

Prüfbericht-Nr.: Test Report No.:	CN25Z2Y6 001	Auftrags-Nr.: Order No.:	326072236	Seite 1 von 41 Page 1 of 41
Kunden-Referenz-Nr.: Client Reference No.:	1288983	Auftragsdatum: Order date.:	2025-01-09	
Auftraggeber: Client:	IKEA of Sweden AB Box 702, SE-343 81 Älmhult, Sweden			
Prüfgegenstand: Test item:	Self-ballasted LED lamps			
Bezeichnung / Typ-Nr.: Identification / Type No.:	LED2409G6NA			
Auftrags-Inhalt: Order content:	TÜV Rheinland EMC service			
Prüfgrundlage: Test specification:	FCC 47 CFR Part 15, Subpart B:2023 Class B ICES-005:2018 ICES-003:2020			
Wareneingangsdatum: Date of receipt:	2025-03-21	Refer to the EUT photos file		
Prüfmuster-Nr.: Test sample No.:	A003951539-006			
Prüfzeitraum: Testing period:	Refer to test report			
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:	genehmigt von: authorized by:			
Datum: Date: 2025-04-30	Ausstellungsdatum: Issue date: 2025-04-30			
Stellung: / Position	Project engineer	Stellung: / Position:	Authorizer	
Sonstiges / Other:	FCC ID: FHO- LED2409G6NA Test Firm Name: TUV 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 specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

Anmerkungen Remarks

- | | |
|----------|--|
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| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.</p> <p>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.</i></p> <p><i>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.: CN25Z2Y6 001
Test Report No.:

Seite 3 von 41
Page 3 of 41

Revision history of test report:

Report number	Issue date	Contents and reason for change if appropriate
CN25Z2Y6 001	2025-04-30	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	PHYSICAL CONFIGURATION FOR TESTING	8
3.4	TEST OPERATION AND TEST SOFTWARE	8
3.5	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	8
3.6	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	20
5.2.1	Radiated Emission (30 - 1000 MHz)	20
5.2.2	Radiated Emission (1-18 GHz)	30
6	PHOTOGRAPHS OF THE TEST SET-UP	39
7	LIST OF TEST AND MEASUREMENT INSTRUMENTS	40
8	LIST OF FIGURES	41

1 Test Sites

1.1 Test Facilities

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

Address: Workshop14, 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 self-ballasted LED lamps for lighting and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

Rated input	: AC 120 V, 60 Hz
Rated power	: 6.5 W
IC	: 10912A-LED2409G6NA

2.3 Independent Operation Modes

The basic operation modes are: "On" or "Off" with dimmer.

The test mode as follows:

"On"

- Mode 1: Warm lighting with the maximum lighting output.
- Mode 2: Warm lighting with the minimum lighting output.
- Mode 3: White lighting with the maximum lighting output.
- Mode 4: White lighting with the minimum lighting output.

2.4 Description of interconnecting cables

None.

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 2480 MHz.

2.7 Submitted Documents

Circuit diagram, label and user's manual.

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.

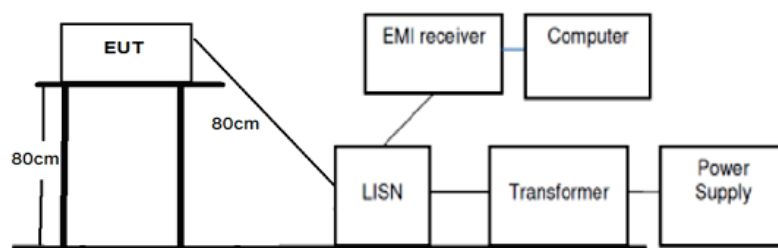
Refer to the related paragraph of this report.

The sequence of testing:

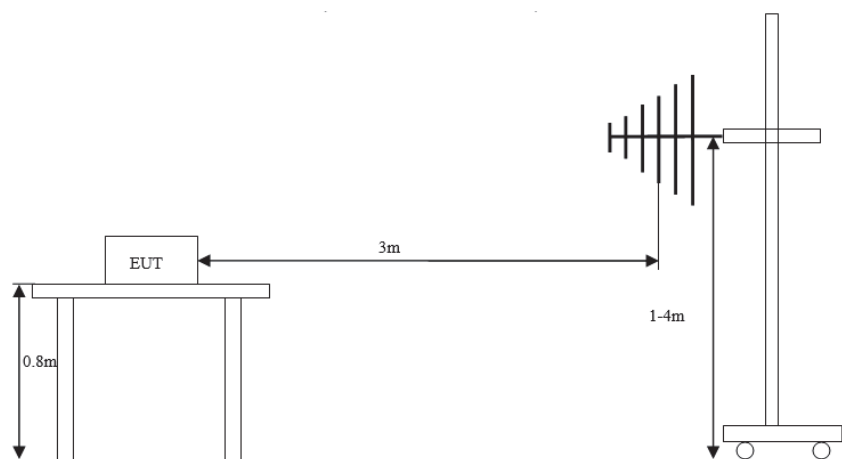
1. Conducted emission tests were performed on 2025-04-03.
2. Radiated emission tests were performed on 2025-04-03.

3.2 Equipment and cable arrangement

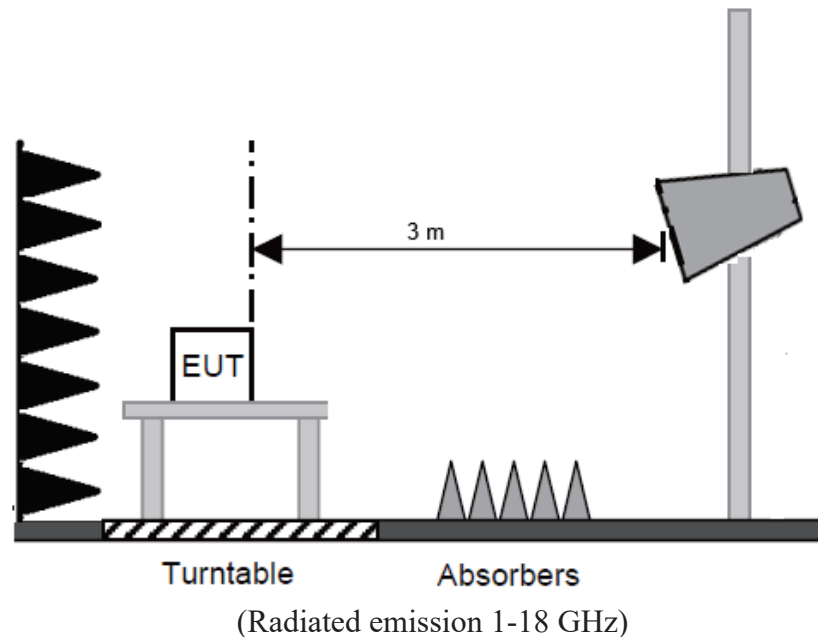
Block diagram for radiated emission tests is as follows:



(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 Physical Configuration for Testing

Refer to the related paragraph of this report.

3.4 Test Operation and Test Software

The “Home” APP for iPhone was used during the tests.

3.5 Special Accessories and Auxiliary Equipment

During the tests, the following auxiliary equipment were used.

No.	Product	Model	Brand
1	Mobile phone	iPhone 15	Apple
2	Loudspeaker	HomePod mini	Apple
3	Remote control	E2489	IKEA

3.6 Countermeasures to achieve EMC Compliance

No special measure is employed to achieve the requirement.

4 Conformity Decision Rule

For all EMI tests (when 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	: 2025-04-03	
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ICES-003:2020, 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, 2, 3, 4	
Ambient condition	: Temperature: 20.8 °C; Relative humidity: 41.7 %	
Expanded measurement uncertainty ($k=2$)	: 2.33 dB The minimum margin to the limit is 7.78 dB at 0.177000 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.

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.

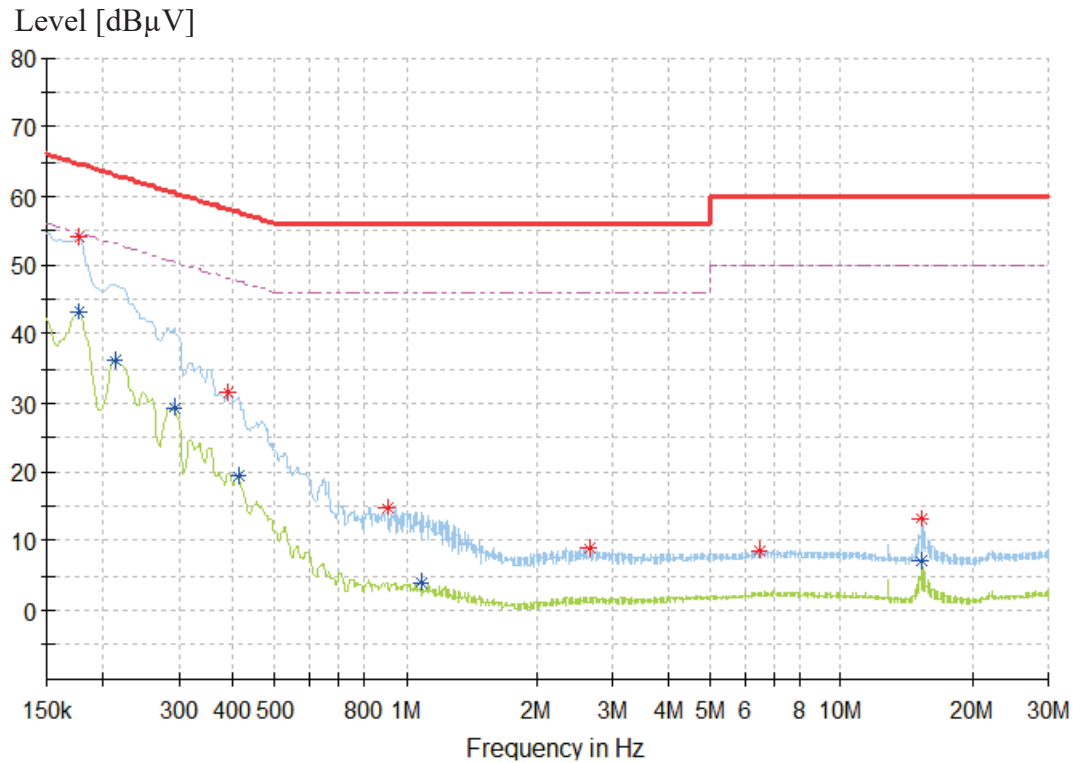
Notes on following tables of conducted emission results and conversions:

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)

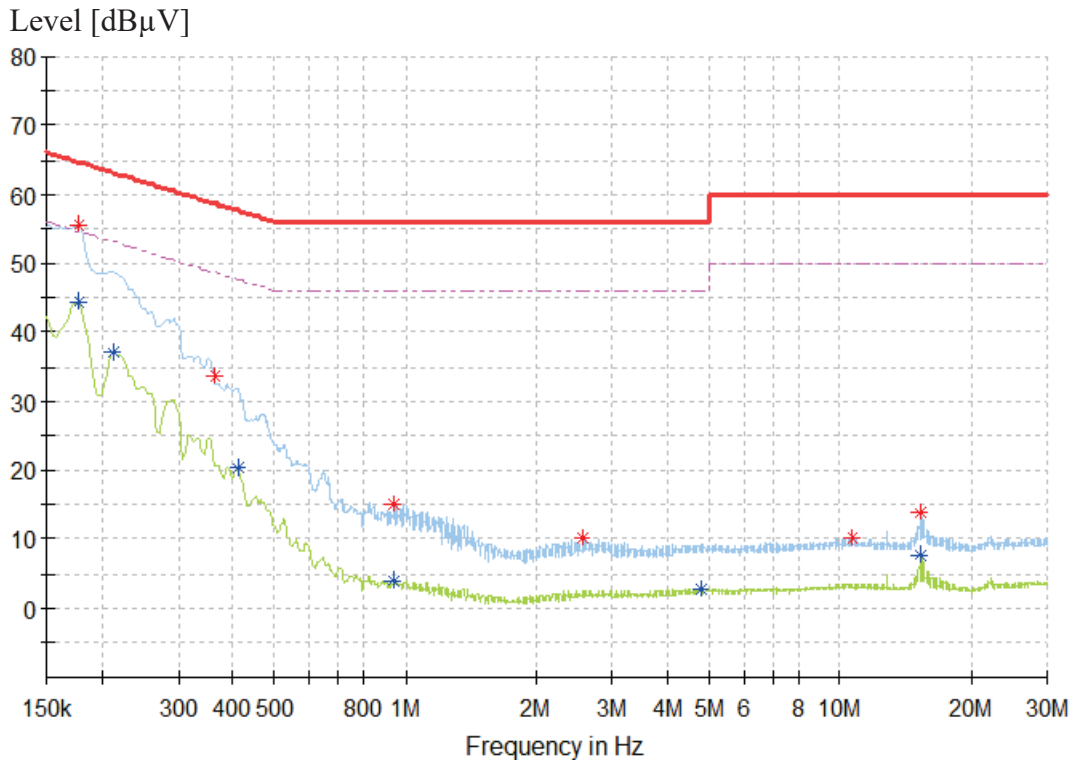
Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line L, mode 1



