FCC PART 15, SUBPART B and C; ICES-003, RSS-210 & RSS-GEN

TEST REPORT

for

EAS system

Model: CPP+380 AM TRX

Prepared for

Callidus trading, spol. s r.o.
Pašerových 1270/1
709 00 Ostrava - Mariánské Hory, Česká republika

Prepared by:_____

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Approved by:_____

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DATE: DECEMBER 6, 2022

	REPORT BODY	APPENDICES					TOTAL
		A	***B***	***C***	***D***	***E***	
PAGES	22	2	2	2	11	14	**53**

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

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:	EAS system Model: CPP+380 AM TRX P/N: 18-501.CP S/N: P0098142
Product Description:	The device is used in pairs at a 6-foot distance apart creating an AM detection field in between them. Once an undeactivated AM label/tag is detected in the detection field, the EUT triggers a visual and an acoustic alarm. ○ EUT operating frequencies: 0.057 – 0.059 MHz ○ Operating frequencies: 32.768 kHz and 25 MHz,. ○ Dimensions: 38.2 cm (W) x 5.5 cm (D) x 168 cm (H)
Modifications:	The EUT was not modified during the testing.
Customer:	Callidus trading, spol. s r.o. Pašerových 1270/1 709 00 Ostrava - Mariánské Hory, Česká republika
Test Date:	July 26, 28, and 29, 2022
Test Specifications:	Emissions requirements CFR Title 47, Part 15, Subpart B, sections 15.107 and 15.109; Subpart C, sections 15.205, 15.207, and 15.209; ICES-003, RSS-210 and RSS-Gen
Test Procedure:	ANSI C63.4 and ANSI C63.10

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Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Spurious Radiated RF Emissions, 9 kHz – 30 MHz (Transmitter and Digital portion)	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.205 and 15.209; and the limits of RSS-Gen and RSS-210
2	Spurious Radiated RF Emissions, 30 MHz – 1,000 MHz (Transmitter and Digital portion)	Complies with the **Class A** limits of CFR Title 47, Part 15, Subpart B, section 15.109; the **Class A** limits of ICES-003; RSS-Gen; and RSS-210
3	Conducted RF Emissions, 150 kHz to 30 MHz	Complies with the **Class A** limits of ICES-003 and CFR Title 47, Part 15 Subpart B, section 15.107; the limits of CFR Title 47, Part 15, Subpart C, section 15.207; and the limits of RSS-Gen

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the EAS system, Model: CPP+380 AM TRX. The emissions 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 A** specification limits defined by ICES-003 and CFR Title 47, Part 15, Subpart B; and within the specification limits defined in Subpart C, sections 15.205, 15.207, 15.209; RSS-Gen and RSS-210.

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 considering 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

Callidus trading, spol. s r.o.

Radim Hotovec Ing.

Compatible Electronics Inc.

James Ross Sr. Test Engineer
Kyle Fujimoto Sr. Test Engineer

2.4 Date Test Sample was Received

The test sample was received prior to the initial test date.

2.5 Disposition of the Test Sample

The test sample has not yet been returned to Callidus trading, spol. s r.o. as of the date of this report.

2.6 Abbreviations and Acronyms

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

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
N/A	Not Applicable
EAS	Electronic Article Surveillance
AM	Acousto-Magnetic
Ing.	Inzenyr (Czech academic title engineer, corresponds to MSc)

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	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 of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-210 Issue 10: 2019 + Amendment (April 2020)	License-exempt Radio Apparatus: Category I Equipment
RSS-Gen Issue 5: 2018 + Amendment 1: 2019 + Amendment 2: 2021	General Requirements for Compliance of Radio Apparatus
ICES-Gen Issue 1: July 2018	General Requirements for Compliance of Interference-Causing Equipment
ICES-003 Issue 7 October 2020	Information Technology Equipment (Including Digital Apparatus)
EN 50147-2: 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - Emissions

The EAS System, Model: CPP+380 AM TRX (EUT) was connected to a D-Link router via its Ethernet port. The EUT was also connected to a switching adapter via its Ethernet and power ports, respectively. The switching adapter was also connected to the D-Link router via its Ethernet port. The D-Link router was connected to a Wide Area Network (via a Netgear Ethernet Router) and an AC/DC Adapter. See the EUT specific test setup diagram below.

The routers were located 50 feet away from the test site in an accessory room.

The EUT was continuously transmitting 58 kHz and pinging the Wide Area network.

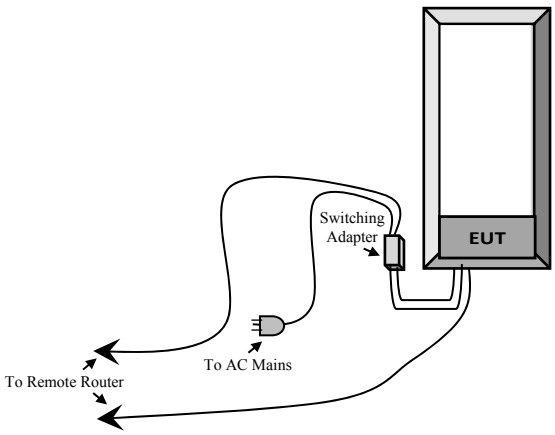
A laptop was connected to the diagnostic port of the EUT prior to testing via the Smart EAS v1 software to allow the EUT to continuously transmit and to continuously sound the alarm.

The cables were moved to maximize the emissions. The final conducted and radiated data was taken in the continuously exercising mode of operation. All initial investigations were performed with the EMI Receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photograph in Appendix D.

Note: Per section 15.209 (f), measurements made beyond the 10th harmonic (580 kHz) shall comply with the general radiated emission limits in 15.109 that are applicable to the incorporated digital device.

Client's Statement of Rational:

It has been kept into reception mode, when undeactivated deactivable AM label has been searched for. Once found one, the device triggers a visual and an acoustic alarm and come back into reception mode.



EUT Specific Test Setup Diagram

4.1.1 Cable Construction and Termination

Cable 1 This is a 15.24-meter unshielded cable connecting the EUT to the D-Link router. The cable has an RJ-45 connector at each end.

Cable 2 This is a 15.24-meter unshielded cable connecting the switching adapter to the D-Link router. The cable has an RJ-45 connector at each end.

Cable 3 This is a 3-meter unshielded cable connecting the switching adapter to the EUT. The cable has an RJ-45 connector at each end. The cable is bundled to a length of 1-meter.

Cable 4 This is a 2-meter unshielded cable connecting the switching adapter to the EUT. The cable has a 2-pin terminal block at each end. The cable is bundled to a length of 1-meter.

Cable 5 This is a 3-meter unshielded cable connecting the D-Link Router WAN port to the Netgear Router. The cable has an RJ-45 connector at each end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
EAS system (EUT)	Callidus trading, spol. s r.o.	CPP+380 AM TRX	P0098142	2ABWHPCPP380A IC: 29314-PCPP380A
Software	Callidus trading, spol. s r.o.	Smart EAS v1	N/A	N/A
Switching Adapter	Sunny Computer Technology Europe	SYS1651-6538	G21105040280	DoC
Router	D-Link	DI-704	0L00B02399	N/A
AC/DC Adapter (for D-Link Router)	Jameco	S15AB050200	N/A	N/A
Ethernet Router	Netgear	EN 108	ENT8114202	N/A
Laptop*	Vostro	P89G	DQNH703	DoC

*Only to program the EUT to be put into test mode for the testing, then it was removed.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
RF RADIATED EMISSIONS TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Keysight Technologies, Inc.	N9038A	MY51210510	September 17, 2021	September 17, 2022
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
Mini, Low-Profile Turntable (2)	Compatible Electronics	N/A	N/A	N/A	N/A
Loop Antenna	Com-Power	AL-130R	121090	February 10, 2022	February 10, 2025
CombiLog Antenna	Com-Power	AC-220	61093	December 14, 2021	December 14, 2023
LISN (EUT)	Com-Power	LI-215A	191951	August 4, 2021	August 4, 2022
Attenuator 10 dB	SureCall	SC-ATT-10	17100174	December 7, 2021	December 7, 2022
Variable Autotransformer	Staco Energy Products	3PN2210	003	N/A	N/A
Multimeter	Fluke	115	36601149WS	November 21, 2021	November 21, 2022
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A

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 below 30 MHz, the EUT was tested in a test area that had no ground plane. For above 30 MHz, the EUT was mounted on the turntable inside the test area with ground plane.

