

## TEST REPORT

**Report Number: 17081166HKG-002**

Appcessory Pte Ltd.

Application for Original Grant of 47 CFR Part 15 Certification

Transceiver

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

**FCC ID: 2AJ9S-V15**

**PREPARED AND CHECKED BY:**

**APPROVED BY:**

Signed On File  
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Date: October 31, 2017

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## TEST REPORT

### GENERAL INFORMATION

<b>Applicant Name:</b>	Appcessory Pte Ltd.
<b>Applicant Address:</b>	3 Ang Mo Kio Street, 62 #06-09, Singapore, 569139.
<b>FCC Specification Standard:</b>	FCC Part 15, October 1, 2016 Edition
<b>FCC ID:</b>	<b>2AJ9S-V15</b>
<b>FCC Model(s):</b>	V15
<b>Type of EUT:</b>	Spread Spectrum Transmitter
<b>Description of EUT:</b>	Robotic Pet Toy
<b>Serial Number:</b>	N/A
<b>Sample Receipt Date:</b>	August 18, 2017
<b>Date of Test:</b>	August 18, 2017 to October 27, 2017
<b>Report Date:</b>	October 31, 2017
<b>Environmental Conditions:</b>	Temperature: +10 to 40°C Humidity: 10 to 90%

## TEST REPORT

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## TEST REPORT

### 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 (Peak)	15.247(b)(3)&(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	Pass	4.2
Max. Power Density (average)	15.247(e)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	Pass	4.7

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

##### 1.2 Statement of Compliance

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

FCC Part 15, October 1, 2016 Edition

## TEST REPORT

### EXHIBIT 2 GENERAL DESCRIPTION

#### 2.0 GENERAL DESCRIPTION

##### 2.1 Product Description

The Equipment Under Test (EUT) is a Robotic Pet Toy, equipped with a WLAN module. After connecting the EUT to the WLAN network, user can control the Robotic Pet Toy to monitor the activities of the pet via the mobile apps. The EUT contains motors, camera and SD card storage. The EUT is powered by 3.7V rechargeable battery and/or USB port (5VDC). The USB port is for charging purpose only.

##### For the WLAN (WiFi) module:

For 802.11b mode, it operates at frequency range of 2412MHz to 2462MHz 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 2412MHz to 2462MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps. For 802.11n (HT20 with 20MHz bandwidth) mode, it operates at frequency range of 2412MHz to 2462MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7). Maximum bit rate can support up to 65Mbps. For 802.11n (HT40 with 40MHz bandwidth) mode, it operates at frequency range of 2422MHz to 2452MHz with 9 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7). Maximum bit rate can support up to 130Mbps.

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

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

## TEST REPORT

### 2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No.558074 D01 v04 (05-April-2017) 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: 2042V-1.

### 2.4 Related Submittal(s) Grants

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

## TEST REPORT

### EXHIBIT 3 SYSTEM TEST CONFIGURATION

#### 3.0 SYSTEM TEST CONFIGURATION

##### 3.1 Justification

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

The EUT was powered by 120VAC.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. 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.

## TEST REPORT

### 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 4.8.3.

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 4.8.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, 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 was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. 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.

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

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

### 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.



## TEST REPORT

### 3.3 Details of EUT and Description of Accessories

#### Details of EUT:

1. The EUT is powered by 120VAC

#### Description of Accessories:

1. 4GB Micro SD Card
2. LAN cable of 2m long
3. HP Notebook Computer (Adaptor Model: HSTNN-CA15)  
(Provided by Intertek)
4. USB cable of 1m long  
(Provided by Applicant)

### 3.4 Measurement Uncertainty

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

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.

## TEST REPORT

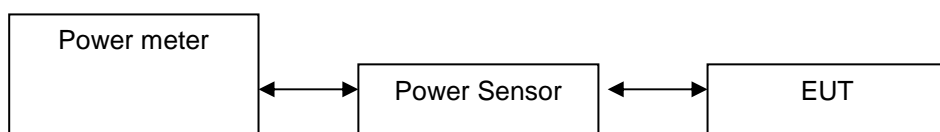
### EXHIBIT 4 TEST RESULTS

#### 4.0 TEST RESULTS

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

###### RF Conduct Measurement Test Setup

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



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

- ☒ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals. The measurement procedure 9.1.2 was used.
- ☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

###### IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 2.0 dBi

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	24.6	288.4
Middle Channel: 2437	24.4	275.4
High Channel: 2462	23.2	208.9

###### IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 2.0 dBi

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	25.4	346.7
Middle Channel: 2437	25.2	331.1
High Channel: 2462	23.2	208.9

###### IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 2.0 dBi

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	25.2	331.1
Middle Channel: 2437	24.8	302.0
High Channel: 2462	23.4	218.8

## TEST REPORT

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

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 2.0 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2422	24.8	302.0
Middle Channel:	2437	24.6	288.4
High Channel:	2452	23.2	208.9

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 (peak) output level = 24.6 dBm

IEEE 802.11g (OFDM, 9 Mbps)

max. conducted (peak) output level = 25.4 dBm

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

max. conducted (peak) output level = 25.2 dBm

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

max. conducted (peak) output level = 24.8 dBm

Limits:

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

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

## TEST REPORT

### 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	10.40
Middle Channel:	2437	9.88
High Channel:	2462	9.92

#### IEEE 802.11g (OFDM, 6 Mbps)

Frequency (MHz)		6dB Bandwidth (MHz)
Low Channel:	2412	16.56
Middle Channel:	2437	16.44
High Channel:	2462	16.48

#### IEEE 802.11n (20MHz) (OFDM, MCS0)

Frequency (MHz)		6dB Bandwidth (MHz)
Low Channel:	2412	17.76
Middle Channel:	2437	17.48
High Channel:	2462	17.52

#### IEEE 802.11n (40MHz) (OFDM, MCS0)

Frequency (MHz)		6dB Bandwidth (MHz)
Low Channel:	2422	36.60
Middle Channel:	2437	36.20
High Channel:	2452	36.08

