Issuing Laboratory:
Intertek Testing Services Hong Kong Limited

HKAS has accredited this laboratory (HOKLAS 005 – TEST) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories.

TEST REPORT

Report Number: 14061521HKG-001

Application
for
Original Grant of 47 CFR Part 15 Certification
New Family of RSS-210 Issue 8 Equipment Certification

Learning App Tablet

FCC ID: G2R-1668

IC: 1135D-1668

Prepared and Checked by:

James Yeung
Engineer

Approved by:

Chan Chi Hung, Terry
Supervisor
August 13, 2014

GENERAL INFORMATION

Applicant Name:	VTech Electronics Limited
Applicant Address:	23/F., Tai Ping Industrial Center, Block 1, 57 Ting Kok Road, Tai Po, N.T., Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2012 Edition
FCC ID:	G2R-1668
FCC Model(s):	1668
IC Specification Standard:	RSS-210 Issue 8, December 2010 RSS-Gen Issue 3, December 2010
IC:	1135D-1668
IC Model(s):	1668
Type of EUT:	Digital Transmission System
Description of EUT:	Learning App Tablet
Serial Number:	N/A
Sample Receipt Date:	June 30, 2014
Date of Test:	June 30, 2014 to July 17, 2014
Report Date:	August 13, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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EXHIBIT 1
SUMMARY OF TEST RESULTS & STATEMENT OF COMPLIANCE

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1.0 Summary of Test Results

Test Items	FCC Part 15 Section	RSS-210/ RSS-Gen# Section	Results	Details see section
Antenna Requirement	15.203	7.1.2#	Pass	2.1
Max. Conducted Output Power (average)	15.247(b)(3)&(4)	A8.4(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	A8.2(a)	Pass	4.2
Max. Power Density (average)	15.247(e)	A8.2(b)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	A8.5	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	A8.5	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	7.2.4#	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.

1.1 Statement of Compliance

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

FCC Part 15, October 1, 2012 Edition
RSS-210 Issue 8, December 2010
RSS-Gen Issue 3, December 2010

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EXHIBIT 2
GENERAL DESCRIPTION

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2.0 General Description

2.1 Product Description

The 1668 is a Learning App Tablet.

For 802.11b mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via direct-sequence spread spectrum (DSSS) modulation. Maximum bit rate can be up to 11Mbps. For 802.11g mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps. For 802.11n (with 20MHz bandwidth) mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can support up to 65Mbps. For 802.11n (with 40MHz bandwidth) mode, it operates at frequency range of 2422.000MHz to 2452.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can support up to 65Mbps.

The EUT is power by a "Li-ion" type rechargeable battery pack (3.7V 3800mAh).

The antenna(s) used in the EUT is Integral.

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

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2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). 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 (2009) and KDB Publication No. 558074 D01 v03r02 (05-June-2014). All other measurements were made in accordance with the procedures in RSS-Gen Issue 3 (2010).

2.3 Test Facility

The open area test site, AC Power Line conducted measurement facility, and antenna port conducted measurement facility used to collect the radiated data, AC Power Line conducted data, and conductive data are at Intertek Testing Services Hong Kong Ltd., which is located at World-Wide Industrial Centre 43-47 Shan Mei Street, Fo Tan ShaTin, New Territories, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC and the Industry Canada.

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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 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 is power by a "Li-ion" type rechargeable battery pack (3.7V 3800mAh).

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the EUT 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) A "Li-ion" type rechargeable battery (3.7V 3800mAh) (Supplied by Client)

Description of Accessories:

(1) An AC adaptor (120VAC to 5V 2000mA, Model: SED0502000TU, Brand: Vtech) (Supplied by Client)
(2) HP Notebook, Model: CPQNC2400, S/N: CNF638276D (Supplied by Intertek)
(3) Smart-Drive External Hard Disk, Model: HD3-SU2FW, S/N: 0800261, DoC Product (Supplied by Intertek)
(4) 1 x USB cable with 1 meter long with ferrite (Supplied by Client)
(5) 1 x HDMI cable with 1 meter long (Supplied by Client)
(6) 1x Headset (Supplied by Client)

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

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EXHIBIT 4
TEST RESULTS

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4.0 Test Results

4.1 Occupied bandwidth

When maximum conducted (average) output power is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth (see ANSI C63.10-2009 section 6.9.1)

IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 0 dBi	
Frequency (MHz)	OBW (MHz)
Low Channel: 2412	17.43
Middle Channel: 2437	17.32
High Channel: 2462	17.44

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 0 dBi	
Frequency (MHz)	OBW (MHz)
Low Channel: 2412	20.68
Middle Channel: 2437	20.72
High Channel: 2462	20.70

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 0 dBi	
Frequency (MHz)	OBW (MHz)
Low Channel: 2412	21.22
Middle Channel: 2437	20.97
High Channel: 2462	20.88

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 0 dBi	
Frequency (MHz)	OBW (MHz)
Low Channel: 2422	41.1825
Middle Channel: 2437	40.9725
High Channel: 2452	41.140

The plots of OBW are saved as below.

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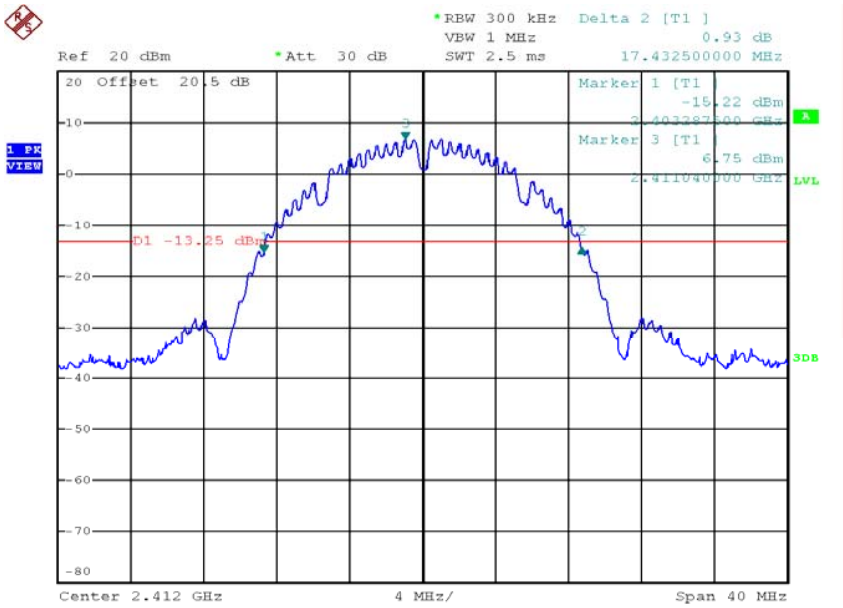
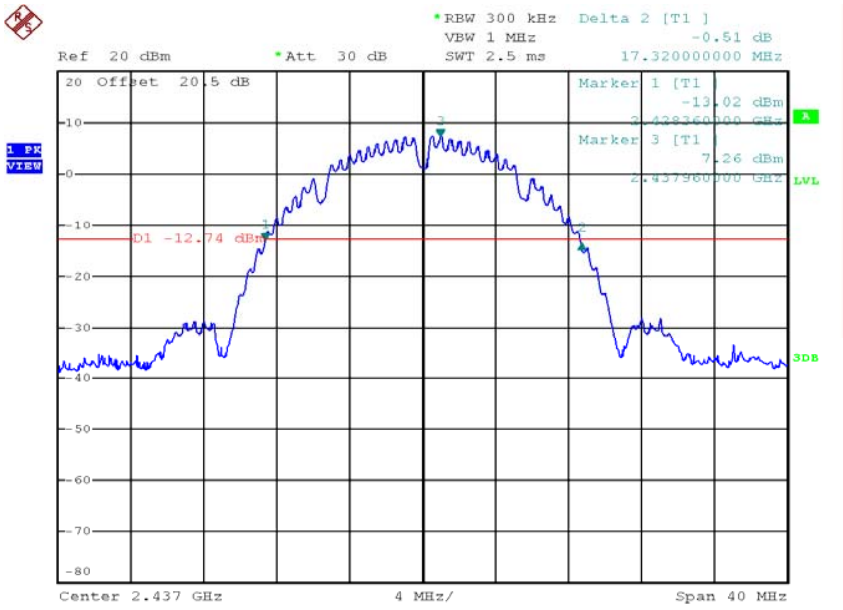
Plots of Occupied Bandwidth

802.11b, Lowest channel



802.11b, Middle channel



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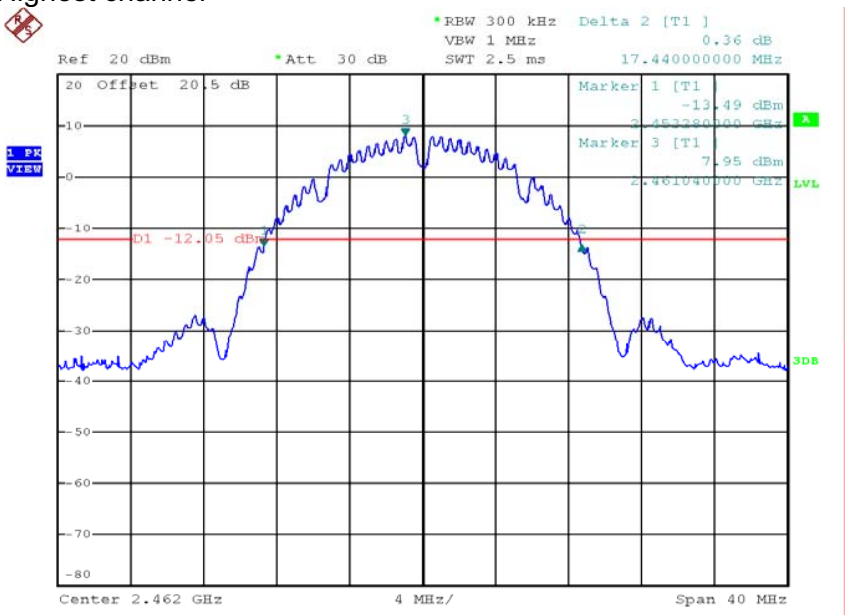
Plots of Occupied Bandwidth

802.11b, Highest channel



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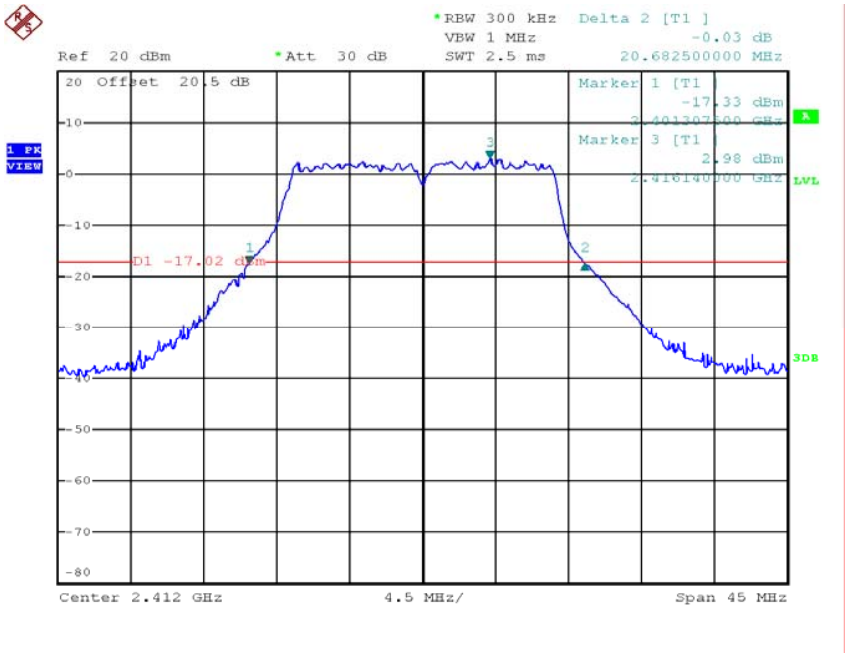
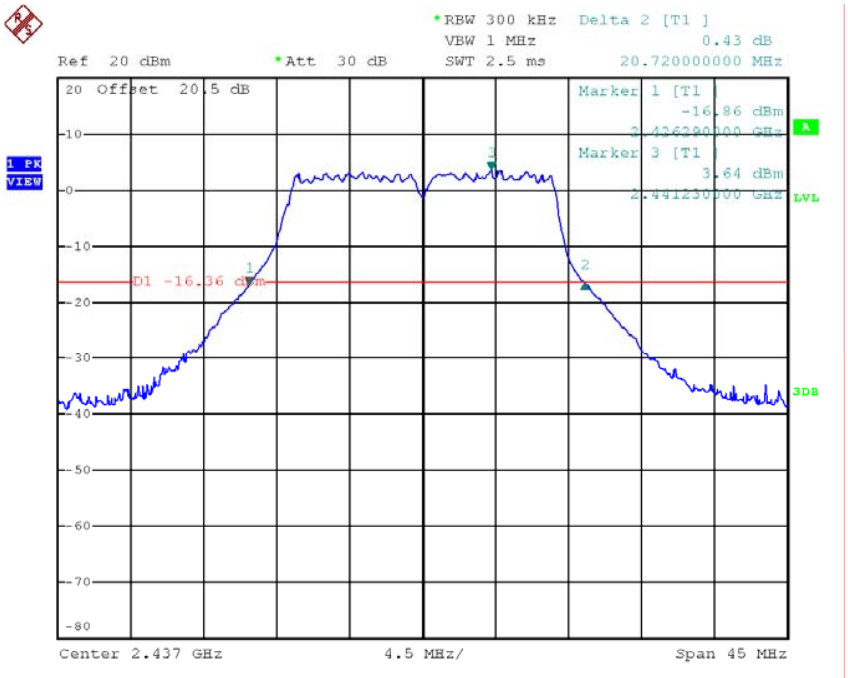
Plots of Occupied Bandwidth

802.11g, Lowest channel



802.11g, Middle channel



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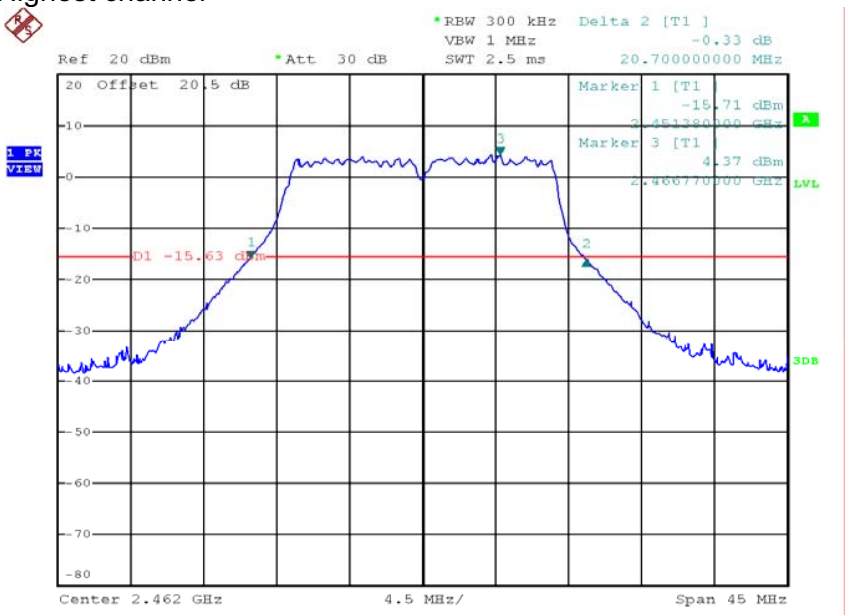
Plots of Occupied Bandwidth

802.11g, Highest channel



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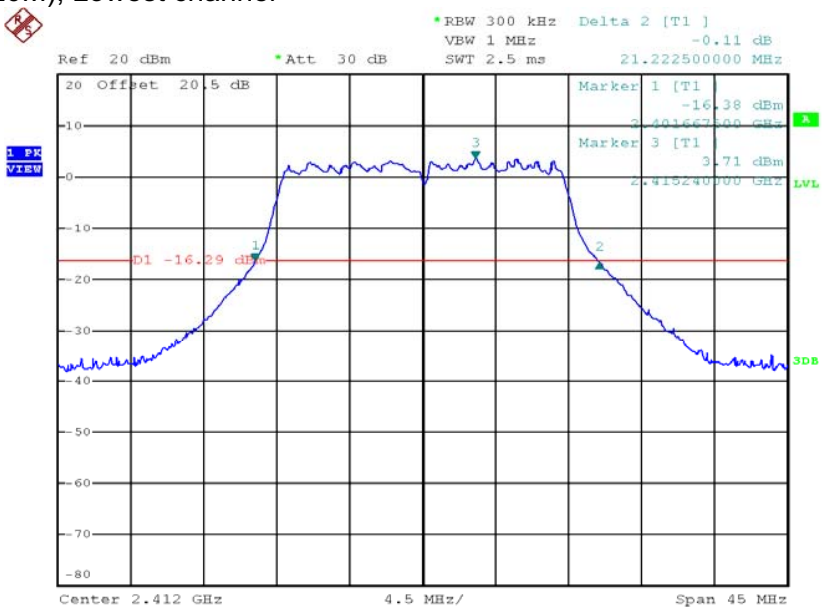
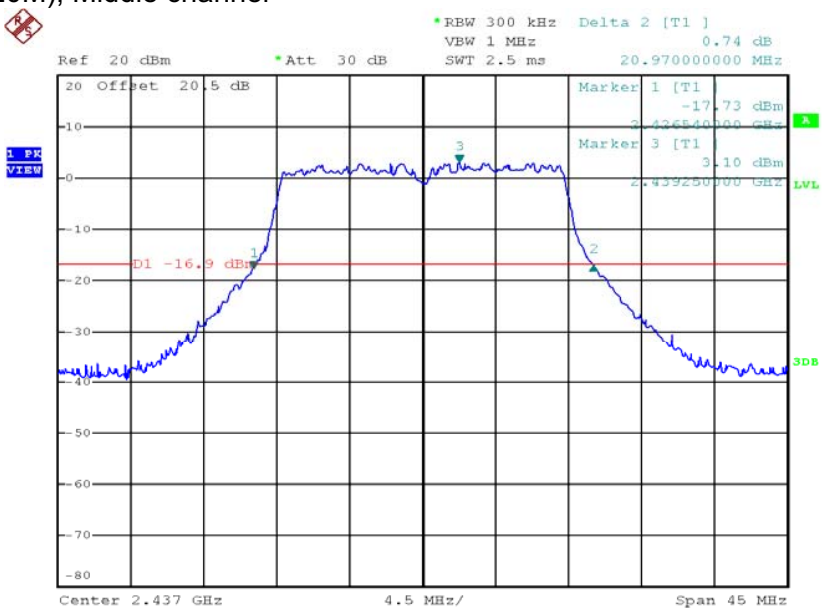
Plots of Occupied Bandwidth

802.11n(20M), Lowest channel



802.11n(20M), Middle channel



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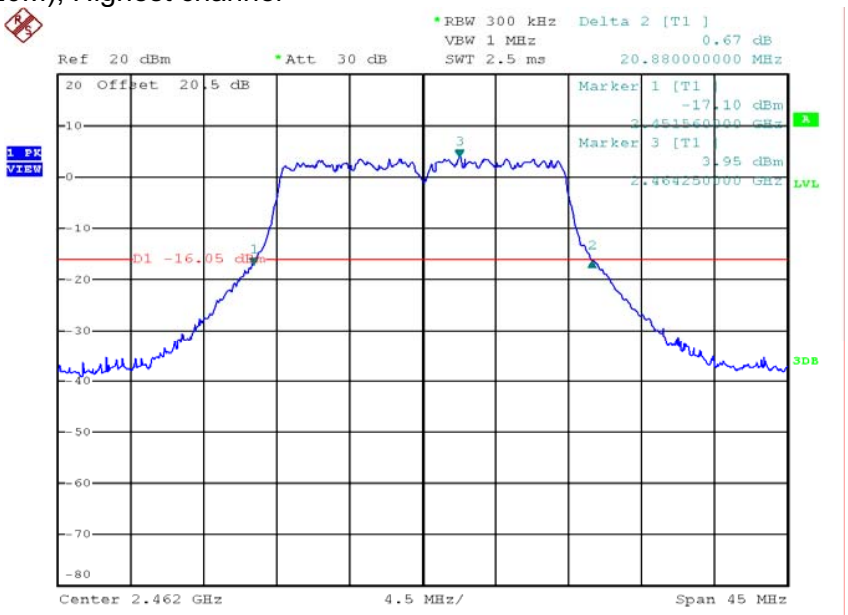
Plots of Occupied Bandwidth

