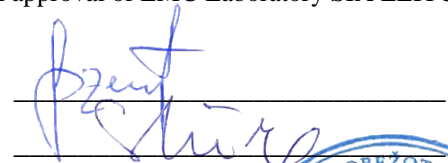



# EMC TEST REPORT

<b>Type of equipment:</b>	<b>Computer workstation platform</b>
<b>Model:</b>	<b>RM-M</b>
<b>Marketing name:</b>	Comino Grando Workstation
<b>Sub model:</b>	RM-M
<b>Serial number:</b>	500.M.00285.03
<b>Applicant:</b>	<b>SIA IAS</b>
<b>Manufacturer:</b>	<b>COMINO HOLDING LTD</b>
<b>Test standard:</b>	<b>FCC Title 47, Part 15 Subpart B</b>
<b>Test report no.:</b>	LEITC-TR-23-162
<b>Identification no.:</b>	ID_1423/2.1
<b>Testing laboratory:</b>	SIA LEITC
<b>Result summary:</b>	<b>Pass</b>

The results applies only to the sample tested, according to the carried tests, which are included in this test report.  
This test report shall not be reproduced expect in full, without the written approval of EMC Laboratory SIA LEITC.

<b>Test responsible:</b>	Andris Dzenis
<b>Laboratory responsible:</b>	Uldis Stūre
<b>Date of issue:</b>	13.12.2023.

  
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## 1. REVISION HISTORY

Revision no.	Description	Date	Pages revised
00	First release.	13.12.2023.	N/A

## 2. LABORATORY INFORMATION



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**Accredited by:** State agency Latvian National accreditation bureau (LATAK)

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E-mail: [latak@latak.gov.lv](mailto:latak@latak.gov.lv)

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**Accreditation No:** LATAK-T-397-11-2009

### 3. CLIENT INFORMATION

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Contact Person: Kaspars Frišfelds

E-mail: kaspars@iasolutions.lv

Web: -

**Manufacturer:** COMINO HOLDING LTD

Address: 30 Churchill Pl, London, England, E14 5RE

Manufacture address: Krimuldas iela 2A, LV-1039, Riga, Latvia

Telephone number: +44 2038855315

Contact Person: -

E-mail: info@comino.com

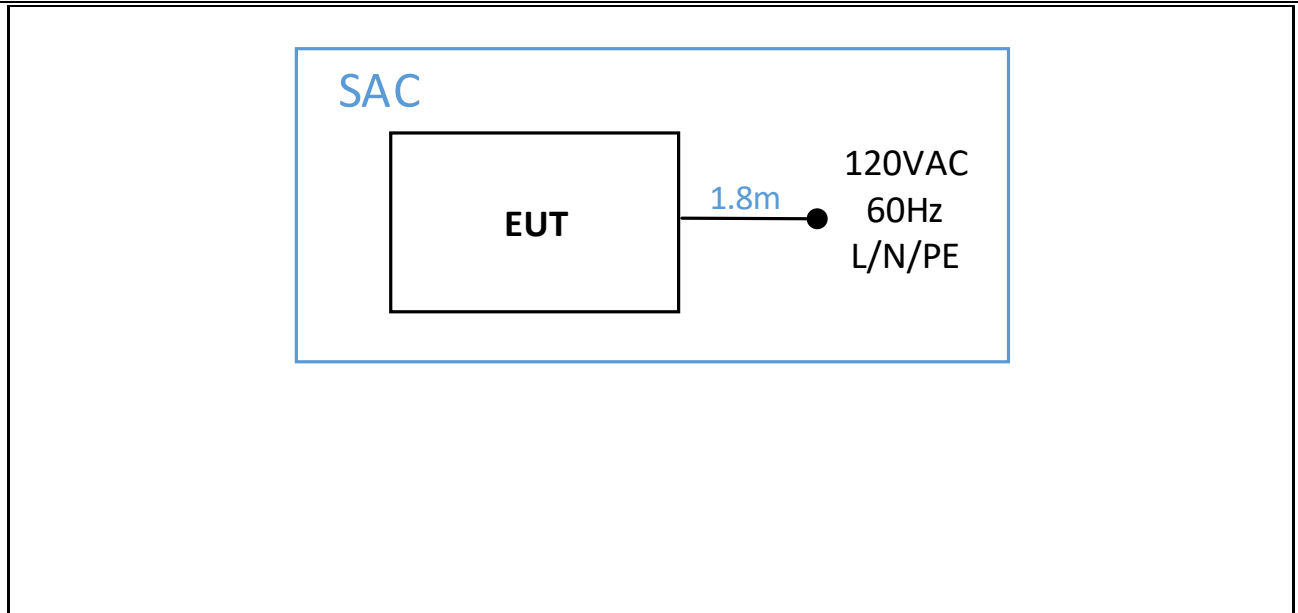
Web: www.comino.com

## 4. SUMMARY OF TEST RESULTS

<b>Standard:</b>		<b>FCC Title 47, Part 15 Subpart B</b>		
<b>Emissions</b>				
No.	Measurement type	Reference standard	Ref. Standard Clause	Result
1.	Radiated emissions (30MHz to 1GHz)	FCC Title 47, Part 15 Subpart B (Class B)	15.109	<b>Pass</b>
2.	Radiated emissions (1GHz to 6GHz)	FCC Title 47, Part 15 Subpart B (Class B)	15.109	<b>Pass</b>
3.	Conducted emissions (AC power port)	FCC Title 47, Part 15 Subpart B (Class B)	15.107	<b>Pass</b>
<b>Notes:</b> Y- applied; N/A - not applicable.				
<b>Deviations from standard specification:</b> no deviations from the test standards.				

## 5. DESCRIPTION OF EQUIPMENT UNDER TEST

<b>5.1 Description of EUT</b>						
<b>LEITC identification no.:</b> ID_1423/2.1						
Computer workstation platform in a 4U form-factor equipped with the power supply, liquid-cooling and monitoring system.						
No.	EUT	Model	Serial No.	Manufacturer		
1.	Comino Grando Workstation	RM-M	500.M.00285.03	COMINO HOLDING LTD		
<b>5.2 Peripherals and associated equipment</b>						
No.	Description	Model	Serial No.	Manufacturer		
1.	N/A	N/A	N/A	N/A		
<b>5.3 Cables used during the testing</b>						
No.	Cable type	Shielded	Ferrite	Length used during test	Connection 1	Connection2
1.	AC power	<input type="checkbox"/>	<input type="checkbox"/>	1.8m	AC main	EUT
<b>5.4 EUT configuration</b>						
The equipment under test (EUT) was functioning correctly during all tests, according to user's manual. The EUT was installed within the test site and configured to simulate a typical user installation according to the manufacturer instructions.						
<b>5.4.1 Operating modes/load</b>						
1.	Operating mode: system forced work enabled. Monitoring parameters: Air IN/OUT CLNT IN/OUT PUMPS RPM FANS RPM Flow R. Block diagram 1.					
<b>5.4.2 Modification state</b>						
1.	No modification made.					
<b>5.4.3 Radio frequency transmitters incorporated in EUT</b>						
No.	Description	Frequency	Modulation			
1.	N/A	N/A	N/A			
Block diagram 1:						



## 6. INSTRUMENTATION AND CALIBRATION

Equipment and EUT during the tests are operated in temperature range of 21<sup>0</sup> to 25<sup>0</sup>C, humidity range of 40% to 60%, if not mentioned more precisely next to measurement data.

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with manufacturer's recommendations or quality manager deliverance and it is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

The following list contains measurement equipment used for testing. The equipment conforms to the requirements of CISPR 16-1 and other standard requirements.

Radiated emissions						
Device	Manufacturer	Model	S/N	Calibrated	Next calibration	Notes
Antenna	Rohde & Schwarz	HL562E	102093	15.04.2021	15.04.2027	Certificate of calibration No. 200583 D-K-15195-01-00
Antenna	Rohde & Schwarz	HF906	100448	14.02.2022	14.02.2028	Certificate of calibration No. 202200066.00
Preamplifier	BONN Elektronik GmbH	BLMA 0118-1M	066396D	10.02.2023	10.02.2024	Test report No. LEITC-M-04/2023
Receiver	Rohde & Schwarz	ESIB26	1088.7490K26	26.01.2023	26.01.2025	Certificate of calibration No. 202204692.00
Receiver	Gauss Instruments	TDEMI X6	1605023	10.02.2022	10.02.2024	Certificate of calibration No. 202100907.00
Antenna mast	FRANKONIA	FBM 1-4 Rev.1	-	-	-	Not applicable.
Turntable	FRANKONIA	FCTAM01	-	-	-	Not applicable.
Test site	FRANKONIA	SAC3	-	18.05.2023	18.05.2025	Interlaboratory comparison No. LEITC-TR-23-066
Software for EMC measurements EMC32	Rohde & Schwarz	Version 8.53.0	-	-	-	Not applicable.
Software for EMC measurements (Gauss Instruments)	Gauss Instruments	Version 6.12	-	-	-	Not applicable.

### Conducted emissions

The test results relate only to the sample tested. This test report shall not be reproduced except in full, without the written approval of SIA LEITC.



Device	Manufacturer	Model	S/N	Calibrated	Next calibration	Notes
LISN	Rohde & Schwarz	ENV432	100266	13.01.2023	13.01.2025	Certificate of calibration No. 0001A300679985
AMN	Rohde & Schwarz	ENV216	100266	12.01.2023	12.01.2025	Certificate of calibration No. 300679983 D-K-15195-01-00
ISN	Rohde & Schwarz	ENY81	100066	10.02.2022	10.02.2024	Certificate of calibration No. 202100909.00
CDN	Teseq	ISN-ST08	55183	10.02.2022	10.02.2024	Certificate of calibration No. 202200075.00
Receiver	Rohde & Schwarz	ESIB26	1088.7490K26	26.01.2023	26.01.2025	Certificate of calibration No. 202204692.00
Receiver	Gauss Instruments	TDEMI X6	1605023	10.02.2022	10.02.2024	Certificate of calibration No. 202100907.00
Test site	FRANKONIA	SAC3	-	-	-	Not applicable.
Software for EMC measurements EMC32	Rohde & Schwarz	Version 8.53.0	-	-	-	Not applicable.
Software for EMC measurements (Gauss Instruments)	Gauss Instruments	Version 6.12	-	-	-	Not applicable.

## 7. STATEMENT OF THE MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainties were calculated according to guidelines given in EN 55016-4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4 Uncertainty in EMC Measurements” and is documented in the SIA “LEITC” quality system according to ISO/IEC 17025. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manuals.

Measurement uncertainty			
Procedure	Designation	Uncertainty	Device
Conducted emissions 9kHz to 30MHz	$U_{lab}$	2.75dB	LISN: ENV216
Radiated emissions 30MHz to 1GHz	$U_{lab}$	4.97dB	Antenna: HL562E
Radiated emissions 1GHz to 6GHz	$U_{lab}$	4.96dB	Antenna: HF906

## 8. TEST PROCEDURES

### Radiated emissions

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is a table top equipment, a non-conductive table with a height of 0,8m is used which is placed on the ground plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation support.

Auxiliary equipment and/or support equipment, if needed was placed as per FCC Title 47, Part 15 Subpart B recommendations.

All input/output cables were positioned to simulate typical usage as per FCC Title 47, Part 15 Subpart B.

The EUT was connected to AC mains 230V/50Hz under the turntable shucko type socket, all other equipment was connected to the other shucko type socket under the turntable.

The antenna was placed at 3m away from EUT. Antenna height was changed in range 1-4m and EUT rotation angle in range of  $-180^{\circ}$  to  $180^{\circ}$  maximize measured emissions.

### Conducted emissions

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is a table top equipment, a non-conductive table with a height of 0,8m is used which is placed in a distance of 0,4m from vertical conductive plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation support in a distance of 0,4m from vertical conductive plane.

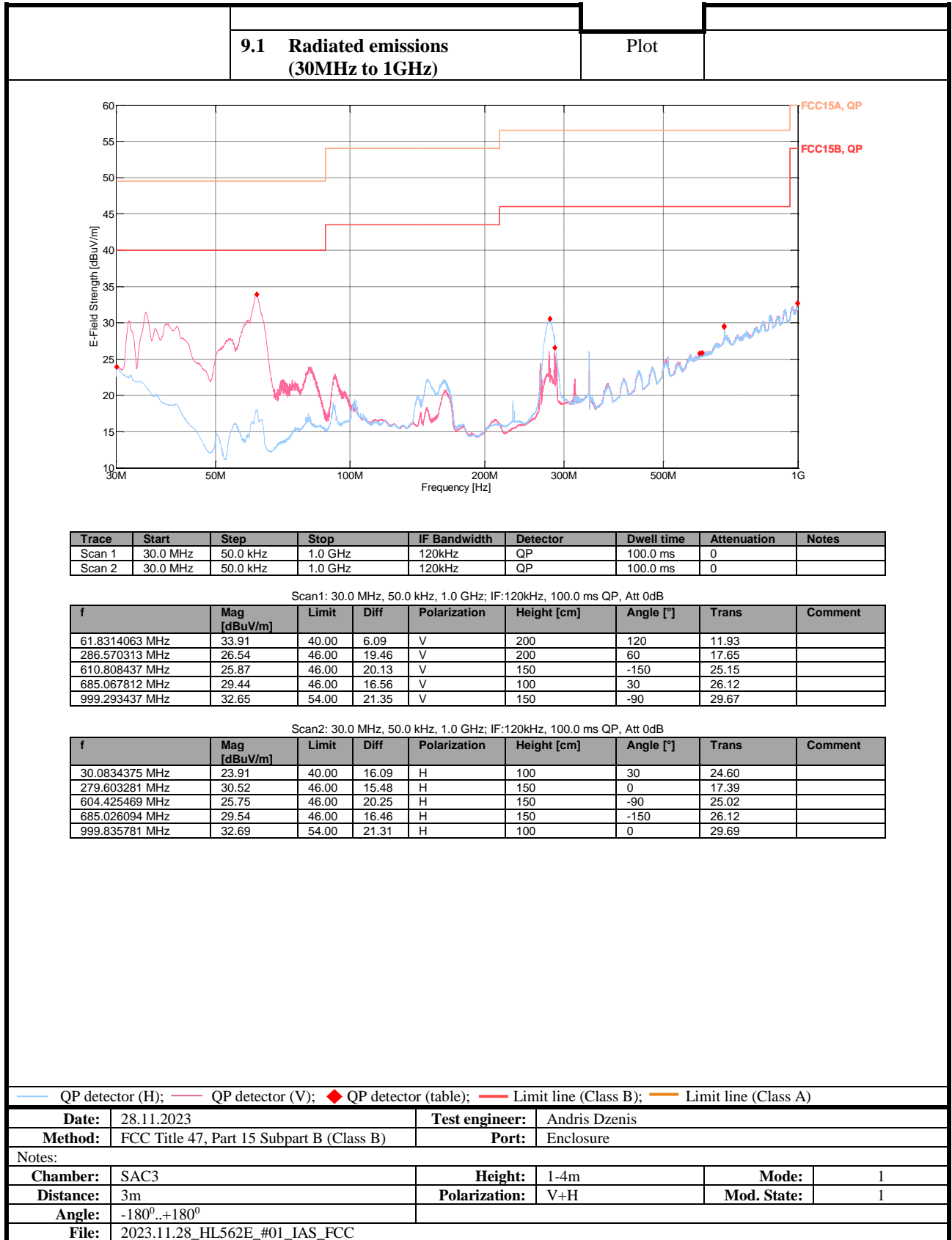
Auxiliary equipment and/or support equipment, if needed was placed as per FCC Title 47, Part 15 Subpart B recommendations.

All input/output cables were positioned to simulate typical usage as per FCC Title 47, Part 15 Subpart B.

EUT mains power port was connected to LISN/AMN which is placed in a distance of 0,8m. Each EUT power lead, except ground (safety), was connected through a LISN/AMN to power source. All lines and neutral of power cord were measured.

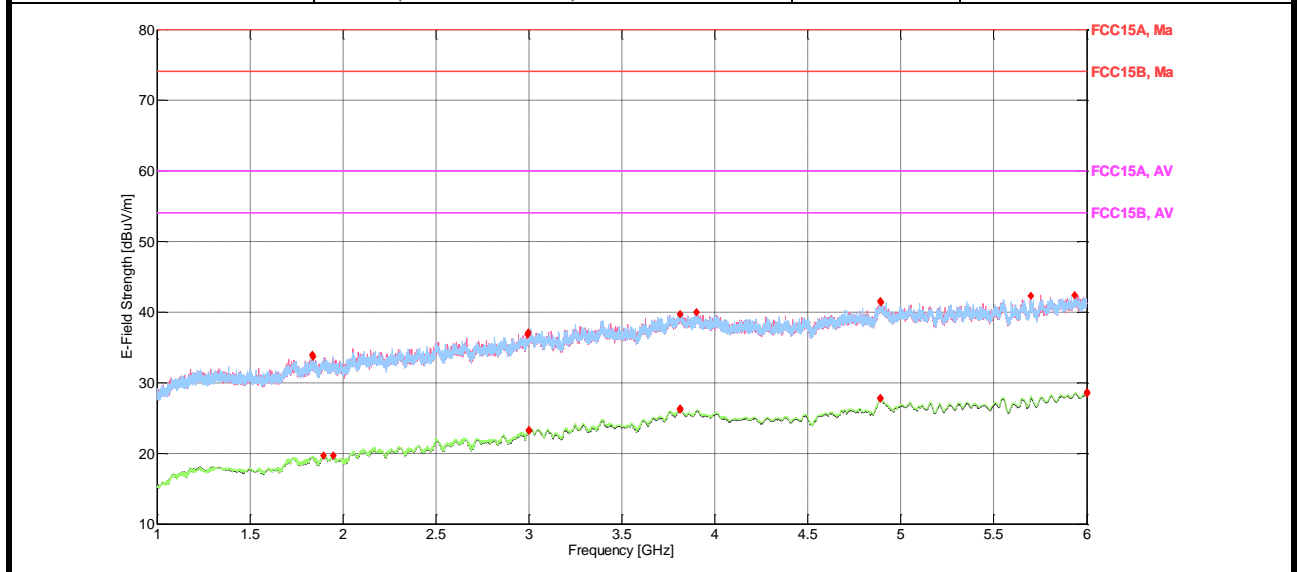
All telecommunication and signal cables are connected through ISN which is located in distance of 0,8m. Each cable lead is measured according to used connection type.

## 9. TEST RESULTS



The test results relate only to the sample tested. This test report shall not be reproduced except in full, without the written approval of SIA LEITC.

<b>9.2 Radiated emissions (1GHz to 6GHz)</b>	Plot	
--------------------------------------------------	------	--



Trace	Start	Step	Stop	IF Bandwidth	Detector	Dwell time	Attenuation	Notes
Scan 1	1.0 GHz	400.0 kHz	6.0 GHz	1MHz	MaxPeak	100.0 ms	Auto	
Scan 2	1.0 GHz	400.0 kHz	6.0 GHz	1MHz	Average	100.0 ms	Auto	
Scan 3	1.0 GHz	400.0 kHz	6.0 GHz	1MHz	MaxPeak	100.0 ms	Auto	
Scan 4	1.0 GHz	400.0 kHz	6.0 GHz	1MHz	Average	100.0 ms	Auto	

Scan1: 1.0 GHz, 400.0 kHz, 6.0 GHz; IF:1MHz, 100.0 ms MaxPeak, Att AutodB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Comment
1.8403825 GHz	33.67	74.00	40.33	V	100	-90	-10.43	
2.99415625 GHz	36.85	74.00	37.15	V	150	-150	-5.96	
3.8135125 GHz	39.69	74.00	34.31	V	100	-120	-2.52	
4.89185875 GHz	41.38	74.00	32.62	V	150	120	-0.08	
5.93516125 GHz	42.38	74.00	31.62	V	150	60	-0.04	

Scan2: 1.0 GHz, 400.0 kHz, 6.0 GHz; IF:1MHz, 100.0 ms Average, Att AutodB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Comment
1.94885125 GHz	19.65	54.00	34.35	V	100	90	-9.72	
2.99983 GHz	23.15	54.00	30.85	V	150	-180	-5.89	
3.81418 GHz	26.18	54.00	27.82	V	150	-150	-2.52	
4.89119125 GHz	27.72	54.00	26.28	V	150	-180	-0.07	
6 GHz	28.47	54.00	25.53	V	150	-150	0.28	

Scan3: 1.0 GHz, 400.0 kHz, 6.0 GHz; IF:1MHz, 100.0 ms MaxPeak, Att AutodB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Comment
1.83671125 GHz	33.91	74.00	40.09	H	150	-150	-10.55	
2.99615875 GHz	37.09	74.00	36.91	H	150	180	-5.93	
3.9016225 GHz	39.95	74.00	34.05	H	150	60	-2.56	
4.8881875 GHz	41.50	74.00	32.50	H	150	-60	-0.11	
5.6992 GHz	42.26	74.00	31.74	H	150	-150	-0.31	

Scan4: 1.0 GHz, 400.0 kHz, 6.0 GHz; IF:1MHz, 100.0 ms Average, Att AutodB

f	Mag [dBuV/m]	Limit	Diff	Polarization	Height [cm]	Angle [°]	Trans	Comment
1.8964525 GHz	19.72	54.00	34.28	H	150	-90	-9.76	
2.99983 GHz	23.28	54.00	30.72	H	150	-150	-5.89	
3.812845 GHz	26.35	54.00	27.65	H	150	-90	-2.52	
4.8908575 GHz	27.87	54.00	26.13	H	150	60	-0.07	
6 GHz	28.67	54.00	25.33	H	150	-90	0.28	

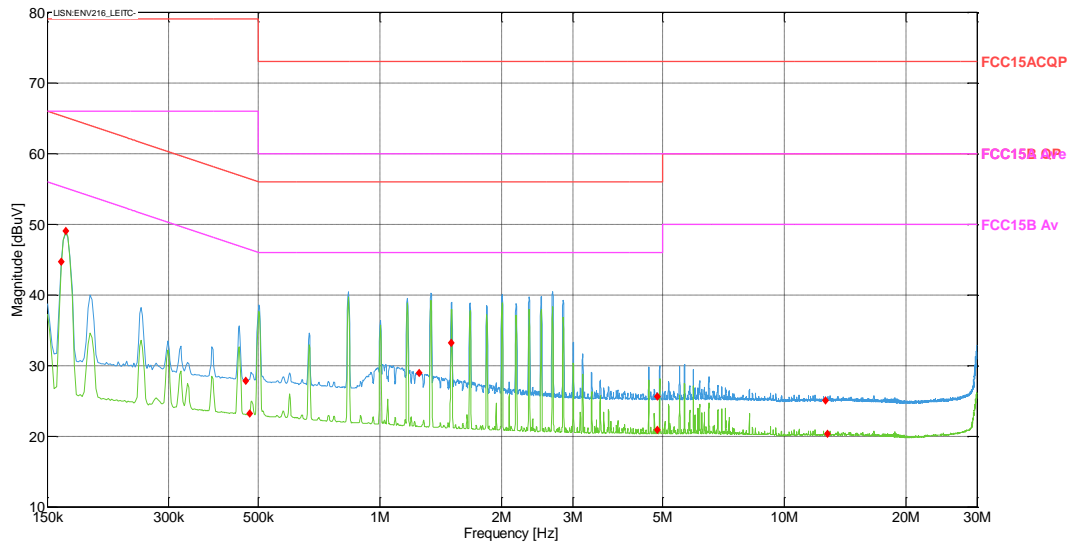
— MaxPeak detector (H); — MaxPeak detector (V); — AV detector (H); — AV detector (V); — MaxPeak Limit line; — AV Limit line

<b>Date:</b> 24.11.2023	<b>Test engineer:</b> Andris Dzenis	
<b>Method:</b> FCC Title 47, Part 15 Subpart B (Class B)	<b>Port:</b> Enclosure	
Notes:		
<b>Chamber:</b> SAC3	<b>Height:</b> 1-4m	<b>Mode:</b> 1
<b>Distance:</b> 3m	<b>Polarization:</b> V+H	<b>Mod. State:</b> 1
<b>Angle:</b> -180°..+180°		
<b>File:</b> 2023.11.24_HF906_#01_IAS_FCC		

The test results relate only to the sample tested. This test report shall not be reproduced except in full, without the written approval of SIA LEITC.

### 9.3 Conducted emissions

Plot



Trace	Start	Step	Stop	IF Bandwidth	Detector	Dwell time	Attenuation	Notes
Scan 1	150.0 kHz	4.0 kHz	30.0 MHz	9kHz	QP	15.0 s	10	
Scan 2	150.0 kHz	4.0 kHz	30.0 MHz	9kHz	Average	15.0 s	10	

Scan1: 150.0 kHz, 4.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s QP, Att 10dB

f	Mag [dBuV]	Limit	Diff	Phase	Trans	Comment
162.515625 kHz	44.66	65.33	20.68	N	19.63	
464.976563 kHz	27.87	56.60	28.73	N	19.66	
1.24928906 MHz	28.93	56.00	27.07	L1	19.74	
4.855875 MHz	25.61	56.00	30.39	N	20.01	
12.6343359 MHz	25.07	60.00	34.93	N	20.39	

Scan2: 150.0 kHz, 4.0 kHz, 30.0 MHz; IF:9kHz, 15.0 s Average, Att 10dB

f	Mag [dBuV]	Limit	Diff	Phase	Trans	Comment
166.6875 kHz	49.04	55.12	6.08	N	19.64	
475.40625 kHz	23.19	46.42	23.23	L1	19.66	
1.49751562 MHz	33.18	46.00	12.82	N	19.76	
4.85170313 MHz	20.92	46.00	25.08	N	20.01	
12.799125 MHz	20.31	50.00	29.69	L1	20.38	

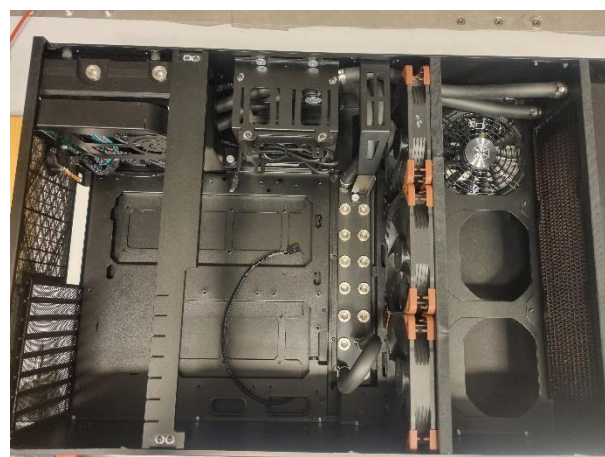
— QP detector; ◆ QP detector (table); — AV detector; ◆ AV detector (table); — QP Limit line; — AV Limit line; L- Live, N-Neutral

<b>Date:</b>	28.11.2023	<b>Test engineer:</b>	Andris Dzenis
<b>Method:</b>	FCC Title 47, Part 15 Subpart B (Class B)	<b>Port:</b>	AC power
Notes:			
<b>Chamber:</b>	SAC3	<b>Attenuator:</b>	10dB
<b>LISN:</b>	ENV216	<b>Mode:</b>	1
<b>File:</b>	2023.11.28_2-Line_ENV216_#01_IAS_FCC	<b>Mod. State:</b>	1

The test results relate only to the sample tested. This test report shall not be reproduced except in full, without the written approval of SIA LEITC.

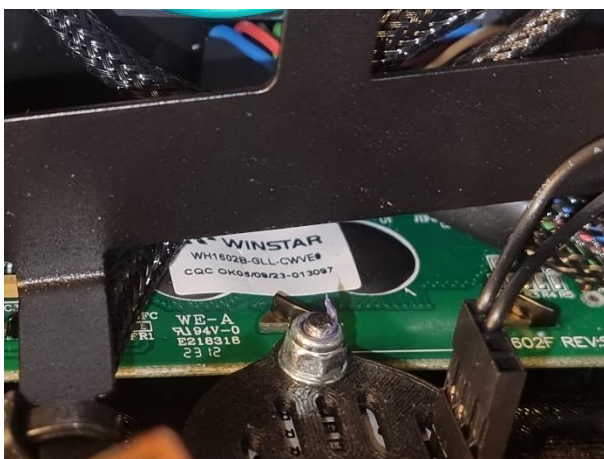
## 10. TEST PHOTOGRAPHS

EUT-equipment under test:



The test results relate only to the sample tested. This test report shall not be reproduced except in full, without the written approval of SIA LEITC.



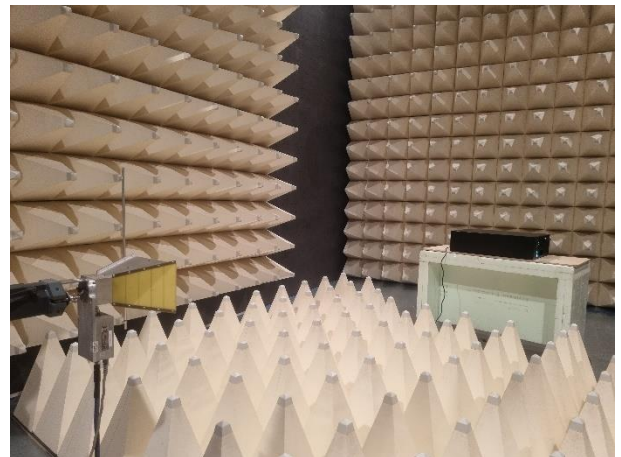




Radiated emissions (30MHz-1GHz):



Radiated emissions (1GHz-6GHz):



Conducted emissions:

