

Emissions Test Report

EUT Name: Energy Axis Rex2 Form 12S Meter

EUT Model: RX2EA, RX2EAI

FCC ID: QZC-RX2EA, QZC-RX2EAI

IC: 4557A-RX2EA

CLASS 2 PERMISSIVE CHANGE

FCC Title 47, Part 15, Subpart C, RSS-210 Issue 7

Prepared for:

John Holt
Elster Electricity, LLC
208 South Rogers Lane
Raleigh, NC 27610
Tel: 919 212-4700
Fax: 919 212-5108

Prepared by:

TUV Rheinland
762 Park Avenue
Youngsville, NC 27596
Tel: (919) 554-0901
Fax: (919) 556-2043
<http://www.tuv.com/>

Report/Issue Date: 27 February, 2009

Report Number: 30960515.001 C2PC

Statement of Compliance

Manufacturer: Elster Electricity, LLC
208 South Rogers Lane
Raleigh, NC 27610
919 212-4700

Requester / Applicant: John Holt

Name of Equipment: Energy Axis Rex2 Form 12S Meter

Operation Frequency Range: 902.4 MHz to 927.6 MHz

Type of Equipment: Intentional Radiator

Application of Regulations: FCC Title 47, Part 15, Subpart C, RSS-210 Issue 7

Test Dates: 25 February, 2009 to 27 February, 2009

Guidance Documents:

Emissions: FCC 47 CFR Part 15C, RSS-210 Issue 7

Test Methods:

Emissions: ANSI C63.4:2003, RSS-GEN

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of the laboratory.

NVLAP Signatory

27 February 2009

Date



200094-0



90552 and
100881

Industry Canada

IC 2932H-1

Table of Contents

1	EXECUTIVE SUMMARY	4
1.1	SCOPE.....	4
1.2	PURPOSE.....	4
1.3	SUMMARY OF TEST RESULTS.....	4
1.4	SPECIAL ACCESSORIES.....	5
1.5	EQUIPMENT MODIFICATIONS.....	5
2	LABORATORY INFORMATION	5
2.1	ACCREDITATIONS & ENDORSEMENTS.....	5
2.2	TEST FACILITIES.....	6
2.3	MEASUREMENT UNCERTAINTY.....	7
2.4	CALIBRATION TRACEABILITY.....	7
2.5	PRODUCT INFORMATION.....	8
2.6	PRODUCT DESCRIPTION.....	8
2.7	CONFIGURATION.....	8
3	SPURIOUS EMISSIONS	9
3.1	SPURIOUS EMISSIONS FCC PART 15.247(C).....	9
4	TEST EQUIPMENT USE LIST	35
4.1	TEST EQUIPMENT USE LIST.....	35
	EMC TEST PLAN FOR CLASS II PERMISSIVE CHANGE	36
	REVISION HISTORY.....	36
	INTRODUCTION.....	36
	CUSTOMER.....	36
	EQUIPMENT UNDER TEST.....	37
	TESTING THE REX2 METER.....	39

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Title 47, Part 15, Subpart C, RSS-210 Issue 7 based on the results of testing performed on 25 February, 2009 through 27 February, 2009 on the *Energy Axis Rex2 Form 12S Meter* Model No. *RX2EA, RX2EAI* manufactured by Elster Electricity, LLC. Refer to Test plan at the end of this test report for details on the modification. The modification will have no effect on any of the Time of Occupancy, or Occupied Bandwidth. The only possible effect would be the Radiated Peak Power and spurious emissions. This test report is the measurement of those emissions. The test set up was identical as was used in the previous test report. Other than the 2nd harmonic, all other harmonic emissions not in the restricted bands has margins of typically -40 dBc (verified by the frequency scan), the focus of emissions will be mostly those in the restricted bands. The device will always require professional installation, therefore the provisions of FCC Part 15.203 applies.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1 - Summary of Test Results

Test	Test Method(s)	Test Parameters	Result
Spurious Emissions	FCC Part 15.247(C) RSS-210, Annex 8, Section A8.5	Table FCC Parts 15.205 and 15.209	compliant

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

No modifications were found to be necessary in order to achieve compliance.

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90552 and 100881). The laboratory scope of accreditation includes: Title 47 CFR Part 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / NVLAP

TUV Rheinland is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 25 and ISO 9002 (Lab code 200094-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

Registration No. IC 2932H-1

2.1.4 Japan - VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-1174 and C-1236).

2.1.5 Acceptance By Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 762 Park Ave., Youngsville, North Carolina 27596, USA.

2.2.1 Emission Test Facility

The Open Area Test Site and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2005, at a test distance of 3 and 10 meters. This site has been described in reports dated May 12, 1997, submitted to the FCC, and accepted by letter dated June 25, 1997 (31040/SIT 1300F2). The site is listed with the FCC and accredited by NVLAP (code 200094-0). The 5m semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2005, at a test distance of 3 meters. A report detailing this site can be obtained from TUV Rheinland.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7m x 3.7m x 3.175mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6m x 0.8m x 0.8m high non-conductive table with a 3.175mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 k Ω resistors. The Vertical Coupling Plane consists of an aluminum plate 50cm x 50cm x 3.175mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 k Ω resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 7.3m x 3.7m x 3.2m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9m x 3.7m x 3.175mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st addition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

The test system for conducted emissions is defined as the LISN, spectrum analyzer, coaxial cables, and pads. The test system for radiated emissions is defined as the antenna, spectrum analyzer, pre-amplifier, coaxial cables, and pads. The conducted test system has a combined standard uncertainty of ± 1.2 dB. The radiated test system has a combined standard uncertainty of ± 1.6 dB. The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Guide 25.

2.5 Product Information

2.6 Product Description

The EUT is a watt-hour meter with an integrated 900 MHz band, frequency hopping radio. A block diagram and schematic showing the major sections of the electronic assembly have been included in a separate test plan document for submission.

A more detailed description of the EUT can be found in the Manufacturer's test plan.

The EUT submitted for testing was Not Serialized.

2.7 Configuration

Each meter type was installed in turn in a meter socket appropriate for measuring electricity consumption. Preliminary testing was performed on each of the three meter types to determine the configuration that produced maximum radiation. The following meter types were tested:

Meter Form	Test Voltage
Rex2 meter, Form 12S	240Vac
Rex2 meter, Form 12S, with service disconnect switch (SDS) installed.	240Vac

All units have an internal microwave slot antenna printed on the main PCB. There are no other antenna options to be tested. The printed circuit board assembly is connected to line voltage (120 or 240V ac) and to the output of a current transformer. There are no other cables or wires connected to the Single-phase meter. For the service disconnect meter, there is a disconnect option board that connects to the main board via the 10-pin header J5.

The final configuration was selected to produce worse case radiation and place the EUT in the most susceptible state. The Rex2 meter with the internal service disconnect switch was determined to have the worst case emissions and was therefore used for all final testing displayed in this report.

3 Spurious Emissions

3.1 Spurious Emissions FCC Part 15.247(c)

3.1.1 Test Methodology

3.1.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 300 kHz and provide a reading at each frequency for each 6° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

3.1.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

3.1.1.3 Deviations

There were no deviations from this test methodology.

3.1.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

3.1.2.1 Restricted band measurements

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)). In addition, where an average detector is used for determining compliance with the limits in 15.209(a), there is a corresponding peak limit 20 dB above the specified average limit according to 15.35(b)

Measurements demonstrating compliance with these parts are provided in the tables below.

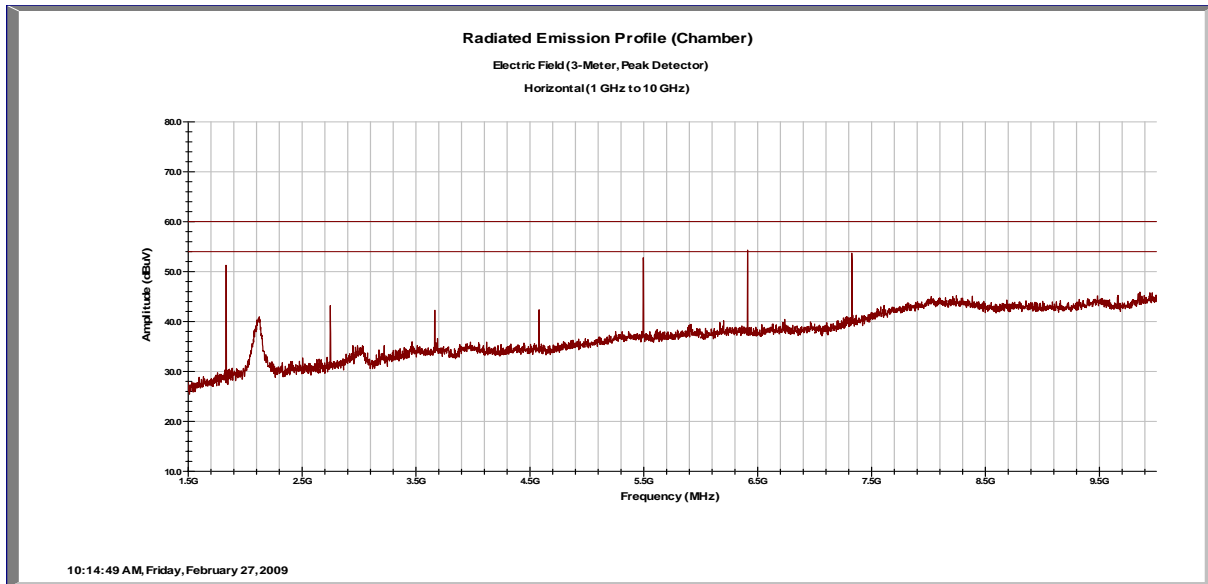


Figure 1: Plot of Radiated Harmonics and spurs 1-10GHz Horizontal

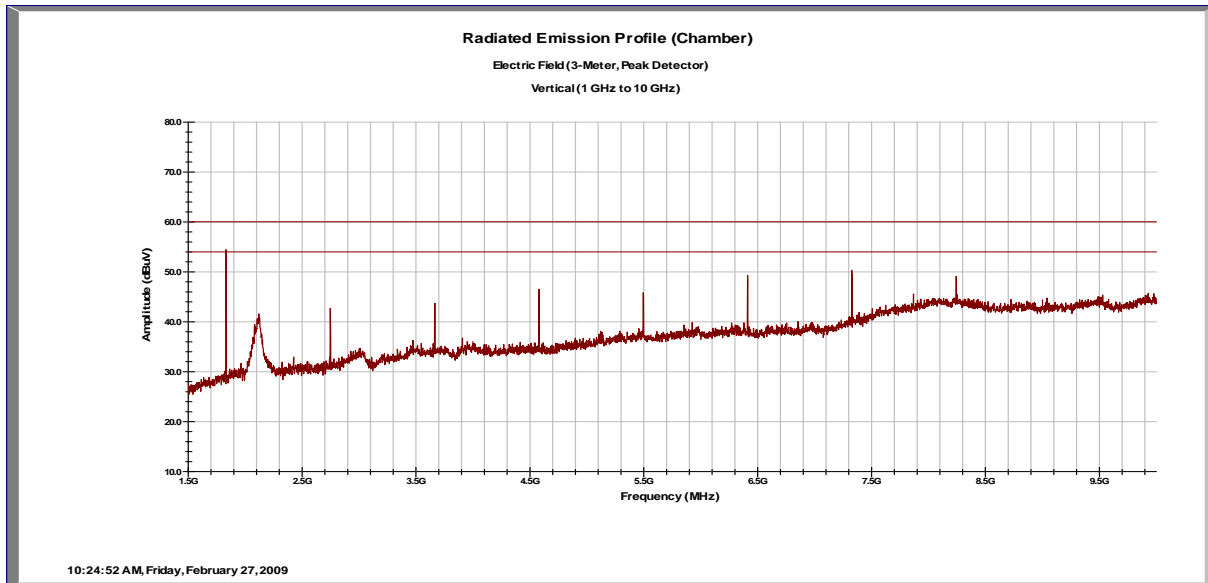


Figure 2: Plot of Radiated Harmonics and spurs 1-10GHz Vertical

Note: These plots are worst case (ch 34, antenna LP800NMO). Other plots on file at TUV Rheinland.

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 1 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	25 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	74.3° F / 23% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 1, 902.8 MHz		

Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
902.80	H	1.17	126	95.03	0.00	3.37	22.50	120.90		
1805.60*	H	1.0	322	53.27	36.13	6.33	26.74	50.20	100.9	-50.7
2708.40	H	1.0	243	44.35	36.01	7.81	28.79	44.95	74.00	-29.05
3611.20	H	1.0	332	42.77	35.74	9.42	31.67	48.11	74.00	-25.89
4514.00	H	1.03	321	41.08	35.83	10.51	32.20	47.96	74.00	-26.04
5414.40	H	1.0	19	43.92	35.15	11.28	34.01	54.07	74.00	-19.03
8125.20	H	1.0	0	35.01	35.46	15.81	36.97	52.33	74.00	-21.67
9028.00	H	1.02	71	36.61	35.94	15.50	37.77	53.94	74.00	-20.06
Average										
2708.40	H	1.0	243	30.53	36.01	7.81	28.79	31.13	54.00	-22.87
3611.20	H	1.0	332	31.96	35.74	9.42	31.67	37.30	54.00	-16.70
4514.00	H	1.03	321	30.07	35.83	10.51	32.20	36.95	54.00	-17.05
5414.40	H	1.0	19	34.81	35.15	11.28	34.01	44.96	54.00	-9.04
8125.20	H	1.0	0	21.66	35.46	15.81	36.97	38.98	54.00	-15.02
9028.00	H	1.02	71	23.23	35.94	15.50	37.77	40.56	54.00	-13.44

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 2 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	25 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	74.3° F / 23% rh
EUT Serial	07 672 721	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 1, 902.8 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
902.80	V	1.11	176	97.27	0.00	3.37	22.21	122.85		
1805.60*	V	1.29	77	57.55	36.13	6.33	26.83	54.58	102.85	-28.47
2708.40	V	1.0	23	42.41	36.01	7.81	28.91	43.13	74.00	-30.87
3611.20	V	1.0	11	42.39	35.74	9.42	31.40	47.47	74.00	-26.53
4514.00	V	1.13	22	40.59	35.83	10.51	32.14	47.42	74.00	-26.58
5414.40	V	1.25	80	42.13	35.15	11.28	34.10	52.36	74.00	-21.64
8125.20	V	1.33	35	36.08	35.46	15.81	36.97	53.40	74.00	-20.60
9028.00	V	1.37	34	36.45	35.94	15.50	37.74	53.75	74.00	-20.25
Average										
2708.40	V	1.0	23	30.38	36.01	7.81	28.91	31.10	54.00	-22.90
3611.20	V	1.0	11	31.85	35.74	9.42	31.40	36.93	54.00	-17.07
4514.00	V	1.13	22	29.37	35.83	10.51	32.14	36.20	54.00	-17.80
5414.40	V	1.25	80	32.21	35.15	11.28	34.10	42.44	54.00	-11.56
8125.20	V	1.33	35	23.27	35.46	15.81	36.97	40.59	54.00	-13.41
9028.00	V	1.37	34	23.49	35.94	15.50	37.74	40.79	54.00	-13.21

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 3 of 24 C2PC	
EUT Name	Energy Axis Rex2 Form 12S Meter						Date	25 February 2009				
EUT Model	RX2EA, RX2EAI						Temp / Hum in	74.3° F / 23% rh				
EUT Serial	Not Serialized						Temp / Hum out	N/A				
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7						Line AC / Freq.	240 VAC / 60 Hz				
Deg/sweep	6						RBW / VBW	See Note below				
Dist/Ant Used	3 meters / 3115						Performed by	Bob Richards				
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 34, 916.00 MHz											
Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
916.00	H	1.11	121	94.91	0.00	3.42	22.62	120.95				
1832.00*	H	1.03	323	55.90	36.15	6.34	26.92	53.01	100.95	-47.94		
2748.00	H	1.08	350	44.35	35.93	7.94	28.75	45.11	74.00	-28.89		
3664.00	H	1.68	310	43.41	35.60	9.25	31.98	49.04	74.00	-24.96		
4580.00	H	1.38	10	42.52	35.94	10.93	32.20	49.71	74.00	-24.29		
7328.00	H	1.0	23	42.65	36.11	14.35	36.56	57.45	74.00	-16.55		
8244.00	H	1.0	39	37.88	35.57	15.76	36.94	55.02	74.00	-18.98		
9160.00	H	1.0	310	36.86	36.04	15.43	37.64	53.89	74.00	-20.11		
Average												
2748.00	H	1.08	350	31.84	35.93	7.94	28.75	32.60	54.00	-21.40		
3664.00	H	1.68	310	32.95	35.60	9.25	31.98	38.58	54.00	-15.42		
4580.00	H	1.38	10	29.42	35.94	10.93	32.20	36.61	54.00	-17.39		
7328.00	H	1.0	23	33.19	36.11	14.35	36.56	47.99	54.00	-6.01		
8244.00	H	1.0	39	22.82	35.57	15.76	36.94	39.96	54.00	-14.04		
9160.00	H	1.0	310	23.76	36.04	15.43	37.64	40.79	54.00	-13.21		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 4 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	25 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	74.3° F / 23% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 34, 916.00 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
916.00	V	1.09	181	97.50	0.00	3.42	22.32	123.24		
1832.00*	V	1.25	79	60.35	36.15	6.34	26.99	57.53	103.24	-45.71
2748.00	V	1.16	290	48.72	35.93	7.94	28.95	49.67	74.00	-24.33
3664.00	V	1.0	338	43.37	35.60	9.25	31.88	48.89	74.00	-25.11
4580.00	V	1.12	14	39.37	35.94	10.93	32.34	46.70	74.00	-27.30
7328.00	V	1.43	5	42.01	36.11	14.35	36.56	56.81	74.00	-17.19
8244.00	V	1.25	244	38.38	35.57	15.76	36.94	55.52	54.00	-18.48
9160.00	V	1.72	334	36.34	36.04	15.43	37.60	53.33	74.00	-20.67
Average										
2748.00	V	1.16	290	29.46	35.93	7.94	28.95	30.41	54.00	-23.59
3664.00	V	1.0	338	32.81	35.60	9.25	31.88	38.33	54.00	-15.67
4580.00	V	1.12	14	27.20	35.94	10.93	32.34	34.53	54.00	-19.47
7328.00	V	1.43	5	31.96	36.11	14.35	36.56	46.76	54.00	-7.24
8244.00	V	1.25	244	22.45	35.57	15.76	36.94	39.59	54.00	-14.41
9160.00	V	1.72	334	23.32	36.04	15.43	37.60	40.31	54.00	-13.69

