

Enlighted, Inc.

ADDENDUM TEST REPORT TO 92685-9

Gateway, GW-2-00

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207, 15.247
and
RSS-210 Issue 8

Report No.: 92685-9A

Date of issue: June 15, 2012



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.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Enlighted, Inc.
930 Benicia Ave.
Sunnyvale, CA 94085

Representative: Po. Chiu

REPORT PREPARED BY:

Joyce Walker
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 92685

DATE OF EQUIPMENT RECEIPT:

January 13, 2012

DATE(S) OF TESTING:

January 13-31, 2012

Revision History

Original: Testing of the Gateway, GW-2-00 to FCC Part 15 Subpart C Sections 15.207, 15.247.

Addendum A: Corrected the test equipment list in the Bandedge test section.

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.
1120 Fulton Place
Fremont, CA 94539

Site Registration & Accreditation Information

Location	CB #	Japan	Canada	FCC
Fremont	US0082	R-2160, C-2332, T-228 & G-522	3082B-1	958979

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Description	Test Procedure/Method	Results
Voltage Variation	FCC Part 15 Subpart C Section 15.31(e)	Pass
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
-6dBc Occupied Bandwidth	FCC Part 15 Subpart C Section 15.247(a)(2) / 558074 DO1 / DTS Measurement Guidance VO1	Pass
RF Power Output	FCC Part 15 Subpart C Section 15.247(b)(3) / 558074 DO1 / DTS Measurement Guidance VO1	Pass
Bandedge	FCC Part 15 Subpart C / ITU-R 55/1 & DTS Measurement Guidance VO1	Pass
Radiated Spurious Emissions	FCC Part 15 Subpart C Section 15.247(d) / 15.209 / 558074 DO1 / DTS Measurement Guidance VO1	Pass
Power Spectral Density	FCC Part 15 Subpart C 15.247(e) / 558074 DO1 / DTS Measurement Guidance VO1	Pass
99% Bandwidth	RSS-210 Issue 8	Pass

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

Gateway

Manuf: Enlighted
Model: GW-2-00
Serial: ASI51994

PERIPHERAL DEVICES

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

Laptop

Manuf: Lenovo
Model: Type 4177-0KU
Serial: R8-V1WEF 11/07

AC Adaptor

Manuf: Lenovo
Model: 92P1156
Serial: 11S92P1156ZDXN 17BG5GG Rev. N

Passive Power Over Ethernet

Manuf: None
Model: APOE02-WM
Serial: None

Power Supply

Manuf: Mastech
Model: 10010EX
Serial: None

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

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Enlighted, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **92685** Date: 1/30/2012
 Test Type: **Conducted Emissions** Time: 3:27:34 PM
 Equipment: **Gateway** Sequence#: 26
 Manufacturer: Enlighted
 Model: GW-2-00
 S/N: ASI51994
 Tested By: E. Wong
 120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	2/23/2011	2/23/2013
T1	ANP01211	Attenuator	23-10-34	4/15/2011	4/15/2013
T2	ANP05300	Cable	RG214/U	3/7/2011	3/7/2013
T3	ANP05440	Cable		3/7/2011	3/7/2013
T4	ANP05258	High Pass Filter	HE9615-150K-50-720B	12/2/2010	12/2/2012
T5	AN00493	50uH LISN-L1 (L) Loss W/O European Adapter	3816/NM	3/10/2011	3/10/2013
	AN00493	50uH LISN-L(2) N Loss W/O European Adapter	3816/NM	3/10/2011	3/10/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Gateway*	Enlighted	GW-2-00	ASI51994

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Lenovo	Type 4177-0KU	R8-V1WEF 11/07
AC Adaptor	Lenovo	92P1156	11S92P1156ZDXN 17BG5GG Rev. N
Passive Power Over Ethernet	None	APOE02-WM	None
Power Supply	Mastech	10010EX	None

Test Conditions / Notes:

EUT is placed on a Styrofoam block, elevated from the wooden turntable, set in intended operational orientation with the antenna set in vertical position. The transmitter is in continuous Transmit Mode. The Ethernet port is connected to passive power over Ethernet device, the debug/service port intended for configuration only is not populated.

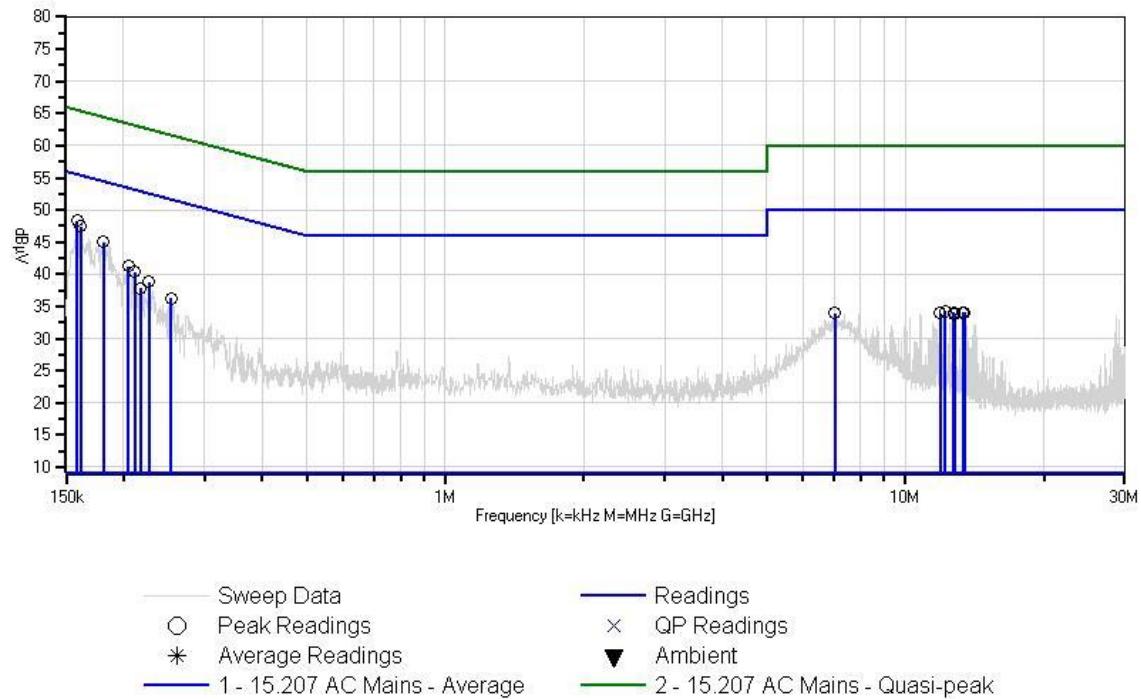
Freq 2404.56- 2479.10MHz
 TX= 2439.61MHz
 Frequency range of measurement = 150kHz- 30MHz.
 150 kHz-30 MHz; RBW=9 kHz, VBW=9kHz
 Temperature: 20.0°C
 Humidity: 45%
 Atmospheric Pressure: 1023mbar