The EUT was not grounded during testing (however, the EUT switching adapter had a 3rd wire earth ground on its AC mains side only).

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}**	$U_{lab} = 2\,uc\,(y)$
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. 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 Radiated Emissions (Spurious and Harmonics) Test – Lab A

The EMI Receiver was used as a measuring meter. A built-in, internal preamplifier was used to increase the sensitivity of the instrument. The EMI Receiver was used in the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. The final reading is then taken accurately, taking into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit.

The measurement bandwidth 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

An open field test site, without ground plane, 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. Also, the antenna mast allowed axis variations of the antenna. Spurious data was collected in the worst case (highest emission) configuration of the EUT. At each reading per axis, the EUT was rotated 360 degrees (for E field radiated field strength).

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 10-meter test distance from 9 kHz to 30 MHz to obtain the final test data.

Test Results:

The EUT complies the limits of CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209**;** RSS-Gen; and RSS-210 for radiated emissions.

7.1.2 Radiated Emissions (Spurious and Harmonics) Test – Lab D

The EMI Receiver was used as the measuring meter. A built-in, internal preamplifier was 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. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is set up according to ANSI C63.4 and EN 50147-2. 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 measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
30 MHz to 1 GHz	120 kHz	CombiLog Antenna

The EUT was tested at a 3-meter test distance to obtain the final test data. The six highest emissions are listed in Table 1.

Test Results:

The EUT complies with the **Class A** limits of CFR Title 47, Part 15, Subpart B, Section 15.109; and the **Class A** limits of ICES-003. Please see Appendix E for the data sheets.

7.1.3 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. The data was collected with the EMI receiver in the peak detect mode with the "Max Hold" feature activated. A peak, quasi-peak, and average reading were taken for all readings and are marked accordingly on the data sheets. A 10 dB attenuator 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 TDK TestLab software in several overlapping sweeps. The final data is located in Appendix E.

The EUT was tested at 120 VAC. The six highest emissions are listed in Table 2.

Test Results:

The EUT complies with the **Class A** limits of CFR Title 47, Part 15, Subpart B; the limits of CFR Title 47, Part 15, Subpart C, sections 15.107 and 15.207; the **Class A** limits of ICES-003 and RSS-Gen. Please see Appendix E for the data sheets.

Note: The FCC 15.207 and RSS-Gen limits were used to determine compliance in the data sheets. Since the FCC 15.207 and RSS-Gen limits are the same as the **Class B** limits of FCC 15.109 and ICES-003, the EUT also meets the **Class A** limits of FCC 15.109 and ICES-003.

7.1.4 RF Emissions Test Results

Table 1 RADIATED EMISSION RESULTS
EAS system, Model: CPP+380 AM TRX

Frequency (MHz)	Corrected Reading* (dBµV)	Specification Limit (dBµV)	Delta (Cor. Reading – Spec. Limit) (dB)
0.058 (X-Axis)	30.87 (PK)	32.33	-1.46
0.406 (X-Axis)	13.35 (PK)	15.43	-2.08
0.290 (X-Axis)	16.13 (PK)	18.36	-2.23
0.580 (X-Axis)	29.74 (PK)	32.33	-2.59
41.90 (V)	46.92 (QP)	49.53	-2.61
0.174 (X-Axis)	20.11 (PK)	22.79	-2.68

Table 2 CONDUCTED EMISSION RESULTS
EAS system, Model: CPP+380 AM TRX

Frequency (MHz)	Corrected Reading* (dBµV)	Specification Limit (dBµV)	Delta (Cor. Reading – Spec. Limit) (dB)
0.702 (BL)	37.06 (AV)	46.00 (AV)	-8.94
0.606 (BL)	36.64 (AV)	46.00 (AV)	-9.36
0.598 (WL)	35.45 (AV)	46.00 (AV)	-10.55
0.702 (BL)	44.68 (QP)	56.00 (QP)	-11.32
0.798 (WL)	34.47 (AV)	46.00 (AV)	-11.53
0.606 (BL)	44.41 (QP)	56.00 (QP)	-11.59

Notes:

* The complete emissions data is given in Appendix E of this report.
(BL)Black Lead
(WL) White Lead
(QP)Quasi-Peak
(AV) Average
(PK)Peak

7.1.5 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 (μV/m) log x 20 = Specification Limit in dBuV/m

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

For measurements below 30 MHz: Limit in uV/m = 2400/F (kHz) at 300 Meters from 9 kHz to 490 kHz; Limit in uV/m = 24000/F (kHz) at 30 Meters from 490 kHz to 1705 kHz dBuV/m = 20 Log (uV/m)

For measurements above 30 MHz: (Specification distance / test distance) log x 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.

When the limit is in terms of magnetic field, the following equation applies:

$$H[dB(\mu A/m)] = V[dB(\mu V)] + L_C\,[dB] - G_{PA}\,[dB] + AF^H\,[dB(S/m)]$$

where: H is the magnetic field strength (to be compared with the limit),
V is the voltage level measured by the receiver or spectrum analyzer,
L_C is the cable loss,
G_{PA} is the gain of the preamplifier (if used), and
AF^H is the magnetic antenna factor.

The G_{PA} term is only included in the equation when an external preamplifier is used in the measurement chain, in front of the receiver or spectrum analyzer. An external preamplifier is not usually necessary (or even advisable, due to risk of saturating the input mixer of the receiver) when an active loop antenna is used. In that case, the antenna factor of the loop already includes the gain of its built-in preamplifier.

Sample Calculations (Continued)

If the "electrical" antenna factor is used instead, the above equation becomes:

$$H[dB(\mu A/m)] = V[dB(\mu V)] + L_C\,[dB] - G_{PA}[dB] + AF^E\,[dB(m^{-1})\,] - 51.5\,[dB\Omega]$$

where: AF^E is the "electric" antenna factor, as provided by the antenna calibration laboratory.

When the limit is in terms of electric field, the following equation applies:

$$E[dB(\mu V/m)] = V[dB(\mu V)] + L_C[dB] - G_{PA}[dB] + AF^E\,[dB(m^{-1})\,]$$

or, if the magnetic antenna factor is used:

$$E[dB(\mu V/m)] = V[dB(\mu V)] + L_C[dB] - G_{PA}[dB] + AF^H\,[dB(S/m)] + 51.5[dB\Omega]$$

The display of the receiver (or spectrum analyzer) **shall not** be configured in units of current, e.g. µA or dB(µA). That conversion is calculated inside the receiver (or spectrum analyzer) using its input impedance, which is 50 Ω, while the magnetic field calculation is based on the free-space impedance of 377 Ω.

7.1.6 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:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart A section 15.31 (e).

8. CONCLUSIONS

The EAS system, Model: CPP+380 AM TRX (EUT) as tested, meets all of the **Class A** specification limits defined in ICES-003 and FCC Title 47, Part 15, Subpart B, sections 15.107 and 15.109; and the specification limits defined in RSS-Gen; RSS-210; and FCC Title 47, Part 15, Subpart C, sections 15.205, 15.207, and 15.209.

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 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

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass ICES-003, RSS-Gen, RSS-210, FCC Subpart B and FCC Subpart C 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.

There were no modifications made to the EUT during testing.

