Bently Nevada, Inc.

ADDENDUM TEST REPORT TO 92362-12B

EI.mesh Repeater, 185350-01
EI.mesh wSIM, 185310-01

Tested To The Following Standards:

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

Report No.: 92362-12C

Date of issue: July 13, 2012

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:

Bently Nevada, Inc.
1631 Bently Parkway South
Minden, NV 89423

Representative: Dwayne Folden
Customer Reference Number: 1010054595

REPORT PREPARED BY:

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

Project Number: 92362

DATE OF EQUIPMENT RECEIPT: October 12, 2011
DATE(S) OF TESTING: October 12-September 29, 2011

Revision History

Original: Testing of the EI.mesh Repeater, 185350-01 & EI.mesh wSIM, 185310-01 to FCC Part 15 Subpart C Sections 15.207, 15.247 and RSS 210 Issue 8.
Addendum A: To correct the RF Power Output results.
Addendum B: To include a statement to the RF Power Output section concerning 15.31(e) requirements.
Addendum C: Spurious emissions (15.209) data sheets, Bandedge and PSD data sheets were replaced with corrected data sheets.

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.
5046 Sierra Pines Drive
Mariposa, CA 95338

Site Registration & Accreditation Information

Location	CB #	Japan	Canada	FCC
Mariposa A	US0103	R-563, C-578, T-1492 & G-87	3082A-2	90477

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C and RSS 210 Issue 8

Description	Test Procedure/Method	Results
AC Mains Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
Radiated Emissions	FCC Part 15 Subpart C Section 15.209/ ANSI C63.4 (2003)	Pass
RF Power Output	FCC Part 15 Subpart C Section 15.247(b)	Pass
-6dB Occupied Bandwidth	FCC Part 15 Subpart C Section 15.247	Pass
Bandedge	FCC Part 15 Subpart C 15.247(d)	Pass
Power Spectral Density	FCC Part 15 Subpart C 15.247(e)	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

EI.mesh Repeater
Manuf: Bently Nevada, Inc.
Model: 185350-01
Serial: 193ADO

EI.mesh wSIM
Manuf: Bently Nevada, Inc.
Model: 185310-01
Serial: 193AF2

Power Supply
Manuf: Phoenix Contact
Model: MINI-PS-100-240AC/5DC/3
Serial: 3039075599

PERIPHERAL DEVICES

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

Laptop Computer
Manuf: Dell
Model: E6400
Serial: T0066970

AC Power Supply
Manuf: TRACO
Model: TSP090-124
Serial: None

Energy Harvester
Manuf: Bently Nevada, Inc.
Model: 185545-02
Serial: MM006200

Essential Insight.mesh Gateway Manager microManager
Manuf: Bently Nevada, Inc.
Model: 185512-01
Serial: 10H00STU

Zone Zero Battery
Manuf: Bently Nevada, Inc.
Model: 185547-01
Serial: NA

Essential Insight.mesh Gateway Manager 19" Rack Mount
Manuf: Bently Nevada, Inc.
Model: 185510-01
Serial: NA

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. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer:	**Bently Nevada-GE**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**91948**	Date:	9/13/2011
Test Type:	**Conducted Emissions**	Time:	14:22:36
Equipment:	**EI.mesh wSIM**	Sequence#:	8
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185310-01		120V 60Hz
S/N:	193AF2		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	2/11/2010	2/11/2012
T2	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
T3	AN00374	50uH LISN-Black Lead Amplitude (dB)	8028-TS-50-BNC	5/16/2011	5/16/2013
	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
	AN00069	Quasi Peak Adapter	85650A	5/4/2011	5/4/2013
T4	ANMACOND	Cable		5/10/2011	5/10/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh wSIM*	Bently Nevada, Inc.	185310-01	193AF2
EI.mesh Repeater	Bently Nevada, Inc.	185350-01	193ADO
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Essential Insight.mesh Gateway Manager microManager	Bently Nevada, Inc.	185512-01	10H00STU
Laptop Computer`	Dell	E6400	T0066970
AC Power Supply	TRACO	TSP090-124	None

Test Conditions / Notes:

EI.mesh esh wSIM & EI.mesh Repeater Power Supply is connected to the Test LISN. wSIM is operating on the highest output frequency of 2405 MHz during the testing.

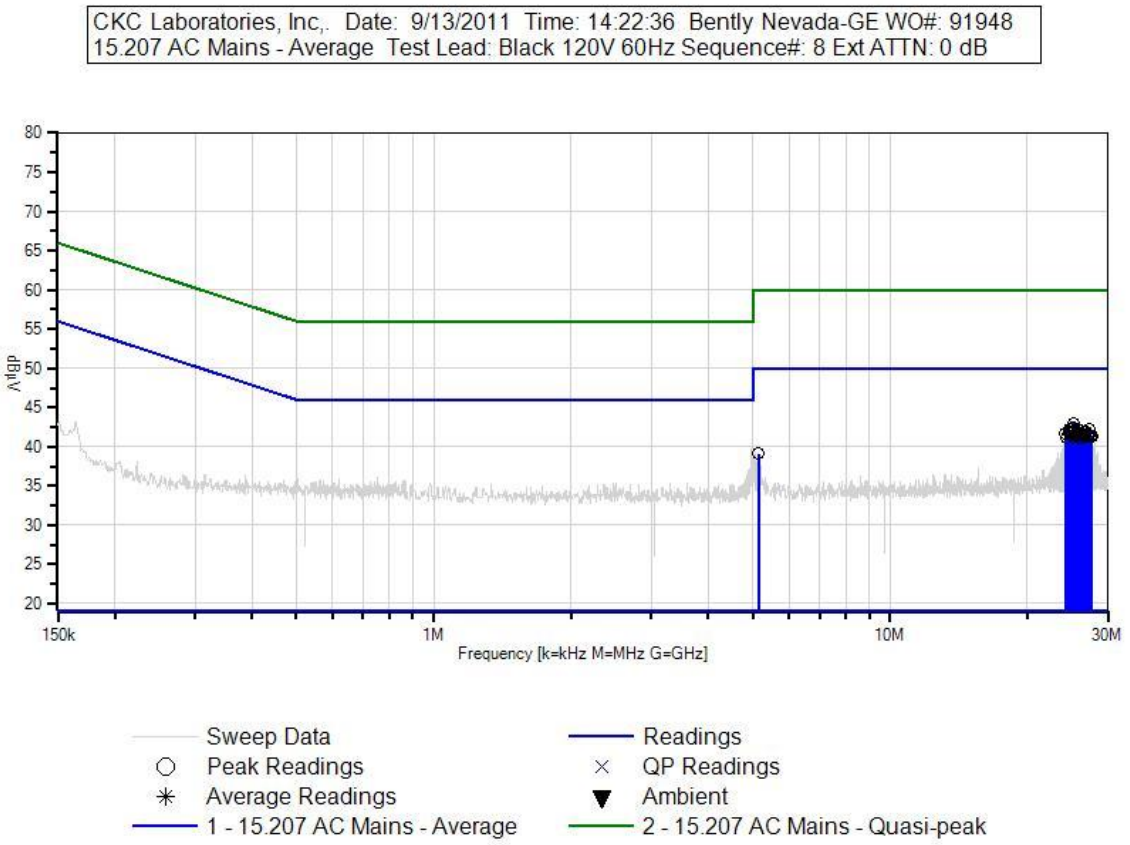
Frequencies of Interest: 0.15 - 30 MHz
EI.mesh wSIM & EI.mesh Repeater are set up on a wooden turntable.
Temp = 20.2°C
Relative Humidity = 40%
Press = 975 mBars

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	25.183M	30.9	+0.1	+10.1	+0.6	+1.3	+0.0	43.0	50.0	-7.0	Black
2	25.087M	30.4	+0.1	+10.1	+0.6	+1.3	+0.0	42.5	50.0	-7.5	Black
3	25.279M	30.3	+0.1	+10.1	+0.6	+1.3	+0.0	42.4	50.0	-7.6	Black
4	25.738M	30.2	+0.1	+10.1	+0.6	+1.3	+0.0	42.3	50.0	-7.7	Black
5	27.410M	30.1	+0.1	+10.1	+0.6	+1.4	+0.0	42.3	50.0	-7.7	Black
6	24.649M	30.1	+0.1	+10.1	+0.6	+1.3	+0.0	42.2	50.0	-7.8	Black
7	25.457M	29.9	+0.1	+10.1	+0.6	+1.3	+0.0	42.0	50.0	-8.0	Black
8	26.958M	29.7	+0.1	+10.1	+0.6	+1.4	+0.0	41.9	50.0	-8.1	Black
9	25.574M	29.7	+0.1	+10.1	+0.6	+1.3	+0.0	41.8	50.0	-8.2	Black
10	26.567M	29.7	+0.1	+10.1	+0.6	+1.3	+0.0	41.8	50.0	-8.2	Black
11	24.827M	29.7	+0.1	+10.1	+0.6	+1.3	+0.0	41.8	50.0	-8.2	Black
12	26.855M	29.6	+0.1	+10.1	+0.6	+1.4	+0.0	41.8	50.0	-8.2	Black
13	24.738M	29.6	+0.1	+10.1	+0.6	+1.3	+0.0	41.7	50.0	-8.3	Black
14	24.902M	29.6	+0.1	+10.1	+0.6	+1.3	+0.0	41.7	50.0	-8.3	Black
15	24.998M	29.6	+0.1	+10.1	+0.6	+1.3	+0.0	41.7	50.0	-8.3	Black

16	24.251M	29.6	+0.1	+10.1	+0.6	+1.3	+0.0	41.7	50.0	-8.3	Black
17	26.019M	29.5	+0.1	+10.1	+0.6	+1.3	+0.0	41.6	50.0	-8.4	Black
18	26.766M	29.4	+0.1	+10.1	+0.6	+1.3	+0.0	41.5	50.0	-8.5	Black
19	25.368M	29.4	+0.1	+10.1	+0.6	+1.3	+0.0	41.5	50.0	-8.5	Black
20	27.321M	29.3	+0.1	+10.1	+0.6	+1.4	+0.0	41.5	50.0	-8.5	Black
21	27.232M	29.3	+0.1	+10.1	+0.6	+1.4	+0.0	41.5	50.0	-8.5	Black
22	25.642M	29.3	+0.1	+10.1	+0.6	+1.3	+0.0	41.4	50.0	-8.6	Black
23	27.691M	29.1	+0.2	+10.1	+0.6	+1.4	+0.0	41.4	50.0	-8.6	Black
24	26.478M	29.2	+0.1	+10.1	+0.6	+1.3	+0.0	41.3	50.0	-8.7	Black
25	27.047M	29.1	+0.1	+10.1	+0.6	+1.4	+0.0	41.3	50.0	-8.7	Black
26	27.513M	29.0	+0.2	+10.1	+0.6	+1.4	+0.0	41.3	50.0	-8.7	Black
27	25.937M	29.1	+0.1	+10.1	+0.6	+1.3	+0.0	41.2	50.0	-8.8	Black
28	26.204M	29.1	+0.1	+10.1	+0.6	+1.3	+0.0	41.2	50.0	-8.8	Black
29	24.347M	29.0	+0.1	+10.1	+0.6	+1.3	+0.0	41.1	50.0	-8.9	Black
30	26.108M	29.0	+0.1	+10.1	+0.6	+1.3	+0.0	41.1	50.0	-8.9	Black
31	5.148M	28.1	+0.0	+10.1	+0.3	+0.6	+0.0	39.1	50.0	-10.9	Black



Note: Since the time of testing, it has come to CKC Laboratories attention; the above company name should read Bently Nevada, Inc., and not Bently Nevada-GE. The above plot screen capture was taken at the time of testing and cannot be changed.

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Bently Nevada, Inc.**
Specification: **15.207 AC Mains - Average**
Work Order #: **91948** Date: 9/13/2011
Test Type: **Conducted Emissions** Time: 1:54:34 PM
Equipment: **EI.mesh wSIM** Sequence#: 7
Manufacturer: Bently Nevada, Inc. Tested By: Chuck Kendall
Model: 185310-01 120V 60Hz
S/N: 193AF2

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
	AN00069	Quasi Peak Adapter	85650A	5/4/2011	5/4/2013
T2	ANMACOND	Cable		5/10/2011	5/10/2013
	AN01183	Spectrum Analyzer Display	85662A	5/4/2011	5/4/2013
	AN01184	Spectrum Analyzer	8568B	5/4/2011	5/4/2013
T3	AN02609	High Pass Filter	HE9615-150K-50-720B	2/11/2010	2/11/2012
T4	AN00374	50uH LISN-White Lead Amplitude (dB)	8028-TS-50-BNC	5/16/2011	5/16/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh wSIM*	Bently Nevada, Inc.	185310-01	193AF2
EI.mesh Repeater	Bently Nevada, Inc.	185350-01	193ADO
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Essential Insight.mesh Gateway Manager microManager	Bently Nevada, Inc.	185512-01	10H00STU
AC Power Supply	TRACO	TSP090-124	None
Laptop Computer`	Dell	E6400	T0066970

Test Conditions / Notes:

EI.mesh esh wSIM & EI.mesh Repeater Power Supply is connected to the Test LISN. Both units are operating on the highest output frequency of 2405 MHz during the testing.

Frequencies of Interest: 0.15 - 30 MHz

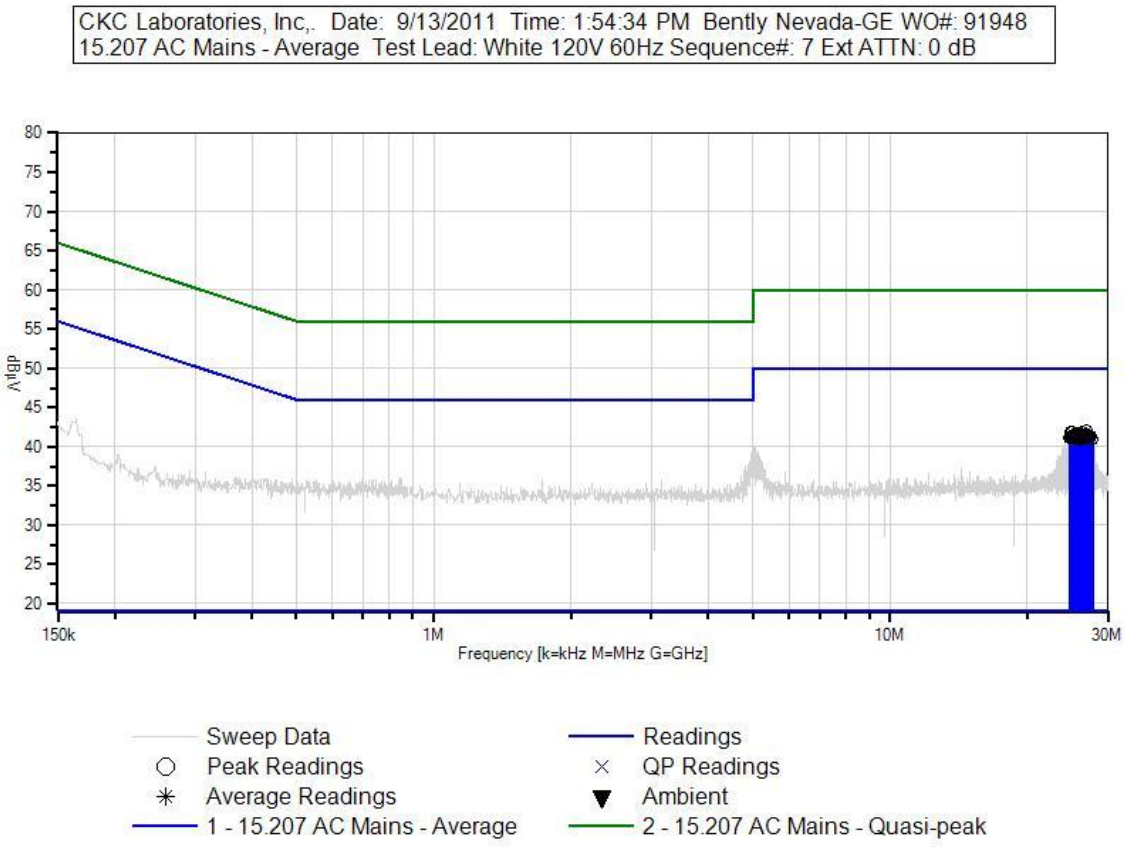
EI.mesh wSIM & EI.mesh Repeater are set up on a wooden turntable.
Temp = 20.2°C
Relative Humidity = 40%
Press = 975 mBars

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	26.951M	30.0	+10.1	+1.4	+0.1	+0.5	+0.0	42.1	50.0	-7.9	White
2	24.991M	29.9	+10.1	+1.3	+0.1	+0.5	+0.0	41.9	50.0	-8.1	White
3	24.902M	29.8	+10.1	+1.3	+0.1	+0.5	+0.0	41.8	50.0	-8.2	White
4	26.286M	29.8	+10.1	+1.3	+0.1	+0.5	+0.0	41.8	50.0	-8.2	White
5	25.635M	29.7	+10.1	+1.3	+0.1	+0.5	+0.0	41.7	50.0	-8.3	White
6	25.923M	29.7	+10.1	+1.3	+0.1	+0.5	+0.0	41.7	50.0	-8.3	White
7	25.272M	29.6	+10.1	+1.3	+0.1	+0.5	+0.0	41.6	50.0	-8.4	White
8	26.855M	29.4	+10.1	+1.4	+0.1	+0.5	+0.0	41.5	50.0	-8.5	White
9	25.553M	29.5	+10.1	+1.3	+0.1	+0.5	+0.0	41.5	50.0	-8.5	White
10	27.232M	29.4	+10.1	+1.4	+0.1	+0.5	+0.0	41.5	50.0	-8.5	White
11	27.136M	29.4	+10.1	+1.4	+0.1	+0.5	+0.0	41.5	50.0	-8.5	White
12	25.361M	29.4	+10.1	+1.3	+0.1	+0.5	+0.0	41.4	50.0	-8.6	White
13	27.321M	29.3	+10.1	+1.4	+0.1	+0.5	+0.0	41.4	50.0	-8.6	White
14	27.047M	29.2	+10.1	+1.4	+0.1	+0.5	+0.0	41.3	50.0	-8.7	White
15	26.971M	29.2	+10.1	+1.4	+0.1	+0.5	+0.0	41.3	50.0	-8.7	White
16	27.506M	29.1	+10.1	+1.4	+0.2	+0.5	+0.0	41.3	50.0	-8.7	White
17	26.012M	29.2	+10.1	+1.3	+0.1	+0.5	+0.0	41.2	50.0	-8.8	White
18	25.457M	29.2	+10.1	+1.3	+0.1	+0.5	+0.0	41.2	50.0	-8.8	White
19	25.094M	29.2	+10.1	+1.3	+0.1	+0.5	+0.0	41.2	50.0	-8.8	White
20	26.670M	29.2	+10.1	+1.3	+0.1	+0.5	+0.0	41.2	50.0	-8.8	White
21	26.567M	29.2	+10.1	+1.3	+0.1	+0.5	+0.0	41.2	50.0	-8.8	White
22	26.101M	29.2	+10.1	+1.3	+0.1	+0.5	+0.0	41.2	50.0	-8.8	White
23	24.813M	29.1	+10.1	+1.3	+0.1	+0.5	+0.0	41.1	50.0	-8.9	White
24	24.724M	29.1	+10.1	+1.3	+0.1	+0.5	+0.0	41.1	50.0	-8.9	White

25	25.183M	29.1	+10.1	+1.3	+0.1	+0.5	+0.0	41.1	50.0	-8.9	White
26	26.773M	29.1	+10.1	+1.3	+0.1	+0.5	+0.0	41.1	50.0	-8.9	White
27	26.478M	29.1	+10.1	+1.3	+0.1	+0.5	+0.0	41.1	50.0	-8.9	White
28	25.731M	29.0	+10.1	+1.3	+0.1	+0.5	+0.0	41.0	50.0	-9.0	White
29	26.204M	29.0	+10.1	+1.3	+0.1	+0.5	+0.0	41.0	50.0	-9.0	White
30	27.780M	28.7	+10.1	+1.4	+0.2	+0.5	+0.0	40.9	50.0	-9.1	White



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Test Setup Photos

15.209 Radiated Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc,. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Bently Nevada-GE**
Specification: **15.209 Radiated Emissions**
Work Order #: **91951** Date: 9/14/2011
Test Type: **Maximized Emissions** Time: 10:54:20
Equipment: **EI.mesh Repeater** Sequence#: 2
Manufacturer: Bently Nevada Tested By: Chuck Kendall
Model: 185350-01
S/N: 193ADO

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	11/3/2011	11/3/2013
T1	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T2	AN01992	Biconilog Antenna	CBL6111C	12/23/2010	12/23/2012
T3	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T4	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
	AN00226	Loop Antenna	6502	3/28/2012	3/28/2014
	ANMA10M	Cable		5/10/2011	5/10/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh Repeater*	Bently Nevada-GE	185350-01	193ADO
Power Supplly	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Zone Zero EPM	Bently Nevada-GE	185547-02	N/A
Energy Harvester	Bently Nevada-GE	185545-02	MM006200
Zone Zero Battery	Bently-Nevada-GE	185547-01	N/A
Zone Zero Battery	Bently-Nevada-GE	185547-01	N/A
Essential Insight.mesh Gateway Manager microManager	Bently Nevada-GE	185512-01	10H00STU

Test Conditions / Notes:

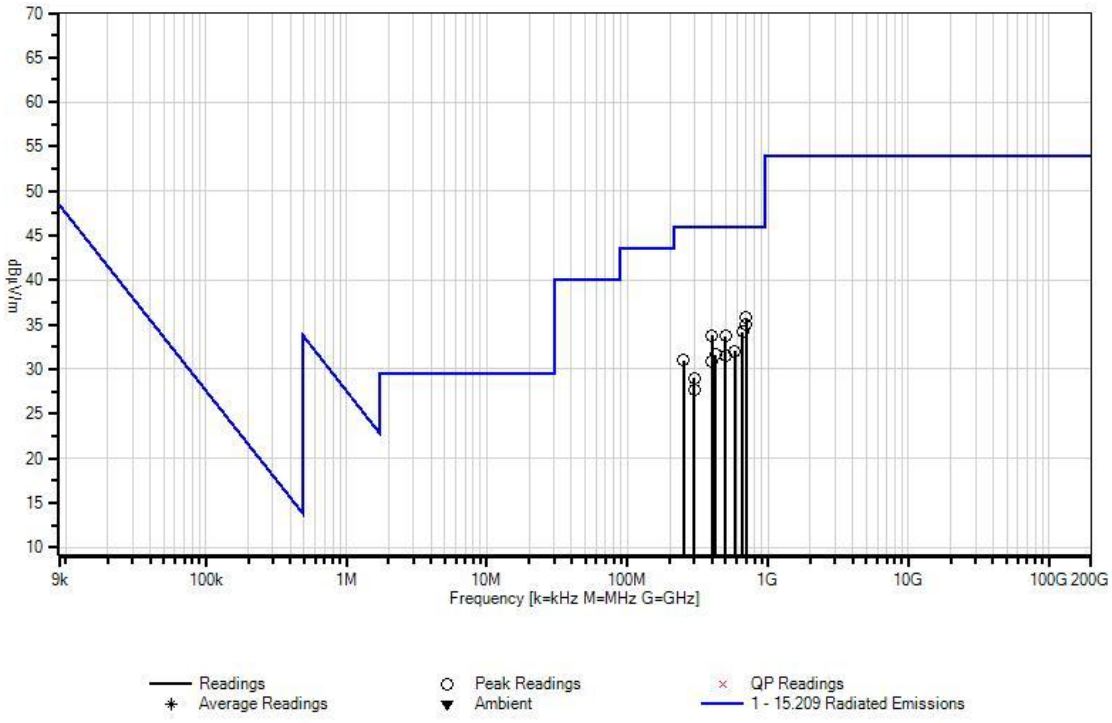
EI.mesh Repeater is set up on a wooden turntable on top of Styrofoam insulation. EI.mesh Repeater is on the table is communicating with the Gateway. Repeater is operating on the following frequencies: 2405 MHz. 2445 MHz, & 2480 MHz.
Frequencies of Interest: 9kHz to 1000 MHz
Measurements were made using CISPR bandwidths.
Temperature = 20.3°C
Relative Humidity = 40%
Pressure = 975 mBars

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	700.030M	43.3	+1.2	+20.6	-30.5	+1.2	+0.0	35.8	46.0	-10.2	Vert
2	700.220M	42.6	+1.2	+20.6	-30.5	+1.2	+0.0	35.1	46.0	-10.9	Horiz
3	660.060M	42.2	+1.2	+20.4	-30.7	+1.1	+0.0	34.2	46.0	-11.8	Horiz
4	399.900M	46.0	+1.1	+16.2	-30.4	+0.9	+0.0	33.8	46.0	-12.2	Horiz
5	500.050M	44.2	+1.0	+18.0	-30.5	+1.0	+0.0	33.7	46.0	-12.3	Vert
6	580.180M	41.1	+1.1	+19.6	-30.7	+1.0	+0.0	32.1	46.0	-13.9	Horiz
7	425.590M	43.5	+1.1	+16.7	-30.5	+0.9	+0.0	31.7	46.0	-14.3	Vert
8	499.860M	41.9	+1.0	+18.0	-30.5	+1.0	+0.0	31.4	46.0	-14.6	Horiz
9	249.970M	46.9	+0.8	+12.6	-30.0	+0.7	+0.0	31.0	46.0	-15.0	Vert
10	400.110M	43.1	+1.1	+16.3	-30.4	+0.9	+0.0	31.0	46.0	-15.0	Vert
11	299.660M	44.2	+0.9	+13.1	-29.9	+0.7	+0.0	29.0	46.0	-17.0	Vert
12	299.560M	42.8	+0.9	+13.1	-29.9	+0.7	+0.0	27.6	46.0	-18.4	Horiz

CKC Laboratories, Inc,. Date: 9/14/2011 Time: 10:54:20 Bently Nevada-GE WO#: 91951
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc,. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Bently Nevada-GE**
Specification: **15.209 Radiated Emissions**
Work Order #: **91951** Date: 9/14/2011
Test Type: **Maximized Emissions** Time: 10:54:20
Equipment: **EI.mesh wSIM** Sequence#: 2
Manufacturer: Bently Nevada-GE Tested By: Chuck Kendall
Model: 185310-01
S/N: 193AF2

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
	AN02660	Spectrum Analyzer	E4446A	11/3/2011	11/3/2013
T2	AN01992	Biconilog Antenna	CBL6111C	12/23/2010	12/23/2012
T3	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T4	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
	AN00226	Loop Antenna	6502	3/28/2012	3/28/2014
	ANP05686	Cable	RG214/U	1/24/2012	1/24/2014

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

Function	Manufacturer	Model #	S/N
EI.mesh wSIM*	Bently Nevada-GE	185310-01	193AF2
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Essential Insight.mesh Gateway Manager microManager	Bently Nevada-GE	185512-01	10H00STU
AC Power Supply	TRACO	TSP090-124	None

Test Conditions / Notes:

15.209 Radiated Emissions

EI.mesh wSIM is set up on a wooden turntable on top of Styrofoam insulation. EI.mesh wSIM on the table is communicating with the Gateway. wSIM is operating on the following frequencies: 2405 MHz. 2445 MHz, & 2480 MHz.

Frequencies of Interest: 9kHz to 1000 MHz

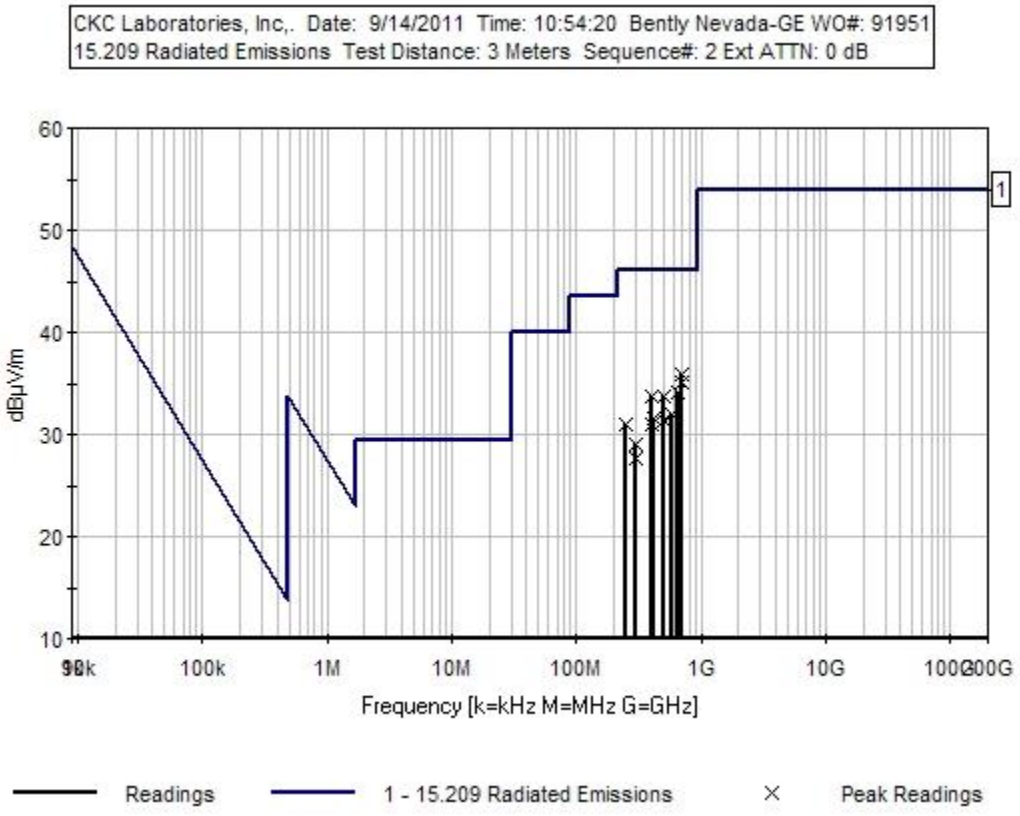
Measurements were made using CISPR bandwidths.

