Heads Up Systems

TEST REPORT FOR

In Vehicle Obstacle Alerter, EGAS Alerter

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207, 15.249
and
RSS 210 Issue 8

Report No.: 91979-24

Date of issue: December 20, 2011

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Testing the Future
CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Heads Up Systems
850 Lafayette Street
Denver, CO 80218

Representative: Pat Weston

REPORT PREPARED BY:

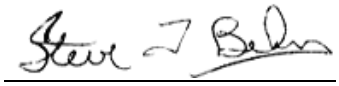
Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 91979

DATE OF EQUIPMENT RECEIPT: November 7, 2011
DATE(S) OF TESTING: November 7- December 6, 2011

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Site Registration & Accreditation Information

Location	CB #	JAPAN	CANADA	FCC
Brea A	US0060	R-2945, C-3248 & T-1572	3082D-1	90473

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.207, 15.209, 15.249 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	NA
RF Power Output/ Spurious Emissions	FCC Part 15 Subpart C Section 15.249(a)	Pass
-20dBc Occupied Bandwidth	FCC Part 15 Subpart C Section 15.249	Pass
Bandedge	FCC Part 15 Subpart C 15.249	Pass
99% Bandwidth	RSS 210 Issue 8	Pass

NA = Not applicable

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

In Vehicle Obstacle Alerter
Manuf: Heads Up Systems
Model: EGAS Alerter
Serial: NA

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Supply
Manuf: Topward
Model: 6306D
Serial: 988614

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.207 AC Conducted Emissions

NA = Conducted Emissions is not applicable because the EUT is battery powered.

15.247 RF Power Output / Spurious Emissions

Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **Heads Up Systems**
Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
Work Order #: **91979** Date: 11/8/2011
Test Type: **Maximized Emissions** Time: 16:36:54
Equipment: **In Vehicle Obstacle Alerter** Sequence#: 1
Manufacturer: Heads Up Systems Tested By: E. Wong
Model: EGAS Alerter
S/N: NA

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	8/9/2010	8/9/2012
T2	AN00309	Preamp	8447D	5/7/2010	5/7/2012
T3	AN01995	Biconilog Antenna	CBL6111C	3/8/2010	3/8/2012
T4	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T5	ANP05198	Cable	8268	12/21/2010	12/21/2012
T6	AN00786	Preamp	83017A	8/5/2010	8/5/2012
T7	AN00849	Horn Antenna	3115	4/23/2010	4/23/2012
T8	ANP05565	Cable	ANDL-1-PNMN-54	9/3/2010	9/3/2012
T9	ANP05421	Cable	Sucoflex 104A	2/12/2010	2/12/2012
T10	ANP05563	Cable	ANDL-1-PNMN-48	9/3/2010	9/3/2012
	AN00314	Loop Antenna	6502	6/30/2010	6/30/2012
	AN01413	Horn Antenna-ANSI C63.5 Antenna Factors (dB)	84125-80008	12/2/2010	12/2/2012
	AN01413	Horn Antenna-1 Meter Antenna Factors (dB) - SAE ARP 958	84125-80008	12/2/2010	12/2/2012
T11	AN02744	High Pass Filter	11SH10-3000/T10000-O/O	3/5/2010	3/5/2012

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
In Vehicle Obstacle Alerter*	Heads Up Systems	EGAS Alerter	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

Test Conditions / Notes:

Two EUTS (EGAS Beacon, EGAS Alerter) are placed on the wooden table lined with Styrofoam of 10 cm thickness. The EUTs are set in constant transmit mode.

Field strength of fundamental frequency was evaluated individually, whereas spurious emissions are presented as combined emission of the two devices.

Freq: 2424 MHz

Emission profile of EGAS Beacon and EGAS Alerter rotated along three orthogonal axis was investigated. Recorded data represent worse case emission.

15.31(e) Battery powered EGAS Beacon and EGAS Alerter: Fresh battery was installed in EGAS Beacon and for EGAS Alert was powered by a support power supply with the DC voltage set to 3.3 V to simulate a fresh battery.

Frequency range of measurement = 9 kHz- 25 GHz.
Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz- 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz- 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz-25,000 MHz RBW=1 MHz, VBW=1 MHz.

