EMC Test Report
Application for Grant of Equipment Authorization
pursuant to
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15 Subpart C

Model: WPA5151

IC CERTIFICATION #:	1353A-WPA5151
FCC ID:	H8N-WPA5151
APPLICANT:	Askey Computer Corporation 10F, No. 119 ChienKang Rd., Chung-Ho Taipei, Taiwan R.O.C.
TEST SITE(S):	Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5
REPORT DATE:	July 30, 2009
FINAL TEST DATES:	July 23, July 24, July 25 and July 26, 2009

AUTHORIZED SIGNATORY:

Mark E. Hill
Staff Engineer
Elliott Laboratories.

Testing Cert #2016-01

REVISION HISTORY

Rev#	Date	Comments	Modified By
1	August 5, 2009	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Askey Computer Corporation model WPA5151, pursuant to the following rules:

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

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

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

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

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

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

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Askey Computer Corporation model WPA5151 complied with the requirements of the following regulations:

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

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

The test results recorded herein are based on a single type test of Askey Computer Corporation model WPA5151 and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Chen of Askey Computer Corporation.

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 OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11g: 15.3 MHz 802.11b: 6.6 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11g: 18.5 dBm (70mW) EIRP = 18.9dBm[Note 1] 802.11b: 19.1 dBm (82mW) EIRP = 19.5dBm[Note 1]	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11g: -3.14 dBm/3kHz 802.11b: 0.1 dBm/3KHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	<-30dBc	< -30dBc [Note 2]	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.2dBµV/m @ 2390.1MHz (-0.8dB)	15.207 in restricted bands, all others <-30dBc [Note 2]	Complies

Note 1: EIRP calculated using antenna gain of 0.4 dBi for the highest EIRP multi-point system.

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antenna is integral to the pcb	Refer to standard	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions B Mode	45.4dBµV/m @ 1039.9MHz	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	47.5dBµV @ 0.282MHz (-3.3dB)	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	802.11g: 17.2 MHz 802.11b: 12.0 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	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Askey Computer Corporation model WPA5151 is a 802.11bgn device that will connect to a printer, allowing for wireless connectivity.. The EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3VDC.

The sample was received on July 23, 2009 and tested on July 23, July 24, July 25 and July 26, 2009. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Askey Computer Corporation	WPA5151	802.11b/g/n Dongle	N/A	H8N-WPA5151

OTHER EUT DETAILS

The 802.11n mode is restricted to 20 MHz SISO operation only. The 802.11g Legacy was tested as representative of the 802.11n 20MHz SISO mode.

ANTENNA SYSTEM

The antenna is integral to the device. Antenna gain of 0.4dBi.

ENCLOSURE

The EUTs enclosure is constructed of plastic, and measures approximately 6cm by 5cm by 3cm.

Note, during testing, the EUT was not installed in its final enclosure. The plastic enclosure would not affect the measurements.

MODIFICATIONS

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

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	CN-04P449-48643-2CH-2011	-
Askey	-	5V to 3.3V fixture	-	-

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

Company	Model	Description	Serial Number	FCC ID
Netgear	FS108	Hub	-	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB/Laptop	EUT Board	USB Cable	Shielded	1.5
Fixture	EUT	multiconductor	Unshielded	0.2
AC Power	AC Mains	3Wire	Unshielded	1.0
Ethernet/Laptop*	Hub	Cat-5	Unshielded	10.0

* used as remote support equipment and cabled only during Conducted emissions testing.

EUT OPERATION

During emissions testing the EUT was configured to transmit at the noted channel. The EUT was connected to a laptop via USB. The connection allowed for control of the radio and provided power. A test fixture was provided that would step the 5V from the USB to 3.3V. This was located between the laptop and the EUT.

Unless otherwise stated, all testing in 802.11b mode was performed at 1MBs. All testing in 802.11g mode was performed at 6Mbs. This was determined to be worse case during preliminary testing.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on July 23, July 24, July 25 and July 26, 2009 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 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
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 with the exception, on OATS sites, of predictable local TV, radio, and mobile communications traffic. 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.

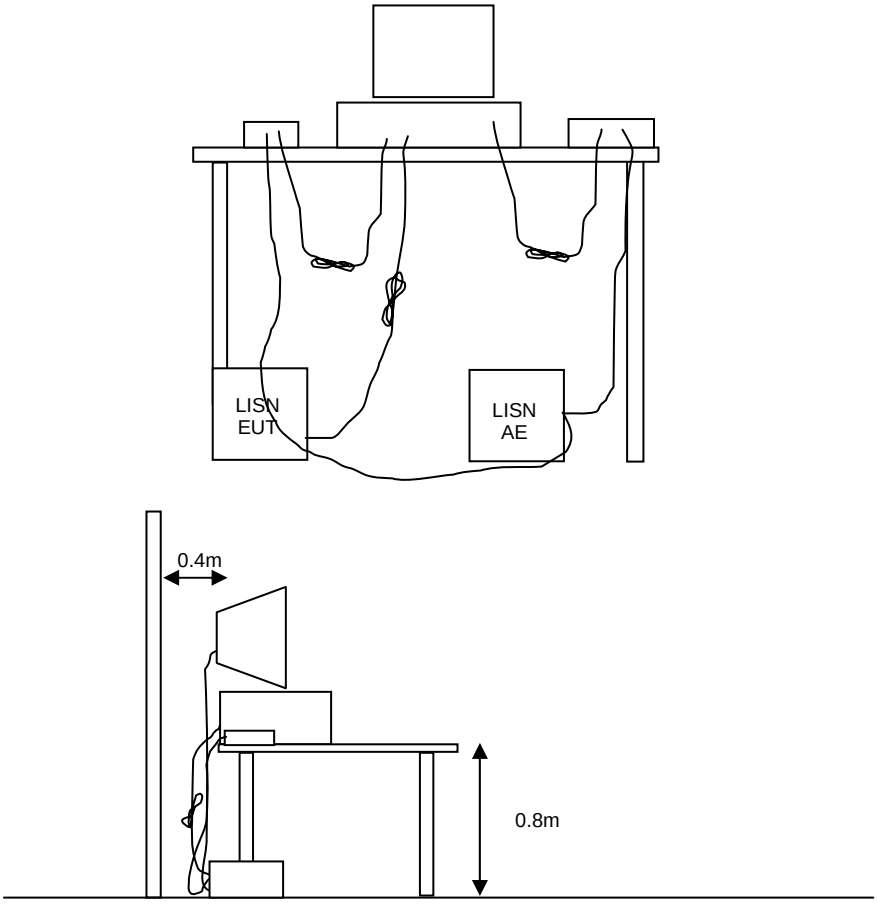


Figure 1 Typical Conducted Emissions Test Configuration

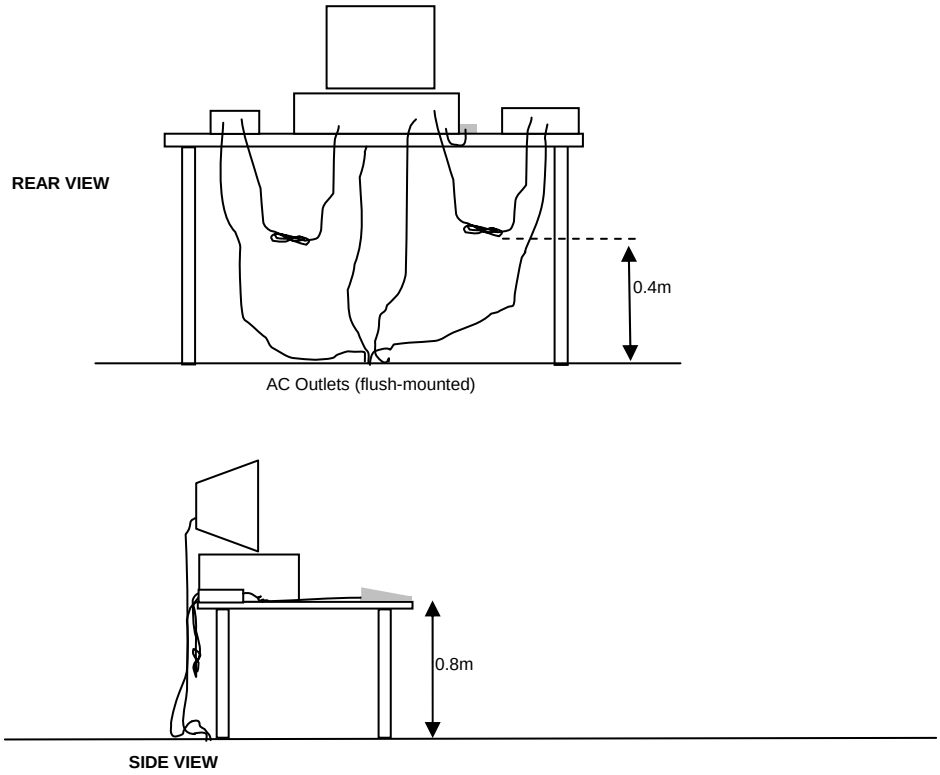
RADIATED EMISSIONS

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.

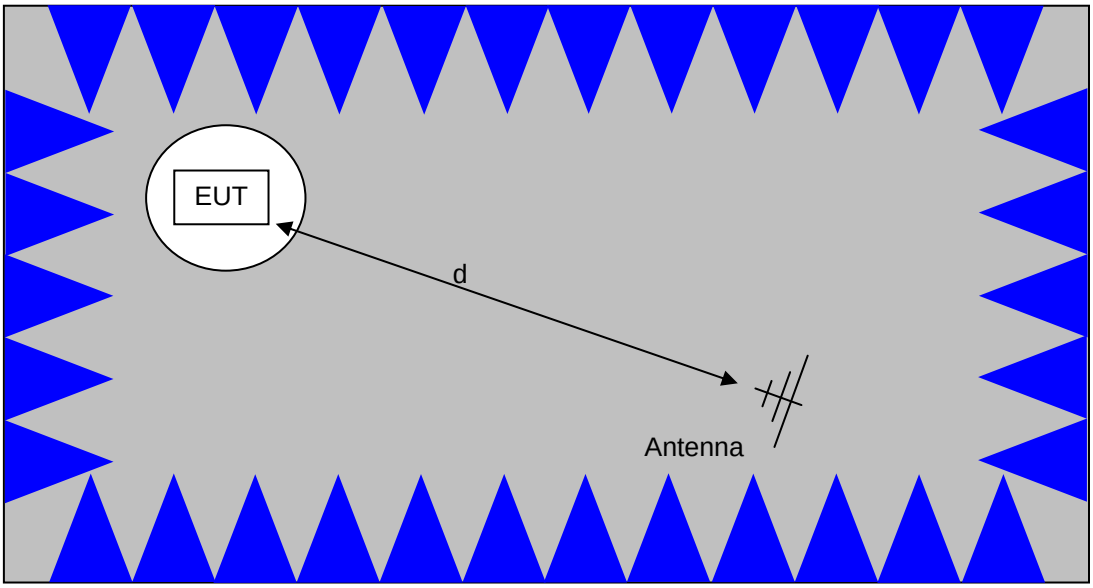
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

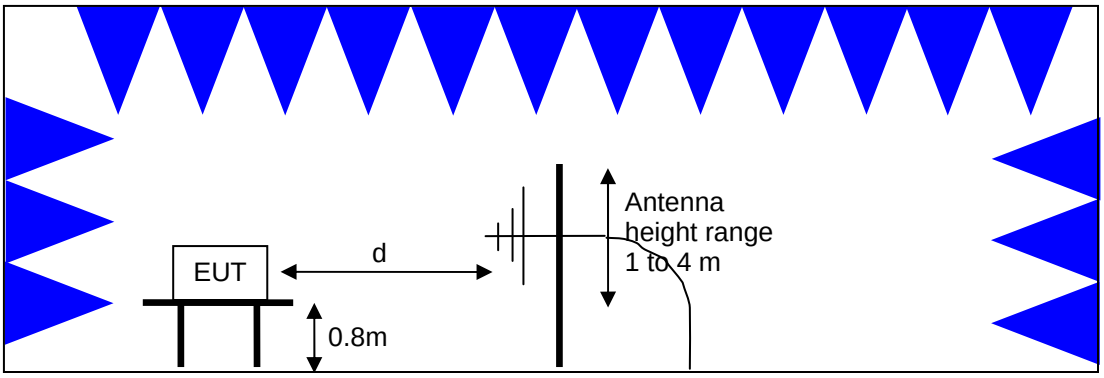


Typical Test Configuration for Radiated Field Strength Measurements



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

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



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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

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

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

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

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

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

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

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

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

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ microvolts per meter}$$

where P is the eirp (Watts)

Appendix A Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 18,000 MHz, 24-Jul-09
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz	3115	786	06-Dec-09
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	26-Feb-10
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Radio Spurious Emissions, 24-Jul-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	29-Dec-09
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	03-Jun-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09

Conducted Emissions - AC Power Ports, 26-Jul-09
Engineer: Peter Sales

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	18-Mar-10
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1401	06-Apr-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	10-Feb-10

Radio Antenna Port (Power and Spurious Emissions), 26-Jul-09
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	10-Apr-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09
Weinschel Corp	Attenuator, 20dB , 50 ohms, 25W, DC-18 GHz	5787A-20	1994	N/A

Radiated Emissions, 30 - 1,000 MHz, 29-Jul-09
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	04-Jun-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	10-Feb-10
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT	2115	19-Nov-09

Appendix B Test Data

T76037 55 Pages

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Emissions Standard(s):	FCC Part 15, RSS 210	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Askey Computer Corporation

Model

WPA5151

Date of Last Test: 7/30/2009

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manger:	Dean Eriksen
Contact:	Jerry Chan		
Emissions Standard(s):	FCC Part 15, RSS 210	Class:	B
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a 802.11bgn device that will connect to a printer, allowing for wireless connectivity. The EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3VDC.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Askey Computer Corporation	WPA5151	802.11b/g/n Dongle	N/A	H8N-WPA5151
Manufacturer	Model	Description	Serial Number	IC ID
Askey Computer Corporation	WPA5151	802.11b/g/n Dongle	N/A	1353A-WPA5151

Other EUT Information

The 802.11n mode is restricted to 20 MHz SISO operation only. The 802.11g Legacy was tested as representative of the 802.11n 20MHz SISO mode.

EUT Antenna (Intentional Radiators Only)

The antenna is integral to the device. 0.4dBi gain.

EUT Enclosure

The EUTs enclosure is constructed of plastic, and measures approximately 6cm by 5cm by 3cm.

Note, during testing, the EUT was not installed in its final enclosure. The plastic enclosure would not affect the measurements.

Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manger:	Dean Eriksen
Contact:	Jerry Chan		
Emissions Standard(s):	FCC Part 15, RSS 210	Class:	B
Immunity Standard(s):	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	CN-04P449-48643-2CH-2011	-
Askey	-	5V to 3.3V fixture	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
-	-	-	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB/Laptop	Fixture	USB Cable	Shielded	1.5
Fixture	EUT	multiconductor	Unshielded	0.2
AC Power	AC Mains	3Wire	Unshielded	1.0

EUT Operation During Emissions Tests

During emissions testing the EUT was configured to transmit at the noted channel. The EUT was connected to a laptop via USB. The connection allowed for control of the radio and provided power. A test fixture was provided that would step the 5V from the USB to 3.3V. This was located between the laptop and the EUT.
Unless otherwise stated, all testing in 802.11b mode was performed at 1MBs. All testing in 802.11g mode was performed at 6Mbs. This was determined to be worse case during preliminary testing.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manger:	Dean Eriksen
Contact:	Jerry Chan		
Emissions Standard(s):	FCC Part 15, RSS 210	Class:	B
Immunity Standard(s):	-	Environment:	-

Test Configuration #2

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Askey	-	5V to 3.3V fixture	-	-
Dell	PP01L	Laptop	CN-04P449-48643-2CH-2011	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	FS108	Hub	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB/Laptop	EUT Board	USB Cable	Shielded	1.5
Fixture	EUT	multiconductor	Unshielded	0.2
AC Power	AC Mains	3Wire	Unshielded	1.0
Ethernet/Laptop	Hub	Cat-5	Unshielded	10.0

EUT Operation During Emissions Tests

During emissions testing the EUT was configured to transmit at the noted channel. The EUT was connected to a laptop via USB. The connection allowed for control of the radio and provided power. A test fixture was provided that would step the 5V from the USB to 3.3V. This was located between the laptop and the EUT.

Unless otherwise stated, all testing in 802.11b mode was performed at 1MBs. All testing in 802.11g mode was performed at 6Mbs. This was determined to be worse case during preliminary testing.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Conducted Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 7/25/2009
Test Engineer: Peter Sales
Test Location: Fremont Chamber #4

Config. Used: 2
Config Change: None
EUT Voltage: 230V/50Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 22 °C
Rel. Humidity: 43 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN 55022 B	Pass	47.5dBµV @ 0.282MHz (-3.3dB)
2	CE, AC Power,110V/60Hz	EN 55022 B	Pass	44.7dBµV @ 0.272MHz (-6.4dB)

Modifications Made During Testing

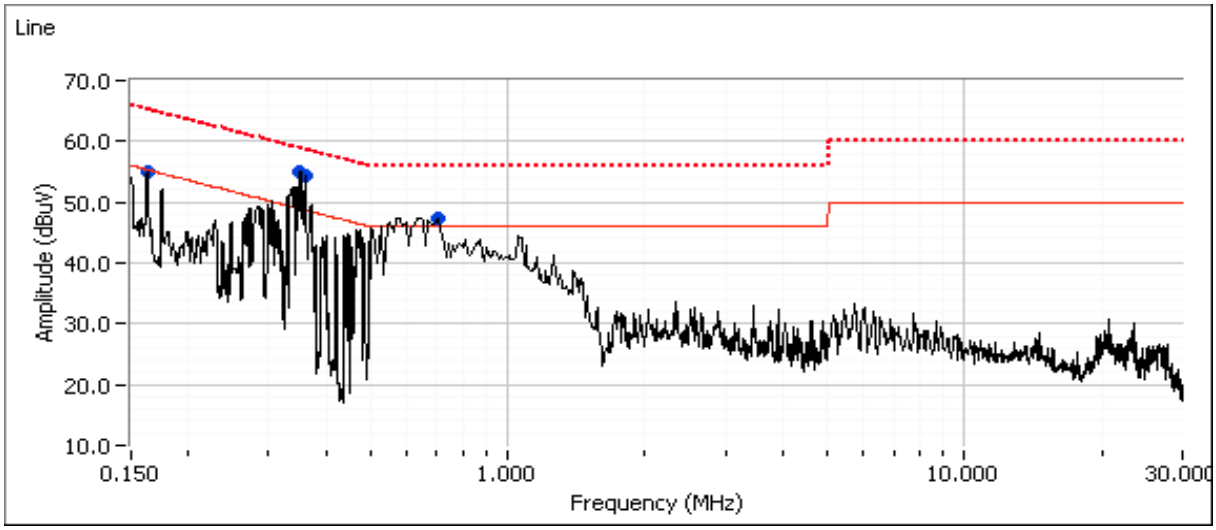
No modifications were made to the EUT during testing

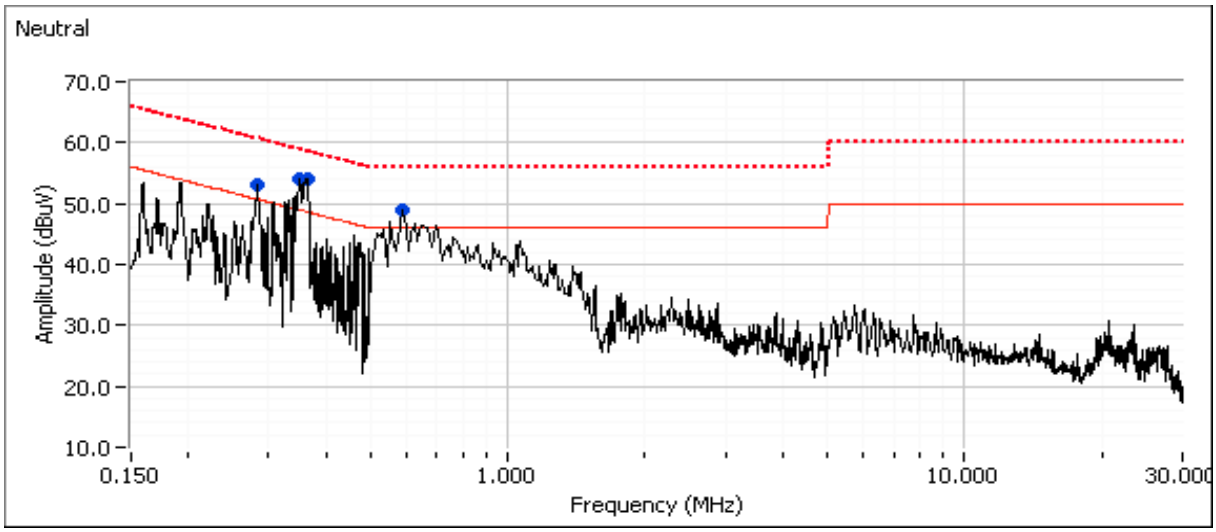
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz Continued next page...

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

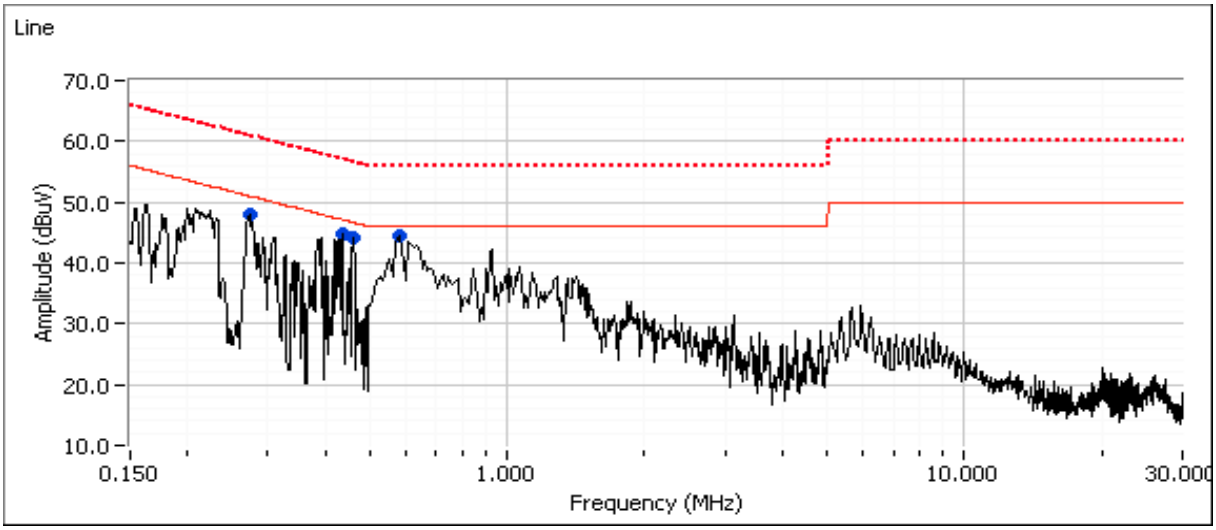
Frequency	Level	AC	EN 55022 Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.362	53.9	Neutral	48.6	5.3	Peak	
0.349	53.9	Neutral	49.0	4.9	Peak	
0.282	53.0	Neutral	50.7	2.3	Peak	
0.591	48.9	Neutral	46.0	2.9	Peak	
0.350	54.9	Line 1	48.9	6.0	Peak	
0.363	54.3	Line 1	48.7	5.6	Peak	
0.162	55.0	Line 1	55.3	-0.3	Peak	
0.727	47.3	Line 1	46.0	1.3	Peak	

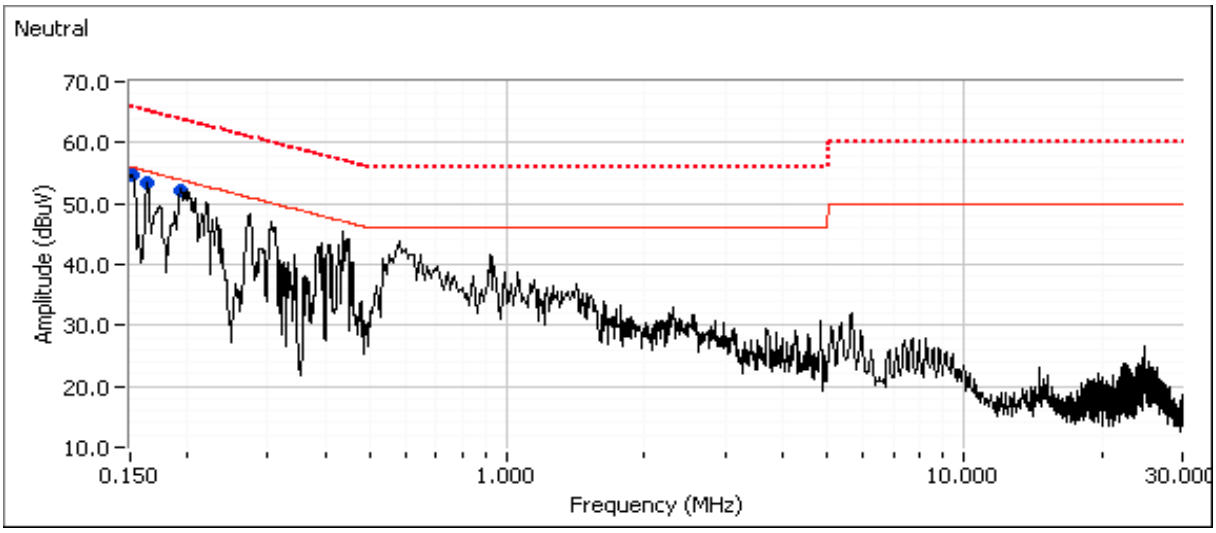
Final quasi-peak and average readings

Frequency	Level	AC	EN 55022 Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.282	47.5	Neutral	50.8	-3.3	AVG	AVG (0.10s)
0.363	54.3	Line 1	58.7	-4.4	QP	QP (1.00s)
0.350	53.5	Line 1	59.0	-5.5	QP	QP (1.00s)
0.349	52.4	Neutral	59.0	-6.6	QP	QP (1.00s)
0.362	51.6	Neutral	58.7	-7.1	QP	QP (1.00s)
0.591	38.4	Neutral	46.0	-7.6	AVG	AVG (0.10s)
0.282	49.1	Neutral	60.8	-11.7	QP	QP (1.00s)
0.591	43.4	Neutral	56.0	-12.6	QP	QP (1.00s)
0.363	34.9	Line 1	48.7	-13.8	AVG	AVG (0.10s)
0.349	35.1	Neutral	49.0	-13.9	AVG	AVG (0.10s)
0.350	34.8	Line 1	49.0	-14.2	AVG	AVG (0.10s)
0.727	41.4	Line 1	56.0	-14.6	QP	QP (1.00s)
0.362	32.8	Neutral	48.7	-15.9	AVG	AVG (0.10s)
0.162	47.8	Line 1	65.4	-17.6	QP	QP (1.00s)
0.162	37.0	Line 1	55.4	-18.4	AVG	AVG (0.10s)
0.727	22.8	Line 1	46.0	-23.2	AVG	AVG (0.10s)

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 110V/60Hz





Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 110V/60Hz Continued next page...

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	AC	EN 55022 Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.152	54.6	Neutral	55.9	-1.3	Peak	
0.577	44.5	Line 1	46.0	-1.5	Peak	
0.195	52.2	Neutral	53.9	-1.7	Peak	
0.165	53.4	Neutral	55.3	-1.9	Peak	
0.439	44.7	Line 1	47.1	-2.4	Peak	
0.462	44.1	Line 1	46.7	-2.6	Peak	
0.272	47.9	Line 1	51.0	-3.1	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	EN 55022 Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.272	44.7	Line 1	51.1	-6.4	AVG	AVG (0.10s)
0.577	37.7	Line 1	46.0	-8.3	AVG	AVG (0.10s)
0.577	44.9	Line 1	56.0	-11.1	QP	QP (1.00s)
0.462	43.7	Line 1	56.7	-13.0	QP	QP (1.00s)
0.272	47.5	Line 1	61.1	-13.6	QP	QP (1.00s)
0.152	52.1	Neutral	65.9	-13.8	QP	QP (1.00s)
0.438	43.0	Line 1	57.1	-14.1	QP	QP (1.00s)
0.165	50.0	Neutral	65.2	-15.2	QP	QP (1.00s)
0.195	48.0	Neutral	63.8	-15.8	QP	QP (1.00s)
0.195	37.0	Neutral	53.8	-16.8	AVG	AVG (0.10s)
0.165	37.4	Neutral	55.2	-17.8	AVG	AVG (0.10s)
0.152	37.1	Neutral	55.9	-18.8	AVG	AVG (0.10s)
0.438	26.3	Line 1	47.1	-20.8	AVG	AVG (0.10s)
0.462	22.6	Line 1	46.7	-24.1	AVG	AVG (0.10s)

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

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: 21.4 °C Rel. Humidity: 40 %

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

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1a	b mode	1	19	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	45.2dBµV/m @ 2390.0MHz (-8.8dB)
			19	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	48.0dBµV/m @ 4824.0MHz (-6.0dB)
1b	b mode	6	19	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	51.5dBµV/m @ 4874.0MHz (-2.5dB)
1c	b mode	11	19	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	50.4dBµV/m @ 2483.6MHz (-3.6dB)
			19	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	52.5dBµV/m @ 4924.0MHz (-1.5dB)
2a	g mode	1	16	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.2dBµV/m @ 2390.1MHz (-0.8dB)
			19	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	43.9dBµV/m @ 1040.0MHz (-10.1dB)
2b	g mode	2	19	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	50.3dBµV/m @ 2390.1MHz (-3.7dB)
2c	g mode	6	19	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	43.3dBµV/m @ 1039.9MHz (-10.7dB)
2d	g mode	10	19	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	47.3dBµV/m @ 2483.6MHz (-6.7dB)
2e	g mode	11	16.5	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	51.7dBµV/m @ 2483.6MHz (-2.3dB)
			19.0	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	44.3dBµV/m @ 1040.0MHz (-9.7dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Deviations From The Standard

No deviations were made from the requirements of the standard.

Run #1: Radiated Spurious Emissions, 1000 - 25000 MHz. Operating Mode: 802.11b,
Run #1a: Low Channel @ 2412 MHz
Bandedge Target Power = 19, Spurious Target Power = 19
Port: Main, Upright Orientation

Date of Test: 7/23/2009 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #3 Host Unit Voltage 120V/ 60Hz

Fundamental Field Strenght - Main Port

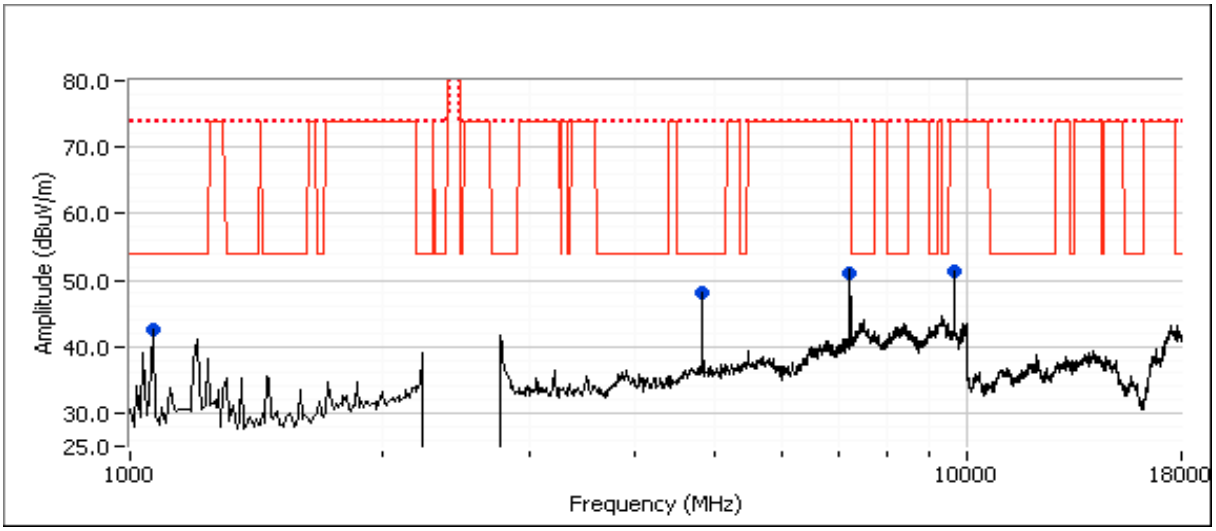
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2413.868	105.0	V	-	-	Avg	87	1.1	EUT Upright
2414.710	108.5	V	-	-	PK	87	1.1	EUT Upright
2412.545	104.1	V	-	-	PK	87	1.1	RB=VB= 100kHz, EUT Upright
2413.868	98.7	H	-	-	Avg	198	1.9	EUT Upright
2414.108	102.1	H	-	-	PK	198	1.9	EUT Upright
2413.627	98.2	H	-	-	PK	198	1.9	RB=VB= 100kHz, EUT Upright

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.030	48.0	V	54.0	-6.0	AVG	34	1.1	RB 1 MHz; VB: 10 Hz
4824.060	51.0	V	74.0	-23.0	PK	34	1.1	RB 1 MHz; VB: 1 MHz
1064.170	42.5	V	54.0	-11.5	Peak	82	1.0	
7240.830	50.9	H	74.0	-23.1	Peak	208	1.6	
9650.000	51.2	H	74.0	-22.8	Peak	150	1.3	

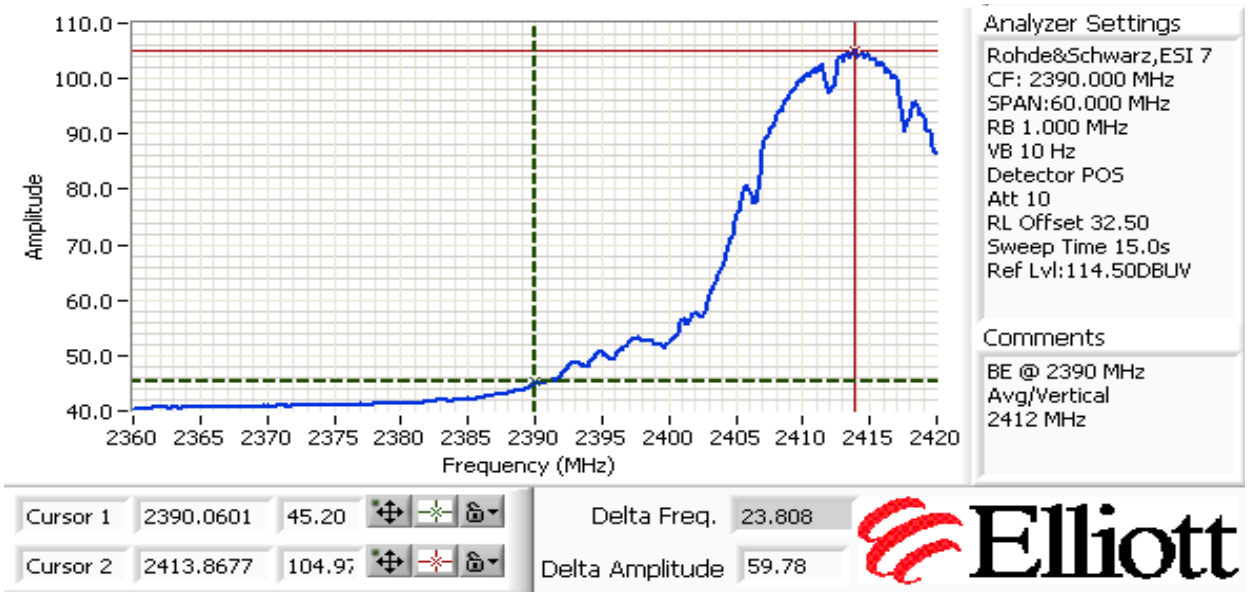
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

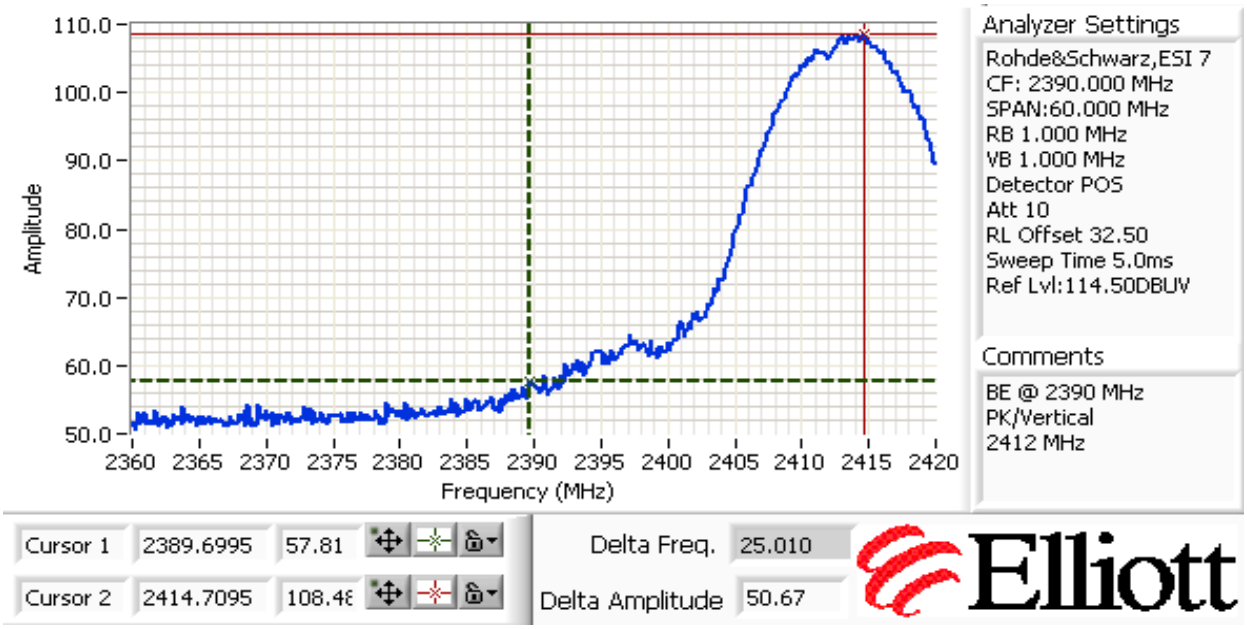


Band Edge Signal Field Strength

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	45.2	V	54.0	-8.8	Avg	87	1.1	
2389.700	57.8	V	74.0	-16.2	PK	87	1.1	
2390.060	41.7	H	54.0	-12.3	Avg	198	1.9	
2388.377	53.9	H	74.0	-20.1	PK	198	1.9	



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Run #1b: Center Channel @ 2437 MHz
Spurious Target Power = 19

Date of Test: 7/23/2009
Test Engineer: Rafael Varelas
Test Location: FT Chamber #3

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

Fundamental Field Strenght - Main Port

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2437.000	99.1	H	-	-	Avg	307	1.9	EUT Flat
2437.000	103.1	H	-	-	PK	307	1.9	EUT Flat
2437.000	99.0	H	-	-	PK	307	1.9	RB=VB= 100kHz, EUT Flat
2437.000	98.8	V	-	-	Avg	273	1.0	EUT Flat
2437.000	102.4	V	-	-	PK	273	1.0	EUT Flat
2437.000	98.2	V	-	-	PK	273	1.0	RB=VB= 100kHz, EUT Flat
2437.000	99.2	H	-	-	Avg	200	1.8	EUT Upright
2437.000	103.1	H	-	-	PK	200	1.8	EUT Upright
2437.000	99.0	H	-	-	PK	200	1.8	RB=VB= 100kHz, EUT Upright
2437.000	106.8	V	-	-	Avg	86	1.5	EUT Upright
2437.000	110.6	V	-	-	PK	86	1.5	EUT Upright
2437.000	106.3	V	-	-	PK	86	1.5	RB=VB= 100kHz, EUT Upright
2437.000	104.8	H	-	-	Avg	164	1.8	EUT Side
2437.000	108.6	H	-	-	PK	164	1.8	EUT Side
2437.000	104.6	H	-	-	PK	164	1.8	RB=VB= 100kHz, EUT Side
2437.000	102.1	V	-	-	Avg	235	1.2	EUT Side
2437.000	106.0	V	-	-	PK	235	1.2	EUT Side
2437.000	101.8	V	-	-	PK	235	1.2	RB=VB= 100kHz, EUT Side

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Fundamental Field Strenght - AuX Port

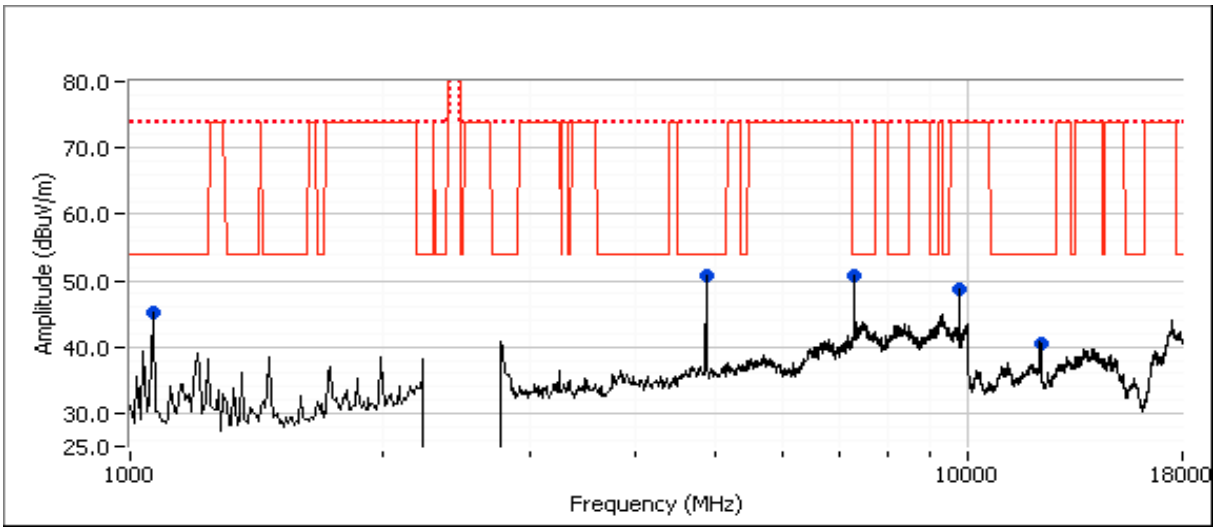
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2437.000	99.2	H	-	-	Avg	308	1.9	EUT Flat
2437.000	102.9	H	-	-	PK	308	1.9	EUT Flat
2437.000	98.7	H	-	-	PK	308	1.9	RB=VB= 100kHz, EUT Flat
2437.000	99.3	V	-	-	Avg	273	1.0	EUT Flat
2437.000	102.8	V	-	-	PK	273	1.0	EUT Flat
2437.000	98.7	V	-	-	PK	273	1.0	RB=VB= 100kHz, EUT Flat
2437.000	99.2	H	-	-	Avg	200	1.8	EUT Upright
2437.000	103.1	H	-	-	PK	200	1.8	EUT Upright
2437.000	98.7	H	-	-	PK	200	1.8	RB=VB= 100kHz, EUT Upright
2437.000	106.6	V	-	-	Avg	86	1.5	EUT Upright
2437.000	110.5	V	-	-	PK	86	1.5	EUT Upright
2437.000	106.1	V	-	-	PK	86	1.5	RB=VB= 100kHz, EUT Upright
2437.000	104.4	H	-	-	Avg	153	1.9	EUT Side
2437.000	108.1	H	-	-	PK	153	1.9	EUT Side
2437.000	103.8	H	-	-	PK	153	1.9	RB=VB= 100kHz, EUT Side
2437.000	102.7	V	-	-	Avg	297	1.2	EUT Side
2437.000	106.4	V	-	-	PK	297	1.2	EUT Side
2437.000	101.8	V	-	-	PK	297	1.2	RB=VB= 100kHz, EUT Side

Other Spurious Emissions
Port: Main, Upright Orientation

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.020	51.5	V	54.0	-2.5	AVG	80	1.0	RB 1 MHz; VB: 10 Hz
4874.000	54.0	V	74.0	-20.0	PK	80	1.0	RB 1 MHz; VB: 1 MHz
7312.690	49.4	H	54.0	-4.6	AVG	216	1.4	RB 1 MHz; VB: 10 Hz
7312.430	54.6	H	74.0	-19.4	PK	216	1.4	RB 1 MHz; VB: 1 MHz
1064.170	45.2	V	54.0	-8.8	Peak	95	1.6	
9749.170	48.8	H	74.0	-25.2	Peak	155	1.3	
12186.670	40.4	H	54.0	-13.6	Peak	16	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



Run #1c: High Channel @ 2462 MHz
Bandedge Target Power = 19, Spurious Target Power = 19
Port: Main, Upright Orientation

Date of Test: 7/23/2009
Test Engineer: Rafael Varelas
Test Location: FT Chamber #3

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

Fundamental Field Strenght - Main Port

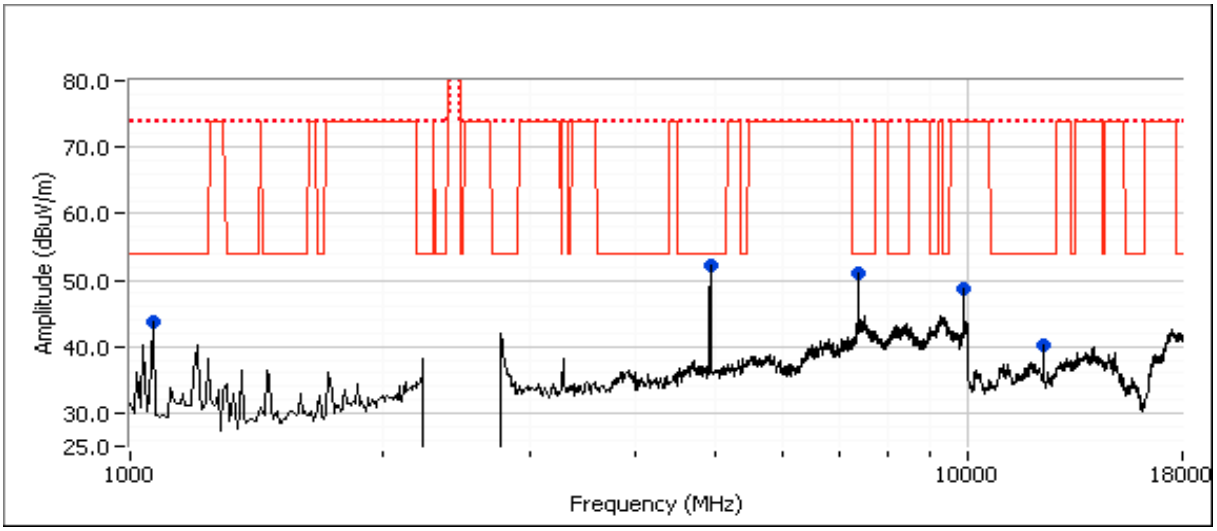
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2463.721	106.4	V	-	-	Avg	88	1.4	EUT Upright
2464.562	110.2	V	-	-	PK	88	1.4	EUT Upright
2463.721	105.8	V	-	-	PK	88	1.4	RB=VB= 100kHz, EUT Upright
2463.841	99.9	H	-	-	Avg	200	1.2	EUT Upright
2464.562	103.8	H	-	-	PK	200	1.2	EUT Upright
2463.841	99.2	H	-	-	PK	200	1.2	RB=VB= 100kHz, EUT Upright

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.980	52.5	V	54.0	-1.5	AVG	85	1.0	RB 1 MHz; VB: 10 Hz
4924.000	54.5	V	74.0	-19.5	PK	85	1.0	RB 1 MHz; VB: 1 MHz
7387.810	49.6	V	54.0	-4.4	AVG	283	1.3	RB 1 MHz; VB: 10 Hz
7387.150	55.0	V	74.0	-19.0	PK	283	1.3	RB 1 MHz; VB: 1 MHz
12306.670	40.1	H	54.0	-13.9	Peak	238	1.0	
1064.170	43.7	V	54.0	-10.3	Peak	73	1.6	
9848.330	48.6	H	74.0	-25.4	Peak	154	1.3	

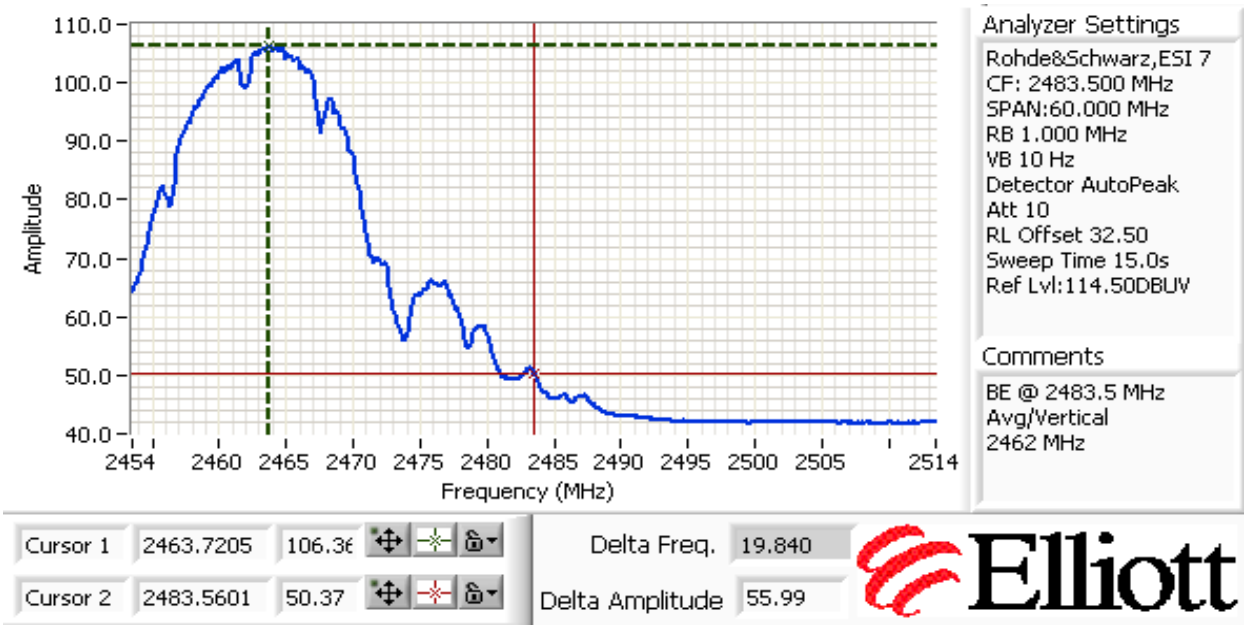
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.



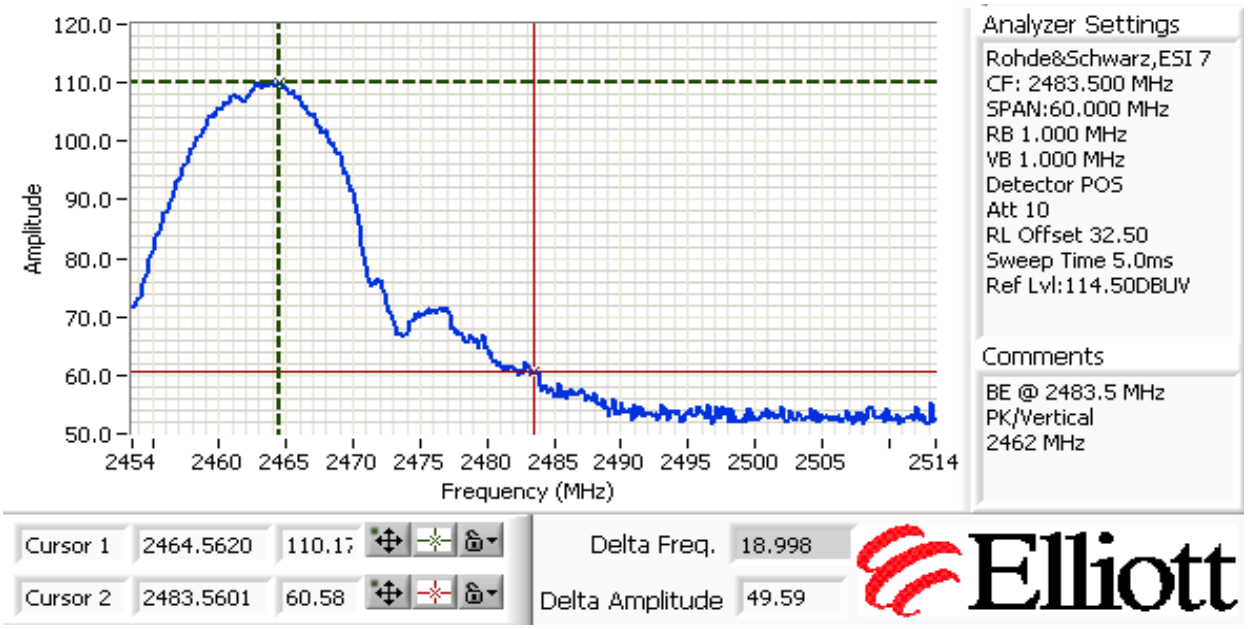
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

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	
2483.560	50.4	V	54.0	-3.6	Avg	88	1.4	
2483.560	60.6	V	74.0	-13.4	PK	88	1.4	
2483.560	47.0	H	54.0	-7.0	Avg	200	1.2	
2486.686	56.1	H	74.0	-17.9	PK	200	1.2	



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

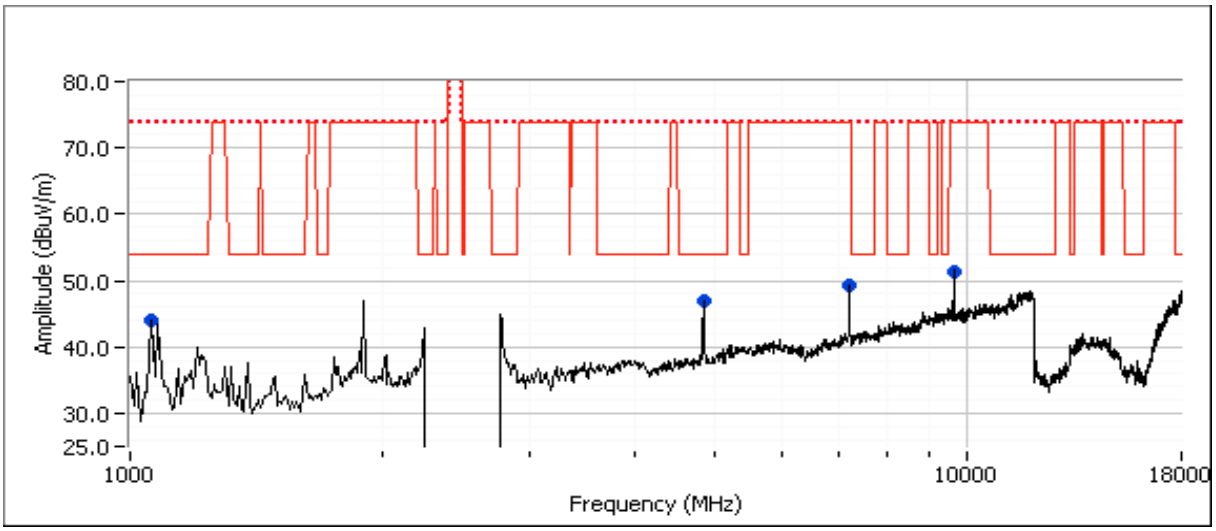


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Run #2: Radiated Spurious Emissions, 1000 - 25000 MHz. Operating Mode: 802.11g,
Run #2a: Low Channel @ 2412 MHz
Bandedge Target Power = 16, Spurious Target Power = 19
Port: Main, Upright Orientation

Date of Test: 7/24/2009
Test Engineer: Suhaila Khushzad
Test Location: Chamber # 5

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



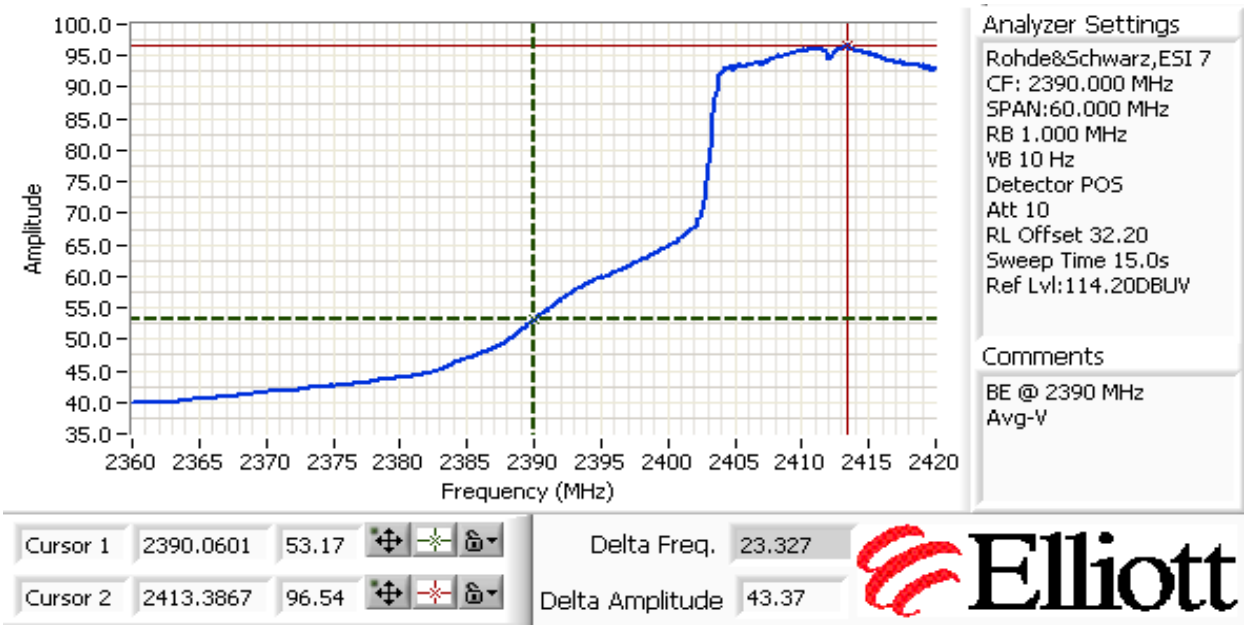
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1040.030	43.9	H	54.0	-10.1	AVG	116	1.0	RB 1 MHz; VB: 10 Hz
1040.010	46.2	H	74.0	-27.8	PK	116	1.0	RB 1 MHz; VB: 1 MHz
4824.030	35.7	V	54.0	-18.3	AVG	116	1.1	RB 1 MHz; VB: 10 Hz
4823.900	47.3	V	74.0	-26.7	PK	116	1.1	RB 1 MHz; VB: 1 MHz
7237.430	44.5	H	74.0	-29.5	AVG	312	1.2	RB 1 MHz; VB: 10 Hz
7237.500	56.8	H	74.0	-17.2	PK	312	1.2	RB 1 MHz; VB: 1 MHz
9648.230	45.4	H	74.0	-28.6	AVG	152	1.0	RB 1 MHz; VB: 10 Hz
9647.430	59.6	H	74.0	-14.4	PK	152	1.0	RB 1 MHz; VB: 1 MHz

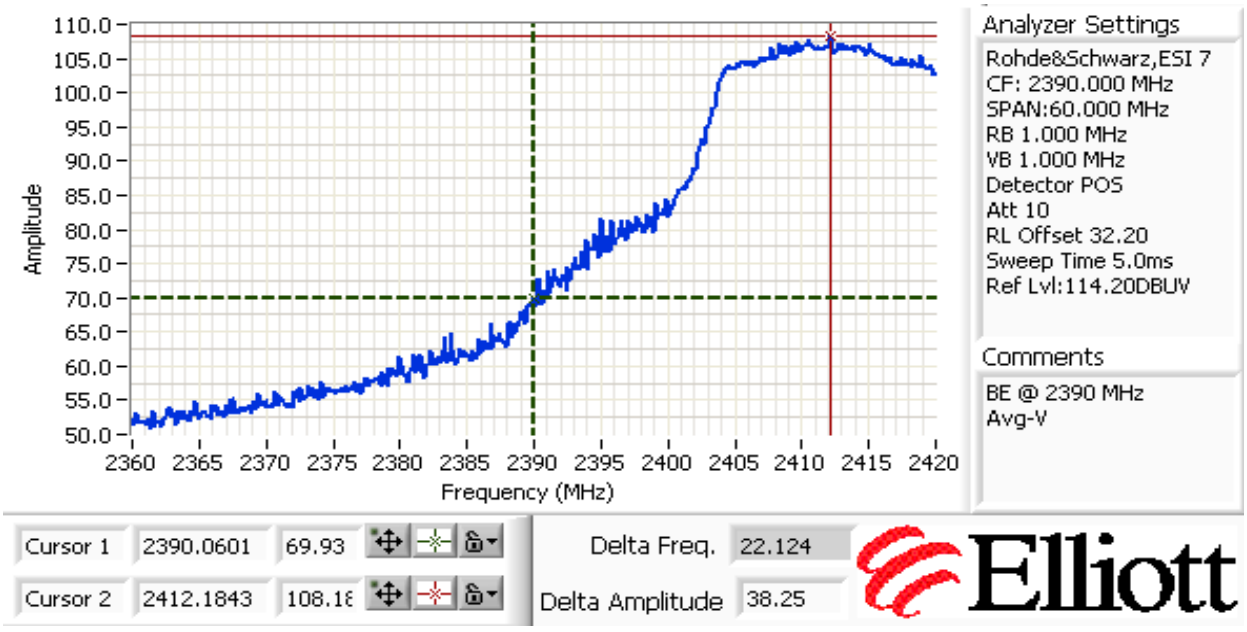
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

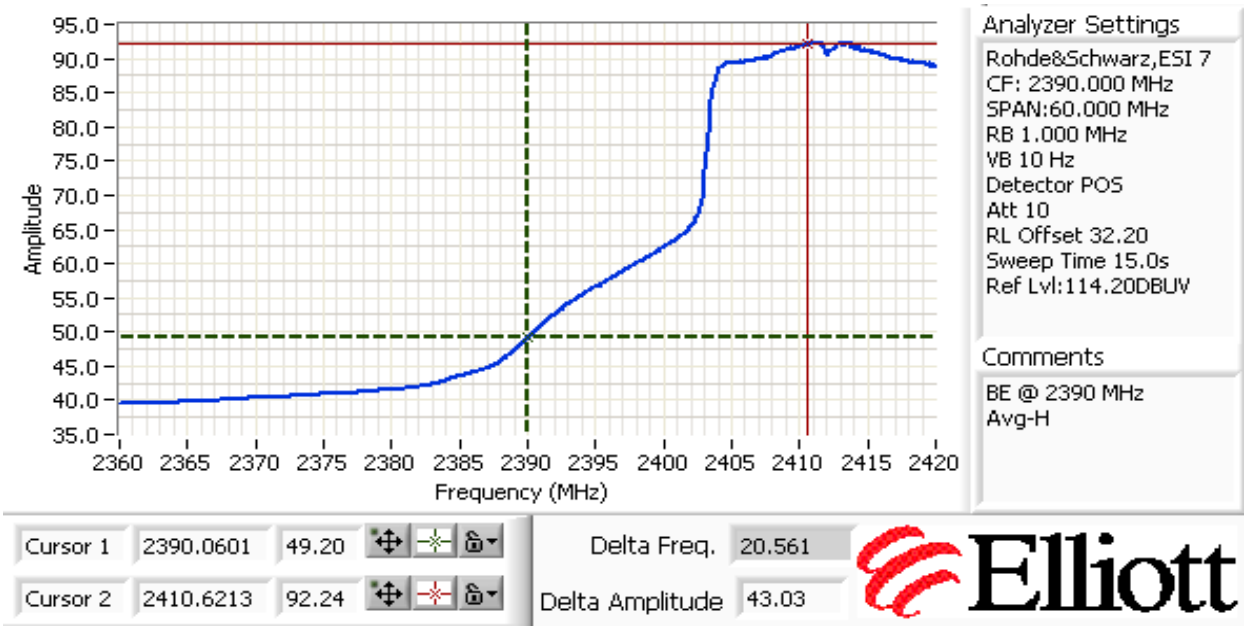
Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.060	53.2	V	54.0	-0.8	Avg	119	1.5	
2390.060	69.9	V	74.0	-4.1	PK	119	1.5	
2390.060	49.2	H	54.0	-4.8	Avg	2	1.3	
2389.690	65.8	H	74.0	-8.3	PK	2	1.3	

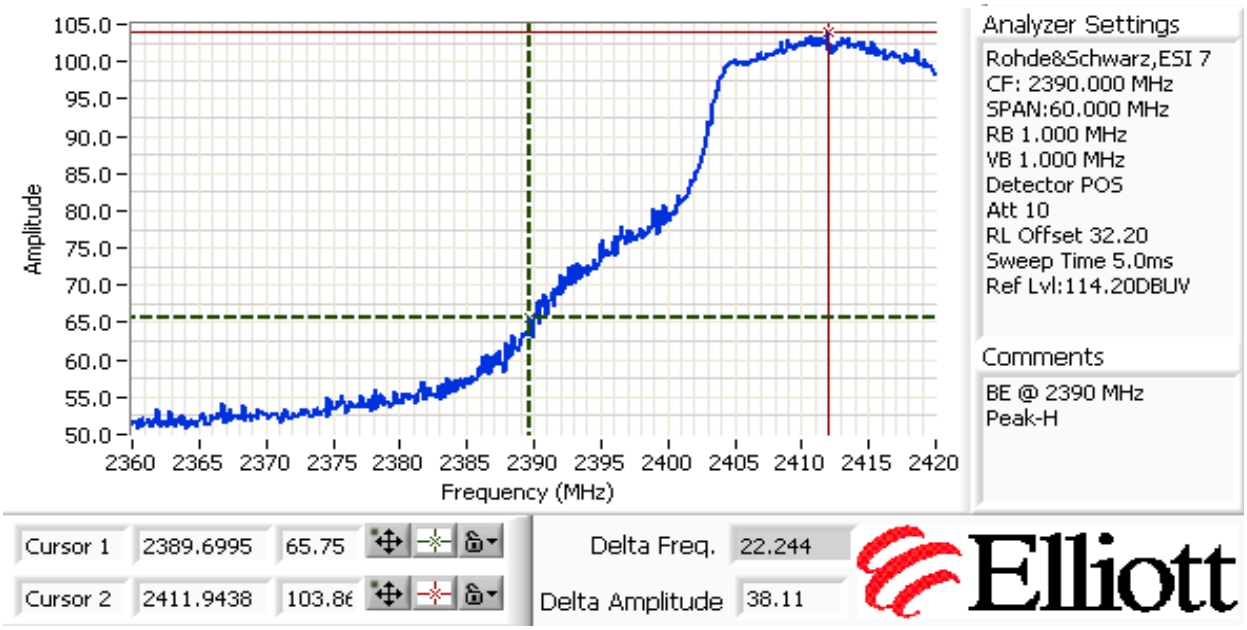


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B





Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

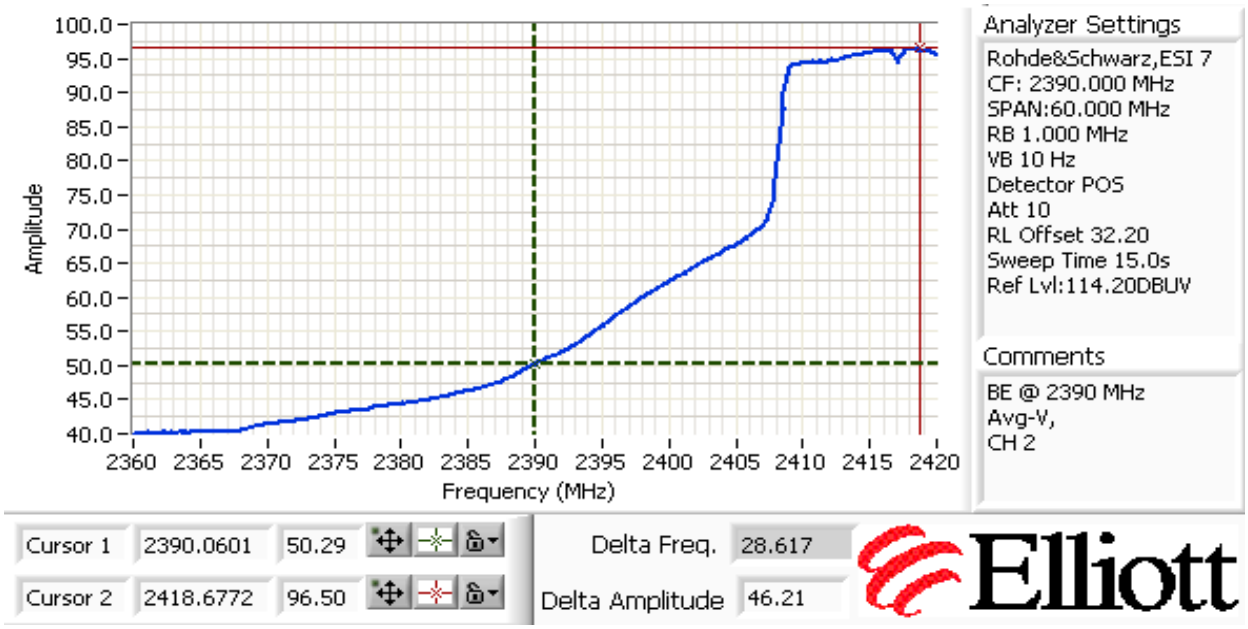


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

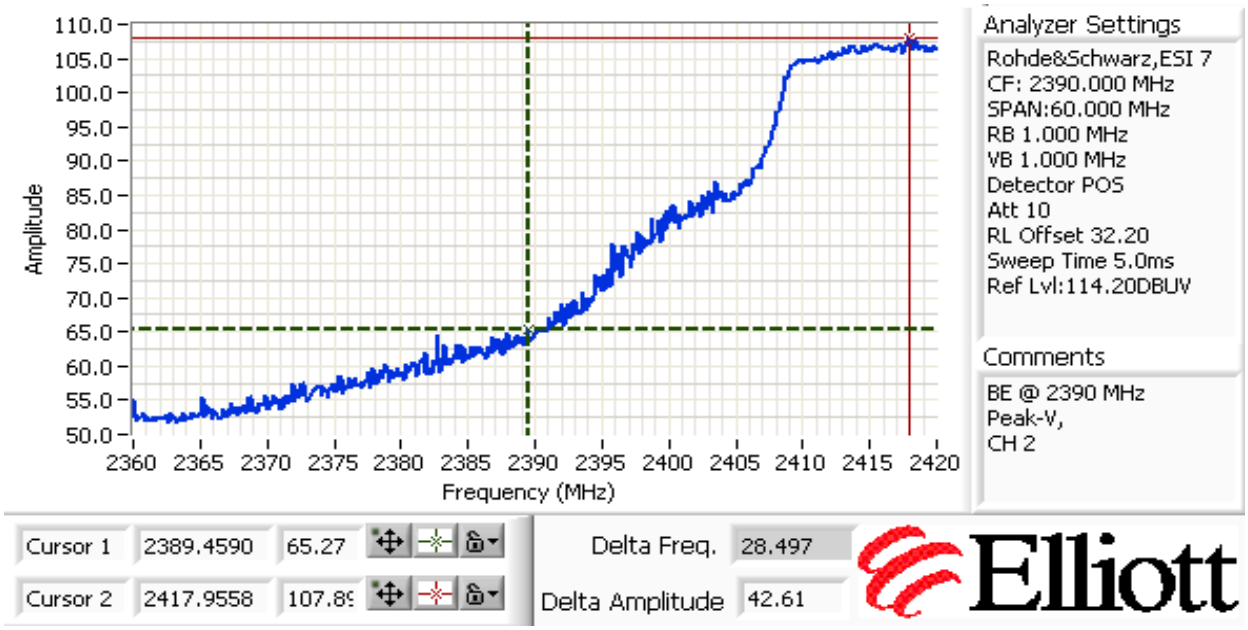
Run #2b: Low Channel @ 2417 MHz
Bandedge Target Power = 19
Port: Main, Upright Orientation

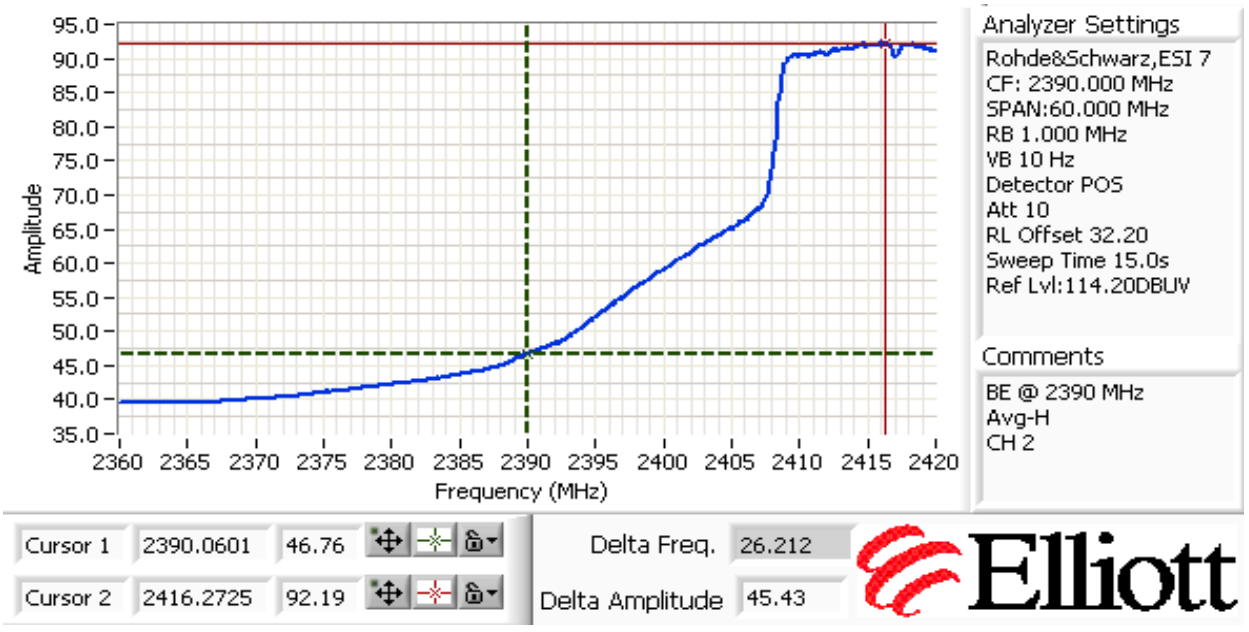
Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.060	50.3	V	54.0	-3.7	Avg	106	1.5	
2389.450	65.3	V	74.0	-8.7	PK	106	1.5	
2390.060	46.8	H	54.0	-7.2	Avg	4	2.3	
2389.450	63.6	H	74.0	-10.4	PK	4	2.3	

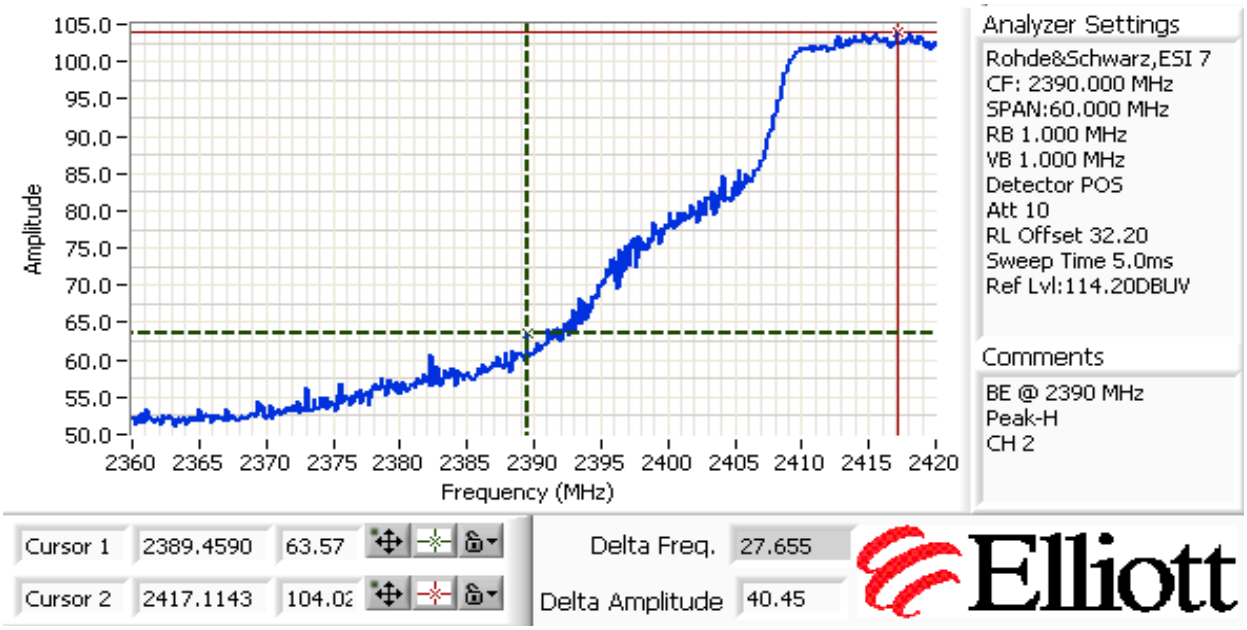


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



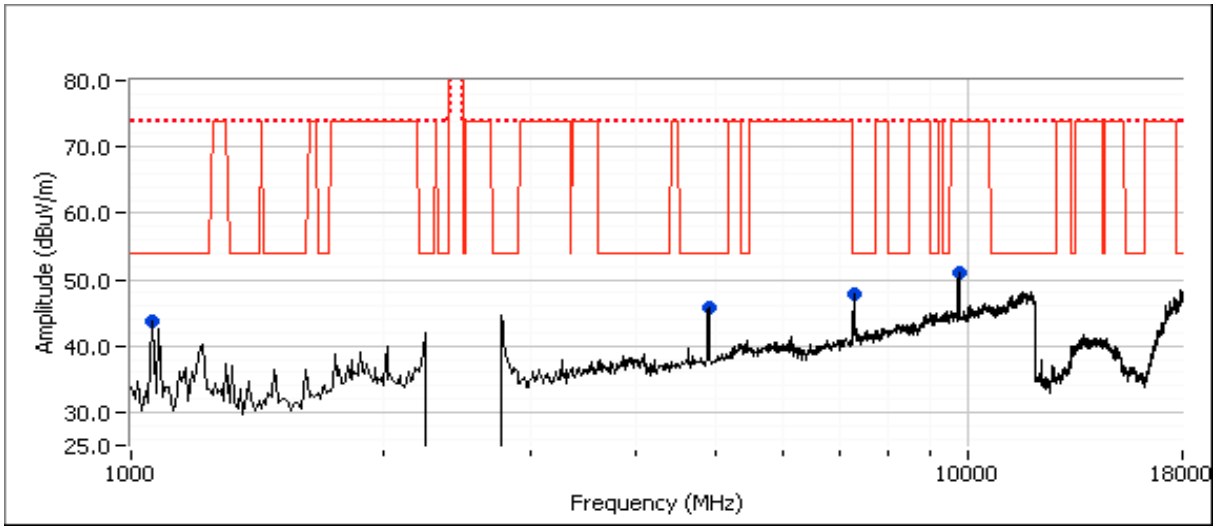


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Run #2c: Center Channel @ 2437 MHz, EUT Up right on table
Spurious Target Power = 19
Port: Main, Upright Orientation



Other Spurious Emissions

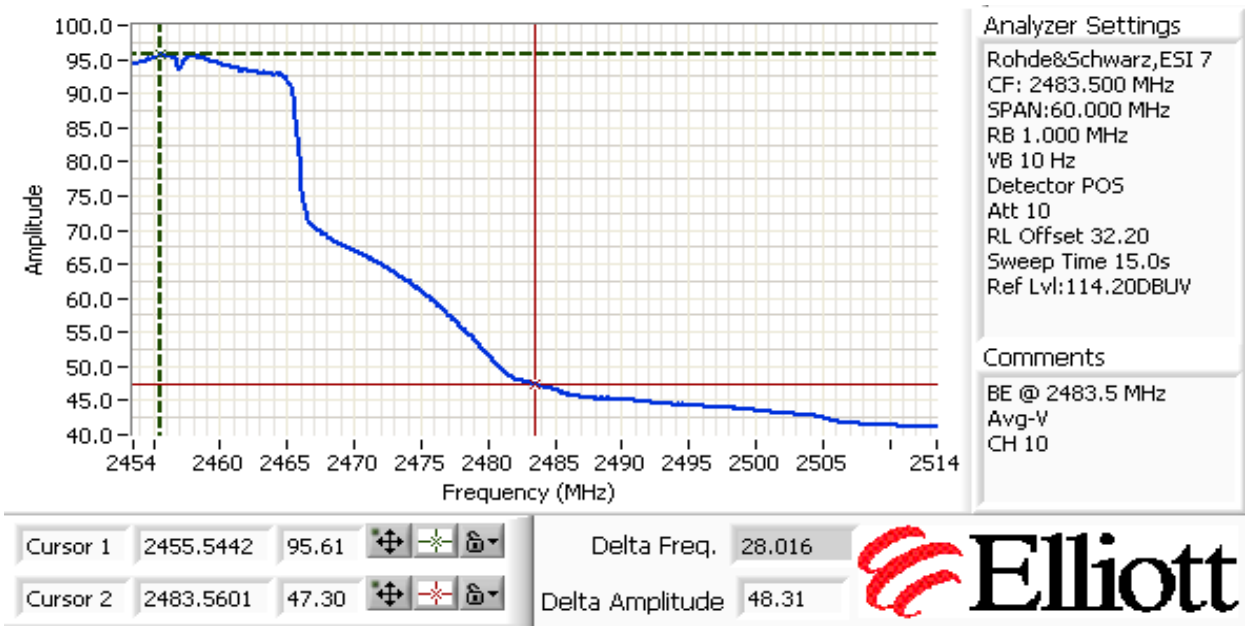
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1039.870	43.3	H	54.0	-10.7	AVG	157	1.0	RB 1 MHz; VB: 10 Hz
1040.000	45.2	H	74.0	-28.8	PK	157	1.0	RB 1 MHz; VB: 1 MHz
7313.410	40.0	H	54.0	-14.0	AVG	183	1.0	RB 1 MHz; VB: 10 Hz
7308.080	54.3	H	74.0	-19.7	PK	183	1.0	RB 1 MHz; VB: 1 MHz
9747.930	46.2	H	74.0	-27.8	AVG	158	1.4	RB 1 MHz; VB: 10 Hz
9744.660	61.4	H	74.0	-12.6	PK	158	1.4	RB 1 MHz; VB: 1 MHz
4873.770	36.2	V	54.0	-17.8	AVG	285	1.3	RB 1 MHz; VB: 10 Hz
4871.500	46.9	V	74.0	-27.1	PK	285	1.3	RB 1 MHz; VB: 1 MHz

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

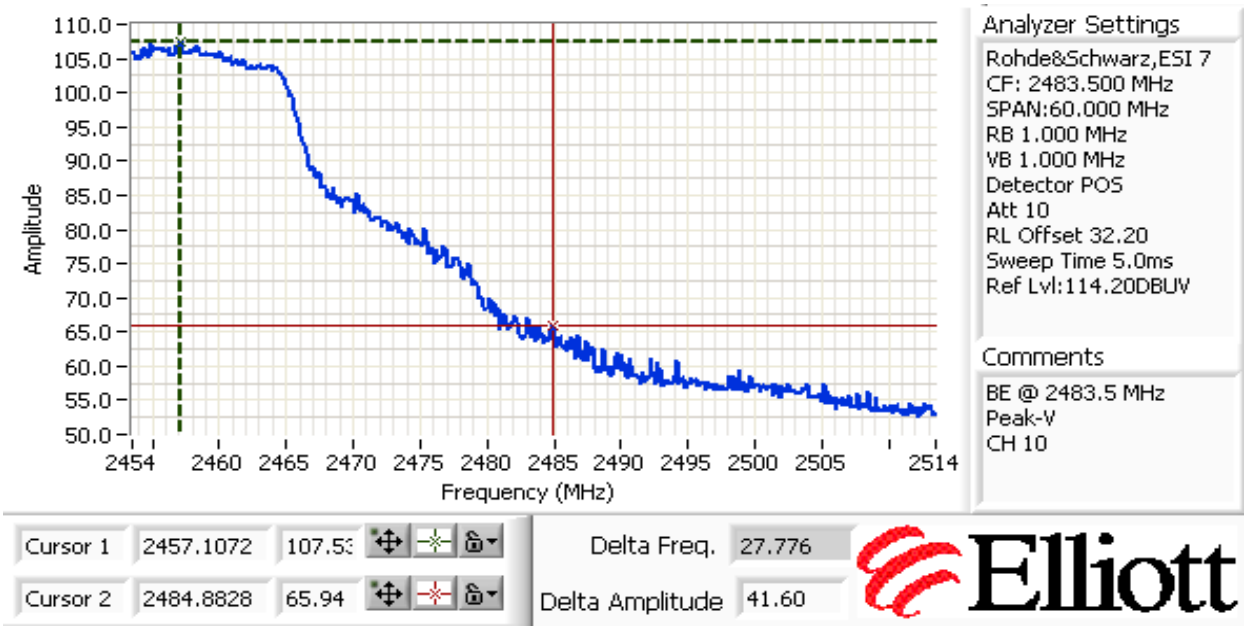
Run #2d: 10th Channel @ 2457 MHz,
Bandedge Target Power = 19
Port: Main, Upright Orientation

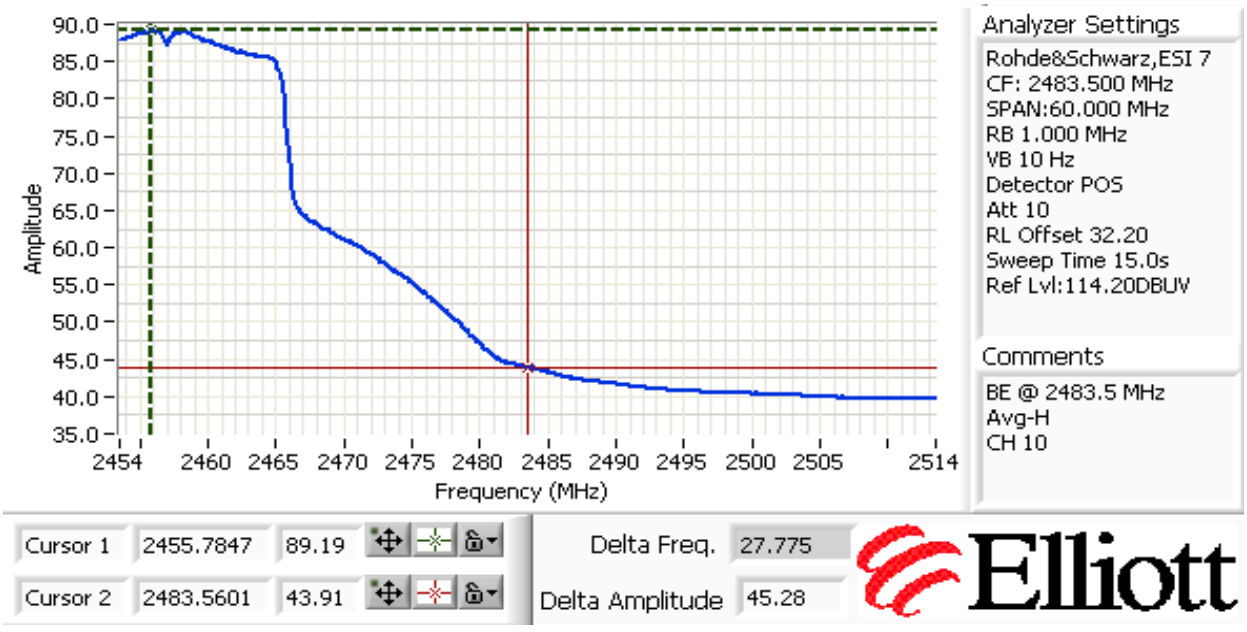
Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.560	47.3	V	54.0	-6.7	Avg	237	1.5	
2484.880	65.9	V	74.0	-8.1	PK	237	1.5	
2483.560	43.9	H	54.0	-10.1	Avg	327	1.0	
2484.040	60.8	H	74.0	-13.2	PK	327	1.0	

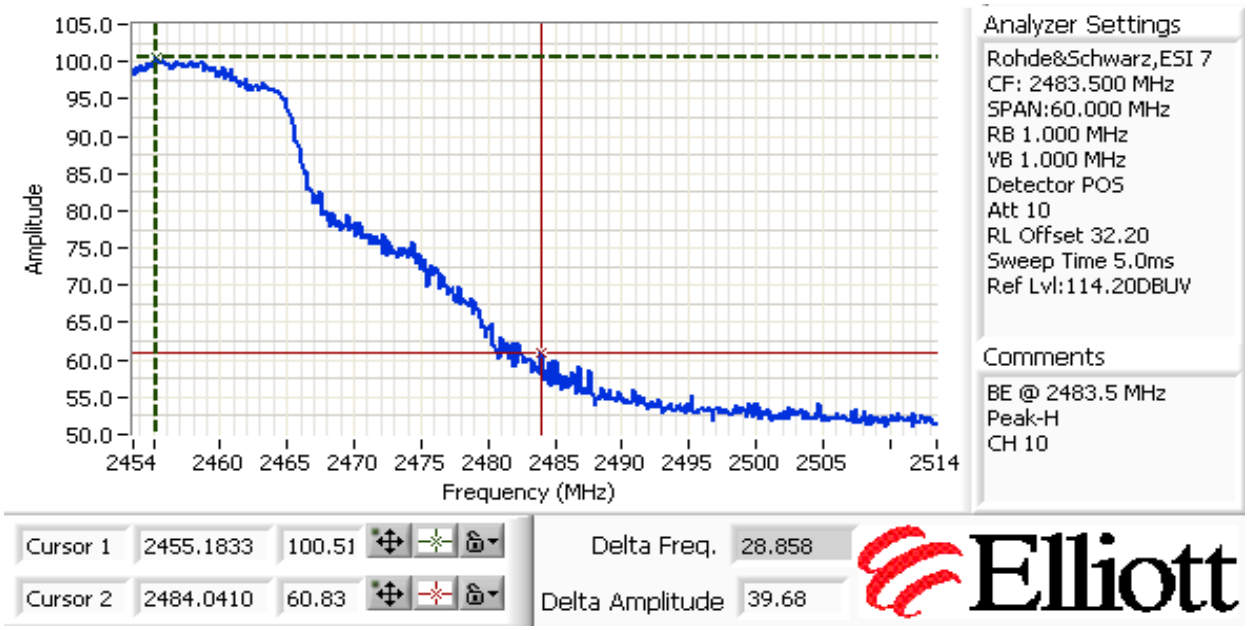


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



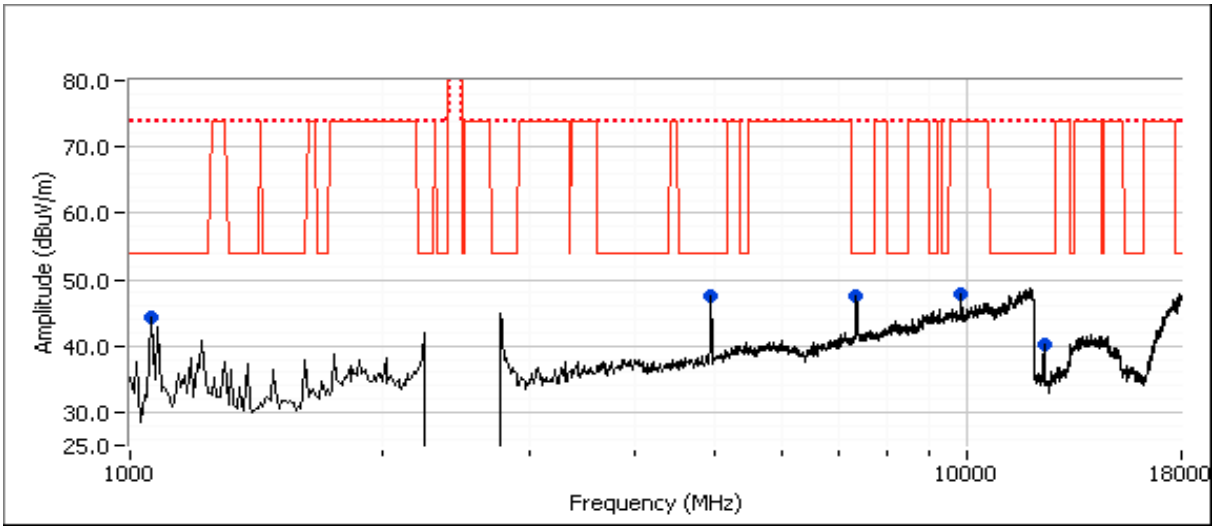


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

Run #2e: High Channel @ 2462 MHz
Bandedge Target Power = 16.5, Spurious = 19
Port: Main, Upright Orientation



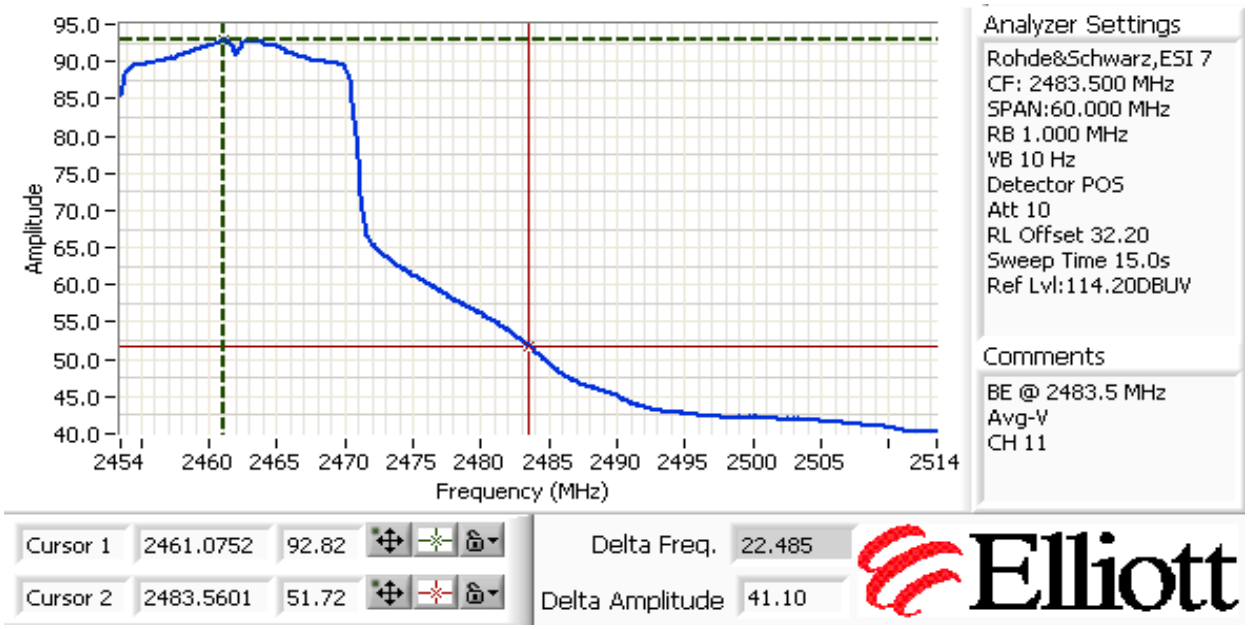
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1039.960	44.3	H	54.0	-9.7	AVG	147	1.0	RB 1 MHz; VB: 10 Hz
1040.100	46.4	H	74.0	-27.6	PK	147	1.0	RB 1 MHz; VB: 1 MHz
4923.620	39.9	H	54.0	-14.1	AVG	26	1.3	RB 1 MHz; VB: 10 Hz
4923.690	50.7	H	74.0	-23.3	PK	26	1.3	RB 1 MHz; VB: 1 MHz
7388.150	42.9	V	54.0	-11.1	AVG	273	1.3	RB 1 MHz; VB: 10 Hz
7388.420	55.0	V	74.0	-19.0	PK	273	1.3	RB 1 MHz; VB: 1 MHz
9848.210	42.2	H	74.0	-31.8	AVG	127	1.2	RB 1 MHz; VB: 10 Hz
9845.750	55.8	H	74.0	-18.2	PK	127	1.2	RB 1 MHz; VB: 1 MHz
12309.210	36.8	H	54.0	-17.2	AVG	162	1.0	RB 1 MHz; VB: 10 Hz
12300.680	51.4	H	74.0	-22.6	PK	162	1.0	RB 1 MHz; VB: 1 MHz