802.11n(20M), Highest channel



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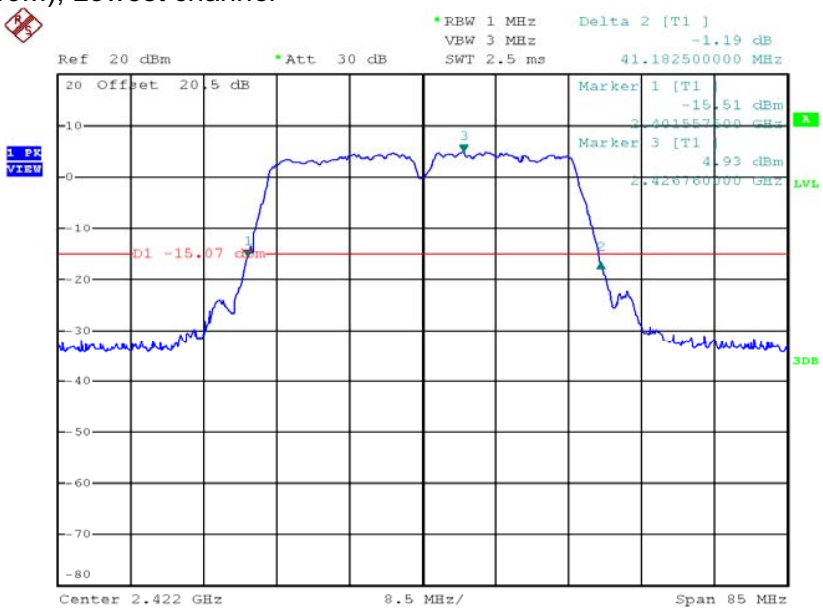
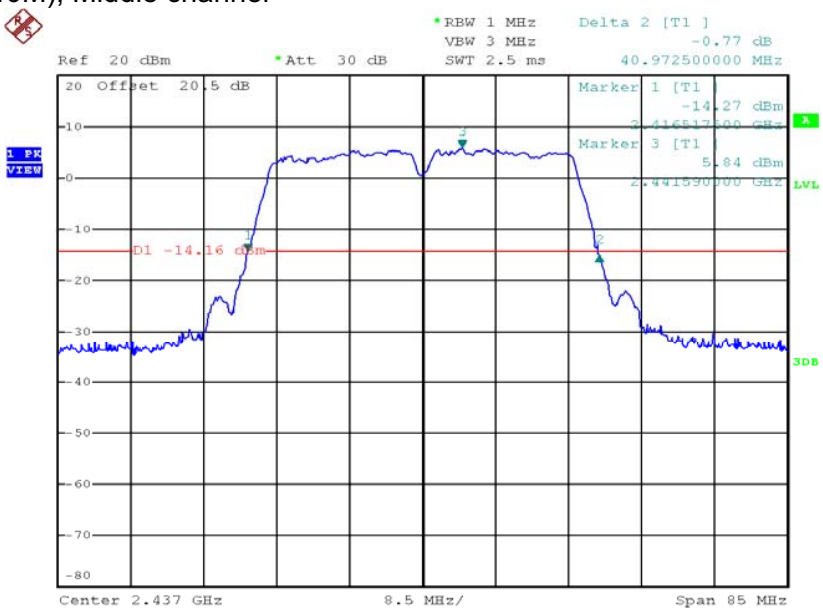
Plots of Occupied Bandwidth

802.11n(40M), Lowest channel



802.11n(40M), Middle channel



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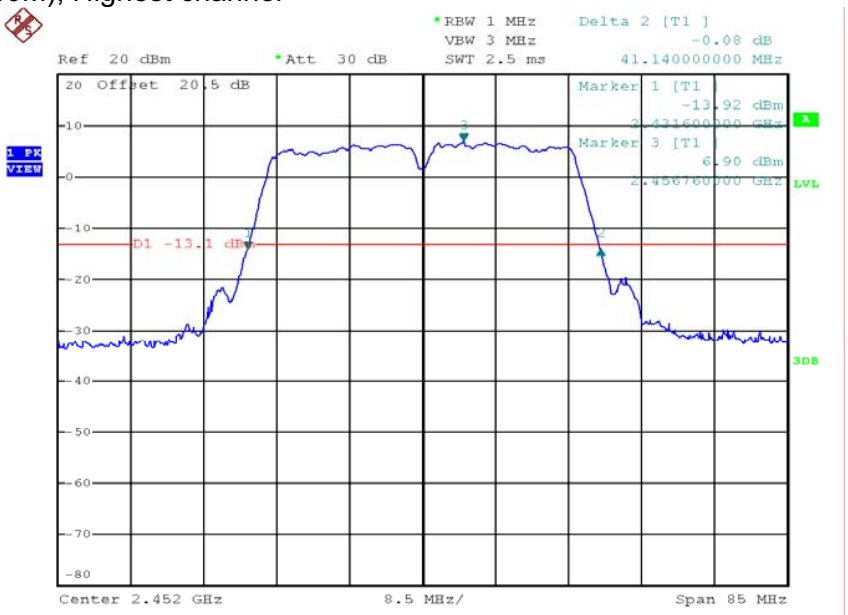
Plots of Occupied Bandwidth

802.11n(40M), Highest channel



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4.2 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 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 = 0 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	14.47	28.0
Middle Channel: 2437	14.95	31.3
High Channel: 2462	15.62	36.5

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 0 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	10.72	11.8
Middle Channel: 2437	12.07	16.1
High Channel: 2462	12.38	17.3

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 0 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	10.92	12.4
Middle Channel: 2437	11.43	13.9
High Channel: 2462	12.25	16.8

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

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 0 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	10.24	10.6
Middle Channel: 2437	10.74	11.9
High Channel: 2452	11.40	13.8

Cable loss : 0.5 dB External Attenuation : 20 dB

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

IEEE 802.11b (DSSS, 1 Mbps)
max. conducted (average) output level = 15.62 dBm

IEEE 802.11g (OFDM, 9 Mbps)
max. conducted (average) output level = 12.38 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)
max. conducted (average) output level = 12.25 dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)
max. conducted (average) output level = 11.40 dBm

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

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

The plots of conducted output power are saved as below.

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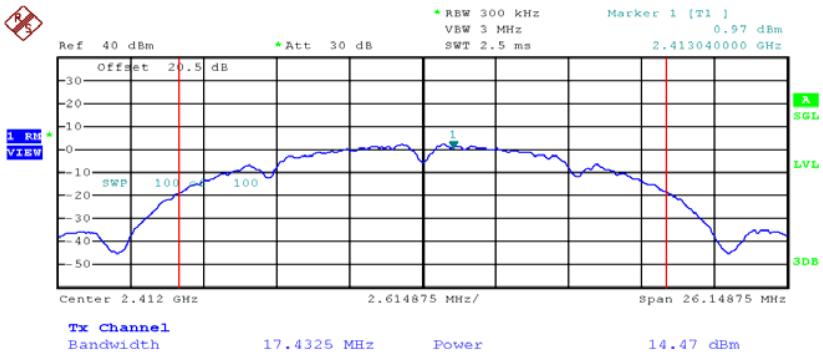
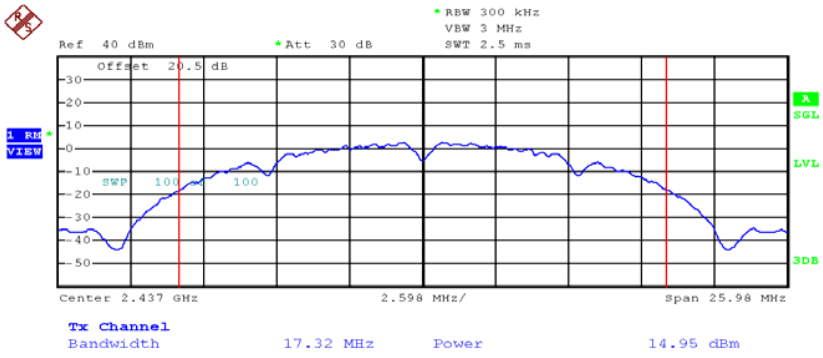
Plots of maximum output power

802.11b, Lowest channel



802.11b, Middle channel



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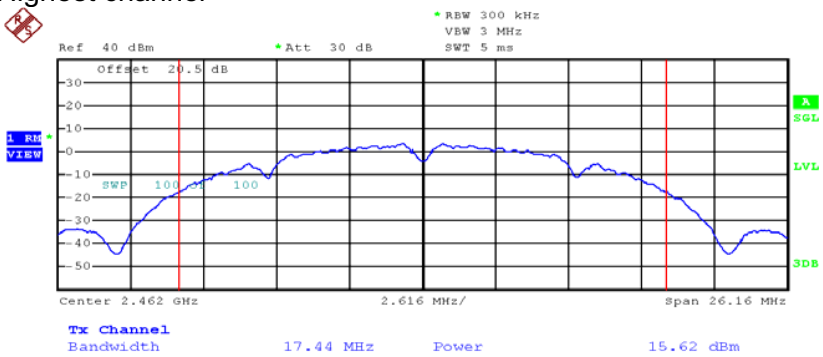
Plots of maximum output power

802.11b, Highest channel



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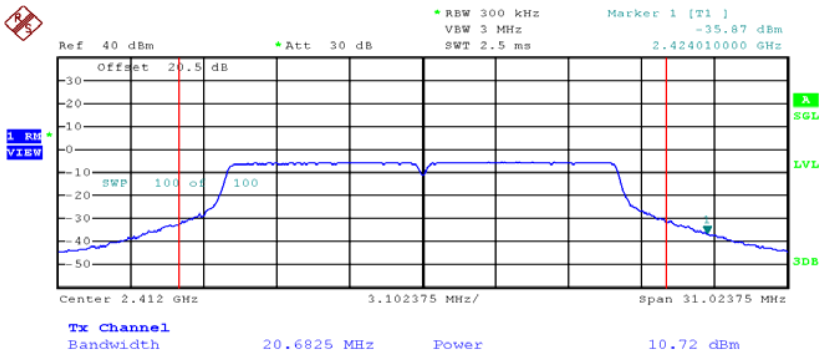
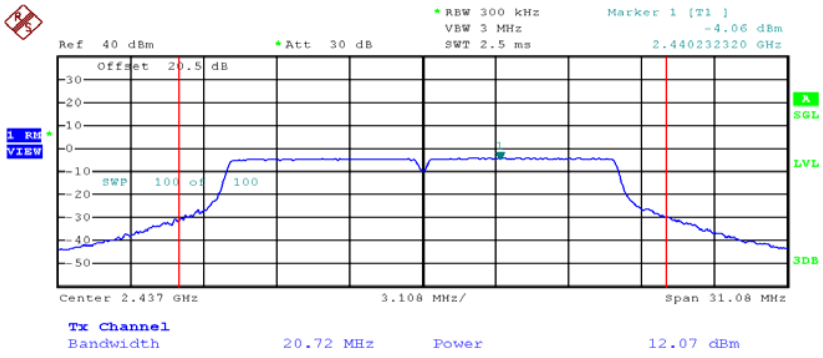
Plots of maximum output power

802.11g, Lowest channel



802.11g, Middle channel



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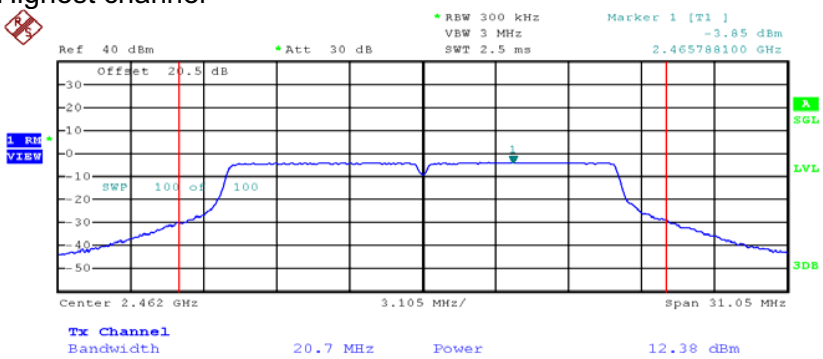
Plots of maximum output power

802.11g, Highest channel



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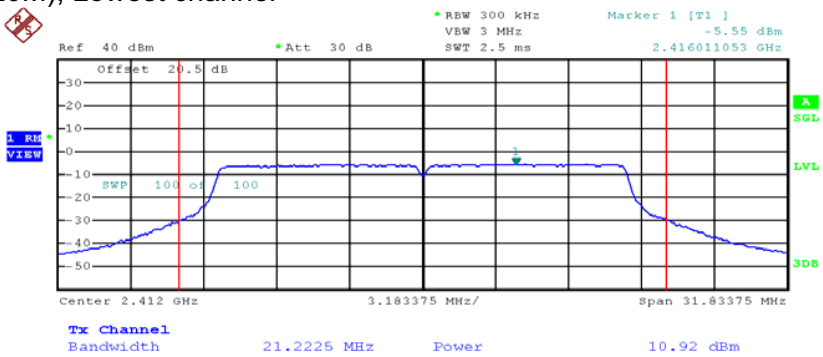
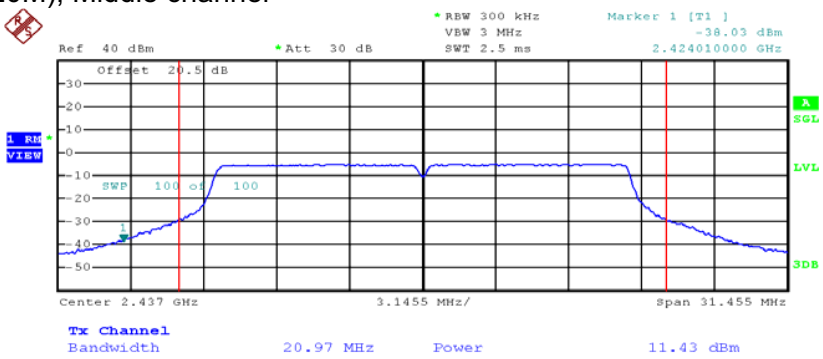
Plots of maximum output power

802.11n(20M), Lowest channel



802.11n(20M), Middle channel



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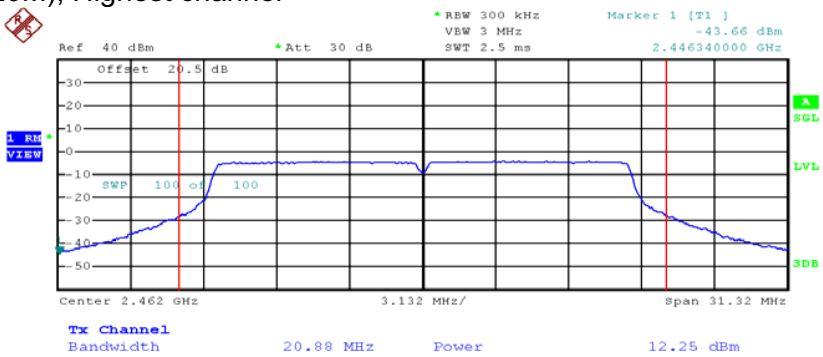
Plots of maximum output power

802.11n(20M), Highest channel



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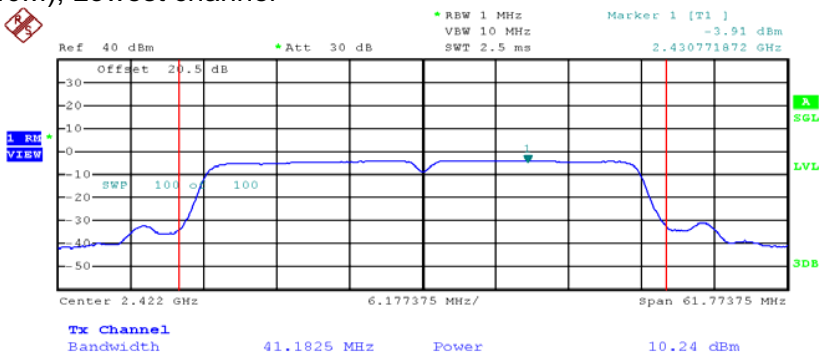
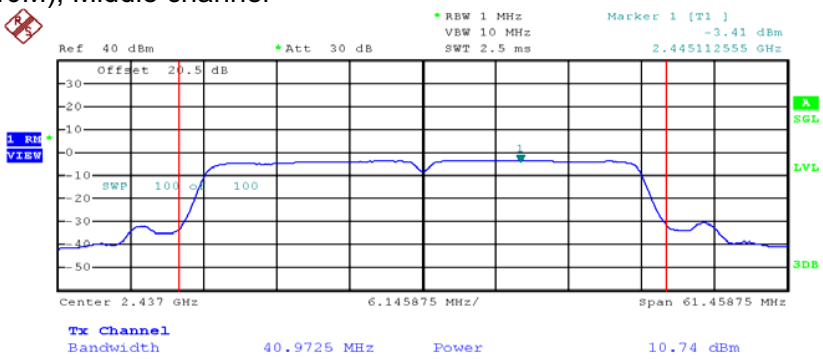
Plots of maximum output power

802.11n(40M), Lowest channel



802.11n(40M), Middle channel



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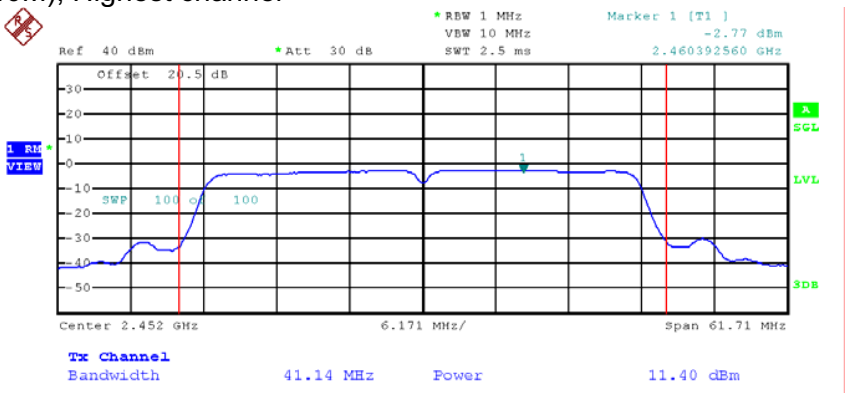
Plots of maximum output power

802.11n(40M), Highest channel



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4.3 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.

For Industry Canada, the 99% occupied bandwidth was measured, and the procedure under the section 4.6.1 of RSS-GEN was used.