17°C, 37% Relative Humidity

Worse case Fundamental:76.2dBuV/m@3m
Worse case Spur: 46.5dBuV/m@3m

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

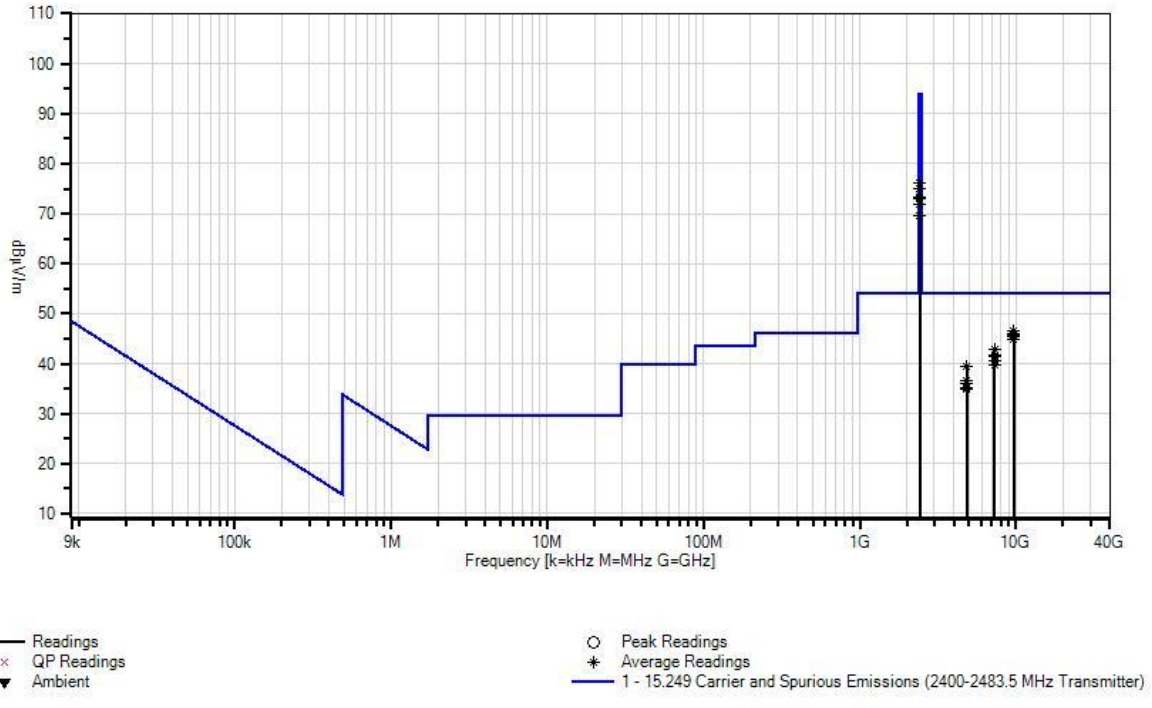
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11						
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	9695.492M	27.5	+0.0	+0.0	+0.0	+0.0	+0.0	46.5	54.0	-7.5	Horiz
	Ave		+0.0	-35.3	+37.6	+6.5			Z-beacon_alerter		
			+2.7	+7.0	+0.5				*(worse case)		
2	9695.417M	26.9	+0.0	+0.0	+0.0	+0.0	+0.0	45.9	54.0	-8.1	Horiz
	Ave		+0.0	-35.3	+37.6	+6.5			X_beacon_alerter		
			+2.7	+7.0	+0.5						
^	9695.417M	45.6	+0.0	+0.0	+0.0	+0.0	+0.0	64.6	54.0	+10.6	Horiz
			+0.0	-35.3	+37.6	+6.5			X_beacon_alerter		
			+2.7	+7.0	+0.5						
4	9695.559M	26.8	+0.0	+0.0	+0.0	+0.0	+0.0	45.8	54.0	-8.2	Horiz
	Ave		+0.0	-35.3	+37.6	+6.5			Y_beacon_alerter		
			+2.7	+7.0	+0.5						
^	9695.492M	47.0	+0.0	+0.0	+0.0	+0.0	+0.0	66.0	54.0	+12.0	Horiz
			+0.0	-35.3	+37.6	+6.5			Z-beacon_alerter		
			+2.7	+7.0	+0.5						
^	9695.559M	44.6	+0.0	+0.0	+0.0	+0.0	+0.0	63.6	54.0	+9.6	Horiz
			+0.0	-35.3	+37.6	+6.5			Y_beacon_alerter		
			+2.7	+7.0	+0.5						
7	9695.492M	26.6	+0.0	+0.0	+0.0	+0.0	+0.0	45.6	54.0	-8.4	Vert
	Ave		+0.0	-35.3	+37.6	+6.5			Z-beacon_alerter		
			+2.7	+7.0	+0.5						