Ext Attn: 0 dB

#	Freq	Rdng	Reading listed by margin.				Test Lead: Black			
			T1	T2	T3	T4	Dist	Corr	Spec	Margin
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB
1	158.726k	35.6	+9.9 +2.3	+0.0	+0.0	+0.5	+0.0	48.3	55.5	-7.2
2	161.635k	34.9	+9.9 +2.2	+0.0	+0.0	+0.4	+0.0	47.4	55.4	-8.0
3	180.543k	32.7	+9.9 +2.0	+0.0	+0.0	+0.4	+0.0	45.0	54.5	-9.5
4	204.540k	29.5	+9.9 +1.7	+0.0	+0.0	+0.1	+0.0	41.2	53.4	-12.2
5	211.813k	28.8	+9.9 +1.6	+0.0	+0.0	+0.1	+0.0	40.4	53.1	-12.7
6	227.084k	27.4	+9.9 +1.4	+0.0	+0.0	+0.1	+0.0	38.8	52.6	-13.8
7	217.630k	26.3	+9.9 +1.5	+0.0	+0.0	+0.1	+0.0	37.8	52.9	-15.1
8	253.263k	25.2	+9.8 +1.2	+0.0	+0.0	+0.1	+0.0	36.3	51.6	-15.3
9	12.193M	23.6	+9.9 +0.4	+0.1	+0.2	+0.1	+0.0	34.3	50.0	-15.7
10	12.752M	23.3	+9.9 +0.5	+0.1	+0.2	+0.1	+0.0	34.1	50.0	-15.9
11	13.364M	23.4	+9.8 +0.5	+0.1	+0.2	+0.1	+0.0	34.1	50.0	-15.9
12	13.418M	23.3	+9.8 +0.5	+0.1	+0.2	+0.1	+0.0	34.0	50.0	-16.0

13	7.040M	23.4	+9.8 +0.4	+0.1	+0.1	+0.1	+0.0	33.9	50.0	-16.1	Black
14	11.896M	23.2	+9.9 +0.4	+0.1	+0.2	+0.1	+0.0	33.9	50.0	-16.1	Black
15	12.806M	23.0	+9.9 +0.5	+0.1	+0.2	+0.1	+0.0	33.8	50.0	-16.2	Black

CKC Laboratories, Inc. Date: 1/30/2012 Time: 3:27:34 PM Enlighted, Inc. WO#: 92685 Model: GW-2-00 SN: ASI51994
 15.207 AC Mains - Average Test Lead: Black 120V 60Hz Sequence#: 26 Black



Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Enlighted, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **92685** Date: 1/30/2012
 Test Type: **Conducted Emissions** Time: 3:24:36 PM
 Equipment: **Gateway** Sequence#: 25
 Manufacturer: Enlighted Tested By: E. Wong
 Model: GW-2-00 120V 60Hz
 S/N: ASI51994

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	2/23/2011	2/23/2013
T1	ANP01211	Attenuator	23-10-34	4/15/2011	4/15/2013
T2	ANP05300	Cable	RG214/U	3/7/2011	3/7/2013
T3	ANP05440	Cable		3/7/2011	3/7/2013
T4	ANP05258	High Pass Filter	HE9615-150K-50-720B	12/2/2010	12/2/2012
	AN00493	50uH LISN-L1 (L) Loss W/O European Adapter	3816/NM	3/10/2011	3/10/2013
T5	AN00493	50uH LISN-L(2) N Loss W/O European Adapter	3816/NM	3/10/2011	3/10/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Gateway*	Enlighted	GW-2-00	ASI51994

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Lenovo	Type 4177-0KU	R8-V1WEF 11/07
AC Adaptor	Lenovo	92P1156	11S92P1156ZDXN 17BG5GG Rev. N
Passive Power Over Ethernet	None	APOE02-WM	None
Power Supply	Mastech	10010EX	None

Test Conditions / Notes:

EUT is placed on a Styrofoam block, elevated from the wooden turntable, set in intended operational orientation with the antenna set in vertical position. The transmitter is in continuous Transmit Mode. The Ethernet port is connected to passive power over Ethernet device, the debug/service port intended for configuration only is not populated. Freq 2404.56- 2479.10MHz TX= 2439.61MHz Frequency range of measurement = 150kHz- 30MHz. 150 kHz-30 MHz; RBW=9 kHz, VBW=9kHz Temperature: 20.0°C Humidity: 45% Atmospheric Pressure: 1023mbar

Ext Attn: 0 dB

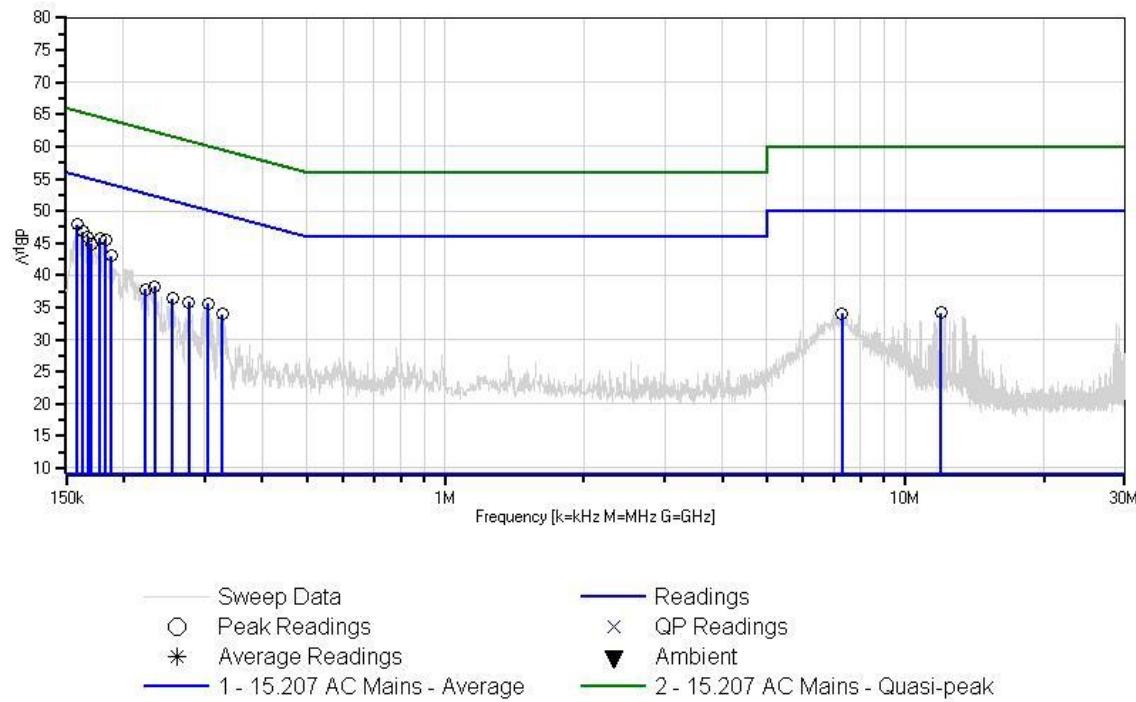
Measurement Data:

Reading listed by margin.