#### Limits

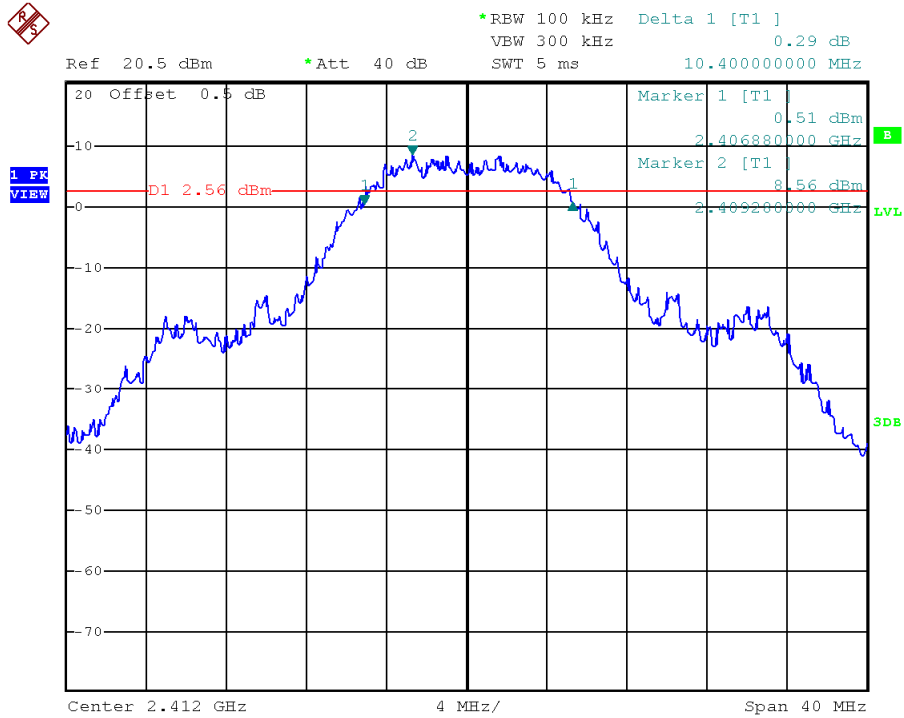
6 dB bandwidth shall be at least 500kHz

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

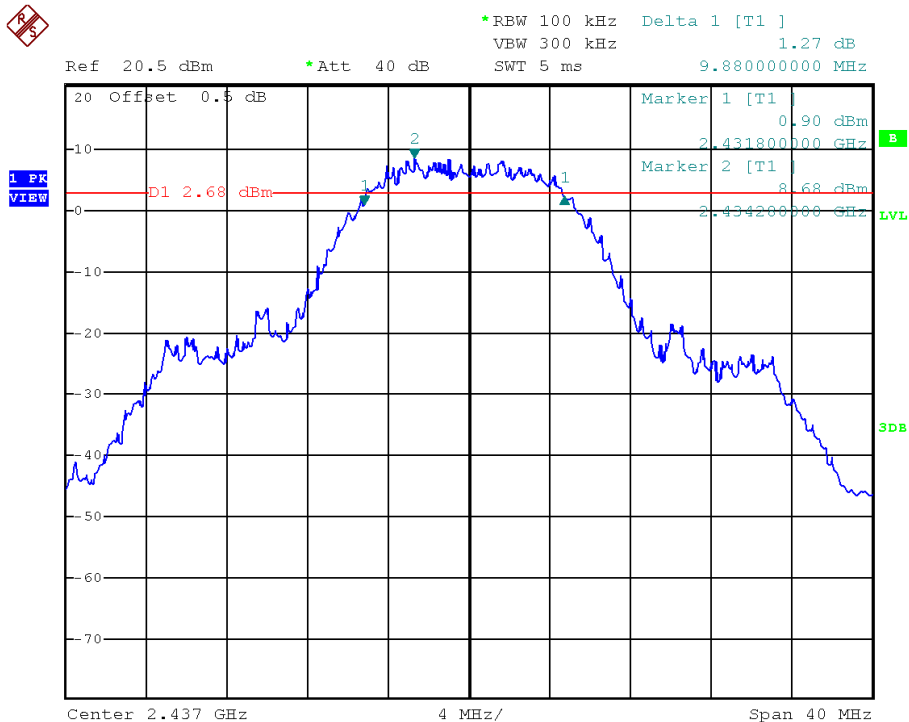
## TEST REPORT

### PLOTS OF 6dB RF BANDWIDTH

#### 802.11b, Lowest Channel



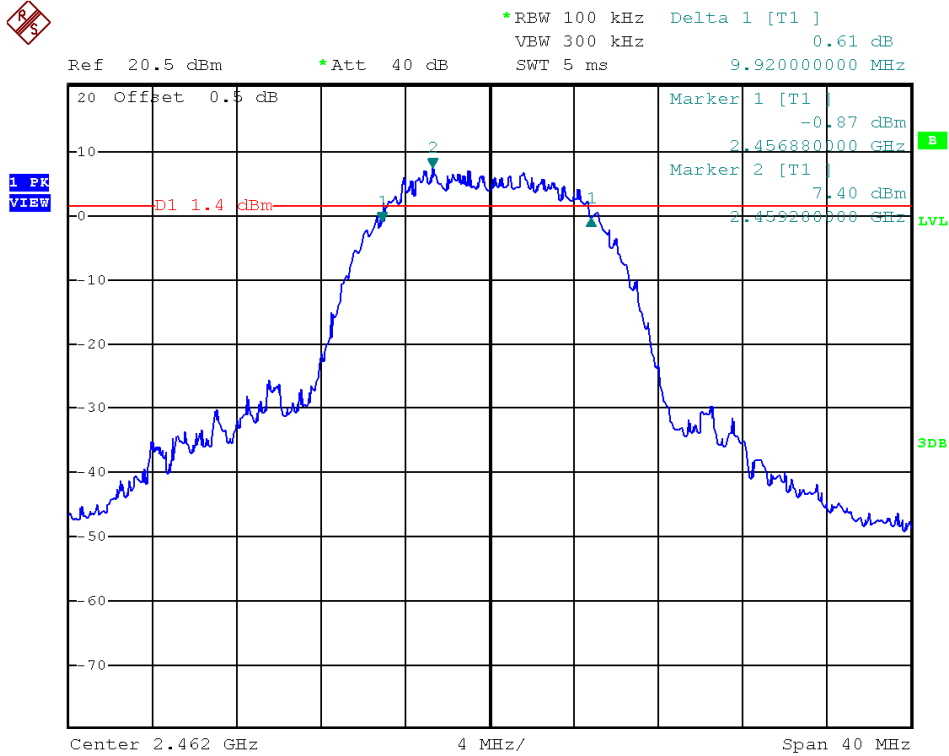
#### 802.11b, Middle Channel



**TEST REPORT**

**PLOTS OF 6dB RF BANDWIDTH**

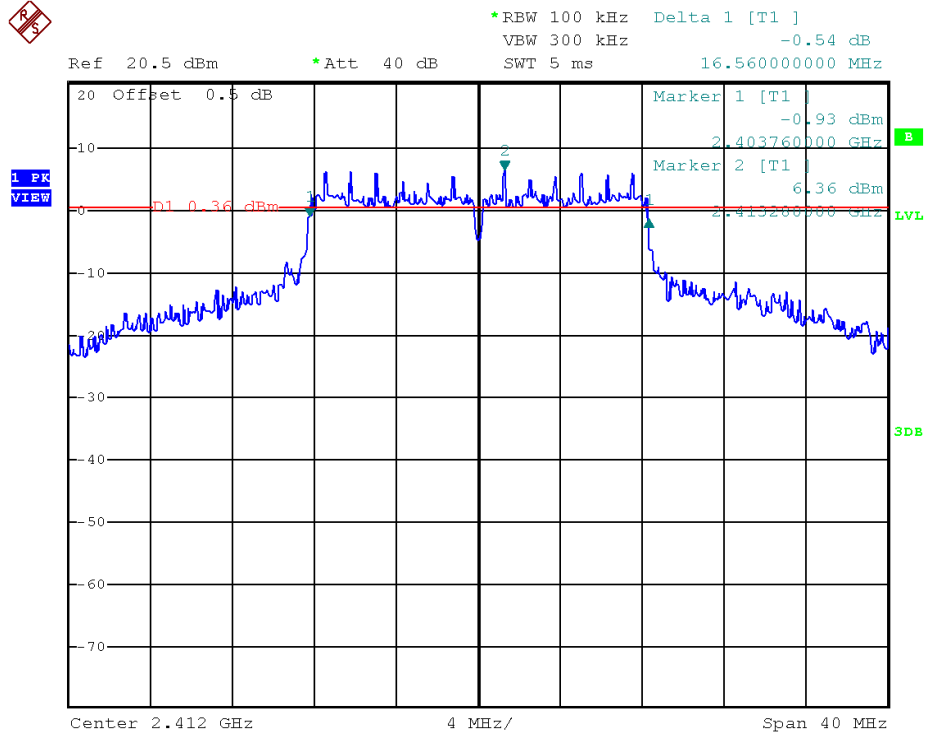
802.11b, Highest Channel



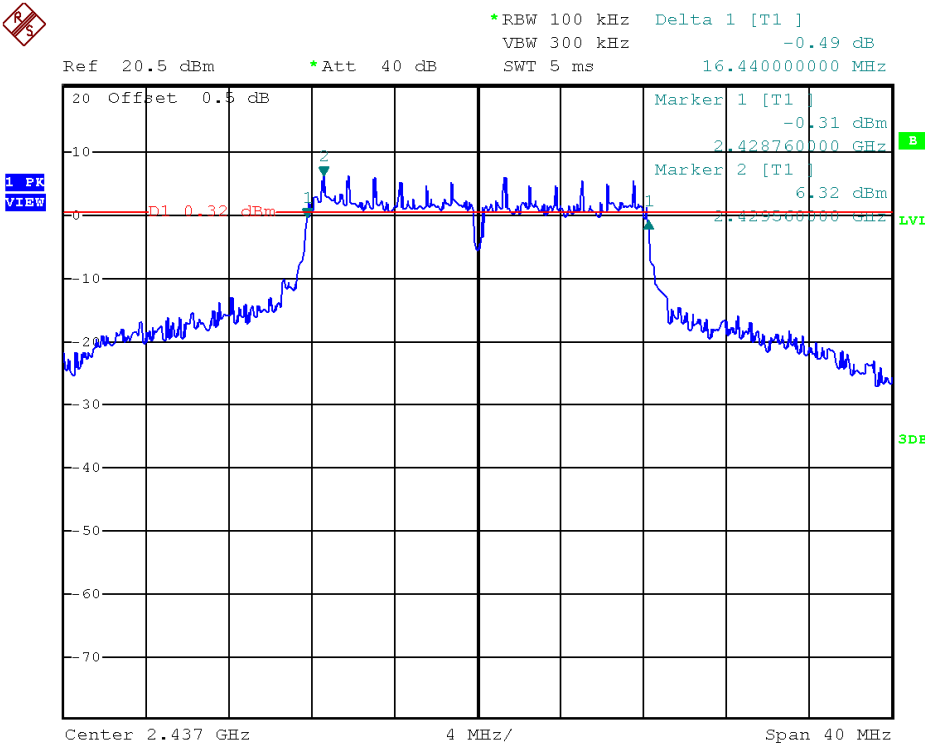
## TEST REPORT

### PLOTS OF 6dB RF BANDWIDTH

#### 802.11g, Lowest Channel



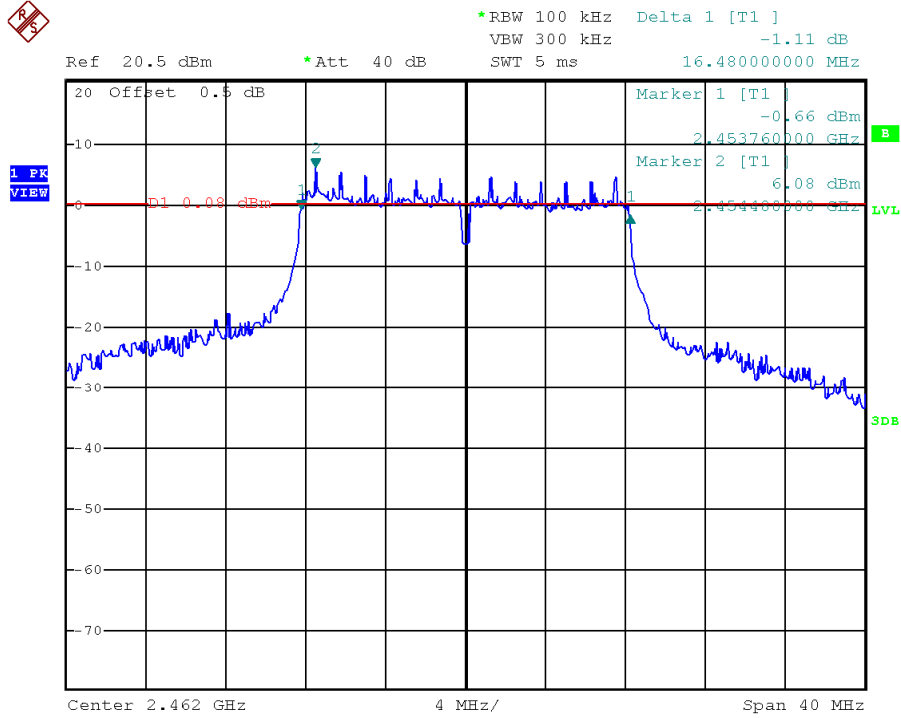
#### 802.11g, Middle Channel



## TEST REPORT

### PLOTS OF 6dB RF BANDWIDTH

802.11g, Highest Channel

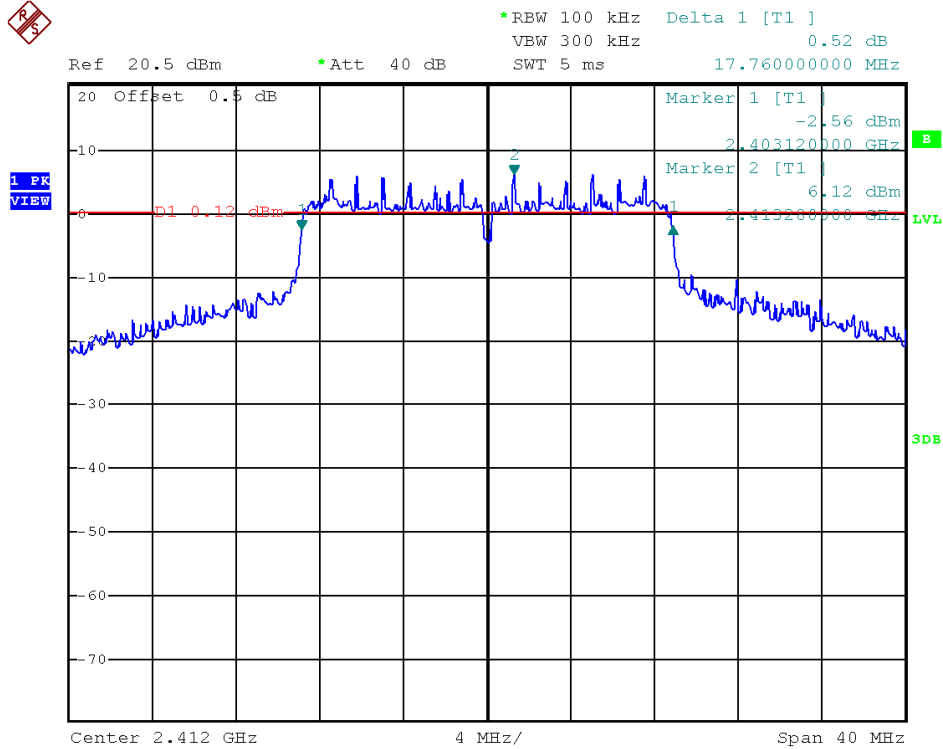




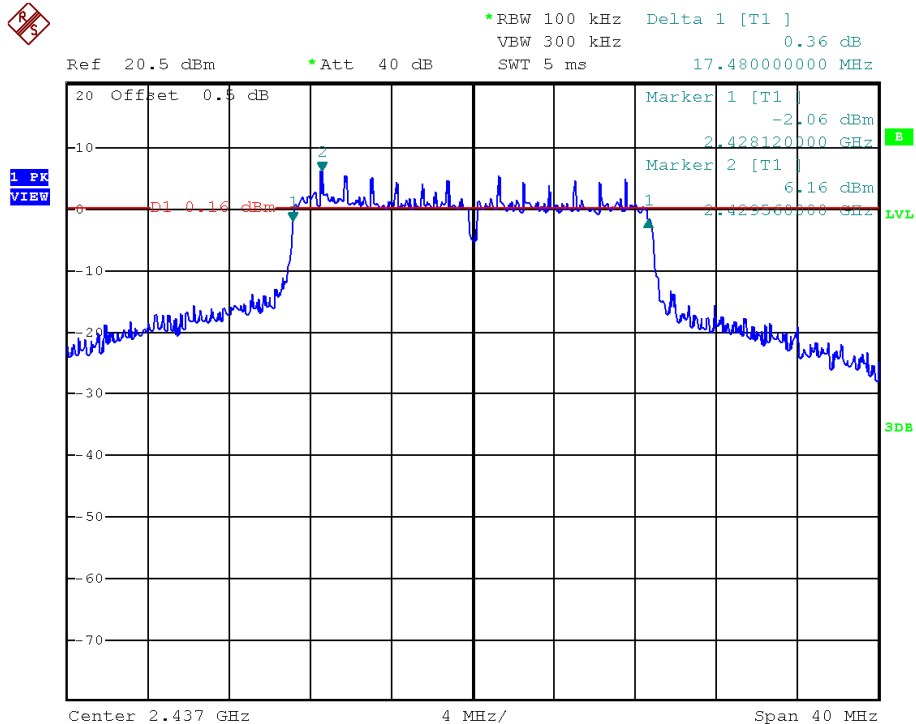
## TEST REPORT

### PLOTS OF 6dB RF BANDWIDTH

802.11n (20MHz), Lowest Channel



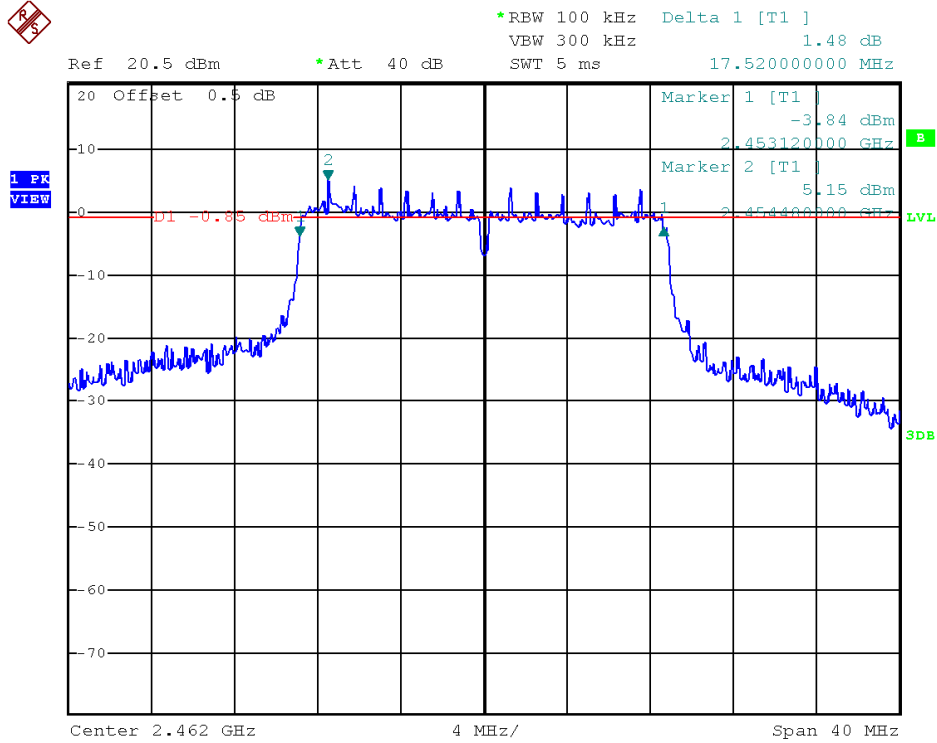
802.11n (20MHz), Middle Channel



**TEST REPORT**

**PLOTS OF 6dB RF BANDWIDTH**

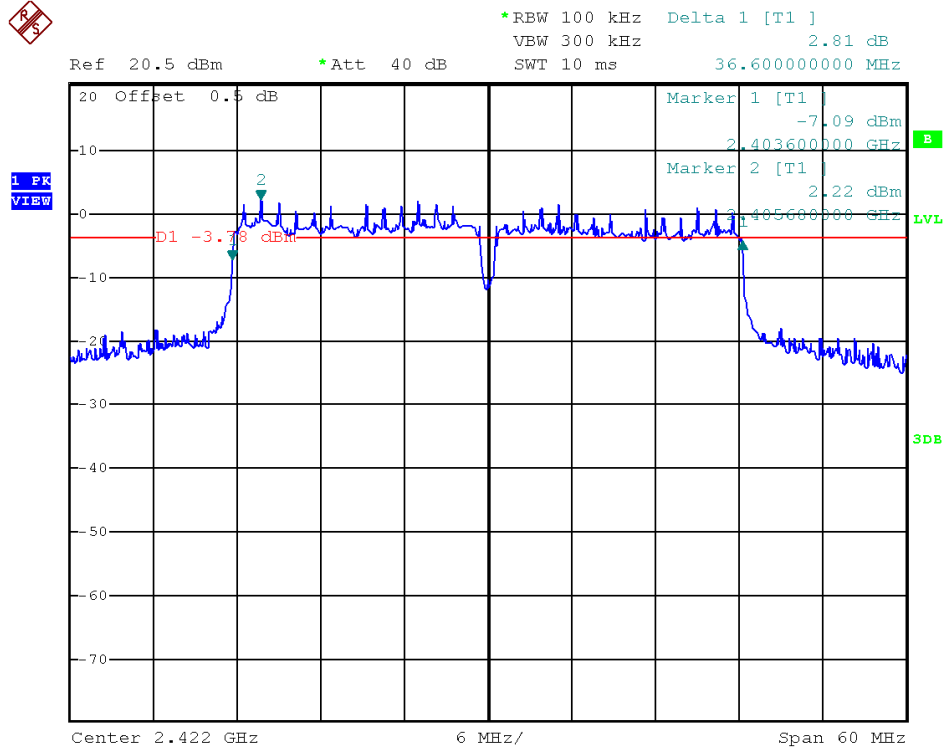
802.11n (20MHz), Highest Channel



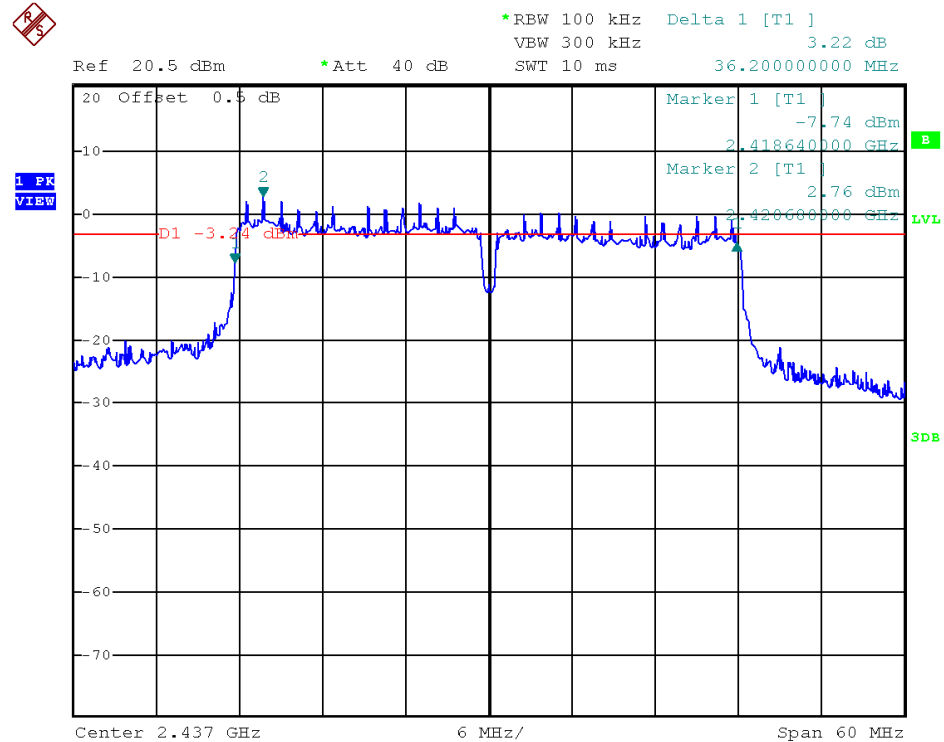
## TEST REPORT

### PLOTS OF 6dB RF BANDWIDTH

802.11n (40MHz), Lowest Channel

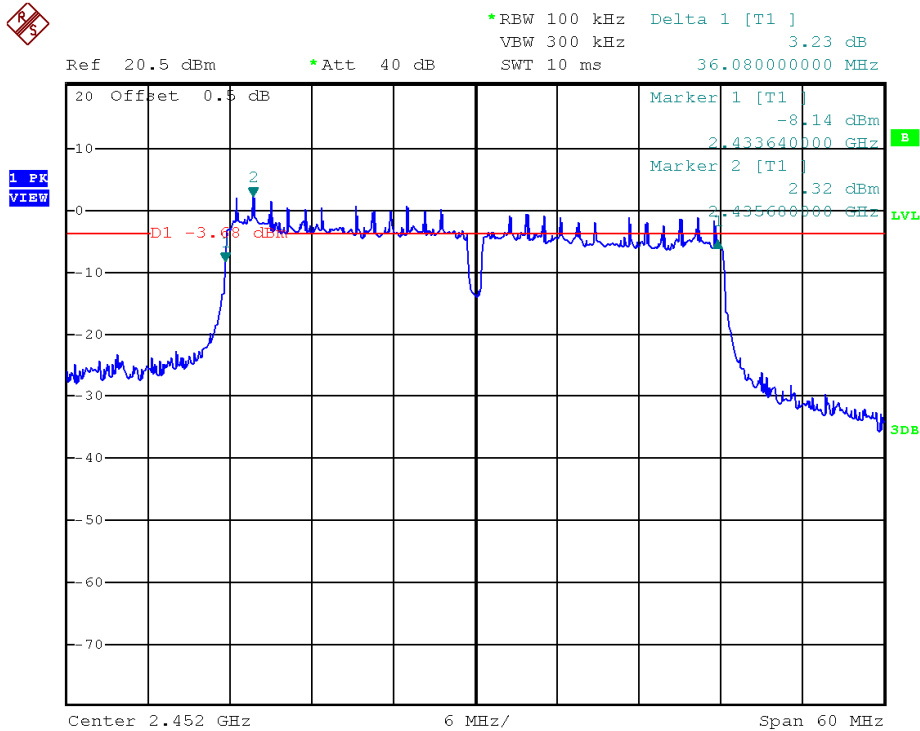


802.11n (40MHz), Middle Channel



TEST REPORT

PLOTS OF 6dB RF BANDWIDTH  
802.11n (40MHz), Highest Channel



## TEST REPORT

### 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)	PSD in 3kHz (dBm)
Low Channel: 2412	8.74	-4.78
Middle Channel: 2437	8.52	-5.06
High Channel: 2462	7.24	-6.70

#### IEEE 802.11g (OFDM, 6 Mbps)

Frequency (MHz)	PSD in 100kHz (dBm)	PSD in 3kHz (dBm)
Low Channel: 2412	8.91	-7.14
Middle Channel: 2437	9.29	-7.39
High Channel: 2462	8.55	-8.97

#### IEEE 802.11n (20MHz) (OFDM, MCS0)

Frequency (MHz)	PSD in 100kHz (dBm)	PSD in 3kHz (dBm)
Low Channel: 2412	8.92	-7.93
Middle Channel: 2437	8.78	-8.26
High Channel: 2462	8.48	-8.61

#### IEEE 802.11n (40MHz) (OFDM, MCS0)

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2422	4.80
Middle Channel: 2437	4.70
High Channel: 2452	4.73

Cable Loss: 0.5 dB

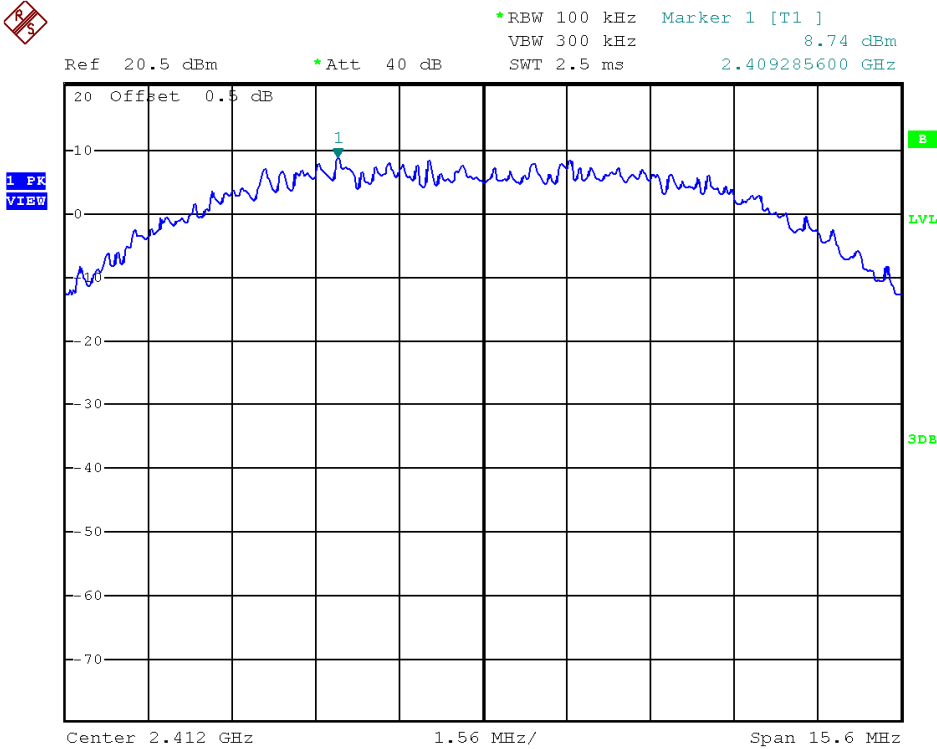
Limit:  
8dBm in 3kHz

The plots of power spectral density are as below.

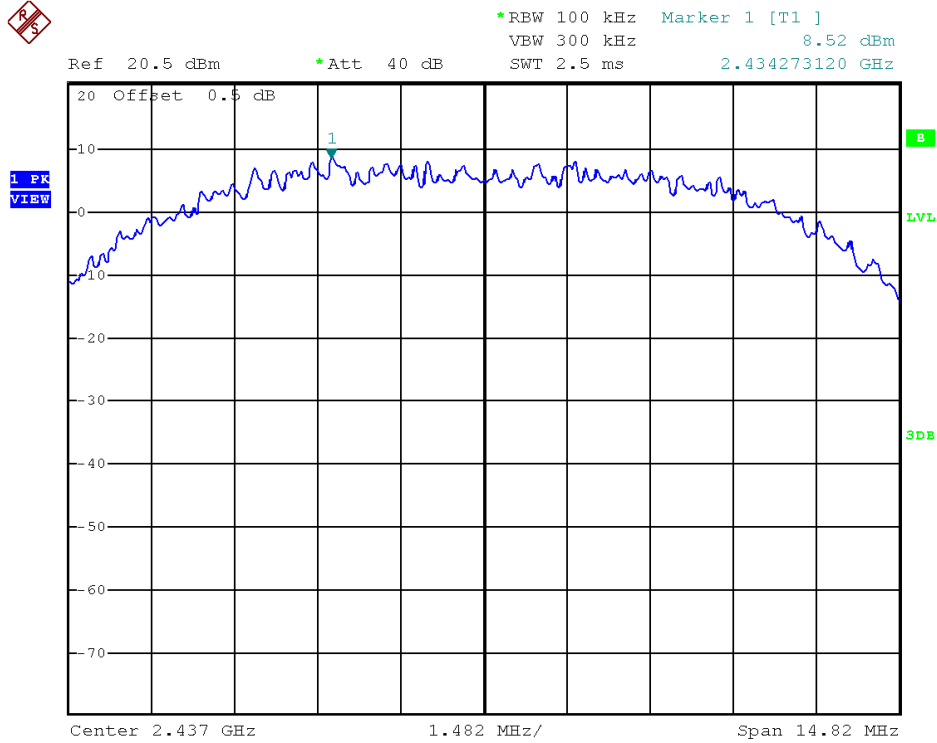
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PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)

802.11b, Lowest channel



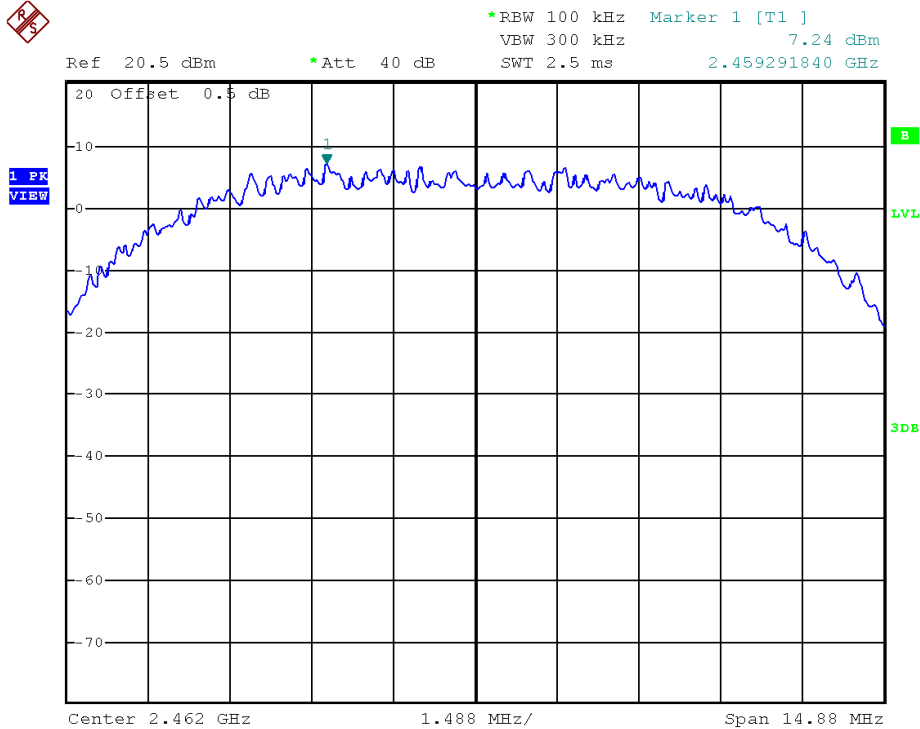
802.11b, Middle channel



TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)

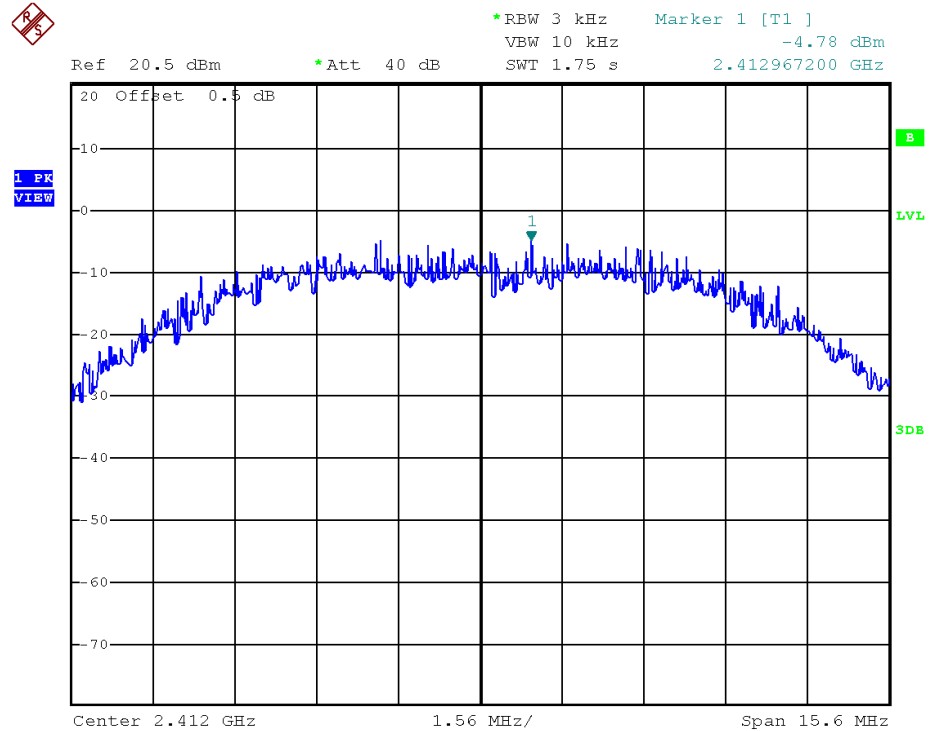
802.11b, Highest channel



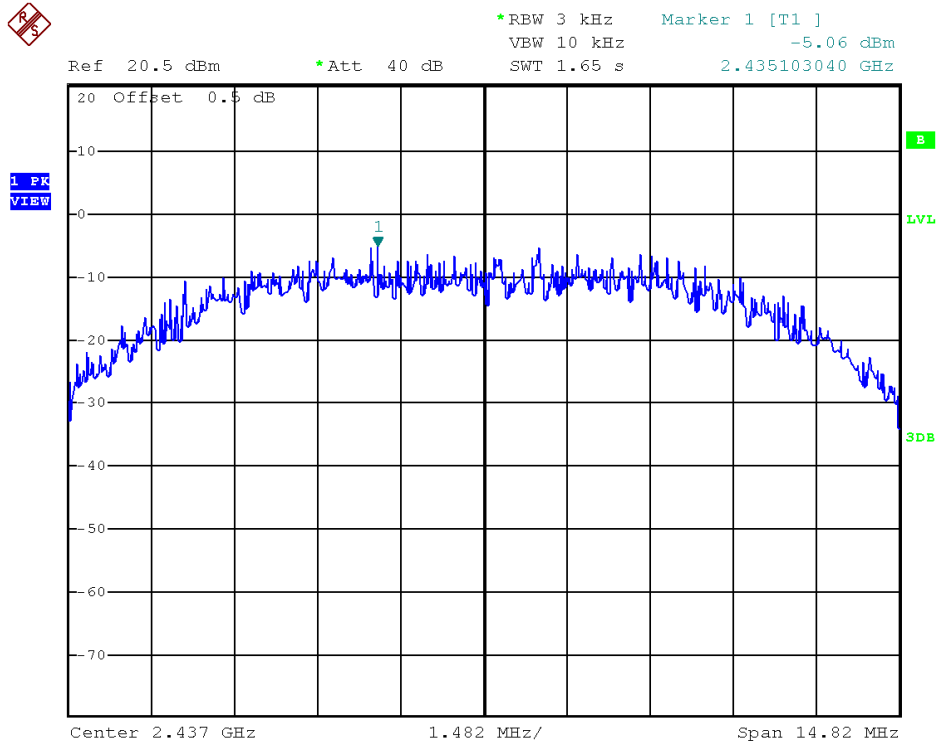
TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

