

**FCC PART 15 SUBPART B and C
TEST REPORT***for***MONITORING STATION****Model: WPMSH**

Prepared for

DYNAQUIP CONTROLS
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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: Monitoring Station
Model: WPMSH
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 29, 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: 44.10 dBuV @ 22.545 MHz (*U _c = 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: 79.42 dBuV @ 433.92 MHz (*U _c = 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 Monitoring Station, Model: WPMSH. 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 Monitoring Station, Model: WPMSH (EUT) was connected to eight water sensors, an electric actuator, and a switching adaptor via its water sensor, remote valve, and power ports, respectively. The EUT also had unterminated cables connected to the REM INTFC, Alarm, and Trouble ports. The EUT was constantly transmitting.

Receive Mode: The Monitoring Station, Model: WPMSH (EUT) was connected to eight water sensors, an electric actuator, and a switching adaptor via its water sensor, remote valve, and power ports, respectively. The EUT also had unterminated cables connected to the REM INTFC, Alarm, and Trouble ports. 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 within 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 1-meter unshielded cable connecting the EUT to the electric actuator. The cable is hard wired at the electric actuator end and is hard wired into a 5-pin terminal block at the EUT end.
- Cable 2** This is a 1-meter unshielded, unterminated cable connected to the EUT's REM INTFC port. The cable has an RJ-45 connector at each end.
- Cables 3-4** These are 1-meter unshielded, unterminated cables connected to the EUT's Alarm port. The cables are hard wired into a 2-pin terminal block at the EUT end.
- Cables 5-6** These are 1-meter unshielded, unterminated cables connected to the EUT's Trouble port. The cables are hard wired into a 2-pin terminal block at the EUT end.
- Cable 7** This is a 2.5-meter unshielded cable connecting water sensor #1 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 8** This is a 2.5-meter unshielded cable connecting water sensor #2 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 9** This is a 2.5-meter unshielded cable connecting water sensor #3 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 10** This is a 2.5-meter unshielded cable connecting water sensor #4 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 11** This is a 2.5-meter unshielded cable connecting water sensor #5 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 12** This is a 2.5-meter unshielded cable connecting water sensor #6 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 13** This is a 2.5-meter unshielded cable connecting water sensor #7 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 14** This is a 2.5-meter unshielded cable connecting water sensor #8 to the EUT. The cable is hard wired into the water sensor and is hard wired into a 2-pin terminal block at the EUT end. The cable was bundled to a length of 40-centimeters.
- Cable 15** This is a 3-meter unshielded cable connecting the switching adaptor to the EUT. The cable is hard wired into the switching adaptor and is hard wired into a 2-pin terminal block at the EUT end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
MONITORING STATION (EUT)	DYNAQUIP CONTROLS	WPMSH	N/A	TBD
SWITCHING ADAPTOR FOR EUT	N/A	FJ-SW1280r044	N/A	N/A
ELECTRIC ACTUATOR	DYNAQUIP CONTROLS	DE153H NEMA 4X	050149	N/A
(8) WATER SENSORS	DYNAQUIP CONTROLS	N/A	N/A	N/A

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	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.

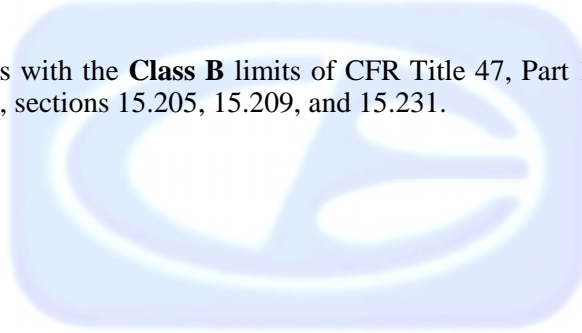
The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. 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 Monitoring Station, Model: WPMSH, 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***

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Ajoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Monitoring Station
Model: WPMSH
S/N: N/A

No additional models were covered under this report.



APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

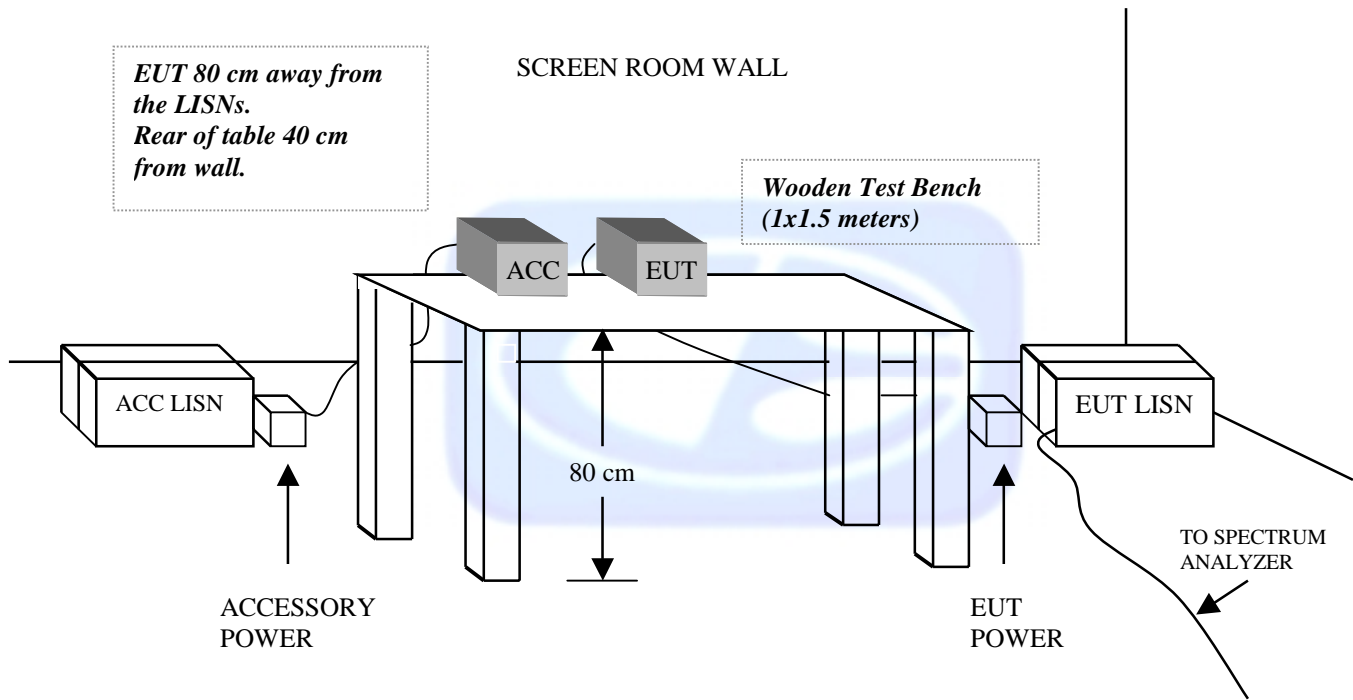
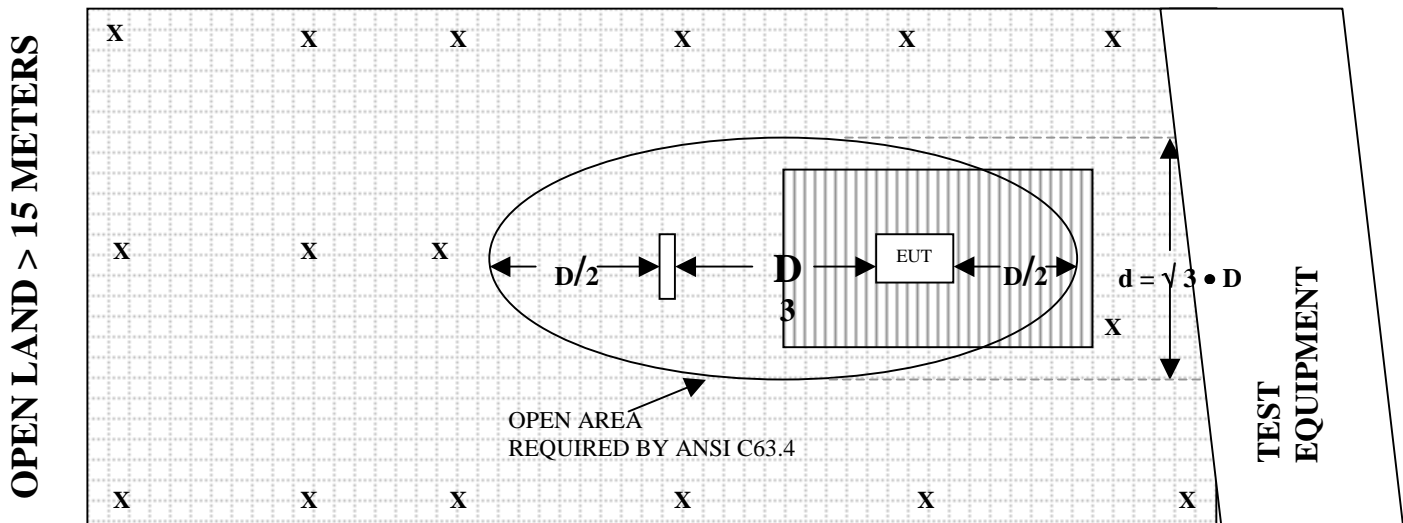


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE – 3 METERS

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

- | | | | |
|----------|--------------------------|--|-----------------|
| X | = GROUND RODS | | = GROUND SCREEN |
| D | = TEST DISTANCE (meters) | | = WOOD COVER |

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
MONITORING STATION
MODEL: WPMSH**

FCC SUBPART B AND C – RADIATED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Ajoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



REAR VIEW

DYNAQUIP CONTROLS
MONITORING STATION
MODEL: WPMSH

FCC SUBPART B AND C – RADIATED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Ajoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



FRONT VIEW

**DYNAQUIP CONTROLS
MONITORING STATION
MODEL: WPMSH**

FCC SUBPART B AND C – CONDUCTED EMISSIONS

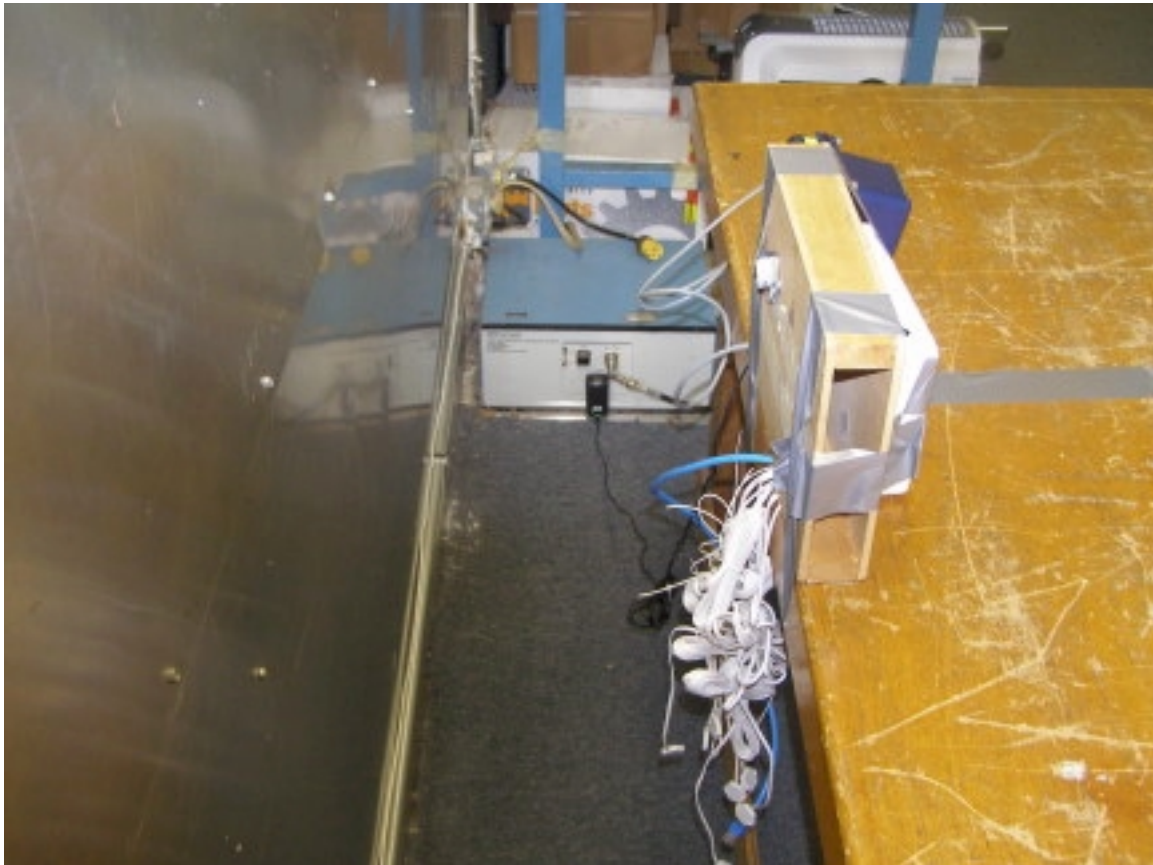
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

**Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500**

**Ajoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600**

**Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700**

**Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400**

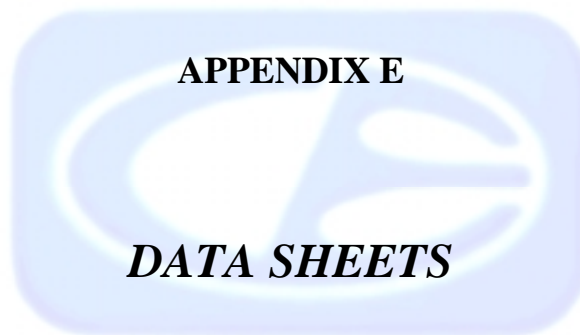


REAR VIEW

DYNAQUIP CONTROLS
MONITORING STATION
MODEL: WPMSH

FCC SUBPART B AND C – CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



RADIATED EMISIONS

DATA SHEETS

FCC 15.231

DynaQuip Controls
 Monitoring Station
 Model: WPMSH

Date: 10/29/09
 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	83.26	V	100.82	-17.56	Peak	1.25	135	
433.92	76.47	V	80.82	-4.35	Avg	1.25	135	
867.84	42.55	V	80.82	-38.27	Peak	1.36	145	
867.84	35.76	V	60.82	-25.06	Avg	1.36	145	
1301.76	41.06	V	74	-32.94	Peak	1.58	135	
1301.76	34.27	V	54	-19.73	Avg	1.58	135	
1735.68	40.16	V	80.82	-40.66	Peak	1.98	165	
1735.68	33.37	V	60.82	-27.45	Avg	1.98	165	
2169.6	48.25	V	80.82	-32.57	Peak	1.25	135	
2169.6	41.46	V	60.82	-19.36	Avg	1.25	135	
2603.52	38.07	V	80.82	-42.75	Peak	1.35	225	
2603.52	31.28	V	60.82	-29.54	Avg	1.35	225	
3037.44	43.68	V	80.82	-37.14	Peak	1.25	135	
3037.44	36.89	V	60.82	-23.93	Avg	1.25	135	
3471.36	42.21	V	80.82	-38.61	Peak	1.35	155	
3471.36	35.42	V	60.82	-25.4	Avg	1.35	155	
3905.28	40.97	V	74	-33.03	Peak	1.25	158	
3905.28	34.18	V	54	-19.82	Avg	1.25	158	
4339.2	40.92	V	74	-33.08	Peak	1.35	175	
4339.2	34.13	V	54	-19.87	Avg	1.35	175	

FCC 15.231

DynaQuip Controls
 Monitoring Station
 Model: WPMSH

Date: 10/29/09
 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	80.15	H	100.82	-20.67	Peak	1.25	135	
433.92	73.36	H	80.82	-7.46	Avg	1.25	135	
867.84	47.75	H	80.82	-33.07	Peak	1.25	135	
867.84	40.96	H	60.82	-19.86	Avg	1.25	135	
1301.76	42.05	H	74	-31.95	Peak	1.35	155	
1301.76	35.26	H	54	-18.74	Avg	1.35	155	
1735.68	41.66	H	80.82	-39.16	Peak	1.25	155	
1735.68	34.87	H	60.82	-25.95	Avg	1.25	155	
2169.6	49.01	H	80.82	-31.81	Peak	1.35	155	
2169.6	42.22	H	60.82	-18.6	Avg	1.35	155	
2603.52	38.03	H	80.82	-42.79	Peak	1.45	165	
2603.52	31.24	H	60.82	-29.58	Avg	1.45	165	
3037.44	42.25	H	80.82	-38.57	Peak	1.55	135	
3037.44	35.46	H	60.82	-25.36	Avg	1.55	135	
3471.36	40.44	H	80.82	-40.38	Peak	1.65	158	
3471.36	33.65	H	60.82	-27.17	Avg	1.65	158	
3905.28	41.41	H	74	-32.59	Peak	1.75	180	
3905.28	34.62	H	54	-19.38	Avg	1.75	180	
4339.2	42.22	H	74	-31.78	Peak	1.55	165	
4339.2	35.43	H	54	-18.57	Avg	1.55	165	

