FCC PART 15 SUBPART B and C
TEST REPORT

for

VALVE ACTUATOR

Model: WPACT

Prepared for

DYNAQUIP CONTROLS
10 HARRIS INDUSTRIAL PARK
ST. CLAIR, MISSOURI 63077

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DATE: NOVEMBER 18, 2009

	REPORT BODY	APPENDICES					TOTAL
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GENERAL REPORT SUMMARY

Compatible Electronics Inc. generates this electromagnetic emission test report, which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested:	Valve Actuator Model: WPACT S/N: N/A
Product Description:	See Expository Statement
Modifications:	The EUT was not modified in order to meet the specifications.
Customer:	DynaQuip Controls 10 Harris Industrial Park St. Clair, Missouri 63077
Test Date(s):	October 28 and 29; and November 2, 2009
Test Specifications:	EMI requirements CFR Title 47, Part 15, Subpart B
Test Procedure:	ANSI C63.4
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, section 15.207 Highest reading in relation to spec limit: 41.40 dBuV @ 0.705 MHz (*Uc = 0.43 dB)
2	Radiated RF Emissions 10 kHz – 4400 MHz (Transmitter Portion)	Complies with the limits of CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.231. Highest reading in relation to spec limit: 79.50 dBuV @ 433.92 MHz (*Uc = 1.76 dB)
3	Radiated RF Emissions 10 kHz – 4400 MHz (Digital and Receiver Portion)	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B.

*U_c = combined standard uncertainty

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Valve Actuator, Model: WPACT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B for the digital and receiver portion; and the limits defined in Subpart C, sections 15.205, 15.209, and 15.231 for the transmitter portion.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

DynaQuip Controls

Mike Purvis	Design Engineer

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
Michael Christensen	Lab Manager, Brea Division

2.4 Date Test Sample was Received

The test sample was received prior to the date of testing.

2.5 Disposition of the Test Sample

The test sample has not yet been returned as of the date of this report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

FCC	Federal Communications Commission
RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
N/A	Not Applicable
Ltd.	Limited
Inc.	Incorporated
IR	Infrared

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – EMI

Transmit Mode: The Valve Actuator, Model: WPACT (EUT) was connected to the switching adaptor via its power port. The EUT was continuously transmitting.

Receive Mode: The Valve Actuator, Model: WPACT (EUT) was connected to the switching adaptor via its power port. The EUT was continuously receiving a signal from the Range Enhancing Repeater, Model: WPR.

Note: For spurious emissions below 1 GHz and for conducted emissions, the EUT was both transmitting and receiving on a continuous basis. In this mode, the transmitter turns on for a normal duration.

The EUT's antenna is a PCB trace. The EUT stops transmitting wthin 5 seconds of being activated during normal operation.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The final emissions data was taken in this mode of operation and any cables were maximized. All initial investigations were performed with the measurement receiver in manual mode scanning the frequency range continuously. Photographs of the test setup are in Appendix D of this report.

4.1.1 Cable Construction and Termination

Cable 1 This is a 3-meter unshielded cable connecting the EUT to the switching adaptor. The cable is hard wired at each end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
VALVE ACTUATOR (EUT)	DYNAQUIP CONTROLS	WPACT	N/A	TBD
SWITCHING ADAPTOR FOR EUT	N/A	FJ-SW1280r044	N/A	N/A
RANGE EHANCING REPEATER	DYNAQUIP CONTROLS	WPR	N/A	TBD

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS					
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	May 29, 2009	May 29, 2010
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A14530	May 29, 2009	May 29, 2010
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	May 29, 2009	May 29, 2010
EMI Receiver	Rohde & Schwarz	ESIB40	100194	September 17, 2008	Sept. 17, 2010
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
RF RADIATED EMISSIONS TEST EQUIPMENT					
Biconical Antenna	Com Power	AB-900	15250	February 23, 2009	Feb. 23, 2010
Log Periodic Antenna	Com Power	AL-100	16060	June 15, 2009	June 15, 2010
Preamplifier	Com-Power	PA-102	1017	January 12, 2009	Jan. 12, 2010
Loop Antenna	Com-Power	AL-130	17089	September 29, 2008	Sept. 29, 2010
Horn Antenna	Com-Power	AH-118	071175	June 27, 2008	June 27, 2010
Microwave Preamplifier	Com Power	PA-122	181921	March 12, 2009	March 12, 2010
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
RF CONDUCTED EMISSIONS TEST EQUIPMENT					
Emissions Program	Compatible Electronics	2.3 (SR19)	N/A	N/A	N/A
LISN	Com Power	LI-215	12078	September 28, 2009	September 28, 2010
LISN	Com Power	LI-215	12082	September 28, 2009	September 28, 2010
Transient Limiter	Seaward	252A910	1	September 28, 2009	September 28, 2010

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1.2 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The measurement receiver was used as a measuring meter. The data was collected with the measurement receiver in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A transient limiter was used for the protection of the measurement receiver's input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the measurement receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

The EUT Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, section 15.207.

7.1.2 Radiated Emissions (Spurious and Harmonics) Test

The measurement receiver was used as a measuring meter. A preamplifier was used to increase the sensitivity of the instrument. The measurement receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the measurement receiver records the highest measured reading over all the sweeps.

The readings were averaged by a "duty cycle correction factor", derived from 20 log (dwell time / one pulse train with blanking interval). The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
9 kHz to 150 kHz	Active Loop Antenna	200 Hz
150 kHz to 30 MHz	Active Loop Antenna	9 kHz
30 MHz to 300 MHz	Biconical Antenna	120 kHz
300 MHz to 1000 MHz	Log Periodic Antenna	120 kHz
1000 MHz to 4400 MHz	Horn Antenna	1 MHz

The final data was taken with a frequency span of 1 MHz for frequencies below 1000 MHz. For frequencies above 1000 MHz, the final data was taken with a frequency span of 10 MHz. The frequency span was reduced during the preliminary investigations as deemed necessary to distinguish between emissions from the EUT and any ambient signals.

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test (Continued)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3-meter distance to obtain final test data. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.231.

7.2 Bandwidth of the Fundamental

The -20 dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for the EUT. Plots of the -20 dB bandwidth are located in Appendix E.

Test Results:

The EUT complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231(c).

