Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	6W59817
Applicant:	Kinectrics Inc 800 Kipling Ave. Toronto, Ontario M8Z 6C4 Canada
Apparatus:	Remote Sensor/Transmitter (RST2)
FCC ID:	TY3-RST2V2
In Accordance With:	FCC Part 15 Subpart C, 15.249 Operation in the 902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz and 24.0-24.25 GHz
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	Roman Kuleba, EMC Specialist
Date:	April 12, 2006
Total Number of Pages:	16

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	Remote Sensor/Transmitter (RST2)
Specification:	FCC Part 15 Subpart C, 15.249
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Mac Huang, EMC Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:
Item #4, Remote Sensor/Transmitter (RST2)

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
#4	Remote Sensor / Transmitter (RST2)	RST2-044

The first samples were received on: February 06, 2006

1.3 Theory of Operation

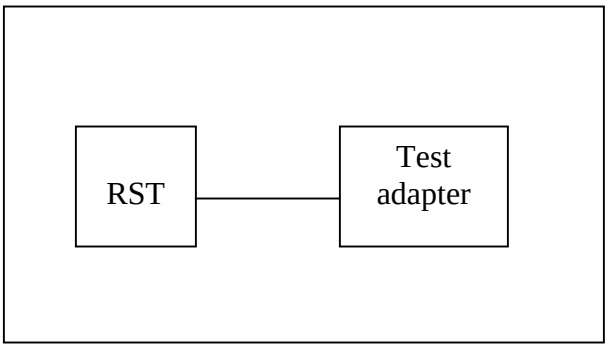
The remote monitoring system uses wireless technologies for monitoring temperatures on parts of high voltage utility power system equipment. The system consists of battery-powered remote sensor/transmitters (RST), a ground-based receiver for collecting the data from the sensors (Ground station Collector - GSC) and an HSM (Handheld Signal strength Meter) to aid in installation of the RSTs

For testing purpose, a Signal Strength test adapter was added to RST2, so the RST2 was continuously transmitting during test.

1.4 Technical Specifications of the EUT

Manufacturer:	Kinectrics Inc
Operating Frequency:	916.5 MHz
Peak Output Power:	-9.4 dBm E.I.R.P
Rated Power:	1mW, (Conducted Power)
Modulation:	OOK
Antenna Data:	Integral @ -10dB with RCVR antenna H polarized Integral @ -15 dB with RCVR antenna V polarized
Antenna Connector:	N/A
Power Source:	3.6 V Lithium battery

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.249

Operation in the 902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz and 24.0-24.25 GHz bands

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 ^{o}C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 18/06
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 18/06
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	July 14/06
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	July 14/06
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	July 14/06
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/06
Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	May 17/06
LISN	EMCO	4825/2	FA001545	Jan. 30/07
Bilog	Schaffner	CBL6112B	FA001504	NCR
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 29/06
Biconical (1) Antenna	EMCO	3109	FA000805	April 22/06
Horn Antenna #1	EMCO	3115	FA000649	Jan. 12/07
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU

COU – Calibrate On Use

Note: 5.0 – 18.0 GHz Amplifier was calibrated before Test.

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N	No : not applicable / not relevant.
Y	Yes : Mandatory i.e. the apparatus shall conform to these tests.
N/T	Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.207(a)	Powerline Conducted Emissions	N	
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.249(a)	Radiated emissions not in Restricted Bands	Y	PASS
15.249(b)	Fixed Point-to-Point operation in the 24.0-24.25 GHz Band	N	
15.249(d)	Spurious emissions (except Harmonics)	Y	PASS

Notes: None

Appendix A : Test Results

Clause 15.209(a) Radiated Emissions within Restricted Bands

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400F (kHz)	300
0.490-1.705	24000F (kHz)	30
1.705-30.0	30	30
30-88	100 (40 dBuV/m)	3
88-216	150 (43.5 dBuV/m)	3
216-960	200 (46 dBuV/m)	3
Above 960	500 (54 dBuV/m)	3

Test Conditions:

Sample Number:	#4	**Temperature:**	21
Date:	February 16, 2006	**Humidity:**	25
Modification State:	None	**Tester:**	Mac Huang
		Laboratory:	Ottawa

