

EMC Test Report
Application for Grant of Equipment Authorization
FCC Part 15 Subpart C
Model: E1105

FCC ID: QB9E1105

APPLICANT: eTab
5017 Washington Place, Ste 202
St. Louis, MO 63108

TEST SITE(S): NTS Silicon Valley
41039 Boyce Road.
Fremont, CA. 94538-2435

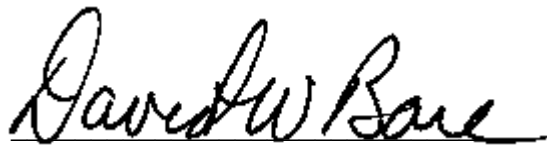
IC SITE REGISTRATION #: 2845B-4; 2845B-5

REPORT DATE: December 31, 2012

FINAL TEST DATES: September 17, 18, 21, 24 and December 31,
2012

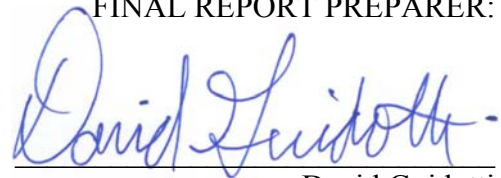
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	12-31-2012	First release	

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SCOPE

An electromagnetic emissions test has been performed on the eTab model E1105, pursuant to the following rules:

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 NTS Silicon Valley test procedures:

ANSI C63.4:2003

FCC DTS Measurement Procedure KDB558074

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.

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 eTab model E1105 complied with the requirements of the following regulations:

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 eTab model E1105 and therefore apply only to the tested sample. The sample was selected and prepared by Veronica Villareal of eTab.

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	Systems uses 802.11b/g techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	b mode: 12.8 MHz g mode: 16.4 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	b mode: 12.7 dBm (0.019 Watts) g mode: 16.5 dBm (0.045 Watts) EIRP 0.074 W ^{Note 1}	1 Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	b mode: -3.4 dBm/100 kHz g mode: -2.1 dBm/100 kHz	8dBm/3kHz	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	b mode: 51.7 dBμV/m @ 2487.7 MHz (-2.3 dB) g mode: 52.6 dBμV/m @ 2483.6 MHz (-1.4 dB)	15.207 in restricted bands, all others <-30dBc ^{Note 2}	Complies

Note 1: EIRP calculated using antenna gain of 2.2 dBi for the highest EIRP system.

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Integral antenna	Unique or integral antenna required	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR report in separate exhibit and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	17.04 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBμV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBμV	0.15 to 30 MHz	± 2.4 dB

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

The eTab model E1105 is a tablet computer that is designed for use in a restaurant environment to enable patrons to order menu items via the touch screen and pay for their meal using the credit card reader. Since the EUT could be used in any position including handheld during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 4.2 Volts, 1.5Amps supplied from a battery which is removed for charging.

The sample was received on September 17, 2012 and tested on September 17, 18, 21, 24 and December 31, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
eTab	E1105	5" Tablet Computer	Prototype	QB9E1105

ANTENNA SYSTEM

The antenna is a ceramic chip antenna (Pulse Inc., W3008C)

The SMD antenna is soldered on the PCB and directly coupled to the RF out of the AR6102 chip via matched LC network, thereby no connector is used.

ENCLOSURE

The EUT enclosure is primarily constructed of Flame Retardant ABS, POLYLAC PA-765. It measures approximately 10.0 cm wide by 3 cm deep by 16 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

No support equipment was used during testing.

EUT INTERFACE PORTS

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

Port	Connected To	Description	Cable(s)	Length(m)
			Shielded or Unshielded	
None				

EUT OPERATION

During emissions testing, a special battery adapter with USB connection was fitted to the EUT to allow software on a computer to control the radio. The radio was set to continuous transmit on the selected channel and mode.

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 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 5	211948	2845B-5	

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.

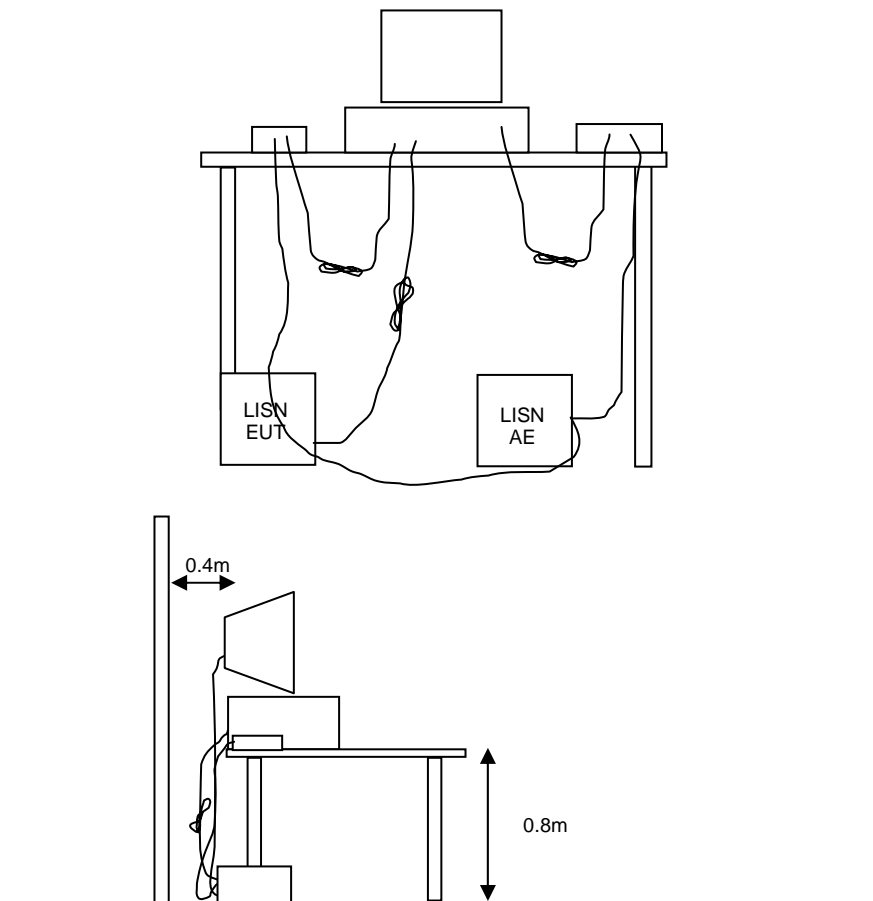


Figure 1 Typical Conducted Emissions Test Configuration

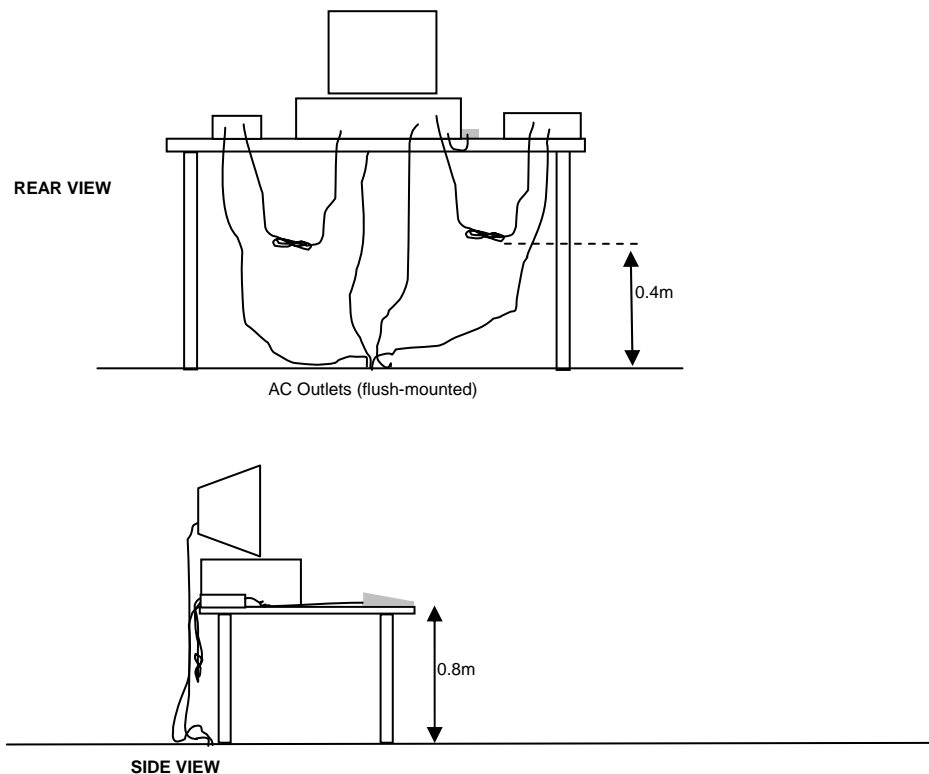
RADIATED EMISSIONS

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.

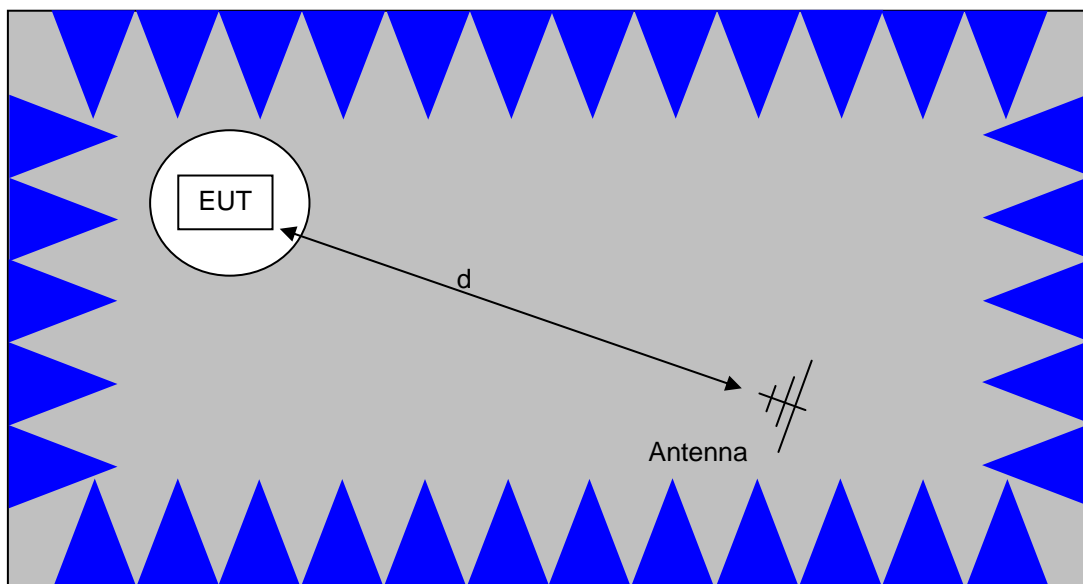
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

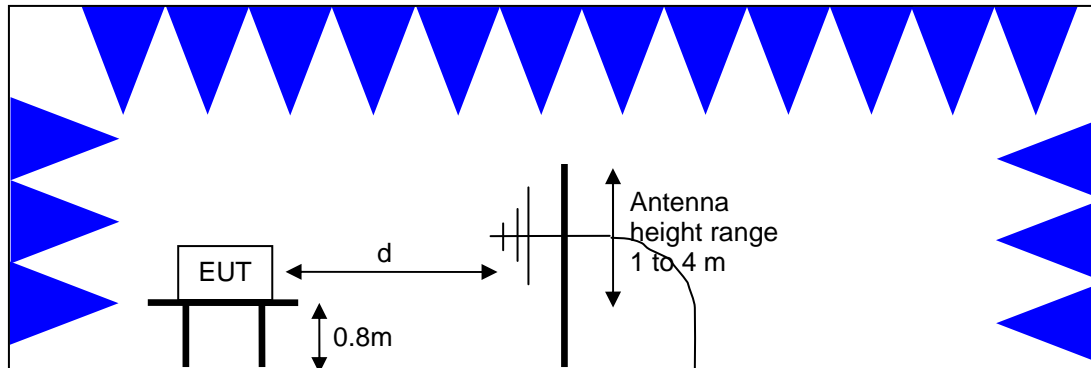


Typical Test Configuration for Radiated Field Strength Measurements



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.

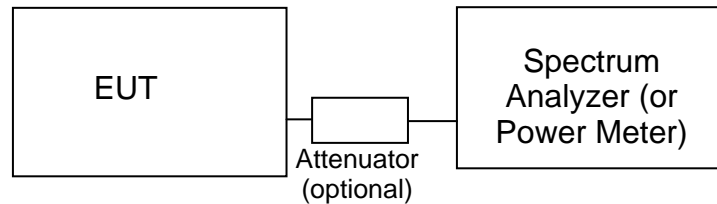
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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 NTS 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:

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	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
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

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

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

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

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

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

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

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$$F_d = \text{Distance Factor in dB}$$

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

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:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

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**Radiated Emissions, 1000 - 6,500 MHz, 18-Sep-12**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012

Radiated Emissions, 1000 - 6,500 MHz, 19-Sep-12

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	1142	8/23/2014
Rohde & Schwarz	(SA40-Red) EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012

Radiated Emissions, 1000 - 12,000 MHz, 19-Sep-12

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	1/13/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	2/23/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1142	8/23/2014
Micro-Tronics	(SA40-Red) Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/2/2013

Radiated Power and Band Edge Emissions, 31-Dec-12

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	12-Jul-14
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	21-May-13

Appendix B Test Data

T88957 Pages 22 – 45

Client:	eTab	Job Number:	J88788
Product	5" Tablet Computer	T-Log Number:	T88957
		Account Manager:	Christine Krebill
Contact:	Veronica Villareal		
Emissions Standard(s):	15.247	Class:	B
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

eTab

Product

5" Tablet Computer

Date of Last Test: 12/31/2012

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Measurements Power, PSD, Bandwidth

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: 9/17/2012 & 12/31/2012
 Test Engineer: Joseph Cadigal & David Bare
 Test Location: FT Chamber#4

Config. Used: 1
 Config Change: none
 Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT was placed on a turntable in the chamber for radiated power testing.

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

Ambient Conditions:

Temperature: 24 °C
 Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Test Performed	Limit	Pass / Fail	Result / Margin
1	16	Output Power	15.247(b)	Pass	16.5 dBm
2	16	Power spectral Density (PSD)	15.247(d)	Pass	-2.1 dBm/1MHz
3	16	Minimum 6dB Bandwidth	15.247(a)	Pass	16.353 MHz
3	16	99% Bandwidth	RSS GEN	-	17.04 MHz

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Run #1: Output Power

Performed on 12/31/12

802.11b

Power Setting ²	Frequency (MHz)	Output Power (EIRP) (dBm) ¹	mW	Antenna Gain (dBi)	Result	Output Power (dBm) ^{Note 3}	W	Output Power (dBm) ⁴	mW
16	2412	10.8	12.0	2.2	Pass	8.6	0.007	5.2	
16	2437	13.6	22.9	2.2	Pass	11.4	0.014	8.8	
16	2462	14.9	30.9	2.2	Pass	12.7	0.019	9.3	

802.11g

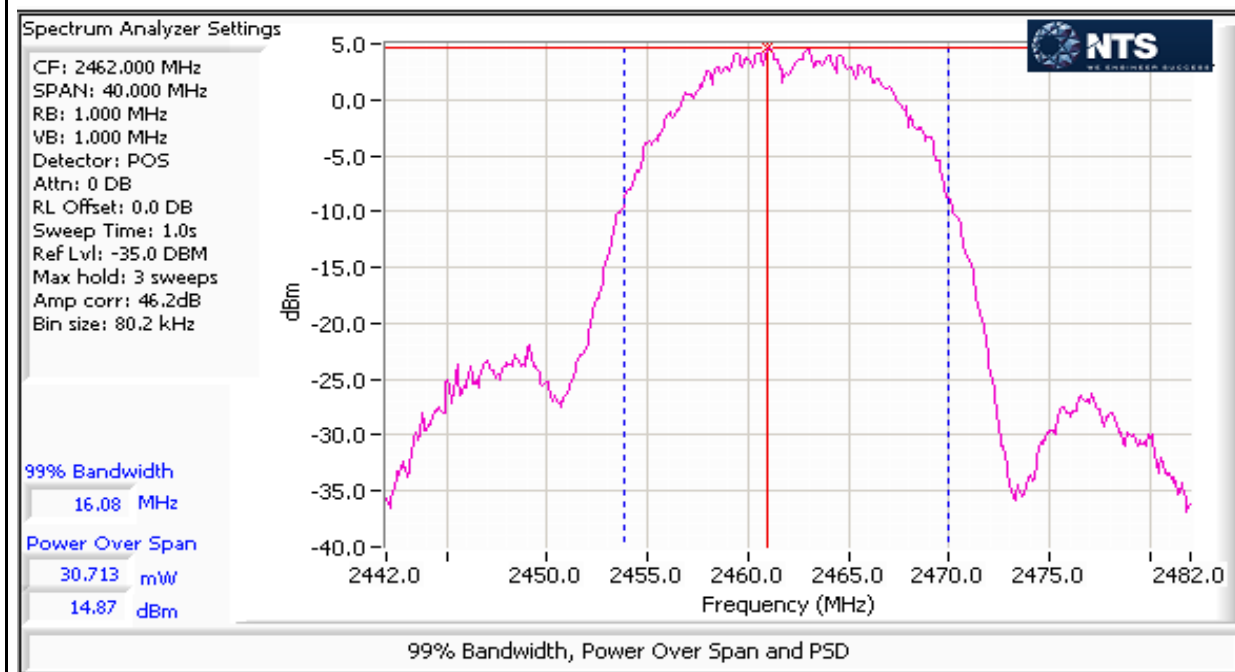
Power Setting ²	Frequency (MHz)	Output Power (EIRP) (dBm) ¹	mW	Antenna Gain (dBi)	Result	Output Power (dBm) ^{Note 3}	W	Output Power (dBm) ⁴	mW
16	2412	15.6	36.3	2.2	Pass	13.4	0.022	5.4	
16	2437	17.4	55.0	2.2	Pass	15.2	0.033	9.0	
16	2462	18.7	74.1	2.2	Pass	16.5	0.045	9.9	

Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, peak detector, and power integration over 40 MHz (option #2 for peak conducted output power in KDB 558074). Spurious limit becomes -20dBc.

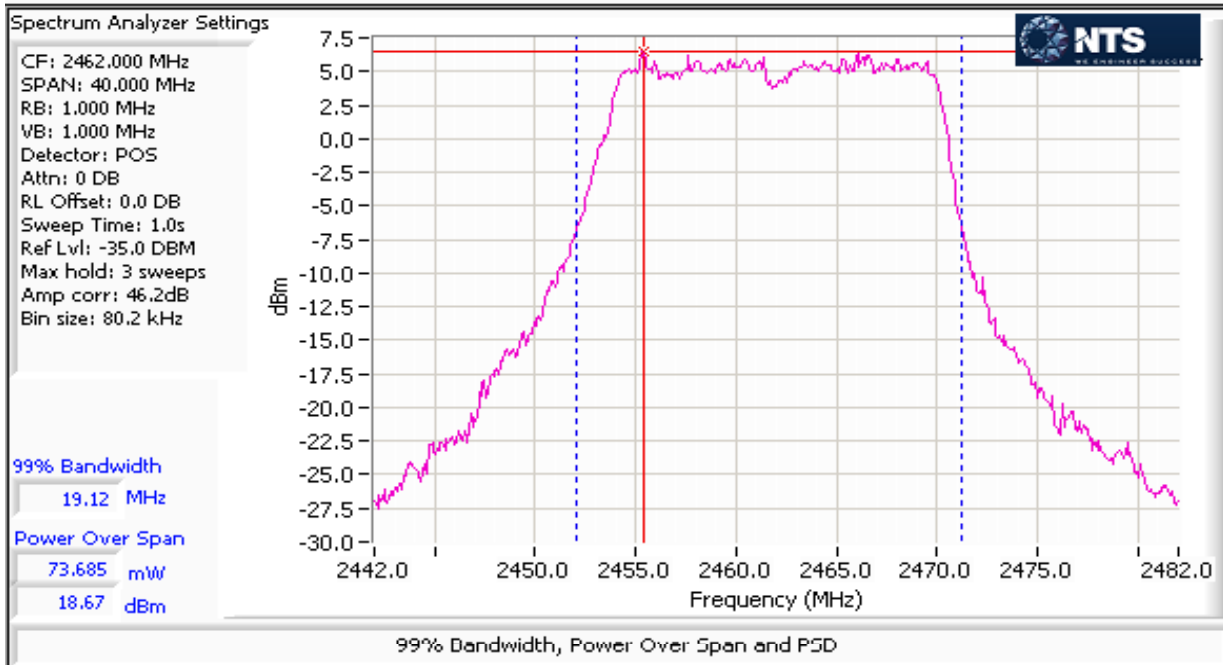
Note 2: Power setting - the software power setting used during testing, included for reference only.

Note 3: Power calculated from radiated power less antenna gain

Note 4: Average power measured for comparison with SAR results.



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A



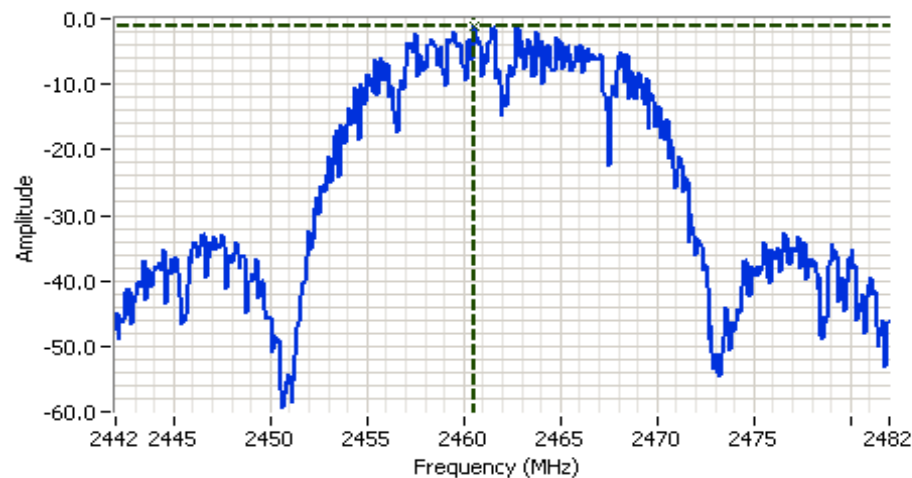
Run #2: Power spectral Density

802.11b					
Power Setting	Frequency (MHz)	PSD (dBm/100 kHz) ^{Note 1}	PSD	Limit dBm/3kHz	Result
16	2412	-6.0	-8.2	8.0	Pass
16	2437	-2.4	-4.6	8.0	Pass
16	2462	-1.2	-3.4	8.0	Pass
802.11g					
Power Setting	Frequency (MHz)	PSD (dBm/100 kHz) ^{Note 1}	PSD	Limit dBm/3kHz	Result
16	2412	-3.9	-6.1	8.0	Pass
16	2437	0.12	-2.1	8.0	Pass
16	2462	-0.3	-2.5	8.0	Pass

Note 1: Power spectral density measured using RB=100 kHz, VB=300 kHz, analyzer with peak detector and auto sweep time with the span set wider than the 6dB bandwidth (e. g. >= 20MHz for b/g/n20 modulations). Since the PSD was less than the required 8dBm and the bandwidth was higher than 3kHz, the EUT complied with this requirement.

Note 2: Power setting - the software power setting used during testing, included for reference only.

Client: eTab	Job Number: J88788
Model: 5" Tablet Computer	T-Log Number: T88957
Contact: Veronica Villareal	Account Manager: Christine Krebill
Standard: 15.247	Class: N/A

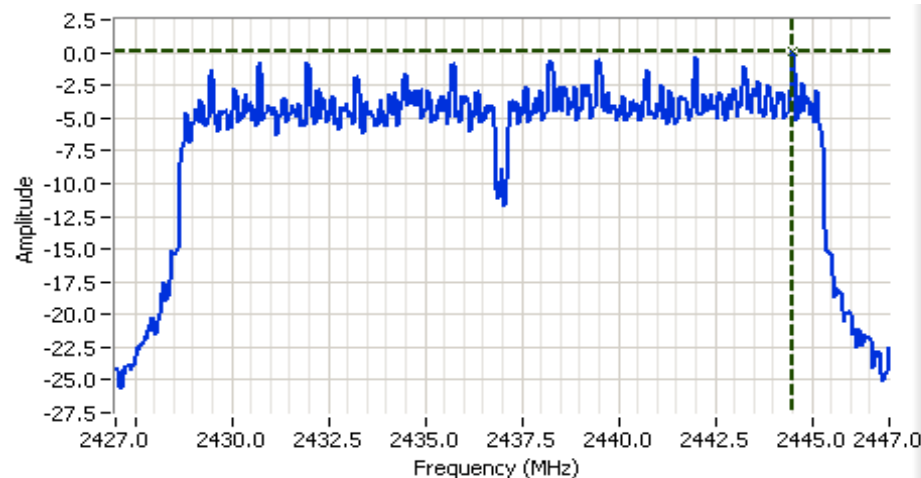
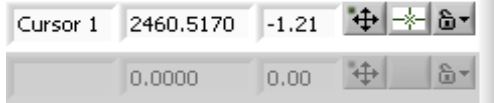


Analyzer Settings

Rohde&Schwarz, ESI
 CF: 2462.000 MHz
 SPAN: 40.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 0 DB
 RL Offset: 43.5 DB
 Sweep Time: 10.0ms
 Ref Lvl: 2.6 DBM

Comments

802.11b setting 16

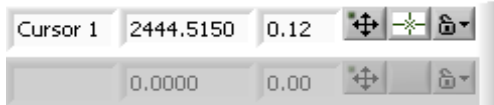


Analyzer Settings

Rohde&Schwarz, ESI
 CF: 2437.000 MHz
 SPAN: 20.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 0 DB
 RL Offset: 43.5 DB
 Sweep Time: 5.0ms
 Ref Lvl: 2.6 DBM

Comments

802.11g setting 16 PSD

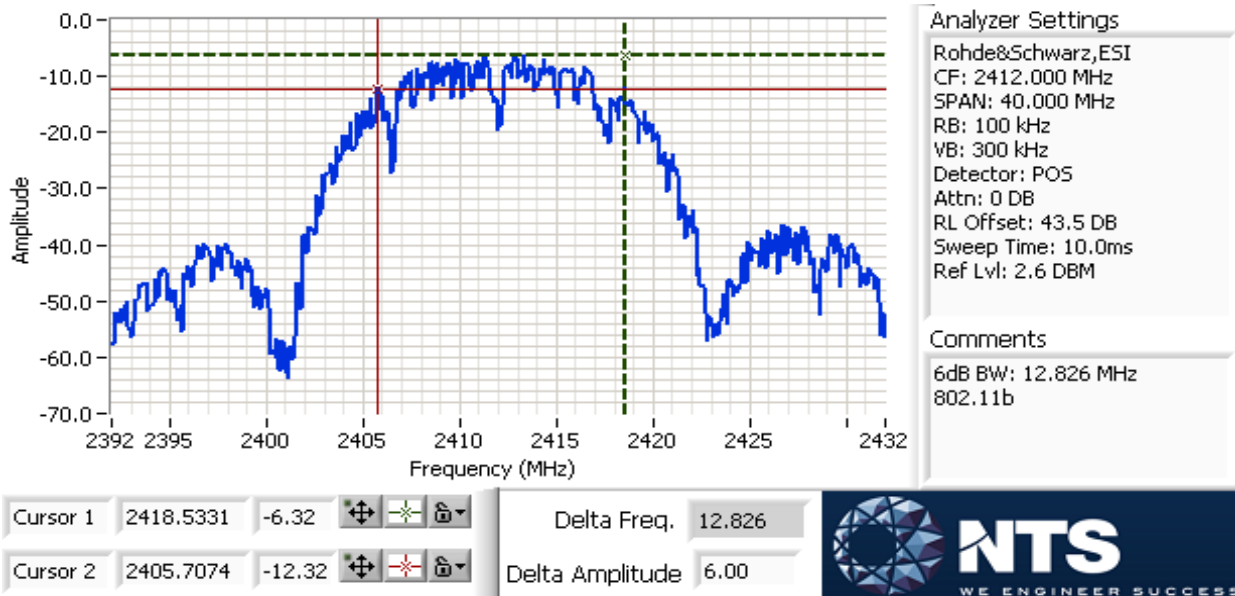


Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

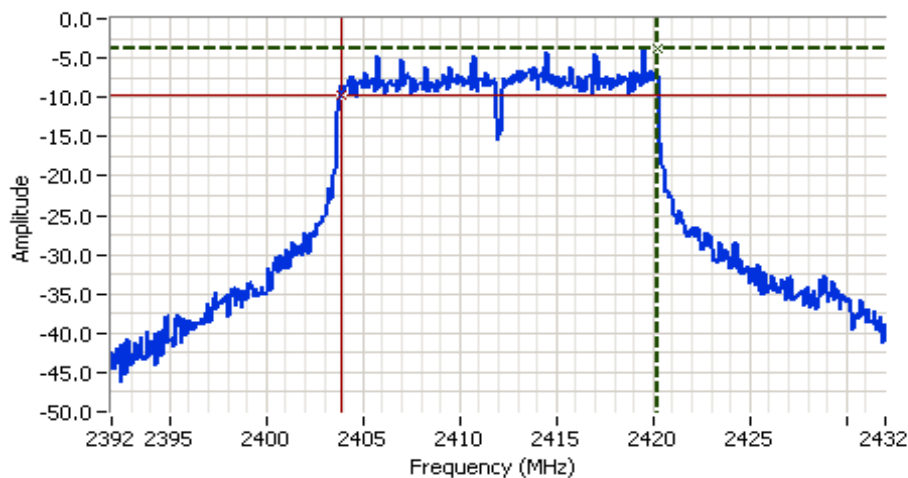
Run #3: Signal Bandwidth

802.11b						
	Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth 6dB	Resolution Bandwidth	Bandwidth 99%
	16	2412	100kHz	12.8	1MHz	15.9
	16	2437	100kHz	11.5	1MHz	15.8
	16	2462	100kHz	12.8	1MHz	15.9
802.11g						
	Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth 6dB	Resolution Bandwidth	Bandwidth 99%
	16	2412	100kHz	16.4	1MHz	17.0
	16	2437	100kHz	16.4	1MHz	17.0
	16	2462	100kHz	16.4	1MHz	17.0

Note 1: 6dB bandwidth measured in accordance with KDB 558074 except RBW was less than 1% of the measured bandwidth and VBW $\geq 3 \times \text{RBW}$. 99% bandwidth measured per RSS GEN with RBW $> 1\%$ of the span and VBW $\geq 3 \times \text{RBW}$.



Client: eTab	Job Number: J88788
Model: 5" Tablet Computer	T-Log Number: T88957
Contact: Veronica Villareal	Account Manager: Christine Krebill
Standard: 15.247	Class: N/A









Analyzer Settings

Rohde&Schwarz, ESI
 CF: 2412.000 MHz
 SPAN: 40.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 0 dB
 RL Offset: 43.5 dB
 Sweep Time: 10.0ms
 Ref Lvl: 2.6 DBM

Comments

6dB BW: 16.353 MHz

Cursor 1	2420.2164	-3.74			
Cursor 2	2403.8637	-9.74			

Delta Freq. 16.353

Delta Amplitude 6.00

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	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.

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

Ambient Conditions:

Temperature:	15-30 °C
Rel. Humidity:	30-50 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	b-mode	low	16		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	38.3 dBμV/m @ 2386.2 MHz (-15.7 dB)
			16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	31.1 dBμV/m @ 1119.0 MHz (-22.9 dB)
1b	b-mode	center	16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	30.7 dBμV/m @ 1204.2 MHz (-23.3 dB)
1c	b-mode	high	16		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	51.7 dBμV/m @ 2487.7 MHz (-2.3 dB)
			16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	38.2 dBμV/m @ 1115.3 MHz (-15.8 dB)
2a	g-mode	low	16		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	50.8 dBμV/m @ 2389.9 MHz (-3.2 dB)
			16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	36.2 dBμV/m @ 2233.5 MHz (-17.8 dB)
2b	g-mode	center	16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	37.6 dBμV/m @ 1118.1 MHz (-16.4 dB)
2c	g-mode	high	16		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.6 dBμV/m @ 2483.6 MHz (-1.4 dB)
			16		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	36.7 dBμV/m @ 2235.7 MHz (-17.3 dB)

Note 1:	Radiated field strength power measurement showed between all orientations, flat gives the highest power level; therefore, all bandedge measurement were performed in that orientations. All other spurious emissions were more than 20dB below the limit, therefore flat orientation of EUT was used.
Note 2:	Scans made between 12 - 25GHz with the measurement antenna moved around the EUT 20-50cm from the device indicated there were no significant emissions in this frequency range

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25,000 MHz. Operating Mode: 802.11b

Date of Test: 9/17/2012 & 12/31/2012

Test Engineer: Joseph Cadigal, David Bare

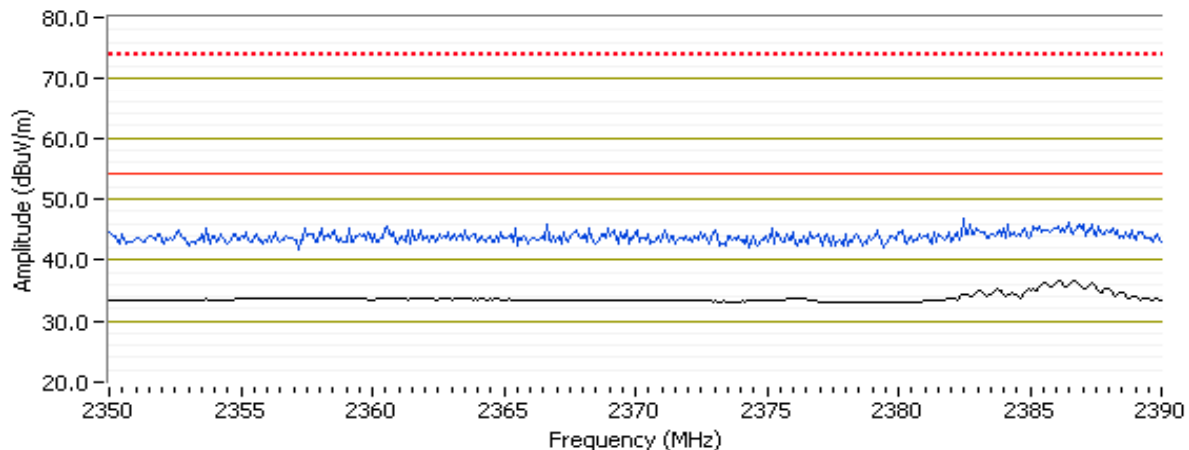
Test Location: FT Chamber#4

Run #1a: Low Channel @ 2412 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.230	38.3	V	54.0	-15.7	AVG	341	1.0	POS; RB 1 MHz; VB: 10 Hz
2386.150	45.6	V	74.0	-28.4	PK	341	1.0	POS; RB 1 MHz; VB: 3 MHz
2386.310	35.2	H	54.0	-18.8	AVG	360	1.0	POS; RB 1 MHz; VB: 10 Hz
2386.950	44.5	H	74.0	-29.5	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz= avg, 1MHz =RB 3MHz = VB = Pk, V



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

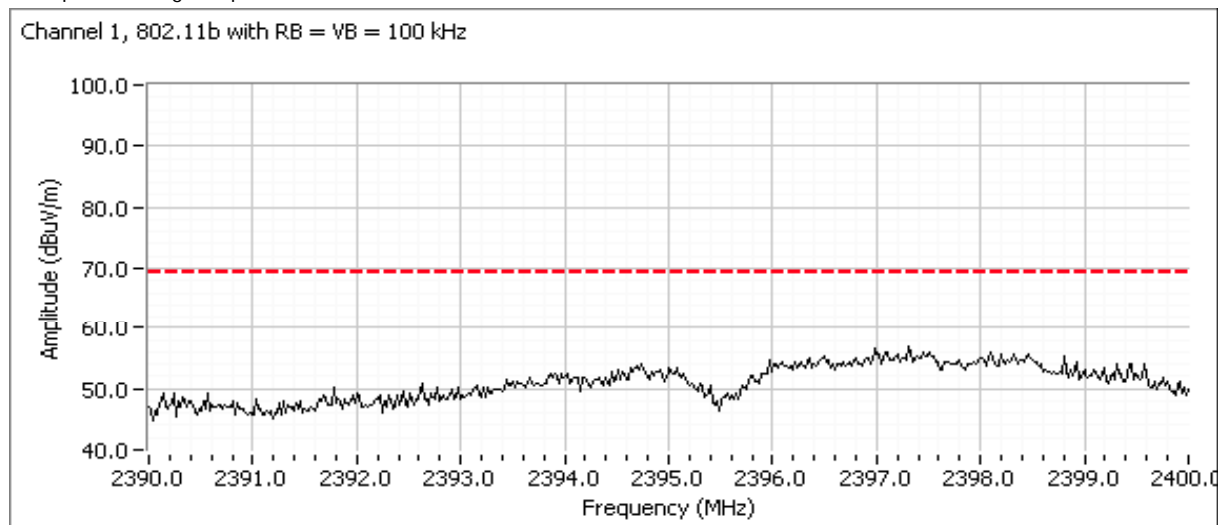
Fundamental Signal Field Strength: Peak value measured in 100kHz

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	
2413.980	78.4	V	-	-	PK	52	1.7	POS; RB 100 kHz; VB: 100 kHz
2411.300	89.4	H	-	-	PK	341	1.0	POS; RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	89.4 dB μ V/m
Limit for emissions outside of restricted bands:	69.4 dB μ V/m

Limit is -20dBc (Peak power measurement)

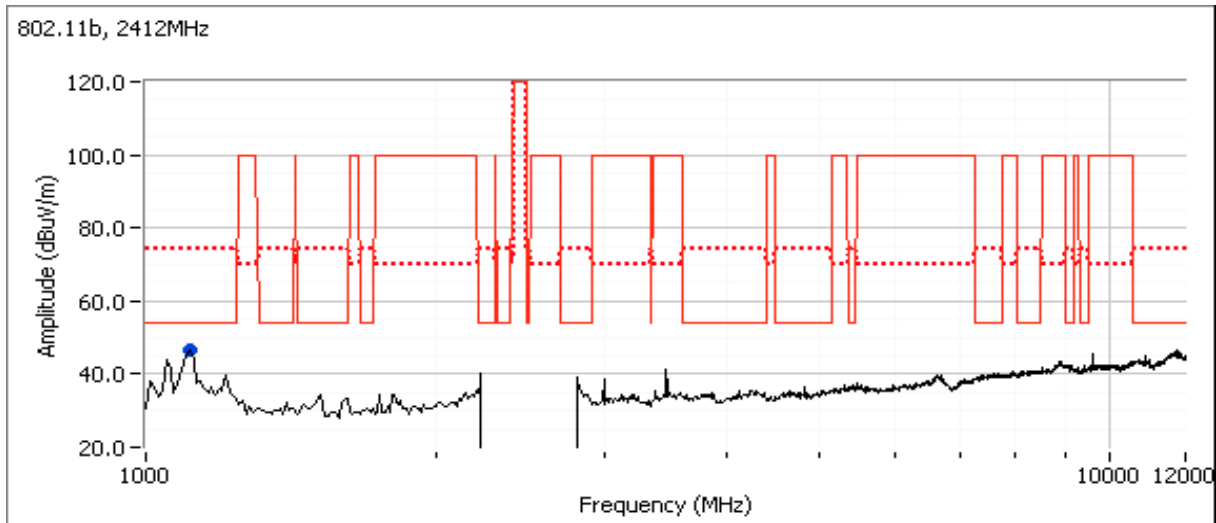
Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Performed on 12/31/12


Other Spurious 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	
1118.970	31.1	H	54.0	-22.9	AVG	327	2.2	RB 1 MHz; VB 10 Hz; Peak
1120.930	40.9	H	74.0	-33.1	PK	327	2.2	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, conducted spurious emissions were measured to determine compliance with the limits.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A



Run #1b: Center Channel @ 2437 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

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	
2436.460	86.6	V	-	-	PK	10	1.6	POS; RB 100 kHz; VB: 100 kHz
2436.340	94.7	H	-	-	PK	308	1.0	POS; RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	94.7 dB μ V/m
Limit for emissions outside of restricted bands:	64.7 dB μ V/m

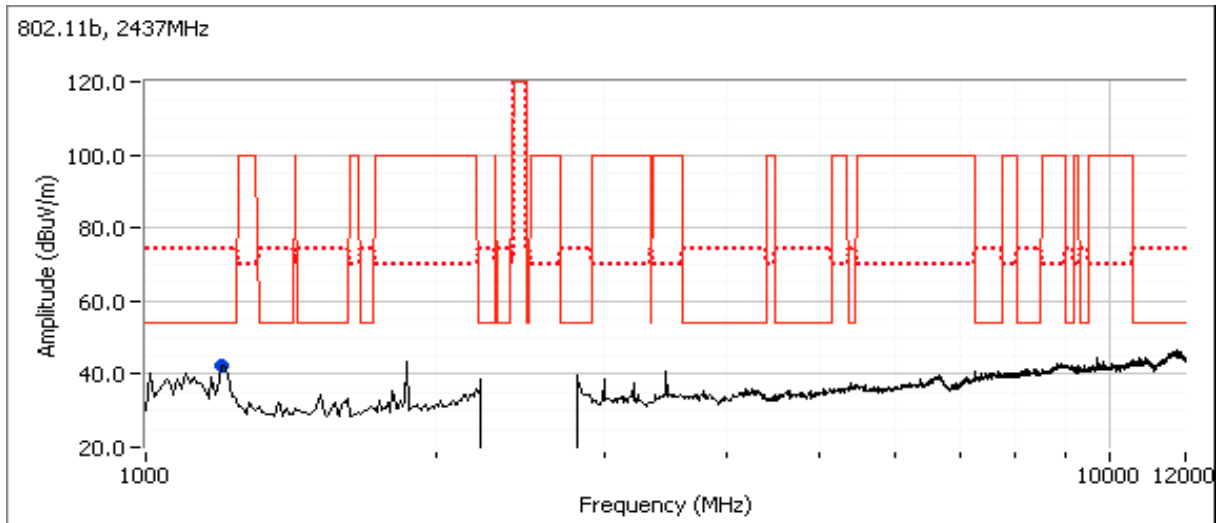
Limit is -30dBc (Average power measurement)

Spurious 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	
1204.210	30.7	V	54.0	-23.3	AVG	358	1.3	RB 1 MHz;VB 10 Hz;Peak
1202.500	37.5	V	74.0	-36.5	PK	358	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, conducted spurious emissions were measured to determine compliance with the limits.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

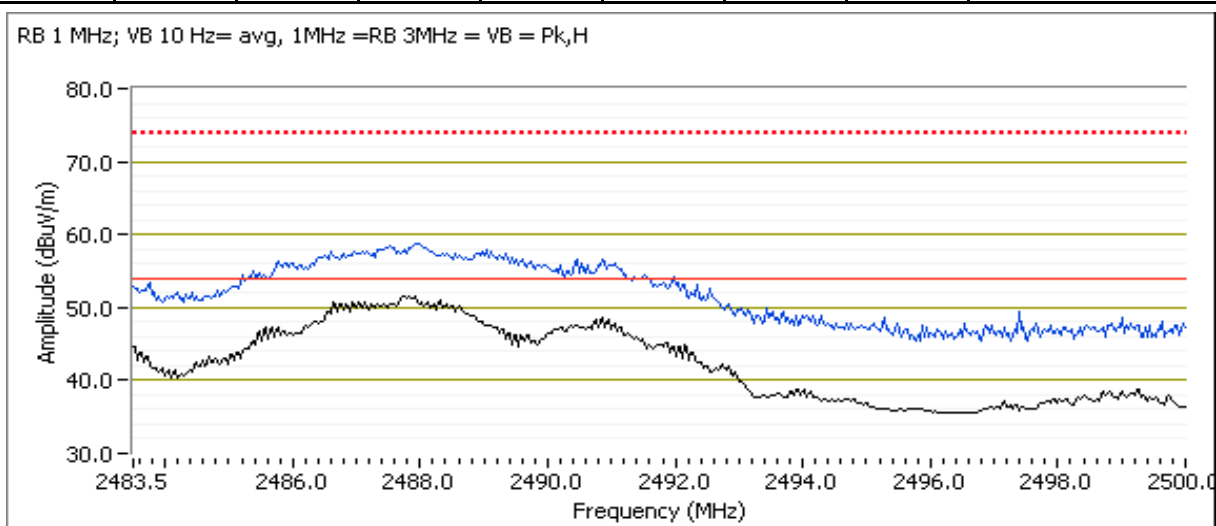
Client: eTab	Job Number: J88788
Model: 5" Tablet Computer	T-Log Number: T88957
Contact: Veronica Villareal	Account Manager: Christine Krebill
Standard: 15.247	Class: N/A



Run #1c: High Channel @ 2462 MHz

Band Edge Signal Field Strength - Direct measurement of 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	
2487.670	51.7	H	54.0	-2.3	AVG	258	1.0	POS; RB 1 MHz; VB: 10 Hz
2487.900	56.1	H	74.0	-17.9	PK	258	1.0	POS; RB 1 MHz; VB: 3 MHz
2487.770	46.2	V	54.0	-7.8	AVG	360	1.6	POS; RB 1 MHz; VB: 10 Hz
2487.570	52.6	V	74.0	-21.4	PK	360	1.6	POS; RB 1 MHz; VB: 3 MHz



Client: eTab	Job Number: J88788
Model: 5" Tablet Computer	T-Log Number: T88957
Contact: Veronica Villareal	Account Manager: Christine Krebill
Standard: 15.247	Class: N/A

Fundamental Signal Field Strength: Peak value measured in 100kHz

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	
2463.740	91.7	V	-	-	AVG	14	1.0	POS; RB 1 MHz; VB: 10 Hz
2462.940	95.6	V	-	-	PK	14	1.0	POS; RB 1 MHz; VB: 3 MHz
2462.660	89.1	V	-	-	PK	14	1.0	POS; RB 100 kHz; VB: 100 kHz
2463.780	98.7	H	-	-	AVG	247	1.0	POS; RB 1 MHz; VB: 10 Hz
2462.900	101.8	H	-	-	PK	247	1.0	POS; RB 1 MHz; VB: 3 MHz
2463.980	96.7	H	-	-	PK	247	1.0	POS; RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	96.7	dB μ V/m
Limit for emissions outside of restricted bands:	66.7	dB μ V/m

Limit is -30dBc (Average power measurement)

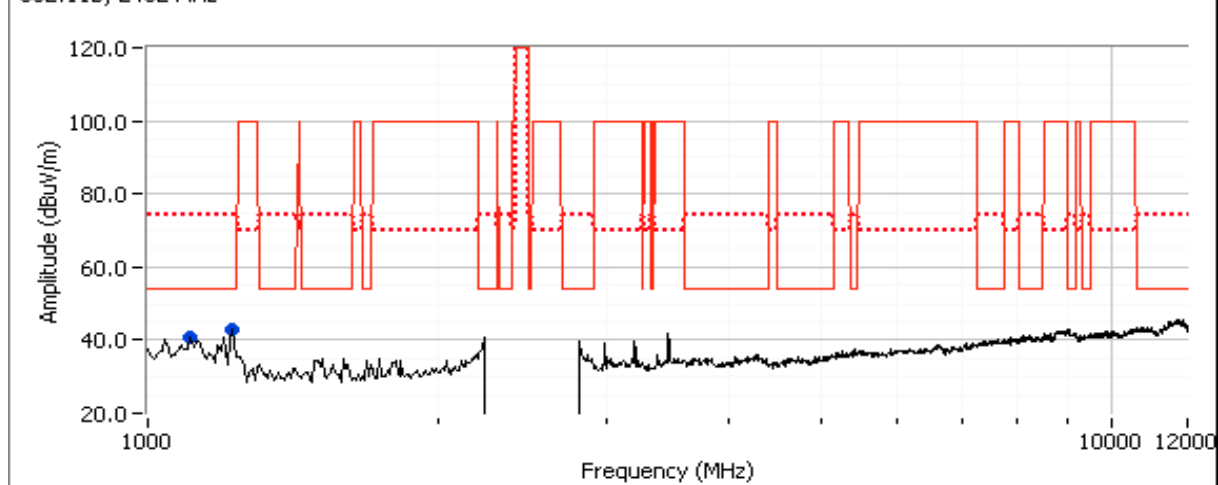
Other Spurious Emissions

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	
1115.320	38.2	H	54.0	-15.8	AVG	356	1.9	RB 1 MHz;VB 10 Hz;Peak
1225.370	32.2	H	54.0	-21.8	AVG	126	1.9	RB 1 MHz;VB 10 Hz;Peak
1117.760	45.6	H	74.0	-28.4	PK	356	1.9	RB 1 MHz;VB 3 MHz;Peak
1226.560	38.3	H	74.0	-35.7	PK	126	1.9	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, conducted spurious emissions were measured to determine compliance with the limits.

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

802.11b, 2462 MHz



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 25,000 MHz. Operating Mode: 802.11g

Date of Test: 9/18/2012 & 12/31/2012

Test Engineer: Joseph Cadigal, David Bare

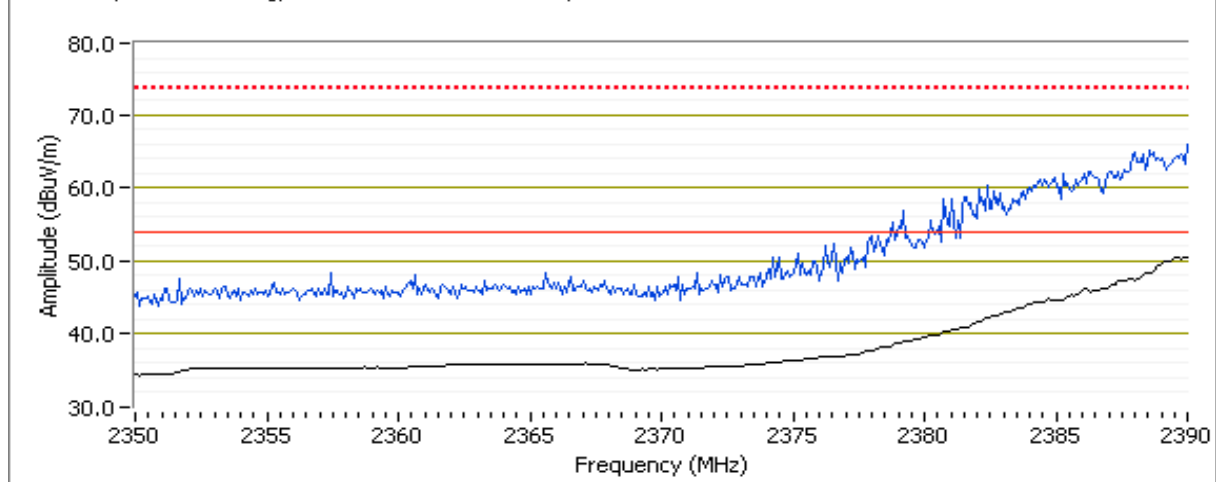
Test Location: FT Chamber#5

Run #2a: Low Channel @ 2412 MHz

Band Edge Signal Field Strength - Direct measurement of 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	50.8	H	54.0	-3.2	AVG	319	1.1	POS; RB 1 MHz; VB: 10 Hz
2389.440	64.3	H	74.0	-9.7	PK	319	1.1	POS; RB 1 MHz; VB: 3 MHz
2389.920	42.2	V	54.0	-11.8	AVG	189	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.520	55.6	V	74.0	-18.4	PK	189	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 10 Hz= avg, 1MHz =RB 3MHz = VB = Pk,H



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

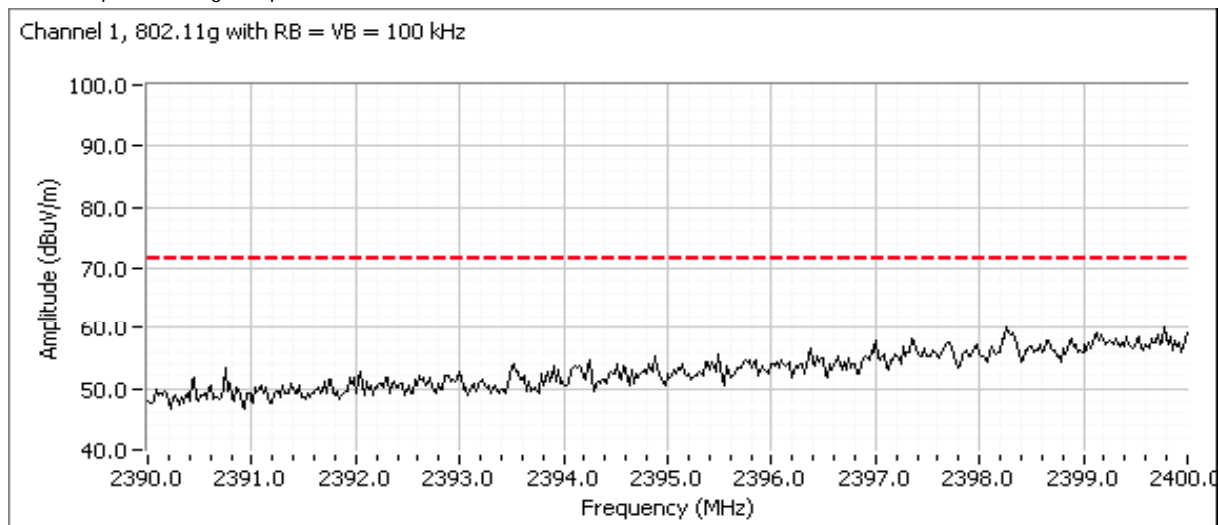
Fundamental Signal Field Strength: Peak value measured in 100kHz

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	
2414.550	82.3	V	-	-	PK	186	1.0	POS; RB 100 kHz; VB: 100 kHz
2405.730	91.7	H	-	-	PK	257	1.0	POS; RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	91.7 dB μ V/m
Limit for emissions outside of restricted bands:	71.7 dB μ V/m

Limit is -20dBc (Peak power measurement)

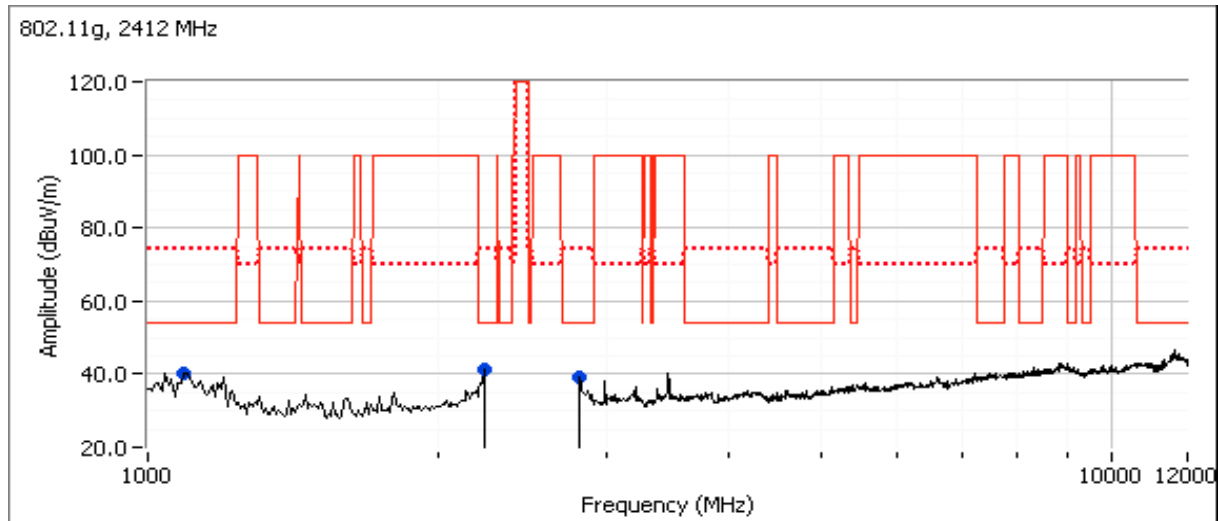
Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Performed on 12/31/12


Other Spurious 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	
2233.450	36.2	H	54.0	-17.8	AVG	249	1.3	RB 1 MHz;VB 10 Hz;Peak
2798.610	35.0	V	54.0	-19.0	AVG	151	1.2	RB 1 MHz;VB 10 Hz;Peak
2233.010	48.2	H	74.0	-25.8	PK	249	1.3	RB 1 MHz;VB 3 MHz;Peak
1090.070	27.9	V	54.0	-26.1	AVG	31	1.9	RB 1 MHz;VB 10 Hz;Peak
2798.640	46.3	V	74.0	-27.7	PK	151	1.2	RB 1 MHz;VB 3 MHz;Peak
1089.110	38.1	V	74.0	-35.9	PK	31	1.9	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, conducted spurious emissions were measured to determine compliance with the limits.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client: eTab	Job Number: J88788
Model: 5" Tablet Computer	T-Log Number: T88957
Contact: Veronica Villareal	Account Manager: Christine Krebill
Standard: 15.247	Class: N/A



Run #2b: Center Channel @ 2437 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2444.520	91.3	V	-	-	AVG	325	1.0	POS; RB 1 MHz; VB: 10 Hz
2442.990	99.2	V	-	-	PK	325	1.0	POS; RB 1 MHz; VB: 3 MHz
2444.520	90.7	V	-	-	PK	325	1.0	POS; RB 100 kHz; VB: 100 kHz
2444.520	91.5	H	-	-	AVG	319	1.0	POS; RB 1 MHz; VB: 10 Hz
2443.510	99.9	H	-	-	PK	319	1.0	POS; RB 1 MHz; VB: 3 MHz
2443.230	90.4	H	-	-	PK	319	1.0	POS; RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW: 90.7 dBuV/m

Limit for emissions outside of restricted bands: 60.7 dBuV/m

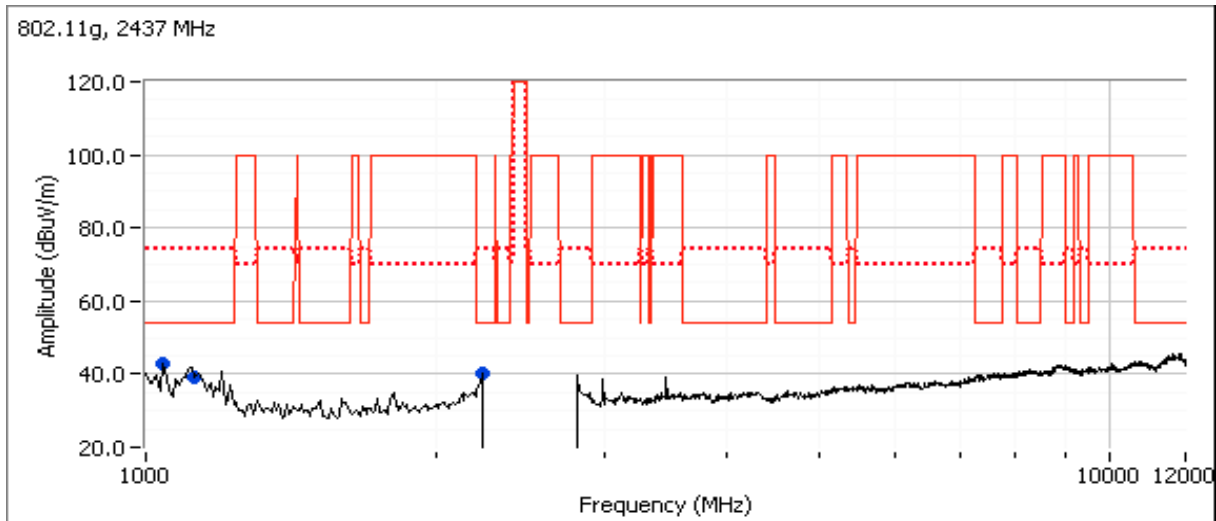
Limit is -30dBc (Average power measurement)

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1118.090	37.6	H	54.0	-16.4	AVG	90	1.6	RB 1 MHz;VB 10 Hz;Peak
1046.110	35.3	H	54.0	-18.7	AVG	226	1.3	RB 1 MHz;VB 10 Hz;Peak
2230.440	35.2	H	54.0	-18.8	AVG	299	2.5	RB 1 MHz;VB 10 Hz;Peak
2231.700	47.4	H	74.0	-26.6	PK	299	2.5	RB 1 MHz;VB 3 MHz;Peak
1120.430	47.0	H	74.0	-27.0	PK	90	1.6	RB 1 MHz;VB 3 MHz;Peak
1046.290	42.9	H	74.0	-31.1	PK	226	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, conducted spurious emissions were measured to determine compliance with the limits.

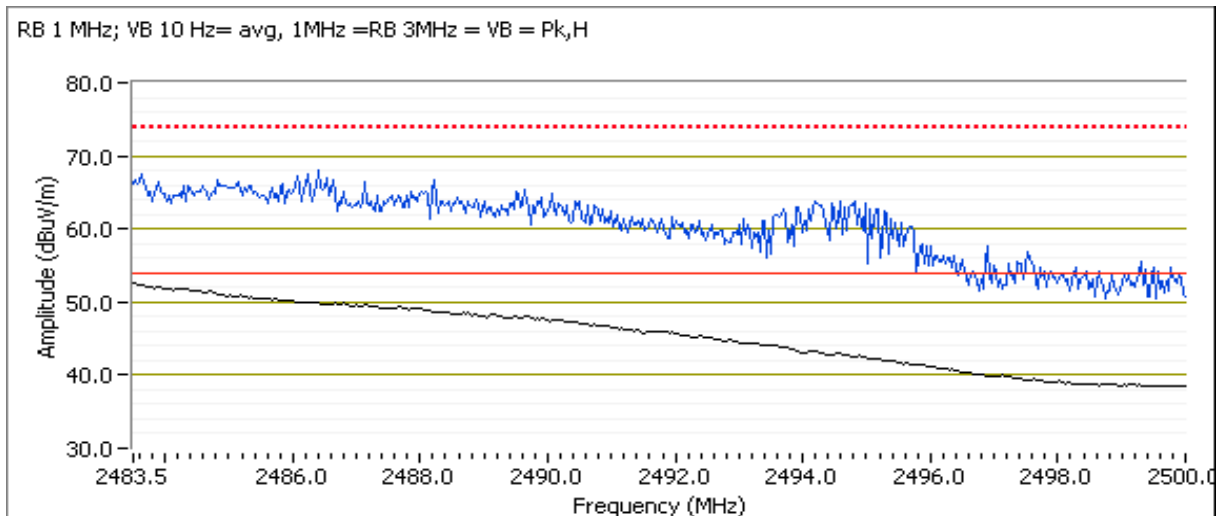
Client: eTab	Job Number: J88788
Model: 5" Tablet Computer	T-Log Number: T88957
Contact: Veronica Villareal	Account Manager: Christine Krebill
Standard: 15.247	Class: N/A



Run #2c: High Channel @ 2462 MHz

Band Edge Signal Field Strength - Direct measurement of 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	
2483.630	52.6	H	54.0	-1.4	AVG	267	1.0	POS; RB 1 MHz; VB: 10 Hz
2486.410	65.6	H	74.0	-8.4	PK	267	1.0	POS; RB 1 MHz; VB: 3 MHz
2483.630	50.3	V	54.0	-3.7	AVG	18	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.530	62.6	V	74.0	-11.4	PK	18	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Fundamental Signal Field Strength: Peak value measured in 100kHz

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	
2468.290	89.6	V	-	-	AVG	10	1.4	POS; RB 1 MHz; VB: 10 Hz
2469.010	97.8	V	-	-	PK	10	1.4	POS; RB 1 MHz; VB: 3 MHz
2470.120	88.2	V	-	-	PK	10	1.4	POS; RB 100 kHz; VB: 100 kHz
2465.870	96.5	H	-	-	AVG	252	1.0	POS; RB 1 MHz; VB: 10 Hz
2458.090	105.0	H	-	-	PK	252	1.0	POS; RB 1 MHz; VB: 3 MHz
2466.990	95.8	H	-	-	PK	252	1.0	POS; RB 100 kHz; VB: 100 kHz

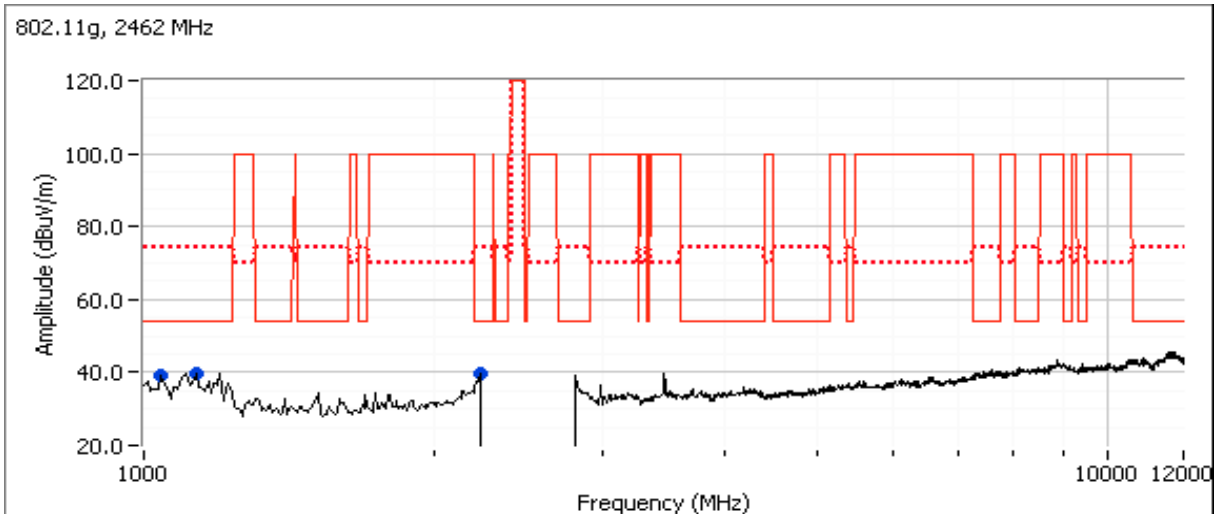
Fundamental emission level @ 3m in 100kHz RBW:	95.8	dB μ V/m
Limit for emissions outside of restricted bands:	65.8	dB μ V/m

Limit is -30dBc (Average power measurement)

Other Spurious 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	
2235.690	36.7	V	54.0	-17.3	AVG	15	1.6	RB 1 MHz;VB 10 Hz;Peak
1046.990	32.6	V	54.0	-21.4	AVG	234	2.2	RB 1 MHz;VB 10 Hz;Peak
2235.970	49.1	V	74.0	-24.9	PK	15	1.6	RB 1 MHz;VB 3 MHz;Peak
1141.660	24.8	H	54.0	-29.2	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Peak
1048.020	38.8	V	74.0	-35.2	PK	234	2.2	RB 1 MHz;VB 3 MHz;Peak
1142.180	35.0	H	74.0	-39.0	PK	360	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, conducted spurious emissions were measured to determine compliance with the limits.



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Radiated Emissions 30-1000 MHz, (FCC 15.247/RSS 210)

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 9/21/2012
 Test Engineer: M. Birgani/Jack Liu
 Test Location: FT Chamber#4

Config. Used: 1
 Config Change: none
 EUT Voltage: Battery

General Test Configuration

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

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature:	24 °C
Rel. Humidity:	37 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz, 802.11b mode	FCC 15.209 / RSS 210	Pass	37.2 dBμV/m @ 339.46 MHz (-8.8 dB)
2	Radiated Emissions 30 - 1000 MHz, 802.11g mode	FCC 15.209 / RSS 210	Pass	39.7 dBμV/m @ 339.46 MHz (-6.3 dB)

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.

