

Prüfbericht-Nr.: Test report no.:	CN25QX0Y 001	Auftrags-Nr.: Order no.:	326094824	Seite 1 von 41 Page 1 of 41
Kunden-Referenz-Nr.: Client reference no.:	1288983	Auftragsdatum: Order date:	2025-02-12	
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.:	LED2410R5NA			
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 sample receipt:	2025-03-18	Refer to the EUT photos file		
Prüfmuster-Nr.: Test sample no.:	A003948647-001			
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:	Ausstellungsdatum: Issue date:			
Stellung / Position:	Project engineer	Authorizer		
Sonstiges / Other:	FCC ID: FHO-LED2410R5NA 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 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	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. <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>
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3	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. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	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. <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>

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Revision history of test report:

Report number	Issue date	Contents and reason for change if appropriate
CN25QX0Y 001	2025-05-10	Initial release.

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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 further information, refer to the user's manual.

2.2 Ratings and System Details

Rated input	: AC 120 V, 60 Hz, 60 mA
Rated power	: 5 W
RF IC	: SiMG301

2.3 Independent Operation Modes

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

The test mode as follows:

"On"

- Mode 1: Warm lighting with the max. lighting output.
- Mode 2: Warm lighting with the min. lighting output.
- Mode 3: White lighting with the max. lighting output.
- Mode 4: White lighting with the min. lighting output.

2.4 Description of interconnecting cables

N/A.

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, user's manual and rating label.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

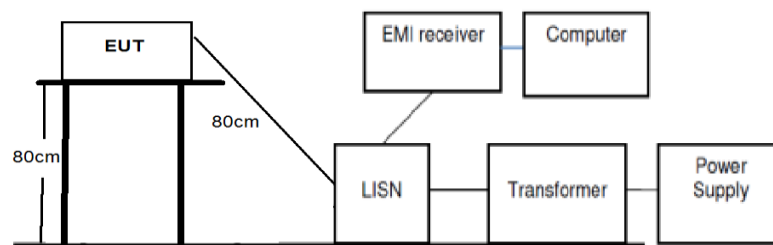
Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.
The sequence of testing:

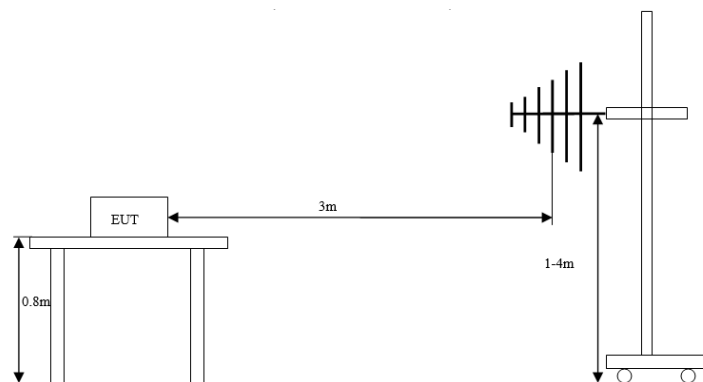
1. Conducted emission tests were performed on 2025-01-20.
2. Radiated emission tests were performed on 2025-01-18~2025-02-07.

3.2 Equipment and cable arrangement

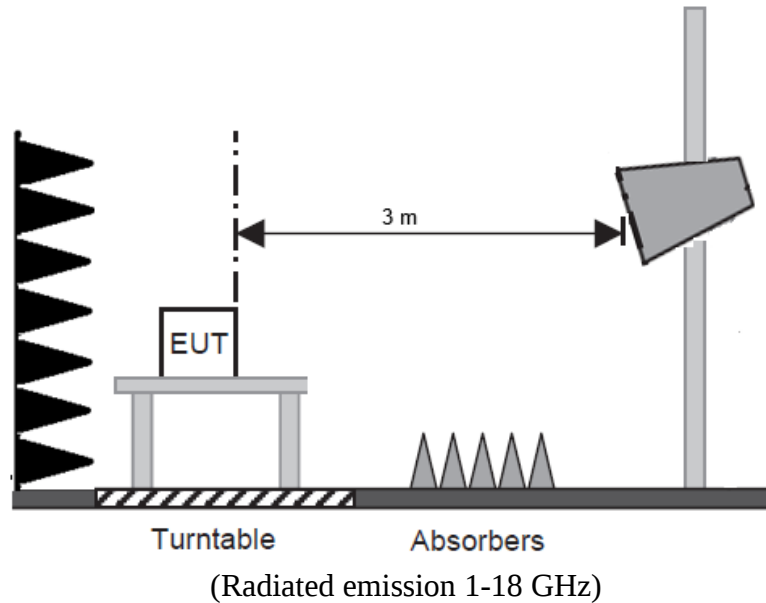
Block diagram for both conducted emission and radiated emission tests is as follows:



(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

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

3.4 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

3.5 Countermeasures to achieve EMC Compliance

During tests, no special countermeasure was 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	: 2025-04-11	
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: Warm lighting with the max. lighting output. Mode 2: Warm lighting with the min. lighting output. Mode 3: White lighting with the max. lighting output. Mode 4: White lighting with the min. lighting output.	
Ambient condition	: Temperature: 20.1 °C; Relative humidity: 49.5 %	
Expanded measurement uncertainty ($k=2$)	: 2.33 dB The minimum margin to the limit is 5.29 dB at 0.156750 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.

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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.

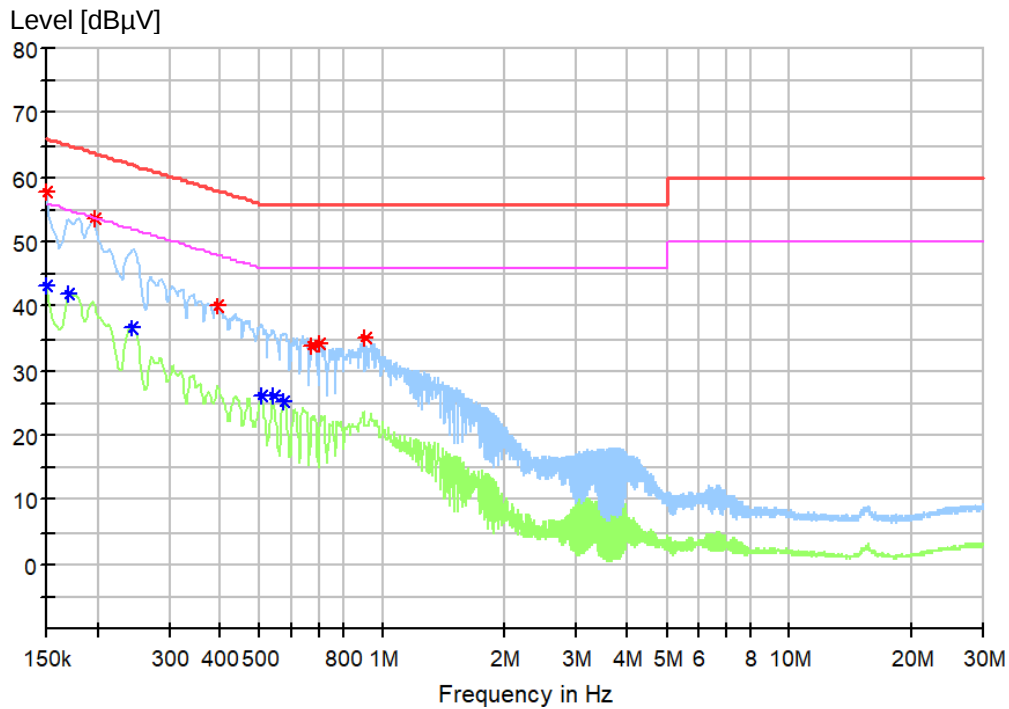
Notes on following tables of conducted emission results and conversions:

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



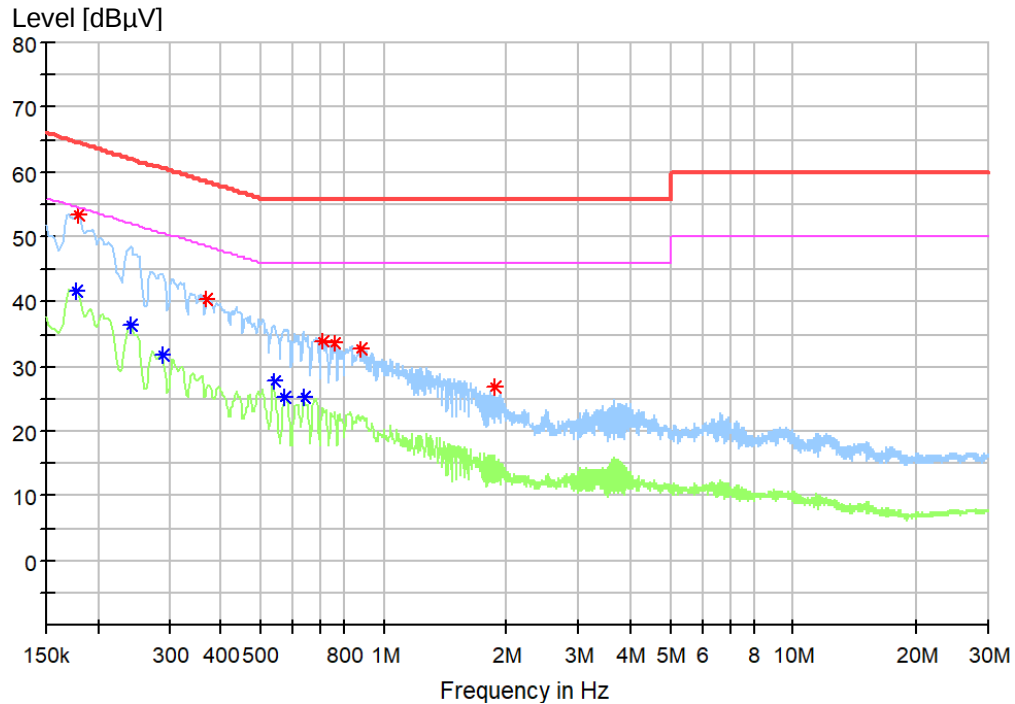
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	57.58	66.00	8.42	L1	10.3
0.197250	53.63	63.73	10.10	L1	10.3
0.395250	40.14	57.95	17.82	L1	10.3
0.669750	33.87	56.00	22.13	L1	10.3
0.703500	34.20	56.00	21.80	L1	10.3
0.906000	35.12	56.00	20.88	L1	10.6

Final Average measurement result:

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	43.19	56.00	12.81	L1	10.3
0.170250	42.09	54.95	12.86	L1	10.3
0.242250	36.75	52.02	15.27	L1	10.3
0.505500	26.17	46.00	19.83	L1	10.3
0.539250	26.08	46.00	19.92	L1	10.3
0.575250	25.13	46.00	20.87	L1	10.3

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



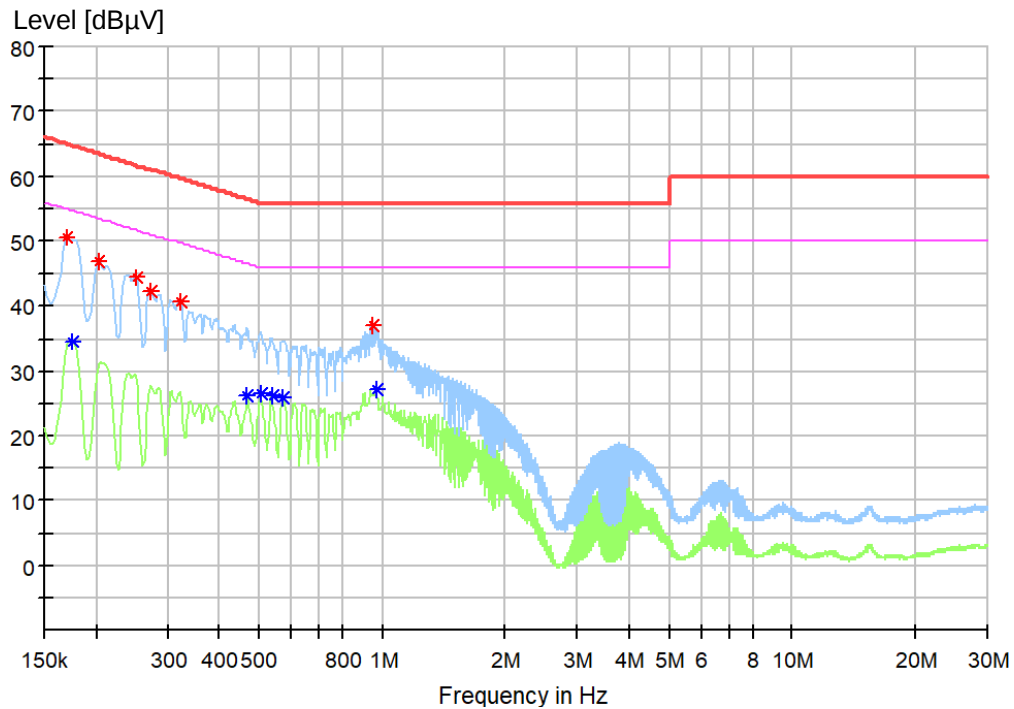
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.179250	53.46	64.52	11.06	N	10.6
0.370500	40.49	58.49	18.00	N	10.4
0.705750	34.01	56.00	21.99	N	10.4
0.762000	33.67	56.00	22.33	N	10.4
0.881250	32.70	56.00	23.30	N	10.4
1.869000	26.77	56.00	29.23	N	10.5

Final Average measurement result:

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.177000	41.72	54.63	12.91	N	10.5
0.240000	36.52	52.10	15.57	N	10.7
0.287250	31.89	50.60	18.71	N	10.6
0.539250	27.72	46.00	18.28	N	10.2
0.575250	25.35	46.00	20.65	N	10.3
0.638250	25.20	46.00	20.80	N	10.4

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

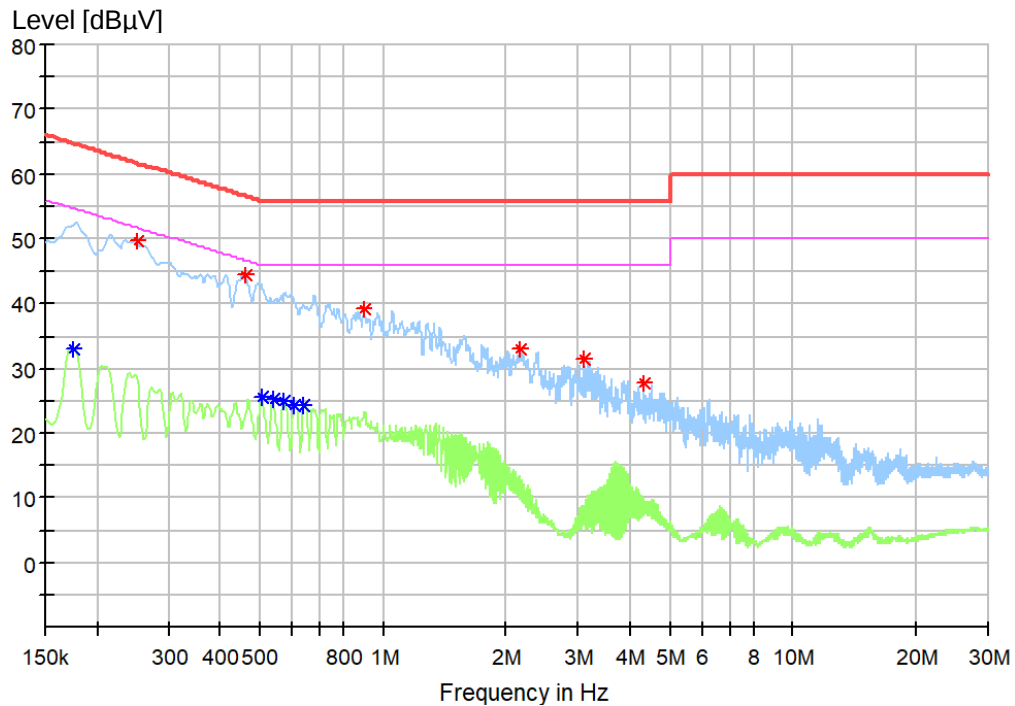


Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.170250	50.53	64.95	14.42	L1	10.3
0.204000	46.90	63.45	16.55	L1	10.3
0.251250	44.47	61.72	17.24	L1	10.3
0.271500	42.17	61.07	18.90	L1	10.3
0.321000	40.69	59.68	18.99	L1	10.3
0.948750	37.12	56.00	18.88	L1	10.7

Final Average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.174750	34.58	54.73	20.16	L1	10.3
0.469500	26.09	46.52	20.43	L1	10.3
0.505500	26.46	46.00	19.54	L1	10.3
0.539250	26.16	46.00	19.84	L1	10.3
0.575250	25.93	46.00	20.07	L1	10.3
0.971250	27.15	46.00	18.85	L1	10.7

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


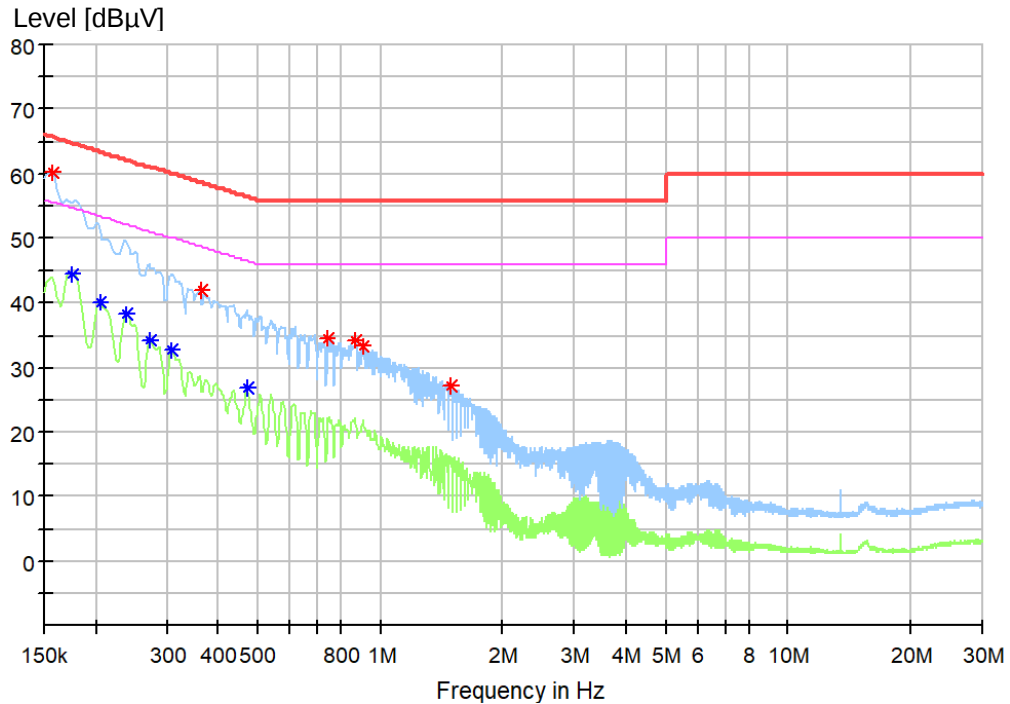
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBUV)	Limit (dBUV)	Margin (dB)	Line	Corr. (dB)
0.251250	49.69	61.72	12.02	N	10.7
0.460500	44.49	56.68	12.20	N	10.3
0.897000	39.18	56.00	16.82	N	10.4
2.154750	32.91	56.00	23.09	N	10.5
3.104250	31.44	56.00	24.56	N	10.6
4.332750	27.68	56.00	28.32	N	10.7

Final Average measurement result:

Frequency (MHz)	CAverage (dBUV)	Limit (dBUV)	Margin (dB)	Line	Corr. (dB)
0.174750	33.14	54.73	21.59	N	10.5
0.505500	25.66	46.00	20.34	N	10.2
0.539250	25.23	46.00	20.77	N	10.2
0.575250	25.02	46.00	20.98	N	10.3
0.606750	24.25	46.00	21.75	N	10.3
0.640500	24.48	46.00	21.52	N	10.4