APPENDIX C

MODELS COVERED UNDER THIS REPORT

MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

EAS system
Model: CPP+380 AM TRX
P/N: 18-501.CP
S/N: P0098142

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE

LAB A

OPEN LAND > 15 METERS

OPEN LAND > 15 METERS

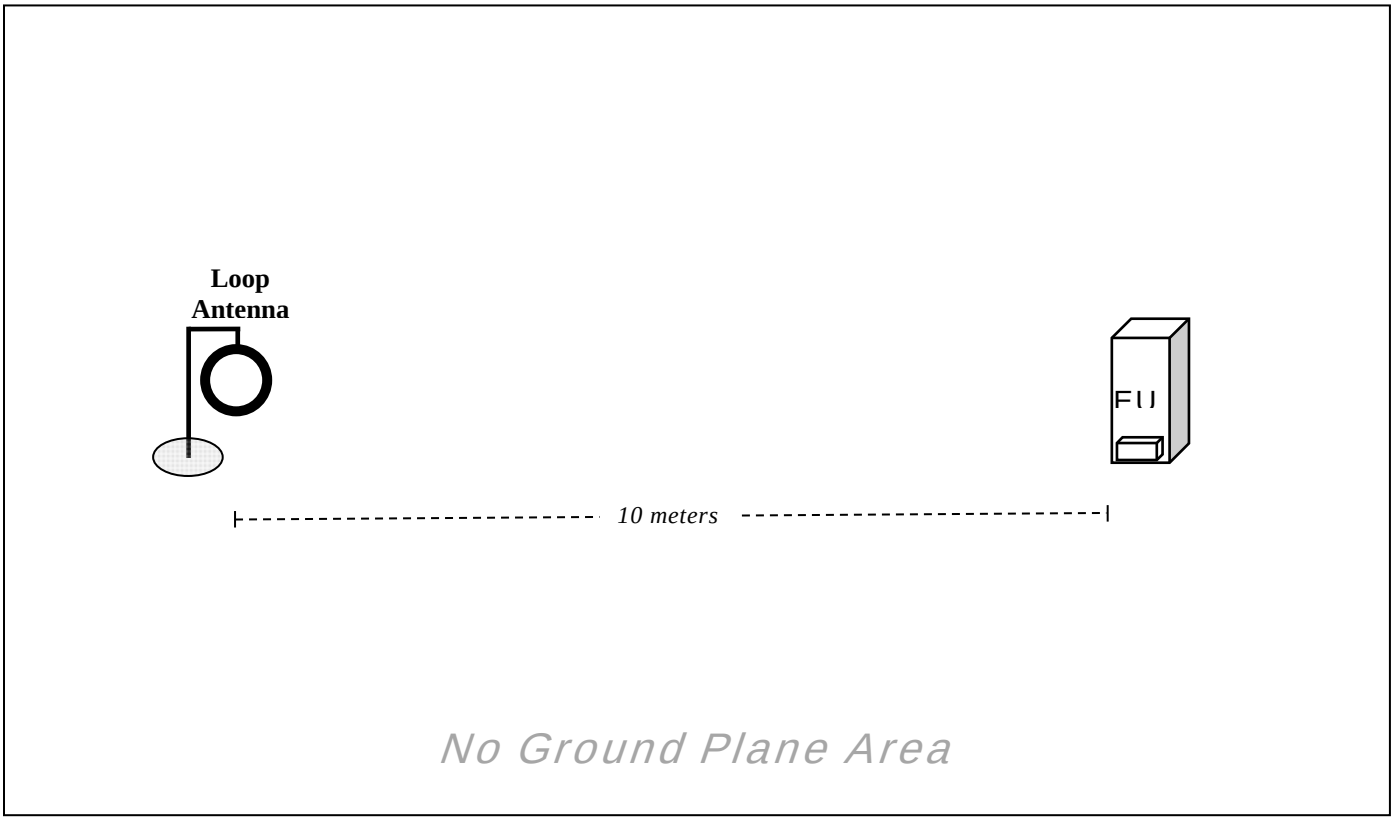


FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER

LAB D

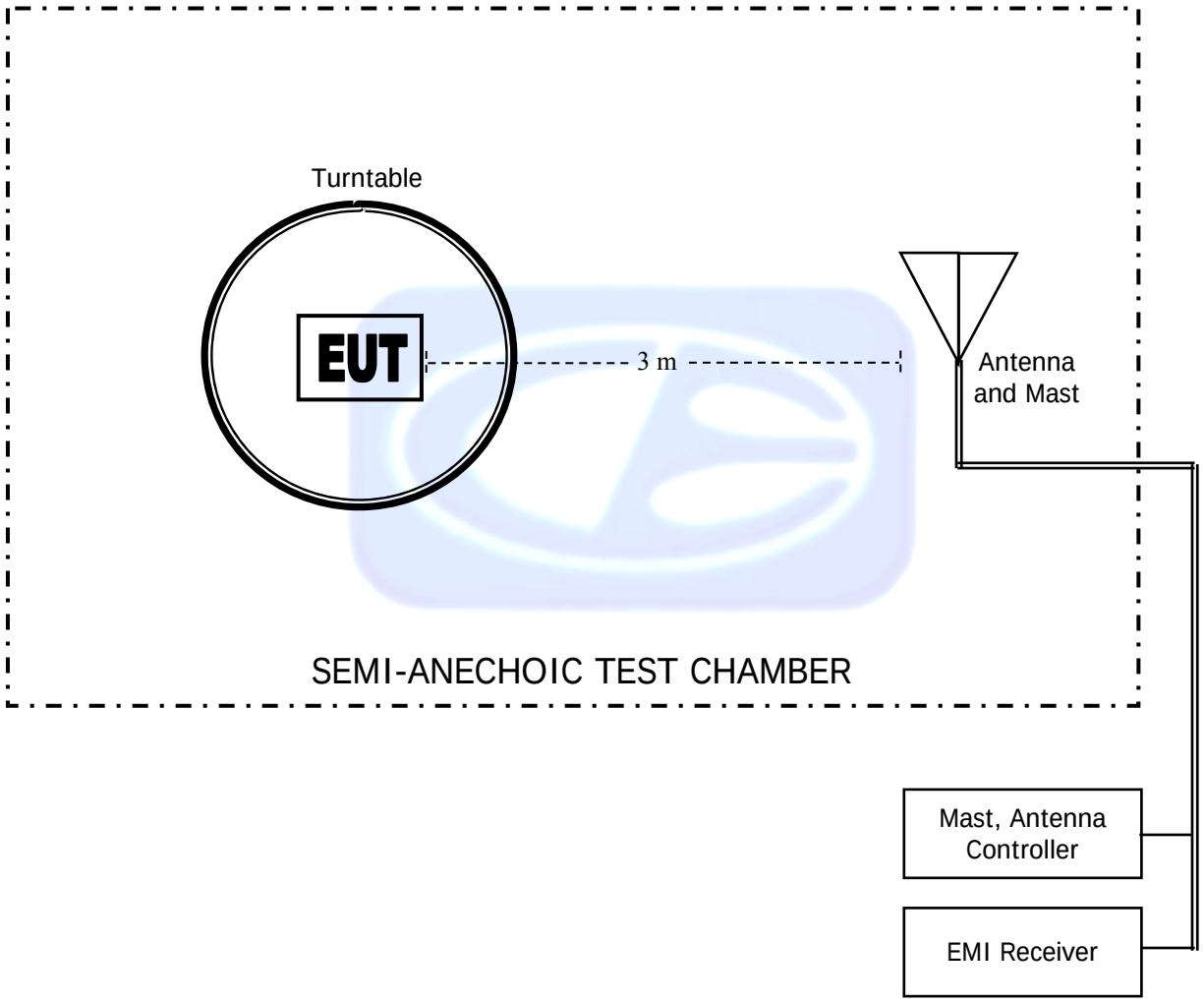
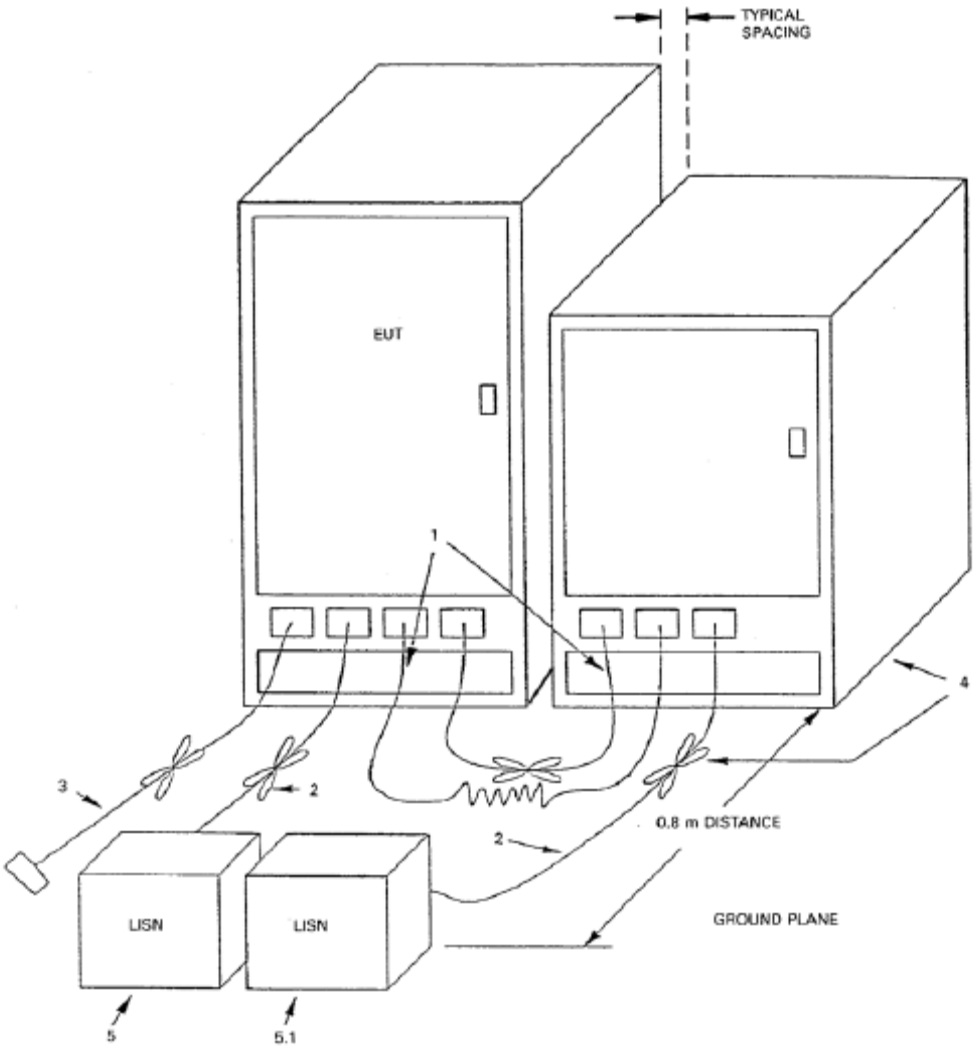


