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## TEST REPORT

**Report Number: 15070497HKG-001R1**

Application  
for  
Original Grant of 47 CFR Part 15 Certification

Smart Toy Bear

FCC ID: CCT-DNV31-15

This report supersedes previous report with report number 15070497HKG-001 dated August 21, 2015.

Prepared and Checked by:

Approved by:

***Signed On File***

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Assistant Engineer

\_\_\_\_\_  
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September 04, 2015

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## INTERTEK TESTING SERVICES

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### GENERAL INFORMATION

<b>Applicant Name:</b>	Fisher-Price Inc.
<b>Applicant Address:</b>	636 Girard Avenue, East Aurora, New York, United States
<b>FCC Specification Standard:</b>	FCC Part 15, October 1, 2014 Edition
<b>FCC ID:</b>	CCT-DNV31-15
<b>FCC Model(s):</b>	DNV31 Additional Model: DNV30, DNV32
<b>Type of EUT:</b>	Spread Spectrum Transmitter
<b>Description of EUT:</b>	Smart Toy Bear (DNV31) Smart Toy Panda (DNV30), Smart Toy Monkey (DNV32)
<b>Serial Number:</b>	N/A
<b>Sample Receipt Date:</b>	July 09, 2015
<b>Date of Test:</b>	July 09, 2015 to August 07, 2015
<b>Report Date:</b>	September 04, 2015
<b>Environmental Conditions:</b>	Temperature: +10 to 40°C Humidity: 10 to 90%

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### **EXHIBIT 1 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE**

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### 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 (peak)	15.247(b)(3)&(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	Pass	4.2
Max. Power Density (Peak)	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.

Remark: Please refer ERA-TLW2816 Letter issued on September 04, 2015 for amendment/ supersede notification.

#### 1.2 Statement of Compliance

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

FCC Part 15, October 1, 2014 Edition

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### **EXHIBIT 2 GENERAL DESCRIPTION**

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### 2.0 General Description

#### 2.1 Product Description

The DNV31 is a Smart Toy Bear.

The Equipment Under Test (EUT) is a 2.4GHz Bluetooth 4.0 and 2.4GHz Wifi transmitter set for a toy bear. For Bluetooth 4.0, the EUT occupies a frequency range from 2402MHz to 2480MHz (40 channels with channel spacing of 2MHz) For Wifi ,the EUT operates in a frequency range from 2412MHz to 2462MHz at 802.11b,g,n HT20 (11 channels with 5MHz spacing) while from 2422MHz to 2452Mhz at 802.11n HT40 (7 channels with 5MHz channel spacing). The EUT firstly pair with smart device application through Bluetooth for setting up the user name and password of Wifi. Afterward, the EUT can be controlled by command list in the application. The EUT will speak or sing under the commands. Without any pairing, the EUT can be controlled by the command card by scanning the code/picture by the camera on the nose the EUT. The camera is just for scanning, no any photo taking or video recoding function. The EUT is powered by an internal 3.7VDC rechargeable battery pack. The battery can be charged by micro USB cable. The micro USB portal is for charging only.

The Model: DNV30 and DNV32 are the same as the Model: DNV31 in hardware aspect. The models are different in cosmetic details, trade name and model number only.

The antenna(s) used in the EUT is integral, and the test sample is a prototype.

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). All other measurements were made in accordance with the procedures in 47 CFR Part 2.

#### 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).

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### **EXHIBIT 3 SYSTEM TEST CONFIGURATION**



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### 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 1 x 3.7V rechargeable battery pack.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable at 0.8m heights from the ground plane for emission testing at or below 1GHz and 1.5m for emission measurements above 1 GHz. 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.

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### 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

### 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.

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### 3.3 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) 3.7VDC (1 x DC 3.7V Rechargeable Battery pack) (Supplied by Applicant)

#### 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 has been considered.

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.

## **INTERTEK TESTING SERVICES**

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### **EXHIBIT 4 TEST RESULTS**

## INTERTEK TESTING SERVICES

### 4.0 Test Results

#### 4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

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

- ☒ External attenuation and cable loss were compensated for using the OFFSET function of the analyser. The measurement procedure 9.1.2 was used.
- ☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 2.32 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	0.52	1.13
Middle Channel: 2437	18.19	65.92
High Channel: 2462	18.27	67.14

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 2.32 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	0.64	1.16
Middle Channel: 2437	21.89	154.53
High Channel: 2462	21.30	134.9

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 2.32 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	8.54	7.14
Middle Channel: 2437	21.89	154.53
High Channel: 2462	21.30	134.9

## INTERTEK TESTING SERVICES

### 4.1 Maximum Conducted (Average) Output Power at Antenna Terminals

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

- ☒ External attenuation and cable loss were compensated for using the OFFSET function of the analyser. The measurement procedure 9.2.2.2 was used.
- ☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 2.32 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	3.62	2.30
Middle Channel: 2437	10.50	11.22
High Channel: 2452	10.63	11.56

The information of Occupied Bandwidth;

IEEE 802.11n (40MHz) (OFDM, MCS0)	
Frequency (MHz)	Measured OBW (MHz)
Low Channel: 2422	36.7
Middle Channel: 2437	36.8
High Channel: 2452	36.8

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

Cable loss : 0.5 dB External Attenuation : 10 dB

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

IEEE 802.11b (DSSS, 1 Mbps)  
max. conducted (peak) output level = 18.27 dBm

IEEE 802.11g (OFDM, 6 Mbps)  
max. conducted (peak) output level = 21.89 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)  
max. conducted (peak) output level = 21.89 dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)  
max. conducted (Average) output level = 10.63 dBm

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The plots of output power level are shown as below.

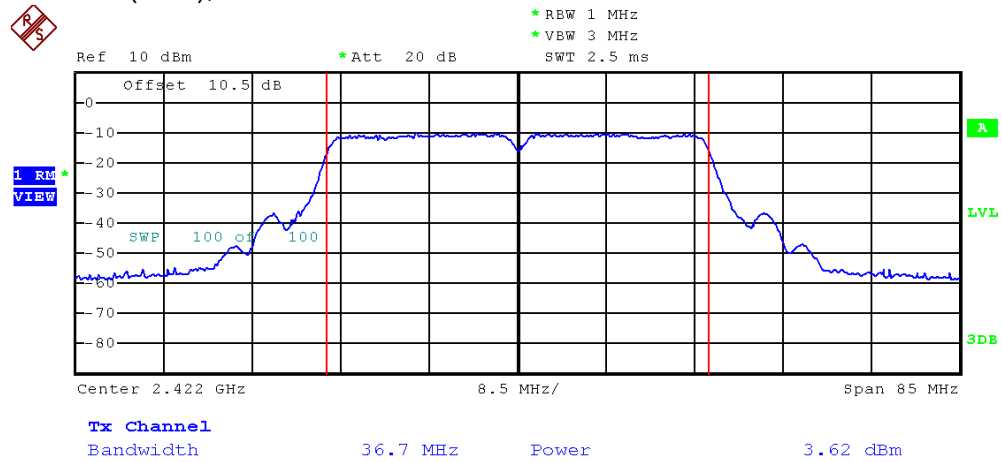
Limits:

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

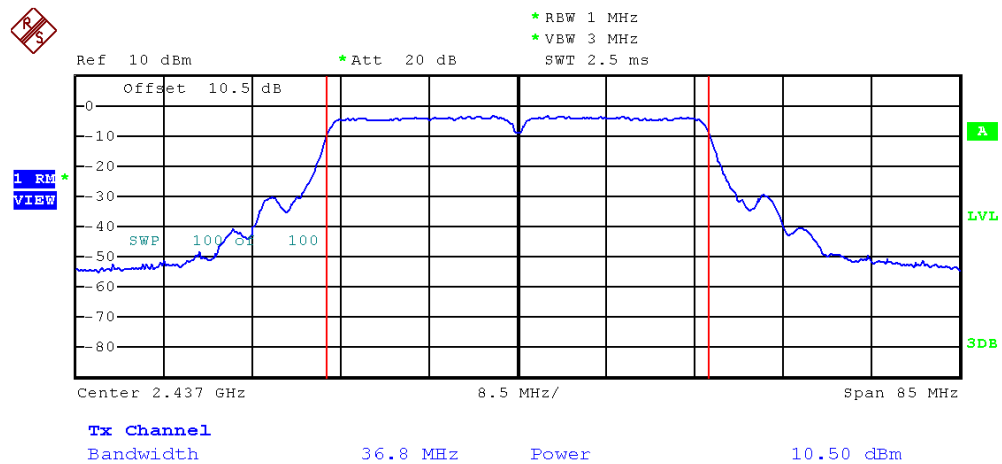
☐ \_\_\_W (\_\_\_dBm) for antennas with gains more than 6dBi

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### Plots of maximum output power 802.11n (40M), Lowest Channel



### Plots of maximum output power 802.11n (40M), Middle

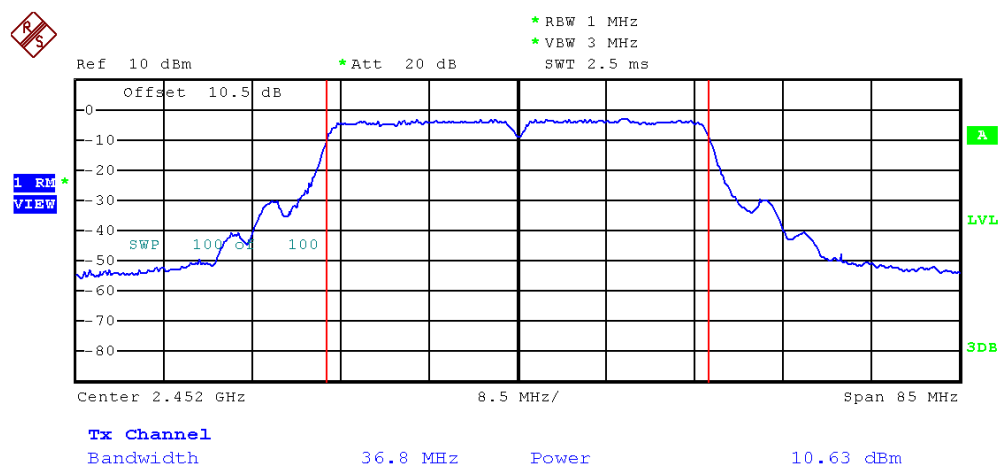




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### Plots of maximum output power

802.11n (40M), Highest



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### 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	10.24
Middle Channel: 2437	10.20
High Channel: 2462	10.24

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.80
Middle Channel: 2437	16.76
High Channel: 2462	16.72

IEEE 802.11n (20MHz) (OFDM, MCS0)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	18.0
Middle Channel: 2437	18.0
High Channel: 2462	18.0

IEEE 802.11n (40MHz) (OFDM, MCS0)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2422	36.72
Middle Channel: 2437	36.89
High Channel: 2452	36.89

