National Technical Systems Canada Inc.
1490-D, Nobel
Boucherville, QC
J4B 5H3, Canada
Phone: 450-868-0360
www.nts-canada.ca

EMC/EMI Test Report

Tested Product:

U-CAM

Test Report TR-0621258

Prepared for: **Inogeni**
979, avenue de Bourgogne, Bureau 530
Québec, QC
G1W 2L4, Canada

Reviewed by:
Xavier Couste, P. Eng. DESS EMC
EMC Lab Manager

Xavier COUSTE Digitally signed by Xavier COUSTE
Date: 2022.11.03 20:34:17 -04'00'

REVISION HISTORY

Revision	Description	Date
0	Initial Release	2022-11-03

TABLE OF CONTENTS

TABLE OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOS

LIST OF GRAPHS

1 INTRODUCTION

This test report describes EMC tests on the product U-CAM:

- in compliance with electromagnetic compatibility directive 2014/30/EU as part of the requirements leading to the CE marking
- in compliance with FCC part 15 subpart B
- in compliance with ICES-003

The essential requirements of the directive 2014/30/EU are covered by the following harmonized standards:

- EN 55032 (2015) A11 (2020) – *Electromagnetic compatibility of multimedia equipment - Emission requirements*
- EN 55035 (2017) A11 (2020) – *Electromagnetic compatibility of multimedia equipment – Immunity requirements*

2 ACRONYMS

EMC: ElectroMagnetic Compatibility
EUT: Equipment Under Test
S/N: Serial Number
N/A: Not Applicable / Not Available
NCR: No Calibration Required
VERIF: Internal Verification of Equipment Characteristics
AC: Alternating Current
DC: Direct Current
PSU: Power Supply Unit
AE: Auxiliary Equipment
LISN: Line Impedance Stabilisation Network
AM: Amplitude Modulation
CDN: Coupling/Decoupling Network
EM Clamp: Electromagnetic Clamp
I/O: Inputs/Outputs
PE: Protective Earth
HCP: Horizontal Coupling Plane
VCP: Vertical Coupling Plane
ESD: Electrostatic Discharge
EFT: Electrical Fast Transient
Pst: short-term flicker
Plt: long-term flicker
Un: Nominal Voltage

3 PROJECT DATES

RECEPTION DATE(S) (yyyy-mm-dd)	2022-10-27 (LABCEM#3316, #3317)
TESTS DATE(S) (yyyy-mm-dd)	From 2022-10-27 to 2022-10-31 (LABCEM#3316, #3317)

4 DESCRIPTION OF EQUIPMENT UNDER TEST

4.1 EUT

TYPE:	USB Camera and Audio to HDMI	
PRODUCT NAME:	U-CAM	
MANUFACTURER:	Inogeni	
LABCEM NUMBER:	LABCEM#3316	LABCEM#3317
PART NUMBER:	U-CAM	U-CAM
SERIAL NUMBER:	UC21390231	UC21390152
VOLTAGE RATING:	12Vdc	12Vdc
EXTERNAL PSU INFO:	Manufacturer: Phihong Model: PSA15R-120P P/N: PSA15R-120P S/N: PN10010016A1 Input Voltage: 120-240V, 50-60Hz Output Voltage: 12Vdc	Manufacturer: Phihong Model: PSA15R-120P P/N: PSA15R-120P S/N: PN10010005A1 Input Voltage: 120-240V, 50-60Hz Output Voltage: 12Vdc
EUT SIZE:	Width = 8.5cm Height = 2.5cm Depth = 7cm	Width = 8.5cm Height = 2.5cm Depth = 7cm
FIRMWARE:	1.18	1.18
HIGHEST INTERNAL FREQUENCY:	1.5GHz	1.5GHz

Photo 1: EUT – Front

Photo 2: EUT – Back

Photo 3: EUT – Side

Photo 4: EUT – S/N – UC21390231

Photo 5: EUT – S/N – UC21390231

Photo 6: PSU

Photo 7: PSU – S/N

4.2 AE

TYPE:	Webcam
PRODUCT NAME:	C920X PRO HD WEBCAM
MANUFACTURER:	Logitech
SERIAL NUMBER:	2133LV00SFV9
VOLTAGE RATING:	5Vdc (USB)
FIRMWARE:	N/A

Photo 8: AE – Webcam #1

TYPE:	Webcam
PRODUCT NAME:	C920X PRO HD WEBCAM
MANUFACTURER:	Logitech
SERIAL NUMBER:	2151LV01T589
VOLTAGE RATING:	5Vdc (USB)
FIRMWARE:	N/A

Photo 9: AE – Webcam #2

4.3 Support Equipment

EUT was exercised with support equipment supplied by client.

Photo 10: Support Equipment – Laptop & LCD Screen

4.4 EUT Setup Diagram

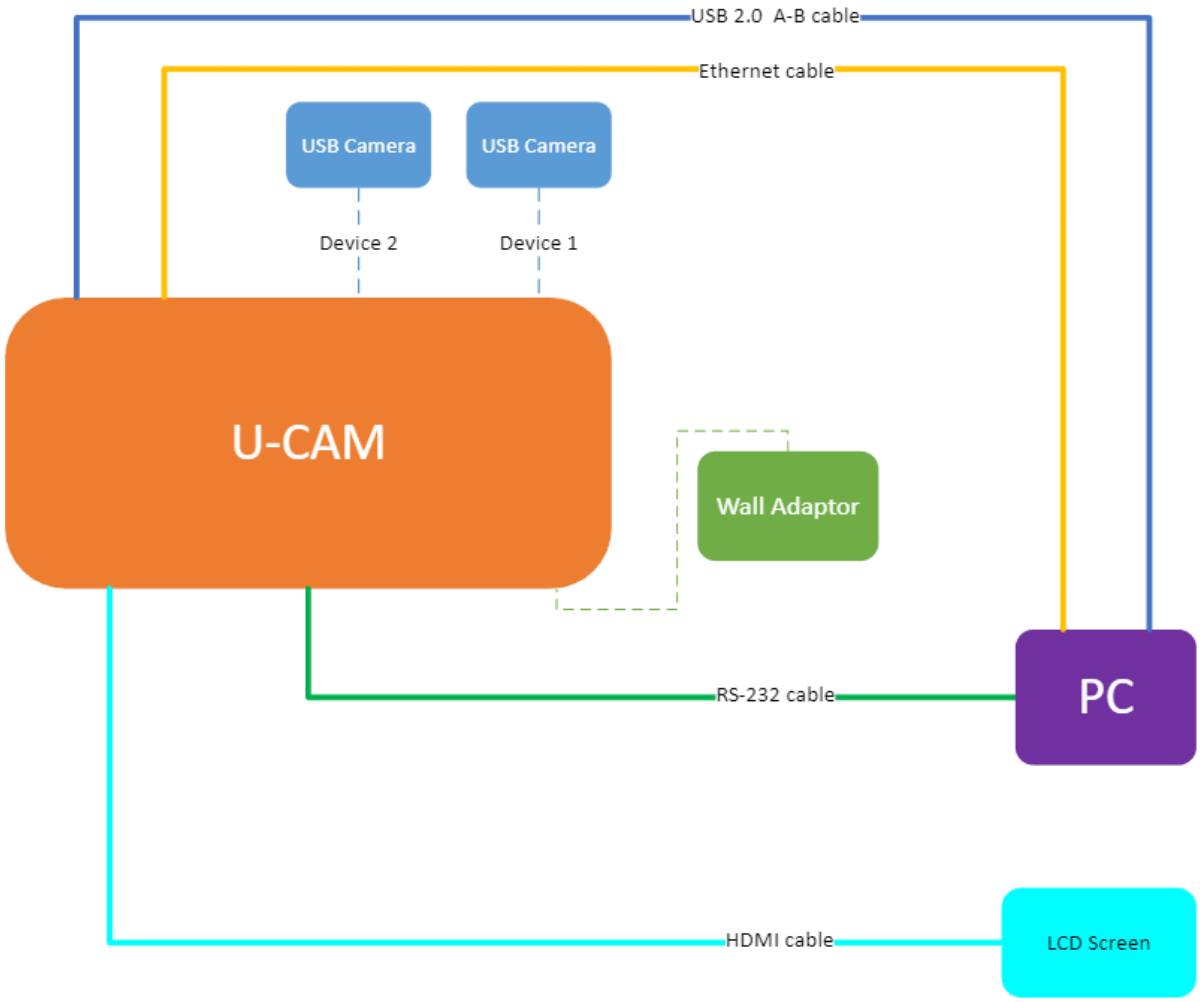


Figure 1: EUT Setup Diagram

4.5 Mode of Operation

During the tests, the EUT was exercised by sharing the USB camera input. The camera was displayed on the laptop and the monitor.

4.6 Method of Monitoring

During the tests, the EUT was monitored by observing the camera on the laptop and the monitor.

5 PERFORMANCE CRITERIA

During the tests, EUT shall operate normally and the picture shall remain stable on the display of the laptop and the monitor.

The performance criteria for the evaluation of the immunity test results are defined by EN 55035 standard (Electromagnetic compatibility of multimedia equipment – Immunity requirements).

Performance criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B: During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

6 CALCULATION OF THE COMPLIANCE MARGIN

Conducted Emission Level (dBµV) =	Value Reading at the EMI receiver (dBµV) + Correction Factor (dB)
Correction Factor (dB) =	LISN Attenuation (dB) + Cable Loss (dB) – Amplifier Gain (dB) + Attenuator (dB)
Margin (dB) =	Conducted Emission Level (dBµV) – Limit Value (dBµV)

Table 1: Example of Conducted Emissions Margin Calculation

Radiated Emission Level (dBµV/m) =	Value reading at the EMI receiver (dBµV) + Antenna Factor (dB/m) + Correction Factor (dB)
Correction Factor (dB) =	Cable Loss (dB) – Amplifier Gain (dB) + Attenuator (dB)
Margin (dB) =	Radiated Emission Level (dBµV/m) – Limit Value (dBµV/m)

Table 2: Example of Radiated Emissions Margin Calculation

7 MEASUREMENT UNCERTAINTIES

All measurements under compliance testing, involve certain levels of uncertainties based on test equipment and facilities. The measurement uncertainties of National Technical Systems Canada Inc. (U_{LAB}) were calculated according to CISPR16-4-2 standard and were lower than the maximum allowed by the standard (U_{CISPR}). Therefore, the measurement uncertainties need not to be considered for compliance.

The following table presents uncertainty calculation for emission measurements as requested by ANSI C63.4 (2014):

Test	Expanded Uncertainty with k=2 Coverage Factor (95% Confidence Level)
Conducted Emissions with LISN (9kHz-150kHz)	± 3.77 dB
Conducted Emissions with LISN (150kHz-30MHz)	± 3.33 dB
Radiated Emissions (30MHz-1GHz)	± 5.87 dB
Radiated Emissions (1GHz-18GHz)	± 5.10 dB

Table 3: Measurement Uncertainties

All other calculations of uncertainties evaluation are available upon request.

8 ENGINEERING COMMENTS

8.1 Modifications incorporated in the EUT

No modification was performed on the EUT during testing.

8.2 Deviations from the standards and/or laboratory tests procedure

No deviation from standards and/or test laboratory procedure was performed during testing.

9 TEST SUMMARY

The following table lists all tests called by the harmonized standards indicated in the test report introduction.

Test Name Standards	Test Specifications	Minimum Performance Criterion Required	EUT Serial Number	Results
Conducted Emissions FCC part 15 subpart B (2021)	Class A 150kHz-30MHz	N/A	UC21390231	Pass
Radiated Emissions FCC part 15 subpart B (2021)	Class A 30MHz-9GHz	N/A	UC21390231	Pass
Conducted Emissions ICES-003 (2016) + Update (2019)	Class A 150kHz-30MHz	N/A	UC21390231	Pass
Radiated Emissions ICES-003 (2016) + Update (2019)	Class A 30MHz-9GHz	N/A	UC21390231	Pass
Conducted Emissions EN 55032 (2015) A11 (2020)	Class A 150kHz-30MHz	N/A	UC21390231	Pass
Radiated Emissions EN 55032 (2015) A11 (2020)	Class A 30MHz-9GHz	N/A	UC21390231	Pass
Harmonic Current Emission Limits EN IEC 61000-3-2 (2019) A1 (2021)	Class A	N/A	UC21390231	Pass
Voltage Fluctuations and Flicker Limitations EN 61000-3-3 (2013) A1 (2019) A2 (2021)	Observation period for P_{st}: 2 min Observation period for P_{lt}: 120 min	N/A	UC21390231	Pass
Electrostatic Discharge Immunity IEC 61000-4-2 (2008)	Contact: ±4kV Air: ±2kV, ±4kV, ±8kV	B	UC21390152	Pass
Radiated Electromagnetic Field Immunity IEC 61000-4-3 (2020)	80MHz-1000MHz: 3V/m 1800MHz, 2600MHz, 3500MHz, 5000MHz: 3V/m	A	UC21390231	Pass
Electrical Fast Transient Immunity IEC 61000-4-4 (2012)	Power: ±1kV / 5kHz I/O Ports: ±0.5kV / 5kHz Communication Ports: ±0.5kV / 5kHz	B	UC21390231	Pass
Surge Immunity IEC 61000-4-5 (2014) A1 (2017)	Power: ±2kV L-PE / ±1kV L-L I/O Ports: N/A Communication Ports: N/A	B	UC21390231	Pass
Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields IEC 61000-4-6 (2013)	Power: 3V I/O Ports: 3V Communication Ports: 3V	A	UC21390231	Pass
Power Frequency Magnetic Field Immunity IEC 61000-4-8 (2009)	Continuous Field: 1A/m / 50Hz & 60Hz	A	UC21390231	Pass

Test Name Standards	Test Specifications	Minimum Performance Criterion Required	EUT Serial Number	Results
Voltage Dips, Short Interruptions and Voltage Variation Immunity on AC Input IEC 61000-4-11 (2020)	Voltage dips: 0%Un during half cycle 70%Un during 25 cycles (at 50Hz) 70%Un during 30 cycles (at 60Hz) Short interruptions: 0%Un during 250 cycles(at 50Hz) 0%Un during 300 cycles (at 60Hz)	B C C C C	UC21390231	Pass

Table 4: Test Summary

10 EMISSIONS TESTS

10.1 Conducted Emissions

10.1.1 Test Details

REFERENCE STANDARD	EN 55032 (2015) A11 (2020) ANSI C63.4 (2014)

SPECIFICATIONS	
Limit	EN 55032 (2015) A11 (2020) class A FCC part 15 subpart B (2021) class A ICES-003 (2016) Update (2019) class A
Frequency Range	150kHz – 30MHz
Installation	Table-top equipment

EUT	
Identification	U-CAM
Voltage Input	230V/50Hz 120V/60Hz

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-27
Temperature °C (For Info Only)	23.3°C
Relative humidity % (For Info Only)	43.7%
Atmospheric pressure kPa (For Info Only)	101.9kPa
Operator	Quoc-Nhan Van
Client Witness	Donatien Crémet (Inogeni)

10.1.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
TDK	Emission Anechoic Chamber	16706-1	5412	24	2024-08-26 (NSA / SVSWR)
NEXIO	Software	BAT-EMC v2022.0.11.0	N/A	N/A	N/A
Rohde&Schwarz	EMI receiver	ESW44	101905	12	2023-01-19
NARDA	LISN	PMM L2-16B	000WX20801	12	2023-06-10
TESEQ	ISN, CDN	ST08A	33995	24	2024-10-05

Table 5: Conducted Emissions – Test Equipment

10.1.3 Test Results

Tested Line	Frequency (MHz)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)	Results
Power – Phase (230V/50Hz)	0.150 – 0.50	66	79	Pass
	0.50 – 30	60	73	
Power – Neutral (230V/50Hz)	0.150 – 0.50	66	79	Pass
	0.50 – 30	60	73	
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.				

Table 6: Conducted Emissions – Test Results – EN 55032 Class A

Tested Line	Frequency (MHz)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)	Results
Power – Phase (120V/60Hz)	0.150 – 0.50	66	79	Pass
	0.50 – 30	60	73	
Power – Neutral (120V/60Hz)	0.150 – 0.50	66	79	Pass
	0.50 – 30	60	73	
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.				

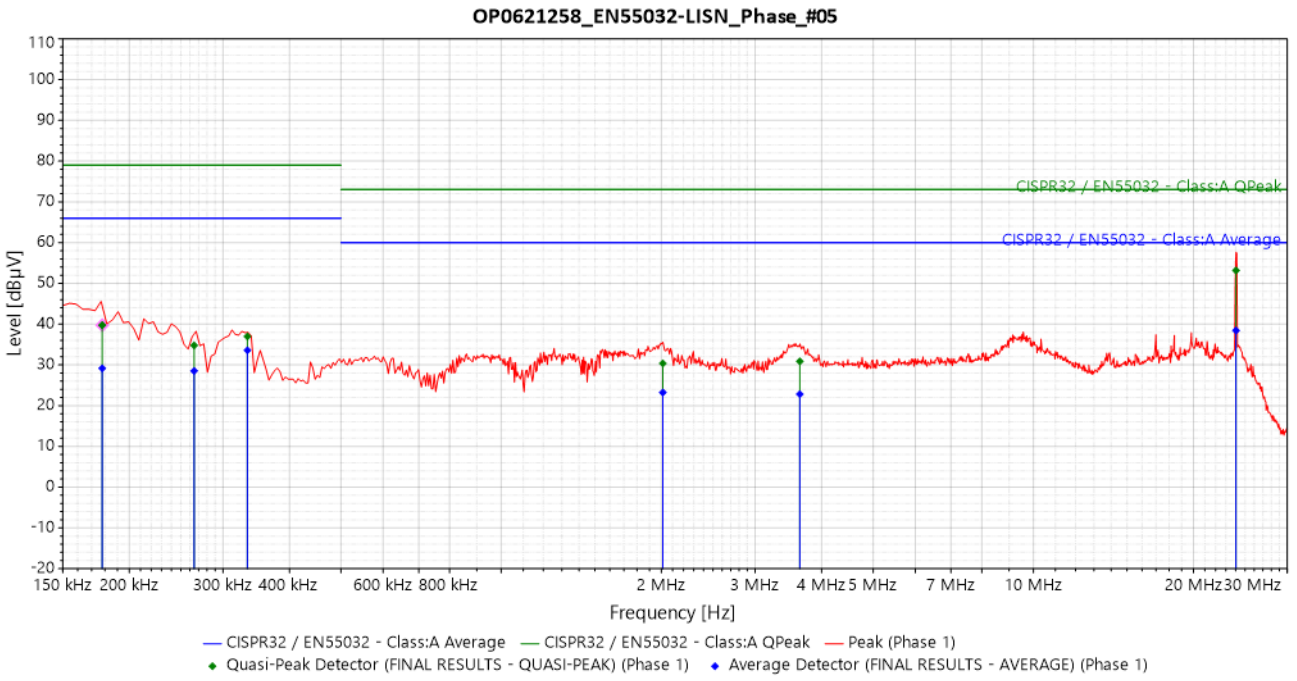
Table 7: Conducted Emissions – Test Results – FCC Part 15 Subpart B / ICES-003 Class A

Tested Line	Frequency (MHz)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)	Results
Ethernet	0.150 – 0.50	84 to 74	97 to 87	Pass
	0.50 – 30	74	87	
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.				

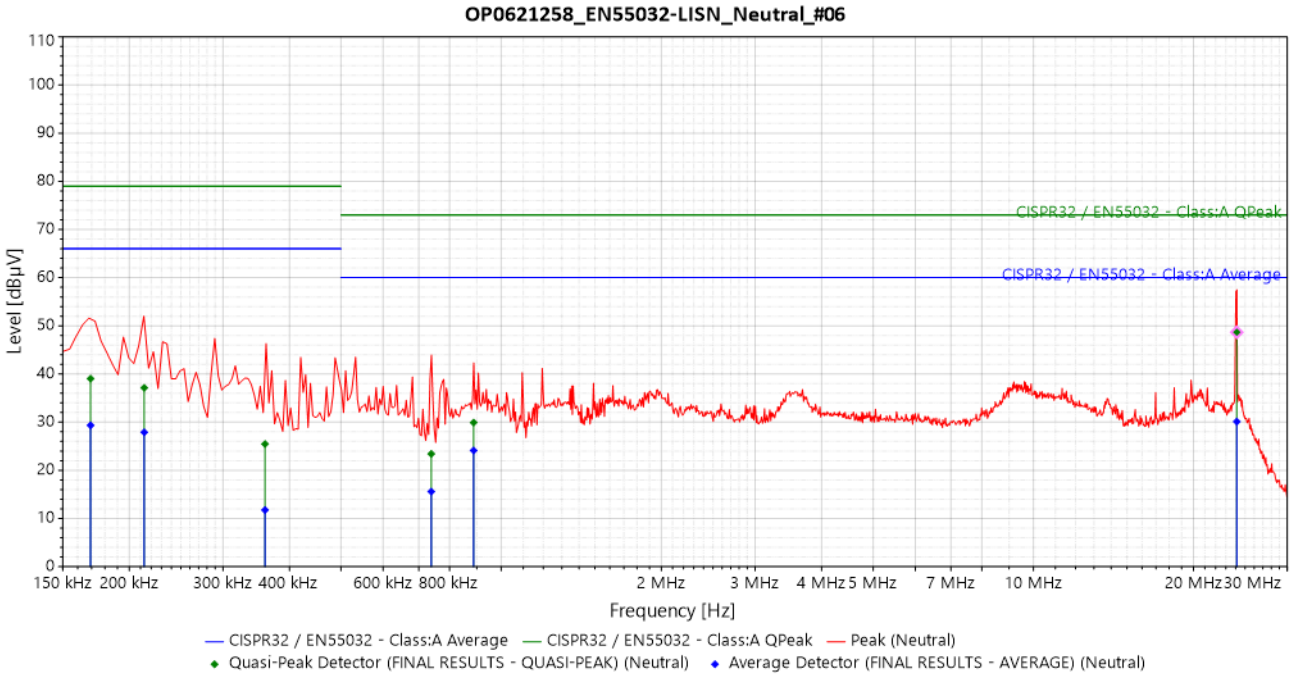
Table 8: Conducted Emissions – Test Results – EN 55032 Class A Telecom Ports

10.1.4 Test Data

See APPENDIX A for data files.