8. CONCLUSIONS

The Valve Actuator, Model: WPACT, as tested, meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B for the digital and receiver portion; and the limits defined in Subpart C, sections 15.205, 15.209, and 15.231 for the transmitter portion.

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.231 and/or FCC **Class B** specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	Valve Actuator Model: WPACT S/N: N/A

No additional models were covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

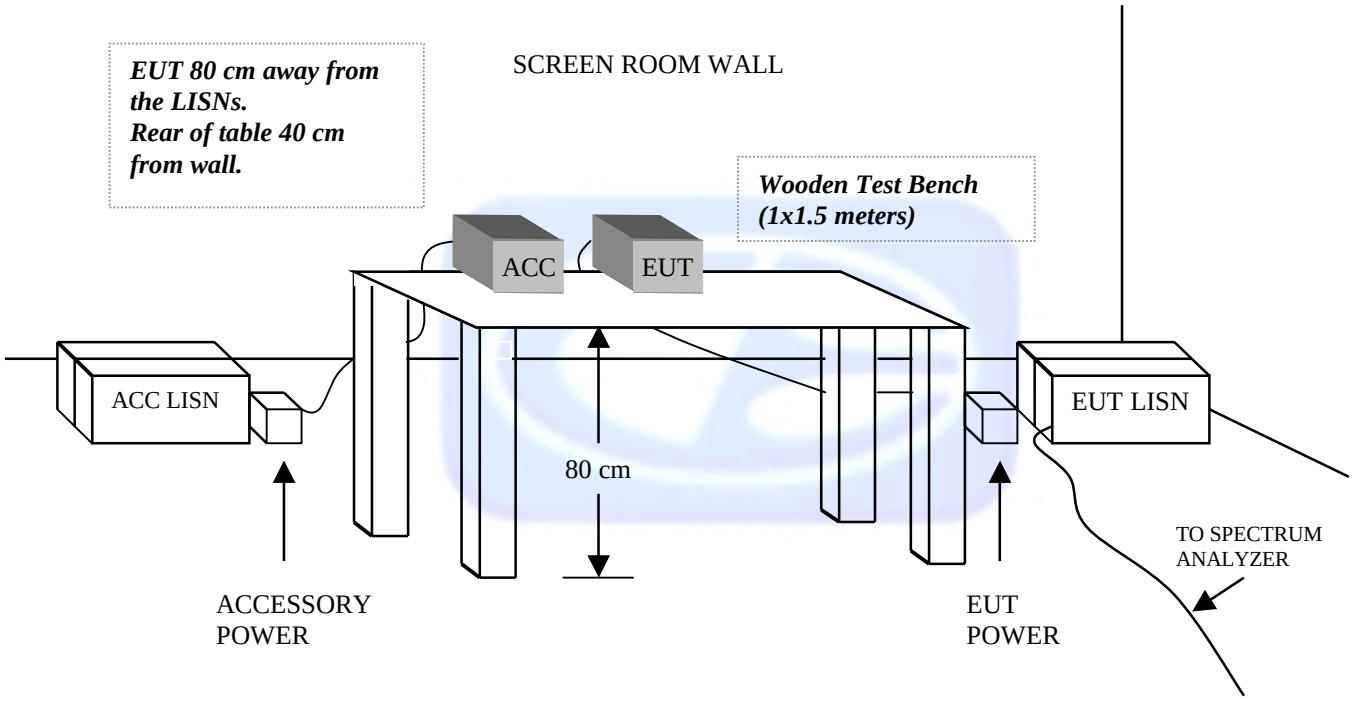
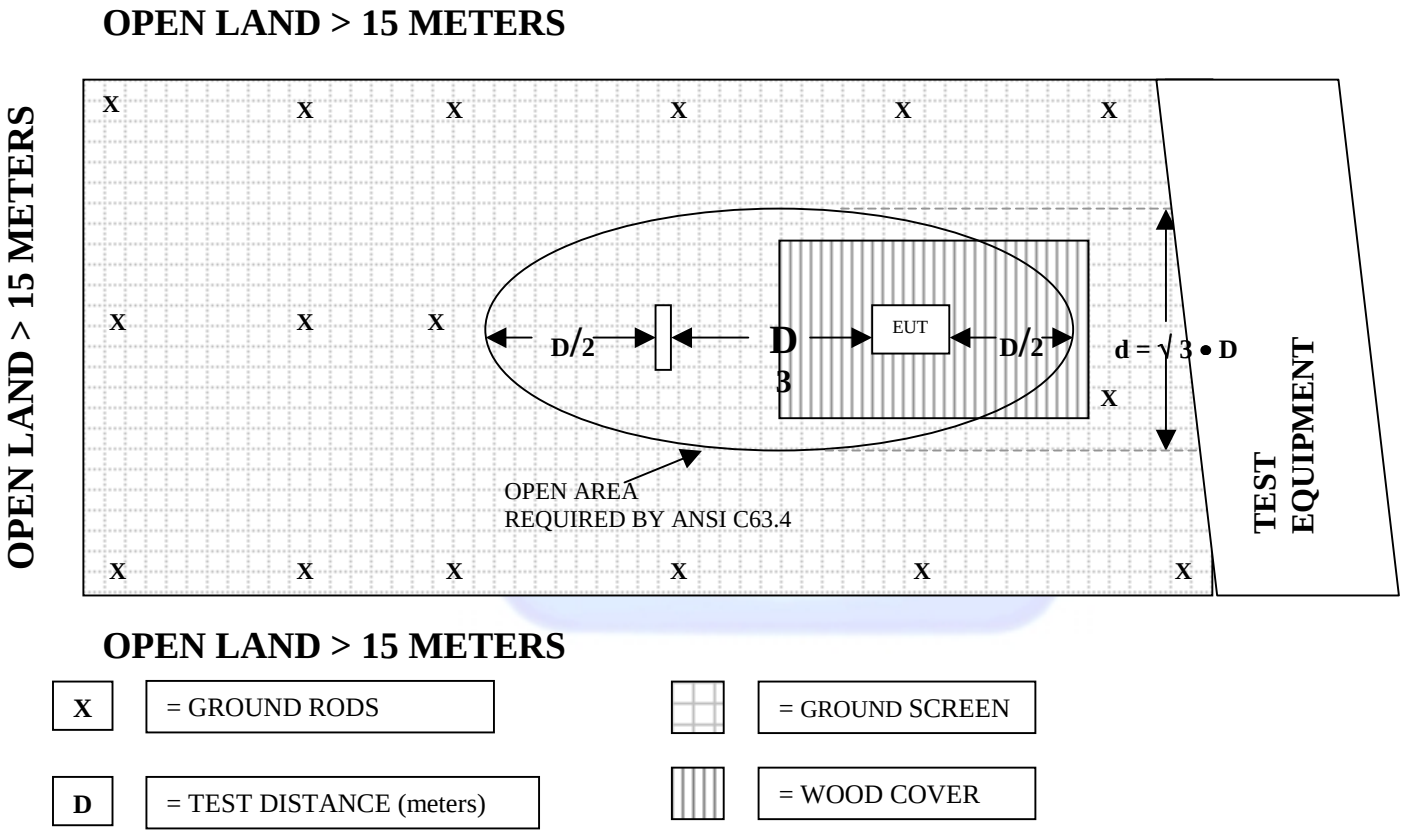


