

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	<b>CN2514PS 001</b>	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	<b>326069093</b>	<b>Seite 1 von 41</b> <i>Page 1 of 41</i>
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	<b>1288983</b>	<b>Auftragsdatum:</b> <i>Order date:</i>	<b>2024-12-17</b>	
<b>Auftraggeber:</b> <i>Client:</i>	<b>IKEA of Sweden AB</b> Box 702, SE-343 81 Älmhult, Sweden			
<b>Prüfgegenstand:</b> <i>Test item:</i>	<b>Self-ballasted LED lamps</b>			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	<b>LED2408G10NA</b>			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	<b>TÜV Rheinland EMC service</b>			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	<b>FCC 47 CFR Part 15, Subpart B:2023 Class B</b> <b>ICES-005:2018</b>			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	<b>2025-03-06</b>	Refer to the EUT photos file		
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	<b>A003951539-004</b>			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	<b>Refer to test report</b>			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	<b>Refer to clause 1.1</b>			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	<b>TÜV Rheinland (Shanghai) Co., Ltd.</b>			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	<b>Pass</b>			
<b>geprüft von:</b> <i>tested by:</i>	<i>Jessie Xu</i>		<b>genehmigt von:</b> <i>authorized by:</i>	<i>Hexiang Liu</i>
<b>Datum:</b> <i>Date:</i>	2025-05-11		<b>Ausstellungsdatum:</b> <i>Issue date:</i>	2025-05-11
<b>Stellung / Position:</b>	Project engineer		<b>Stellung / Position:</b>	Authorizer
<b>Sonstiges /</b> <i>Other:</i>	FCC ID: FHO-LED2408G10NA Test Firm Name: TÜV Rheinland (Shanghai) Co., Ltd. Designation Number: CN1396 Test Firm Registration Number: 930979			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>	<b>Prüfmuster vollständig und unbeschädigt</b> <i>Test item complete and undamaged</i>			
<b>* Legende:</b>	P(ass) = entspricht o.g. Prüfgrundlage(n)    F(ail) = entspricht nicht o.g. Prüfgrundlage(n)    N/A = nicht anwendbar    N/T = nicht getestet			
<b>* Legend:</b>	P(ass) = passed a.m. test specification(s)    F(ail) = failed a.m. test specification(s)    N/A = not applicable    N/T = not tested			
<b>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.</b> <i>This test report only relates to the above mentioned 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>				

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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.<br/>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.<br/>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.<br/>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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**Revision history of test report:**

<b>Report number</b>	<b>Issue date</b>	<b>Contents and reason for change if appropriate</b>
CN2514PS 001	2025-05-11	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 test equipment used 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 with wireless dimming function 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, 110 mA
Rated power	: 11.5 W
RF IC	: SiMG301

### 2.3 Independent Operation Modes

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

- 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

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 for wireless module.

### 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.

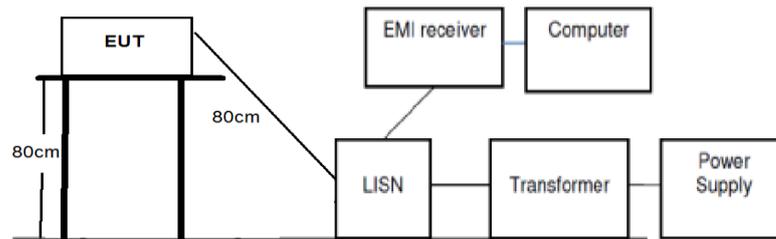
Refer to the related paragraph of this report.