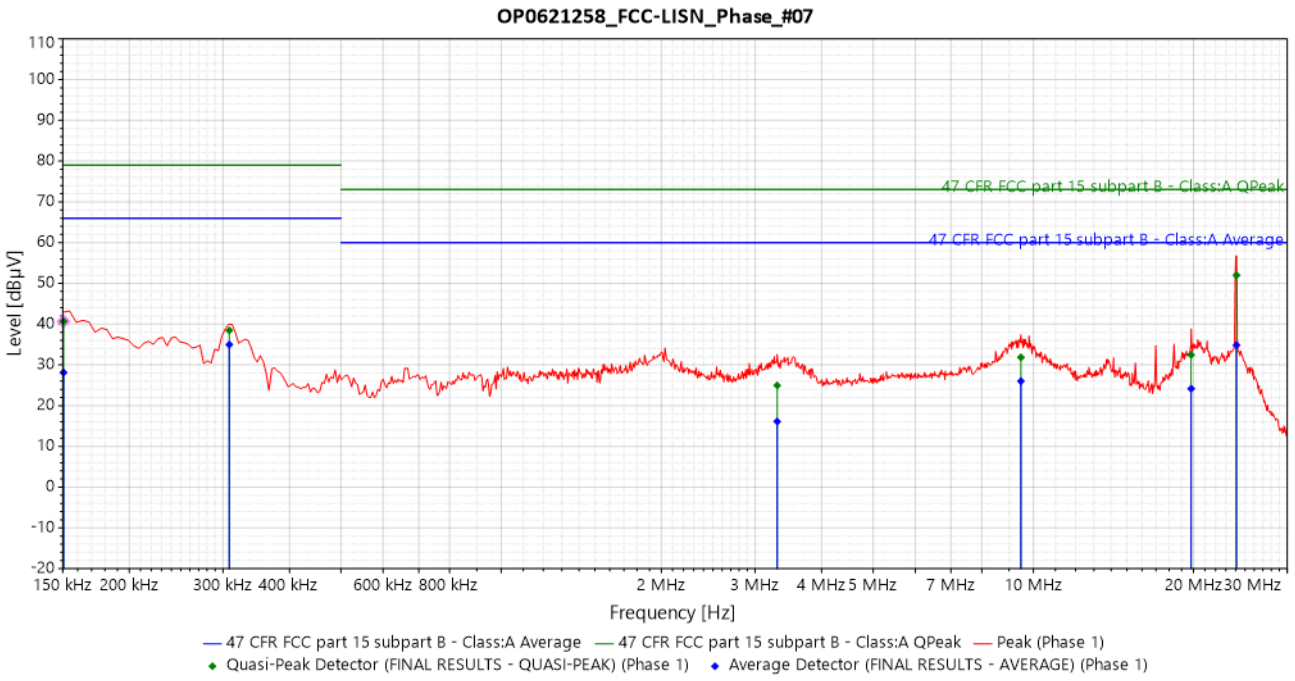
Graph 1: Conducted Emissions – EN 55032 – Power – Phase



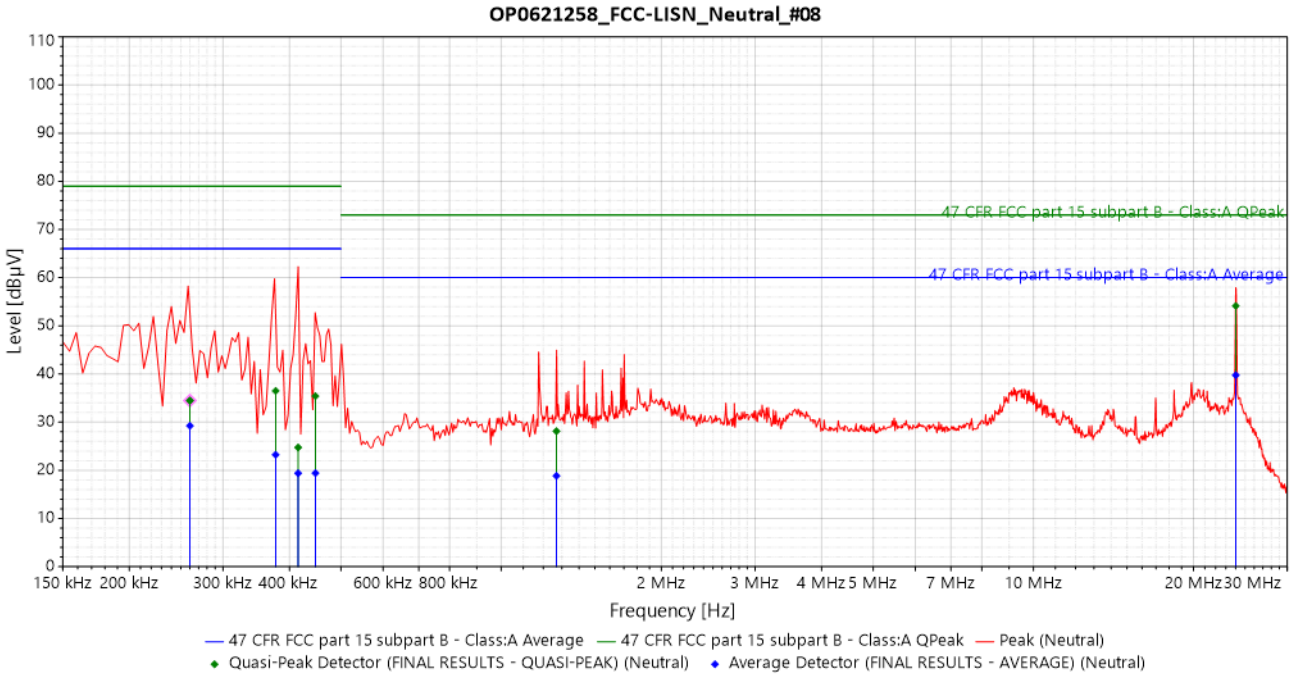
Graph 2: Conducted Emissions – EN 55032 – Power – Neutral

Tested Line	Frequency (MHz)	Detector	Level (dBµV)	Limit (dBµV)	Bandwidth (kHz)	Measurement Time (s)	Margin
Power – Phase (230V/50Hz)	24.03	Q-Peak	53.172	73.00	9 kHz	15	19.828
Power – Neutral (230V/50Hz)	24.11	Q-Peak	48.670	73.00	9 kHz	15	24.330

Table 9: Conducted Emissions – Lowest Margin according to EN 55032



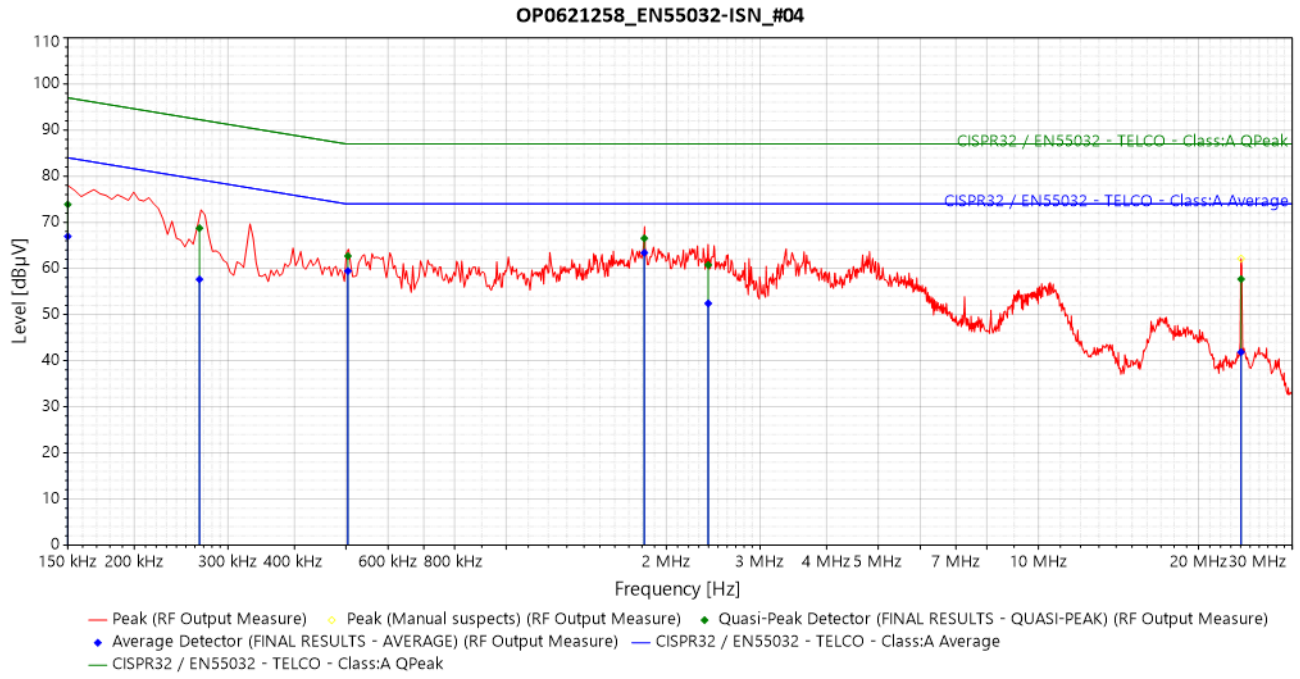
Graph 3: Conducted Emissions – FCC part 15 Subpart B – Power – Phase



Graph 4: Conducted Emissions – FCC part 15 Subpart B – Power – Neutral

Tested Line	Frequency (MHz)	Detector	Level (dBµV)	Limit (dBµV)	Bandwidth (kHz)	Measurement Time (s)	Margin
Power – Phase (120V/60Hz)	24.08	Q-Peak	51.988	73.00	9 kHz	15	21.012
Power – Neutral (120V/60Hz)	24.01	Q-Peak	54.141	73.00	9 kHz	15	18.859

Table 10: Conducted Emissions – Lowest Margin according to FCC Part 15 Subpart B / ICES-003



Graph 5: Conducted Emissions – EN 55032 – Telecom Ports

Tested Line	Frequency (MHz)	Detector	Level (dBµV)	Limit (dBµV)	Bandwidth (kHz)	Measurement Time (s)	Margin
Ethernet	1.82	Average	63.388	74.00	9 kHz	15	10.612

Table 11: Conducted Emissions – Lowest Margin according to EN 55032 – Telecom Ports

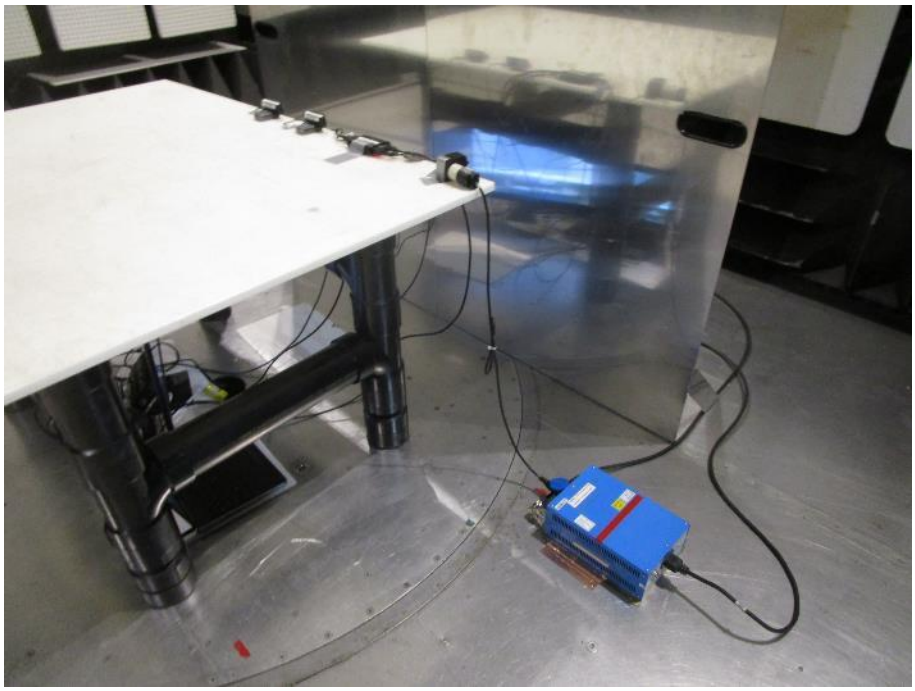


Photo 11: Conducted Emissions – Test Setup

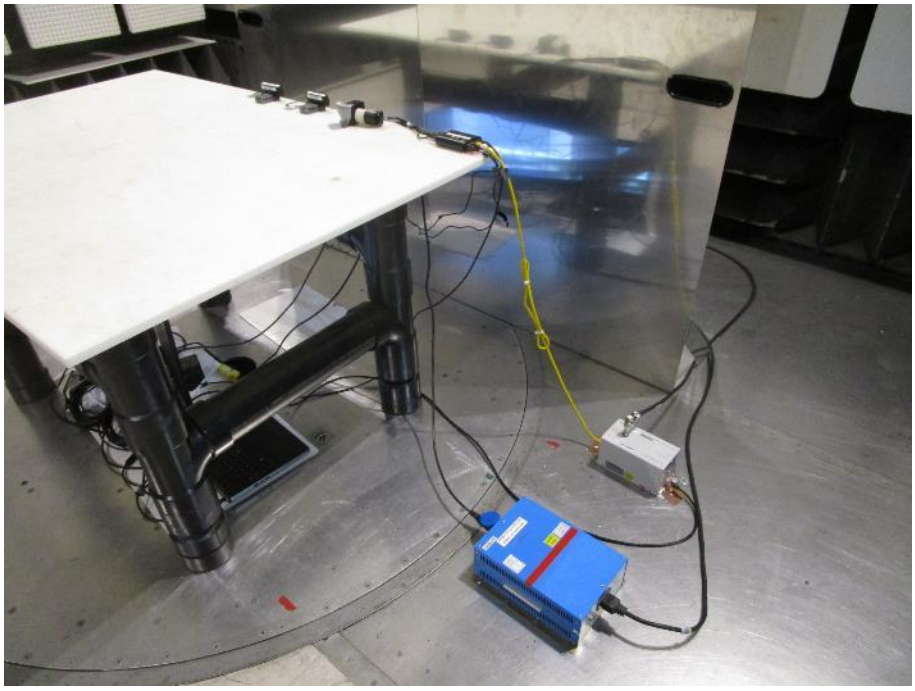


Photo 12: Conducted Emissions – Telecom Ports – Test Setup

10.1.5 Test Method

Conducted emissions were performed using the procedures of the reference standard.

Once the configuration or mode of operation causing the highest emission level (worst case) was determined, a scan was performed with the Peak detector in the frequency range specified by the reference standard.
Frequencies where level was above the limit or within 20dB of the limit were recorded. The level at these frequencies was measured with the detector specified by the limit.

10.2 Radiated Emissions

10.2.1 Test Details

REFERENCE STANDARD	EN 55032 (2015) A11 (2020) ANSI C63.4 (2014)

SPECIFICATIONS	
Limit	EN 55032 (2015) A11 (2020) class A FCC part 15 subpart B (2021) class A ICES-003 (2016) Update (2019) class A
Frequency Range	30MHz – 6GHz (EN 55032 / FCC / ICES-003) 6GHz – 9GHz (FCC / ICES-003)
Measurement Distance	3m
Installation	Table-top equipment

EUT	
Identification	U-CAM
Voltage Input	230V/50Hz

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-27
Temperature °C (For Info Only)	23.3°C
Relative humidity % (For Info Only)	43.7%
Atmospheric pressure kPa (For Info Only)	101.9kPa
Operator	Quoc-Nhan Van
Client Witness	Donatien Crémet (Inogeni)

10.2.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
TDK	Emission Anechoic Chamber	16706-1	5412	24	2024-08-26 (NSA / SVSWR)
Sunol Sciences Corporation	Antenna Positioning Tower	TLT2	LABCEM #0181	N.C.R.	N.C.R.
Sunol Sciences Corporation	Flush Mount Turntable	FM2011VS/2022VS	LABCEM #0182	N.C.R.	N.C.R.
Sunol Sciences Corporation	System Controller	SC110V	LABCEM #0183	N.C.R.	N.C.R.
NEXIO	Software	BAT-EMC v2022.0.11.0	N/A	N/A	N/A
Rohde&Schwarz	EMI receiver	ESW44	101905	12	2023-01-19
Schaffner	Bilog antenna	CBL6112D	22617	24	2023-06-28
TESEQ	Horn antenna	BHA9118	33053	24	2024-09-20
Amplical	Amplifier 1GHz-18GHz	AMP1G18-30-N/PSU	121212	12	2022-12-22

Table 12: Radiated Emissions – Test Equipment

10.2.3 Test Results

Frequency (MHz)	Quasi-Peak Limit extrapolated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Results
30 – 230	50	-	-	Pass
230 – 1000	57	-	-	
1000 – 3000	-	56	76	Pass
3000 – 6000	-	60	80	
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.				

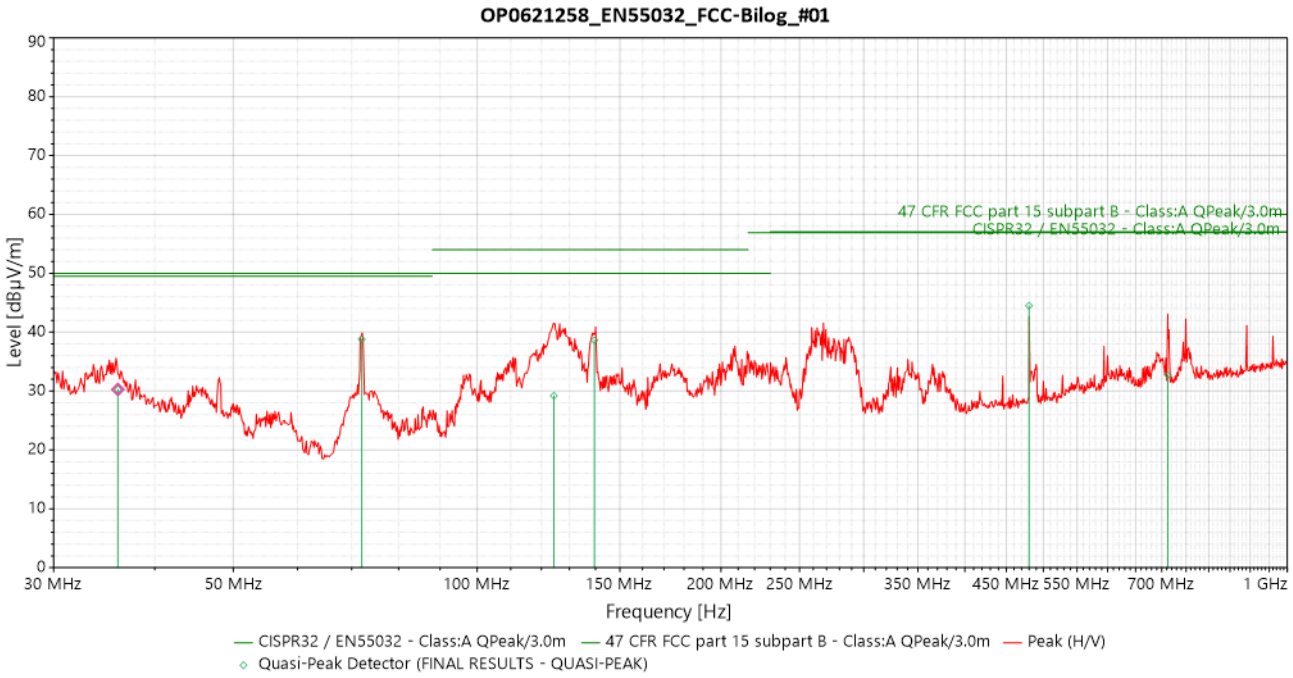
Table 13: Radiated Emissions – Test Results – CISPR 32 Class A

Frequency (MHz)	Quasi-Peak Limit extrapolated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Results
30 – 88	49.5	-	-	Pass
88 – 216	54.0	-	-	
216 – 960	56.9	-	-	
960 – 1000	60.0	-	-	
1000 – 9000	-	60	80	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.				

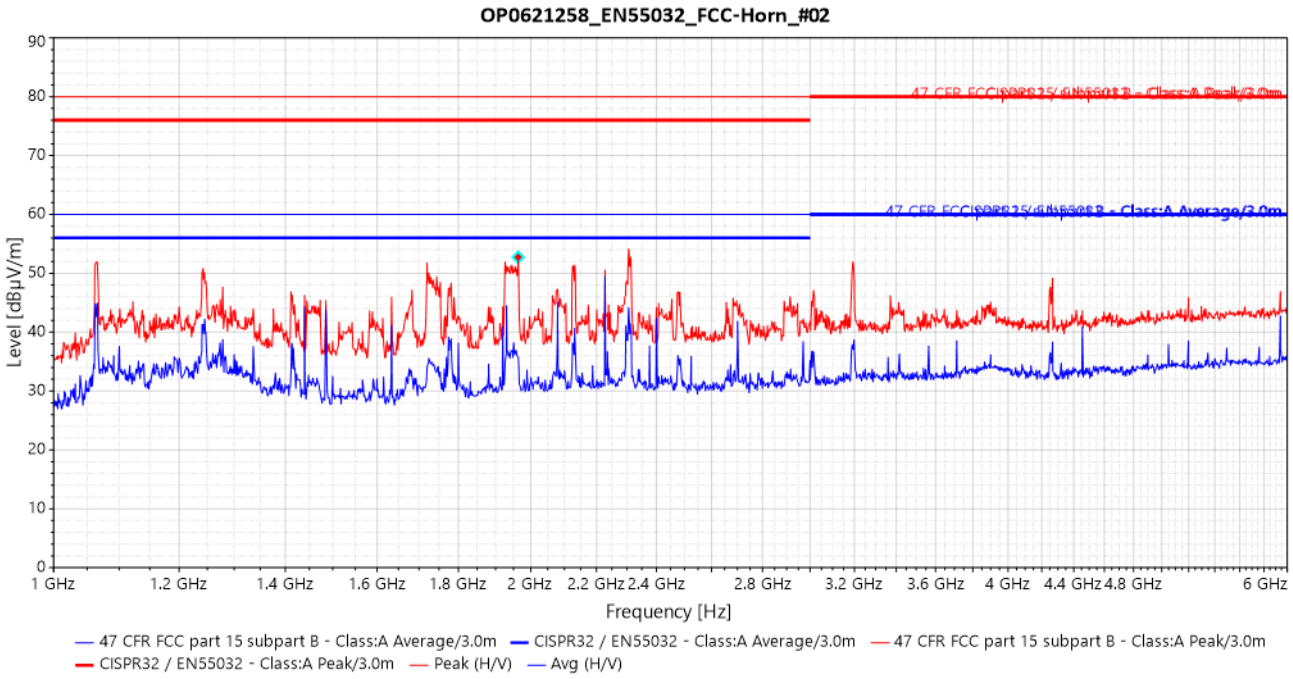
Table 14: Radiated Emissions – Test Results – FCC Part 15 Subpart B / ICES-003 Class A

10.2.4 Test Data

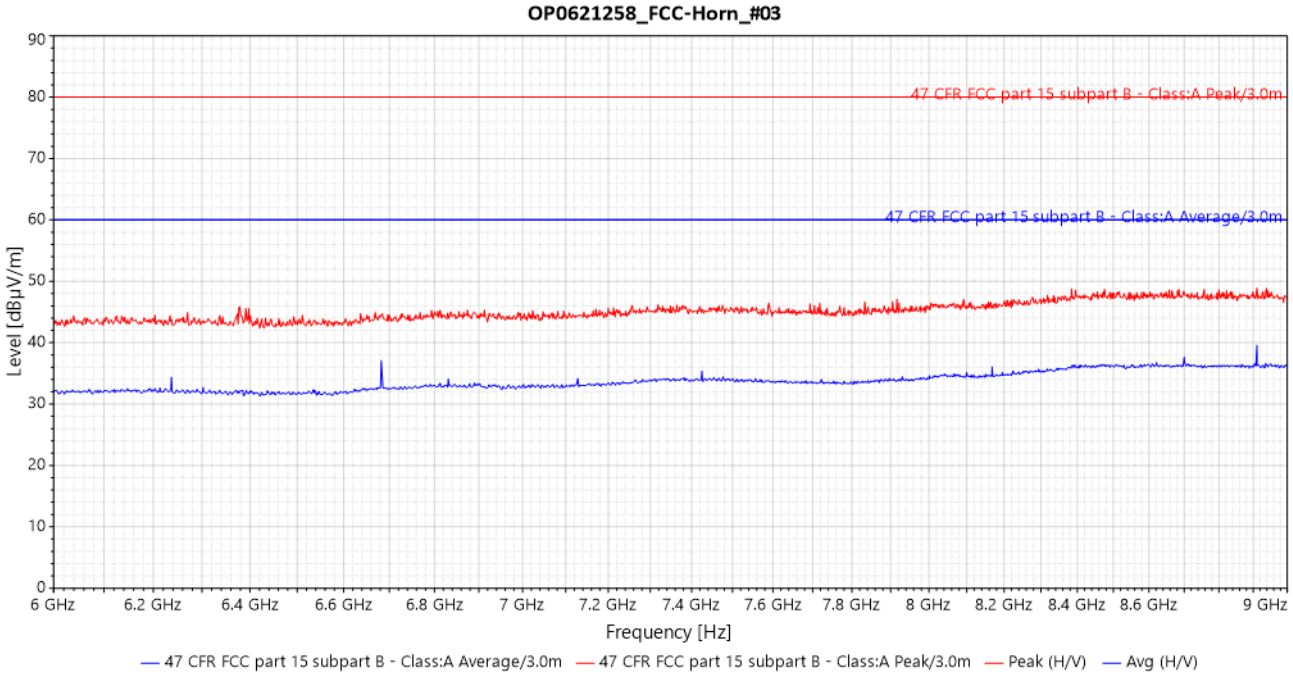
See APPENDIX B for data files.



