Sentient Energy, Inc.

ADDENDUM TO TEST REPORT 95102-3

LNG1
Model: Gridstream, S4 Modular SCADA/DA

Tested To The Following Standards:

FCC Part 15 Subpart C, Section 15.247
(Partial Testing)

Report No.: 95102-3A

Date of issue: May 30, 2014

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.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Sentient Energy, Inc.
880 Mitten Road, Suite 105
Burlingame, CA 94010

Representative: Dennis Saxby
Customer Reference Number: 2277

REPORT PREPARED BY:

Morgan Tramontin
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 95102

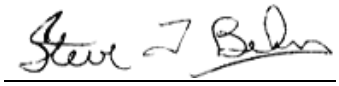
DATE OF EQUIPMENT RECEIPT: April 15, 2014
DATE(S) OF TESTING: April 15-16, 2014

Revision History

Original: Testing of the LNG1, Gridstream, S4 Modular SCADA/DA to FCC Part 15 Subpart C, Section 15.247.
Addendum A: To replace the original datasheets with the new updated datasheets that has an explanation on the derivation of the spec limit.

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

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Mariposa A	US0103	SL2-IN-E-1147R	3082A-2	90477	A-0136

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.247

Test Procedure/Method	Description	Results
15.207 / ANSI C63.4	Conducted Emissions	NP
15.247	RF Power Output	NP
15.31(e)	Voltage Variation	NP
15.215(c)	Occupied Bandwidth	NP
15.247	Antenna Conducted Emissions	NP
15.247	Field Strength of Harmonics	NP
15.247(d)	Radiated Spurious Emissions	Pass
15.247	Field Strength of Spurious Emissions and Bandedge	NP
15.247	Frequency Stability	NP
15.247	Power Spectral Density	NP

NP = CKC Laboratories was not contracted to perform test.

Conditions During Testing

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

Summary of Conditions
Test data in this report represents partial testing Class 2 permissive change for an approved FCC modular transmitter with a new type antenna. There are two types of modulations used for this device (Narrowband and Wideband). Radiated Spurious emissions performed for each type of modulation.

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

LNG1
Manuf: Sentient Energy, Inc.
Model: Gridstream, S4 Modular SCADA/DA
Serial: E121M501200012250

PERIPHERAL DEVICES

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

Laptop Computer
Manuf: Dell
Model: Latitude E5530
Serial: D97LYW1

DC Power Supply
Manuf: Agilent
Model: E3610A
Serial: MY51040007

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) CFR 47 Section 15 Subpart C requirements for Intentional Radiators.

15.247(d) Radiated Spurious Emissions

Test Data

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

Customer: **Sentient Energy, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **95102** Date: 4/15/2014
Test Type: **Maximized Emissions** Time: 13:15:04
Equipment: **LNG1** Sequence#: 1
Manufacturer: Sentient Energy, Inc. Tested By: Eddie Mariscal
Model: Gridstream, S4 Modular SCADA/DA
S/N: E121M501200012250

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01991	Biconilog Antenna	CBL6111C	3/7/2014	3/7/2016
T2	ANP05904	Cable	32022-2-29094K-144TC	2/15/2013	2/15/2015
T3	AN03355	Cable	32026-2-29094K-48TC	2/7/2013	2/7/2015
T4	AN03358	Cable	32022-2-29094K-36TC	2/7/2013	2/7/2015
T5	AN03359	Cable		2/4/2013	2/4/2015
T6	AN03360	Cable	32022-2-29094-36TC	2/4/2013	2/4/2015
T7	AN00449	Preamp-Bottom Amp (dB)	8447F	7/10/2012	7/10/2014
T8	AN02660	Spectrum Analyzer	E4446A	8/23/2012	8/23/2014
T9	AN00226	Loop Antenna	6502	3/28/2014	3/28/2016
T10	ANP06230	Cable	CXTA04A-50	8/16/2012	8/16/2014

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

Function	Manufacturer	Model #	S/N
LNG1*	Sentient Energy, Inc.	Gridstream, S4 Modular SCADA/DA	E121M501200012250

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude E5530	D97LYW1
DC Power supply	Agilent	E3610A	MY51040007

Test Conditions / Notes:

The EUT is placed atop a wooden, nonconductive turntable of height 80cm. The EUT is continuously transmitting in Narrow Band mode (Baud Rate set to 9600), powered with 4.75VDC from support power supply. Support laptop computer is also placed atop turntable. Laptop is used to set channel and modulation type.

Worst-case fundamental emissions measurements were taken and then used to derive the limit line. The calculations are shown below. Spurious emissions must be 20dB below the carrier, except within the restricted bands as defined in FCC part 15.205, in which case the limits of FCC part 15.209 are used.

Worst-case fundamental emission measurement: 113.4dBuV
Spurious emissions limit excluding restricted frequency bands: 113.4dBuV - 20dB = 93.4dBuV

Frequency range of interest:
.009-1000MHz
RBW = 200Hz; VBW >RBW for frequencies between .009-0.15MHz outside the restricted frequency bands as defined in FCC part 15.205
RBW = 9kHz; VBW > RBW for frequencies between 0.15-30MHz outside the restricted frequency bands as defined in FCC part 15.205
RBW = 100kHz; VBW > RBW for frequencies between 30-1000MHz outside the restricted frequency bands as defined in FCC part 15.205.
RBW = 120kHz; VBW > RBW for frequencies between 30-1000MHz within the restricted frequency bands as defined in FCC part 15.205.

