

Prüfbericht-Nr.: Test report no.:	CN25KGZP 001	Auftrags-Nr.: Order no.:	326064928	Seite 1 von 32 Page 1 of 32
Kunden-Referenz-Nr.: Client reference no.:	1288983	Auftragsdatum: Order date:	2024-11-25	
Auftraggeber: Client:	IKEA of Sweden AB Box 702, SE-343 81 Älmhult, Sweden			
Prüfgegenstand: Test item:	LED Rope Lights			
Bezeichnung / Typ-Nr.: Identification / Type no.:	L2402			
Auftrags-Inhalt: Order content:	TÜV Rheinland EMC service			
Prüfgrundlage: Test specification:	FCC 47 CFR Part 15, Subpart B:2023 Class B ICES-005:2018			
Wareneingangsdatum: Date of sample receipt:	2025-05-08	Refer to the EUT photos file		
Prüfmuster-Nr.: Test sample no.:	A003988751-001			
Prüfzeitraum: Testing period:	2025-06-06~2025-06-17			
Ort der Prüfung: Place of testing:	Refer to clause 1.1			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by: Jessie Xu	genehmigt von: authorized by: Jiayi Zhou			
Datum: Date: 2025-06-18	<i>Jessie Xu</i>	Ausstellungsdatum: Issue date: 2025-06-18	<i>Jiayi Zhou</i>	
Stellung / Position: Project engineer		Stellung / Position: Authorizer		
Sonstiges / Other:	FCC ID: FHO-L2402 Test Firm Name: TÜV Rheinland (Shanghai) Co., Ltd. Designation Number: CN1396 Test Firm Registration Number: 930979			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* 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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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> |

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*Page 3 of 32***Revision history of test report:**

Report number	Issue date	Contents and reason for change if appropriate
CN25KGZP 001	2025-06-18	Initial release.

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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 rope lights for lighting and similar use. For further information, refer to the user's manual.

2.2 Ratings and System Details

Rated input : 5 V DC, Max 4.6 W
Protection class : Class III

2.3 Independent Operation Modes

The basic operation modes are: "ON" and "OFF" with dimming function.
The test modes are follows:

1. EUT is power by adaptor via the USB port with max lighting out.
2. EUT is power by adaptor via the USB port with min lighting out.
3. EUT is power by laptop via the USB port with max lighting out.
4. EUT is power by laptop via the USB port with min lighting out.

2.4 Description of interconnecting cables

No.	Interface and name	Shielded or not	Specified length (m)
1	USB cable	Unshielded	0.5 m
2	Control cable	Unshielded	1.5 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 1.2 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.

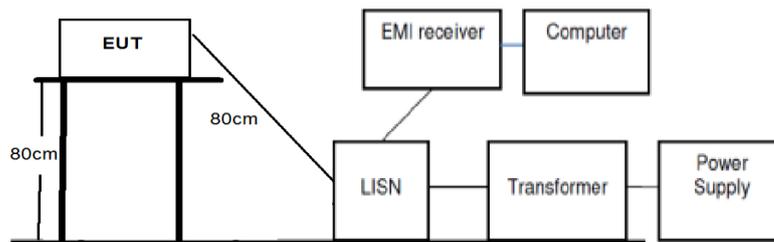
Refer to the related paragraph of this report.

The sequence of testing:

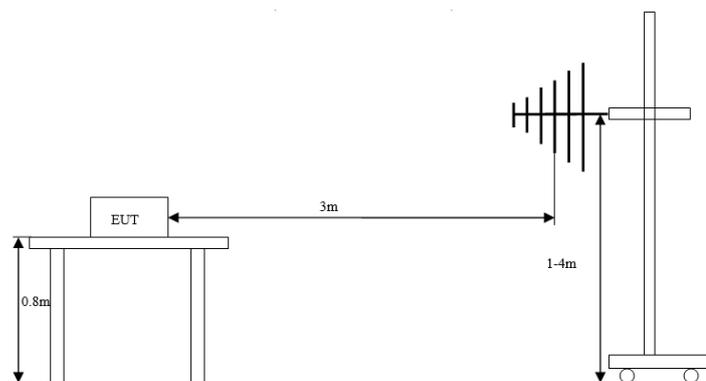
1. Conducted emission tests were performed on 2025-06-06~2025-06-16.
2. Radiated emission tests were performed on 2025-06-17.

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

During the test, the adaptor (model: ICPSW5-5NA-1, brand: IKEA) and laptop (model: T45, brand: ThinkPad) were used as power supply.

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	: 2025-06-07~2025-06-16
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 for adaptor and power supply of laptop
Operational mode	: Mode 1. EUT is power by adaptor via the USB port with max lighting out. Mode 2. EUT is power by adaptor via the USB port with min lighting out. Mode 3. EUT is power by laptop via the USB port with max lighting out. Mode 4. EUT is power by laptop via the USB port with min lighting out.
Ambient condition	: Temperature: 24.8 °C; Relative humidity: 48.0 %
Expanded measurement uncertainty ($k=2$)	: 2.33 dB The minimum margin to the limit is 6.36 dB at 6.886500 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.

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

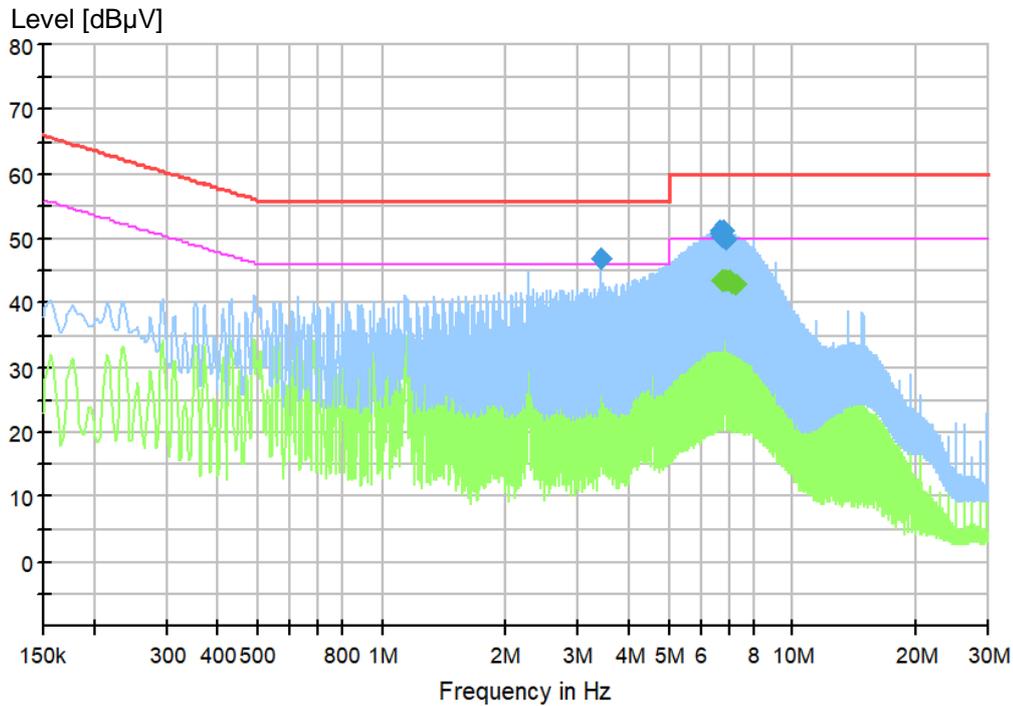
The following figures and tables were those measured by an automatic measuring system. Both quasi-peak and average measurements were performed. In the following spectral diagram, “♦” means Quasi-Peak Value and “◆” means Average Value results.