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE – 3 METERS



COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15250

CALIBRATION DATE: FEBRUARY 23, 2009

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	13.0	100	11.1
35	11.1	120	13.6
40	10.2	140	12.4
45	11.2	160	12.9
50	11.6	180	16.5
60	9.1	200	17.0
70	8.4	250	16.3
80	6.2	275	18.2
90	8.5	300	17.9

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16060

CALIBRATION DATE: JUNE 15, 2009

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	14.2	700	20.1
400	15.9	800	21.2
500	17.1	900	21.3
600	18.8	1000	22.3

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: JUNE 27, 2008

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.5	10.0	39.4
1.5	25.4	10.5	39.7
2.0	28.3	11.0	39.0
2.5	28.9	11.5	40.0
3.0	29.7	12.0	39.7
3.5	30.8	12.5	41.7
4.0	31.4	13.0	42.7
4.5	32.6	13.5	41.2
5.0	33.7	14.0	41.6
5.5	34.4	14.5	43.2
6.0	34.7	15.0	42.3
6.5	35.4	15.5	39.3
7.0	37.0	16.0	41.7
7.5	37.4	16.5	39.6
8.0	37.6	17.0	43.0
8.5	37.6	17.5	47.1
9.0	38.5	18.0	46.2
9.5	38.6		

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 12, 2009

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	39.0	300	38.8
40	39.0	350	38.8
50	38.8	400	38.7
60	38.7	450	38.6
70	38.8	500	38.3
80	38.8	550	38.9
90	39.1	600	38.4
100	39.1	650	38.8
125	38.9	700	38.4
150	38.9	750	38.5
175	38.9	800	38.3
200	38.8	850	38.4
225	39.0	900	38.1
250	38.9	950	37.4
275	38.8	1000	38.1

COM-POWER PA-122

PREAMPLIFIER

S/N: 181921

CALIBRATION DATE: MARCH 12, 2009

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	36.46	10.0	35.06
1.5	35.36	10.5	34.82
2.0	34.76	11.0	33.12
2.5	34.94	11.5	34.33
3.0	34.59	12.0	34.75
3.5	34.55	12.5	33.94
4.0	34.25	13.0	35.50
4.5	33.89	13.5	34.89
5.0	34.22	14.0	36.56
5.5	34.81	14.5	36.06
6.0	35.74	15.0	36.67
6.5	36.51	15.5	36.84
7.0	36.66	16.0	34.31
7.5	35.72	16.5	35.11
8.0	33.28	17.0	35.35
8.5	33.11	17.5	34.11
9.0	34.71	18.0	33.88
9.5	35.50	18.5	32.20

COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: SEPTEMBER 29, 2008

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-41.57	9.93
0.01	-42.06	9.44
0.02	-42.43	9.07
0.05	-42.50	9.00
0.07	-42.10	9.40
0.1	-42.03	9.47
0.2	-44.50	7.00
0.3	-41.93	9.57
0.5	-41.90	9.60
0.7	-41.73	9.77
1	-41.23	10.27
2	-40.90	10.60
3	-41.20	10.30
4	-41.30	10.20
5	-40.70	10.80
10	-41.10	10.40
15	-42.17	9.33
20	-42.00	9.50
25	-42.20	9.30
30	-43.10	8.40

FRONT VIEW

DYNAQUIP CONTROLS
VALVE ACTUATOR
MODEL: WPACT
FCC SUBPART B AND C – RADIATED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

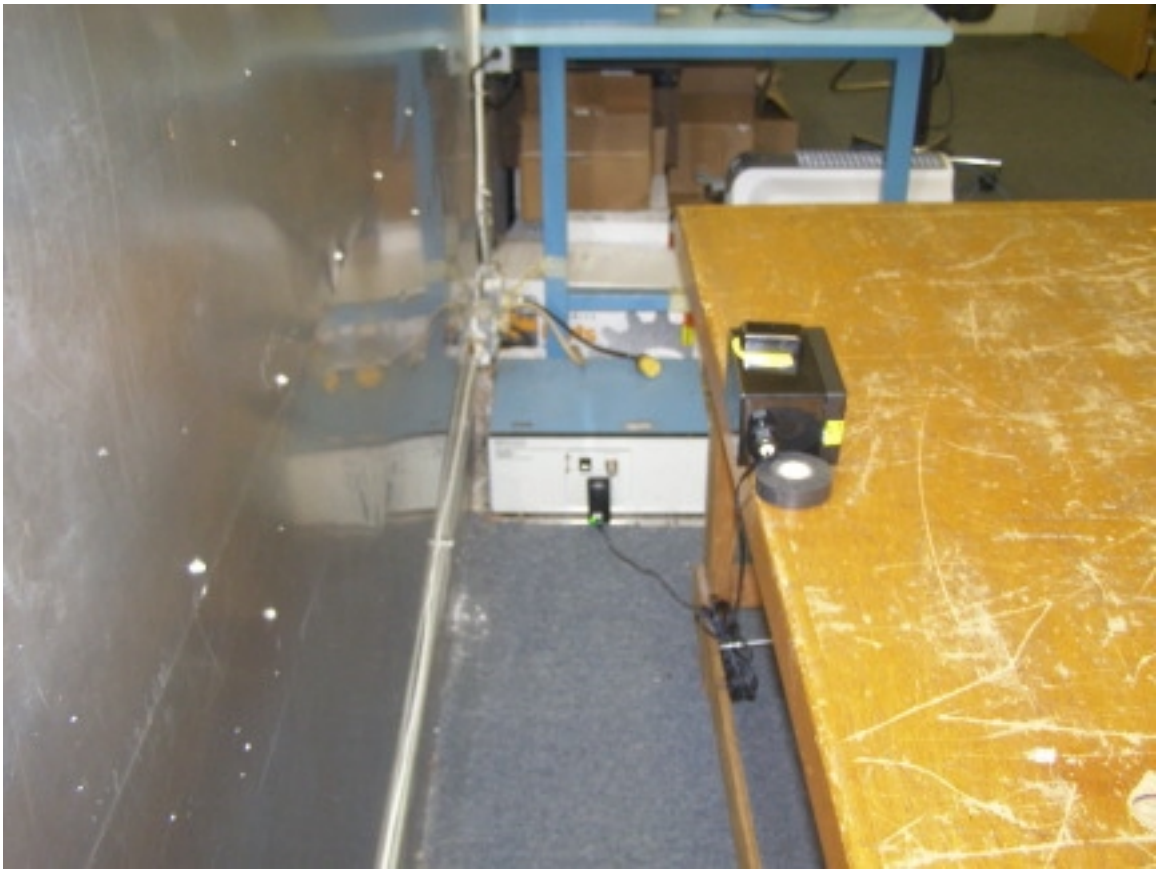
DYNAQUIP CONTROLS
VALVE ACTUATOR
MODEL: WPACT
FCC SUBPART B AND C – RADIATED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