The sequence of testing:

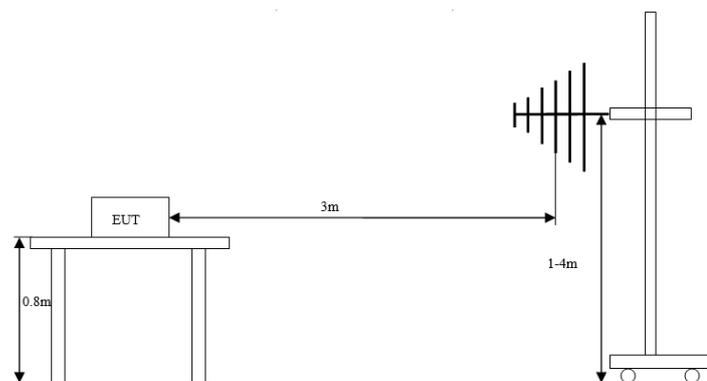
1. Conducted emission tests were performed on 2025-04-11.
2. Radiated emission tests were performed on 2025-04-10~2025-04-11.

#### 3.2 Equipment and cable arrangement

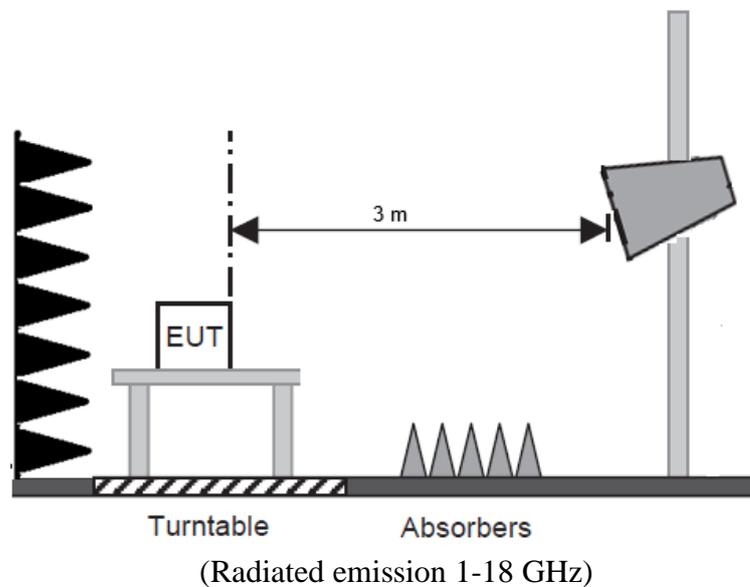
Block diagram for both conducted emission and radiated emission tests is as follows:



(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 tests.

### 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

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  $U_{\text{CISPR}}$  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

<b>Result:</b>	<b>Passed</b>
Date of testing	: 2025-04-11
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 $\mu$ V (decrease with the logarithm of frequency); 0.5 – 5 MHz, 56 dB $\mu$ V; 5 – 30 MHz, 60 dB $\mu$ V Average limit: 0.15 – 0.5 MHz, 56 to 46 dB $\mu$ V (decrease with the logarithm of frequency); 0.5 – 5 MHz, 46 dB $\mu$ V; 5 – 30 MHz, 50 dB $\mu$ 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	: Modes 1, 2, 3, 4 defined in clause 2.3
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 7.65 dB at 0.152250 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 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.

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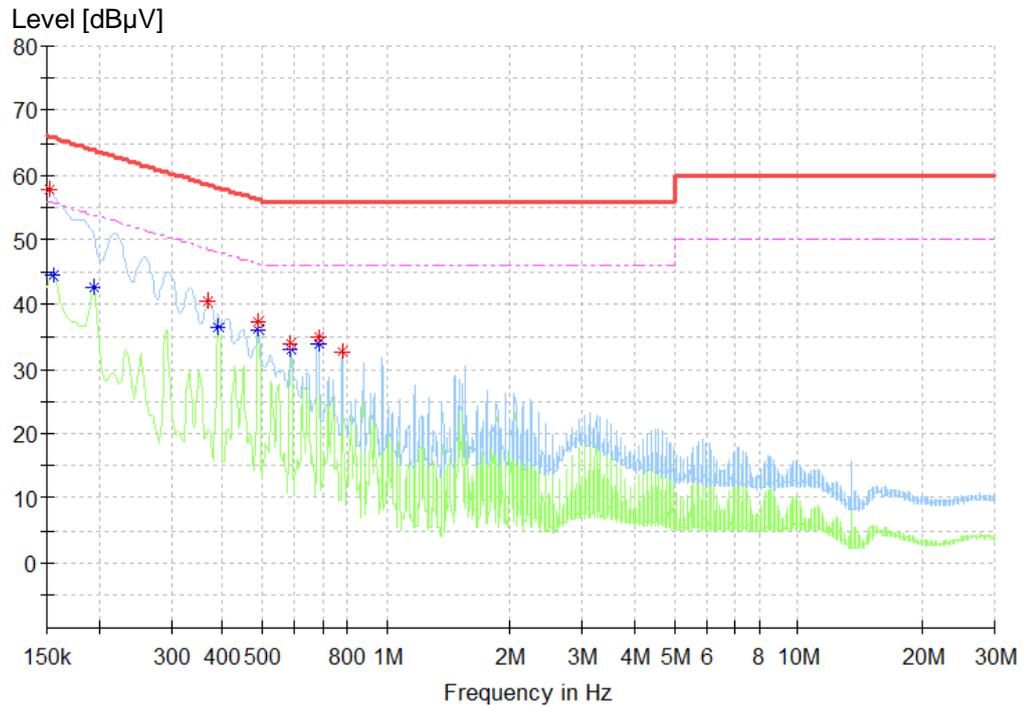
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Notes on following tables of conducted emission results and conversions:

Level (dB $\mu$ 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 $\mu$ V) - Level (dB $\mu$ V)

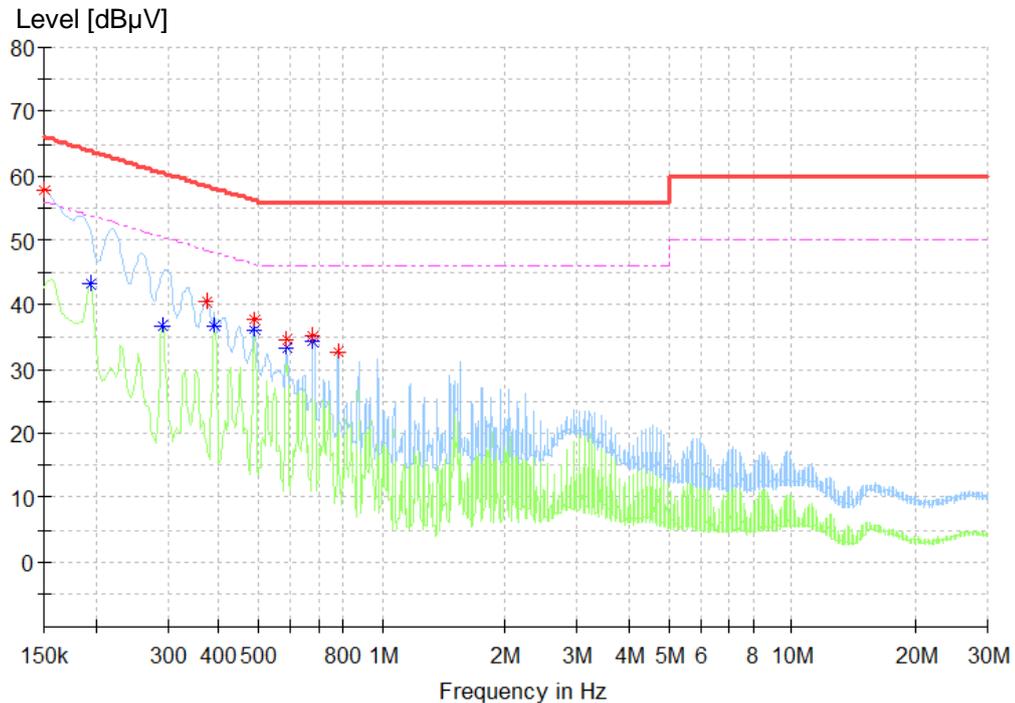
**Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L on mode 1**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.152250	57.71	65.88	8.17	L1
0.370500	40.39	58.49	18.10	L1
0.487500	37.37	56.21	18.84	L1
0.584250	34.06	56.00	21.94	L1
0.683250	34.85	56.00	21.15	L1
0.780000	32.58	56.00	23.42	L1

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.154500	44.32	55.75	11.43	L1
0.195000	42.50	53.82	11.32	L1
0.390750	36.48	48.05	11.57	L1
0.487500	36.02	46.21	10.19	L1
0.584250	32.91	46.00	13.09	L1
0.683250	33.82	46.00	12.18	L1

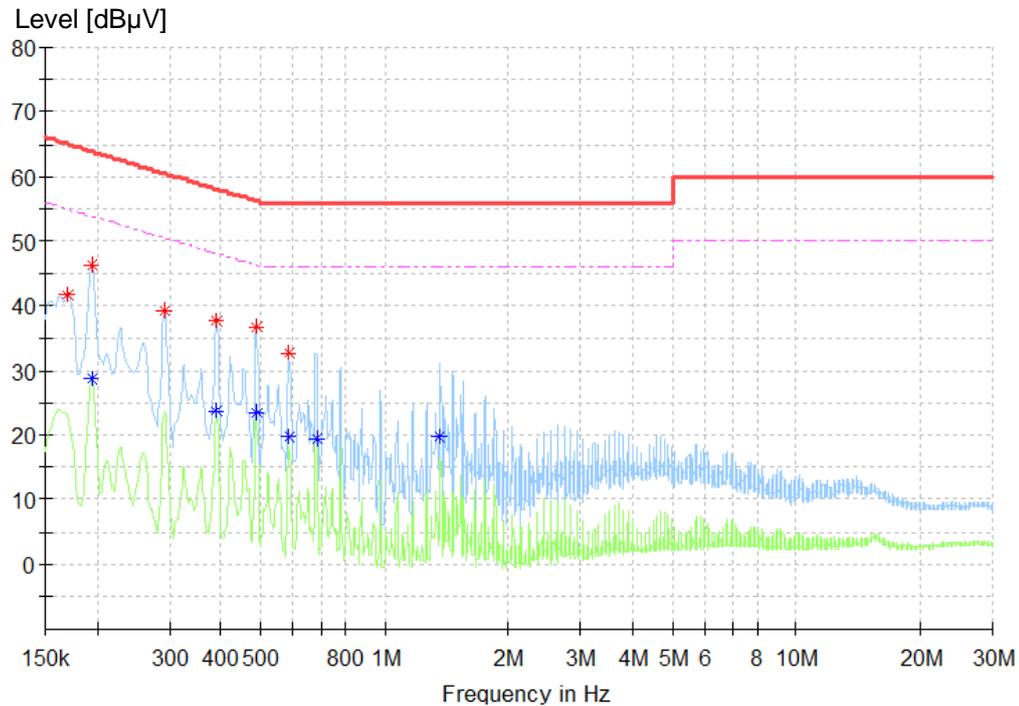
**Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N on mode 1**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line
0.150000	57.85	66.00	8.15	N
0.372750	40.56	58.44	17.88	N
0.487500	37.50	56.21	18.71	N
0.584250	34.49	56.00	21.51	N
0.681000	35.07	56.00	20.93	N
0.780000	32.56	56.00	23.44	N

Final average measurement result:

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line
0.195000	43.23	53.82	10.59	N
0.291750	36.78	50.47	13.69	N
0.388500	36.56	48.10	11.53	N
0.487500	36.12	46.21	10.09	N
0.584250	33.45	46.00	12.55	N
0.681000	34.12	46.00	11.88	N

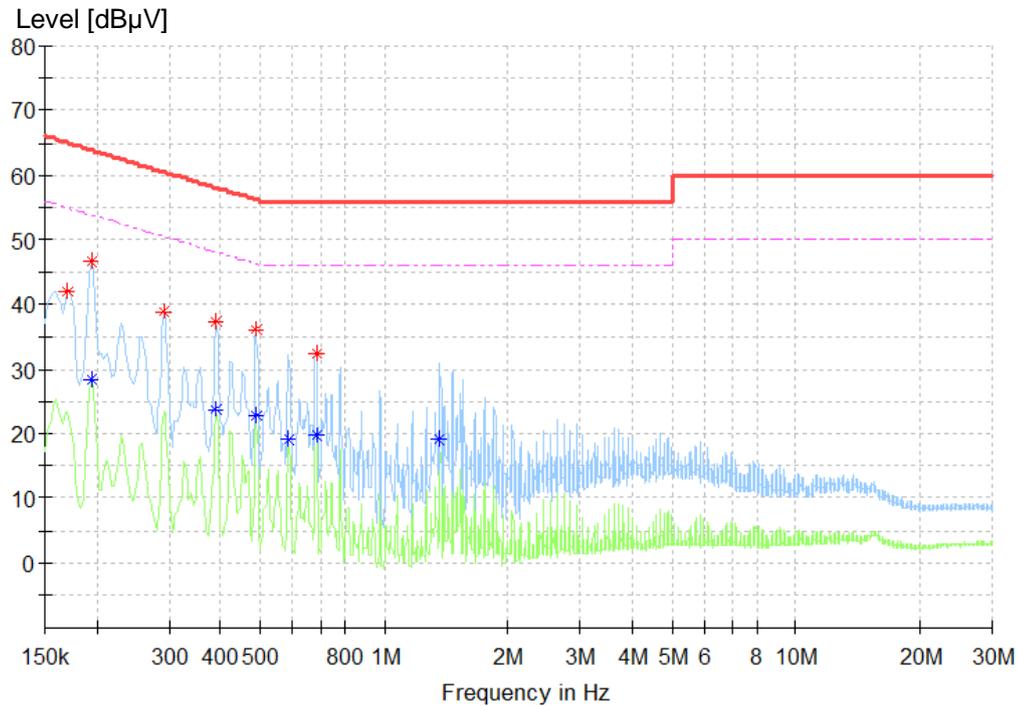
**Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L on mode 2**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.170250	41.69	64.95	23.26	L1
0.195000	46.42	63.82	17.40	L1
0.291750	39.20	60.47	21.27	L1
0.390750	37.59	58.05	20.46	L1
0.487500	36.55	56.21	19.66	L1
0.584250	32.69	56.00	23.31	L1

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.195000	28.52	53.82	25.30	L1
0.390750	23.69	48.05	24.36	L1
0.487500	23.51	46.21	22.70	L1
0.584250	19.69	46.00	26.31	L1
0.683250	19.51	46.00	26.49	L1
1.365000	19.76	46.00	26.24	L1

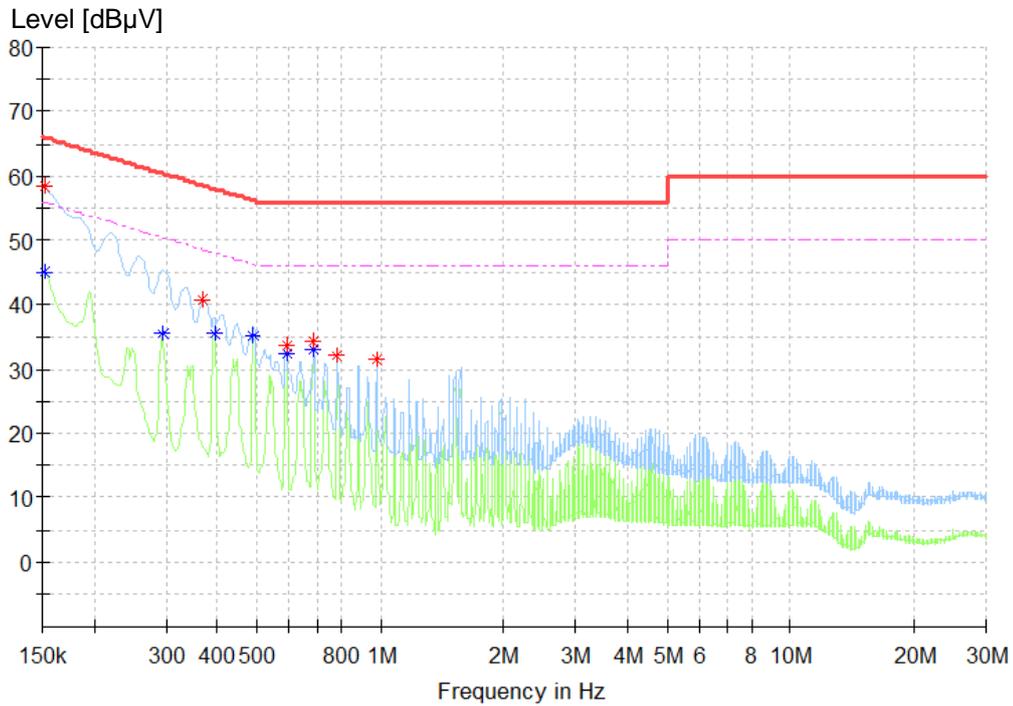
**Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N on mode 2**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.170250	42.09	64.95	22.85	N
0.195000	46.47	63.82	17.35	N
0.291750	38.86	60.47	21.62	N
0.390750	37.36	58.05	20.69	N
0.487500	36.06	56.21	20.15	N
0.683250	32.47	56.00	23.53	N

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.195000	28.33	53.82	25.49	N
0.390750	23.63	48.05	24.42	N
0.487500	22.90	46.21	23.31	N
0.584250	19.01	46.00	26.99	N
0.683250	19.57	46.00	26.43	N
1.365000	19.08	46.00	26.92	N

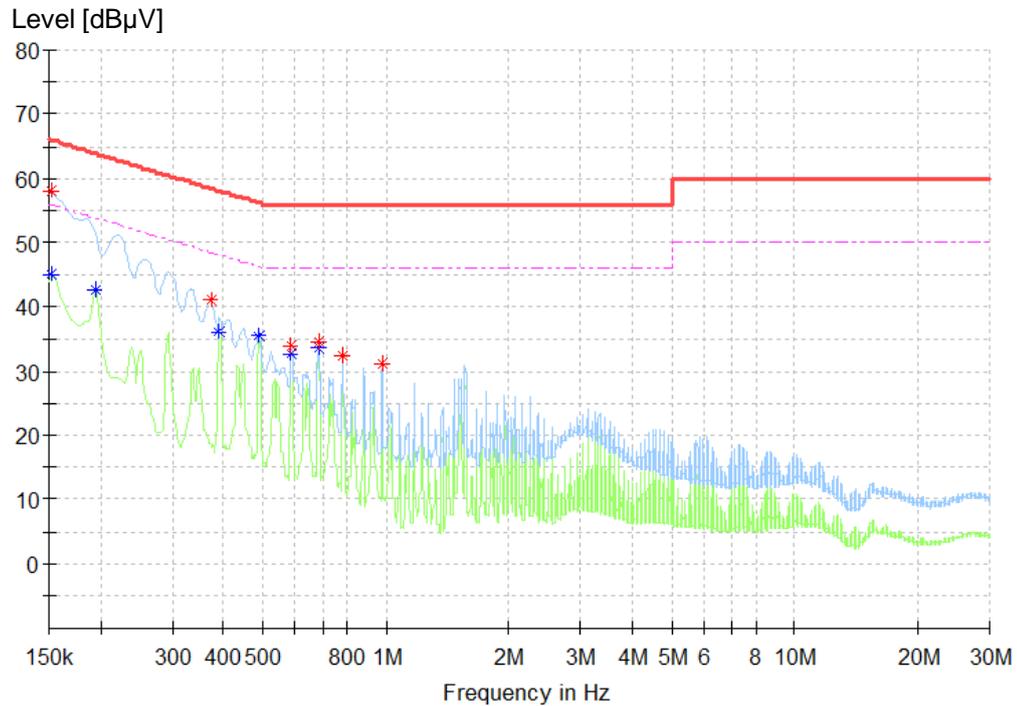
**Figure 5: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L on mode 3**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.152250	58.23	65.88	7.65	L1
0.370500	40.79	58.49	17.70	L1
0.588750	33.69	56.00	22.31	L1
0.685500	34.28	56.00	21.72	L1
0.784500	32.15	56.00	23.85	L1
0.980250	31.55	56.00	24.45	L1