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)

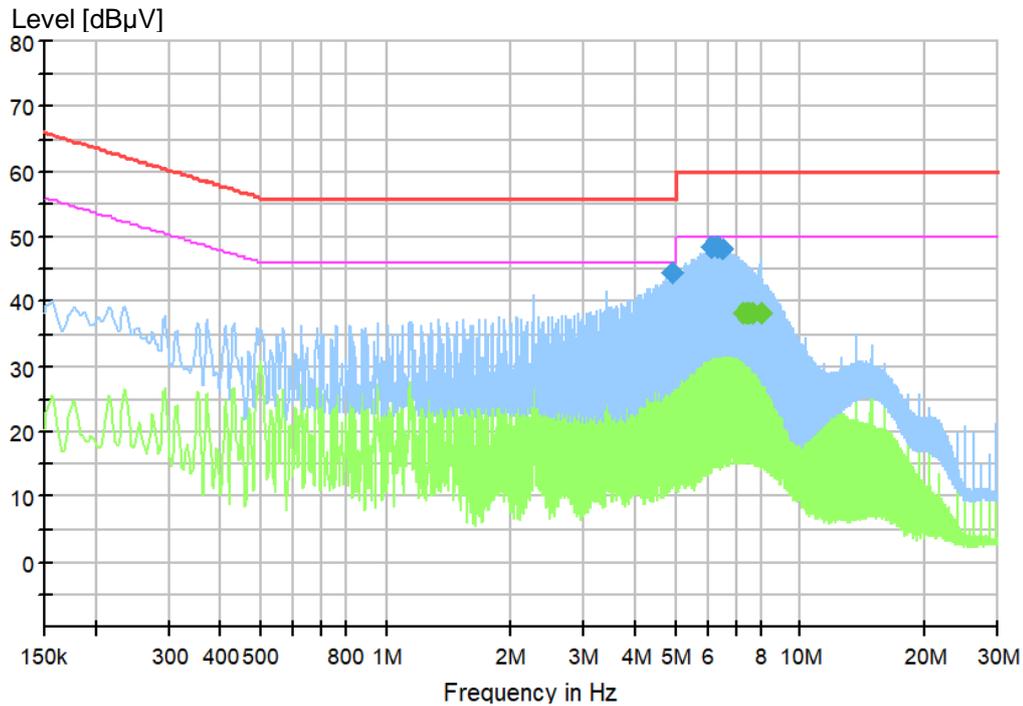
Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 1


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
3.426000	46.94	56.00	9.06	1000.0	9.000	L1	10.6
6.612000	51.26	60.00	8.74	1000.0	9.000	L1	10.7
6.672750	50.82	60.00	9.18	1000.0	9.000	L1	10.7
6.731250	50.38	60.00	9.62	1000.0	9.000	L1	10.7
6.807750	51.26	60.00	8.74	1000.0	9.000	L1	10.7
6.868500	49.92	60.00	10.08	1000.0	9.000	L1	10.7

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
6.690750	43.54	50.00	6.46	1000.0	9.000	L1	10.7
6.828000	43.45	50.00	6.55	1000.0	9.000	L1	10.7
6.886500	43.64	50.00	6.36	1000.0	9.000	L1	10.7
7.023750	43.48	50.00	6.52	1000.0	9.000	L1	10.7
7.082250	43.06	50.00	6.94	1000.0	9.000	L1	10.7
7.278000	42.76	50.00	7.24	1000.0	9.000	L1	10.7

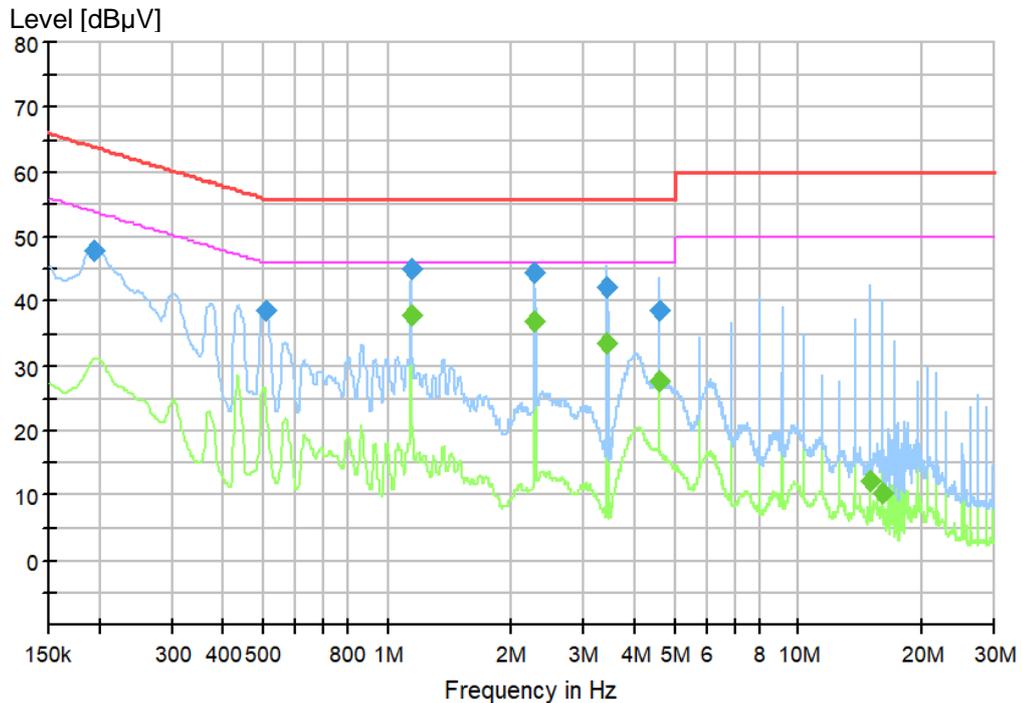
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 1


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
4.929000	44.33	56.00	11.67	1000.0	9.000	N	10.4
6.103500	48.41	60.00	11.59	1000.0	9.000	N	10.5
6.162000	48.46	60.00	11.54	1000.0	9.000	N	10.5
6.299250	48.48	60.00	11.52	1000.0	9.000	N	10.5
6.357750	48.59	60.00	11.41	1000.0	9.000	N	10.5
6.495000	48.06	60.00	11.94	1000.0	9.000	N	10.5