Temperature = 20.3°C
Relative Humidity = 40%
Pressure = 975 mBars

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	249.970M	46.9	+0.7	+12.6	-30.0	+0.8	+0.0	31.0	46.0	-15.0	Vert
2	299.560M	42.8	+0.7	+13.1	-29.9	+0.9	+0.0	27.6	46.0	-18.4	Horiz
3	299.660M	44.2	+0.7	+13.1	-29.9	+0.9	+0.0	29.0	46.0	-17.0	Vert
4	399.900M	46.0	+0.9	+16.2	-30.4	+1.1	+0.0	33.8	46.0	-12.2	Horiz
5	400.110M	43.1	+0.9	+16.3	-30.4	+1.1	+0.0	31.0	46.0	-15.0	Vert
6	425.590M	43.5	+0.9	+16.7	-30.5	+1.1	+0.0	31.7	46.0	-14.3	Vert
7	499.860M	41.9	+1.0	+18.0	-30.5	+1.0	+0.0	31.4	46.0	-14.6	Horiz
8	500.050M	44.2	+1.0	+18.0	-30.5	+1.0	+0.0	33.7	46.0	-12.3	Vert
9	580.180M	41.1	+1.0	+19.6	-30.7	+1.1	+0.0	32.1	46.0	-13.9	Horiz
10	660.060M	42.2	+1.1	+20.4	-30.7	+1.2	+0.0	34.2	46.0	-11.8	Horiz
11	700.030M	43.3	+1.2	+20.6	-30.5	+1.2	+0.0	35.8	46.0	-10.2	Vert
12	700.220M	42.6	+1.2	+20.6	-30.5	+1.2	+0.0	35.1	46.0	-10.9	Horiz


CKC Laboratories, Inc,. Date: 9/14/2011 Time: 10:54:20 Bently Nevada-GE WO#: 91951
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB
60
50
40
30
20
10
dBµV/m
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
1 - 15.209 Radiated Emissions
Peak Readings

Test Location: CKC Laboratories, Inc,. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Bently Nevada-GE**
Specification: **15.209 Radiated Emissions**
Work Order #: **91951** Date: 9/14/2011
Test Type: **Maximized Emissions** Time: 10:54:20
Equipment: **EI.mesh wSIM** Sequence#: 2
Manufacturer: Bently Nevada-GE Tested By: Chuck Kendall
Model: 185310-01
S/N: 193AF2

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
	AN02660	Spectrum Analyzer	E4446A	11/3/2011	11/3/2013
T2	AN01992	Biconilog Antenna	CBL6111C	12/23/2010	12/23/2012
T3	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T4	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
	AN00226	Loop Antenna	6502	3/28/2012	3/28/2014
	ANMA10M	Cable		5/10/2011	5/10/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh wSIM*	Bently Nevada-GE	185310-01	193AF2
Power Supplly	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Essential Insight.mesh Gateway Manager microManager	Bently Nevada-GE	185512-01	10H00STU
AC Power Supply	TRACO	TSP090-124	None

Test Conditions / Notes:

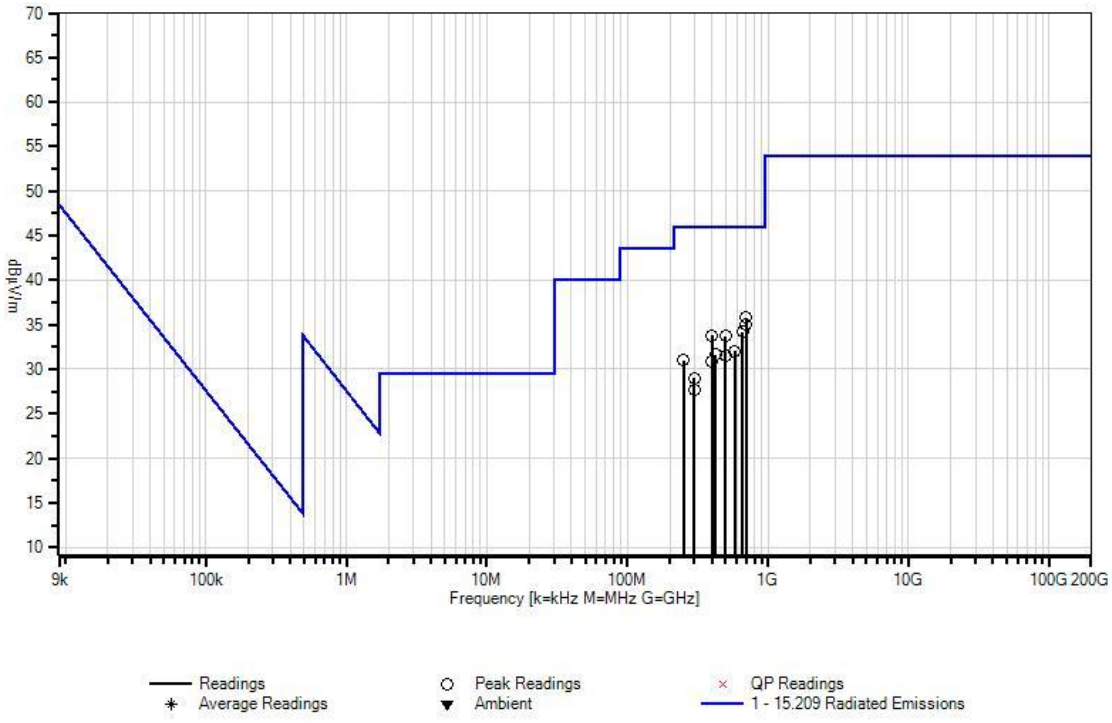
EI.mesh wSIM is set up on a wooden turntable on top of Styrofoam insulation. EI.mesh wSIM on the table is communicating with the Gateway. wSIM is operating on the following frequencies: 2405 MHz. 2445 MHz, & 2480 MHz.
Frequencies of Interest: 9kHz to 1000 MHz
Measurements were made using CISPR bandwidths.
Temperature = 20.3°C
Relative Humidity = 40%
Pressure = 975 mBars

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	700.030M	43.3	+1.2	+20.6	-30.5	+1.2	+0.0	35.8	46.0	-10.2	Vert
2	700.220M	42.6	+1.2	+20.6	-30.5	+1.2	+0.0	35.1	46.0	-10.9	Horiz
3	660.060M	42.2	+1.1	+20.4	-30.7	+1.2	+0.0	34.2	46.0	-11.8	Horiz
4	399.900M	46.0	+0.9	+16.2	-30.4	+1.1	+0.0	33.8	46.0	-12.2	Horiz
5	500.050M	44.2	+1.0	+18.0	-30.5	+1.0	+0.0	33.7	46.0	-12.3	Vert
6	580.180M	41.1	+1.0	+19.6	-30.7	+1.1	+0.0	32.1	46.0	-13.9	Horiz
7	425.590M	43.5	+0.9	+16.7	-30.5	+1.1	+0.0	31.7	46.0	-14.3	Vert
8	499.860M	41.9	+1.0	+18.0	-30.5	+1.0	+0.0	31.4	46.0	-14.6	Horiz
9	249.970M	46.9	+0.7	+12.6	-30.0	+0.8	+0.0	31.0	46.0	-15.0	Vert
10	400.110M	43.1	+0.9	+16.3	-30.4	+1.1	+0.0	31.0	46.0	-15.0	Vert
11	299.660M	44.2	+0.7	+13.1	-29.9	+0.9	+0.0	29.0	46.0	-17.0	Vert
12	299.560M	42.8	+0.7	+13.1	-29.9	+0.9	+0.0	27.6	46.0	-18.4	Horiz

CKC Laboratories, Inc,. Date: 9/14/2011 Time: 10:54:20 Bently Nevada-GE WO#: 91951
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc,. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Bently Nevada-GE**
Specification: **15.209 Radiated Emissions**
Work Order #: **91951** Date: 9/12/2011
Test Type: **Maximized Emissions** Time: 11:48:07
Equipment: **EI.mesh wSIM** Sequence#: 1
Manufacturer: Bently Nevada-GE Tested By: Chuck Kendall
Model: 185310-01
S/N: 193AF2

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
	AN02660	Spectrum Analyzer	E4446A	11/3/2011	11/3/2013
T2	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
	AN02694	Active Horn Antenna-ANSI C63.5 Antenna Factors (dB)	AMFW-5F-18002650-20-10P	11/10/2010	11/10/2012
T3	AN00327	Horn Antenna	3115	4/13/2012	4/13/2014
T4	AN03155	Preamp	83017A	8/3/2011	8/3/2013
T5	AN03012	Cable	32022-2-29094K-36TC	2/28/2012	2/28/2014

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

Function	Manufacturer	Model #	S/N
EI.mesh wSIM*	Bently Nevada-GE	185310-01	193AF2
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Micro Gateway Manager	Bently Nevada-GE	185550-01	10H00STU
AC Power Supply	TRACO	TSP090-124	None

Test Conditions / Notes:

15.209 Radiated Emissions

EI.mesh wSIM is set up on a wooden turntable on top of Styrofoam insulation. EI.mesh wSIM on the table is communicating with the Gateway. wSIM is operating on the following frequencies: 2405 MHz. 2445 MHz, & 2480 MHz.

Frequencies of Interest: 1-26 GHz,

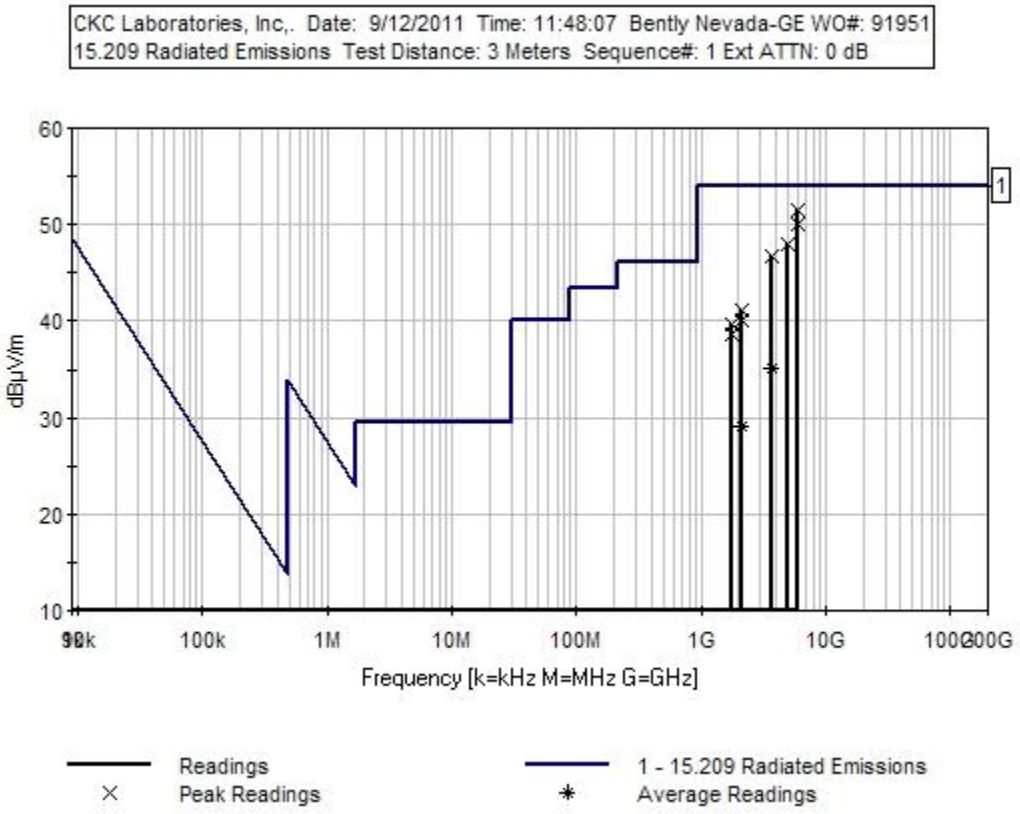
RBW = 1 MHz VBW = 1 MHz

Temp = 20.3°C
RH = 40%
Press = 975 mBars

Ext Attn: 0 dB

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	5939.512M	38.5	+3.4 +1.2	+4.5	+34.2	-30.3	+0.0	51.5	54.0	-2.5	Vert
2	5939.012M	37.1	+3.4 +1.2	+4.5	+34.2	-30.3	+0.0	50.1	54.0	-3.9	Horiz
3	4923.420M	37.8	+3.6 +1.1	+4.2	+31.5	-30.3	+0.0	47.9	54.0	-6.1	Horiz
4	4923.920M	37.8	+3.6 +1.1	+4.2	+31.5	-30.3	+0.0	47.9	54.0	-6.1	Vert
5	3769.721M	38.1	+2.7 +0.9	+3.8	+31.8	-30.6	+0.0	46.7	54.0	-7.3	Horiz
6	2092.265M	39.4	+2.4 +0.7	+2.4	+27.1	-30.8	+0.0	41.2	54.0	-12.8	Horiz
7	2096.506M	38.3	+2.4 +0.7	+2.4	+27.1	-30.8	+0.0	40.1	54.0	-13.9	Horiz
8	1800.100M	39.4	+2.6 +0.6	+2.3	+25.4	-30.7	+0.0	39.6	54.0	-14.4	Vert
9	1799.600M	38.4	+2.6 +0.6	+2.3	+25.4	-30.7	+0.0	38.6	54.0	-15.4	Horiz
10	3770.221M Ave	26.5	+2.7 +0.9	+3.8	+31.8	-30.6	+0.0	35.1	54.0	-18.9	Vert
^	3770.221M	41.4	+2.7 +0.9	+3.8	+31.8	-30.6	+0.0	50.0	54.0	-4.0	Vert
12	2097.006M Ave	27.2	+2.4 +0.7	+2.4	+27.1	-30.8	+0.0	29.0	54.0	-25.0	Vert
^	2097.006M	44.5	+2.4 +0.7	+2.4	+27.1	-30.8	+0.0	46.3	54.0	-7.7	Vert
14	2092.765M Ave	27.2	+2.4 +0.7	+2.4	+27.1	-30.8	+0.0	29.0	54.0	-25.0	Vert
^	2092.765M	44.8	+2.4 +0.7	+2.4	+27.1	-30.8	+0.0	46.6	54.0	-7.4	Vert


CKC Laboratories, Inc,. Date: 9/12/2011 Time: 11:48:07 Bently Nevada-GE WO#: 91951
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB
60
50
40
30
20
10
dBµV/m
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.209 Radiated Emissions
Average Readings

Test Setup Photos

REPEATER LOW FREQUENCY

REPEATER LOW FREQUENCY

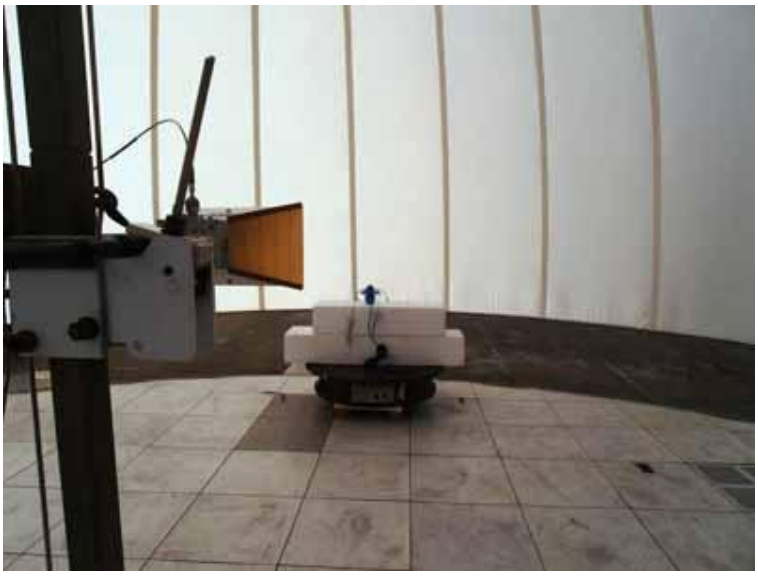
REPEATER HIGH FREQUENCY

REPEATER HIGH FREQUENCY

WSIM LOW FREQUENCY

WSIM LOW FREQUENCY

WSIM HIGH FREQUENCY



WSIM HIGH FREQUENCY

WSIM HIGH FREQUENCY

15.247(b) RF Power Output

Test Conditions / Setup

The EI.mesh Repeater is sitting on some Styrofoam pads atop a wooden turntable .8m from the ground plane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated. RBW = 3MHz; VBW= 3MHz with a span of 10 MHz. Signal is 100% modulated.

The EI.mesh wSIM is sitting on some Styrofoam pads atop a wooden turntable 1.5m from the ground plane. Attached are four I/O Cables and the unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated. RBW = 3 MHz; VBW= 3 MHz with a span of 10 MHz.

Antenna gain is 1.414dBi and formula used for calculations: P = (E*D)^2/30G

Voltage variations were made in accordance with 15.31(e) during testing; no changes in measured field strength observed.

Temp = 20.2°C
Relative Humidity =40%
Press = 976 mBars

Engineer Name: Chuck Kendall

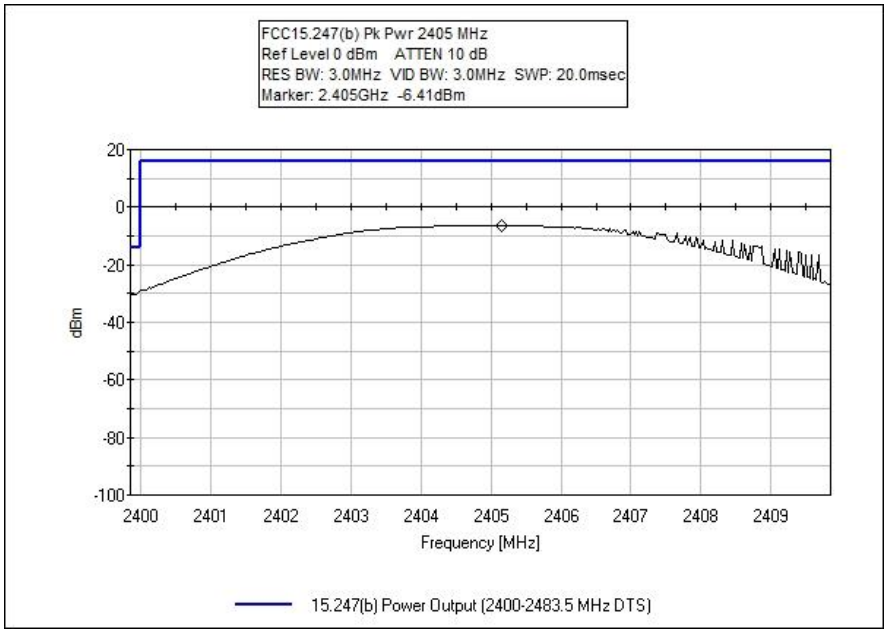
Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN02111	SA	8593EM	HP	3/7/2011	3/7/2013
AN03155	Preamp	83017A	HP	8/3/2011	8/3/2013
AN03008	Cable	32022-2-2909K-24TC	AstroLab	1/26/2010	1/26/2012
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012

Test Data for the Repeater

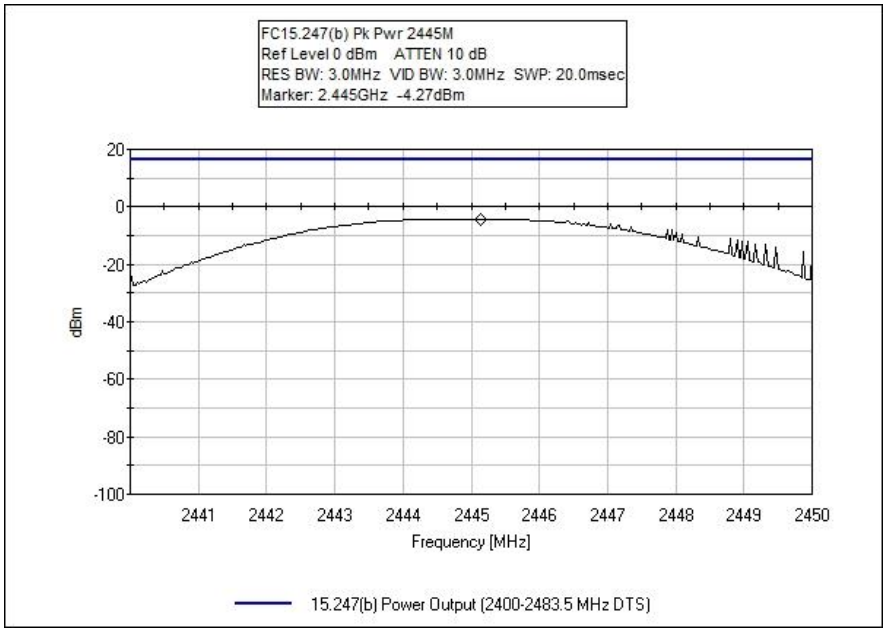
Frequency in MHz	Field Strength in dBµV/m	Power in mW	Limit	Pass or Fail
2405	104.9	6.6945	1 Watt	Pass
2445	106.6	9.9020	1 Watt	Pass
2480	105.9	8.4279	1 Watt	Pass

Test Data for the wSIM

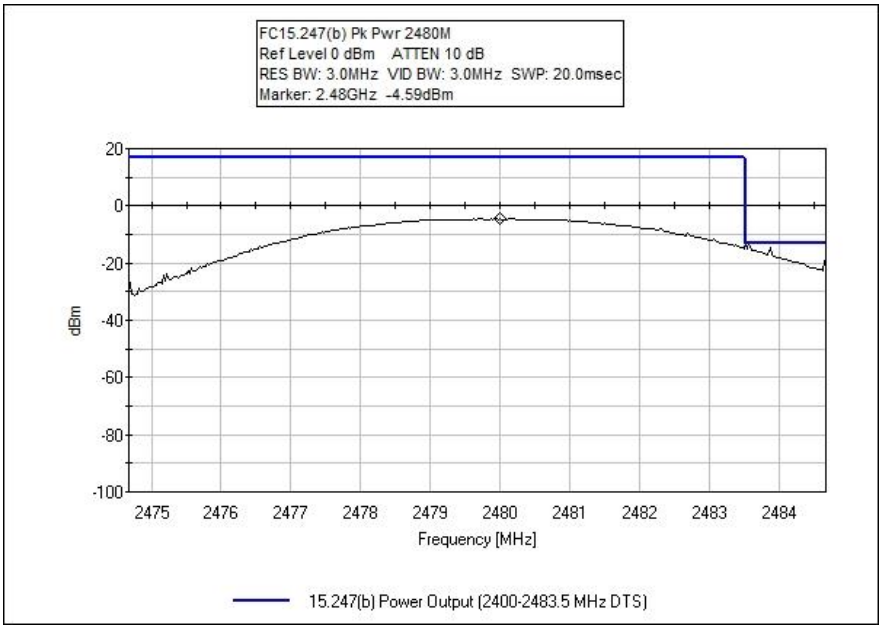
Frequency in MHz	Field Strength in dBµV/m	Power in mW	Limit	Pass or Fail
2405	106.1	8.8251	1 Watt	Pass
2445	104.1	5.5683	1 Watt	Pass
2480	105.2	7.1733	1 Watt	Pass



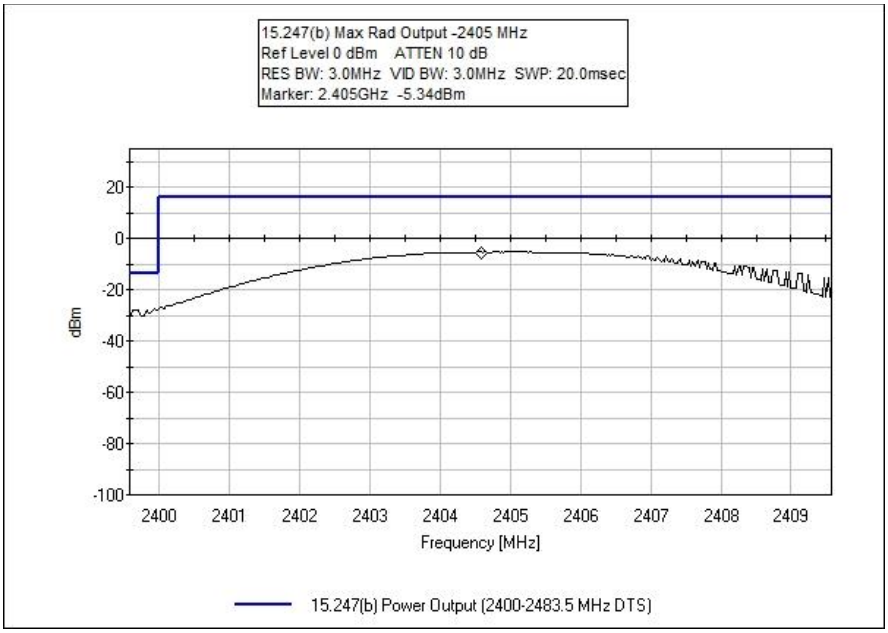
REPEATER



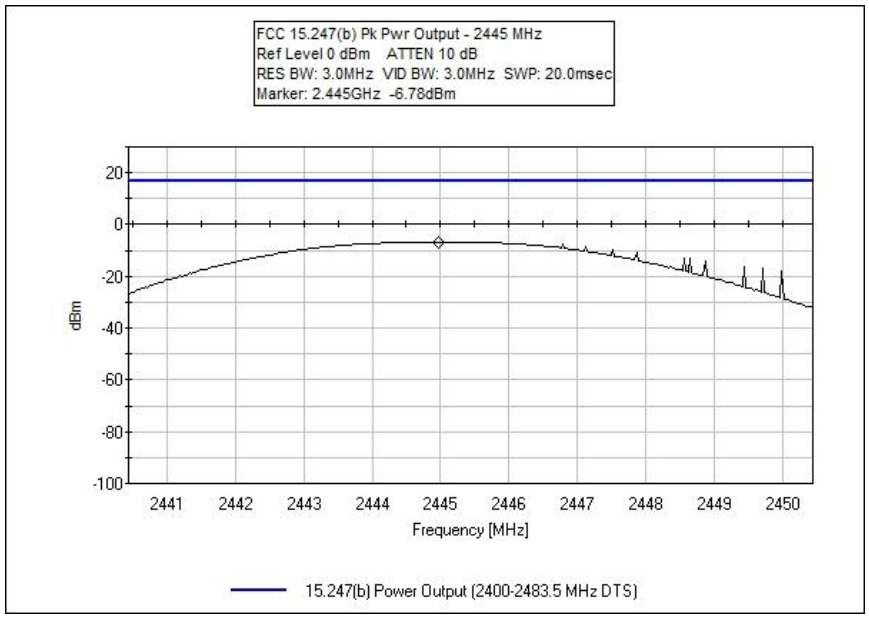
REPEATER



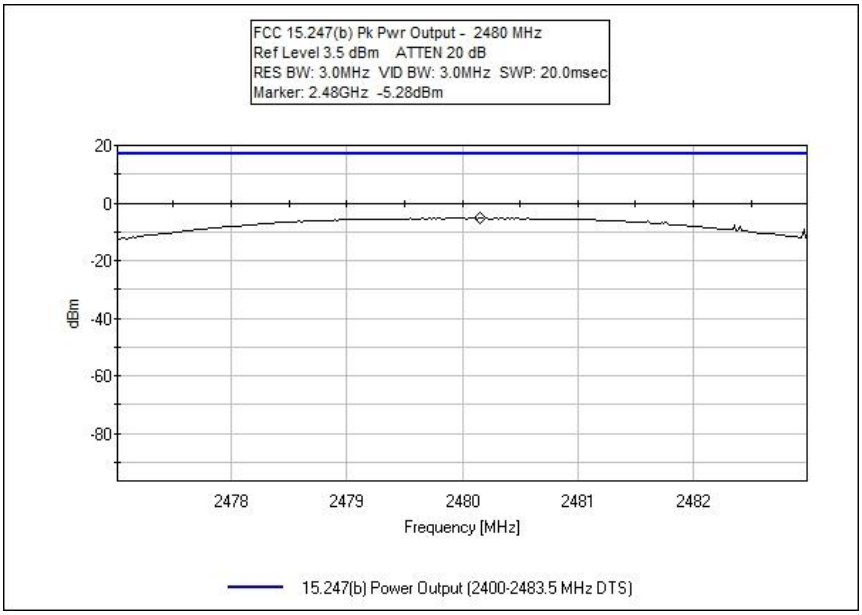
REPEATER



WSIM


FCC 15.247(b) Pk Pwr Output - 2445 MHz
Ref Level 0 dBm ATTEN 10 dB
RES BW: 3.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.445GHz -6.78dBm
dBm
20
0
-20
-40
-60
-80
-100
2441
2442
2443
2444
2445
2446
2447
2448
2449
2450
Frequency [MHz]
15.247(b) Power Output (2400-2483.5 MHz DTS)

WSIM

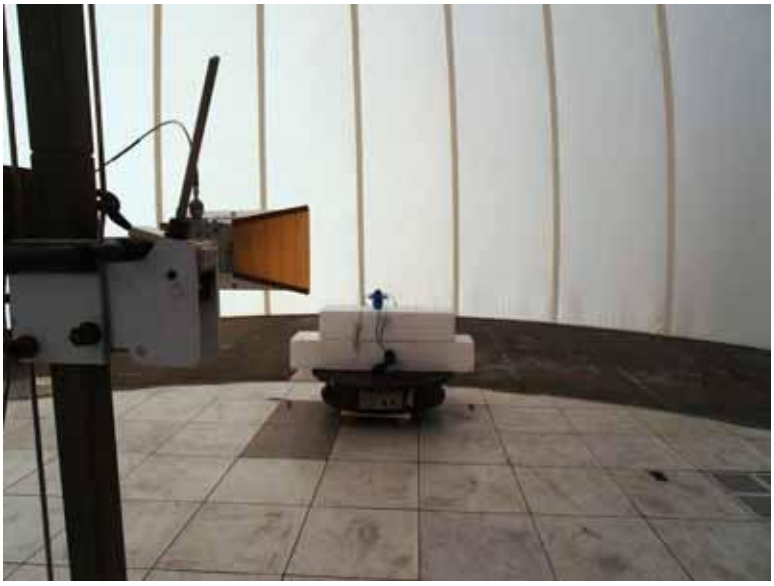

FCC 15.247(b) Pk Pwr Output - 2480 MHz
Ref Level 3.5 dBm ATTEN 20 dB
RES BW: 3.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.48GHz -5.28dBm
dBm
20
0
-20
-40
-60
-80
2478
2479
2480
2481
2482
Frequency [MHz]
15.247(b) Power Output (2400-2483.5 MHz DTS)

WSIM

Test Setup Photos

REPEATER

REPEATER



WSIM

WSIM

-6dB Occupied Bandwidth

Test Conditions / Setup

The EI.mesh Repeater is sitting on some Styrofoam pads atop a wooden turntable 1.0 m from the ground plane. Unit is operating either on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 100 kHz; VBW = 100 kHz with a span of up to 10 MHz.

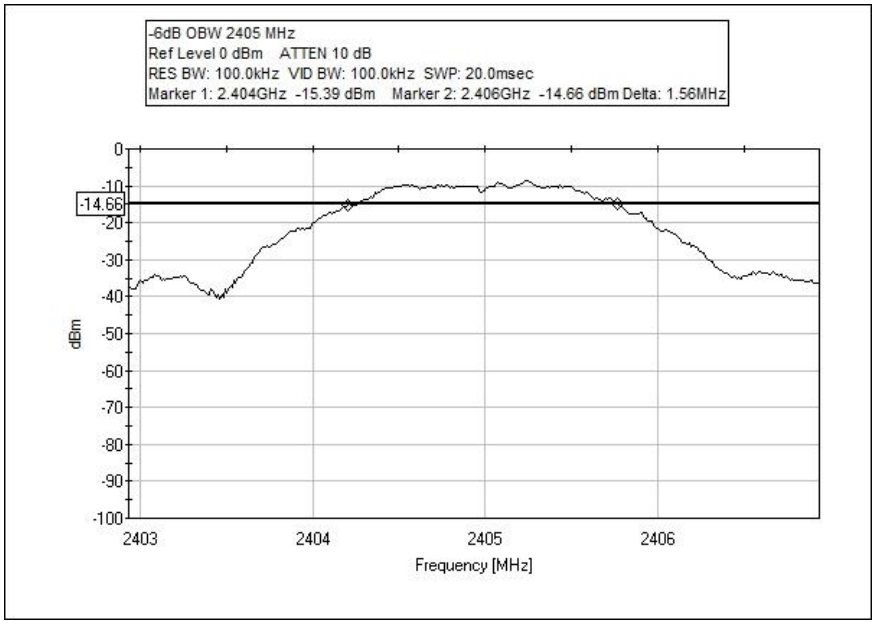
The EI.mesh wSIM is sitting on some Styrofoam pads atop a wooden turntable 1.0 m from the ground plane. Attached are four I/O Cables and the unit is operating either on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 100 kHz; VBW= 100 kHz with spans up to 10 MHz.

