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# TEST REPORT

## Report Number: 16040718HKG-002

Application
for
Original Grant of 47 CFR Part 15 Certification
RSS-247 Issue 1 Equipment Certification

Tablet

FCC ID: A2HCT9223W

IC: 9903A-CT9223W

This report contains the data of WLAN (WiFi) portion only.

| Prepared and Checked by: | Approved by: |
|---|---|
| ***Signed On File*** | Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Ltd. |
| Wong Cheuk Ho, Herbert | Wong Kwok Yeung, Kenneth |
| Lead Engineer | Senior Lead Engineer |
| | October 25, 2016 |




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# GENERAL INFORMATION

| | |
|---|---|
| **Applicant Name:** | Alco Electronics Ltd |
| **Applicant Address:** | 11/F., Zung Fu Industrial Building,<br>1067 King's Road, Quarry Bay,<br>Hong Kong. |
| **Contact Person:** | Peggy Suen |
| **Tel:** | (852) 2562 6121 |
| **Fax:** | (852) 2597 5201 |
| **e-mail:** | peggy.suen@alco.com.hk |
| **Manufacturer:** | Alco Electronics (Dongguan) Limited |
| **Manufacturer Address:** | Gong Ye Xi Road,<br>Houjie Technology Industrial Park,<br>Houjie, Dongguan, Guangdong P.R.C. 523960<br>China |
| **FCC Specification Standard:** | FCC Part 15, 2014 Edition |
| **IC Specification Standard:** | RSS-247 Issue 1, May 2015<br>RSS-Gen Issue 4, November 2014 |
| **FCC ID:** | A2HCT9223W |
| **IC:** | 9903A-CT9223W |
| **Brand Name:** | VENTURER, pro12 / RCA |
| **FCC Model(s):** | CT9223W97<br>CT9x23Wyyzz / RCT6x23Wyyzz<br>x & y will be in numeric/alphabet and stands for different version/design; z will be in numeric/alphabet and stands for accessory optionally |
| **For IC HVIN:** | CT9223W97, CT9223W87 /<br>RCT6223W97, RCT6223W87 |
| **For IC PMN:** | CT9223W97, CT9223W87 /<br>RCT6223W97, RCT6223W87 |
| **Type of EUT:** | Digital Transmission System Transmitter |
| **Description of EUT:** | Tablet |
| **Serial Number:** | N/A |
| **Sample Receipt Date:** | April 13, 2016 |
| **Date of Test:** | April 13, 2016 to September 05, 2016 |
| **Report Date:** | October 25, 2016 |
| **Environmental Conditions:** | Temperature: +10 to 40°C<br>Humidity: 10 to 90% |

## Table of Contents

# EXHIBIT 1
# TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

## 1.0 Test Results Summary & Statement of Compliance

### 1.1 Summary of Test Results

| Test Items | FCC Part 15 Section | RSS-247/ RSS-Gen# Section | Results | Details see section |
|---|---|---|---|---|
| Antenna Requirement | 15.203 | 8.3# | Pass | 2.1 |
| Max. Conducted Output Power (peak) | 15.247(b)(3)&(4) | 5.4(4) | Pass | 4.1 |
| Min. 6dB RF Bandwidth | 15.247(a)(2) | 5.2(1) | Pass | 4.2 |
| Max. Power Density | 15.247(e) | 5.2(2) | Pass | 4.3 |
| Out of Band Antenna Conducted Emission | 15.247(d) | 5.5 | Pass | 4.4 |
| Radiated Emission in Restricted Bands and Spurious Emissions | 15.247(d), 15.209 & 15.109 | 8.9#,8.10# | Pass | 4.6 |
| AC Power Line Conducted Emission | 15.207 & 15.107 | 8.8# | Pass | 4.7 |

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

### 1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, 2014 Edition
RSS-247 Issue 1, May 2015
RSS-Gen Issue 4, November 2014

# EXHIBIT 2
# GENERAL DESCRIPTION

## 2.0 **General Description**

### 2.1 Product Description

The Equipment Under Test (EUT) is a Tablet, equipped with keyboard, headphone, WiFi, Bluetooth, SD, HDMI and USB Interface. The EUT is powered by an external AC/DC adaptor (5VDC output) or/and internal 3.7VDC rechargeable battery. The adaptor accepts 100-240VAC. The applicant declared that only 2.4GHz band is used in this product. FM, 5GHz band will not be used in this product.

For IC, the Model: CT9223W87, RCT6223W97, RCT6223W87 are the same as the Model: CT9223W97 in hardware aspect. The difference in model number and brand name serves as marketing strategy.

For FCC, the Model: CT9x23Wyyzz and RCT6x23Wyyzz are the same as the Model: CT9223W97 in hardware aspect. x & y will be in numeric/alphabet and stands for different version/design; z will be in numeric/alphabet and stands for accessory optionally. The difference in model number and brand name serves as marketing strategy.

For the WLAN (WiFi) module:
For 802.11b mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via direct-sequence spread spectrum (DSSS) modulation. Maximum bit rate can be up to 11Mbps. For 802.11g mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps. For 802.11n (HT20 with 20MHz bandwidth) mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7). Maximum bit rate can support up to 65Mbps. For 802.11n (HT40 with 40MHz bandwidth) mode, it operates at frequency range of 2422.000MHz to 2452.000MHz with 9 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7). Maximum bit rate can support up to 130Mbps.

For Bluetooth module:
For Bluetooth 4.0 BLE mode, it occupies a frequency range from 2402MHz to 2480MHz (40 channels with channel spacing of 2MHz). It transmits via GFSK modulation.

For Bluetooth 3.0 mode, it occupies a frequency range from 2402MHz to 2480MHz (79 channels with channel spacing of 1MHz). It transmits via GFSK modulation.

The antenna(s) used in the EUT is internal, integral.

The circuit description is saved with filename: descri.pdf.

## 2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No.558074 D01 v03r05 (08-April-2016). All other measurements were made in accordance with the procedures in 47 CFR Part 2 and RSS-Gen Issue 4 (2014).

## 2.3 Test Facility

The radiated emission test site, AC conducted emission test site and antenna port conducted measurement facility used to collect the radiated data and conductive data are at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC and the Industry Canada.

## 2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

The Declaration of the Conformity procedure of PC Connectivity for this transceiver (with FCC ID: A2HCT9223W) is being processed as the same time of this application.

# EXHIBIT 3
# SYSTEM TEST CONFIGURATION

## 3.0 System Test Configuration

### 3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by 120VAC.

Three types of AC/DC adaptors were supplied by the applicant.
Model: APS-L012050200W-G, Brand: ACT (worse case)
(Input: 100V-240VAC 50/60Hz, Output: 5VDC 2A)
Model: STC-U100502000-Z, Brand: DOKOCOM
(Input: 100V-240VAC 50-60Hz, Output: 5VDC 2A)
Model: STC-C0502500-Z, Brand: DOKOCOM
(Input: 100V-240VAC 50-60Hz, Output: 5VDC 2.5A)
All adaptors were tested and only worse case data is shown in this report.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. If the base unit attached to peripherals, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Justification – Cont'd

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209/ RSS-247 2.5. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109/ RSS-247 Section 5.5 Limits.

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.2.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF.* The effective period (Teff) was referred to Exhibit 4.6.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

The EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT power cord connected to one LISN (Line impedance stabilization network), which provided 50ohm coupling impedance for measuring instrument. Meanwhile, the peripheral or support equipment power cords connected to a separate LISN. The ac powers for all LISNs were obtained from the same power source. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled. Power cords of non-EUT equipment (peripherals) were not bundled. AC power cords of peripheral equipments draped over the rear edge of the table, and routed them down onto the floor of the ac power line conducted emission test site to the second LISN.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All configuration mode (with and without PC connectivity during transceiver test) and setting of data rate for 802.11b/g/n(HT20)/n(HT40) of WiFi mode had been considered, and worst case test data are shown on this test report.

For simultaneous transmission, both WiFi and Bluetooth portions are also switched on when taking radiated emission for determining worst-case spurious emission.

## 3.2 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

## 3.3 Details of EUT and Description of Accessories

*Details of EUT:*

1 The EUT is powered by 120VAC

*Description of Accessories:*

1. Headphone of 1.2m long cable
2. 4GB USB Flash
3. 4GB Micro SD Card
4. HDMI Monitor
5. HDMI cable of 2m long
6. LAN cable of 2m long (with termination)
7. Notebook Computer
8. USB cable of 1m long
   (Provided by Intertek)
9. AC/DC Adaptor
   Model: APS-L012050200W-G, Brand: ACT (worse case)
   (Input: 100-240VAC 50/60Hz; Output: 5VDC 2A)
10. Test Mode Software: Android Engineering Mode
    (Provided by Applicant)

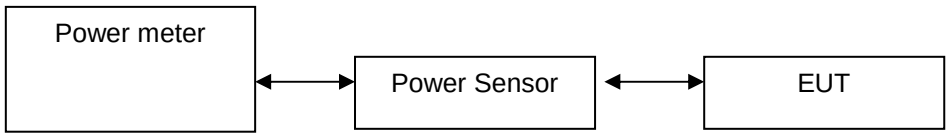
## 3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are ± 5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty for conducted emission test is ±4.2dB.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

# EXHIBIT 4
# TEST RESULTS

4.0 **Test Results**




4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

The antenna port of the EUT was connected to the input of a power meter.

☒ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to the obtain power at the EUT antenna terminals. The measurement procedure 9.1.2 was used.

☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

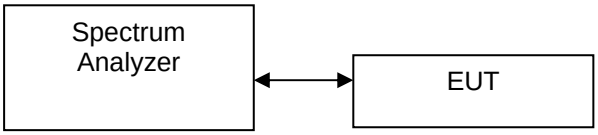
| IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 0 dBi | | |
|---|---|---|
| Frequency (MHz) | Output in dBm | Output in mWatt |
| Low Channel: 2412 | 15.46 | 35.16 |
| Middle Channel: 2437 | 15.98 | 39.63 |
| High Channel: 2462 | 16.78 | 47.64 |

| IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 0 dBi | | |
|---|---|---|
| Frequency (MHz) | Output in dBm | Output in mWatt |
| Low Channel: 2412 | 17.28 | 53.46 |
| Middle Channel: 2437 | 18.16 | 65.46 |
| High Channel: 2462 | 18.98 | 79.07 |

| IEEE 802.11n (HT20, MCS0) Antenna Gain = 0 dBi | | |
|---|---|---|
| Frequency (MHz) | Output in dBm | Output in mWatt |
| Low Channel: 2412 | 17.18 | 52.24 |
| Middle Channel: 2437 | 18.18 | 65.77 |
| High Channel: 2462 | 18.88 | 77.27 |

RF Conduct measurement Test Setup

The figure below shows the test setup, which is utilized to make these measurements.




4.1 Maximum Conducted (Average) output Power at Antenna Terminals – Cont'd

Occupied Bandwidth

| IEEE 802.11n (HT40, mcs0) | |
|---|---|
| Frequency (MHz) | Occupied Bandwidth (kHz) |
| Low Channel: 2422 | 40340 |
| Middle Channel: 2437 | 40040 |
| High Channel: 2452 | 40040 |

Maximum Conducted (Average) Output Power at Antenna Terminals

The antenna port of the EUT was connected to the input of a spectrum analyzer.

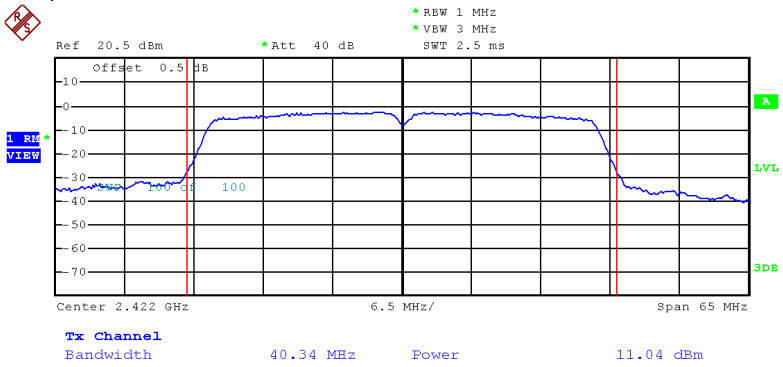
☒ External attenuation and cable loss were compensated for using the OFFSET function of the analyser. The measurement procedure 9.2.2.2 was used.

☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

| IEEE 802.11n (HT40, mcs0) Antenna Gain = 0 dBi | | |
|---|---|---|
| Frequency (MHz) | Output in dBm | Output in mWatt |
| Low Channel: 2412 | 11.04 | 12.71 |
| Middle Channel: 2437 | 12.08 | 16.14 |
| High Channel: 2462 | 11.48 | 14.06 |

## Plots of maximum output power

802.11n HT40, Lowest Channel

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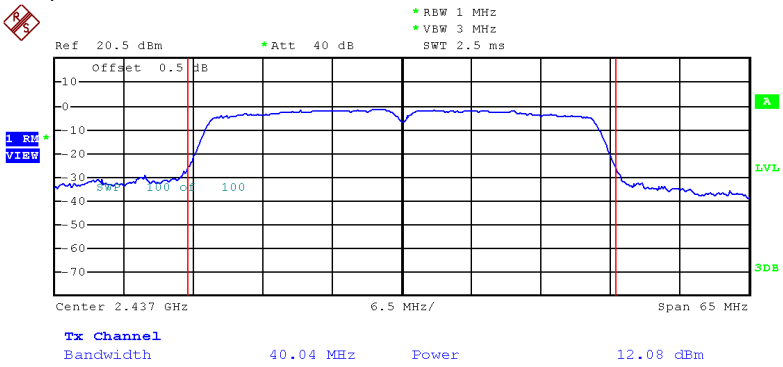
## Plots of maximum output power

802.11n HT40, Middle Channel

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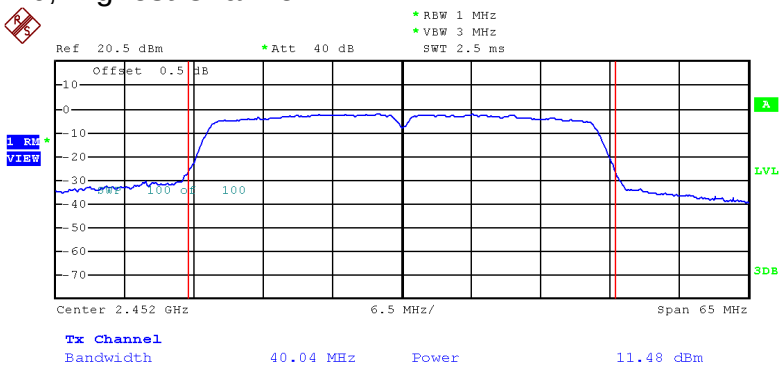
## Plots of maximum output power

802.11n HT40, Highest Channel

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4.1 Maximum Conducted Output Power at Antenna Terminals – Cont'd

Cable loss : 0.5 dB  External Attenuation : 0 dB

IEEE 802.11b (DSSS, 1 Mbps)
max. conducted (peak) output level = 16.78 dBm

IEEE 802.11g (OFDM, 6 Mbps)
max. conducted (peak) output level = 18.98 dBm

IEEE 802.11n (HT20, mcs0)
max. conducted (peak) output level = 18.88 dBm

Cable loss, external attenuation: ☒ included in OFFSET function
☐ added to SA raw reading

IEEE 802.11n ((HT40, mcs0)
max. conducted (Average) output level = 12.08 dBm

Limits:
☒ 1W (30dBm) for antennas with gains of 6dBi or less

☐ ___W (___dBm) for antennas with gains more than 6dBi

4.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

| IEEE 802.11b (DSSS, 1 Mbps) | |
|---|---|
| Frequency (MHz) | 6dB Bandwidth (kHz) |
| Low Channel: 2412 | 9960 |
| Middle Channel: 2437 | 9960 |
| High Channel: 2462 | 9960 |

| IEEE 802.11g (OFDM, 6 Mbps) | |
|---|---|
| Frequency (MHz) | 6dB Bandwidth (kHz) |
| Low Channel: 2412 | 16560 |
| Middle Channel: 2437 | 16560 |
| High Channel: 2462 | 16560 |

| IEEE 802.11n (HT20, MCS0) | |
|---|---|
| Frequency (MHz) | 6dB Bandwidth (kHz) |
| Low Channel: 2412 | 17760 |
| Middle Channel: 2437 | 17760 |
| High Channel: 2462 | 17760 |

Limits:
6 dB bandwidth shall be at least 500kHz

4.2 Minimum 6dB RF Bandwidth – cont'd

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

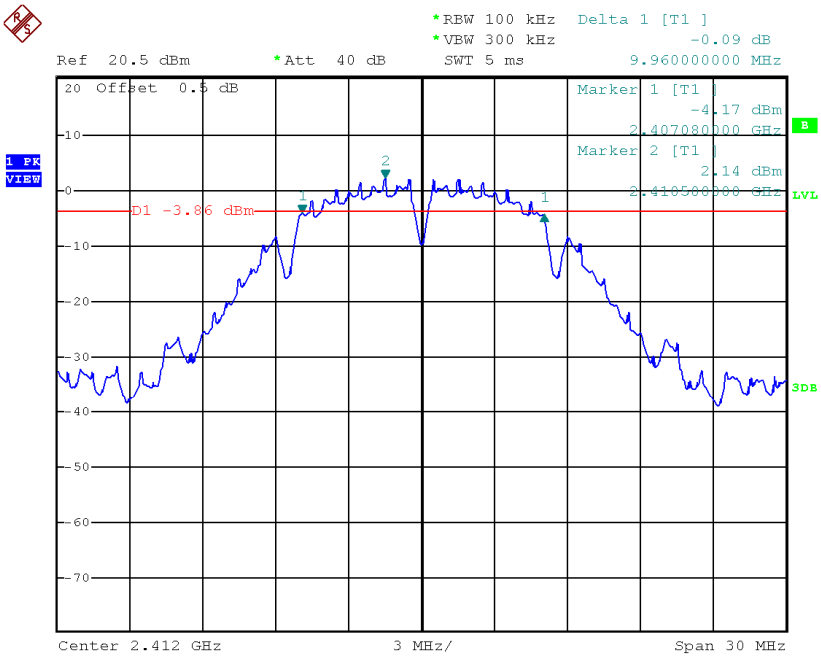
| IEEE 802.11n (HT40, MCS0) | |
|---|---|
| Frequency (MHz) | 6dB Bandwidth (kHz) |
| Low Channel: 2412 | 36660 |
| Middle Channel: 2437 | 36610 |
| High Channel: 2462 | 36690 |

Limits
6 dB bandwidth shall be at least 500kHz

The plots of 6dB RF bandwidth and occupied bandwidth are saved as below.

