



*EMC Test Report*

*Application for Grant of Equipment Authorization  
pursuant to*

*FCC Part 15 Subpart C*

*Model: WLU6113-D69*

FCC ID: H8N-WLU6113

APPLICANT: Askey Computer Corporation  
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TEST SITE(S): Elliott Laboratories  
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Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5

REPORT DATE: March 29, 2010

FINAL TEST DATES: February 17 and 22, March 19, 22, 23 and 24,  
2010

AUTHORIZED SIGNATORY:

A handwritten signature in blue ink, appearing to read "Mark E. Hill", written over a horizontal line.

Mark E. Hill  
Staff Engineer  
Elliott Laboratories



Testing Cert #2016-01

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**REVISION HISTORY**

Rev#	Date	Comments	Modified By
1	March 29, 2010	First release	

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## **SCOPE**

An electromagnetic emissions test has been performed on the Askey Computer Corporation model WLU6113-D69, 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 Elliott Laboratories test procedures:

### ANSI C63.4:2003

### FCC DTS Measurement Procedure KDB558074, March 2005

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 Askey Computer Corporation model WLU6113-D69 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 Askey Computer Corporation model WLU6113-D69 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: 15.0 MHz 802.11b: 7.1 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11g: 17.3 dBm <sup>Note 1</sup> 0.054mW EIRP  802.11b: 17.2 dBm <sup>Note 1</sup> 0.052 mW EIRP	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11g: -3.4 dBm/3kHz  802.11b: 3.6 dBm/3KHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	N/A –All testing performed radiated	< -30dBc <sup>Note 2</sup>	N/A
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9dB $\mu$ V/m @ 2483.6MHz (-0.1dB)	15.207 in restricted bands, all others <-30dBc <sup>Note 2</sup>	Complies

Note 1: Power measured radiated, value reported is EIRP.

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		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	Not applicable receiver tunes above 960 MHz-		Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	36.7dB $\mu$ V @ 1.393MHz	Refer to standard	Complies (- 9.3 dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11 and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies

---

**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 WLU6113-D69 is an 802.11bgn device that will connect to Blue-Ray DVD player 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 5VDC.

The sample was received on February 17, 2010 and tested on February 17 and 22, March 19, 22, 23 and 24, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Askey Computer Corporation	WLU6113-D69	802.11 b/g n WLAN adaptor	N/A	H8N-WLU6113

**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 system used with the Askey Computer Corporation model WLU6113-D69 consists of an integral antenna with approximately 0dBi gain.

**ENCLOSURE**

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

**MODIFICATIONS**

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

**SUPPORT EQUIPMENT**

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

Company	Model	Description	Serial Number
Dell	PP10S	Laptop Computer	78983498010740
Dell	ADP-60NHB	Power Adaptor	NUW0527474112

No remote support equipment was used during emissions testing.

**EUT INTERFACE PORTS**

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

Port		Description	Cable(s)	
From	To		Shielded/Unshielded	Length(m)
USB - Laptop	EUT	Multiconductor	Shielded	1.5
DC Power In - Laptop	AC/DC Adapter	Multiconductor	Shielded	2.0
AC/DC Adapter	AC Mains	3 Wire	Unshielded	1.5

**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.

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 February 17 and 22, March 19, 22, 23 and 24, 2010 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.

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***FILTERS/ATTENUATORS***

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

***ANTENNAS***

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

***ANTENNA MAST AND EQUIPMENT TURNTABLE***

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

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

***INSTRUMENT CALIBRATION***

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

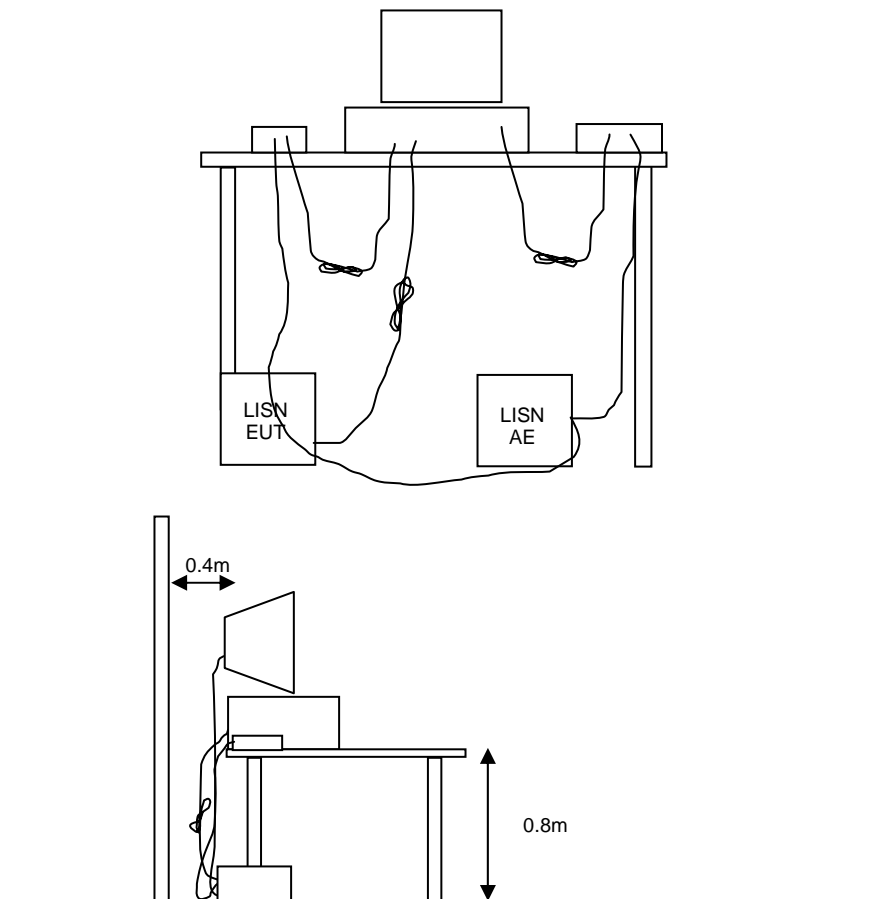
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

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

### CONDUCTED EMISSIONS

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



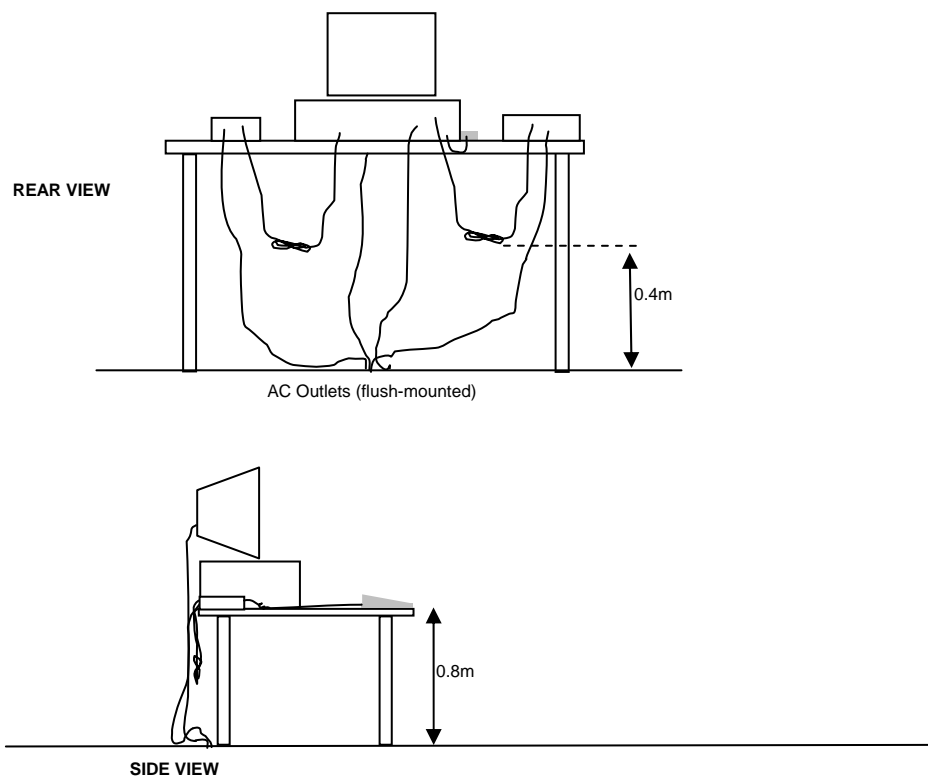
**RADIATED EMISSIONS**

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

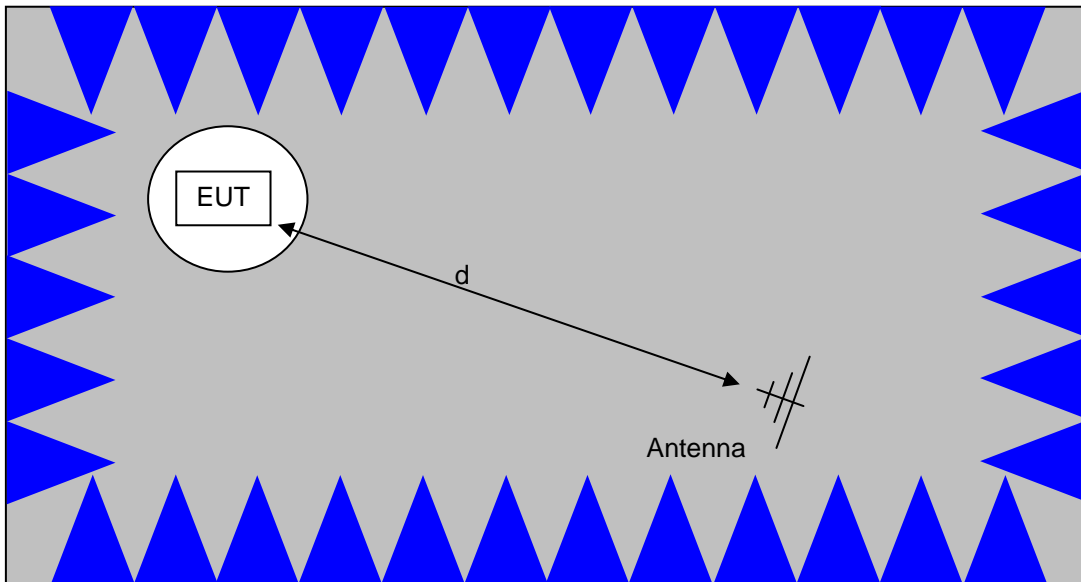
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

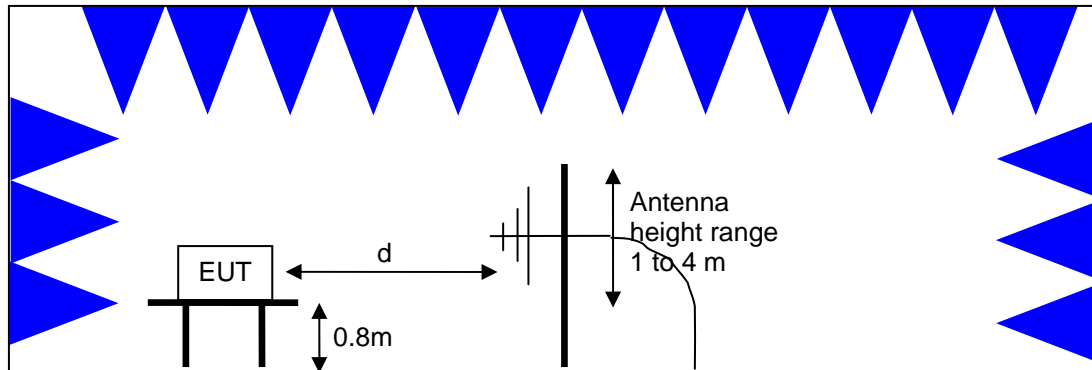


Typical Test Configuration for Radiated Field Strength Measurements



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

#### **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 bands<sup>1</sup> (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 <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 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

