

TEST REPORT

Report Number: HK12081016-5

Application
for
Original Grant of 47 CFR Part 15 Certification

2.4GHz Digital Modulation Transceiver (Learning App Tablet)

FCC ID: G2R-1568

Prepared and Checked by:

Approved by:

Signed on File

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November 20, 2012

INTERTEK TESTING SERVICES

GENERAL INFORMATION

Applicant Name:	VTech Electronics Ltd.
Applicant Address:	23/F., Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, N.T., Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2010 Edition
FCC ID:	G2R-1568
FCC Model(s):	1568
Type of EUT:	Digital Transmission System
Description of EUT:	Learning App Tablet
Average RF Conducted Output Power IEEE 802.11b	12 dBm
Average RF Conducted Output Power IEEE 802.11g	13 dBm
Serial Number:	N/A
Sample Receipt Date:	August 21, 2012
Date of Test:	August 21, 2012 to November 20, 2012
Report Date:	November 20, 2012
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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

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1.0 Summary of Test Results & 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	15.247(b)(3)&(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	Pass	4.2
Max. Power Density	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
Radio Frequency Radiation Exposure	15.247(i)	Pass	4.8

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 standards:

FCC Part 15, October 1, 2010 Edition

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**EXHIBIT 2
GENERAL DESCRIPTION**

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2.0 General Description

2.1 Product Description

The Learning App Tablet is a 2.4GHz Digital Modulation Transceiver (Learning App Tablet). For 802.11b mode, it operates at frequency range of 2412MHz to 2462MHz with 11 channels. The maximum bit rate can be up to 11Mbps via direct-sequence spread spectrum (DSSS) modulation. For 802.11g mode, it operates at frequency range of 2412MHz to 2462MHz with 11 channels. The maximum bit rate can be up to 54Mbps via orthogonal frequency division (OFDM) modulation. The EUT is powered by 6VDC 4 x 1.5V "AA" batteries and/ or an AC/DC adapter 100-240VAC to 7.5VDC 400mA and/ or 3VDC backup battery.

The antenna used in the EUT is internal, integral and the test sample is a prototype.

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

2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (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 v02 (10/04/2012). All other measurements were made in accordance with the procedures in 47 CFR Part 2.

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 Roof Top, 2nd Floor, and 5th Floor respectively of Intertek Testing Services Hong Kong Ltd., which is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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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 was powered by 6VDC 4 x 1.5V "AA" batteries and/ or an AC/DC adapter 100-240VAC to 7.5VDC 400mA and/ or 3VDC backup battery.

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.

For transmitter radiated measurement, the spectrum analyzer resolution bandwidth was 100 kHz for frequencies below 1000 MHz. The resolution bandwidth was 1 MHz for frequencies above 1000 MHz.

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 circuitry 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 4.6.3.

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.

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.

Different data rates were tested. Worst case was reported only.

All relevant operation modes have been tested, and the worst case data was included in this report.

3.2 EUT Exercising Software

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

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3.3 Details of EUT and Description of Accessories

Details of EUT:

An AC/DC adaptor (provided with the unit) was used to power the device. Their description are listed below.

- (1) An AC/DC adaptor (100-240VAC to 7.5VDC 400mA, Model: S004LB0750040 (VTech) (Supplied by Client)
- (2) Earphone with 1.04 meter cable (Supplied by Client)
- (3) USB cable with length of 0.63 meter with ferrite (Supplied by Client)

Description of Accessories:

- (1) 4GB Toshiba SD memory card (Supplied by Client)
- (2) Game card (Supplied by Client)
- (3) Lenovo Notebook, Model: SL500, S/N: ML-DXMM3 (Supplied by Intertek)
- (4) Lenovo Notebook, Model: T61, S/N: L3-CF468 (Supplied by Intertek)
- (5) Smart-Drive External 1394 HDD, Model: HD3-SU2FW, S/N: 0800261 (Supplied by Intertek)

3.4 Measurement Uncertainty

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

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

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**EXHIBIT 4
TEST RESULTS**

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4.0 Test Results

4.1 Maximum Conducted 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 by added to SA raw reading. The 8.1.2 of KDB558074 measurement procedure was used.
- The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration.

Mode: 802.11b (DSSS)		
Antenna Gain = -2 dBi		
Frequency (MHz)	Peak power (dBm)	Peak Power (mW)
Low Channel: 2412	15.24	33.42
Middle Channel: 2437	14.85	30.55
High Channel: 2462	13.96	24.89

Mode: 802.11g (OFDM)		
Antenna Gain = -2 dBi		
Frequency (MHz)	Peak power (dBm)	Peak Power (mW)
Low Channel: 2412	20.22	105.20
Middle Channel: 2437	20.41	109.90
High Channel: 2462	19.31	85.31

Cable loss : 0.3 dB External Attenuation : 0 dB

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

dBm max. output level = 20.41 dBm

Limits:

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

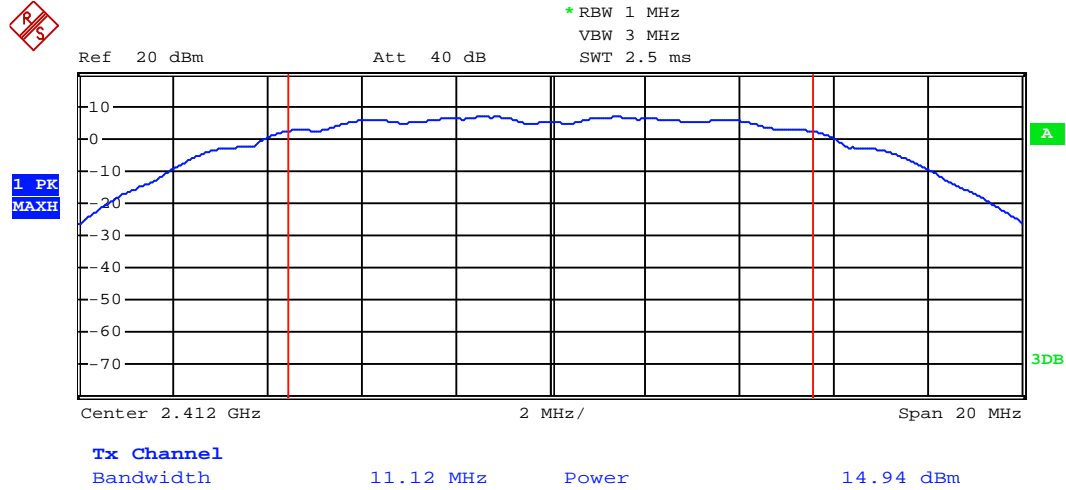
___W (___dBm) for antennas with gains more than 6dBi

The plots of maximum conducted output power are saved as below.

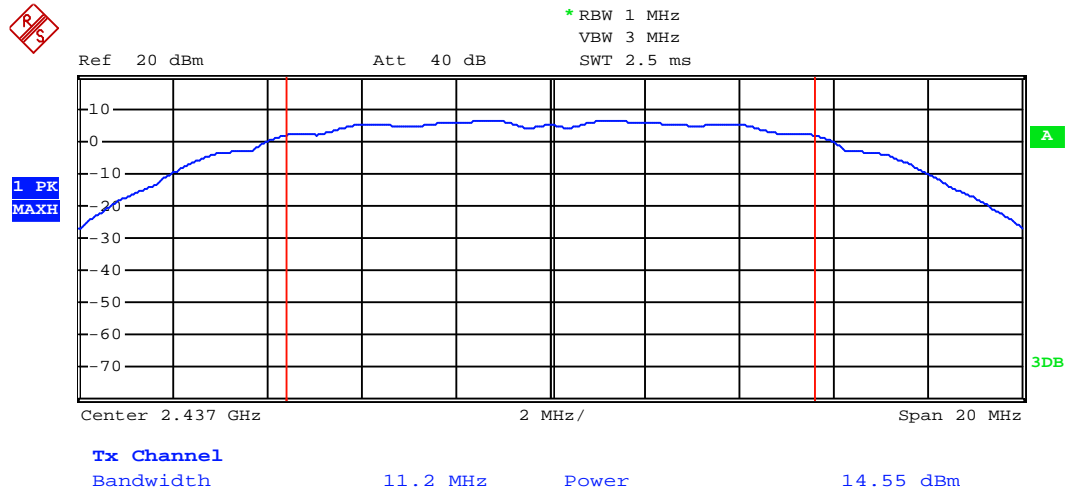
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Plots of maximum conducted output power Mode: 802.11b (DSSS)

