TEST REPORT

Report Number: 16020340HKG-007

Application
for
Original Grant of 47 CFR Part 15 Certification

ARH RDC HelixSentinelDrone Receiver

FCC ID: PQN44578RX2G4

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

Prepared and Checked by:

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June 03, 2016

GENERAL INFORMATION

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FCC Specification Standard:	FCC Part 15, October 1, 2014 Edition
FCC ID:	PQN44578RX2G4
Model(s):	44578RX
Phantom No.:	20072604, 20072605
Type of EUT:	Digital Transmission System Transmitter
Description of EUT:	ARH RDC HelixSentinelDrone Receiver
Serial Number:	N/A
Sample Receipt Date:	February 05, 2016
Date of Test:	February 05, 2016 to May 26, 2016
Report Date:	June 03, 2016
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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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

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

1.2 Statement of Compliance

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

FCC Part 15, 2014 Edition

EXHIBIT 2
GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The 44578RX is a ARH RDC HelixSentinelDrone Receiver.

The Equipment Under Test (EUT) is a portable 2.4GHz Transceiver (Plane Unit) for a RC plane operate from 2407-2440MHz with 1MHz channel spacing and the EUT operates in a frequency range from 2412MHz to 2462MHz at WiFi 802.11b,g (11 channels with 5MHz spacing). The EUT is powered by 1 X 3.7V rechargeable battery. After switch on the EUT and paired with RC Controller, the EUT can be controlled to fly forward, backward, turning left/right direction by the controller. Also, the EUT can pair with smart device that for live streaming for the camera on EUT. Photo shooting and video recording can be operate through the App installed on smart device.

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.

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 v03r05 (08-April-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.

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 fully charged 1 x DC 3.7V Rechargeable Battery Pack.

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.

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 15.109 Limits.

3.1 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

For simultaneous transmission, both WiFi and 2.4GHz control signal portions are also switched on when taking radiated emission for determining worst-case spurious emission.

3.2 EUT Exercising Software

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

Details of EUT and Description of Accessories

Details of EUT:

A battery (provided with the unit) was used to power the device. Their description are listed below.

(1) The EUT is powered by 3.7V rechargeable battery pack

Description of Accessories:

(1) N/A

3.3 Measurement Uncertainty

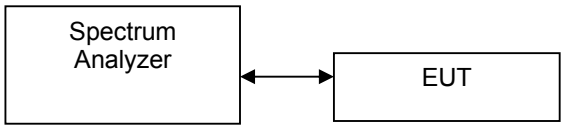
When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are ± 5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty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

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



4.1 Maximum Conducted (Average) Output Power at Antenna Terminals

Occupied Bandwidth

IEEE 802.11b (DSSS, 1Mbps)	
Frequency (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2412	12240
Middle Channel: 2437	12300
High Channel: 2462	12300

IEEE 802.11g (OFDM, 6Mbps)	
Frequency (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2412	16740
Middle Channel: 2437	16740
High Channel: 2462	16740

Maximum Conducted (Average) Output Power at Antenna Terminals

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

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

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

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

IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 0 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	18.71	74.30
Middle Channel: 2437	18.53	71.29
High Channel: 2462	18.47	70.31

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 0 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	15.95	39.36
Middle Channel: 2437	15.83	38.28
High Channel: 2462	15.79	37.93

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 = 18.71 dBm

IEEE 802.11g (OFDM, 6 Mbps)
max. conducted (average) output level = 15.95dBm

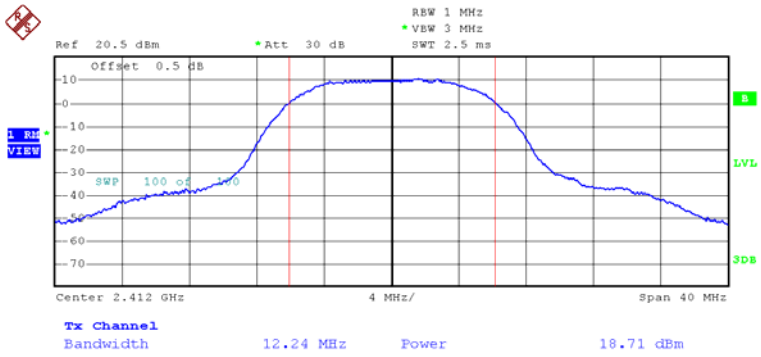
Limits:
☒ 1W (30dBm) for antennas with gains of 6dBi or less

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

The plots of conducted output power are saved as below.

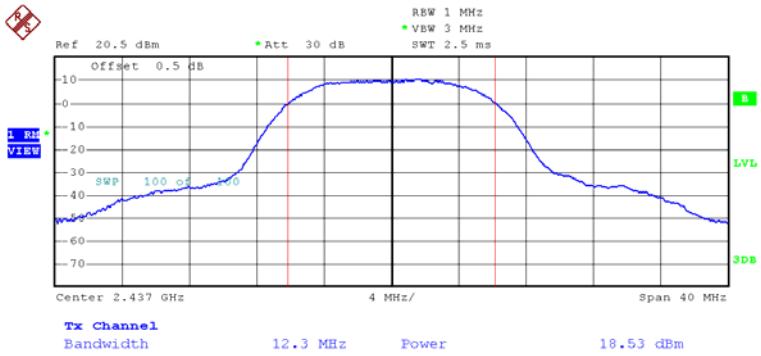
Plots of maximum output power

802.11b, Lowest Channel



Date: 29.FEB.2016 14:51:58

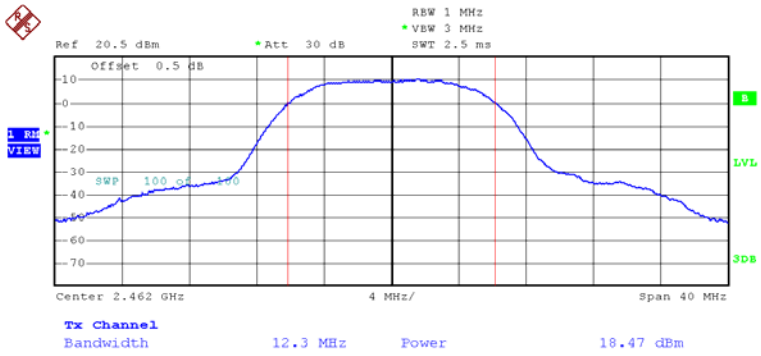
802.11b, Middle Channel



Date: 29.FEB.2016 14:53:01

Plots of maximum output power

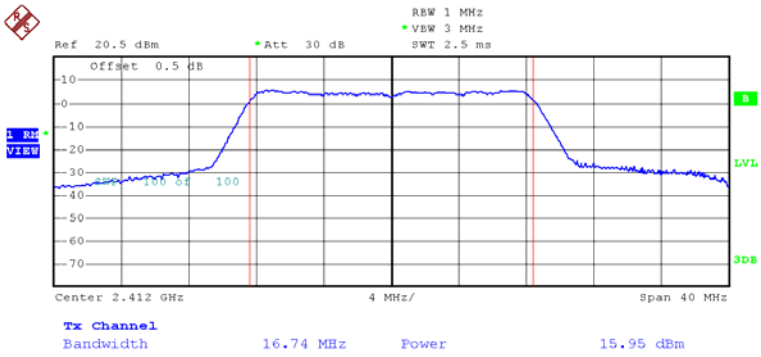
802.11b, Highest Channel



Date: 29.FEB.2016 14:53:45

Plots of maximum output power

802.11g, Lowest Channel



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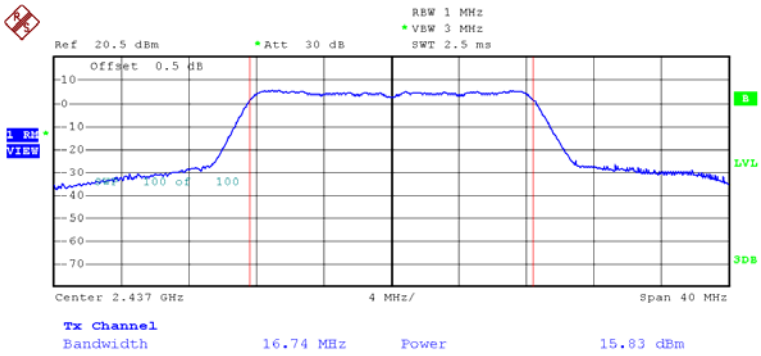
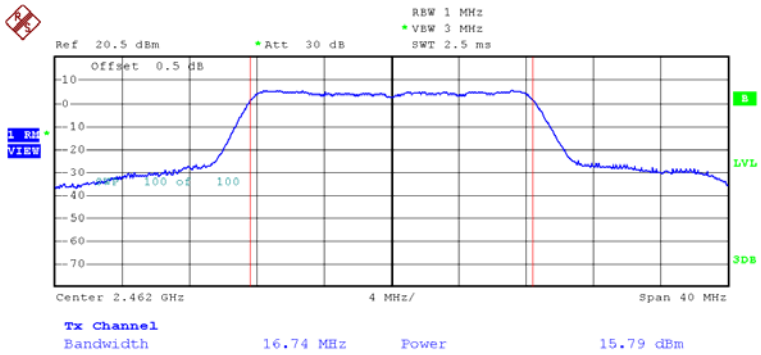
802.11g, Middle Channel



