TEST REPORT

Report Number: 15100448HKG-001R1

Application
for
Original Grant of 47 CFR Part 15 Certification
RSS-247 Issue 2 Equipment Certification

Bicycle Light and Camera

FCC ID: 2AGSV-0201

IC: 20920-0201

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

This report supersedes previous report with report number 15100448HKG-001
dated February 02, 2016

Prepared and Checked by:	Approved by:
Signed On File	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Ltd.
Leung Sung Tak, Andy	Wong Kwok Yeung, Kenneth
Engineer	Senior Lead Engineer
	May 23, 2017

GENERAL INFORMATION

Applicant Name:	Federation Enterprises (WA) Pty Ltd
Applicant Address:	2/646 Newcastle Street Leederville IP WA 6007 Australia
Contact Person:	Kingsley Fiegert
Tel:	+61 413995369
Fax:	+1858 724 1943
e-mail:	kingsley@cycliq.com
FCC Specification Standard:	FCC Part 15, October 1, 2015 Edition
IC Specification Standard:	RSS-247 Issue 1, May 2015 RSS-Gen Issue 4, November 2014
FCC ID:	2AGSV-0201
IC:	20920-0201
FCC/HVIN(s):	FLY12
Type of EUT:	Digital Transmission System Transmitter
Description of EUT:	Bicycle Light and Camera
Serial Number:	N/A
Sample Receipt Date:	October 14, 2015
Date of Test:	October 14, 2015 to February 02, 2016
Report Date:	May 23, 2017
Environmental Conditions:	Temperature: +10 to 40°C 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	7.1.2#	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 (average)	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	5.5	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	7.2.4#	Pass	4.7

Note: 1. 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.
2. Please refer ERA-1604261 Letter issued on April 26, 2016 for the amendment/ supersede notification.

1.2 Statement of Compliance

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

FCC Part 15, October 1, 2015 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) FLY12 is a Bicycle Light and Camera. The EUT contains a WIFI (b/g/n) and a Bluetooth 4.0 BLE modules. The video can be transferred via WIFI or micro USB port to Smartphone or PC. The Bluetooth connection is for the security between the EUT and the Smartphone. The EUT is powered by a 3.7V rechargeable battery which can be charged by the micro USB port. An iOS/Android apps installed in Smartphone can act as the remote control of the EUT. WIFI and BLE mode cannot be operated simultaneously.

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.

For Bluetooth 4.0 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.

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

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

2.2 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in Open Area 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 v03r04 (07-Jan-2016). All other measurements were made in accordance with the procedures in RSS-Gen Issue 4 (2014).

2.3 Test Facility

The radiated 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 No.: 2042V-1.

2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (WiFi portion).

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 a 3.7V rechargeable battery.

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

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.

Different data rates have been tested. Worst case is reported only.

All relevant operation modes have been tested, and the worst case data is included in this report.

All data rates were tested under normal mode of WiFi. Only the worst-case data is shown in the report for DSSS and OFDM

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 a 3.7V rechargeable battery.

Description of Accessories:

(1) 1 x USB cable of 58cm in length (Provided by Applicant)
(2) HP ProBook 430 G1 (Provided by Intertek)

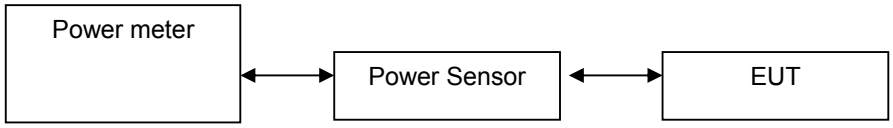
3.4 Measurement Uncertainty

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 = 1.05 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	19.64	92.04
Middle Channel: 2437	19.42	87.50
High Channel: 2462	19.75	94.41

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 1.05 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.77	238.23
Middle Channel: 2437	22.91	195.43
High Channel: 2462	23.57	227.51

IEEE 802.11n (HT20, MCS0) Antenna Gain = 1.05 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.10	204.17
Middle Channel: 2437	22.87	193.64
High Channel: 2462	22.26	168.27

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 = 19.75 dBm

IEEE 802.11g (OFDM, 6 Mbps)
max. conducted (peak) output level = 23.77 dBm

IEEE 802.11n (HT20, mcs0)
max. conducted (peak) output level = 23.10 dBm

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

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 (MHz)
Low Channel: 2412	8.7
Middle Channel: 2437	8.8
High Channel: 2462	8.1

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.40
Middle Channel: 2437	16.48
High Channel: 2462	16.36

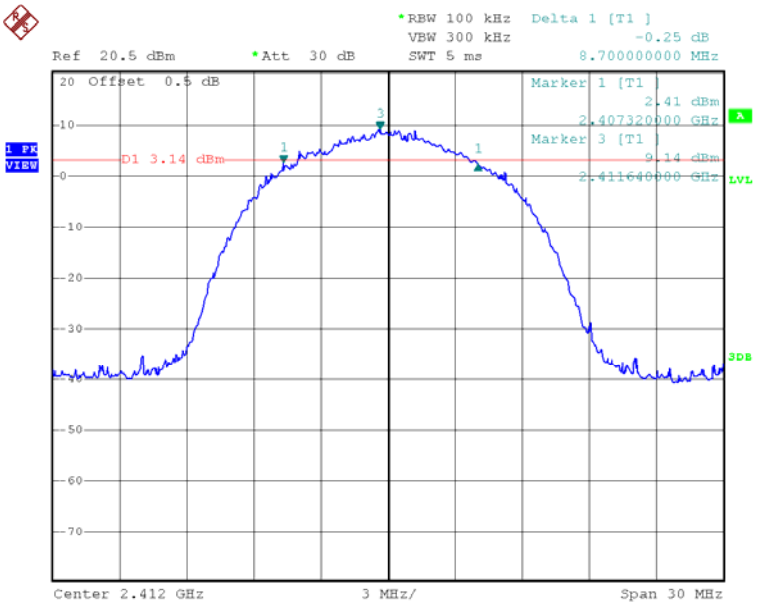
IEEE 802.11n (HT20, MCS0)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.56
Middle Channel: 2437	16.36
High Channel: 2462	16.40