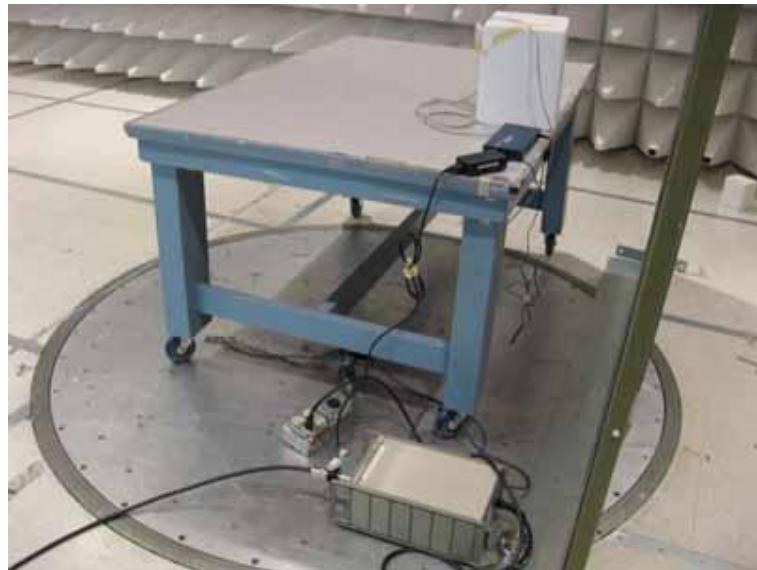
Test Lead: White

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar	
			MHz	dB μ V	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	158.726k	35.3	+9.9 +2.2	+0.0	+0.0	+0.5	+0.0	47.9	55.5	-7.6	White	
2	163.090k	34.2	+9.9 +2.2	+0.0	+0.0	+0.5	+0.0	46.8	55.3	-8.5	White	
3	177.634k	33.5	+9.9 +2.0	+0.0	+0.0	+0.4	+0.0	45.8	54.6	-8.8	White	
4	182.724k	33.4	+9.9 +1.9	+0.0	+0.0	+0.3	+0.0	45.5	54.4	-8.9	White	
5	167.453k	33.5	+9.9 +2.1	+0.0	+0.0	+0.5	+0.0	46.0	55.1	-9.1	White	
6	170.362k	32.5	+9.9 +2.1	+0.0	+0.0	+0.4	+0.0	44.9	54.9	-10.0	White	
7	187.815k	30.9	+9.9 +1.9	+0.0	+0.0	+0.3	+0.0	43.0	54.1	-11.1	White	
8	233.629k	27.0	+9.9 +1.3	+0.0	+0.0	+0.1	+0.0	38.3	52.3	-14.0	White	
9	305.622k	24.8	+9.8 +0.9	+0.0	+0.0	+0.1	+0.0	35.6	50.1	-14.5	White	
10	223.448k	26.4	+9.9 +1.4	+0.0	+0.0	+0.1	+0.0	37.8	52.7	-14.9	White	
11	277.261k	24.9	+9.8 +1.0	+0.0	+0.0	+0.1	+0.0	35.8	50.9	-15.1	White	
12	255.445k	25.3	+9.8 +1.2	+0.0	+0.0	+0.1	+0.0	36.4	51.6	-15.2	White	
13	327.438k	23.2	+9.8 +0.8	+0.0	+0.0	+0.1	+0.0	33.9	49.5	-15.6	White	
14	11.950M	23.4	+9.9 +0.5	+0.1	+0.2	+0.1	+0.0	34.2	50.0	-15.8	White	
15	7.274M	23.6	+9.8 +0.4	+0.1	+0.1	+0.1	+0.0	34.1	50.0	-15.9	White	

CKC Laboratories, Inc. Date: 1/30/2012 Time: 3:24:36 PM Enlighted, Inc. WO#: 92685 Model: GW-2-00 SN:
 ASI51994
 15.207 AC Mains - Average Test Lead: White 120V 60Hz Sequence#: 25 White



Test Setup Photos



-6dBc Occupied Bandwidth

Test Conditions / Setup

The EUT is up and running, the transmitter is in continuous Tx Mode fully modulated. Ethernet, power and debug port are terminated. The Ethernet port is connected to passive power over Ethernet device, the debug port is connected to the laptop via serial to USB adapter. EUT is set to ping the passive power over Ethernet device every few seconds, which is the normal functionality of the EUT.

Testing performed at low, mid and high channels.

RBW/VBW: 100/300kHz

EUT has 16 channels, 0 through 15.

Highest Clock: 2.4GHz

Temperature: 20.0°C

Humidity: 45%

Atmospheric Pressure: 1023mbar

Engineer Name: A. Brar

Test Equipment

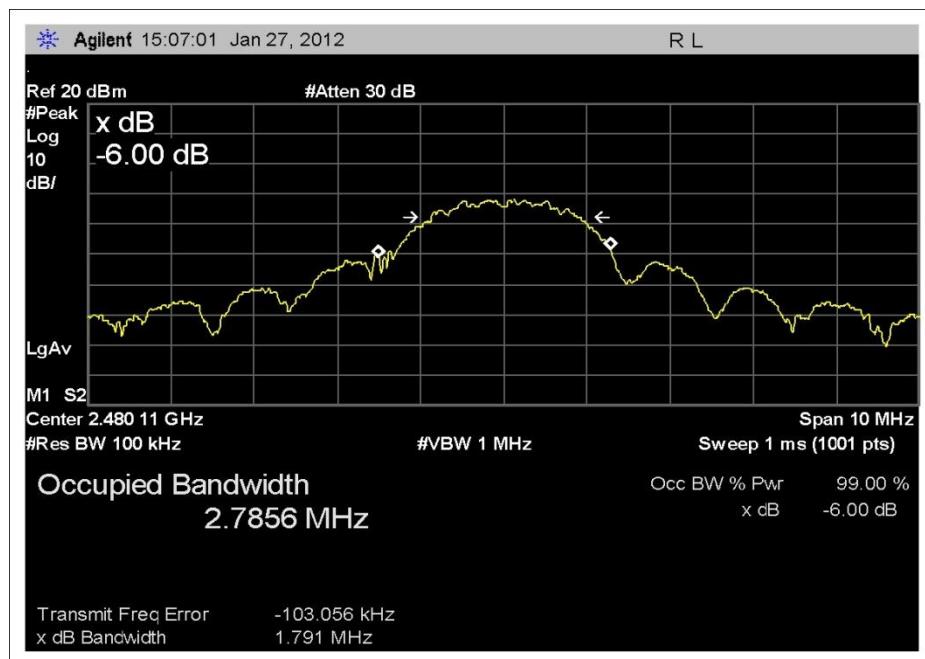
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	2/23/2011	2/23/2013
ANP01211	Attenuator	23-10-34	Aeroflex/Weinschel	4/15/2011	4/15/2013
AN02131	Multimeter	DMM914	Tektronix	9/9/2011	9/9/2013

Test Plots





MID CHANNEL



HIGH CHANNEL

Test Setup Photos



15.247(b)(3) RF Power Output

Test Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Enlighted, Inc.**
 Specification: **15.247(b)(3) Power Output (2400-2483.5 MHz Digital Modulation)**
 Work Order #: **92685** Date: **1/27/2012**
 Test Type: **Conducted Emissions** Time: **15:03:30**
 Equipment: **Gateway** Sequence#: **19**
 Manufacturer: **Enlighted** Tested By: **A. Brar**
 Model: **GW-2-00** 48V DC
 S/N: **ASI51994**

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	2/23/2011	2/23/2013
T1	ANP01211	Attenuator	23-10-34	4/15/2011	4/15/2013
	AN02131	Multimeter	DMM914	9/9/2011	9/9/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Gateway*	Enlighted	GW-2-00	ASI51994

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Lenovo	Type 4177-0KU	R8-V1WEF 11/07
AC Adaptor	Lenovo	92P1156	11S92P1156ZDXN 17BG5GG Rev. N
Passive Power Over Ethernet	None	APOE02-WM	None
Power Supply	Mastech	10010EX	None

Test Conditions / Notes:

Fundamental Conducted Measurements FCC15.247(b)(3).