## Plots of 6dB RF bandwidth

802.11b, Lowest Channel

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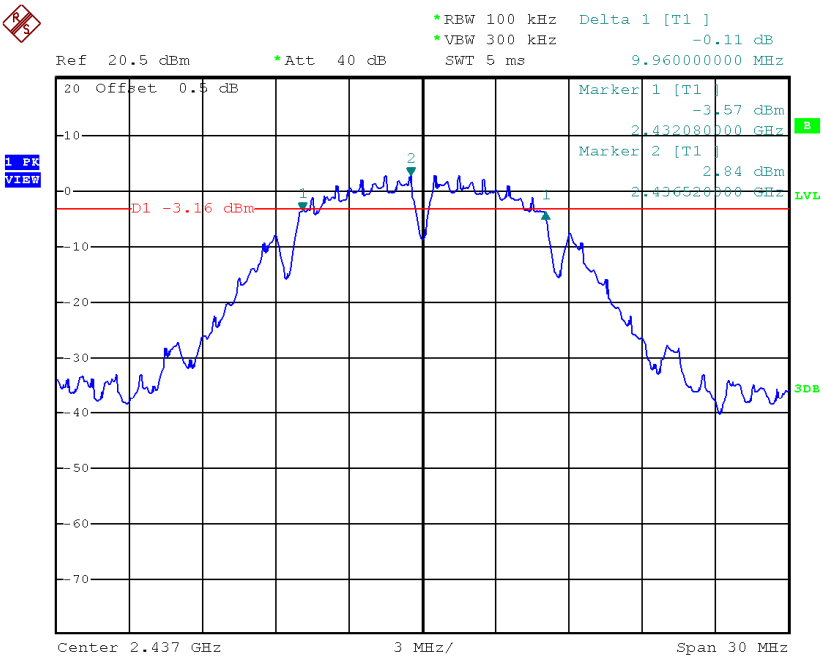
802.11b, Middle Channel

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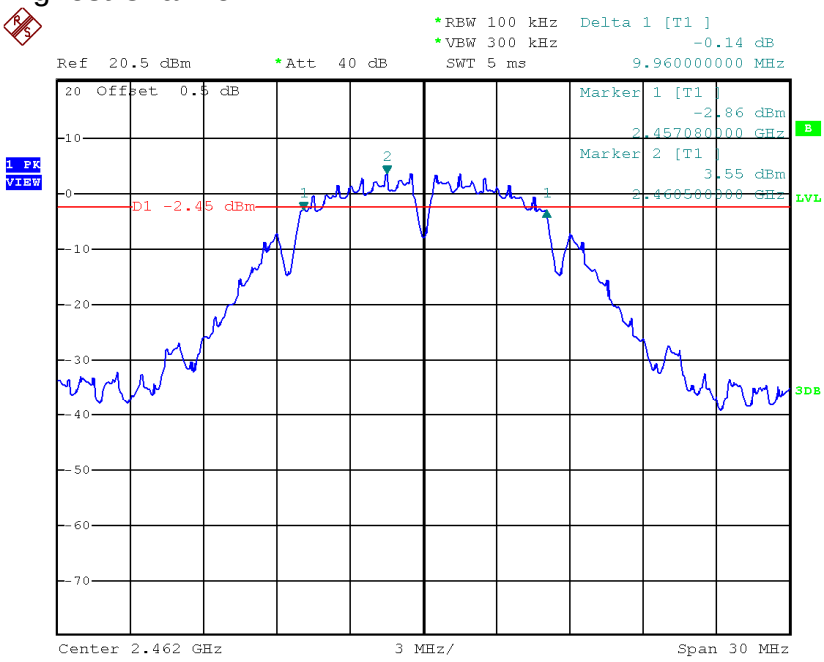
## Plots of 6dB RF bandwidth

802.11b, Highest Channel

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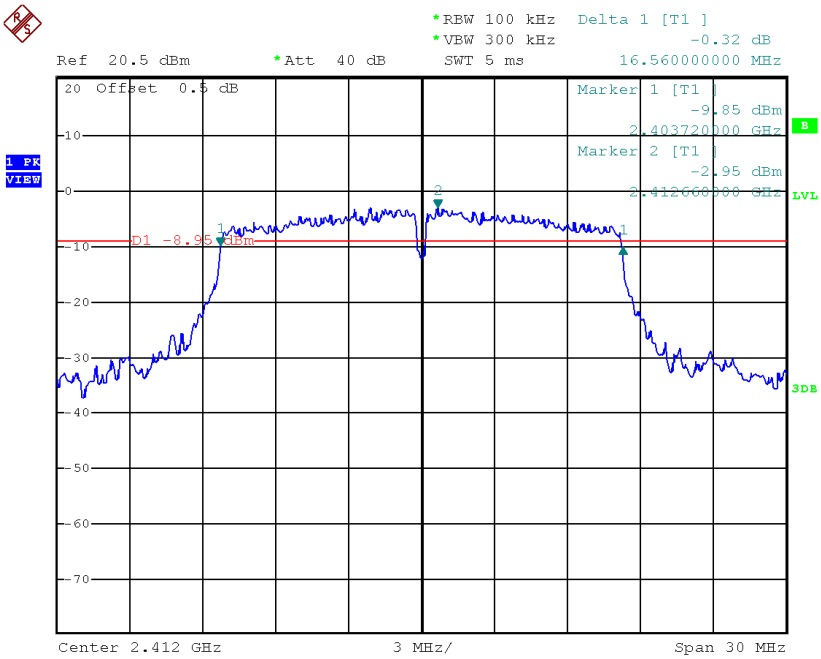
## Plots of 6dB RF bandwidth

802.11g, Lowest Channel

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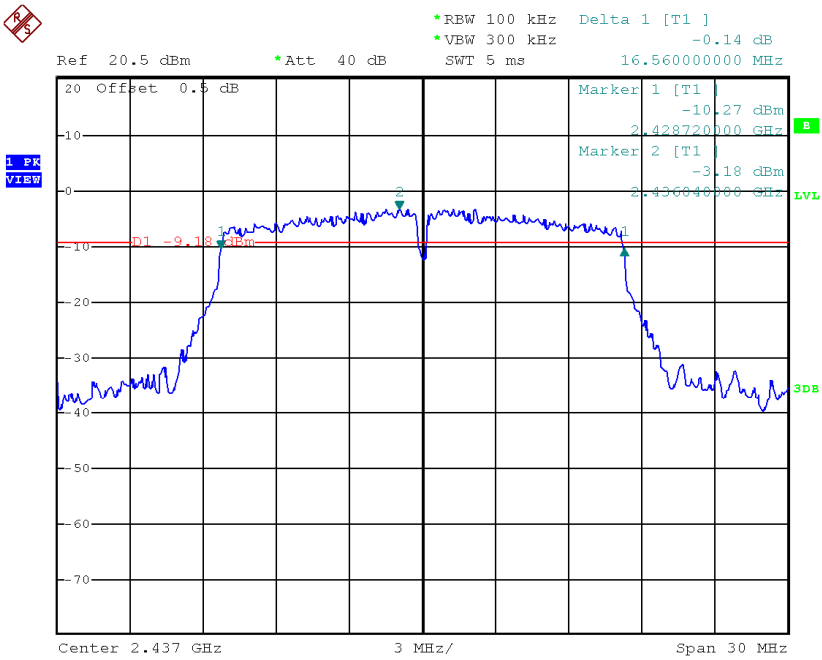
802.11g, Middle Channel

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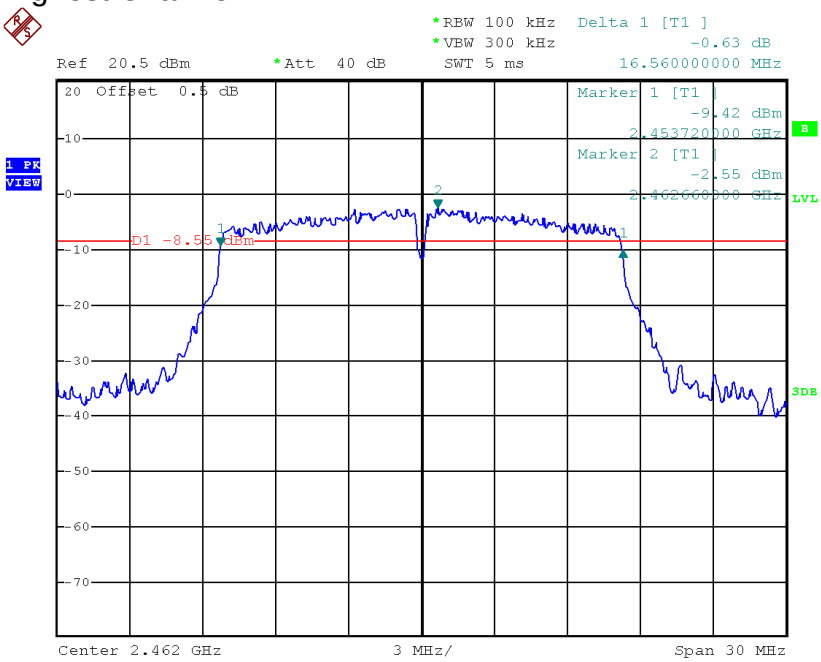
## Plots of 6dB RF bandwidth

802.11g, Highest Channel

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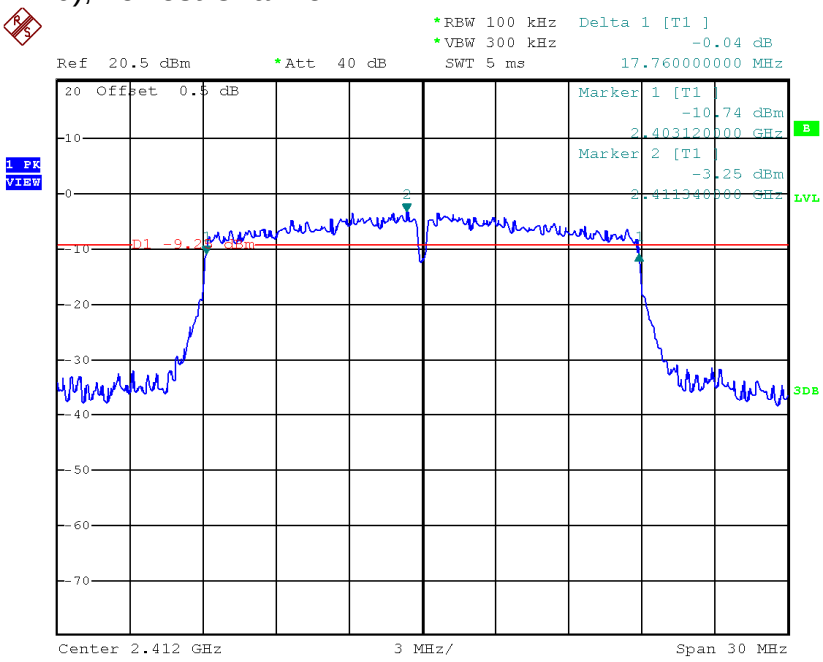
## Plots of 6dB RF bandwidth

802.11n(HT20), Lowest Channel

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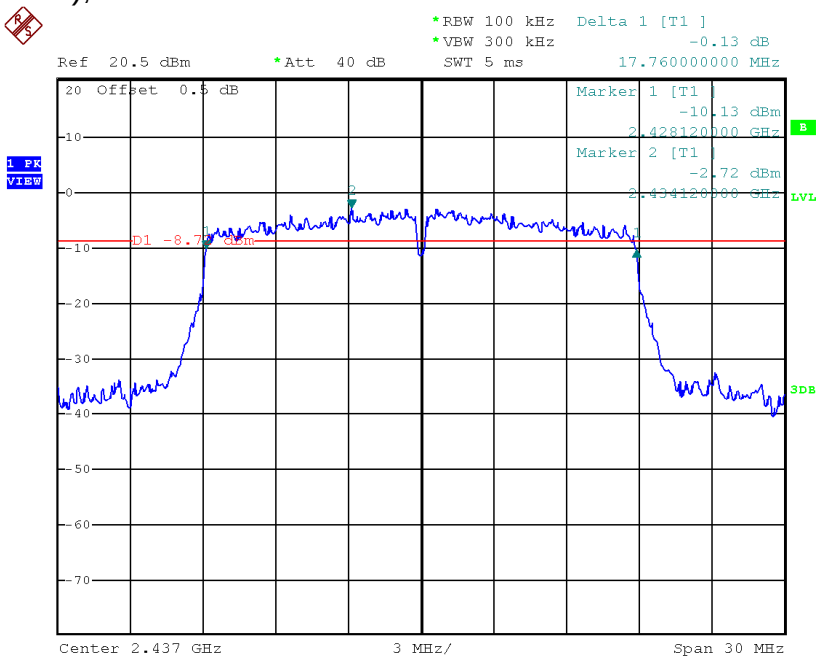
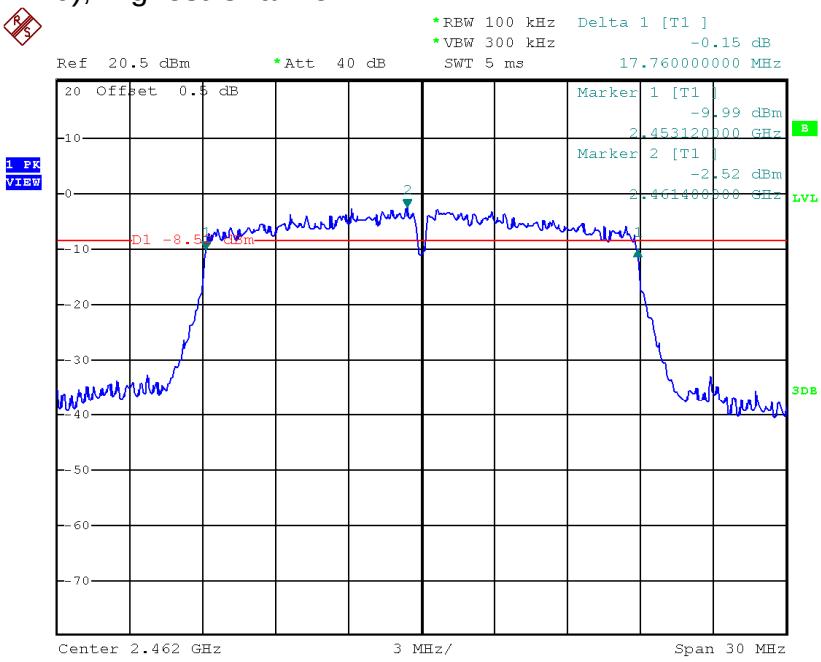
802.11n(HT20), Middle Channel




Date: 3.MAY.2016 16:09:17

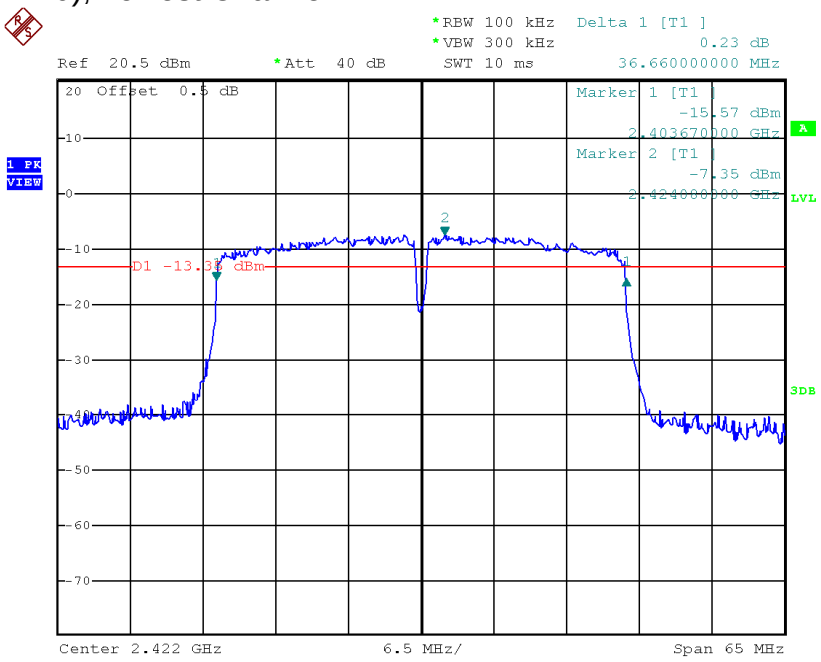
## Plots of 6dB RF bandwidth

802.11n(HT20), Highest Channel



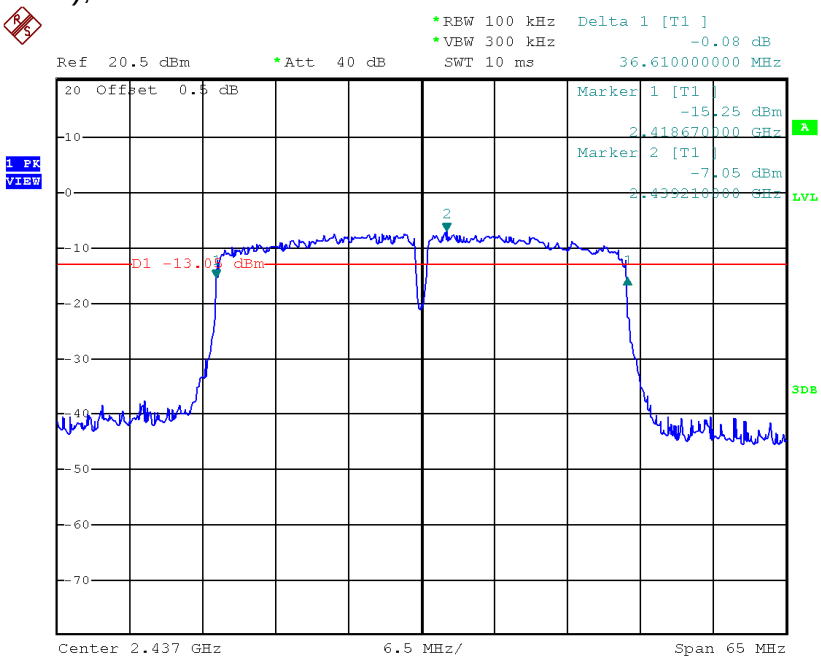
## Plots of 6dB RF bandwidth

802.11n(HT40), Lowest Channel




Date: 3.MAY.2016 16:12:59

802.11n(HT40), Middle Channel

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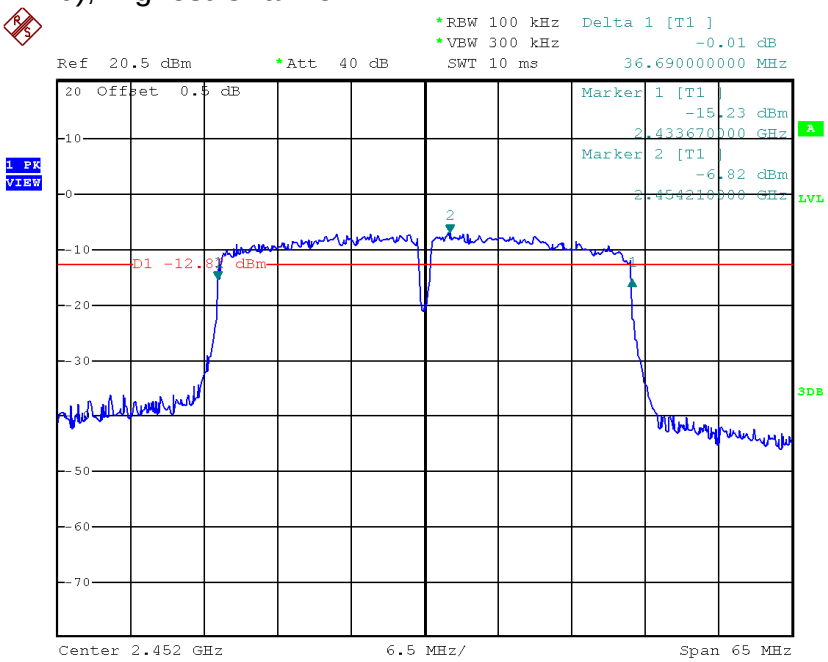
## Plots of 6dB RF bandwidth

