# FCC- TEST REPORT

| | | |
|---|---|---|
| Report Number | : | **68.910.17.020.01** Date of Issue: September 13, 2017 |
| Model | : | **V300S, V300HLB, V300ZLG, V300YLW, V300RLR, V301HLB, V301BLL, V301ZLG, V301YLW, V301RLR, V302HLB, V302BLL, V302ZLG, V302YLW, V302RLR, HX-V3000LB, HX-V3000LL, HX-V3000LG, HX-V3000LW, HX-V3000LR, HX-V3010LB, HX-V3010LL,HX-V3010LG,HX-V3010LW,HX-V3010LR** |
| Product Type | : | Robotic Vacuum Cleaner |
| Applicant | : | Shenzhen Hua Xin Information Technology Co., Ltd. |
| Address | : | Area B, 2nd Floor, Building B, Youxinda Industrial Park, Gongming St, Guangming New District, 518132 Shenzhen, PEOPLE'S REPUBLIC OF CHINA |
| Production Facility | : | Shenzhen Hua Xin Information Technology Co., Ltd. |
| Address | : | Area B, 2nd Floor, Building B, Youxinda Industrial Park, Gongming St, Guangming, 518132 Shenzhen, PEOPLE'S REPUBLIC OF CHINA |
| Test Result | : | ■ **Positive** ☐ **Negative** |
| Total pages including Appendices | : | 58 |

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# 2 Details about the Test Laboratory

**Details about the Test Laboratory**
Test Site 1

| | |
|---|---|
| Company name: | TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch<br>Building 12&13, Zhiheng Wisdomland Business Park,<br>Nantou Checkpoint Road 2, Nanshan District,<br>Shenzhen City, 518052,<br>P. R. China |
| FCC Registration Number: | 514049 |
| Telephone: | 86 755 8828 6998 |
| Fax: | 86 755 8828 5299 |

# 3 Description of the Equipment under Test

**Description of the Equipment Under Test**

| | |
|---|---|
| Product: | Robotic Vacuum Cleaner |
| Model no.: | V300S, HX-V3000LB |
| FCC ID: | 2AMYQ-20170822500 |
| Options and accessories: | NIL |
| Rated Input: | 100-240VAC, 50/60Hz (for Adapter); 19VDC (for Cleaner) |
| RF Transmission Frequency: | 2412-2462MHz |
| No. of Operated Channel: | 11 |
| Modulation: | CCK, DQPSK, DBPSK for 802.11b<br>QPSK,BPSK for 802.11g/n |
| Duty Cycle: | 100% |
| Antenna Type: | Integral Antenna |
| Antenna Gain: | 2dBi |
| Description of the EUT: | Tested with external approved adaptor GSCU0600S019V12E:<br>Input: 100-240V AC, 50/60Hz, 0.5A Max,<br>Output: 19V DC, 0.6A;<br>Or adaptor YLS0241A-T190100:<br>Input: 100-240V AC, 50/60Hz, 0.8A Max,<br>Output: 19V DC, 1.0A |


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# 4 Summary of Test Standards

| Test Standards | |
|---|---|
| FCC Part 15 Subpart C 10-1-2016 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

All the test methods were according to KDB558074 D01 v04 DTS Measurement Guidance and ANSI C63.10 (2013).


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# 5 Summary of Test Results

| Technical Requirements | | | | |
|---|---|---|---|---|
| **FCC Part 15 Subpart C** | | | | |
| Test Condition | | Pages | Test Result | Test Site |
| §15.207 | Conducted emission AC power port | --- | N/A | -- |
| §15.247(b)(1) | Conducted peak output power | 13 | Pass | Site 1 |
| §15.247(e) | Power spectral density* | 20 | Pass | Site 1 |
| §15.247(a)(2) | 6dB bandwidth | 14 | Pass | Site 1 |
| §15.247(a)(1) | 20dB bandwidth and 99% Occupied Bandwidth | 14 | Pass | Site 1 |
| §15.247(a)(1) | Carrier frequency separation | -- | N/A | -- |
| §15.247(a)(1)(iii) | Number of hopping frequencies | -- | N/A | -- |
| §15.247(a)(1)(iii) | Dwell Time | -- | N/A | -- |
| §15.247(d) | Spurious RF conducted emissions | 26 | Pass | Site 1 |
| §15.247(d) | Band edge | 32 | Pass | Site 1 |
| §15.247(d) & §15.209 & | Spurious radiated emissions for transmitter and receiver | 36 | Pass | Site 1 |
| §15.203 | Antenna requirement | See note 1 | Pass | -- |

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses a permanently integral antenna, which gain is 2dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.


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# 6 General Remarks

**Remarks**

This submittal(s) (test report) is intended for FCC ID: 2AMYQ--20170822500, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

All modes have same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction except color of appearance and the V300S, V300HLB, V300ZLG, V300YLW, V300RLR, V301HLB, V301BLL, V301ZLG, V301YLW, V301RLR, V302HLB, V302BLL, V302ZLG, V302YLW, V302RLR have Hand Vacuum Cleaner but the other models without Hand Vacuum Cleaner. So the EMC full tests were applied on V300S and HX-V3000LB, other models were deemed to fulfil the EMC requirement without the further test.

**SUMMARY:**

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: July 27, 2017

Testing Start Date: July 28, 2017

Testing End Date: August 28, 2017

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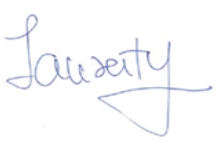
Reviewed by: Prepared by:



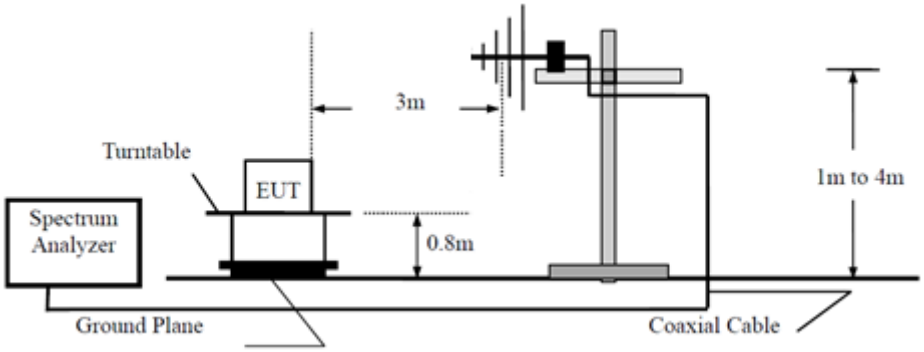
Laurent Yuan
EMC Project Manager

Dawi Xu
EMC Project Engineer

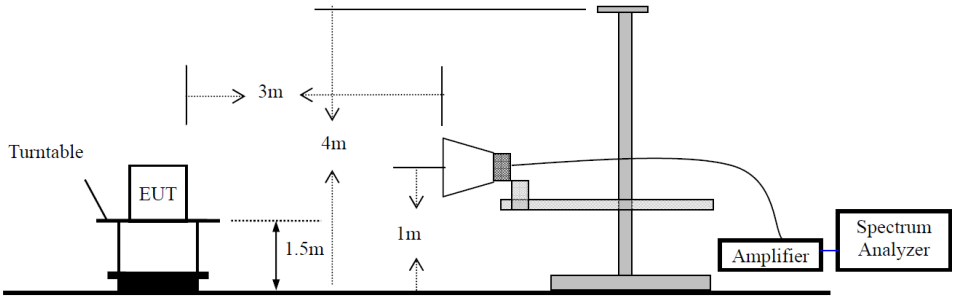
# 7 Test Setups

## 7.1 Radiated test setups

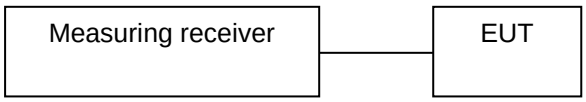
Below 1GHz




Above 1GHz




## 7.2 Conducted RF test setups





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# 8 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|---|---|---|---|
| --- | --- | --- | --- |

Test software: RF test tool

The system was configured to channel 1, 6 and 11 for the test.


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# 9 Technical Requirement

## 9.1

## 9.1 Conducted peak output power

**Test Method**

1. Connect the power meter to the EUT
   a) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
   b) At all times the EUT is transmitting at its maximum power control level.
   c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

**Limits**

According to §15.247 (b) (1), conducted peak output power limit as below:

| Frequency Range MHz | Limit W | Limit dBm |
|---|---|---|
| 2400-2483.5 | ≤1 | ≤30 |

Test result as below table

802.11b

| Frequency MHz | Conducted Peak Output Power dBm | Result |
|---|---|---|
| Top channel 2412MHz | 14.53 | Pass |
| Middle channel 2437MHz | 14.88 | Pass |
| Bottom channel 2462MHz | 14.36 | Pass |

802.11g

| Frequency MHz | Conducted Peak Output Power dBm | Result |
|---|---|---|
| Top channel 2412MHz | 14.06 | Pass |
| Middle channel 2437MHz | 13.79 | Pass |
| Bottom channel 2462MHz | 13.07 | Pass |


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| Frequency | Conducted Peak Output Power | Result |
|---|---|---|
| **MHz** | **dBm** | |
| Top channel 2412MHz | 13.98 | Pass |
| Middle channel 2437MHz | 13.75 | Pass |
| Bottom channel 2462MHz | 13.79 | Pass |

802.11nHT40

| Frequency | Conducted Peak Output Power | Result |
|---|---|---|
| **MHz** | **dBm** | |
| Top channel 2412MHz | 12.91 | Pass |
| Middle channel 2437MHz | 13.09 | Pass |
| Bottom channel 2462MHz | 13.00 | Pass |


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## 9.2 6dB and 99% bandwidth

**Test Method**

1. Use the following spectrum analyzer settings:
   RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

**Limit**

| Limit [kHz] |
|---|
| ≥500 |

Test result

802.11b

| Frequency MHz | 6dB bandwidth KHz | 99 bandwidth KHz | Result |
|---|---|---|---|
| Bottom channel 2412MHz | 10029 | 12200 | Pass |
| Middle channel 2437MHz | 10072 | 12200 | Pass |
| Top channel 2462MHz | 10072 | 121563 | Pass |

802.11g

| Frequency MHz | 6dB bandwidth KHz | 99 bandwidth KHz | Result |
|---|---|---|---|
| Bottom channel 2412MHz | 16454 | 16411 | Pass |
| Middle channel 2437MHz | 16411 | 16454 | Pass |
| Top channel 2462MHz | 16454 | 16411 | Pass |

802.11nHT20

| Frequency MHz | 6dB bandwidth KHz | 99 bandwidth KHz | Result |
|---|---|---|---|
| Bottom channel 2412MHz | 17670 | 17583 | Pass |
| Middle channel 2437MHz | 17627 | 17583 | Pass |
| Top channel 2462MHz | 17670 | 17583 | Pass |

802.11nHT40

| Frequency MHz | 6dB bandwidth KHz | 99 bandwidth KHz | Result |
|---|---|---|---|
| Bottom channel 2412MHz | 36382 | 36121 | Pass |
| Middle channel 2437MHz | 36382 | 36121 | Pass |
| Top channel 2462MHz | 36360 | 36121 | Pass |


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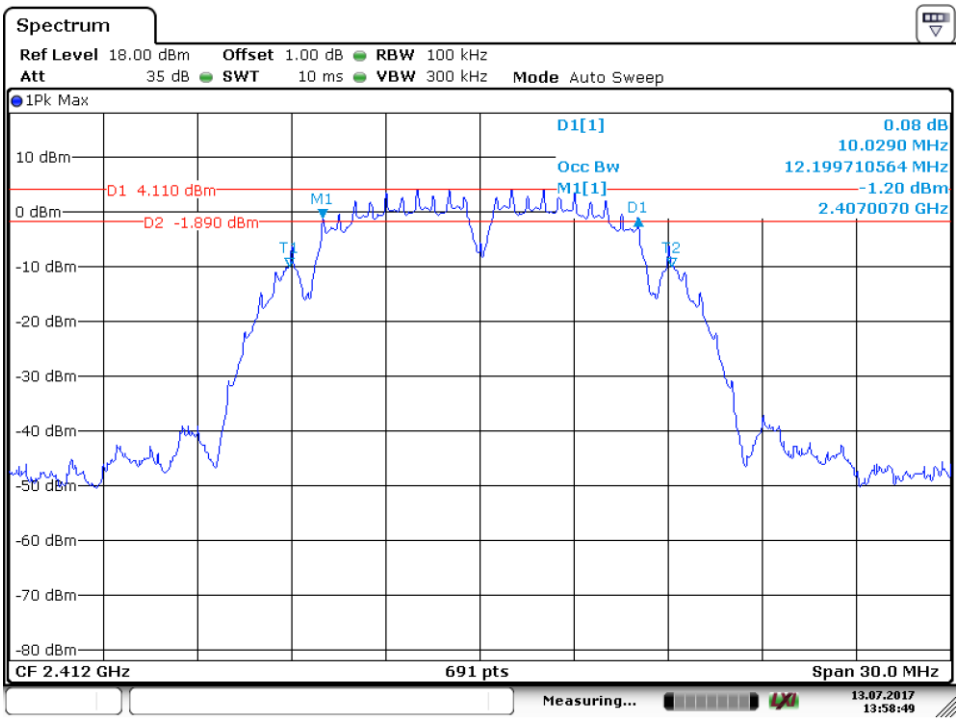
802.11b

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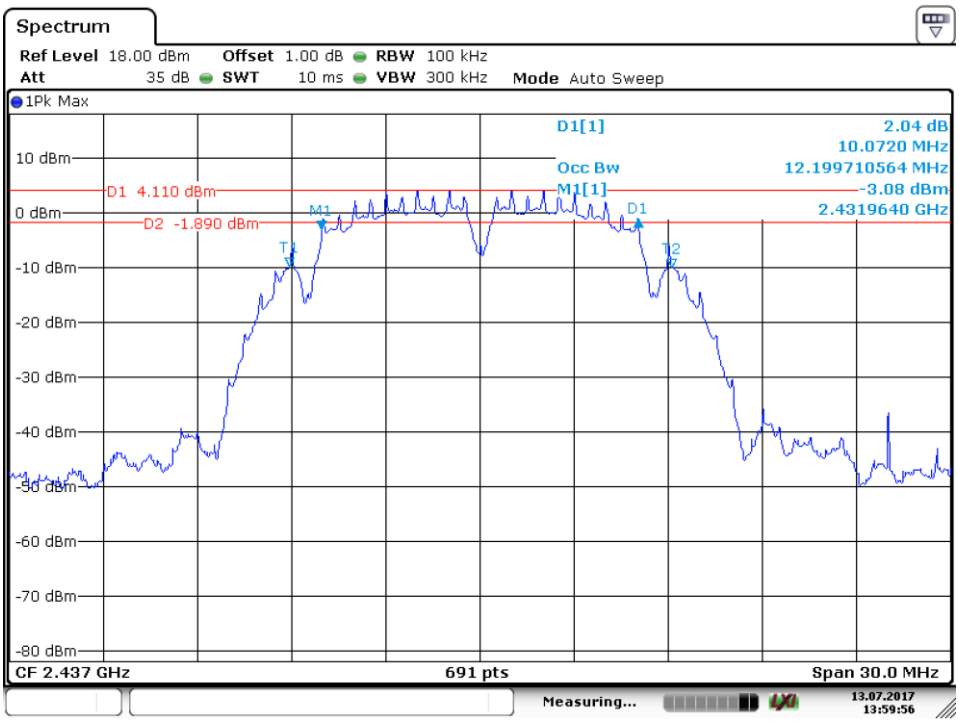
2412MHz

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2437MHz



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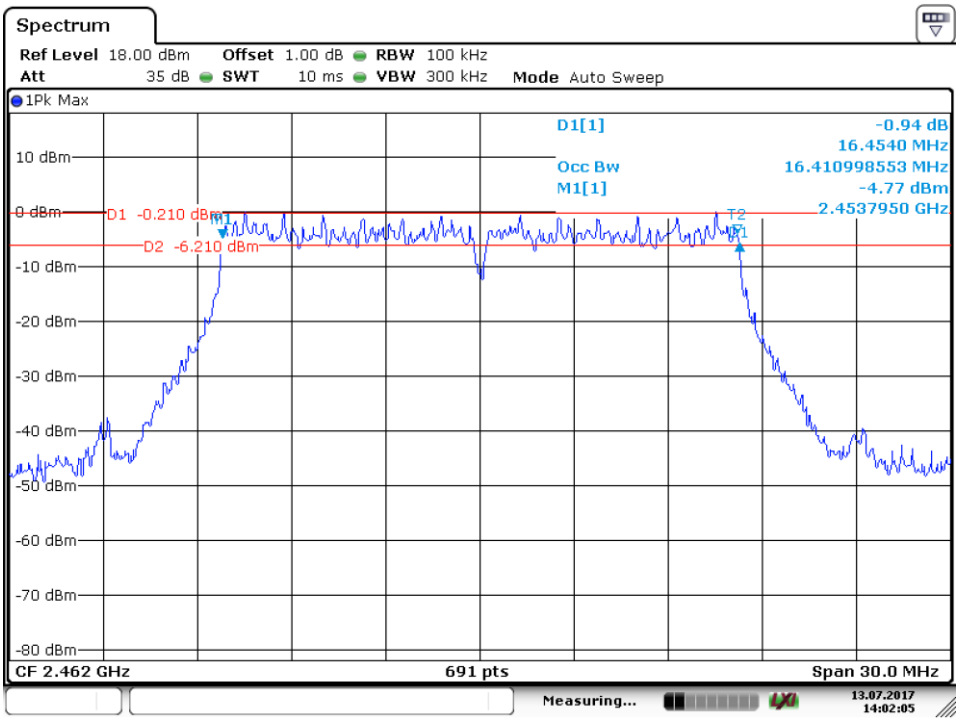