FCC 15.231

DynaQuip Controls
 Monitoring Station
 Model: WPMSH

Date: 10/29/09
 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	86.21	V	100.82	-14.61	Peak	1.25	135	
433.92	79.42	V	80.82	-1.4	Avg	1.25	135	
867.84	38.29	V	80.82	-42.53	Peak	1.35	215	
867.84	31.5	V	60.82	-29.32	Avg	1.35	215	
1301.76	39.43	V	74	-34.57	Peak	1.25	315	
1301.76	32.64	V	54	-21.36	Avg	1.25	315	
1735.68	40.52	V	80.82	-40.3	Peak	1.35	225	
1735.68	33.73	V	60.82	-27.09	Avg	1.35	225	
2169.6	43.82	V	80.82	-37	Peak	1.25	135	
2169.6	37.03	V	60.82	-23.79	Avg	1.25	135	
2603.52	38.31	V	80.82	-42.51	Peak	1.35	155	
2603.52	31.52	V	60.82	-29.3	Avg	1.35	155	
3037.44	40.96	V	80.82	-39.86	Peak	1.25	135	
3037.44	34.17	V	60.82	-26.65	Avg	1.25	135	
3471.36	42.75	V	80.82	-38.07	Peak	1.35	150	
3471.36	35.96	V	60.82	-24.86	Avg	1.35	150	
3905.28	41.96	V	74	-32.04	Peak	1.25	150	
3905.28	35.17	V	54	-18.83	Avg	1.25	150	
4339.2	42.65	V	74	-31.35	Peak	1.35	155	
4339.2	35.86	V	54	-18.14	Avg	1.35	155	

FCC 15.231

DynaQuip Controls
 Monitoring Station
 Model: WPMSH

Date: 10/29/09
 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	81.55	H	100.82	-19.27	Peak	1	180	
433.92	74.76	H	80.82	-6.06	Avg	1	180	
867.84	48.46	H	80.82	-32.36	Peak	1	90	
867.84	41.67	H	60.82	-19.15	Avg	1	90	
1301.76	44.84	H	74	-29.16	Peak	1.25	135	
1301.76	38.05	H	54	-15.95	Avg	1.25	135	
1735.68	40.36	H	80.82	-40.46	Peak	1.35	165	
1735.68	33.57	H	60.82	-27.25	Avg	1.35	165	
2169.6	44.51	H	80.82	-36.31	Peak	1.25	135	
2169.6	37.72	H	60.82	-23.1	Avg	1.25	135	
2603.52	37.85	H	80.82	-42.97	Peak	1.35	150	
2603.52	31.06	H	60.82	-29.76	Avg	1.35	150	
3037.44	41.35	H	80.82	-39.47	Peak	1.25	165	
3037.44	34.56	H	60.82	-26.26	Avg	1.25	165	
3471.36	41.02	H	80.82	-39.8	Peak	1.35	155	
3471.36	34.23	H	60.82	-26.59	Avg	1.35	155	
3905.28	41.54	H	74	-32.46	Peak	1.25	165	
3905.28	34.75	H	54	-19.25	Avg	1.25	165	
4339.2	41.42	H	74	-32.58	Peak	1.25	175	
4339.2	34.63	H	54	-19.37	Avg	1.25	175	

FCC Class B

 DynaQuip Controls
 Monitoring Station
 Model: WPMSH

 Date: 10/29/09
 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

FCC 15.231 and FCC Class B

DynaQuip Controls
 Monitoring Station
 Model: WPMSH

Date: 10/29/09
 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

Test Location : Compatible Electronics	Page : 1/2
Customer : DynaQuip Controls	Date : 10/29/2009
Manufacturer : DynaQuip Controls	Time : 13:20:53
Eut name : Monitoring Station	Lab : D
Model : WPMSH	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 Qualification	
Test Range: 10 kHz to 1000 MHz (Vertical and Horizontal)	
Test Engineer: Kyle Fujimoto	
EUT Operating Mode: Transceiver Mode (Worst Case)	

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
1H	30.090	55.40	0.80	12.96	39.00	30.17	40.00	-9.83
2H	43.240	54.50	1.07	10.86	38.93	27.50	40.00	-12.50
3V	43.740	62.70	1.08	10.96	38.92	35.82	40.00	-4.18
4V	44.080	60.50	1.09	11.02	38.91	33.70	40.00	-6.30
5V	58.180	63.40	1.28	9.52	38.72	35.49	40.00	-4.51
6V	58.250	65.00	1.28	9.51	38.72	37.07	40.00	-2.93
7H	65.920	46.00	1.30	8.67	38.76	17.21	40.00	-22.79
8V	68.035	54.30	1.30	8.53	38.78	25.35	40.00	-14.65
9V	71.846	60.10	1.32	7.97	38.80	30.59	40.00	-9.41
10H	77.500	45.70	1.38	6.72	38.80	15.00	40.00	-25.00
11V	85.131	53.30	1.45	7.41	38.96	23.21	40.00	-16.79
12V	89.631	51.00	1.50	8.42	39.09	21.83	43.50	-21.67
13V	98.975	61.10	1.59	10.85	39.10	34.44	43.50	-9.06
14V	104.807	61.20	1.64	11.74	39.06	35.53	43.50	-7.97
15V	109.488	55.10	1.68	12.34	39.02	30.11	43.50	-13.39
16H	113.260	50.90	1.71	12.81	38.99	26.43	43.50	-17.07
17V	145.477	52.10	1.88	12.54	38.90	27.63	43.50	-15.87
18H	146.380	44.00	1.89	12.57	38.90	19.55	43.50	-23.95
19V	153.812	48.60	1.93	12.75	38.90	24.38	43.50	-19.12
20V	173.728	47.10	2.09	15.42	38.90	25.71	43.50	-17.79
21H	185.620	38.40	2.14	16.65	38.86	18.33	43.50	-25.17
22V	185.823	34.00	2.14	16.65	38.86	13.94	43.50	-29.56
23H	196.360	40.50	2.19	16.91	38.81	20.79	43.50	-22.71
24V	197.680	34.80	2.19	16.94	38.81	15.13	43.50	-28.37
25V	214.377	47.50	2.26	16.78	38.92	27.62	43.50	-15.88
26H	235.720	37.00	2.43	16.48	38.96	16.96	46.00	-29.04
27V	311.160	37.40	2.95	14.42	38.80	15.96	46.00	-30.04
28H	320.980	38.00	2.99	14.60	38.80	16.79	46.00	-29.21
29V	381.560	41.00	3.23	15.62	38.74	21.12	46.00	-24.88
30H	396.100	37.70	3.29	15.84	38.71	18.12	46.00	-27.88
31H	452.500	35.80	3.49	16.56	38.58	17.27	46.00	-28.73
32V	460.520	36.00	3.46	16.66	38.53	17.58	46.00	-28.42
33H	508.240	39.10	3.32	17.25	38.40	21.27	46.00	-24.73
34H	552.940	35.70	3.41	18.04	38.87	18.28	46.00	-27.72
35V	628.940	38.70	3.62	19.20	38.64	22.88	46.00	-23.12

Test Location	: Compatible Electronics	Page	: 2/2
Customer	: DynaQuip Controls	Date	: 10/29/2009
Manufacturer	: DynaQuip Controls	Time	: 13:20:53
Eut name	: Monitoring Station	Lab	: D
Model	: WPMSH	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 Qualification		
	: Test Range: 10 kHz to 1000 MHz (Vertical and Horizontal)		
	: Test Engineer: Kyle Fujimoto		
	: EUT Operating Mode: Transceiver Mode (Worst Case)		

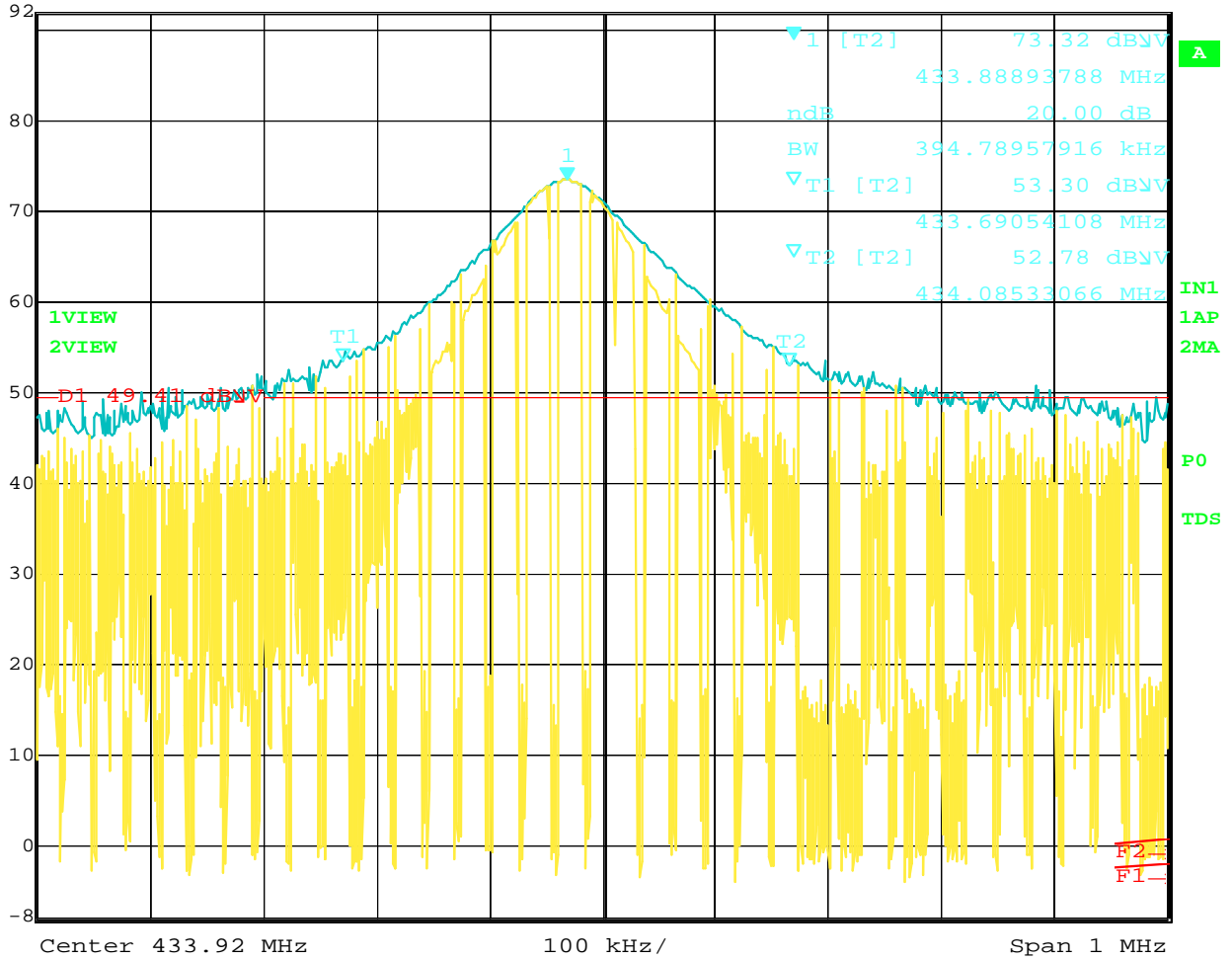
Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	Limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
			dB	dB	dB	dBuV	dBuV/m	dB
36H	632.690	37.20	3.63	19.25	38.67	21.41	46.00	-24.59
37V	826.110	37.30	4.30	21.23	38.35	24.47	46.00	-21.53

-20 dB BANDWIDTH

DATA SHEET



Ref Lvl	92 dBμV	Marker 1 [T2 ndB]	ndB	20.00 dB	RBW	100 kHz	RF Att	10 dB
		BW	394.78957916 kHz		VBW	300 kHz	Unit	dBμV
		SWT	5.5 ms					



Date: 29.OCT.2009 14:40:24

-20 dB Bandwidth of the Fundamental

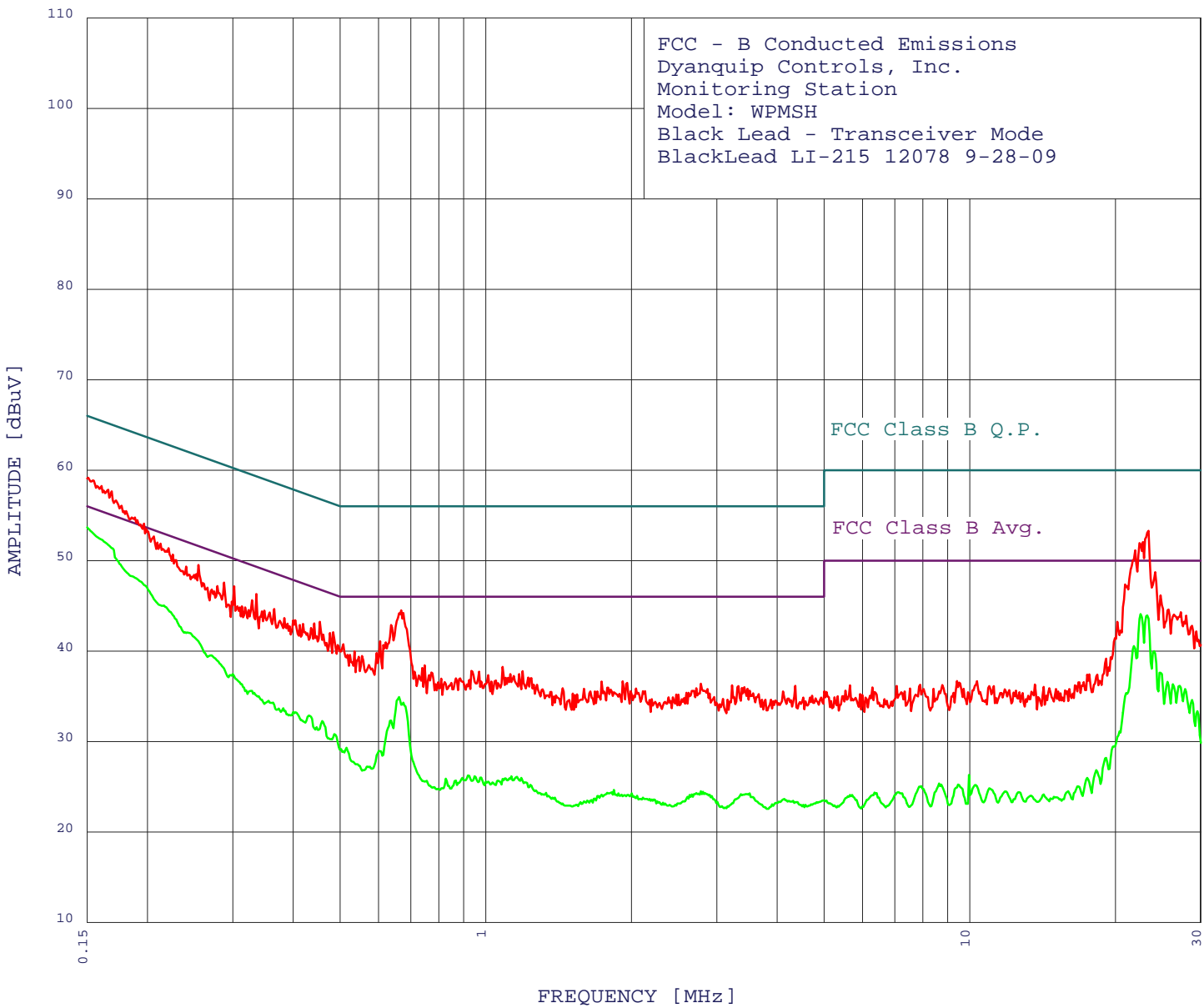
CONDUCTED EMISSIONS

DATA SHEETS



10/29/2009 10:41:44

EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Ajoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

FCC - B Conducted Emissions

Dyanquip Controls, Inc.

Monitoring Station

Model: WPMSH

Black Lead - Transceiver Mode

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	23.399	53.28	50.00	3.28**
2	22.779	52.05	50.00	2.05**
3	21.959	51.12	50.00	1.12**
4	24.152	48.72	50.00	-1.28**
5	0.669	44.49	46.00	-1.51**
6	0.255	49.51	51.60	-2.08**
7	0.336	46.30	49.31	-3.01**
8	0.288	47.57	50.58	-3.01**
9	0.302	47.15	50.19	-3.04**
10	0.637	42.88	46.00	-3.12**
11	0.454	43.23	46.80	-3.57**
12	0.279	47.18	50.85	-3.67**
13	24.798	46.15	50.00	-3.85**
14	0.329	45.61	49.48	-3.87**
15	0.365	44.66	48.61	-3.95**
16	0.442	43.05	47.02	-3.97**
17	0.484	42.09	46.27	-4.18**
18	0.476	42.00	46.40	-4.40**
19	0.400	43.41	47.86	-4.45**
20	0.419	42.98	47.46	-4.48**
21	0.348	44.48	49.00	-4.52**
22	0.383	43.63	48.21	-4.57**
23	0.435	42.56	47.15	-4.59**
24	0.413	42.89	47.59	-4.70**
25	0.345	44.39	49.09	-4.70**
26	0.318	44.82	49.75	-4.92**
27	0.605	41.06	46.00	-4.94**
28	0.313	44.93	49.88	-4.95**
29	0.508	40.77	46.00	-5.23**
30	25.740	44.59	50.00	-5.41**
31	27.287	44.30	50.00	-5.70**
32	0.535	39.97	46.00	-6.03**
33	28.008	43.92	50.00	-6.08**
34	0.595	39.76	46.00	-6.24**
35	0.524	39.57	46.00	-6.43**
36	0.555	39.47	46.00	-6.53**
37	0.547	39.37	46.00	-6.63**
38	20.169	43.24	50.00	-6.76**
39	0.747	38.42	46.00	-7.58**
40	1.083	38.24	46.00	-7.76**
41	29.387	42.17	50.00	-7.83**
42	0.739	38.12	46.00	-7.88**
43	0.934	37.80	46.00	-8.20**
44	1.191	37.76	46.00	-8.24**
45	0.969	37.72	46.00	-8.28**
46	0.771	37.63	46.00	-8.37**
47	1.172	37.46	46.00	-8.54**
48	1.124	37.45	46.00	-8.55**
49	1.011	37.33	46.00	-8.67**

FCC - B Conducted Emissions

Dyanquip Controls, Inc.

