



**EMC TEST REPORT**  
*for*  
**PROSOFT TECHNOLOGY, INC.**  
**WIRELESS INDUSTRIAL TRANSCEIVER**  
**Model: 4160-RLX-WA-01**

**GARWOOD LABORATORIES, INC.**  
*TESTING AND ENGINEERING SERVICES*



**EMC TEST REPORT**  
**Certification for 47 CFR,**  
**Part 15**  
**Subpart C / IC RSS-210**

**Report for:**

**PROSOFT TECHNOLOGY, INC.**  
**WIRELESS INDUSTRIAL TRANSCEIVER**  
**Model: 4160-RLX-WA-01**

*Prepared For: ProSoft Technology, Inc.  
1675 Chester Ave.  
Bakersfield, CA. 93301*

*Prepared By: Garwood Laboratories, Inc  
950 Calle Negocio  
San Clemente, CA 92673*

*Created: August 13, 2004*



# GARWOOD LABORATORIES, INC.

950 Calle Negocio, San Clemente, CA 92673  
Phone: 949-361-9189 Fax: 949-361-9597

"EXCELLENCE  
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Report No: FR50170SEP

## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### RESPONSIBLE SIGNATURES

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### DOCUMENT HISTORY

Revision	Issue Date	Affected Page(s)	Description Of Modifications	Revised By	Approved By
N/C	August 13, 2004		Initial release		



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<b>CLIENT INFORMATION</b>	
<b>Purchase Order</b>	02-30655
<b>Quote Number</b>	200405-110C
<b>EUT Arrival Date</b>	July 28, 2004
<b>Company Name</b>	ProSoft Technology, Incorporated.
<b>Address</b>	1675 Chester Avenue
<b>City, State Zip</b>	Bakersfield, California 93301
<b>Contact Name</b>	Mr. Ben Mathison
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<b>Title</b>	EMC Engineer
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<b>Test Personnel</b>	<b>Test Dates</b>
Mark Jeffrie Lyon – EMC Test Engineer	29 & 30 July 2004 2, 3, 5, 6, 9, & 10 August 2004



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## Accreditations:

*The Open Area Test Site (OATS) and measurement facilities used to collect the test data are located at Garwood Laboratories, Incorporated test facility in San Clemente, California.*

*The test facility is recognized, certified, or accredited by the following organizations:*



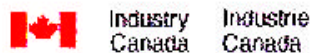
This site has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration Number: 761986; date of expiration: July 9, 2007 and Registration Number: 851168; date of expiration: June 21, 2007. **Garwood Laboratories** is an authorized test laboratory for the DoC process.



**Garwood Laboratories, Inc.** is accredited by the U.S. National Institute Standards Technology under NVLAP as suppliers of test results to the criteria established by ISO/IEC 17025 and ISO 9002. The accreditation is valid through September 22, 2004.



**Garwood Laboratories, Inc.** has been assessed in accordance with ISO 17025 and with ITI's assessment criteria. Based upon this assessment, Technology International (Europe), Ltd. has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC). The scope of the approval was provided on a Schedule of Assessment supplied with a certificate and is available upon request. Certificate Number: 04-057, effective through June 5, 2005, or until the next agreed assessment date.



**Garwood Laboratories, Inc.** is registered by Industry Canada for performance of measurements and complies with RSS 212, Issue 1 (Provisional). Reference IC 5194, Effective through July 20, 2007.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### MEASUREMENT / TECHNICAL REPORT SUMMARY

<i>Type of Authorization</i>	Certification
<i>Applicable FCC Rules</i>	<p>Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 19 (10-1-03 Edition). The following subparts are applicable to the results in this test report:</p> <p>Part 15, Subpart C – Intentional Radiators</p> <ul style="list-style-type: none"><li>§15.247 (c) RSS-210 6.3/7.3 Radiated Spurious Emissions</li><li>§15.247 (c) RSS-210 6.3/7.3 Spurious Conducted Emissions</li><li>§15.209 (a) Radiated Emissions Limits</li><li>§15.207 (a) RSS-210 6.6/7.4 AC Conducted Emissions</li><li>§15.247 (a) (2) RSS-210 6.2.2 (o) (b) 6 dB Bandwidth</li><li>§15.247 (b) RSS-210 6.2.2 (o) (b) Maximum Peak Output Power</li><li>§15.247 (d) RSS-210 6.2.2 (o) (b) Power Spectral Density</li></ul>
<i>Summary of Data</i>	The EUT complied with all the applicable FCC rules as listed above.

**Note:** For the current status of our accreditation to the above standards please visit the *Accreditations* page on our website.





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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 1.0 GENERAL INFORMATION

#### 1.1 Product Description

<b>Equipment Under Test:</b>		Wireless Industrial Transceiver
<b>Model Number:</b>		4160-RLX-WA-01
<b>Serial Number:</b>		N/A
<b>Description:</b>		The ProSoft model 4160-RLX-WA-01 radio circuit board module is a PC/104 bus industrial 802.11b radio designed to be used in three of ProSoft Technology's major product lines. They are as follows: the PLX+, the inRax, and the ProTalkQ. The primary radio component is a USI model CF-BA-G-02 Compact Flash wireless network module. The USI model CF-BA-G-02 radio incorporates the Agere "Beagle" chipset. The operation of the radio is controlled by a ProSoft application program running on an internal 386EX CPU connected to the PC/104 bus.
<b>Specifications And Requirements</b>	<b>Length:</b>	116.5 mm
	<b>Width:</b>	100 mm
	<b>Height:</b>	1.5 mm
<b>RF Specifications</b>	<b>Frequency Range</b>	2400 MHz. To 2497 MHz. (2.4 GHz. ISM Band)
	<b>Number of Channels</b>	14
	<b>RF Power</b>	15.8 dBm
	<b>Modulation</b>	DSSS (Direct Sequence Spread Spectrum) DBPSK, DQPSK, CCK
	<b>Transfer Rate</b>	11 Mbps
	<b>Maximum Receive Level</b>	-4 dBm (with PER < 8%)
<b>Power Requirements</b>	<b>Operating Voltage</b>	5 VDC +/- 5%
	<b>Current (Amp):</b>	Continuous Transmit – 265 mA (Typical at 3.3 VDC) Continuous Receive – 165 mA (Typical at 3.3 VDC) Sleep Mode – 15 mA (Typical at 3.3 VDC)
<b>EUT Operating Modes to be Tested</b>		The Wireless Industrial Transceiver (4160-RLX-WA-01) was tested in the Continuous Transmit (broadcast) mode and the Continuous Receive/ No Transmit Mode. The status of the Wireless Industrial Transceiver was checked by monitoring LED status lights.



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### 1.2 Description of Test Modes

Thirteen selectable sub channels are provided with this EUT:

Channel	Frequency	Channel	Frequency
1	2412 MHz.	8	2447 MHz.
2	2417 MHz.	9	2452 MHz.
3	2422 MHz.	10	2457 MHz.
4	2427 MHz.	11	2462 MHz.
5	2432 MHz.	12	2467 MHz.
6	2437 MHz.	13	2472 MHz.
7	2442 MHz.	14	2477 MHz.

### 1.3 Test Antenna and Cable Requirements

The EUT will be offered to it's customers with various conversion cable, antenna, and RF amplifier options. For the purpose of this test, the worst case antenna , antenna cables, and RF amplifier combinations were selected:

#### Antenna, Amplifier, and Cable Specifications:

Antenna Type	Manufacturer	Model Number	Gain (dBi)
Parabolic	Andrew	T2400F	24 dBi
Panel	Maxrad	MP24013FXPTNF	13 dBi
Omni	Mobile Mark	OD12-2400	12 dBi
Enclosed Yagi	Maxrad	MYP240115PTNF	15 dBi
Amplifier	Manufacturer	Model Number	
RF Amplifier	Radiolinz	RLX-500	N/A



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### Cable Specifications:

Cable type	Length (feet)	Model Number	Manufacturer
N to N Patch Cable	10	C40M40-40-010	Talley Communications
RA N to N Patch Cable	3	C19M40-60-003	Talley Communications
RA SMA to RA N Patch Cable	2	C19M10-60-002	Talley Communications
RA SMA to N Plug Patch Cable	2	C19M10-80-002	Talley Communications

### 1.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories of support units. The following support units or accessories were used to form a representative test configuration during the tests:

Item No.	Manufacturer	Description	Identification Numbers	FCC ID Numbers
1.	Dell.	Notebook Computer	<b>Model #:</b> PP01L <b>P/N:</b> 79CNP A00	N/A*
2.	N/A	5 meter RS232 Cable	<b>Model #:</b> N/A*	N/A*
3	Prolinx	CPU/Power Supply Board	<b>Model #:</b> 4160 Rev 1.0	N/A*
4	CUI Incorporated	Switching Power Supply	<b>Model #:</b> DSA-0151F-24	N/A*

### 1.5 Related Submittal(s)/ Grant(s)

None



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### 1.6 Test Methodology

#### Radiated Emissions, § 15.209(a) RSS-210 6.3/7.3

The test for unwanted emissions was performed according to the general provisions of ANSI C63.4-2000 (American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground plane at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of maximum radiation.
- b. The EUT was placed 3 meters away from the interference-receiving test antenna, which was mounted on top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and it's height is varied from one to four meters above the ground plane to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurements.
- d. For each suspected emission, the EUT was configured to it's worst case. The antenna was varied in heights from one to four meters. The rotating table was turned from 0 to 360 degrees to find the maximum emission reading.
- e. The field strength of the fundamental frequency and harmonics, up to the 10<sup>th</sup> harmonic, were measured utilizing a Bicon, Log Periodic, and Double Ridge Guide Horn antennas.

#### Note:

1. The resolution bandwidth and video bandwidth of the spectrum analyzer is 120 kHz. Quasi-peak detection at frequencies below 1 GHz.
2. The resolution bandwidth and video bandwidth of the spectrum analyzer are 1 MHz. for peak detection (PK) at frequencies above 1 GHz.
3. The resolution bandwidth of the spectrum analyzer is 1 MHz. and the Video Bandwidth is 10 Hz. for average detection (AVE) at frequencies above 1 GHz.



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### 2.0 PRODUCT LABELING

#### 2.1 FCC ID Label

All devices authorized under the certification procedures are required to display an identification label showing the FCC Identifier (FCC ID) under which they are authorized.

Example:

**FCC ID: MX5-P2222**

In addition, the manufacturer (or importer) is responsible for having the compliance label produced, and for having it affixed to each unit that is marketed or imported.

FCC Compliance Label:

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.

#### 2.2 Location of Label on EUT

As stated in §15.19, the label shall be located in a conspicuous location on the device. When the device is so small or for such use that it is not practicable to place the compliance label on it, the information required should be placed in a prominent location in the instruction manual or pamphlet supplied to the user. Alternatively, the compliance label can be placed on the container in which the device is marketed. However, the FCC identifier must be displayed on the device.

#### 2.3 Information to user

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



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### **3.0 SYSTEM TEST CONFIGURATION**

#### **3.1 Justification**

The EUT was used in a system configured for testing in a typical fashion, as a customer would normally use it.

#### **3.2 Special Accessories**

The EUT requires no special accessories to comply with the required limits.

#### **3.3 Equipment Modifications**

No modifications were made to achieve the required specification limit.

#### **3.4 EUT Operating Conditions**

- a. Test software data (wattcp and its respective configuration commands) were downloaded into the EUT from the notebook computer via an RS232 cable, so that the EUT would either transmit or receive continuously.
- b. After the EUT had been programmed, the RS232 cable was disconnected from the EUT so that it would operate independently from the laptop computer.



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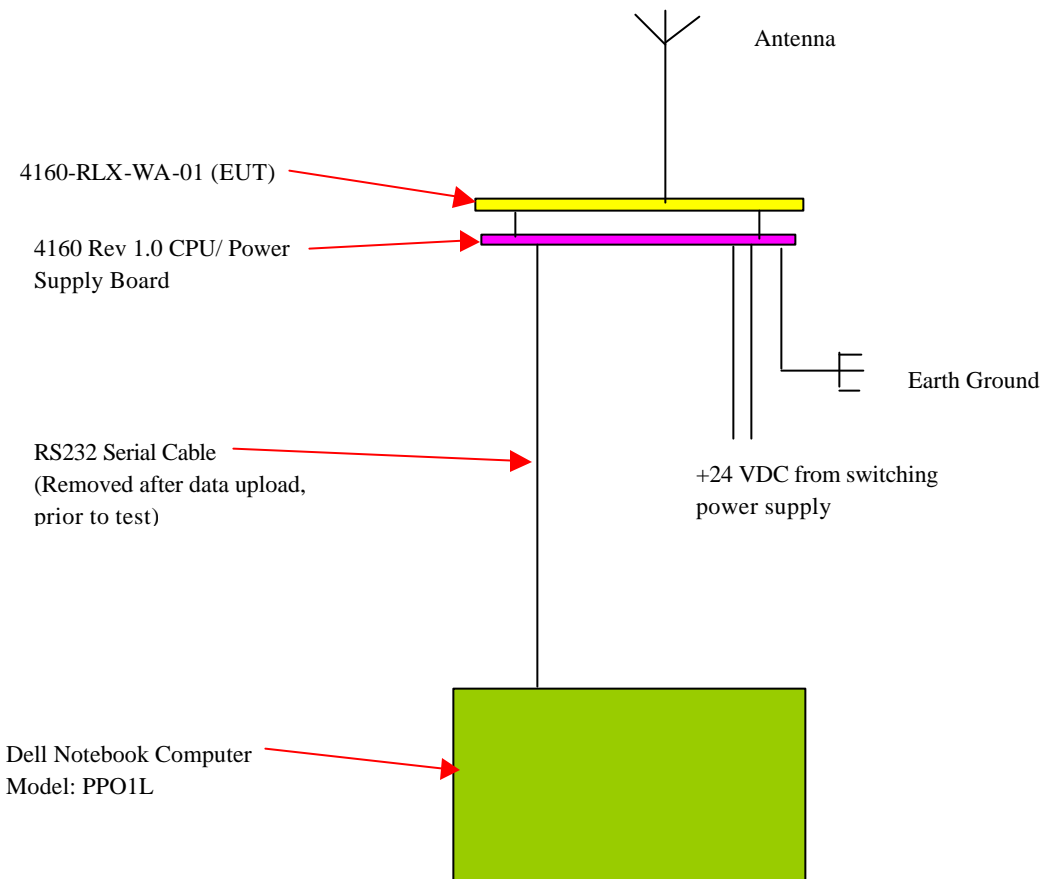
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### 3.5 Configuration of Tested System







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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.0 SUMMARY OF TEST RESULTS

#### 4.1 Radiated Emissions

##### 4.1.1 Radiated Emissions Limits

<i>FCC Part 15, Subpart C, § 15.209(a)</i>		
<i>Fundamental frequency</i>	<i>Field Strength of Fundamental (millivolts/meter)</i>	<i>Measurement Distance (meters)</i>
0.0009-0.490	2400/F(kHz.)	300
0.490-1.705	24000/f(kHz)	30
1.705-30.0	30	500
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m)= 20 log Emission level (μV/m).
3. As shown in 15.35 (b), for frequencies above 1000 MHz., the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.



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### 4.1.2 Field Strength of Emissions from Intentional Radiators Test Results [Reference: FCC PT.15, Subpart C, § 15.209(a) RSS-210 6.3/7.3]

#### 4.1.2.1 Field Strength of Emissions Test Results for Channel 2, 20-1000MHz, Parabolic Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
32.001	V	9.2	-7.6	40	*	-30.8	*	Complied
67.280	V	34.2	-11.7	40	*	-5.8	*	Complied
143.91	V	33.7	-8.3	43.5	*	-9.8	*	Complied
179.671	V	31.3	-6.1	43.5	*	-12.2	*	Complied
195.440	V	25.5	-5.3	43.5	*	-18.0	*	Complied
199.267	V	23.6	-5.2	43.5	*	-19.9	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated.
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.2 Field Strength of Emissions Test Results for Channel 2, 20-1000MHz, Omni Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Omni Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
64.610	V	13.8	-20.5	40	*	-26.8	*	Complied
67.238	V	26.3	-20.5	40	*	-13.7	*	Complied
77.231	V	34.8	-20.5	40	*	-5.2	*	Complied
87.000	V	25.8	-20.5	40	*	-14.2	*	Complied
236.780	H	14.9	-18.9	46	*	-31.1	*	Complied
240.653	H	23.5	-18.9	46	*	-22.5	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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Report No: FR50170SEP

## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.3 Field Strength of Emissions Test Results for Channel 2, 20-1000MHz, Panel Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Panel Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
64.741	H	21.8	-19.3	40	*	-18.2	*	Complied
67.234	V	28.0	-19	40	*	-12.0	*	Complied
77.650	H	33.9	-18.6	40	*	-6.1	*	Complied
86.999	H	25.9	-18	40	*	-14.1	*	Complied
191.760	V	37.1	-19.6	43.5	*	-6.4	*	Complied
240.000	H	27.8	-19.1	46	*	-18.2	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.4 Field Strength of Emissions Test Results for Channel 2, 20-1000MHz, Yagi Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Yagi Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
67.238	V	26.8	-19	40	*	-13.2	*	Complied
77.090	V	29.6	-18.7	40	*	-10.4	*	Complied
87.010	V	21.5	-19	40	*	-18.5	*	Complied
236.780	H	21.3	-19	46	*	-24.7	*	Complied
241.390	H	21.3	-19.2	46	*	-24.7	*	Complied
287.900	H	24.9	-18.3	46	*	-21.1	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.5 Field Strength of Emissions Test Results for Channel 7, 20-1000MHz, Parabolic Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
33.335	H	17.6	-7.6	40	*	-22.4	*	Complied
144.007	H	32	-8.2	43.5	*	-11.5	*	Complied
175.234	V	37	-6.8	43.5	*	-6.5	*	Complied
186.248	V	39.7	-6	43.5	*	-3.8	*	Complied
195.440	V	26.8	-5.6	43.5	*	-16.7	*	Complied
199.267	H	22.5	-5.6	43.5	*	-21.0	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.6 Field Strength of Emissions Test Results for Channel 7, 20-1000MHz, Omni Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Omni Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
67.238	V	26.8	-19	40	*	-13.2	*	Complied
77.090	V	29.6	-18.7	40	*	-10.4	*	Complied
87.010	V	21.5	-19	40	*	-18.5	*	Complied
236.780	H	21.3	-19	46	*	-24.7	*	Complied
241.390	H	21.3	-19.2	46	*	-24.7	*	Complied
287.900	H	24.9	-18.3	46	*	-21.1	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.





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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.7 Field Strength of Emissions Test Results for Channel 7, 20-1000MHz, Panel Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Panel Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
77.622	V	21.7	-20.5	40	*	-18.3	*	Complied
82.940	V	21.0	-20.4	40	*	-19.0	*	Complied
223.670	H	13.3	-18.9	46	*	-32.7	*	Complied
240.630	H	26.5	-18.9	46	*	-19.5	*	Complied
287.865	H	32.7	-18.2	46	*	-13.3	*	Complied
288.600	H	32.3	-18.2	46	*	-13.7	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.8 Field Strength of Emissions Test Results for Channel 7, 20-1000MHz, Yagi Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Yagi Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
64.390	H	20.8	-20.5	40	*	-19.2	*	Complied
78.294	H	33.7	-20.5	40	*	-6.3	*	Complied
82.963	V	31.4	-20.4	40	*	-8.6	*	Complied
82.977	H	30.1	-19.8	40	*	-9.9	*	Complied
125.230	H	32.1	-18.9	43.5	*	-11.4	*	Complied
222.977	H	17.2	-18.9	46	*	-28.8	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.9 Field Strength of Emissions Test Results for Channel 12, 20-1000MHz, Parabolic Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
67.238	V	26.8	-19	40	*	-13.2	*	Complied
77.090	V	29.6	-18.7	40	*	-10.4	*	Complied
87.010	V	21.5	-19	40	*	-18.5	*	Complied
236.780	H	21.3	-19	46	*	-24.7	*	Complied
241.390	H	21.3	-19.2	46	*	-24.7	*	Complied
287.900	H	24.9	-18.3	46	*	-21.1	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



**EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED**

**4.1.2.10 Field Strength of Emissions Test Results for Channel 12, 20-1000MHz, Omni Antenna  
 (Quasi-Peaks)**

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Omni Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
32.001	V	9.3	-7.6	40	*	-30.8	*	Complied
67.280	V	34.1	-11.7	40	*	-5.8	*	Complied
143.910	H	33.2	-8.3	43.5	*	-9.8	*	Complied
179.671	H	31.6	-6.1	43.5	*	-12.2	*	Complied
195.440	V	25.7	-5.3	43.5	*	-18	*	Complied
199.267	H	23.0	-5.2	43.5	*	-19.9	*	Complied

**Notes:**

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.11 Field Strength of Emissions Test Results for Channel 12, 20-1000MHz, Panel Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Panel Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
64.367	H	21.0	-20.5	40	*	-19.0	*	Complied
78.251	H	32.6	-20.5	40	*	-7.4	*	Complied
128.367	H	22.0	-19.8	43.5	*	-21.5	*	Complied
160.000	H	18.6	-19.7	43.5	*	-24.9	*	Complied
240.630	H	23.9	-18.9	46.0	*	-22.1	*	Complied
287.935	H	31.6	-18.2	46.0	*	-14.4	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.12 Field Strength of Emissions Test Results for Channel 12, 20-1000MHz, Yagi Antenna (Quasi-Peaks)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12	<b>FREQUENCY RANGE</b>	20-1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Yagi Antenna		

Frequency (MHz)	Polarity (V or H)	Emission Level (dBμV)	CF (dB/m)	FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
				pk	ave	pk	ave	
67.232	V	28.4	-19.1	40	*	-11.6	*	Complied
68.930	V	21.6	-18.9	40	*	-18.4	*	Complied
87.000	H	17.3	-19	40	*	-22.7	*	Complied
240.720	H	23.0	-19.1	46	*	-23.0	*	Complied
287.900	H	27.7	-18.3	46	*	-18.3	*	Complied
336.944	H	25.1	-17.9	46	*	-20.9	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.
2. All readings are quasi- peak with the specified bandwidth unless otherwise stated
3. No radiated emissions were found below 30 MHz.



**EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED**

**4.1.2.13 Field Strength of Emissions Test Results for Channel 2, 1-24 GHz, Parabolic Antenna (Peak)**

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2417									Fundamental Frequency
4833.97	H	12.6	67.3	45.2	74	54	-6.7	-25.3	Complied
4833.97	V	12.6	35.3	16.1	74	54	-38.7	-46.2	Complied
7249.00	V	18.8	44.6	24.6	74	54	-29.4	-44.5	Complied
7249.00	H	18.8	45.0	24.4	74	54	-29.0	-46.6	Complied
9668.00	H	21.8	48.8	28.2	74	54	-25.2	-42.1	Complied
9668.00	V	21.8	49.0	27.7	74	54	-25.0	-44.2	Complied

**Notes:**

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.





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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.14 Field Strength of Emissions Test Results for Channel 2, 1-24 GHz, Omni Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Omni Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2417									Fundamental Frequency
4833.97	H	12.6	44.5	25.2	74	54	-29.5	-44.6	Complied
4833.97	V	12.6	67.0	48.5	74	54	-7.0	-38.3	Complied
7249.00	H	18.8	44.7	24.1	74	54	-29.3	-44.3	Complied
7249.00	V	18.8	51.9	32.3	74	54	-22.1	-41.1	Complied
9668.00	V	21.8	46.5	27.9	74	54	-27.5	-40.6	Complied
9668.00	H	21.8	47.4	27.7	74	54	-26.6	-41.0	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.15 Field Strength of Emissions Test Results for Channel 2, 1-24 GHz, Panel Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Panel Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2417									Fundamental Frequency
4833.97	H	12.6	45.5	25.8	74	54	-28.6	-44.6	Complied
4833.97	V	12.6	65.0	48.1	74	54	-9.0	-36.3	Complied
7249.00	V	18.8	43.9	24.0	74	54	-31.3	-43.3	Complied
7249.00	H	18.8	49.9	32.8	74	54	-21.1	-40.1	Complied
9668.00	H	21.8	45.7	27.1	74	54	-29.5	-43.6	Complied
9668.00	V	21.8	46.9	27.7	74	54	-29.6	-42.0	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.16 Field Strength of Emissions Test Results for Channel 2, 1-24 GHz, Yagi Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 2	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Yagi Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2417									Fundamental Frequency
4833.97	H	12.6	39.7	19.3	74	54	-34.3	-44.6	Complied
4833.97	V	12.6	41.3	27.9	74	54	-32.7	-46.0	Complied
7249.00	H	18.8	52.2	25.6	74	54	-21.8	-38.3	Complied
7249.00	V	18.8	52.3	24.4	74	54	-21.7	-39.5	Complied
9668.00	H	21.8	55.1	29.0	74	54	-18.9	-34.9	Complied
9668.00	V	21.8	56.2	27.7	74	54	-17.8	-38.9	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



# GARWOOD LABORATORIES, INC.

950 Calle Negocio, San Clemente, CA 92673

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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.17 Field Strength of Emissions Test Results for Channel 7, 1-24 GHz, Parabolic Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2442.00									Fundamental Frequency
4884.00	H	12.6	67.0	17.7	74	54	-7.0	-36.2	Complied
4884.00	V	12.6	35.8	19.0	74	54	-38.2	-34.9	Complied
7326.00	V	19.0	46.1	24.7	74	54	-27.9	-29.2	Complied
7326.00	H	19.0	45.8	25.2	74	54	-28.2	-28.7	Complied
9768.00	H	22.1	52.8	28.9	74	54	-21.2	-25.0	Complied
9768.00	V	22.1	48.9	29.7	74	54	-25.1	-26.0	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.18 Field Strength of Emissions Test Results for Channel 7, 1-24 GHz, Omni Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Omni Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2442.00									Fundamental Frequency
4884.00	H	12.6	63.9	5.5	74	54	-31.8	-48.4	Complied
4884.00	V	12.6	42.2	4.5	74	54	-10.1	-49.4	Complied
7326.00	H	19.0	44.6	10.3	74	54	-29.4	-43.6	Complied
7326.00	V	19.0	44.2	9.9	74	54	-29.8	-44.0	Complied
9768.00	V	22.1	47.6	13.5	74	54	-26.4	-40.4	Complied
9768.00	H	22.1	47.4	12.6	74	54	-26.6	-41.3	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.19 Field Strength of Emissions Test Results for Channel 7, 1-24 GHz, Panel Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Panel Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2442.00									Fundamental Frequency
4884.00	V	12.6	66.2	4.6	74	54	-7.8	-49.3	Complied
4884.00	H	12.6	35.8	3.9	74	54	-38.2	-50.0	Complied
7326.00	V	19.0	44.4	10.1	74	54	-29.6	-43.8	Complied
7326.00	H	19.0	44.4	10.3	74	54	-29.6	-43.6	Complied
9768.00	H	22.1	47.1	12.7	74	54	-26.9	-41.2	Complied
9768.00	V	22.1	48.0	13.6	74	54	-26.0	-40.3	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.20 Field Strength of Emissions Test Results for Channel 7, 1-24 GHz, Yagi Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 7	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Yagi Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2442.00									Fundamental Frequency
4884.00	V	12.6	41.3	19.2	74	54	-32.7	-48.4	Complied
4884.00	H	12.6	35.7	3.4	74	54	-38.3	-20.5	Complied
7326.00	H	19.0	45.8	25.0	74	54	-28.2	-44.6	Complied
7326.00	V	19.0	45.7	10.0	74	54	-28.3	-43.0	Complied
9768.00	H	22.1	48.5	28.3	74	54	-25.5	-41.3	Complied
9768.00	V	22.1	47.0	28.4	74	54	-27.0	-42.1	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.





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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.21 Field Strength of Emissions Test Results for Channel 12, 1-24 GHz, Parabolic Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12 - Transmit	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2467.00									Fundamental Frequency
4934.00	V	12.7	40.2	19.1	74	54	-33.8	-34.8	Complied
4934.00	H	12.8	69.9	22.2	74	54	-4.1	-31.7	Complied
7401.00	V	18.8	51.9	25.3	74	54	-22.1	-28.6	Complied
7401.00	H	18.8	53.2	25.3	74	54	-20.8	-28.6	Complied
9868.00	H	22.2	55.3	29.1	74	54	-18.7	-24.8	Complied
9868.00	V	22.2	56.1	28.8	74	54	-17.9	-25.1	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.22 Field Strength of Emissions Test Results for Channel 12, 1-24 GHz, Omni Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12- Transmit	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Omni Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2467.00									Fundamental Frequency
4934.00	V	12.8	68.1	10.6	74	54	-5.9	-43.3	Complied
4934.00	H	12.8	50.7	3.6	74	54	-23.8	-50.3	Complied
7401.00	H	18.8	43.6	10.5	74	54	-30.4	-43.4	Complied
7401.00	V	18.8	43.9	10.1	74	54	-30.1	-43.8	Complied
9868.00	V	22.2	48.3	13.7	74	54	-25.7	-40.2	Complied
9868.00	H	22.2	48.3	14	74	54	-25.7	-39.9	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.23 Field Strength of Emissions Test Results for Channel 12, 1-24 GHz, Panel Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12- Transmit	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Panel Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2467.00									Fundamental Frequency
4934.00	H	12.8	34.0	3.5	74	54	-40.0	-50.4	Complied
4934.00	V	12.8	70.7	6.6	74	54	-3.3	-47.3	Complied
7401.00	H	18.8	43.4	10.4	74	54	-30.6	-43.5	Complied
7401.00	V	18.8	44.4	11.1	74	54	-29.6	-42.8	Complied
9868.00	H	22.2	48.2	13.2	74	54	-25.8	-40.7	Complied
9868.00	V	22.2	48.8	13.5	74	54	-25.2	-40.4	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.24 Field Strength of Emissions Test Results for Channel 12, 1-24 GHz, Yagi Antenna (Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Channel 12- Transmit	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Yagi Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
2467.00									Fundamental Frequency
4934.00	H	12.8	38.9	4.0	74	54	-35.1	-49.9	Complied
4934.00	V	12.8	44.5	2.4	74	54	-29.5	-51.5	Complied
7401.00	V	18.8	45.6	8.7	74	54	-28.4	-45.2	Complied
7401.00	H	18.8	46.1	25.7	74	54	-27.9	-28.2	Complied
9868.00	H	22.2	50.6	28.1	74	54	-23.4	-25.8	Complied
9868.00	V	22.2	48.2	28.7	74	54	-25.8	-25.2	Complied

#### Notes:

1. All readings are peak with the specified bandwidth unless otherwise stated.
2. As per §15.209 (d) & as shown in §15.35 (b), for frequencies above 1000MHz, the field strength limits set forth are based on average limits. However, the peak field strength of any emission should not exceed the maximum permitted average limits specified by more than 20dB under any condition of modulation. .
3. No emissions were found above 10 GHz.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.25 Field Strength of Emissions Test Results for Receive Mode, 30-1000 MHz, Parabolic Antenna (Quasi-Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Receive	<b>FREQUENCY RANGE</b>	30 – 1000 MHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
159.376	H	-7.1	18.0	*	43.5	*	-25.5	*	Complied
185.939	H	-5.6	18.2	*	43.5	*	-25.3	*	Complied
275.000	V	-4.5	20.2	*	46.0	*	-25.8	*	Complied
318.754	H	-3.6	27.8	*	46.0	*	-18.2	*	Complied
425.001	H	-0.6	23.0	*	46.0	*	-23.0	*	Complied
504.686	H	1.8	30.5	*	46.0	*	-15.5	*	Complied
557.813	H	3.3	28.0	*	46.0	*	-18.0	*	Complied

#### Notes:

1. All readings are quasi-peak with the specified bandwidth unless otherwise stated.
2. Cells with (\*) indicates information not applicable.



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## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.2.26 Field Strength of Emissions Test Results for Receive Mode, 1-24 GHz, Parabolic Antenna (Quasi-Peak)

<b>EUT</b>	Wireless Industrial Transceiver	<b>MODEL</b>	4160-RLX-WA-01
<b>MODE</b>	Receive	<b>FREQUENCY RANGE</b>	1-24 GHz.
<b>INPUT POWER</b>	5/3.3 VDC. From host equipment	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 44% RH	<b>TESTED BY</b>	Mark Lyon
<b>PERIPHERALS</b>	Parabolic Antenna		

Frequency (MHz)	Polarity (V or H)	CF (dB/m)	Corrected Reading (dBμV/m)		FCC Radiated Spurious Limit (dBμV/m)		Margin (dB)		Remarks
			pk	ave	pk	ave	pk	ave	
1202.65	H	-9.8	43.9	*	53.9	*	-10.0	*	Complied
1302.88	H	-9.2	40.3	*	53.9	*	-13.6	*	Complied
1402.54	H	-8.6	40.5	*	53.9	*	-13.4	*	Complied
1452.63	H	-8.3	40.1	*	53.9	*	-13.8	*	Complied
1472.67	H	-8.2	37.4	*	53.9	*	-16.5	*	Complied
1654.11	H	-6.7	43.6	*	53.9	*	-10.3	*	Complied
1955.54	H	-4.1	42.2	*	53.9	*	-11.7	*	Complied

#### Notes:

1. Cells with (\*) indicates information not applicable.



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### **EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED**

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#### **4.1.3 Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where: FS = Field strength  
RA = Receiver Amplitude  
AF = Antenna Factor  
CF = Cable Attenuation Factor  
AG = Amplifier gain

Example:

Assume a receiver reading of 52.5 dB? V is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dB? V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB? V/m}$$

#### **4.1.4 Test Site**

**The Radiated Spurious Emissions measurements were performed at the following test location:**

Garwood Laboratories, Inc.  
San Clemente, California  
OATS Site # 2

**Testing was performed at a test distance of:**

3 meters



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Report No: FR50170SEP

## EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED

### 4.1.5 Field Strength of Emissions from Intentional Radiators Test Equipment:

<i>Instrument</i>	<i>MFG / Model No.</i>	<i>Serial Number</i>	<i>Calibration Due Date</i>
<b><i>Radiated Emissions Test</i></b>			
Spectrum Analyzer	Hewlett Packard/8566B	2427A04639	2/13/05
Analyzer Display	Hewlett Packard/85662A	2848A17070	2/26/05
Pre-Amplifier	Hewlett Packard/8447A	2805A03163	2/26/05
Pre-Amplifier	Hewlett Packard//8449B	3008A00410	2/13/05
Log Periodical Antenna	A. H. Systems/SAS-200-512	116	5/10/05
Horn Antenna	A. H. Systems/SAS-200/571	145	5/10/05
High Pass Filter	Sage	008	NCR

\* UWCE = Use With Calibrated Equipment





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### 4.2 Power Line Conducted Emissions Test Summary (Reference: FCC PT.15, Subpart C, §15.207 RSS-210 6.6/7.4)

#### 4.2.1 Power Line Conducted Emissions Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected through the power mains through another LISN. The two LISNS provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz were searched.

<i>FCC Part 15, Subpart B, Conducted Emissions, Class B Limits</i>			
<i>Frequency (MHz)</i>	<i>Quasi Peak Limit (dBμV)</i>	<i>Average Limit (dBμV)</i>	<i>Remarks</i>
0.15 - 0.50	66-56	56-46	Decreasing Logarithmically
0.50 – 5.0	56	46	None
5.0 – 30.0	60	50	None



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### 4.2.2 Summary Table for Highest Conducted Emissions Levels

The initial step in collecting data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the data page, and these signals are then quasi-peaked if necessary. Spectrum analyzer plots and additional tabulated data are included in Section 6. The following data lists the significant emission frequencies and measured levels measured from the EUT. See Section 6 for supplemental test data sheets.

<i>Sensor Location</i>	<i>Frequency Band (MHz)</i>	<i>Detection Mode</i>	<i>Measured* (dB<math>\mu</math>V)</i>	<i>Delta To Limit (dB)</i>
Line 1 (Supply Side)	.1548	Highest Peak	39.2	-16.4
	.1668	Highest Peak	39.8	-15.3
	.1694	Highest Peak	32.5	-22.4
	.1712	Highest Peak	32.5	-22.4
	.1730	Highest Peak	30.8	-24.0
	.1749	Highest Peak	34.4	-20.3
Line 2 (Return Side)	.1633	Highest Peak	36.4	-18.8
	.1650	Highest Peak	36.8	-18.4
	.1712	Highest Peak	40.5	-14.4
	.1786	Highest Peak	38.7	-15.8
	.1815	Highest Peak	39.2	-15.2
	.1844	Highest Peak	40	-22.0

\* All readings are peak with specified CISPR bandwidth unless stated otherwise.

<b>Test Personnel:</b>	Mark J. Lyon
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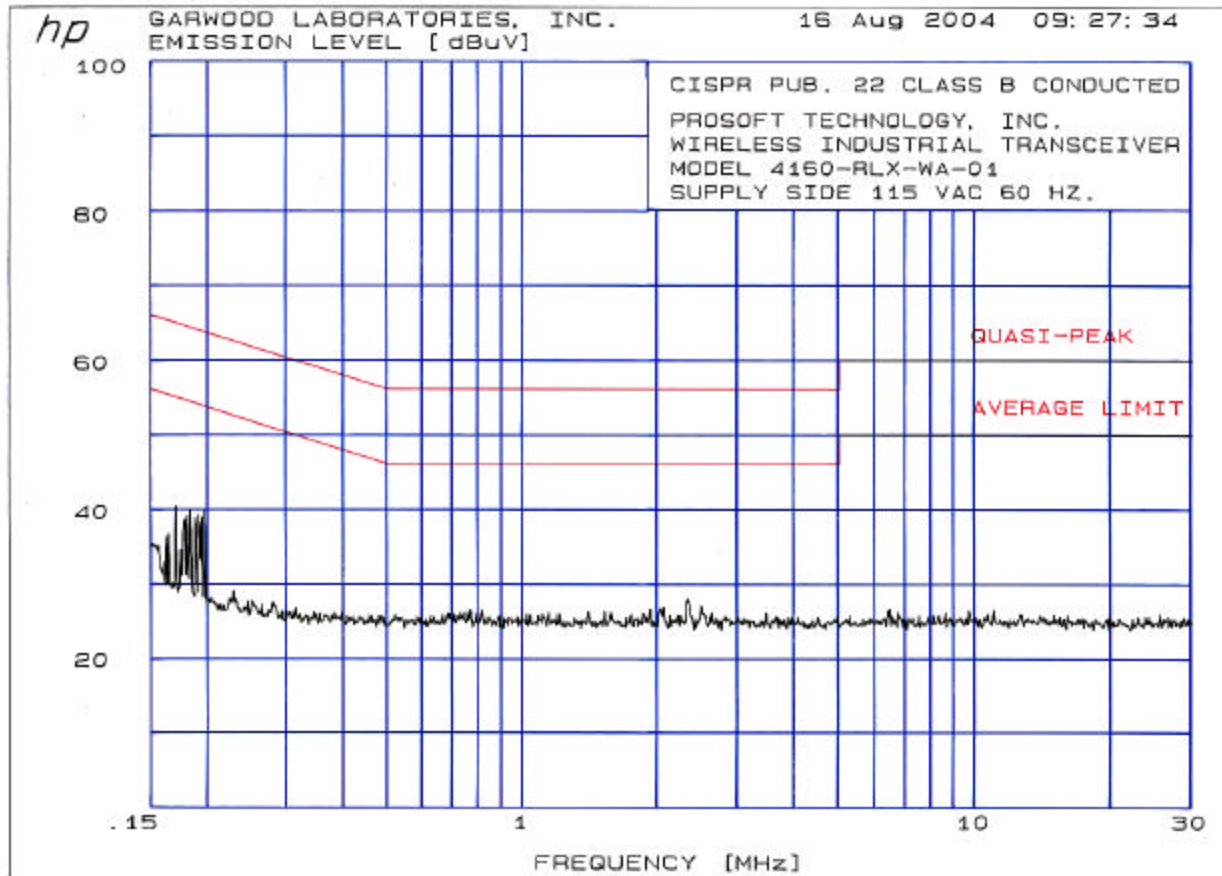
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### 4.2.3 Power Line Conducted Emissions Detailed Test Data (Reference: FCC PT.15, Subpart C, §15.207 RSS-210 6.2.2 (o) (e1))

#### Conducted Emissions - Supply Side





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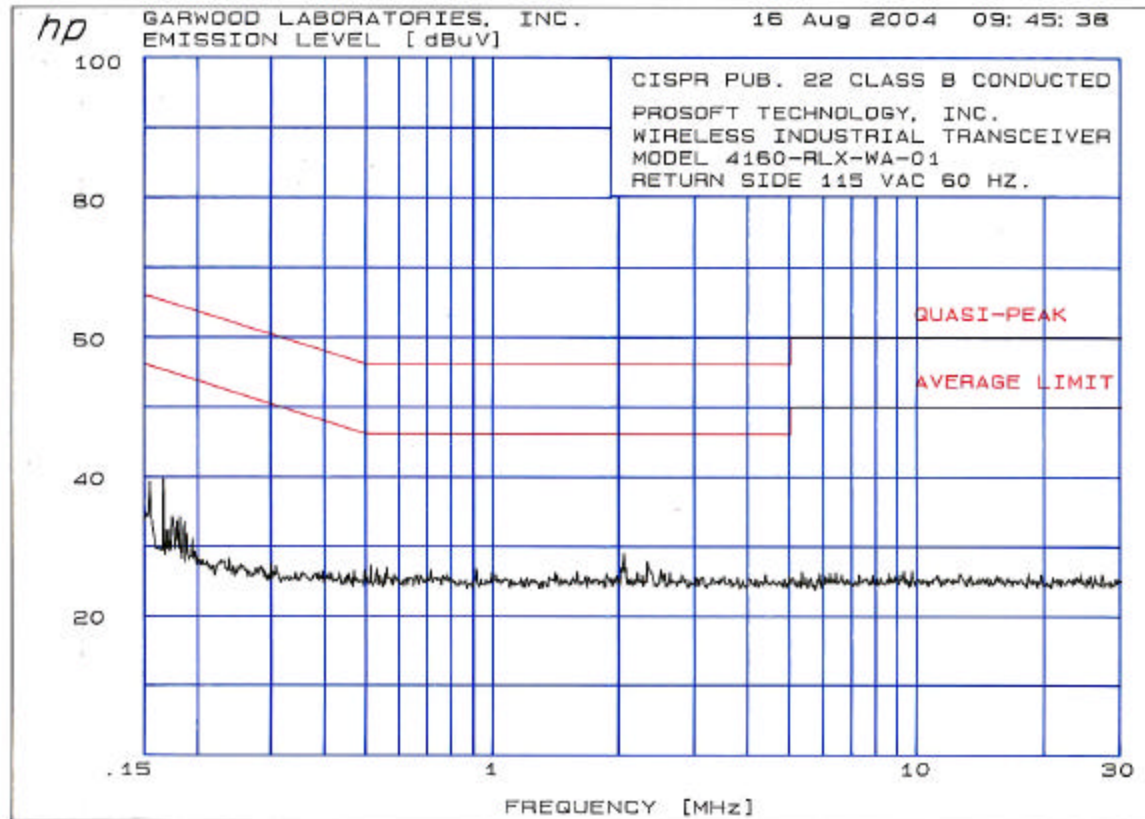
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### Conducted Emissions - Return Side



#### 4.2.4 Power Line Conducted Emissions Test Equipment

Instrument	MFG / Model No.	Serial Number	Calibration Due Date
<b>Conducted Emission Test</b>			
Spectrum Analyzer	Hewlett Packard/8566B	2427A04639	2/13/05
Analyzer Display	Hewlett Packard/85662A	2848A17070	2/26/05
RF Pre-selector	Hewlett Packard/85685A	2901A00858	2/26/05
Quasi-Peak Adapter	Hewlett Packard/856850A	2811A01210	2/26/05
Line Impedance Stabilization Network	EMCO/923825/2	9202-1410	4/30/05
Line Impedance Stabilization Network	EMCO/923825/2	9202-2024	4/30/05



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**EMC TEST REPORT FOR PROSOFT TECHNOLOGY, INCORPORATED**

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#### **4.3 RF Power Output Test Summary**

**Test Requirement: Peak Output Power (Reference: FCC PT.15, Subpart C, §15.247(b)(3)  
RSS-210 6.2.2 (o) (b)**

##### **4.3.1 RF Power Output Test Procedure**

This test was performed with conducted peak power measurements method in accordance with FCC Part 15.247 (b) (3).

The method used to determine the rf peak output power for the selected frequencies was to integrate the bandwidth measurement taken from the 6 dB bandwidth measurements (section 4.4) and add it to the rf peak power measurements. The formula used in this case was  $10 \cdot \text{LOG}(\text{BW1/BW2})$ . This was performed, due to the fact that the capabilities of the spectrum analyzer resolution bandwidth was limited to 3 MHz. The limits were determined per 15.247 (4).

##### **4.3.2 EUT Operating Conditions:**

The software provided by client enabled the EUT to operate continuously in transmit mode at the selected channels, individually.

##### **4.3.3 Peak Output Power Test Summary**

**Temperature: 24 C Relative Humidity: 28%**

**12 dBi Omni N Jack Collinear Antenna (Mobile Mark – OD12-2400)**

<b>Channel</b>	<b>Channel Frequency (MHz.)</b>	<b>Original Measurement (dBm)</b>	<b>Correction Factor (dBm)</b>	<b>Actual Measurement (dBm) *</b>	<b>Minimum Limit (dBm)</b>	<b>Pass/Fail</b>
2	2417	11.00	6.50	17.50	24	PASS
7	2442	9.70	6.16	15.86	24	PASS
12	2467	9.70	6.16	15.86	24	PASS
<b>Test Personnel:</b>		<b>- Mark J. Lyon</b>				

**\* Actual measurement = Original measurement + correction factor.**



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### 4.3.3 Peak Output Power Test Summary (continued)

Temperature: 24 C Relative Humidity: 28%

15 dBi Directional Enclosed N Jack Yagi (Maxrad – MYP240115PTNF)

Channel	Channel Frequency (MHz.)	Original Measurement (dBm)	Correction Factor (dBm)	Actual Measurement (dBm) *	Minimum Limit (dBm)	Pass/Fail
2	2417	11.00	6.50	17.50	27	PASS
7	2442	9.70	6.16	15.86	27	PASS
12	2467	9.70	6.16	15.86	27	PASS
Test Personnel:		- Mark J. Lyon				

\* Actual measurement = Original measurement + correction factor.

Temperature: 24 C Relative Humidity: 28%

24 dBi Directional N Jack Parabolic (Andrew – T2400F)

Channel	Channel Frequency (MHz.)	Original Measurement (dBm)	Correction Factor (dBm)	Actual Measurement (dBm) *	Minimum Limit (dBm)	Pass/Fail
2	2417	11.00	6.50	17.50	24	PASS
7	2442	9.70	6.16	15.86	24	PASS
12	2467	9.70	6.16	15.86	24	PASS
Test Personnel:		- Mark J. Lyon				

\* Actual measurement = Original measurement + correction factor.