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TEST REPORT

Report Number: 16070638HKG-001

Application
for
Original Grant of 47 CFR Part 15 Certification

Smarter iKettle

FCC ID: 2AKC5-SMKET01

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

Prepared and Checked by:	Approved by:
Signed On File Wong Cheuk Ho, Herbert Lead Engineer	Digitally signed by Koo Wai Ip Location: Intertek Testing Services Hong Kong Ltd. Koo Wai Ip Assistant Supervisor January 19, 2017

GENERAL INFORMATION

Applicant Name:	Smarter Applications Ltd.
Applicant Address:	1 Fellmongers Path, London, SE1 3LY, UK
FCC Specification Standard:	FCC Part 15, 2015 Edition
FCC ID:	2AKC5-SMKET01
FCC Model(s):	SMKET01-US
Type of EUT:	Digital Transmission System Transmitter
Description of EUT:	Smarter iKettle
Serial Number:	N/A
Sample Receipt Date:	July 12, 2016
Date of Test:	July 12, 2016 to August 04, 2016
Report Date:	January 19, 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	Results	Details see section
Antenna Requirement	15.203	Pass	2.1
Max. Conducted Output Power (average)	15.247(b)(3)&(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	Pass	4.2
Max. Power Density (average)	15.247(e)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	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, 2015 Edition

EXHIBIT 2
GENERAL DESCRIPTION

2.0 **General Description**

2.1 Product Description

The Equipment Under Test (EUT) is a Smarter iKettle Model: SMKET01-US, that equips with WiFi connectivity feature. The Smarter iKettle can be controlled by the smartphone iKettle apps to boil water, set temperature or keep warm for preset time. The EUT is powered 120VAC only.

The Equipment Under Test (EUT) operates at frequency range of 2412MHz to 2462MHz with 11 channels. 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 (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. Maximum bit rate can support up to 65Mbps.

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

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

2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

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.

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 EUT attached to peripherals, they were connected and operational (as typical as possible).

The EUT shall be placed at the centre of the table.

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.

3.1 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. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109Limits.

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 and setting of data rate for 802.11b/g/n(HT20) of WiFi mode had been considered, and worst case test data are shown on this test report.

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:

The EUT was powered by 120VAC

Description of Accessories:

There are no special accessories necessary for compliance of this product.

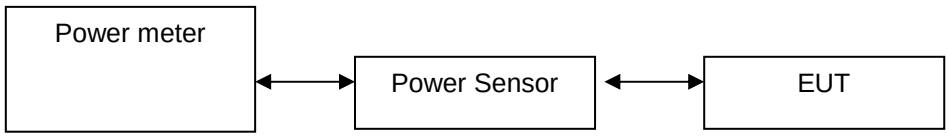
3.4 Measurement Uncertainty

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 spectrum analyzer.

☒ External attenuation and cable loss were compensated for using the OFFSET function of the analyser. The measurement procedure 9.2.2 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 802.11b (DSSS, 1 Mbps) Antenna Gain = 2.24 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	22.22	166.725
Middle Channel: 2437	22.24	167.494
High Channel: 2462	22.28	169.044

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 2.24 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	22.48	177.011
Middle Channel: 2437	22.68	185.353
High Channel: 2462	22.98	198.609

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 2.24 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	21.18	131.220
Middle Channel: 2437	21.22	132.434
High Channel: 2462	21.48	140.605

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

Cable loss : 0.5 dB External Attenuation : 0 dB

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

IEEE 802.11b (DSSS, 1 Mbps)
max. conducted (average) output level = 22.28 dBm

IEEE 802.11g (OFDM, 9 Mbps)
max. conducted (average) output level = 22.98 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)
max. conducted (average) output level = 21.48 dBm

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

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

The plots of conducted output power are saved as below.

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	8.48
Middle Channel: 2437	9.44
High Channel: 2462	8.72

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.44
Middle Channel: 2437	16.36
High Channel: 2462	16.48

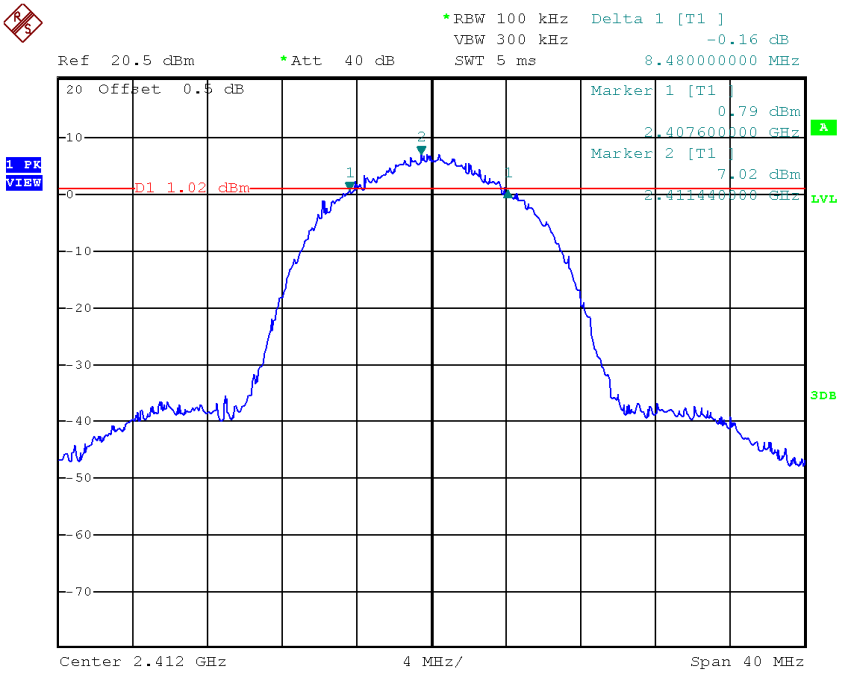
IEEE 802.11n (20MHz) (OFDM, MCS0)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	17.60
Middle Channel: 2437	17.64
High Channel: 2462	17.68

Limits
6 dB bandwidth shall be at least 500kHz

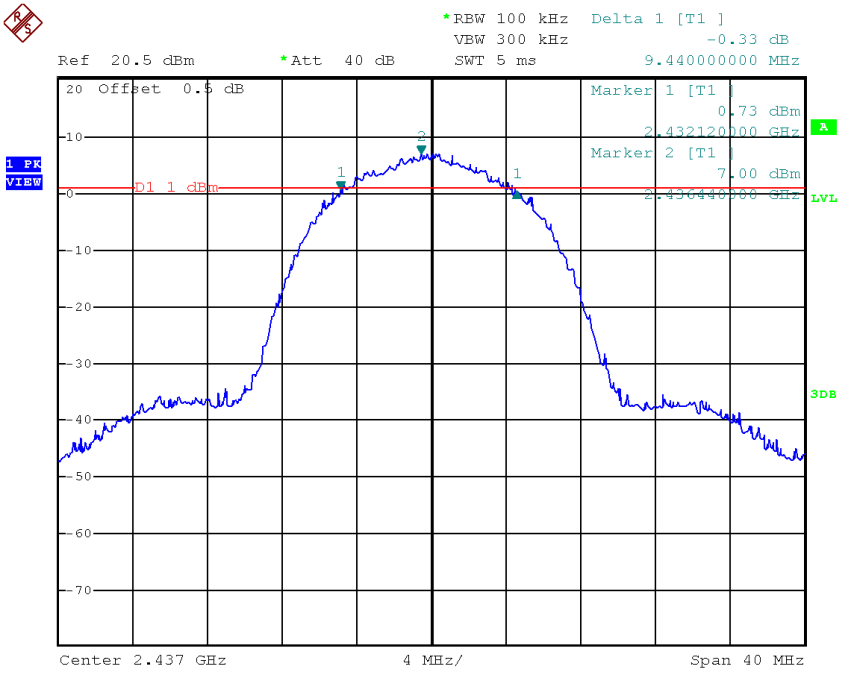
The plots of 6dB RF bandwidth and occupied bandwidth are saved as below.

