

EMC Test Report

Application for Permissive Change/Re-assessment

Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8 FCC Part 15 Subpart C

Model: WS-AP3710e

FCC ID: QQD10E
IC CERTIFICATION #: 5248S-10E

APPLICANT: Flextronics
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IC SITE REGISTRATION #: 2845B-4, 2845B-5, 2845B-7

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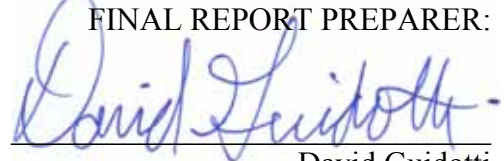
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	05-06-2013	Initial release	

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SCOPE

An electromagnetic emissions test has been performed on the Flextronics model WS-AP3710e, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3

RSS 210 Issue 8 “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 National Technical Systems - Silicon Valley test procedures:

ANSI C63.4:2003

FCC DTS Measurement Procedure, KDB 558074

FCC KDB 662911 “Emissions Testing of Transmitters with Multiple Outputs in the Same Band”

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 Flextronics model WS-AP3710e complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3

RSS 210 Issue 8 "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 Flextronics model WS-AP3710e and therefore apply only to the tested sample. The sample was selected and prepared by Georges Fares of Flextronics.

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
15.247(a)	RSS 210 A8.2	Digital Modulation	System uses 802.11b/g/n techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (a)	Min. 6dB Bandwidth	No change from original filing		-
15.247 (b) (3)	RSS 210 A8.4 (4)	Output Power (multipoint systems)	b: 22.7 dBm g: 22.8 dBm n20: 22.1 dBm n40: 22.4 dBm EIRP = 2.538 W ^{Note 1}	1Watt, EIRP limited to 4 Watts.	Complies, all less than original powers
15.247(d)	RSS 210 A8.2 (b)	Power Spectral Density	Output powers all below levels form original filing		-
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	Output powers all below levels form original filing		-
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.8 dBμV/m @ 2384.5 MHz (-0.2 dB)	15.207 in restricted bands, all others > 30dBc ^{Note 2}	Complies
Note 1: EIRP calculated using antenna gain of 11.3 dBi (three 6.5 dBi antennas) for the highest EIRP system. Note 2: A limit of -30dBc was used when the maximum conducted output power was measured and a limit of -20dBc was used when maximum peak conducted output power was measured.					

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	System uses 802.11a/n techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (a)	Min. 6dB Bandwidth	No change from original filing		-
15.247 (b)	RSS 210 A8.4 (4)	Output Power (multipoint systems)	a: 21.6 dBm n20: 21.7 dBm n40: 23.9 dBm EIRP = 1.524 W ^{Note 1}	1 Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (b)	Power Spectral Density	Output powers all below levels form original filing		-
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	Output powers all below levels form original filing		-
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	53.6 dBμV/m @ 5480.0 MHz (-0.4 dB)	15.207 in restricted bands, all others > 30dBc ^{Note 2}	Complies
Note 1: EIRP calculated using antenna gain of 10.3 dBi (three 5.5 dBi antennas) for the highest EIRP system.					
Note 2: A limit of -30dBc was used when the maximum conducted output power was measured and a limit of -20dBc was used when maximum peak conducted output power was measured.					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	No change from original filing		-
15.207	RSS GEN Table 2	AC Conducted Emissions	No change from original filing		-
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Output powers all below levels form original filing		-
-	RSP 100 RSS GEN 7.1.5	User Manual	No change from original filing		-
-	RSP 100 RSS GEN 7.1.5	User Manual	No change from original filing		-
-	RSP 100 RSS GEN 4.4.1	Max. 99% Bandwidth	No change from original filing		-

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)	dB μ V/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dB μ V	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Flextronics model WS-AP3710e is a multiple radio access point, each radio operating in 3x3 MIMO and legacy modes. It incorporates both a 2.4 GHz band 802.11b/g/n and a 5.2 GHz band and 5.8 GHz band 802.11a/n radio in a single enclosure. Since the EUT could be placed in any position during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 48 Volts DC, 0.8 Amps.

The sample was received on April 11, 2013 and tested on April 11, 14, 15, 16, 17 and 22, 2013. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Flextronics	WS-AP3710e	Access Point	1245049259450000	QQD10E

ANTENNA SYSTEM

The antenna system for this permissive change consists of a 6 element Sector antenna (gain of 12.5 dBi in the 2.4 GHz band and 11.5 dBi in the 5.8 GHz band). However, the antenna will be used with at least 6dB of attenuation in the feed line and thus the effective gains are 6.5 dBi and 5.5 dBi in the 2.4 and 5.8 GHz bands respectively.

Model	Application	Description	Gain (dBi)	Frequency (GHz)	Connector type
WS-AI-DX13025	Indoor	MIMO, Sector, dual-band	6.5 dBi 5.5 dBi	2.4 – 2.5 5.15 – 5.85	RSMA

ENCLOSURE

The EUT enclosure measures approximately 20 by 18.5 by 3 centimeters. It is constructed of uncoated plastic and cast metal.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at National Technical Systems - Silicon Valley.

SUPPORT EQUIPMENT

The following equipment was used as remote support equipment for emissions testing:

Company	Model	Description	Serial Number	FCC ID
PowerDsine	9001G-40/SP	POE adapter	N11456519001846A0 1	-
Dell	Latitude D610	Laptop Computer	26895386773	-

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
Ethernet/POE	Remote POE adapter or switch	Cat 5	Unshielded	10
Remote POE Data or switch	Laptop	Cat 5	Unshielded	2

The console port was not connected during testing as this is used only during configuration of the radio.

EUT OPERATION

During testing, the EUT was configured to transmit a “continuous” modulated signal, 99% duty cycle at the selected frequency and power level on all three chains of both radios.

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 7	A2LA accreditation	2845B-7	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.

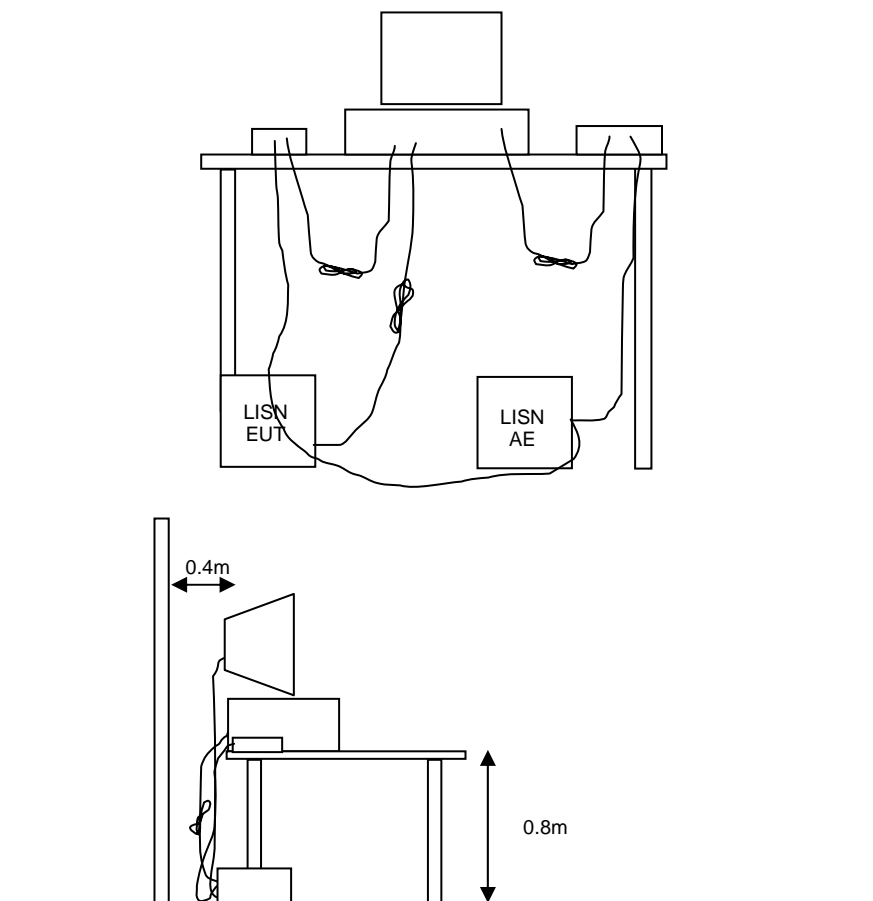


Figure 1 Typical Conducted Emissions Test Configuration

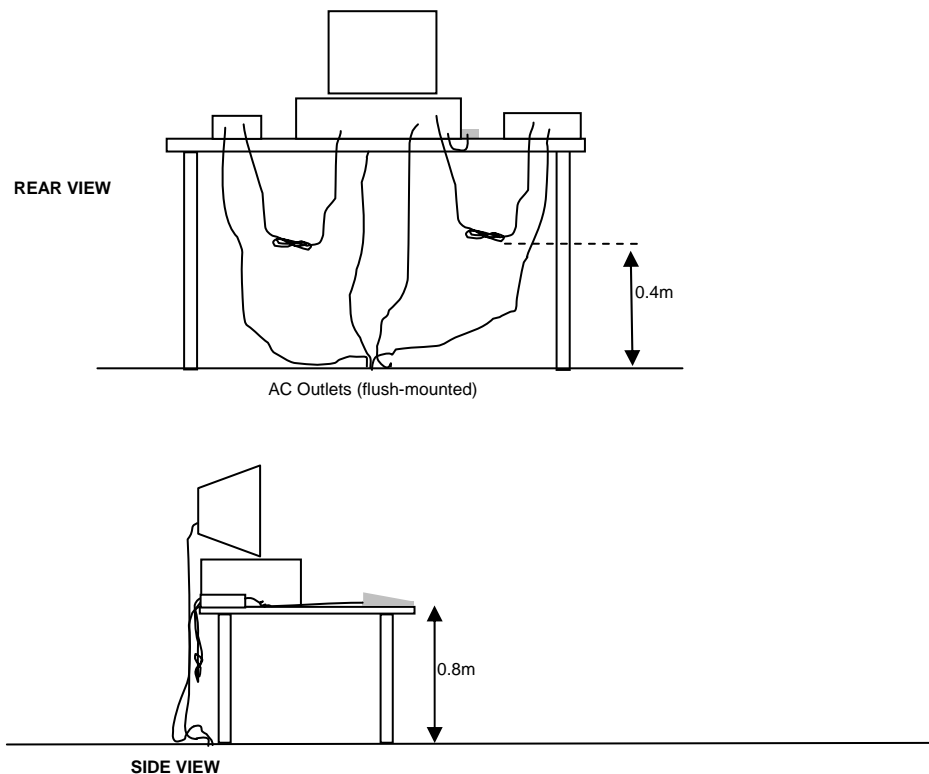
RADIATED EMISSIONS

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.

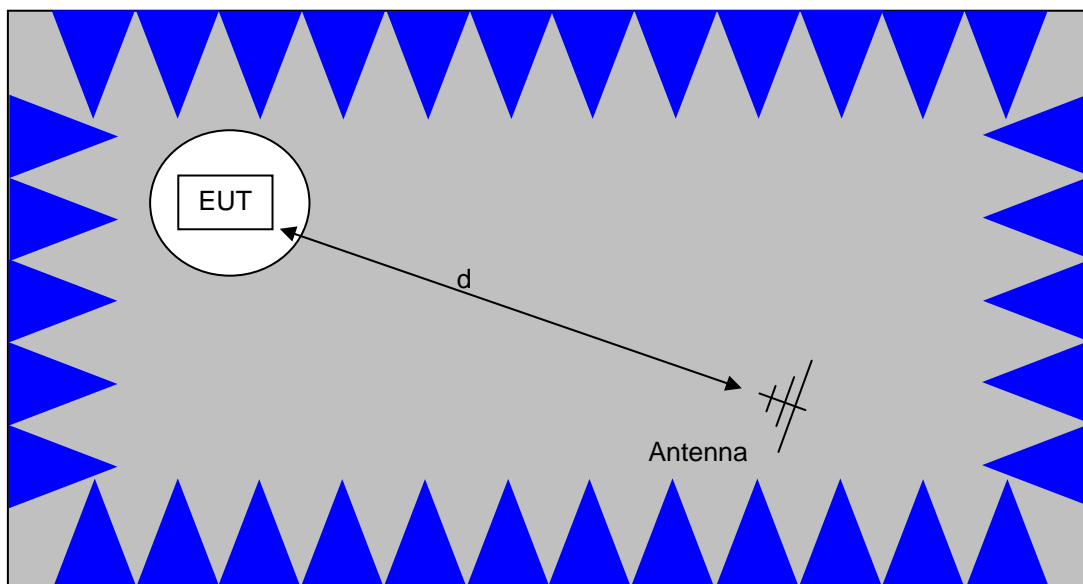
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

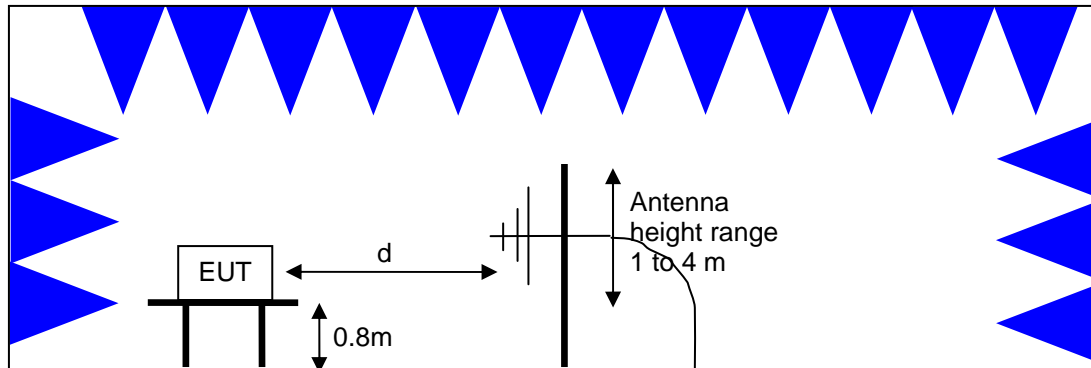


Typical Test Configuration for Radiated Field Strength Measurements



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.

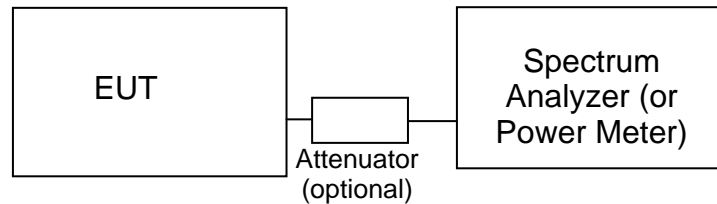
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

**Test Configuration for Antenna Port Measurements**

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and National Technical Systems - Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

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 bands¹ (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:

$$R_T - S = M$$

where:

R_T = 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:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

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:

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

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**Radio Antenna Port (Power and Spurious Emissions), 11-Apr-13**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	1/3/2014
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts use with 20dB attenuator sn:100059 only	NRV-Z32	1423	9/18/2013
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	1/28/2014

Radiated Emissions, 1000 - 40,000 MHz, 14-Apr-13 to 17-Apr-13

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	11/9/2013
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	7/5/2013
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	12/5/2013
A. H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	5/30/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2013
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/11/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-01	2738	11/6/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013

Radio Antenna Port (Power and Spurious Emissions), 17-Apr-13

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	1/3/2014
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts use with 20dB attenuator sn:100059 only	NRV-Z32	1423	9/18/2013
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	1/28/2014

Radio Antenna Port (Power and Spurious Emissions), 22-Apr-13

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	1/3/2014
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts use with 20dB attenuator sn:100059 only	NRV-Z32	1423	9/18/2013
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	1/28/2014

Appendix B Test Data

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Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
		Account Manager:	Christine Krebill
Contact:	George Fares		
Emissions Standard(s):	15.247, 15.407, RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

Flextronics

Model

WS-AP3710e

Date of Last Test: 4/22/2013



EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power - 802.11b mode

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: 4/14 & 4/17/2013
Test Engineer: Rafael Varelas
Test Location: FT Lab 4A

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.5 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11b)	15.247(b)	Pass	22.7 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 6.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11b

Run #1a:

Antenna: 6.5dBi Panel

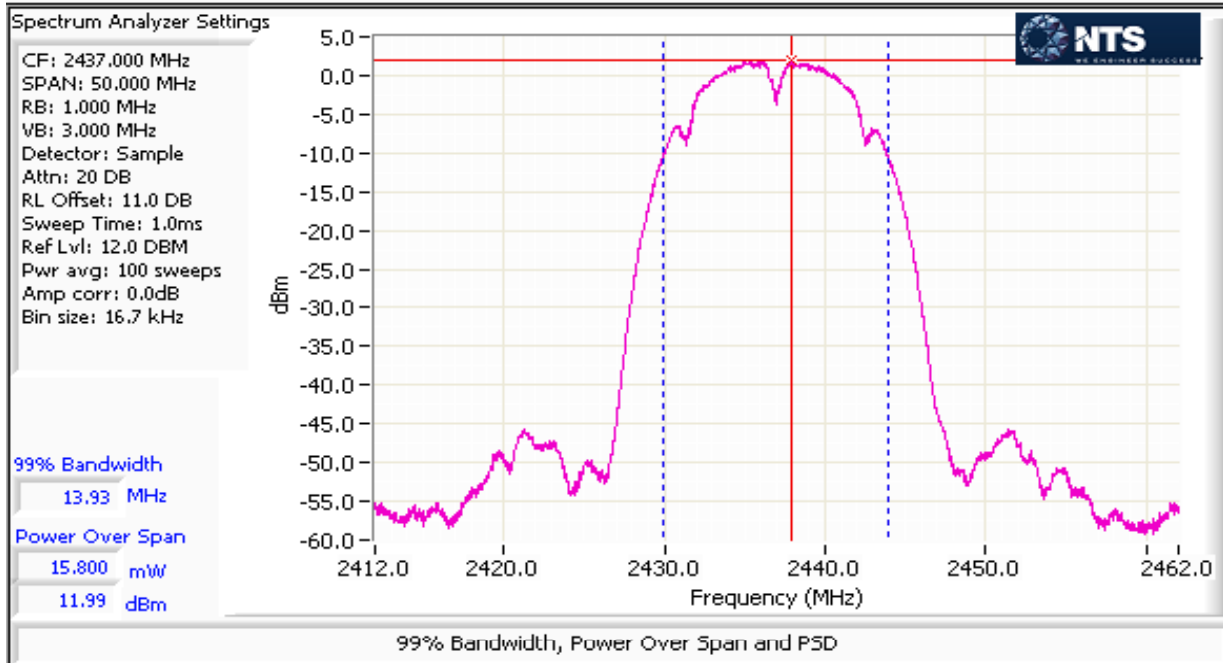
Operating Mode: 802.11b

Transmitted signal on chain is coherent ? yes

2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0							
Output Power (dBm) ^{Note 1}	16.5	16.8	17.0		21.5 dBm	0.143 W	24.7 dBm	0.297 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		11.3 dBi		Pass	
eirp (dBm) ^{Note 2}	23	23.3	23.5		32.8 dBm	1.912 W		
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	18.0							
Output Power (dBm) ^{Note 1}	17.8	17.9	18.0		22.7 dBm	0.185 W	24.7 dBm	0.297 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		11.3 dBi		Pass	
eirp (dBm) ^{Note 2}	24.3	24.4	24.5		33.9 dBm	2.479 W		
2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	18.0							
Output Power (dBm) ^{Note 1}	17.2	17.3	17.0		21.9 dBm	0.156 W	24.7 dBm	0.297 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		11.3 dBi		Pass	
eirp (dBm) ^{Note 2}	23.7	23.8	23.5		33.2 dBm	2.095 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50MHz (option #1 in KDB 558074. Spurious limit becomes -30dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A





EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power - 802.11g mode

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: 4/17/2013
Test Engineer: Rafael Varelas
Test Location: FT Lab 4A

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.5 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11g)	15.247(b)	Pass	22.8 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 6.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11g

Run #1a:

Antenna: 6.5dBi Panel

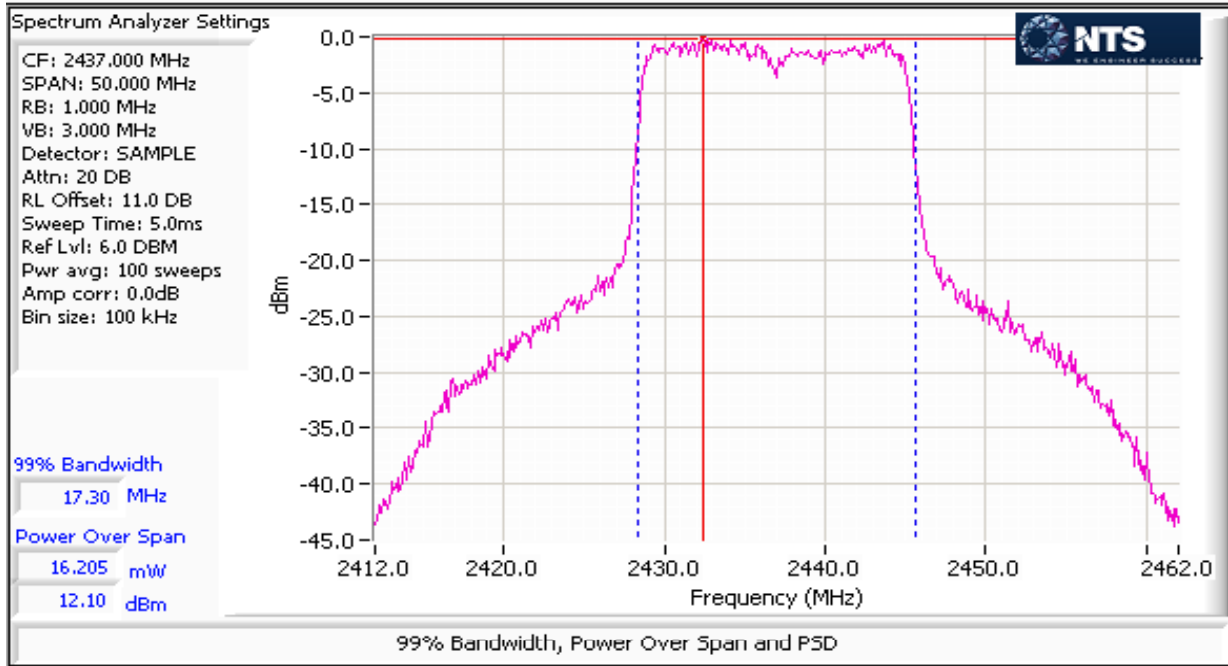
Operating Mode: 802.11g

Transmitted signal on chain is coherent ? yes

2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	14.0							
Output Power (dBm) ^{Note 1}	13.0	13.3	13.8		18.2 dBm	0.065 W	24.7 dBm	0.297 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		11.3 dBi		Pass	
eirp (dBm) ^{Note 2}	19.5	19.8	20.3		29.4 dBm	0.875 W		
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	19.0							
Output Power (dBm) ^{Note 1}	18.1	17.8	18.1		22.8 dBm	0.189 W	24.7 dBm	0.297 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		11.3 dBi		Pass	
eirp (dBm) ^{Note 2}	24.6	24.3	24.6		34.0 dBm	2.538 W		
2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	12.5							
Output Power (dBm) ^{Note 1}	12.1	12.2	12.0		16.9 dBm	0.049 W	24.7 dBm	0.297 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		11.3 dBi		Pass	
eirp (dBm) ^{Note 2}	18.6	18.7	18.5		28.1 dBm	0.652 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50MHz (option #1 in KDB 558074. Spurious limit becomes -30dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A





EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power - 802.11n20 mode

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: 4/17/2013
Test Engineer: Rafael Varelas
Test Location: FT Lab 4A

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.5 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11n20)	15.247(b)	Pass	22.1 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 6.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n20

Run #1a:

Antenna: 6.5dBi Panel

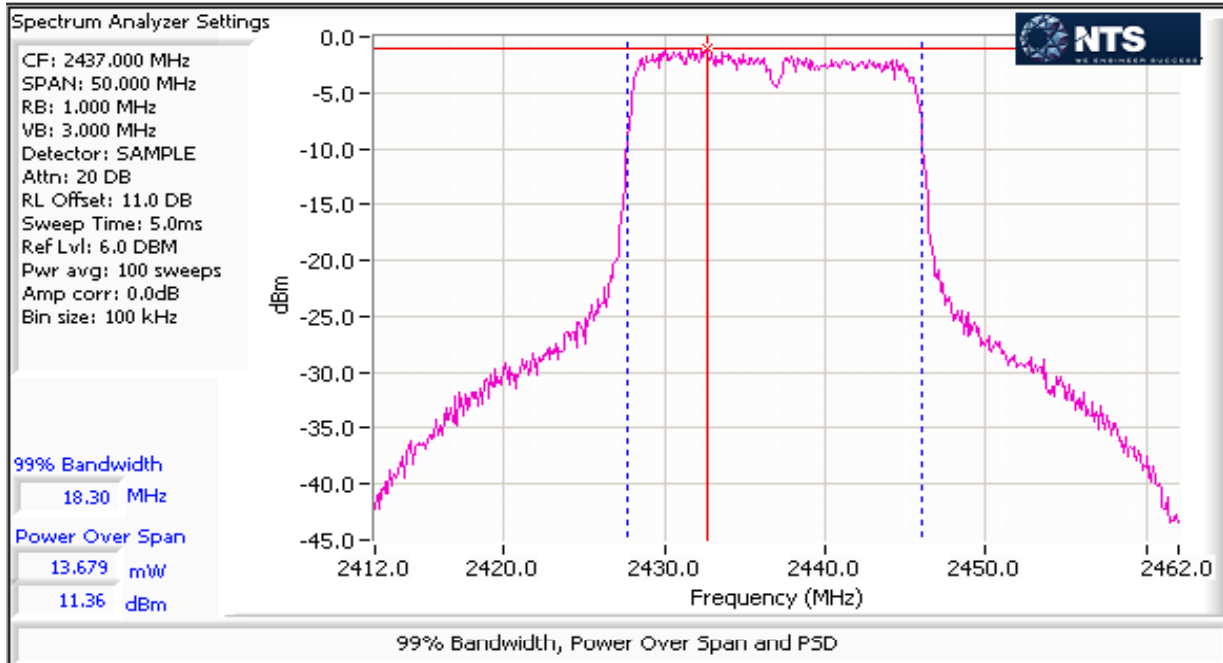
Operating Mode: 802.11n20

Transmitted signal on chain is coherent ? no

2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	13.0							
Output Power (dBm) ^{Note 1}	12.2	12.6	12.7		17.3 dBm	0.053 W	29.5 dBm	0.891 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		6.5 dBi		Pass	
eirp (dBm) ^{Note 2}	18.7	19.1	19.2		23.8 dBm	0.239 W		
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	18.0							
Output Power (dBm) ^{Note 1}	17.4	17.2	17.3		22.1 dBm	0.161 W	29.5 dBm	0.891 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		6.5 dBi		Pass	
eirp (dBm) ^{Note 2}	23.9	23.7	23.8		28.6 dBm	0.720 W		
2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	12.5							
Output Power (dBm) ^{Note 1}	12.0	12.0	11.6		16.6 dBm	0.046 W	29.5 dBm	0.891 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		6.5 dBi		Pass	
eirp (dBm) ^{Note 2}	18.5	18.5	18.1		23.1 dBm	0.206 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50MHz (option #1 in KDB 558074. Spurious limit becomes -30dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A





EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power - 802.11n40 mode

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: 4/17/2013, 4/22/2013
Test Engineer: Rafael Varelas, Deniz Demirci
Test Location: FT Lab 4A

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.5 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11n40)	15.247(b)	Pass	22.4 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 6.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n40

Run #1a:

Antenna: 6.5dBi Panel

Operating Mode: 802.11n40

Transmitted signal on chain is coherent ? no

2422 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	11.0							
Output Power (dBm) ^{Note 1}	16.4	16.6	17.5		21.6 dBm	0.146 W	29.5 dBm	0.891 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		6.5 dBi		Pass	
eirp (dBm) ^{Note 2}	22.9	23.1	24		28.1 dBm	0.650 W		
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	13.0							
Output Power (dBm) ^{Note 1}	17.5	17.8	17.7		22.4 dBm	0.175 W	29.5 dBm	0.891 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		6.5 dBi		Pass	
eirp (dBm) ^{Note 2}	24	24.3	24.2		28.9 dBm	0.783 W		
2452 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	11.0							
Output Power (dBm) ^{Note 1}	16.8	16.8	16.9		21.6 dBm	0.145 W	29.5 dBm	0.891 W
Antenna Gain (dBi) ^{Note 2}	6.5	6.5	6.5		6.5 dBi		Pass	
eirp (dBm) ^{Note 2}	23.3	23.3	23.4		28.1 dBm	0.646 W		

Note 1: Output power measured using a peak power meter, spurious limit is -20dBc.

Note 2: As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.

Note 3: Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2).

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, 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 and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 21 °C
 Rel. Humidity: 35 %

Summary of Results - Device Operating in the DTS Bands

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11b Chain A+B+C	#1 2412MHz	17.0	-	Restricted Band Edge at 2390 MHz	15.209	50.1 dBµV/m @ 2386.6 MHz (-3.9 dB)
		#11 2462MHz	18.0	-	Restricted Band Edge at 2483.5 MHz	15.209	72.5 dBµV/m @ 2497.7 MHz (-1.5 dB)
		#1 2412MHz	14.0	-	Restricted Band Edge at 2390 MHz	15.209	53.2 dBµV/m @ 2389.9 MHz (-0.8 dB)
Run # 2	802.11g Chain A+B+C	#2 2417MHz	15.5	-	Restricted Band Edge at 2390 MHz	15.209	53.3 dBµV/m @ 2390.0 MHz (-0.7 dB)
		#3 2422MHz	16.0	-	Restricted Band Edge at 2390 MHz	15.209	52.9 dBµV/m @ 2389.3 MHz (-1.1 dB)
		#4 2427MHz	16.5	-	Restricted Band Edge at 2390 MHz	15.209	52.7 dBµV/m @ 2387.0 MHz (-1.3 dB)
		#5 2432MHz	17.5	-	Restricted Band Edge at 2390 MHz	15.209	53.1 dBµV/m @ 2386.9 MHz (-0.9 dB)
		#8 2447MHz	17.5	-	Restricted Band Edge at 2483.5 MHz	15.209	52.6 dBµV/m @ 2486.3 MHz (-1.4 dB)
		#9 2452MHz	16.5	-	Restricted Band Edge at 2483.5 MHz	15.209	53.8 dBµV/m @ 2483.5 MHz (-0.2 dB)
		#10 2457MHz	15.0	-	Restricted Band Edge at 2483.5 MHz	15.209	53.8 dBµV/m @ 2483.5 MHz (-0.2 dB)
		#11 2462MHz	12.5	-	Restricted Band Edge at 2483.5 MHz	15.209	73.2 dBµV/m @ 2484.0 MHz (-0.8 dB)

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 3	802.11n20 Chain A+B+C	#1 2412MHz	13.0	-	Restricted Band Edge at 2390 MHz	15.209	53.6 dBμV/m @ 2390.0 MHz (-0.4 dB)
		#2 2417MHz	14.5	-	Restricted Band Edge at 2390 MHz	15.209	52.5 dBμV/m @ 2390.0 MHz (-1.5 dB)
		#3 2422MHz	15.5	-	Restricted Band Edge at 2390 MHz	15.209	53.3 dBμV/m @ 2390.0 MHz (-0.7 dB)
		#4 2427MHz	16.5	-	Restricted Band Edge at 2390 MHz	15.209	53.6 dBμV/m @ 2387.0 MHz (-0.4 dB)
		#5 2432MHz	17.0	-	Restricted Band Edge at 2390 MHz	15.209	53.2 dBμV/m @ 2390.0 MHz (-0.8 dB)
		#6 2437MHz	18.0	-	Restricted Band Edge at 2390 MHz	15.209	52.5 dBμV/m @ 2386.5 MHz (-1.5 dB)
		#6 2437MHz	18.0	-	Restricted Band Edge at 2483.5 MHz	15.209	72.3 dBμV/m @ 2484.5 MHz (-1.7 dB)
		#9 2452MHz	15.5	-	Restricted Band Edge at 2483.5 MHz	15.209	52.2 dBμV/m @ 2484.1 MHz (-1.8 dB)
		#10 2457MHz	14.5	-	Restricted Band Edge at 2483.5 MHz	15.209	51.5 dBμV/m @ 2483.5 MHz (-2.5 dB)
		#11 2462MHz	12.5	-	Restricted Band Edge at 2483.5 MHz	15.209	73.5 dBμV/m @ 2483.7 MHz (-0.5 dB)
		#3 2422MHz	11.0	-	Restricted Band Edge at 2390 MHz	15.209	53.6 dBμV/m @ 2390.0 MHz (-0.4 dB)
Run # 4	802.11n40 Chain A+B+C	#4 2427MHz	12.0	-	Restricted Band Edge at 2390 MHz	15.209	53.5 dBμV/m @ 2389.9 MHz (-0.5 dB)
		#5 2432MHz	13.5	-	Restricted Band Edge at 2390 MHz	15.209	73.8 dBμV/m @ 2383.8 MHz (-0.2 dB)
		#6 2437MHz	14.0	-	Restricted Band Edge at 2390 MHz	15.209	73.5 dBμV/m @ 2389.4 MHz (-0.5 dB)



EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 4	802.11n40 Chain A+B+C	#6 2437MHz	14.0	-	Restricted Band Edge at 2483.5 MHz	15.209	52.0 dBμV/m @ 2483.5 MHz (-2.0 dB)
		#7 2442MHz	13.0	-	Restricted Band Edge at 2483.5 MHz	15.209	73.3 dBμV/m @ 2485.5 MHz (-0.7 dB)
		#8 2447MHz	11.0	-	Restricted Band Edge at 2483.5 MHz	15.209	73.1 dBμV/m @ 2485.1 MHz (-0.9 dB)
		#9 2452MHz	11.0	-	Restricted Band Edge at 2483.5 MHz	15.209	53.4 dBμV/m @ 2483.6 MHz (-0.6 dB)

Antenna:

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
4	Enterasys WS-AI-DX13025	Sector (6 element)	2.4	12.5	Indoor	2 Xpol / 2 Vert	No
4	Enterasys WS-AI-DX13025	Sector (6 element)	5.8	11.5	Indoor	2 Xpol / 2 Vert	No

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.

Tested w/ 6dB Pad

Notes

Antenna: antenna(s) connected

Duty Cycle: 99.0%

ART GUI (Singleradio test) Or Command Line Script (multiple radio test)

ART GUI Used: No

ART GUI Boot File: -

-

ART GUI Calibration file: -

-

Command Line Script: 3710e Pilot_115942 boot and initialize all 3 radios to NART Command Line Interface from 15T - HIGH POWER

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11b, Chain A+B+C

Date of Test: 4/15/2013

Test Location: FT7

Test Engineer: Jack Liu

Config Change: None

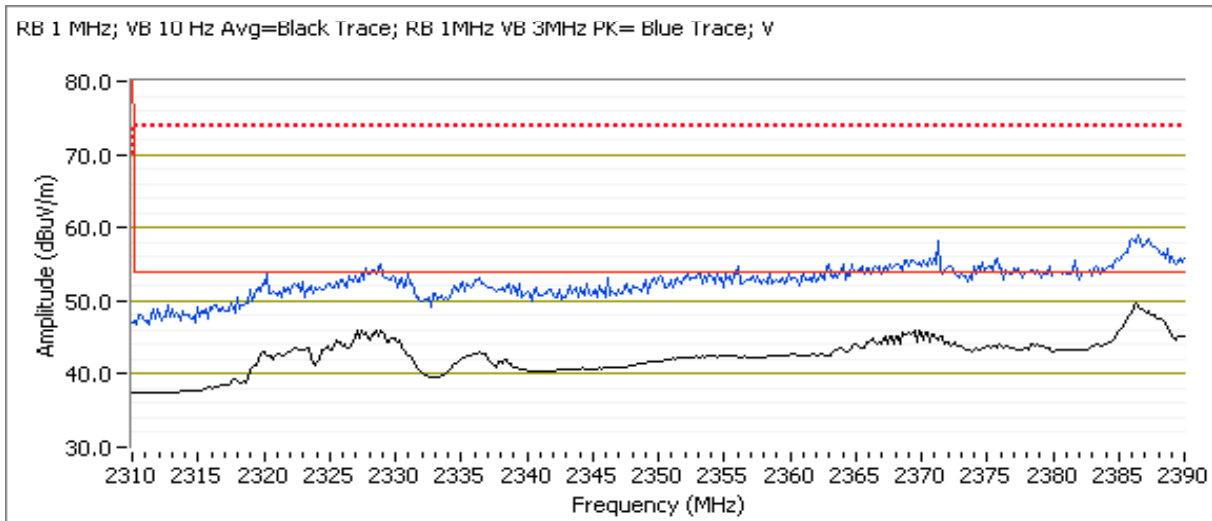
Run # 1a, EUT on Channel #1 2412MHz - 802.11b, Chain A+B+C

Radio	Freq	Power Setting	
1	5745 MHz	19.0	a mode
2	2412 MHz	17.0	

2390 MHz Band Edge Signal 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	
2386.630	50.1	V	54.0	-3.9	AVG	0	1.7	POS; RB 1 MHz; VB: 10 Hz
2386.470	57.6	V	74.0	-16.4	PK	0	1.7	POS; RB 1 MHz; VB: 3 MHz
2386.310	48.0	H	54.0	-6.0	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2385.830	56.6	H	74.0	-17.4	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

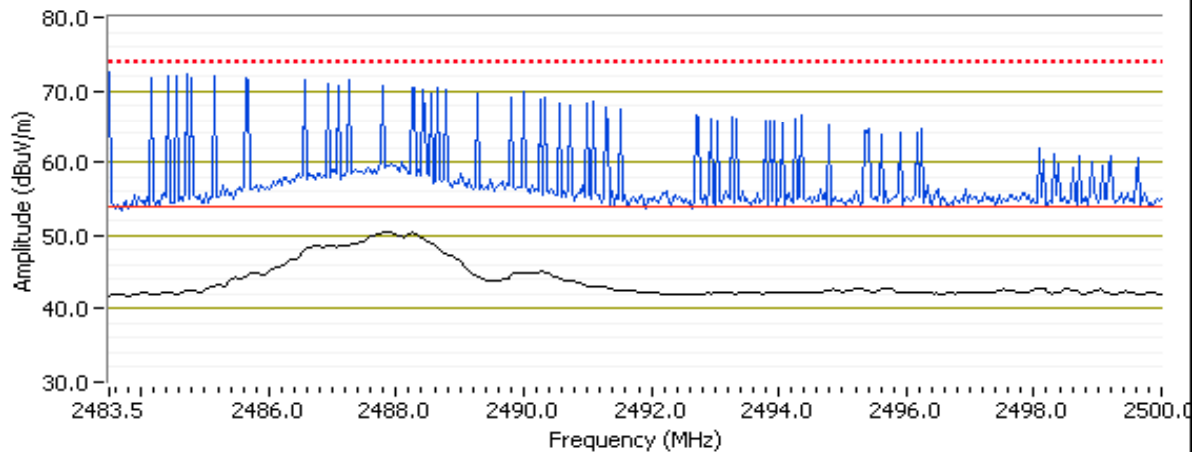
Run # 1b, EUT on Channel #11 2462MHz - 802.11b, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2462 MHz	18.0

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2497.720	72.5	V	74.0	-1.5	PK	0	1.5	POS; RB 1 MHz; VB: 3 MHz
2488.160	52.1	V	54.0	-1.9	AVG	0	1.5	POS; RB 1 MHz; VB: 10 Hz
2488.160	48.9	H	54.0	-5.1	AVG	1	1.1	POS; RB 1 MHz; VB: 10 Hz
2492.590	68.0	H	74.0	-6.0	PK	1	1.1	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11g, Chain A+B+C

Date of Test: 4/15/2013

Test Location: FT7

Test Engineer: Rafael Varelas

Config Change: None

Run # 2a, EUT on Channel #1 2412MHz - 802.11g, Chain A+B+C

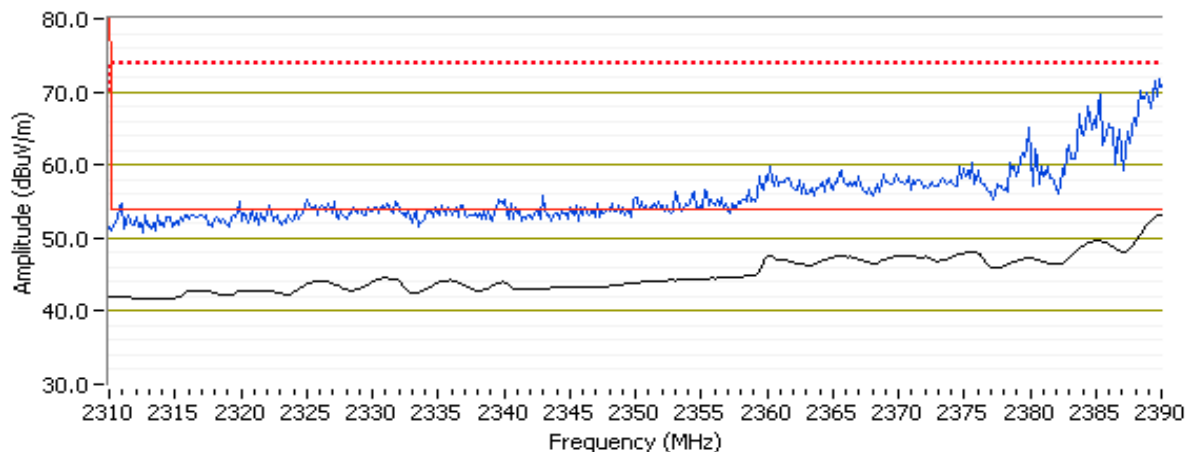
Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2412 MHz	14.0

2390 MHz Band Edge Signal 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	
2389.920	53.2	V	54.0	-0.8	AVG	0	1.4	POS; RB 1 MHz; VB: 10 Hz
2390.000	72.4	V	74.0	-1.6	PK	0	1.4	POS; RB 1 MHz; VB: 3 MHz
2390.000	52.8	H	54.0	-1.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.840	68.7	H	74.0	-5.3	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

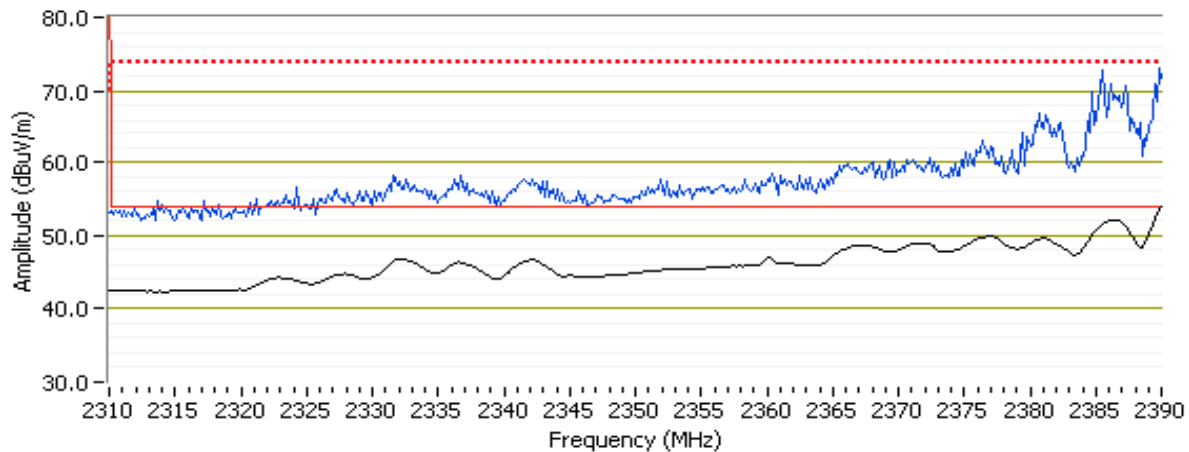
Run # 2b, EUT on Channel #2 2417MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2417 MHz	15.5

2390 MHz Band Edge Signal 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	
2390.000	53.3	V	54.0	-0.7	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2387.030	71.1	V	74.0	-2.9	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	51.4	H	54.0	-2.6	AVG	4	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.600	66.9	H	74.0	-7.1	PK	4	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

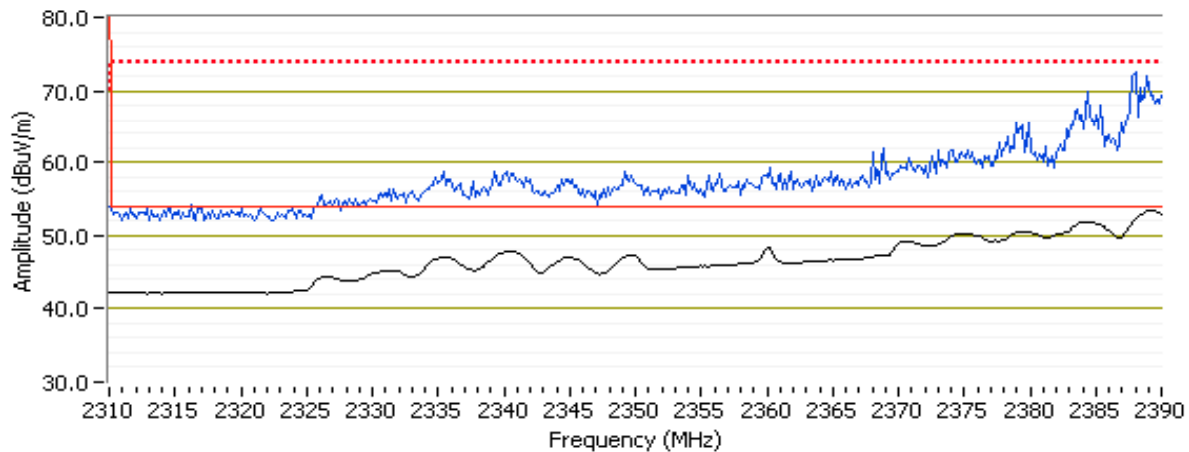
Run # 2c, EUT on Channel #3 2422MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2422 MHz	16.0

2390 MHz Band Edge Signal 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	
2389.280	52.9	V	54.0	-1.1	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2389.280	72.3	V	74.0	-1.7	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2389.920	49.5	H	54.0	-4.5	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.000	65.9	H	74.0	-8.1	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

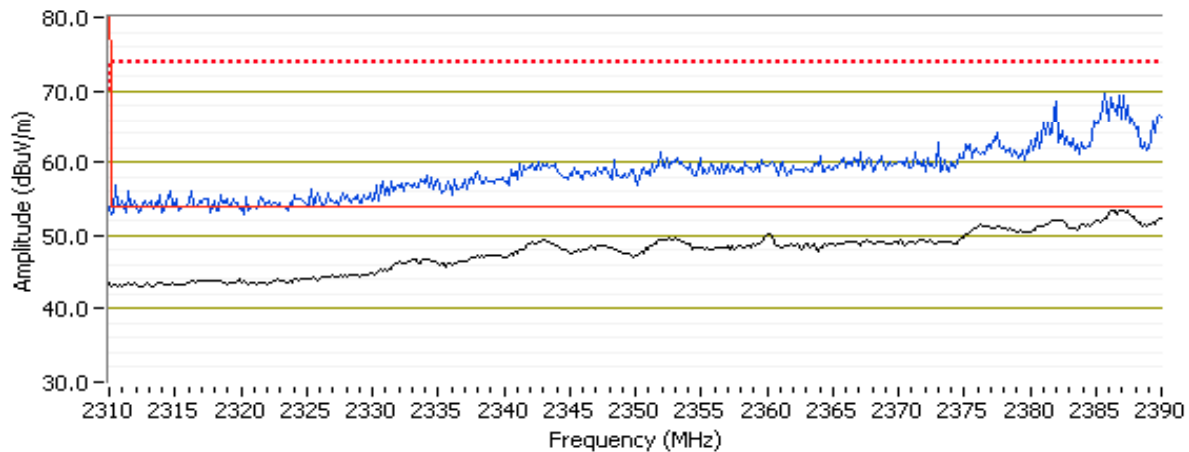
Run # 2d, EUT on Channel #4 2427MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2427 MHz	16.5

2390 MHz Band Edge Signal 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	
2387.030	52.7	V	54.0	-1.3	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2385.110	70.5	V	74.0	-3.5	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	50.9	H	54.0	-3.1	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.880	66.6	H	74.0	-7.4	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

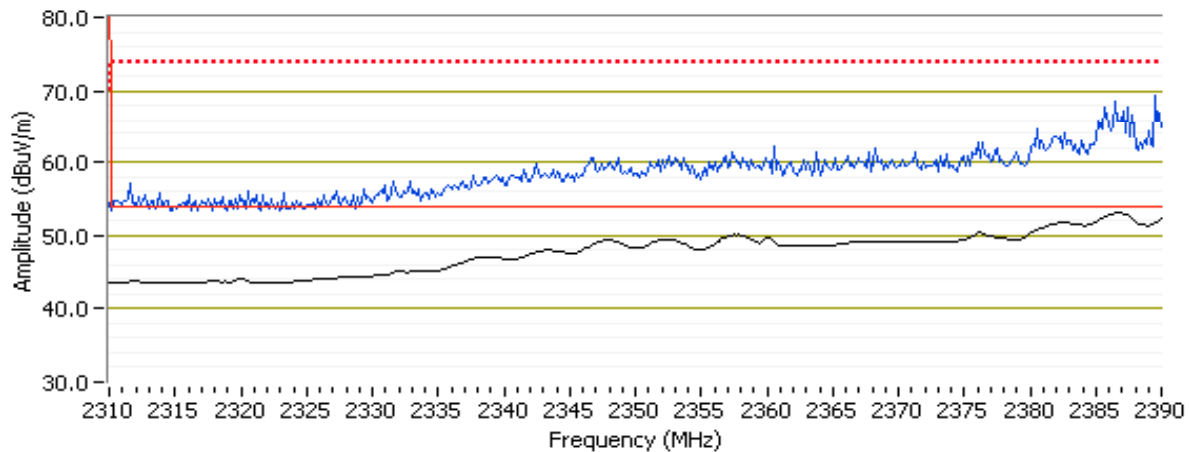
Run # 2e, EUT on Channel #5 2432MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2432 MHz	17.5

2390 MHz Band Edge Signal 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	
2386.870	53.1	V	54.0	-0.9	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2389.840	72.5	V	74.0	-1.5	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	49.8	H	54.0	-4.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2386.230	62.7	H	74.0	-11.3	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

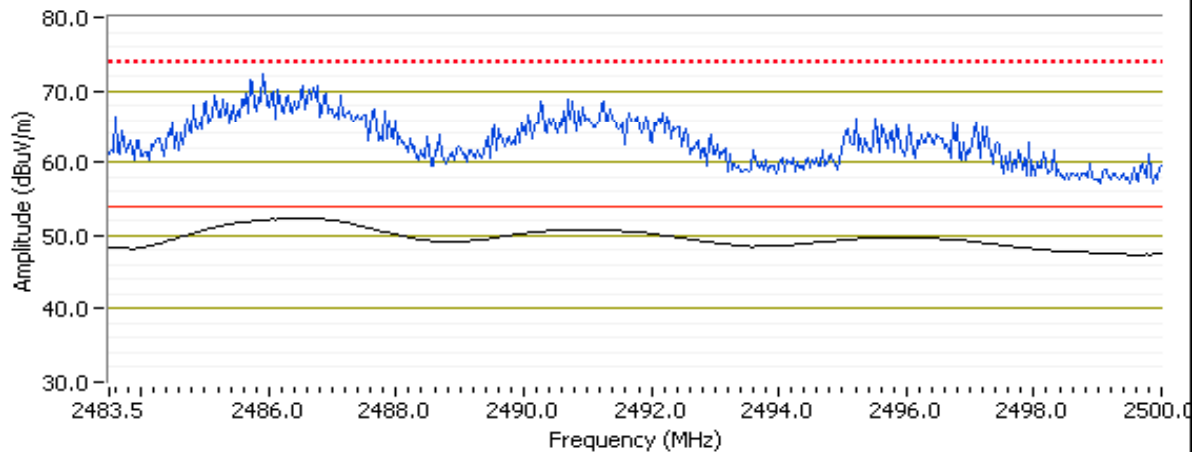
Run # 2f, EUT on Channel #8 2447MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2447 MHz	17.5

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2486.310	52.6	V	54.0	-1.4	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2485.550	71.2	V	74.0	-2.8	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	50.4	H	54.0	-3.6	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2488.720	65.9	H	74.0	-8.1	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

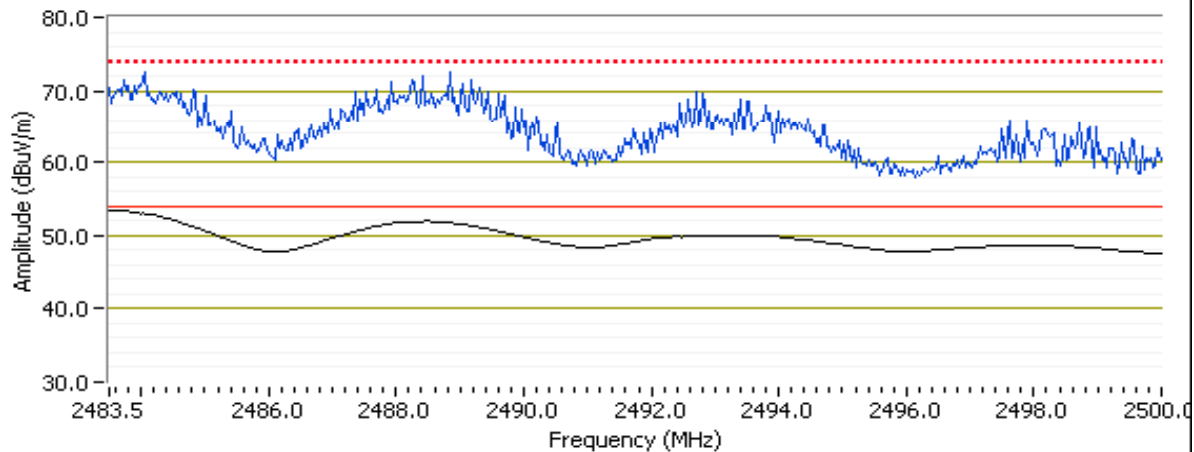
Run # 2g, EUT on Channel #9 2452MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2452 MHz	16.5

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.530	53.8	V	54.0	-0.2	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.260	72.9	V	74.0	-1.1	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	50.4	H	54.0	-3.6	AVG	2	1.1	POS; RB 1 MHz; VB: 10 Hz
2486.640	66.8	H	74.0	-7.2	PK	2	1.1	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

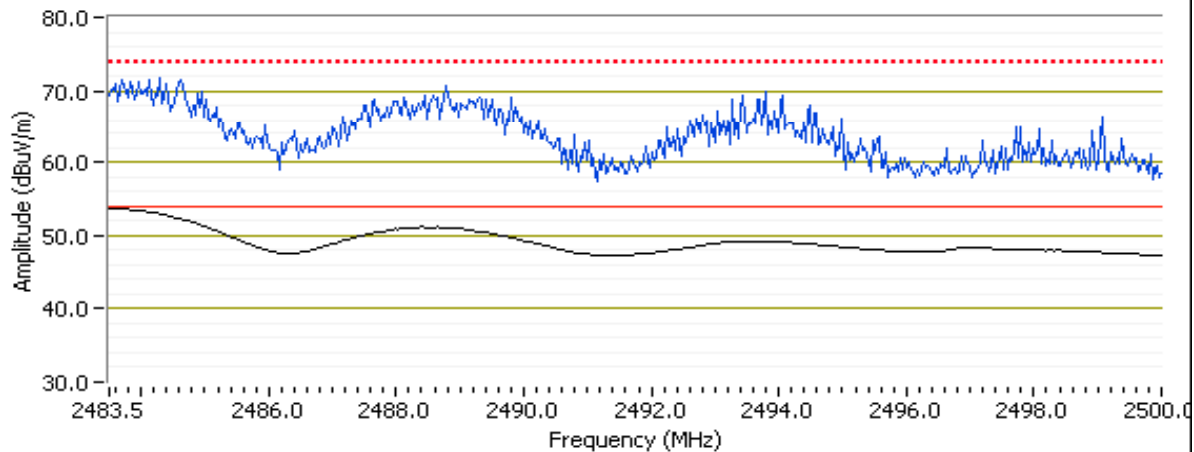
Run # 2h, EUT on Channel #10 2457MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2457 MHz	15.0

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.530	53.8	V	54.0	-0.2	AVG	3	1.2	POS; RB 1 MHz; VB: 10 Hz
2483.570	71.9	V	74.0	-2.1	PK	3	1.2	POS; RB 1 MHz; VB: 3 MHz
2483.530	49.5	H	54.0	-4.5	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.860	66.6	H	74.0	-7.4	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