DYNAQUIP CONTROLS
VALVE ACTUATOR
MODEL: WPACT
FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

DYNAQUIP CONTROLS
VALVE ACTUATOR
MODEL: WPACT
FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISISONS

DATA SHEETS

FCC 15.231

DynaQuip Controls
Valve Actuator
Model: WPACT

Date: 10/28/09
Labs: B and D
Tested By: Kyle Fujimoto

X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
433.92	74.35	V	100.82	-26.47	Peak	1	180	
433.92	67.56	V	80.82	-13.26	Avg	1	180	
867.84	38.29	V	80.82	-42.53	Peak	1.11	225	
867.84	31.5	V	60.82	-29.32	Avg	1.11	225	
1301.76	46.31	V	74	-27.69	Peak	1.25	135	
1301.76	39.52	V	54	-14.48	Avg	1.25	135	
1735.68	48.37	V	80.82	-32.45	Peak	1.35	150	
1735.68	41.58	V	60.82	-19.24	Avg	1.35	150	
2169.6	47.56	V	80.82	-33.26	Peak	1.25	165	
2169.6	40.77	V	60.82	-20.05	Avg	1.25	165	
2603.52	50.13	V	80.82	-30.69	Peak	1.35	155	
2603.52	43.34	V	60.82	-17.48	Avg	1.35	155	
3037.44	52.14	V	80.82	-28.68	Peak	1.55	165	
3037.44	45.35	V	60.82	-15.47	Avg	1.55	165	
3471.36	46.93	V	80.82	-33.89	Peak	1.25	135	
3471.36	40.14	V	60.82	-20.68	Avg	1.25	135	
3905.28	47.19	V	74	-26.81	Peak	1.35	155	
3905.28	40.4	V	54	-13.6	Avg	1.35	155	
4339.2	42.35	V	74	-31.65	Peak	1.25	155	
4339.2	35.56	V	54	-18.44	Avg	1.25	155	

FCC 15.231

DynaQuip Controls
Valve Actuator
Model: WPACT

Date: 10/28/09
Labs: B and D
Tested By: Kyle Fujimoto

X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
433.92	84.29	H	100.82	-16.53	Peak	1	180	
433.92	77.5	H	80.82	-3.32	Avg	1	180	
867.84	43.55	H	80.82	-37.27	Peak	1	90	
867.84	36.76	H	60.82	-24.06	Avg	1	90	
1301.76	44.86	H	74	-29.14	Peak	1.25	135	
1301.76	38.07	H	54	-15.93	Avg	1.25	135	
1735.68	46.58	H	80.82	-34.24	Peak	1.35	155	
1735.68	39.79	H	60.82	-21.03	Avg	1.35	155	
2169.6	48.04	H	80.82	-32.78	Peak	1.55	165	
2169.6	41.25	H	60.82	-19.57	Avg	1.55	165	
2603.52	51.31	H	80.82	-29.51	Peak	1.35	155	
2603.52	44.52	H	60.82	-16.3	Avg	1.35	155	
3037.44	57.01	H	80.82	-23.81	Peak	1.65	135	
3037.44	50.22	H	60.82	-10.6	Avg	1.65	135	
3471.36	45.91	H	80.82	-34.91	Peak	1.69	155	
3471.36	39.12	H	60.82	-21.7	Avg	1.69	155	
3905.28	42.62	H	74	-31.38	Peak	1.58	135	
3905.28	35.83	H	54	-18.17	Avg	1.58	135	
4339.2	43.11	H	74	-30.89	Peak	1.25	135	
4339.2	36.32	H	54	-17.68	Avg	1.25	135	

FCC 15.231

DynaQuip Controls
Valve Actuator
Model: WPACT

Date: 10/28/09
Labs: B and D
Tested By: Kyle Fujimoto

Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
433.92	86.29	V	100.82	-14.53	Peak	1.25	135	
433.92	79.5	V	80.82	-1.32	Avg	1.25	135	
867.84	55.8	V	80.82	-25.02	Peak	1.35	215	
867.84	49.01	V	60.82	-11.81	Avg	1.35	215	
1301.76	49.68	V	74	-24.32	Peak	1.25	135	
1301.76	42.89	V	54	-11.11	Avg	1.25	135	
1735.68	53.25	V	80.82	-27.57	Peak	1.35	150	
1735.68	46.46	V	60.82	-14.36	Avg	1.35	150	
2169.6	52.21	V	80.82	-28.61	Peak	1.25	165	
2169.6	45.42	V	60.82	-15.4	Avg	1.25	165	
2603.52	53.58	V	80.82	-27.24	Peak	1.35	155	
2603.52	46.79	V	60.82	-14.03	Avg	1.35	155	
3037.44	55.16	V	80.82	-25.66	Peak	1.55	165	
3037.44	48.37	V	60.82	-12.45	Avg	1.55	165	
3471.36	48.36	V	80.82	-32.46	Peak	1.25	135	
3471.36	41.57	V	60.82	-19.25	Avg	1.25	135	
3905.28	50.36	V	74	-23.64	Peak	1.35	155	
3905.28	43.57	V	54	-10.43	Avg	1.35	155	
4339.2	45.36	V	74	-28.64	Peak	1.25	155	
4339.2	38.57	V	54	-15.43	Avg	1.25	155	

