ENGINEERING TEST REPORT

GProx II Mullion Reader
Model No.: MU2N
FCC ID: X78MU2N

Applicant:

Guardall, A Division of CSG Security Corp.
5201 Explorer Drive
Mississauga, Ontario
Canada L4W 4H1

In Accordance With
Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.209

UltraTech's File No.: CHB-119F15C209

This Test report is Issued under the Authority of
Tri M. Luu, BASc
Vice President of Engineering
UltraTech Group of Labs

Date: August 11, 2010

Report Prepared by: Dan Huynh	Tested by: Hung Trinh, EMC/RFI Technician Satish Patel, EMC Technician
Issued Date: August 11, 2010	Test Dates: March 9 & 11, 2010

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax.: (905) 829-8050
Website: www.ultratech-labs.com, Email: vic@ultratech-labs.com, Email: tri@ultratech-labs.com

FCC	VCCI	Industry Canada Approved Test Facility	NVLAP	BSMI	Korea KCC-RRL
91038	1309	46390-2049	NvLap Lab Code 200093-0	SL2-IN-E-1119R	CA2049

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C
Title:	Code of Federal Regulations (CFR), Title 47, Telecommunication - Part 15
Purpose of Test:	To gain FCC Equipment Certification for Part 15C devices.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Commercial, industrial or business environment

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC 47 CFR 15	2009	Code of Federal Regulations – Telecommunication
ANSI C63.10	2009	American National Standard for Testing Unlicensed Wireless Devices
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
CISPR 22 EN 55022	2008-09, Edition 6.0 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Guardall, A Division of CSG Security Corp.
Address:	5201 Explorer Drive Mississauga, Ontario Canada L4W 4H1
Contact Person:	George Grzeslo Phone #: 905-629-2600 x 3624 Fax #: 905-629-4970 Email Address: george.grzeslo@guardall.com

MANUFACTURER	
Name:	Guardall, A Division of CSG Security Corp.
Address:	5201 Explorer Drive Mississauga, Ontario Canada L4W 4H1
Contact Person:	George Grzeslo Phone #: 905-629-2600 x 3624 Fax #: 905-629-4970 Email Address: george.grzeslo@guardall.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Guardall, A Division of CSG Security Corp.
Product Name:	GProx II Mullion Reader
Model Name or Number:	MU2N
Serial Number:	Test sample
Type of Equipment:	Low Power Transceiver
Input Power Supply Type:	12VDC to 13.8 VDC
Primary User Functions of EUT:	Present RFID card into field to allow reader to read card information,

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Mobile
Intended Operating Environment:	Commercial, light industry & heavy industry
Power Supply Requirement:	12 VDC to 13.8 VDC
RF Output Power Rating:	60.35 dBµV/m peak at 10m distance
Operating Frequency Range:	120 kHz
Duty Cycle:	100%
20 dB Bandwidth:	3.24 kHz
Modulation Type:	ASK
Oscillator Frequencies:	125 kHz, 11.0592 MHz
Antenna Connector Type:	Integral Custom wound wire loop

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	Power and communication	1	None - loose wire	Shielded 10 Feet (3.05 m)

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

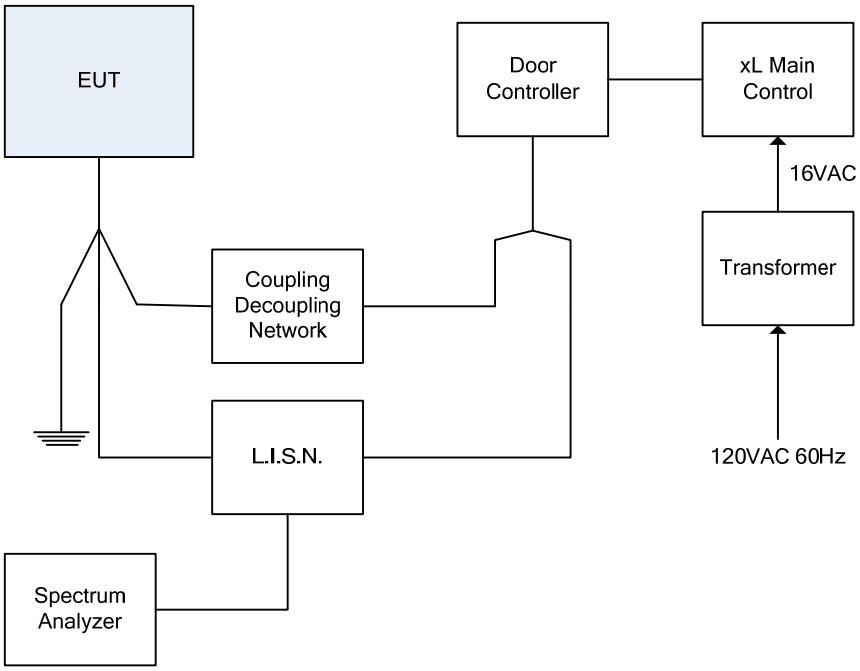
Ancillary Equipment # 1	
Description:	Door Controller
Brand Name:	Guardall
Model Name or Number:	950-9015
Serial Number:	57880
Cable Length & Type:	> 3 m, Shielded
Connected to EUT's Port:	Power and I/O ports