802.11b, Lowest channel



802.11b, Middle channel

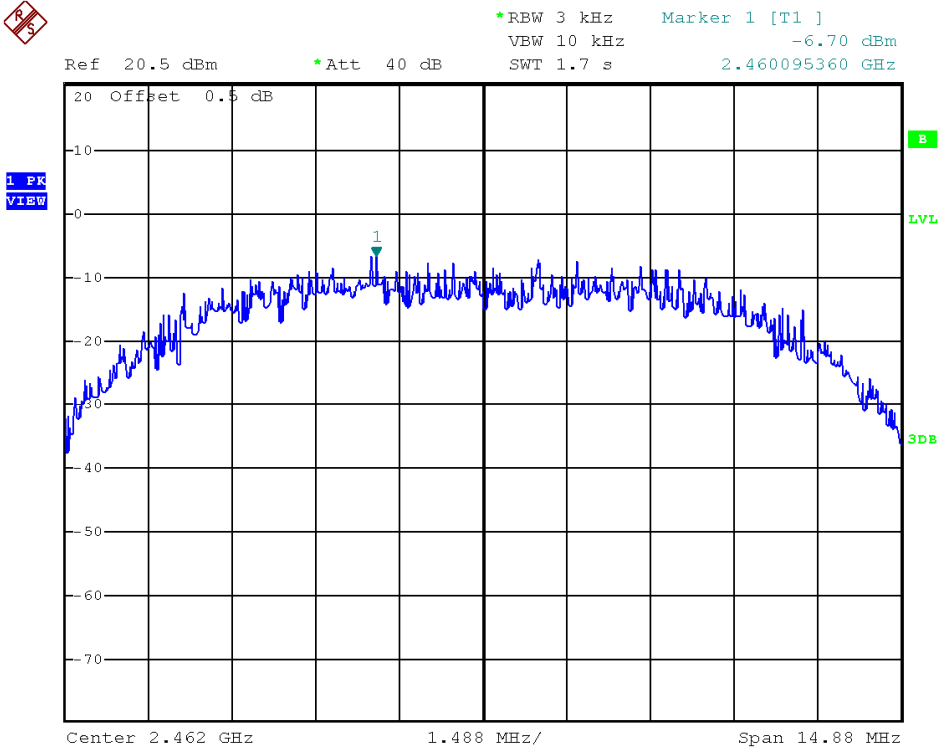




TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

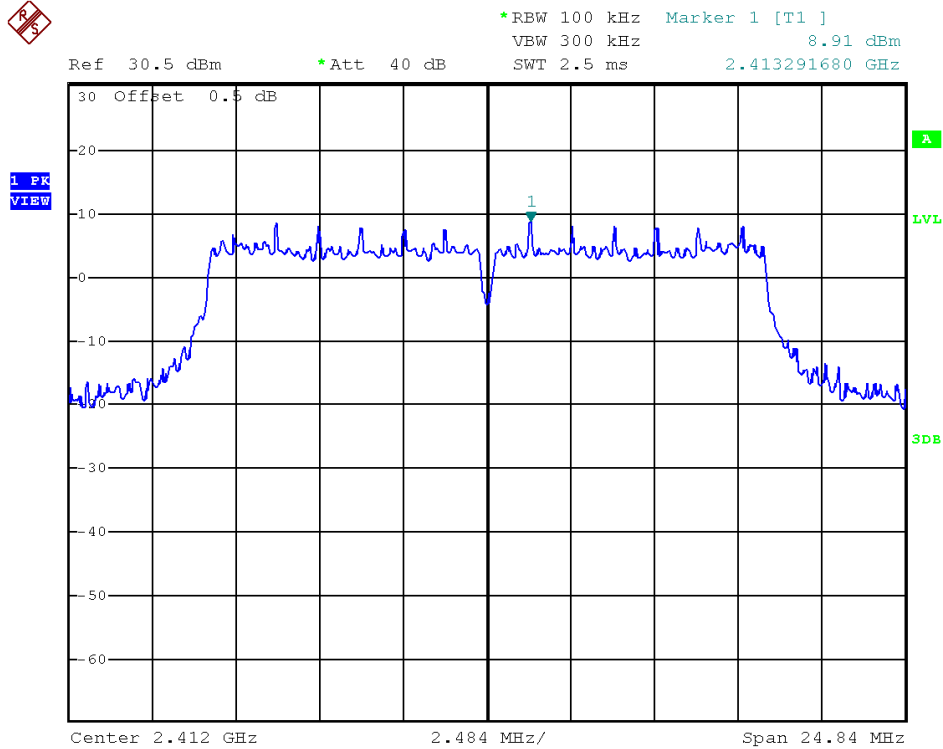
802.11b, Highest channel



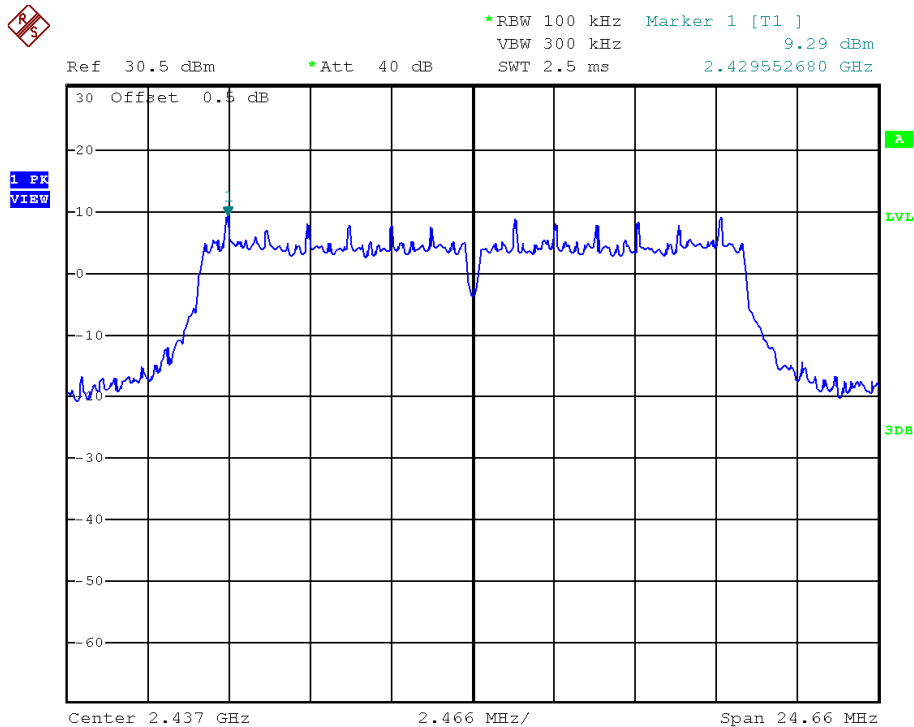
**TEST REPORT**

**PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)**

802.11g, Lowest channel



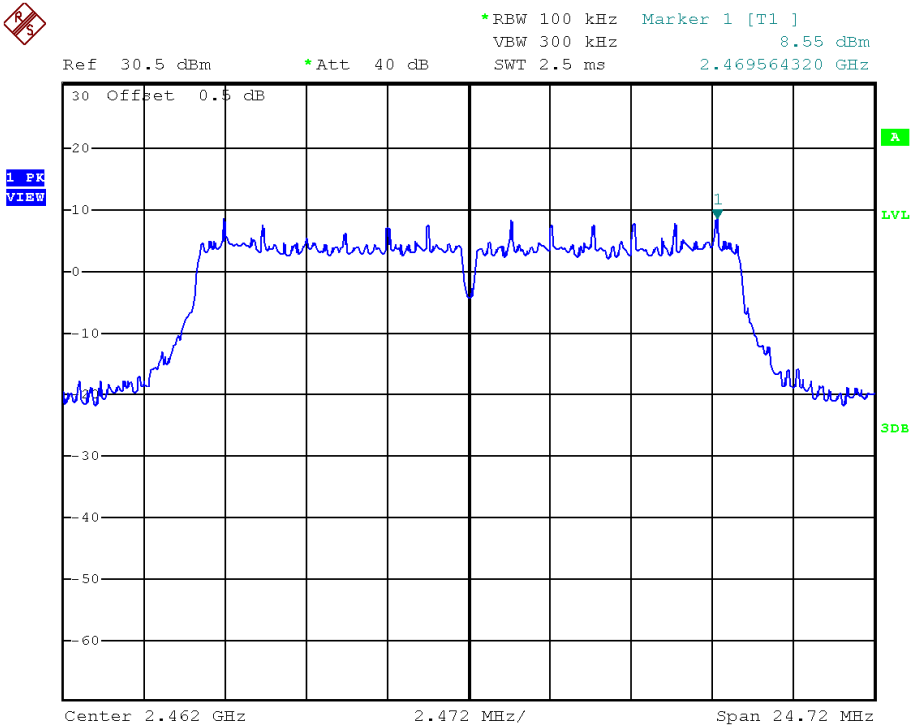
802.11g, Middle channel



TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)

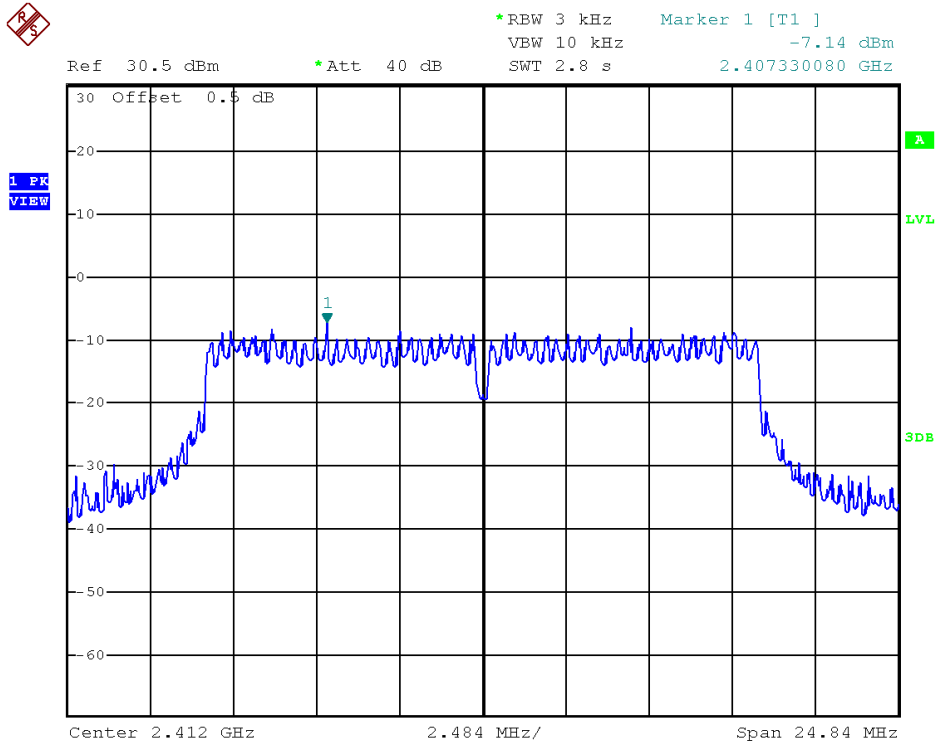
802.11g, Highest channel



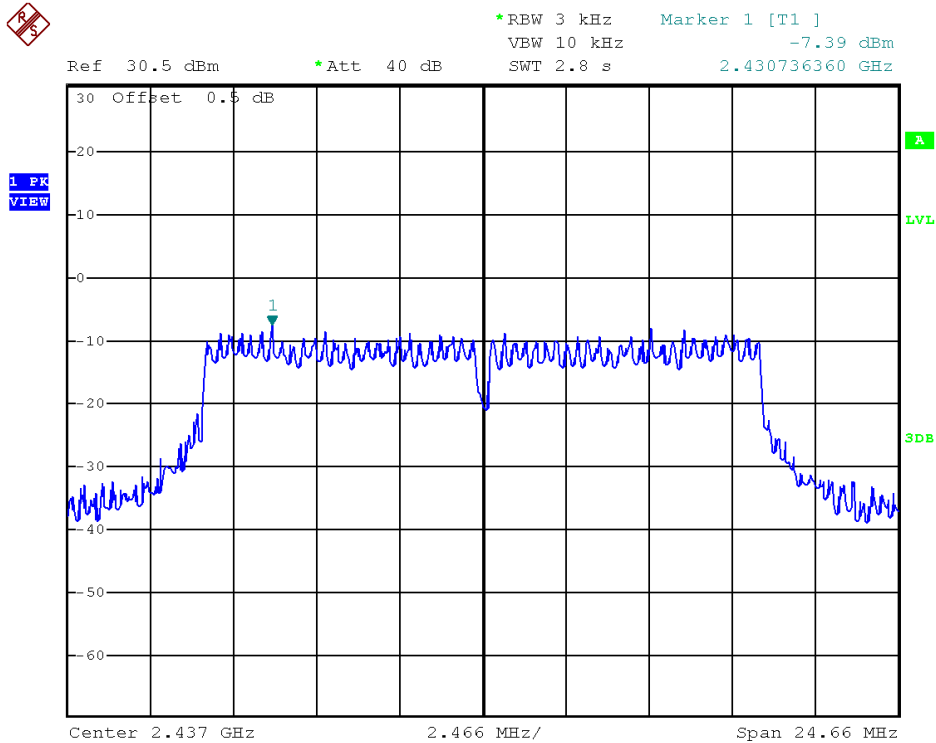
TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

802.11g, Lowest channel



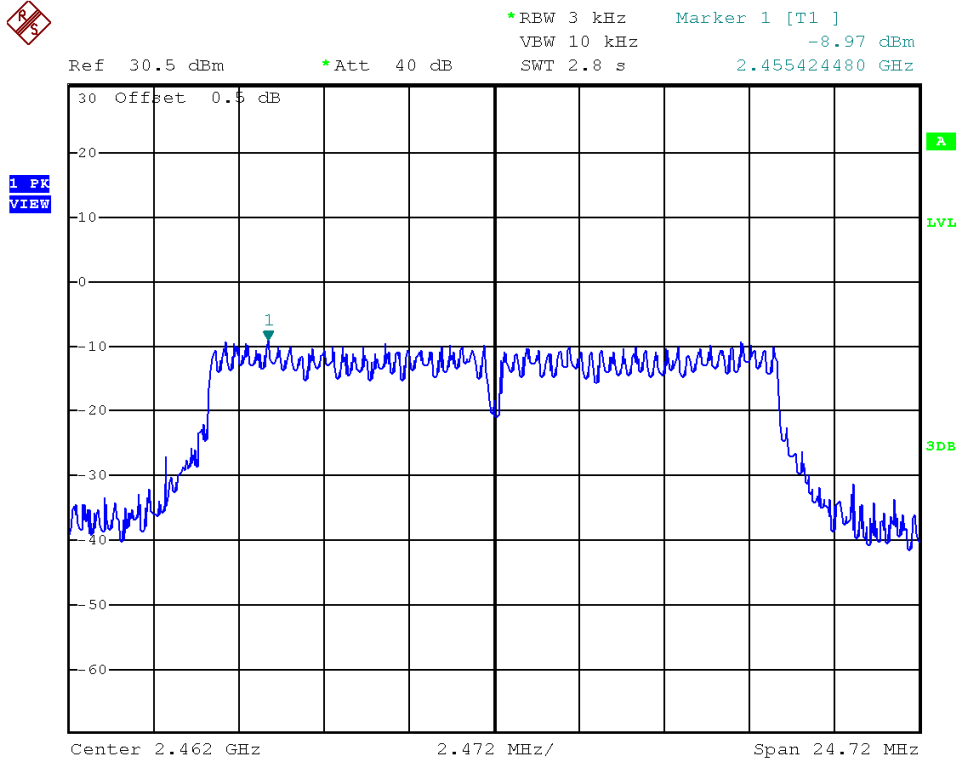
802.11g, Middle channel



TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

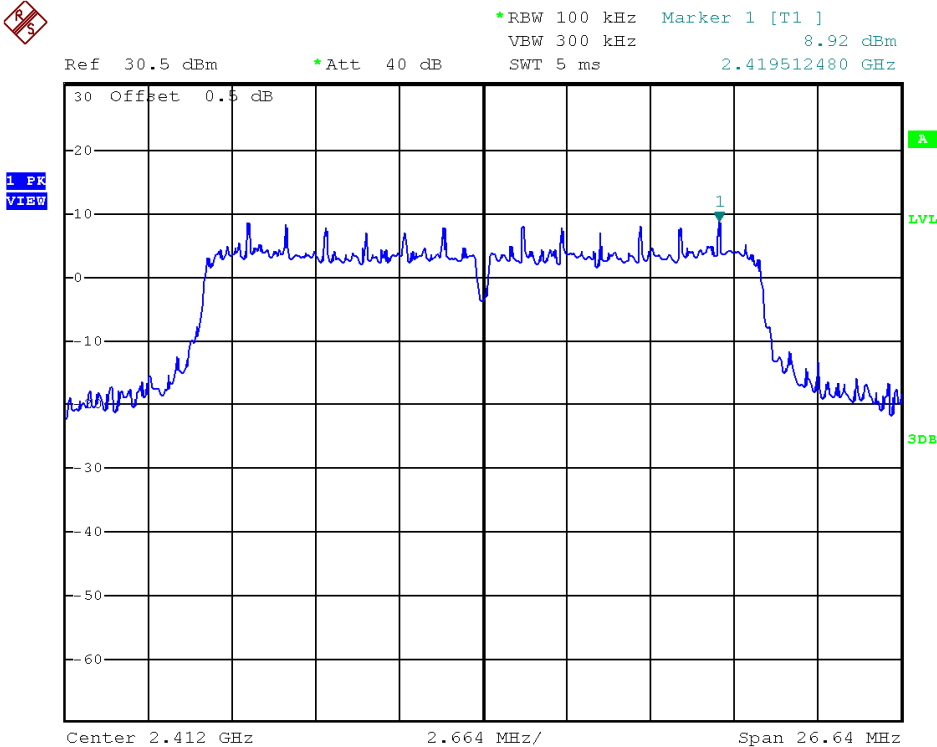
802.11g, Highest channel



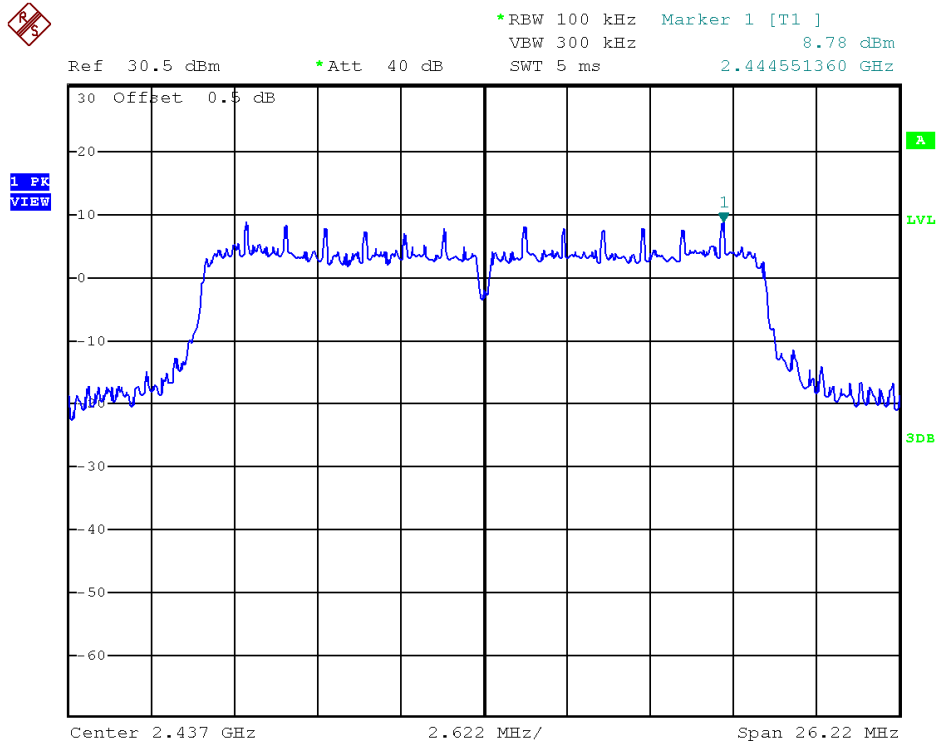
TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)

802.11n (20MHz), Lowest channel



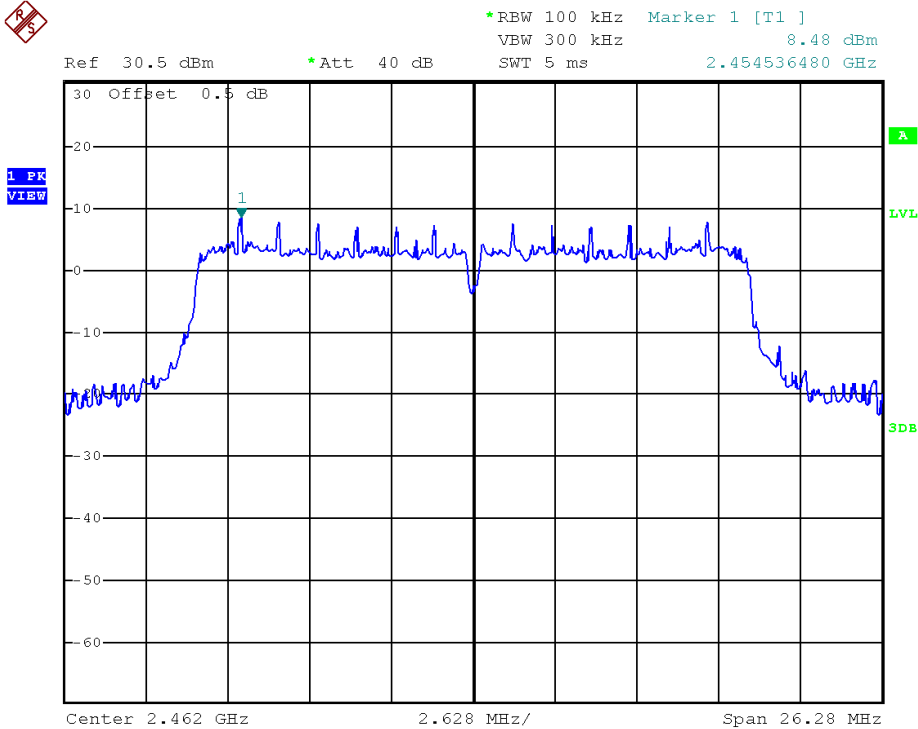
802.11n (20MHz), Middle channel



TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)