FCC 15.231

DynaQuip Controls
Valve Actuator
Model: WPACT

Date: 10/28/09
Labs: B and D
Tested By: Kyle Fujimoto

Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
433.92	68.65	H	100.82	-32.17	Peak	1.25	135	
433.92	61.86	H	80.82	-18.96	Avg	1.25	135	
867.84	43.45	H	80.82	-37.37	Peak	1.35	150	
867.84	36.66	H	60.82	-24.16	Avg	1.35	150	
1301.76	45.13	H	74	-28.87	Peak	1.25	225	
1301.76	38.34	H	54	-15.66	Avg	1.25	225	
1735.68	49.41	H	80.82	-31.41	Peak	1.35	135	
1735.68	42.62	H	60.82	-18.2	Avg	1.35	135	
2169.6	46.07	H	80.82	-34.75	Peak	1.55	165	
2169.6	39.28	H	60.82	-21.54	Avg	1.55	165	
2603.52	54.63	H	80.82	-26.19	Peak	1.69	135	
2603.52	47.84	H	60.82	-12.98	Avg	1.69	135	
3037.44	54.76	H	80.82	-26.06	Peak	1.69	155	
3037.44	47.97	H	60.82	-12.85	Avg	1.69	155	
3471.36	47.38	H	80.82	-33.44	Peak	1.39	165	
3471.36	40.59	H	60.82	-20.23	Avg	1.39	165	
3905.28	47.11	H	74	-26.89	Peak	1.55	135	
3905.28	40.32	H	54	-13.68	Avg	1.55	135	
4339.2	42.14	H	74	-31.86	Peak	1.35	155	
4339.2	35.35	H	54	-18.65	Avg	1.35	155	

Test Location : Compatible Electronics **Page** : 1/1
Customer : DynaQuip Controls **Date** : 11/02/2009
Manufacturer : DynaQuip Controls **Time** : 9:22:45
Eut name : Valve Actuator **Lab** : D
Model : WPACT **Test Distance** : 3 Meters
Serial # : N/A
Specification : FCC Class B
Distance correction factor (20 * log(test/spec) : 0.00
Test Mode : Test Type: Radiated Emissions Qual - Tx Mode (Worst Case)
Test Range: 9 kHz to 1 GHz (Vertical and Horizontal)
Test Engineer: Kyle Fujimoto
AC Adapter: Model: FJ-SW1280r044

Pol	Freq	Rdng	Cable loss	Ant factor	Amp gain	Cor'd rdg = R	Limit = L	Delta R-L
	MHz	dBuV	dB	dB	dB	dBuV	dBuV/m	dB
1V	55.028	60.40	1.25	10.29	38.75	33.19	40.00	-6.81
2H	58.440	48.70	1.29	9.46	38.71	20.73	40.00	-19.27
3V	59.600	65.50	1.30	9.19	38.70	37.28	40.00	-2.72
4H	59.720	42.90	1.30	9.16	38.70	14.66	40.00	-25.34
5V	60.320	64.80	1.30	9.08	38.70	36.47	40.00	-3.53
6V	79.520	48.80	1.40	6.30	38.80	17.69	40.00	-22.31
7V	115.160	45.00	1.73	13.04	38.97	20.79	43.50	-22.71
8V	125.248	45.90	1.80	13.27	38.90	22.07	43.50	-21.43
9V	131.600	43.20	1.83	12.88	38.90	19.01	43.50	-24.49
10V	151.311	37.90	1.91	12.69	38.90	13.60	43.50	-29.90
11V	203.480	37.10	2.21	16.95	38.83	17.43	43.50	-26.07
12V	272.234	34.60	2.69	18.00	38.81	16.48	46.00	-29.52
13V	349.878	39.10	3.10	15.11	38.80	18.51	46.00	-27.49
14V	405.156	39.50	3.32	15.97	38.69	20.10	46.00	-25.90
15H	467.450	35.50	3.43	16.74	38.49	17.17	46.00	-28.83
16V	499.770	44.00	3.30	17.10	38.30	26.10	46.00	-19.90
17H	730.250	35.60	4.12	20.45	38.46	21.71	46.00	-24.29
18V	825.240	35.50	4.30	21.23	38.35	22.68	46.00	-23.32
19H	975.650	33.50	5.12	22.07	37.76	22.92	54.00	-31.08

FCC 15.231 and FCC Class B

DynaQuip Controls
Valve Actuator
Model: WPACT

Date: 10/28/09
Labs: B and D
Tested By: Kyle Fujimoto

Digital Portion and Non-Harmonic Emissions Above 1000 MHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Detected
								from the Digital Portion of the EUT
								from 1000 MHz to 4400 MHz
								in Both Vertical and Horizontal
								Polarizations
								No Emissions Detected
								from the Non-Harmonic Portion
								of the EUT from
								1000 MHz to 4400 MHz
								in Both Vertical and Horizontal
								Polarizations

