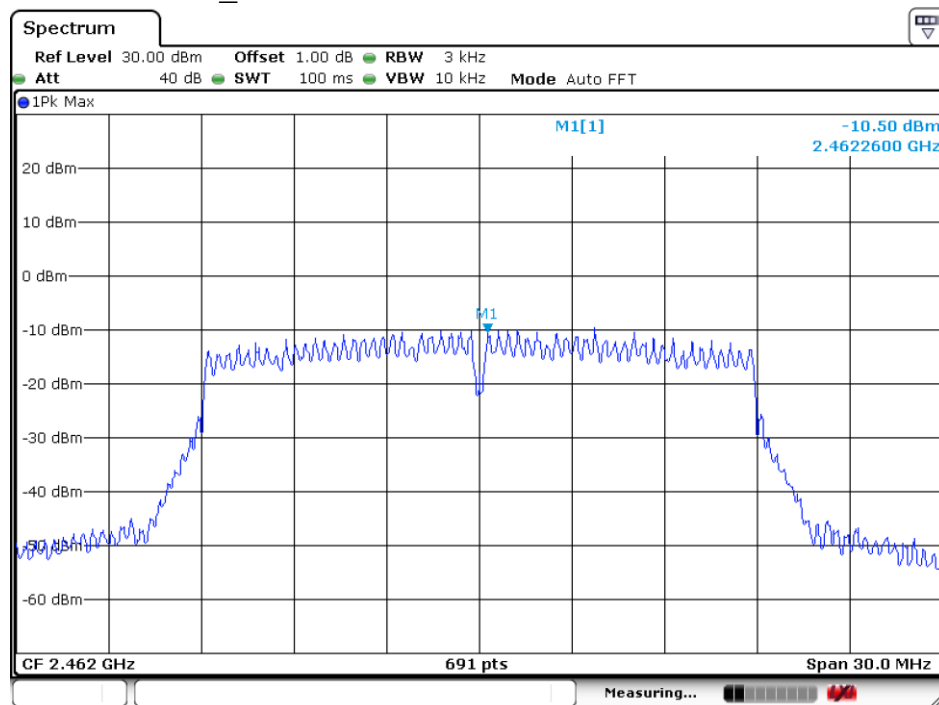
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2.6.2.13

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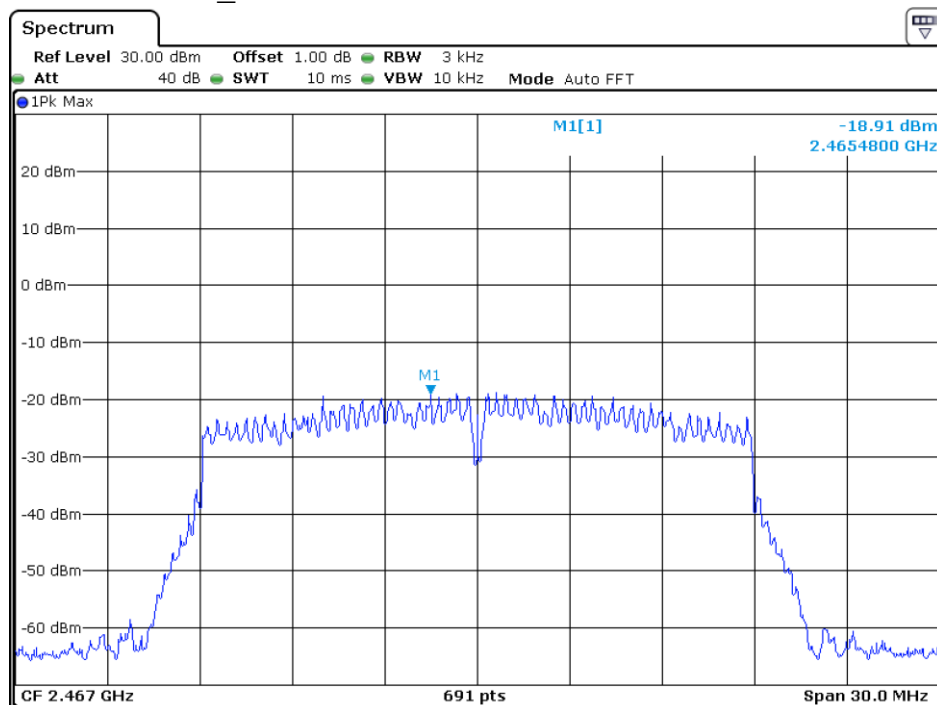
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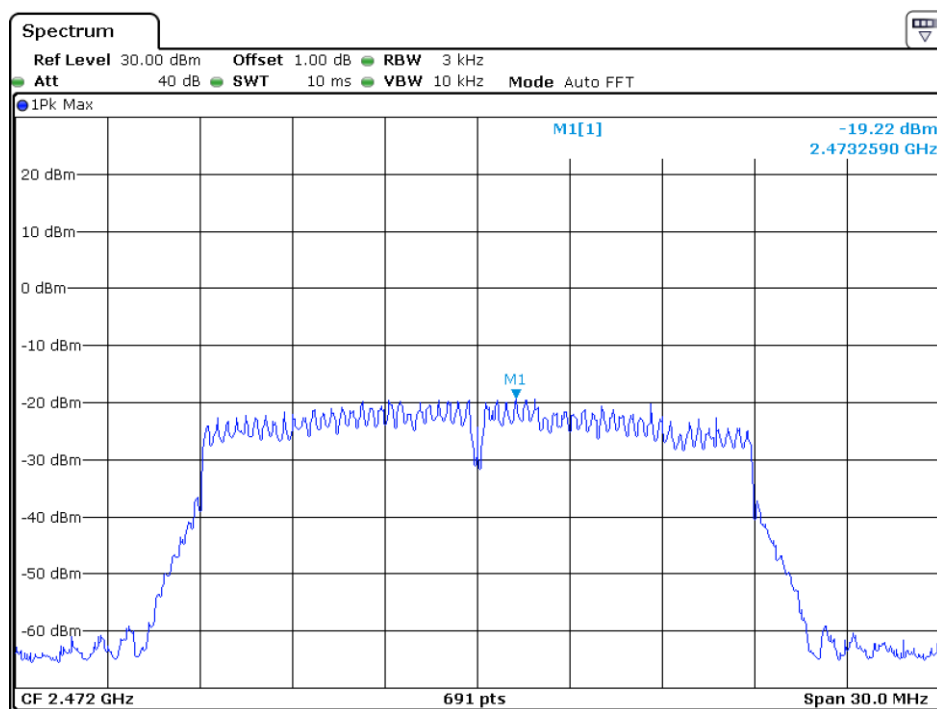
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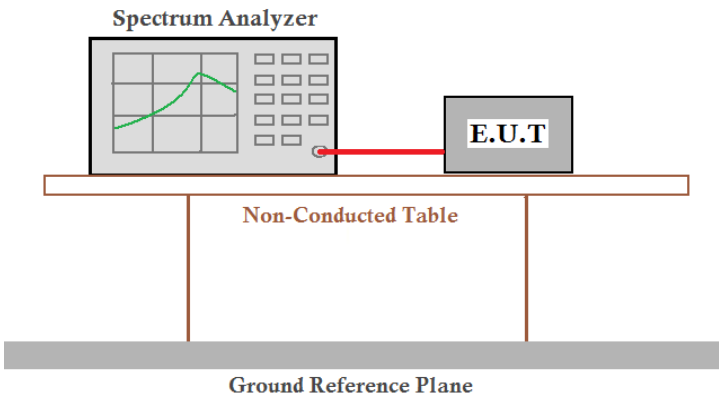
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## 2.7 Band-edge for RF Conducted Emissions

|                        |                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (d)                                                                                                                                                                                                                                                                                                                                                      |
| Test Method:           | ANSI C63.10: 2013 Section 11.13                                                                                                                                                                                                                                                                                                                                                         |
| Test Setup:            |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>                              |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                                                                                                                                                                                                                                   |
| Final Test Mode:       | Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G ;<br>6.5Mbps of rate is the worst case of 802.11N(HT20) ;                                                                                                                                                                                                       |
| Limit:                 | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |
| Instruments Used:      | Refer to section 5.10 for details                                                                                                                                                                                                                                                                                                                                                       |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                    |