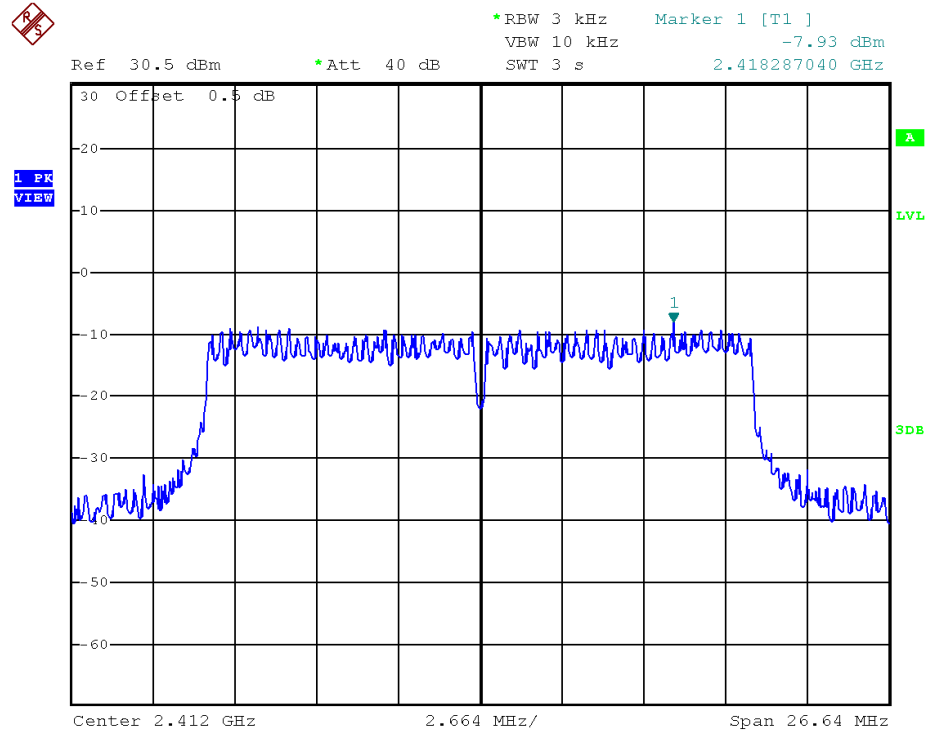
802.11n (20MHz), Highest channel



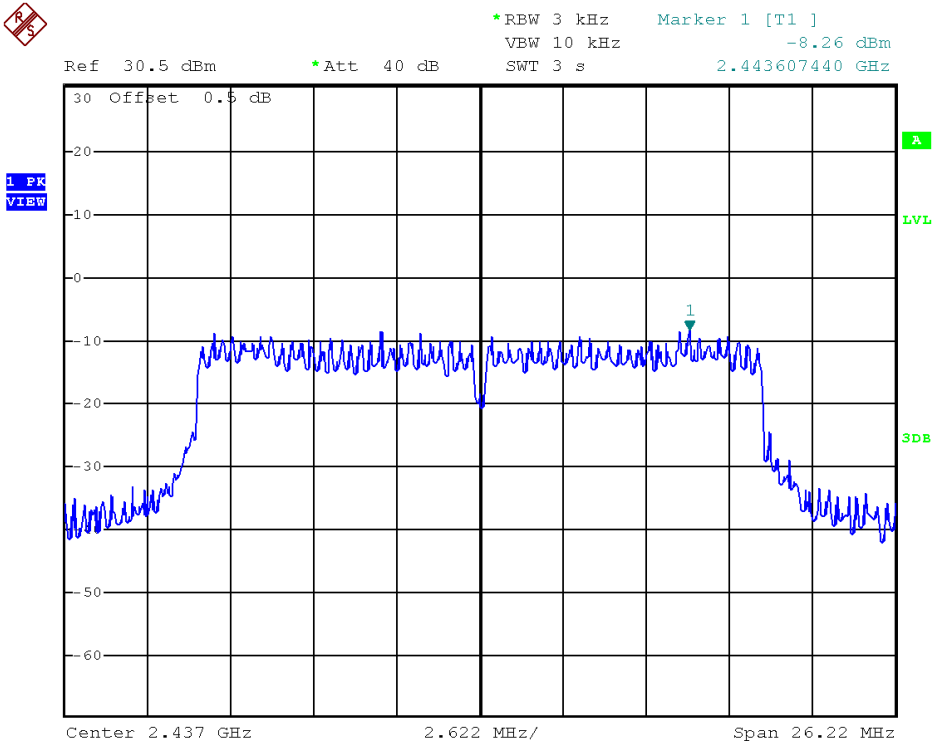
TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

802.11n (20MHz), Lowest channel



802.11n (20MHz), Middle channel

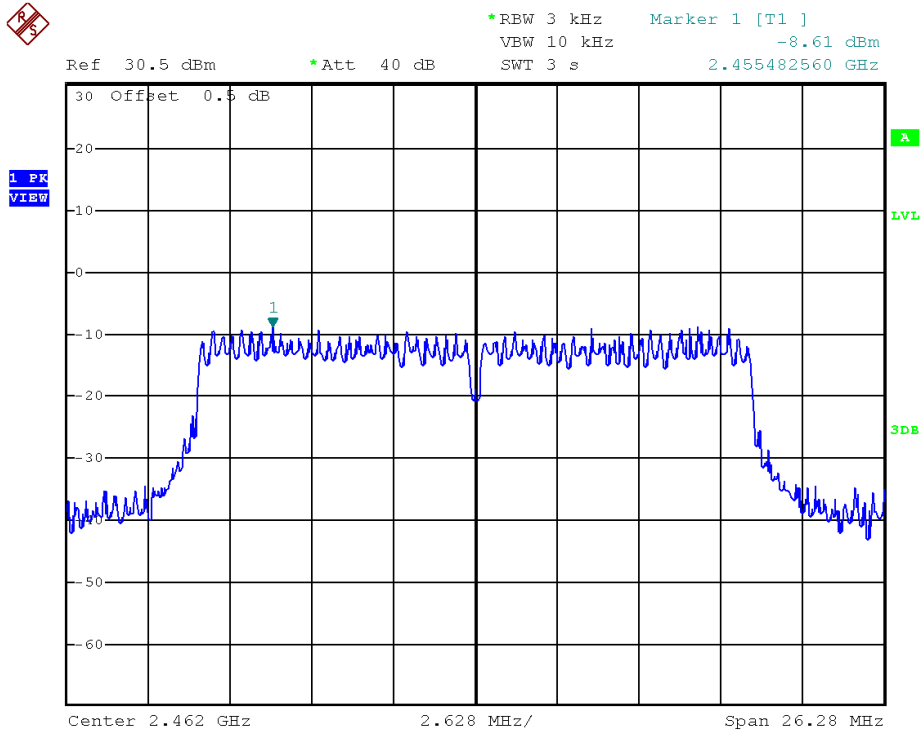




TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

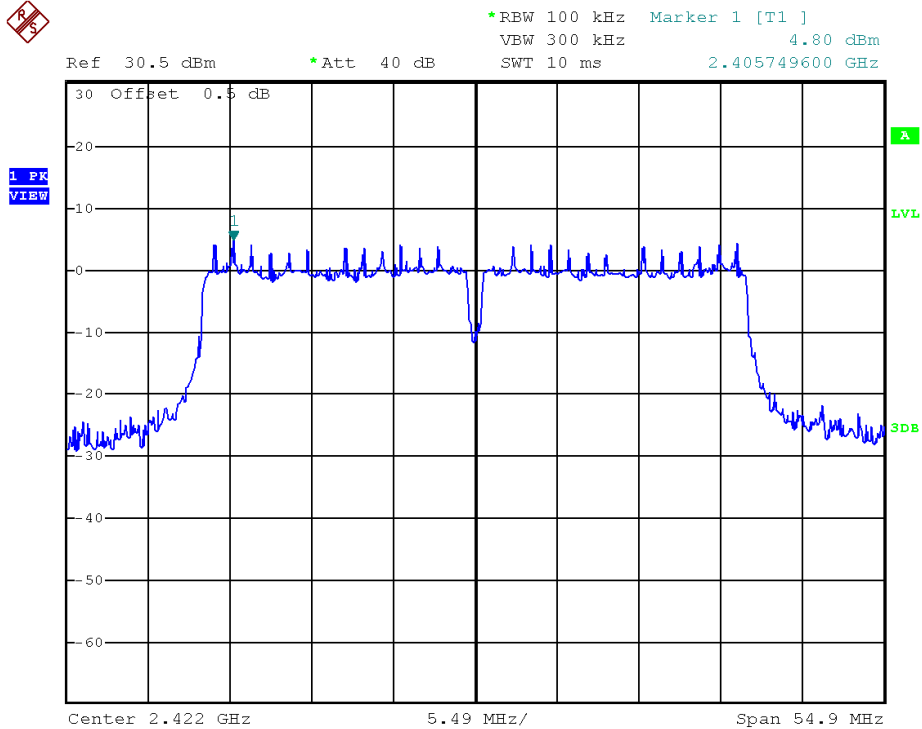
802.11n (20MHz), Highest channel



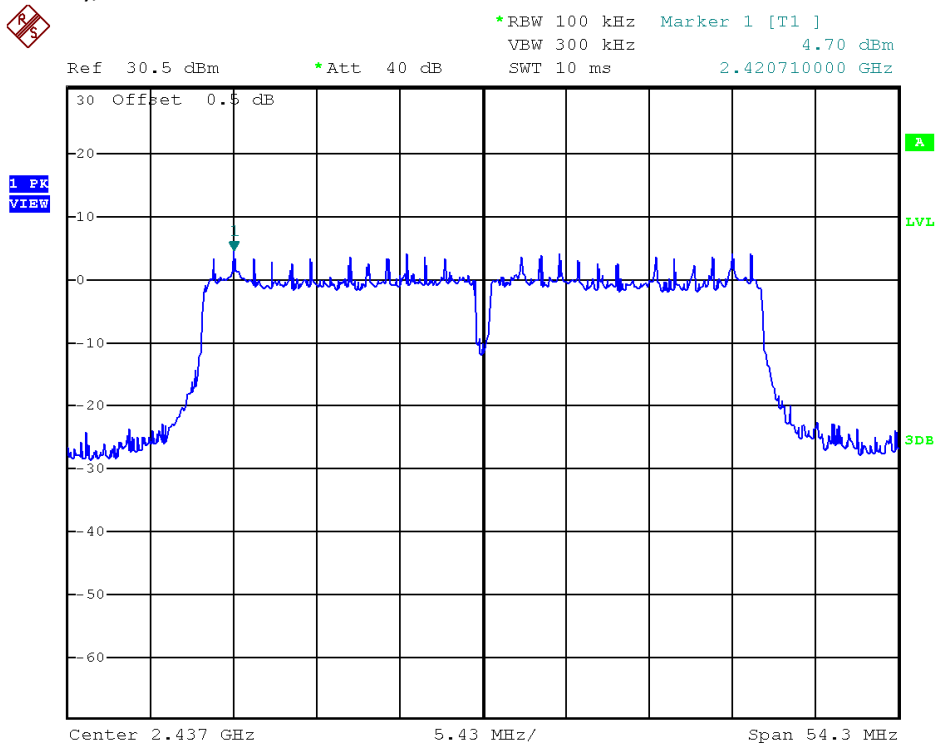
**TEST REPORT**

**PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)**

802.11n (40MHz), Lowest channel



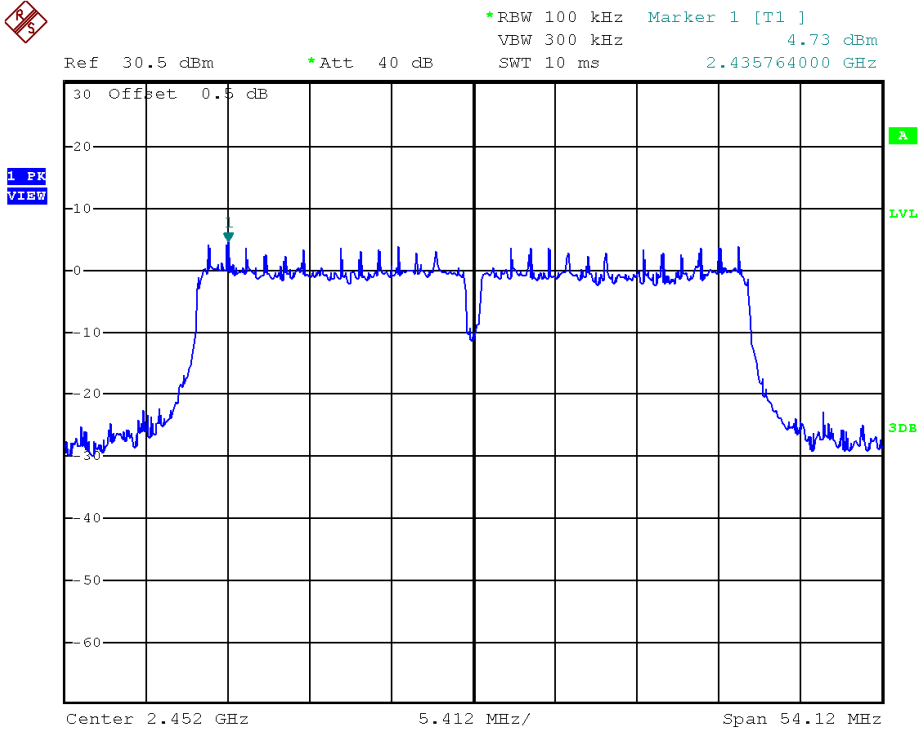
802.11n (40MHz), Middle channel



TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (100kHz RBW)

802.11n (20MHz), Highest channel



## TEST REPORT

### 4.4 Out of Band Conducted Emissions

For 802.11b/g/n20/n40MHz, the maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth for 802.11b/g/n20/n40MHz.

The measurement procedures under sections 11 of KDB558074 D01 v04 (05-April-2017) were used.

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

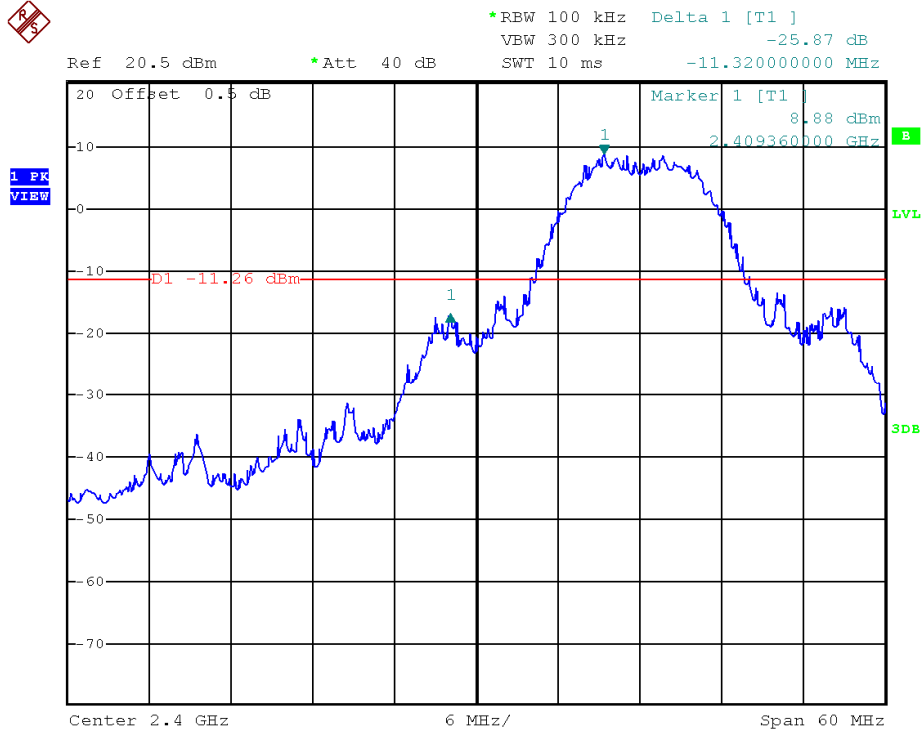
#### Limits:

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

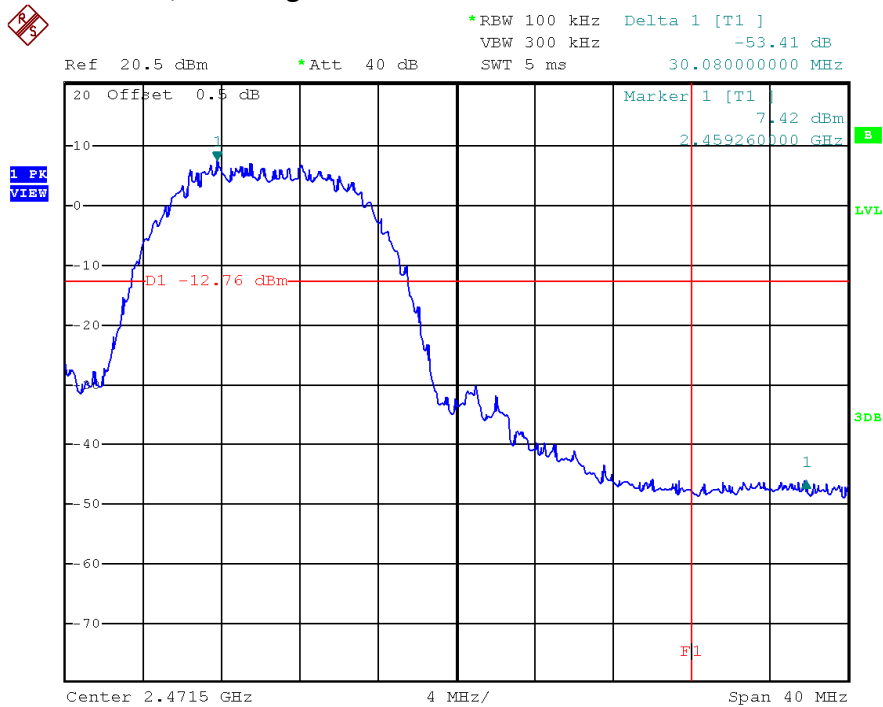
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

#### 802.11b, Lowest Channel, Bandedge



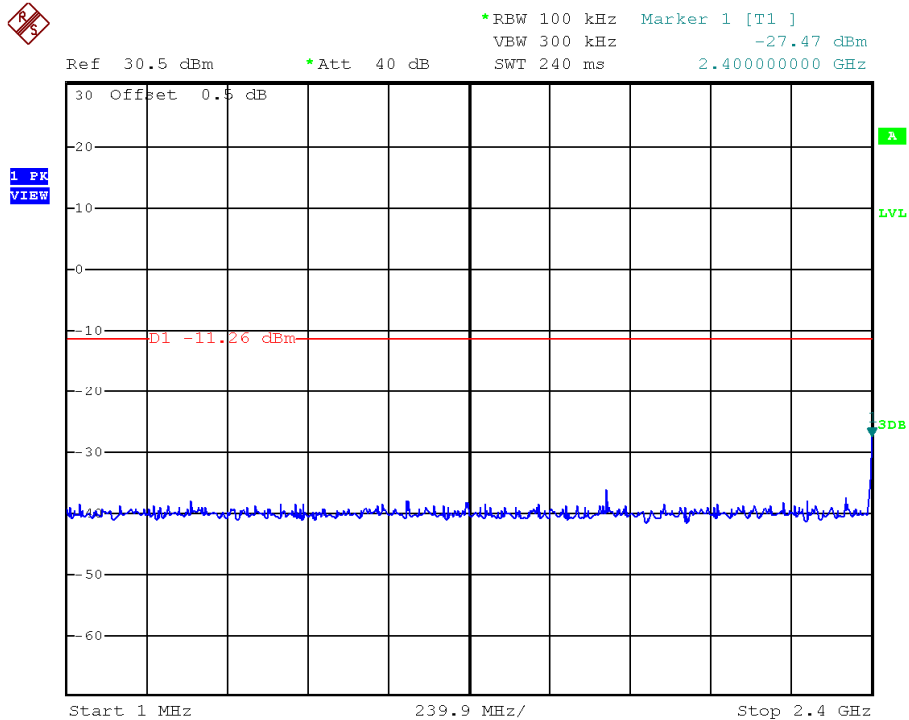
#### 802.11b, Highest Channel, Bandedge



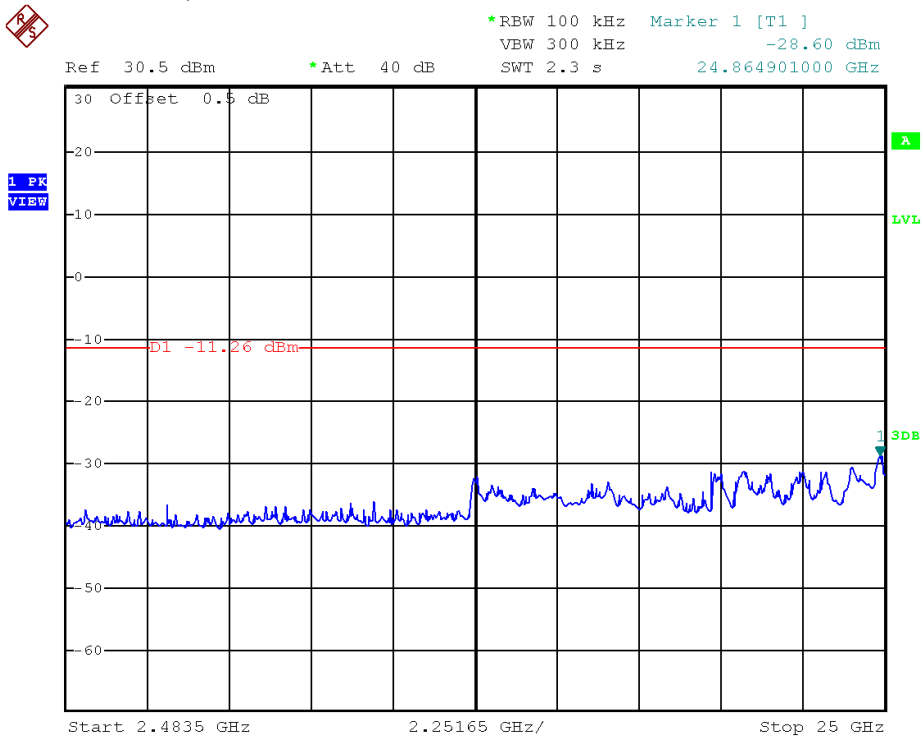
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

#### 802.11b, Lowest Channel, Plot A



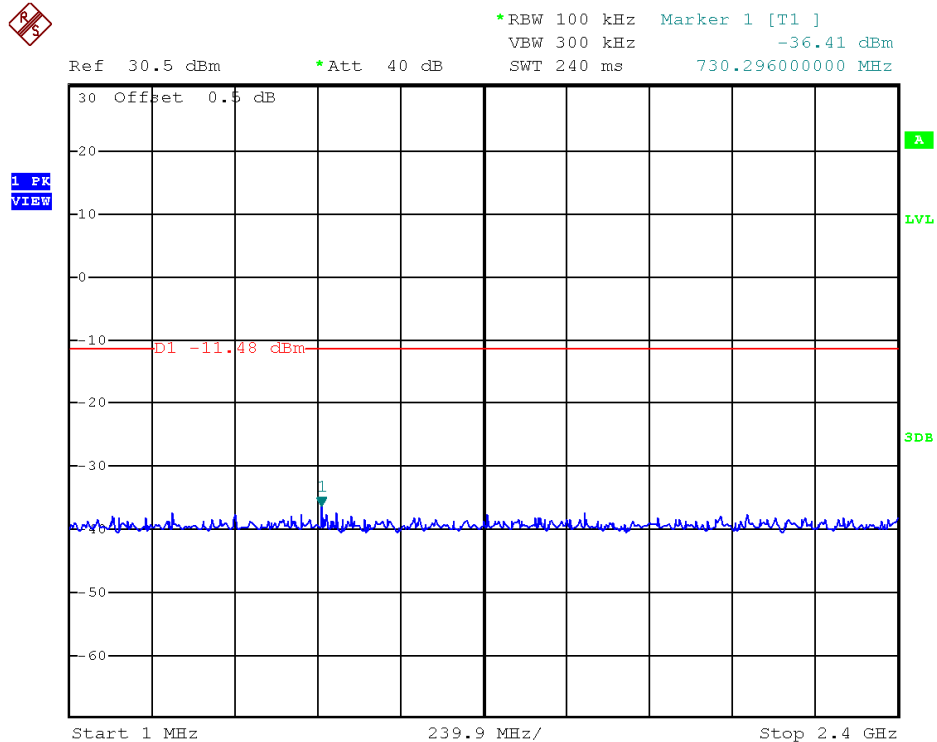
#### 802.11b, Lowest Channel, Plot B



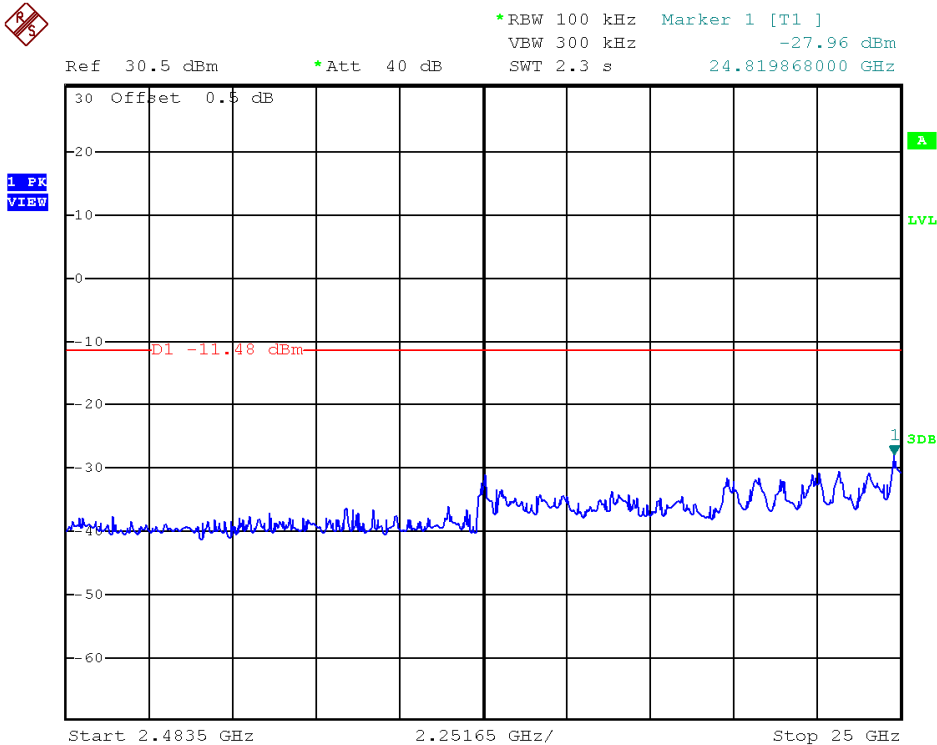
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Middle Channel, Plot A