IEEE 802.11b (DSSS, 1 Mbps)	
Frequency (MHz)	6dB Bandwidth (kHz)
Low Channel: 2412	10220
Middle Channel: 2437	10268
High Channel: 2462	10240

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	6dB Bandwidth (kHz)
Low Channel: 2412	16700
Middle Channel: 2437	16738
High Channel: 2462	16740

IEEE 802.11n (20MHz) (OFDM, MCS0)	
Frequency (MHz)	6dB Bandwidth (kHz)
Low Channel: 2412	17960
Middle Channel: 2437	17998
High Channel: 2462	18000

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4.2 Minimum 6dB RF Bandwidth – Cont'd

IEEE 802.11n (40MHz) (OFDM, MCS0)	
Frequency (MHz)	6dB Bandwidth (kHz)
Low Channel: 2422	36700
Middle Channel: 2437	36860
High Channel: 2452	36828

Limits
6 dB bandwidth shall be at least 500kHz

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

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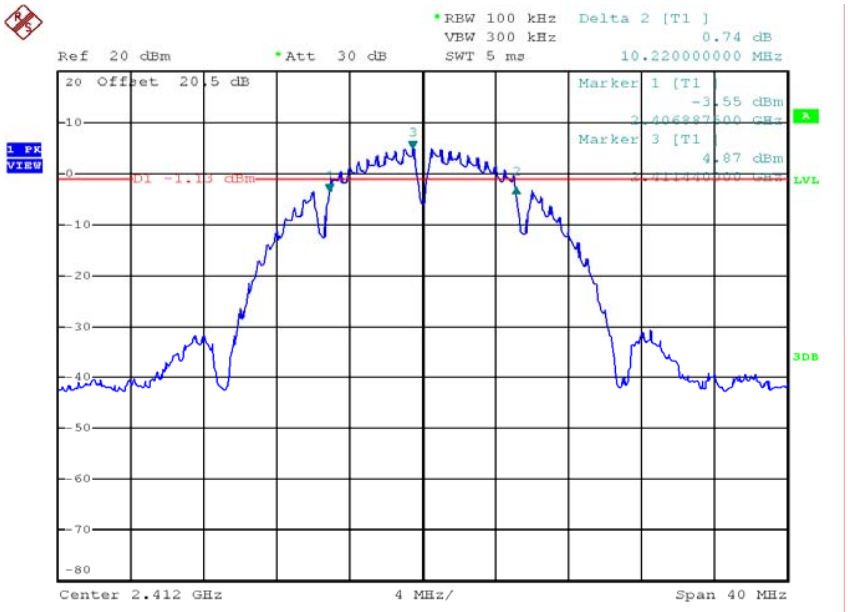
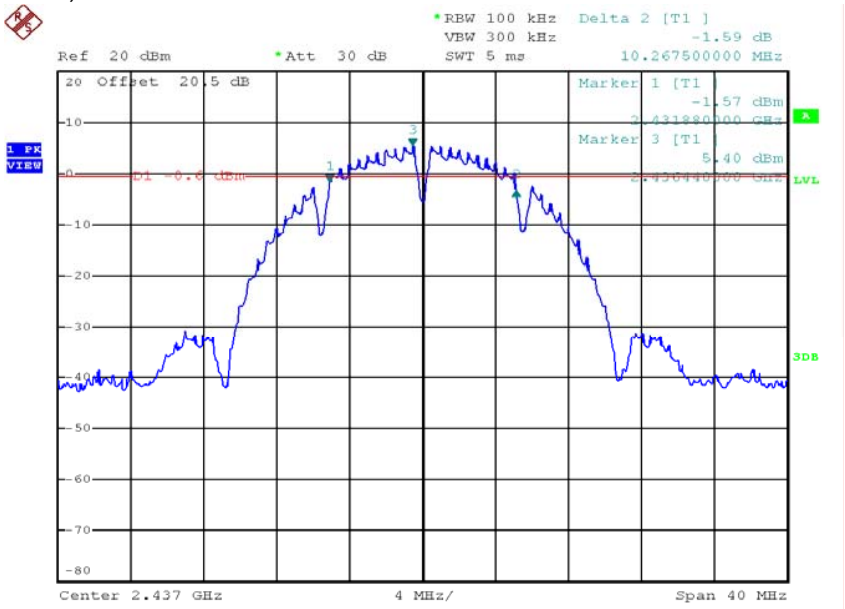
Plots of 6dB RF bandwidth

802.11b, Lowest Channel



802.11b, Middle Channel



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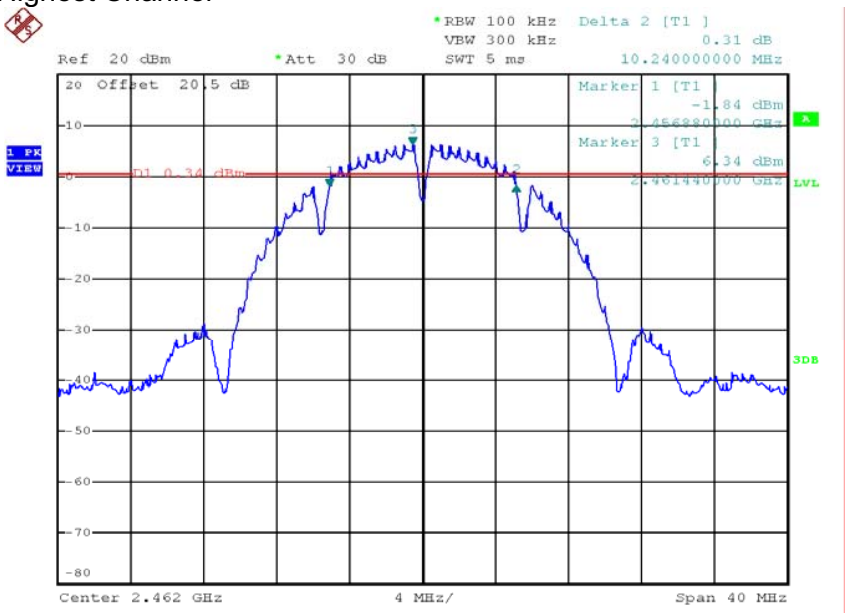
Plots of 6dB RF bandwidth

802.11b, Highest Channel



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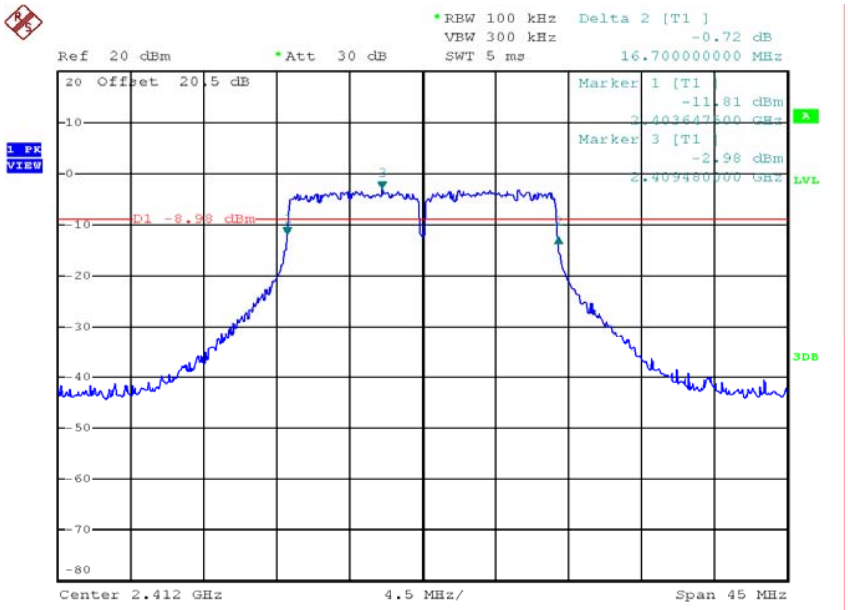
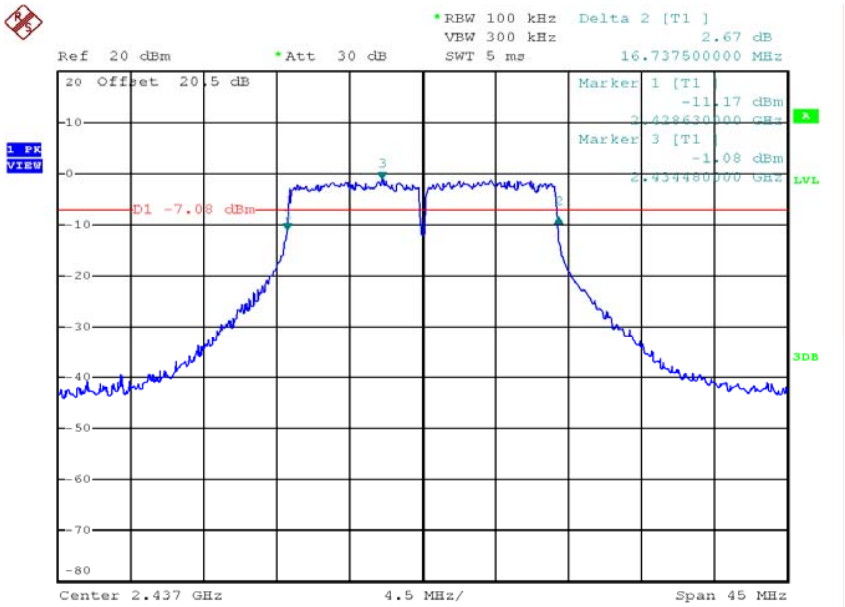
Plots of 6dB RF bandwidth

802.11g, Lowest Channel



802.11g, Middle Channel



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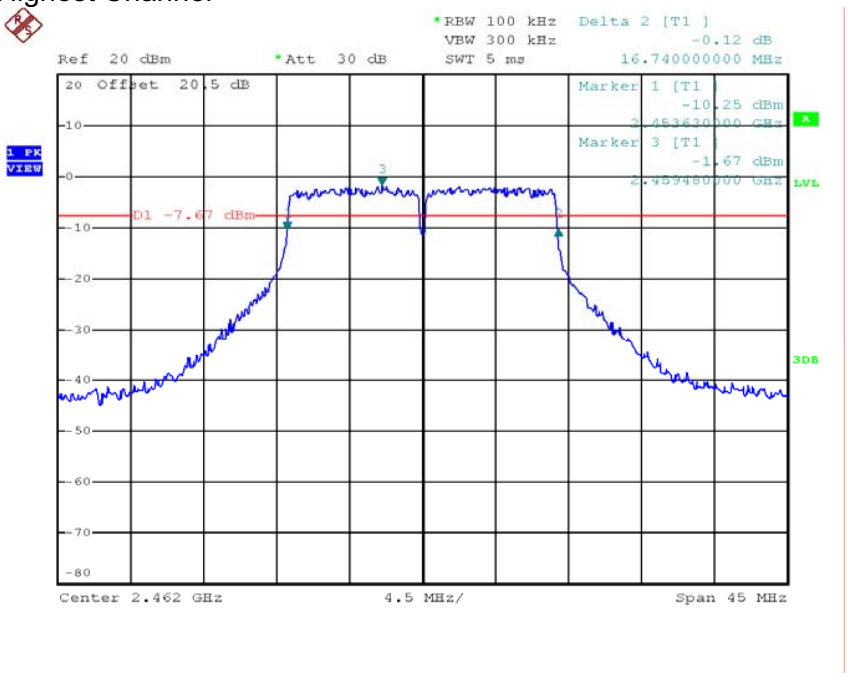
Plots of 6dB RF bandwidth

802.11g, Highest Channel



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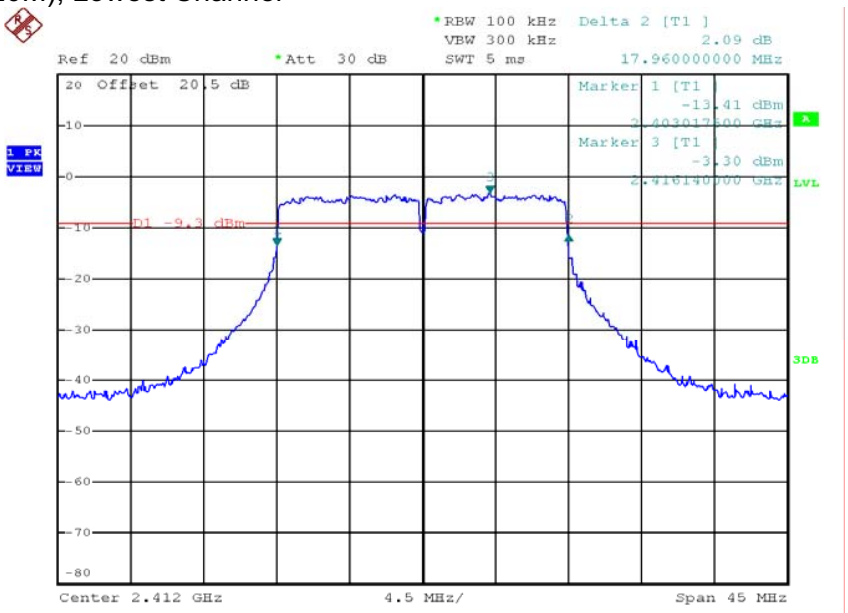
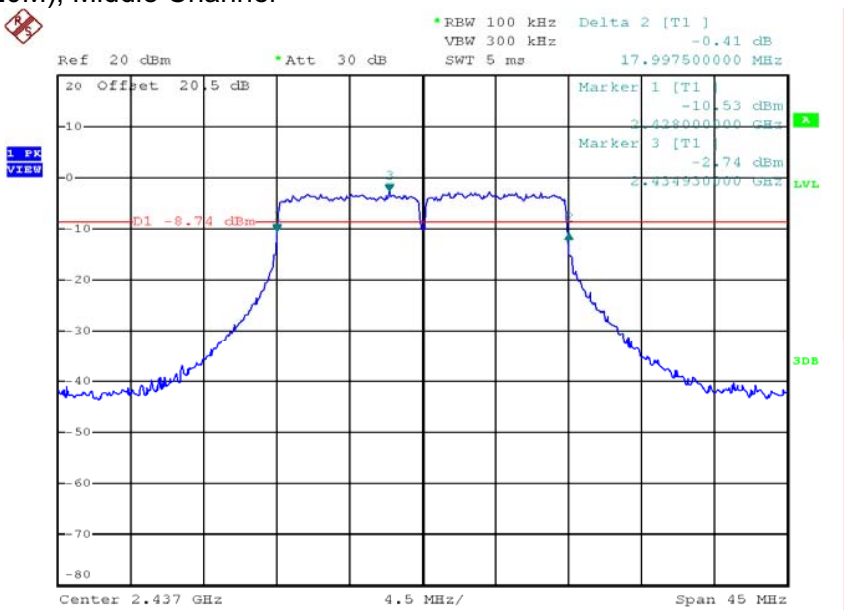
Plots of 6dB RF bandwidth

802.11n(20M), Lowest Channel



802.11n(20M), Middle Channel



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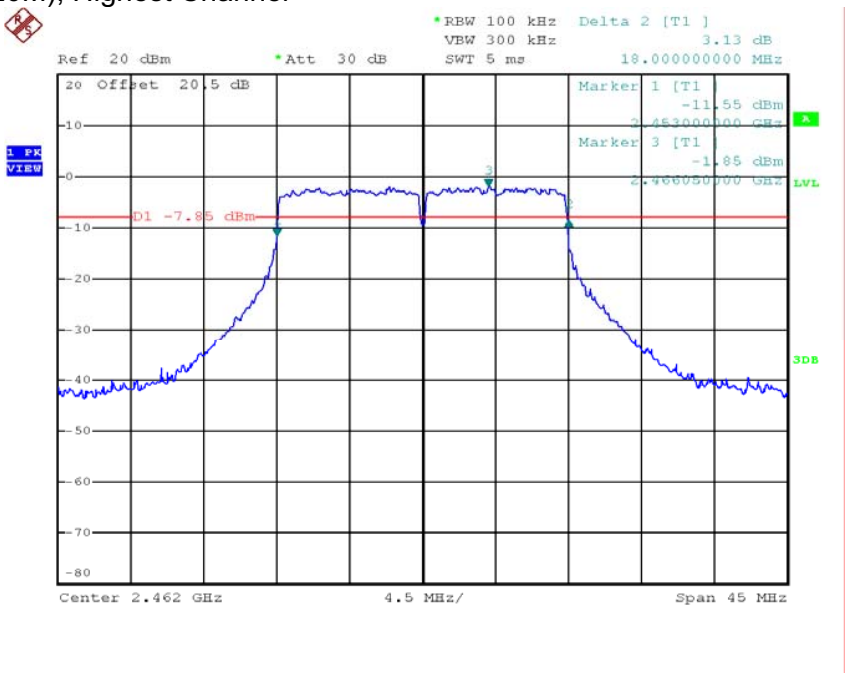
Plots of 6dB RF bandwidth

802.11n(20M), Highest Channel



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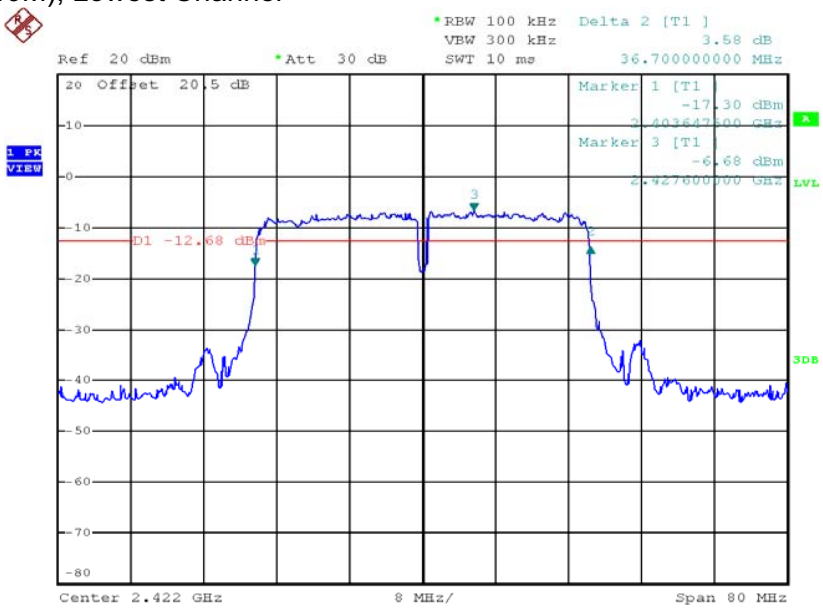
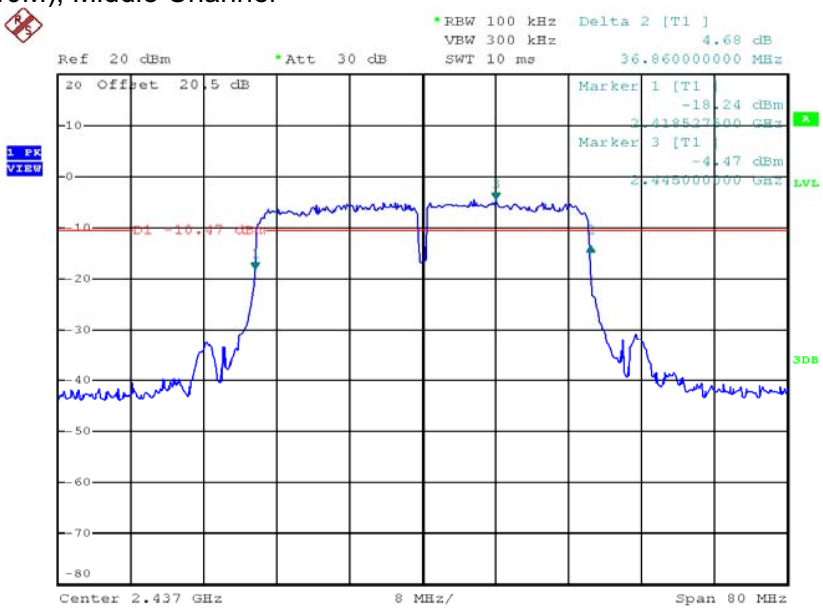
Plots of 6dB RF bandwidth

802.11n(40M), Lowest Channel



802.11n(40M), Middle Channel



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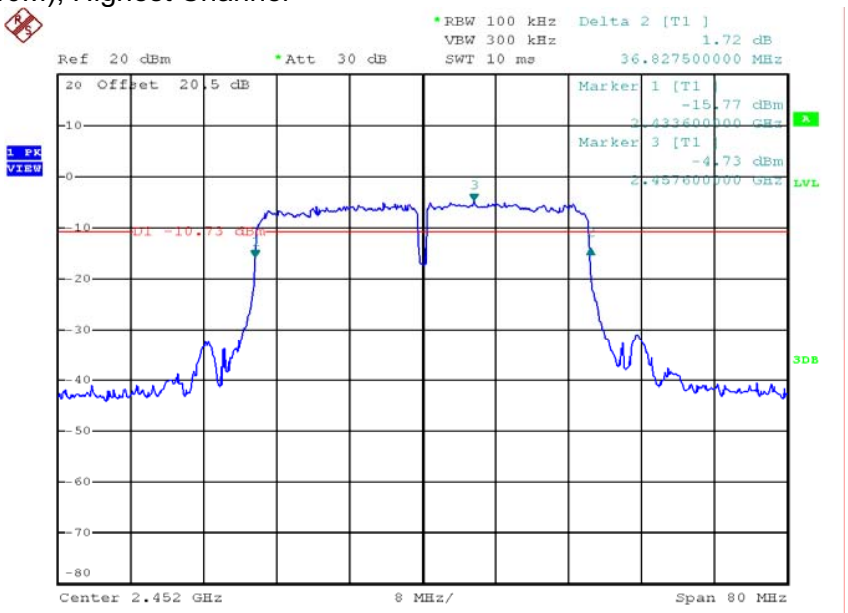
Plots of 6dB RF bandwidth

802.11n(40M), Highest Channel



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4.4 Maximum Power Spectral Density

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

IEEE 802.11b (DSSS, 1 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	-3.15
Middle Channel: 2437	-2.51
High Channel: 2462	-1.79

IEEE 802.11g (OFDM, 6 Mbps)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	-9.51
Middle Channel: 2437	-8.53
High Channel: 2462	-8.09

IEEE 802.11n (20MHz) (OFDM, MCS0)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	-10.52
Middle Channel: 2437	-9.82
High Channel: 2462	-8.92

IEEE 802.11n (40MHz) (OFDM, MCS0)	
Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2422	-13.60
Middle Channel: 2437	-13.25
High Channel: 2452	-12.47

Cable Loss: 0.5 dB

Limit:
8dBm

The plots of n power spectral density are as below.