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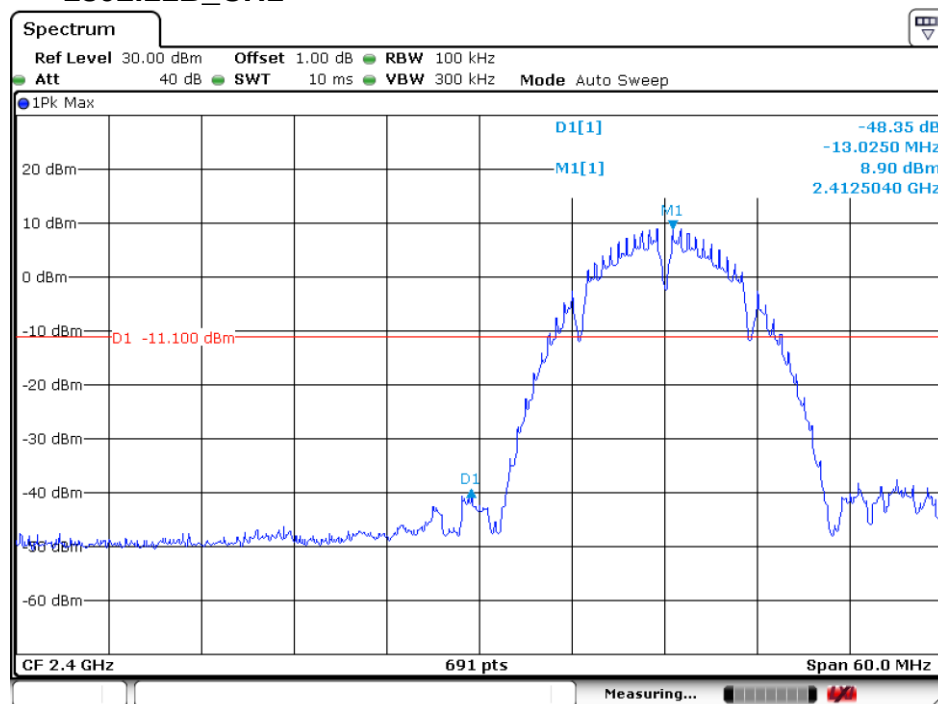
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## 2.7.1 Test plots

### 2.7.1.1 1802.11B\_CH1



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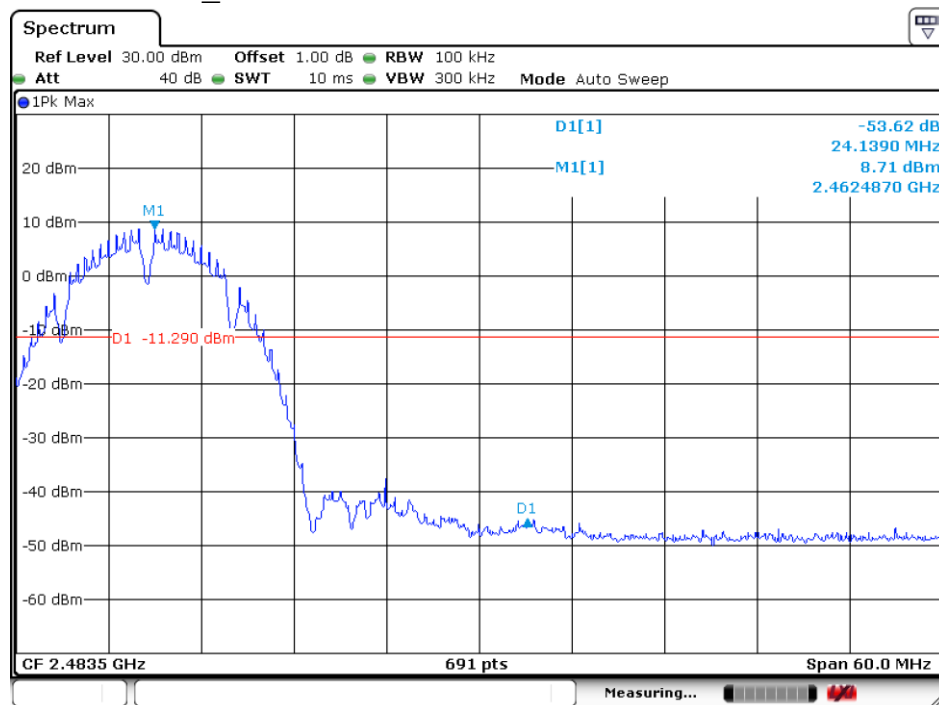
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2.7.1.2

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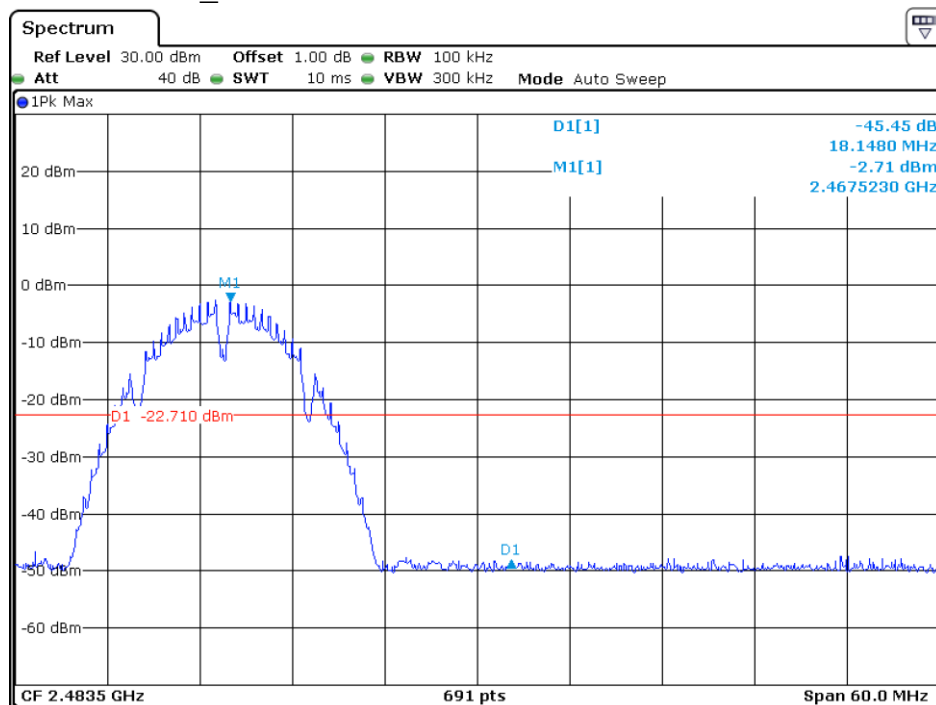
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2.7.1.3

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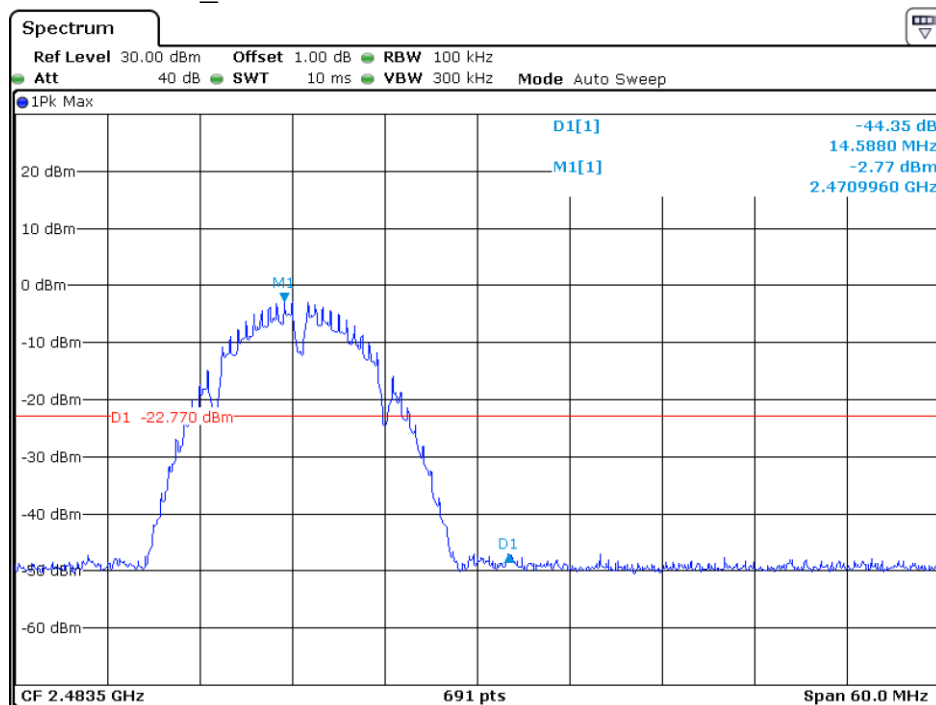
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2.7.1.4