Plots of 6dB RF bandwidth

802.11b, Lowest Channel

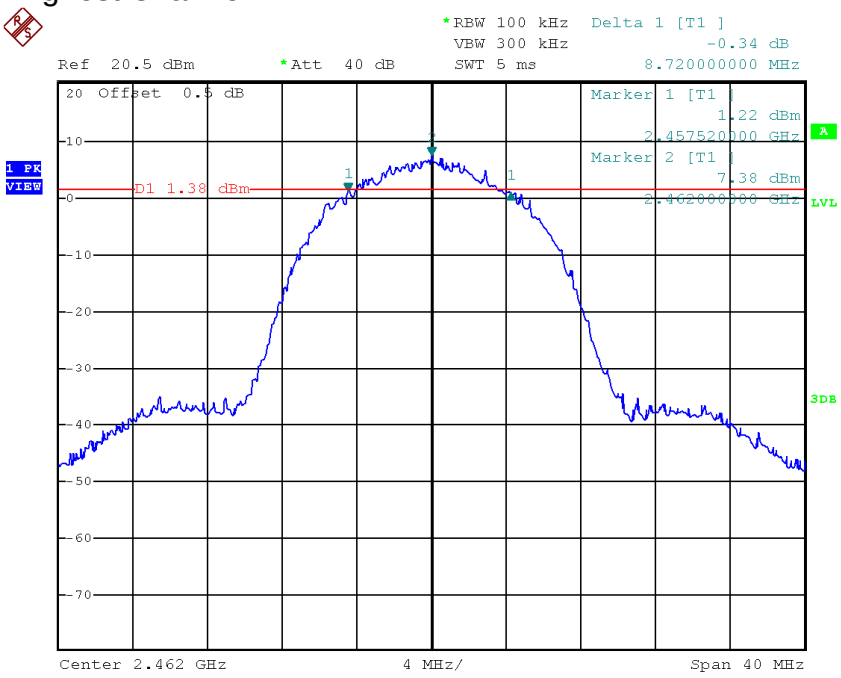


802.11b, Middle Channel



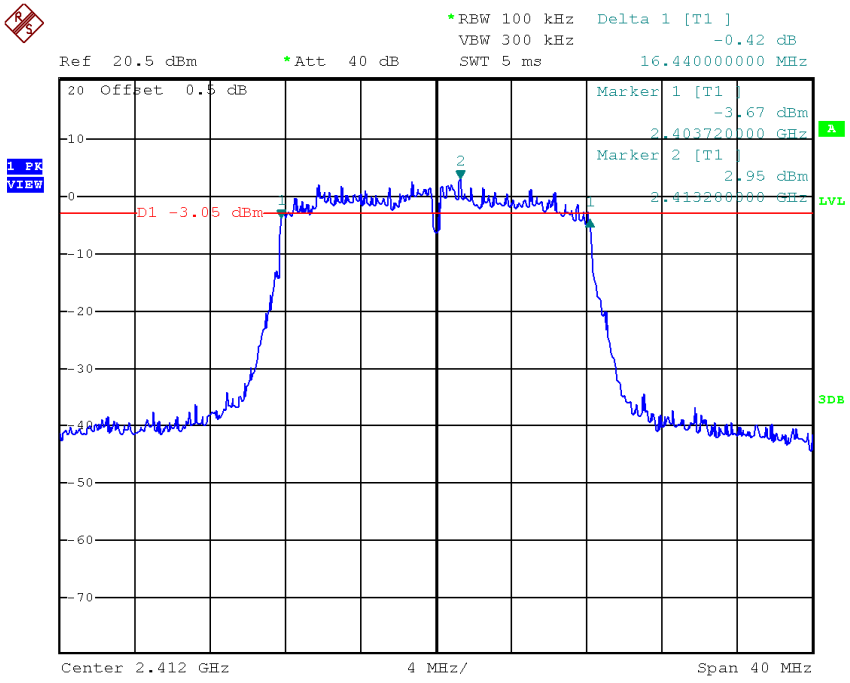
Plots of 6dB RF bandwidth

802.11b, Highest Channel

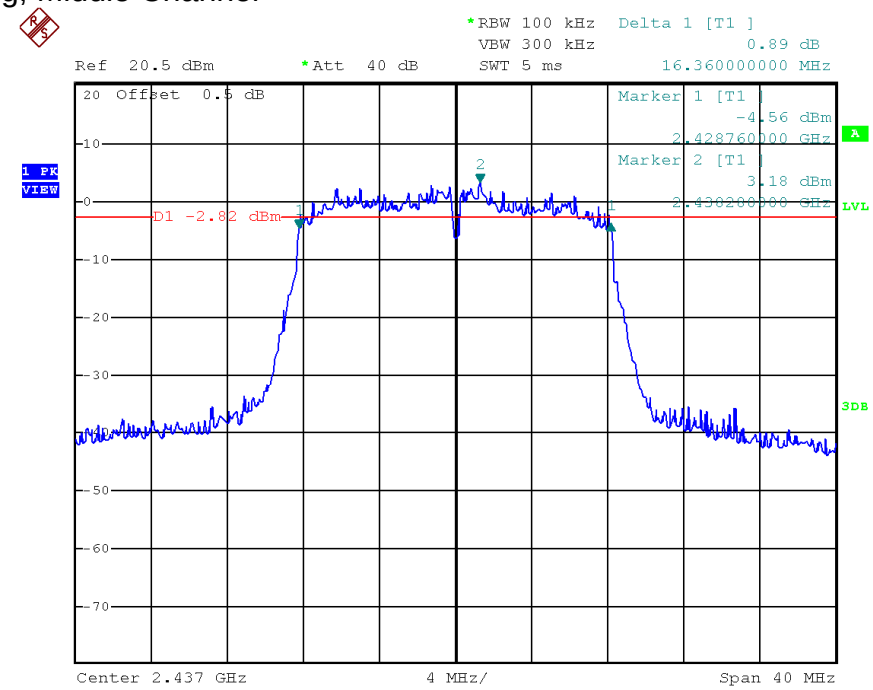


Plots of 6dB RF bandwidth

802.11g, Lowest Channel

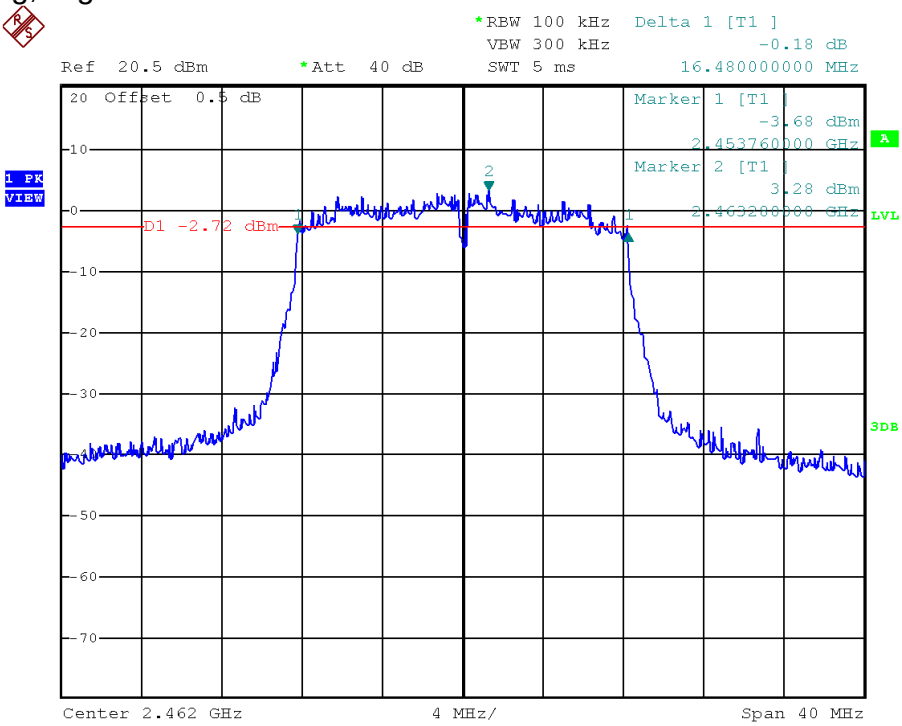


802.11g, Middle Channel



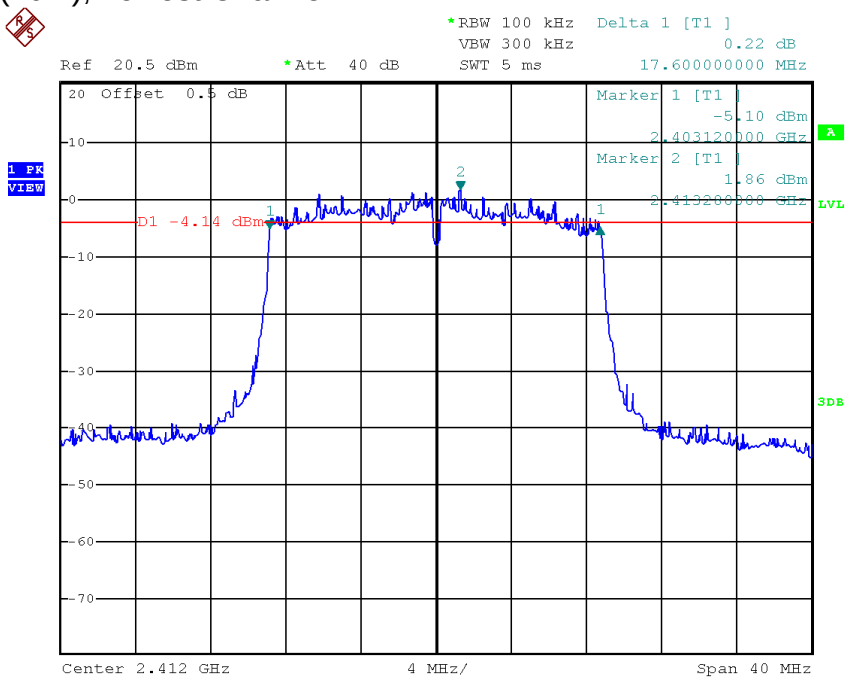
Plots of 6dB RF bandwidth

802.11g, Highest Channel

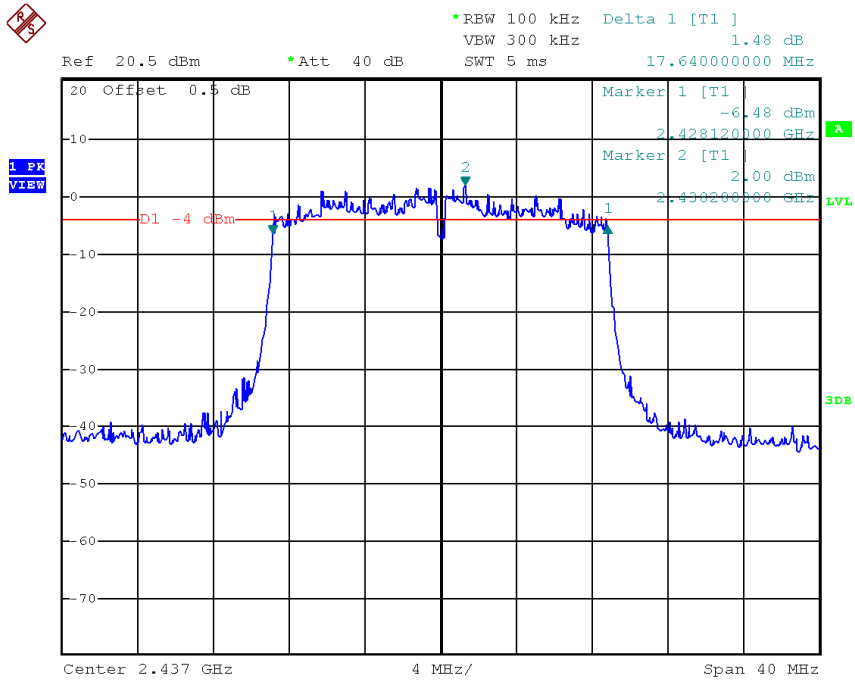


Plots of 6dB RF bandwidth

802.11n(20M), Lowest Channel

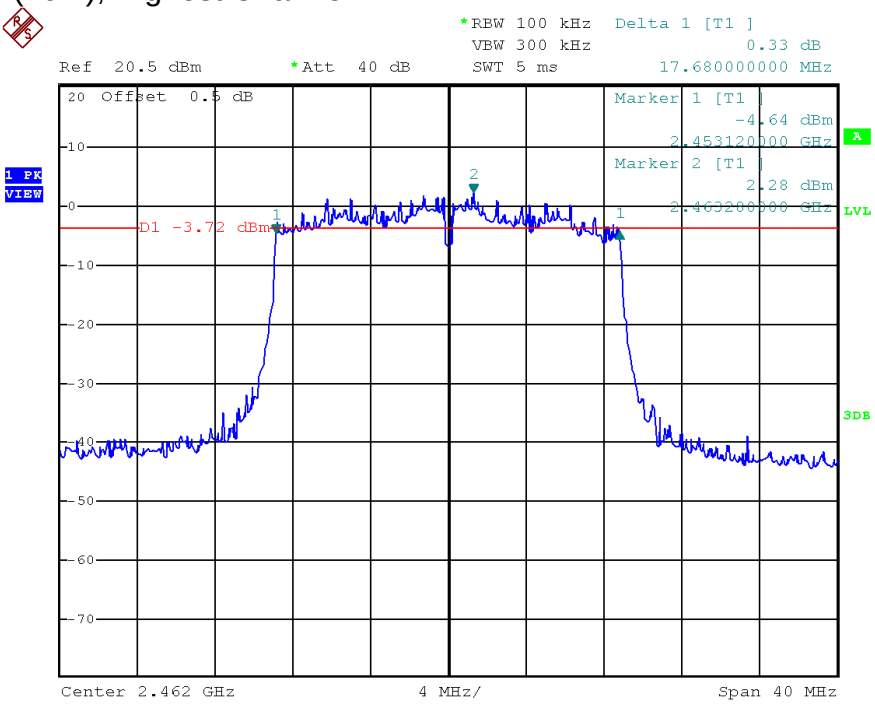


802.11n(20M), Middle Channel



Plots of 6dB RF bandwidth

802.11n(20M), 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	7.68
Middle Channel: 2437	7.72
High Channel: 2462	7.42

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	2.92
Middle Channel: 2437	3.10
High Channel: 2462	3.26

IEEE 802.11n (20MHz) (OFDM, MCS0)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	1.75
Middle Channel: 2437	1.85
High Channel: 2462	2.08