#### Limits

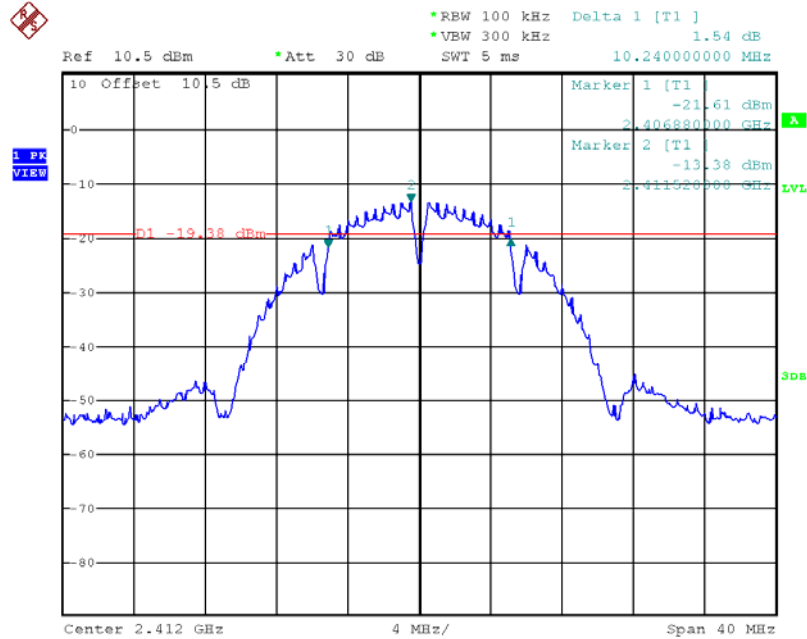
6 dB bandwidth shall be at least 500kHz

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

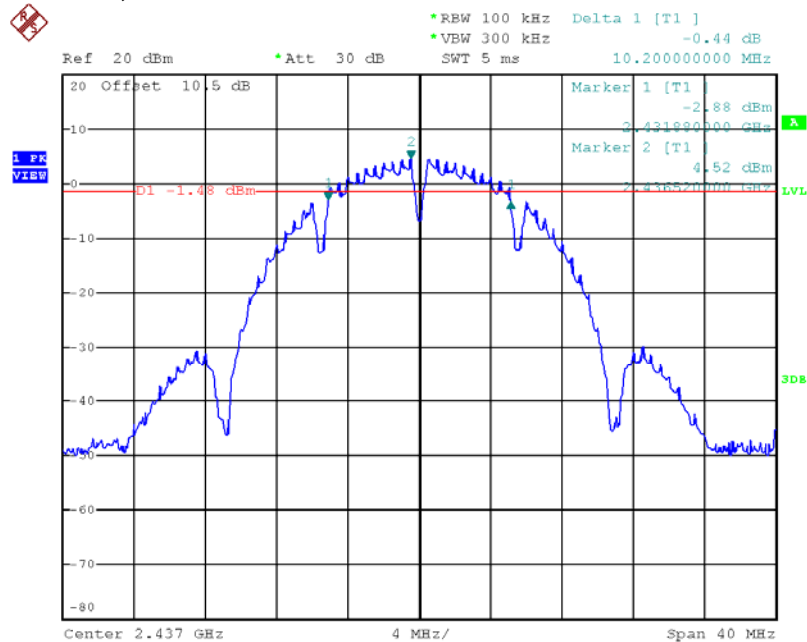
## INTERTEK TESTING SERVICES

### Plots of 6dB RF bandwidth

#### 802.11b, Lowest Channel



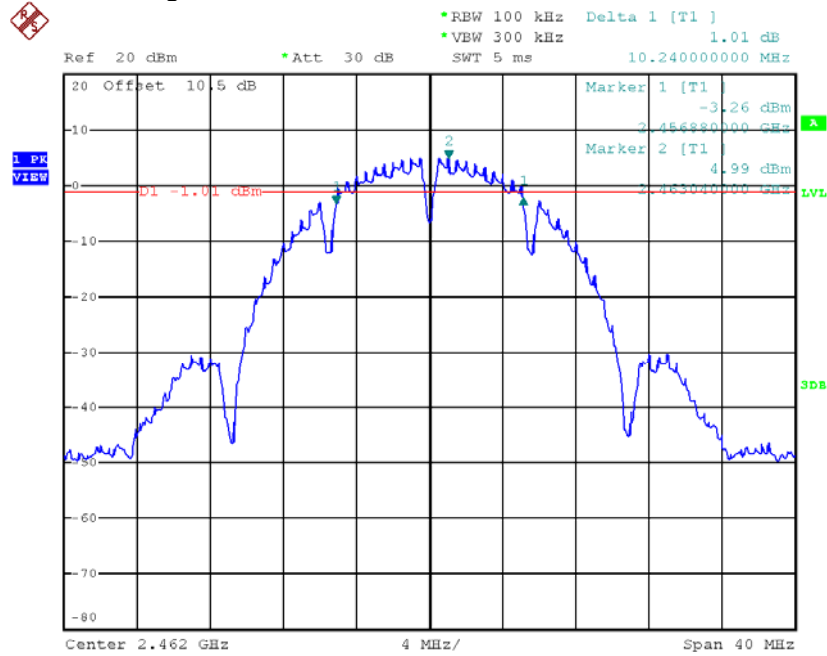
#### 802.11b, Middle Channel



## INTERTEK TESTING SERVICES

### Plots of 6dB RF bandwidth

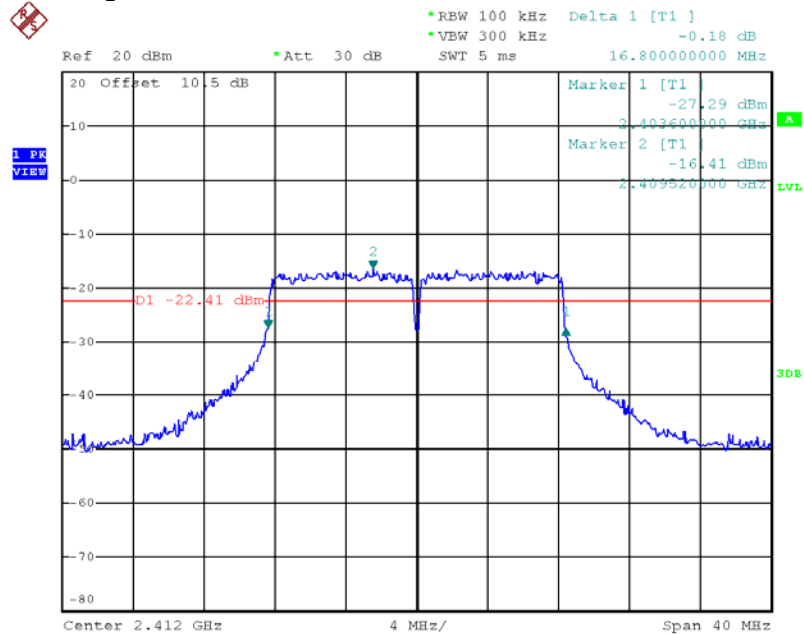
802.11b, Highest Channel



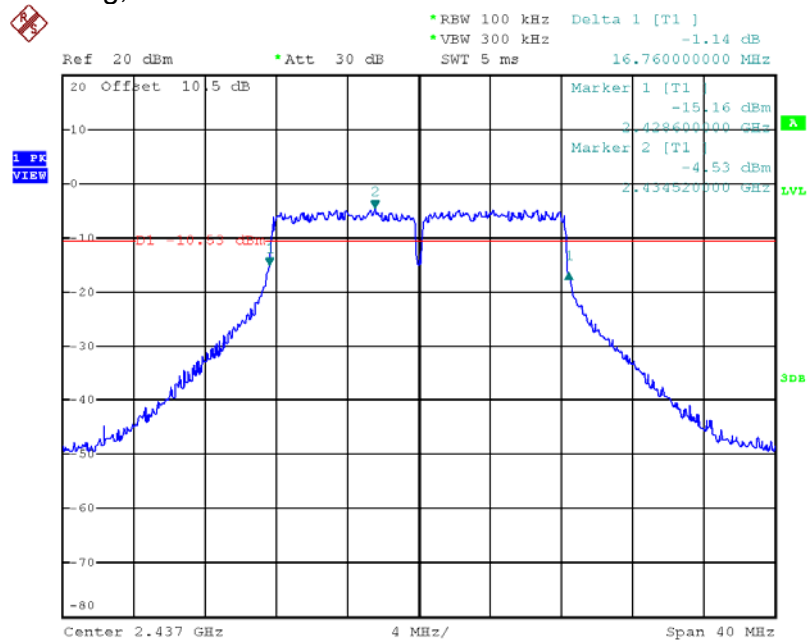
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### Plots of 6dB RF bandwidth

802.11g, Lowest Channel



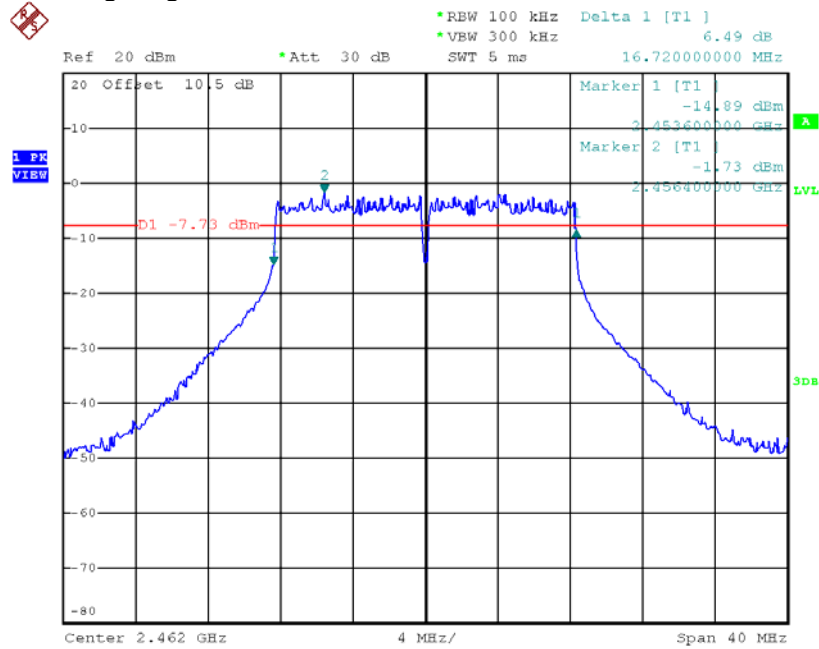
802.11g, Middle Channel



## INTERTEK TESTING SERVICES

### Plots of 6dB RF bandwidth

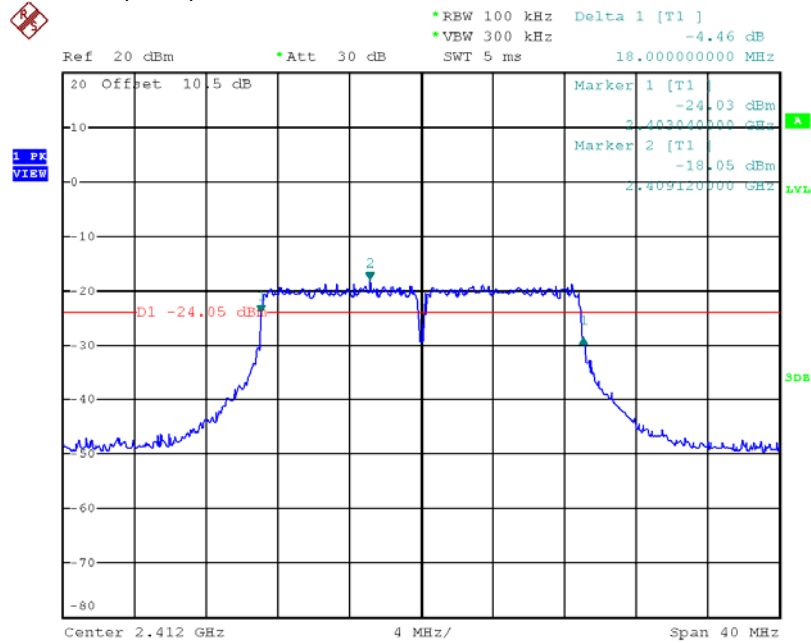
802.11g, Highest Channel



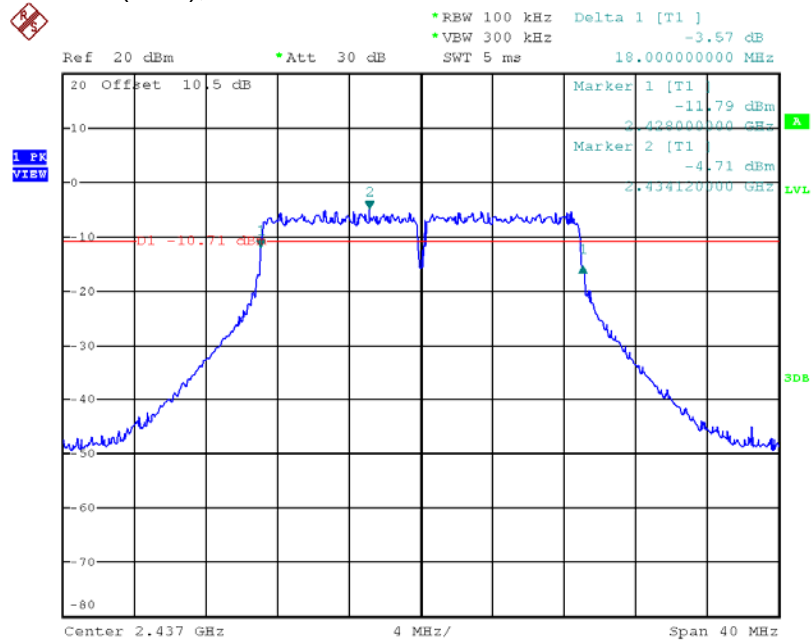
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### Plots of 6dB RF bandwidth

802.11n(20M), Lowest Channel



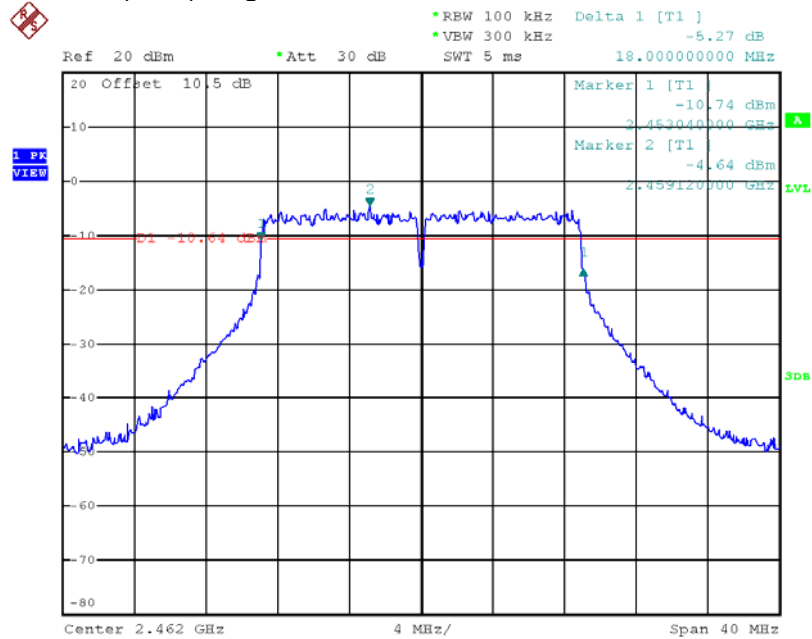
802.11n(20M), Middle Channel



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### Plots of 6dB RF bandwidth

802.11n(20M), Highest Channel

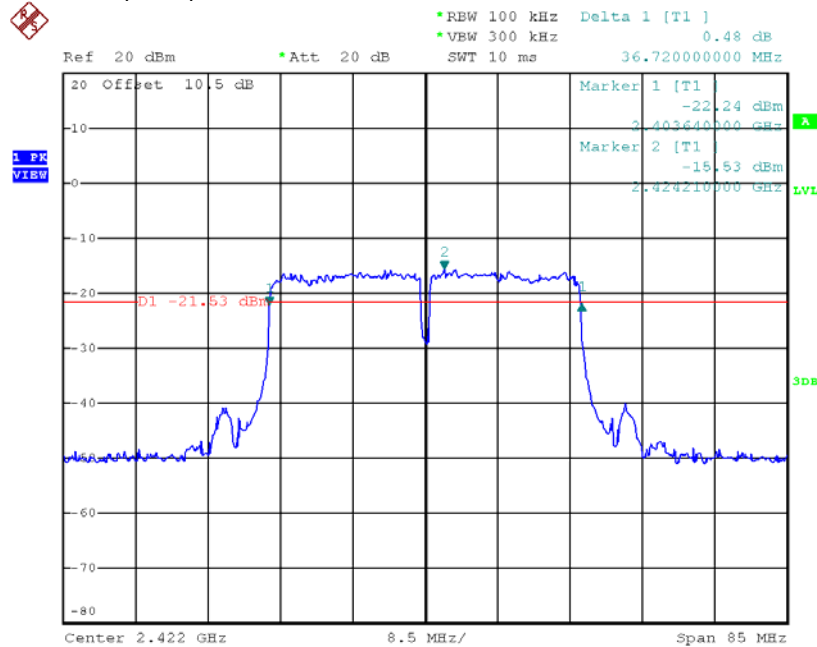




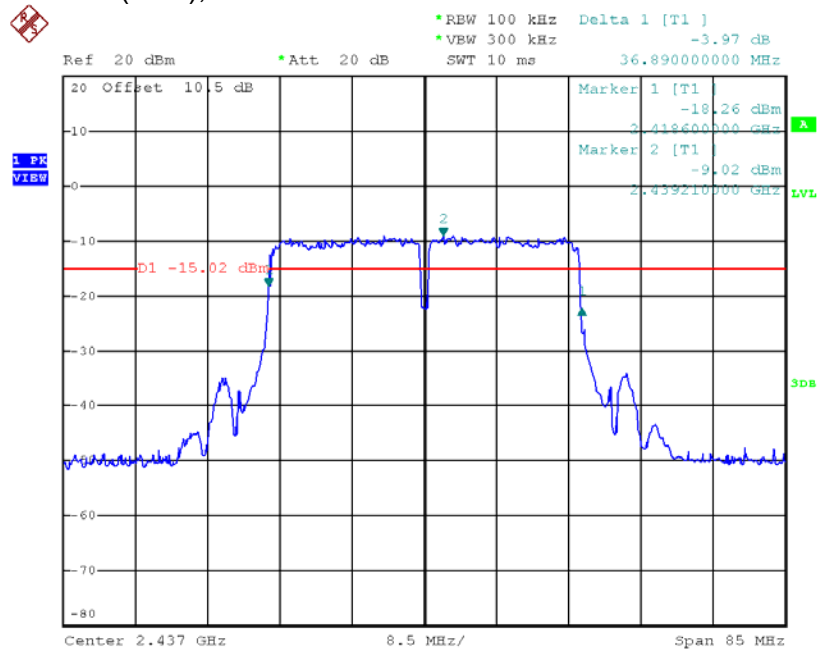
## INTERTEK TESTING SERVICES

### Plots of 6dB RF bandwidth

802.11n(40M), Lowest Channel



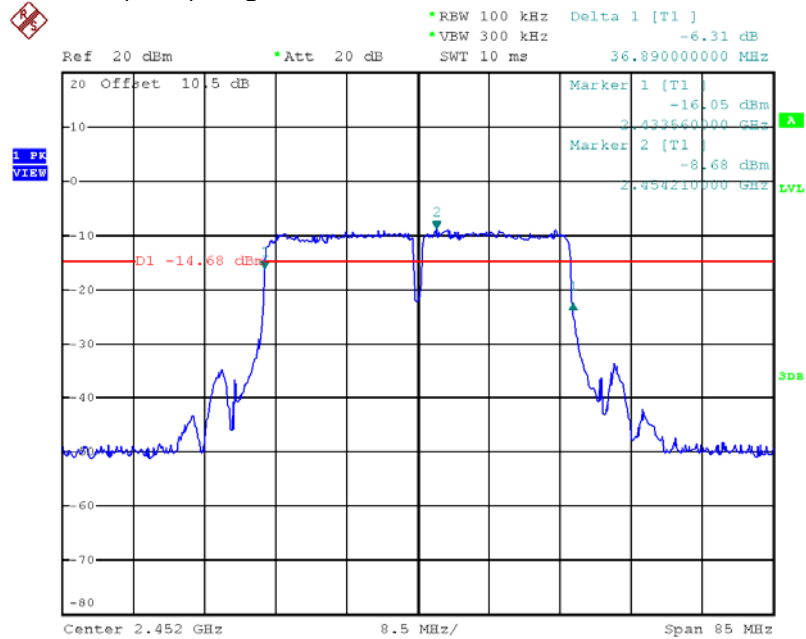
802.11n(40M), Middle Channel



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### Plots of 6dB RF bandwidth