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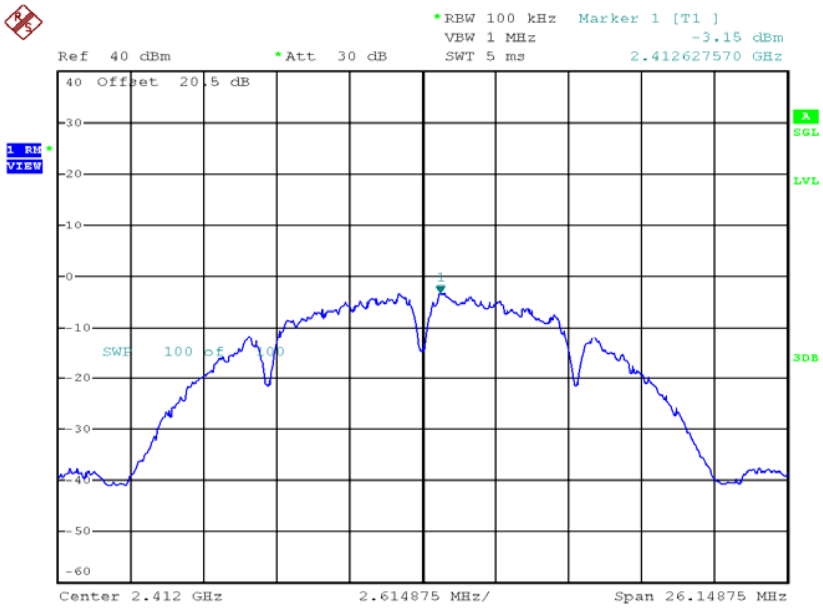
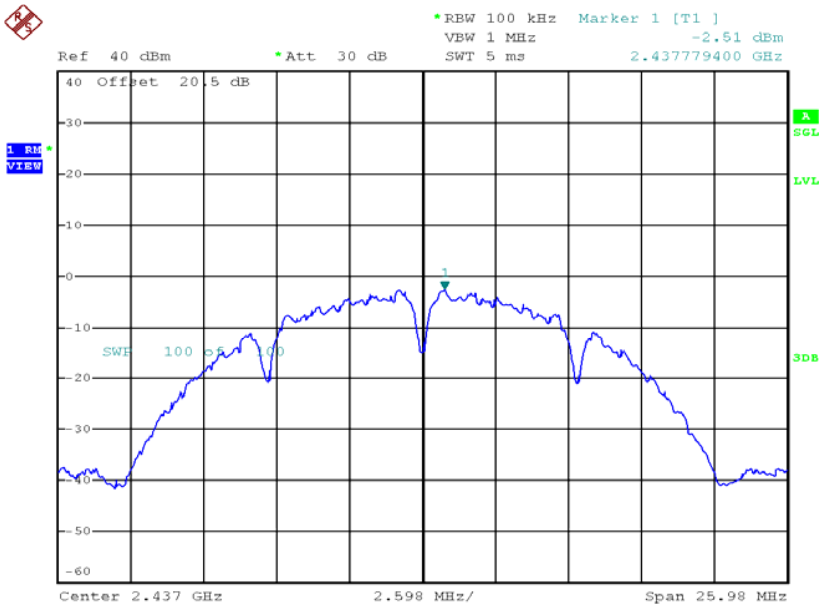
Plots of power spectral density

802.11b, Lowest channel



802.11b, Middle channel



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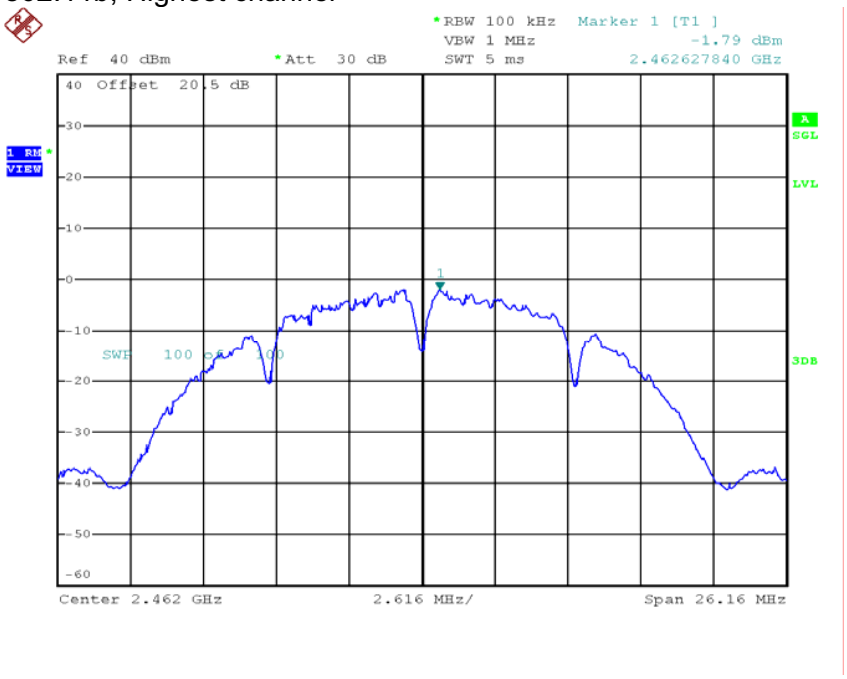
Plots of power spectral density

802.11b, Highest channel



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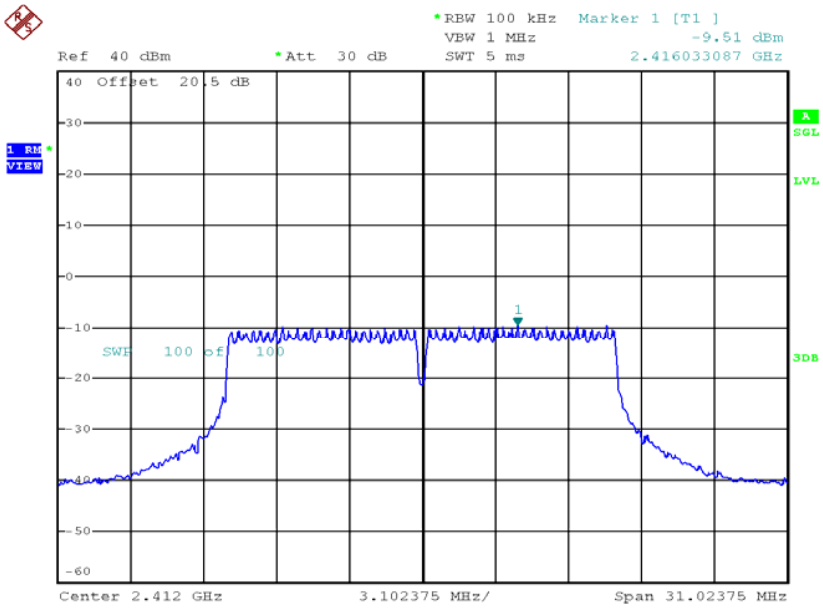
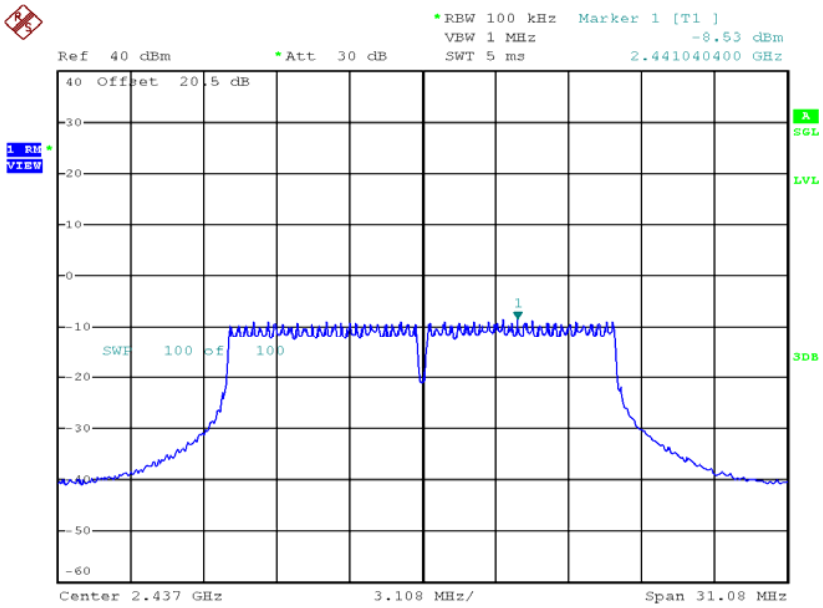
Plots of power spectral density

802.11g, Lowest channel



802.11g, Middle channel



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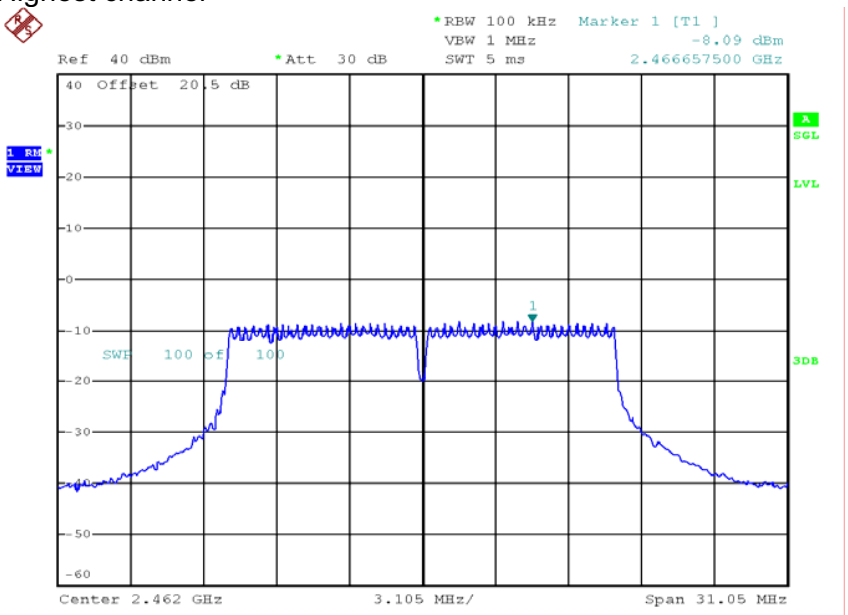
Plots of power spectral density

802.11g, Highest channel



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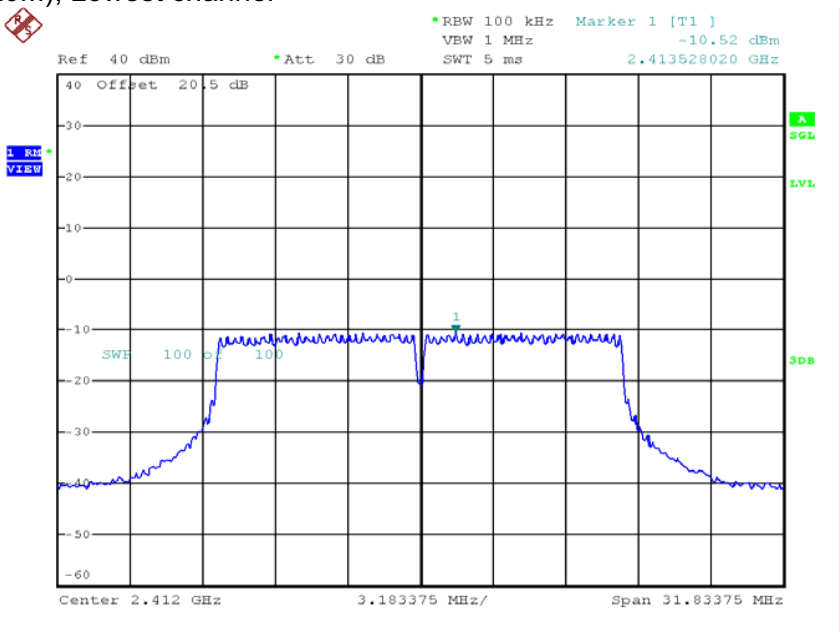
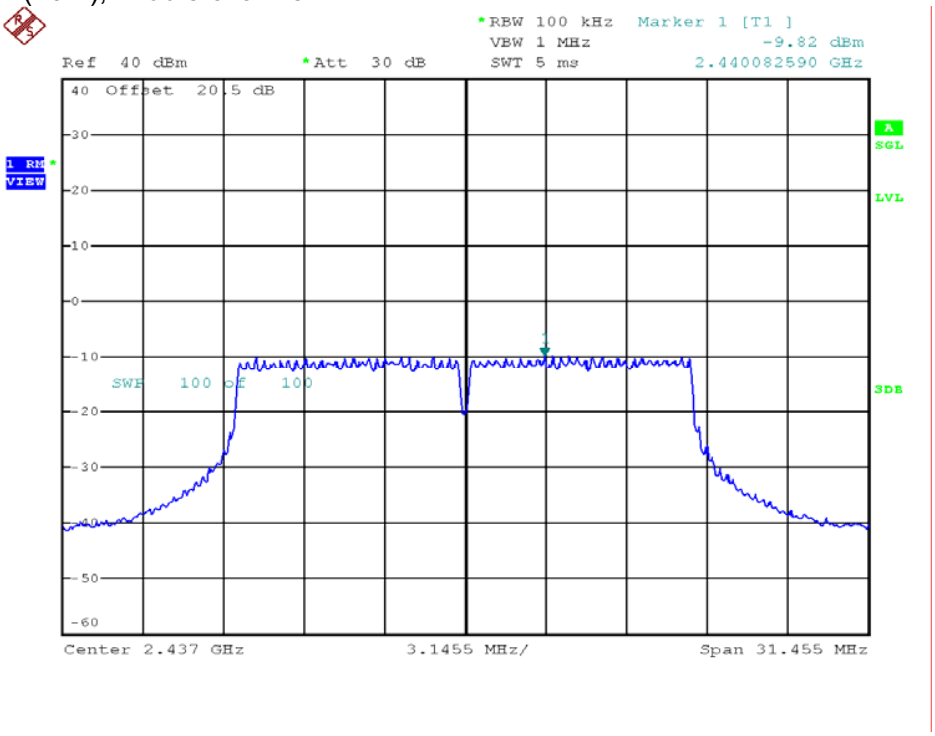
Plots of power spectral density

802.11n(20M), Lowest channel



802.11n(20M), Middle channel



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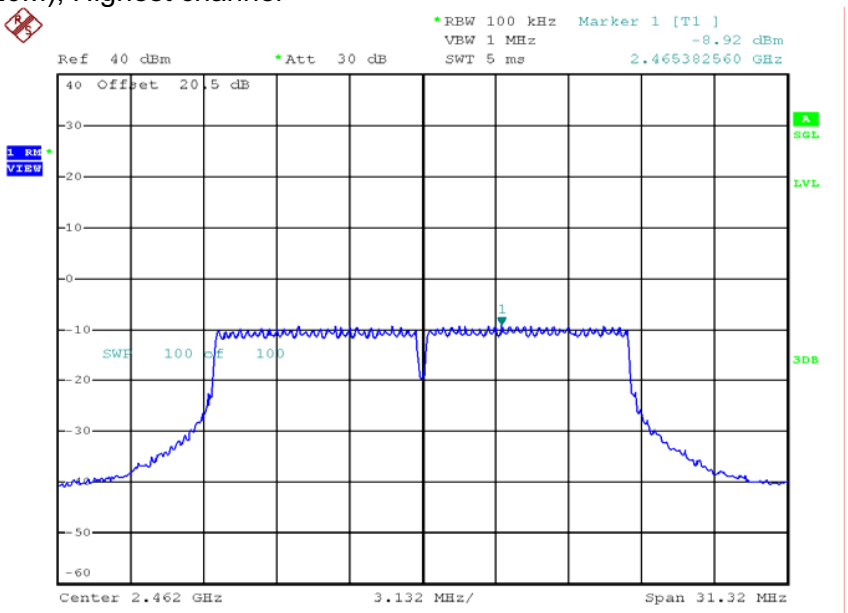
Plots of power spectral density

802.11n(20M), Highest channel



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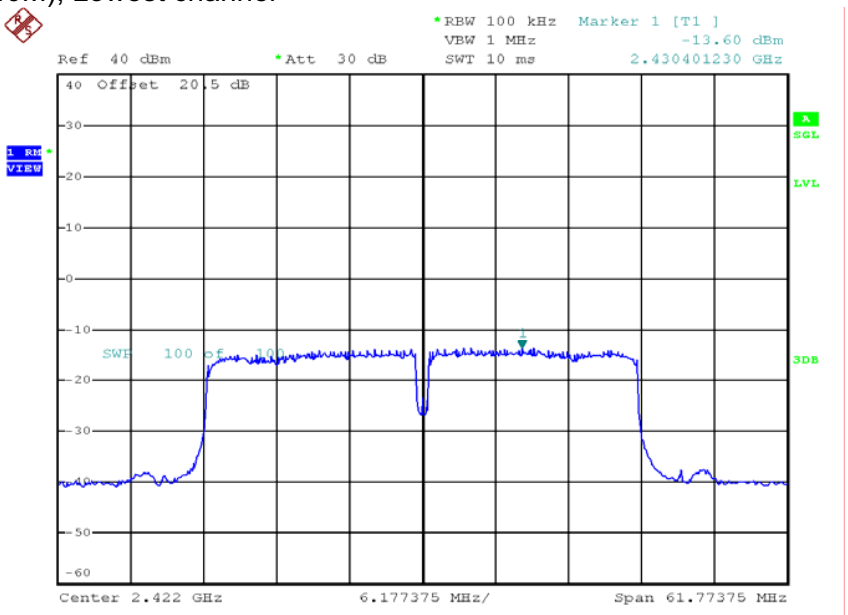
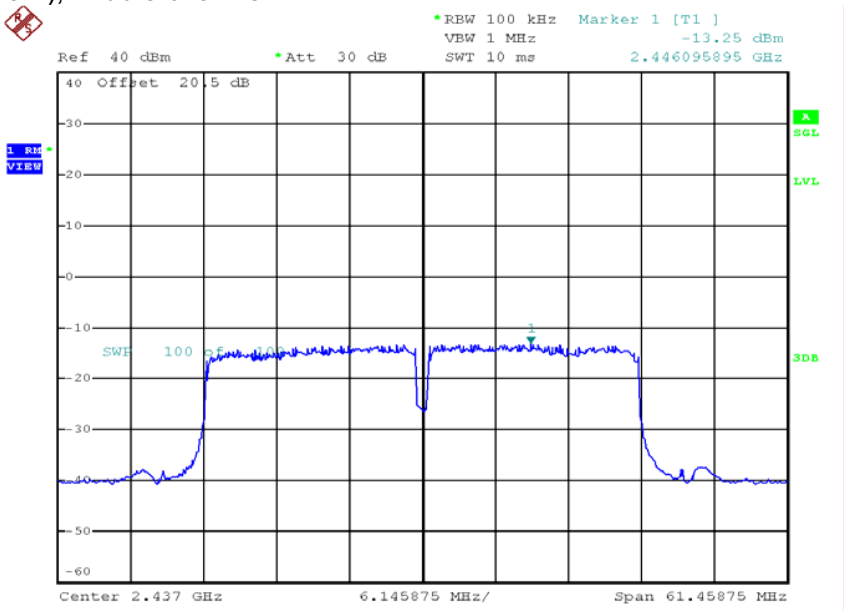
Plots of power spectral density

802.11n(40M), Lowest channel



802.11n(40M), Middle channel



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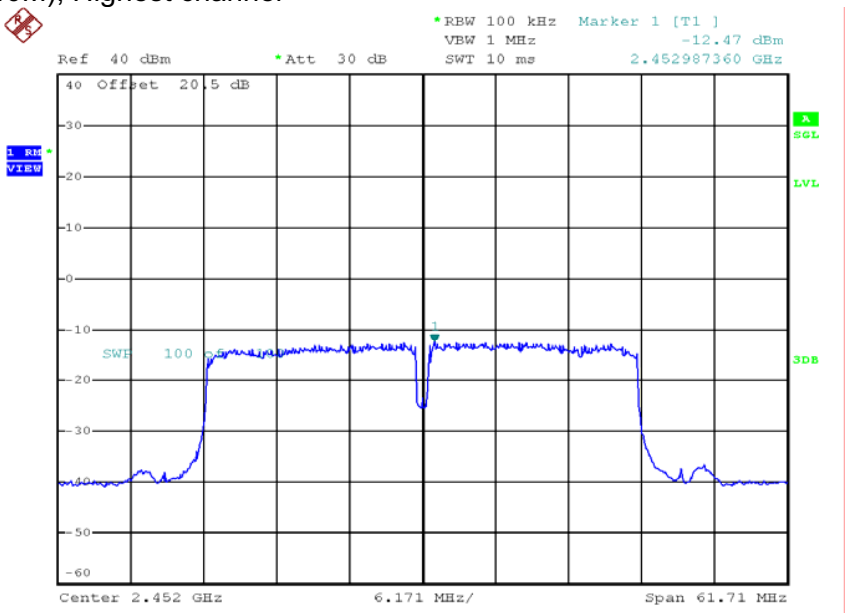
Plots of power spectral density

802.11n(40M), Highest channel



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4.5 Out of Band Conducted Emissions

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 v03r02 (05-June-2014) were used.