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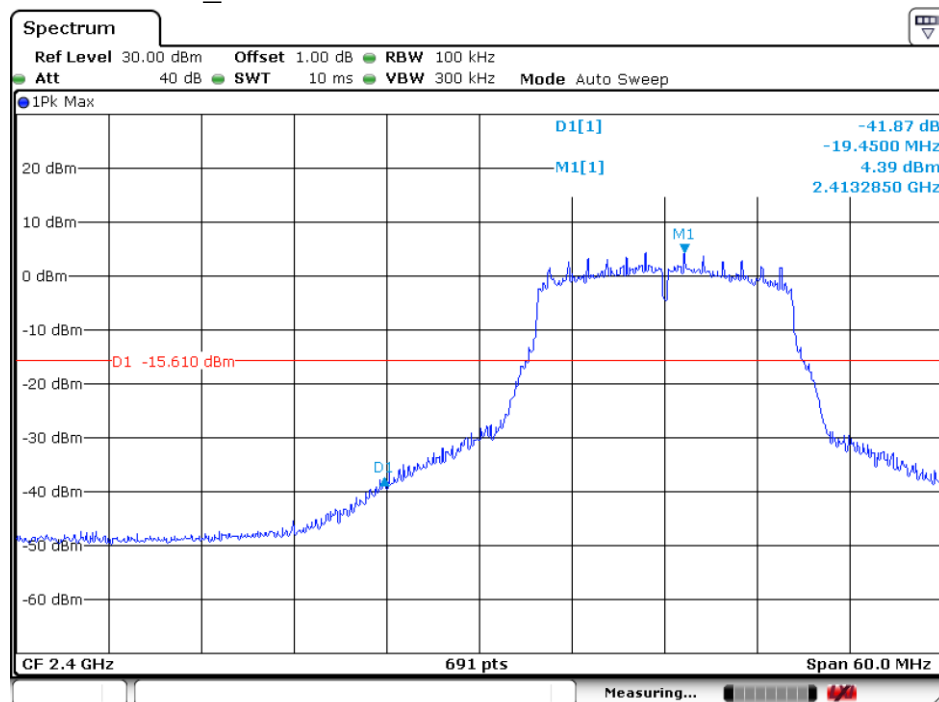
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2.7.1.5

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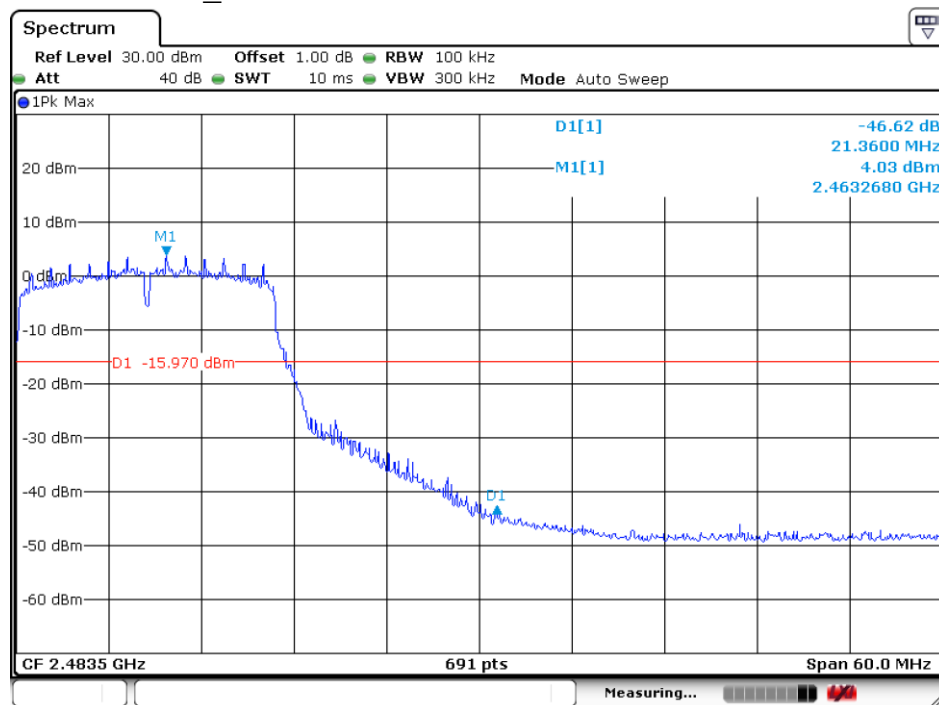
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2.7.1.6

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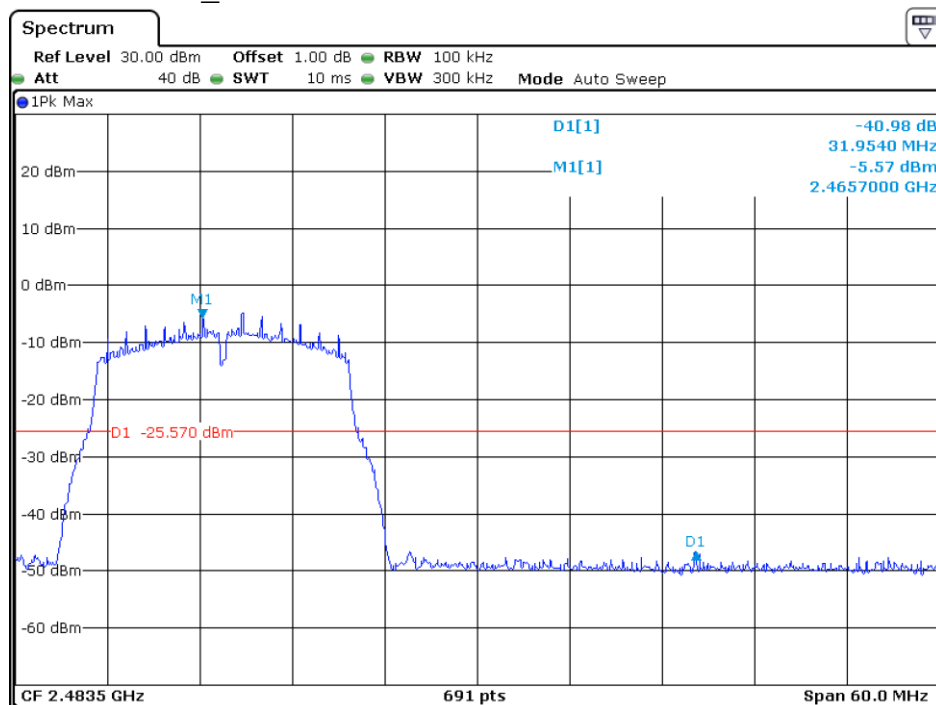
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2.7.1.7