Ancillary Equipment # 2	
Description:	xL Main Control
Brand Name:	Guardall
Model Name or Number:	650-3600
Serial Number:	03756
Cable Length & Type:	> 3 m, Shielded
Connected to EUT's Port:	N/A

Ancillary Equipment # 3	
Description:	120 VAC to 16 VAC 60 Hz transformer
Brand Name:	Guardall
Model Name or Number:	FTC3716
Serial Number:	N/A
Cable Length & Type:	> 3 m, Shielded
Connected to EUT's Port:	N/A

2.6. TEST SETUP BLOCK DIAGRAM

2.6.1. Power Line Conducted Emission Test Setup



2.6.2. Radiated Emission Test Setup

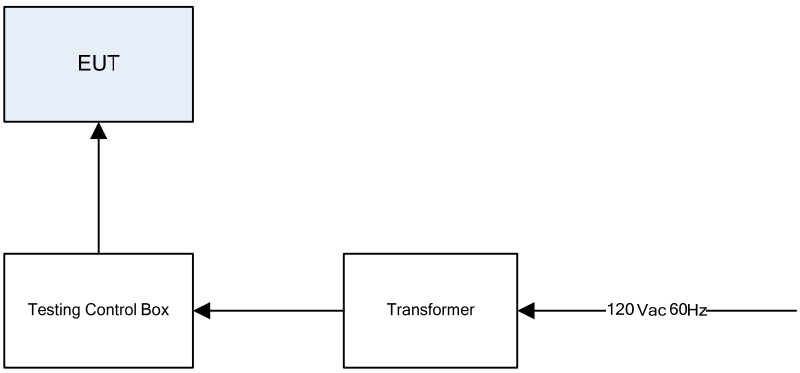


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	13.8 VDC

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The EUT was configured for continuous transmission for the duration of testing.
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT was tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signals	
Frequency Band(s):	120 kHz
Test Frequency(ies):	120 kHz
RF Power Output:	60.35 dBµV/m peak at 10m distance
Normal Test Modulation:	ASK
Modulating Signal Source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2011-05-01.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna Requirement	Yes
15.207(a)	Power Line Conducted Emissions	Yes
15.205, 15.209(a)	20 dB Bandwidth	Yes
15.209	Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious Emissions	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4 and Ultratech's test procedures ULTR-P001-2004.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.
Please refer to Exhibit 7 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1-1.

5.4. ANTENNA REQUIREMENTS [47 CFR 15.203]

5.4.1. Requirements

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

N**otes**: This requirement does not apply to carrier current devices operated under the provisions of @ 15.211, 15.213, 15.217, 17.219 or 15.221.

5.4.2. Engineering Analysis

The antenna is an integral part of the EUT; it is soldered onto the radio printed circuit board and located inside the enclosure.

5.5. POWERLINE CONDUCTED EMISSION [47 CFR 15.207(a)]

5.5.1. Limit(s)

The equipment shall meet the limits of the following table:

Frequency of emission (MHz)	Conducted Limits (dBμV)	
	Quasi-peak	Average
0.15–0.5 .....……..	66 to 56*	56 to 46*
0.5–5 .....……..	56	46
5-30 ……..	60 ...……..	50

*Decreases linearly with the logarithm of the frequency

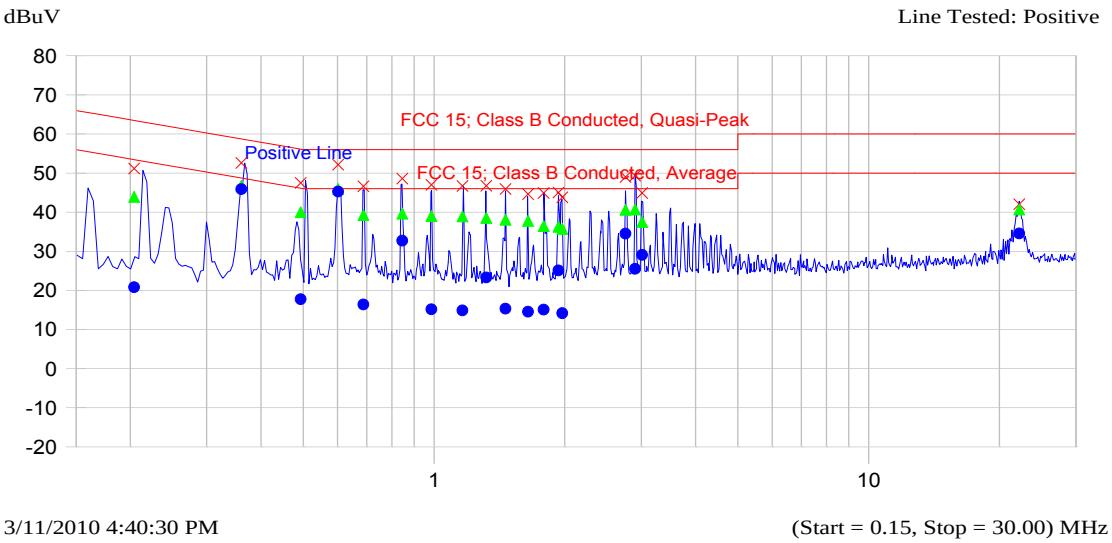
5.5.2. Method of Measurements

Refer to ANSI C63.4.

5.5.3. Test Data

Plot 5.5.3.1. Power Line Conducted Emission
Line Voltage: 13.8 VDC
Line Tested: Positive

Current Graph

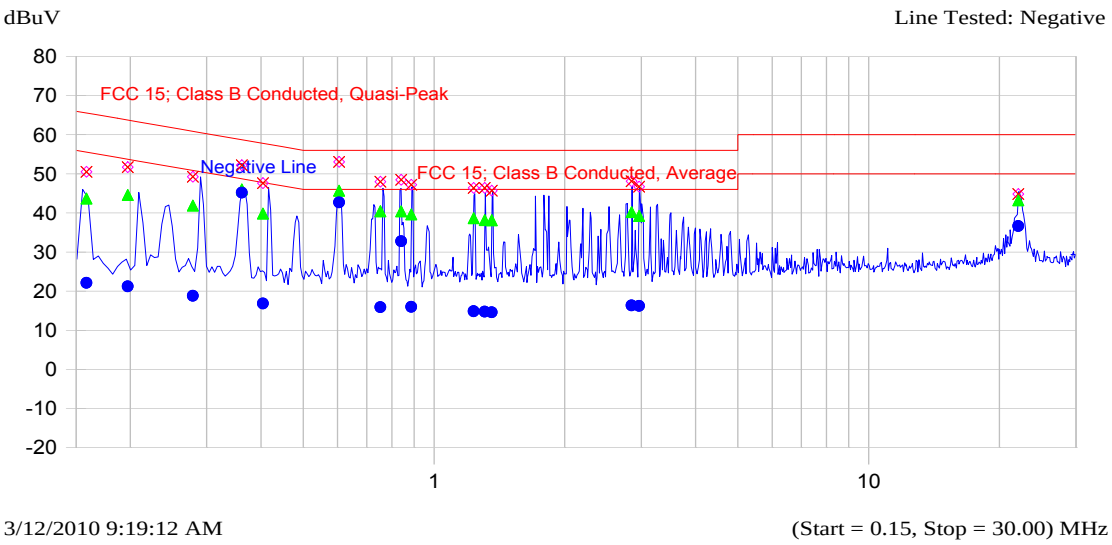


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.204	51.1	43.9	-20.5	20.8	-33.6	Positive Line
0.360	52.6	46.7	-13.2	45.9	-4.0	Positive Line
0.494	47.5	40.0	-16.2	17.8	-28.4	Positive Line
0.602	52.1	45.9	-10.1	45.3	-0.7	Positive Line
0.688	46.6	39.3	-16.7	16.4	-29.6	Positive Line
0.846	48.6	39.6	-16.4	32.7	-13.3	Positive Line
0.987	47.0	39.0	-17.0	15.2	-30.8	Positive Line
1.163	46.7	38.9	-17.1	14.9	-31.1	Positive Line
1.319	46.7	38.5	-17.5	23.3	-22.7	Positive Line
1.460	45.9	38.1	-17.9	15.3	-30.7	Positive Line
1.645	44.6	37.8	-18.2	14.6	-31.4	Positive Line
1.788	44.9	36.4	-19.6	15.1	-30.9	Positive Line
1.933	45.0	36.3	-19.7	25.1	-20.9	Positive Line
1.972	43.8	35.7	-20.3	14.1	-31.9	Positive Line
2.759	49.0	40.6	-15.4	34.5	-11.5	Positive Line
2.901	49.3	40.7	-15.3	25.5	-20.5	Positive Line
3.010	44.9	37.5	-18.5	29.1	-16.9	Positive Line
22.204	42.1	40.7	-19.3	34.6	-15.4	Positive Line

Plot 5.5.3.2. Power Line Conducted Emission
Line Voltage: 13.8 VDC
Line Tested: Negative

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.159	50.5	43.7	-22.1	22.1	-33.6	Negative Line
0.197	51.7	44.6	-20.0	21.2	-33.4	Negative Line
0.279	49.2	41.9	-20.4	18.8	-33.4	Negative Line
0.361	52.2	46.0	-13.9	45.2	-4.7	Negative Line
0.404	47.6	39.8	-18.9	16.9	-31.8	Negative Line
0.605	53.1	45.7	-10.3	42.7	-3.3	Negative Line
0.753	48.0	40.4	-15.6	15.9	-30.1	Negative Line
0.840	48.4	40.4	-15.6	32.7	-13.3	Negative Line
0.886	47.2	39.6	-16.4	16.0	-30.0	Negative Line
1.233	46.4	38.6	-17.4	14.9	-31.1	Negative Line
1.308	46.3	38.2	-17.8	14.8	-31.2	Negative Line
1.358	45.7	38.1	-17.9	14.6	-31.4	Negative Line
2.849	48.1	40.2	-15.8	16.4	-29.6	Negative Line
2.965	46.7	39.2	-16.8	16.2	-29.8	Negative Line
22.109	44.8	43.2	-16.8	36.6	-13.4	Negative Line

5.6. TRANSMITTER RADIATED EMISSIONS [47 CFR §§ 15.209 & 15.205]

5.6.1. Limit(s)

§ 15.209:

(a) The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

47 CFR 15.209(a) General Field Strength Limits

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 – 88	100 **	3
88 – 216	150 **	3
216 – 960	200 **	3
Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.		

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in Sections 15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this Part.

(f) In accordance with Section 15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in Section 15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in Section 15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in Section 15.109 that are applicable to the incorporated digital device.

(g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

5.6.2. Method of Measurements

Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods.

5.6.3. Test Data

Remarks:

- The measuring receiver shall be tuned over the frequency range 10 kHz to 30 MHz.
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- Extrapolation factor of 40dB/decade shall be used for frequencies below 30 MHz.
- EUT was placed in three different orthogonal positions to obtain maximum field strength level.

5.6.3.1. Fundamental Emissions

Remarks:

- Field strength limit of the fundamental 125 kHz at 300m distance is 20*log(2400/125) = 25.7 dBµV/m
- For frequency band 0.009- 0.490 MHz, the measured E-Field at 10m (column 2) will be extrapolated to 300m E-Field Level (column 3) using the extrapolation factor of 40*log(10/300) = -59.1 dB

Frequency (MHz)	Peak E-Field @ 10m (dBµV/m)	Extrapolated E-Field Level @ 300m (dBµV/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits @ 300m (dBµV/m)	Margin (dB)
0.120	54.16	-4.94	V	25.7	-30.6
0.120	60.35	1.25	H	25.7	-24.5

5.6.3.2. Harmonic/Spurious Emissions

Remarks:

- For frequency band 0.009- 0.490 MHz, the measured E-Field at 10m (column 2) will be extrapolated to 300m E-Field Level (column 3) using the extrapolation factor of 40*log(10/300) = -59.1 dB
- For frequency bands 0.490-1.705 MHz and 1.705-30.0 MHz, the measured E-Field at 10m (column 2) will be extrapolated to 30m E-Field Level (column 3) using the extrapolation factor of 40*log(10/30) = -19.1 dB

Frequency (MHz)	Peak E-Field @ 10m (dBµV/m)	Extrapolated E-Field Level (dBµV/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits (dBµV/m)	Margin (dB)
0.010 - 0.490	*	*	H / V	25.7	*
0.490 - 1.705	*	*	H / V	45.7	*
1.705 - 30.0	*	*	H / V	29.5	*

* No emissions or harmonics were detected within 20 dB of the limit.

5.7. 20 dB BANDWIDTH [47 CFR §§ 15.209 (a) & 15.205]

5.7.1. Limit(s)

Emission bandwidth shall not be located in the restricted bands in 15.205 and the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz.

5.7.2. Method of Measurements

The measurements were performed in accordance with Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4:2003.

The transmitter output was loosely coupled to the spectrum analyzer through a receiving antenna. The bandwidth of the fundamental frequency was measured with the spectrum analyzer, with the resolution BW set to 1% to 3 % of the approximate emission width and video BW set to 3 times the resolution BW.

5.7.3. Test Data

Channel Frequency (kHz)	20 dB Bandwidth (kHz)
120	3.24

See the following plot for details.

Plot 5.7.3.1. 20 dB Bandwidth
Carrier Frequency: 120 kHz, Bi-Phase modulation

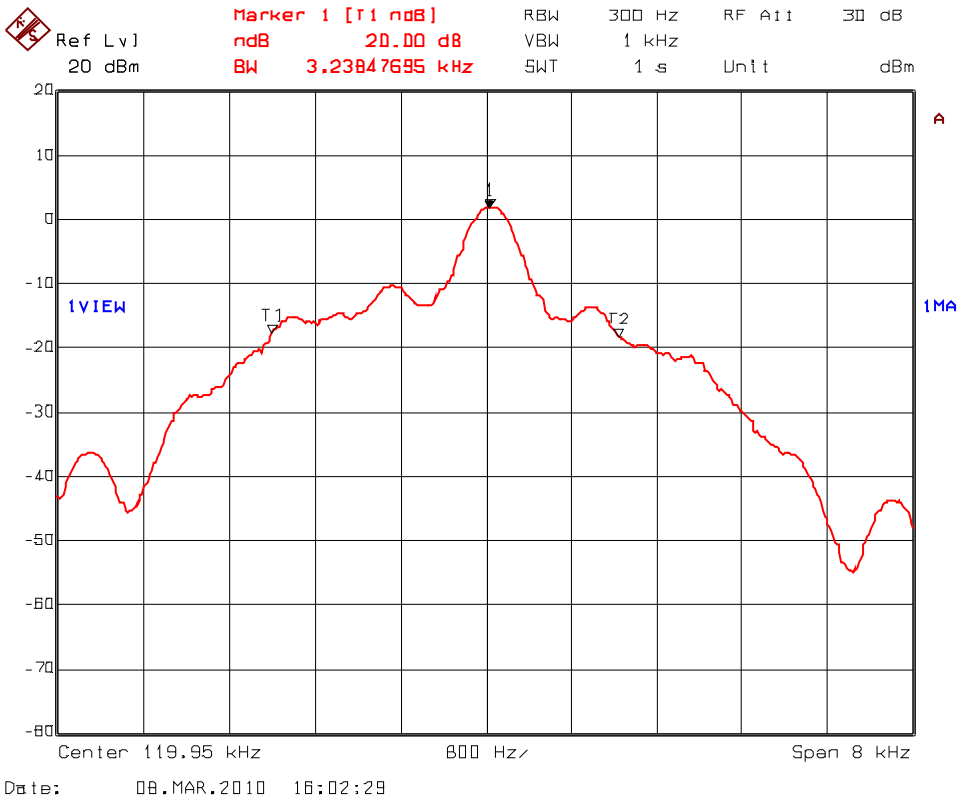


EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range
EMI Receiver System/ Spectrum Analyzer with built-in Amplifier	Hewlett Packard	HP 8546A	3520A00248	9KHz-5.6GHz, 50 Ω
Transient Limiter	Hewlett Packard	11947A	310701998	9 kHz – 200 MHz 10 dB attenuation
L.I.S.N.	EMCO	3810/2NM	2209	9 kHz – 30 MHz 50 Ω / 50 μH
RF Shielded Chamber	RF Shielding	…	..	…
Coupling Decoupling Network	Fischer Custom Communications Inc.	FCC-801-S9	24	150 kHz - 230 MHz
Loop Antenna	EMCO	6502	2611	10 kHz – 30 MHz
BiConiLog Antenna	Emco	3142	10005	0.03 – 2 GHz
Horn Antenna	Emco	3155	9911-5955	1 - 18 GHz
RF Amplifier	Com-Power	PA-103A	161243	10 MHz – 1 GHz
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz
Spectrum Analyzer	Hewlett Packard	8593EM	3412A00103	9 kHz – 26.5 GHz

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.15**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.30**	**± 5.2**

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.15**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.30**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.39**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.78**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 1.87**	Under consideration
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.75**	Under consideration

	Radiated Emission Measurement Uncertainty @ 10m, Horizontal (30-1000 MHz):	Measured	Limit
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.15**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.30**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 10m, Vertical (30-1000 MHz):	Measured	Limit
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.17**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.33**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 10m, Horizontal & Vertical (1 – 18 GHz):	Measured	Limit
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 1.87**	Under consideration
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.75**	Under consideration

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)