Environmental conditions:
Temperature = 18°C
Relative Humidity = 40%
Atmospheric Pressure = 97.7kPa

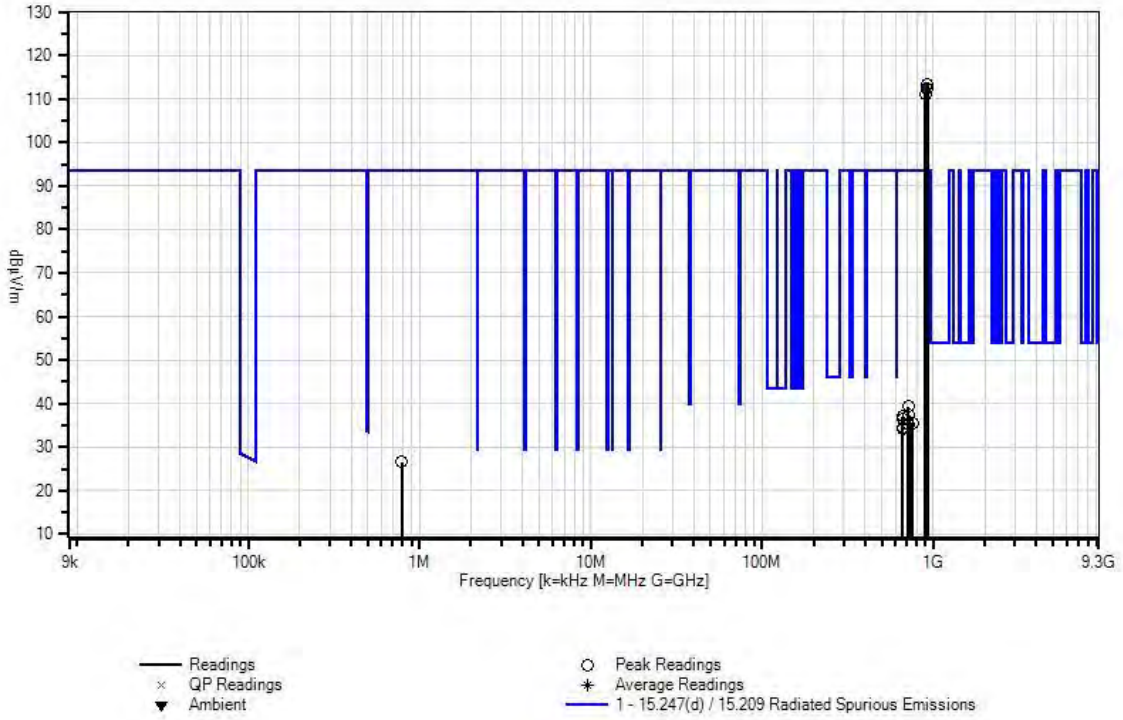
Ext Attn: 0 dB

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	927.893M	109.0	+23.6 +0.4 +0.0	+1.5 +0.4 +0.0	+0.4 -22.3	+0.4 +0.0	+0.0	113.4	113.4	+0.0	Vert
2	914.992M	108.3	+23.4 +0.4 +0.0	+1.5 +0.4 +0.0	+0.4 -22.3	+0.4 +0.0	+0.0	112.5	113.4	-0.9	Vert
3	902.002M	107.3	+23.1 +0.4 +0.0	+1.5 +0.4 +0.0	+0.4 -22.3	+0.4 +0.0	+0.0	111.2	113.4	-2.2	Vert
4	712.570M	38.7	+20.7 +0.3 +0.0	+1.3 +0.4 +0.0	+0.4 -22.9	+0.4 +0.0	+0.0	39.3	93.4 Low Channel Narrow Band	-54.1	Vert
5	719.970M	36.5	+20.8 +0.3 +0.0	+1.3 +0.4 +0.0	+0.4 -22.8	+0.4 +0.0	+0.0	37.3	93.4 Mid Channel Narrow Band	-56.1	Vert

6	659.970M	37.3	+20.3 +0.3 +0.0	+1.3 +0.4 +0.0	+0.3 -23.2	+0.4 +0.0	+0.0	37.1	93.4 Mid Channel Narrow Band	-56.3	Vert
7	660.017M	36.6	+20.3 +0.3 +0.0	+1.3 +0.4 +0.0	+0.3 -23.2	+0.4 +0.0	+0.0	36.4	93.4 High Channel Narrow Band	-57.0	Vert
8	760.017M	33.9	+21.4 +0.3 +0.0	+1.4 +0.4 +0.0	+0.4 -22.7	+0.4 +0.0	+0.0	35.5	93.4 Low Channel Narrow Band	-57.9	Horiz
9	720.020M	34.4	+20.8 +0.3 +0.0	+1.3 +0.4 +0.0	+0.4 -22.8	+0.4 +0.0	+0.0	35.2	93.4 Low Channel Narrow Band	-58.2	Horiz
10	720.000M	34.3	+20.8 +0.3 +0.0	+1.3 +0.4 +0.0	+0.4 -22.8	+0.4 +0.0	+0.0	35.1	93.4 Low Channel Narrow Band	-58.3	Vert
11	660.000M	34.8	+20.3 +0.3 +0.0	+1.3 +0.4 +0.0	+0.3 -23.2	+0.4 +0.0	+0.0	34.6	93.4 High Channel Narrow Band	-58.8	Horiz
12	660.000M	34.3	+20.3 +0.3 +0.0	+1.3 +0.4 +0.0	+0.3 -23.2	+0.4 +0.0	+0.0	34.1	93.4 Low Channel Narrow Band	-59.3	Vert
13	790.300k	55.7	+0.0 +0.0 +10.8	+0.0 +0.0 +0.1	+0.0 +0.0	+0.0 +0.0	-40.0	26.6	93.4 High Channel Narrow Band	-66.8	Vert