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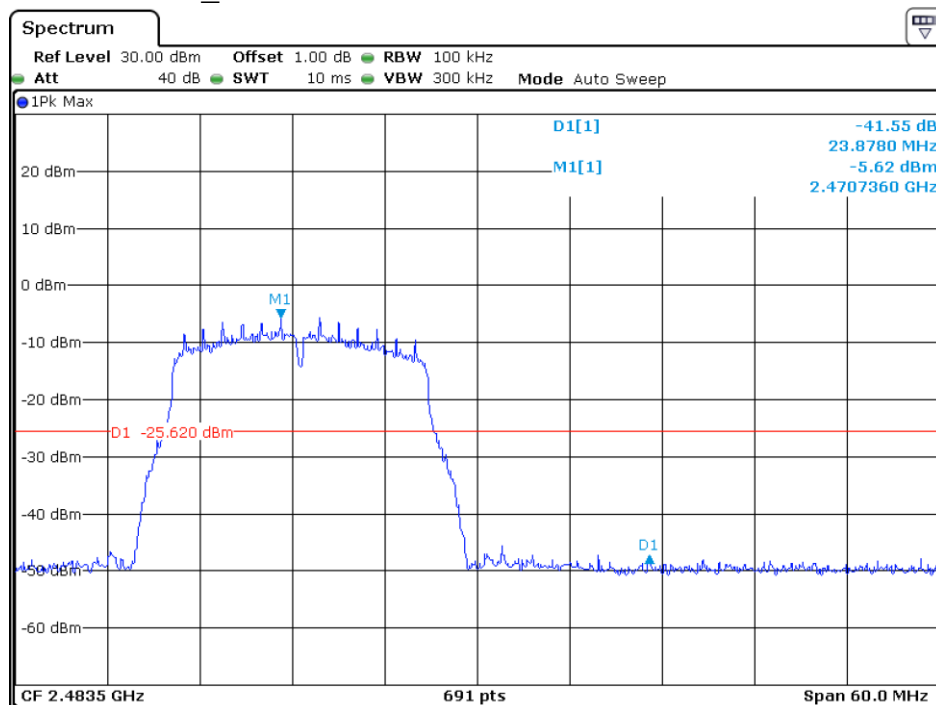
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2.7.1.8

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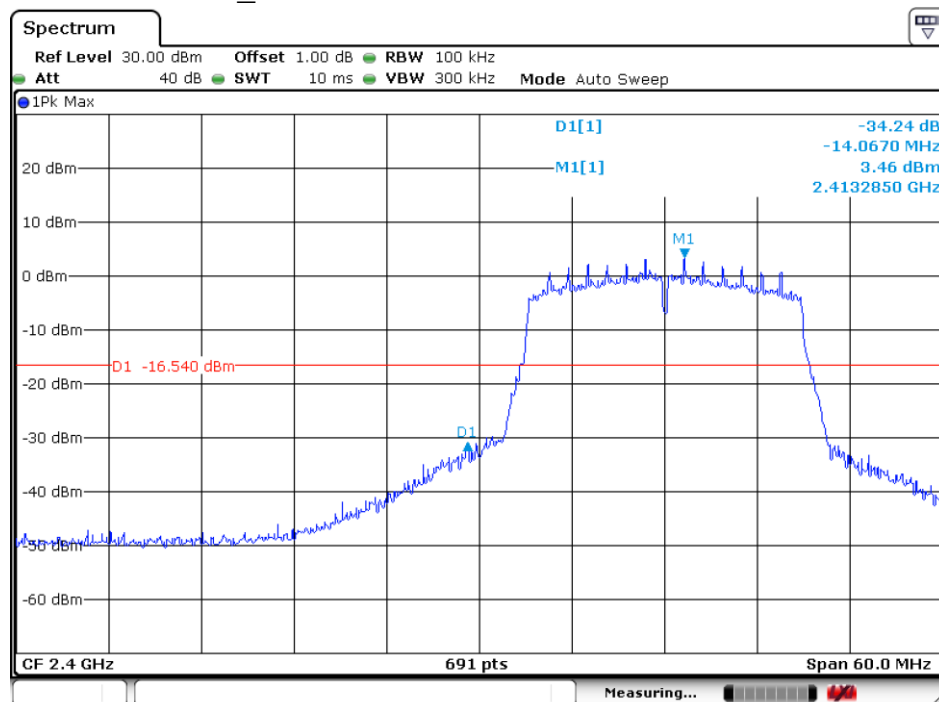
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2.7.1.9

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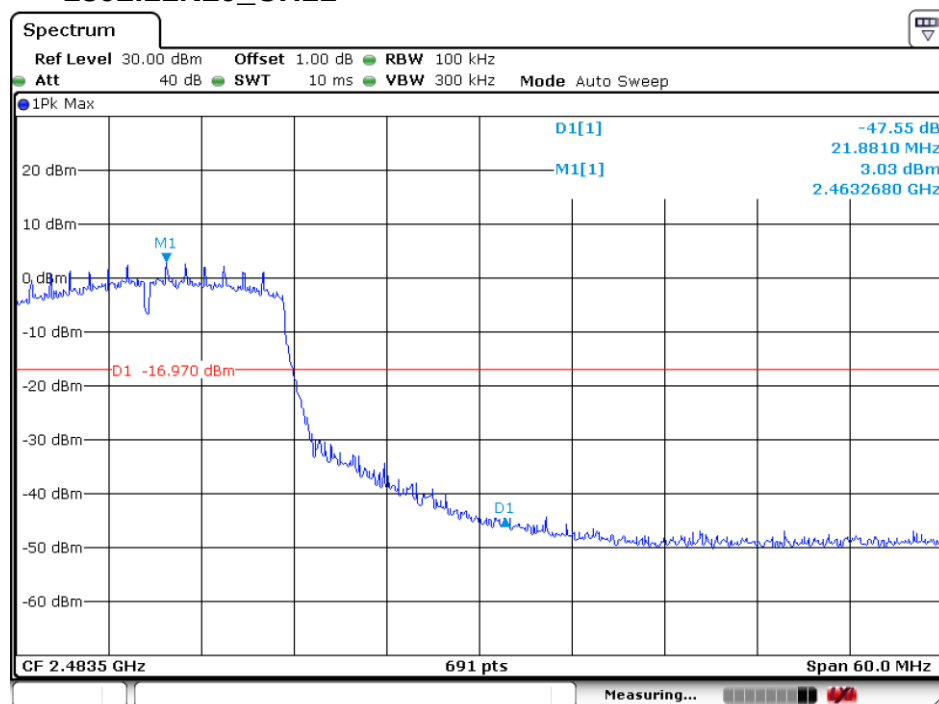
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2.7.1.10

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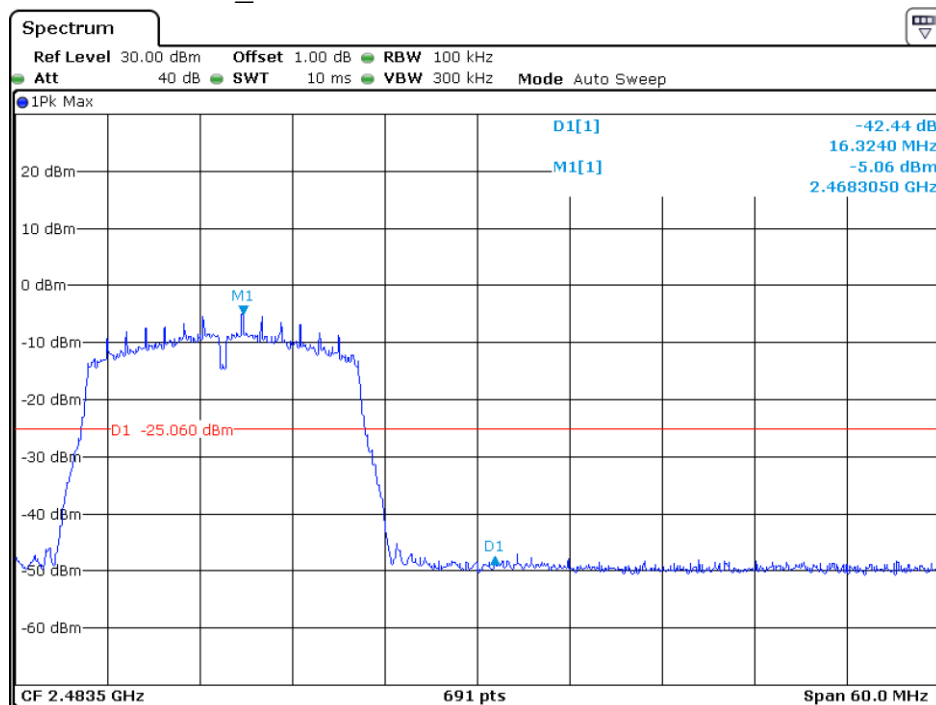
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2.7.1.11 1802.11N20\_CH12