FIGURE 3: CONDUCTED EMISSIONS TEST SETUP



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

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 061093

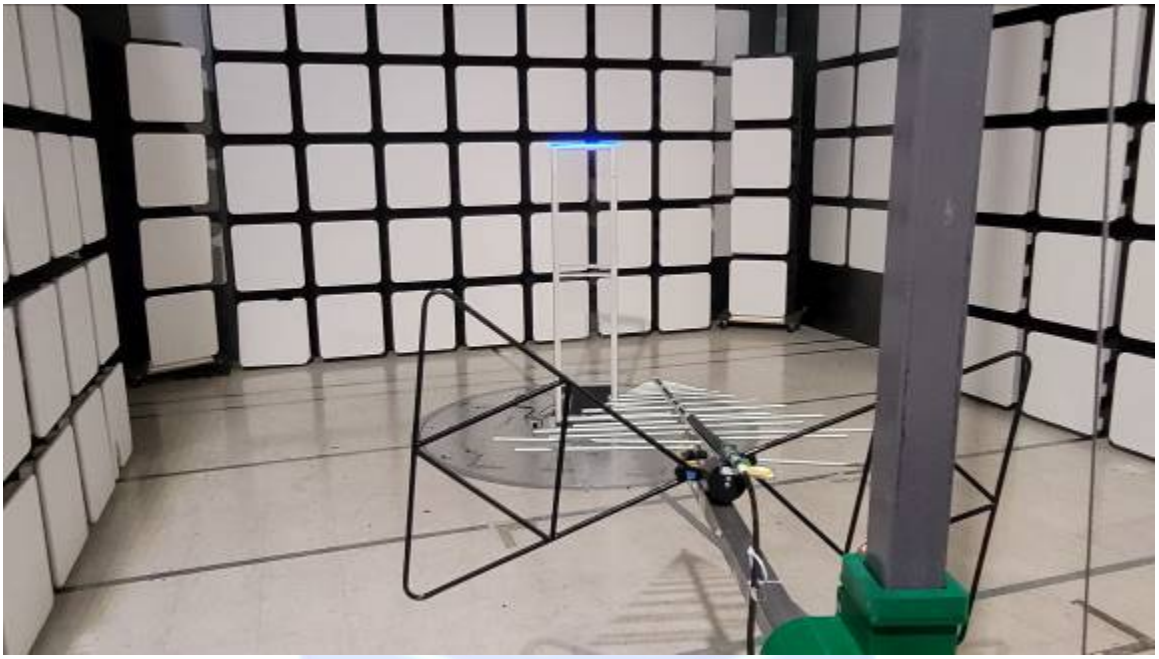
CALIBRATION DATE: DECEMBER 14, 2021

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.5	200	16.0
35	21.4	250	17.4
40	21.0	300	19.7
45	20.6	350	20.0
50	19.7	400	22.2
60	16.1	450	22.4
70	12.8	500	23.1
80	12.5	550	23.4
90	14.2	600	24.9
100	15.4	650	25.3
120	16.5	700	25.4
125	16.8	750	26.4
140	15.9	800	26.7
150	16.6	850	27.1
160	18.5	900	27.9
175	15.9	950	28.0
180	15.5	1000	28.0

LAB A

Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX
FCC SUBPART B AND C, RSS-GEN, and RSS-210 – RADIATED EMISSIONS – BELOW 30 MHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

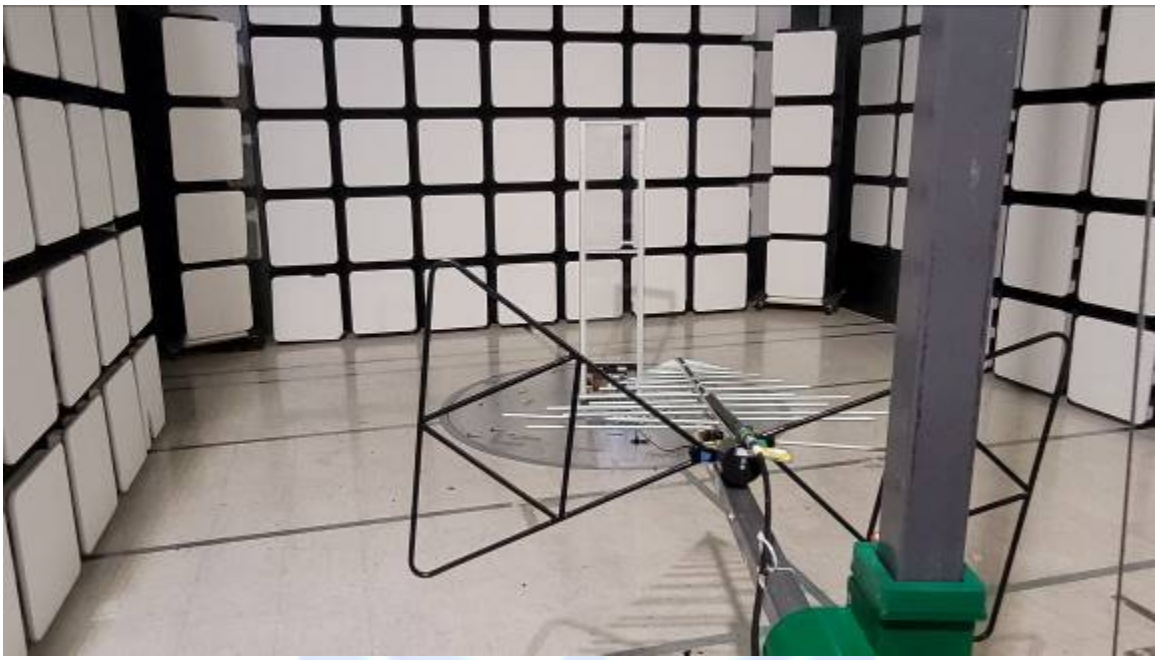


LAB D

FRONT VIEW

Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX
FCC SUBPART B AND C, ICES-003, RSS-GEN, and RSS-210
RADIATED EMISSIONS – 30 MHz to 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