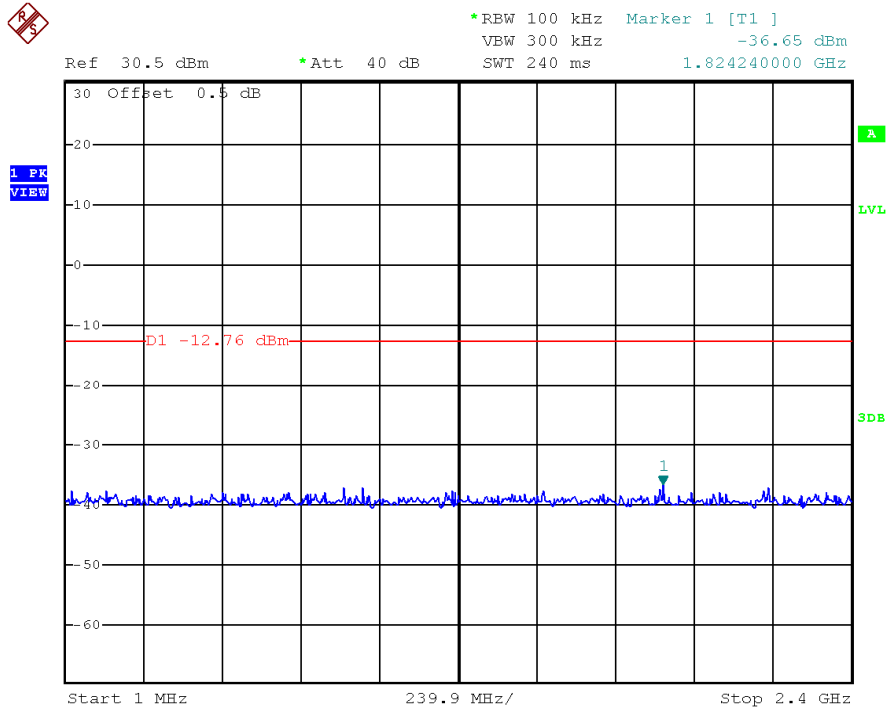
802.11b, Middle Channel, Plot B



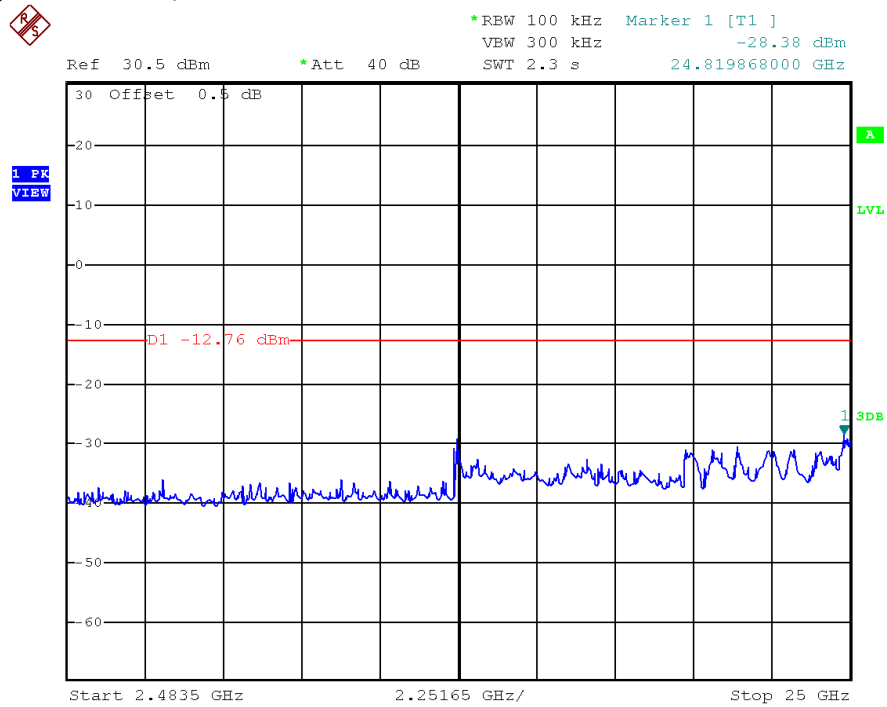
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Highest Channel, Plot A



802.11b, Highest Channel, Plot B

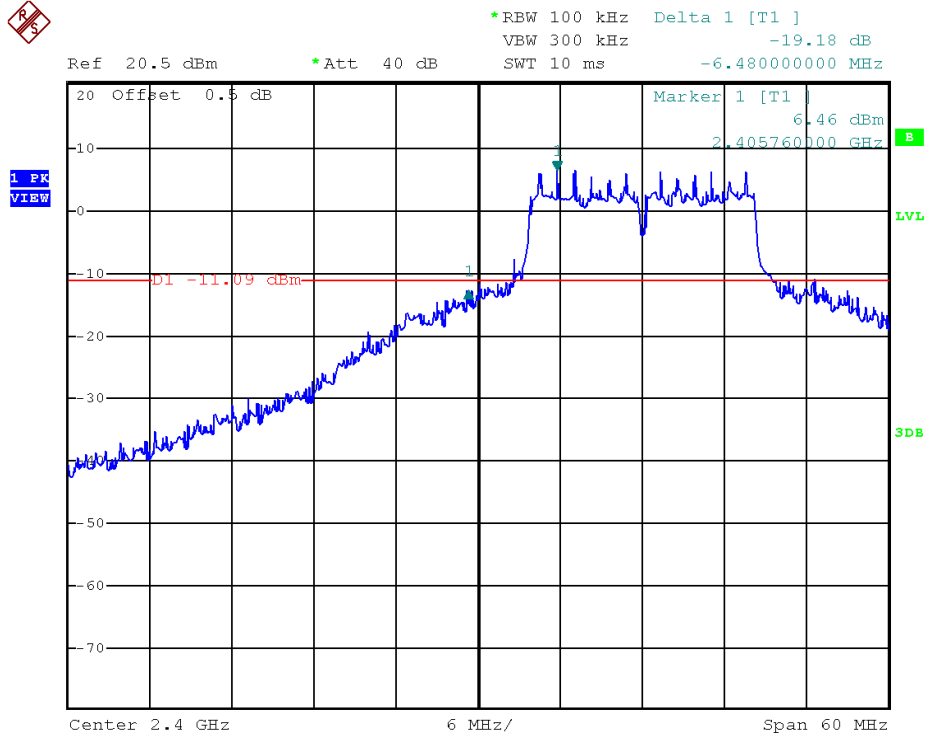




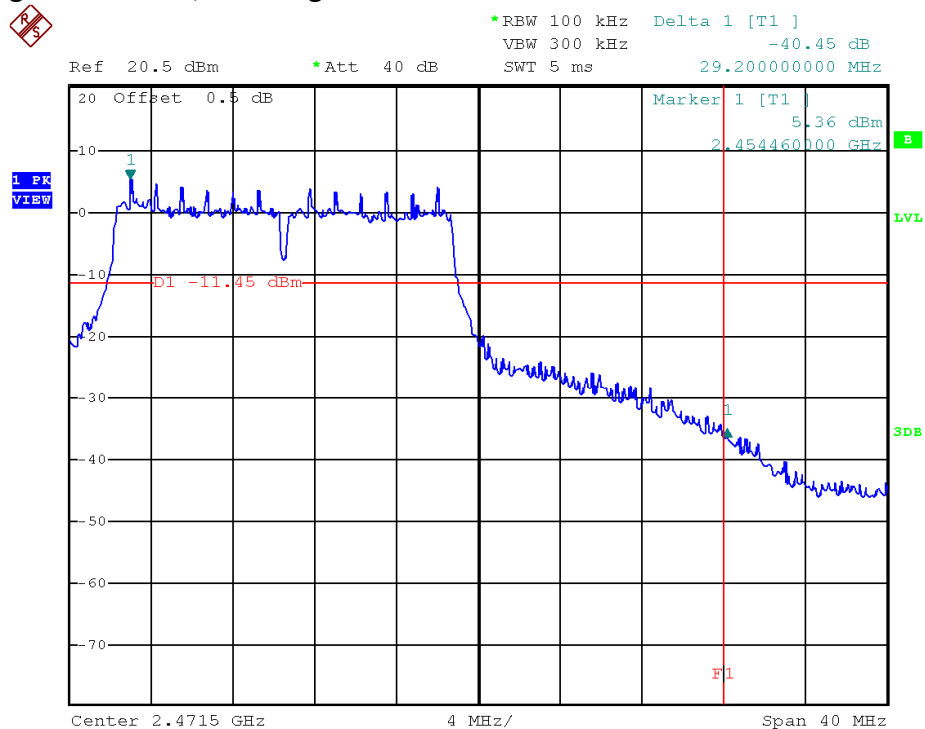
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Lowest Channel, Bandedge



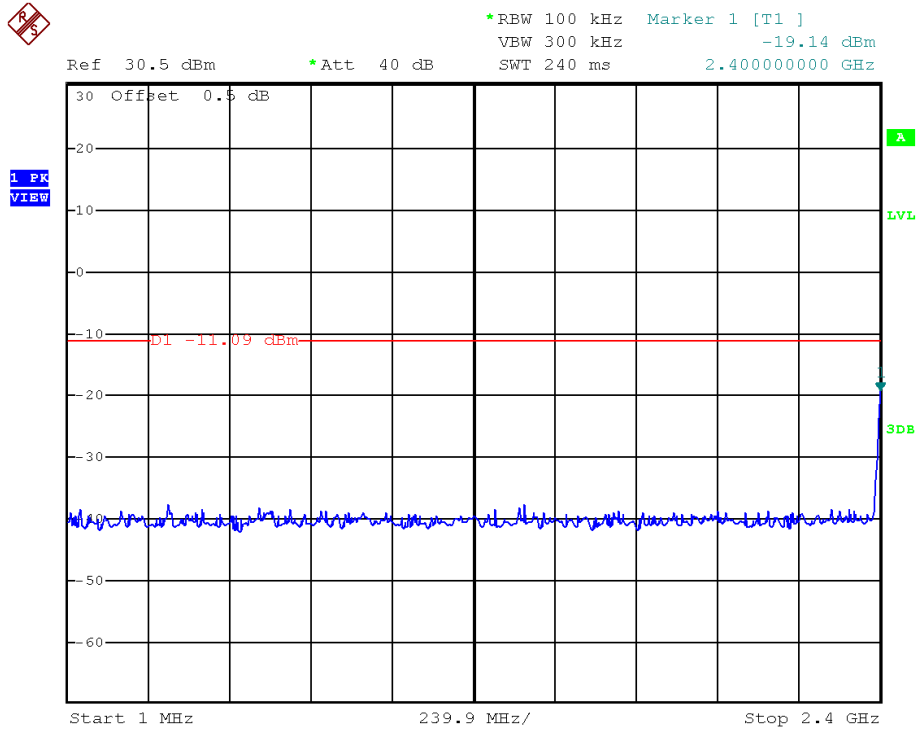
802.11g, Highest Channel, Bandedge



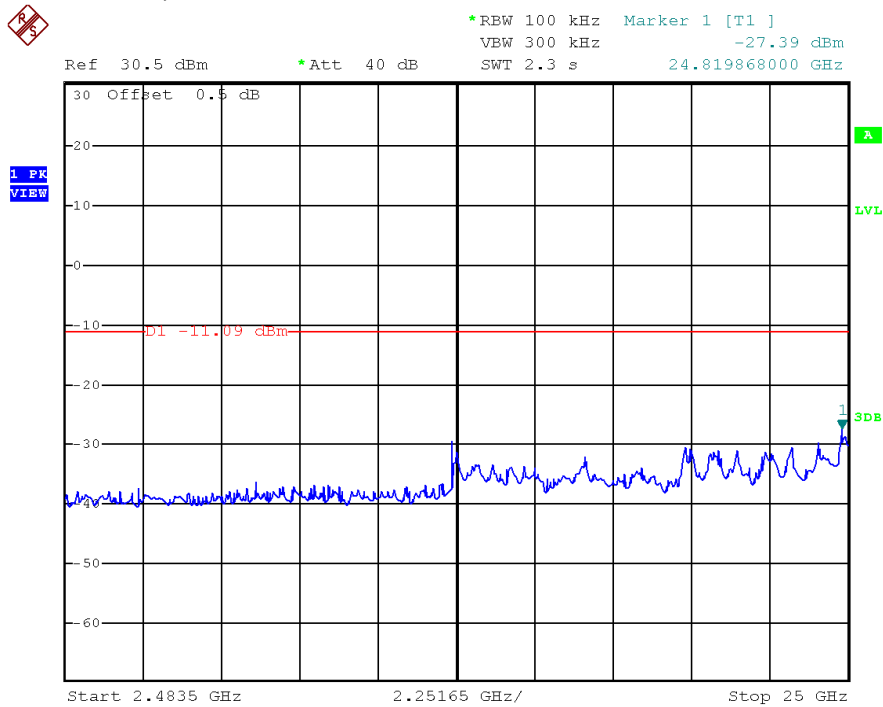
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Lowest Channel, Plot A



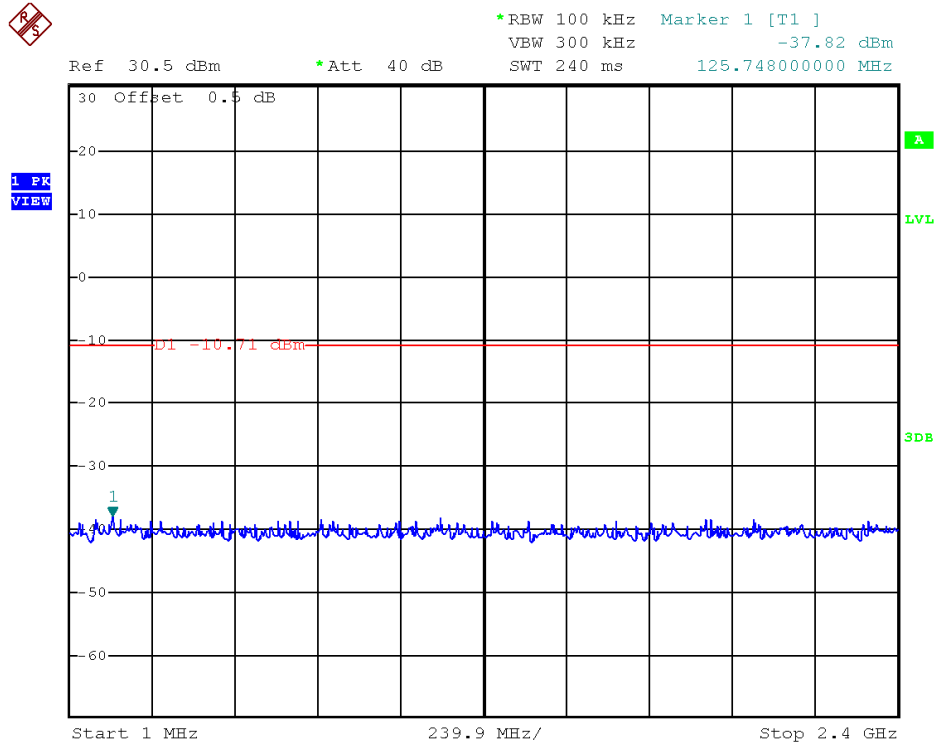
802.11g, Lowest Channel, Plot B



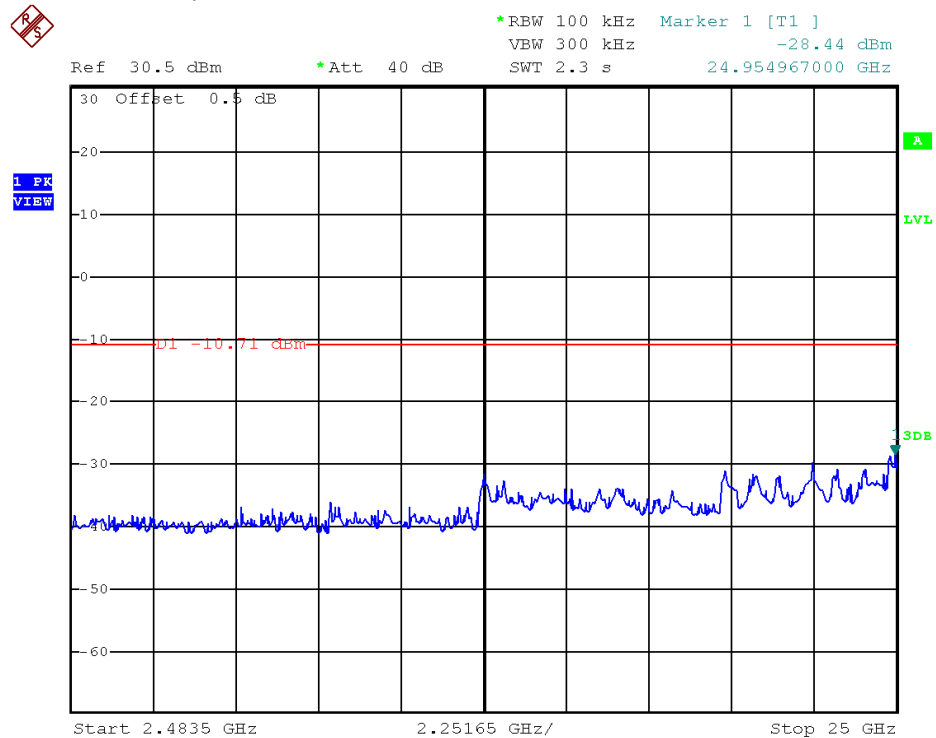
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Middle Channel, Plot A



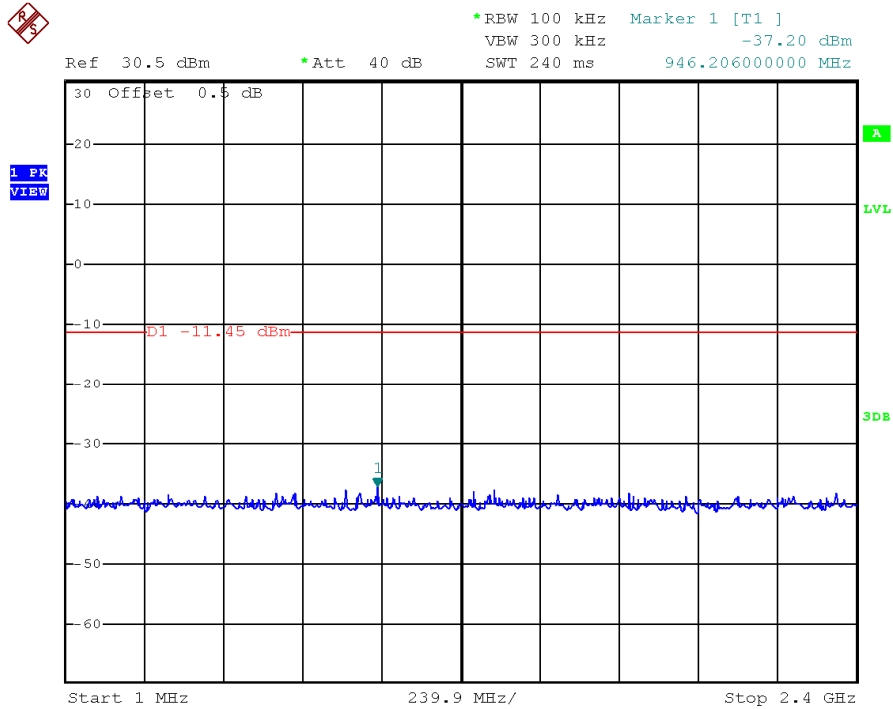
802.11g, Middle Channel, Plot B



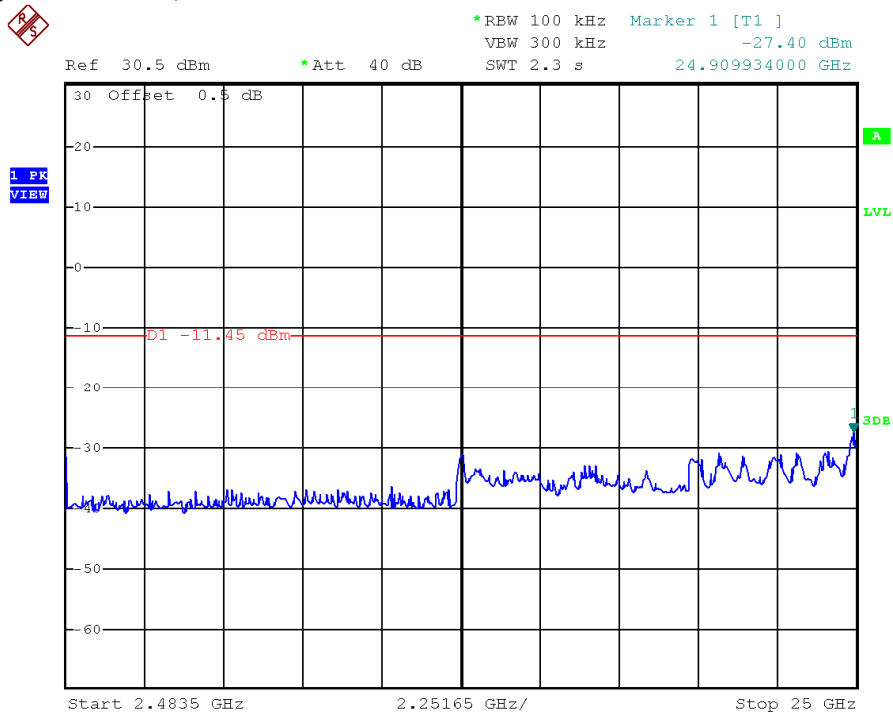
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Highest Channel, Plot A