FCC Class B

DynaQuip Controls
Valve Actuator
Model: WPACT

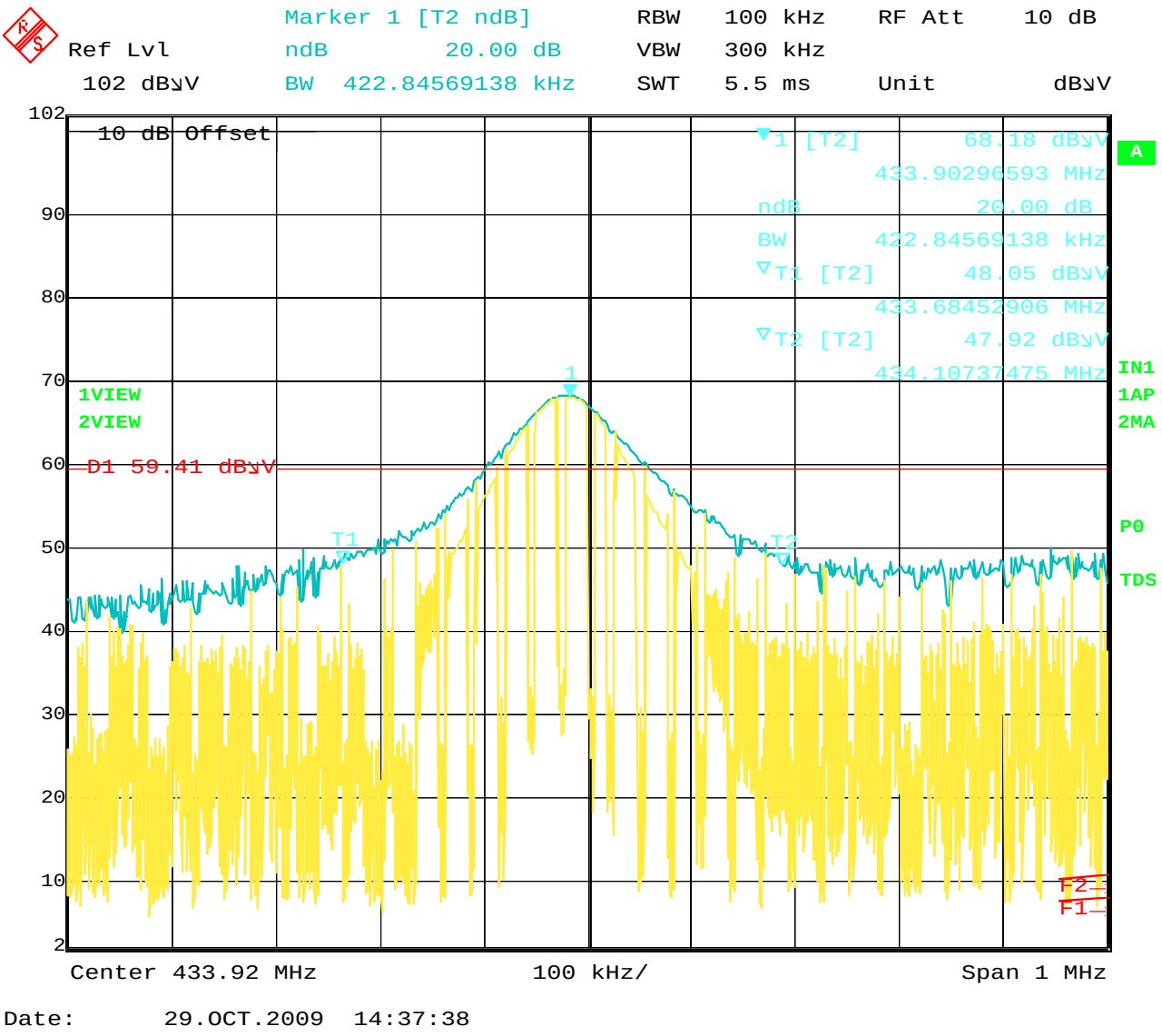
Date: 10/28/09
Labs: B and D
Tested By: Kyle Fujimoto

Receiver Portion

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Detected
								from the Receiver Portion of the EUT
								from 1000 MHz to 4400 MHz
								in Both Vertical and Horizontal
								Polarizations

