FCC PART 15, SUBPART B and C
TEST REPORT

for

SMARTCONNECT

Model: WCSCLV

Prepared for

DYNAQUIP CONTROLS, INC.
10 HARRIS INDUSTRIAL PARK
SAINT CLAIR, MISSOURI 63077

Prepared by:_____

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DATE: OCTOBER 8, 2018

	REPORT BODY	APPENDICES					TOTAL
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NVLAP TESTING
NVLAP LAB CODE 200528-0

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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., 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 certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Device Tested:	SmartConnect Model: WCSCLV S/N: N/A
Product Description:	The WaterCop® SmartConnect is designed to work alongside the WaterCop® Pro Integrated System or WaterCop® Classic and deliver real time notification of leaks in your plumbing system.
Modifications:	The EUT was modified to meet the specifications. Please see the list located in Appendix B of this test report.
Customer:	DynaQuip Controls, Inc. 10 Harris Industrial Park Saint Clair, Missouri 63077
Test Dates:	September 14, 18, and 19, 2018; and October 26, 2018

Test Specifications covered by accreditation:

NVLAP® TESTING
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CFR Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.207, 15.209, and 15.249

Test Procedures: ANSI C63.4: 2014 and ANSI C63.10: 2013

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Spurious Radiated RF Emissions, 9 kHz –25000 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; and the limits of CFR Title 47, Part 15 Subpart C, section 15.205, 15.209 and 15.249 Highest reading in relation to spec limit 51.74 (Avg) dBuV/m @ 2400.00 MHz (*U = 3.67 dB)
2	Conducted RF Emissions, 150 kHz – 30 MHz	The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; and the limits of CFR Title 47, Part 15 Subpart C, section 15.207 Highest reading in relation to spec limit 51.74 (Avg) dBuV/m @ 2400.00 MHz (*U = 2.72 dB)

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the SmartConnect, Model: WCSCLV. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. The tests were performed 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; and Subpart C, sections 15.205, 15.209, and 15.249.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The emissions tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

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, Inc.

Rodney Bryan, Jr. President

Compatible Electronics Inc.

Tom Szynal	Test Technician
James Ross	Test Engineer
Kyle Fujimoto	Test Engineer

2.4 Date Test Sample was Received

The test sample was received prior to the date of this report.

2.5 Disposition of the Test Sample

The test sample has not been returned to DynaQuip Controls, Inc. as of the date of this test report.

2.6 Abbreviations and Acronyms

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

EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
DoC	Declaration of Conformity
N/A	Not Applicable
Tx	Transmit
Rx	Receive
Inc.	Incorporated
RF	Radio Frequency
IR	Infrared
AT&T	American Telephone & Telegraph

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
ANSI C63.4: 2014	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 25 GHz
ANSI C63.10: 2013	American National Standard of procedure for compliance testing of unlicensed wireless devices

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

6 VDC Power Mode with Ethernet: The SmartConnect, Model: WCSCLV (EUT) was connected to the router and class 2 transformer via its Ethernet and Aux. 6 VDC ports, respectively. The EUT was transmitting BLE and pinging the router on a continuous basis.

6 VDC Power Mode with WiFi: The SmartConnect, Model: WCSCLV (EUT) was connected to a class 2 transformer via its Aux. 6 VDC port. The EUT was transmitting BLE and WiFi at the same time.

Classic Actuator Power Mode with Ethernet: The SmartConnect, Model: WCSCLV (EUT) was connected to the router and WaterCop Classic Actuator via its Ethernet and CONNECT TO WaterCop ports, respectively. The EUT was transmitting BLE and pinging the router on a continuous basis.

Classic Actuator Power Mode with WiFi: The SmartConnect, Model: WCSCLV (EUT) was connected to the router and WaterCop Classic Actuator via its Ethernet and CONNECT TO WaterCop ports, respectively. The EUT was transmitting BLE and WiFi on a continuous basis.

The laptop was used to program the EUT to transmit the BLE and WiFi on the low, middle, and high channels. The laptop was removed prior to the testing since it was only used to program the EUT to transmit BLE and WiFi.

Note: The router for the Ethernet modes was located 50-feet away from the test site in an accessory room. The router was also connected to a laptop via its Ethernet port. The laptop was also connected to a power supply via its power port.

The EUT was continuously transmitting or receiving during the test.

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 spectrum analyzer 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 (**DC Power Modes Only)**
This is a 2-meter cable connecting the EUT to the class 2 transformer. The cable has an EI-35 connector at the EUT end and is hard wired into the class 2 transformer.

Cable 2 **(Classic Actuator Power Modes Only)**
This is a 3-meter unshielded cable connecting the EUT to the actuator. The cable has an RJ-45 connector at each end. The cable was bundled to a length of 1-meter.

Cable 3 **(Ethernet Modes Only)**
This is a 1-meter unshielded Ethernet cable connecting the router with the laptop. It contains an RJ-45 connector at each end.

Cable 4 (**Ethernet Modes Only)**
This is a 1.8-meter unshielded cable connecting the laptop computer to its AC/DC adapter. It contains a metallic barrel power connector at the laptop computer end and is hard wired at the AC/DC adapter end. The cable was bundled to a length of 1-meter.

Cable 5 (**WiFi Modes Only)**
This is a 15.24-meter unshielded cable connecting the EUT to the router. The cable has RJ-45 connectors at each end.

Cable 6 **(Classic Actuator Power Modes Only)**
This is a 5-meter unshielded cable connecting the actuator to the power supply. 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
SMARTCONNECT (EUT)	DYNAQUIP CONTROLS, INC.	WCSCLV	N/A	ONCWCSCLV
WATERCOP CLASSIC ACTUATOR	DYNAQUIP CONTROLS, INC.	WCDACT	170593	ONCWPACT
WIFI MODULE	ESPRESSIF SYSTEMS PTE LTD.	ESP-WROOM-02	N/A	2AC7Z-ESPWROOM02
POWER SUPPLY (WATERCOP CLASSIC ACTUATOR)	INTERTEK	DYS605-050100W-1	N/A	N/A
ROUTER	NETGEAR	EN108TP	ENT48118202	DoC
CLASS 2 TRANSFORMER (6 VDC Mode for EUT)	SANADN LIMITED	DC0600200	N/A	N/A
POWER SUPPLY (ROUTER)	NETGEAR	PWR-002-004	N/A	N/A
LAPTOP COMPUTER	HEWLETT PACKARD	G60-441US	2CE927RF3Q	DoC
POWER SUPPLY (LAPTOP)	DELL	PA-1900-02D	N/A	N/A
FIRMWARE*	TEXAS INSTRUMENTS	V1.42.10	N/A	N/A

*This is placed on the laptop to program the EUT.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Keysight Technologies	N9038A	MY51210150	July 26, 2018	1 Year
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A
Loop Antenna	Com-Power	AL-130R	121090	February 9, 2017	2 Year
CombiLog Antenna	Com-Power	AC-220	61060	July 27, 2017	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 22, 2018	2 Year
Horn Antenna	Com-Power	AH-826	71957	N/A	N/A
Preamplifier	Com-Power	PAM-118A	551024	May 10, 2018	1 Year
Preamplifier	Com-Power	PA-840	711013	May 10, 2018	1 Year
Digital Multimeter	Fluke	115	36601149WS	September 20, 2018	1 Year
Variable Transformer	Superior Electric	Type: 11560	Spec: BP142056	N/A	N/A
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Keysight Technologies	N9038A	MY51210150	July 26, 2018	1 Year
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
LISN	Com-Power	LI-215A	191951	June 28, 2018	1 Year
Transient Limiter	Com-Power	252A910	N/A	November 1, 2017	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 of this report for emissions test location.

6.2 EUT Mounting, Bonding and Grounding

For frequencies 1 GHz and below: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

For frequencies above 1 GHz: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 1.5 meters above the ground plane.

The EUT was not grounded.

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 EMI Receiver was used as a measuring meter. A transient limiter was used for the protection of the EMI Receiver input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the EMI 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 TDK TestLab software in several overlapping sweeps by running the EMI Receiver at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

The six highest emissions are listed in Table 2.0.

Test Results:

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

7.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. Preamplifiers were used to increase the sensitivity of the instrument. The EMI Receiver was initially used with the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured.

The frequencies below 1 GHz were quasi-peaked using the quasi-peak detector of the EMI Receiver.

The frequencies for the fundamental, low and high channel band edge, and harmonics above 1 GHz were averaged using a duty cycle correction factor.

All the other frequencies above 1 GHz were averaged using the average detector of the EMI Receiver.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with 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 EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 1.0.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	CombiLog Antenna
1 GHz to 25 GHz	1 MHz	Horn Antenna

Test Results:

The EUT complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.209 and 15.249 for radiated emissions.

7.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
SmartConnect
Model: WCSCLV

Frequency (MHz)	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) (dB)
2400.00 (H) (Ethernet Mode – Actuator Power)	53.36 (Avg)	53.97	-0.61
625.00 (H) (Ethernet Mode – Class 2 Power)	45.37 (QP)	46.00	-0.63
2400.00 (H) (Ethernet Mode – DC Power)	53.28 (Avg)	53.97	-0.69
2400.00 (V) (WiFi Mode – DC Power)	53.24 (Avg)	53.97	-0.73
2400.00 (H) (WiFi Mode – Actuator Power)	53.16 (Avg)	53.97	-0.81
625.00 (H) (WiFi Mode – Class 2 Power)	45.13 (QP)	46.00	-0.87

Notes:

* The complete emissions data is given in Appendix E of this report.
(V) Vertical
(H) Horizontal
(QP) Quasi-Peak
(AVG) Average

RF Emissions Test Results (Continued)

Table 2.0 CONDUCTED EMISSIONS RESULTS
SmartConnect
Model: WCSCLV

Frequency (MHz)	EMI Reading* (dBuV/m)	Specification Limit (dBuV/m)	Margin Delta (dB)
0.454 (BL) (WiFi Mode – Actuator Powered)	33.93 (AVG)	46.81	-12.88
0.182 (BL) (WiFi Mode – Actuator Powered	40.66 (AVG)	54.33	-13.67
0.174 (BL) (Ethernet Mode – Actuator Powered)	40.89 (AVG)	54.69	-13.79
0.182 (WL) (WiFi Mode – Actuator Powered)	40.70 (AVG)	54.54	-13.84
0.170 (BL) (Ethernet Mode – Actuator Powered)	40.57 (AVG)	54.59	-14.02
0.166 (BL) (Ethernet Mode – Actuator Powered)	40.00 (AVG)	54.47	-14.47

Notes:

* The complete emissions data is given in Appendix E of this report.

(V) Vertical
(H) Horizontal
(BL) Black Lead
(WL) White Lead
(AVG) Average

7.1.4 Duty Cycle Calculation

The fundamental and harmonics were measured at a 3-meter test distance. The EMI Receiver was used to obtain the final test data. The final qualification data sheets are located in Appendix E.

Where

$$\delta(\mathrm{dB}) = 20\log\left[\sum\left(nt_1 + mt_2 + \ldots + \xi t_x\right)/T\right]$$

n is the number of pulses of duration *t*1
m is the number of pulses of duration *t*2
ξ is the number of pulses of duration *tx*
T is the period of the pulse train or 100 ms if the pulse train length is greater than 100 ms

The worst case was when the EUT was in normal data mode

Duty Cycle Correction Factor = -20.00 dB

Time of One Pulse = 2.15 ms

Total On Time = 2.15 ms

The time between pulses is 30.7 ms

Duty Cycle = 2.15 ms / 30.7 ms = 7.003%

The duty cycle is less than 10%, so the maximum Peak to Average ratio of -20 dB can be utilized.

7.1.5 Variation of the Input Power

The variation of the input power test was performed using the EMI Receiver. The EUT input power was varied between 85% and 115% of the nominal rated supply voltage. The carrier frequency was monitored for any change in amplitude.

Test Results:

This test complies with the FCC Title 47, Part 15, Subpart A, section 15.31 (e) requirements.

8. CONCLUSIONS

The SmartConnect, Model: WCSCLV (EUT), as tested, meets all the **Class B** specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209 and 15.249.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP TESTING
NVLAP LAB CODE 200528-0

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For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.
For the most up-to-date version of our scopes and certificates please visit http://celectronics.com/quality/scope/

Quote from ISO-ILAC-IAF Communiqué on 17025:
"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.249 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.

Modifications:

1. Change default power level from 0 dBm to -12 dBm.

APPENDIX C

ADDITIONAL MODELS

ADDITIONAL MODELS

USED FOR THE PRIMARY TEST:	SmartConnect Model: WCSCLV S/N: N/A
ADDITIONAL MODELS COVERED:	The following models are considered by the manufacturer to be similar to the sample tested, however the test results contained in this report relate only to the sample tested.

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

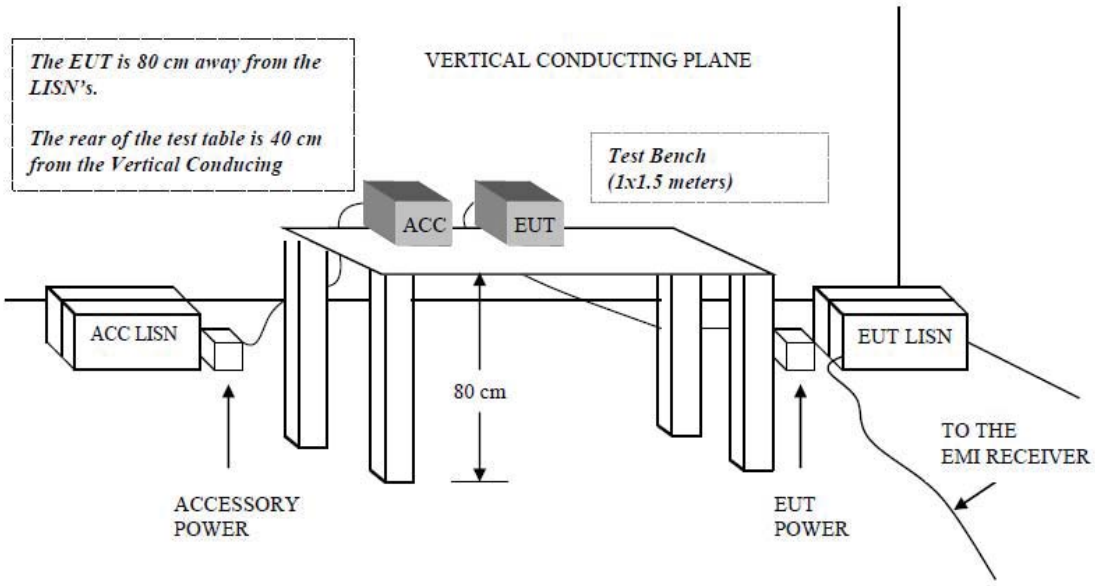
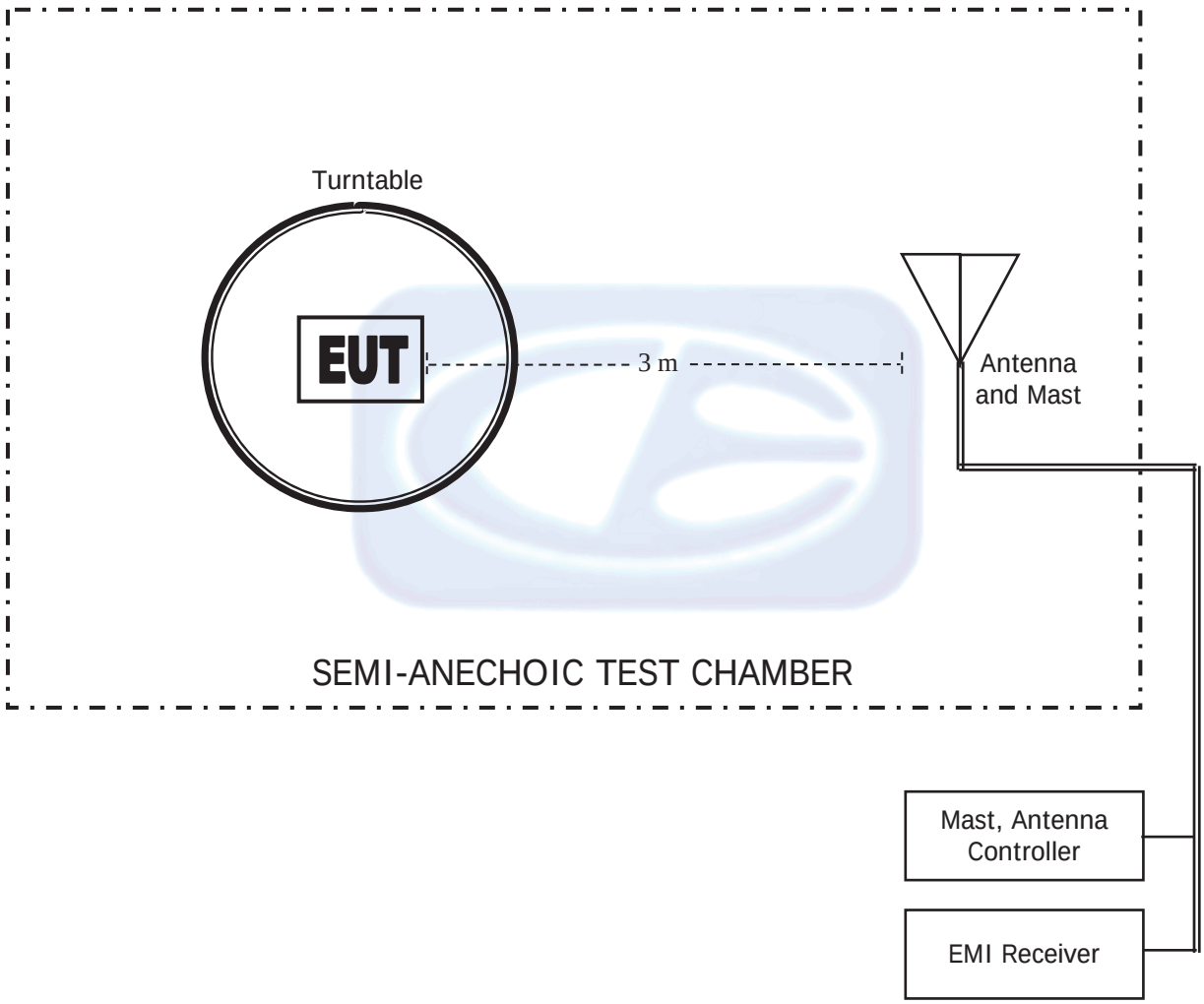


FIGURE 2: LAYOUT OF THE SEMI -ANECHOIC TEST CHAMBER



COM-POWER AL-130R

LOOP ANTENNA

S/N: 121090

CALIBRATION DATE: FEBRUARY 9, 2017

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-36.17	15.33
0.01	-35.86	15.64
0.02	-37.30	14.20
0.03	-36.58	14.92
0.04	-36.99	14.51
0.05	-37.66	13.84
0.06	-37.53	13.97
0.07	-37.64	13.86
0.08	-37.52	13.98
0.09	-37.62	13.88
0.1	-37.59	13.91
0.2	-37.79	13.71
0.3	-37.80	13.70
0.4	-37.70	13.80
h0.5	-37.79	13.71
0.6	-37.79	13.71
0.7	-37.69	13.81
0.8	-37.49	14.01
0.9	-37.39	14.11
1	-37.39	14.11
2	-37.09	14.41
3	-37.09	14.41
4	-37.19	14.31
5	-36.98	14.52
6	-37.17	14.33
7	-37.05	14.45
8	-36.85	14.65
9	-36.84	14.66
10	-36.75	14.75
15	-37.16	14.34
20	-36.44	15.06
25	-37.88	13.62
30	-39.14	12.36

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61060

CALIBRATION DATE: JULY 27, 2017

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.80	200	14.10
35	24.00	250	15.30
40	24.70	300	17.70
45	22.90	350	17.70
50	22.10	400	19.00
60	17.60	450	21.30
70	12.70	500	21.00
80	11.20	550	22.30
90	13.10	600	23.40
100	14.40	650	22.90
120	15.30	700	24.60
125	15.00	750	24.50
140	12.80	800	25.40
150	16.50	850	26.40
160	12.90	900	27.20
175	14.30	950	27.80
180	14.50	1000	26.80

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: FEBRUARY 22, 2018

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.71	10.0	40.08
1.5	25.46	10.5	40.75
2.0	29.26	11.0	41.78
2.5	27.95	11.5	41.02
3.0	29.03	12.0	40.32
3.5	29.70	12.5	40.96
4.0	30.71	13.0	40.29
4.5	31.62	13.5	39.48
5.0	33.23	14.0	39.89
5.5	35.07	14.5	42.75
6.0	34.43	15.0	40.98
6.5	34.98	15.5	38.54
7.0	36.75	16.0	39.40
7.5	37.10	16.5	39.40
8.0	37.66	17.0	41.74
8.5	39.29	17.5	42.58
9.0	37.75	18.0	44.68
9.5	38.23		

COM-POWER PAM-118A

PREAMPLIFIER

S/N: 551024

CALIBRATION DATE: MAY 10, 2018

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.99	6.0	39.01
1.1	39.77	6.5	39.00
1.2	39.02	7.0	39.69
1.3	39.44	7.5	38.96
1.4	39.64	8.0	38.57
1.5	40.23	8.5	39.17
1.6	40.17	9.0	38.82
1.7	40.23	9.5	39.30
1.8	39.48	10.0	38.90
1.9	39.85	11.0	38.86
2.0	39.99	12.0	39.87
2.5	40.38	13.0	39.55
3.0	40.64	14.0	38.92
3.5	40.68	15.0	39.33
4.0	40.87	16.0	39.60
4.5	40.04	17.0	40.28
5.0	39.54	18.0	39.58
5.5	39.58		

COM-POWER AH-826

HORN ANTENNA

S/N: 71957

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	33.5	22.5	35.5
18.5	33.5	23.0	35.9
19.0	34.0	23.5	35.7
19.5	34.0	24.0	35.6
20.0	34.3	24.5	36.0
20.5	34.9	25.0	36.2
21.0	34.7	25.5	36.1
21.5	35.0	26.0	36.2
22.0	35.0	26.5	35.7

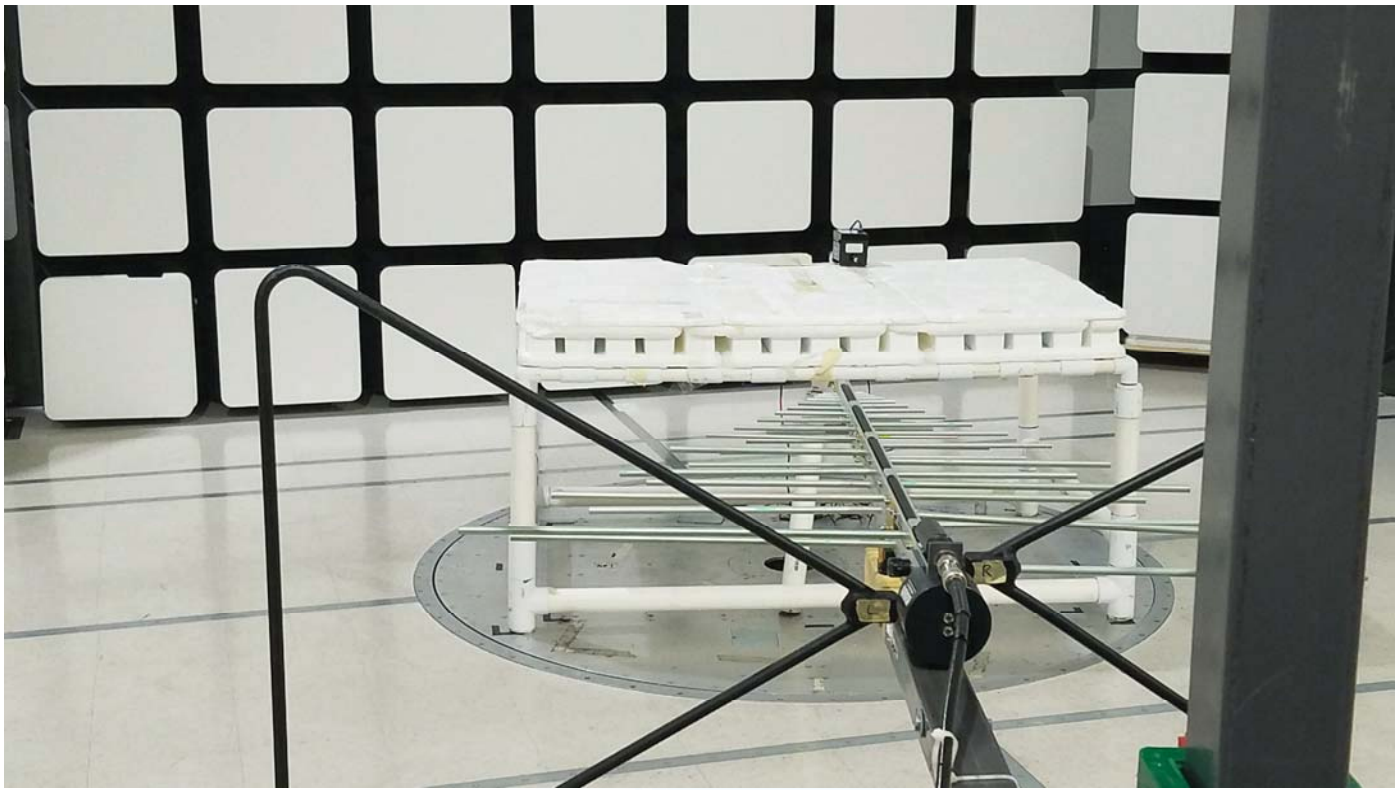
COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711013

CALIBRATION DATE: MAY 10, 2018

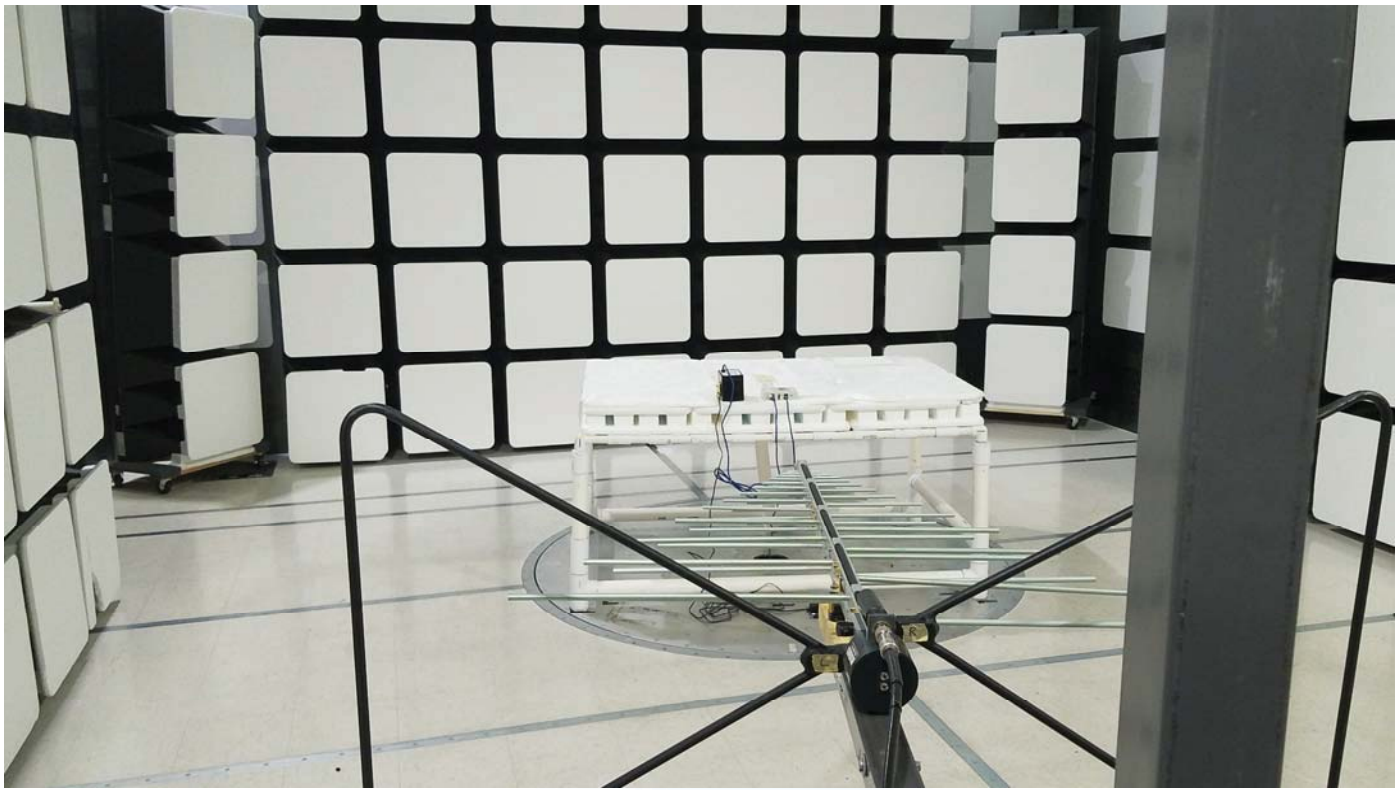
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	26.90	31.0	24.56
19.0	24.65	31.5	25.84
20.0	25.74	32.0	26.93
21.0	24.78	32.5	27.76
22.0	24.83	33.0	25.76
23.0	24.81	33.5	26.76
24.0	25.52	34.0	26.51
25.0	24.90	34.5	27.49
26.0	25.92	35.0	27.64
26.5	26.53	35.5	27.45
27.0	26.41	36.0	25.08
27.5	24.78	36.5	25.61
28.0	25.13	37.0	24.69
28.5	29.29	37.5	24.10
29.0	28.44	38.0	24.83
29.5	27.51	38.5	24.41
30.0	27.12	39.0	24.44
30.5	26.42	39.5	22.96
		40.0	22.29



FRONT VIEW

DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
ETHERNET MODE – ACTUATOR POWER
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

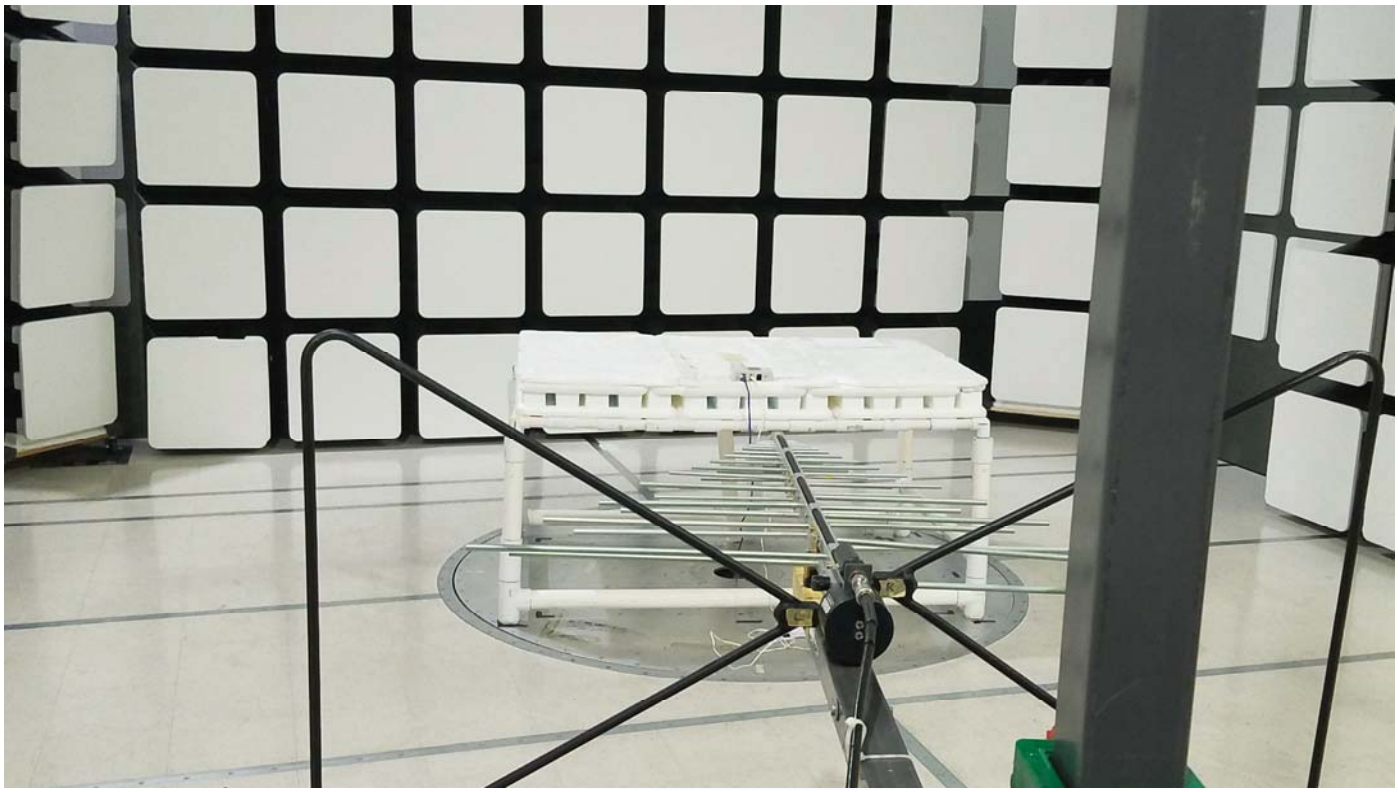
DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
ETHERNET MODE – ACTUATOR POWER
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
ETHERNET MODE – CLASS 2 TRANSFORMER POWER
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
ETHERNET MODE – CLASS 2 TRANSFORMER POWER
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
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FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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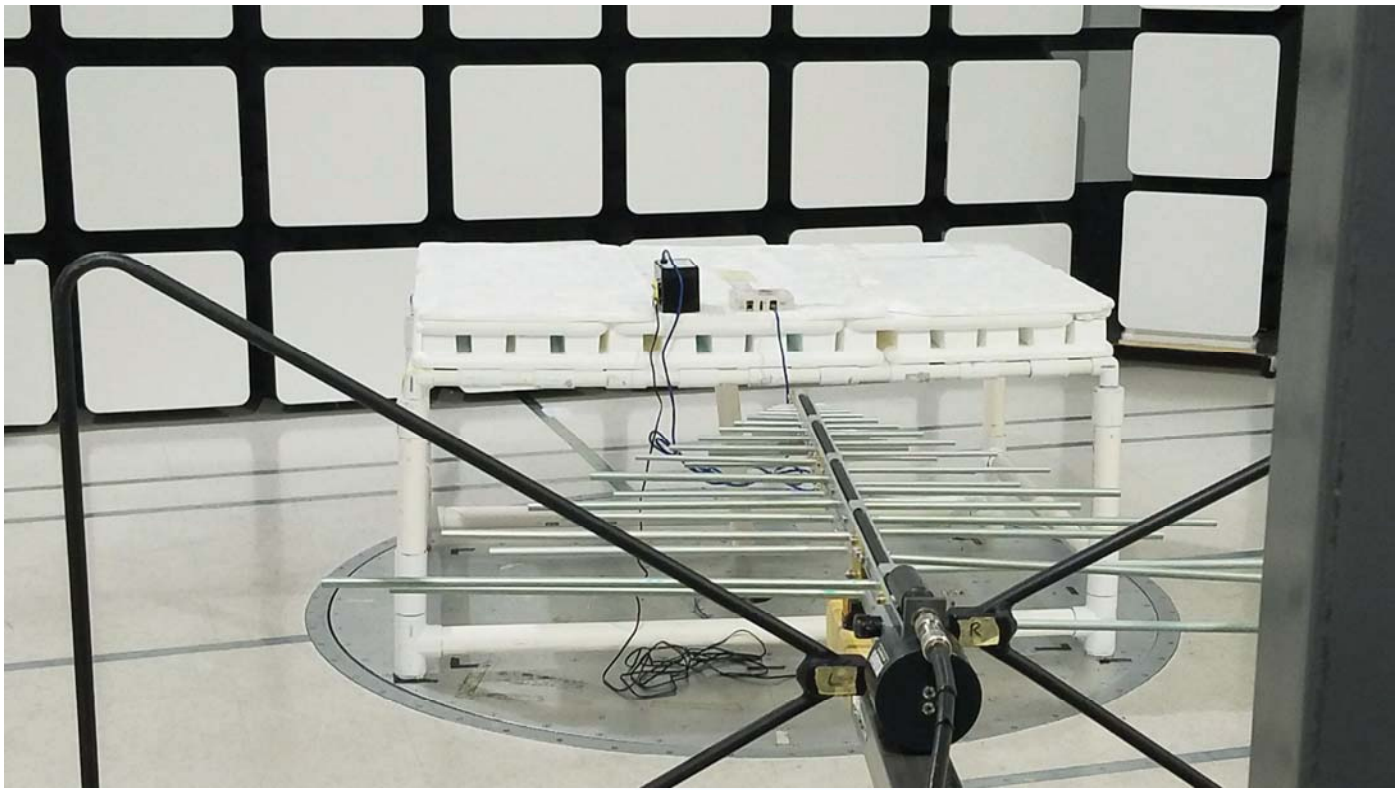

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DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
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FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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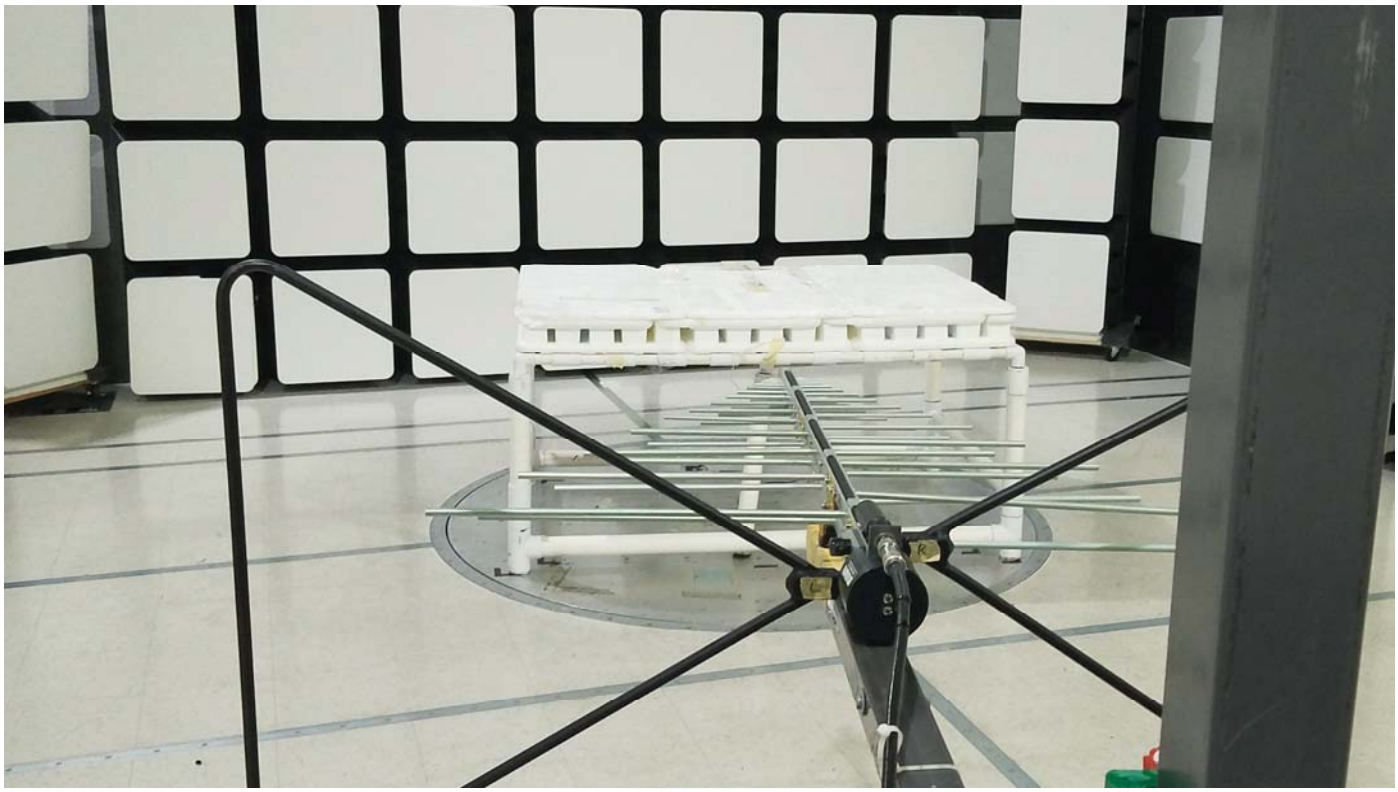

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MODEL: WCSCLV
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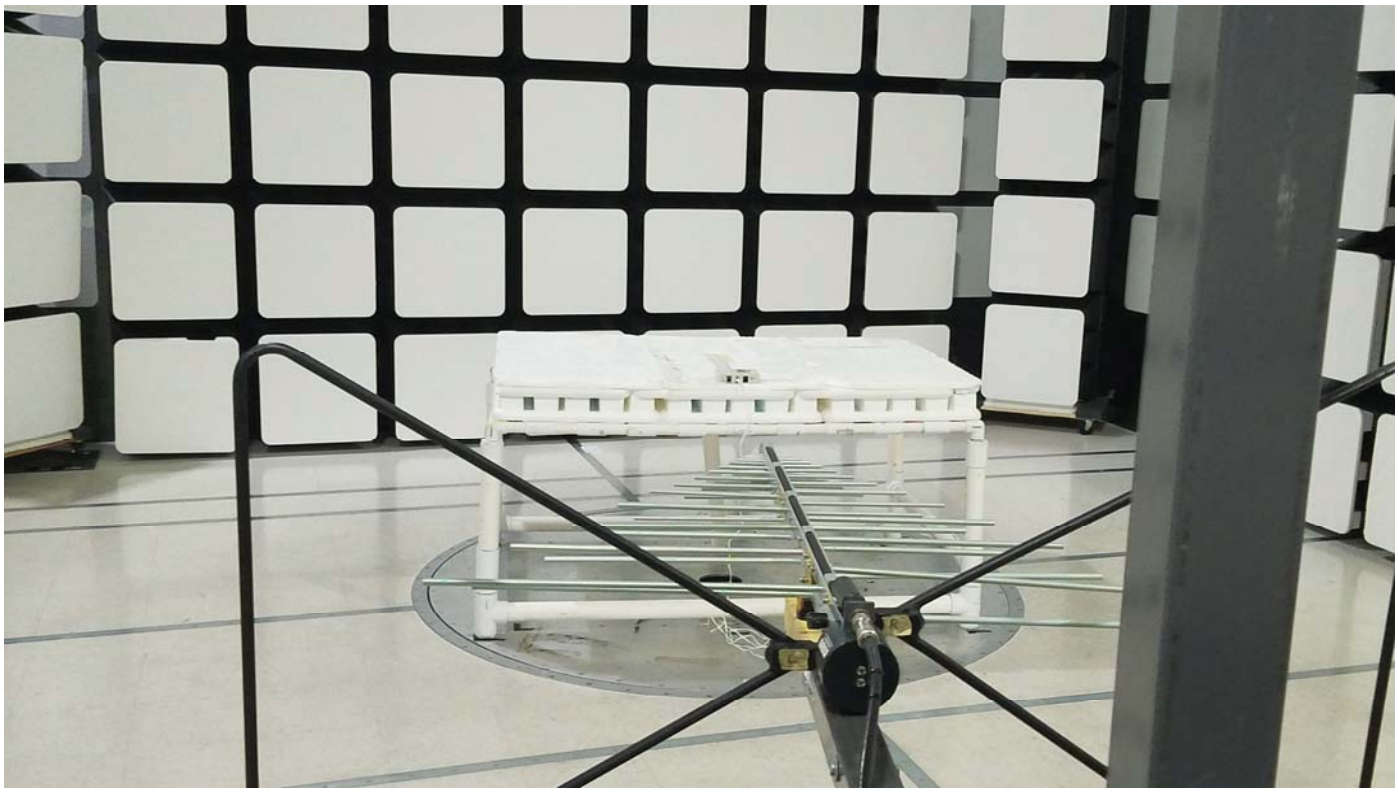

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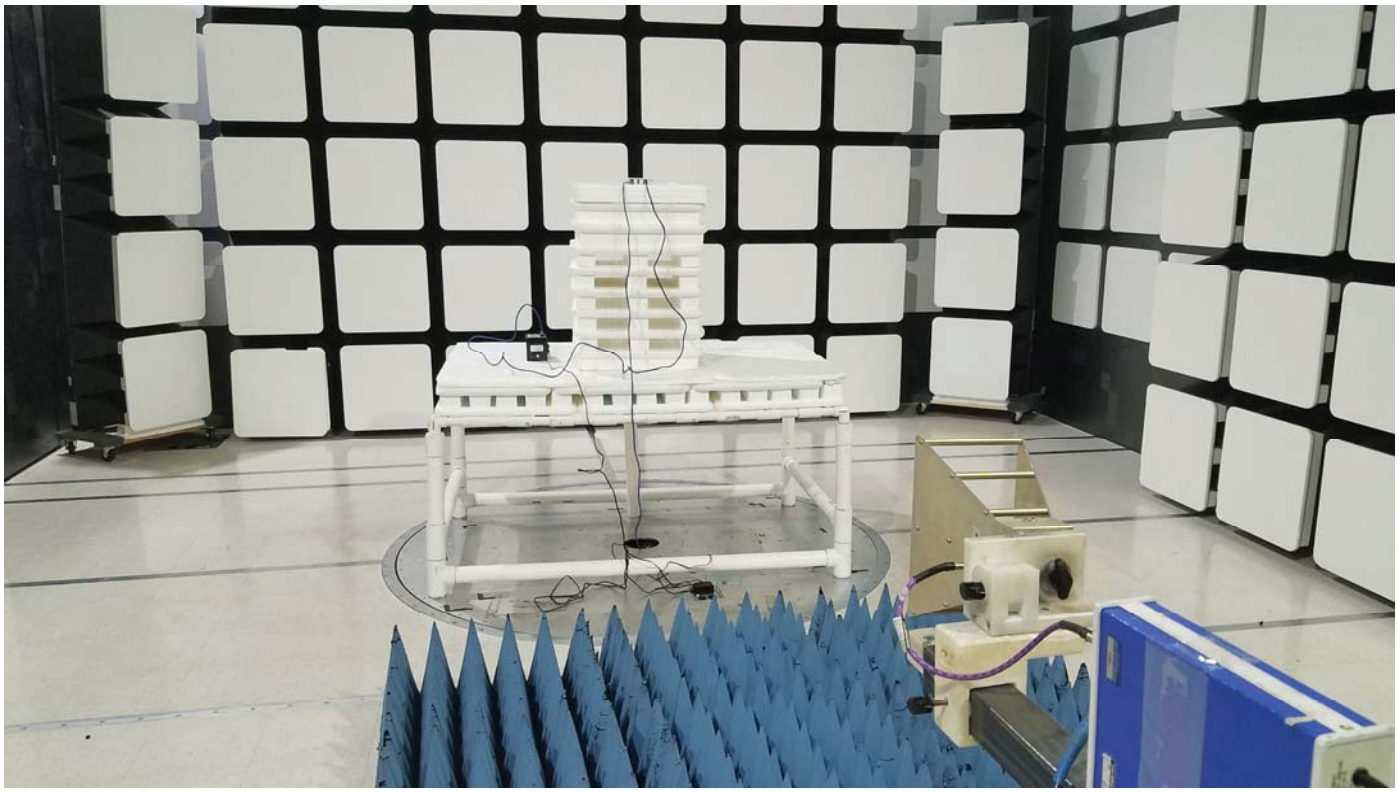

FRONT VIEW

DYNAQUIP CONTROLS, INC.
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MODEL: WCSCLV
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FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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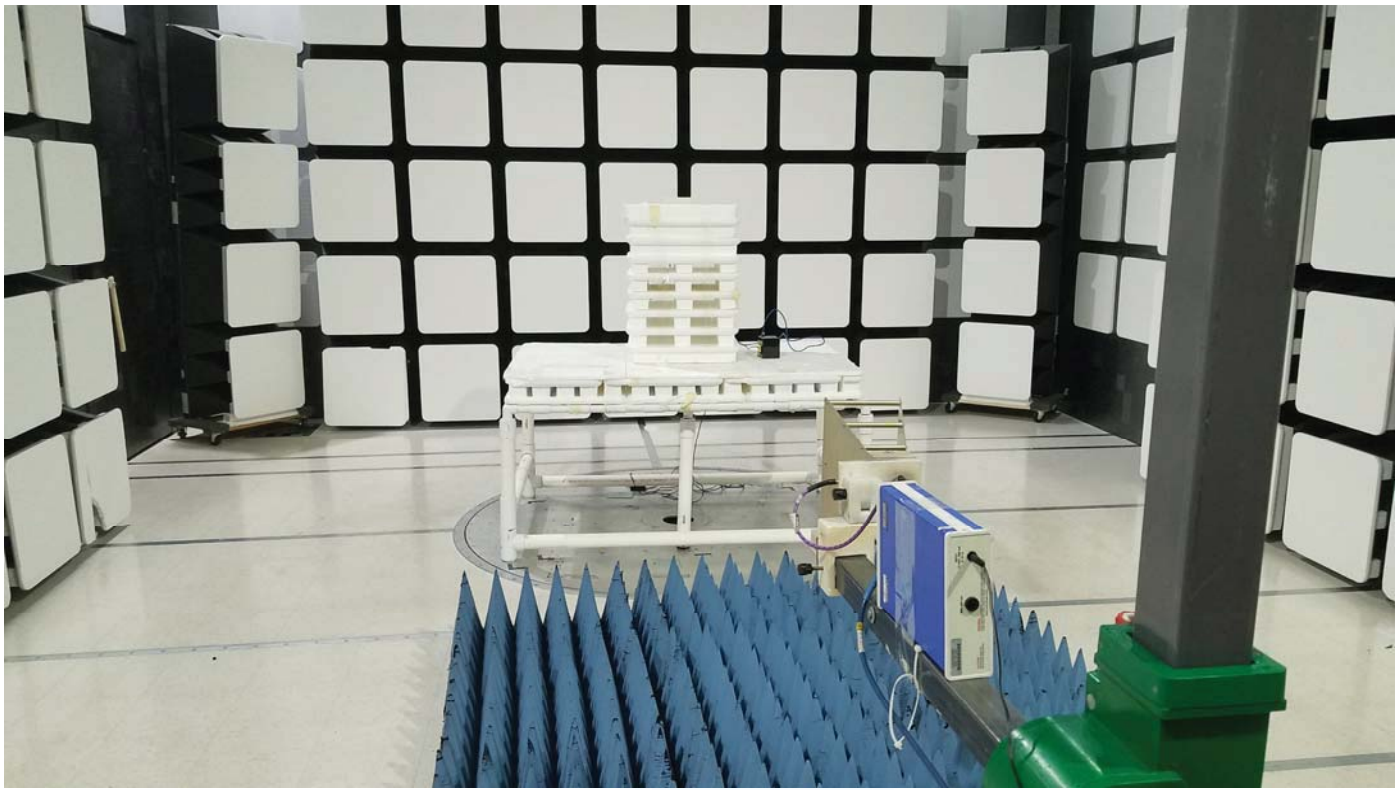

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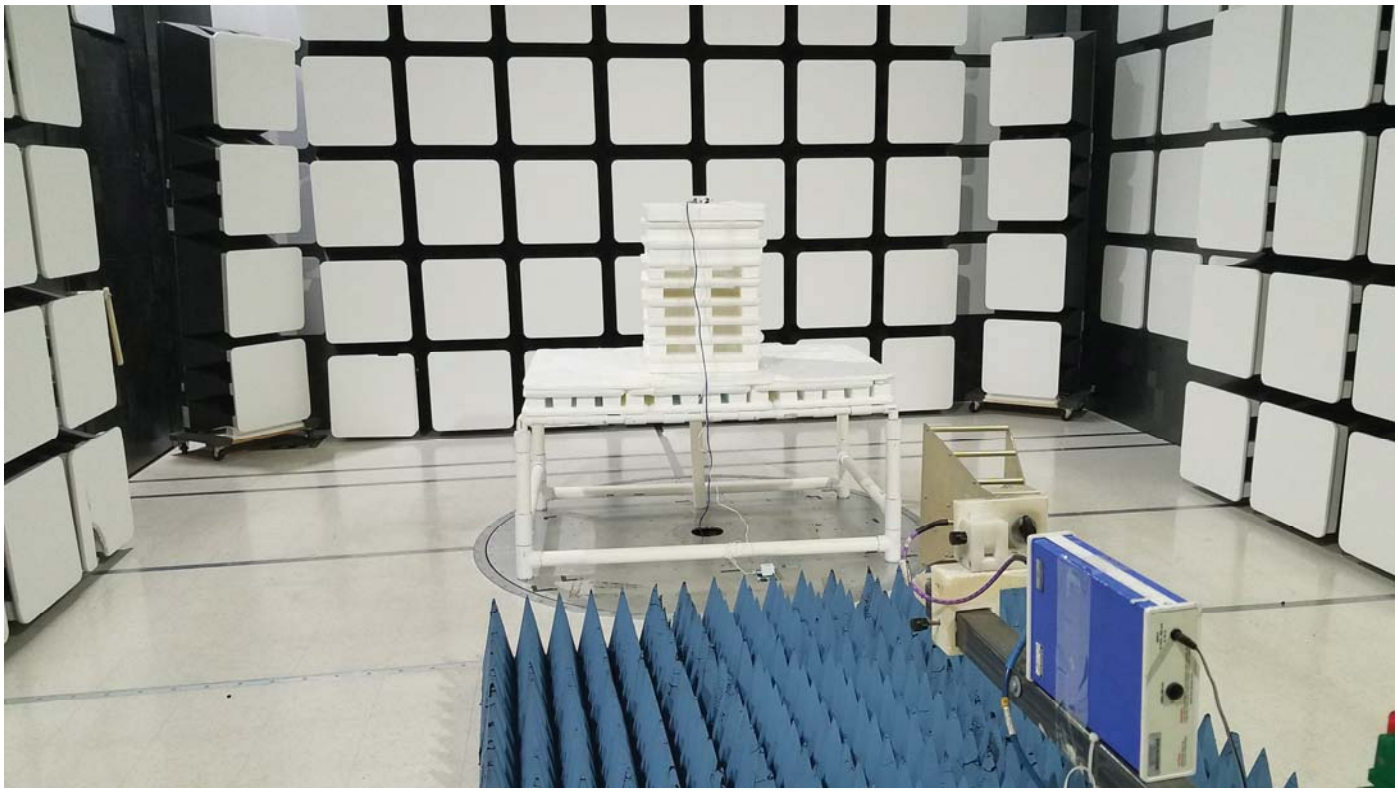

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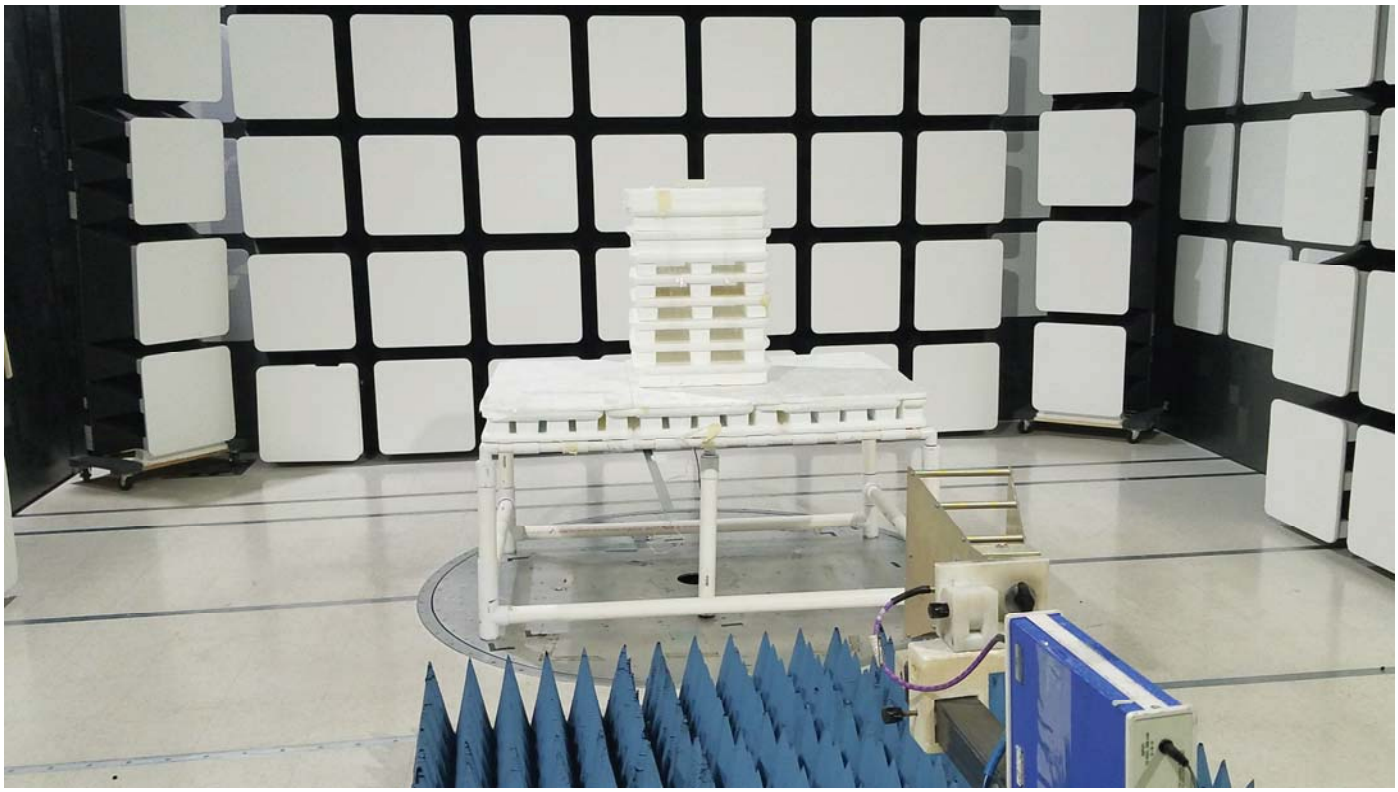

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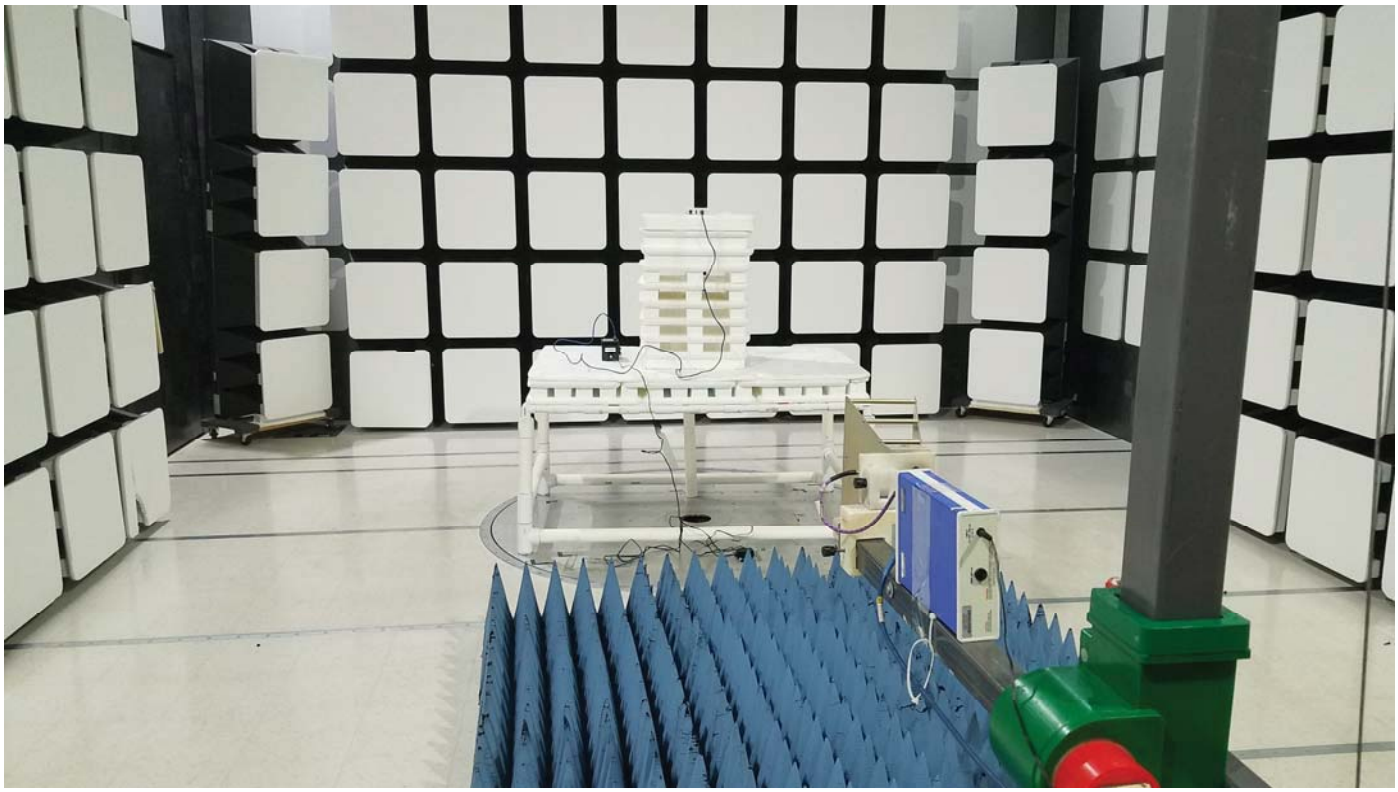

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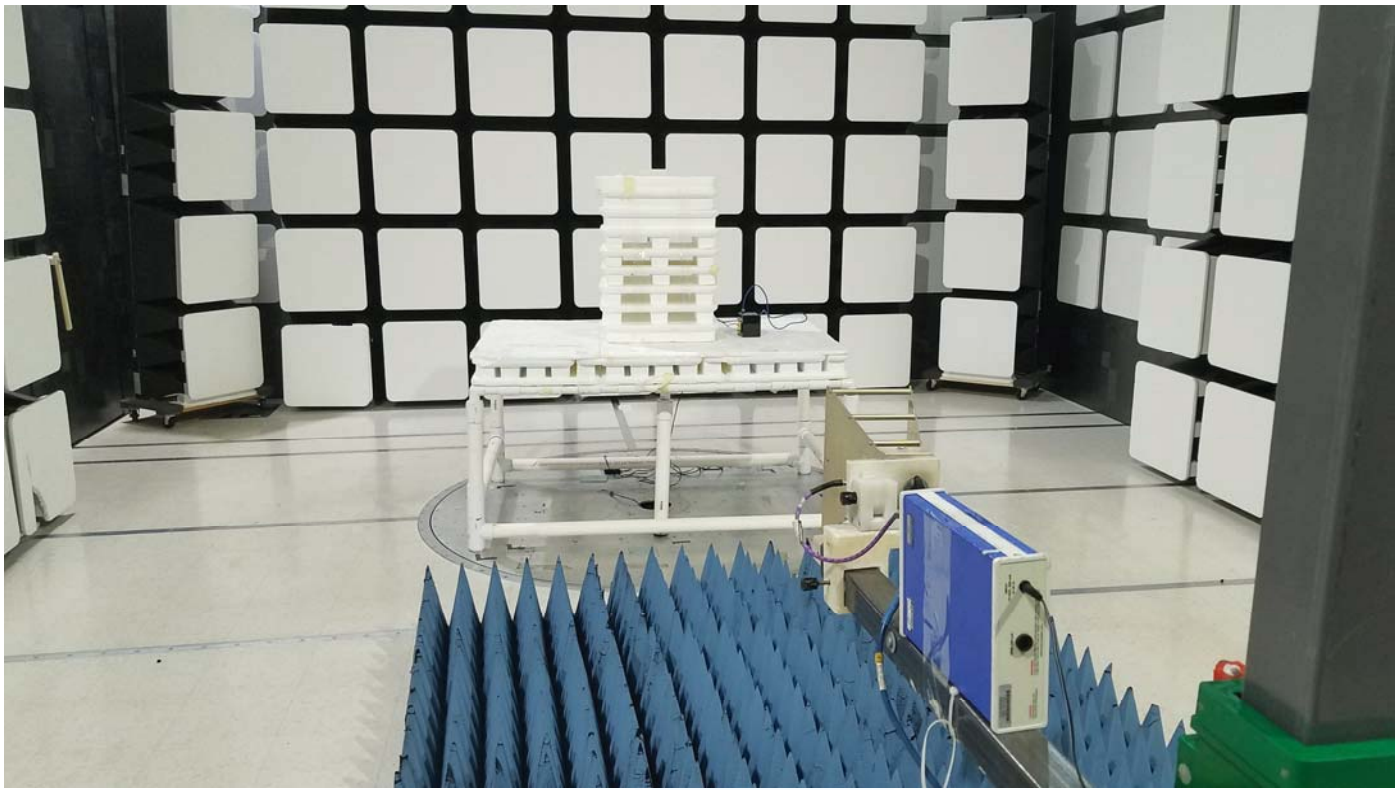

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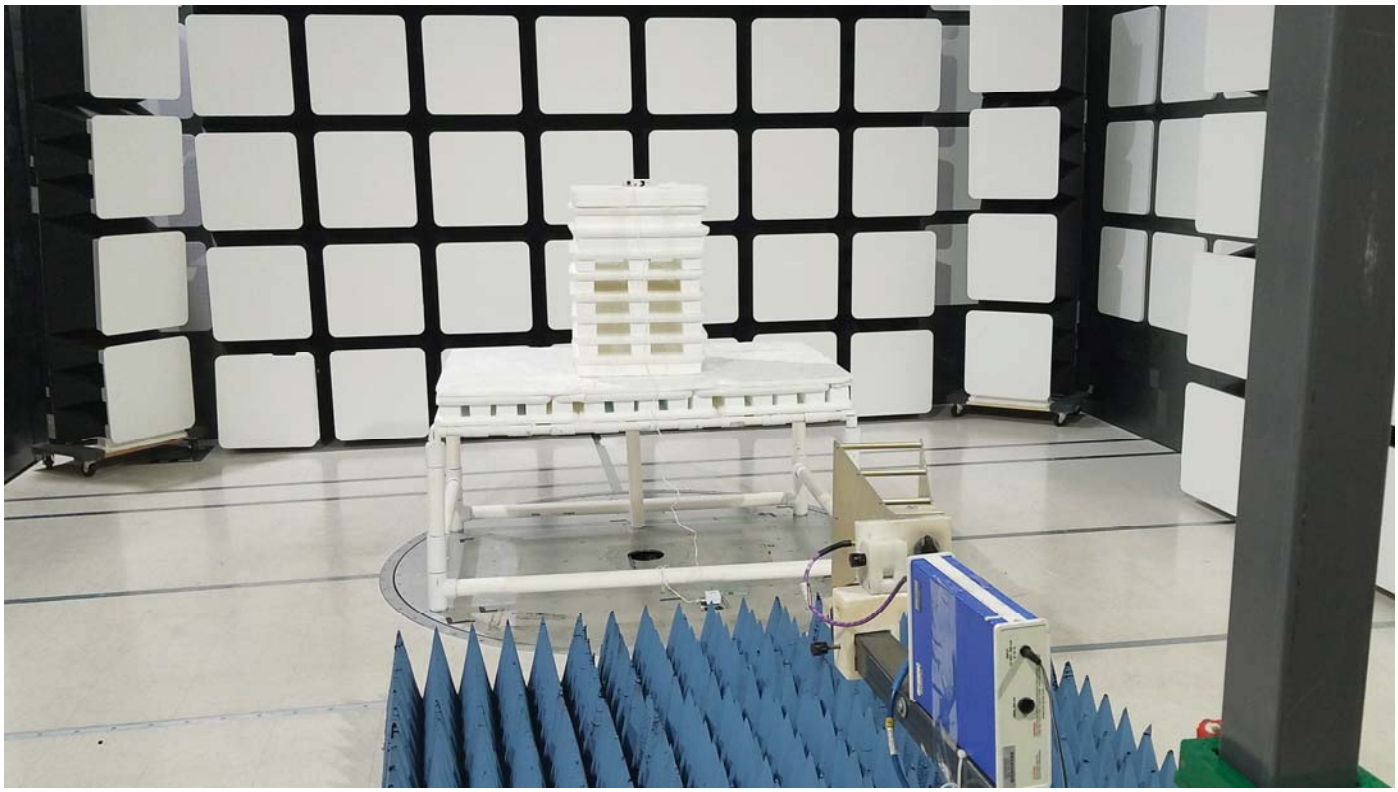

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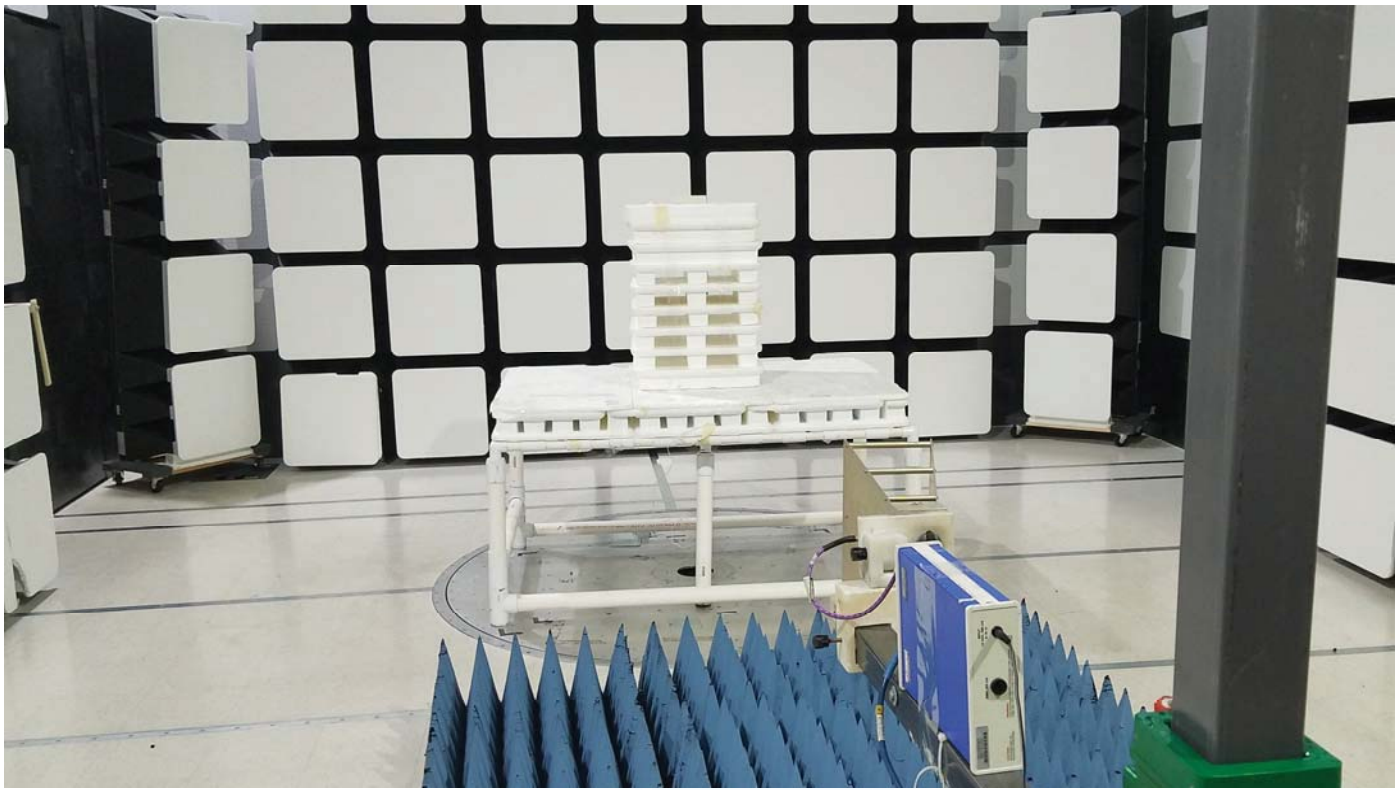

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DYNAQUIP CONTROLS, INC.
SMARTCONNECT
MODEL: WCSCLV
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FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

DYNAQUIP CONTROLS, INC.
SMARTCONNECT
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FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

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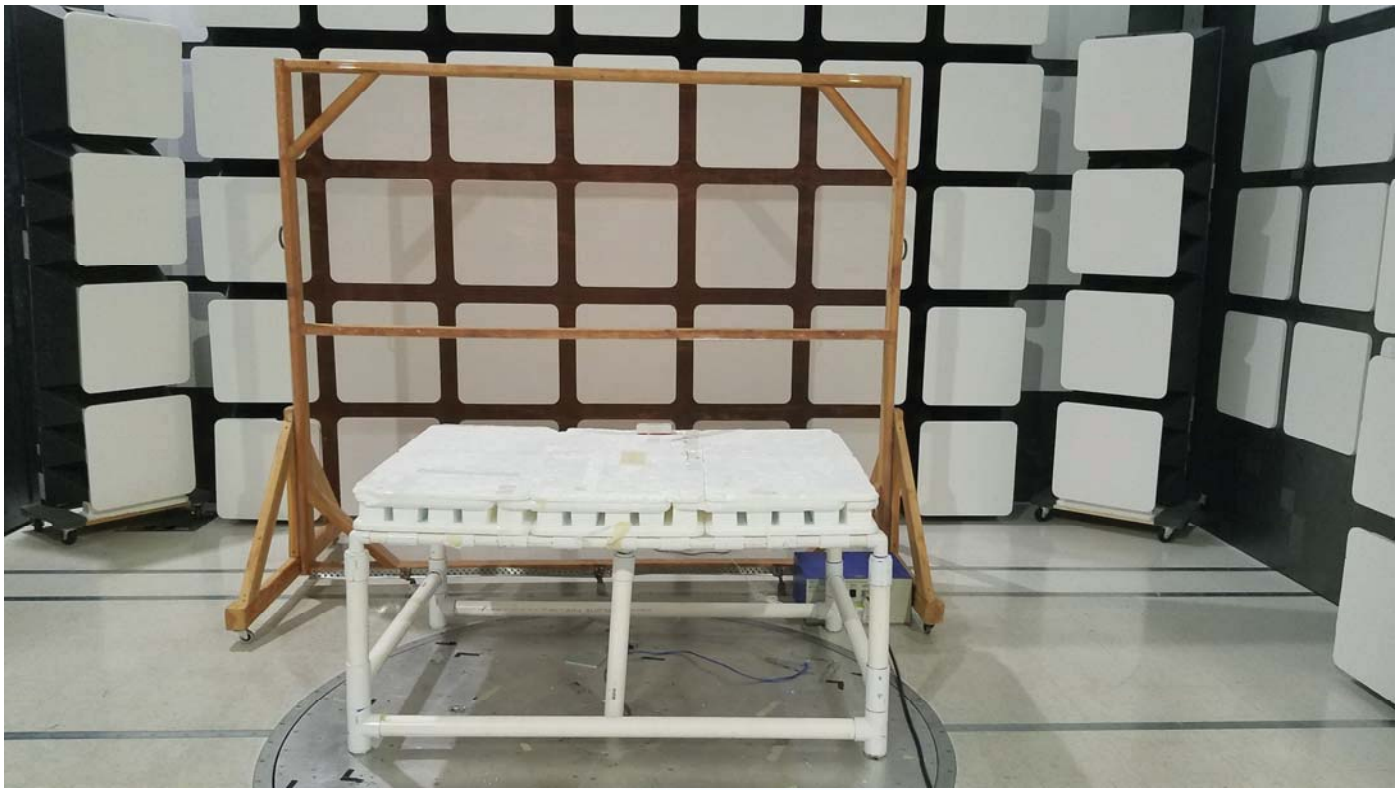

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