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.177000	54.03	---	64.63	10.59	L1	10.3
0.177000	---	43.16	54.63	11.46	L1	10.3
0.215250	---	35.98	53.00	17.03	L1	10.3
0.294000	---	29.23	50.41	21.18	L1	10.3
0.388500	31.42	---	58.10	26.68	L1	10.3
0.411000	---	19.44	47.63	28.19	L1	10.3
0.906000	14.68	---	56.00	41.32	L1	10.6
1.083750	---	3.97	46.00	42.03	L1	10.7
2.643000	8.99	---	56.00	47.01	L1	10.1
6.526500	8.58	---	60.00	51.42	L1	10.7
15.321750	13.17	---	60.00	46.83	L1	10.8
15.321750	---	7.14	50.00	42.86	L1	10.8

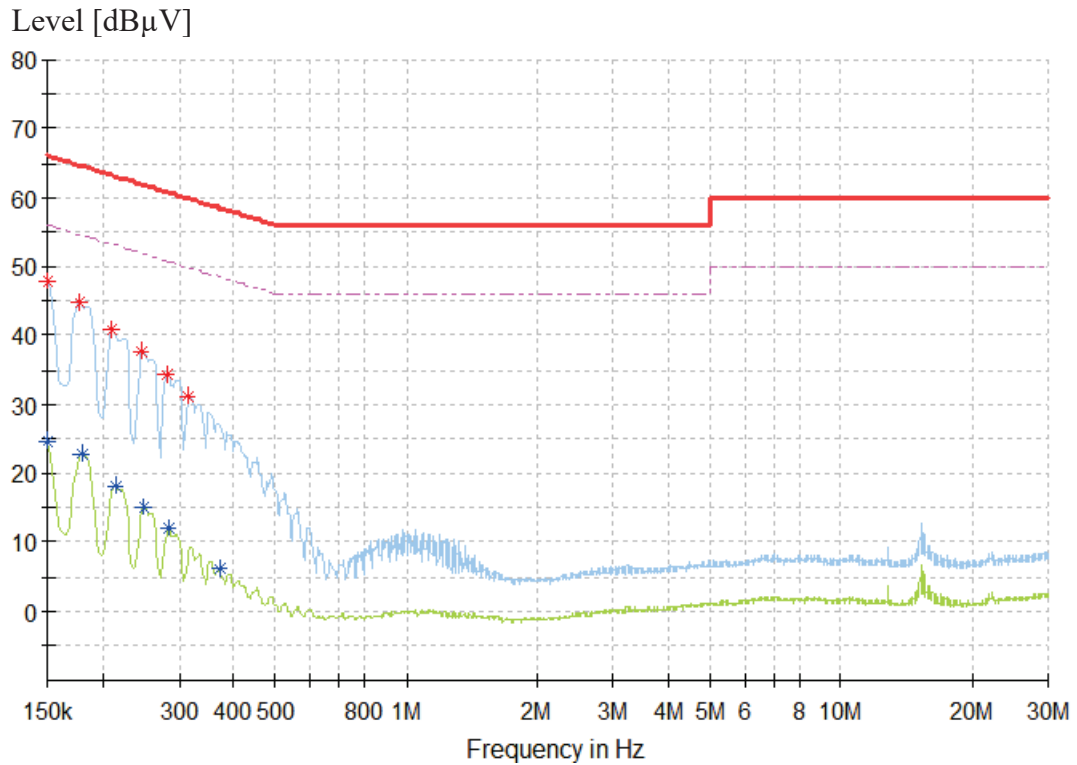
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line N, mode 1



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.177000	55.51	---	64.63	9.11	N	10.5
0.177000	---	44.47	54.63	10.15	N	10.5
0.213000	---	37.04	53.09	16.05	N	10.8
0.363750	33.56	---	58.64	25.09	N	10.4
0.411000	---	20.18	47.63	27.45	N	10.3
0.942000	---	3.92	46.00	42.08	N	10.4
0.942000	15.19	---	56.00	40.81	N	10.4
2.559750	9.96	---	56.00	46.04	N	10.6
4.818750	---	2.68	46.00	43.32	N	10.7
10.648500	10.02	---	60.00	49.98	N	11.1
15.321750	13.86	---	60.00	46.14	N	11.1
15.321750	---	7.67	50.00	42.33	N	11.1

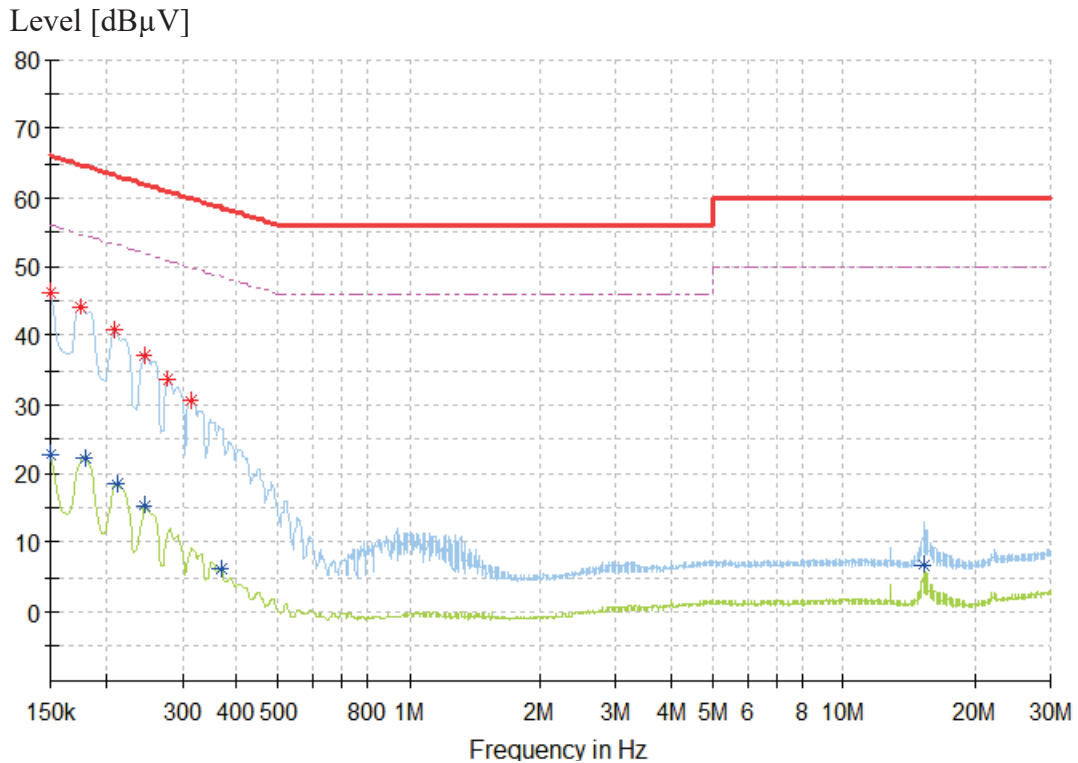
Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line L, mode 2



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	47.93	---	66.00	18.07	L1	10.3
0.150000	---	24.55	56.00	31.45	L1	10.3
0.177000	44.85	---	64.63	19.77	L1	10.3
0.179250	---	22.94	54.52	31.58	L1	10.3
0.210750	40.60	---	63.18	22.58	L1	10.3
0.215250	---	18.07	53.00	34.93	L1	10.3
0.246750	37.52	---	61.87	24.34	L1	10.3
0.249000	---	15.04	51.79	36.75	L1	10.3
0.280500	34.28	---	60.80	26.52	L1	10.3
0.285000	---	11.98	50.67	38.69	L1	10.3
0.316500	30.98	---	59.80	28.82	L1	10.3
0.372750	---	6.08	48.44	42.36	L1	10.3

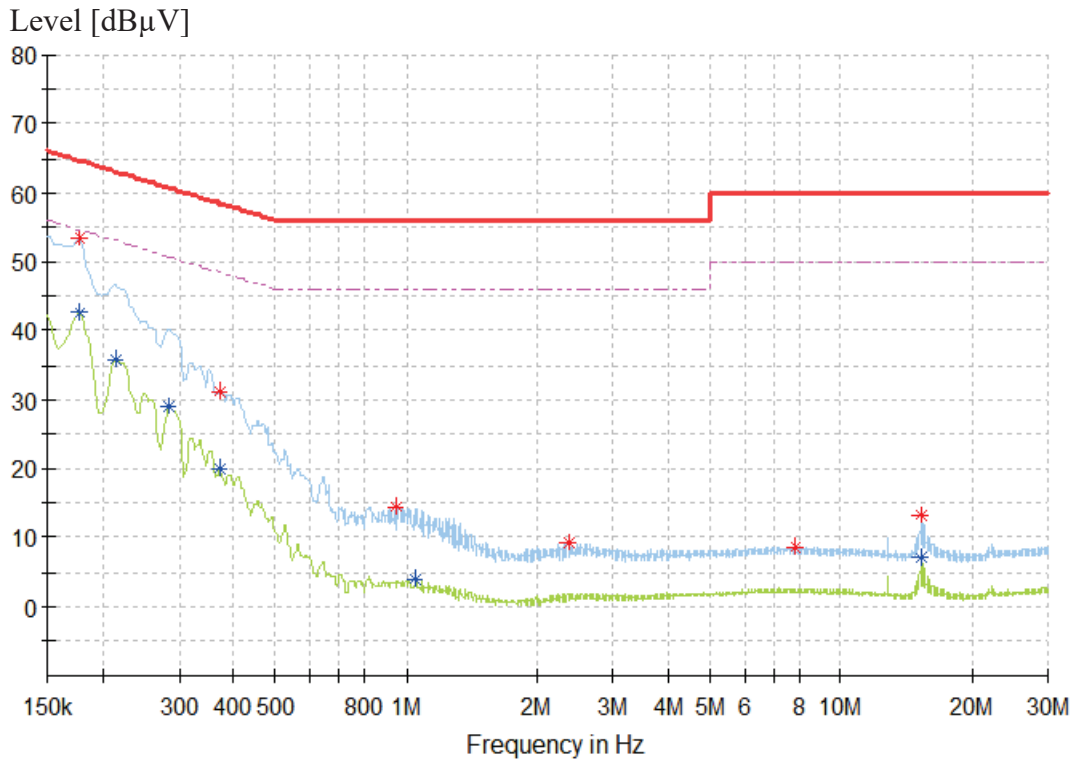
Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line N, mode 2



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	46.22	---	66.00	19.78	N	10.2
0.150000	---	22.82	56.00	33.18	N	10.2
0.174750	44.24	---	64.73	20.49	N	10.5
0.179250	---	22.30	54.52	32.22	N	10.6
0.210750	40.57	---	63.18	22.60	N	10.8
0.213000	---	18.46	53.09	34.62	N	10.8
0.246750	---	15.23	51.87	36.63	N	10.7
0.246750	37.13	---	61.87	24.74	N	10.7
0.278250	33.47	---	60.87	27.40	N	10.6
0.314250	30.53	---	59.86	29.33	N	10.5
0.368250	---	6.22	48.54	42.32	N	10.4
15.321750	---	6.72	50.00	43.28	N	11.1

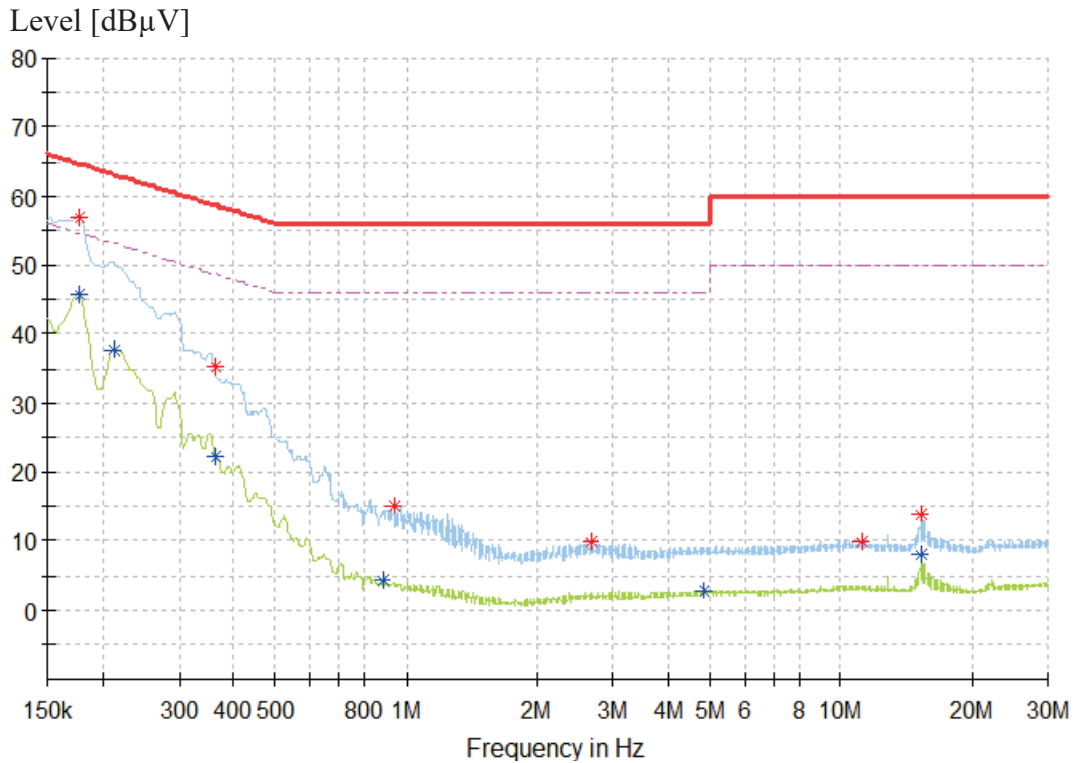
Figure 5: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line L, mode 3



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.177000	53.38	---	64.63	11.25	L1	10.3
0.177000	---	42.43	54.63	12.20	L1	10.3
0.215250	---	35.69	53.00	17.31	L1	10.3
0.285000	---	29.02	50.67	21.65	L1	10.3
0.372750	---	19.86	48.44	28.58	L1	10.3
0.375000	31.15	---	58.39	27.24	L1	10.3
0.946500	14.53	---	56.00	41.47	L1	10.7
1.050000	---	3.90	46.00	42.10	L1	10.7
2.348250	9.08	---	56.00	46.92	L1	10.1
7.883250	8.58	---	60.00	51.42	L1	10.9
15.321750	13.26	---	60.00	46.74	L1	10.8
15.321750	---	7.14	50.00	42.86	L1	10.8

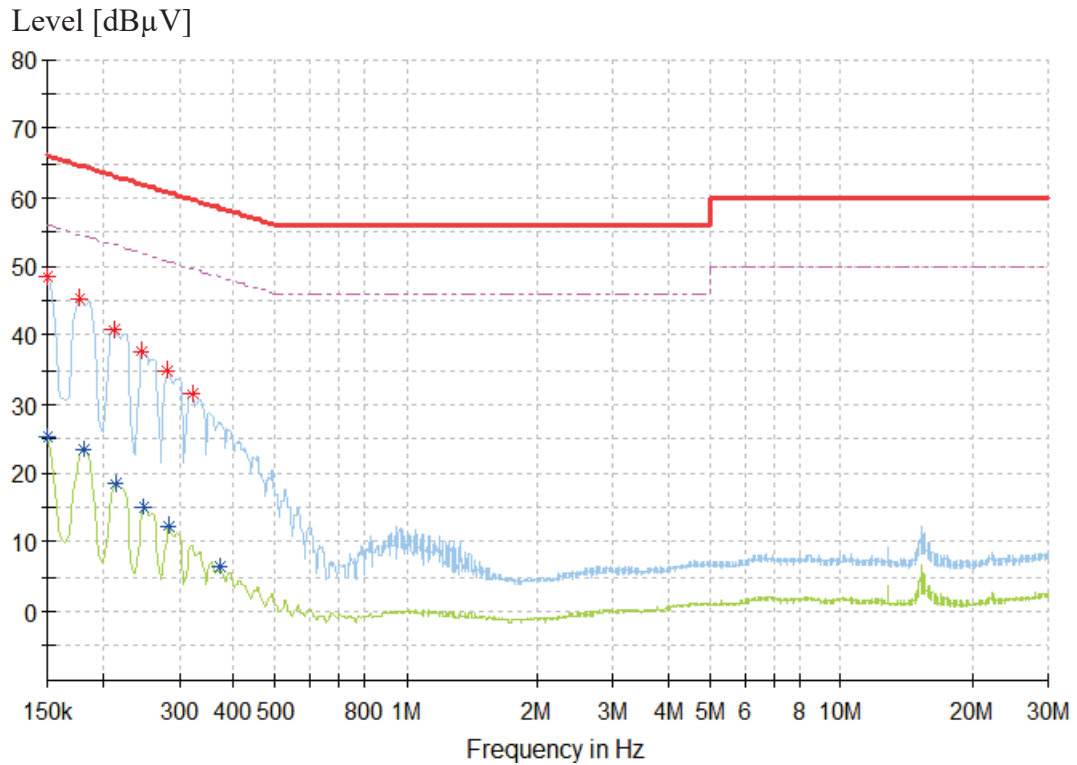
Figure 6: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line N, mode 3



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.177000	56.84	---	64.63	7.78	N	10.5
0.177000	---	45.70	54.63	8.93	N	10.5
0.213000	---	37.77	53.09	15.31	N	10.8
0.363750	---	22.06	48.64	26.59	N	10.4
0.363750	35.15	---	58.64	23.50	N	10.4
0.885750	---	4.24	46.00	41.76	N	10.4
0.937500	15.14	---	56.00	40.86	N	10.4
2.661000	9.79	---	56.00	46.21	N	10.6
4.823250	---	2.74	46.00	43.26	N	10.7
11.103000	9.77	---	60.00	50.23	N	11.1
15.321750	13.83	---	60.00	46.17	N	11.1
15.321750	---	7.89	50.00	42.11	N	11.1

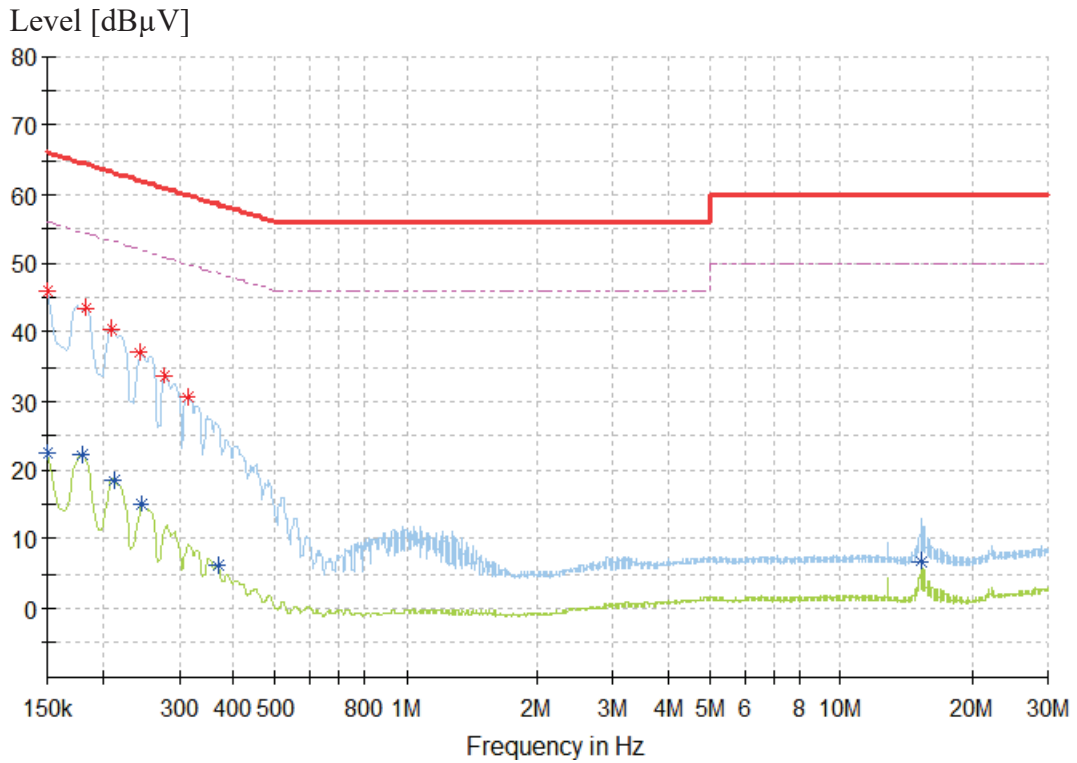
Figure 7: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, Line L, mode 4



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	48.40	---	66.00	17.60	L1	10.3
0.150000	---	25.24	56.00	30.76	L1	10.3
0.177000	45.35	---	64.63	19.28	L1	10.3
0.181500	---	23.26	54.42	31.16	L1	10.3
0.213000	40.78	---	63.09	22.30	L1	10.3
0.215250	---	18.40	53.00	34.60	L1	10.3
0.246750	37.77	---	61.87	24.10	L1	10.3
0.249000	---	15.02	51.79	36.77	L1	10.3
0.282750	34.71	---	60.74	26.03	L1	10.3
0.285000	---	12.26	50.67	38.41	L1	10.3
0.321000	31.31	---	59.68	28.37	L1	10.3
0.372750	---	6.28	48.44	42.16	L1	10.3

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



Final measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	45.96	---	66.00	20.04	N	10.2
0.150000	---	22.57	56.00	33.43	N	10.2
0.179250	---	22.30	54.52	32.22	N	10.6
0.183750	43.46	---	64.31	20.85	N	10.6
0.210750	40.55	---	63.18	22.63	N	10.8
0.213000	---	18.61	53.09	34.48	N	10.8
0.244500	36.87	---	61.94	25.07	N	10.7
0.246750	---	15.10	51.87	36.77	N	10.7
0.278250	33.46	---	60.87	27.41	N	10.6
0.314250	30.51	---	59.86	29.35	N	10.5
0.368250	---	6.15	48.54	42.39	N	10.4
15.321750	---	6.85	50.00	43.15	N	11.1

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	: 2025-04-03
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ICES-003:2020, ANSI C63.4-2014 and CISPR 16-2-3
Product classification	: Class B
Frequency range	: 30 – 1000 MHz
Limits	: Quasi-peak limits (3 m distance): (see Note) 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
Bandwidth of EMI receiver for final measurement	: 120 kHz
Measurement time for final measurement	: 1 s
Kind of test site	: Semi-anechoic chamber
Supply voltage	: AC 120 V, 60 Hz
Operational mode	: Mode 1, 2, 3, 4
Ambient condition	: Temperature: 21.8 °C; Relative humidity: 43.6 %
Expanded measurement uncertainty ($k=2$)	: 5.40 dB The minimum margin to the limit is 16.7 dB at 60.900000 & 727.320000 MHz. The margin is higher than the 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 a 0.8 m high wooden table above the reference ground plane. The wooden table 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. Before final measurement, a survey was made to determine in which state the maximum disturbance was obtained. The final measurement was made in the state the maximum disturbance was obtained. In the following spectral diagram, “x” means quasi-peak test results.