8	9695.534M	26.4	+0.0	+0.0	+0.0	+0.0	+0.0	45.4	54.0	-8.6	Vert
	Ave		+0.0	-35.3	+37.6	+6.5			Y_beacon_alerter		
			+2.7	+7.0	+0.5						
^	9695.492M	45.4	+0.0	+0.0	+0.0	+0.0	+0.0	64.4	54.0	+10.4	Vert
			+0.0	-35.3	+37.6	+6.5			Z-beacon_alerter		
			+2.7	+7.0	+0.5						
10	9695.633M	25.8	+0.0	+0.0	+0.0	+0.0	+0.0	44.8	54.0	-9.2	Vert
	Ave		+0.0	-35.3	+37.6	+6.5			X_beacon_alerter		
			+2.7	+7.0	+0.5						
^	9695.534M	44.6	+0.0	+0.0	+0.0	+0.0	+0.0	63.6	54.0	+9.6	Vert
			+0.0	-35.3	+37.6	+6.5			Y_beacon_alerter		
			+2.7	+7.0	+0.5						
^	9695.633M	43.1	+0.0	+0.0	+0.0	+0.0	+0.0	62.1	54.0	+8.1	Vert
			+0.0	-35.3	+37.6	+6.5			X_beacon_alerter		
			+2.7	+7.0	+0.5						
13	7271.723M	30.2	+0.0	+0.0	+0.0	+0.0	+0.0	42.9	54.0	-11.1	Horiz
	Ave		+0.0	-36.8	+36.0	+5.2			X_beacon_alerter		
			+2.3	+5.8	+0.2						
^	7271.723M	46.5	+0.0	+0.0	+0.0	+0.0	+0.0	59.2	54.0	+5.2	Horiz
			+0.0	-36.8	+36.0	+5.2			X_beacon_alerter		
			+2.3	+5.8	+0.2						
15	7271.800M	28.9	+0.0	+0.0	+0.0	+0.0	+0.0	41.6	54.0	-12.4	Vert
	Ave		+0.0	-36.8	+36.0	+5.2			X_beacon_alerter		
			+2.3	+5.8	+0.2						
^	7271.800M	46.4	+0.0	+0.0	+0.0	+0.0	+0.0	59.1	54.0	+5.1	Vert
			+0.0	-36.8	+36.0	+5.2			X_beacon_alerter		
			+2.3	+5.8	+0.2						
17	7271.515M	28.7	+0.0	+0.0	+0.0	+0.0	+0.0	41.4	54.0	-12.6	Horiz
	Ave		+0.0	-36.8	+36.0	+5.2			Z-beacon_alerter		
			+2.3	+5.8	+0.2						
18	7271.581M	27.9	+0.0	+0.0	+0.0	+0.0	+0.0	40.6	54.0	-13.4	Horiz
	Ave		+0.0	-36.8	+36.0	+5.2			Y_beacon_alerter		
			+2.3	+5.8	+0.2						
^	7271.515M	47.3	+0.0	+0.0	+0.0	+0.0	+0.0	60.0	54.0	+6.0	Horiz
			+0.0	-36.8	+36.0	+5.2			Z-beacon_alerter		
			+2.3	+5.8	+0.2						
^	7271.581M	43.1	+0.0	+0.0	+0.0	+0.0	+0.0	55.8	54.0	+1.8	Horiz
			+0.0	-36.8	+36.0	+5.2			Y_beacon_alerter		
			+2.3	+5.8	+0.2						
21	7271.565M	27.8	+0.0	+0.0	+0.0	+0.0	+0.0	40.5	54.0	-13.5	Vert
	Ave		+0.0	-36.8	+36.0	+5.2			Z-beacon_alerter		
			+2.3	+5.8	+0.2						
22	7271.581M	27.1	+0.0	+0.0	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Vert
	Ave		+0.0	-36.8	+36.0	+5.2			Y_beacon_alerter		
			+2.3	+5.8	+0.2						
^	7271.565M	43.3	+0.0	+0.0	+0.0	+0.0	+0.0	56.0	54.0	+2.0	Vert
			+0.0	-36.8	+36.0	+5.2			Z-beacon_alerter		
			+2.3	+5.8	+0.2						
^	7271.581M	42.0	+0.0	+0.0	+0.0	+0.0	+0.0	54.7	54.0	+0.7	Vert
			+0.0	-36.8	+36.0	+5.2			Y_beacon_alerter		
			+2.3	+5.8	+0.2						

25	4847.854M Ave	32.7	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	39.5	54.0 X_beacon_alerter	-14.5	Horiz
26	4847.333M Ave	29.9	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	36.7	54.0 X_beacon_alerter	-17.3	Vert
^	4847.333M	47.1	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	53.9	54.0 X_beacon_alerter	-0.1	Vert
28	2423.858M Ave	78.8	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	76.2	94.0 Fundamental_Z_Alerter *(Worse case)	-17.8	Horiz
29	4847.538M Ave	29.3	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	36.1	54.0 Z-beacon_alerter	-17.9	Horiz
^	4847.538M	45.5	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	52.3	54.0 Z-beacon_alerter	-1.7	Horiz
^	4847.604M	42.6	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	49.4	54.0 Y_beacon_alerter	-4.6	Horiz
32	4847.954M Ave	28.3	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	35.1	54.0 Y_beacon_alerter	-18.9	Horiz
^	4847.854M	50.3	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	57.1	54.0 X_beacon_alerter	+3.1	Horiz
34	2423.858M Ave	77.5	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	74.9	94.0 Fundamental_Y_Alerter	-19.1	Horiz
^	2423.858M	99.4	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	96.8	94.0 Fundamental_Z_Alerter	+2.8	Horiz
^	2423.858M	97.9	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	95.3	94.0 Fundamental_Y_Alerter	+1.3	Horiz
37	4848.529M Ave	28.1	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	34.9	54.0 Y_beacon_alerter	-19.1	Vert
^	4848.529M	44.0	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	50.8	54.0 Y_beacon_alerter	-3.2	Vert
39	4850.088M Ave	28.0	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	34.8	54.0 Z-beacon_alerter	-19.2	Vert
^	4850.088M	45.9	+0.0 +0.0 +1.9	+0.0 -37.1 +4.4	+0.0 +33.0 +0.4	+0.0 +4.2	+0.0	52.7	54.0 Z-beacon_alerter	-1.3	Vert
41	2424.100M Ave	76.0	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	73.4	94.0 Fundamental_Z_Alerter	-20.6	Vert

42	2424.100M Ave	75.5	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	72.9	94.0 Fundamental_X_Al erter	-21.1	Horiz
^	2424.100M	97.6	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	95.0	94.0 Fundamental_X_Al erter	+1.0	Horiz
44	2424.100M Ave	74.4	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	71.8	94.0 Fundamental_X_Al erter	-22.2	Vert
45	2424.100M Ave	72.2	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	69.6	94.0 Fundamental_Y_Al erter	-24.4	Vert
^	2424.100M	98.3	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	95.7	94.0 Fundamental_Z_Al erter	+1.7	Vert
^	2424.083M	96.3	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	93.7	94.0 Fundamental_X_Al erter	-0.3	Vert
^	2424.100M	93.5	+0.0 +0.0 +1.2	+0.0 -38.0 +3.1	+0.0 +28.4 +0.0	+0.0 +2.7	+0.0	90.9	94.0 Fundamental_Y_Al erter	-3.1	Vert

CKC Laboratories, Inc. Date: 11/8/2011 Time: 16:36:54 Heads Up Systems WO#: 91979
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