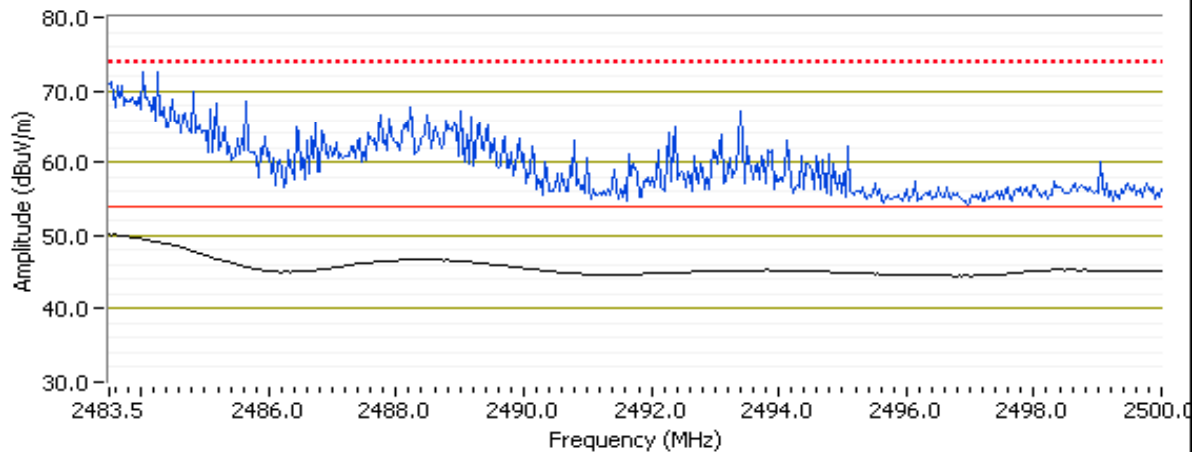
Run # 2I, EUT on Channel #11 2462MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2462 MHz	12.5

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.960	73.2	V	74.0	-0.8	PK	1	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	50.1	V	54.0	-3.9	AVG	1	1.1	POS; RB 1 MHz; VB: 10 Hz
2483.530	46.9	H	54.0	-7.1	AVG	1	1.2	POS; RB 1 MHz; VB: 10 Hz
2485.120	66.1	H	74.0	-7.9	PK	1	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #3, Band Edge Field Strength - 802.11n20, Chain A+B+C

Date of Test: 4/15/2013

Test Location: FT7

Test Engineer: Rafael Varelas/ Jack Liu

Config Change: None

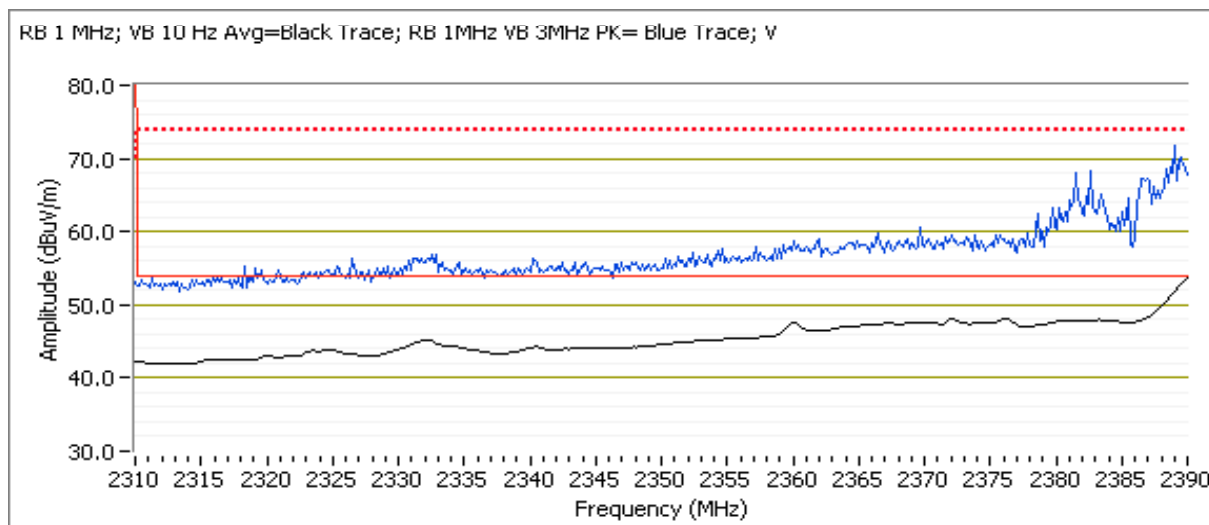
Run #3a, EUT on Channel #1 2412MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2412 MHz	13.0

2390 MHz Band Edge Signal 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	
2390.000	53.6	V	54.0	-0.4	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2389.040	69.3	V	74.0	-4.7	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	52.2	H	54.0	-1.8	AVG	2	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.160	66.0	H	74.0	-8.0	PK	2	1.0	POS; RB 1 MHz; VB: 3 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

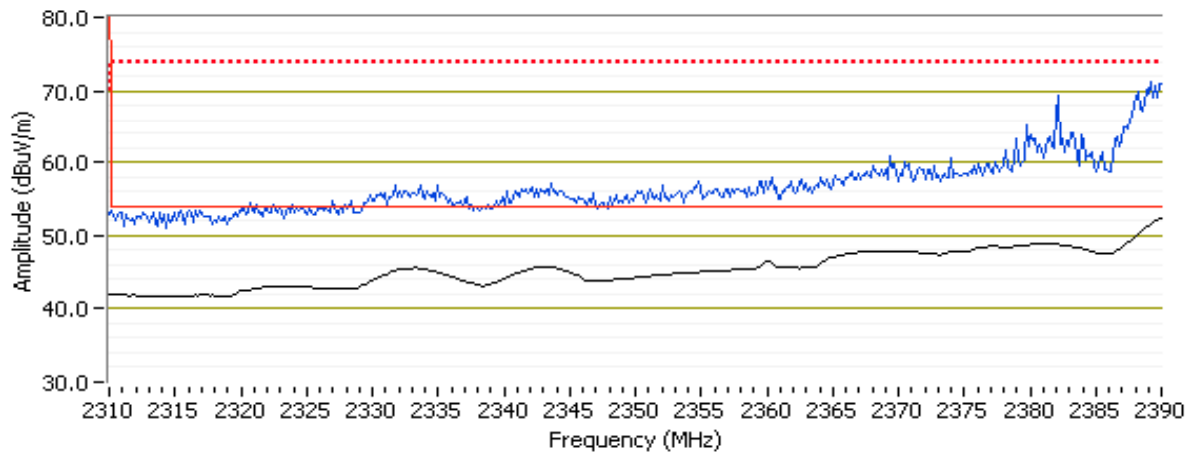
Run #3b, EUT on Channel #2 2417MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2417 MHz	14.5

2390 MHz Band Edge Signal 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	
2390.000	52.5	V	54.0	-1.5	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2388.720	68.5	V	74.0	-5.5	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	50.9	H	54.0	-3.1	AVG	1	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.680	68.1	H	74.0	-5.9	PK	1	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

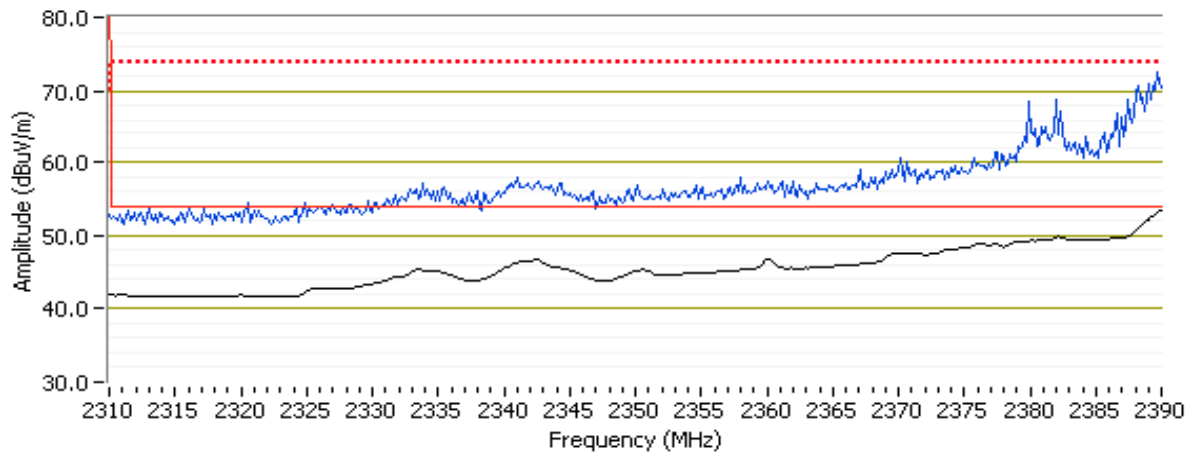
Run #3c, EUT on Channel #3 2422MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2422 MHz	15.5

2390 MHz Band Edge Signal 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	
2390.000	53.3	V	54.0	-0.7	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2389.120	72.7	V	74.0	-1.3	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	49.5	H	54.0	-4.5	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.720	63.4	H	74.0	-10.6	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

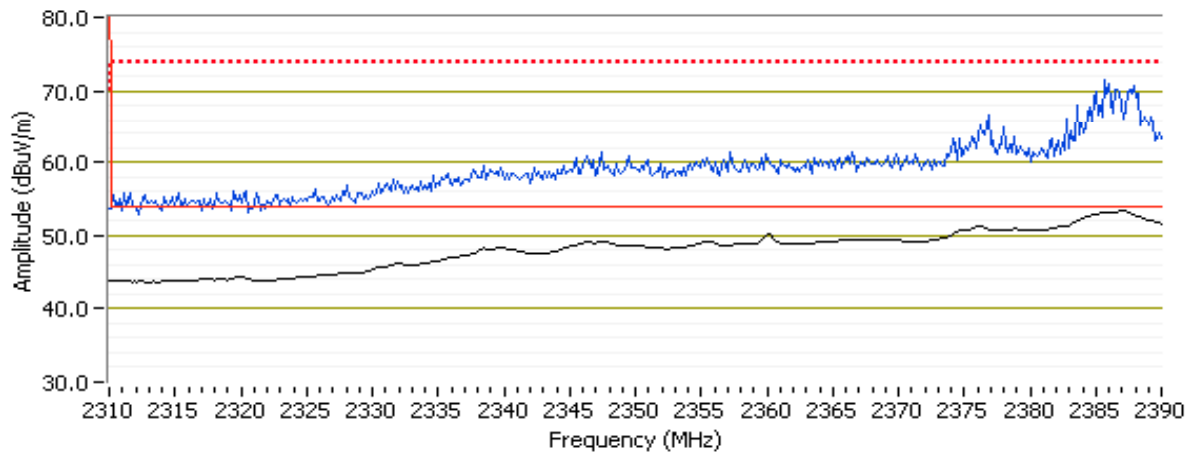
Run #3d, EUT on Channel #4 2427MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2427 MHz	16.5

2390 MHz Band Edge Signal 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	
2387.030	53.6	V	54.0	-0.4	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2387.270	72.3	V	74.0	-1.7	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	50.9	H	54.0	-3.1	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.440	65.5	H	74.0	-8.5	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

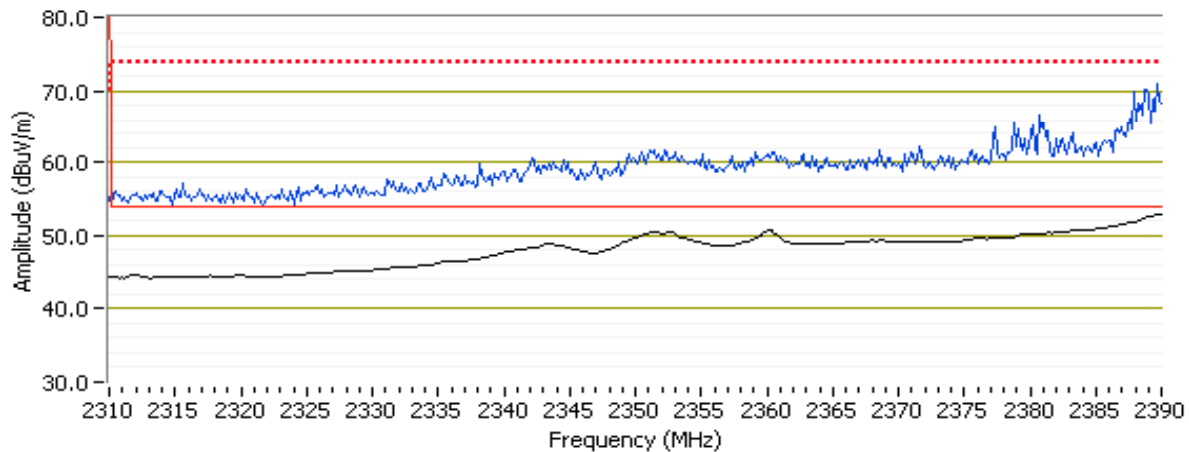
Run #3e, EUT on Channel #5 2432MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2432 MHz	17.0

2390 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2390.000	53.2	V	54.0	-0.8	AVG	3	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.480	70.5	V	74.0	-3.5	PK	3	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	50.0	H	54.0	-4.0	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.400	65.6	H	74.0	-8.4	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

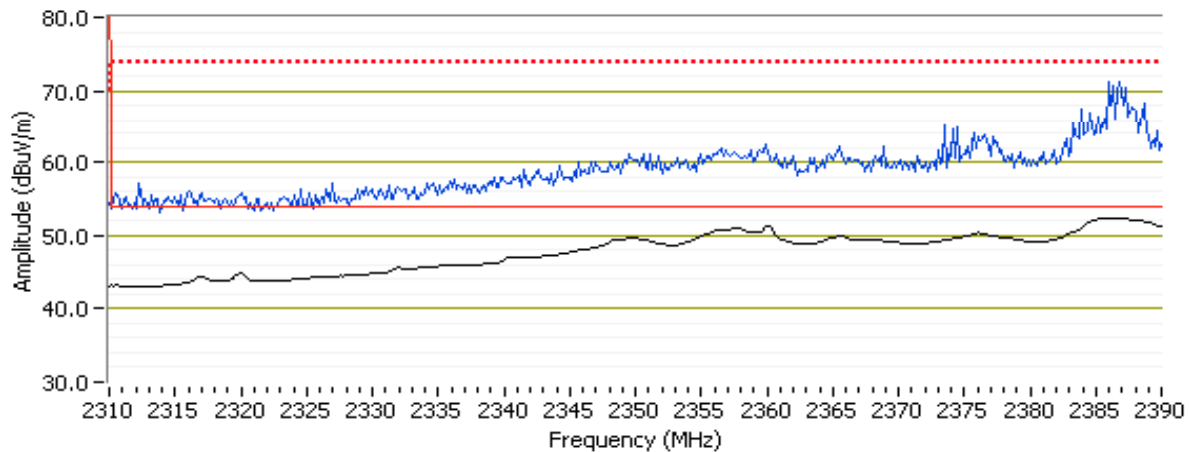
Run #3f, EUT on Channel #6 2437MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2437 MHz	18.0

2390 MHz Band Edge Signal 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	
2386.470	52.5	V	54.0	-1.5	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2385.990	71.1	V	74.0	-2.9	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2390.000	49.5	H	54.0	-4.5	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2386.470	64.7	H	74.0	-9.3	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

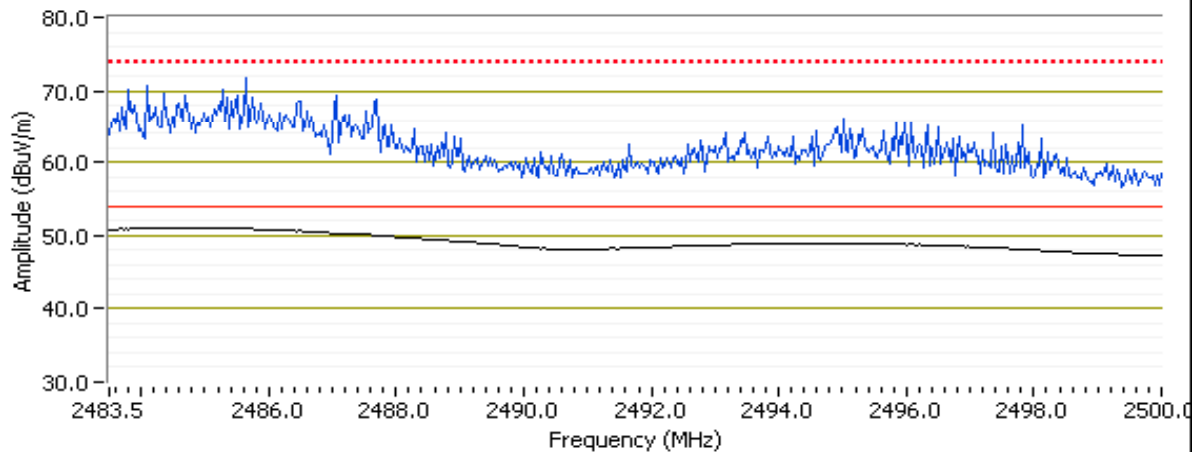
Run #3g, EUT on Channel #6 2437MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2437 MHz	18.0

2483.5 MHz Band Edge Signal 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	
2484.890	51.0	V	54.0	-3.0	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.490	72.3	V	74.0	-1.7	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.700	48.8	H	54.0	-5.2	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2488.790	68.0	H	74.0	-6.0	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

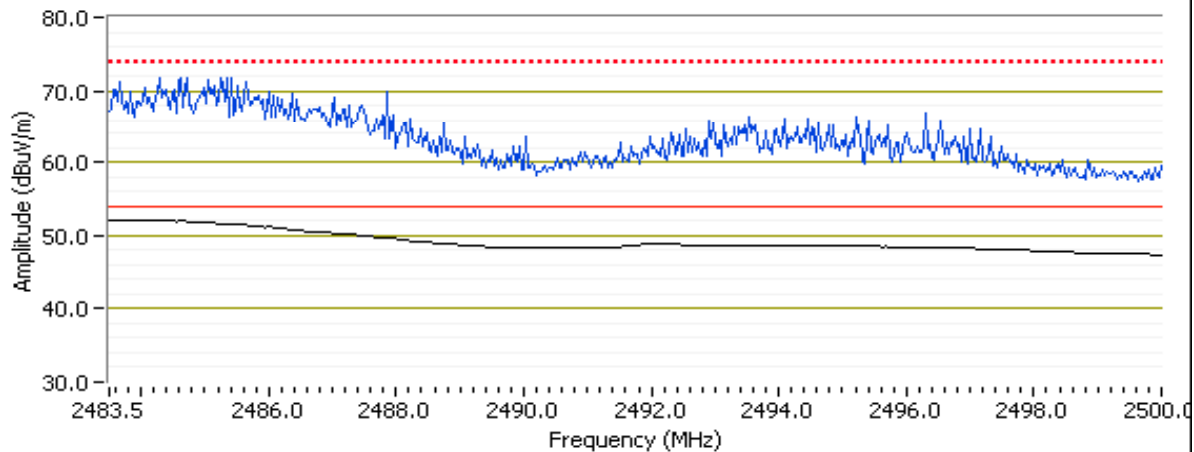
Run #3h, EUT on Channel #9 2452MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2452 MHz	15.5

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2484.060	52.2	V	54.0	-1.8	AVG	2	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.330	71.8	V	74.0	-2.2	PK	2	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.600	46.3	H	54.0	-7.7	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2483.530	66.8	H	74.0	-7.2	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

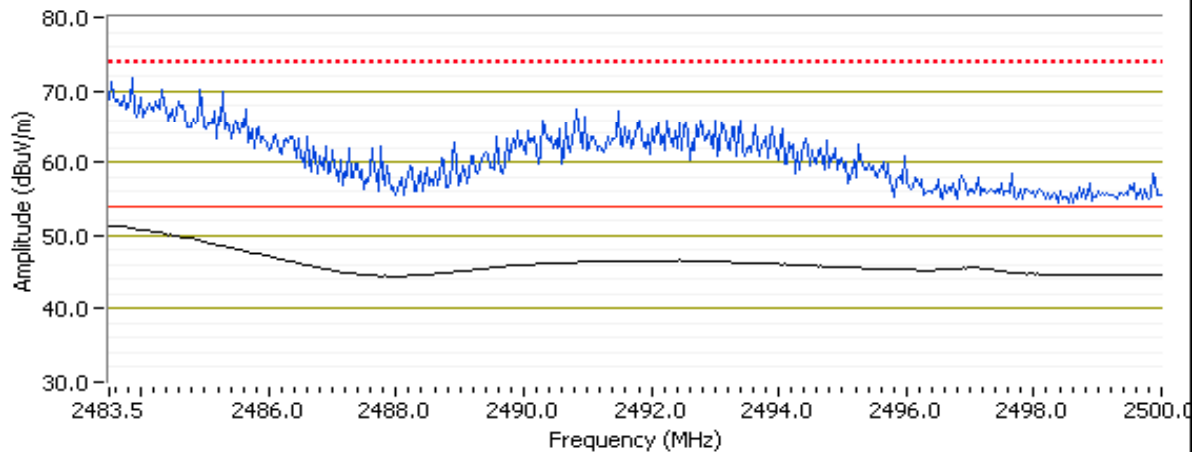
Run #3i, EUT on Channel #10 2457MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2457 MHz	14.5

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.530	51.5	V	54.0	-2.5	AVG	2	1.5	POS; RB 1 MHz; VB: 10 Hz
2484.430	69.8	V	74.0	-4.2	PK	2	1.5	POS; RB 1 MHz; VB: 3 MHz
2483.600	48.8	H	54.0	-5.2	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2485.850	67.6	H	74.0	-6.4	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

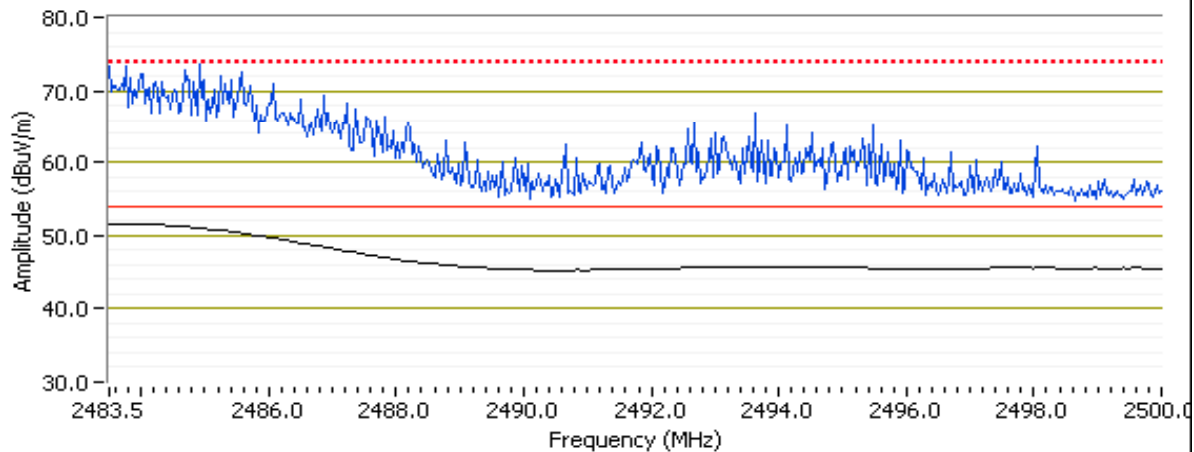
Run #3j, EUT on Channel #11 2462MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2462 MHz	12.5

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.860	51.6	V	54.0	-2.4	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2483.730	73.5	V	74.0	-0.5	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.530	46.9	H	54.0	-7.1	AVG	360	1.2	POS; RB 1 MHz; VB: 10 Hz
2484.360	69.6	H	74.0	-4.4	PK	360	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #4, Band Edge Field Strength - 802.11n40, Chain A+B+C

Date of Test: 4/16/2013

Test Location: FT7

Test Engineer: Jack Liu

Config Change: None

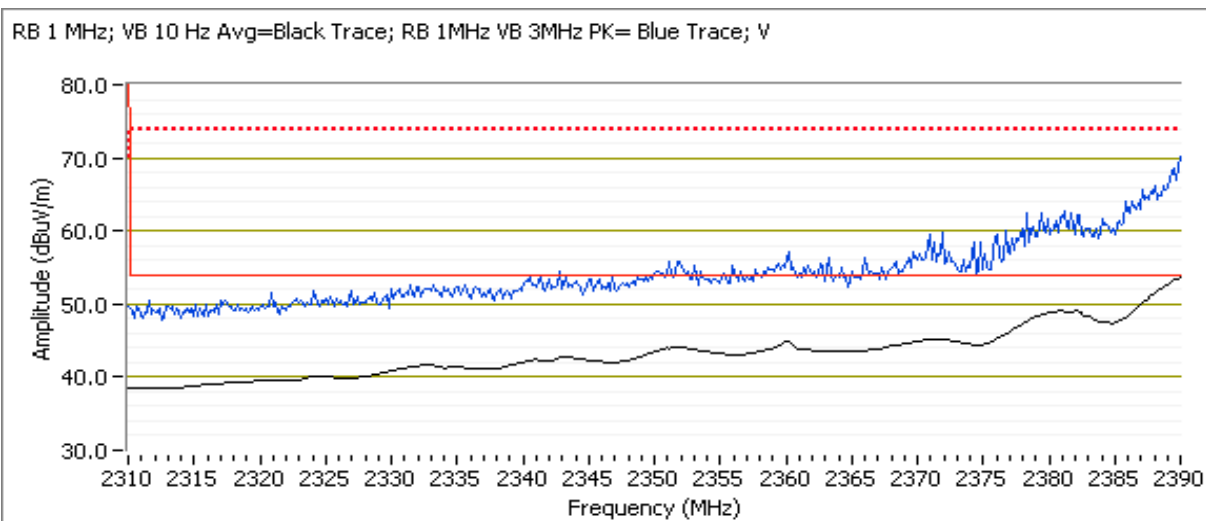
Run #4a, EUT on Channel #3 2422MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2422 MHz	11.0

2390 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.6	V	54.0	-0.4	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.840	65.4	V	74.0	-8.6	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	52.8	H	54.0	-1.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.200	66.1	H	74.0	-7.9	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

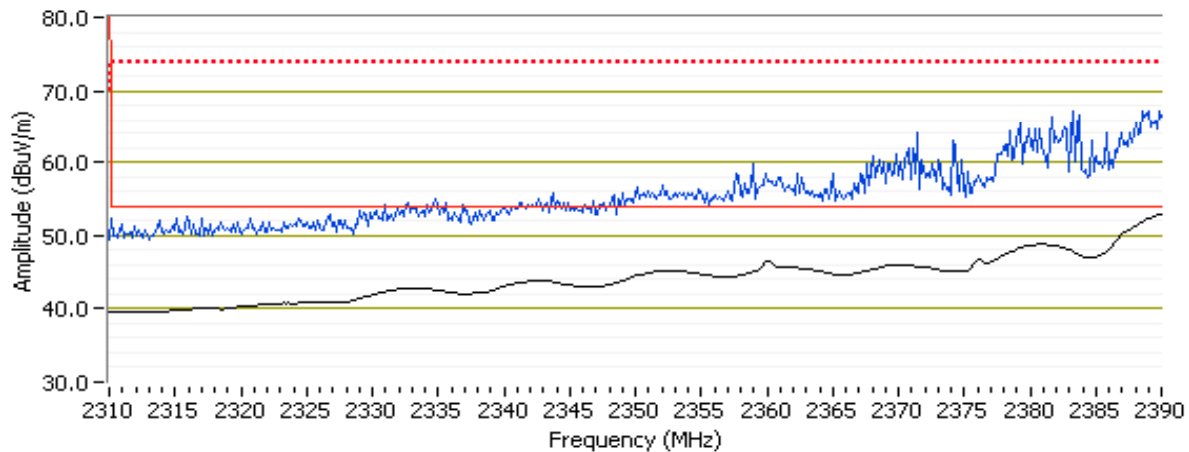
Run #4b, EUT on Channel #4 2427MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2427 MHz	12.0

2390 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2389.920	53.5	V	54.0	-0.5	AVG	1	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.240	70.2	V	74.0	-3.8	PK	1	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	52.7	H	54.0	-1.3	AVG	1	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.200	67.3	H	74.0	-6.7	PK	1	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #4c, EUT on Channel # 2422MHz - 802.11n40, Chain A+B+C

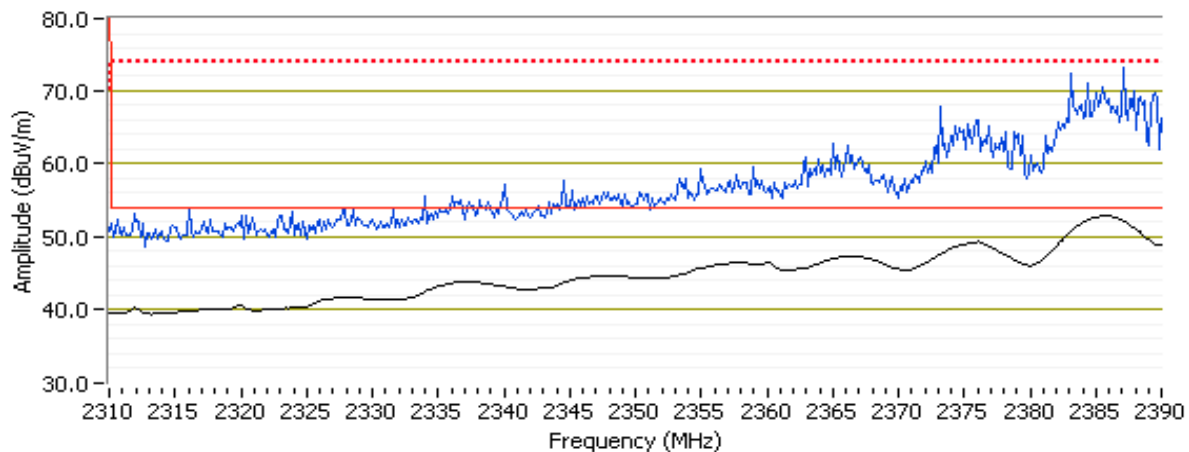
Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2432 MHz	13.5

2390 MHz Band Edge Signal 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	
2385.670	52.8	V	54.0	-1.2	AVG	1	1.0	POS; RB 1 MHz; VB: 10 Hz
2383.750	73.8	V	74.0	-0.2	PK	1	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	52.4	H	54.0	-1.6	AVG	1	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.720	67.6	H	74.0	-6.4	PK	1	1.0	POS; RB 1 MHz; VB: 3 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



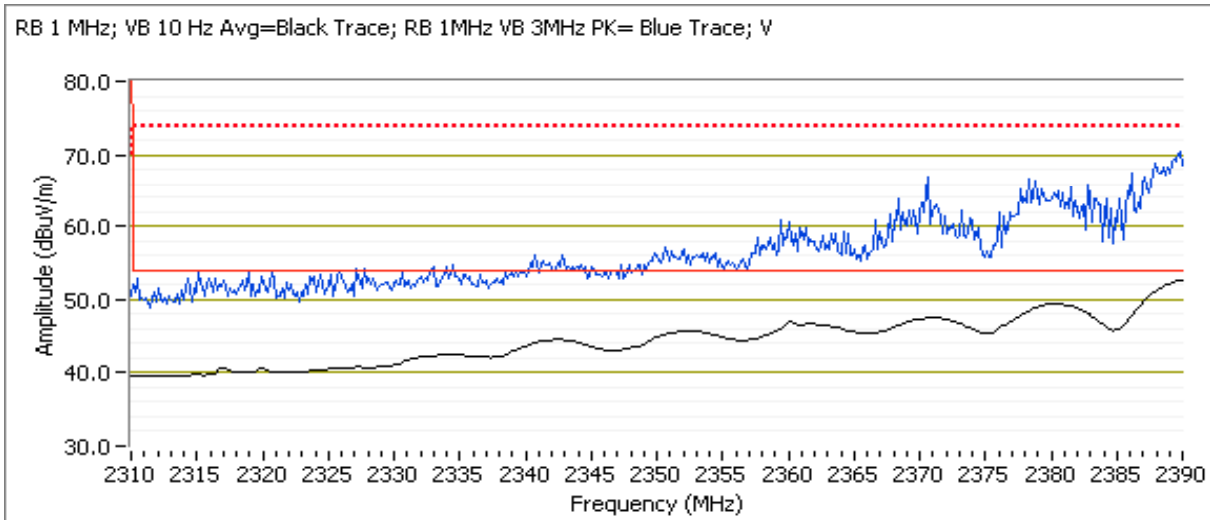
Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #4d, EUT on Channel #6 2437MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2437 MHz	14.0

2390 MHz Band Edge Signal 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	
2389.920	53.1	V	54.0	-0.9	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.360	73.5	V	74.0	-0.5	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	52.5	H	54.0	-1.5	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.280	68.2	H	74.0	-5.8	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

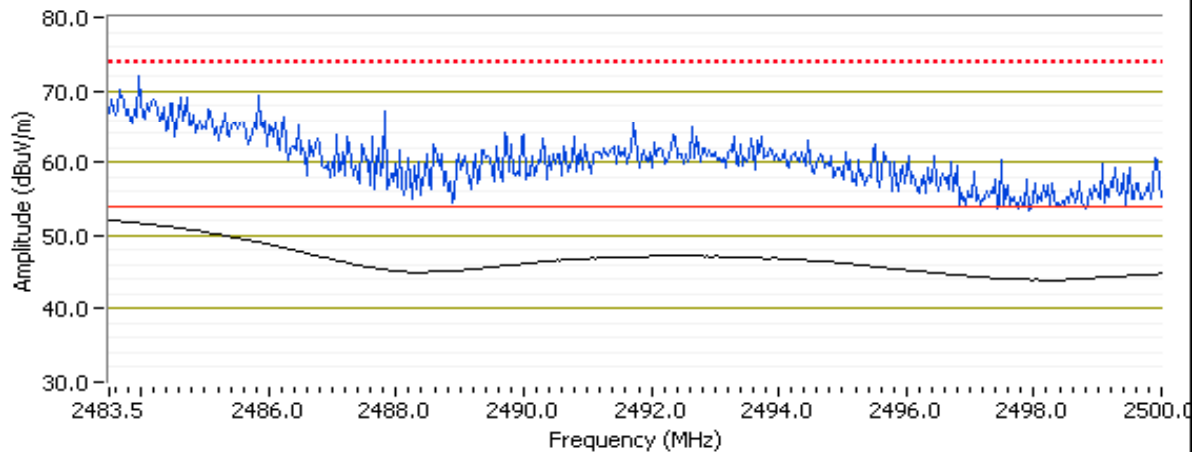
Run #4e, EUT on Channel #6 2437MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2437 MHz	14.0

2483.5 MHz Band Edge Signal Field Strength

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.530	52.0	V	54.0	-2.0	AVG	0	1.5	POS; RB 1 MHz; VB: 10 Hz
2486.610	70.6	V	74.0	-3.4	PK	0	1.5	POS; RB 1 MHz; VB: 3 MHz
2483.500	49.5	H	54.0	-4.5	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2486.380	68.3	H	74.0	-5.7	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

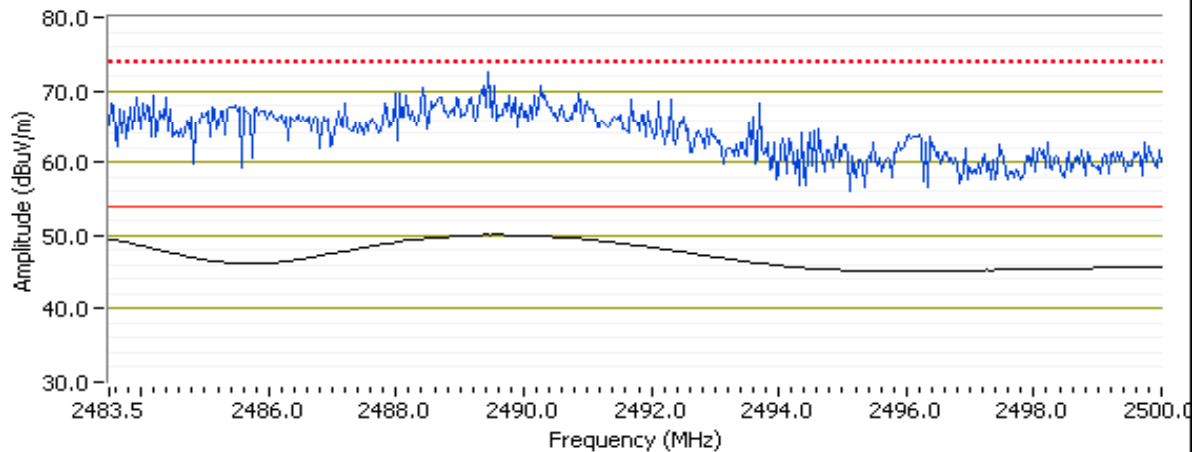
Run #4f, EUT on Channel #7 2442MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2442 MHz	13.0

2483.5 MHz Band Edge Signal 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	
2485.520	73.3	V	74.0	-0.7	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
2489.780	50.4	V	54.0	-3.6	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2487.900	46.7	H	54.0	-7.3	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2486.970	65.5	H	74.0	-8.5	PK	0	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

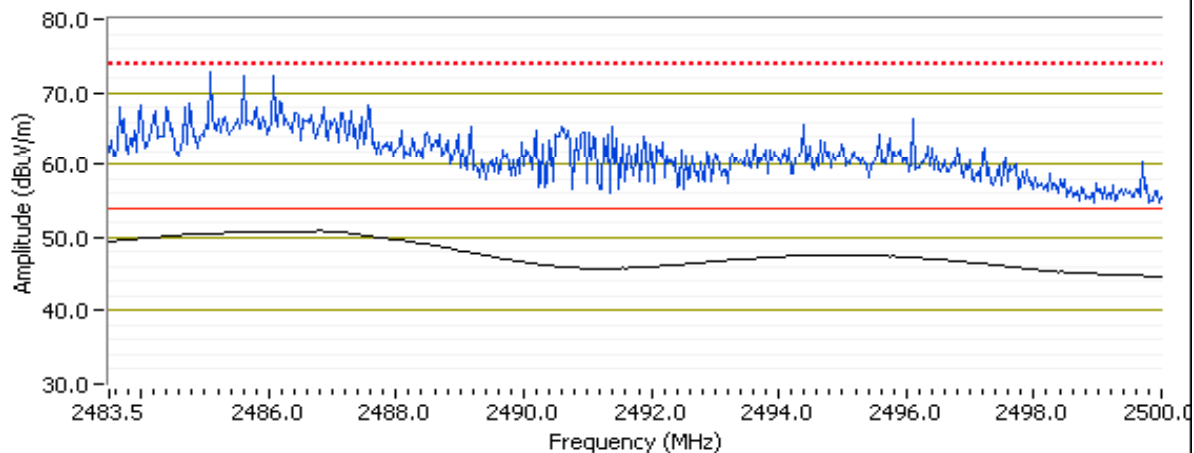
Run #4g, EUT on Channel #8 2447MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2447 MHz	11.0

2483.5 MHz Band Edge Signal 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	
2485.090	73.1	V	74.0	-0.9	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz
2486.940	51.2	V	54.0	-2.8	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2483.600	45.8	H	54.0	-8.2	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2485.190	62.2	H	74.0	-11.8	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz Avg=Black Trace; RB 1MHz VB 3MHz PK= Blue Trace; V



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

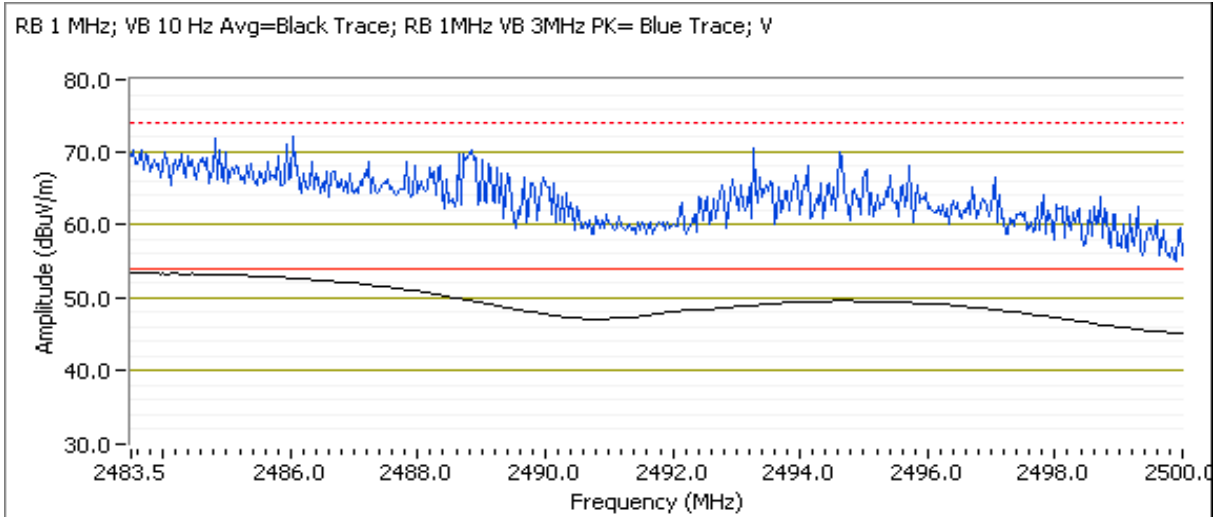
Run #4h, EUT on Channel #9 2452MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2452 MHz	11.0

2483.5 MHz Band Edge Signal 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	
2483.600	53.4	V	54.0	-0.6	AVG	0	1.1	POS; RB 1 MHz; VB: 10 Hz
2483.630	70.8	V	74.0	-3.2	PK	0	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	49.4	H	54.0	-4.6	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2487.670	68.6	H	74.0	-5.4	PK	0	1.2	POS; RB 1 MHz; VB: 3 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements

MIMO and Smart Antenna Systems

Power - 802.11a mode

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: 4/11/2013, 4/22/2013
 Test Engineer: Rafael Varelas, Deniz Demirci
 Test Location: FT Lab 4A

Config. Used: 1
 Config Change: None
 EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.4 °C
 Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11a)	15.247(b)	Pass	21.6 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
 Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 5.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11a

Run #1a:

Antenna: 5.5dBi Panel

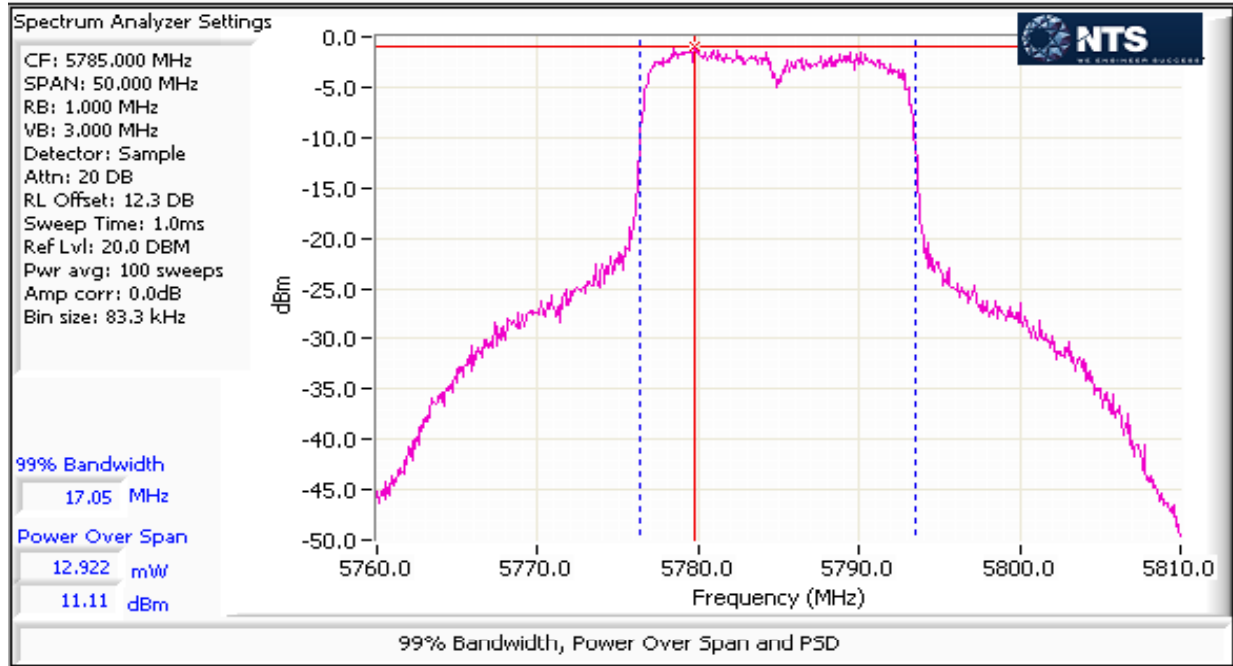
Operating Mode: 802.11a

Transmitted signal on chain is coherent ? yes

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0							
Output Power (dBm) ^{Note 1}	17.0	16.6	16.7		21.5 dBm	0.142 W	25.7 dBm	0.374 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5		10.3 dBi		Pass	
eirp (dBm) ^{Note 2}	22.5	22.1	22.2		31.8 dBm	1.509 W		
5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0							
Output Power (dBm) ^{Note 1}	17.1	16.2	17.0		21.6 dBm	0.143 W	25.7 dBm	0.374 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5		10.3 dBi		Pass	
eirp (dBm) ^{Note 2}	22.6	21.7	22.5		31.8 dBm	1.524 W		
5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0							
Output Power (dBm) ^{Note 1}	17.0	16.0	16.8		21.4 dBm	0.138 W	25.7 dBm	0.374 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5		10.3 dBi		Pass	
eirp (dBm) ^{Note 2}	22.5	21.5	22.3		31.7 dBm	1.464 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #1 in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client: Flextronics	Job Number: J89632
Model: WS-AP3710e	T-Log Number: T89830
Contact: George Fares	Account Manager: Christine Krebill
Standard: 15.247, 15.407, RSS-210	Class: N/A





EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power - 802.11n20 mode

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: 4/11/2013, 4/22/2013
Test Engineer: Rafael Varelas, Deniz Demirci
Test Location: FT Lab 4A

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11n20)	15.247(b)	Pass	21.7 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 5.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n20

Run #1a:

Antenna: 5.5dBi Panel

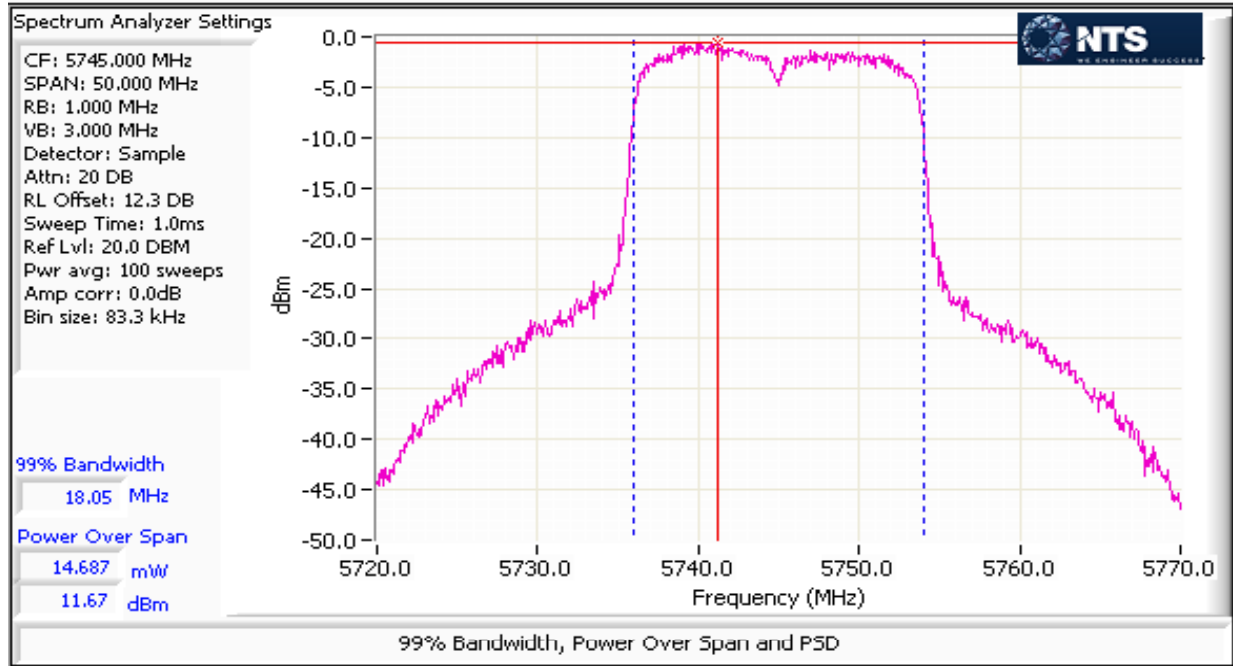
Operating Mode: 802.11n20

Transmitted signal on chain is coherent ? no

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0				Total Across All Chains		Limit	
Output Power (dBm) ^{Note 1}	17.0	16.1	17.7		21.7 dBm	0.149 W	30.0 dBm	1.000 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5		5.5 dBi		Pass	
eirp (dBm) ^{Note 2}	22.5	21.6	23.2		27.2 dBm	0.529 W		
5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0				Total Across All Chains		Limit	
Output Power (dBm) ^{Note 1}	16.9	16.0	16.8		21.3 dBm	0.136 W	30.0 dBm	1.000 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5		5.5 dBi		Pass	
eirp (dBm) ^{Note 2}	22.4	21.5	22.3		26.8 dBm	0.484 W		
5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	17.0				Total Across All Chains		Limit	
Output Power (dBm) ^{Note 1}	17.15	15.8	16.7		21.3 dBm	0.136 W	30.0 dBm	1.000 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5		5.5 dBi		Pass	
eirp (dBm) ^{Note 2}	22.65	21.3	22.15		26.8 dBm	0.483 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #1 in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client: Flextronics	Job Number: J89632
Model: WS-AP3710e	T-Log Number: T89830
Contact: George Fares	Account Manager: Christine Krebill
Standard: 15.247, 15.407, RSS-210	Class: N/A





EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements MIMO and Smart Antenna Systems Power - 802.11n40 mode

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: 4/11/2013
Test Engineer: Rafael Varelas
Test Location: FT Lab 4A

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11n40)	15.247(b)	Pass	23.9 dBm

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.

Notes

All measurements performed at the antenna port, Sample S/N 1245049259450000
Tested w/o 6dB attenuator w/ High Power script, antenna gain is thus 5.5 dBi

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n40

Run #1a:

Antenna: 5.5dBi Panel

Operating Mode: 802.11n40

Transmitted signal on chain is coherent ? no

5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	16.0							
Output Power (dBm) ^{Note 1}	18.7	19.0	19.5		23.9 dBm	0.243 W	30.0 dBm	1.000 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5			5.5 dBi	Pass	
eirp (dBm) ^{Note 2}	24.2	24.5	25		29.4 dBm	0.861 W		
5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting ^{Note 3}	16.0							
Output Power (dBm) ^{Note 1}	18.8	18.9	19.0		23.7 dBm	0.233 W	30.0 dBm	1.000 W
Antenna Gain (dBi) ^{Note 2}	5.5	5.5	5.5			5.5 dBi	Pass	
eirp (dBm) ^{Note 2}	24.3	24.4	24.5		29.2 dBm	0.826 W		

Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, 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 and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 20.8 °C
 Rel. Humidity: 35 %

Summary of Results - Device Operating in the DTS Bands

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11b	2412 MHz	17	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	53.5 dBμV/m @ 5511.5 MHz (-0.5 dB)
	802.11a	5745 MHz	19	-			50.6 dBμV/m @ 4999.7 MHz (-3.4 dB)
		2437 MHz	18	-			53.6 dBμV/m @ 5480.0 MHz (-0.4 dB)
	Chain A+B+C	5825 MHz	19	-			53.6 dBμV/m @ 5480.0 MHz (-0.4 dB)
Run # 2	802.11g	2412 MHz	18	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	49.1 dBμV/m @ 4999.9 MHz (-4.9 dB)
	802.11a	5745 MHz	19	-			51.2 dBμV/m @ 4999.9 MHz (-2.8 dB)
		2437 MHz	19	-			53.7 dBμV/m @ 4999.9 MHz (-0.3 dB)
	Chain A+B+C	5825 MHz	19	-			53.7 dBμV/m @ 4999.9 MHz (-0.3 dB)
Run # 3	802.11n20	2412 MHz	19	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	49.8 dBμV/m @ 5400.0 MHz (-4.2 dB)
	802.11n20	5745 MHz	19	-			51.5 dBμV/m @ 5440.0 MHz (-2.5 dB)
		2437 MHz	20	-			53.2 dBμV/m @ 5440.0 MHz (-0.8 dB)
	Chain A+B+C	5825 MHz	18	-			53.2 dBμV/m @ 5440.0 MHz (-0.8 dB)



EMC Test Data

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 4	802.11n40	2422MHz	17	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	48.1 dBμV/m @ 4999.9 MHz (-5.9 dB)
		5755MHz	16	-			
	802.11n40	2437MHz	18	-			50.3 dBμV/m @ 5360.0 MHz (-3.7 dB)
		5795MHz	16	-			
	Chain A+B+C	2452MHz	17	-			51.6 dBμV/m @ 5400.0 MHz (-2.4 dB)
		5795MHz	16	-			

Antenna:

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
4	Enterasys WS-AI-DX13025	Sector (6 element)	2.4	12.5	Indoor	2 Xpol / 2 Vert	No
4	Enterasys WS-AI-DX13025	Sector (6 element)	5.8	11.5	Indoor	2 Xpol / 2 Vert	No

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.

Notes

Antenna: antenna(s) connected
Duty Cycle: 99.0%

ART GUI (Singleradio test) Or Command Line Script (multiple radio test)

ART GUI Used: No
ART GUI Boot File: -
ART GUI Calibration file: -

Command Line Script: 3710e Pilot_295948 boot and initialize all 3 radios to NART Command Line Interface from 15T - High POWER

Tested w/ 6dB Pad
w/ High Power Script

Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1, Radiated Spurious Emissions, 1-40GHz, 802.11b/802.11a, Chain A+B+C

Run #1a, EUT on Channel #1 2412MHz - 802.11b and Channel #149 5745MHz - 802.11a - Chain A+B+C

Date of Test: 4/17/2013

Test Location: FT#7

Test Engineer: Mark Hill

Config Change: -

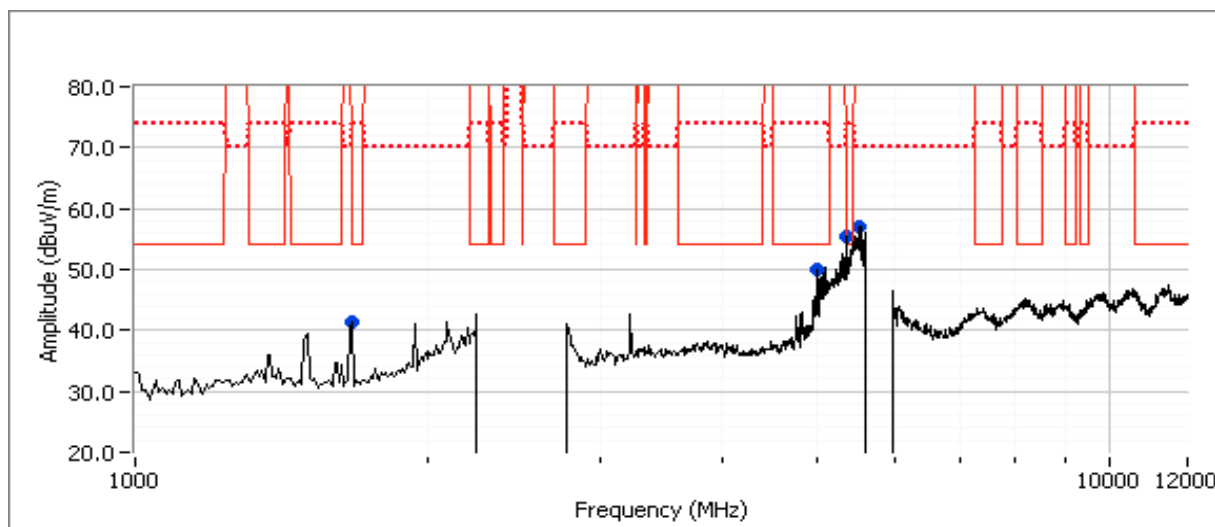
Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2412 MHz	17.0

Spurious Radiated Emissions:

Unpaired Related Emissions:								
Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5511.540	53.5	V	54.0	-0.5	AVG	360	1.1	RB 1 MHz:VB 10 Hz:Peak, note 2
5360.060	50.1	V	54.0	-3.9	AVG	360	1.2	RB 1 MHz:VB 10 Hz:Peak
4999.980	48.5	V	54.0	-5.5	AVG	360	1.5	RB 1 MHz:VB 10 Hz:Peak
5506.270	65.0	V	74.0	-9.0	PK	360	1.1	RB 1 MHz:VB 3 MHz:Peak, note 2
5359.990	61.2	V	74.0	-12.8	PK	360	1.2	RB 1 MHz:VB 3 MHz:Peak
1666.840	40.7	V	54.0	-13.3	AVG	198	1.3	RB 1 MHz:VB 10 Hz:Peak
5000.650	58.6	V	74.0	-15.4	PK	360	1.5	RB 1 MHz:VB 3 MHz:Peak
1666.810	45.1	V	74.0	-28.9	PK	198	1.3	RB 1 MHz:VB 3 MHz:Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

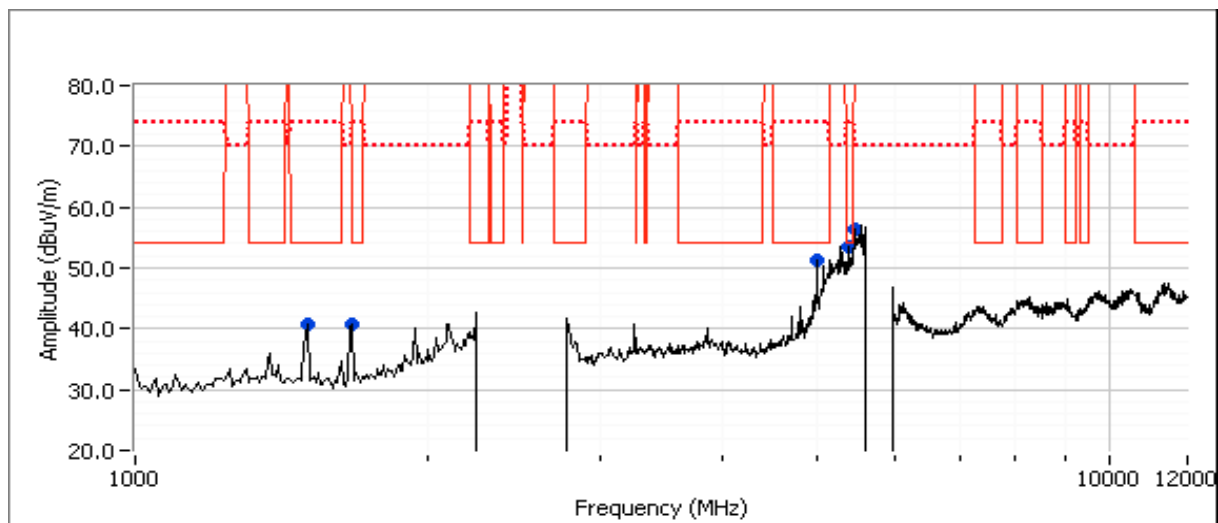
Run #1b, EUT on Channel #6 2437MHz - 802.11b and Channel #157 5785MHz - 802.11a, Chain A+B+C

Radio	Freq	Power Setting
1	5785 MHz	19.0
2	2437 MHz	18.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
4999.700	50.6	V	54.0	-3.4	AVG	1	1.5	RB 1 MHz;VB 10 Hz;Peak
5400.070	49.0	V	54.0	-5.0	AVG	360	1.1	RB 1 MHz;VB 10 Hz;Peak
5401.060	61.1	V	74.0	-12.9	PK	360	1.1	RB 1 MHz;VB 3 MHz;Peak
1666.650	40.1	V	54.0	-13.9	AVG	196	1.3	RB 1 MHz;VB 10 Hz;Peak
4999.840	59.6	V	74.0	-14.4	PK	1	1.5	RB 1 MHz;VB 3 MHz;Peak
1500.070	38.9	H	54.0	-15.1	AVG	210	1.0	RB 1 MHz;VB 10 Hz;Peak
1500.240	44.6	H	74.0	-29.4	PK	210	1.0	RB 1 MHz;VB 3 MHz;Peak
1666.790	44.3	V	74.0	-29.7	PK	196	1.3	RB 1 MHz;VB 3 MHz;Peak
5480.030	54.6	V	-	-	AVG	0	1.1	RB 1 MHz;VB 10 Hz;Peak, note 2
5480.130	64.8	V	-	-	PK	0	1.1	RB 1 MHz;VB 3 MHz;Peak, note 2

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Compliance confirmed via conducted spurious emissions measurement.
Note 3:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1c, EUT on Channel #11 2462MHz - 802.11b and Channel #165 5825MHz - 802.11a, Chain A+B+C

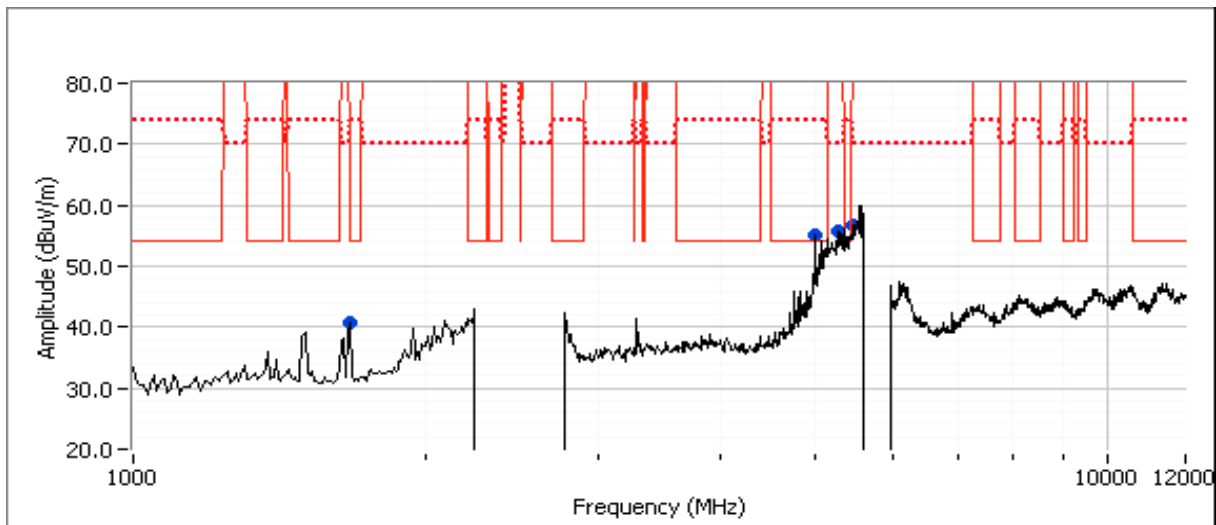
Radio	Freq	Power Setting
1	5825 MHz	19.0
2	2462 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5480.010	53.6	V	54.0	-0.4	AVG	0	1.4	RB 1 MHz;VB 10 Hz;Peak, note 2
4999.750	53.0	V	54.0	-1.0	AVG	360	1.5	RB 1 MHz;VB 10 Hz;Peak
5279.910	52.5	V	54.0	-1.5	AVG	2	1.2	RB 1 MHz;VB 10 Hz;Peak, note 2
5484.020	65.0	V	74.0	-9.0	PK	0	1.4	RB 1 MHz;VB 3 MHz;Peak, note 2
5279.940	63.9	V	74.0	-10.1	PK	2	1.2	RB 1 MHz;VB 3 MHz;Peak, note 2
4999.790	63.1	V	74.0	-10.9	PK	360	1.5	RB 1 MHz;VB 3 MHz;Peak
1666.660	39.9	H	54.0	-14.1	AVG	240	1.2	RB 1 MHz;VB 10 Hz;Peak
1666.460	43.7	H	74.0	-30.3	PK	240	1.2	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #2, Radiated Spurious Emissions, 1-40GHz, 802.11g/802.11a, Chain A+B+C

Run #2a, EUT on Channel #1 2412MHz - 802.11g and Channel #149 5745MHz - 802.11a - Chain A+B+C

Date of Test: 4/17/2013

Test Location: FT#7

Test Engineer: Mark Hill

Config Change: -

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2412 MHz	18.0

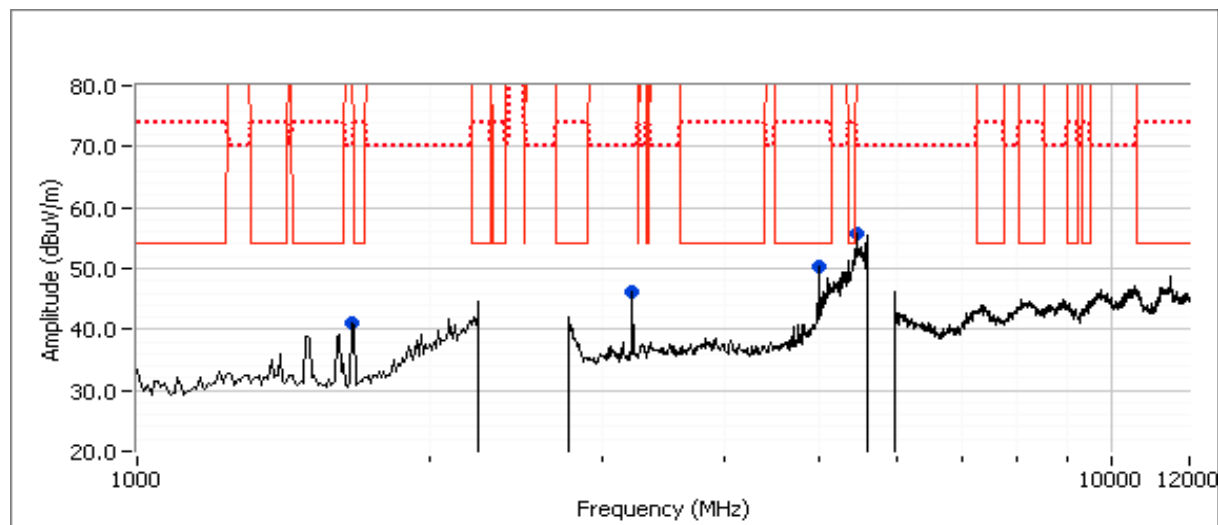
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4999.920	49.1	V	54.0	-4.9	AVG	0	1.6	RB 1 MHz;VB 10 Hz;Peak
3216.030	45.9	V	54.0	-8.1	AVG	0	1.4	RB 1 MHz;VB 10 Hz;Peak, note 2
1666.730	40.1	V	54.0	-13.9	AVG	173	1.6	RB 1 MHz;VB 10 Hz;Peak
5000.600	58.0	V	74.0	-16.0	PK	0	1.6	RB 1 MHz;VB 3 MHz;Peak
3215.680	49.5	V	74.0	-24.5	PK	0	1.4	RB 1 MHz;VB 3 MHz;Peak, note 2
1666.650	44.9	V	74.0	-29.1	PK	173	1.6	RB 1 MHz;VB 3 MHz;Peak
5479.980	54.5	V	-	-	AVG	8	1.1	RB 1 MHz;VB 10 Hz;Peak, note 3
5480.410	63.9	V	-	-	PK	8	1.1	RB 1 MHz;VB 3 MHz;Peak, note 3

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.

Note 3: Compliance confirmed via conducted spurious emissions measurement.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

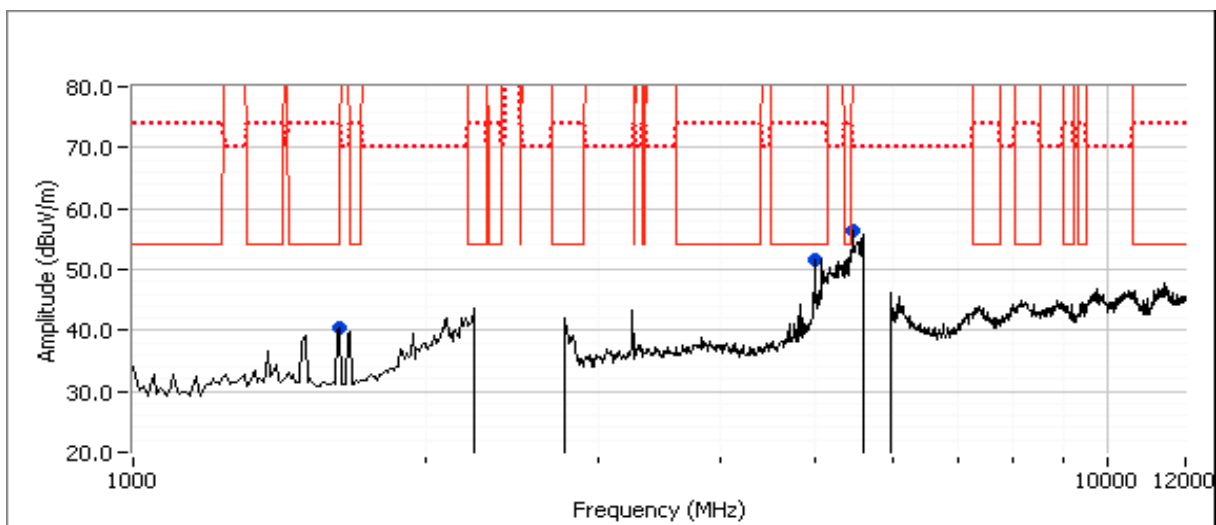
Run #2b, EUT on Channel #6 2437MHz - 802.11g and Channel #157 5785MHz - 802.11a, Chain A+B+C

Radio	Freq	Power Setting
1	5785 MHz	19.0
2	2437 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
4999.900	51.2	V	54.0	-2.8	AVG	2	1.6	RB 1 MHz;VB 10 Hz;Peak
5000.330	60.6	V	74.0	-13.4	PK	2	1.6	RB 1 MHz;VB 3 MHz;Peak
1624.660	41.7	V	54.0	-12.3	AVG	342	1.5	RB 1 MHz;VB 10 Hz;Peak
1624.560	45.4	V	74.0	-28.6	PK	342	1.5	RB 1 MHz;VB 3 MHz;Peak
5479.920	53.8	V	-	-	AVG	0	1.2	RB 1 MHz;VB 10 Hz;Peak, note 3
5479.750	66.0	V	-	-	PK	0	1.2	RB 1 MHz;VB 3 MHz;Peak, note 3

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band average limit was used.
Note 3:	Compliance confirmed via conducted spurious emissions measurement.
Note 3:	Scans made between 12 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #2c, EUT on Channel #11 2462MHz - 802.11g and Channel #165 5825MHz - 802.11a, Chain A+B+C

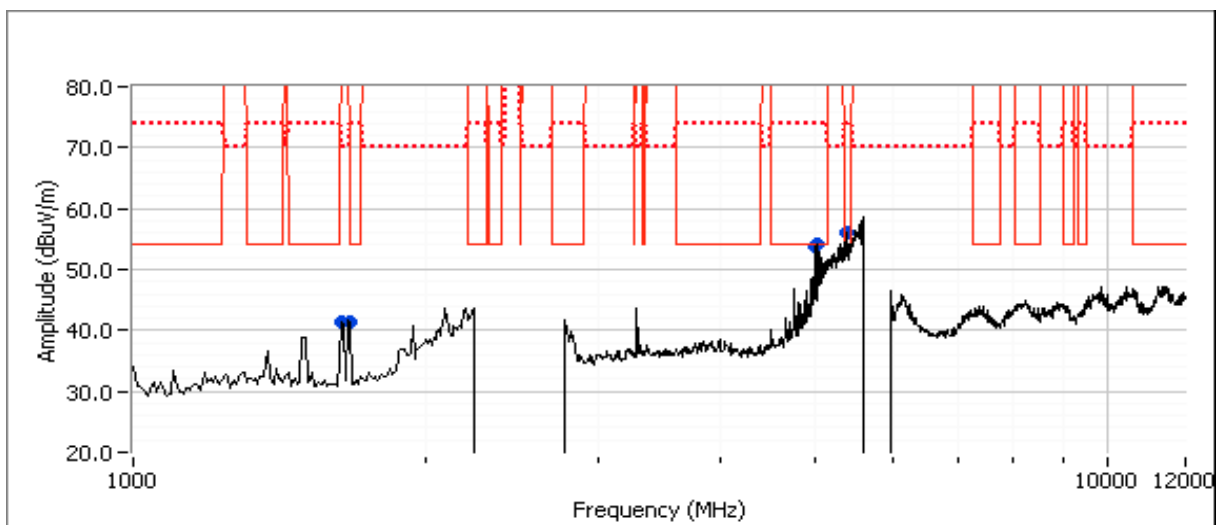
Radio	Freq	Power Setting
1	5825 MHz	19.0
2	2462 MHz	18.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4999.870	53.7	V	54.0	-0.3	AVG	6	1.0	RB 1 MHz;VB 10 Hz;Peak
5000.050	63.3	V	74.0	-10.7	PK	6	1.0	RB 1 MHz;VB 3 MHz;Peak
1666.820	40.5	V	54.0	-13.5	AVG	173	1.7	RB 1 MHz;VB 10 Hz;Peak
1666.710	45.0	V	74.0	-29.0	PK	173	1.7	RB 1 MHz;VB 3 MHz;Peak
5040.040	47.0	H	54.0	-7.0	AVG	1	1.0	RB 1 MHz;VB 10 Hz;Peak
5040.330	57.7	H	74.0	-16.3	PK	1	1.0	RB 1 MHz;VB 3 MHz;Peak
1641.320	41.6	V	54.0	-12.4	AVG	14	1.1	Note 2
1641.350	45.3	V	74.0	-28.7	PK	14	1.1	Note 2
5399.260	51.6	V	54.0	-2.4	AVG	0	1.0	RB 1 MHz;VB 10 Hz;Peak
5399.980	64.0	V	74.0	-10.0	PK	0	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #3, Radiated Spurious Emissions, 1-40GHz, 802.11n20/802.11n20, Chain A+B+C

Run #3a, EUT on Channel #1 2412MHz - 802.11n20 and Channel #149 5745MHz - 802.11n20 - Chain A+B+C

Date of Test: 4/17/2013

Test Location: FT7

Test Engineer: Rafael Varelas

Config Change: None

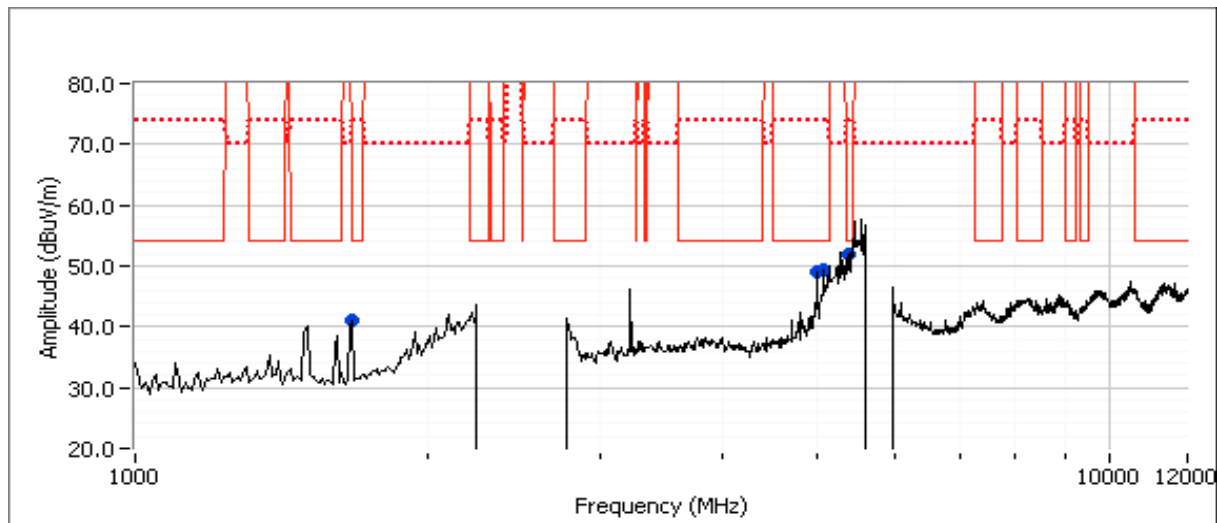
Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2412 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5399.960	49.8	V	54.0	-4.2	AVG	0	1.2	RB 1 MHz;VB 10 Hz;Peak
5399.840	60.7	V	74.0	-13.3	PK	0	1.2	RB 1 MHz;VB 3 MHz;Peak
5080.020	46.5	V	54.0	-7.5	AVG	5	1.0	RB 1 MHz;VB 10 Hz;Peak
5079.520	55.5	V	74.0	-18.5	PK	5	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.880	49.1	V	54.0	-4.9	AVG	1	1.6	RB 1 MHz;VB 10 Hz;Peak
5001.140	58.1	V	74.0	-15.9	PK	1	1.6	RB 1 MHz;VB 3 MHz;Peak
1666.790	39.3	V	54.0	-14.7	AVG	212	1.0	RB 1 MHz;VB 10 Hz;Peak
1666.760	44.3	V	74.0	-29.7	PK	212	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

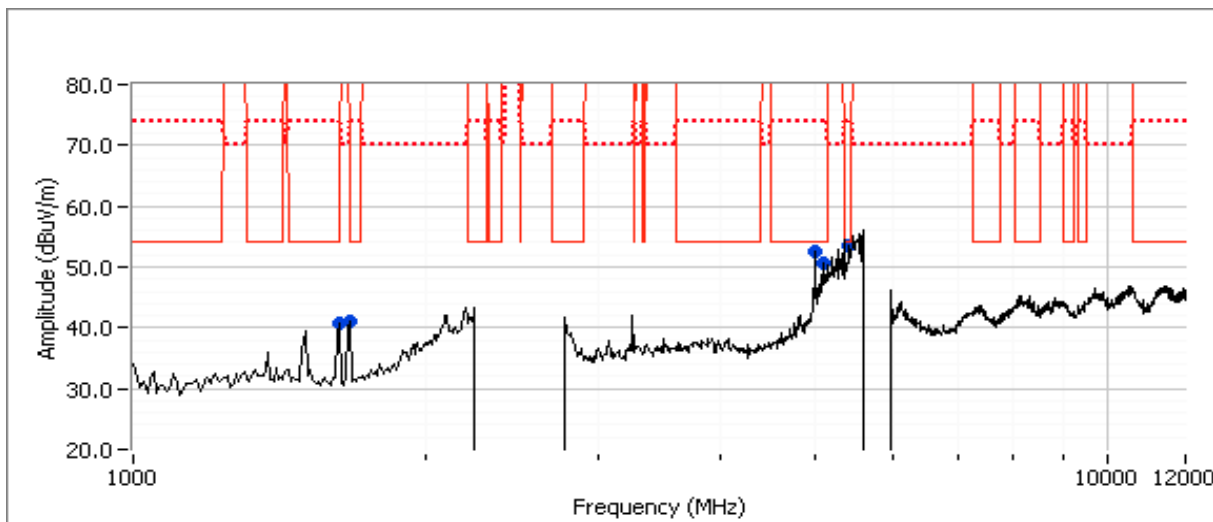
Run #3b: , EUT on Channel #6 2437MHz - 802.11n20 and Channel #157 5785MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5785 MHz	19.0
2	2437 MHz	20.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5439.980	51.5	V	54.0	-2.5	AVG	360	1.4	RB 1 MHz;VB 10 Hz;Peak
5440.300	61.3	V	74.0	-12.7	PK	360	1.4	RB 1 MHz;VB 3 MHz;Peak
1666.640	38.2	V	54.0	-15.8	AVG	210	1.0	RB 1 MHz;VB 10 Hz;Peak
1666.540	44.2	V	74.0	-29.8	PK	210	1.0	RB 1 MHz;VB 3 MHz;Peak
1624.700	40.3	V	54.0	-13.7	AVG	18	1.4	RB 1 MHz;VB 10 Hz;Peak
1624.700	44.9	V	74.0	-29.1	PK	18	1.4	RB 1 MHz;VB 3 MHz;Peak
5119.970	50.1	V	54.0	-3.9	AVG	4	1.0	RB 1 MHz;VB 10 Hz;Peak
5121.570	59.5	V	74.0	-14.5	PK	4	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.730	50.9	V	54.0	-3.1	AVG	2	1.6	RB 1 MHz;VB 10 Hz;Peak
5000.020	60.4	V	74.0	-13.6	PK	2	1.6	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band average limit was used.
Note 3:	Scans made between 12 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

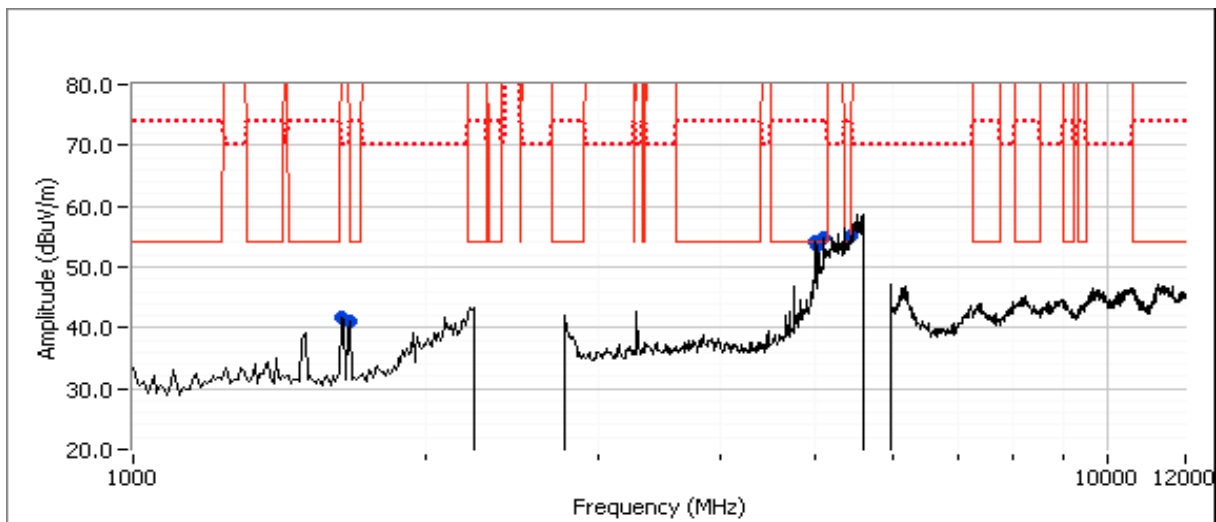
Run #3c: , EUT on Channel #11 2462MHz - 802.11n20 and Channel #165 5825MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5825 MHz	18.0
2	2462 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.040	53.2	V	54.0	-0.8	AVG	2	1.4	RB 1 MHz;VB 10 Hz;Peak
5439.650	63.6	V	74.0	-10.4	PK	2	1.4	RB 1 MHz;VB 3 MHz;Peak
1641.360	41.0	V	100.0	-59.0	AVG	13	1.4	RB 1 MHz;VB 10 Hz;Peak
1641.230	44.9	V	70.0	-25.1	PK	13	1.4	RB 1 MHz;VB 3 MHz;Peak
5040.080	52.7	H	54.0	-1.3	AVG	5	1.0	RB 1 MHz;VB 10 Hz;Peak
5040.040	59.5	H	74.0	-14.5	PK	5	1.0	RB 1 MHz;VB 3 MHz;Peak
5120.060	53.0	V	54.0	-1.0	AVG	1	1.3	RB 1 MHz;VB 10 Hz;Peak
5120.300	62.0	V	74.0	-12.0	PK	1	1.3	RB 1 MHz;VB 3 MHz;Peak
4999.710	53.0	V	54.0	-1.0	AVG	6	1.6	RB 1 MHz;VB 10 Hz;Peak
4999.630	62.6	V	74.0	-11.4	PK	6	1.6	RB 1 MHz;VB 3 MHz;Peak
1666.800	39.1	V	54.0	-14.9	AVG	212	1.0	RB 1 MHz;VB 10 Hz;Peak
1666.660	44.5	V	74.0	-29.5	PK	212	1.0	RB 1 MHz;VB 3 MHz;Peak

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #4, Radiated Spurious Emissions, 1-40GHz, 802.11n40/802.11n40, Chain A+B+C

Run #4a, EUT on Channel #3 2422MHz - 802.11n40 and Channel #151 5755MHz - 802.11n40 - Chain A+B+C

Date of Test: 4/17/2013
 Test Engineer: Rafael Varelas

Test Location: FT7
 Config Change: None

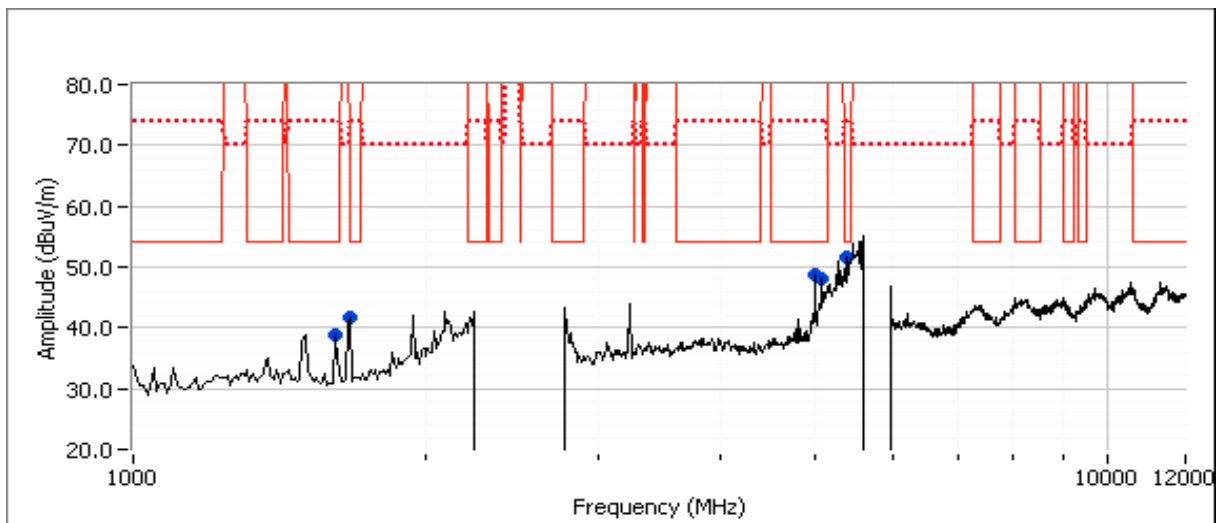
Radio	Freq	Power Setting
1	5755 MHz	16.0
2	2412 MHz	17.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4999.930	48.1	V	54.0	-5.9	AVG	3	1.6	RB 1 MHz;VB 10 Hz;Peak
4999.730	56.3	V	74.0	-17.7	PK	3	1.6	RB 1 MHz;VB 3 MHz;Peak
5400.060	47.6	V	54.0	-6.4	AVG	0	1.0	RB 1 MHz;VB 10 Hz;Peak
5399.050	58.5	V	74.0	-15.5	PK	0	1.0	RB 1 MHz;VB 3 MHz;Peak
1614.670	36.5	V	54.0	-17.5	AVG	359	1.1	RB 1 MHz;VB 10 Hz;Peak
1614.580	42.1	V	74.0	-31.9	PK	359	1.1	RB 1 MHz;VB 3 MHz;Peak
1666.610	40.1	V	54.0	-13.9	AVG	211	1.0	RB 1 MHz;VB 10 Hz;Peak
1666.610	44.8	V	74.0	-29.2	PK	211	1.0	RB 1 MHz;VB 3 MHz;Peak
5080.050	44.6	V	54.0	-9.4	AVG	4	1.0	RB 1 MHz;VB 10 Hz;Peak
5080.020	54.1	V	74.0	-19.9	PK	4	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

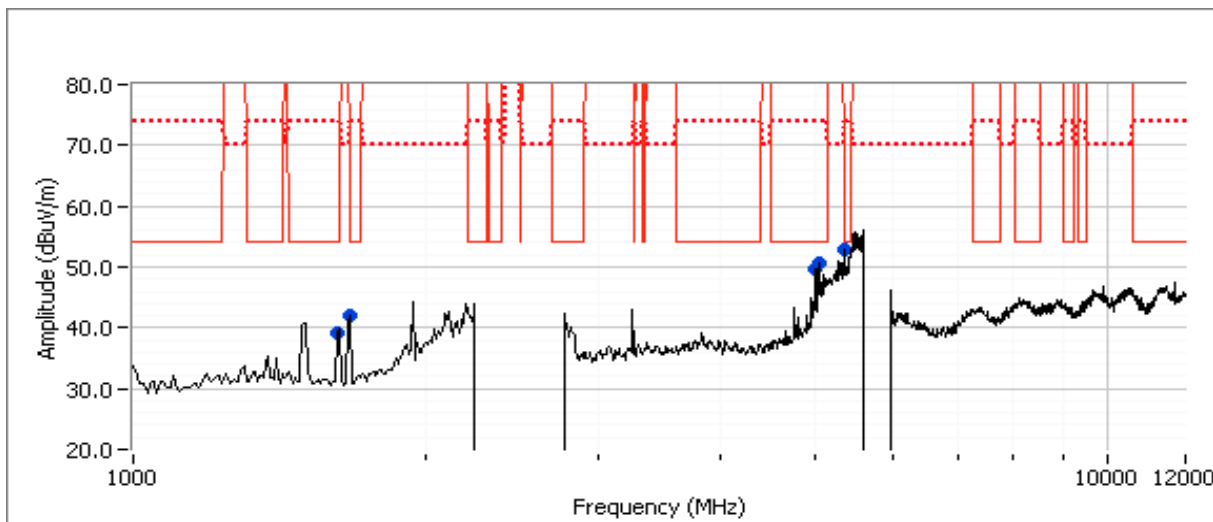
Run #4b: , EUT on Channel #6 2437MHz - 802.11n40 and Channel #159 5795MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5795 MHz	16.0
2	2437 MHz	18.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5359.980	50.3	V	54.0	-3.7	AVG	1	1.1	RB 1 MHz;VB 10 Hz;Peak
5359.750	61.7	V	74.0	-12.3	PK	1	1.1	RB 1 MHz;VB 3 MHz;Peak
4999.890	49.4	V	54.0	-4.6	AVG	0	1.5	RB 1 MHz;VB 10 Hz;Peak
4999.980	59.1	V	74.0	-14.9	PK	0	1.5	RB 1 MHz;VB 3 MHz;Peak
5040.000	45.4	H	54.0	-8.6	AVG	5	1.0	RB 1 MHz;VB 10 Hz;Peak
5039.990	54.7	H	74.0	-19.3	PK	5	1.0	RB 1 MHz;VB 3 MHz;Peak
1666.530	39.5	V	54.0	-14.5	AVG	180	1.6	RB 1 MHz;VB 10 Hz;Peak
1666.450	44.6	V	74.0	-29.4	PK	180	1.6	RB 1 MHz;VB 3 MHz;Peak
1624.680	41.3	V	54.0	-12.7	AVG	354	1.1	RB 1 MHz;VB 10 Hz;Peak
1624.520	45.1	V	74.0	-28.9	PK	354	1.1	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band average limit was used.
Note 3:	Scans made between 12 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Flextronics	Job Number:	J89632
Model:	WS-AP3710e	T-Log Number:	T89830
Contact:	George Fares	Account Manager:	Christine Krebill
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #4c: , EUT on Channel #9 2452MHz - 802.11n40 and Channel #159 5795MHz - 802.11n40, Chain A+B+C

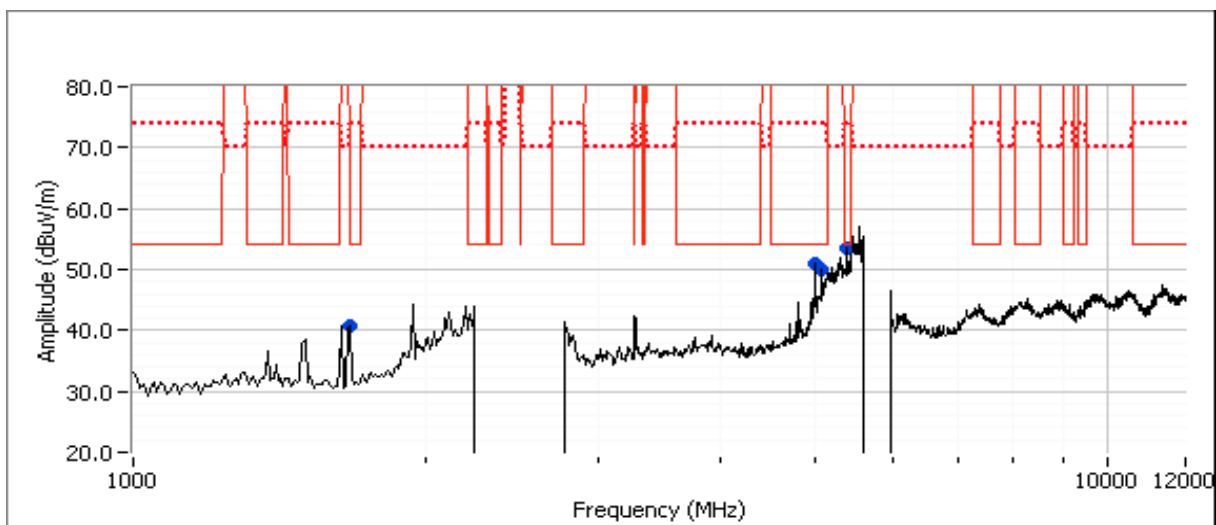
Radio	Freq	Power Setting
1	5795 MHz	16.0
2	2452 MHz	17.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5399.990	51.6	V	54.0	-2.4	AVG	360	1.4	RB 1 MHz;VB 10 Hz;Peak
5400.270	60.5	V	74.0	-13.5	PK	360	1.4	RB 1 MHz;VB 3 MHz;Peak
1666.690	40.0	V	54.0	-14.0	AVG	211	1.0	RB 1 MHz;VB 10 Hz;Peak
1666.560	44.6	V	74.0	-29.4	PK	211	1.0	RB 1 MHz;VB 3 MHz;Peak
5079.980	50.3	V	54.0	-3.7	AVG	2	1.0	RB 1 MHz;VB 10 Hz;Peak
5079.960	57.5	V	74.0	-16.5	PK	2	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.940	48.6	V	54.0	-5.4	AVG	0	1.5	RB 1 MHz;VB 10 Hz;Peak
5000.510	58.2	V	74.0	-15.8	PK	0	1.5	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band average limit was used.



End of Report

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