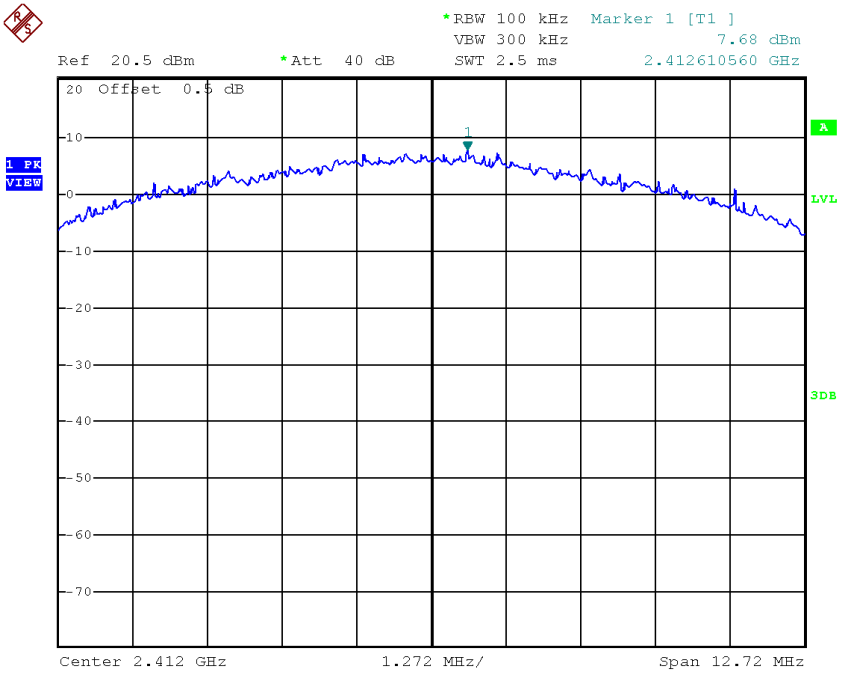
Cable Loss: 0.5 dB

Limit:
8dBm

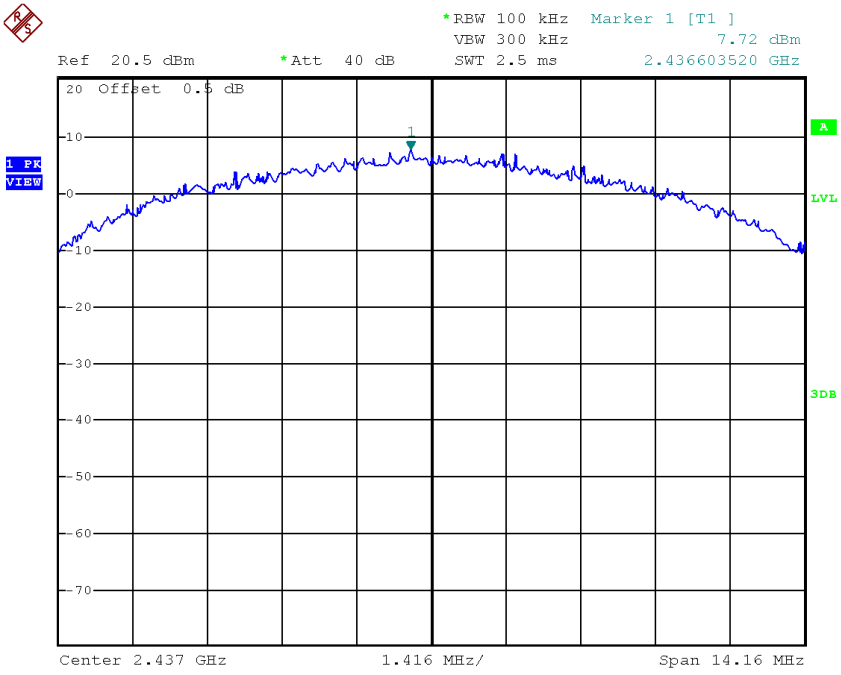
The plots of n power spectral density are as below.