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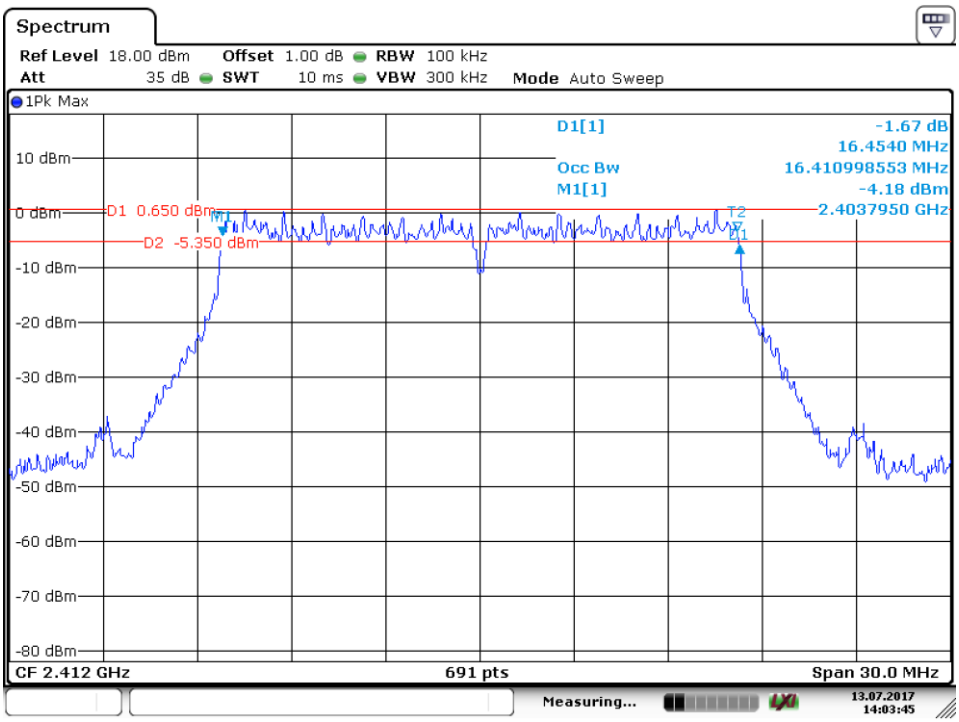
2462MHz

802.11g

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2412MHz



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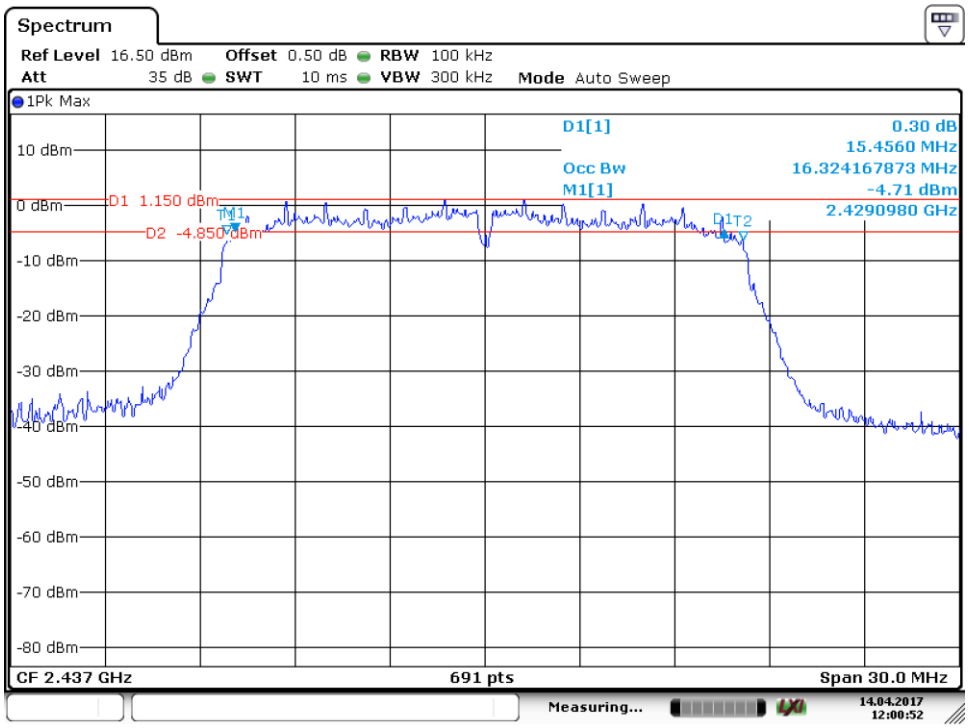


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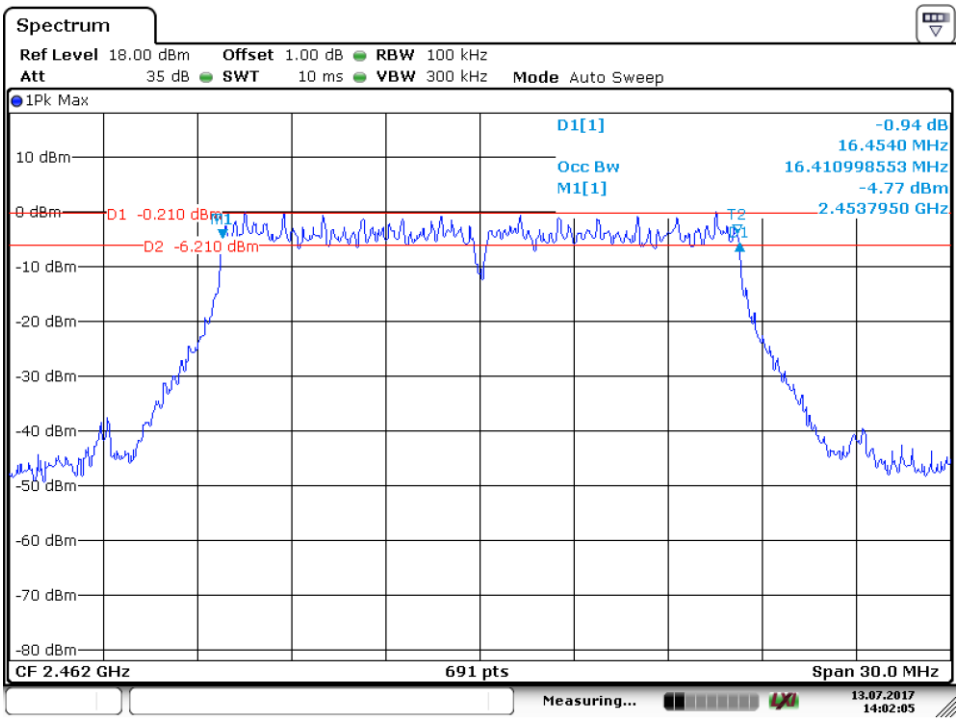
2437MHz

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2462MHz



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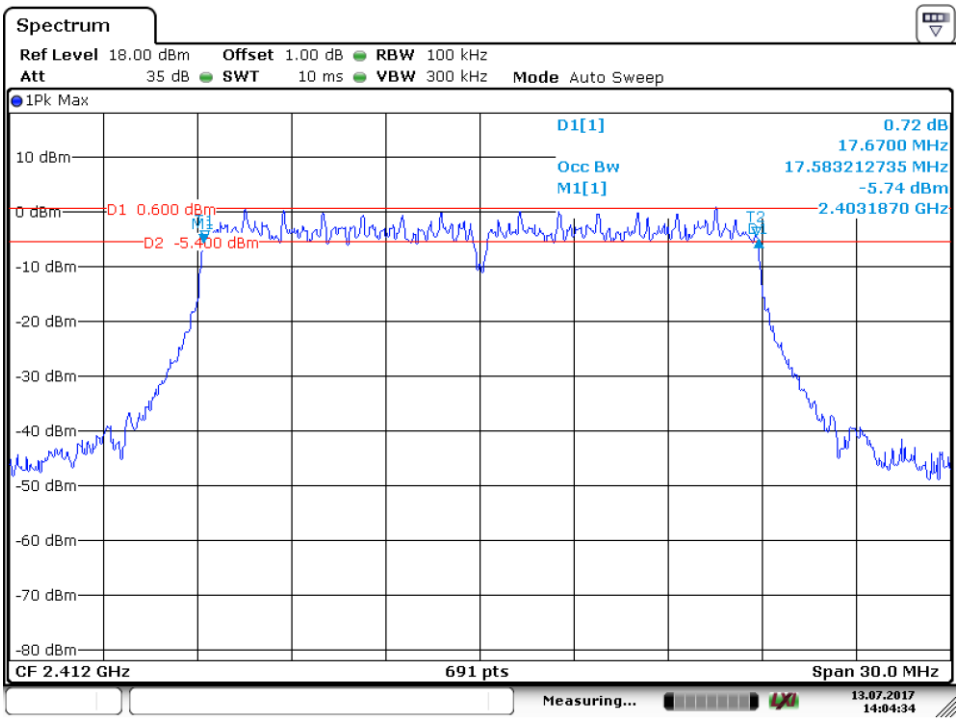
802.11nHT20

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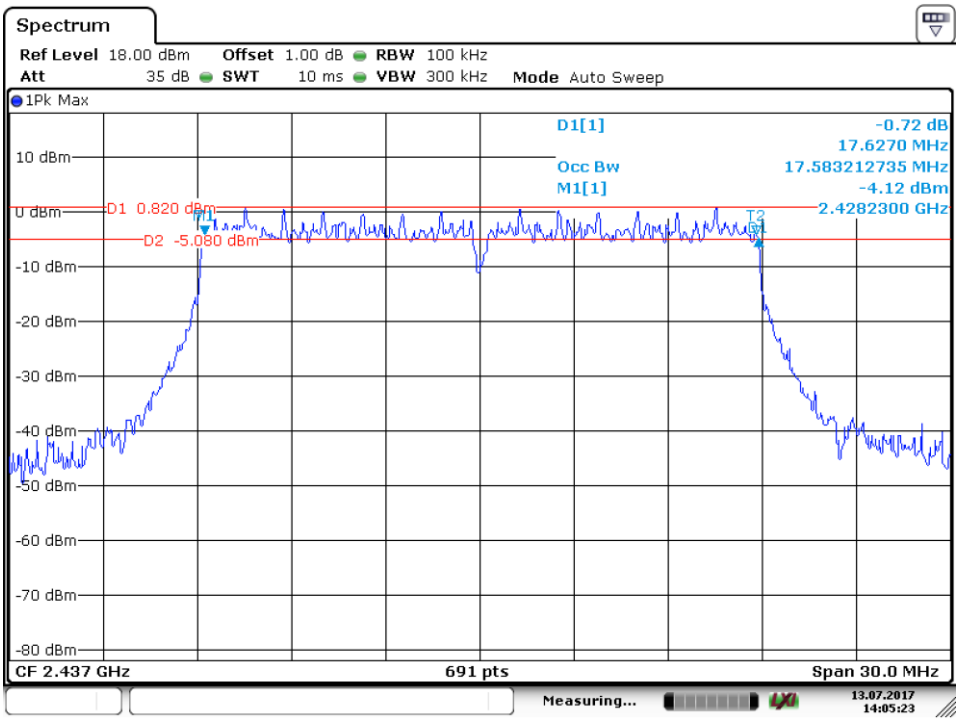
2412MHz

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2437MHz



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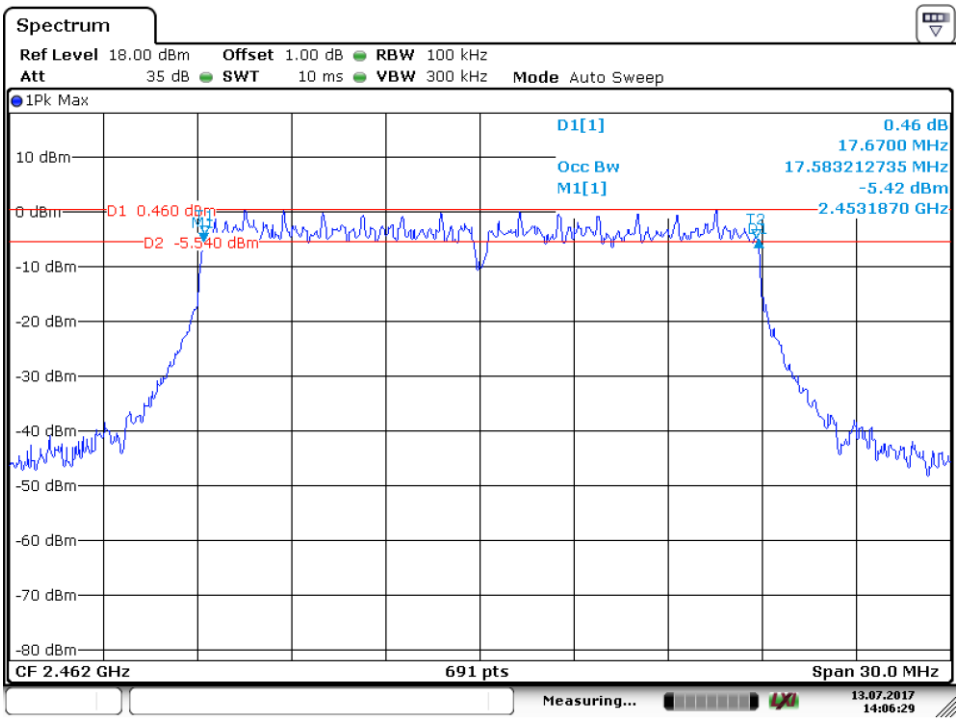


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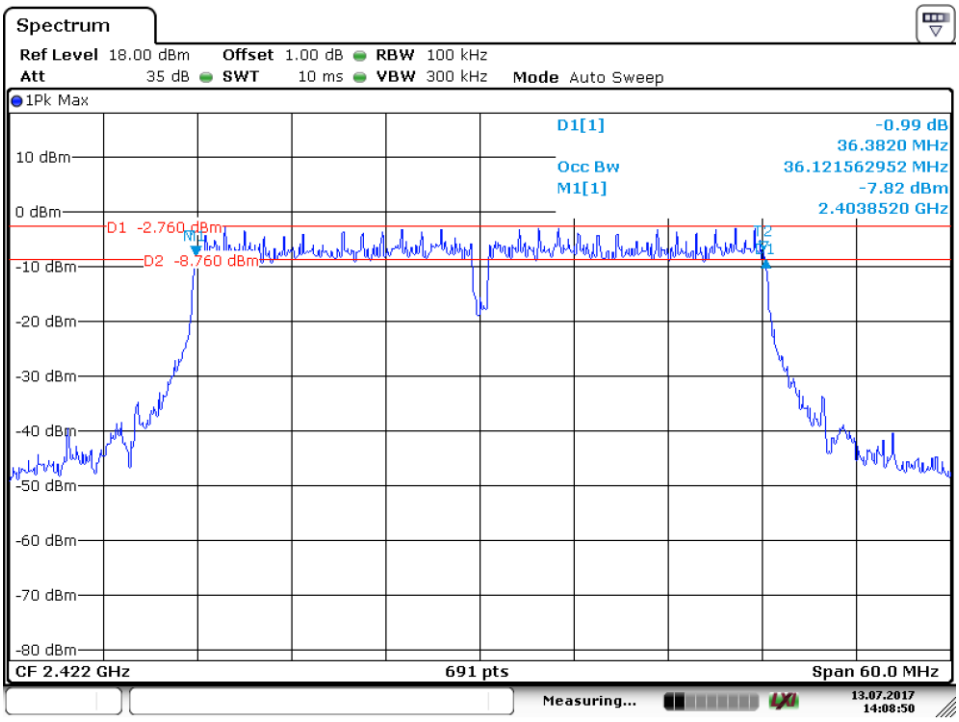
2462MHz

802.11nHT40

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2412MHz



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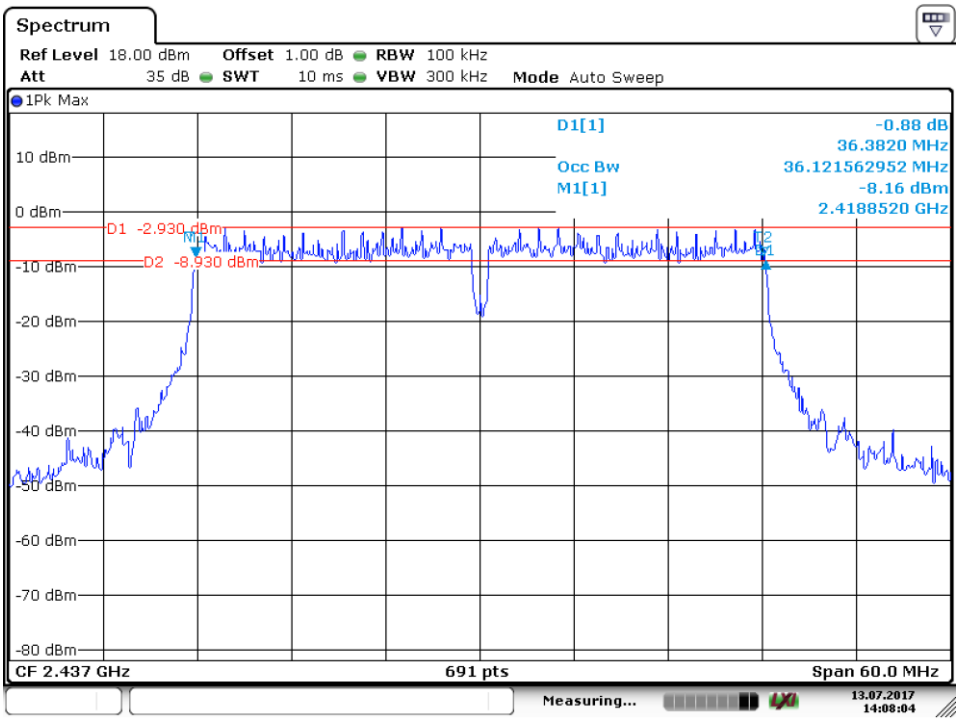