Limits:
6 dB bandwidth shall be at least 500kHz

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

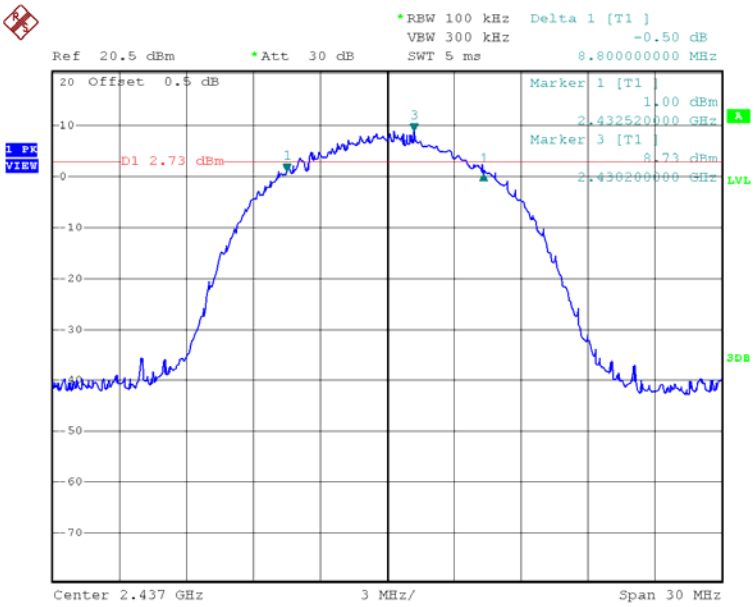
Plots of 6dB RF bandwidth

802.11b, Lowest Channel



Date: 8.DEC.2015 14:48:02

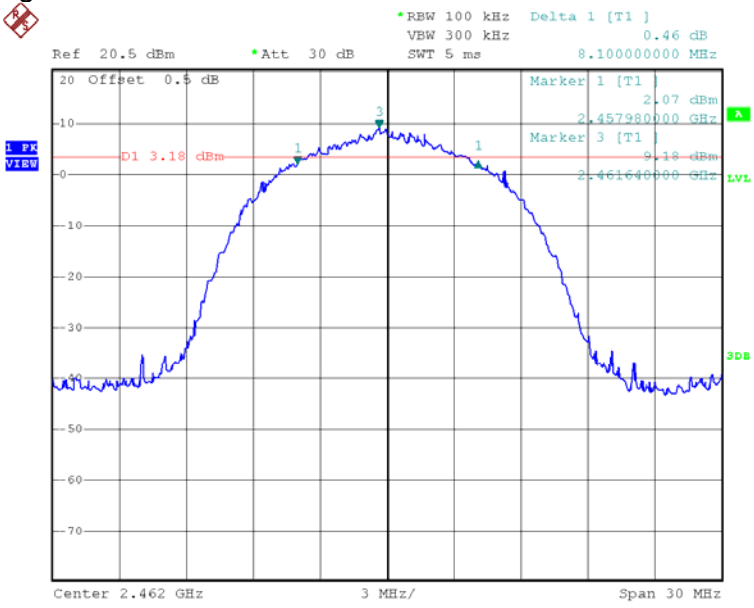
802.11b, Middle Channel



Date: 8.DEC.2015 14:52:41

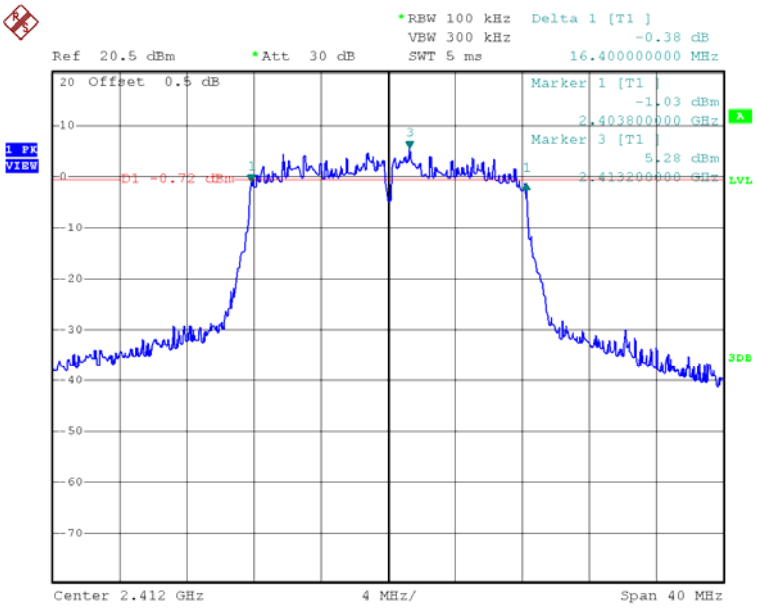
Plots of 6dB RF bandwidth

802.11b, Highest Channel



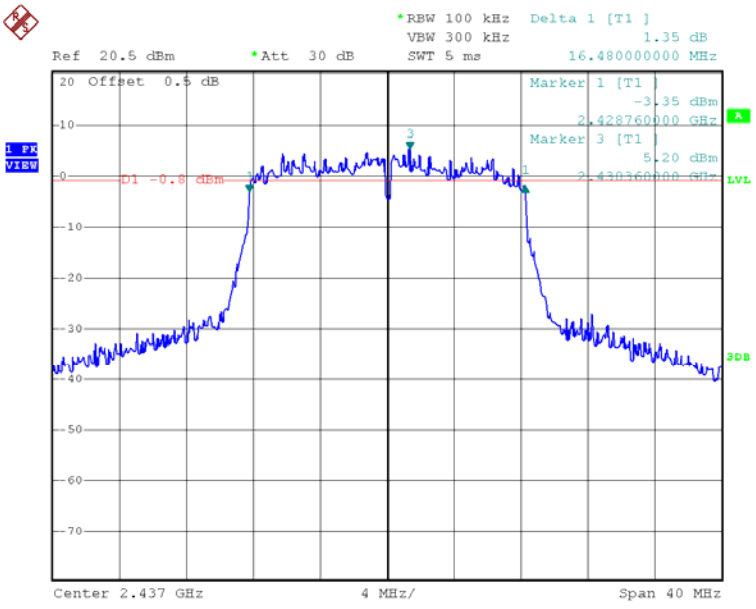
Plots of 6dB RF bandwidth

802.11g, Lowest Channel



Date: 8.DEC.2015 14:55:22

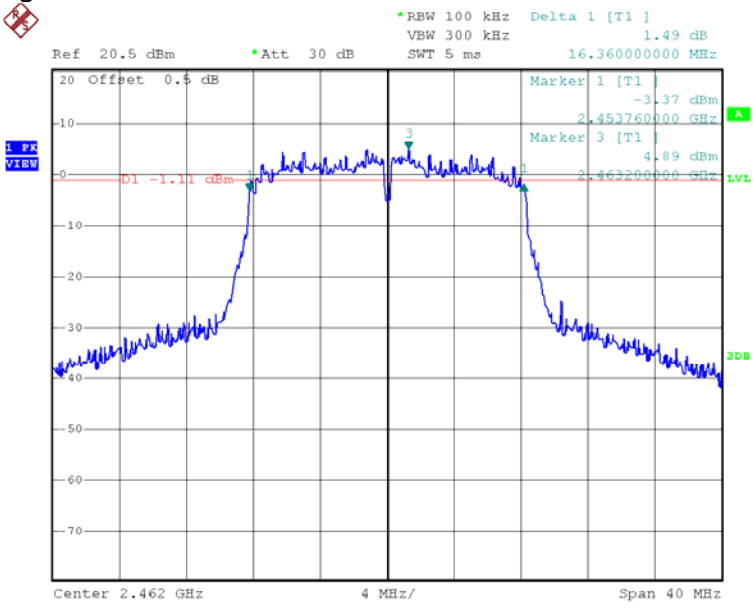
802.11g, Middle Channel



Date: 8.DEC.2015 14:56:47

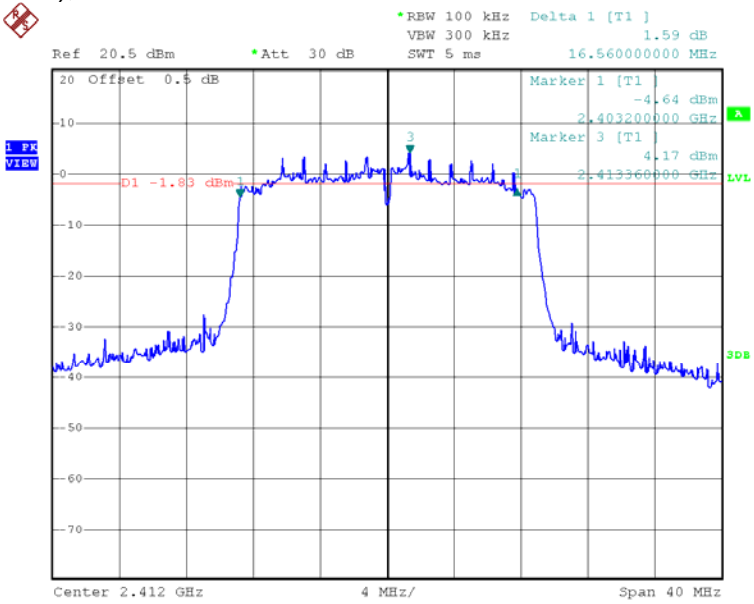
Plots of 6dB RF bandwidth

802.11g, Highest Channel



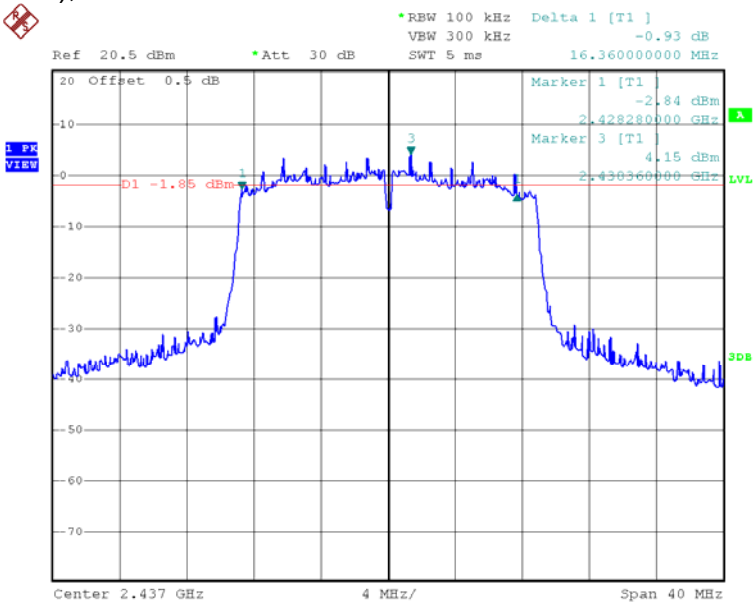
Plots of 6dB RF bandwidth

802.11n(HT20), Lowest Channel



Date: 8.DEC.2015 14:59:33

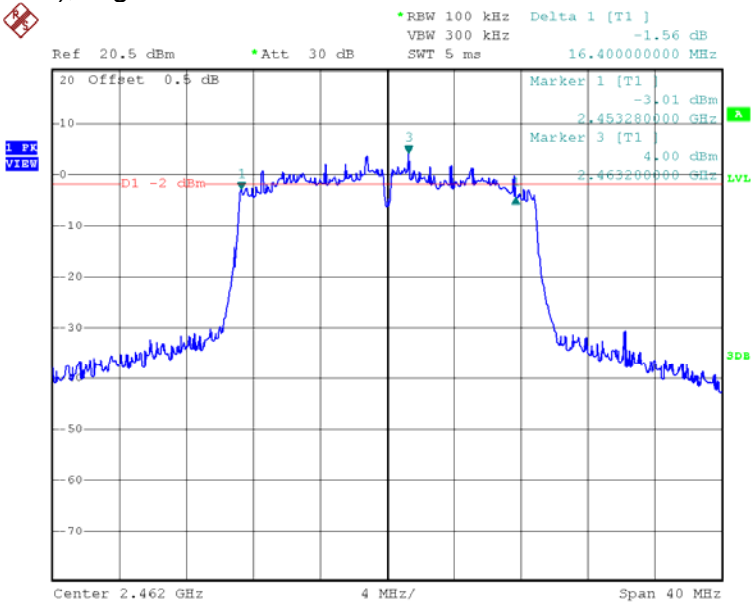
802.11n(HT20), Middle Channel



Date: 8.DEC.2015 15:00:30

Plots of 6dB RF bandwidth

802.11n(HT20), 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 3kHz (dBm)
Low Channel: 2412	-6.23
Middle Channel: 2437	-5.89
High Channel: 2462	-6.60

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	5.34
Middle Channel: 2437	5.39
High Channel: 2462	5.54

IEEE 802.11n (HT20, MCS0)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	3.69
Middle Channel: 2437	4.11
High Channel: 2462	4.12

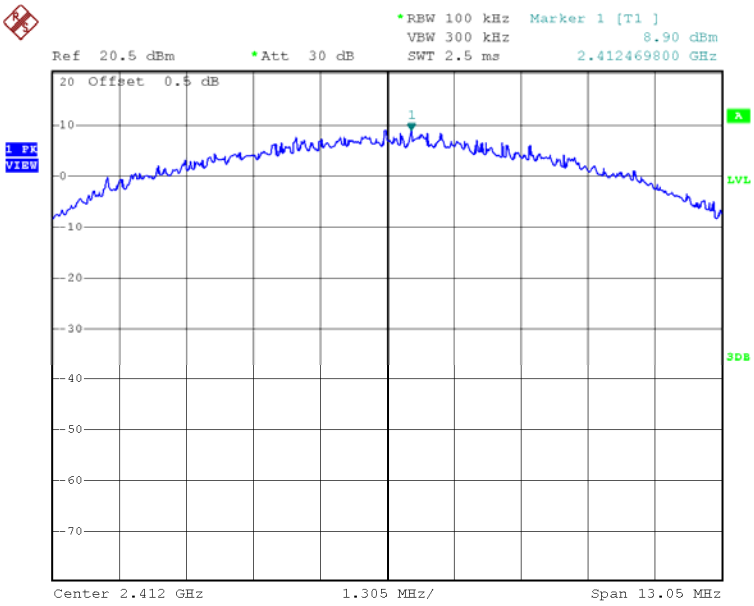
Cable Loss: 0.5 dB

Limit:
8dBm

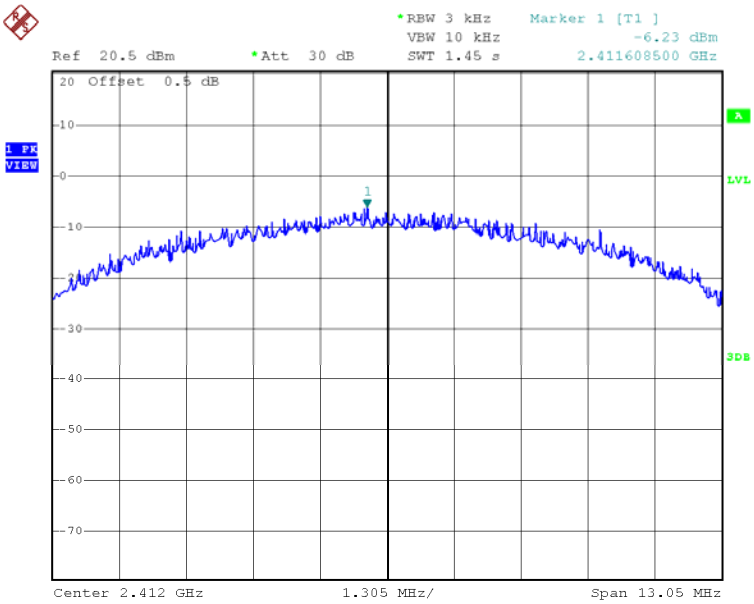
The plots of power spectral density are as below.