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
7.275750	38.32	50.00	11.68	1000.0	9.000	N	10.5
7.471500	38.28	50.00	11.72	1000.0	9.000	N	10.6
7.530000	38.27	50.00	11.73	1000.0	9.000	N	10.6
7.667250	38.24	50.00	11.76	1000.0	9.000	N	10.6
7.725750	38.30	50.00	11.70	1000.0	9.000	N	10.6
8.000250	38.27	50.00	11.73	1000.0	9.000	N	10.6

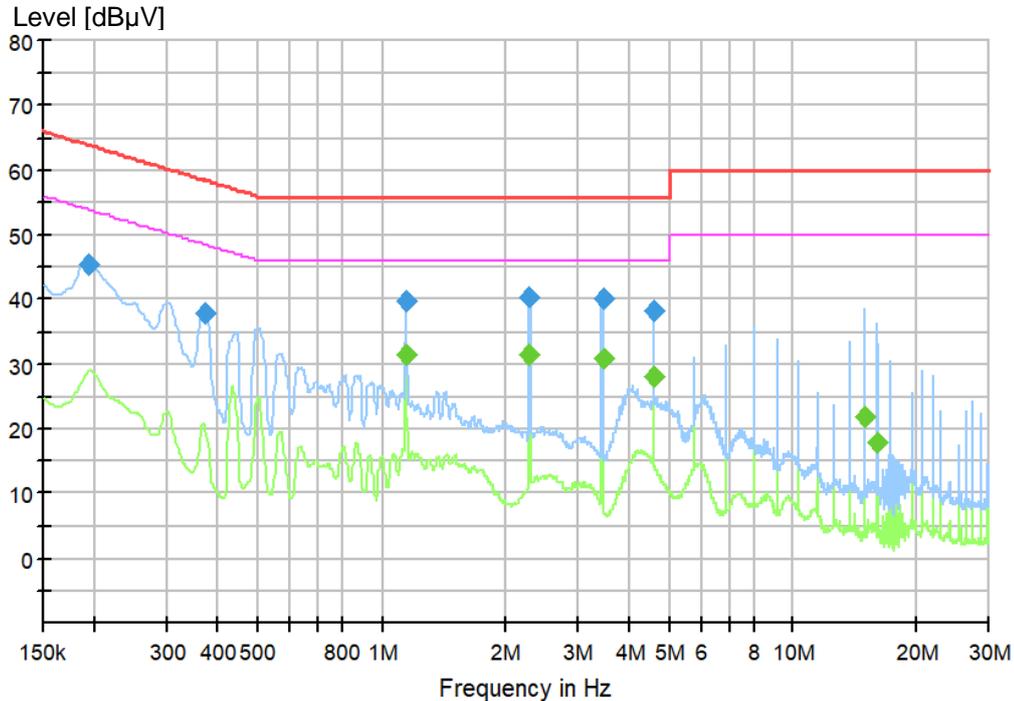
Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 2


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.195000	47.79	63.82	16.03	1000.0	9.000	L1	10.5
0.503250	38.47	56.00	17.53	1000.0	9.000	L1	10.5
1.144500	44.99	56.00	11.01	1000.0	9.000	L1	10.5
2.289750	44.49	56.00	11.51	1000.0	9.000	L1	10.6
3.435000	42.40	56.00	13.60	1000.0	9.000	L1	10.6
4.580250	38.45	56.00	17.55	1000.0	9.000	L1	10.6

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
1.144500	37.87	46.00	8.13	1000.0	9.000	L1	10.5
2.289750	36.96	46.00	9.04	1000.0	9.000	L1	10.6
3.435000	33.68	46.00	12.32	1000.0	9.000	L1	10.6
4.580250	27.77	46.00	18.23	1000.0	9.000	L1	10.6
14.887500	12.27	50.00	37.73	1000.0	9.000	L1	11.0
16.032750	10.54	50.00	39.46	1000.0	9.000	L1	11.1

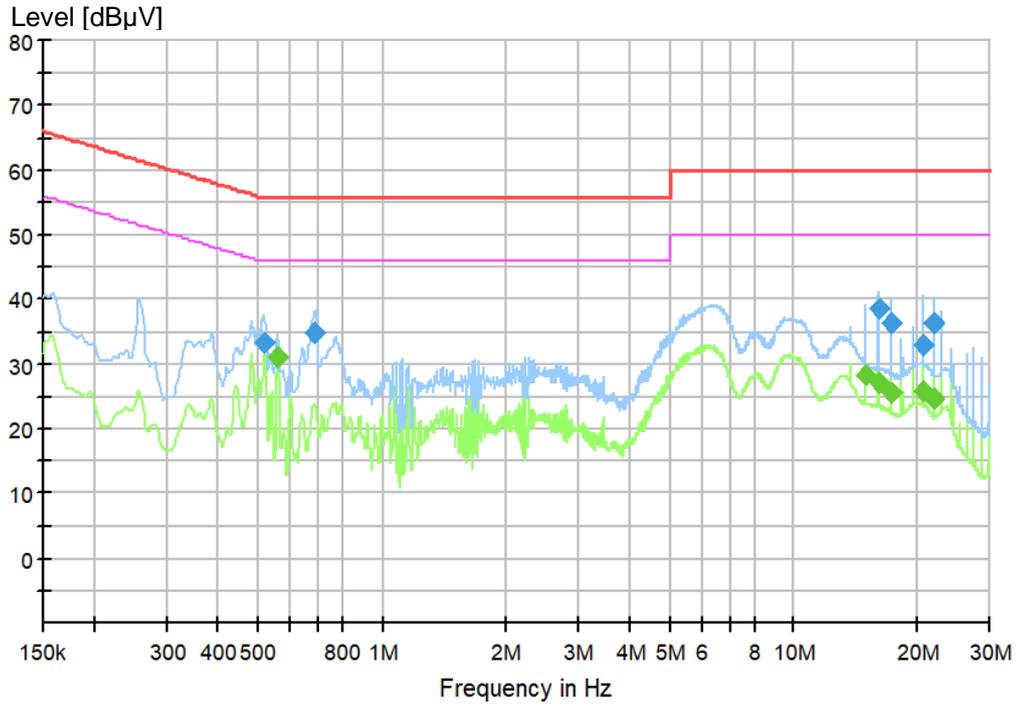
Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 2


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.195000	45.47	63.82	18.35	1000.0	9.000	N	10.3
0.372750	38.05	58.44	20.39	1000.0	9.000	N	10.3
1.146750	39.76	56.00	16.24	1000.0	9.000	N	10.3
2.294250	40.37	56.00	15.63	1000.0	9.000	N	10.4
3.441750	40.05	56.00	15.95	1000.0	9.000	N	10.4
4.589250	38.25	56.00	17.75	1000.0	9.000	N	10.4

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
1.146750	31.34	46.00	14.66	1000.0	9.000	N	10.3
2.294250	31.54	46.00	14.46	1000.0	9.000	N	10.4
3.441750	30.98	46.00	15.02	1000.0	9.000	N	10.4
4.589250	28.15	46.00	17.85	1000.0	9.000	N	10.4
14.914500	21.95	50.00	28.05	1000.0	9.000	N	10.9
16.062000	17.88	50.00	32.12	1000.0	9.000	N	10.9