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

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

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

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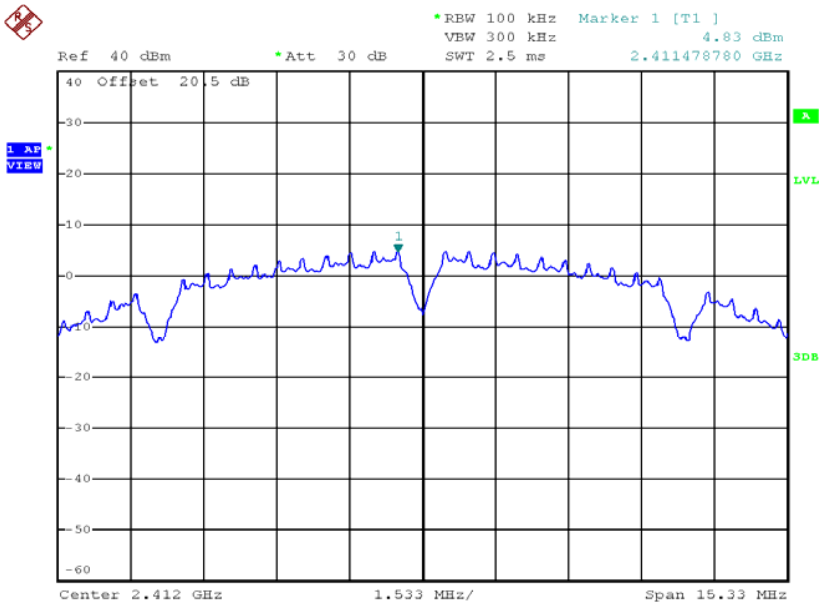
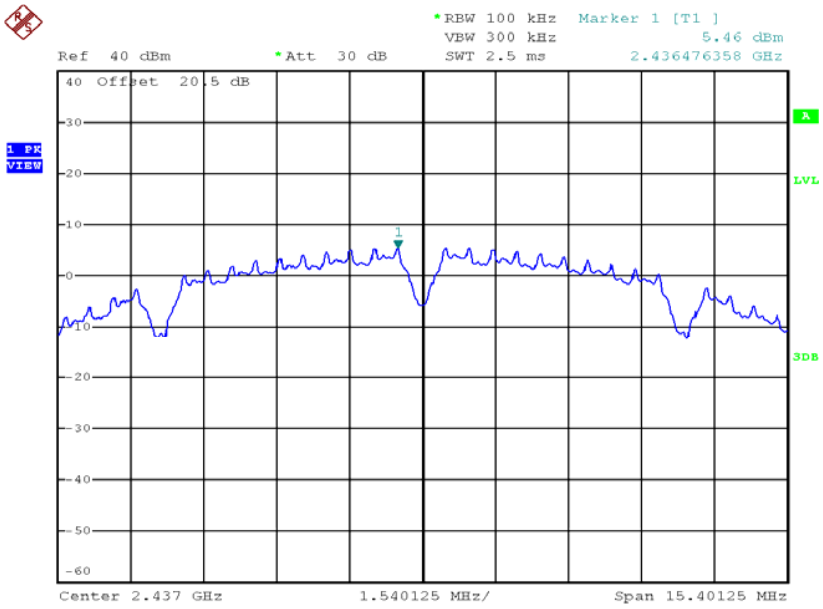
Plots of reference level measurement

802.11b, Lowest channel



802.11b, Middle channel



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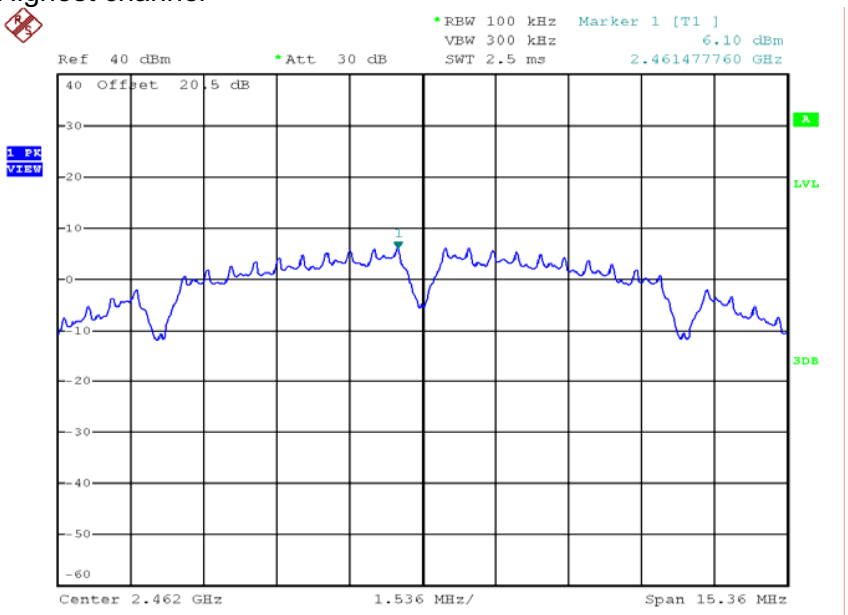
Plots of reference level measurement

802.11b, Highest channel



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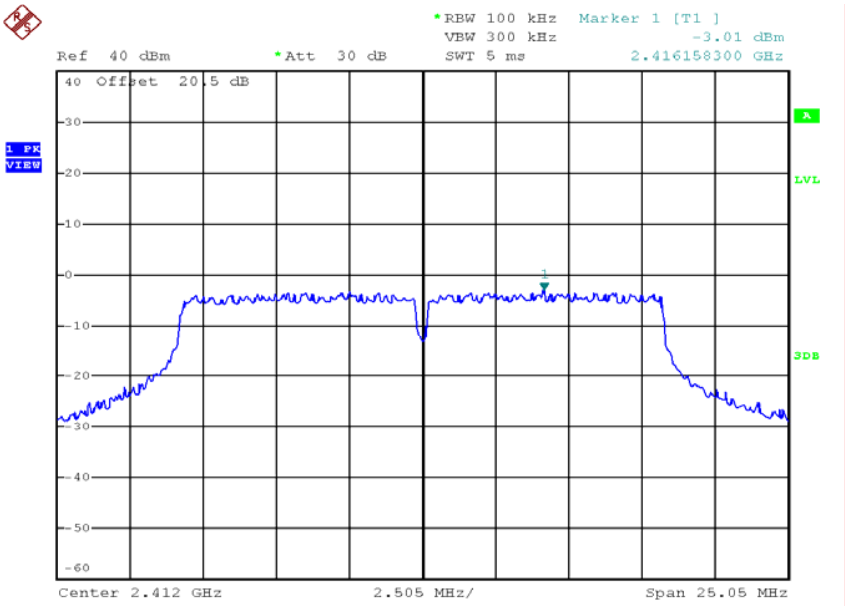
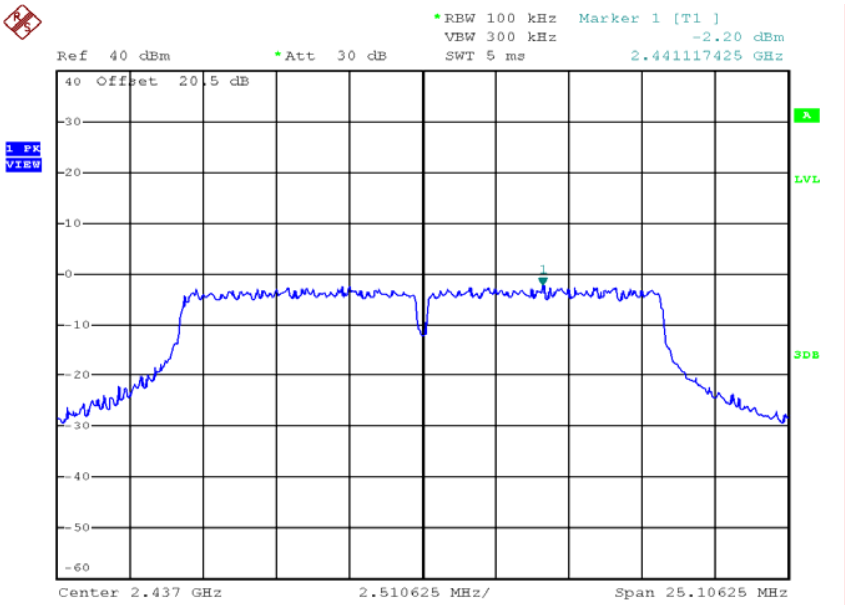
Plots of reference level measurement

802.11g, Lowest channel



802.11g, Middle channel



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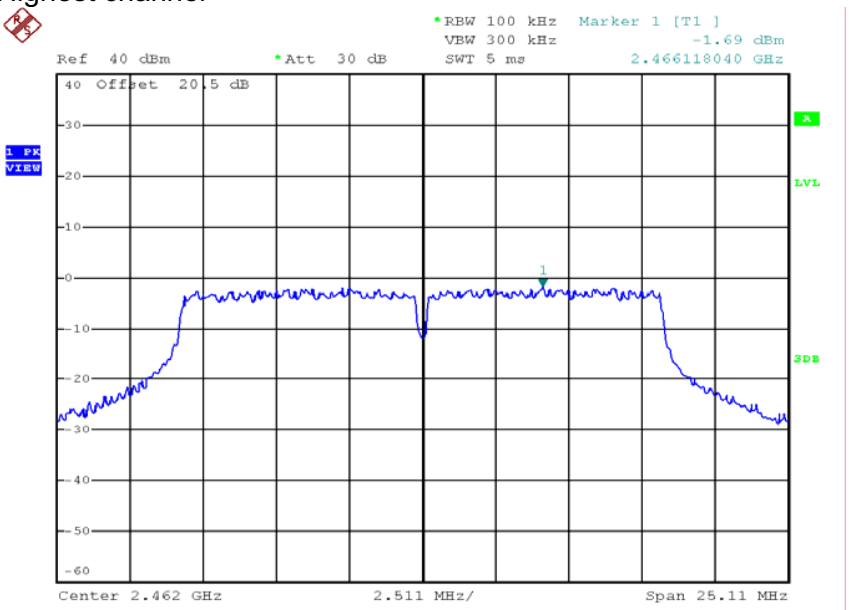
Plots of reference level measurement

802.11g, Highest channel



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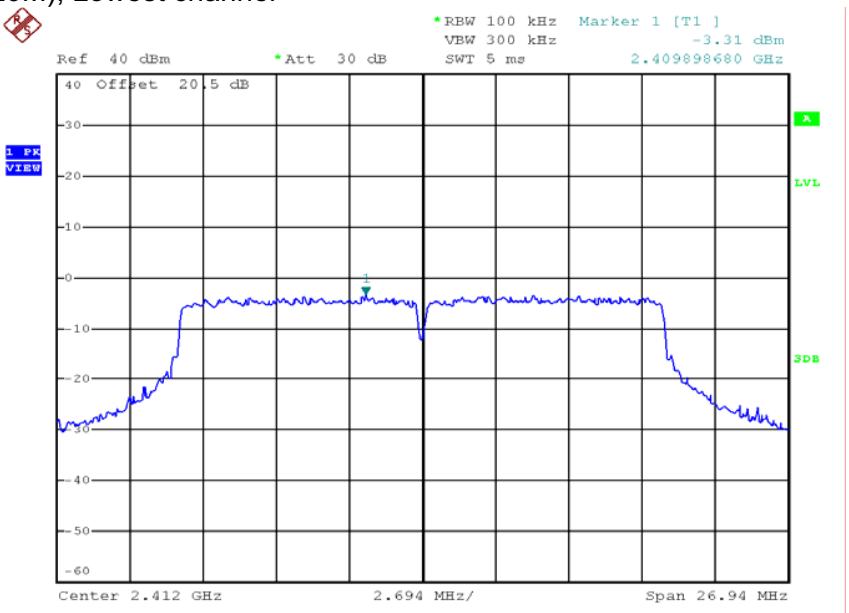
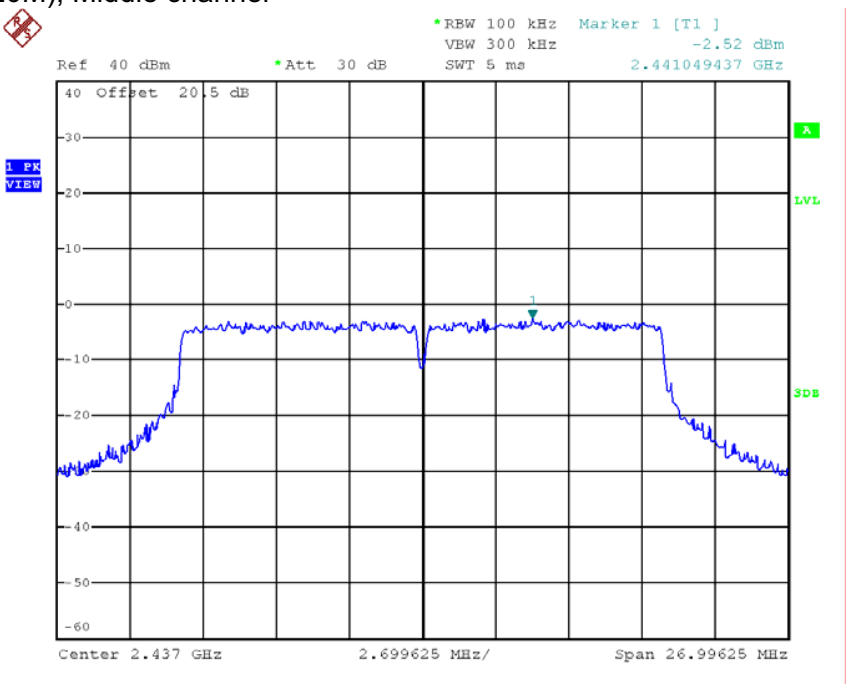
Plots of reference level measurement

802.11n(20M), Lowest channel



802.11n(20M), Middle channel



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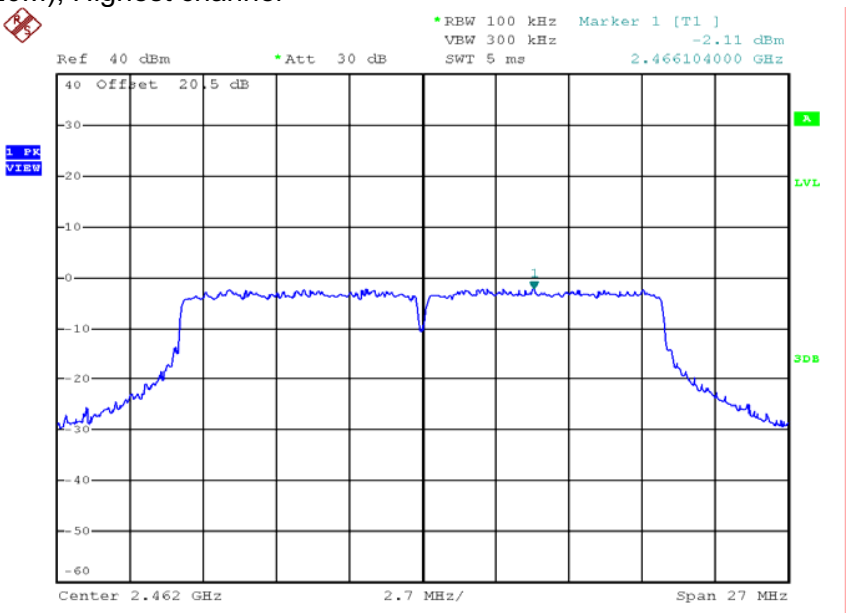
Plots of reference level measurement

802.11n(20M), Highest channel



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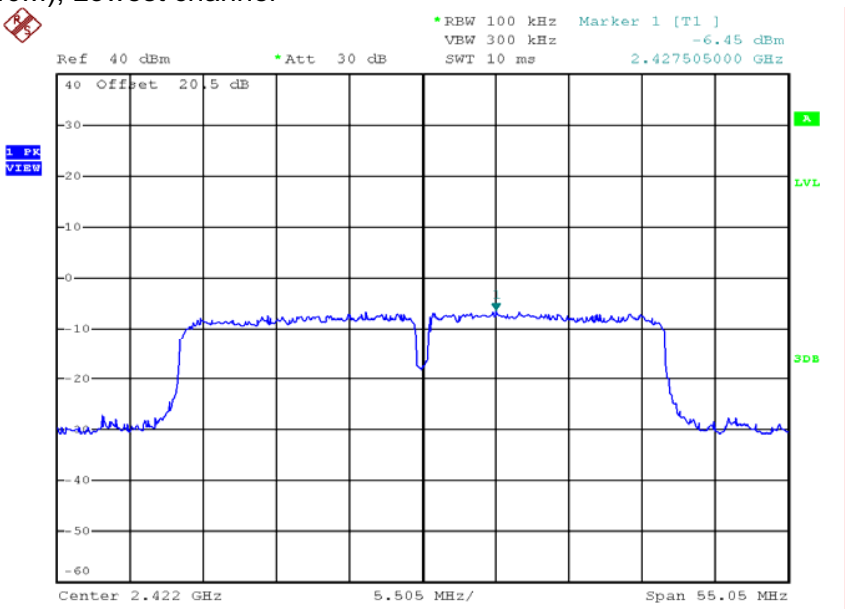
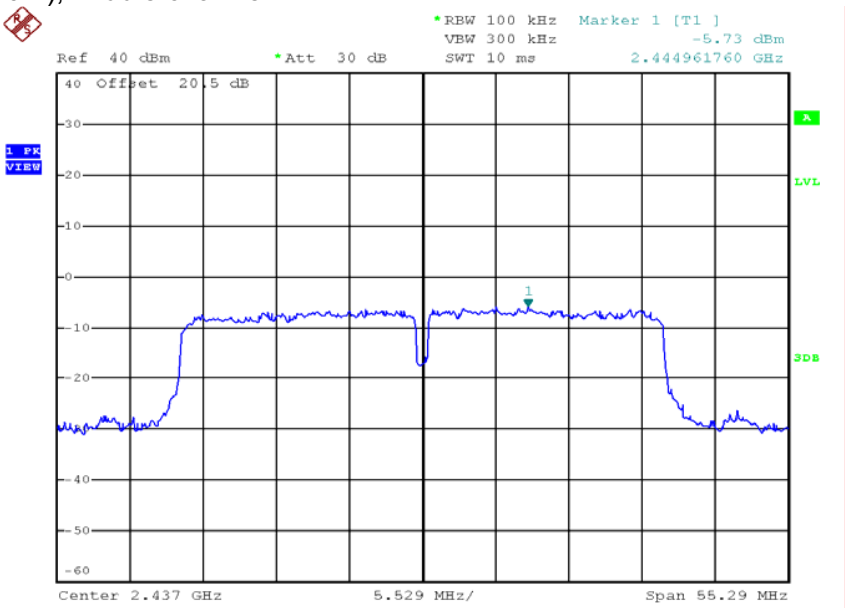
Plots of reference level measurement