Plots of power spectral density

802.11b, Lowest channel

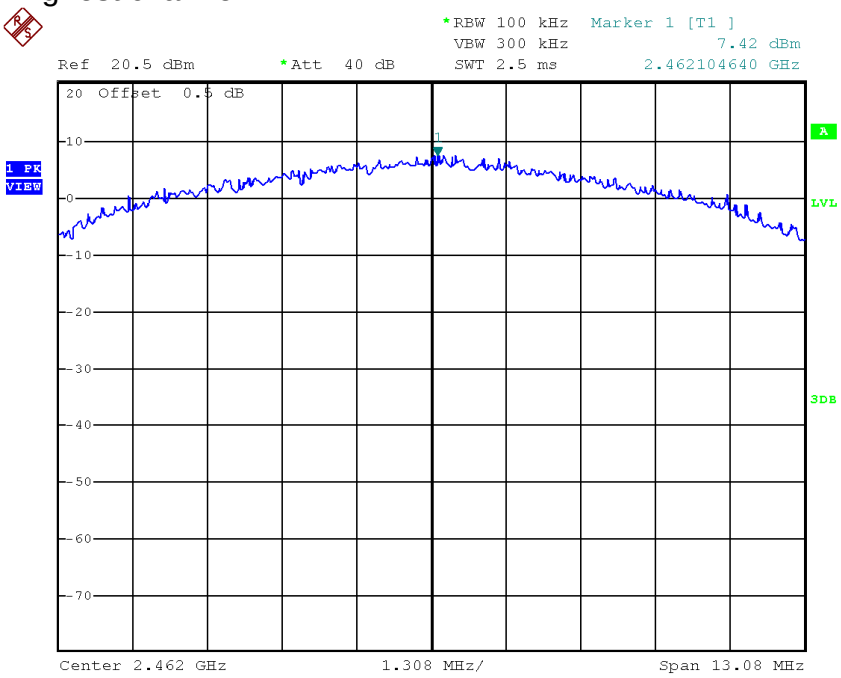


802.11b, Middle channel



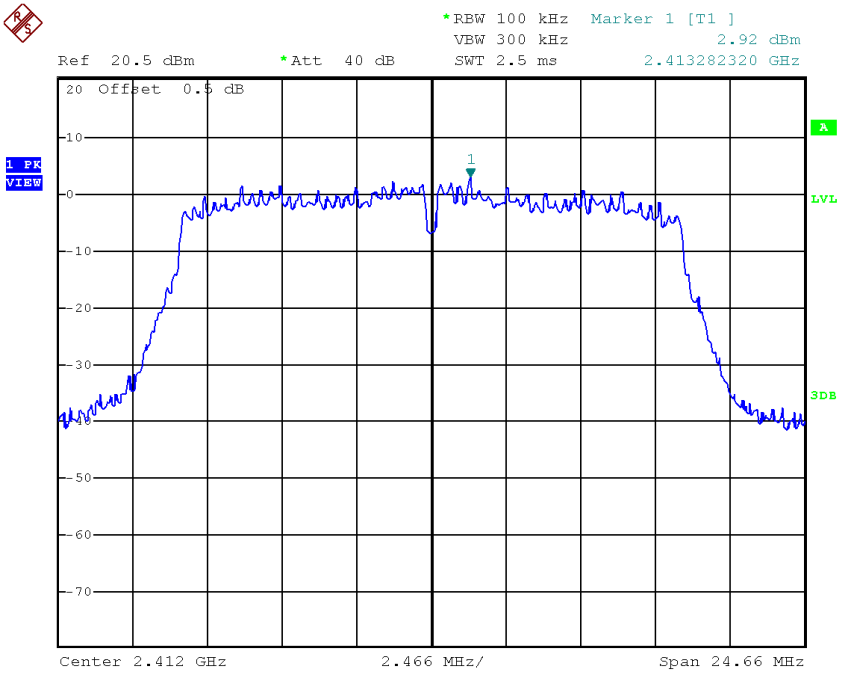
Plots of power spectral density

802.11b, Highest channel

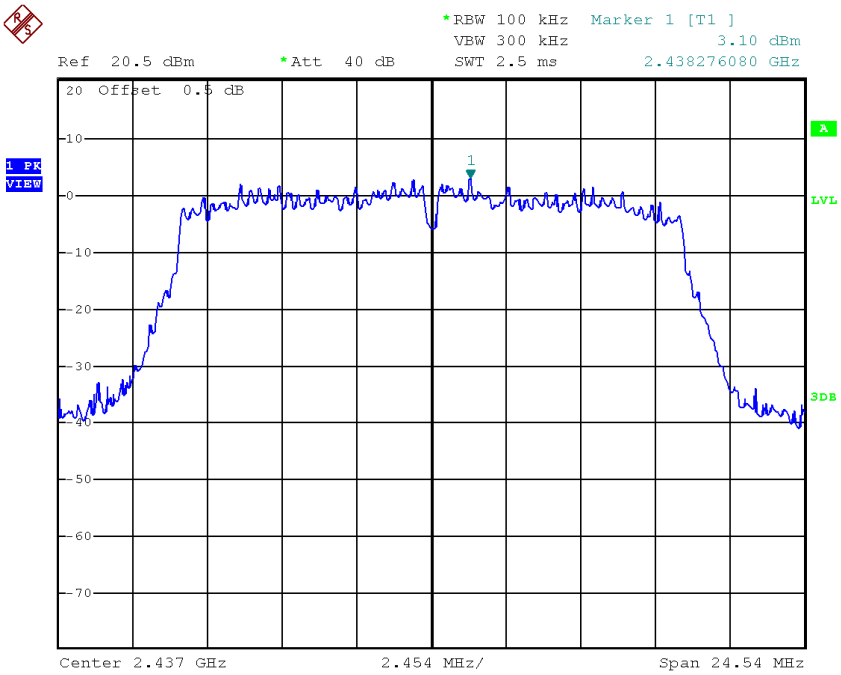


Plots of power spectral density

802.11g, Lowest channel

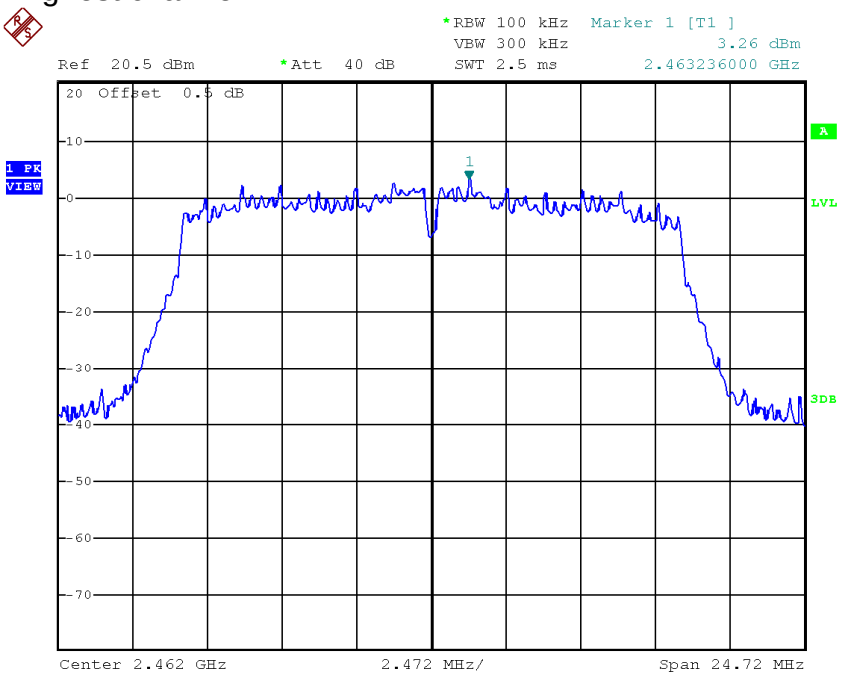


802.11g, Middle channel



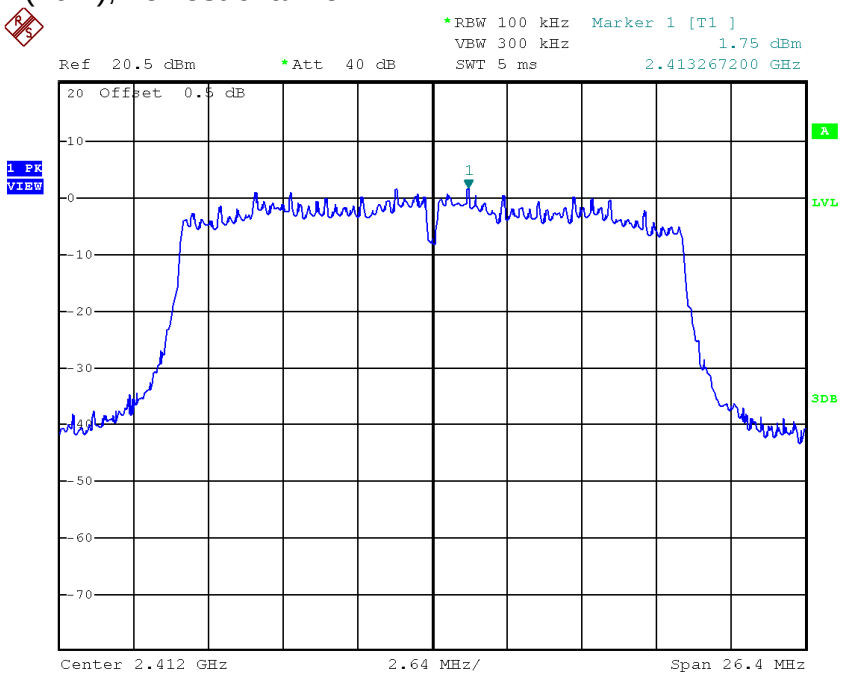
Plots of power spectral density

802.11g, Highest channel

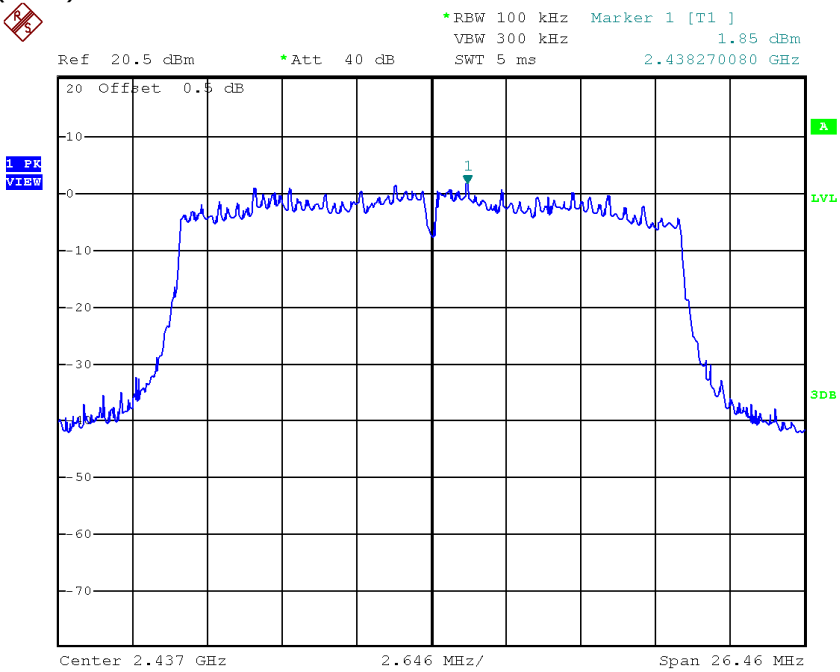


Plots of power spectral density

802.11n(20M), Lowest channel

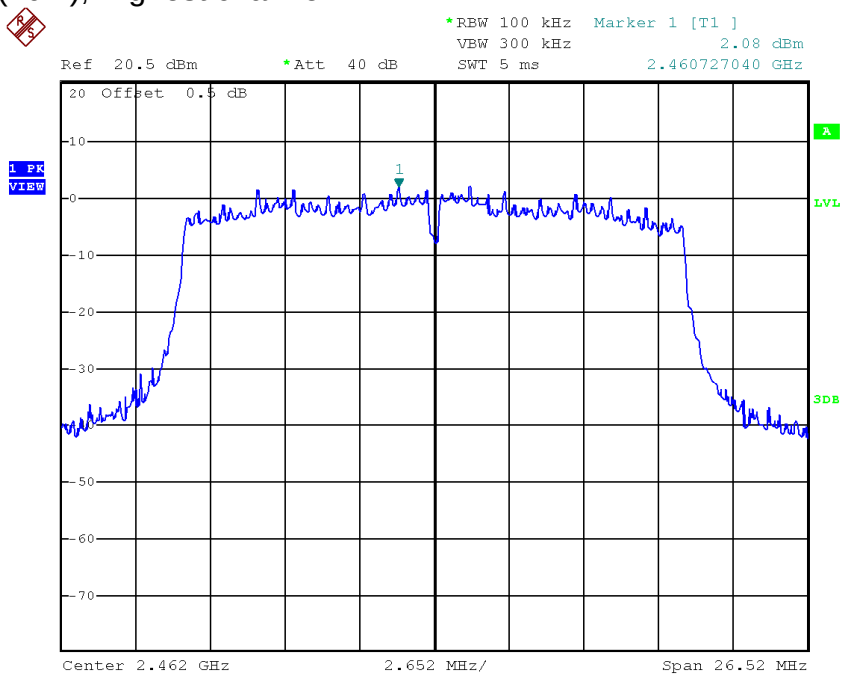


802.11n(20M), Middle channel



Plots of power spectral density

802.11n(20M), Highest channel



4.4 Out of Band Conducted Emissions

For 802.11b/g/n20MHz, 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 v03r03 (08-April-2016) were used.

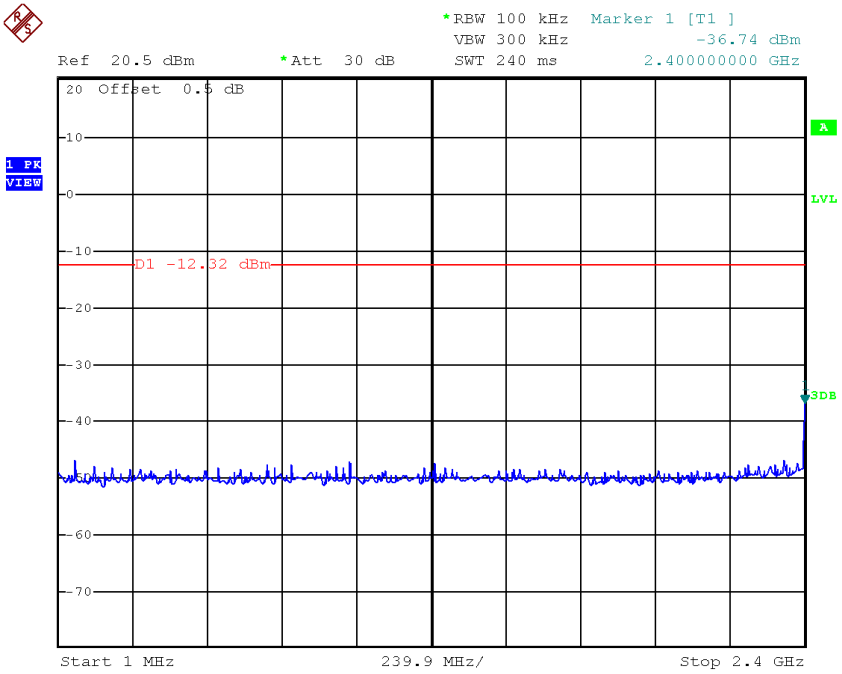
Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

Limits:
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB for 802.11b,g,n20MHz below the maximum measured in-band peak PSD level.

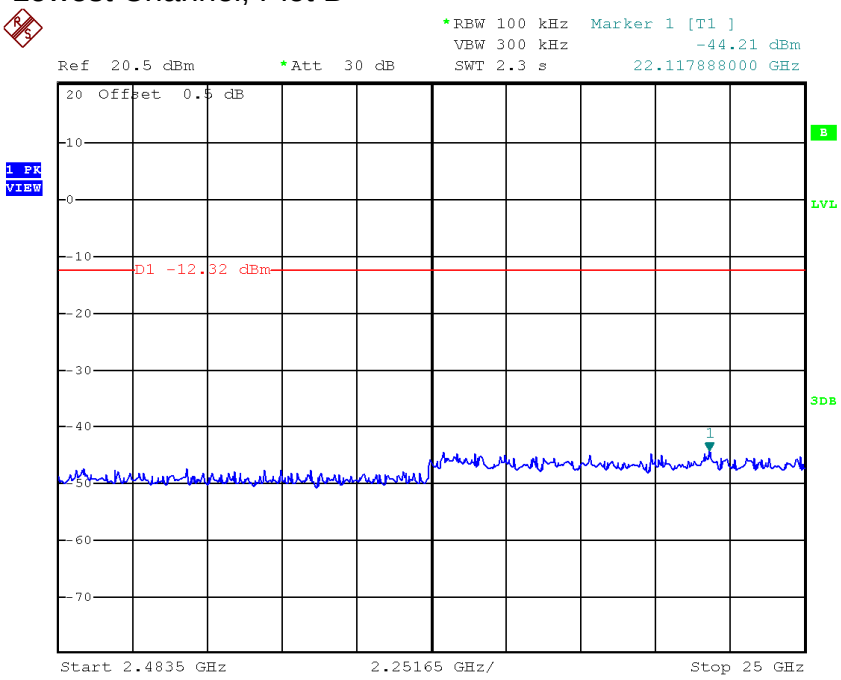
The plots of reference level measurement and out of band conducted emissions are as below.