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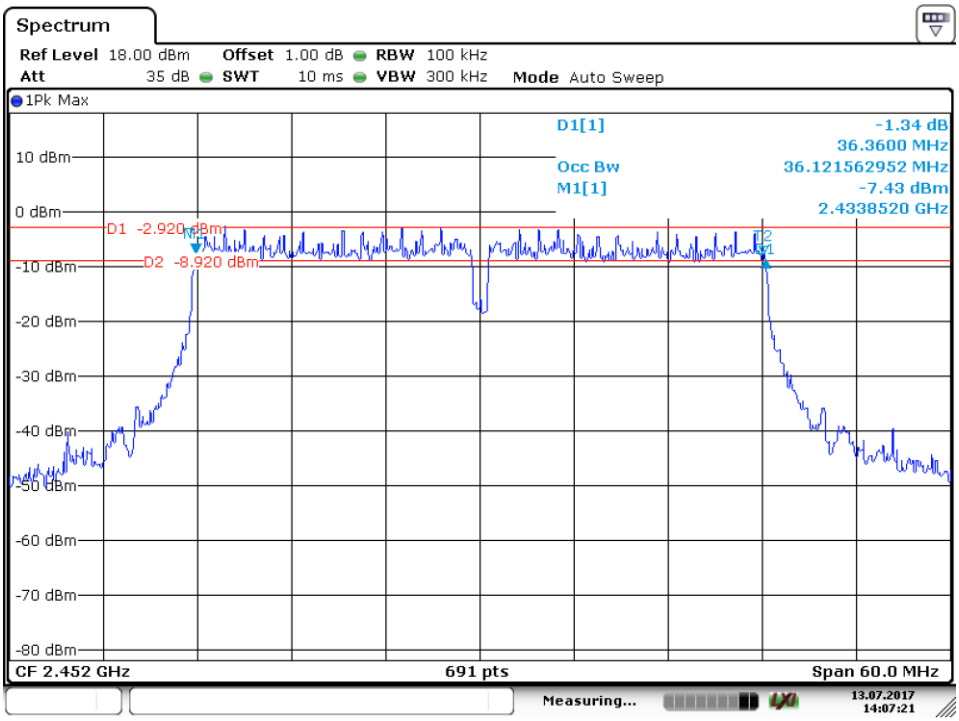
2437MHz

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2462MHz



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## 9.3 Power spectral density

**Test Method**

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

**Limit**

| Limit [dBm] |
|---|
| ≤8 |

Test result

802.11b

| Frequency | Power spectral density | Result |
|---|---|---|
| **MHz** | **dBm** | |
| Top channel 2412MHz | -2.10 | Pass |
| Middle channel 2437MHz | -1.80 | Pass |
| Bottom channel 2462MHz | -1.79 | Pass |

802.11g

| Frequency | Power spectral density | Result |
|---|---|---|
| **MHz** | **dBm** | |
| Top channel 2412MHz | -14.78 | Pass |
| Middle channel 2437MHz | -15.69 | Pass |
| Bottom channel 2462MHz | -14.54 | Pass |

802.11nHT20

| Frequency | Power spectral density | Result |
|---|---|---|
| **MHz** | **dBm** | |
| Top channel 2412MHz | -14.95 | Pass |
| Middle channel 2437MHz | -14.86 | Pass |
| Bottom channel 2462MHz | -15.39 | Pass |


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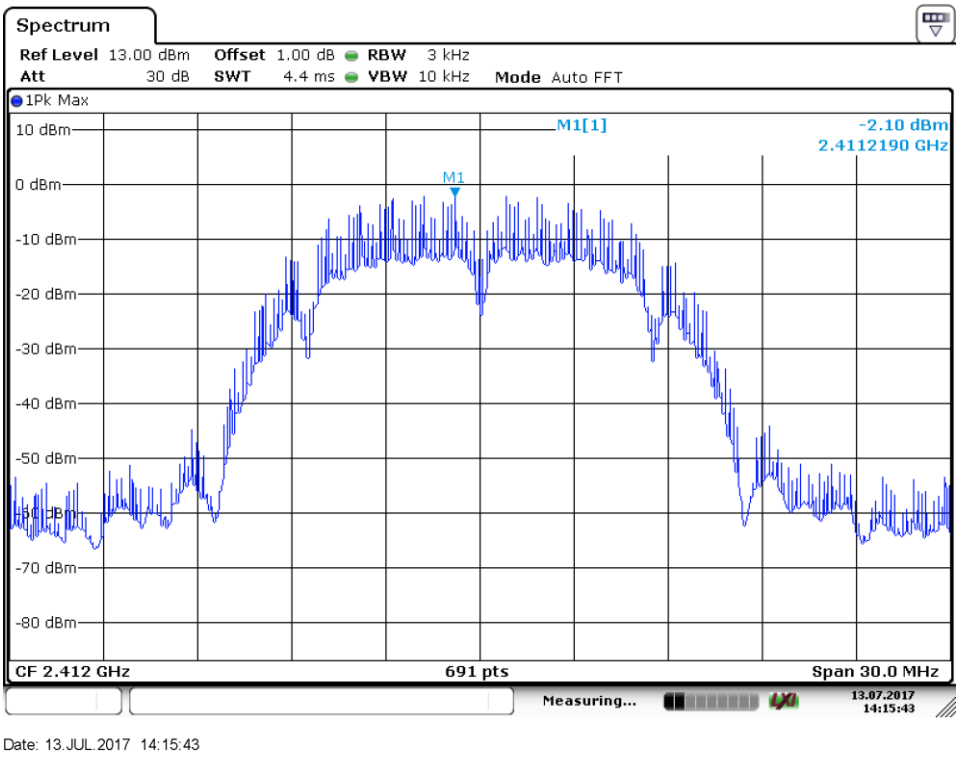
802.11nHT40

| Frequency | Power spectral density | Result |
|---|---|---|
| **MHz** | **dBm** | |
| Top channel 2412MHz | -18.85 | Pass |
| Middle channel 2437MHz | -19.44 | Pass |
| Bottom channel 2462MHz | -19.63 | Pass |

802.11b




2412MHz



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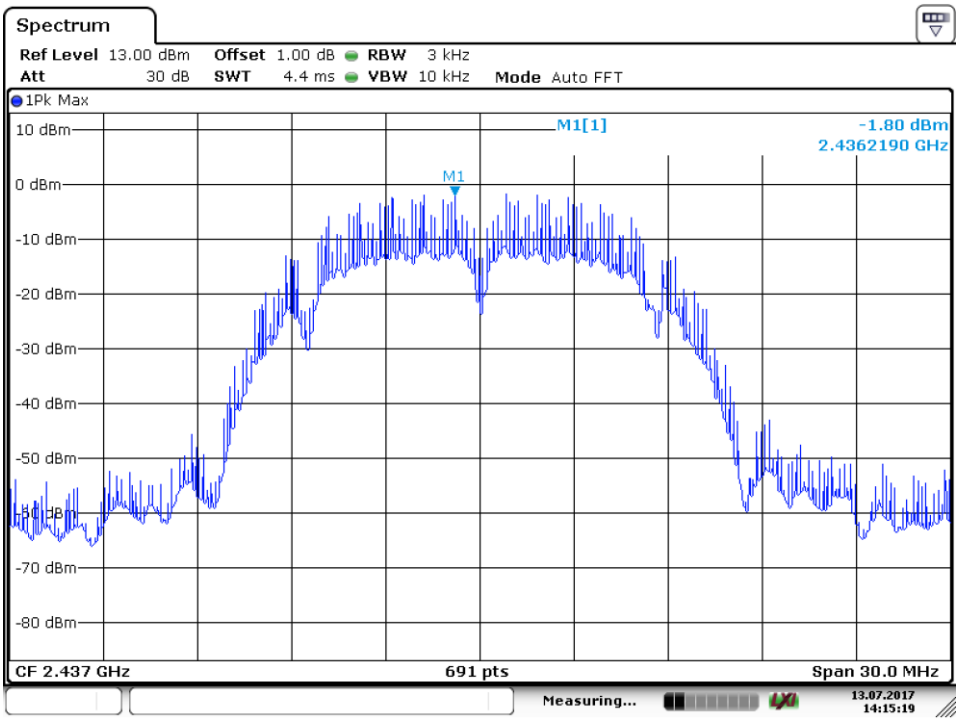


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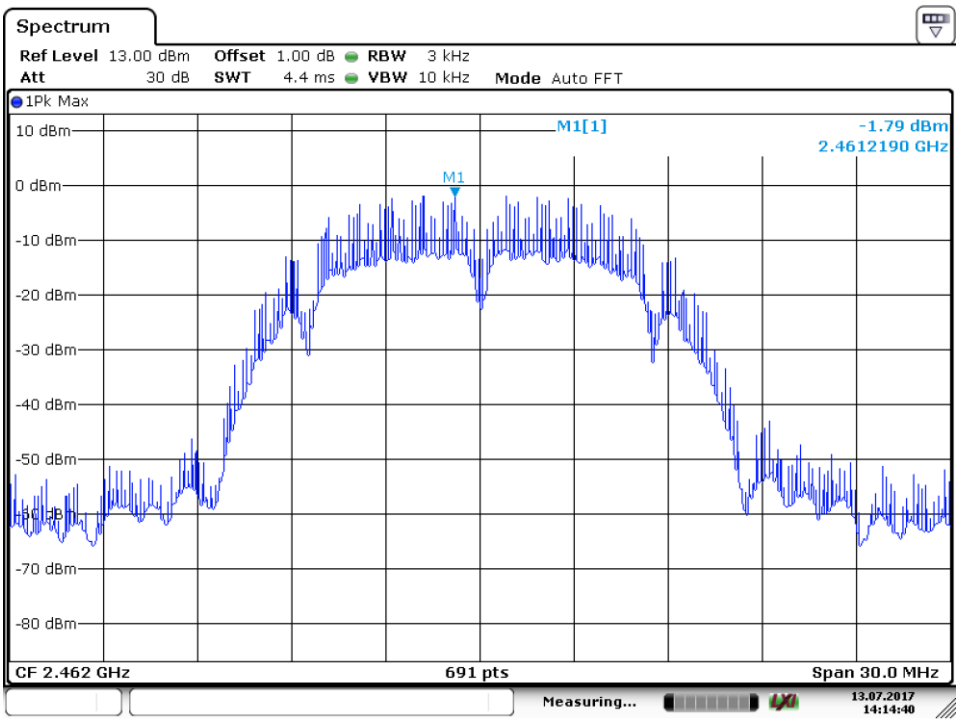
2437MHz

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2462MHz



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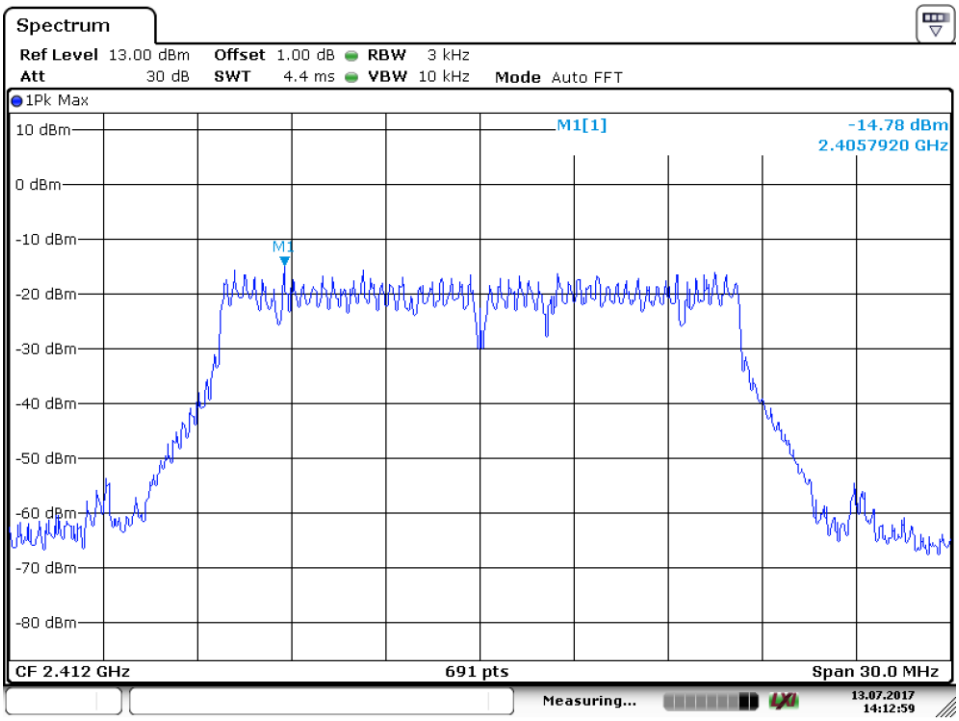
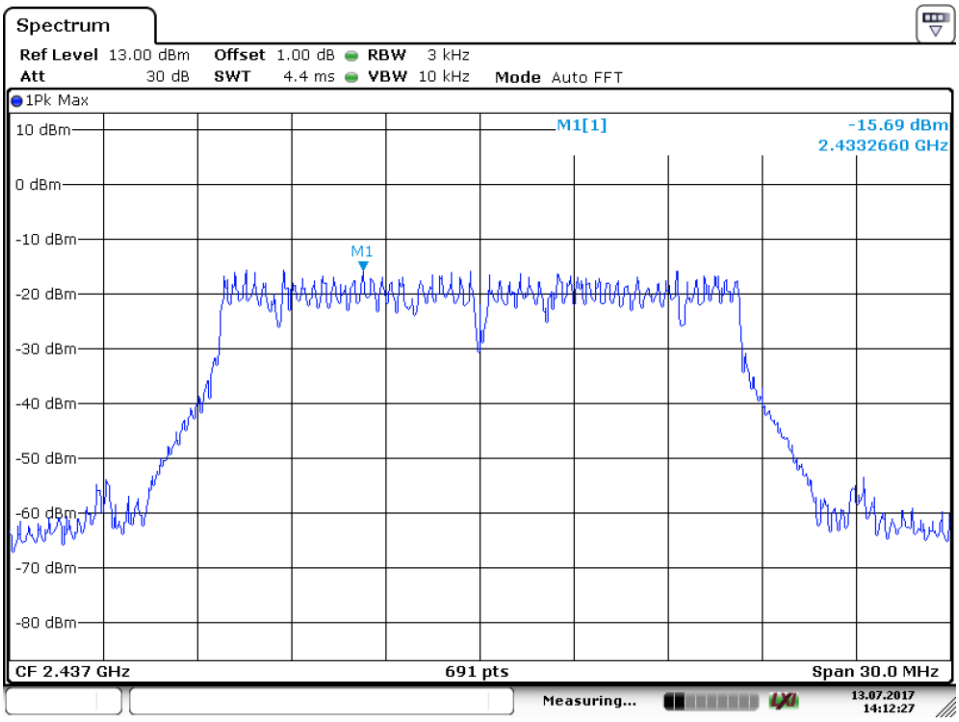
802.11g




Date: 13.JUL.2017 14:12:59

2412MHz




Date: 13.JUL.2017 14:12:27

2437MHz



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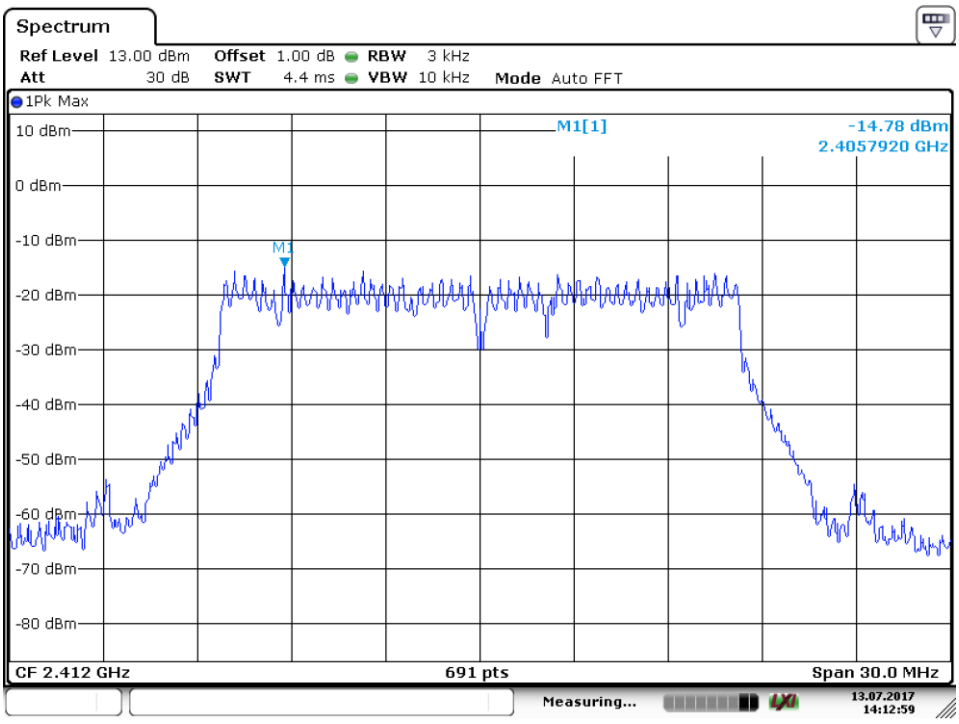


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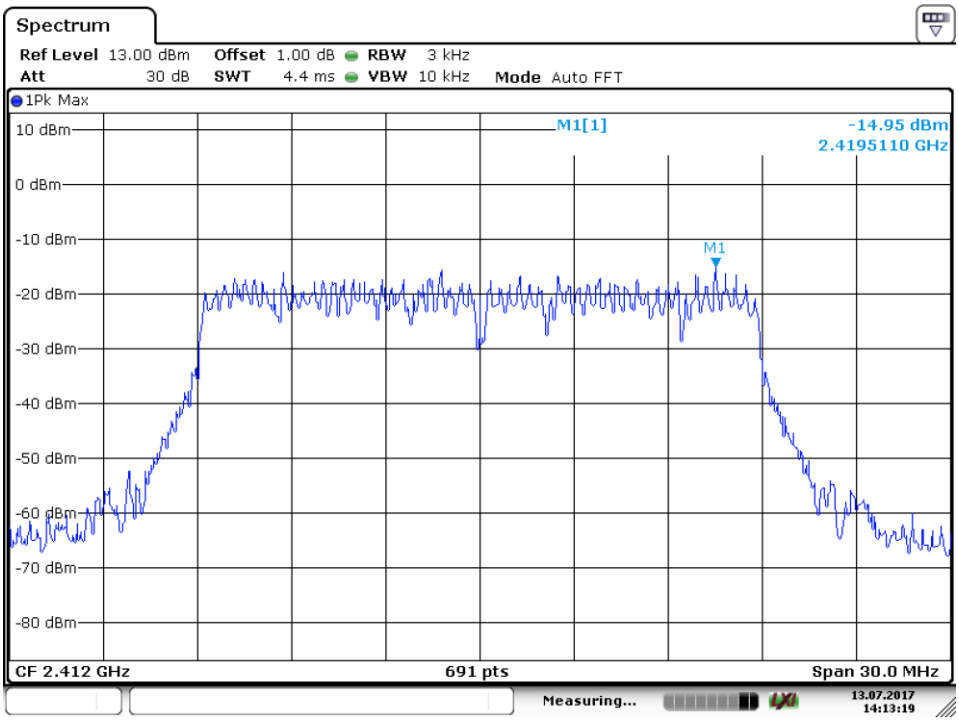
2462MHz