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



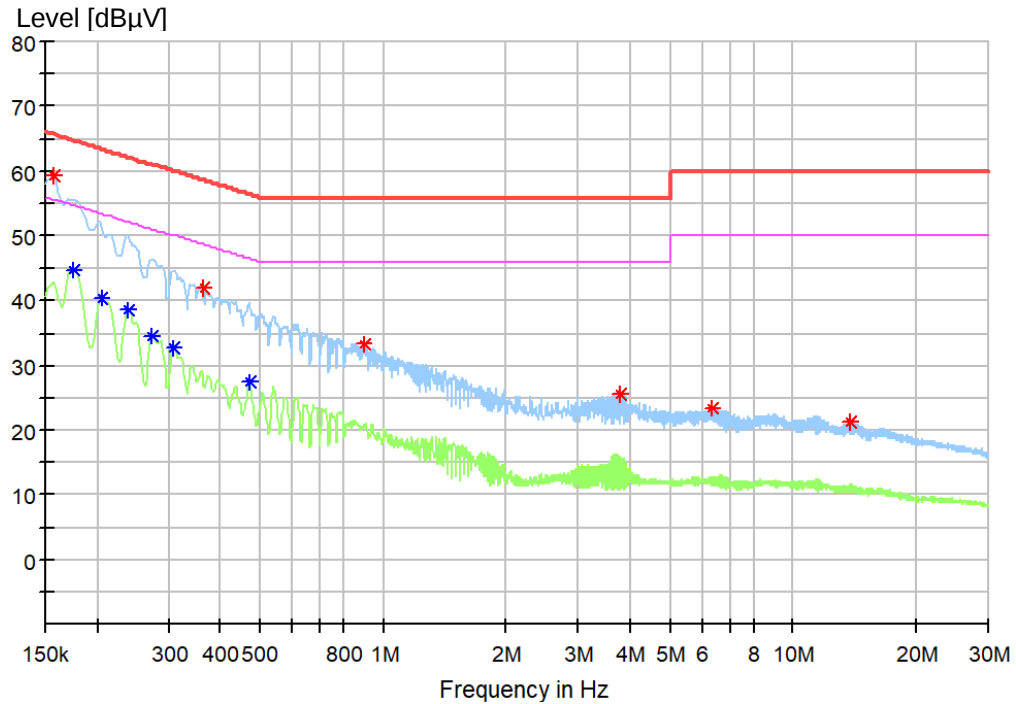
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.156750	60.35	65.63	5.29	L1	10.3
0.363750	41.84	58.64	16.81	L1	10.3
0.741750	34.44	56.00	21.56	L1	10.3
0.872250	34.29	56.00	21.71	L1	10.6
0.908250	33.40	56.00	22.60	L1	10.6
1.488750	27.02	56.00	28.98	L1	10.4

Final Average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.174750	44.51	54.73	10.22	L1	10.3
0.206250	39.98	53.36	13.37	L1	10.3
0.237750	38.20	52.17	13.98	L1	10.3
0.273750	34.26	51.00	16.75	L1	10.3
0.307500	32.56	50.04	17.48	L1	10.3
0.471750	26.78	46.48	19.70	L1	10.3

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



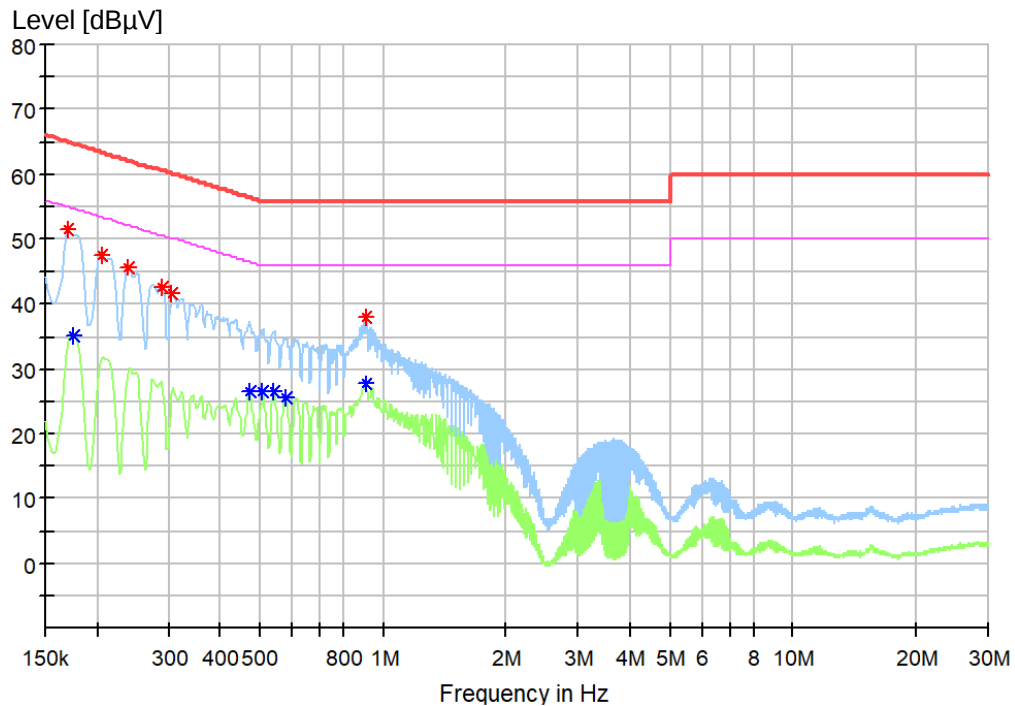
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.156750	59.31	65.63	6.32	N	10.3
0.363750	42.10	58.64	16.55	N	10.4
0.901500	33.33	56.00	22.67	N	10.4
3.781500	25.66	56.00	30.34	N	10.7
6.362250	23.46	60.00	36.54	N	10.6
13.818750	21.22	60.00	38.78	N	11.1

Final Average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.174750	44.73	54.73	10.00	N	10.5
0.206250	40.48	53.36	12.88	N	10.8
0.237750	38.42	52.17	13.75	N	10.7
0.273750	34.67	51.00	16.33	N	10.6
0.307500	32.76	50.04	17.28	N	10.5
0.471750	27.32	46.48	19.16	N	10.2

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



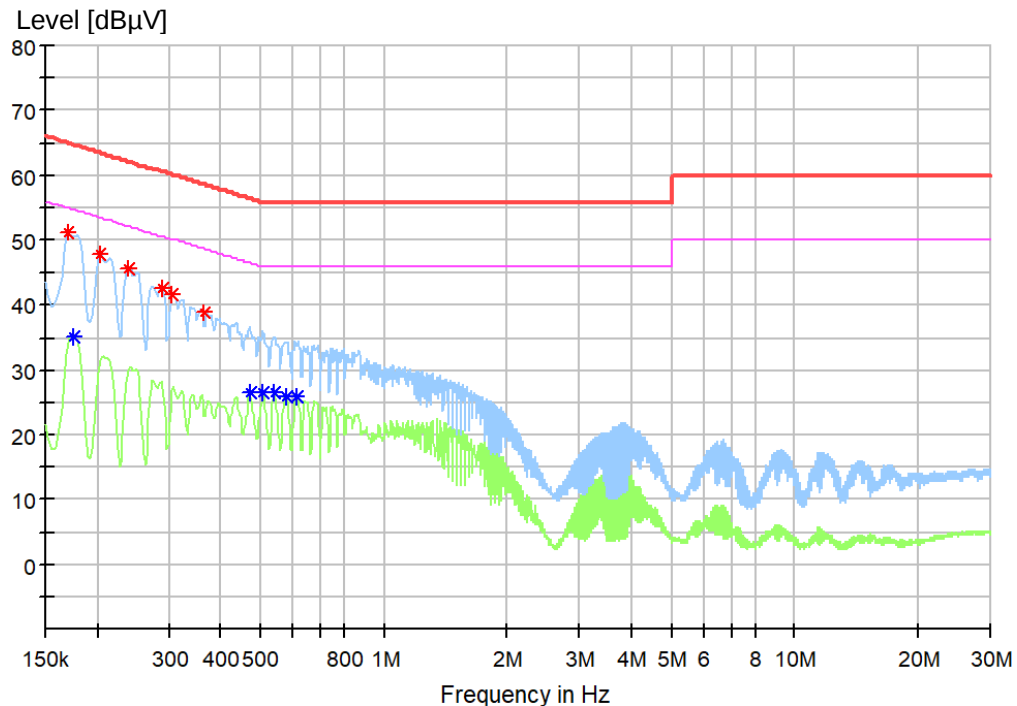
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.170250	51.41	64.95	13.54	L1	10.3
0.206250	47.48	63.36	15.88	L1	10.3
0.237750	45.54	62.17	16.64	L1	10.3
0.289500	42.70	60.54	17.84	L1	10.3
0.305250	41.55	60.10	18.55	L1	10.3
0.908250	37.79	56.00	18.21	L1	10.6

Final Average measurement result:

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.174750	35.27	54.73	19.46	L1	10.3
0.471750	26.38	46.48	20.10	L1	10.3
0.507750	26.36	46.00	19.64	L1	10.3
0.541500	26.56	46.00	19.44	L1	10.3
0.577500	25.64	46.00	20.36	L1	10.3
0.906000	27.68	46.00	18.32	L1	10.6

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



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.170250	51.35	64.95	13.60	N	10.5
0.204000	47.75	63.45	15.69	N	10.8
0.237750	45.80	62.17	16.38	N	10.7
0.289500	42.59	60.54	17.95	N	10.6
0.305250	41.72	60.10	18.38	N	10.5
0.363750	38.93	58.64	19.71	N	10.4

Final Average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.174750	35.30	54.73	19.43	N	10.5
0.471750	26.40	46.48	20.08	N	10.2
0.507750	26.61	46.00	19.39	N	10.2
0.541500	26.55	46.00	19.45	N	10.2
0.577500	26.01	46.00	19.99	N	10.3
0.613500	25.94	46.00	20.06	N	10.3

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	: 2025-04-11
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): 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)
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: Warm lighting with the max. lighting output. Mode 2: Warm lighting with the min. lighting output. Mode 3: White lighting with the max. lighting output. Mode 4: White lighting with the min. lighting output.
Ambient condition	: Temperature: 19.2 °C; Relative humidity: 51.3 %
Expanded measurement uncertainty ($k=2$)	: 5.40 dB The minimum margin to the limit is 10.1 dB at 33.758750 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 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 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, “ $\times$ ” means quasi-peak test results.

