

PSC Inc.

ST200 RFID Module installed in Falcon 5500

May 17, 2005

Report No. PSCI0157 Rev 01

Report Prepared By



www.nwemc.com

1-888-EMI-CERT

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EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: May 17, 2005
PSC Inc.

Model: ST200 RFID Module installed in Falcon 5500

Emissions			
Specification	Test Method	Pass	Fail
FCC 15.247(a) Occupied Bandwidth:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a)(1) Channel Spacing:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a)(1) Dwell Time:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(a)(1) Number of Hopping Frequencies:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(b) Output Power:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Band Edge Compliance:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.107 Class B AC Powerline Conducted Emissions:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Spurious Conducted Emissions:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247(d) Spurious Radiated Emissions:2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Modifications made to the product

See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066
Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Greg Kiemel, Director of Engineering

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.

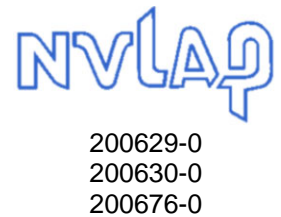
Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested; the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

Revision Number	Description	Date	Page Number
01	Revised model name (to clarify host is being certified with module installed)	5/24/05	1, 2, 11

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 recognized 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 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. 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 TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories, available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0401C.



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).



Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment, Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



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 and R-1025, Irvine: C-2094 and R-1943, Newberg: C-1877 and R-1760, Sultan: R-871, C-1784 and R-1761*).



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>

What is measurement uncertainty?

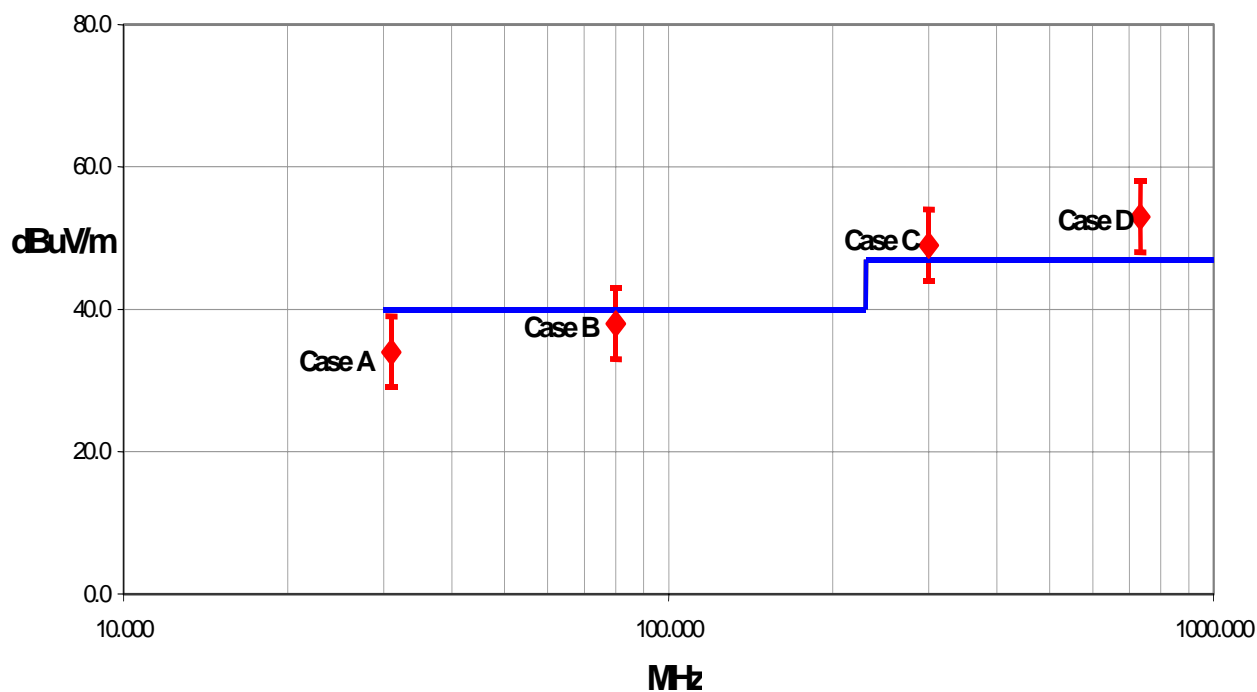
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its “true” value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- “ISO Guide to the Expression of Uncertainty in Measurements”, October 1993
- “NIS81: The Treatment of Uncertainty in EMC Measurements”, May 1994
- “IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques”, December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:

Case A: Product complies.

Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz

Value (dB)

Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 - 2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49

Radiated Emissions > 1 GHz

Value (dB)

Test Distance	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25	+ 1.38 - 1.35	+ 1.29 - 1.25	+ 1.38 - 1.35
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 2.57 - 2.51	+ 2.76 - 2.70	+ 2.57 - 2.51	+ 2.76 - 2.70

Conducted Emissions

Test Distance	Probability Distribution	Value (+/- dB)	
		3m	10m
Combined standard uncertainty $u_c(y)$	normal	1.48	1.48
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.97	2.97

Radiated Immunity

Test Distance	Probability Distribution	Value (+/- dB)	
		3m	10m
Combined standard uncertainty $u_c(y)$	normal	1.05	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.11	2.11

Conducted Immunity

Test Distance	Probability Distribution	Value (+/- dB)	
		3m	10m
Combined standard uncertainty $u_c(y)$	normal	1.05	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.10	2.10

Legend

$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties

U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then $k=3$ (CL of 99.7%) can be used. Please note that with a coverage factor of one, $u_c(y)$ yields a confidence level of only 68%.

**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 – EV10**

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

**Oregon****Trails End Facility****Labs TE01 – TE03**

30475 NE Trails End Lane
Newberg, OR 97132
(503) 844-4066
FAX (503) 537-0735

**Washington****Sultan Facility****Labs SU01 – SU07**

14128 339th Ave. SE
Sultan, WA 98294
(888) 364-2378
FAX (360) 793-2536

Party Requesting the Test

Company Name:	PSC Inc.
Address:	959 Terry Street
City, State, Zip:	Eugene, OR 97402-9120
Test Requested By:	Jerry Kalina
Model:	ST200 RFID Module installed in Falcon 5500
First Date of Test:	5-03-2005
Last Date of Test:	5-16-2005
Receipt Date of Samples:	5-03-2005
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided.
I/O Ports:	N/A

Functional Description of the EUT (Equipment Under Test):

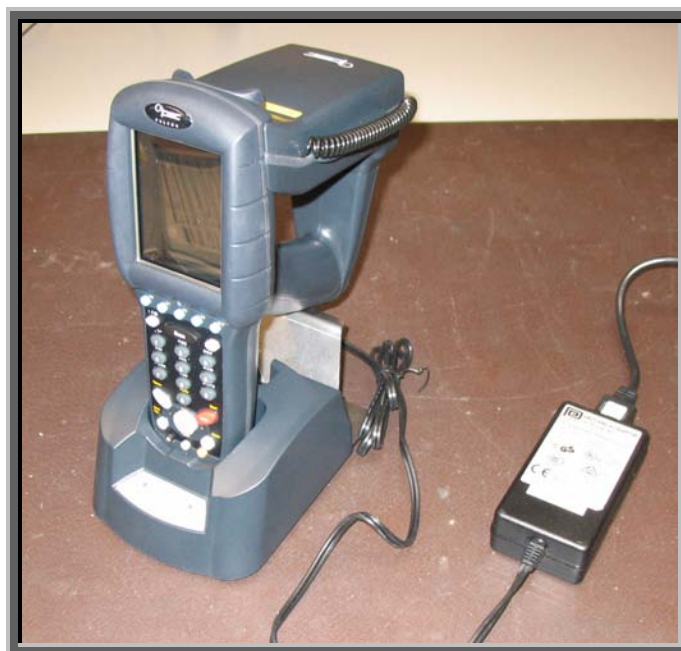
RFID module in Falcon 5500 held Portable Data Terminal.

Client Justification for EUT Selection:

The product is a representative production sample.

Client Justification for Test Selection:

These tests satisfy the requirements for the original certification of the Falcon 5500 with the ST200 RFID Module under FCC 15.247.

EUT Photo

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Occupied Bandwidth	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
2	Output Power	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
3	Band Edge Compliance	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
4	Spurious Conducted Emissions	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
5	Channel Spacing	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
6	Number Of Hopping Frequencies	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
7	AC Power line Conducted Emissions	05/03/2005	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
8	Dwell Time	05/16/2005	The dwell time of the EUT was reduced to 16.05mS to obtain the largest duty cycle correction factor possible.	This modification is in addition to previous modifications. Modifications made by Customer	EUT remained at Northwest EMC.
9	Spurious Radiated Emissions	05/16/2005	The dwell time of the EUT was reduced to 16.05mS to obtain the largest duty cycle correction factor possible.	Same configuration as in previous test.	EUT was returned to client following testing.

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

All

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Version
ST200.S19	ST200.S19

Description

The system was tested using special software developed to place the radio in typical hopping mode during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

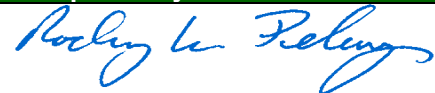
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo


Test Description

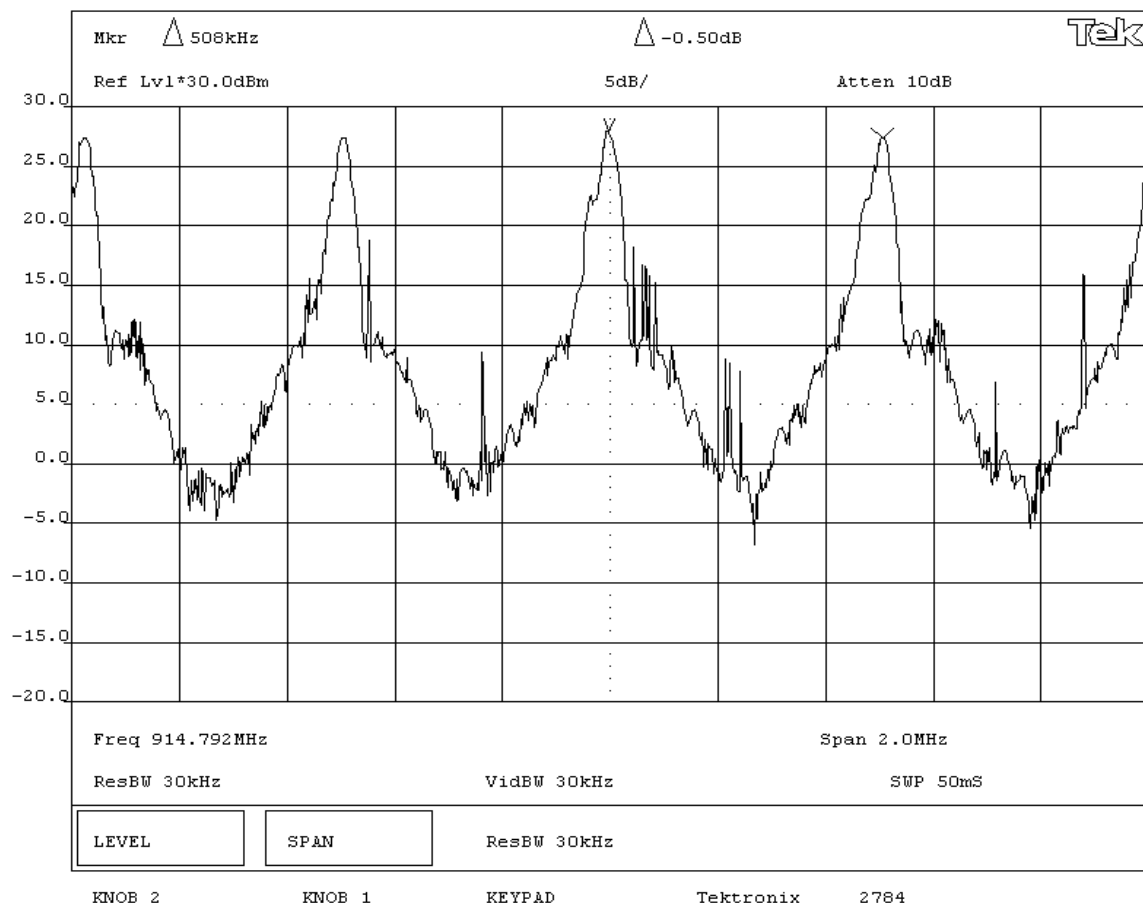
Requirement: Per 47 CFR 15.247(a)(1), the hopping channel carrier frequencies must be separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel. The measurement is made with the spectrum analyzer's resolution bandwidth set to greater than or equal to 1% of the span, and the video bandwidth set to greater than or equal to the resolution bandwidth.

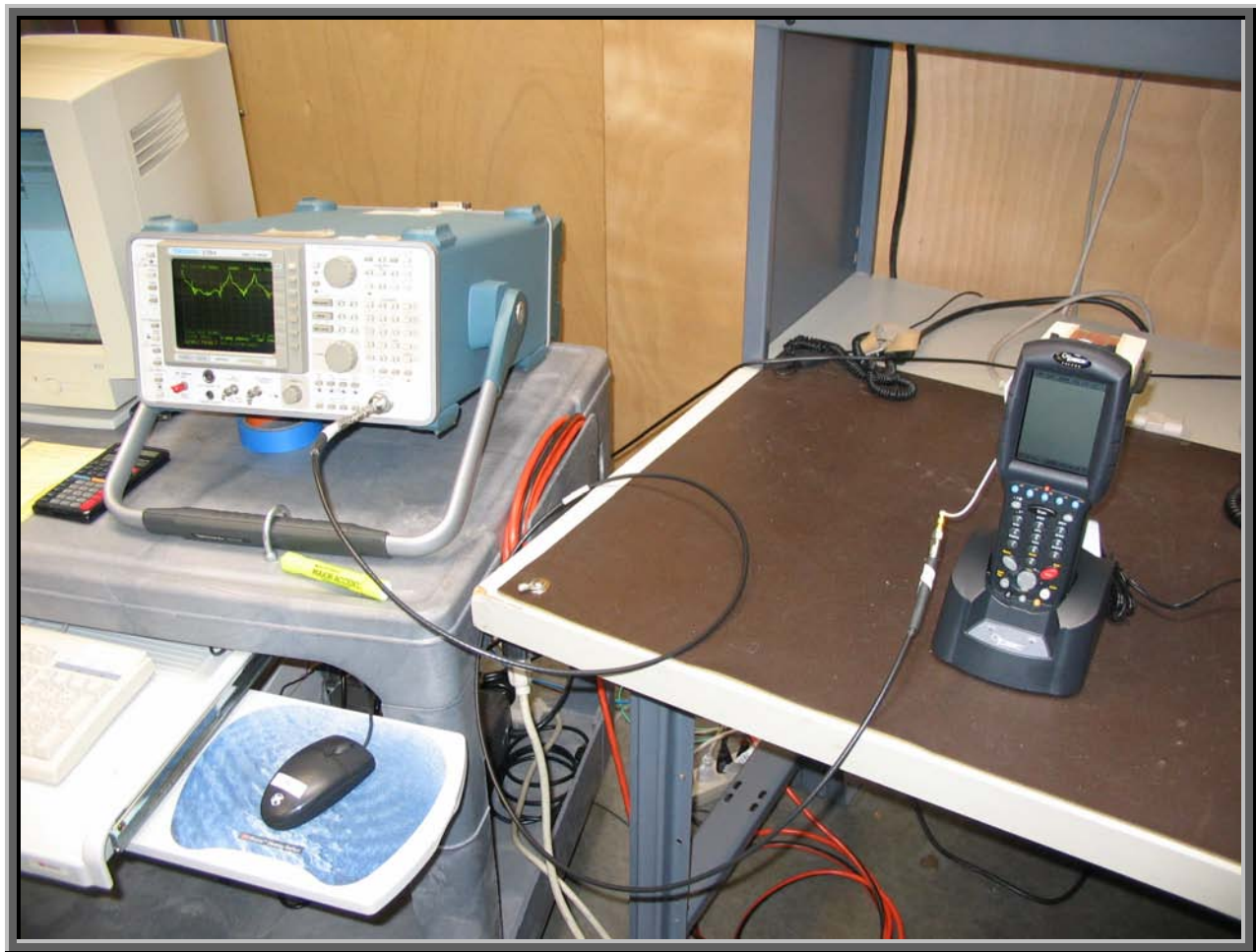
Configuration: The carrier frequency separation was measured between each of 5 hopping channels in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

Completed by:



NORTHWEST EMC		CHANNEL SPACING		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 22°C		
Attendees: Jim Wagner, Ron Burke			Humidity: 44% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Rod Peloquin			Power: 120VAC/60Hz		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)(1)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
If the occupied bandwidth is less than 250 kHz, the system shall use at least 50 hopping frequencies					
RESULTS					
Pass			CHANNEL SPACING 508 kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Channel Spacing					





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

All

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200.S19
Description			
The system was tested using special software developed to place the radio in typical hopping mode on all the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

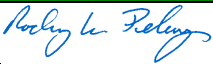
Test Description

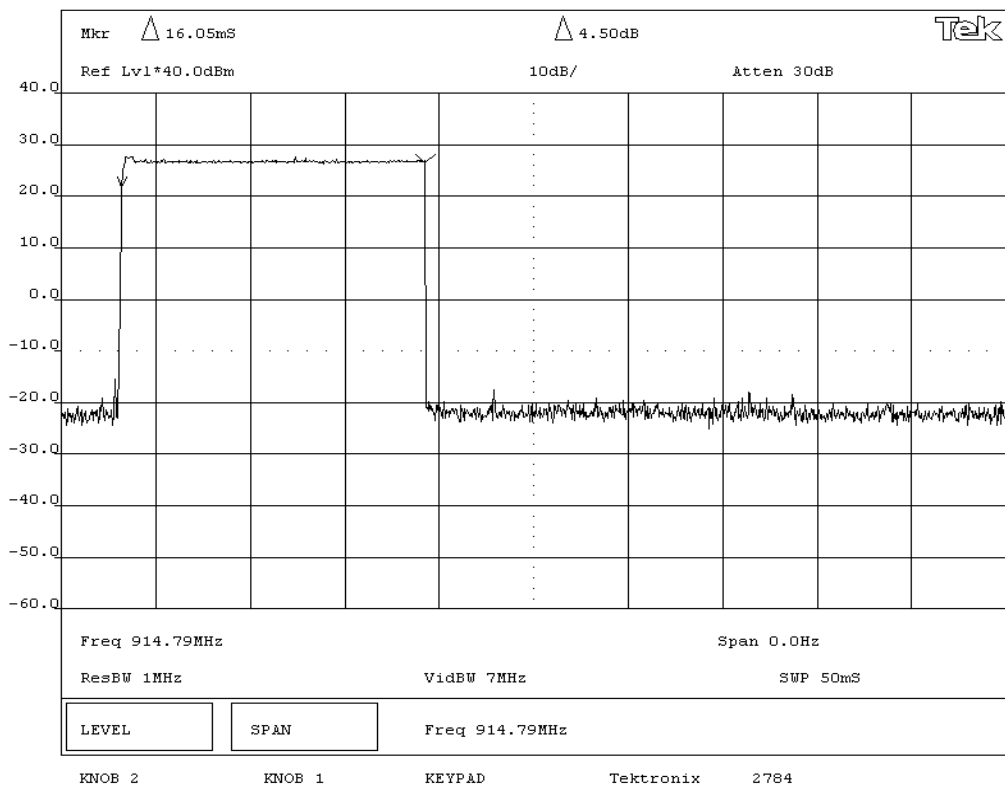
Requirement: Per 47 CFR 15.247(a)(1)(i), the average time of occupancy on any frequency must not be greater than 0.4 seconds within a 20 second period. The measurement is made with the spectrum analyzer's span set to zero. The measurement is made in two steps. First, the sweep speed is adjusted to capture the pulse width or dwell time of a single transmission. Then, the sweep speed is set to 20 seconds to count the number of transmissions during that period. The dwell time of a single transmission multiplied by the number of transmissions during a 20 second period equals the average time of occupancy during a 20 second period.

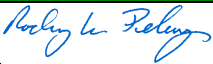
Configuration: The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

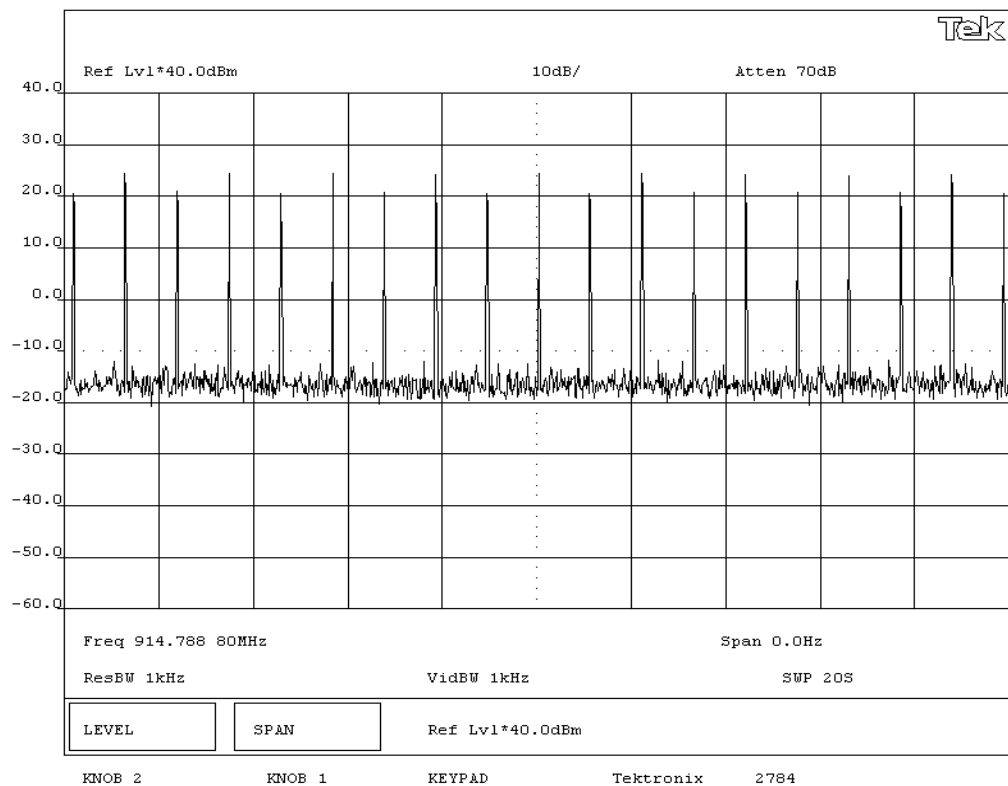
Completed by:

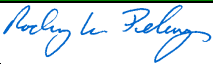


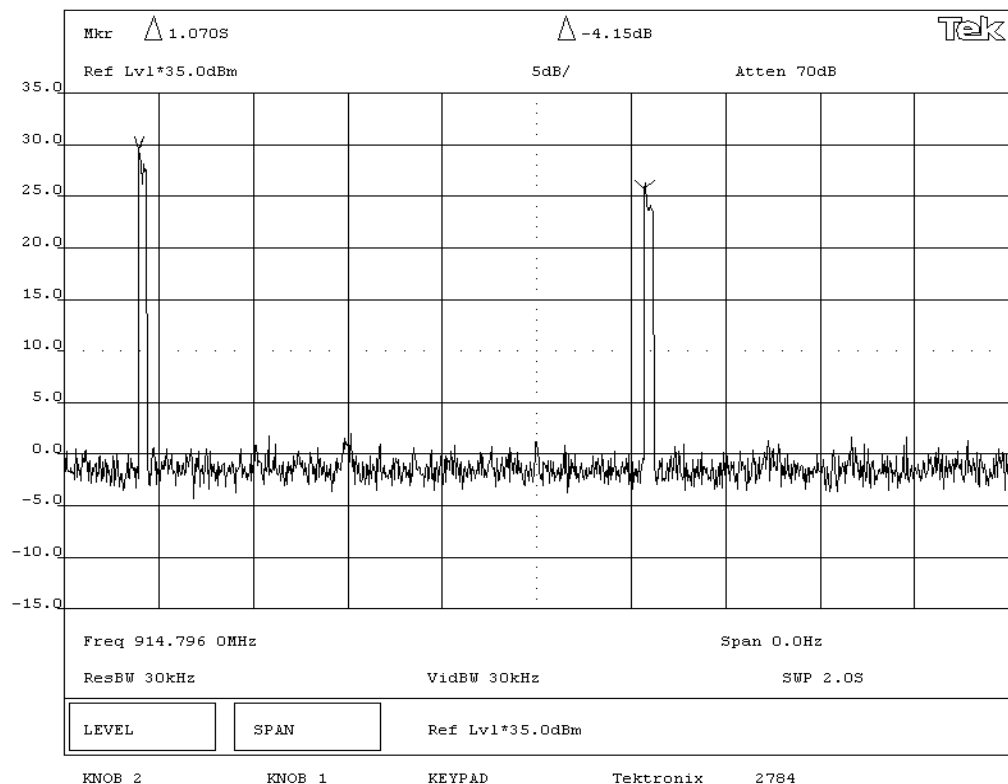
NORTHWEST EMC		DWELL TIME		Rev BETA 01/30/01	
EUT:	ST200	Work Order:	PSCI0159		
Serial Number:		Date:	05/16/05		
Customer:	PSC Inc.	Temperature:	22°C		
Attendees:	Ron Burke, Brian Kelly	Tested by:	Rod Peloquin	Humidity:	44% RH
Customer Ref. No.:		Power:	120VAC/60Hz	Job Site:	EV06
TEST SPECIFICATIONS					
Specification:	47 CFR 15.247(a)(1)(i)	Year:	Most Current	Method:	DA 00-705, ANSI C63.4
				Year:	1992
SAMPLE CALCULATIONS					
Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 20 second period)					
Total Dwell time = (16.05) X (19) = .305 mS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate. Hopping carrier.					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.					
RESULTS		DWELL TIME DURING A SINGLE TRANSMISSION			
Pass		16.05 mS			
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Time of Occupancy (Dwell Time) - Single Transmission					



NORTHWEST EMC		DWELL TIME		Rev BETA 01/30/01	
EUT:	ST200	Work Order:	PSCI0159		
Serial Number:		Date:	05/16/05		
Customer:	PSC Inc.	Temperature:	22°C		
Attendees:	Ron Burke, Brian Kelly	Tested by:	Rod Peloquin	Humidity:	44% RH
Customer Ref. No.:		Power:	120VAC/60Hz	Job Site:	EV06
TEST SPECIFICATIONS					
Specification:	47 CFR 15.247(a)(1)(i)	Year:	Most Current	Method:	DA 00-705, ANSI C63.4
				Year:	1992
SAMPLE CALCULATIONS					
Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 20 second period)					
Total Dwell time = (16.05) X (19) = .305 mS					
COMMENTS					
EUT OPERATING MODES					
Modulated by PRBS at maximum data rate. Hopping carrier.					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.					
RESULTS					
				NUMBER OF TRANSMISSIONS DURING A 20 SECOND PERIOD	
Pass				19	
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Time of Occupancy (Dwell Time) - Number of transmissions during a 20 second period					



NORTHWEST EMC				DWELL TIME		Rev BETA 01/30/01	
EUT: ST200		Work Order: PSC10159					
Serial Number:		Date: 05/16/05					
Customer: PSC Inc.		Temperature: 22°C					
Attendees: Ron Burke, Brian Kelly		Tested by: Rod Peloquin		Humidity: 44% RH			
Customer Ref. No.:		Power: 120VAC/60Hz		Job Site: EV06			
TEST SPECIFICATIONS							
Specification: 47 CFR 15.247(a)(1)(i)		Year: Most Current		Method: DA 00-705, ANSI C63.4		Year: 1992	
SAMPLE CALCULATIONS							
Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 20 second period)							
Total Dwell time = (16.05) X (19) = .305 mS							
COMMENTS							
EUT OPERATING MODES							
Modulated by PRBS at maximum data rate. Hopping carrier.							
DEVIATIONS FROM TEST STANDARD							
None							
REQUIREMENTS							
The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.							
RESULTS				TOTAL PERIOD			
Pass				1.07 Seconds			
SIGNATURE							
 Tested By: _____							
DESCRIPTION OF TEST							
Time of Occupancy (Dwell Time) - Period							





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

All

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200.S19
Description			
The system was tested using special software developed to place the radio in a typical hopping mode on all the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

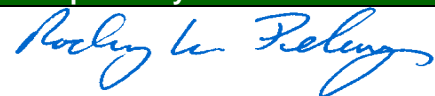
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo


Test Description

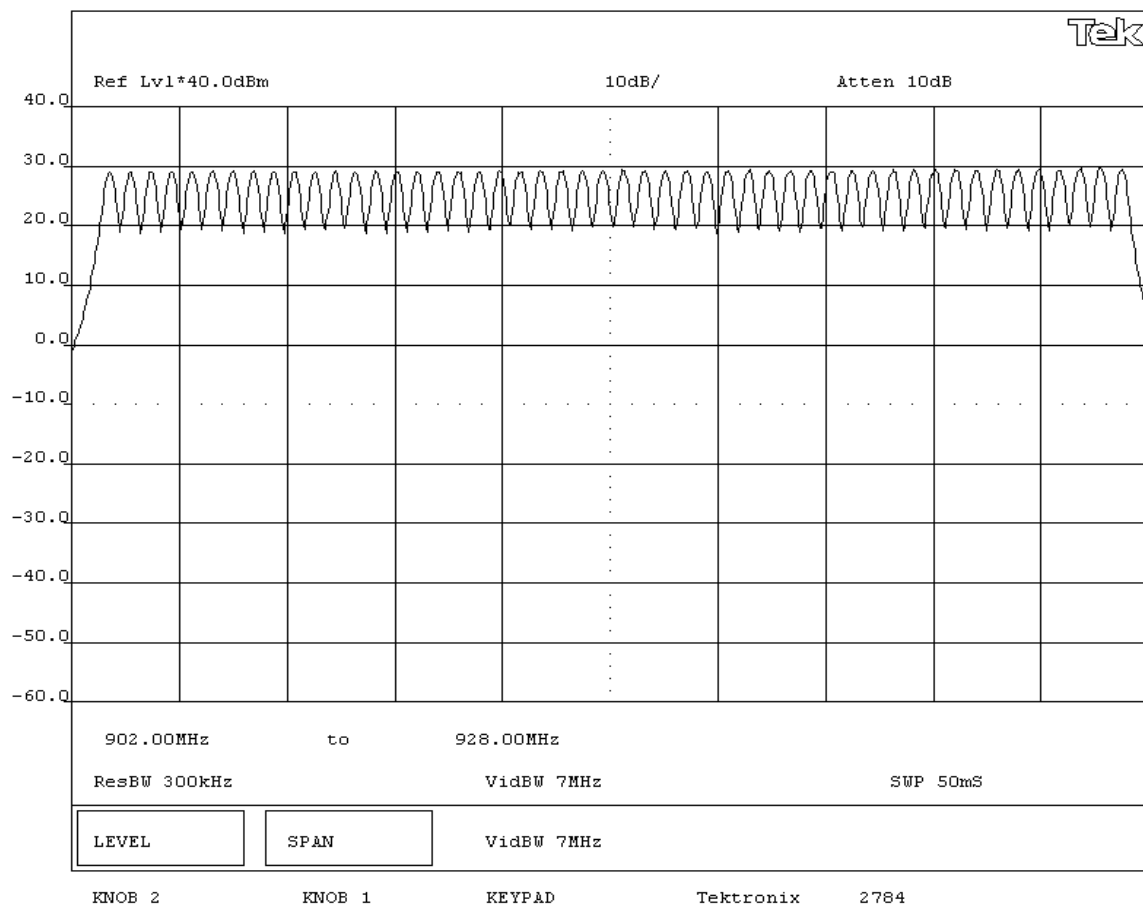
Requirement: Per 47 CFR 15.247(a)(1)(i), the number of hopping channels must be at least 50. The measurement is made with the spectrum analyzer's span set to encompass the entire allowable band, resolution bandwidth set to 300 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

Completed by:



NORTHWEST EMC		NUMBER OF HOPPING FREQUENCIES		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 22°C		
Attendees: Jim Wagner, Ron Burke			Humidity: 44% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Rod Peloquin			Power: 120VAC/60Hz		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)(1)(i)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
If the occupied bandwidth is less than 250 kHz, the system shall use at least 50 hopping frequencies					
RESULTS			NUMBER OF HOPPING FREQUENCIES		
Pass			50		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Number of Hopping Frequencies					





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200_Low.S19
			ST200_Mid.S19
			ST200_High.S19
Description			
The system was tested using special software developed to place the radio in a no hop mode on the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

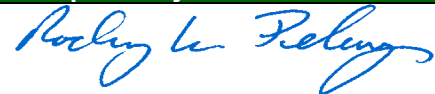
Measurement Equipment


Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

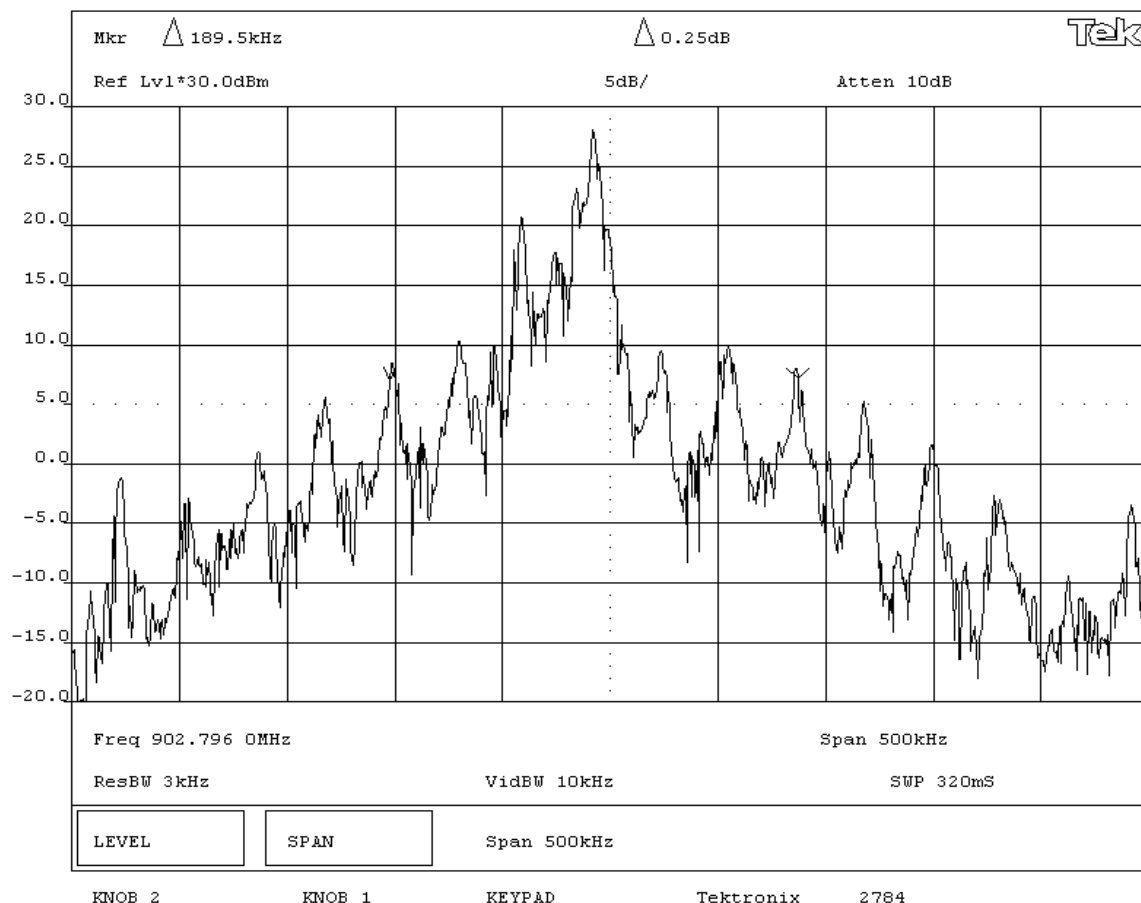
Test Description

Requirement: Per 47 CFR 15.247(a)(1)(i), the 20 dB bandwidth of a hopping channel must be less than 250 kHz for a system employing at least 50 hopping frequencies. The measurement is made with the spectrum analyzer's resolution bandwidth set to $\geq 1\%$ of the 20dB bandwidth, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

Completed by:


NORTHWEST EMC		OCCUPIED BANDWIDTH		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 21°C		
Attendees: Jim Wagner, Ron Burke			Tested by: Rod Peloquin		
Customer Ref. No.:			Power: 120VAC/60Hz		
			Humidity: 42% RH		
			Job Site: EV06		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(a)(1)(i)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
If the occupied bandwidth is less than 250 kHz, the system shall use at least 50 hopping frequencies with a time of occupancy not greater than 0.4S in 20S					
RESULTS			BANDWIDTH		
Pass			189.5 kHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Occupied Bandwidth - Low Channel					



NORTHWEST
EMC

OCCUPIED BANDWIDTH

Rev BETA
01/30/01

EUT: ST200		Work Order: PSCI0153	
Serial Number:		Date:	05/03/05
Customer:	PSC Inc.	Temperature:	21°C
Attendees:	Jim Wagner, Ron Burke	Humidity:	42% RH
Customer Ref. No.:		Power:	120VAC/60Hz
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)(1)(i)	Year:	2005	Method:	FCC DA 00-705, ANSI C63.4	Year:	2000, 2004
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SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated at maximum data rate, at maximum output power

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

If the occupied bandwidth is less than 250 kHz, the system shall use at least 50 hopping frequencies with a time of occupancy not greater than 0.4S in 20S

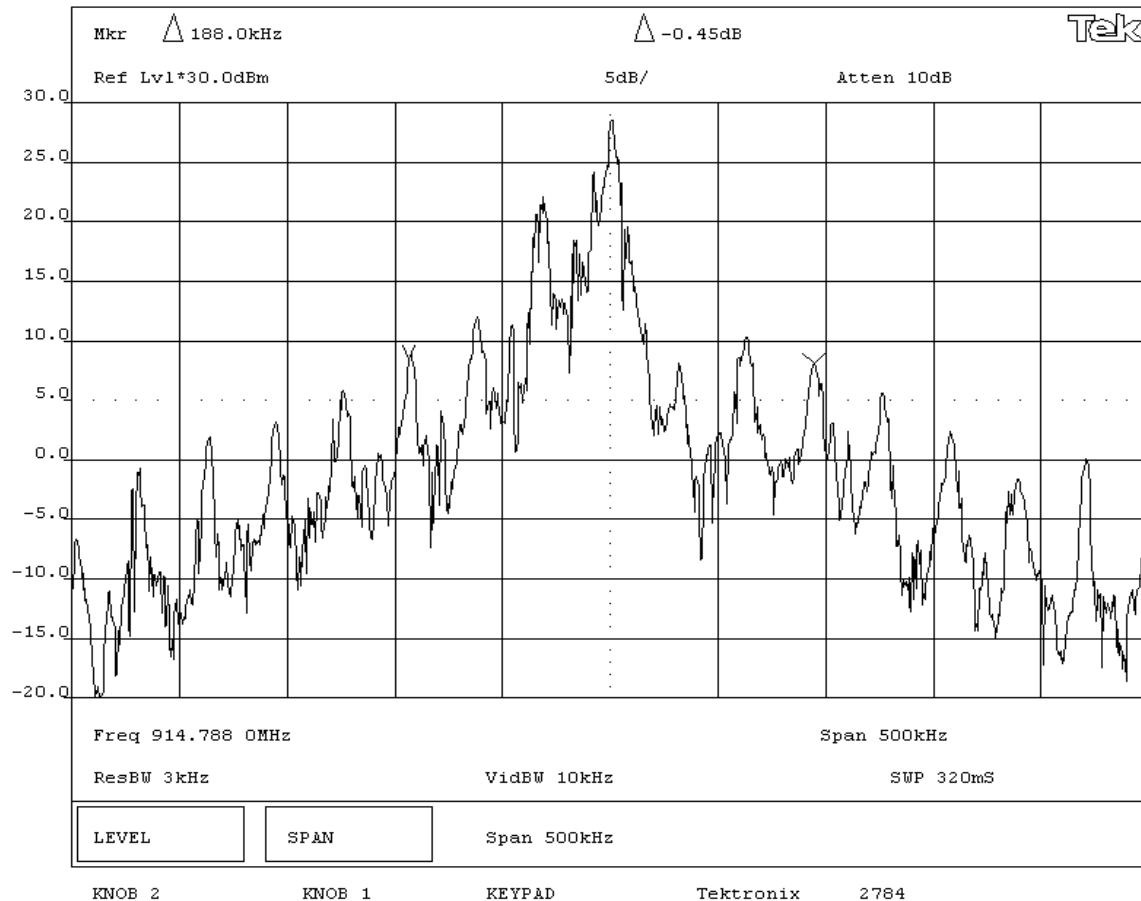
RESULTS	BANDWIDTH
Pass	188 kHz

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - Mid Channel



NORTHWEST
EMC

OCCUPIED BANDWIDTH

Rev BETA
01/30/01

EUT: ST200		Work Order: PSCI0153	
Serial Number:		Date:	05/03/05
Customer:	PSC Inc.	Temperature:	21°C
Attendees:	Jim Wagner, Ron Burke	Tested by:	Rod Peloquin
Customer Ref. No.:		Power:	120VAC/60Hz
		Humidity:	42% RH
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(a)(1)(i)	Year:	2005	Method:	FCC DA 00-705, ANSI C63.4	Year:	2000, 2004
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SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated at maximum data rate, at maximum output power

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

If the occupied bandwidth is less than 250 kHz, the system shall use at least 50 hopping frequencies with a time of occupancy not greater than 0.4S in 20S

RESULTS

BANDWIDTH

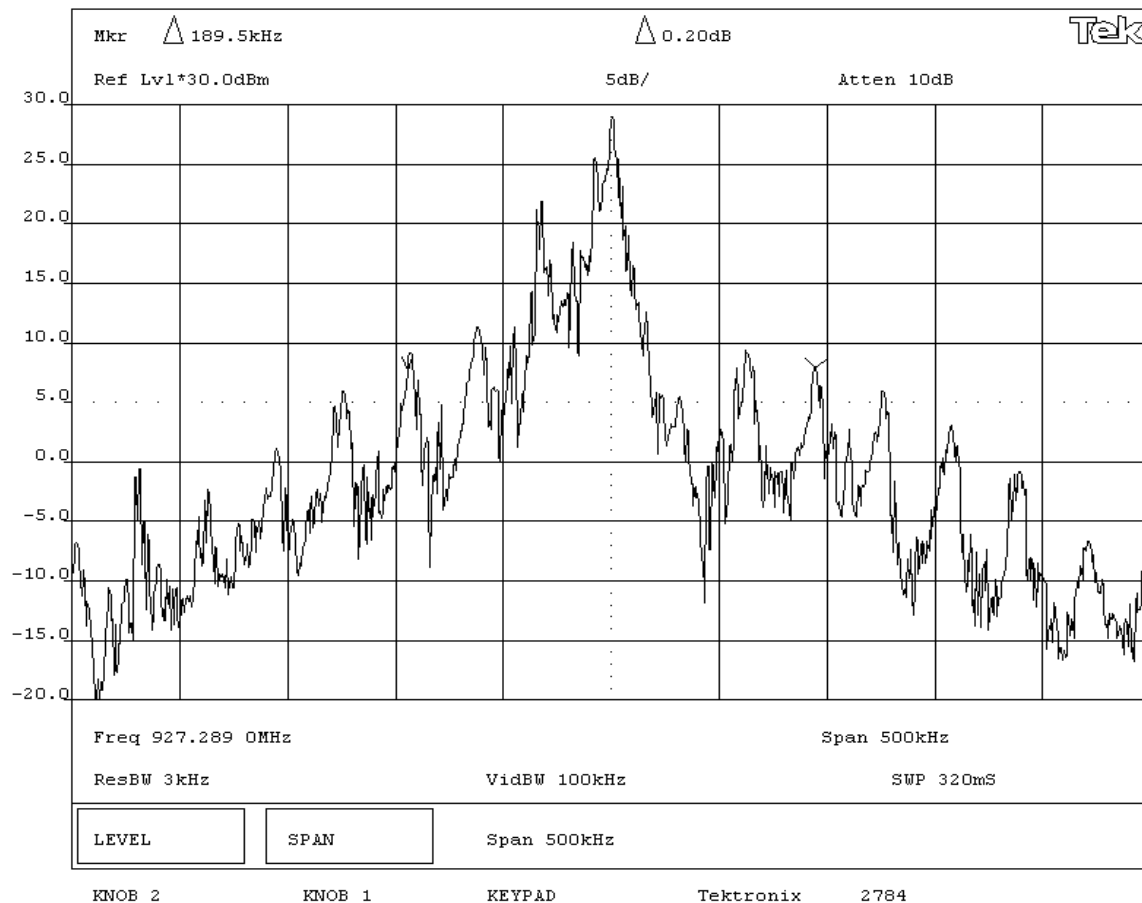
Pass 189.5 kHz

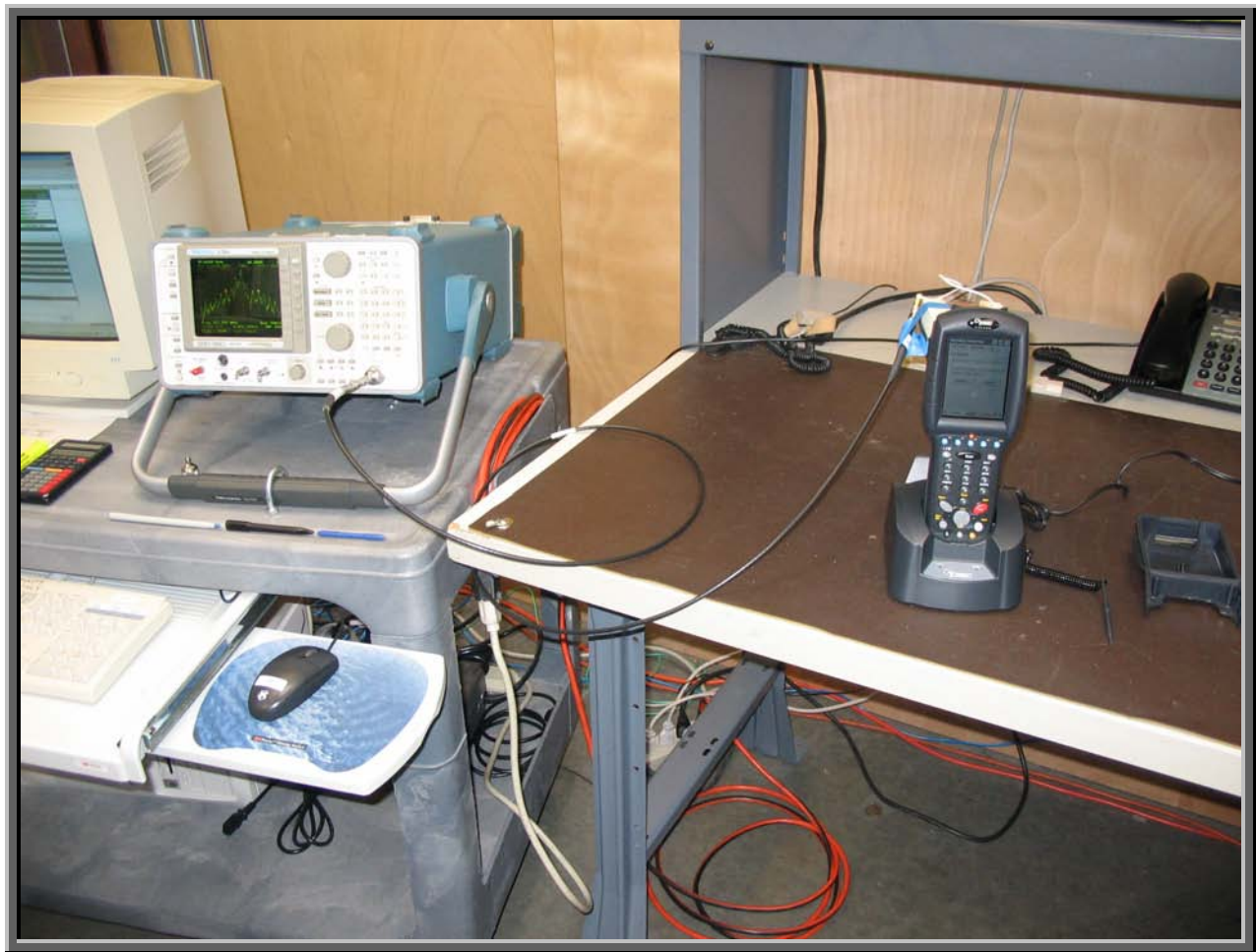
SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - High Channel





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200_Low.S19
			ST200_Mid.S19
			ST200_High.S19
Description			
The system was tested using special software developed to place the radio in a no hop mode on the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

Test Description

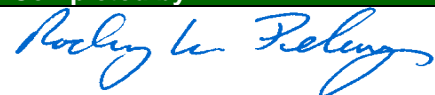
Requirement: Per 47 CFR 15.247(b)(2), the maximum peak output power must not exceed 1 Watt. The measurement is made using a spectrum analyzer using the following settings:

- Resolution bandwidth set to greater than the 20dB bandwidth of the modulated carrier, and
- The video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

Completed by:



NORTHWEST
EMC

OUTPUT POWER

Rev BETA
01/30/01

EUT:	ST200	Work Order:	PSCI0153
Serial Number:		Date:	05/03/05
Customer:	PSC Inc.	Temperature:	21°C
Attendees:	Jim Wagner, Ron Burke	Humidity:	42% RH
Customer Ref. No.:		Power:	120VAC/60Hz
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(b)(2)	Year:	2005	Method:	FCC DA 00-705, ANSI C63.4	Year:	2000, 2004
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SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated at maximum data rate, at maximum output power

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

RESULTS

AMPLITUDE

Pass

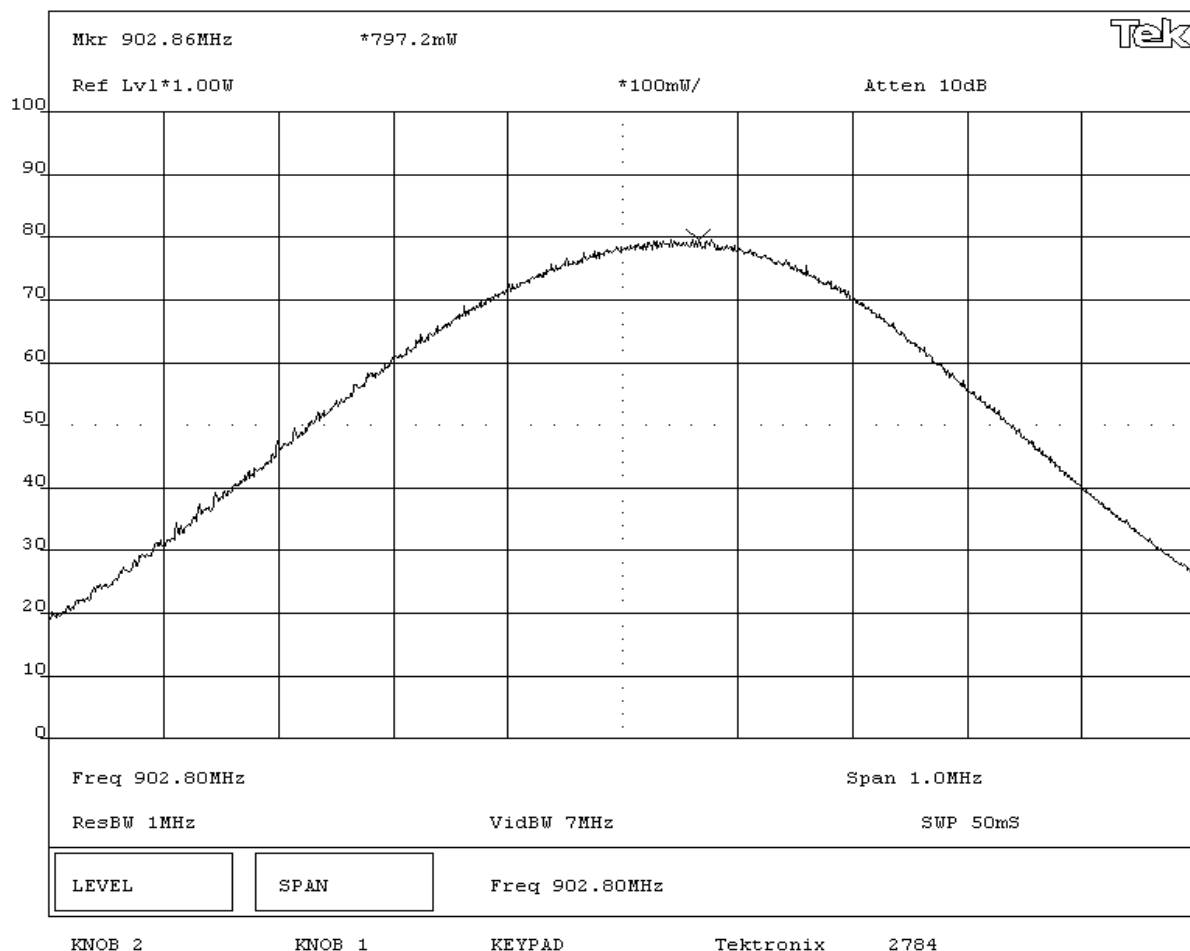
797.2 mW


SIGNATURE

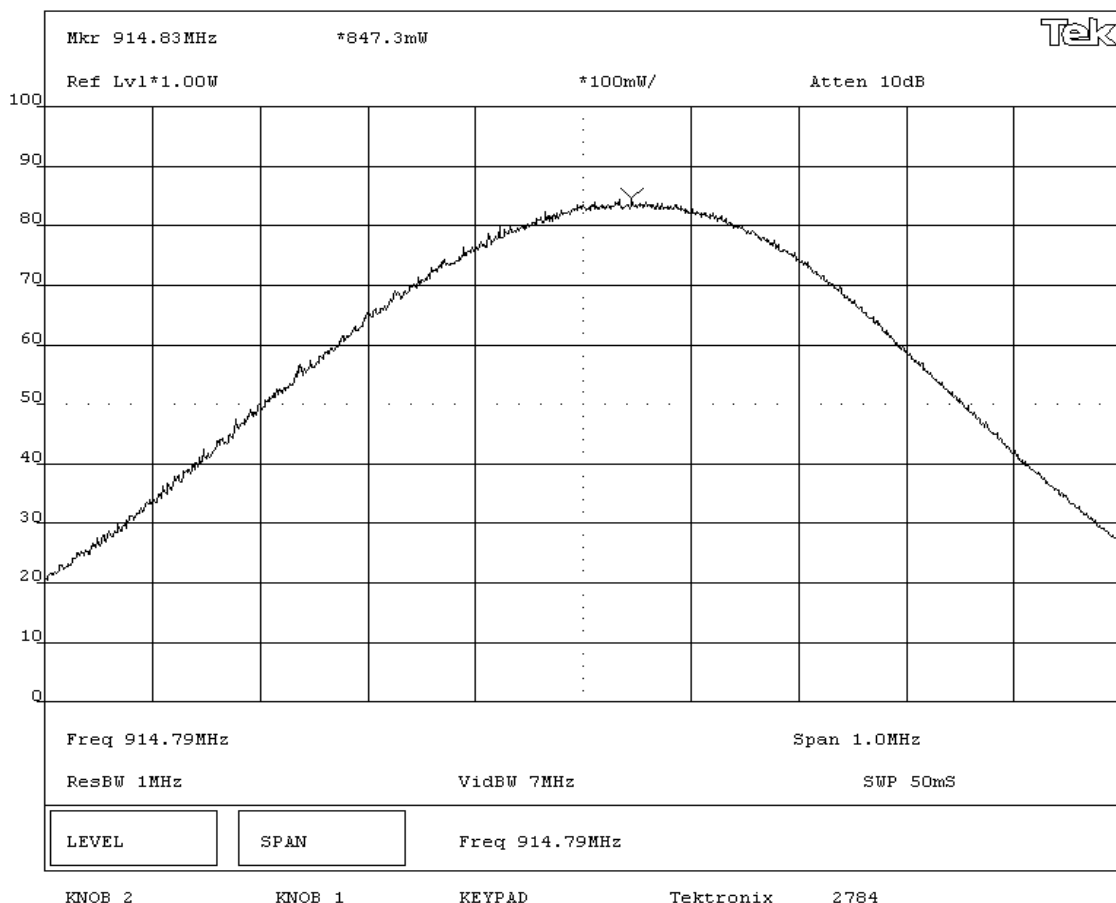
Tested By: 


DESCRIPTION OF TEST

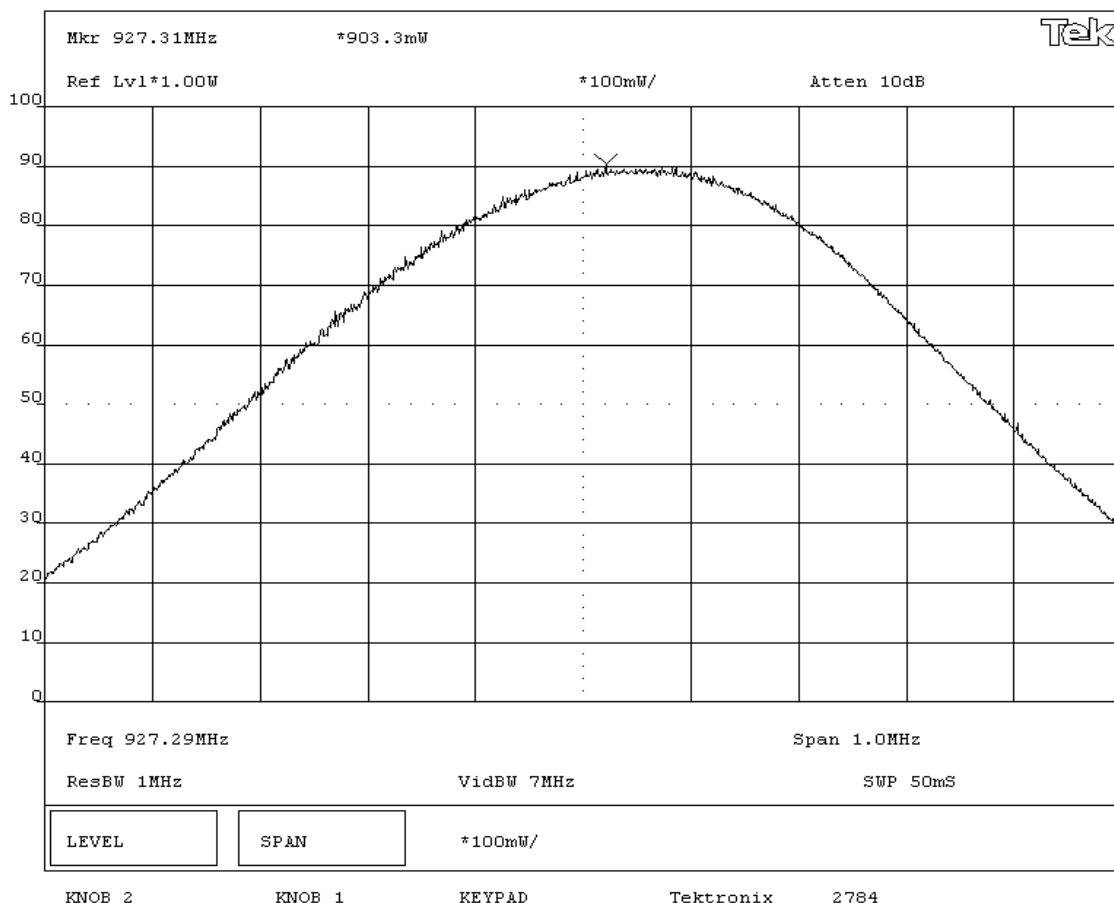
Output Power - Low Channel

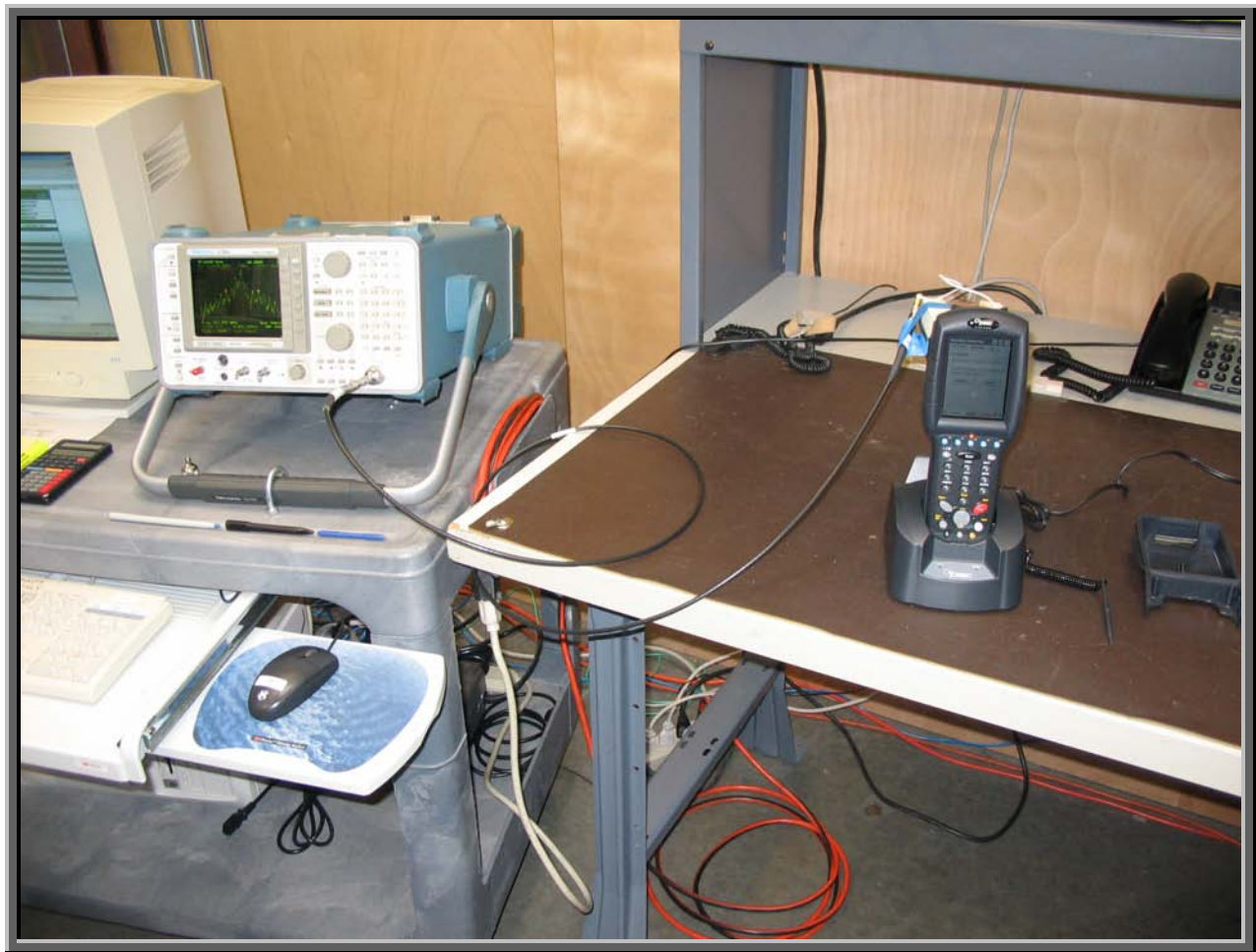


NORTHWEST EMC		OUTPUT POWER		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 21°C		
Attendees: Jim Wagner, Ron Burke			Tested by: Rod Peloquin		
Customer Ref. No.:			Humidity: 42% RH		
			Power: 120VAC/60Hz		
			Job Site: EV06		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(b)(2)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak conducted output power does not exceed 1 Watt					
RESULTS					
Pass			AMPLITUDE 847.3 mW		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Output Power - Mid Channel					



NORTHWEST EMC		OUTPUT POWER		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 21°C		
Attendees: Jim Wagner, Ron Burke			Tested by: Rod Peloquin		
Customer Ref. No.:			Power: 120VAC/60Hz		
			Humidity: 42% RH		
			Job Site: EV06		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(b)(2)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
Maximum peak conducted output power does not exceed 1 Watt					
RESULTS					
			AMPLITUDE		
Pass			903.3 mW		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Output Power - High Channel					





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low

High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200_Low.S19
			ST200_High.S19

Description

The system was tested using special software developed to place the radio in a no hop mode on the required channels during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

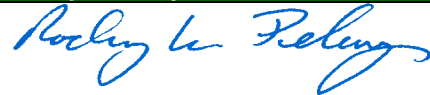
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo


Test Description

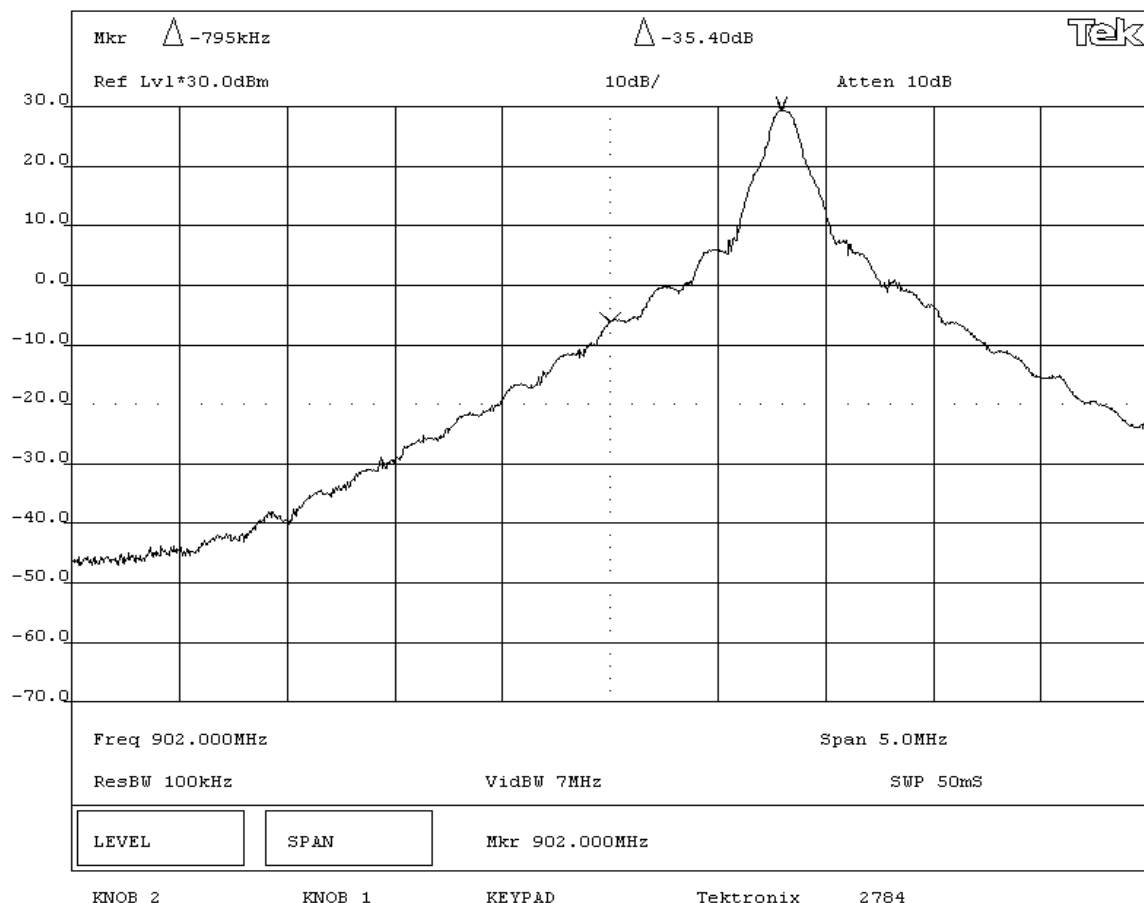
Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

Completed by:



NORTHWEST EMC		Band Edge Compliance		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC, Inc.			Temperature: 21°C		
Attendees: Jim Wagner, Ron Burke			Tested by: Rod Peloquin		
Customer Ref. No.:			Power: 120VAC/60Hz		
			Humidity: 42% RH		
			Job Site: EV06		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS					
Pass			AMPLITUDE -35.4 dBm		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Band Edge Compliance - Low Channel					



Band Edge Compliance

Rev BETA
01/30/01

EUT:	ST200	Work Order:	PSCI0153
Serial Number:		Date:	05/03/05
Customer:	PSC, Inc.	Temperature:	21°C
Attendees:	Jim Wagner, Ron Burke	Tested by:	Rod Peloquin
Customer Ref. No.:		Humidity:	42% RH
		Power:	120VAC/60Hz
		Job Site:	EV06

TEST SPECIFICATIONS

Specification:	47 CFR 15.247(d)	Year:	2005	Method:	FCC DA 00-705, ANSI C63.4	Year:	2000, 2004
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SAMPLE CALCULATIONS

COMMENTS

Comments	

EUT OPERATING MODES

Modulated at maximum data rate, at maximum output power

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.

RESULTS

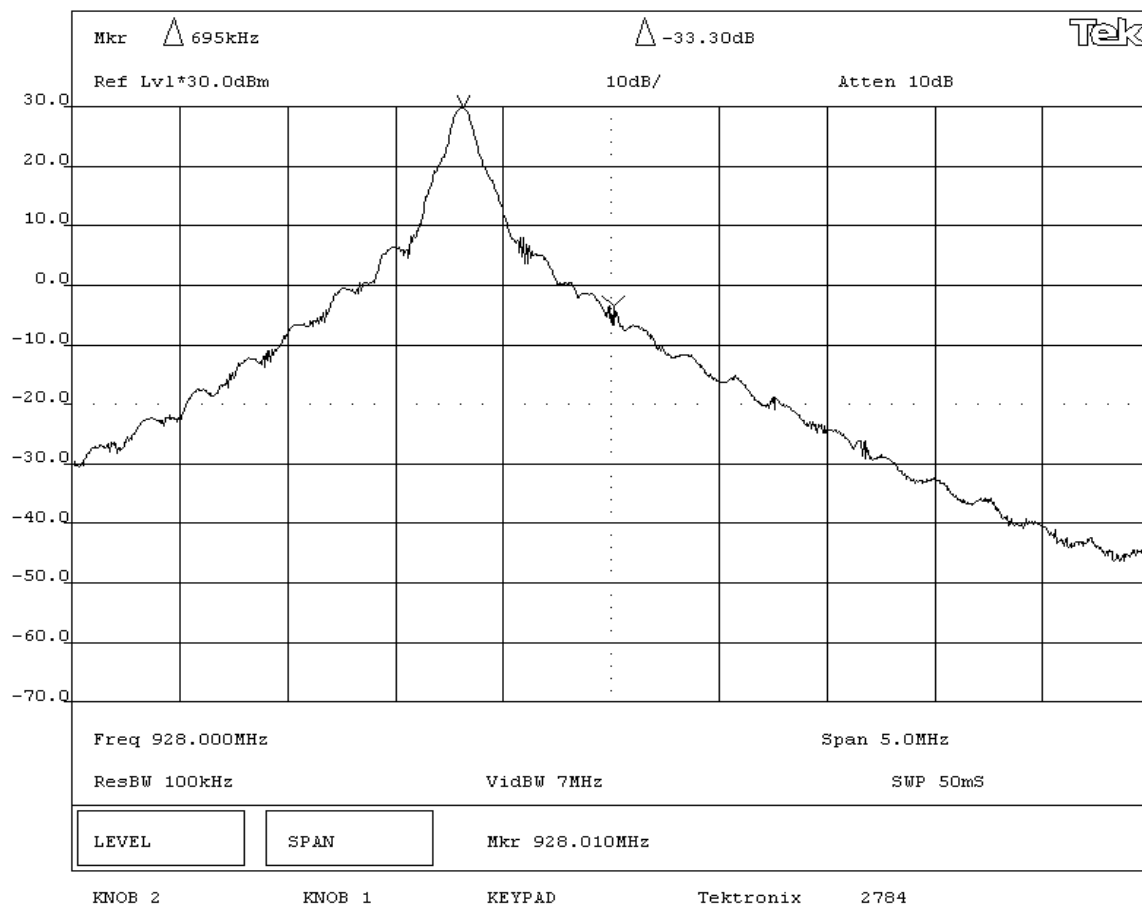
RESULT	AMM. ERROR
Pass	-33.3 dBm

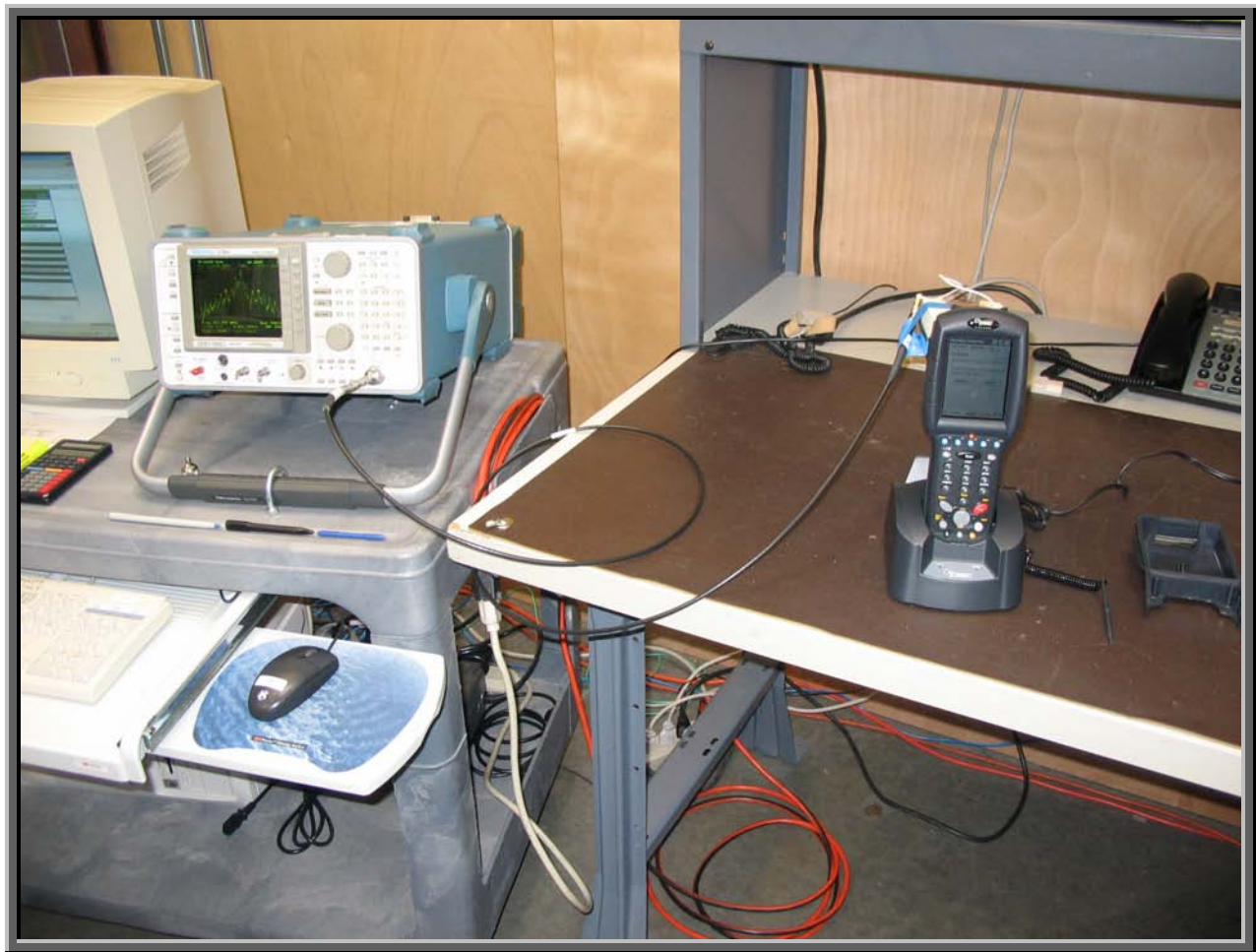
SIGNATURE

Tested By: Rocky L. Peleng

DESCRIPTION OF TEST

Band Edge Compliance - High Channel





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low

Mid

High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200_Low.S19
			ST200_Mid.S19
			ST200_High.S19
Description			
The system was tested using special software developed to place the radio in a no hop mode on the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

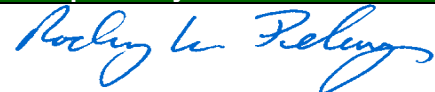
Measurement Equipment


Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo

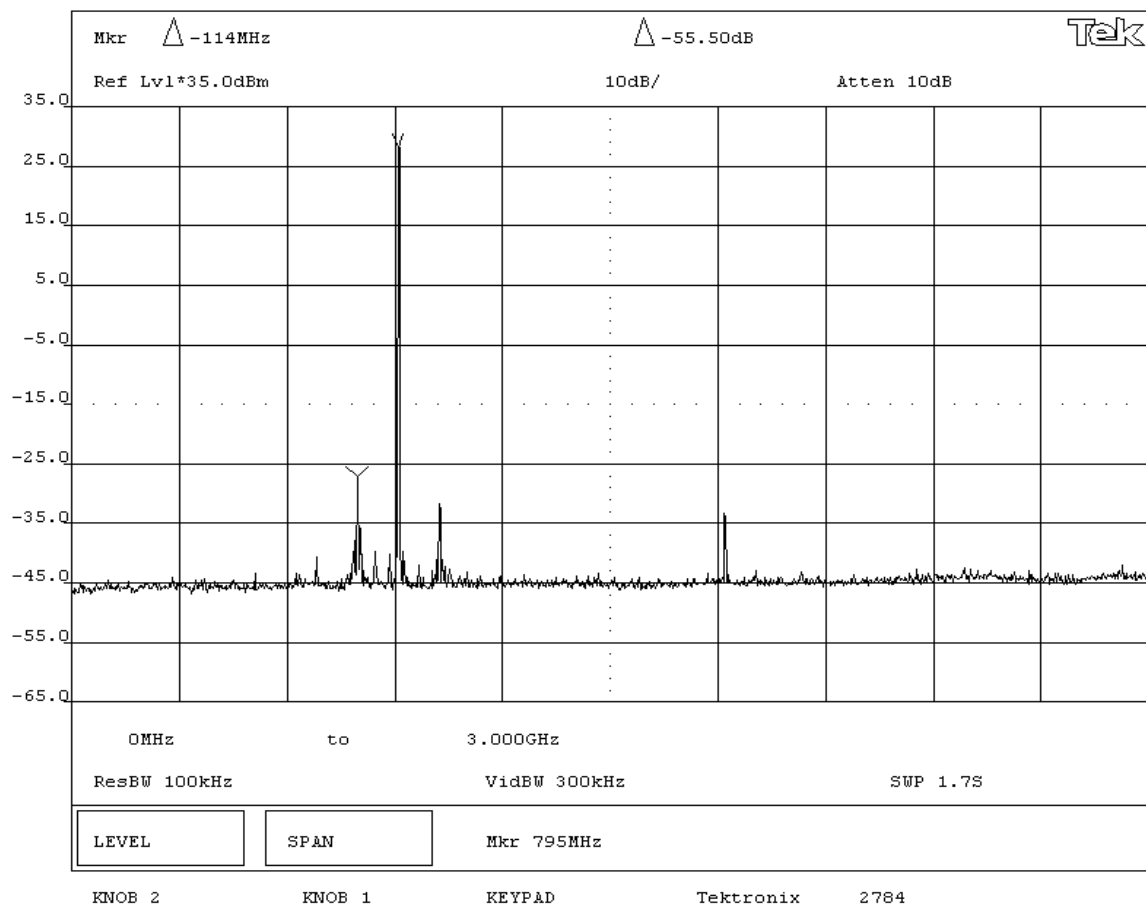
Test Description

Requirement: Per 47 CFR 15.247(d), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

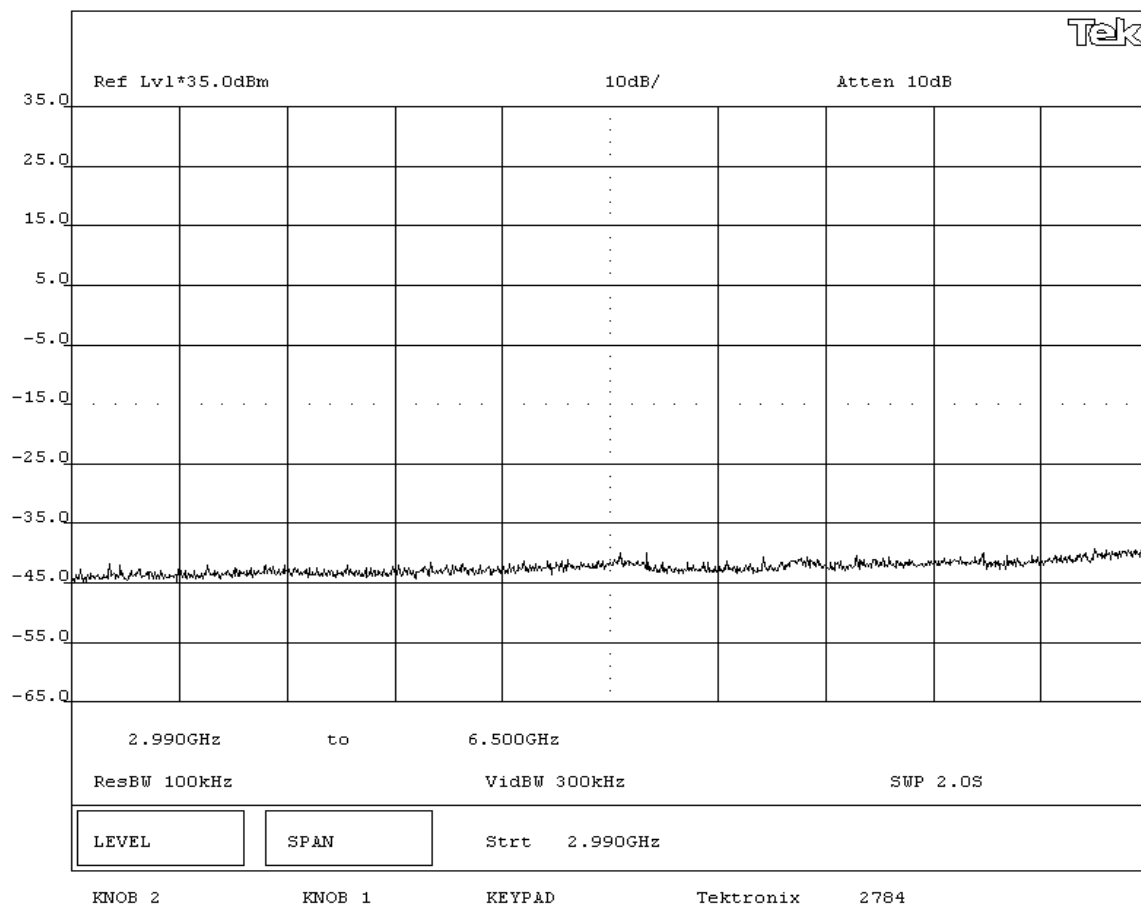
Configuration: The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.


Completed by:


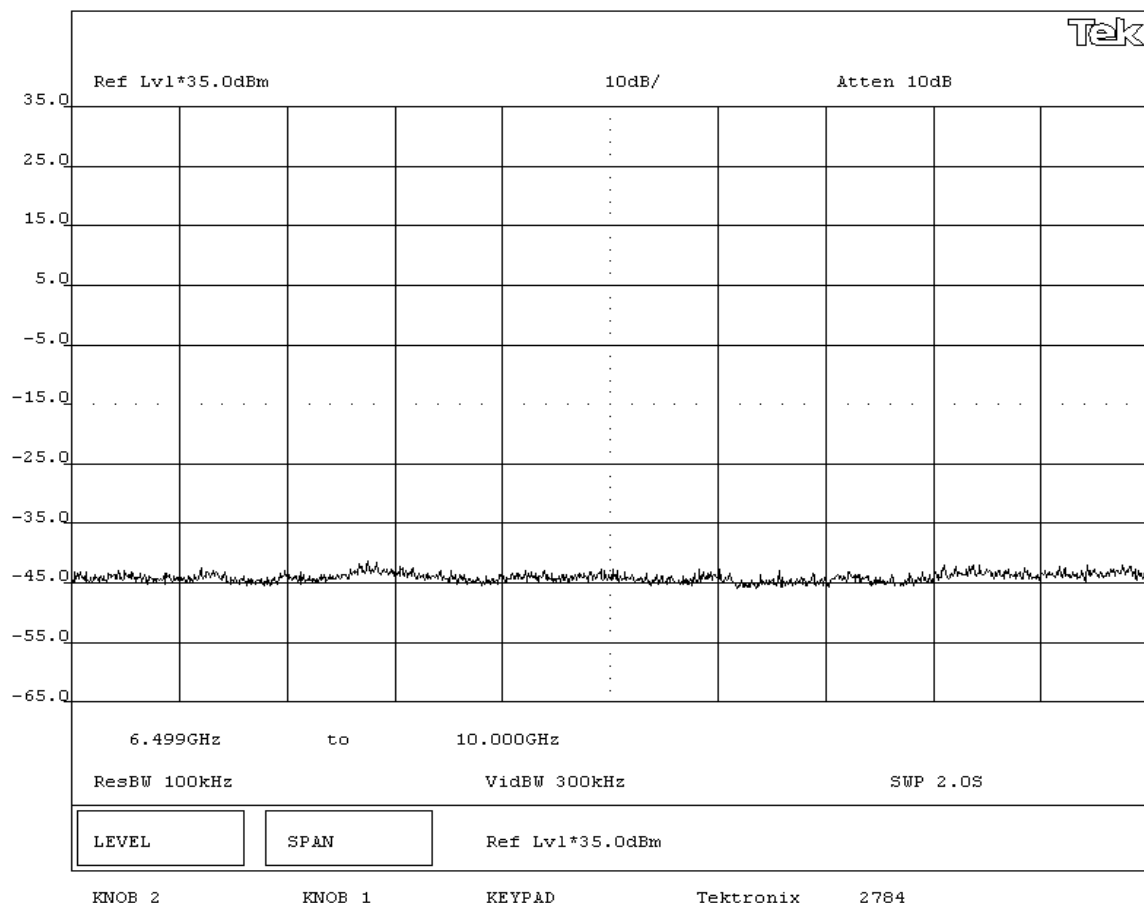
NORTHWEST EMC		Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 22°C		
Attendees: Jim Wagner, Ron Burke			Humidity: 44% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Rod Peloquin			Power: 120VAC/60Hz		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS			AMPLITUDE		
Pass			-55.5 dB		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Spurious Conducted Emissions - Low Channel 0MHz-3GHz					




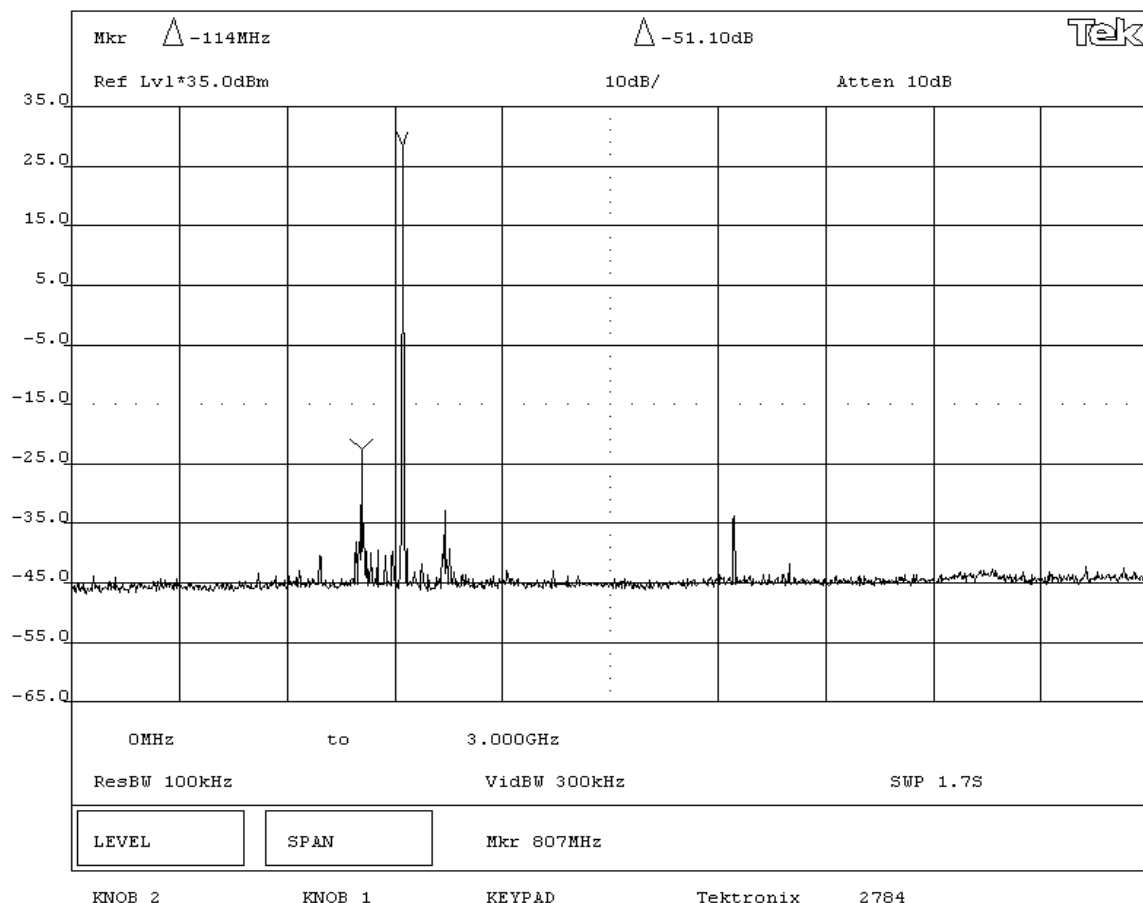
Spurious Conducted Emissions - Low Channel 3GHz-6.5GHz



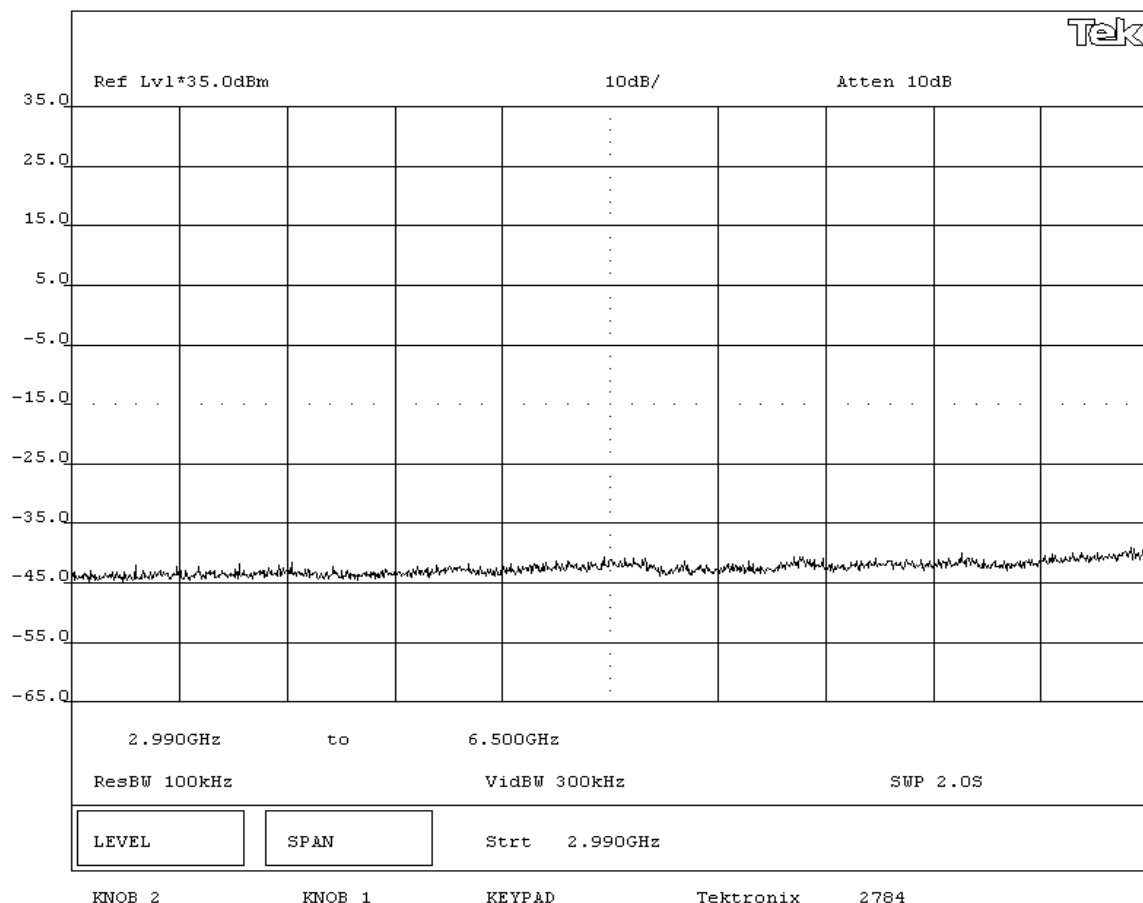
NORTHWEST EMC		Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 22°C		
Attendees: Jim Wagner, Ron Burke			Humidity: 44% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Rod Peloquin			Power: 120VAC/60Hz		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS			AMPLITUDE		
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Spurious Conducted Emissions - Low Channel 6.5GHz-10GHz					




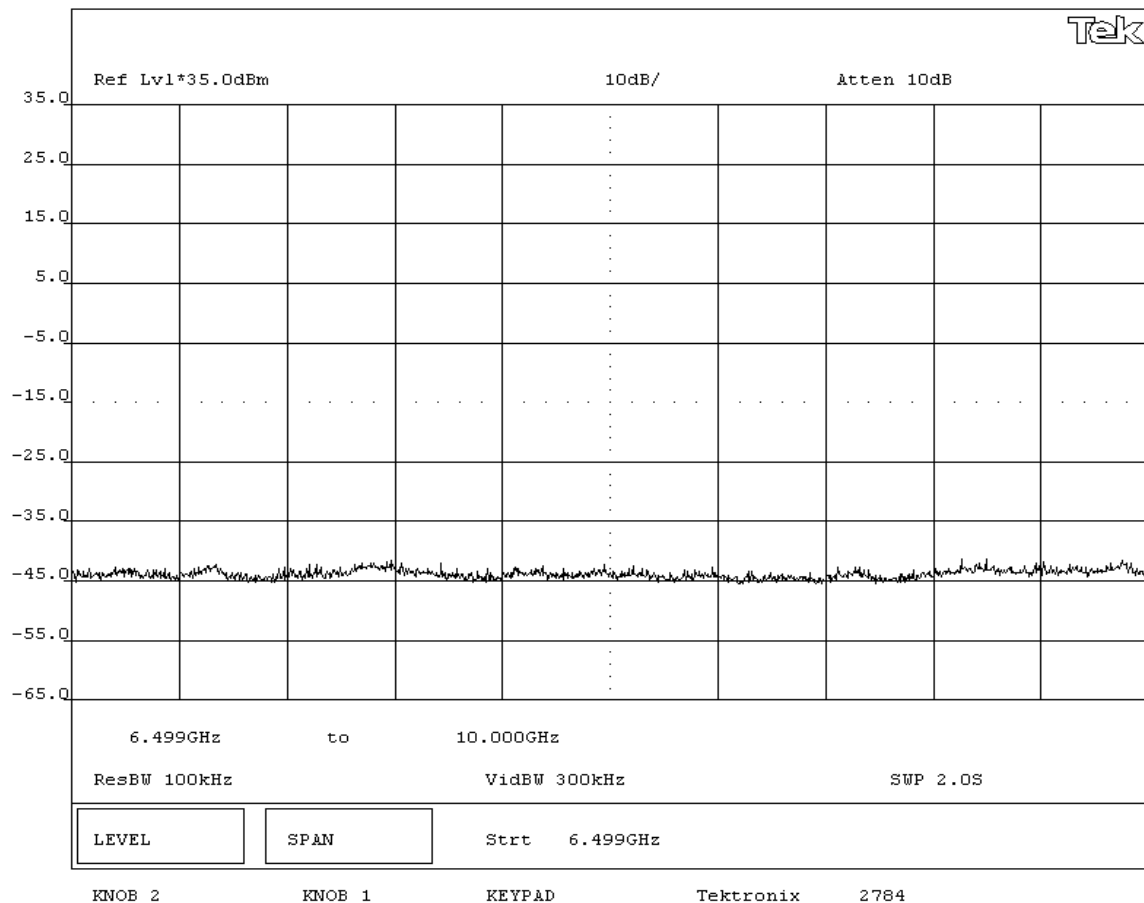
NORTHWEST EMC		Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 22°C		
Attendees: Jim Wagner, Ron Burke			Humidity: 44% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Rod Peloquin			Power: 120VAC/60Hz		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS			AMPLITUDE		
Pass			-51.1 dB		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Spurious Conducted Emissions - Mid Channel 0MHz-3GHz					




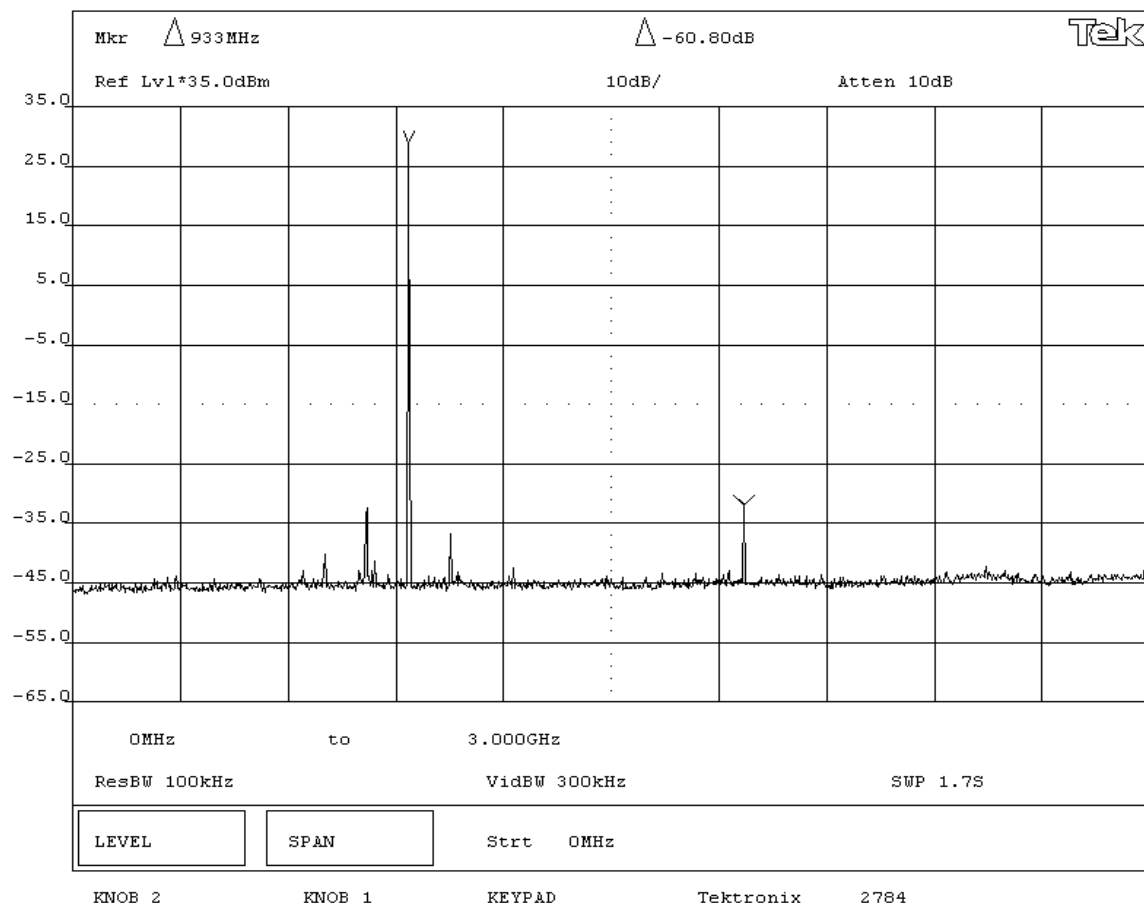
Specialized Conducted Emosensors and Channel-Cell Electrode




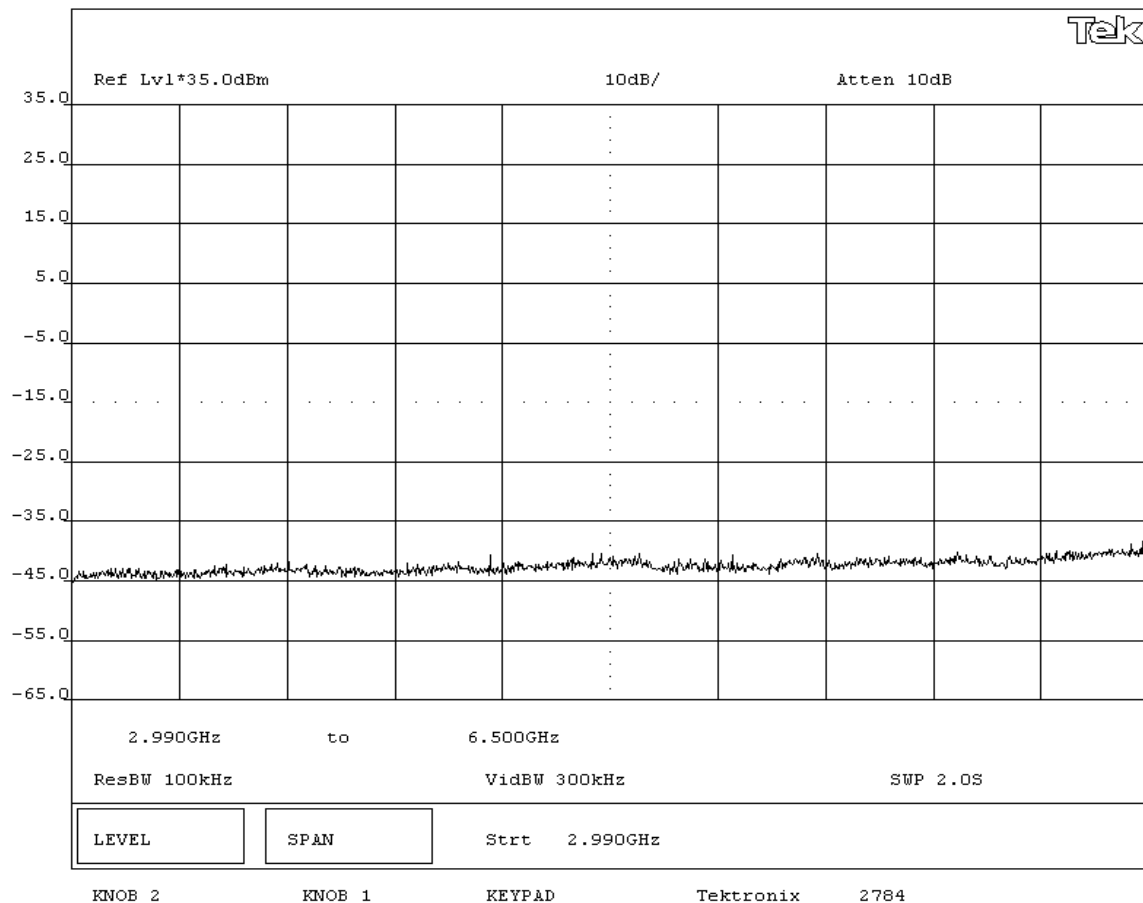
NORTHWEST EMC		Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200			Work Order: PSCI0153		
Serial Number:			Date: 05/03/05		
Customer: PSC Inc.			Temperature: 22°C		
Attendees: Jim Wagner, Ron Burke			Humidity: 44% RH		
Customer Ref. No.:			Job Site: EV06		
Tested by: Rod Peloquin			Power: 120VAC/60Hz		
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS			AMPLITUDE		
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Spurious Conducted Emissions - Mid Channel 6.5GHz-10GHz					




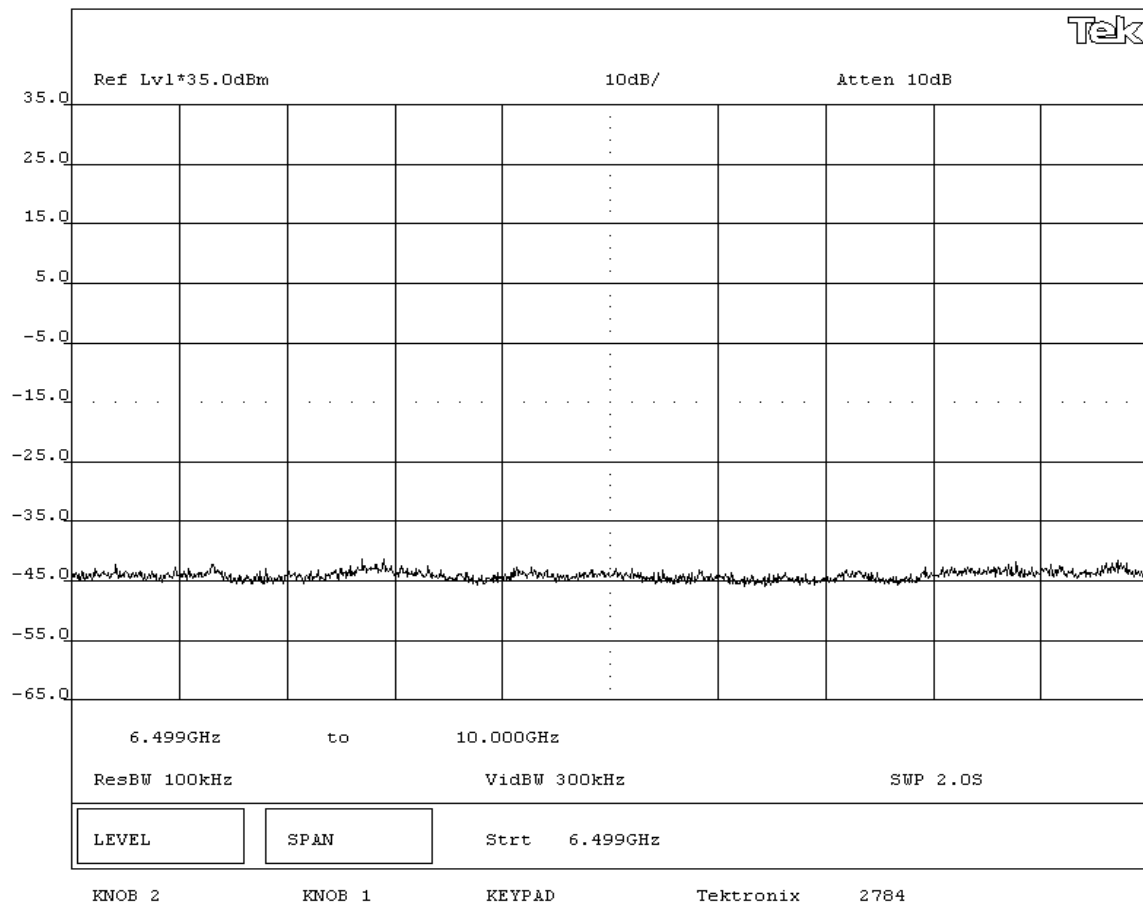
NORTHWEST EMC				Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200				Work Order: PSCI0153			
Serial Number:				Date: 05/03/05			
Customer: PSC Inc.				Temperature: 22°C			
Attendees: Jim Wagner, Ron Burke				Tested by: Rod Peloquin		Humidity: 44% RH	
Customer Ref. No.:				Power: 120VAC/60Hz		Job Site: EV06	
TEST SPECIFICATIONS							
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4		Year: 2000, 2004	
SAMPLE CALCULATIONS							
COMMENTS							
EUT OPERATING MODES							
Modulated at maximum data rate, at maximum output power							
DEVIATIONS FROM TEST STANDARD							
None							
REQUIREMENTS							
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.							
RESULTS				AMPLITUDE			
Pass				-60.8 dB			
SIGNATURE							
 Tested By: _____							
DESCRIPTION OF TEST							
Spurious Conducted Emissions - High Channel 0MHz-3GHz							

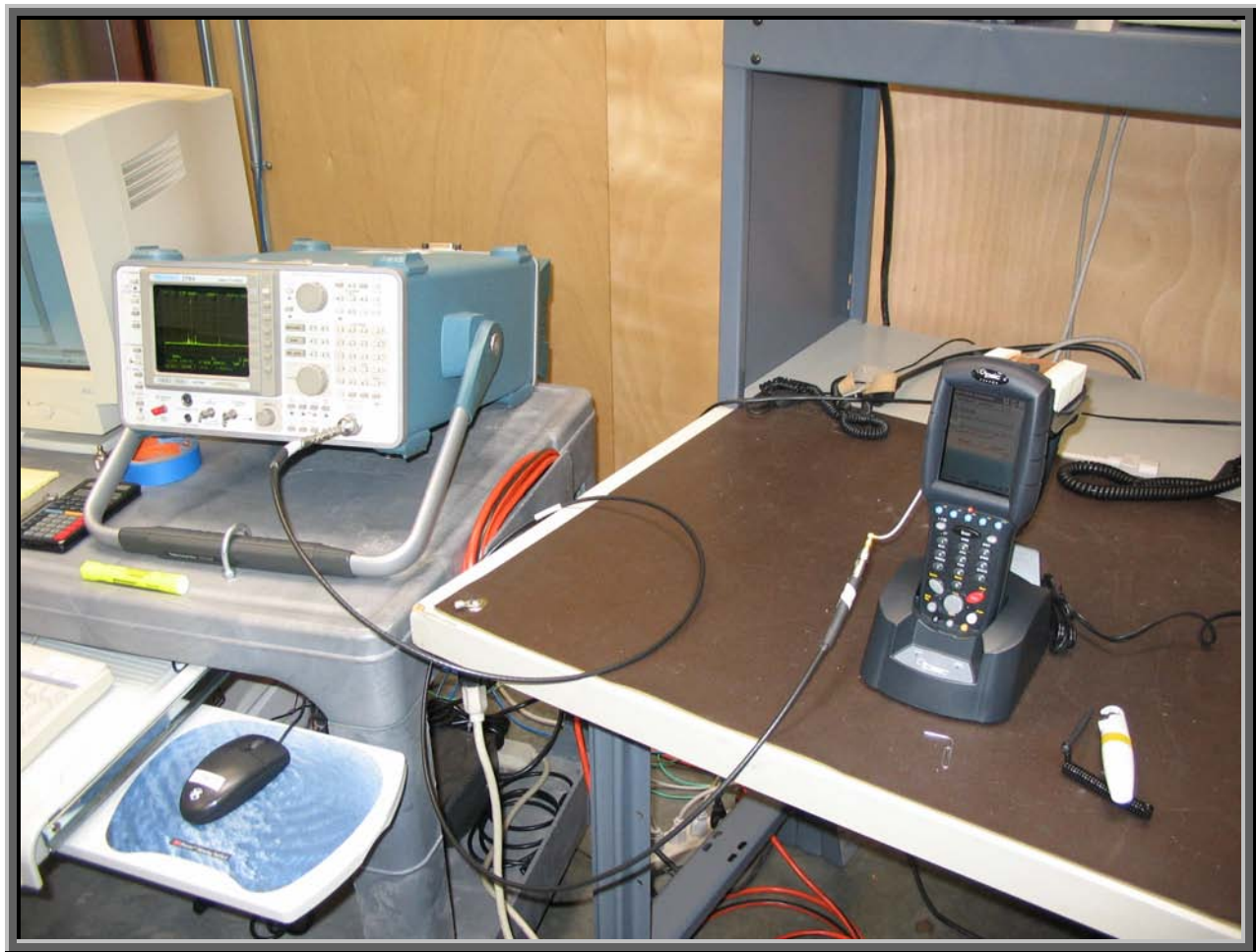


NORTHWEST EMC		Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200				Work Order: PSCI0153	
Serial Number:				Date: 05/03/05	
Customer: PSC Inc.				Temperature: 22°C	
Attendees: Jim Wagner, Ron Burke				Humidity: 44% RH	
Customer Ref. No.:				Power: 120VAC/60Hz	
				Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS					
AMPLITUDE					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Spurious Conducted Emissions - High Channel 3GHz-6.5GHz					



NORTHWEST EMC		Spurious Conducted Emissions		Rev BETA 01/30/01	
EUT: ST200				Work Order: PSCI0153	
Serial Number:				Date: 05/03/05	
Customer: PSC Inc.				Temperature: 22°C	
Attendees: Jim Wagner, Ron Burke				Humidity: 44% RH	
Customer Ref. No.:				Job Site: EV06	
Tested by: Rod Peloquin				Power: 120VAC/60Hz	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.247(d)		Year: 2005		Method: FCC DA 00-705, ANSI C63.4	
				Year: 2000, 2004	
SAMPLE CALCULATIONS					
COMMENTS					
EUT OPERATING MODES					
Modulated at maximum data rate, at maximum output power					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
In any 100 kHz band outside the allowable band the maximum spurious emission shall be at least 20 dB below the fundamental.					
RESULTS					
AMPLITUDE					
Pass					
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Spurious Conducted Emissions - High Channel 6.5GHz-10GHz					





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Frequency Range Investigated

Start Frequency	30 MHz	Stop Frequency	10 GHz
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Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200.S19
Description			
The system was tested using special software developed to place the radio in a no hop mode on the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
USB	Yes	1.0	No	1 Slot Dock	Unterminated
Serial	Yes	1.0	No	1 Slot Dock	Unterminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Pre-Amplifier	Amplifier Research	LN1000A	APS	03/01/2005	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	16 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/02/2004	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/02/2004	13 mo
High Pass Filter	MicroLab	FH-1001	HFI	02/28/2005	13 mo
Attenuator	Coaxicom	66702 5910-20	RBJ	02/25/2005	13 mo
High Pass Filter	Micro-Tronics	HPM50114	HFN	03/09/2005	13 mo

Test Description


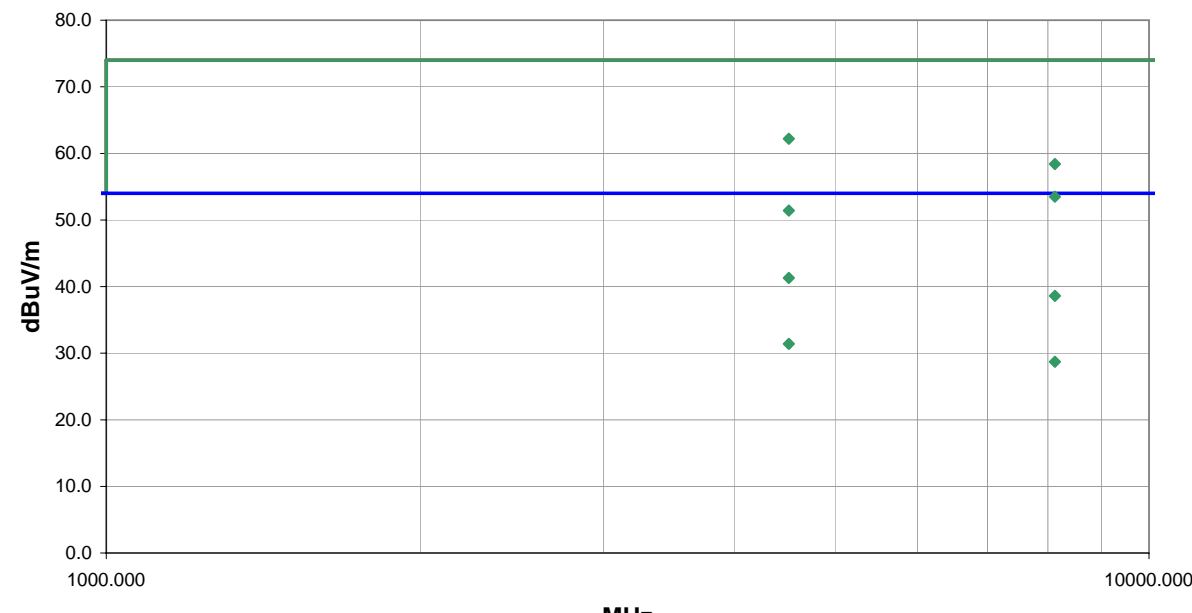
Requirement: The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.


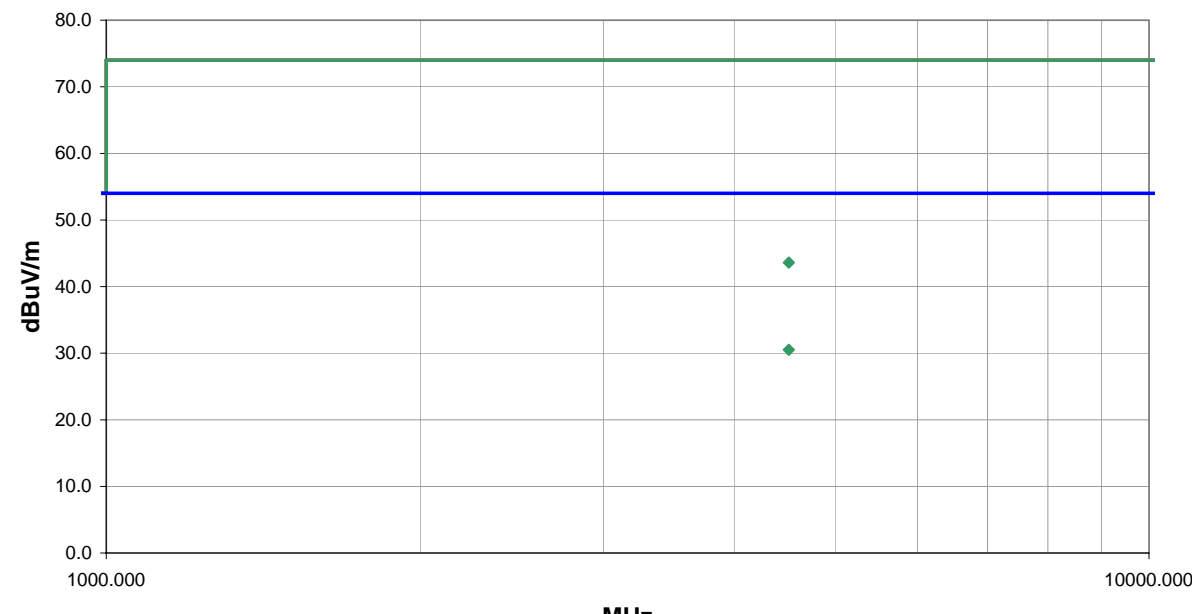
Configuration: The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands 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 C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.


Bandwidths Used for Measurements

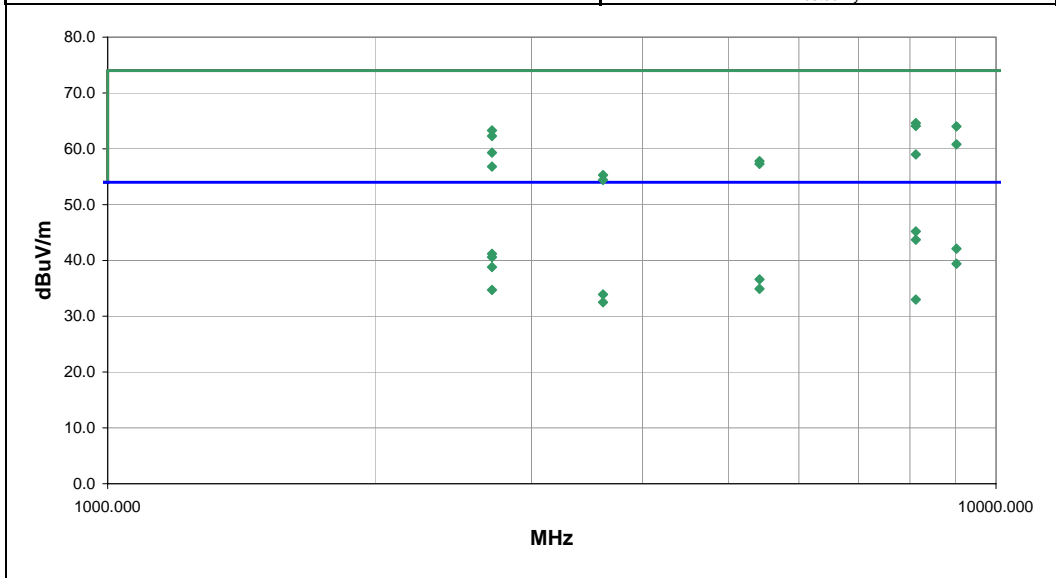
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

Completed by:



NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET				ACQ 2005.1.4 EMI 2005.4.13						
EUT: ST200		Work Order: PSCI0153										
Serial Number:		Date: 05/04/05										
Customer: PSC Inc.		Temperature: 23										
Attendees: Jim Wagner, Ron Burke		Humidity: 44%										
Cust. Ref. No.:		Barometric Pressure: 30.09										
Tested by: Travis Rychener		Power: 120VAC/60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(d) Spurious Radiated Emissions:2004				Method: ANSI C63.4:2003								
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
EUT in Falcon 5500 in dock												
EUT OPERATING MODES												
No hop, low channel												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS						Run #						
Pass						1						
Other												
Duty cycle correction factor applied to average measurement is calculated from the dwell time of 16.05mS in a 100S period: 20Log(16.05/100)						 Tested By: _____						
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4513.970	59.6	2.6	268.0	1.2	0.0	0.0	V-Horn	PK	0.0	62.2	74.0	-11.8
4513.970	54.6	2.6	268.0	1.2	15.9	0.0	V-Horn	AV	0.0	41.3	54.0	-12.7
8125.180	41.1	13.4	228.0	1.1	15.9	0.0	V-Horn	AV	0.0	38.6	54.0	-15.4
8125.180	45.0	13.4	228.0	1.1	0.0	0.0	V-Horn	PK	0.0	58.4	74.0	-15.6
8125.180	40.1	13.4	184.0	1.4	0.0	0.0	H-Horn	PK	0.0	53.5	74.0	-20.5
4513.970	44.7	2.6	315.0	2.3	15.9	0.0	H-Horn	AV	0.0	31.4	54.0	-22.6
4513.970	48.8	2.6	315.0	2.3	0.0	0.0	H-Horn	PK	0.0	51.4	74.0	-22.6
8125.180	31.2	13.4	184.0	1.4	15.9	0.0	H-Horn	AV	0.0	28.7	54.0	-25.3

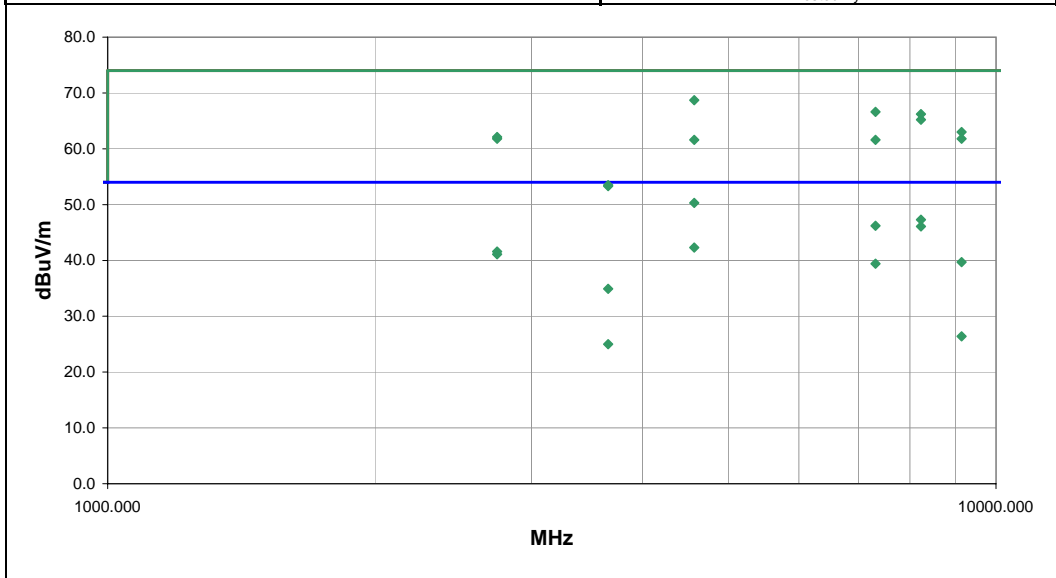
NORTHWEST EMC										ACQ 2005.1.4 EMI 2005.4.13			
RADIATED EMISSIONS DATA SHEET													
EUT: ST200					Work Order: PSCI0153								
Serial Number:					Date: 05/04/05								
Customer: PSC Inc.					Temperature: 23								
Attendees: Jim Wagner, Ron Burke					Humidity: 44%								
Cust. Ref. No.:					Barometric Pressure: 30.09								
Tested by: Travis Rychener					Power: 120VAC/60Hz					Job Site: EV01			
TEST SPECIFICATIONS													
Specification: FCC 15.247(d) Spurious Radiated Emissions:2004					Method: ANSI C63.4:2003								
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
EUT in Falcon 5500 NOT in dock													
EUT OPERATING MODES													
No hop, low channel													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS										Run #			
Pass										2			
Other													
Duty cycle correction factor applied to average measurement is calculated from the dwell time of 16.05mS in a 100S period: 20Log(16.05/100)										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
4513.807	56.8	2.7	350.0	1.2	15.9	0.0	V-Horn	AV	0.0	43.6	54.0	-10.4	
4513.927	43.7	2.7	287.0	1.3	15.9	0.0	H-Horn	AV	0.0	30.5	54.0	-23.5	

NORTHWEST		ACQ 2005.1.4	
EMC		RADIATED EMISSIONS DATA SHEET	
EUT: ST200		Work Order: PSCI0153	
Serial Number:		Date: 05/12/05	
Customer: PSC Inc.		Temperature: 24	
Attendees: Ron Burke, Brian Kelly		Humidity: 41%	
Cust. Ref. No.:		Barometric Pressure: 30.1	
Tested by: Rod Peloquin		Power: 120VAC/60Hz	
		Job Site: EV01	
TEST SPECIFICATIONS			
Specification: FCC 15.247(d) Spurious Radiated Emissions:2004		Method: ANSI C63.4:2003	
SAMPLE CALCULATIONS			
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation			
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator			
COMMENTS			
EUT in Falcon 5500			
EUT OPERATING MODES			
No hop, low channel			
DEVIATIONS FROM TEST STANDARD			
No deviations.			
RESULTS			Run #
Pass			4
Other		 Tested By:	
Duty cycle correction factor applied to average measurement is calculated from the dwell time of 16.05mS in a 100S period: 20Log(16.05/100)			


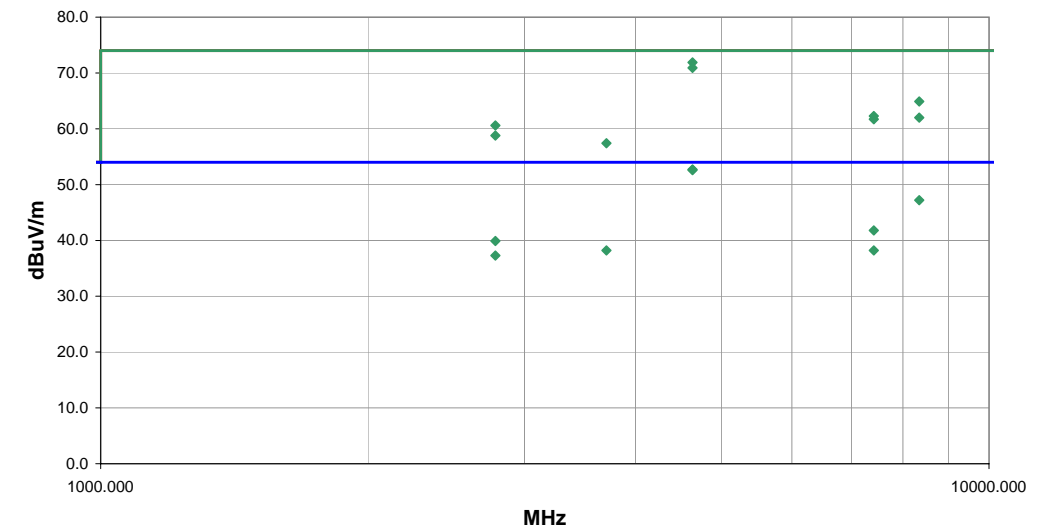


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
8125.180	48.3	12.8	328.0	1.2	15.9	0.0	V-Horn	AV	0.0	45.2	54.0	-8.8	EUT on side, no dock
8125.180	51.8	12.8	328.0	1.2	0.0	0.0	V-Horn	PK	0.0	64.6	74.0	-9.4	EUT on side, no dock
8125.180	51.3	12.8	22.0	1.3	0.0	0.0	H-Horn	PK	0.0	64.1	74.0	-9.9	EUT horizontal, no dock
9027.940	46.9	17.1	92.0	1.8	0.0	0.0	H-Horn	PK	0.0	64.0	74.0	-10.0	EUT horizontal, no dock
8125.180	46.8	12.8	22.0	1.3	15.9	0.0	H-Horn	AV	0.0	43.7	54.0	-10.3	EUT horizontal, no dock
2708.322	64.6	-1.3	44.0	1.5	0.0	0.0	H-Horn	PK	0.0	63.3	74.0	-10.7	EUT horizontal, no dock
2708.322	63.6	-1.3	196.0	1.4	0.0	0.0	V-Horn	PK	0.0	62.3	74.0	-11.7	EUT on side, no dock
9027.940	40.9	17.1	92.0	1.8	15.9	0.0	H-Horn	AV	0.0	42.1	54.0	-11.9	EUT horizontal, no dock
2708.322	58.4	-1.3	44.0	1.5	15.9	0.0	H-Horn	AV	0.0	41.2	54.0	-12.8	EUT horizontal, no dock
9027.940	43.7	17.1	178.0	2.3	0.0	0.0	V-Horn	PK	0.0	60.8	74.0	-13.2	EUT on side, no dock
2708.322	57.8	-1.3	196.0	1.4	15.9	0.0	V-Horn	AV	0.0	40.6	54.0	-13.4	EUT on side, no dock
9027.940	38.2	17.1	178.0	2.3	15.9	0.0	V-Horn	AV	0.0	39.4	54.0	-14.6	EUT on side, no dock
2708.322	60.6	-1.3	119.0	1.2	0.0	0.0	V-Horn	PK	0.0	59.3	74.0	-14.7	In Dock
8125.180	46.2	12.8	331.0	1.2	0.0	0.0	V-Horn	PK	0.0	59.0	74.0	-15.0	EUT horizontal, no dock
2708.322	56.0	-1.3	119.0	1.2	15.9	0.0	V-Horn	AV	0.0	38.8	54.0	-15.2	In Dock
5416.540	50.3	7.5	98.0	1.3	0.0	0.0	H-Horn	PK	0.0	57.8	74.0	-16.2	EUT horizontal, no dock
5416.540	49.8	7.5	347.0	1.9	0.0	0.0	H-Horn	PK	0.0	57.3	74.0	-16.7	EUT on side, no dock
2708.322	58.1	-1.3	89.0	1.2	0.0	0.0	V-Horn	PK	0.0	56.8	74.0	-17.2	EUT horizontal, no dock
5416.540	45.0	7.5	98.0	1.3	15.9	0.0	H-Horn	AV	0.0	36.6	54.0	-17.4	EUT horizontal, no dock
3611.060	53.1	2.2	69.0	1.3	0.0	0.0	H-Horn	PK	0.0	55.3	74.0	-18.7	EUT horizontal, no dock

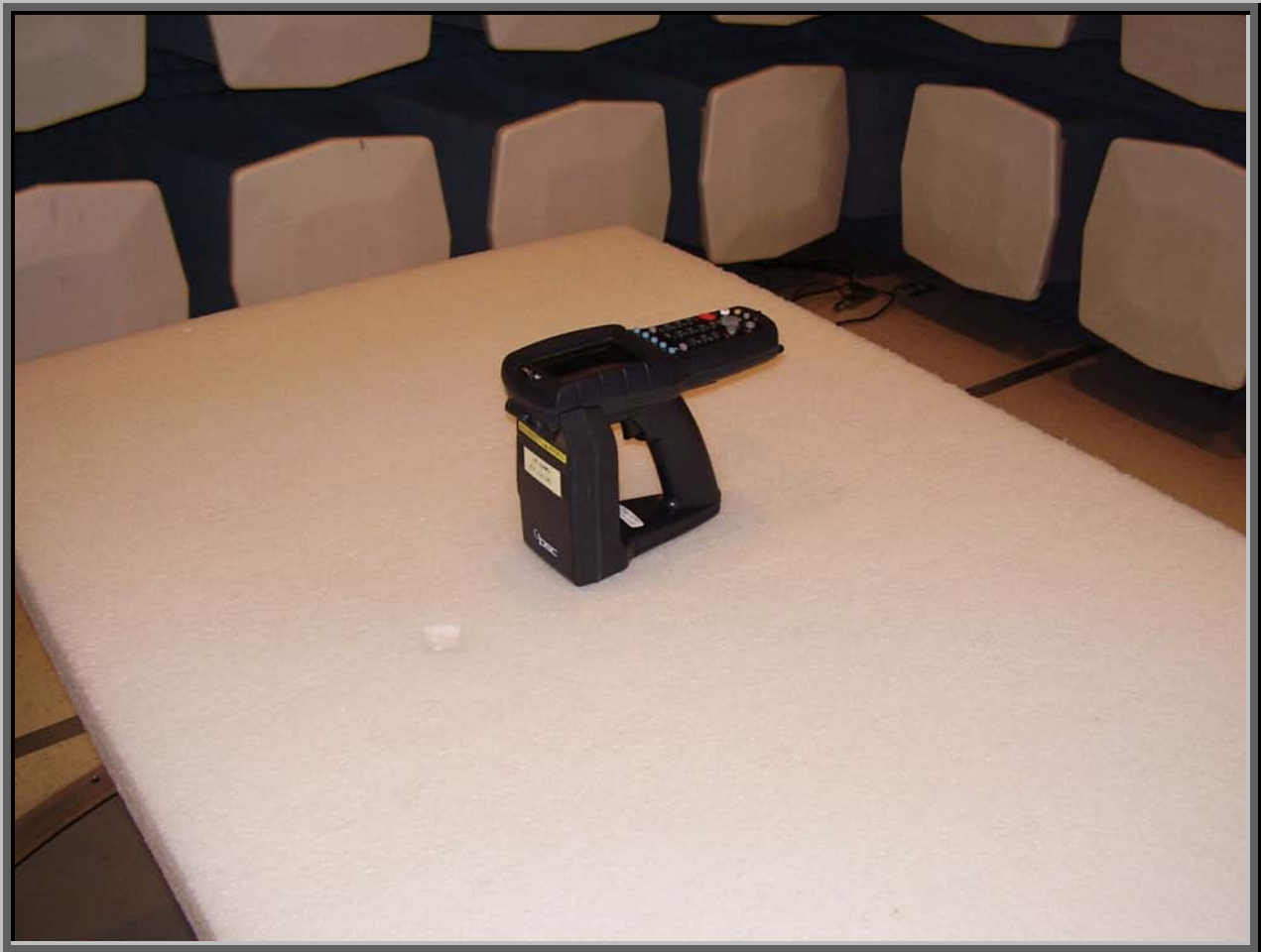
NORTHWEST		ACQ 2005.1.4	
EMC		RADIATED EMISSIONS DATA SHEET	
EUT: ST200		Work Order: PSCI0153	
Serial Number:		Date: 05/12/05	
Customer: PSC Inc.		Temperature: 24	
Attendees: Brian Kelly, Ron Burke		Humidity: 44%	
Cust. Ref. No.:		Barometric Pressure: 29.93	
Tested by: Rod Peloquin		Power: 120VAC/60Hz	
		Job Site: EV01	
TEST SPECIFICATIONS			
Specification: FCC 15.247(d) Spurious Radiated Emissions:2004		Method: ANSI C63.4:2003	
SAMPLE CALCULATIONS			
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation			
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator			
COMMENTS			
EUT in Falcon 5500			
EUT OPERATING MODES			
No hop, Mid channel			
DEVIATIONS FROM TEST STANDARD			
No deviations.			
RESULTS			Run #
Pass			5
Other		 Tested By:	
Duty cycle correction factor applied to average measurement is calculated from the dwell time of 16.05mS in a 100S period: 20Log(16.05/100)			



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
4573.801	61.3	4.9	215.0	1.1	15.9	0.0	H-Horn	AV	0.0	50.3	54.0	-3.7	EUT horizontal, no dock
4573.801	63.8	4.9	215.0	1.1	0.0	0.0	H-Horn	PK	0.0	68.7	74.0	-5.3	EUT horizontal, no dock
8233.096	49.8	13.4	76.0	1.2	15.9	0.0	H-Horn	AV	0.0	47.3	54.0	-6.7	EUT horizontal, no dock
7318.304	54.8	11.8	259.0	1.4	0.0	0.0	H-Horn	PK	0.0	66.6	74.0	-7.4	EUT horizontal, no dock
7318.304	50.3	11.8	259.0	1.4	15.9	0.0	H-Horn	AV	0.0	46.2	54.0	-7.8	EUT horizontal, no dock
8233.096	52.8	13.4	76.0	1.2	0.0	0.0	H-Horn	PK	0.0	66.2	74.0	-7.8	EUT horizontal, no dock
8233.096	48.6	13.4	329.0	1.3	15.9	0.0	V-Horn	AV	0.0	46.1	54.0	-7.9	EUT on side, no dock
8233.096	51.8	13.4	329.0	1.3	0.0	0.0	V-Horn	PK	0.0	65.2	74.0	-8.8	EUT on side, no dock
9147.819	45.9	17.1	67.0	1.3	0.0	0.0	H-Horn	PK	0.0	63.0	74.0	-11.0	EUT horizontal, no dock
4573.801	53.3	4.9	136.0	1.2	15.9	0.0	V-Horn	AV	0.0	42.3	54.0	-11.7	EUT on side, no dock
2744.347	63.3	-1.2	3.0	1.6	0.0	0.0	V-Horn	PK	0.0	62.1	74.0	-11.9	EUT on side, no dock
2744.347	63.0	-1.2	105.0	2.5	0.0	0.0	H-Horn	PK	0.0	61.8	74.0	-12.2	EUT horizontal, no dock
9147.819	44.7	17.1	165.0	1.2	0.0	0.0	V-Horn	PK	0.0	61.8	74.0	-12.2	EUT on side, no dock
4573.801	56.7	4.9	136.0	1.2	0.0	0.0	V-Horn	PK	0.0	61.6	74.0	-12.4	EUT on side, no dock
2744.347	58.7	-1.2	3.0	1.6	15.9	0.0	V-Horn	AV	0.0	41.6	54.0	-12.4	EUT on side, no dock
7318.304	49.8	11.8	162.0	1.5	0.0	0.0	V-Horn	PK	0.0	61.6	74.0	-12.4	EUT on side, no dock
2744.347	58.2	-1.2	105.0	2.5	15.9	0.0	H-Horn	AV	0.0	41.1	54.0	-12.9	EUT horizontal, no dock
9148.009	38.5	17.1	165.0	1.2	15.9	0.0	V-Horn	AV	0.0	39.7	54.0	-14.3	EUT on side, no dock
7318.304	43.5	11.8	162.0	1.5	15.9	0.0	V-Horn	AV	0.0	39.4	54.0	-14.6	EUT on side, no dock
3659.120	48.4	2.4	306.0	1.2	15.9	0.0	V-Horn	AV	0.0	34.9	54.0	-19.1	EUT on side, no dock

NORTHWEST		ACQ 2005.1.4											
EMI 2005.5.05													
EMC		RADIATED EMISSIONS DATA SHEET											
EUT: ST200		Work Order: PSCI0153											
Serial Number:		Date: 05/16/05											
Customer: PSC Inc.		Temperature: 24											
Attendees: Brian Kelly, Ron Burke		Humidity: 44%											
Cust. Ref. No.:		Barometric Pressure 29.93											
Tested by: Rod Peloquin		Power: 120VAC/60Hz											
Job Site: EV01													
TEST SPECIFICATIONS													
Specification: FCC 15.247(d) Spurious Radiated Emissions:2004		Method: ANSI C63.4:2003											
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
EUT in Falcon 5500													
EUT OPERATING MODES													
No hop, High channel													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS													
Pass		Run # 6											
Other													
Duty cycle correction factor applied to average measurement is calculated from the dwell time of 16.05mS in a 100S period: 20Log(16.05/100)		Tested By: 											
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
4636.443	63.4	5.2	177.0	1.2	15.9	0.0	V-Horn	AV	0.0	52.7	54.0	-1.3	EUT on side, no dock
4636.443	63.3	5.2	212.0	1.3	15.9	0.0	H-Horn	AV	0.0	52.6	54.0	-1.4	EUT horizontal, no dock
4636.443	66.7	5.2	212.0	1.3	0.0	0.0	H-Horn	PK	0.0	71.9	74.0	-2.1	EUT horizontal, no dock
4636.443	65.7	5.2	177.0	1.2	0.0	0.0	V-Horn	PK	0.0	70.9	74.0	-3.1	EUT on side, no dock
8345.577	49.2	13.9	262.0	1.3	15.9	0.0	H-Horn	AV	0.0	47.2	54.0	-6.8	EUT horizontal, no dock
8345.577	51.0	13.9	262.0	1.3	0.0	0.0	H-Horn	PK	0.0	64.9	74.0	-9.1	EUT horizontal, no dock
7418.280	50.3	12.0	246.0	1.5	0.0	0.0	H-Horn	PK	0.0	62.3	74.0	-11.7	EUT horizontal, no dock
8345.577	48.1	13.9	176.0	1.3	0.0	0.0	V-Horn	PK	0.0	62.0	74.0	-12.0	EUT on side, no dock
7418.280	45.7	12.0	246.0	1.5	15.9	0.0	H-Horn	AV	0.0	41.8	54.0	-12.2	EUT horizontal, no dock
7418.280	49.7	12.0	326.0	1.2	0.0	0.0	V-Horn	PK	0.0	61.7	74.0	-12.3	EUT on side, no dock
2782.040	61.6	-1.0	87.0	1.3	0.0	0.0	H-Horn	PK	0.0	60.6	74.0	-13.4	EUT horizontal, no dock
2781.908	56.8	-1.0	87.0	1.3	15.9	0.0	H-Horn	AV	0.0	39.9	54.0	-14.1	EUT horizontal, no dock
2782.040	59.8	-1.0	336.0	1.2	0.0	0.0	V-Horn	PK	0.0	58.8	74.0	-15.2	EUT on side, no dock
3709.073	51.4	2.7	6.0	1.3	15.9	0.0	H-Horn	AV	0.0	38.2	54.0	-15.8	EUT horizontal, no dock
7418.280	42.1	12.0	326.0	1.2	15.9	0.0	V-Horn	AV	0.0	38.2	54.0	-15.8	EUT on side, no dock
3709.073	54.7	2.7	6.0	1.3	0.0	0.0	H-Horn	PK	0.0	57.4	74.0	-16.6	EUT horizontal, no dock
2781.908	54.2	-1.0	336.0	1.2	15.9	0.0	V-Horn	AV	0.0	37.3	54.0	-16.7	EUT on side, no dock







Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	ST200.S19	Version	ST200_low.S19
			ST200_mid.S19
			ST200_high.S19
Description			
The system was tested using special software developed to place the radio in a no hop mode on the required channels during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT - ST200	PSC, Inc	ST200	Unknown
DC adapter	Phihong	PSA31U-120	I41400220A3
Host Portable Data Terminal	PSC, Inc	Falcon 5500	F405117059
1 Slot Dock	PSC, Inc.	7-0858	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.8	No	DC adapter	AC Mains
DC Leads	No	1.8	PA	DC adapter	1 Slot Dock
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

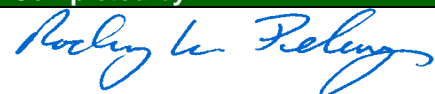
Measurement Equipment


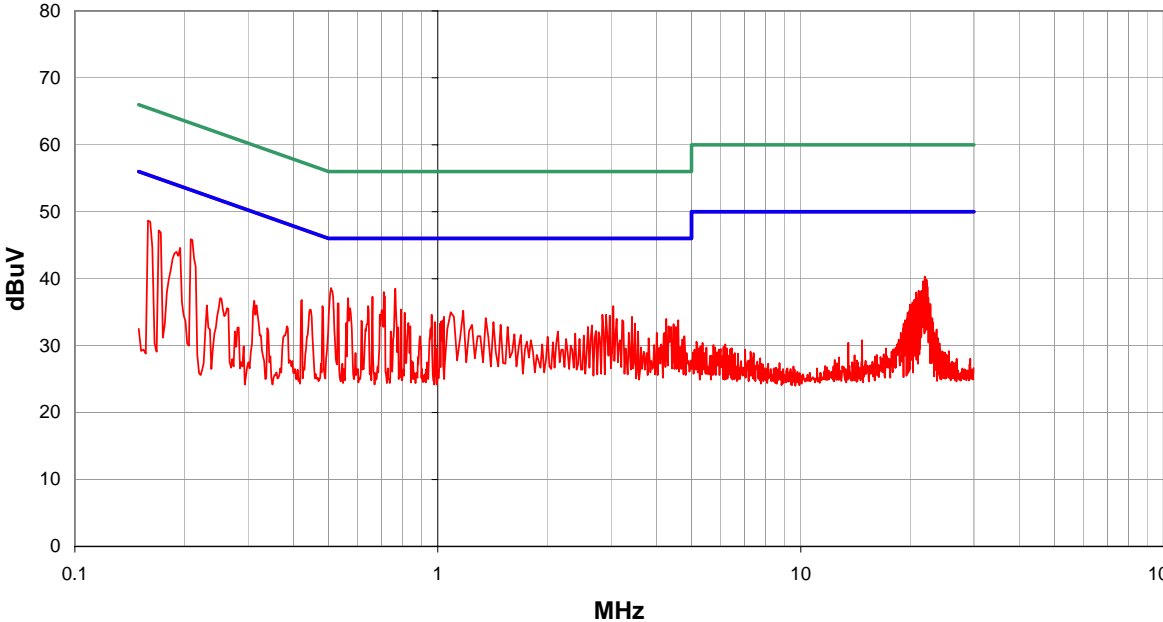
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8593E	AAN	12/15/2004	12 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	12/29/2004	13 mo
LISN	Solar	9252-50-R-24-BNC	LIP	12/29/2004	13 mo


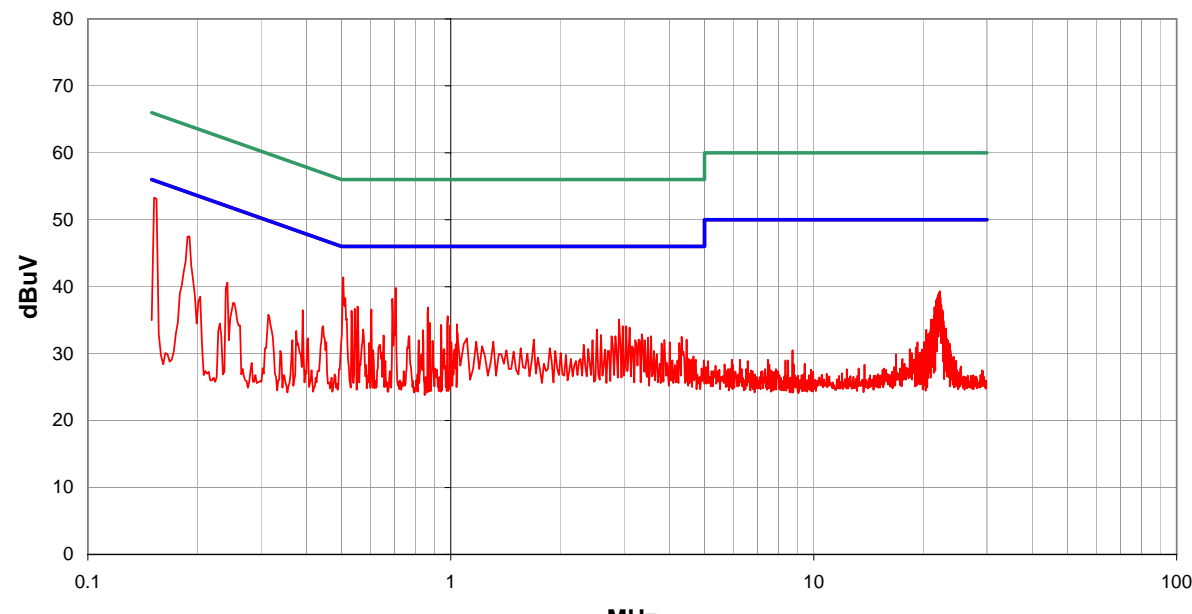
Test Description


Requirement: Per 47 15.207(d), if the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits of 15.207.

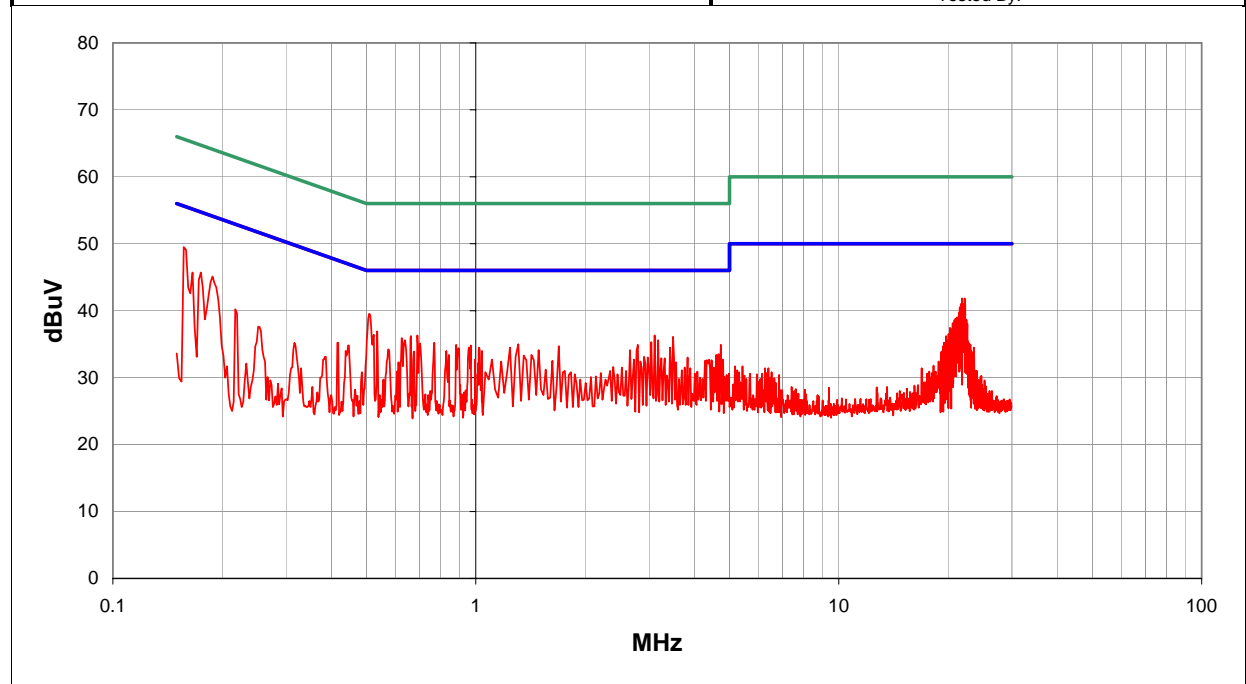
Configuration: The EUT will be powered from a device that could be connected to the AC power line. Therefore, the measurements were made on the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-1992.

Completed by:



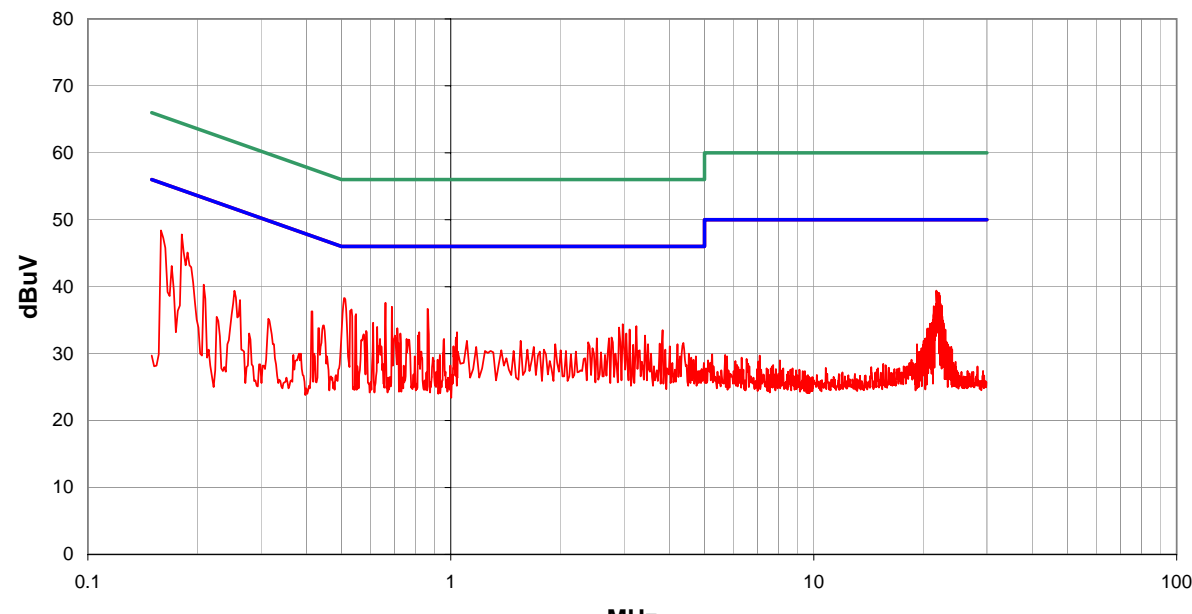
NORTHWEST		ACQ 2005.1.4									
EMI		EMI A2.13									
CONDUCTED EMISSIONS DATA SHEET											
EUT: ST200		Work Order: PSCI0153									
Serial Number:		Date: 05/03/05									
Customer: PSC Inc.		Temperature: 23									
Attendees: Jim Wagner, Ron Burke		Humidity: 44%									
Cust. Ref. No.:		Barometric Pressure: 30.09									
Tested by: Rod Peloquin		Power: 120VAC/60Hz									
		Job Site: EV10									
TEST SPECIFICATIONS											
Specification: FCC 15.107 Class B:2004		Method: ANSI C63.4:2003									
SAMPLE CALCULATIONS											
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation											
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator											
COMMENTS											
EUT in Falcon 5500 in dock											
EUT OPERATING MODES											
No hop, low channel											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS		Line	Run #								
Pass		L1	1								
Other											
		Tested By: 									
											
Freq (MHz)	Amplitude (dBuV)		Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.159	28.2		0.0	0.5	20.0				48.7	55.5	-6.8
0.209	25.4		0.0	0.5	20.0				45.9	53.3	-7.4
0.508	18.1		0.0	0.5	20.0				38.6	46.0	-7.4
0.764	18.0		0.0	0.5	20.0				38.5	46.0	-7.5
0.170	26.7		0.0	0.5	20.0				47.2	54.9	-7.7
0.710	17.5		0.0	0.5	20.0				38.0	46.0	-8.0
0.661	16.8		0.0	0.5	20.0				37.3	46.0	-8.7
0.566	16.6		0.0	0.5	20.0				37.1	46.0	-8.9
0.195	24.1		0.0	0.5	20.0				44.6	53.8	-9.2
21.970	19.4		0.0	0.9	20.0				40.3	50.0	-9.7
0.530	15.8		0.0	0.5	20.0				36.3	46.0	-9.7
0.643	15.4		0.0	0.5	20.0				35.9	46.0	-10.1
3.044	15.4		0.0	0.5	20.0				35.9	46.0	-10.1
22.218	18.9		0.0	0.9	20.0				39.8	50.0	-10.2
22.025	18.7		0.0	0.9	20.0				39.6	50.0	-10.4
21.695	18.7		0.0	0.9	20.0				39.6	50.0	-10.4
0.481	15.4		0.0	0.5	20.0				35.9	46.3	-10.4
0.791	14.9		0.0	0.5	20.0				35.4	46.0	-10.6
0.422	16.3		0.0	0.5	20.0				36.8	47.4	-10.6


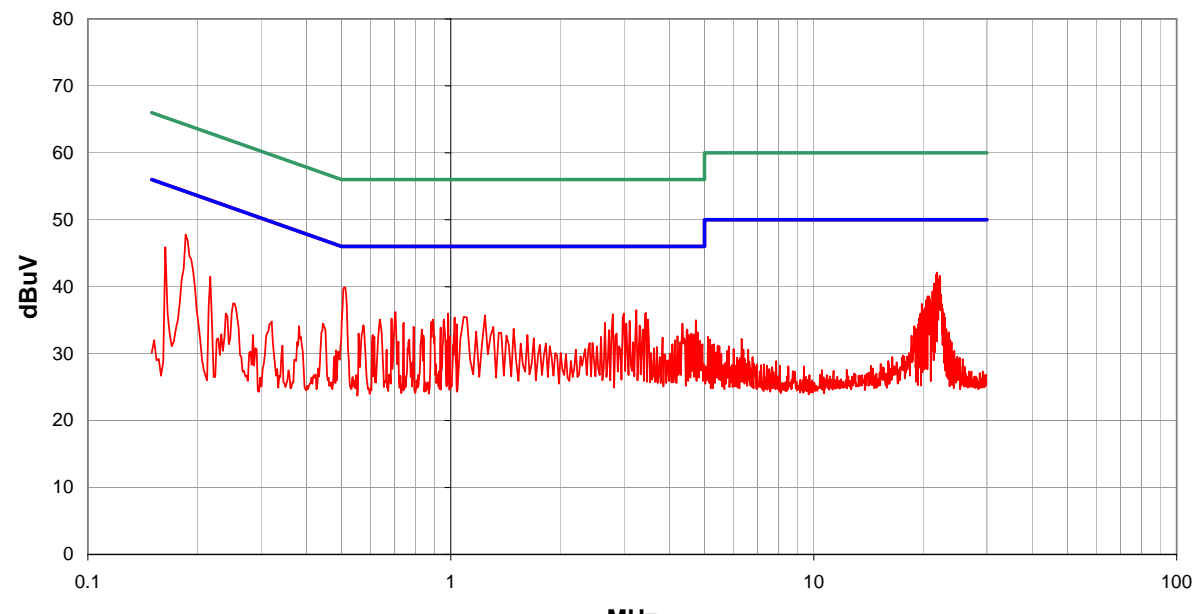
NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				ACQ 2005.1.4 EMI A2.13						
EUT: ST200		Work Order: PSCI0153										
Serial Number:		Date: 05/03/05										
Customer: PSC Inc.		Temperature: 23										
Attendees: Jim Wagner, Ron Burke		Humidity: 44%										
Cust. Ref. No.:		Barometric Pressure: 30.09										
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV10								
TEST SPECIFICATIONS												
Specification: FCC 15.107 Class B:2004				Method: ANSI C63.4:2003								
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
EUT in Falcon 5500 in dock												
EUT OPERATING MODES												
No hop, low channel												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS				Line		Run #						
Pass				N		2						
Other				 Tested By:								
												
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.152	32.8			0.0	0.5	20.0				53.3	55.9	-2.6
0.505	20.9			0.0	0.5	20.0				41.4	46.0	-4.6
0.703	19.3			0.0	0.5	20.0				39.8	46.0	-6.2
0.188	27.0			0.0	0.5	20.0				47.5	54.1	-6.6
0.690	17.7			0.0	0.5	20.0				38.2	46.0	-7.8
0.553	16.5			0.0	0.5	20.0				37.0	46.0	-9.0
0.866	16.4			0.0	0.5	20.0				36.9	46.0	-9.1
0.544	16.2			0.0	0.5	20.0				36.7	46.0	-9.3
0.604	16.1			0.0	0.5	20.0				36.6	46.0	-9.4
0.532	15.9			0.0	0.5	20.0				36.4	46.0	-9.6
0.980	15.1			0.0	0.5	20.0				35.6	46.0	-10.4
22.273	18.4			0.0	0.9	20.0				39.3	50.0	-10.7
22.163	18.2			0.0	0.9	20.0				39.1	50.0	-10.9
2.909	14.6			0.0	0.5	20.0				35.1	46.0	-10.9
22.080	18.0			0.0	0.9	20.0				38.9	50.0	-11.1
22.025	17.8			0.0	0.9	20.0				38.7	50.0	-11.3
21.970	17.7			0.0	0.9	20.0				38.6	50.0	-11.4
0.875	14.1			0.0	0.5	20.0				34.6	46.0	-11.4
0.242	20.1			0.0	0.5	20.0				40.6	52.0	-11.4


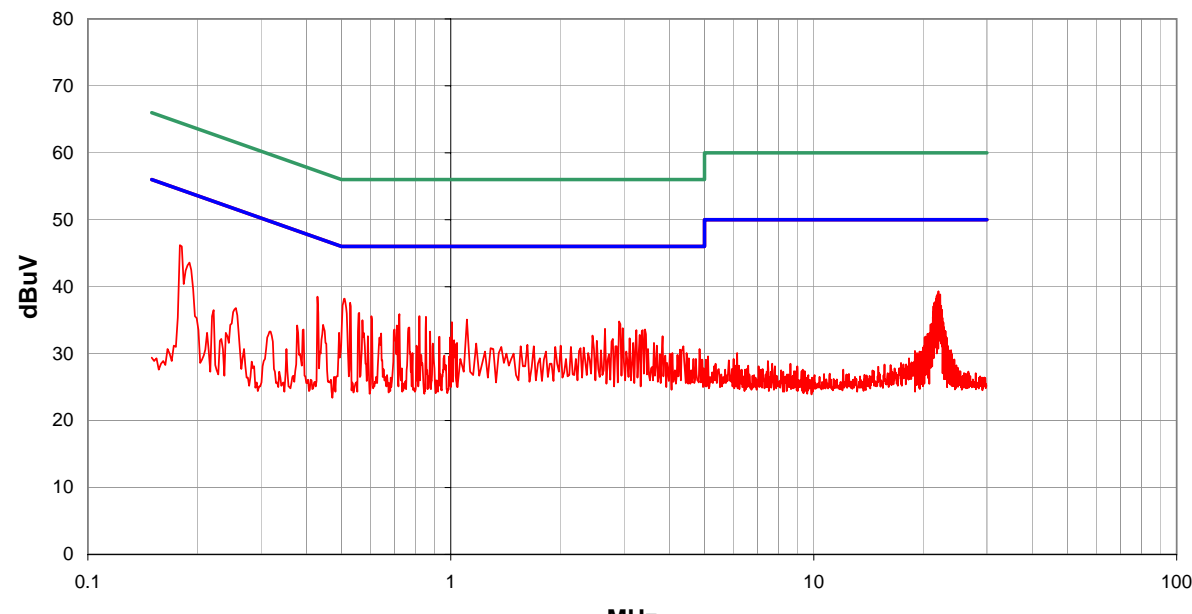
NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		ACQ 2005.1.4 EMI A2.13	
EUT: ST200		Work Order: PSCI0153			
Serial Number:		Date: 05/03/05			
Customer: PSC Inc.		Temperature: 23			
Attendees: Jim Wagner, Ron Burke		Humidity: 44%			
Cust. Ref. No.:		Barometric Pressure: 30.09			
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV10	
TEST SPECIFICATIONS					
Specification: FCC 15.107 Class B:2004		Method: ANSI C63.4:2003			
SAMPLE CALCULATIONS					
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation					
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator					
COMMENTS					
EUT in Falcon 5500 in dock					
EUT OPERATING MODES					
No hop, mid channel					
DEVIATIONS FROM TEST STANDARD					
No deviations.					
RESULTS		Line		Run #	
Pass		L1		3	
Other		 Tested By:			



Freq (MHz)	Amplitude (dBuV)		Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.157	29.0		0.0	0.5	20.0				49.5	55.6	-6.1
0.508	19.0		0.0	0.5	20.0				39.5	46.0	-6.5
22.245	20.9		0.0	0.9	20.0				41.8	50.0	-8.2
21.860	20.9		0.0	0.9	20.0				41.8	50.0	-8.2
21.970	20.1		0.0	0.9	20.0				41.0	50.0	-9.0
21.723	20.1		0.0	0.9	20.0				41.0	50.0	-9.0
0.188	24.6		0.0	0.5	20.0				45.1	54.1	-9.0
0.175	25.2		0.0	0.5	20.0				45.7	54.7	-9.0
22.300	20.0		0.0	0.9	20.0				40.9	50.0	-9.1
22.108	20.0		0.0	0.9	20.0				40.9	50.0	-9.1
0.535	16.4		0.0	0.5	20.0				36.9	46.0	-9.1
0.166	25.2		0.0	0.5	20.0				45.7	55.2	-9.5
21.558	19.6		0.0	0.9	20.0				40.5	50.0	-9.5
0.690	15.8		0.0	0.5	20.0				36.3	46.0	-9.7
3.111	15.8		0.0	0.5	20.0				36.3	46.0	-9.7
0.663	15.7		0.0	0.5	20.0				36.2	46.0	-9.8
3.494	15.6		0.0	0.5	20.0				36.1	46.0	-9.9
21.915	19.0		0.0	0.9	20.0				39.9	50.0	-10.1
0.625	15.4		0.0	0.5	20.0				35.9	46.0	-10.1

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		ACQ 2005.1.4 EMI A2.13								
EUT: ST200		Work Order: PSCI0153										
Serial Number:		Date: 05/03/05										
Customer: PSC Inc.		Temperature: 23										
Attendees: Jim Wagner, Ron Burke		Humidity: 44%										
Cust. Ref. No.:		Barometric Pressure: 30.09										
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV10								
TEST SPECIFICATIONS												
Specification: FCC 15.107 Class B:2004		Method: ANSI C63.4:2003										
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
EUT in Falcon 5500 in dock												
EUT OPERATING MODES												
No hop, mid channel												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS		Line		Run #								
Pass		N		4								
Other		 Tested By:										
												
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.182	27.3			0.0	0.5	20.0				47.8	54.4	-6.6
0.159	27.9			0.0	0.5	20.0				48.4	55.5	-7.1
0.508	17.8			0.0	0.5	20.0				38.3	46.0	-7.7
0.661	17.1			0.0	0.5	20.0				37.6	46.0	-8.4
0.688	16.5			0.0	0.5	20.0				37.0	46.0	-9.0
0.863	16.2			0.0	0.5	20.0				36.7	46.0	-9.3
0.532	16.1			0.0	0.5	20.0				36.6	46.0	-9.4
0.548	15.4			0.0	0.5	20.0				35.9	46.0	-10.1
21.778	18.5			0.0	0.9	20.0				39.4	50.0	-10.6
22.163	18.1			0.0	0.9	20.0				39.0	50.0	-11.0
22.108	18.1			0.0	0.9	20.0				39.0	50.0	-11.0
22.053	18.1			0.0	0.9	20.0				39.0	50.0	-11.0
0.413	15.8			0.0	0.5	20.0				36.3	47.6	-11.3
0.611	14.1			0.0	0.5	20.0				34.6	46.0	-11.4
2.976	13.9			0.0	0.5	20.0				34.4	46.0	-11.6
0.170	22.6			0.0	0.5	20.0				43.1	54.9	-11.8
21.915	17.2			0.0	0.9	20.0				38.1	50.0	-11.9
3.246	13.6			0.0	0.5	20.0				34.1	46.0	-11.9
0.627	13.5			0.0	0.5	20.0				34.0	46.0	-12.0

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		ACQ 2005.1.4 EMI A2.13							
EUT: ST200		Work Order: PSCI0153									
Serial Number:		Date: 05/03/05									
Customer: PSC Inc.		Temperature: 23									
Attendees: Jim Wagner, Ron Burke		Humidity: 44%									
Cust. Ref. No.:		Barometric Pressure: 30.09									
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV10							
TEST SPECIFICATIONS											
Specification: FCC 15.107 Class B:2004			Method: ANSI C63.4:2003								
SAMPLE CALCULATIONS											
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation											
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator											
COMMENTS											
EUT in Falcon 5500 in dock											
EUT OPERATING MODES											
No hop, high channel											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS											
Pass		Line L1		Run # 5							
Other		 Tested By:									
											
Freq (MHz)	Amplitude (dBuV)		Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.508	19.4		0.0	0.5	20.0				39.9	46.0	-6.1
0.186	27.3		0.0	0.5	20.0				47.8	54.2	-6.4
21.888	21.2		0.0	0.9	20.0				42.1	50.0	-7.9
21.723	20.9		0.0	0.9	20.0				41.8	50.0	-8.2
22.245	20.7		0.0	0.9	20.0				41.6	50.0	-8.4
22.053	20.2		0.0	0.9	20.0				41.1	50.0	-8.9
0.164	25.4		0.0	0.5	20.0				45.9	55.3	-9.4
21.475	19.6		0.0	0.9	20.0				40.5	50.0	-9.5
3.246	16.0		0.0	0.5	20.0				36.5	46.0	-9.5
0.703	15.7		0.0	0.5	20.0				36.2	46.0	-9.8
21.558	19.2		0.0	0.9	20.0				40.1	50.0	-9.9
3.449	15.6		0.0	0.5	20.0				36.1	46.0	-9.9
21.613	19.1		0.0	0.9	20.0				40.0	50.0	-10.0
0.983	15.5		0.0	0.5	20.0				36.0	46.0	-10.0
2.999	15.5		0.0	0.5	20.0				36.0	46.0	-10.0
2.796	15.4		0.0	0.5	20.0				35.9	46.0	-10.1
21.998	18.9		0.0	0.9	20.0				39.8	50.0	-10.2
1.243	15.2		0.0	0.5	20.0				35.7	46.0	-10.3
1.085	15.0		0.0	0.5	20.0				35.5	46.0	-10.5

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		ACQ 2005.1.4 EMI A2.13							
EUT: ST200		Work Order: PSCI0153									
Serial Number:		Date: 05/03/05									
Customer: PSC Inc.		Temperature: 23									
Attendees: Jim Wagner, Ron Burke		Humidity: 44%									
Cust. Ref. No.:		Barometric Pressure: 30.09									
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV10							
TEST SPECIFICATIONS											
Specification: FCC 15.107 Class B:2004		Method: ANSI C63.4:2003									
SAMPLE CALCULATIONS											
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation											
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator											
COMMENTS											
EUT in Falcon 5500 in dock											
EUT OPERATING MODES											
No hop, high channel											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS		Line		Run #							
Pass		N		6							
Other		 Tested By:									
											
Freq (MHz)	Amplitude (dBuV)		Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.508	17.7		0.0	0.5	20.0				38.2	46.0	-7.8
0.179	25.7		0.0	0.5	20.0				46.2	54.5	-8.3
0.528	17.1		0.0	0.5	20.0				37.6	46.0	-8.4
0.429	18.0		0.0	0.5	20.0				38.5	47.3	-8.8
0.559	15.6		0.0	0.5	20.0				36.1	46.0	-9.9
0.722	15.4		0.0	0.5	20.0				35.9	46.0	-10.1
0.604	15.1		0.0	0.5	20.0				35.6	46.0	-10.4
0.818	15.1		0.0	0.5	20.0				35.6	46.0	-10.4
0.191	23.1		0.0	0.5	20.0				43.6	54.0	-10.4
0.854	15.0		0.0	0.5	20.0				35.5	46.0	-10.5
22.053	18.4		0.0	0.9	20.0				39.3	50.0	-10.7
1.108	14.6		0.0	0.5	20.0				35.1	46.0	-10.9
0.571	14.5		0.0	0.5	20.0				35.0	46.0	-11.0
21.998	18.0		0.0	0.9	20.0				38.9	50.0	-11.1
21.943	18.0		0.0	0.9	20.0				38.9	50.0	-11.1
22.300	17.9		0.0	0.9	20.0				38.8	50.0	-11.2
2.909	14.3		0.0	0.5	20.0				34.8	46.0	-11.2
22.190	17.8		0.0	0.9	20.0				38.7	50.0	-11.3
1.007	14.2		0.0	0.5	20.0				34.7	46.0	-11.3