Plots of power spectral density

802.11b, Lowest channel



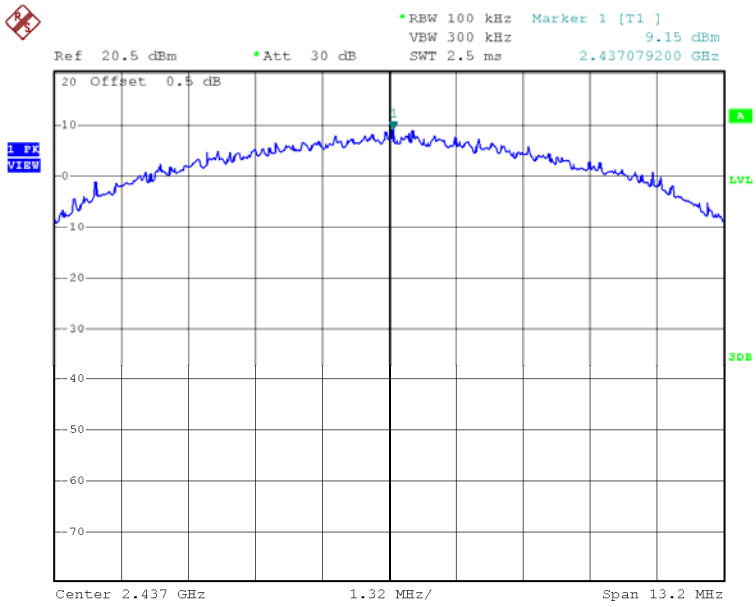
Date: 8.DEC.2015 15:03:05



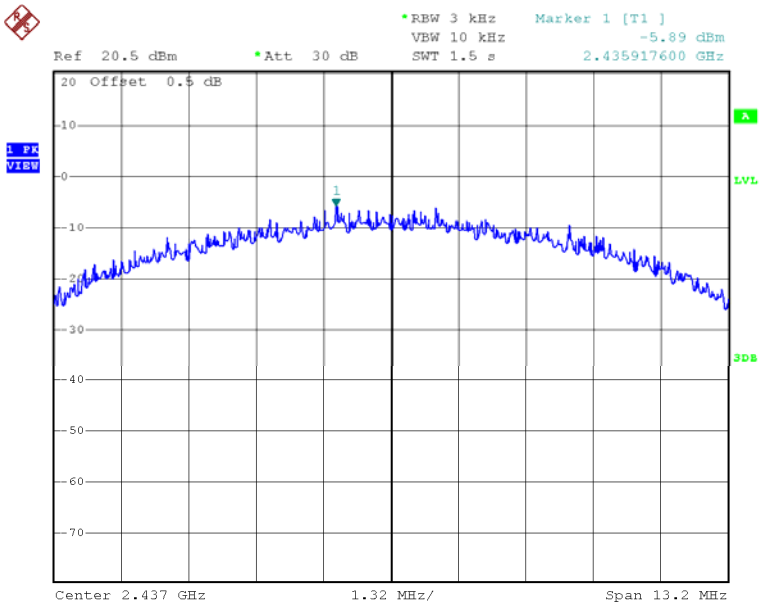
Date: 8.DEC.2015 15:03:58

Plots of power spectral density

802.11b, Middle channel



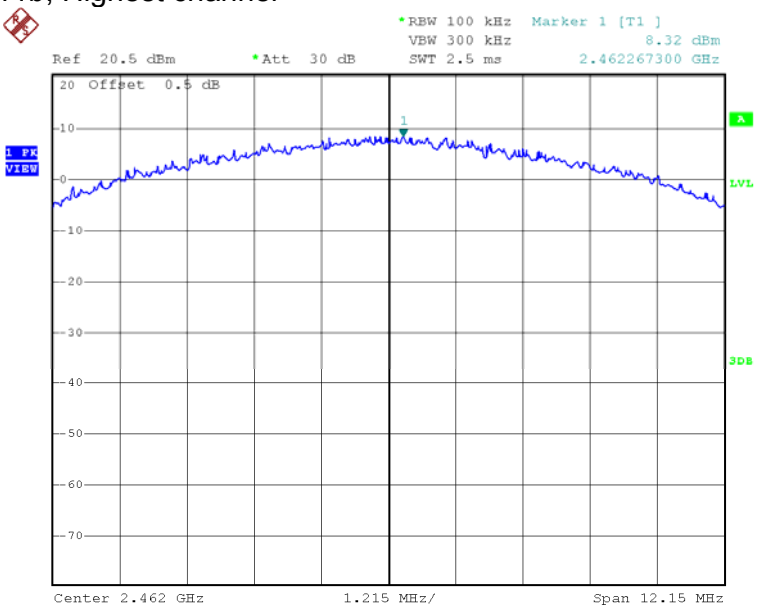
Date: 8.DEC.2015 15:04:58



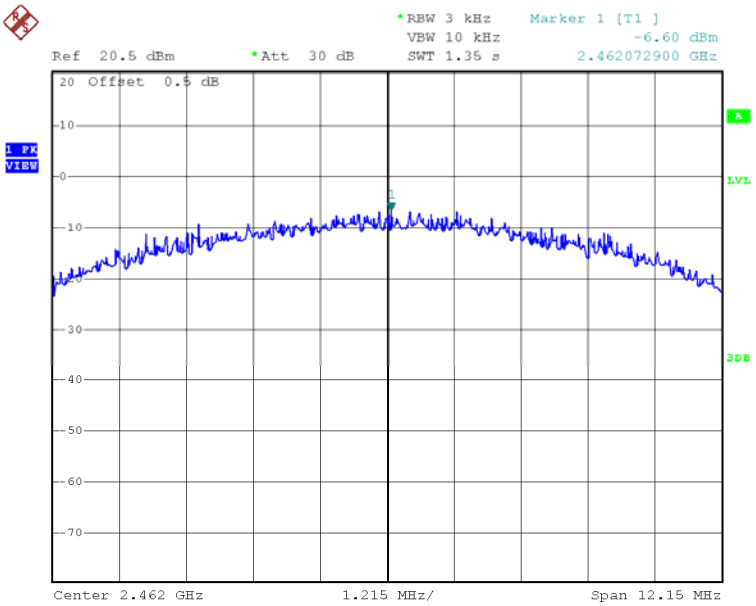
Date: 8.DEC.2015 15:05:44

Plots of power spectral density

802.11b, Highest channel



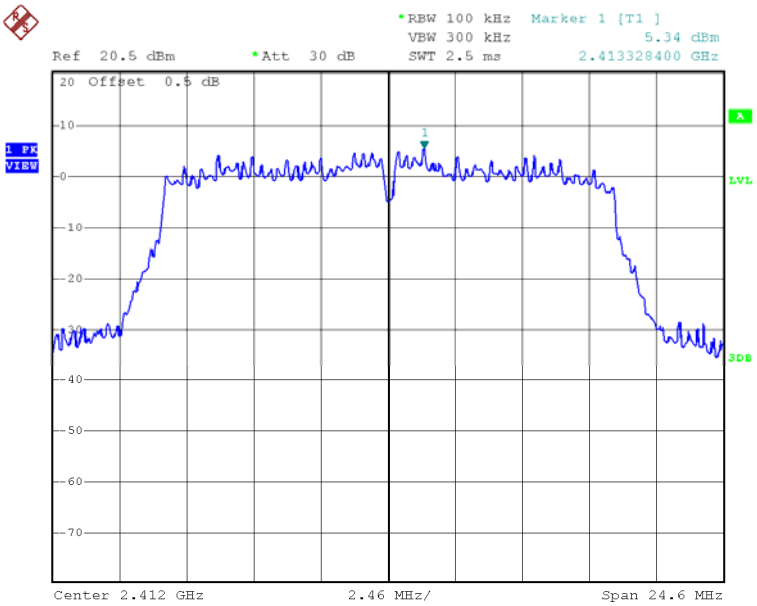
Date: 8.DEC.2015 15:06:43



Date: 8.DEC.2015 15:07:21

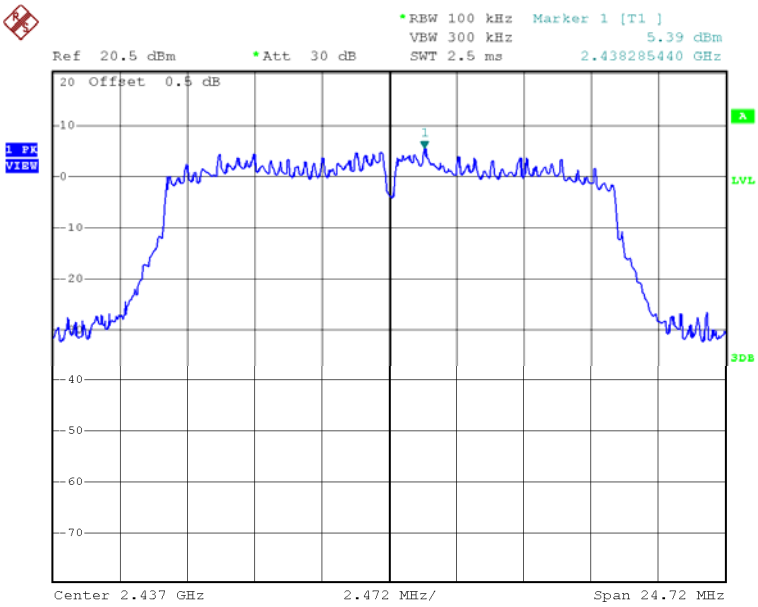
Plots of power spectral density

802.11g, Lowest channel



Date: 8.DEC.2015 15:10:43

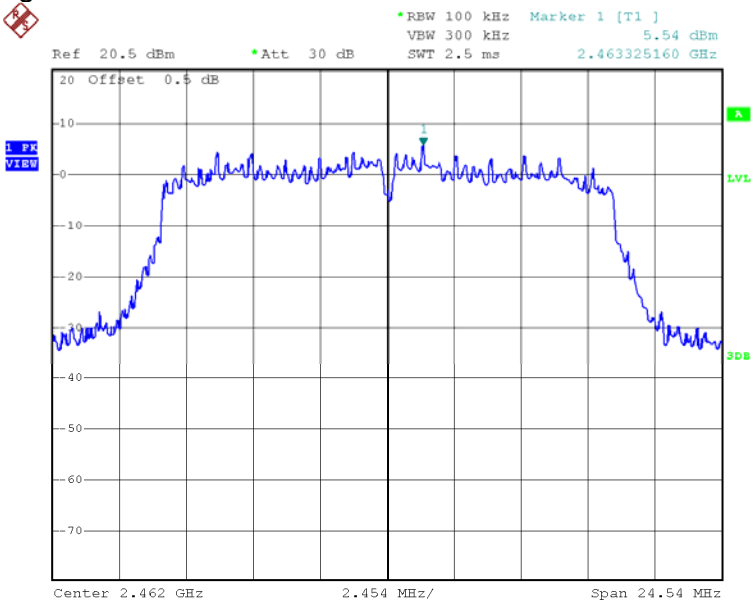
802.11g, Middle channel



Date: 8.DEC.2015 15:11:45

Plots of power spectral density

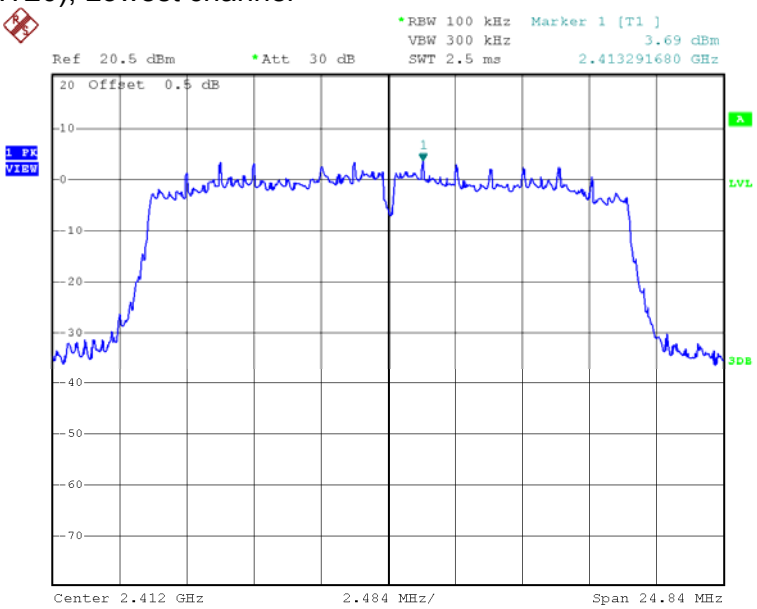
802.11g, Highest channel



Date: 8.DEC.2015 15:12:33

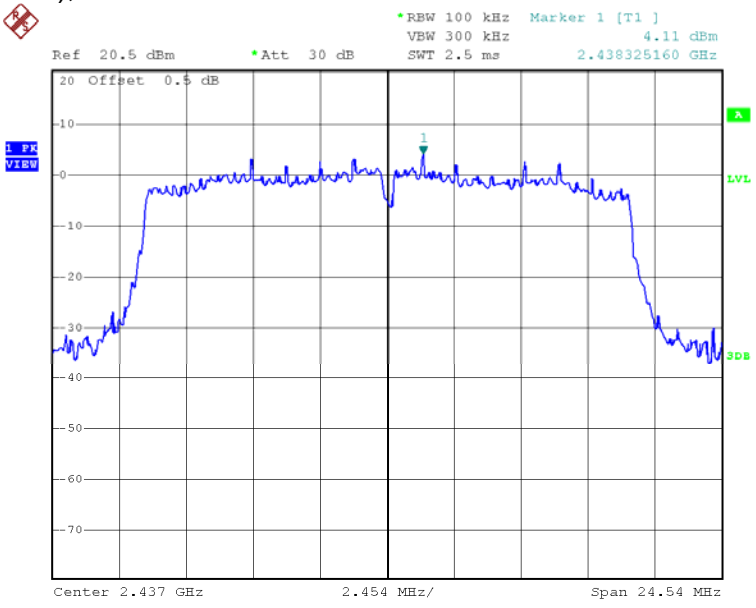
Plots of power spectral density

802.11n(HT20), Lowest channel



Date: 8.DEC.2015 15:16:28

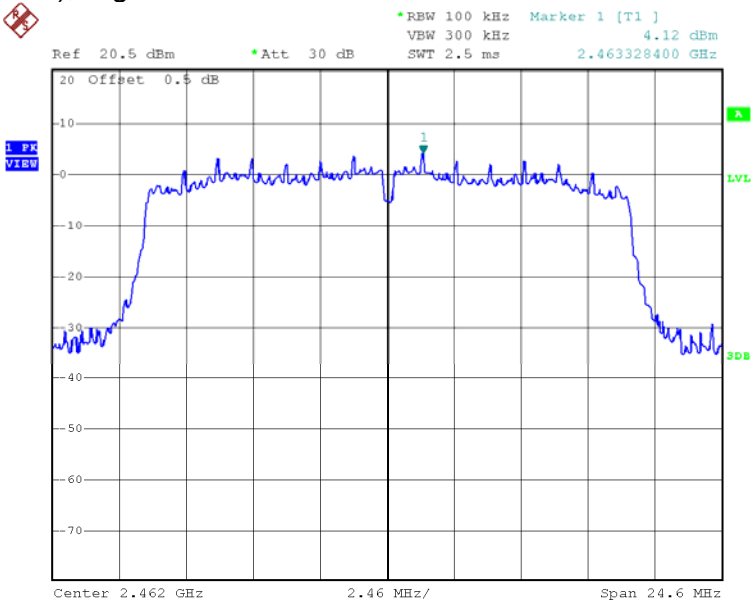