-20 dB BANDWIDTH

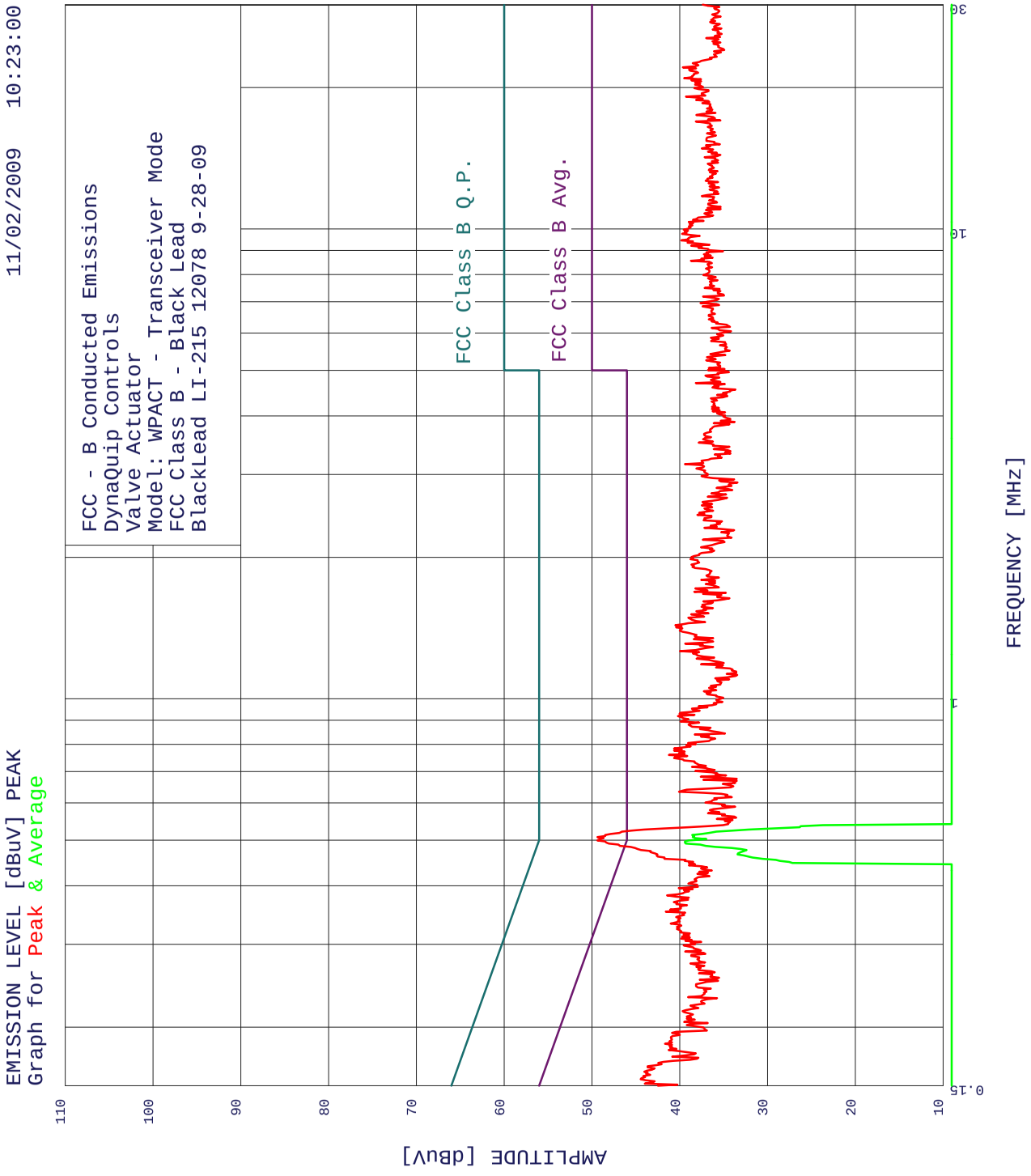
DATA SHEET



-20 dB Bandwidth of the Fundamental

CONDUCTED EMISSIONS

DATA SHEETS


11/02/2009 10:23:00
FCC - B Conducted Emissions
DynaQuip Controls
Valve Actuator
Model: WPACT - Transceiver Mode
FCC Class B - Black Lead
BlackLead LI-215 12078 9-28-09
FCC Class B Q.P.
FCC Class B Avg.
EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
AMPLITUDE [dBuV]
FREQUENCY [MHz]
110
100
90
80
70
60
50
40
30
20
10
30
1
0.15

FCC - B Conducted Emissions
DynaQuip Controls
Valve Actuator
Model: WPACT - Transceiver Mode
FCC Class B - Black Lead
BlackLead LI-215 12078 9-28-09
TEST ENGINEER : Kyle Fujimoto