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 5 of 24 C2PC	
EUT Name		Energy Axis Rex2 Form 12S Meter					Date		25 February 2009			
EUT Model		RX2EA, RX2EAI					Temp / Hum in		74.3° F / 23% rh			
EUT Serial		Not Serialized					Temp / Hum out		N/A			
Standard		FCC 47 CFR Part 15C, RSS-210 Issue 7					Line AC / Freq.		240 VAC / 60 Hz			
Deg/sweep		6					RBW / VBW		See Note below			
Dist/Ant Used		3 meters / 3115					Performed by		Bob Richards			
Configuration											REX2 Meter with TRAB9023NP external antenna connected, Channel 48, 921.60 MHz	
Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
921.60	H	1.15	131	95.01	0.00	3.42	22.73	121.16				
1843.20*	H	1.0	322	57.18	36.17	6.33	27.00	54.34	101.16	-46.82		
2764.80	H	1.09	351	41.61	35.95	7.99	28.74	42.38	74.00	-31.62		
3686.40	H	1.0	318	41.08	35.54	9.18	32.12	46.85	74.00	-27.15		
4608.00	H	1.44	303	40.46	35.98	10.94	32.22	47.64	74.00	-26.36		
7372.80	H	1.0	23	41.74	36.05	14.42	36.65	56.76	74.00	-17.24		
8294.40	H	1.28	65	37.24	35.59	15.73	36.99	54.37	74.00	-19.63		
9216.00	H	1.0	51	36.73	36.12	15.41	37.62	53.64	74.00	-20.36		
Average												
2764.80	H	1.09	351	31.49	35.95	7.99	28.74	32.26	54.00	-21.74		
3686.40	H	1.0	318	30.13	35.54	9.18	32.12	35.90	54.00	-18.10		
4608.00	H	1.44	303	29.70	35.98	10.94	32.22	36.88	54.00	-17.12		
7372.80	H	1.0	23	32.23	36.05	14.42	36.65	47.25	54.00	-6.75		
8294.40	H	1.28	65	23.84	35.59	15.73	36.99	40.97	54.00	-13.03		
9216.00	H	1.0	51	24.03	36.12	15.41	37.62	40.94	54.00	-13.06		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 6 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	25 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	74.3° F / 23% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 48, 921.60 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
921.60	V	1.00	148	99.08	0.00	3.42	22.43	124.93		
1843.20*	V	1.23	79	61.33	36.17	6.33	27.06	58.55	104.93	-46.38
2764.80	V	1.2	73	41.47	35.95	7.99	28.96	42.47	74.00	-31.53
3686.40	V	1.0	337	42.27	35.54	9.18	32.08	48.00	74.00	-26.00
4608.00	V	1.34	355	40.10	35.98	10.94	32.42	47.48	74.00	-26.52
7372.80	V	1.26	5	40.46	36.05	14.42	36.65	55.48	74.00	-18.52
8294.40	V	1.14	336	36.61	35.59	15.73	36.99	53.74	74.00	-20.26
9216.00	V	1.03	5	35.80	36.12	15.41	37.63	52.72	74.00	-21.28
Average										
2764.80	V	1.2	73	29.70	35.95	7.99	28.96	30.70	54.00	-23.30
3686.40	V	1.0	337	32.43	35.54	9.18	32.08	38.16	54.00	-15.84
4608.00	V	1.34	355	28.83	35.98	10.94	32.42	36.21	54.00	-17.79
7372.80	V	1.26	5	30.89	36.05	14.42	36.65	45.91	54.00	-8.09
8294.40	V	1.14	336	23.58	35.59	15.73	36.99	40.71	54.00	-13.29
9216.00	V	1.03	5	23.20	36.12	15.41	37.63	40.12	54.00	-13.88

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 7 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	25 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	74.3° F / 23% rh
EUT Serial	07 672 721	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	12	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 63, 927.6 MHz		

Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
927.60	H	1.11	127	94.12	0.00	3.42	22.80	120.34		
1855.20*	H	1.0	308	57.43	36.16	6.42	27.09	54.77	100.34	-45.57
2782.80	H	1.0	25	42.39	35.98	8.05	28.72	43.18	74.00	-30.82
3710.40	H	1.62	328	39.49	35.51	9.03	32.21	45.23	74.00	-28.77
4638.00	H	1.03	7	38.26	36.01	10.76	32.31	45.33	74.00	-28.67
7420.80	H	1.11	68	41.74	35.94	14.56	36.66	57.02	74.00	-16.98
8348.40	H	1.34	75	36.34	35.61	15.72	37.10	53.55	74.00	-20.45
Average										
2782.80	H	1.0	25	29.46	35.98	8.05	28.72	30.25	54.00	-23.75
3710.40	H	1.62	328	27.46	35.51	9.03	32.21	33.20	54.00	-20.80
4638.00	H	1.03	7	25.20	36.01	10.76	32.31	32.27	54.00	-21.73
7420.80	H	1.11	68	32.15	35.94	14.56	36.66	47.43	54.00	-6.57
8348.40	H	1.34	75	22.99	35.61	15.72	37.10	40.20	54.00	-13.80

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions				Tracking # 30960515.001 Page 8 of 24 C2PC						
EUT Name	Energy Axis Rex2 Form 12S Meter			Date	25 February 2009					
EUT Model	RX2EA, RX2EAI			Temp / Hum in	74.3° F / 23% rh					
EUT Serial	Not Serialized			Temp / Hum out	N/A					
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7			Line AC / Freq.	240 VAC / 60 Hz					
Deg/sweep	12			RBW / VBW	See Note below					
Dist/Ant Used	3 meters / 3115			Performed by	Bob Richards					
Configuration	REX2 Meter with TRAB9023NP external antenna connected, Channel 63, 927.6 MHz									
Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
927.60	V	1.07	173	97.55	0.00	3.42	22.60	123.57		
1855.20*	V	1.22	69	60.49	36.16	6.42	27.13	57.88	103.57	-45.69
2782.80	V	1.11	288	49.12	35.98	8.05	28.98	50.18	74.00	-23.82
3710.40	V	1.0	336	41.47	35.51	9.03	32.23	47.23	74.00	-26.77
4638.00	V	1.0	274	38.01	36.01	10.76	32.51	45.28	74.00	-28.72
7420.80	V	1.11	56	39.97	35.94	14.56	36.68	55.27	74.00	-18.73
8348.40	V	1.02	5	37.12	35.61	15.72	37.05	54.28	74.00	-19.72
Average										
2782.80	V	1.11	288	29.53	35.98	8.05	28.98	30.59	54.00	-23.41
3710.40	V	1.0	336	30.60	35.51	9.03	32.23	36.36	54.00	-17.64
4638.00	V	1.0	274	23.83	36.01	10.76	32.51	31.10	54.00	-22.90
7420.80	V	1.11	56	30.26	35.94	14.56	36.68	45.56	54.00	-8.44
8348.40	V	1.02	5	22.90	35.61	15.72	37.05	40.06	54.00	-13.94
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty										
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence										
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz										
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.										
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.										
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.										

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 10 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	26 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.3° F / 29% rh
EUT Serial	07 672 721	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with MFB9153 external antenna connected, Channel 1, 902.8 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
902.80	V	1.0	148	97.37	0.00	3.37	22.21	122.95		
1805.60	V	1.0	80	56.92	36.13	6.33	26.83	53.95	102.95	-49.00
2708.40	V	1.0	5	42.08	36.01	7.81	28.91	42.80	74.00	-31.20
3611.20	V	1.0	7	41.74	35.74	9.42	31.40	46.82	74.00	-27.18
4514.00	V	1.15	23	39.11	35.83	10.51	32.14	45.94	74.00	-28.06
5414.40	V	1.0	259	40.34	35.15	11.28	34.10	50.57	74.00	-23.43
8125.20	V	1.0	352	36.21	35.46	15.81	36.97	53.53	74.00	-20.47
9028.00	V	1.11	34	35.68	35.94	15.50	37.74	52.98	74.00	-21.02
Average										
2708.40	V	1.0	5	29.29	36.01	7.81	28.91	30.01	54.00	-23.99
3611.20	V	1.0	7	30.75	35.74	9.42	31.40	35.83	54.00	-18.17
4514.00	V	1.15	23	26.52	35.83	10.51	32.14	33.35	54.00	-20.65
5414.40	V	1.0	259	30.05	35.15	11.28	34.10	40.28	54.00	-13.72
8125.20	V	1.0	352	23.41	35.46	15.81	36.97	40.73	54.00	-13.27
9028.00	V	1.11	34	22.57	35.94	15.50	37.74	39.87	54.00	-14.13

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 11 of 24 C2PC	
EUT Name	Energy Axis Rex2 Form 12S Meter						Date	26 February 2009				
EUT Model	RX2EA, RX2EAI						Temp / Hum in	73.3° F / 29% rh				
EUT Serial	Not Serialized						Temp / Hum out	N/A				
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7						Line AC / Freq.	240 VAC / 60 Hz				
Deg/sweep	6						RBW / VBW	See Note below				
Dist/Ant Used	3 meters / 3115						Performed by	Bob Richards				
Configuration	REX2 Meter with MFB9153 external antenna connected, Channel 34, 916.00 MHz											
Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
916.00	H	1.63	53	84.53	0.00	3.42	22.62	110.57				
1832.00	H	1.03	322	56.93	36.15	6.34	26.92	54.04	90.57	-36.53		
2748.00	H	1.10	30	44.88	35.93	7.94	28.75	45.64	74.00	-28.36		
3664.00	H	1.0	297	42.27	35.60	9.25	31.98	47.90	74.00	-26.10		
4580.00	H	1.23	3	40.71	35.94	10.93	32.20	47.90	74.00	-26.10		
7328.00	H	1.16	311	43.27	36.11	14.35	36.56	58.07	74.00	-15.93		
8244.00	H	1.12	322	37.12	35.57	15.76	36.94	54.26	74.00	-19.74		
9160.00	H	1.10	308	36.21	36.04	15.43	37.64	53.24	74.00	-20.76		
Average												
2748.00	H	1.10	30	27.75	35.93	7.94	28.75	28.51	54.00	-25.49		
3664.00	H	1.0	297	31.92	35.60	9.25	31.98	37.55	54.00	-16.45		
4580.00	H	1.23	3	28.99	35.94	10.93	32.20	36.18	54.00	-17.82		
7328.00	H	1.16	311	34.05	36.11	14.35	36.56	48.85	54.00	-5.15		
8244.00	H	1.12	322	22.54	35.57	15.76	36.94	39.68	54.00	-14.32		
9160.00	H	1.10	308	22.58	36.04	15.43	37.64	39.61	54.00	-14.39		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 12 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	26 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.3° F / 29% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with MFB9153 external antenna connected, Channel 34, 916.00 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
916.00	V	1.0	160	96.29	0.00	3.42	22.32	122.03		
1832.00	V	1.29	81	60.28	36.15	6.34	26.99	57.46	102.03	-44.57
2748.00	V	1.15	299	48.20	35.93	7.94	28.95	49.15	74.00	-24.85
3664.00	V	1.0	335	42.52	35.60	9.25	31.88	48.04	74.00	-25.96
4580.00	V	1.09	357	40.10	35.94	10.93	32.34	47.43	74.00	-26.57
7328.00	V	1.17	83	40.59	36.11	14.35	36.56	55.39	74.00	-18.61
8244.00	V	1.0	73	36.61	35.57	15.76	36.94	53.75	74.00	-20.25
9160.00	V	1.66	26	36.98	36.04	15.43	37.60	53.97	74.00	-20.03
Average										
2748.00	V	1.15	299	28.47	35.93	7.94	28.95	29.42	54.00	-24.58
3664.00	V	1.0	335	32.37	35.60	9.25	31.88	37.89	54.00	-16.11
4580.00	V	1.09	357	27.25	35.94	10.93	32.34	34.58	54.00	-19.42
7328.00	V	1.17	83	30.14	36.11	14.35	36.56	44.94	54.00	-9.06
8244.00	V	1.0	73	21.95	35.57	15.76	36.94	39.09	54.00	-14.91
9160.00	V	1.66	26	22.95	36.04	15.43	37.60	39.94	54.00	-14.06

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 13 of 24 C2PC	
EUT Name		Energy Axis Rex2 Form 12S Meter					Date		26 February 2009			
EUT Model		RX2EA, RX2EAI					Temp / Hum in		73.3° F / 29% rh			
EUT Serial		Not Serialized					Temp / Hum out		N/A			
Standard		FCC 47 CFR Part 15C, RSS-210 Issue 7					Line AC / Freq.		240 VAC / 60 Hz			
Deg/sweep		6					RBW / VBW		See Note below			
Dist/Ant Used		3 meters / 3115					Performed by		Bob Richards			
Configuration											REX2 Meter with MFB9153 external antenna connected, Channel 48, 921.60 MHz	
Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
921.60	H	1.16	329	83.16	0.00	3.42	22.73	109.31				
1843.20	H	1.0	310	57.81	36.17	6.33	27.00	54.97	89.31	-34.34		
2764.80	H	1.11	347	42.39	35.95	7.99	28.74	43.16	74.00	-30.84		
3686.40	H	1.0	308	41.61	35.54	9.18	32.12	47.38	74.00	-26.62		
4608.00	H	1.16	322	39.85	35.98	10.94	32.22	47.03	74.00	-26.97		
7372.80	H	1.16	5	40.71	36.05	14.42	36.65	55.73	74.00	-18.27		
8294.40	H	1.0	315	36.21	35.59	15.73	36.99	53.34	74.00	-20.66		
9216.00	H	1.0	47	36.61	36.12	15.41	37.62	53.52	74.00	-20.48		
Average												
2764.80	H	1.11	347	30.74	35.95	7.99	28.74	31.51	54.00	-22.49		
3686.40	H	1.0	308	30.57	35.54	9.18	32.12	36.34	54.00	-17.66		
4608.00	H	1.16	322	28.83	35.98	10.94	32.22	36.01	54.00	-17.99		
7372.80	H	1.16	5	30.77	36.05	14.42	36.65	45.79	54.00	-8.21		
8294.40	H	1.0	315	23.07	35.59	15.73	36.99	40.20	54.00	-13.80		
9216.00	H	1.0	47	23.52	36.12	15.41	37.62	40.43	54.00	-13.57		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 14 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	26 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.3° F / 29% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with MFB9153 external antenna connected, Channel 48, 921.60 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
921.60	V	1.10	185	96.14	0.00	3.42	22.43	121.99		
1843.20	V	1.28	82	60.81	36.17	6.33	27.06	58.03	101.99	-43.96
2764.80	V	1.12	287	44.20	35.95	7.99	28.96	45.20	74.00	-28.80
3686.40	V	1.0	335	42.65	35.54	9.18	32.08	48.38	74.00	-25.62
4608.00	V	1.0	14	38.38	35.98	10.94	32.42	45.76	74.00	-28.24
7372.80	V	1.11	2	40.34	36.05	14.42	36.65	55.36	74.00	-18.64
8294.40	V	1.12	9	35.68	35.59	15.73	36.99	52.81	74.00	-21.19
9216.00	V	1.02	338	36.21	36.12	15.41	37.63	53.13	74.00	-20.87
Average										
2764.80	V	1.12	287	28.24	35.95	7.99	28.96	29.24	54.00	-24.76
3686.40	V	1.0	335	32.45	35.54	9.18	32.08	38.18	54.00	-15.82
4608.00	V	1.0	14	26.14	35.98	10.94	32.42	33.52	54.00	-20.48
7372.80	V	1.11	2	30.74	36.05	14.42	36.65	45.76	54.00	-8.24
8294.40	V	1.12	9	22.62	35.59	15.73	36.99	39.75	54.00	-14.25
9216.00	V	1.02	338	23.14	36.12	15.41	37.63	40.06	54.00	-13.94