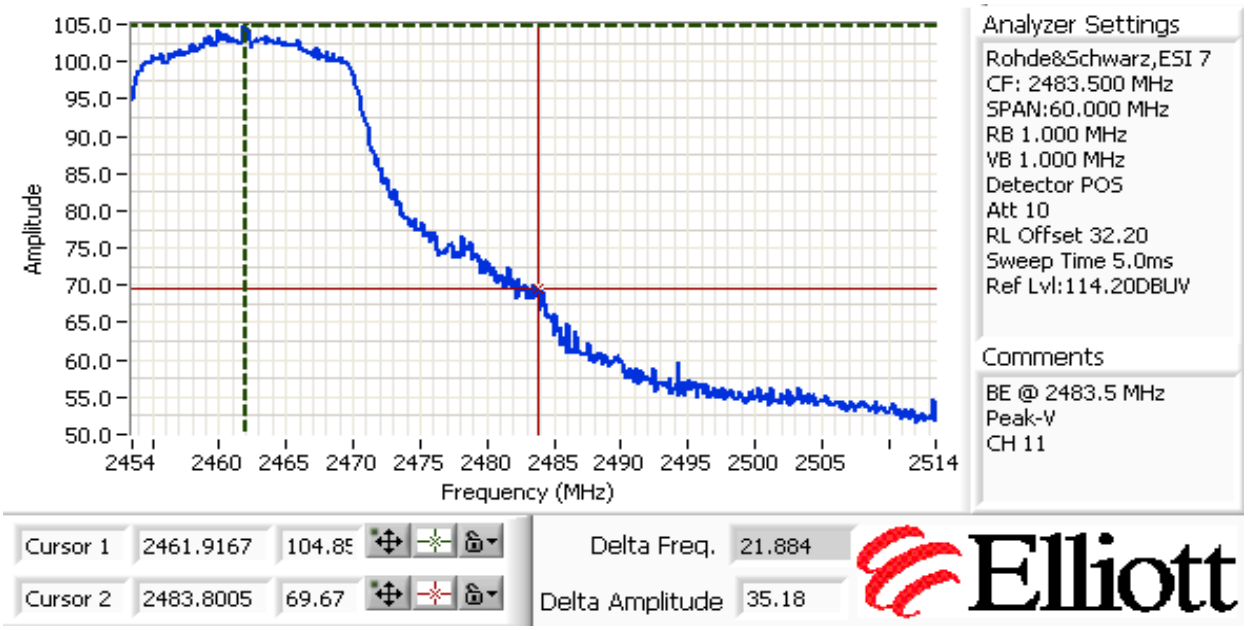
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B

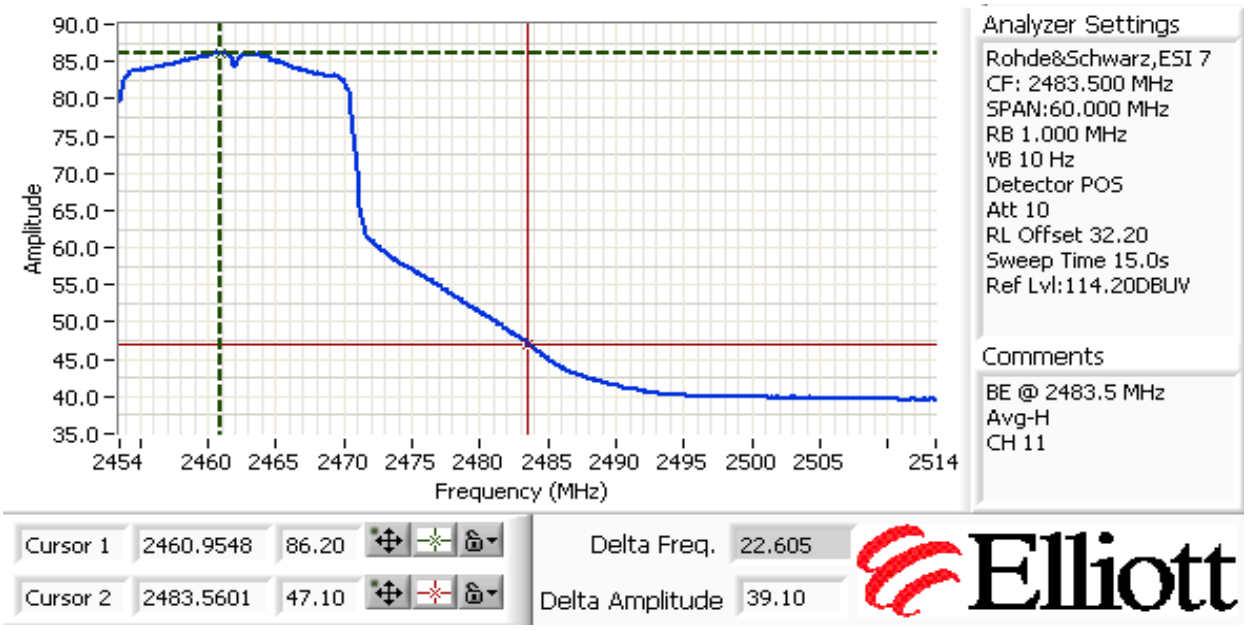
Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.560	51.7	V	54.0	-2.3	Avg	237	1.4	
2483.880	69.7	V	74.0	-4.3	PK	237	1.4	
2483.560	47.1	H	54.0	-6.9	Avg	328	1.0	
2483.680	65.3	H	74.0	-8.7	PK	328	1.0	

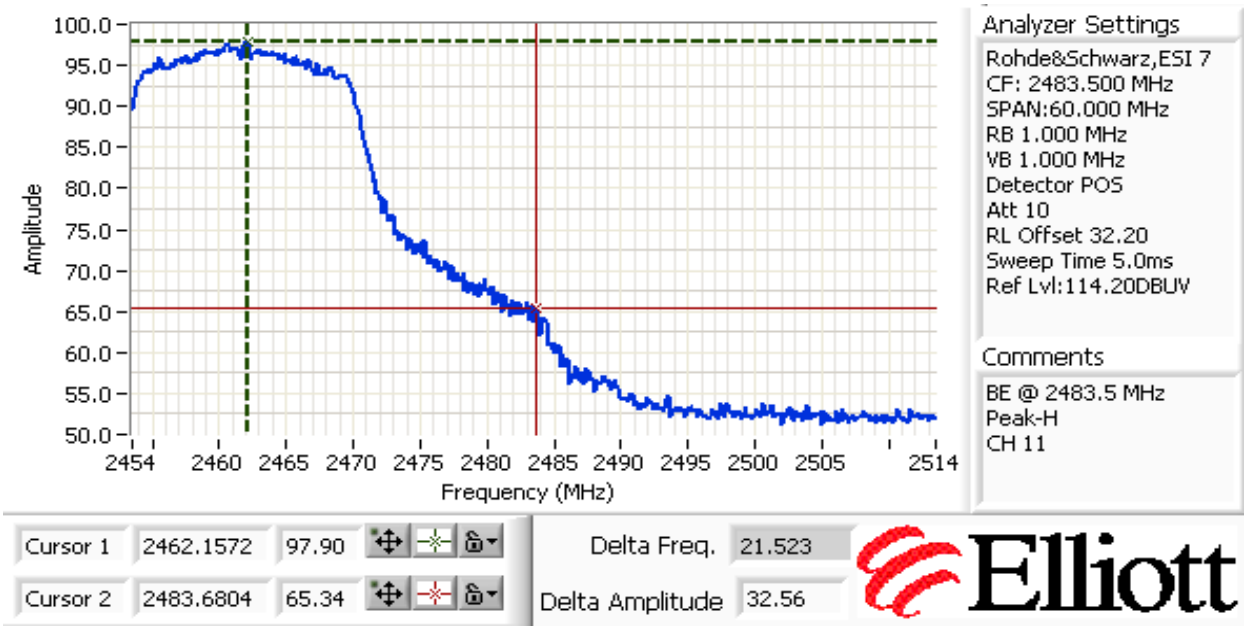


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B





Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan	Project Manager:	Mark Hills
Standard:	FCC Part 15, RSS 210	Class:	B



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
Power, PSD, Bandwidth and Spurious Emissions
(802.11 G 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: 7/26/2009
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: -
Config Change: -
Host Unit Voltage 120V/ 60Hz

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: 21.6 °C
Rel. Humidity: 42 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	15.247(b)	Pass	18.5 dBm (70mW) 18.9 dBm EIRP
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	-3.14 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	15.3 MHz
3	-	-	99% Bandwidth	RSS GEN	-	17.2 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	<-30dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

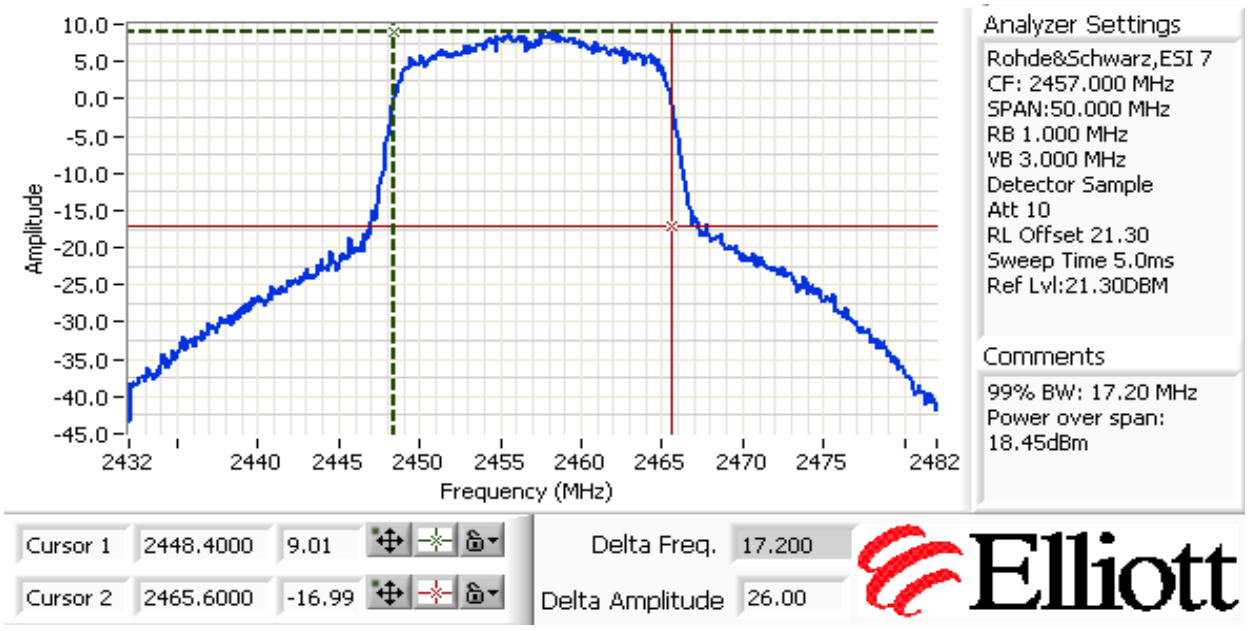
No deviations were made from the requirements of the standard.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Run #1: Output Power

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP Note 2 dBm	EIRP Note 2 W
16	2412	15.8	38.0	0.40	Pass	16.2	0.042
19	2417	18.2	65.5	0.40	Pass	18.6	0.072
19	2437	18.1	64.6	0.40	Pass	18.5	0.071
19	2457	18.5	70.0	0.40	Pass	18.9	0.077
16.5	2462	16.0	39.8	0.40	Pass	16.4	0.044

Note 1:	RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used.
Note 2:	Power setting - the software power setting used during testing, included for reference only.

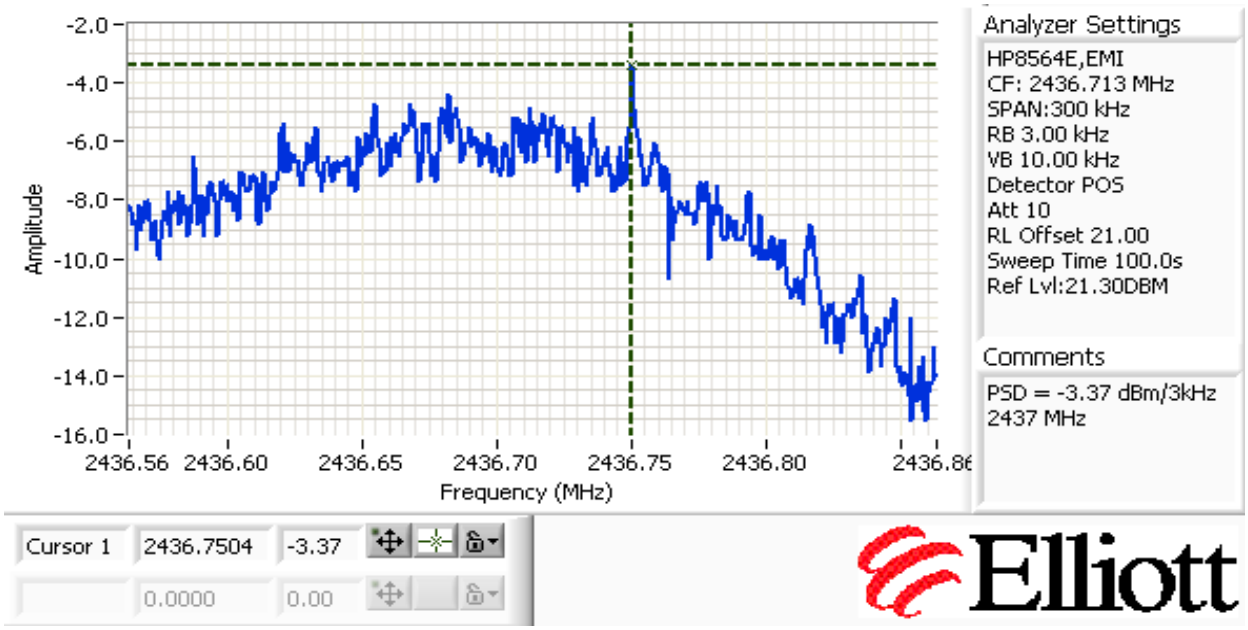


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
16.0	2412.8233	-6.2	8.0	Pass
19.0	2436.7504	-3.4	8.0	Pass
16.5	2461.7511	-5.7	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.

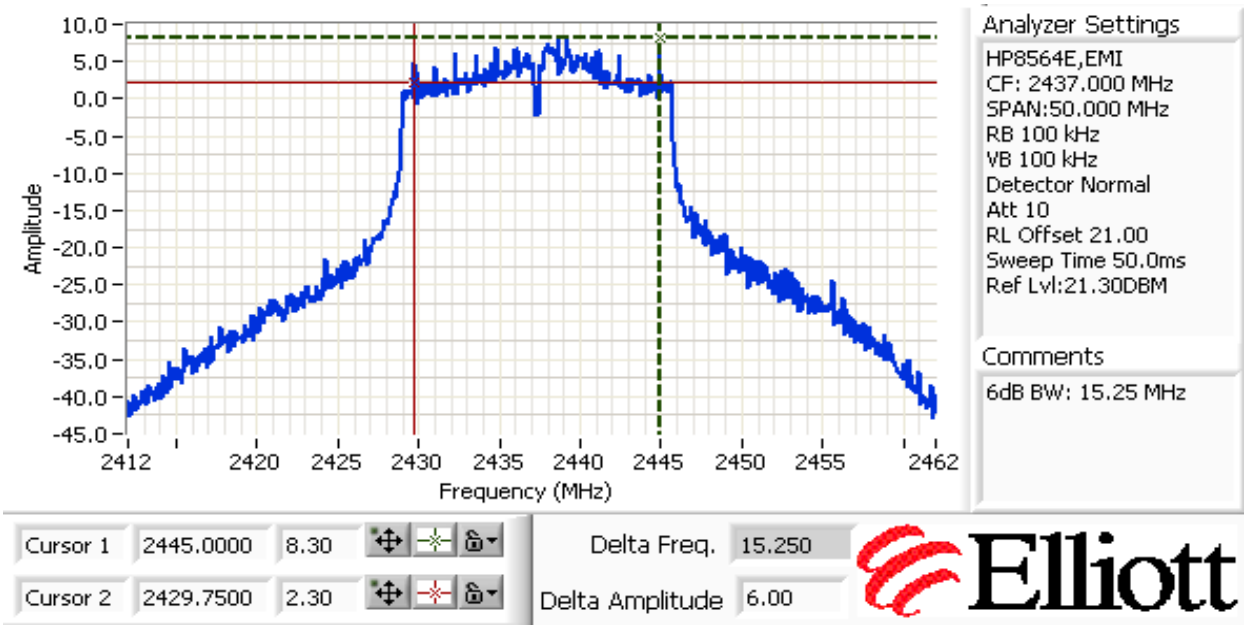


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

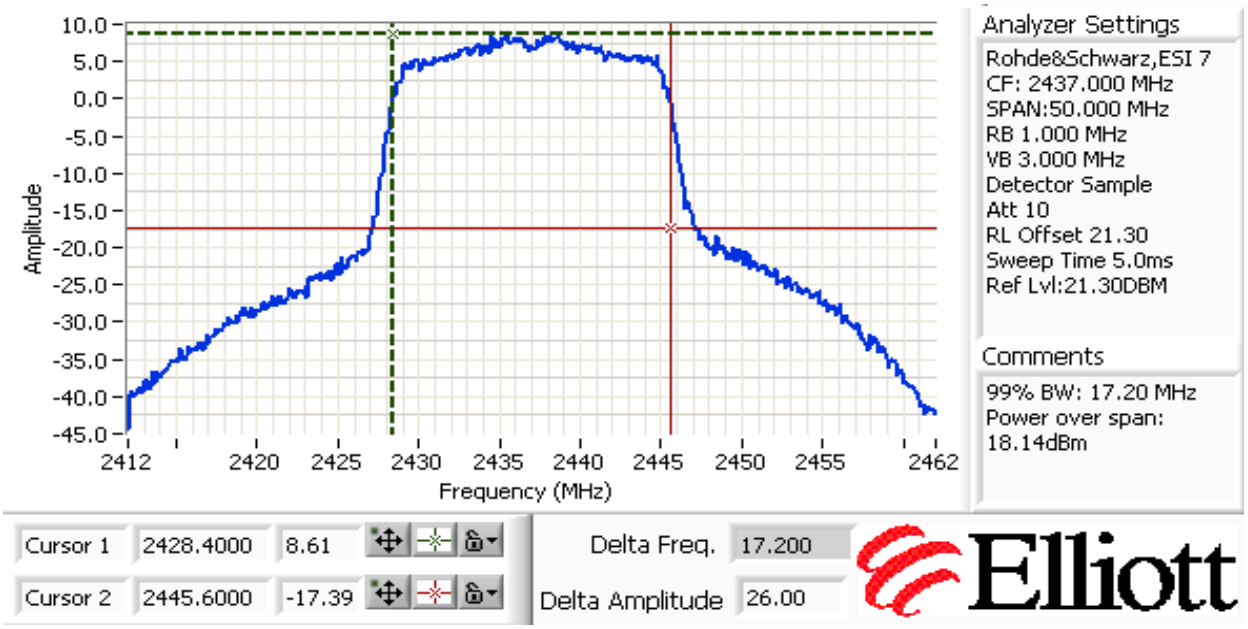
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
-	2412	100 kHz	15.8	17.1
-	2437	100 kHz	15.3	17.2
-	2462	100 kHz	15.3	17.1

Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A



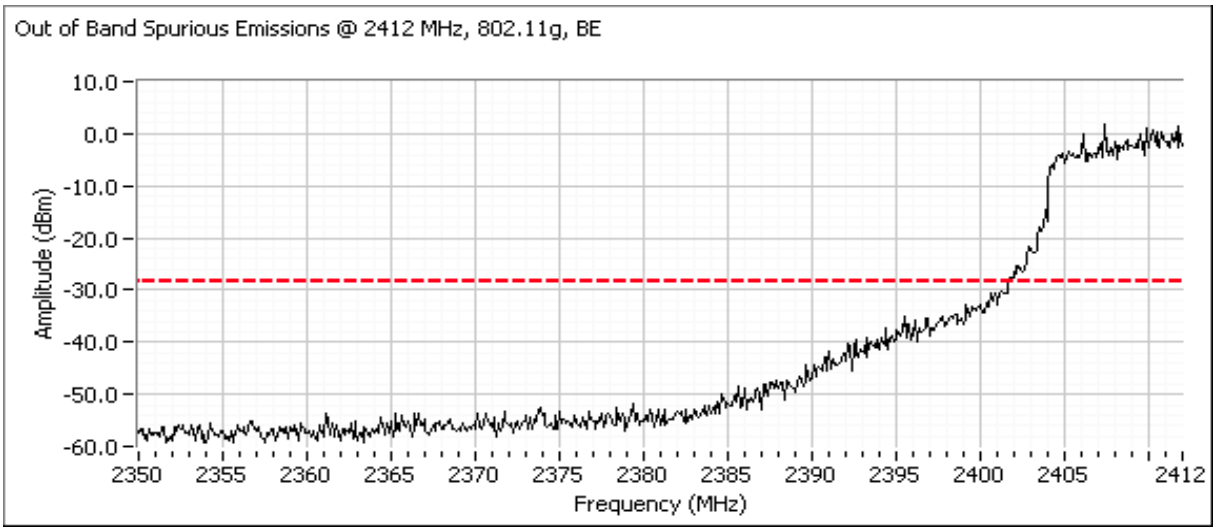
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

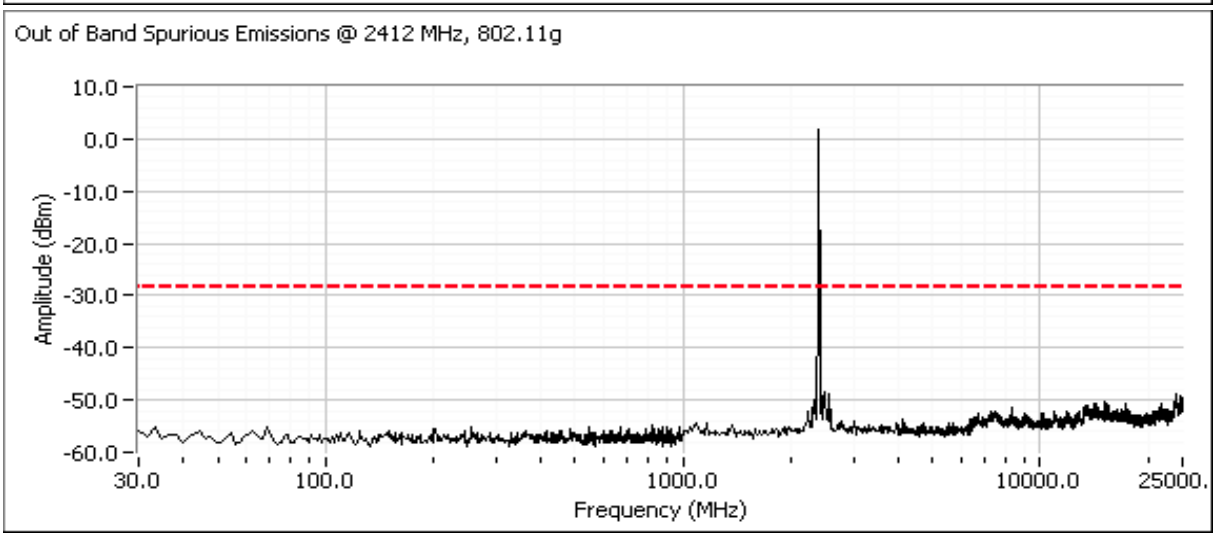
Run #4: Out of Band Spurious Emissions

Note: All plots were taken with RBW=VBW=100kHz

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

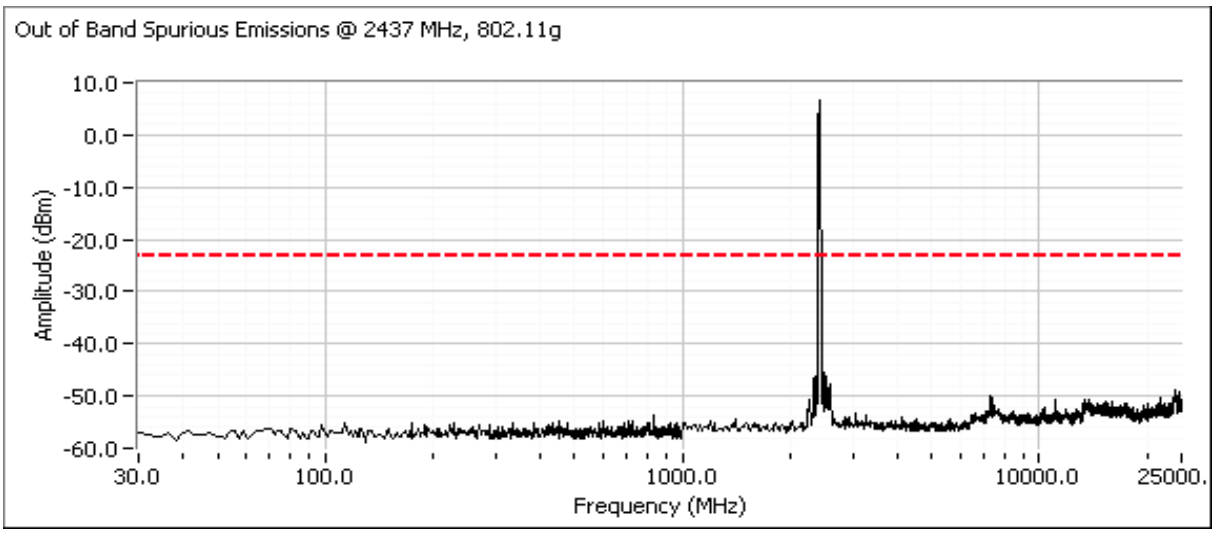
Plots for low channel





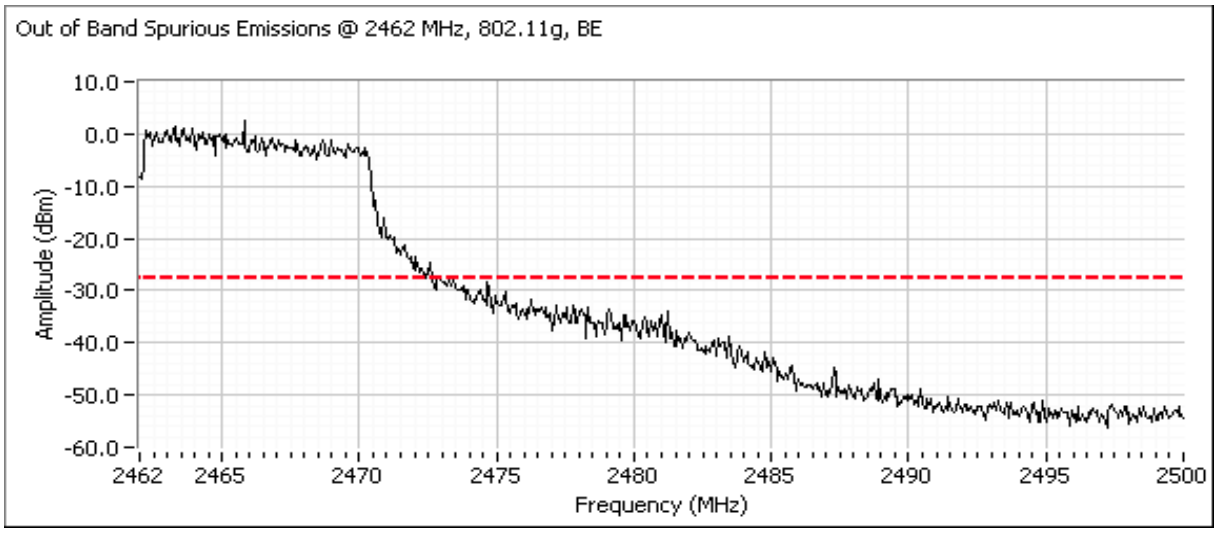
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

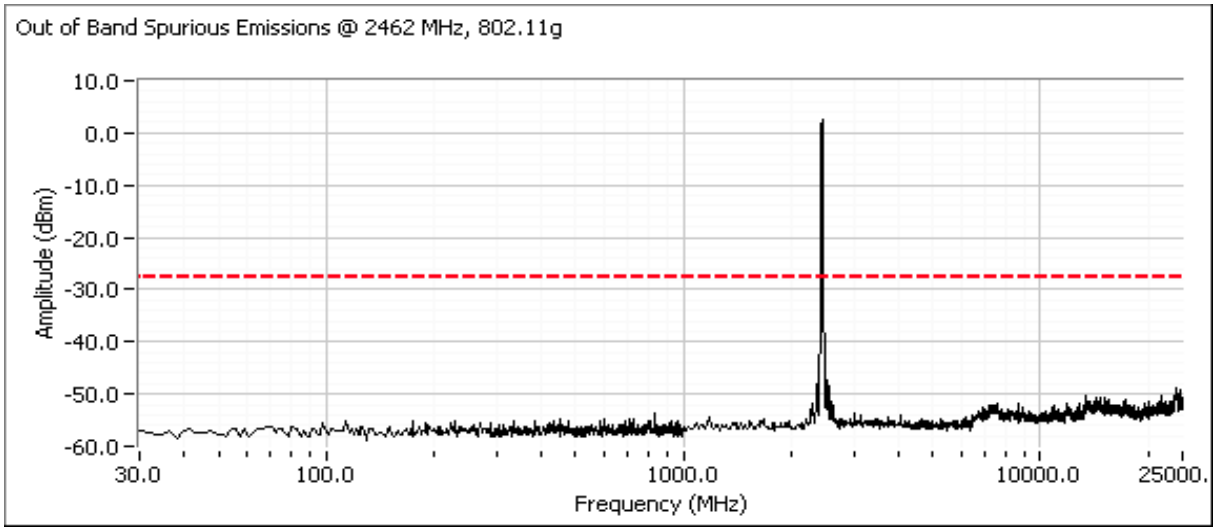
Plots for center channel



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Plots for high channel





Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
Power, PSD, Bandwidth and Spurious Emissions
(802.11 B 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: 7/26/2009
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: -
Config Change: -
Host Unit Voltage 120V/ 60Hz

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: 21.6 °C
Rel. Humidity: 42 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	15.247(b)	Pass	19.1 dBm (82mW) 19.5 dBm EIRP
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	0.1 dBm/3KHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	6.6 MHz
3	-	-	99% Bandwidth	RSS GEN	-	12 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	<-30dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

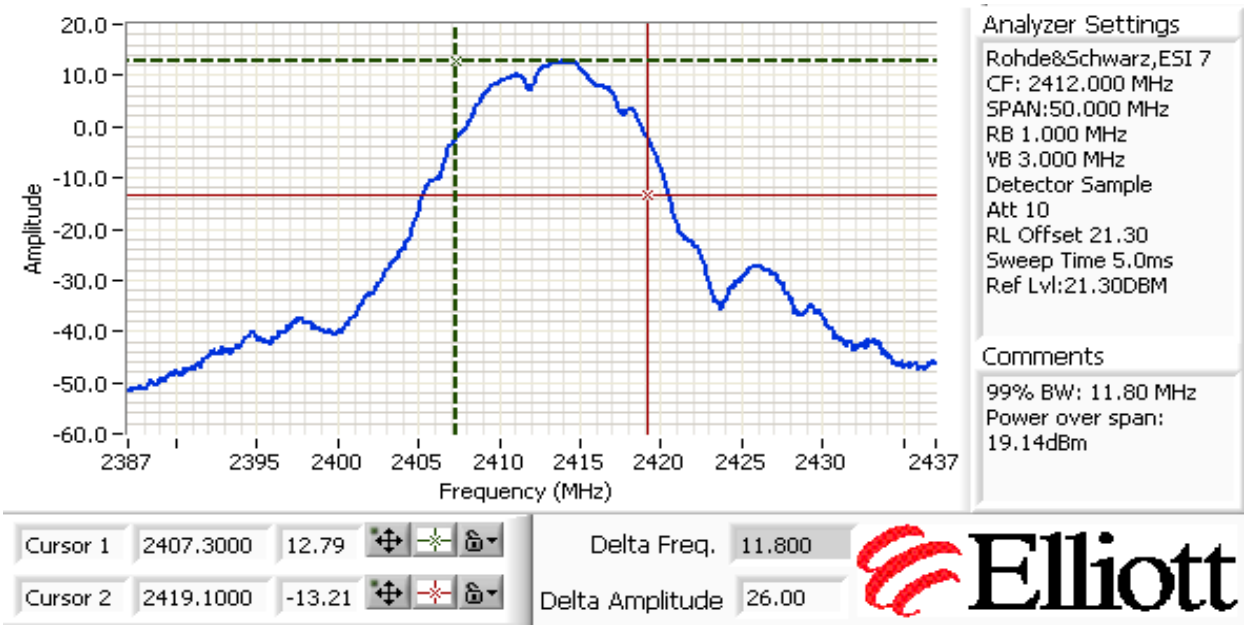
No deviations were made from the requirements of the standard.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Run #1: Output Power

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP Note 2 dBm	EIRP W
19	2412	19.1	82.0	0.40	Pass	19.5	0.090
19	2437	18.6	71.6	0.40	Pass	19.0	0.079
19	2462	19.1	81.3	0.40	Pass	19.5	0.089

Note 1:	RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 30? MHz. Spurious limit is -30dBc because this method was used.
Note 2:	Power setting - the software power setting used during testing, included for reference only.

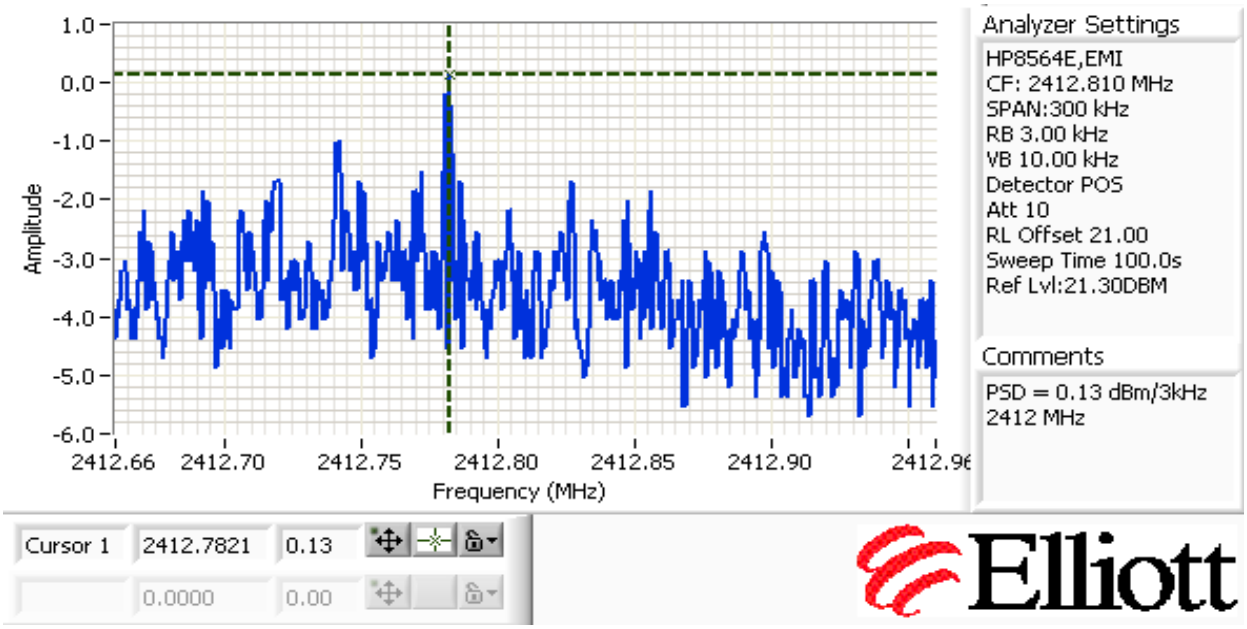


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
19	2412.7821	0.1	8.0	Pass
19	2436.2207	-1.0	8.0	Pass
19	2462.7809	-0.2	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.

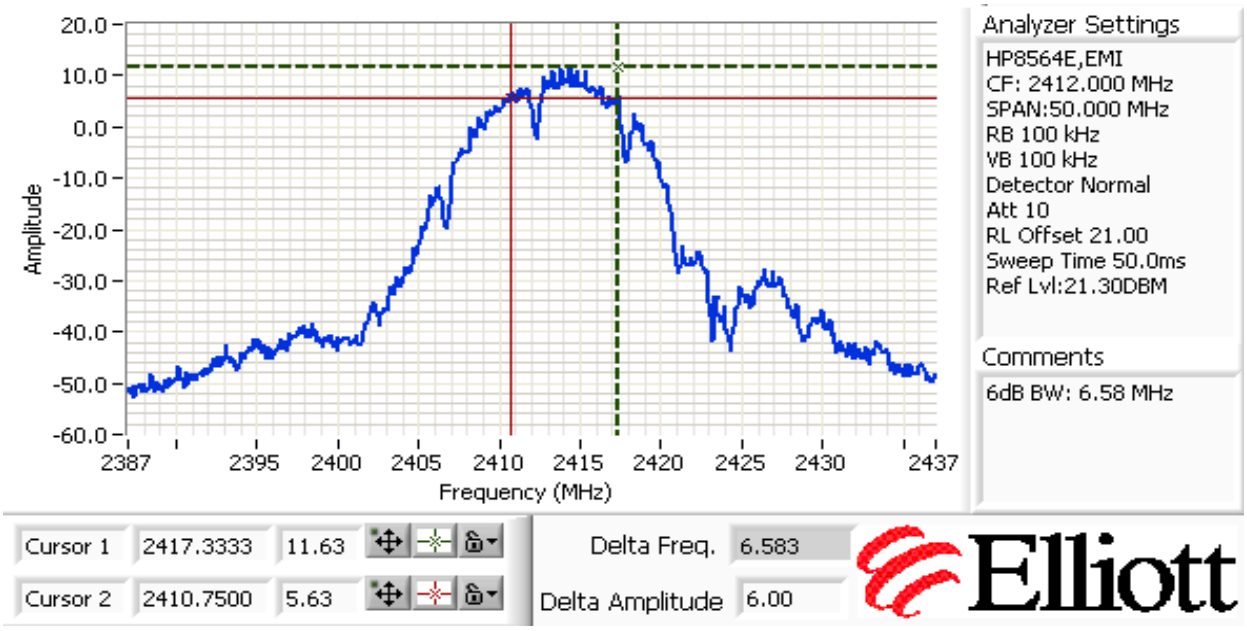


Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

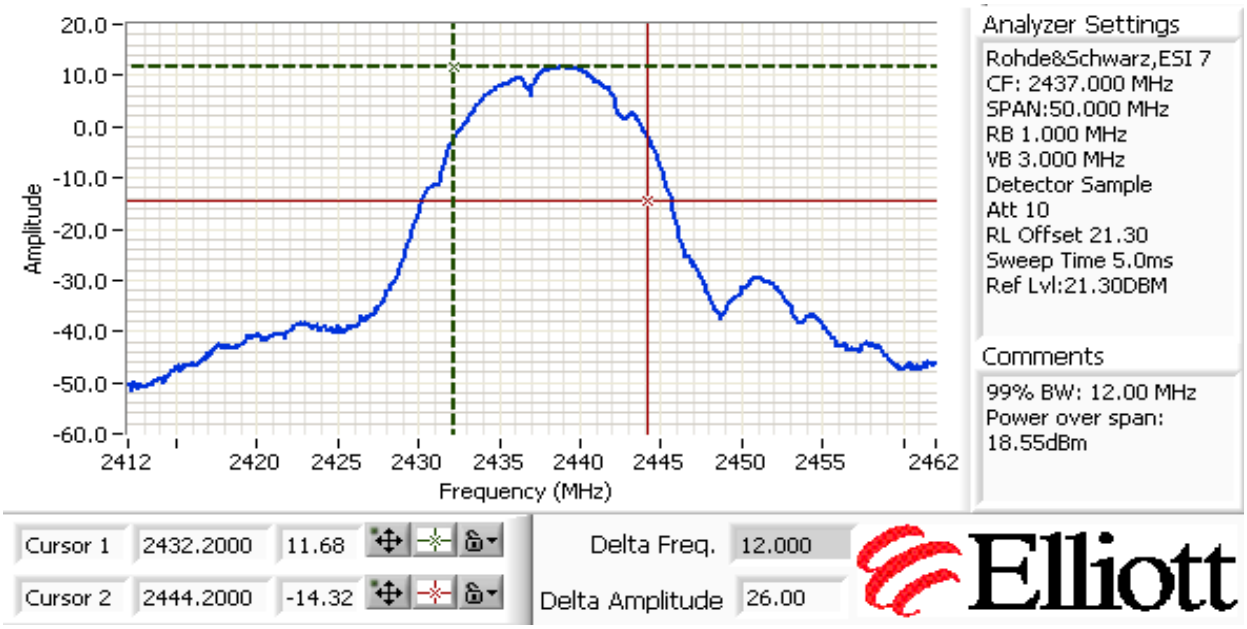
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
-	2412	100 kHz	6.6	11.8
-	2437	100 kHz	7.2	12.0
-	2462	100 kHz	7.3	11.8

Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A



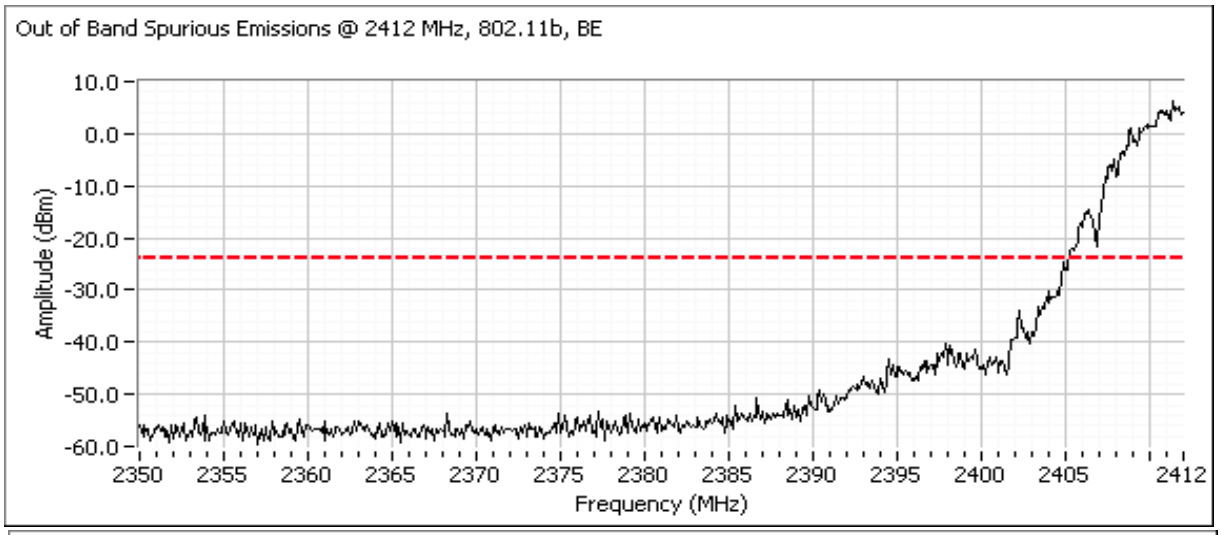
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

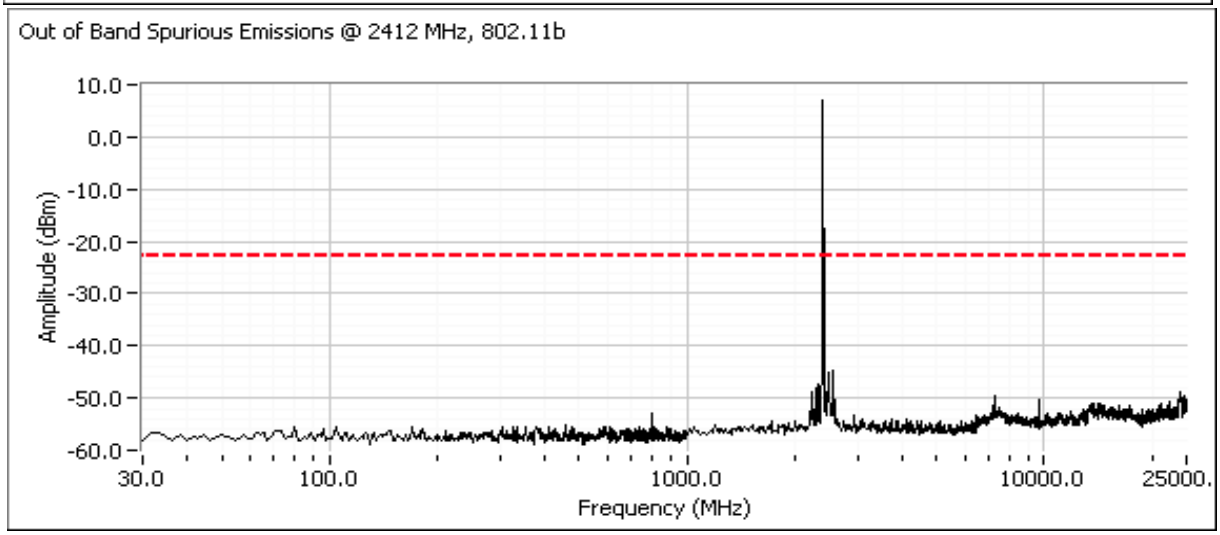
Run #4: Out of Band Spurious Emissions

Note: All plots were taken with RBW=VBW=100kHz

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

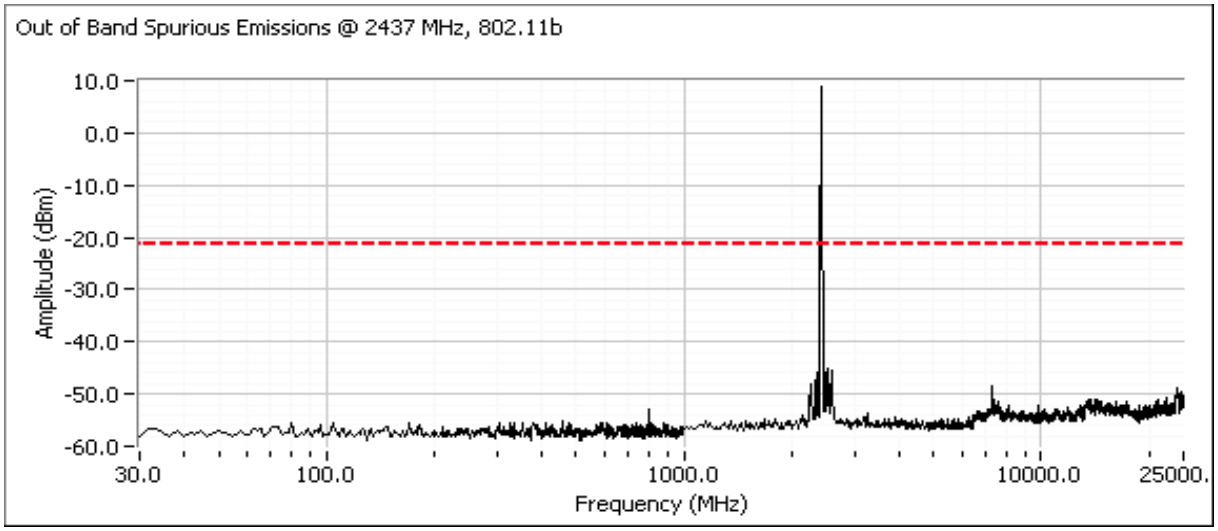
Plots for low channel





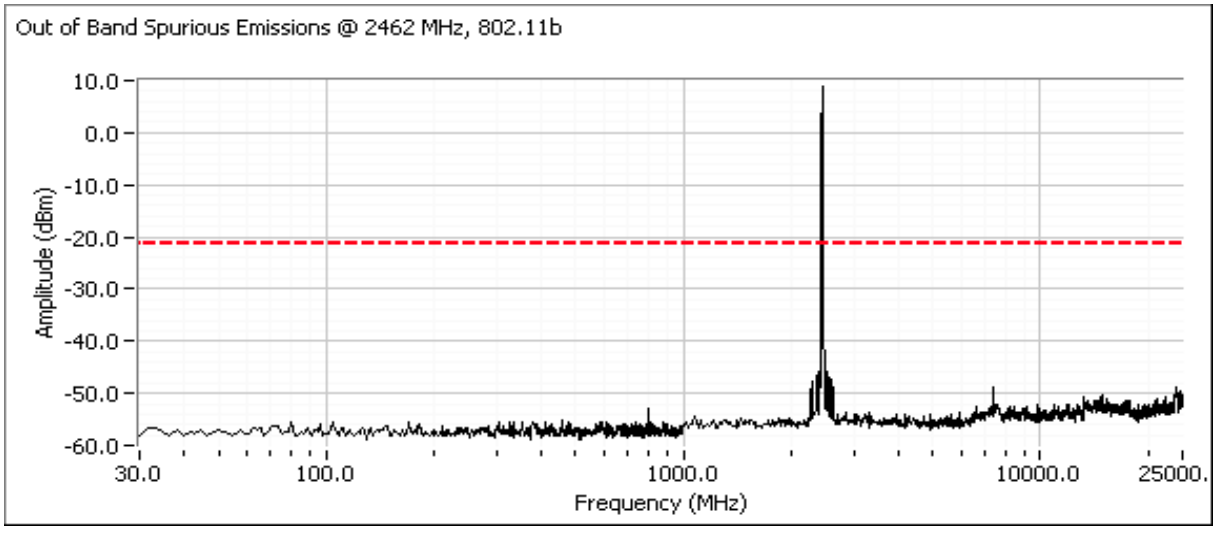
Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Plots for center channel



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	N/A

Plots for high channel



Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Radiated Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 7/24/2009
Test Engineer: Suhaila Khushzad
Test Location: Chamber # 5

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

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

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: 20.4 °C
Rel. Humidity: 33 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 (802.11b)	RE, 1000 - 7500 MHz Maximized Emissions	FCC Class B		45.4dBµV/m @ 1039.9MHz (-8.6dB)
2 (802.11g)	RE, 1000 - 7500 MHz Maximized Emissions	FCC Class B	Pass	44.6dBµV/m @ 1039.9MHz (-9.4dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

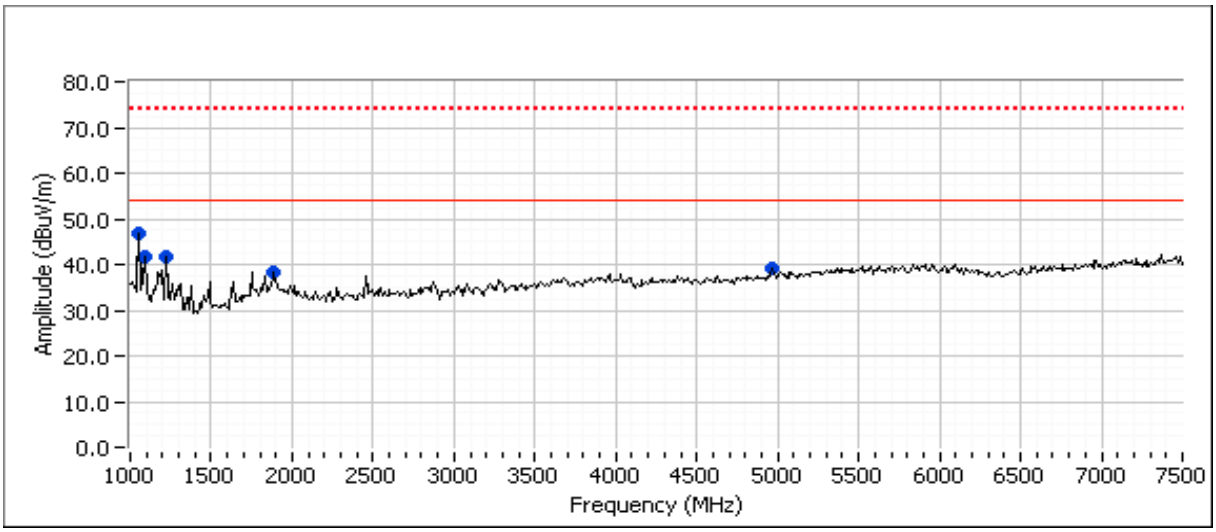
No deviations were made from the requirements of the standard.

Note: Preliminary testing showed no radio related emissions below 1000 MHz

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Run #1: Maximized Readings, 1000 - 7500 MHz. 802.11b Mode
Rx Mode on 2437 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500 MHz	3	3	0.0



Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1039.930	46.7	H	54.0	-7.3	Peak	148	1.0	
1039.980	41.8	V	54.0	-12.2	Peak	161	1.0	
1200.090	41.5	V	54.0	-12.5	Peak	183	1.9	
4948.060	39.2	H	54.0	-14.8	Peak	50	1.3	
1865.800	38.2	V	54.0	-15.8	Peak	129	1.9	

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Final peak and average readings

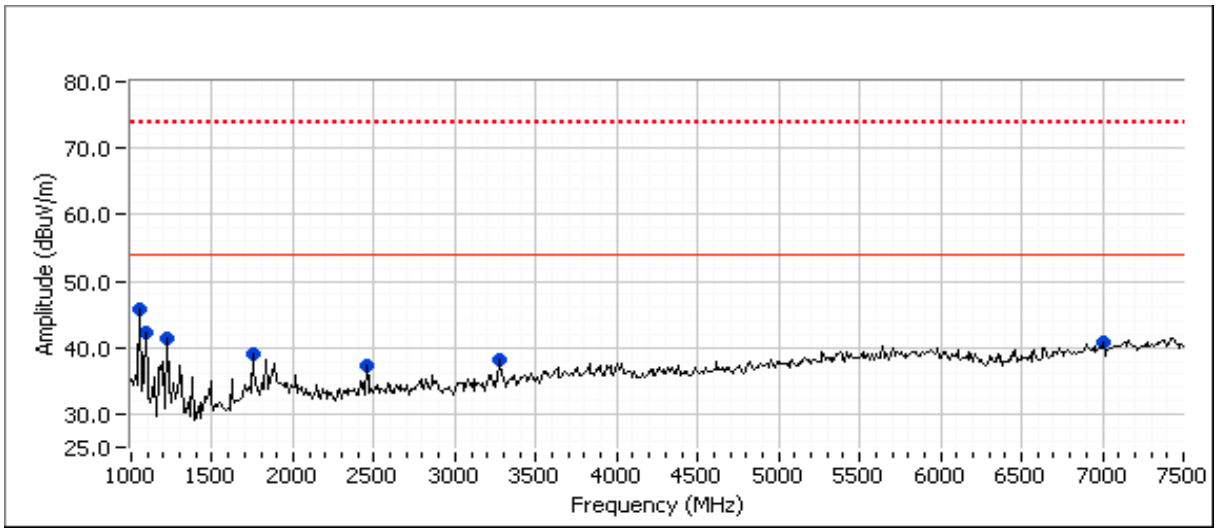
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1039.930	45.4	H	54.0	-8.6	AVG	109	1.0	RB 1 MHz; VB: 10 Hz
1040.060	47.2	H	74.0	-26.8	PK	109	1.0	RB 1 MHz; VB: 1 MHz
1065.850	40.3	V	54.0	-13.7	AVG	161	1.1	RB 1 MHz; VB: 10 Hz
1066.830	49.1	V	74.0	-24.9	PK	161	1.1	RB 1 MHz; VB: 1 MHz
1199.160	32.7	V	54.0	-21.3	AVG	149	1.5	RB 1 MHz; VB: 10 Hz
1202.090	47.9	V	74.0	-26.1	PK	149	1.5	RB 1 MHz; VB: 1 MHz
1865.400	35.4	V	54.0	-18.6	AVG	136	1.6	RB 1 MHz; VB: 10 Hz
1867.730	45.7	V	74.0	-28.3	PK	136	1.6	RB 1 MHz; VB: 1 MHz
4939.730	33.1	H	54.0	-20.9	AVG	92	1.4	RB 1 MHz; VB: 10 Hz
4948.460	44.4	H	74.0	-29.6	PK	92	1.4	RB 1 MHz; VB: 1 MHz

Note 1:	Above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Run #2: Maximized Readings, 1000 - 7500 MHz. 802.11g Mode
Rx Mode on 2437 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500 MHz	3	3	0.0



Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1039.930	45.9	H	54.0	-8.1	Peak	151	1.0	
1039.980	42.3	V	54.0	-11.7	Peak	162	1.0	
1200.090	41.3	V	54.0	-12.7	Peak	186	1.9	
7024.020	40.8	V	54.0	-13.2	Peak	216	1.3	
1731.640	39.1	V	54.0	-14.9	Peak	136	1.6	
3249.400	38.1	V	54.0	-15.9	Peak	129	1.6	
2437.250	37.3	V	54.0	-16.7	Peak	189	1.6	

Client:	Askey Computer Corporation	Job Number:	J76020
Model:	WPA5151	T-Log Number:	T76037
		Account Manager:	Dean Eriksen
Contact:	Jerry Chan		
Standard:	FCC Part 15, RSS 210	Class:	B

Final peak and average readings

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1039.930	44.6	H	54.0	-9.4	AVG	155	1.0	RB 1 MHz; VB: 10 Hz
1040.000	46.9	H	74.0	-27.1	PK	155	1.0	RB 1 MHz; VB: 1 MHz
1065.750	40.6	V	54.0	-13.4	AVG	161	1.0	RB 1 MHz; VB: 10 Hz
1066.340	48.2	V	74.0	-25.8	PK	161	1.0	RB 1 MHz; VB: 1 MHz
1200.160	35.1	V	54.0	-18.9	AVG	191	1.8	RB 1 MHz; VB: 10 Hz
1201.760	51.9	V	74.0	-22.1	PK	191	1.8	RB 1 MHz; VB: 1 MHz
1732.240	33.7	V	54.0	-20.3	AVG	144	1.5	RB 1 MHz; VB: 10 Hz
1737.570	55.5	V	74.0	-18.5	PK	144	1.5	RB 1 MHz; VB: 1 MHz
3249.270	33.0	V	54.0	-21.0	AVG	97	1.2	RB 1 MHz; VB: 10 Hz
3249.200	42.6	V	74.0	-31.4	PK	97	1.2	RB 1 MHz; VB: 1 MHz
2437.050	35.5	V	54.0	-18.5	AVG	204	1.5	RB 1 MHz; VB: 10 Hz
2437.050	43.5	V	74.0	-30.5	PK	204	1.5	RB 1 MHz; VB: 1 MHz
7022.290	35.2	V	54.0	-18.8	AVG	175	1.0	RB 1 MHz; VB: 10 Hz
7015.420	47.2	V	74.0	-26.8	PK	175	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	Above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Appendix C Photographs of Test Configurations

Uploaded as a separate exhibit

Appendix D Proposed FCC ID Label & Label Location

Uploaded as a separate exhibit

Appendix E Detailed Photographs

Uploaded as a separate exhibit

Appendix F Operator's Manual

Uploaded as a separate exhibit

Appendix G Block Diagram

Uploaded as a separate exhibit

Appendix H Schematic Diagrams

Uploaded as a separate exhibit

Appendix I Theory of Operation

Uploaded as a separate exhibit

Appendix J RF Exposure Information

Uploaded as a separate exhibit