802.11nHT20




Date: 13.JUL.2017 14:13:20

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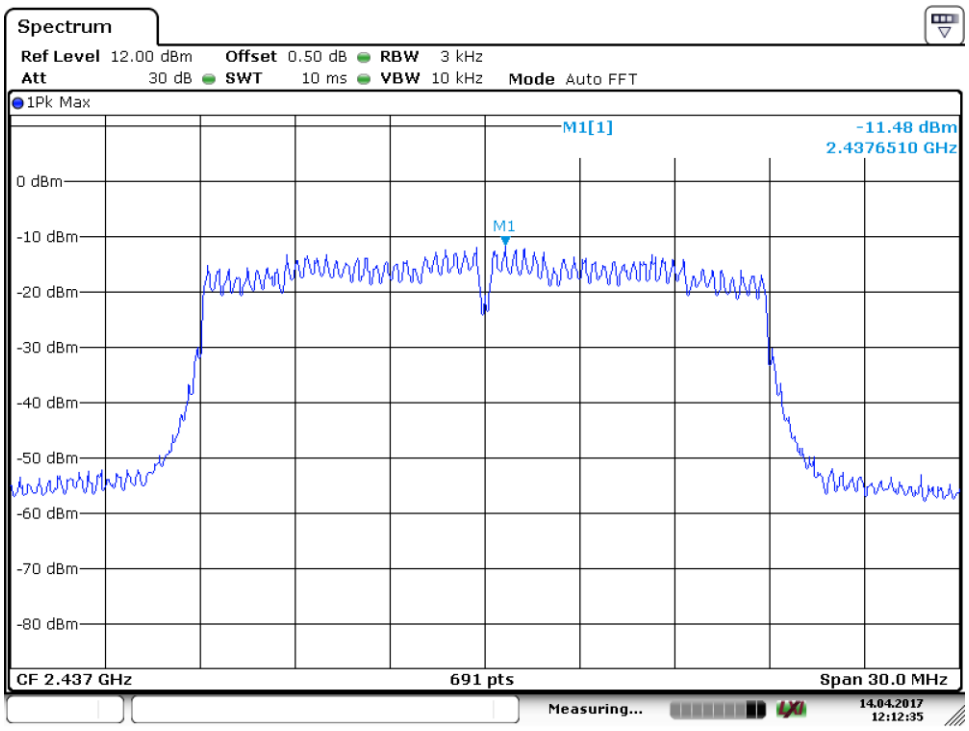


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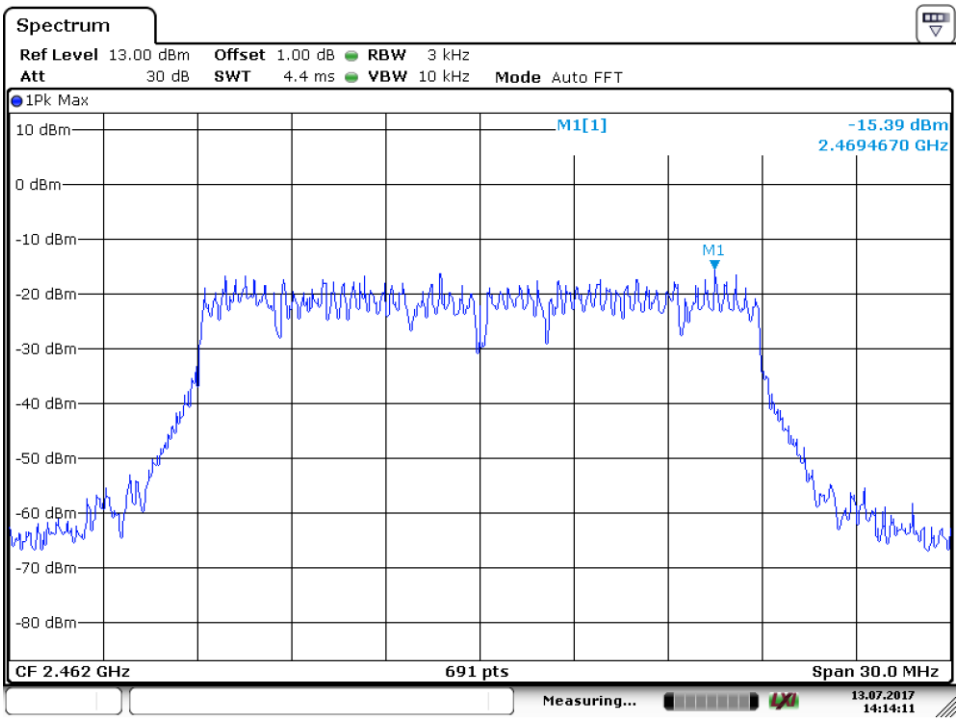
2437MHz




Date: 13.JUL.2017 14:14:12

2462MHz



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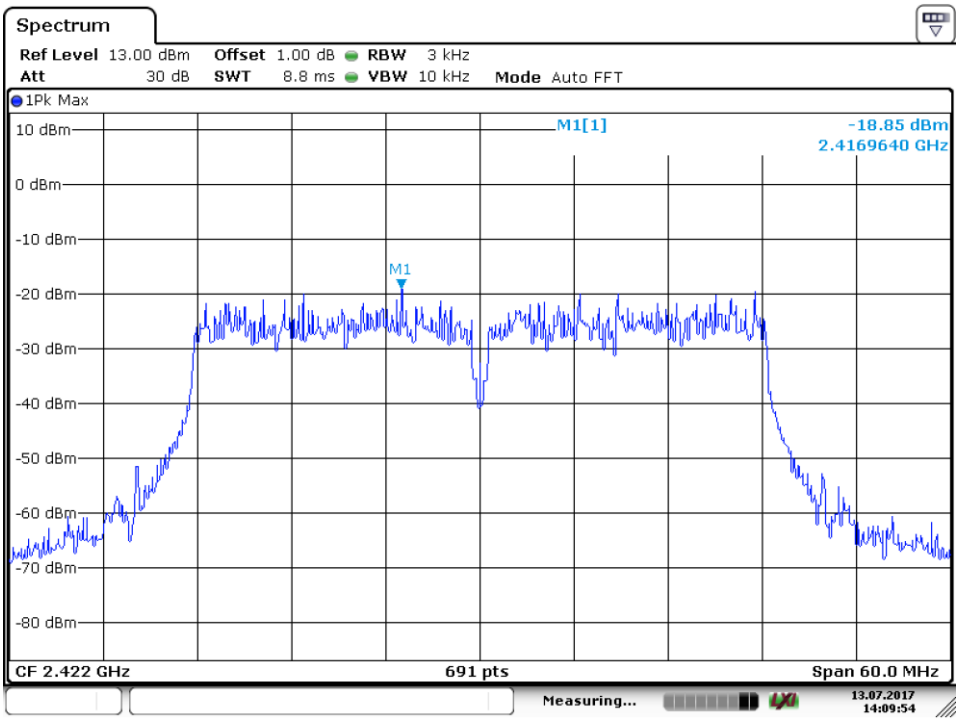
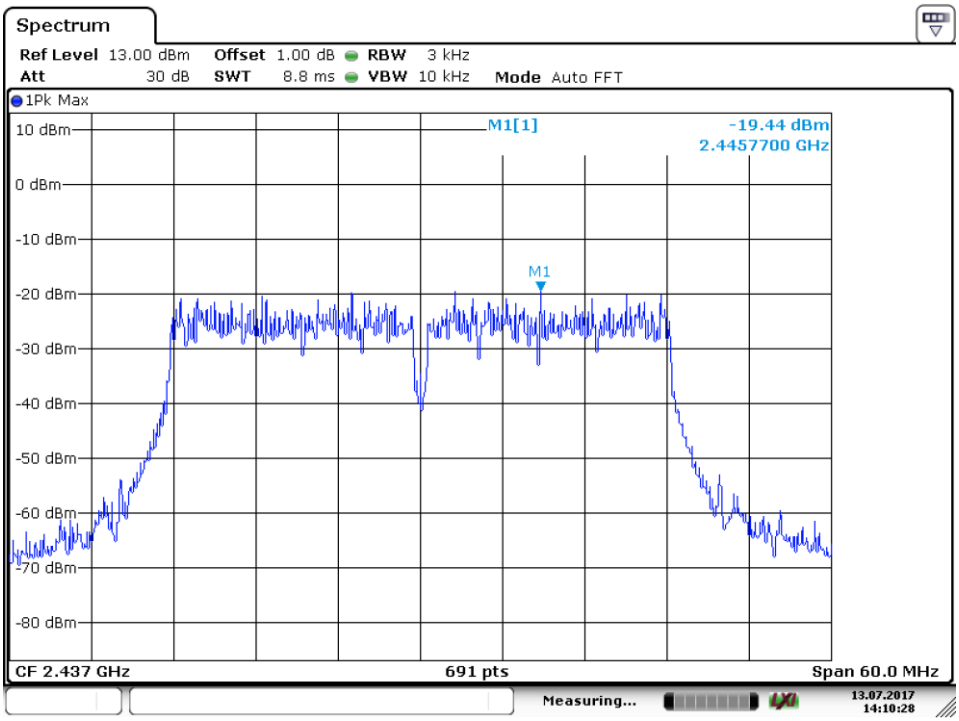
802.11nHT40




Date: 13.JUL.2017 14:09:55

2412MHz




Date: 13.JUL.2017 14:10:28

2437MHz



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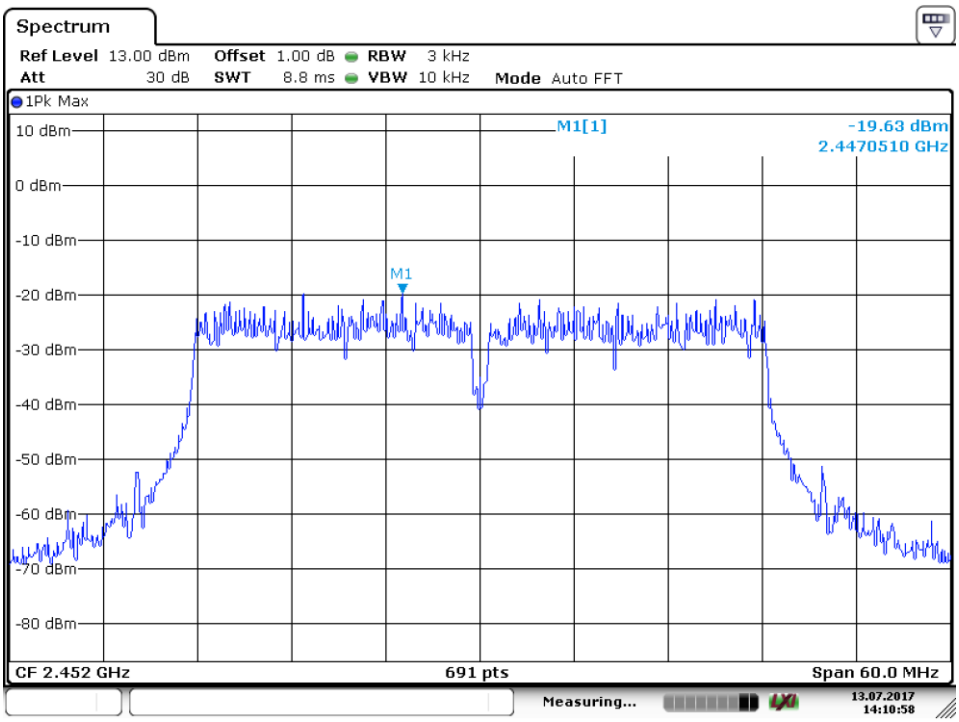


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## 9.4 Spurious RF conducted emissions

**Test Method**

1. Establish a reference level by using the following procedure:
   a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
   b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
   a. Set the center frequency and span to encompass frequency range to be measured.
   b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

**Limit**

| Frequency Range MHz | Limit (dBc) |
|---|---|
| 30-25000 | -20 |


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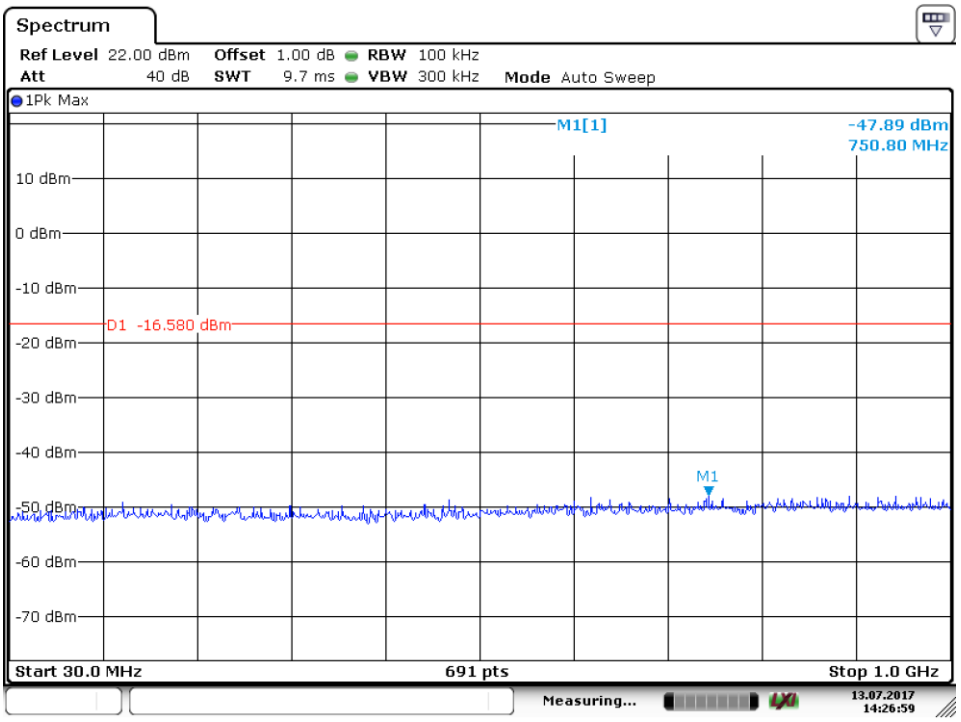
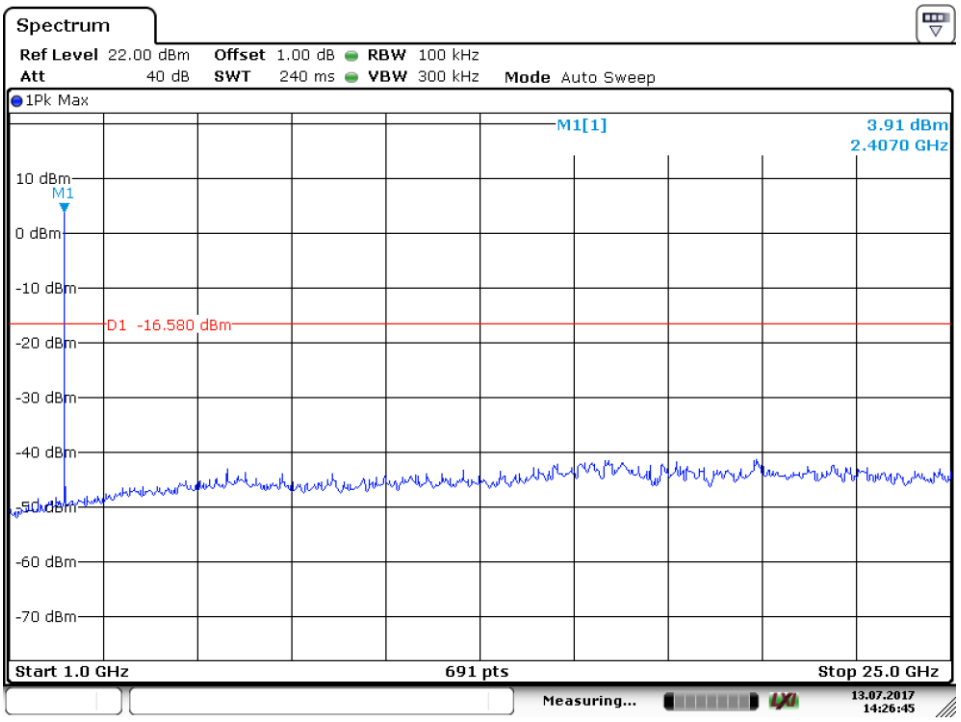
## Spurious RF conducted emissions