802.11n(HT40), Highest Channel



4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD-1 was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

| IEEE 802.11b (DSSS, 1 Mbps) | |
|---|---|
| Frequency (MHz) | PSD in 100kHz (dBm) |
| Low Channel: 2412 | 2.65 |
| Middle Channel: 2437 | 2.94 |
| High Channel: 2462 | 3.45 |

| IEEE 802.11g (OFDM, 6 Mbps) | |
|---|---|
| Frequency (MHz) | PSD in 100kHz (dBm) |
| Low Channel: 2412 | -3.15 |
| Middle Channel: 2437 | -2.80 |
| High Channel: 2462 | -2.48 |

| IEEE 802.11n (HT20, MCS0) | |
|---|---|
| Frequency (MHz) | PSD in 100kHz (dBm) |
| Low Channel: 2412 | -2.98 |
| Middle Channel: 2437 | -2.86 |
| High Channel: 2462 | -2.58 |

Cable Loss: 0.5 dB

Limit:
8dBm

4.3 Maximum Power Spectral Density – cont'd

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.3 AVGPSD-1 was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

| IEEE 802.11n (HT40, MCS0) | |
|---|---|
| Frequency (MHz) | PSD in 100kHz (dBm) |
| Low Channel: 2412 | -9.74 |
| Middle Channel: 2437 | -9.58 |
| High Channel: 2462 | -9.36 |

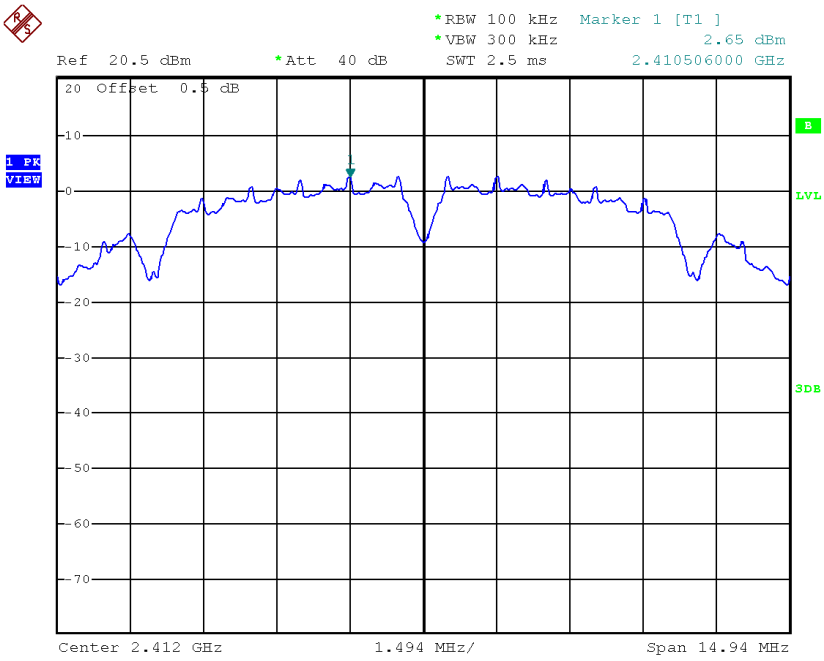
Cable Loss: 0.5 dB

Limit:
8dBm

The plots of power spectral density are as below.