Date: 4/15/2014 Time: 13:15:04 Sentient Energy, Inc. WO#: 95102
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



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

Customer: **Sentient Energy, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **95102** Date: 4/15/2014
Test Type: **Maximized Emissions** Time: 14:49:52
Equipment: **LNG1** Sequence#: 1
Manufacturer: Sentient Energy, Inc. Tested By: Eddie Mariscal
Model: Gridstream, S4 Modular SCADA/DA
S/N: E121M501200012250

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	3/18/2014	3/18/2016
T2	AN03360	Cable	32022-2-29094-36TC	2/4/2013	2/4/2015
T3	AN03171	High Pass Filter	HM1155-11SS	2/26/2013	2/26/2015
T4	AN03155	Preamp	83017A	6/26/2013	6/26/2015
T5	ANP05904	Cable	32022-2-29094K-144TC	2/15/2013	2/15/2015
T6	AN03355	Cable	32026-2-29094K-48TC	2/7/2013	2/7/2015
T7	AN03358	Cable	32022-2-29094K-36TC	2/7/2013	2/7/2015
T8	AN03359	Cable		2/4/2013	2/4/2015
T9	AN02660	Spectrum Analyzer	E4446A	8/23/2012	8/23/2014

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

Function	Manufacturer	Model #	S/N
LNG1*	Sentient Energy, Inc.	Gridstream, S4 Modular SCADA/DA	E121M501200012250

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude E5530	D97LYW1
DC Power supply	Agilent	E3610A	MY51040007

Test Conditions / Notes:

The EUT is placed atop a wooden, nonconductive turntable of height 80cm. The EUT is continuously transmitting in Narrow Band mode (Baud Rate set to 9600), powered with 4.75VDC from support power supply. Support laptop computer is also placed atop turntable. Laptop is used to set channel and modulation type.

Worst-case fundamental emissions measurements were taken and then used to derive the limit line. The calculations are shown below. Spurious emissions must be 20dB below the carrier, except within the restricted bands as defined in FCC part 15.205, in which case the limits of FCC part 15.209 are used.

Worst-case fundamental emission measurement: 113.4dBuV
Spurious emissions limit excluding restricted frequency bands: 113.4dBuV - 20dB = 93.4dBuV

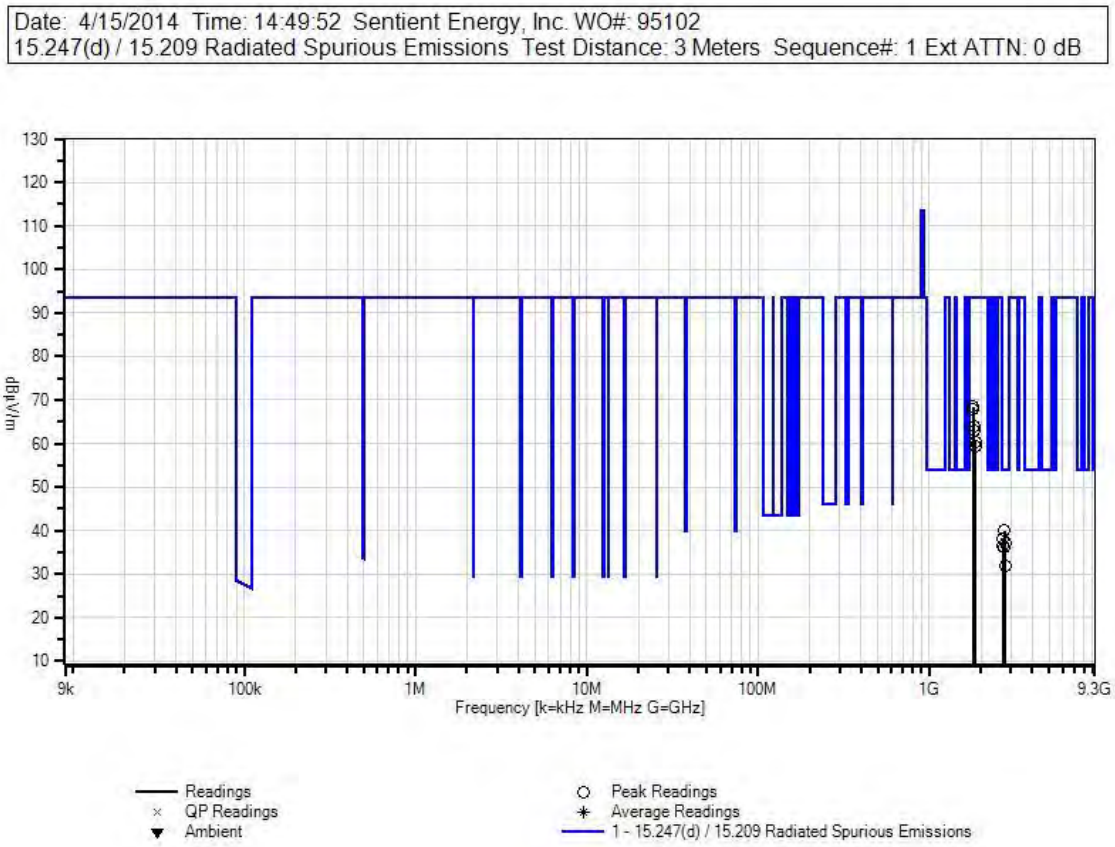
Frequency range of interest:
1 - 9.28GHz
RBW = 100kHz; VBW > RBW for frequencies outside the restricted frequency bands as defined in FCC part 15.205.
RBW = 1MHz; VBW > RBW for frequencies within the restricted frequency bands as defined in FCC part 15.205.
Environmental conditions: Temperature = 18°C, Relative Humidity = 40%, Atmospheric Pressure = 97.7kPa

