

Prüfbericht-Nr.: <i>Test report no.:</i>	CN245XPT 001	Auftrags-Nr.: <i>Order no.:</i>	326041351	Seite 1 von 24 <i>Page 1 of 24</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	1288983	Auftragsdatum: <i>Order date:</i>	2024-08-26	
Auftraggeber: <i>Client:</i>	IKEA of Sweden AB Box 702, SE-343 81 Älmhult, Sweden			
Prüfgegenstand: <i>Test item:</i>	LED lighting chain			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	J2505			
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland EMC service			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15, Subpart B:2023 Class B ICES-005:2018			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2025-01-21	Refer to the EUT photos file		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003913764-001			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report			
Ort der Prüfung: <i>Place of testing:</i>	Refer to clause 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	<i>Jessie Xu</i>	genehmigt von: <i>authorized by:</i>	<i>Jiani Zhou</i>	
Datum: <i>Date:</i>	2025-05-12	Ausstellungsdatum: <i>Issue date:</i>	2025-05-12	
Stellung / Position:	Project engineer	Stellung / Position:	Authorizer	
Sonstiges / <i>Other:</i>	FCC ID: FHO-J2505 Test Firm Name: TÜV Rheinland (Shanghai) Co., Ltd. Designation Number: CN1396 Test Firm Registration Number: 930979			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
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Prüfbericht-Nr.: CN245XPT 001
Test report no.:

Seite 2 von 24
Page 2 of 24

Anmerkungen
Remarks

- | | |
|---|--|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.
Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p> |
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| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.
Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.
Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p> |
| 4 | <p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p> |

Prüfbericht - Nr.: CN245XPT 001
*Test Report No.:***Seite 3 von 24**
*Page 3 of 24***Revision history of test report:**

Report number	Issue date	Contents and reason for change if appropriate
CN245XPT 001	2025-05-12	Initial release.

Contents

1	TEST SITES	5
1.1	TEST FACILITIES.....	5
2	GENERAL PRODUCT INFORMATION	6
2.1	PRODUCT FUNCTION AND INTENDED USE.....	6
2.2	RATINGS AND SYSTEM DETAILS.....	6
2.3	INDEPENDENT OPERATION MODES.....	6
2.4	DESCRIPTION OF INTERCONNECTING CABLES	6
2.5	NOISE GENERATING AND NOISE SUPPRESSING PARTS	6
2.6	HIGHEST FREQUENCY GENERATED OR USED IN THE DEVICE OR ON WHICH THE DEVICE OPERATES OR TUNES .	6
2.7	SUBMITTED DOCUMENTS.....	6
3	TEST SET-UP AND OPERATION MODES	7
3.1	PRINCIPLE OF CONFIGURATION SELECTION	7
3.2	EQUIPMENT AND CABLE ARRANGEMENT.....	7
3.3	TEST SOFTWARE	8
3.4	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	8
3.5	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	8
4	CONFORMITY DECISION RULE	9
5	TEST RESULTS EMISSION	10
5.1	EMISSION IN THE FREQUENCY RANGE UP TO 30 MHz	10
5.1.1	Conducted emission	10
5.2	EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz.....	16
5.2.1	Radiated emission (30-1000 MHz).....	16
6	PHOTOGRAPHS OF THE TEST SET-UP	22
7	LIST OF TEST AND MEASUREMENT INSTRUMENTS	23
8	LIST OF FIGURES	24

1 Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland (Shanghai) Co., Ltd.

Address: Workshop 14, North Half of Workshop 10 and Workshop 16, Pingqian (Taicang) Modern Industrial Park, No.525, Yuewang Lingang South Road, Shaxi, Taicang, Jiangsu, China

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

Refer to Clause 7 for test and measurement instruments.

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary LED lighting chain for lighting and similar use. For further information, refer to the user's manual.

2.2 Ratings and System Details

Rated input : AC 120 V, 60 Hz, 0.045 A, Max 3.8 W

Protection class : II

This product is LED light chain, it be powered by approved Class 2 power unit ICPSW24-3.6-IL-1. The information of power unit as below:

Manufacturer/ trademark	Type/model	Technical data
IKEA OF SWEDEN AB	ICPSW24-3.6-IL-1	Input: 100-240 VAC; 50/60 Hz; Max.0.05 A Output: 24 VDC; Max. 0.15 A; 3.6 W

2.3 Independent Operation Modes

The basic operation modes are: "ON" and "OFF".

2.4 Description of interconnecting cables

No.	Interface and name	Shielded or not	Specified length (m)
1	AC Power line	Unshielded	0.93 m
2	DC power line	Unshielded	4.1 m

2.5 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.6 Highest frequency generated or used in the device or on which the device operates or tunes

The highest frequency used in the EUT is 8 MHz.