Date: 29.FEB.2016 14:58:14

Plots of maximum output power

802.11g, Highest Channel



Date: 29.FEB.2016 14:59:03

4.2 Minimum 6dB RF Bandwidth

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

IEEE 802.11b (DSSS, 1 Mbps)	
Frequency (MHz)	6dB Bandwidth (kHz)
Low Channel: 2412	10160
Middle Channel: 2437	10200
High Channel: 2462	10160

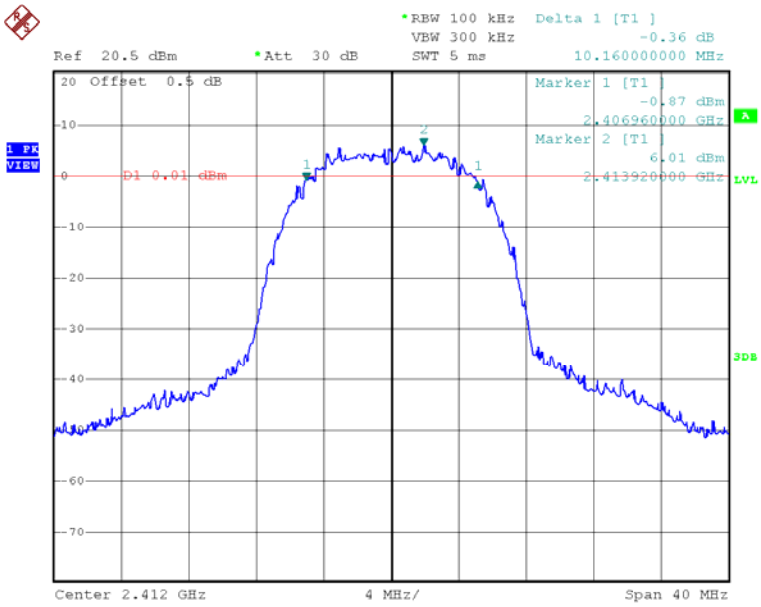
IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	6dB Bandwidth (kHz)
Low Channel: 2412	16720
Middle Channel: 2442	16680
High Channel: 2462	16720