802.11n(40M), Highest Channel



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### 4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD 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	-13.51
Middle Channel: 2437	4.27
High Channel: 2462	4.42

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	-16.87
Middle Channel: 2442	-4.94
High Channel: 2462	-4.77

IEEE 802.11n (20MHz) (OFDM, MCS0)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	-19.19
Middle Channel: 2442	-5.53
High Channel: 2462	-5.43

For 802.11n (40MHz), Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.3 AVGPS-1 was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

IEEE 802.11n (40MHz) (OFDM, MCS0)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2422	-17.39
Middle Channel: 2437	-9.76
High Channel: 2452	-10.37

## INTERTEK TESTING SERVICES

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The information of Occupied Bandwidth;

IEEE 802.11n (40MHz) (OFDM, MCS0)	
Frequency (MHz)	Measured OBW (MHz)
Low Channel: 2422	36.7
Middle Channel: 2437	36.8
High Channel: 2452	36.8

Cable Loss: 0.5 dB

Limit:

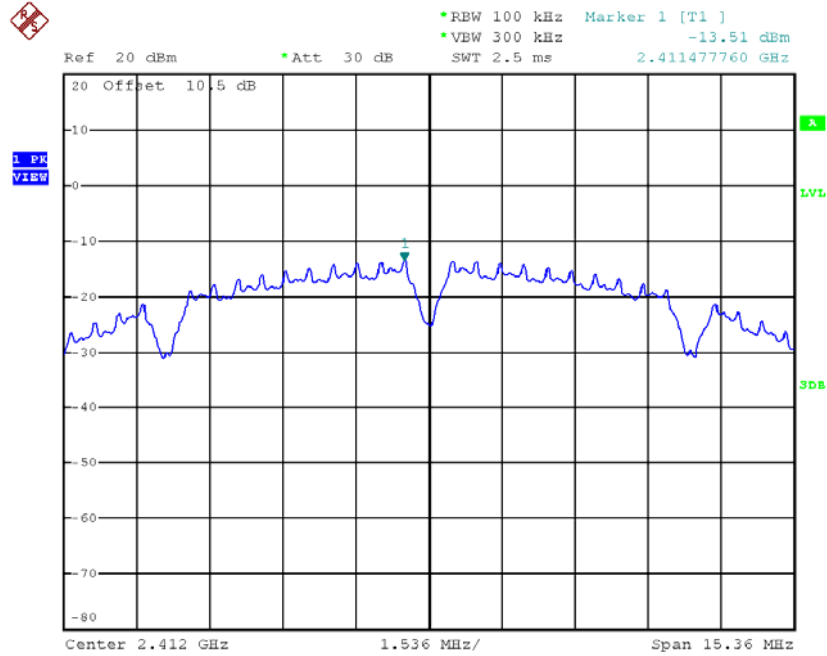
8dBm

The plots of n power spectral density are as below.

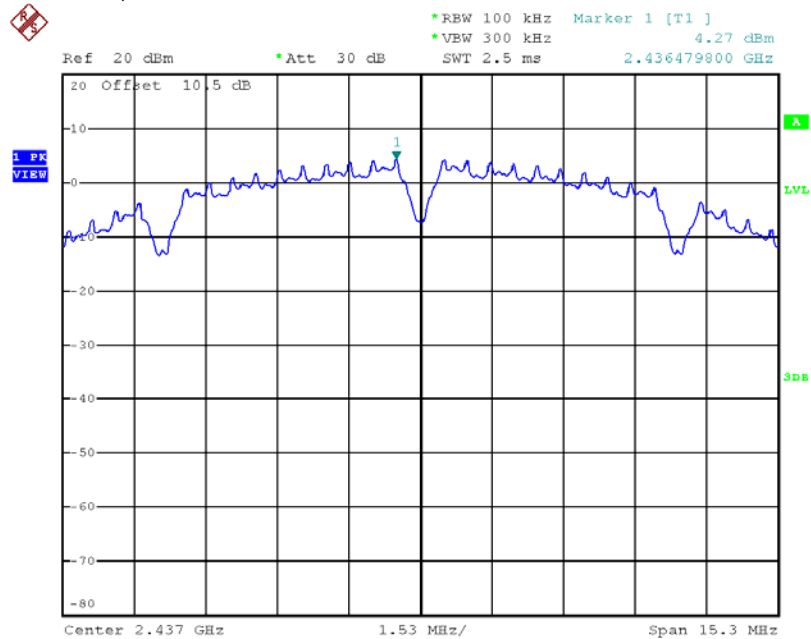
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### Plots of power spectral density

802.11b, Lowest channel

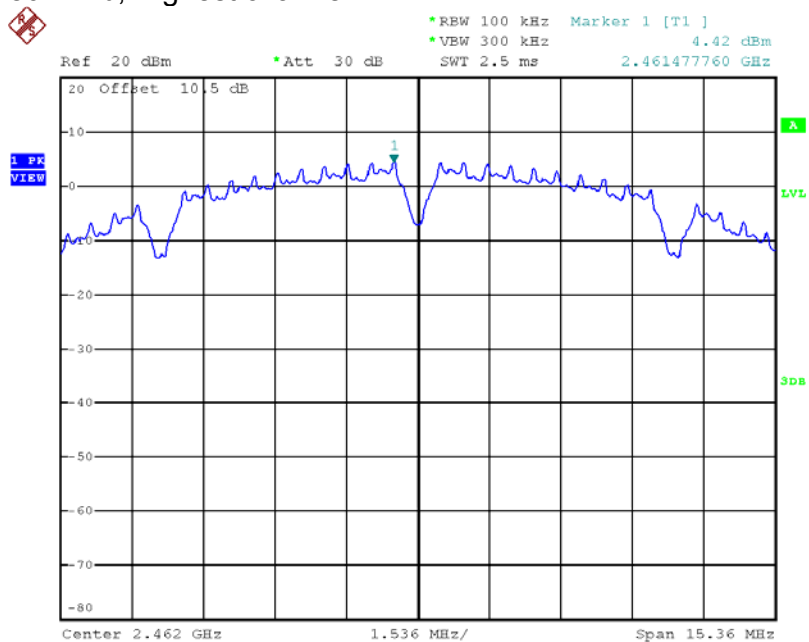


802.11b, Middle channel



## Plots of power spectral density

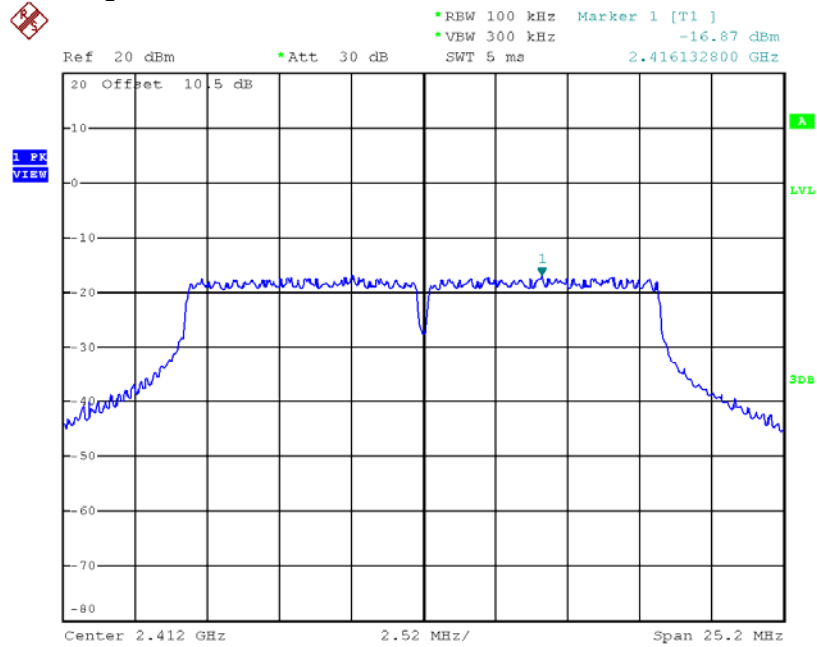
802.11b, Highest channel



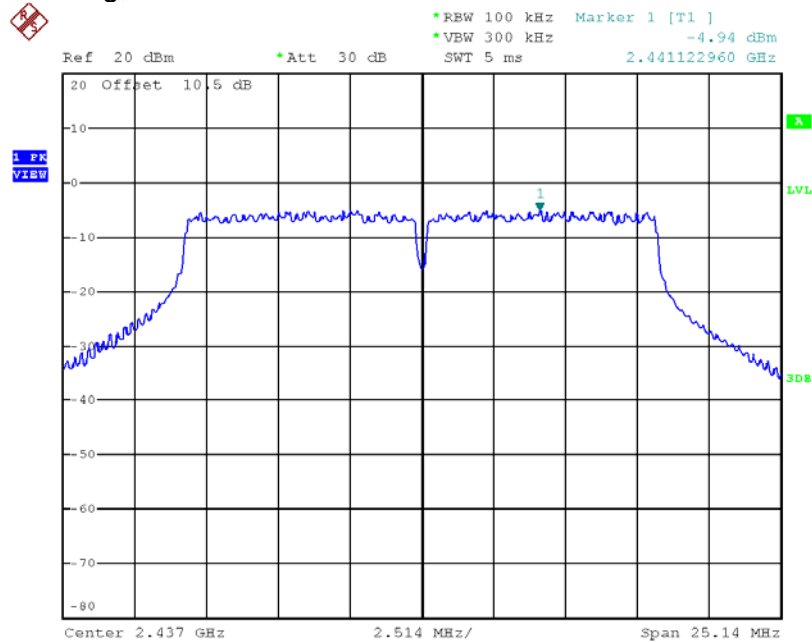
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### Plots of power spectral density

802.11g, Lowest channel



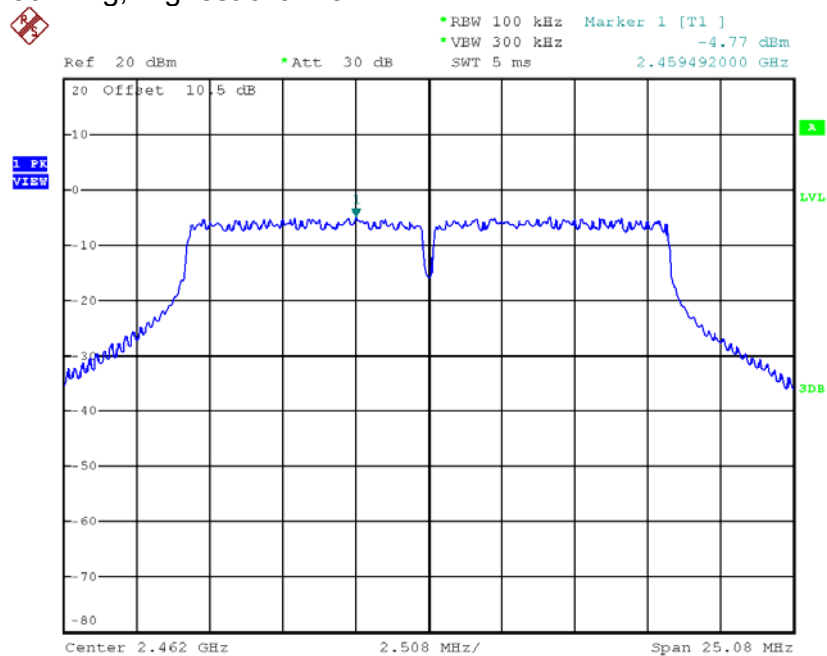
802.11g, Middle channel



## INTERTEK TESTING SERVICES

### Plots of power spectral density

802.11g, Highest channel

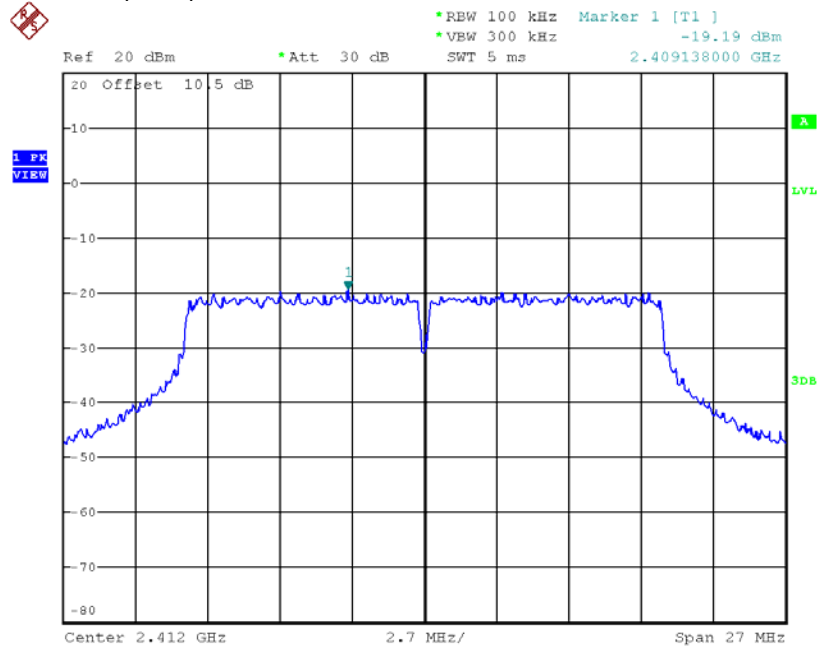




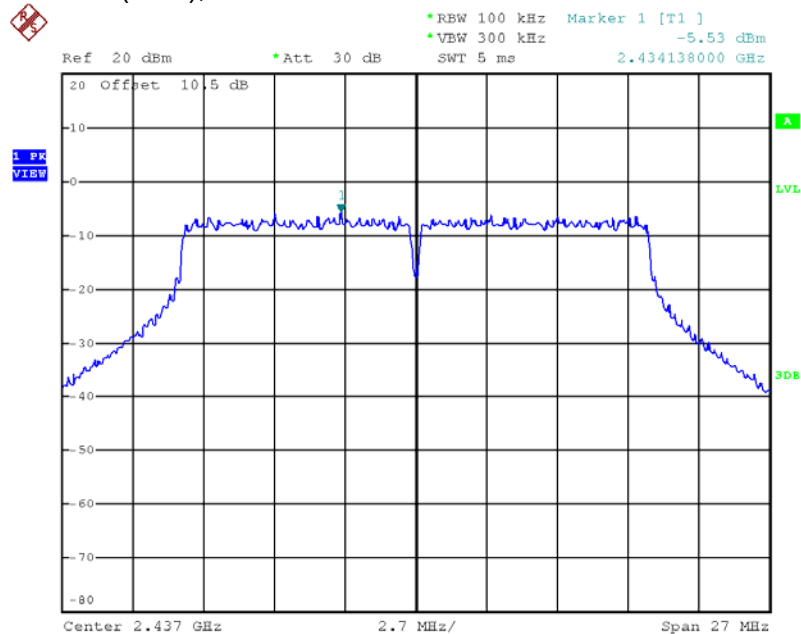
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### Plots of power spectral density