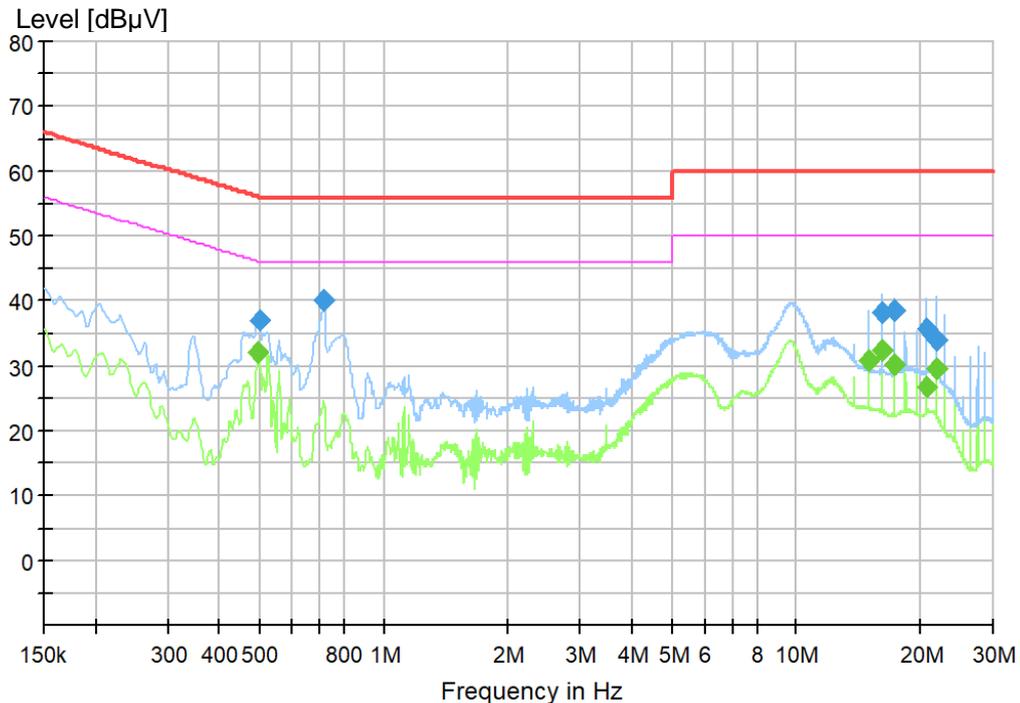
Figure 5: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 3


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.514500	33.18	56.00	22.82	1000.0	9.000	L1
0.687750	34.94	56.00	21.06	1000.0	9.000	L1
16.068750	38.45	60.00	21.55	1000.0	9.000	L1
17.216250	36.44	60.00	23.56	1000.0	9.000	L1
20.658750	32.93	60.00	27.07	1000.0	9.000	L1
21.808500	36.51	60.00	23.49	1000.0	9.000	L1

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.559500	31.25	46.00	14.75	1000.0	9.000	L1
14.921250	28.50	50.00	21.50	1000.0	9.000	L1
16.068750	27.09	50.00	22.91	1000.0	9.000	L1
17.216250	25.60	50.00	24.40	1000.0	9.000	L1
20.661000	25.82	50.00	24.18	1000.0	9.000	L1
21.808500	24.74	50.00	25.26	1000.0	9.000	L1

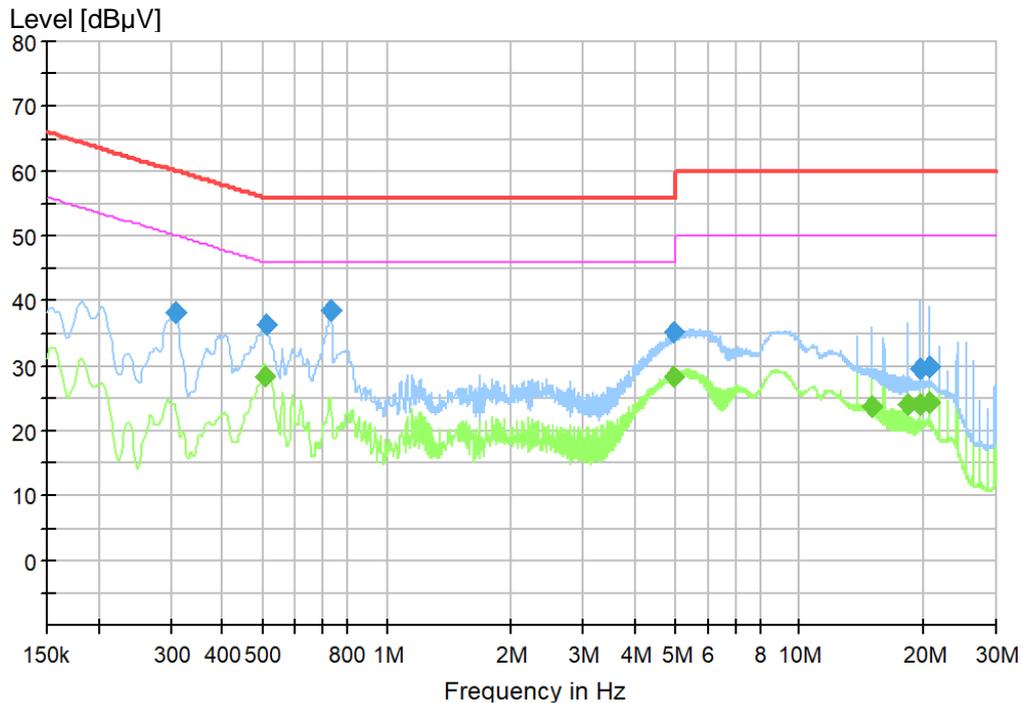
Figure 6: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 3


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.498750	36.91	56.02	19.11	1000.0	9.000	N
0.719250	40.07	56.00	15.93	1000.0	9.000	N
16.089000	38.18	60.00	21.82	1000.0	9.000	N
17.238750	38.57	60.00	21.43	1000.0	9.000	N
20.685750	35.84	60.00	24.16	1000.0	9.000	N
21.833250	34.04	60.00	25.96	1000.0	9.000	N

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.496500	32.16	46.06	13.90	1000.0	9.000	N
14.939250	30.83	50.00	19.17	1000.0	9.000	N
16.089000	32.35	50.00	17.66	1000.0	9.000	N
17.238750	30.32	50.00	19.68	1000.0	9.000	N
20.685750	26.69	50.00	23.31	1000.0	9.000	N
21.835500	29.50	50.00	20.50	1000.0	9.000	N