2.7 Submitted Documents

Circuit diagram, user's manual and rating label.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

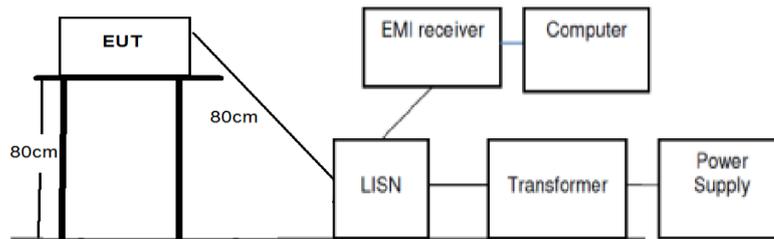
Refer to the related paragraph of this report.

The sequence of testing:

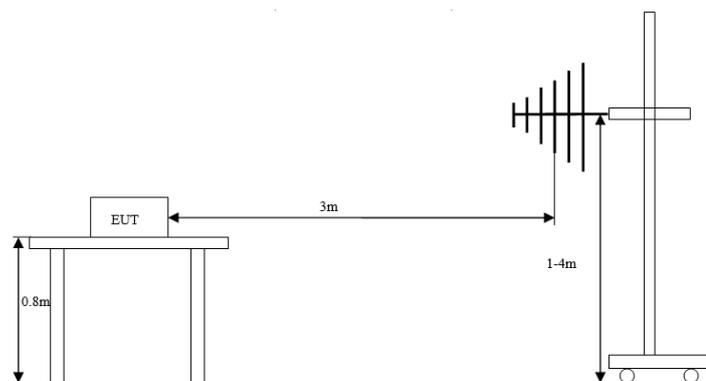
1. Radiated emission tests were performed on 2025-02-13.
2. Conducted emission tests were performed on 2025-02-13.

3.2 Equipment and cable arrangement

Block diagram for both conducted emission and radiated emission tests is as follows:



(Conducted emission)



(Radiated emission 30-1000 MHz)

Also refer to photographs on clause 6 for test setups for both conducted emission test and radiated emission test.

3.3 Test Software

No special test software was used during the tests.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

No other special measure is employed to achieve the requirement.

4 Conformity Decision Rule

For all EMI tests included in this report, as measurement uncertainties are less than the values U_{CISPR} given in CISPR 16-4-2, compliance with the limits is determined by comparing measurement results directly with corresponding limits without taking into consideration of measurement uncertainties.

5 Test Results EMISSION

5.1 Emission in the Frequency Range up to 30 MHz

5.1.1 Conducted emission

Result:	Passed
Date of testing	: 2025-02-13
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-2-1
Frequency range	: 0.15 – 30 MHz
Limits	: Quasi-peak limit: 0.15 – 0.5 MHz, 66 to 56 dB μ V (decrease with the logarithm of frequency); 0.5 – 5 MHz, 56 dB μ V; 5 – 30 MHz, 60 dB μ V Average limit: 0.15 – 0.5 MHz, 56 to 46 dB μ V (decrease with the logarithm of frequency); 0.5 – 5 MHz, 46 dB μ V; 5 – 30 MHz, 50 dB μ V
Bandwidth of EMI receiver for final measurement	: 9 kHz
Measurement time for final measurement	: 1 s
Kind of test site	: Shielded room
Input voltage	: AC 120 V, 60 Hz
Operational mode	: Mode 1: lighting on. Mode 2: flashing.
Ambient condition	: Temperature: 15.2 °C; Relative humidity: 51.3 %
Expanded measurement uncertainty ($k=2$)	: 2.33 dB The minimum margin to the limit is 9.22 dB at 0.179250 MHz. The margin is higher than expanded measurement uncertainty.

The measurement setup was made according to ANSI C63.4-2014 in a shielded room.

The measurement equipment like test receivers, quasi-peak detector and artificial mains network (AMN) are in compliance with CISPR 16-1 series standards.

The tested object was set-up on a wooden support. The EUT was set 0.8 m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3 m and 0.4 m.

The disturbance voltage test was performed on the neutral line and phase line of the power supply of the EUT respectively.