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Notes on following tables of radiated emission results and conversions:

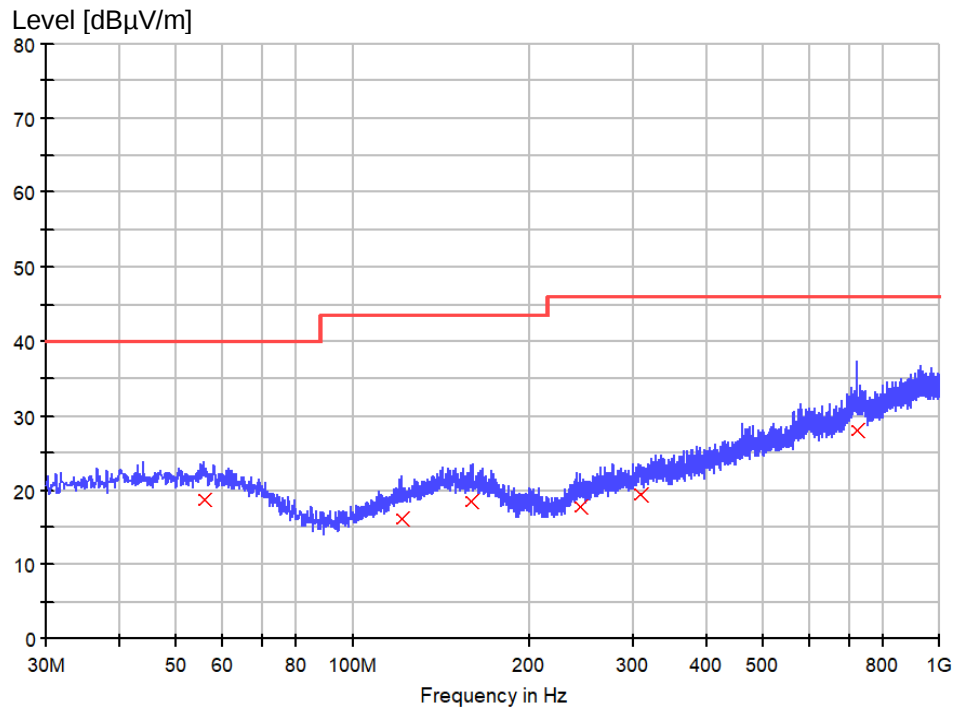
QuasiPeak (dB μ V/m): final measurement results by using quasi-peak detector

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: 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.

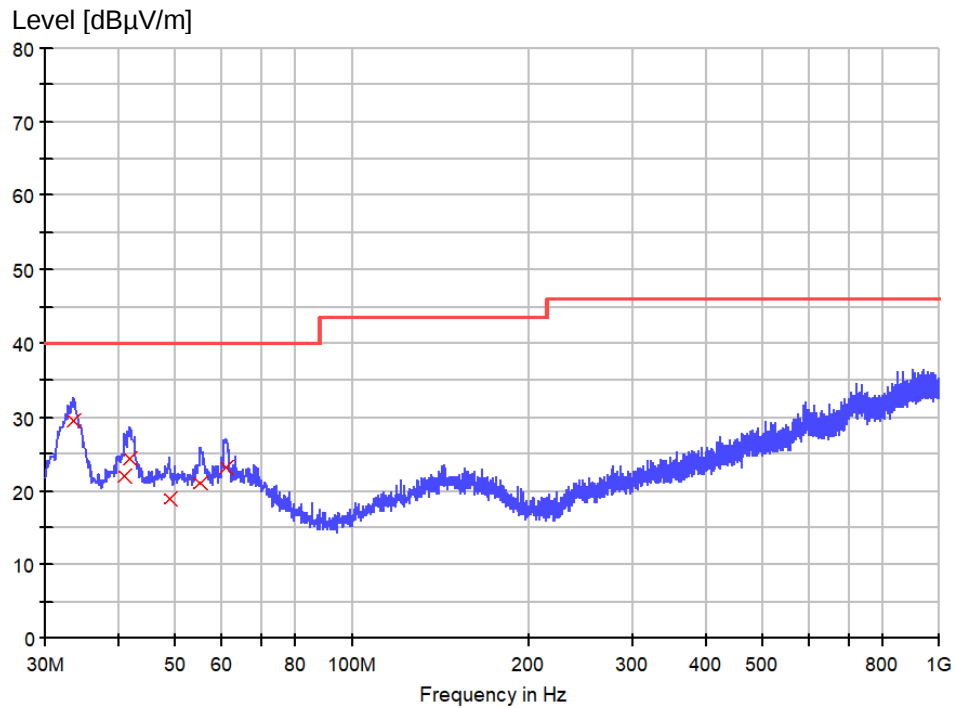
Figure 9: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, Mode 1



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)
55.583750	18.6	120.000	150.0	H	65.0	14.1	21.4	40.0
120.695000	16.2	120.000	200.0	H	-22.0	12.1	27.3	43.5
158.646250	18.5	120.000	100.0	H	-106.0	14.3	25.0	43.5
244.733750	17.8	120.000	150.0	H	32.0	13.5	28.2	46.0
310.208750	19.5	120.000	100.0	H	-46.0	15.2	26.5	46.0
722.095000	28.1	120.000	150.0	H	-169.0	24.5	18.0	46.0

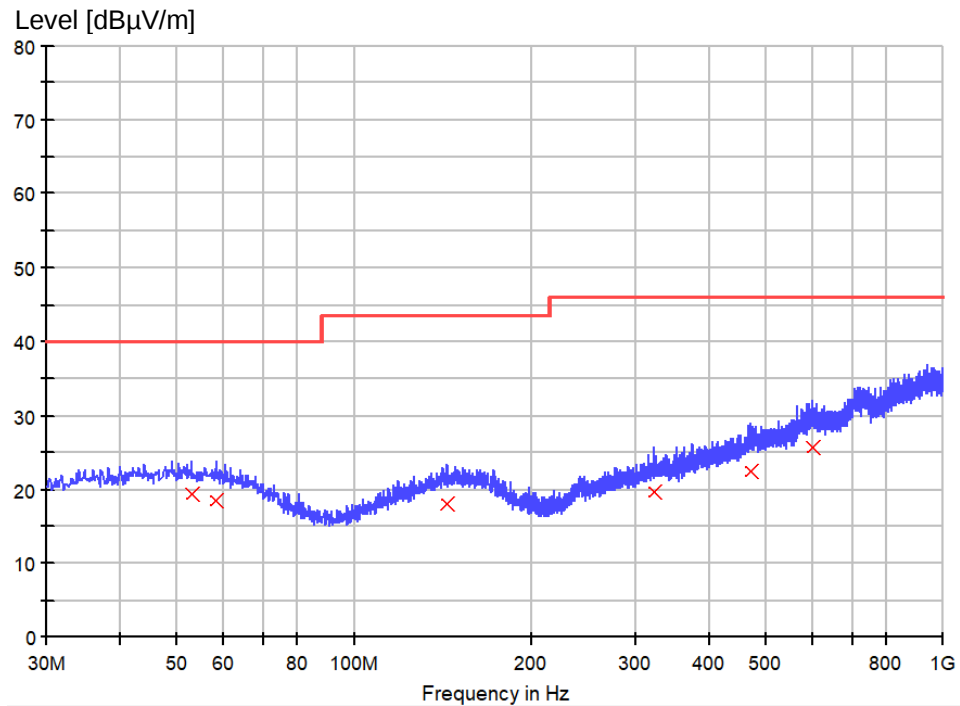
Figure 10: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, Mode 1



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
33.516250	29.4	120.000	100.0	V	-19.0	13.2	10.6	40.0
41.033750	22.1	120.000	100.0	V	76.0	14.0	17.9	40.0
41.882500	24.4	120.000	150.0	V	92.0	14.1	15.6	40.0
48.672500	19.1	120.000	100.0	V	-178.0	14.2	20.9	40.0
55.098750	21.2	120.000	150.0	V	-52.0	14.2	18.9	40.0
61.161250	23.2	120.000	150.0	V	117.0	13.5	16.8	40.0

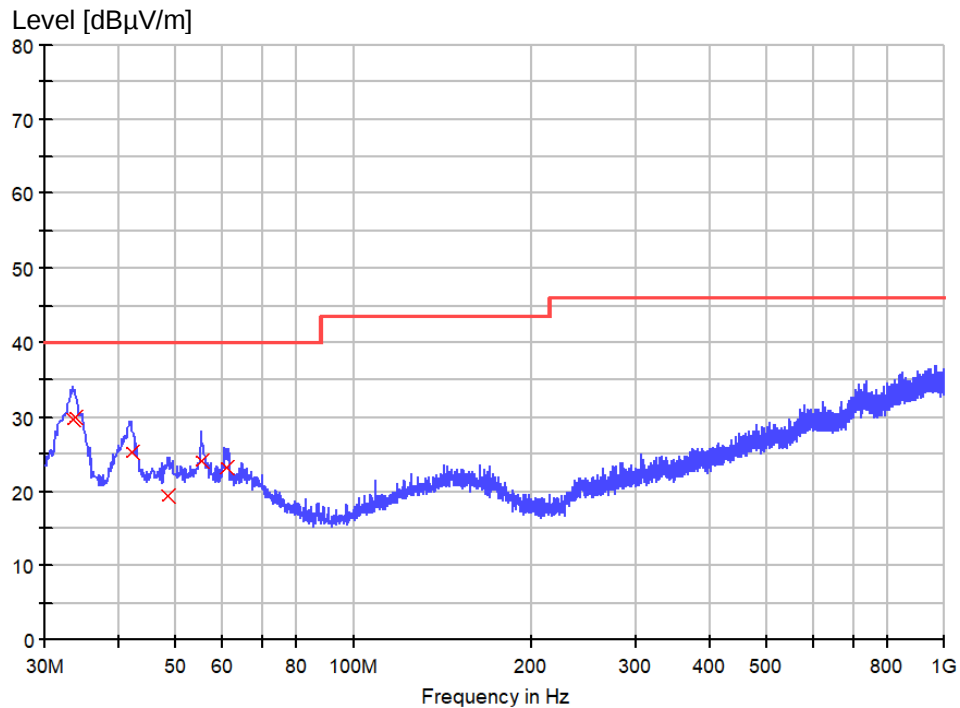
Figure 11: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, Mode 2



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
52.916250	19.5	120.000	128.0	H	100.0	14.3	20.5	40.0
58.130000	18.4	120.000	-126.0	H	200.0	13.9	21.6	40.0
143.975000	18.1	120.000	29.0	H	100.0	13.9	25.4	43.5
322.333750	19.7	120.000	-98.0	H	200.0	15.6	26.3	46.0
470.016250	22.4	120.000	97.0	H	200.0	19.2	23.6	46.0
601.693750	25.7	120.000	-102.0	H	100.0	22.2	20.4	46.0

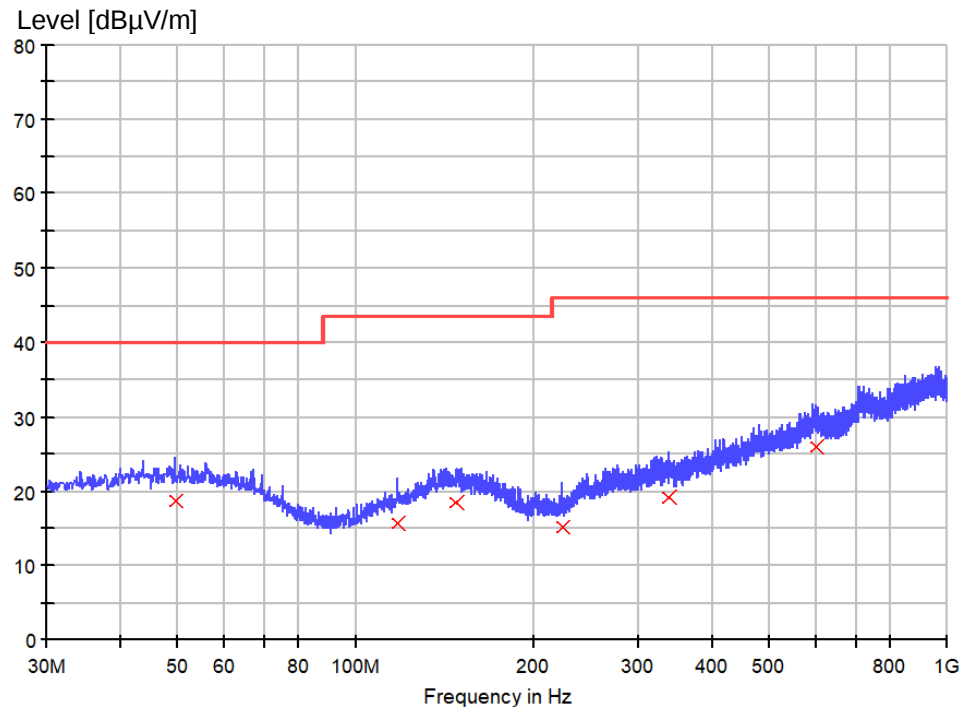
Figure 12: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, Mode 2



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
33.395000	29.7	120.000	150.0	V	149.0	13.2	10.3	40.0
33.758750	29.9	120.000	150.0	V	116.0	13.3	10.1	40.0
42.125000	25.3	120.000	150.0	V	-4.0	14.1	14.7	40.0
48.430000	19.5	120.000	200.0	V	162.0	14.2	20.6	40.0
55.341250	24.2	120.000	200.0	V	111.0	14.1	15.8	40.0
60.918750	23.1	120.000	100.0	V	-59.0	13.6	16.9	40.0

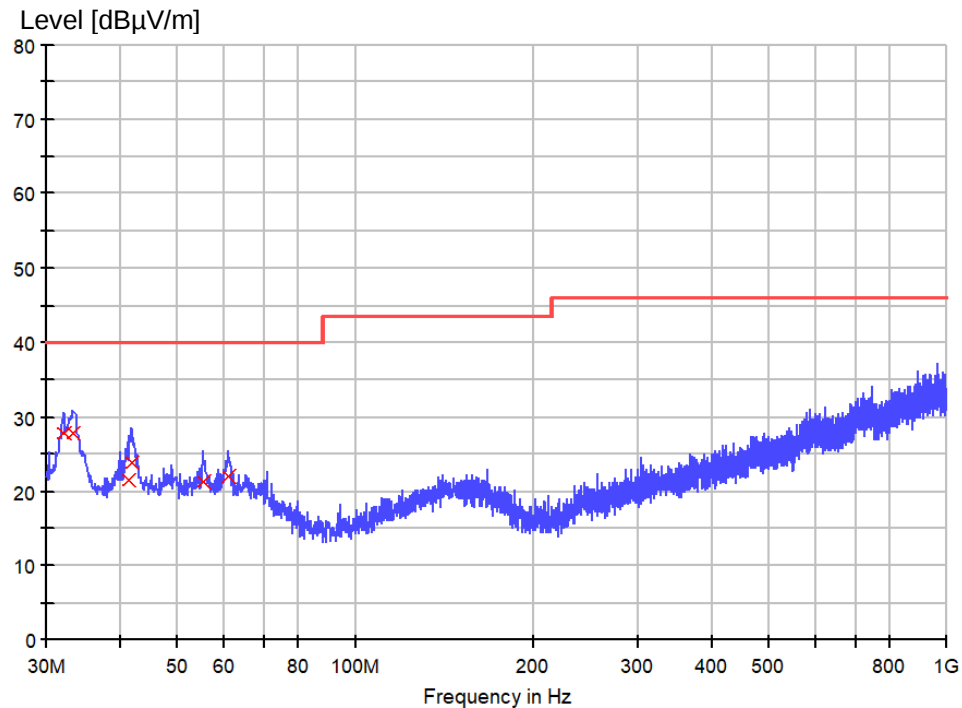
Figure 13: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, Mode 3



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
49.521250	18.7	120.000	200.0	H	113.0	14.3	21.3	40.0
117.300000	15.7	120.000	200.0	H	29.0	11.8	27.8	43.5
148.218750	18.4	120.000	100.0	H	-7.0	14.2	25.1	43.5
223.878750	15.2	120.000	200.0	H	120.0	10.9	30.8	46.0
338.217500	19.2	120.000	100.0	H	-44.0	16.1	26.8	46.0
599.753750	25.9	120.000	100.0	H	-70.0	22.2	20.1	46.0

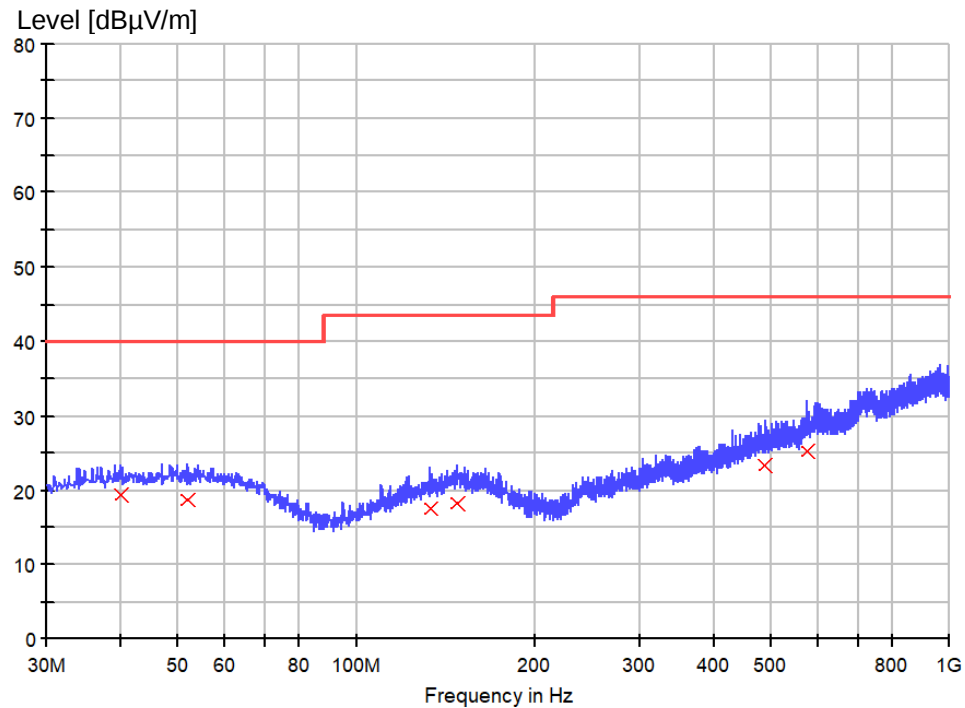
Figure 14: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization, Mode 3



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
32.061250	27.9	120.000	100.0	V	117.0	13.1	12.1	40.0
33.273750	27.7	120.000	150.0	V	103.0	13.2	12.3	40.0
41.155000	21.5	120.000	100.0	V	-93.0	14.0	18.5	40.0
41.882500	23.9	120.000	200.0	V	106.0	14.1	16.1	40.0
55.220000	21.2	120.000	100.0	V	133.0	14.2	18.8	40.0
61.040000	22.0	120.000	100.0	V	-122.0	13.5	18.0	40.0

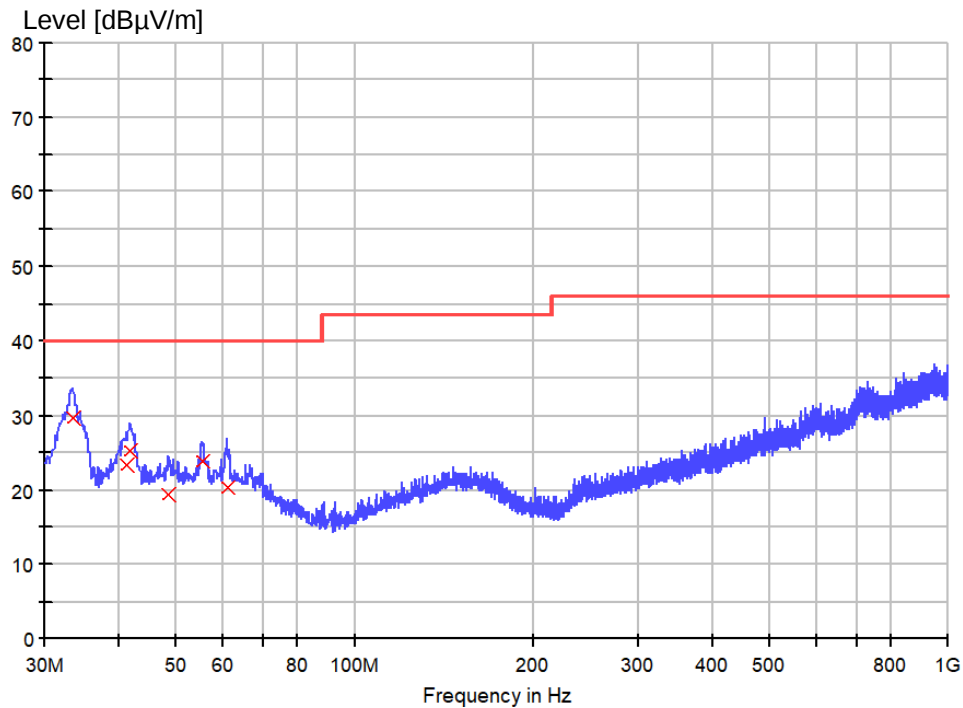
Figure 15: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization, Mode 4



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
39.942500	19.5	120.000	150.0	H	-139.0	13.9	20.5	40.0
51.825000	18.7	120.000	200.0	H	171.0	14.3	21.3	40.0
133.547500	17.5	120.000	100.0	H	-101.0	13.1	26.0	43.5
147.733750	18.3	120.000	100.0	H	165.0	14.1	25.2	43.5
489.052500	23.4	120.000	100.0	H	-138.0	19.2	22.6	46.0
576.110000	25.2	120.000	100.0	H	143.0	21.7	20.8	46.0