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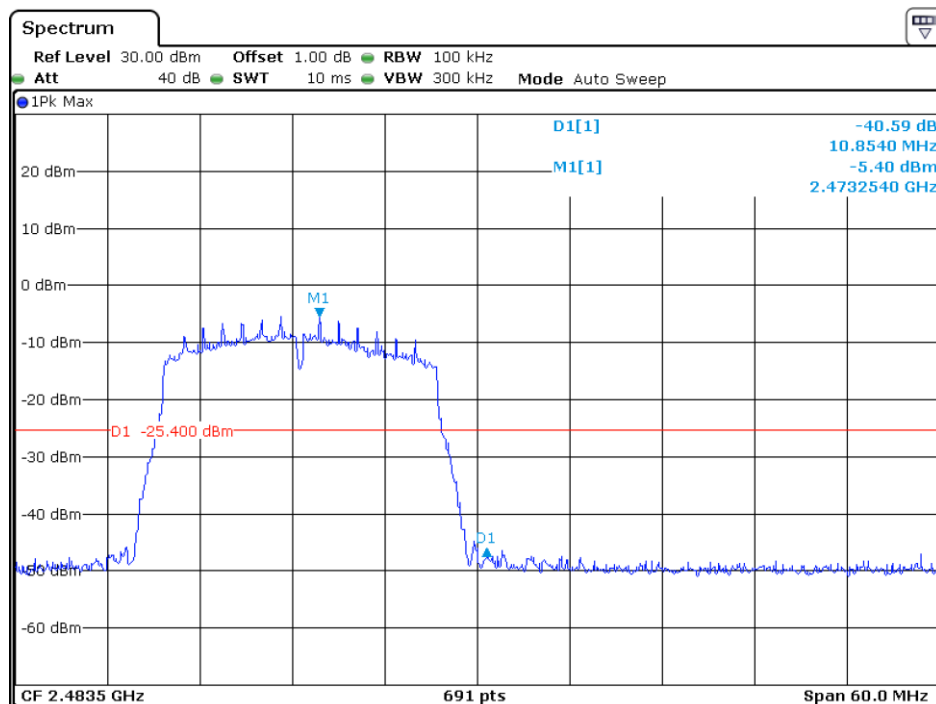
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2.7.1.12

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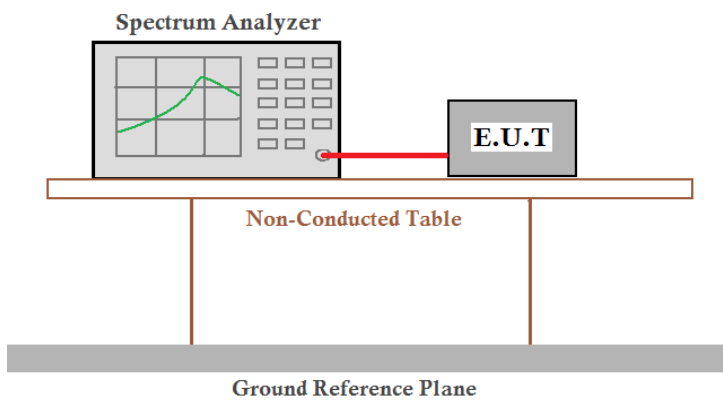
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## 2.8 RF Conducted Spurious Emissions

|                        |                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:      | 47 CFR Part 15C Section 15.247 (d)                                                                                                                                                                                                                                                                                                                                                      |
| Test Method:           | ANSI C63.10: 2013 Section 11.11                                                                                                                                                                                                                                                                                                                                                         |
| Test Setup:            |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>                              |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates                                                                                                                                                                                                                                                                                                                                   |
| Final Test Mode:       | Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G;<br>6.5Mbps of rate is the worst case of 802.11N(HT20);                                                                                                                                                                                                         |
| Limit:                 | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |
| Instruments Used:      | Refer to section 5.10 for details                                                                                                                                                                                                                                                                                                                                                       |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                    |

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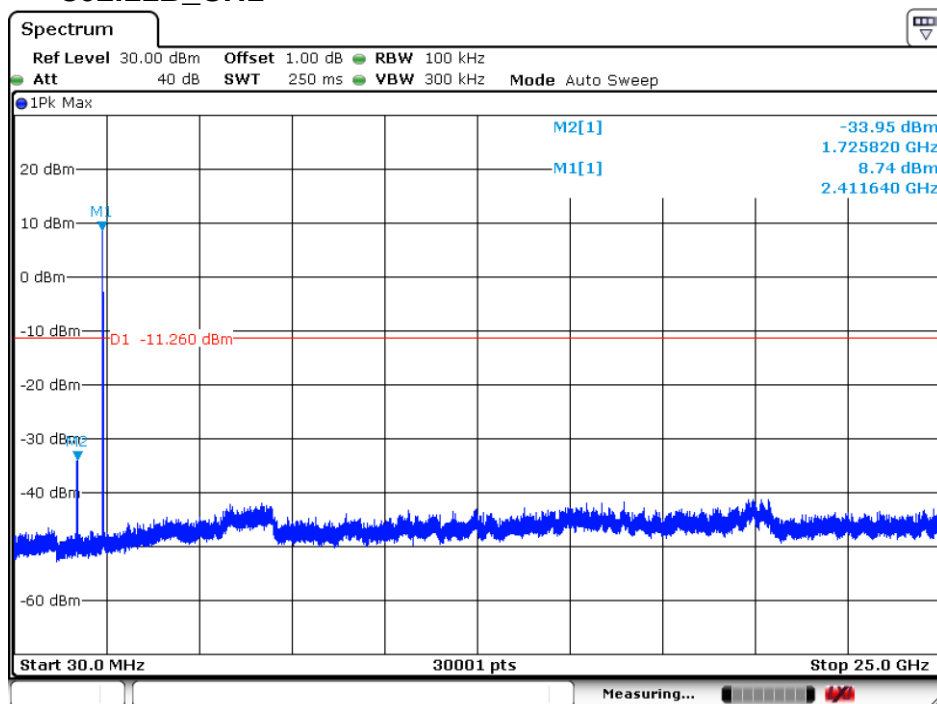
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## 2.8.1 Test plots

### 2.8.1.1 802.11B\_CH1



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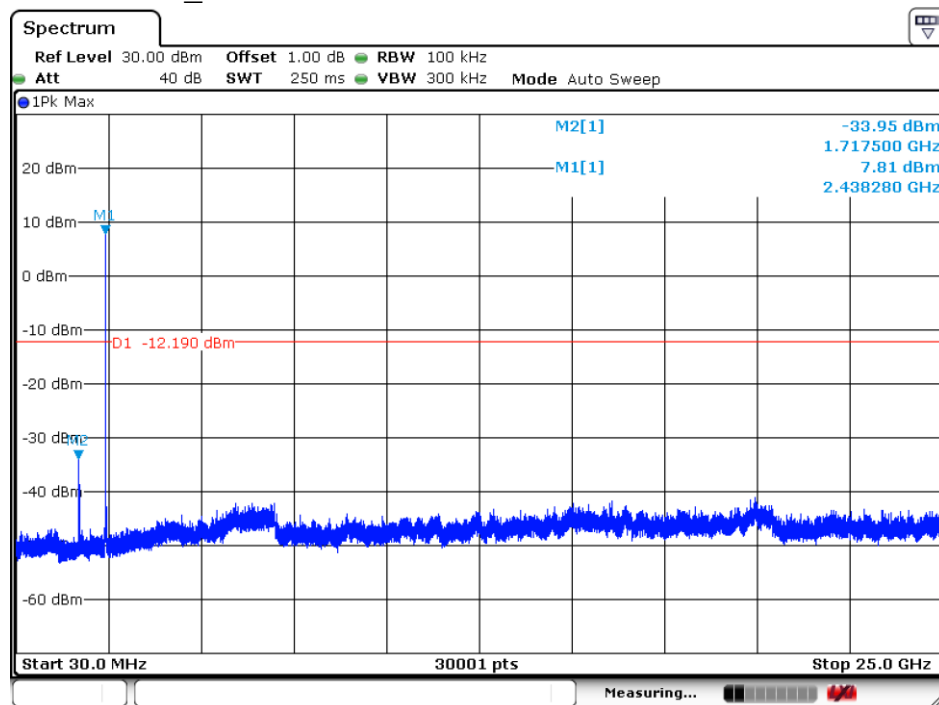
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2.8.1.2