Graph 6: Radiated Emissions 30MHz-1GHz



Graph 7: Radiated Emissions 1GHz-6GHz



Graph 8: Radiated Emissions 6GHz-9GHz

Frequency (MHz)	Detector	Level (dBµV/m)	Limit (dBµV/m)	Bandwidth (kHz)	Measurement Time(s)	Margin (dB)
72.02	Quasi-Peak	38.818	50.00	120	15	11.182
1000-6000 Note 1	Peak Average	-	-	1000	15	-
Note 1: No significant emission was noted						

Table 15: Radiated Emissions – Lowest Margin according toEN 55032

Frequency (MHz)	Detector	Level (dBµV/m)	Limit (dBµV/m)	Bandwidth (kHz)	Measurement Time(s)	Margin (dB)
72.02	Quasi-Peak	38.818	49.50	120	15	10.682
1000-9000 Note 1	Peak Average	-	-	1000	15	-
Note 1: No significant emission was noted						

Table 16: Radiated Emissions – Lowest Margin according to FCC Part 15 Subpart B / ICES-003

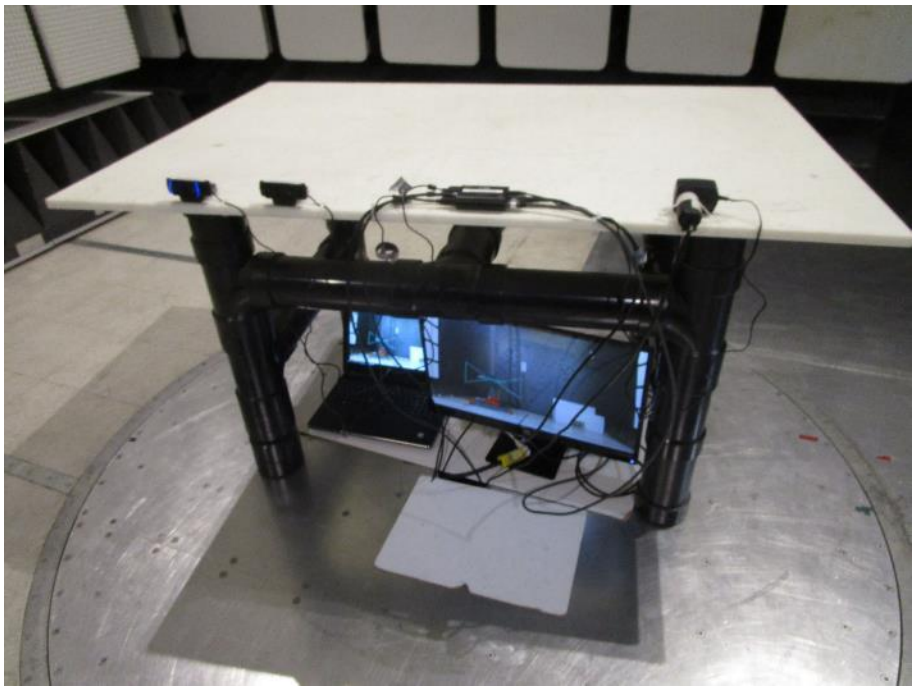


Photo 13: Radiated Emissions – Test Setup

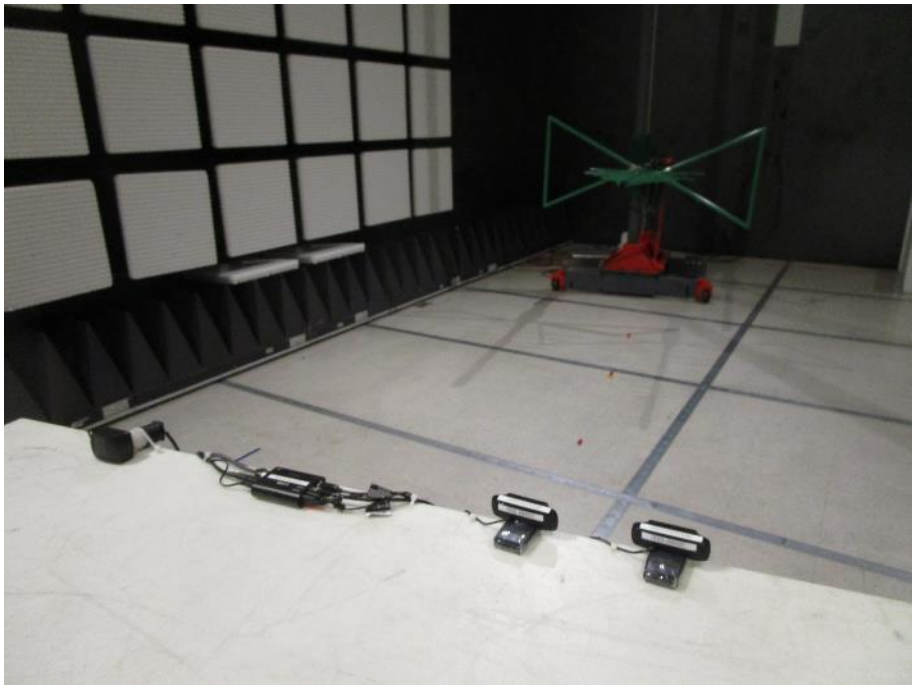


Photo 14: Radiated Emissions – Test Setup 30MHz-1GHz

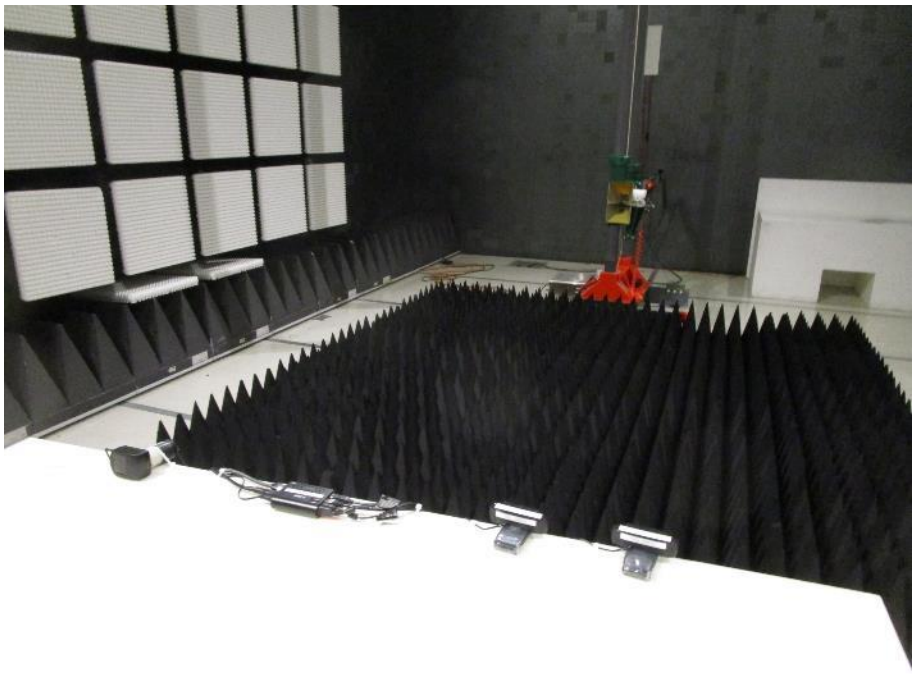


Photo 15: Radiated Emissions – Test Setup 1GHz-9GHz

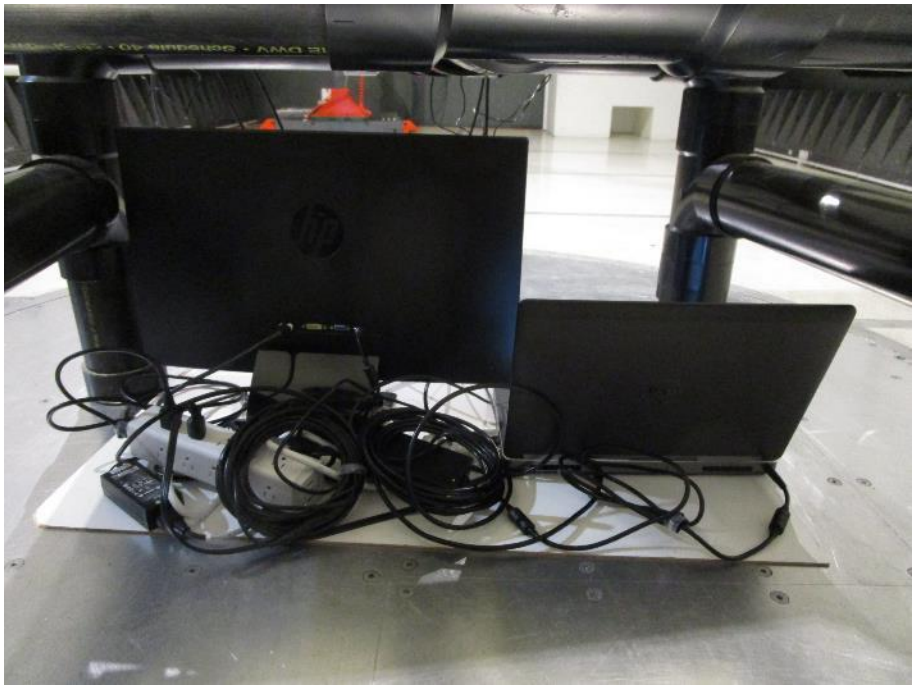


Photo 16: Radiated Emissions – Support Equipment

10.2.5 Test Method

Radiated emissions were performed using the procedures of the reference standard.

Once the configuration or mode of operation causing the highest emission level (worst case) was determined, spectral previews were performed with the Peak detector in the frequency range specified by the reference standard.
Frequencies where level was above the limit or within 10 dB of the limit were recorded. The level at these frequencies was maximized and measured with the detector specified by the limit.

Note: FCC measurements combined with CISPR measurements for frequency above 1 GHz
Measurement methods of radiated emissions are slightly different between FCC regulation and CISPR standard. The FCC through ANSI C63.4 requires boresighting (tilt) and CISPR16-2-3 does not. For better efficiency, only the boresighting method is carried out, which may increase the level of disturbances during the final evaluation with the CISPR limit.

10.3 Harmonic Current Emissions

10.3.1 Test Details

REFERENCE STANDARD	EN IEC 61000-3-2 (2019) A1 (2021)
SPECIFICATIONS	
Limit	Class A
EUT	
Identification	U-CAM
Voltage Input	230V/50Hz
TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-27
Temperature °C (For Info Only)	24.1°C
Relative humidity % (For Info Only)	38.4%
Atmospheric pressure kPa (For Info Only)	102.3kPa
Operator	Quoc-Nhan Van
Client Witness	Donatien Crémet (Inogeni)

10.3.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
TESEQ	Software	Win2100 v4.9	N/A	N/A	N/A
TESEQ	AC-DC Power source	NSG 1007	1232A04499 (NSG 1007)	24	2023-09-14

Table 17: Harmonic Current Emissions – Test Equipment

10.3.3 Test Results

Class A ☒	Class B ☐	Class C ☐	Class D ☐

Class A:
Equipment not specified as belonging to Class B, C or D shall be considered as Class A equipment.

- balanced three-phase equipment;
- household appliances, excluding those specified as belonging to Class B, C or D;
- vacuum cleaners;
- high pressure cleaners;
- tools, excluding portable tools;
- independent phase control dimmers;
- audio equipment;
- professional luminaires for stage lighting and studios.

NOTE 1 Equipment that can be shown to have a significant effect on the supply system may be reclassified in a future of this document, taking into account the following factors:
– number of pieces of equipment in use;
– duration of use;
– simultaneity of use;
– power consumption;
– harmonic spectrum, including phase.

Class B:

- portable tools;
- arc welding equipment which is not professional equipment.

Class C:

- lighting equipment.

Class D:
Equipment having a specified power according to 6.3.2 less than or equal to 600 W, of the following types:

- personal computers and personal computer monitors;
- television receivers;
- refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).

NOTE 2 Class D limits are reserved for equipment that, by virtue of the factors listed in note 1, can be shown to have a pronounced effect on the public electricity supply system.

*Starting and stopping
When a piece of equipment is brought into operation or is taken out of operation, manually or automatically, harmonic currents and power are not taken into account for the first 10 s following the switching event.
The equipment under test shall not be in stand-by mode (see 3.14) for more than 10 % of any observation period.

Table 18: Harmonic Current Emissions – Classification of Equipment

Tested Line	Limit	Observation Time (min)	Harmonics Repeatability Verification ≤5%	Results
Power (230V/50Hz)	Class A	2	YES	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.				

Table 19: Harmonic Current Emissions – Test Results

10.3.4 Test Data

See APPENDIX C for data files

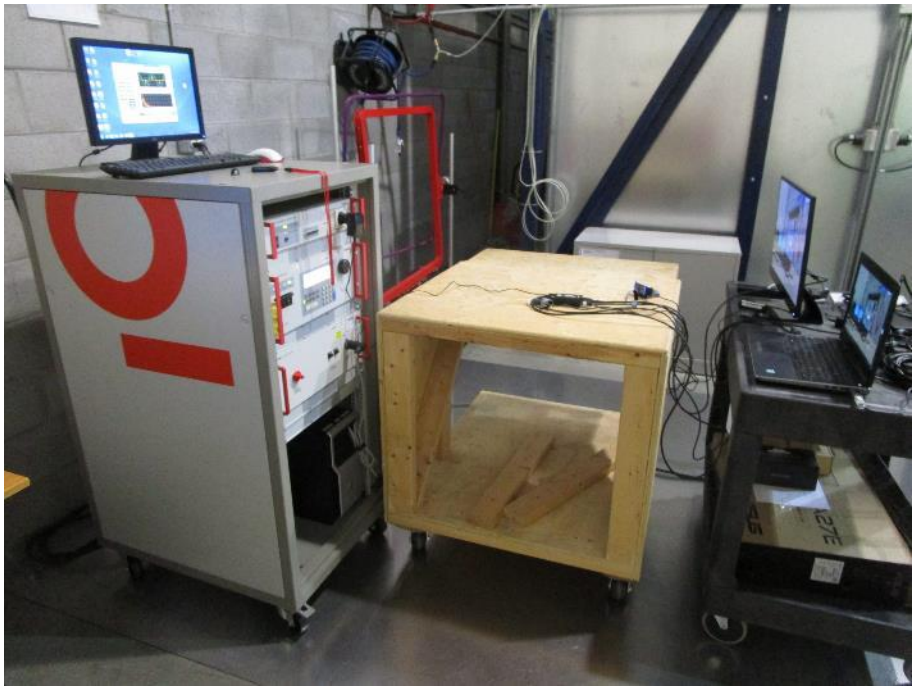


Photo 17: Harmonic Current Emissions – Test Setup

10.3.5 Test Method

Harmonic current emissions measurements were performed using the procedures of the reference standard.

10.4 Voltage Fluctuations and Flicker Measurements

10.4.1 Test Details

REFERENCE STANDARD	EN 61000-3-3 (2013) A1 (2019) A2 (2021)

SPECIFICATIONS	
P_{st} Observation Period	10 min
P_{lt} Observation Period	120 min

EUT	
Identification	U-CAM
Voltage Input	230V/50Hz
Manual Switching	NO

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-27
Temperature °C (For Info Only)	24.1°C
Relative humidity % (For Info Only)	38.4%
Atmospheric pressure kPa (For Info Only)	102.3kPa
Operator	Quoc-Nhan Van
Client Witness	Donatien Crémet (Inogeni)

10.4.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
TESEQ	Software	Win2100 v4.9	N/A	N/A	N/A
TESEQ	AC-DC Power source	NSG 1007	1232A04499 (NSG 1007)	24	2023-09-14
TESEQ	Lumped impedance	CCN 1000-1	1232A04499 (CCN 1000-1)	24	2023-09-14

Table 20: Voltage Fluctuations and Flicker Measurements – Test Equipment

10.4.3 Test Results

Parameters	Limit	Results
Short-term flicker value: P_{st}	1.0	Pass
Long-term flicker value: P_{lt}	0.65	Pass
Voltage change for more than 500ms: d(t)	3.3%	Pass
Relative steady state voltage change: dc	3.3%	Pass
Maximum relative voltage change: d_{max}	4%	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client.		

Table 21: Voltage Fluctuations and Flicker Measurements – Test Results

10.4.4 Test Data

See APPENDIX D for data files

Test setup was identical to harmonic current emissions measurements.

10.4.5 Test Method

Voltage fluctuations and flicker measurements were performed using the procedures of the reference standard.

11 IMMUNITY TESTS

11.1 Electrostatic Discharge Immunity

11.1.1 Test Details

REFERENCE STANDARD	IEC 61000-4-2 (2008)

SPECIFICATIONS	
Test Level	Contact: ±4kV Air: ±2kV, ±4kV, ±8kV
Installation	Table-top equipment
Ungrounded Equipment	YES

PERFORMANCE CRITERION	B

EUT	
Identification	U-CAM
Voltage Input	230V/50Hz

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-27
Temperature Min 15°C – Max 35°C	24.1°C
Relative Humidity Min 30% - Max 60%	38.4%
Atmospheric Pressure Min 86kPa – Max 106kPa	102.3kPa
Operator	Quoc-Nhan Van
Client Witness	Donatien Crémet (Inogeni)

11.1.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
Vaisala	Thermo-Hygrometer	MI70/HMP77	H4610004/JO430012	24	2023-08-13
EMC-Partner	Discharge Generator	ESD3000	1550	18	2023-04-06
EMC-Partner	Relay Module	ESD3000RM32	1892	18	2023-04-06
EMC-Partner	Discharge Network 150pF/330Ohms	ESD3000DN1	1551	18	2023-04-06

Table 22: ESD – Test Equipment

11.1.3 Test Results

Coupling Plane	Position	Polarity Test Level (kV)	Number	Time Interval (s)	Generator Perpendicular	Comments	Results
HCP	Front	±4	10+ / 10-	1	YES	No event	Pass
VCP	Front	±4	10+ / 10-	1	YES	No event	Pass
	Right	±4	10+ / 10-	1	YES	No event	Pass
	Rear	±4	10+ / 10-	1	YES	No event	Pass
	Left	±4	10+ / 10-	1	YES	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.							

Table 23: ESD – Test Results – Indirect Discharges – EUT

ESD Point	ESD Type	Test Level (kV)	Number	Time Interval (s)	Generator Perpendicular	Comments	Results
C1-C8	Contact	±4	10+ / 10-	1	YES	No event	Pass
NONE	Air	±2, ±4, ±8,	10+ / 10-	1	N/A	Note 1	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.							
Note 1: After discharge points research, no possible air discharge was found on the EUT.							

Table 24: ESD – Test Results – Direct Discharges – EUT

Coupling Plane	Position	Polarity Test Level (kV)	Number	Time Interval (s)	Generator Perpendicular	Comments	Results
HCP	Front	±4	10+ / 10-	1	YES	No event	Pass
VCP	Front	±4	10+ / 10-	1	YES	No event	Pass
	Right	±4	10+ / 10-	1	YES	No event	Pass
	Rear	±4	10+ / 10-	1	YES	No event	Pass
	Left	±4	10+ / 10-	1	YES	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.							

Table 25: ESD – Test Results – Indirect Discharges – PSU

ESD Point	ESD Type	Test Level (kV)	Number	Time Interval (s)	Generator Perpendicular	Comments	Results
NONE	Contact	±4	10+ / 10-	1	N/A	Note 1	Pass
NONE	Air	±2, ±4, ±8,	10+ / 10-	1	N/A	Note 2	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.							
Note 1: After discharge points research, no possible air discharge was found on the EUT. Note 2: After discharge points research, no possible air discharge was found on the EUT.							

Table 26: ESD – Test Results – Direct Discharges – PSU

11.1.4 Test Data

Photo 18: ESD – Test Setup – EUT

Photo 19: ESD – Test Setup – PSU

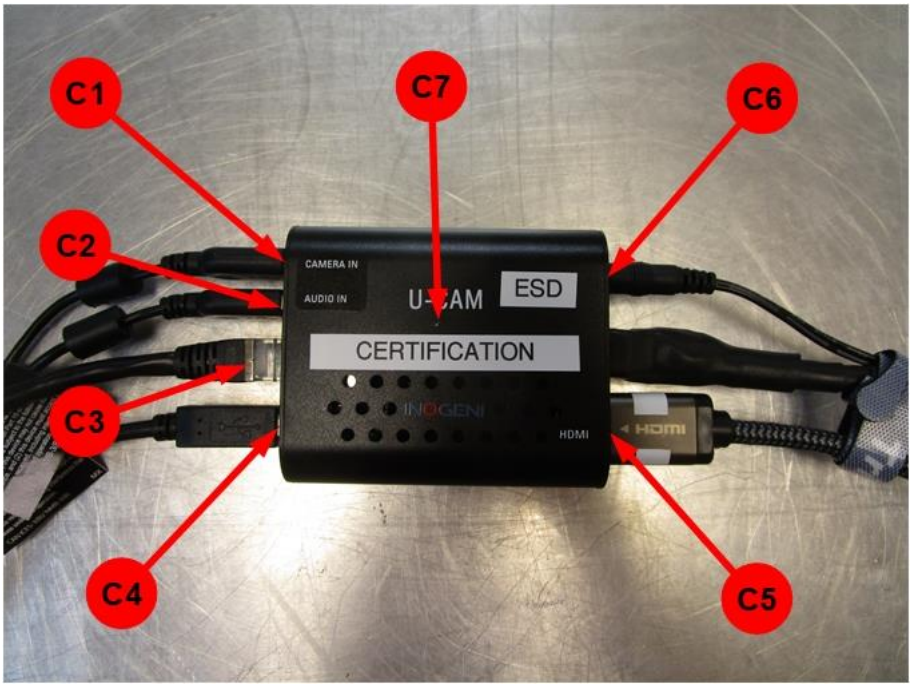


Photo 20: ESD – Location of Discharge Points #1

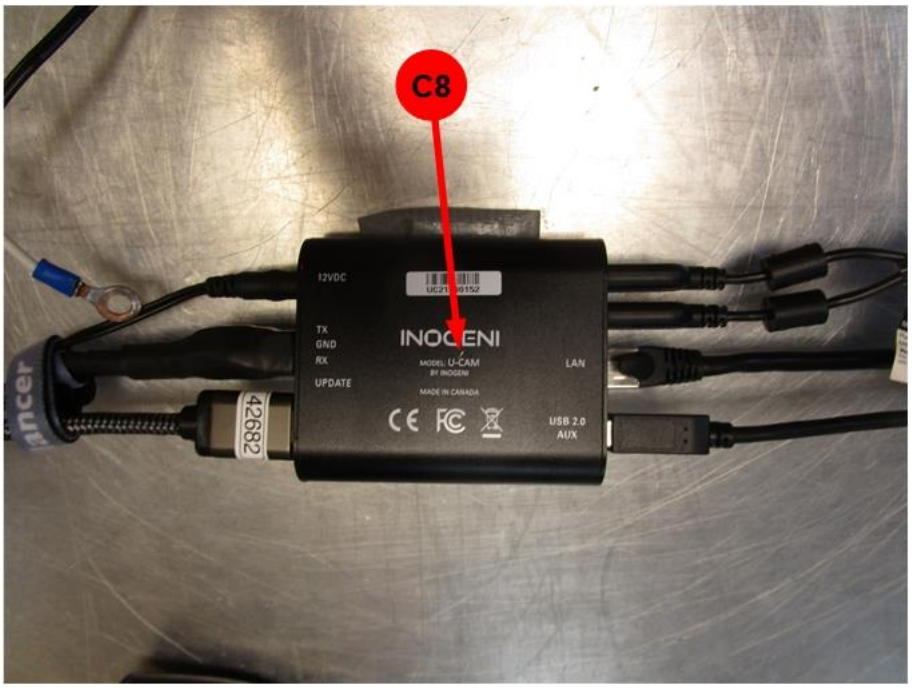


Photo 21: ESD – Location of Discharge Points #2

11.1.5 Test Method

Electrostatic discharge immunity tests were performed using the procedures of the reference standard.

Application of direct discharges was applied to points and surfaces of EUT which are accessible to person during normal use. If contact discharge cannot be applied, the air discharge method shall be performed.

Application of indirect discharges was applied to the horizontal coupling plane (0.1m from the front of EUT) and to vertical coupling plane (VCP is positioned at 0.1m from EUT in order to illuminate the four faces of EUT).

11.2 Radiated Electromagnetic Field Immunity

11.2.1 Test Details

REFERENCE STANDARD	IEC 61000-4-3 (2020)

SPECIFICATIONS			
TEST	#1	#2	#3
Frequency Range	80MHz-1000MHz	1.8GHz, 2.6GHz	3.5GHz, 5.0GHz
Test Level	3V/m	3V/m	3V/m
Test Distance	2m	2m	2.7m
Uniformity Field Area	Area: 1.5m x 1.5m Lower Edge @ 80cm Antenna Height @ 1.55m	Area: 1.5m x 1.5m Lower Edge @ 80cm Antenna Height @ 1.55m	Area: 1.5m x 1.5m Lower Edge @ 80cm Antenna Height @ 1.55m
Modulation	AM 80% / 1kHz	AM 80% / 1kHz	AM 80% / 1kHz
Frequency Step	1%	N/A	N/A
Dwell Time	0.5s	10s	10s
Illuminated Face	4		
Installation	Table-top equipment		

PERFORMANCE CRITERION	A

EUT	
Identification	U-CAM
Voltage Input	230V/50Hz

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-31
Temperature °C (For Info Only)	22.6°C
Relative humidity % (For Info Only)	29.7%
Atmospheric pressure kPa (For Info Only)	101.5kPa
Operator	Quoc-Nhan Van
Client Witness	No witness

11.2.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
TDK	Immunity Anechoic Chamber	16706-2	5712	N/A	N/A
NEXIO	Software	BAT-EMC v2022.0.11.0	N/A	N/A	N/A
TESEQ	Signal generator	ITS 6006	33007	12	2023-09-29
Agilent	RF Generator	N5183A	MY5014816	12	2023-03-28
Werlatone	Directional coupler (80MHz-1GHz)	C3908-10	98552	12	2022-12-22
Werlatone	Directional coupler (0.8GHz-3GHz)	C6721-10	98746	12	2022-12-22
Amplifier Research (AR)	Dual Directional Coupler, 2-8GHz, 600W	DC7281A	348875	12	2023-03-29
TESEQ	Power meter	PM 6006	72804	12	2023-09-29
TESEQ	Power meter	PM 6006	72805	12	2023-09-29
TESEQ	Power meter	PM 6006	77352	12	2023-09-29
TESEQ	Power meter	PM 6006	77353	12	2023-09-29
Rohde & Schwarz	3-Path Diode Power Sensor 10MHz-18GHz	NRP18SN	102193	12	2023-04-29
Rohde & Schwarz	3-Path Diode Power Sensor 10MHz-18GHz	NRP18SN	102192	12	2023-04-29
TESEQ	RF amplifier (80MHz-1GHz)	CBA 1G-500	T44193	VERIF	VERIF
TESEQ	RF amplifier (800MHz-3GHz)	CBA 3G-180	T44194	VERIF	VERIF
IFI	RF Amplifier (2GHz-8GHz)	T82-300	O1159-0710	VERIF	VERIF
Schwarzbeck	Antenna	STLP 9128 D special	9128DS 025	VERIF	VERIF
Com-Power	Horn Antenna	AH-118	071324	24	2024-08-03
Narda	Electric Field Probe	PMM EP604	811ZX20408	12	2023-10-14
LABCEM	RF Uniformity Field 80MHz-1GHz (36V/m)	N/A	N/A	12	2022-12-27
LABCEM	RF Uniformity Field 1GHz-3GHz (18V/m)	N/A	N/A	12	2022-12-27
LABCEM	RF Uniformity Field 3GHz-6GHz (18V/m)	N/A	N/A	12	2023-08-29

Table 27: Radiated EM Field – Test Equipment

11.2.3 Test Results

Illuminated Face	Frequencies (MHz)	Test Level (V/m)	Modulation	Polarization	Comments	Results
Front	80 - 1000	3	AM / 1kHz	Horizontal Vertical	No event Note 1	Pass
	1800, 2600	3	AM / 1kHz	Horizontal Vertical	No event Note 1	Pass
	3500, 5000	3	AM / 1kHz	Horizontal Vertical	No event Note 1	Pass
Right	80 - 1000	3	AM / 1kHz	Horizontal Vertical	No event Note 2	Pass
	1800, 2600	3	AM / 1kHz	Horizontal Vertical	No event Note 2	Pass
	3500, 5000	3	AM / 1kHz	Horizontal Vertical	No event Note 2	Pass
Rear	80 - 1000	3	AM / 1kHz	Horizontal Vertical	No event Note 3	Pass
	1800, 2600	3	AM / 1kHz	Horizontal Vertical	No event Note 3	Pass
	3500, 5000	3	AM / 1kHz	Horizontal Vertical	No event Note 3	Pass
Left	80 - 1000	3	AM / 1kHz	Horizontal Vertical	No event	Pass
	1800, 2600	3	AM / 1kHz	Horizontal Vertical	No event	Pass
	3500, 5000	3	AM / 1kHz	Horizontal Vertical	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.						
Note 1: 1m of cable (DC Power, Serial, HDMI & Webcams) was exposed to the electromagnetic field. Note 2: 1m of cable (AC Power) was exposed to the electromagnetic field. Note 3: 1m of cable (LAN & USB 2.0 AUX) was exposed to the electromagnetic field.						

Table 28: Radiated EM Field – Test Results

11.2.4 Test Data

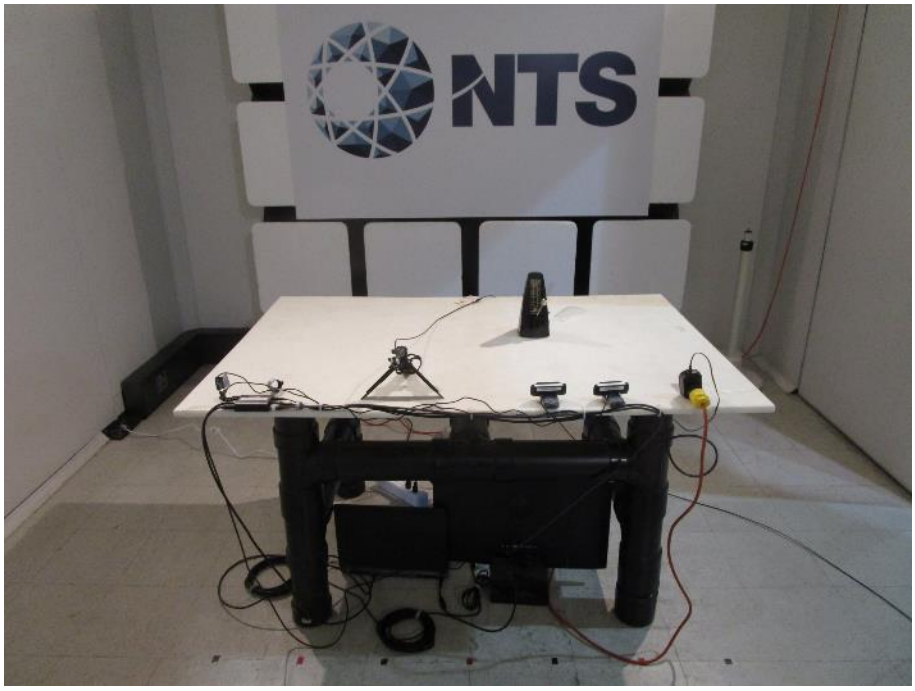


Photo 22: Radiated EM Field – Test setup – Front

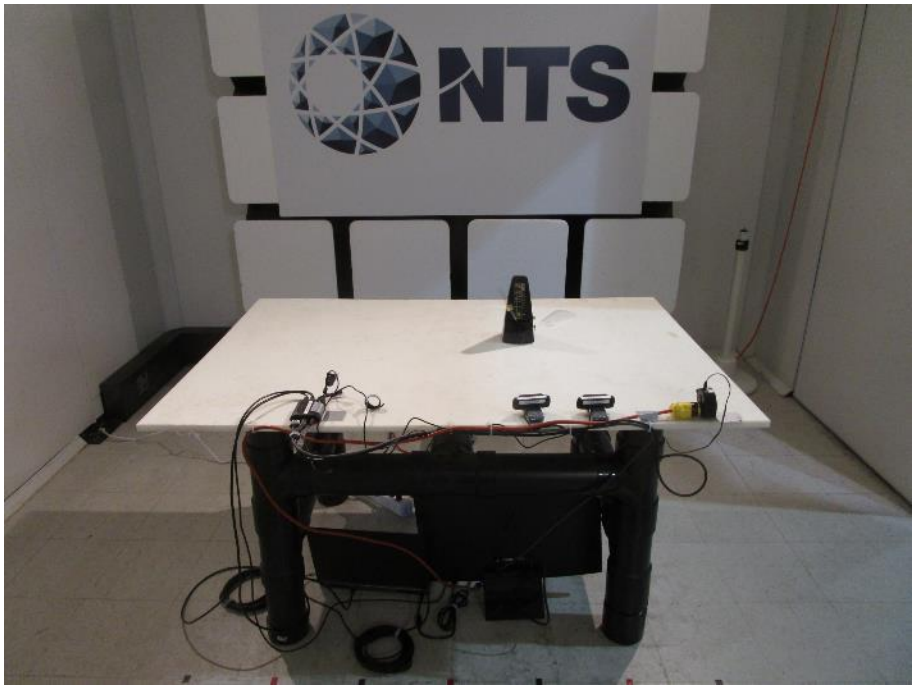


Photo 23: Radiated EM Field – Test setup – Right

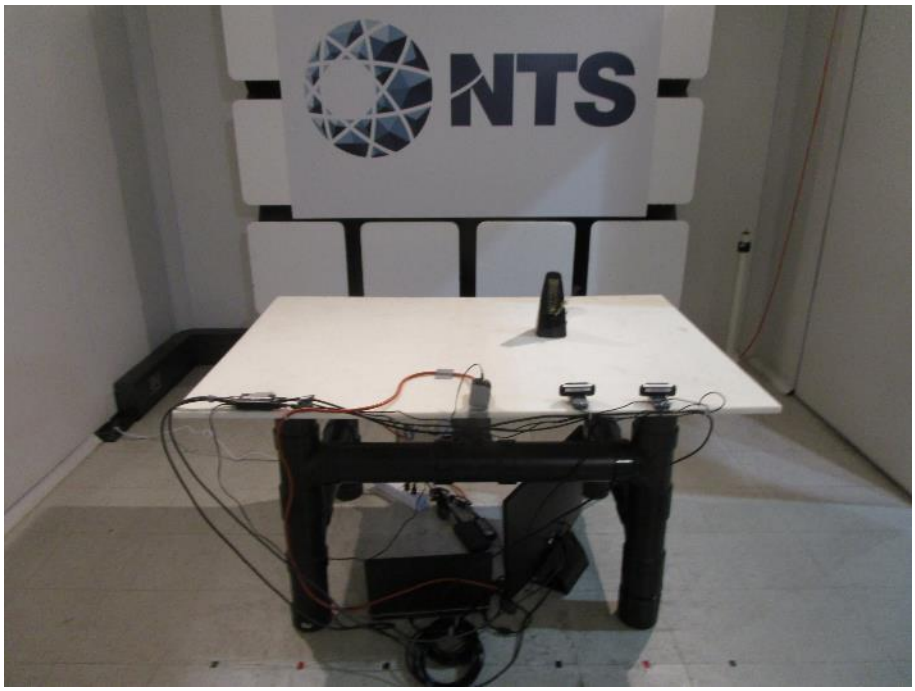


Photo 24: Radiated EM Field – Test setup – Rear

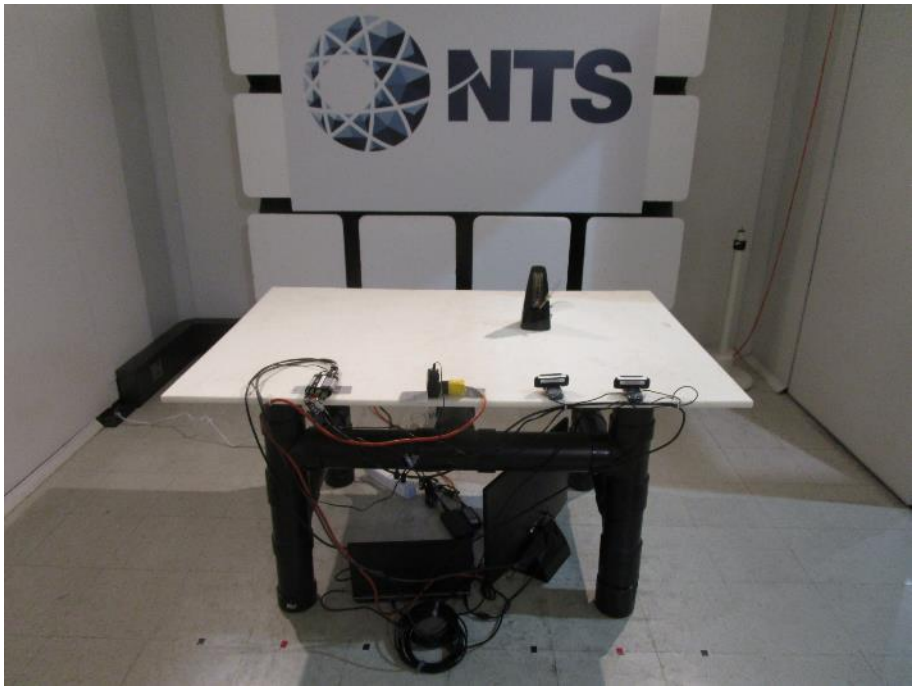


Photo 25: Radiated EM Field – Test setup – Left

Photo 26: Radiated EM Field – Test setup – <3GHz

Photo 27: Radiated EM Field – Test setup – >3GHz

11.2.5 Test Method

Radiated field immunity tests were performed using the procedures of the reference standard.

During the first illuminated face of EUT, radiated immunity test equipment's were verified by monitoring the EM field.

11.3 Electrical Fast Transient Immunity

11.3.1 Test Details

REFERENCE STANDARD	IEC 61000-4-4 (2012)
SPECIFICATIONS	
Test Level	Power Ports: ±1kV I/O Ports: ±0.5kV Communication Ports: ±0.5kV
Repetition Frequency	5kHz
Installation	Table-top equipment
PERFORMANCE CRITERION	B
EUT	
Identification	U-CAM
Voltage Input	230V/50Hz
TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-31
Temperature °C (For Info Only)	23.4°C
Relative humidity % (For Info Only)	29.7%
Atmospheric pressure kPa (For Info Only)	101.4kPa
Operator	Quoc-Nhan Van
Client Witness	No witness

11.3.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
EMC-Partner	Software	GENECS 3.28	N/A	N/A	N/A
EMC-Partner	Transient Test System	TRA3000	1507	18	2023-08-25
Hilo-Test GmbH	EFT Coupling Clamp	EFTC 2012	2204144	12	2023-09-29

Table 29: EFT – Test Equipment

11.3.3 Test Results

Tested Line	Polarity Test level (kV)	Coupling Method	Repetition Frequency (kHz)	Test Duration By Polarity (s)	Comments	Results
L, N	±1	CDN	5	60	Note 1	Pass
Serial & HDMI	±0.5	Capacitive clamp	5	60	Note 1	Pass
LAN & USB 2.0 AUX	±0.5	Capacitive clamp	5	60	Note 1	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.						
Note 1: Self-recoverable degradation – EUT had glitches on the display of the laptop but the camera never stopped working.						

Table 30: EFT – Test Results

11.3.4 Test Data

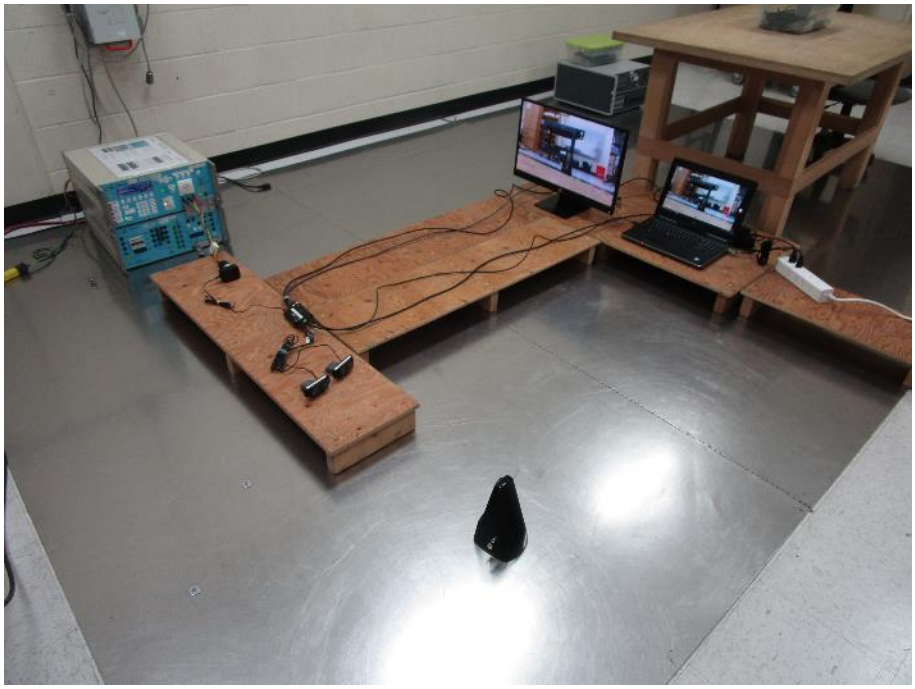


Photo 28: EFT – Test Setup

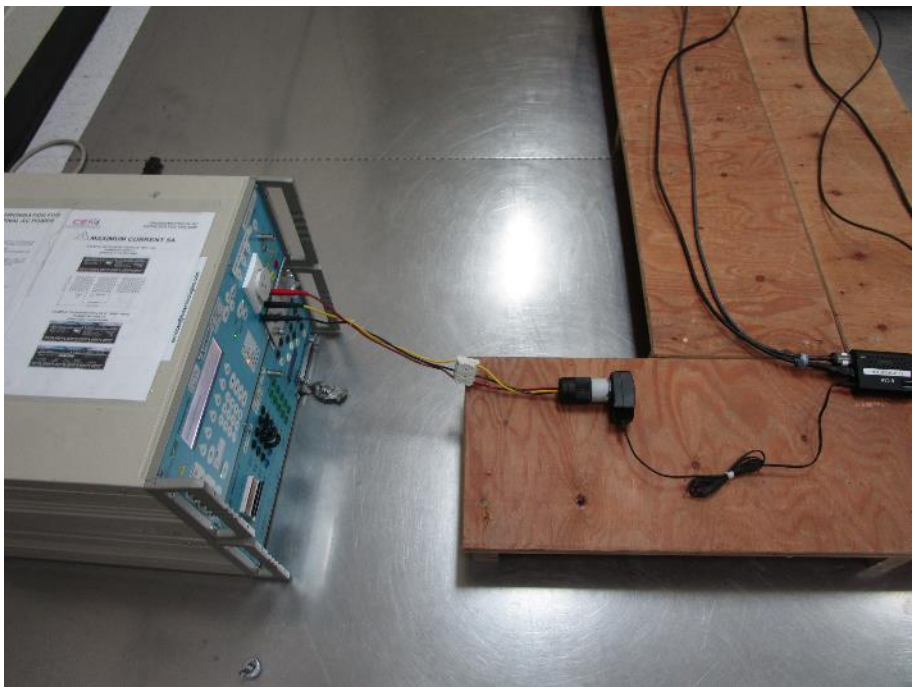


Photo 29: EFT – Test Setup – CDN – Power

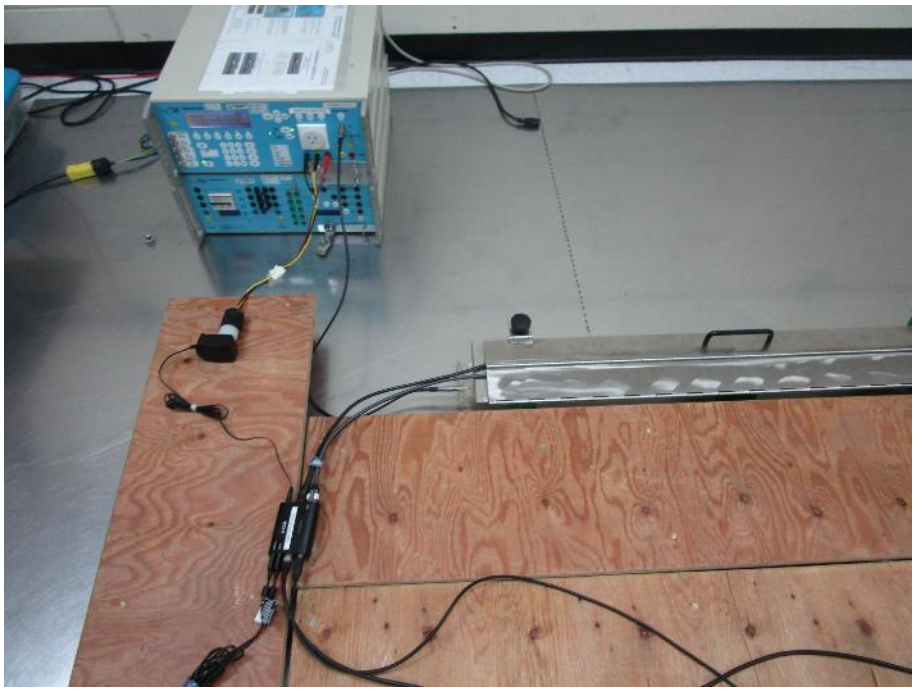


Photo 30: EFT – Test Setup – Capacitive Clamp – Serial & HDMI

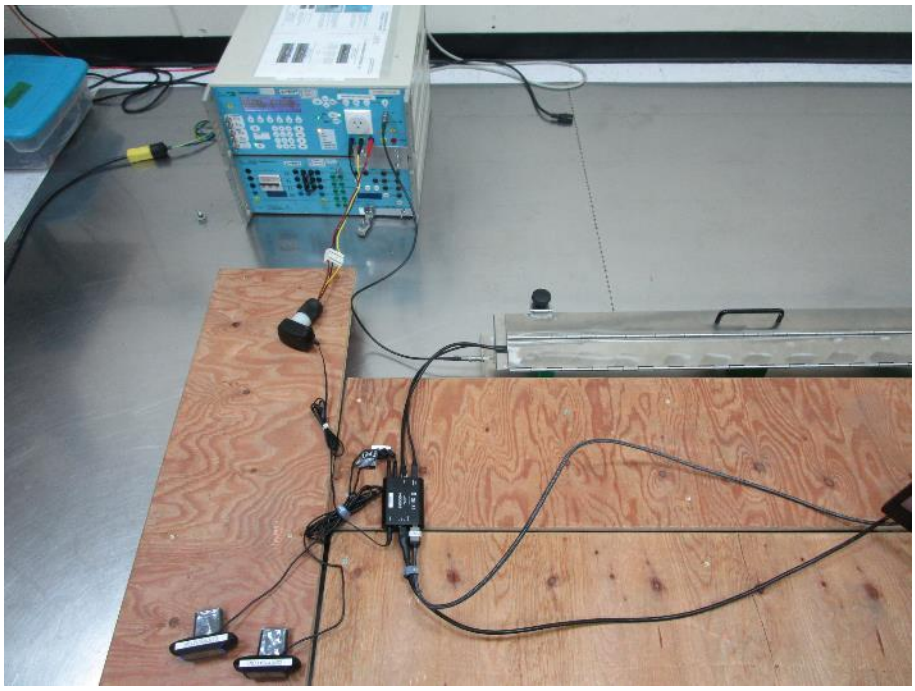


Photo 31: EFT – Test Setup – Capacitive Clamp – LAN & USB 2.0 AUX

11.3.5 Test Method

Electrical fast transient immunity tests were performed using the procedures of the reference standard.

11.4 Surge Immunity

11.4.1 Test Details

REFERENCE STANDARD	IEC 61000-4-5 (2014) A1 (2017)
SPECIFICATIONS	
1.2/50µs Waveform	Open-Circuit Voltage: 1.2µs/50µs Short-Circuit Current: 8µs/20µs
Test level	Power: ±2kV L-PE / ±1kV L-L I/O Ports: N/A Communication Ports: N/A
PERFORMANCE CRITERION	B
EUT	
Identification	U-CAM
Voltage Input	230V/50Hz
TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-31
Temperature °C (For Info Only)	23.4°C
Relative humidity % (For Info Only)	29.7%
Atmospheric pressure kPa (For Info Only)	101.4kPa
Operator	Quoc-Nhan Van
Client Witness	No witness

11.4.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
EMC-Partner	Software	GENECS 3.28	N/A	N/A	N/A
EMC-Partner	Transient Test System	TRA3000	1507	18	2023-08-25
EMC-Partner	Coupling/Decoupling Network	CDN2000-6-32	CDN2000-6-32 0175	VERIF	VERIF

Table 31: Surge – Test Equipment

11.4.3 Test Results

Application		Polarity Test Level (kV)	Additional Impedance	Number	Interval (s)	Phase Shifting (°)	Comments	Results
between	and							
L	PE	±0.5 ±1 ±2	10Ω	5+	30	90	Note 1	Pass
						270	Note 1	Pass
N	PE	±0.5 ±1 ±2	10Ω	5+	30	90	Note 1	Pass
						270	Note 1	Pass
L	N	±0.5 ±1	0Ω	5+	30	90	No event	Pass
						270	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.								
Note 1: EUT without PE, no L vs PE test performed.								

Table 32: 1.2/50µs Surge – Test Results – Power Ports

11.4.4 Test Data

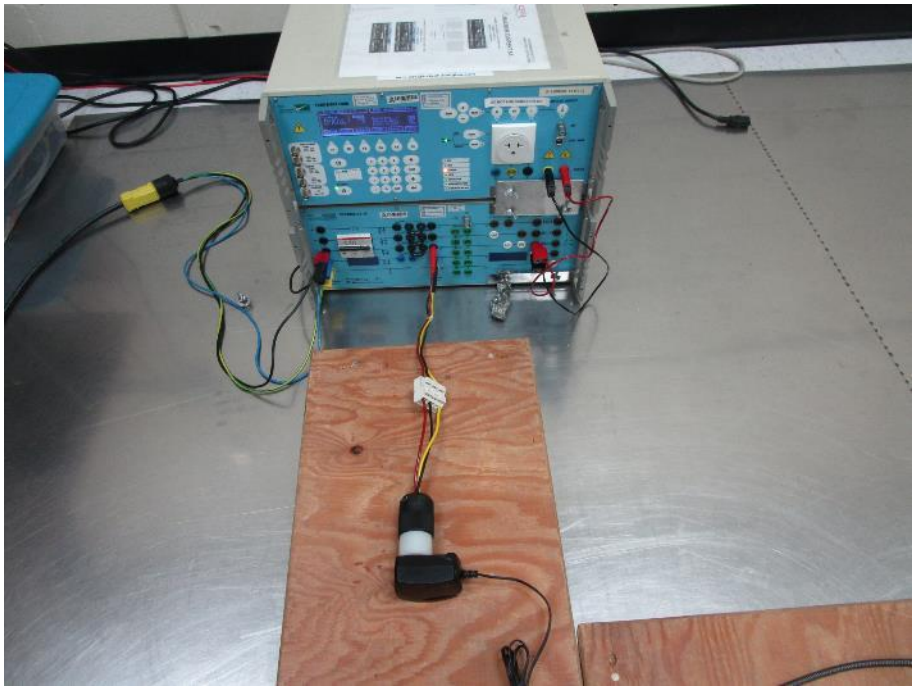


Photo 32: 1.2/50µs Surge – Test Setup – Power Ports

11.4.5 Test Method

Surge immunity tests were performed using the procedures of the reference standard.

11.5 Conducted Disturbances Immunity

11.5.1 Test Details

REFERENCE STANDARD	IEC 61000-4-6 (2013)

SPECIFICATIONS	
Test level	Power: 3Vrms I/O Ports: 3Vrms Communication Ports: 3Vrms
Frequency Range	150kHz-80MHz
Modulation	AM: 80% / 1kHz
Frequency Step	1%
Dwell Time	0.5s

PERFORMANCE CRITERION	A

EUT	
Identification	U-CAM
Voltage Input	230V/50Hz

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-31
Temperature °C (For Info Only)	22.3°C
Relative humidity % (For Info Only)	29.6%
Atmospheric pressure kPa (For Info Only)	101.5kPa
Operator	Quoc-Nhan Van
Client Witness	No witness

11.5.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
NEXIO	Software	BAT-EMC v2022.0.11.0	N/A	N/A	N/A
TESEQ	Conducted Immunity Test Generator	NSG 4070B-75	34302	12	2023-10-13
TESEQ	CDN M2/M3	CDN M016	34597	24	2024-10-05
TESEQ	CDN M2	CDN M216	32740	24	2024-10-05
TESEQ	EM Clamp	KEMZ 801A	45851	12	2022-12-01
TESEQ	RF Current Clamp	MD 4070	33320	24	2024-10-17
Luthi	Attenuation Clamp	FTC 101	5062	NCR	NCR
Pasternack	6dB Fixed Attenuator 150W	PE7AP150-06	LABCEM #0287	VERIF	VERIF
LABCEM	Laboratory 3 - Conducted Voltage Immunity Calibration CDN-M2 - CI Injection Cable	N/A	N/A	12	2023-10-13
LABCEM	Laboratory 3 - Conducted Voltage Immunity Calibration EM Clamp (sn:45851) - CI Injection Cable + CI Monitoring Cable	N/A	N/A	12	2023-10-13

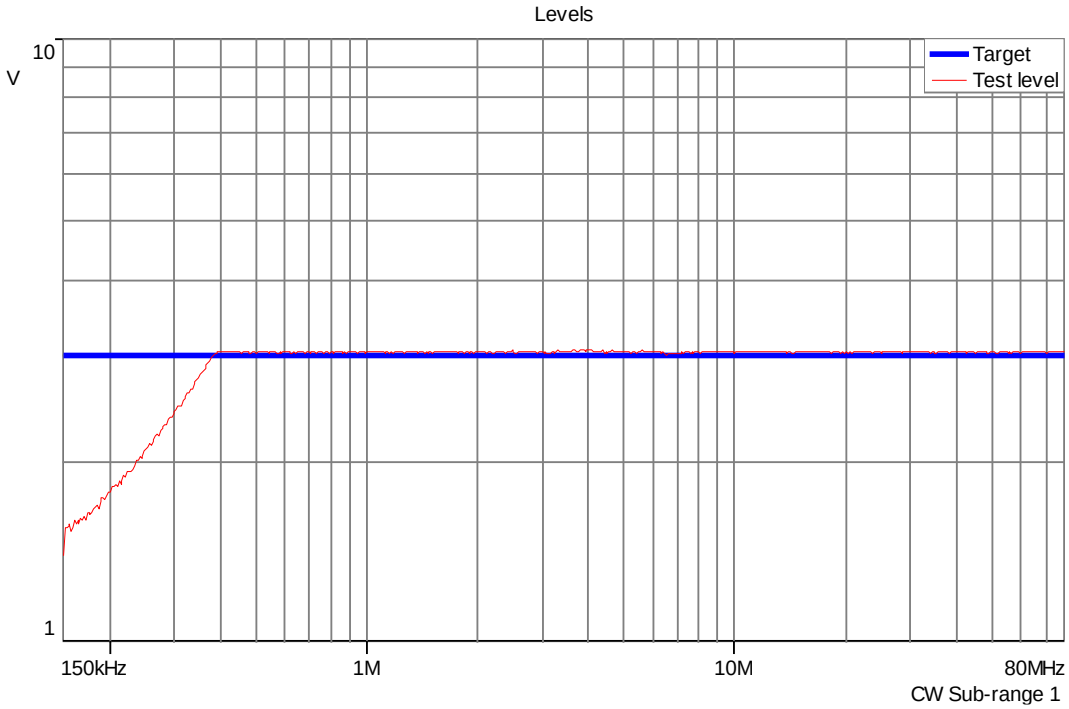
Table 33: Conducted Disturbances – Test Equipment

11.5.3 Test Results

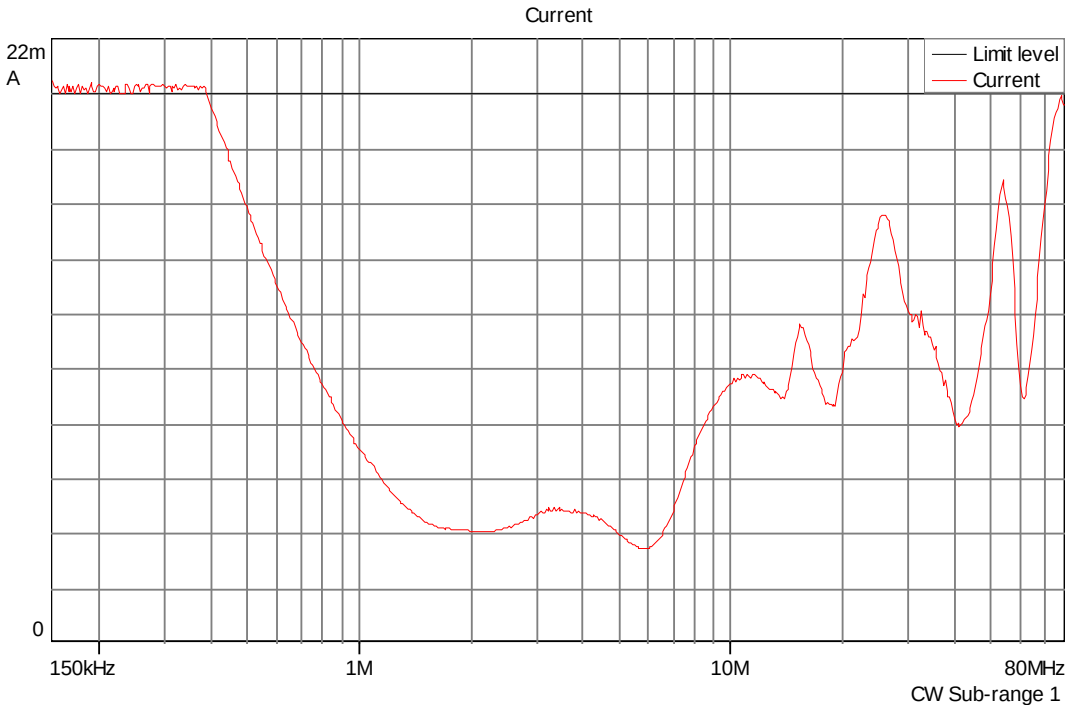
Tested Line	Coupling Method	Frequency (MHz)	Test Level (V)	Modulation	Comments	Results
Power (230V/50Hz)	CDN-M2	0.150 - 80	3	AM / 1kHz	No event	Pass
Serial & HDMI	EM Clamp	0.150 - 80	3	AM / 1kHz	No event	Pass
LAN & USB 2.0 AUX	EM Clamp	0.150 - 80	3	AM / 1kHz	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.						

Table 34: Conducted Disturbances – Test Results

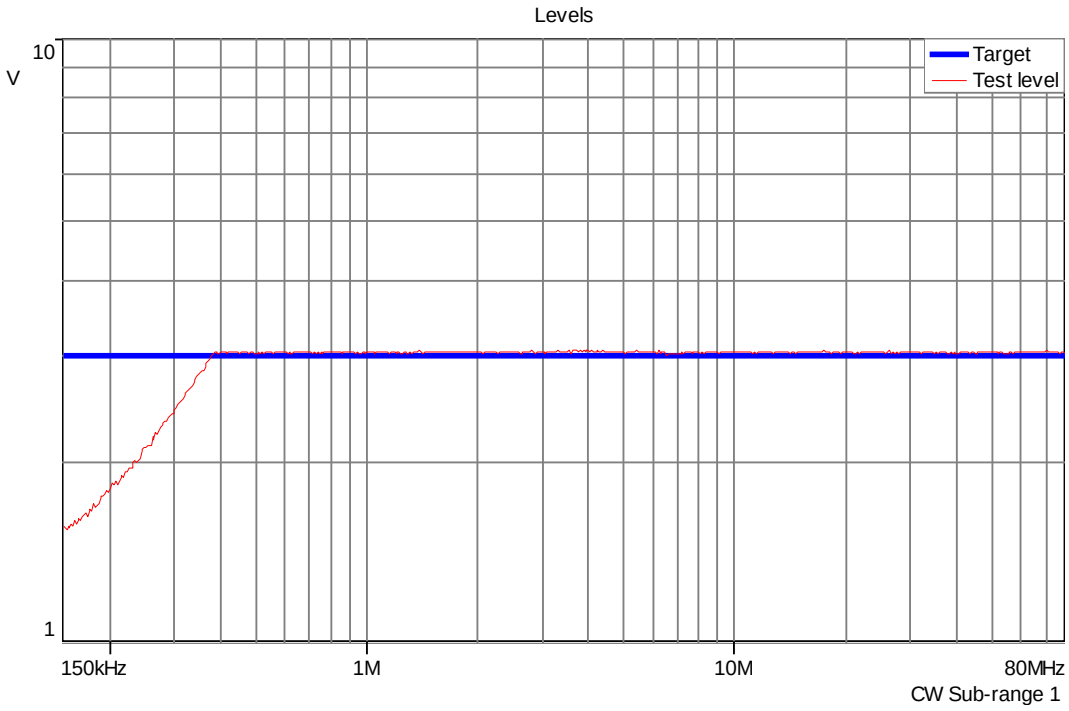
11.5.4 Test Data



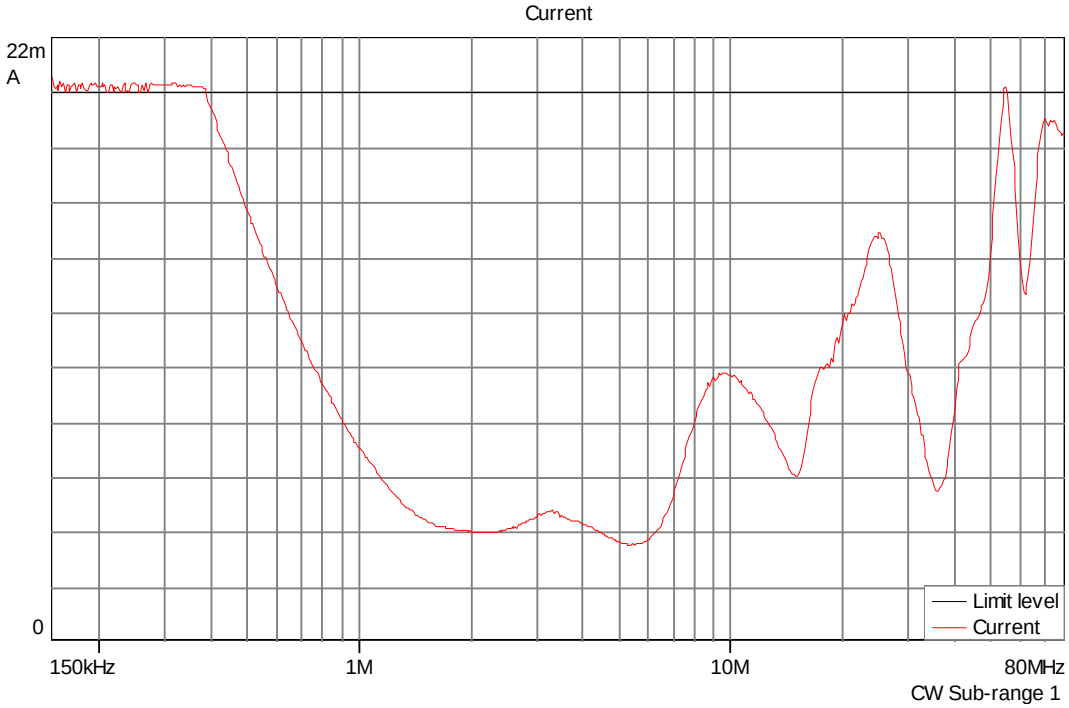
Graph 9: Conducted Disturbances – Voltage Level – EM Clamp – Serial & HDMI



Graph 10: Conducted Disturbances – Current Measurements – EM Clamp – Serial & HDMI



Graph 11: Conducted Disturbances – Voltage Level – EM Clamp – LAN & USB 2.0 AUX



Graph 12: Conducted Disturbances – Current Measurements – EM Clamp – LAN & USB 2.0 AUX

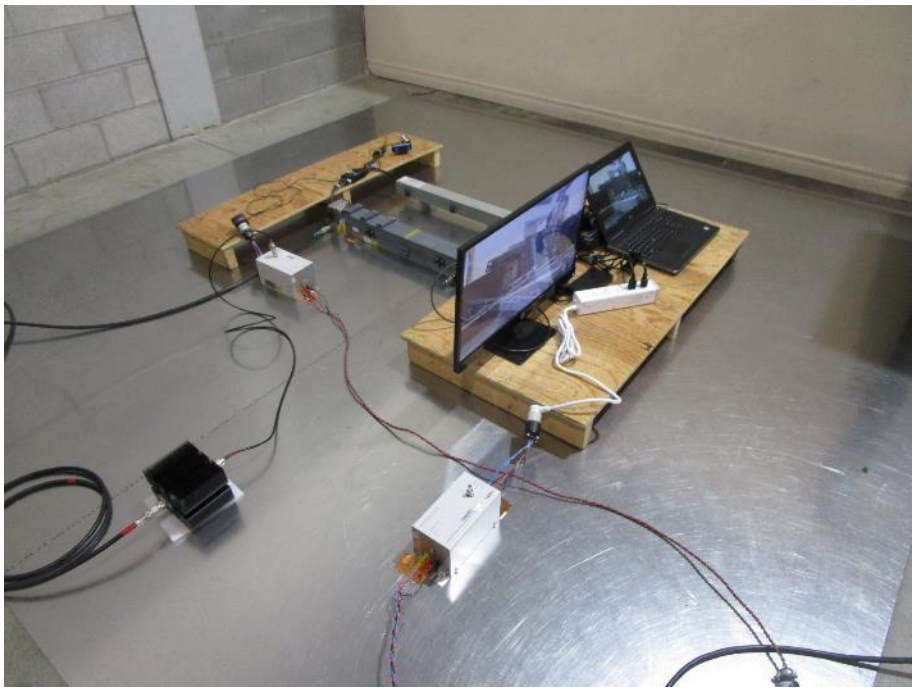


Photo 33: Conducted Disturbances – Test Setup

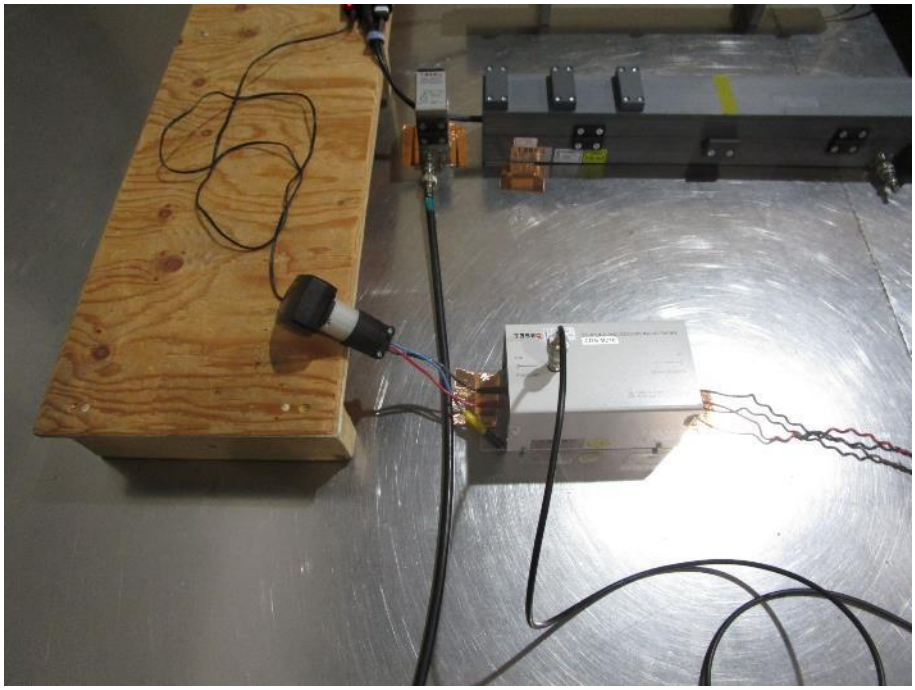


Photo 34: Conducted Disturbances – Test Setup – CDN – Power

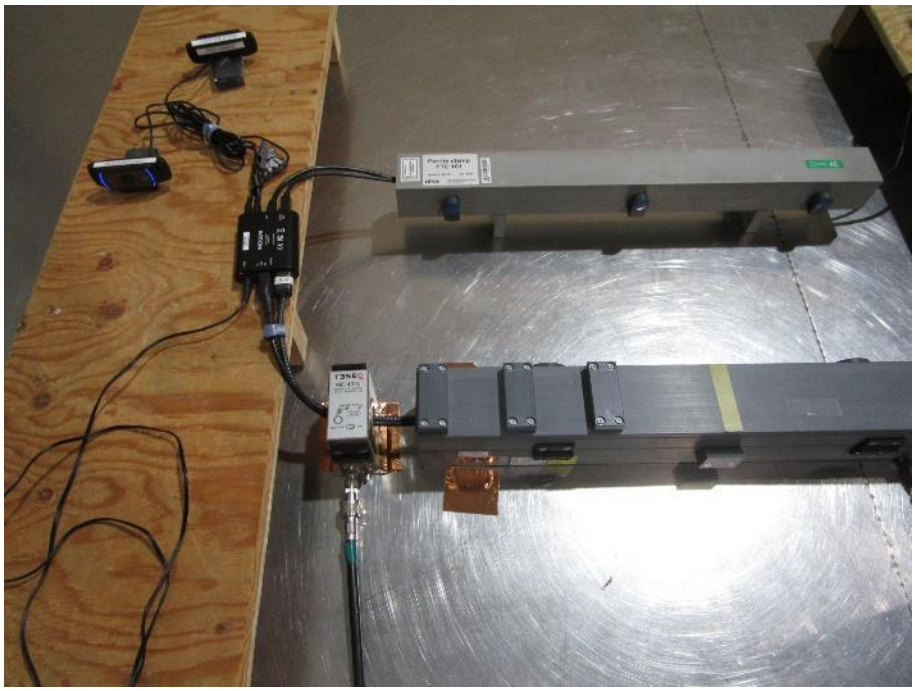


Photo 35: Conducted Disturbances – Test Setup – EM Clamp – Serial & HDMI

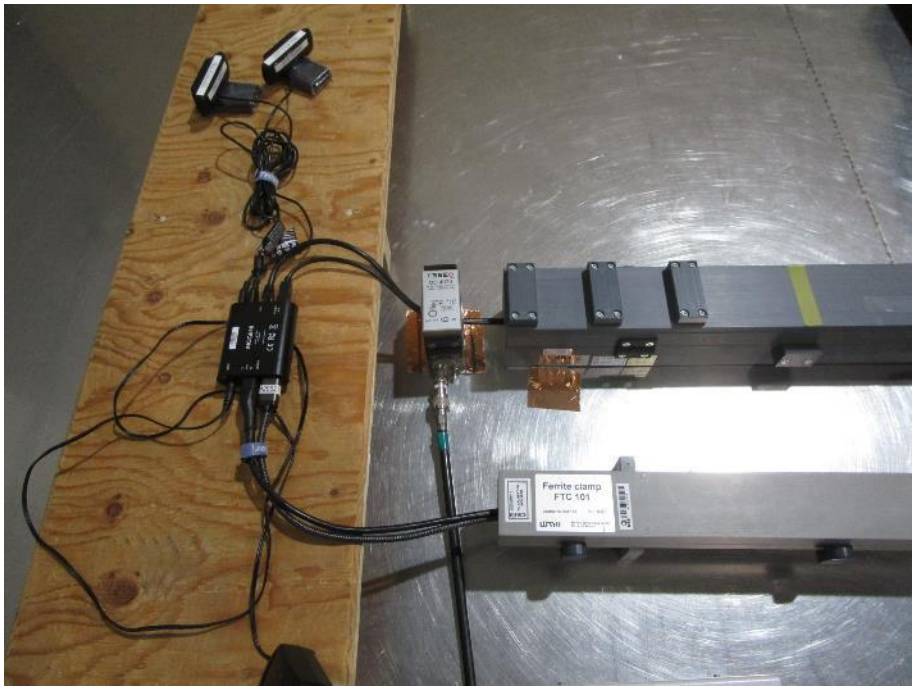


Photo 36: Conducted Disturbances – Test Setup – EM Clamp – LAN & USB 2.0 AUX

11.5.5 Test Method

Conducted Disturbances immunity tests were performed using the procedures of the reference standard.