802.11n(20M), Lowest channel



802.11n(20M), Middle channel

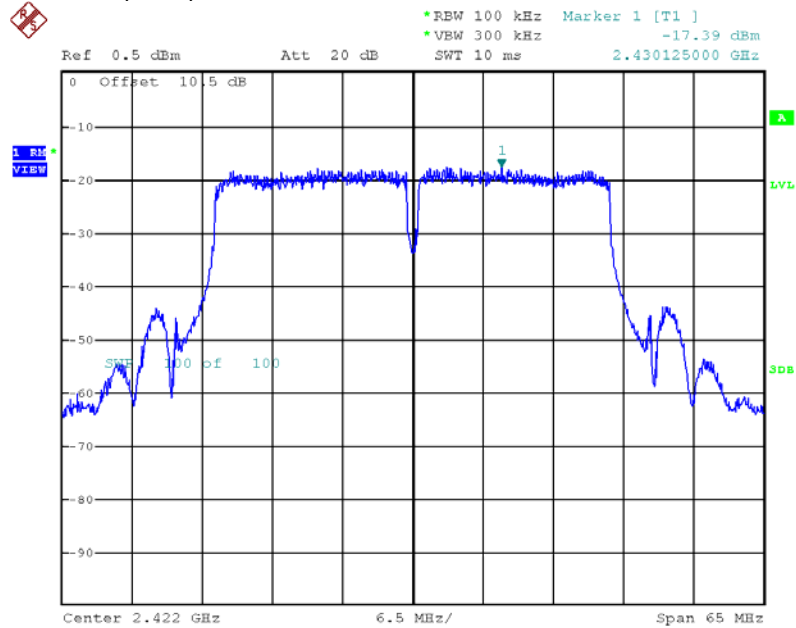




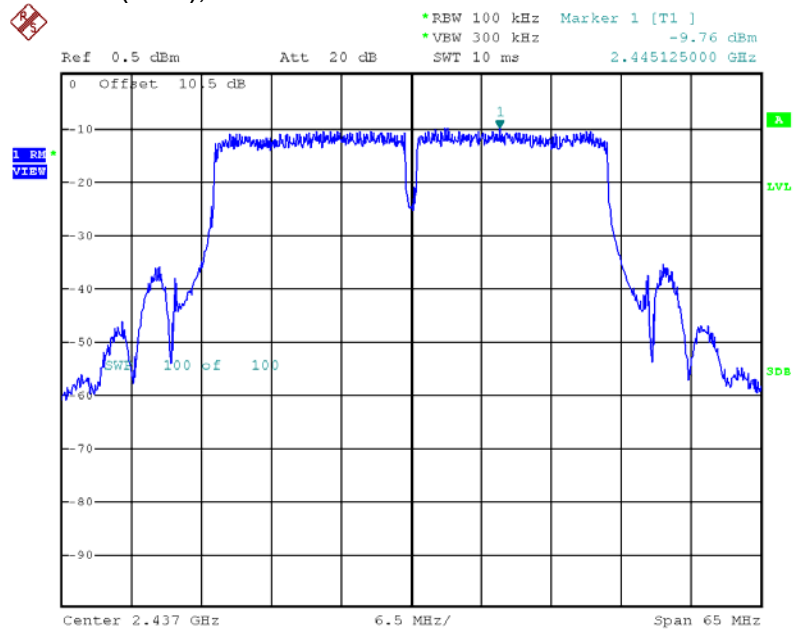
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### Plots of power spectral density

802.11n(40M), Lowest channel



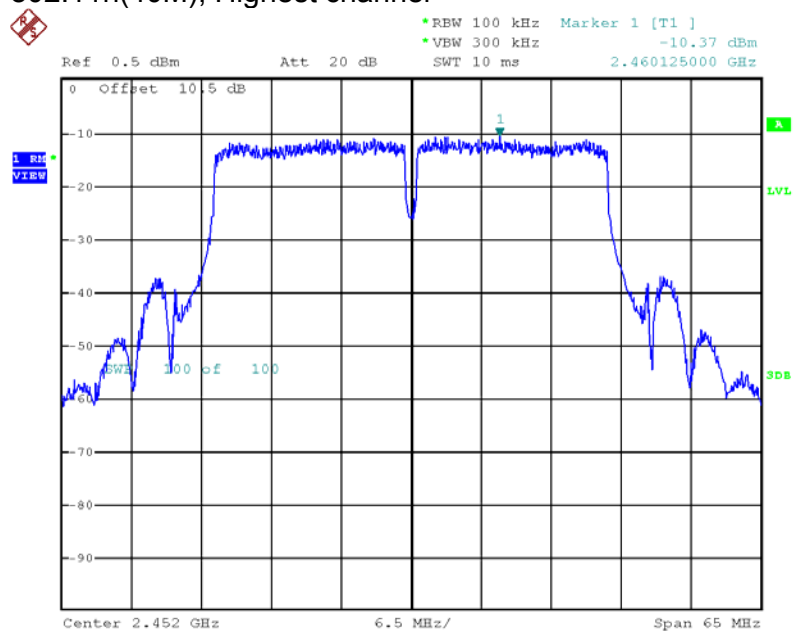
802.11n(40M), Middle channel



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### Plots of power spectral density

802.11n(40M), Highest channel



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### 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.

For 802.11n40MHz, the maximum conducted (Average) output power was used to demonstrate compliance as described in 9.2. 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 v03r03 (09-June-2015) were used.

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

#### Limits:

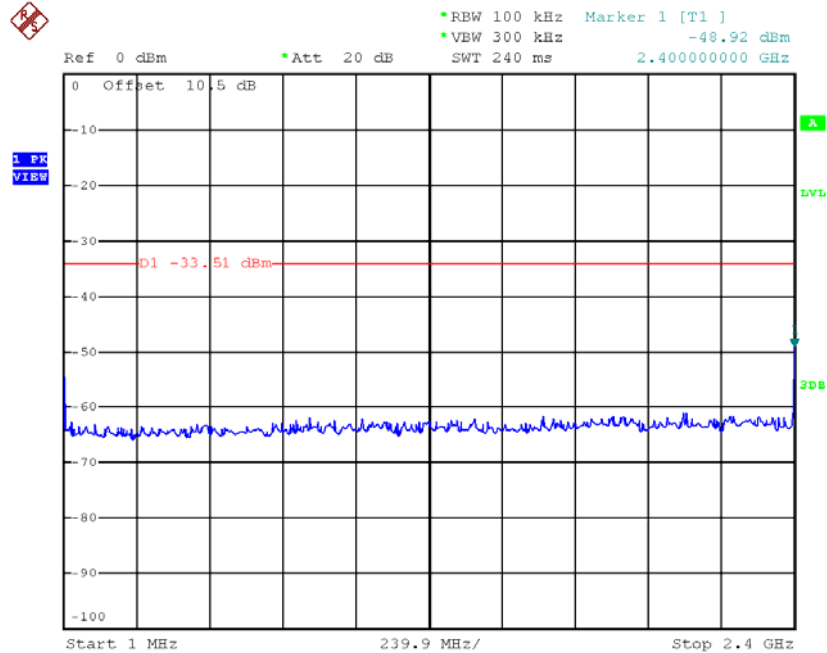
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB for 802.11b,g,n20MHz and 30dB for 802.11n40MHz below the maximum measured in-band peak PSD level.

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

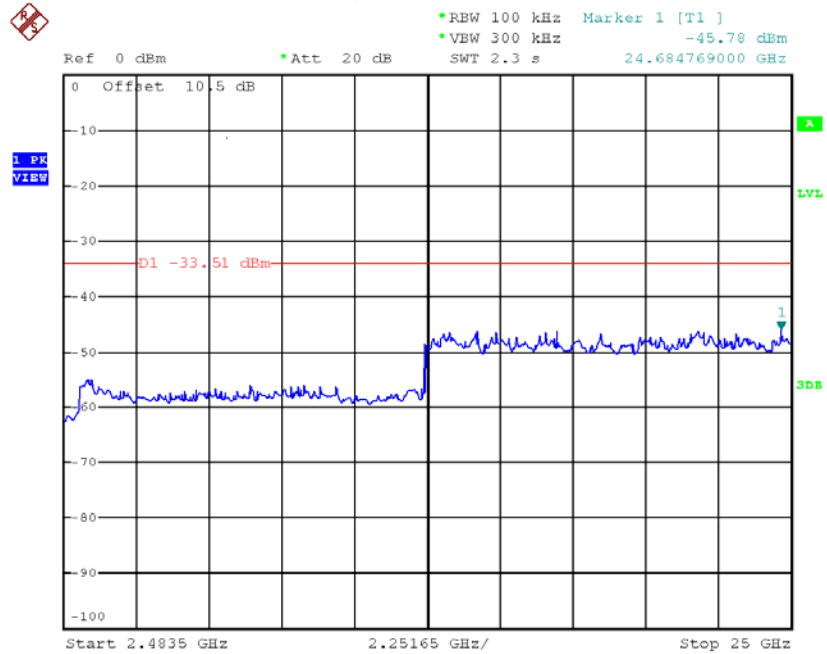
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11b, Lowest Channel, Plot A



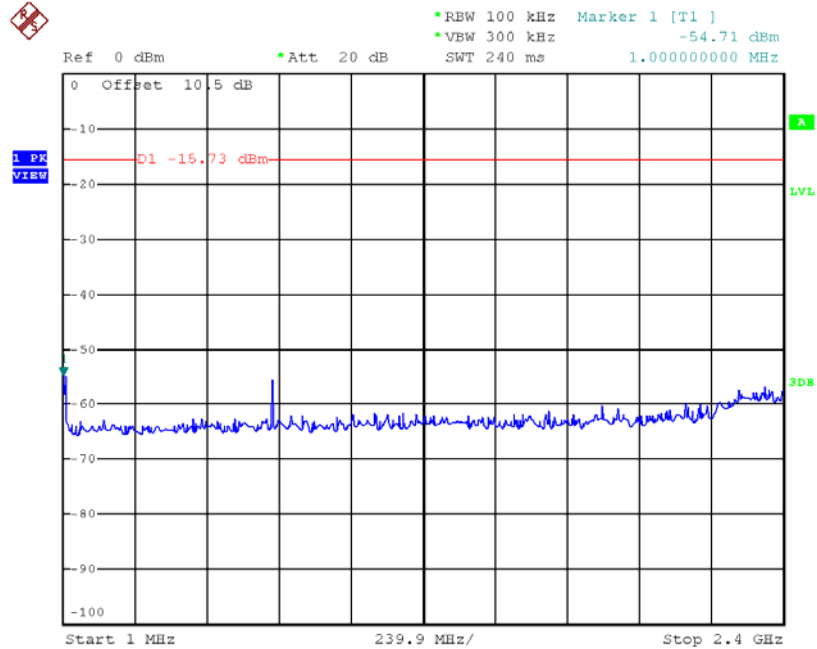
802.11b, Lowest Channel, Plot B



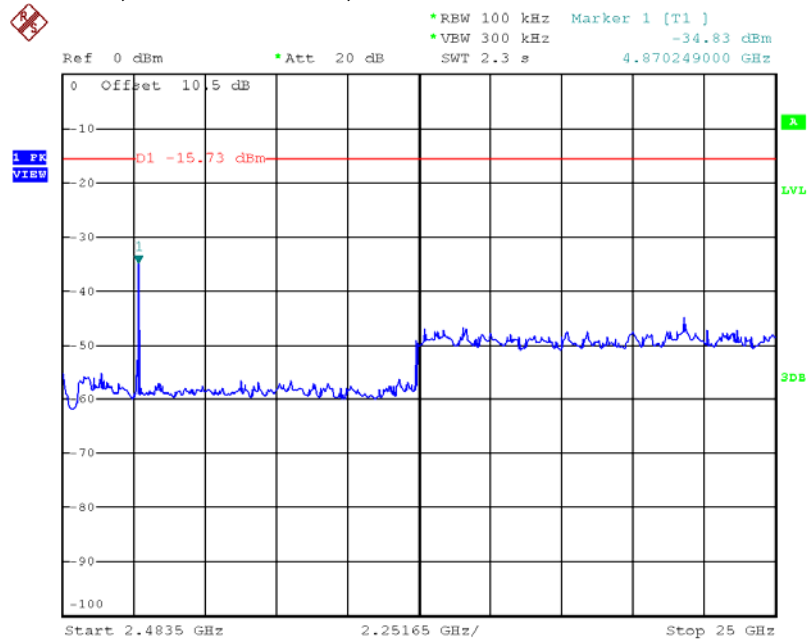
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11b, Middle Channel, Plot A