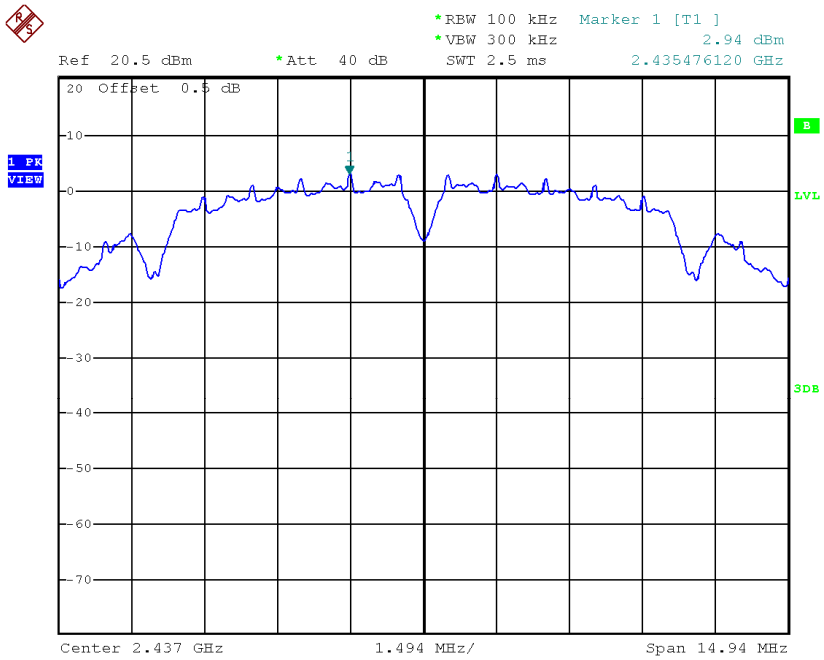
## Plots of power spectral density

802.11b, Lowest channel




Date: 3.MAY.2016 16:24:21

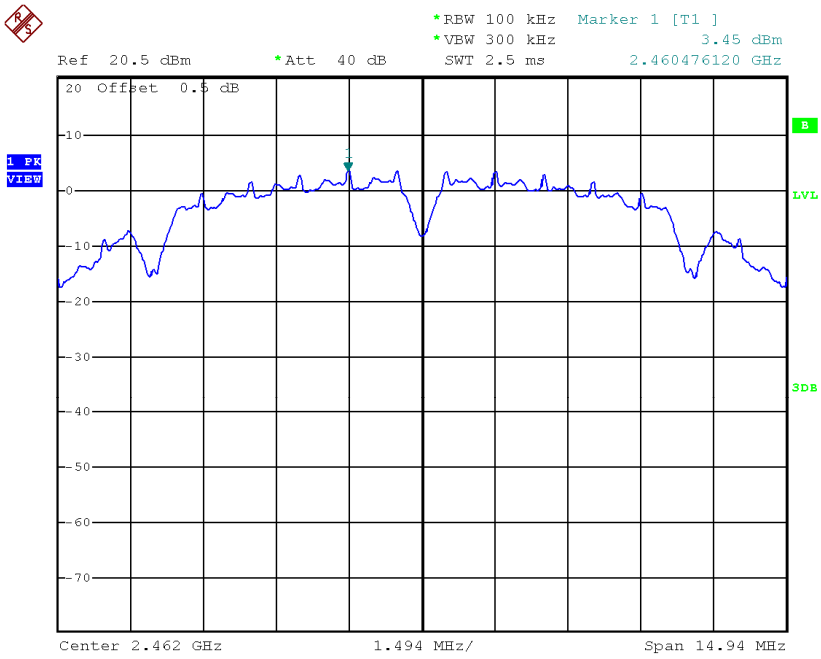
802.11b, Middle channel




Date: 3.MAY.2016 16:25:34

## Plots of power spectral density

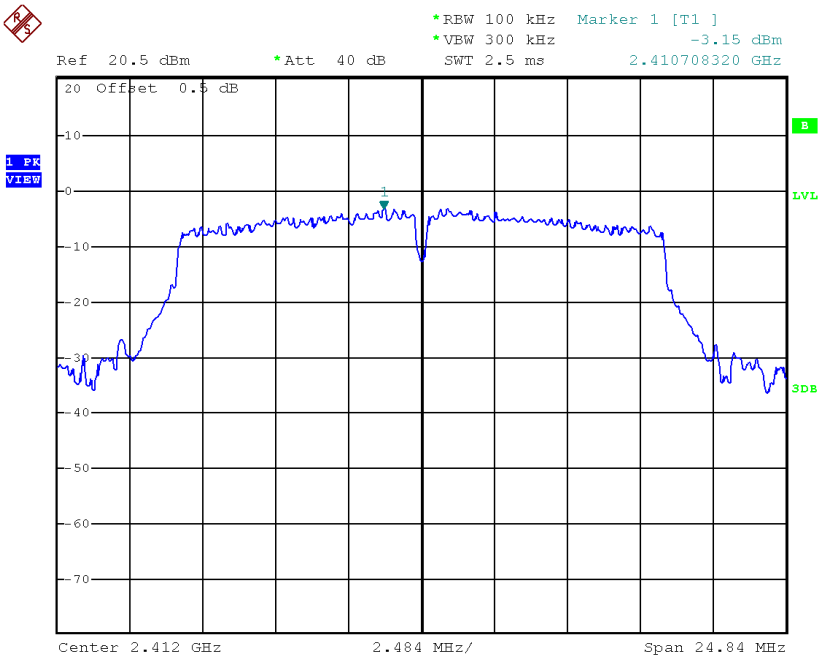
802.11b, Highest channel




Date: 3.MAY.2016 16:26:29

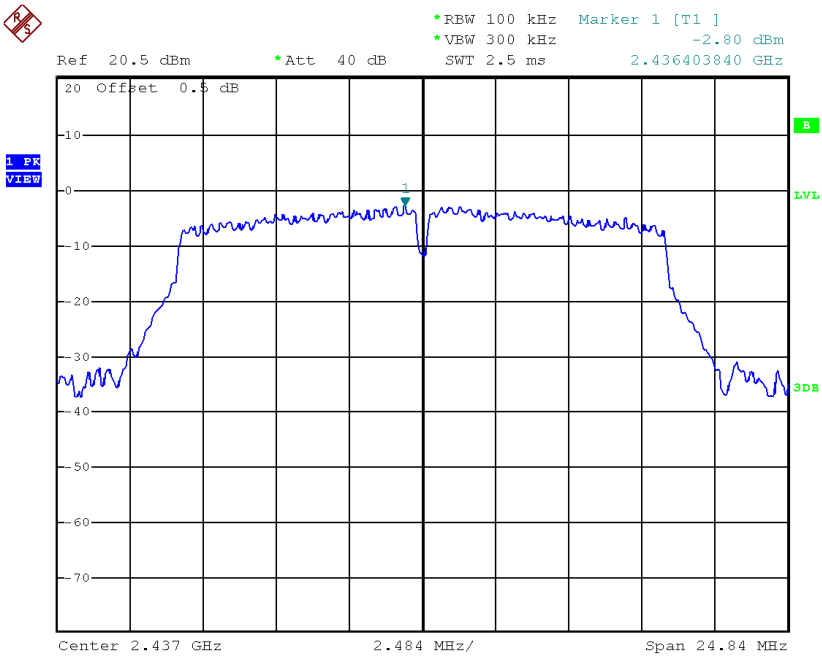
## Plots of power spectral density

802.11g, Lowest channel




Date: 3.MAY.2016 16:27:57

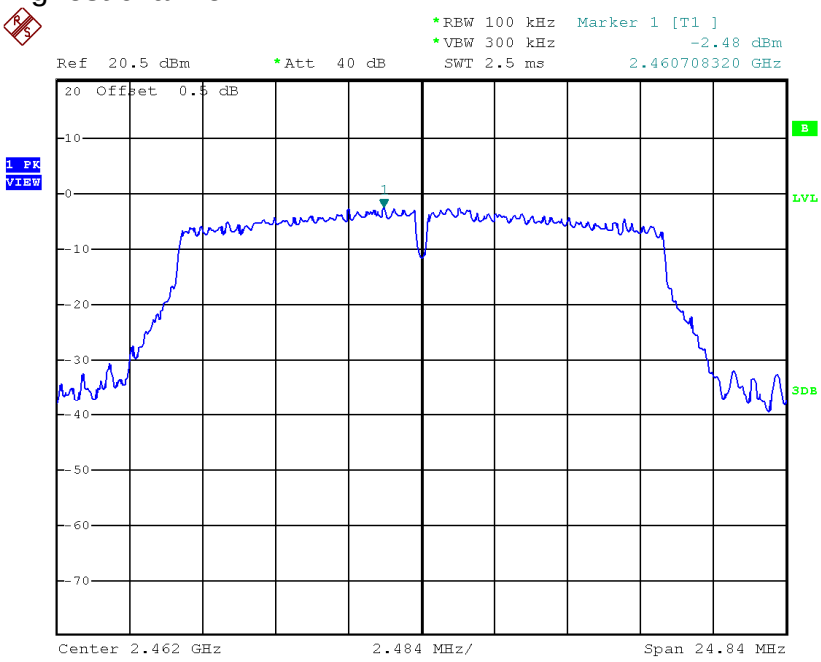
802.11g, Middle channel




Date: 3.MAY.2016 16:28:39

## Plots of power spectral density

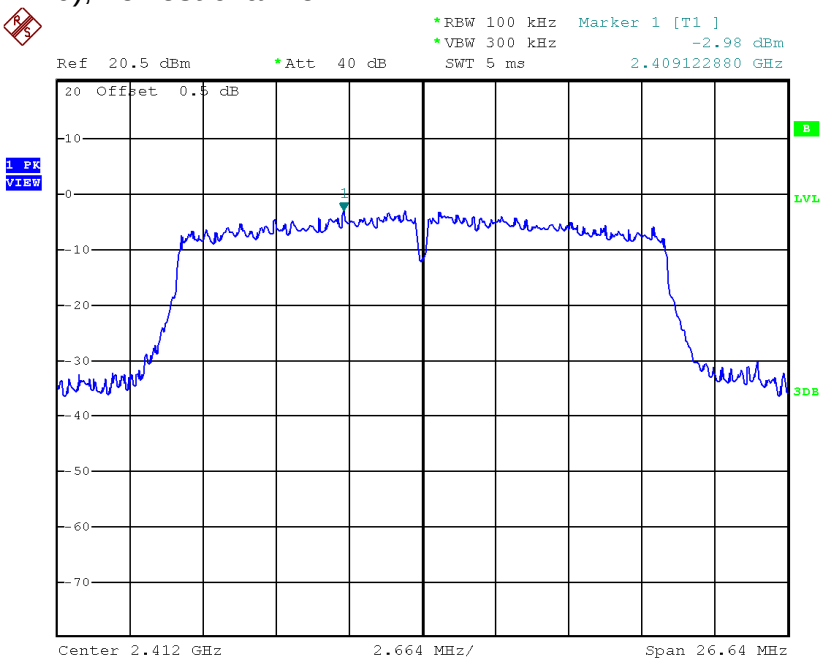
802.11g, Highest channel




Date: 3.MAY.2016 16:29:21

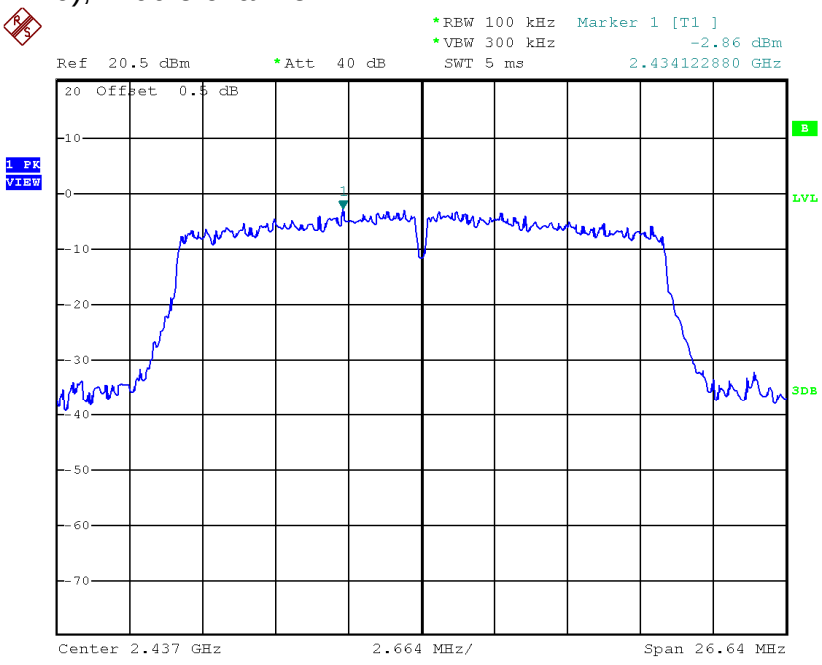
## Plots of power spectral density

802.11n(HT20), Lowest channel




Date: 3.MAY.2016 16:32:01

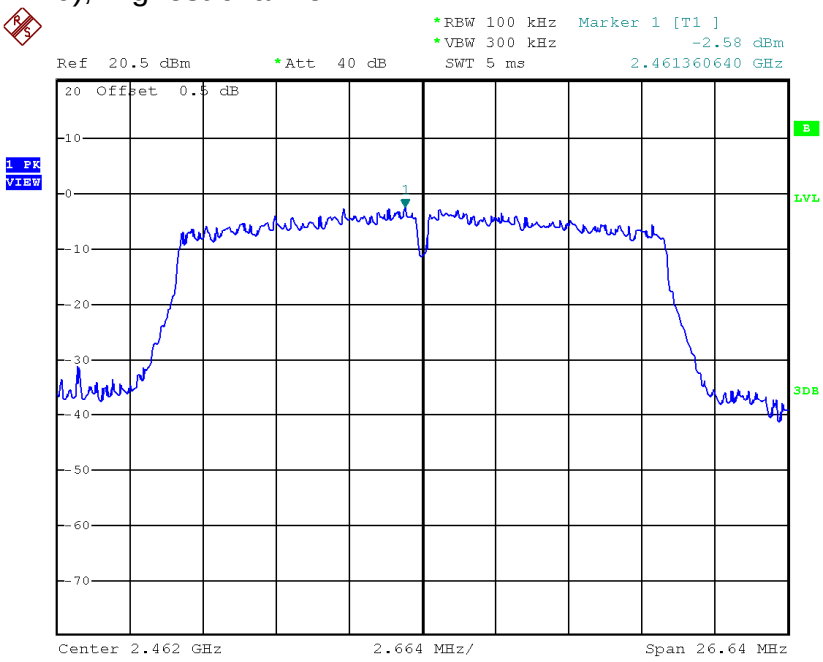
802.11n(HT20), Middle channel




Date: 3.MAY.2016 16:32:41

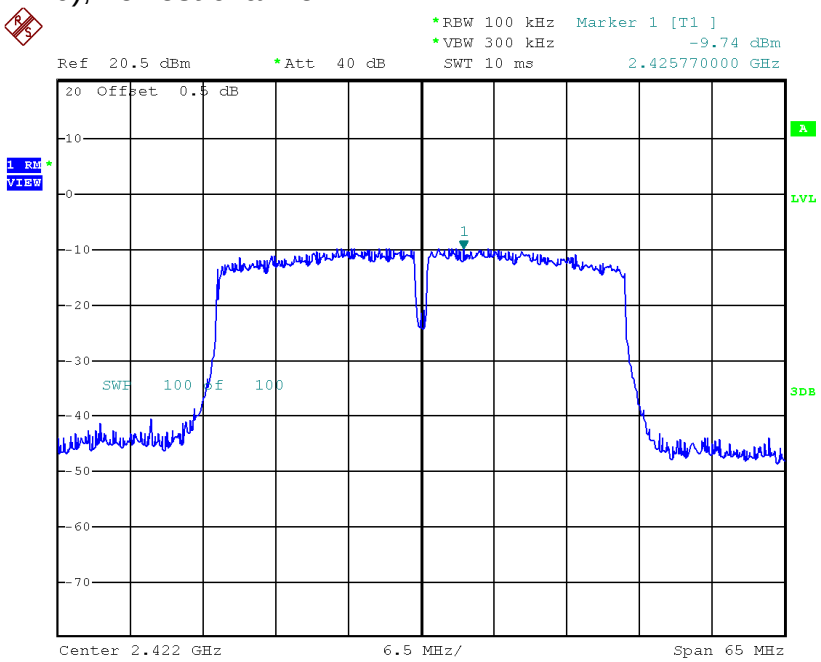
## Plots of power spectral density

802.11n(HT20), Highest channel



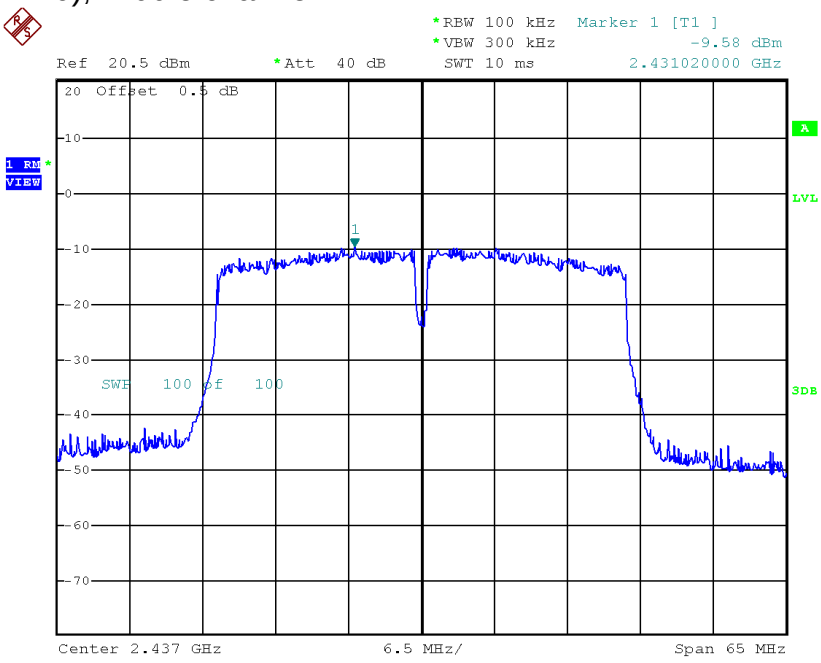
## Plots of power spectral density

802.11n(HT40), Lowest channel




Date: 3.MAY.2016 16:44:07

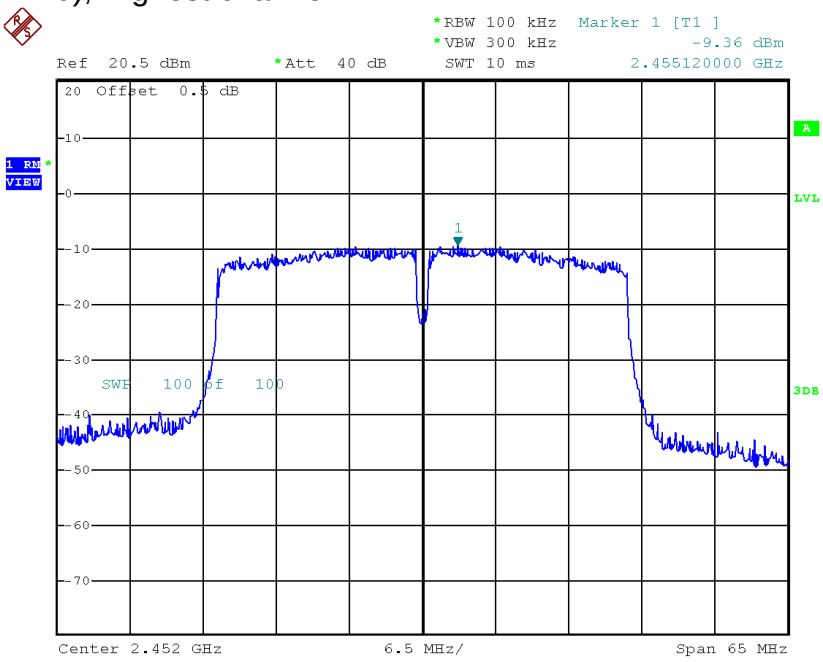
802.11n(HT40), Middle channel




Date: 3.MAY.2016 16:45:49

## Plots of power spectral density

802.11n(HT40), Highest channel




Date: 3.MAY.2016 16:46:47

4.4 Out of Band Conducted Emissions

For 802.11b/g/n (HT20):
The maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth.

For 802.11b/g/n (HT40):
The maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 30dB below maximum measured in-band peak PSD level in 100 KHz bandwidth.

The measurement procedures under sections 11 of KDB558074 D01 v03r05 (08-April-2016) were used.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

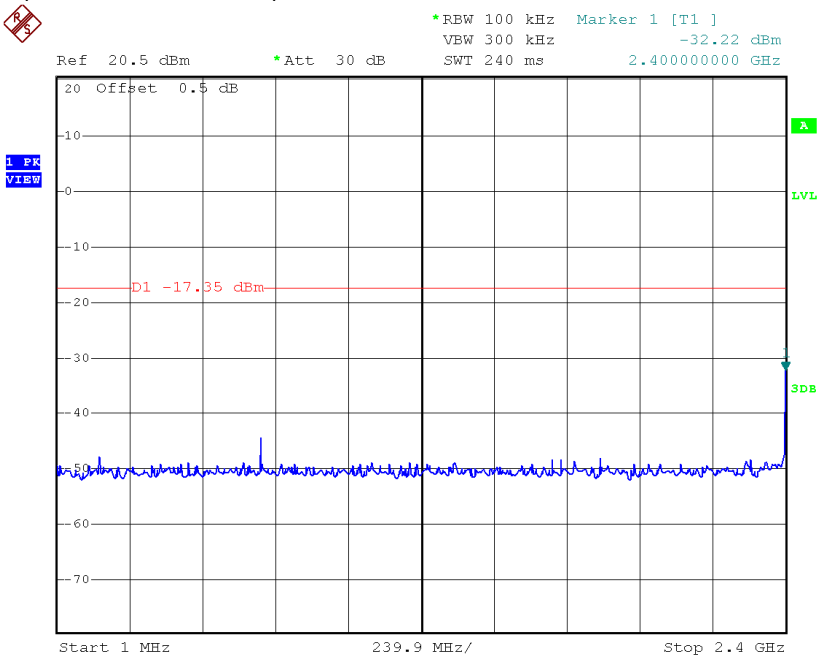
Limits:
For 802.11 b/g/n (HT20)
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the maximum measured in-band peak PSD level.

For 802.11n HT40:
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 30 dB below the maximum measured in-band peak PSD level.

The plots of out of band conducted emissions are as below.

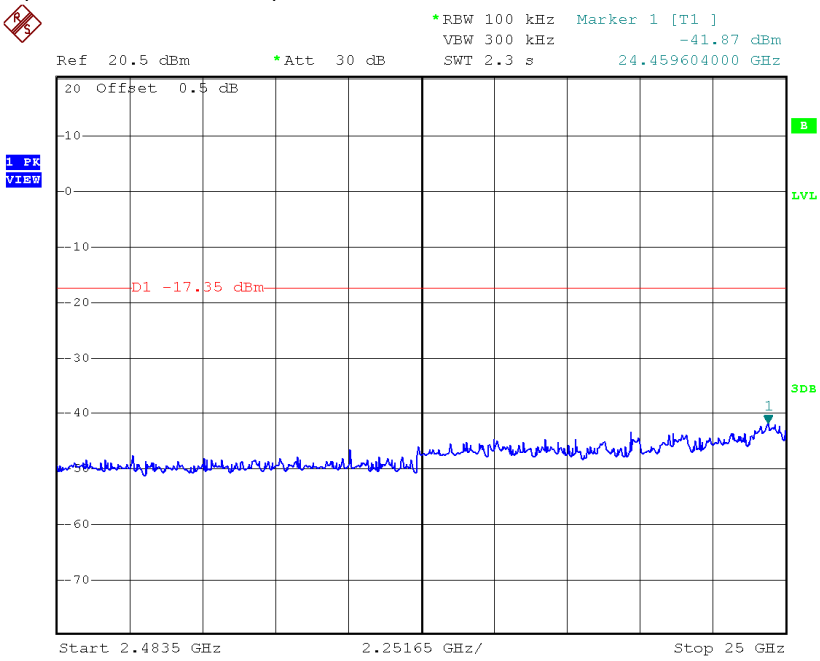
## Plots of out of band conducted emissions

802.11b, Lowest Channel, Plot A




Date: 4.SEP.2016 18:28:50

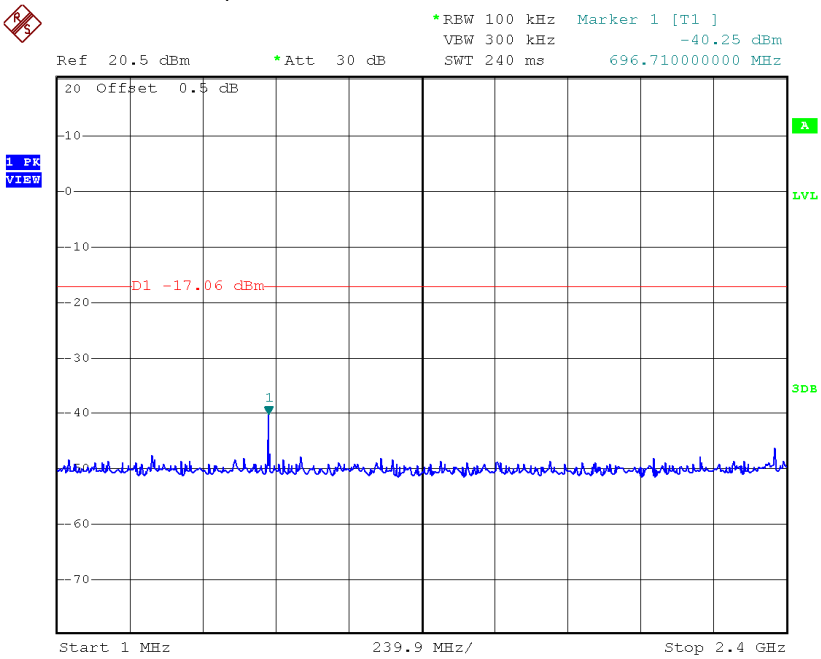
802.11b, Lowest Channel, Plot B




Date: 4.SEP.2016 18:27:57

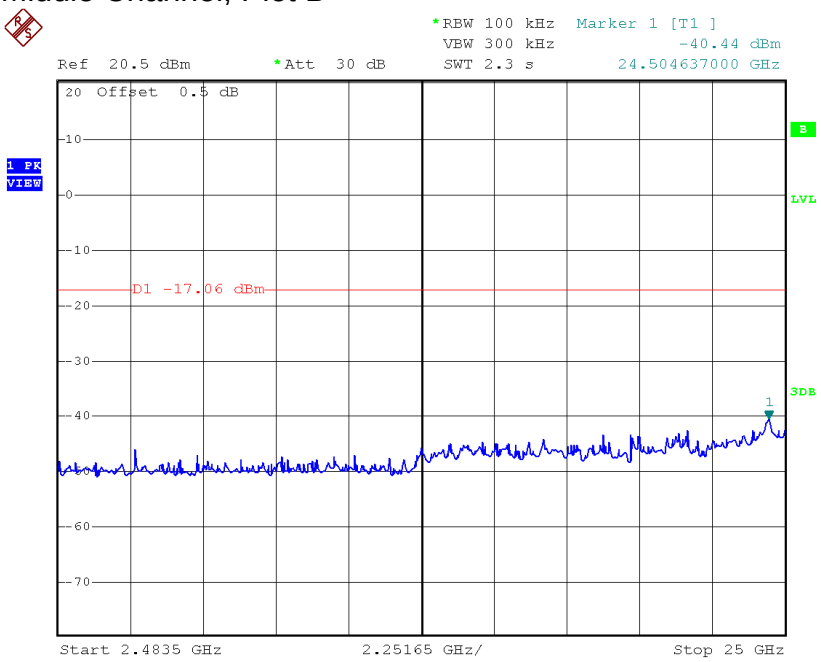
## Plots of out of band conducted emissions

802.11b, Middle Channel, Plot A




Date: 4.SEP.2016 18:30:55

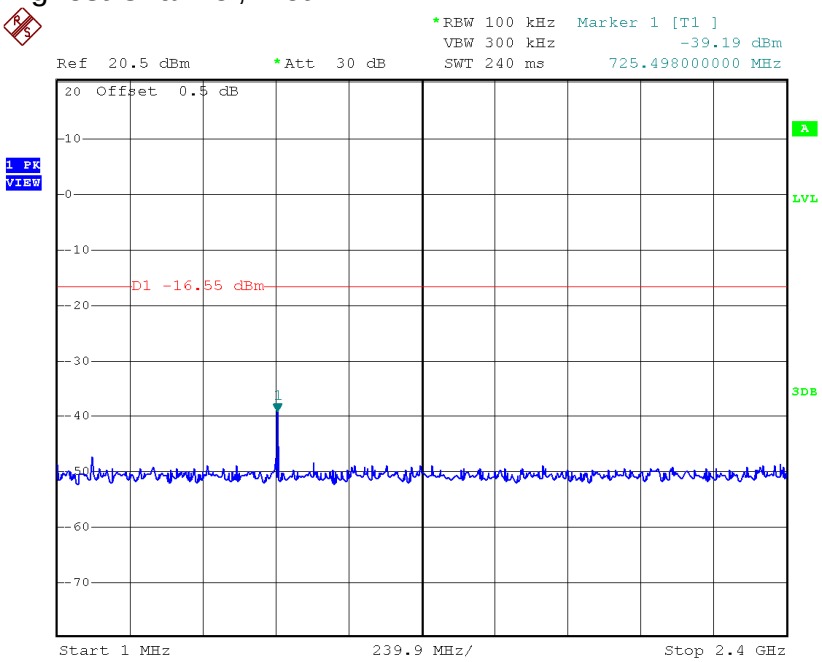
802.11b, Middle Channel, Plot B




Date: 4.SEP.2016 18:31:42

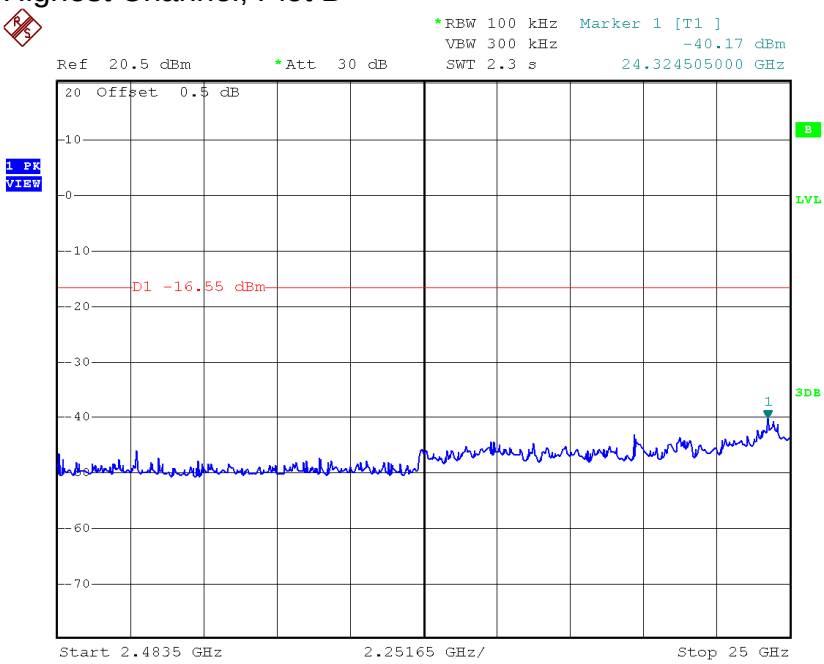
## Plots of out of band conducted emissions

802.11b, Highest Channel, Plot A




Date: 4.SEP.2016 18:33:07

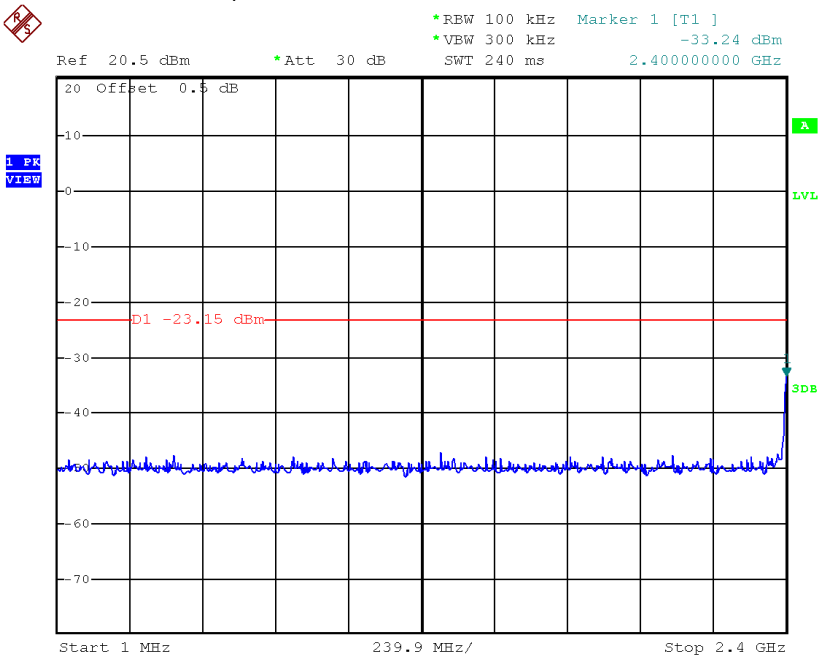
802.11b, Highest Channel, Plot B




Date: 4.SEP.2016 18:33:43

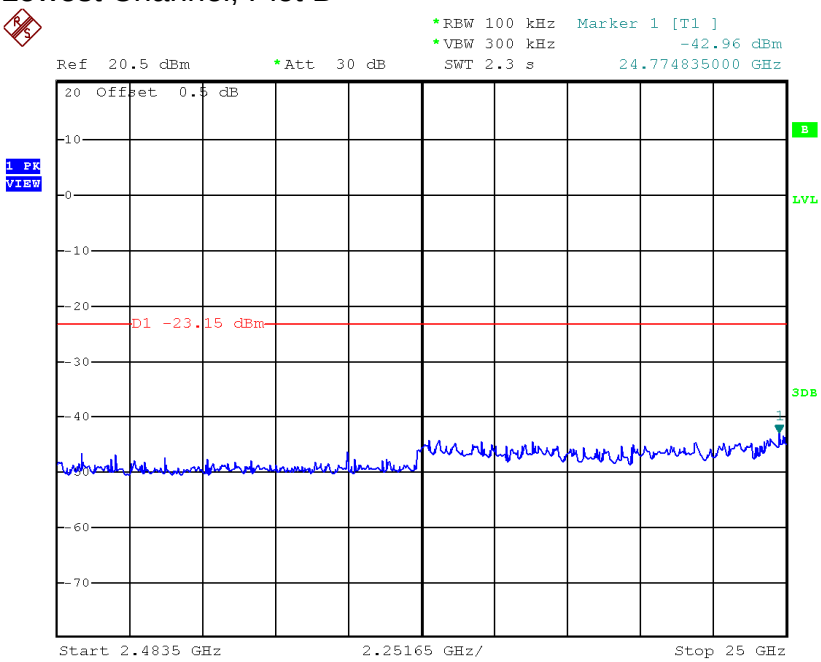
## Plots of out of band conducted emissions

802.11g, Lowest Channel, Plot A




Date: 3.MAY.2016 17:12:11

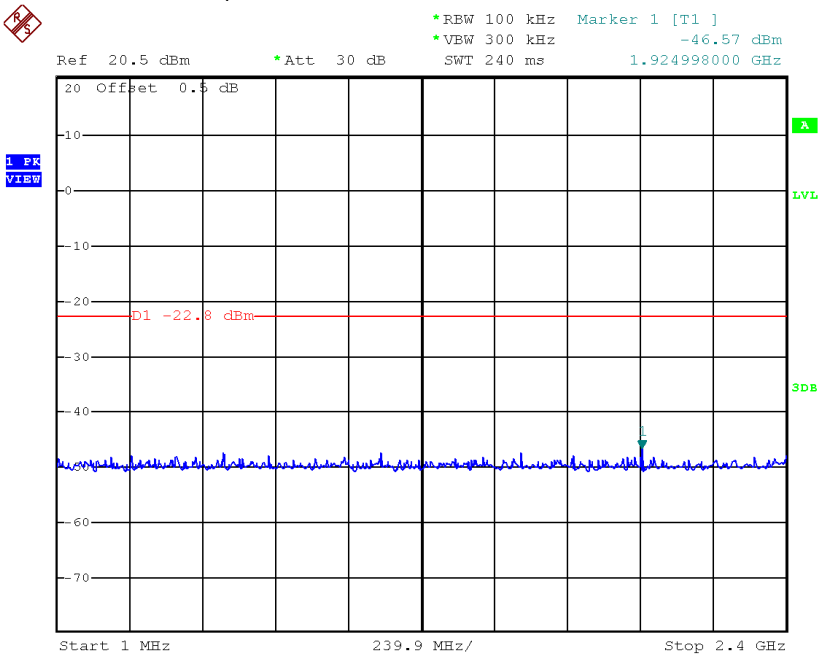
802.11g, Lowest Channel, Plot B




Date: 3.MAY.2016 17:12:39

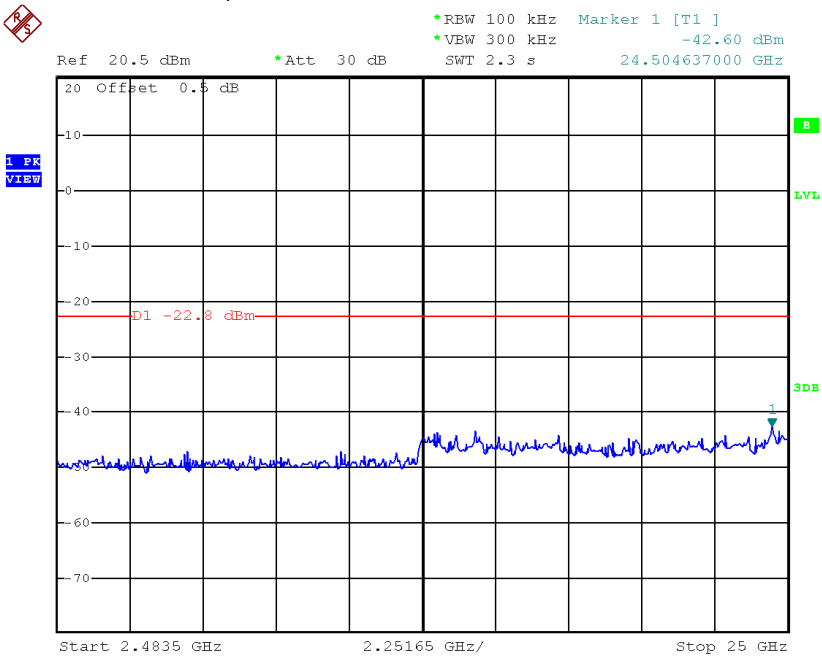
## Plots of out of band conducted emissions

802.11g, Middle Channel, Plot A




Date: 3.MAY.2016 17:13:29

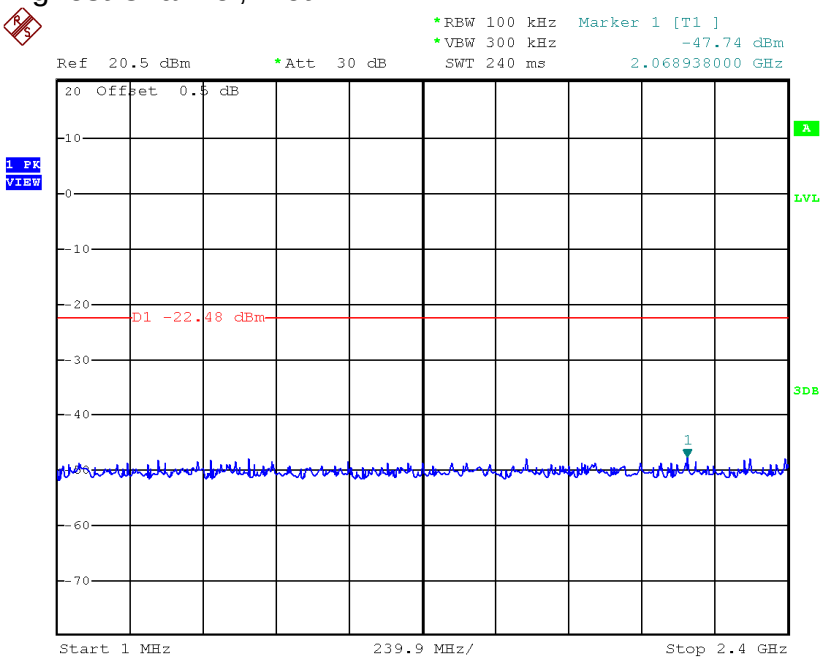
802.11g, Middle Channel, Plot B




Date: 3.MAY.2016 17:13:56

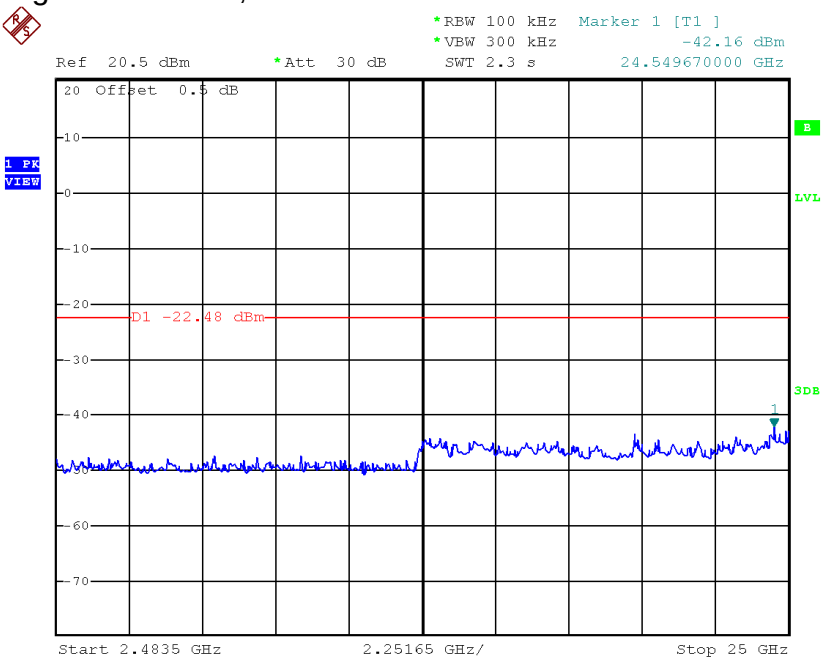
## Plots of out of band conducted emissions

802.11g, Highest Channel, Plot A




Date: 3.MAY.2016 17:14:37

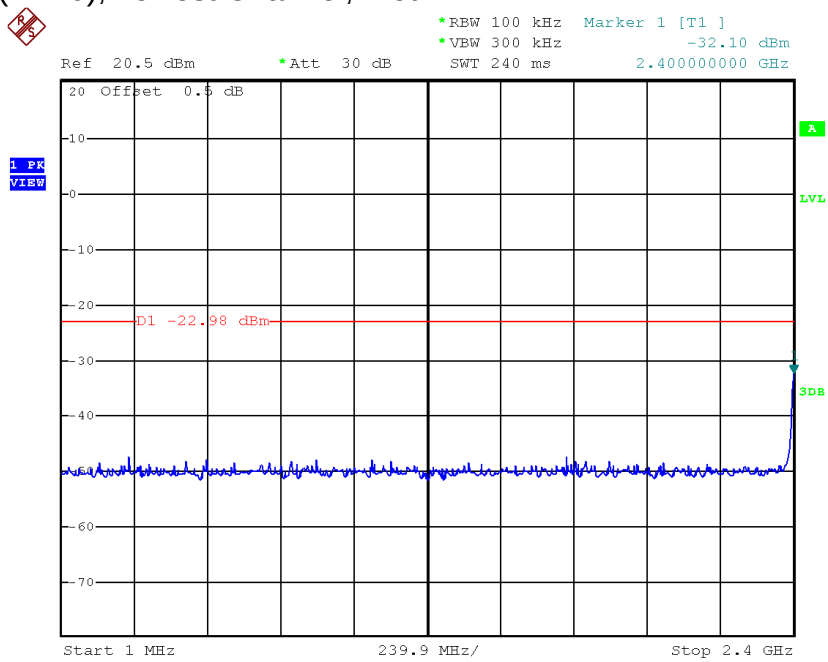
802.11g, Highest Channel, Plot B




Date: 3.MAY.2016 17:15:04

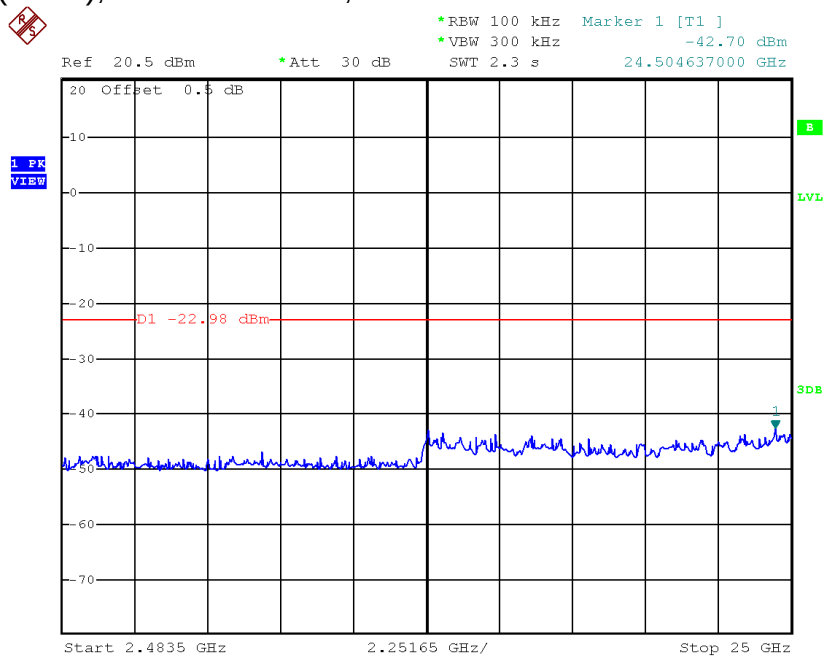
## Plots of out of band conducted emissions

802.11n (HT20), Lowest Channel, Plot A




Date: 3.MAY.2016 17:05:24

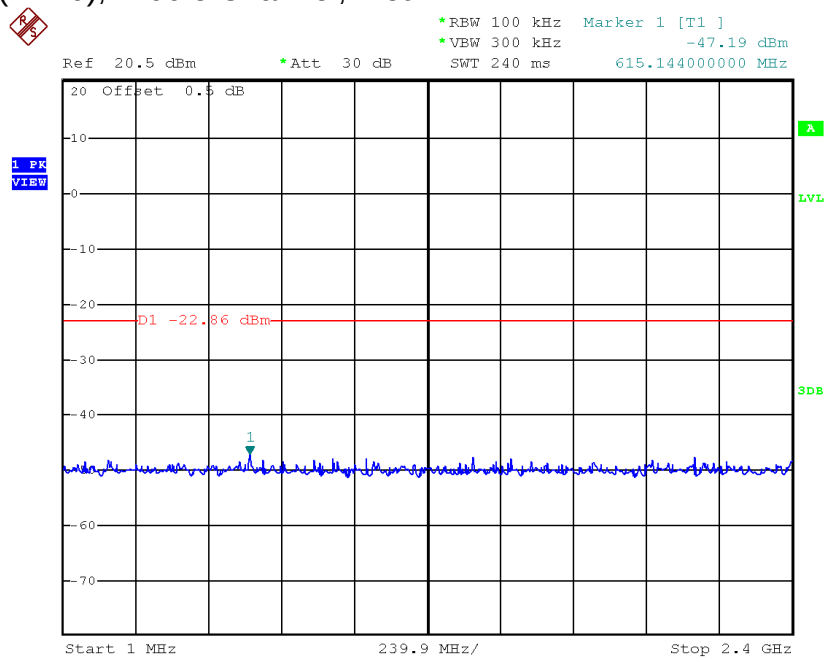
802.11n (HT20), Lowest Channel, Plot B




Date: 3.MAY.2016 17:06:17

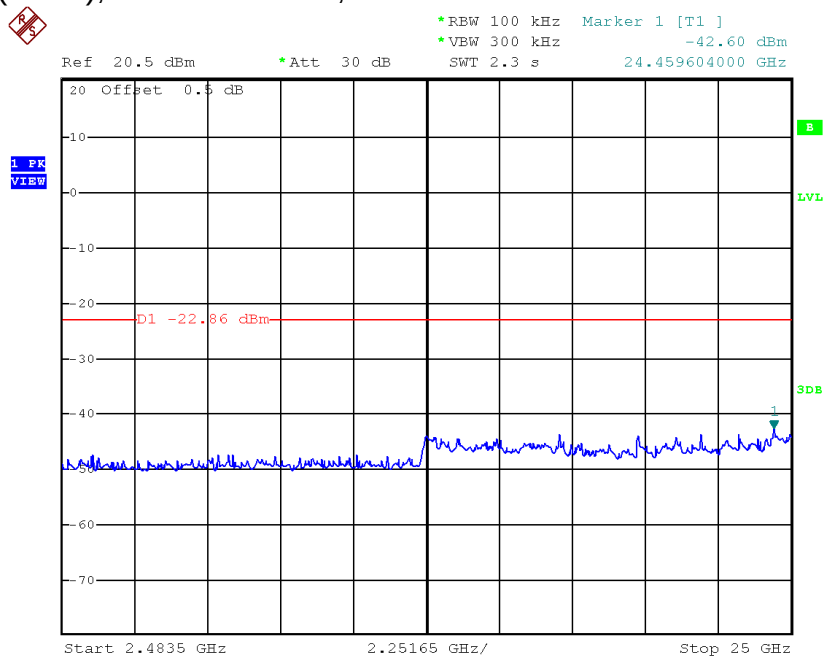
## Plots of out of band conducted emissions