Testing at low, mid and high channel. RBW/VBW: 3/8MHz TX = 2404.56 MHz, 2439.61MHz, 2479.41MHz

Power = 3.6 dBm (0.0023W) , 3.3dBm (0.0021W) , 2.7dBm (0.0018W)

EUT has 16 channels, 0 through 15.

Highest Clock: 2.4GHz

Temperature: 20.0°C

Humidity: 45%

Atmospheric Pressure: 1023mbar

EUT is up and running, the transmitter is in continuous Tx Mode fully modulated. Ethernet, power and debug port are terminated. The Ethernet port is connected to passive power over Ethernet device, the debug port is connected to the laptop via serial to USB adapter. EUT is set to ping the passive power over Ethernet device every few seconds, which is the normal functionality of the EUT.

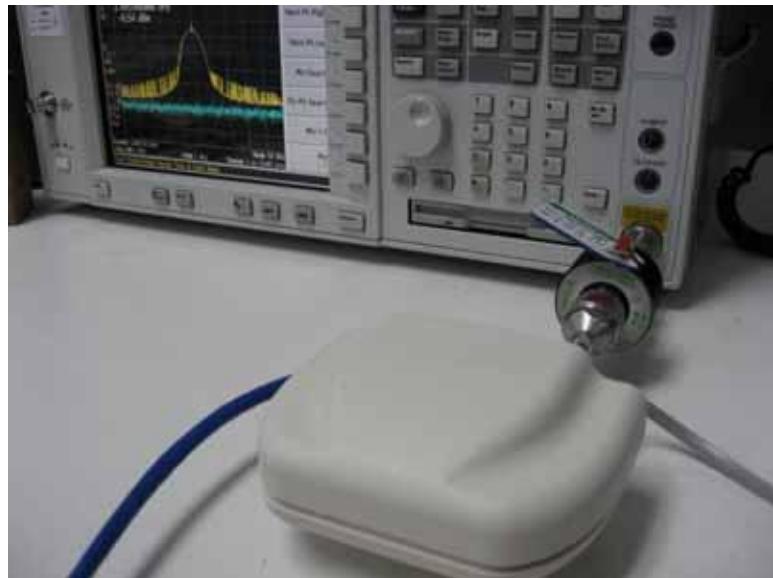
FCC15.31e is covered by this data sheet as the voltage was varied to 85% and 115% of the nominal EUT voltage of 48V DC. No variation in Output power was observed.

FCC15.31m is covered by this data sheet, three channels were tested.

Ext Attn: 0 dB

Measurement Data: Reading listed by margin.					Test Lead: RF Output Port				
#	Freq MHz	Rdng dB μ V	T1 dB	T1 dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	2404.560M	-6.4	+10.0		+0.0	3.6	30.0	-26.4	RF Ou Low Channel.
2	2439.610M	-6.7	+10.0		+0.0	3.3	30.0	-26.7	RF Ou Middle Channel.
3	2479.410M	-7.3	+10.0		+0.0	2.7	30.0	-27.3	RF Ou High Channel.

Test Setup Photos



Bandedge

Test Conditions / Setup

EUT is placed on a Styrofoam block elevated from the wooden turntable, set in intended operational orientation with the antenna set in vertical position. The transmitter is in continuous Tx Mode fully modulated. The Ethernet port is connected to passive power over Ethernet device, the debug/service port intended for configuration only is not populated.

Freq 2404.56- 2479.10MHz

TX = 2404.56 MHz, 2479. 41MHz

Power = 3.6 dBm (0.0023W), 2.7dBm (0.0018W)

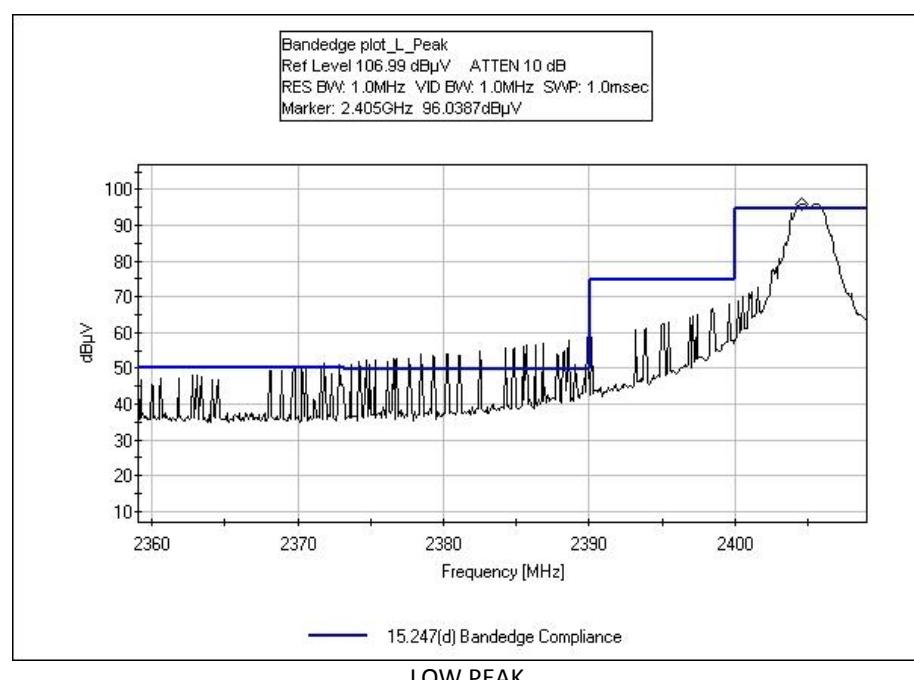
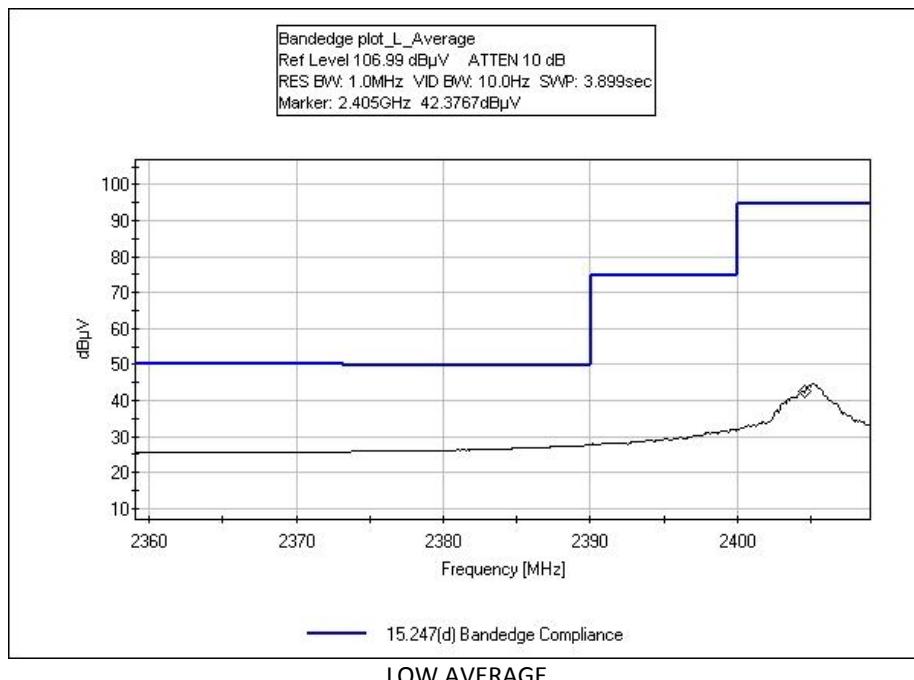
Frequency range of measurement = Fundamental

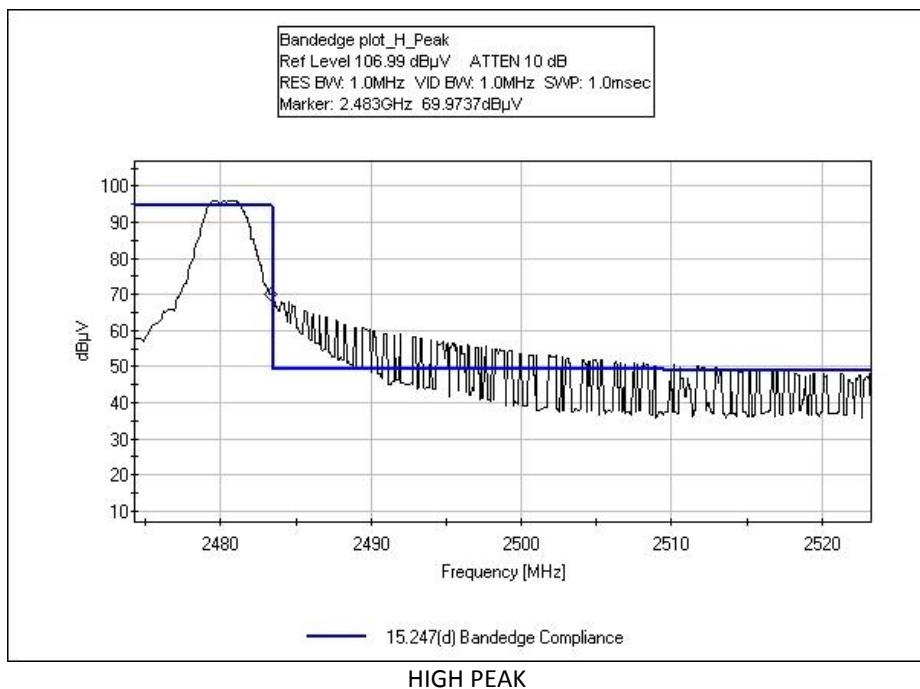
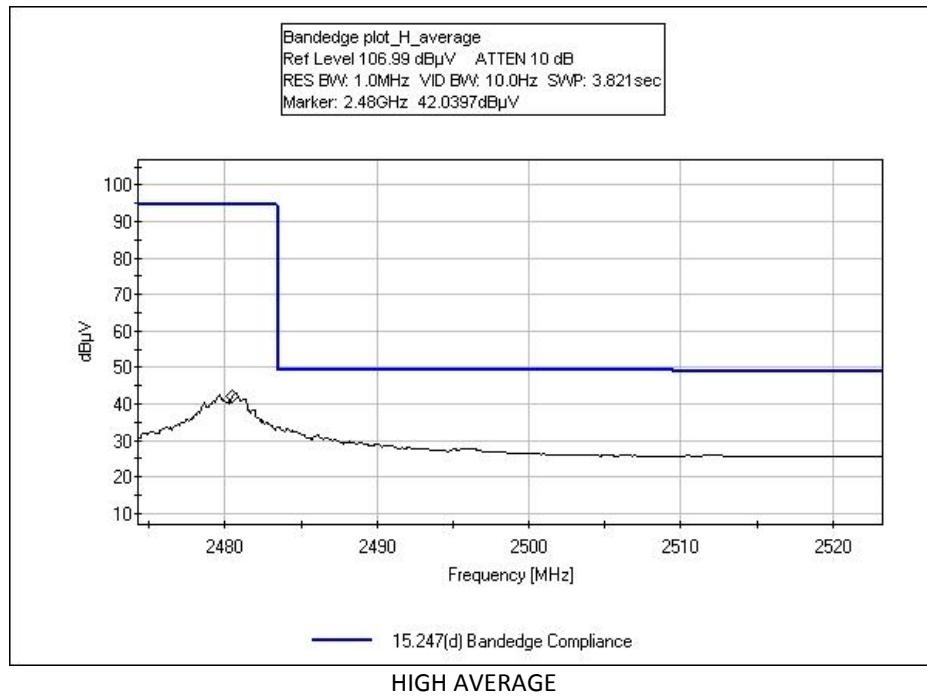
30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz.

Engineer Name: E. Wong

Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	2/23/2011	2/23/2013
AN02157	Horn Antenna- ANSI C63.5	3115	EMCO	1/17/2011	1/17/2013
AN02810	Preamp	83051A	HP	1/7/2012	1/7/2014
ANP04241	Cable	FSJ1-50A	Andrews	3/2/2010	3/2/2012
ANP05138	Cable	FSJ1P-50A-4	Andrews	3/19/2010	3/19/2012
ANP05843	Cable	32022-2-29094K-48TC	AstroLab	7/30/2010	7/30/2012

Test Data




Test Setup Photos



15.247(d) Radiated Spurious Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Enlighted, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **92685** Date: 1/30/2012
 Test Type: **Radiated Scan** Time: 13:46:38
 Equipment: **Gateway** Sequence#: 20
 Manufacturer: **Enlighted** Tested By: E. Wong
 Model: **GW-2-00**
 S/N: **ASI51994**

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02668	Spectrum Analyzer	E4446A	2/23/2011	2/23/2013
	AN02157	Horn Antenna-SAE	3115	1/17/2011	1/17/2013
		ARP958			
T2	AN02157	Horn Antenna-ANSI	3115	1/17/2011	1/17/2013
		C63.5			
T3	AN02810	Preamp	83051A	1/7/2012	1/7/2014
T4	ANP04241	Cable	FSJ1-50A	3/2/2010	3/2/2012
T5	ANP05138	Cable	FSJ1P-50A-4	3/19/2010	3/19/2012
T6	ANP05843	Cable	32022-2-29094K-	7/30/2010	7/30/2012
		48TC			
T7	AN01416	High Pass Filter	84300-80038	2/23/2010	2/23/2012
	AN02112	Horn Antenna-ANSI	84125-8008	11/10/2010	11/10/2012
		C63.5 Antenna			
		Factors (dB)			
	AN02112	Horn Antenna-1	84125-8008	11/10/2010	11/10/2012
		Meter Antenna			
		Factors (dB) - SAE			
		ARP 958			
T8	AN00730	Preamp		1/31/2011	1/31/2013
T9	AN00852	Biconilog Antenna	CBL 6111C	11/16/2010	11/16/2012
T10	ANP05299	Cable	RG214	3/6/2011	3/6/2013
T11	ANP05300	Cable	RG214/U	3/7/2011	3/7/2013
T12	ANP05440	Cable		3/7/2011	3/7/2013
	AN00432	Loop Antenna	6502	3/31/2011	3/31/2013

Equipment Under Test (= EUT):*

Function	Manufacturer	Model #	S/N
Gateway*	Enlighted	GW-2-00	ASI51994

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Lenovo	Type 4177-0KU	R8-V1WEF 11/07
AC Adaptor	Lenovo	92P1156	11S92P1156ZDXN 17BG5GG Rev. N
Passive Power Over Ethernet	None	APOE02-WM	None
Power Supply	Mastech	10010EX	None

Test Conditions / Notes:

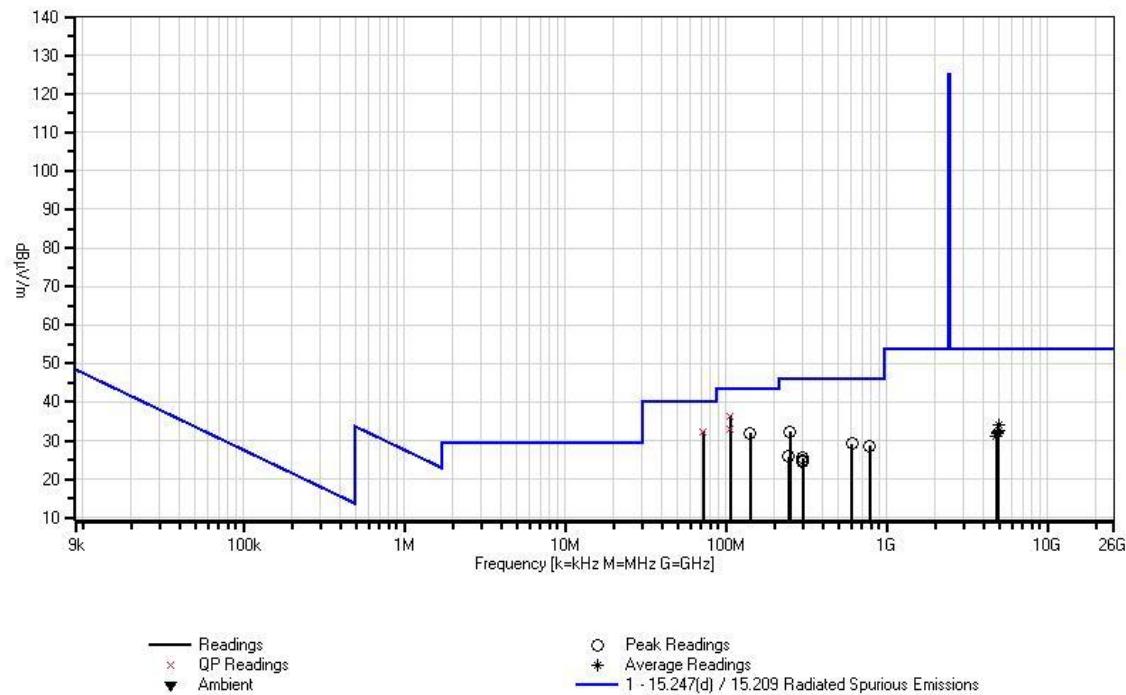
EUT is placed on a Styrofoam block elevated from wooden turntable, set in intended operational orientation with the antenna set in vertical position. The transmitter is in continuous Tx Mode fully modulated. The Ethernet port is connected to passive power over Ethernet device, the debug/service port intended for configuration only is not populated
Freq 2404.56- 2479.10MHz
TX = 2404.56 MHz, 2439.61MHz, 2479.41MHz
Power = 3.6 dBm (0.0023W) , 3.3dBm (0.0021W) , 2.7dBm (0.0018W)
Frequency range of measurement = 9 kHz- 25 GHz.
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-25000

Ext Attn: 0 dB

#	Freq	Rdng	Reading listed by margin.				Test Distance: 3 Meters				
			T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	106.700M	52.4	+0.0	+0.0	+0.0	+0.0	+0.0	36.4	43.5	-7.1	Horiz
			+0.0	+0.0	+0.0	-27.5	71				173
			+10.5	+0.1	+0.3	+0.6					
^	106.700M	55.3	+0.0	+0.0	+0.0	+0.0	+0.0	39.3	43.5	-4.2	Horiz
			+0.0	+0.0	+0.0	-27.5	71				173
			+10.5	+0.1	+0.3	+0.6					
3	72.329M	52.5	+0.0	+0.0	+0.0	+0.0	+0.0	32.3	40.0	-7.7	Verti
			+0.0	+0.0	+0.0	-27.5	301				97
			+6.7	+0.0	+0.2	+0.4					
^	72.329M	58.1	+0.0	+0.0	+0.0	+0.0	+0.0	37.9	40.0	-2.1	Verti
			+0.0	+0.0	+0.0	-27.5	301				97
			+6.7	+0.0	+0.2	+0.4					
5	106.710M	49.1	+0.0	+0.0	+0.0	+0.0	+0.0	33.1	43.5	-10.4	Verti
			+0.0	+0.0	+0.0	-27.5	334				116
			+10.5	+0.1	+0.3	+0.6					
^	106.710M	54.4	+0.0	+0.0	+0.0	+0.0	+0.0	38.4	43.5	-5.1	Verti
			+0.0	+0.0	+0.0	-27.5	229				97
			+10.5	+0.1	+0.3	+0.6					
7	141.250M	46.8	+0.0	+0.0	+0.0	+0.0	+0.0	31.9	43.5	-11.6	Horiz
			+0.0	+0.0	+0.0	-27.5	65				124
			+11.5	+0.1	+0.3	+0.7					
8	250.005M	46.0	+0.0	+0.0	+0.0	+0.0	+0.0	32.4	46.0	-13.6	Horiz
			+0.0	+0.0	+0.0	-27.4	43				99
			+12.4	+0.1	+0.4	+0.9					
9	607.600M	34.8	+0.0	+0.0	+0.0	+0.0	+0.0	29.2	46.0	-16.8	Verti
			+0.0	+0.0	+0.0	-27.2	29				125
			+19.2	+0.2	+0.7	+1.5					

10	785.490M	31.5	+0.0	+0.0	+0.0	+0.0	+0.0	28.7	46.0	-17.3	Horiz
			+0.0	+0.0	+0.0	-27.2	217				97
			+21.6	+0.2	+0.9	+1.7					
11	4961.406M	22.6	+0.0	+33.2	-27.5	+0.8	+0.0	34.2	54.0	-19.8	Verti
	Ave		+3.5	+1.1	+0.5	+0.0	304				136
			+0.0	+0.0	+0.0	+0.0					
^	4961.406M	38.4	+0.0	+33.2	-27.5	+0.8	+0.0	50.0	54.0	-4.0	Verti
			+3.5	+1.1	+0.5	+0.0	304				136
			+0.0	+0.0	+0.0	+0.0					
13	244.820M	39.7	+0.0	+0.0	+0.0	+0.0	+0.0	25.8	46.0	-20.2	Horiz
			+0.0	+0.0	+0.0	-27.4	11				136
			+12.1	+0.1	+0.4	+0.9					
14	299.900M	38.3	+0.0	+0.0	+0.0	+0.0	+0.0	25.6	46.0	-20.4	Verti
			+0.0	+0.0	+0.0	-27.4	204				125
			+13.1	+0.1	+0.5	+1.0					
15	4959.672M	21.2	+0.0	+33.2	-27.5	+0.8	+0.0	32.8	54.0	-21.2	Horiz
	Ave		+3.5	+1.1	+0.5	+0.0	106				143
			+0.0	+0.0	+0.0	+0.0					
^	4959.672M	34.8	+0.0	+33.2	-27.5	+0.8	+0.0	46.4	54.0	-7.6	Horiz
			+3.5	+1.1	+0.5	+0.0	106				143
			+0.0	+0.0	+0.0	+0.0					
17	299.990M	37.4	+0.0	+0.0	+0.0	+0.0	+0.0	24.7	46.0	-21.3	Horiz
			+0.0	+0.0	+0.0	-27.4	191				97
			+13.1	+0.1	+0.5	+1.0					
18	300.150M	37.1	+0.0	+0.0	+0.0	+0.0	+0.0	24.4	46.0	-21.6	Horiz
			+0.0	+0.0	+0.0	-27.4	314				97
			+13.1	+0.1	+0.5	+1.0					
19	4880.302M	21.2	+0.0	+33.0	-27.8	+0.8	+0.0	32.2	54.0	-21.8	Verti
	Ave		+3.5	+1.1	+0.4	+0.0	232				96
			+0.0	+0.0	+0.0	+0.0					
^	4880.302M	34.1	+0.0	+33.0	-27.8	+0.8	+0.0	45.1	54.0	-8.9	Verti
			+3.5	+1.1	+0.4	+0.0	232				96
			+0.0	+0.0	+0.0	+0.0					
21	4880.302M	20.8	+0.0	+33.0	-27.8	+0.8	+0.0	31.8	54.0	-22.2	Horiz
	Ave		+3.5	+1.1	+0.4	+0.0	336				147
			+0.0	+0.0	+0.0	+0.0					
^	4880.302M	33.4	+0.0	+33.0	-27.8	+0.8	+0.0	44.4	54.0	-9.6	Horiz
			+3.5	+1.1	+0.4	+0.0	336				147
			+0.0	+0.0	+0.0	+0.0					
23	4810.133M	20.6	+0.0	+32.9	-27.9	+0.8	+0.0	31.2	54.0	-22.8	Verti
	Ave		+3.4	+1.1	+0.3	+0.0	318				128
			+0.0	+0.0	+0.0	+0.0					
^	4810.133M	33.7	+0.0	+32.9	-27.9	+0.8	+0.0	44.3	54.0	-9.7	Verti
			+3.4	+1.1	+0.3	+0.0	318				128
			+0.0	+0.0	+0.0	+0.0					
25	4810.133M	20.5	+0.0	+32.9	-27.9	+0.8	+0.0	31.1	54.0	-22.9	Horiz
	Ave		+3.4	+1.1	+0.3	+0.0	143				97
			+0.0	+0.0	+0.0	+0.0					
^	4810.133M	33.8	+0.0	+32.9	-27.9	+0.8	+0.0	44.4	54.0	-9.6	Horiz
			+3.4	+1.1	+0.3	+0.0	143				97
			+0.0	+0.0	+0.0	+0.0					

CKC Laboratories, Inc. Date: 1/30/2012 Time: 13:46:38 Enlighted, Inc. WO#: 92685 Model: GW-2-00 SN:
 ASI51994
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Sequence#: 20 Horizontal



Test Setup Photos



15.247(e) Power Spectral Density

Test Conditions / Setup

The EUT is up and running, the transmitter is in continuous Tx Mode fully modulated.

Test performed IAW KDB8558074 D01 Meas Guidance, section 5.3.1 PKPSD. Sweep time was set in auto couple to ensure all component of the emission was captured before switching to as lower sweep time for presentation purposes. BW correction factor = $10 \log 3\text{kHz}/100\text{kHz} = -15.2\text{dB}$.

Testing performed at low, mid and high channels.

Highest Clock: 2.4GHz

Temperature: 20.0°C

Humidity: 45%

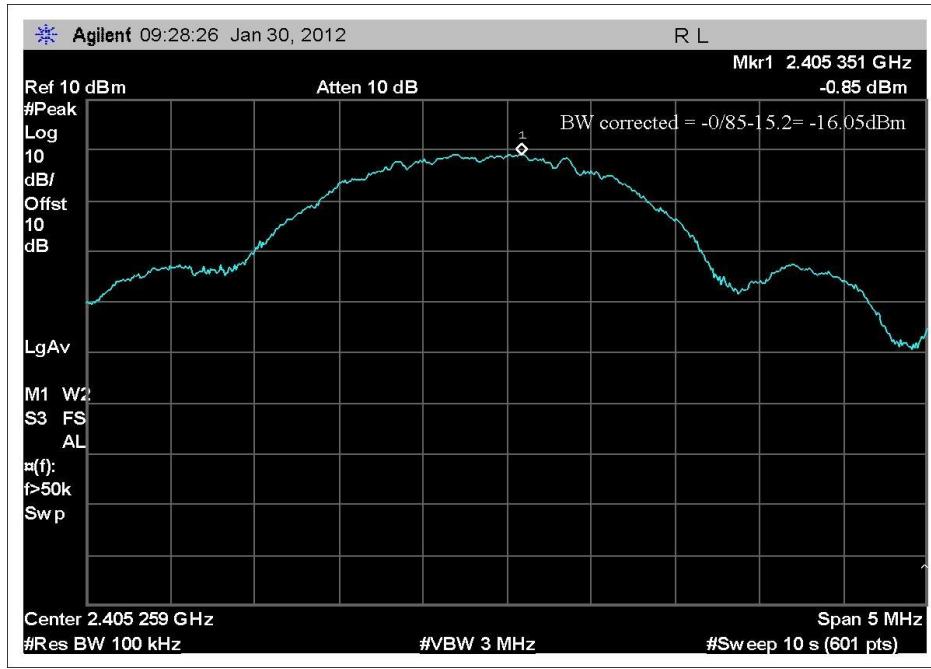
Atmospheric Pressure: 1023mbar

Engineer Name: A. Brar

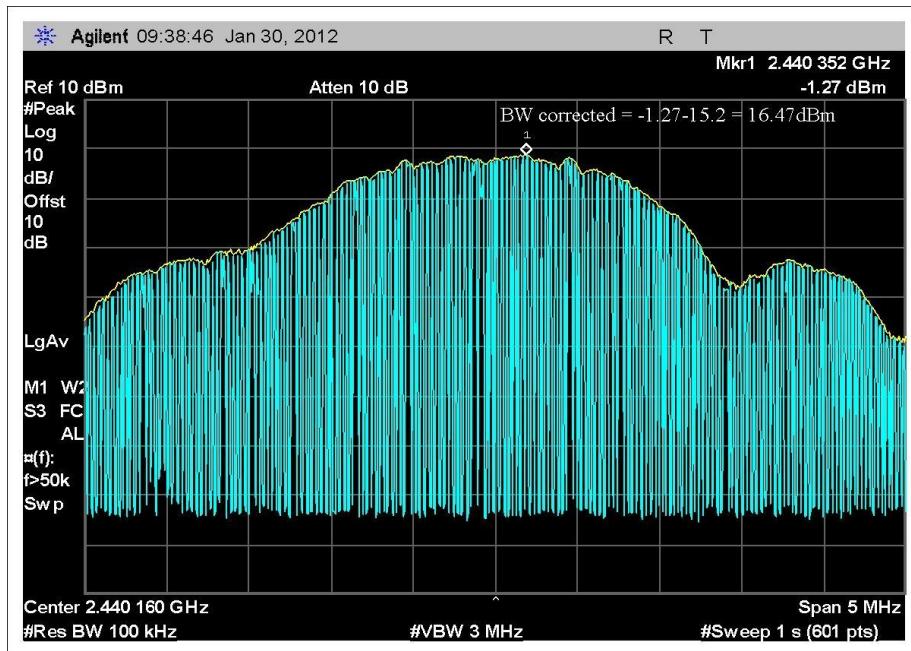
Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	2/23/2011	2/23/2013

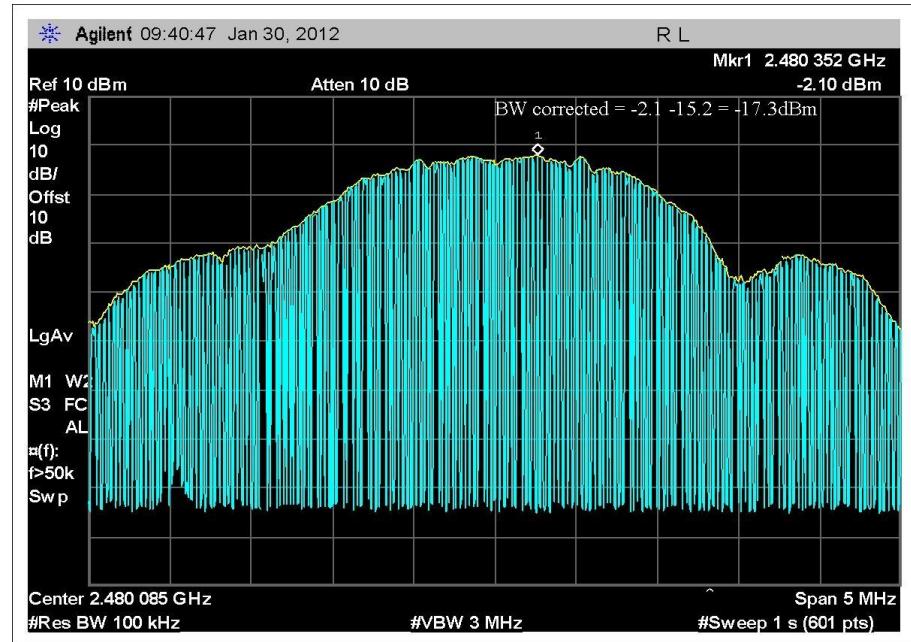
Test Data



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

Test Setup Photos



RSS-210

99 % Bandwidth

Test Conditions / Setup

The EUT is up and running, the transmitter is in continuous Tx Mode fully modulated. Ethernet, power and debug port are terminated. The Ethernet port is connected to passive power over Ethernet device, the debug port is connected to the laptop via serial to USB adapter. EUT is set to ping the passive power over Ethernet device every few seconds, which is the normal functionality of the EUT.

Testing performed at low, mid and high channels.

RBW/VBW: 100/300kHz

EUT has 16 channels, 0 through 15.

Highest Clock: 2.4GHz

Temperature: 20.0°C

Humidity: 45%

Atmospheric Pressure: 1023mbar

RSP 100 / RSS 210 99% Band Width

Engineer Name: A. Brar

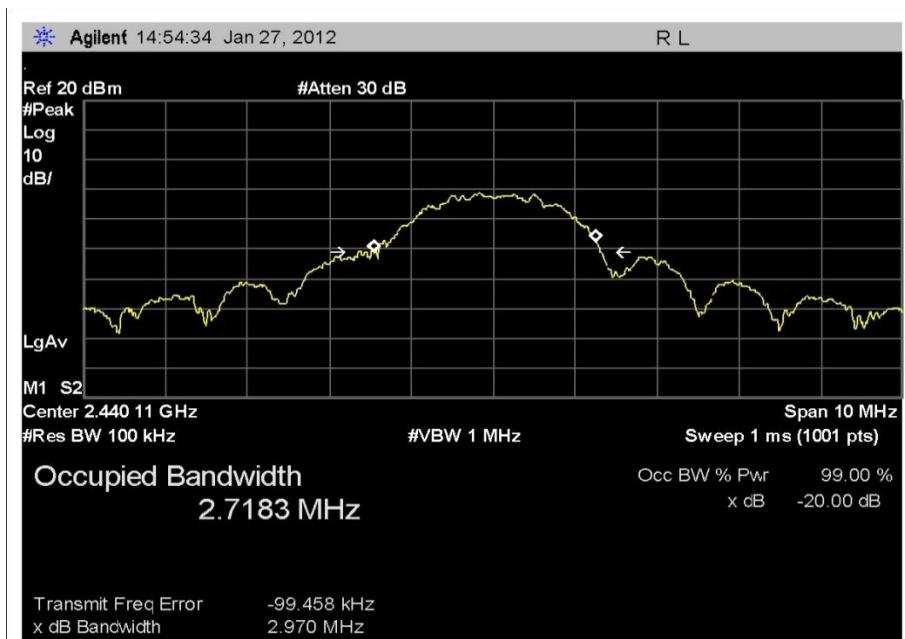
Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	2/23/2011	2/23/2013
ANP01211	Attenuator	23-10-34	Aeroflex/Weinschel	4/15/2011	4/15/2013
AN02131	Multimeter	DMM914	Tektronix	9/9/2011	9/9/2013

Test Data



LOW CHANNEL

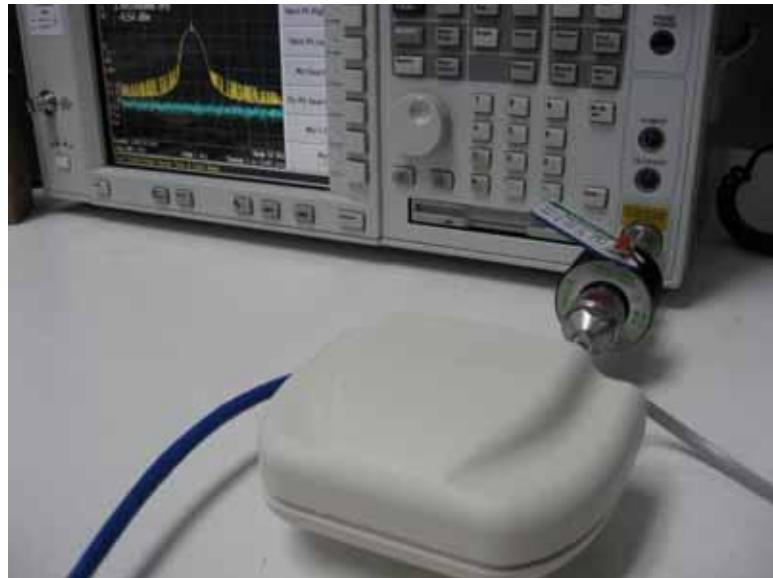


MID CHANNEL



HIGH CHANNEL

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 $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit.

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