802.11n(HT20), Middle channel



Date: 8.DEC.2015 15:14:20

Plots of power spectral density

802.11n(HT20), Highest channel



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.

The measurement procedures under sections 11 of KDB558074 D01 v03r04 (07-Jan-2016) were used.

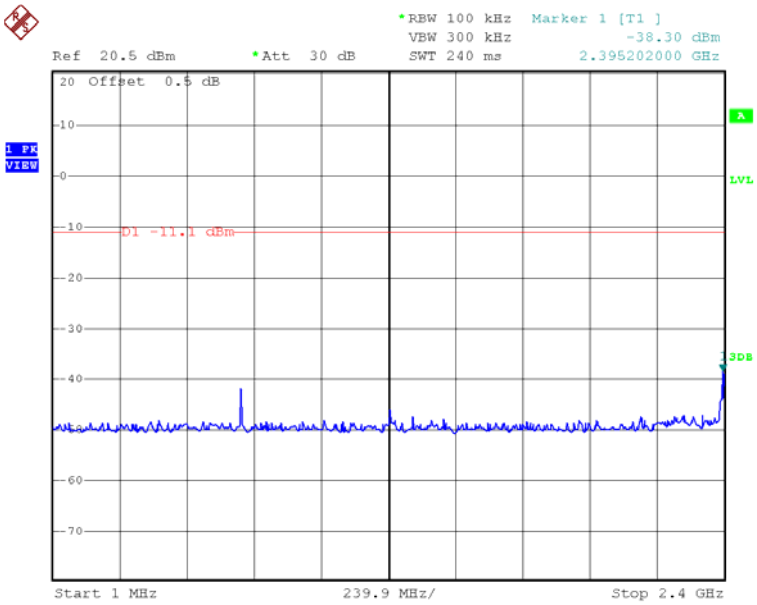
Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

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.

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

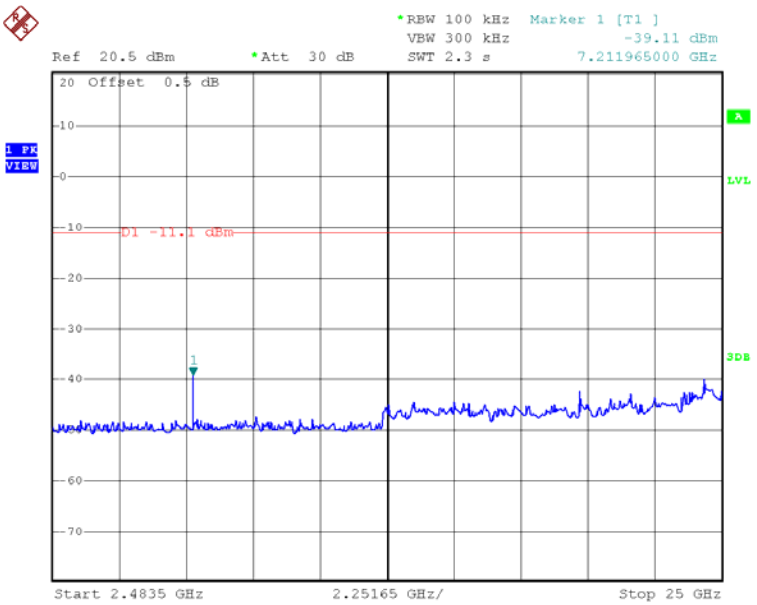
Plots of out of band conducted emissions

802.11b, Lowest Channel, Plot A



Date: 8.DEC.2015 16:04:16

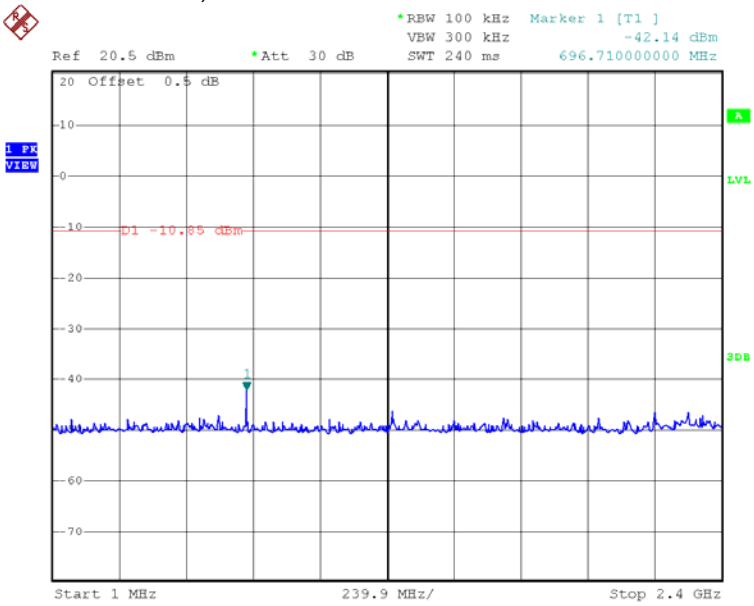
802.11b, Lowest Channel, Plot B



Date: 8.DEC.2015 16:04:51

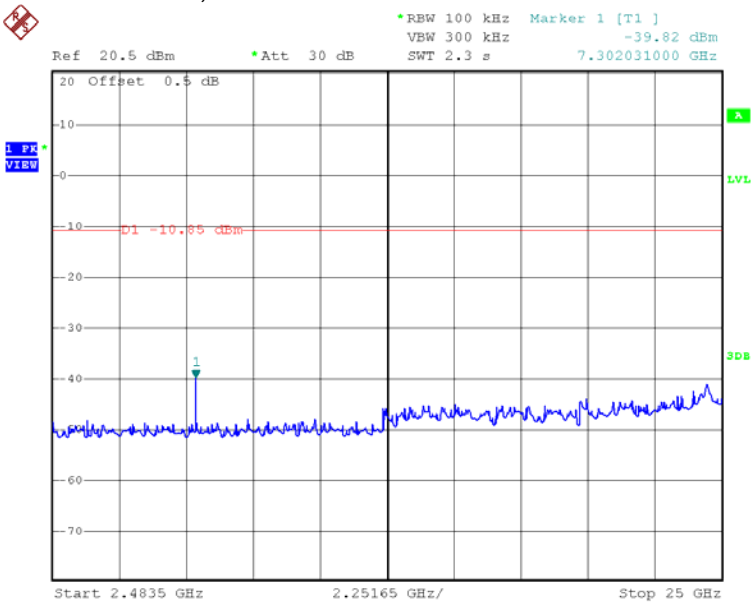
Plots of out of band conducted emissions

802.11b, Middle Channel, Plot A



Date: 8.DEC.2015 16:06:25

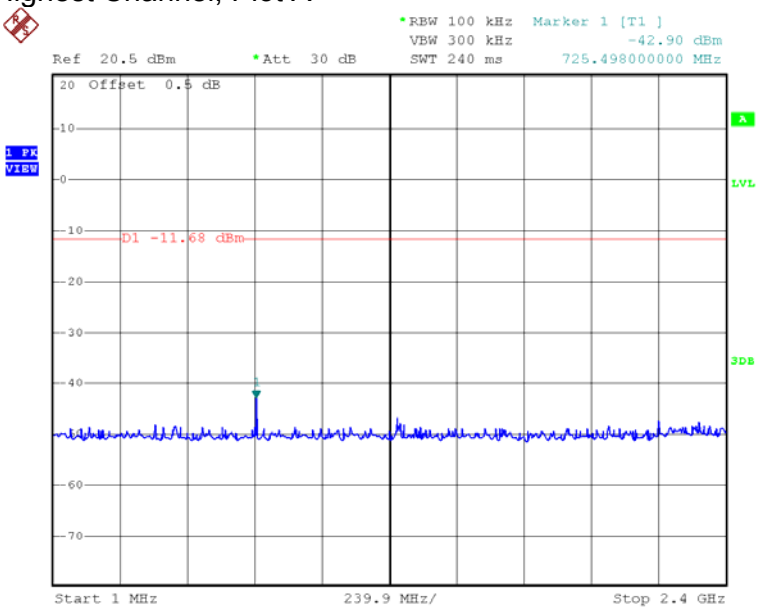
802.11b, Middle Channel, Plot B



Date: 8.DEC.2015 16:07:36

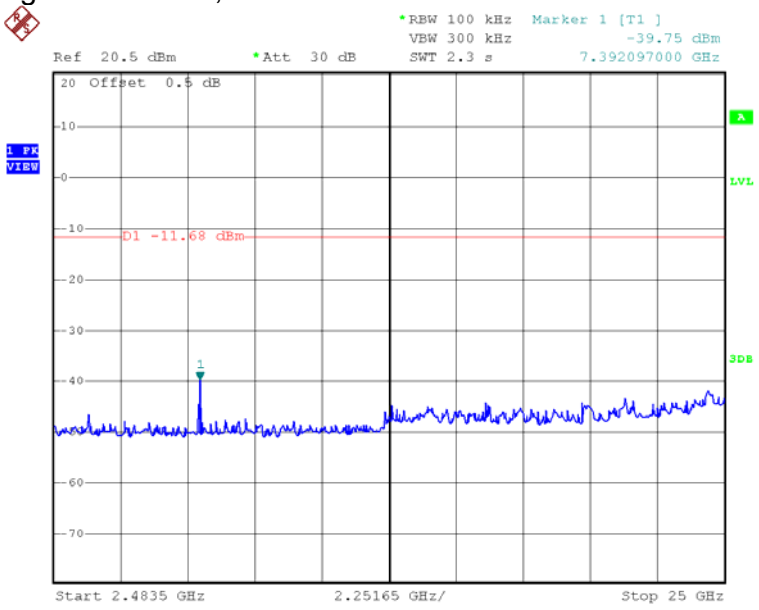
Plots of out of band conducted emissions

802.11b, Highest Channel, Plot A



Date: 8.DEC.2015 16:09:19

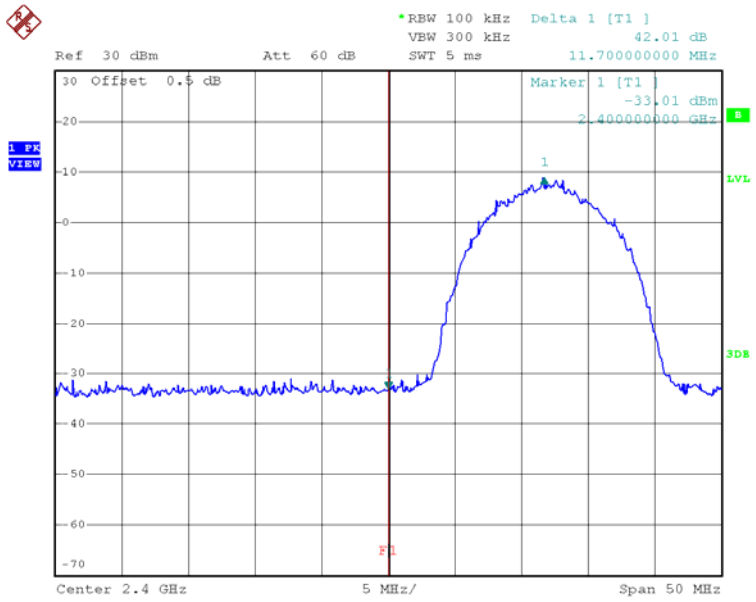
802.11b, Highest Channel, Plot B



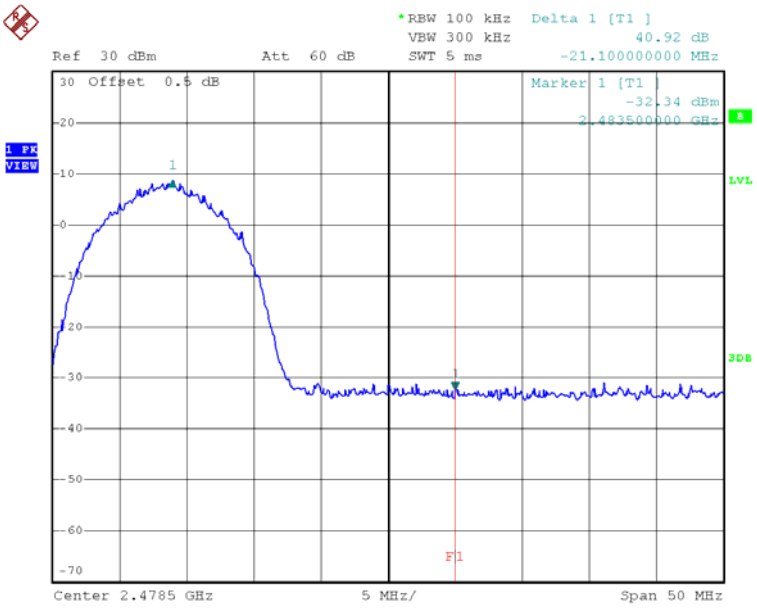
Date: 8.DEC.2015 16:10:19

Plots of Bandedge

802.11b



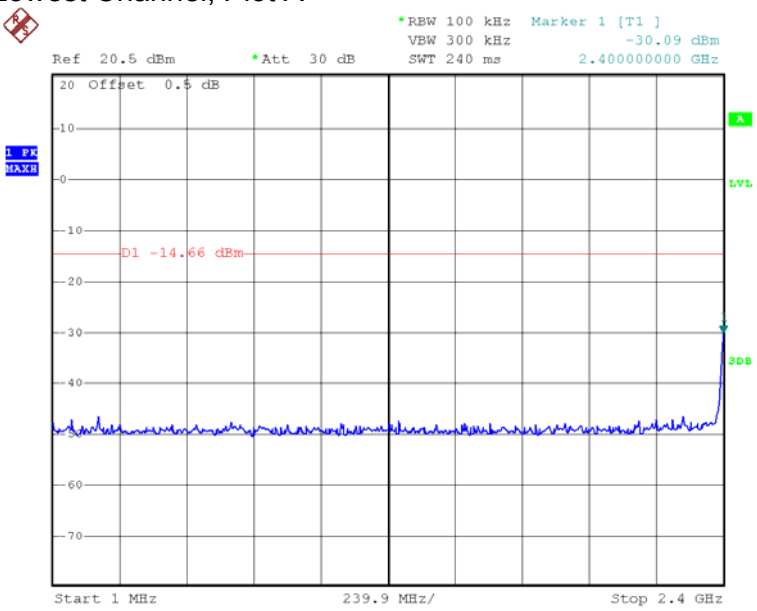
Date: 29.DEC.2015 15:32:09



Date: 29.DEC.2015 15:24:13

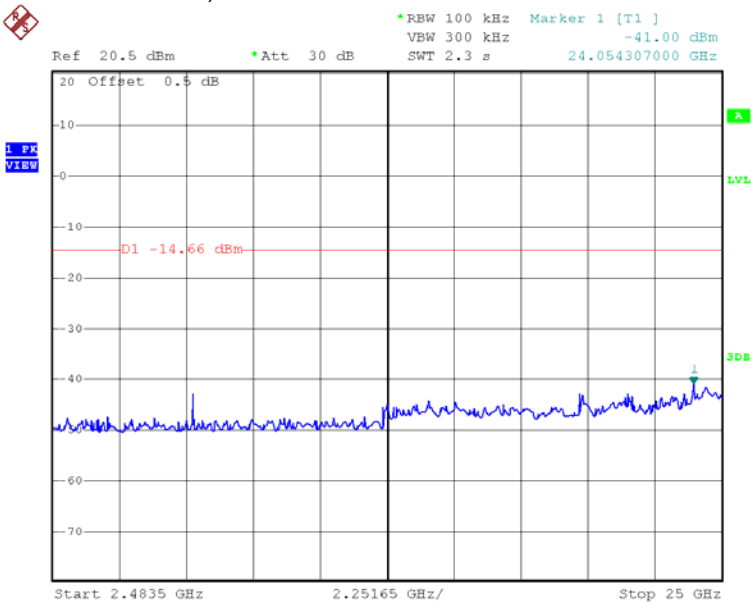
Plots of out of band conducted emissions

802.11g, Lowest Channel, Plot A



Date: 8.DEC.2015 16:11:41

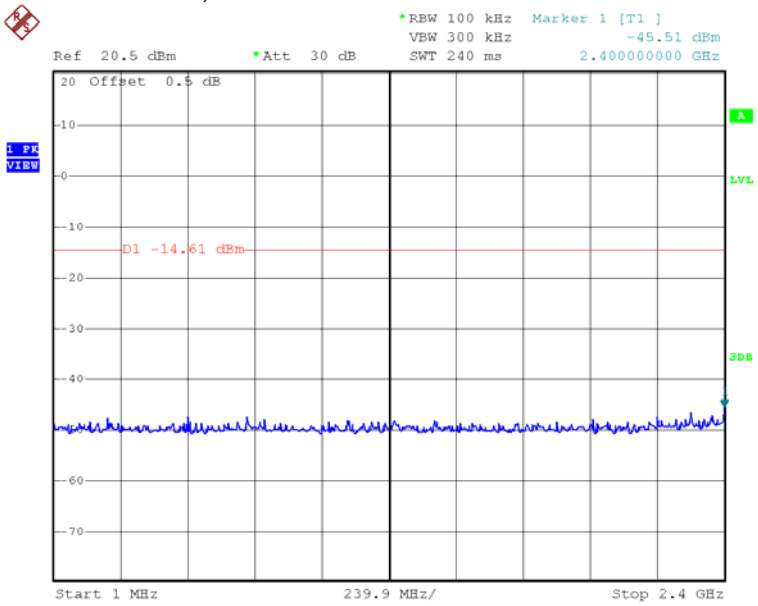
802.11g, Lowest Channel, Plot B



Date: 8.DEC.2015 16:12:53

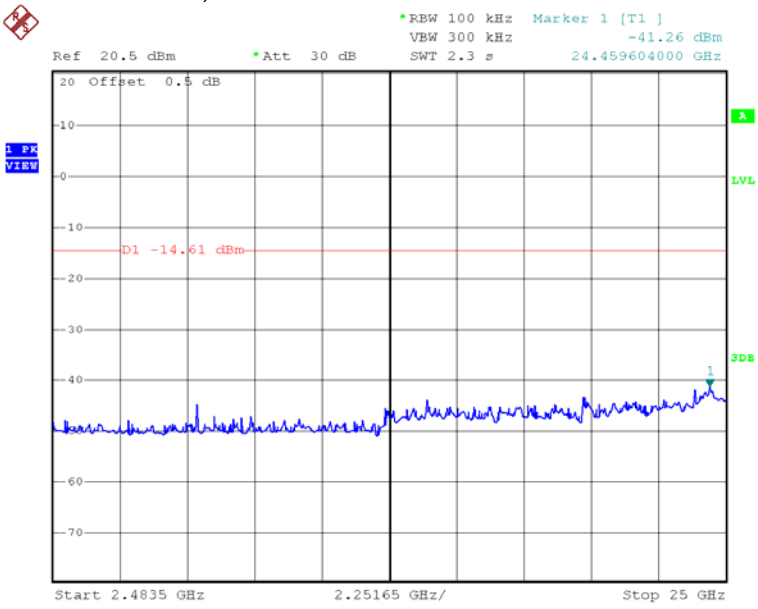
Plots of out of band conducted emissions

802.11g, Middle Channel, Plot A



Date: 8.DEC.2015 16:14:06

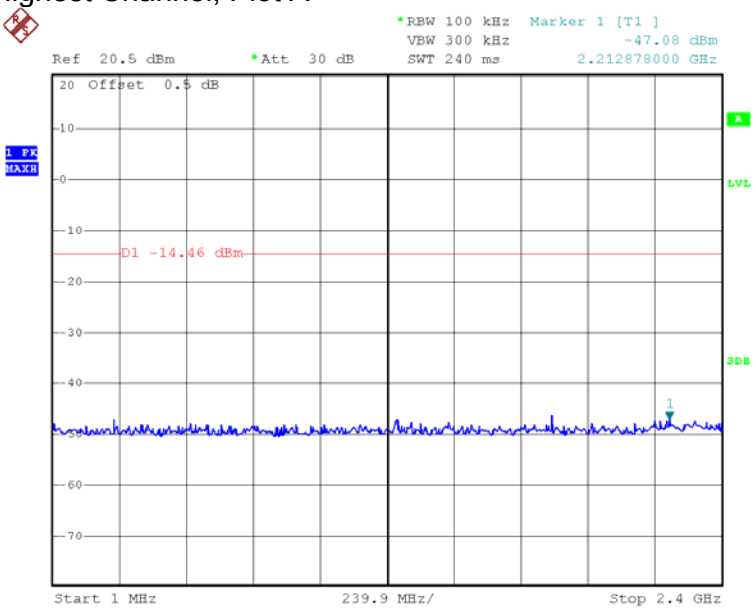
802.11g, Middle Channel, Plot B



Date: 8.DEC.2015 16:15:22

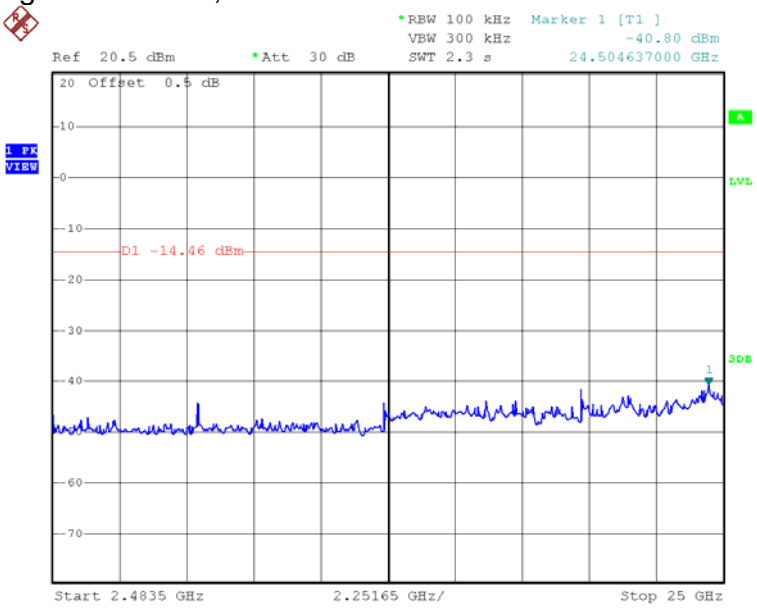
Plots of out of band conducted emissions

802.11g, Highest Channel, Plot A



Date: 8.DEC.2015 16:16:34

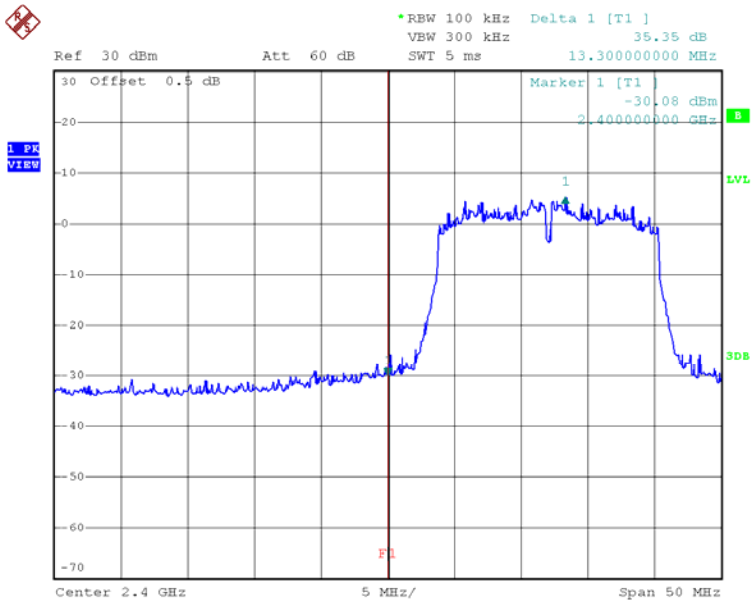
802.11g, Highest Channel, Plot B



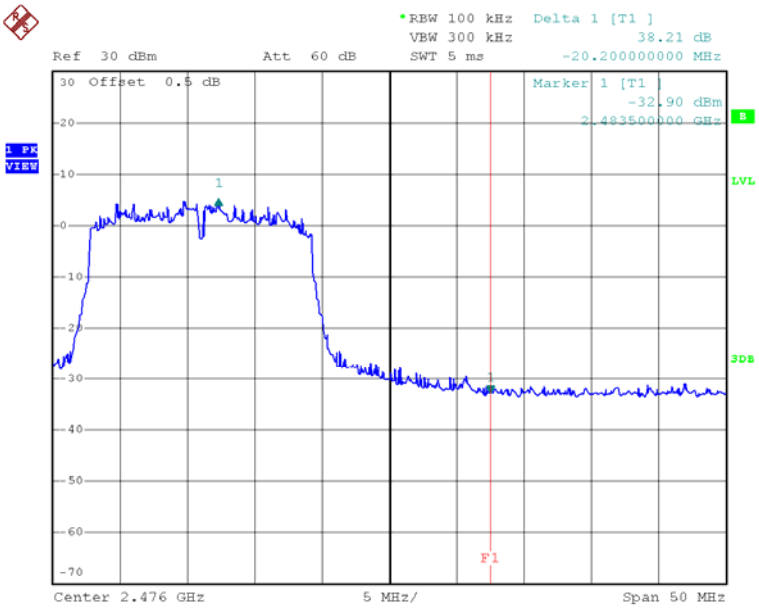
Date: 8.DEC.2015 16:17:24

Plots of Bandedge

802.11g



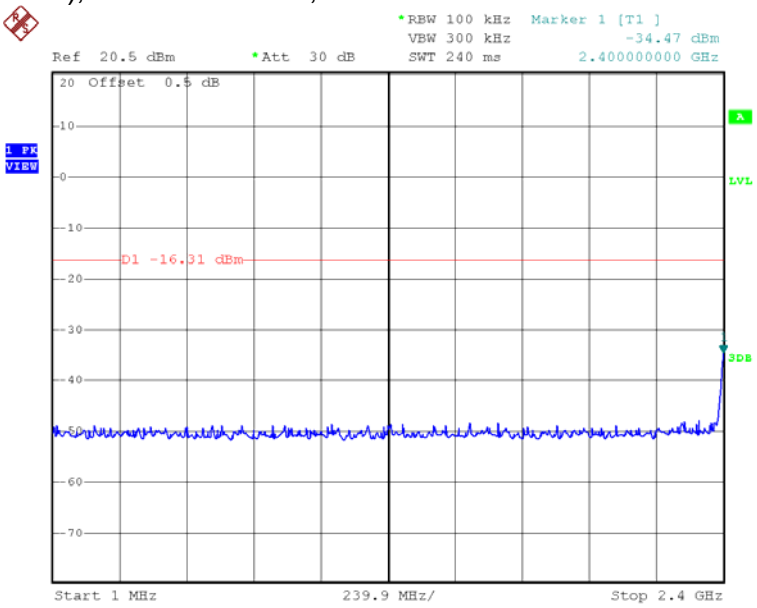
Date: 29.DEC.2015 15:27:11



Date: 29.DEC.2015 15:29:12

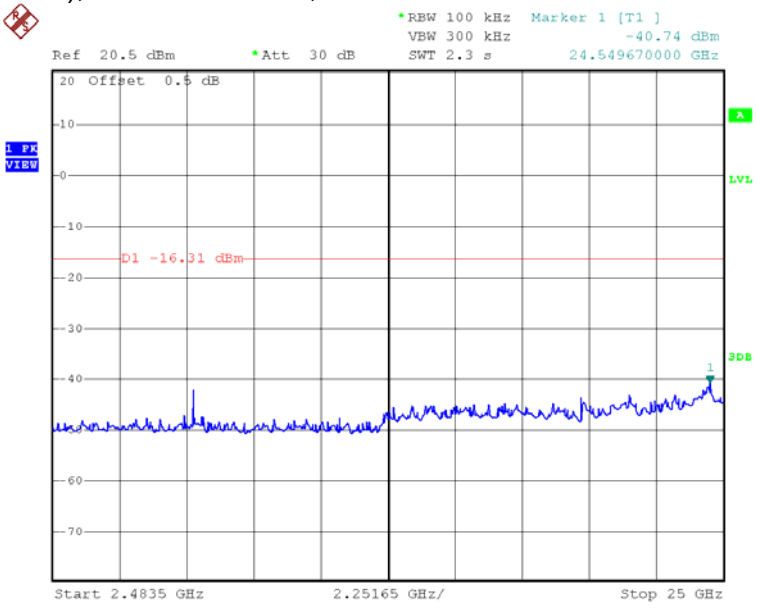
Plots of out of band conducted emissions

802.11n (HT20), Lowest Channel, Plot A



Date: 8.DEC.2015 16:18:32

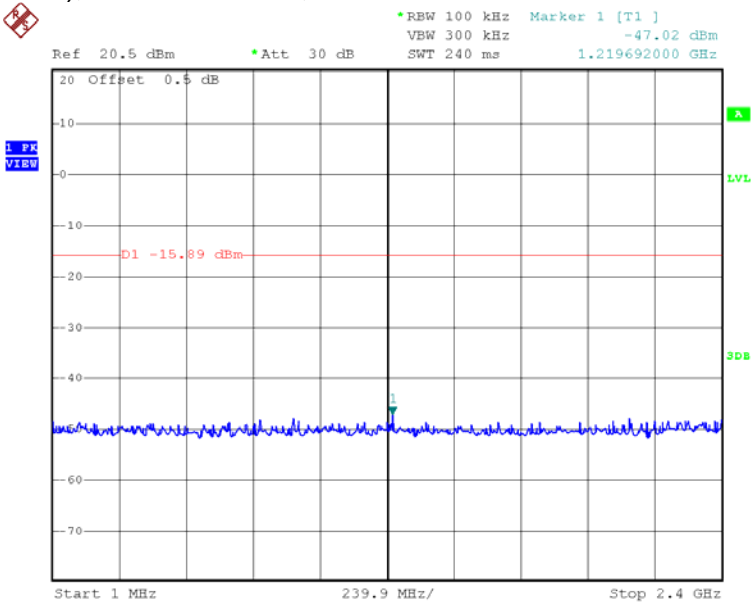
802.11n (HT20), Lowest Channel, Plot B



Date: 8.DEC.2015 16:19:08

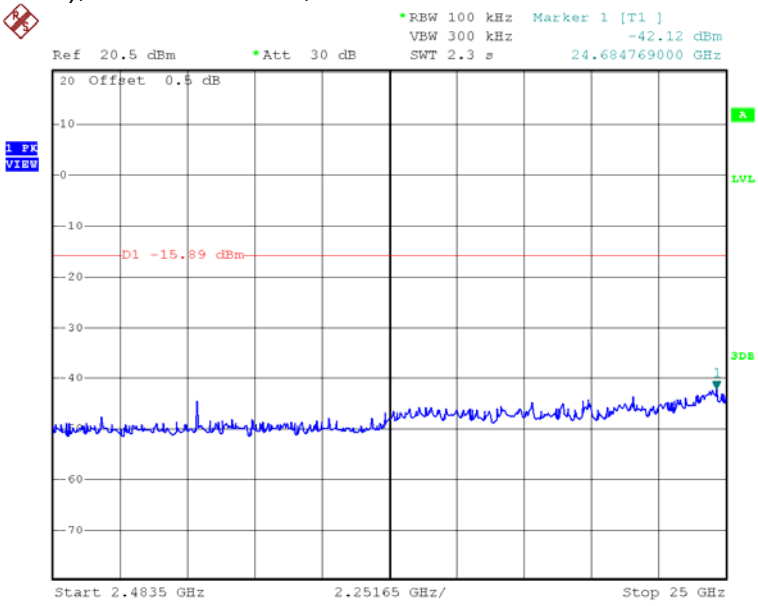
Plots of out of band conducted emissions

802.11n (HT20), Middle Channel, Plot A



Date: 8.DEC.2015 16:21:55

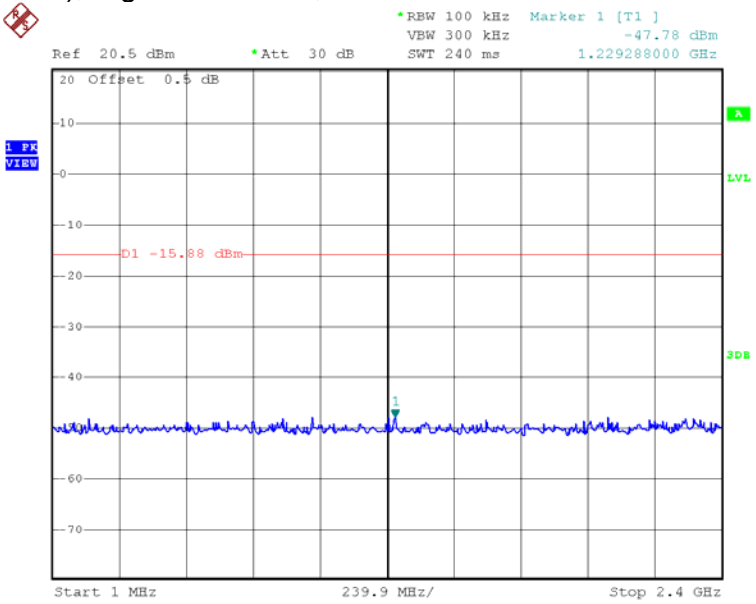
802.11n (HT20), Middle Channel, Plot B



Date: 8.DEC.2015 16:21:15

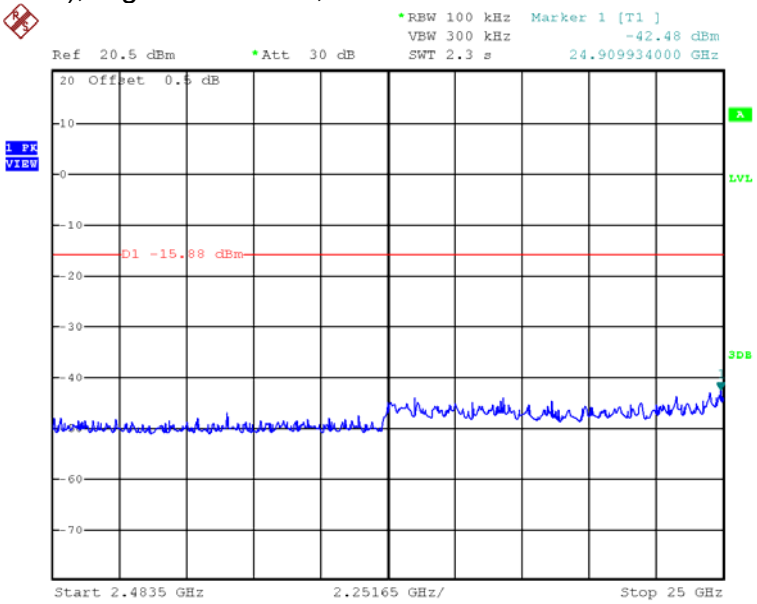
Plots of out of band conducted emissions

802.11n (HT20), Highest Channel, Plot A



Date: 8.DEC.2015 16:22:55

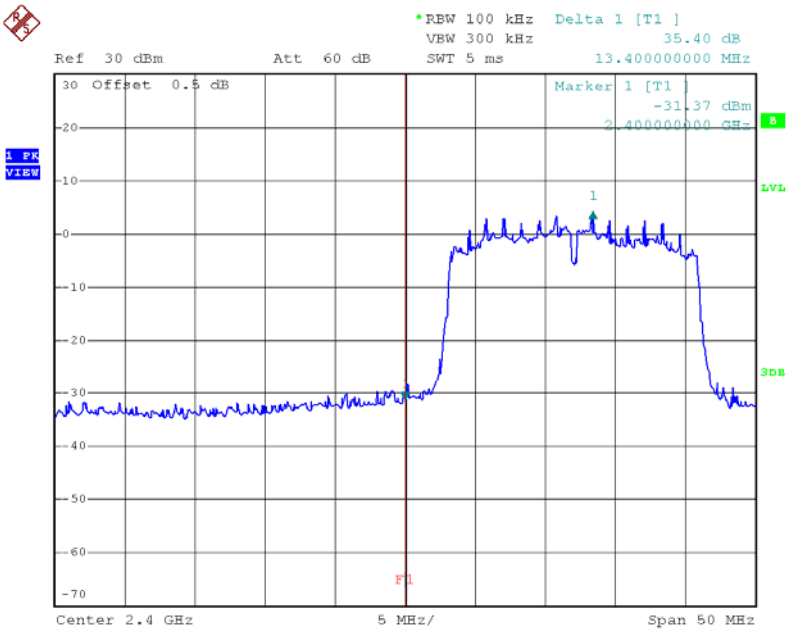
802.11n (HT20), Highest Channel, Plot B



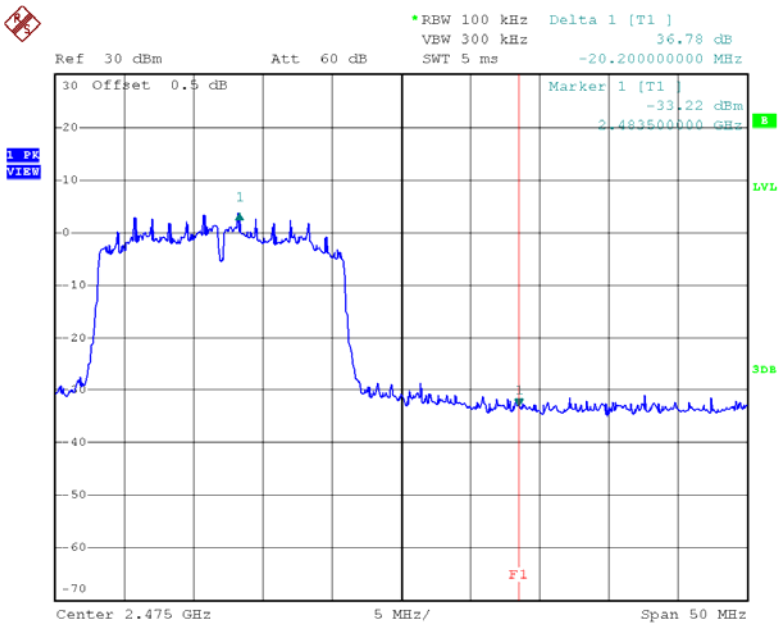
Date: 15.DEC.2015 14:18:52

Plots of Bandedge

802.11g



Date: 29.DEC.2015 15:30:05



Date: 29.DEC.2015 15:31:10

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

2390.000MHz

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 1.0 dB margin compare with average limit

Mode: TX-Channel 01

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)
V	***2390.000***	***53.5***	***33***	***29.4***	***49.9***	***54.0***	***-4.1***
V	***4824.000***	***38.6***	***33***	***34.9***	***40.5***	***54.0***	***-13.5***
V	***12060.000***	***37.0***	***33***	***40.5***	***44.5***	***54.0***	***-9.5***

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)
V	***2390.000***	***63.7***	***33***	***29.4***	***60.1***	***74.0***	***13.9***
V	***4824.000***	***48.4***	***33***	***34.9***	***50.3***	***74.0***	***-23.7***
V	***12060.000***	***47.7***	***33***	***40.5***	***55.2***	***74.0***	***-18.8***

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-GEN Section 8.10.

Mode: TX-Channel 06

Table 2
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)
V	***4874.000***	***38.7***	***33***	***34.9***	***40.6***	***54.0***	***-13.4***
V	***7311.000***	***36.5***	***33***	***37.9***	***41.4***	***54.0***	***-12.6***
V	***12185.000***	***36.8***	***33***	***40.5***	***44.3***	***54.0***	***-9.7***

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)
V	***4874.000***	***48.5***	***33***	***34.9***	***50.4***	***74.0***	***-23.6***
V	***7311.000***	***46.8***	***33***	***37.9***	***51.7***	***74.0***	***-22.3***
V	***12185.000***	***47.9***	***33***	***40.5***	***55.4***	***74.0***	***-18.6***

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-GEN Section 8.10.

Mode: TX-Channel 11

Table 3
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)
V	***2483.500***	***52.0***	***33***	***29.4***	***48.4***	***54.0***	***-5.6***
V	***4924.000***	***38.3***	***33***	***34.9***	***40.2***	***54.0***	***-13.8***
V	***7386.000***	***36.1***	***33***	***37.9***	***41.0***	***54.0***	***-13.0***
V	***12310.000***	***36.9***	***33***	***40.5***	***44.4***	***54.0***	***-9.6***

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)
V	***2483.500***	***63.4***	***33***	***29.4***	***59.8***	***74.0***	***-14.2***
V	***4924.000***	***47.9***	***33***	***34.9***	***49.8***	***74.0***	***-24.2***
V	***7386.000***	***46.6***	***33***	***37.9***	***51.5***	***74.0***	***-22.5***
V	***12310.000***	***48.0***	***33***	***40.5***	***55.5***	***74.0***	***-18.5***

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-GEN Section 8.10.

Mode: TX-Channel 01

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)
V	***2390.000***	***57.0***	***33***	***29.4***	***52.4***	***54.0***	***-1.6***
V	***4824.000***	***38.5***	***33***	***34.9***	***40.4***	***54.0***	***-13.6***
V	***12060.000***	***37.1***	***33***	***40.5***	***44.6***	***54.0***	***-9.4***

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)
V	***2390.000***	***73.8***	***33***	***29.4***	***70.2***	***74.0***	***-3.8***
V	***4824.000***	***48.3***	***33***	***34.9***	***50.2***	***74.0***	***-23.8***
V	***12060.000***	***47.9***	***33***	***40.5***	***55.4***	***74.0***	***-18.6***

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-GEN Section 8.10.

Mode: TX-Channel 06

Table 5
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)
V	***4874.000***	***38.6***	***33***	***34.9***	***40.5***	***54.0***	***-13.5***
V	***7311.000***	***36.6***	***33***	***37.9***	***41.5***	***54.0***	***-12.5***
V	***12185.000***	***37.0***	***33***	***40.5***	***44.5***	***54.0***	***-9.5***

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)
V	***4874.000***	***48.4***	***33***	***34.9***	***50.3***	***74.0***	***-23.7***
V	***7311.000***	***46.9***	***33***	***37.9***	***51.8***	***74.0***	***-22.2***
V	***12185.000***	***48.2***	***33***	***40.5***	***55.7***	***74.0***	***-18.3***

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-GEN Section 8.10.

Mode: TX-Channel 11

Table 6
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)
V	***2483.500***	***52.8***	***33***	***29.4***	***49.2***	***54.0***	***-4.8***
V	***4924.000***	***38.4***	***33***	***34.9***	***40.3***	***54.0***	***-13.7***
V	***7386.000***	***36.1***	***33***	***37.9***	***41.0***	***54.0***	***-13.0***
V	***12310.000***	***36.7***	***33***	***40.5***	***44.2***	***54.0***	***-9.8***

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)
V	***2483.500***	***65.9***	***33***	***29.4***	***62.3***	***74.0***	***-11.7***
V	***4924.000***	***48.0***	***33***	***34.9***	***49.9***	***74.0***	***-24.1***
V	***7386.000***	***46.5***	***33***	***37.9***	***51.4***	***74.0***	***-22.6***
V	***12310.000***	***47.8***	***33***	***40.5***	***55.3***	***74.0***	***-18.7***

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-GEN Section 8.10.

Mode: TX-Channel 01

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)
V	***2390.000***	***58.2***	***33***	***29.4***	***53.0***	***54.0***	***-1.0***
V	***4824.000***	***38.8***	***33***	***34.9***	***40.7***	***54.0***	***-13.3***
V	***12060.000***	***37.0***	***33***	***40.5***	***44.5***	***54.0***	***-9.5***

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)
V	***2390.000***	***74.8***	***33***	***29.4***	***71.2***	***74.0***	***-2.8***
V	***4824.000***	***48.7***	***33***	***34.9***	***50.6***	***74.0***	***-23.4***
V	***12060.000***	***47.8***	***33***	***40.5***	***55.3***	***74.0***	***-18.7***

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-GEN Section 8.10.

Mode: TX-Channel 06

Table 8
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)
V	***4874.000***	***39.0***	***33***	***34.9***	***40.9***	***54.0***	***-13.1***
V	***7311.000***	***36.2***	***33***	***37.9***	***41.1***	***54.0***	***-12.9***
V	***12185.000***	***37.1***	***33***	***40.5***	***44.6***	***54.0***	***-9.4***

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)
V	***4874.000***	***48.9***	***33***	***34.9***	***50.8***	***74.0***	***-23.2***
V	***7311.000***	***46.5***	***33***	***37.9***	***51.4***	***74.0***	***-22.6***
V	***12185.000***	***48.1***	***33***	***40.5***	***55.6***	***74.0***	***-18.4***

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-GEN Section 8.10.

