Bently Nevada, Inc.

ADDENDUM TEST REPORT TO 92719-12A

EI.mesh ISA100a wSIM, 185410-01
EI.mesh ISA100a Repeater, 185450-01

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207, 15.209, 15.247
and
RSS 210 Issue 8

Report No.: 92719-12B

Date of issue: July 25, 2012

A2LA 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

REPORT PREPARED BY:

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

Project Number: 92719

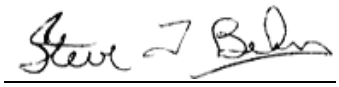
DATE OF EQUIPMENT RECEIPT: February 6, 2012
DATE(S) OF TESTING: February 6-18, 2012

Revision History

Original: Testing of the EI.mesh ISA100a wSIM, 185410-01 and EI.mesh ISA100a Repeater, 185450-01 to FCC Part 15 Subpart C Sections 15.207, 15.209, 15.247 and RSS-210 Issue 8.
Addendum A: Replaced data in -6dBc Occupied Bandwidth, Bandedge and PSD with corrected data.
Addendum B: Replaced data in the Power Output and PSD with corrected data.

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 #	Taiwan	Canada	FCC	Japan
Mariposa A	US0103	SL2-IN-E-1147R	3082A-2	90477	R-563 C-578 T-1492 G-87

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.207, 15.209, 15.247 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)/KDB 55807	Pass
Radiated Emissions	FCC Part 15 Subpart C Section 15.209/ ANSI C63.4 (2003)/KDB 55807	Pass
RF Power Output	FCC Part 15 Subpart C Section 15.247(b)(3)/KDB 55807	Pass
-6dBc Occupied Bandwidth	FCC Part 15 Subpart C/KDB 55807	Pass
Bandedge	FCC Part 15 Subpart C 15.247(d)/KDB 55807	Pass
Power Spectral Density	FCC Part 15 Subpart C 15.247(e)/KDB 55807	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 ISA100a wSIM
Manuf: Bently Nevada, Inc.
Model: 185410-01
Serial: 0002:1409

EI.mesh ISA 100a Repeater
Manuf: Bently Nevada, Inc.
Model: 185450-01
Serial: 0002:14CE

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):

Router
Manuf: NIVIS
Model: VersaRouter900
Serial: 000317
FCC ID: SQB-NIVISMOD003

Laptop Computer`
Manuf: Dell
Model: E6400
Serial: T0066970

POE
Manuf: Unknown
Model: POE-24i
Serial: 09A99127D

Optical Mouse
Manuf: Microsoft
Model: 3000
Serial: NA

Accelerometer (2)
Manuf: Bently Nevada, Inc.
Model: 200157
Serial: G088033 / G08C01KG

Thermocouple (2)
Manuf: Bently Nevada, Inc.
Model: Type K TC
Serial: NA

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

AC Power Supply
Manuf: TRACO
Model: TSP090-124
Serial: NA

PERIPHERAL DEVICES CONTINUED

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

Zone Zero EPM
Manuf: Bently Nevada, Inc.
Model: 185547-02
Serial: NA

Energy Harvester
Manuf: Bently Nevada, Inc.
Model: MM006200
Serial: NA

Power Supply
Manuf: Topward
Model: TPS-4000
Serial: 918520

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, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**91950**	Date:	2/15/2012
Test Type:	**Conducted Emissions**	Time:	14:22:36
Equipment:	**EI.mesh ISA100a wSIM/Repeater**	Sequence#:	8
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185410-01/185450-01		115V 60Hz
S/N:	0002:1409/0002:14CE		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP00082	Attenuator	PE7002-10	6/7/2011	6/7/2013
T2	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
T3	ANMACOND	Cable		5/10/2011	5/10/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA100a wSIM*	Bently Nevada, Inc.	185410-01	0002:1409
EI.mesh ISA 100a Repeater	Bently Nevada, Inc.	185450-01	0002:14CE
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D
Laptop Computer	Dell	E6400	T0066970
Thermocouple	Bently Nevada, Inc.	Type K TC	NA
Thermocouple	Bently Nevada, Inc.	Type K TC	NA
Accelerometer	Bently Nevada	200157	G088033
Accelerometer	Bently Nevada	200157	G08C01KG

Test Conditions / Notes:

ISA100a wSIM & ISA100a Repeater DC Supply is connected to the Test LISN.
ISA100a wSIM & ISA100a Repeater are connected to the DC Adapter, Batteries, and Zero Energy voltage sources.
Wireless router is remotely located and communicating with the motes.
EI mesh ISA100a wSIM & EI.mesh ISA100a Repeater are set up on a wooden turntable, 80 cm above the ground plane. Both devices are operating on the worst case frequency (max output).
Frequencies of Interest: 0.15 - 30 MHz
RBW = 9 kHz; VBW = 30 kHz
Temperature = 20.2°C
Relative Humidity = 30 %
Pressure- = 97.5 kPa

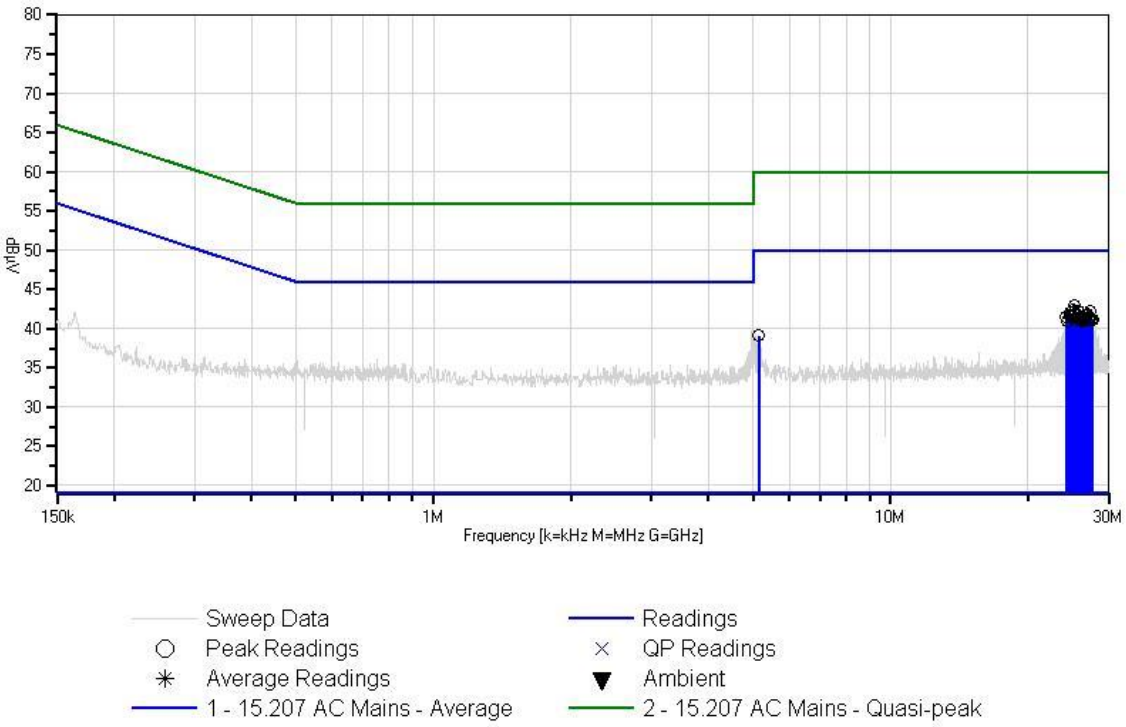
Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	25.183M	30.9	+10.1	+0.6	+1.3		+0.0	42.9	50.0	-7.1	Black
2	25.087M	30.4	+10.1	+0.6	+1.3		+0.0	42.4	50.0	-7.6	Black
3	25.279M	30.3	+10.1	+0.6	+1.3		+0.0	42.3	50.0	-7.7	Black
4	25.738M	30.2	+10.1	+0.6	+1.3		+0.0	42.2	50.0	-7.8	Black
5	27.410M	30.1	+10.1	+0.6	+1.4		+0.0	42.2	50.0	-7.8	Black
6	24.649M	30.1	+10.1	+0.6	+1.3		+0.0	42.1	50.0	-7.9	Black
7	25.457M	29.9	+10.1	+0.6	+1.3		+0.0	41.9	50.0	-8.1	Black
8	26.958M	29.7	+10.1	+0.6	+1.4		+0.0	41.8	50.0	-8.2	Black
9	25.574M	29.7	+10.1	+0.6	+1.3		+0.0	41.7	50.0	-8.3	Black
10	24.827M	29.7	+10.1	+0.6	+1.3		+0.0	41.7	50.0	-8.3	Black
11	26.855M	29.6	+10.1	+0.6	+1.4		+0.0	41.7	50.0	-8.3	Black
12	26.567M	29.7	+10.1	+0.6	+1.3		+0.0	41.7	50.0	-8.3	Black
13	24.738M	29.6	+10.1	+0.6	+1.3		+0.0	41.6	50.0	-8.4	Black

14	24.902M	29.6	+10.1	+0.6	+1.3	+0.0	41.6	50.0	-8.4	Black
15	24.998M	29.6	+10.1	+0.6	+1.3	+0.0	41.6	50.0	-8.4	Black
16	24.251M	29.6	+10.1	+0.6	+1.3	+0.0	41.6	50.0	-8.4	Black
17	26.019M	29.5	+10.1	+0.6	+1.3	+0.0	41.5	50.0	-8.5	Black
18	26.766M	29.4	+10.1	+0.6	+1.3	+0.0	41.4	50.0	-8.6	Black
19	25.368M	29.4	+10.1	+0.6	+1.3	+0.0	41.4	50.0	-8.6	Black
20	27.321M	29.3	+10.1	+0.6	+1.4	+0.0	41.4	50.0	-8.6	Black
21	27.232M	29.3	+10.1	+0.6	+1.4	+0.0	41.4	50.0	-8.6	Black
22	25.642M	29.3	+10.1	+0.6	+1.3	+0.0	41.3	50.0	-8.7	Black
23	27.047M	29.1	+10.1	+0.6	+1.4	+0.0	41.2	50.0	-8.8	Black
24	26.478M	29.2	+10.1	+0.6	+1.3	+0.0	41.2	50.0	-8.8	Black
25	27.691M	29.1	+10.1	+0.6	+1.4	+0.0	41.2	50.0	-8.8	Black
26	25.937M	29.1	+10.1	+0.6	+1.3	+0.0	41.1	50.0	-8.9	Black
27	26.204M	29.1	+10.1	+0.6	+1.3	+0.0	41.1	50.0	-8.9	Black
28	27.513M	29.0	+10.1	+0.6	+1.4	+0.0	41.1	50.0	-8.9	Black
29	24.347M	29.0	+10.1	+0.6	+1.3	+0.0	41.0	50.0	-9.0	Black
30	26.108M	29.0	+10.1	+0.6	+1.3	+0.0	41.0	50.0	-9.0	Black
31	5.148M	28.1	+10.1	+0.3	+0.6	+0.0	39.1	50.0	-10.9	Black

CKC Laboratories, Inc,. Date: 2/15/2012 Time: 14:22:36 Bently Nevada, Inc. WO#: 91950
15.207 AC Mains - Average Test Lead: Black 115V 60Hz Sequence#: 8 Ext ATTN: 0 dB



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 #:	**91950**	Date:	2/15/2012
Test Type:	**Conducted Emissions**	Time:	1:54:34 PM
Equipment:	**EI.mesh ISA100a wSIM/Repeater**	Sequence#:	7
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185410-01/185450-01		115V 60Hz
S/N:	0002:1409/0002:14CE		

***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	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 ISA100a wSIM*	Bently Nevada, Inc.	185410-01	0002:1409
EI.mesh ISA 100a Repeater	Bently Nevada, Inc.	185450-01	0002:14CE
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D
Laptop Computer	Dell	E6400	T0066970
Thermocouple	Bently Nevada, Inc.	Type K TC	NA
Thermocouple	Bently Nevada, Inc.	Type K TC	NA
Accelerometer	Bently Nevada	200157	G088033
Accelerometer	Bently Nevada	200157	G08C01KG

Test Conditions / Notes:

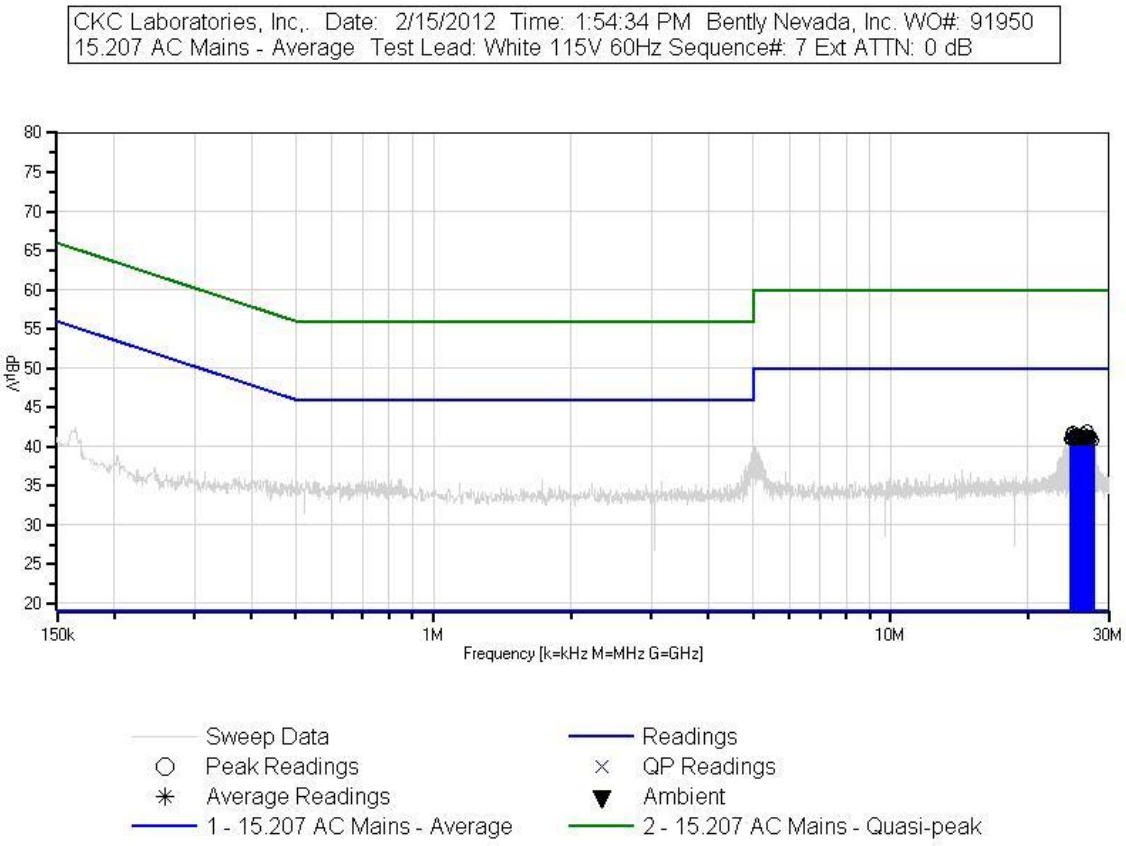
ISA100a wSIM & ISA100a Repeater DC Supply is connected to the Test LISN.
EI.mesh ISA100a wSIM & EI.mesh ISA100a Repeater are connected to the DC Adapter, Batteries, and Zero Energy voltage sources. Wireless router is remotely located and communicating with the motes.
EI.mesh ISA100a wSIM & EI.mesh ISA100a Repeater are set up on a wooden turntable, 80 cm above the ground plane. . Both devices are operating on the worst case frequency (max output).
Frequencies of Interest: 0.15 - 30 MHz
RBW = 9 kHz; VBW = 30 kHz
Temperature = 20.2°C
Relative Humidity = 30%
Pressure = 97.5 kPa

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	26.951M	30.0	+10.1	+1.4	+0.5		+0.0	42.0	50.0	-8.0	White
2	24.991M	29.9	+10.1	+1.3	+0.5		+0.0	41.8	50.0	-8.2	White
3	24.902M	29.8	+10.1	+1.3	+0.5		+0.0	41.7	50.0	-8.3	White
4	26.286M	29.8	+10.1	+1.3	+0.5		+0.0	41.7	50.0	-8.3	White
5	25.635M	29.7	+10.1	+1.3	+0.5		+0.0	41.6	50.0	-8.4	White
6	25.923M	29.7	+10.1	+1.3	+0.5		+0.0	41.6	50.0	-8.4	White
7	25.272M	29.6	+10.1	+1.3	+0.5		+0.0	41.5	50.0	-8.5	White
8	26.855M	29.4	+10.1	+1.4	+0.5		+0.0	41.4	50.0	-8.6	White
9	25.553M	29.5	+10.1	+1.3	+0.5		+0.0	41.4	50.0	-8.6	White
10	27.232M	29.4	+10.1	+1.4	+0.5		+0.0	41.4	50.0	-8.6	White
11	27.136M	29.4	+10.1	+1.4	+0.5		+0.0	41.4	50.0	-8.6	White
12	25.361M	29.4	+10.1	+1.3	+0.5		+0.0	41.3	50.0	-8.7	White
13	27.321M	29.3	+10.1	+1.4	+0.5		+0.0	41.3	50.0	-8.7	White
14	27.047M	29.2	+10.1	+1.4	+0.5		+0.0	41.2	50.0	-8.8	White
15	26.971M	29.2	+10.1	+1.4	+0.5		+0.0	41.2	50.0	-8.8	White
16	26.012M	29.2	+10.1	+1.3	+0.5		+0.0	41.1	50.0	-8.9	White
17	25.457M	29.2	+10.1	+1.3	+0.5		+0.0	41.1	50.0	-8.9	White
18	25.094M	29.2	+10.1	+1.3	+0.5		+0.0	41.1	50.0	-8.9	White
19	26.101M	29.2	+10.1	+1.3	+0.5		+0.0	41.1	50.0	-8.9	White
20	26.670M	29.2	+10.1	+1.3	+0.5		+0.0	41.1	50.0	-8.9	White
21	27.506M	29.1	+10.1	+1.4	+0.5		+0.0	41.1	50.0	-8.9	White
22	26.567M	29.2	+10.1	+1.3	+0.5		+0.0	41.1	50.0	-8.9	White
23	24.813M	29.1	+10.1	+1.3	+0.5		+0.0	41.0	50.0	-9.0	White
24	24.724M	29.1	+10.1	+1.3	+0.5		+0.0	41.0	50.0	-9.0	White

25	25.183M	29.1	+10.1	+1.3	+0.5	+0.0	41.0	50.0	-9.0	White
26	26.773M	29.1	+10.1	+1.3	+0.5	+0.0	41.0	50.0	-9.0	White
27	26.478M	29.1	+10.1	+1.3	+0.5	+0.0	41.0	50.0	-9.0	White
28	25.731M	29.0	+10.1	+1.3	+0.5	+0.0	40.9	50.0	-9.1	White
29	26.204M	29.0	+10.1	+1.3	+0.5	+0.0	40.9	50.0	-9.1	White
30	27.780M	28.7	+10.1	+1.4	+0.5	+0.0	40.7	50.0	-9.3	White



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, Inc.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**91950**	Date:	2/14/2012
Test Type:	**Maximized Emissions**	Time:	13:06:58
Equipment:	**EI.mesh ISA 100a Repeater**	Sequence#:	4
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185450-01		
S/N:	0002:14CE		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
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
	ANP05686	Cable	RG214/U	1/24/2012	1/24/2014

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA 100a Repeater*	Bently Nevada, Inc.	185450-01	0002:14CE
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D

Test Conditions / Notes:

EI.mesh ISA 100a Repeater is set up on some Styrofoam pads on a wooden turntable (0.8m high). VersaRouter 900 is located remotely and communicated with the motes. EI.mesh ISA 100a Repeater is operating on 2405. 2445, & 2480 MHz during the testing

All measurements were taken using CISPR bandwidths
Frequencies investigated were: 9kHz to 1000 MHz

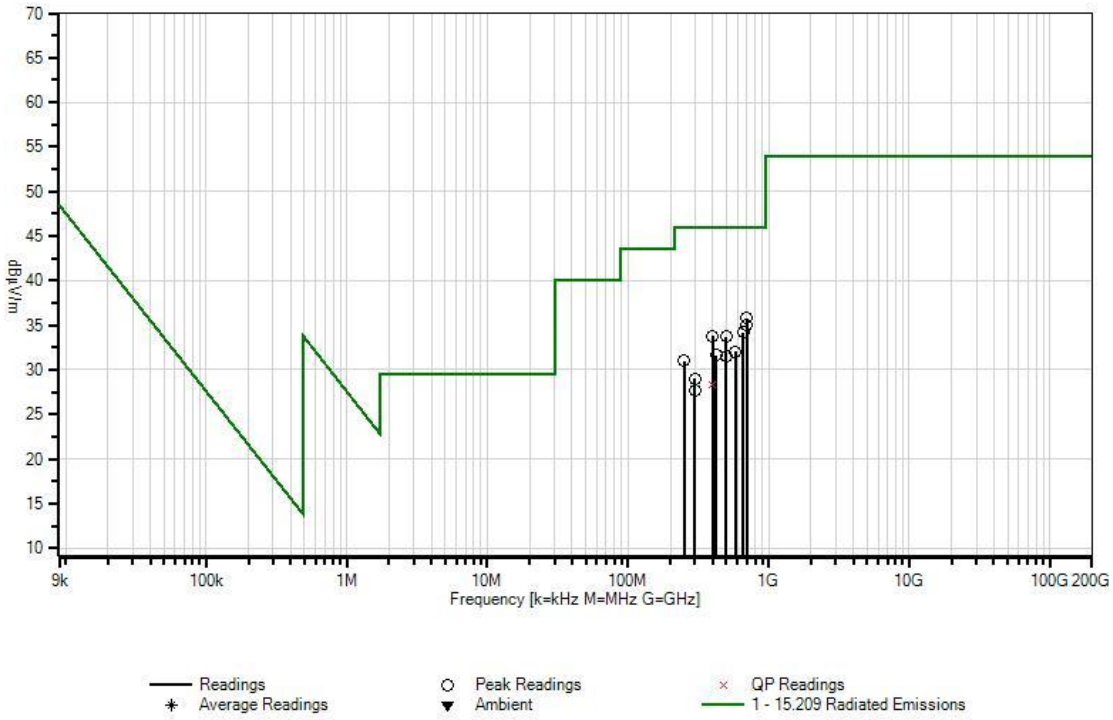
Temperature = 21°C
Relative Humidity= 35%
Pressure = 975 mBars

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	299.660M	44.2	+0.9	+13.1	-29.9	+0.7	+0.0	29.0	46.0	-17.0	Vert
11	400.110M QP	40.4	+1.1	+16.3	-30.4	+0.9	+0.0	28.3	46.0	-17.7	Vert
^	400.110M	43.1	+1.1	+16.3	-30.4	+0.9	+0.0	31.0	46.0	-15.0	Vert
13	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: 2/14/2012 Time: 13:06:58 Bently Nevada, Inc. WO#: 91950
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 4 Ext ATTN: 0 dB



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

Customer:	**Bently Nevada, Inc.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**91950**	Date:	2/12/2012
Test Type:	**Maximized Emissions**	Time:	11:48:07
Equipment:	**EI.mesh ISA 100a Repeater**	Sequence#:	2
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185450-01		
S/N:	0002:14CE		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
T1	AN00327	Horn Antenna	3115	4/23/2010	4/23/2012
T2	AN03155	Preamp	83017A	8/3/2011	8/3/2013
T3	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T4	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
T5	AN03012	Cable	32022-2-29094K-36TC	2/28/2012	2/28/2014
	AN02694	Active Horn Antenna-ANSI C63.5 Antenna Factors (dB)	AMFW-5F-18002650-20-10P	11/10/2010	11/10/2012

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA 100a Repeater*	Bently Nevada, Inc.	185450-01	0002:14CE
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D

Test Conditions / Notes:

EI.mesh ISA100a Repeater are set up on a wooden turntable (80 cm high). Wireless VersaRouter 900 is located remotely and communicated with the motes.
Frequencies of Interest: 1-25 GHz

All measurements were taken using CISPR bandwidths.