Prüfbericht - Nr.: CN245XPT 001**Seite 11 von 24**

Test Report No.:

Page 11 of 24

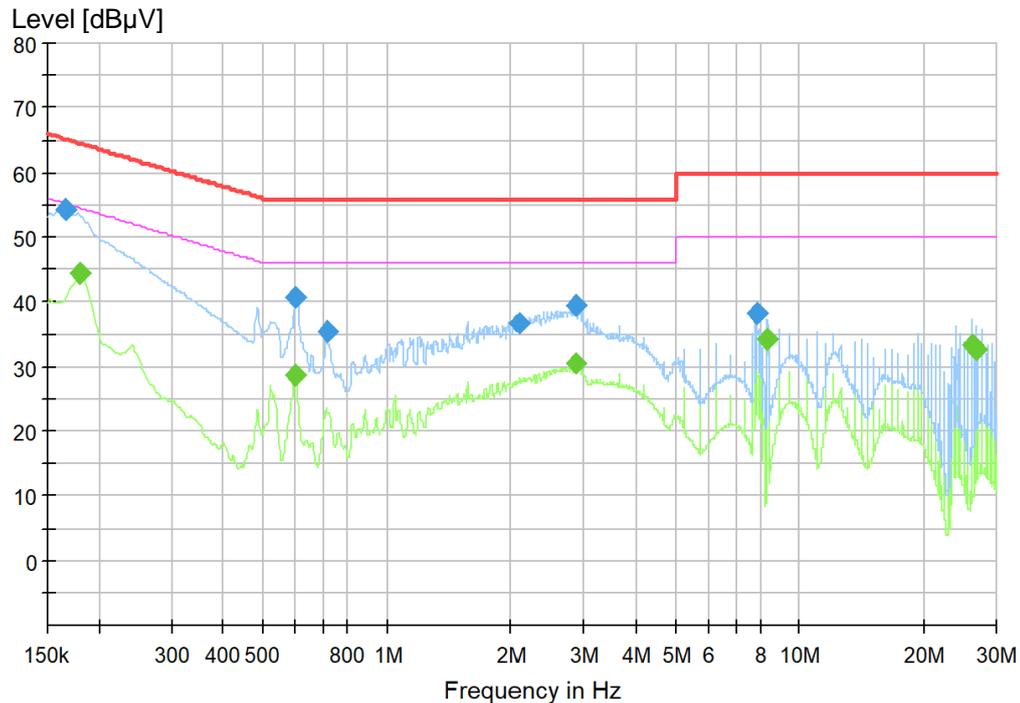
The following figures and tables were those measured by an automatic measuring system. Both quasi-peak and average measurements were performed. In the following spectral diagram, “♦” means Quasi-Peak Value and “◆” means Average Value results.

Notes on following tables of conducted emission results and conversions:

Level (dB μ V): final measurement results by using quasi-peak detector and average detector

Transd (dB): transducer factor including cable loss, insertion loss of artificial mains network and gain of pre-amplifier (if used)

Margin: Limit (dB μ V) - Level (dB μ V)

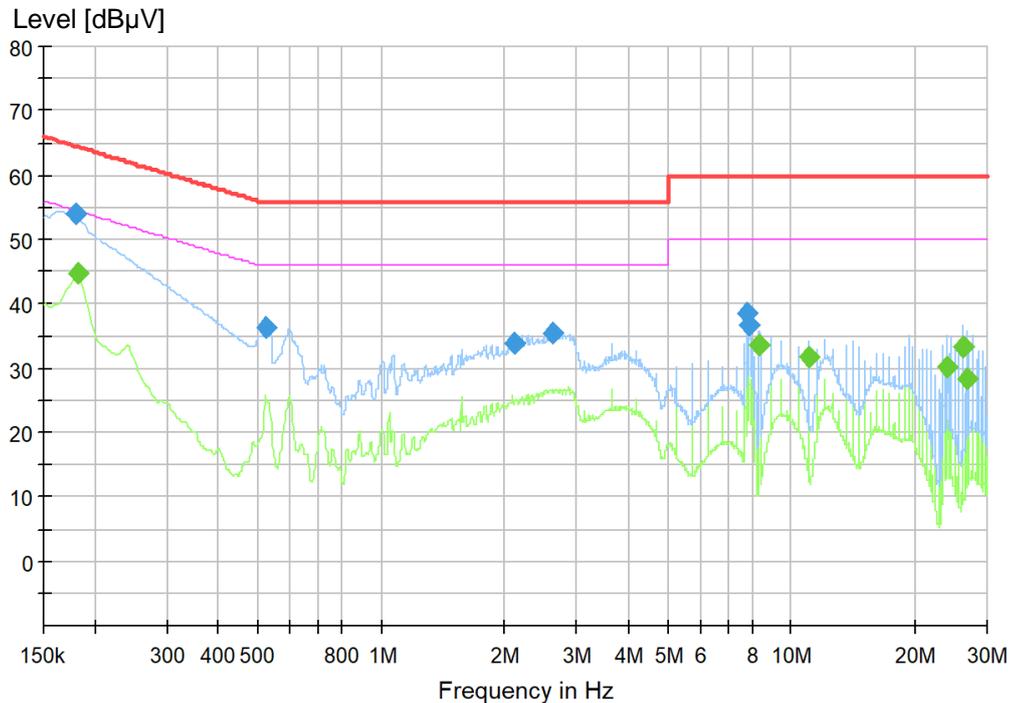
Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 1


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.165750	54.40	65.17	10.77	L1	10.3
0.597750	40.72	56.00	15.28	L1	10.3
0.712500	35.35	56.00	20.65	L1	10.3
2.085000	36.80	56.00	19.20	L1	10.1
2.870250	39.45	56.00	16.55	L1	10.2
7.845000	38.23	60.00	21.77	L1	10.9

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.179250	44.49	54.52	10.03	L1	10.3
0.597750	28.67	46.00	17.33	L1	10.3
2.865750	30.48	46.00	15.52	L1	10.2
8.364750	34.22	50.00	15.78	L1	10.8
26.142000	33.42	50.00	16.58	L1	11.2
26.666250	32.68	50.00	17.32	L1	11.2

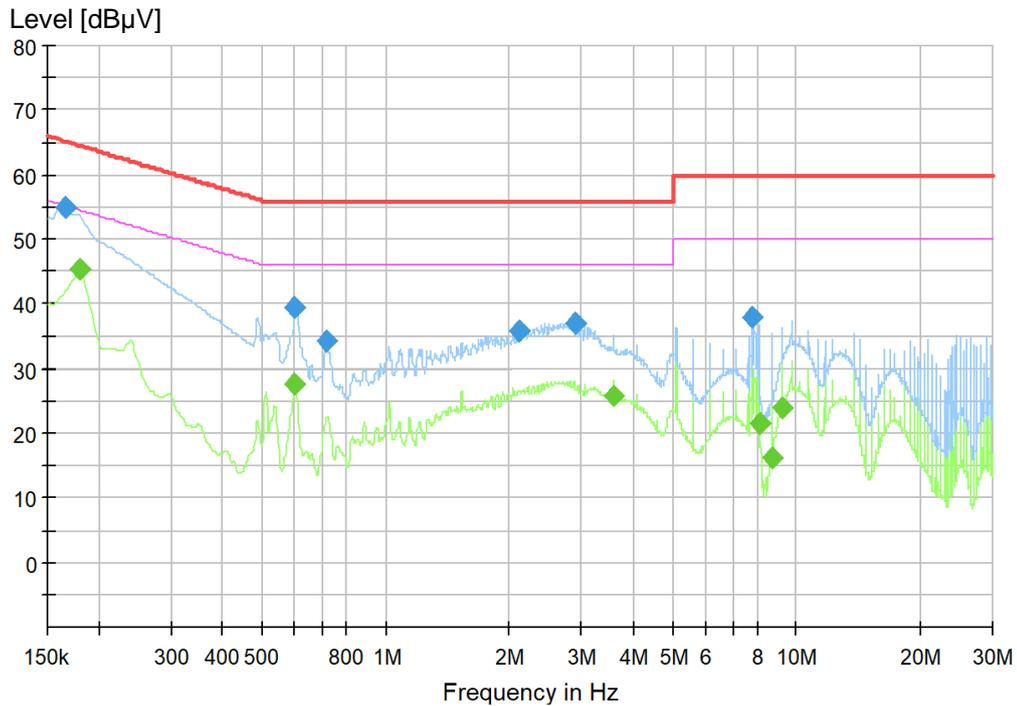
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 1


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.179250	53.87	64.52	10.65	N	10.6
0.523500	36.45	56.00	19.55	N	10.2
2.118750	33.95	56.00	22.05	N	10.5
2.616000	35.61	56.00	20.39	N	10.6
7.813500	38.60	60.00	21.40	N	10.7
7.845000	36.85	60.00	23.15	N	10.7

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.181500	44.73	54.42	9.68	N	10.6
8.367000	33.50	50.00	16.50	N	10.8
10.981500	31.76	50.00	18.24	N	11.1
24.056250	30.31	50.00	19.69	N	11.5
26.146500	33.36	50.00	16.64	N	11.6
26.670750	28.32	50.00	21.68	N	11.6