Test Results: PASS

Freq. (MHz)	Ant	Pol. V/ H	RCVD Signal (dBμV)	Ant. Factor (dB)	Cable loss (dB)	Duty Cycle Corr.	Amp. Gain (dB)	Level (dBuV/m)	Limit (dBuV/ m)	Margin (dB)
2749.5600	Horn1	V	47.0	30.1	5.4	-6.0	59.2	17.3	54	36.7
2749.5600	Horn1	H	45.7	30.3	5.4	-6.0	59.2	16.2	54	37.8

Note 1: Antenna Legend: LP = Log-Periodic, Horn = Horn,
Note 2: Positive Peak detector used

Additional Observations:

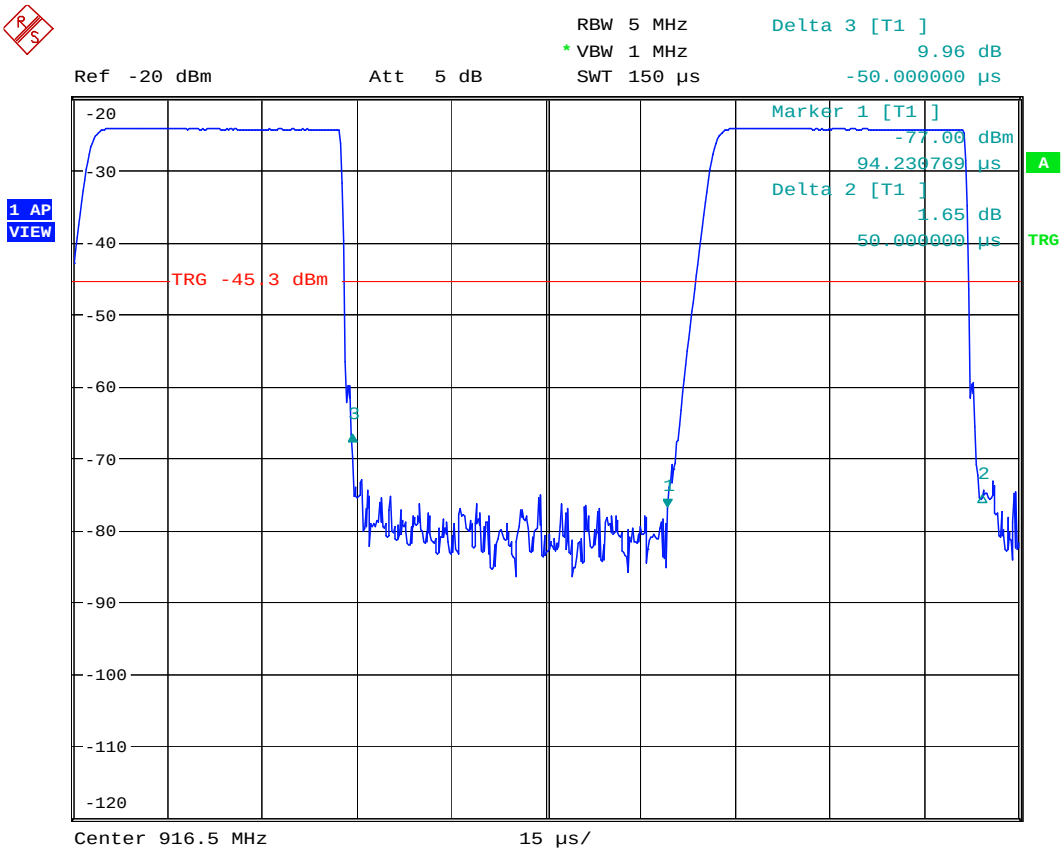
The Spectrum was searched from 30MHz to the 10th Harmonic (9.16GHz).

These results apply to emissions found in the Restricted bands defined in FCC Part 15 Subpart C, 15.205.
All measurements were performed using a Quasi-peak Detector with 120kHz RBW below 1GHz and a Peak Detector and 1MHz RBW (3MHz VBW) above 1GHz at a distance of 3 meters.
The EUT was measured on three orthogonal axes.
A new battery was used for the test.