Plots of out of band conducted emissions

802.11b, Lowest Channel, Plot A

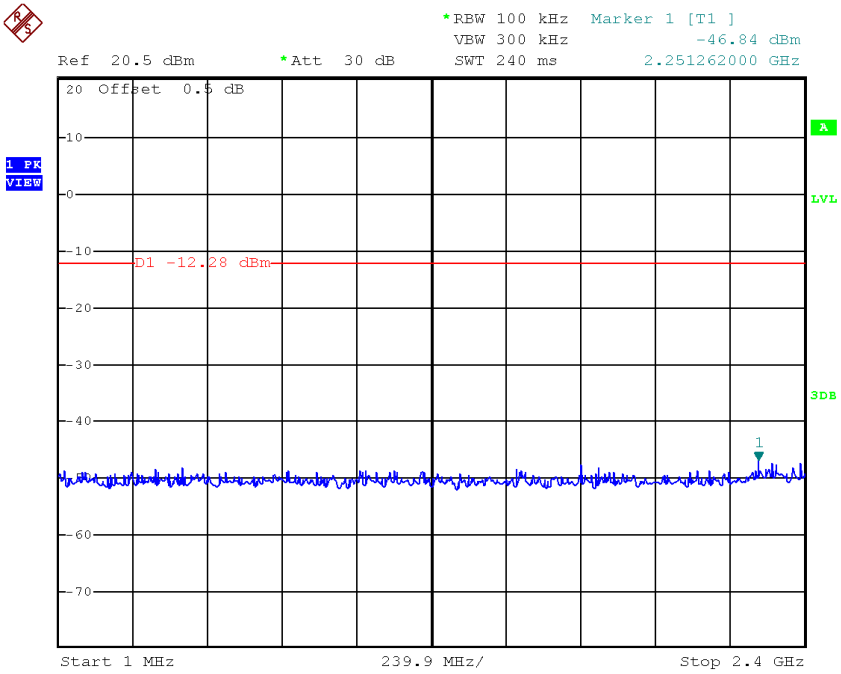


802.11b, Lowest Channel, Plot B

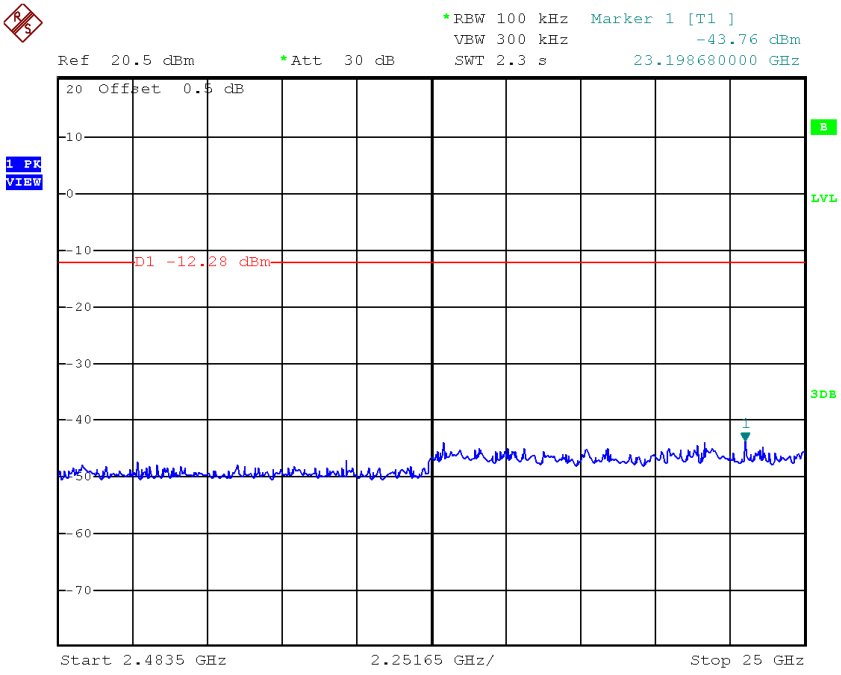


Plots of out of band conducted emissions

802.11b, Middle Channel, Plot A

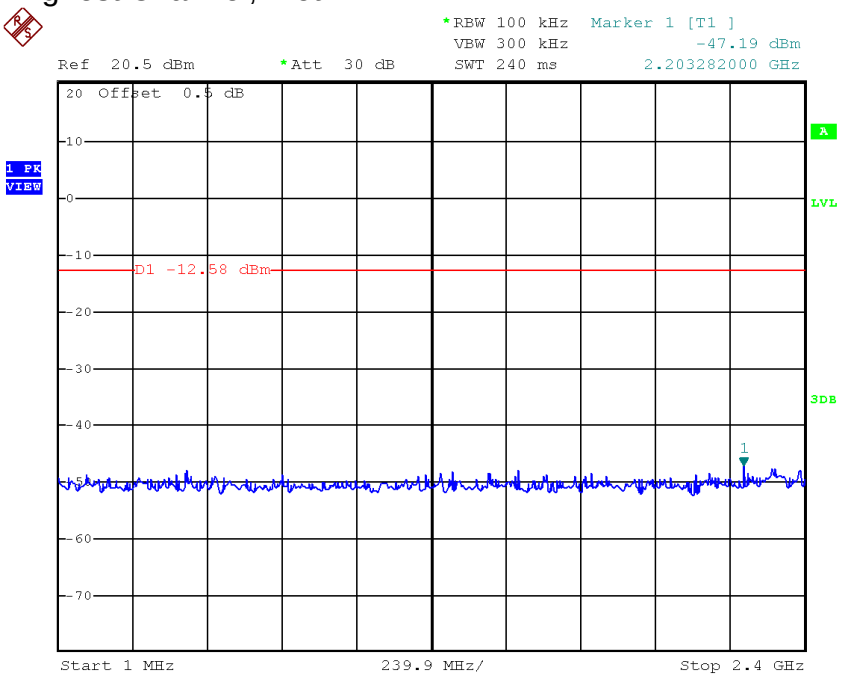


802.11b, Middle Channel, Plot B

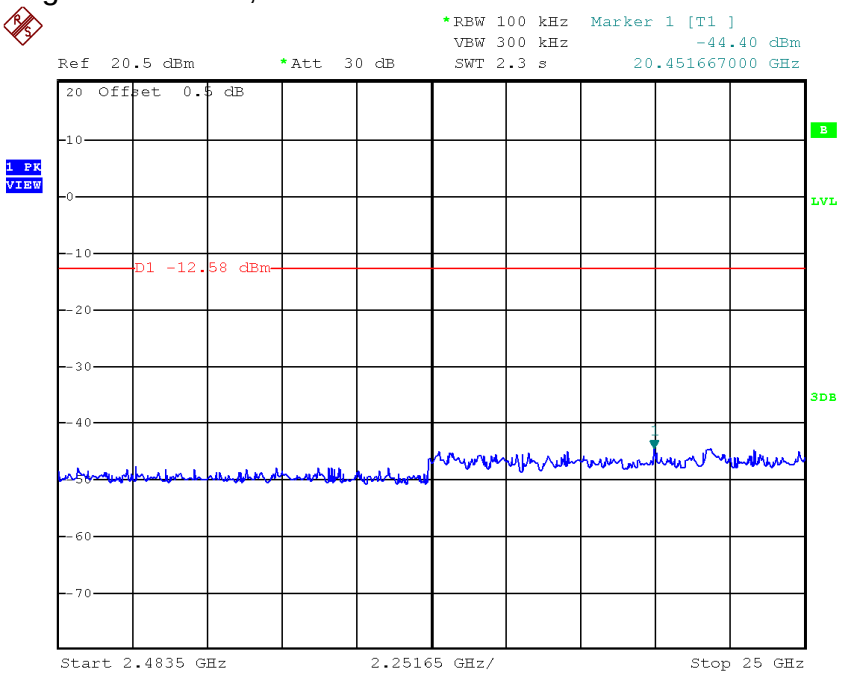


Plots of out of band conducted emissions

802.11b, Highest Channel, Plot A

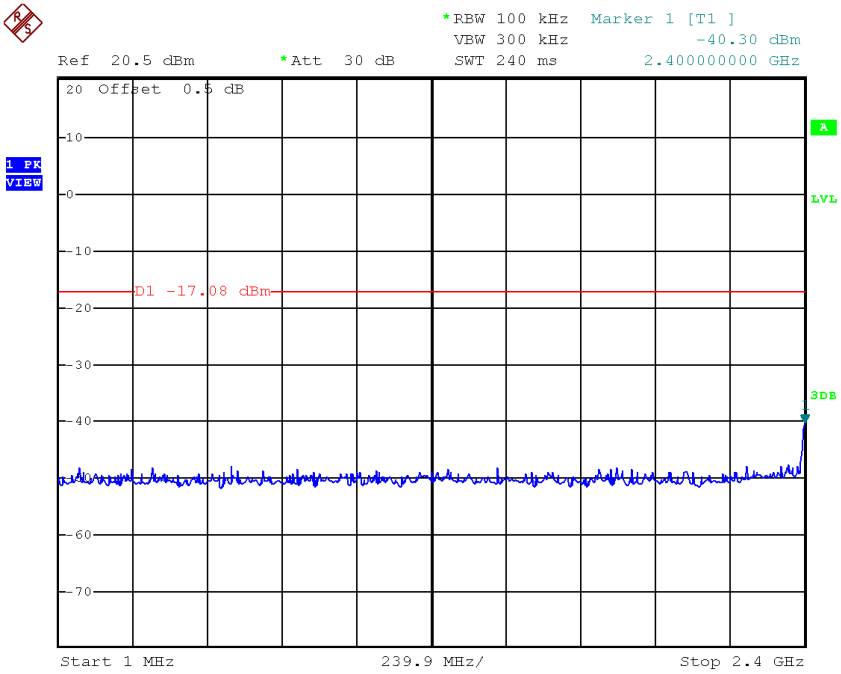


802.11b, Highest Channel, Plot B

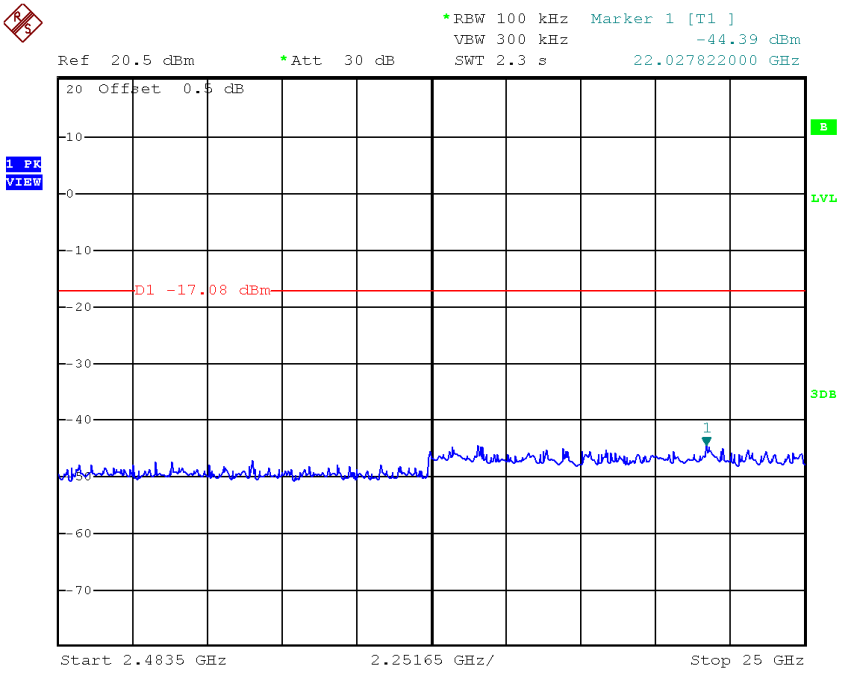


Plots of out of band conducted emissions

802.11g, Lowest Channel, Plot A

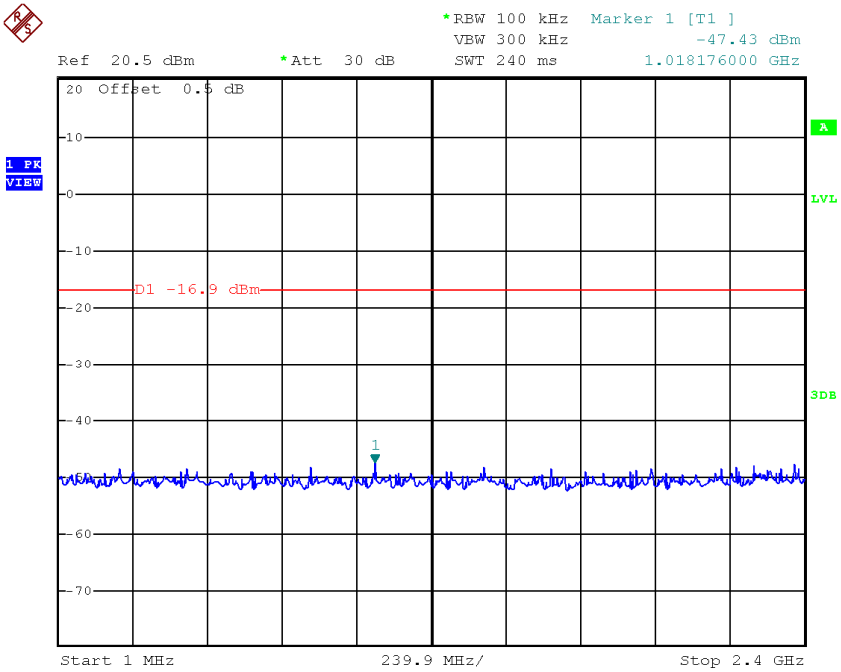


802.11g, Lowest Channel, Plot B

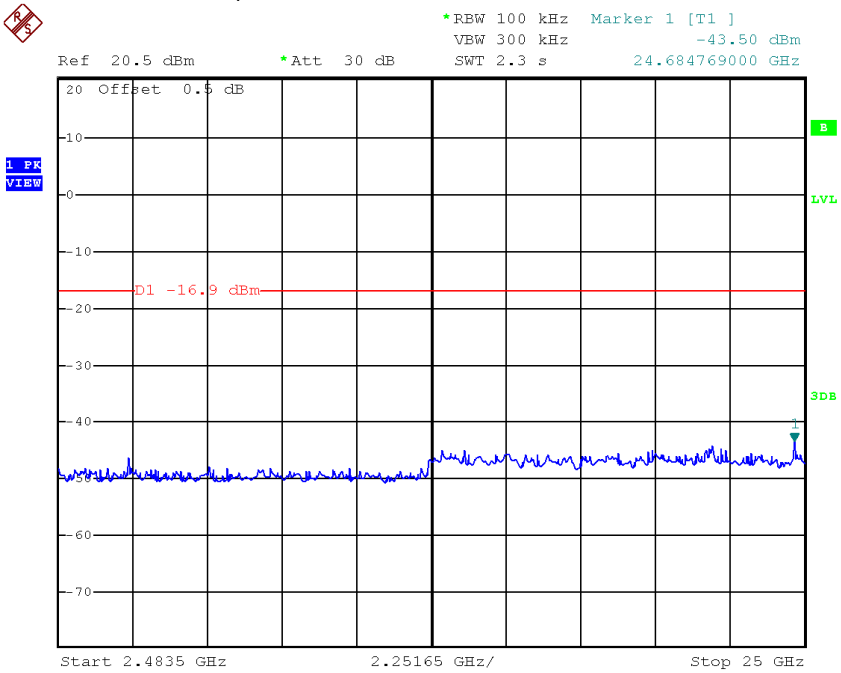


Plots of out of band conducted emissions

802.11g, Middle Channel, Plot A

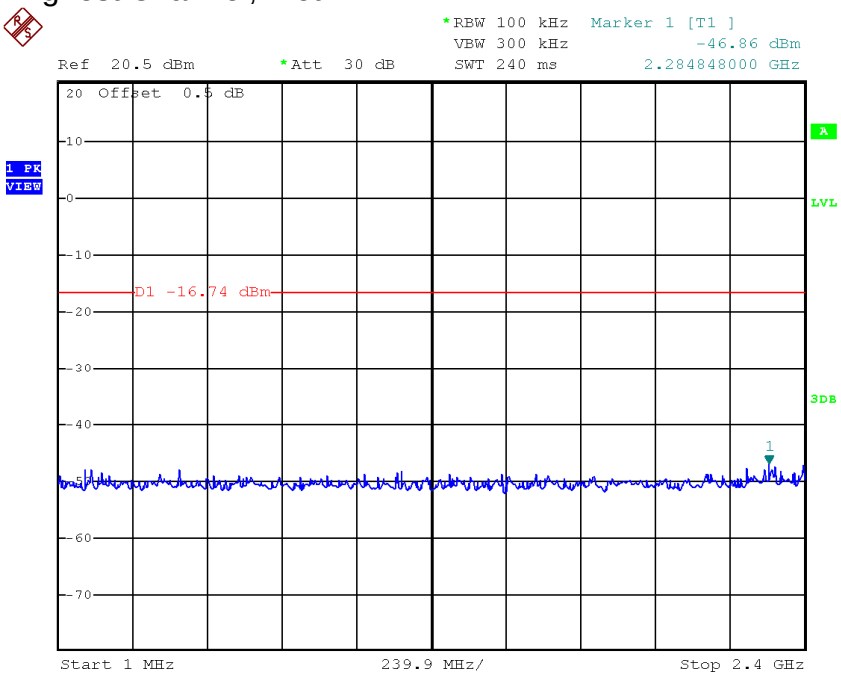


802.11g, Middle Channel, Plot B

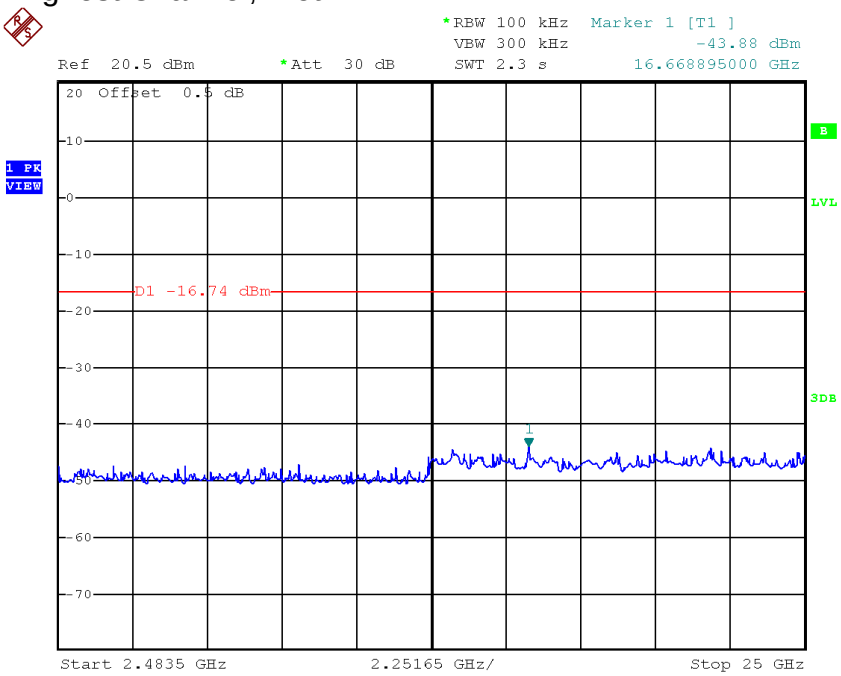


Plots of out of band conducted emissions

802.11g, Highest Channel, Plot A

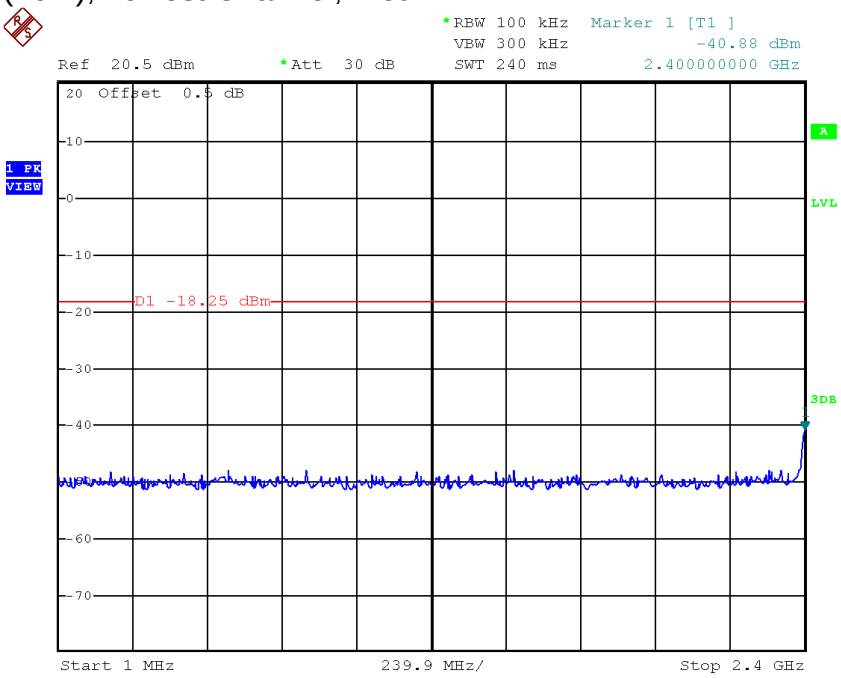


802.11g, Highest Channel, Plot B

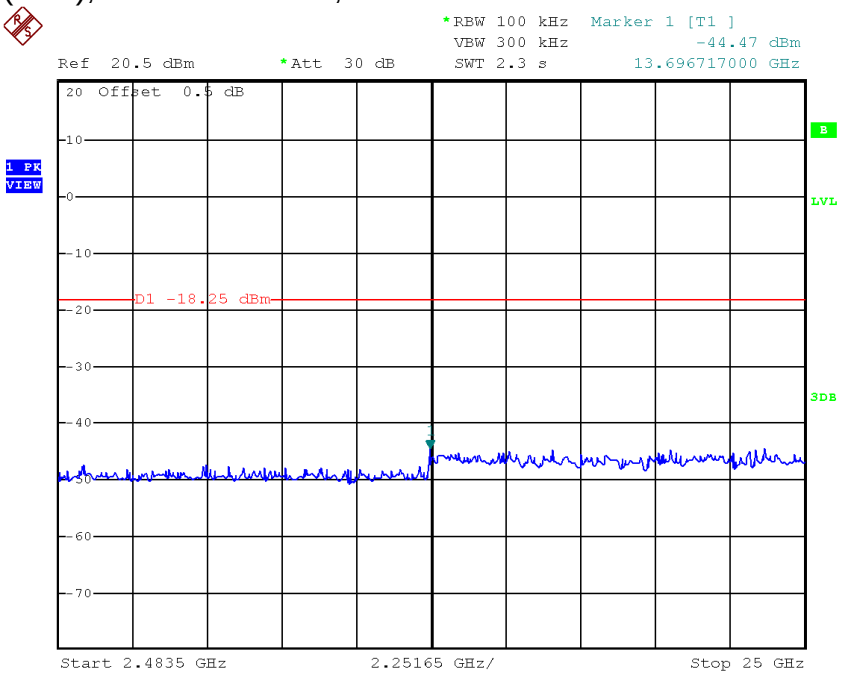


Plots of out of band conducted emissions

802.11n (20m), Lowest Channel, Plot A

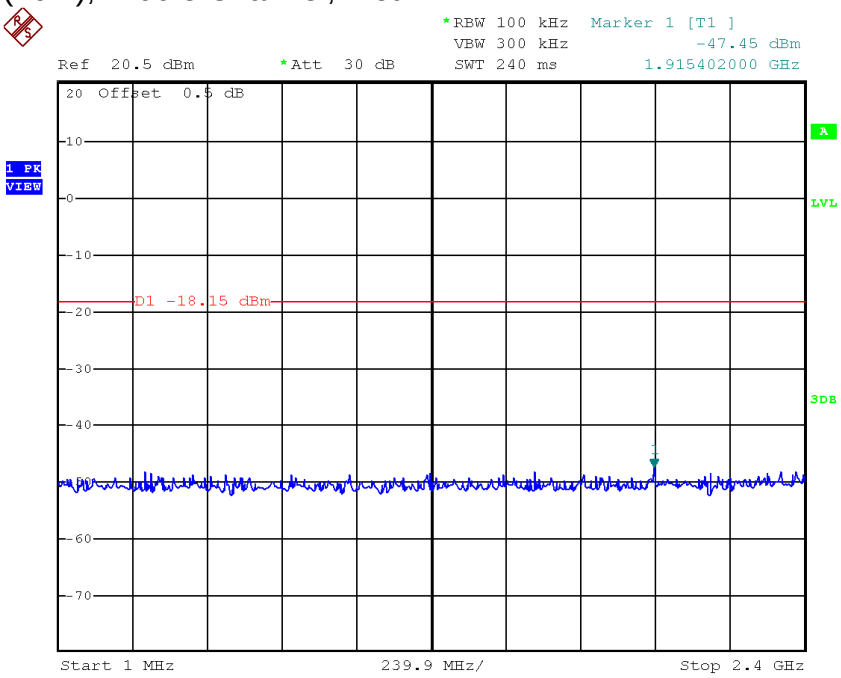


802.11n (20m), Lowest Channel, Plot B

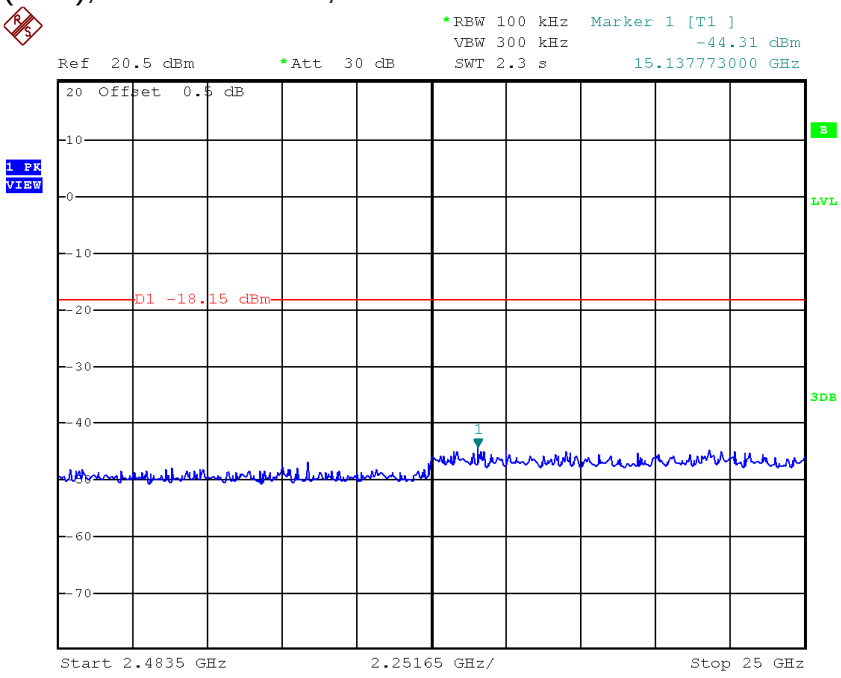


Plots of out of band conducted emissions

802.11n (20m), Middle Channel, Plot A

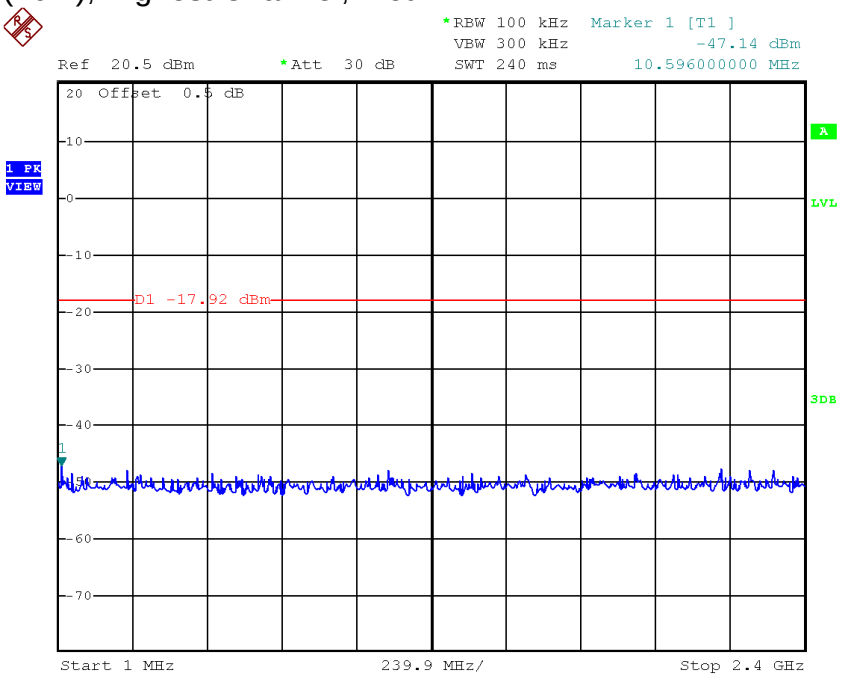


802.11n (20m), Middle Channel, Plot B

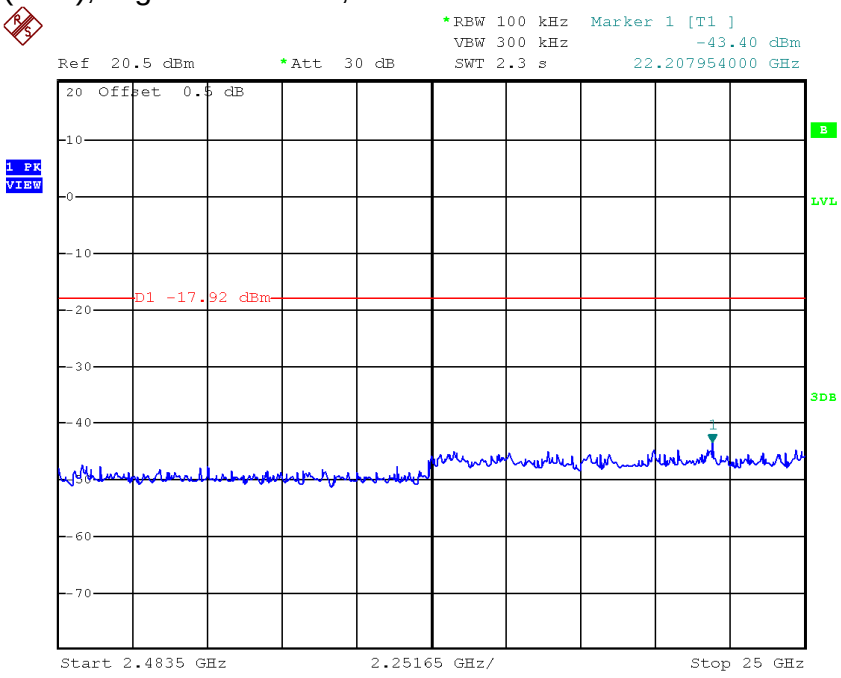


Plots of out of band conducted emissions

802.11n (20m), Highest Channel, Plot A

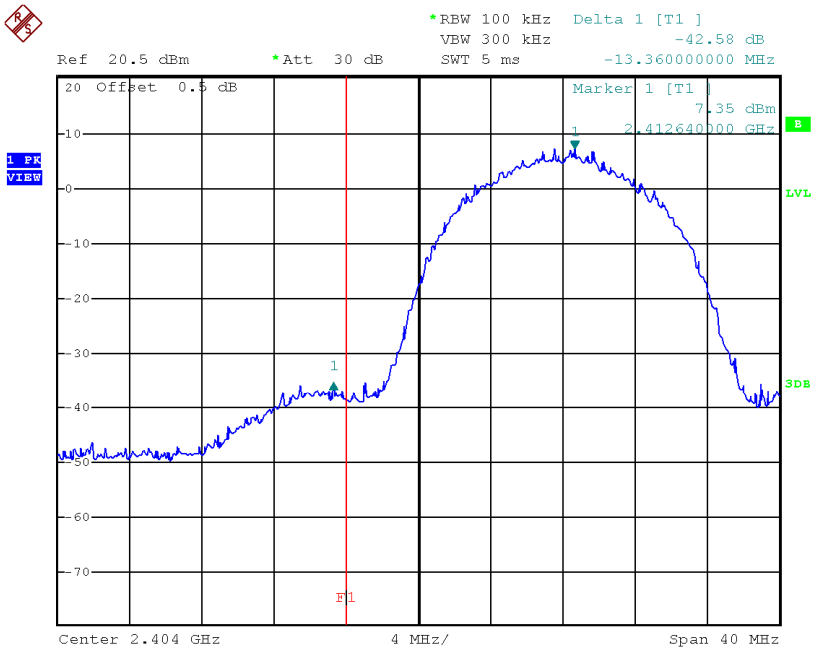


802.11n (20m), Highest Channel, Plot B



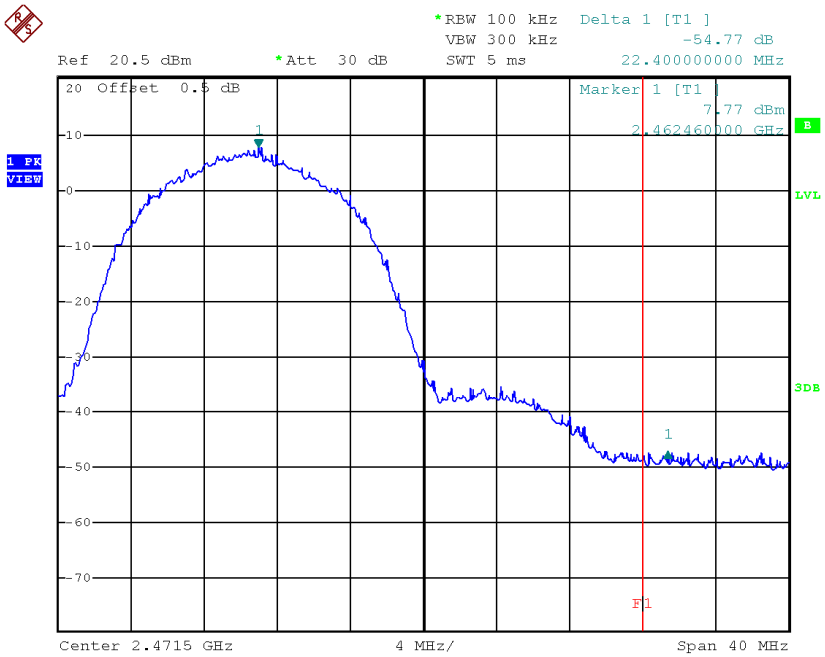
Plots of Bandedge

802.11b, Lowest Channel



Date: 4.AUG.2016 11:21:58

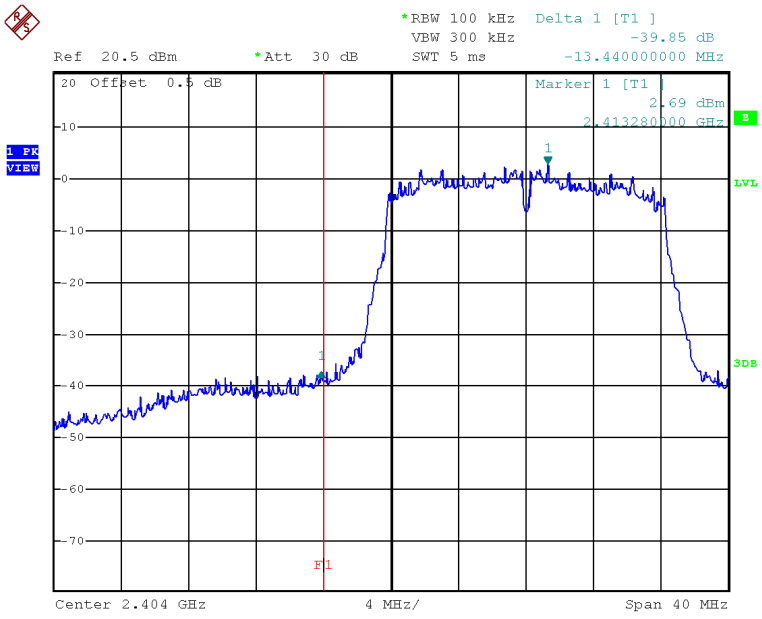
802.11b, Highest Channel



Date: 4.AUG.2016 11:29:15

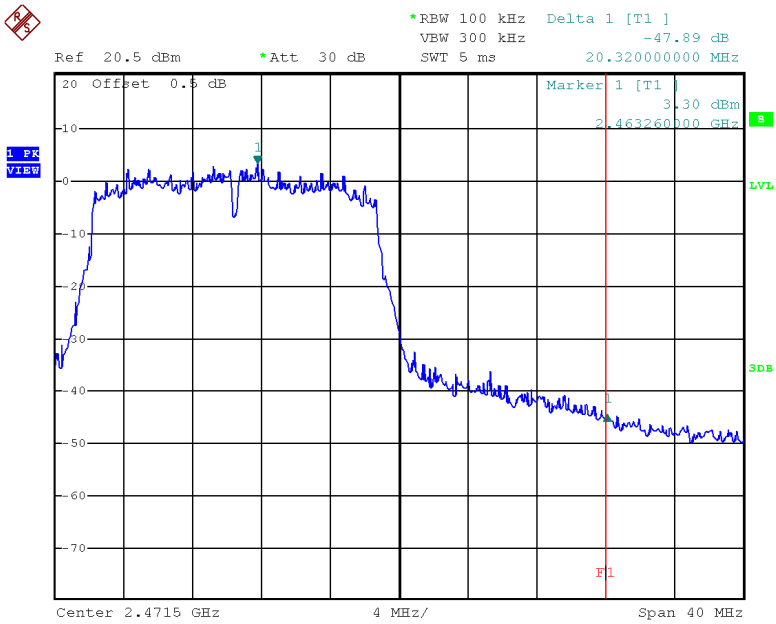
Plots of Bandedge

802.11g, Lowest Channel



Date: 4.AUG.2016 11:24:28

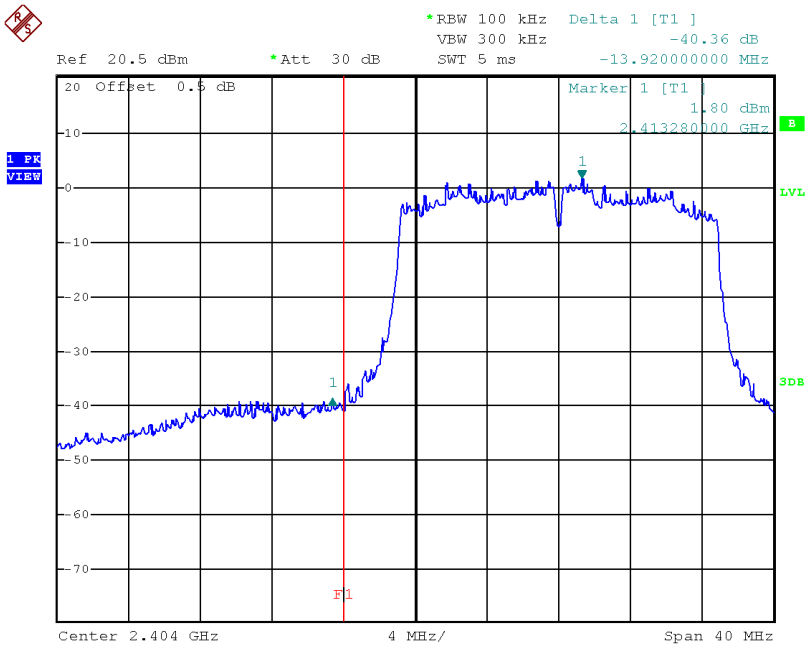
802.11g, Highest Channel



Date: 4.AUG.2016 11:30:37

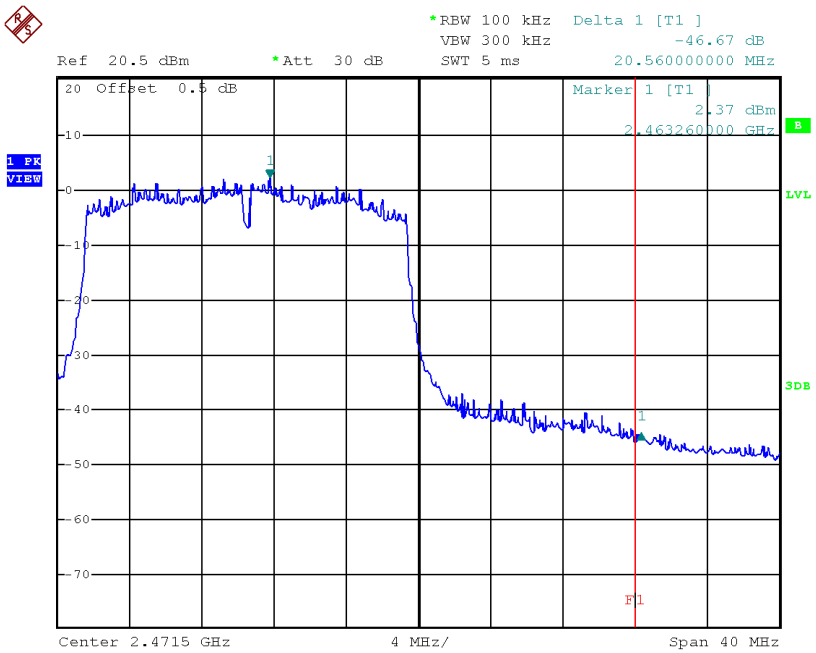
Plots of Bandedge

802.11n (NT20), Lowest Channel



Date: 4.AUG.2016 11:26:44

802.11n (HT20), Highest Channel



Date: 4.AUG.2016 11:32:09

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 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 1.0 dB margin

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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 07

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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 07

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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 01

Table 7
IEEE 802.11n (20MHz) (OFDM, 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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 07

Table 8
IEEE 802.11n (20MHz) (OFDM, 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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected spectrum analyzer with 1MHz resolution bandwidth.

Mode: TX-Channel 11

Table 9
IEEE 802.11n (20MHz) (OFDM, 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 peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. 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.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected spectrum analyzer with 1MHz resolution bandwidth.

Mode: WIFI ON and Boiling

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	***37.517***	***32.7***	***16***	***10.0***	***26.7***	***40.0***	***-13.3***
V	87.836	31.0	16	9.0	24.0	40.0	-16.0
V	148.703	26.1	16	14.0	24.1	43.5	-19.4
V	185.321	34.2	16	16.0	34.2	43.5	-9.3
V	196.355	34.5	16	16.0	34.5	43.5	-9.0
V	798.240	23.2	16	31.0	38.2	46.0	-7.8

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

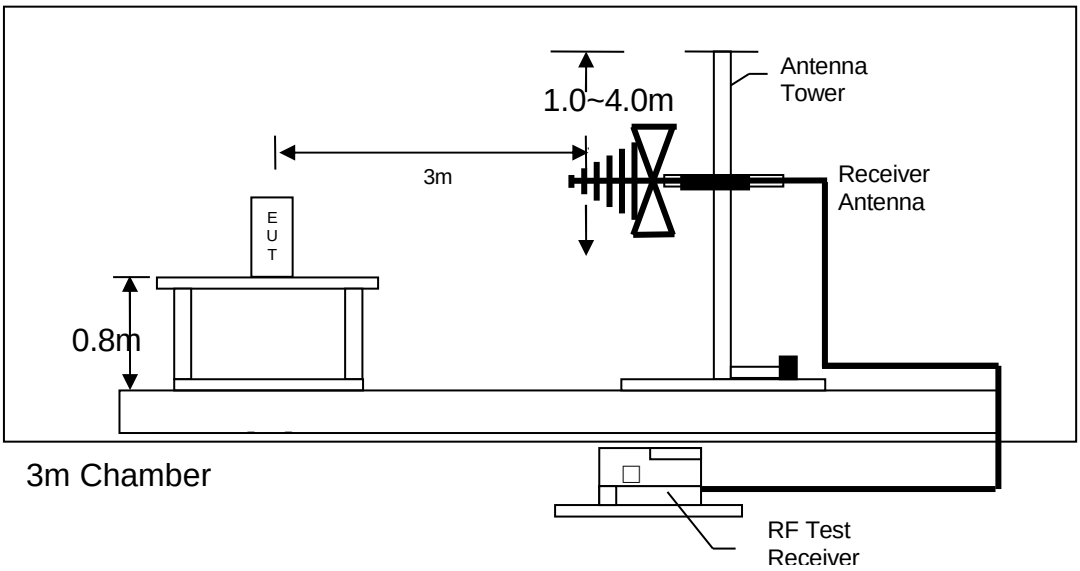
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test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

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

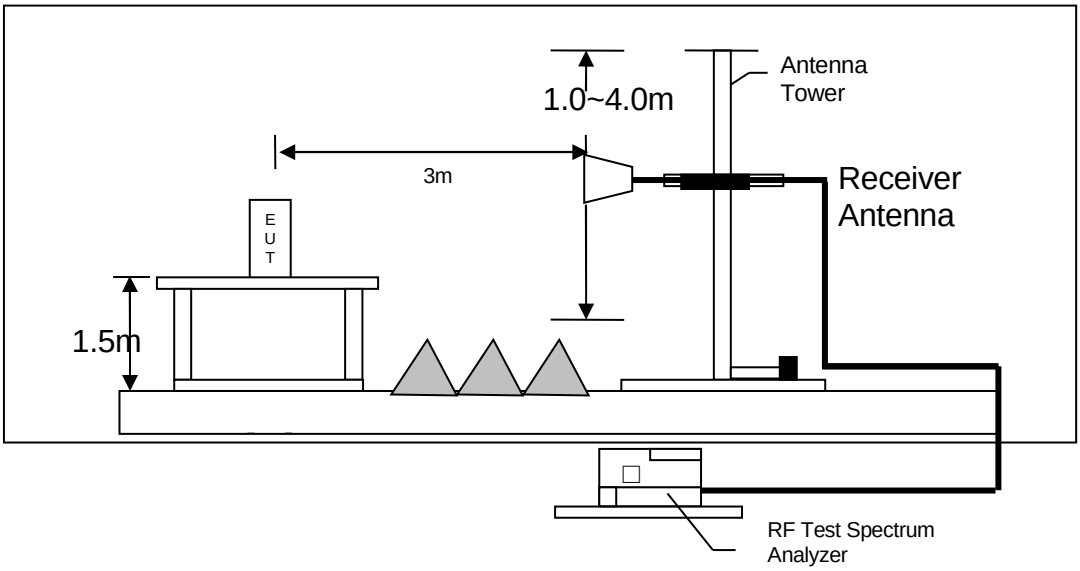
4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

4.6.3 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

4.6.4 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

0.447 MHz

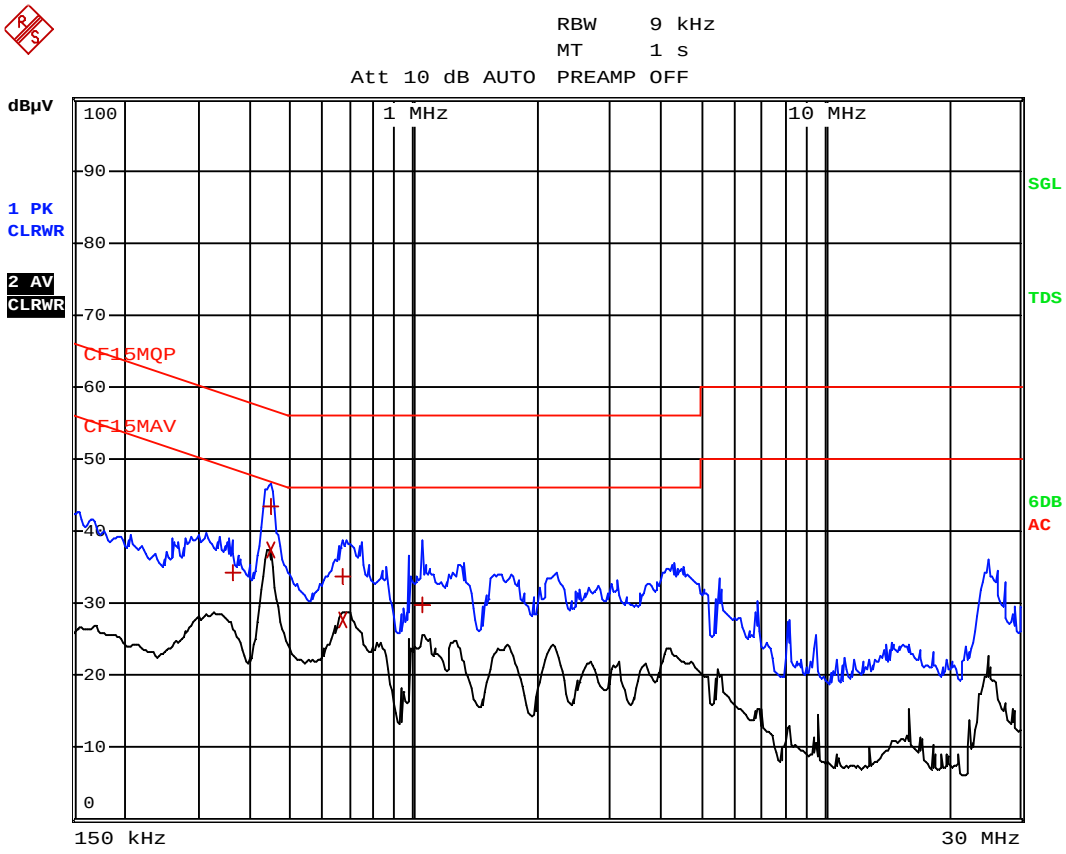
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

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 9.7 dB margin

Worst Case: WIFI ON and Boiling



Date: 4.AUG.2016 13:59:00

Worst Case: WIFI ON and Boiling

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	361.5 kHz	34.26	L1	-24.43
1	Quasi Peak	447 kHz	43.36	L1	-13.57
2	CISPR Average	447 kHz	37.27	L1	-9.65
1	Quasi Peak	672 kHz	33.71	N	-22.28
2	CISPR Average	672 kHz	27.70	L1	-18.29
1	Quasi Peak	1.0455 MHz	29.73	N	-26.26

Date: 4.AUG.2016 13:58:43

4.7.3 Conducted Emission Test Setup

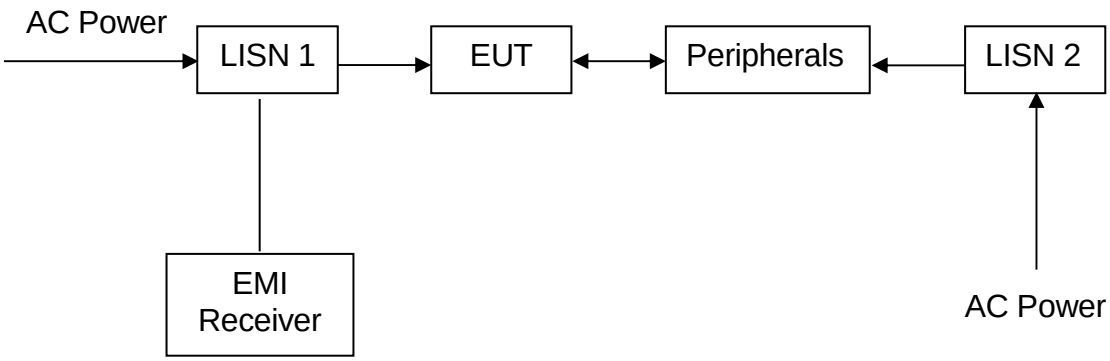


EXHIBIT 5
EQUIPMENT LIST

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) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN	LISN
Registration No.	EW-2500	EW-2501	EW-2874
Manufacturer	R&S	R&S	R&S
Model No.	ESCI	ENV-216	ENV-216
Calibration Date	Jan. 28, 2016	Jan. 28, 2016	Jan. 28, 2016
Calibration Due Date	Jan. 28, 2017	Jan. 28, 2017	Jan. 28, 2017

3) Bandedge/Bandwidth Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Nov. 27, 2015
Calibration Due Date	Nov. 27, 2016

END OF TEST REPORT