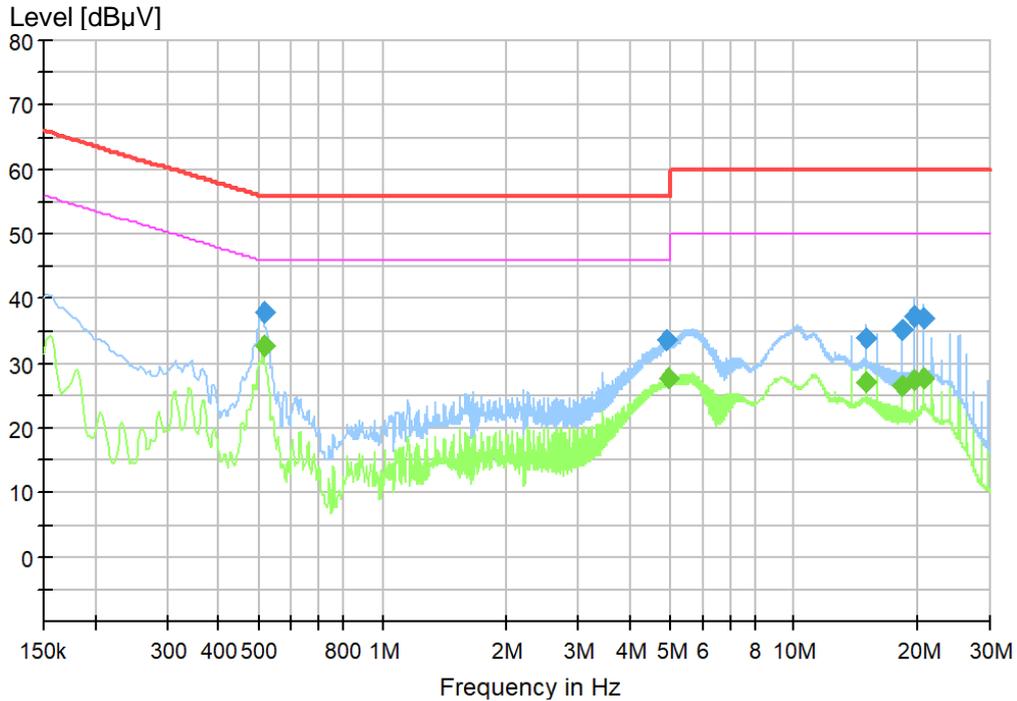
Figure 7: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, mode 4


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.307500	38.17	60.04	21.86	1000.0	9.000	L1
0.510000	36.35	56.00	19.65	1000.0	9.000	L1
0.730500	38.56	56.00	17.44	1000.0	9.000	L1
4.978500	35.07	56.00	20.93	1000.0	9.000	L1
19.506750	29.72	60.00	30.28	1000.0	9.000	L1
20.654250	30.04	60.00	29.96	1000.0	9.000	L1

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.503250	28.48	46.00	17.52	1000.0	9.000	L1
4.978500	28.32	46.00	17.68	1000.0	9.000	L1
14.916750	23.57	50.00	26.43	1000.0	9.000	L1
18.359250	23.98	50.00	26.02	1000.0	9.000	L1
19.506750	24.10	50.00	25.90	1000.0	9.000	L1
20.654250	24.31	50.00	25.69	1000.0	9.000	L1

Figure 8: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, mode 4


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.514500	37.84	56.00	18.16	1000.0	9.000	N
4.922250	33.50	56.00	22.50	1000.0	9.000	N
14.892000	33.95	60.00	26.05	1000.0	9.000	N
18.327750	35.19	60.00	24.81	1000.0	9.000	N
19.473000	37.20	60.00	22.80	1000.0	9.000	N
20.618250	36.97	60.00	23.03	1000.0	9.000	N

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.514500	32.53	46.00	13.47	1000.0	9.000	N
4.980750	27.87	46.00	18.13	1000.0	9.000	N
14.892000	27.19	50.00	22.81	1000.0	9.000	N
18.327750	26.63	50.00	23.37	1000.0	9.000	N
19.473000	27.57	50.00	22.43	1000.0	9.000	N
20.618250	27.70	50.00	22.30	1000.0	9.000	N

5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated emission (30-1000 MHz)

Result:	Passed
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Date of testing	: 2025-06-17
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 for adaptor and power supply of laptop
Operational mode	: Mode 1. EUT is power by adaptor via the USB port with max lighting out. Mode 2. EUT is power by adaptor via the USB port with min lighting out. Mode 3. EUT is power by laptop via the USB port with max lighting out. Mode 4. EUT is power by laptop via the USB port with min lighting out.
Ambient condition	: Temperature: 24.3 °C; Relative humidity: 48.0 %
Expanded measurement uncertainty ($k=2$)	: 5.40 dB The minimum margin to the limit is 6.36 dB at 452.677500 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.

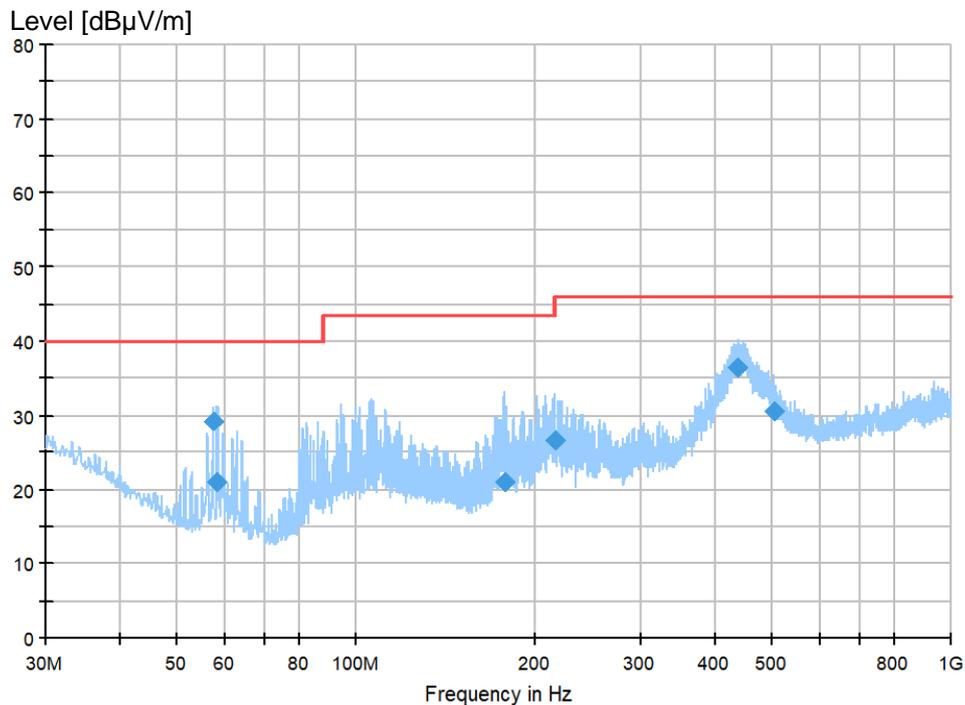
The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following spectral diagram, “◆” means quasi-peak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

Notes on following tables of radiated emission results and conversions:

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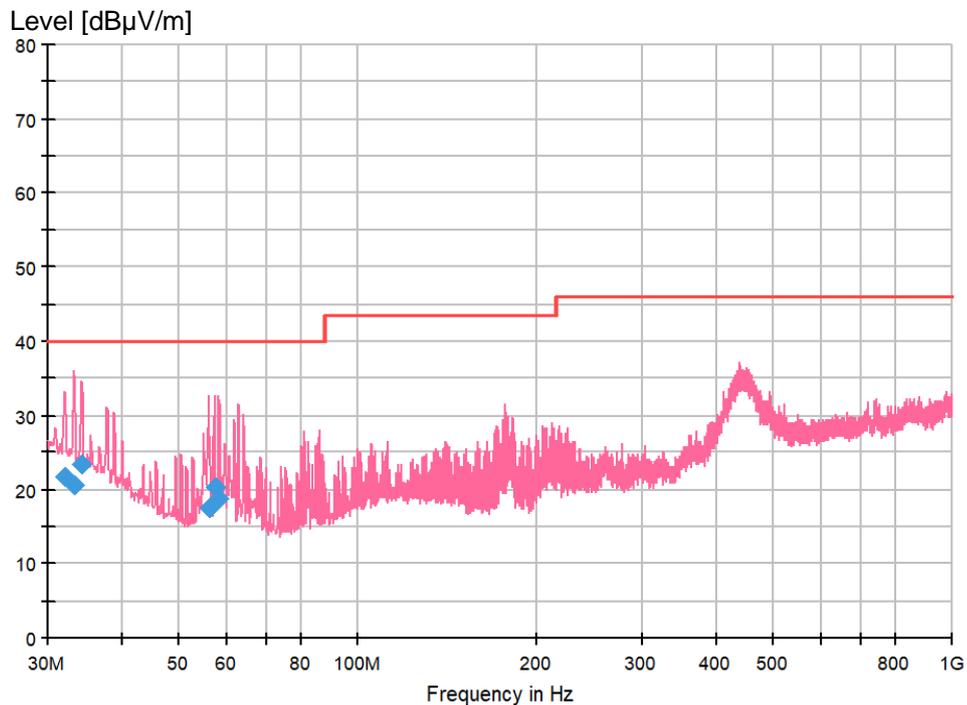
QuasiPeak (dB μ V/m): final measurement results by using quasi-peak detector
Corr. (dB): correction factor including: antenna factor, cable loss, and gain of pre-amplifier (if used)
Margin: Limit (dB μ V/m) - QuasiPeak (dB μ V/m)

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 9: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, mode 1


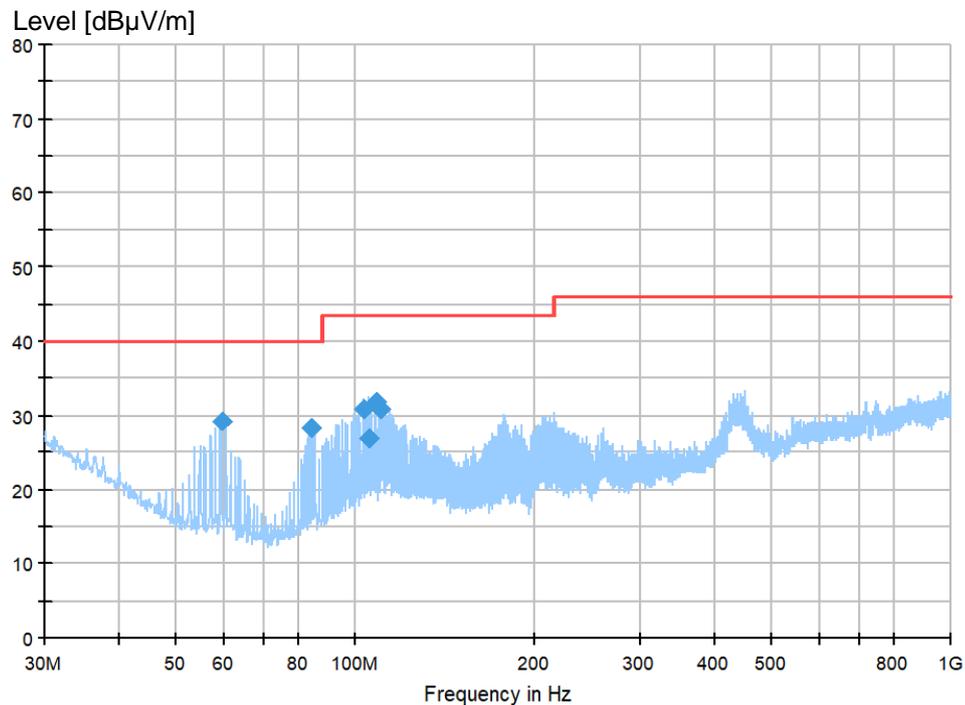
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
57.402500	29.35	40.00	10.65	1000.0	120.000	400.0	H	-17.0
58.493750	21.07	40.00	18.93	1000.0	120.000	400.0	H	-17.0
177.925000	21.16	43.50	22.34	1000.0	120.000	170.0	H	-148.0
214.663750	26.70	43.50	16.80	1000.0	120.000	170.0	H	-5.0
438.006250	36.60	46.00	9.40	1000.0	120.000	100.0	H	91.0
504.936250	30.54	46.00	15.46	1000.0	120.000	100.0	H	147.0

Figure 10: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, mode 1


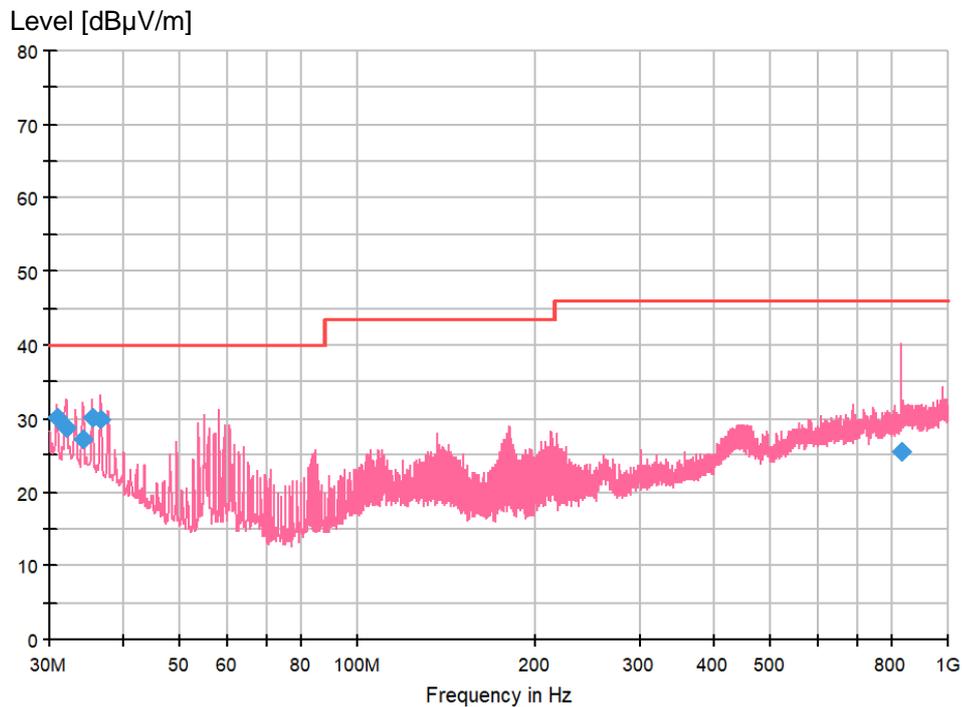
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.061250	21.75	40.00	18.25	1000.0	120.000	100.0	V	81.0
33.152500	20.52	40.00	19.48	1000.0	120.000	100.0	V	37.0
34.365000	23.43	40.00	16.57	1000.0	120.000	100.0	V	-61.0
56.068750	17.64	40.00	22.36	1000.0	120.000	100.0	V	37.0
57.281250	20.29	40.00	19.71	1000.0	120.000	301.0	V	-96.0
58.372500	18.66	40.00	21.34	1000.0	120.000	100.0	V	26.0