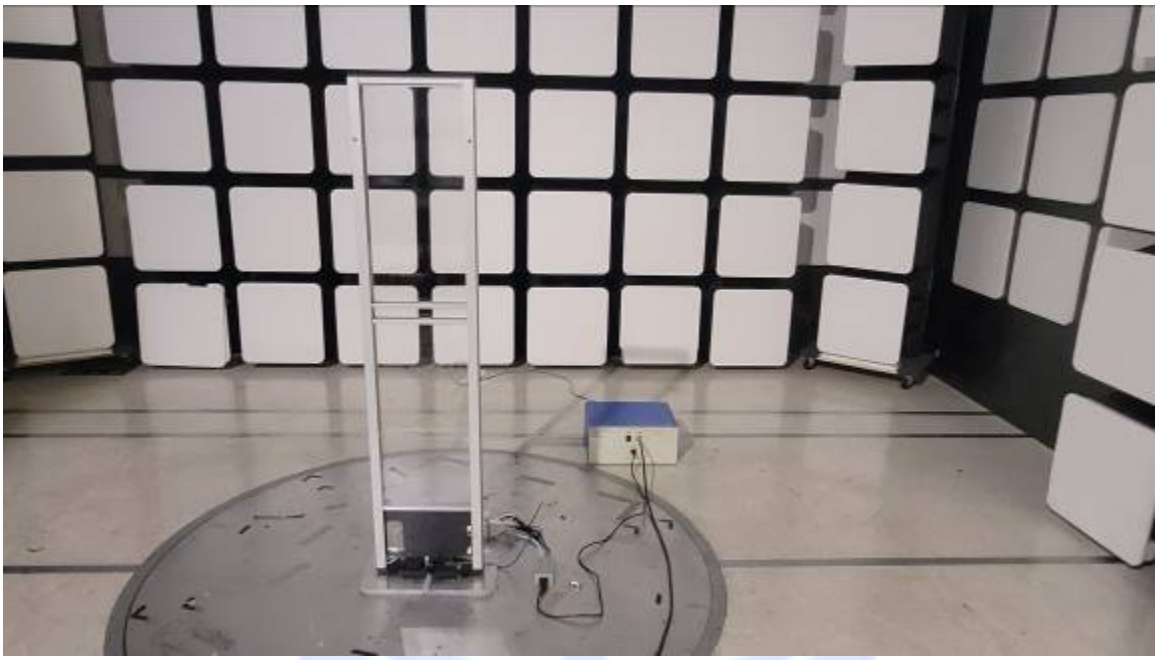


LAB D

REAR VIEW

Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX
FCC SUBPART B AND C, ICES-003, RSS-GEN, and RSS-210
RADIATED EMISSIONS – 30 MHz to 1 GHz

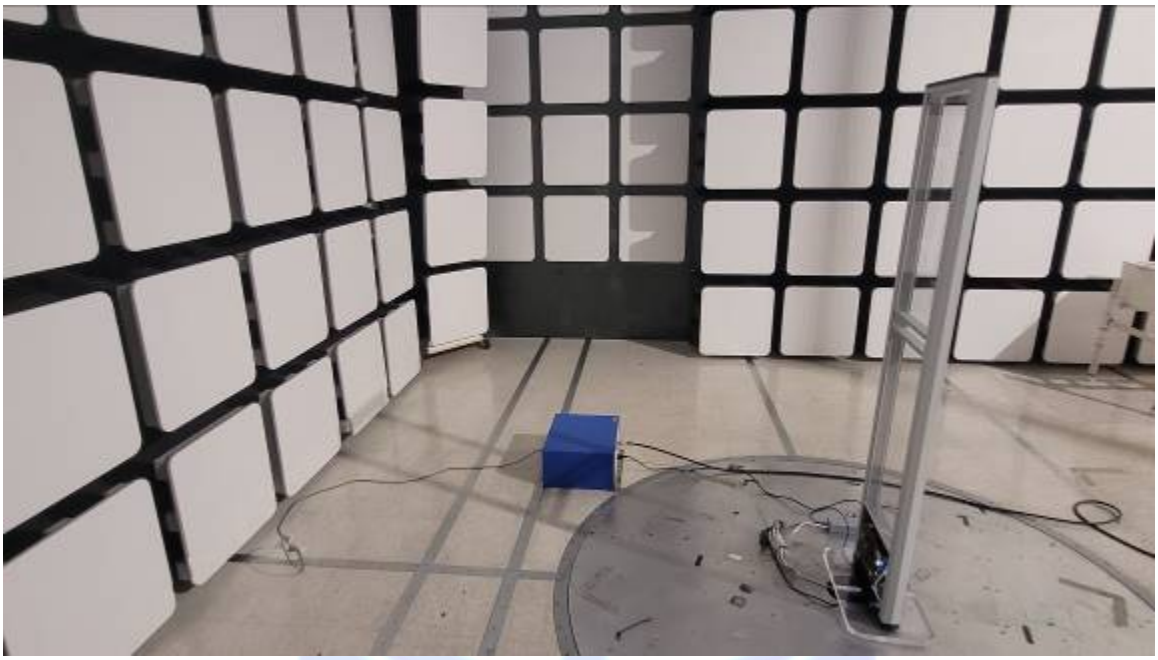
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX
FCC SUBPART B AND C, ICES-003, AND RSS-GEN
CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX
FCC SUBPART B AND C, ICES-003, AND RSS-GEN
CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.209
Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX

Date: 07/26/2022
Lab: A
Tested By: Kyle Fujimoto

Transmit Mode - X-Axis
Test Distance: 10 Meters

Freq. (kHz)	Level at 10 Meters (dBuV/m)	Corrected Level at Limit Distance* (dBuV/m)	Axis (x/y/z)	Spec Limit per FCC 15.209	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
58.00	114.92	30.87	X	32.33	-1.46	Peak	1.00	180.00	See Note #1 Below
116.00	56.60	-2.48	X	26.31	-28.79	Peak	1.00	0.00	See Note #2 Below
174.00	78.42	20.11	X	22.79	-2.68	Peak	1.00	0.00	See Note #3 Below
232.00	61.29	5.47	X	20.29	-14.82	Peak	1.00	180.00	See Note #3 Below
290.00	70.01	16.13	X	18.36	-2.23	Peak	1.00	0.00	See Note #3 Below
348.00	56.53	4.24	X	16.77	-12.53	Peak	1.00	180.00	See Note #3 Below
406.00	64.31	13.35	X	15.43	-2.08	Peak	1.00	0.00	See Note #3 Below
464.00	55.71	5.92	X	14.27	-8.35	Peak	1.00	180.00	See Note #3 Below
522.00	43.54	24.46	X	33.25	-8.79	Peak	1.00	0.00	See Note #4 Below
580.00	48.82	29.74	X	32.33	-2.59	Peak	1.00	180.00	See Note #4 Below

*300 Meters from 9 kHz to 490 kHz and 30 Meters above 490 kHz
Limit in uV/m = 2400/F (kHz) at 300 Meters from 9 kHz to 490 kHz
Limit in uV/m = 24000/F (kHz) at 30 Meters from 490 kHz to 1705 kHz
dBuV/m = 20 Log (uV/m)

Note #1: Two measurement points were performed to obtain the correct level at the spec distance
The Worst Case Level at 10 Meters at 58 kHz is 114.92 dBuV/m
The Worst Case Level at 15 Meters at 58 kHz is 104.90 dBuV/m
Equation (5) of ANSI C63.10: 2013 was used to determine N
N = 20 [Log (557185.75/175792.36) / Log (10/15)] = -56.9023133
Equation (8) of ANSI C63.10: 2013 was used to determine Field Strength at 300 Meters

Note #2: Equation (4) of ANSI C63.10: 2013 was used to obtain the corrected level at 300 Meters
Note #3: Equation (2) of ANSI C63.10: 2013 was used to obtain the corrected level at 300 Meters
Note #4: Equation (4) of ANSI C63.10: 2013 was used to obtain the corrected level at 30 Meters

FCC 15.209
Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX

Date: 07/26/2022
Lab: A
Tested By: Kyle Fujimoto

Transmit Mode - Y-Axis
Test Distance: 10 Meters

Freq. (kHz)	Level at 10 Meters (dBuV/m)	Corrected Level at Limit Distance* (dBuV/m)	Axis (x/y/z)	Spec Limit per FCC 15.209	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
58.00	111.01	26.96	Y	32.33	-5.37	Peak	1.00	0.00	See Note #1 Below
116.00	62.27	3.18	Y	26.31	-23.13	Peak	1.00	180.00	See Note #2 Below
174.00	73.77	15.46	Y	22.79	-7.33	Peak	1.00	0.00	See Note #3 Below
232.00	54.92	-0.90	Y	20.29	-21.19	Peak	1.00	180.00	See Note #3 Below
290.00	54.92	1.04	Y	18.36	-17.32	Peak	1.00	0.00	See Note #3 Below
348.00	48.17	-4.13	Y	16.77	-20.90	Peak	1.00	180.00	See Note #3 Below
406.00	53.46	2.51	Y	15.43	-12.92	Peak	1.00	0.00	See Note #3 Below
464.00	50.43	0.63	Y	14.27	-13.64	Peak	1.00	180.00	See Note #3 Below
522.00	40.14	21.06	Y	33.25	-12.19	Peak	1.00	0.00	See Note #4 Below
580.00	48.35	29.27	Y	32.33	-3.06	Peak	1.00	180.00	See Note #4 Below

*300 Meters from 9 kHz to 490 kHz and 30 Meters above 490 kHz
Limit in uV/m = 2400/F (kHz) at 300 Meters from 9 kHz to 490 kHz
Limit in uV/m = 24000/F (kHz) at 30 Meters from 490 kHz to 1705 kHz
dBuV/m = 20 Log (uV/m)

Note #1: Two measurement points were performed to obtain the correct level at the spec distance
The Worst Case Level at 10 Meters at 58 kHz is 114.92 dBuV/m
The Worst Case Level at 15 Meters at 58 kHz is 104.90 dBuV/m
Equation (5) of ANSI C63.10: 2013 was used to determine N
N = 20 [Log (557185.75/175792.36) / Log (10/15)] = -56.9023133
Equation (8) of ANSI C63.10: 2013 was used to determine Field Strength at 300 Meters

Note #2: Equation (4) of ANSI C63.10: 2013 was used to obtain the corrected level at 300 Meters
Note #3: Equation (2) of ANSI C63.10: 2013 was used to obtain the corrected level at 300 Meters
Note #4: Equation (4) of ANSI C63.10: 2013 was used to obtain the corrected level at 30 Meters

FCC 15.209
Callidus trading, spol. s r.o.
EAS system
Model: CPP+380 AM TRX

Date: 07/26/2022
Lab: A
Tested By: Kyle Fujimoto

Transmit Mode - Z-Axis
Test Distance: 10 Meters

Freq. (kHz)	Level at 10 Meters (dBuV/m)	Corrected Level at Limit Distance* (dBuV/m)	Axis (x/y/z)	Spec Limit per FCC 15.209	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
58.00	99.06	15.01	Z	32.33	-17.32	Peak	1.00	180.00	See Note #1 Below
116.00	47.07	-12.01	Z	26.31	-38.32	Peak	1.00	0.00	See Note #2 Below
174.00	54.08	-4.24	Z	22.79	-27.03	Peak	1.00	180.00	See Note #3 Below
232.00	57.64	1.82	Z	20.29	-18.47	Peak	1.00	0.00	See Note #3 Below
290.00	61.29	7.41	Z	18.36	-10.95	Peak	1.00	180.00	See Note #3 Below
348.00	55.90	3.61	Z	16.77	-13.16	Peak	1.00	0.00	See Note #3 Below
406.00	57.49	6.54	Z	15.43	-8.89	Peak	1.00	180.00	See Note #3 Below
464.00	50.36	0.56	Z	14.27	-13.71	Peak	1.00	0.00	See Note #3 Below
522.00	49.36	30.28	Z	33.25	-2.97	Peak	1.00	180.00	See Note #4 Below
580.00	36.67	17.59	Z	32.33	-14.74	Peak	1.00	0.00	See Note #4 Below

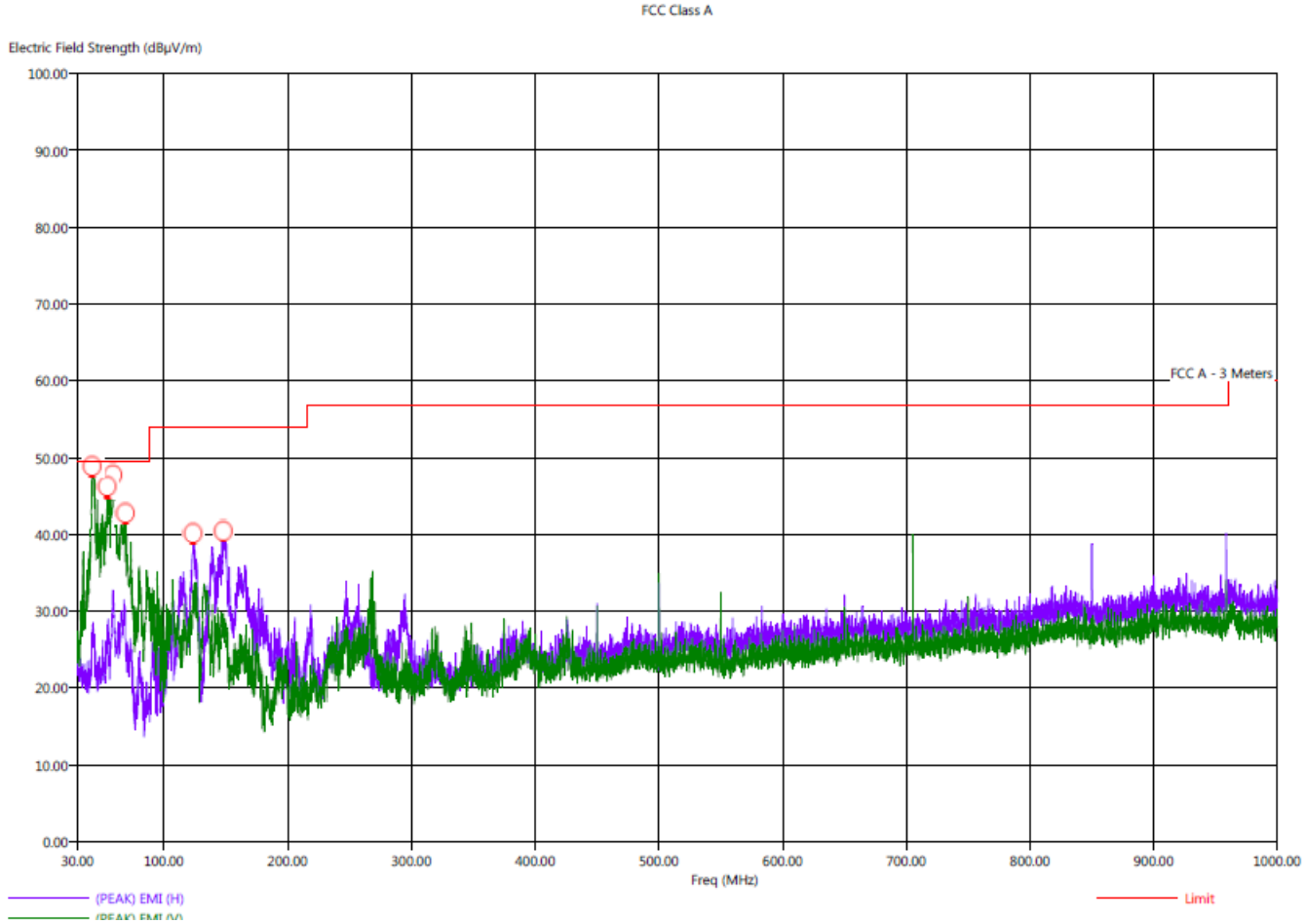
*300 Meters from 9 kHz to 490 kHz and 30 Meters above 490 kHz
Limit in uV/m = 2400/F (kHz) at 300 Meters from 9 kHz to 490 kHz
Limit in uV/m = 24000/F (kHz) at 30 Meters from 490 kHz to 1705 kHz
dBuV/m = 20 Log (uV/m)

Note #1: Two measurement points were performed to obtain the correct level at the spec distance
The Worst Case Level at 10 Meters at 58 kHz is 114.92 dBuV/m
The Worst Case Level at 15 Meters at 58 kHz is 104.90 dBuV/m
Equation (5) of ANSI C63.10: 2013 was used to determine N
N = 20 [Log (557185.75/175792.36) / Log (10/15)] = -56.9023133
Equation (8) of ANSI C63.10: 2013 was used to determine Field Strength at 300 Meters

Note #2: Equation (4) of ANSI C63.10: 2013 was used to obtain the corrected level at 300 Meters
Note #3: Equation (2) of ANSI C63.10: 2013 was used to obtain the corrected level at 300 Meters
Note #4: Equation (4) of ANSI C63.10: 2013 was used to obtain the corrected level at 30 Meters

Title: Pre-Scan - FCC Class A
File: 4 - LF - Pre-Scan - CPP+380 AM TRX - FCC Class A - 07-28-2022.set
Operator: Kyle Fujimoto
EUT Type: EAS System
EUT Condition: The EUT is continuously transmitting at 58 kHz
Company: Callidus trading, spol, s r.o.
Model: CPP+380 AM TRX

7/28/2022 11:50:42 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class A
File: 4 - LF - Final Scan - CPP+380 AM TRX - FCC Class A - 07-28-2022.set
Operator: Kyle Fujimoto
EUT Type: EAS System
EUT Condition: The EUT is continuously transmitting at 58 kHz
Company: Calidus trading, spol, s r.o.
Model: CPP+380 AM TRX

7/28/2022 12:01:09 PM
Sequence: Final Measurements

FCC Class A

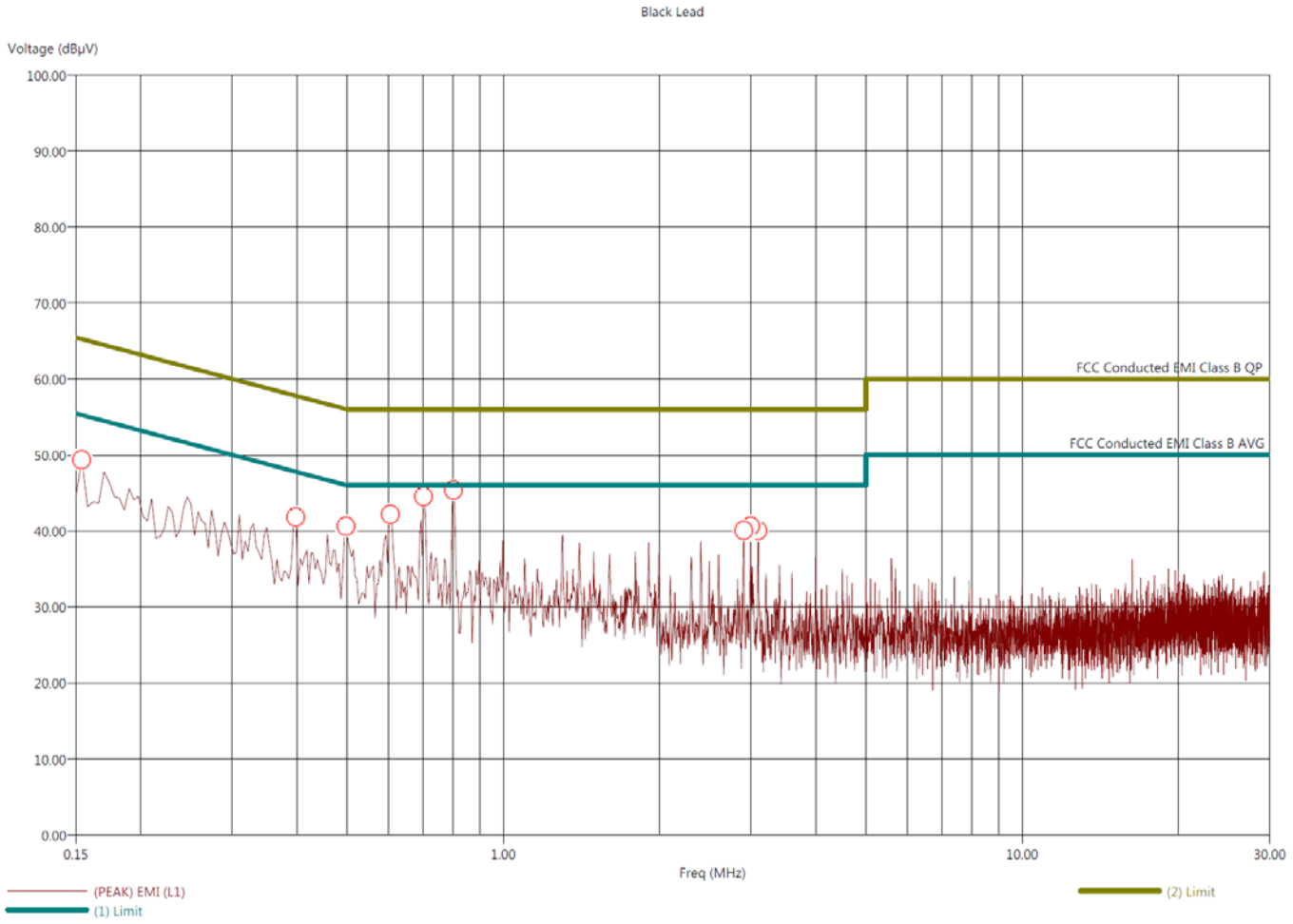
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (deg)	Twr Ht (cm)
41.90	V	51.30	46.92	1.77	-2.61	49.53	20.90	0.48	76.50	143.10
43.00	V	50.69	46.31	1.16	-3.22	49.53	20.80	0.48	163.00	159.22
54.20	V	46.35	41.24	-3.18	-8.29	49.53	18.41	0.55	353.50	127.28
54.60	V	47.96	43.04	-1.57	-6.49	49.53	18.23	0.55	41.50	111.34
58.80	V	48.48	45.74	-1.05	-3.79	49.53	16.51	0.58	81.50	143.16
68.90	V	43.44	36.59	-6.09	-12.94	49.53	13.04	0.62	255.50	207.04
123.60	H	42.37	37.87	-11.60	-16.10	53.97	16.70	0.90	155.75	143.28
148.10	H	43.12	39.47	-10.85	-14.50	53.97	16.39	1.03	339.50	191.16

CONDUCTED EMISSIONS

DATA SHEETS

Title: FCC Class B - Black Lead
File: 1 - Pre-Scan - Black Lead - FCC Class B - 07-29-2022.set
Operator: Kyle Fujimoto
EUT Type: EAS system
EUT Condition: The EUT is coninuously transmitting at 58 kHz and pinging the router
Company: Callidus trading, spol, s r.o.
Model: CPP+380 AM TRX

7/29/2022 3:37:51 PM
Sequence: Preliminary Scan



Title: FCC Class B - Black Lead
File: 1 - Final Scan - Black Lead - FCC Class B - 07-29-2022.set
Operator: Kyle Fujmoto
EUT Type: EAS system
EUT Condition: The EUT is continuously transmitting at 58 kHz and pinging the router
Company: Callidus trading, spol s r.o.
Model: CPP+380 AM TRX

7/29/2022 3:39:07 PM
Sequence: Final Measurements

Black Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) Margin (QP) (dB)	(QP) Margin (QP) (dB)	(QP) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)
0.154	51.71	45.84	-13.97	-19.84	65.68	0.13	0.16	10.00
0.398	47.66	41.77	-10.13	-16.02	57.79	0.14	0.09	10.00
0.498	44.11	40.23	-11.89	-15.77	56.00	0.14	0.09	10.00
0.606	47.36	44.41	-8.64	-11.59	56.00	0.15	0.09	10.00
0.702	47.30	44.68	-8.70	-11.32	56.00	0.15	0.09	10.00
0.802	44.57	40.76	-11.43	-15.24	56.00	0.16	0.09	10.00
2.906	43.02	39.76	-12.98	-16.24	56.00	0.26	0.09	10.00
2.998	42.27	38.89	-13.73	-17.11	56.00	0.27	0.09	10.00
3.098	39.76	36.36	-16.24	-19.64	56.00	0.27	0.09	10.00