802.11n(40M), Lowest channel



802.11n(40M), Middle channel



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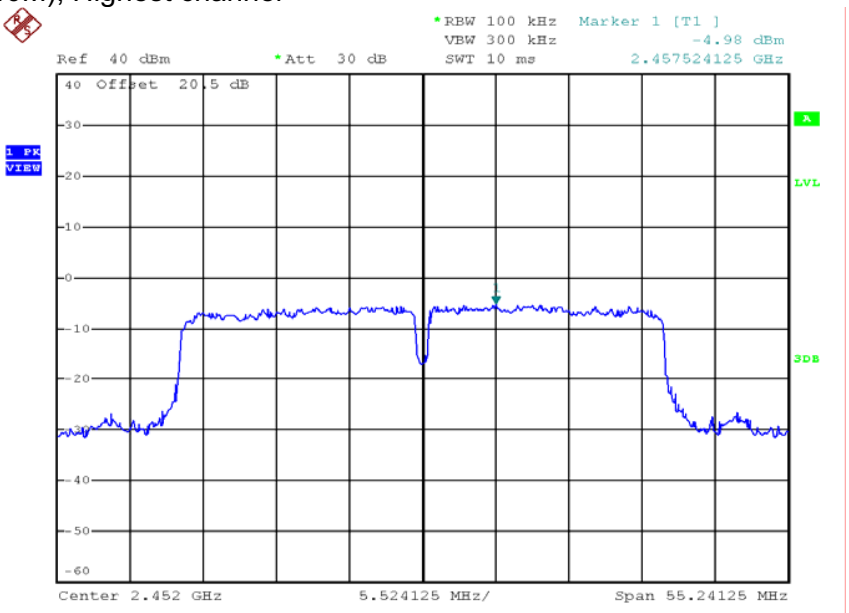
802.11n(40M), Highest channel



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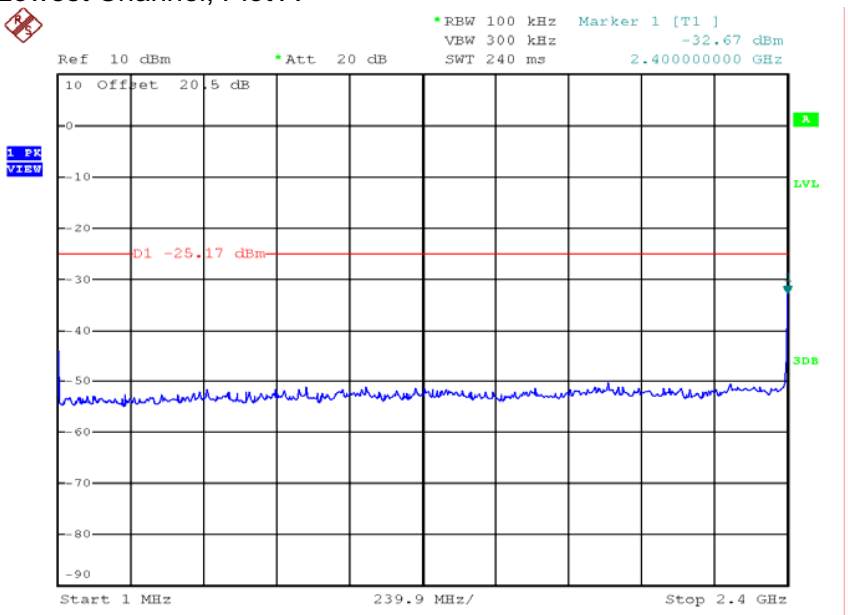
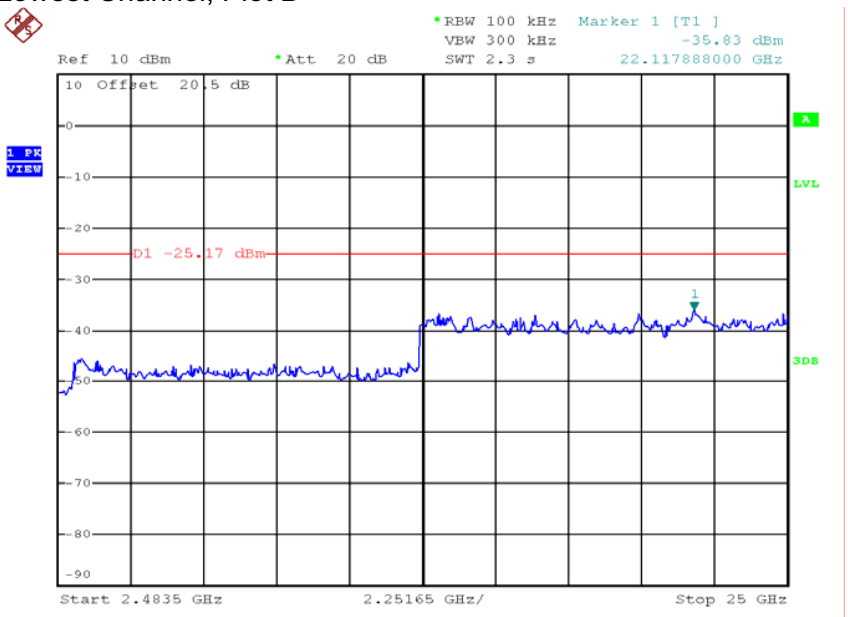
Plots of out of band conducted emissions

802.11b, Lowest Channel, Plot A



802.11b, Lowest Channel, Plot B



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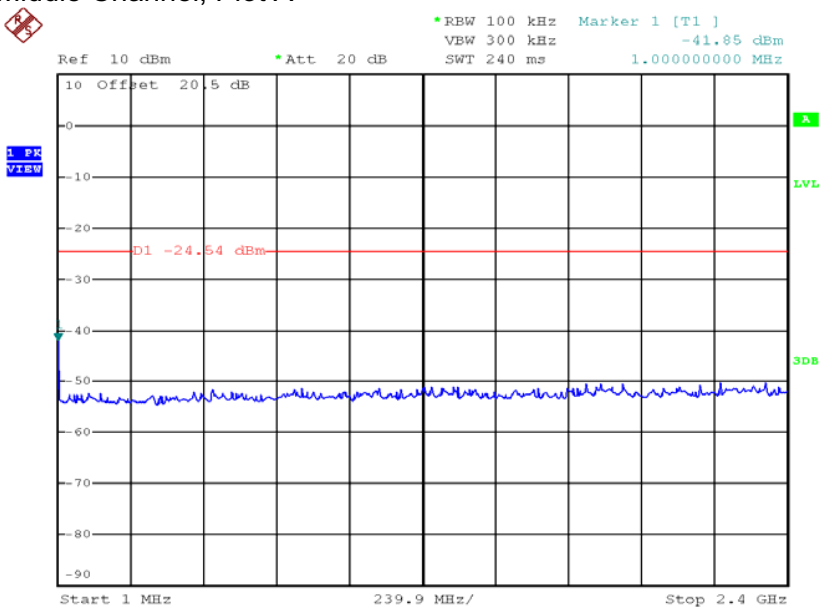
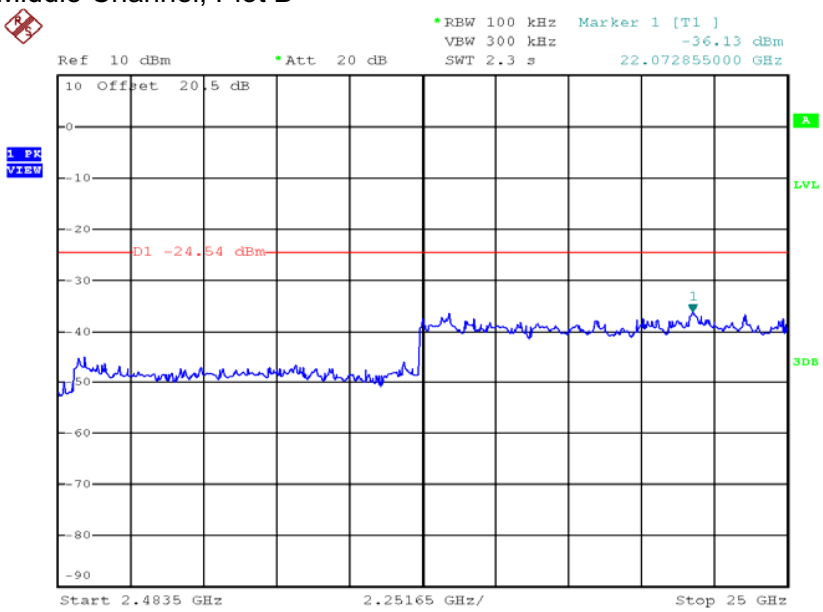
Plots of out of band conducted emissions

802.11b, Middle Channel, Plot A



802.11b, Middle Channel, Plot B



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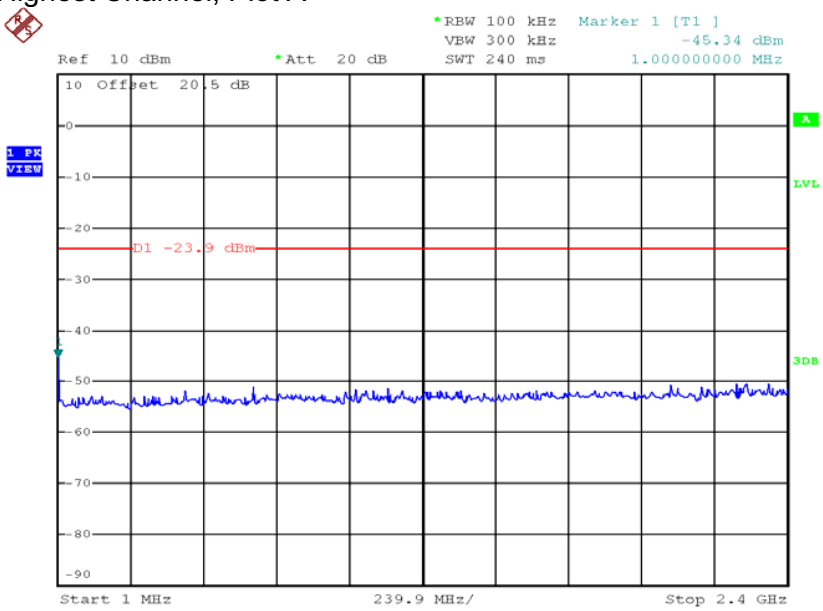
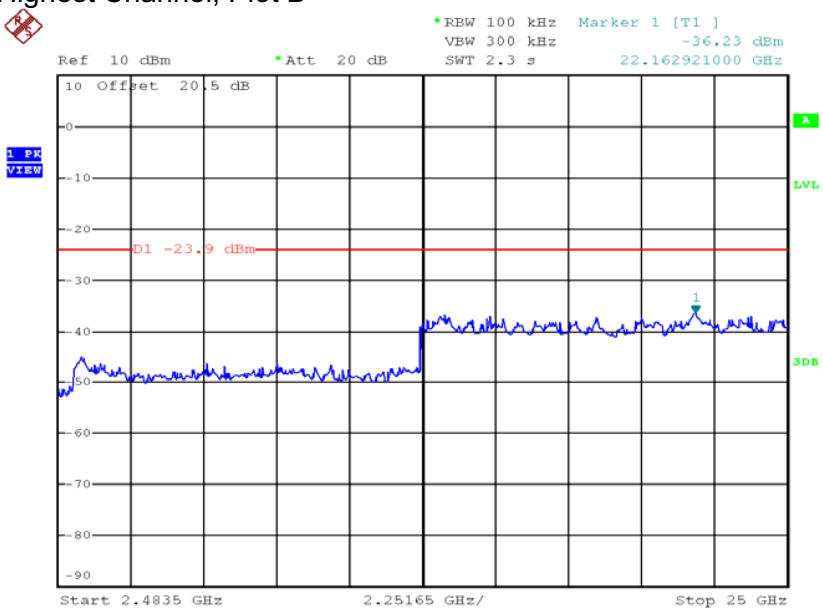
Plots of out of band conducted emissions

802.11b, Highest Channel, Plot A



802.11b, Highest Channel, Plot B



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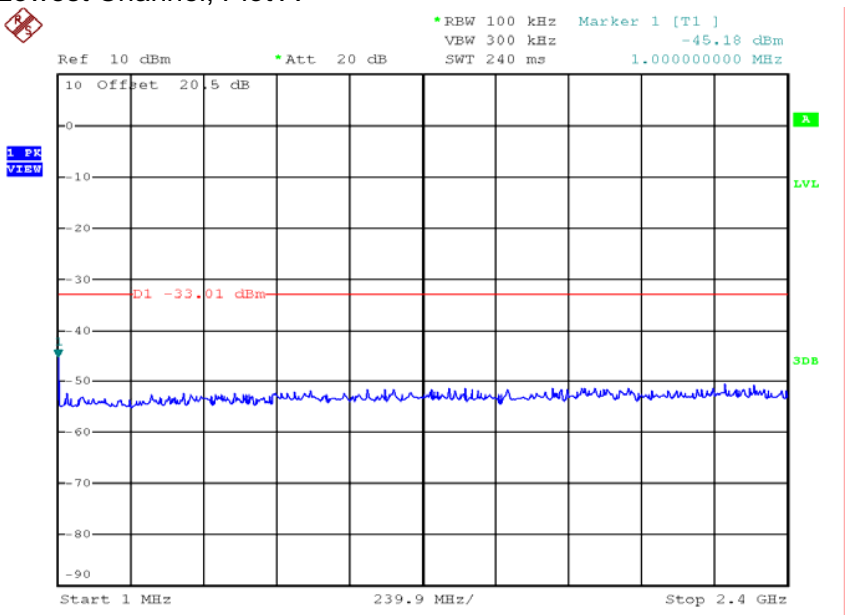
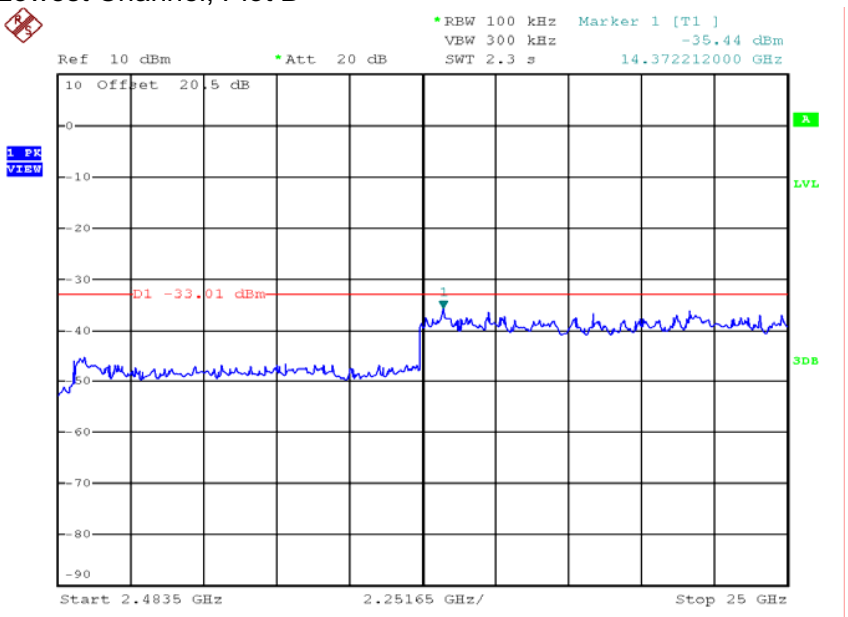
Plots of out of band conducted emissions

802.11g, Lowest Channel, Plot A



802.11g, Lowest Channel, Plot B



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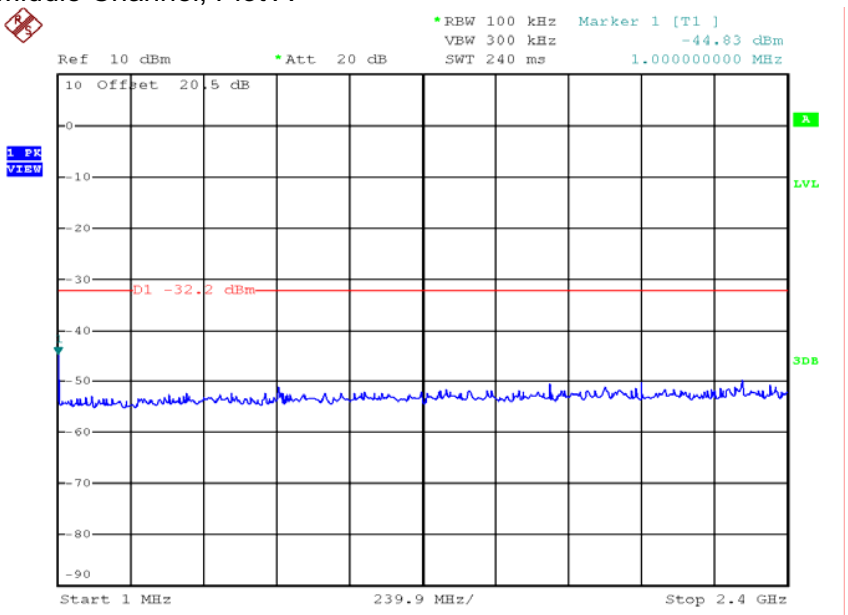
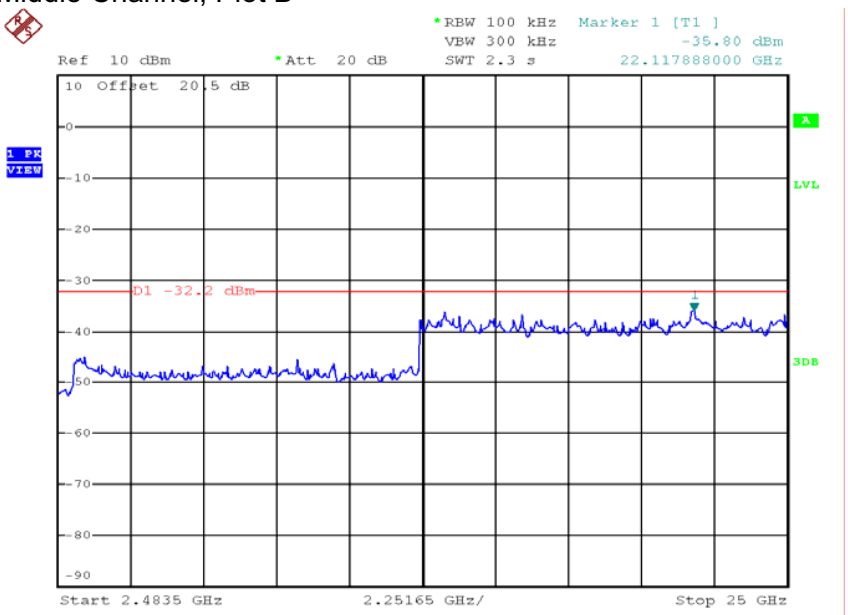
Plots of out of band conducted emissions

802.11g, Middle Channel, Plot A



802.11g, Middle Channel, Plot B



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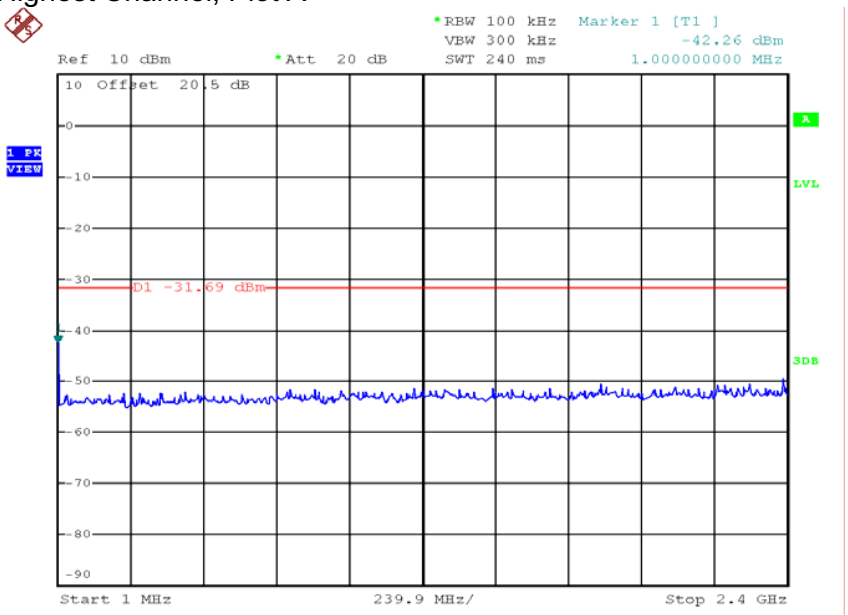
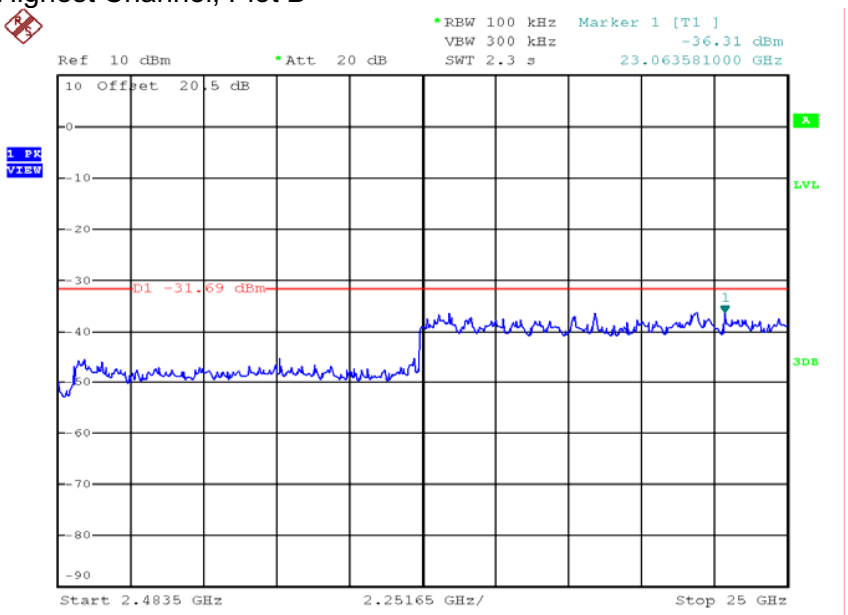
Plots of out of band conducted emissions

802.11g, Highest Channel, Plot A



802.11g, Highest Channel, Plot B



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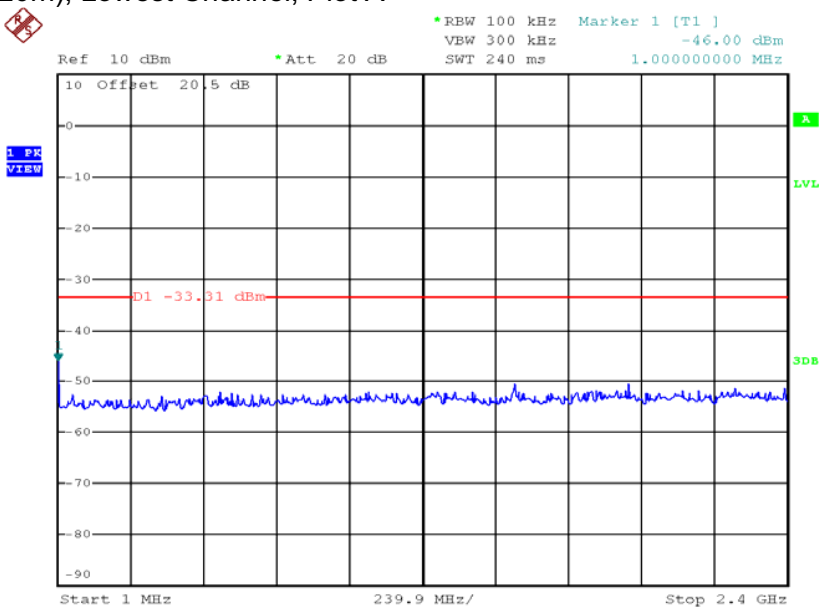
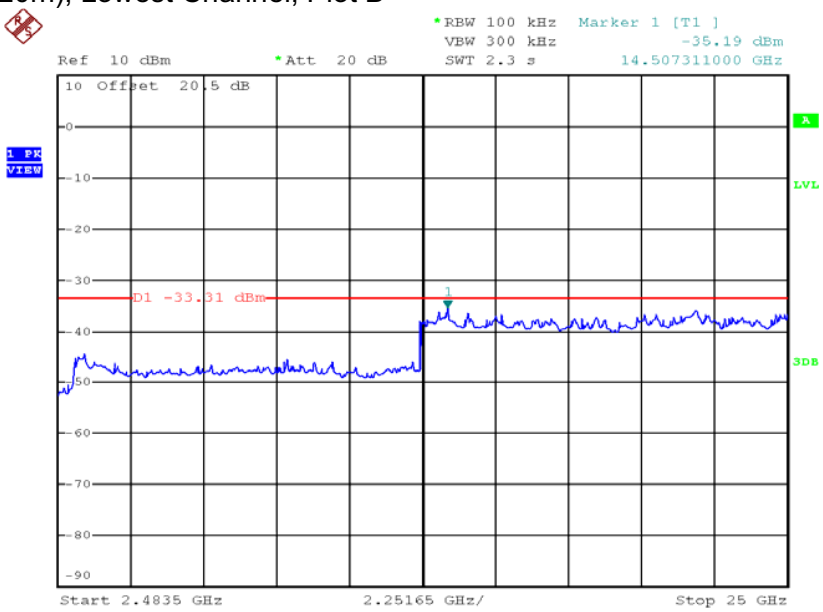
Plots of out of band conducted emissions

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



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



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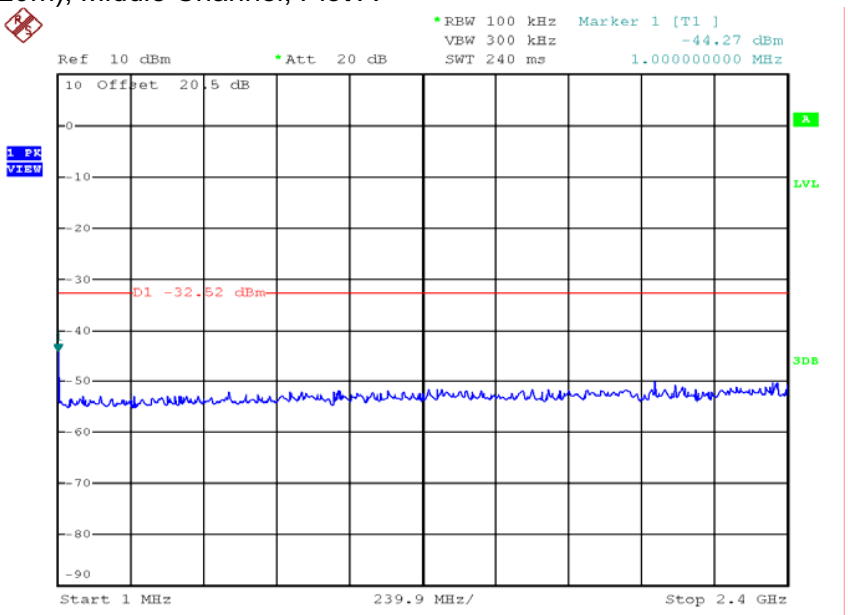
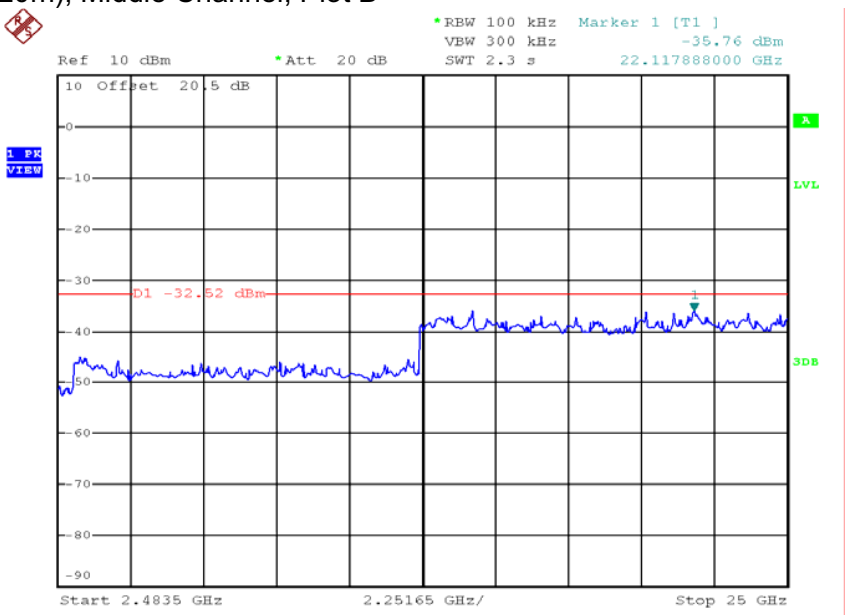
Plots of out of band conducted emissions

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



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



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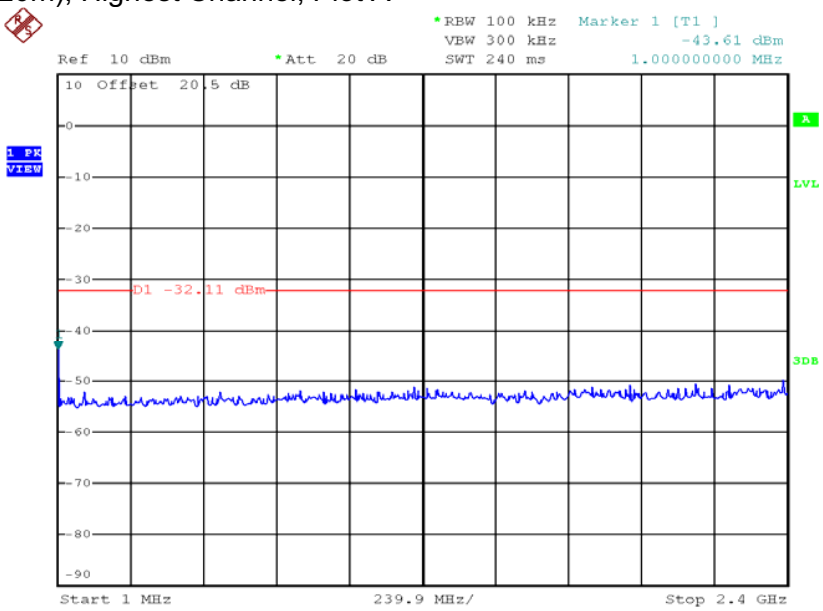
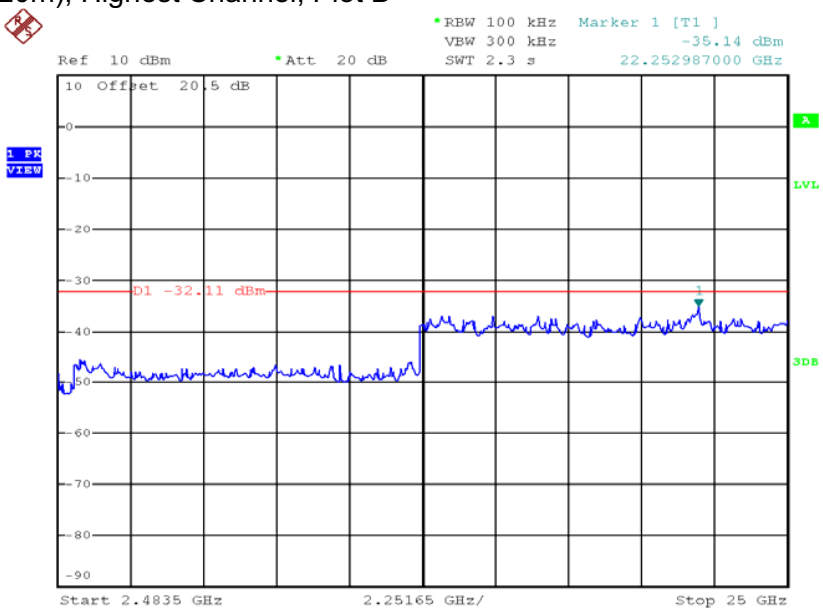
Plots of out of band conducted emissions

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



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



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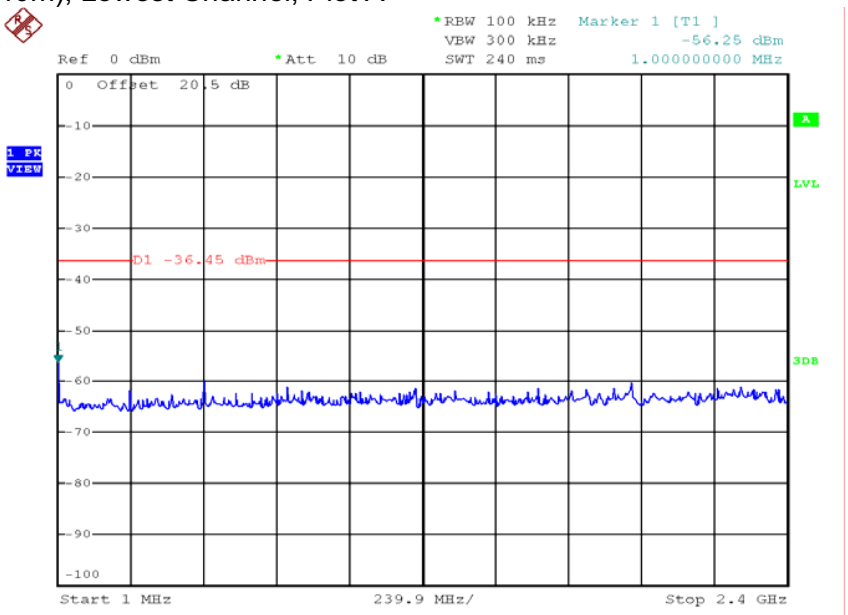
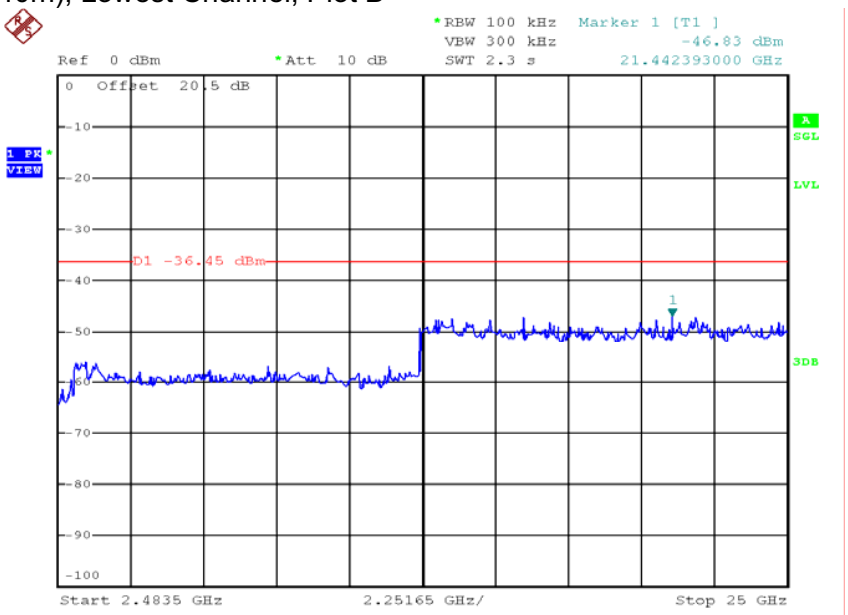
Plots of out of band conducted emissions

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



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



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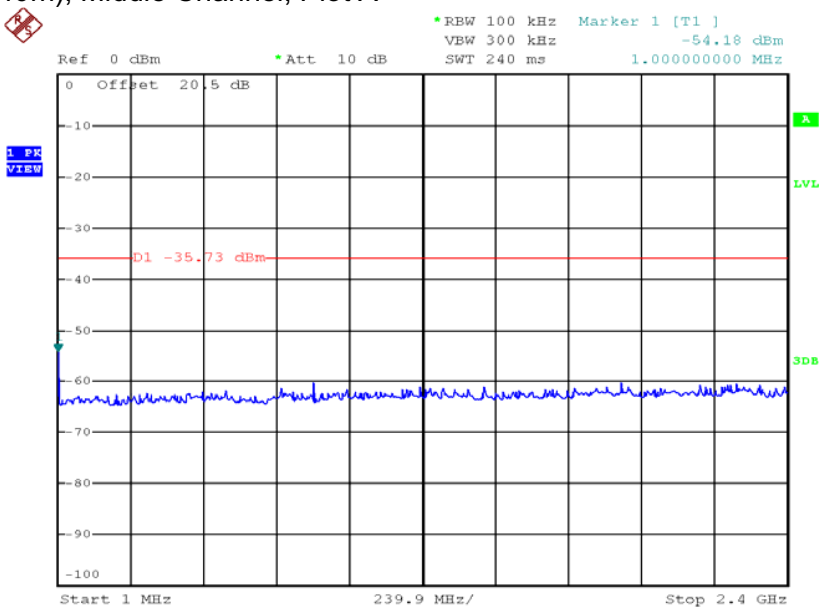
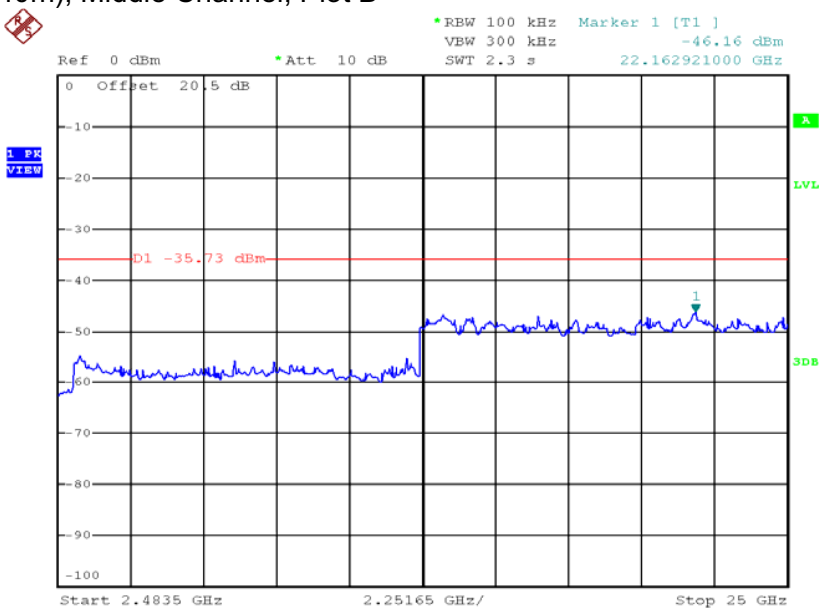
Plots of out of band conducted emissions

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



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



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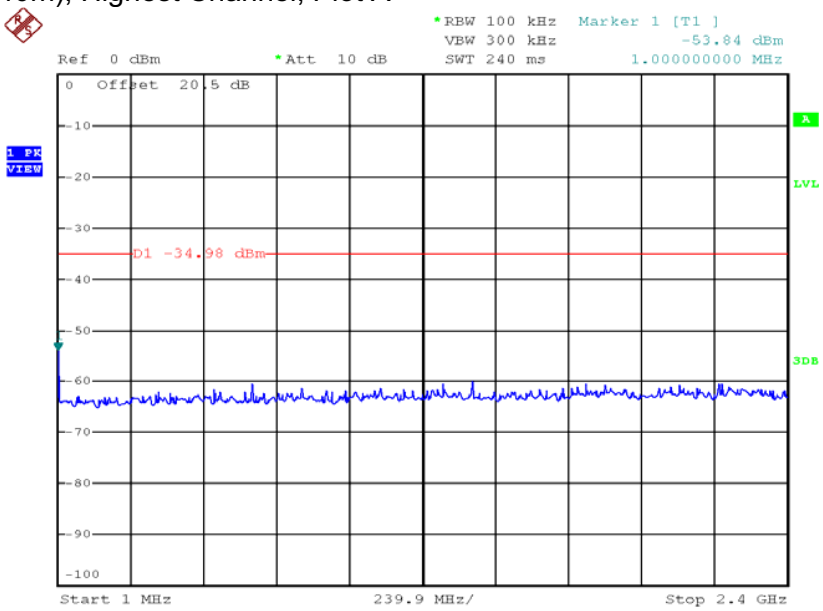
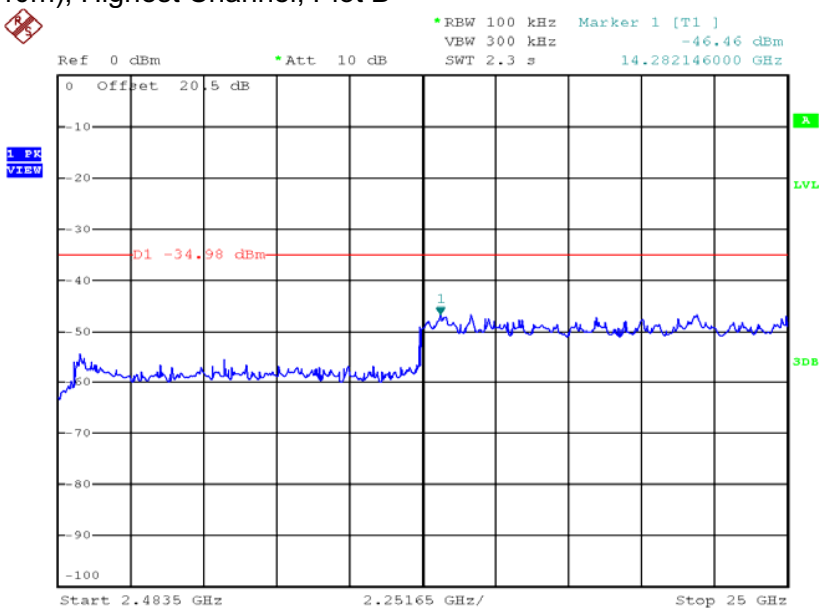
Plots of out of band conducted emissions

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



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



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4.6 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dBμV/m. This value in dBμV/m is converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0.0 dB
AV = -10 dB

FS = 62.0 + 7.4 + 1.6 – 29.0 + 0.0 + (-10.0) = 32.0 dBμV/m

Level in μV/m = Common Antilogarithm [(32.0 dBμV/m)/20] = 39.8 μV/m

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4.7 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.

