

Digital Control, Inc.

DigiTrak FS

Report No. DIGC0082

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

Last Date of Test: January 21, 2010

Digital Control, Inc.

Model: DigiTrak FS

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Radiated Emissions	FCC 15.109(g) (CISPR 22:1997):2010 Class B	ANSI C63.4:2009	Pass
Radiated Emissions	EN 55022:2006 (Amended by A1:2007)	CISPR 22:2005 (Amended by A1:2005 and A2:2006)	Pass
Radiated Emissions	ICES-003:2004	CISPR 22:2005 (Amended by A1:2005 and A2:2006)	Pass
Field Strength of Fundamental	FCC 15.209:2010	ANSI C63.10:2009	Pass
Field Strength of Spurious Emissions	FCC 15.209:2010	ANSI C63.10:2009	Pass

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: (503) 844-3826

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

Approved By:

Don Fecteau, IS Manager



NVLAP Lab Code: 200630-0

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

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

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

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



NVLAP

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



NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0
NVLAP LAB CODE 200881-0

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-Gen, Issue 2 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. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)



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.



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, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, C-3464, and T-1634).



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 (US0017). 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



KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157)



SCOPE

For details on the Scopes of our Accreditations, please visit:
<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



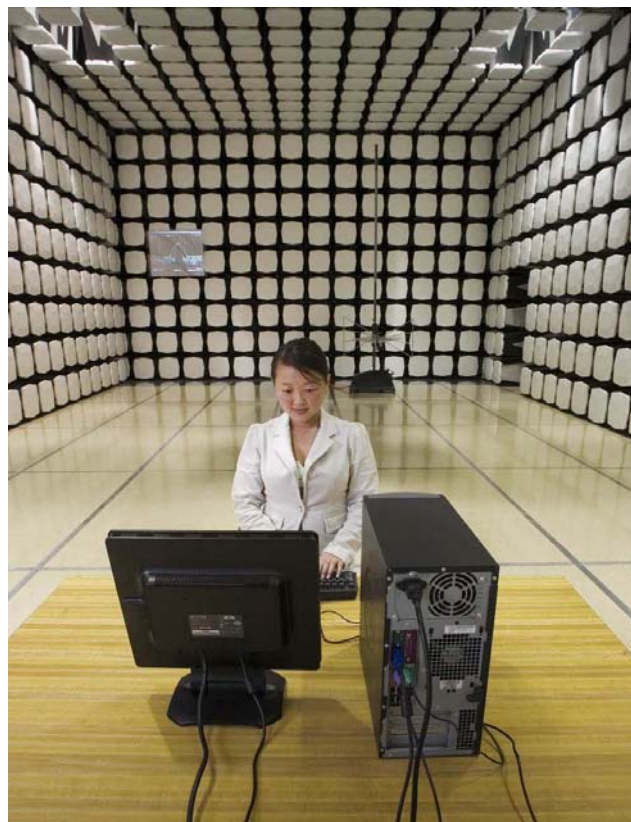
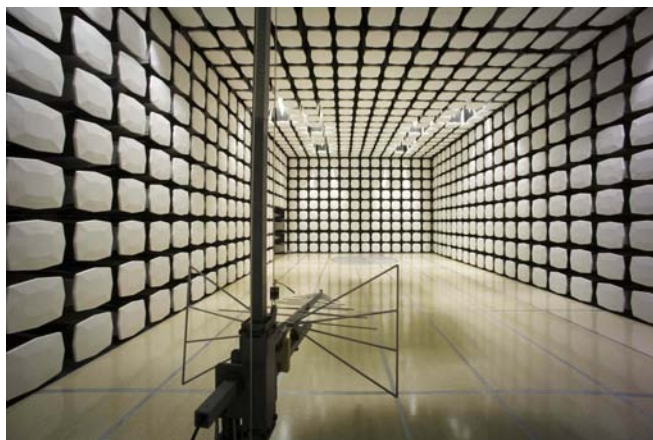
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	Digital Control, Inc.
Address:	19625 62nd Avenue South, Suite B103
City, State, Zip:	Kent, WA 98032
Test Requested By:	Amanda Hamm
Model:	DigiTrak FS
First Date of Test:	January 20, 2010
Last Date of Test:	January 21, 2010
Receipt Date of Samples:	January 20, 2010
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

11.976 kHz transmitter located in a horizontal Drill Head

Testing Objective:

Seeking TCB authorization of the kHz transmitter in the Drill Head

EUT Photo

Northwest

EMC

Configurations

Revision 9/21/05

CONFIGURATION 1 DIGC0082

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
EUT	Digital Control, Inc.	DigiTrak FS	916062

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	1/20/2010	Radiated Emissions	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	1/21/2010	Field Strength 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.
3	1/21/2010	Field Strength of Spurious Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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

MODES OF OPERATION

Tx

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

DIGC0082 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 MHz
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CLOCKS AND OSCILLATORS

None Provided

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4443A	AFB	11/17/2008	15 mo
EV11 Cables		10m Test Distance Cables	EVL	7/13/2009	13 mo
Antenna, Biconilog	EMCO	3142	AXB	1/14/2010	24 mo
Pre-Amplifier	Miteq	AM-1551	AOY	7/13/2009	13 mo

MEASUREMENT BANDWIDTHS

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

Measurements were made using the bandwidths and detectors specified. No video filter was used.


MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

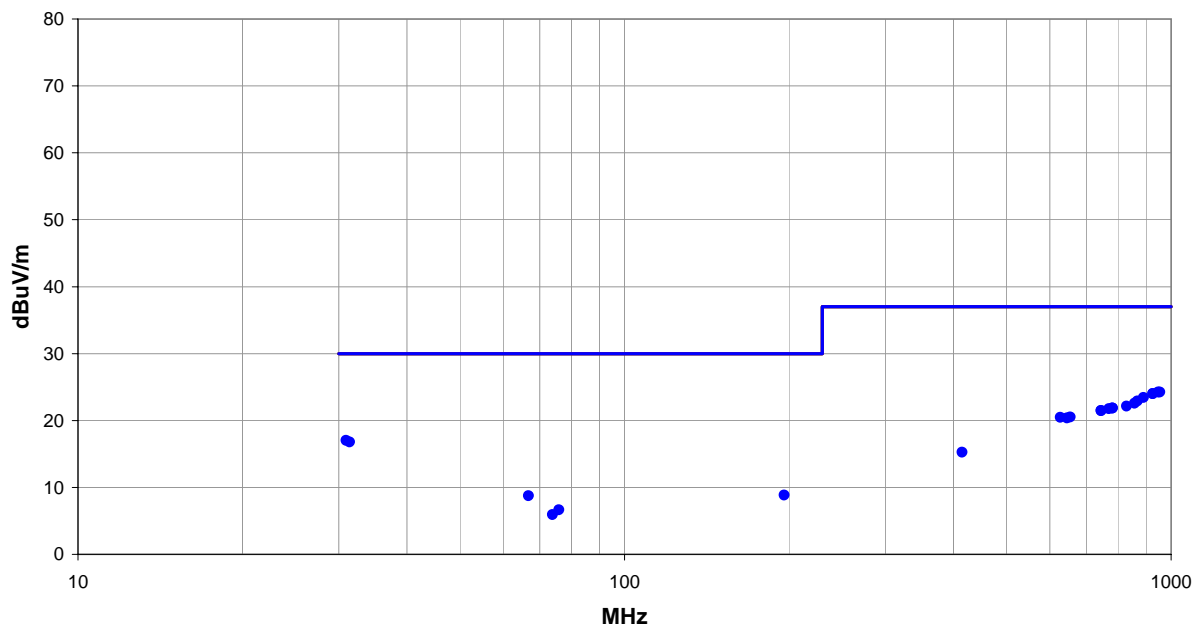
TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

Work Order:	DIGC0082	Date:	01/20/10		
Project:	None	Temperature:	20		
Job Site:	EV11	Humidity:	37.4		
Serial Number:	916062	Barometric Pres.:	987		
				Tested by:	Ethan Schoonover
EUT:	DigiTrak FS				
Configuration:	1 - Basic Configuration				
Customer:	Digital Control, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Tx				
Deviations:	None				
Comments:	EUT Horizontal				


Test Specifications				Class B	Test Method		
FCC 15.109(g) (CISPR 22:1997):2010					ANSI C63.4:2009		
EN 55022: 2006 (Amended by A1:2007)					CISPR 22:2005 (Amended by A1:2005 and A2:2006)		
ICES-003:2004					CISPR 22:2005 (Amended by A1:2005 and A2:2006)		
Run #	2	Test Distance (m)	10	Antenna Height(s)	1-4m	Results	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
947.125	31.0	-6.7	3.5	116.0	10.0	0.0	Horz	QP	0.0	24.3	37.0	-12.7
953.420	30.9	-6.7	2.5	197.0	10.0	0.0	Vert	QP	0.0	24.2	37.0	-12.8
30.947	31.9	-14.9	3.8	170.0	10.0	0.0	Horz	QP	0.0	17.0	30.0	-13.0
926.530	31.1	-7.1	1.0	133.0	10.0	0.0	Horz	QP	0.0	24.0	37.0	-13.0
926.328	31.1	-7.1	1.0	365.0	10.0	0.0	Vert	QP	0.0	24.0	37.0	-13.0
31.403	31.9	-15.1	2.5	-4.0	10.0	0.0	Vert	QP	0.0	16.8	30.0	-13.2
890.363	31.1	-7.7	3.3	164.0	10.0	0.0	Vert	QP	0.0	23.4	37.0	-13.6
867.705	31.1	-8.2	2.9	66.0	10.0	0.0	Vert	QP	0.0	22.9	37.0	-14.1
857.126	31.1	-8.5	3.5	12.0	10.0	0.0	Horz	QP	0.0	22.6	37.0	-14.4
828.982	31.2	-9.1	3.5	220.0	10.0	0.0	Horz	QP	0.0	22.1	37.0	-14.9
781.443	31.2	-9.4	3.4	248.0	10.0	0.0	Horz	QP	0.0	21.8	37.0	-15.2
781.098	31.2	-9.4	3.8	9.0	10.0	0.0	Vert	QP	0.0	21.8	37.0	-15.2
769.980	31.2	-9.5	1.0	349.0	10.0	0.0	Vert	QP	0.0	21.7	37.0	-15.3
744.446	31.2	-9.7	3.0	188.0	10.0	0.0	Horz	QP	0.0	21.5	37.0	-15.5
745.665	31.2	-9.7	1.5	178.0	10.0	0.0	Vert	QP	0.0	21.5	37.0	-15.5
653.814	31.3	-10.8	3.0	347.0	10.0	0.0	Horz	QP	0.0	20.5	37.0	-16.5
627.348	31.3	-10.8	2.6	169.0	10.0	0.0	Vert	QP	0.0	20.5	37.0	-16.5
644.962	31.2	-10.8	1.5	365.0	10.0	0.0	Vert	QP	0.0	20.4	37.0	-16.6
195.851	30.6	-21.8	1.0	98.0	10.0	0.0	Vert	QP	0.0	8.8	30.0	-21.2
66.701	34.0	-25.3	1.0	194.0	10.0	0.0	Vert	QP	0.0	8.7	30.0	-21.3

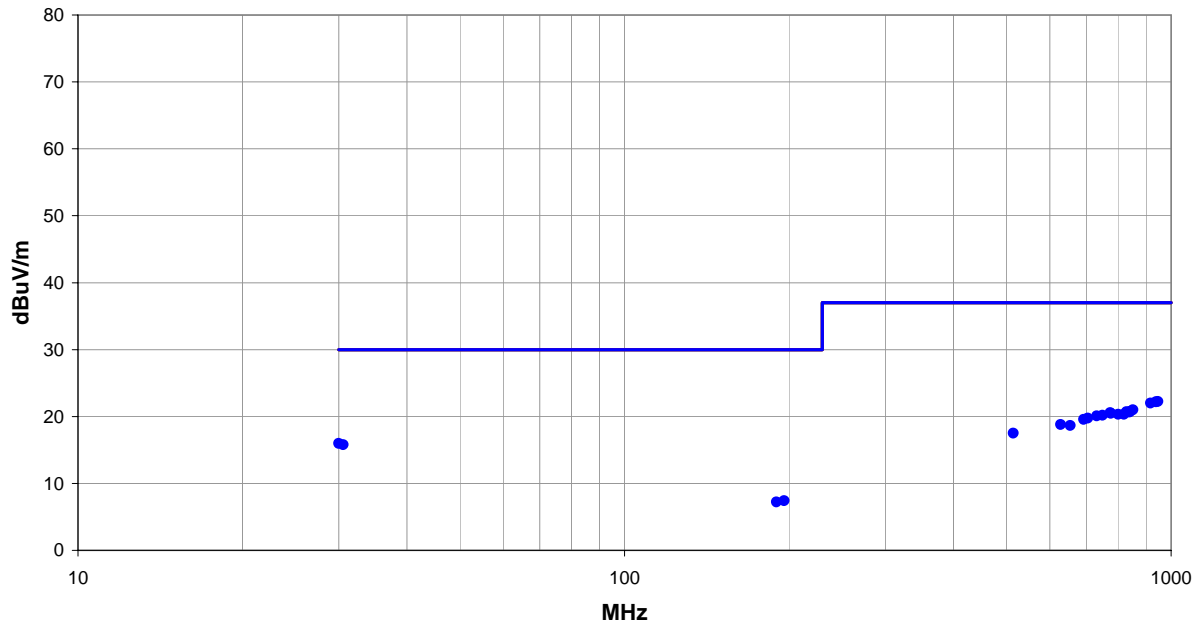
EMC

RADIATED EMISSIONS

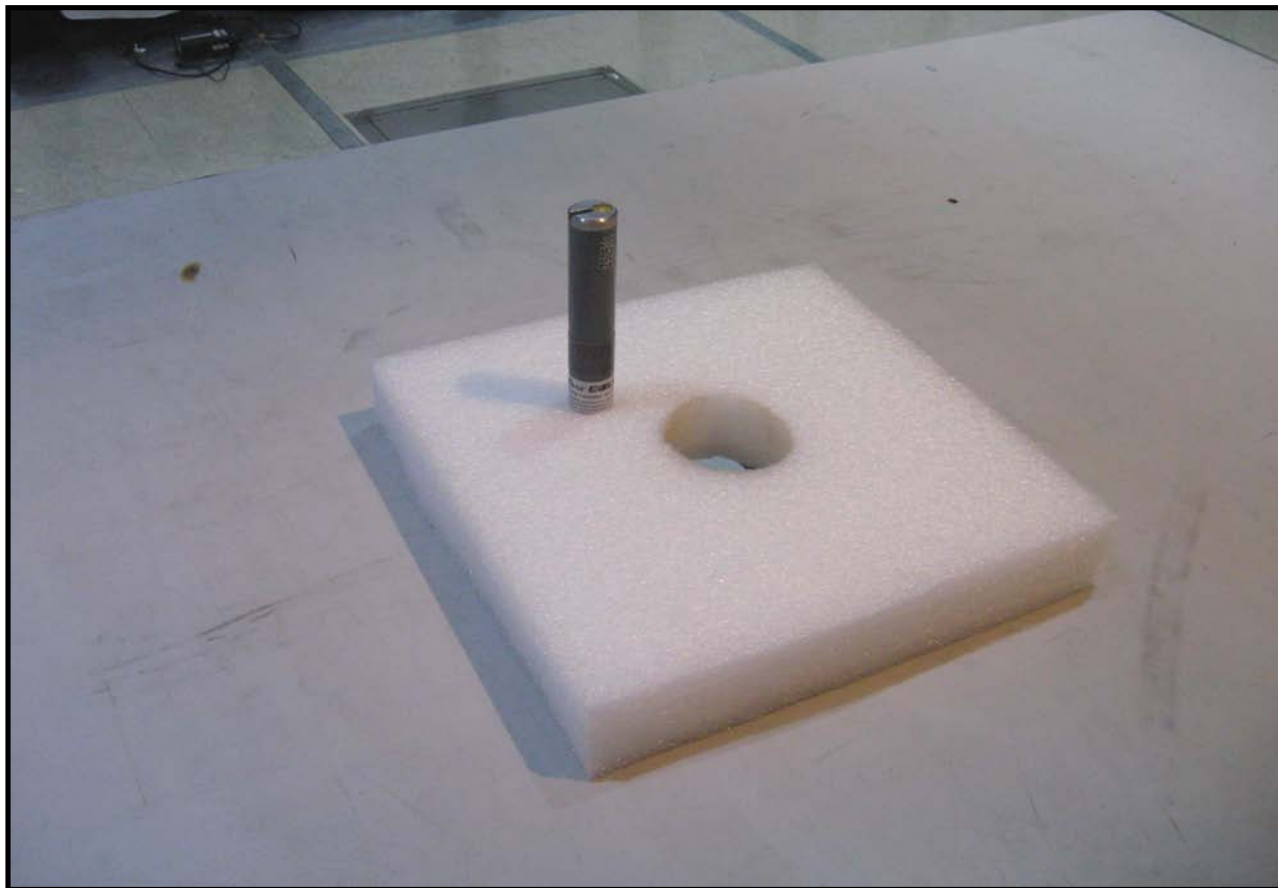
Work Order:	DIGC0082	Date:	01/20/10	
Project:	None	Temperature:	20	
Job Site:	EV11	Humidity:	37.4	
Serial Number:	916062	Barometric Pres.:	987	
EUT:	DigiTrak FS			
Configuration:	1 - Basic Configuration			
Customer:	Digital Control, Inc.			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	Tx			
Deviations:	None			
Comments:	EUT Vertical			

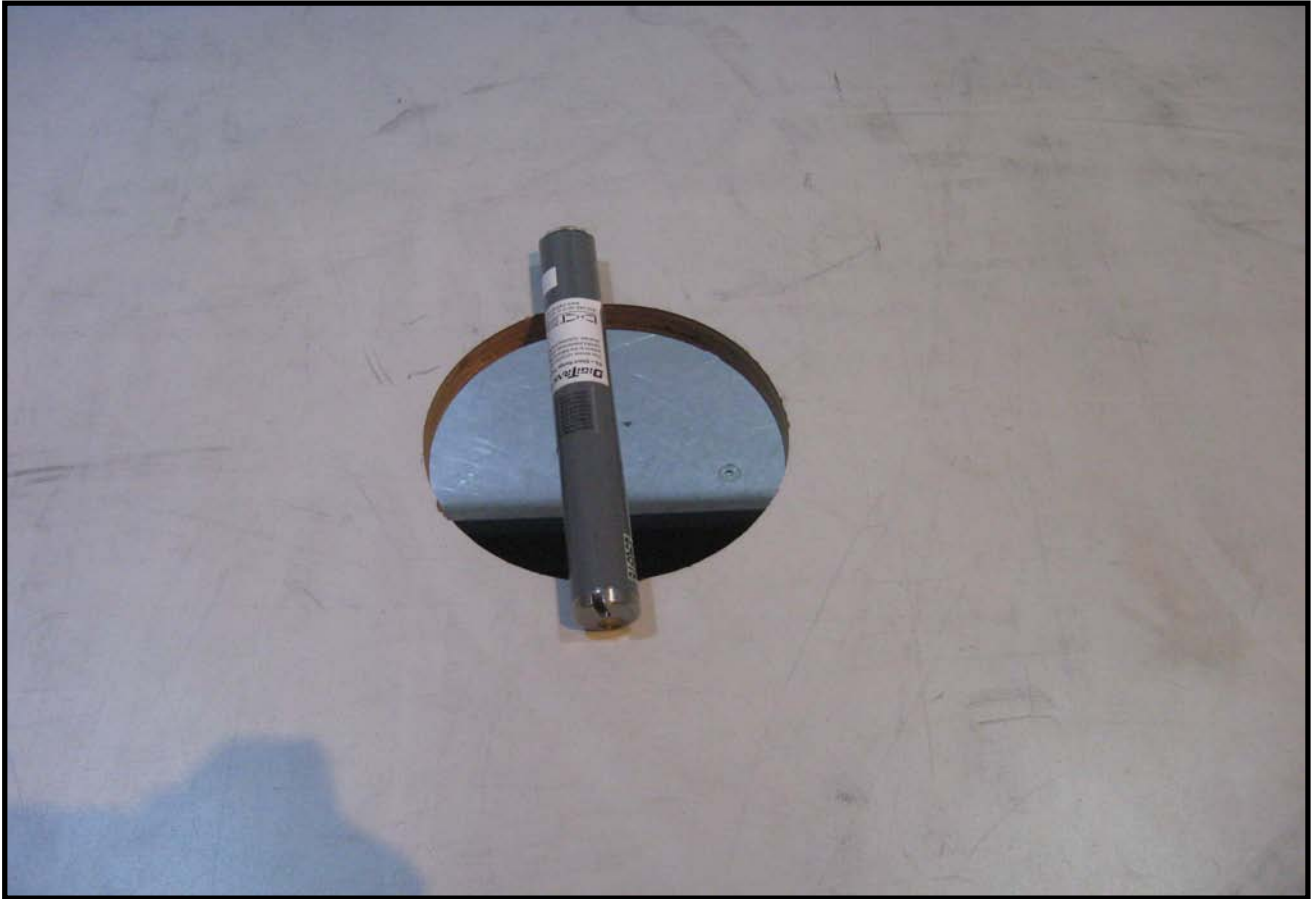
Test Specifications	Class B	Test Method
FCC 15.109(g) (CISPR 22:1997):2010		ANSI C63.4:2009
EN 55022: 2006 (Amended by A1:2007)		CISPR 22:2005 (Amended by A1:2005 and A2:2006)
ICES-003:2004		CISPR 22:2005 (Amended by A1:2005 and A2:2006)

Run #	5	Test Distance (m)	10	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
30.574	31.9	-16.1	2.0	271.0	10.0	0.0	Vert	QP	0.0	15.8	30.0	-14.2
945.885	31.0	-8.8	3.1	331.0	10.0	0.0	Vert	QP	0.0	22.2	37.0	-14.8
938.102	31.1	-8.9	3.3	363.0	10.0	0.0	Horz	QP	0.0	22.2	37.0	-14.8
917.782	31.2	-9.2	3.9	41.0	10.0	0.0	Vert	QP	0.0	22.0	37.0	-15.0
852.146	31.2	-10.2	3.7	319.0	10.0	0.0	Horz	QP	0.0	21.0	37.0	-16.0
843.050	31.2	-10.4	2.0	63.0	10.0	0.0	Horz	QP	0.0	20.8	37.0	-16.2
829.096	31.5	-10.8	2.0	125.0	10.0	0.0	Vert	QP	0.0	20.7	37.0	-16.3
838.774	31.2	-10.5	3.0	41.0	10.0	0.0	Vert	QP	0.0	20.7	37.0	-16.3
774.407	31.4	-10.9	3.0	267.0	10.0	0.0	Vert	QP	0.0	20.5	37.0	-16.5
775.627	31.3	-10.9	3.5	30.0	10.0	0.0	Horz	QP	0.0	20.4	37.0	-16.6
820.324	31.2	-10.9	3.0	130.0	10.0	0.0	Horz	QP	0.0	20.3	37.0	-16.7
800.136	31.3	-11.0	2.1	51.0	10.0	0.0	Horz	QP	0.0	20.3	37.0	-16.7
749.722	31.2	-11.0	2.0	156.0	10.0	0.0	Horz	QP	0.0	20.2	37.0	-16.8
731.732	31.2	-11.1	1.0	365.0	10.0	0.0	Horz	QP	0.0	20.1	37.0	-16.9
704.579	31.2	-11.4	1.0	282.0	10.0	0.0	Vert	QP	0.0	19.8	37.0	-17.2
692.070	31.2	-11.7	3.5	127.0	10.0	0.0	Horz	QP	0.0	19.5	37.0	-17.5
628.155	31.5	-12.7	2.5	345.0	10.0	0.0	Vert	QP	0.0	18.8	37.0	-18.2
654.430	31.2	-12.5	3.7	339.0	10.0	0.0	Horz	QP	0.0	18.7	37.0	-18.3
514.380	32.1	-14.6	2.5	326.0	10.0	0.0	Horz	QP	0.0	17.5	37.0	-19.5
196.051	31.2	-23.8	1.5	233.0	10.0	0.0	Vert	QP	0.0	7.4	30.0	-22.6





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

Tx

POWER SETTINGS INVESTIGATED

Battery

FREQUENCY RANGE INVESTIGATED

Start Frequency	10kHz	Stop Frequency	30MHz
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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, Loop	EMCO	6502	AOA	7/1/2009	24
EV11 Cables		3m Test Distance Cables	EVM	7/13/2009	13
Spectrum Analyzer	Agilent	E4443A	AFB	11/17/2008	15

MEASUREMENT BANDWIDTHS


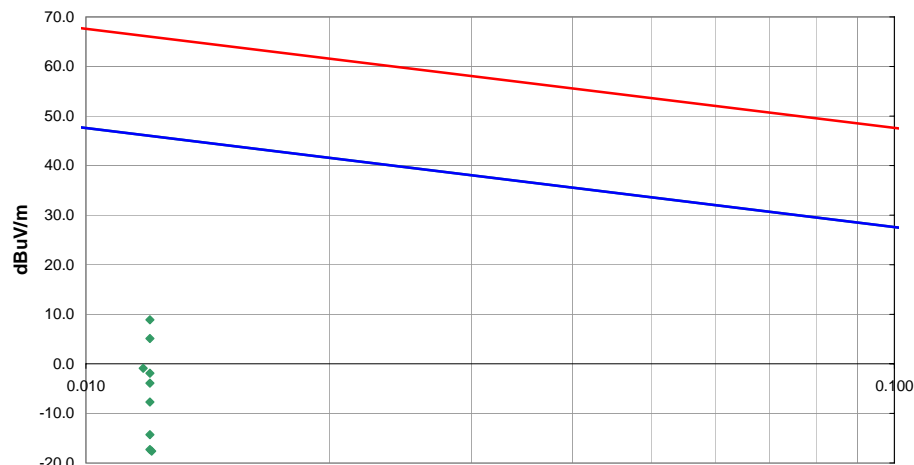
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

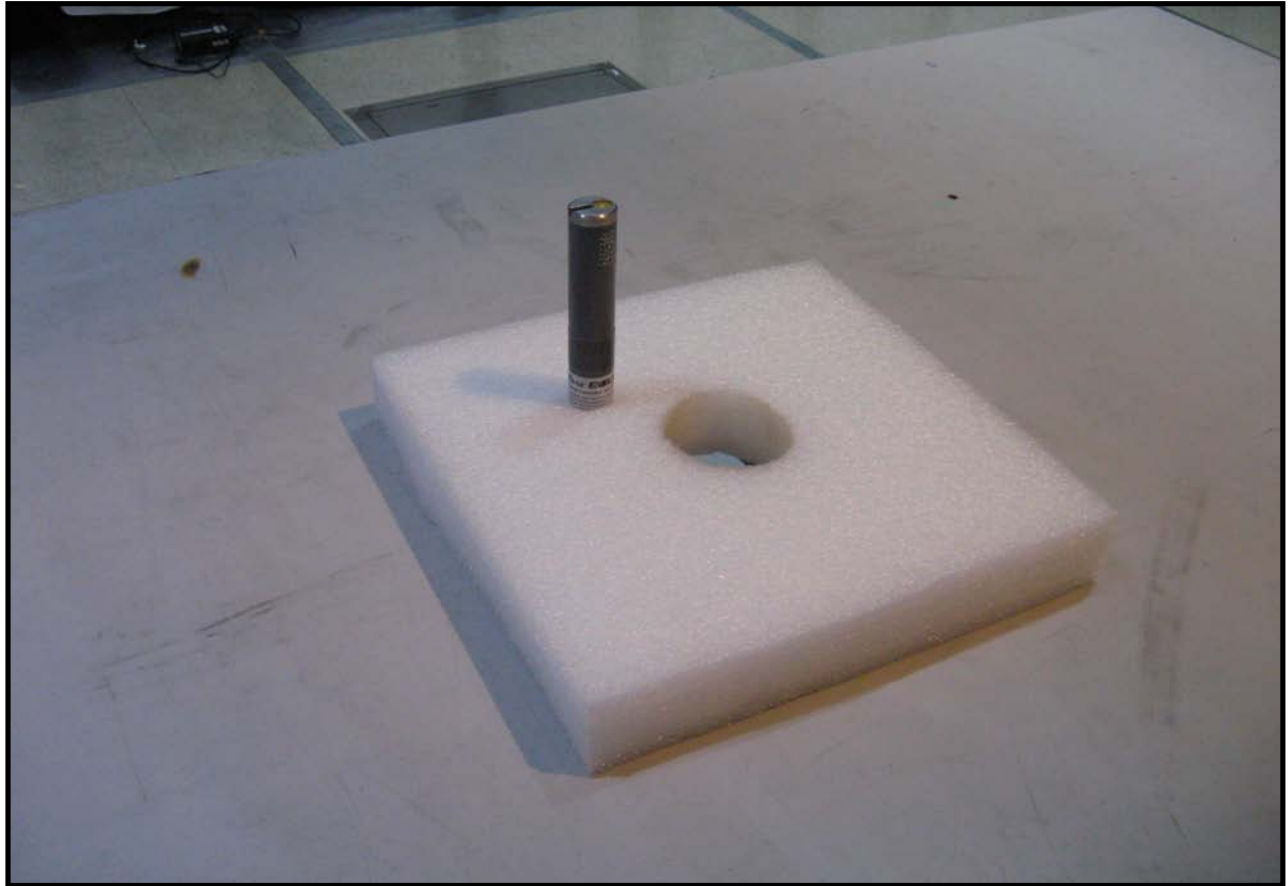
MEASUREMENT UNCERTAINTY

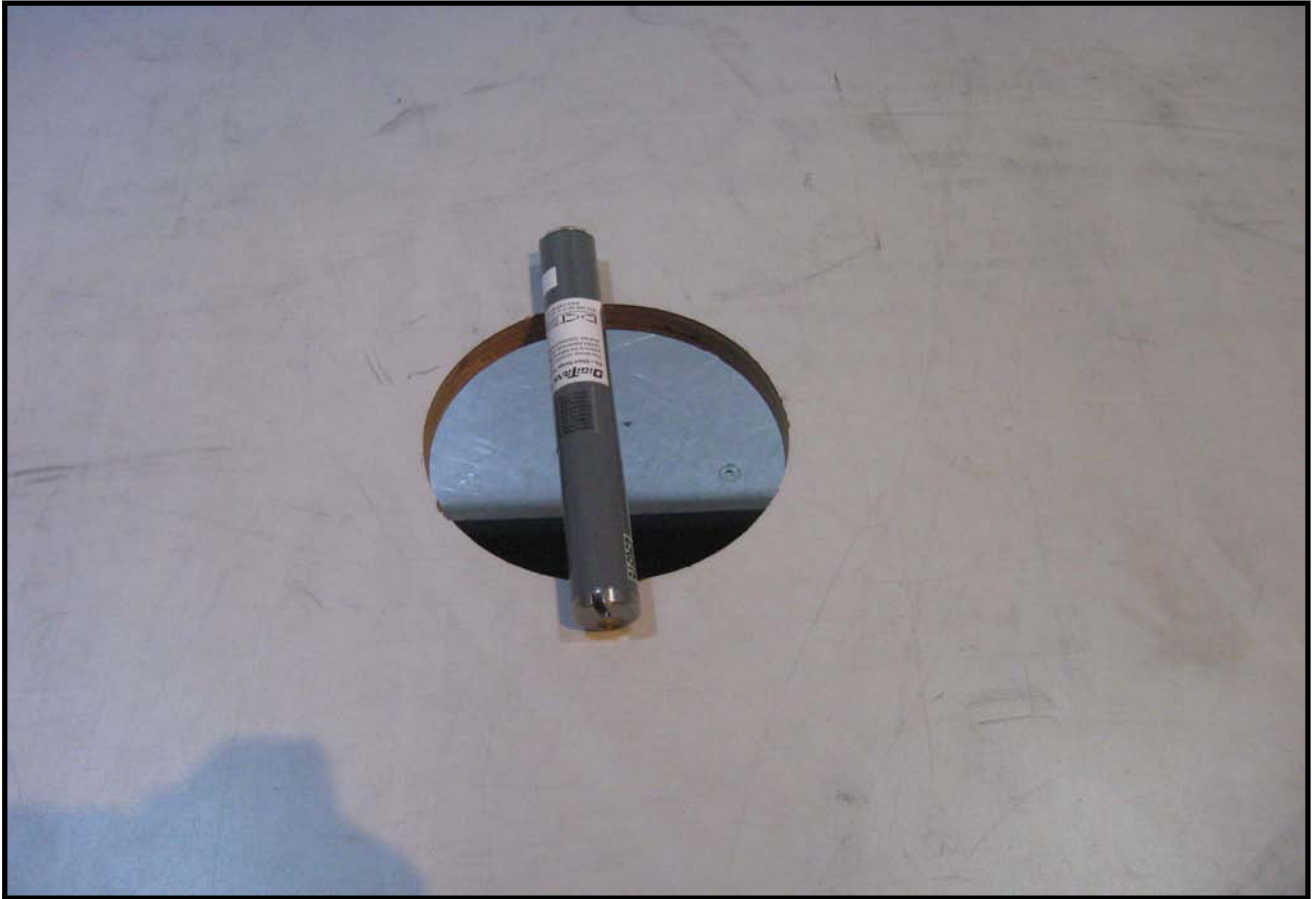
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and 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 C63.10:2009).

NORTHWEST		Field Strength of Fundamental		PSA 2008.07.21 EMI 2008.7.3									
EMC													
EUT: DigiTrak FS		Work Order: DIGC0082											
Serial Number: 916062		Date: 01/21/10											
Customer: Digital Control, Inc.		Temperature: 22											
Attendees: None		Humidity: 33%											
Project: None		Barometric Pres.: 987											
Tested by: Ethan Schoonover		Power: Battery		Job Site: EV11									
TEST SPECIFICATIONS		Test Method											
FCC 15.209 Field Strength of Fundamental:2010		ANSI C63.10:2009											
TEST PARAMETERS													
Antenna Height(s) (m)		1-2.5		Test Distance (m)									
				3									
COMMENTS													
See below.													
EUT OPERATING MODES													
Tx													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
Run #	1												
Configuration #	1												
Results	Pass		Signature 										
													
MHz													
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)	Comments
0.012	67.0	18.1	12.0	1.0	3.0	0.0	see comments	AV	-80.0	5.1	46.0	-40.9	EUT Horz, Loop Par to EUT
0.012	58.0	18.1	-4.0	1.6	3.0	0.0	see comments	AV	-80.0	-3.9	46.0	-49.9	EUT Vert, Loop Perp to EUT, Par to floor
0.012	54.2	18.1	83.0	1.0	3.0	0.0	see comments	AV	-80.0	-7.7	46.0	-53.7	EUT Vert, Loop Par to EUT,
0.012	70.8	18.1	12.0	1.0	3.0	0.0	see comments	PK	-80.0	8.9	66.0	-57.1	EUT Horz, Loop Par to EUT,
0.012	61.0	18.1	-4.0	1.6	3.0	0.0	see comments	PK	-80.0	-0.9	66.2	-67.1	EUT Vert, Loop Perp to EUT, Par to floor
0.012	60.0	18.1	83.0	1.0	3.0	0.0	see comments	PK	-80.0	-1.9	66.0	-67.9	EUT Vert, Loop Par to EUT,
0.012	38.2	18.1	157.0	1.9	3.0	0.0	see comments	AV	-80.0	-23.7	46.0	-69.7	EUT Horz, Loop Perp to EUT, Par to floor
0.012	37.8	18.1	16.0	1.0	3.0	0.0	see comments	AV	-80.0	-24.1	46.0	-70.1	EUT Vert, Loop Perp to EUT, Perp to floor
0.012	36.9	18.1	141.0	1.7	3.0	0.0	see comments	AV	-80.0	-25.0	46.0	-71.0	EUT Horz, Loop Perp to EUT, Perp to floor
0.012	47.6	18.1	16.0	1.0	3.0	0.0	see comments	PK	-80.0	-14.3	66.0	-80.3	EUT Vert, Loop Perp to EUT, Perp to floor
0.012	44.6	18.1	141.0	1.7	3.0	0.0	see comments	PK	-80.0	-17.3	66.0	-83.3	EUT Horz, Loop Perp to EUT, Perp to floor
0.012	44.3	18.1	157.0	1.9	3.0	0.0	see comments	PK	-80.0	-17.6	66.0	-83.6	EUT Horz, Loop Perp to EUT, Par to floor





Field Strength of Spurious Emissions

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

MODES OF OPERATION

Tx

POWER SETTINGS INVESTIGATED

Battery

FREQUENCY RANGE INVESTIGATED

Start Frequency	10kHz	Stop Frequency	30MHz
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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, Loop	EMCO	6502	AOA	7/1/2009	24
EV11 Cables		3m Test Distance Cables	EVM	7/13/2009	13
Spectrum Analyzer	Agilent	E4443A	AFB	11/17/2008	15

MEASUREMENT BANDWIDTHS


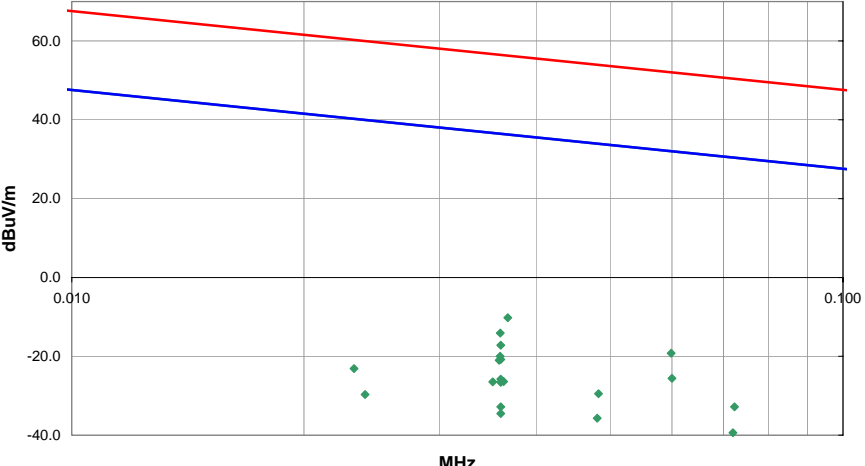
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal plane, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST		Field Strength of Spurious Emissions		PSA 2008.07.21 EMI 2008.7.3									
EMC													
EUT: DigiTrak FS				Work Order: DIGC0082									
Serial Number: 916062				Date: 01/21/10									
Customer: Digital Control, Inc.				Temperature: 22									
Attendees: none				Humidity: 33%									
Project: None				Barometric Pres.: 987									
Tested by: Ethan Schoonover				Job Site: EV11									
Power: Battery													
TEST SPECIFICATIONS				Test Method									
FCC 15.209:2010				ANSI C63.10:2009									
TEST PARAMETERS													
Antenna Height(s) (m)		1-2.5		Test Distance (m)									
				3									
COMMENTS													
See below.													
EUT OPERATING MODES													
Tx													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
Run #		2											
Configuration #		1											
Results		Pass		Signature 									
													
MHz													
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)	Comments
0.036	50.1	12.7	7.0	1.0	3.0	0.0	see comments	AV	-80.0	-17.2	36.5	-53.7	EUT horz. Loop par with EUT
0.036	46.5	12.7	114.0	1.0	3.0	0.0	see comments	AV	-80.0	-20.8	36.5	-57.3	EUT horz. Loop perp with EUT perp with ground.
0.060	43.2	11.2	184.0	1.0	3.0	0.0	see comments	AV	-80.0	-25.6	32.0	-57.6	EUT horz. Loop par with EUT
0.036	41.5	12.7	193.0	1.3	3.0	0.0	see comments	AV	-80.0	-25.8	36.5	-62.3	EUT vert. Loop perp with EUT par with ground.
0.036	40.7	12.7	318.0	1.0	3.0	0.0	see comments	AV	-80.0	-26.6	36.5	-63.1	EUT vert. Loop par with EUT
0.037	57.1	12.7	7.0	1.0	3.0	0.0	see comments	PK	-80.0	-10.2	56.3	-66.5	EUT horz. Loop par with EUT
0.036	34.5	12.7	291.0	2.9	3.0	0.0	see comments	AV	-80.0	-32.8	36.5	-69.3	EUT horz. Loop perp with EUT par with ground.
0.048	32.7	11.6	281.0	1.0	3.0	0.0	see comments	AV	-80.0	-35.7	34.0	-69.7	EUT horz. Loop par with EUT
0.024	36.5	13.8	273.0	1.5	3.0	0.0	see comments	AV	-80.0	-29.7	40.0	-69.7	EUT horz. Loop par with EUT
0.072	29.6	11.0	269.0	1.0	3.0	0.0	see comments	AV	-80.0	-39.4	30.4	-69.8	EUT horz. Loop par with EUT
0.036	53.2	12.7	114.0	1.0	3.0	0.0	see comments	PK	-80.0	-14.1	56.5	-70.6	EUT horz. Loop perp with EUT perp with ground.
0.036	32.8	12.7	162.0	1.0	3.0	0.0	see comments	AV	-80.0	-34.5	36.5	-71.0	EUT vert. Loop perp with EUT perp with ground.
0.060	49.6	11.2	184.0	1.0	3.0	0.0	see comments	PK	-80.0	-19.2	52.0	-71.2	EUT horz. Loop par with EUT
0.036	47.3	12.7	193.0	1.3	3.0	0.0	see comments	PK	-80.0	-20.0	56.5	-76.5	EUT vert. Loop perp with EUT par with ground.
0.036	46.3	12.7	318.0	1.0	3.0	0.0	see comments	PK	-80.0	-21.0	56.5	-77.5	EUT vert. Loop par with EUT
0.036	40.9	12.7	162.0	1.0	3.0	0.0	see comments	PK	-80.0	-26.4	56.4	-82.8	EUT vert. Loop perp with EUT perp with ground.
0.035	40.8	12.7	299.0	2.5	3.0	0.0	see comments	PK	-80.0	-26.5	56.7	-83.2	EUT horz. Loop perp with EUT par with ground.
0.072	36.2	11.0	269.0	1.0	3.0	0.0	see comments	PK	-80.0	-32.8	50.4	-83.2	EUT horz. Loop par with EUT
0.023	43.1	13.8	273.0	1.5	3.0	0.0	see comments	PK	-80.0	-23.1	60.3	-83.4	EUT horz. Loop par with EUT
0.048	38.9	11.6	281.0	1.0	3.0	0.0	see comments	PK	-80.0	-29.5	53.9	-83.4	EUT horz. Loop par with EUT