11.6 Power Frequency Magnetic Field Immunity

11.6.1 Test Details

REFERENCE STANDARD	IEC 61000-4-8 (2009)
SPECIFICATIONS	
Test Level	Continuous field: 1A/m (60s)
Frequency	50Hz / 60Hz
Induction Coil	1m x 1m
PERFORMANCE CRITERION	A
EUT	
Identification	U-CAM
Voltage Input	230V/50Hz 120V/60Hz
TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-27
Temperature °C (For Info Only)	24.1°C
Relative humidity % (For Info Only)	38.4%
Atmospheric pressure kPa (For Info Only)	102.3kPa
Operator	Quoc-Nhan Van
Client Witness	Donatien Crémet (Inogeni)

11.6.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
TESEQ	Software	Win2120 v6.0 BETA	N/A	N/A	N/A
TESEQ	AC-DC Power source	NSG 1007	1232A04499 (NSG 1007)	24	2023-09-14
TESEQ	Magnetic coil interface	INA 2141	1417	NCR	NCR
TESEQ	Magnetic coil	INA 703	1978	VERIF	VERIF
Fluke	Digital Clamp Meter	353	21950072	12	2023-07-25
F.W. Bell	ELF Meter	4190	1237005	24	2024-10-21

Table 35: Magnetic Field – Test Equipment

11.6.3 Test Results

Position	Frequency (Hz)	Test Level (A/m)	Test Duration (s)	Comments	Results
1	50	1	60	No event	Pass
2	50	1	60	No event	Pass
3	50	1	60	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.					

Table 36: Magnetic Field – Test Results – 230V/50Hz

Position	Frequency (Hz)	Test Level (A/m)	Test Duration (s)	Comments	Results
1	60	1	60	No event	Pass
2	60	1	60	No event	Pass
3	60	1	60	No event	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.					

Table 37: Magnetic Field – Test Results – 120V/60Hz

11.6.4 Test Data

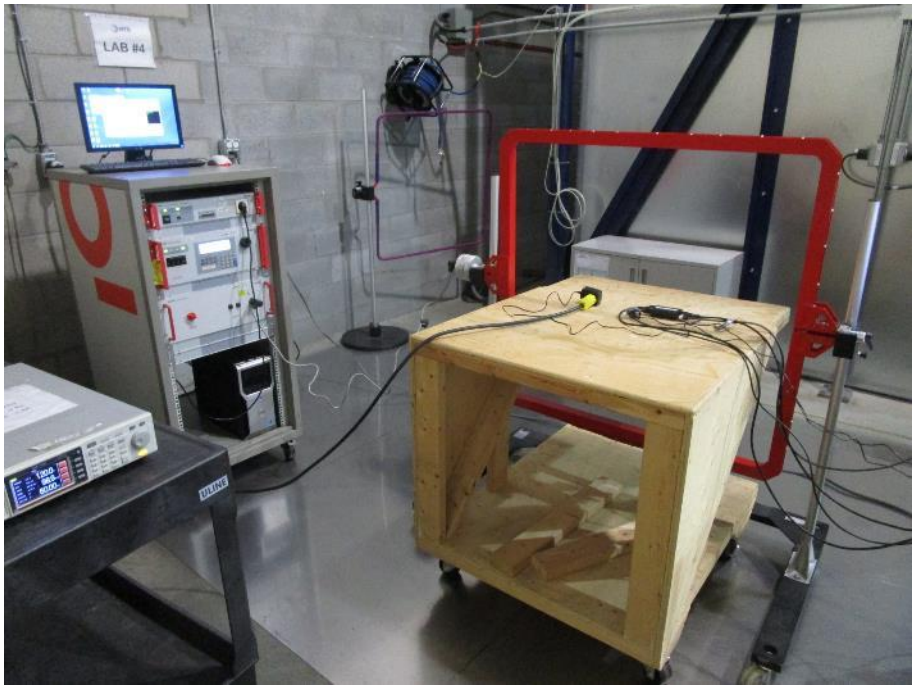


Photo 37: Magnetic Field – Test Setup – Position #1

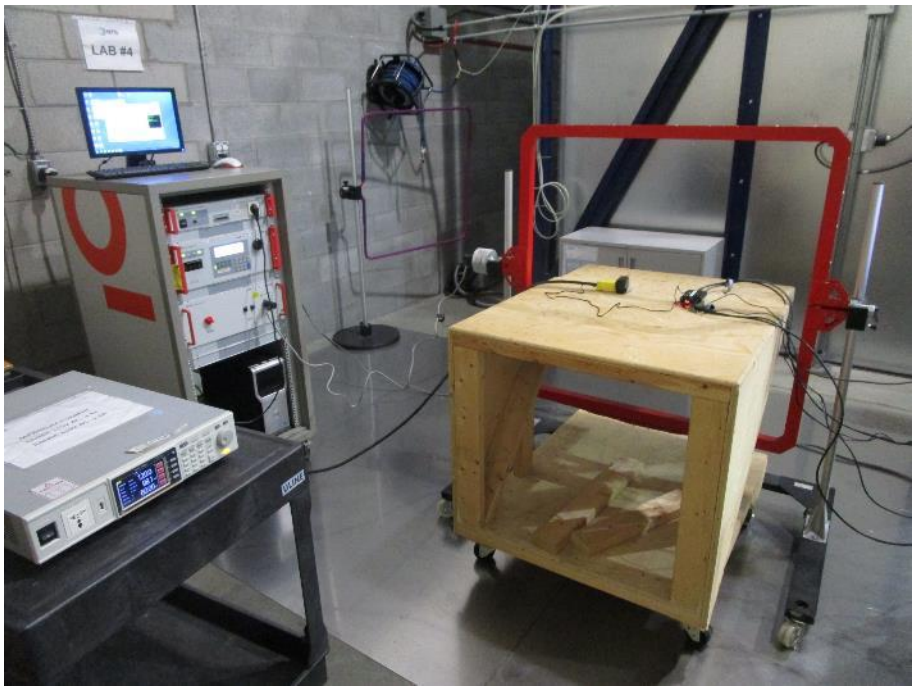


Photo 38: Magnetic Field – Test Setup – Position #2

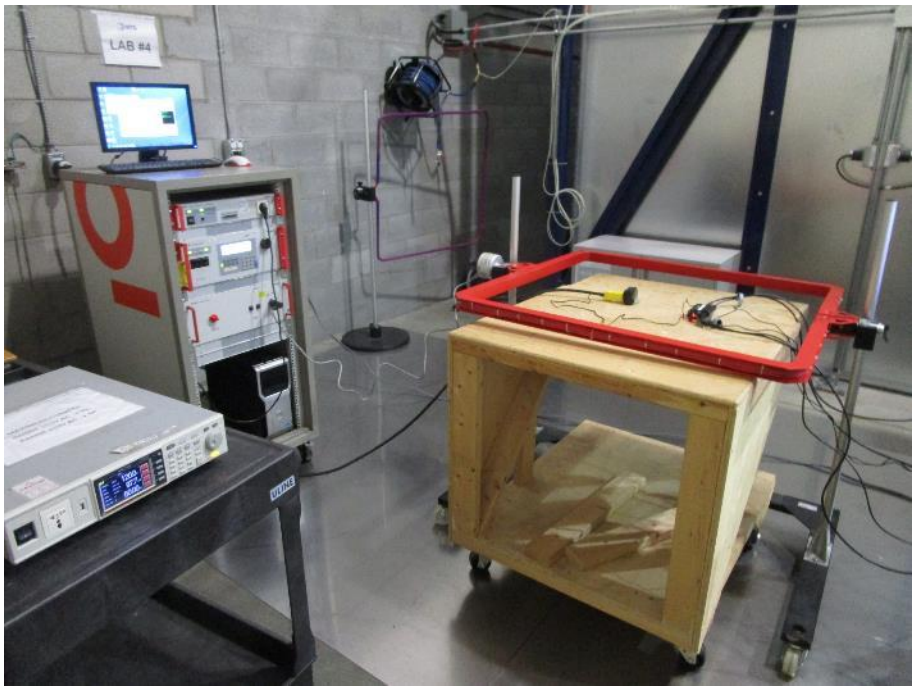


Photo 39: Magnetic Field – Test Setup – Position #3

11.6.5 Test Method

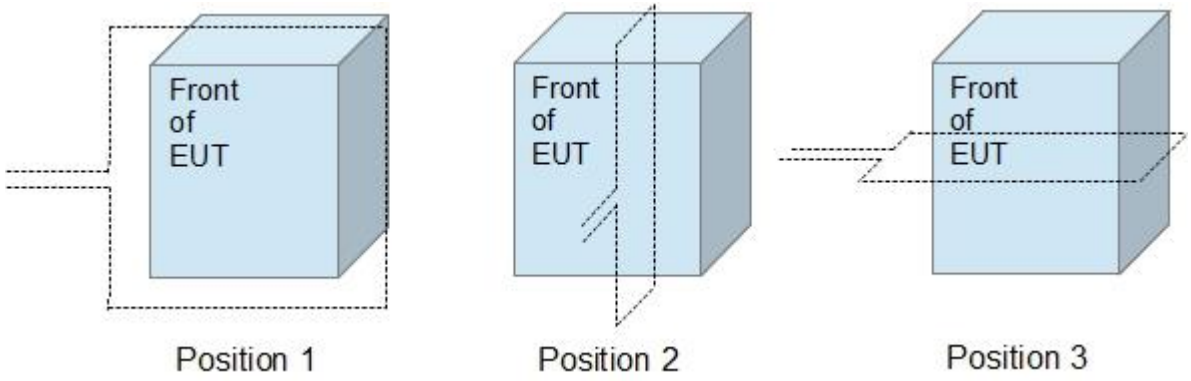


Figure 2: Magnetic Field – Position of Induction Coil

Power frequency field magnetic immunity tests were performed using the procedures of the reference standard.

11.7 Voltage Dips, Short Interruptions and Voltage Variation Immunity on AC input

11.7.1 Test Details

REFERENCE STANDARD	IEC 61000-4-11 (2020)

SPECIFICATIONS	
Voltage Dips	0%Un: ½ cycle 70%Un: 25 cycles 70%Un: 30 cycles
Short Interruptions	0%Un: 250 cycles 0%Un: 300 cycles

PERFORMANCE CRITERION	0%Un / ½ cycle: B 70%Un / 25 cycles: C 70%Un / 30 cycles: C 0%Un / 250 cycles: C 0%Un / 300 cycles: C

EUT	
Identification	U-CAM
Voltage Input	240V/50Hz 100V/60Hz

TEST INFO	
Test Date (yyyy-mm-dd)	2022-10-31
Temperature °C (For Info Only)	23.4°C
Relative humidity % (For Info Only)	29.7%
Atmospheric pressure kPa (For Info Only)	101.4kPa
Operator	Quoc-Nhan Van
Client Witness	No witness

11.7.2 Test Equipment

Manufacturer	Description	Model	Serial No	Calibration Cycle (month)	Next Calibration (y-m-d)
EMC-Partner	Software	GENECS 3.28	N/A	N/A	N/A
EMC-Partner	Transient Test System	TRA3000	1507	18	2023-08-25

Table 38: Voltage Variations on AC Input – Test Equipment

11.7.3 Test Results

Tested line	Test Level (% Un)	Duration (Cycle)	Number	Interval (s)	Phase Shifting (°)	Comments	Results
Power (240V/50Hz)	0	1/2	3	10	0	No event	Pass
	70	25	3	10	0	No event	Pass
	0	250	3	10	0	Note 1	Pass
Power (100V/60Hz)	0	1/2	3	10	0	No event	Pass
	70	30	3	10	0	No event	Pass
	0	300	3	10	0	Note 1	Pass
The decision rule used to determine the test results is based on the limits stated in the test standard and the functional requirement provided by the client. See section 5 for further detail.							
Note 1: Self-recoverable degradation – EUT turned off during the interruptions and turned back on after the disturbances.							

Table 39: Voltage Variations on AC Input – Test Results

11.7.4 Test Data

Photo 40: Voltage Variations on AC Input – Test Setup

11.7.5 Test Method

Voltage dips, short interruptions and voltage variation on AC Input immunity tests were performed using the procedures of the reference standard.

APPENDIX A
CONDUCTED EMISSIONS

CONDUCTED EMISSIONS - VOLTAGE

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

CONDUCTED EMISSIONS MEASUREMENT: *OP0621258_EN55032-LISN_Phase_#05*

Test Location: Anechoic chamber
Test Date: 2022-10-27 11:26:54 AM
Operator(s): Quoc-Nhan Van
Test Standard: EN55032 Class A
Power: 230V/50Hz
Tested Line: Phase
Operating Mode:
Comments:

TEST PARAMETERS		TEST EQUIPMENT USED
Frequency Range 150 kHz - 30 MHz	Bandwidth 9 kHz	LF#1+LF#2 LISN : PMM L2-16B#20801-red Rohde & Schwarz : ESW44

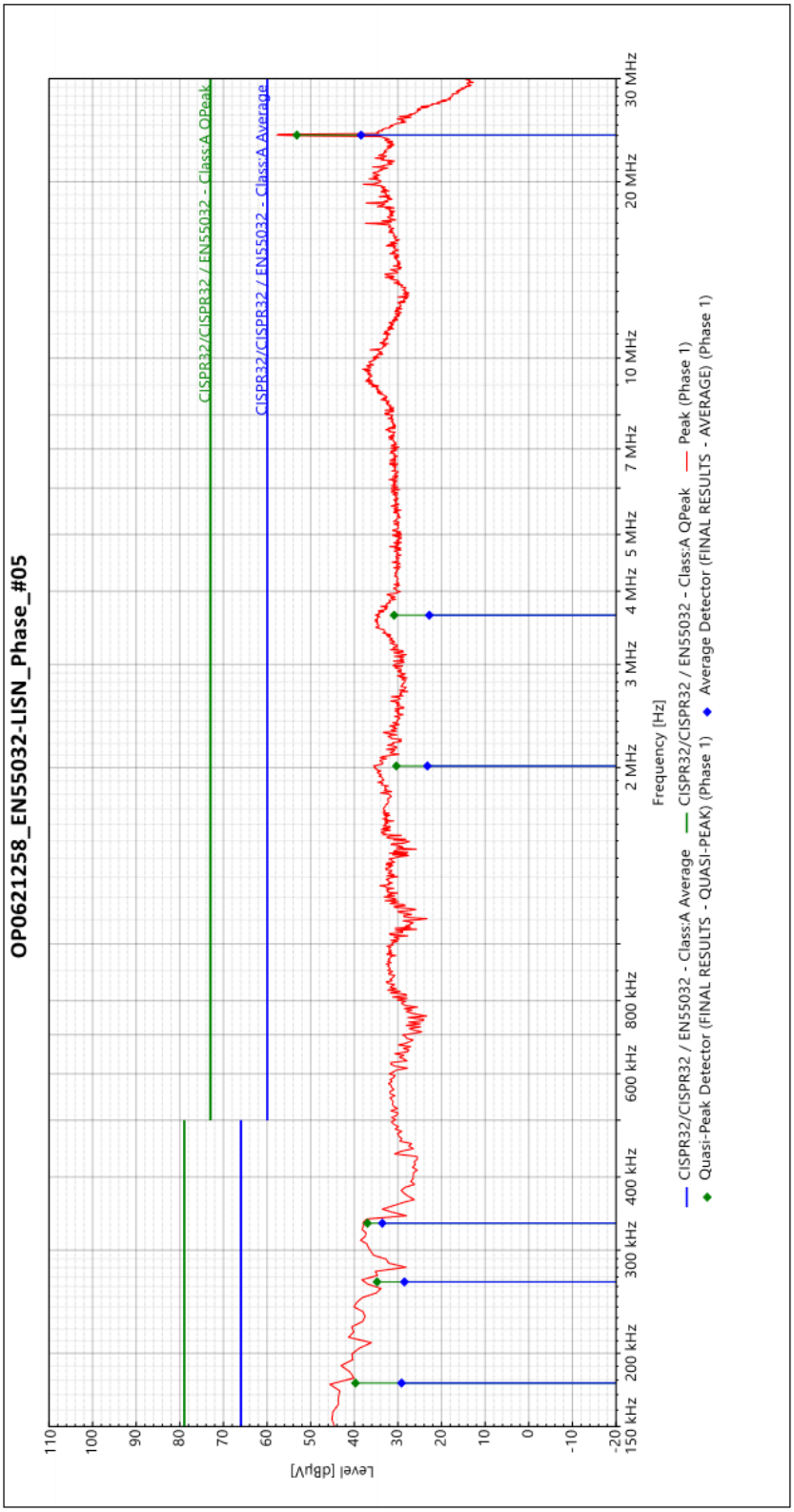
FINAL RESULTS - QUASI-PEAK

Frequency	SR #	Quasi-Peak Detector (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	Correction (dB)
177.934 kHz	1	39.742	79	39.258	0.131
264.806 kHz	1	34.779	79	44.221	0.132
333.521 kHz	1	36.979	79	42.021	0.132
2.01251 MHz	1	30.359	73	42.641	0.169
3.640405 MHz	1	30.881	73	42.119	0.201
24.034245 MHz	1	53.172	73	19.828	0.811

FINAL RESULTS - AVERAGE

Frequency	SR #	Average Detector (dBµV)	Average Limit (dBµV)	Margin (dB)	Correction (dB)
177.934 kHz	1	29.155	66	36.845	0.131
264.806 kHz	1	28.513	66	37.487	0.132
333.521 kHz	1	33.575	66	32.425	0.132
2.01251 MHz	1	23.231	60	36.769	0.169
3.640405 MHz	1	22.814	60	37.186	0.201
24.034245 MHz	1	38.44	60	21.56	0.811

CONDUCTED EMISSIONS - VOLTAGE
page 2 / 2



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CONDUCTED EMISSIONS - VOLTAGE

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

CONDUCTED EMISSIONS MEASUREMENT: *OP0621258_EN55032-LISN_Neutral_#06*

Test Location: Anechoic chamber
Test Date: 2022-10-27 11:41:45 AM
Operator(s): Quoc-Nhan Van
Test Standard: EN55032 Class A
Power: 230V/50Hz
Tested Line: Neutral
Operating Mode:
Comments:

TEST PARAMETERS		TEST EQUIPMENT USED
Frequency Range 150 kHz - 30 MHz	Bandwidth 9 kHz	LF#1+LF#2 LISN : PMM L2-16B#20801-red Rohde & Schwarz : ESW44

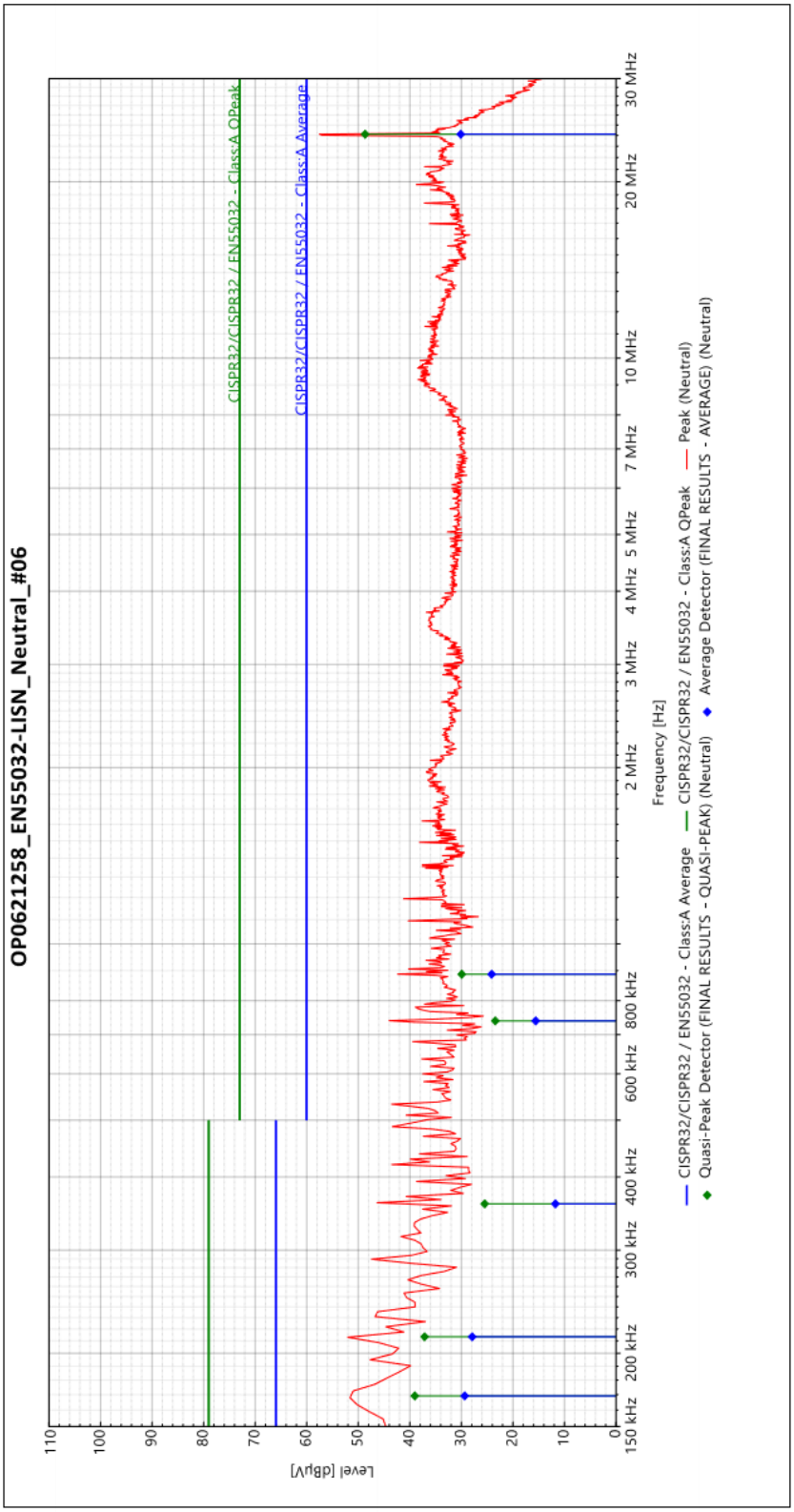
FINAL RESULTS - QUASI-PEAK

Frequency	SR #	Quasi-Peak Detector (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	Correction (dB)
169.143 kHz	1	39.026	79	39.974	0.341
213.412 kHz	1	37.126	79	41.874	0.341
359.877 kHz	1	25.473	79	53.527	0.333
738.779 kHz	1	23.424	73	49.576	0.366
887.466 kHz	1	29.917	73	43.083	0.368
24.113181 MHz	1	48.67	73	24.33	1.072

FINAL RESULTS - AVERAGE

Frequency	SR #	Average Detector (dBµV)	Average Limit (dBµV)	Margin (dB)	Correction (dB)
169.143 kHz	1	29.345	66	36.655	0.341
213.412 kHz	1	27.899	66	38.101	0.341
359.877 kHz	1	11.764	66	54.236	0.333
738.779 kHz	1	15.578	60	44.422	0.366
887.466 kHz	1	24.116	60	35.884	0.368
24.113181 MHz	1	30.121	60	29.879	1.072

CONDUCTED EMISSIONS - VOLTAGE
page 2 / 2



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CONDUCTED EMISSIONS - VOLTAGE

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

CONDUCTED EMISSIONS MEASUREMENT: *OP0621258_FCC-LISN_Phase_#07*

Test Location: Anechoic chamber
Test Date: 2022-10-27 11:55:50 AM
Operator(s): Quoc-Nhan Van
Test Standard: FCC part 15 subpart B / ICES-003 / Class A
Power: 120V/60Hz
Tested Line: Phase
Operating Mode:
Comments:

TEST PARAMETERS		TEST EQUIPMENT USED
Frequency Range 150 kHz - 30 MHz	Bandwidth 9 kHz	LF#1+LF#2 LISN : PMM L2-16B#20801-red Rohde & Schwarz : ESW44

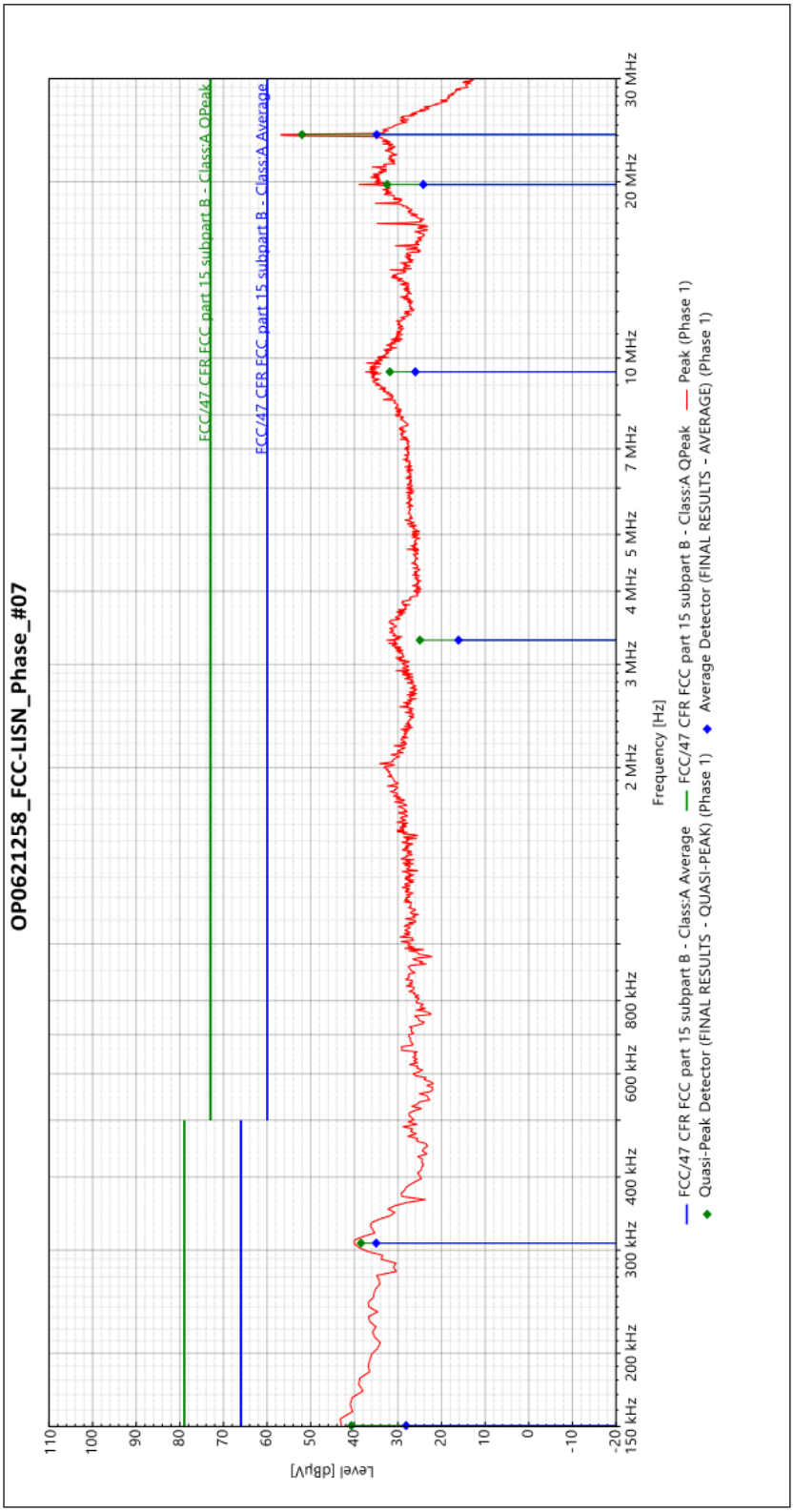
FINAL RESULTS - QUASI-PEAK

Frequency	SR #	Quasi-Peak Detector (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	Correction (dB)
150.512 kHz	1	40.666	79	38.334	0.131
308.368 kHz	1	38.459	79	40.541	0.132
3.300709 MHz	1	24.946	73	48.054	0.194
9.476018 MHz	1	31.85	73	41.15	0.335
19.78993 MHz	1	32.466	73	40.534	0.662
24.083078 MHz	1	51.988	73	21.012	0.813

FINAL RESULTS - AVERAGE

Frequency	SR #	Average Detector (dBµV)	Average Limit (dBµV)	Margin (dB)	Correction (dB)
150.512 kHz	1	28.133	66	37.867	0.131
308.368 kHz	1	34.985	66	31.015	0.132
3.300709 MHz	1	16.109	60	43.891	0.194
9.476018 MHz	1	25.999	60	34.001	0.335
19.78993 MHz	1	24.169	60	35.831	0.662
24.083078 MHz	1	34.863	60	25.137	0.813

CONDUCTED EMISSIONS - VOLTAGE
page 2 / 2



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CONDUCTED EMISSIONS - VOLTAGE

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

CONDUCTED EMISSIONS MEASUREMENT: *OP0621258_FCC-LISN_Neutral_#08*

Test Location: Anechoic chamber
Test Date: 2022-10-27 12:32:09 PM
Operator(s): Quoc-Nhan Van
Test Standard: FCC part 15 subpart B / ICES-003 / Class A
Power: 120V/60Hz
Tested Line: Neutral
Operating Mode:
Comments:

TEST PARAMETERS		TEST EQUIPMENT USED
Frequency Range 150 kHz - 30 MHz	Bandwidth 9 kHz	LF#1+LF#2 LISN : PMM L2-16B#20801-red Rohde & Schwarz : ESW44

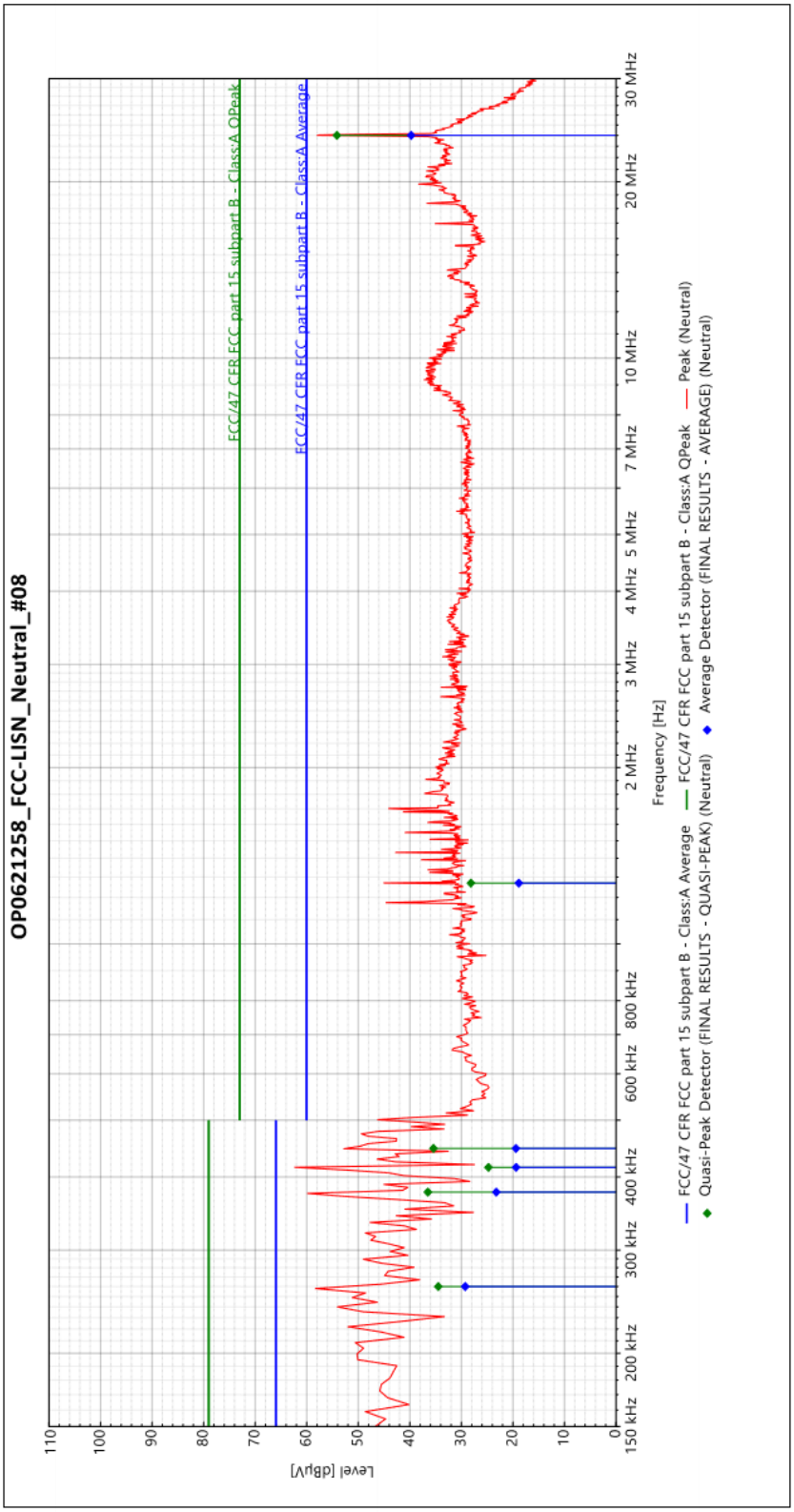
FINAL RESULTS - QUASI-PEAK

Frequency	SR #	Quasi-Peak Detector (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	Correction (dB)
260.023 kHz	1	34.482	79	44.518	0.342
376.897 kHz	1	36.502	79	42.498	0.343
415.373 kHz	1	24.743	79	54.257	0.343
447.522 kHz	1	35.41	79	43.59	0.35
1.269779 MHz	1	28.138	73	44.862	0.382
24.007031 MHz	1	54.141	73	18.859	1.069

FINAL RESULTS - AVERAGE

Frequency	SR #	Average Detector (dBµV)	Average Limit (dBµV)	Margin (dB)	Correction (dB)
260.023 kHz	1	29.25	66	36.75	0.342
376.897 kHz	1	23.226	66	42.774	0.343
415.373 kHz	1	19.376	66	46.624	0.343
447.522 kHz	1	19.416	66	46.584	0.35
1.269779 MHz	1	18.85	60	41.15	0.382
24.007031 MHz	1	39.745	60	20.255	1.069

CONDUCTED EMISSIONS - VOLTAGE
page 2 / 2



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CONDUCTED EMISSIONS - VOLTAGE

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

CONDUCTED EMISSIONS MEASUREMENT: *OP0621258_EN55032-ISN_#04*

Test Location: Anechoic chamber
Test Date: 2022-10-27 11:03:59 AM
Operator(s): Quoc-Nhan Van
Test Standard: EN55032 Class A
Power: 230V/50Hz
Tested Line: Ethernet
Operating Mode:
Comments:

TEST PARAMETERS		TEST EQUIPMENT USED
Frequency Range 150 kHz - 30 MHz	Bandwidth 9 kHz	ISN : ST08A LF#1+LF#2 Rohde & Schwarz : ESW44

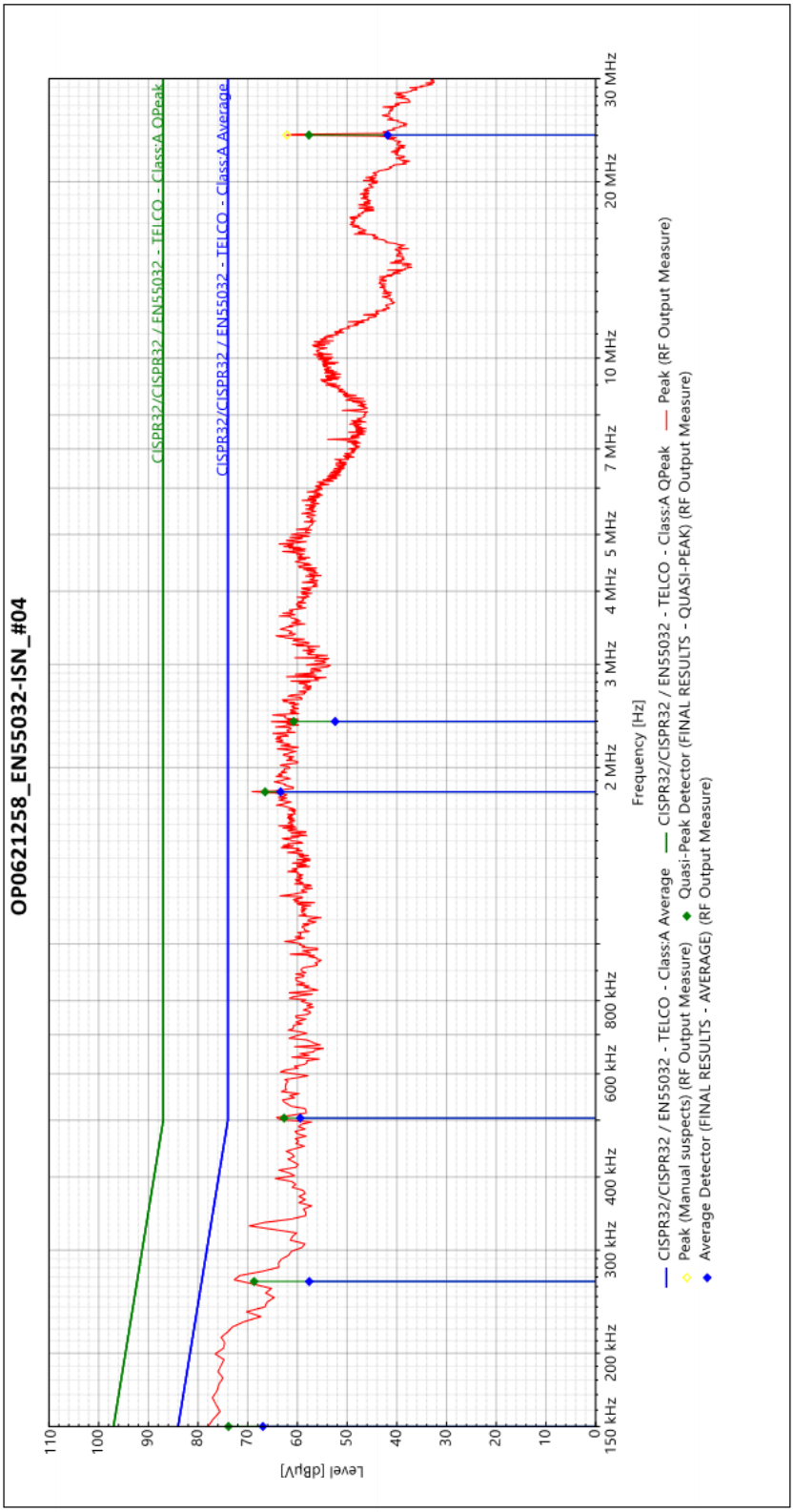
FINAL RESULTS - QUASI-PEAK

Frequency	SR #	Quasi-Peak Detector (dBµV)	Quasi-Peak Limit (dBµV)	Margin (dB)	Correction (dB)
150.023 kHz	1	73.881	97	23.119	9.76
265.24 kHz	1	68.716	92.211	23.494	9.722
504.185 kHz	1	62.685	87	24.315	9.703
1.81763 MHz	1	66.519	87	20.481	9.671
2.397171 MHz	1	60.746	87	26.254	9.673
24.034977 MHz	1	57.682	87	29.318	10.189

FINAL RESULTS - AVERAGE

Frequency	SR #	Average Detector (dBµV)	Average Limit (dBµV)	Margin (dB)	Correction (dB)
150.023 kHz	1	66.952	84	17.048	9.76
265.24 kHz	1	57.616	79.211	21.594	9.722
504.185 kHz	1	59.43	74	14.57	9.703
1.81763 MHz	1	63.388	74	10.612	9.671
2.397171 MHz	1	52.407	74	21.593	9.673
24.034977 MHz	1	41.841	74	32.159	10.189

CONDUCTED EMISSIONS - VOLTAGE
page 2 / 2



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APPENDIX B
RADIATED EMISSIONS

RADIATED EMISSIONS – ELECTRIC FIELD

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

RADIATED EMISSIONS MEASUREMENT*: OP0621258_EN55032_FCC-Bilog_#01*

Test Location: Anechoic chamber
Test Date: 2022-10-27 9:22:11 AM
Operator(s): Quoc-Nhan Van
Test Standard: EN55032 / FCC part 15 subpart B / ICES-003 / Class A
Power: 230V/50Hz
Operating Mode:
Comments:

TEST PARAMETERS

Frequency Range	Bandwidth	Test Distance
30 MHz - 1 GHz	120 kHz	3 m

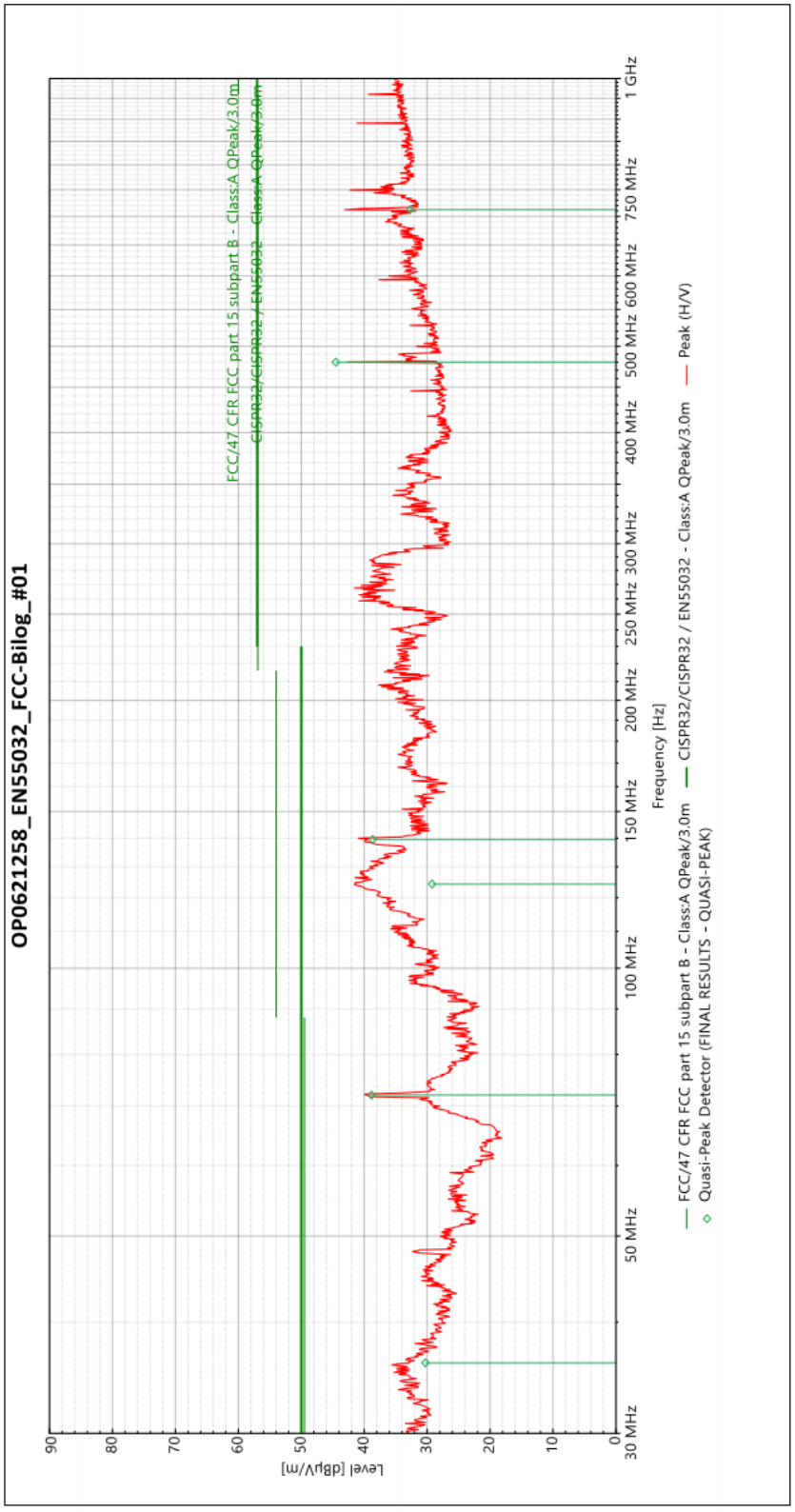
TEST EQUIPMENT USED

Antenna Mast : SUNOL
Bilog Antenna + 6dB : Schaffner CBL6112D#22617
HF#1 + HF#2
Rohde & Schwarz : ESW44
Turntable : SUNOL

