EMC Test Report

Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7

FCC Part 15 Subpart C

Model: W2SW0001

IC CERTIFICATION #:	7980A-22553
FCC ID:	VSF22553
APPLICANT:	Juniper Systems, Inc. 1132 West 1700 North Logan, UT 84321
TEST SITE(S):	Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-5
REPORT DATE:	September 13, 2010
FINAL TEST DATES:	July 13 and 14, 2010

AUTHORIZED SIGNATORY:

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Elliott Laboratories

Testing Cert #2016.01

REVISION HISTORY

Rev#	Date	Comments	Modified By
	09-13-2010	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Juniper Systems, Inc. model W2SW0001, pursuant to the following rules:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003
FCC DTS Measurement Procedure KDB558074, March 2005

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Juniper Systems, Inc. model W2SW0001 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Juniper Systems, Inc. model W2SW0001 and therefore apply only to the tested sample. The sample was selected and prepared by Kent Campbell of Juniper Systems, Inc..

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.247(a)	RSS 210 A8.2	Digital Modulation	Not evaluated, the proposed changes to the radio module (new antenna type and host-specific portable rf exposure conditions) do not affect the modulation, signal bandwidth, output power or spurious emissions at the antenna port. The field strength of the fundamental signal was measured to verify that the expected field strength, based on the module's output power rating, was within 3dB of the expected value based on the original testing performed on the module with a 3dBi antenna.		
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth			
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)			
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density			
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz			
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	48.0dBµV/m @ 2389.9MHz	15.207 in restricted bands, all others <-30dBc Note 1	Complies (6.0dB)
Note 1: Limit of -30dBc used because the rated power was measured using the UNII test procedure (maximum power averaged over a transmission burst) during the original device certification tests.					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Not evaluated – proposed changes do not affect the rf connector as previously described in the original filings for the module.		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	37.8dBµV/m @ 4838.3MHz	Refer to page 17	Complies (16.2dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	Not measured – proposed changes do not affect the values previously measured. Note that the host system is subject to the Class B digital device limits for spurious emissions on the AC power port of the AC adapter.		
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR report and RSS 102 declaration	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Refer to host system manual	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	N/A - for this specific host system antenna is integral	Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	From original certification documents:	Information only	N/A

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Juniper Systems, Inc. model W2SW0001 is an 802.11bg wireless module. Testing covered by the scope of this test report was performed to evaluate the module in a specific host system, the Juniper Systems' MESA hand-held PDT. As the module has been approved under the FCC's and Industry Canada's modular approval system, and as no changes other than the addition of a new antenna type for use in the specific host system configuration detailed in the application documents associated with this report, testing was limited to an evaluation of the radiated spurious emissions.

The sample was received on July 12, 2010 and tested on July 13 and 14, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Juniper Systems	W2SW0001	802.11bg Module (Wi-Fi)	none	VSF22553

ANTENNA SYSTEM

The antenna system evaluated for the combination of W2SW0001 module in the Juniper Systems' handheld PDT model MESA was the Tyco Electronics part number 1513349-1. This antenna has a gain of 0dBi in the 2400-2483.5MHz band and is integrated into the host device.

ENCLOSURE

The host system enclosure is constructed of a magnesium alloy case-front and molded plastic case-back. It measures approximately 13 cm wide by 22 cm deep by 5 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

Company	Model	Description	Serial Number	FCC ID
Juniper Systems	MESA	Hand-held PDT	none	N/A

EUT INTERFACE PORTS

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Handheld DC Power In	AC/DC Adapter	Multiconductor	Unshielded (w/molded Ferrite)	1.5m
AC/DC Adapter AC In	AC Mains	-	-	-

EUT OPERATION

During testing the module was exercised under control of the hand held system test utility. The module was operating in a continuous transmit mode on the top, bottom and center channels at maximum power level. Additional testing was performed with the module in a receive-only mode, tuned to the center channel.

All testing was limited to the frequency range above 1GHz as emissions below 1GHz were considered to be host dependent and will be subject to the appropriate limits for a digital device.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 5	211948	2845B-5	41039 Boyce Road Fremont, CA 94538-2435

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

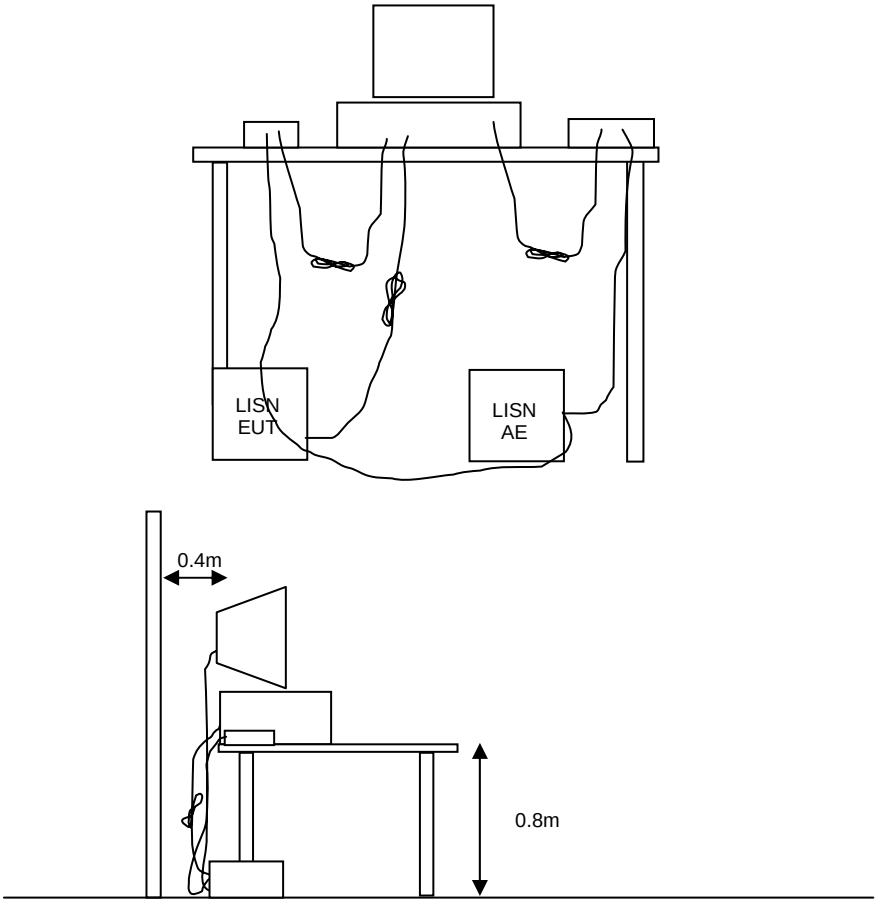
TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.



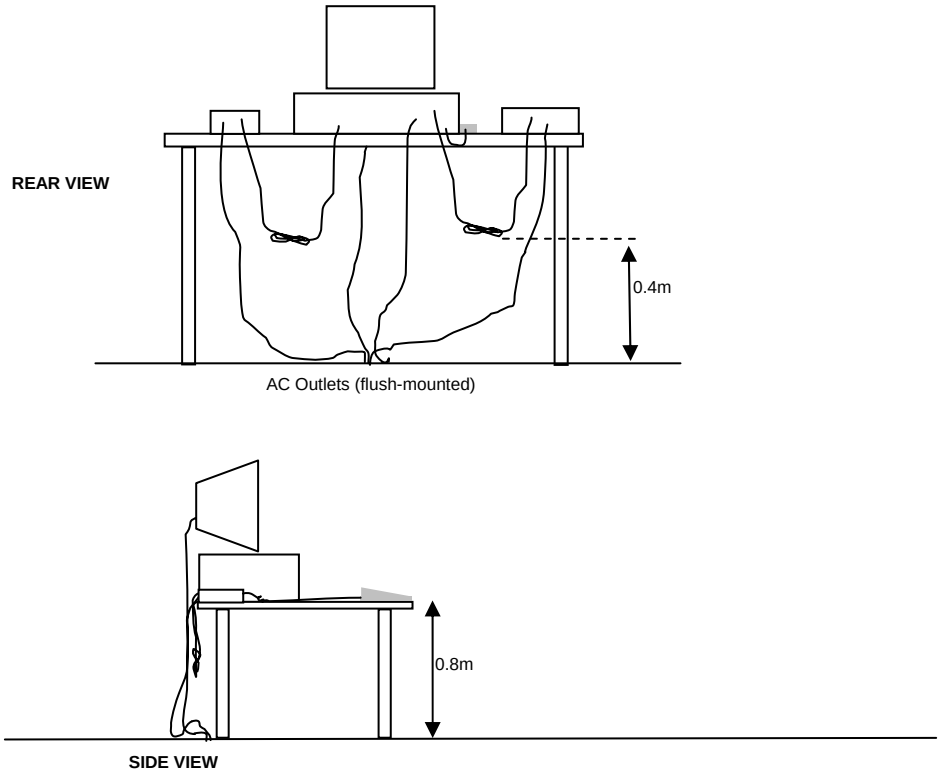
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

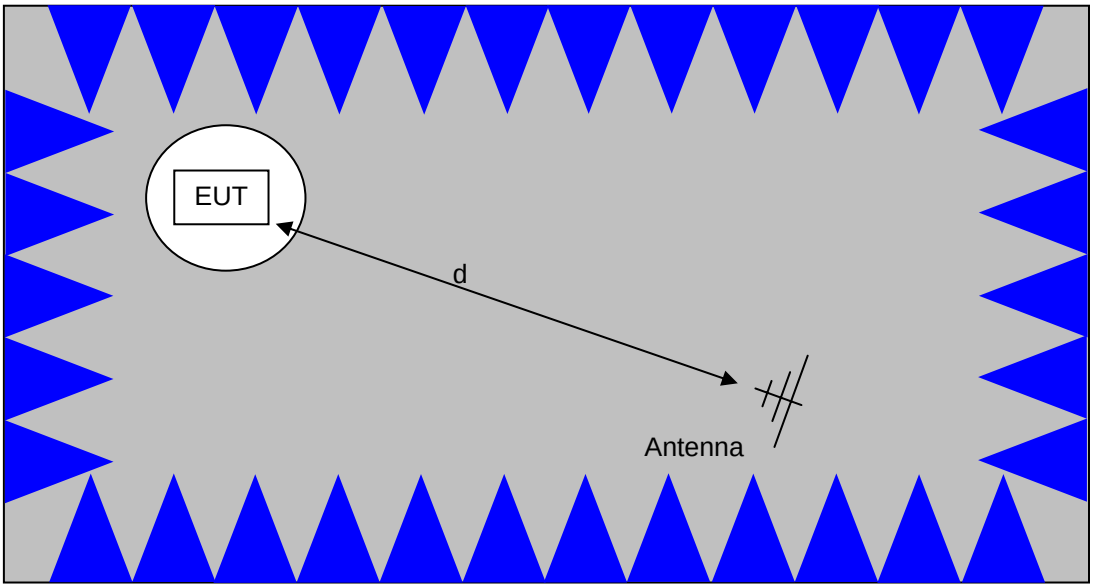
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