Lowest channel



Middle channel



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Highest channel

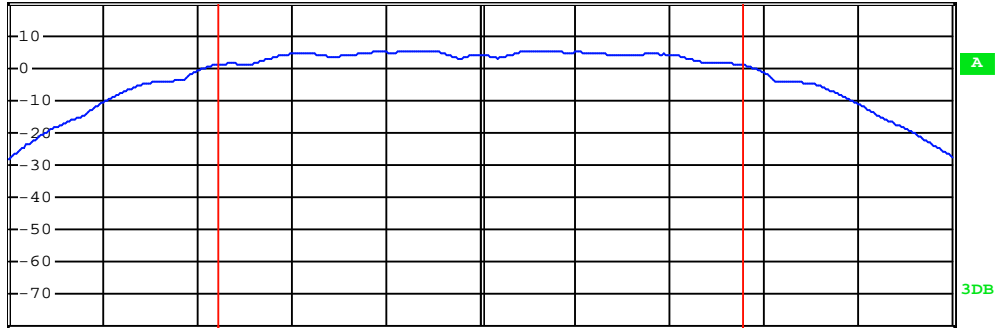


* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Ref 20 dBm

Att 40 dB

1 PK
MAXH



Center 2.462 GHz

2 MHz/

Span 20 MHz

Tx Channel

Bandwidth

11.12 MHz

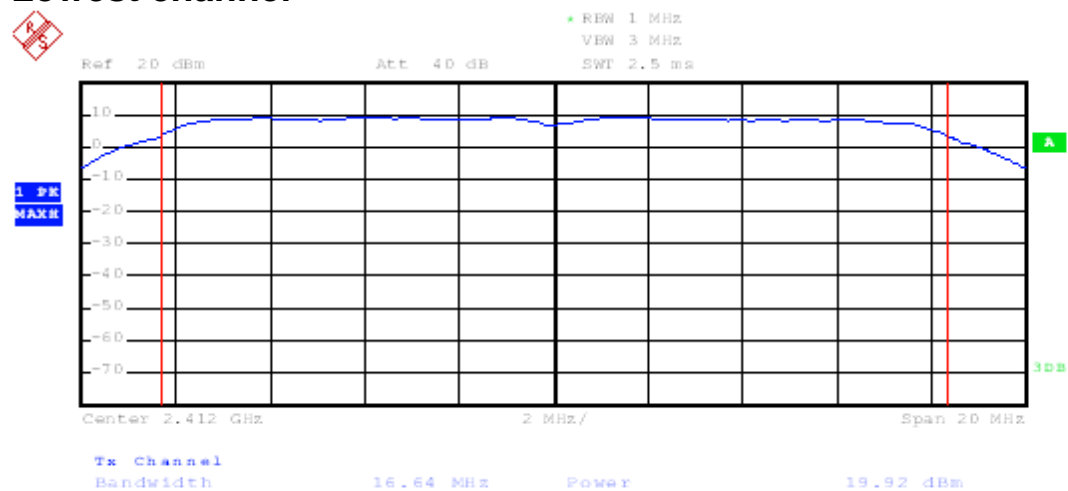
Power

13.66 dBm

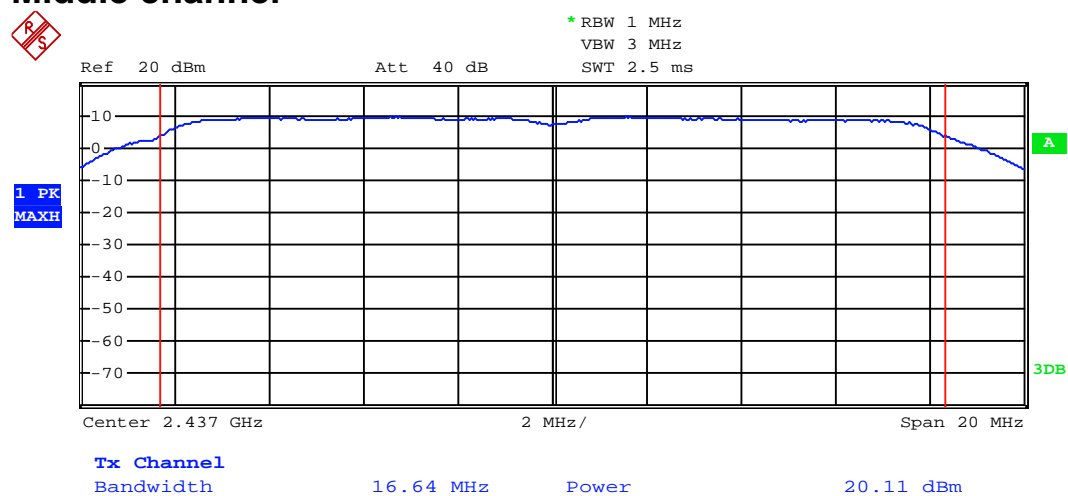
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Plots of maximum conducted output power Mode: 802.11g (OFDM)

Lowest channel



Middle channel



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Highest channel

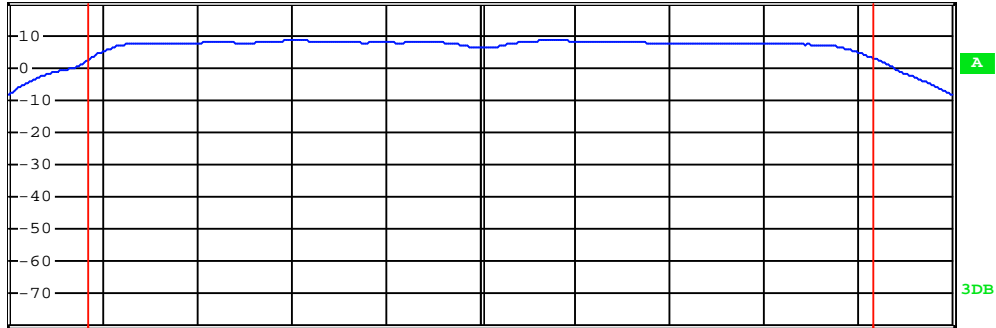


* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Ref 20 dBm

Att 40 dB

1 PK
MAXH



Center 2.462 GHz

2 MHz/

Span 20 MHz

Tx Channel

Bandwidth

16.64 MHz

Power

19.01 dBm

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4.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The 7.1 of KDB558074 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 802.11 b (DSSS)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	11.12
Middle Channel: 2437	11.20
High Channel: 2462	11.12

IEEE 802.11 g (OFDM)	
Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.64
Middle Channel: 2437	16.64
High Channel: 2462	16.64

Limits

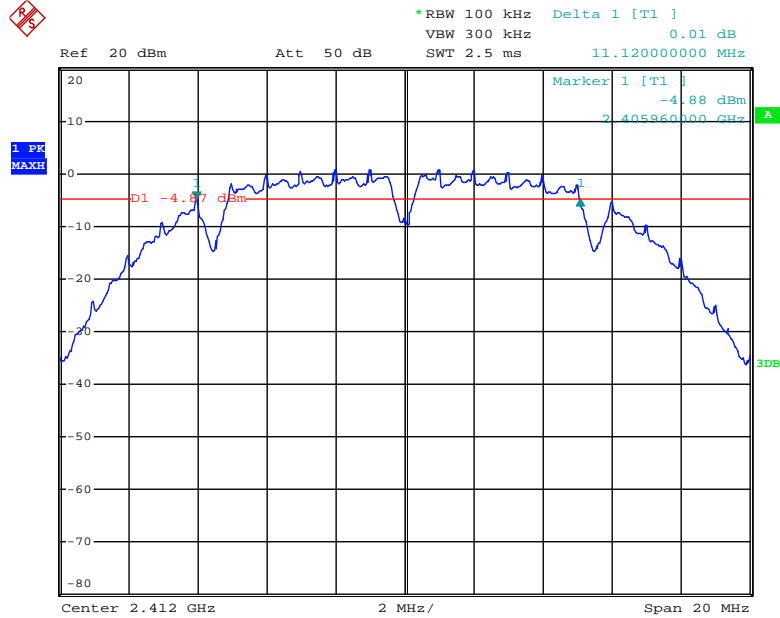
6 dB bandwidth shall be at least 500kHz

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

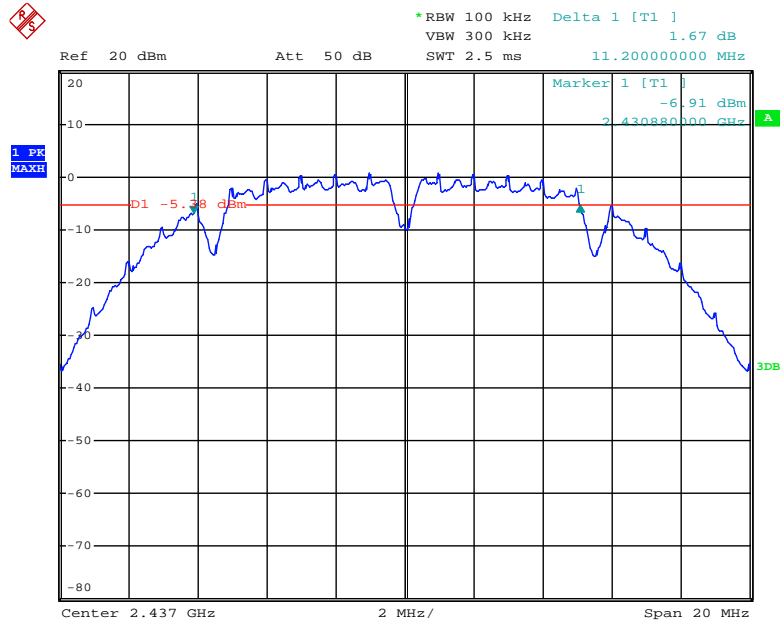
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Plots of 6dB RF bandwidth Mode: 802.11b (DSSS)

Lowest channel

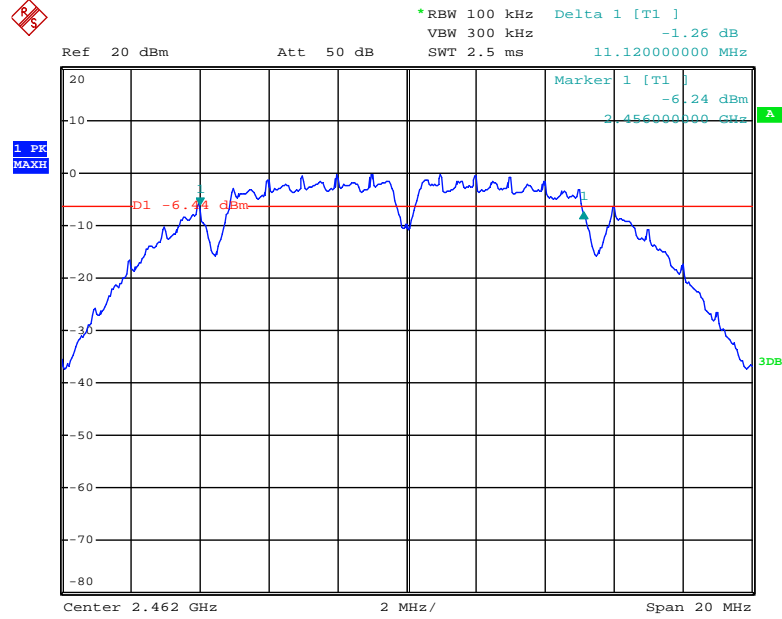


Middle channel



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Highest channel

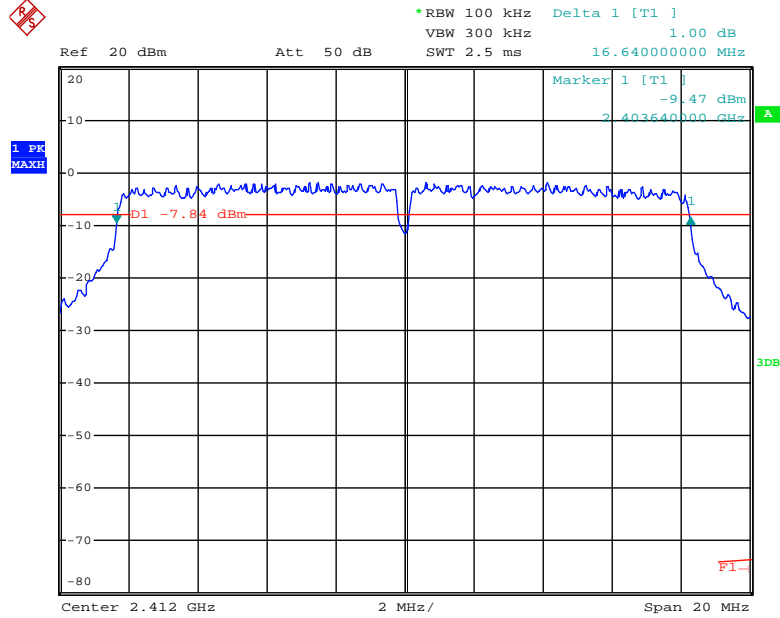


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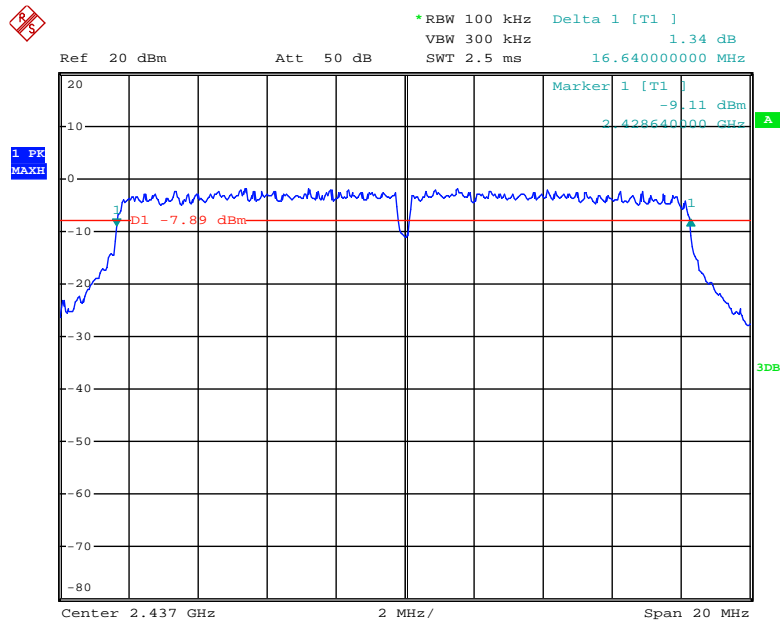
Plots of 6dB RF bandwidth

Mode: 802.11g (OFDM)

Lowest channel

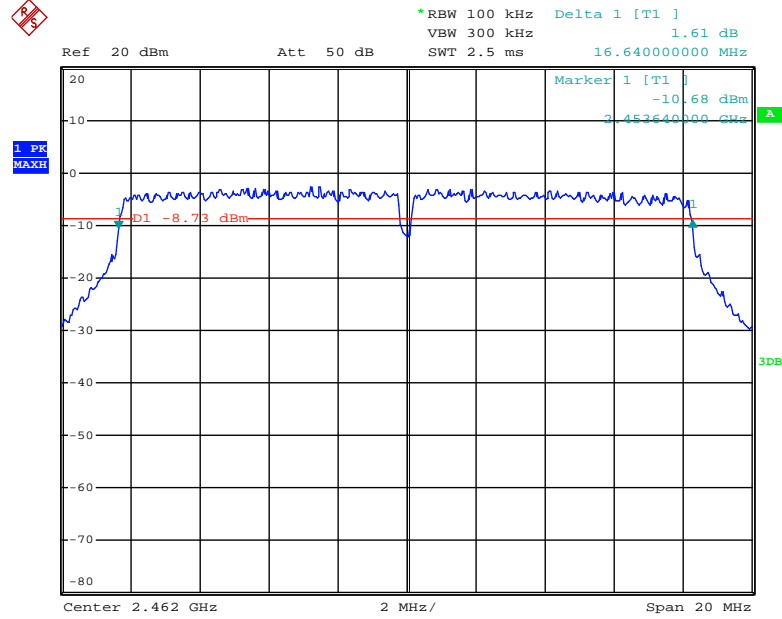


Middle channel



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Highest channel



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4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 9.1 of KDB558074 was used. If an external attenuator and/or cable was used, these losses are compensated by added to SA raw reading.

IEEE 802.11 b (DSSS)	
Frequency (MHz)	PSD (dBm)
Low Channel: 2412	0.83
Middle Channel: 2437	1.91
High Channel: 2462	0.06

IEEE 802.11 g (OFDM)	
Frequency (MHz)	PSD (dBm)
Low Channel: 2412	0.44
Middle Channel: 2437	-1.87
High Channel: 2462	-1.68

Cable Loss: 0.3 dB

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

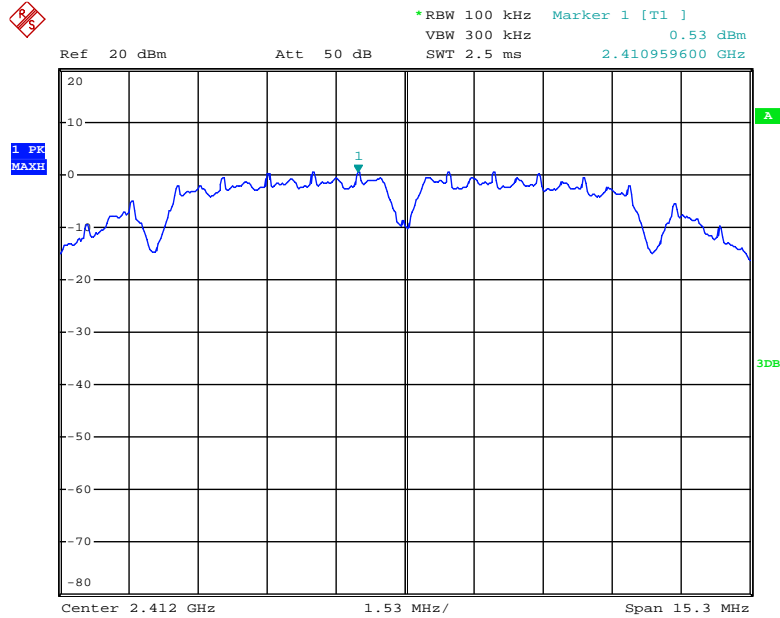
Limit:
8dBm in 3kHz

The plots of power spectral density are saved as below.

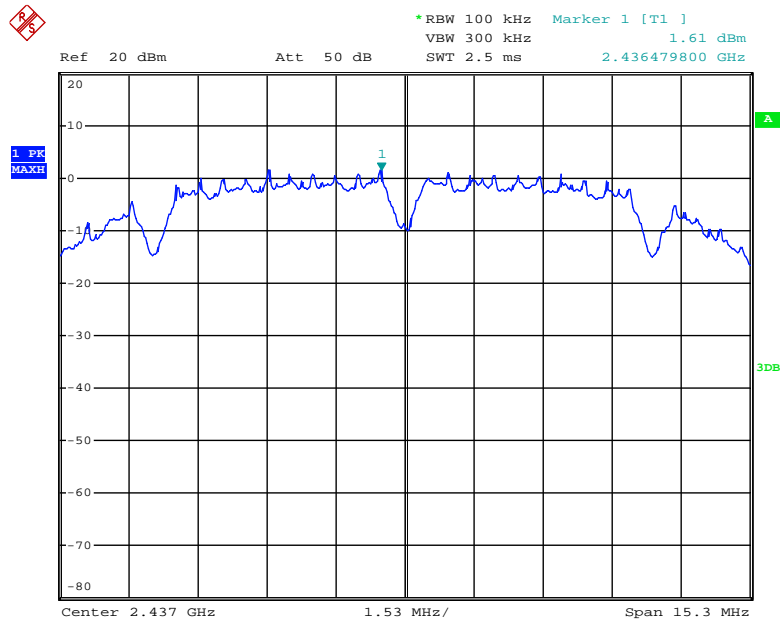
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Plots of power spectral density (802.11b)

Lowest Channel

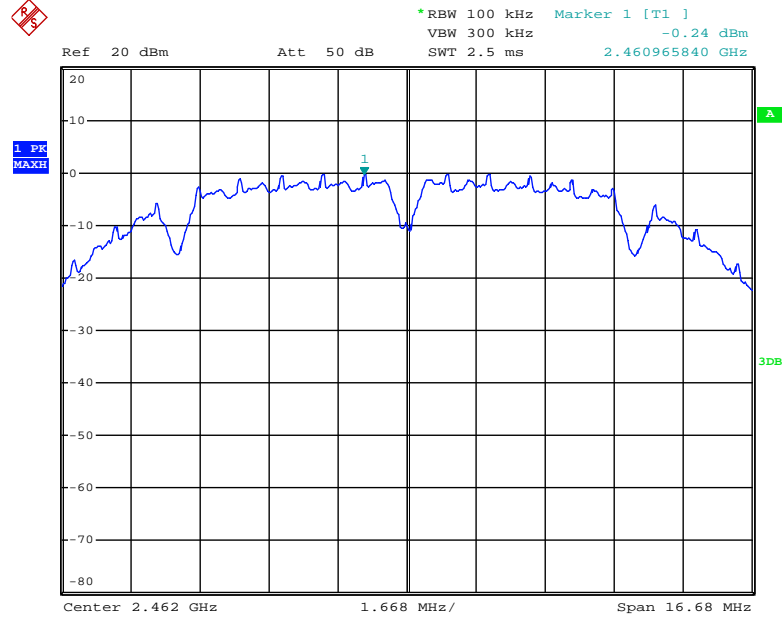


Middle Channel



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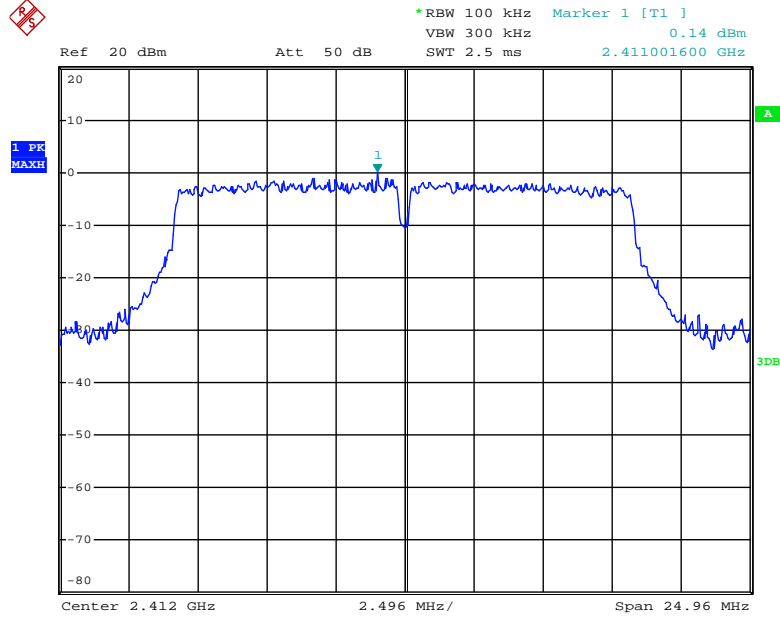
Highest Channel



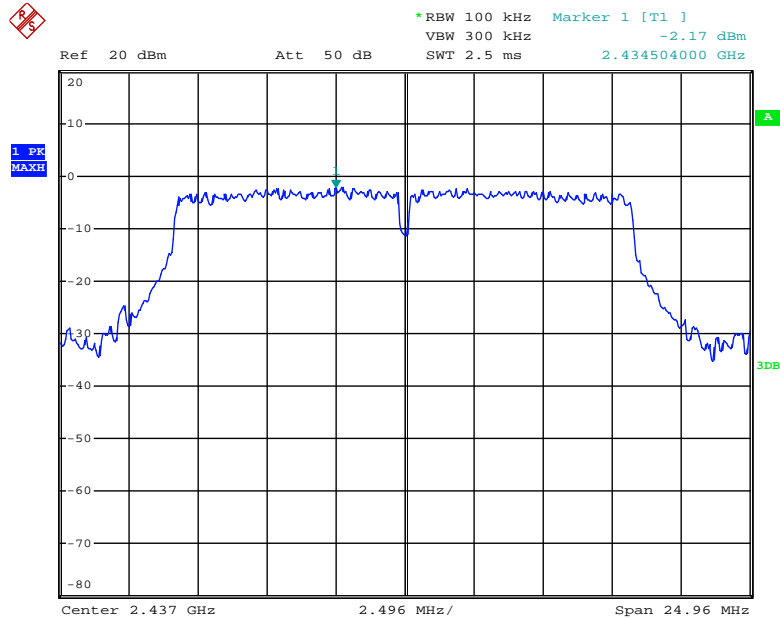
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Plots of power spectral density (802.11g)

Lowest Channel

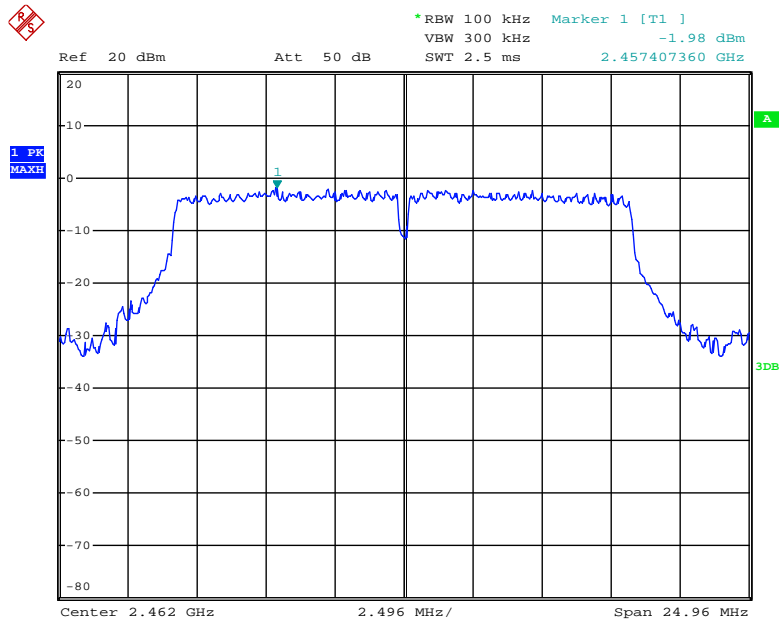


Middle Channel



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Highest Channel



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4.4 Out of Band Conducted Emissions

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

The measurement procedures under sections 10.1 of KDB558074 were used.

Limits:

All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the maximum measured in-band peak PSD level.

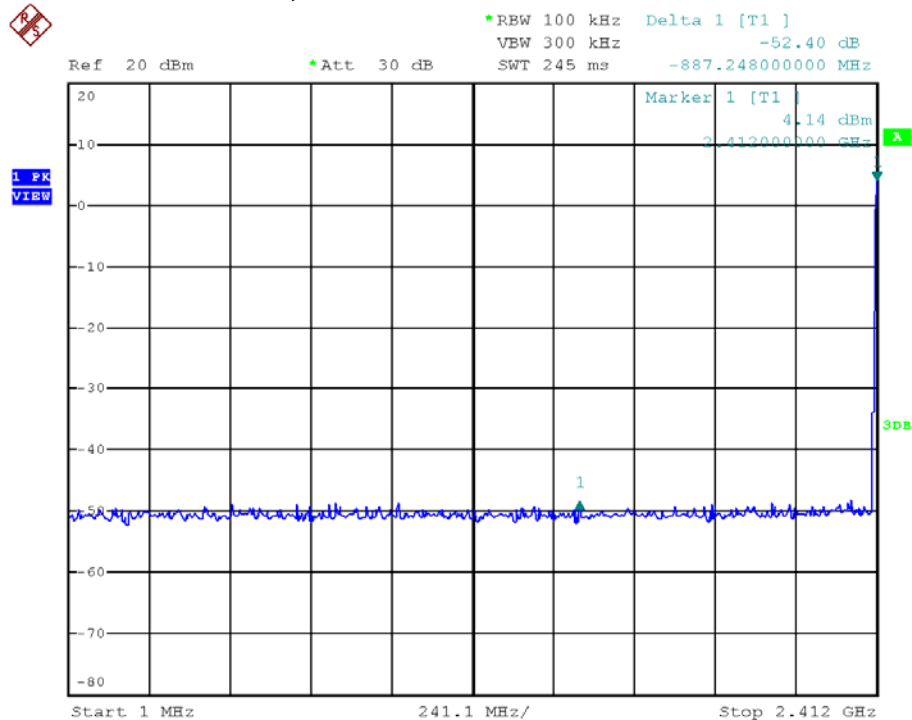
The plots of out of band conducted emissions and bandedge are saved as below.

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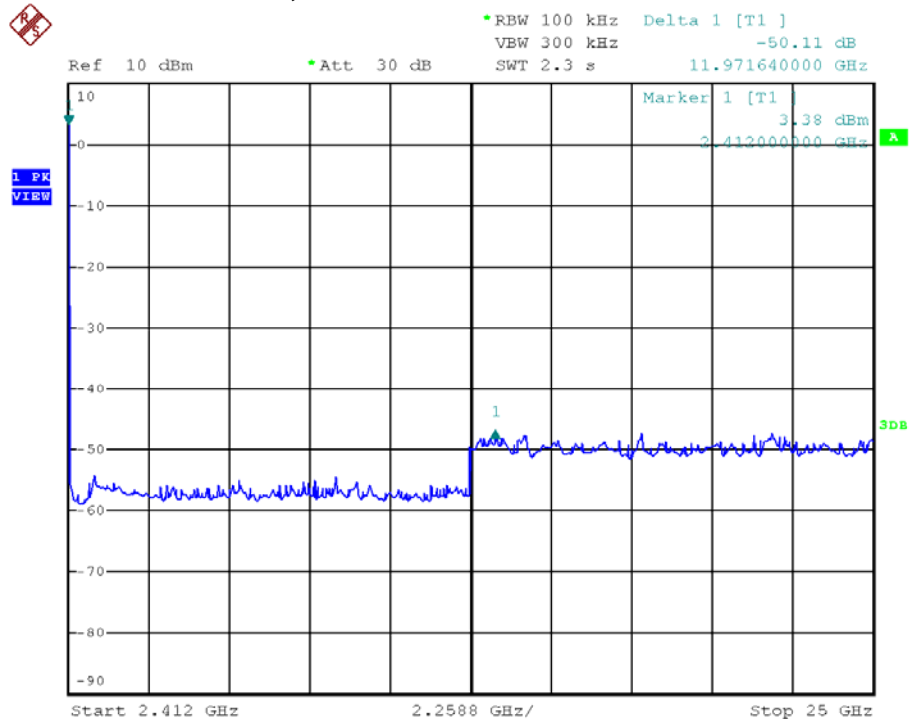
Plots of out of band conducted emissions

Mode: 802.11b (DSSS)

Lowest channel, Plot 1

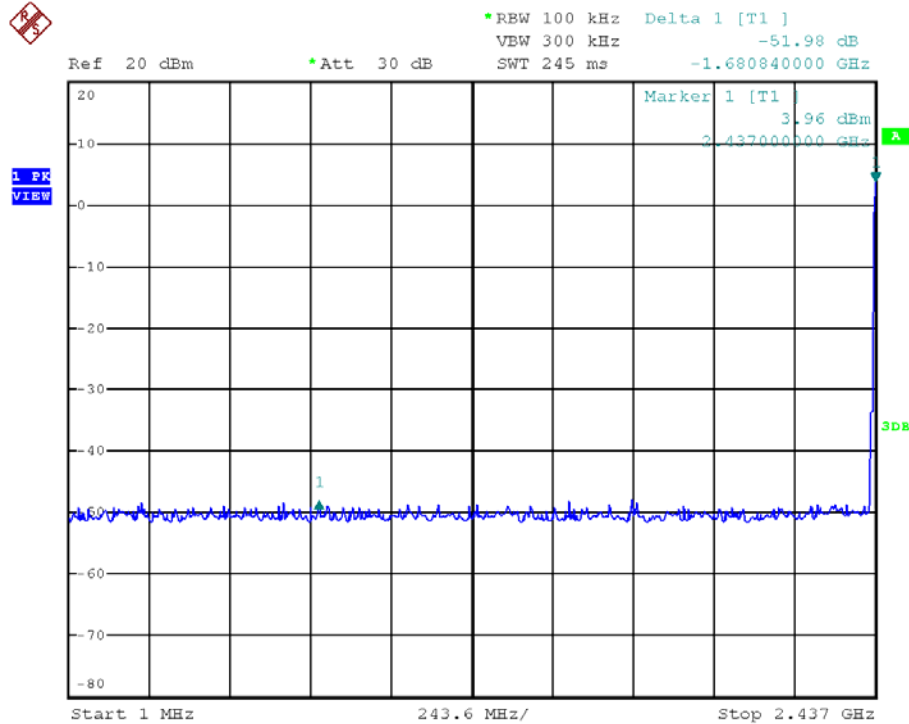


Lowest channel, Plot 2

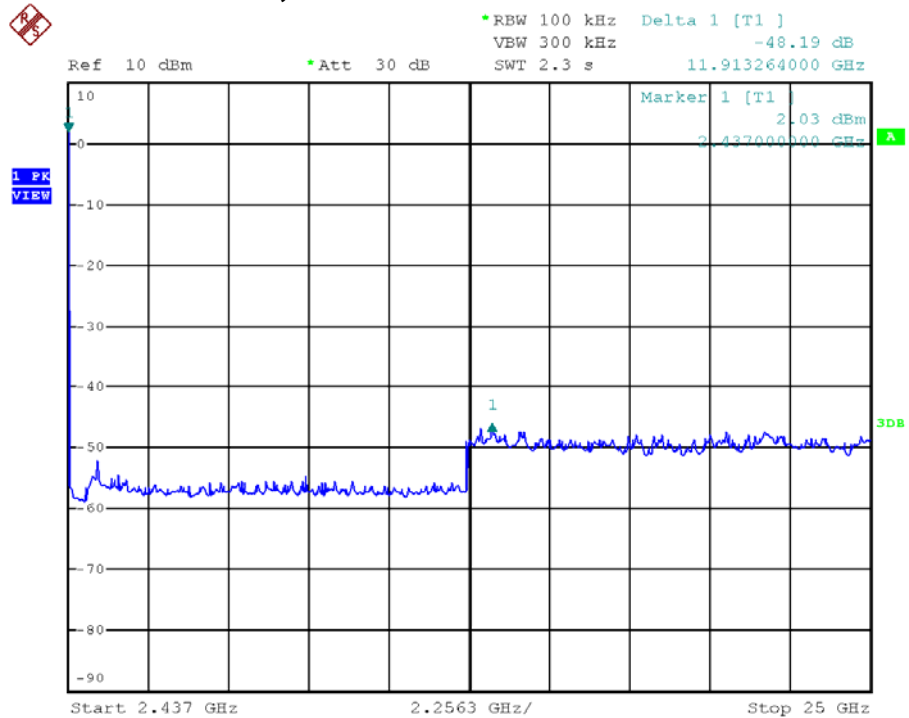


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Middle channel, Plot 1

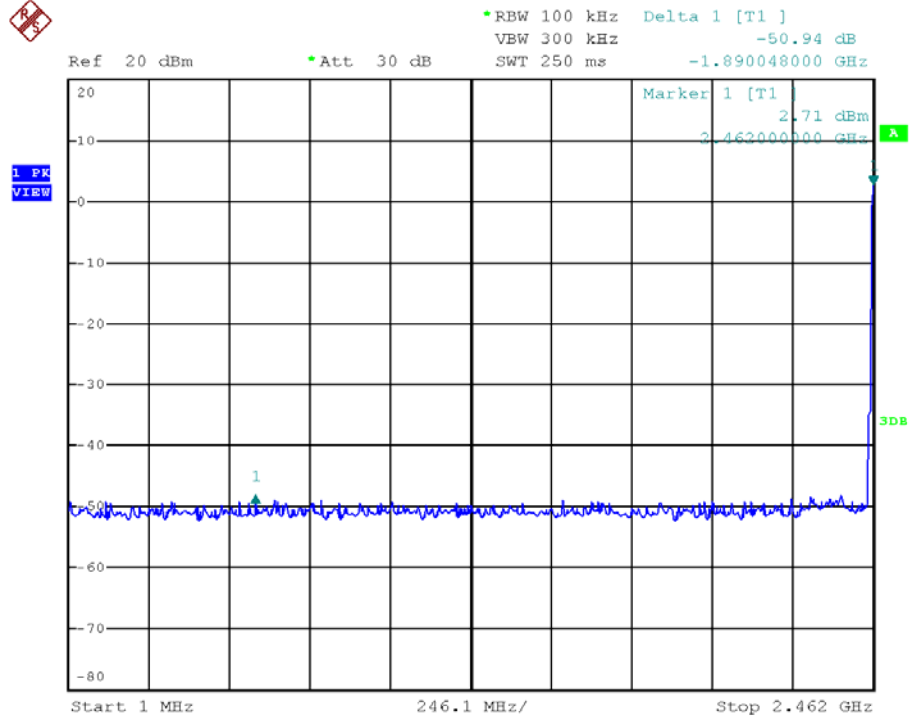


Middle channel, Plot 2

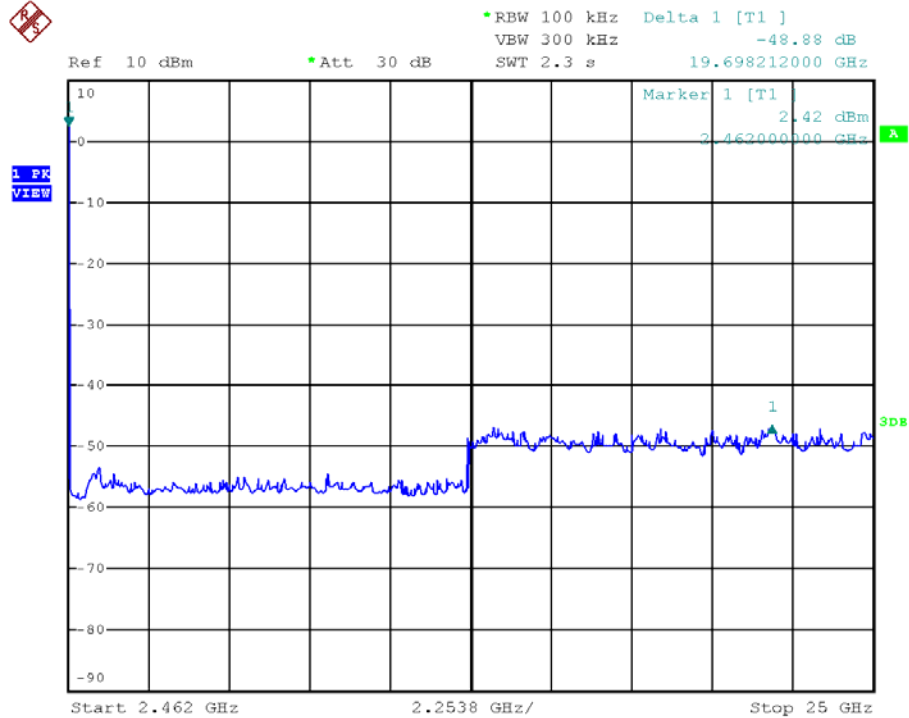


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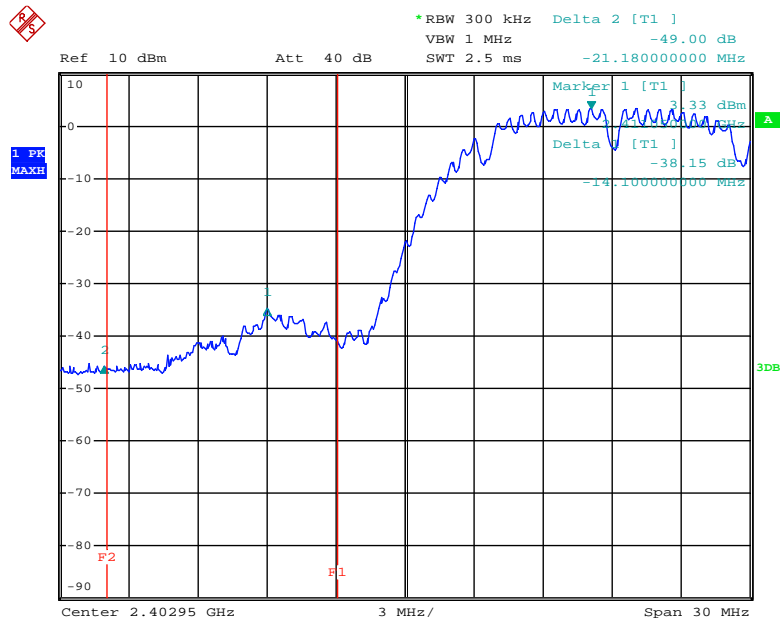
Highest channel, Plot 1



Highest channel, Plot 2

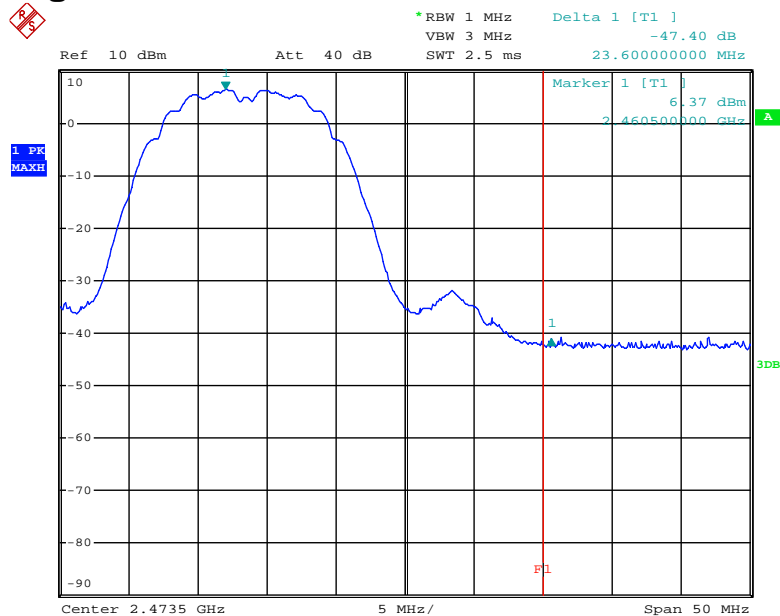


Plots of bandedge
Bandedge plot, Plot 1
Lowest channel



Date: 20.NOV.2012 15:07:08

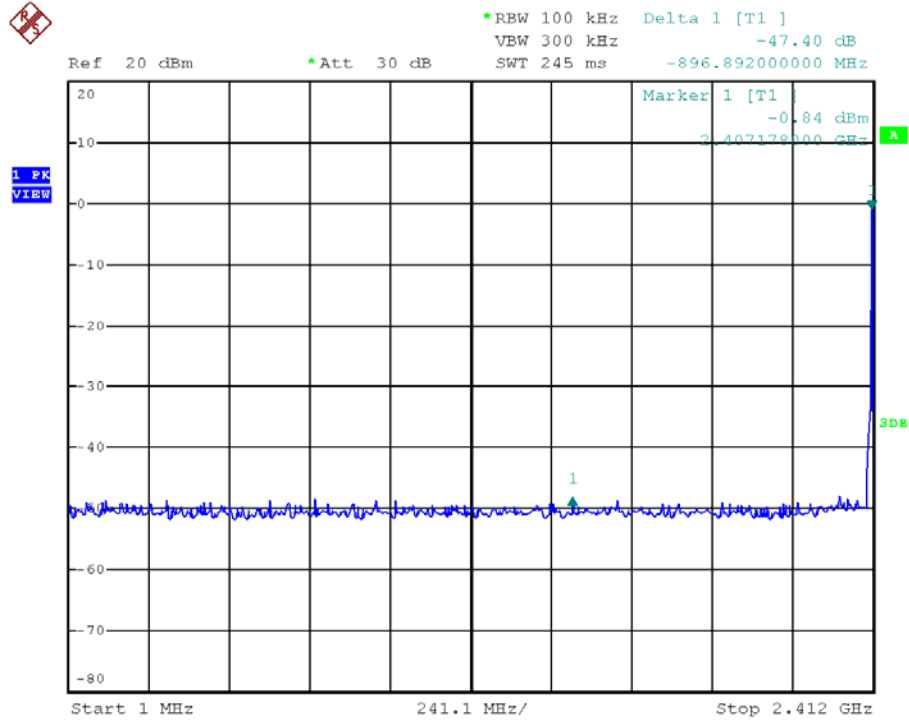
Bandedge plot, Plot 2
Highest channel



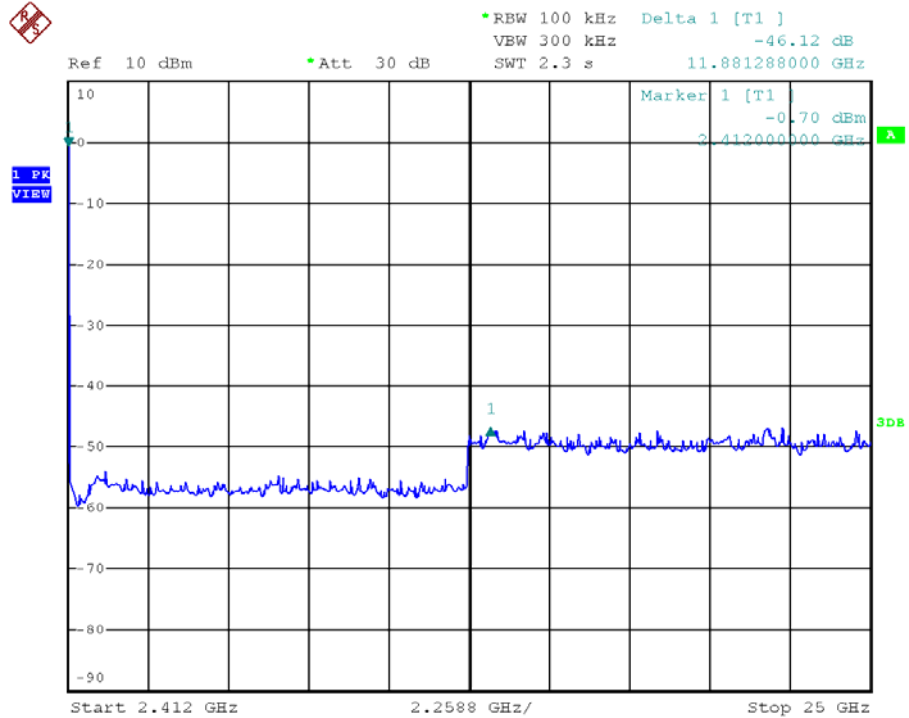
Date: 20.NOV.2012 15:02:14

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Plots of out of band conducted emissions Mode: 802.11g (OFDM) Lowest channel, Plot 1

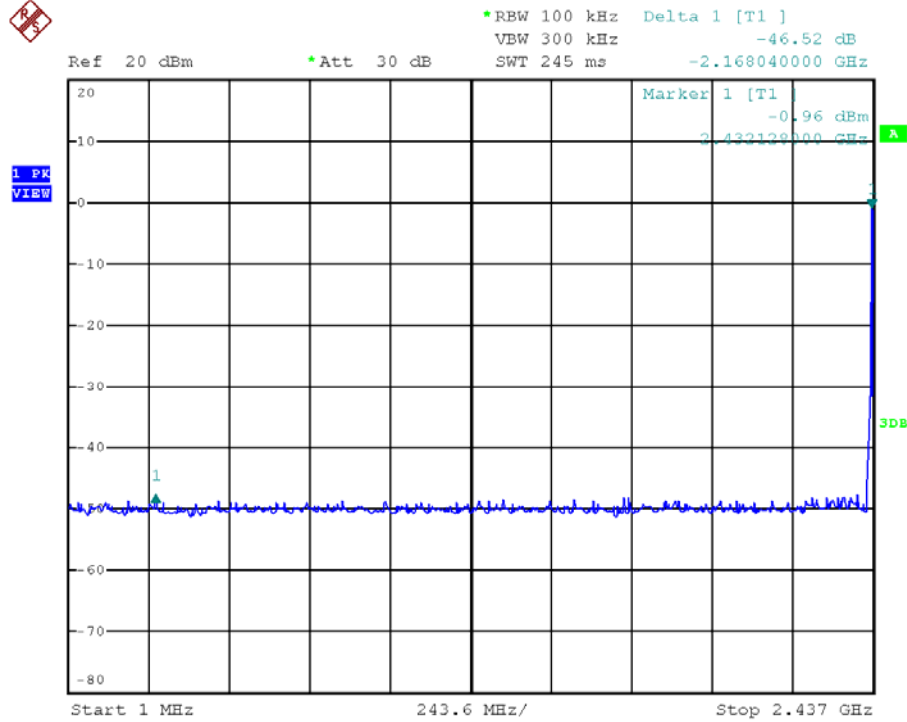


Lowest channel, Plot 2

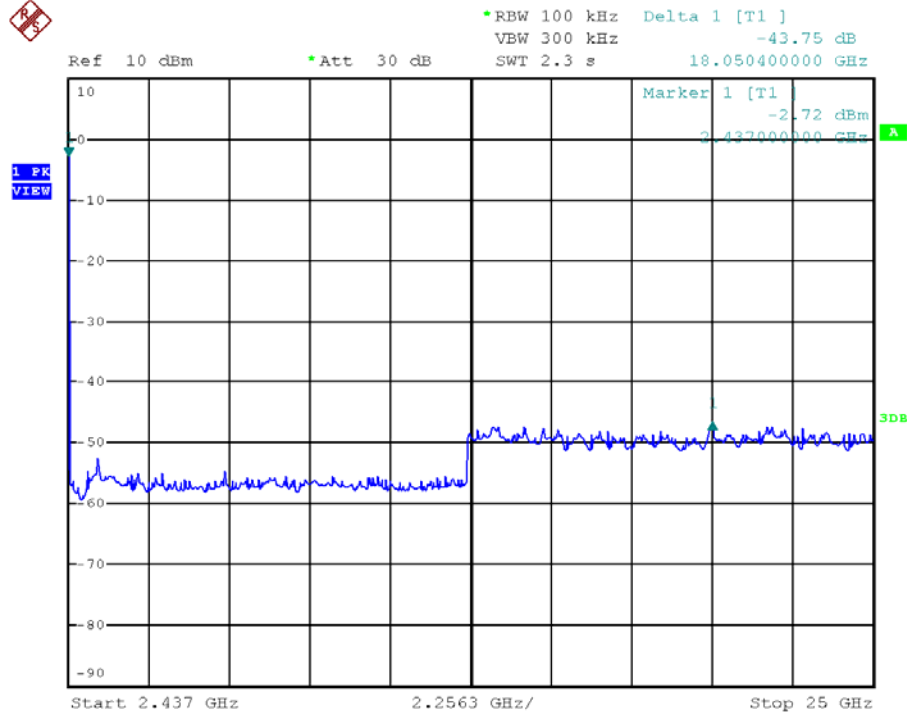


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Middle channel, Plot 1

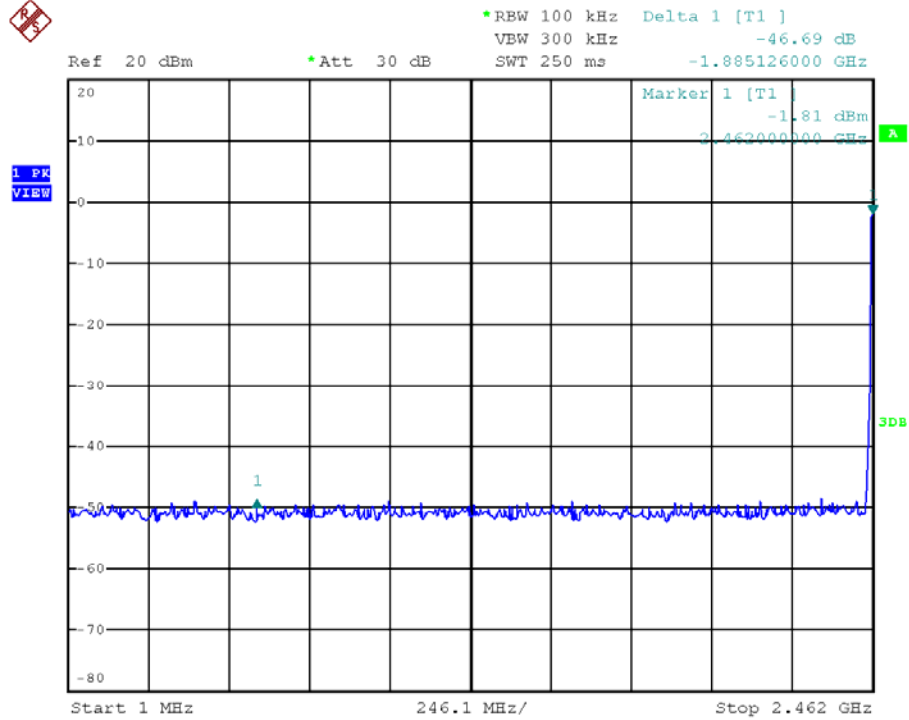


Middle channel, Plot 2

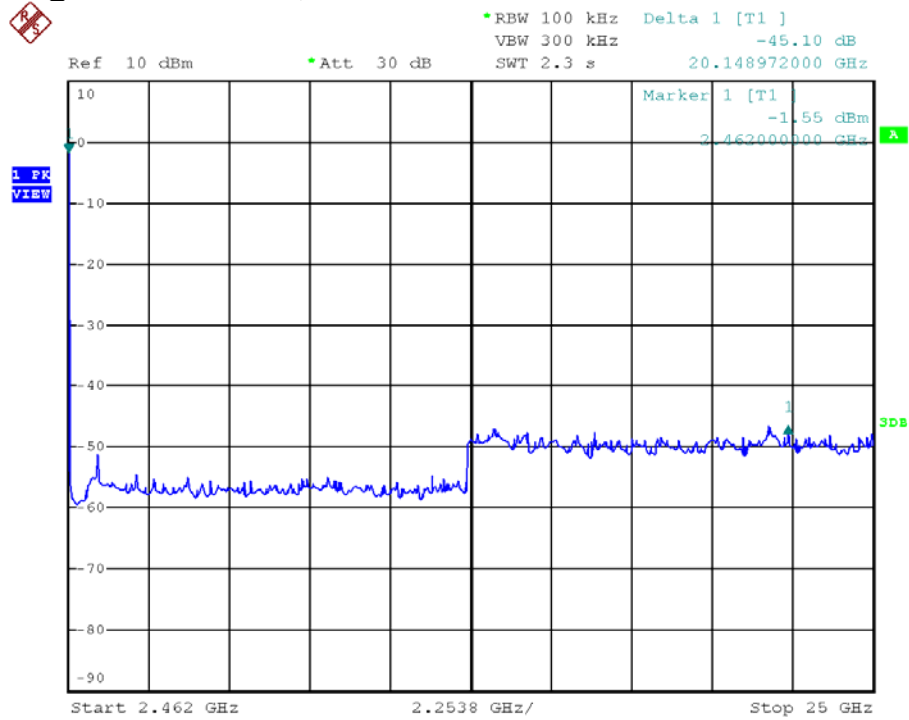


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Highest channel, Plot 1

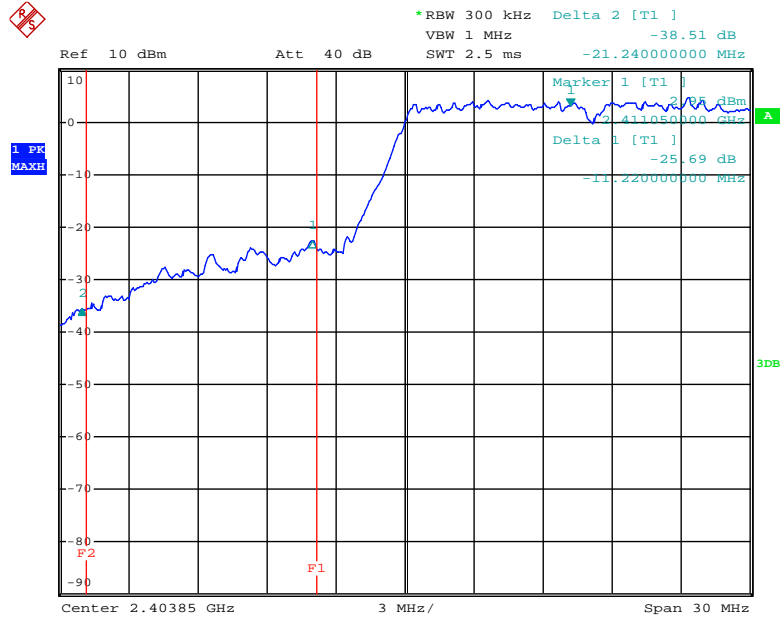


Highest channel, Plot 2



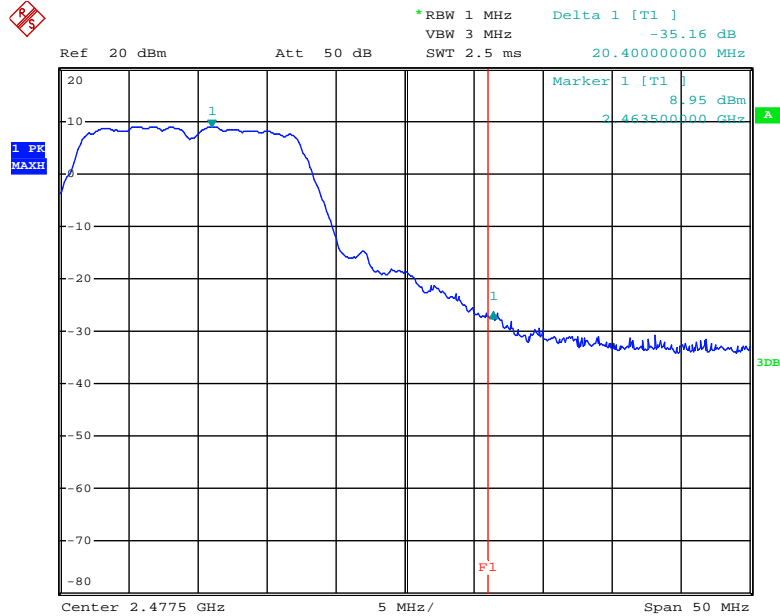
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Plots of bandedge Bandedge plot, Plot 1 Lowest channel



Date: 20.NOV.2012 15:10:31

Bandedge plot, Plot 2 Highest channel



Date: 20.NOV.2012 15:12:56

4.5 Field Strength Calculation

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

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

Where

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

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

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

Example

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

RA = 62.0 dB μ V
AF = 7.4 dB
CF = 1.6 dB*
AG = 29.0 dB
PD = 0.0 dB
AV = -10 dB

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

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

*The cable factor will be included in the reading during measurement, and it will not be shown on the following tables.

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4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

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4.6.1 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at

14622.000 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 1-4 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 2.2 dB margin

INTERTEK TESTING SERVICES

Mode: 802.11b (DSSS)
Lowest Channel

Table 1

Radiated Emission Data

Polari- zation	Frequency (MHz)	Reading (dBμV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	4824.000	45.1	33	34.9	47.0	0	47.0	54	-7.0
V	7236.000	42.2	33	37.9	47.1	0	47.1	54	-6.9
H	9648.000	41.8	33	40.4	49.2	0	49.2	54	-4.8
H	12060.000	42.9	33	40.5	50.4	0	50.4	54	-3.6
H	14472.000	44.4	33	40.0	51.4	0	51.4	54	-2.6

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)
V	4824.000	45.1	33	34.9	47.0	74	-27.0
V	7236.000	42.2	33	37.9	47.1	74	-26.9
H	9648.000	41.8	33	40.4	49.2	74	-24.8
H	12060.000	42.9	33	40.5	50.4	74	-23.6
H	14472.000	44.4	33	40.0	51.4	74	-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.

INTERTEK TESTING SERVICES

Mode: 802.11b (DSSS)
Middle Channel

Table 2

Radiated Emission Data

Polari- zation	Frequency (MHz)	Reading (dB μ V)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	4874.000	45.5	33	34.9	47.4	0	47.4	54	-6.6
V	7311.000	42.3	33	37.9	47.2	0	47.2	54	-6.8
H	9748.000	42	33	40.4	49.4	0	49.4	54	-4.6
H	12185.000	42.6	33	40.5	50.1	0	50.1	54	-3.9
H	14622.000	46.2	33	38.4	51.6	0	51.6	54	-2.4

Polari- zation	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	4874.000	45.5	33	34.9	47.4	74	-26.6
V	7311.000	42.3	33	37.9	47.2	74	-26.8
H	9748.000	42	33	40.4	49.4	74	-24.6
H	12185.000	42.6	33	40.5	50.1	74	-23.9
H	14622.000	46.2	33	38.4	51.6	74	-22.4

- 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.

INTERTEK TESTING SERVICES

Mode: 802.11b (DSSS)
Highest Channel

Table 3

Radiated Emission Data

Polari- zation	Frequency (MHz)	Reading (dBμV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	4924.000	45.9	33	34.9	47.8	0	47.8	54	-6.2
V	7386.000	42.6	33	37.9	47.5	0	47.5	54	-6.5
H	9848.000	42.2	33	40.4	49.6	0	49.6	54	-4.4
H	12310.000	43.3	33	40.5	50.8	0	50.8	54	-3.2
H	14772.000	45.7	33	38.4	51.1	0	51.1	54	-2.9

Polari- zation	Frequency (MHz)	Reading (dBμV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	4924.000	45.9	33	34.9	47.8	74	-26.2
V	7386.000	42.6	33	37.9	47.5	74	-26.5
H	9848.000	42.2	33	40.4	49.6	74	-24.4
H	12310.000	43.3	33	40.5	50.8	74	-23.2
H	14772.000	45.7	33	38.4	51.1	74	-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.

INTERTEK TESTING SERVICES

Bandedge emission

802.11b (DSSS)

Fundamental emission was measured for determining band-edge compliance of using delta measurement technique.