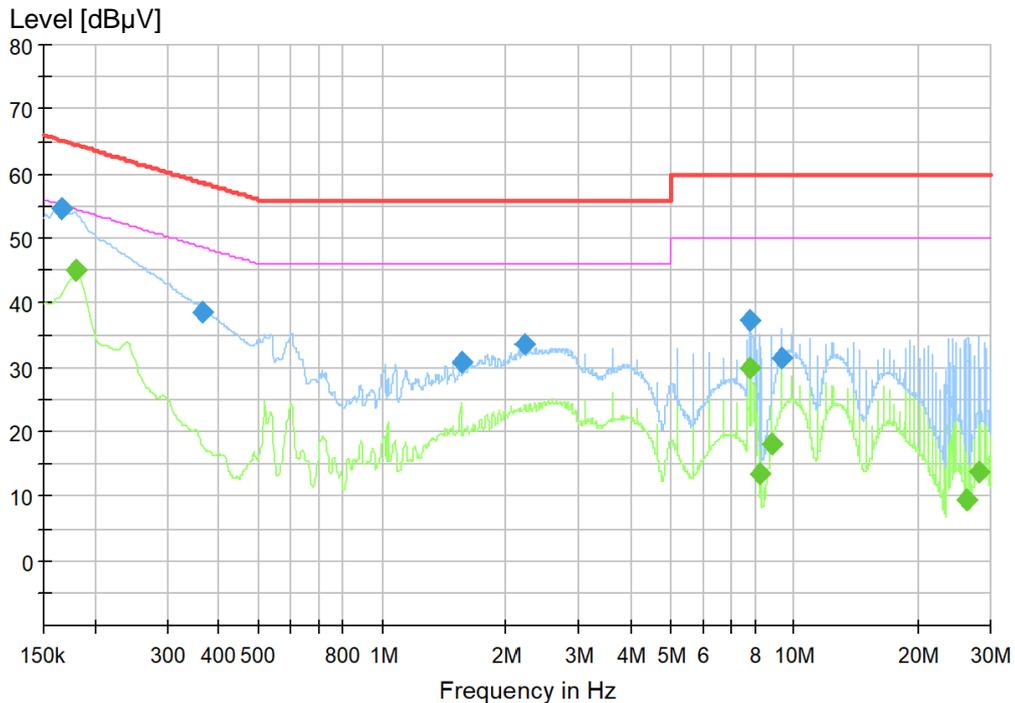
Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 2


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.165750	55.09	65.17	10.09	L1	10.3
0.600000	39.40	56.00	16.60	L1	10.3
0.714750	34.23	56.00	21.77	L1	10.3
2.114250	35.66	56.00	20.34	L1	10.1
2.883750	36.96	56.00	19.04	L1	10.2
7.809000	38.05	60.00	21.95	L1	10.9

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.179250	45.30	54.52	9.22	L1	10.3
0.600000	27.83	46.00	18.17	L1	10.3
3.570000	25.86	46.00	20.14	L1	10.2
8.162250	21.41	50.00	28.59	L1	10.9
8.670750	16.35	50.00	33.65	L1	10.8
9.181500	23.96	50.00	26.04	L1	10.8

Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 2


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.165750	54.76	65.17	10.41	N	10.4
0.363750	38.60	58.64	20.04	N	10.4
1.551750	30.83	56.00	25.17	N	10.5
2.206500	33.56	56.00	22.44	N	10.5
7.811250	37.17	60.00	22.83	N	10.7
9.303000	31.29	60.00	28.71	N	11.0

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.179250	45.02	54.52	9.50	N	10.6
7.811250	30.04	50.00	19.96	N	10.7
8.270250	13.60	50.00	36.40	N	10.8
8.785500	18.02	50.00	31.98	N	10.9
26.358000	9.45	50.00	40.55	N	11.6
27.908250	13.80	50.00	36.20	N	11.6

5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated emission (30-1000 MHz)

Result:
Passed

Date of testing	: 2025-02-13
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-2-3
Product classification	: Class B
Frequency range	: 30 – 1000 MHz (see Note 1)
Limits	: Quasi-peak limits (3 m distance): 30 – 88 MHz, 40 dB μ V/m; 88 – 216 MHz, 43.5 dB μ V/m; 216 – 1000 MHz, 46 dB μ V/m (see Note 2)
Bandwidth of EMI receiver for final measurement	: 120 kHz
Measurement time for final measurement	: 1 s
Kind of test site	: Semi-anechoic chamber
Input voltage	: AC 120 V, 60 Hz
Operational mode	: Mode 1: lighting on. Mode 2: flashing.
Ambient condition	: Temperature: 16.1 °C; Relative humidity: 50.3 %
Expanded measurement uncertainty ($k=2$)	: 5.40 dB The minimum margin to the limit is 4.58 dB at 30.970000 MHz. The margin is higher than expanded measurement uncertainty.

The radiated disturbance test was carried out in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3 m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on an 80 cm wooden support above the reference ground plane. The wooden support was rotated 360° around and the height of the antenna was varied from 1 m to 4 m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following spectral diagram, “◆” means quasi-peak test results.

Prüfbericht - Nr.: CN245XPT 001**Seite 17 von 24**

Test Report No.:

Page 17 of 24

Notes on following tables of radiated emission results and conversions:

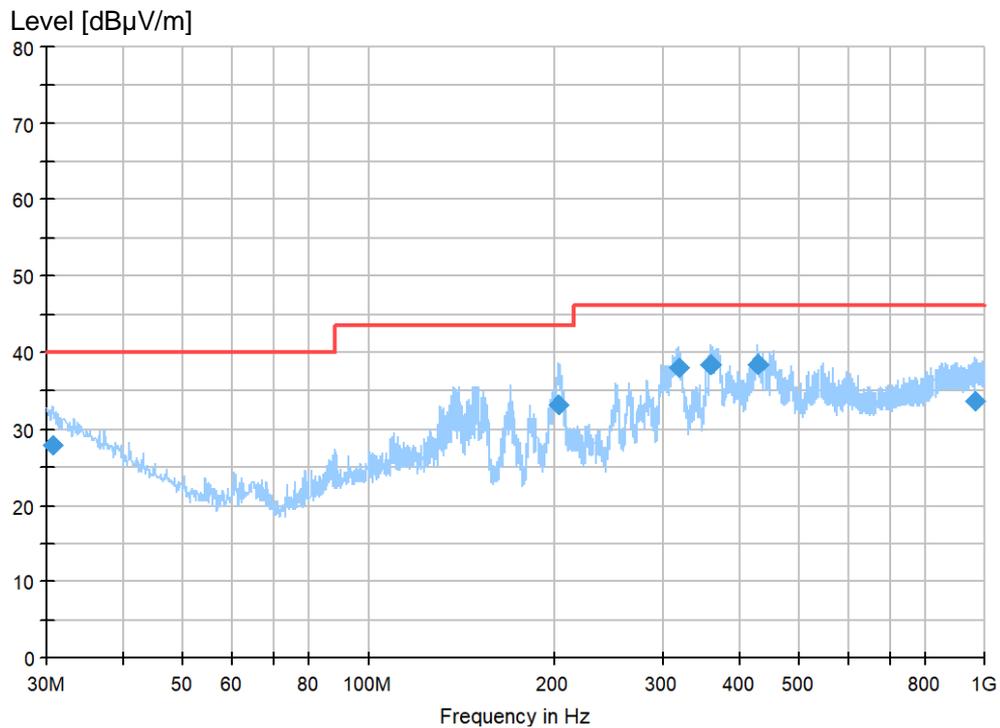
QuasiPeak (dB μ V/m): final measurement results by using quasi-peak detector

Corr. (dB): correction factor including: antenna factor, cable loss, and gain of pre-amplifier (if used)

Margin: Limit (dB μ V/m) - QuasiPeak (dB μ V/m)

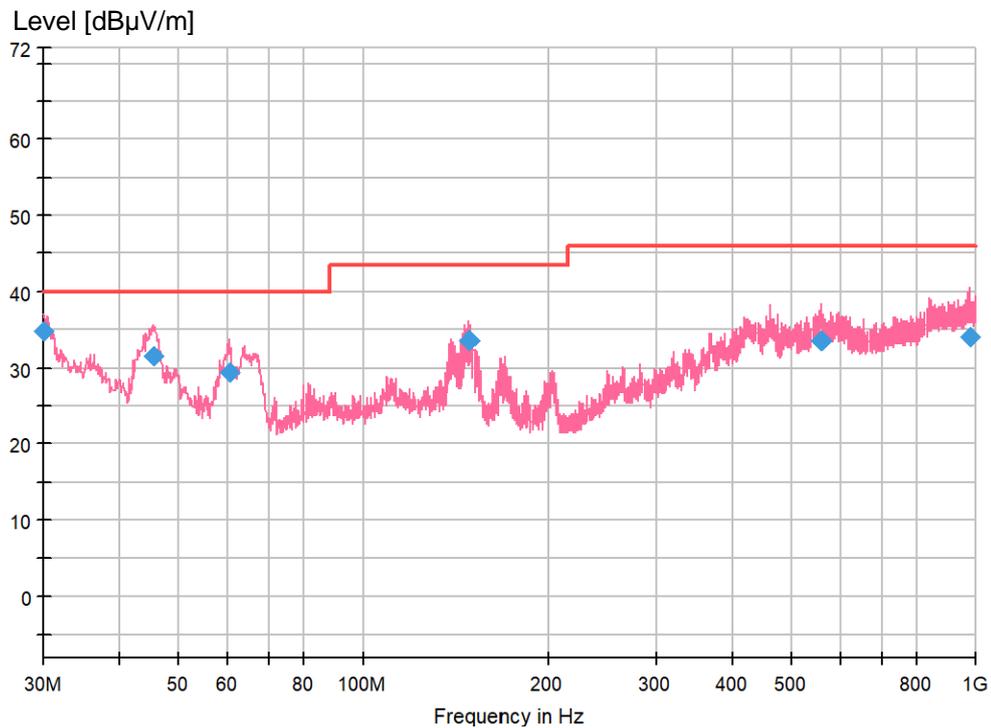
Note 1: The highest frequency in the EUT is less than 108 MHz. According to FCC Part 15 subpart B §15.33 (b) (1), the upper frequency for radiated emission measurement is 1000 MHz.

Note 2: The class B limits of ICES-005:2018 is stricter than those FCC 47 CFR Part 15, Subpart B:2023 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

Figure 5: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization on mode 1


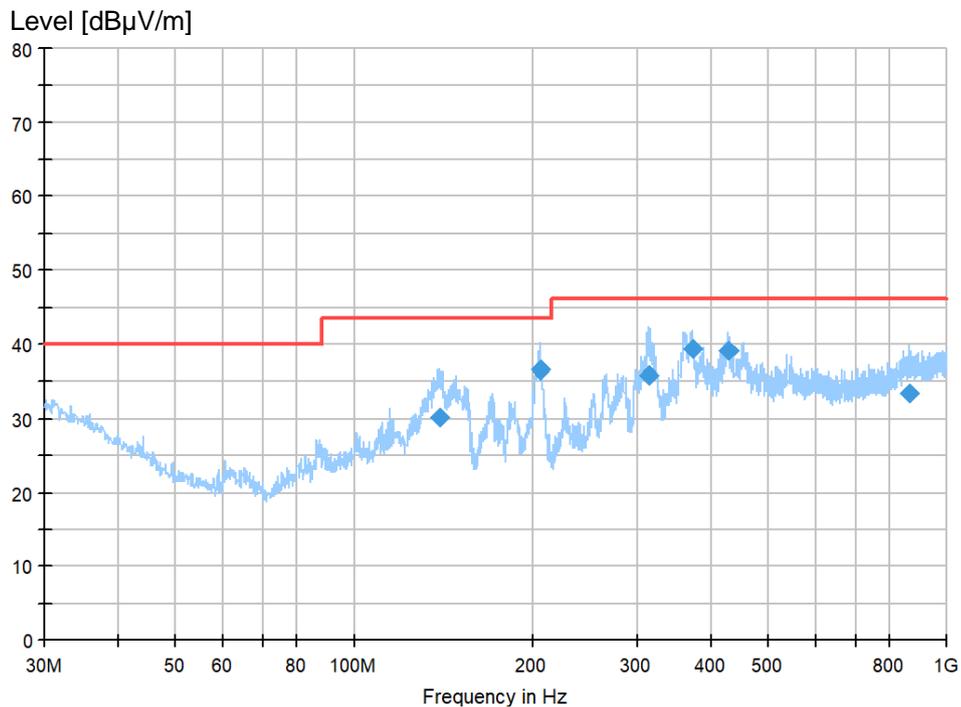
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.727500	27.85	40.00	12.15	1000.0	120.000	100.0	H	-174.0
203.630000	33.12	43.50	10.38	1000.0	120.000	100.0	H	180.0
319.302500	37.83	46.00	8.17	1000.0	120.000	100.0	H	137.0
357.860000	38.35	46.00	7.65	1000.0	120.000	100.0	H	36.0
428.548750	38.34	46.00	7.66	1000.0	120.000	100.0	H	54.0
964.110000	33.71	46.00	12.29	1000.0	120.000	100.0	H	-137.0

Figure 6: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization on mode 1


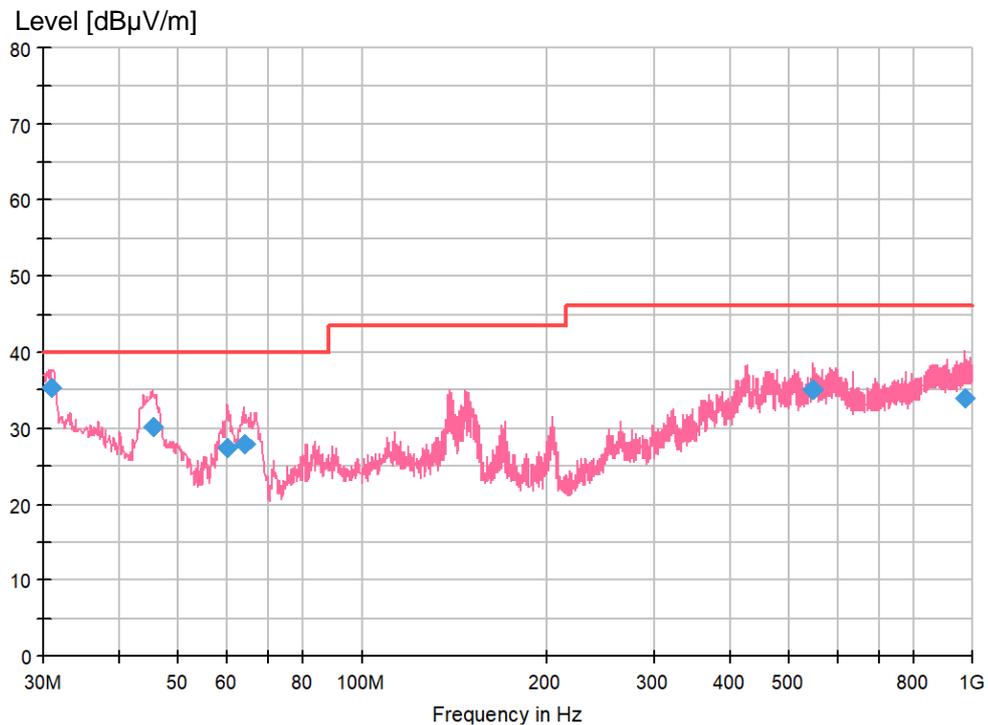
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	PoI	Azimuth (deg)
30.000000	34.73	40.00	5.27	1000.0	120.000	100.0	V	120.0
45.277500	31.48	40.00	8.52	1000.0	120.000	100.0	V	-141.0
60.555000	29.46	40.00	10.54	1000.0	120.000	100.0	V	56.0
148.946250	33.58	43.50	9.92	1000.0	120.000	100.0	V	138.0
558.286250	33.59	46.00	12.41	1000.0	120.000	100.0	V	-123.0
980.236250	34.02	46.00	11.98	1000.0	120.000	100.0	V	138.0

Figure 7: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization on mode 2


Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
139.367500	30.26	43.50	13.24	1000.0	120.000	225.0	H	-3.0
205.448750	36.46	43.50	7.04	1000.0	120.000	175.0	H	170.0
312.755000	35.72	46.00	10.28	1000.0	120.000	100.0	H	10.0
370.591250	39.20	46.00	6.80	1000.0	120.000	100.0	H	37.0
427.821250	38.97	46.00	7.03	1000.0	120.000	100.0	H	50.0
862.623750	33.39	46.00	12.61	1000.0	120.000	120.0	H	101.0

Figure 8: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization on mode 2


Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	PoI	Azimuth (deg)
30.970000	35.42	40.00	4.58	1000.0	120.000	100.0	V	137.0
45.398750	30.28	40.00	9.72	1000.0	120.000	100.0	V	-108.0
60.191250	27.41	40.00	12.59	1000.0	120.000	100.0	V	70.0
63.950000	27.77	40.00	12.23	1000.0	120.000	100.0	V	-99.0
547.616250	35.13	46.00	10.87	1000.0	120.000	100.0	V	34.0
971.870000	33.85	46.00	12.15	1000.0	120.000	100.0	V	-180.0

6 Photographs of the Test Set-Up

Refer to the test setup file.

7 List of Test and Measurement Instruments

Equip. no.	Equipment name	Model	Serial no.	Manufacturer	Cal. date	Due date
EMC-S-028	EMI measurement software	EMC32-E+ (10.60.20)	100150	Rohde & Schwarz	N/A	N/A
EMC-C-366	Thermohygrometer	608-H1	2485149174	testo	2024-07-26	2025-07-26
EMC-C-195	EMI test receiver	ESR3	102794	Rohde & Schwarz	2024-08-03	2025-08-03
EMC-C-190	Artificial mains network	ENV432	101514	Rohde & Schwarz	2024-10-11	2025-10-11
EMC-C-121	Thermohygrometer	608-H1	1241320265	testo	2024-06-25	2025-06-25
EMC-C-066	EMI test receiver	ESCI	100280	Rohde & Schwarz	2024-10-17	2025-10-17
EMC-C-001	3 m semi-anechoic chamber	SAC3	FJ129002	Frankonia	2023-12-03	2026-12-03
EMC-S-032	EMI measurement software	EMC32-MEB (10.60.20)	100697	Rohde & Schwarz	N/A	N/A
EMC-C-373	Trilog broadband antenna	VULB 9168	1771	Schwarzbeck	2024-11-23	2025-11-23

8 List of Figures

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 1	12
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 1	13
Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 2	14
Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 2	15
Figure 5: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization on mode 1	18
Figure 6: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization on mode 1	19
Figure 7: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization on mode 2	20
Figure 8: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization on mode 2	21

End of test report