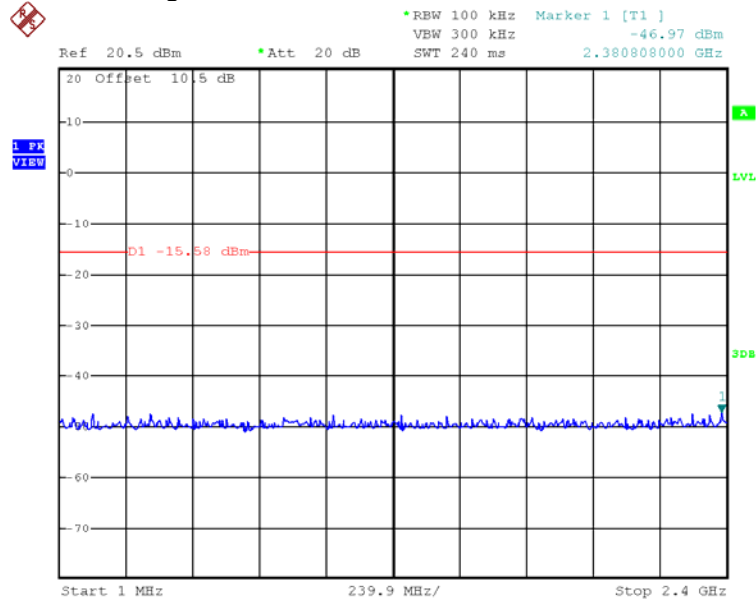
802.11b, Middle Channel, Plot B



## INTERTEK TESTING SERVICES

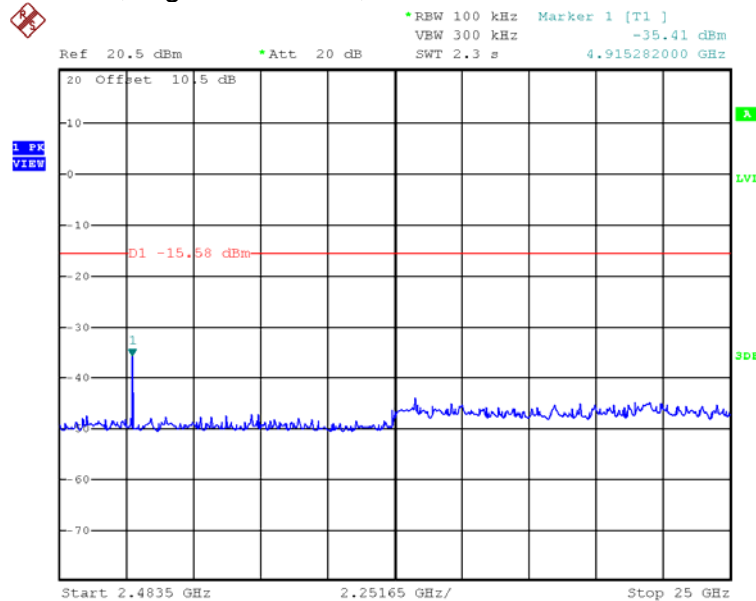
### Plots of out of band conducted emissions

#### 802.11b, Highest Channel, Plot A



Date: 6.AUG.2015 10:13:46

#### 802.11b, Highest Channel, Plot B



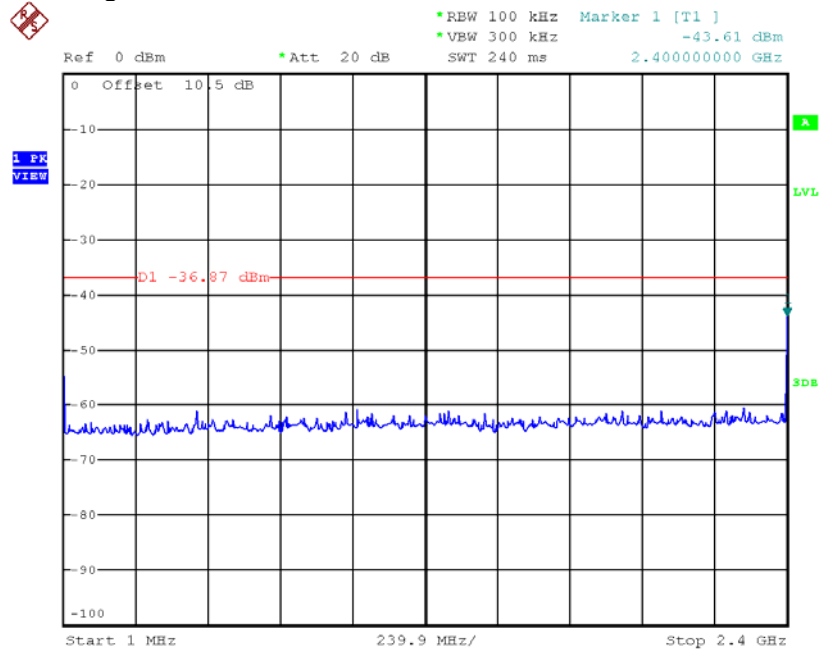
Date: 6.AUG.2015 10:14:22



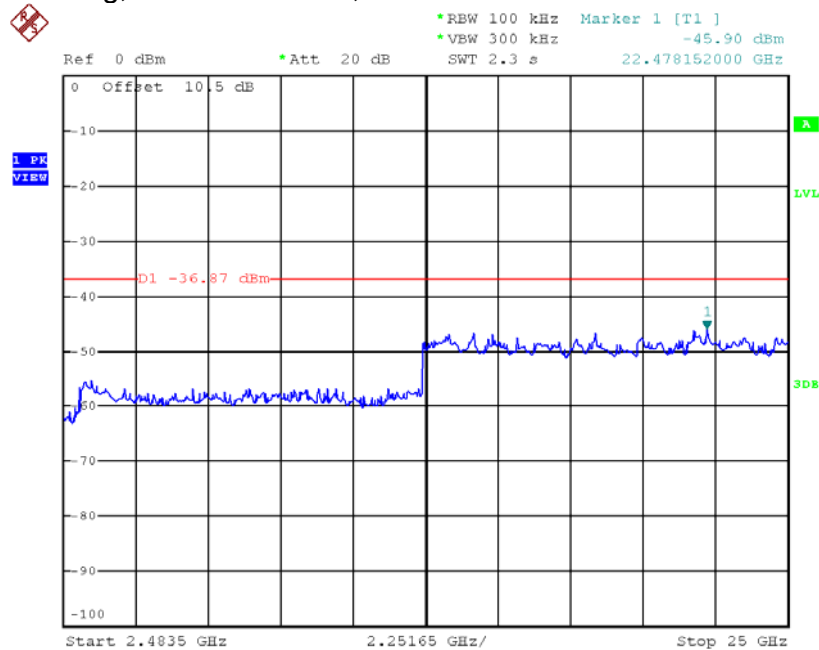
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11g, Lowest Channel, Plot A



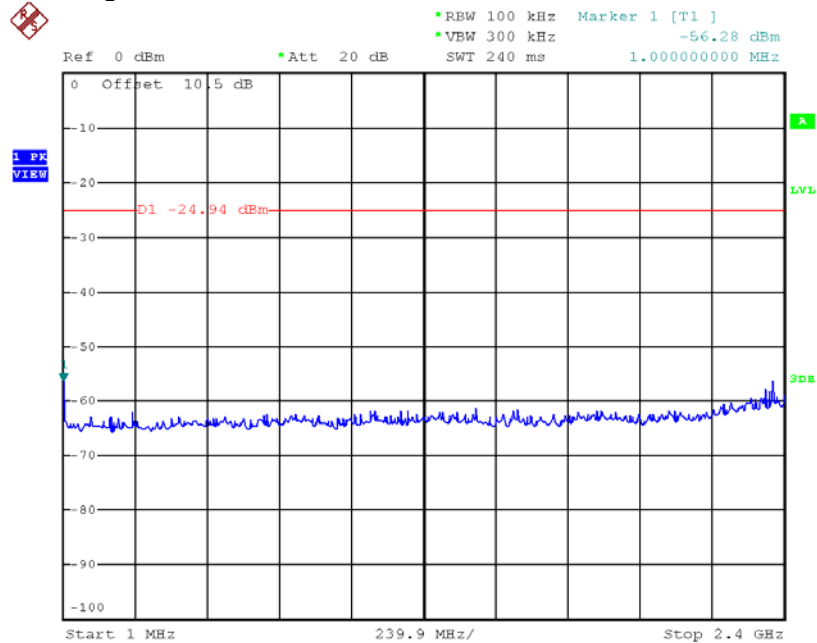
802.11g, Lowest Channel, Plot B



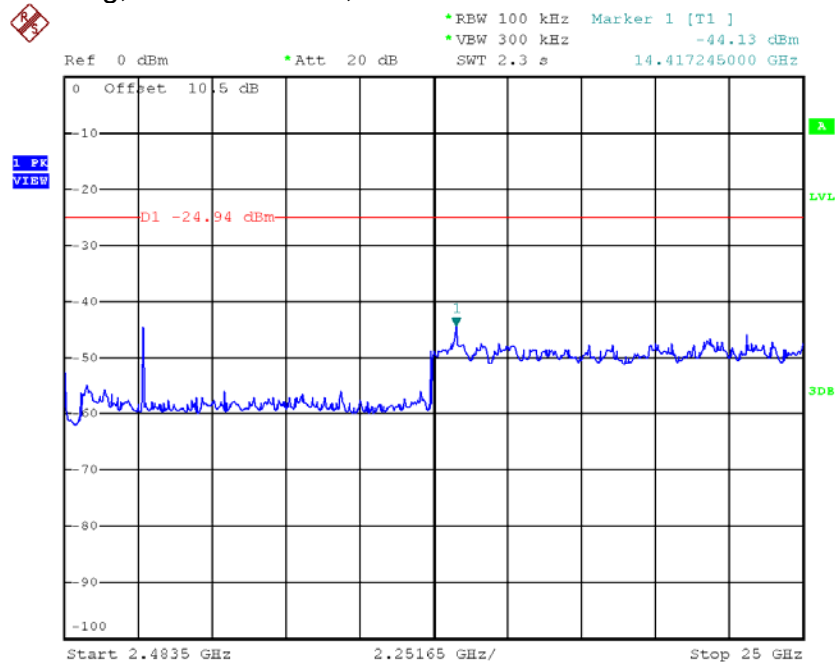
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11g, Middle Channel, Plot A



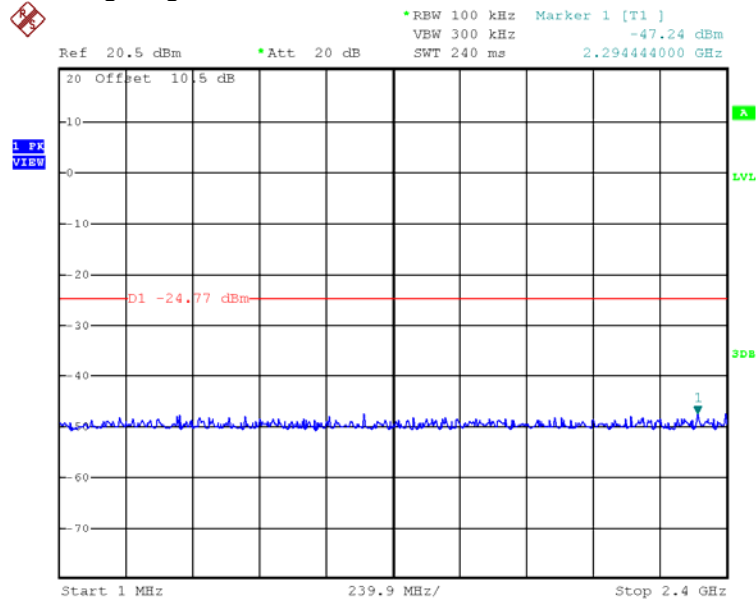
802.11g, Middle Channel, Plot B



## INTERTEK TESTING SERVICES

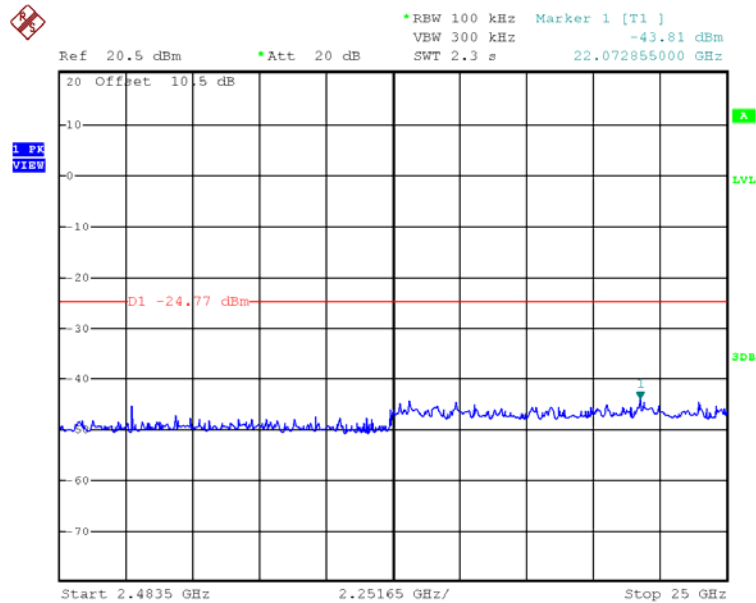
### Plots of out of band conducted emissions

802.11g, Highest Channel, Plot A



Date: 6.AUG.2015 10:15:37

802.11g, Highest Channel, Plot B

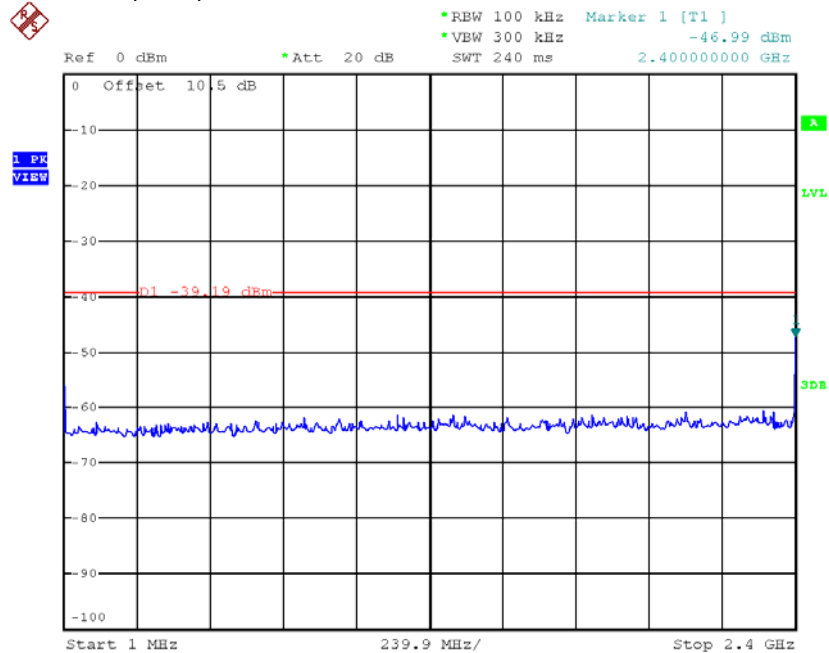


Date: 6.AUG.2015 10:16:05

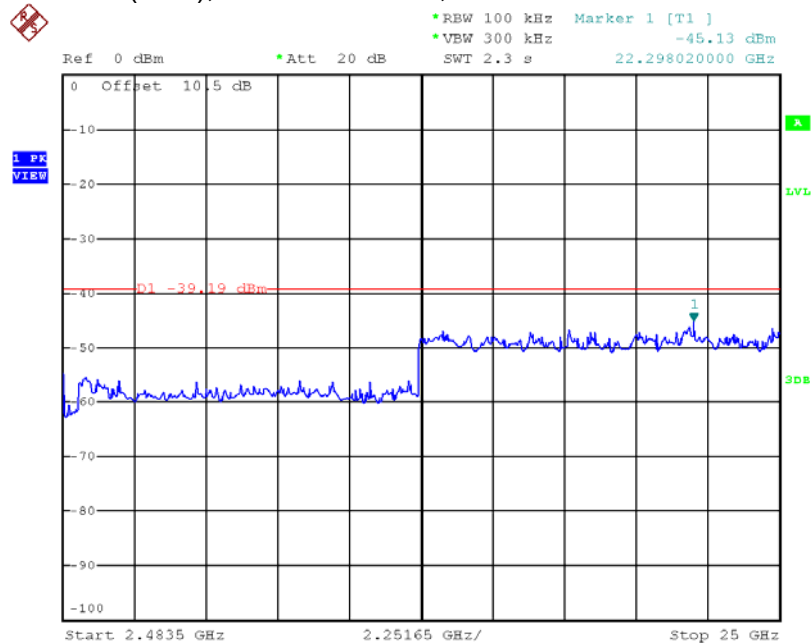
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