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



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
33.395000	29.8	120.000	150.0	V	-178.0	13.2	10.2	40.0
41.276250	23.3	120.000	100.0	V	-168.0	14.1	16.7	40.0
41.882500	25.3	120.000	200.0	V	-51.0	14.1	14.7	40.0
48.551250	19.5	120.000	150.0	V	-180.0	14.2	20.5	40.0
55.462500	23.9	120.000	100.0	V	87.0	14.1	16.1	40.0
61.040000	20.4	120.000	100.0	V	-81.0	13.5	19.6	40.0

5.2.2 Radiated Emission (1-18 GHz)

Result:
Passed

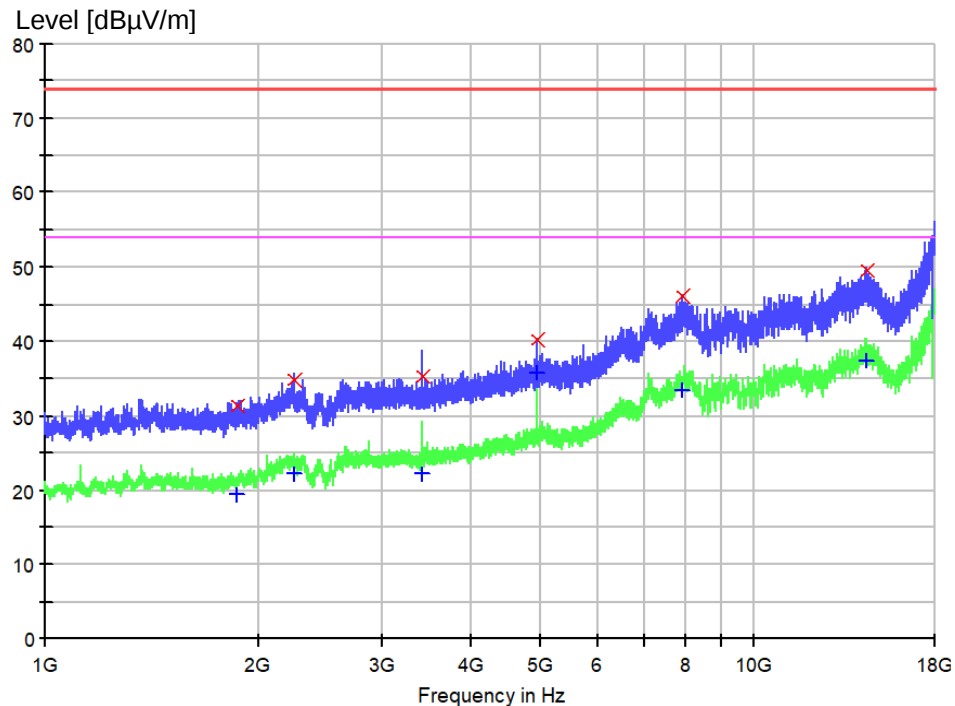
Date of testing	: 2025-04-10
Port	: Enclosure
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ICES-003:2020, ANSI C63.4-2014 and CISPR 16-2-3
Product classification	: Class B
Limit	: Peak limits (3 m distance): 1–18 GHz, 74 dB μ V/m Average limits (3 m distance): 1–18 GHz, 54 dB μ 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: Warm lighting with the max. lighting output. Mode 2: Warm lighting with the min. lighting output. Mode 3: White lighting with the max. lighting output. Mode 4: White lighting with the min. lighting output.
Earthing	: No earthing
Ambient condition	: Temperature: 19.2 °C; Relative humidity: 51.3 %
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 15.6 dB at 4952.500000 MHz. The margin is higher than the 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 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, “×” and “+” means measurement results with peak detector and average detector.

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

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

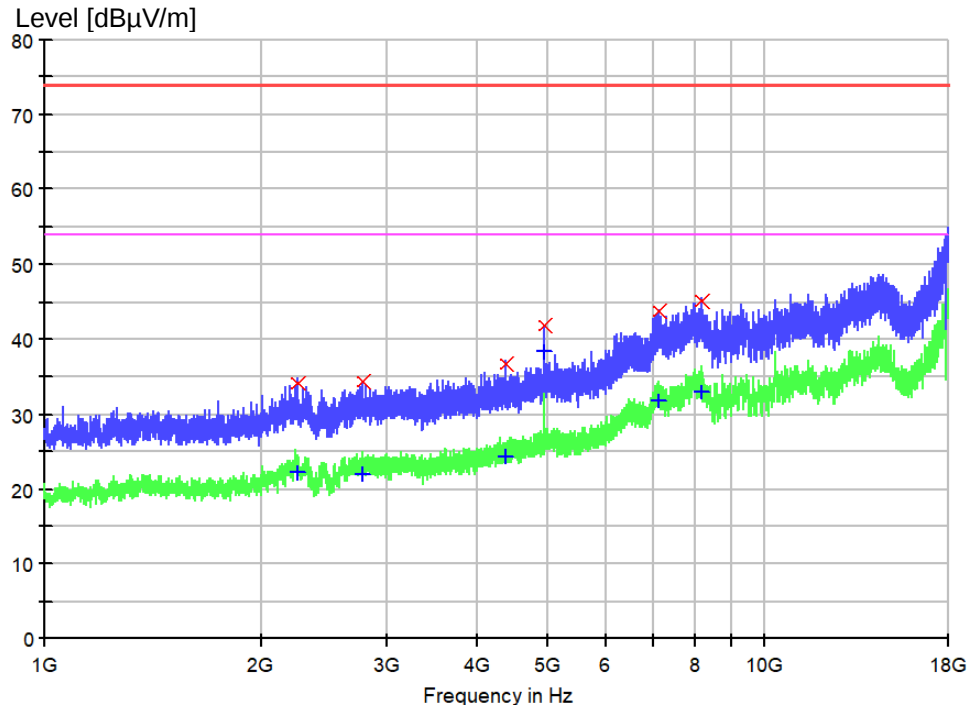


Final peak measurement result:

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)
1871.781250	31.4	1000.0	1000.000	130.0	H	121.0	-18.4	42.6	74.0
2247.906250	34.9	1000.0	1000.000	110.0	H	-149.0	-15.6	39.1	74.0
3409.218750	35.3	1000.0	1000.000	150.0	H	78.0	-14.9	38.7	74.0
4952.500000	40.2	1000.0	1000.000	200.0	H	4.0	-11.2	33.8	74.0
7946.093750	46.2	1000.0	1000.000	100.0	H	-123.0	-3.7	27.8	74.0
14418.312500	49.7	1000.0	1000.000	140.0	H	-125.0	2.4	24.3	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)
1871.781250	19.4	1000.0	1000.000	100.0	H	-122.0	-18.4	34.6	54.0
2247.906250	22.2	1000.0	1000.000	140.0	H	-150.0	-15.6	31.8	54.0
3409.218750	22.3	1000.0	1000.000	130.0	H	179.0	-14.9	31.7	54.0
4952.500000	35.8	1000.0	1000.000	150.0	H	109.0	-11.2	18.2	54.0
7946.093750	33.3	1000.0	1000.000	180.0	H	-167.0	-3.7	20.7	54.0
14418.312500	37.4	1000.0	1000.000	160.0	H	-113.0	2.4	16.6	54.0

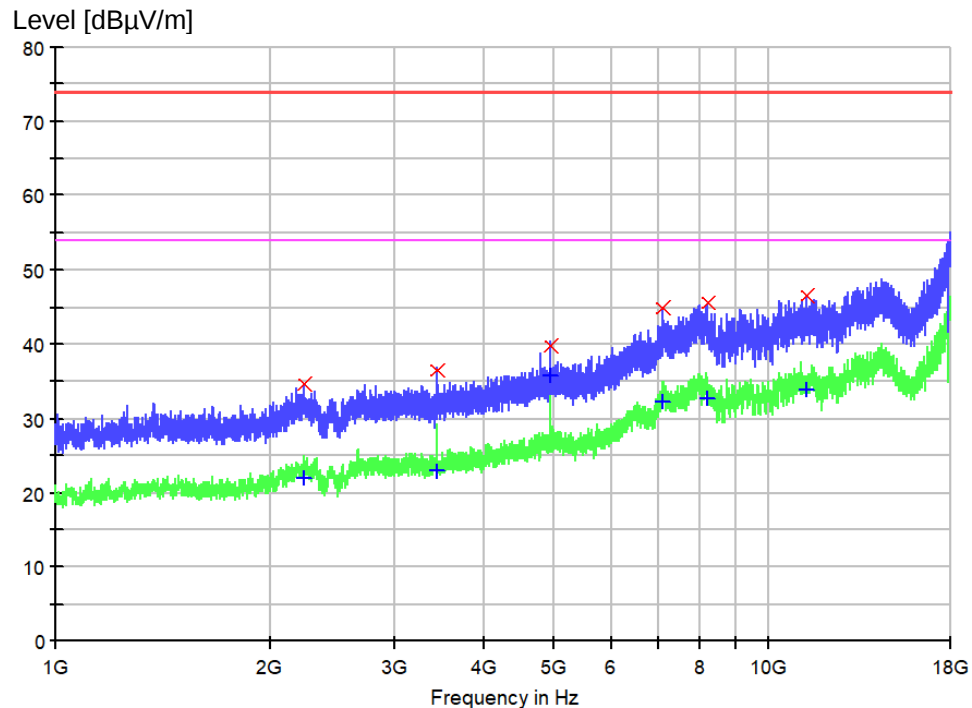
Figure 18: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization on mode 1

Final peak measurement result:

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
2246.312500	34.1	1000.0	1000.000	190.0	V	76.0	-15.6	39.9	74.0
2771.187500	34.4	1000.0	1000.000	120.0	V	-84.0	-15.2	39.6	74.0
4368.656250	36.8	1000.0	1000.000	130.0	V	-136.0	-12.5	37.2	74.0
4952.500000	41.8	1000.0	1000.000	150.0	V	-173.0	-11.2	32.2	74.0
7146.031250	43.8	1000.0	1000.000	130.0	V	119.0	-5.5	30.2	74.0
8185.687500	45.1	1000.0	1000.000	150.0	V	109.0	-4.6	28.9	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)
2246.312500	22.2	1000.0	1000.000	110.0	V	114.0	-15.6	31.8	54.0
2771.187500	22.0	1000.0	1000.000	150.0	V	165.0	-15.2	32.0	54.0
4368.656250	24.3	1000.0	1000.000	120.0	V	-35.0	-12.5	29.8	54.0
4952.500000	38.3	1000.0	1000.000	200.0	V	-61.0	-11.2	15.7	54.0
7146.031250	31.8	1000.0	1000.000	120.0	V	21.0	-5.5	22.2	54.0
8185.687500	33.0	1000.0	1000.000	170.0	V	-168.0	-4.6	21.0	54.0