Emission frequency (MHz)	OATS radiated field strength at carrier frequency measured at 3 m (dB μ V/m)		Attenuation (dBc)	Calculated radiated field strength at the bandedge (dB μ V/m)	
	Peak	Average		Peak	Average
2483.5	95.4	93.0	-47.4	48.0	45.6

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

Mode: 802.11g (OFDM)

INTERTEK TESTING SERVICES

Lowest Channel

Table 4

Radiated Emission Data

Polari- zation	Frequency (MHz)	Reading (dBμV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	4824.000	46.5	33	34.9	48.4	0	48.4	54	-5.6
V	7236.000	42.2	33	37.9	47.1	0	47.1	54	-6.9
H	9648.000	42.2	33	40.4	49.6	0	49.6	54	-4.4
H	12060.000	42.9	33	40.5	50.4	0	50.4	54	-3.6
H	14472.000	44.7	33	40.0	51.7	0	51.7	54	-2.3

Polari- zation	Frequency (MHz)	Reading (dBμV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	4824.000	46.5	33	34.9	48.4	74	-25.6
V	7236.000	42.2	33	37.9	47.1	74	-26.9
H	9648.000	42.2	33	40.4	49.6	74	-24.4
H	12060.000	42.9	33	40.5	50.4	74	-23.6
H	14472.000	44.7	33	40.0	51.7	74	-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.

INTERTEK TESTING SERVICES

Mode: 802.11g (OFDM)
Middle Channel

Table 5

Radiated Emission Data

Polari- zation	Frequency (MHz)	Reading (dBµV)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	4874.000	46.1	33	34.9	48.0	0	48.0	54	-6.0
V	7311.000	42.1	33	37.9	47.0	0	47.0	54	-7.0
H	9748.000	42.4	33	40.4	49.8	0	49.8	54	-4.2
H	12185.000	42.6	33	40.5	50.1	0	50.1	54	-3.9
H	14622.000	46.4	33	38.4	51.8	0	51.8	54	-2.2

Polari- zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	4874.000	46.1	33	34.9	48.0	74	-26.0
V	7311.000	42.1	33	37.9	47.0	74	-27.0
H	9748.000	42.4	33	40.4	49.8	74	-24.2
H	12185.000	42.6	33	40.5	50.1	74	-23.9
H	14622.000	46.4	33	38.4	51.8	74	-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.

INTERTEK TESTING SERVICES

Mode: 802.11g (OFDM)
Highest Channel

Table 6

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	4924.000	46.2	33	34.9	48.1	0	48.1	54	-5.9
V	7386.000	42.4	33	37.9	47.3	0	47.3	54	-6.7
H	9848.000	42.1	33	40.4	49.5	0	49.5	54	-4.5
H	12310.000	43.1	33	40.5	50.6	0	50.6	54	-3.4
H	14772.000	46.0	33	38.4	51.4	0	51.4	54	-2.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	4924.000	46.2	33	34.9	48.1	74	-25.9
V	7386.000	42.4	33	37.9	47.3	74	-26.7
H	9848.000	42.1	33	40.4	49.5	74	-24.5
H	12310.000	43.1	33	40.5	50.6	74	-23.4
H	14772.000	46.0	33	38.4	51.4	74	-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.

INTERTEK TESTING SERVICES

Bandedge emission

802.11g (OFDM)

Fundamental emission was measured for determining band-edge compliance of using delta measurement technique.

Emission frequency (MHz)	OATS radiated field strength at carrier frequency measured at 3 m (dB μ V/m)		Attenuation (dBc)	Calculated radiated field strength at the bandedge (dB μ V/m)	
	Peak	Average		Peak	Average
2483.5	96.4	88.5	-35.16	61.24	53.34

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

INTERTEK TESTING SERVICES

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

370.5 KHz

The worst case line conducted configuration photographs are 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 14.07 dB margin compare with average limit

INTERTEK TESTING SERVICES

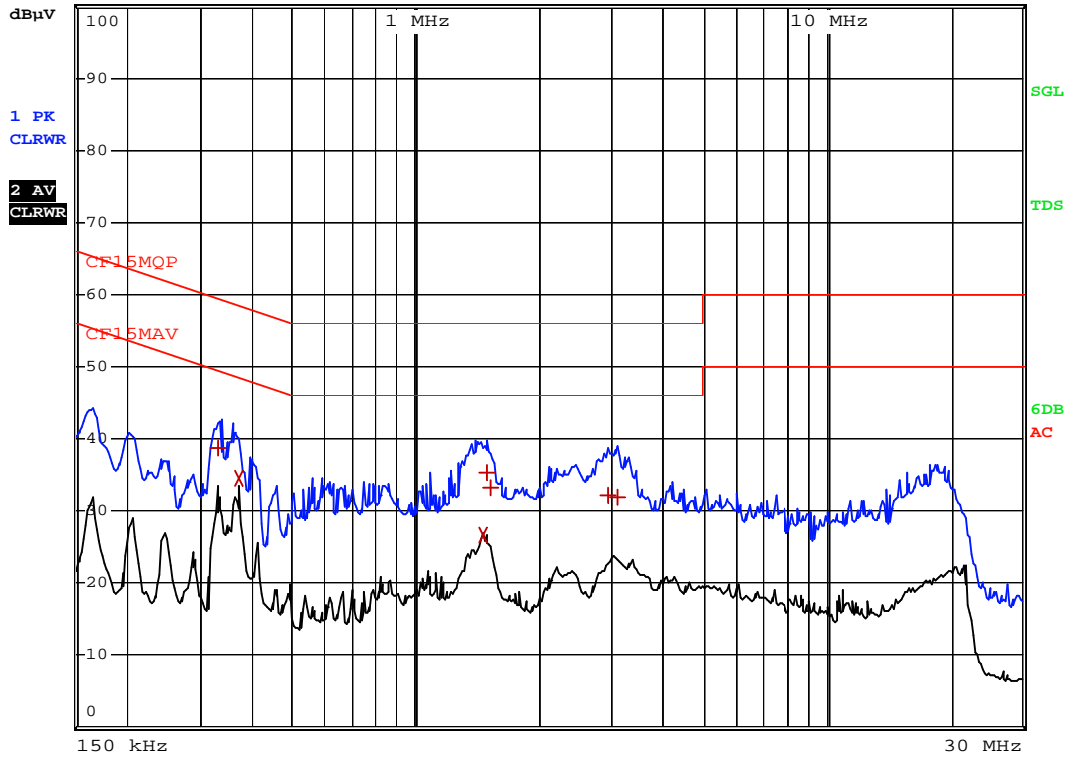
Worst Case: Transmitting



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



INTERTEK TESTING SERVICES

Worst Case: Transmitting

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dB μ V		DELTA LIMIT dB
1	Quasi Peak	334.5 kHz	38.74	L1	-20.59
2	CISPR Average	370.5 kHz	34.41	L1	-14.07
2	CISPR Average	1.455 MHz	26.59	N	-19.40
1	Quasi Peak	1.4865 MHz	35.17	N	-20.82
1	Quasi Peak	1.527 MHz	33.26	L1	-22.74
1	Quasi Peak	2.94 MHz	32.25	L1	-23.74
1	Quasi Peak	3.1155 MHz	31.98	L1	-24.01

INTERTEK TESTING SERVICES

4.8 Radio Frequency Radiation Exposure

EUT is subject to the radio frequency exposure requirements specified in FCC Rule §§ 1.1307. It shall be considered to operate in a “general population / uncontrolled” environment.

- Output power is less than the applicable low threshold from SAR evaluation. The evaluation calculation results are saved with filename: RF exposure info.pdf
- EUT was evaluated for Maximum Permissible Exposure (MPE) evaluation compliance according to OET Bulletin 65, Supplement C (Edition 01-01). The evaluation calculation results are saved with filename: RF exposure info.pdf
- EUT was evaluated for Specific Absorption Rate (SAR) evaluation compliance according to OET Bulletin 65, Supplement C (Edition 01-01). It is in compliance with the SAR evaluation requirements. A SAR test report was submitted at same time and saved as SAR Report.pdf

INTERTEK TESTING SERVICES

**EXHIBIT 5
EQUIPMENT LIST**

INTERTEK TESTING SERVICES

5.0 Equipment List

1) Radiated Emissions Test

Equipment	Biconical Antenna	Log Periodic Antenna	EMI Test Receiver
Registration No.	EW-2512	EW-0446	EW-2500
Manufacturer	EMCO	EMCO	ROHDESCHWARZ
Model No.	3104C	3146	ESCI
Calibration Date	Nov. 15, 2011	Oct. 31, 2011	Feb. 24, 2012
Calibration Due Date	May. 15, 2013	Apr. 30, 2013	Feb. 24, 2013

Equipment	14m Double Shield RF Cable	14m Double Shield RF Cable	Spectrum Analyzer 40GHz
Registration No.	EW-2528	EW-2074	EW-2253
Manufacturer	RADIALL	RADIALL	R&S
Model No.	nm / br5d / sma 14m	N(m)-RG142-BNC(m) L= 14M	FSP40
Calibration Date	Nov. 29, 2011	Jan. 13, 2012	Jan. 12, 2012
Calibration Due Date	Nov 29, 2012	Jan. 14, 2013	Jan. 12, 2013

Equipment	Double Ridged Guide Antenna	Active Loop H-Field	12m Double Shield RF Cable
Registration No.	EW-1015	EW-2313	EW-2274
Manufacturer	EMCO	ELECTROMETRI	GREATBILLION
Model No.	3115	EM-6876	SMA m-m ra 12m 40G outdoor
Calibration Date	Aug. 24, 2011	Oct 14, 2011	Jan 12, 2012
Calibration Due Date	Feb. 24, 2013	Apr 14, 2013	Jan 12, 2013

Equipment	Pre-Amplifier
Registration No.	EW-2354
Manufacturer	MITEQ
Model No.	12002600-30-10P
Calibration Date	Aug 22, 2012
Calibration Due Date	Aug 22, 2013

INTERTEK TESTING SERVICES

2) Conducted Emissions Test

Equipment	EMI Test Receiver (9kHz to 7GHz)	Artificial Mains	Pulse Limiter
Registration No.	EW-2666	EW-0192	EW-0698
Manufacturer	ROHDESCHWARZ	ROHDESCHWARZ	R&S
Model No.	ESC17	ESH3-Z5	ESH3-Z2
Calibration Date	May. 21, 2012	Apr. 11, 2012	Apr. 06, 2012
Calibration Due Date	May. 21, 2013	Apr. 11, 2013	Apr. 06, 2013

3) Conductive Measurement Test

Equipment	Spectrum Analyzer 40GHz
Registration No.	EW-2253
Manufacturer	R&S
Model No.	FSP40
Calibration Date	Jan. 12, 2012
Calibration Due Date	Jan. 12, 2013