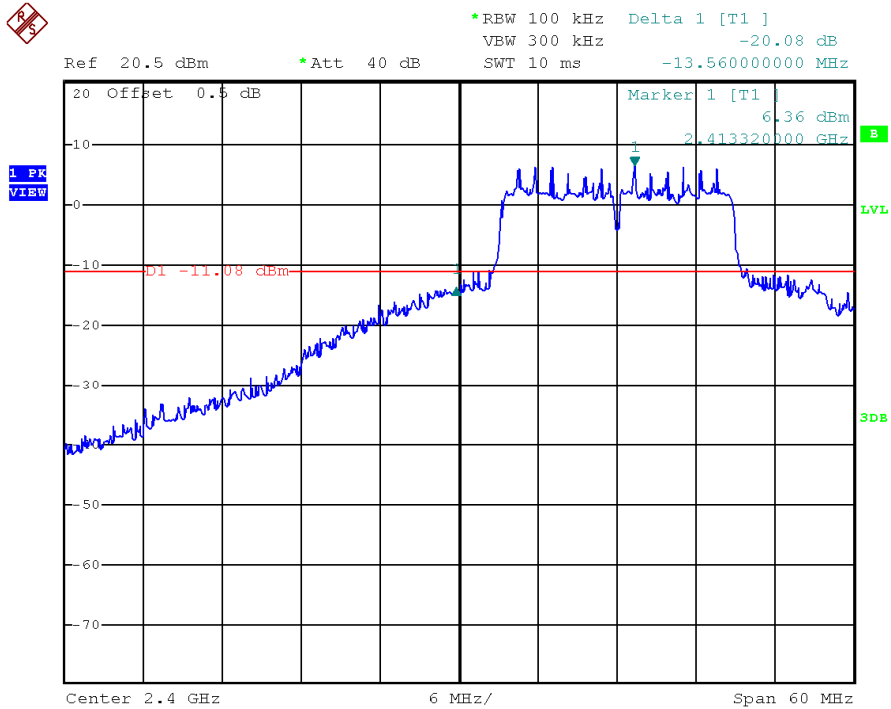
802.11g, Highest Channel, Plot B



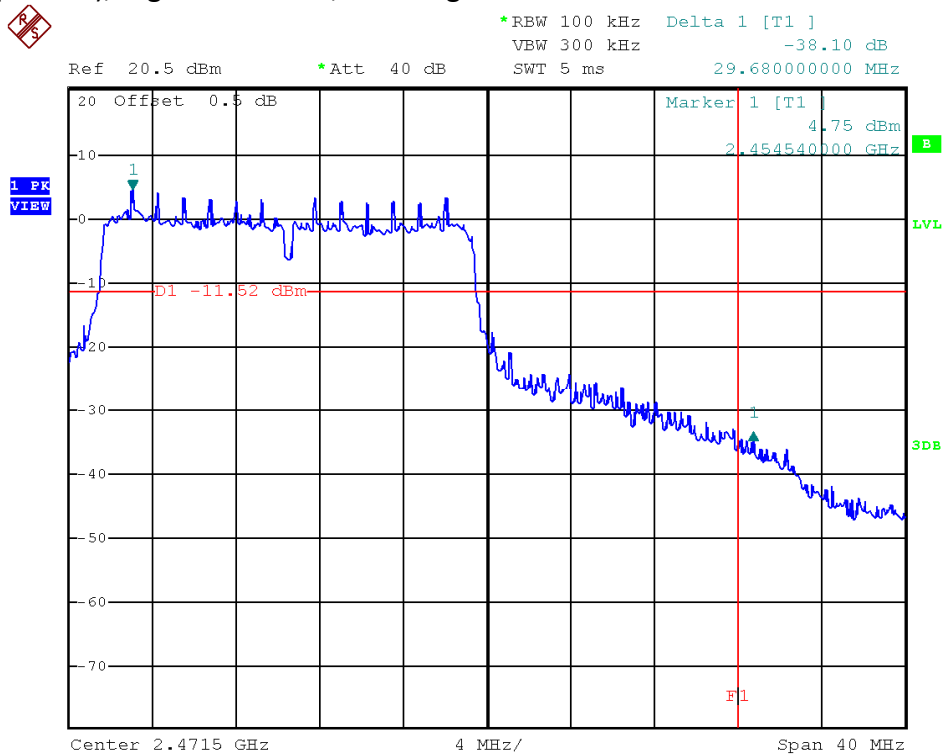
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802. 11n (20MHz), Lowest Channel, Bandedge



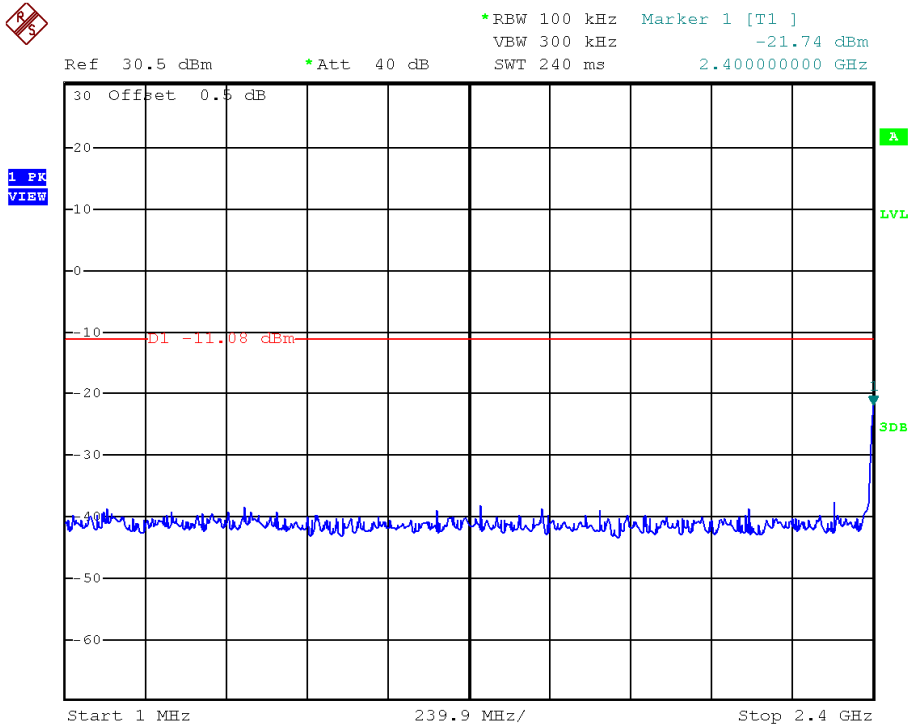
802. 11n (20MHz), Highest Channel, Bandedge



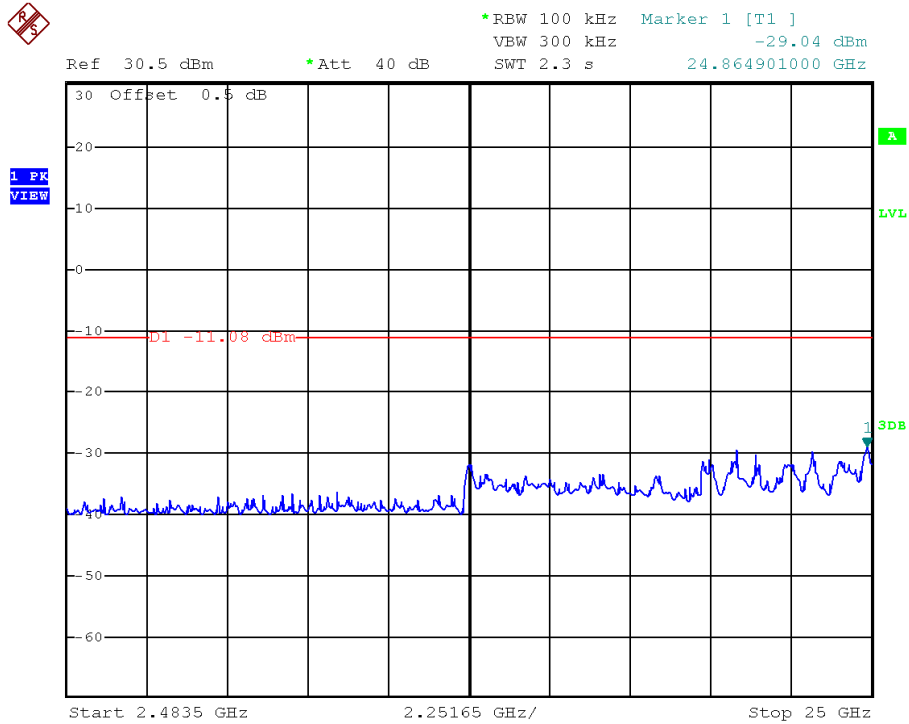
TEST REPORT

PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

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



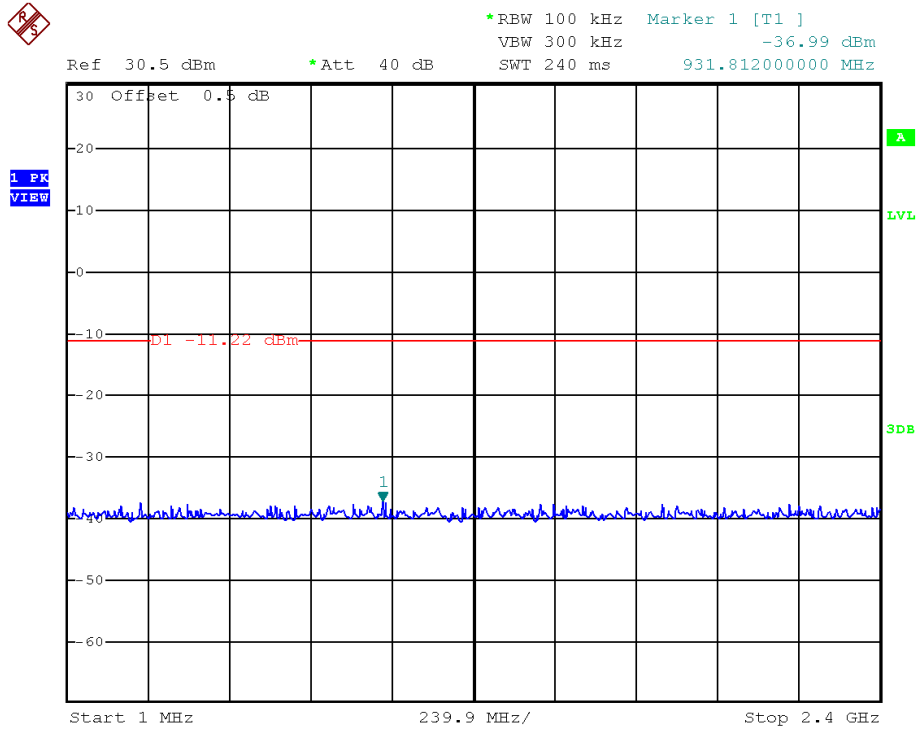
802.11n (20MHz), Lowest Channel, Plot B



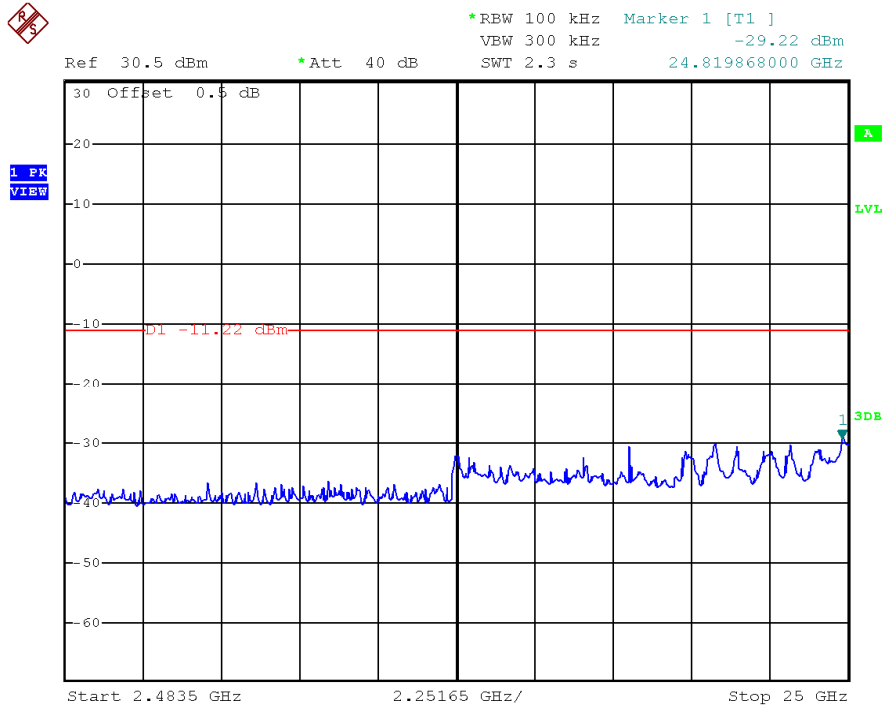
**TEST REPORT**

**PLOTS OF OUT OF BAND CONDUCTED EMISSIONS**

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



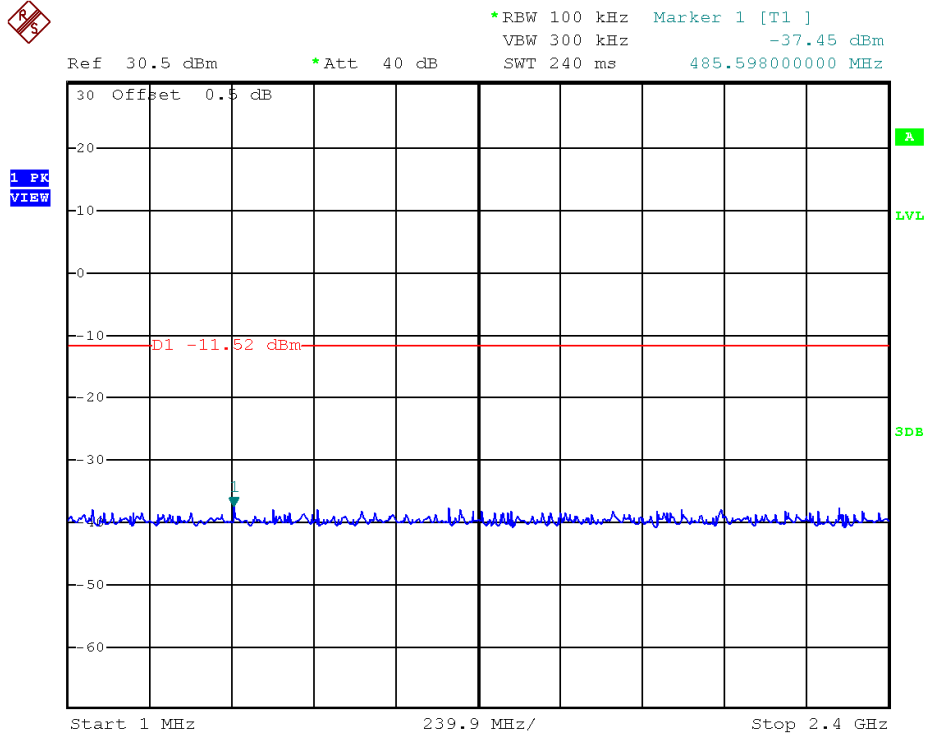
802.11n (20MHz), Middle Channel, Plot B



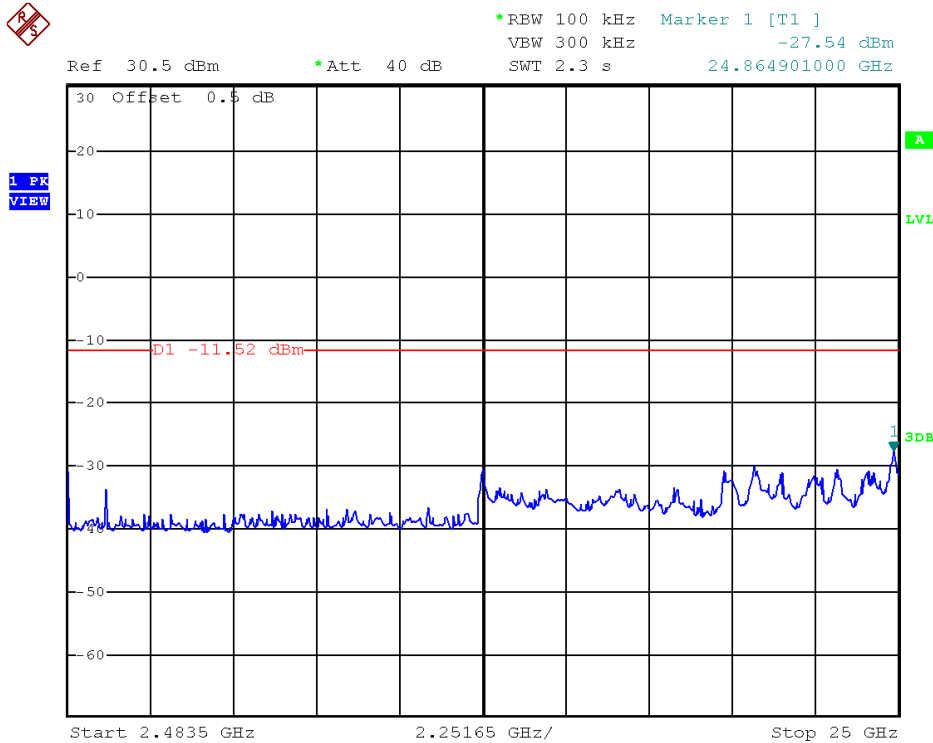
**TEST REPORT**

**PLOTS OF OUT OF BAND CONDUCTED EMISSIONS**

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



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

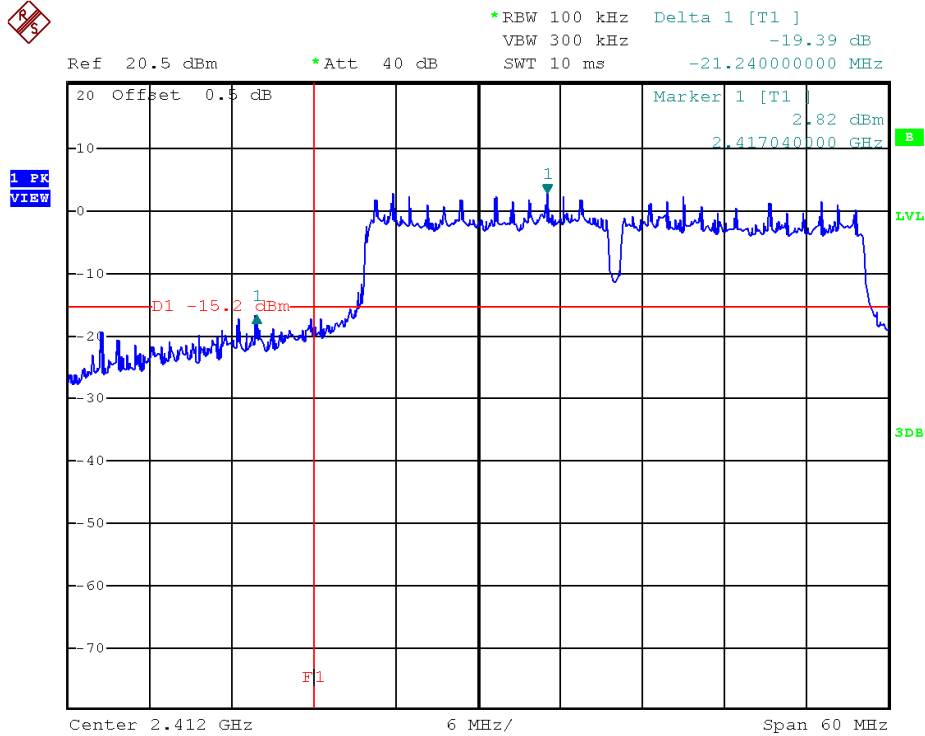




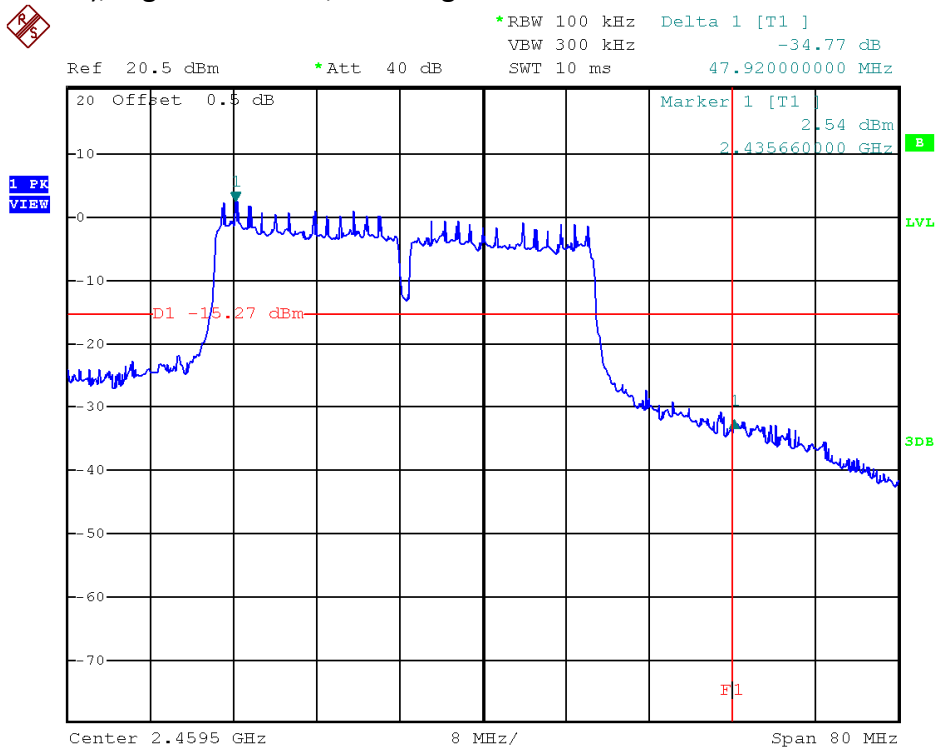
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802. 11n (40MHz), Lowest Channel, Bandedge