FINAL RESULTS - QUASI-PEAK

Frequency	SR #	Quasi-Peak Detector (dBµV/m)	Quasi-Peak Limit (dBµV/m)	Margin (dB)	Polarization	Azimuth (degree)	Height (m)	Correction (dB)
36.008446 MHz	1	30.272	50	19.728	Vertical	228.25	1.464	21.795
72.016365 MHz	1	38.818	50	11.182	Vertical	105.25	1.579	13.141
124.331195 MHz	1	29.212	50	20.788	Vertical	111.75	1	19.067
139.553969 MHz	1	38.64	50	11.36	Vertical	157.5	1	18.195
479.996732 MHz	1	44.499	57	12.501	Horizontal	184.5	1	25.33
712.287105 MHz	1	32.686	57	24.314	Vertical	296.75	1.109	27.62

RADIATED EMISSIONS – ELECTRIC FIELD
page 2 / 2



PR / OP0621258_EN55032_FCC-Bilog_#01.docx

RADIATED EMISSIONS – ELECTRIC FIELD
page 1 / 2

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

RADIATED EMISSIONS MEASUREMENT*: OP0621258_EN55032_FCC-Horn_#02*

Test Location: Anechoic chamber
Test Date: 2022-10-27 9:49:54 AM
Operator(s): Quoc-Nhan Van
Test Standard: EN55032 / FCC part 15 subpart B / ICES-003 / Class A
Power: 230V/50Hz
Operating Mode:
Comments:

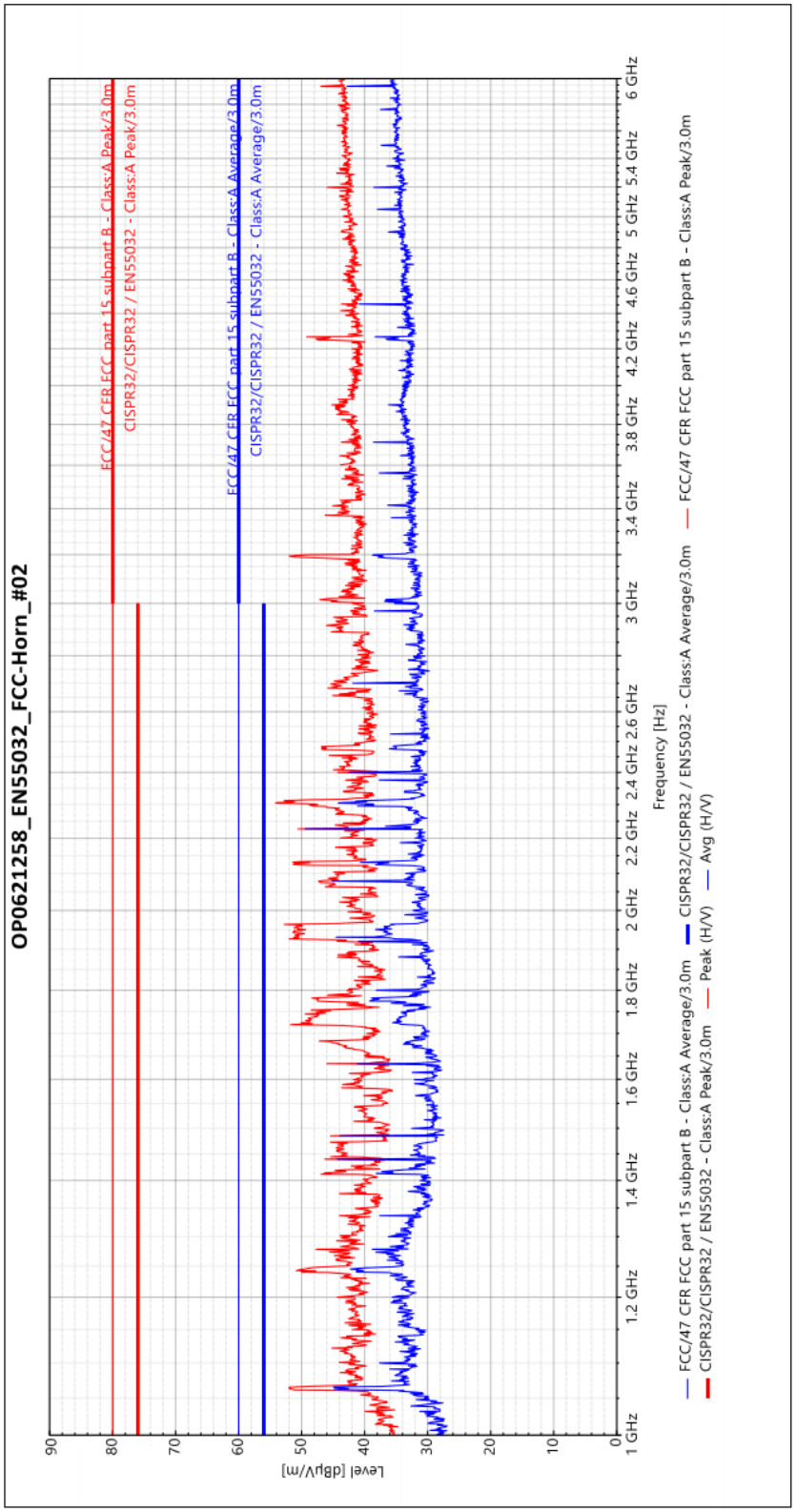
TEST PARAMETERS

Frequency Range	Bandwidth	Test Distance
1 GHz - 3.6 GHz	1 MHz	3 m
3.6 GHz - 6 GHz	1 MHz	3 m

TEST EQUIPMENT USED

Antenna Mast : SUNOL
HF#1+HF#2 + HF-LNA + 3dB
Horn Antenna : TESEQ BHA9118
Rohde & Schwarz : ESW44
Turntable : SUNOL

RADIATED EMISSIONS – ELECTRIC FIELD
page 2 / 2



PR / OP0621258_EN55032_FCC-Horn_#02.docx

RADIATED EMISSIONS – ELECTRIC FIELD

Project: *OP0621258* ***Customer:*** *Inogeni*

DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Equipment: U-CAM
Manufacturer: Inogeni
Hardware Version:
Software Version:

RADIATED EMISSIONS MEASUREMENT*: OP0621258_FCC-Horn_#03*

Test Location: Anechoic chamber
Test Date: 2022-10-27 10:20:39 AM
Operator(s): Quoc-Nhan Van
Test Standard: FCC part 15 subpart B / ICES-003 / Class A
Power: 120V/60Hz
Operating Mode:
Comments:

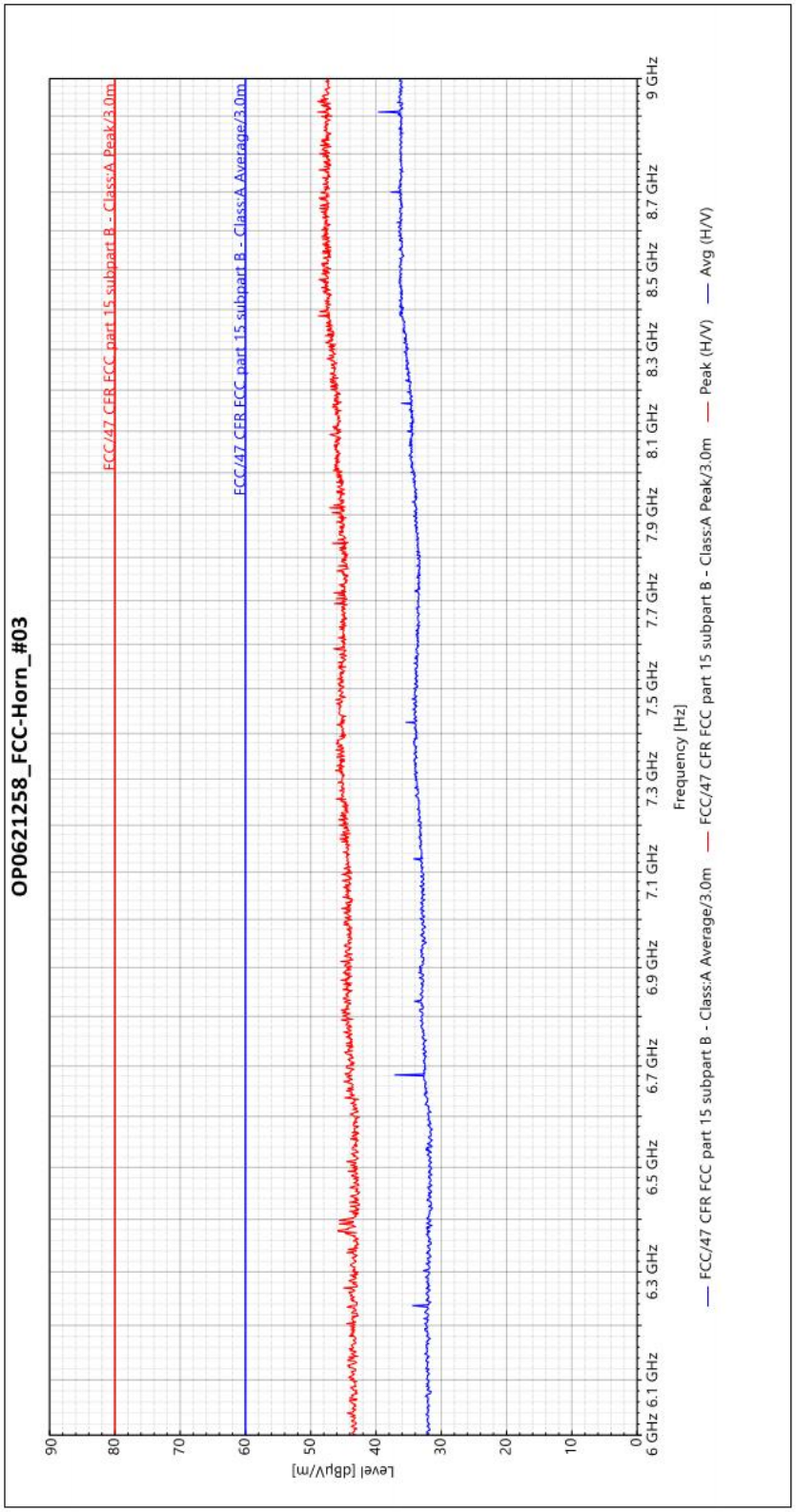
TEST PARAMETERS

Frequency Range	Bandwidth	Test Distance
6 GHz - 9 GHz	1 MHz	3 m

TEST EQUIPMENT USED

Antenna Mast : SUNOL
HF#1+HF#2 + HF-LNA + 3dB
Horn Antenna : TESEQ BHA9118
Rohde & Schwarz : ESW44
Turntable : SUNOL

RADIATED EMISSIONS – ELECTRIC FIELD
page 2 / 2



PR / OP0621258_FCC-Horn_#03.docx

APPENDIX C
HARMONIC CURRENT EMISSIONS LIMITS

Teseq Profline
4542 Luterbach, Switzerland

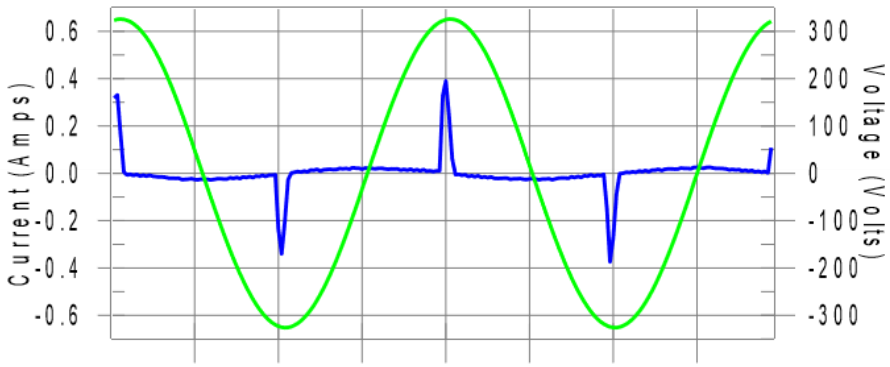
10/31/2022
2:52 PM

Harmonics – Class-A per Ed. 4.0 (2014)(Run time)

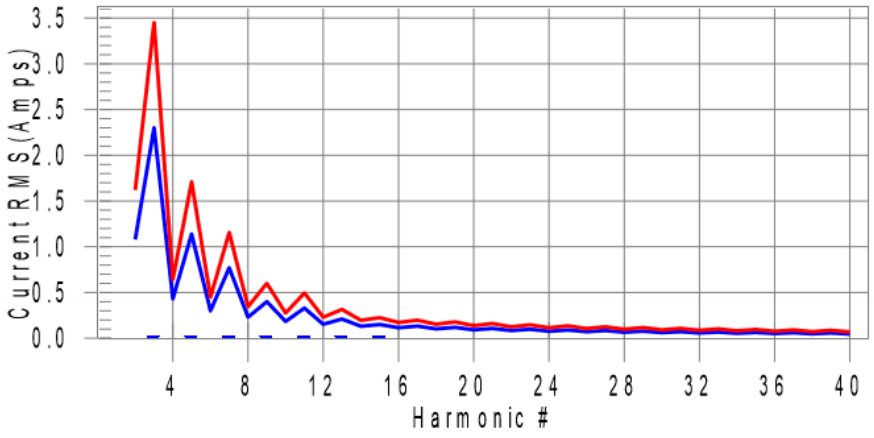
EUT: U-CAM **Tested by: Quoc-Nhan Van**
Test category: Class-A per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 10/27/2022 **Start time: 2:26:30 PM** **End time: 2:28:51 PM**
Test duration (min): 2 **Data file name: H-000156.cts_data**
Comment: Harmonics Fluctuations
Customer: Inogeni

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonic was #19 with 8.1% of the limit.**

Teseq Profline
4542 Luterbach, Switzerland

10/31/2022
2:52 PM

Current Test Result Summary (Run time)

EUT: U-CAM **Tested by: Quoc-Nhan Van**
Test category: Class-A per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 10/27/2022 **Start time: 2:26:30 PM** **End time: 2:28:51 PM**
Test duration (min): 2 **Data file name: H-000156.cts_data**
Comment: Harmonics Fluctuations
Customer: Inogeni

Test Result: Pass **Source qualification: Normal**
THC(A): 0.065 **I-THD(%): 213.2** **POHC(A): 0.022** **POHC Limit(A): 0.251**

Highest parameter values during test:

V_RMS (Volts):	230.55	Frequency(Hz):	50.00
I_Peak (Amps):	0.418	I_RMS (Amps):	0.074
I_Fund (Amps):	0.031	Crest Factor:	5.917
Power (Watts):	5.7	Power Factor:	0.343

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.024	2.300	1.0	0.024	3.450	0.7	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.023	1.140	2.0	0.024	1.710	1.4	Pass
6	0.001	0.300	N/A	0.001	0.450	N/A	Pass
7	0.023	0.770	2.9	0.023	1.155	2.0	Pass
8	0.001	0.230	N/A	0.001	0.345	N/A	Pass
9	0.022	0.400	5.4	0.022	0.600	3.6	Pass
10	0.001	0.184	N/A	0.001	0.276	N/A	Pass
11	0.020	0.330	6.2	0.021	0.495	4.2	Pass
12	0.001	0.153	N/A	0.001	0.230	N/A	Pass
13	0.019	0.210	9.1	0.019	0.315	6.1	Pass
14	0.001	0.131	N/A	0.001	0.197	N/A	Pass
15	0.018	0.150	11.7	0.018	0.225	7.9	Pass
16	0.001	0.115	N/A	0.001	0.173	N/A	Pass
17	0.016	0.132	12.1	0.016	0.198	8.1	Pass
18	0.001	0.102	N/A	0.001	0.153	N/A	Pass
19	0.014	0.118	12.1	0.014	0.178	8.1	Pass
20	0.001	0.092	N/A	0.001	0.138	N/A	Pass
21	0.013	0.107	11.9	0.013	0.161	8.0	Pass
22	0.001	0.084	N/A	0.001	0.125	N/A	Pass
23	0.011	0.098	11.3	0.011	0.147	7.6	Pass
24	0.001	0.077	N/A	0.001	0.115	N/A	Pass
25	0.009	0.090	10.5	0.009	0.135	7.0	Pass
26	0.000	0.071	N/A	0.001	0.107	N/A	Pass
27	0.008	0.083	9.5	0.008	0.125	6.4	Pass
28	0.000	0.066	N/A	0.001	0.099	N/A	Pass
29	0.006	0.078	8.3	0.007	0.116	5.6	Pass
30	0.000	0.061	N/A	0.001	0.092	N/A	Pass
31	0.005	0.073	7.1	0.005	0.109	4.8	Pass
32	0.000	0.058	N/A	0.001	0.086	N/A	Pass
33	0.004	0.068	N/A	0.004	0.102	N/A	Pass
34	0.000	0.054	N/A	0.001	0.081	N/A	Pass
35	0.003	0.064	N/A	0.003	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.002	0.061	N/A	0.003	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.002	0.058	N/A	0.002	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

Teseq Profline
4542 Luterbach, Switzerland

10/31/2022
2:52 PM

Voltage Source Verification Data (Run time)

EUT: U-CAM **Tested by: Quoc-Nhan Van**
Test category: Class-A per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 10/27/2022 **Start time: 2:26:30 PM** **End time: 2:28:51 PM**
Test duration (min): 2 **Data file name: H-000156.cts_data**
Comment: Harmonics Fluctuations
Customer: Inogeni

Test Result: Pass **Source qualification: Normal**

Highest parameter values during test:

Voltage (Vrms):	230.55	Frequency(Hz):	50.00
I_Peak (Amps):	0.418	I_RMS (Amps):	0.074
I_Fund (Amps):	0.031	Crest Factor:	5.917
Power (Watts):	5.7	Power Factor:	0.343

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.027	0.461	5.88	OK
3	0.420	2.075	20.23	OK
4	0.031	0.461	6.77	OK
5	0.042	0.922	4.57	OK
6	0.029	0.461	6.31	OK
7	0.018	0.692	2.58	OK
8	0.007	0.461	1.47	OK
9	0.022	0.461	4.71	OK
10	0.006	0.461	1.32	OK
11	0.012	0.231	5.31	OK
12	0.011	0.231	4.74	OK
13	0.015	0.231	6.40	OK
14	0.004	0.231	1.78	OK
15	0.008	0.231	3.33	OK
16	0.012	0.231	5.32	OK
17	0.013	0.231	5.58	OK
18	0.014	0.231	6.16	OK
19	0.015	0.231	6.41	OK
20	0.013	0.231	5.61	OK
21	0.017	0.231	7.39	OK
22	0.004	0.231	1.63	OK
23	0.011	0.231	4.76	OK
24	0.004	0.231	1.70	OK
25	0.011	0.231	4.76	OK
26	0.001	0.231	0.52	OK
27	0.007	0.231	3.19	OK
28	0.002	0.231	0.97	OK
29	0.011	0.231	4.95	OK
30	0.003	0.231	1.18	OK
31	0.007	0.231	3.22	OK
32	0.002	0.231	0.68	OK
33	0.008	0.231	3.40	OK
34	0.003	0.231	1.13	OK
35	0.005	0.231	2.15	OK
36	0.002	0.231	0.84	OK
37	0.006	0.231	2.41	OK
38	0.002	0.231	0.75	OK
39	0.004	0.231	1.77	OK
40	0.006	0.231	2.50	OK

APPENDIX D
VOLTAGE FLUCTUATIONS AND FLICKER LIMITATIONS

Teseq Profline
4542 Luterbach, Switzerland

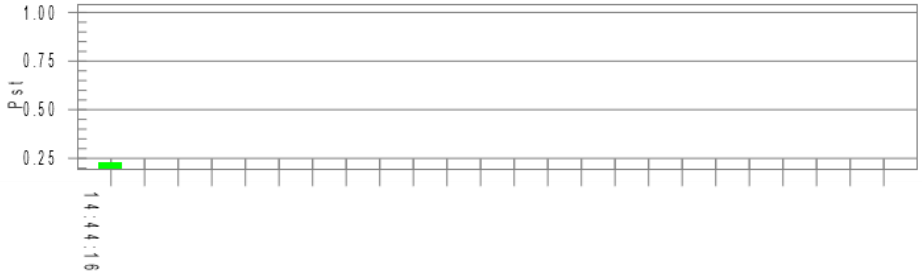
10/31/2022
2:52 PM

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: U-CAM **Tested by: Quoc-Nhan Van**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 10/27/2022 **Start time: 2:33:46 PM** **End time: 2:44:17 PM**
Test duration (min): 10 **Data file name: F-000158.cts_data**
Comment: Flicker Pst
Customer: Inogeni

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Plt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt):	**230.52**			
Highest dt (%):	**0.00**	**Test limit (%):**	**N/A**	**N/A**
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.03**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.230**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.101**	**Test limit:**	**0.650**	**Pass**

Teseq AG Win2100 V4.9.0 Page 1 of 1

Teseq Profline
4542 Luterbach, Switzerland

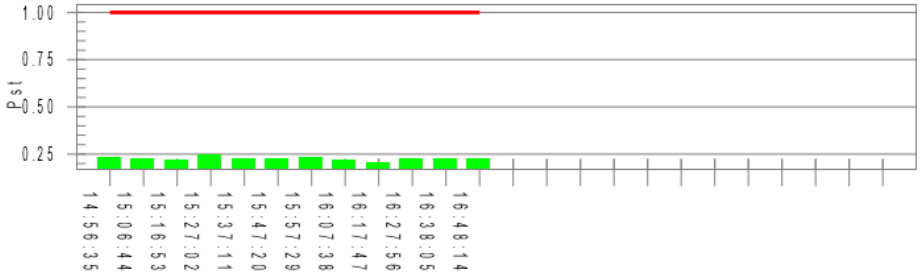
10/31/2022
2:52 PM

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

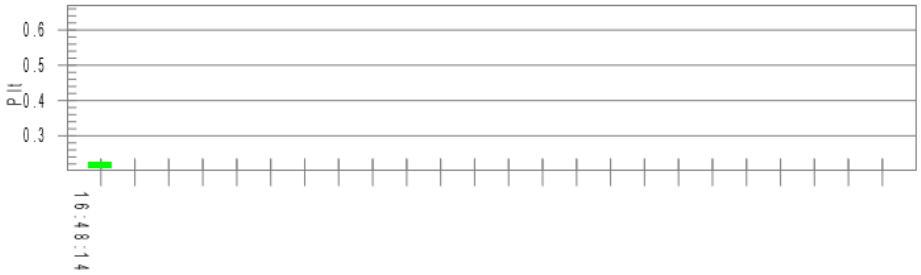
EUT: U-CAM **Tested by: Quoc-Nhan Van**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 10/27/2022 **Start time: 2:46:04 PM** **End time: 4:48:15 PM**
Test duration (min): 120 **Data file name: F-000159.cts_data**
Comment: Flicker Plt
Customer: Inogeni

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	**230.47**			
Highest dt (%):	**0.00**	**Test limit (%):**	**N/A**	**N/A**
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.10**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.247**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.225**	**Test limit:**	**0.650**	**Pass**

Teseq AG Win2100 V4.9.0 Page 1 of 1

END OF TEST REPORT