802.11b




Date: 13.JUL.2017 14:26:59




Date: 13.JUL.2017 14:26:45

2412MHz



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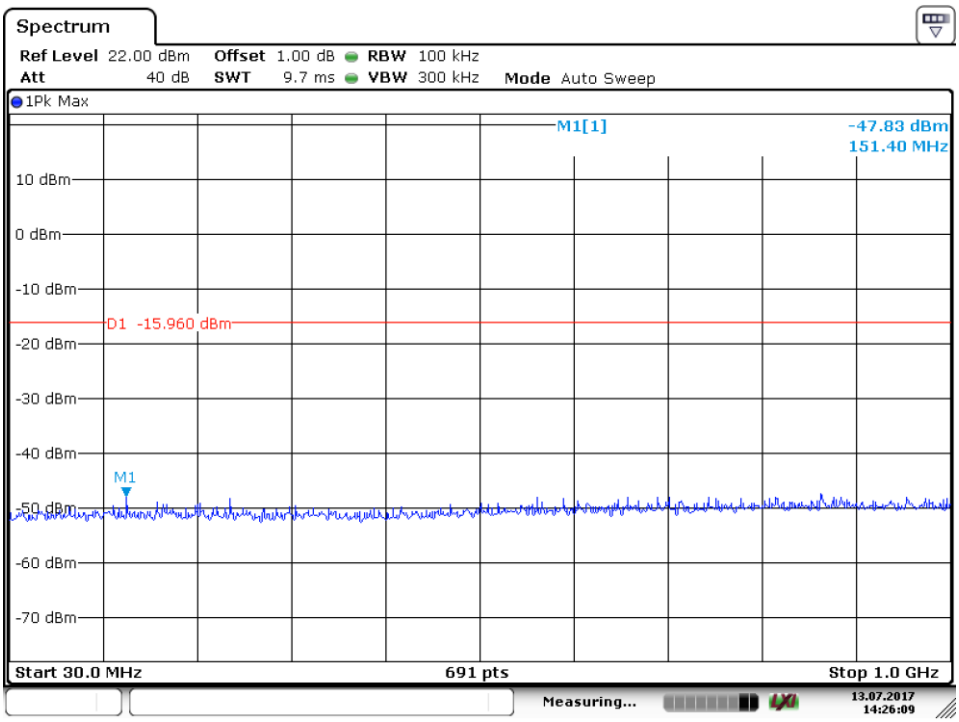


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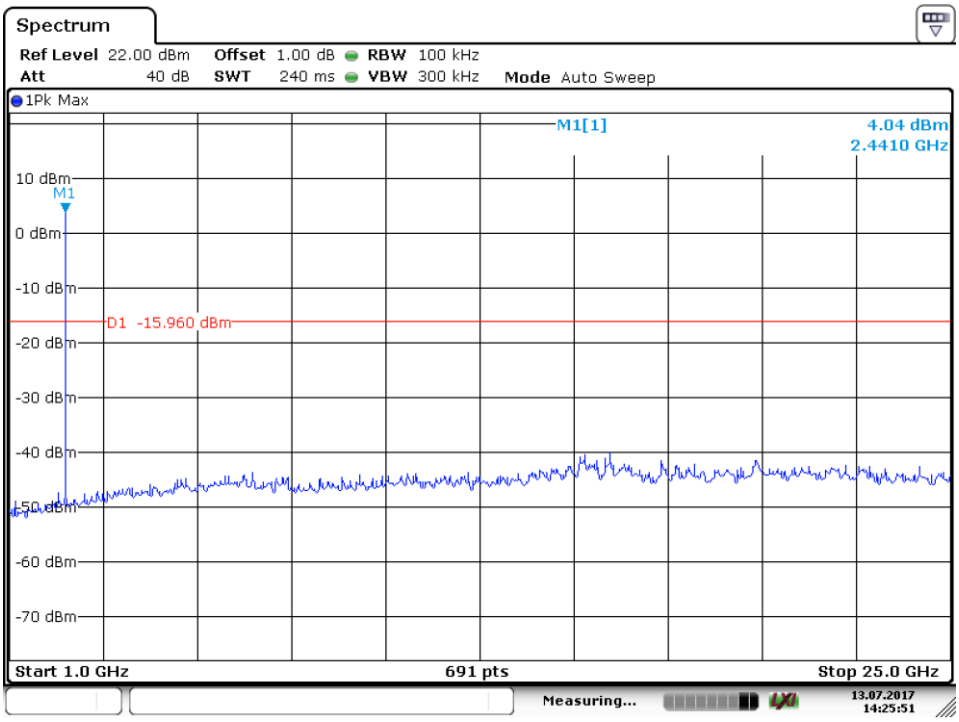


Date: 13.JUL.2017 14:25:51

2437MHz



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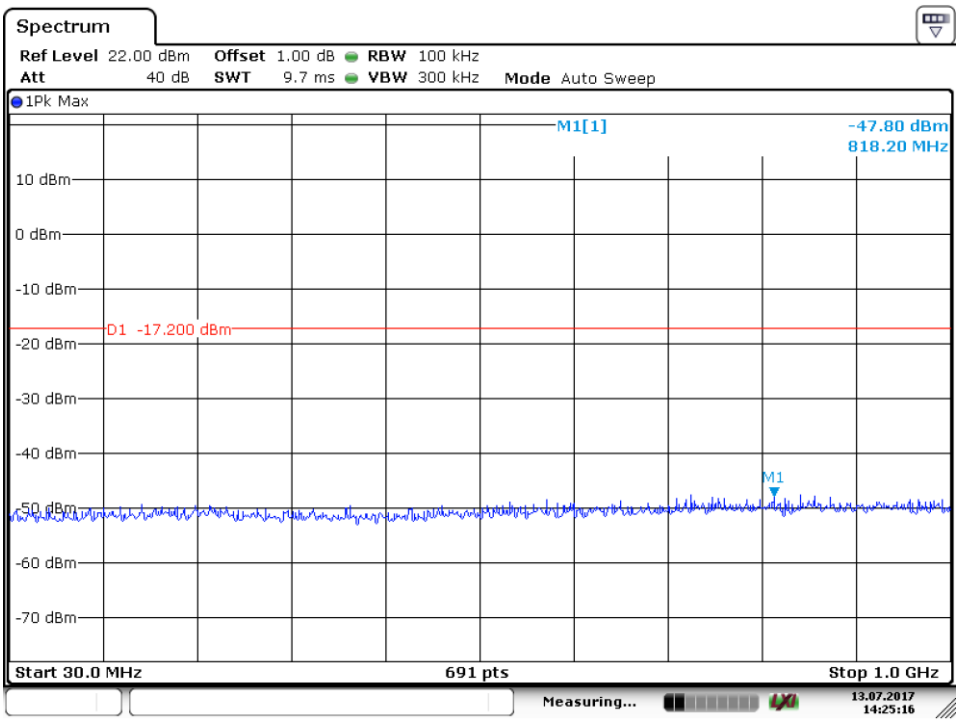
## Spurious RF conducted emissions

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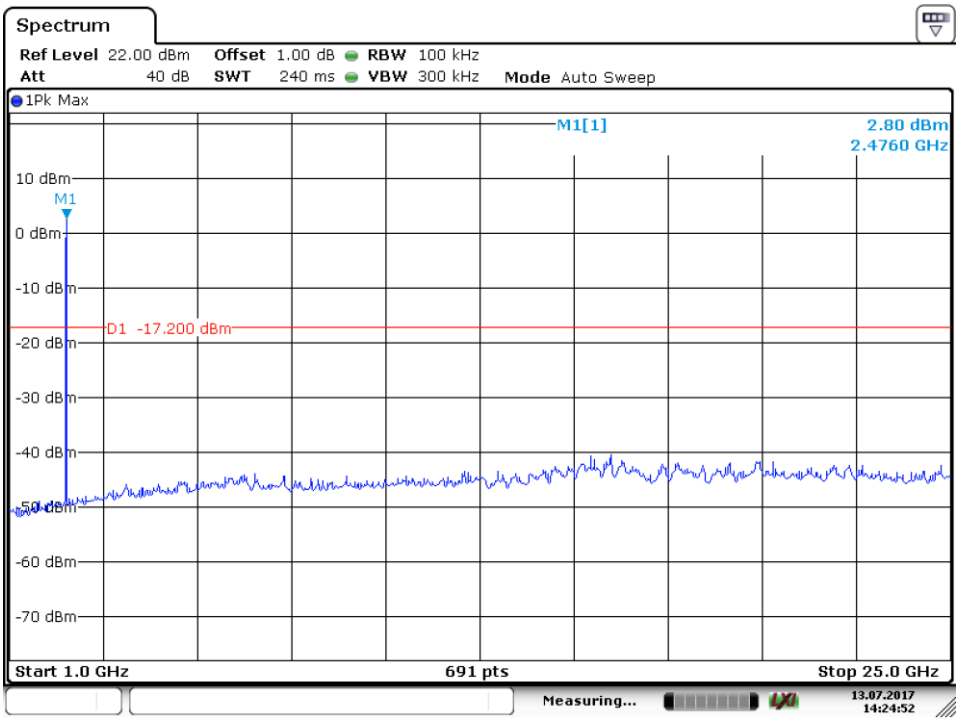


Date: 13.JUL.2017 14:24:52

2462MHz



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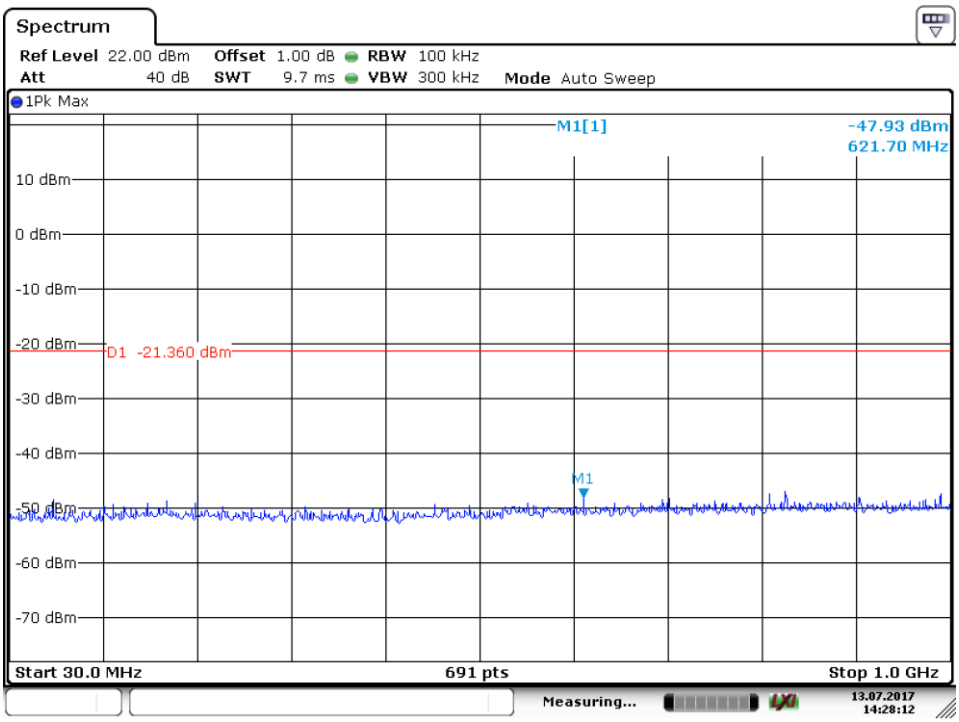
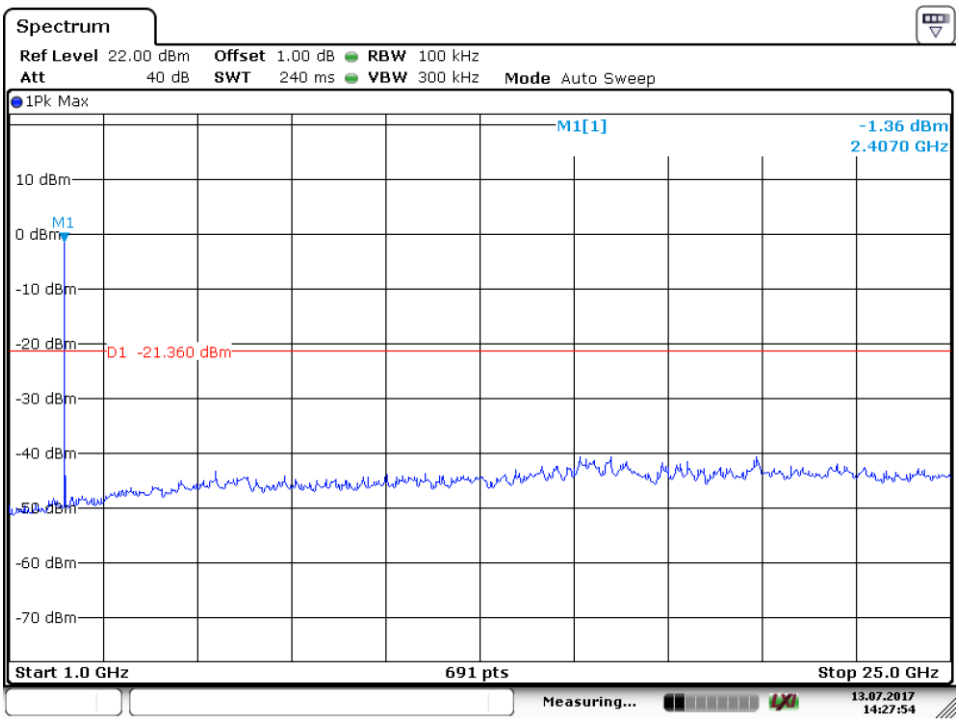
802.11g




Date: 13.JUL.2017 14:28:11




Date: 13.JUL.2017 14:27:55

2412MHz



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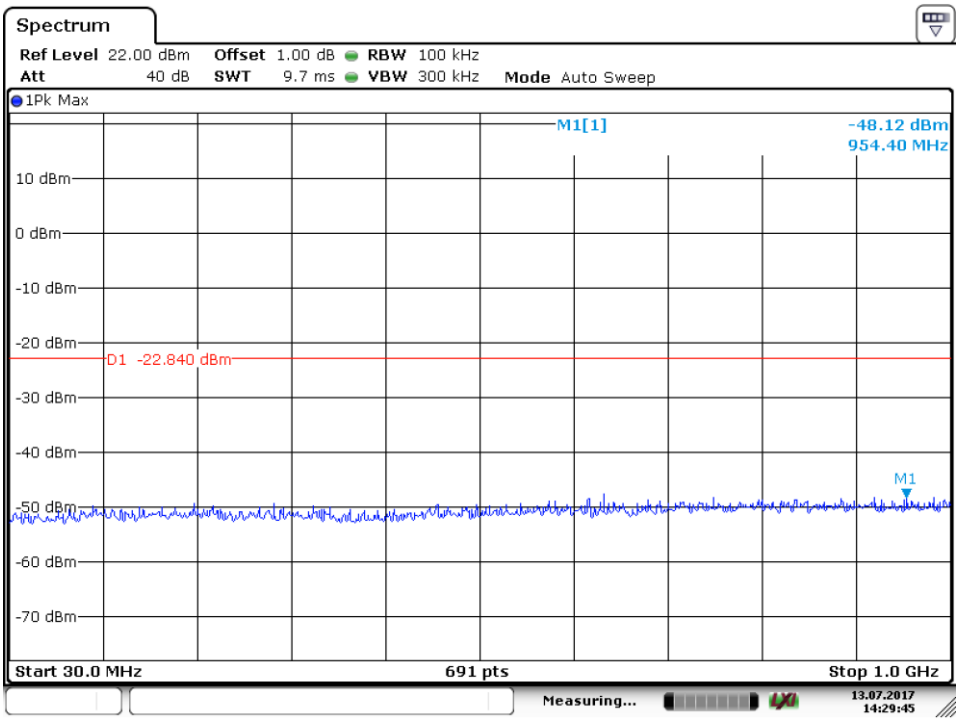
## Spurious RF conducted emissions

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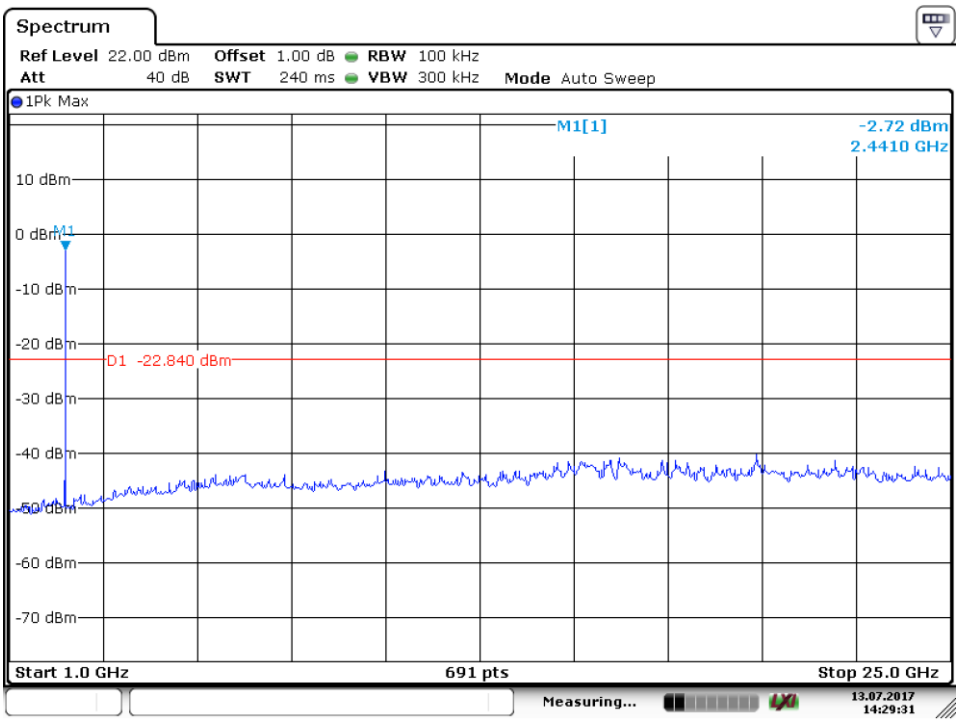