Mode: TX-Channel 11

Table 9
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)
V	***2483.500***	***52.0***	***33***	***29.4***	***48.4***	***54.0***	***-5.6***
V	***4924.000***	***38.4***	***33***	***34.9***	***40.3***	***54.0***	***-13.7***
V	***7386.000***	***36.7***	***33***	***37.9***	***41.6***	***54.0***	***-12.4***
V	***12310.000***	***36.7***	***33***	***40.5***	***44.2***	***54.0***	***-9.8***

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)
V	***2483.500***	***63.4***	***33***	***29.4***	***59.8***	***74.0***	***-14.2***
V	***4924.000***	***48.2***	***33***	***34.9***	***50.1***	***74.0***	***-23.9***
V	***7386.000***	***46.9***	***33***	***37.9***	***51.8***	***74.0***	***-22.2***
V	***12310.000***	***47.9***	***33***	***40.5***	***55.4***	***74.0***	***-18.6***

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-GEN Section 8.10.

Worst Case: EUT Charging

Table 10

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	***117.556***	***24.5***	***16***	***14.0***	***22.5***	***43.5***	***-21.0***
V	***331.836***	***22.1***	***16***	***24.0***	***30.1***	***46.0***	***-15.9***
V	380.536	20.9	16	24.0	28.9	46.0	-17.1
V	***405.860***	***19.4***	***16***	***24.0***	***27.4***	***46.0***	***-18.6***
V	676.632	19.0	16	29.0	32.0	46.0	-14.0
V	779.876	19.2	16	31.0	34.2	46.0	-11.8

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

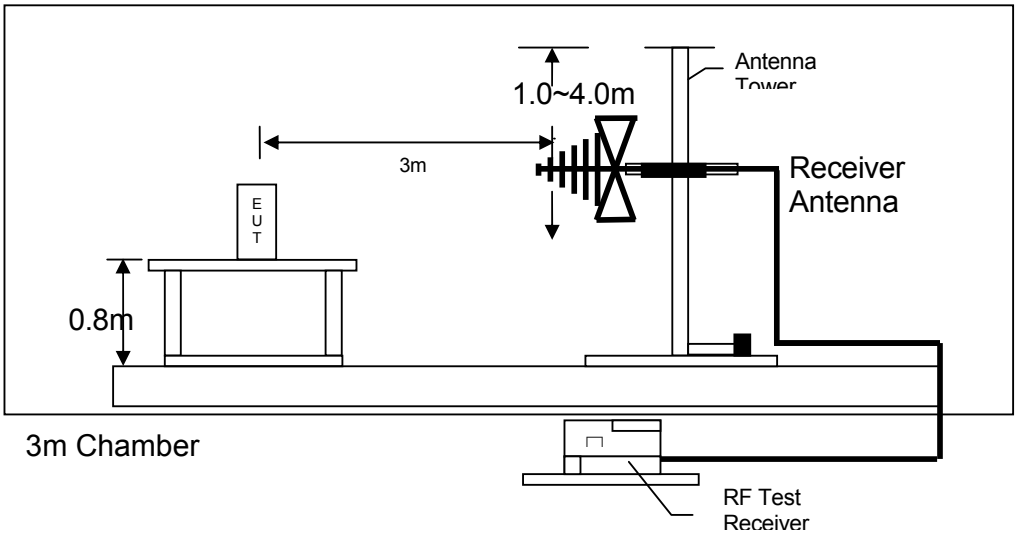
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test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

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

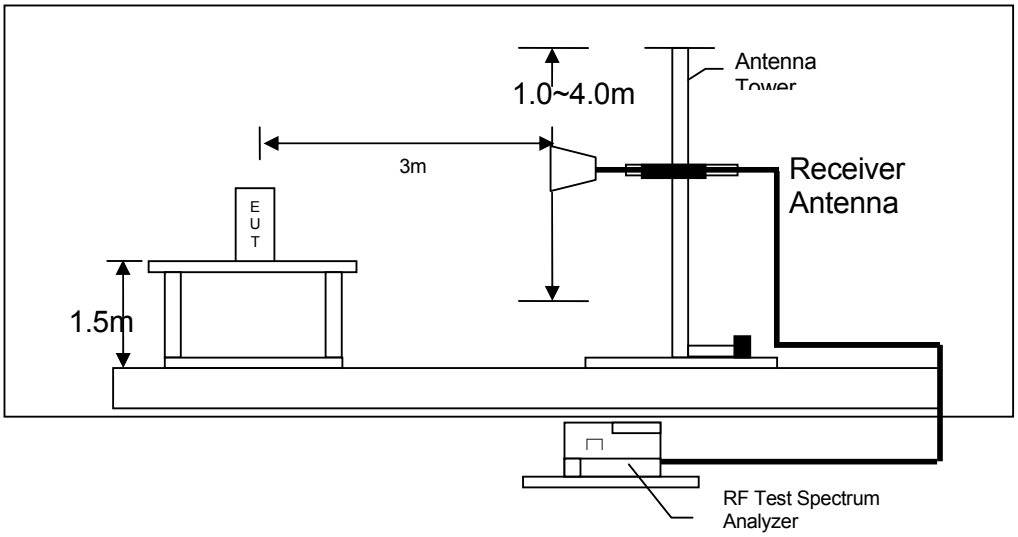
4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-GEN Section 8.10.

Radiated Emission Test Setup

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



Test setup of radiated emissions upto 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

0.172 MHz

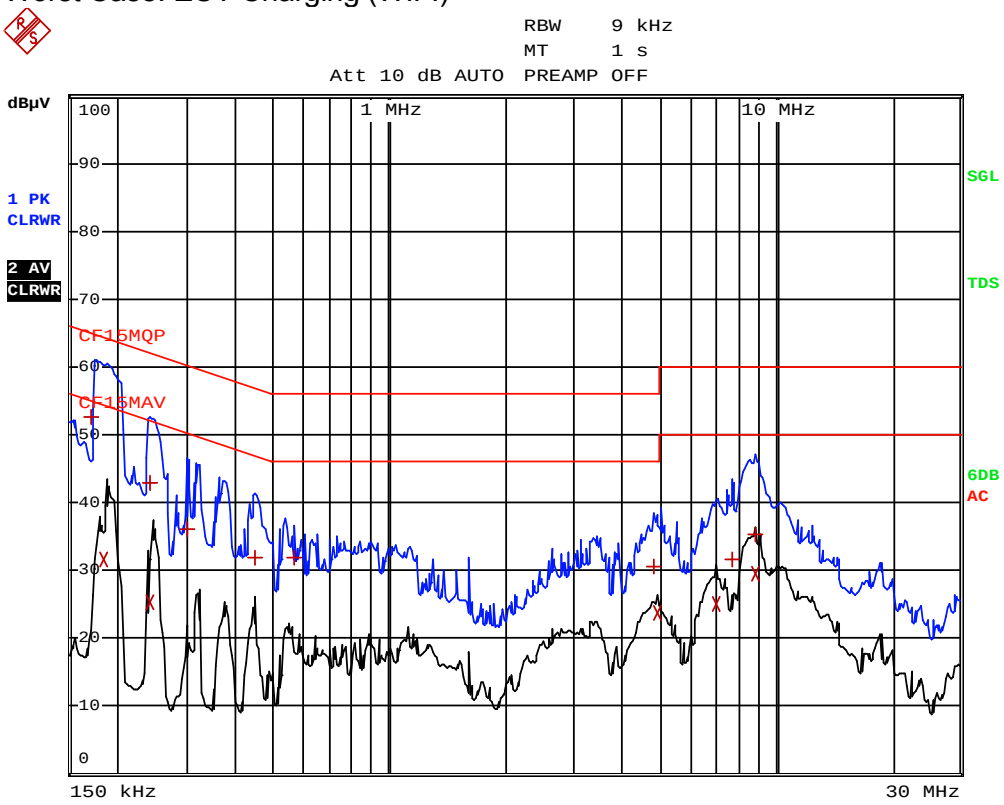
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

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 12.19 dB margin compare with average limit

Worst Case: EUT Charging (WIFI)



Date: 2.FEB.2016 17:40:00

Worst Case: EUT Charging (WIFI)

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	172.5 kHz	52.64	N	-12.19
2	CISPR Average	186 kHz	31.54	L1	-22.66
1	Quasi Peak	240 kHz	42.84	N	-19.25
2	CISPR Average	244.5 kHz	25.23	N	-26.71
1	Quasi Peak	298.5 kHz	36.21	N	-24.07
1	Quasi Peak	447 kHz	31.92	L1	-25.00
1	Quasi Peak	568.5 kHz	31.82	L1	-24.17
1	Quasi Peak	4.8255 MHz	30.50	L1	-25.49
2	CISPR Average	4.9605 MHz	23.76	L1	-22.23
2	CISPR Average	7.008 MHz	25.10	N	-24.89
1	Quasi Peak	7.701 MHz	31.51	N	-28.48
1	Quasi Peak	8.8485 MHz	35.40	N	-24.59
2	CISPR Average	8.8845 MHz	29.55	L1	-20.44

Date: 2.FEB.2016 17:39:23

Conducted Emission Test Setup

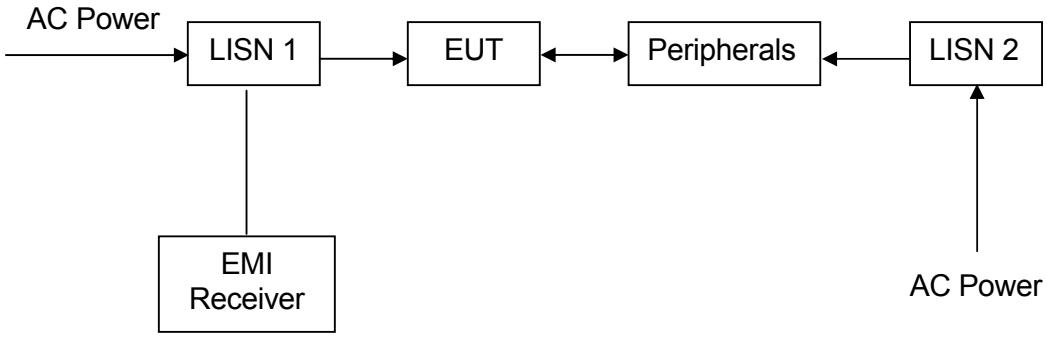


EXHIBIT 5
EQUIPMENT LIST

5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-3095	EW-2253
Manufacturer	R&S	R&S
Model No.	ESCI	FSP40
Calibration Date	Nov. 05, 2015	May 27, 2015
Calibration Due Date	Nov. 05, 2016	May 27, 2016

Equipment	BiConiLog Antenna	Double Ridged Guide Antenna
Registration No.	EW-3061	EW-0194
Manufacturer	EMCO	EMCO
Model No.	3412E	3115
Calibration Date	Jul. 22, 2015	Jan. 29, 2015
Calibration Due Date	Jul. 22, 2016	Jul. 29, 2016

2) Conductive Measurement Test

Equipment	RF Power Meter with Power Sensor (N1921A)	Spectrum Analyzer
Registration No.	EW-2270	EW-2329
Manufacturer	AGILENTTECH	R&S
Model No.	N1911A	FSP3
Calibration Date	Jan. 05, 2015	Jun. 17, 2015
Calibration Due Date	Jan. 05, 2016	Jun. 17, 2016

3) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2666	EW-2501
Manufacturer	R&S	R&S
Model No.	ESCI7	ENV-216
Calibration Date	May 13, 2015	Jan. 15, 2015
Calibration Due Date	May 13, 2016	Jan. 15, 2016

END OF TEST REPORT