Ext Attn: 0 dB

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

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2745.050M	41.7	+25.9 +2.3 +0.0	+0.8 +0.5	+0.3 +0.8	-32.9 +0.6	+0.0	40.0	54.0 3rd Harm-Mid Channel Narrow Band	-14.0	Vert
2	2706.000M	40.1	+25.7 +2.3 +0.0	+0.7 +0.5	+0.3 +0.7	-32.9 +0.6	+0.0	38.0	54.0 3rd Harm-Low Channel Narrow Band	-16.0	Vert
3	2783.683M	38.5	+26.0 +2.4 +0.0	+0.8 +0.5	+0.3 +0.8	-32.8 +0.6	+0.0	37.1	54.0 3rd Harm-High Channel Narrow Band	-16.9	Vert
4	2706.003M	38.5	+25.7 +2.3 +0.0	+0.7 +0.5	+0.3 +0.7	-32.9 +0.6	+0.0	36.4	54.0 3rd Harm-Low Channel Narrow Band	-17.6	Horiz
5	2744.992M	38.0	+25.9 +2.3 +0.0	+0.8 +0.5	+0.3 +0.8	-32.9 +0.6	+0.0	36.3	54.0 3rd Harm-Mid Channel Narrow Band	-17.7	Horiz
6	2783.730M	33.4	+26.0 +2.4 +0.0	+0.8 +0.5	+0.3 +0.8	-32.8 +0.6	+0.0	32.0	54.0 3rd Harm-High Channel Narrow Band	-22.0	Horiz
7	1804.000M	73.0	+24.2 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	68.4	93.4 2nd Harm-Low Channel Narrow Band	-25.0	Vert
8	1804.000M	72.4	+24.2 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	67.8	93.4 2nd Harm-Low Channel Narrow Band	-25.6	Horiz
9	1829.996M	68.3	+24.3 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	63.8	93.4 2nd Harm-Mid Channel Narrow Band	-29.6	Vert

10	1829.992M	67.6	+24.3 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	63.1	93.4 2nd Harm-Mid Channel Narrow Band	-30.3	Horiz
11	1855.783M	64.8	+24.4 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.2 +0.5	+0.0	60.5	93.4 2nd Harm-High Channel Narrow Band	-32.9	Vert
12	1855.783M	63.7	+24.4 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.2 +0.5	+0.0	59.4	93.4 2nd Harm-High Channel Narrow Band	-34.0	Horiz



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

Customer: **Sentient Energy, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **95102** Date: 4/16/2014
Test Type: **Maximized Emissions** Time: 10:10:32
Equipment: **LNG1** Sequence#: 1
Manufacturer: Sentient Energy, Inc. Tested By: Eddie Mariscal
Model: Gridstream, S4 Modular SCADA/DA
S/N: E121M501200012250

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01991	Biconilog Antenna	CBL6111C	3/7/2014	3/7/2016
T2	ANP05904	Cable	32022-2-29094K-144TC	2/15/2013	2/15/2015
T3	AN03355	Cable	32026-2-29094K-48TC	2/7/2013	2/7/2015
T4	AN03358	Cable	32022-2-29094K-36TC	2/7/2013	2/7/2015
T5	AN03359	Cable		2/4/2013	2/4/2015
T6	AN03360	Cable	32022-2-29094-36TC	2/4/2013	2/4/2015
T7	AN00449	Preamp-Bottom Amp (dB)	8447F	7/10/2012	7/10/2014
T8	AN02660	Spectrum Analyzer	E4446A	8/23/2012	8/23/2014
	AN00226	Loop Antenna	6502	3/28/2014	3/28/2016
	ANP06230	Cable	CXTA04A-50	8/16/2012	8/16/2014

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

Function	Manufacturer	Model #	S/N
LNG1*	Sentient Energy, Inc.	Gridstream, S4 Modular SCADA/DA	E121M501200012250

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude E5530	D97LYW1
DC Power supply	Agilent	E3610A	MY51040007

Test Conditions / Notes:

The EUT is placed atop a wooden, nonconductive turntable of height 80cm. The EUT is continuously transmitting in Wide Band mode (Baud Rate set to 115200), powered with 4.75VDC from support power supply. Support laptop computer is also placed atop turntable. Laptop is used to set channel and modulation type.