Figure 11: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, mode 2


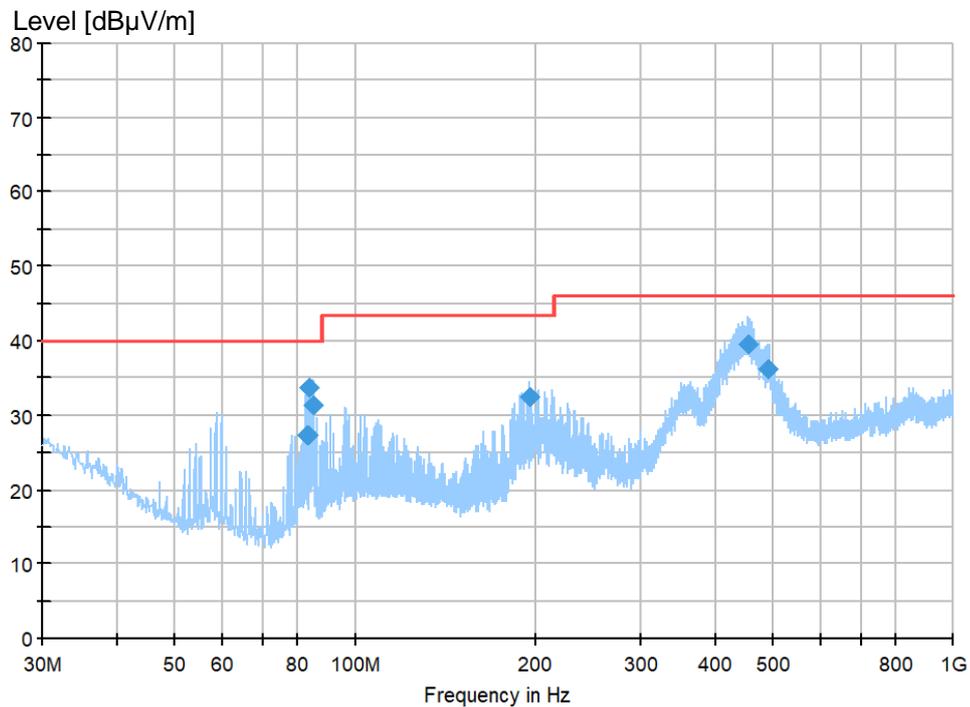
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
59.463750	29.20	40.00	10.80	1000.0	120.000	400.0	H	-15.0
84.562500	28.24	40.00	11.76	1000.0	120.000	323.0	H	4.0
102.871250	30.98	43.50	12.52	1000.0	120.000	302.0	H	4.0
105.053750	26.95	43.50	16.55	1000.0	120.000	303.0	H	14.0
108.570000	31.89	43.50	11.61	1000.0	120.000	330.0	H	4.0
109.782500	30.95	43.50	12.55	1000.0	120.000	323.0	H	15.0

Figure 12: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, mode 2


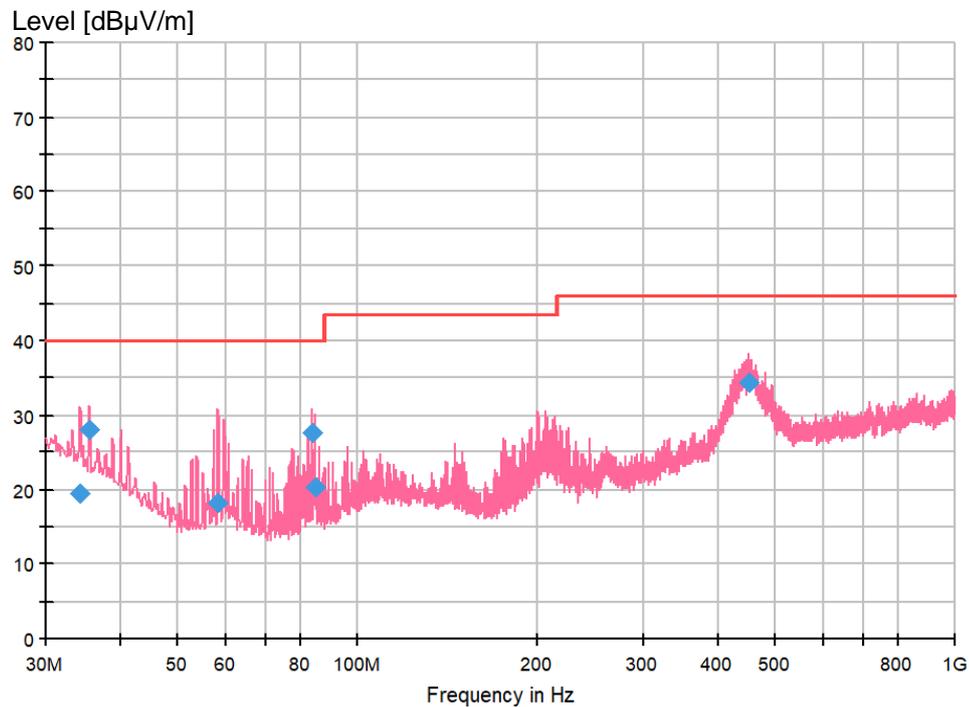
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/)
53.037500	26.4	1000.0	120.000	200.0	V	170.0	13.8	13.7	40.0
117.057500	35.1	1000.0	120.000	101.0	V	-124.0	18.8	8.4	43.5
120.573750	35.9	1000.0	120.000	109.0	V	34.0	18.7	7.7	43.5
124.211250	35.6	1000.0	120.000	130.0	V	99.0	18.7	7.9	43.5
292.142500	34.2	1000.0	120.000	117.0	V	125.0	20.2	11.8	46.0
297.962500	34.4	1000.0	120.000	149.0	V	-72.0	20.6	11.6	46.0

