

*FCC PART 15, SUBPART B and C; and FCC SECTION 15.247
TEST REPORT*

for

Lighting Control Node

Model: LCN300

Prepared for

MESH SYSTEMS LLC
1920 N CASALOMA DRIVE
APPLETON, WISCONSIN 54913

Prepared by: _____

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DATE: APRIL 25, 2022

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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 by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the U.S. government.

Device Tested: Lighting Control Node
 Model: LCN300
 S/N: N/A

Product Description: The EUT is a device to monitor the status of LED lights and shut them on or off. Clock Frequencies: 12.288 MHz and 16 MHz. (Dimensions: 10 cm x 10 cm x 7 cm)

Modifications: The EUT was modified for a Class II Permissive Change. Please see the list located in Appendix B.

Customer: Mesh Systems LLC
 1920 N Casaloma Drive
 Appleton, Wisconsin 54913

Test Dates: April 5 and 6, 2022

Test Specification covered by accreditation:



Test Specifications: Emissions requirements
 CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209,
 and 15.247

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

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	The EUT complies with the Class B limits of CFR Title 47, Part 15 Subpart B; the limits of CFR Title 47, Part 15, Subpart C, section 15.207 Highest reading in relation to spec limit 33.51 (Avg) dBuV @ 4.970 MHz (*U = 2.72 dB)
2	Radiated RF Emissions, 9 kHz – 9300 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, 15.205, 15.209 and 15.247 (d) Highest reading in relation to spec limit 52.47 (Avg) dBuV/m @ 2718 MHz (*U = 4.06 dB)
3	DTS Bandwidth	This test was not performed because the changes to the EUT is unlikely to affect this test.
4	Peak Output Power	This test was not performed because the changes to the EUT is unlikely to affect this test.
5	RF Band Edges	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d)
6	Spectral Density	This test was not performed because the changes to the EUT is unlikely to affect this test.
7	Fundamental and Emissions produced by the intentional radiator in non-restricted bands, 9 kHz – 9.3 GHz	This test was not performed because the changes to the EUT is unlikely to affect this test.

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Lighting Control Node, Model: LCN300 (EUT). The emissions measurements were performed according to the measurement procedure described in ANSI C 63.4 and ANSI C 63.10. 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; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

This report is a Class II Permissive change with the original version tested under Compatible Electronics, Inc. test report number B90603D1.

1.1 Decision rule & risk

If a measured value exceeds a specification limit it implies non-compliance. If the value is below a specification limit it implies compliance. Measurement uncertainty of the laboratory is reported with all measurement results but generally not taken into consideration unless a standard, rule or law requires it to be considered.

Qualification test reports are only produced for products that are in compliance with the test requirements, therefore results are always in conformity. Otherwise, an engineering report or just the data is provided to the customer.

When performing a measurement and making a statement of conformity, in or out-of-specification to manufacturer's specifications or Pass/Fail against a requirement, there are two possible outcomes:

- The result is reported as conforming with the specification
- The result is reported as not conforming with the specification

The decision rule is defined below.

When the test result is found to be below the limit but within our measurement uncertainty of the limit, it is our policy that the final acceptance decision is left to the customer, after discussing the implications and potential risks of the decision.

When the test result is found to be exactly on the specification, it is our policy, in the case of unwanted emissions measurements to consider the result non-compliant; however, the final decision is left to the customer, after discussing the implications and potential risks of the decision.

When the test result is found to be over the specification limit under any condition, it is our policy to consider the result non-compliant.

In terms of uncertainty of measurement, the laboratory is a calibrated and tightly controlled environment and generally exceptionally stable, the measurement uncertainties are evaluated without the consideration of the test sample. When it comes to the test sample however, as most testing is performed on a single sample rather than a sample population, and that sample is often a pre-production representation of the final product that test sample represents a significantly higher source of measurement uncertainty. We advise our customers of this and that when in doubt (small test to limit margins), they may wish to perform statistical sampling on a population to gain a higher confidence in the results. All lab reported results are that of a single sample in any event.

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

Mesh Systems LLC

Nate Welch Associate Embedded Engineer

Compatible Electronics Inc.

Kyle Fujimoto Senior Test Engineer
James Ross Senior Test Engineer

2.4 Date Test Sample was Received

The test sample was received on April 4, 2022. Received as described in product description.

2.5 Disposition of the Test Sample

The test sample has not been returned to Mesh Systems LLC 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	LIN	Line
EUT	Equipment Under Test	GND	Ground
P/N	Part Number	BLE	Bluetooth Low Energy
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		
UART	Universal Asynchronous Receiver/Transmitter		
LLC	Limited Liability Company		
RSS	Radio Standard Specifications		

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
558074 D01 DTS Meas Guidance v05r02	Guidance for Performing Compliance Measurements on Digital Transmissions Systems (DTS) Operating Under Section 15.247
EN 50147-2: 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation
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 40 GHz
ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices

4. DESCRIPTION OF TEST CONFIGURATION

The Lighting Control Node, Model: LCN300 (EUT) was connected to the AC public mains and LED Light Stand via its power cord and terminal blocks.

The laptop was used to program the EUT to continuously transmit or receive at the low, middle, or high channel on a continuous basis.

The EUT is continuously transmitting or receiving at the low, middle, or high channel during the testing.

The EUT light stand was also fully illuminated with all twelve LED's turned on.

The EUT voltage was also varied between 85% and 115% using a variable transformer and the fundamental was verified to not change.

The firmware used for the EUT is stored on the company's servers.

Statement of Rationale: The device should be used as stated in the operation manual. The manufacturer is not responsible for the device performance when the device is not used as intended.

The final radiated as well as the conducted emissions data for the EUT was taken in the configuration described above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

Cables 1-4 These are 1.2-meter unshielded cables connecting the EUT to the LED light stand. The cables are 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
LIGHTING CONTROL NODE (EUT)	MESH SYSTEMS LLC	LCN300	N/A	2AC46-LCN300
AC/DC POWER SUPPLY (LAPTOP)	DELL	HA65NS1-00	N/A	N/A
SWITCHING POWER SUPPLY (EUT)	XP POWER	VEL05US120-EU-JA	N/A	N/A
LED LIGHT STAND	CREE	N/A	N/A	N/A
MODFLEX TEST TOOL SUITE*	LS RESEARCH	VERSION 2.6.2.0	N/A	N/A
LAPTOP	DELL	LATITUDE	4XTJ4S	DoC

*Used to program the EUT to transmit or receive on a continuous basis.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
RF RADIATED AND CONDUCTED EMISSIONS TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
MXE EMI Receiver, 20 Hz – 26.5 GHz	Keysight Technologies, Inc.	N9038A	MY51210150	September 17, 2021	2 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 10 2022	3 Year
CombiLog Antenna	Com-Power	AC-220	61093	December 14, 2021	2 Year
Horn Antenna	Com-Power	AH-118	10050113	December 16, 2021	2 Year
Preamplifier	Com-Power	PAM-118	181653	March 7, 2022	1 Year
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
LISN (EUT)	Com-Power	LI-215A	191951	August 4, 2021	1 Year
Attenuator 10 dB	SureCall	SC-ATT-10	17100025	December 7, 2021	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 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 grounded to earth ground via the safety ground of the AC Adapter.

6.3 Measurement Uncertainty

Compatible Electronics' U_{lab} value is less than U_{cispr} , thus based on this – compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2 u_c(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3.4 dB	2.72 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	6.3 dB	3.32 dB (Vertical) 3.30 dB (Horizontal)
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(1 GHz - 6 GHz)	5.2 dB	4.06 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(6 GHz – 18 GHz)	5.5 dB	4.06 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(18 GHz – 26.5 GHz)	N/A	4.43 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(26.5 GHz – 40 GHz)	N/A	4.57 dB

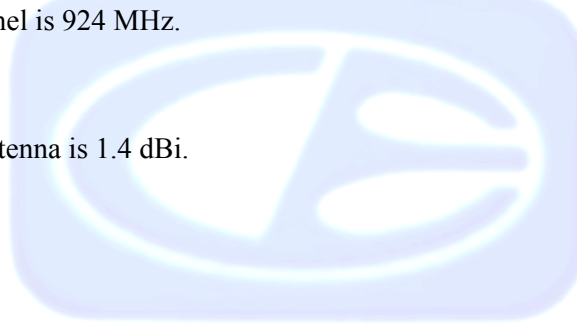
7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Description and Frequencies

The EUT operates on three channels. The low channel is 906 MHz, the middle channel is 914 MHz, and the high channel is 924 MHz.

7.2 Antenna Gain

The gain of the antenna is 1.4 dBi.



8. TEST PROCEDURES

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

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. A 10 dB attenuator 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 63.4. 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 computer software. The final qualification data is located in Appendix E.

The six highest emissions are listed in Table 1.0.

Test Results:

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 for conducted emissions.

8.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. A preamplifier was used to increase the sensitivity of the instrument for frequencies above 1 GHz. 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 above 1 GHz were averaged using the RMS detector average function on 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 gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

The EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 2.0.

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 9.3 GHz	1 MHz	Horn Antenna

Test Results:

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 sections 15.205, 15.209 and 15.247;

8.1.3 RF Emissions Test Results

Table 1.0 CONDUCTED EMISSION RESULTS
 LIGHTING CONTROL NODE
 Model: LCN300

Frequency MHz	Average Emission Level* dBuV	Average Specification Limit dBuV	Delta (Emission – Spec limit) dB
4.970 (BL) (Rx)	33.51	46.00	-12.49
4.974 (BL) (Tx)	33.25	46.00	-12.75
6.218 (BL) (Tx)	36.89	50.00	-13.11
6.218 (WL) (Tx)	36.57	50.00	-13.43
6.838 (BL) (Rx)	36.50	50.00	-13.50
6.838 (WL) (Tx)	36.45	50.00	-13.55

Table 2.0 RADIATED EMISSION RESULTS
 LIGHTING CONTROL NODE
 Model: LCN300

Frequency (MHz)	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) (dB)
2718 (Y-Axis) (V)	52.47 (Avg)	53.97	-1.50
2718 (X-Axis) (H)	52.37 (Avg)	53.97	-1.60
2718 (X-Axis) (V)	51.47 (Avg)	53.97	-2.50
31.80 (Tx) (V)	35.75 (QP)	40.00	-4.25
61.20 (Rx) (H)	35.74 (QP)	40.00	-4.26
8154 (Y-Axis) (V)	49.58 (Avg)	53.97	-4.39

Notes: * The complete emissions data is given in Appendix E of this report.
 (BL) Black Lead (H) Horizontal
 (WL) White Lead (Avg) Average
 (V) Vertical (QP) Quasi-Peak

8.1.4 Sample Calculations

A correction factor for the antenna, cable and a distance factor (if any) must be applied to the meter reading before a true field strength reading can be obtained. This Corrected Meter Reading is then compared to the specification limit in order to determine compliance with the limits.

Conversion to logarithmic terms: Specification limit ($\mu\text{V/m}$) $\log \times 20$ = Specification Limit in dBuV/m

To correct for distance when measuring at a distance other than the specification

For measurements below 30 MHz: (Specification distance / test distance) $\log \times 40$ = distance factor

For measurements above 30 MHz: (Specification distance / test distance) $\log \times 20$ = distance factor

Note: When using an Active Antenna, the Antenna factor shall be subtracted due to the combination of the internal amplification and antenna loss.

Corrected Meter Reading = meter reading + F – A + C

where: F = antenna factor

A = amplifier gain

C = cable loss

The correction factors for the antenna and the amplifier gain are attached in Appendix D of this report. The data sheets are attached in Appendix E.

The distance factor D is 0 when the test is performed at the required specification distance.

8.2 DTS Bandwidth

The DTS Bandwidth was measured using the EMI Receiver. The following steps were performed for measuring the DTS Bandwidth.

1. Set RBW = 100 kHz
2. Set the video bandwidth (VBW) to equal or greater than 3 times the RBW
3. Detector = Peak
4. Trace Mode = Max Hold
5. Sweep = Auto Couple
6. Allow the trace to stabilize
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Results:

This test was not performed because the modifications made to the EUT is unlikely to affect the results of this test.

8.3 Maximum Average Output Power

The Conducted Average Output Power was measured using the EMI Receiver. The average output power was measured using the average power measurement procedure described in section 11.9.2.2.2 of ANSI C63.10. The Maximum Average Output Power was then taken. The following steps were performed for measuring the Maximum Average Output Power.

1. Set span to at least 1.5 times the OBW
2. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz
3. Set VBW $\geq$ [3 X RBW]
4. Number of points in sweep is $\geq$ [2 x span /RBW]. 1001 points were used for the measurement
5. Sweep time - auto
6. Detector = RMS
7. Sweep Trigger = Free Run
8. Trace average at least 100 traces in power averaging (rms) mode
9. Computer power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges.

Test Results:

This test was not performed because the modifications made to the EUT is unlikely to affect the results of this test.

8.4 Emissions in Non-restricted Frequency Bands

The emissions in the non-restricted frequency bands measurements were performed using the EMI receiver directly connected to the EUT. The reference level was established by setting the instrument center frequency to DTS channel center frequency. The span was set to ≥ 1.5 times the DTS bandwidth. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with sweep set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the level and 30 dB below that was the reference level. For emission level measurement, the center frequency and span were set to encompass the frequency range to be measured. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with a sweep time set to auto. The number of measurement points were greater than the span/RBW. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level. The final qualification data sheets are located in Appendix E.

Test Results:

This test was not performed because the modifications made to the EUT is unlikely to affect the results of this test.

8.5 RF Band Edges

The RF band edges were measured using the EMI Receiver. The RF band edges were measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The following steps were performed for measuring the spectral density.

The RF band edges were taken at 902 MHz when the EUT was on the low channel and 928 MHz when the EUT was on the high channel using the EMI Receiver. The following steps were performed for measuring the band edges:

1. Set analyzer center frequency to DTS channel center frequency
2. Set the span wide enough to cover the band edges.
3. Set the RBW to 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = Peak
6. Sweep time = auto couple
7. Allow the trace to stabilize
8. Use the peak marker function to determine the maximum amplitude level

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d) for band edges. Please see the data sheets located in Appendix E.

8.6 Spectral Density Test

The spectrum density output was measured using the EMI Receiver. The spectral density output was measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The following steps were performed for measuring the spectral density.

1. Set analyzer center frequency to DTS channel center frequency
2. Set the span to at least 1.5 times the OBW.
3. Set the RBW to 3 kHz $\leq$ RBW $\leq$ 100 kHz
4. Set the VBW $\geq$ 3 X RBW
5. Detector = power averaging (RMS)
6. Ensure that the number of measurement points in the sweep $\geq$ 2 x span/RBW
7. Sweep time = auto couple
8. Employ trace averaging (RMS) mode over a minimum of 100 traces
9. Use the peak marker function to determine the maximum amplitude level
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Results:

This test was not performed because the modifications made to the EUT is unlikely to affect the results of this test.

8.7 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 was not performed because the modifications made to the EUT is unlikely to affect the results of this test.

9. CONCLUSIONS

The Lighting Control Node, Model: LCN300 (EUT), as tested, meets all of the specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.



APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS



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 the Management Systems Requirements of ISO/IEC 17025, General Requirements for the competence of testing and calibration laboratories:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025 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 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001"

ISED Test Site Registration Number: 2154A

APPENDIX B

***MODIFICATIONS TO THE EUT
FOR CLASS II***

MODIFICATIONS TO THE EUT FOR CLASS II

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.247 specifications for the Class II Permissive change.

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

1. The meter board circuit has been has been changed from a 4151031 to a 4151189 to use a new component.



APPENDIX C

***MODELS COVERED
UNDER THIS REPORT***

MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Lighting Control Node
Model: LCN300
S/N: N/A

There are no additional models covered under this report.



APPENDIX D

DIAGRAMS AND CHARTS

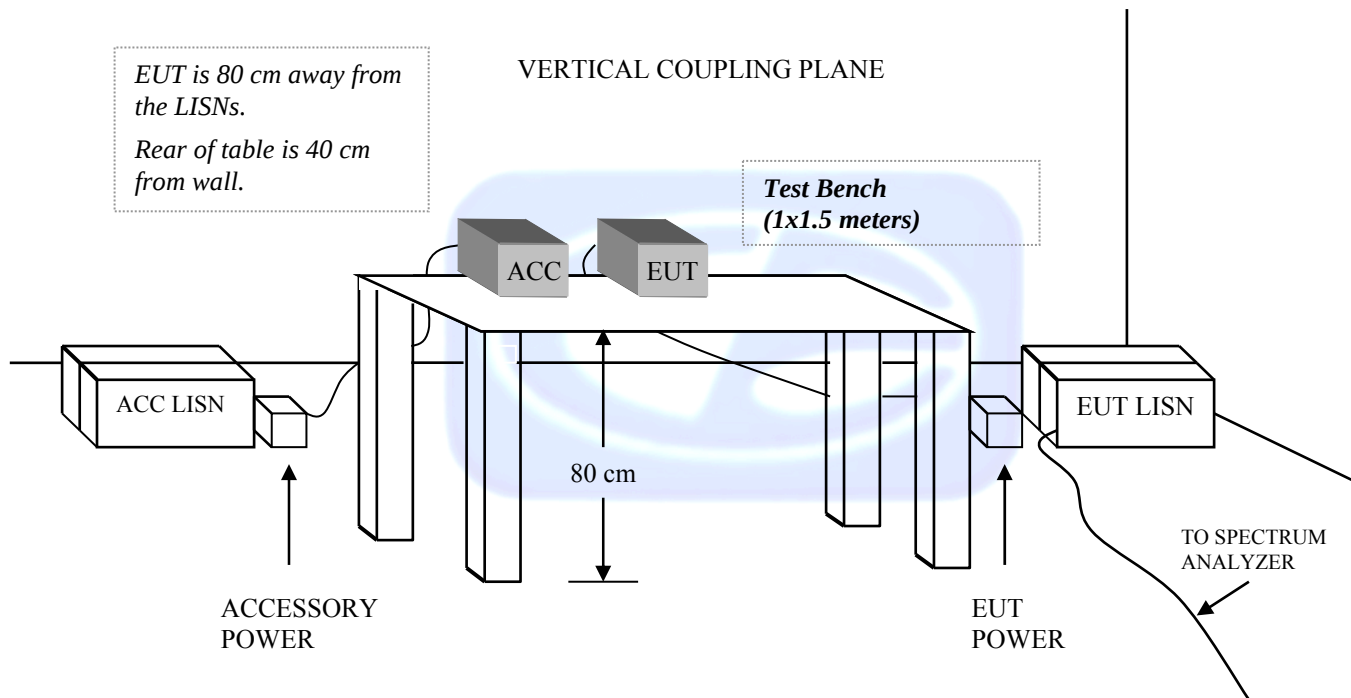
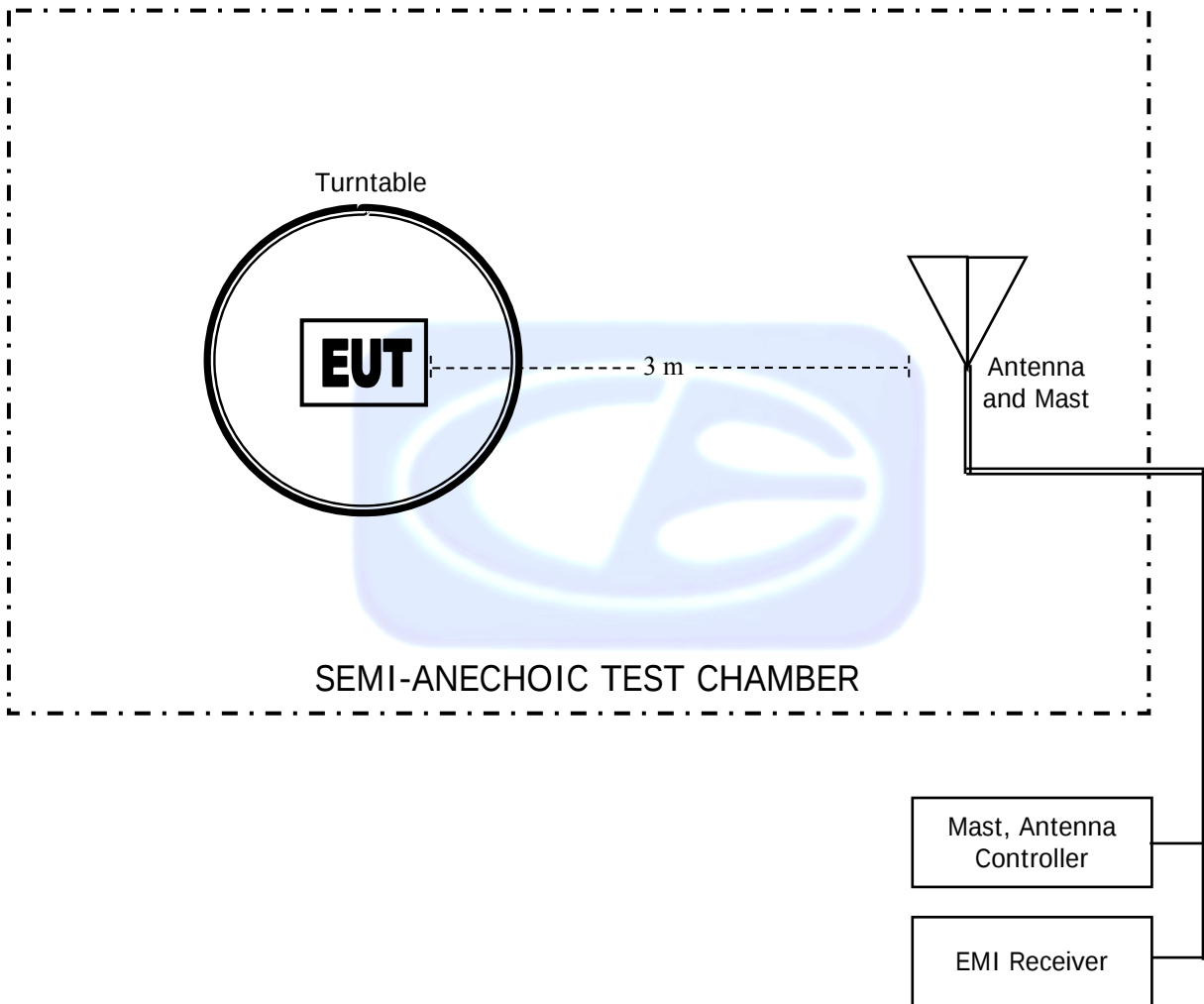
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER





COM-POWER AL-130R

LOOP ANTENNA

S/N: 121090

CALIBRATION DATE: FEBRUARY 10, 2022

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	15.6	-35.8
0.01	15.8	-35.6
0.02	14.8	-36.6
0.03	15.6	-35.9
0.04	15.0	-36.5
0.05	14.4	-37.1
0.06	14.6	-36.9
0.07	14.3	-37.2
0.08	14.3	-37.2
0.09	14.4	-37.0
0.10	14.1	-37.4
0.20	14.1	-37.4
0.30	14.0	-37.5
0.40	13.9	-37.6
0.50	14.1	-37.3
0.60	14.1	-37.3
0.70	14.2	-37.3
0.80	14.2	-37.3
0.90	14.2	-37.2
1.00	14.4	-37.0
2.00	14.6	-36.9
3.00	14.6	-36.8
4.00	14.9	-36.6
5.00	14.9	-36.7
6.00	14.8	-36.7
7.00	14.6	-36.8
8.00	14.5	-37.0
9.00	14.3	-37.2
10.00	14.5	-37.0
11.00	14.6	-36.9
12.00	14.7	-36.7
13.00	14.9	-36.6
14.00	15.0	-36.5
15.00	14.9	-36.6
16.00	14.9	-36.6
17.00	14.6	-36.8
18.00	14.4	-37.1
19.00	14.5	-37.0
20.00	14.5	-37.0
21.00	14.2	-37.3
22.00	13.9	-37.5
23.00	13.9	-37.5
24.00	13.8	-37.7
25.00	13.4	-38.0
26.00	13.2	-38.2
27.00	13.2	-38.3
28.00	12.7	-38.7
29.00	12.7	-38.8
30.00	12.4	-39.0

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

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

Newbury Park Division
1050 Lawrence Drive
Newbury Park, CA 91320
(805) 480-4044

COM-POWER AC-220**COMBILOG ANTENNA****S/N: 61093****CALIBRATION DATE: DECEMBER 14, 2021**

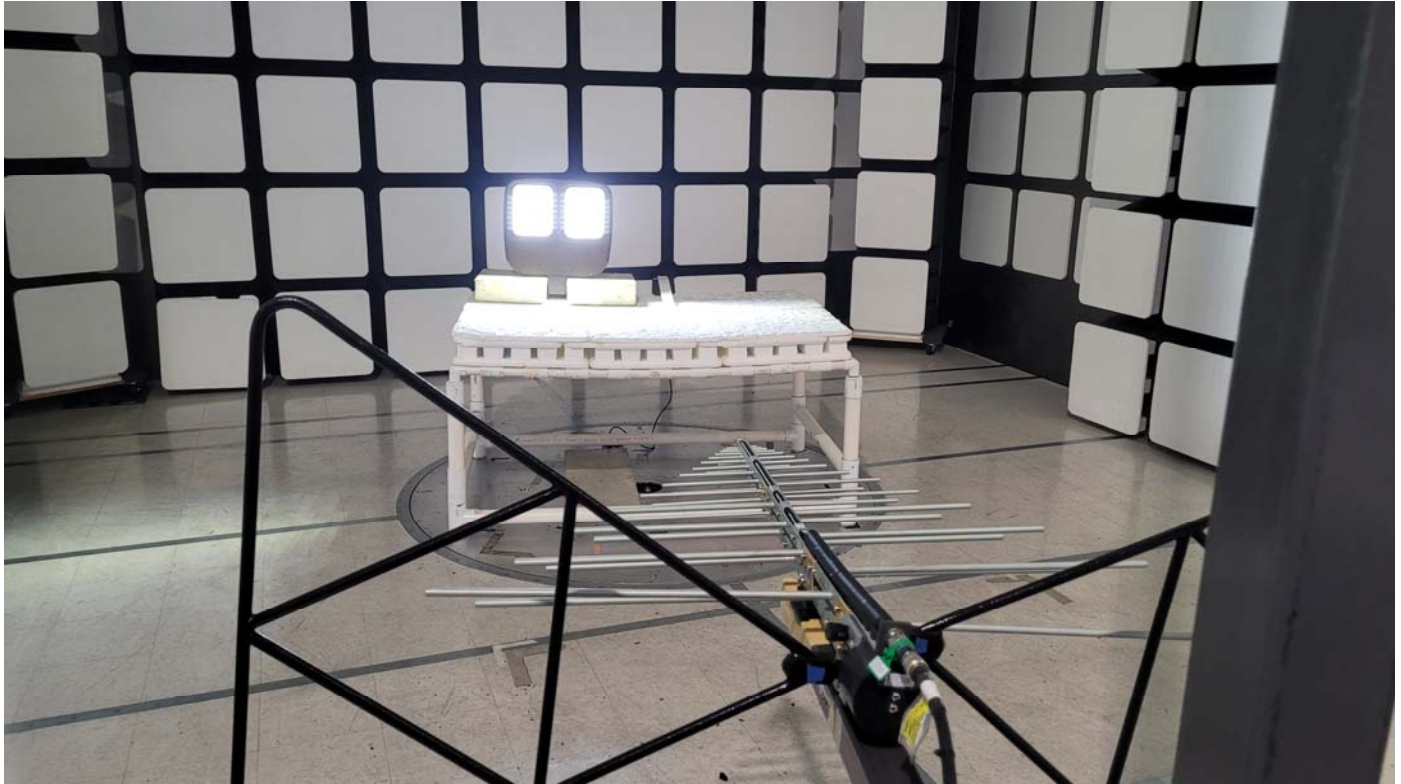
FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.50	200	16.00
35	21.40	250	17.40
40	21.00	300	19.70
45	20.60	350	20.00
50	19.70	400	22.20
60	16.10	450	22.40
70	12.80	500	23.10
80	12.50	550	23.40
90	14.20	600	24.90
100	15.40	650	25.30
120	16.50	700	25.40
125	16.80	750	26.40
140	15.90	800	26.70
150	16.60	850	27.10
160	18.50	900	27.90
175	15.90	950	28.00
180	15.50	1000	28.00

COM POWER AH-118**HORN ANTENNA****S/N: 10050113****CALIBRATION DATE: DECEMBER 16, 2021**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.86	10.0	38.91
1.5	25.67	10.5	39.94
2.0	28.25	11.0	39.10
2.5	29.17	11.5	39.70
3.0	29.78	12.0	40.29
3.5	30.88	12.5	41.93
4.0	31.21	13.0	41.34
4.5	32.96	13.5	40.57
5.0	33.30	14.0	40.23
5.5	34.24	14.5	42.25
6.0	34.57	15.0	43.63
6.5	35.61	15.5	39.96
7.0	36.60	16.0	40.38
7.5	37.49	16.5	40.56
8.0	37.44	17.0	40.93
8.5	37.98	17.5	42.27
9.0	38.01	18.0	43.77
9.5	38.53		

COM-POWER PAM-118**PREAMPLIFIER****S/N: 181653****CALIBRATION DATE: MARCH 7, 2022**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.02	6.0	38.84
1.1	39.72	6.5	39.20
1.2	39.93	7.0	39.46
1.3	39.98	7.5	39.67
1.4	39.99	8.0	39.28
1.5	40.20	8.5	38.63
1.6	40.05	9.0	38.96
1.7	40.15	9.5	39.33
1.8	40.20	10.0	39.58
1.9	40.33	11.0	38.25
2.0	40.33	12.0	40.03
2.5	40.60	13.0	40.55
3.0	40.76	14.0	40.36
3.5	40.87	15.0	39.34
4.0	40.39	16.0	37.34
4.5	39.55	17.0	42.14
5.0	40.34	18.0	42.54
5.5	39.45		



FRONT VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

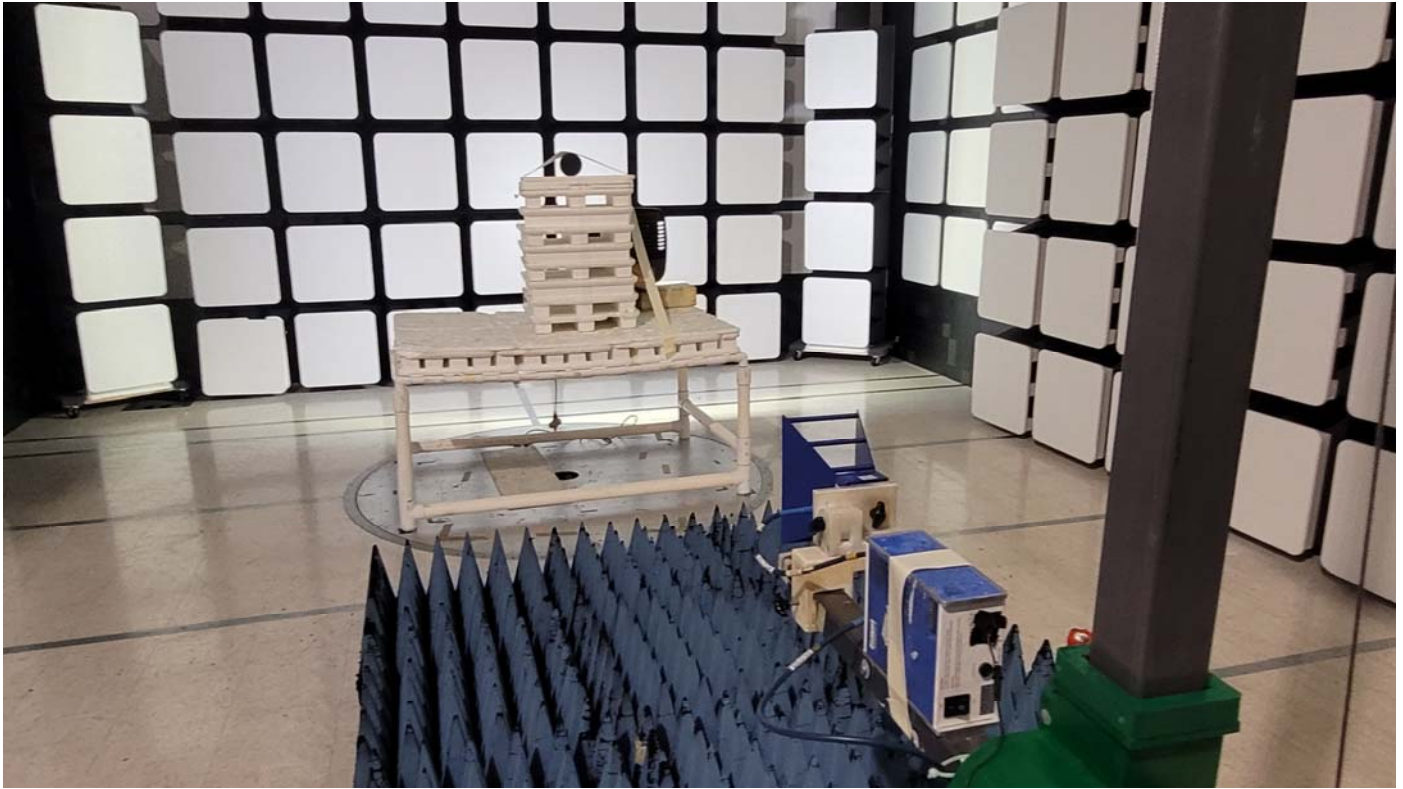
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

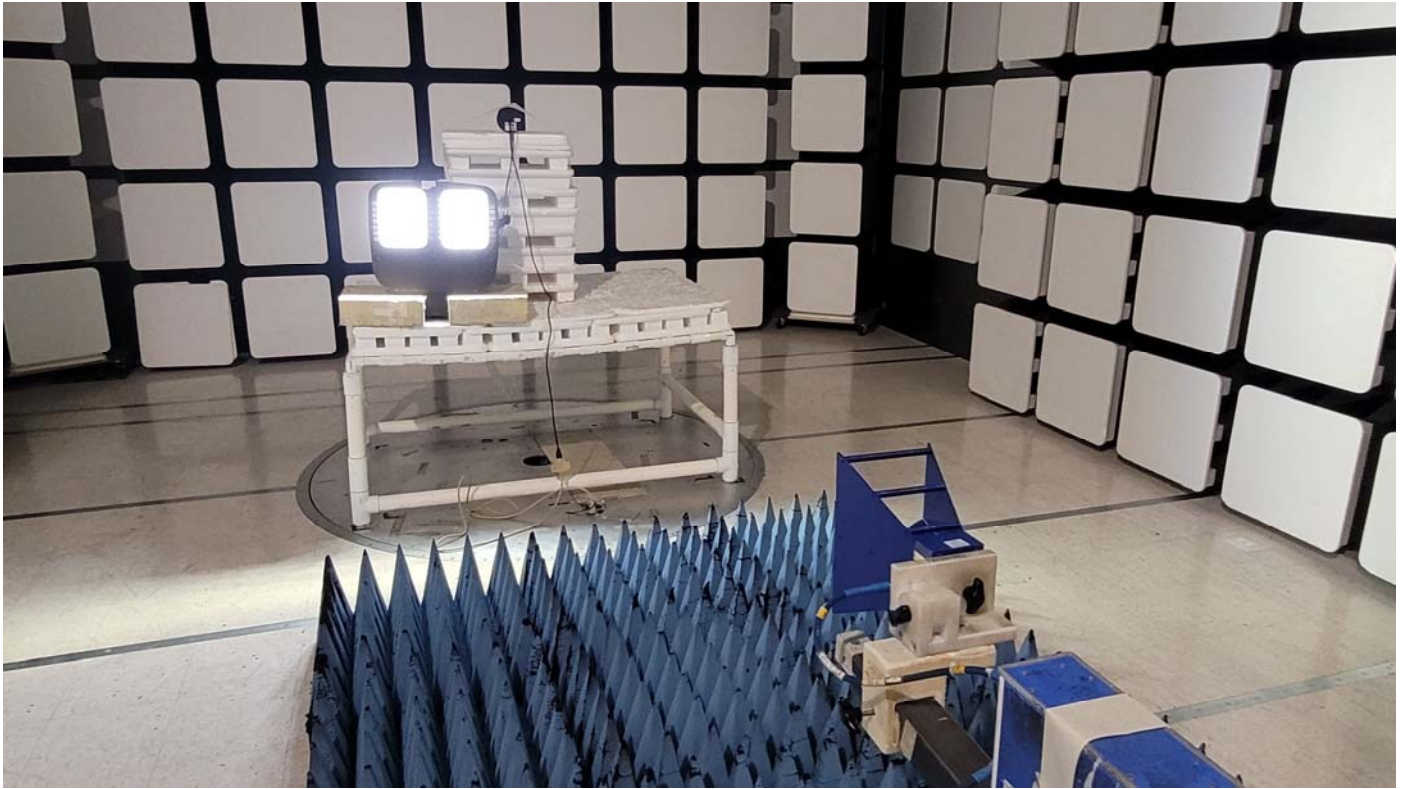
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz
Tx MODE

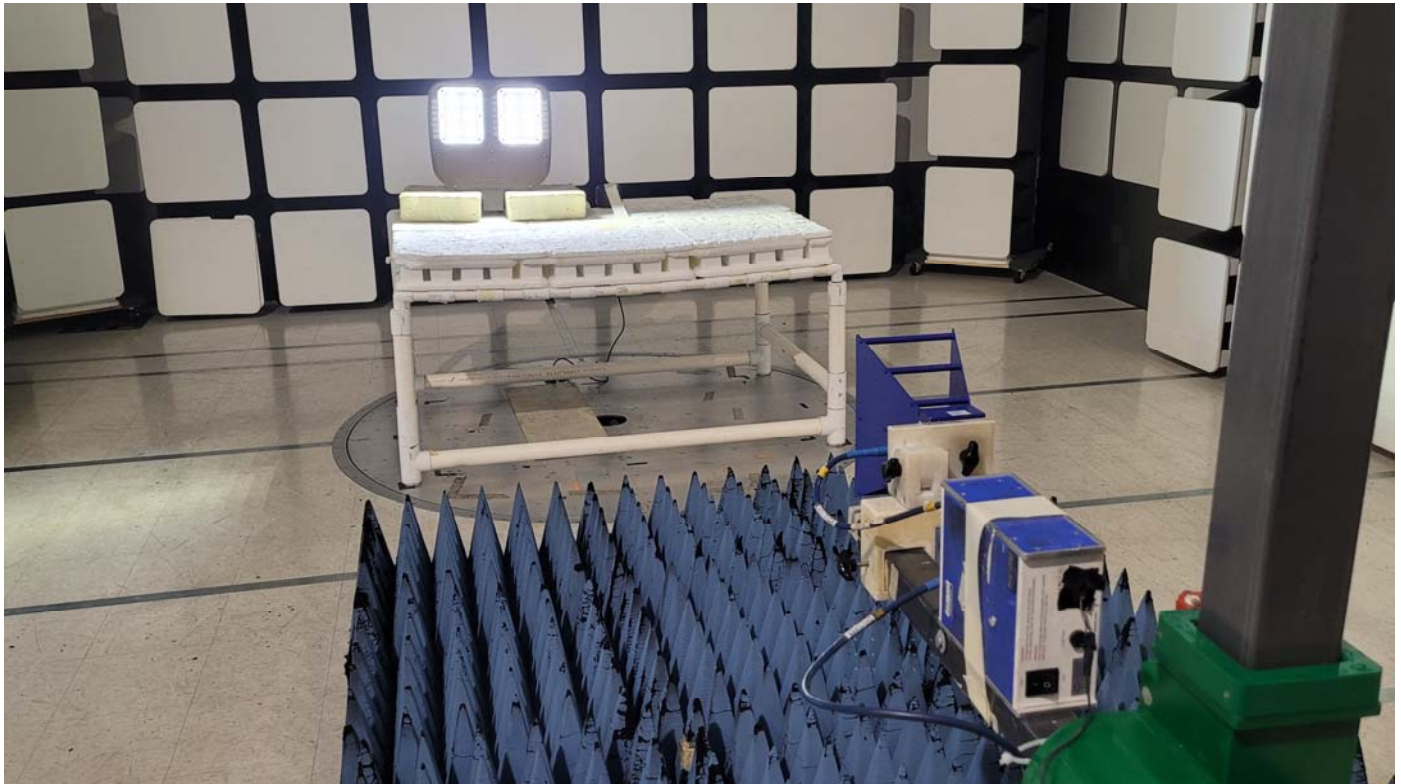
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz
Tx MODE

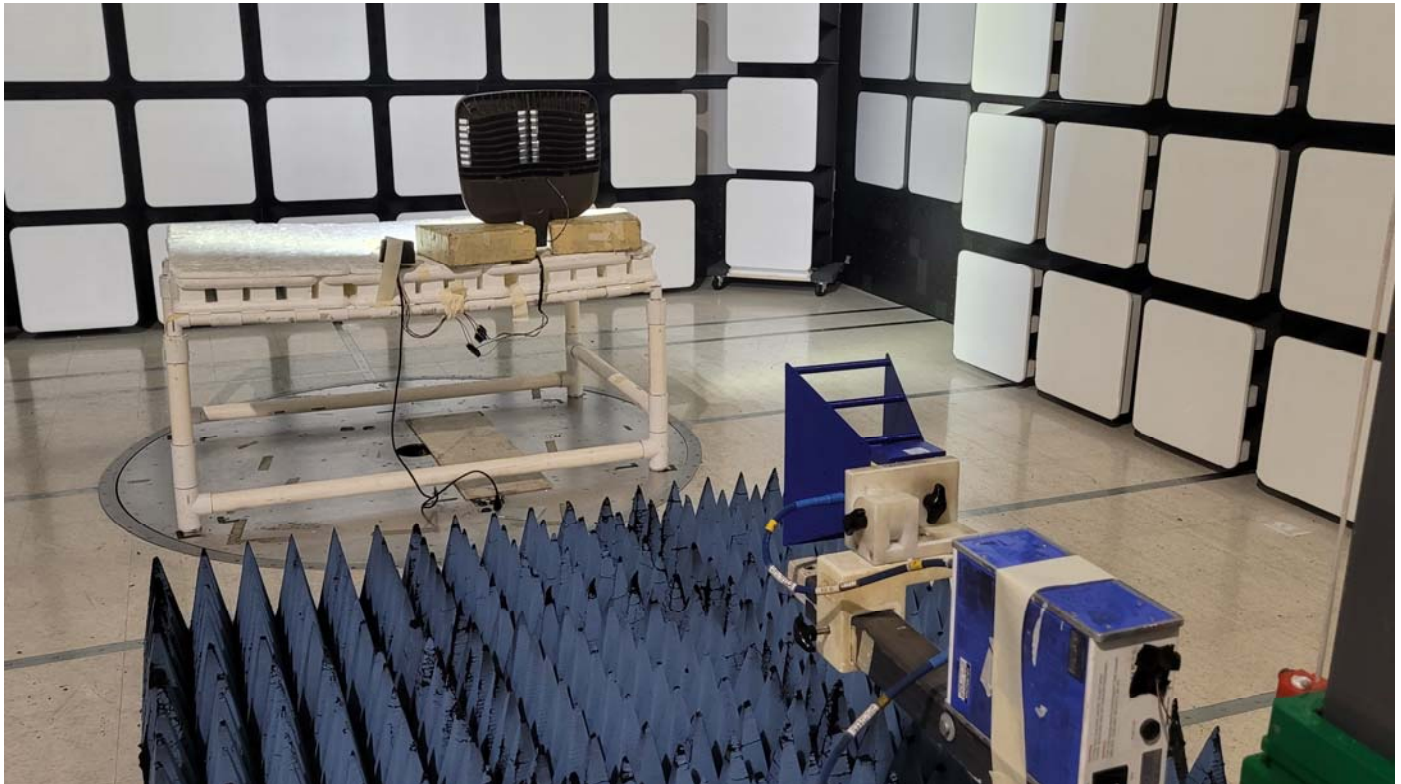
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz
Rx MODE

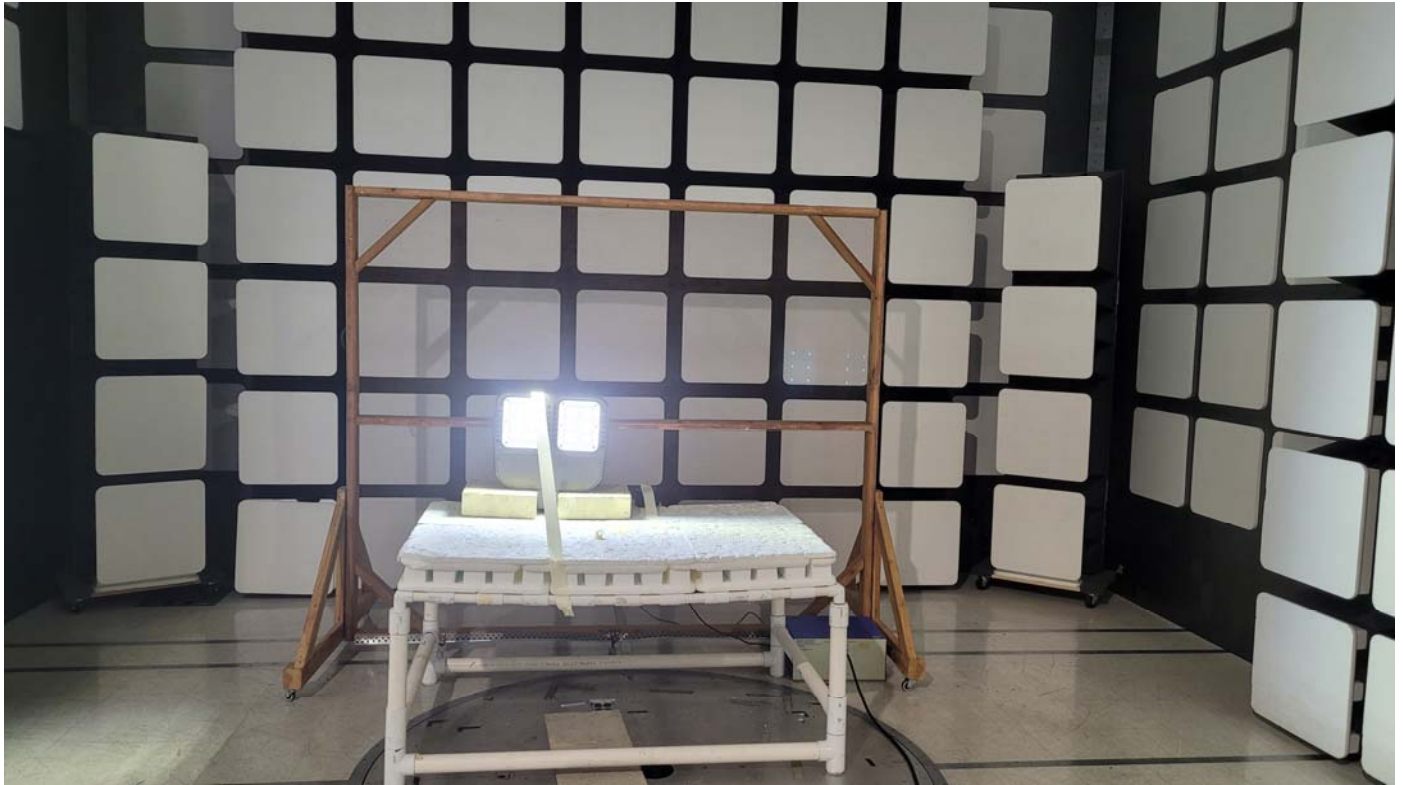
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz
Rx MODE

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



FRONT VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – CONDUCTED EMISSIONS

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



REAR VIEW

MESH SYSTEMS LLC
LIGHTING CONTROL NODE
MODEL: LCN300
FCC SUBPART B AND C – CONDUCTED EMISSIONS

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

APPENDIX E

DATA SHEETS

***RADIATED EMISSIONS
DATA SHEETS***

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**Low Channel - X-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1812								Not in Restricted Band
2718	57.34	V	73.97	-16.63	Peak	249.75	143.40	
2718	51.47	V	53.97	-2.50	Avg	249.75	143.40	
3624	45.63	V	73.97	-28.34	Peak	191.25	159.04	
3624	38.82	V	53.97	-15.15	Avg	191.25	159.04	
4530	42.01	V	73.97	-31.96	Peak	154.00	158.44	
4530	31.16	V	53.97	-22.81	Avg	154.00	158.44	
5436	42.43	V	73.97	-31.54	Peak	167.75	249.98	
5436	29.24	V	53.97	-24.73	Avg	167.75	249.98	
6342								Not in Restricted Band
7248								Not in Restricted Band
8154	51.45	V	73.97	-22.52	Peak	141.00	174.14	
8154	42.29	V	53.97	-11.68	Avg	141.00	174.14	
9060	44.30	V	73.97	-29.67	Peak	143.28	34.25	
9060	32.48	V	53.97	-21.49	Avg	143.28	34.25	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300
**Low Channel - Y-Axis
Transmit Mode**

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1812								Not in Restricted Band
2718	58.32	V	73.97	-15.65	Peak	155.75	143.34	
2718	52.47	V	53.97	-1.50	Avg	155.75	143.34	
3624	47.13	V	73.97	-26.84	Peak	117.00	175.34	
3624	40.29	V	53.97	-13.68	Avg	117.00	175.34	
4530	42.55	V	73.97	-31.42	Peak	102.25	143.16	
4530	32.49	V	53.97	-21.48	Avg	102.25	143.16	
5436	46.07	V	73.97	-27.90	Peak	112.75	190.98	
5436	34.67	V	53.97	-19.30	Avg	112.75	190.98	
6342								Not in Restricted Band
7248								Not in Restricted Band
8154	56.43	V	73.97	-17.54	Peak	150.25	127.28	
8154	49.58	V	53.97	-4.39	Avg	150.25	127.28	
9060	49.38	V	73.97	-24.59	Peak	148.50	143.16	
9060	36.80	V	53.97	-17.17	Avg	148.50	143.16	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**Low Channel - Z-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1812								Not in Restricted Band
2718	46.02	V	73.97	-27.95	Peak	327.25	159.10	
2718	32.38	V	53.97	-21.59	Avg	327.25	159.10	
3624	42.54	V	73.97	-31.43	Peak	18.75	111.28	
3624	30.08	V	53.97	-23.89	Avg	18.75	111.28	
4530	38.23	V	73.97	-35.74	Peak	254.50	143.10	
4530	26.52	V	53.97	-27.45	Avg	254.50	143.10	
5436	43.73	V	73.97	-30.24	Peak	141.50	111.22	
5436	31.57	V	53.97	-22.40	Avg	141.50	111.22	
6342								Not in Restricted Band
7248								Not in Restricted Band
8154	53.24	V	73.97	-20.73	Peak	146.50	143.28	
8154	44.93	V	53.97	-9.04	Avg	146.50	143.28	
9060	46.25	V	73.97	-27.72	Peak	221.75	222.92	
9060	34.03	V	53.97	-19.94	Avg	221.75	222.92	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**Low Channel - X-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1812								Not in Restricted Band
2718	58.06	H	73.97	-15.91	Peak	218.25	143.28	
2718	52.37	H	53.97	-1.60	Avg	218.25	143.28	
3624	43.60	H	73.97	-30.37	Peak	239.25	159.22	
3624	33.97	H	53.97	-20.00	Avg	239.25	159.22	
4530	40.99	H	73.97	-32.98	Peak	267.00	143.28	
4530	26.10	H	53.97	-27.87	Avg	267.00	143.28	
5436	43.37	H	73.97	-30.60	Peak	131.25	175.16	
5436	28.08	H	53.97	-25.89	Avg	131.25	175.16	
6342								Not in Restricted Band
7248								Not in Restricted Band
8154	48.92	H	73.97	-25.05	Peak	141.25	127.40	
8154	39.74	H	53.97	-14.23	Avg	141.25	127.40	
9060	44.95	H	73.97	-29.02	Peak	310.00	127.34	
9060	32.32	H	53.97	-21.65	Avg	310.00	127.34	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**Low Channel - Y-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1812								Not in Restricted Band
2718	54.25	H	73.97	-19.72	Peak	356.75	117.31	
2718	45.04	H	53.97	-8.93	Avg	356.75	117.31	
3624	41.61	H	73.97	-32.36	Peak	298.00	143.40	
3624	30.01	H	53.97	-23.96	Avg	298.00	143.40	
4530	40.99	H	73.97	-32.98	Peak	219.50	159.28	
4530	26.92	H	53.97	-27.05	Avg	219.50	159.28	
5436	40.71	H	73.97	-33.26	Peak	55.00	143.10	
5436	29.05	H	53.97	-24.92	Avg	55.00	143.10	
6342								Not in Restricted Band
7248								Not in Restricted Band
8154	50.67	H	73.97	-23.30	Peak	158.50	175.10	
8154	39.89	H	53.97	-14.08	Avg	158.50	175.10	
9060	44.59	H	73.97	-29.38	Peak	99.25	159.16	
9060	32.25	H	53.97	-21.72	Avg	99.25	159.16	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**Low Channel - Z-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1812								Not in Restricted Band
2718	54.94	H	73.97	-19.03	Peak	253.00	142.98	
2718	47.62	H	53.97	-6.35	Avg	253.00	142.98	
3624	44.29	H	73.97	-29.68	Peak	115.75	159.04	
3624	36.64	H	53.97	-17.33	Avg	115.75	159.04	
4530	39.83	H	73.97	-34.14	Peak	81.00	127.40	
4530	28.55	H	53.97	-25.42	Avg	81.00	127.40	
5436	42.56	H	73.97	-31.41	Peak	201.00	159.28	
5436	27.99	H	53.97	-25.98	Avg	201.00	159.28	
6342								Not in Restricted Band
7248								Not in Restricted Band
8154	49.02	H	73.97	-24.95	Peak	136.25	143.28	
8154	40.15	H	53.97	-13.82	Avg	136.25	143.28	
9060	46.48	H	73.97	-27.49	Peak	138.75	143.16	
9060	34.38	H	53.97	-19.59	Avg	138.75	143.16	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**Middle Channel - X-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1828								Not in Restricted Band
2742	56.17	V	73.97	-17.80	Peak	203.75	238.56	
2742	44.80	V	53.97	-9.17	Avg	203.75	238.56	
3656	50.33	V	73.97	-23.64	Peak	226.50	173.73	
3656	40.06	V	53.97	-13.91	Avg	226.50	173.73	
4570	46.36	V	73.97	-27.61	Peak	201.75	207.70	
4570	34.41	V	53.97	-19.56	Avg	201.75	207.70	
5484								Not in Restricted Band
6398								Not in Restricted Band
7312	58.00	V	73.97	-15.97	Peak	137.25	192.47	
7312	45.62	V	53.97	-8.35	Avg	137.25	192.47	
8226	57.03	V	73.97	-16.94	Peak	228.75	175.70	
8226	42.41	V	53.97	-11.56	Avg	228.75	175.70	
9140	49.16	V	73.97	-24.81	Peak	236.75	159.16	
9140	35.09	V	53.97	-18.88	Avg	236.75	159.16	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**Middle Channel - Y-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1828								Not in Restricted Band
2742	53.61	V	73.97	-20.36	Peak	341.75	111.28	
2742	43.11	V	53.97	-10.86	Avg	341.75	111.28	
3656	45.67	V	73.97	-28.30	Peak	12.75	127.40	
3656	34.51	V	53.97	-19.46	Avg	12.75	127.40	
4570	52.53	V	73.97	-21.44	Peak	242.25	143.22	
4570	37.76	V	53.97	-16.21	Avg	242.25	143.22	
5484								Not in Restricted Band
6398								Not in Restricted Band
7312	50.28	V	73.97	-23.69	Peak	173.75	223.22	
7312	37.43	V	53.97	-16.54	Avg	173.75	223.22	
8226	57.51	V	73.97	-16.46	Peak	175.50	207.10	
8226	43.76	V	53.97	-10.21	Avg	175.50	207.10	
9140	48.90	V	73.97	-25.07	Peak	239.25	111.28	
9140	34.89	V	53.97	-19.08	Avg	239.25	111.28	



FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**Middle Channel - Z-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1828								Not in Restricted Band
2742	60.77	V	73.97	-13.20	Peak	179.25	159.34	
2742	48.94	V	53.97	-5.03	Avg	179.25	159.34	
3656	52.37	V	73.97	-21.60	Peak	183.25	143.22	
3656	43.31	V	53.97	-10.66	Avg	183.25	143.22	
4570	48.62	V	73.97	-25.35	Peak	190.25	127.16	
4570	36.74	V	53.97	-17.23	Avg	190.25	127.16	
5484								Not in Restricted Band
6398								Not in Restricted Band
7312	56.70	V	73.97	-17.27	Peak	118.00	111.40	
7312	44.96	V	53.97	-9.01	Avg	118.00	111.40	
8226	61.56	V	73.97	-12.41	Peak	150.75	111.40	
8226	46.29	V	53.97	-7.68	Avg	150.75	111.40	
9140	50.51	V	73.97	-23.46	Peak	147.25	127.58	
9140	36.81	V	53.97	-17.16	Avg	147.25	127.58	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**Middle Channel - X-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1828								Not in Restricted Band
2742	55.95	H	73.97	-18.02	Peak	302.75	127.64	
2742	46.17	H	53.97	-7.80	Avg	302.75	127.64	
3656	49.14	H	73.97	-24.83	Peak	168.75	159.28	
3656	38.56	H	53.97	-15.41	Avg	168.75	159.28	
4570	50.33	H	73.97	-23.64	Peak	0.00	175.28	
4570	36.04	H	53.97	-17.93	Avg	0.00	175.28	
5484								Not in Restricted Band
6398								Not in Restricted Band
7312	51.21	H	73.97	-22.76	Peak	233.25	143.70	
7312	36.85	H	53.97	-17.12	Avg	233.25	143.70	
8226	55.04	H	73.97	-18.93	Peak	89.75	127.46	
8226	40.70	H	53.97	-13.27	Avg	89.75	127.46	
9140	46.27	H	73.97	-27.70	Peak	45.25	143.22	
9140	33.21	H	53.97	-20.76	Avg	45.25	143.22	

FCC 15.247Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**Middle Channel - Y-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1828								Not in Restricted Band
2742	61.69	H	73.97	-12.28	Peak	180.50	143.04	
2742	49.46	H	53.97	-4.51	Avg	180.50	143.04	
3656	41.89	H	73.97	-32.08	Peak	0.00	223.40	
3656	28.87	H	53.97	-25.10	Avg	0.00	223.40	
4570	50.02	H	73.97	-23.95	Peak	171.25	127.28	
4570	37.67	H	53.97	-16.30	Avg	171.25	127.28	
5484								Not in Restricted Band
6398								Not in Restricted Band
7312	55.47	H	73.97	-18.50	Peak	149.00	192.29	
7312	43.37	H	53.97	-10.60	Avg	149.00	192.29	
8226	59.54	H	73.97	-14.43	Peak	170.00	159.22	
8226	45.48	H	53.97	-8.49	Avg	170.00	159.22	
9140	49.27	H	73.97	-24.70	Peak	170.75	176.00	
9140	34.58	H	53.97	-19.39	Avg	170.75	176.00	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**Middle Channel - Z-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1828								Not in Restricted Band
2742	54.56	H	73.97	-19.41	Peak	301.75	143.46	
2742	44.38	H	53.97	-9.59	Avg	301.75	143.46	
3656	47.59	H	73.97	-26.38	Peak	218.75	192.00	
3656	36.07	H	53.97	-17.90	Avg	218.75	192.00	
4570	48.31	H	73.97	-25.66	Peak	169.75	159.04	
4570	29.58	H	53.97	-24.39	Avg	169.75	159.04	
5484								Not in Restricted Band
6398								Not in Restricted Band
7312	54.99	H	73.97	-18.98	Peak	112.75	111.46	
7312	42.28	H	53.97	-11.69	Avg	112.75	111.46	
8226	53.86	H	73.97	-20.11	Peak	62.25	159.70	
8226	37.26	H	53.97	-16.71	Avg	62.25	159.70	
9140	49.70	H	73.97	-24.27	Peak	175.00	192.89	
9140	34.84	H	53.97	-19.13	Avg	175.00	192.89	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**High Channel - X-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1848								Not in Restricted Band
2772	48.71	V	73.97	-25.26	Peak	43.75	175.70	
2772	41.32	V	53.97	-12.65	Avg	43.75	175.70	
3696	46.43	V	73.97	-27.54	Peak	16.25	223.04	
3696	30.48	V	53.97	-23.49	Avg	16.25	223.04	
4620	44.70	V	73.97	-29.27	Peak	79.50	224.89	
4620	34.19	V	53.97	-19.78	Avg	79.50	224.89	
5544								Not in Restricted Band
6468								Not in Restricted Band
7392	54.24	V	73.97	-19.73	Peak	131.25	208.53	
7392	44.85	V	53.97	-9.12	Avg	131.25	208.53	
8316	50.60	V	73.97	-23.37	Peak	281.75	127.28	
8316	37.41	V	53.97	-16.56	Avg	281.75	127.28	
9240	46.51	V	73.97	-27.46	Peak	137.50	143.52	
9240	33.69	V	53.97	-20.28	Avg	137.50	143.52	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**High Channel - Y-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1848								Not in Restricted Band
2772	48.60	V	73.97	-25.37	Peak	182.50	159.16	
2772	41.13	V	53.97	-12.84	Avg	182.50	159.16	
3696	47.35	V	73.97	-26.62	Peak	139.00	159.52	
3696	40.33	V	53.97	-13.64	Avg	139.00	159.52	
4620	44.98	V	73.97	-28.99	Peak	162.75	143.28	
4620	31.04	V	53.97	-22.93	Avg	162.75	143.28	
5544								Not in Restricted Band
6468								Not in Restricted Band
7392	51.40	V	73.97	-22.57	Peak	135.75	239.04	
7392	39.84	V	53.97	-14.13	Avg	135.75	239.04	
8316	50.05	V	73.97	-23.92	Peak	141.00	128.05	
8316	36.91	V	53.97	-17.06	Avg	141.00	128.05	
9240	44.64	V	73.97	-29.33	Peak	124.00	207.22	
9240	33.07	V	53.97	-20.90	Avg	124.00	207.22	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

**High Channel - Z-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1848								Not in Restricted Band
2772	48.03	V	73.97	-25.94	Peak	194.25	143.28	
2772	43.12	V	53.97	-10.85	Avg	194.25	143.28	
3696	48.82	V	73.97	-25.15	Peak	200.50	127.28	
3696	43.16	V	53.97	-10.81	Avg	200.50	127.28	
4620	45.69	V	73.97	-28.28	Peak	241.75	143.28	
4620	36.50	V	53.97	-17.47	Avg	241.75	143.28	
5544								Not in Restricted Band
6468								Not in Restricted Band
7392	52.18	V	73.97	-21.79	Peak	195.50	176.11	
7392	43.11	V	53.97	-10.86	Avg	195.50	176.11	
8316	54.91	V	73.97	-19.06	Peak	194.00	191.16	
8316	48.85	V	53.97	-5.12	Avg	194.00	191.16	
9240	45.39	V	73.97	-28.58	Peak	183.00	207.82	
9240	33.37	V	53.97	-20.61	Avg	183.00	207.82	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

High Channel - X-Axis

Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1848								Not in Restricted Band
2772	48.92	H	73.97	-25.05	Peak	40.25	181.25	
2772	41.53	H	53.97	-12.44	Avg	40.25	181.25	
3696	47.43	H	73.97	-26.54	Peak	0.25	221.22	
3696	32.21	H	53.97	-21.76	Avg	0.25	221.22	
4620	44.88	H	73.97	-29.09	Peak	90.50	226.25	
4620	34.29	H	53.97	-19.68	Avg	90.50	226.25	
5544								Not in Restricted Band
6468								Not in Restricted Band
7392	54.35	H	73.97	-19.62	Peak	152.25	215.25	
7392	44.99	H	53.97	-8.98	Avg	152.25	215.25	
8316	51.23	H	73.97	-22.74	Peak	295.25	128.25	
8316	38.06	H	53.97	-15.91	Avg	295.25	128.25	
9240	46.53	H	73.97	-27.44	Peak	145.25	144.25	
9240	33.71	H	53.97	-20.26	Avg	145.25	144.25	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

High Channel - Y-Axis

Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1848								Not in Restricted Band
2772	47.14	H	73.97	-26.83	Peak	300.75	143.10	
2772	30.90	H	53.97	-23.07	Avg	300.75	143.10	
3696	42.11	H	73.97	-31.86	Peak	3.00	111.28	
3696	31.25	H	53.97	-22.72	Avg	3.00	111.28	
4620	43.18	H	73.97	-30.79	Peak	116.25	111.28	
4620	27.41	H	53.97	-26.56	Avg	116.25	111.28	
5544								Not in Restricted Band
6468								Not in Restricted Band
7392	49.25	H	73.97	-24.72	Peak	91.50	175.28	
7392	40.55	H	53.97	-13.42	Avg	91.50	175.28	
8316	51.18	H	73.97	-22.79	Peak	169.75	100.04	
8316	39.23	H	53.97	-14.74	Avg	169.75	100.04	
9240	45.09	H	73.97	-28.88	Peak	159.50	206.92	
9240	32.79	H	53.97	-21.18	Avg	159.50	206.92	

FCC 15.247

Mesh Systems LLC
Lighting Control Node
Model: LCN300

Date: 04/06/2022

Lab: D

Tested By: Kyle Fujimoto

**High Channel - Z-Axis
Transmit Mode**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1848								Not in Restricted Band
2772	41.07	H	73.97	-32.90	Peak	72.75	110.38	
2772	29.46	H	53.97	-24.51	Avg	72.75	110.38	
3696	45.21	H	73.97	-28.76	Peak	127.00	110.32	
3696	39.69	H	53.97	-14.28	Avg	127.00	110.32	
4620	43.33	H	73.97	-30.64	Peak	149.50	172.05	
4620	34.58	H	53.97	-19.39	Avg	149.50	172.05	
5544								Not in Restricted Band
6468								Not in Restricted Band
7392	51.29	H	73.97	-22.68	Peak	235.25	222.14	
7392	41.35	H	53.97	-12.62	Avg	235.25	222.14	
8316	51.78	H	73.97	-22.19	Peak	164.75	110.98	
8316	44.32	H	53.97	-9.65	Avg	164.75	110.98	
9240	44.66	H	73.97	-29.31	Peak	169.75	175.40	
9240	32.77	H	53.97	-21.20	Avg	169.75	175.40	

FCC 15.247 and FCC Class BMesh Systems LLC
Lighting Control Node
Model: LCN300Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto**Non Harmonic Emissions from the Tx and Digital Portion - 9 kHz to 30 MHz**
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								Investigated in the X-Axis,
								Y-Axis, and Z-Axis

FCC Class B

Mesh Systems LLC
Lighting Control Node
Model: LCN300

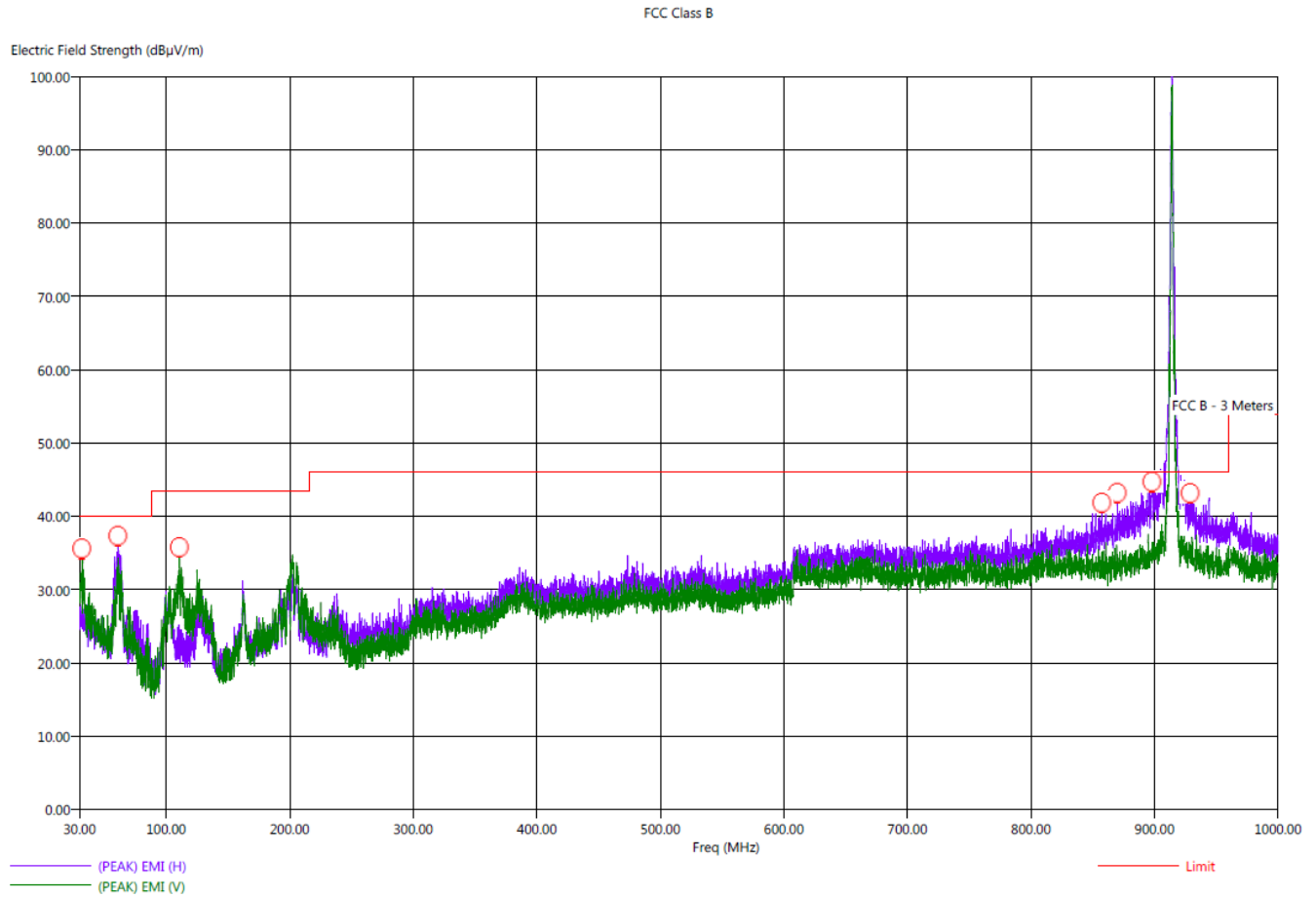
Date: 04/06/2022
Lab: D
Tested By: Kyle Fujimoto

Receiver Portion - 9 kHz to 30 MHz
Receiver Portion - 1 GHz to 9.3 GHz

[illegible]

Title: Pre-Scan - FCC Class B
File: 1 - RS - Pre-Scan - Tx Mode - FCC Class B - With LED Light.set
Operator: Kye Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously transmitting at the middle channel and lighting LED's on Accessory
Comments: Company: Mesh Systems LLC
Model: LCN300
S/N: N/A
The frequency at 914 MHz is from the intentional radiator and is subject to the limits of FCC 15.247 instead. The frequencies from 902 MHz to 928 MHz are also subject to the limits of FCC 15.247.

4/5/2022 9:50:45 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 1 - RS - Final Scan - Tx Mode - FCC Class B - With LED Light.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously transmitting at the middle channel and lighting LED's on Accessory
Comments: Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/5/2022 10:06:41 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (deg)	Twr Ht (cm)
31.80	V	38.22	35.75	-1.78	-4.25	40.00	22.00	0.43	40.75	127.34
60.90	H	40.10	34.78	0.10	-5.22	40.00	15.73	0.58	359.50	366.62
110.80	V	38.64	32.79	-4.86	-10.71	43.50	15.86	0.84	64.25	143.22
857.30	H	42.61	37.15	-3.39	-8.85	46.00	27.00	2.58	119.75	302.38
869.80	H	41.60	36.84	-4.40	-9.16	46.00	27.10	2.59	145.25	254.74
897.90	H	46.22	40.63	0.22	-5.37	46.00	27.81	2.61	102.50	159.04
928.80	H	46.47	41.13	0.47	-4.87	46.00	28.37	2.70	128.00	254.74

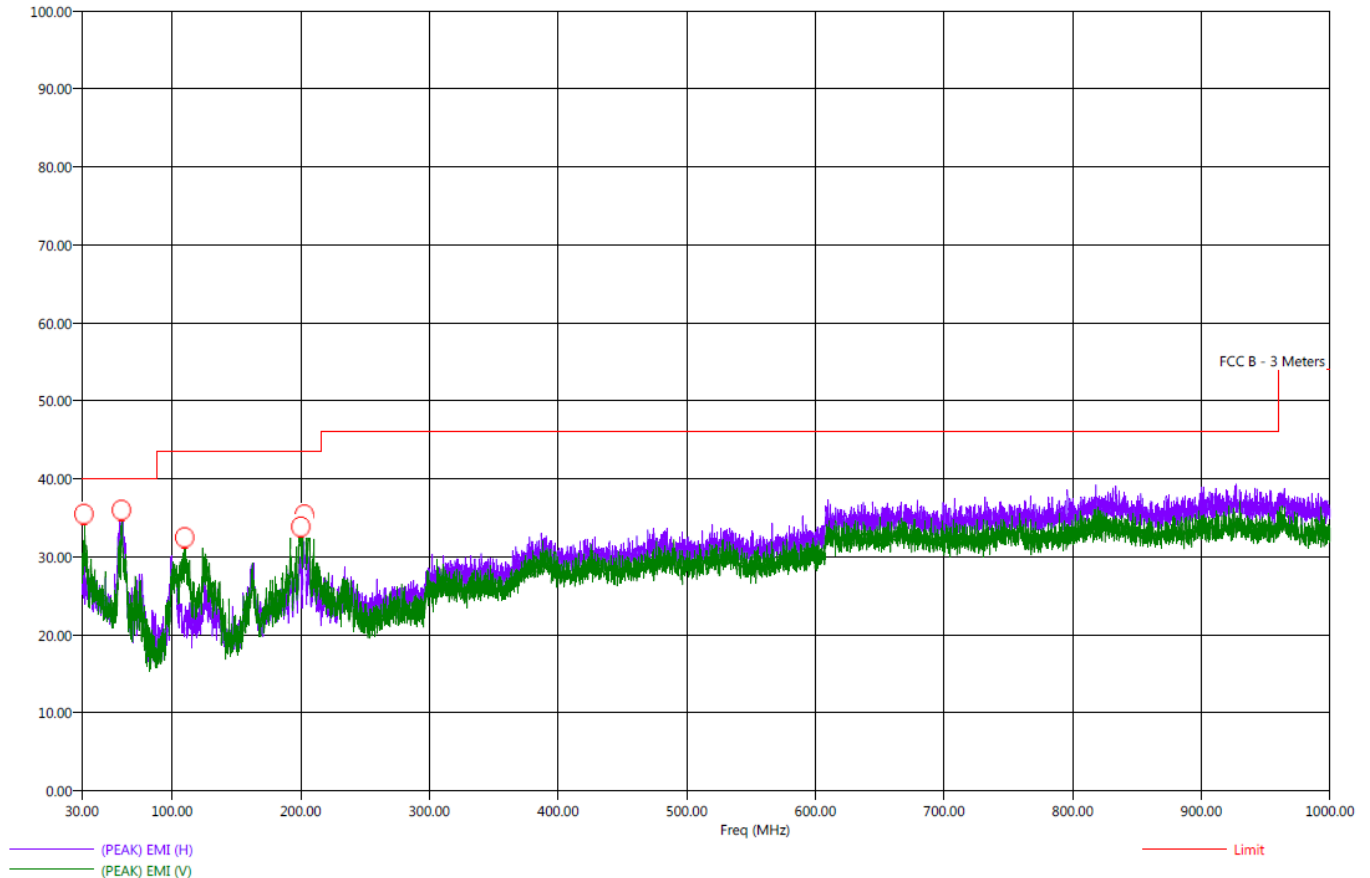


Title: Pre-Scan - FCC Class B
File: 2 - RS - Pre-Scan - Rx Mode - FCC Class B - With LED Light.set
Operator: Kye Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously receiving at the middle channel and lighting LED's on Accessory
Comments: Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/5/2022 10:33:36 AM
Sequence: Preliminary Scan

FCC Class B

Electric Field Strength (dB μ V/m)



Title: Radiated Final - FCC Class B
File: 2 - RS - Final Scan - Rx Mode - FCC Class B - With LED Light.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously receiving and lighting LED's on Accessory
Comments: Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/5/2022 10:45:55 AM
Sequence: Final Measurements

FCC Class B

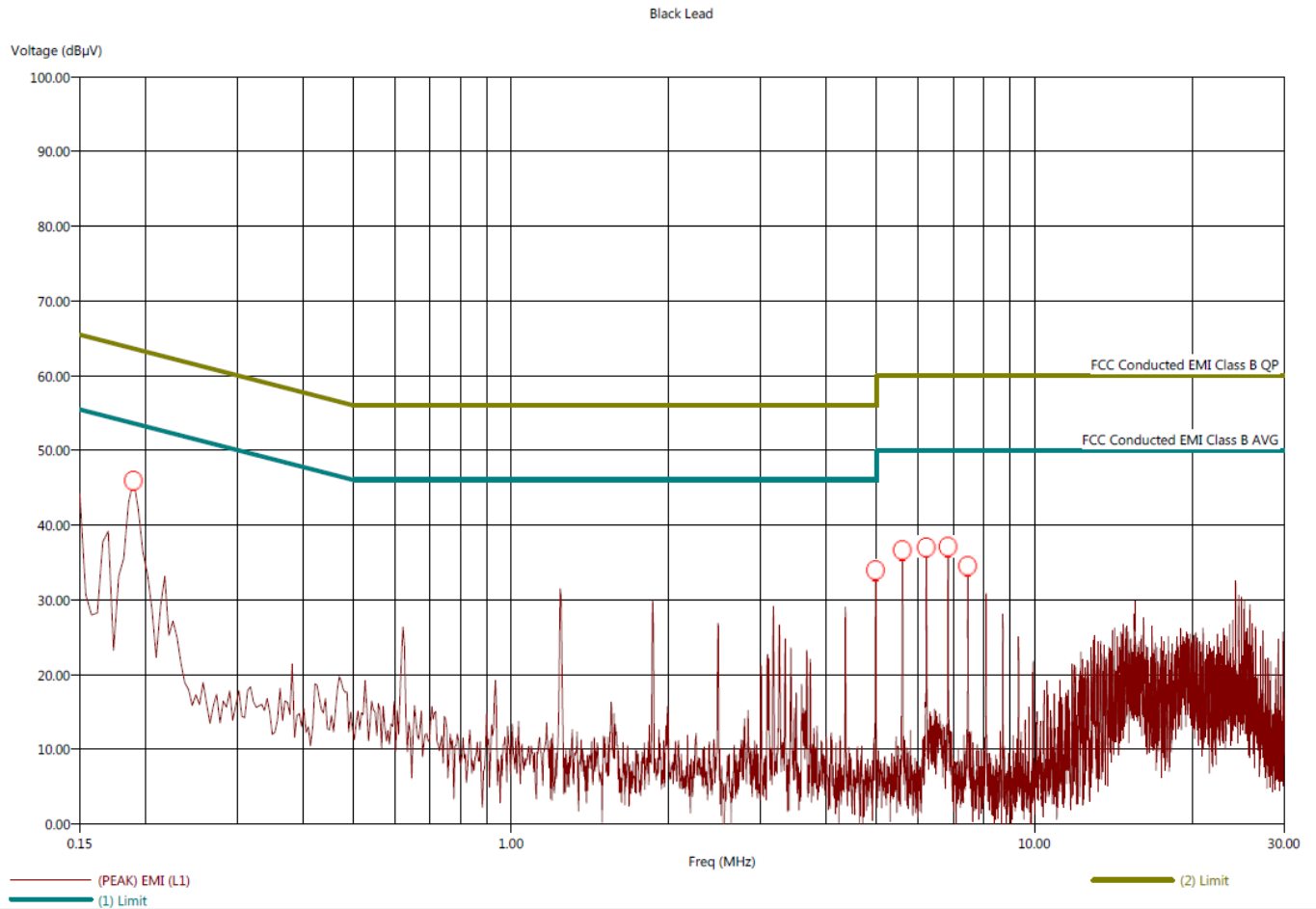
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbt Agl (deg)	Twr Ht (cm)
31.60	V	38.75	35.21	-1.25	-4.79	40.00	22.00	0.43	64.75	111.28
60.70	H	39.63	34.58	-0.37	-5.42	40.00	15.74	0.58	45.50	318.44
61.20	H	40.48	35.74	0.48	-4.26	40.00	15.62	0.59	24.75	334.62
109.90	V	37.86	32.40	-5.64	-11.10	43.50	15.80	0.84	74.00	111.40
200.10	V	36.52	32.98	-6.98	-10.52	43.50	16.01	1.19	160.50	111.34
202.90	V	38.13	34.52	-5.37	-8.98	43.50	15.72	1.20	141.50	111.34



**CONDUCTED EMISSIONS
DATA SHEETS**

Title: FCC Class B - Black Lead
File: 1 - BL - Pre-Scan - Tx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously transmitting at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/6/2022 1:16:12 PM
Sequence: Preliminary Scan



Title: FCC Class B - Black Lead
File: 1 - BL - Final Scan - Tx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously transmitting at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/6/2022 1:18:52 PM
Sequence: Final Measurements

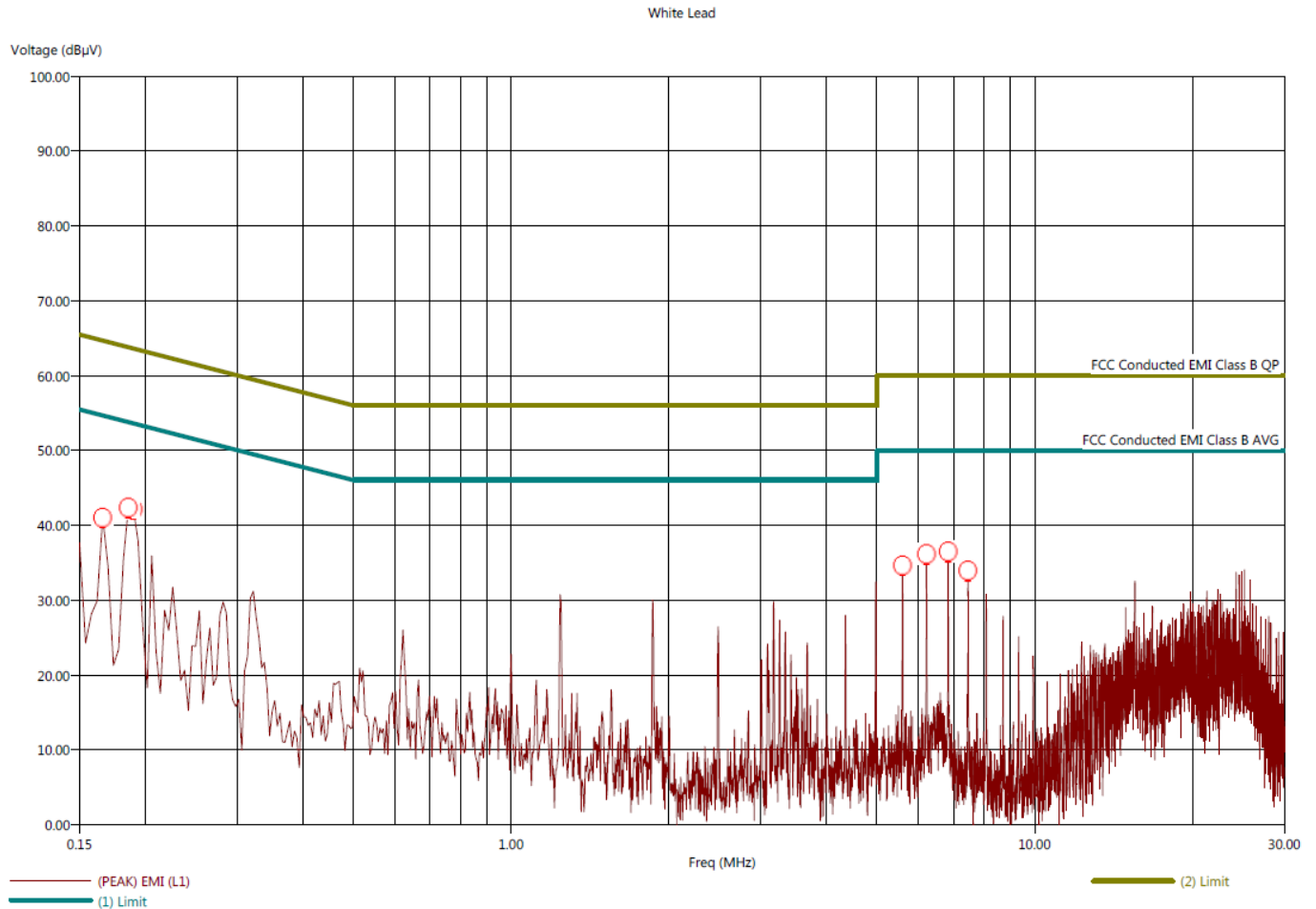
Black Lead - Average

Freq (MHz)	(PEAK) EMI (dBμV)	(AVG) EMI (dBμV)	(PEAK) Margin (dB)	(AVG) Margin (AVG) (dB)	(AVG) Limit (dBμV)	Cable (dB)	Transducer (dB)	Filter (dB)
0.190	45.50	34.94	-8.20	-18.76	53.70	0.12	0.12	10.00
4.974	34.26	33.25	-11.74	-12.75	46.00	0.33	0.10	10.00
5.598	36.93	34.66	-13.07	-15.34	50.00	0.35	0.10	10.00
6.218	37.96	36.89	-12.04	-13.11	50.00	0.37	0.10	10.00
6.842	37.44	36.34	-12.56	-13.66	50.00	0.38	0.10	10.00
7.462	34.81	31.93	-15.19	-18.07	50.00	0.40	0.09	10.00



Title: FCC Class B - White Lead
File: 2 - WL - Pre-Scan - Tx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously transmitting at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/6/2022 1:26:48 PM
Sequence: Preliminary Scan



Title: FCC Class B - White Lead
File: 2 - WL - Final Scan - Tx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously transmitting at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

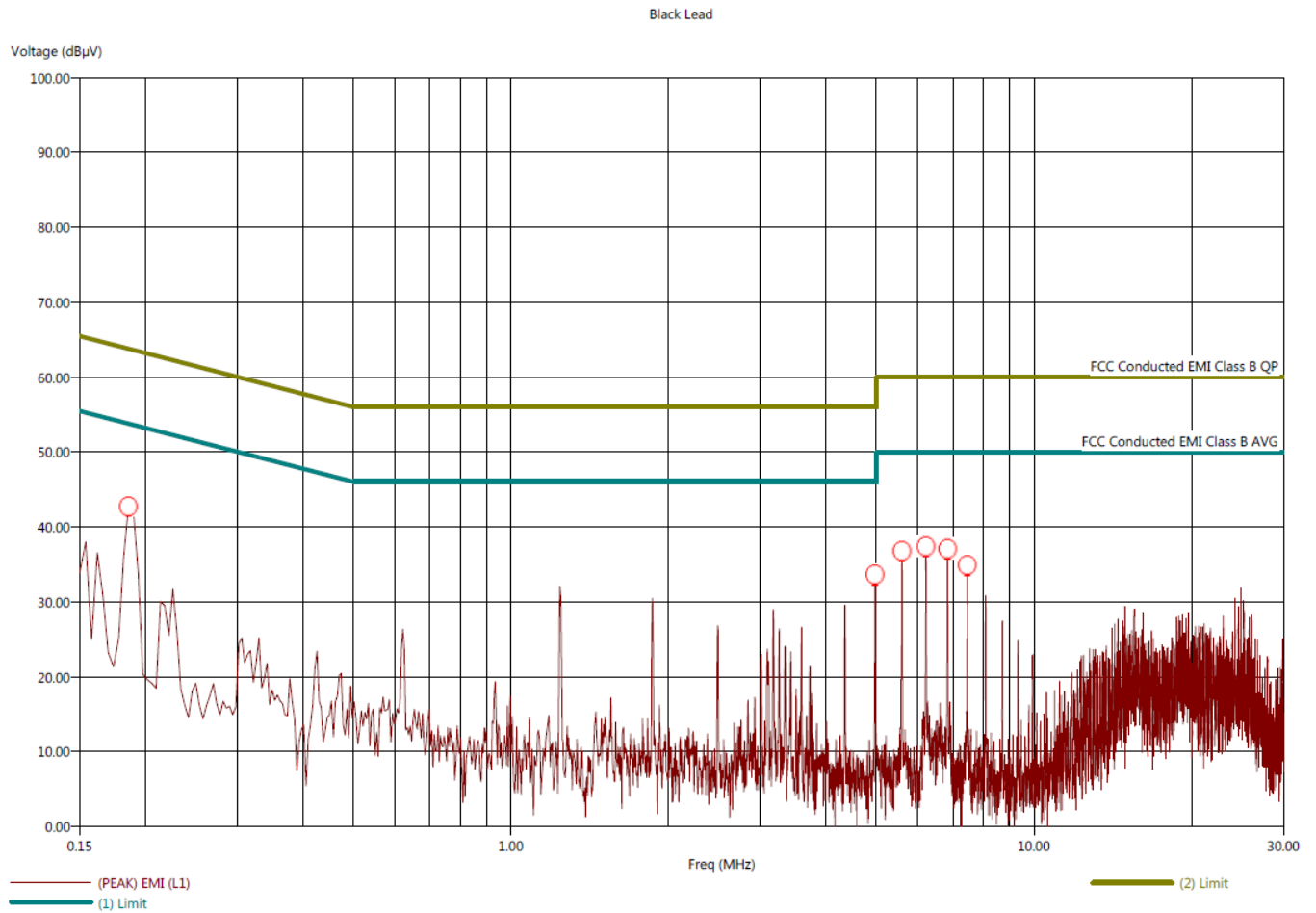
4/6/2022 1:37:05 PM
Sequence: Final Measurements

White Lead - Average									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (AVG) (dB)	(AVG) Margin (AVG) (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
0.166	44.65	28.88	-10.10	-25.87	54.75	0.13	0.14		10.00
0.186	44.40	34.28	-9.32	-19.44	53.72	0.12	0.12		10.00
0.190	45.37	34.06	-8.34	-19.65	53.72	0.12	0.12		10.00
5.598	36.97	35.16	-13.03	-14.84	50.00	0.35	0.09		10.00
6.218	37.87	36.57	-12.13	-13.43	50.00	0.37	0.10		10.00
6.838	37.57	36.45	-12.43	-13.55	50.00	0.38	0.10		10.00
7.458	35.26	34.29	-14.74	-15.71	50.00	0.40	0.10		10.00



Title: FCC Class B - Black Lead
File: 3 - BL - Pre-Scan - Rx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously receiving at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/6/2022 1:50:40 PM
Sequence: Preliminary Scan



Title: FCC Class B - Black Lead
File: 3 - BL - Final Scan - Rx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously receiving at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

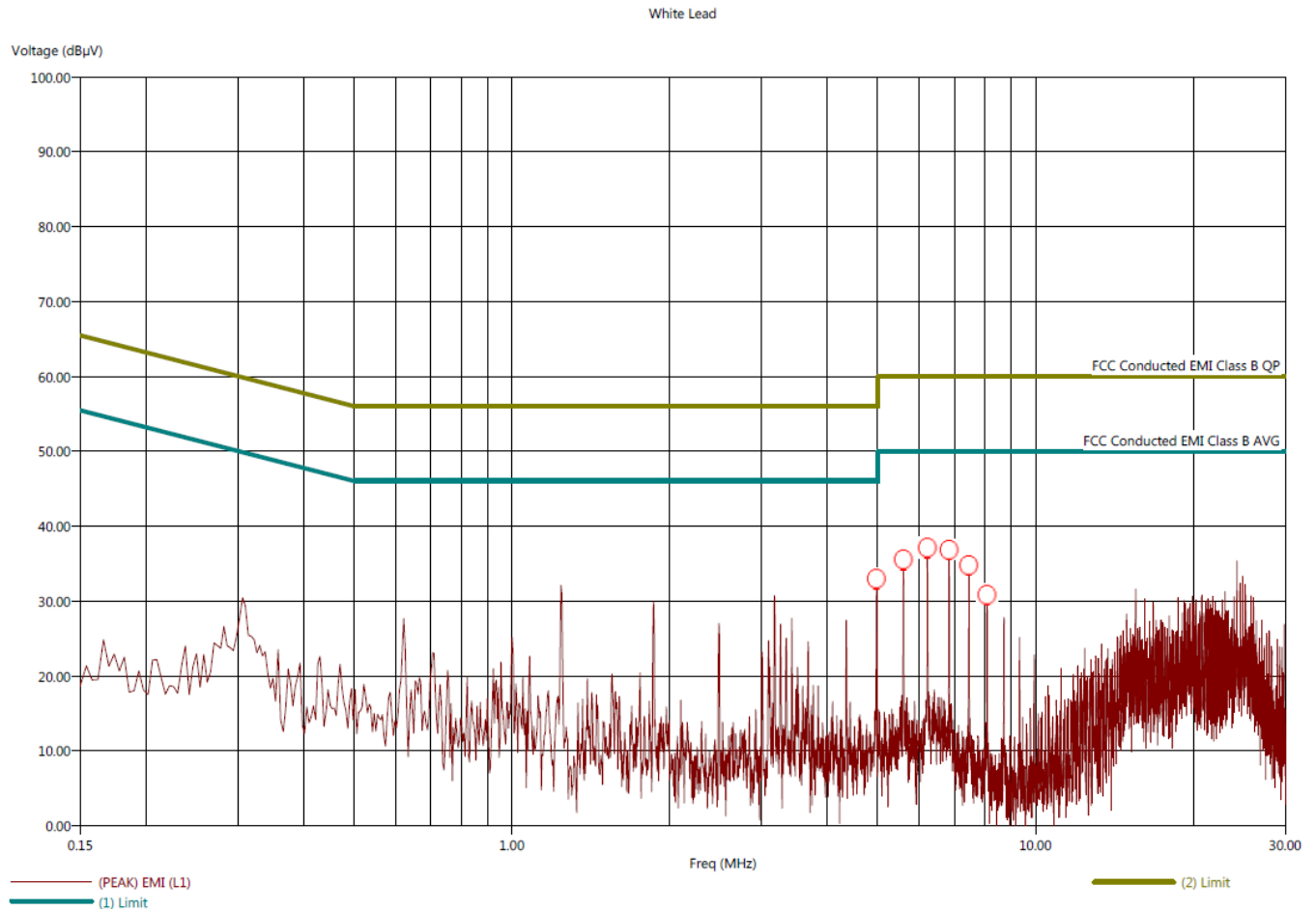
4/6/2022 1:52:21 PM
Sequence: Final Measurements

Black Lead - Average									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (AVG) (dB)	(AVG) Margin (AVG) (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
0.186	43.66	33.57	-10.03	-20.12	53.69	0.12	0.12	10.00	
4.970	34.58	33.51	-11.42	-12.49	46.00	0.33	0.10	10.00	
5.594	37.33	36.17	-12.67	-13.83	50.00	0.35	0.10	10.00	
6.218	38.06	36.07	-11.94	-13.93	50.00	0.37	0.10	10.00	
6.838	37.54	36.50	-12.46	-13.50	50.00	0.38	0.10	10.00	
7.458	35.15	34.06	-14.85	-15.94	50.00	0.40	0.09	10.00	



Title: FCC Class B - White Lead
File: 4 - WL - Pre-Scan - Rx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously receiving at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/6/2022 1:44:28 PM
Sequence: Preliminary Scan



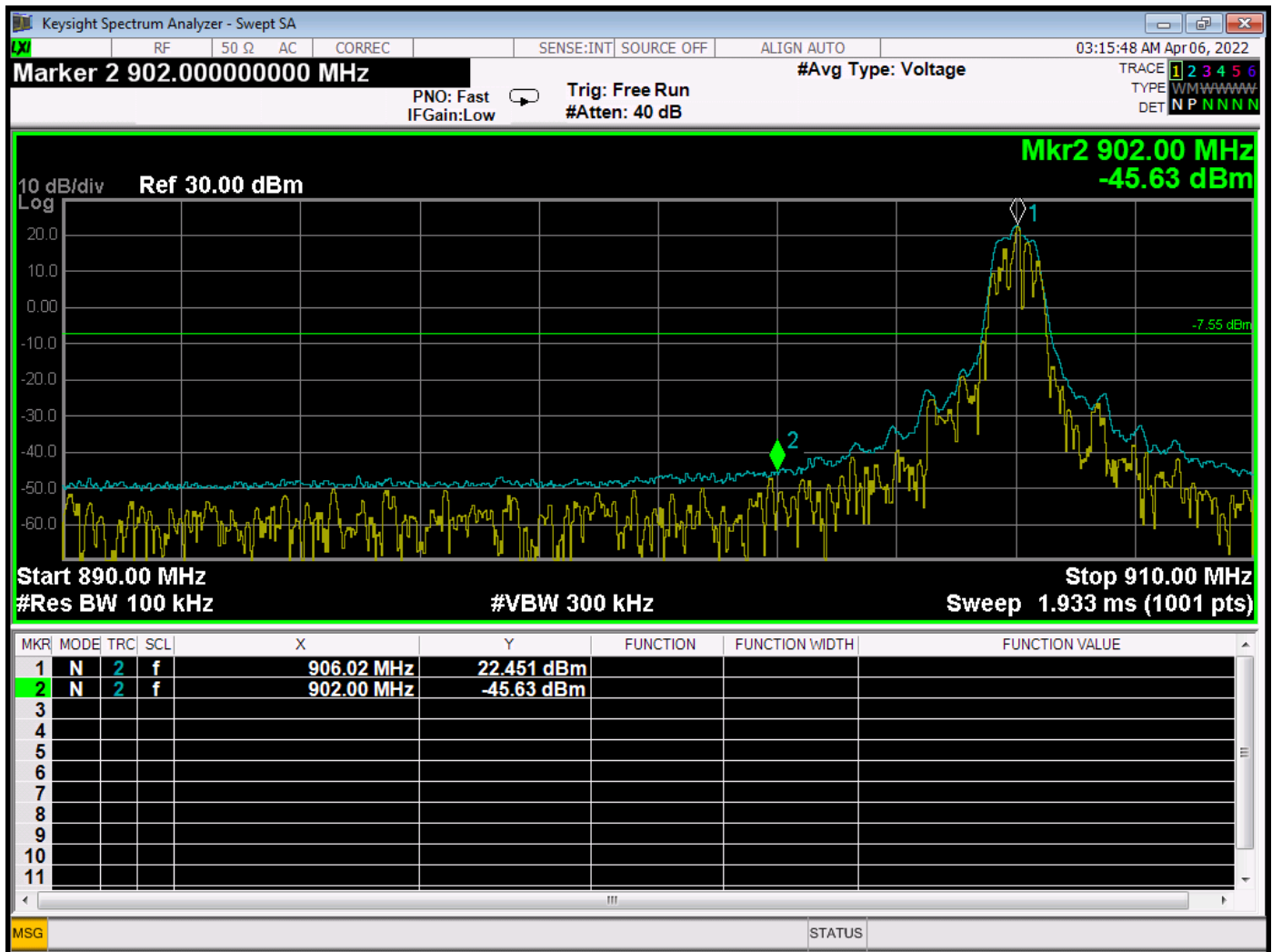
Title: FCC Class B - White Lead
File: 4 - WL - Final Scan - Rx Mode - FCC-B - 04-06-2022.set
Operator: Kyle Fujimoto
EUT Type: Lighting Control Node
EUT Condition: The EUT is continuously receiving at the middle channel and lighting LED's on Accessory
Company: Mesh Systems LLC
Model: LCN300
S/N: N/A

4/6/2022 1:47:03 PM
Sequence: Final Measurements

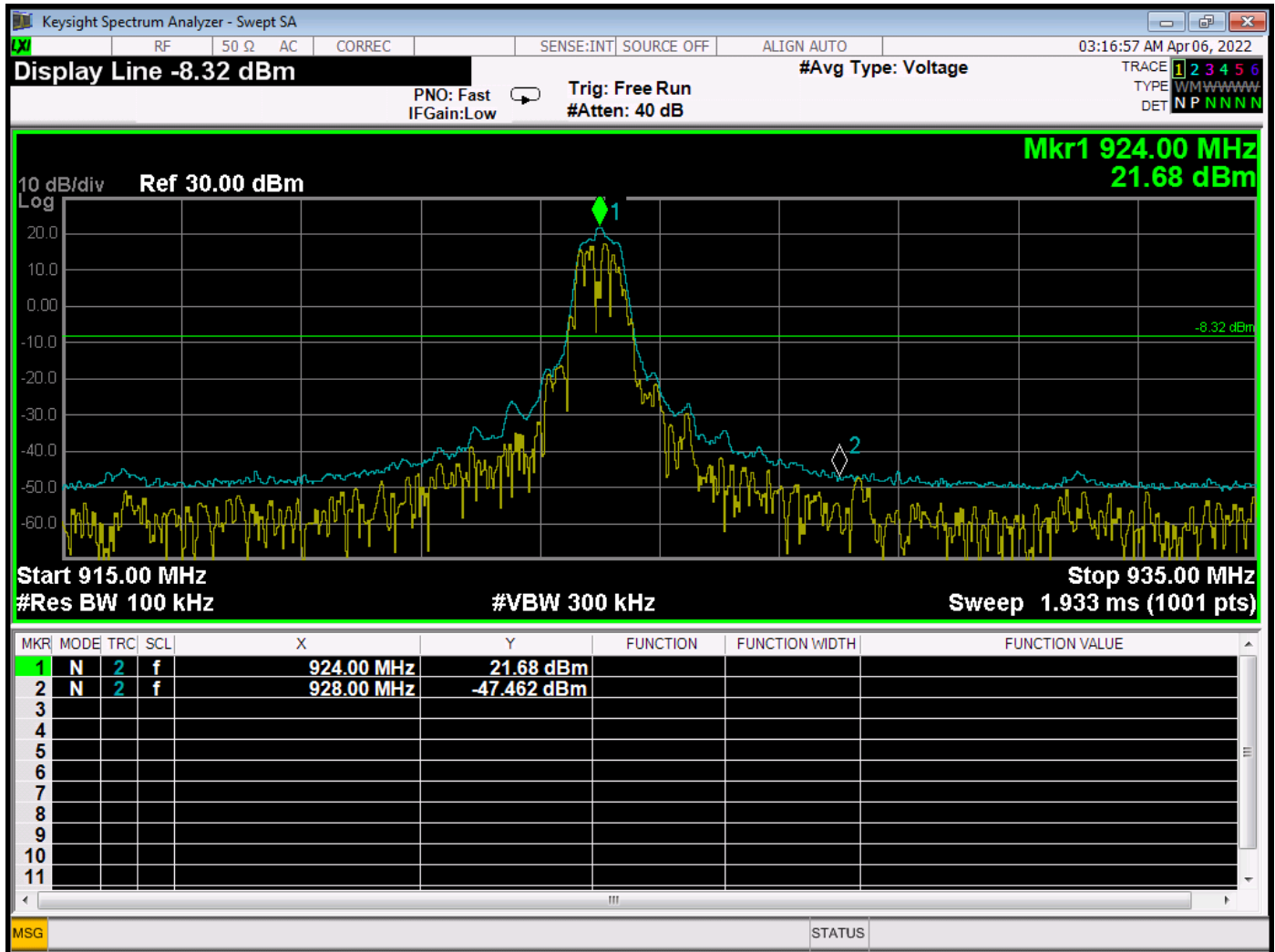
White Lead - Average									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (AVG) (dB)	(AVG) Margin (AVG) (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
4.970	34.08	32.09	-11.92	-13.91	46.00	0.33	0.09		10.00
5.598	37.04	35.19	-12.96	-14.81	50.00	0.35	0.09		10.00
6.218	37.81	34.29	-12.19	-15.71	50.00	0.37	0.10		10.00
6.838	37.56	35.72	-12.44	-14.28	50.00	0.38	0.10		10.00
7.458	35.22	31.54	-14.78	-18.46	50.00	0.40	0.10		10.00
8.078	31.40	29.91	-18.60	-20.09	50.00	0.41	0.10		10.00



***BAND EDGES
DATA SHEETS***



Conducted Band Edge – Low Channel



Conducted Band Edge – High Channel