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2437MHz



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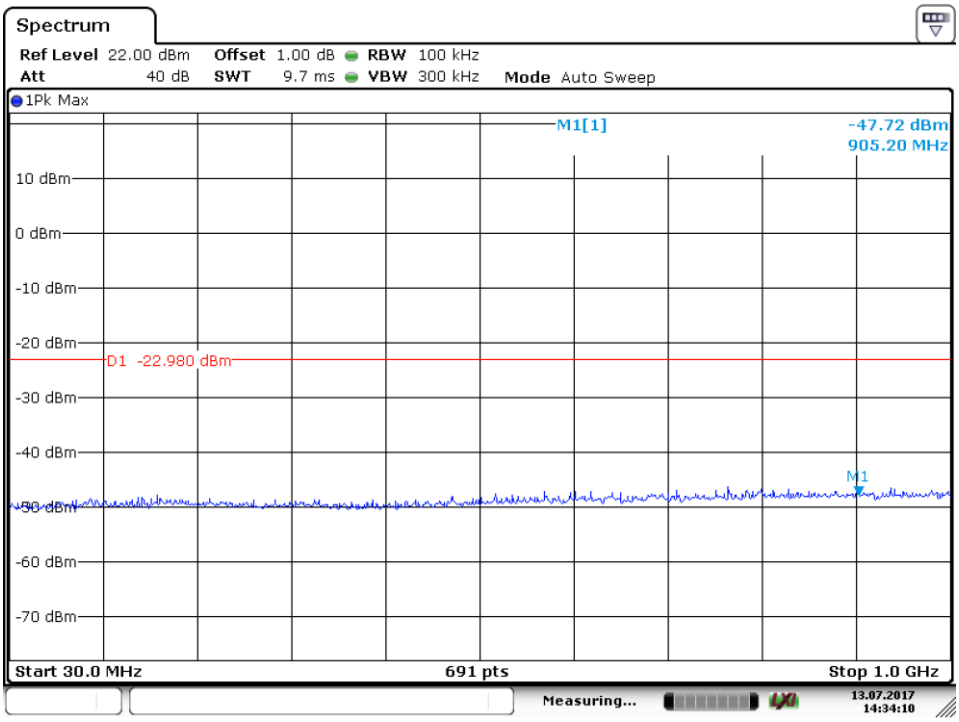


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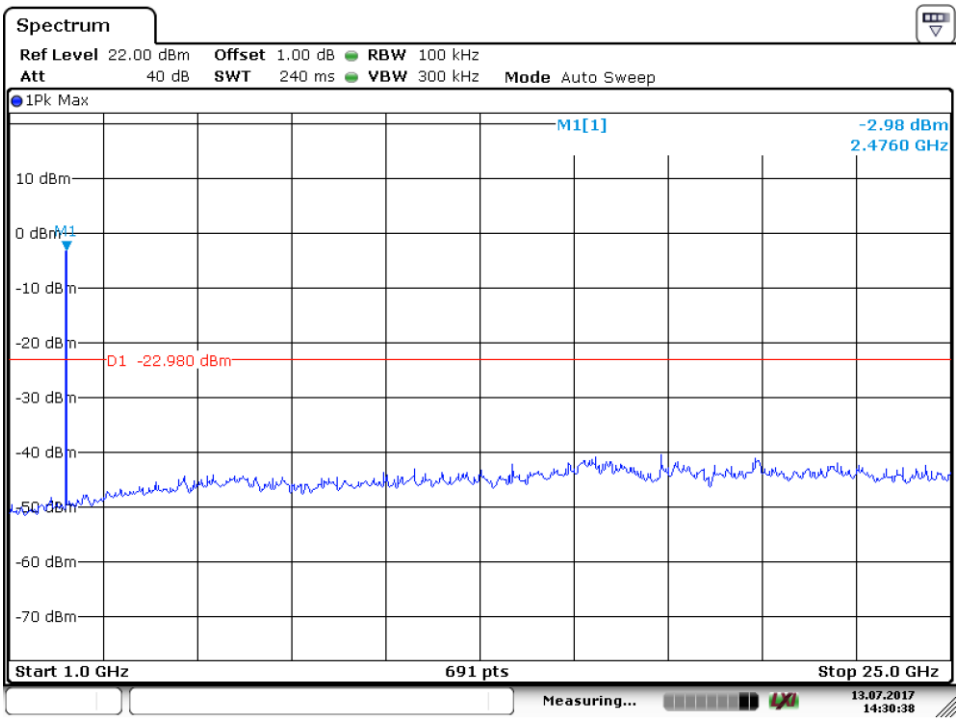


Date: 13.JUL.2017 14:30:37

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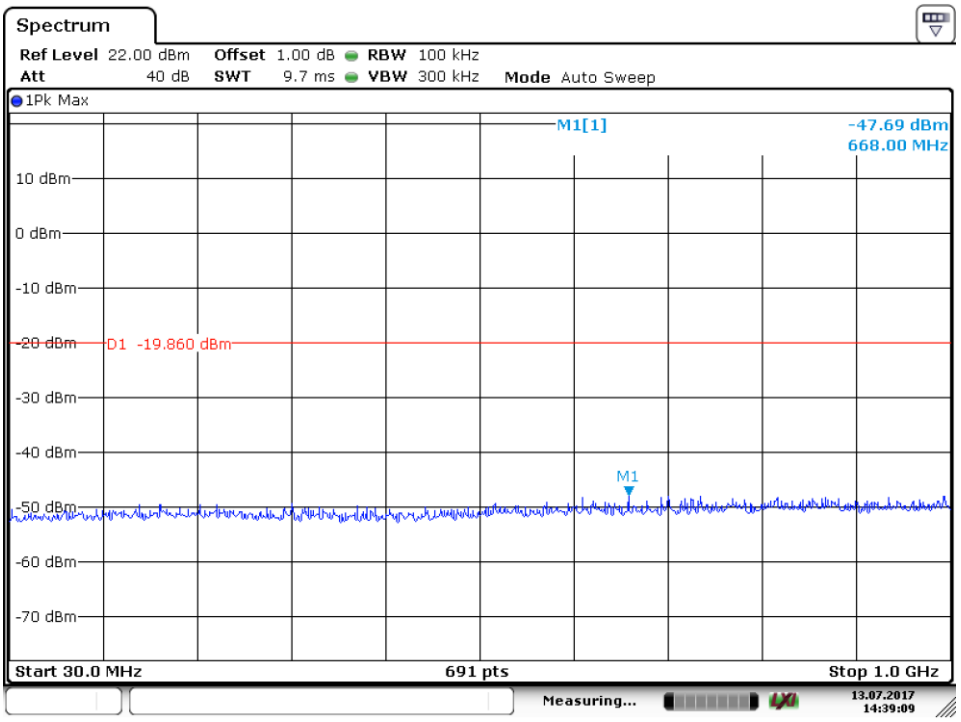
## Spurious RF conducted emissions

802.11nHT20

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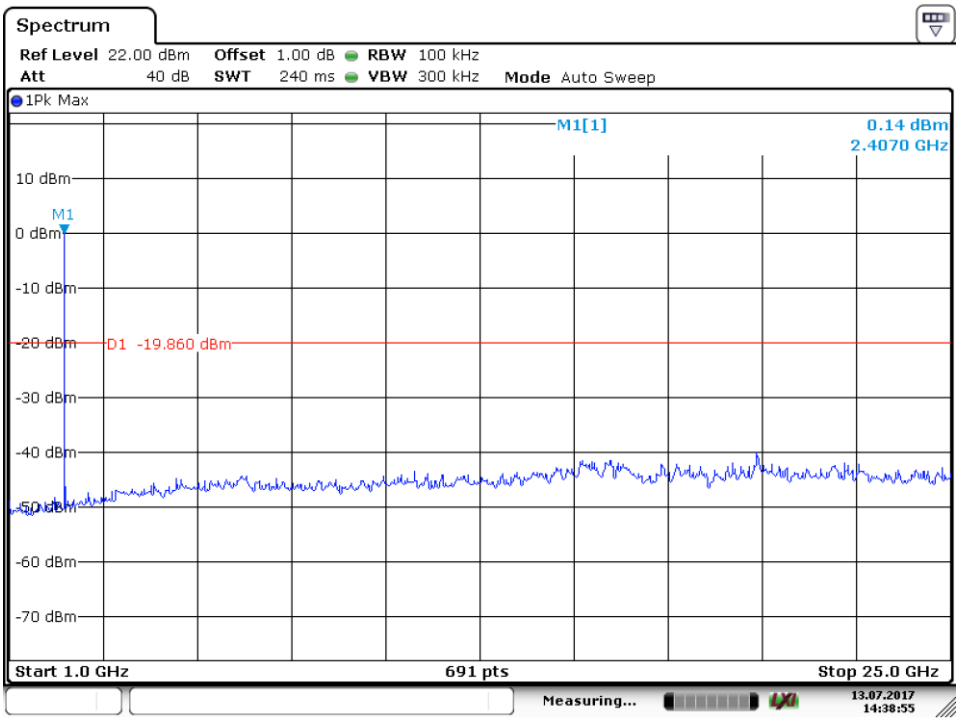


Date: 13.JUL.2017 14:38:56

2412MHz



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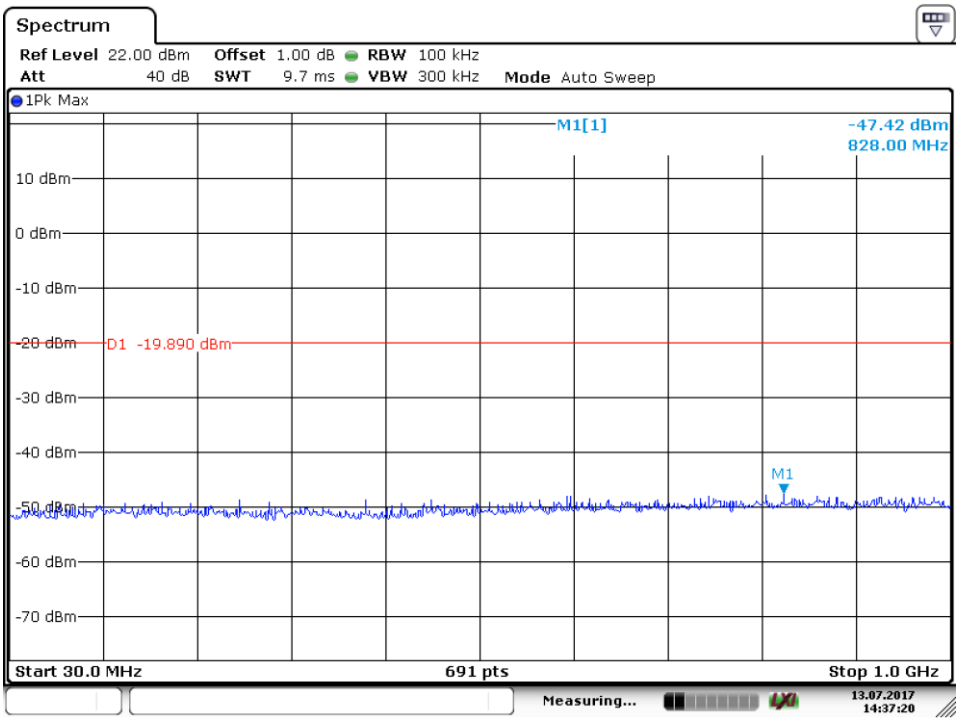


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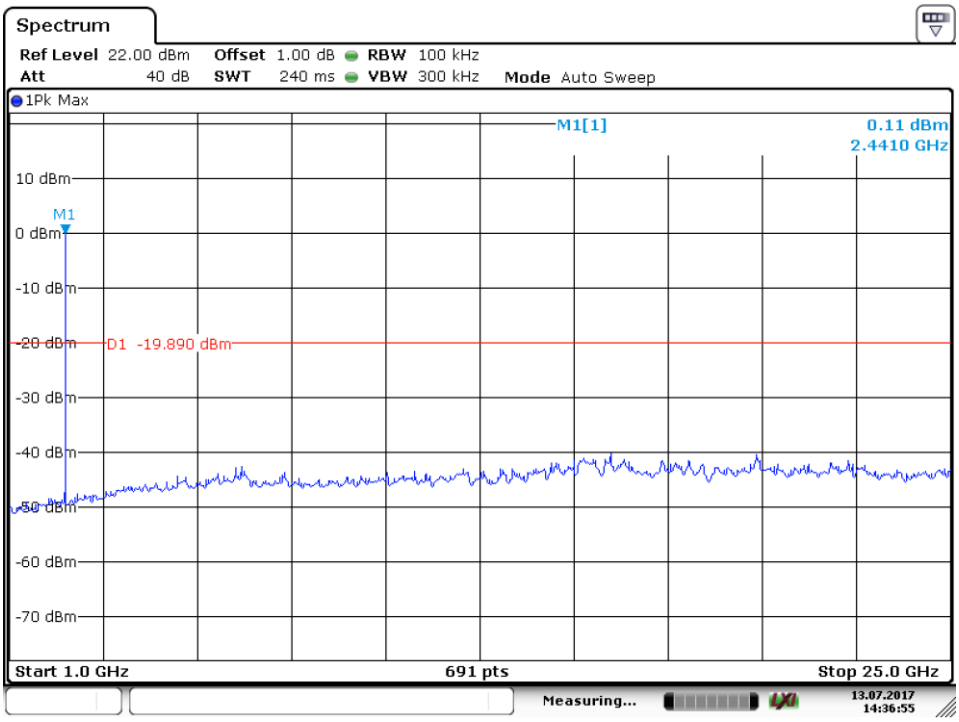


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2437MHz



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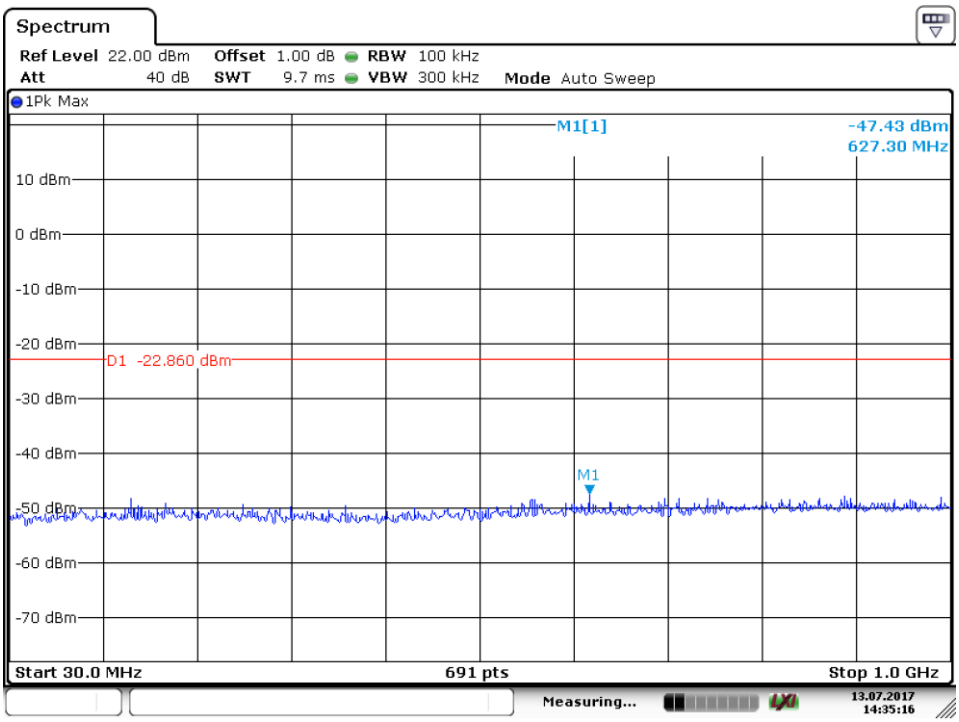
## Spurious RF conducted emissions

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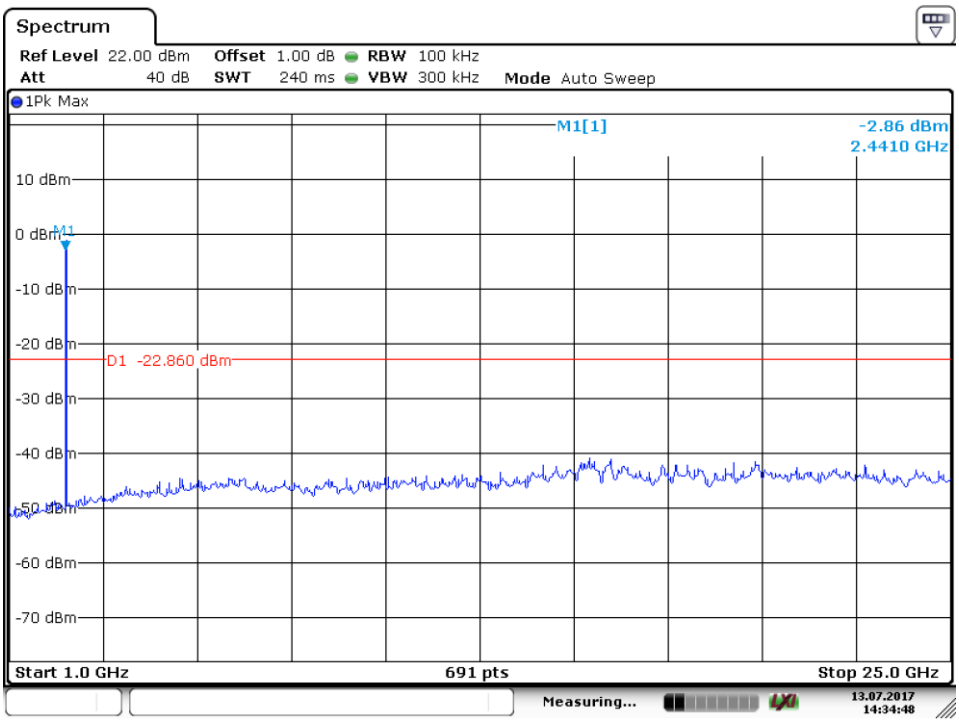