Temp = 20.2°C
Relative Humidity =40%
Press = 976 mBars

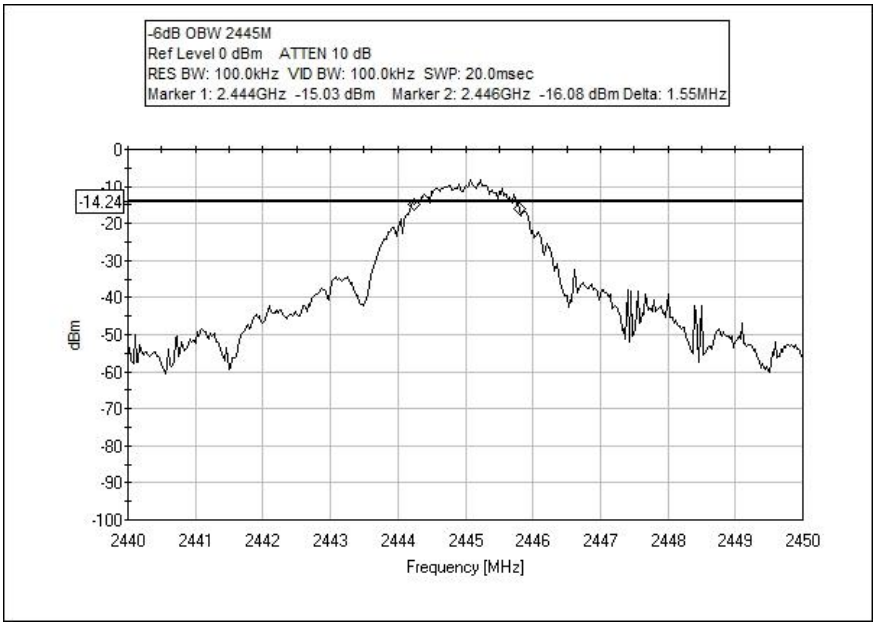
Engineer Name: Chuck Kendall

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN02111	Spectrum Analyzer	8593EM	HP	3/7/2011	3/7/2013
AN03155	Preamp	83017A	HP	8/3/2011	8/3/2013
AN03008	Cable	32022-2-2909K-24TC	AstroLab	1/26/2010	1/26/2012
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012

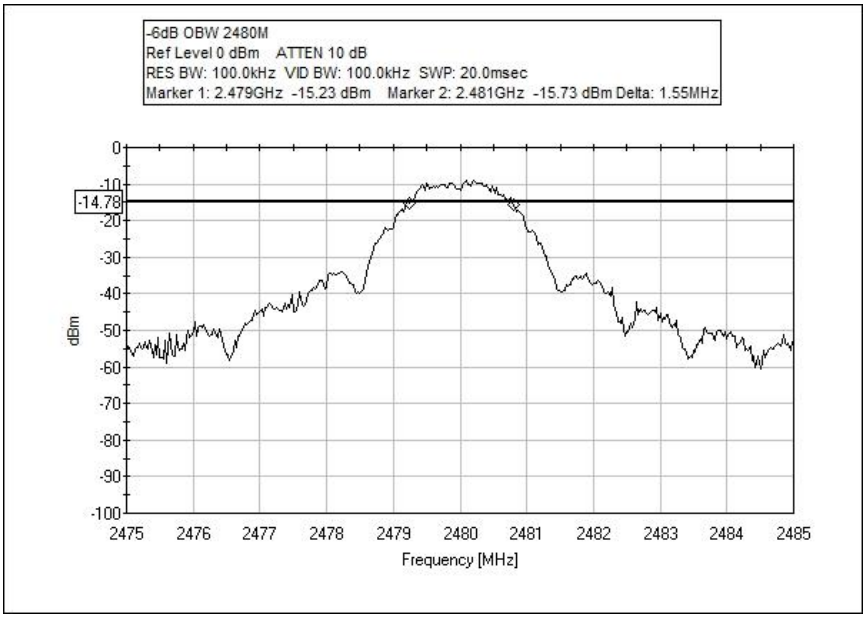
Test Plots



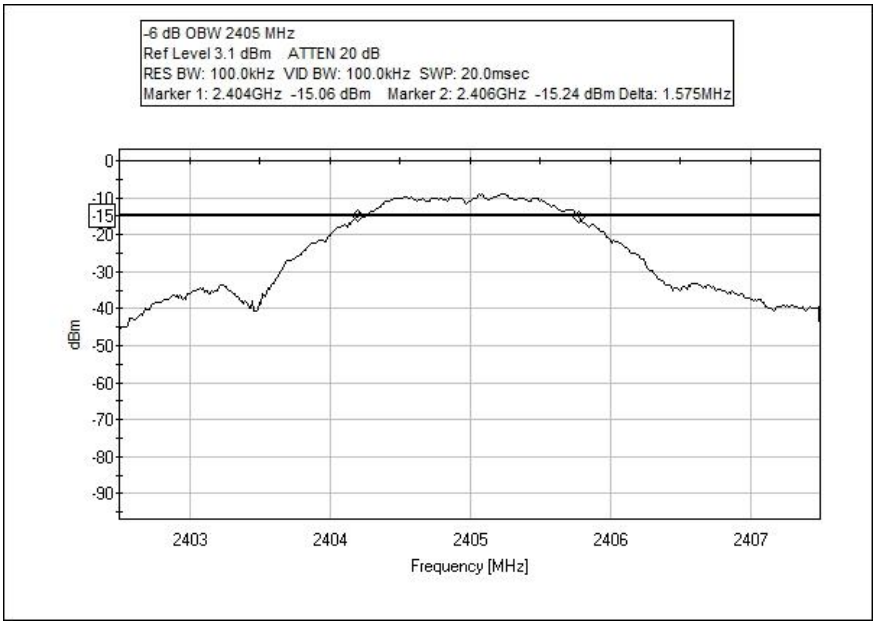
REPEATER



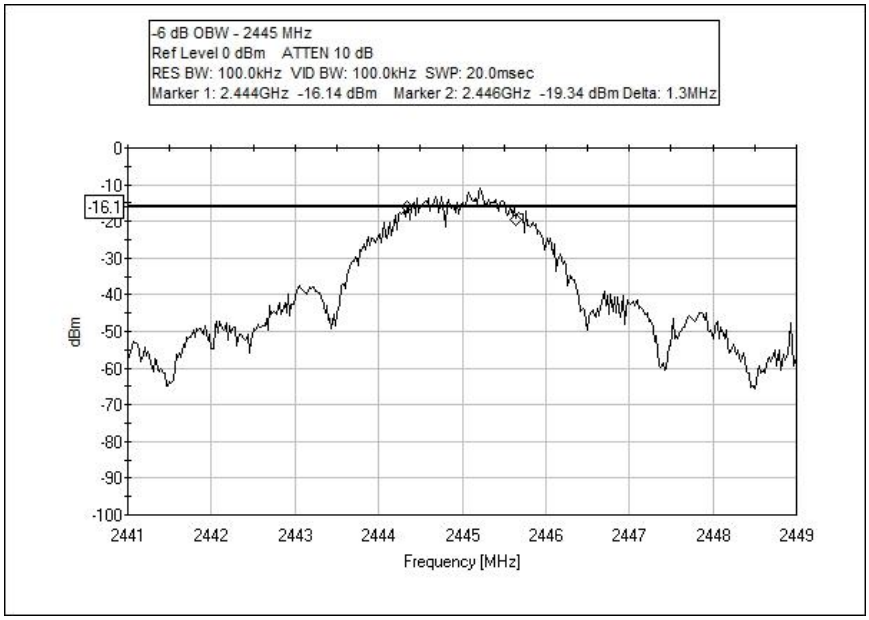
REPEATER



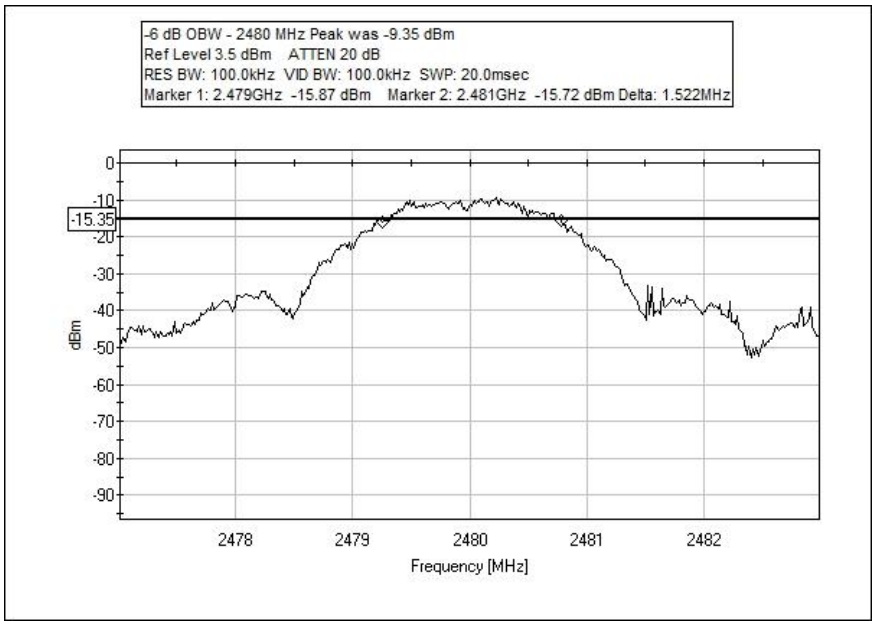
REPEATER



WSIM


-6 dB OBW - 2445 MHz
Ref Level 0 dBm ATTEN 10 dB
RES BW: 100.0kHz VID BW: 100.0kHz SWP: 20.0msec
Marker 1: 2.444GHz -16.14 dBm Marker 2: 2.446GHz -19.34 dBm Delta: 1.3MHz
0
-10
-16.1
-20
-30
-40
-50
-60
-70
-80
-90
-100
dBm
2441
2442
2443
2444
2445
2446
2447
2448
2449
Frequency [MHz]

WSIM

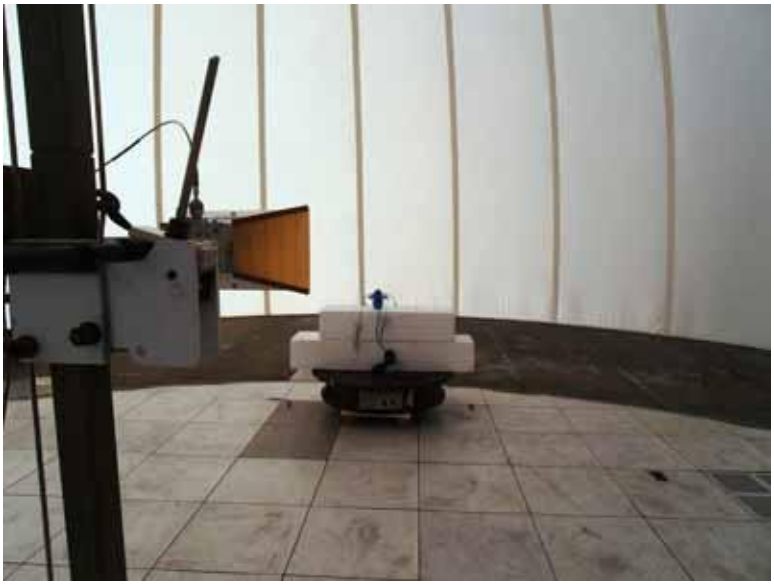

-6 dB OBW - 2480 MHz Peak was -9.35 dBm
Ref Level 3.5 dBm ATTEN 20 dB
RES BW: 100.0kHz VID BW: 100.0kHz SWP: 20.0msec
Marker 1: 2.479GHz -15.87 dBm Marker 2: 2.481GHz -15.72 dBm Delta: 1.522MHz
0
-10
-15.35
-20
-30
-40
-50
-60
-70
-80
-90
dBm
2478
2479
2480
2481
2482
Frequency [MHz]

WSIM

Test Setup Photos

REPEATER

REPEATER



WSIM

WSIM

15.247(d) Bandedge

Test Conditions / Setup - Repeater

EI.mesh Repeater is sitting on some Styrofoam pads atop a wooden turntable 0.8 m from the groundplane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
Duty cycle = 1
Bandwidths as stated in KDB 550874 and noted in the plots.

Band edge readings were taken both at 1 MHz Resolution Bandwidths with the Video Bandwidths set to at least 3 times that of the Resolution Bandwidth. After correcting for the Duty Cycle Correction Factor of -13.2 dB. The plots accompanying this datasheet show the number of times during the 100ms the transmitter was on and the other plot is showing a more detailed plot with more accuracy. This was performed at both the upper and the lower band edges. The DCCF appears to be 2.175 ms in the 100 ms image and since this is shown to be on five times during the 100 ms image of the DCCF, the Duty Cycle Correction Factor will be 20 log 21.75/100 ms or -13.2 dB. It appears to be compliant with the requirements of FCC 15.209 at the band edges.

Test Conditions / Setup – w/SIM

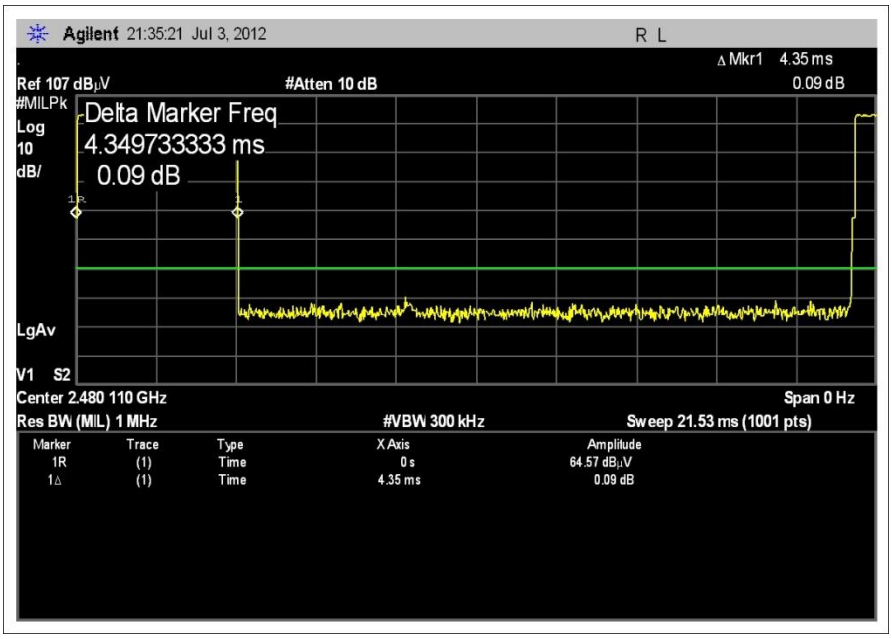
EI.mesh wSIM is sitting on some Styrofoam pads atop a wooden turntable 0.8 m from the groundplane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
Duty cycle = 1
CISPR bandwidths were used.
Plot was adjusted by adding the Duty Cycle Correction Factor to the reverse.
Band edge readings were taken both at 1MHz Resolution Bandwidths with the Video Bandwidths set to at least 3 times that of the Resolution Bandwidth. A Duty Cycle Correction Factor was applied. The plots accompanying this datasheet show the number of times during the 100ms the transmitter was on and the other plot is showing a more detailed plot with more accuracy. This was performed at both the upper and the lower band edges. The DCCF appears to be 21.75 ms in the <100 ms image and since this is shown to be on ten times during the 100 ms image of the DCCF, the Duty Cycle Correction Factor will be 20 log 21.75 /100 ms or -13.2 dB. It appears to be compliant with the requirements of FCC 15.209 at the band edges.