Title: FCC Class B - Black Lead
File: 1 - Final Scan - Black Lead - FCC Class B - 07-29-2022.set
Operator: Kyle Fujmoto
EUT Type: EAS system
EUT Condition: The EUT is continuously transmitting at 58 kHz and pinging the router
Company: Callidus trading, spol s r.o.
Model: CPP+380 AM TRX

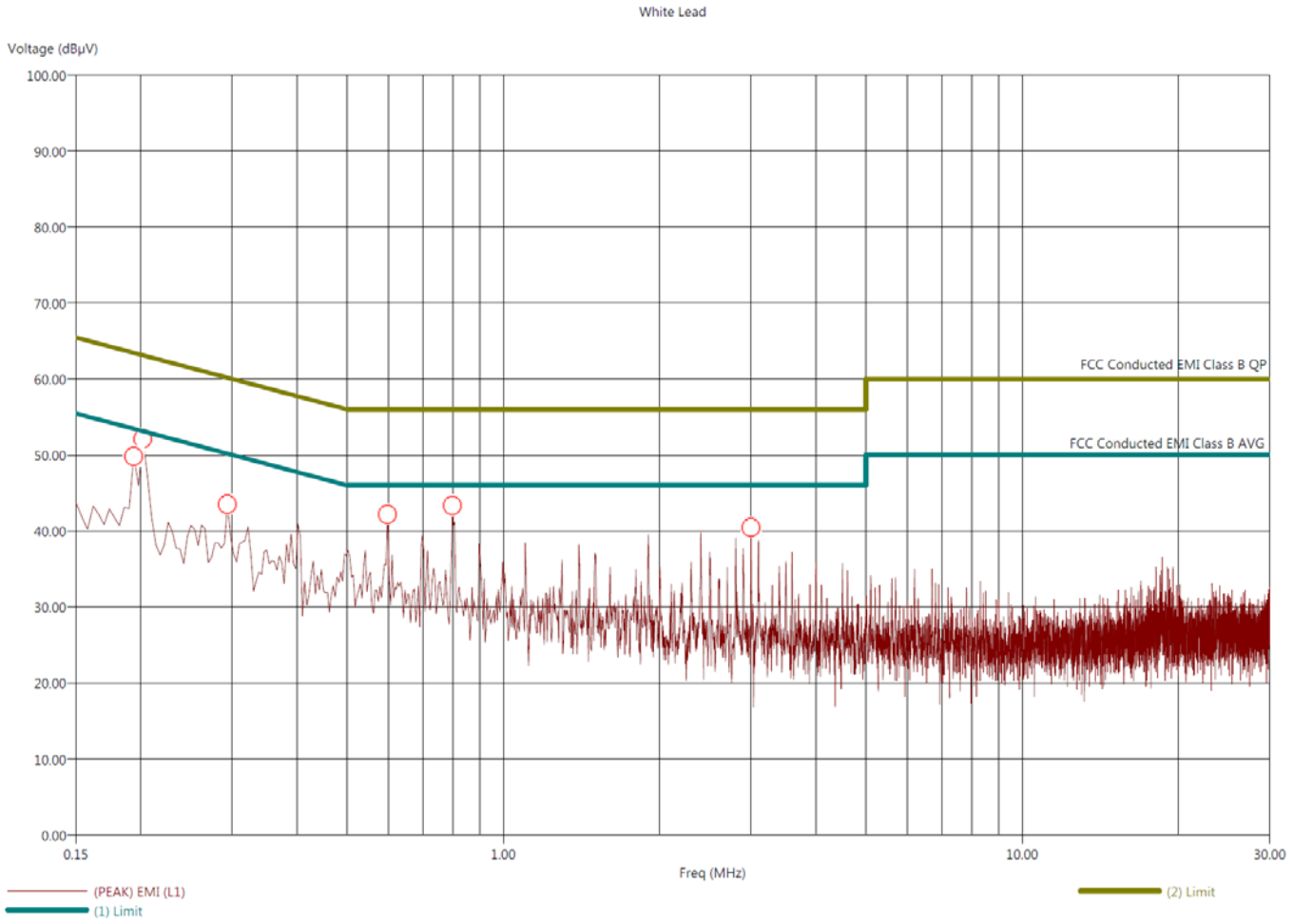
7/29/2022 3:39:07 PM
Sequence: Final Measurements

Black Lead

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)
0.154	51.71	38.35	-3.97	-17.33	55.68	0.13	0.16	10.00
0.398	47.66	34.47	-0.13	-13.32	47.79	0.14	0.09	10.00
0.498	44.11	32.46	-1.89	-13.54	46.00	0.14	0.09	10.00
0.606	47.36	36.64	1.36	-9.36	46.00	0.15	0.09	10.00
0.702	47.30	37.06	1.30	-8.94	46.00	0.15	0.09	10.00
0.802	44.57	33.02	-1.43	-12.98	46.00	0.16	0.09	10.00
2.906	43.02	31.12	-2.98	-14.88	46.00	0.26	0.09	10.00
2.998	42.27	30.09	-3.73	-15.91	46.00	0.27	0.09	10.00
3.098	39.76	27.61	-6.24	-18.39	46.00	0.27	0.09	10.00

Title: FCC Class B - White Lead
File: 2 - Pre-Scan - White Lead - FCC Class B - 007-29-2022.set
Operator: Kyle Fujimoto
EUT Type: EAS system
EUT Condition: The EUT is continuously transmitting at 58 kHz and pinging the router
Company: Callidus trading, spol s r.o.
Model: CPP+380 AM TRX

7/29/2022 3:49:37 PM
Sequence: Preliminary Scan



Title: FCC Class B - White Lead
File: 2 - Final Scan - White Lead - FCC Class B - 007-29-2022.set
Operator: Kyle Fujimoto
EUT Type: EAS system
EUT Condition: The EUT is continuously transmitting at 58 kHz and pinging the router
Company: Callidus trading, spol s r.o.
Model: CPP+380 AM TRX

7/29/2022 3:51:14 PM
Sequence: Final Measurements

White Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) Margin QP) (dB)	(QP) Margin (QP) (dB)	(QP) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)
0.194	55.21	51.30	-7.98	-11.89	63.19	0.12	0.11	10.00
0.202	55.34	51.63	-7.91	-11.62	63.25	0.12	0.11	10.00
0.294	49.15	43.85	-10.80	-16.10	59.95	0.13	0.09	10.00
0.598	46.42	43.10	-9.58	-12.90	56.00	0.15	0.08	10.00
0.798	46.32	42.23	-9.68	-13.77	56.00	0.16	0.08	10.00
3.002	42.46	39.78	-13.54	-16.22	56.00	0.27	0.09	10.00

Title: FCC Class B - White Lead
File: 2 - Final Scan - White Lead - FCC Class B - 007-29-2022.set
Operator: Kyle Fujimoto
EUT Type: EAS system
EUT Condition: The EUT is continuously transmitting at 58 kHz and pinging the router
Company: Callidus trading, spol s r.o.
Model: CPP+380 AM TRX

7/29/2022 3:51:14 PM
Sequence: Final Measurements

White Lead

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)
0.194	55.21	40.38	2.02	-12.81	53.19	0.12	0.11	10.00
0.202	55.34	39.43	2.09	-13.82	53.25	0.12	0.11	10.00
0.294	49.15	35.26	-0.80	-14.69	49.95	0.13	0.09	10.00
0.598	46.42	35.45	0.42	-10.55	46.00	0.15	0.08	10.00
0.798	46.32	34.47	0.32	-11.53	46.00	0.16	0.08	10.00
3.002	42.46	31.58	-3.54	-14.42	46.00	0.27	0.09	10.00