Figure 13: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, mode 3


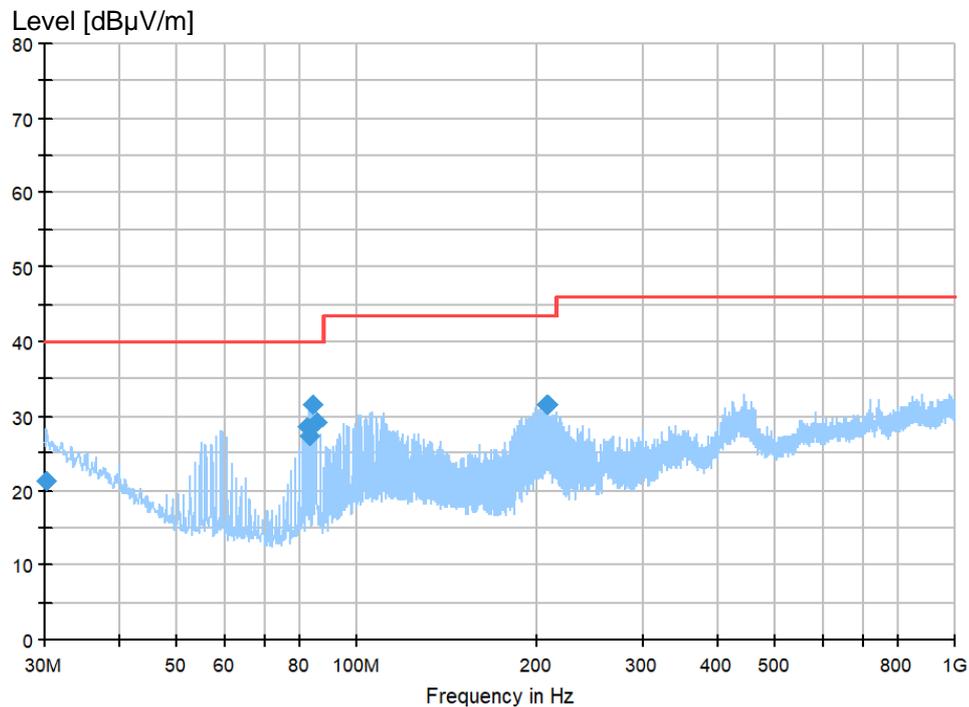
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
82.865000	27.41	40.00	12.59	1000.0	120.000	400.0	H	-5.0
83.956250	33.61	40.00	6.39	1000.0	120.000	400.0	H	28.0
85.168750	31.44	40.00	8.56	1000.0	120.000	330.0	H	23.0
195.385000	32.62	43.50	10.88	1000.0	120.000	170.0	H	-175.0
452.677500	39.64	46.00	6.36	1000.0	120.000	100.0	H	38.0
488.325000	36.33	46.00	9.67	1000.0	120.000	100.0	H	49.0

Figure 14: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, mode 3


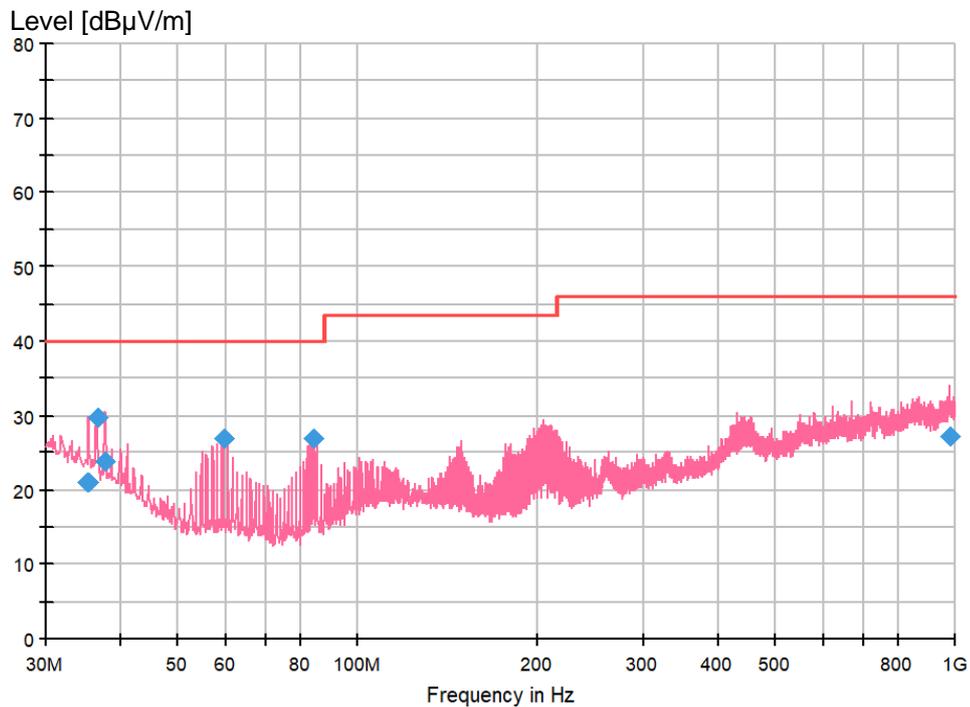
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.365000	19.52	40.00	20.48	1000.0	120.000	100.0	V	92.0
35.577500	27.96	40.00	12.04	1000.0	120.000	100.0	V	68.0
58.493750	18.22	40.00	21.78	1000.0	120.000	100.0	V	103.0
83.835000	27.68	40.00	12.32	1000.0	120.000	400.0	V	116.0
84.926250	20.34	40.00	19.66	1000.0	120.000	400.0	V	96.0
449.403750	34.30	46.00	11.70	1000.0	120.000	202.0	V	1.0

Figure 15: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, mode 4


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)
30.242500	21.34	40.00	18.66	1000.0	120.000	100.0	H	175.0
82.258750	28.63	40.00	11.37	1000.0	120.000	400.0	H	9.0
83.350000	27.39	40.00	12.61	1000.0	120.000	400.0	H	9.0
84.562500	31.64	40.00	8.36	1000.0	120.000	370.0	H	21.0
85.653750	29.20	40.00	10.80	1000.0	120.000	330.0	H	16.0
207.995000	31.58	43.50	11.92	1000.0	120.000	170.0	H	174.0

Figure 16: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, mode 4


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)
35.335000	20.96	40.00	19.04	1000.0	120.000	100.0	V	70.0
36.547500	29.82	40.00	10.18	1000.0	120.000	100.0	V	48.0
37.638750	23.91	40.00	16.09	1000.0	120.000	100.0	V	48.0
59.463750	26.82	40.00	13.18	1000.0	120.000	100.0	V	92.0
84.562500	26.94	40.00	13.06	1000.0	120.000	400.0	V	116.0
975.143750	27.19	46.00	18.81	1000.0	120.000	322.0	V	-51.0

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-S-032	EMI measurement software	EMC32-MEB (10.60.20)	100697	Rohde & Schwarz	N/A	N/A
EMC-C-155	BiLog antenna	CBL 6112D	40530	Teseq	2025-03-24	2026-09-24
EMC-C-121	Thermohygrometer	608-H1	1241320265	testo	2025-06-05	2026-06-05
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

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End of test report