Test Setup Photos

FRONT VIEW

BACK VIEW

-20dBc Occupied Bandwidth

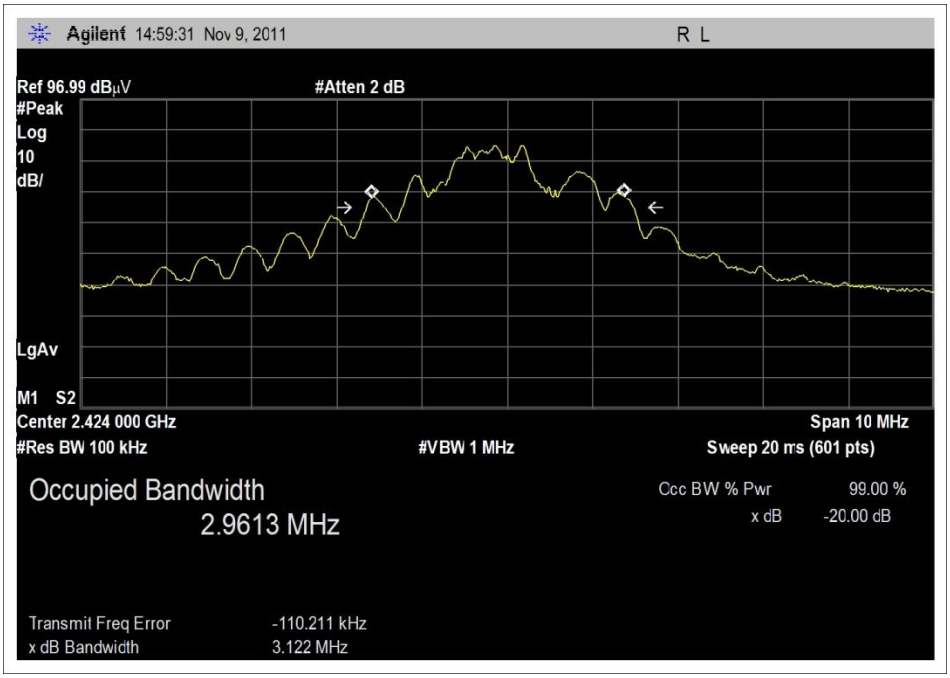
Test Conditions / Setup

The EUT is set in constant transmit mode and placed next to a spectrum analyzer with a un-calibrated field probe attached., the BW measurement is relative to the peak of the detected amplitude as detected with the field probe.
Freq: 2424 MHz
15.31(e) EGAS Alerter was powered by a support power supply with the DC voltage set to 3.3 V to simulate a fresh battery.
17°C, 37% Relative Humidity

Engineer Name: E. Wong

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN00786	Preamp	83017A	HP	8/5/2010	8/5/2012
AN00849	Horn Antenna	3115	ETS	4/23/2010	4/23/2012
ANP05565	Cable	ANDL-1-PNMN-54	Andrews	9/3/2010	9/3/2012
ANP05421	Cable	Sucoflex 104A	Huber & Suhner	2/12/2010	2/12/2012
ANP05563	Cable	ANDL-1-PNMN-48	Andrews	9/3/2010	9/3/2012