Monitoring Station

Model: WPMSH

Black Lead - Transceiver Mode

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

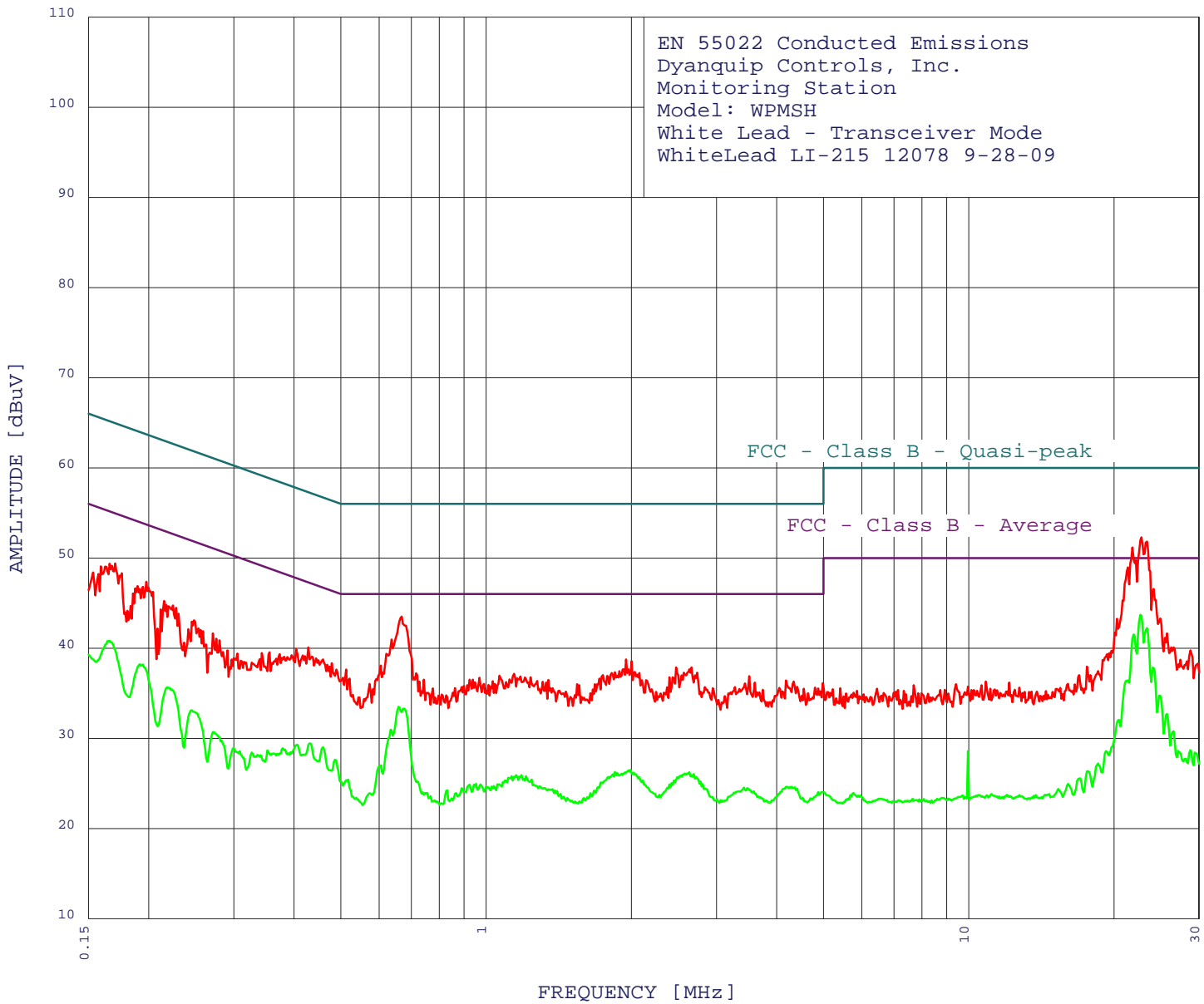
Peak criteria : 0.00 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	22.545	44.10	50.00	-5.90
2	23.273	43.95	50.00	-6.05
3	0.216	45.02	52.96	-7.94
4	21.841	40.56	50.00	-9.44
5	0.242	42.04	52.04	-9.99
6	24.027	39.98	50.00	-10.02
7	0.239	42.07	52.12	-10.06
8	0.662	34.91	46.00	-11.09
9	0.270	39.52	51.11	-11.59
10	0.676	34.28	46.00	-11.72
11	24.798	37.60	50.00	-12.40
12	0.300	37.44	50.23	-12.79
13	0.296	37.34	50.36	-13.03
14	25.605	36.60	50.00	-13.40
15	0.637	32.33	46.00	-13.67
16	26.278	36.32	50.00	-13.68
17	27.143	36.14	50.00	-13.86
18	0.327	35.58	49.53	-13.94
19	0.332	35.37	49.39	-14.02
20	0.320	35.64	49.71	-14.06
21	27.864	35.81	50.00	-14.19
22	0.339	35.00	49.22	-14.22
23	0.356	34.50	48.82	-14.32
24	0.363	34.28	48.65	-14.37
25	0.431	32.84	47.24	-14.39
26	0.459	32.24	46.71	-14.47
27	0.404	33.24	47.77	-14.52
28	0.381	33.69	48.25	-14.56
29	0.400	33.25	47.86	-14.61
30	21.044	35.36	50.00	-14.64
31	0.373	33.66	48.43	-14.77
32	0.385	33.39	48.16	-14.77
33	0.393	32.95	47.99	-15.04
34	0.447	31.58	46.93	-15.35
35	0.486	30.83	46.23	-15.40
36	28.770	34.57	50.00	-15.43
37	29.542	33.34	50.00	-16.66
38	0.516	29.30	46.00	-16.70
39	0.502	29.15	46.00	-16.85
40	0.601	28.96	46.00	-17.04
41	0.508	28.93	46.00	-17.07
42	0.567	27.20	46.00	-18.80
43	0.577	27.20	46.00	-18.80
44	20.388	31.10	50.00	-18.90
45	0.558	26.83	46.00	-19.17
46	0.919	26.25	46.00	-19.75
47	0.948	26.15	46.00	-19.85
48	1.130	26.14	46.00	-19.86
49	1.160	26.09	46.00	-19.91



10/29/2009 13:01:49

EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Ajoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

FCC Conducted Emissions

Dyanquip Controls, Inc.

Monitoring Station

Model: WPMSH

White Lead - Transceiver Mode

WhiteLead LI-215 12078 9-28-09

TEST ENGINEER : Kyle Fujimoto

49 highest peaks above -50.00 dB of FCC - Class B - Average limit line

Peak criteria : 1.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	22.779	52.28	50.00	2.28**
2	23.399	51.81	50.00	1.81**
3	21.841	51.16	50.00	1.16**
4	21.373	48.94	50.00	-1.06**
5	0.669	43.49	46.00	-2.51**
6	24.152	46.55	50.00	-3.45**
7	0.170	49.40	54.94	-5.54**
8	0.198	47.36	53.71	-6.35**
9	0.176	48.31	54.68	-6.37**
10	20.278	43.23	50.00	-6.77**
11	0.195	46.81	53.84	-7.03**
12	0.189	46.89	54.06	-7.17**
13	0.428	40.08	47.28	-7.20**
14	1.950	38.74	46.00	-7.26**
15	0.157	48.21	55.60	-7.39**
16	0.153	48.38	55.82	-7.44**
17	2.002	38.55	46.00	-7.45**
18	0.215	45.23	53.00	-7.78**
19	0.404	39.91	47.77	-7.86**
20	0.224	44.75	52.65	-7.91**
21	0.605	38.06	46.00	-7.94**
22	0.479	38.34	46.36	-8.02**
23	0.228	44.48	52.52	-8.04**
24	2.665	37.87	46.00	-8.13**
25	2.475	37.86	46.00	-8.14**
26	0.185	46.06	54.24	-8.18**
27	25.740	41.64	50.00	-8.36**
28	0.513	37.62	46.00	-8.38**
29	0.230	43.83	52.43	-8.60**
30	0.248	43.09	51.82	-8.73**
31	2.736	37.27	46.00	-8.73**
32	0.212	44.29	53.14	-8.85**
33	1.142	37.14	46.00	-8.86**
34	1.745	37.02	46.00	-8.98**
35	1.066	36.93	46.00	-9.07**
36	0.373	39.34	48.43	-9.09**
37	3.511	36.89	46.00	-9.11**
38	1.178	36.85	46.00	-9.15**
39	2.397	36.76	46.00	-9.24**
40	1.236	36.76	46.00	-9.24**
41	0.356	39.56	48.82	-9.27**
42	0.969	36.71	46.00	-9.29**
43	0.521	36.62	46.00	-9.38**
44	1.717	36.62	46.00	-9.38**
45	0.272	41.64	51.07	-9.43**
46	0.743	36.52	46.00	-9.48**
47	0.939	36.50	46.00	-9.50**
48	1.345	36.47	46.00	-9.53**
49	2.145	36.45	46.00	-9.55**

FCC Conducted Emissions

Dyanquip Controls, Inc.

Monitoring Station

Model: WPMSH

White Lead - Transceiver Mode

WhiteLead LI-215 12078 9-28-09

TEST ENGINEER : Kyle Fujimoto

49 highest peaks above -50.00 dB of FCC - Class B - Average limit line

Peak criteria : 0.00 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	22.662	43.69	50.00	-6.31
2	23.399	42.24	50.00	-7.76
3	21.959	41.52	50.00	-8.48
4	24.027	37.84	50.00	-12.16
5	0.658	33.48	46.00	-12.52
6	0.676	33.30	46.00	-12.70
7	21.373	36.41	50.00	-13.59
8	0.166	40.81	55.16	-14.35
9	0.164	40.77	55.25	-14.48
10	0.634	30.97	46.00	-15.03
11	24.798	34.74	50.00	-15.26
12	0.195	38.19	53.84	-15.65
13	0.192	38.22	53.97	-15.75
14	0.221	35.60	52.78	-17.18
15	0.219	35.65	52.87	-17.22
16	0.223	35.42	52.70	-17.28
17	25.740	32.70	50.00	-17.30
18	0.459	29.01	46.71	-17.70
19	0.431	29.41	47.24	-17.83
20	20.497	32.05	50.00	-17.95
21	0.406	29.29	47.72	-18.44
22	0.486	27.63	46.23	-18.60
23	0.246	33.12	51.90	-18.79
24	0.605	27.01	46.00	-18.99
25	26.566	30.79	50.00	-19.21
26	0.417	28.18	47.50	-19.33
27	0.379	28.90	48.29	-19.39
28	0.449	27.48	46.89	-19.41
29	0.383	28.74	48.21	-19.47
30	1.992	26.50	46.00	-19.50
31	0.393	28.45	47.99	-19.54
32	1.971	26.45	46.00	-19.55
33	1.849	26.27	46.00	-19.73
34	0.389	28.32	48.08	-19.75
35	2.637	26.25	46.00	-19.75
36	1.939	26.22	46.00	-19.78
37	2.023	26.18	46.00	-19.82
38	1.869	26.16	46.00	-19.84
39	2.582	26.08	46.00	-19.92
40	1.908	26.06	46.00	-19.94
41	2.693	26.03	46.00	-19.97
42	2.044	26.01	46.00	-19.99
43	1.830	25.99	46.00	-20.01
44	2.665	25.92	46.00	-20.08
45	1.184	25.91	46.00	-20.09
46	1.154	25.91	46.00	-20.09
47	0.373	28.30	48.43	-20.13
48	2.527	25.85	46.00	-20.15
49	1.210	25.80	46.00	-20.20
