# Datalogic Scanning, Inc.

# Falcon 44xx-177xx-xxxxx

August 07, 2007

Report No. PSCI0245

Report Prepared By



www.nwemc.com 1-888-EMI-CERT

© 2007Northwest EMC, Inc



22975 NW Evergreen Parkway Suite 400 Hillsboro, Oregon 97124

# **Certificate of Test**

Issue Date: August 07, 2007
Datalogic Scanning, Inc.
Model: Falcon 44xx-177xx-xxxxx

Emissions				
Test Description Specification Test Method Pass/Fai				
Spurious Radiated Emissions	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	Pass	
AC Powerline Conducted Emissions	FCC 15.207:2006	ANSI C63.4:2003	Pass	

Approved By:

Ethan Schoonover, Sultan Lab Manager

NVLAP

NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

# **Revision History**

Revision 05/05/03

Revision Number	Description	Date	Page Number
00	None		

**FCC:** Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.





**NVLAP:** Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.



**Industry Canada:** Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.



**CAB:** Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.



**TÜV Product Service:** Included in TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories, available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV's CARAT Program requirements. Certificate No. USA0604C.



**TÜV Rheinland:** Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



**NEMKO:** Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



**Australia/New Zealand:** The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



**VCCI:** Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294).



**BSMI:** Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.



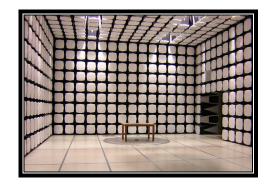
**GOST:** Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



## SCOPE

For details on the Scopes of our Accreditations, please visit: http://www.nwemc.com/scope.asp





## California – Orange County Facility Labs OC01 – OC13

41 Tesla Ave. Irvine, CA 92618 (888) 364-2378 Fax: (503) 844-3826





## Oregon – Evergreen Facility Labs EV01 – EV11

22975 NW Evergreen Pkwy. Suite 400 Hillsboro, OR 97124 (503) 844-4066 Fax: (503) 844-3826





## Washington – Sultan Facility Labs SU01 – SU07

14128 339<sup>th</sup> Ave. SE Sultan, WA 98294 (888) 364-2378

Rev 11/17/06

## Party Requesting the Test

Company Name:	Datalogic Scanning, Inc.
Address:	959 Terry Street
City, State, Zip:	Eugene, OR 97402-9120
Test Requested By:	Wes Emmert
Model:	Falcon 44xx-177xx-xxxxx
First Date of Test:	July 19, 2007
Last Date of Test:	July 23, 2007
Receipt Date of Samples:	July 19, 2007
Equipment Design Stage:	Production
Equipment Condition:	No Damage

## **Information Provided by the Party Requesting the Test**

## Functional Description of the EUT (Equipment Under Test):

Wi-Fi radio module in the Falcon handheld computer.

## **Testing Objective:**

Seeking to demonstrate compliance of the Wi-Fi radio module to FCC 15.247 requirements.

# Configurations

Revision 9/21/05

# **CONFIGURATION 1 PSCI0245**

Software/Firmware Running during test				
Description	Version			
SDC Test	1.01.12			

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
802.11 Radio module	Summit Data Communications	SDC-CF10G	Unknown

Peripherals in test setup boundary						
Description	Manufacturer	Model/Part Number	Serial Number			
AC Adapter	Phihong	PSA31U-120	P61403028A4			
Falcon Handheld Computer (Unit 1)	PSC, Inc.	Falcon	Unknown			
Charging cradle	PSC, Inc.	7-0856	D106031049			
Bluetooth radio	BlueGiga Technologies	WT12-A	Unknown			

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC	No	1.8m	No	AC Mains	AC Adapter
DC	No	1.2m	No	Charging cradle	AC Adapter
USB	Yes	1.6m	No	Charging cradle	Unterminated
Serial	Yes	1.6m	No	Charging cradle	Unterminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

# **CONFIGURATION 2 PSCI0245**

Software/Firmware Running during test			
Description	Version		
SDC Test	1.01.12		

EUT				
Description	Manufacturer	Model/Part Number	Serial Number	
802.11 Radio module	Summit Data Communications	SDC-CF10G	Unknown	

Peripherals in test setup boundary						
Description	Manufacturer	Model/Part Number	Serial Number			
AC Adapter	Phihong	PSA31U-120	P61403028A4			
Falcon Handheld Computer (Unit 2)	PSC, Inc.	Falcon	Unknown			
Charging cradle	PSC, Inc.	7-0856	D106031049			
Bluetooth radio	BlueGiga Technologies	WT12-A	Unknown			

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC	No	1.8m	No	AC Mains	AC Adapter
DC	No	1.2m	No	Charging cradle	AC Adapter
USB	Yes	1.6m	No	Charging cradle	Unterminated
Serial	Yes	1.6m	No	Charging cradle	Unterminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

# **Modifications**

Revision 4/28/03

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
		Surious	Tested as	No EMI suppression	EUT remained at
1	7/20/2007	Radiated	delivered to	devices were added or	Northwest EMC
		Emission	Test Station.	modified during this test.	following the test.
2	7/23/2007	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled Testing was completed.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

#### MODES OF OPERATION

Transmitting	802.11(b),	1 Mbps
Transmitting	802.11(b),	11 Mbps
Transmitting	802 11(a)	6 Mhns

Transmitting 802.11(g), 36 Mbps

Transmitting 802.11(g), 54 Mbps

#### **CHANNELS TESTED**

Low, Channel 1, 2412 MHz

Mid, Channel 6, 2437 MHz

High, Channel 11, 2462 MHz

#### POWER SETTINGS INVESTIGATED

120VAC/60Hz

Start Frequency 30 MHz Stop Frequency 25 GHz

#### **CLOCKS AND OSCILLATORS**

Not provided

#### SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
EV01 cables c,g, h			EVA	12/29/2006	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/10/2007	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	12
EV01 cables g,h,j			EVB	5/10/2007	13
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	5/10/2007	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
EV01 Cable D			EVD	3/30/2006	18
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	3/23/2006	17
Antenna, Horn	EMCO	3160-09	AHG	NCR	0
EV01 cables g.h.l			EVF	5/10/2007	13

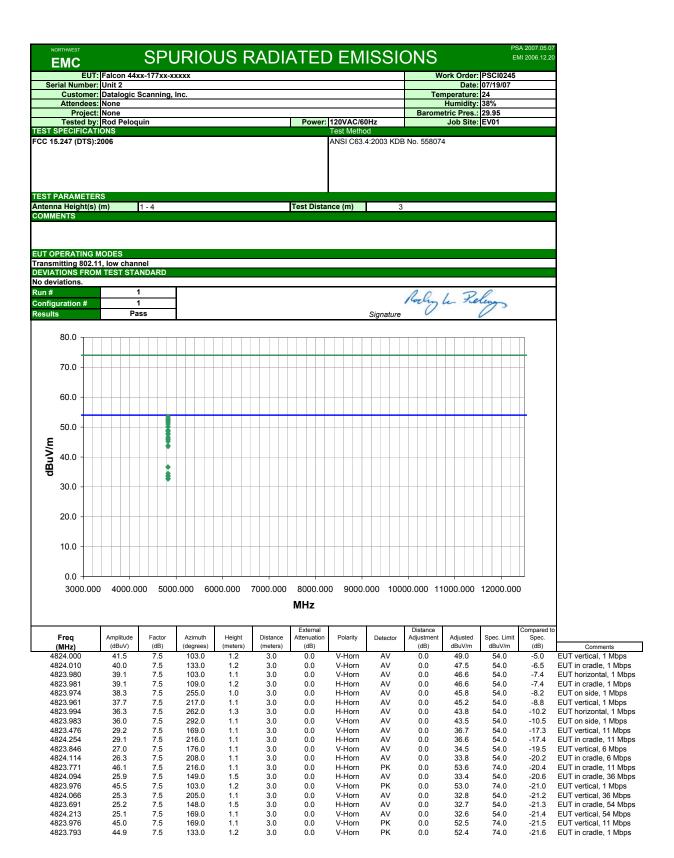
IEASUREMENT BANDWIDTHS					
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data	
	(MHz)	(kHz)	(kHz)	(kHz)	
	0.01 - 0.15	1.0	0.2	0.2	
	0.15 - 30.0	10.0	9.0	9.0	
	30.0 - 1000	100.0	120.0	120.0	
	Above 1000	1000.0	N/A	1000.0	
	Apacuramente ware made us	ing the handwidths and dete	ctors enecified No video filt	ar was usad	

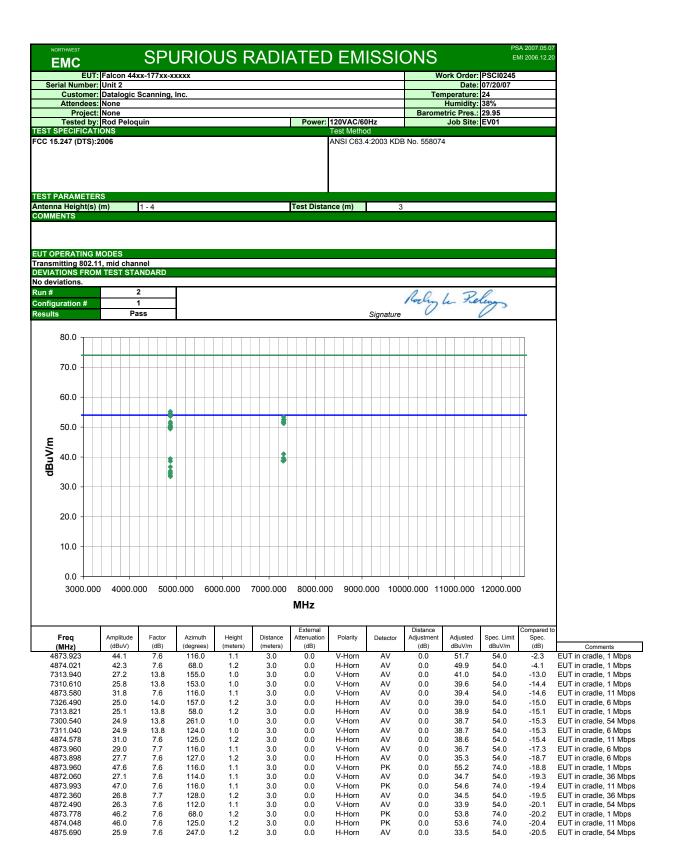
#### MEASUREMENT UNCERTAINTY

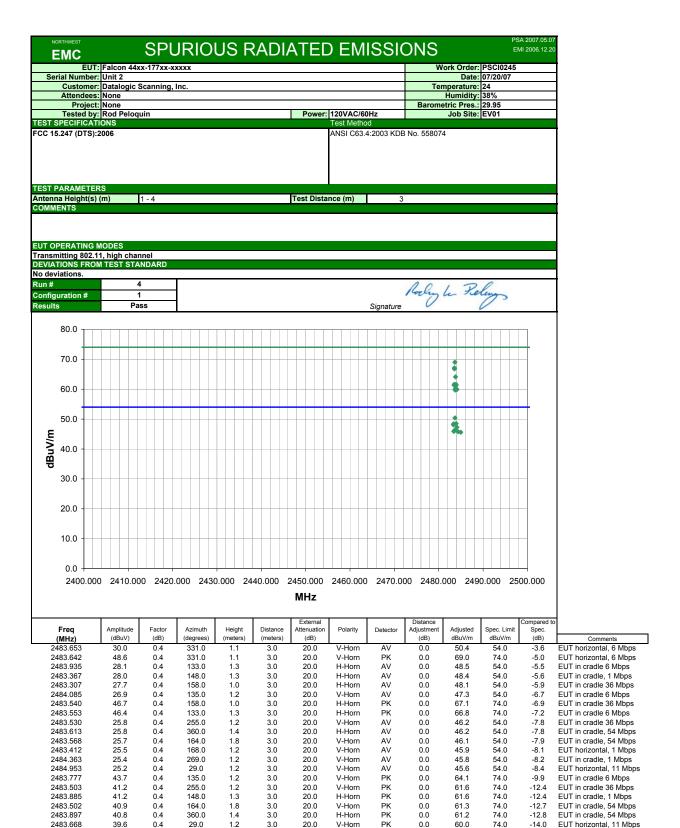
Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

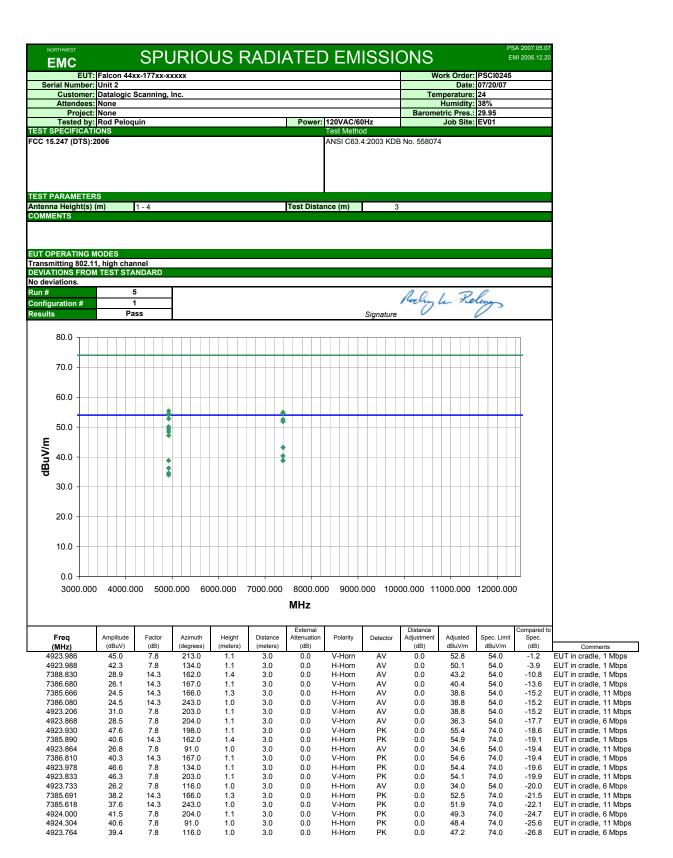
#### **TEST DESCRIPTION**

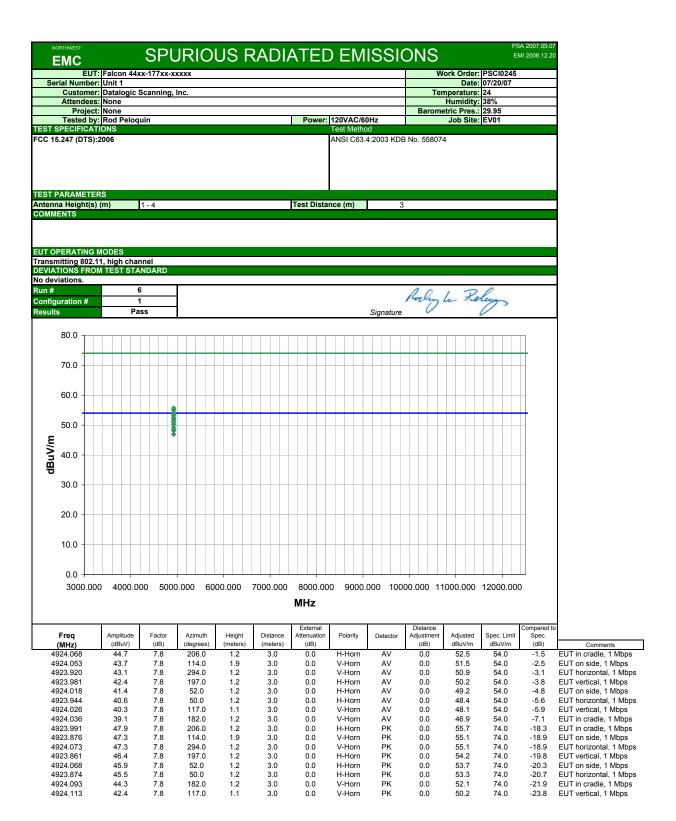
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

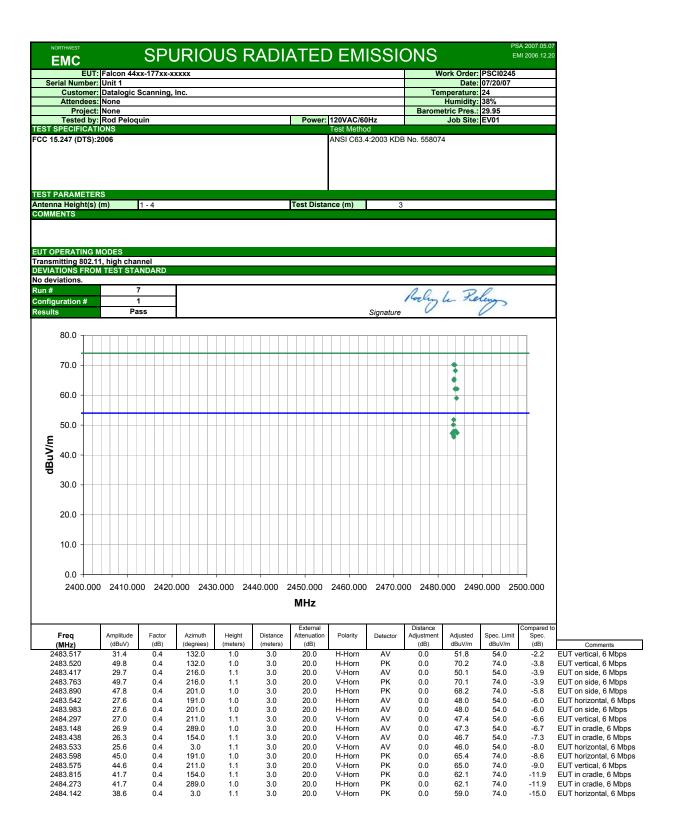


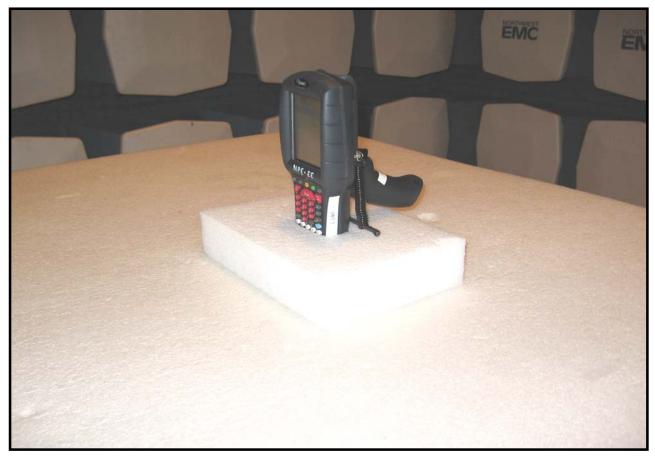




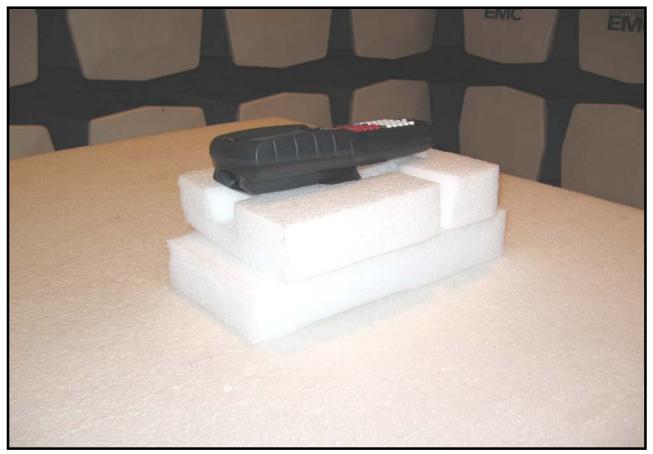




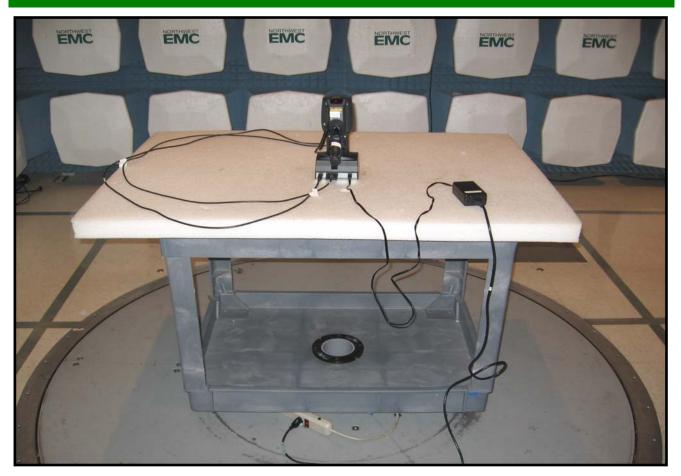












# **AC Powerline Conducted Emissions**

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

#### **MODES OF OPERATION**

Transmit 802.11(b), 1 Mbps, high channel Transmit 802.11(b), 1 Mbps, mid channel

Transmit 802.11(b), 1 Mbps, low channel

#### POWER SETTINGS INVESTIGATED

120VAC/60Hz

#### SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
EV07 cable d			EVG	4/17/2007	13
LISN	Solar	9252-50-R-24-BNC	LIQ	12/20/2006	13
Attenuator	Tektronix	011-0059-02	ATC	12/27/2006	13
High Pass Filter	TTE	H97-100K-50-720B	HFX	8/22/2006	13
Receiver	Rohde & Schwartz	ESCI	ARG	12/7/2006	13

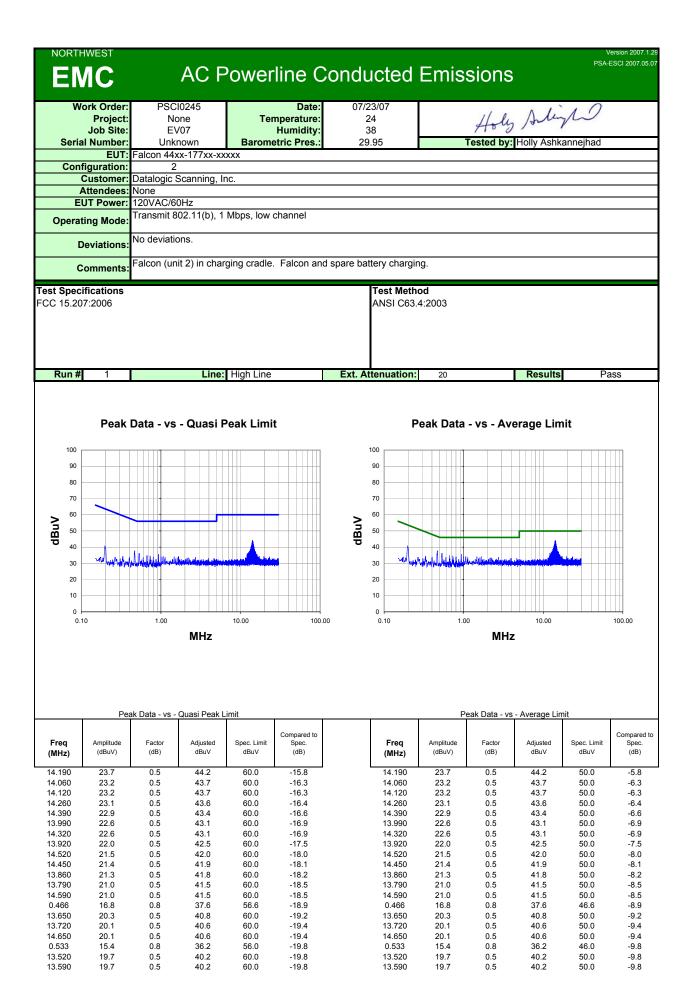
Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

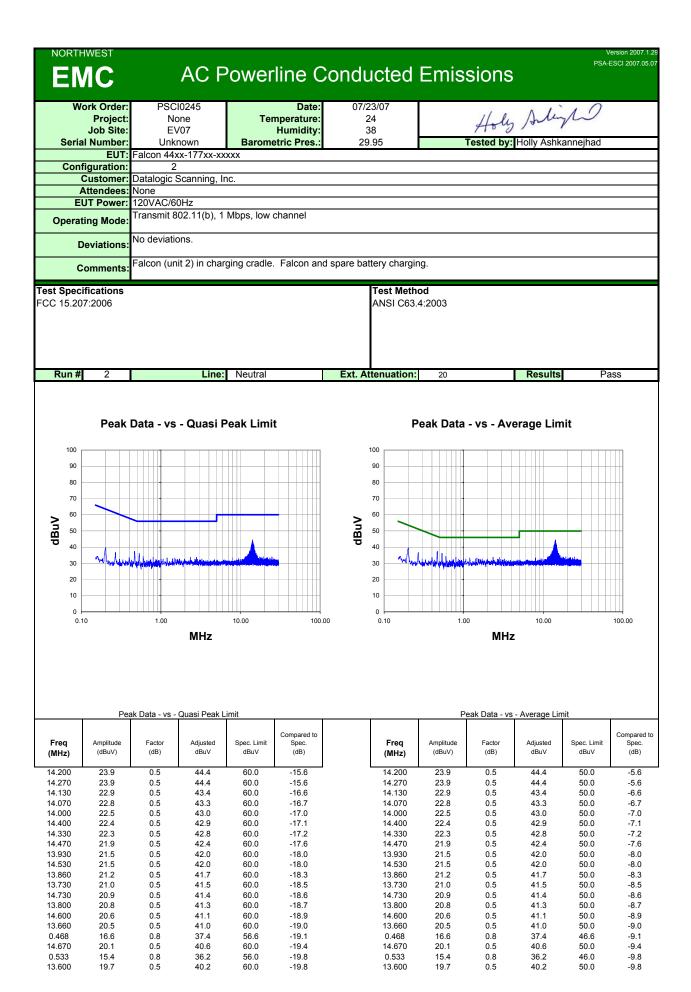
### **MEASUREMENT UNCERTAINTY**

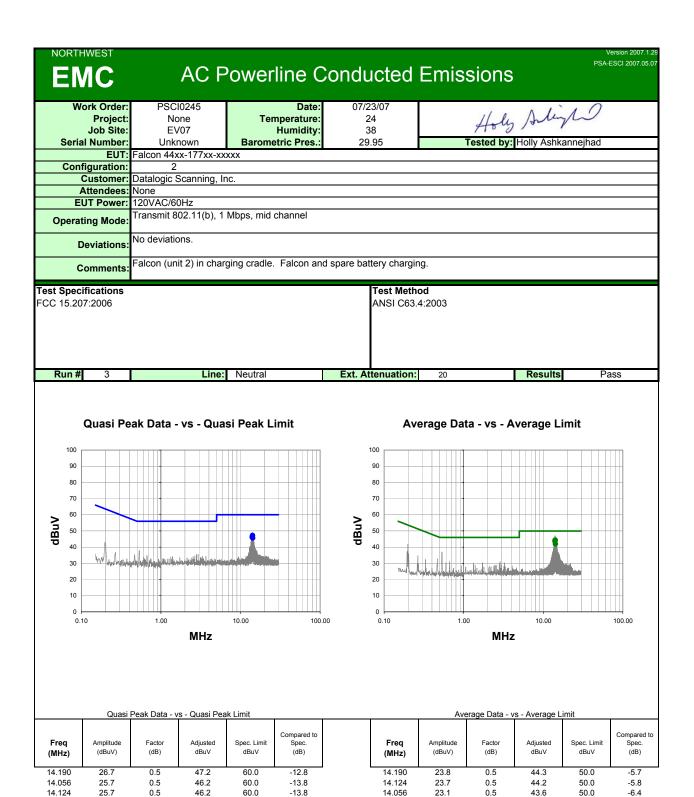
Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

#### **TEST DESCRIPTION**

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50  $\Omega$  measuring port is terminated by a 50  $\Omega$  EMI meter or a 50  $\Omega$  resistive load. All 50  $\Omega$  measuring ports of the LISN are terminated by 50 $\Omega$ .







14.256

21.5

0.5

-8.0

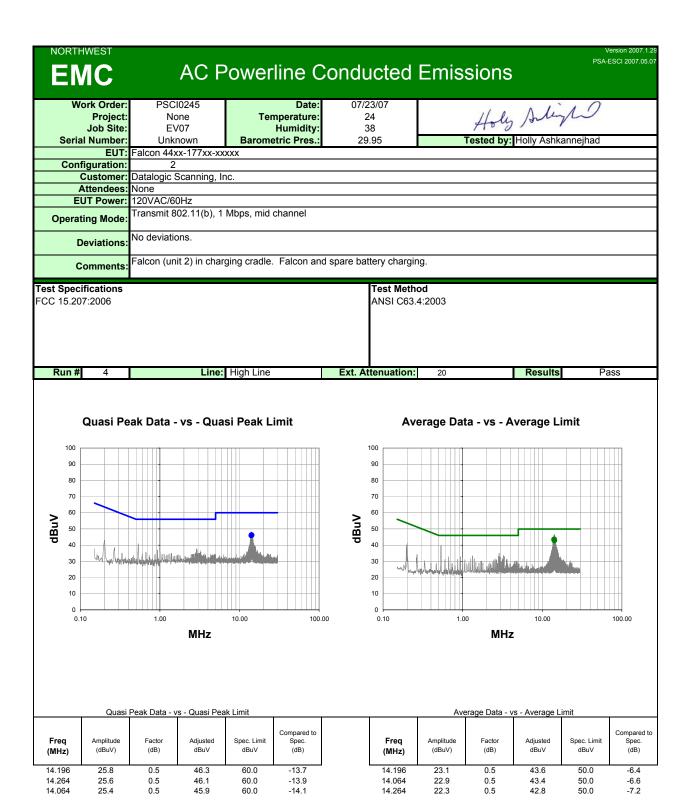
50.0

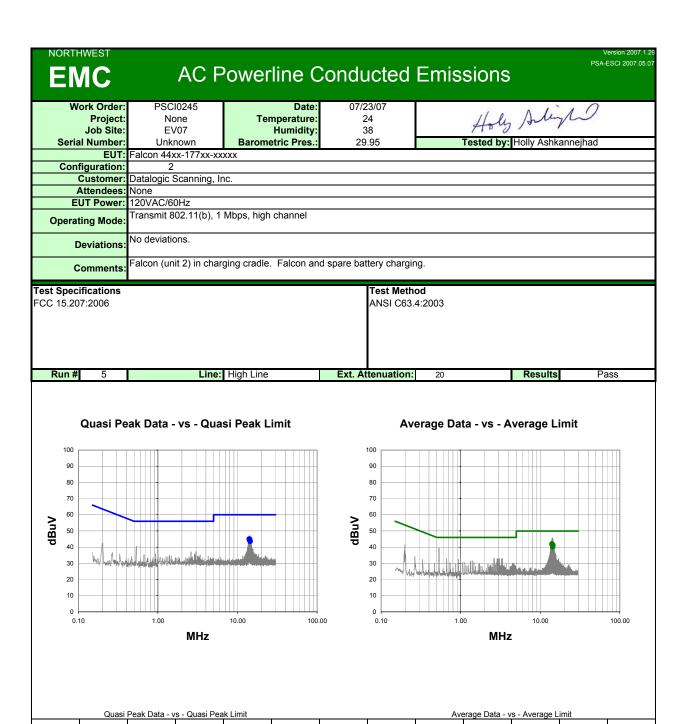
14.256

45.6

60.0

-14.4





Compared to Spec.

(dB)

-15.0

-15.1

-15.1

-15.6

-16.5

Amplitude

(dBuV)

21.5

21.3

21.3

20.8

19.6

Freq

(MHz)

14.074

14.140

14.206

14.270

14.410

14.344

Factor

(dB)

0.5

0.5

0.5

0.5

0.5

dBuV

42.0

41.8 41.8

41.3

40.1

dBuV

50.0

50.0

50.0

50.0

50.0

Spec. Limit

dBuV

60.0

60.0

60.0

60.0

60.0

Amplitude

(dBuV)

24.5

24.4

24.4

23.9

23.0

(dB)

0.5

0.5

0.5

0.5

Freq

(MHz)

14.206

14.074

14.140

14.270

14.344

14.410

Adjusted

dBuV

45.0

44.9

44.9

44.4

43.5

Compared to Spec.

(dB)

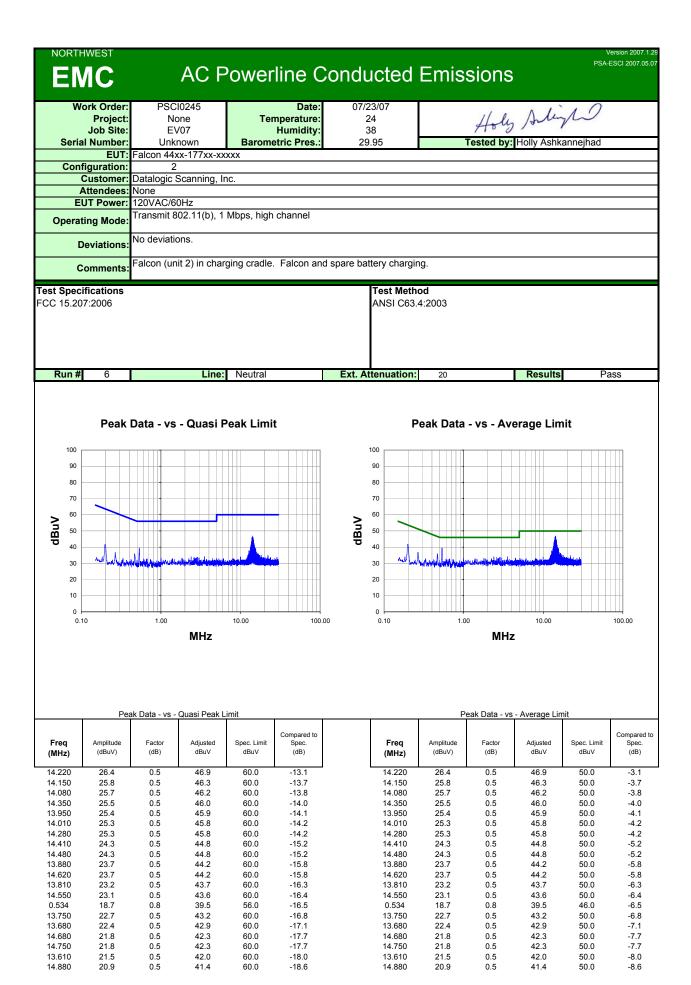
-8.0

-8.2

-8.2

-8.7

-9.9



# AC Powerline Conducted Emissions