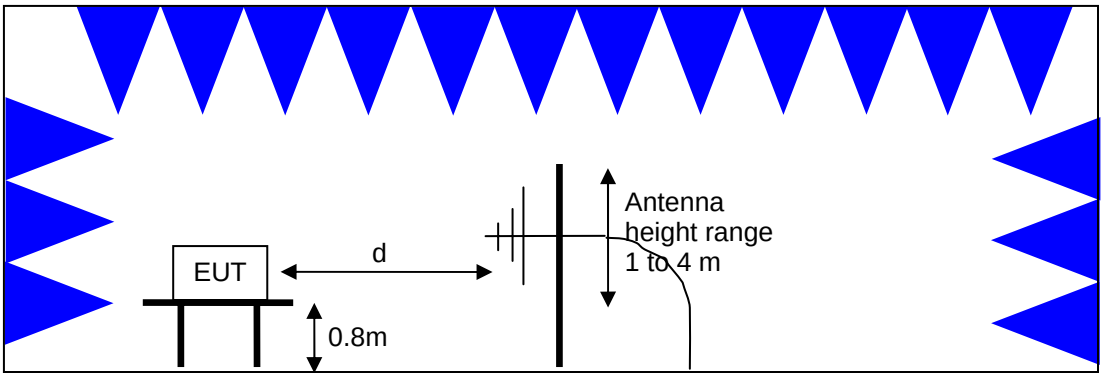


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

[1] The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \text{ microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

Radiated Emissions, 1000 - 18,000 MHz, 13 and 14 July, 2010

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	8/19/2010
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	7/15/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010
Hewlett Packard	Head (Inc W1-W4, 1946, 1947) Purple	84125C	1772	5/6/2011
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	5/7/2011

Appendix B Test Data

T79928 14 Pages

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell	Project Engineer:	Mark Briggs
Emissions Standard(s):	FCC 15.247 / RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Juniper Systems

Model

W2SW0001 in Mesa

Date of Last Test: 7/15/2010

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT was installed in the host system and placed on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Expected FS	Measured FS	Test Performed	Limit	Result / Margin
Spurious emissions at the band edges Expected FS is the target field strength in dBuV/m, measured in a 1MHz bandwidth, for the fundamental (average) based on the original testing performed on the module with a 3dBi antenna.							
1	802.11b	2412 MHz	100.0	102	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	47.2dBµV/m @ 2387.0MHz (-6.8dB)
		2462 MHz	100.0	101	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	48.0dBµV/m @ 2486.4MHz (-6.0dB)
2	802.11g	2412 MHz	96.0	93.5	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	48.0dBµV/m @ 2389.9MHz (-6.0dB)
		2462 MHz	95.0	94.0	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	47.9dBµV/m @ 2483.5MHz (-6.1dB)
Spurious emissions away from the band edges The original testing on the module indicated no significant differences between the emissions levels for 802.11b and 802.11g modes. Initial measurements made on the center channel in both modes to determine the worst case mode in this host system and additional measurements made on that mode on the top and bottom channels							
3a	802.11b	2437MHz	-	102	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.2dBµV/m @ 4874.0MHz (-7.8dB)
3b	802.11g	2437MHz	-	94	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	35.4dBµV/m @ 7306.7MHz (-18.6dB)
3c	802.11b	2412 MHz	100	102	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.9dBµV/m @ 4824.1MHz (-7.1dB)
3d	802.11b	2462 MHz	100	101	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	44.7dBµV/m @ 4924.0MHz (-9.3dB)

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Ambient Conditions:

Temperature:	20.7 °C
Rel. Humidity:	41 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #1: Radiated Emissions at the Band Edges - 802.11b

Date of Test: 7/13/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

Run #1a: 802.11b, 2412MHz

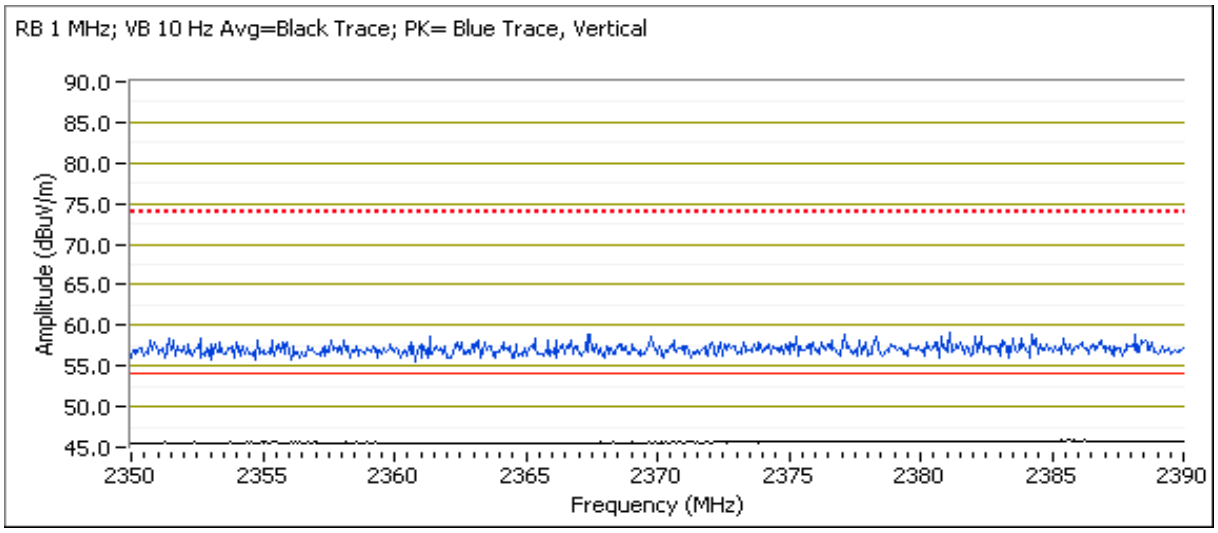
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

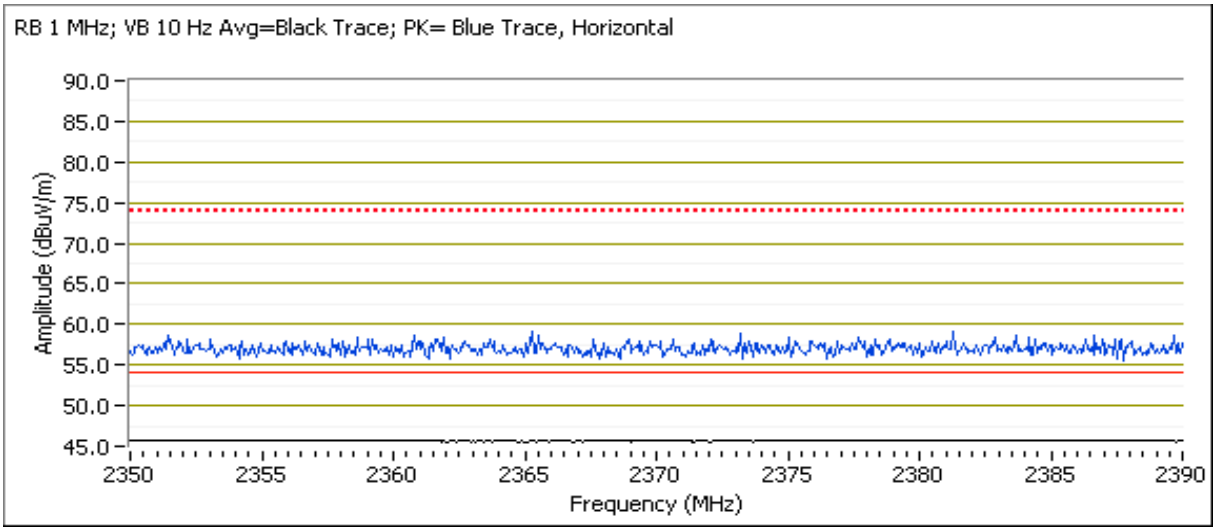
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Flat								
2411.370	102.2	V	-	-	AVG	224	1.0	
2411.230	105.3	V	-	-	PK	224	1.0	
2411.500	99.6	V	-	-	PK	224	1.0	RB 100 kHz; VB: 100 kHz
2411.400	98.7	H	-	-	AVG	285	1.0	
2411.270	101.8	H	-	-	PK	285	1.0	
EUT Upright								
2411.400	98.3	V	-	-	AVG	219	1.0	
2413.170	101.3	V	-	-	PK	219	1.0	
2412.900	100.9	H	-	-	AVG	187	1.0	
2411.230	103.9	H	-	-	PK	187	1.0	
2412.870	98.3	H	-	-	PK	187	1.0	RB 100 kHz; VB: 100 kHz
EUT Side								
2411.400	99.7	V	-	-	AVG	72	1.0	
2411.270	102.9	V	-	-	PK	72	1.0	
2412.870	96.9	V	-	-	PK	72	1.0	RB 100 kHz; VB: 100 kHz
2411.370	97.4	H	-	-	AVG	99	1.2	
2411.230	100.5	H	-	-	PK	99	1.2	

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2387.000	47.2	V	54.0	-6.8	AVG	223	1.0	
2387.520	58.2	V	74.0	-15.8	PK	223	1.0	
2387.040	47.1	H	54.0	-6.9	AVG	232	1.0	
2387.040	58.6	H	74.0	-15.4	PK	232	1.0	

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A





Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

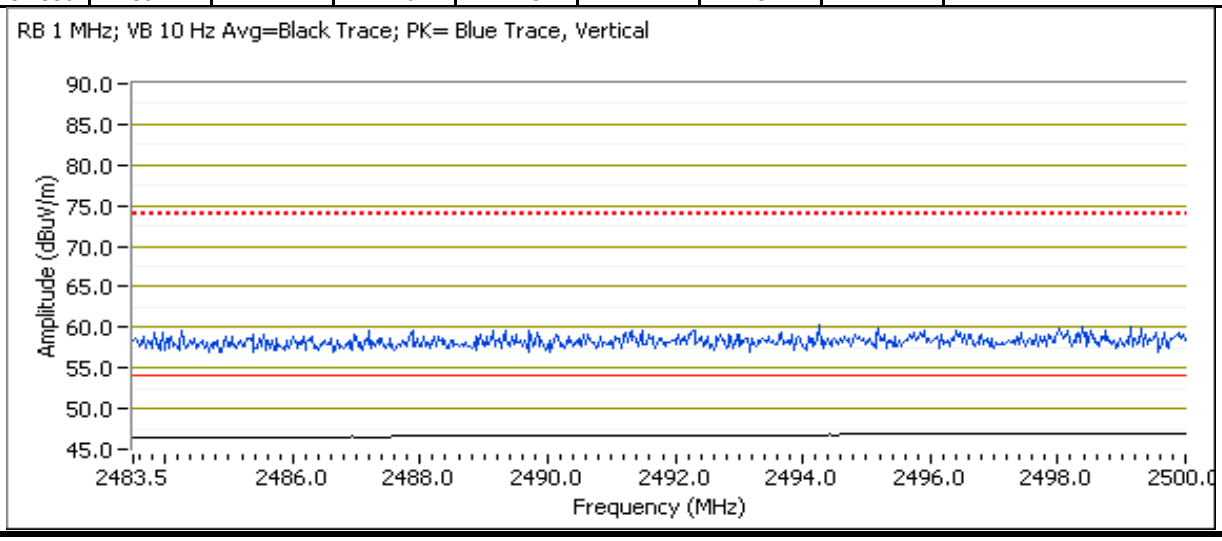
Run #1b: 802.11b, 2462MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Flat								
2462.900	100.6	V	120.0	-19.4	AVG	223	1.0	
2463.200	103.7	V	120.0	-16.3	PK	223	1.0	
2462.870	97.9	V	120.0	-22.1	PK	223	1.0	RB 100 kHz; VB: 100 kHz
2460.400	97.6	H	120.0	-22.4	AVG	226	1.2	
2461.200	100.5	H	120.0	-19.5	PK	226	1.2	
EUT Upright								
2463.900	96.8	V	120.0	-23.2	AVG	188	1.0	
2463.130	99.6	V	120.0	-20.4	PK	188	1.0	
2463.900	96.5	H	120.0	-23.5	AVG	175	1.2	
2463.200	99.4	H	120.0	-20.6	PK	175	1.2	
EUT Side								
2462.750	98.8	V	120.0	-21.2	AVG	95	1.3	
2462.940	101.9	V	120.0	-18.1	PK	95	1.3	
2461.370	97.2	H	120.0	-22.8	AVG	112	1.4	
2461.230	100.2	H	120.0	-19.8	PK	112	1.4	

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2486.370	48.0	V	54.0	-6.0	AVG	217	1.0	
2484.150	59.3	V	74.0	-14.7	PK	217	1.0	
2486.270	47.7	H	54.0	-6.3	AVG	137	1.2	
2484.330	59.2	H	74.0	-14.8	PK	137	1.2	



Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #2: Radiated Emissions at the Band Edges - 802.11g

Date of Test: 7/13/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

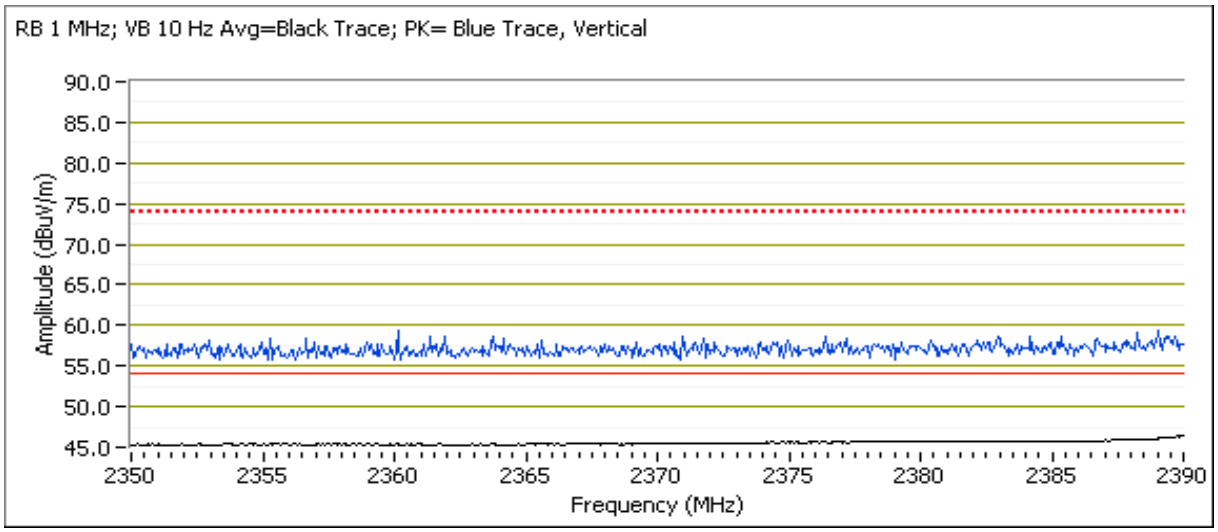
Run #2a: 802.11g, 2412MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Flat (worst case from Run #1)								
2417.170	93.5	V	120.0	-26.5	AVG	220	1.0	
2416.270	101.8	V	120.0	-18.2	PK	220	1.0	
2414.070	91.9	V	120.0	-28.1	PK	220	1.0	RB 100 kHz; VB: 100 kHz
2417.200	91.9	H	120.0	-28.1	AVG	139	1.2	
2416.370	100.1	H	120.0	-19.9	PK	139	1.2	

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.930	48.0	V	54.0	-6.0	AVG	221	1.0	
2389.200	60.6	V	74.0	-13.4	PK	221	1.0	
2389.900	47.7	H	54.0	-6.3	AVG	134	1.0	
2389.730	60.6	H	74.0	-13.4	PK	134	1.0	



Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

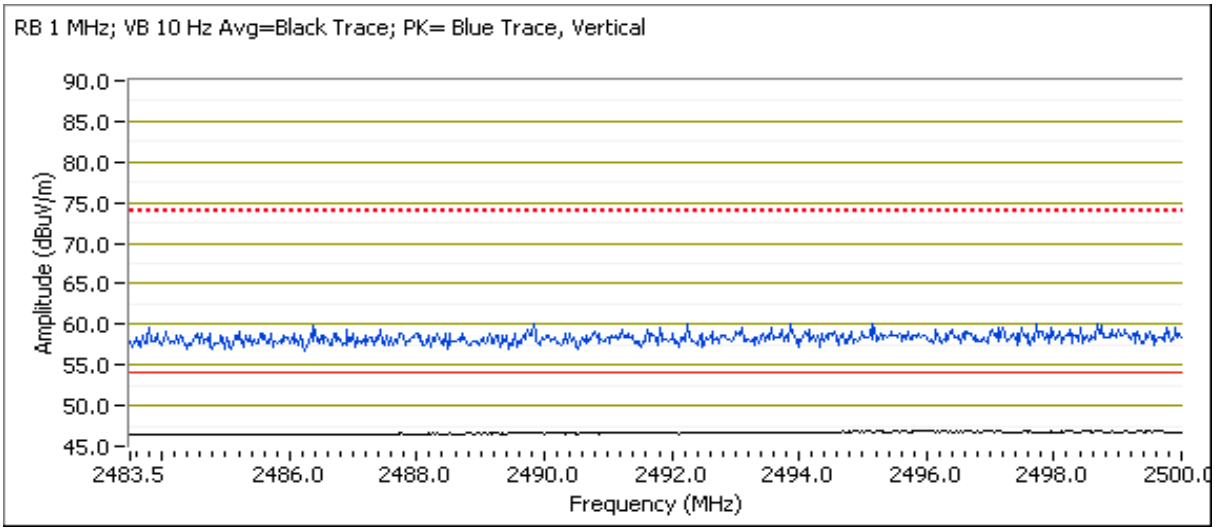
Run #2b: 802.11g, 2462MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Flat (worst case from Run #1)								
2468.370	94.2	V	120.0	-25.8	AVG	222	1.0	
2466.370	101.8	V	120.0	-18.2	PK	222	1.0	
2458.370	92.3	V	120.0	-27.7	PK	222	1.0	RB 100 kHz; VB: 100 kHz
2455.200	88.9	H	120.0	-31.1	AVG	237	1.0	
2458.070	96.7	H	120.0	-23.3	PK	237	1.0	

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	47.9	V	54.0	-6.1	AVG	221	1.0	
2485.980	59.1	V	74.0	-14.9	PK	221	1.0	
2483.500	47.6	H	54.0	-6.4	AVG	138	1.2	
2485.050	59.0	H	74.0	-15.0	PK	138	1.2	



Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #3: Radiated Spurious Emissions, 1000 - 26,000 MHz

Date of Test: 7/13/2010

Test Engineer: Rafael Varelas

Test Location: FT Chamber #5

Run #3a: 802.11b, 2437MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2437.900	102.1	V	120.0	-17.9	AVG	215	1.0	
2438.100	105.2	V	120.0	-14.8	PK	215	1.0	
2436.500	99.3	V	120.0	-20.7	PK	215	1.0	RB 100 kHz; VB: 100 kHz
2437.870	96.9	H	120.0	-23.1	PK	138	1.2	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	99.3	dBµV/m	
Limit for emissions outside of restricted bands:	69.3	dBµV/m	Limit is -30dBc (UNII power measurement)

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	(EUT Orientation)
4874.000	46.2	V	54.0	-7.8	AVG	271	1.0	EUT Flat
4874.000	45.5	H	54.0	-8.5	AVG	244	1.2	EUT Upright
4874.000	43.8	V	54.0	-10.2	AVG	108	1.0	EUT Side
4874.010	43.8	H	54.0	-10.2	AVG	235	1.0	EUT Flat
4873.980	43.1	V	54.0	-10.9	AVG	105	1.2	EUT Upright
4874.000	42.7	H	54.0	-11.3	AVG	109	1.0	EUT Side
7310.100	37.8	V	54.0	-16.2	AVG	86	1.1	EUT Flat
7310.270	37.4	V	54.0	-16.6	AVG	207	1.0	EUT Upright
7310.200	37.1	V	54.0	-16.9	AVG	60	1.0	EUT Side
7310.300	37.1	H	54.0	-16.9	AVG	81	1.0	EUT Upright
7307.600	36.3	H	54.0	-17.7	AVG	212	1.0	EUT Flat
7306.630	36.2	H	54.0	-17.8	AVG	61	1.3	EUT Side
4874.040	49.7	H	74.0	-24.3	PK	244	1.2	EUT Upright
4873.970	49.6	V	74.0	-24.4	PK	271	1.0	EUT Flat
7308.870	49.6	H	74.0	-24.4	PK	61	1.3	EUT Side
4873.990	49.0	H	74.0	-25.0	PK	235	1.0	EUT Flat
7310.870	48.5	V	74.0	-25.5	PK	86	1.1	EUT Flat
4874.050	48.4	V	74.0	-25.6	PK	108	1.0	EUT Side
7315.230	48.3	V	74.0	-25.7	PK	207	1.0	EUT Upright
7309.600	48.0	H	74.0	-26.0	PK	81	1.0	EUT Upright
7312.270	48.0	V	74.0	-26.0	PK	60	1.0	EUT Side
4873.960	47.9	V	74.0	-26.1	PK	105	1.2	EUT Upright
4873.980	47.7	H	74.0	-26.3	PK	109	1.0	EUT Side
7308.600	47.4	H	74.0	-26.6	PK	212	1.0	EUT Flat

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #3b: 802.11g, 2437MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2442.100	94.2	V	120.0	-25.8	AVG	214	1.0	
2430.530	102.5	V	120.0	-17.5	PK	214	1.0	
2435.030	92.0	V	120.0	-28.0	PK	214	1.0	RB 100 kHz; VB: 100 kHz
2431.500	90.6	H	120.0	-29.4	PK	137	1.2	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	92	dBµV/m	
Limit for emissions outside of restricted bands:	62	dBµV/m	Limit is -30dBc (UNII power measurement)

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7304.900	35.4	V	54.0	-18.6	AVG	229	1.0	EUT Side
7306.700	35.4	H	54.0	-18.6	AVG	35	1.0	EUT Flat
7301.070	35.3	V	54.0	-18.7	AVG	351	1.0	EUT Flat
7303.770	35.3	V	54.0	-18.7	AVG	276	1.0	EUT Upright
7303.930	35.3	H	54.0	-18.7	AVG	348	1.6	EUT Side
7303.800	35.2	H	54.0	-18.8	AVG	273	1.3	EUT Upright
4874.200	33.1	V	54.0	-20.9	AVG	251	1.0	EUT Flat
4875.870	32.0	H	54.0	-22.0	AVG	237	1.0	EUT Flat
4876.130	32.0	H	54.0	-22.0	AVG	56	1.0	EUT Side
4875.870	31.8	H	54.0	-22.2	AVG	253	1.3	EUT Upright
4876.330	31.8	V	54.0	-22.2	AVG	216	1.0	EUT Upright
4878.170	31.7	V	54.0	-22.3	AVG	86	1.0	EUT Side
7312.000	47.7	V	74.0	-26.3	PK	351	1.0	EUT Flat
7303.700	47.3	H	74.0	-26.7	PK	35	1.0	EUT Flat
7314.770	47.2	H	74.0	-26.8	PK	273	1.3	EUT Upright
7319.530	46.6	V	74.0	-27.4	PK	276	1.0	EUT Upright
7310.270	46.5	V	74.0	-27.5	PK	229	1.0	EUT Side
7305.730	46.4	H	74.0	-27.6	PK	348	1.6	EUT Side
4871.930	45.4	V	74.0	-28.6	PK	251	1.0	EUT Flat
4877.200	44.1	H	74.0	-29.9	PK	253	1.3	EUT Upright
4879.170	44.0	H	74.0	-30.0	PK	237	1.0	EUT Flat
4877.500	43.4	H	74.0	-30.6	PK	56	1.0	EUT Side
4868.000	43.3	V	74.0	-30.7	PK	216	1.0	EUT Upright
4883.800	43.2	V	74.0	-30.8	PK	86	1.0	EUT Side

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Scans from 18GHz - 26GHz showed no signficant signals from the system.

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	N/A

Run #3c: 802.11b (worst case from runs 3a and 3b), 2412MHz

Fundamental emission level @ 3m in 100kHz RBW:	99.6	dBµV/m	
Limit for emissions outside of restricted bands:	69.6	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions (EUT in flat orientation - worst case for both 2nd and 3rd harmonics from Run 3a)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.100	46.9	V	54.0	-7.1	AVG	246	1.0	
4824.130	50.8	V	74.0	-23.2	PK	246	1.0	
4824.070	43.9	H	54.0	-10.1	AVG	246	1.0	
4823.920	48.0	H	74.0	-26.0	PK	246	1.0	
7237.220	47.6	V	69.6	-22.0	PK	82	1.2	RB 100 kHz; VB: 100 kHz
7236.580	46.7	H	69.6	-22.9	PK	248	1.1	RB 100 kHz; VB: 100 kHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Run #3d: 802.11b (worst case from runs 3a and 3b), 2462MHz

Fundamental emission level @ 3m in 100kHz RBW:	97.9	dBµV/m	
Limit for emissions outside of restricted bands:	67.9	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions (EUT in flat orientation - worst case for both 2nd and 3rd harmonics from Run 3a)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.030	44.7	V	54.0	-9.3	AVG	264	1.0	
4923.950	48.6	V	74.0	-25.4	PK	264	1.0	
4924.030	41.8	H	54.0	-12.2	AVG	232	1.1	
4924.080	47.2	H	74.0	-26.8	PK	232	1.1	
7386.930	37.3	V	54.0	-16.7	AVG	88	1.4	
7386.770	48.6	V	74.0	-25.4	PK	88	1.4	
7384.800	36.0	H	54.0	-18.0	AVG	157	1.0	
7382.970	47.5	H	74.0	-26.5	PK	157	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	-

Radiated Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 7/14/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 42 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1-2	Radiated Emissions 1 GHz - 8 GHz Maximized	RSS-210	Pass	37.8dBµV/m @ 4838.3MHz (-16.2dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	-

Run #1: Rx Radiated Emissions, 1000 - 8,000 MHz

Date of Test: 7/14/2010

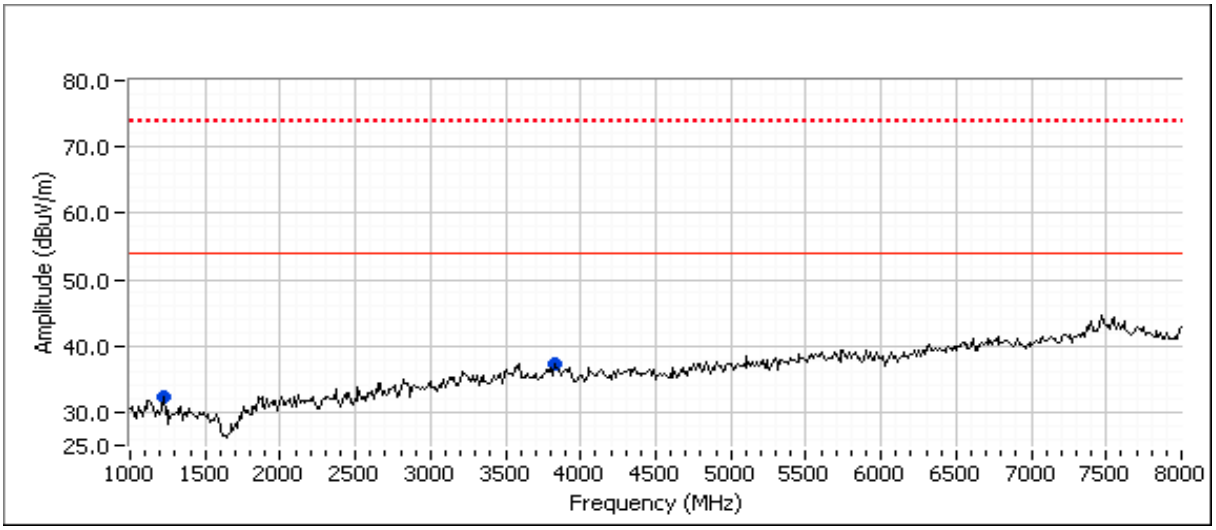
Test Engineer: Rafael Varelas

Test Location: FT Chamber #5

802.11b, 2437MHz

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1221.670	32.4	V	54.0	-21.6	Peak	263	1.0	
3823.330	37.4	V	54.0	-16.6	Peak	356	1.6	

Note 1:	Above 1 GHz, the limit is based on an average measurement. In addition, the peak reading of any emission above 1 GHz can not exceed the average limit by more than 20 dB.



Client:	Juniper Systems	Job Number:	J79764
Model:	W2SW0001 in Mesa	T-Log Number:	T79928
		Account Manager:	Christine Krebill
Contact:	Kent Campbell		
Standard:	FCC 15.247 / RSS 210	Class:	-

Run #2: Rx Radiated Emissions, 1000 - 8,000 MHz

Date of Test: 7/14/2010

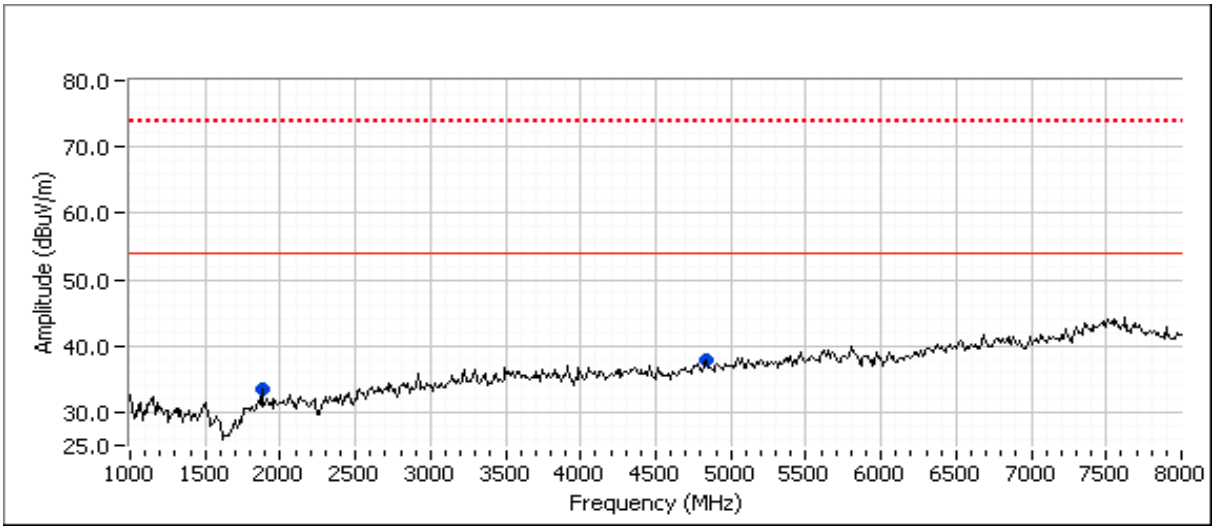
Test Engineer: Rafael Varelas

Test Location: FT Chamber #5

802.11g, 2437MHz

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4838.330	37.8	V	54.0	-16.2	Peak	317	1.9	
1875.000	33.5	H	54.0	-20.5	Peak	192	1.6	

Note 1: Above 1 GHz, the limit is based on an average measurement. In addition, the peak reading of any emission above 1 GHz can not exceed the average limit by more than 20 dB.



Appendix C Test Configuration Photographs

Test configuration photographs will be provided as a separate document.