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



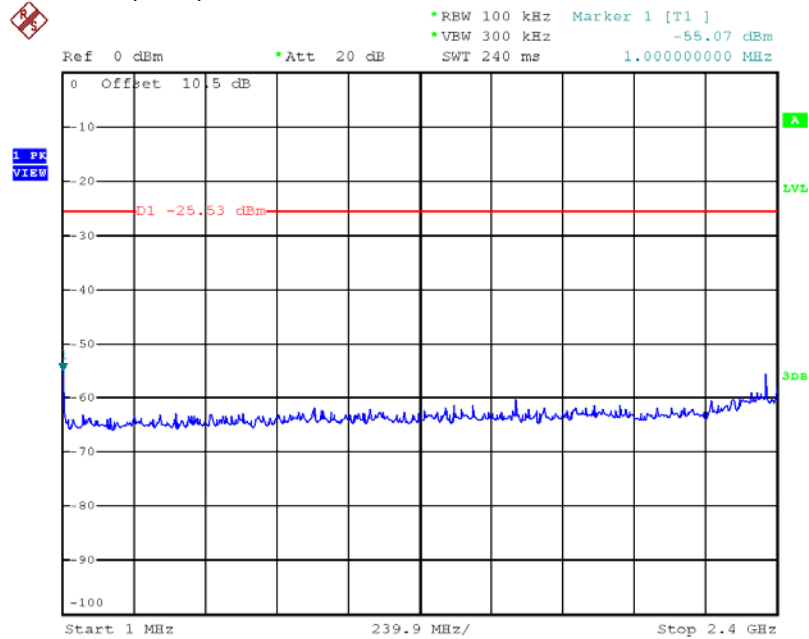
802.11n (20m), Lowest Channel, Plot B



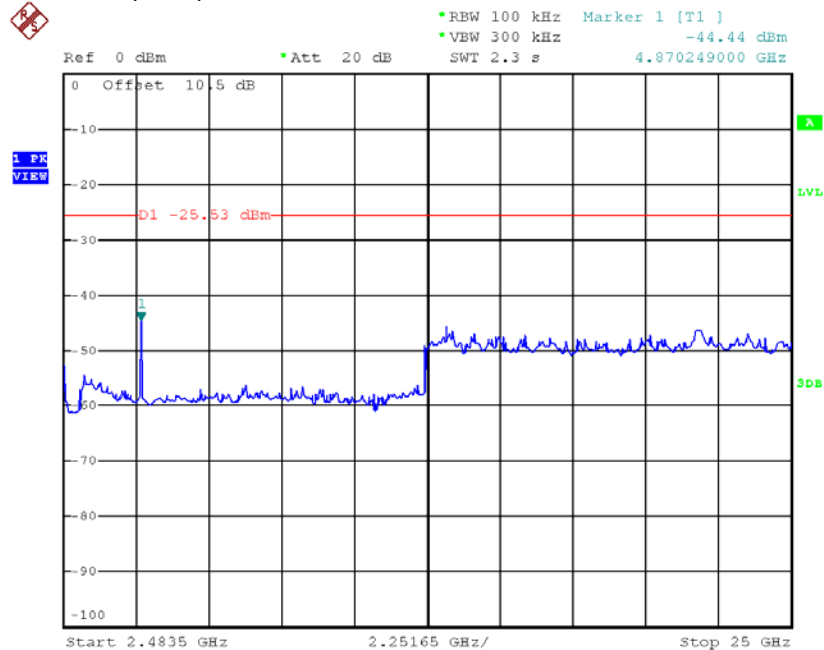
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

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



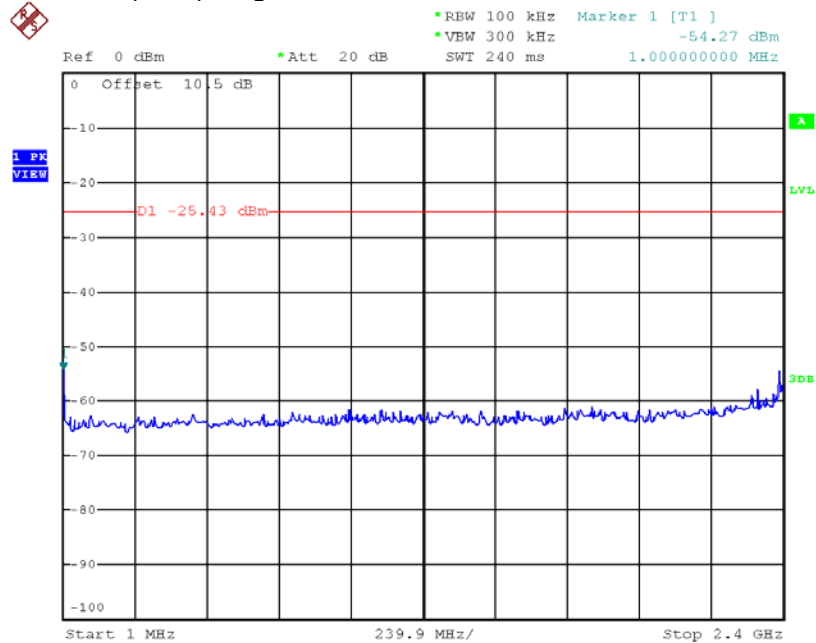
802.11n (20m), Middle Channel, Plot B



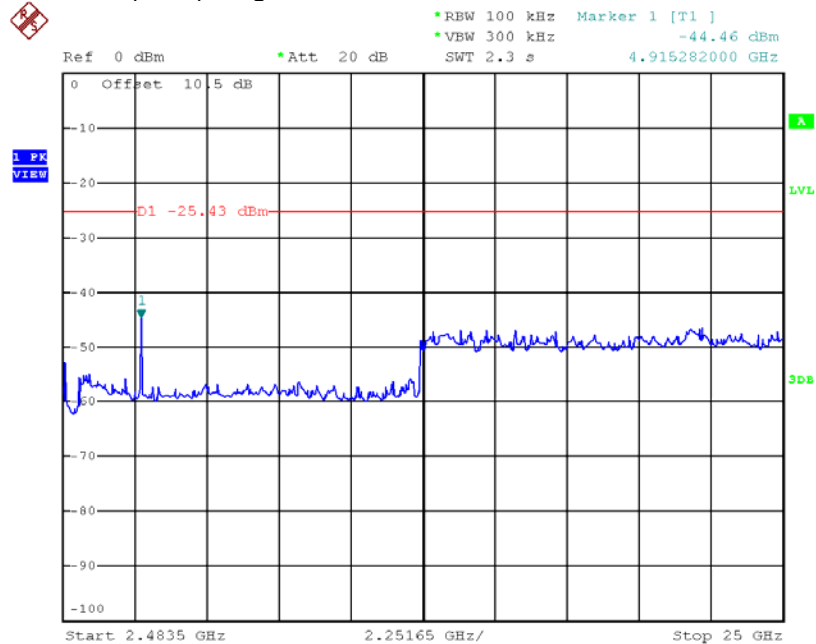
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

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



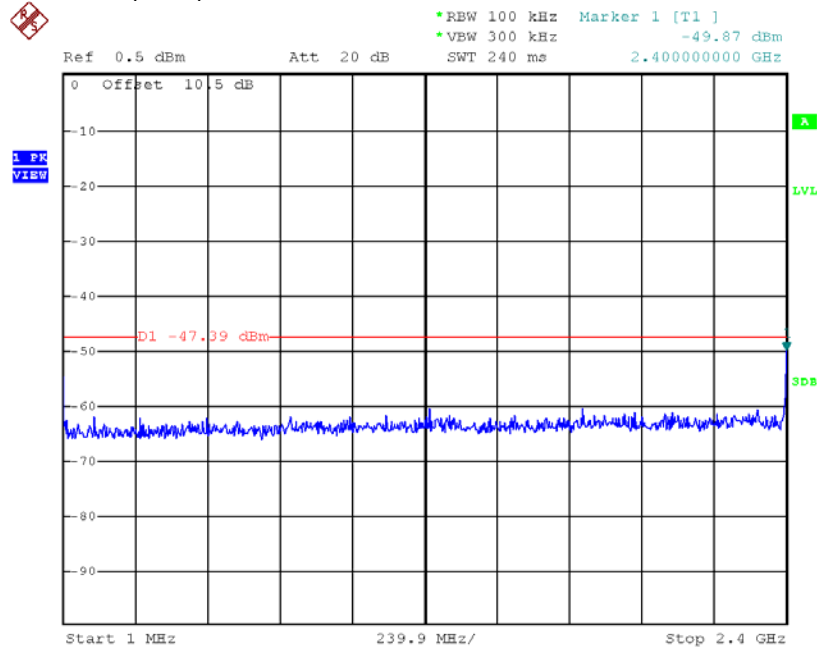
802.11n (20m), Highest Channel, Plot B



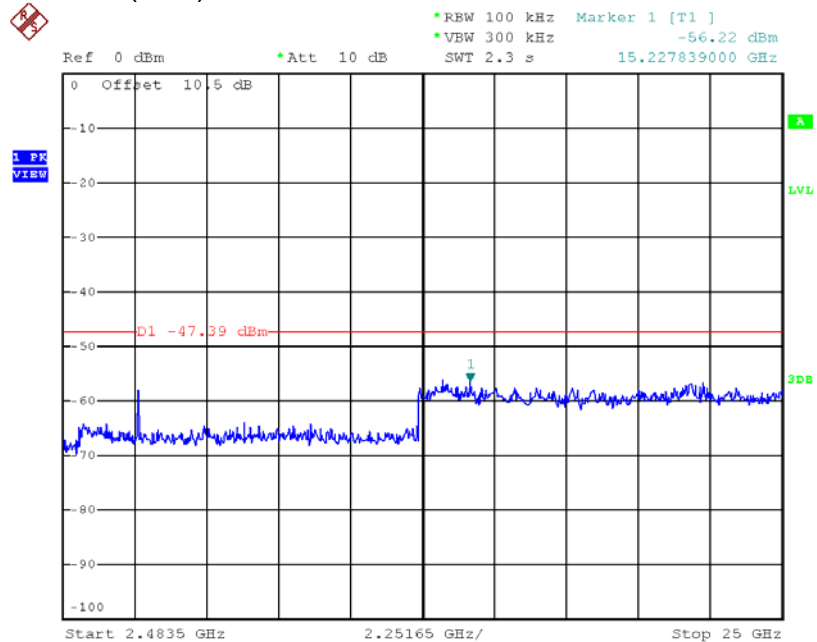
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11n (40m), Lowest Channel, Plot A



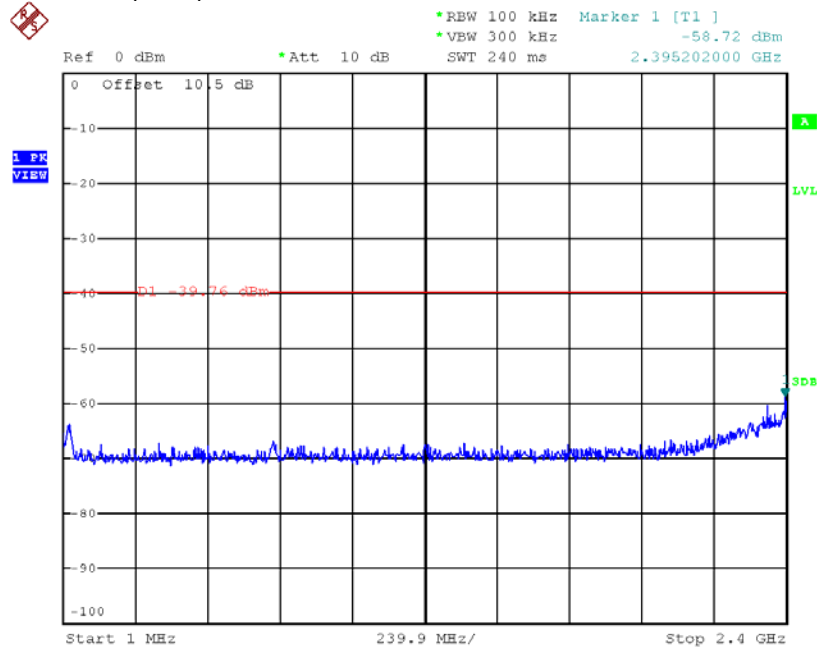
802.11n (40m), Lowest Channel, Plot B



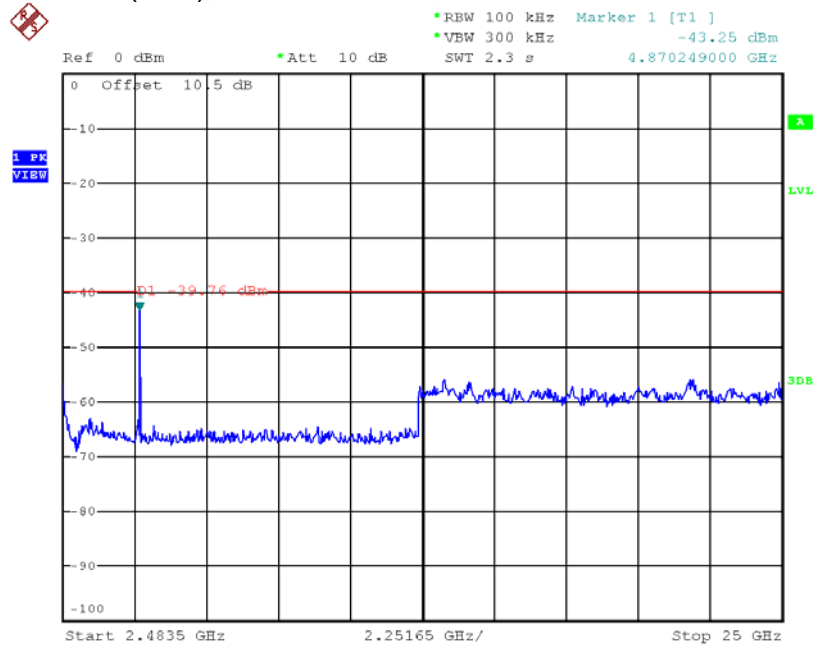
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11n (40m), Middle Channel, Plot A



802.11n (40m), Middle Channel, Plot B

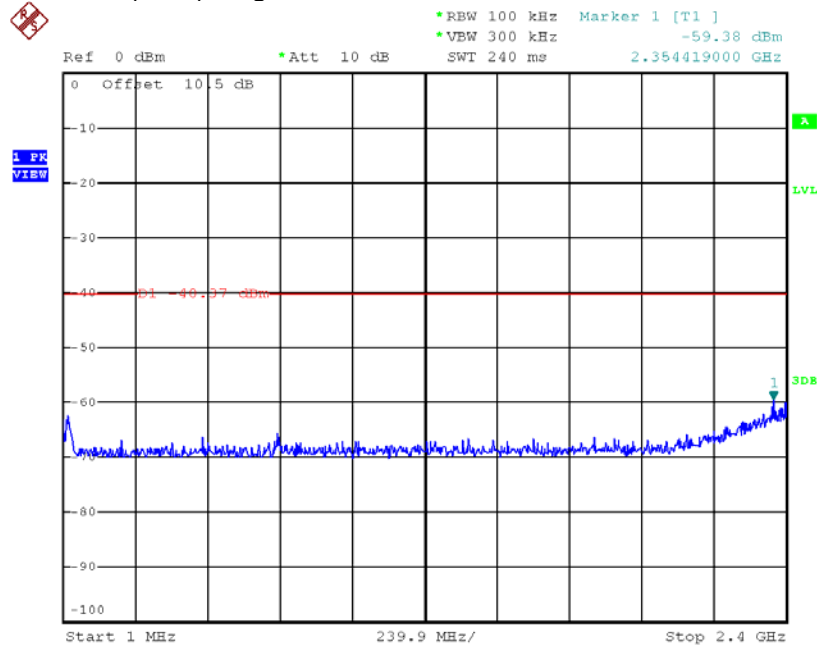




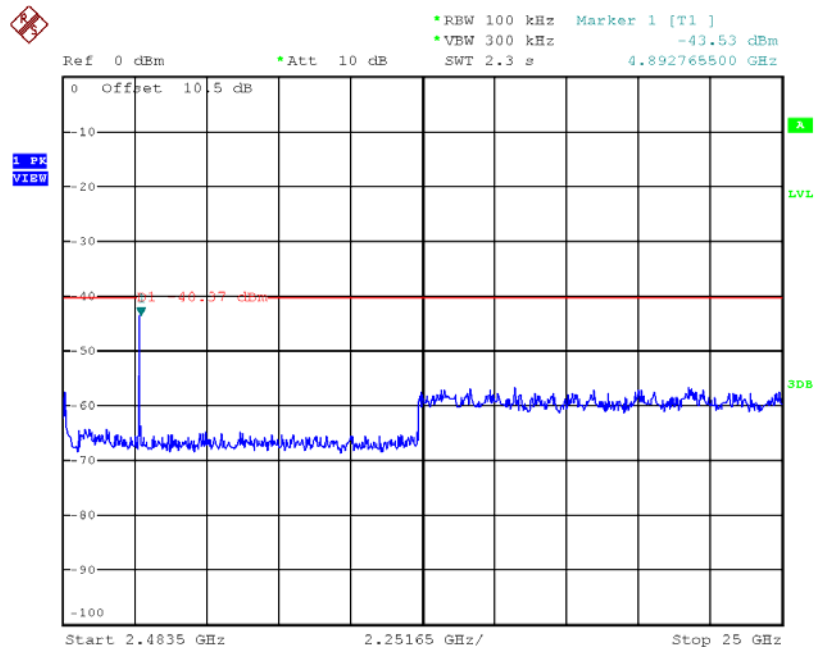
## INTERTEK TESTING SERVICES

### Plots of out of band conducted emissions

802.11n (40m), Highest Channel, Plot A



802.11n (40m), Highest Channel, Plot B



## INTERTEK TESTING SERVICES

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### 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 dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- 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 dB $\mu$ V 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 dB $\mu$ V/m. This value in dB $\mu$ V/m is converted to its corresponding level in  $\mu$ V/m.

RA = 62.0 dB $\mu$ V  
AF = 7.4 dB  
CF = 1.6 dB  
AG = 29.0 dB  
PD = 0.0 dB  
AV = -10 dB

$$FS = 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + (-10.0) = 32.0 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

## **INTERTEK TESTING SERVICES**

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### 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

2400 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 1-13 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 0.5 dB margin compare with average limit

## INTERTEK TESTING SERVICES

### Radiated Emission on the Bandedge

For IEEE 802.11b/g/n 20MHz channel 1 & IEEE 802.11n 40MHz channel 3;

The test data of bandedge emissions were shown on the below radiated emissions table 1,3,4,6,7,9,10 & 12.

For IEEE 802.11b/g/n 20MHz channel 2 & IEEE 802.11n 40MHz channel 4;

As channel 1 of IEEE802.11b/g/n 20MHz & channel 3 of IEEE802.11n 40MHz were operated at reduced output powers, so the channel 2 of IEEE802.11 b/g/n 20MHz & channel 4 of IEEE802.11n 40MHz were also measured and the test data are shown as below;

IEEE802.11b ch2;

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	51.6	33	29.4	48.0	54.0	-6.0

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	63.3	33	29.4	59.7	74.0	-14.3

Remark: Peak detector is used.

IEEE802.11g ch2;

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	51.1	33	29.4	47.5	54.0	-6.5

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	63.0	33	29.4	59.4	74.0	-14.6

Remark: Peak detector is used.

## INTERTEK TESTING SERVICES

IEEE802.11n 20MHz ch2;

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	51.6	33	29.4	48.0	54.0	-6.0

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	63.5	33	29.4	59.9	74.0	-14.1

Remark: Peak detector is used.

IEEE802.11n 40MHz ch4;

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	52.2	33	29.4	48.6	54.0	-5.4

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	63.5	33	29.4	59.9	74.0	-14.1

Remark: Peak detector is used.

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74dBμV/m (Peak Limit) and 54dBμV/m (Average Limit).

# INTERTEK TESTING SERVICES

Mode: TX-Channel 01

Table 1  
IEEE 802.11b (DSSS, 1 Mbps)

## Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	57.1	33	29.4	53.5	54.0	-0.5
<b>V</b>	<b>4824.000</b>	<b>40.9</b>	<b>33</b>	<b>34.9</b>	<b>42.8</b>	<b>54.0</b>	<b>-11.2</b>
V	7236.000	39.7	33	37.9	44.6	54.0	-9.4
H	9648.000	41.3	33	40.4	48.7	54.0	-5.3
<b>V</b>	<b>12060.000</b>	<b>43.5</b>	<b>33</b>	<b>40.5</b>	<b>51.0</b>	<b>54.0</b>	<b>-3.0</b>
<b>V</b>	<b>14472.000</b>	<b>45.8</b>	<b>33</b>	<b>40.0</b>	<b>52.8</b>	<b>54.0</b>	<b>-1.2</b>

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	66.1	33	29.4	62.5	74.0	-11.5
<b>V</b>	<b>4824.000</b>	<b>51.4</b>	<b>33</b>	<b>34.9</b>	<b>53.3</b>	<b>74.0</b>	<b>-20.7</b>
V	7236.000	50.6	33	37.9	55.5	74.0	-18.5
H	9648.000	52.6	33	40.4	60.0	74.0	-14.0
<b>V</b>	<b>12060.000</b>	<b>53.2</b>	<b>33</b>	<b>40.5</b>	<b>60.7</b>	<b>74.0</b>	<b>-13.3</b>
<b>V</b>	<b>14472.000</b>	<b>55.5</b>	<b>33</b>	<b>40.0</b>	<b>62.5</b>	<b>74.0</b>	<b>-11.5</b>

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## INTERTEK TESTING SERVICES

Mode: TX-Channel 07

Table 2  
IEEE 802.11b (DSSS, 1 Mbps)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	<b>4874.000</b>	<b>46.6</b>	<b>33</b>	<b>34.9</b>	<b>48.5</b>	<b>54.0</b>	<b>-5.5</b>
V	<b>7311.000</b>	<b>39.3</b>	<b>33</b>	<b>37.9</b>	<b>44.2</b>	<b>54.0</b>	<b>-9.8</b>
V	9748.000	40.9	33	40.4	48.3	54.0	-5.7
V	<b>12185.000</b>	<b>43.5</b>	<b>33</b>	<b>40.5</b>	<b>51.0</b>	<b>54.0</b>	<b>-3.0</b>
V	14622.000	46.9	33	38.4	52.3	54.0	-1.7

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
V	<b>4874.000</b>	<b>52.6</b>	<b>33</b>	<b>34.9</b>	<b>54.5</b>	<b>74.0</b>	<b>-19.5</b>
V	7311.000	50.4	33	37.9	55.3	74.0	-18.7
V	9748.000	53.1	33	40.4	60.5	74.0	-13.5
V	<b>12185.000</b>	<b>52.8</b>	<b>33</b>	<b>40.5</b>	<b>60.3</b>	<b>74.0</b>	<b>-13.7</b>
V	14622.000	56.7	33	38.4	62.1	74.0	-11.9

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

# INTERTEK TESTING SERVICES

Mode: TX-Channel 11

Table 3  
IEEE 802.11b (DSSS, 1 Mbps)

## Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b>H</b>	<b>2483.500</b>	<b>52.4</b>	<b>33</b>	<b>29.4</b>	<b>48.8</b>	<b>54.0</b>	<b>-5.2</b>
<b>V</b>	<b>4924.000</b>	<b>44.9</b>	<b>33</b>	<b>34.9</b>	<b>46.8</b>	<b>54.0</b>	<b>-7.2</b>
<b>V</b>	<b>7386.000</b>	<b>39.5</b>	<b>33</b>	<b>37.9</b>	<b>44.4</b>	<b>54.0</b>	<b>-9.6</b>
V	9848.000	39.6	33	40.4	47.0	54.0	-7.0
<b>V</b>	<b>12310.000</b>	<b>43.7</b>	<b>33</b>	<b>40.5</b>	<b>51.2</b>	<b>54.0</b>	<b>-2.8</b>
V	14772.000	47.2	33	38.4	52.6	54.0	-1.4

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
<b>H</b>	<b>2483.500</b>	<b>63.6</b>	<b>33</b>	<b>29.4</b>	<b>60.0</b>	<b>74.0</b>	<b>-14.0</b>
<b>V</b>	<b>4924.000</b>	<b>52.9</b>	<b>33</b>	<b>34.9</b>	<b>54.8</b>	<b>74.0</b>	<b>-19.2</b>
<b>V</b>	<b>7386.000</b>	<b>50.7</b>	<b>33</b>	<b>37.9</b>	<b>55.6</b>	<b>74.0</b>	<b>-18.4</b>
V	9848.000	51.0	33	40.4	58.4	74.0	-15.6
<b>V</b>	<b>12310.000</b>	<b>52.8</b>	<b>33</b>	<b>40.5</b>	<b>60.3</b>	<b>74.0</b>	<b>-13.7</b>
V	14772.000	56.8	33	38.4	62.2	74.0	-11.8

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.



## INTERTEK TESTING SERVICES

Mode: TX-Channel 01

Table 4  
IEEE 802.11g (OFDM, 6 Mbps)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	54.6	33	29.4	51.0	54.0	-3.0
<b>V</b>	<b>4824.000</b>	<b>40.5</b>	<b>33</b>	<b>34.9</b>	<b>42.4</b>	<b>54.0</b>	<b>-11.6</b>
V	7236.000	39.4	33	37.9	44.3	54.0	-9.7
H	9648.000	41.1	33	40.4	48.5	54.0	-5.5
<b>V</b>	<b>12060.000</b>	<b>43.7</b>	<b>33</b>	<b>40.5</b>	<b>51.2</b>	<b>54.0</b>	<b>-2.8</b>

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	76.8	33	29.4	73.2	74.0	-0.8
<b>V</b>	<b>4824.000</b>	<b>51.8</b>	<b>33</b>	<b>34.9</b>	<b>53.7</b>	<b>74.0</b>	<b>-20.3</b>
V	7236.000	50.3	33	37.9	55.2	74.0	-18.8
H	9648.000	51.0	33	40.4	58.4	74.0	-15.6
<b>V</b>	<b>12060.000</b>	<b>52.7</b>	<b>33</b>	<b>40.5</b>	<b>60.2</b>	<b>74.0</b>	<b>-13.8</b>
V	14472.000	55.4	33	40.0	62.4	74.0	-11.6

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

# INTERTEK TESTING SERVICES

Mode: TX-Channel 07

Table 5  
IEEE 802.11g (OFDM, 6 Mbps)

## Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	<b>4874.000</b>	<b>41.4</b>	<b>33</b>	<b>34.9</b>	<b>43.3</b>	<b>54.0</b>	<b>-10.7</b>
V	<b>7311.000</b>	<b>39.9</b>	<b>33</b>	<b>37.9</b>	<b>44.8</b>	<b>54.0</b>	<b>-9.2</b>
V	9748.000	40.8	33	40.4	48.2	54.0	-5.8
V	<b>12185.000</b>	<b>43.8</b>	<b>33</b>	<b>40.5</b>	<b>51.3</b>	<b>54.0</b>	<b>-2.7</b>
V	14622.000	47.2	33	38.4	52.6	54.0	-1.4

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
V	<b>4874.000</b>	<b>52.4</b>	<b>33</b>	<b>34.9</b>	<b>54.3</b>	<b>74.0</b>	<b>-19.7</b>
V	<b>7311.000</b>	<b>50.9</b>	<b>33</b>	<b>37.9</b>	<b>55.8</b>	<b>74.0</b>	<b>-18.2</b>
V	9748.000	51.4	33	40.4	58.8	74.0	-15.2
V	<b>12185.000</b>	<b>52.6</b>	<b>33</b>	<b>40.5</b>	<b>60.1</b>	<b>74.0</b>	<b>-13.9</b>
V	14622.000	56.9	33	38.4	62.3	74.0	-11.7

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## INTERTEK TESTING SERVICES