Worst-case fundamental emissions measurements were taken and then used to derive the limit line. The calculations are shown below. Spurious emissions must be 20dB below the carrier, except within the restricted bands as defined in FCC part 15.205, in which case the limits of FCC part 15.209 are used.

Worst-case fundamental emission measurement: 114.9dBuV
Spurious emissions limit excluding restricted frequency bands: 114.9dBuV - 20dB = 94.9dBuV

Frequency range of interest:
.009-1000MHz
RBW = 200Hz; VBW >RBW for frequencies between .009-0.15MHz within the restricted frequency bands as defined in FCC part 15.205.
RBW = 9kHz; VBW > RBW for frequencies between 0.15-30MHz within the restricted frequency bands as defined in FCC part 15.205.
RBW = 120kHz; VBW > RBW for frequencies between 30-1000MHz within the restricted frequency bands as defined in FCC part 15.205.
RBW = 100kHz; VBW > RBW for frequencies outside the restricted frequency bands as defined in FCC part 15.205.

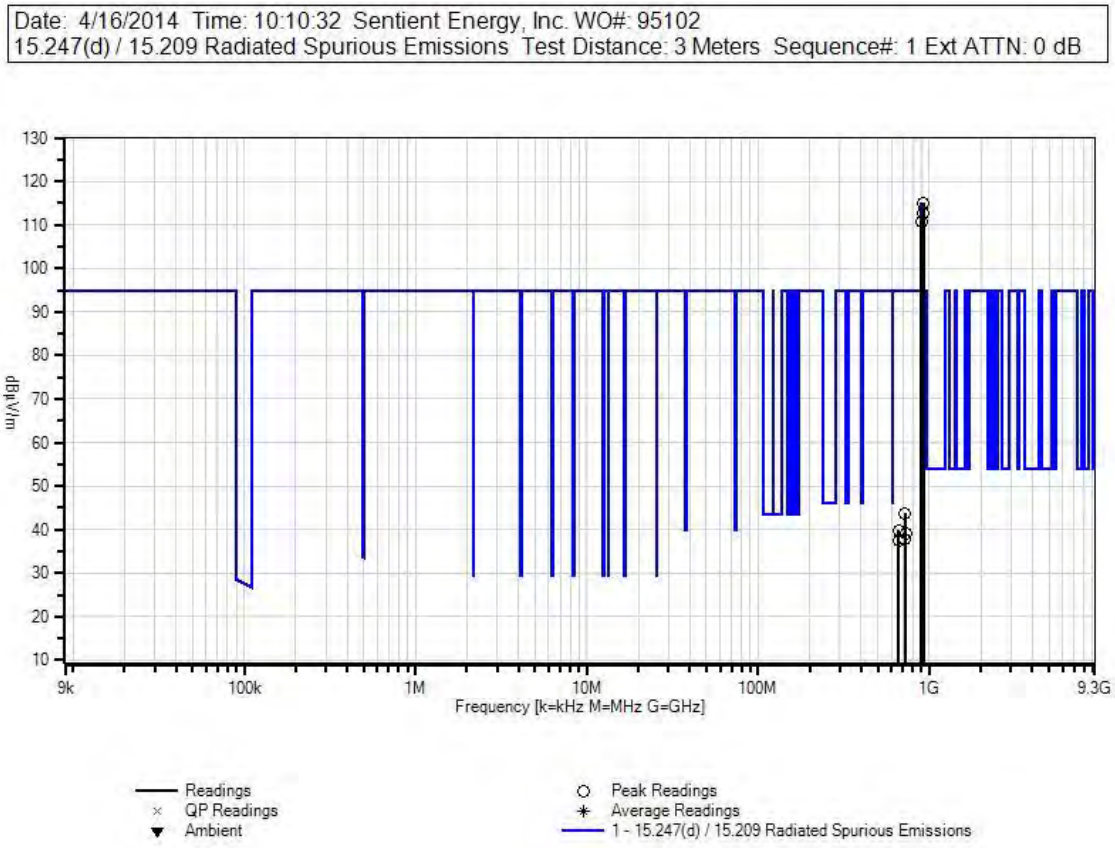
Environmental conditions: Temperature = 18°C, Relative Humidity = 40%, Atmospheric Pressure = 97.7kPa

Ext Attn: 0 dB

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	927.960M	110.5	+23.6 +0.4	+1.5 +0.4	+0.4 -22.3	+0.4 +0.0	+0.0	114.9	114.9	+0.0	Vert
2	914.937M	108.6	+23.3 +0.4	+1.5 +0.4	+0.4 -22.3	+0.4 +0.0	+0.0	112.7	114.9	-2.2	Vert
3	902.057M	106.9	+23.1 +0.4	+1.5 +0.4	+0.4 -22.3	+0.4 +0.0	+0.0	110.8	114.9	-4.1	Vert
4	720.050M	42.9	+20.8 +0.3	+1.3 +0.4	+0.4 -22.8	+0.4 +0.0	+0.0	43.7	94.9 Low Channel-Wide Band	-51.2	Vert
5	659.870M	40.0	+20.3 +0.3	+1.3 +0.4	+0.3 -23.2	+0.4 +0.0	+0.0	39.8	94.9 Low Channel-Wide Band	-55.1	Horiz

6	725.560M	38.1	+20.9 +0.3	+1.3 +0.4	+0.4 -22.8	+0.4 +0.0	+0.0	39.0	94.9 Mid Channel-Wide Band	-55.9	Vert
7	719.983M	37.0	+20.8 +0.3	+1.3 +0.4	+0.4 -22.8	+0.4 +0.0	+0.0	37.8	94.9 Low Channel-Wide Band	-57.1	Horiz
8	660.023M	37.8	+20.3 +0.3	+1.3 +0.4	+0.3 -23.2	+0.4 +0.0	+0.0	37.6	94.9 Low Channel-Wide Band	-57.3	Vert



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

Customer: **Sentient Energy, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **95102** Date: 4/15/2014
Test Type: **Maximized Emissions** Time: 16:28:24
Equipment: **LNG1** Sequence#: 1
Manufacturer: Sentient Energy, Inc. Tested By: Eddie Mariscal
Model: Gridstream, S4 Modular SCADA/DA
S/N: E121M501200012250

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	3/18/2014	3/18/2016
T2	AN03360	Cable	32022-2-29094-36TC	2/4/2013	2/4/2015
T3	AN03171	High Pass Filter	HM1155-11SS	2/26/2013	2/26/2015
T4	AN03155	Preamp	83017A	6/26/2013	6/26/2015
T5	ANP05904	Cable	32022-2-29094K-144TC	2/15/2013	2/15/2015
T6	AN03355	Cable	32026-2-29094K-48TC	2/7/2013	2/7/2015
T7	AN03358	Cable	32022-2-29094K-36TC	2/7/2013	2/7/2015
T8	AN03359	Cable		2/4/2013	2/4/2015
T9	AN02660	Spectrum Analyzer	E4446A	8/23/2012	8/23/2014

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

Function	Manufacturer	Model #	S/N
LNG1*	Sentient Energy, Inc.	Gridstream, S4 Modular SCADA/DA	E121M501200012250

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude E5530	D97LYW1
DC Power supply	Agilent	E3610A	MY51040007

Test Conditions / Notes:

The EUT is placed atop a wooden, nonconductive turntable of height 80cm. The EUT is continuously transmitting in Wide Band mode (Baud Rate set to 115200), powered with 4.75VDC from support power supply. Support laptop computer is also placed atop turntable. Laptop is used to set channel and modulation type.

Worst-case fundamental emissions measurements were taken and then used to derive the limit line. The calculations are shown below. Spurious emissions must be 20dB below the carrier, except within the restricted bands as defined in FCC part 15.205, in which case the limits of FCC part 15.209 are used.

Worst-case fundamental emission measurement: 114.9dBuV
Spurious emissions limit excluding restricted frequency bands: 114.9dBuV - 20dB = 94.9dBuV

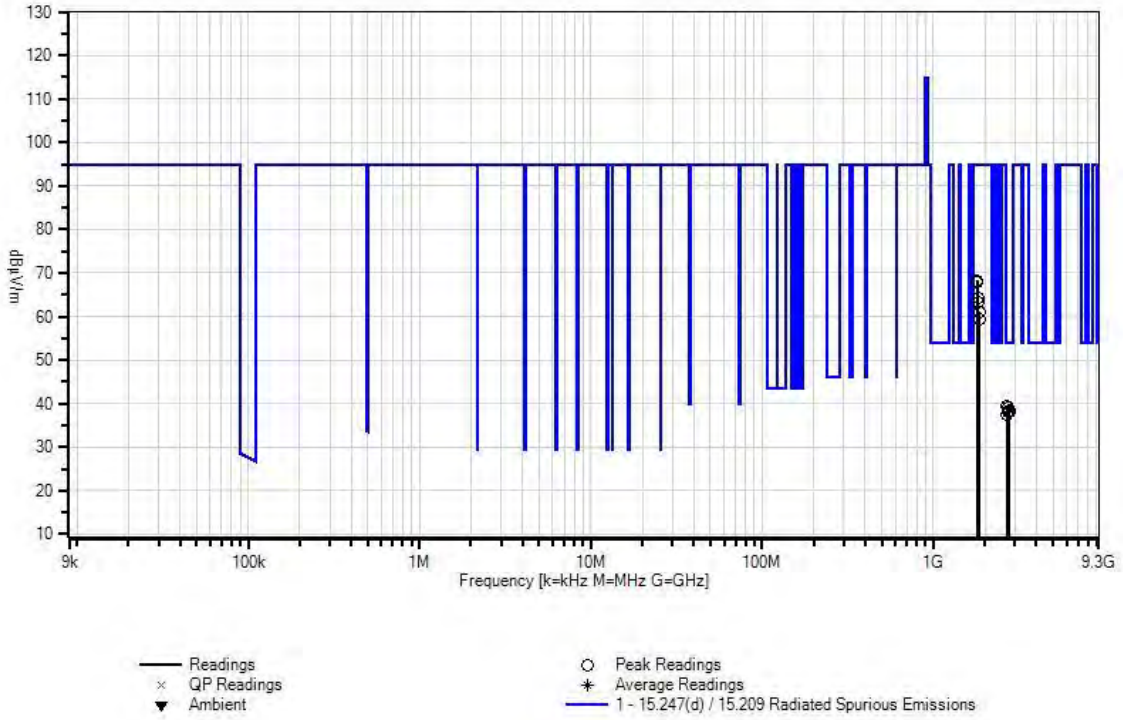
Frequency range of interest:
1000 - 9280MHz
RBW = 100kHz; VBW > RBW for frequencies outside the restricted frequency bands as defined in FCC part 15.205.
RBW = 1MHz; VBW > RBW for frequencies within the restricted frequency bands as defined in FCC part 15.205.
Environmental conditions: Temperature = 18°C, Relative Humidity = 40%, Atmospheric Pressure = 97.7kPa

Ext Attn: 0 dB

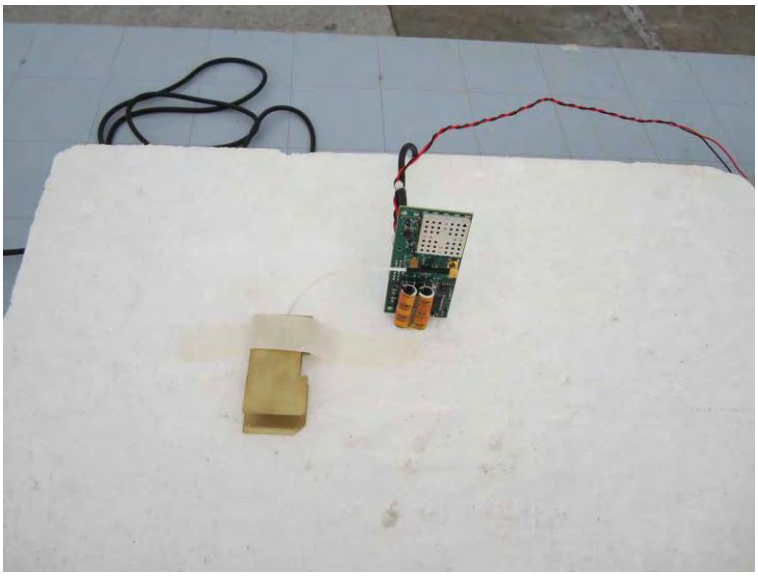
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2706.140M	41.4	+25.7 +2.3 +0.0	+0.7 +0.5	+0.3 +0.7	-32.9 +0.6	+0.0	39.3	54.0 3rd Harm-Low Channel Wide Band	-14.7	Horiz
2	2745.033M	40.9	+25.9 +2.3 +0.0	+0.8 +0.5	+0.3 +0.8	-32.9 +0.6	+0.0	39.2	54.0 3rd Harm-Mid Channel Wide Band	-14.8	Vert
3	2784.033M	39.8	+26.0 +2.4 +0.0	+0.8 +0.5	+0.3 +0.8	-32.8 +0.6	+0.0	38.4	54.0 3rd Harm-High Channel Wide Band	-15.6	Horiz
4	2784.000M	39.6	+26.0 +2.4 +0.0	+0.8 +0.5	+0.3 +0.8	-32.8 +0.6	+0.0	38.2	54.0 3rd Harm-High Channel Wide Band	-15.8	Vert
5	2745.033M	39.9	+25.9 +2.3 +0.0	+0.8 +0.5	+0.3 +0.8	-32.9 +0.6	+0.0	38.2	54.0 3rd Harm-Mid Channel Wide Band	-15.8	Horiz
6	2706.000M	39.7	+25.7 +2.3 +0.0	+0.7 +0.5	+0.3 +0.7	-32.9 +0.6	+0.0	37.6	54.0 3rd Harm-Low Channel Wide Band	-16.4	Vert
7	1803.908M	72.9	+24.2 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	68.3	94.9 2nd Harm-Low Channel Wide Band	-26.6	Vert
8	1803.883M	72.5	+24.2 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	67.9	94.9 2nd Harm-Low Channel Wide Band	-27.0	Horiz
9	1829.867M	68.7	+24.3 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	64.2	94.9 2nd Harm-Mid Channel Wide Band	-30.7	Vert
10	1830.033M	67.9	+24.3 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.3 +0.5	+0.0	63.4	94.9 2nd Harm-Mid Channel Wide Band	-31.5	Horiz
11	1856.000M	65.3	+24.4 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.2 +0.5	+0.0	61.0	94.9 2nd Harm-High Channel Wide Band	-33.9	Vert
12	1855.667M	63.8	+24.4 +2.1 +0.0	+0.6 +0.4	+0.4 +0.5	-33.2 +0.5	+0.0	59.5	94.9 2nd Harm-High Channel Wide Band	-35.4	Horiz

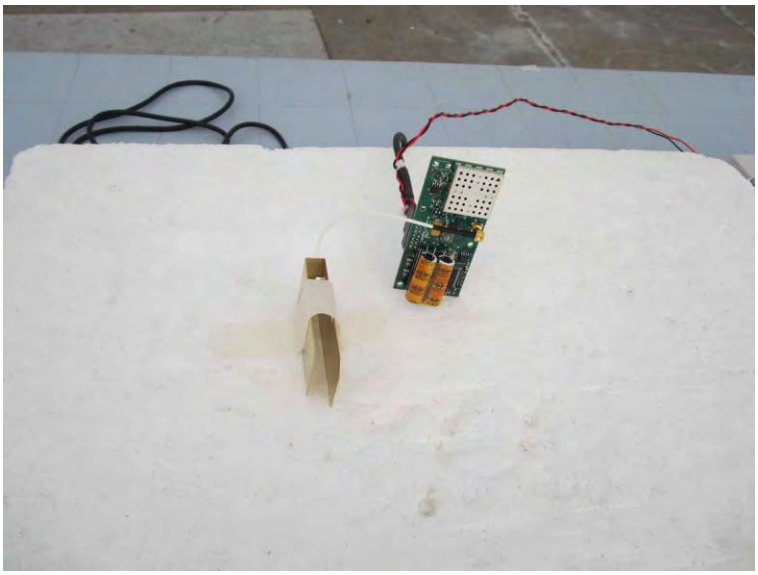
Date: 4/15/2014 Time: 16:28:24 Sentient Energy, Inc. WO#: 95102
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