Limits
6 dB bandwidth shall be at least 500kHz

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

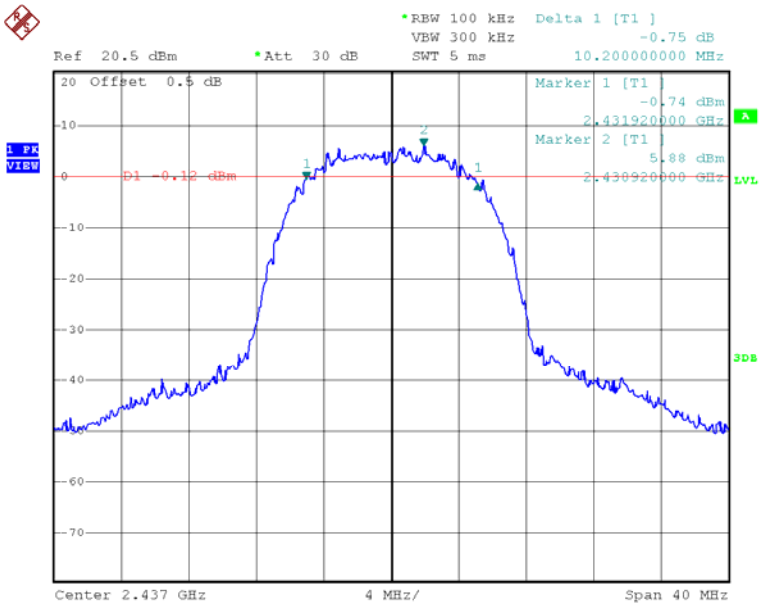
Plots of 6dB RF bandwidth

802.11b, Lowest Channel



Date: 1.MAR.2016 14:17:25

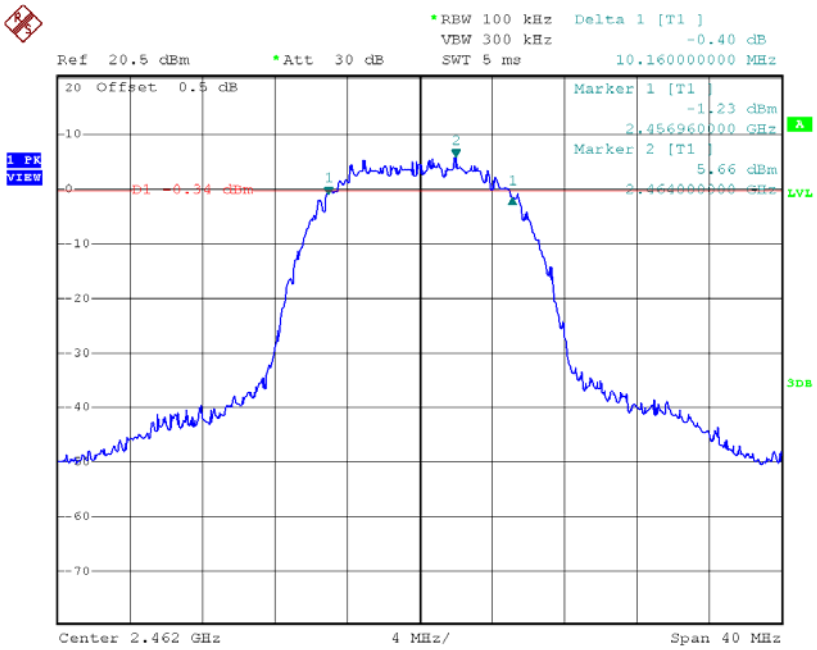
802.11b, Middle Channel



Date: 1.MAR.2016 14:15:56

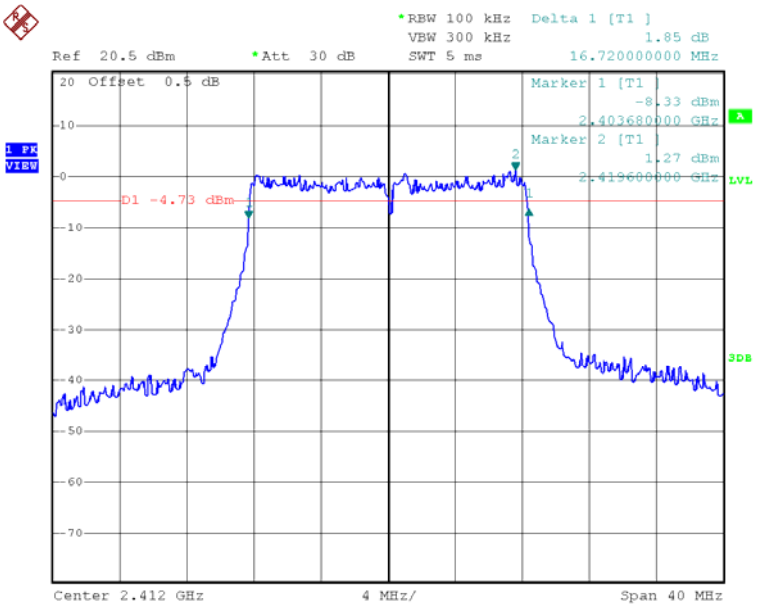
Plots of 6dB RF bandwidth

802.11b, Highest Channel



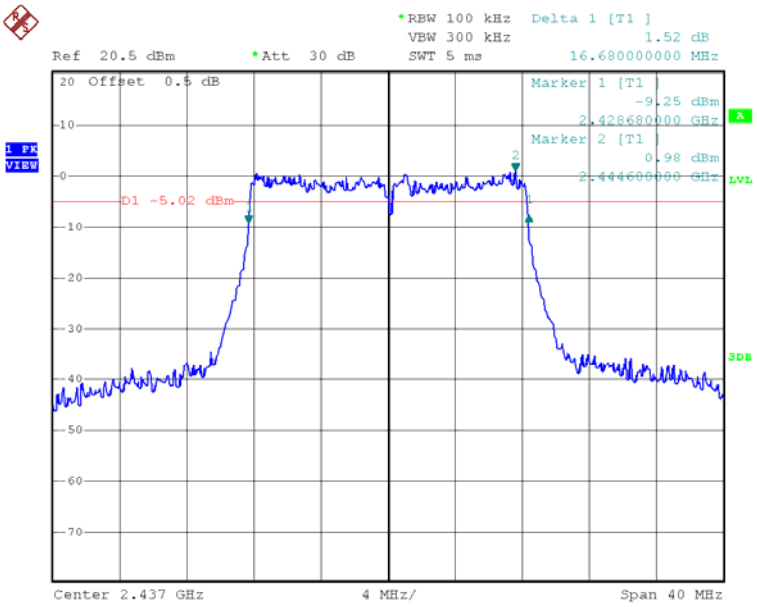
Plots of 6dB RF bandwidth

802.11g, Lowest Channel



Date: 29.FEB.2016 15:07:32

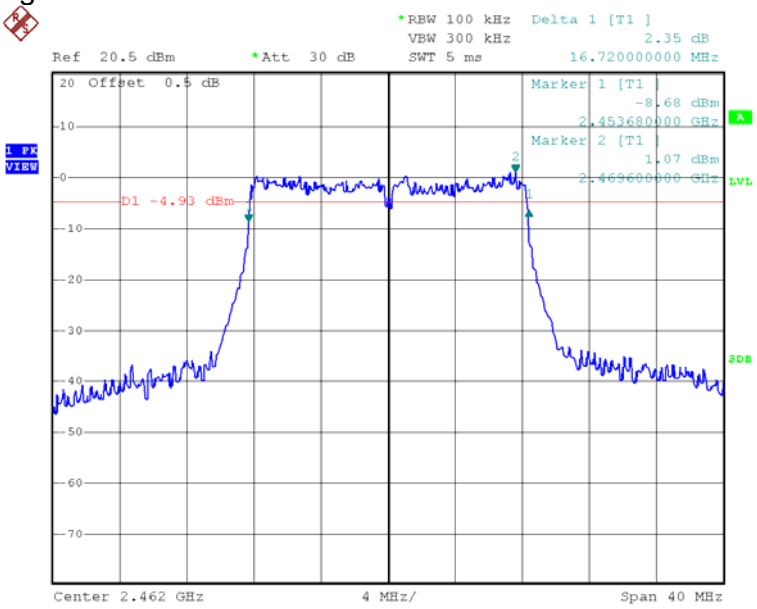
802.11g, Middle Channel



Date: 29.FEB.2016 15:08:35

Plots of 6dB RF bandwidth

802.11g, Highest Channel



Date: 29.FEB.2016 15:09:42

4.3 Maximum Power Spectral Density

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

IEEE 802.11b (DSSS, 1 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	5.83
Middle Channel: 2437	5.70
High Channel: 2462	5.59

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	-0.63
Middle Channel: 2442	-0.49
High Channel: 2462	-0.34

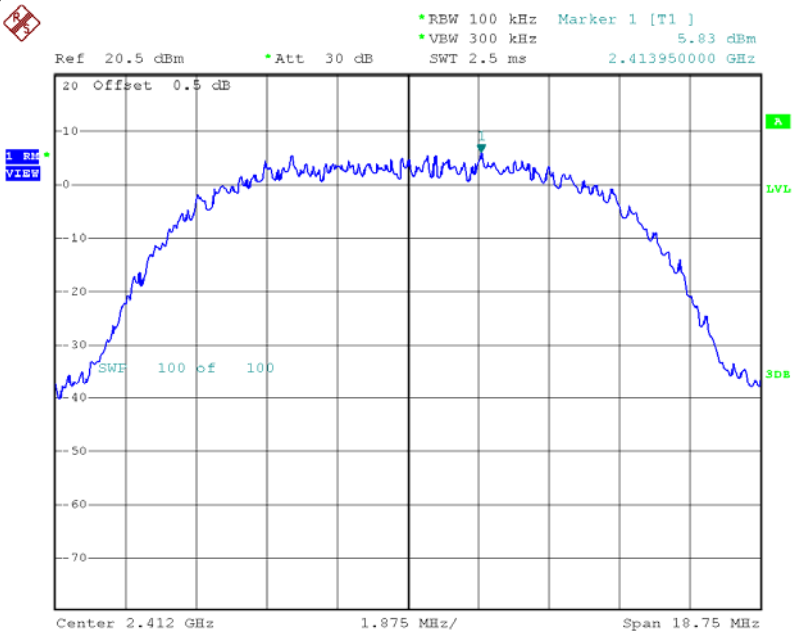
Cable Loss: 0.5 dB

Limit:
8dBm

The plots of n power spectral density are as below.