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).

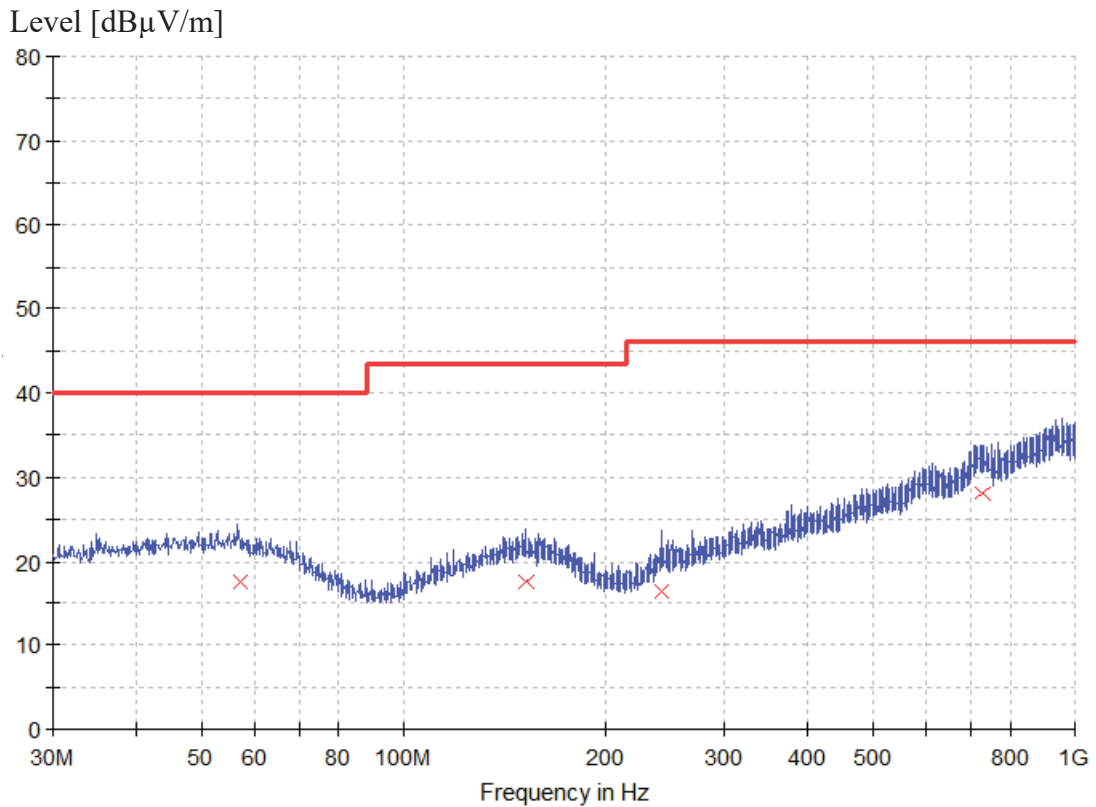
Margin: Limit (dB μ V/m) - QuasiPeak (dB μ V/m).

Prüfbericht - Nr.: CN25Z2Y6 001
Test Report No.:

Seite 21 von 41
Page 21 of 41

Note: The class B limits of ICES-005:2018 is stricter than those FCC 47 CFR Part 15, Subpart B:2023 and ICES-003:2020 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

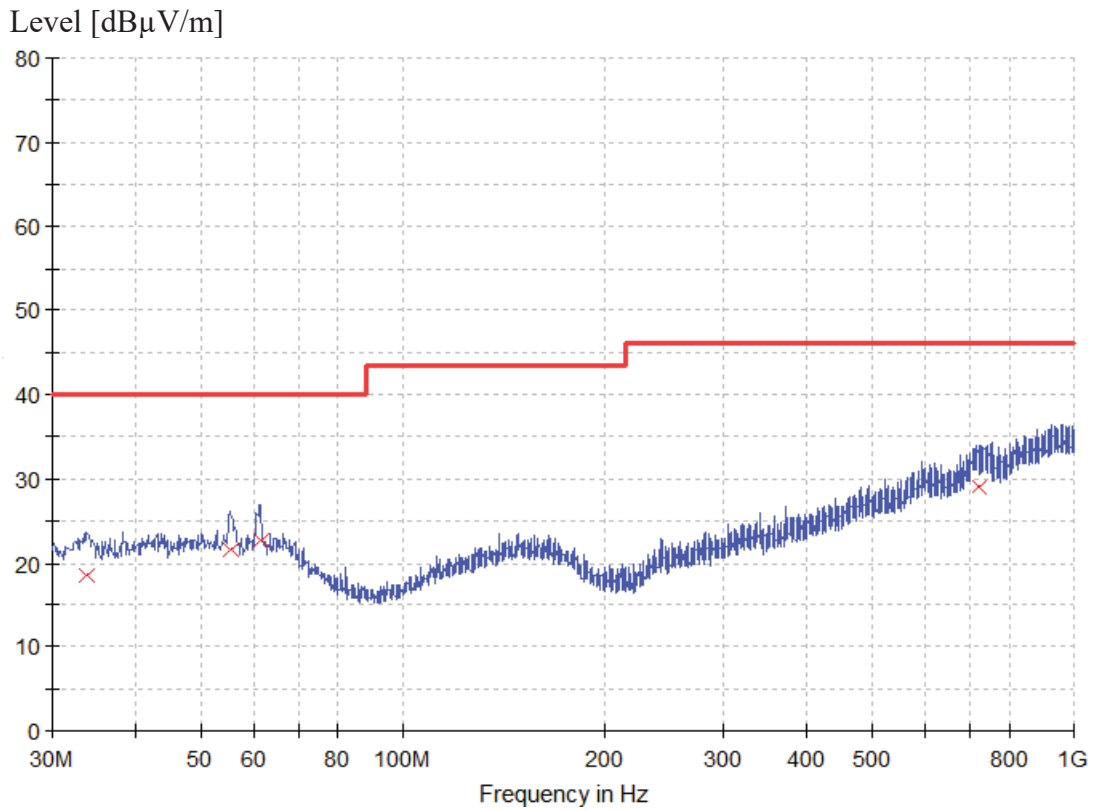
Figure 9: Spectral diagrams and measurement results, 30 – 1000 MHz, Horizontal polarization, mode 1



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
56.820000	17.5	120.000	120.0	H	-180.0	14.0	22.5	40.0
151.740000	17.5	120.000	100.0	H	0.0	14.3	26.0	43.5
242.040000	16.4	120.000	150.0	H	120.0	13.4	29.6	46.0
729.360000	28.1	120.000	200.0	H	-90.0	24.5	17.9	46.0

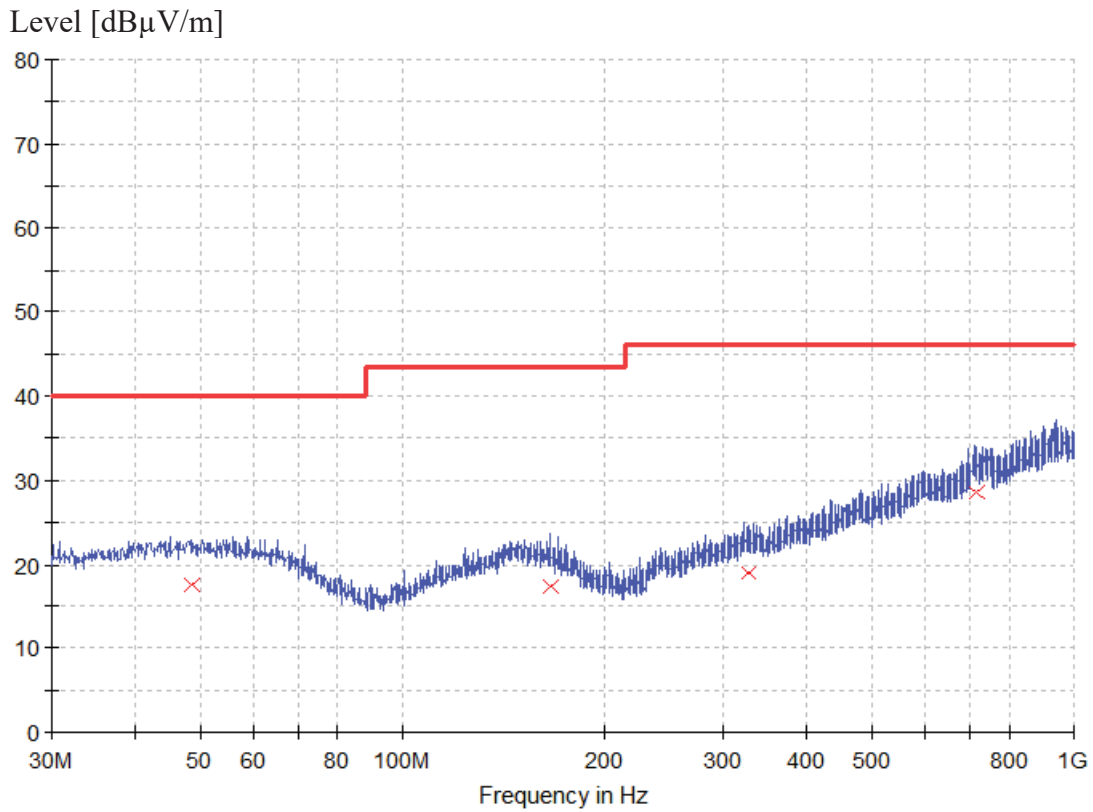
Figure 10: Spectral diagrams and measurement results, 30 – 1000 MHz, Vertical polarization, mode 1



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
33.780000	18.4	120.000	100.0	V	120.0	13.3	21.6	40.0
55.200000	21.6	120.000	150.0	V	-100.0	14.2	18.4	40.0
61.260000	22.6	120.000	100.0	V	0.0	13.5	17.4	40.0
725.220000	28.9	120.000	250.0	V	90.0	24.0	17.1	46.0

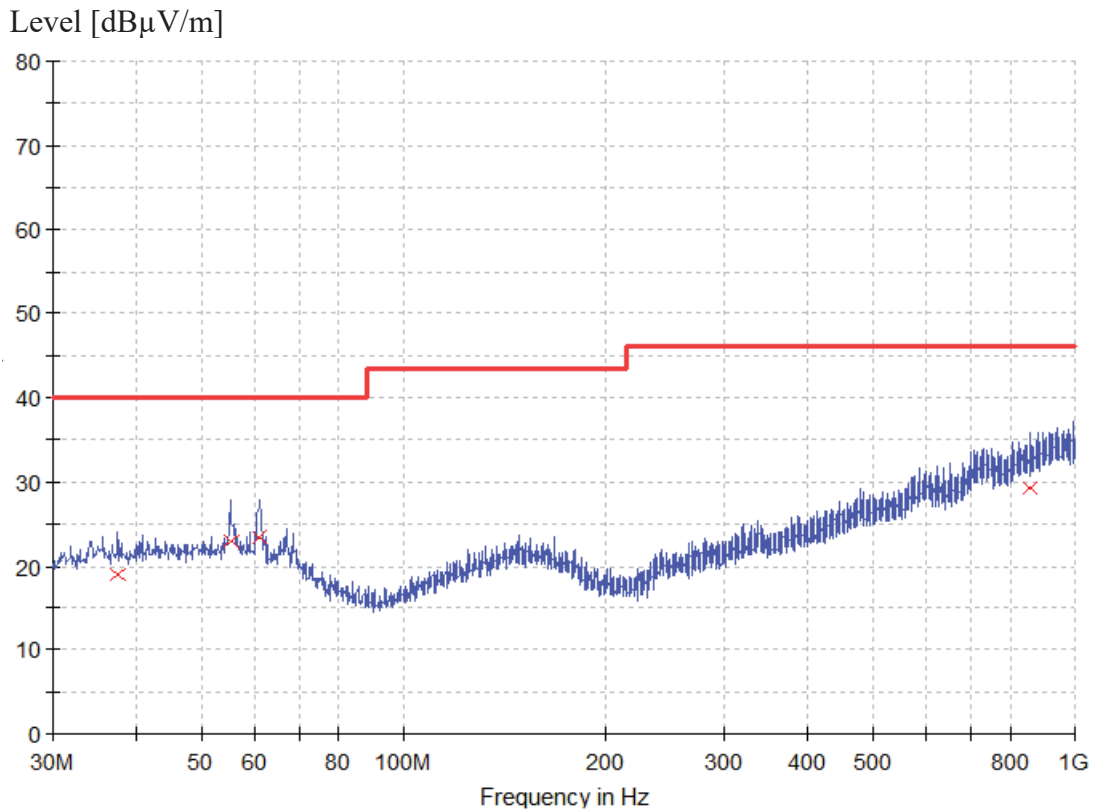
Figure 11: Spectral diagrams and measurement results, 30 – 1000 MHz, Horizontal polarization, mode 2