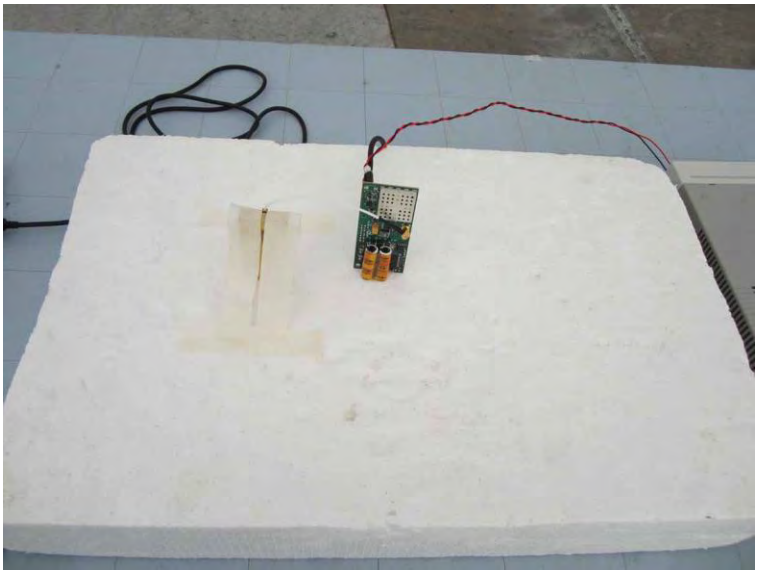
Test Setup Photo(s)



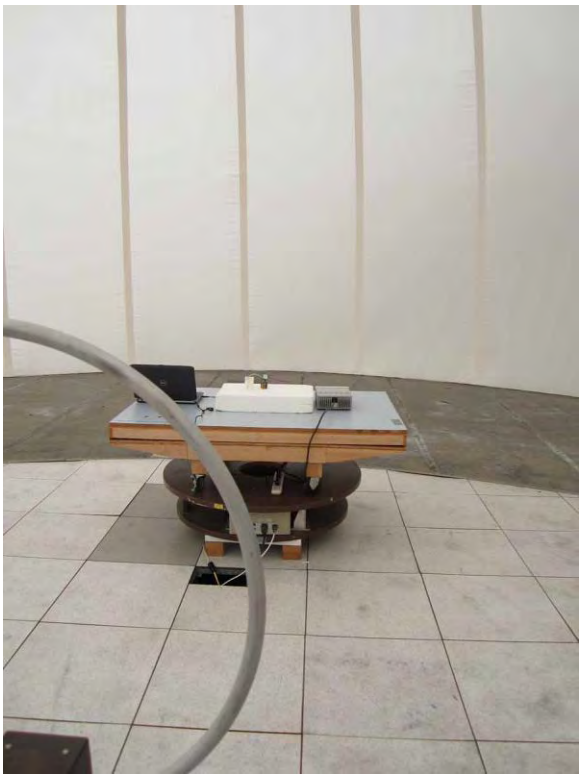
X Axis



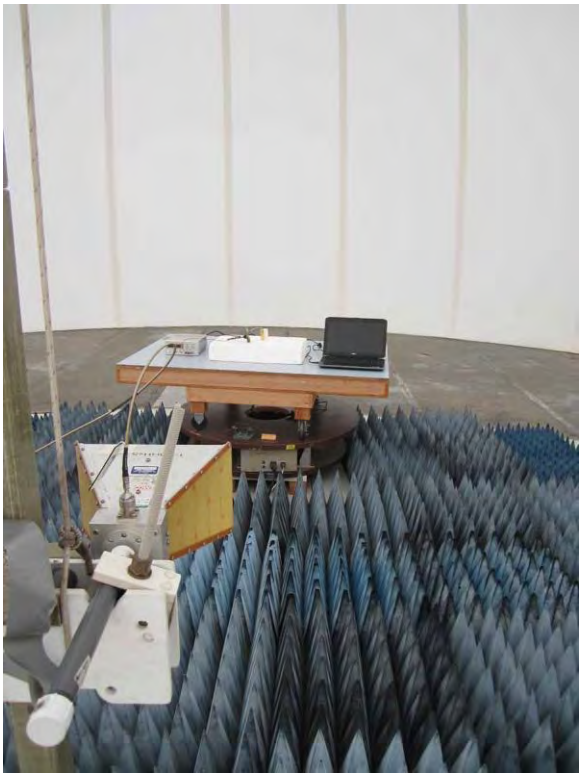
Y Axis



Z Axis



.009MHz-1GHz



1-9.3GHz

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	9 kHz	150 kHz	200 Hz
RADIATED 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.