Test Plots



Test Setup Photos

Bandedge

Test Conditions / Setup

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. The EUT is set in constant transmit mode.
Freq: 2424 MHz
Emission profile of EGAS Alerter rotated along three orthogonal axis was investigated. Recorded data represent worse case emission.
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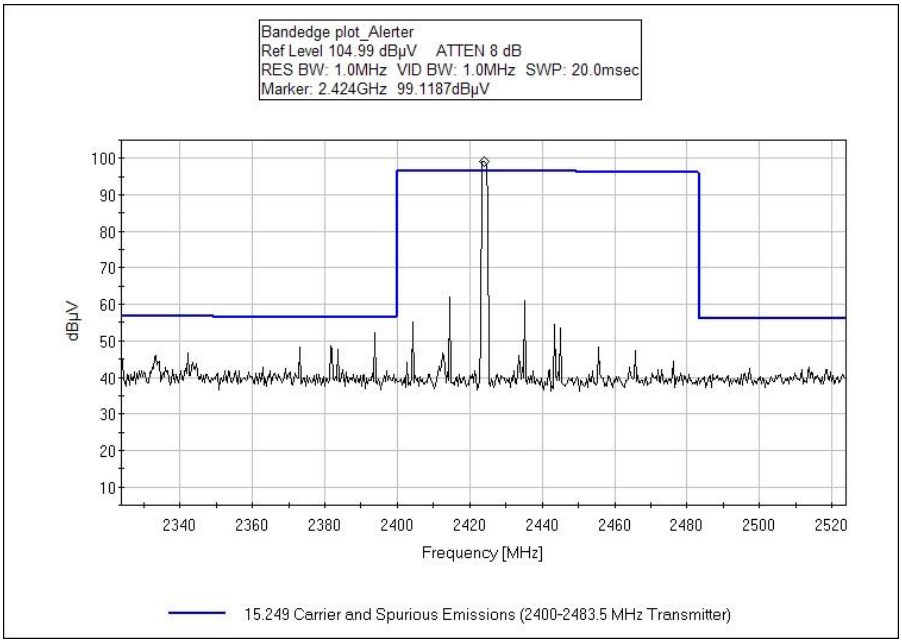
ANP05563	Cable	ANDL-1-PNMN-48	Andrews	9/3/2010	9/3/2012

Test Data



Test Setup Photos

FRONT VIEW

BACK VIEW

RSS-210

99 % Bandwidth

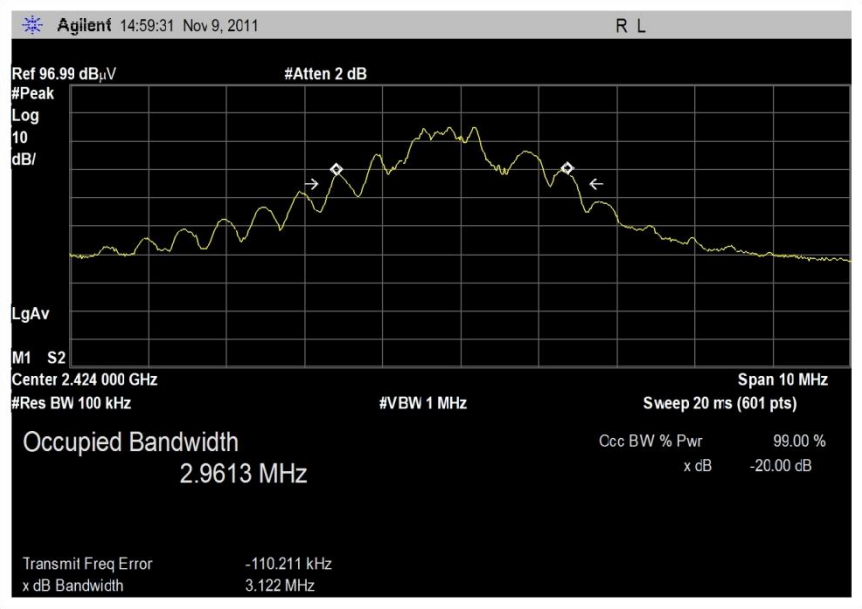
Test Conditions / Setup

The EUT is set in constant transmit mode and placed next to a spectrum analyzer with a un-calibrated field probe attached., the BW measurement is relative to the peak of the detected amplitude as detected with the field probe.
Freq: 2424 MHz
15.31(e) EGAS Alerter was powered by a support power supply with the DC voltage set to 3.3 V to simulate a fresh battery.
17°C, 37% Relative Humidity

Engineer Name: E. Wong

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN00786	Preamp	83017A	HP	8/5/2010	8/5/2012
AN00849	Horn Antenna	3115	ETS	4/23/2010	4/23/2012
ANP05565	Cable	ANDL-1-PNMN-54	Andrews	9/3/2010	9/3/2012
ANP05421	Cable	Sucoflex 104A	Huber & Suhner	2/12/2010	2/12/2012
ANP05563	Cable	ANDL-1-PNMN-48	Andrews	9/3/2010	9/3/2012

Test Data



Test Setup Photos

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.