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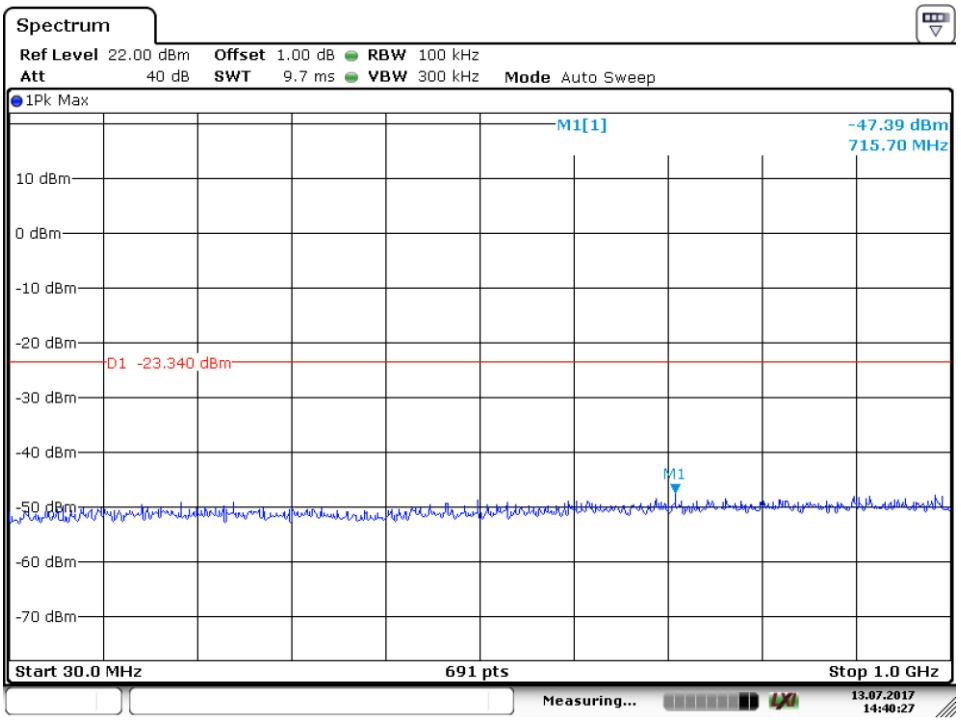
## Spurious RF conducted emissions

802.11nHT40

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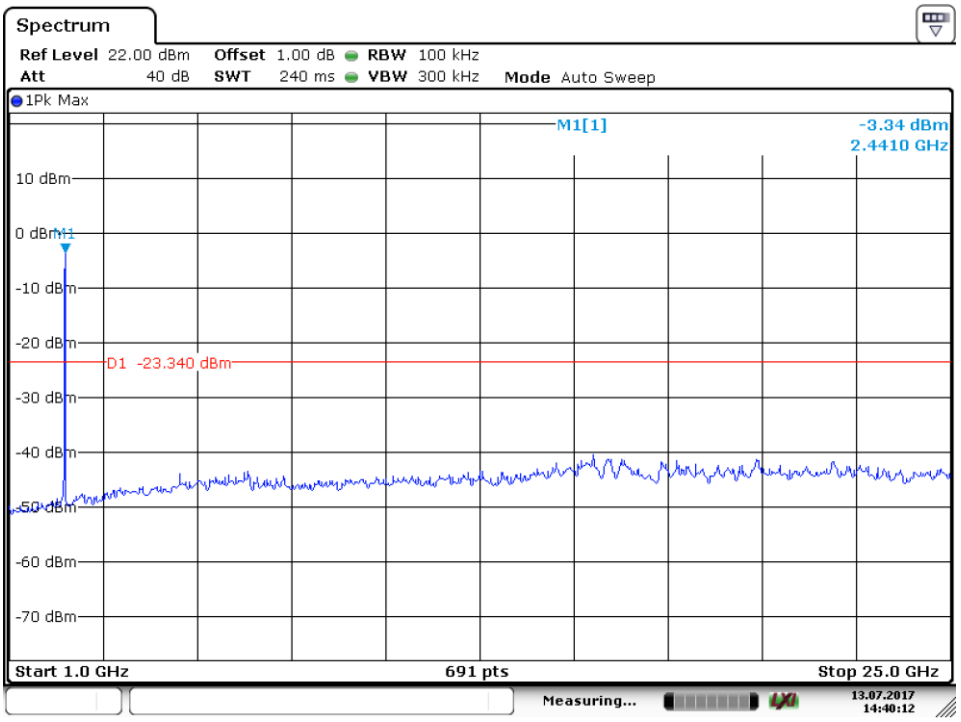


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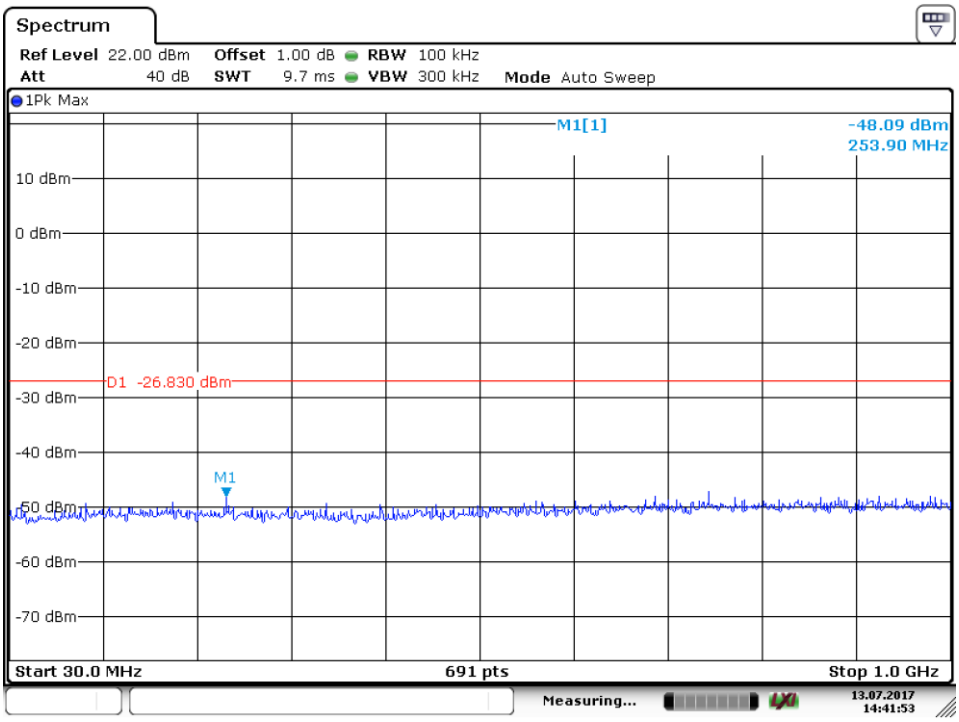


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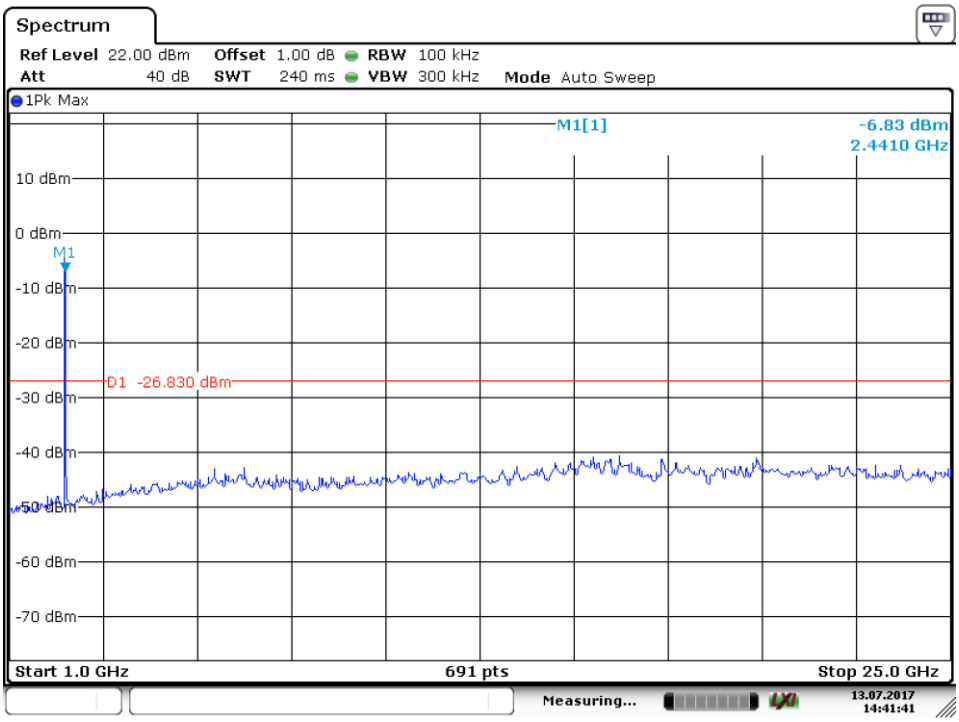


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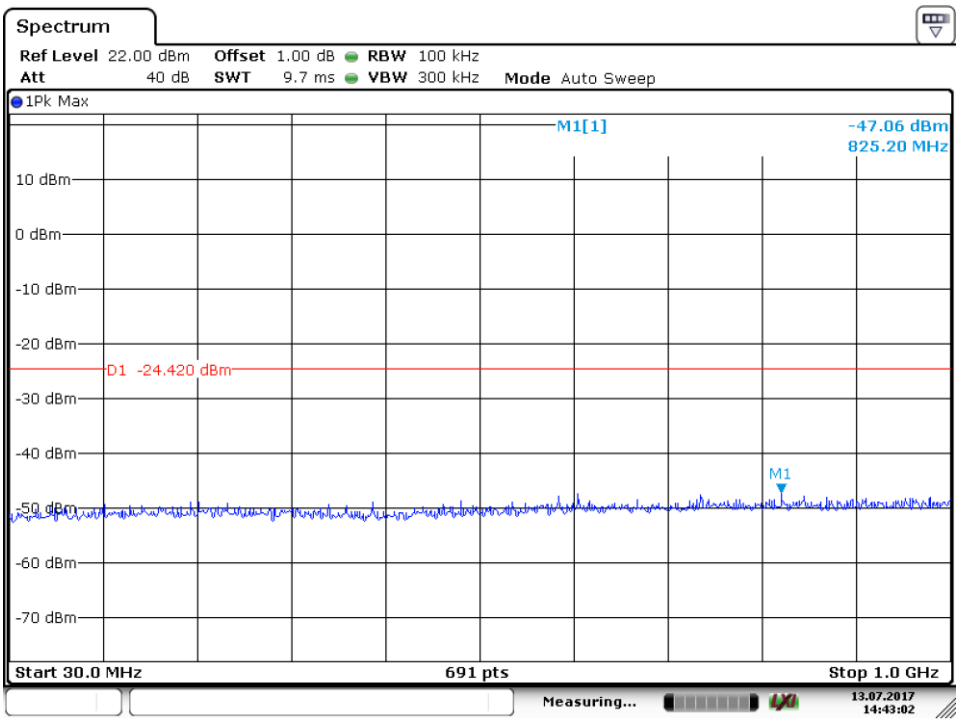
## Spurious RF conducted emissions

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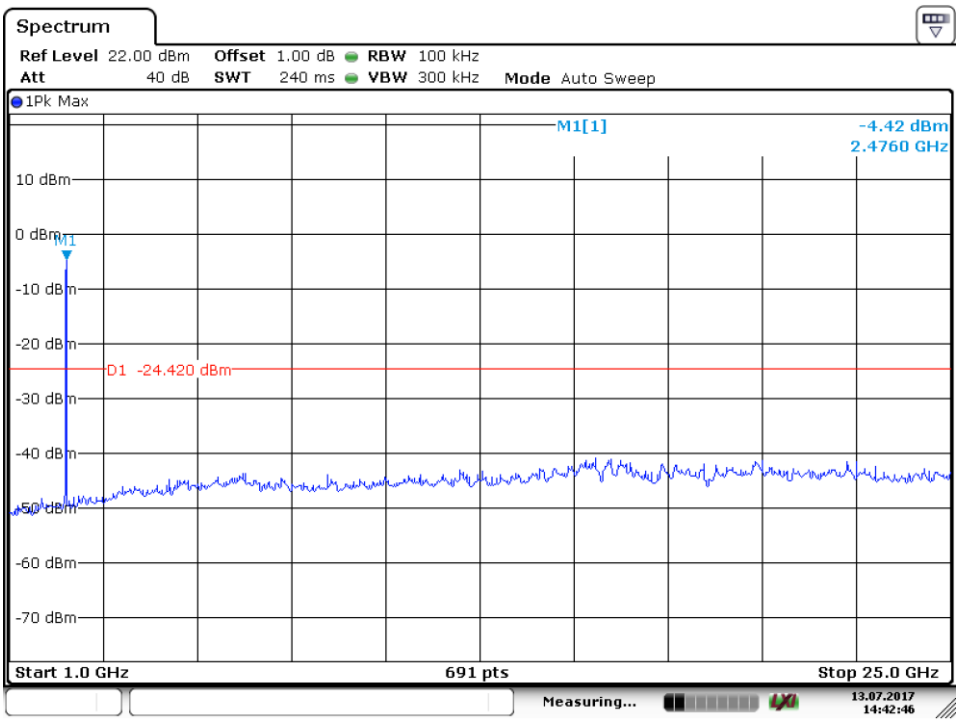


Date: 13.JUL.2017 14:42:45

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## 9.5 Band edge

### Test Method

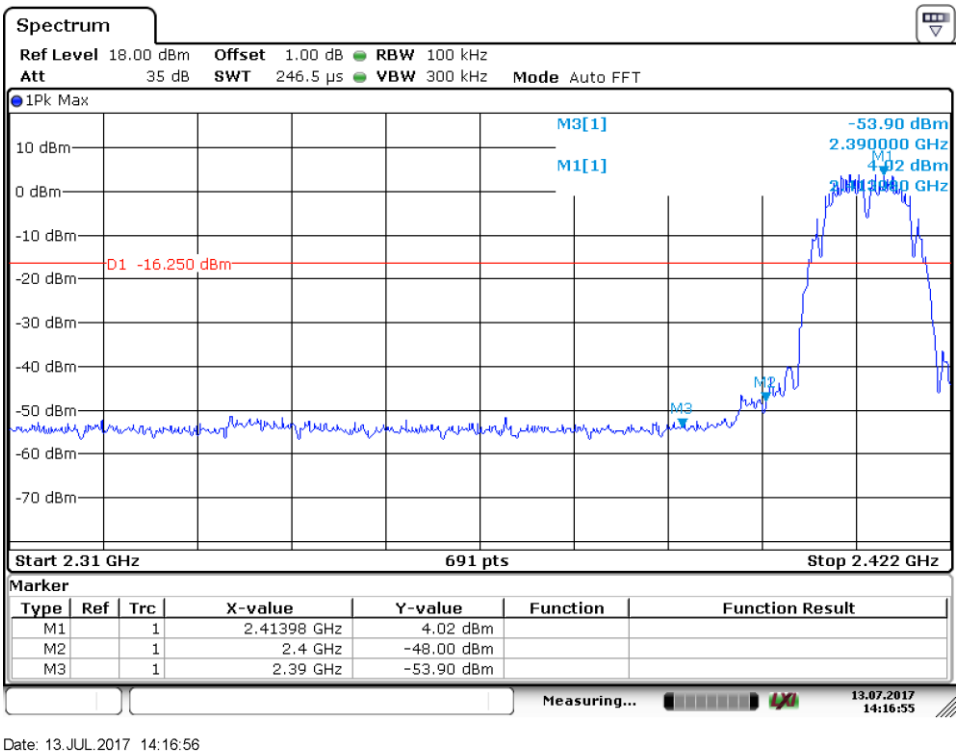
1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.

### Limit

| Frequency Range MHz | Limit (dBc) |
|---|---|
| 30-25000 | -20 |

### Test result

802.11b

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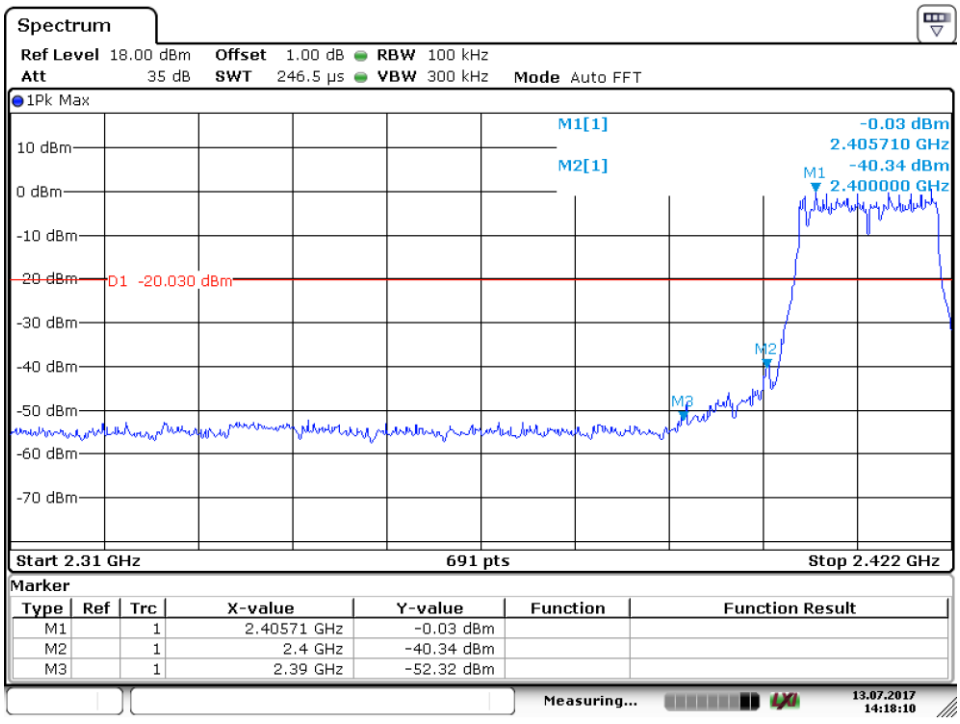
## Band edge