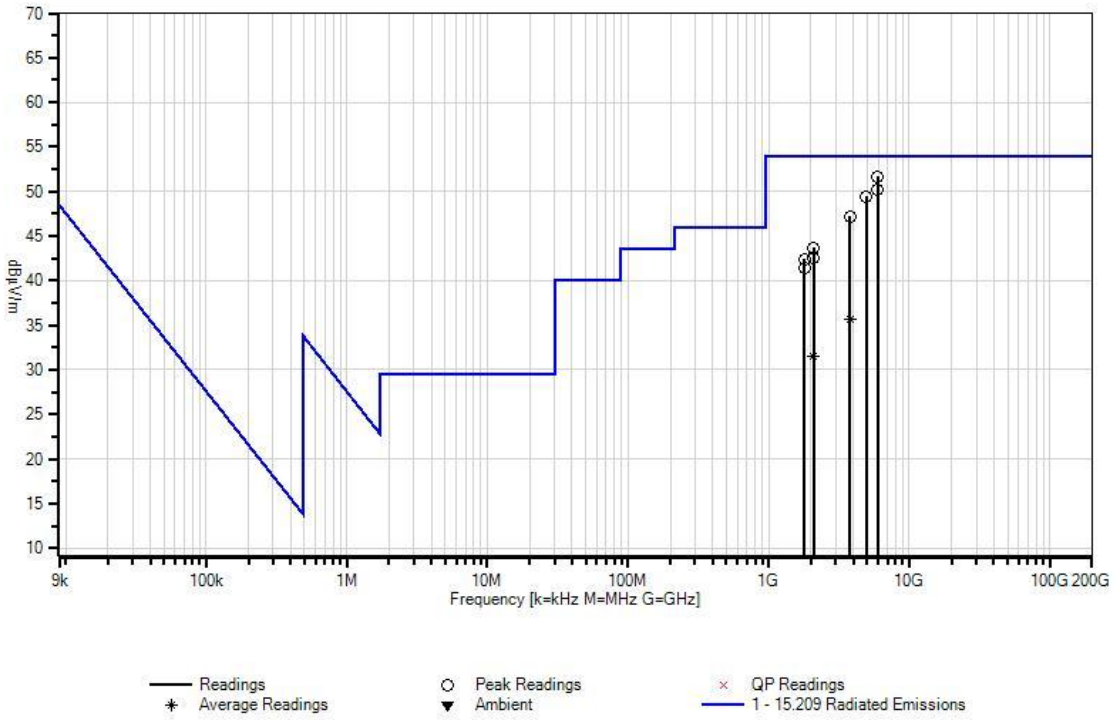
Temperature = 21°C
Relative Humidity = 35%
Pressure = 975 mBars

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	+34.4 +1.2	-30.3	+3.4	+4.5	+0.0	51.7	54.0	-2.3	Vert
2	5939.012M	37.1	+34.4 +1.2	-30.3	+3.4	+4.5	+0.0	50.3	54.0	-3.7	Horiz
3	4923.420M	37.8	+33.0 +1.1	-30.3	+3.6	+4.2	+0.0	49.4	54.0	-4.6	Horiz
4	4923.920M	37.8	+33.0 +1.1	-30.3	+3.6	+4.2	+0.0	49.4	54.0	-4.6	Vert
5	3769.721M	38.1	+32.3 +0.9	-30.6	+2.7	+3.8	+0.0	47.2	54.0	-6.8	Horiz
6	2092.265M	39.4	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	43.7	54.0	-10.3	Horiz
7	2096.506M	38.3	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	42.6	54.0	-11.4	Horiz
8	1800.100M	39.4	+28.2 +0.6	-30.7	+2.6	+2.3	+0.0	42.4	54.0	-11.6	Vert
9	1799.600M	38.4	+28.2 +0.6	-30.7	+2.6	+2.3	+0.0	41.4	54.0	-12.6	Horiz
10	3770.221M Ave	26.5	+32.3 +0.9	-30.6	+2.7	+3.8	+0.0	35.6	54.0	-18.4	Vert
^	3770.221M	41.4	+32.3 +0.9	-30.6	+2.7	+3.8	+0.0	50.5	54.0	-3.5	Vert
12	2092.765M Ave	27.2	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	31.5	54.0	-22.5	Vert
^	2092.765M	44.8	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	49.1	54.0	-4.9	Vert
14	2097.006M Ave	27.2	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	31.5	54.0	-22.5	Vert
^	2097.006M	44.5	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	48.8	54.0	-5.2	Vert

CKC Laboratories, Inc,. Date: 2/12/2012 Time: 11:48:07 Bently Nevada, Inc. WO#: 91950
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, Inc.**
Specification: **15.209 Radiated Emissions**
Work Order #: **91950** Date: 2/14/2012
Test Type: **Maximized Emissions** Time: 13:06:58
Equipment: **EI.mesh ISA100a wSIM** Sequence#: 4
Manufacturer: Bently Nevada, Inc. Tested By: Chuck Kendall
Model: 185410-01
S/N: 0002:1409

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
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

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA100a wSIM*	Bently Nevada, Inc.	185410-01	0002:1409
Zone Zero Battery	Bently-Nevada, Inc.	185547-01	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D
Laptop Computer	Dell	E6400	T0066970
Thermocouple	Bently Nevada, Inc.	Type K TC	NA
Thermocouple	Bently Nevada, Inc.	Type K TC	NA
Accelerometer	Bently Nevada, Inc.	200157	G088033
Accelerometer	Bently Nevada, Inc.	200157	G08C01KG

Test Conditions / Notes:

EI.mesh ISA 100a wSIM is set up on some Styrofoam pads on a wooden turntable (0.8m high) with I/O cables attached. VersaRouter 900 is located remotely and communicated with the motes. EI.mesh ISA 100a Repeater is operating on 2405. 2445, & 2480 MHz during the testing.
Frequency range tested: 30-1000MHz
RBW = 120 kHz VBW = 300 kHz
Temperature = 21°C
Relative Humidity = 35%
Pressure = 975 mBars

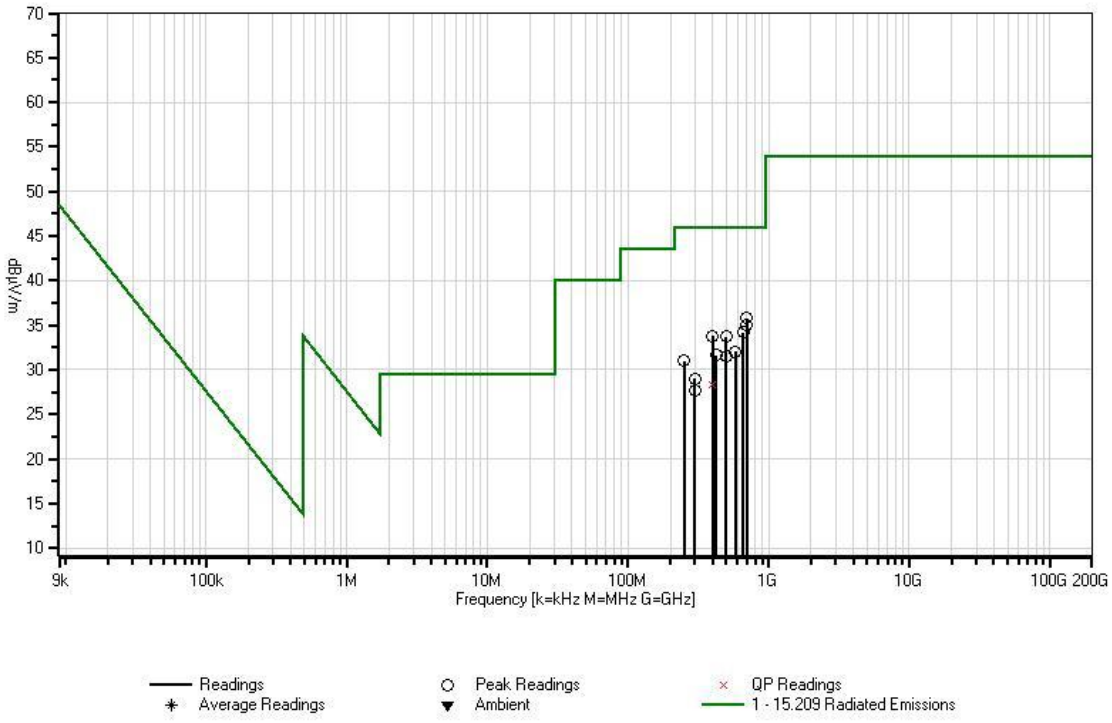
Ext Attn: 0 dB

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	299.660M	44.2	+0.9	+13.1	-29.9	+0.7	+0.0	29.0	46.0	-17.0	Vert
11	400.110M QP	40.4	+1.1	+16.3	-30.4	+0.9	+0.0	28.3	46.0	-17.7	Vert
^	400.110M	43.1	+1.1	+16.3	-30.4	+0.9	+0.0	31.0	46.0	-15.0	Vert
13	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: 2/14/2012 Time: 13:06:58 Bently Nevada, Inc. WO#: 91950
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 4 Ext ATTN: 0 dB



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

Customer:	**Bently Nevada, Inc.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**91950**	Date:	2/14/2012
Test Type:	**Maximized Emissions**	Time:	11:48:07
Equipment:	**EI.mesh ISA100a wSIM**	Sequence#:	2
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185410-01		
S/N:	0002:1409		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
T1	AN00327	Horn Antenna	3115	4/23/2010	4/23/2012
T2	AN03155	Preamp	83017A	8/3/2011	8/3/2013
T3	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T4	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
T5	AN03012	Cable	32022-2-29094K-36TC	2/28/2012	2/28/2014
	AN02694	Active Horn Antenna-ANSI C63.5 Antenna Factors (dB)	AMFW-5F-18002650-20-10P	11/10/2010	11/10/2012

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA100a wSIM*	Bently Nevada, Inc.	185410-01	0002:1409
Power Supply	Phoenix Contact	MINI-PS-100-240AC/5DC/3	3039075599

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer`	Dell	E6400	T0066970
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D

Test Conditions / Notes:

EI.mesh ISA100a wSIM is set up on a wooden turntable (80 cm high) with IO cables attached. Unit is operating on 2405, 2445, & 2480 MHz. Wireless VersaRouter 900 is located remotely and communicated with the motes.
Frequencies of Interest: 1-25 GHz

All measurements were taken using CISPR bandwidths.

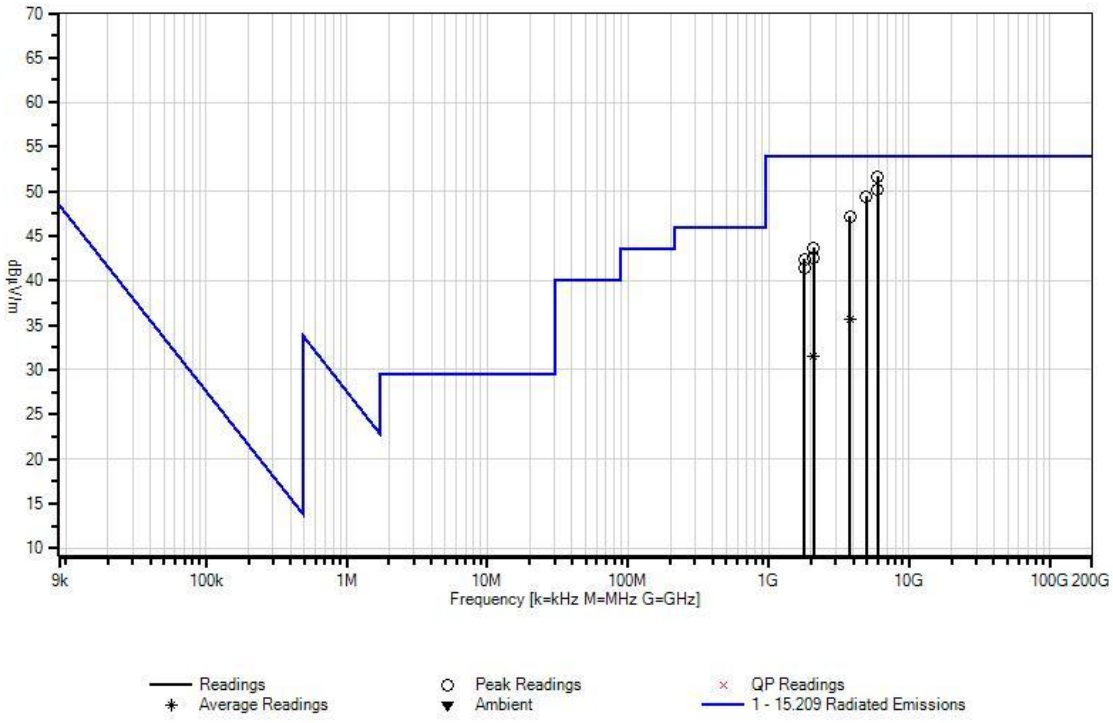
Temperature = 21°C
Relative Humidity = 35%
Pressure = 975 mBars

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	+34.4 +1.2	-30.3	+3.4	+4.5	+0.0	51.7	54.0	-2.3	Vert
2	5939.012M	37.1	+34.4 +1.2	-30.3	+3.4	+4.5	+0.0	50.3	54.0	-3.7	Horiz
3	4923.420M	37.8	+33.0 +1.1	-30.3	+3.6	+4.2	+0.0	49.4	54.0	-4.6	Horiz
4	4923.920M	37.8	+33.0 +1.1	-30.3	+3.6	+4.2	+0.0	49.4	54.0	-4.6	Vert
5	3769.721M	38.1	+32.3 +0.9	-30.6	+2.7	+3.8	+0.0	47.2	54.0	-6.8	Horiz
6	2092.265M	39.4	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	43.7	54.0	-10.3	Horiz
7	2096.506M	38.3	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	42.6	54.0	-11.4	Horiz
8	1800.100M	39.4	+28.2 +0.6	-30.7	+2.6	+2.3	+0.0	42.4	54.0	-11.6	Vert
9	1799.600M	38.4	+28.2 +0.6	-30.7	+2.6	+2.3	+0.0	41.4	54.0	-12.6	Horiz
10	3770.221M Ave	26.5	+32.3 +0.9	-30.6	+2.7	+3.8	+0.0	35.6	54.0	-18.4	Vert
^	3770.221M	41.4	+32.3 +0.9	-30.6	+2.7	+3.8	+0.0	50.5	54.0	-3.5	Vert
12	2092.765M Ave	27.2	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	31.5	54.0	-22.5	Vert
^	2092.765M	44.8	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	49.1	54.0	-4.9	Vert
14	2097.006M Ave	27.2	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	31.5	54.0	-22.5	Vert
^	2097.006M	44.5	+29.6 +0.7	-30.8	+2.4	+2.4	+0.0	48.8	54.0	-5.2	Vert

CKC Laboratories, Inc,. Date: 2/14/2012 Time: 11:48:07 Bently Nevada, Inc. WO#: 91950
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB



Test Setup Photos

REPEATER LOW FREQUENCY FRONT VIEW

REPEATER LOW FREQUENCY BACK VIEW

REPEATER HIGH FREQUENCY FRONT VIEW

REPEATER HIGH FREQUENCY BACK VIEW

wSIM LOW FREQUENCY FRONT VIEW

wSIM LOW FREQUENCY BACK VIEW

wSIM HIGH FREQUENCY FRONT VIEW

wSIM HIGH FREQUENCY BACK VIEW

15.247(b)(3) RF Power Output

Test Data

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

Customer: **Bently Nevada, Inc.**
Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**
Work Order #: **91950** Date: 7/18/2012
Test Type: **Maximized Emissions** Time: 19:26:16
Equipment: **EI.mesh ISA 100a Repeater** Sequence#: 3
Manufacturer: Bently Nevada, Inc. Tested By: Chuck Kendall
Model: 185450-01
S/N: 0002:14CE

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	4/13/2012	4/13/2014
T2	AN03012	Cable	32022-2-29094K-36TC	2/28/2012	2/28/2014
T3	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
T4	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T5	AN02111	Spectrum Analyzer	8593EM	9/8/2011	9/8/2013
T6	AN03155	Preamp	83017A	8/3/2011	8/3/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA 100a Repeater*	Bently Nevada, Inc.	185450-01	0002:14CE
Zone Zero Battery	Bently-Nevada, Inc.	185547-01	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	E6400	T0066970

Test Conditions / Notes:

EI.mesh ISA100a 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 IAW KDB 550874
Readings are peak readings.
Ant Gain = 1.414 dBi
P = (E*D)^2/30G

Max Output power:	Frequency	Corrected Reading	Rad Output Power
	2405 MHz	112.09 dBuV/m	15.45dBm
	2445 MHz	111.44 dBuV/m	14.76 dBm
	2480 MHz	111.49 dBuV/m	14.86 dBm

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

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

Customer: **Bently Nevada, Inc.**
Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**
Work Order #: **91950** Date: 7/18/2012
Test Type: **Maximized Emissions** Time: 20:17:23
Equipment: **EI.mesh ISA100a wSIM** Sequence#: 2
Manufacturer: Bently Nevada, Inc. Tested By: Chuck Kendall
Model: 185410-01
S/N: ISA100U2

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	4/13/2012	4/13/2014
T2	AN03012	Cable	32022-2-29094K-36TC	2/28/2012	2/28/2014
T3	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
T4	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T5	AN02660	Spectrum Analyzer	8593EM	9/8/2011	9/8/2013
T6	AN03155	Preamp	83017A	8/3/2011	8/3/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA100a wSIM*	Bently Nevada, Inc.	185410-01	ISA100U2
Zone Zero Battery	Bently-Nevada, Inc.	185547-01	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	E6400	T0066970

Test Conditions / Notes:

EI.mesh ISA100a 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
Bandwidths IAW KDB 550874
Readings are peak readings.
Ant Gain = 1.414 dBi
P = (E*D)^2/30G

Max Output power:	Frequency	Corrected Reading	Rad Output Power
	2405 MHz	109.84 dBuV/m	13,20 dBm
	2445 MHz	109.64 dBuV/m	13.00 dBm
	2480 MHz	109.45 dBuV/m	12.81 dBm

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

Test Setup Photos

REPEATER LOW FREQUENCY

REPEATER HIGH FREQUENCY

wSIM LOW FREQUENCY

wSIM HIGH FREQUENCY

-6dBc Occupied Bandwidth

Test Conditions / Setup

EI.mesh ISA 100a Repeater is sitting on Styrofoam pads atop a wooden turntable 1.5m from the ground plane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 30 kHz; VBW= 300 kHz with a span of 3 MHz.
EI.mesh ISA 100a wSIM is sitting on Styrofoam pads atop a wooden turntable 0.8 m from the ground plane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 30 kHz; VBW= 300 kHz with a span of 3 MHz.

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

Engineer Name: C. Kendall

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
AN03155	Preamp	83017A	Pasternack	8/3/2011	8/3/2013
AN02660	Spectrum Analyzer	E4446A	Agilent	6/30/2010	6/30/2012
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012
AN03012	Cable	32022-2-29094K-36TC	AstroLab	2/28/2012	2/28/2014

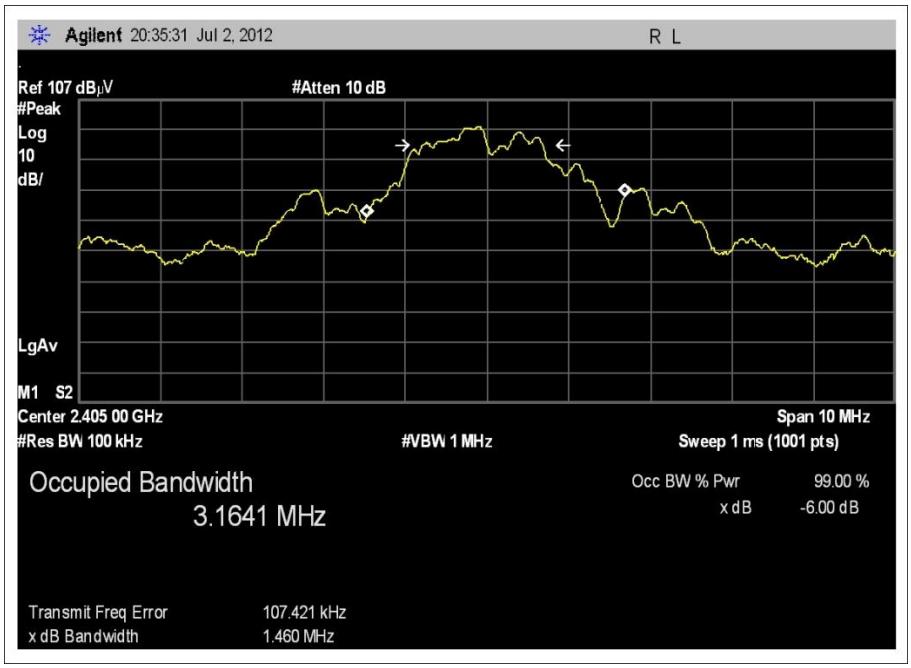
Repeater

Frequency (MHz)	6dB Emissions Bandwidth (MHz)	6dB Emissions Bandwidth Minimum
2405	1.394	500 kHz
2445	1.395	500 kHz
2480	1.393	500 kHz

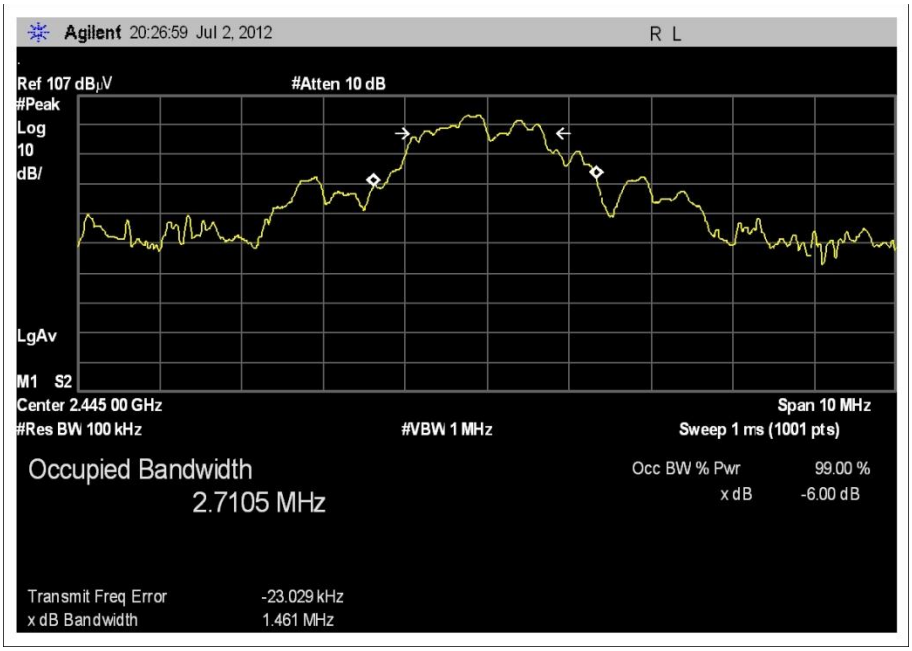
wSIM

Frequency (MHz)	6dB Emissions Bandwidth (MHz)	6dB Emissions Bandwidth Minimum
2405	1.394	500 kHz
2445	1.220	500 kHz
2480	1.394	500 kHz

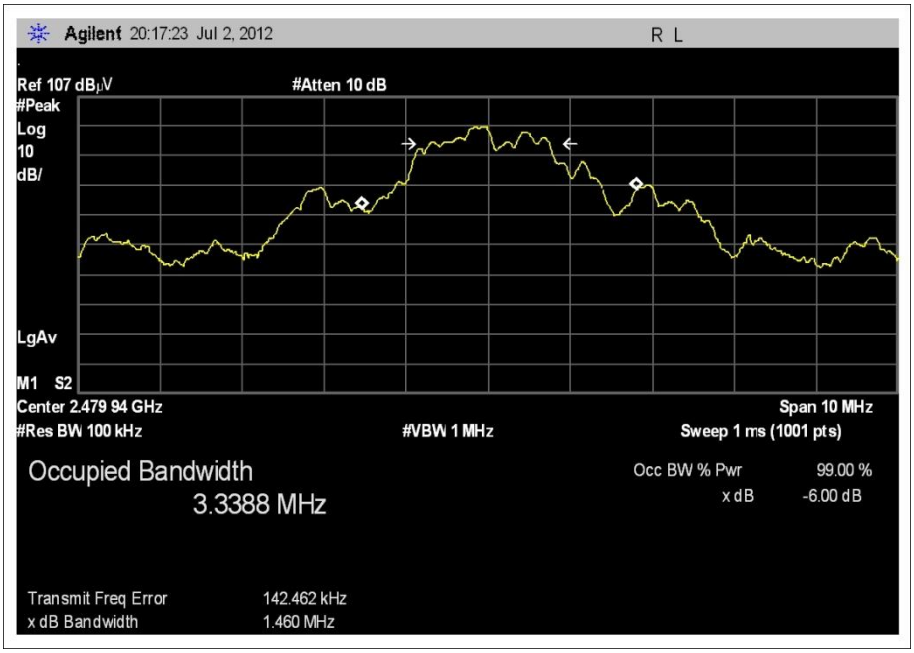
Test Plots



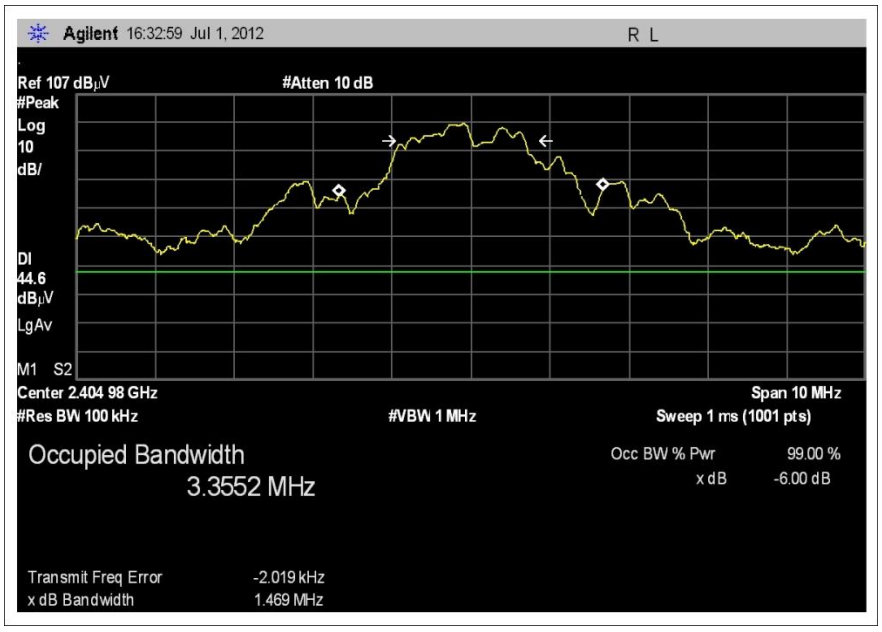
REPEATER 2405MHz



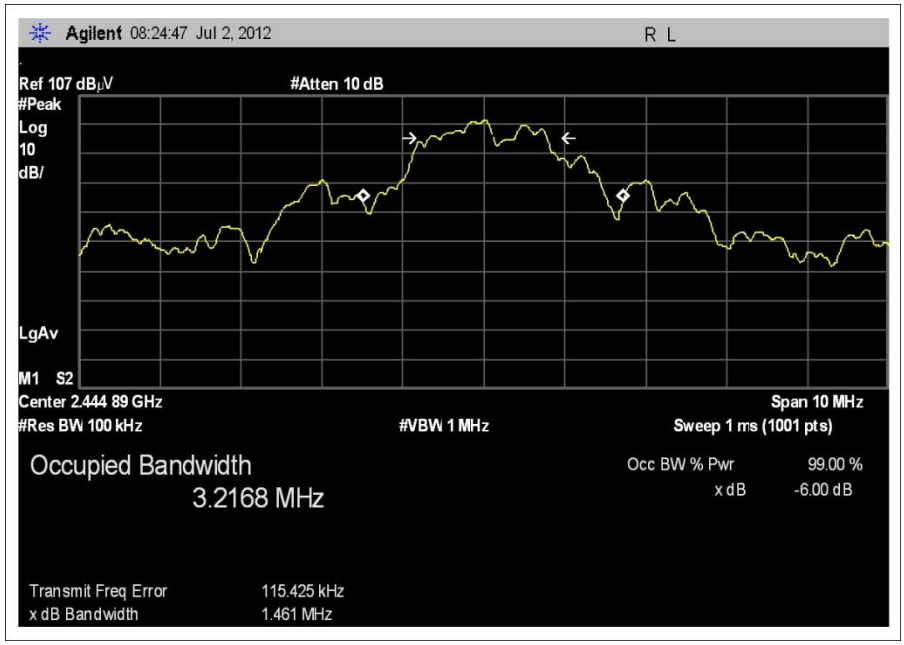
REPEATER 2445MHz



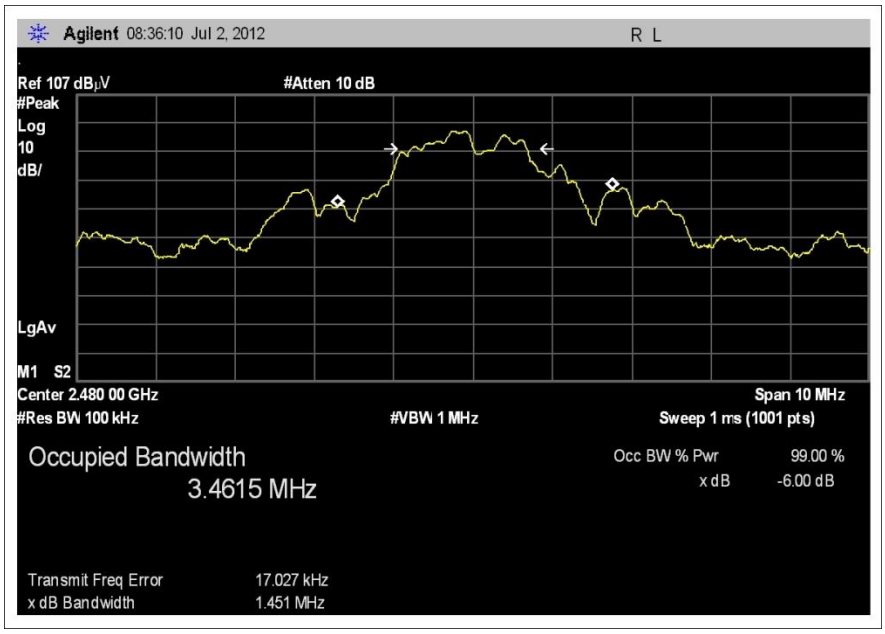
REPEATER 2480MHz



wSIM 2405MHz



wSIM 2445MHz



wSIM 2480MHz

Test Setup Photos

REPEATER

wSIM

15.247(d)Bandedge

Test Conditions / Setup - Repeater

EI.mesh ISA100a 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 made using the Marker Delta Method.

Band edge readings were taken at 100 kHz Resolution Bandwidths with the Video Bandwidths set to at least 3 times that of the Resolution Bandwidth. A Duty Cycle Correction Factor (-7.2dB) was added along with the Marker Delta. The Marker Delta Factor was 4.2 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 4.366 ms in the <100 ms image and since this is shown to be on ten times Adding back in the Marker Delta, it appears to be compliant with the requirements of FCC 15.209 at the band edges.

Test Conditions / Setup –wSIM

EI.mesh ISA100a 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 15 in transmit mode 100% modulated.
Duty cycle = 1
Bandwidths as stated in KDB 550874 and noted in the plots. Band Edge readings were made using the Marker Delta Method.

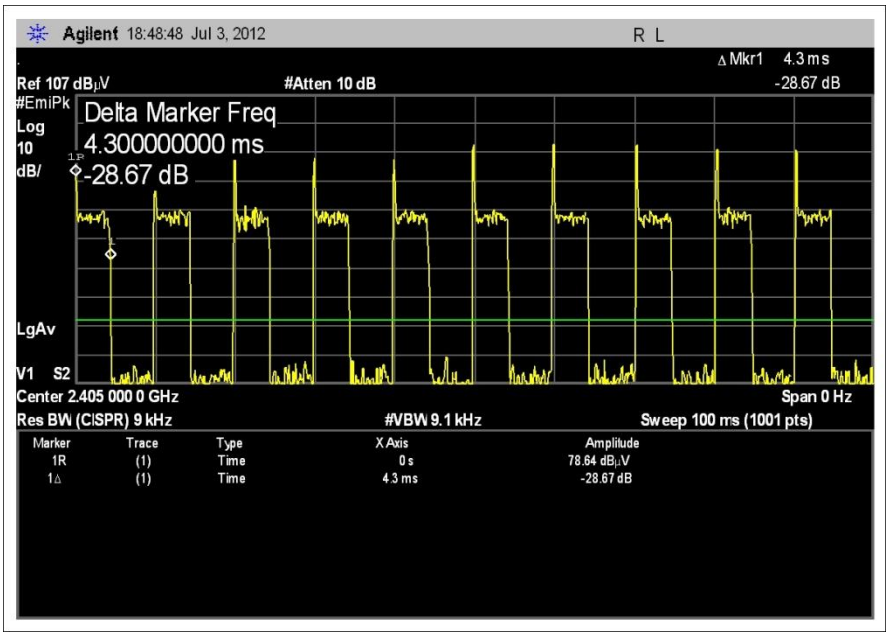
Band edge readings were taken at 100 kHz Resolution Bandwidths with the Video Bandwidths set to at least 3 times that of the Resolution Bandwidth. A Duty Cycle Correction Factor (-7.2dB) was added along with the Marker Delta. The Marker Delta Factor was 4.2 dB. The plots accompanying this datasheet show 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 4.366 ms in the <100 ms image and since this is shown to be on ten times Adding back in the Marker Delta, it appears to be compliant with the requirements of FCC 15.209 at the band edges.

RBW = 10kHz; VBW= 10kHz with a span of 10 MHz.
Temp = 20.2°C
Relative Humidity=40%
Press = 976 mBars

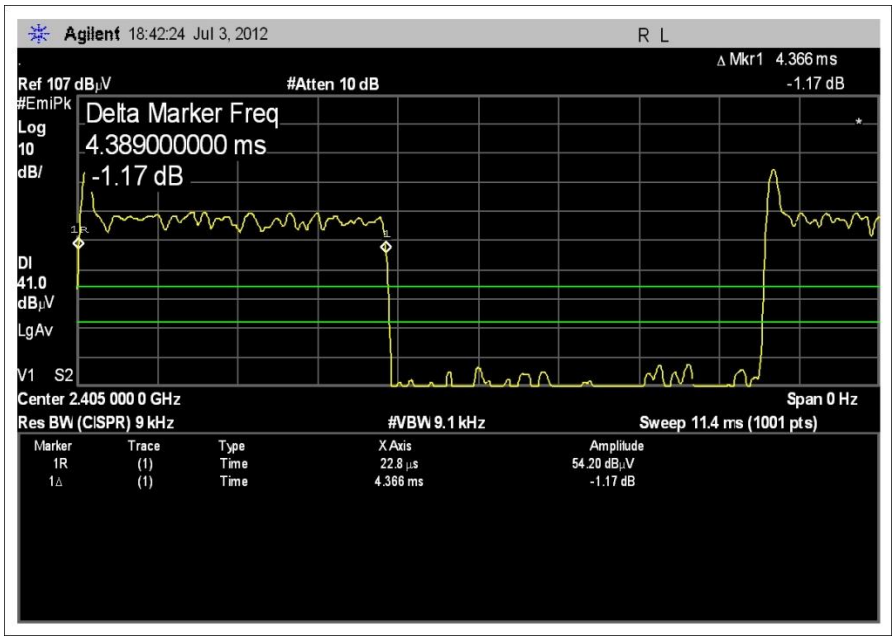
Engineer Name: C. Kendall

Test Equipment					
Asset/Serial #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN03155	Preamp	83017A	Pasternack	8/3/2011	8/3/2013
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
ANP00740	Cable		Andrews	1/24/2012	1/24/2014
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012
AN02660	Spectrum Analyzer	E4446A	Agilent	11/3/2011	11/3/2013
AN03012	Cable	32022-2-29094K-36TC	Astrolab	4/13/2012	4/13/2014
DCCF	Duty Cycle Correction Factor	NA	NA	No Cal Required	No Cal Required
MarkerDelta Factor	Test Data Adjustment	NA	NA	No Cal Required	No Cal Required

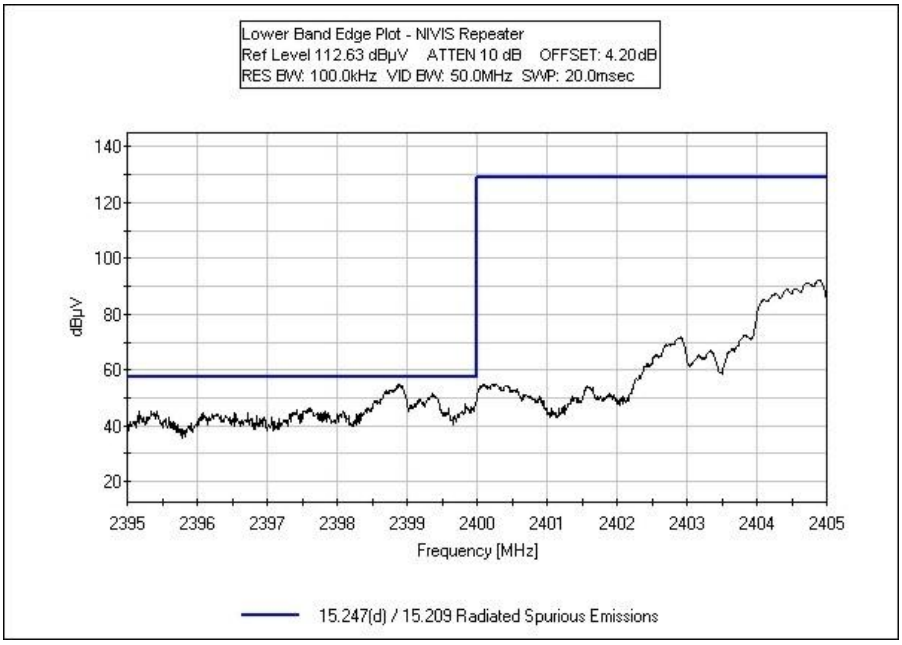
Test Data



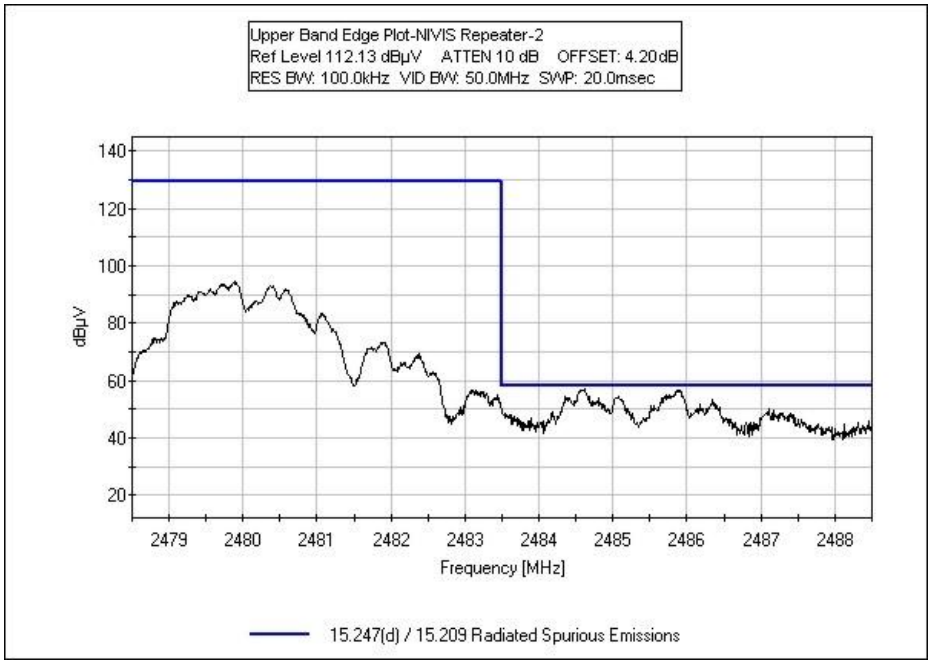
Duty Cycle on 4.389ms at 10 each per 100ms



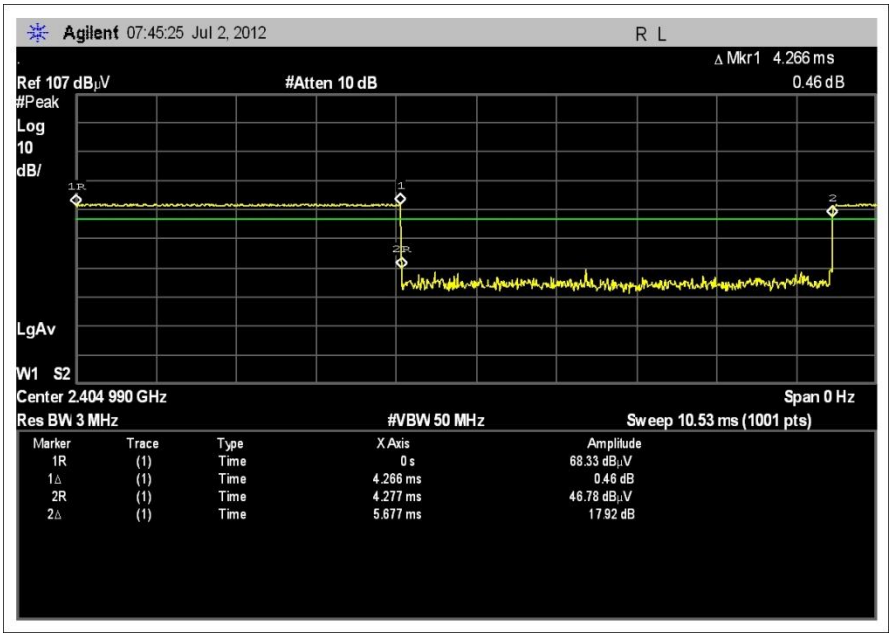
Duty Cycle on 4.389ms



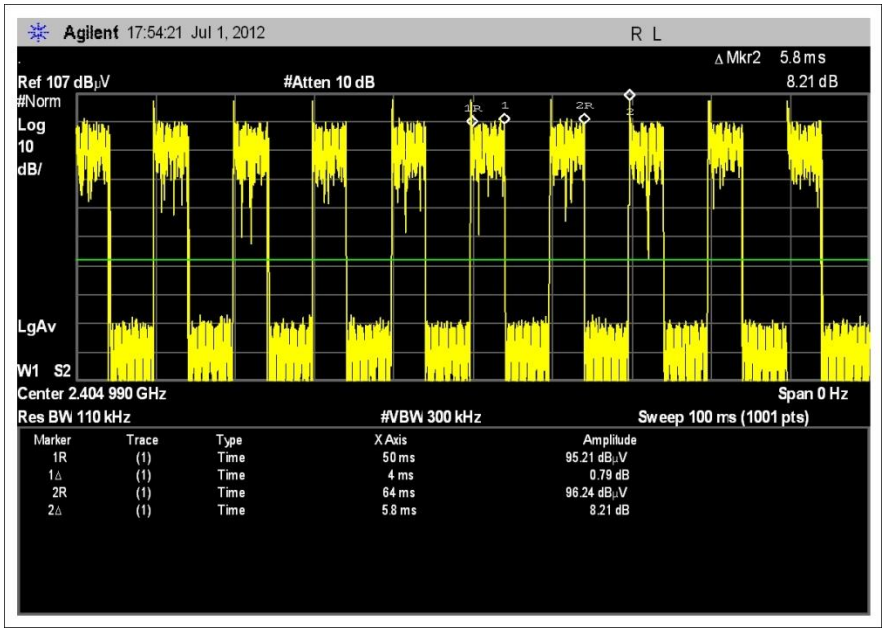
REPEATER



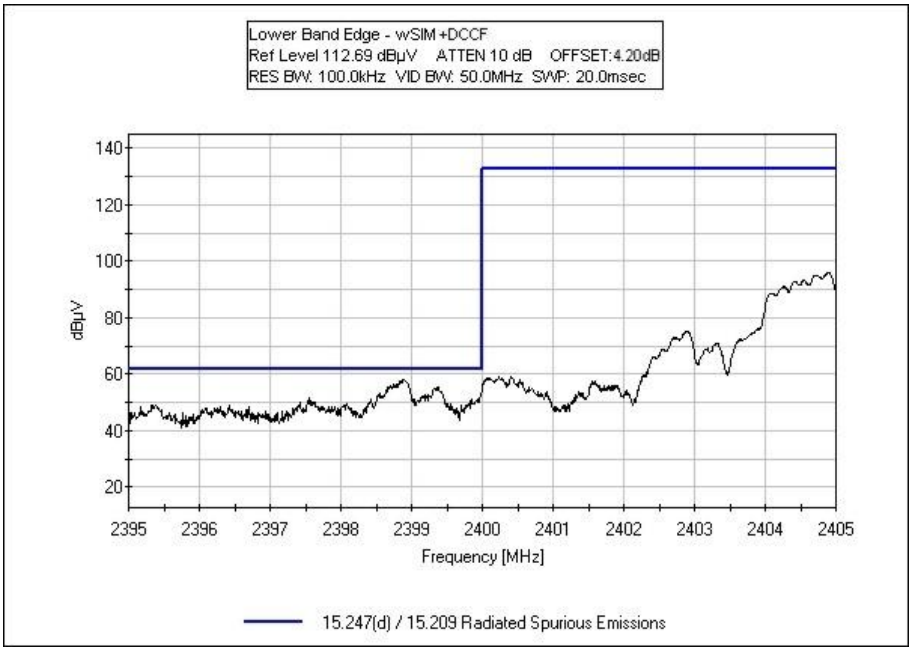
REPEATER



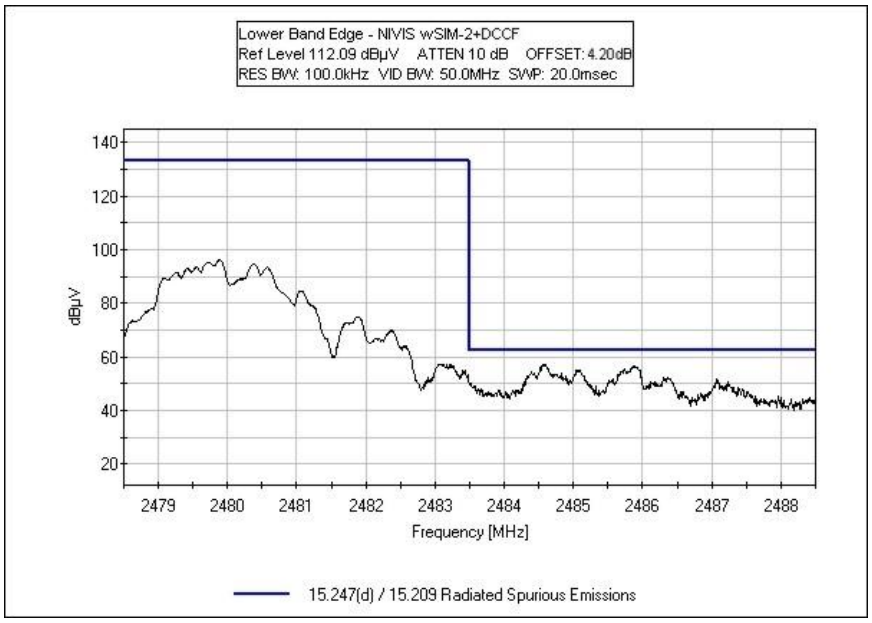
wSIM Duty Cycle Correction Factor at 10.53ms



Duty Cycle Correction Factor Immage


Lower Band Edge - wSIM +DCCF
Ref Level 112.69 dBµV ATTEN 10 dB OFFSET: 4.20dB
RES BW: 100.0kHz VID BW: 50.0MHz SWP: 20.0msec
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

wSIM


Lower Band Edge - NIVIS wSIM-2+DCCF
Ref Level 112.09 dBµV ATTEN 10 dB OFFSET: 4.20dB
RES BW: 100.0kHz 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

wSIM

Test Setup Photos

REPEATER

wSIM

15.247(e) Power Spectral Density

Data

Test Location:	CKC Laboratories, Inc,. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240		
Customer:	**Bently Nevada, Inc.**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**91950**	Date:	7/18/2012
Test Type:	**Maximized Emissions**	Time:	19:35:18
Equipment:	**EI.mesh ISA 100a Repeater**	Sequence#:	3
Manufacturer:	Bently Nevada, Inc.	Tested By:	Chuck Kendall
Model:	185450-01		
S/N:	0002:14CE		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	4/13/2012	4/13/2014
T2	AN03012	Cable	32022-2-29094K-36TC	2/28/2012	2/28/2014
T3	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
T4	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T5	AN02111	Spectrum Analyzer	8593EM	9/8/2011	9/8/2013
T6	AN03155	Preamp	83017A	8/3/2011	8/3/2013
T7	ANPSDCORR	Test Data Adjustment		No Cal Required	No Cal Required

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

Function	Manufacturer	Model #	S/N
EI.mesh ISA 100a Repeater*	Bently Nevada, Inc.	185450-01	0002:14CE
Zone Zero Battery	Bently-Nevada, Inc.	185547-01	N/A

Support Devices:

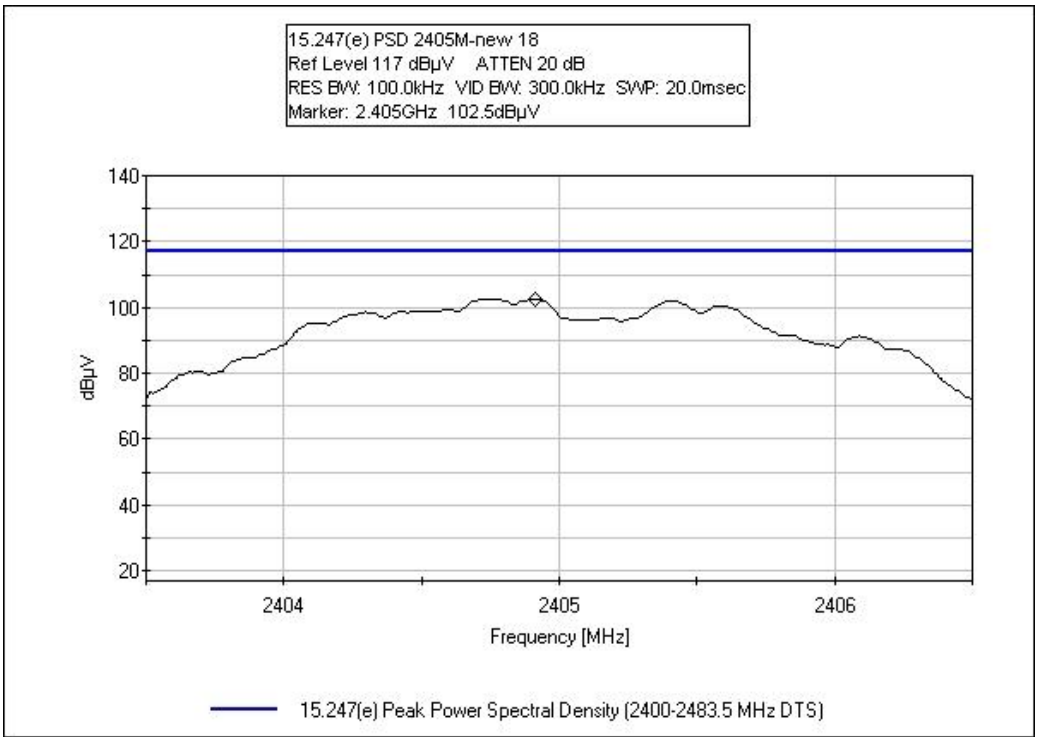
Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	E6400	T0066970

Test Conditions / Notes:

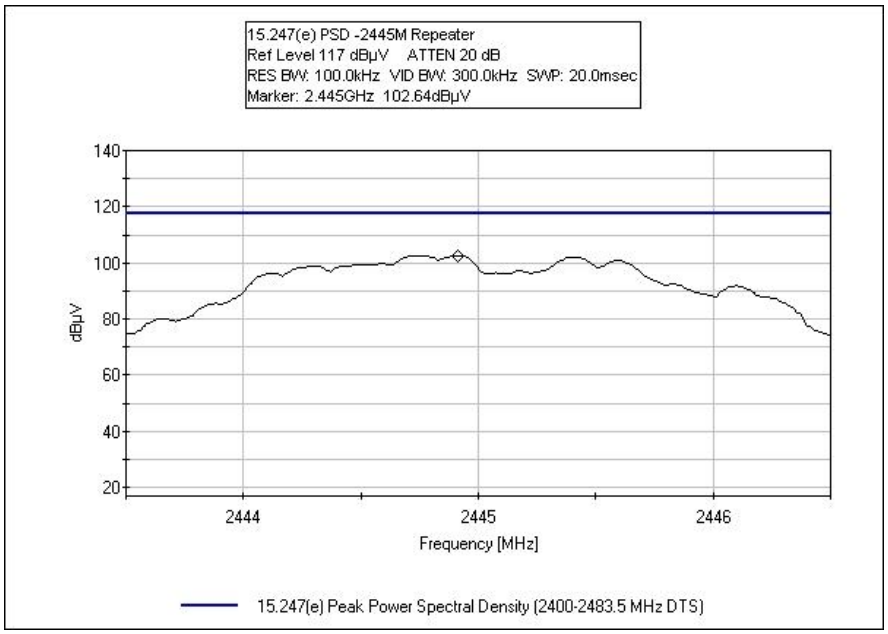
EI.mesh ISA100a Repeater is sitting on some Styrofoam pads atop a wooden turntable 0.8 m from the groundplane.
The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
Duty cycle = 1
Bandwidths IAW KDB 550874
Readings are peak readings.
-15.2 dB correction used in accordance with KDB 558074.
EUT antenna gain is 1.414dBi
Calculations used:
Power Density (dBm)=E (dBuV)+20Log(d)-104.8-10Log(3kHz/100kHz)

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

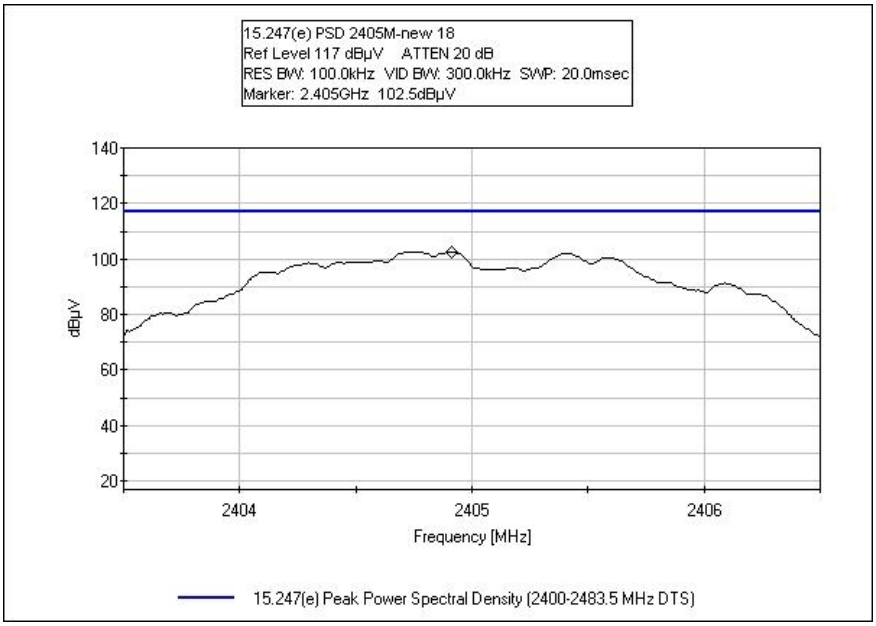
Frequency	Measured PSD Field Strength (dBuV/ @3m/100kHz)	Calculated PSD (dBm)	Limit	Pass or Fail
2405 MHz	106.00	-5.8	8 dBm	PASS
2445 MHz	105.94	-5.9	8 dBm	PASS
2480 MHz	104.18	-7.7	8 dBm	PASS



REPEATER 2405MHz



REPEATER 2445MHz



REPEATER 2480 MHz

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

Customer: **Bently Nevada-GE**
Specification: **15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**
Work Order #: **91950** Date: 7/19/2012
Test Type: **Maximized Emissions** Time: 19:34:48
Equipment: **EI.mesh Repeater** Sequence#: 1
Manufacturer: Bently Nevada, Inc. Tested By: Chuck Kendall
Model: 185350-01
S/N: 193ADO

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	4/23/2010	4/23/2012
T2	AN02111	Spectrum Analyzer	8593EM	3/7/2011	3/7/2013
T3	AN03155	Preamp	83017A	8/3/2011	8/3/2013
T4	AN03008	Cable	32022-2-2909K-24TC	1/26/2010	1/26/2012
T5	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013
T6	ANP01403	Cable	58758-23	6/22/2011	6/22/2013

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

Function	Manufacturer	Model #	S/N
EI.mesh Repeater*	Bently Nevada, Inc.	185350-01	193ADO
Zone Zero Battery	Bently Nevada, Inc.	185547-01	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Router	NIVIS	VersaRouter900	000317
POE	Unknown	POE-24i	09A99127D
Laptop Computer`	Dell	E6400	T0066970

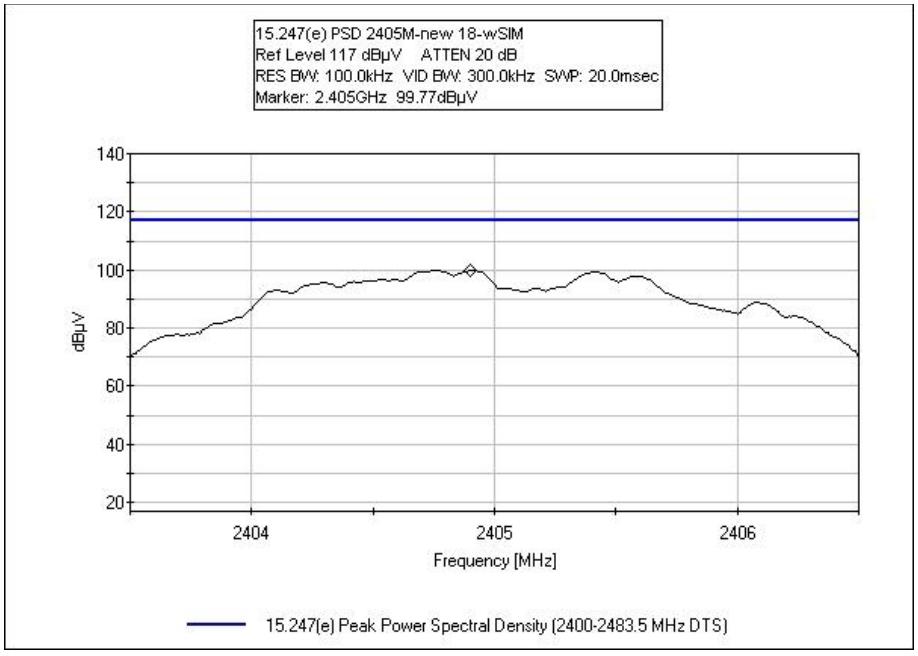
Test Conditions / Notes:

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

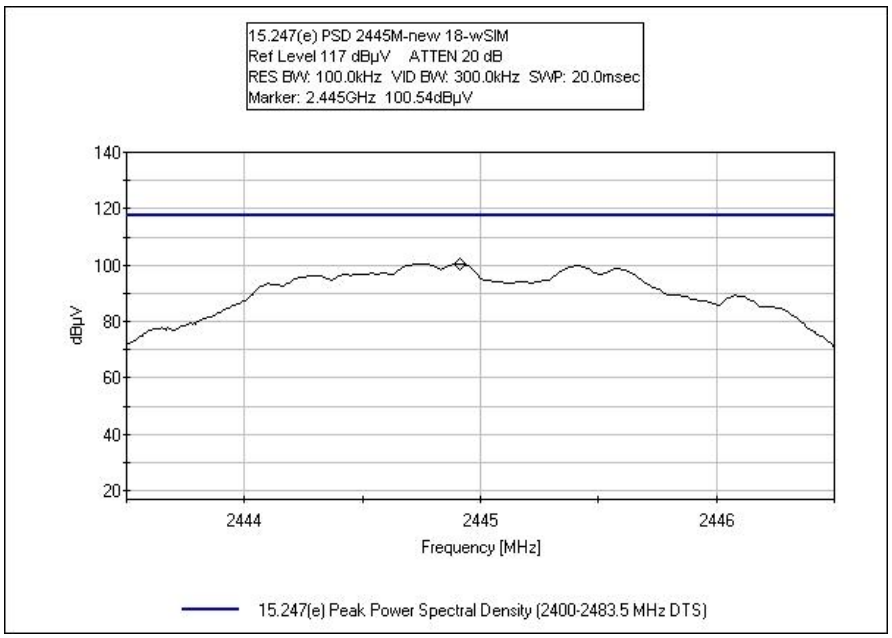
-15.2 dB correction used in accordance with KDB 558074.
EUT antenna gain is 1.414dBi
Calculations used:
Power Density (dBm)=E (dBuV)+20Log(d)-104.8-10Log(3kHz/100kHz)

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

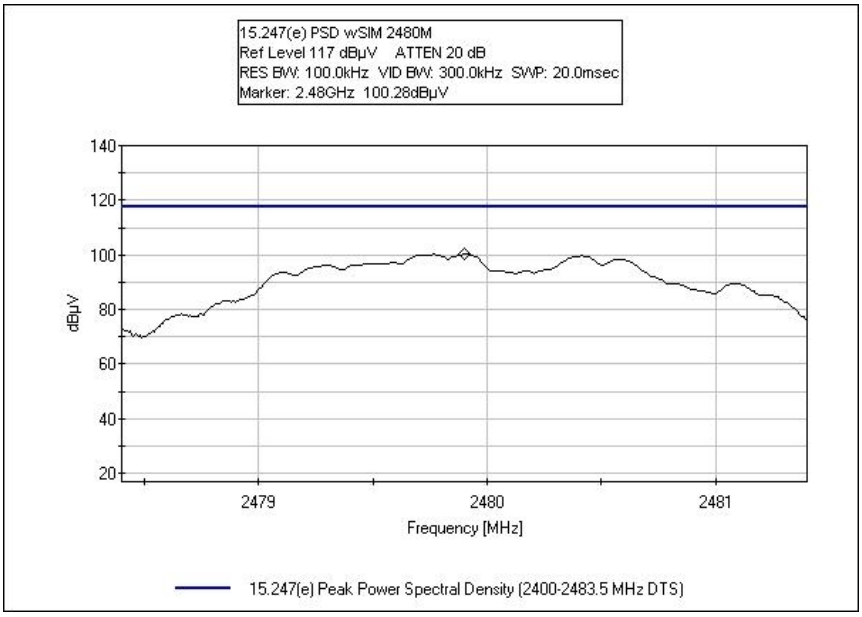
Frequency	Measured PSD Field Strength (dBuV/ @3m/100kHz)	Calculated PSD (dBm)	Limit
2405 MHz	103.27	-8.57	8 dBm
2445 MHz	103.84	- 8.00	8 dBm
2480 MHz	103.28	- 8.56	8 dBm



wSIM 2405MHz



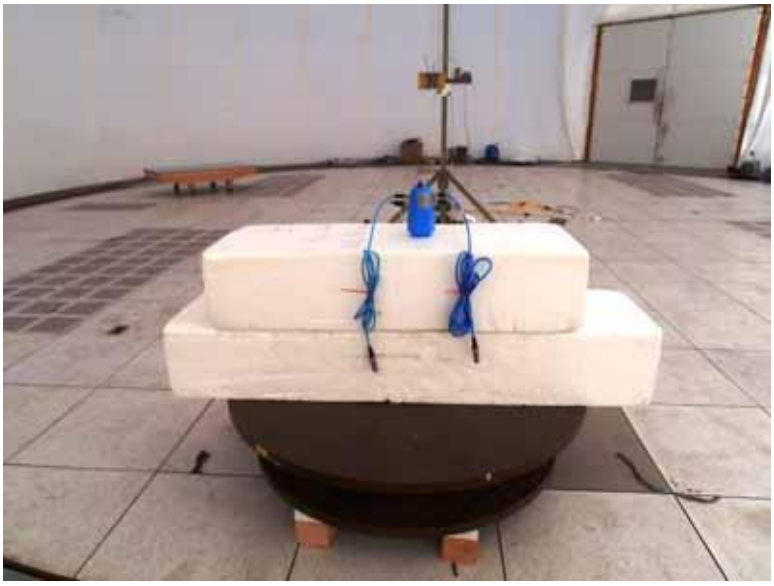
wSIM 2445MHz



wSIM 2480MHz

Test Setup Photos

REPEATER



wSIM

RSS-210

99 % Bandwidth

Test Conditions / Setup

The EI.mesh ISA 100a Repeater is sitting on Styrofoam pads atop a wooden turntable 1.5m from the ground plane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 30 kHz; VBW= 300 kHz with a span of 3 MHz.
The EI.mesh ISA 100a wSIM is sitting on some Styrofoam pads atop a wooden turntable 0.8 m from the ground plane. The unit is operating on Channel 0, Channel 8, & Channel 15 in transmit mode 100% modulated.
RBW = 30 kHz; VBW= 300 kHz with a span of 3 MHz.

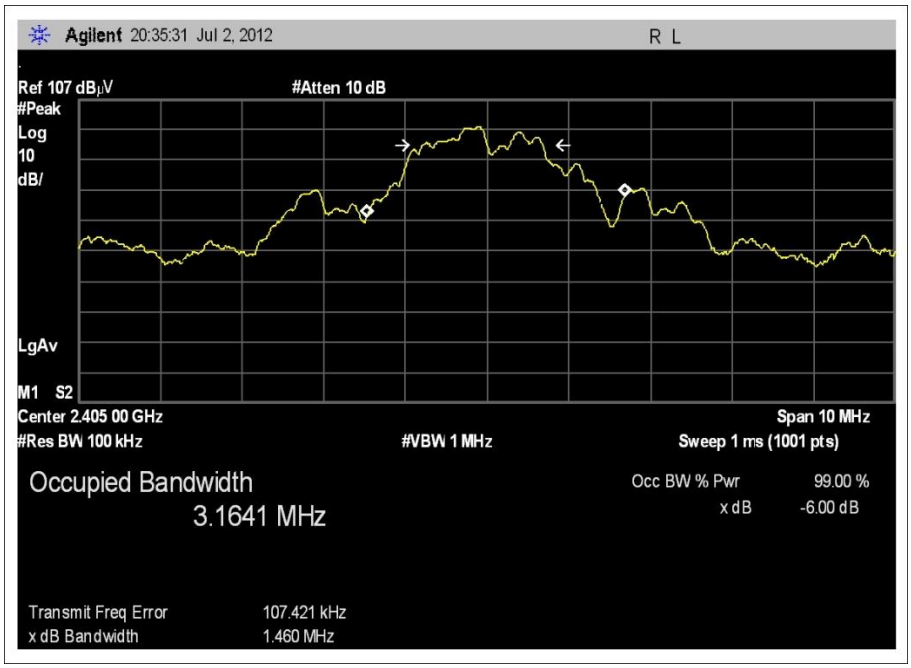
Temp = 20.2°C
Relative Humidity =40%
Press = 976 mBars

Engineer Name: C. Kendall

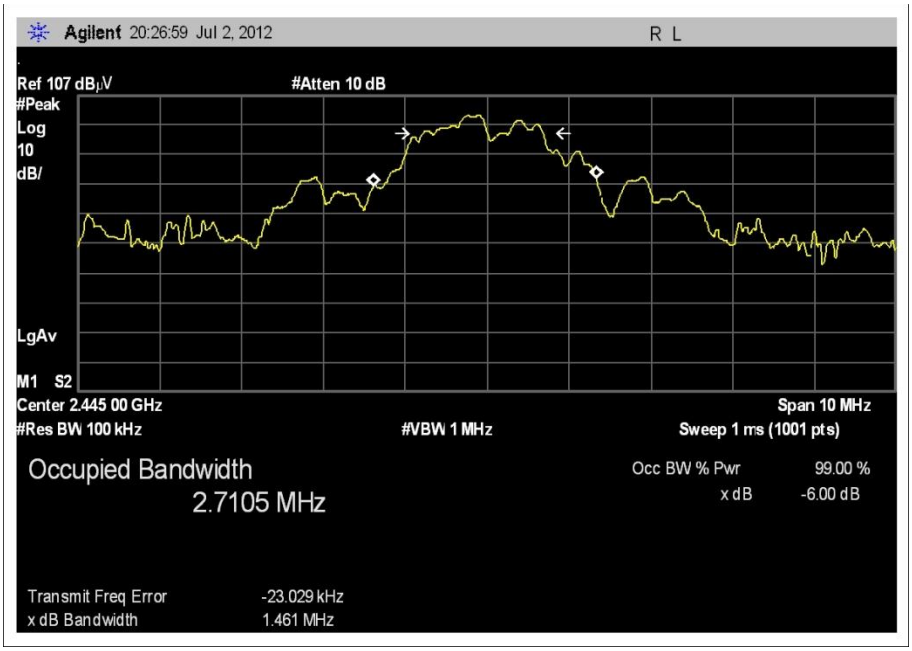
Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
ANP01403	Cable	58758-23	Simflex	6/22/2011	6/22/2013
ANP05904	Cable	32022-2-29094K-144TC	AstroLab	6/22/2011	6/22/2013
AN03155	Preamp	83017A	Pasternack	8/3/2011	8/3/2013
AN02660	Spectrum Analyzer	E4446A	Agilent	6/30/2010	6/30/2012
AN00327	Horn Antenna	3115	EMCO	4/23/2010	4/23/2012
AN03012	Cable	32022-2-29094K-36TC	AstroLab	2/28/2012	2/28/2014

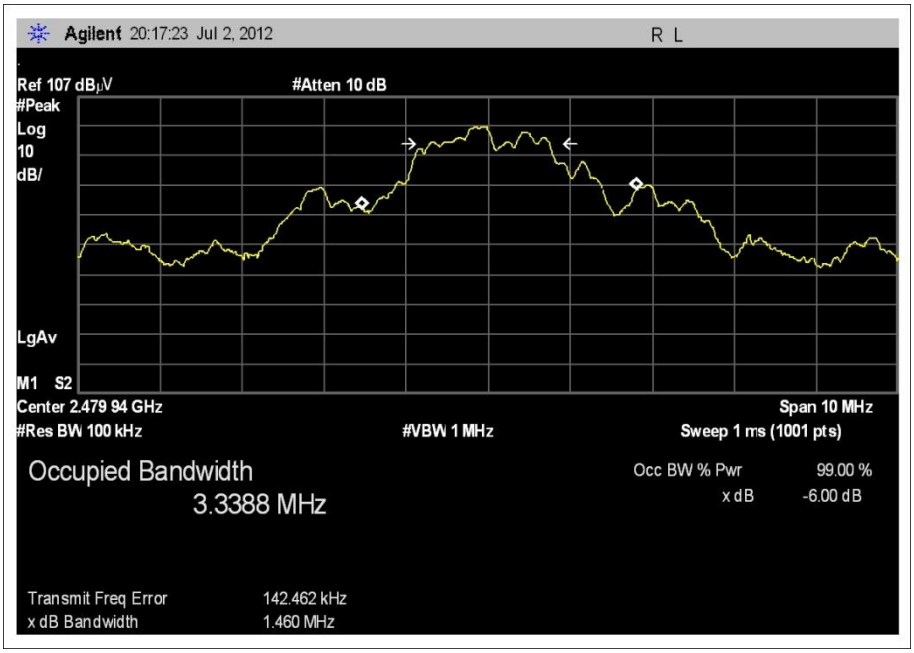
Test Data



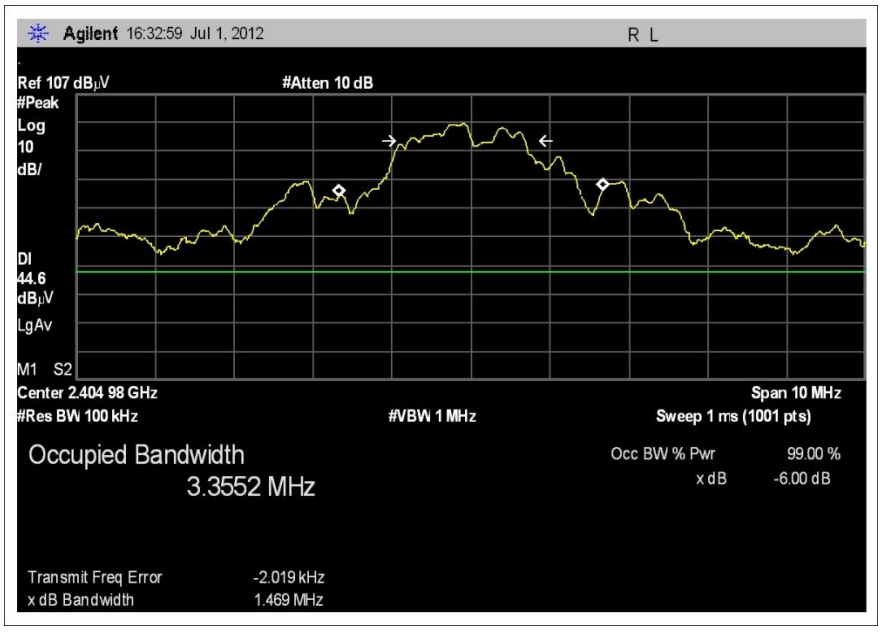
REPEATER 2405MHz



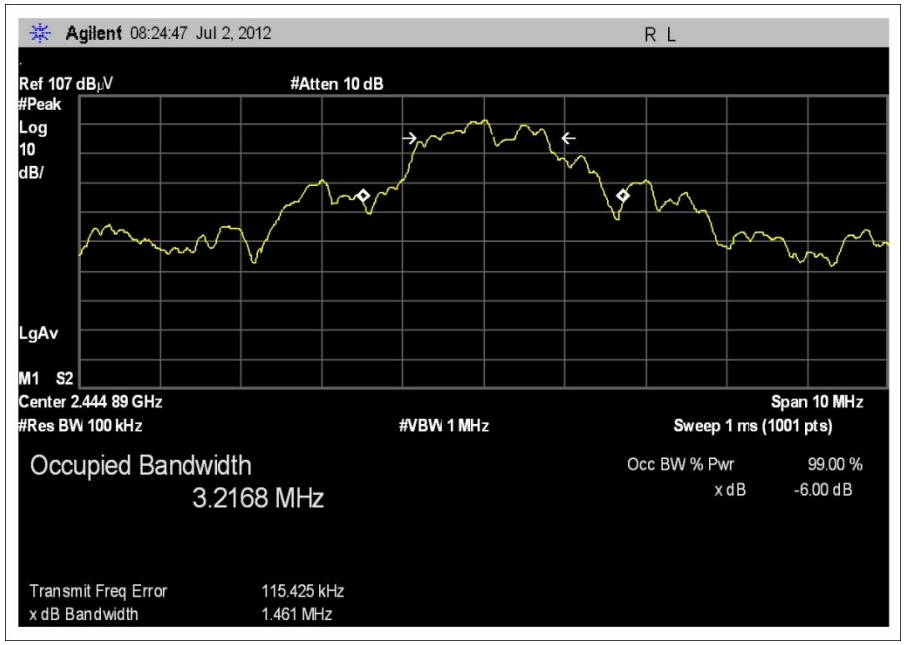
REPEATER 2445MHz



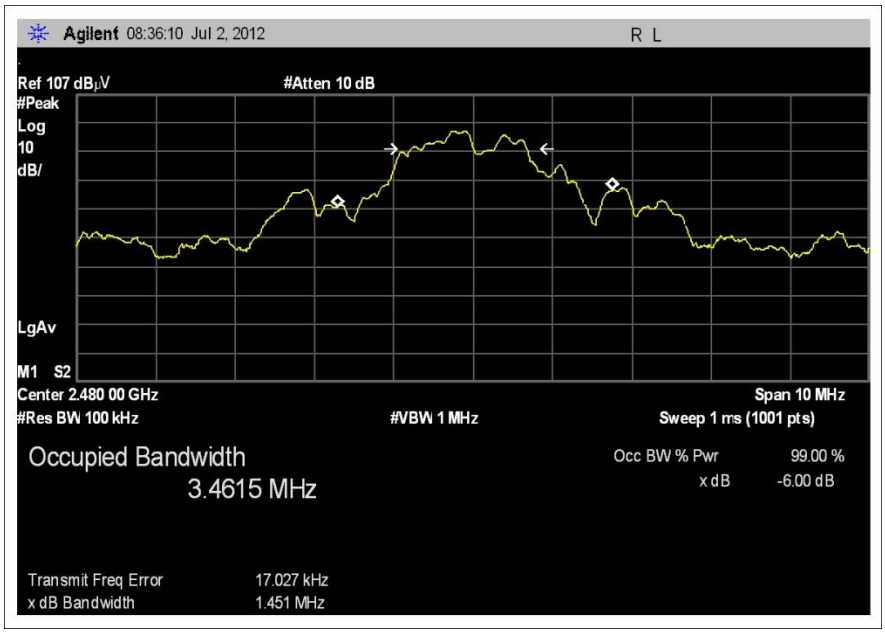
REPEATER 2480MHz



wSIM 2405MHz



wSIM 2445MHz



wSIM 2480MHz

Test Setup Photos

REPEATER

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.