**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

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

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 3m from the equipment under test:

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

where P is the eirp (Watts)

**Appendix A Test Equipment Calibration Data****Conducted Emissions - AC Power Ports, 17-Feb-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	LISN, FCC / CISPR	LISN-3, OATS	304	7/15/2010
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	787	5/18/2010
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	812	2/3/2011
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	1316	3/6/2010

**Radiated Emissions, 30 - 18,000 MHz, 20-Mar-10 thru 25-Mar-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	4/12/2010
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010
Hewlett Packard	Microwave Preamplifier, 1- 26.5GHz	8449B	2199	1/11/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	10/15/2010

## *Appendix B Test Data*

T78124 36 Pages



## EMC Test Data

Client:	Askey Computer Corporation	Job Number:	J78103
Model:	WLU6113-D69	T-Log Number:	T78124
		Account Manager:	Dean Eriksen
Contact:	Jerry Chen	Project Manager:	Mark Hill
Emissions Standard(s):	FCC Part 15	Class:	B
Immunity Standard(s):	-	Environment:	-

# EMC Test Data

For The

## Askey Computer Corporation

Model

WLU6113-D69

Date of Last Test: 3/25/2010

Client:	Askey Computer Corporation	Job Number:	J78103
Model:	WLU6113-D69	T-Log Number:	T78124
Contact:	Jerry Chen	Account Manager:	Dean Eriksen
Standard:	FCC Part 15	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:      19.7 °C      Rel. Humidity:      39 %

### 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	18	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247 (c)	45.4dB $\mu$ V/m @ 2390.1MHz (-8.6dB)
			18	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247 (c)	53.4dB $\mu$ V/m @ 4824.0MHz (-0.6dB)
1b	b mode	6	17	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247 (c)	51.3dB $\mu$ V/m @ 7312.8MHz (-2.7dB)
1c	b mode	11	17	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247 (c)	52.3dB $\mu$ V/m @ 2483.6MHz (-1.7dB)
			18	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247 (c)	52.8dB $\mu$ V/m @ 4924.0MHz (-1.2dB)
2a	g mode	1	63	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247 (c)	53.7dB $\mu$ V/m @ 2390.1MHz (-0.3dB)
			63	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247 (c)	41.7dB $\mu$ V/m @ 4824.0MHz (-12.3dB)
2b	g mode	2	73	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247 (c)	53.6dB $\mu$ V/m @ 2390.1MHz (-0.4dB)
2c	g mode	6	75	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247 (c)	53.6dB $\mu$ V/m @ 7308.5MHz (-0.4dB)
2d	g mode	10	73	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247 (c)	53.1dB $\mu$ V/m @ 2483.6MHz (-0.9dB)
2e	g mode	11	56	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247 (c)	53.9dB $\mu$ V/m @ 2483.6MHz (-0.1dB)
			79	Radiated Emissions 1 - 26 GHz	FCC Part 15.209 / 15.247 (c)	51.3dB $\mu$ V/m @ 7385.3MHz (-2.7dB)

### Modifications Made During Testing

No modifications were made to the EUT during testing



Client:	Askey Computer Corporation	Job Number:	J78103
Model:	WLU6113-D69	T-Log Number:	T78124
Contact:	Jerry Chen	Account Manager:	Dean Eriksen
Standard:	FCC Part 15	Class:	N/A

**Deviations From The Standard**

No deviations were made from the requirements of the standard.

Note - Preliminary testing showed no radio related emissions below 1 GHz and above 18 GHz.

Run #1: Radiated Spurious Emissions, 1000 - 25000 MHz. Operating Mode: 802.11b

Run #1a: Low Channel @ 2412 MHz

Bandedge Target Power = 18, Spurious Target Power = 18

Port: Upright Orientation

Date of Test: 3/22/2009  
Test Engineer: Rafael Varelas  
Test Location: FT Chamber #3

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

**Fundamental Field Strength**

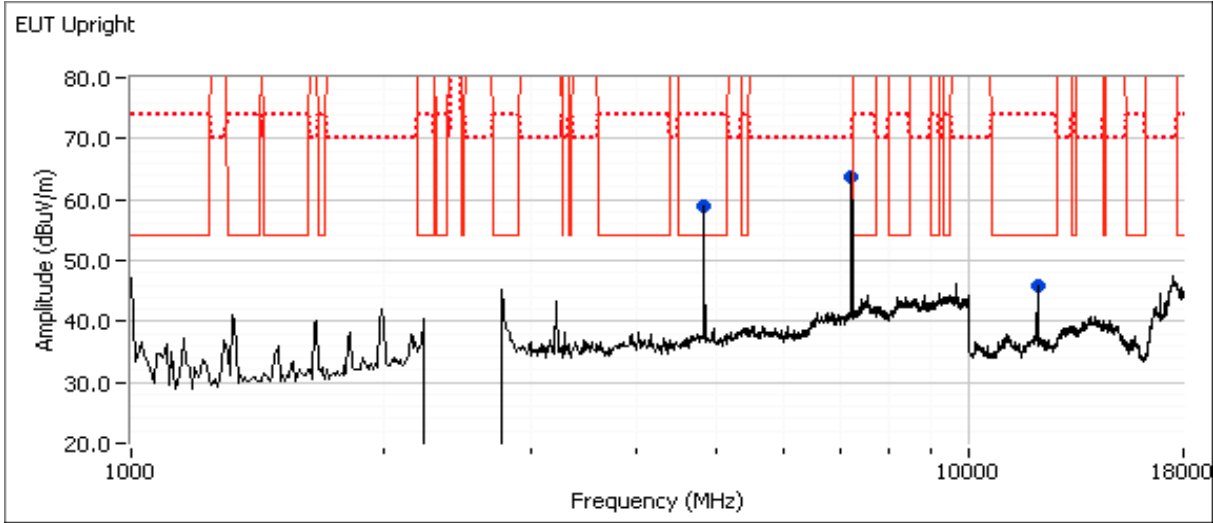
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters	
<b>Setting = 18</b>								
2414.000	103.1	V	-	-	AVG	97	1.0	RB 1 MHz; VB: 10 Hz
2414.770	105.8	V	-	-	PK	97	1.0	RB 1 MHz; VB: 1 MHz
2414.230	102.6	V	-	-	PK	97	1.0	RB 100 kHz; VB: 100 kHz
2413.930	106.6	H	-	-	AVG	353	1.0	RB 1 MHz; VB: 10 Hz
2413.170	109.3	H	-	-	PK	353	1.0	RB 1 MHz; VB: 1 MHz
2413.930	105.0	H	-	-	PK	353	1.0	RB 100 kHz; VB: 100 kHz

**Other Spurious Emissions**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters	
<b>Setting = 18</b>								
4824.020	53.4	V	54.0	-0.6	AVG	269	1.0	RB 1 MHz; VB: 10 Hz
4824.050	55.5	V	74.0	-18.5	PK	269	1.0	RB 1 MHz; VB: 1 MHz
7238.630	57.5	V	75.0	-17.5	PK	263	1.6	RB 100 kHz; VB: 100 kHz
12053.330	45.7	V	54.0	-8.3	Peak	0	1.0	

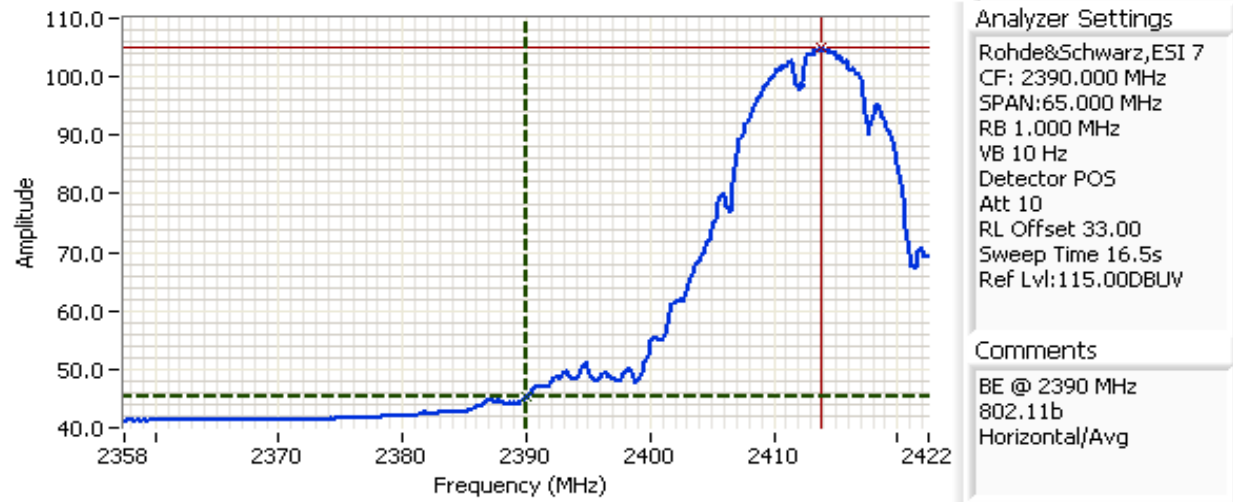
Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A



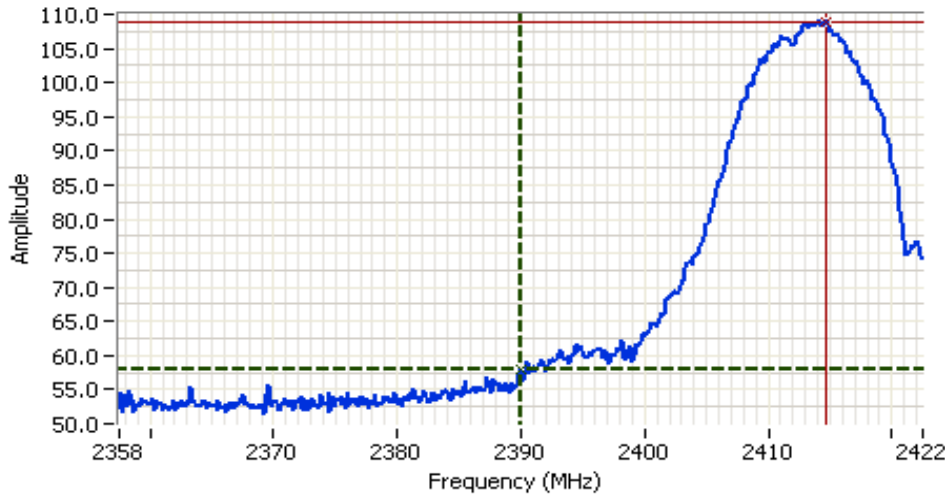
**Band Edge Signal Field Strength**

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters
<b>Setting = 18</b>							
2390.065	45.4	H	54.0	-8.6	AVG	11	1.1
2390.065	57.8	H	74.0	-16.2	PK	11	1.1
2389.935	44.3	V	54.0	-9.7	AVG	255	1.0
2386.809	55.6	V	74.0	-18.4	PK	255	1.0



Cursor 1	2390.0652	45.43	+	+	+	+	+	Delta Freq.	23.838
Cursor 2	2413.9028	104.93	+	-	+	+	+	Delta Amplitude	59.50

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A



**Analyzer Settings**  
 Rohde&Schwarz, ESI 7  
 CF: 2390.000 MHz  
 SPAN: 65.000 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 5.0ms  
 Ref Lvl: 115.000dBuV

**Comments**  
 BE @ 2390 MHz  
 802.11b  
 Horizontal/PK

Cursor 1	2390.0652	57.83	+	-	+	+	Delta Freq.	24.619
Cursor 2	2414.6843	108.86	+	-	+	+	Delta Amplitude	51.05



Run #1b: Radiated Spurious Emissions, 30 - 26,000 MHz. Operating Mode: 802.11b  
 Center Channel @ 2437 MHz  
 Spurious Target Power = 17  
 Port: Upright Orientation

Date of Test: 3/19/2010  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #5

**Fundamental 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	
2438.970	107.4	V	-	-	AVG	266	1.2	RB 1 MHz; VB: 10 Hz
2439.870	109.9	V	-	-	PK	266	1.2	RB 1 MHz; VB: 1 MHz
2439.230	107.8	V	-	-	PK	266	1.2	RB 100 kHz; VB: 100 kHz
2438.930	104.9	H	-	-	AVG	182	1.4	RB 1 MHz; VB: 10 Hz
2439.800	107.8	H	-	-	PK	182	1.4	RB 1 MHz; VB: 1 MHz
2439.230	103.8	H	-	-	PK	182	1.4	RB 100 kHz; VB: 100 kHz

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

### Other Spurious Emissions

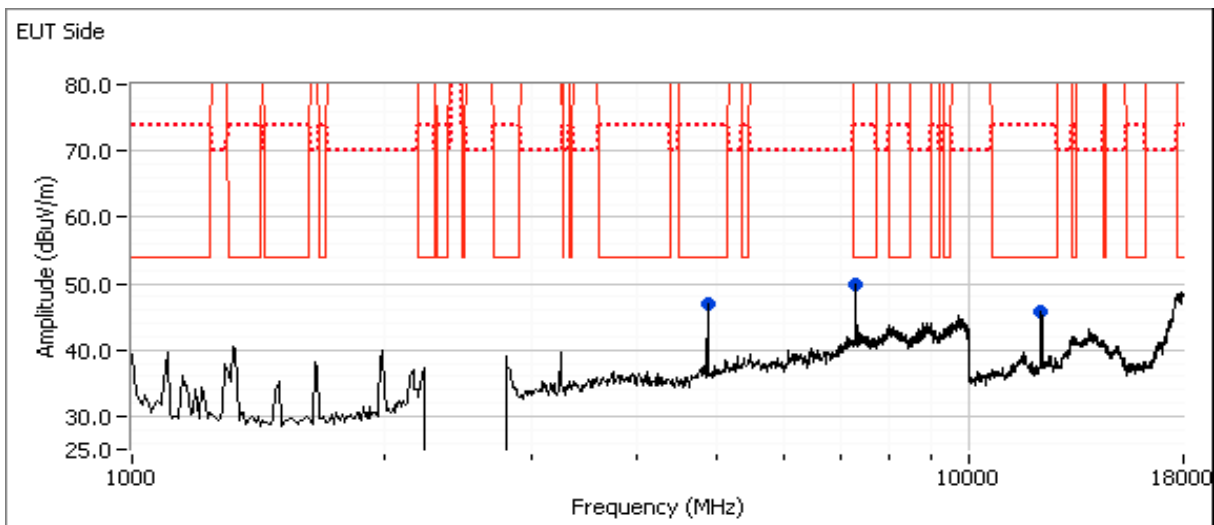
Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>EUT Side</b>								
<b>Power setting = 17</b>								
7312.770	51.3	V	54.0	-2.7	AVG	264	1.5	RB 1 MHz; VB: 10 Hz, Note 2
7312.270	56.7	V	74.0	-17.3	PK	264	1.5	RB 1 MHz; VB: 1 MHz, Note 2
4874.080	47.3	V	54.0	-6.7	AVG	84	1.6	RB 1 MHz; VB: 10 Hz
4873.910	51.3	V	74.0	-22.7	PK	84	1.6	RB 1 MHz; VB: 1 MHz
12173.330	45.7	H	54.0	-8.3	Peak	16	1.0	
<b>EUT Flat</b>								
4868.330	40.3	V	54.0	-13.7	Peak	105	1.6	
<b>EUT Upright</b>								
4874.060	49.5	V	54.0	-4.5	AVG	107	1.3	RB 1 MHz; VB: 10 Hz
4874.100	53.0	V	74.0	-21.0	PK	107	1.3	RB 1 MHz; VB: 1 MHz
7312.870	48.9	V	54.0	-5.1	AVG	260	1.6	RB 1 MHz; VB: 10 Hz
7312.020	54.9	V	74.0	-19.1	PK	260	1.6	RB 1 MHz; VB: 1 MHz
12173.330	44.4	V	54.0	-9.6	Peak	17	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.

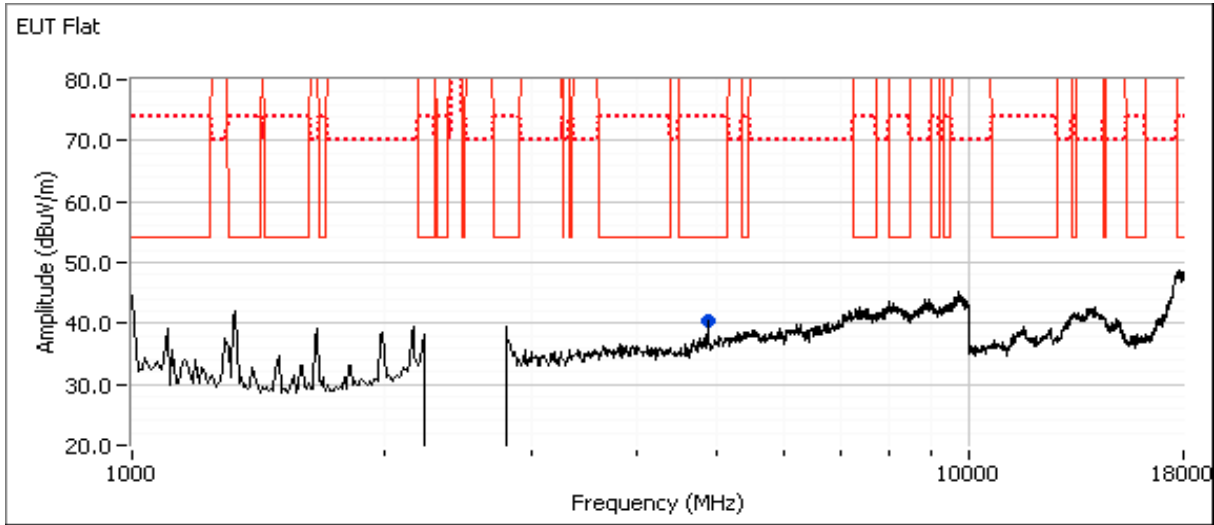
Power Setting = 17

Sample #1

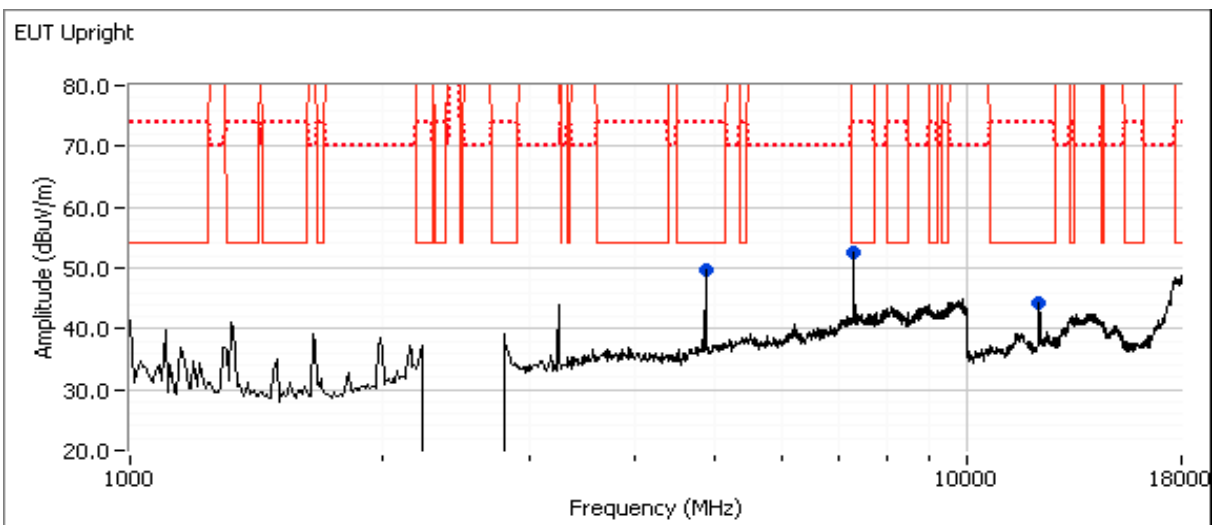


Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

Power Setting = 17  
 Sample #1



Power Setting = 17  
 Sample #1



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

Run #1c: High Channel @ 2462 MHz  
 Bandedge Target Power = 17, Spurious Target Power = 18  
 Port: Upright Orientation

Date of Test: 3/22/2010  
 Test Engineer: Rafael Varelas  
 Test Location: FT Chamber #3

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

**Fundamental Field Strenght**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>Setting = 18</b>								
<b>Eut Upright</b>								
2463.870	104.3	V	-	-	AVG	277	1.1	RB 1 MHz; VB: 10 Hz
2464.770	107.2	V	-	-	PK	277	1.1	RB 1 MHz; VB: 1 MHz
2463.170	103.4	V	-	-	PK	277	1.1	RB 100 kHz; VB: 100 kHz
2463.900	104.2	H	-	-	AVG	359	1.0	RB 1 MHz; VB: 10 Hz
2464.800	107.1	H	-	-	PK	359	1.0	RB 1 MHz; VB: 1 MHz
2464.730	102.6	H	-	-	PK	359	1.0	RB 100 kHz; VB: 100 kHz
<b>EUT Side</b>								
2464.000	98.0	V	-	-	AVG	221	1.6	RB 1 MHz; VB: 10 Hz
2464.830	100.8	V	-	-	PK	221	1.6	RB 1 MHz; VB: 1 MHz
2463.870	99.6	H	-	-	AVG	150	1.2	RB 1 MHz; VB: 10 Hz
2463.200	102.3	H	-	-	PK	150	1.2	RB 1 MHz; VB: 1 MHz
<b>EUT Flat</b>								
2463.970	102.8	H	-	-	AVG	77	1.3	RB 1 MHz; VB: 10 Hz
2464.800	105.7	H	-	-	PK	77	1.3	RB 1 MHz; VB: 1 MHz
2463.970	97.1	V	-	-	AVG	148	1.0	RB 1 MHz; VB: 10 Hz
2464.830	100.0	V	-	-	PK	148	1.0	RB 1 MHz; VB: 1 MHz

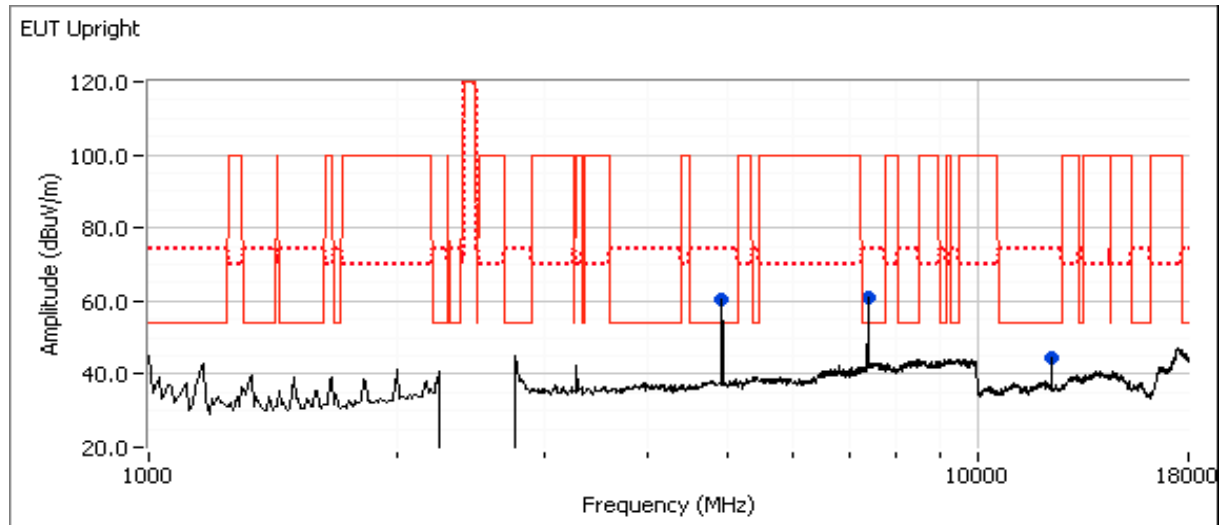
**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>Setting = 18</b>								
4924.010	52.8	H	54.0	-1.2	AVG	160	1.0	RB 1 MHz; VB: 10 Hz
4924.050	55.2	H	74.0	-18.8	PK	160	1.0	RB 1 MHz; VB: 1 MHz
7387.750	51.4	V	54.0	-2.6	AVG	274	1.7	RB 1 MHz; VB: 10 Hz, note 2
7387.040	56.5	V	74.0	-17.5	PK	274	1.7	RB 1 MHz; VB: 1 MHz, note 2
12306.670	44.3	V	54.0	-9.7	Peak	334	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: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

### Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>Setting = 17</b>								
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.565	52.3	H	54.0	-1.7	AVG	345	1.0	
2483.565	60.9	H	74.0	-13.1	PK	345	1.0	
2483.565	50.0	V	54.0	-4.0	AVG	81	1.0	
2483.565	60.5	V	74.0	-13.5	PK	81	1.0	



**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2483.500 MHz  
 SPAN: 65.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 16.5s  
 Ref Lvl: 115.00DBUV

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**Comments**

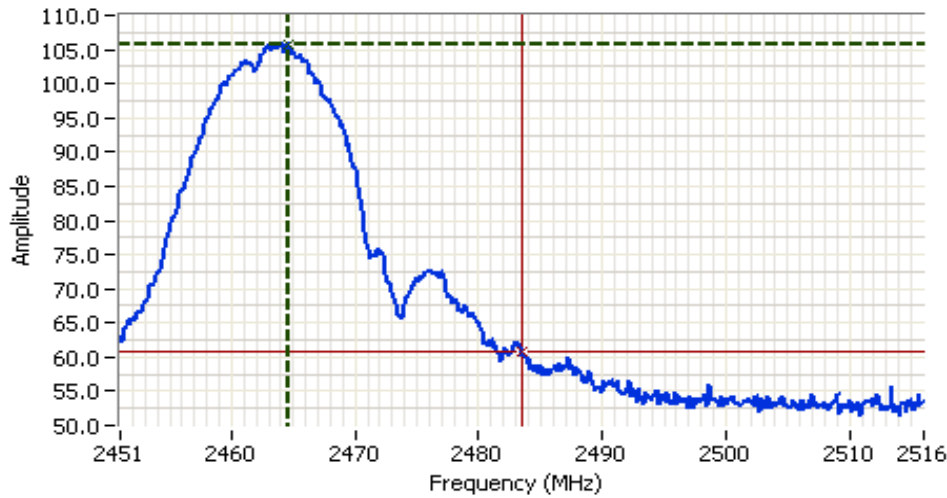
BE @ 2483.5 MHz  
 802.11b  
 Horizontal/Avg

Cursor 1	2463.7656	102.57	Delta Freq.	19.800
Cursor 2	2483.5652	52.29	Delta Amplitude	50.28





Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A



**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2483.500 MHz  
 SPAN: 65.000 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 5.0ms  
 Ref Lvl: 115.00DBUV

**Comments**

BE @ 2483.5 MHz  
 802.11b  
 Horizontal/PK

Cursor 1	2464.5471	105.86	+	-	lock
Cursor 2	2483.5652	60.94	+	-	lock

Delta Freq. 19.018  
 Delta Amplitude 44.92



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

Run #2: Radiated Spurious Emissions, 1000 - 25000 MHz. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz

Bandedge Target Power = 63, Spurious Target Power = 63

Port: Upright Orientation

Date of Test: 3/23/2010  
 Test Engineer: Rafael Varelas  
 Test Location: Chamber # 3

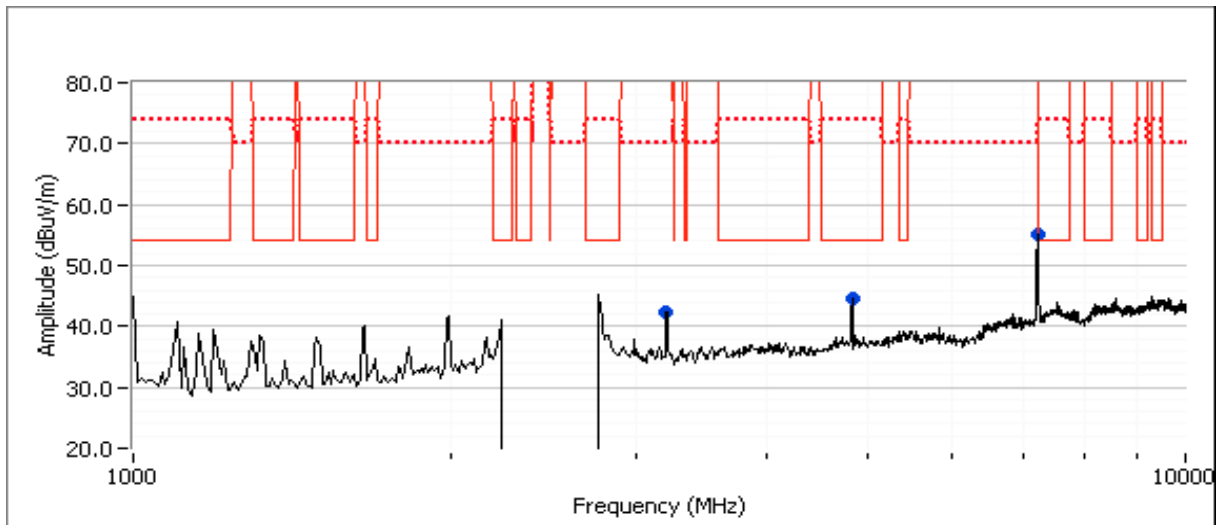
Config. Used: 1  
 Config Change: None  
 Host Unit Voltage 120V/ 60Hz

### Fundamental Field Strenght

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2413.570	100.2	V	-	-	AVG	267	1.0	RB 1 MHz; VB: 10 Hz
2415.070	108.1	V	-	-	PK	267	1.0	RB 1 MHz; VB: 1 MHz
2415.930	99.0	V	-	-	PK	267	1.0	RB 100 kHz; VB: 100 kHz
2413.200	99.8	H	-	-	AVG	174	1.4	RB 1 MHz; VB: 10 Hz
2413.630	108.0	H	-	-	PK	174	1.4	RB 1 MHz; VB: 1 MHz
2409.700	100.6	H	-	-	PK	174	1.4	RB 100 kHz; VB: 100 kHz

### Other Spurious Emissions

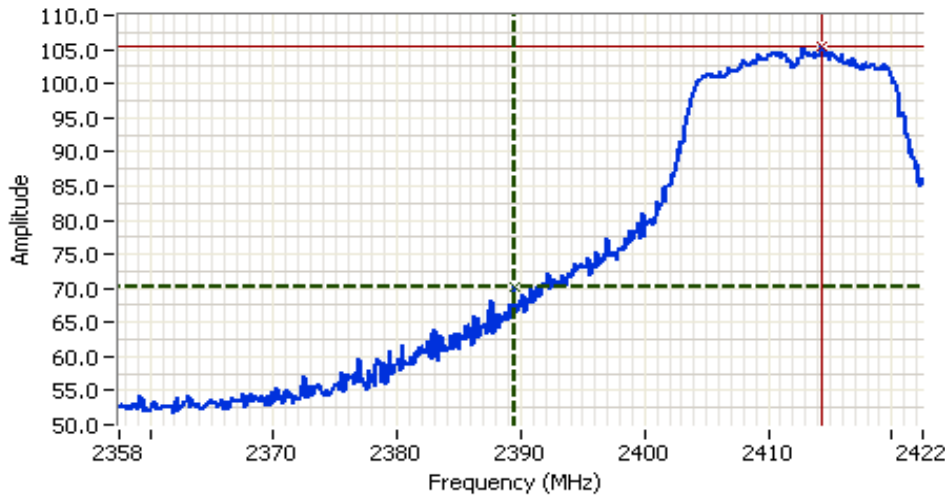
Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4824.030	41.7	H	54.0	-12.3	AVG	162	1.0	RB 1 MHz; VB: 10 Hz
4826.290	52.0	H	74.0	-22.0	PK	162	1.0	RB 1 MHz; VB: 1 MHz
7238.730	52.1	V	70.6	-17.9	PK	262	1.0	RB 100 kHz; VB: 100 kHz
3209.170	42.3	V	70.0	-27.7	Peak	145	1.0	



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

**Band Edge Signal Field Strength**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>Setting = 63</b>								
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.065	53.7	V	54.0	-0.3	AVG	98	1.0	
2389.414	70.1	V	74.0	-3.9	PK	98	1.0	
2390.065	53.4	H	54.0	-0.6	AVG	356	1.1	
2388.893	69.5	H	74.0	-4.5	PK	356	1.1	



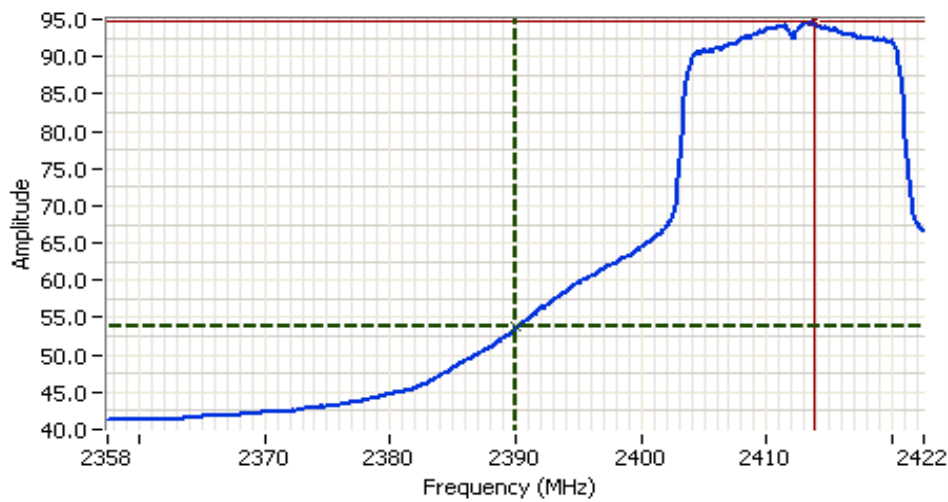
**Analyzer Settings**  
 Rohde&Schwarz, ESI 7  
 CF: 2390.000 MHz  
 SPAN: 65.000 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 5.0ms  
 Ref Lvl: 115.00DBUV

**Comments**  
 BE @ 2390 MHz  
 802.11g  
 Vertical/PK

Cursor 1	2389.4138	70.09	Delta Freq.	24.880
Cursor 2	2414.2937	105.37	Delta Amplitude	35.28



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A



**Analyzer Settings**  
 Rohde&Schwarz, ESI 7  
 CF: 2390.000 MHz  
 SPAN: 65.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 16.5s  
 Ref Lvl: 115.000DBUV

**Comments**  
 BE @ 2390 MHz  
 802.11g  
 Vertical/Avg

Cursor 1	2390.0652	53.70		Delta Freq.	23.707
Cursor 2	2413.7725	94.70		Delta Amplitude	40.99