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
48.300000	17.6	120.000	150.0	H	-180.0	14.2	22.4	40.0
166.500000	17.2	120.000	100.0	H	135.0	14.0	26.3	43.5
328.260000	18.9	120.000	120.0	H	0.0	15.6	27.2	46.0
718.080000	28.5	120.000	100.0	H	180.0	24.8	17.5	46.0

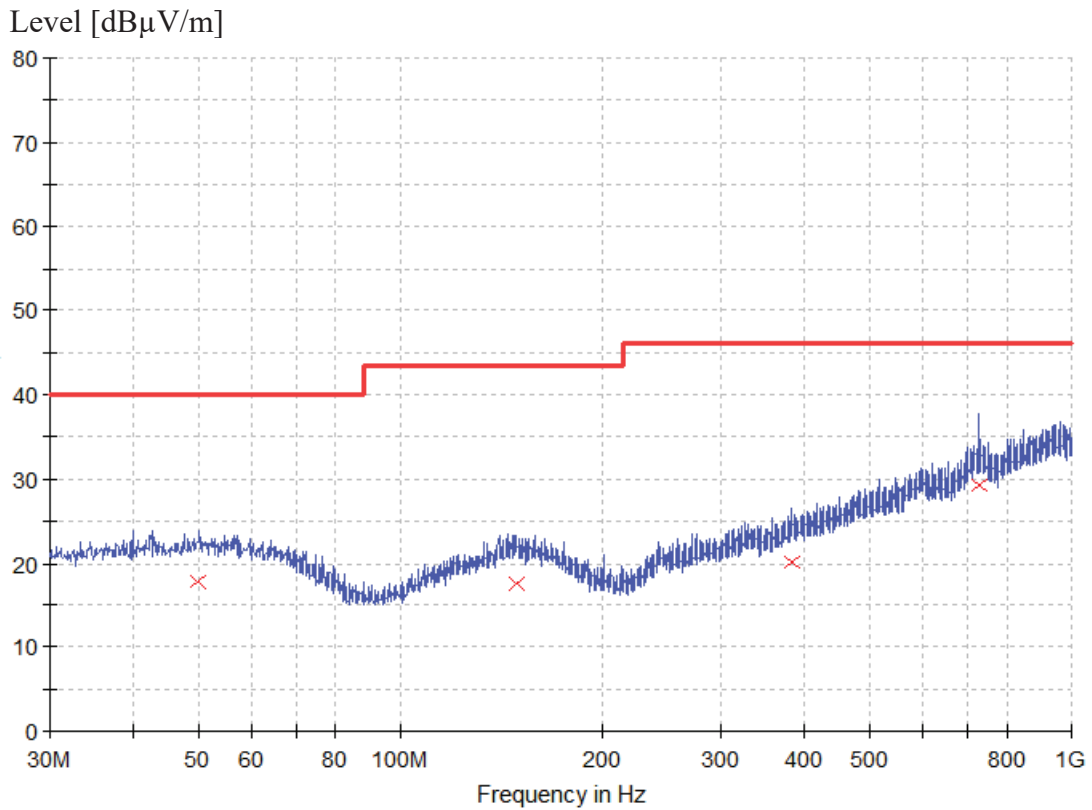
Figure 12: Spectral diagrams and measurement results, 30 – 1000 MHz, Vertical polarization, mode 2



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
37.500000	18.9	120.000	100.0	V	60.0	13.6	21.1	40.0
55.320000	22.8	120.000	130.0	V	0.0	14.1	17.2	40.0
60.900000	23.3	120.000	100.0	V	-90.0	13.6	16.7	40.0
853.800000	29.2	120.000	200.0	V	135.0	24.8	16.8	46.0

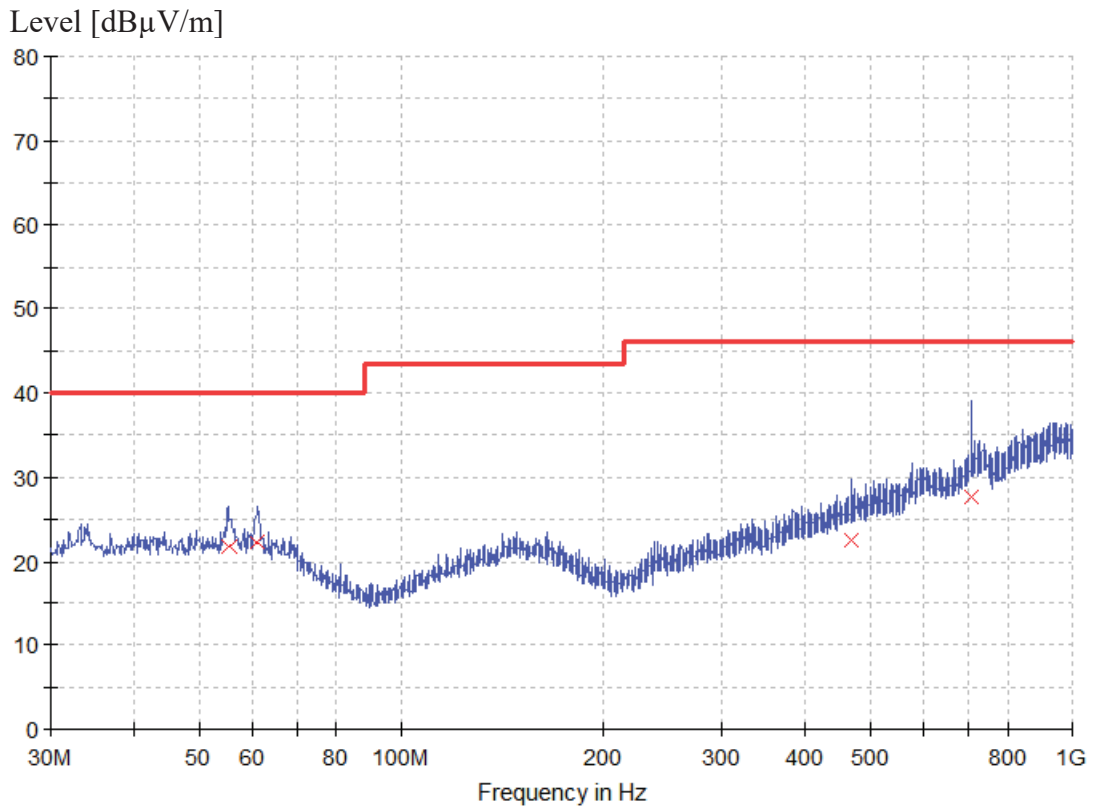
Figure 13: Spectral diagrams and measurement results, 30 – 1000 MHz, Horizontal polarization, mode 3



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
49.980000	17.8	120.000	100.0	H	45.0	14.3	22.2	40.0
148.800000	17.5	120.000	120.0	H	-90.0	14.2	26.0	43.5
383.460000	20.0	120.000	100.0	H	180.0	16.8	26.0	46.0
727.320000	29.3	120.000	200.0	H	-135.0	24.2	16.7	46.0

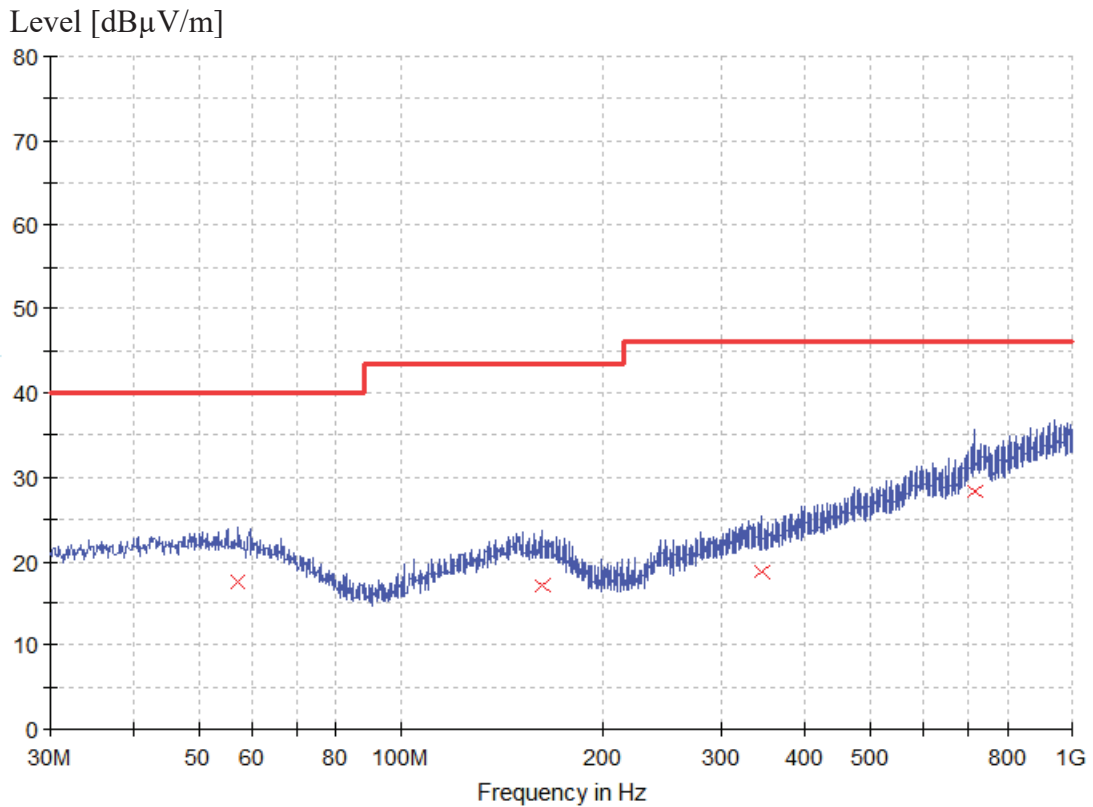
Figure 14: Spectral diagrams and measurement results, 30 – 1000 MHz, Vertical polarization, mode 3



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
55.200000	21.7	120.000	125.0	V	45.0	14.2	18.3	40.0
60.900000	22.2	120.000	100.0	V	-135.0	13.6	17.8	40.0
468.180000	22.5	120.000	100.0	V	90.0	19.1	23.5	46.0
704.520000	27.6	120.000	200.0	V	-180.0	24.0	18.4	46.0

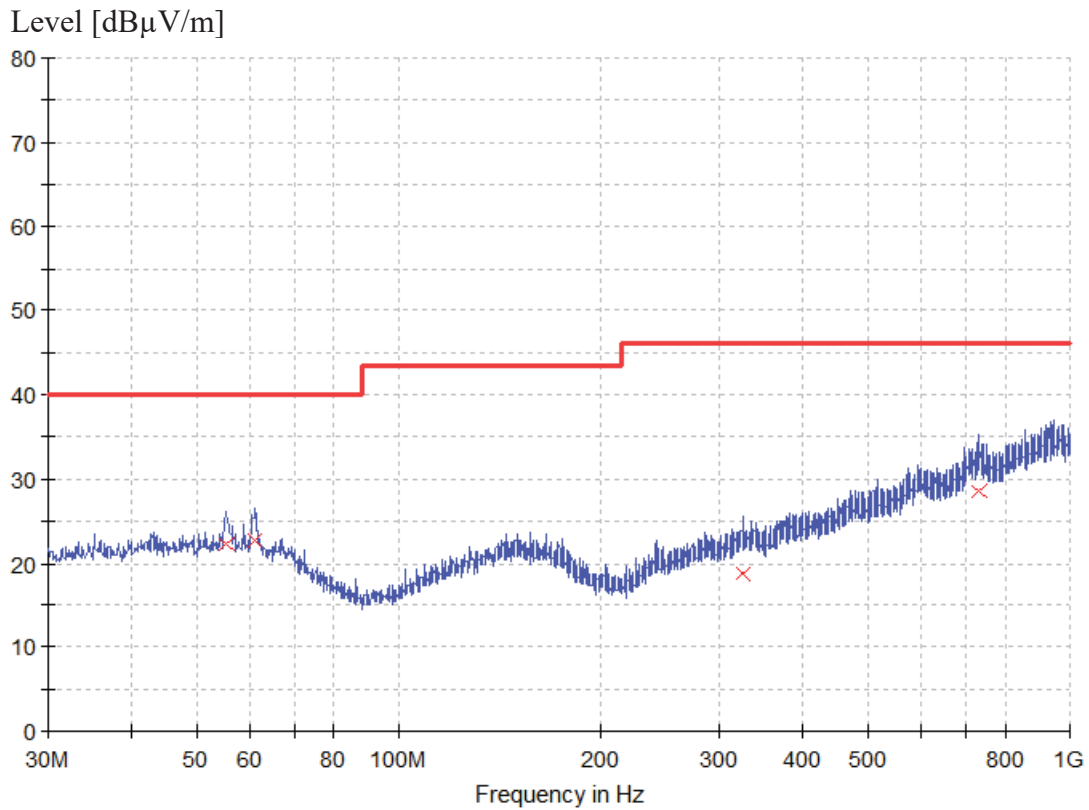
Figure 15: Spectral diagrams and measurement results, 30 – 1000 MHz, Horizontal polarization, mode 4



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
57.180000	17.4	120.000	100.0	H	45.0	14.0	22.6	40.0
162.660000	17.1	120.000	150.0	H	0.0	14.1	26.4	43.5
345.120000	18.7	120.000	100.0	H	-180.0	15.4	27.3	46.0
716.880000	28.2	120.000	200.0	H	90.0	24.7	17.8	46.0

Figure 16: Spectral diagrams and measurement results, 30 – 1000 MHz, Vertical polarization, mode 4



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
55.320000	22.2	120.000	100.0	V	100.0	14.1	17.8	40.0
60.900000	22.7	120.000	200.0	V	-90.0	13.6	17.3	40.0
326.220000	18.8	120.000	100.0	V	135.0	15.6	27.2	46.0
735.540000	28.5	120.000	150.0	V	-45.0	24.8	17.6	46.0

5.2.2 Radiated Emission (1-18 GHz)

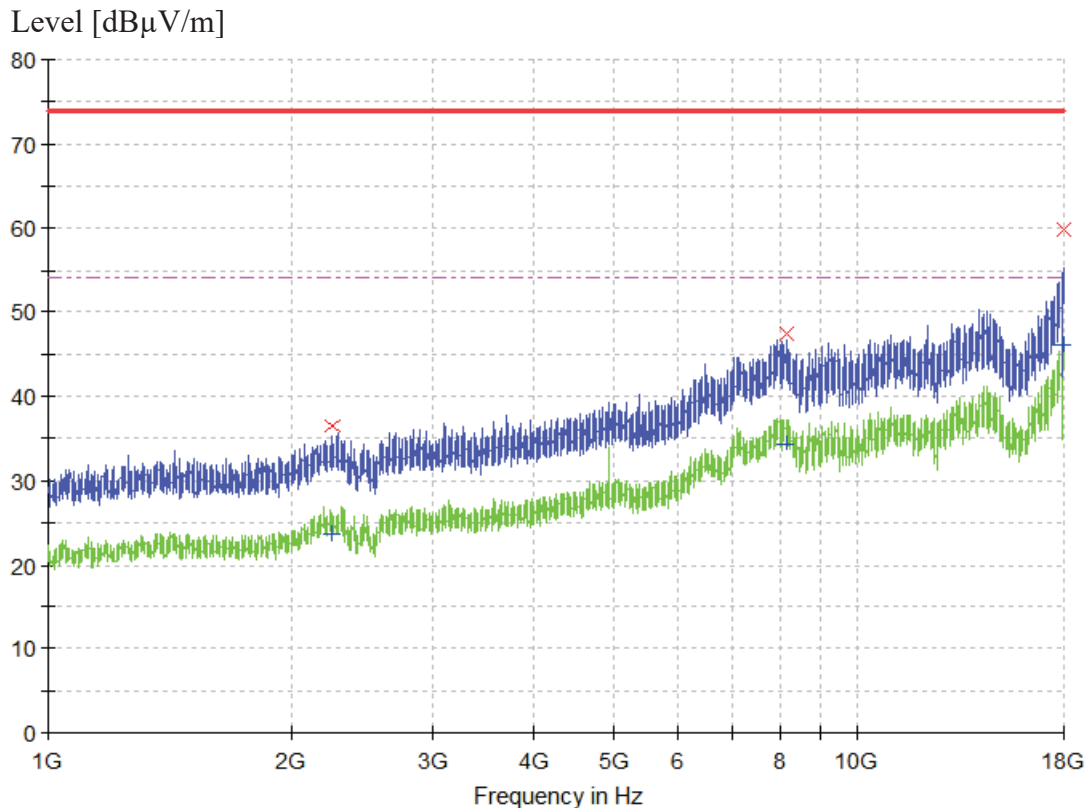
Result:		Passed
Date of testing	: 2025-04-03	
Port	: Enclosure	
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ICES-003:2020, ANSI C63.4-2014 and CISPR 16-2-3	
Product classification	: Class B	
Limit	: Peak limits (3 m distance): 1 – 18 GHz, 74 dB μ V/m Average limits (3 m distance): 1 – 18 GHz, 54 dB μ V/m	
Frequency range	: 1 – 18 GHz (see Note)	
Kind of test site	: Absorber-lined semi-anechoic chamber	
Test distance	: 3 m	
Test voltage	: AC 120 V, 60 Hz	
Operational mode	: Mode 1, 2, 3, 4	
Earthing	: No earthing	
Ambient condition	: Temperature: 21.8 °C; Relative humidity: 43.6 %	
Expanded measurement uncertainty ($k=2$)	: 5.17 dB (1 GHz~6 GHz) 5.12 dB (6 GHz~18 GHz) The minimum margin to the limit is 7.7 dB at 17973.000000, 17975.500000 & 17959.500000 MHz. The margin is higher than expanded measurement uncertainty.	

The radiated disturbance test was carried out in an absorber-lined semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3 m. The site voltage standing wave ratio (S_{VSWR}) of the absorber-lined 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 supporting table. And the supporting table was rotated 360° around, the receiving antenna was kept aiming at the EUT and its height 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. The final test was performed with peak detector and average detector at those critical frequencies during the preview test. In the following figure, “ $\times$ ” and “ $+$ ” means measurement results with peak detector and average detector.

Note: The highest frequency in the EUT is 2480 MHz. According to FCC 47 CFR Part 15, Subpart B:2023 §15.33 (b) (1) and Table 3 of ICES-003:2020, the upper frequency for radiated emission measurement is 18 GHz.

Figure 17: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Horizontal polarization, mode 1



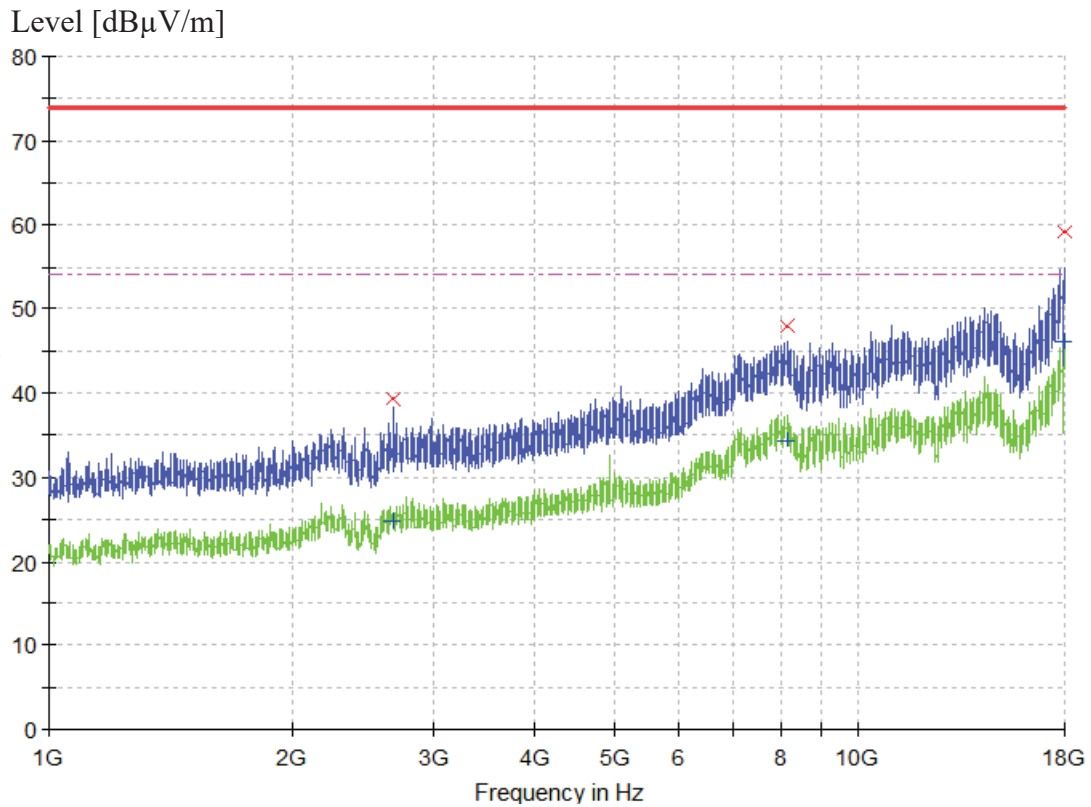
Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2238.500000	36.6	1000.0	1000.000	105.0	H	150.0	-15.6	37.4	74.0
8177.000000	47.6	1000.0	1000.000	135.0	H	0.0	-4.6	26.4	74.0
17982.000000	59.9	1000.0	1000.000	200.0	H	-120.0	12.1	14.1	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2238.500000	23.7	1000.0	1000.000	105.0	H	150.0	-15.6	30.3	54.0
8177.000000	34.4	1000.0	1000.000	135.0	H	0.0	-4.6	19.6	54.0
17982.000000	46.0	1000.0	1000.000	200.0	H	-120.0	12.1	8.0	54.0