802.11n (HT20), Middle Channel, Plot A




Date: 3.MAY.2016 17:07:34

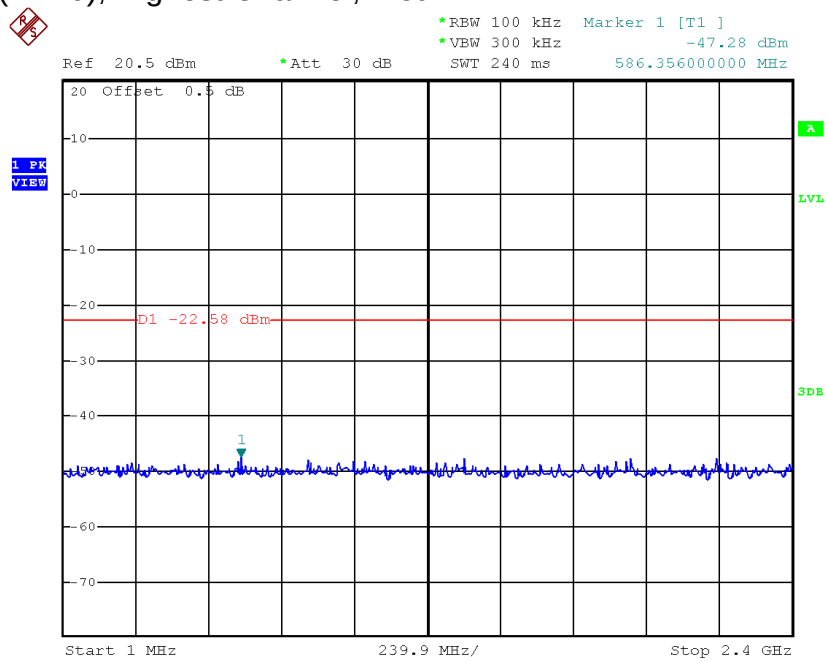
802.11n (HT20), Middle Channel, Plot B




Date: 3.MAY.2016 17:08:26

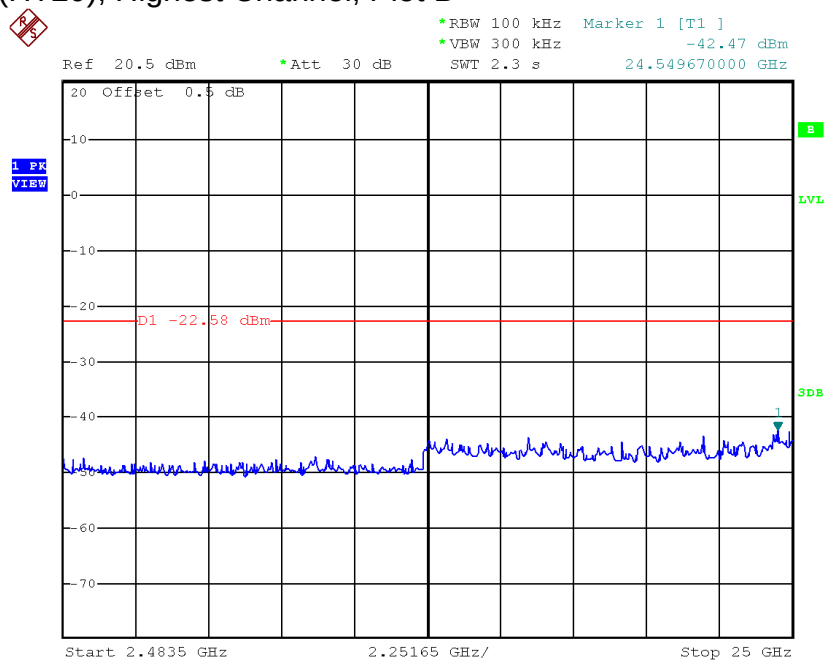
## Plots of out of band conducted emissions

802.11n (HT20), Highest Channel, Plot A




Date: 3.MAY.2016 17:10:18

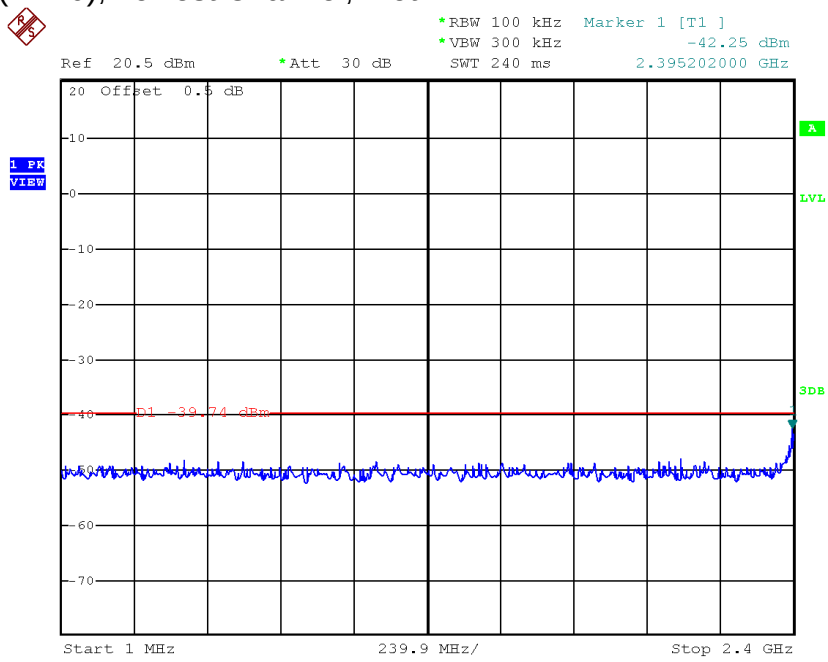
802.11n (HT20), Highest Channel, Plot B




Date: 3.MAY.2016 17:10:47

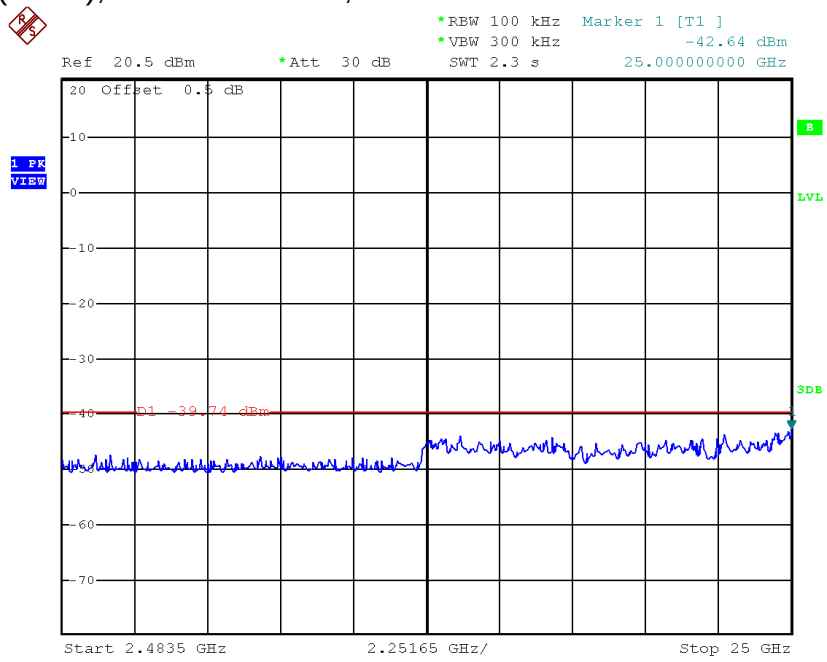
## Plots of out of band conducted emissions

802.11n (HT40), Lowest Channel, Plot A




Date: 3.MAY.2016 16:57:58

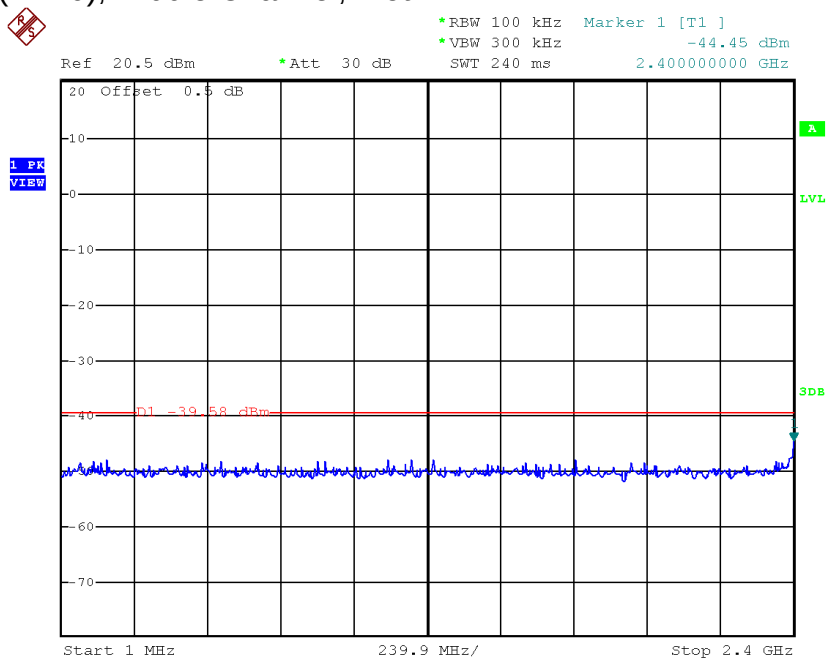
802.11n (HT40), Lowest Channel, Plot B




Date: 3.MAY.2016 16:59:33

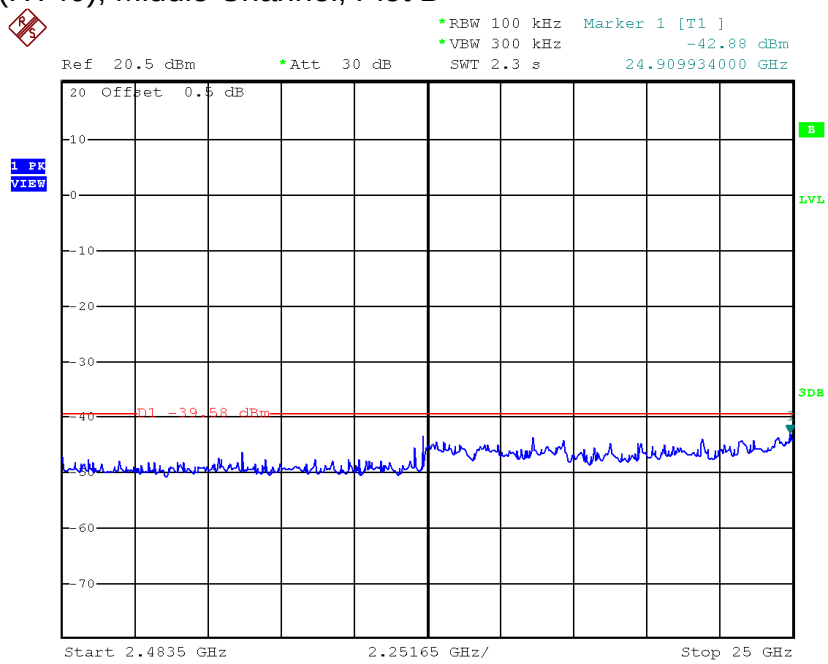
## Plots of out of band conducted emissions

802.11n (HT40), Middle Channel, Plot A




Date: 3.MAY.2016 17:01:06

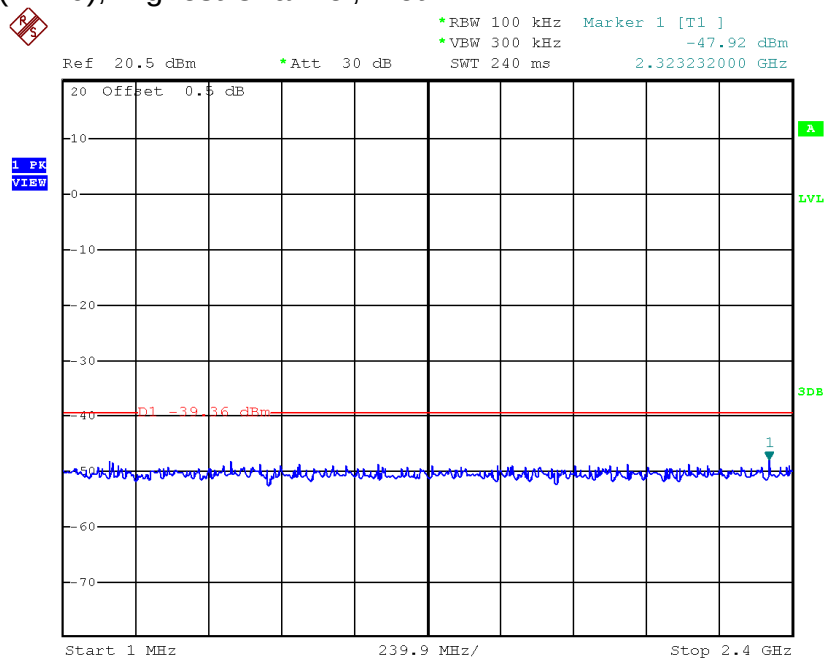
802.11n (HT40), Middle Channel, Plot B




Date: 3.MAY.2016 17:00:27

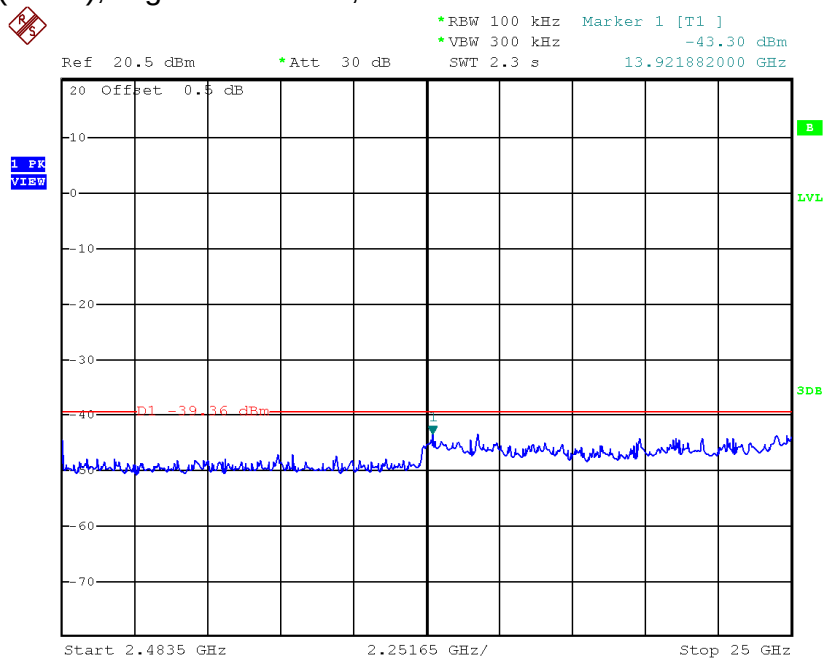
## Plots of out of band conducted emissions