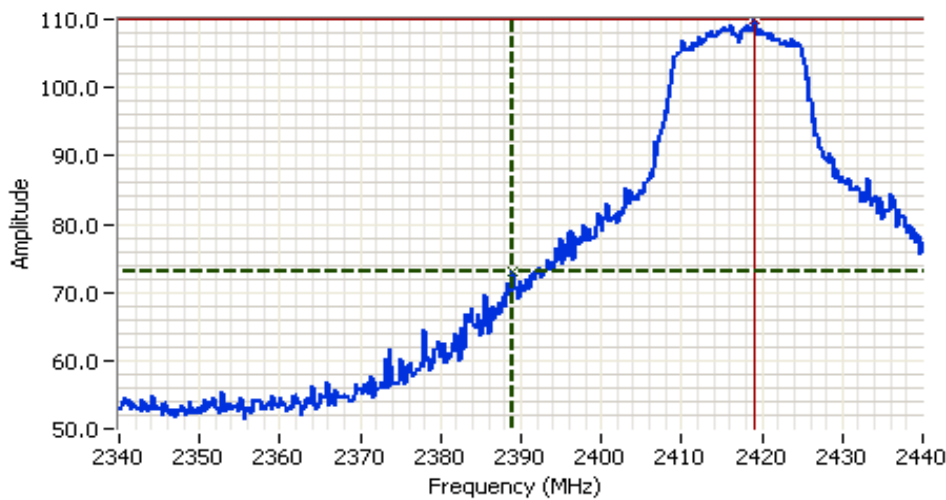


Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

Run #2b: Low Channel @ 2417 MHz  
 Bandedge Target Power = 73  
 Port: Upright Orientation

**Band Edge Signal Field Strength**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2390.100	53.6	V	54.0	-0.4	AVG	269	1.3	
2388.898	72.9	V	74.0	-1.1	PK	269	1.3	
2390.100	51.1	H	54.0	-2.9	AVG	7	1.3	
2387.295	68.3	H	74.0	-5.7	PK	7	1.3	



**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2390.000 MHz  
 SPAN: 100.000 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 5.0ms  
 Ref Lvl: 115.00DBUV

---

**Comments**

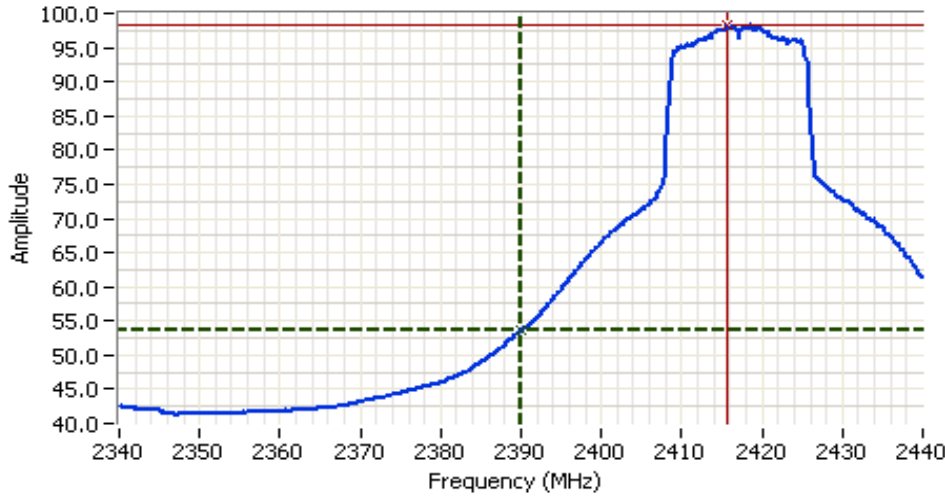
BE @ 2390 MHz  
 802.11g  
 Vert/PK

Cursor 1	2388.8977	72.91	
Cursor 2	2419.1582	109.8	

Delta Freq. 30.260  
 Delta Amplitude 36.98



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A





**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2390.000 MHz  
 SPAN: 100.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 25.0s  
 Ref Lvl: 115.00DBUV

**Comments**

BE @ 2390 MHz  
 802.11g  
 Vert/Avg

Cursor 1	2390.1001	53.62	
Cursor 2	2415.7515	98.23	

Delta Freq. 25.651  
 Delta Amplitude 44.61



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

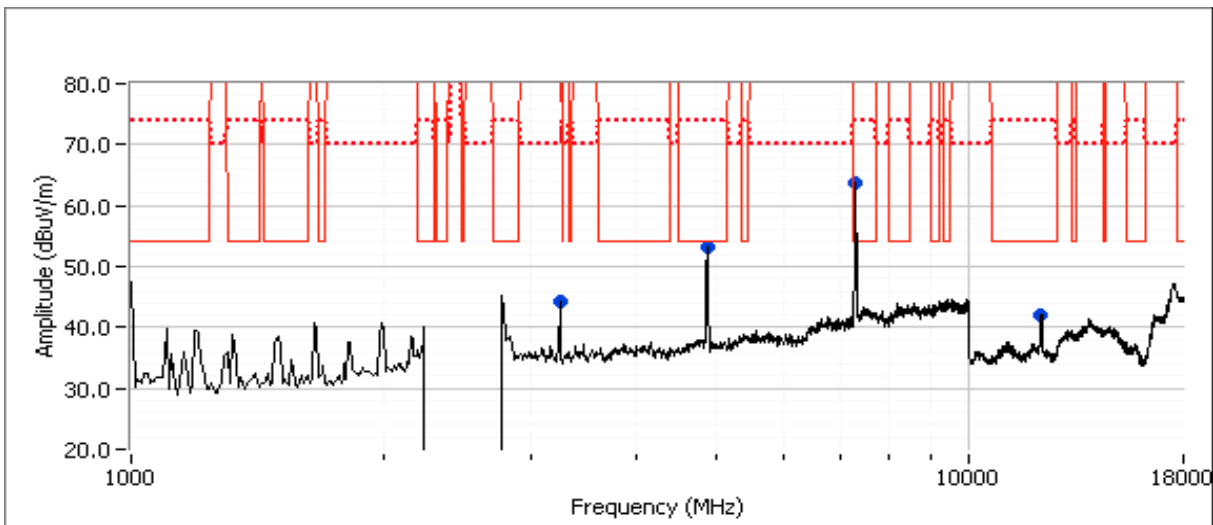
Run #2c: Center Channel @ 2437 MHz,  
Spurious Target Power = 75  
Port: Upright Orientation

### Fundamental Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2438.270	102.5	V	-	-	AVG	266	1.2	RB 1 MHz; VB: 10 Hz
2437.670	111.0	V	-	-	PK	266	1.2	RB 1 MHz; VB: 1 MHz
2439.770	104.3	V	-	-	PK	266	1.2	RB 100 kHz; VB: 100 kHz
2438.930	102.8	H	-	-	AVG	186	1.3	RB 1 MHz; VB: 10 Hz
2439.130	111.2	H	-	-	PK	186	1.3	RB 1 MHz; VB: 1 MHz
2435.930	103.8	H	-	-	PK	186	1.3	RB 100 kHz; VB: 100 kHz

### Other Spurious Emissions

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7308.470	53.6	V	54.0	-0.4	AVG	262	1.6	RB 1 MHz; VB: 10 Hz, note 2
7308.300	66.0	V	74.0	-8.0	PK	262	1.6	RB 1 MHz; VB: 1 MHz, note 2
4874.080	45.2	V	54.0	-8.8	AVG	40	1.1	RB 1 MHz; VB: 10 Hz
4874.980	56.5	V	74.0	-17.5	PK	40	1.1	RB 1 MHz; VB: 1 MHz
3245.830	44.1	V	70.0	-25.9	Peak	88	1.3	
12173.330	41.9	V	54.0	-12.1	Peak	9	1.3	

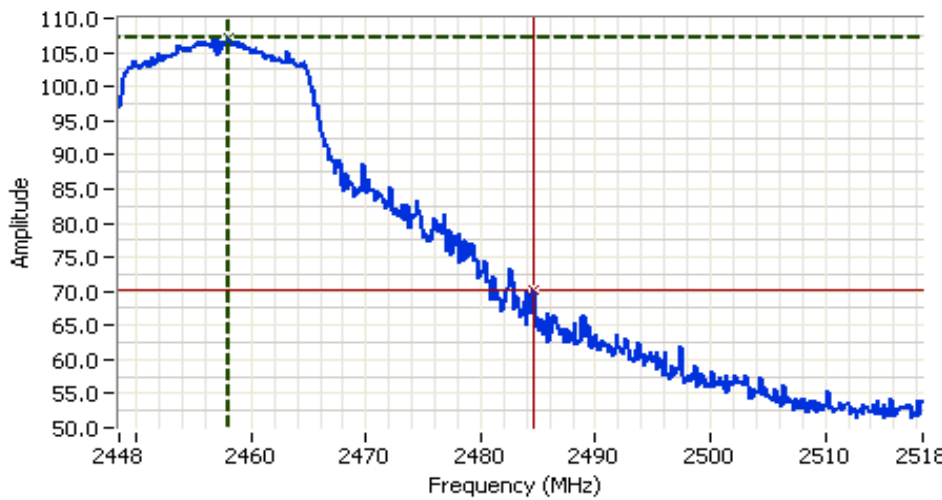


Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

Run #2d: Channel 10 @ 2457 MHz,  
Bandedge Target Power = 73  
Port: Upright Orientation

**Band Edge Signal Field Strength**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.570	53.1	H	54.0	-0.9	AVG	180	1.5	
2484.552	70.1	H	74.0	-3.9	PK	180	1.5	
2483.570	51.1	V	54.0	-2.9	AVG	278	1.0	
2483.991	68.3	V	74.0	-5.7	PK	278	1.0	



**Analyzer Settings**  
 Rohde&Schwarz, ESI 7  
 CF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 32.50  
 Sweep Time 5.0ms  
 Ref Lvl: 104.50DBLW

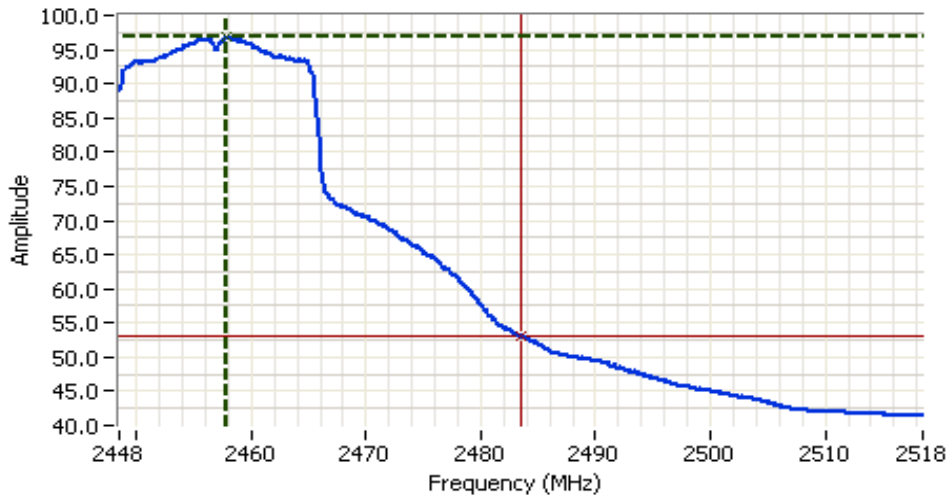
**Comments**  
 BE @ 2483.5 MHz  
 802.11g  
 Horizontal/PK

Cursor 1	2458.0391	107.24	+	-	+	-	Delta Freq.	26.513
Cursor 2	2484.5520	70.07	+	-	+	-	Delta Amplitude	37.16





Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A



**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector POS  
 Att 10  
 RL Offset 32.50  
 Sweep Time 17.5s  
 Ref Lvl: 104.50DBUV

**Comments**

BE @ 2483.5 MHz  
 802.11g  
 Horizontal/Avg

Cursor 1	2457.7585	96.75	
Cursor 2	2483.5701	53.09	

Delta Freq. 25.812  
 Delta Amplitude 43.66



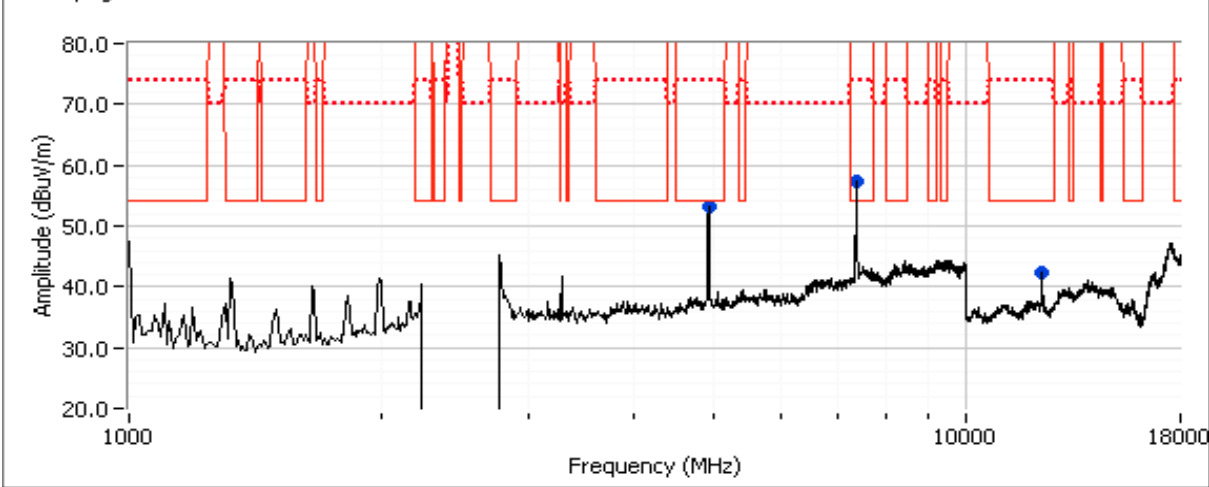
Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

Run #2e: High Channel @ 2462 MHz  
 Bandedge Target Power = 56, Spurious = 20  
 Port: Upright Orientation

### Other Spurious Emissions

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7385.330	51.3	V	54.0	-2.7	AVG	248	1.8	RB 1 MHz; VB: 10 Hz, note 2
7385.900	63.2	V	74.0	-10.8	PK	248	1.8	RB 1 MHz; VB: 1 MHz, note 2
4923.930	47.2	V	54.0	-6.8	AVG	249	1.0	RB 1 MHz; VB: 10 Hz
4930.330	59.1	V	74.0	-14.9	PK	249	1.0	RB 1 MHz; VB: 1 MHz
12306.670	42.3	V	54.0	-11.7	Peak	14	1.3	

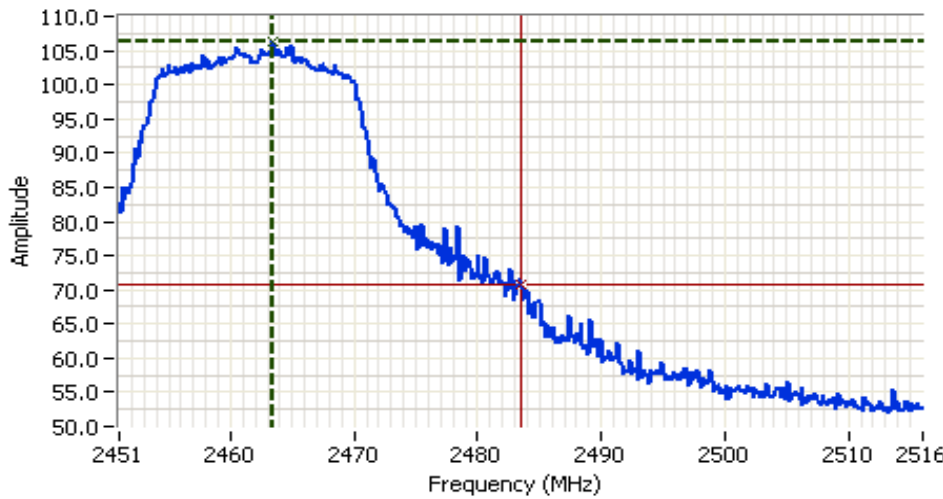
EUT Upright



### Band Edge Signal Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
Setting = 56								
2483.565	53.9	H	54.0	-0.1	AVG	0	1.0	
2483.565	70.7	H	74.0	-3.3	PK	0	1.0	
2483.565	49.7	V	54.0	-4.3	AVG	102	1.0	
2483.695	66.3	V	74.0	-7.7	PK	102	1.0	

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

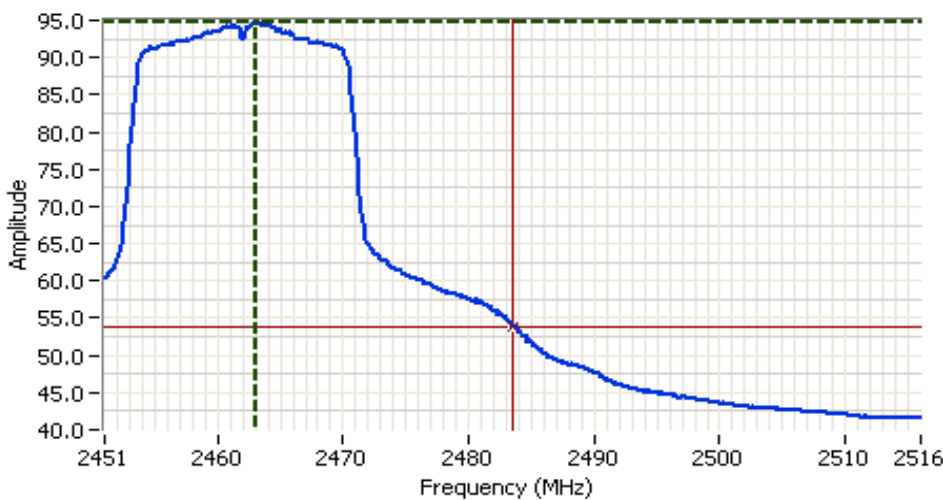


**Analyzer Settings**  
 Rohde&Schwarz,ESI 7  
 CF: 2483.500 MHz  
 SPAN:65.000 MHz  
 RB 1.000 MHz  
 VB 1.000 MHz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 5.0ms  
 Ref Lvl:115.00DBUV

**Comments**  
 BE @ 2483.5 MHz  
 802.11g  
 Horizontal/PK

Cursor 1	2463.5051	106.24	
Cursor 2	2483.5652	70.65	

Delta Freq. 20.060  
 Delta Amplitude 35.58



**Analyzer Settings**  
 Rohde&Schwarz,ESI 7  
 CF: 2483.500 MHz  
 SPAN:65.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector POS  
 Att 10  
 RL Offset 33.00  
 Sweep Time 16.5s  
 Ref Lvl:115.00DBUV

**Comments**  
 BE @ 2483.5 MHz  
 802.11g  
 Horizontal/Avg

Cursor 1	2463.1143	94.64	
Cursor 2	2483.5652	53.87	

Delta Freq. 20.451  
 Delta Amplitude 40.76



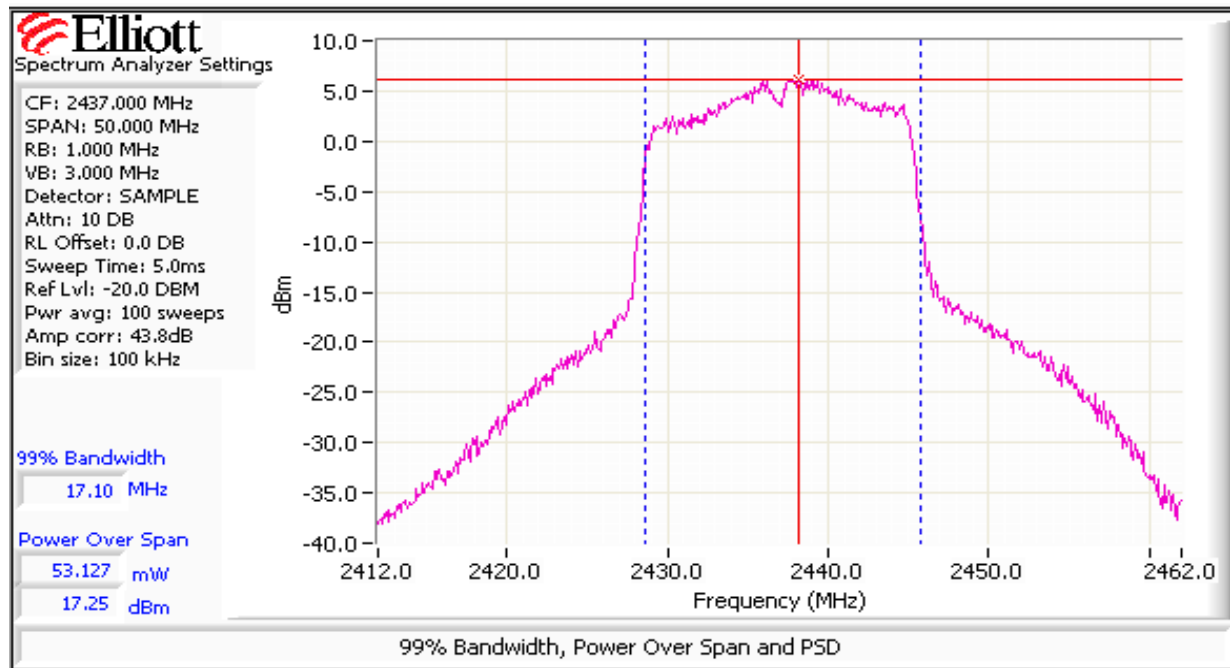


Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

### Run #1: Output Power

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
63	2412	15.2	33.1		Pass	15.2	0.033		
75	2437	17.3	53.7		Pass	17.3	0.054		
56	2462	12.7	18.6		Pass	12.7	0.019		

- Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over **50 MHz** (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes **-30dBc**.
- Note 2: Power measurement taken radiated, power reported is EIRP.



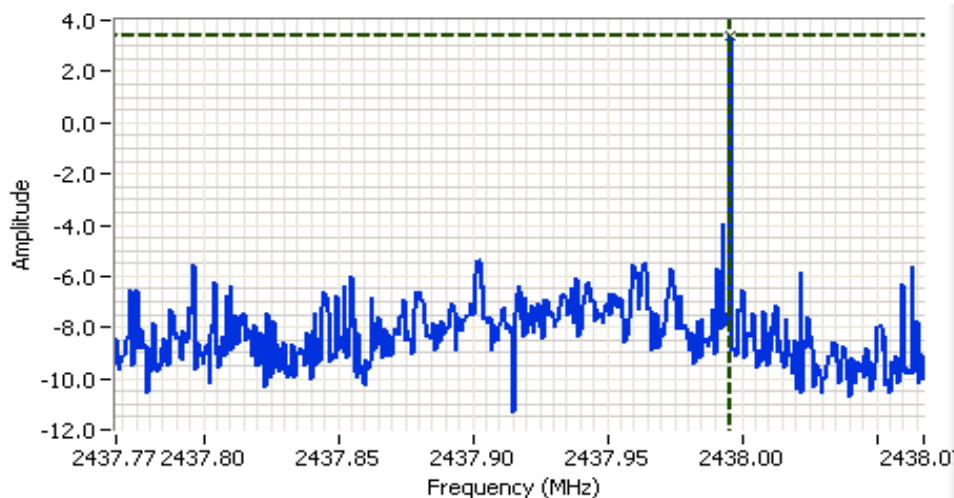
**Power and PSD Procedure:** As the product did not have an antenna port to take conducted measurements, power and PSD were performed radiated. The measurement was taken at a 3m separation distance with the fundamental level maximized for EUT orientation, turntable azimuth, antenna height and antenna polarity. The amplitude correction shown in the plots was calculated from the following: +107dB (convert received power to voltage) + 32.1dB (convert voltage to field strength (antenna factor+cable loss)) - 95.3dB (convert 3m field strength to EIRP) = 43.8dB

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

**Run #2: Power spectral Density**

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
63	2412	-6.5	8.0	Pass
75	2437	3.4	8.0	Pass
56	2462	-9.0	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.




**Analyzer Settings**


Rohde&Schwarz, ESI 7  
 CF: 2437.917 MHz  
 SPAN: 300 kHz  
 RB 3.00 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 10  
 RL Offset 43.80  
 Sweep Time 100.0s  
 Ref Lvl: 23.80DBM

---

**Comments**

PSD = 3.42 dBm/3kHz  
 2437 MHz

Cursor 1    2437.9959    3.42    

                  0.0000    0.00    

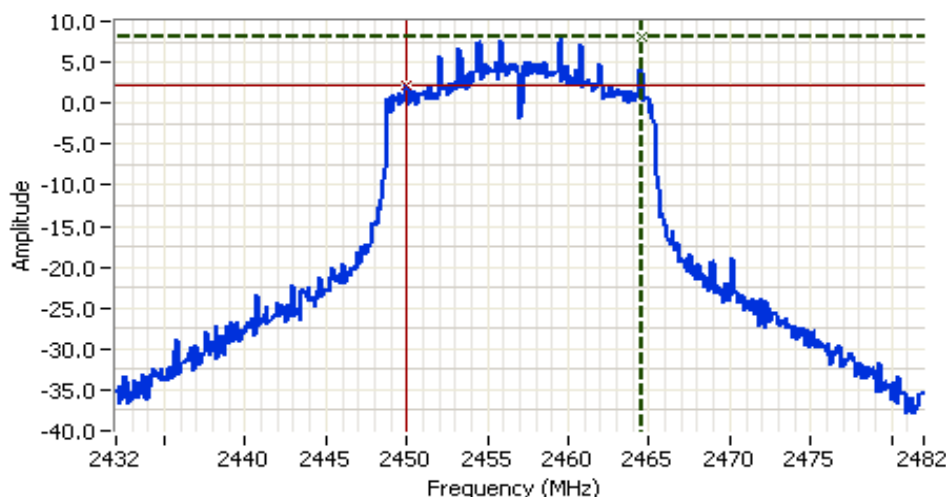


Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

**Run #3: Signal Bandwidth**

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
63	2412	100KHz	15.0	16.8
75	2437	100KHz	15.5	17.1
56	2462	100KHz	15.6	16.9

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



**Analyzer Settings**  
 Rohde&Schwarz, ESI 7  
 CF: 2457.000 MHz  
 SPAN: 50.000 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 10  
 RL Offset 43.80  
 Sweep Time 12.0ms  
 Ref Lvl: 23.80DBM

**Comments**  
 6dB BW: 14.629 MHz  
 2457 MHz

Cursor 1	2464.5651	8.17		Delta Freq.	14.629
Cursor 2	2449.9359	2.17		Delta Amplitude	6.00



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
Contact: Jerry Chen	Account Manager: Dean Eriksen
Standard: FCC Part 15	Class: N/A

**Run #4: Out of Band Spurious Emissions**

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass

Plots for low channel, power setting(s) = 63

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2413.604 MHz  
 SPAN: 50.000 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 10  
 RL Offset 43.80  
 Sweep Time 12.0ms  
 Ref Lvl: 23.80DBM

---

**Comments**

-30dBc @ 2400 MHz  
 2412 MHz

Cursor 1	2400.0000	-23.80	
Cursor 2	2413.2539	6.17	

Delta Freq. 13.254  
 Delta Amplitude 29.97





Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

**RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements  
Power, PSD, Bandwidth and 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.

Date of Test: 3/24/2010	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: Fremont Chamber #4	EUT Voltage: 120V/60Hz

**General Test Configuration**

All measurements were made using a radiated method, as the EUT did not provide an antenna port for a direct connection.

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

**Ambient Conditions:**                      Temperature:            19.3 °C  
    Rel. Humidity:            35 %

**Summary of Results**

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	18		Output Power	15.247(b)	Pass	17.2 dBm (0.052W)
2	18		Power spectral Density (PSD)	15.247(d)	Pass	3.6 dBm/3kHz
3	18		Minimum 6dB Bandwidth	15.247(a)	Pass	7.1 MHz
3	17		99% Bandwidth	RSS GEN	-	12.3 MHz
4	18		Spurious emissions	15.247(b)	Pass	< -30dBc

**Modifications Made During Testing**

No modifications were made to the EUT during testing

**Deviations From The Standard**

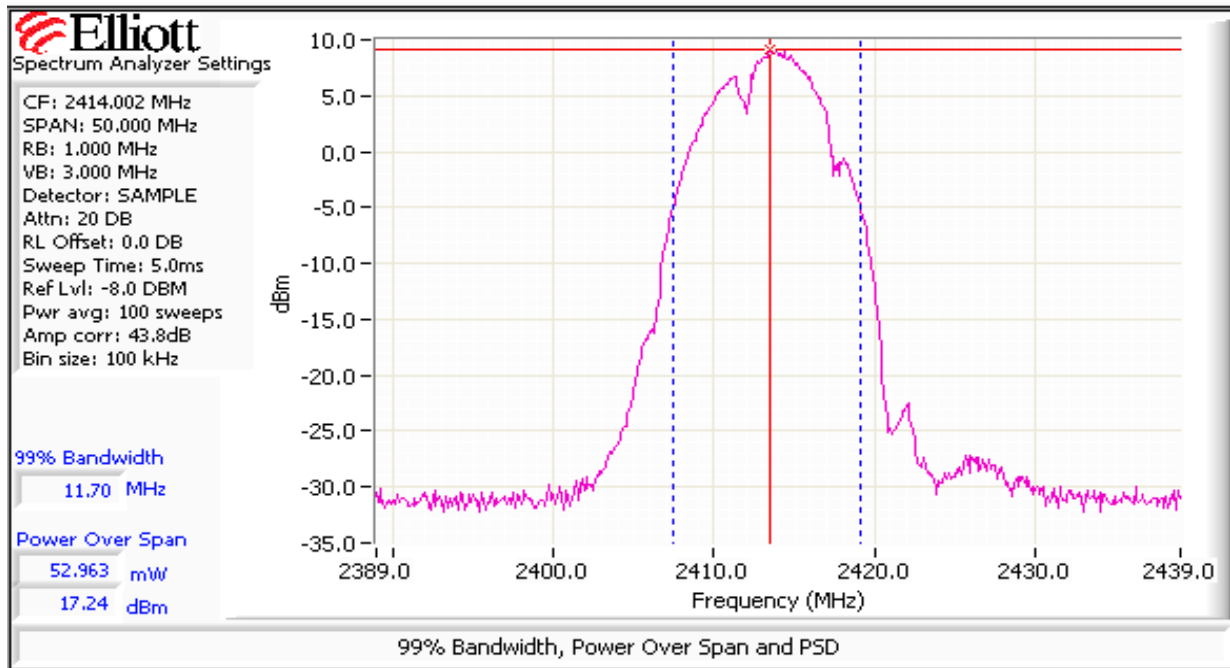
No deviations were made from the requirements of the standard.

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

**Run #1: Output Power**

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
18	2412	17.2	52.5		Pass	17.2	0.052		
17	2437	16.7	46.8		Pass	16.7	0.047		
17	2462	15.4	34.7		Pass	15.4	0.035		

- Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes -30dBc.
- Note 2: Power measurement taken radiated, power reported is EIRP.



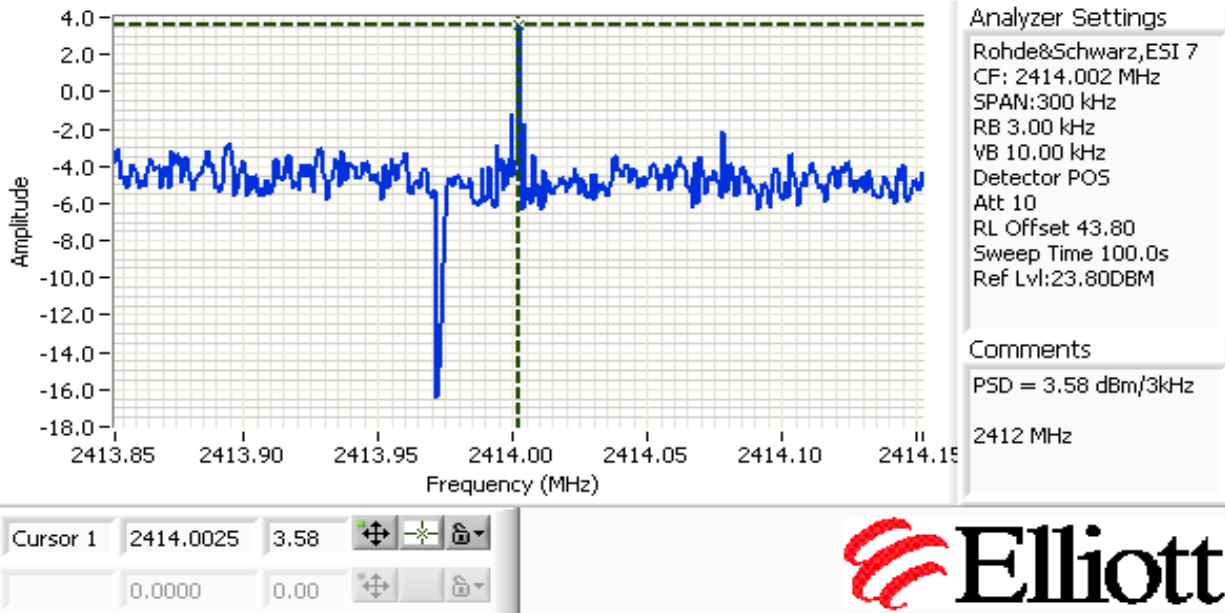
**Power and PSD Procedure:** As the product did not have an antenna port to take conducted measurements, power and PSD were performed radiated. The measurement was taken at a 3m separation distance with the fundamental level maximized for EUT orientation, turntable azimuth, antenna height and antenna polarity. The amplitude correction shown in the plots was calculated from the following: +107dB (convert received power to voltage) + 32.1dB (convert voltage to field strength (antenna factor+cable loss)) - 95.3dB (convert 3m field strength to EIRP) = 43.8dB

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

**Run #2: Power spectral Density**

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
18	2412	3.6	8.0	Pass
17	2437	-3.6	8.0	Pass
17	2462	-4.0	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: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

**Run #3: Signal Bandwidth**

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
18	2412	100kHz	7.1	11.7
17	2437	100kHz	7.5	11.7
17	2462	100kHz	7.6	12.3

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



**Analyzer Settings**

Rohde&Schwarz, ESI 7  
 CF: 2413.604 MHz  
 SPAN: 50.000 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 10  
 RL Offset 43.80  
 Sweep Time 12.0ms  
 Ref Lvl: 23.80DBM

**Comments**

6dB BW: 7.114 MHz  
 2412 MHz

Cursor 1	2417.0614	10.07	
Cursor 2	2409.9472	4.07	

Delta Freq. 7.114  
 Delta Amplitude 6.00



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: N/A

**Run #4: Out of Band Spurious Emissions**

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass

Plots for low channel, power setting(s) = 18.0

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



Cursor 1	2400.0000	-20.00		Delta Freq.	14.556	
Cursor 2	2414.5564	10.07		Delta Amplitude	30.07	

Client:	Askey Computer Corporation	Job Number:	J78103
Model:	WLU6113-D69	T-Log Number:	T78124
		Account Manager:	Dean Eriksen
Contact:	Jerry Chen		
Standard:	FCC Part 15	Class:	B

### Conducted Emissions - Power Ports

#### 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: 2/17/2010  
 Test Engineer: Mehran Birgani  
 Test Location: SVOATS #2

Config. Used: 1  
 Config Change: None  
 EUT Voltage: Refer to individual run

#### General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN.

#### Ambient Conditions:

Temperature: 10-15 °C  
 Rel. Humidity: 30-40 %

#### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN 55022 Class B	Pass	39.0dBµV @ 1.015MHz (-7.0dB)
2	CE, AC Power, 120V/60Hz	EN 55022 Class B	Pass	36.7dBµV @ 1.393MHz (-9.3dB)

#### Modifications Made During Testing

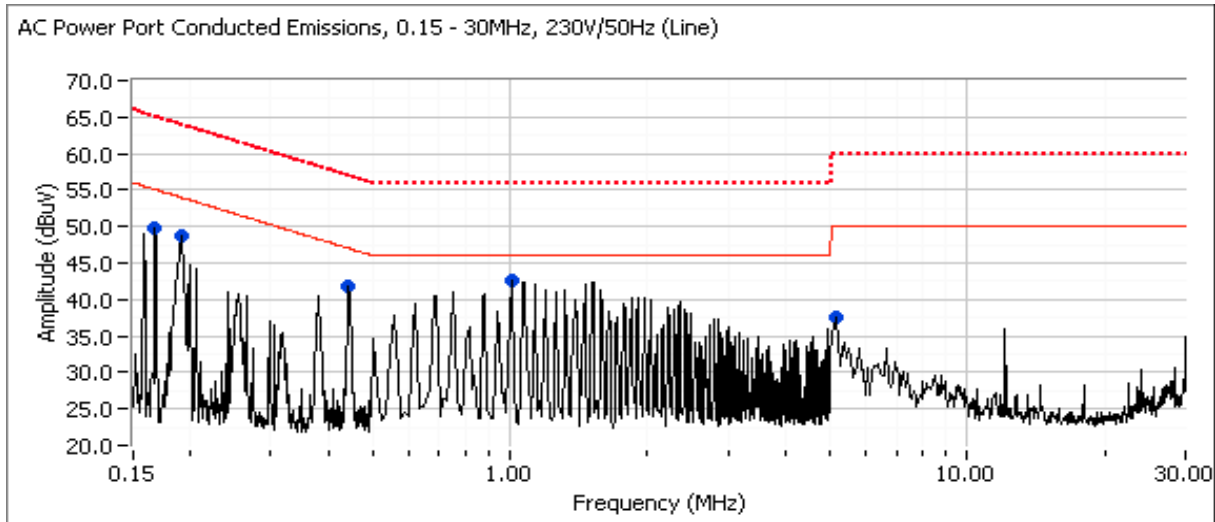
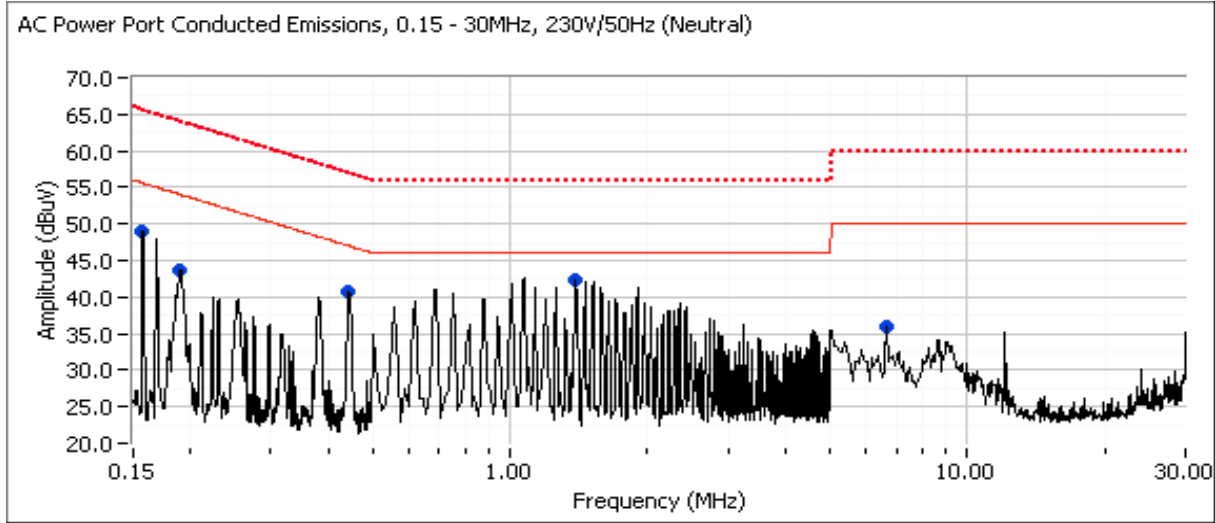
No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: B

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



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: B

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

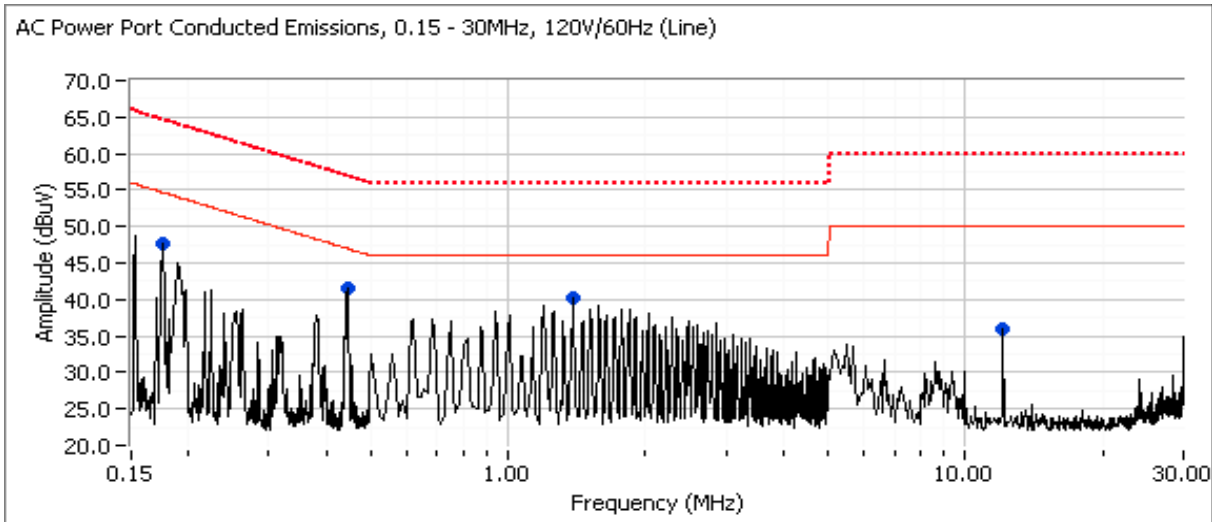
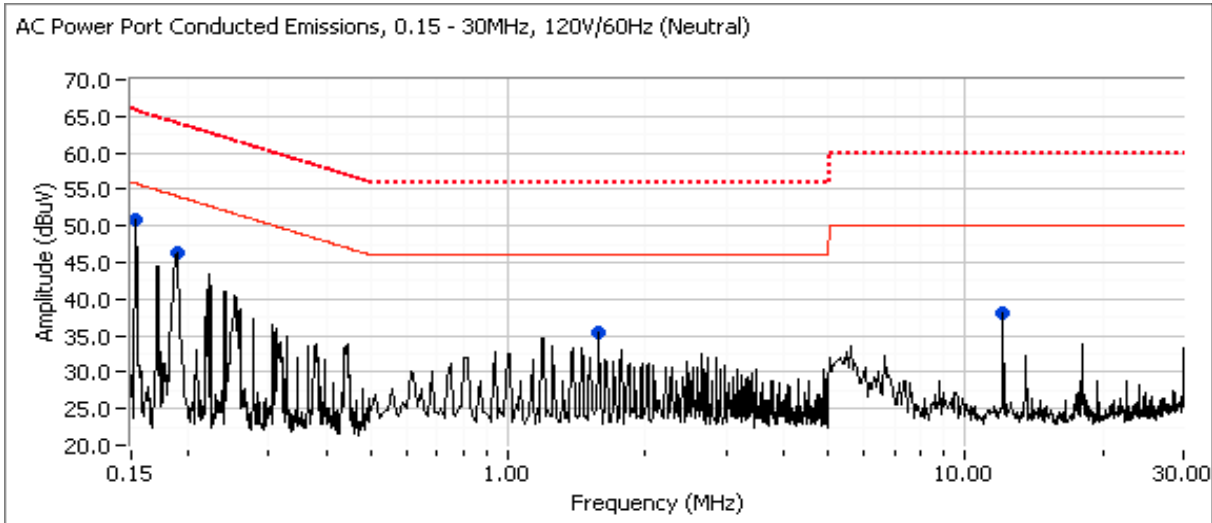
Frequency MHz	Level dB $\mu$ V	AC Line	EN55022 Limit	Class B Margin	Detector QP/Ave	Comments
0.158	15.0	Neutral	55.6	-40.6	AVG	
0.164	14.9	Line	55.3	-40.4	AVG	
0.190	39.3	Neutral	54.0	-14.7	AVG	
0.192	39.5	Line	54.0	-14.5	AVG	
0.443	38.0	Line	47.0	-9.0	AVG	
0.445	37.4	Neutral	47.0	-9.6	AVG	
<b>1.015</b>	<b>39.0</b>	<b>Line</b>	<b>46.0</b>	<b>-7.0</b>	AVG	
1.398	38.2	Neutral	46.0	-7.8	AVG	
5.330	29.2	Line	50.0	-20.8	AVG	
6.410	24.1	Neutral	50.0	-25.9	AVG	
0.158	43.3	Neutral	65.6	-22.3	QP	
0.164	42.7	Line	65.3	-22.6	QP	
0.190	42.2	Neutral	64.0	-21.8	QP	
0.192	43.7	Line	64.0	-20.3	QP	
0.443	40.1	Line	57.0	-16.9	QP	
0.445	39.7	Neutral	57.0	-17.3	QP	
1.015	40.3	Line	56.0	-15.7	QP	
1.398	40.0	Neutral	56.0	-16.0	QP	
5.330	32.0	Line	60.0	-28.0	QP	
6.410	28.0	Neutral	60.0	-32.0	QP	

Note 1: The EUT was transmitting and tuned to center channel at 2437 MHz with highest power setting.



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz



Client: Askey Computer Corporation	Job Number: J78103
Model: WLU6113-D69	T-Log Number: T78124
	Account Manager: Dean Eriksen
Contact: Jerry Chen	
Standard: FCC Part 15	Class: B

**Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz**

Frequency MHz	Level dB $\mu$ V	AC Line	EN55022 Class B Limit	Class B Margin	Detector QP/Ave	Comments
0.152	16.4	Neutral	55.9	-39.5	AVG	
0.174	16.6	Line	54.8	-38.2	AVG	
0.190	35.9	Neutral	54.0	-18.1	AVG	
0.443	35.1	Line	47.0	-11.9	AVG	
<b>1.393</b>	<b>36.7</b>	<b>Line</b>	<b>46.0</b>	<b>-9.3</b>	AVG	
1.580	28.6	Neutral	46.0	-17.4	AVG	
12.002	37.7	Neutral	50.0	-12.3	AVG	
12.002	35.1	Line	50.0	-14.9	AVG	
0.152	44.2	Neutral	65.9	-21.7	QP	
0.174	40.0	Line	64.8	-24.8	QP	
0.190	44.0	Neutral	64.0	-20.0	QP	
0.443	38.9	Line	57.0	-18.1	QP	
1.393	37.9	Line	56.0	-18.1	QP	
1.580	31.3	Neutral	56.0	-24.7	QP	
12.002	37.2	Neutral	60.0	-22.8	QP	
12.002	34.3	Line	60.0	-25.7	QP	

Note 1: The EUT was transmitting and tuned to center channel at 2437 MHz with highest power setting.