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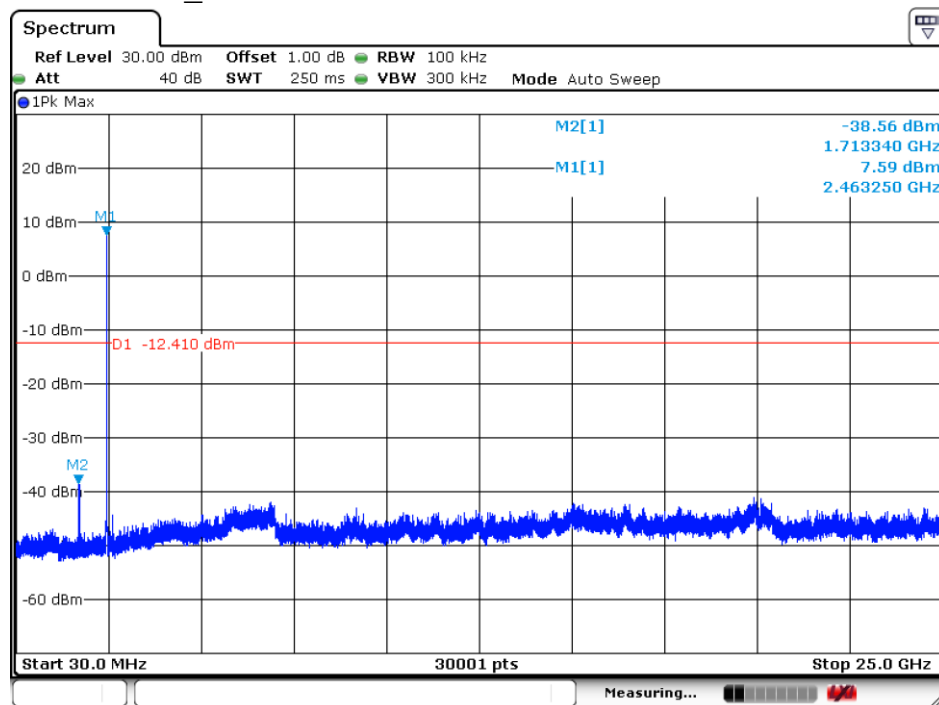
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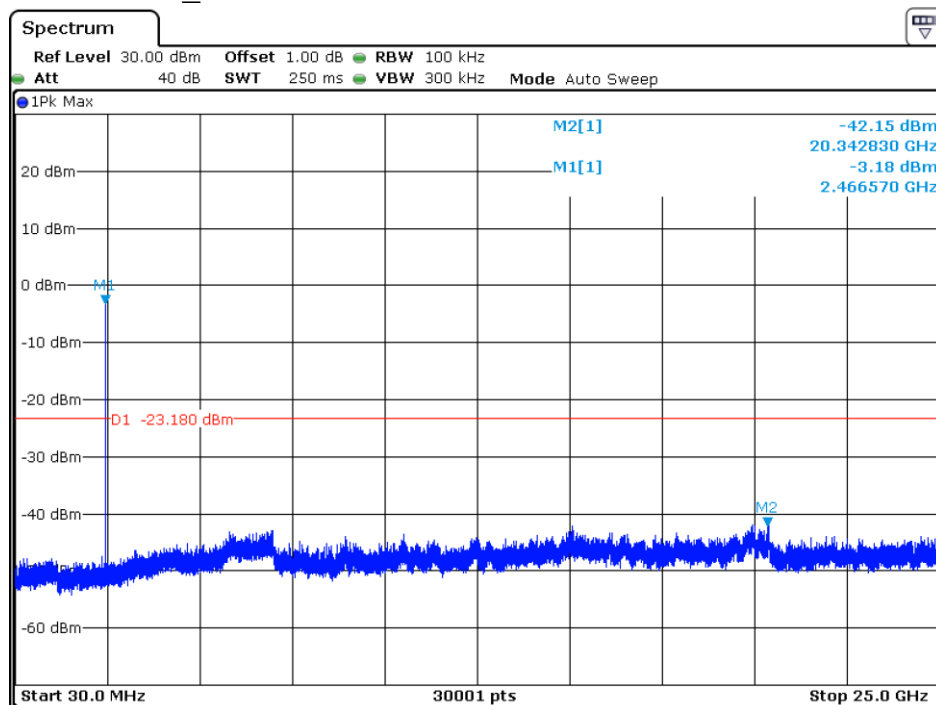
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2.8.1.4

802.11B\_CH12



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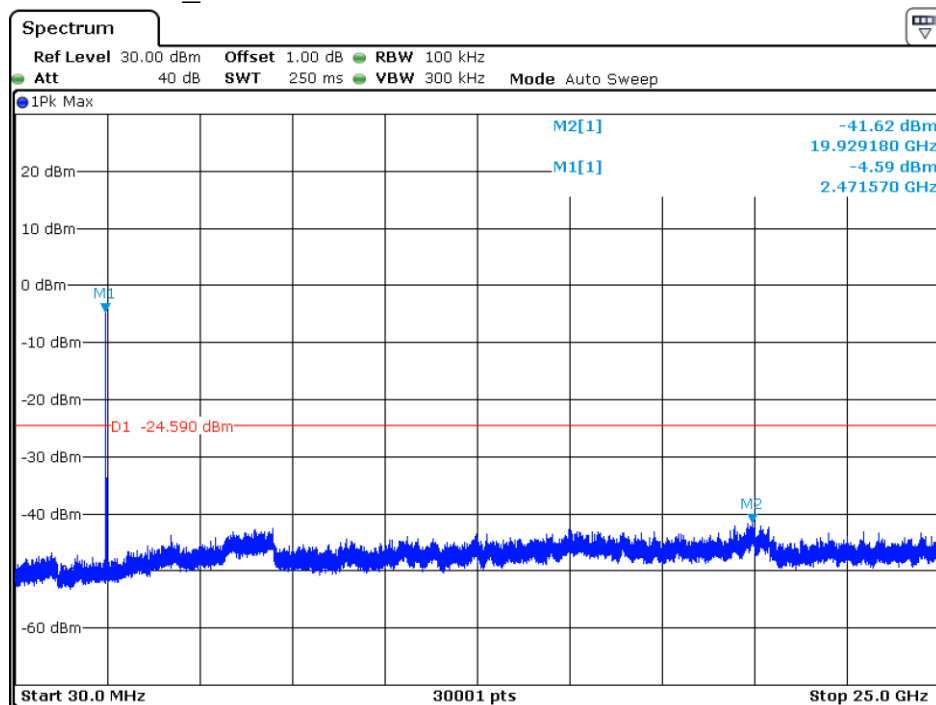
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2.8.1.5

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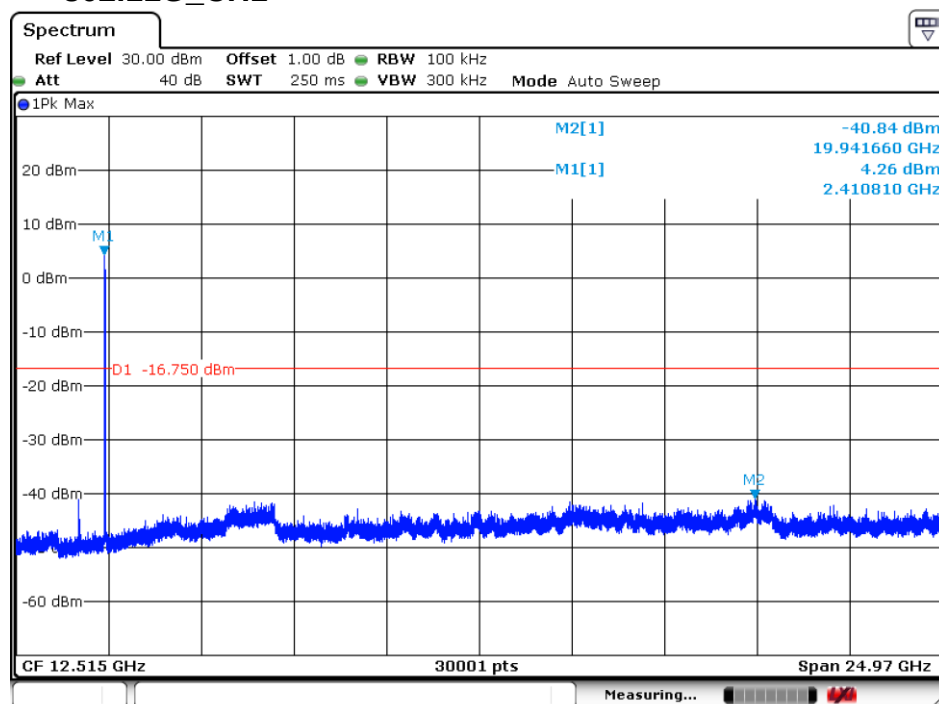
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## 802.11G CH1



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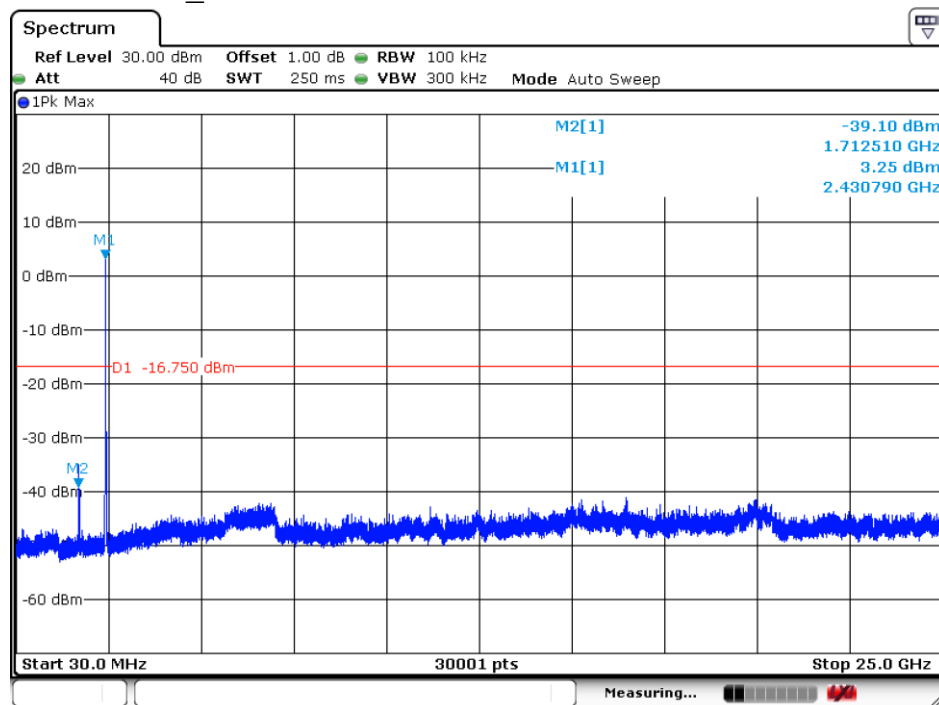
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2.8.1.7

802.11G\_CH6



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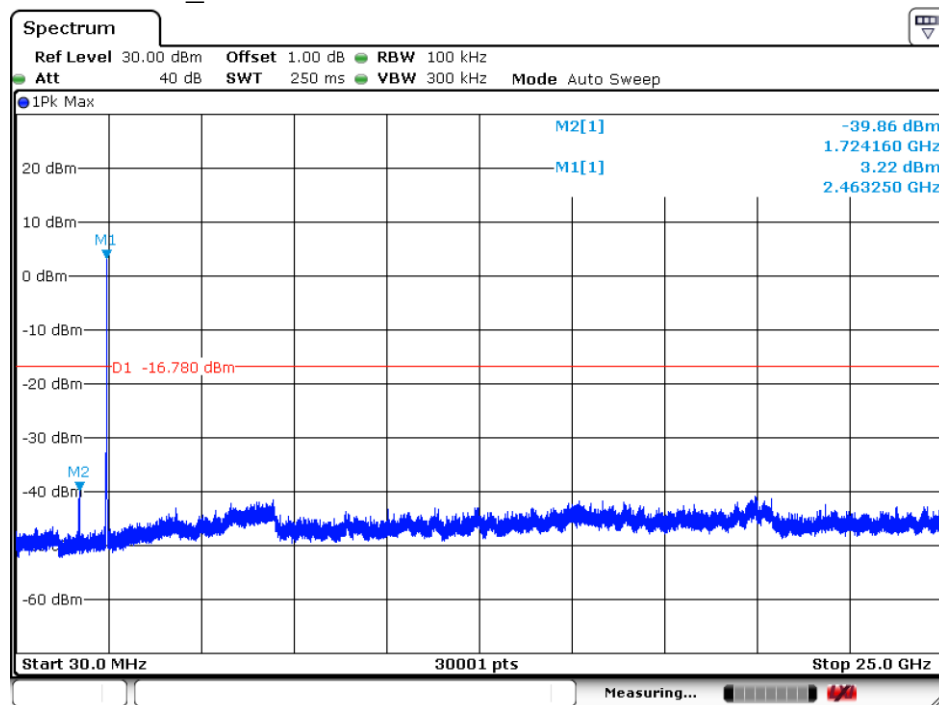
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2.8.1.8

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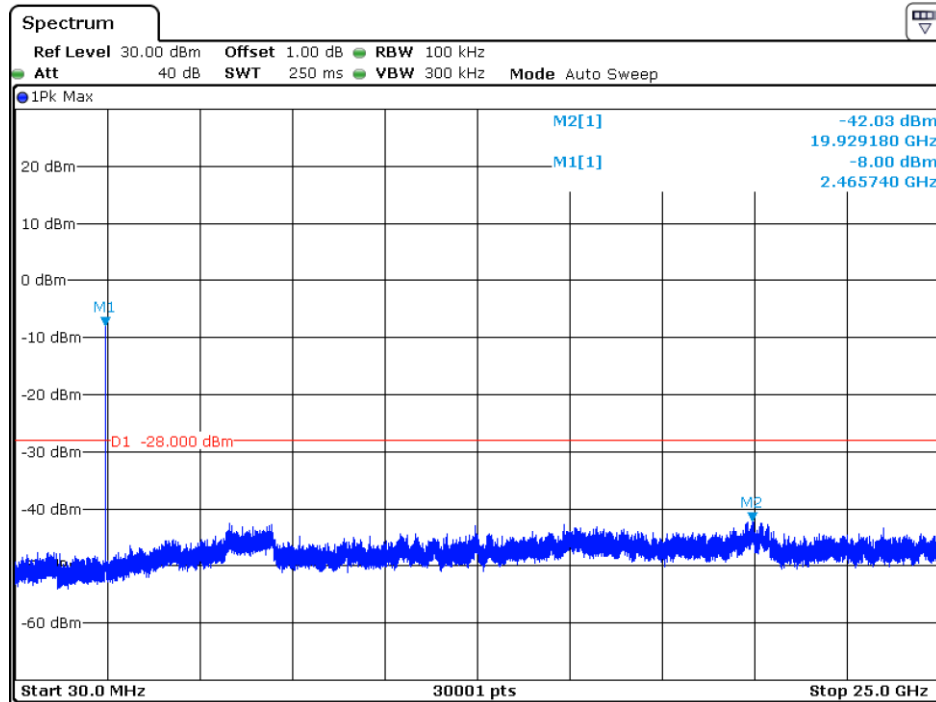
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2.8.1.9