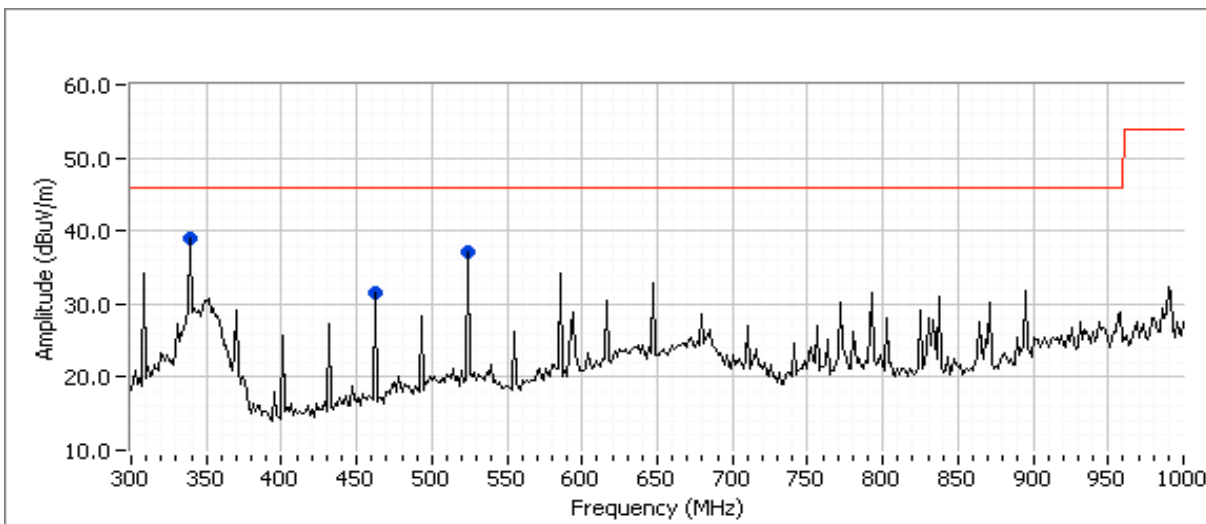
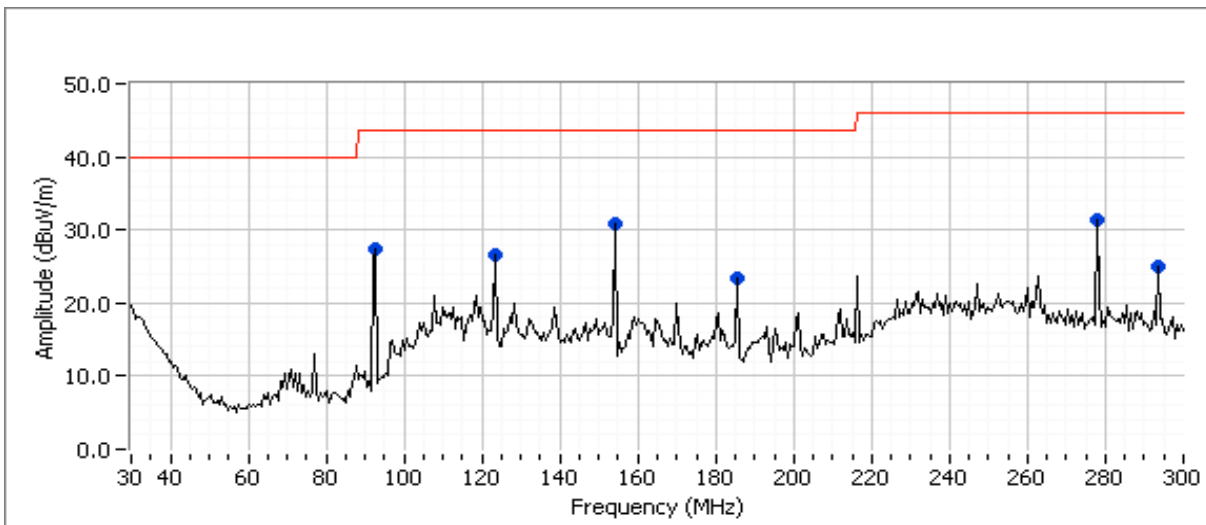
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

Test Notes

Removed programming pod and inserted battery to perform tests

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz
 Configured Radio to Tx , 802.11b (settings 16) on channel 1



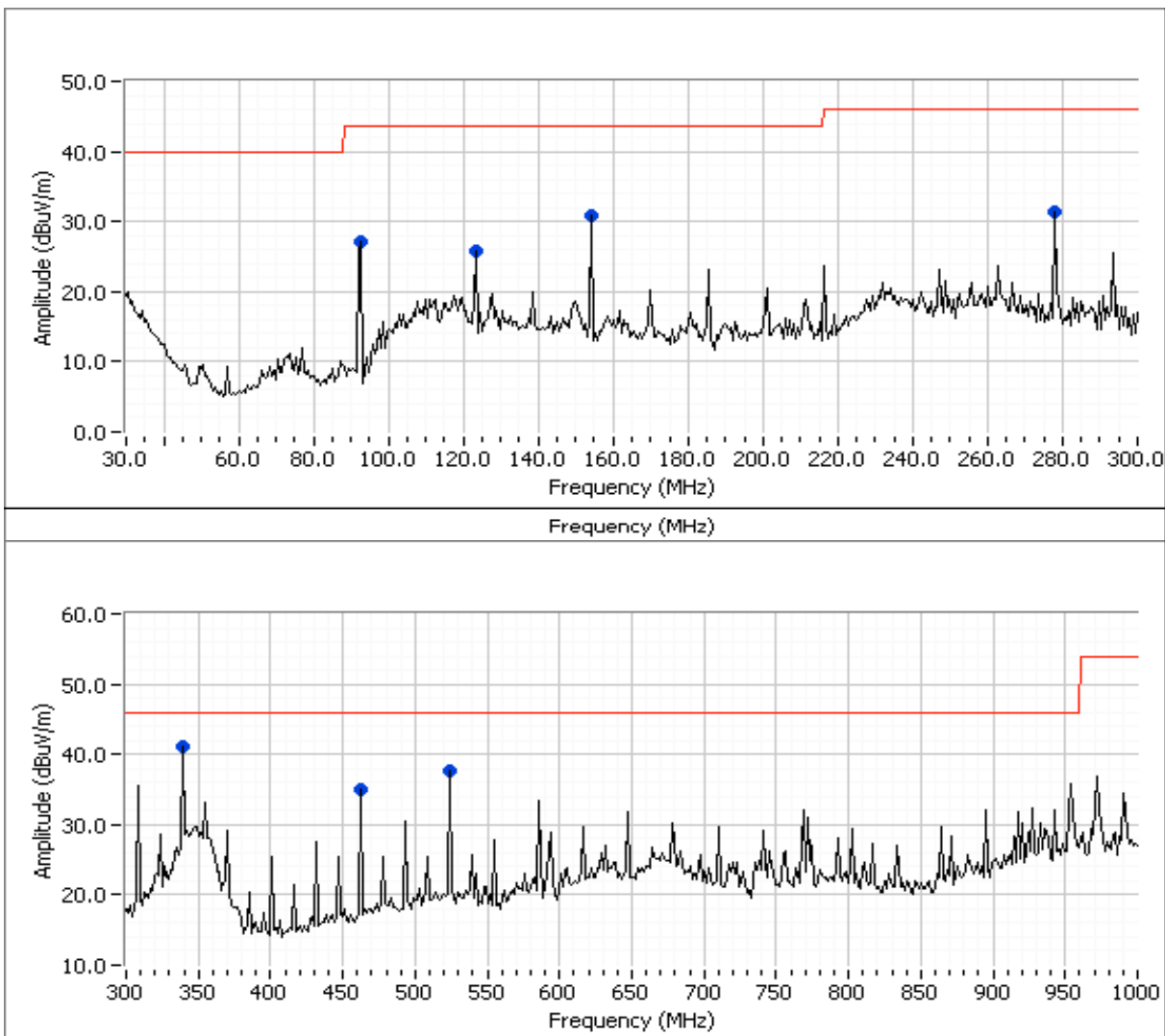
Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
339.456	37.2	H	46.0	-8.8	QP	275	1.0	
524.586	36.3	V	46.0	-9.7	QP	252	1.0	
154.295	29.9	V	43.5	-13.6	QP	332	1.0	
462.862	31.6	V	46.0	-14.4	QP	238	1.0	
277.727	30.4	H	46.0	-15.6	QP	93	1.0	
92.579	26.5	V	43.5	-17.0	QP	304	1.0	
123.437	25.8	V	43.5	-17.7	QP	334	1.0	
185.160	21.0	V	43.5	-22.5	QP	264	1.0	
295.451	15.4	V	46.0	-30.6	QP	261	1.0	

Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Run #2: Preliminary Radiated Emissions, 30 - 1000 MHz
 Configured Radio to Tx , 802.11g (settings 16) on channel 11



Client:	eTab	Job Number:	J88788
Model:	5" Tablet Computer	T-Log Number:	T88957
Contact:	Veronica Villareal	Account Manager:	Christine Krebill
Standard:	15.247	Class:	N/A

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
339.456	39.7	H	46.0	-6.3	QP	70	1.0	QP (1.00s)
524.586	36.7	V	46.0	-9.3	QP	248	1.0	QP (1.00s)
154.290	30.3	V	43.5	-13.2	QP	155	1.0	QP (1.00s)
277.733	30.4	H	46.0	-15.6	QP	258	1.0	QP (1.00s)
92.577	26.2	V	43.5	-17.3	QP	127	1.0	QP (1.00s)
123.433	25.6	V	43.5	-17.9	QP	123	1.0	QP (1.00s)
462.862	25.4	V	46.0	-20.6	QP	332	1.0	QP (1.00s)

Note: As the emissions observed below 1GHz were independent of the mode and frequency of the transmitters, additional modes and frequencies were not tested for emissions below 1GHz.

End of Report

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