Figure 18: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization, mode 1



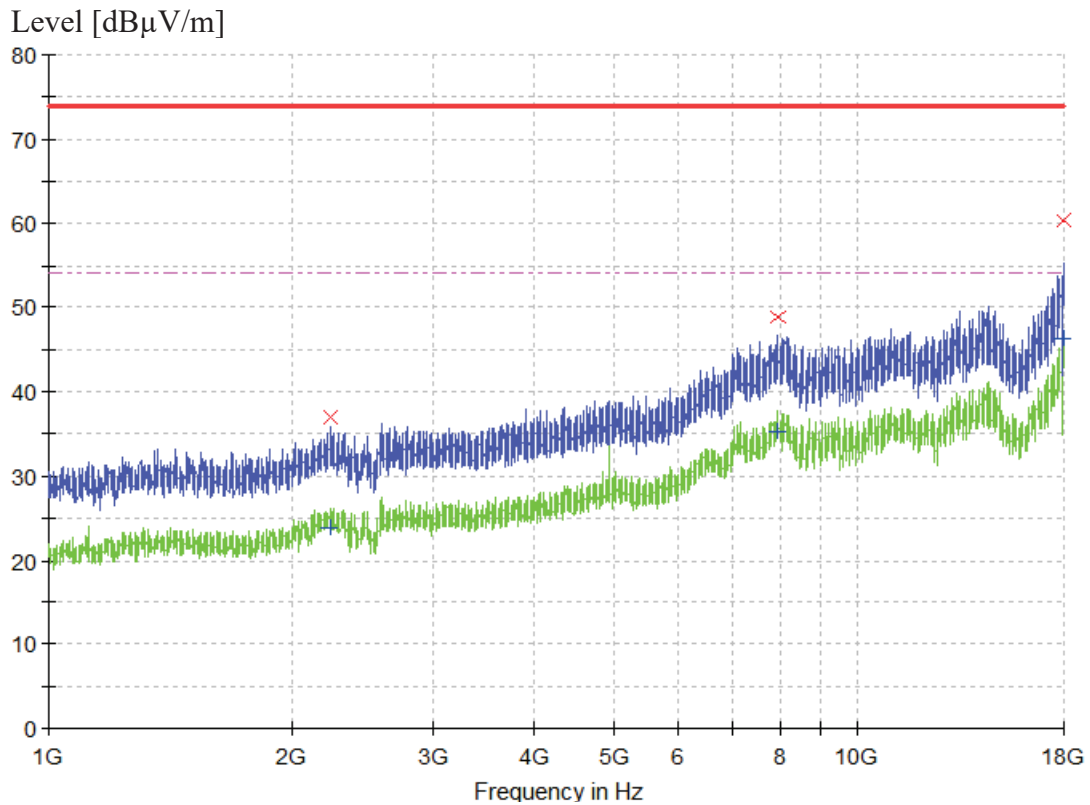
Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2656.500000	39.3	1000.0	1000.000	135.0	V	-105.0	-15.6	34.8	74.0
8162.500000	47.9	1000.0	1000.000	100.0	V	0.0	-4.5	26.1	74.0
17965.000000	59.1	1000.0	1000.000	150.0	V	60.0	11.8	14.9	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2656.500000	24.8	1000.0	1000.000	135.0	V	-105.0	-15.6	29.2	54.0
8162.500000	34.3	1000.0	1000.000	100.0	V	0.0	-4.5	19.7	54.0
17965.000000	46.2	1000.0	1000.000	150.0	V	60.0	11.8	7.8	54.0

Figure 19: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Horizontal polarization, mode 2



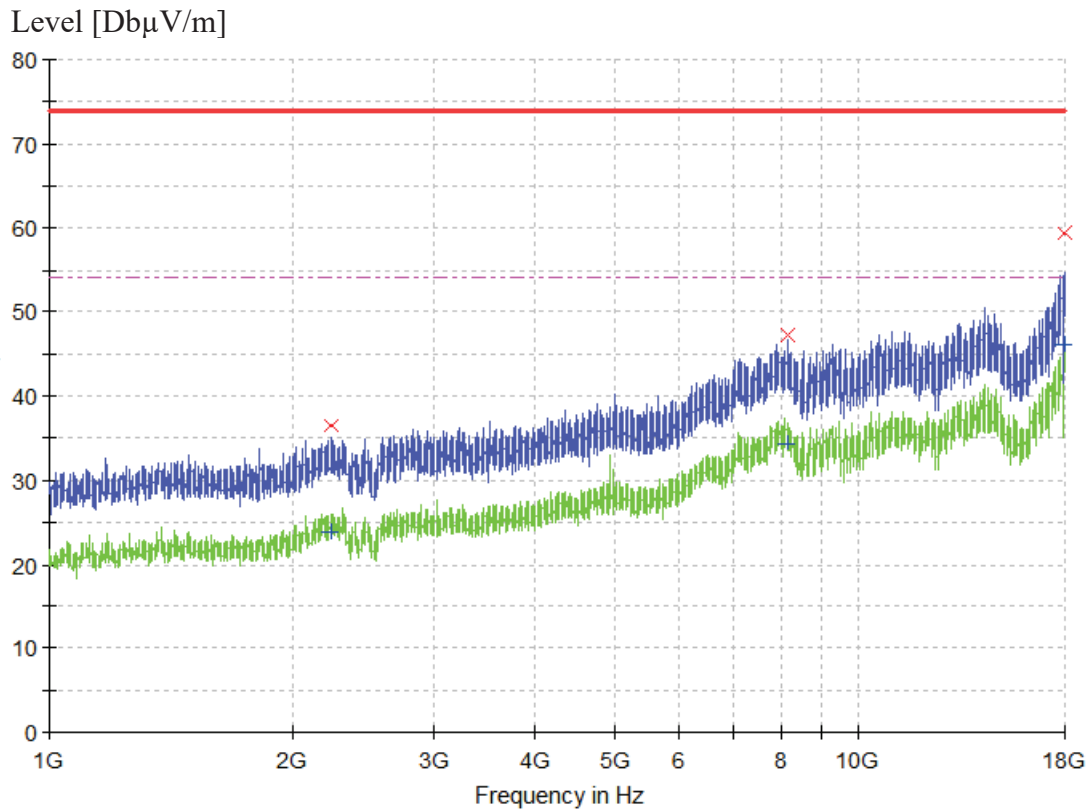
Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2235.000000	37.0	1000.0	1000.000	100.0	H	-45.0	-15.6	37.0	74.0
7966.500000	48.9	1000.0	1000.000	150.0	H	90.0	-3.6	25.1	74.0
17973.000000	60.4	1000.0	1000.000	120.0	H	-135.0	11.9	13.6	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2235.000000	24.0	1000.0	1000.000	100.0	H	-45.0	-15.6	30.0	54.0
7966.500000	35.3	1000.0	1000.000	150.0	H	90.0	-3.6	18.7	54.0
17973.000000	46.3	1000.0	1000.000	120.0	H	-135.0	11.9	7.7	54.0

Figure 20: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization, mode 2



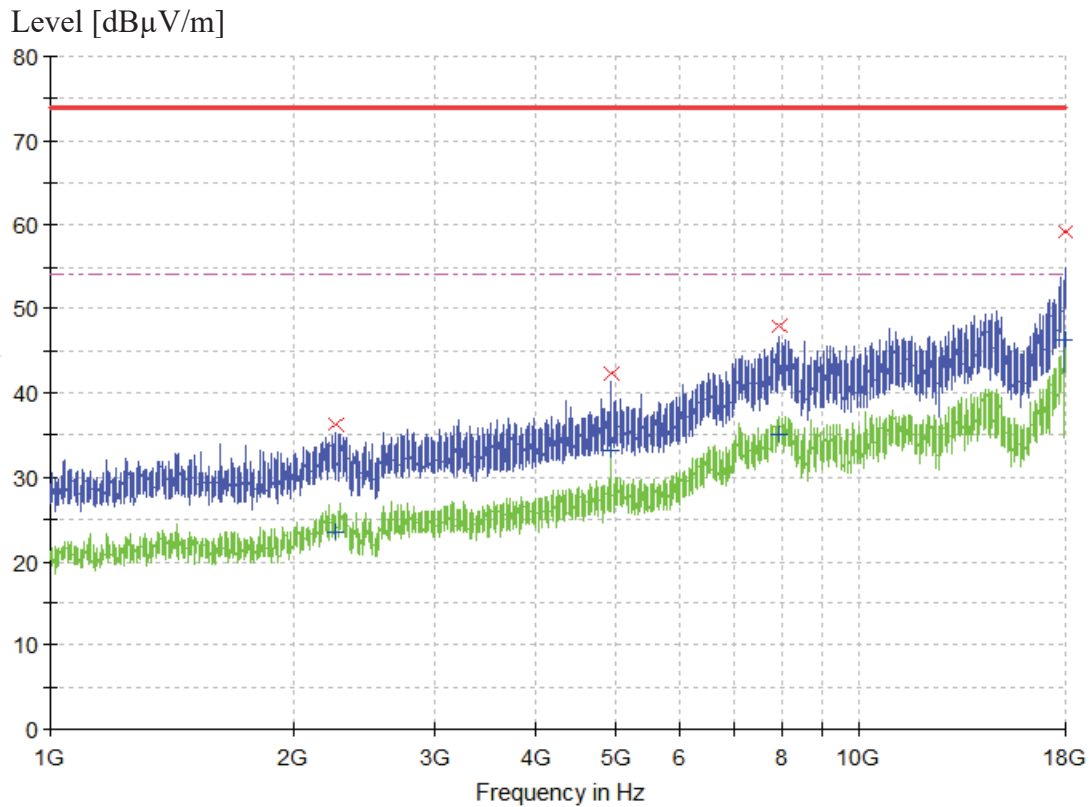
Final peak measurement result:

Frequency (MHz)	MaxPeak (DbμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (Db/m)	Margin – PK+ (Db)	Limit – PK+ (DbμV/m)
2224.500000	36.4	1000.0	1000.000	135.0	V	180.0	-15.7	37.6	74.0
8148.000000	47.2	1000.0	1000.000	150.0	V	-45.0	-4.4	26.8	74.0
17966.000000	59.3	1000.0	1000.000	200.0	V	90.0	11.8	14.7	74.0

Final average measurement result:

Frequency (MHz)	Average (DbμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (Db/m)	Margin – AVG (Db)	Limit – AVG (DbμV/m)
2224.500000	24.0	1000.0	1000.000	135.0	V	180.0	-15.7	30.1	54.0
8148.000000	34.4	1000.0	1000.000	150.0	V	-45.0	-4.4	19.6	54.0
17966.000000	46.2	1000.0	1000.000	200.0	V	90.0	11.8	7.9	54.0

Figure 21: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Horizontal polarization, mode 3



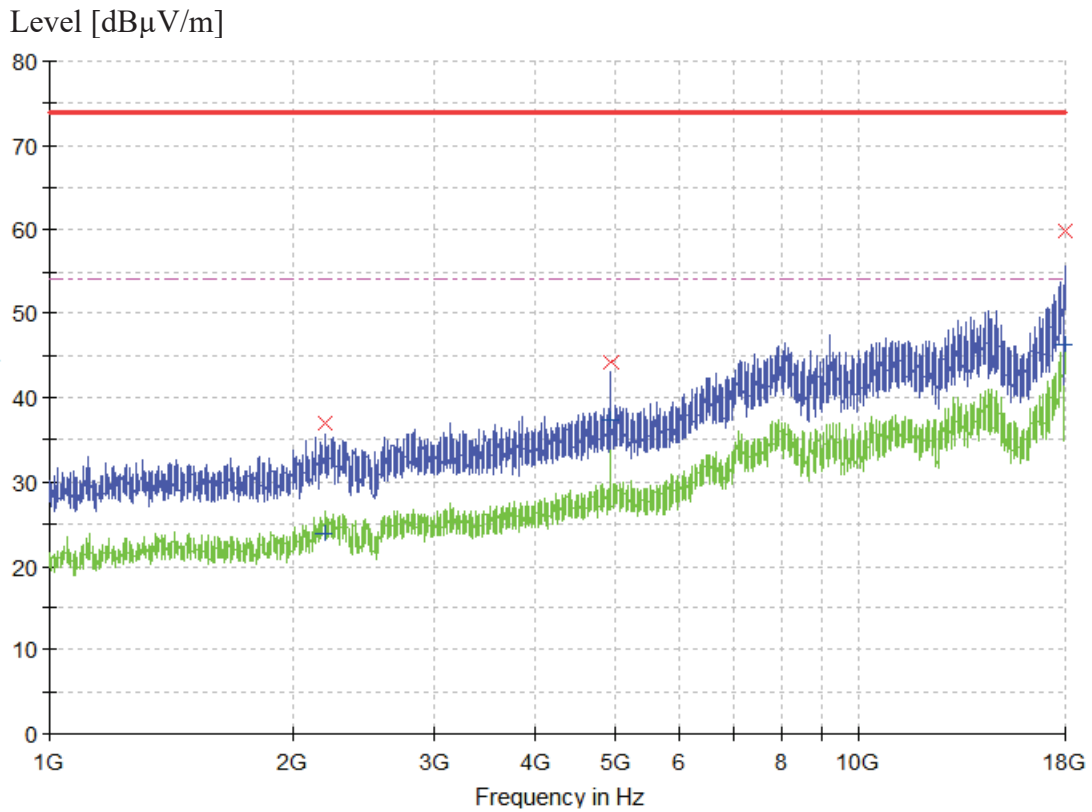
Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2258.500000	36.3	1000.0	1000.000	100.0	H	45.0	-15.6	37.7	74.0
4952.500000	42.4	1000.0	1000.000	150.0	H	-90.0	-11.2	31.6	74.0
7952.500000	48.1	1000.0	1000.000	135.0	H	180.0	-3.7	26.0	74.0
17974.000000	59.3	1000.0	1000.000	200.0	H	-135.0	11.9	14.7	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2258.500000	23.4	1000.0	1000.000	100.0	H	45.0	-15.6	30.6	54.0
4952.500000	33.3	1000.0	1000.000	150.0	H	-90.0	-11.2	20.7	54.0
7952.500000	35.0	1000.0	1000.000	135.0	H	180.0	-3.7	19.0	54.0
17974.000000	46.3	1000.0	1000.000	200.0	H	-135.0	11.9	7.8	54.0