Mode: TX-Channel 11

Table 6  
IEEE 802.11g (OFDM, 6 Mbps)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b>H</b>	<b>2483.500</b>	<b>52.4</b>	<b>33</b>	<b>29.4</b>	<b>48.8</b>	<b>54.0</b>	<b>-5.2</b>
<b>V</b>	<b>4924.000</b>	<b>40.8</b>	<b>33</b>	<b>34.9</b>	<b>42.7</b>	<b>54.0</b>	<b>-11.3</b>
<b>V</b>	<b>7386.000</b>	<b>40.0</b>	<b>33</b>	<b>37.9</b>	<b>44.9</b>	<b>54.0</b>	<b>-9.1</b>
V	9848.000	39.7	33	40.4	47.1	54.0	-6.9
<b>V</b>	<b>12310.000</b>	<b>43.5</b>	<b>33</b>	<b>40.5</b>	<b>51.0</b>	<b>54.0</b>	<b>-3.0</b>

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
<b>H</b>	<b>2483.500</b>	<b>63.5</b>	<b>33</b>	<b>29.4</b>	<b>59.9</b>	<b>74.0</b>	<b>-14.1</b>
<b>V</b>	<b>4924.000</b>	<b>52.3</b>	<b>33</b>	<b>34.9</b>	<b>54.2</b>	<b>74.0</b>	<b>-19.8</b>
<b>V</b>	<b>7386.000</b>	<b>51.0</b>	<b>33</b>	<b>37.9</b>	<b>55.9</b>	<b>74.0</b>	<b>-18.1</b>
V	9848.000	51.2	33	40.4	58.6	74.0	-15.4
<b>V</b>	<b>12310.000</b>	<b>52.8</b>	<b>33</b>	<b>40.5</b>	<b>60.3</b>	<b>74.0</b>	<b>-13.7</b>

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## INTERTEK TESTING SERVICES

Mode: TX-Channel 01

Table 7  
IEEE 802.11n (20MHz) (OFDM, MCS0)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	54.2	33	29.4	50.6	54.0	-3.4
<b>V</b>	<b>4824.000</b>	<b>40.4</b>	<b>33</b>	<b>34.9</b>	<b>42.3</b>	<b>54.0</b>	<b>-11.7</b>
V	7236.000	39.7	33	37.9	44.6	54.0	-9.4
H	9648.000	40.8	33	40.4	48.2	54.0	-5.8
<b>V</b>	<b>12060.000</b>	<b>43.8</b>	<b>33</b>	<b>40.5</b>	<b>51.3</b>	<b>54.0</b>	<b>-2.7</b>
<b>V</b>	<b>14472.000</b>	<b>45.2</b>	<b>33</b>	<b>40.0</b>	<b>52.2</b>	<b>54.0</b>	<b>-1.8</b>

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	73.1	33	29.4	69.5	74.0	-4.5
<b>V</b>	<b>4824.000</b>	<b>51.5</b>	<b>33</b>	<b>34.9</b>	<b>53.4</b>	<b>74.0</b>	<b>-20.6</b>
V	7236.000	50.6	33	37.9	55.5	74.0	-18.5
H	9648.000	51.4	33	40.4	58.8	74.0	-15.2
<b>V</b>	<b>12060.000</b>	<b>52.6</b>	<b>33</b>	<b>40.5</b>	<b>60.1</b>	<b>74.0</b>	<b>-13.9</b>
<b>V</b>	<b>14472.000</b>	<b>55.2</b>	<b>33</b>	<b>40.0</b>	<b>62.2</b>	<b>74.0</b>	<b>-11.8</b>

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## INTERTEK TESTING SERVICES

Mode: TX-Channel 07

Table 8  
IEEE 802.11n (20MHz) (OFDM, MCS0)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	<b>4874.000</b>	<b>41.6</b>	<b>33</b>	<b>34.9</b>	<b>43.5</b>	<b>54.0</b>	<b>-10.5</b>
V	<b>7311.000</b>	<b>39.3</b>	<b>33</b>	<b>37.9</b>	<b>44.2</b>	<b>54.0</b>	<b>-9.8</b>
V	9748.000	40.6	33	40.4	48.0	54.0	-6.0
V	<b>12185.000</b>	<b>43.6</b>	<b>33</b>	<b>40.5</b>	<b>51.1</b>	<b>54.0</b>	<b>-2.9</b>
V	14622.000	46.9	33	38.4	52.3	54.0	-1.7

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
V	<b>4874.000</b>	<b>52.1</b>	<b>33</b>	<b>34.9</b>	<b>54.0</b>	<b>74.0</b>	<b>-20.0</b>
V	<b>7311.000</b>	<b>50.4</b>	<b>33</b>	<b>37.9</b>	<b>55.3</b>	<b>74.0</b>	<b>-18.7</b>
V	9748.000	51.2	33	40.4	58.6	74.0	-15.4
V	<b>12185.000</b>	<b>52.8</b>	<b>33</b>	<b>40.5</b>	<b>60.3</b>	<b>74.0</b>	<b>-13.7</b>
V	14622.000	56.8	33	38.4	62.2	74.0	-11.8

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

# INTERTEK TESTING SERVICES

Mode: TX-Channel 11

Table 9  
IEEE 802.11n (20MHz) (OFDM, MCS0)

## Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b>H</b>	<b>2483.500</b>	<b>52.0</b>	<b>33</b>	<b>29.4</b>	<b>48.4</b>	<b>54.0</b>	<b>-5.6</b>
<b>V</b>	<b>4924.000</b>	<b>40.3</b>	<b>33</b>	<b>34.9</b>	<b>42.2</b>	<b>54.0</b>	<b>-11.8</b>
<b>V</b>	<b>7386.000</b>	<b>39.5</b>	<b>33</b>	<b>37.9</b>	<b>44.4</b>	<b>54.0</b>	<b>-9.6</b>
V	9848.000	39.7	33	40.4	47.1	54.0	-6.9
<b>V</b>	<b>12310.000</b>	<b>43.7</b>	<b>33</b>	<b>40.5</b>	<b>51.2</b>	<b>54.0</b>	<b>-2.8</b>
V	14772.000	47.3	33	38.4	52.7	54.0	-1.3

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
<b>H</b>	<b>2483.500</b>	<b>63.6</b>	<b>33</b>	<b>29.4</b>	<b>60.0</b>	<b>74.0</b>	<b>-14.0</b>
<b>V</b>	<b>4924.000</b>	<b>52.2</b>	<b>33</b>	<b>34.9</b>	<b>54.1</b>	<b>74.0</b>	<b>-19.9</b>
<b>V</b>	<b>7386.000</b>	<b>50.3</b>	<b>33</b>	<b>37.9</b>	<b>55.2</b>	<b>74.0</b>	<b>-18.8</b>
V	9848.000	51.0	33	40.4	58.4	74.0	-15.6
<b>V</b>	<b>12310.000</b>	<b>53.2</b>	<b>33</b>	<b>40.5</b>	<b>60.7</b>	<b>74.0</b>	<b>-13.3</b>
V	14772.000	57.1	33	38.4	62.5	74.0	-11.5

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## INTERTEK TESTING SERVICES

Mode: TX-Channel 01

Table 10  
IEEE 802.11n (40MHz) (OFDM, MCS0)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2400.000	56.6	33	29.4	53.0	54.0	-1.0
V	<b>4844.000</b>	<b>40.3</b>	<b>33</b>	<b>34.9</b>	<b>42.2</b>	<b>54.0</b>	<b>-11.8</b>
V	<b>7266.000</b>	<b>39.4</b>	<b>33</b>	<b>37.9</b>	<b>44.3</b>	<b>54.0</b>	<b>-9.7</b>
H	9688.000	41.1	33	40.4	48.5	54.0	-5.5
V	<b>12110.000</b>	<b>43.7</b>	<b>33</b>	<b>40.5</b>	<b>51.2</b>	<b>54.0</b>	<b>-2.8</b>
V	14532.000	47.4	33	38.4	52.8	54.0	-1.2

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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	2400.000	69.3	33	29.4	65.7	74.0	-8.3
V	<b>4844.000</b>	<b>51.4</b>	<b>33</b>	<b>34.9</b>	<b>53.3</b>	<b>74.0</b>	<b>-20.7</b>
V	<b>7266.000</b>	<b>50.2</b>	<b>33</b>	<b>37.9</b>	<b>55.1</b>	<b>74.0</b>	<b>-18.9</b>
H	9688.000	50.6	33	40.4	58.0	74.0	-16.0
V	<b>12110.000</b>	<b>53.0</b>	<b>33</b>	<b>40.5</b>	<b>60.5</b>	<b>74.0</b>	<b>-13.5</b>
V	14532.000	56.9	33	38.4	62.3	74.0	-11.7

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

# INTERTEK TESTING SERVICES

Mode: TX-Channel 04

Table 11  
IEEE 802.11n (40MHz) (OFDM, MCS0)

## Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	<b>4874.000</b>	<b>41.5</b>	<b>33</b>	<b>34.9</b>	<b>43.4</b>	<b>54.0</b>	<b>-10.6</b>
V	<b>7311.000</b>	<b>39.7</b>	<b>33</b>	<b>37.9</b>	<b>44.6</b>	<b>54.0</b>	<b>-9.4</b>
V	9748.000	40.9	33	40.4	48.3	54.0	-5.7
V	<b>12185.000</b>	<b>44.0</b>	<b>33</b>	<b>40.5</b>	<b>51.5</b>	<b>54.0</b>	<b>-2.5</b>
V	14622.000	46.8	33	38.4	52.2	54.0	-1.8

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
V	<b>4874.000</b>	<b>52.3</b>	<b>33</b>	<b>34.9</b>	<b>54.2</b>	<b>74.0</b>	<b>-19.8</b>
V	<b>7311.000</b>	<b>50.4</b>	<b>33</b>	<b>37.9</b>	<b>55.3</b>	<b>74.0</b>	<b>-18.7</b>
V	9748.000	50.8	33	40.4	58.2	74.0	-15.8
V	<b>12185.000</b>	<b>52.7</b>	<b>33</b>	<b>40.5</b>	<b>60.2</b>	<b>74.0</b>	<b>-13.8</b>
V	14622.000	57.1	33	38.4	62.5	74.0	-11.5

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.



## INTERTEK TESTING SERVICES

Mode: TX-Channel 07

Table 12  
IEEE 802.11n (40MHz) (OFDM, MCS0)

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b>H</b>	<b>2483.500</b>	<b>52.0</b>	<b>33</b>	<b>29.4</b>	<b>48.4</b>	<b>54.0</b>	<b>-5.6</b>
<b>V</b>	<b>4904.000</b>	<b>40.8</b>	<b>33</b>	<b>34.9</b>	<b>42.7</b>	<b>54.0</b>	<b>-11.3</b>
<b>V</b>	<b>7356.000</b>	<b>39.3</b>	<b>33</b>	<b>37.9</b>	<b>44.2</b>	<b>54.0</b>	<b>-9.8</b>
V	9808.000	40.0	33	40.4	47.4	54.0	-6.6
<b>V</b>	<b>12260.000</b>	<b>44.2</b>	<b>33</b>	<b>40.5</b>	<b>51.7</b>	<b>54.0</b>	<b>-2.3</b>
V	14712.000	46.9	33	38.4	52.3	54.0	-1.7

Remark: Average measurement method is used according to ANSI C63.10.

Polarization	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)
<b>H</b>	<b>2483.500</b>	<b>63.7</b>	<b>33</b>	<b>29.4</b>	<b>60.1</b>	<b>74.0</b>	<b>-13.9</b>
<b>V</b>	<b>4904.000</b>	<b>52.4</b>	<b>33</b>	<b>34.9</b>	<b>54.3</b>	<b>74.0</b>	<b>-19.7</b>
<b>V</b>	<b>7356.000</b>	<b>50.6</b>	<b>33</b>	<b>37.9</b>	<b>55.5</b>	<b>74.0</b>	<b>-18.5</b>
V	9808.000	51.3	33	40.4	58.7	74.0	-15.3
<b>V</b>	<b>12260.000</b>	<b>52.8</b>	<b>33</b>	<b>40.5</b>	<b>60.3</b>	<b>74.0</b>	<b>-13.7</b>
V	14712.000	56.8	33	38.4	62.2	74.0	-11.8

Remark: Peak detector is used for the emission measurement.

- 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.
  6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## INTERTEK TESTING SERVICES

Mode: Operating (simultaneous transmission Wifi+Bluetooth) with Sound

Table 13

### Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	31.020	29.2	16	10.0	23.2	40.0	-16.8
V	48.020	33.7	16	11.0	28.7	40.0	-11.3
H	139.480	28.3	16	14.0	26.3	43.5	-17.2
<b>H</b>	<b>150.020</b>	<b>28.1</b>	<b>16</b>	<b>14.0</b>	<b>26.1</b>	<b>43.5</b>	<b>-17.4</b>
<b>H</b>	<b>171.434</b>	<b>37.0</b>	<b>16</b>	<b>18.0</b>	<b>39.0</b>	<b>43.5</b>	<b>-4.5</b>
H	178.300	29.5	16	20.0	33.5	43.5	-10.0
V	384.905	34.5	16	24.0	42.5	46.0	-3.5
V	432.004	30.5	16	25.0	39.5	46.0	-6.5
H	471.600	31.5	16	26.0	41.5	46.0	-4.5
V	510.560	30.1	16	27.0	41.1	46.0	-4.9
H	557.156	32.4	16	28.0	44.4	46.0	-1.6
H	642.800	29.5	16	29.0	42.5	46.0	-3.5
H	700.540	26.8	16	30.0	40.8	46.0	-5.2
H	729.600	29.0	16	30.0	43.0	46.0	-3.0
H	750.400	28.5	16	30.0	42.5	46.0	-3.5
H	801.200	25.5	16	31.0	40.5	46.0	-5.5
V	816.560	23.8	16	31.0	38.8	46.0	-7.2

- 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.

## **INTERTEK TESTING SERVICES**

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### 4.6.3 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

## **INTERTEK TESTING SERVICES**

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### **EXHIBIT 5 EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

### 5.0 Equipment List

#### 1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-3095	EW-2512	EW-0447
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI	3104C	3146
Calibration Date	Oct. 16, 2014	Jan. 22, 2015	Mar. 16, 2015
Calibration Due Date	Oct. 16, 2015	Jul. 22, 2016	Sep. 16, 2016

Equipment	Spectrum Analyzer	Double Ridged Guide Antenna
Registration No.	EW-2466	EW-1133
Manufacturer	R&S	EMCO
Model No.	FSP30	3115
Calibration Date	Sep. 02, 2014	Apr. 30, 2014
Calibration Due Date	Sep. 02, 2015	Oct. 30, 2015

#### 2) Conductive Measurement Test

Equipment	RF Power Meter with Power Sensor (N1921A)	Spectrum Analyzer
Registration No.	EW-2270	EW-2253
Manufacturer	AGILENTTECH	R&S
Model No.	N1911A	FSP40
Calibration Date	Jan. 05, 2015	May. 27, 2015
Calibration Due Date	Jan. 05, 2016	May. 27, 2016

**END OF TEST REPORT**