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

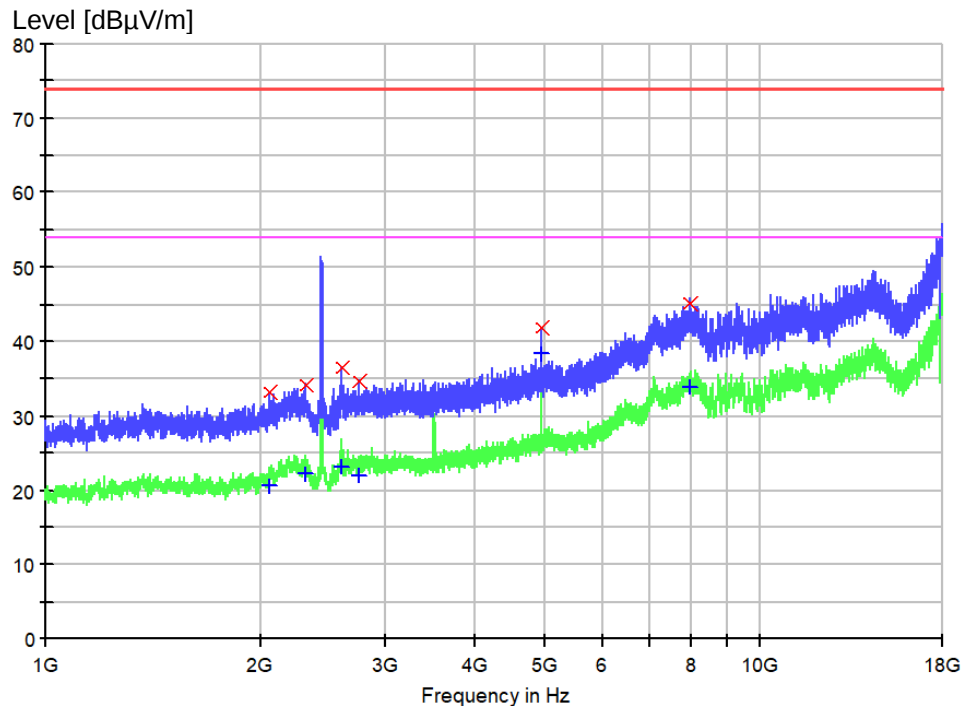


Final peak measurement result:

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)
2228.781250	34.7	1000.0	1000.000	110.0	H	-119.0	-15.7	39.3	74.0
3417.187500	36.5	1000.0	1000.000	180.0	H	-152.0	-14.9	37.5	74.0
4952.500000	39.8	1000.0	1000.000	120.0	H	37.0	-11.2	34.2	74.0
7105.125000	44.9	1000.0	1000.000	160.0	H	-154.0	-5.2	29.1	74.0
8211.718750	45.6	1000.0	1000.000	120.0	H	-4.0	-4.8	28.4	74.0
11271.187500	46.5	1000.0	1000.000	130.0	H	-122.0	-2.6	27.5	74.0

Final average measurement result:

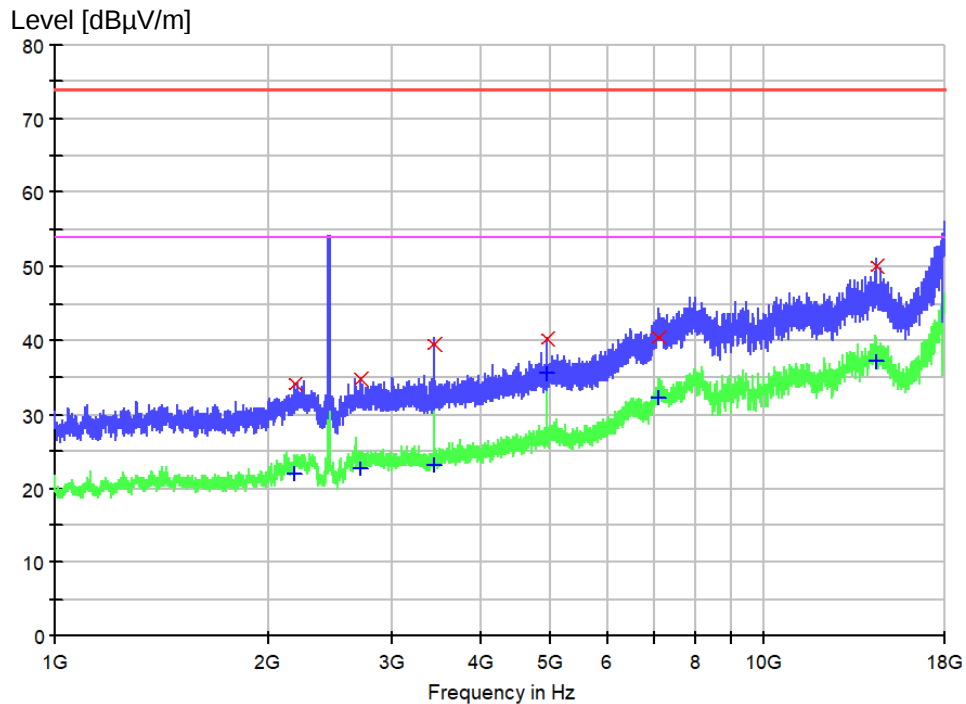
Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2228.781250	22.1	1000.0	1000.000	130.0	H	101.0	-15.7	31.9	54.0
3417.187500	22.9	1000.0	1000.000	120.0	H	99.0	-14.9	31.1	54.0
4952.500000	35.9	1000.0	1000.000	180.0	H	160.0	-11.2	18.1	54.0
7105.125000	32.2	1000.0	1000.000	120.0	H	-123.0	-5.2	21.8	54.0
8211.718750	32.8	1000.0	1000.000	200.0	H	125.0	-4.8	21.2	54.0
11271.187500	33.8	1000.0	1000.000	170.0	H	35.0	-2.6	20.2	54.0

Figure 20: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization on 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)
2060.906250	33.1	1000.0	1000.000	100.0	V	117.0	-17.3	40.9	74.0
2311.656250	34.2	1000.0	1000.000	120.0	V	-108.0	-15.8	39.8	74.0
2599.062500	36.4	1000.0	1000.000	140.0	V	124.0	-15.8	37.6	74.0
2752.062500	34.6	1000.0	1000.000	190.0	V	-118.0	-15.2	39.4	74.0
4952.500000	41.8	1000.0	1000.000	200.0	V	85.0	-11.2	32.2	74.0
7987.000000	45.2	1000.0	1000.000	130.0	V	-24.0	-3.5	28.8	74.0

Final average measurement result:

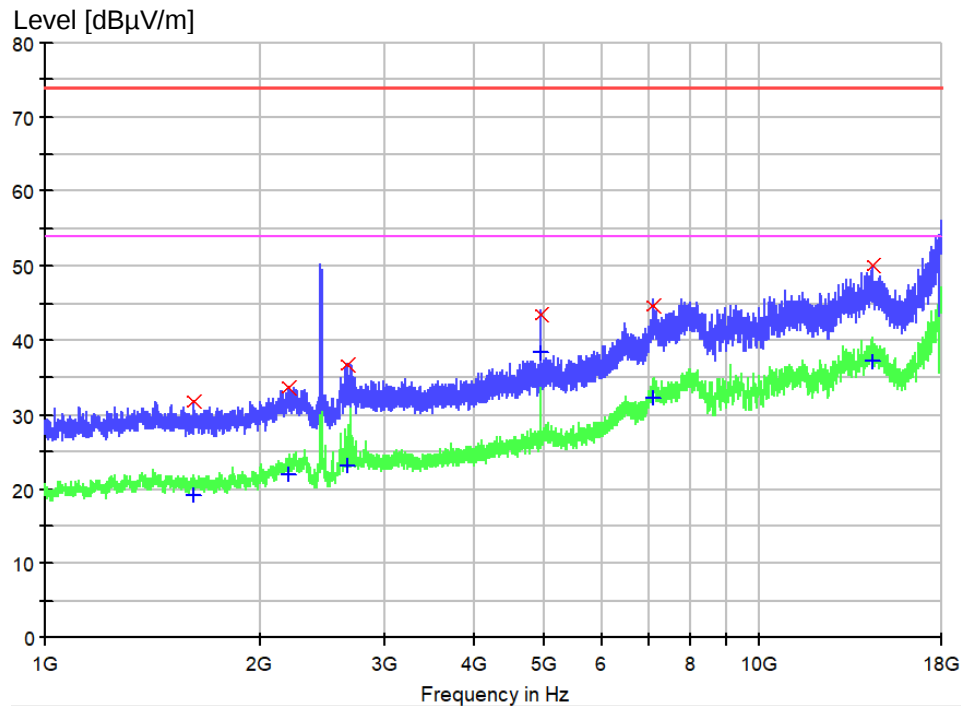
Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2060.906250	20.5	1000.0	1000.000	180.0	V	6.0	-17.3	33.5	54.0
2311.656250	22.2	1000.0	1000.000	130.0	V	103.0	-15.8	31.9	54.0
2599.062500	23.1	1000.0	1000.000	110.0	V	-68.0	-15.8	30.9	54.0
2752.062500	22.1	1000.0	1000.000	200.0	V	74.0	-15.2	31.9	54.0
4952.500000	38.3	1000.0	1000.000	160.0	V	33.0	-11.2	15.7	54.0
7987.000000	33.8	1000.0	1000.000	130.0	V	53.0	-3.5	20.2	54.0

Figure 21: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Horizontal polarization on 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)
2179.375000	34.2	1000.0	1000.000	100.0	H	141.0	-15.9	39.8	74.0
2698.406250	34.8	1000.0	1000.000	200.0	H	107.0	-15.4	39.2	74.0
3417.187500	39.5	1000.0	1000.000	130.0	H	-140.0	-14.9	34.5	74.0
4952.500000	40.3	1000.0	1000.000	120.0	H	66.0	-11.2	33.7	74.0
7109.906250	40.5	1000.0	1000.000	150.0	H	-94.0	-5.2	33.5	74.0
14420.437500	50.0	1000.0	1000.000	110.0	H	145.0	2.4	24.1	74.0

Final average measurement result:

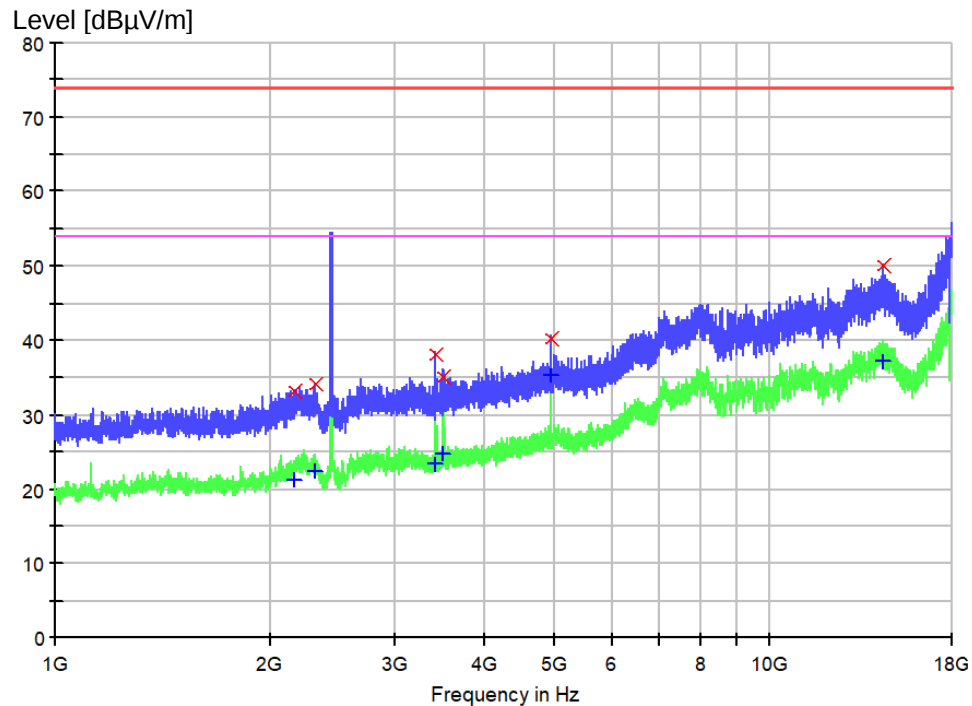
Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
2179.375000	22.0	1000.0	1000.000	200.0	H	-124.0	-15.9	32.0	54.0
2698.406250	22.7	1000.0	1000.000	130.0	H	-27.0	-15.4	31.3	54.0
3417.187500	23.2	1000.0	1000.000	120.0	H	113.0	-14.9	30.8	54.0
4952.500000	35.6	1000.0	1000.000	190.0	H	123.0	-11.2	18.4	54.0
7109.906250	32.4	1000.0	1000.000	120.0	H	16.0	-5.2	21.7	54.0
14420.437500	37.2	1000.0	1000.000	130.0	H	-90.0	2.4	16.8	54.0

Figure 22: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization on 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)
1613.062500	31.9	1000.0	1000.000	100.0	V	112.0	-18.9	42.1	74.0
2190.531250	33.8	1000.0	1000.000	150.0	V	-110.0	-15.8	40.2	74.0
2652.187500	36.8	1000.0	1000.000	120.0	V	136.0	-15.6	37.2	74.0
4952.500000	43.5	1000.0	1000.000	150.0	V	55.0	-11.2	30.5	74.0
7108.312500	44.7	1000.0	1000.000	170.0	V	49.0	-5.2	29.3	74.0
14416.718750	50.1	1000.0	1000.000	200.0	V	-91.0	2.4	24.0	74.0

Final average measurement result:

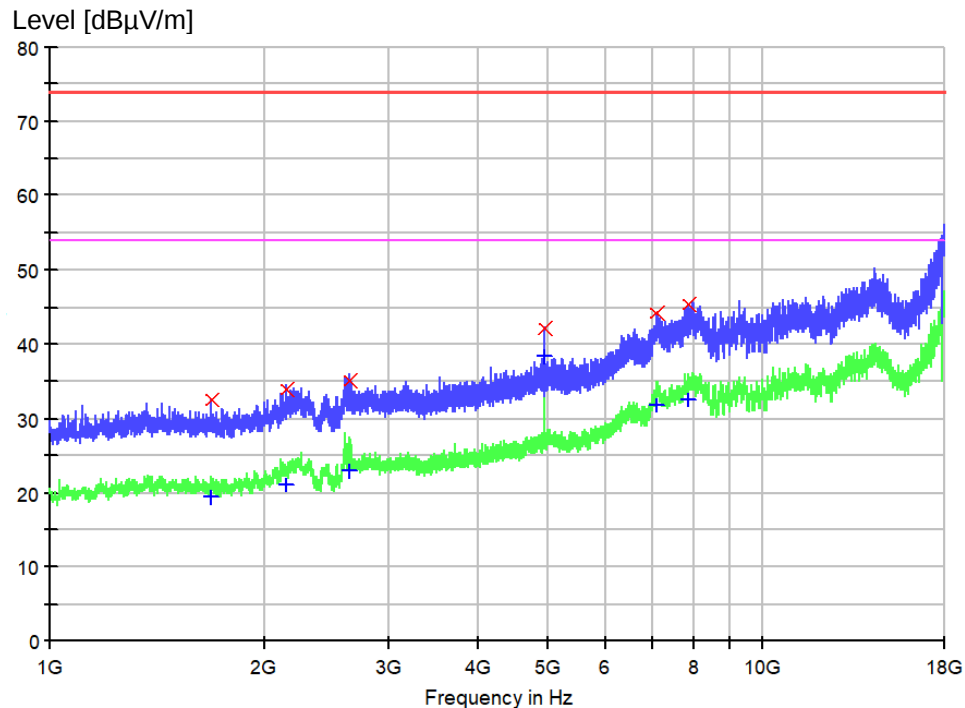
Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBμV/m)
1613.062500	19.2	1000.0	1000.000	130.0	V	-151.0	-18.9	34.8	54.0
2190.531250	22.1	1000.0	1000.000	190.0	V	27.0	-15.8	32.0	54.0
2652.187500	23.3	1000.0	1000.000	120.0	V	60.0	-15.6	30.7	54.0
4952.500000	38.3	1000.0	1000.000	160.0	V	108.0	-11.2	15.7	54.0
7108.312500	32.3	1000.0	1000.000	110.0	V	164.0	-5.2	21.7	54.0
14416.718750	37.3	1000.0	1000.000	190.0	V	7.0	2.4	16.7	54.0

Figure 23: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Horizontal polarization on 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)
2157.593750	33.1	1000.0	1000.000	180.0	H	171.0	-16.2	40.9	74.0
2311.656250	34.1	1000.0	1000.000	120.0	H	37.0	-15.8	39.9	74.0
3404.437500	38.2	1000.0	1000.000	180.0	H	180.0	-14.9	35.8	74.0
3497.937500	35.1	1000.0	1000.000	120.0	H	25.0	-14.4	38.9	74.0
4952.500000	40.2	1000.0	1000.000	130.0	H	134.0	-11.2	33.8	74.0
14410.343750	50.1	1000.0	1000.000	200.0	H	-125.0	2.4	23.9	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)
2157.593750	21.2	1000.0	1000.000	120.0	H	82.0	-16.2	32.8	54.0
2311.656250	22.4	1000.0	1000.000	140.0	H	-29.0	-15.8	31.7	54.0
3404.437500	23.3	1000.0	1000.000	150.0	H	26.0	-14.9	30.7	54.0
3497.937500	24.8	1000.0	1000.000	170.0	H	99.0	-14.4	29.2	54.0
4952.500000	35.4	1000.0	1000.000	120.0	H	165.0	-11.2	18.6	54.0
14410.343750	37.2	1000.0	1000.000	110.0	H	100.0	2.4	16.8	54.0

Figure 24: Spectral Diagrams, Radiated Emission, 1 GHz – 18 GHz, Vertical polarization on 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)
1685.843750	32.5	1000.0	1000.000	160.0	V	51.0	-18.9	41.5	74.0
2154.406250	34.0	1000.0	1000.000	140.0	V	-72.0	-16.2	40.0	74.0
2634.656250	35.1	1000.0	1000.000	120.0	V	-155.0	-15.7	38.9	74.0
4952.500000	42.1	1000.0	1000.000	170.0	V	-109.0	-11.2	31.9	74.0
7100.343750	44.1	1000.0	1000.000	200.0	V	-37.0	-5.3	29.9	74.0
7862.156250	45.3	1000.0	1000.000	130.0	V	120.0	-4.4	28.7	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)
1685.843750	19.4	1000.0	1000.000	200.0	V	-136.0	-18.9	34.6	54.0
2154.406250	21.2	1000.0	1000.000	130.0	V	-20.0	-16.2	32.8	54.0
2634.656250	23.0	1000.0	1000.000	170.0	V	-164.0	-15.7	31.0	54.0
4952.500000	38.4	1000.0	1000.000	120.0	V	124.0	-11.2	15.6	54.0
7100.343750	31.9	1000.0	1000.000	130.0	V	67.0	-5.3	22.1	54.0
7862.156250	32.4	1000.0	1000.000	180.0	V	84.0	-4.4	21.6	54.0

6 Photographs of the Test Set-Up

Refer to the test setup file.

7 List of Test and Measurement Instruments

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
9061503	Shielded enclosure	10.055x3.605x3.000	Frankonia	08.11.2023	08.11.2028
9023229	EMI test receiver	ESR3	Rohde&Schwarz	03.08.2024	03.08.2025
G1824248	Dual display multimeter	F45	Fluke	28.06.2024	28.06.2025
9062744	EMI measurement software	EMC32-E+(10.60.20)	Rohde&Schwarz	N/A	N/A
G1830003	Artificial mains network	ENV432	Rohde&Schwarz	11.10.2024	11.10.2025
G1811378	3m semi-anechoic chamber	SAC3	Frankonia	03.12.2023	03.12.2026
G1811391	EMI test receiver	ESCI	Rohde&Schwarz	17.10.2024	17.10.2025
G1811425	Bilog antenna	CBL 6112D	Teseq	20.04.2023	20.04.2026
9062745	EMI measurement software	EMC32-MEB (10.60.20)	Rohde&Schwarz	N/A	N/A
G1822702	Spectrum analyser	FSV40	Rohde&Schwarz	15.07.2024	15.07.2025
G1822694	Double ridged broadband horn antenna	BBHA 9120 D	Schwarzbeck	24.03.2021	24.03.2026
G1825371	Preamplifier	EMC051845SE	Taiwan EMCI	24.07.2024	24.07.2025

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End of test report