Figure 22: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization, mode 3



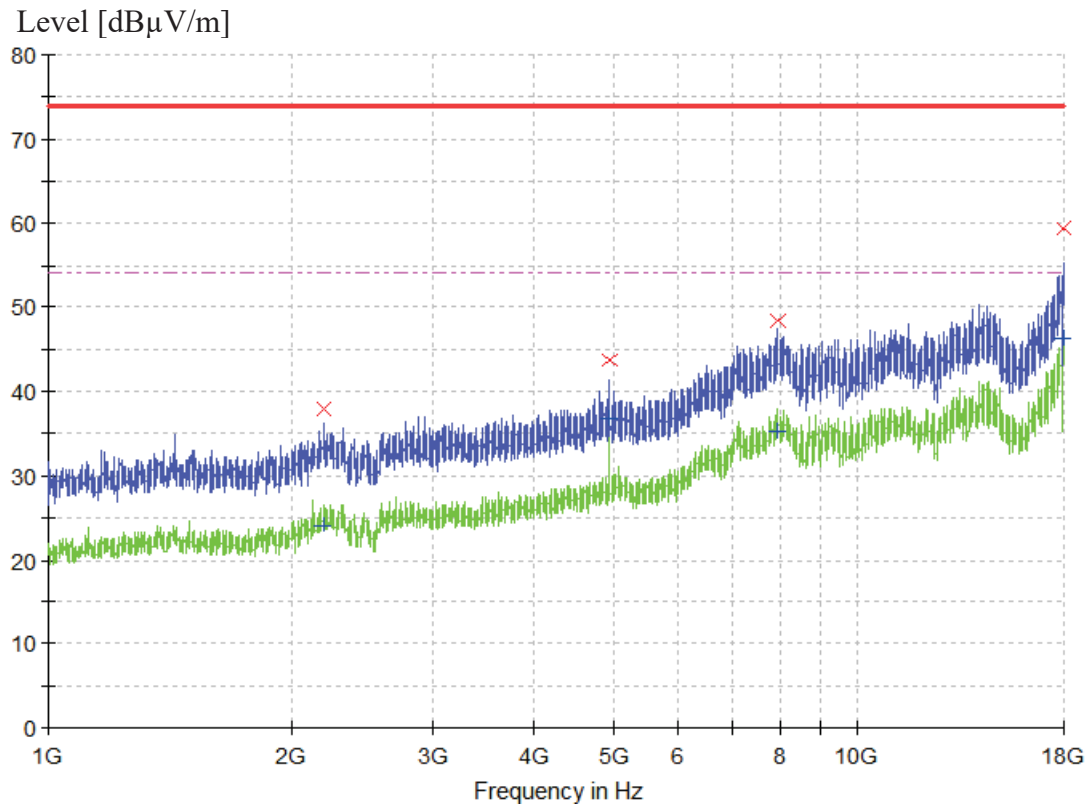
Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2195.000000	37.0	1000.0	1000.000	135.0	V	45.0	-15.8	37.0	74.0
4952.500000	44.1	1000.0	1000.000	100.0	V	-80.0	-11.2	29.9	74.0
17975.500000	59.9	1000.0	1000.000	150.0	V	180.0	11.9	14.1	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2195.000000	23.9	1000.0	1000.000	135.0	V	45.0	-15.8	30.1	54.0
4952.500000	37.5	1000.0	1000.000	100.0	V	-80.0	-11.2	16.5	54.0
17975.500000	46.3	1000.0	1000.000	150.0	V	180.0	11.9	7.7	54.0

Figure 23: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Horizontal polarization, mode 4



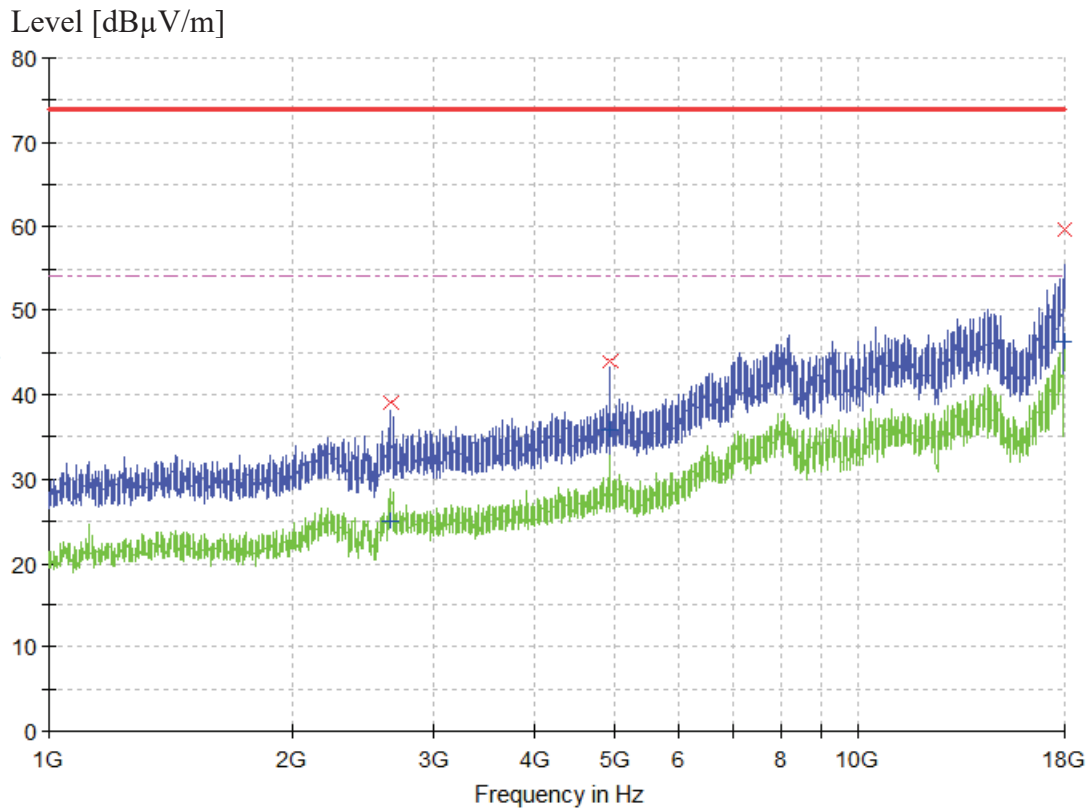
Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2184.000000	37.8	1000.0	1000.000	105.0	H	-130.0	-15.9	36.2	74.0
4952.500000	43.7	1000.0	1000.000	100.0	H	0.0	-11.2	30.3	74.0
7984.500000	48.4	1000.0	1000.000	135.0	H	180.0	-3.6	25.6	74.0
17974.500000	59.5	1000.0	1000.000	200.0	H	-90.0	11.9	14.5	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2184.000000	24.2	1000.0	1000.000	105.0	H	-130.0	-15.9	29.8	54.0
4952.500000	36.7	1000.0	1000.000	100.0	H	0.0	-11.2	17.3	54.0
7984.500000	35.3	1000.0	1000.000	135.0	H	180.0	-3.6	18.7	54.0
17974.500000	46.2	1000.0	1000.000	200.0	H	-90.0	11.9	7.8	54.0

Figure 24: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization, mode 4



Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2647.500000	39.0	1000.0	1000.000	120.0	V	100.0	-15.6	35.0	74.0
4953.000000	43.9	1000.0	1000.000	150.0	V	-90.0	-11.2	30.1	74.0
17959.500000	59.6	1000.0	1000.000	135.0	V	150.0	11.7	14.4	74.0

Final average measurement result:

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2647.500000	25.0	1000.0	1000.000	120.0	V	100.0	-15.6	29.0	54.0
4953.000000	35.7	1000.0	1000.000	150.0	V	-90.0	-11.2	18.3	54.0
17959.500000	46.3	1000.0	1000.000	135.0	V	150.0	11.7	7.7	54.0

Prüfbericht - Nr.: CN25Z2Y6 001
Test Report No.:

Seite 39 von 41
Page 39 of 41

6 Photographs of the Test Set-Up

Refer to the test setup file.

7 List of Test and Measurement Instruments

Equipment no	Name	Model	Serial no	Manufacturer	Calibration 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-373	Trilog broadband antenna	VULB 9168	1771	Schwarzbeck	2024-11-23	2025-11-23
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-C-175	Preamplifier	EMC051845SE	980612	EMCI Taiwan	2024-07-24	2025-07-24
EMC-C-161	Spectrum analyser	FSV40	101258	Rohde & Schwarz	2024-07-15	2025-07-15
EMC-C-019	Double ridged horn antenna	BBHA 9120 D	9120D-433	Schwarzbeck	2025-02-28	2026-02-28

8 List of Figures

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line L, mode 1	12
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line N, mode 1	13
Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line L, mode 2	14
Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line N, mode 2	15
Figure 5: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line L, mode 3	16
Figure 6: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line N, mode 3	17
Figure 7: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line L, mode 4	18
Figure 8: Spectral Diagrams, Conducted Emission, 150 kHz - 30 MHz, Line N, mode 4	19
Figure 9: Spectral diagrams and measurement results, 30 - 1000 MHz, Horizontal polarization, mode 1	22
Figure 10: Spectral diagrams and measurement results, 30 - 1000 MHz, Vertical polarization, mode 1	23
Figure 11: Spectral diagrams and measurement results, 30 - 1000 MHz, Horizontal polarization, mode 2	24
Figure 12: Spectral diagrams and measurement results, 30 - 1000 MHz, Vertical polarization, mode 2	25
Figure 13: Spectral diagrams and measurement results, 30 - 1000 MHz, Horizontal polarization, mode 3	26
Figure 14: Spectral diagrams and measurement results, 30 - 1000 MHz, Vertical polarization, mode 3	27
Figure 15: Spectral diagrams and measurement results, 30 - 1000 MHz, Horizontal polarization, mode 4	28
Figure 16: Spectral diagrams and measurement results, 30 - 1000 MHz, Vertical polarization, mode 4	29
Figure 17: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Horizontal polarization, mode 1	31
Figure 18: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Vertical polarization, mode 1	32
Figure 19: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Horizontal polarization, mode 2	33
Figure 20: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Vertical polarization, mode 2	34
Figure 21: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Horizontal polarization, mode 3	35
Figure 22: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Vertical polarization, mode 3	36
Figure 23: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Horizontal polarization, mode 4	37
Figure 24: Spectral Diagrams, Radiated Emission, 1 GHz - 18 GHz, Vertical polarization, mode 4	38

End of test report