Date: 14.APR.2017 12:33:04

2462MHz

802.11g




Date: 13.JUL.2017 14:18:11

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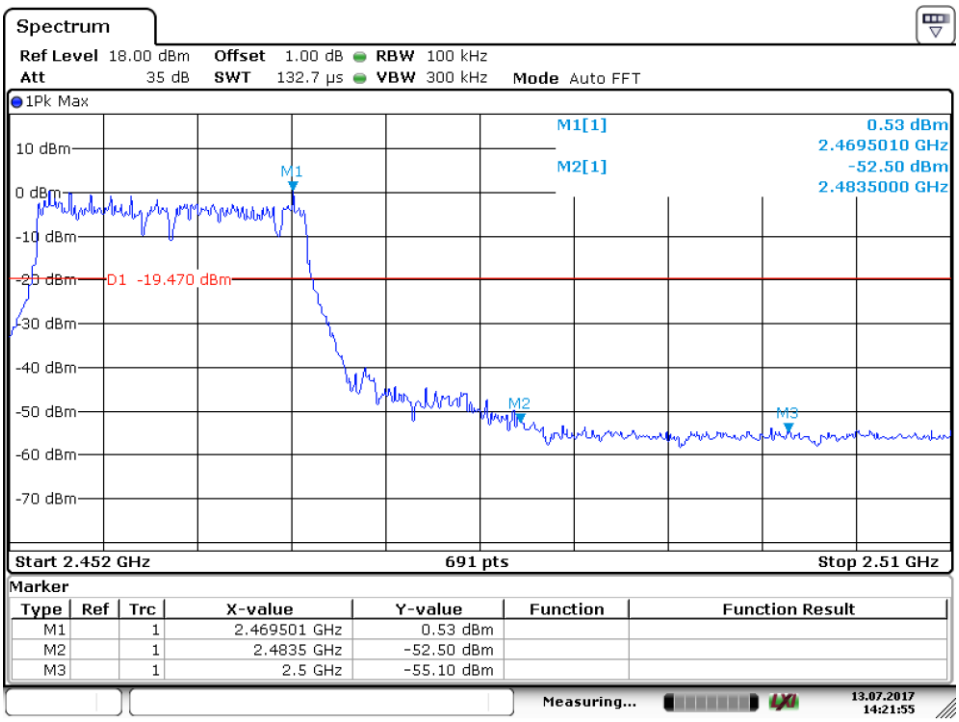
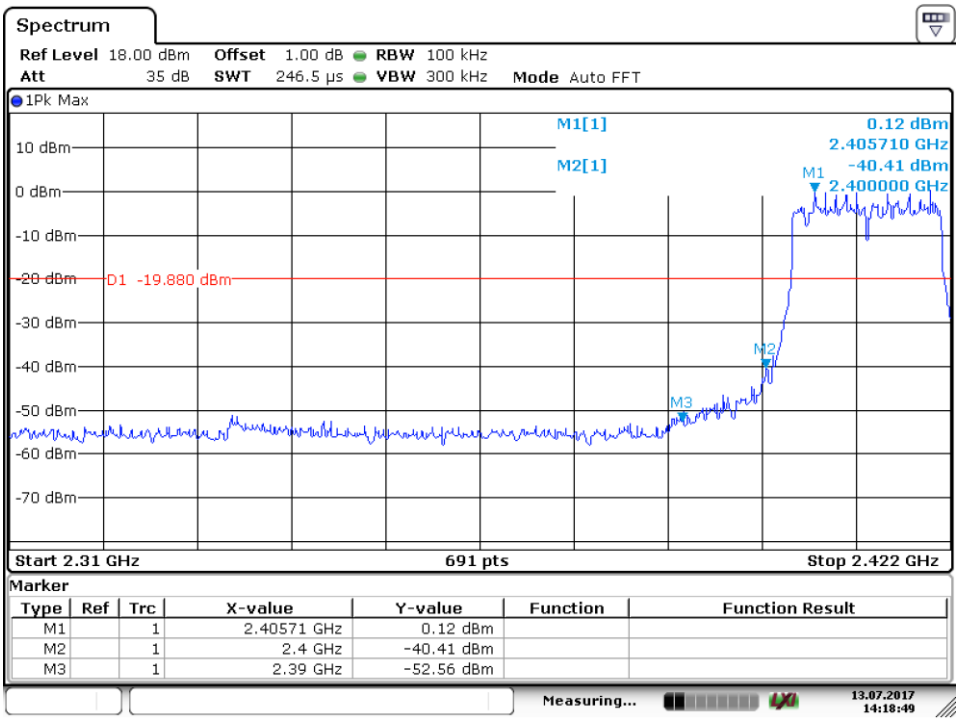
## Band edge




Date: 13.JUL.2017 14:21:56

2462MHz

802.11nHT20




Date: 13.JUL.2017 14:18:49

2412MHz



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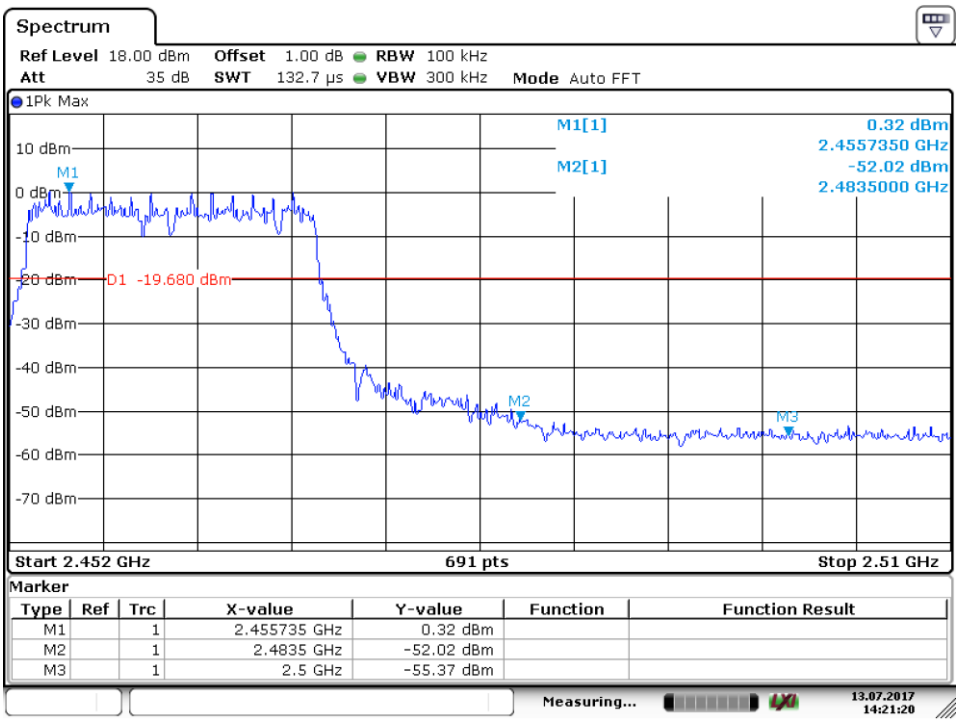
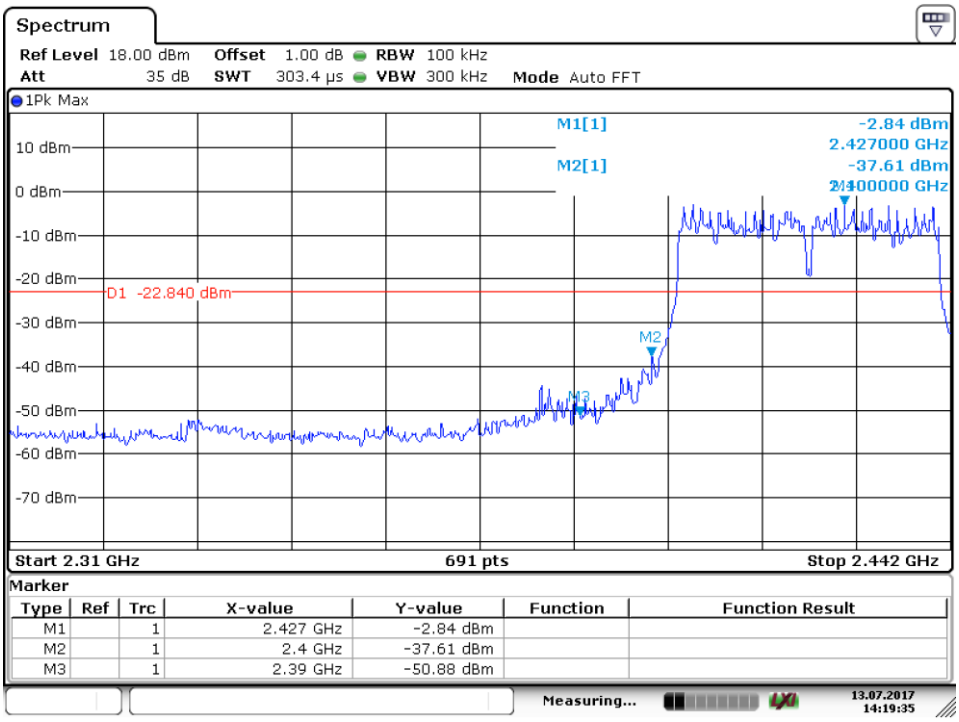
## Band edge




Date: 13.JUL.2017 14:21:20

2462MHz

802.11nHT40




Date: 13.JUL.2017 14:19:36

2412MHz



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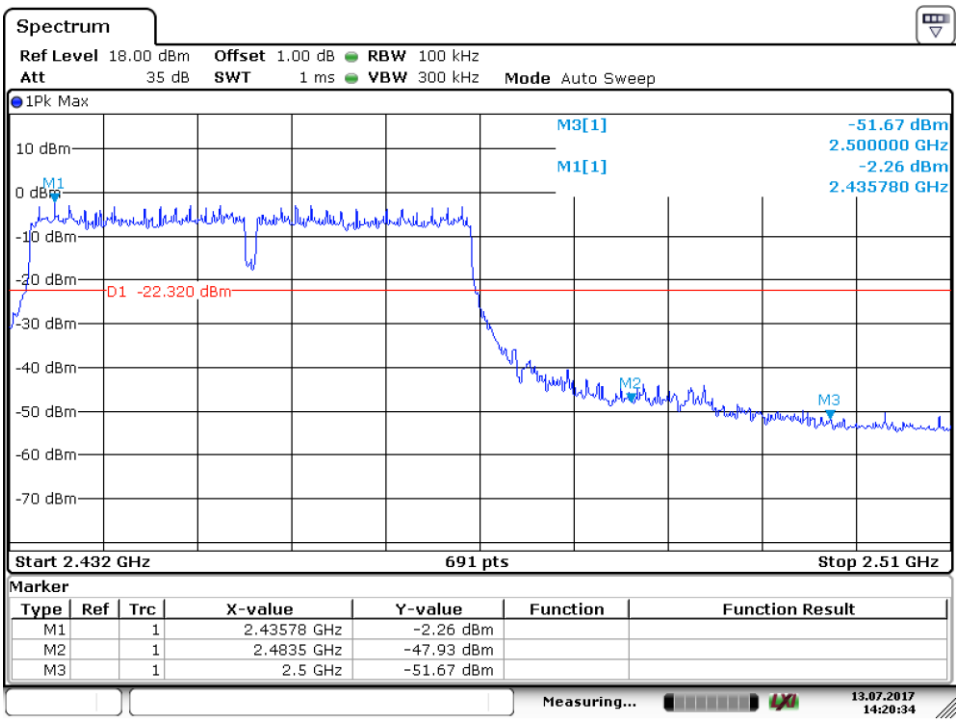
## Band edge




Date: 13.JUL.2017 14:20:34

2462MHz



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## 9.6 Spurious radiated emissions for transmitter

**Test Method**

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

**Note:**

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.

3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.


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## Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency MHz | Field Strength uV/m | Field Strength dBµV/m | Detector |
|---|---|---|---|
| 30-88 | 100 | 40 | QP |
| 88-216 | 150 | 43.5 | QP |
| 216-960 | 200 | 46 | QP |
| 960-1000 | 500 | 54 | QP |
| Above 1000 | 500 | 54 | AV |
| Above 1000 | 5000 | 74 | PK |


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## Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

**Transmitting spurious emission test result as below:**

802.11b
2412MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 144.02 | 36.86 | Horizontal | 43.50 | QP | Pass | -32.5 |
| 31.15 | 34.85 | Vertical | 40.00 | QP | Pass | -26.5 |

2412MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 3215.62 * | 44.46 | Horizontal | 74.00 | PK | Pass | -4.1 |
| 11788.12 * | 42.83 | Vertical | 74.00 | PK | Pass | 11.3 |

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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2437MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2437MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 3249.37 * | 42.24 | Horizontal | 74.00 | PK | Pass | -4.1 |
| 8162.81 * | 40.48 | Vertical | 74.00 | PK | Pass | 11.3 |

Remark:

(1) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2462MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2462MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 3282,65 * | 39.94 | Horizontal | 74.00 | PK | Pass | -3.7 |
| 8006.25* | 39.74 | Vertical | 74.00 | PK | Pass | 7.3 |

Remark:

(1) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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802.11g

2412MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Detector | Result |
|---|---|---|---|---|---|
| | | Horizontal | | QP | Pass |
| | | Vertical | | QP | Pass |

2412MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| 11797.03 * | 42.19 | Horizontal | 74.00 | PK | Pass | 11.4 |
| 15046.40* | 47.62 | Vertical | 74.00 | PK | Pass | 18.3 |

Remark:

(1) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2437MHz (30MHz – 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Detector | Result |
|---|---|---|---|---|---|
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2437MHz (Above 1GHz)

| Frequency MHz | Emission Level dBuV/m | Polarization | Limit dBµV/m | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| 3249.37 * | 34.10 | Horizontal | 74.00 | PK | Pass | -3.7 |
| 7494.37* | 38.99 | Vertical | 74.00 | PK | Pass | 6.8 |

Remark:

(1) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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2462MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2462MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 3283.65* | 40.59 | Horizontal | 74.00 | PK | Pass | -3.2 |
| 15066.56* | 47.63 | Vertical | 74.00 | PK | Pass | 18.2 |

Remark:

(1) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

802.11nHT20

2412MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2412MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 14985.93 * | 46.30 | Horizontal | 74.00 | PK | Pass | -4.1 |
| 3215.62* | 38.00 | Vertical | 74.00 | PK | Pass | 18.3 |

Remark:

(1) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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2437MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2437MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 16255.78* | 48.16 | Horizontal | 74.00 | PK | Pass | 19.2 |
| 15106.40* | 47.08 | Vertical | 74.00 | PK | Pass | 18.0 |

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2462MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2462MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 14989.68* | 45.42 | Horizontal | 74.00 | PK | Pass | 18.3 |
| 15049.21* | 46.86 | Vertical | 74.00 | PK | Pass | 18.3 |

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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802.11nHT40
2412MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2412MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 14976.09 * | 46.83 | Horizontal | 74.00 | PK | Pass | 18.3 |
| 15001.87* | 47.33 | Vertical | 74.00 | PK | Pass | 18.3 |

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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2437MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2437MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 15014.53* | 46.23 | Horizontal | 74.00 | PK | Pass | 18.3 |
| 14994.37* | 45.09 | Vertical | 74.00 | PK | Pass | 18.3 |

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2462MHz (30MHz – 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result |
|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | |
| -- | -- | Horizontal | -- | QP | Pass |
| -- | -- | Vertical | -- | QP | Pass |

2462MHz (Above 1GHz)

| Frequency | Emission Level | Polarization | Limit | Detector | Result | Corr. (dB) |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | | |
| 14598.28* | 46.54 | Horizontal | 74.00 | PK | Pass | 18.3 |
| 11349.84* | 41.11 | Vertical | 74.00 | PK | Pass | 10.5 |

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss


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# 10 Test Equipment List

## List of Test Instruments

| DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DUE DATE |
|---|---|---|---|---|
| Signal Analyzer | Rohde & Schwarz | FSV40 | 101030 | 2018-7-7 |
| EMI Test Receiver | Rohde & Schwarz | ESR 26 | 101269 | 2018-7-7 |
| Trilog Super Broadband Test Antenna | Schwarzbeck | VULB 9163 | 707 | 2018-7-7 |
| Horn Antenna | Rohde & Schwarz | HF907 | 102294 | 2018-7-7 |
| Pre-amplifier | Rohde & Schwarz | SCU 18 | 102230 | 2018-7-7 |
| 3m Semi-anechoic chamber | TDK | 9X6X6 | ---- | 2019-5-29 |
| EMI Test Receiver | Rohde & Schwarz | ESR 26 | 101269 | 2018-7-7 |
| Trilog Super Broadband Test Antenna | Schwarzbeck | VULB 9163 | 707 | 2018-7-7 |
| Horn Antenna | Rohde & Schwarz | HF907 | 102294 | 2018-7-14 |
| EMI Test Receiver | Rohde & Schwarz | ESR 3 | 101782 | 2018-7-14 |
| LISN | Rohde & Schwarz | ENV4200 | 100249 | 2018-7-14 |
| LISN | Rohde & Schwarz | ENV216 | 100326 | 2018-7-14 |
| ISN | Rohde & Schwarz | ENY81 | 100177 | 2018-7-14 |
| ISN | Rohde & Schwarz | ENY81-CA6 | 101664 | 2018-7-14 |
| High Voltage Probe | Rohde & Schwarz | TK9420(VT9420) | 9420-58 | 2018-7-14 |
| RF Current Probe | Rohde & Schwarz | EZ-17 | 100816 | 2018-7-14 |

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge


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# 11 System Measurement Uncertainty

**For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:**

**System Measurement Uncertainty**

| System Measurement Uncertainty | |
|---|---|
| Test Items | Extended Uncertainty |
| Uncertainty for Radiated Spurious Emission 25MHz-3000MHz | Horizontal: 4.98dB;<br>Vertical: 5.06dB; |
| Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz | Horizontal: 4.95dB;<br>Vertical: 4.94dB; |
| Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz | Horizontal: 5.14dB;<br>Vertical: 5.12dB; |
| Uncertainty for Conducted RF test with TS 8997 | Power level test involved: 2.06dB<br>Frequency test involved: $1.16\times10^{-7}$ |


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# 12 General product information

This product for indoor use only.
Model list

| Model No. | Power Supply | Hand Vacuum Cleaner |
|---|---|---|
| V300S, V300HLB, V300ZLG, V300YLW, V300RLR, V301HLB, V301BLL, V301ZLG, V301YLW, V301RLR, V302HLB, V302BLL, V302ZLG, V302YLW, V302RLR | YLS0241A-T190100 | With |
| HX-V3000LB, HX-V3000LL, HX-V3000LG, HX-V3000LW, HX-V3000LR, HX-V3010LB, HX-V3010LL,HX-V3010LG,HX-V3010LW,HX-V3010LR | GSCU0600S019V12E | Without |

All modes have same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction except color of appearance and the V300S, V300HLB, V300ZLG, V300YLW, V300RLR, V301HLB, V301BLL, V301ZLG, V301YLW, V301RLR, V302HLB, V302BLL, V302ZLG, V302YLW, V302RLR have Hand Vacumm Cleaner but the other models without Hand Vacumm Cleaner.


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