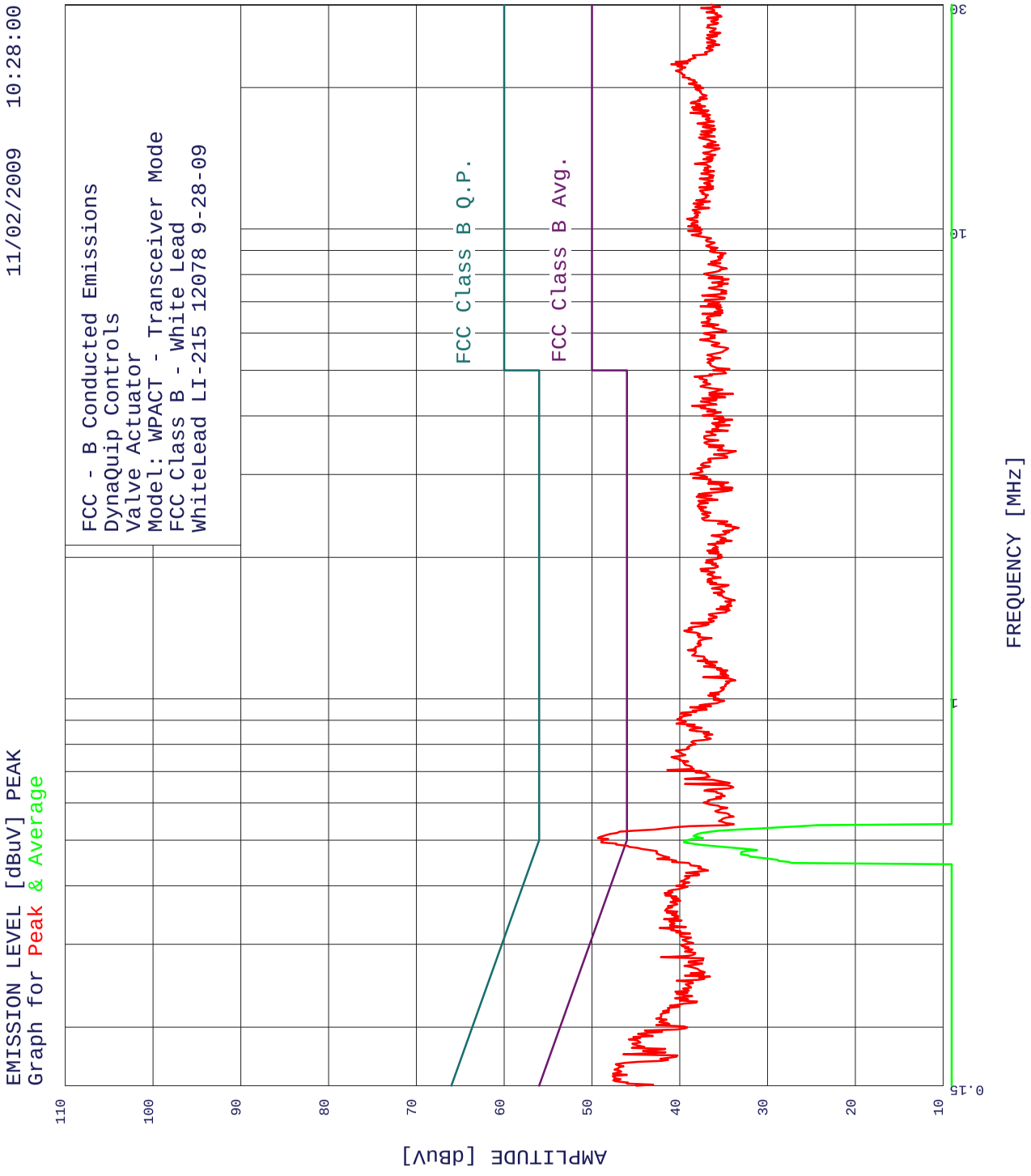
---

49 highest peaks above -50.00 dB of FCC Class B Avg. limit line
Peak criteria : 1.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.500	49.37	46.01	3.36**
2	0.759	41.23	46.00	-4.77
3	0.783	40.64	46.00	-5.36
4	0.747	40.62	46.00	-5.38
5	1.434	40.49	46.00	-5.51
6	0.919	40.20	46.00	-5.80
7	0.634	40.07	46.00	-5.93
8	0.929	40.00	46.00	-6.00
9	1.262	39.97	46.00	-6.03
10	3.158	39.41	46.00	-6.59
11	1.311	39.37	46.00	-6.63
12	0.381	41.44	48.25	-6.81
13	1.488	39.00	46.00	-7.00
14	0.881	38.98	46.00	-7.02
15	1.981	38.76	46.00	-7.24
16	1.512	38.70	46.00	-7.30
17	0.352	41.58	48.91	-7.33
18	0.716	38.61	46.00	-7.39
19	1.338	38.38	46.00	-7.62
20	1.690	38.33	46.00	-7.67
21	0.839	38.26	46.00	-7.74
22	1.717	38.23	46.00	-7.77
23	0.701	38.20	46.00	-7.80
24	0.396	40.11	47.95	-7.83
25	4.696	38.16	46.00	-7.84
26	0.369	40.65	48.52	-7.87
27	1.536	38.10	46.00	-7.90
28	1.217	38.06	46.00	-7.94
29	2.462	37.98	46.00	-8.02
30	3.511	37.82	46.00	-8.18
31	0.963	37.82	46.00	-8.18
32	0.862	37.67	46.00	-8.33
33	0.332	41.00	49.39	-8.39
34	0.683	37.60	46.00	-8.40
35	2.100	37.57	46.00	-8.43
36	1.184	37.56	46.00	-8.44
37	1.790	37.54	46.00	-8.46
38	1.569	37.51	46.00	-8.49
39	2.582	37.49	46.00	-8.51
40	2.624	37.39	46.00	-8.61
41	2.179	37.37	46.00	-8.63
42	1.671	37.32	46.00	-8.68
43	3.565	37.32	46.00	-8.68
44	1.611	37.31	46.00	-8.69
45	0.672	37.29	46.00	-8.71
46	1.038	37.24	46.00	-8.76
47	0.404	39.00	47.77	-8.76
48	2.310	37.18	46.00	-8.82
49	0.601	37.06	46.00	-8.94

** Please See the Average Readings on the Next Page and on the Plot

```
FCC - B Conducted Emissions
DynaQuip Controls
Valve Actuator
Model: WPACT - Transceiver Mode
FCC Class B - Black Lead
BlackLead LI-215 12078 9-28-09
TEST ENGINEER :  Kyle Fujimoto
-------------------------------------------------
4 highest peaks above -50.00 dB of FCC Class B Avg. limit line
Peak criteria :  0.00 dB, Curve : Average
Peak#  Freq(MHz)  Amp(dBuV)  Limit(dB)  Delta(dB)
  1     0.494     39.40       46.09      -6.69
  2     0.513     38.56       46.00      -7.44
  3     0.508     38.51       46.00      -7.49
  4     0.466     33.41       46.58     -13.16
-------------------------------------------------
```


11/02/2009 10:28:00
FCC - B Conducted Emissions
DynaQuip Controls
Valve Actuator
Model: WPACT - Transceiver Mode
FCC Class B - White Lead
WhiteLead LI-215 12078 9-28-09
FCC Class B Q.P.
FCC Class B Avg.
EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
AMPLITUDE [dBuV]
FREQUENCY [MHz]
110
100
90
80
70
60
50
40
30
20
10
30
1
0.15

FCC - B Conducted Emissions
DynaQuip Controls
Valve Actuator
Model: WPACT - Transceiver Mode
FCC Class B - White Lead
WhiteLead LI-215 12078 9-28-09
TEST ENGINEER : Kyle Fujimoto

49 highest peaks above -50.00 dB of FCC Class B Avg. limit line
Peak criteria : 1.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.505	49.32	46.00	3.32**
2	0.457	42.56	46.76	-4.20**
3	0.705	41.40	46.00	-4.60
4	0.751	40.92	46.00	-5.08
5	0.775	40.43	46.00	-5.57
6	0.885	40.38	46.00	-5.62
7	0.904	40.29	46.00	-5.71
8	0.929	39.90	46.00	-6.10
9	0.385	41.73	48.16	-6.44
10	1.397	39.48	46.00	-6.52
11	0.676	39.39	46.00	-6.61
12	0.658	39.38	46.00	-6.62
13	1.269	39.06	46.00	-6.94
14	0.858	38.87	46.00	-7.13
15	0.958	38.81	46.00	-7.19
16	0.354	41.66	48.87	-7.21
17	3.011	38.77	46.00	-7.23
18	0.325	42.29	49.57	-7.29
19	1.449	38.68	46.00	-7.32
20	4.204	38.60	46.00	-7.40
21	0.400	40.41	47.86	-7.44
22	0.339	41.77	49.22	-7.45
23	0.350	41.46	48.95	-7.49
24	2.948	38.47	46.00	-7.53
25	4.851	38.32	46.00	-7.68
26	0.159	47.58	55.51	-7.93
27	2.693	38.07	46.00	-7.93
28	0.157	47.61	55.60	-7.99
29	2.568	37.96	46.00	-8.04
30	0.426	39.29	47.33	-8.04
31	1.204	37.95	46.00	-8.05
32	0.336	41.17	49.31	-8.13
33	2.722	37.87	46.00	-8.13
34	2.637	37.87	46.00	-8.13
35	0.969	37.71	46.00	-8.29
36	0.175	46.43	54.72	-8.30
37	0.188	45.81	54.10	-8.30
38	1.889	37.64	46.00	-8.36
39	4.624	37.61	46.00	-8.39
40	4.294	37.60	46.00	-8.40
41	3.141	37.58	46.00	-8.42
42	4.361	37.41	46.00	-8.59
43	4.008	37.40	46.00	-8.60
44	0.282	42.14	50.76	-8.62
45	1.112	37.34	46.00	-8.66
46	0.601	37.26	46.00	-8.74
47	1.172	37.25	46.00	-8.75
48	3.624	37.19	46.00	-8.81
49	3.511	37.19	46.00	-8.81

** Please See the Average Readings on the Next Page and on the Plot

```
FCC - B Conducted Emissions
DynaQuip Controls
Valve Actuator
Model: WPACT - Transceiver Mode
FCC Class B - White Lead
WhiteLead LI-215 12078 9-28-09
TEST ENGINEER :  Kyle Fujimoto
-------------------------------------------------
3 highest peaks above -50.00 dB of FCC Class B Avg. limit line
Peak criteria :  0.00 dB, Curve : Average
Peak#  Freq(MHz)  Amp(dBuV)  Limit(dB)  Delta(dB)
  1     0.497     39.49       46.05      -6.56
  2     0.510     38.43       46.00      -7.57
  3     0.469     33.01       46.53     -13.52
-------------------------------------------------
```