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 15 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	27 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.9° F / 32% rh
EUT Serial	07 672 721	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	12	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with MFB9153 external antenna connected, Channel 63, 927.6 MHz		

Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
927.60	H	1.60	96	81.54	0.00	3.42	22.80	107.76		
1855.20	H	1.05	308	57.31	36.16	6.42	27.09	54.65	87.76	-33.11
2782.80	H	1.0	52	50.49	35.98	8.05	28.72	51.28	74.00	-22.72
3710.40	H	1.0	328	42.01	35.51	9.03	32.21	47.75	74.00	-26.25
4638.00	H	1.33	4	40.71	36.01	10.76	32.31	47.78	74.00	-26.22
7420.80	H	1.14	251	40.46	35.94	14.56	36.66	55.74	74.00	-18.26
8348.40	H	1.11	72	38.62	35.61	15.72	37.10	55.83	74.00	-18.17
Average										
2782.80	H	1.0	52	30.22	35.98	8.05	28.72	31.01	54.00	-22.99
3710.40	H	1.0	328	27.24	35.51	9.03	32.21	32.98	54.00	-21.02
4638.00	H	1.33	4	26.65	36.01	10.76	32.31	33.72	54.00	-20.28
7420.80	H	1.14	251	30.37	35.94	14.56	36.66	45.65	54.00	-8.35
8348.40	H	1.11	72	22.93	35.61	15.72	37.10	40.14	54.00	-13.86

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions				Tracking # 30960515.001 Page 16 of 24 C2PC						
EUT Name	Energy Axis Rex2 Form 12S Meter			Date	27 February 2009					
EUT Model	RX2EA, RX2EAI			Temp / Hum in	73.9° F / 32% rh					
EUT Serial	Not Serialized			Temp / Hum out	N/A					
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7			Line AC / Freq.	240 VAC / 60 Hz					
Deg/sweep	12			RBW / VBW	See Note below					
Dist/Ant Used	3 meters / 3115			Performed by	Bob Richards					
Configuration	REX2 Meter with MFB9153 external antenna connected, Channel 63, 927.6 MHz									
Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
927.60	V	1.07	173	95.51	0.00	3.42	22.60	121.53		
1855.20	V	1.27	81	60.41	36.16	6.42	27.13	57.80	101.53	-43.73
2782.80	V	1.12	272	50.35	35.98	8.05	28.98	51.41	74.00	-22.59
3710.40	V	1.08	28	43.02	35.51	9.03	32.23	48.78	74.00	-25.22
4638.00	V	1.08	269	39.85	36.01	10.76	32.51	47.12	74.00	-26.88
7420.80	V	1.04	29	40.21	35.94	14.56	36.68	55.51	74.00	-18.49
8348.40	V	1.06	5	36.86	35.61	15.72	37.05	54.02	74.00	-19.98
Average										
2782.80	V	1.12	272	29.74	35.98	8.05	28.98	30.80	54.00	-23.20
3710.40	V	1.08	28	29.15	35.51	9.03	32.23	34.91	54.00	-19.09
4638.00	V	1.08	269	25.36	36.01	10.76	32.51	32.63	54.00	-21.37
7420.80	V	1.04	29	30.16	35.94	14.56	36.68	45.46	54.00	-8.54
8348.40	V	1.06	5	22.83	35.61	15.72	37.05	39.99	54.00	-14.01
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty										
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence										
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz										
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.										
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.										
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.										

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 17 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	27 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.9° F / 32% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 1, 902.8 MHz		

Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
902.80	H	1.07	113	91.06	0.00	3.37	22.50	116.93		
1805.60	H	1.04	322	52.96	36.13	6.33	26.74	49.89	96.93	-47.04
2708.40	H	1.0	254	44.61	36.01	7.81	28.79	45.21	74.00	-28.79
3611.20	H	1.0	332	42.13	35.74	9.42	31.67	47.47	74.00	-26.53
4514.00	H	1.33	6	39.49	35.83	10.51	32.20	46.37	74.00	-27.63
5414.40	H	1.16	15	42.65	35.15	11.28	34.01	52.80	74.00	-21.20
8125.20	H	1.0	44	36.08	35.46	15.81	36.97	53.40	74.00	-20.60
9028.00	H	1.36	323	35.94	35.94	15.50	37.77	53.27	74.00	-20.73
Average										
2708.40	H	1.0	254	29.46	36.01	7.81	28.79	30.06	54.00	-23.94
3611.20	H	1.0	332	31.86	35.74	9.42	31.67	37.20	54.00	-16.80
4514.00	H	1.33	6	28.06	35.83	10.51	32.20	34.94	54.00	-19.06
5414.40	H	1.16	15	33.27	35.15	11.28	34.01	43.42	54.00	-10.58
8125.20	H	1.0	44	22.35	35.46	15.81	36.97	39.67	54.00	-14.33
9028.00	H	1.36	323	22.61	35.94	15.50	37.77	39.94	54.00	-14.06

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 18 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	27 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.9° F / 32% rh
EUT Serial	07 672 721	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 1, 902.8 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
902.80	V	1.0	43	93.19	0.00	3.37	22.50	119.06		
1805.60	V	1.0	82	56.93	36.13	6.33	26.83	53.96	99.06	-45.10
2708.40	V	1.17	278	45.78	36.01	7.81	28.91	46.50	74.00	-27.50
3611.20	V	1.01	9	41.61	35.74	9.42	31.40	46.69	74.00	-27.31
4514.00	V	1.26	5	39.85	35.83	10.51	32.14	46.68	74.00	-27.32
5414.40	V	1.20	348	39.97	35.15	11.28	34.10	50.20	74.00	-23.80
8125.20	V	1.05	355	36.98	35.46	15.81	36.97	54.30	74.00	-19.70
9028.00	V	1.47	31	36.08	35.94	15.50	37.74	53.38	74.00	-20.62
Average										
2708.40	V	1.17	278	28.86	36.01	7.81	28.91	29.58	54.00	-24.42
3611.20	V	1.01	9	30.99	35.74	9.42	31.40	36.07	54.00	-17.93
4514.00	V	1.26	5	28.53	35.83	10.51	32.14	35.36	54.00	-18.64
5414.40	V	1.20	348	29.66	35.15	11.28	34.10	39.89	54.00	-14.11
8125.20	V	1.05	355	23.65	35.46	15.81	36.97	40.97	54.00	-13.03
9028.00	V	1.47	31	23.46	35.94	15.50	37.74	40.76	54.00	-13.24

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 19 of 24 C2PC	
EUT Name	Energy Axis Rex2 Form 12S Meter						Date	27 February 2009				
EUT Model	RX2EA, RX2EAI						Temp / Hum in	73.9° F / 32% rh				
EUT Serial	Not Serialized						Temp / Hum out	N/A				
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7						Line AC / Freq.	240 VAC / 60 Hz				
Deg/sweep	6						RBW / VBW	See Note below				
Dist/Ant Used	3 meters / 3115						Performed by	Bob Richards				
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 34, 916.00 MHz											
Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
916.00	H	1.11	150	88.62	0.00	3.42	22.62	114.66				
1832.00	H	1.05	312	55.18	36.15	6.34	26.92	52.29	94.66	-42.37		
2748.00	H	1.04	355	45.53	35.93	7.94	28.75	46.29	74.00	-27.71		
3664.00	H	1.74	300	42.27	35.60	9.25	31.98	47.90	74.00	-26.10		
4580.00	H	1.01	323	40.96	35.94	10.93	32.20	48.15	74.00	-25.85		
7328.00	H	1.07	288	41.74	36.11	14.35	36.56	56.54	74.00	-17.46		
8244.00	H	1.13	323	38.75	35.57	15.76	36.94	55.89	74.00	-18.11		
9160.00	H	1.0	310	35.94	36.04	15.43	37.64	52.97	74.00	-21.03		
Average												
2748.00	H	1.04	355	30.88	35.93	7.94	28.75	31.64	54.00	-22.36		
3664.00	H	1.74	300	31.30	35.60	9.25	31.98	36.93	54.00	-17.07		
4580.00	H	1.01	323	29.26	35.94	10.93	32.20	36.45	54.00	-17.55		
7328.00	H	1.07	288	32.43	36.11	14.35	36.56	47.23	54.00	-6.77		
8244.00	H	1.13	323	23.00	35.57	15.76	36.94	40.14	54.00	-13.86		
9160.00	H	1.0	310	22.64	36.04	15.43	37.64	39.67	54.00	-14.33		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 20 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	27 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.9° F / 32% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 34, 916.00 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
916.00	V	1.09	5	89.15	0.00	3.42	22.32	114.89		
1832.00	V	1.27	81	59.34	36.15	6.34	26.99	56.52	94.89	-38.37
2748.00	V	1.13	300	48.72	35.93	7.94	28.95	49.67	74.00	-24.33
3664.00	V	1.0	339	42.77	35.60	9.25	31.88	48.29	74.00	-25.71
4580.00	V	1.0	17	39.49	35.94	10.93	32.34	46.82	74.00	-27.18
7328.00	V	1.08	75	40.21	36.11	14.35	36.56	55.01	74.00	-18.99
8244.00	V	1.05	355	38.50	35.57	15.76	36.94	55.64	74.00	-18.36
9160.00	V	1.03	4	35.56	36.04	15.43	37.60	52.55	74.00	-21.45
Average										
2748.00	V	1.13	300	29.54	35.93	7.94	28.95	30.49	54.00	-23.51
3664.00	V	1.0	339	32.73	35.60	9.25	31.88	38.25	54.00	-15.75
4580.00	V	1.0	17	27.66	35.94	10.93	32.34	34.99	54.00	-19.01
7328.00	V	1.08	75	29.97	36.11	14.35	36.56	44.77	54.00	-9.23
8244.00	V	1.05	355	22.41	35.57	15.76	36.94	39.55	54.00	-14.45
9160.00	V	1.03	4	22.16	36.04	15.43	37.60	39.15	54.00	-14.85

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 21 of 24 C2PC	
EUT Name	Energy Axis Rex2 Form 12S Meter							Date	27 February 2009			
EUT Model	RX2EA, RX2EAI							Temp / Hum in	73.9° F / 32% rh			
EUT Serial	Not Serialized							Temp / Hum out	N/A			
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7							Line AC / Freq.	240 VAC / 60 Hz			
Deg/sweep	6							RBW / VBW	See Note below			
Dist/Ant Used	3 meters / 3115							Performed by	Bob Richards			
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 48, 921.60 MHz											
Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
921.60	H	1.09	148	89.88	0.00	3.42	22.73	116.03				
1843.20	H	1.0	310	58.06	36.17	6.33	27.00	55.22	96.03	-40.81		
2764.80	H	1.12	338	44.05	35.95	7.99	28.74	44.82	74.00	-29.18		
3686.40	H	1.04	25	42.27	35.54	9.18	32.12	48.04	74.00	-25.96		
4608.00	H	1.43	323	40.21	35.98	10.94	32.22	47.39	74.00	-26.61		
7372.80	H	1.0	4	40.71	36.05	14.42	36.65	55.73	74.00	-18.27		
8294.40	H	1.0	316	36.45	35.59	15.73	36.99	53.58	74.00	-20.42		
9216.00	H	1.0	49	36.73	36.12	15.41	37.62	53.64	74.00	-20.36		
Average												
2764.80	H	1.12	338	30.39	35.95	7.99	28.74	31.16	54.00	-22.84		
3686.40	H	1.04	25	30.75	35.54	9.18	32.12	36.52	54.00	-17.48		
4608.00	H	1.43	323	29.17	35.98	10.94	32.22	36.35	54.00	-17.65		
7372.80	H	1.0	4	31.39	36.05	14.42	36.65	46.41	54.00	-7.59		
8294.40	H	1.0	316	23.31	35.59	15.73	36.99	40.44	54.00	-13.56		
9216.00	H	1.0	49	23.93	36.12	15.41	37.62	40.84	54.00	-13.16		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 22 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	27 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.9° F / 32% rh
EUT Serial	Not Serialized	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	6	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 48, 921.60 MHz		

Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
921.60	V	1.10	2	90.28	0.00	3.42	22.43	116.13		
1843.20	V	1.29	80	60.81	36.17	6.33	27.06	58.03	96.13	-38.10
2764.80	V	1.47	74	42.26	35.95	7.99	28.96	43.26	74.00	-30.74
3686.40	V	1.0	338	43.14	35.54	9.18	32.08	48.87	74.00	-25.13
4608.00	V	1.0	17	40.10	35.98	10.94	32.42	47.48	74.00	-26.52
7372.80	V	1.0	302	39.73	36.05	14.42	36.65	54.75	74.00	-19.25
8294.40	V	1.24	253	36.08	35.59	15.73	36.99	53.21	74.00	-20.79
9216.00	V	1.02	338	36.73	36.12	15.41	37.63	53.65	74.00	-20.35
Average										
2764.80	V	1.47	74	29.75	35.95	7.99	28.96	30.75	54.00	-23.25
3686.40	V	1.0	338	33.43	35.54	9.18	32.08	39.16	54.00	-14.84
4608.00	V	1.0	17	28.14	35.98	10.94	32.42	35.52	54.00	-18.48
7372.80	V	1.0	302	29.40	36.05	14.42	36.65	44.42	54.00	-9.58
8294.40	V	1.24	253	23.25	35.59	15.73	36.99	40.38	54.00	-13.62
9216.00	V	1.02	338	23.49	36.12	15.41	37.63	40.41	54.00	-13.59

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions

Tracking # 30960515.001 Page 23 of 24
 C2PC

EUT Name	Energy Axis Rex2 Form 12S Meter	Date	27 February 2009
EUT Model	RX2EA, RX2EAI	Temp / Hum in	73.9° F / 32% rh
EUT Serial	07 672 721	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15C, RSS-210 Issue 7	Line AC / Freq.	240 VAC / 60 Hz
Deg/sweep	12	RBW / VBW	See Note below
Dist/Ant Used	3 meters / 3115	Performed by	Bob Richards
Configuration	REX2 Meter with LP800NMO external antenna connected, Channel 63, 927.6 MHz		

Emission Freq (MHz)	ANT Polar (H)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Peak										
927.60	H	1.09	151	89.99	0.00	3.42	22.80	116.21		
1855.20	H	1.05	305	56.31	36.16	6.42	27.09	53.65	96.21	-42.56
2782.80	H	1.0	22	44.20	35.98	8.05	28.72	44.99	74.00	-29.01
3710.40	H	1.0	60	39.49	35.51	9.03	32.21	45.23	74.00	-28.77
4638.00	H	1.07	5	38.01	36.01	10.76	32.31	45.08	74.00	-28.92
7420.80	H	1.07	45	41.61	35.94	14.56	36.66	56.89	74.00	-17.02
8348.40	H	1.1	77	36.86	35.61	15.72	37.10	54.07	74.00	-19.93
Average										
2782.80	H	1.0	22	30.33	35.98	8.05	28.72	31.12	54.00	-22.88
3710.40	H	1.0	60	27.31	35.51	9.03	32.21	33.05	54.00	-20.95
4638.00	H	1.07	5	25.22	36.01	10.76	32.31	32.29	54.00	-21.71
7420.80	H	1.07	45	31.39	35.94	14.56	36.66	46.67	54.00	-7.33
8348.40	H	1.1	77	23.51	35.61	15.72	37.10	40.72	54.00	-13.28

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz.
 1MHz/1MHz For frequencies above 1GHz

The emission in **GREEN** is the fundamental frequency.

The emissions in **RED** are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental.

The emissions in **BLUE** are frequencies that ARE in the restricted bands.

Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.

SOP 1 Radiated Emissions											Tracking # 30960515.001 Page 24 of 24 C2PC	
EUT Name		Energy Axis Rex2 Form 12S Meter					Date		27 February 2009			
EUT Model		RX2EA, RX2EAI					Temp / Hum in		73.9° F / 32% rh			
EUT Serial		Not Serialized					Temp / Hum out		N/A			
Standard		FCC 47 CFR Part 15C, RSS-210 Issue 7					Line AC / Freq.		240 VAC / 60 Hz			
Deg/sweep		12					RBW / VBW		See Note below			
Dist/Ant Used		3 meters / 3115					Performed by		Bob Richards			
Configuration											REX2 Meter with LP800NMO external antenna connected, Channel 63, 927.6 MHz	
Emission Freq (MHz)	ANT Polar (V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)		
Peak												
927.60	V	1.07	199	90.18	0.00	3.42	22.60	116.20				
1855.20	V	1.27	83	59.61	36.16	6.42	27.13	57.00	96.20	-39.20		
2782.80	V	1.0	343	45.01	35.98	8.05	28.98	46.07	74.00	-27.93		
3710.40	V	1.0	339	42.01	35.51	9.03	32.23	47.77	74.00	-26.23		
4638.00	V	1.0	51	37.50	36.01	10.76	32.51	44.77	74.00	-29.23		
7420.80	V	1.29	53	40.10	35.94	14.56	36.68	55.40	74.00	-18.60		
8348.40	V	1.1	19	36.21	35.61	15.72	37.05	53.37	74.00	-20.63		
Average												
2782.80	V	1.0	343	30.33	35.98	8.05	28.98	31.39	54.00	-22.61		
3710.40	V	1.0	339	32.26	35.51	9.03	32.23	38.02	54.00	-15.98		
4638.00	V	1.0	51	24.23	36.01	10.76	32.51	31.50	54.00	-22.50		
7420.80	V	1.29	53	30.54	35.94	14.56	36.68	45.84	54.00	-8.16		
8348.40	V	1.1	19	23.59	35.61	15.72	37.05	40.75	54.00	-13.25		
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty												
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence												
Notes: RBW/VBW = 120kHz/300kHz for frequencies below 1GHz. 1MHz/1MHz For frequencies above 1GHz												
The emission in GREEN is the fundamental frequency. The emissions in RED are frequencies NOT in the restricted bands; the limit is 20dB below the fundamental. The emissions in BLUE are frequencies that ARE in the restricted bands.												
Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.												
* All other peak harmonics emissions not in the restricted bands are below the limits of 15.209.												

4 Test Equipment Use List

4.1 Test Equipment use list

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
SOP 1 - Radiated Emissions (5 Meter Chamber)					
Amplifier, preamp	Agilent Technologies	8449B	3008A01480	23-Jan-09	23-Jan-10
Antenna Horn 1-18GHz	EMCO	3115	5770	16-Jun-08	16-Jun-10
Ant. BiconiLog	Chase	CBL6140A	1108	13-Jun-08	13-Jun-10
Receiver, EMI	Rohde & Schwarz	ESIB40	100043	9-Jun-08	9-Jun-09
Cable, Coax	Andrew	FSJ1-50A	003	22-Jan-09	22-Jan-10
Cable, Coax	Andrew	FSJ1-50A	030	22-Jan-09	22-Jan-10
Cable, Coax	Andrew	FSJ1-50A	045	22-Jan-09	22-Jan-10

- Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

EMC Test Plan for Class II Permissive Change

TO ADD EXTERNAL ANTENNA CAPABILITY TO MODELS RX2EA AND RX2EAI

TUV QUOTE #: NSHS-7P6M5M-0

REVISION DATE: FEBRUARY 22, 2009

Revision History

Author	Date	Modification
John Holt	02/18/2009	Initial document
John Holt	02/22/09	Added test frequency chart

Introduction

This manufacturer-supplied document provides a description of the Equipment Under Test (EUT), configuration(s), operating condition(s), and performance acceptance criteria. It is intended to provide the test laboratory with the essential information needed to perform the requested testing.

Customer

The information in the following tables is required, as it should appear in the final test report.

Table 2 – Manufacturer Information

Company Name:	Elster Electricity, LLC
Street Address:	208 South Rogers Lane
City, State, Zip Code:	Raleigh, NC 27610
Tel:	919-212-4700
Fax:	919-212-5108

Table 3 – Technical Contact Information

Contact Name	Telephone	Fax	Email address
John Holt	919-250-5557	919-250-5486	john.holt@us.elster.com

Equipment Under Test

Background

The model RX2EA transceiver is a frequency hopping spread spectrum device operating in the US domestic 902-928 MHz ISM frequency band. The model RX2EAI is the same module, designated for use in some international markets that are open only in the 916-928 MHz portion of the ISM band and require an FCC grant stating that frequency range only. The two models are equivalent and are only different by the frequencies of operation stated in their FCC authorization grants. Throughout this document, references made to the RX2EA also include the RX2EAI unless stated. The RX2EA will support two networks, one for LAN traffic and one for in-home display communications. The LAN is the primary network, and the in-home display is the secondary network. The 25 channels used for the primary network are selectable between 902.8 and 927.6 MHz. When enabled, the secondary network uses the same set of channel designations and applies a 12.8 MHz offset to the channel used by the primary network. For example, if the primary network was configured to use 25 channels between 902.4 and 914.8 MHz, the secondary network may be configured to use 25 channels between 915.2 and 927.6 MHz. The product requires all channels to be between 902.8 and 927.6 MHz. The RX2EAI will only support the primary LAN network with channels selected between 916.0 and 927.6 MHz.

The Equipment Under Test is the Form 12S Rex2 meter, containing the model RX2EA(I) transceiver, a Limited Modular Approval device for which a Class II Permissive Change is being sought. The RX2EA previously used its internal printed circuit antenna exclusively, as stated in the original grant of certification. It is now desired to configure the device with an optional external antenna. This can be accomplished without implementing a board layout change because an RF connector is available at the transmitter output. This connector was originally placed on the board to provide a means for FCC compliance testing of conducted parameters such as output power. This same connector may be used to connect an external antenna by configuring an on-board jumper and attaching said antenna.

Class II Permissive Change

The desired change for the RX2EA is to allow its use with any one of a selected set of approved commercially available antennas. No changes to the printed circuit board or any of its transmitter circuitry are required to implement the addition of new external antennas. The antenna connector already exists as it was previously used for FCC compliance testing purposes. Part 15.247 stipulates that antenna gains must be less than 6dBi or a reduction in output power is required. The desired antennas are all less than 6dBi gain, are commercially available and are well documented as to gain and antenna pattern.

External Antennas

Three different models of external antenna will be tested for use with the RX2EA equipment as shown in the following table. One of the models offers a 3db gain option and another has the option of metal or non-metal ground plane mounting.

Antenna	Gain
PCTEL(MAXRAD) MFB9150 Unity Gain Fiberglass Omnidirectional	2.15 dBi
PCTEL(MAXRAD) MFB9153 3dB Fiberglass Omnidirectional	5.15 dBi
Antenex TRA9023P(NP)* [white body] 3dB Gain	5.15 dBi
Antenex TRAB9023P(NP)* [black body] 3dB Gain	
Larsen LP800NMO Unity Gain Omnidirectional Low Profile	2.15 dBi

* Note the “NP” designation specifies the NGP variation that can be used without a ground plane. It is equivalent with respect to gain and pattern, to the “P” model that does require a ground plane.

Test Frequencies

The RX2EA operating frequency range is 902.8 MHz to 927.6 MHz. The RX2EAI is the same device but operates from 916.0 MHz to 927.6 Mhz. This was done to satisfy certain foreign regulations that require an FCC certification stating that the operating range only occupies the upper half of the 902-928 MHz ISM band. The following chart shows test frequencies in the low, middle and high end of both operating bands, minimized to four frequencies for the shortest test time and to low both grants to be submitted simultaneously.

RX2EA	LOW	MID	Not needed	HIGH
RX2EAI	Not needed	LOW	MID	HIGH
Operating Frequency (MHz)	902.8	916.30	921.6	927.6
Test Channels	CH 1	CH 34	CH 48	CH 63

Testing the Rex2 Meter

Required Equipment

The following equipment is required to communicate to the RXEA2 to change the operating mode for test purposes and will be provided by Elster Electricity:

1. A laptop pc.
2. An Elster Electricity software program titled “MeterExplorer”. This software tool can be used to place the meter into the various test modes. Version 3.2.23 or higher of MeterExplorer is required.
3. An optical probe.
4. SMA (f) to MCX (m) adapter for measuring TX output power.
5. 120 VAC isolation transformer for tests where measuring equipment grounds will be attached to RXEA2 module grounds.

Measuring RF Output Power

An MCX test connector (J62) that is not populated in production has been installed on the printed circuit board to facilitate conducted RF signal measurements. To route the RF output to the test connector instead of the printed circuit antenna, R107 (0-Ohms) must be removed and R109 (0-Ohms) must be populated. The zero-ohm resistors can be returned to their standard configuration for radiated measurements using the internal printed circuit antenna.

Elster will provide an SMA to MCX adapter used for measuring conducted RF output power at J62.

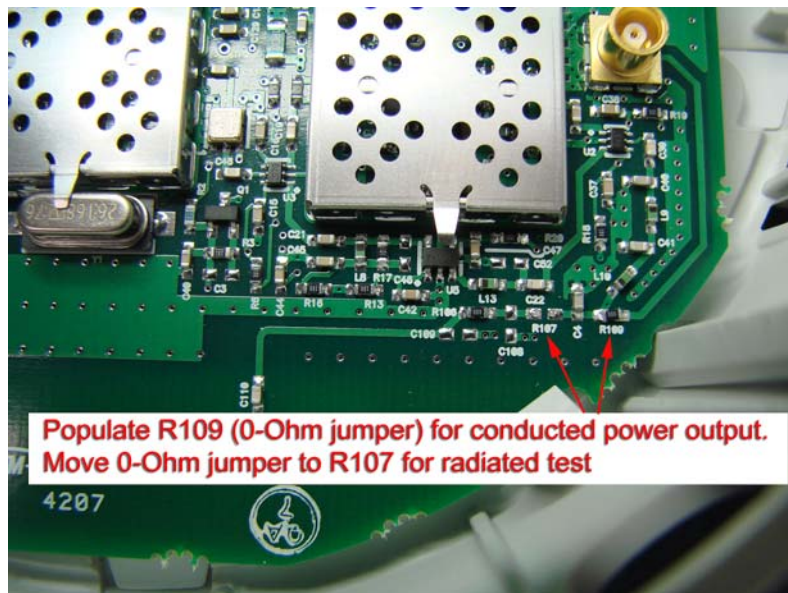


Figure 8: Jumper Configuration for Measuring Conducted RF Output Power

Running and Using MeterExplorer

From the Start menu, open MeterExplorer as follows:

Start ► Programs ► MeterTools ► MeterExplorer

MeterExplorer can be used to read or write tables to the meter and to force the meter to execute functions or commands. To read or write tables, expand the <Tables> item by clicking on the + box and then select the desired table by highlighting the table in the table list in the left-hand window. The table then can be accessed one of two ways:

1. From the main menu: **Action ► Read or Action ► Write** OR
2. Right click the mouse while it is over the highlighted table and click the right mouse button. From the pop-up menu, select **Read or Write**

To execute a function, expand the <Functions> item by clicking on the + box and then select the desired function by highlighting the function in the function list in the left-hand window. The function can then be executed one of two ways:

1. From the main menu: **Action ► Execute Function(s)** OR
2. Right click the mouse while it is over the highlighted function and click the right mouse button. From the pop-up menu, select **Execute Function(s)**

Description of Test Modes in the RXEA2

The RXEA2 supports the following test modes of operation to facilitate FCC and manufacturing tests:

1. Test mode – Constant Transmit, unmodulated – CW transmission on a single channel. This is not normally used for Part 15.247 testing.
2. Test mode – Constant Transmit, modulated – constant transmission of a modulated signal on a single channel. This is used for Part 15 Subpart C, radiated harmonics of transmitted signal testing, among other tests.
3. Test mode – Constant Transmit, hopping – continuous hopping between the 25 channels in the pseudo-random list of channels. This is not normally used for Part 15.247 testing.
4. Test mode – Constant Receive – normal receive mode on a single channel or by scanning multiple channels of the channel list, depending on the number of channels designated. This is not normally used for Part 15 Subpart C testing but is used for Subpart B, Unintentional Radiator testing.
5. Test mode – Burst Transmit – normal hopping between the 25 pseudorandom channels sending 16 transmissions followed by 1750 msec delay before starting the next 16 transmissions. This is used for Part 15.247 channel occupancy measurements and represents the worst case, realizable condition for maximum channel occupancy.
6. Normal operation – Receive mode unless polled by another device. This is normally used for Part 15 Subpart B conducted emissions.

The following sections describe the MeterExplorer software can be used to place the meter in the various modes.

For all the tests, the radio channel is specified as a channel number from 0 to 63, with the center frequency of the channel calculated from the following formula:

$$\text{Center Frequency (MHz)} = 902.4 + \text{Channel \#} * 0.4$$

For example, channel 0 is:

$$\text{Center Frequency (MHz)} = 902.4 + 0 * 0.4 = 902.4 \text{ MHz}$$

and channel 31 is:

$$\text{Center Frequency} = 902.4 + 31 * 0.4 \text{ (MHz)} = 914.8 \text{ MHz}$$

Test Modes Controlled by Parameters in MT-224

MT-224 is a configuration table that controls the operation of the 900 MHz radio, allowing the RXEA2 to be placed in test modes. After configuring MT-224, function MF-064 must be executed to begin operation in the new test mode. To change the contents of MT-224, first read the table by doing the following:

1. Under the list of tables in the RXEA2, highlight MT_224_LAN_CONFIGURATION.
2. With the table selected, right click on the mouse to bring up a pop-up menu and select **Read**
3. After reading the table, change the parameters necessary for the test (refer to Sections 0 and 0).
4. With the table selected, right click on the mouse to bring up a menu and select **Write**. To ensure the other MT-224 parameters are not inadvertently changed when modifying the meter mode, **Always Read, Modify, then Write** the MT-224 table.

To take the unit out of test mode, the table must be written again with the parameters returned to the normal state, or as outlined in Section 0.

Constant Transmit, Unmodulated

The following MT-224 fields must be set to put the meter in this test mode:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 1 {TRUE}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 2 {continuous, unmodulated}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 1
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 0-63 (choose to select the specific test channel)
```

WARNING: Once MT-224 is set for a test mode, the RXEA2 will stay in this constant transmit mode until MT-224 is rewritten with the parameters set for normal operation. After the test is completed, make sure to reverse the procedure to put the meter back into the normal operating mode. To do this, the MT-224 parameters must be changed back to their default values:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 0 {False}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 0 {Disabled}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 1
```

Constant Transmit, Modulated

The following MT-224 fields must be set to put the meter in this test mode:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 1 {TRUE}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 1 {continuous, modulated}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 1
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 0-63 (choose to select the specific test channel)
```

WARNING: Once MT-224 is set for a test mode, the RXEA2 will stay in this constant transmit mode until MT-224 is rewritten with the parameters set for normal operation. After the test is completed, make sure to reverse the procedure to put the meter back into the normal operating mode. To do this, the MT-224 parameters must be changed back to their default values:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 0 {False}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 0 {Disabled}
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
```

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 1
```

Constant Transmit, Continuous Hopping

When placed in this mode, the RX2EA will continually transmit packets, with each packet being approximately 97.3 msec in duration and an 8 – 16 msec off time between packets. Each packet is sent on the next channel in the pseudo-random list of channels (refer to Section **Error! Reference source not found.**).

To place the meter in this mode, the following MT-224 parameters must be changed from the normal MT-224 configuration:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 1 {True}

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_SENDER = 1 {True}

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
```

The default 25 channel configuration is for 25 channels in the lower half of the band, between 902.8 MHz and 914.8 MHz. This can be changed to the upper half of the band by loading the “high band” channel list into MT-224.

WARNING: Once MT-224 is set for a test mode, the RXEA2 will stay in this constant transmit mode until MT-224 is written with the parameters set for normal operation. After the test is completed, make sure to reverse the procedure to put the meter back into the normal operating mode. To do this, the MT-224 parameters must be changed back to their default values:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 0 {False}

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_SENDER = 0 {False}

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
```

Constant Receive

In test mode, the meter can be configured to receive only on a specified channel. To place the RXEA2 in this mode, the following MT-224 parameters must be changed from the normal MT-224 configuration:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 1 {True}

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 3 {Receive}

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 1

MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 0-63 (choose to select the specific test channel)
```

WARNING: Once MT-224 is set as shown above, the meter will stay in this mode of operation until MT-224 is written with the parameters set for normal operation. After the test is completed, make sure to reverse the procedure to put the meter back into a normal mode of operation. To do this, the MT-224 parameters must be changed back to their default values:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 0 {False}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 0 {Disabled}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 1
```

Constant Transmit, Burst Mode

In this test mode, the RXEA2 will make 16 one-packet transmissions with approximately 10msec delay between each packet, followed by 1750msec of dead time to yield a 50% duty cycle. Each packet sent will be on the next pseudorandom channel from the 25-channel list. This represents the worst case transmission scenario and is used to measure the channel occupancy time as required by Part 15.247.

To place the meter in this mode, the following MT-224 parameters must be changed from the normal MT-224 configuration:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 1 {True}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_SENDER = 1 {True}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.PACKET_DELAY = 15
```

WARNING: Once MT-224 is set for a test mode, the RXEA2 will stay in this constant transmit mode until MT-224 is written with the parameters set for normal operation. After the test is completed, make sure to reverse the procedure to put the meter back into the normal operating mode. To do this, the MT-224 parameters must be changed back to their default values:

```
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 0 {False}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_SENDER = 0 {False}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.PACKET_DELAY = 0
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 1
```

Normal Operation

In the normal operating mode, the meter will only transmit if there is an exception condition to be sent or if polled by another device. To prevent unwanted exception conditions that would result in a transmission, SILENCE_EXCEPTIONS is enabled. Thus, the meter is in receive mode, scanning the 25 channels for a valid packet in an attempt to synchronize to another device.

To restore the meter to the normal operating condition, use MeterExplorer to return MT-224 to its normal configuration.

```
MT_224_LAN_CONFIGURATION.LAN_CONTROL.SILENCE_EXCEPTIONS = 1 {Enabled}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_IN_TEST_MODE = 0 {False}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CONF.TRANSMIT_CONTINUOUSLY = 0 {Disabled}
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.NUMBER_OF_CHANNELS = 25
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.CHANNEL.CHANNEL_LIST[0].CHANNEL = 1
MT_224_LAN_CONFIGURATION.RADIO_CONFIG.FLAGS.IS_SENDER = 0 {False}
```