Environmental Conditions:
Temperature = 20.2°C
Relative Humidity = 40%
Press = 97.6 kPa

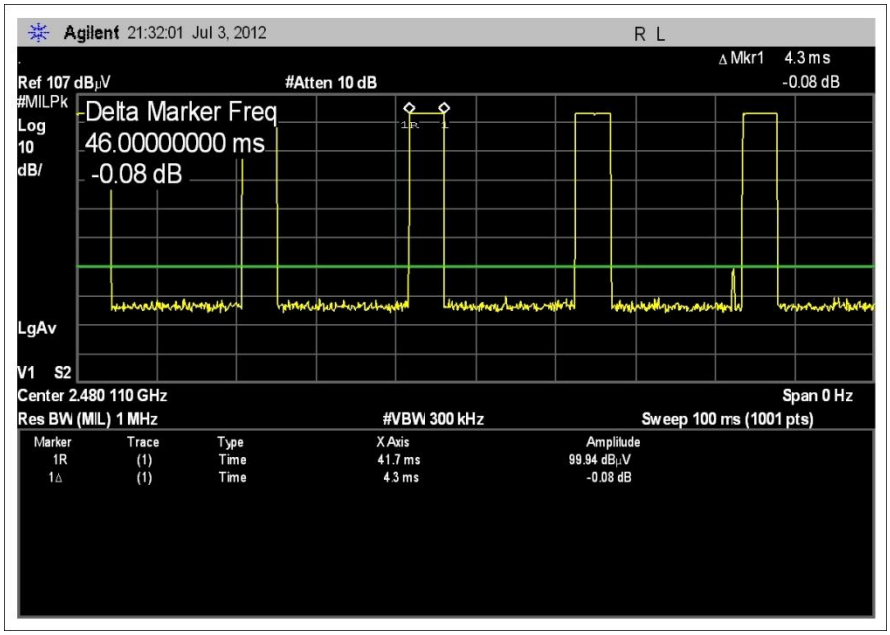
Engineer Name: Chuck Kendall

Test Equipment					
Asset	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN02660	Spectrum Analyzer	E4446A	Agilent	6/30/2010	6/30/2012
AN03155	Preamp	83017A	HP	8/3/2011	8/3/2013
AN03012	Cable	32022-2-29094K-36TC	AstroLab	1/26/2010	1/26/2012
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012
ANDCCF-Dust Repeater	Duty Cycle Correction Factor	NA	NA	7/7/2012	7/7/2014

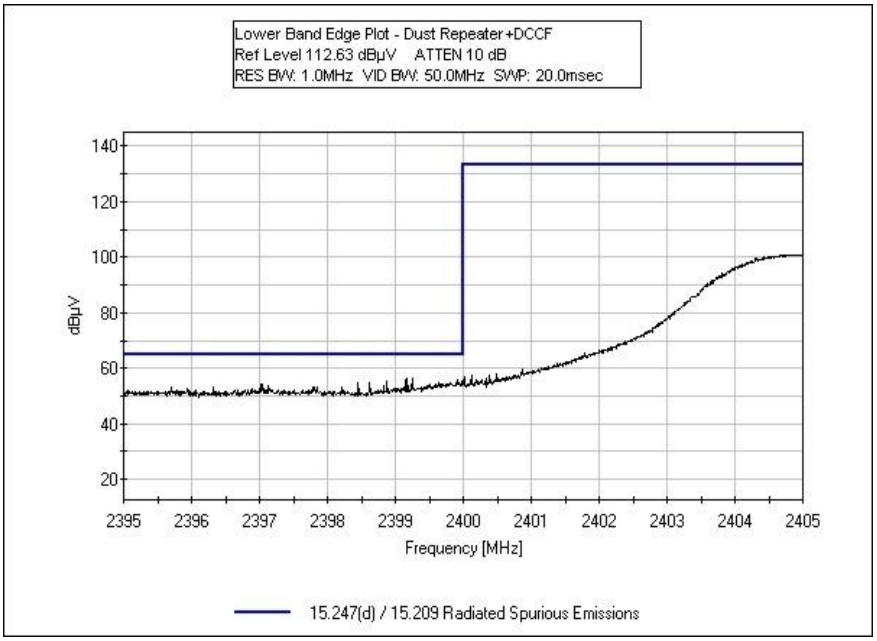
Test Data



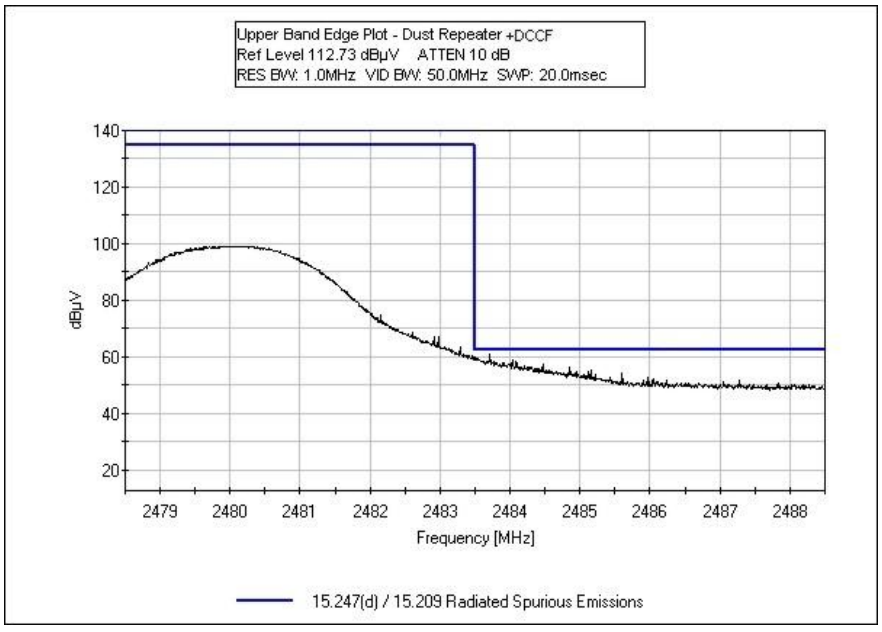
REPEATER



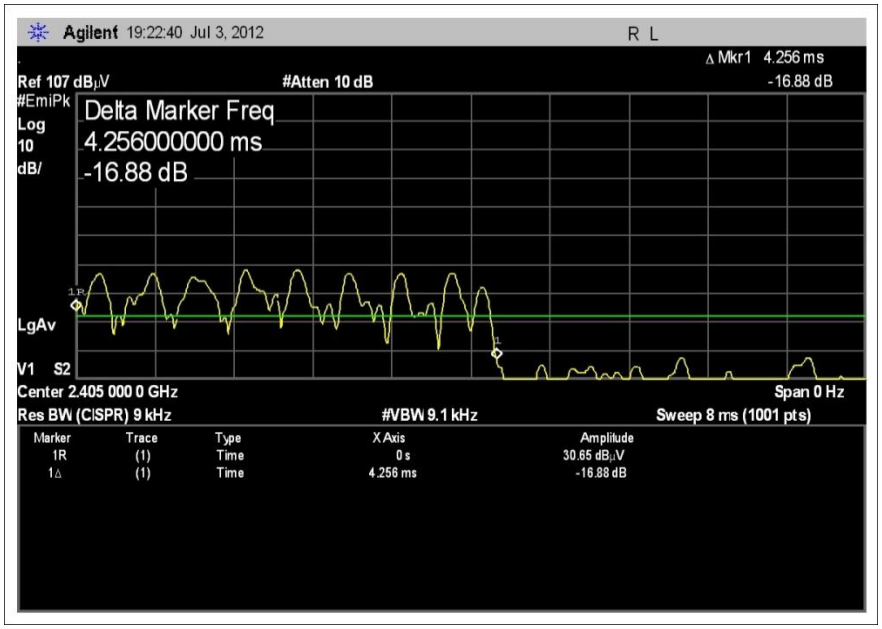
REPEATER



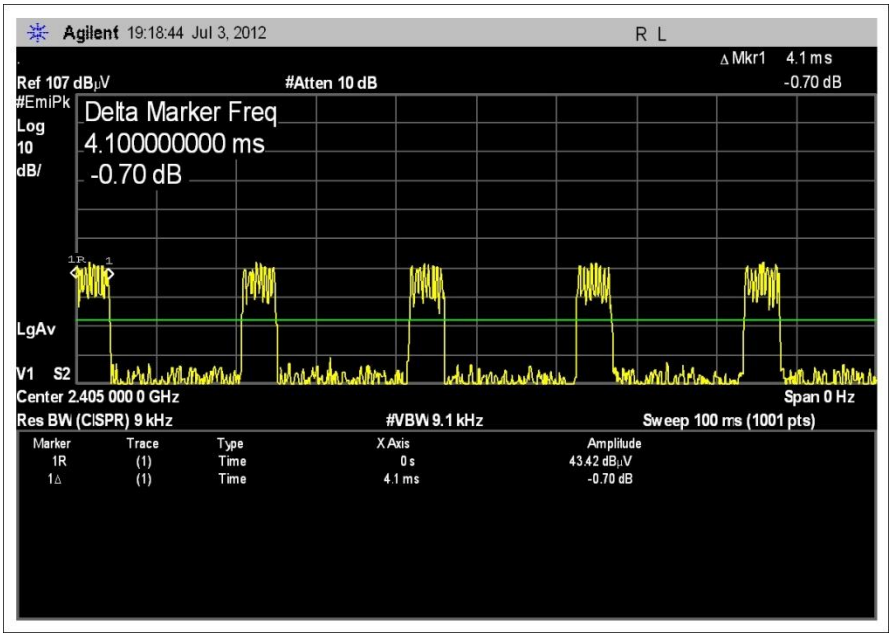
REPEATER



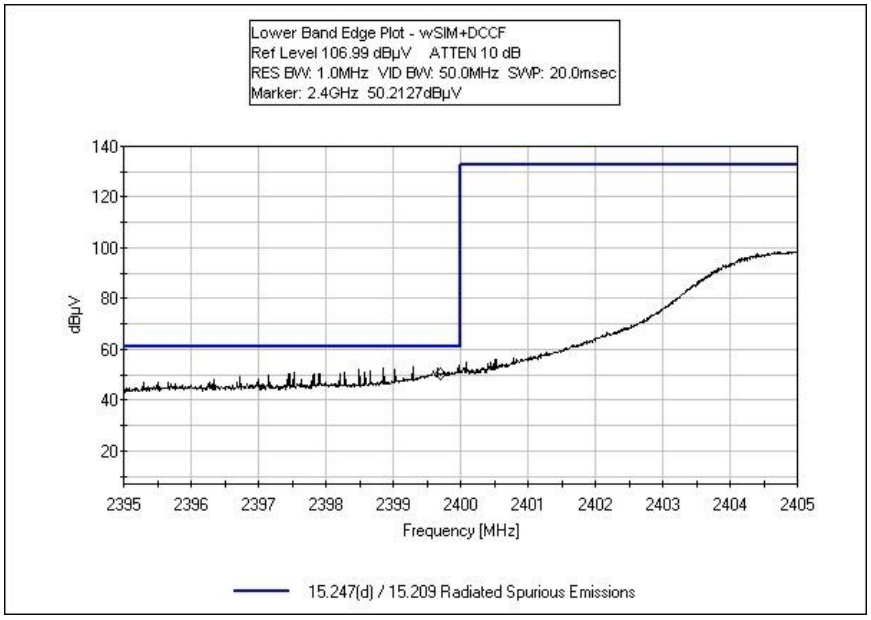
REPEATER


Agilent 19:22:40 Jul 3, 2012
R L
Δ Mkr1 4.256 ms
-16.88 dB
Ref 107 dBµV
#Atten 10 dB
#EmiPk
Log
10
dB/
Delta Marker Freq
4.256000000 ms
-16.88 dB
LgAv
V1 S2
Center 2.405 000 0 GHz
Span 0 Hz
Res BW (CISPR) 9 kHz
#VBW 9.1 kHz
Sweep 8 ms (1001 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 0 s 30.65 dBµV
1Δ (1) Time 4.256 ms -16.88 dB

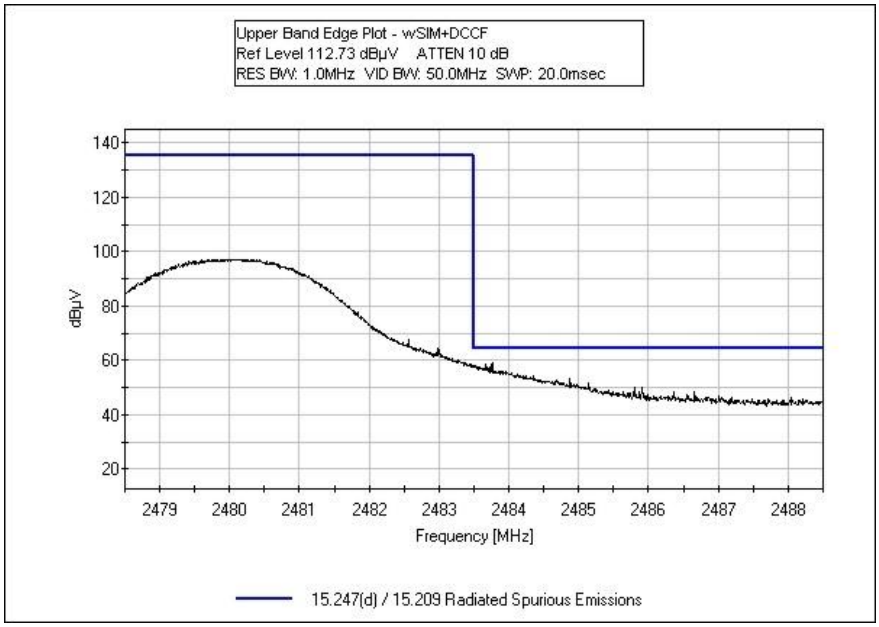
w/SIM


Agilent 19:18:44 Jul 3, 2012
R L
Δ Mkr1 4.1 ms
-0.70 dB
Ref 107 dBµV
#Atten 10 dB
#EmiPk
Log
10
dB/
Delta Marker Freq
4.100000000 ms
-0.70 dB
LgAv
V1 S2
Center 2.405 000 0 GHz
Span 0 Hz
Res BW (CISPR) 9 kHz
#VBW 9.1 kHz
Sweep 100 ms (1001 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 0 s 43.42 dBµV
1Δ (1) Time 4.1 ms -0.70 dB

w/SIM


Lower Band Edge Plot - wSIM+DCCF
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 50.0MHz SWP: 20.0msec
Marker: 2.4GHz 50.2127dBµV
140
120
100
80
60
40
20
dBµV
2395
2396
2397
2398
2399
2400
2401
2402
2403
2404
2405
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

w/SIM

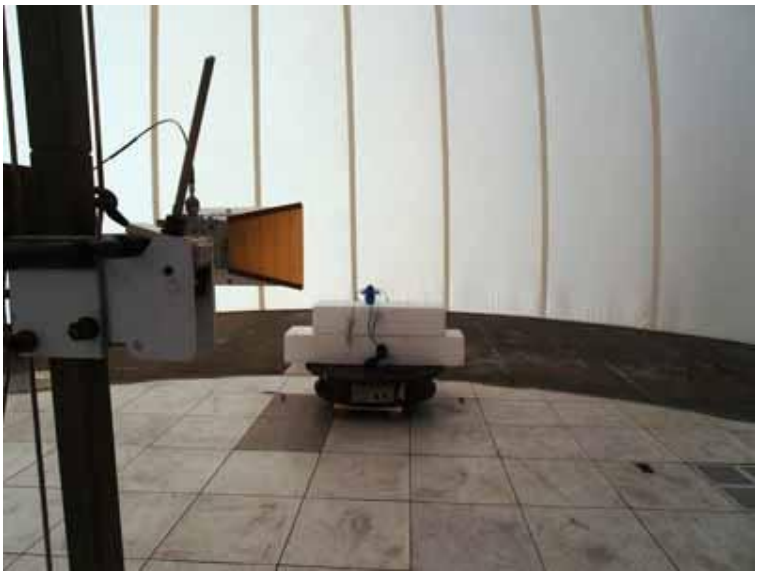

Upper Band Edge Plot - wSIM+DCCF
Ref Level 112.73 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 50.0MHz SWP: 20.0msec
140
120
100
80
60
40
20
dBµV
2479
2480
2481
2482
2483
2484
2485
2486
2487
2488
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

w/SIM

Test Setup Photos

REPEATER

REPEATER



WSIM

WSIM

15.247(e) Power Spectral Density

Test Conditions / Setup - Repeater

15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

Repeater is sitting on some Styrofoam pads atop a wooden turntable 80 cm from the groundplane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 100 kHz; VBW= 300 kHz

-15.2 dB correction used in accordance with KDB 558074.
EUT antenna gain is 1.414dBi
Calculations used:
E(dB) = dBµV/m/100kHz + PSD correction
P = (E*D)^2/30G

Test Results – Repeater

Frequency	Measured PSD Field Strength (dBuV/ @3m/3kHz)	Calculated PSD (dBm)	Limit	Pass or Fail
2405 MHz	82.9	-13.743	8 dBm	PASS
2445 MHz	87.7	- 8.943	8 dBm	PASS
2480 MHz	91.5	-5.143	8 dBm	PASS

Test Conditions / Setup – w/SIM

15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

EI.mesh wSIM is sitting on some Styrofoam pads atop a wooden turntable 80 cm from the groundplane. Attached are four I/O Cables and the unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
New Batteries installed.

RBW = 100 kHz; VBW= 300 kHz
-15.2 dB correction used in accordance with KDB 558074.
EUT antenna gain is 1.414dBi
Calculations used:
E(dB) = dBuV/m/100kHz + PSD correction
P = (E*D)^2/30G

Test Results –w/SIM

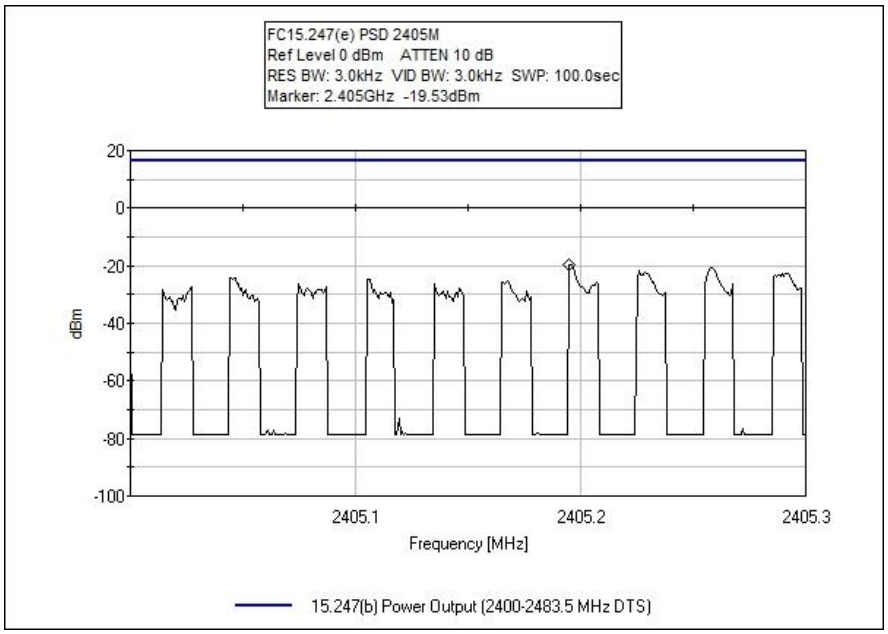
Frequency	Measured PSD Field Strength (dBuV/ @3m/3kHz)	Calculated PSD (dBm)	Limit	Pass or Fail
2405 MHz	76.6	-20.043	8 dBm	PASS
2445 MHz	75.9	-20.743	8 dBm	PASS
2480 MHz	83.3	-13.343	8 dBm	PASS

Environmental Conditions:
Temp = 20.2°C
Relative Humidity =40%
Press = 976 mBars

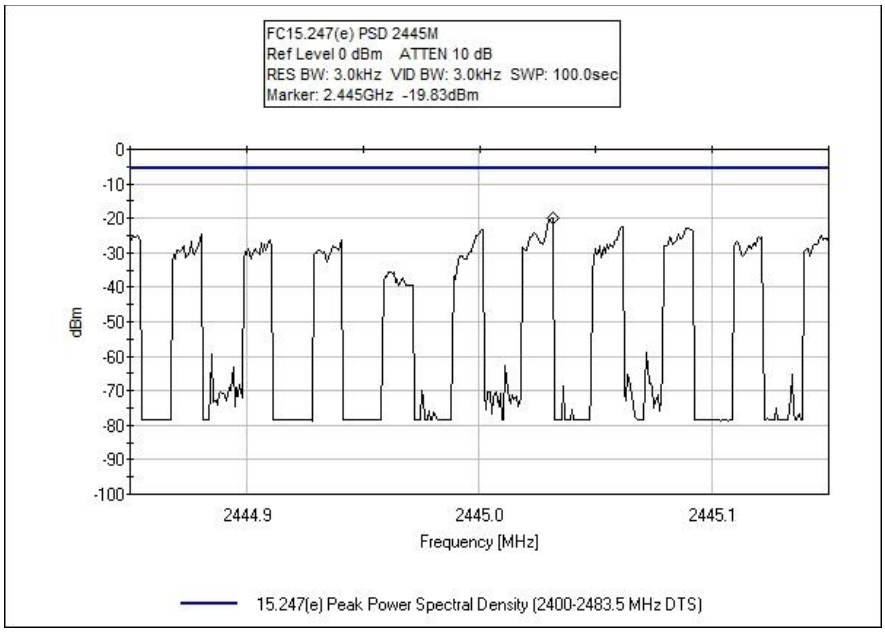
Engineer Name: Chuck Kendall

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012
AN02111	Spectrum Analyzer	8593EM	HP	3/7/2011	3/7/2013
AN03155	Preamp	83017A	HP	8/3/2011	8/3/2013
AN03008	Cable	32022-2-2909K-24TC	AstroLab	1/26/2010	1/26/2012
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
ANP01403	Cable	58758-23	EMCO	6/22/2011	6/22/2013

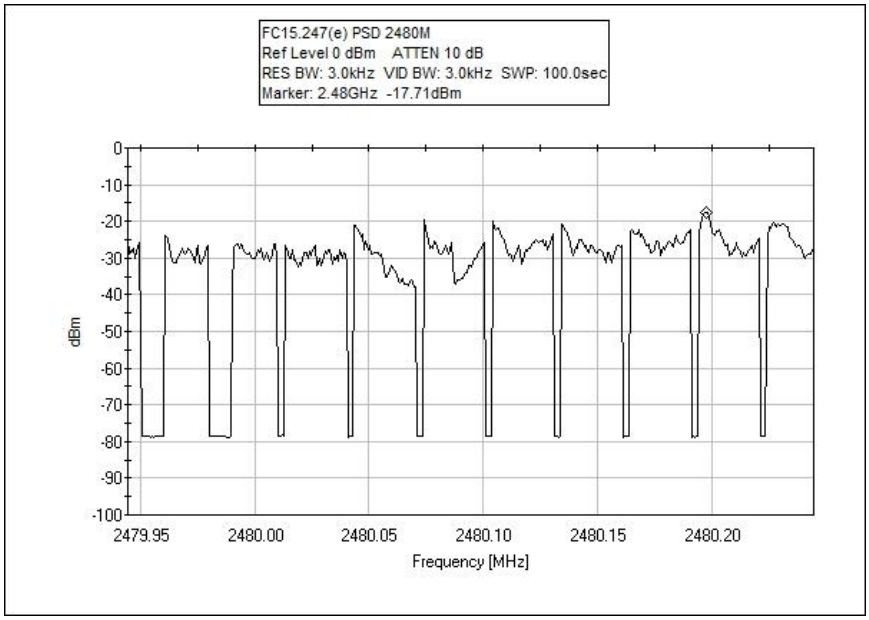
Test Data



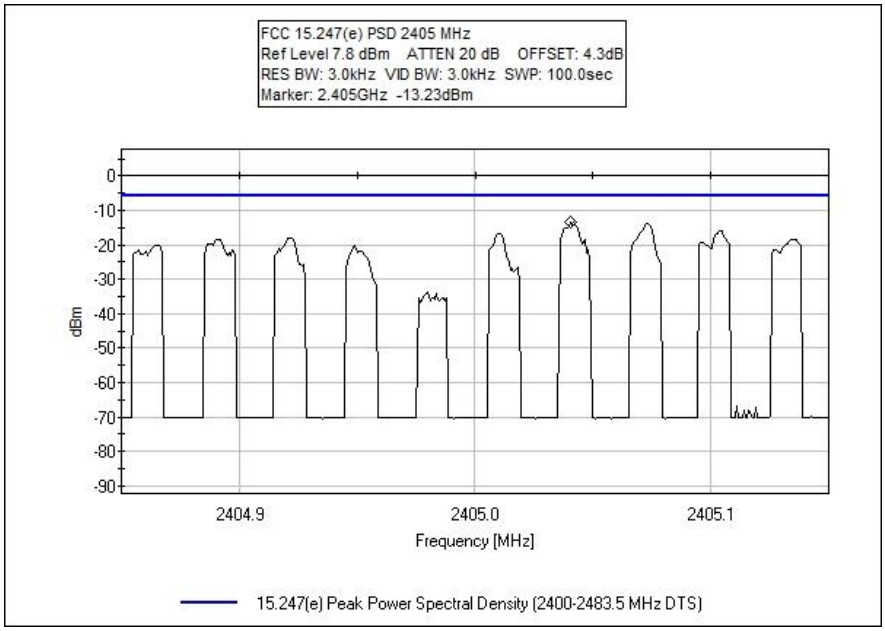
REPEATER



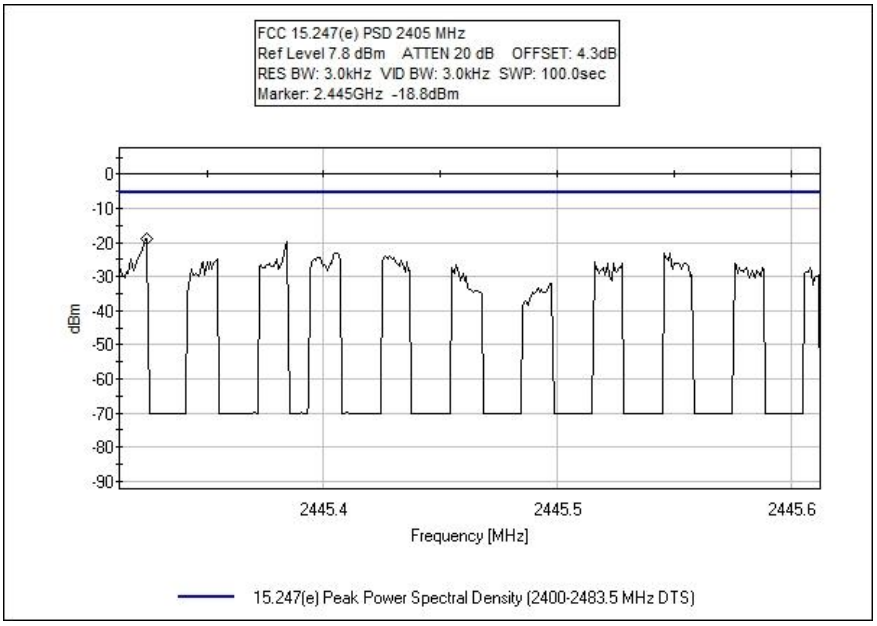
REPEATER



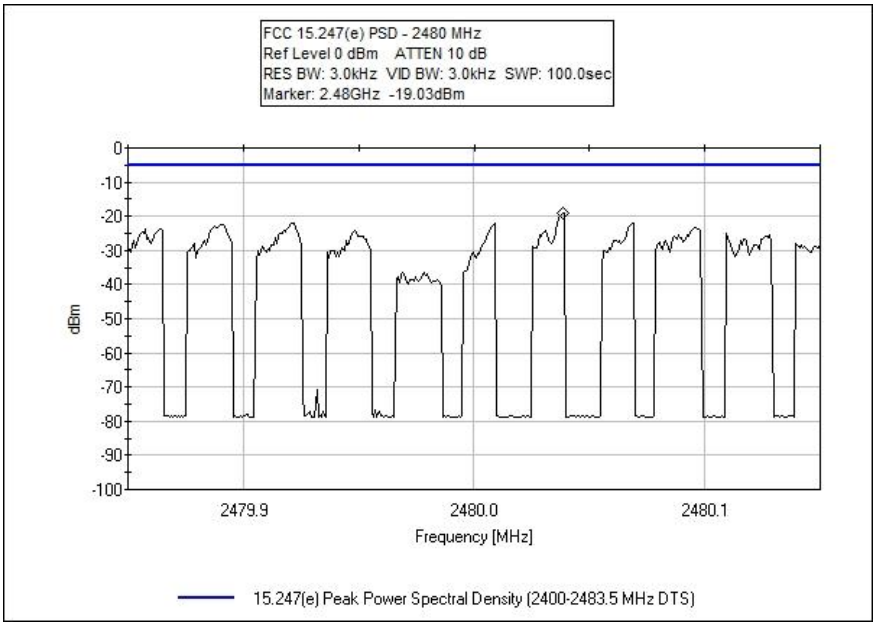
REPEATER



WSIM


FCC 15.247(e) PSD 2405 MHz
Ref Level 7.8 dBm ATTEN 20 dB OFFSET: 4.3dB
RES BW: 3.0kHz VID BW: 3.0kHz SWP: 100.0sec
Marker: 2.445GHz -18.8dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
dBm
2445.4
2445.5
2445.6
Frequency [MHz]
15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

WSIM

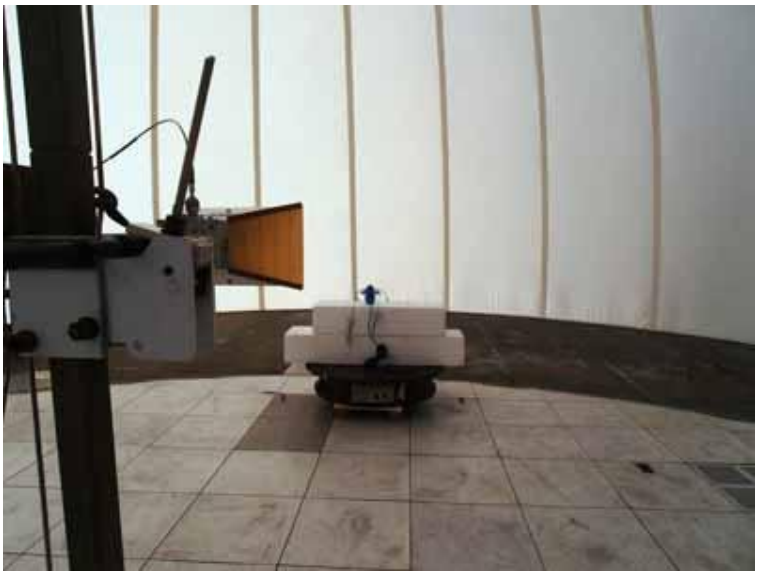

FCC 15.247(e) PSD - 2480 MHz
Ref Level 0 dBm ATTEN 10 dB
RES BW: 3.0kHz VID BW: 3.0kHz SWP: 100.0sec
Marker: 2.48GHz -19.03dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
dBm
2479.9
2480.0
2480.1
Frequency [MHz]
15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

WSIM

Test Setup Photos

REPEATER

REPEATER



WSIM

WSIM

RSS-210

99 % Bandwidth

Test Conditions / Setup

The EI.mesh Repeater is sitting on some Styrofoam pads atop a wooden turntable 1.0 m from the ground plane. Unit is operating either on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 100 kHz; VBW = 100 kHz with a span of up to 10 MHz.

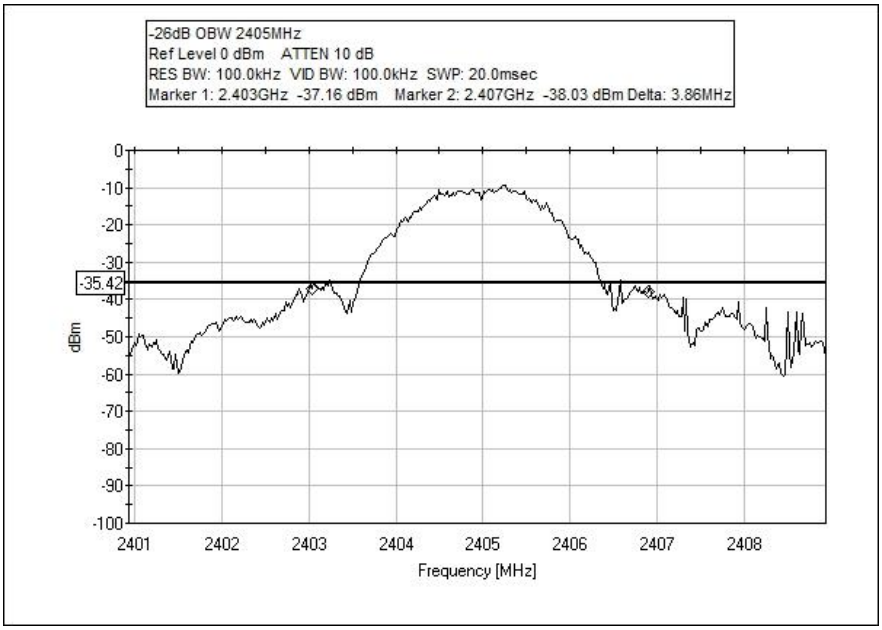
The EI.mesh wSIM is sitting on some Styrofoam pads atop a wooden turntable 1.0 m from the ground plane. Attached are four I/O Cables and the unit is operating either on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 100 kHz; VBW= 100 kHz with spans up to 10 MHz.

Temp = 20.2°C
Relative Humidity =40%
Press = 976 mBars

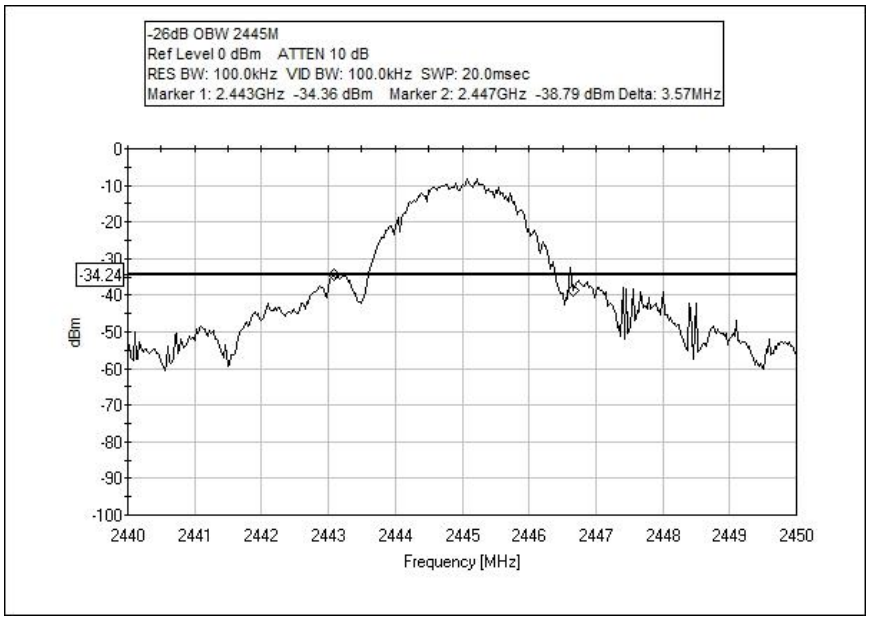
Engineer Name: Chuck Kendall

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN02111	Spectrum Analyzer	8593EM	HP	3/7/2011	3/7/2013
AN03155	Preamp	83017A	HP	8/3/2011	8/3/2013
AN03008	Cable	32022-2-2909K-24TC	AstroLab	1/26/2010	1/26/2012
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012

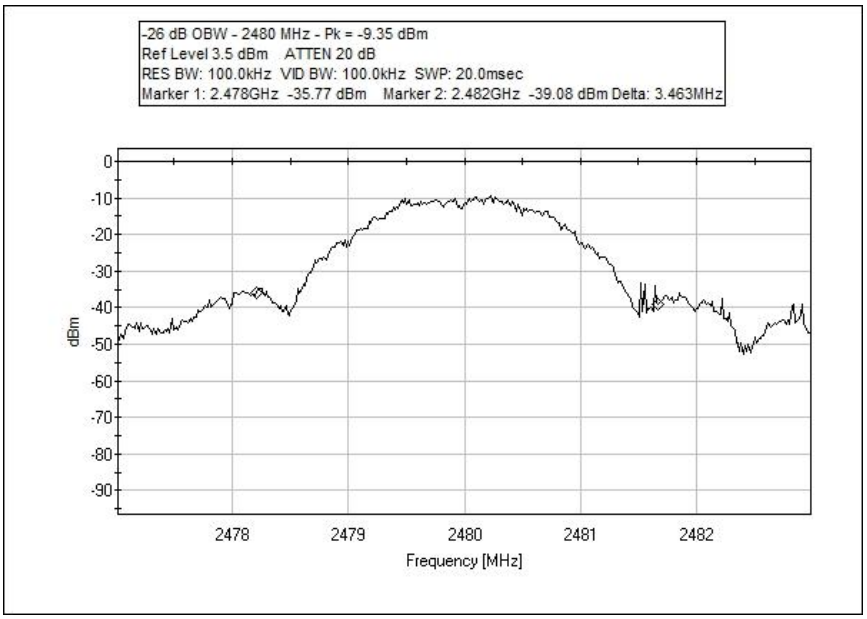
Test Data



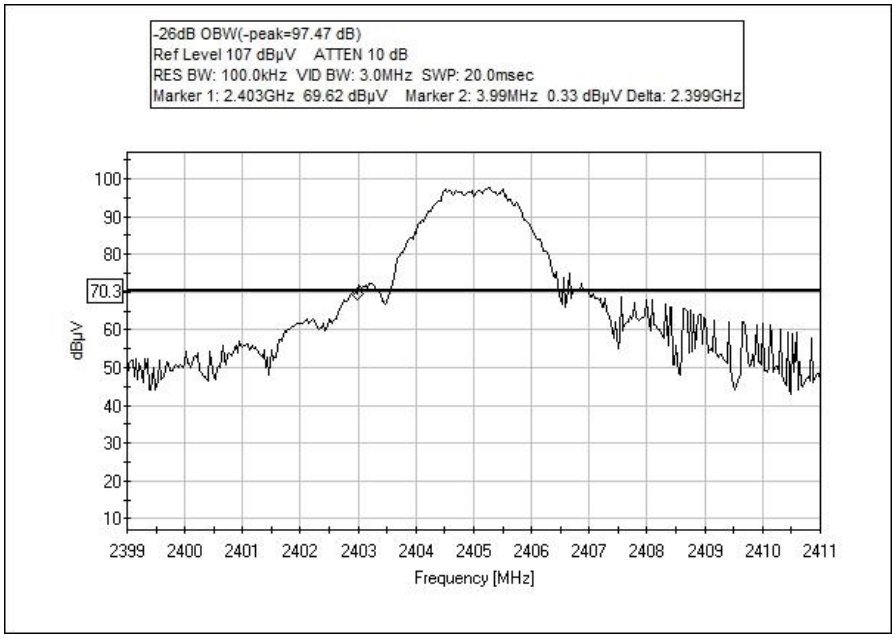
REPEATER



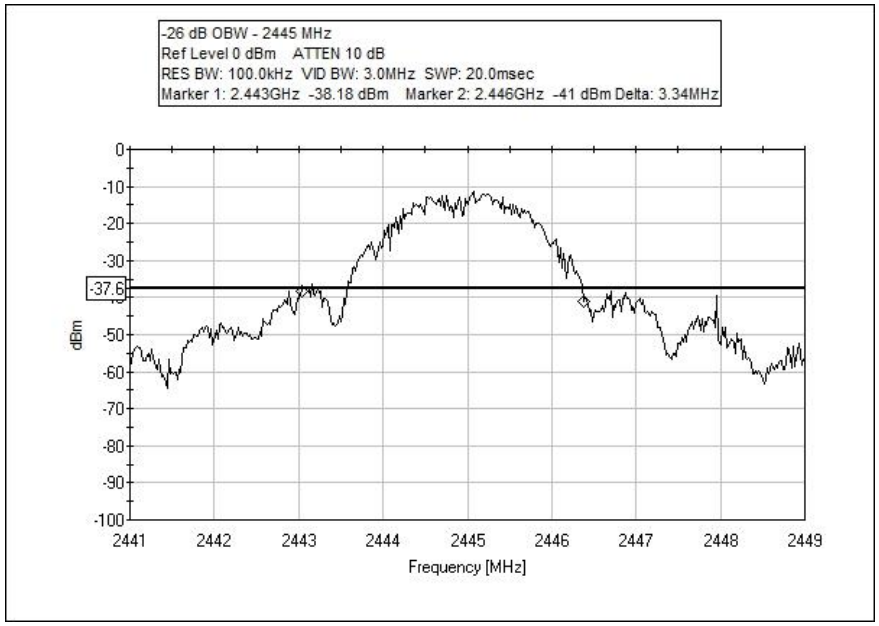
REPEATER



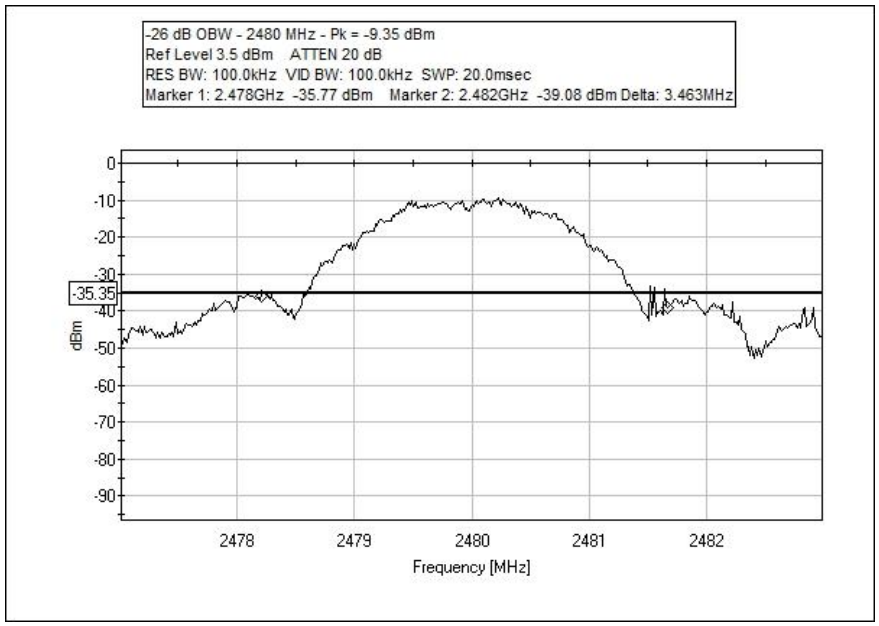
REPEATER



WSIM


-26 dB OBW - 2445 MHz
Ref Level 0 dBm ATTEN 10 dB
RES BW: 100.0kHz VID BW: 3.0MHz SWP: 20.0msec
Marker 1: 2.443GHz -38.18 dBm Marker 2: 2.446GHz -41 dBm Delta: 3.34MHz
0
-10
-20
-30
-37.6
-50
-60
-70
-80
-90
-100
dBm
2441
2442
2443
2444
2445
2446
2447
2448
2449
Frequency [MHz]

WSIM

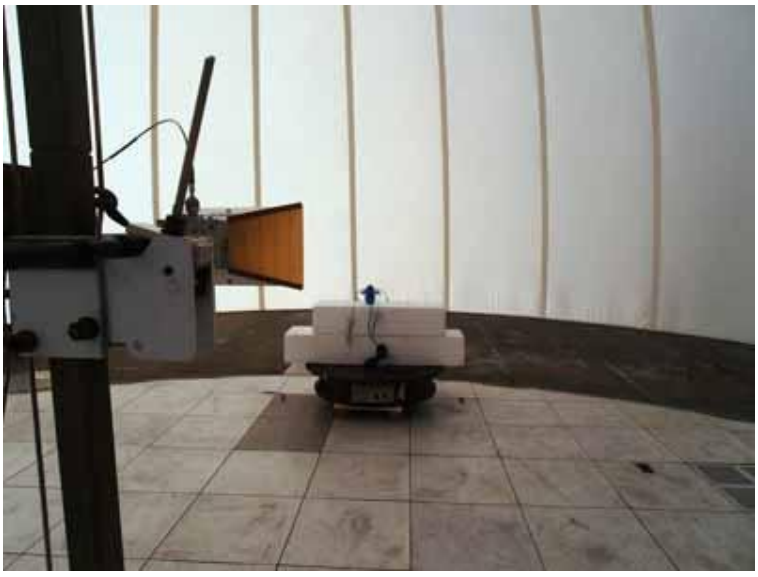

-26 dB OBW - 2480 MHz - Pk = -9.35 dBm
Ref Level 3.5 dBm ATTEN 20 dB
RES BW: 100.0kHz VID BW: 100.0kHz SWP: 20.0msec
Marker 1: 2.478GHz -35.77 dBm Marker 2: 2.482GHz -39.08 dBm Delta: 3.463MHz
0
-10
-20
-30
-35.35
-40
-50
-60
-70
-80
-90
dBm
2478
2479
2480
2481
2482
Frequency [MHz]

WSIM

Test Setup Photos

REPEATER

REPEATER



WSIM

WSIM

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.