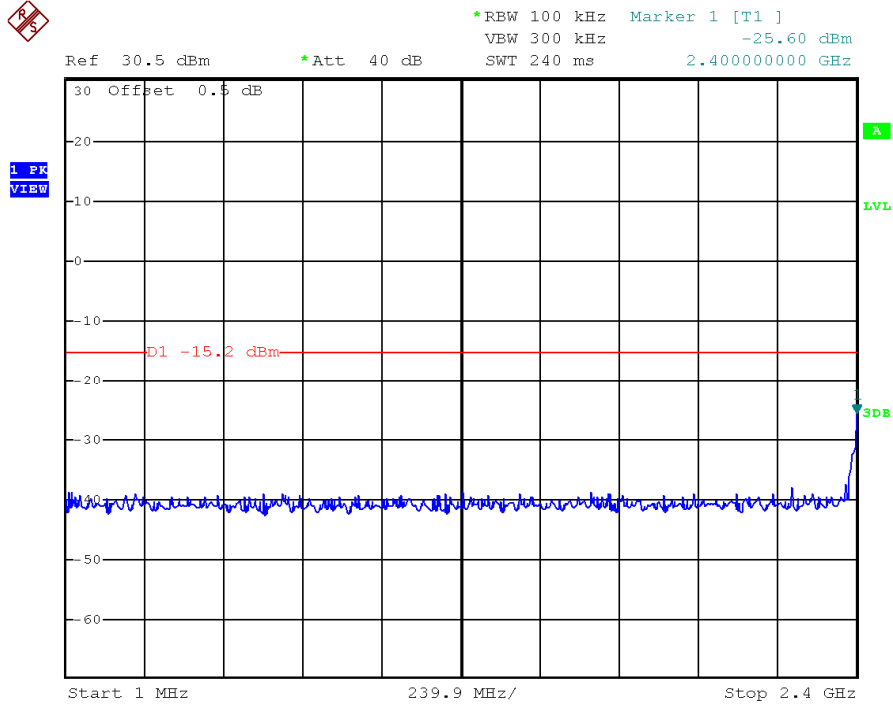
802. 11n (40MHz), Highest Channel, Bandedge



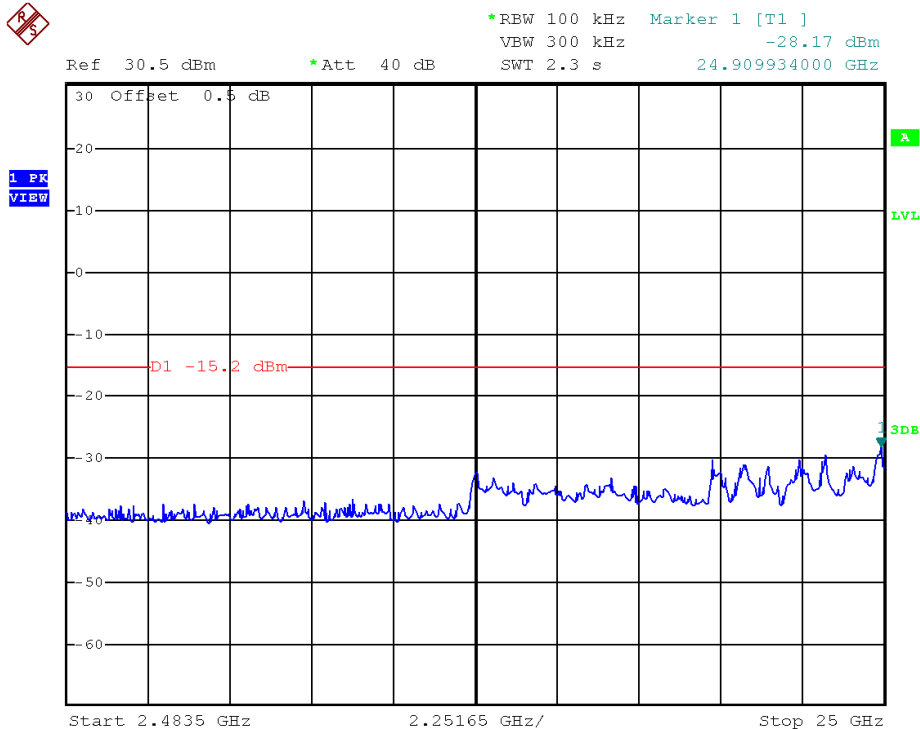
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

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



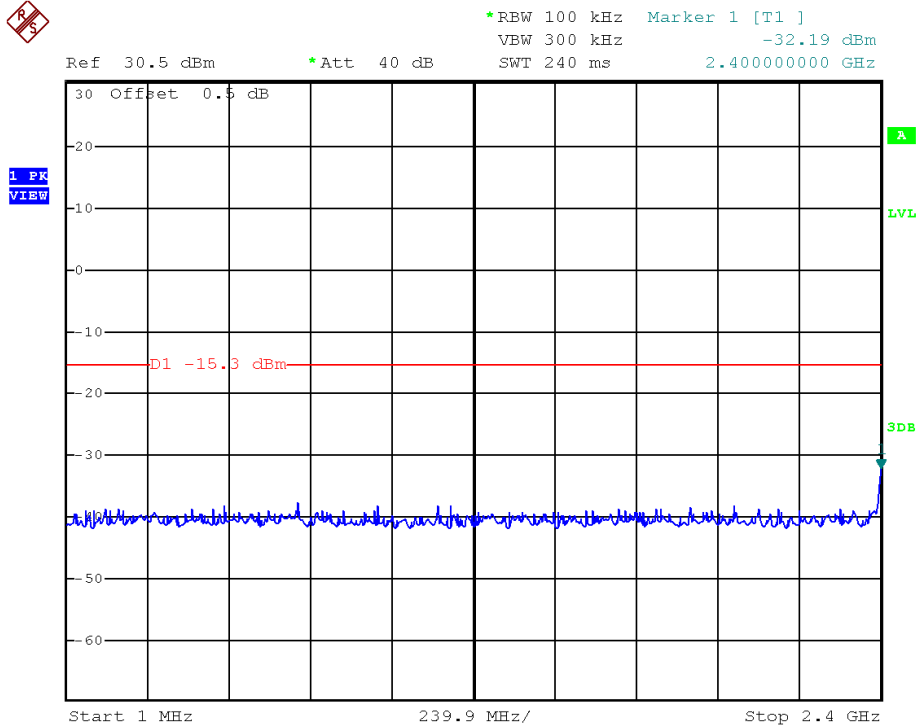
802.11n (40MHz), Lowest Channel, Plot B



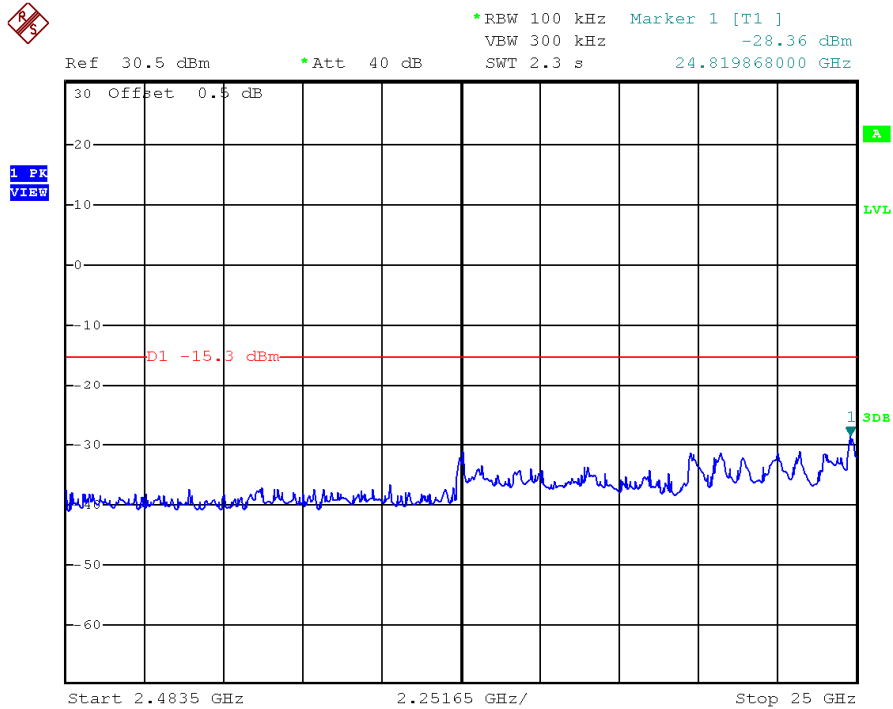
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

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



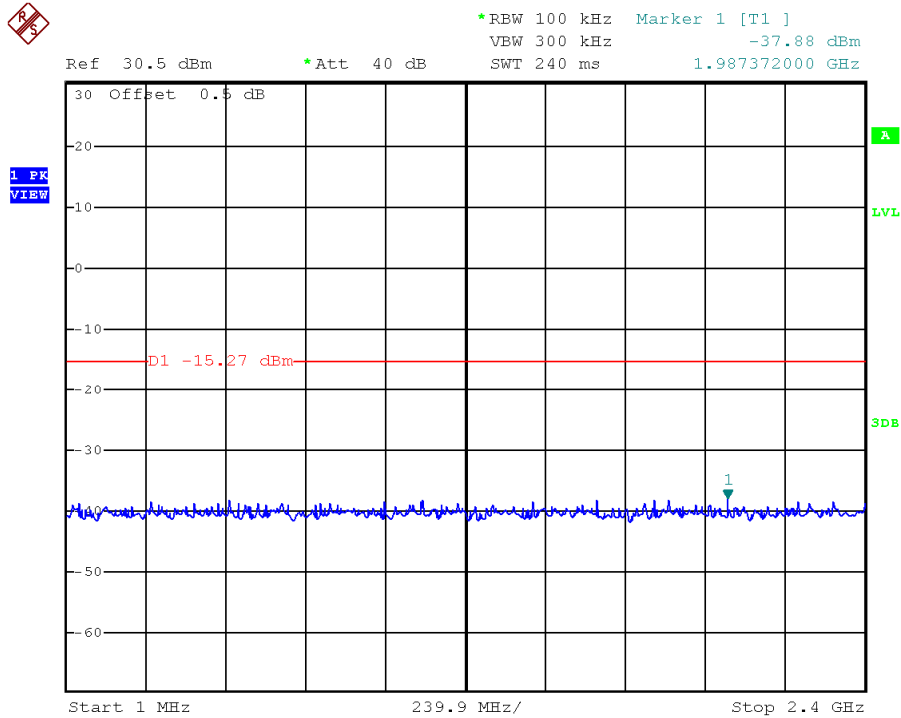
802.11n (40MHz), Middle Channel, Plot B



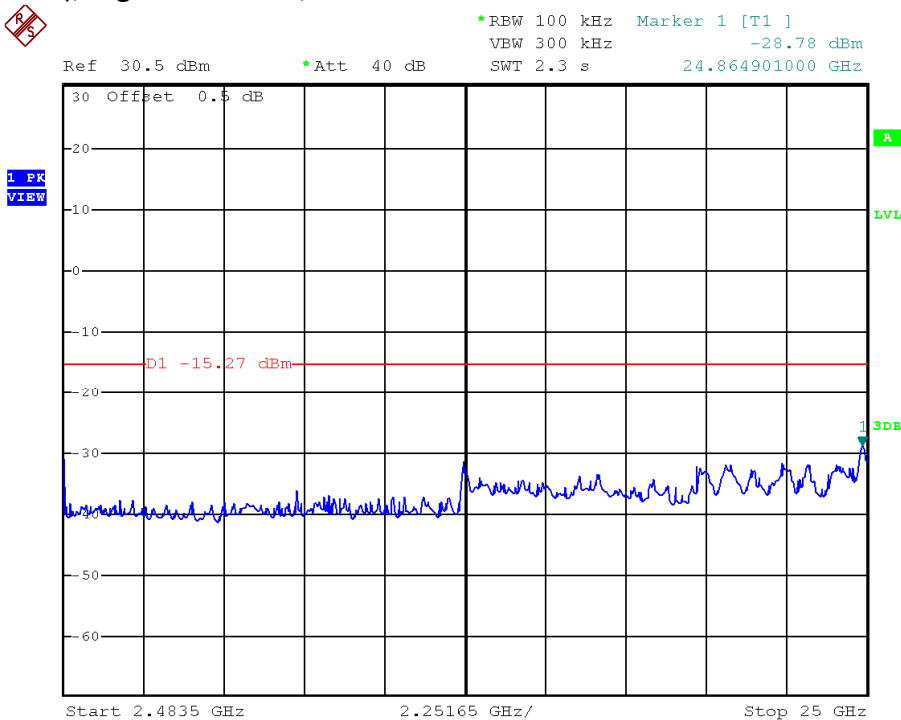
## TEST REPORT

### PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

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



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



## TEST REPORT

### 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.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0.0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

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

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

## TEST REPORT

### 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

2483.5 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 0.2 dB margin

## TEST REPORT

### RADIATED EMISSION DATA

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 (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>53.8</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>50.2</i></b>	<b><i>54.0</i></b>	<b><i>-3.8</i></b>
<b><i>H</i></b>	<b><i>4824.000</i></b>	<b><i>46.1</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>48.0</i></b>	<b><i>54.0</i></b>	<b><i>-6.0</i></b>
<b><i>H</i></b>	<b><i>12060.000</i></b>	<b><i>31.7</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.2</i></b>	<b><i>54.0</i></b>	<b><i>-14.8</i></b>

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)
<b><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>66.1</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>62.5</i></b>	<b><i>74.0</i></b>	<b><i>-11.5</i></b>
<b><i>H</i></b>	<b><i>4824.000</i></b>	<b><i>55.6</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>57.5</i></b>	<b><i>74.0</i></b>	<b><i>-16.5</i></b>
<b><i>H</i></b>	<b><i>12060.000</i></b>	<b><i>43.7</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.2</i></b>	<b><i>74.0</i></b>	<b><i>-22.8</i></b>

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

## TEST REPORT

Mode: TX-Channel 06

Table 2  
IEEE 802.11b (DSSS, 1 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>46.7</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>48.6</i></b>	<b><i>54.0</i></b>	<b><i>-5.4</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>31.6</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.5</i></b>	<b><i>54.0</i></b>	<b><i>-17.5</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>31.7</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.2</i></b>	<b><i>54.0</i></b>	<b><i>-14.8</i></b>

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><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>56.1</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>58.0</i></b>	<b><i>74.0</i></b>	<b><i>-16.0</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>42.8</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.7</i></b>	<b><i>74.0</i></b>	<b><i>-26.3</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>43.8</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.3</i></b>	<b><i>74.0</i></b>	<b><i>-22.7</i></b>

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



## TEST REPORT

Mode: TX-Channel 11

Table 3  
IEEE 802.11b (DSSS, 1 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>54.4</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>50.8</i></b>	<b><i>54.0</i></b>	<b><i>-3.2</i></b>
<b><i>H</i></b>	<b><i>4924.000</i></b>	<b><i>47.2</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>49.1</i></b>	<b><i>54.0</i></b>	<b><i>-4.9</i></b>
<b><i>H</i></b>	<b><i>7386.000</i></b>	<b><i>31.3</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.2</i></b>	<b><i>54.0</i></b>	<b><i>-17.8</i></b>
<b><i>H</i></b>	<b><i>12310.000</i></b>	<b><i>32.2</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.7</i></b>	<b><i>54.0</i></b>	<b><i>-14.3</i></b>

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><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>67.9</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>64.3</i></b>	<b><i>74.0</i></b>	<b><i>-9.7</i></b>
<b><i>H</i></b>	<b><i>4924.000</i></b>	<b><i>56.6</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>58.5</i></b>	<b><i>74.0</i></b>	<b><i>-15.5</i></b>
<b><i>H</i></b>	<b><i>7386.000</i></b>	<b><i>42.6</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.5</i></b>	<b><i>74.0</i></b>	<b><i>-26.5</i></b>
<b><i>H</i></b>	<b><i>12310.000</i></b>	<b><i>44.3</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.8</i></b>	<b><i>74.0</i></b>	<b><i>-22.2</i></b>

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

## TEST REPORT

Mode: TX-Channel 01

Table 4  
IEEE 802.11g (OFDM, 6 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>56.9</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>53.3</i></b>	<b><i>54.0</i></b>	<b><i>-0.7</i></b>
<b><i>H</i></b>	<b><i>4824.000</i></b>	<b><i>38.9</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>40.8</i></b>	<b><i>54.0</i></b>	<b><i>-13.2</i></b>
<b><i>H</i></b>	<b><i>12060.000</i></b>	<b><i>31.8</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.3</i></b>	<b><i>54.0</i></b>	<b><i>-14.7</i></b>

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><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>77.1</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>73.5</i></b>	<b><i>74.0</i></b>	<b><i>-0.5</i></b>
<b><i>H</i></b>	<b><i>4824.000</i></b>	<b><i>49.4</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>51.3</i></b>	<b><i>74.0</i></b>	<b><i>-22.7</i></b>
<b><i>H</i></b>	<b><i>12060.000</i></b>	<b><i>43.7</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.2</i></b>	<b><i>74.0</i></b>	<b><i>-22.8</i></b>

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

## TEST REPORT

Mode: TX-Channel 06

Table 5  
IEEE 802.11g (OFDM, 6 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>38.7</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>40.6</i></b>	<b><i>54.0</i></b>	<b><i>-13.4</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>31.3</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.2</i></b>	<b><i>54.0</i></b>	<b><i>-17.8</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>31.6</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.1</i></b>	<b><i>54.0</i></b>	<b><i>-14.9</i></b>

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><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>49.2</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>51.1</i></b>	<b><i>74.0</i></b>	<b><i>-22.9</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>42.5</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.4</i></b>	<b><i>74.0</i></b>	<b><i>-26.6</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>43.6</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.1</i></b>	<b><i>74.0</i></b>	<b><i>-22.9</i></b>

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

## TEST REPORT

Mode: TX-Channel 11

Table 6  
IEEE 802.11g (OFDM, 6 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>56.7</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>53.1</i></b>	<b><i>54.0</i></b>	<b><i>-0.9</i></b>
<b><i>H</i></b>	<b><i>4924.000</i></b>	<b><i>38.5</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>40.4</i></b>	<b><i>54.0</i></b>	<b><i>-13.6</i></b>
<b><i>H</i></b>	<b><i>7386.000</i></b>	<b><i>31.6</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.5</i></b>	<b><i>54.0</i></b>	<b><i>-17.5</i></b>
<b><i>H</i></b>	<b><i>12310.000</i></b>	<b><i>31.9</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.4</i></b>	<b><i>54.0</i></b>	<b><i>-14.6</i></b>

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><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>76.8</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>73.2</i></b>	<b><i>74.0</i></b>	<b><i>-0.8</i></b>
<b><i>H</i></b>	<b><i>4924.000</i></b>	<b><i>49.1</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>51.0</i></b>	<b><i>74.0</i></b>	<b><i>-23.0</i></b>
<b><i>H</i></b>	<b><i>7386.000</i></b>	<b><i>42.9</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.8</i></b>	<b><i>74.0</i></b>	<b><i>-26.2</i></b>
<b><i>H</i></b>	<b><i>12310.000</i></b>	<b><i>44.0</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.5</i></b>	<b><i>74.0</i></b>	<b><i>-22.5</i></b>

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

## TEST REPORT

Mode: TX-Channel 01

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

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>56.6</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>53.0</i></b>	<b><i>54.0</i></b>	<b><i>-1.0</i></b>
<b><i>H</i></b>	<b><i>4824.000</i></b>	<b><i>38.9</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>40.8</i></b>	<b><i>54.0</i></b>	<b><i>-13.2</i></b>
<b><i>H</i></b>	<b><i>12060.000</i></b>	<b><i>31.9</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.4</i></b>	<b><i>54.0</i></b>	<b><i>-14.6</i></b>

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><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>76.9</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>73.3</i></b>	<b><i>74.0</i></b>	<b><i>-0.7</i></b>
<b><i>H</i></b>	<b><i>4824.000</i></b>	<b><i>49.5</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>51.4</i></b>	<b><i>74.0</i></b>	<b><i>-22.6</i></b>
<b><i>H</i></b>	<b><i>12060.000</i></b>	<b><i>43.9</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.4</i></b>	<b><i>74.0</i></b>	<b><i>-22.6</i></b>

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

## TEST REPORT

Mode: TX-Channel 06

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

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>38.8</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>40.7</i></b>	<b><i>54.0</i></b>	<b><i>-13.3</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>31.5</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.4</i></b>	<b><i>54.0</i></b>	<b><i>-17.6</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>32.1</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.6</i></b>	<b><i>54.0</i></b>	<b><i>-14.4</i></b>

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><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>49.4</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>51.3</i></b>	<b><i>74.0</i></b>	<b><i>-22.7</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>42.7</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.6</i></b>	<b><i>74.0</i></b>	<b><i>-26.4</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>44.0</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.5</i></b>	<b><i>74.0</i></b>	<b><i>-22.5</i></b>

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

## TEST REPORT

Mode: TX-Channel 11

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

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>56.9</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>53.3</i></b>	<b><i>54.0</i></b>	<b><i>-0.7</i></b>
<b><i>H</i></b>	<b><i>4924.000</i></b>	<b><i>38.2</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>40.1</i></b>	<b><i>54.0</i></b>	<b><i>-13.9</i></b>
<b><i>H</i></b>	<b><i>7386.000</i></b>	<b><i>31.5</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.4</i></b>	<b><i>54.0</i></b>	<b><i>-17.6</i></b>
<b><i>H</i></b>	<b><i>12310.000</i></b>	<b><i>31.8</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.3</i></b>	<b><i>54.0</i></b>	<b><i>-14.7</i></b>

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><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>77.1</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>73.5</i></b>	<b><i>74.0</i></b>	<b><i>-0.5</i></b>
<b><i>H</i></b>	<b><i>4924.000</i></b>	<b><i>48.8</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>50.7</i></b>	<b><i>74.0</i></b>	<b><i>-23.3</i></b>
<b><i>H</i></b>	<b><i>7386.000</i></b>	<b><i>42.6</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.5</i></b>	<b><i>74.0</i></b>	<b><i>-26.5</i></b>
<b><i>H</i></b>	<b><i>12310.000</i></b>	<b><i>43.8</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.3</i></b>	<b><i>74.0</i></b>	<b><i>-22.7</i></b>

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

## TEST REPORT

Mode: TX-Channel 01

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

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>57.3</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>53.7</i></b>	<b><i>54.0</i></b>	<b><i>-0.3</i></b>
<b><i>H</i></b>	<b><i>4844.000</i></b>	<b><i>34.1</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>36.0</i></b>	<b><i>54.0</i></b>	<b><i>-18.0</i></b>
<b><i>H</i></b>	<b><i>12110.000</i></b>	<b><i>32.0</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.5</i></b>	<b><i>54.0</i></b>	<b><i>-14.5</i></b>

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><i>H</i></b>	<b><i>2390.000</i></b>	<b><i>76.8</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>73.2</i></b>	<b><i>74.0</i></b>	<b><i>-0.8</i></b>
<b><i>H</i></b>	<b><i>4844.000</i></b>	<b><i>44.7</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>46.6</i></b>	<b><i>74.0</i></b>	<b><i>-27.4</i></b>
<b><i>H</i></b>	<b><i>12110.000</i></b>	<b><i>44.1</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.6</i></b>	<b><i>74.0</i></b>	<b><i>-22.4</i></b>

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



## TEST REPORT

Mode: TX-Channel 06

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

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>33.8</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>35.7</i></b>	<b><i>54.0</i></b>	<b><i>-18.3</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>31.7</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.6</i></b>	<b><i>54.0</i></b>	<b><i>-17.4</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>32.1</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.6</i></b>	<b><i>54.0</i></b>	<b><i>-14.4</i></b>

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><i>H</i></b>	<b><i>4874.000</i></b>	<b><i>44.3</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>46.2</i></b>	<b><i>74.0</i></b>	<b><i>-27.8</i></b>
<b><i>H</i></b>	<b><i>7311.000</i></b>	<b><i>42.8</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.7</i></b>	<b><i>74.0</i></b>	<b><i>-26.3</i></b>
<b><i>H</i></b>	<b><i>12185.000</i></b>	<b><i>44.2</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.7</i></b>	<b><i>74.0</i></b>	<b><i>-22.3</i></b>

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

## TEST REPORT

Mode: TX-Channel 11

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

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<b><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>57.4</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>53.8</i></b>	<b><i>54.0</i></b>	<b><i>-0.2</i></b>
<b><i>H</i></b>	<b><i>4904.000</i></b>	<b><i>33.4</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>35.3</i></b>	<b><i>54.0</i></b>	<b><i>-18.7</i></b>
<b><i>H</i></b>	<b><i>7356.000</i></b>	<b><i>31.1</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>36.0</i></b>	<b><i>54.0</i></b>	<b><i>-18.0</i></b>
<b><i>H</i></b>	<b><i>12260.000</i></b>	<b><i>31.9</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>39.4</i></b>	<b><i>54.0</i></b>	<b><i>-14.6</i></b>

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><i>H</i></b>	<b><i>2483.500</i></b>	<b><i>77.4</i></b>	<b><i>33</i></b>	<b><i>29.4</i></b>	<b><i>73.8</i></b>	<b><i>74.0</i></b>	<b><i>-0.2</i></b>
<b><i>H</i></b>	<b><i>4904.000</i></b>	<b><i>44.0</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>45.9</i></b>	<b><i>74.0</i></b>	<b><i>-28.1</i></b>
<b><i>H</i></b>	<b><i>7356.000</i></b>	<b><i>42.3</i></b>	<b><i>33</i></b>	<b><i>37.9</i></b>	<b><i>47.2</i></b>	<b><i>74.0</i></b>	<b><i>-26.8</i></b>
<b><i>H</i></b>	<b><i>12260.000</i></b>	<b><i>44.1</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>51.6</i></b>	<b><i>74.0</i></b>	<b><i>-22.4</i></b>

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

## TEST REPORT

Mode: WiFi with Charging

Table 13

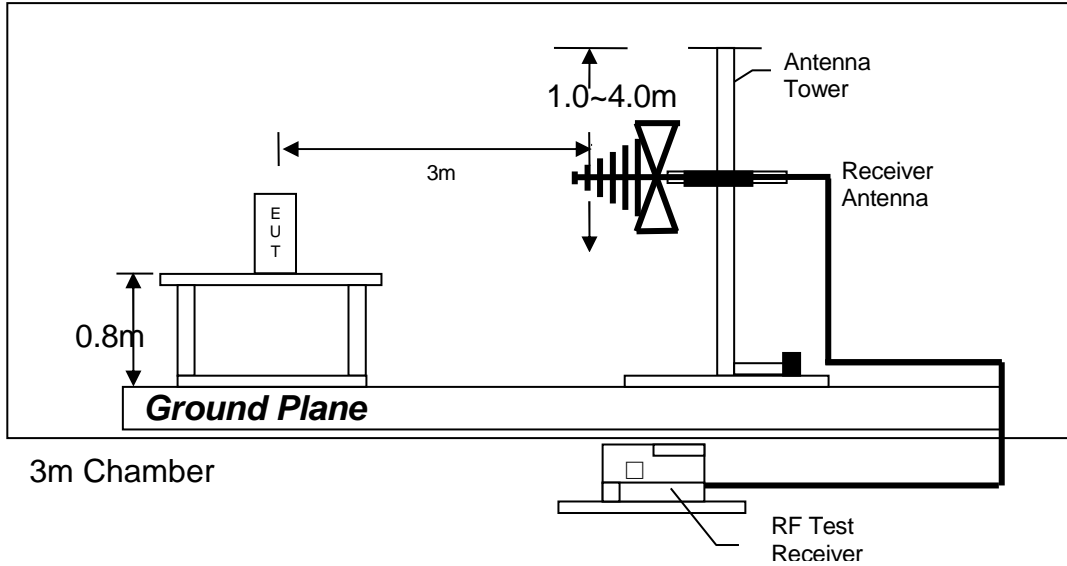
Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
H	150.360	34.0	16	14.0	32.0	43.5	-11.5
H	180.280	24.8	16	20.0	28.8	43.5	-14.7
H	200.000	26.6	16	16.0	26.6	43.5	-16.9
H	216.000	29.4	16	17.0	30.4	43.5	-13.1
<b>H</b>	<b>250.000</b>	<b>36.6</b>	<b>16</b>	<b>20.0</b>	<b>40.6</b>	<b>46.0</b>	<b>-5.4</b>
H	288.000	26.8	16	22.0	32.8	46.0	-13.2
<b>H</b>	<b>324.000</b>	<b>25.8</b>	<b>16</b>	<b>24.0</b>	<b>33.8</b>	<b>46.0</b>	<b>-12.2</b>
H	350.000	25.6	16	24.0	33.6	46.0	-12.4
H	360.000	34.0	16	24.0	42.0	46.0	-4.0
<b>H</b>	<b>400.000</b>	<b>23.6</b>	<b>16</b>	<b>25.0</b>	<b>32.6</b>	<b>46.0</b>	<b>-13.4</b>
H	432.000	24.6	16	25.0	33.6	46.0	-12.4
H	504.000	25.6	16	26.0	35.6	46.0	-10.4
H	550.000	21.8	16	28.0	33.8	46.0	-12.2
H	600.000	23.0	16	29.0	36.0	46.0	-10.0
H	648.100	25.4	16	29.0	38.4	46.0	-7.6
H	750.100	20.8	16	30.0	34.8	46.0	-11.2
H	850.000	23.8	16	31.0	38.8	46.0	-7.2
H	950.100	19.6	16	33.0	36.6	46.0	-9.4

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

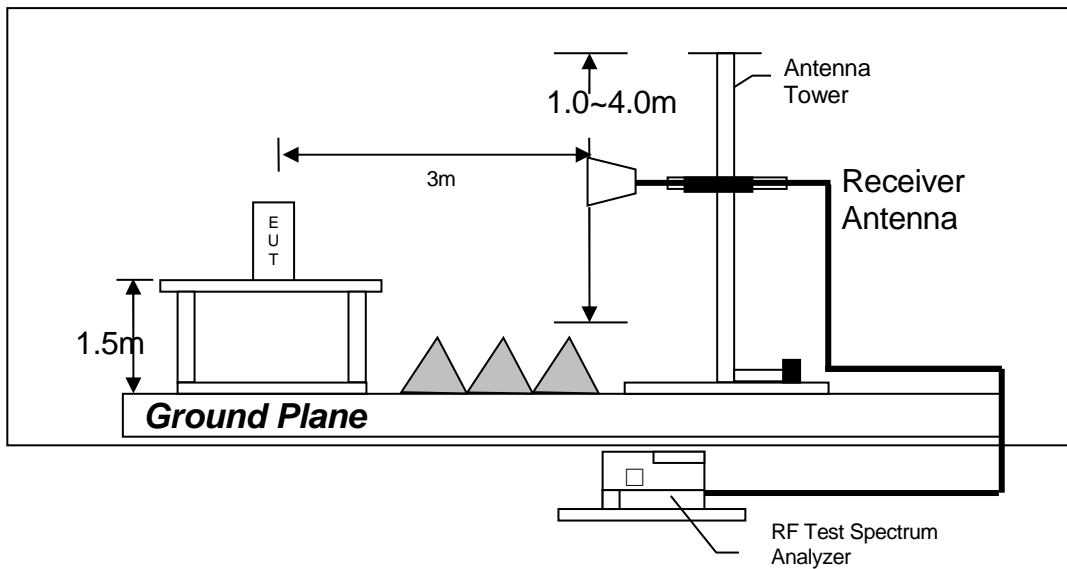
## TEST REPORT

### 4.6.3 Radiated Emission Test Setup

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



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

## TEST REPORT

### 4.6.4 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

## TEST REPORT

### 4.7 AC Power Line Conducted Emission

- ☐ Not applicable – EUT is only powered by battery for operation.
- ☒ EUT connects to AC power line. Emission Data is listed in following pages.
- ☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

#### 4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration  
at

0.150 MHz

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

#### 4.7.2 AC Power Line Conducted Emission Data

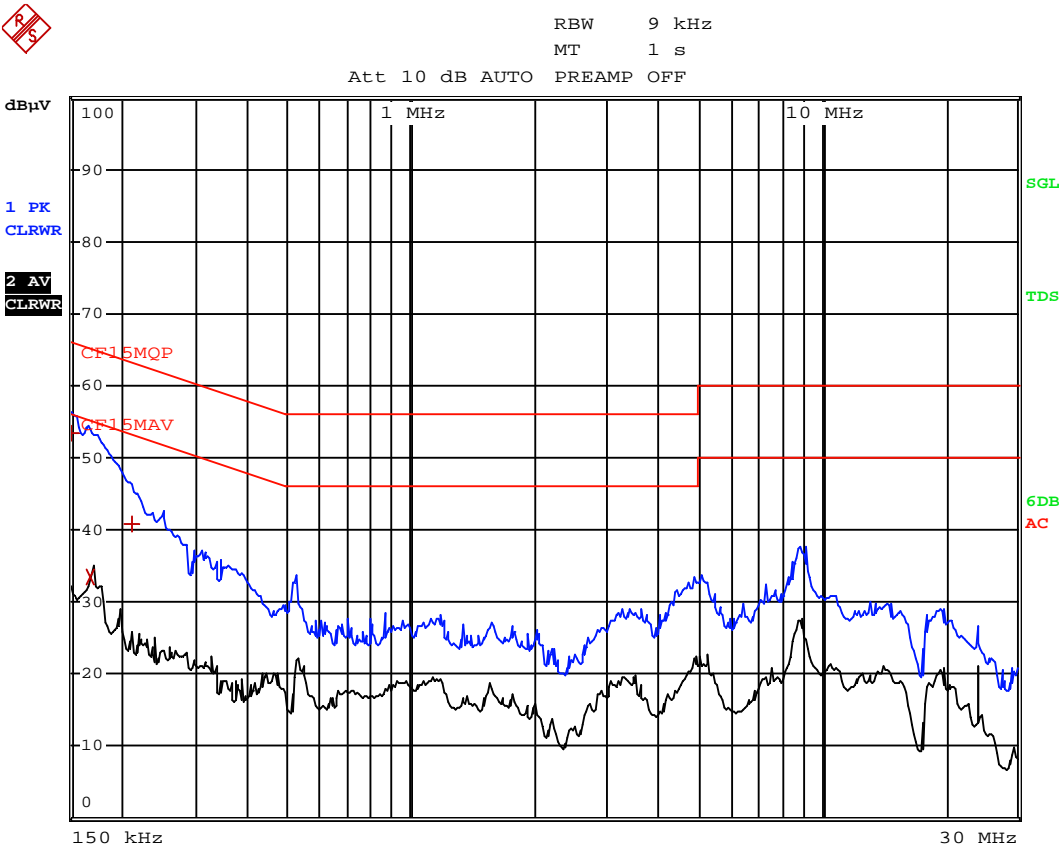
The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 12.6 dB margin compare with Quasi-peak limit

TEST REPORT

AC POWER LINE CONDUCTED EMISSION

Worst Case: WiFi Operating



# TEST REPORT

### Worst Case: WiFi Operating

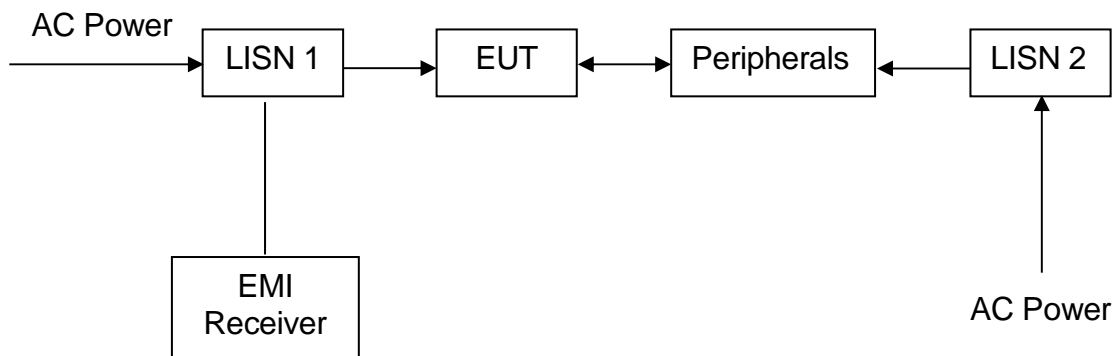
[illegible]

Date: 6.SEP.2017 17:59:50



## TEST REPORT

### 4.7.3 Conducted Emission Test Setup



## TEST REPORT

### 4.8 Occupied Bandwidth

Occupied Bandwidth Results: (802.11b)

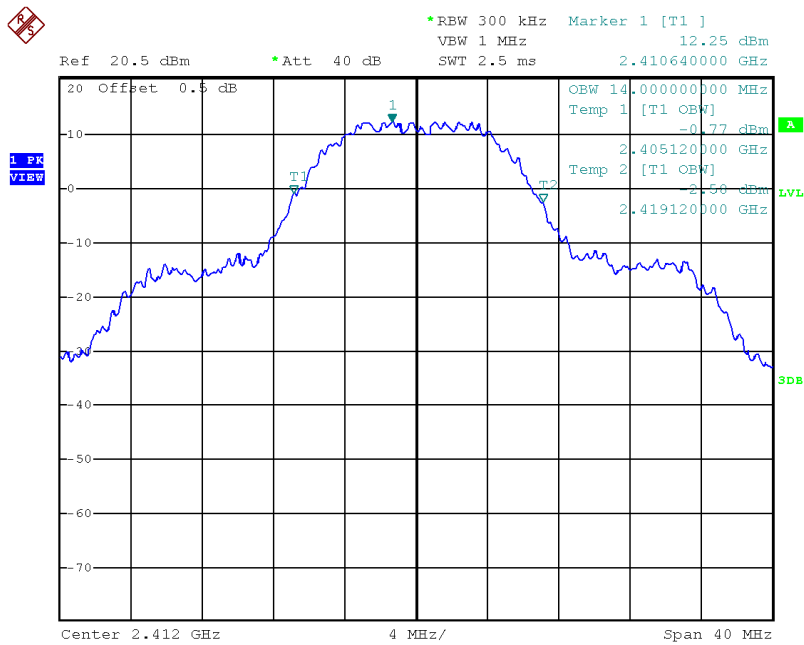
(802.11b) Occupied Bandwidth (kHz)

Low Channel: 2412 14000

Middle Channel: 2437 13040

High Channel: 2462 12240

The worst case is shown as below



TEST REPORT

Occupied Bandwidth Results: (802.11g)

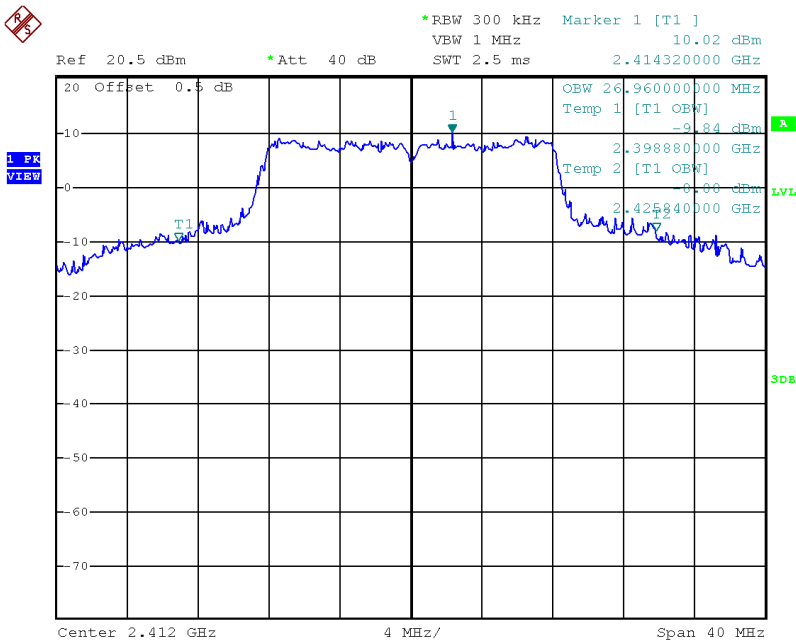
(802.11g) Occupied Bandwidth (kHz)

Low Channel: 2412 26960

Middle Channel: 2437 21280

High Channel: 2462 17360

The worst case is shown as below



TEST REPORT

Occupied Bandwidth Results: (802.11n HT20)

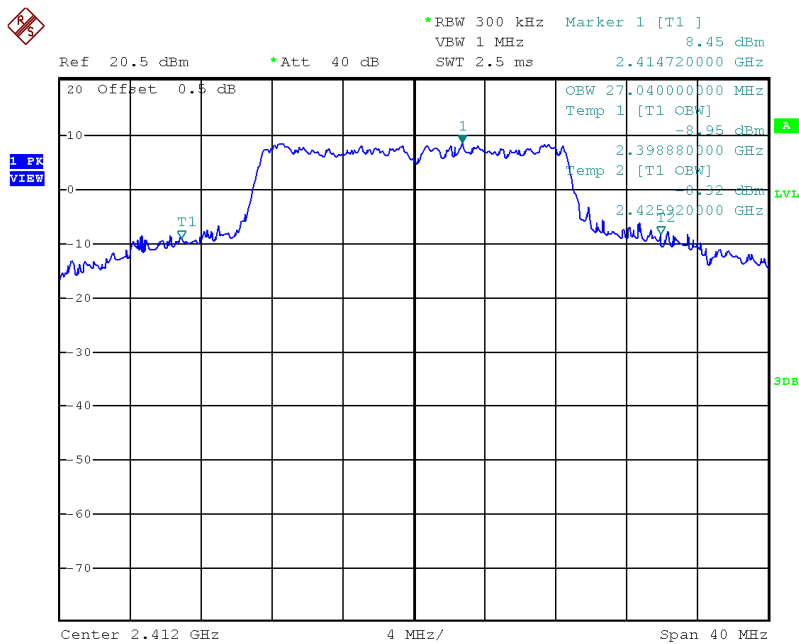
(802.11n HT20) Occupied Bandwidth (kHz)

Low Channel: 2412 27040

Middle Channel: 2437 22240

High Channel: 2462 18160

The worst case is shown as below

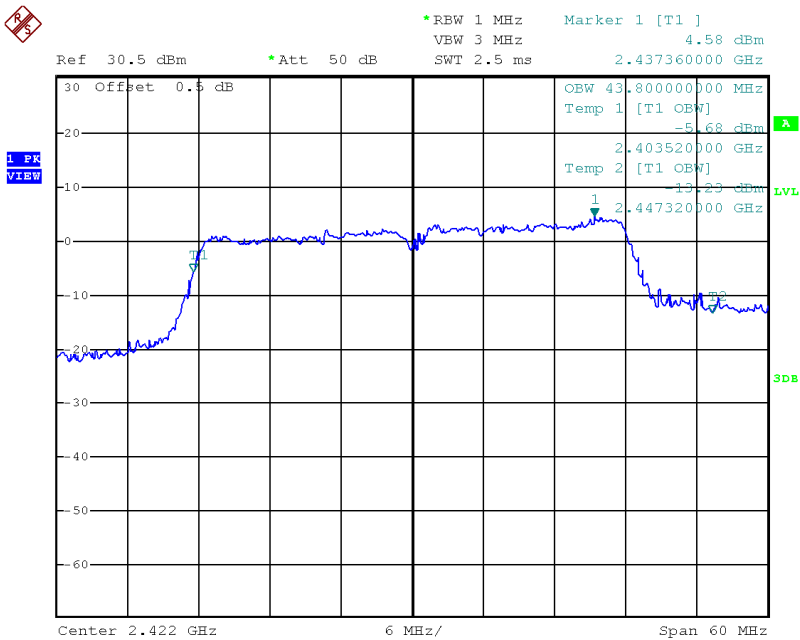


TEST REPORT

Occupied Bandwidth Results: (802.11n HT40)

(802.11n HT40)	Occupied Bandwidth (kHz)
Low Channel: 2422	43800
Middle Channel: 2437	43440
High Channel: 2452	41640

The worst case is shown as below



## TEST REPORT

### EXHIBIT 5 EQUIPMENT LIST

#### 5.0 EQUIPMENT LIST

##### 1) Radiated Emissions Test

Equipment	Biconical Antenna	EMI Test Receiver (9kHz to 26.5GHz)	Double Ridged Guide Antenna
Registration No.	EW-0571	EW-3156	EW-0194
Manufacturer	EMCO	ROHDE-SCHWARZ	EMCO
Model No.	3104C	ESR26	3115
Calibration Date	May. 18, 2016	Dec. 06, 2016	Aug. 10, 2016
Calibration Due Date	Nov. 18, 2017	Dec. 06, 2017	Feb. 10, 2018

Equipment	Log Periodic Antenna	Pyramidal Horn Antenna	Spectrum Analyzer
Registration No.	EW-0447	EW-0905	EW-2249
Manufacturer	EMCO	EMCO	R&S
Model No.	3146	3160-09	FSP30
Calibration Date	May. 18, 2016	Aug. 18, 2017	Dec. 23, 2016
Calibration Due Date	Nov. 18, 2017	Feb. 18, 2019	Nov. 27, 2017

Equipment	Active Loop H-field (9kHz to 30MHz)	RF Cable 9kHz to 1000MHz	RF Cable (up to 40GHz)
Registration No.	EW-2313	EW-3170	EW-3155
Manufacturer	ELECTROMETRI	N/A	N/A
Model No.	EM-6876	9kHz to 1000MHz	1-40 GHz
Calibration Date	May. 18, 2016	Mar. 20, 2017	Dec. 05, 2016
Calibration Due Date	Nov. 18, 2017	Mar. 20, 2018	Dec. 05, 2017

Equipment	RF Pre-amplifier 3 pcs (9kHz to 40GHz)	Notch Filter (cutoff frequency 2.4GHz to 2.5GHz)
Registration No.	EW-3006	EW-3155
Manufacturer	SCHWARZBECK	MICROTRONICS
Model No.	BBV 9744	BRM50701-02
Calibration Date	Mar. 23, 2017	May. 26, 2017
Calibration Due Date	Mar. 23, 2018	May. 26, 2018

## TEST REPORT

### 2) Conducted Emissions Test

Equipment	EMI Test Receiver	RF Cable 9kHz to 1000MHz	LISN
Registration No.	EW-3156	EW-3170	EW-2874
Manufacturer	ROHDESCHWARZ	N/A	R&S
Model No.	ESR26	9kHz to 1000MHz	ENV-216
Calibration Date	Dec. 06. 2016	Mar. 20, 2017	Mar. 16, 2017
Calibration Due Date	Dec. 06, 2017	Mar. 20, 2018	Mar. 16, 2018

### 3) Conductive Measurement Test

Equipment	Spectrum Analyzer	RF Cable (up to 40GHz) 1.5m length	RF Power Meter with Power Sensor (N1921A)
Registration No.	EW-2249	EW-3104	EW-2270
Manufacturer	R&S	N/A	AGILENTTECH
Model No.	FSP30	SMA-M to SMA-M	N1911A
Calibration Date	Dec. 23, 2016	Feb. 28, 2017	Jan. 04, 2017
Calibration Due Date	Nov, 27. 2017	Feb. 28, 2018	Jan. 04, 2018