802.11n (HT40), Highest Channel, Plot A




Date: 3.MAY.2016 17:01:42

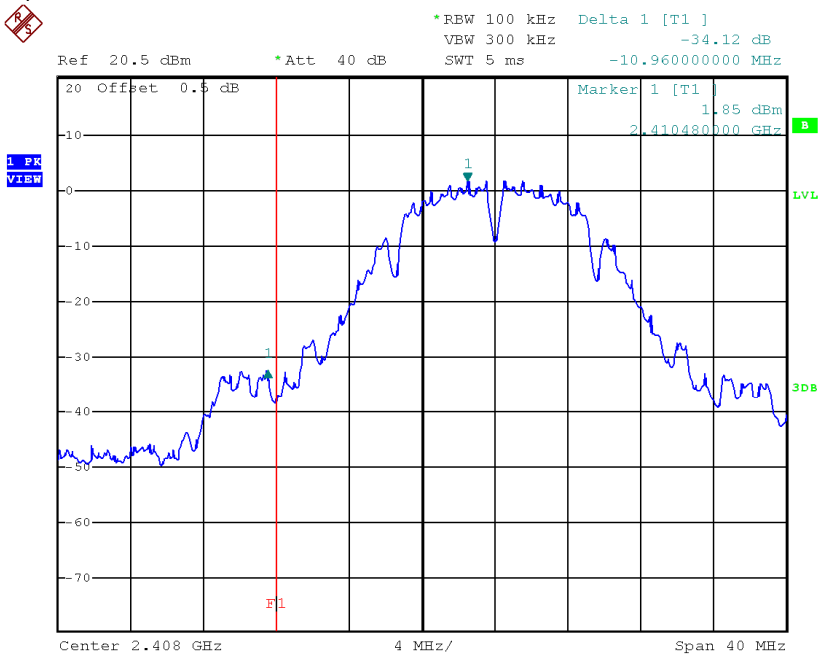
802.11n (HT40), Highest Channel, Plot B




Date: 3.MAY.2016 17:02:23

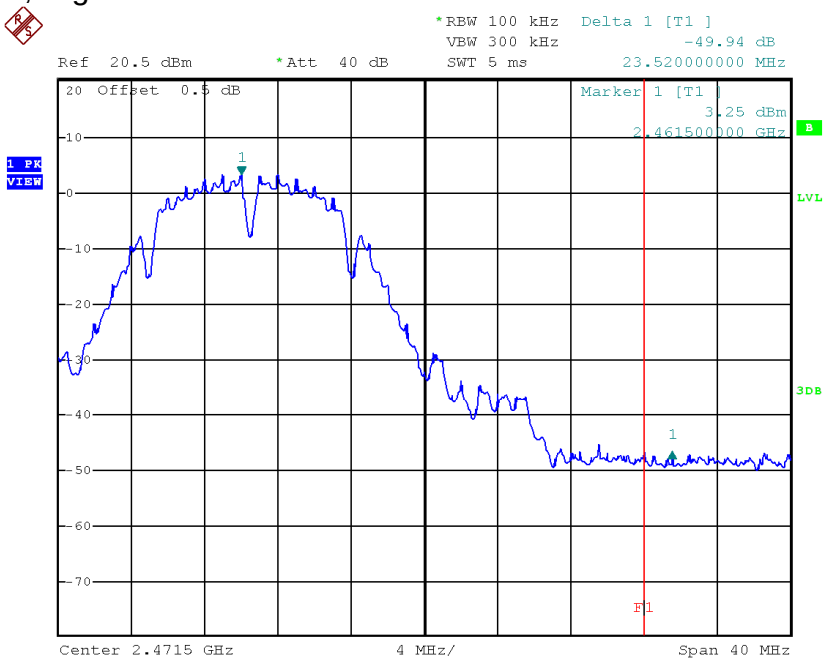
## Plots of Bandedge

802.11b, Lowest Channel




Date: 4.MAY.2016 04:09:40

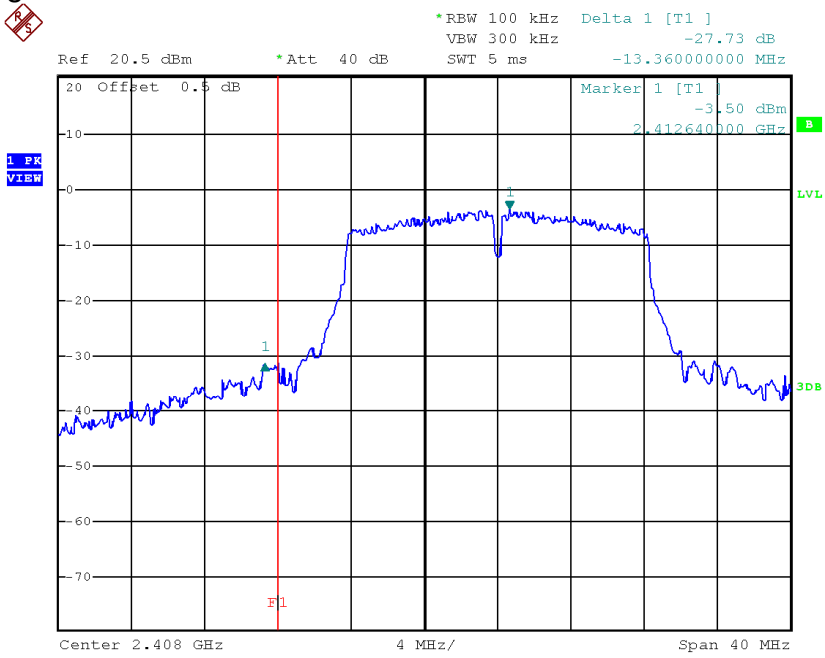
802.11b, Highest Channel




Date: 4.MAY.2016 04:42:00

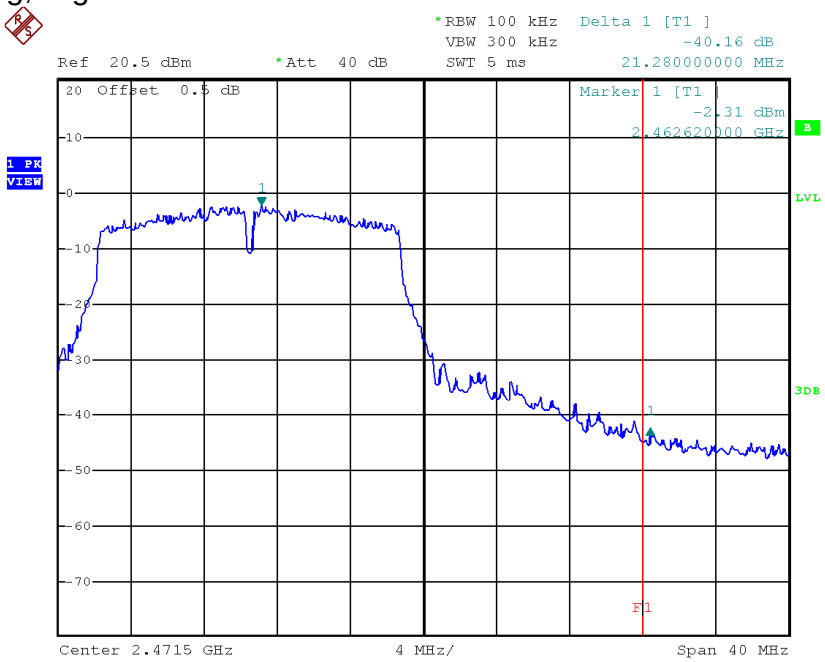
## Plots of Bandedge

802.11g, Lowest Channel




Date: 4.MAY.2016 04:11:09

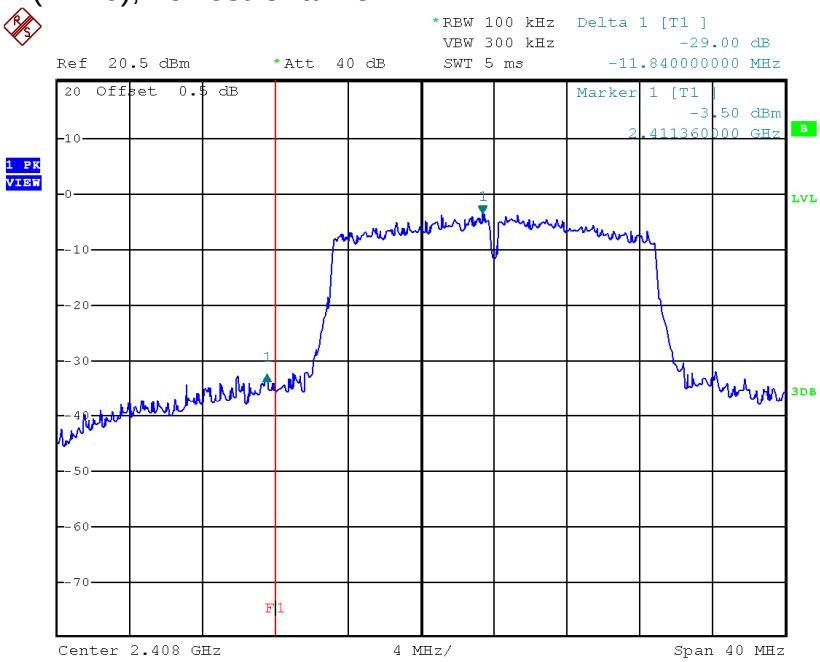
802.11g, Highest Channel




Date: 4.MAY.2016 04:44:02

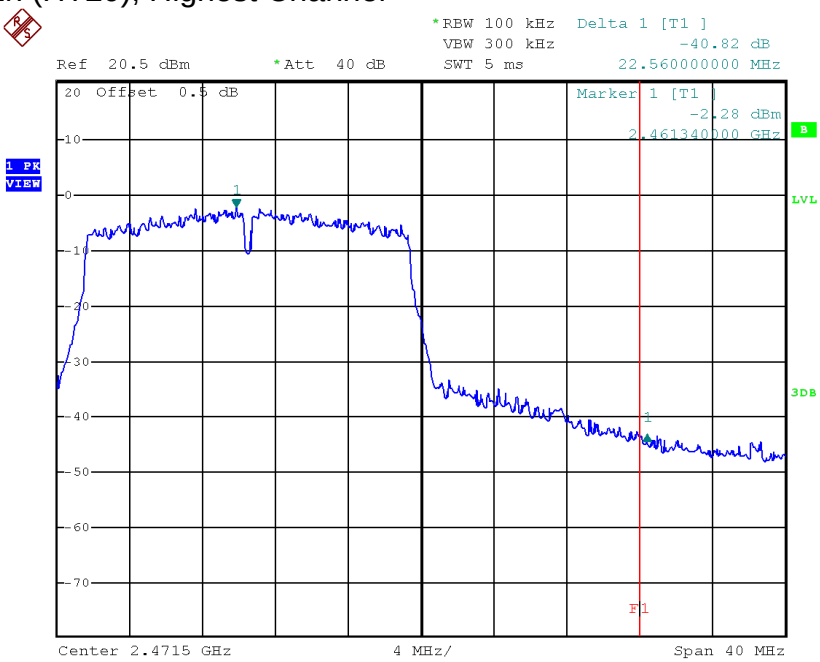
## Plots of Bandedge

802.11n (NT20), Lowest Channel




Date: 4.MAY.2016 04:12:11

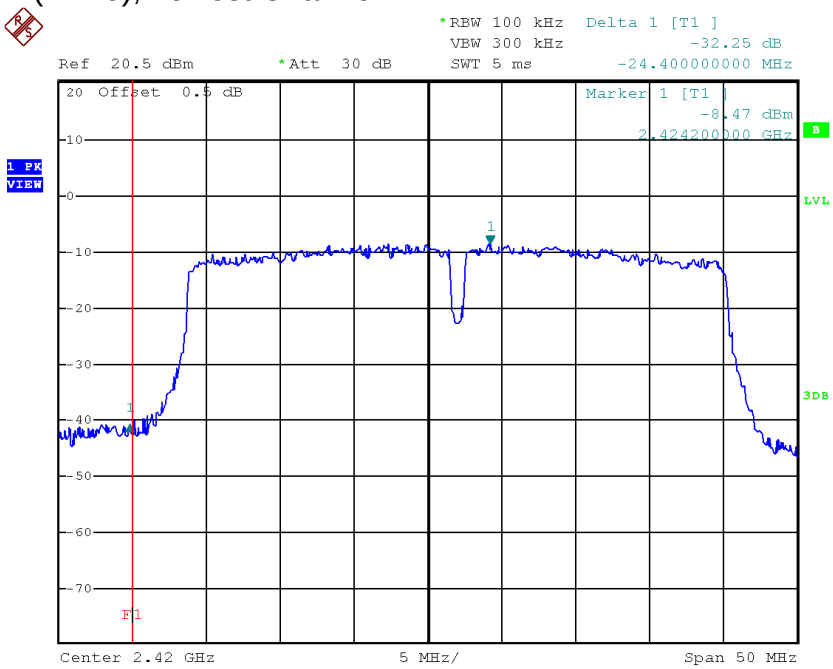
802.11n (HT20), Highest Channel




Date: 4.MAY.2016 04:46:01

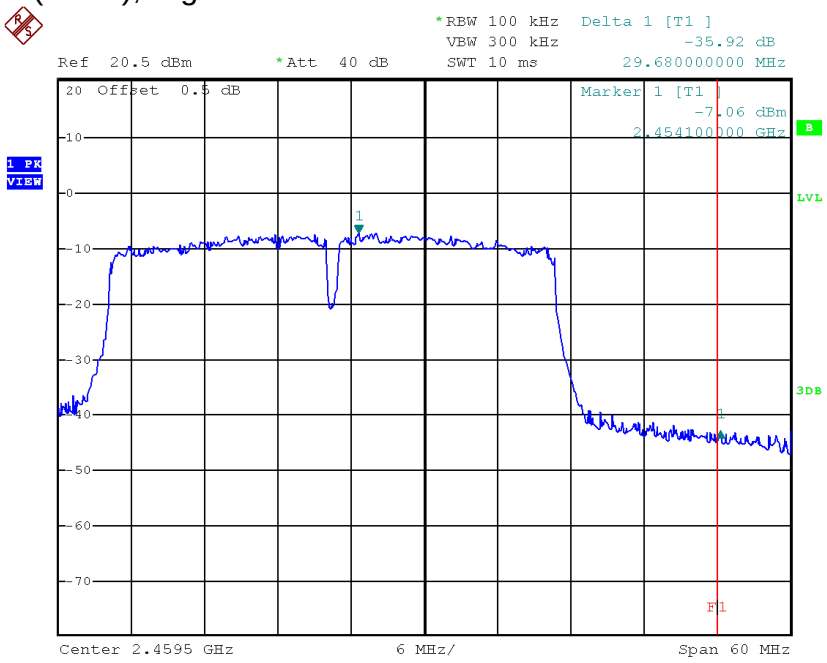
## Plots of Bandedge

802.11n (NT40), Lowest Channel




Date: 4.MAY.2016 04:20:41

802.11n (HT40), Highest Channel




Date: 4.MAY.2016 04:47:52

4.5 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dBμV/m. This value in dBμV/m is converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0.0 dB
AV = -10 dB

FS = 62.0 + 7.4 + 1.6 – 29.0 + 0.0 + (-10.0) = 32.0 dBμV/m

Level in μV/m = Common Antilogarithm [(32.0 dBμV/m)/20] = 39.8 μV/m

4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

4.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

2390.000 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

4.6.2 Radiated Emission Data

The data in tables 1-10 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 0.2 dB margin

Mode: TX-Channel 01
Date of Test: July 05, 2016

Table 1
IEEE 802.11b (DSSS, 1 Mbps)

**Radiated Emission Data**

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.2*** | ***33*** | ***29.4*** | ***53.6*** | ***54.0*** | ***-0.4*** |
| ***H*** | ***4824.000*** | ***51.1*** | ***33*** | ***34.9*** | ***53.0*** | ***54.0*** | ***-1.0*** |
| ***H*** | ***12060.000*** | ***44.1*** | ***33*** | ***40.5*** | ***51.6*** | ***54.0*** | ***-2.4*** |

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.2*** | ***33*** | ***29.4*** | ***53.6*** | ***74.0*** | ***-20.4*** |
| ***H*** | ***4824.000*** | ***51.1*** | ***33*** | ***34.9*** | ***53.0*** | ***74.0*** | ***-21.0*** |
| ***H*** | ***12060.000*** | ***44.1*** | ***33*** | ***40.5*** | ***51.6*** | ***74.0*** | ***-22.4*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 06
Date of Test: July 05, 2016

Table 2
IEEE 802.11b (DSSS, 1 Mbps)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***50.8*** | ***33*** | ***34.9*** | ***52.7*** | ***54.0*** | ***-1.3*** |
| ***H*** | ***7311.000*** | ***41.1*** | ***33*** | ***37.9*** | ***46.0*** | ***54.0*** | ***-8.0*** |
| ***H*** | ***12185.000*** | ***43.9*** | ***33*** | ***40.5*** | ***51.4*** | ***54.0*** | ***-2.6*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***50.8*** | ***33*** | ***34.9*** | ***52.7*** | ***74.0*** | ***-21.3*** |
| ***H*** | ***7311.000*** | ***41.1*** | ***33*** | ***37.9*** | ***46.0*** | ***74.0*** | ***-28.0*** |
| ***H*** | ***12185.000*** | ***43.9*** | ***33*** | ***40.5*** | ***51.4*** | ***74.0*** | ***-22.6*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 11
Date of Test: July 05, 2016

Table 3
IEEE 802.11b (DSSS, 1 Mbps)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***57.2*** | ***33*** | ***29.4*** | ***53.6*** | ***54.0*** | ***-0.4*** |
| ***H*** | ***4924.000*** | ***51.0*** | ***33*** | ***34.9*** | ***52.9*** | ***54.0*** | ***-1.1*** |
| ***H*** | ***7386.000*** | ***40.9*** | ***33*** | ***37.9*** | ***45.8*** | ***54.0*** | ***-8.2*** |
| ***H*** | ***12310.000*** | ***44.3*** | ***33*** | ***40.5*** | ***51.8*** | ***54.0*** | ***-2.2*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***57.2*** | ***33*** | ***29.4*** | ***53.6*** | ***74.0*** | ***-20.4*** |
| ***H*** | ***4924.000*** | ***51.0*** | ***33*** | ***34.9*** | ***52.9*** | ***74.0*** | ***-21.1*** |
| ***H*** | ***7386.000*** | ***40.9*** | ***33*** | ***37.9*** | ***45.8*** | ***74.0*** | ***-28.2*** |
| ***H*** | ***12310.000*** | ***44.3*** | ***33*** | ***40.5*** | ***51.8*** | ***74.0*** | ***-22.2*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 01
Date of Test: July 05, 2016

Table 4
IEEE 802.11g (OFDM, 6 Mbps)

**Radiated Emission Data**

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.4*** | ***33*** | ***29.4*** | ***53.8*** | ***54.0*** | ***-0.2*** |
| ***H*** | ***4824.000*** | ***49.9*** | ***33*** | ***34.9*** | ***51.8*** | ***54.0*** | ***-2.2*** |
| ***H*** | ***12060.000*** | ***43.9*** | ***33*** | ***40.5*** | ***51.4*** | ***54.0*** | ***-2.6*** |

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.4*** | ***33*** | ***29.4*** | ***53.8*** | ***74.0*** | ***-20.2*** |
| ***H*** | ***4824.000*** | ***49.9*** | ***33*** | ***34.9*** | ***51.8*** | ***74.0*** | ***-22.2*** |
| ***H*** | ***12060.000*** | ***43.9*** | ***33*** | ***40.5*** | ***51.4*** | ***74.0*** | ***-22.6*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 06
Date of Test: July 05, 2016

Table 5
IEEE 802.11g (OFDM, 6 Mbps)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***50.1*** | ***33*** | ***34.9*** | ***52.0*** | ***54.0*** | ***-2.0*** |
| ***H*** | ***7311.000*** | ***40.8*** | ***33*** | ***37.9*** | ***45.7*** | ***54.0*** | ***-8.3*** |
| ***H*** | ***12185.000*** | ***43.6*** | ***33*** | ***40.5*** | ***51.1*** | ***54.0*** | ***-2.9*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***50.1*** | ***33*** | ***34.9*** | ***52.0*** | ***74.0*** | ***-22.0*** |
| ***H*** | ***7311.000*** | ***40.8*** | ***33*** | ***37.9*** | ***45.7*** | ***74.0*** | ***-28.3*** |
| ***H*** | ***12185.000*** | ***43.6*** | ***33*** | ***40.5*** | ***51.1*** | ***74.0*** | ***-22.9*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 11
Date of Test: July 05, 2016

Table 6
IEEE 802.11g (OFDM, 6 Mbps)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***57.3*** | ***33*** | ***29.4*** | ***53.7*** | ***54.0*** | ***-0.3*** |
| ***H*** | ***4924.000*** | ***49.7*** | ***33*** | ***34.9*** | ***51.6*** | ***54.0*** | ***-2.4*** |
| ***H*** | ***7386.000*** | ***40.3*** | ***33*** | ***37.9*** | ***45.2*** | ***54.0*** | ***-8.8*** |
| ***H*** | ***12310.000*** | ***43.8*** | ***33*** | ***40.5*** | ***51.3*** | ***54.0*** | ***-2.7*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***57.3*** | ***33*** | ***29.4*** | ***53.7*** | ***74.0*** | ***-20.3*** |
| ***H*** | ***4924.000*** | ***49.7*** | ***33*** | ***34.9*** | ***51.6*** | ***74.0*** | ***-22.4*** |
| ***H*** | ***7386.000*** | ***40.3*** | ***33*** | ***37.9*** | ***45.2*** | ***74.0*** | ***-28.8*** |
| ***H*** | ***12310.000*** | ***43.8*** | ***33*** | ***40.5*** | ***51.3*** | ***74.0*** | ***-22.7*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 01
Date of Test: July 05, 2016

Table 7
IEEE 802.11n (HT20, MCS0)

**Radiated Emission Data**

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.0*** | ***33*** | ***29.4*** | ***53.4*** | ***54.0*** | ***-0.6*** |
| ***H*** | ***4824.000*** | ***50.5*** | ***33*** | ***34.9*** | ***52.4*** | ***54.0*** | ***-1.6*** |
| ***H*** | ***12060.000*** | ***44.0*** | ***33*** | ***40.5*** | ***51.5*** | ***54.0*** | ***-2.5*** |

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.0*** | ***33*** | ***29.4*** | ***53.4*** | ***74.0*** | ***-20.6*** |
| ***H*** | ***4824.000*** | ***50.5*** | ***33*** | ***34.9*** | ***52.4*** | ***74.0*** | ***-21.6*** |
| ***H*** | ***12060.000*** | ***44.0*** | ***33*** | ***40.5*** | ***51.5*** | ***74.0*** | ***-22.5*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 06
Date of Test: July 05, 2016

Table 8
IEEE 802.11n (HT20, MCS0)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***49.0*** | ***33*** | ***34.9*** | ***50.9*** | ***54.0*** | ***-3.1*** |
| ***H*** | ***7311.000*** | ***40.7*** | ***33*** | ***37.9*** | ***45.6*** | ***54.0*** | ***-8.4*** |
| ***H*** | ***12185.000*** | ***43.9*** | ***33*** | ***40.5*** | ***51.4*** | ***54.0*** | ***-2.6*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***49.0*** | ***33*** | ***34.9*** | ***50.9*** | ***74.0*** | ***-23.1*** |
| ***H*** | ***7311.000*** | ***40.7*** | ***33*** | ***37.9*** | ***45.6*** | ***74.0*** | ***-28.4*** |
| ***H*** | ***12185.000*** | ***43.9*** | ***33*** | ***40.5*** | ***51.4*** | ***74.0*** | ***-22.6*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 11
Date of Test: July 05, 2016

Table 9
IEEE 802.11n (HT20, MCS0)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***56.6*** | ***33*** | ***29.4*** | ***53.0*** | ***54.0*** | ***-1.0*** |
| ***H*** | ***4924.000*** | ***49.2*** | ***33*** | ***34.9*** | ***51.1*** | ***54.0*** | ***-2.9*** |
| ***H*** | ***7386.000*** | ***40.2*** | ***33*** | ***37.9*** | ***45.1*** | ***54.0*** | ***-8.9*** |
| ***H*** | ***12310.000*** | ***43.8*** | ***33*** | ***40.5*** | ***51.3*** | ***54.0*** | ***-2.7*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***56.6*** | ***33*** | ***29.4*** | ***53.0*** | ***74.0*** | ***-21.0*** |
| ***H*** | ***4924.000*** | ***49.2*** | ***33*** | ***34.9*** | ***51.1*** | ***74.0*** | ***-22.9*** |
| ***H*** | ***7386.000*** | ***40.2*** | ***33*** | ***37.9*** | ***45.1*** | ***74.0*** | ***-28.9*** |
| ***H*** | ***12310.000*** | ***43.8*** | ***33*** | ***40.5*** | ***51.3*** | ***74.0*** | ***-22.7*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 03
Date of Test: July 05, 2016

Table 10
IEEE 802.11n (HT40, MCS0)

**Radiated Emission Data**

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.3*** | ***33*** | ***29.4*** | ***53.7*** | ***54.0*** | ***-0.3*** |
| ***H*** | ***4844.000*** | ***49.6*** | ***33*** | ***34.9*** | ***51.5*** | ***54.0*** | ***-2.5*** |
| ***H*** | ***12110.000*** | ***43.7*** | ***33*** | ***40.5*** | ***51.2*** | ***54.0*** | ***-2.8*** |

| Polari-zation | Frequency (MHz) | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2390.000*** | ***57.3*** | ***33*** | ***29.4*** | ***53.7*** | ***74.0*** | ***-20.3*** |
| ***H*** | ***4844.000*** | ***49.6*** | ***33*** | ***34.9*** | ***51.5*** | ***74.0*** | ***-22.5*** |
| ***H*** | ***12110.000*** | ***43.7*** | ***33*** | ***40.5*** | ***51.2*** | ***74.0*** | ***-22.8*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 06
Date of Test: July 05, 2016

Table 11
IEEE 802.11n (HT40, MCS0)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***48.8*** | ***33*** | ***34.9*** | ***50.7*** | ***54.0*** | ***-3.3*** |
| ***H*** | ***7311.000*** | ***40.4*** | ***33*** | ***37.9*** | ***45.3*** | ***54.0*** | ***-8.7*** |
| ***H*** | ***12185.000*** | ***43.8*** | ***33*** | ***40.5*** | ***51.3*** | ***54.0*** | ***-2.7*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***4874.000*** | ***48.8*** | ***33*** | ***34.9*** | ***50.7*** | ***74.0*** | ***-23.3*** |
| ***H*** | ***7311.000*** | ***40.4*** | ***33*** | ***37.9*** | ***45.3*** | ***74.0*** | ***-28.7*** |
| ***H*** | ***12185.000*** | ***43.8*** | ***33*** | ***40.5*** | ***51.3*** | ***74.0*** | ***-22.7*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 09
Date of Test: July 05, 2016

Table 12
IEEE 802.11n (HT40, MCS0)

**Radiated Emission Data**

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBuV/m) | Average Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***56.8*** | ***33*** | ***29.4*** | ***53.2*** | ***54.0*** | ***-0.8*** |
| ***H*** | ***4904.000*** | ***48.6*** | ***33*** | ***34.9*** | ***50.5*** | ***54.0*** | ***-3.5*** |
| ***H*** | ***7356.000*** | ***40.3*** | ***33*** | ***37.9*** | ***45.2*** | ***54.0*** | ***-8.8*** |
| ***H*** | ***12260.000*** | ***43.7*** | ***33*** | ***40.5*** | ***51.2*** | ***54.0*** | ***-2.8*** |

| Polari-zation | Frequency | Reading (dBuV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBuV/m) | Peak Limit at 3m (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***H*** | ***2483.500*** | ***56.8*** | ***33*** | ***29.4*** | ***53.2*** | ***74.0*** | ***-20.8*** |
| ***H*** | ***4904.000*** | ***48.6*** | ***33*** | ***34.9*** | ***50.5*** | ***74.0*** | ***-23.5*** |
| ***H*** | ***7356.000*** | ***40.3*** | ***33*** | ***37.9*** | ***45.2*** | ***74.0*** | ***-28.8*** |
| ***H*** | ***12260.000*** | ***43.7*** | ***33*** | ***40.5*** | ***51.2*** | ***74.0*** | ***-22.8*** |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Worst Case: EUT WiFi and Bluetooth Transmitting
Date of Test: July 05, 2016

Table 13

**Radiated Emission Data**

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| ***V*** | ***120.003*** | ***36.2*** | ***16*** | ***14.0*** | ***34.2*** | ***43.5*** | ***-9.3*** |
| V | 200.004 | 35.2 | 16 | 16.0 | 35.2 | 43.5 | -8.3 |
| ***H*** | ***240.006*** | ***35.4*** | ***16*** | ***19.0*** | ***38.4*** | ***46.0*** | ***-7.6*** |
| H | 300.008 | 30.6 | 16 | 22.0 | 36.6 | 46.0 | -9.4 |
| H | 360.009 | 28.8 | 16 | 24.0 | 36.8 | 46.0 | -9.2 |
| H | 380.145 | 27.4 | 16 | 24.0 | 35.4 | 46.0 | -10.6 |
| ***H*** | ***400.012*** | ***30.0*** | ***16*** | ***24.0*** | ***38.0*** | ***46.0*** | ***-8.0*** |
| H | 600.015 | 29.0 | 16 | 29.0 | 42.0 | 46.0 | -4.0 |
| H | 720.036 | 23.6 | 16 | 30.0 | 37.6 | 46.0 | -8.4 |
| H | 799.856 | 23.2 | 16 | 31.0 | 38.2 | 46.0 | -7.8 |

NOTES: 1. Peak detector is used for the emission measurement.

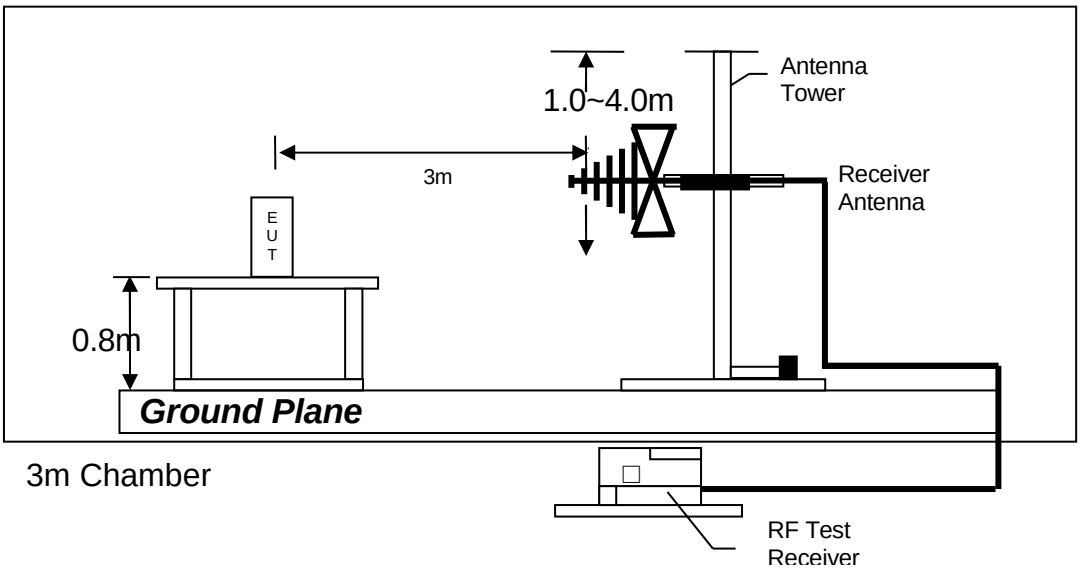
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

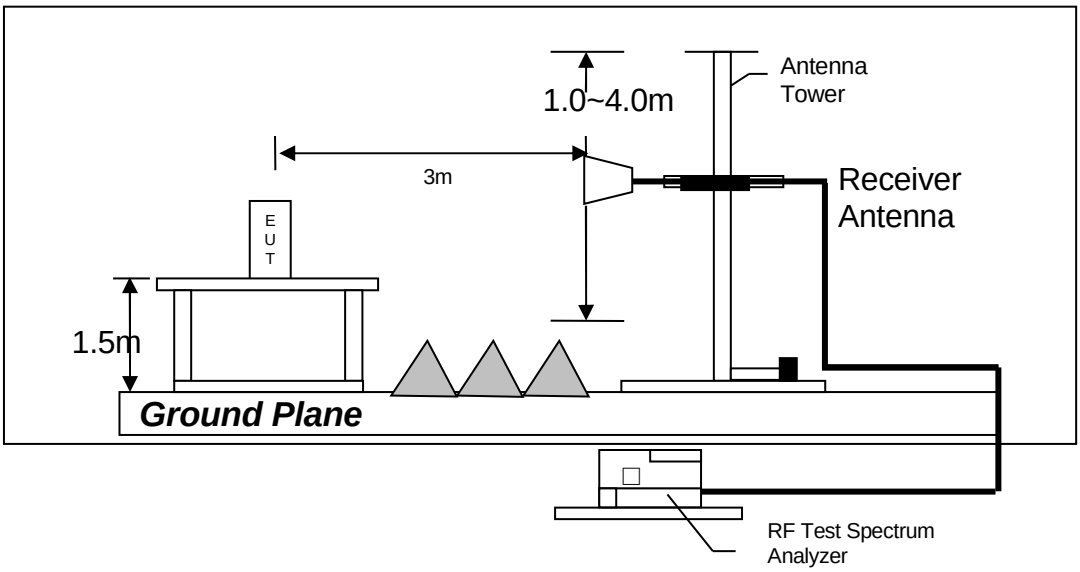
4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 3.3.

Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.




Test setup of radiated emissions up to 1GHz




Test setup of radiated emissions above 1GHz

4.6.3 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

4.7 AC Power Line Conducted Emission

☐ Not applicable – EUT is only powered by battery for operation.

☒ EUT connects to AC power line. Emission Data is listed in following pages.

☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.182 MHz

The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.7.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance

Passed by 4.1 dB margin

Worst Case: EUT Simultaneous Transmitting (WiFi and Bluetooth)

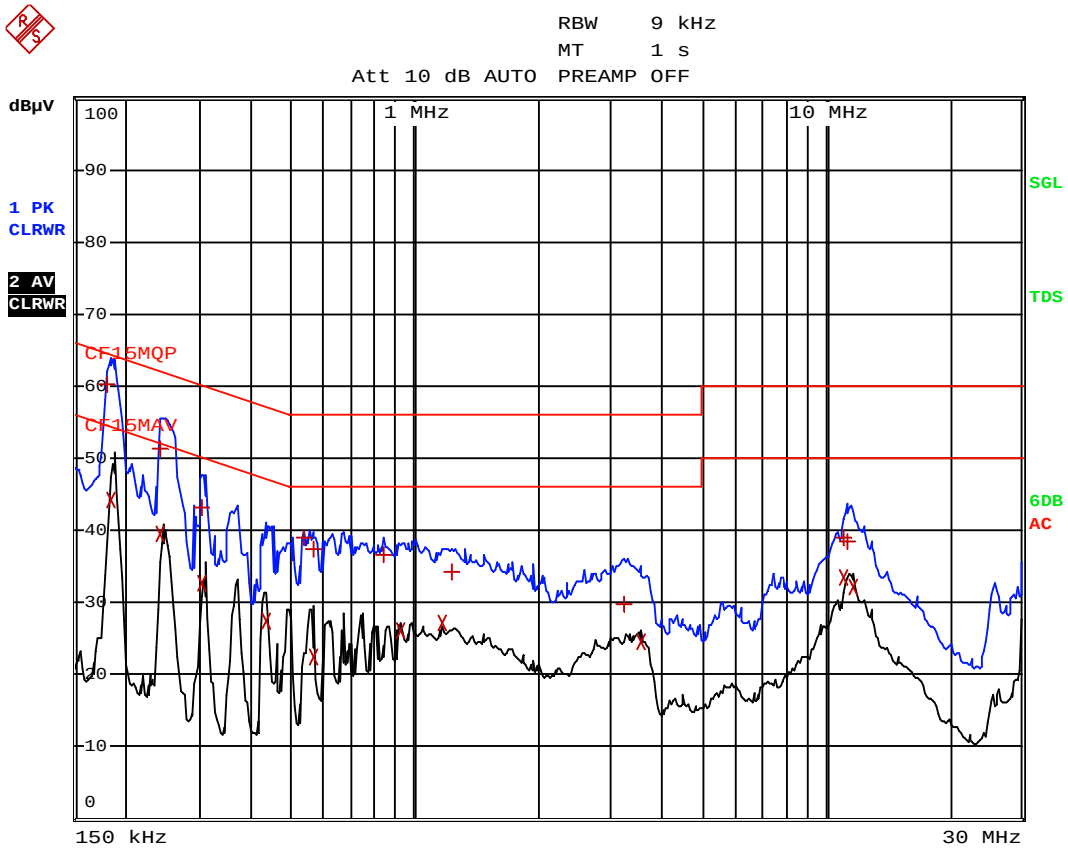
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

| TRACE | | FREQUENCY | LEVEL dBµV | | DELTA LIMIT dB |
|---|---|---|---|---|---|
| 1 | Quasi Peak | 181.5 kHz | 60.29 | L1 | -4.12 |
| 2 | CISPR Average | 186 kHz | 44.22 | L1 | -9.98 |
| 1 | Quasi Peak | 244.5 kHz | 51.24 | L1 | -10.69 |
| 2 | CISPR Average | 244.5 kHz | 39.47 | N | -12.47 |
| 1 | Quasi Peak | 307.5 kHz | 43.20 | L1 | -16.83 |
| 2 | CISPR Average | 307.5 kHz | 32.57 | L1 | -17.46 |
| 2 | CISPR Average | 433.5 kHz | 27.43 | N | -19.75 |
| 1 | Quasi Peak | 537 kHz | 38.99 | N | -17.00 |
| 1 | Quasi Peak | 568.5 kHz | 37.43 | N | -18.56 |
| 2 | CISPR Average | 568.5 kHz | 22.38 | N | -23.61 |
| 1 | Quasi Peak | 843 kHz | 36.52 | N | -19.48 |
| 2 | CISPR Average | 924 kHz | 26.05 | N | -19.95 |
| 2 | CISPR Average | 1.1715 MHz | 27.18 | N | -18.81 |
| 1 | Quasi Peak | 1.2345 MHz | 34.16 | N | -21.83 |
| 1 | Quasi Peak | 3.246 MHz | 29.82 | L1 | -26.17 |
| 2 | CISPR Average | 3.543 MHz | 24.48 | N | -21.51 |
| 1 | Quasi Peak | 11.049 MHz | 38.85 | N | -21.14 |
| 2 | CISPR Average | 11.0895 MHz | 33.43 | N | -16.56 |
| 1 | Quasi Peak | 11.3325 MHz | 38.44 | N | -21.55 |
| 2 | CISPR Average | 11.706 MHz | 32.23 | N | -17.76 |

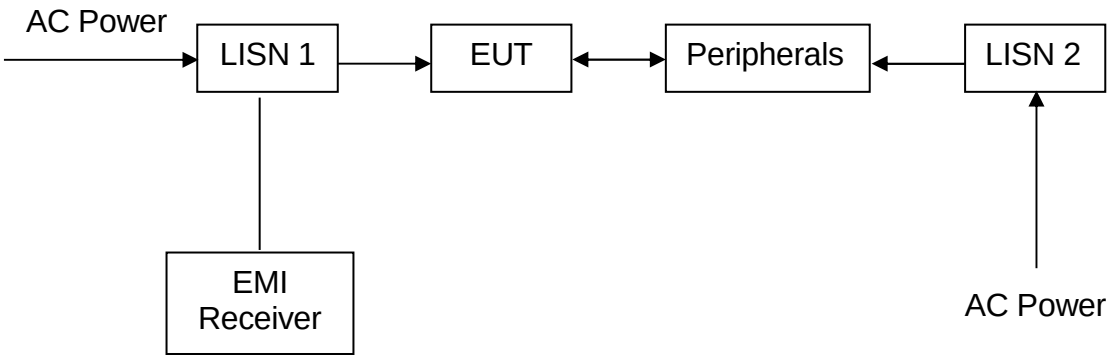
Date: 1.MAY.2016 18:00:37

Worst Case: EUT Simultaneous Transmitting (WiFi and Bluetooth)




Date: 1.MAY.2016 18:01:30

Conducted Emission Test Setup



# EXHIBIT 5
# EQUIPMENT LIST

## 5.0 **Equipment List**

1) Radiated Emissions Test

| Equipment | EMI Test Receiver | Spectrum Analyzer | Biconical Antenna |
|---|---|---|---|
| Registration No. | EW-3156 | EW-2188 | EW-0571 |
| Manufacturer | R&S | AGILENTTECH | EMCO |
| Model No. | ESR26 | E4407B | 3104C |
| Calibration Date | Nov. 03, 2015 | Apr. 25, 2016 | Jun. 23, 2015 |
| Calibration Due Date | Nov. 03, 2016 | Apr. 25, 2017 | Dec. 23, 2016 |

| Equipment | Log Periodic Antenna | Pyramidal Horn Antenna | Double Ridged Guide Antenna |
|---|---|---|---|
| Registration No. | EW-1042 | EW-0905 | EW-1133 |
| Manufacturer | EMCO | EMCO | EMCO |
| Model No. | 3148 | 3160-09 | 3115 |
| Calibration Date | May 21, 2015 | Feb. 12, 2016 | Nov. 05, 2015 |
| Calibration Due Date | Nov. 21, 2016 | Aug. 12, 2017 | May 05, 2017 |

2) Conductive Measurement Test

| Equipment | RF Power Meter with Power Sensor (N1921A) | Spectrum Analyzer |
|---|---|---|
| Registration No. | EW-2270 | EW-2249 |
| Manufacturer | AGILENTTECH | R&S |
| Model No. | N1911A | FSP30 |
| Calibration Date | Jan. 19, 2016 | Nov. 27, 2015 |
| Calibration Due Date | Jan. 19, 2017 | Nov. 27, 2016 |

3) Conducted Emissions Test

| Equipment | EMI Test Receiver | LISN |
|---|---|---|
| Registration No. | EW-2500 | EW-2501 |
| Manufacturer | R&S | R&S |
| Model No. | ESCI | ENV-216 |
| Calibration Date | Jan. 28, 2016 | Jan. 28, 2016 |
| Calibration Due Date | Jan. 28, 2017 | Jan. 28, 2017 |

**END OF TEST REPORT**