Duty Cycle:

Duty cycle (%) = 100 * Ton / (Ton + Toff)
= 100 * 50 / 100 = 50.0%

Duty cycle (dB) = 20 * log(Ton / (Ton + Toff)
= 20 * log(50 / 100) = -6 dB



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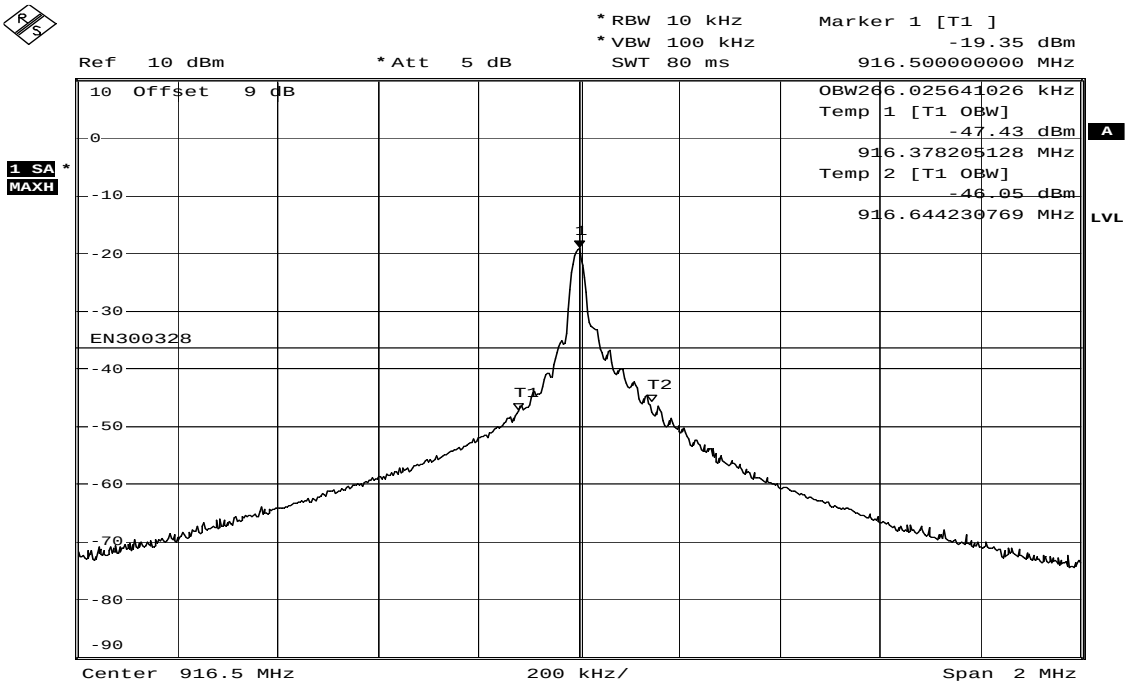
99% Occupied Bandwidth:



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Clause 15.249(a) Radiated emissions not in Restricted Bands

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Test Conditions:

Sample Number:	#4	**Temperature:**	21
Date:	February 16, 2006	**Humidity:**	25
Modification State:	None	**Tester:**	Mac Huang
		Laboratory:	Ottawa

Test Results: PASS

See attached Table

Additional Observations:

Measured Fundamental Frequency: 916.5 MHz.

The Spectrum was searched from 30MHz to the 10th Harmonic (9.16GHz).

The EUT was measured on three orthogonal axes.
A new battery was used for the test.
All measurements were performed using a Quasi-peak Detector with 120kHz RBW below 1GHz and a Peak Detector and 1MHz RBW (3MHz VBW) above 1GHz at a distance of 3 meters.

Transmitter Spurious (Worst case): 40.5 dBuV/m (-53.5 dBm) @1832.0 MHz.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Cable loss (dB)	Duty Cycle Corr.	Amp. Gain (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
916.5160	LP1	V	61.1	23.1	4.6		N/A	88.8	94	5.2
916.5160	LP1	H	59.1	23.8	4.6		N/A	87.5	94	6.5
1832.0000	Horn1	V	57.3	27.1	4.1	-6.0	47.9	34.7	54	19.3
1832.0000	Horn1	H	62.9	27.3	4.1	-6.0	47.9	40.5	54	13.5

Note 1: Antenna Legend: LP = Log-Periodic, Horn = Horn,
Note 2: Quasi-peak @ 916.5 MHz, Positive Peak detector @1832 MHz

Clause 15.249(d) Spurious emissions (except Harmonics)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Conditions:

Sample Number:	#4	**Temperature:**	21
Date:	February 16, 2006	**Humidity:**	25
Modification State:	None	**Tester:**	Mac Huang
		Laboratory:	Ottawa

Test Results: PASS

No spurious signal was found within 20 dB below the limits.

Appendix B : Setup Photographs

Spurious Emissions Setup:

Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions