Preco, Inc.

WB PreView

July 24, 2006

Report No. PRCO0034

Report Prepared By

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

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

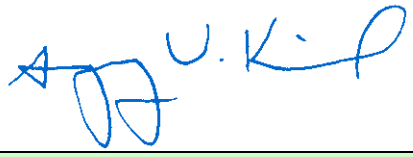
Certificate of Test

Issue Date: July 24, 2006
Preco, Inc.
Model: WB PreView

Emissions				
Test Description	**Specification**	**Test Method**	**Pass**	**Fail**
Effective Radiated Power	FCC 15.250:2006	FCC 02-48, KDB No. 393764	☒	☐
Occupied Bandwidth	FCC 15.250:2006	FCC 02-48, KDB No. 393764	☒	☐
Frequency Stability	FCC 15.250:2006	FCC 02-48, KDB No. 393764	☒	☐
Spurious Radiated Emissions	FCC 15.209:2006	ANSI C63.4:2003	☒	☐
Spurious Radiated Emissions	FCC 15.250:2006	FCC 02-48, KDB No. 393764	☒	☐

Modifications made to the product
See the Modifications section of this report

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
00	None		

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

NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 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.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0

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

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

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

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

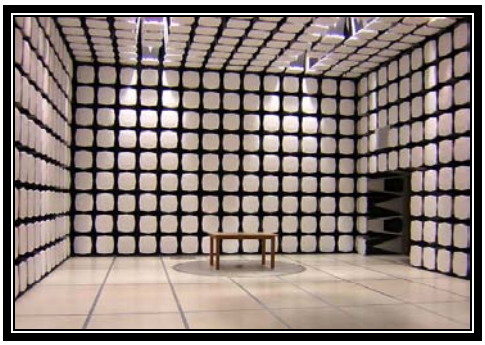
VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, and R-2318, Irvine: C-2094 and R-1943, 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

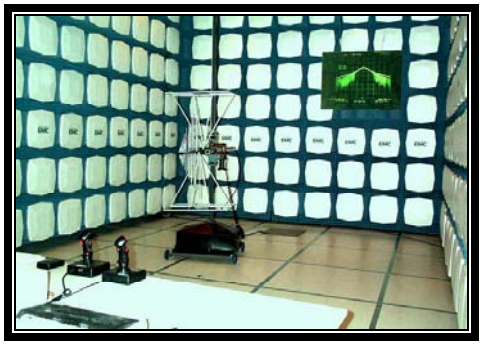
SCOPE

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



California – Orange County Facility
Labs OC01 – OC13

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



Oregon – Evergreen Facility
Labs EV01 – EV11

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

Washington – Sultan Facility
Labs SU01 – SU07

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

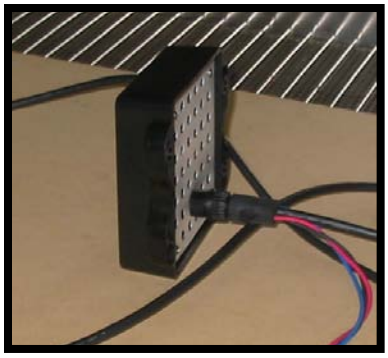
Party Requesting the Test	
Company Name:	Preco, Inc.
Address:	415 N. Maple Grove
City, State, Zip:	Boise, ID 83704-8241
Test Requested By:	John Fadgen
Model:	WB PreView
First Date of Test:	7/12/2006
Last Date of Test:	7/13/2006
Receipt Date of Samples:	7/12/2006
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Detection System

Testing Objective:
To meet the requirements for FCC Part 15.

EUT Photo



CONFIGURATION 1 PRCO0034

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
EUT - Vehicle Indication System	Preco, Inc.	WB Preview	10

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Topward Electric Instrument Co. Ltd.	TPS 2000	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8m	No	EUT Display	DC Power Supply
Sensor Lead	PA	1.8m	PA	EUT Display	EUT Sensor
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 PRCO0034

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
EUT - Vehicle Indication System	Preco, Inc.	WB Preview	10

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Topward Electric Instrument Co. Ltd.	TPS 2000	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	No	1.8m	No	EUT Display	DC Power Supply
Sensor Lead	PA	3.0m	PA	EUT Display	EUT Sensor
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	7/12/2006	EIRP of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	7/12/2006	Field Strength of Spurious Emissions below 960 MHz	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	7/12/2006	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	7/13/2006	EIRP of Spurious Emissions above 960 MHz	Modified from delivered configuration. Initial or No Modification	Added chip ferrites to EUT. Modification done by Brian Bandhauer.	EUT remained at Northwest EMC following the test.
5	7/13/2006	Occupied Bandwidth (-10dB)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	7/13/2006	Freqency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

EIRP of the FUNDAMENTAL

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

MODES OF OPERATION

Standard operating mode.

POWER SETTINGS INVESTIGATED

12V DC

FREQUENCY RANGE INVESTIGATED

Start Frequency	5925 MHz	Stop Frequency	7250 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
EV01 cables g,h,j			EVB	3/30/2006	13
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	8/2/2005	13
Antenna, Horn	EMCO	3115	AHC	8/30/2005	12

MEASUREMENT BANDWIDTHS

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.

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and/or receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003).

The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a horn antenna. A signal generator was connected to the horn antenna and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the cable loss to the dipole antenna and its gain (dBi); the effective radiated power for each radiated spurious emission was determined.

There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs and this 50 MHz bandwidth must be contained within the 5925-7250 MHz band. The peak EIRP limit is 20 log (RBW/50) dBm where RBW is the resolution bandwidth in megahertz that is employed by the measurement instrument.

An 8MHz RBW and 3MHz VBW were used for the measurement. The corresponding limit for these bandwidths is -16.0dBm.

NORTHWEST EMC

EIRP of the FUNDAMENTAL

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/12/06
Customer:	Preco, Inc.			Temperature:	23
Attendees:	Brian Bandhauer			Humidity:	42%
Project:	None			Barometric Pres.:	29.97
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250:2006	FCC 02-48, KDB No. 393764

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

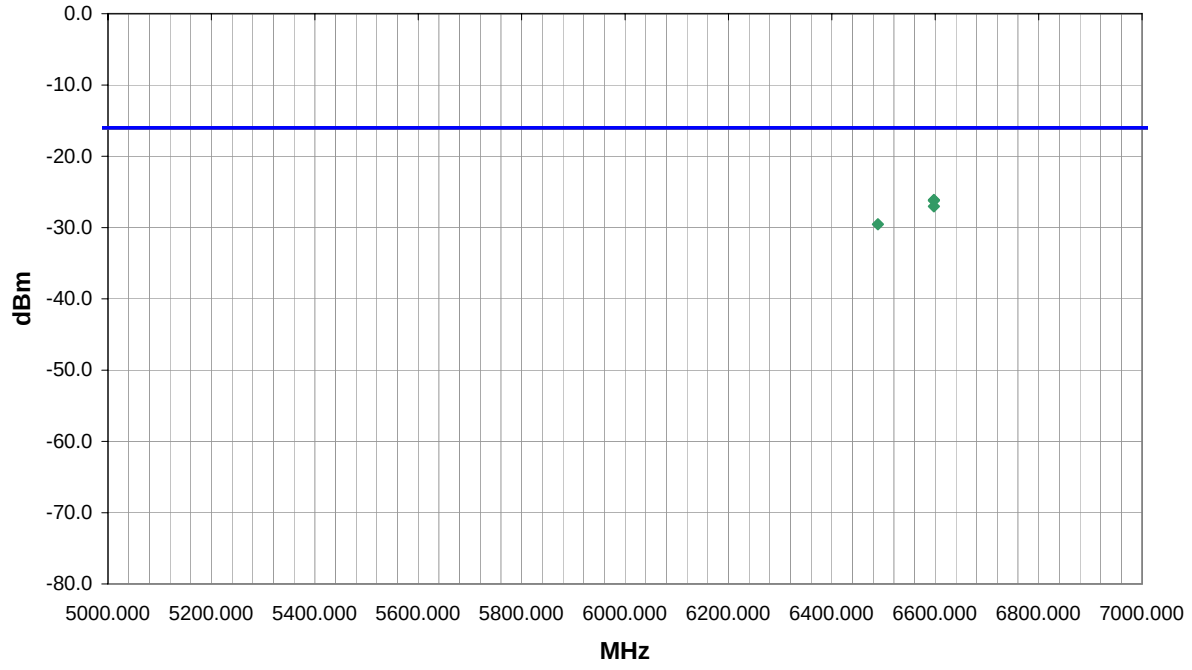
EUT OPERATING MODES

Standard operating mode.

DEVIATIONS FROM TEST STANDARD

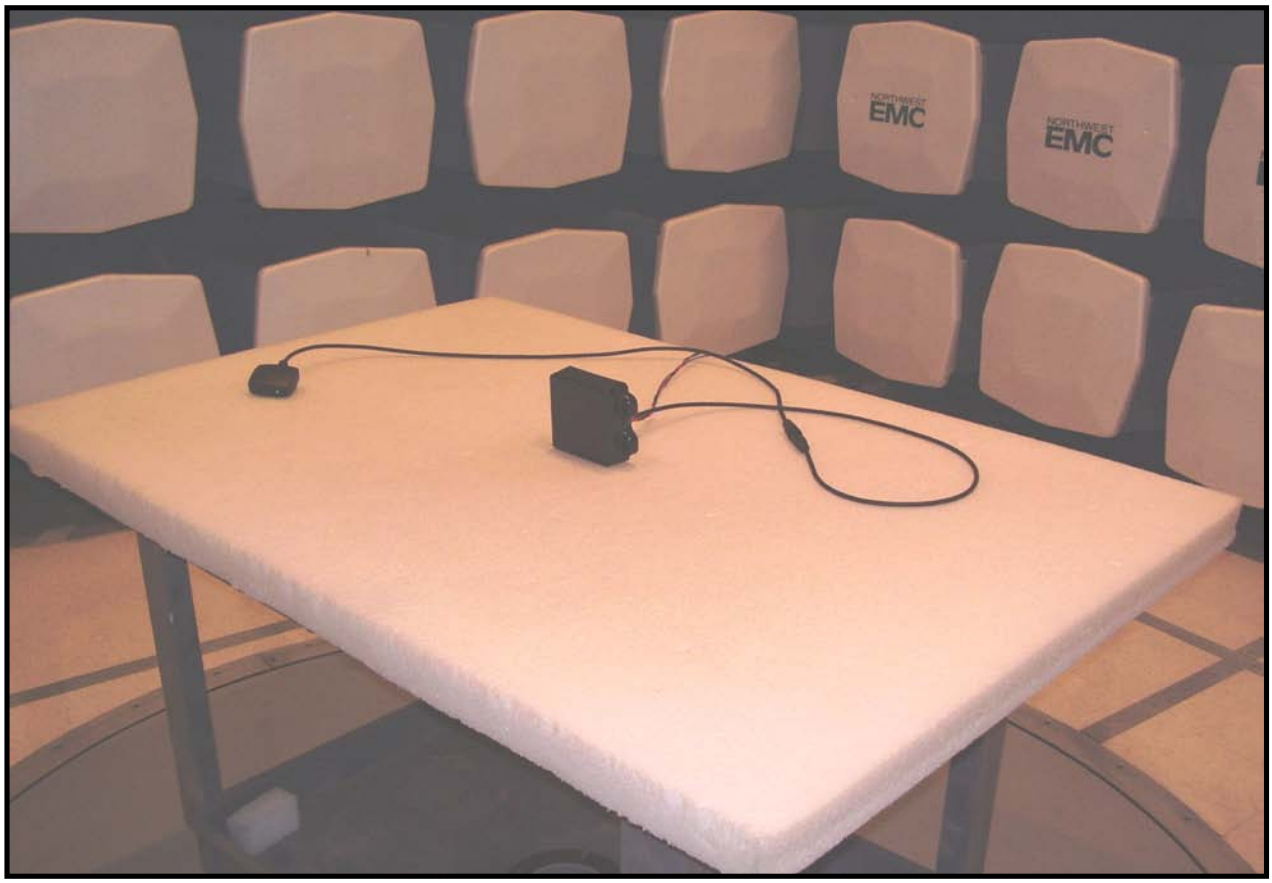
No deviations.

Run #	1		
Configuration #	1		
Results	Pass	NVLAP Lab Code 200630-0	Signature

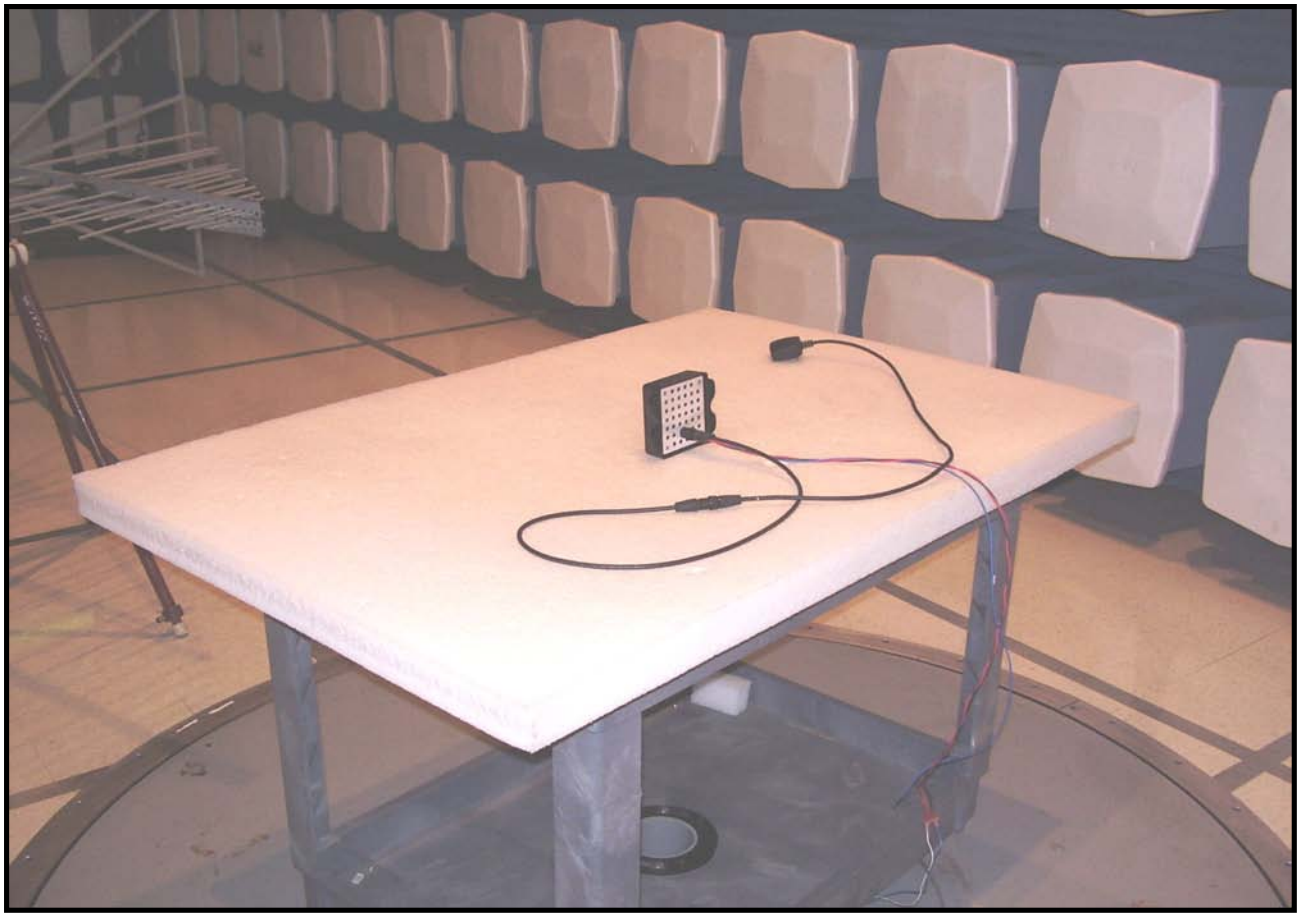


Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
6597.389			327.0	1.0			H-Horn	PK	2.44E-06	-26.1	-16.0	-10.1
6597.389			335.0	1.0			H-Horn	PK	2.38E-06	-26.2	-16.0	-10.2
6597.389			334.0	1.1			H-Horn	PK	1.98E-06	-27.0	-16.0	-11.0
6489.100			6.0	1.0			H-Horn	PK	1.11E-06	-29.5	-16.0	-13.5

EIRP of the FUNDAMENTAL



EIRP of the FUNDAMENTAL



FREQUENCY STABILITY

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	TBA	8/24/2005	12
Spectrum Analyzer	Hewlett-Packard	8593E	AAN	1/25/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The frequency stability was measured with the EUT in typical operating mode. 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. Measurements were made at normal and extreme conditions.

NORTHWEST EMC

FREQUENCY STABILITY DATASHEET

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/12/06
Customer:	Preco, Inc.			Temperature:	23
Attendees:	Brian Bandhauer			Humidity:	42%
Project:				Barometric Pres.:	29.97
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV06/EV09

TEST SPECIFICATIONS	Test Method
FCC 15.250:2006	FCC 02-48, KDB No. 393764

REQUIREMENTS

The -10dB bandwidth must be contained within 5925-7250MHz.

EUT OPERATING MODES

Standard operating mode.

DEVIATIONS FROM TEST STANDARD

No deviations.

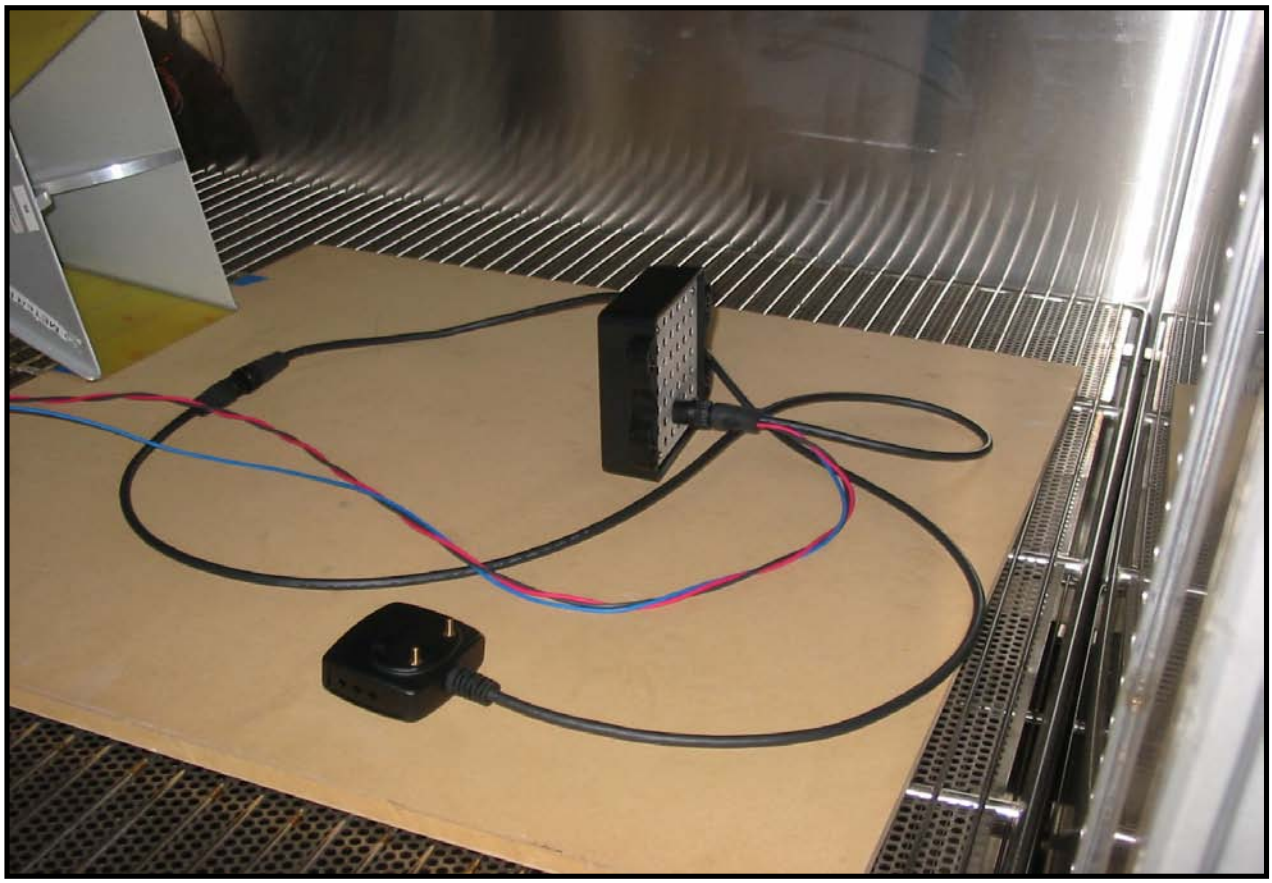
Configuration #	1		
Results	Pass	NVLAP Lab Code 200630-0	*Signature*

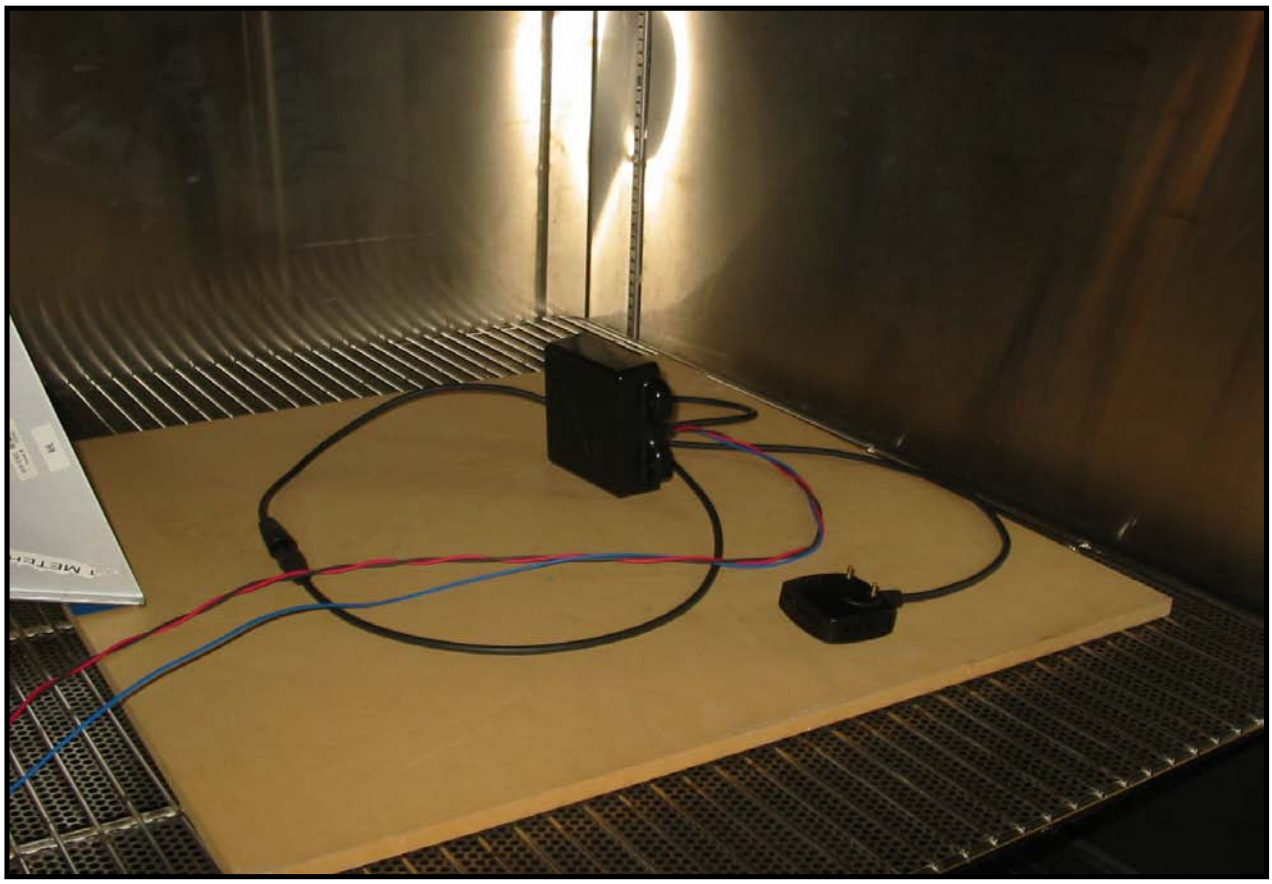
Frequency Stability with Variation of Ambient Temperature (Primary Supply = 48 Vdc)

Temp (°C)	Peak Amplitude (dB)	Low edge -10dB (MHz)	High edge -10dB (MHz)
-30	-40.100000	6105.000000	6752.000000
-20	-40.100000	6105.000000	6751.000000
-10	-39.700000	6104.000000	6750.000000
0	-39.800000	6101.000000	6727.000000
10	-40.000000	6098.000000	6727.000000
20	-39.800000	6097.000000	6727.000000
30	-40.000000	6096.000000	6726.000000
40	-39.800000	6095.000000	6725.000000
50	-39.300000	6099.000000	6716.000000

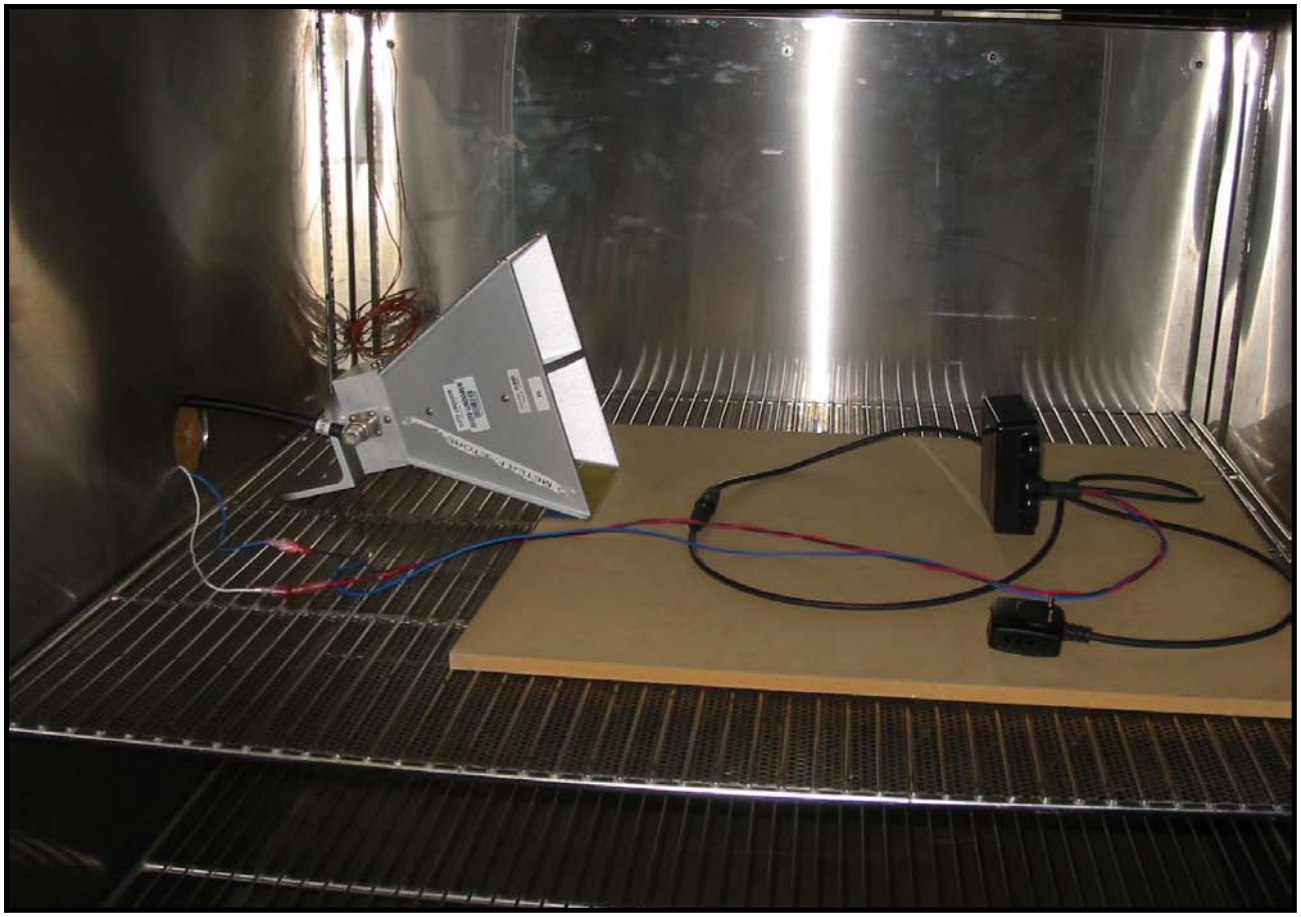
Frequency Stability with Variation of Primary Supply Voltage (Ambient Temperature = 20°C)

Voltage (Vdc)	Peak Amplitude (dB)	Low edge -10dB (MHz)	High edge -10dB (MHz)
13.8 (115%)	-39.400000	6103.000000	6720.000000
13.2 (110%)	-39.300000	6103.000000	6720.000000
12.6 (105%)	-39.300000	6103.000000	6723.000000
12 (100%)	-39.300000	6103.000000	6723.000000
11.4 (95%)	-39.500000	6102.000000	6722.000000
10.8 (90%)	-39.500000	6102.000000	6722.000000
10.2 (85%)	-39.500000	6101.000000	6722.000000





FREQUENCY STABILITY



OCCUPIED BANDWIDTH

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	TBA	8/24/2005	12
Spectrum Analyzer	Hewlett-Packard	8593E	AAN	1/25/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT in typical operating mode. 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.

NORTHWEST EMC

OCCUPIED BANDWIDTH DATASHEET

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/12/06
Customer:	Preco, Inc.			Temperature:	23
Attendees:	Brian Bandhauer			Humidity:	42%
Project:				Barometric Pres.:	29.97
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV06/EV09

TEST SPECIFICATIONS	Test Method
FCC 15.250:2006	FCC 02-48, KDB No. 393764

REQUIREMENTS

The -10dB bandwidth must be greater than or equal to 50MHz.

COMMENTS

-10dB bandwidth is greater than 600MHz.

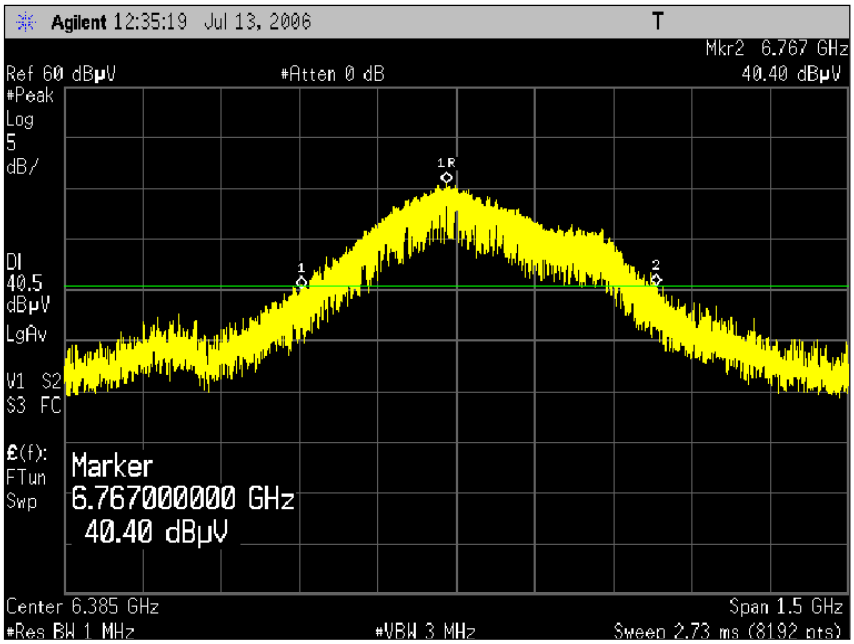
EUT OPERATING MODES

Standard operating mode.

DEVIATIONS FROM TEST STANDARD

No deviations.

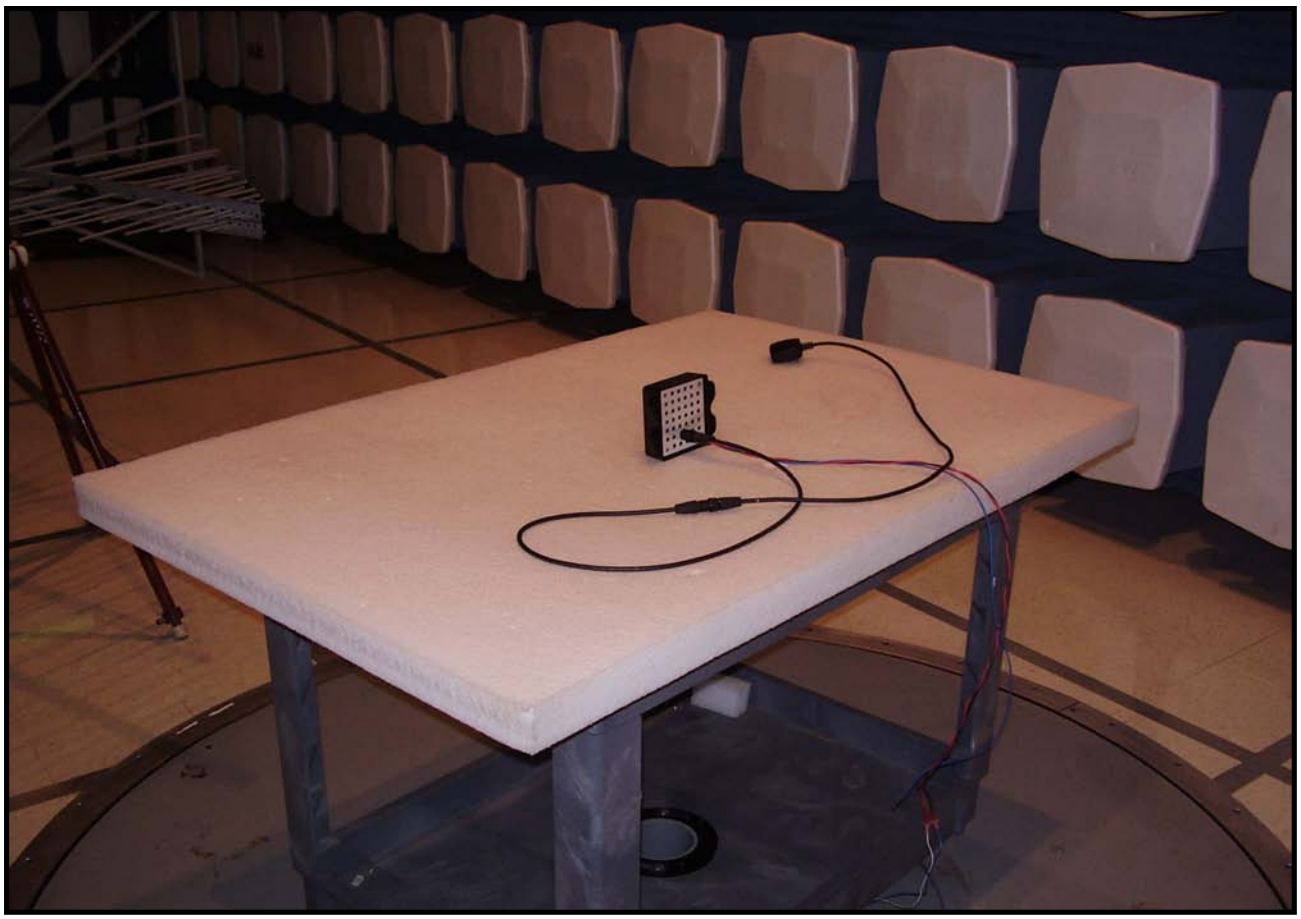
Configuration #	1		
Results	Pass	NVLAP Lab Code 200630-0	*Signature*




NORTHWEST
EMC
NORTHWEST
EMC


NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC

OCCUPIED BANDWIDTH



EIRP OF SPURIOUS EMISSIONS (above 960MHz)

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

MODES OF OPERATION

Standard operating mode.

POWER SETTINGS INVESTIGATED

12V DC

FREQUENCY RANGE INVESTIGATED

Start Frequency	960 MHz	Stop Frequency	40 GHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Pre-Amplifier	Miteq	JS4-26004000-50-5A	AON	3/29/2006	13
Pre-Amplifier	Miteq	JS4-26004000-40-8P	APV	3/29/2006	13
EV01 cable B			EVE	3/30/2006	13
Antenna, Horn	EMCO	3160-10	AHI	NCR	0
EV01 Cable D			EVD	3/30/2006	13
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	3/23/2006	13
Antenna, Horn	EMCO	3160-09	AHG	NCR	0
EV01 cables g,h,I			EVF	4/17/2006	13
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	5/12/2006	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
EV01 cables g,h,j			EVB	3/30/2006	13
EV01 cables c,g, h			EVA	3/30/2006	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	8/2/2005	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	1/4/2006	13
Antenna, Horn	EMCO	3115	AHC	8/30/2005	12
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12

MEASUREMENT BANDWIDTHS

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.

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and/or receiving while in standard operating mode. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003).

The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a horn antenna. A signal generator was connected to the horn antenna and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the cable loss to the dipole antenna and its gain (dBi); the effective radiated power for each radiated spurious emission was determined.

NORTHWEST EMC

EIRP OF SPURIOUS EMISSIONS (above 960MHz)

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/13/06
Customer:	Preco, Inc.			Temperature:	24 degrees C
Attendees:	Brian Bandhauer			Humidity:	41%
Project:				Barometric Pres.:	30.01
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250:2006	FCC 02-48, KDB No. 393764

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	0.5

COMMENTS

EUT OPERATING MODES

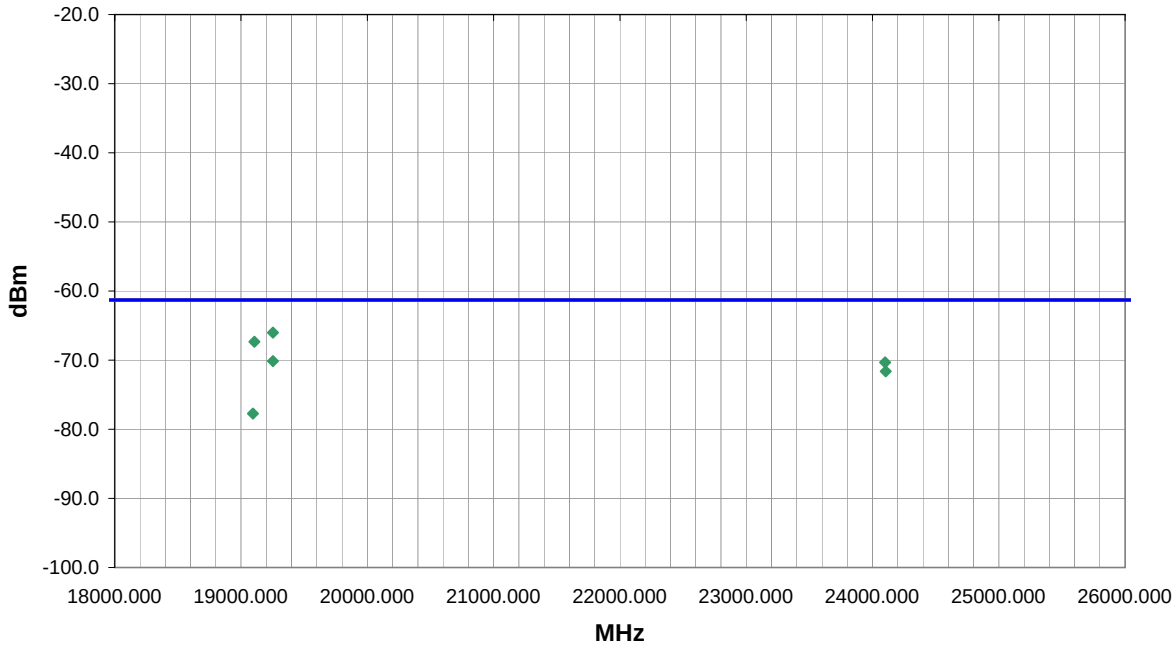
Standard operating mode.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
19252.610			25.0	1.0			V-High Horn	AV		-66.0	-61.3	-4.7
19106.560			29.0	1.0			V-High Horn	AV		-67.3	-61.3	-6.0
19253.210			319.0	1.0			H-High Horn	AV		-70.1	-61.3	-8.8
24100.230			45.0	1.0			H-High Horn	AV		-70.3	-61.3	-9.0
26127.930			70.0	1.0			V-High Horn	AV		-70.8	-61.3	-9.5
26127.950			-1.0	1.0			H-High Horn	AV		-70.9	-61.3	-9.6
24104.720			195.0	1.0			V-High Horn	AV		-71.6	-61.3	-10.3
19094.460			295.0	1.0			H-High Horn	AV		-77.7	-61.3	-16.4

NORTHWEST EMC

EIRP OF SPURIOUS EMISSIONS (above 960MHz)

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/13/06
Customer:	Preco, Inc.			Temperature:	24 degrees C
Attendees:	Brian Bandhauer			Humidity:	41%
Project:				Barometric Pres.:	30.01
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250:2006	FCC 02-48, KDB No. 393764

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	1

COMMENTS

EUT OPERATING MODES

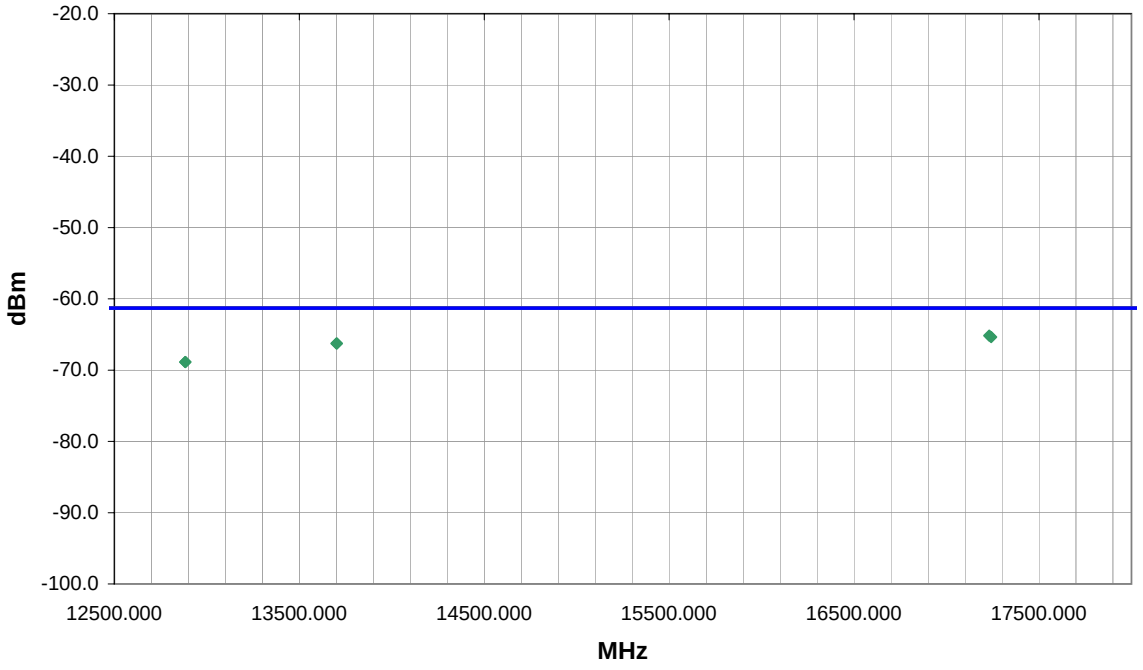
Standard operating mode.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
17230.630			272.0	1.1			V-Horn	AV		-65.2	-61.3	-3.9
17241.230			342.0	1.0			H-Horn	AV		-65.4	-61.3	-4.1
13700.830			239.0	1.1			V-Horn	AV		-66.3	-61.3	-5.0
13703.600			185.0	1.0			H-Horn	AV		-66.3	-61.3	-5.0
12883.470			207.0	1.2			V-Horn	AV		-68.9	-61.3	-7.6
12884.290			64.0	1.0			H-Horn	AV		-68.9	-61.3	-7.6

NORTHWEST EMC

EIRP OF SPURIOUS EMISSIONS (above 960MHz)

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/13/06
Customer:	Preco, Inc.			Temperature:	24 degrees C
Attendees:	Brian Bandhauer			Humidity:	41%
Project:				Barometric Pres.:	30.01
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250:2006	FCC 02-48, KDB No. 393764

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

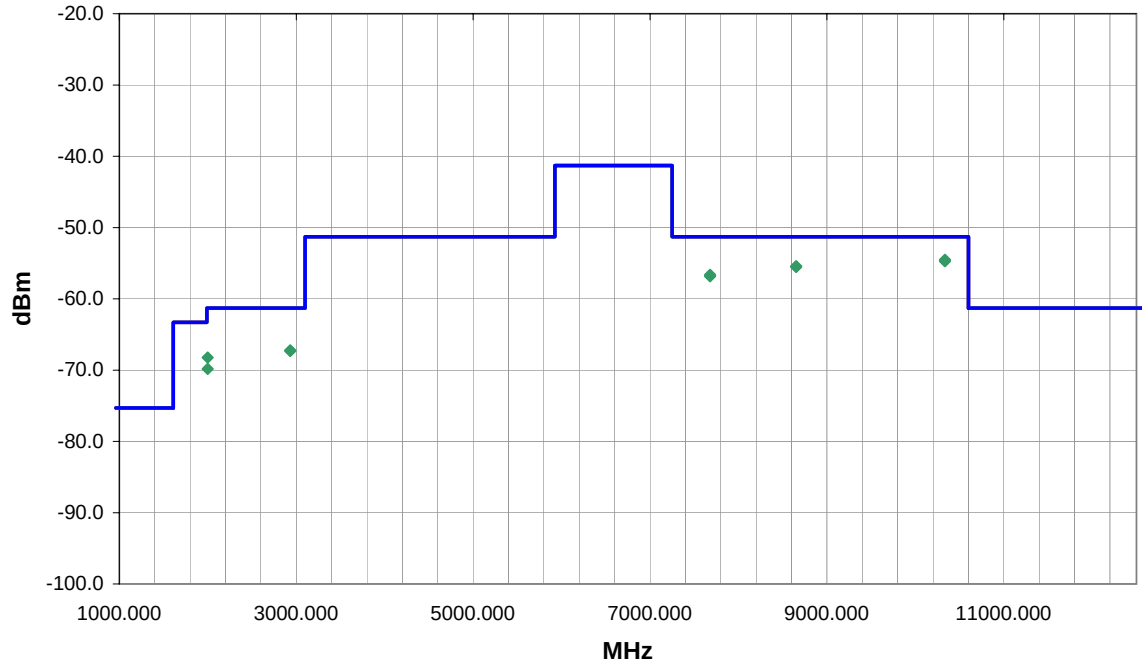
Standard operating mode.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
10333.920			308.0	1.1			V-Horn	AV		-54.5	-51.3	-3.2
10333.940			55.0	2.1			H-Horn	AV		-54.7	-51.3	-3.4
8651.858			323.0	1.0			H-Horn	AV		-55.4	-51.3	-4.1
8651.918			44.0	1.5			V-Horn	AV		-55.5	-51.3	-4.2
7679.240			79.0	1.2			V-Horn	AV		-56.6	-51.3	-5.3
7679.062			360.0	1.0			H-Horn	AV		-56.8	-51.3	-5.5
2932.185			165.0	1.0			V-Horn	AV		-67.2	-61.3	-5.9
2932.172			36.0	1.8			H-Horn	AV		-67.3	-61.3	-6.0
1997.865			158.0	1.0			H-Horn	AV		-68.2	-61.3	-6.9
1997.973			360.0	1.0			V-Horn	AV		-69.8	-61.3	-8.5

EIRP OF SPURIOUS EMISSIONS (above 960MHz)

Scans were performed with the radio transmitting and while in idle mode. These scans were used to determine if emissions above the 15.250 specification limit were radio related or digital emissions. On the following pages, scans are presented to demonstrate that noise above the limit is from the digital portion of the device.

MODES OF OPERATION
Standard operating mode.
Transmitter disabled.

POWER SETTINGS INVESTIGATED
12V DC

FREQUENCY RANGE INVESTIGATED			
Start Frequency	960 MHz	Stop Frequency	40 GHz

NORTHWEST EMC

RADIATED EMISSIONS - EVALUATION ONLY

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView	Work Order:	PRCO0034
Serial Number:	10	Date:	07/13/06
Customer:	Preco, Inc.	Temperature:	24 degrees C
Attendees:	Brian Bandhauer	Humidity:	41%
Project:	None	Barometric Pres.:	30.01
Tested by:	Ethan Schoonover	Power: 12V DC	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250(d)(1) Radiated Emissions:2006-2	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1.0, 1.2, 1.5, 1.8, 3.0	Test Distance (m)	1

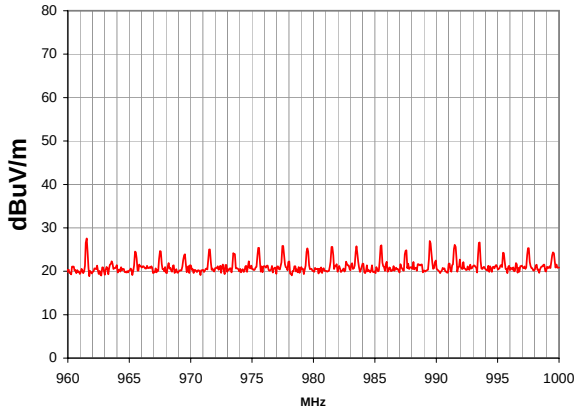
DEVIATIONS FROM TEST STANDARD

No deviations.

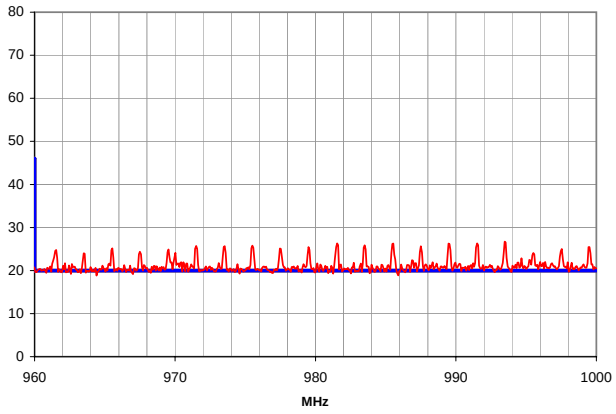
Run #	15,16
Configuration #	1
Results	Evaluation

Signature

EUT in standard operating mode



EUT with transmitter disabled



NORTHWEST EMC

RADIATED EMISSIONS - EVALUATION ONLY

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView	Work Order:	PRCO0034
Serial Number:	10	Date:	07/13/06
Customer:	Preco, Inc.	Temperature:	24 degrees C
Attendees:	Brian Bandhauer	Humidity:	41%
Project:	None	Barometric Pres.:	30.01
Tested by:	Ethan Schoonover	Power: 12V DC	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250(d)(1) Radiated Emissions:2006-2	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1.0, 1.2, 1.5, 1.8, 3.0	Test Distance (m)	1

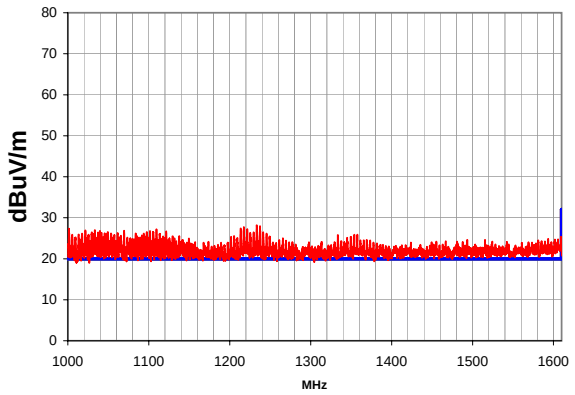
DEVIATIONS FROM TEST STANDARD

No deviations.

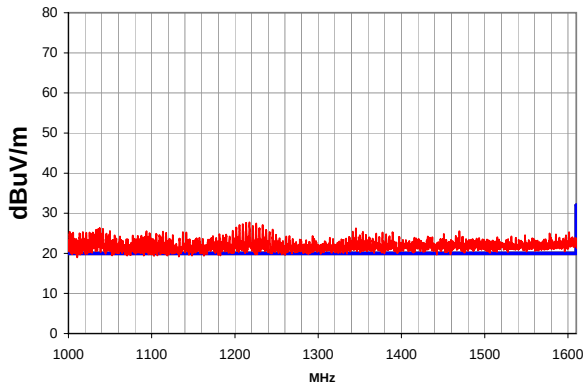
Run #	4,5
Configuration #	1
Results	Evaluation

Signature

EUT in standard operating mode



EUT with transmitter disabled



NORTHWEST EMC

RADIATED EMISSIONS - EVALUATION ONLY

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/13/06
Customer:	Preco, Inc.			Temperature:	24 degrees C
Attendees:	Brian Bandhauer			Humidity:	41%
Project:	None			Barometric Pres.:	30.01
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.250(d)(2) Radiated Emissions:2006-2	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1.0, 1.2, 1.5, 1.8, 3.0	Test Distance (m)	1

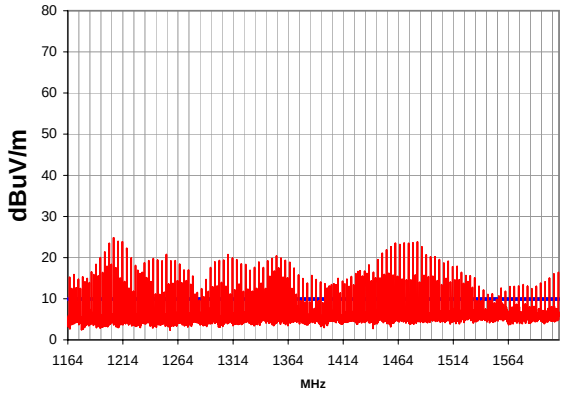
DEVIATIONS FROM TEST STANDARD

No deviations.

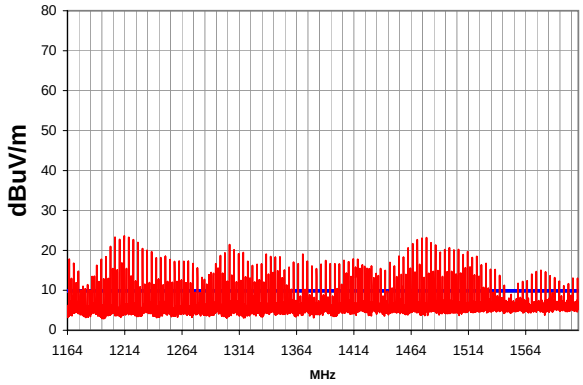
Run #	7,8
Configuration #	1
Results	Evaluation

Signature

EUT in standard operating mode



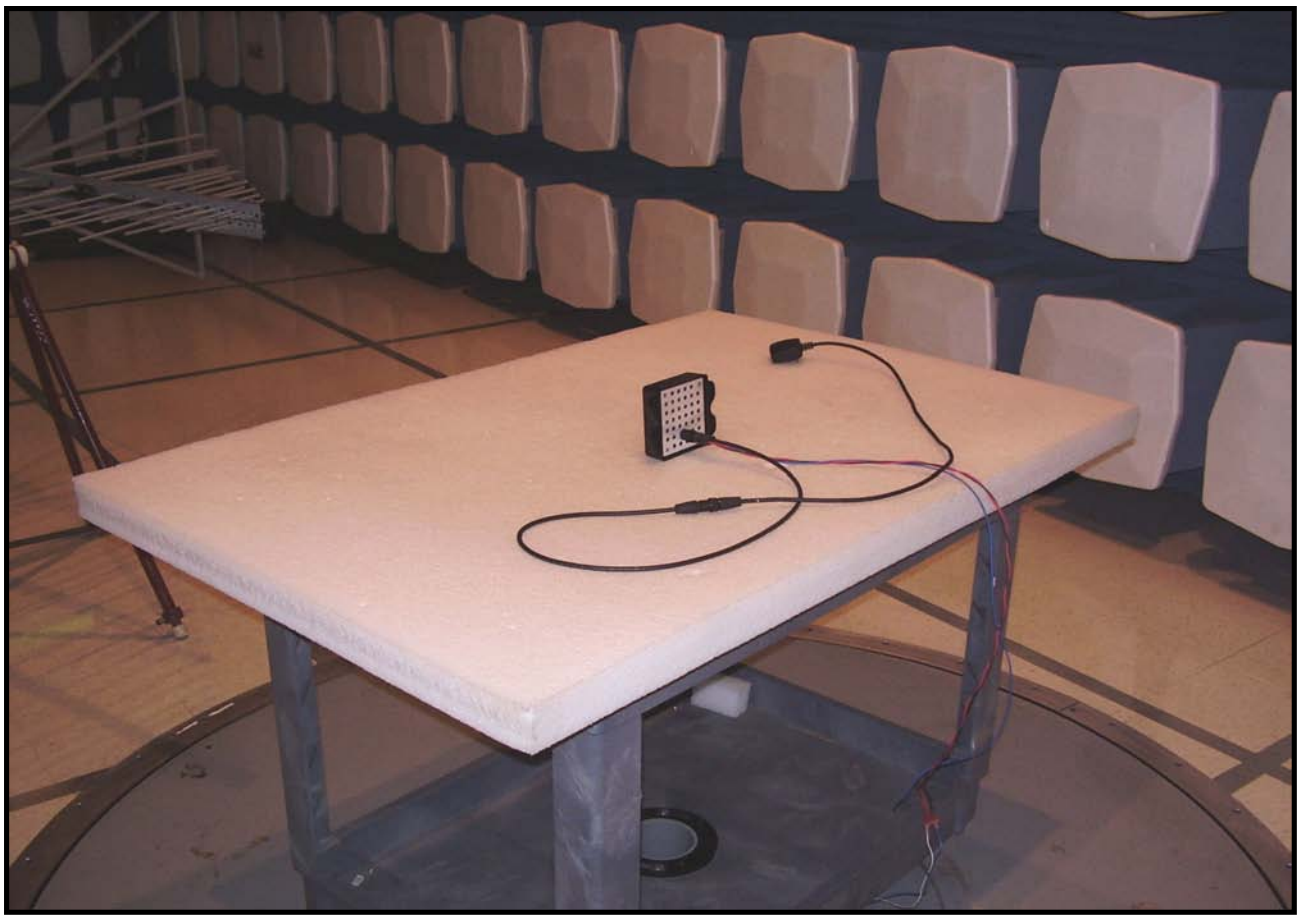
EUT with transmitter disabled




NORTHWEST
EMC
NORTHWEST
EMC


NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC
NORTHWEST
EMC

EIRP OF SPURIOUS EMISSIONS (above 960MHz)



SPURIOUS RADIATED EMISSIONS (below 960MHz)

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

MODES OF OPERATION

Standard Operating Mode

POWER SETTINGS INVESTIGATED

12V DC

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	960 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Biconilog	EMCO	3142	AXB	1/6/2005	24
Pre-Amplifier	Miteq	AM-1551	AOY	4/5/2006	13
Spectrum Analyzer	Agilent	E4443A	AAS	12/8/2005	12

MEASUREMENT BANDWIDTHS

	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.

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

Per 47 CFR Part 15.250(d)(4), radiated emissions at or below 960 MHz shall not exceed the emission levels in 15.209. At an approved test site, the EUT is placed on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of spurious emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. A preamp was used to gain sensitivity.

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS (below 960MHz)

PSA 2006.05.30
EMI 2006.7.11

EUT:	WB PreView			Work Order:	PRCO0034
Serial Number:	10			Date:	07/12/06
Customer:	Preco, Inc.			Temperature:	23
Attendees:	Brian Bandhauer			Humidity:	42%
Project:				Barometric Pres.:	29.97
Tested by:	Ethan Schoonover	Power:	12V DC	Job Site:	EV11

TEST SPECIFICATIONS	Test Method
FCC 15.209:2006	ANSI C63.4:2003
FCC 15.250:2006	FCC 02-48, KDB No. 393764

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Added chip ferrites. Removed tape shield.

EUT OPERATING MODES

Standard Operating Mode

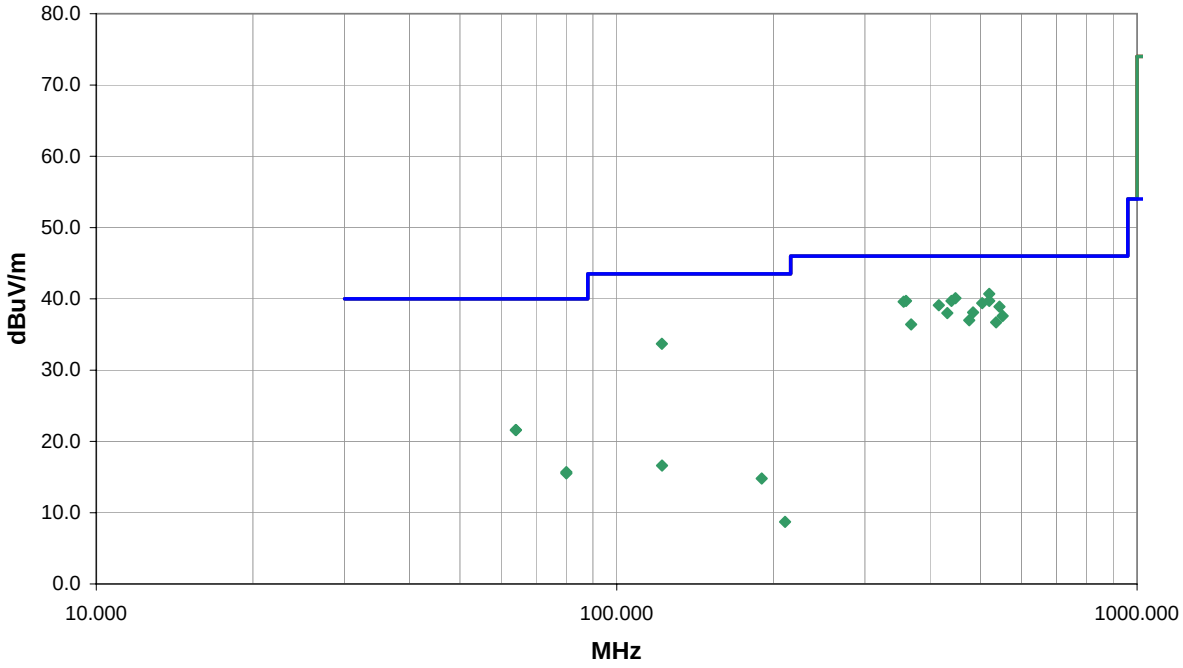
DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	1
Results	Pass

NVLAP Lab Code 200630-0

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
519.835	54.7	-14.0	195.0	2.0	3.0	0.0	V-Bilog	QP	0.0	40.7	46.0	-5.3
447.855	56.0	-15.9	79.0	1.0	3.0	0.0	H-Bilog	QP	0.0	40.1	46.0	-5.9
359.898	57.0	-17.3	78.0	1.0	3.0	0.0	H-Bilog	QP	0.0	39.7	46.0	-6.3
519.845	53.7	-14.0	271.0	1.0	3.0	0.0	H-Bilog	QP	0.0	39.7	46.0	-6.3
439.861	55.8	-16.1	84.0	1.0	3.0	0.0	H-Bilog	QP	0.0	39.7	46.0	-6.3
355.901	57.0	-17.4	72.0	1.0	3.0	0.0	H-Bilog	QP	0.0	39.6	46.0	-6.4
503.850	53.8	-14.4	267.0	1.0	3.0	0.0	H-Bilog	QP	0.0	39.4	46.0	-6.6
415.865	55.7	-16.6	96.0	1.0	3.0	0.0	H-Bilog	QP	0.0	39.1	46.0	-6.9
543.843	52.7	-13.8	195.0	2.0	3.0	0.0	V-Bilog	QP	0.0	38.9	46.0	-7.1
483.860	52.8	-14.7	209.0	2.0	3.0	0.0	V-Bilog	QP	0.0	38.1	46.0	-7.9
431.876	54.2	-16.2	72.0	1.0	3.0	0.0	H-Bilog	QP	0.0	38.0	46.0	-8.0
551.841	51.3	-13.7	142.0	1.7	3.0	0.0	V-Bilog	QP	0.0	37.6	46.0	-8.4
475.863	51.9	-14.9	196.0	2.0	3.0	0.0	V-Bilog	QP	0.0	37.0	46.0	-9.0
535.843	50.5	-13.8	144.0	1.7	3.0	0.0	V-Bilog	QP	0.0	36.7	46.0	-9.3
367.899	53.4	-17.0	63.0	1.0	3.0	0.0	H-Bilog	QP	0.0	36.4	46.0	-9.6
122.178	60.6	-26.9	249.0	2.0	3.0	0.0	H-Bilog	QP	0.0	33.7	43.5	-9.8
64.018	48.4	-26.8	17.0	3.1	3.0	0.0	H-Bilog	QP	0.0	21.6	40.0	-18.4
64.019	48.4	-26.8	170.0	3.6	3.0	0.0	H-Bilog	QP	0.0	21.6	40.0	-18.4
80.021	43.2	-27.5	-1.0	1.0	3.0	0.0	H-Bilog	QP	0.0	15.7	40.0	-24.3
80.020	43.0	-27.5	344.0	1.0	3.0	0.0	H-Bilog	QP	0.0	15.5	40.0	-24.5
122.186	43.5	-26.9	337.0	1.9	3.0	0.0	H-Bilog	QP	0.0	16.6	43.5	-26.9

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
189.951	38.3	-23.5	129.0	1.4	3.0	0.0	H-Bilog	QP	0.0	14.8	43.5	-28.7
210.626	31.4	-22.7	326.0	2.0	3.0	0.0	H-Bilog	QP	0.0	8.7	43.5	-34.8