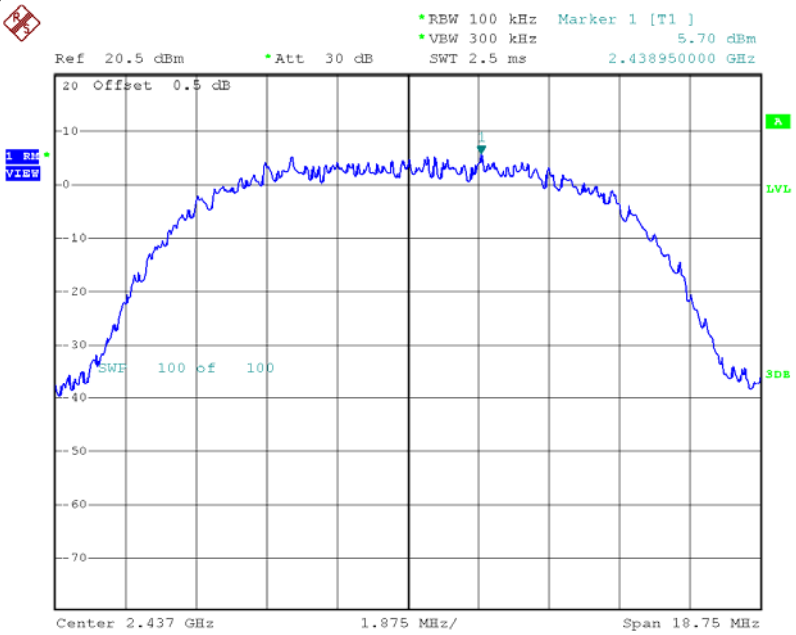
Plots of power spectral density

802.11b, Lowest channel



Date: 29.FEB.2016 15:15:23

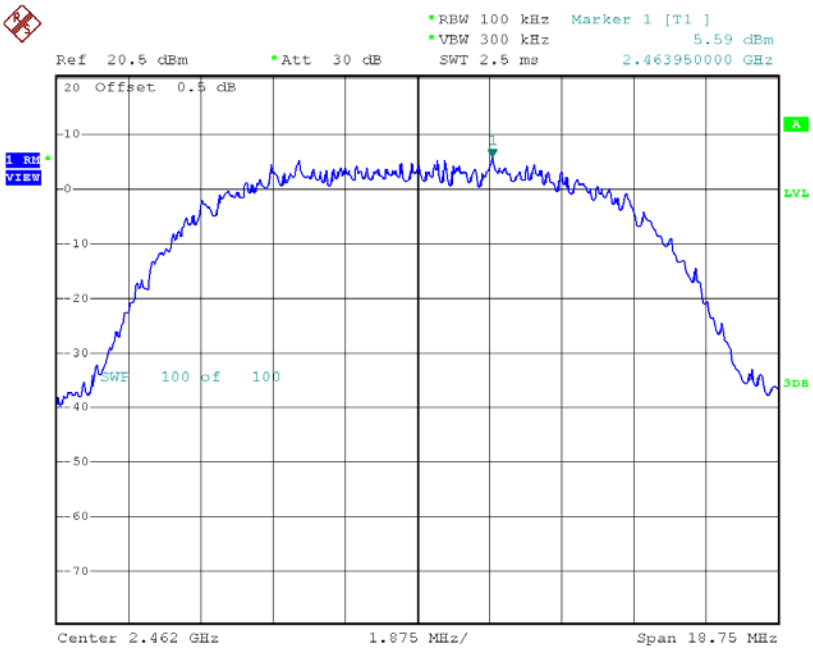
802.11b, Middle channel



Date: 29.FEB.2016 15:16:03

Plots of power spectral density

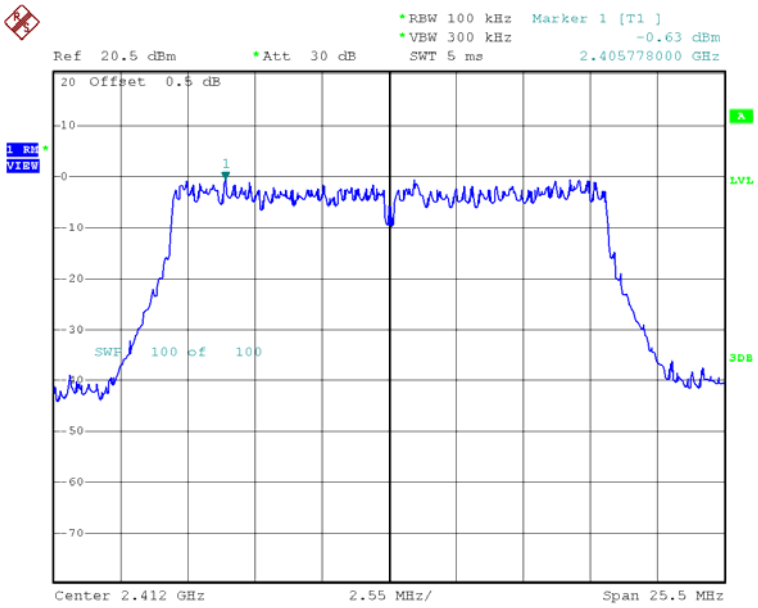
802.11b, Highest channel



Date: 29.FEB.2016 15:16:32

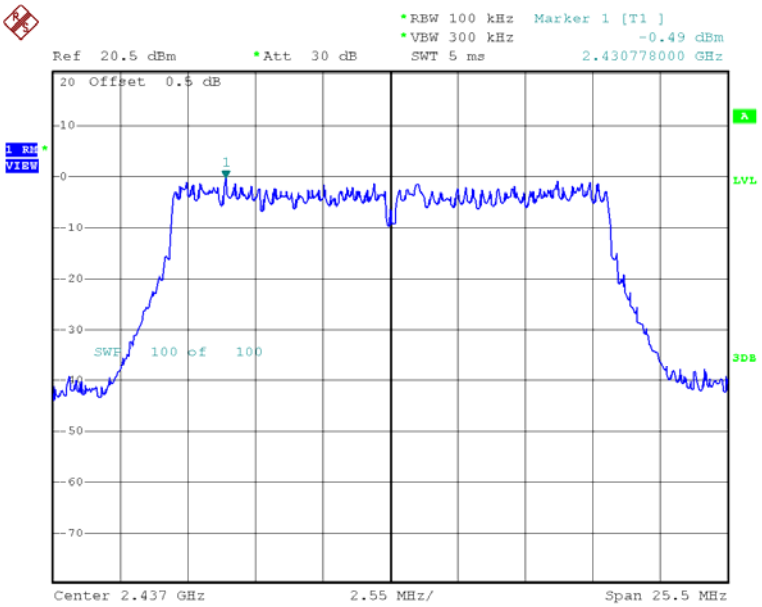
Plots of power spectral density

802.11g, Lowest channel



Date: 29.FEB.2016 15:18:06

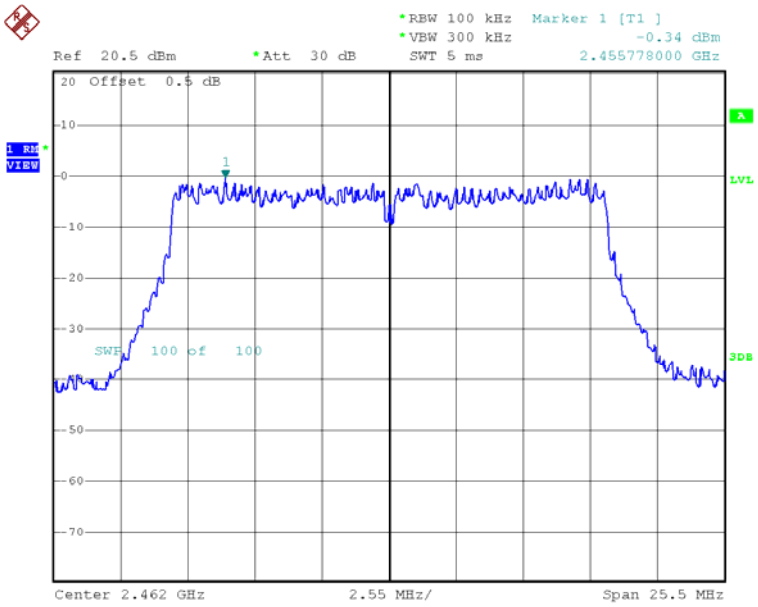
802.11g, Middle channel



Date: 29.FEB.2016 15:18:38

Plots of power spectral density

802.11g, Highest channel



Date: 29.FEB.2016 15:19:09

4.4 Out of Band Conducted Emissions

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

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

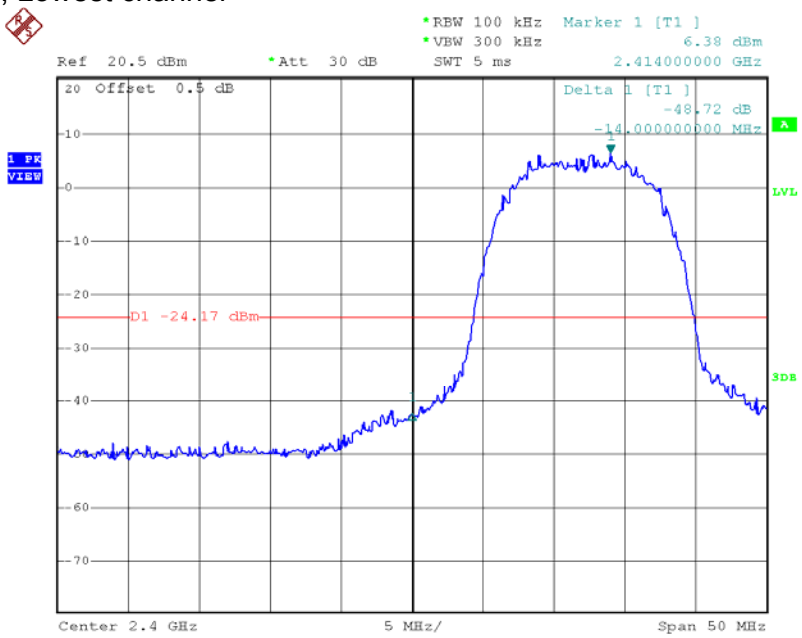
Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

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

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

Plots of reference level measurement

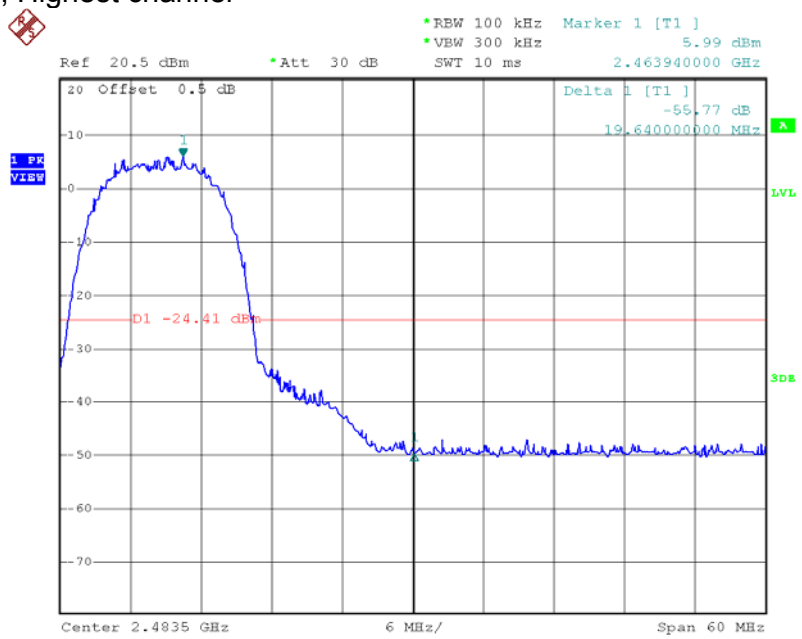
802.11b, Lowest channel



Date: 29.FEB.2016 15:30:26

Plots of reference level measurement

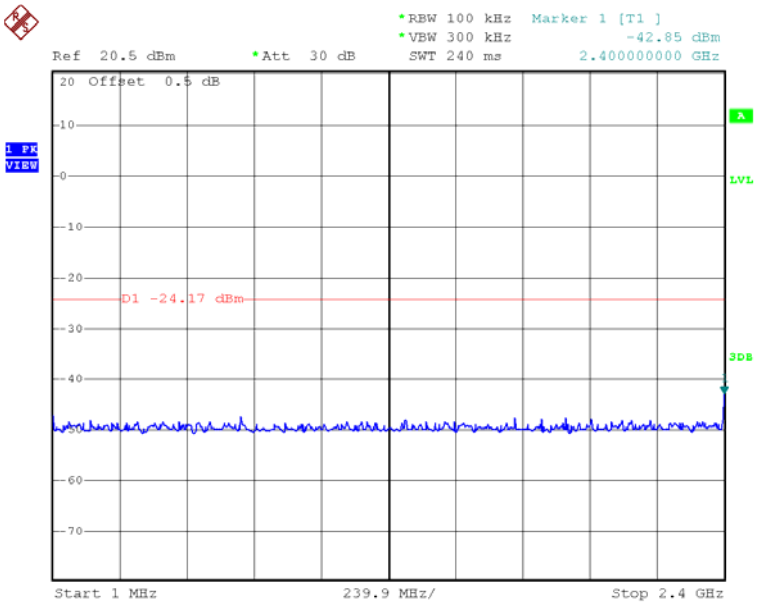
802.11b, Highest channel



Date: 29.FEB.2016 15:32:45

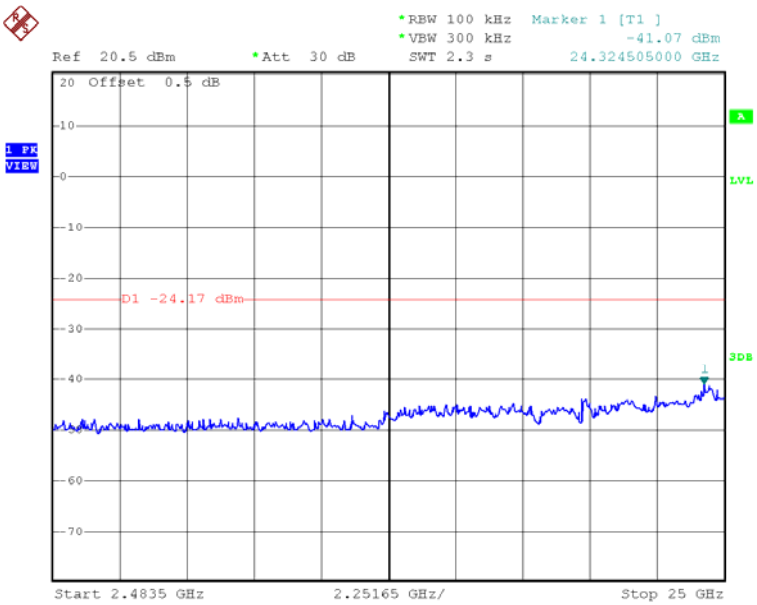
Plots of out of band conducted emissions

802.11b, Lowest Channel, Plot A



Date: 29.FEB.2016 15:21:35

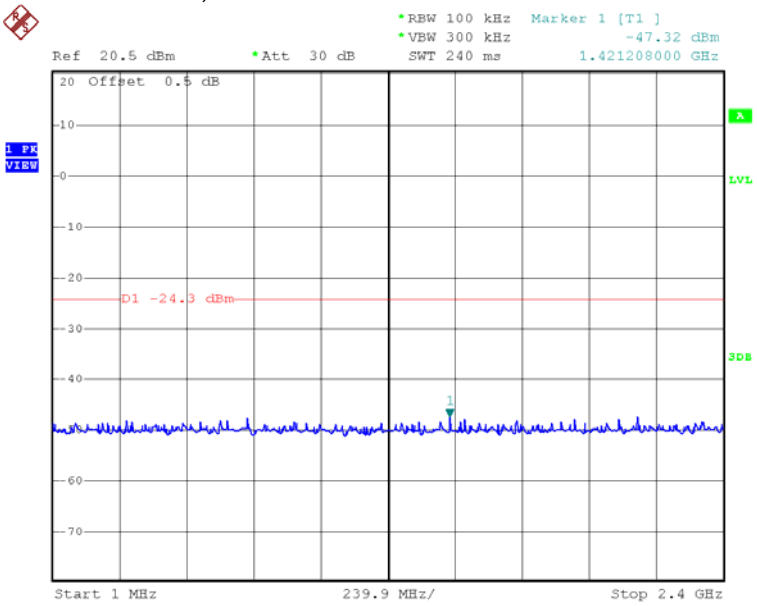
802.11b, Lowest Channel, Plot B



Date: 29.FEB.2016 15:22:23

Plots of out of band conducted emissions

802.11b, Middle Channel, Plot A



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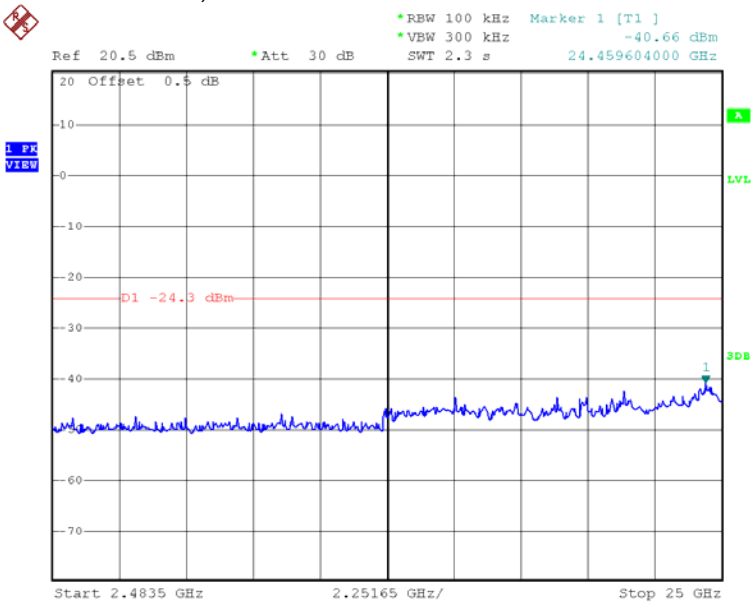
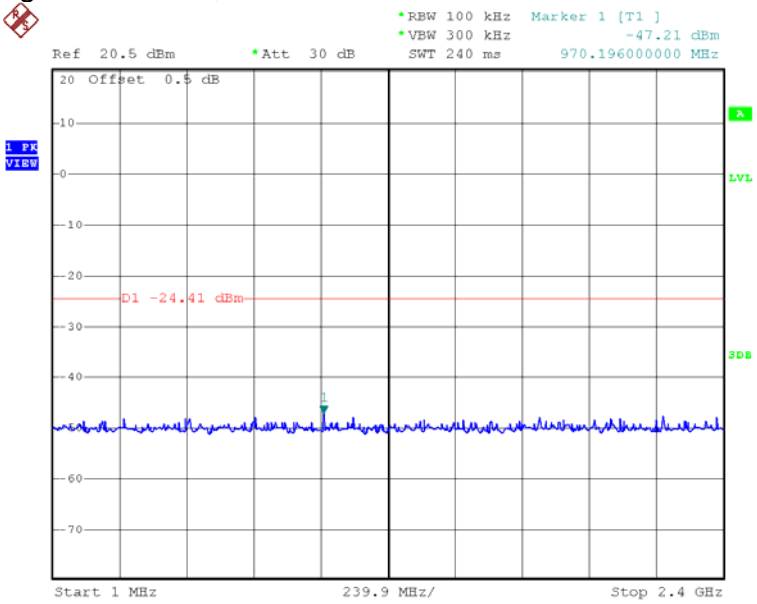
802.11b, Middle Channel, Plot B



Date: 29.FEB.2016 15:24:05

Plots of out of band conducted emissions

802.11b, Highest Channel, Plot A



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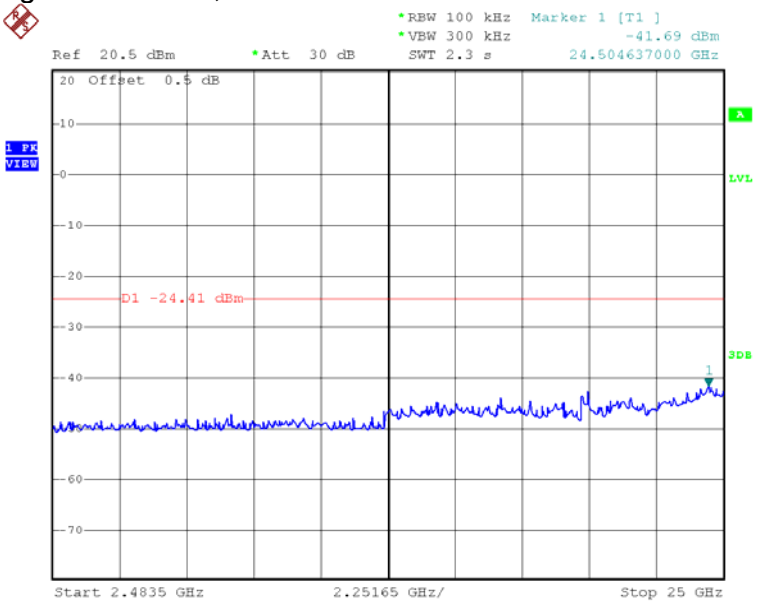
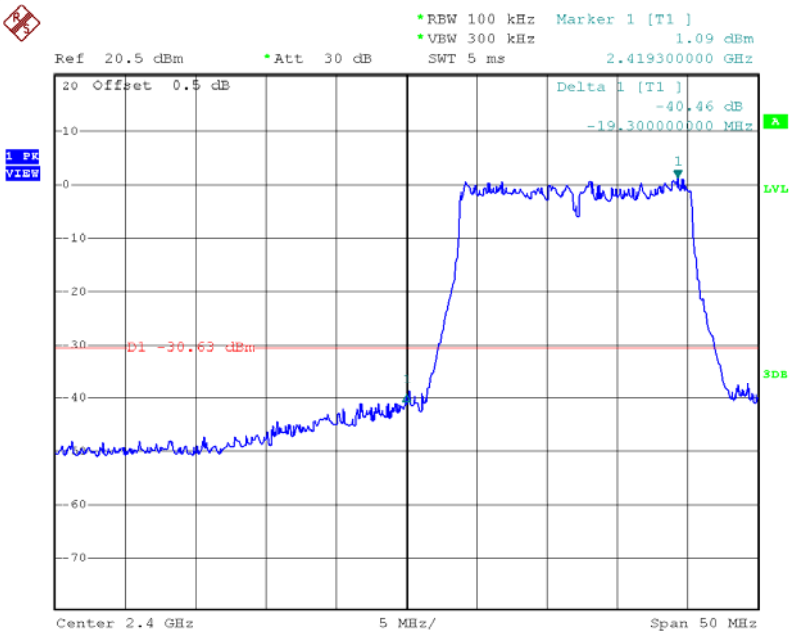
802.11b, Highest Channel, Plot B



Date: 29.FEB.2016 15:25:17

Plots of reference level measurement

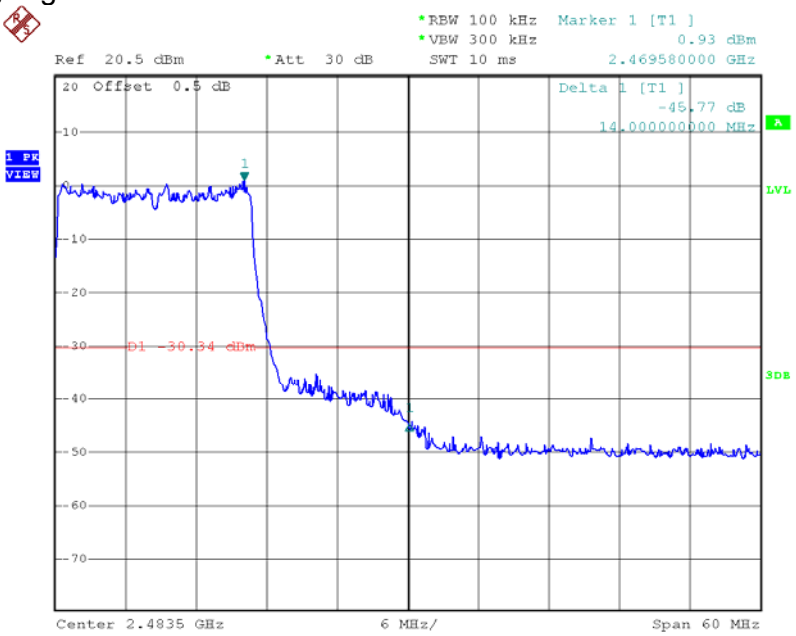
802.11g, Lowest channel



Date: 29.FEB.2016 15:31:19

Plots of reference level measurement

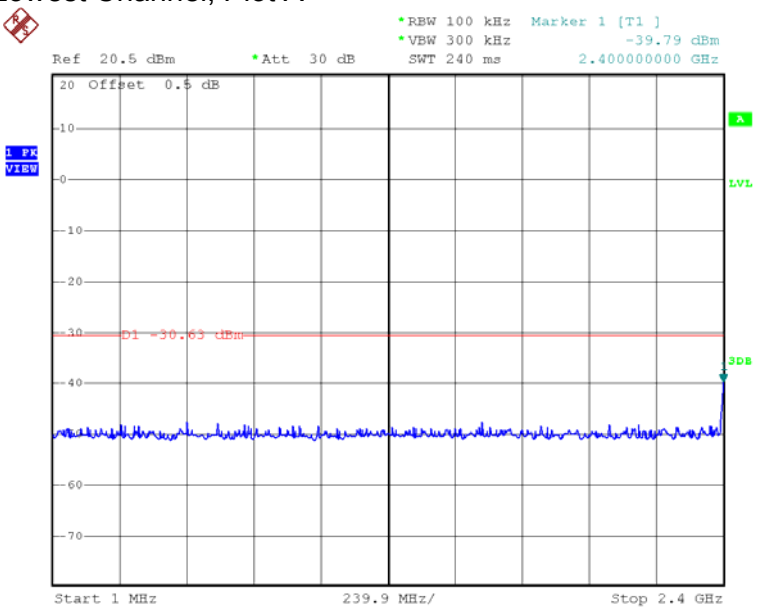
802.11g, Highest channel



Date: 29.FEB.2016 15:33:29

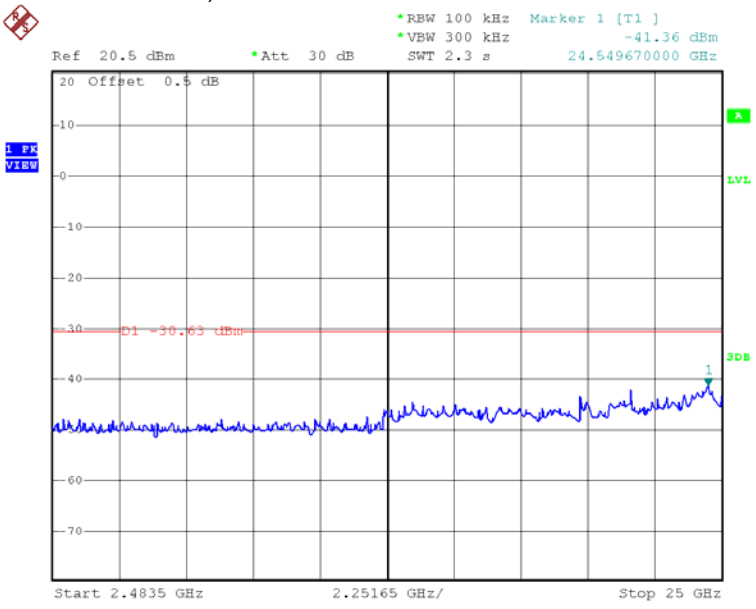
Plots of out of band conducted emissions

802.11g, Lowest Channel, Plot A



Date: 29.FEB.2016 15:26:04

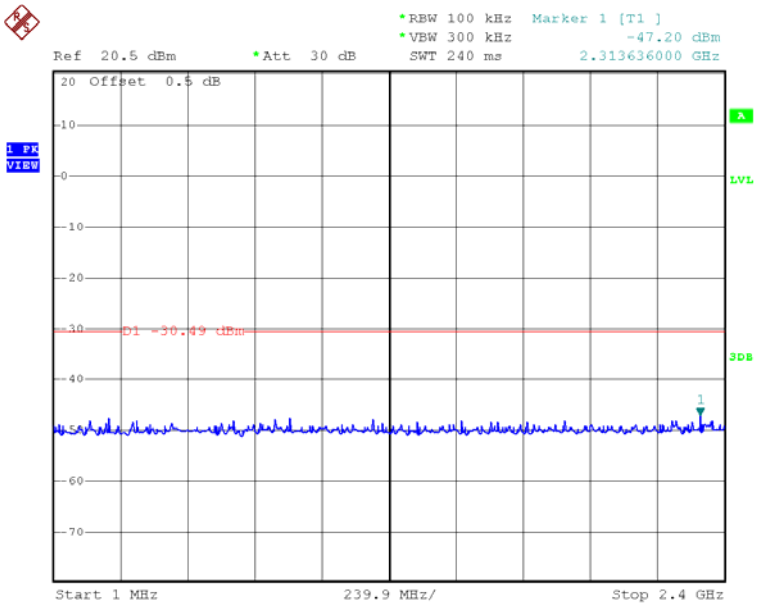
802.11g, Lowest Channel, Plot B



Date: 29.FEB.2016 15:26:34

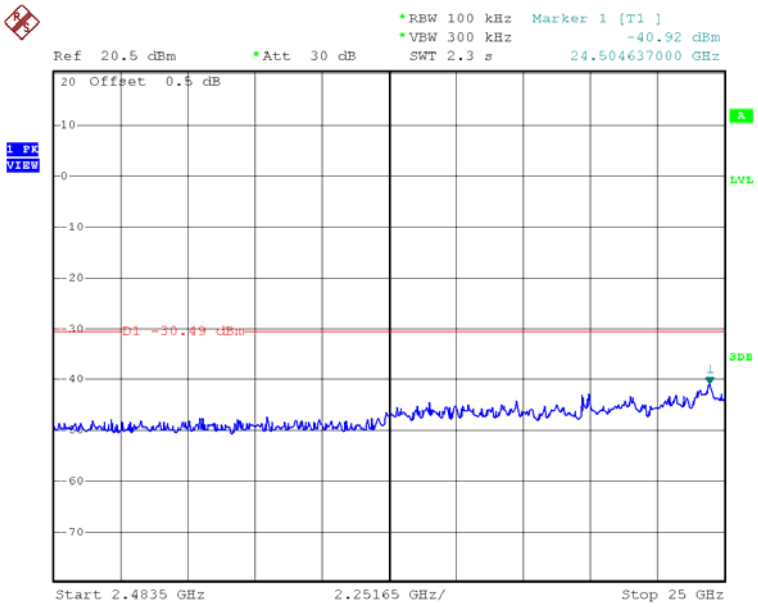
Plots of out of band conducted emissions

802.11g, Middle Channel, Plot A



Date: 29.FEB.2016 15:27:17

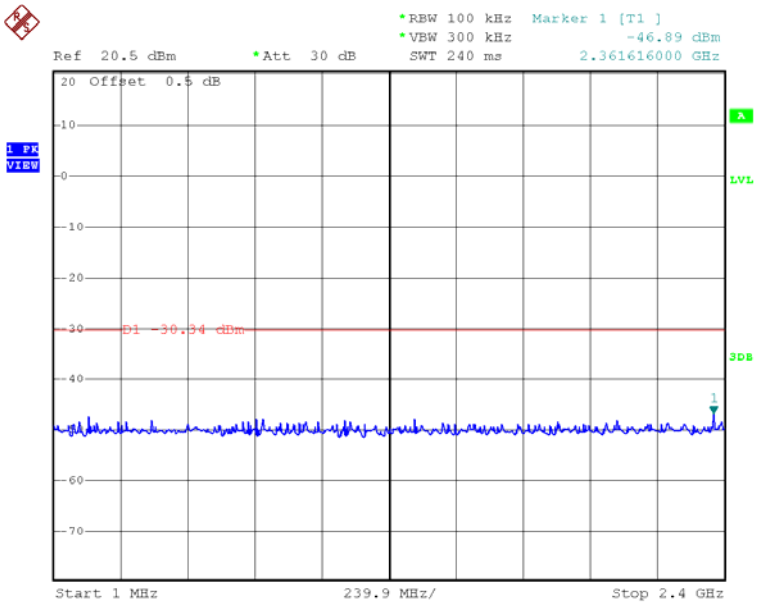
802.11g, Middle Channel, Plot B



Date: 29.FEB.2016 15:27:48

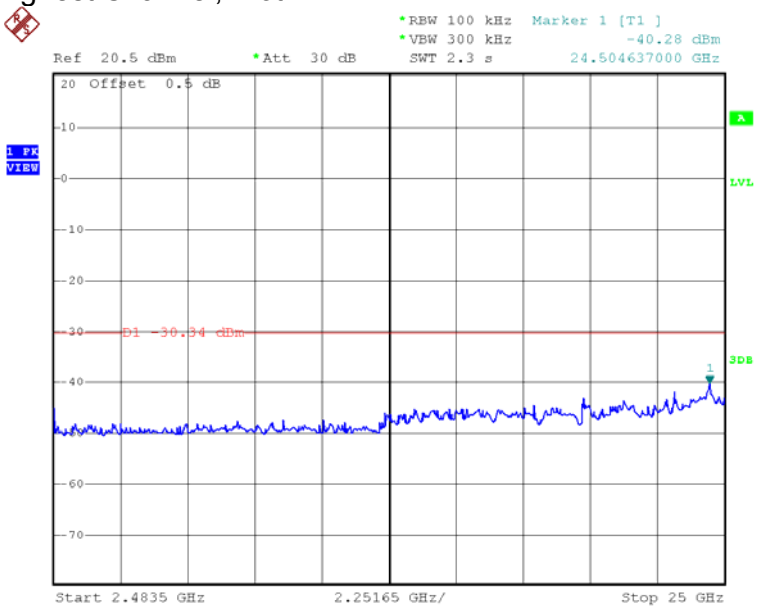
Plots of out of band conducted emissions

802.11g, Highest Channel, Plot A



Date: 29.FEB.2016 15:28:24

802.11g, Highest Channel, Plot B



Date: 29.FEB.2016 15:29:01

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

921.756 MHz

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

4.6.2 Radiated Emission Data

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

Judgement -

Passed by 0.6 dB margin compare with average limit

Mode: TX-Channel 01

Table 1
IEEE 802.11b (DSSS, 1 Mbps)

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***2390.000***	***51.6***	***33***	***29.4***	***48.0***	***54.0***	***-6.0***
H	***4824.000***	***43.0***	***33***	***34.9***	***44.9***	***54.0***	***-9.1***
H	7236.000	40.7	33	37.9	45.6	54.0	-8.4
H	9648.000	43.8	33	40.4	51.2	54.0	-2.8
H	***12060.000***	***44.8***	***33***	***40.5***	***52.3***	***54.0***	***-1.7***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***2390.000***	***51.6***	***33***	***29.4***	***48.0***	***74.0***	***-26.0***
H	***4824.000***	***43.0***	***33***	***34.9***	***44.9***	***74.0***	***-29.1***
H	7236.000	40.7	33	37.9	45.6	74.0	-28.4
H	9648.000	43.8	33	40.4	51.2	74.0	-22.8
H	***12060.000***	***44.8***	***33***	***40.5***	***52.3***	***74.0***	***-21.7***

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.

Mode: TX-Channel 07

Table 2
IEEE 802.11b (DSSS, 1 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***4874.000***	***45.2***	***33***	***34.9***	***47.1***	***54.0***	***-6.9***
H	***7311.000***	***43.1***	***33***	***37.9***	***48.0***	***54.0***	***-6.0***
H	9748.000	42.7	33	40.4	50.1	54.0	-3.9
H	***12185.000***	***44.6***	***33***	***40.5***	***52.1***	***54.0***	***-2.0***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***4874.000***	***45.2***	***33***	***34.9***	***47.1***	***74.0***	***-26.9***
H	***7311.000***	***43.1***	***33***	***37.9***	***48.0***	***74.0***	***-26.0***
H	9748.000	42.7	33	40.4	50.1	74.0	-23.9
H	***12185.000***	***44.6***	***33***	***40.5***	***52.1***	***74.0***	***-22.0***

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.

Mode: TX-Channel 11

Table 3
IEEE 802.11b (DSSS, 1 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***2483.500***	***53.4***	***33***	***29.4***	***49.8***	***54.0***	***-4.2***
H	***4924.000***	***41.9***	***33***	***34.9***	***43.8***	***54.0***	***-10.2***
H	***7386.000***	***41.1***	***33***	***37.9***	***46.0***	***54.0***	***-8.0***
H	9848.000	42.5	33	40.4	49.9	54.0	-4.1
H	***12310.000***	***43.4***	***33***	***40.5***	***50.9***	***54.0***	***-3.1***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***2483.500***	***53.4***	***33***	***29.4***	***49.8***	***74.0***	***-24.2***
H	***4924.000***	***41.9***	***33***	***34.9***	***43.8***	***74.0***	***-30.2***
H	***7386.000***	***41.1***	***33***	***37.9***	***46.0***	***74.0***	***-28.0***
H	9848.000	42.5	33	40.4	49.9	74.0	-24.1
H	***12310.000***	***43.4***	***33***	***40.5***	***50.9***	***74.0***	***-23.1***

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.

Mode: TX-Channel 01

Table 4
IEEE 802.11g (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***2390.000***	***53.1***	***33***	***29.4***	***49.5***	***54.0***	***-4.5***
H	***4824.000***	***45.3***	***33***	***34.9***	***47.2***	***54.0***	***-6.9***
H	7236.000	43.1	33	37.9	48.0	54.0	-6.0
H	9648.000	42.6	33	40.4	50.0	54.0	-4.0
H	***12060.000***	***43.6***	***33***	***40.5***	***51.1***	***54.0***	***-2.9***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***2390.000***	***53.1***	***33***	***29.4***	***49.5***	***74.0***	***-24.5***
H	***4824.000***	***45.3***	***33***	***34.9***	***47.2***	***74.0***	***-26.9***
H	7236.000	43.1	33	37.9	48.0	74.0	-26.0
H	9648.000	42.6	33	40.4	50.0	74.0	-24.0
H	***12060.000***	***43.6***	***33***	***40.5***	***51.1***	***74.0***	***-22.9***

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

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

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

4. Horn antenna is used for the emission over 1000MHz.

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

Mode: TX-Channel 07

Table 5
IEEE 802.11g (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***4874.000***	***41.6***	***33***	***34.9***	***43.5***	***54.0***	***-10.6***
H	***7311.000***	***43.1***	***33***	***37.9***	***48.0***	***54.0***	***-6.0***
H	9748.000	42.6	33	40.4	50.0	54.0	-4.0
H	***12185.000***	***43.6***	***33***	***40.5***	***51.1***	***54.0***	***-2.9***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***4874.000***	***41.6***	***33***	***34.9***	***43.5***	***74.0***	***-30.6***
H	***7311.000***	***43.1***	***33***	***37.9***	***48.0***	***74.0***	***-26.0***
H	9748.000	42.6	33	40.4	50.0	74.0	-24.0
H	***12185.000***	***43.6***	***33***	***40.5***	***51.1***	***74.0***	***-22.9***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

Mode: TX-Channel 11

Table 6
IEEE 802.11g (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***2483.500***	***53.1***	***33***	***29.4***	***49.5***	***54.0***	***-4.5***
H	***4924.000***	***40.5***	***33***	***34.9***	***42.4***	***54.0***	***-11.6***
H	***7386.000***	***38.2***	***33***	***37.9***	***43.1***	***54.0***	***-10.9***
H	9848.000	40.9	33	40.4	48.3	54.0	-5.7
H	***12310.000***	***42.6***	***33***	***40.5***	***50.1***	***54.0***	***-3.9***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	peak Limit at 3m (dBµV/m)	Margin (dB)
H	***2483.500***	***53.1***	***33***	***29.4***	***49.5***	***74.0***	***-24.5***
H	***4924.000***	***40.5***	***33***	***34.9***	***42.4***	***74.0***	***-31.6***
H	***7386.000***	***38.2***	***33***	***37.9***	***43.1***	***74.0***	***-30.9***
H	9848.000	40.9	33	40.4	48.3	74.0	-25.7
H	***12310.000***	***42.6***	***33***	***40.5***	***50.1***	***74.0***	***-23.9***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

Mode: Transmission

Table 7
IEEE 802.11b (DSSS, 1 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	48.156	35.9	16	11.0	30.9	40.0	-9.1
V	52.544	33.4	16	11.0	28.4	40.0	-11.6
V	100.441	40.8	16	12.0	36.8	43.5	-6.7
H	143.828	36.8	16	14.0	34.8	43.5	-8.7
H	175.150	30.9	16	19.0	33.9	43.5	-9.6
H	210.006	37.8	16	17.0	38.8	43.5	-4.7
H	***252.053***	***32.4***	***16***	***20.0***	***36.4***	***46.0***	***-9.6***
H	293.978	29.8	16	22.0	35.8	46.0	-10.2
H	320.059	28.1	16	23.0	35.1	46.0	-10.9
H	456.925	25.6	16	26.0	35.6	46.0	-10.4
H	663.259	28.0	16	29.0	41.0	46.0	-5.0
H	921.756	28.4	16	33.0	45.4	46.0	-0.6

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

Mode: Transmission

Table 8
IEEE 802.11g (OFDM, 11 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	44.256	37.6	16	10.0	31.6	40.0	-8.5
V	52.909	34.7	16	11.0	29.7	40.0	-10.4
V	100.441	40.1	16	12.0	36.1	43.5	-7.4
V	143.828	37.4	16	14.0	35.4	43.5	-8.1
H	***166.741***	***33.6***	***16***	***17.0***	***34.6***	***43.5***	***-8.9***
H	210.006	35.4	16	17.0	36.4	43.5	-7.1
H	***252.053***	***31.7***	***16***	***20.0***	***35.7***	***46.0***	***-10.3***
H	293.978	31.7	16	22.0	37.7	46.0	-8.3
H	320.059	29.2	16	23.0	36.2	46.0	-9.8
H	477.522	26.0	16	26.0	36.0	46.0	-10.1
H	681.175	27.8	16	29.0	40.8	46.0	-5.2

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

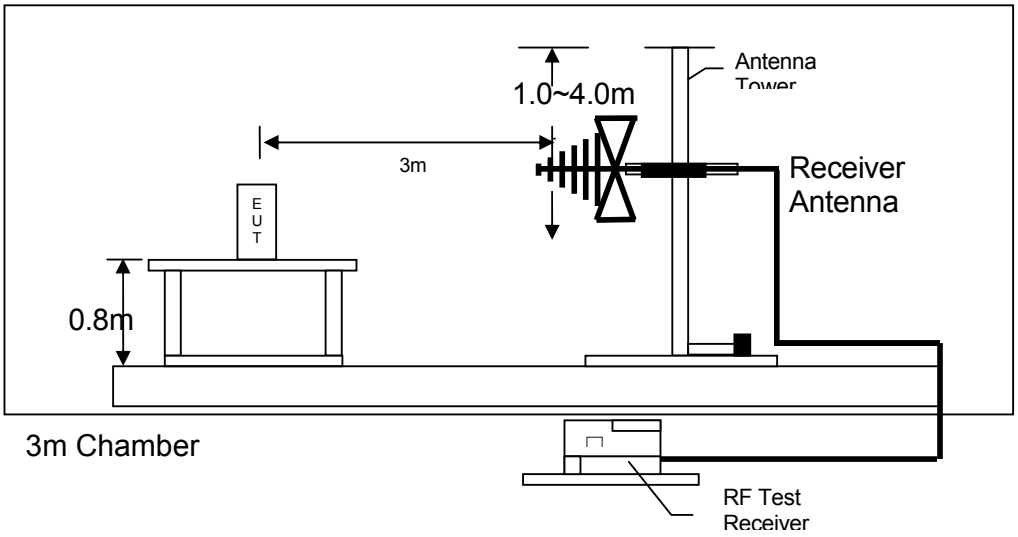
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test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

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

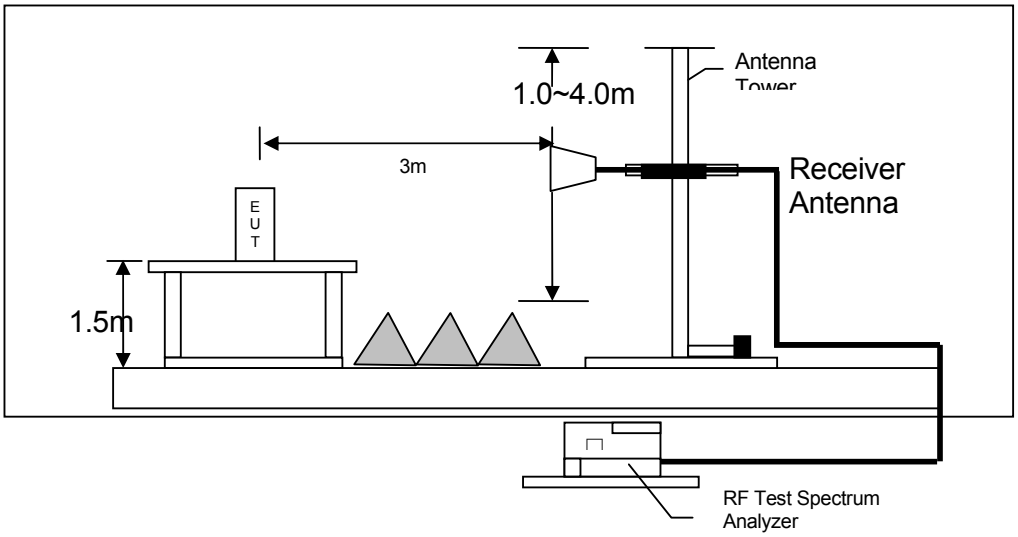
4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

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.

EXHIBIT 5
EQUIPMENT LIST

5.0 **Equipment List**

1) Radiated Emissions Test

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	BiConical Antenna
Registration No.	EW-3156	EW-2253	EW-0571
Manufacturer	R&S	R&S	EMCO
Model No.	ESR26	FSP40	3104C
Calibration Date	Nov. 03, 2015	May 27, 2015	Jun. 23, 2015
Calibration Due Date	Nov. 03, 2016	May 27, 2016	Dec. 23, 2016

Equipment	Double Ridged Guide Antenna	Log Periodic Antenna
Registration No.	EW-1133	EW-0572
Manufacturer	EMCO	EMCO
Model No.	3115	3146
Calibration Date	Nov. 05, 2015	Jan.19, 2015
Calibration Due Date	May 05, 2017	Jul. 19, 2016

2) Conductive Measurement Test

Equipment	Spectrum Analyzer
Registration No.	EW-2253
Manufacturer	R&S
Model No.	FSP40
Calibration Date	May 27, 2015
Calibration Due Date	May 27, 2016

END OF TEST REPORT