4.7.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

2390.000 MHz

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

4.7.2 Radiated Emission Data

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

Judgement -

Passed by 0.5 dB margin compare with average limit

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Mode: TX-Channel 01

Table 1
IEEE 802.11b (DSSS, 1 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***2390.000***	***51.6***	***33***	***29.4***	***48.0***	***54.0***	***-6.0***
V	***4824.000***	***41.5***	***33***	***34.9***	***43.4***	***54.0***	***-10.6***
V	***12060.000***	***35.8***	***33***	***40.5***	***43.3***	***54.0***	***-10.7***
V	***14472.000***	***37.1***	***33***	***40.0***	***44.1***	***54.0***	***-9.9***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***2390.000***	***63.6***	***33***	***29.4***	***60.0***	***74.0***	***-14.0***
V	***4824.000***	***56.4***	***33***	***34.9***	***58.3***	***74.0***	***-15.7***
V	***12060.000***	***45.3***	***33***	***40.5***	***52.8***	***74.0***	***-21.2***
V	***14472.000***	***46.4***	***33***	***40.0***	***53.4***	***74.0***	***-20.6***

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

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

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

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

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 06

Table 2
IEEE 802.11b (DSSS, 1 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***4874.000***	***41.2***	***33***	***34.9***	***43.1***	***54.0***	***-10.9***
V	***7311.000***	***42.1***	***33***	***37.9***	***47.0***	***54.0***	***-7.0***
V	***12185.000***	***35.7***	***33***	***40.5***	***43.2***	***54.0***	***-10.8***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***4874.000***	***56.2***	***33***	***34.9***	***58.1***	***74.0***	***-15.9***
V	***7311.000***	***53.5***	***33***	***37.9***	***58.4***	***74.0***	***-15.6***
V	***12185.000***	***45.0***	***33***	***40.5***	***52.5***	***74.0***	***-21.5***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 11

Table 3
IEEE 802.11b (DSSS, 1 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***52.1***	***33***	***29.4***	***48.5***	***54.0***	***-5.5***
V	***4924.000***	***41.6***	***33***	***34.9***	***43.5***	***54.0***	***-10.5***
V	***7386.000***	***42.7***	***33***	***37.9***	***47.6***	***54.0***	***-6.4***
V	***12310.000***	***36.1***	***33***	***40.5***	***43.6***	***54.0***	***-10.4***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***63.6***	***33***	***29.4***	***60.0***	***74.0***	***-14.0***
V	***4924.000***	***56.6***	***33***	***34.9***	***58.5***	***74.0***	***-15.5***
V	***7386.000***	***53.7***	***33***	***37.9***	***58.6***	***74.0***	***-15.4***
V	***12310.000***	***45.4***	***33***	***40.5***	***52.9***	***74.0***	***-21.1***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 01

Table 4
IEEE 802.11g (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***2390.000***	***54.7***	***33***	***29.4***	***51.1***	***54.0***	***-2.9***
V	***4824.000***	***38.6***	***33***	***34.9***	***40.5***	***54.0***	***-13.5***
V	***12060.000***	***34.6***	***33***	***40.5***	***42.1***	***54.0***	***-11.9***
V	***14472.000***	***34.5***	***33***	***40.0***	***41.5***	***54.0***	***-12.5***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***2390.000***	***74.1***	***33***	***29.4***	***70.5***	***74.0***	***-3.5***
V	***4824.000***	***50.3***	***33***	***34.9***	***52.2***	***74.0***	***-21.8***
V	***12060.000***	***44.3***	***33***	***40.5***	***51.8***	***74.0***	***-22.2***
V	***14472.000***	***45.6***	***33***	***40.0***	***52.6***	***74.0***	***-21.4***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 06

Table 5
IEEE 802.11g (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***4874.000***	***38.3***	***33***	***34.9***	***40.2***	***54.0***	***-13.8***
V	***7311.000***	***36.4***	***33***	***37.9***	***41.3***	***54.0***	***-12.7***
V	***12185.000***	***34.2***	***33***	***40.5***	***41.7***	***54.0***	***-12.3***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***4874.000***	***49.9***	***33***	***34.9***	***51.8***	***74.0***	***-22.2***
V	***7311.000***	***48.1***	***33***	***37.9***	***53.0***	***74.0***	***-21.0***
V	***12185.000***	***43.9***	***33***	***40.5***	***51.4***	***74.0***	***-22.6***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 11

Table 6
IEEE 802.11g (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***56.4***	***33***	***29.4***	***52.8***	***54.0***	***-1.2***
V	***4924.000***	***39.8***	***33***	***34.9***	***41.7***	***54.0***	***-12.3***
V	***7386.000***	***38.6***	***33***	***37.9***	***43.5***	***54.0***	***-10.5***
V	***12310.000***	***34.6***	***33***	***40.5***	***42.1***	***54.0***	***-11.9***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***72.2***	***33***	***29.4***	***68.6***	***74.0***	***-5.4***
V	***4924.000***	***51.9***	***33***	***34.9***	***53.8***	***74.0***	***-20.2***
V	***7386.000***	***50.0***	***33***	***37.9***	***54.9***	***74.0***	***-19.1***
V	***12310.000***	***44.2***	***33***	***40.5***	***51.7***	***74.0***	***-22.3***

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

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

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

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

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 01

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

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***2390.000***	***55.8***	***33***	***29.4***	***52.2***	***54.0***	***-1.8***
V	***4824.000***	***39.3***	***33***	***34.9***	***41.2***	***54.0***	***-12.8***
V	***12060.000***	***34.8***	***33***	***40.5***	***42.3***	***54.0***	***-11.7***
V	***14472.000***	***35.1***	***33***	***40.0***	***42.1***	***54.0***	***-11.9***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***2390.000***	***77.1***	***33***	***29.4***	***73.5***	***74.0***	***-0.5***
V	***4824.000***	***51.3***	***33***	***34.9***	***53.2***	***74.0***	***-20.8***
V	***12060.000***	***43.9***	***33***	***40.5***	***51.4***	***74.0***	***-22.6***
V	***14472.000***	***45.2***	***33***	***40.0***	***52.2***	***74.0***	***-21.8***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 06

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

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***4874.000***	***39.6***	***33***	***34.9***	***41.5***	***54.0***	***-12.5***
V	***7311.000***	***38.5***	***33***	***37.9***	***43.4***	***54.0***	***-10.6***
V	***12185.000***	***34.7***	***33***	***40.5***	***42.2***	***54.0***	***-11.8***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***4874.000***	***50.8***	***33***	***34.9***	***52.7***	***74.0***	***-21.3***
V	***7311.000***	***49.0***	***33***	***37.9***	***53.9***	***74.0***	***-20.1***
V	***12185.000***	***43.6***	***33***	***40.5***	***51.1***	***74.0***	***-22.9***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 11

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

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***56.9***	***33***	***29.4***	***53.3***	***54.0***	***-0.7***
H	***4924.000***	***39.6***	***33***	***34.9***	***41.5***	***54.0***	***-12.5***
H	***7386.000***	***38.3***	***33***	***37.9***	***43.2***	***54.0***	***-10.8***
H	***12310.000***	***34.9***	***33***	***40.5***	***42.4***	***54.0***	***-11.6***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***76.6***	***33***	***29.4***	***73.0***	***74.0***	***-1.0***
H	***4924.000***	***51.5***	***33***	***34.9***	***53.4***	***74.0***	***-20.6***
H	***7386.000***	***49.4***	***33***	***37.9***	***54.3***	***74.0***	***-19.7***
H	***12310.000***	***44.3***	***33***	***40.5***	***51.8***	***74.0***	***-22.2***

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

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 03

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

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***2390.000***	***56.1***	***33***	***29.4***	***52.5***	***54.0***	***-1.5***
V	***4844.000***	***38.6***	***33***	***34.9***	***40.5***	***54.0***	***-13.5***
V	***12110.000***	***34.6***	***33***	***40.5***	***42.1***	***54.0***	***-11.9***
V	***14532.000***	***36.1***	***33***	***38.4***	***41.5***	***54.0***	***-12.5***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***2390.000***	***71.6***	***33***	***29.4***	***68.0***	***74.0***	***-6.0***
V	***4844.000***	***50.3***	***33***	***34.9***	***52.2***	***74.0***	***-21.8***
V	***12110.000***	***44.3***	***33***	***40.5***	***51.8***	***74.0***	***-22.2***
V	***14532.000***	***47.2***	***33***	***38.4***	***52.6***	***74.0***	***-21.4***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 06

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

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***4874.000***	***38.3***	***33***	***34.9***	***40.2***	***54.0***	***-13.8***
V	***7311.000***	***36.4***	***33***	***37.9***	***41.3***	***54.0***	***-12.7***
V	***12185.000***	***34.2***	***33***	***40.5***	***41.7***	***54.0***	***-12.3***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***4874.000***	***49.9***	***33***	***34.9***	***51.8***	***74.0***	***-22.2***
V	***7311.000***	***48.1***	***33***	***37.9***	***53.0***	***74.0***	***-21.0***
V	***12185.000***	***43.9***	***33***	***40.5***	***51.4***	***74.0***	***-22.6***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: TX-Channel 09

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

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - average (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***56.6***	***33***	***29.4***	***53.0***	***54.0***	***-1.0***
H	***4904.000***	***38.8***	***33***	***34.9***	***40.7***	***54.0***	***-13.3***
H	***7356.000***	***37.0***	***33***	***37.9***	***41.9***	***54.0***	***-12.1***
H	***12260.000***	***35.0***	***33***	***40.5***	***42.5***	***54.0***	***-11.5***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
H	***2483.500***	***72.7***	***33***	***29.4***	***69.1***	***74.0***	***-4.9***
H	***4904.000***	***50.7***	***33***	***34.9***	***52.6***	***74.0***	***-21.4***
H	***7356.000***	***48.4***	***33***	***37.9***	***53.3***	***74.0***	***-20.7***
H	***12260.000***	***44.4***	***33***	***40.5***	***51.9***	***74.0***	***-22.1***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: HDMI Video Playing + Charging + Wifi on with adaptor

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	***132.543***	***34.4***	***16***	***14.0***	***32.4***	***43.5***	***-11.1***
V	156.012	34.2	16	16.0	***34.2***	43.5	-9.3
H	***168.024***	***28.8***	***16***	***18.0***	***30.8***	***43.5***	***-12.7***
H	180.023	31.5	16	20.0	35.5	43.5	-8.0
H	216.034	31.4	16	17.0	32.4	46.0	-13.6
H	***240.012***	***30.2***	***16***	***19.0***	***33.2***	***46.0***	***-12.8***
H	300.023	29.2	16	22.0	35.2	46.0	-10.8
H	336.034	27.1	16	24.0	35.1	46.0	-10.9
H	480.032	30.2	16	26.0	40.2	46.0	-5.8
H	720.045	23.5	16	30.0	37.5	46.0	-8.5

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

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

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

4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Mode: HDMI Video Playing + Charging with data transfer

Table 14

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)
H	82.352	36.6	16	7.0	27.6	40.0	-12.4
V	148.025	37.4	16	14.0	***35.4***	43.5	-8.1
H	222.345	32.4	16	18.0	34.4	46.0	-11.6
H	***245.647***	***29.6***	***16***	***20.0***	***33.6***	***46.0***	***-12.4***
H	300.345	34.0	16	22.0	40.0	46.0	-6.0
H	346.036	28.8	16	24.0	36.8	46.0	-9.2
H	371.046	34.2	16	24.0	42.2	46.0	-3.8
H	432.306	30.6	16	25.0	39.6	46.0	-6.4
H	480.002	29.8	16	26.0	39.8	46.0	-6.2
H	528.025	26.8	16	27.0	37.8	46.0	-8.2
H	901.023	25.1	16	32.0	41.1	46.0	-4.9

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

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

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

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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4.7.3 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

4.8 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.

4.8.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.596 MHz

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

4.8.2 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 1.31 dB margin compare with average limit

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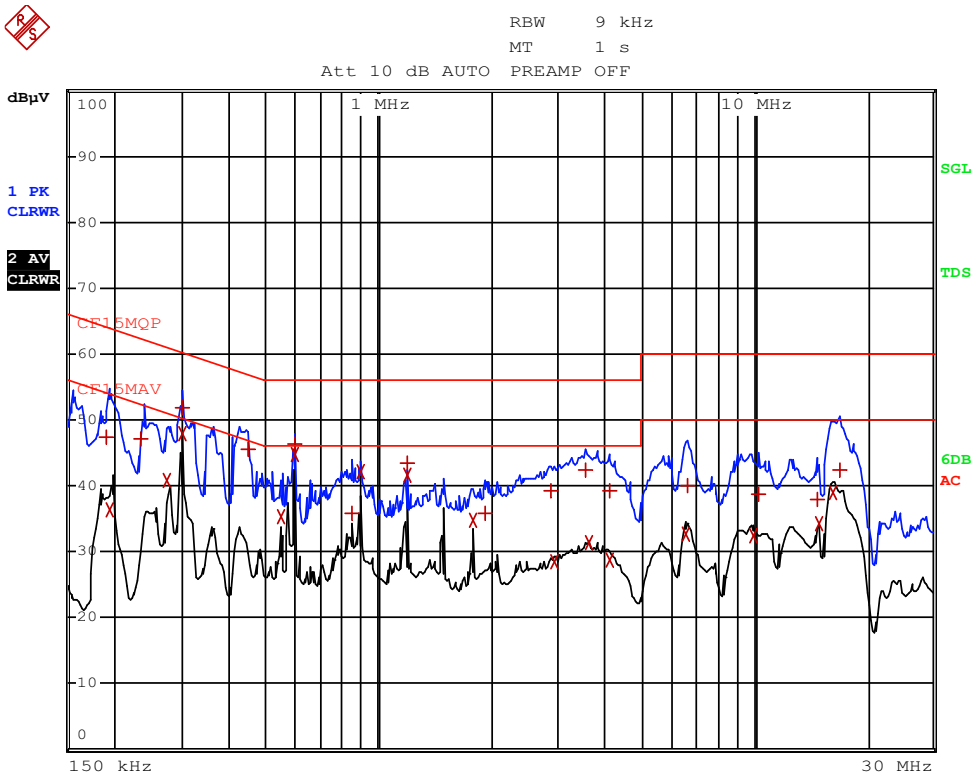
Worst Case: HDMI Video Playing + Charging + Wifi transmission with adaptor



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Worst Case: HDMI Video Playing + Charging + Wifi transmission with adaptor

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	190.5 kHz	47.32	N	-16.69
2	CISPR Average	195 kHz	36.24	L1	-17.57
1	Quasi Peak	235.5 kHz	47.12	N	-15.13
2	CISPR Average	276 kHz	40.74	N	-10.18
1	Quasi Peak	298.5 kHz	51.82	L1	-8.46
2	CISPR Average	298.5 kHz	47.92	L1	-2.36
1	Quasi Peak	447 kHz	45.64	N	-11.28
2	CISPR Average	550.5 kHz	35.31	N	-10.68
1	Quasi Peak	595.5 kHz	46.27	L1	-9.72
2	CISPR Average	595.5 kHz	44.69	L1	-1.31
1	Quasi Peak	852 kHz	35.79	L1	-20.20
2	CISPR Average	892.5 kHz	42.18	L1	-3.81
1	Quasi Peak	1.1895 MHz	43.35	N	-12.65
2	CISPR Average	1.1895 MHz	41.56	N	-4.43
2	CISPR Average	1.7835 MHz	34.79	N	-11.20
1	Quasi Peak	1.9185 MHz	35.86	N	-20.13
1	Quasi Peak	2.886 MHz	39.27	N	-16.72
2	CISPR Average	2.949 MHz	28.51	L1	-17.48
1	Quasi Peak	3.552 MHz	42.38	L1	-13.61
2	CISPR Average	3.6195 MHz	31.36	N	-14.63

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Worst Case: HDMI Video Playing + Charging + Wifi transmission with adaptor

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	4.119 MHz	39.15	N	-16.85
2	CISPR Average	4.119 MHz	28.78	L1	-17.21
2	CISPR Average	6.603 MHz	32.71	N	-17.28
1	Quasi Peak	6.675 MHz	40.07	N	-19.92
2	CISPR Average	9.9195 MHz	32.37	N	-17.62
1	Quasi Peak	10.3065 MHz	38.72	N	-21.27
1	Quasi Peak	14.775 MHz	37.83	N	-22.16
2	CISPR Average	14.9145 MHz	34.28	L1	-15.71
2	CISPR Average	16.251 MHz	39.09	N	-10.90
1	Quasi Peak	16.8495 MHz	42.36	L1	-17.63

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EXHIBIT 5
EQUIPMENT LIST

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5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-2666	EW-2188	EW-0571
Manufacturer	R&S	AGILENTTECH	EMCO
Model No.	ESCI7	E4407B	3104C
Calibration Date	Jun. 20, 2013	Apr. 16, 2014	Nov. 01, 2013
Calibration Due Date	Sep. 20, 2014	Apr. 16, 2015	May 01, 2015

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna (1GHz - 18GHz)
Registration No.	EW-0446	EW-1133
Manufacturer	EMCO	EMCO
Model No.	3146	3115
Calibration Date	Apr. 30. 2013	Apr. 30, 2014
Calibration Due Date	Oct. 30, 2014	Oct. 30, 2015

2) Conducted Emissions Test

Equipment	EMI Test Receiver	Artificial Mains Network
Registration No.	EW-2251	EW-2501
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Nov. 20, 2013	Dec. 25, 2013
Calibration Due Date	Nov. 20, 2014	Nov. 30, 2014

3) Conductive Measurement Test

Equipment	Spectrum Analyzer
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 28, 2013
Calibration Due Date	Oct. 28, 2014

END OF TEST REPORT

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