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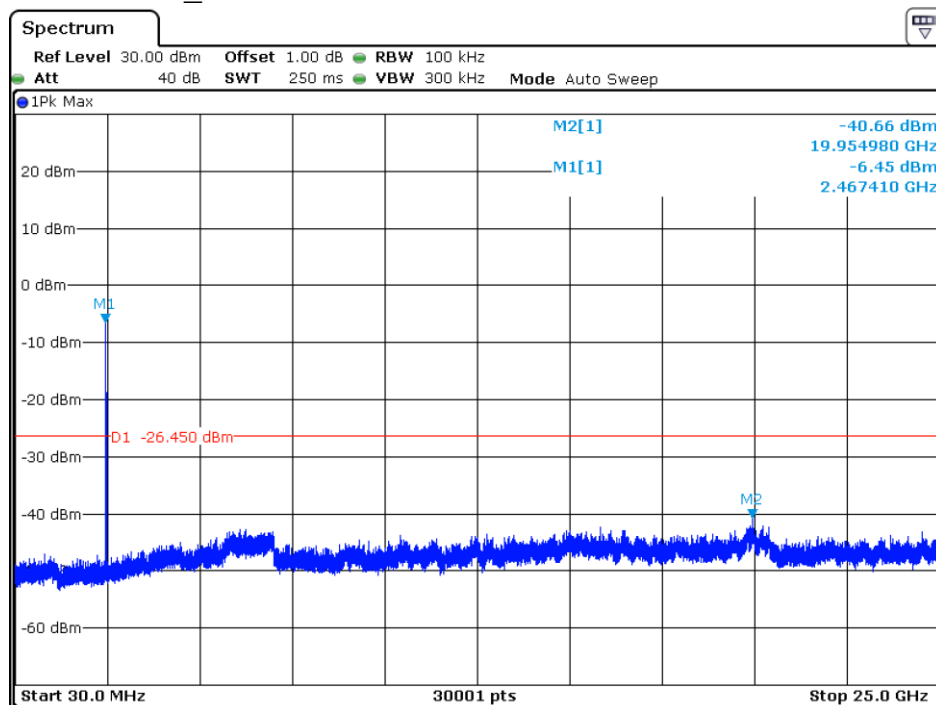
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2.8.1.10

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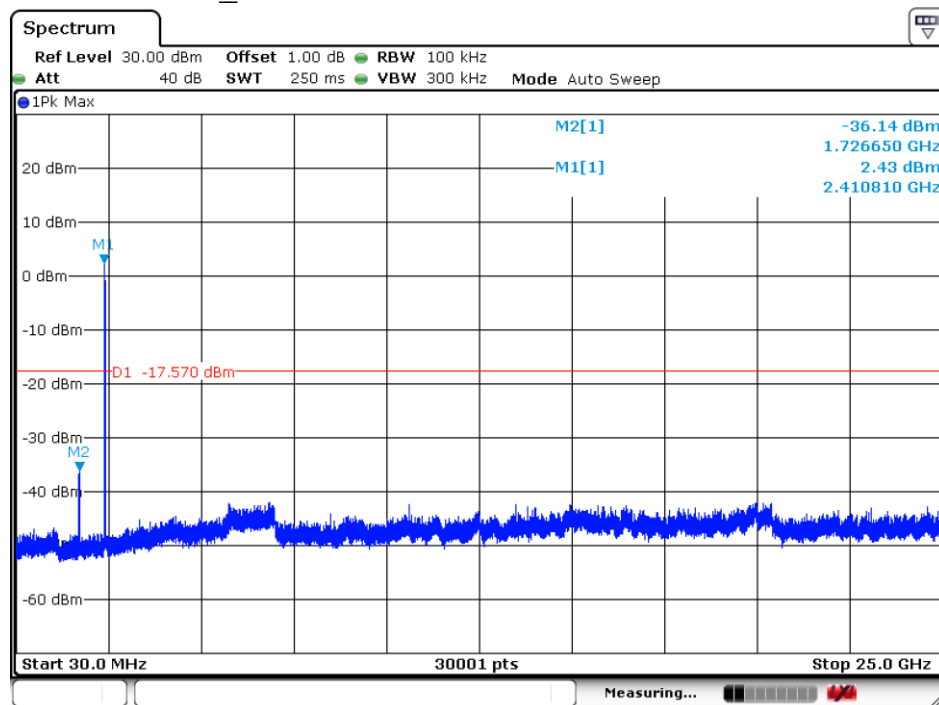
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2.8.1.11 802.11N20\_CH1



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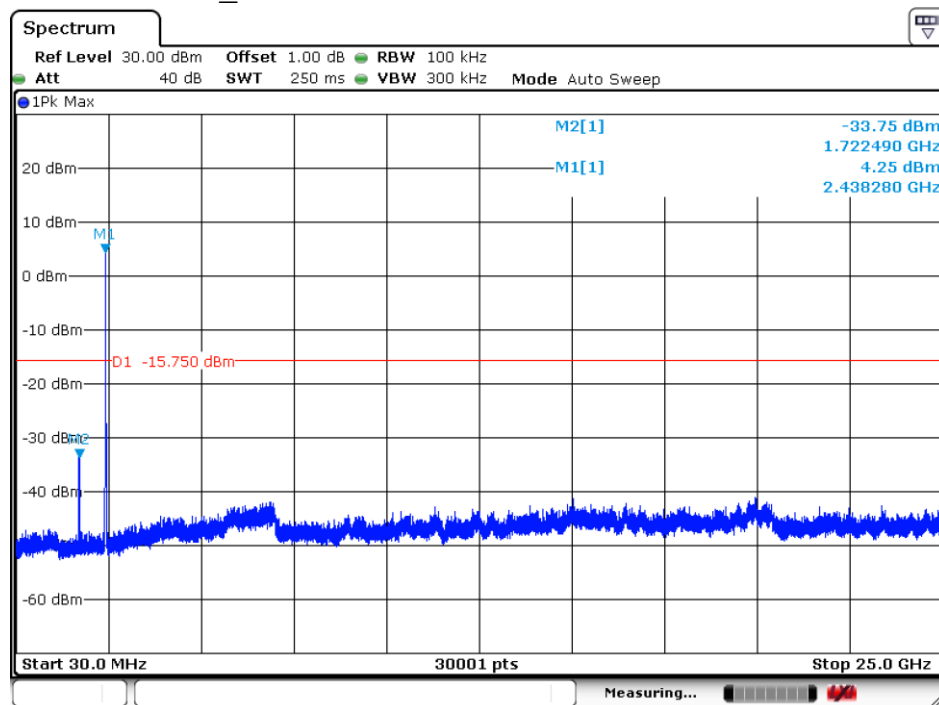
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2.8.1.12 802.11N20\_CH6



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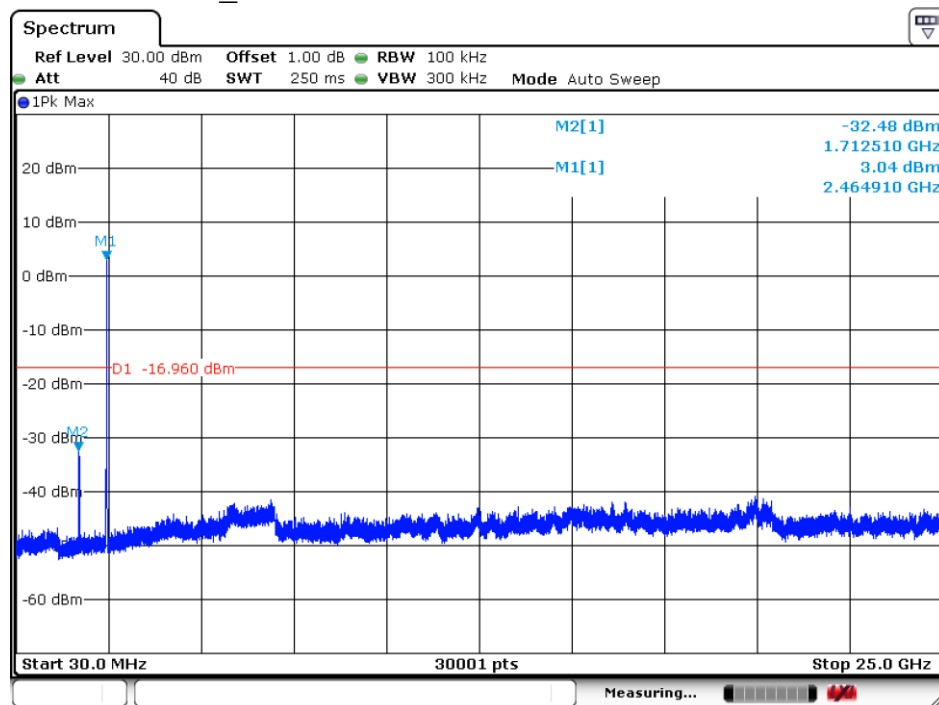
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