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.152250	45.17	55.88	10.71	L1
0.294000	35.56	50.41	14.85	L1
0.393000	35.60	48.00	12.40	L1
0.489750	35.19	46.17	10.98	L1
0.588750	32.39	46.00	13.61	L1
0.685500	33.14	46.00	12.86	L1

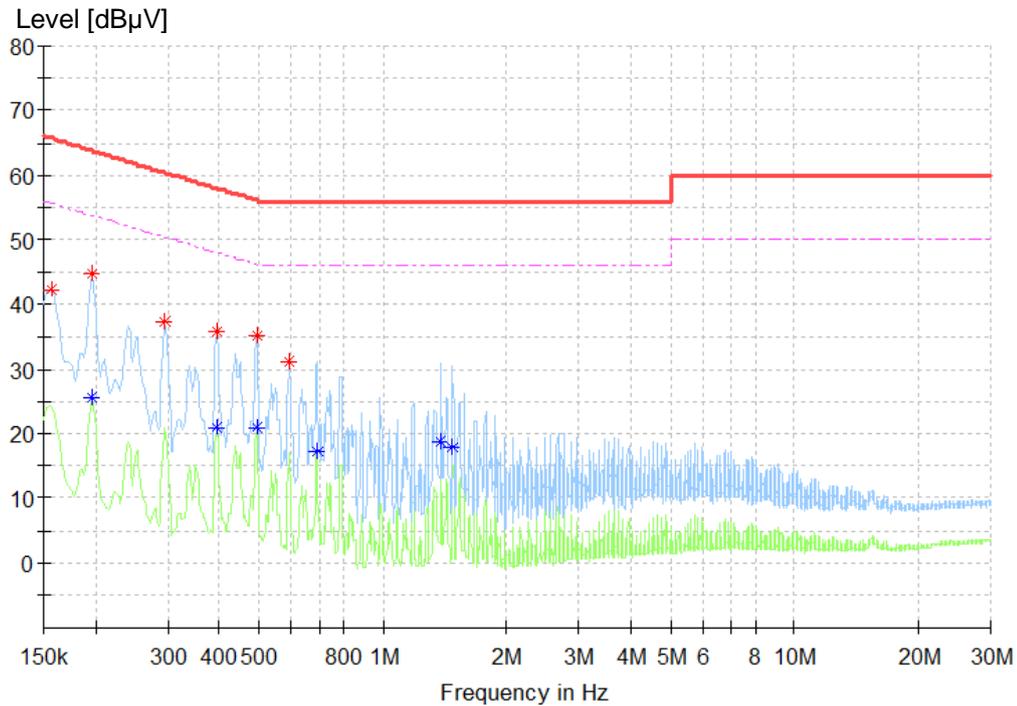
**Figure 6: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N on mode 3**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.152250	57.93	65.88	7.94	N
0.372750	40.89	58.44	17.55	N
0.586500	33.90	56.00	22.10	N
0.685500	34.65	56.00	21.35	N
0.782250	32.22	56.00	23.78	N
0.978000	31.23	56.00	24.77	N

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.152250	45.10	55.88	10.77	N
0.195000	42.61	53.82	11.21	N
0.390750	36.11	48.05	11.94	N
0.489750	35.35	46.17	10.83	N
0.586500	32.76	46.00	13.24	N
0.685500	33.62	46.00	12.38	N

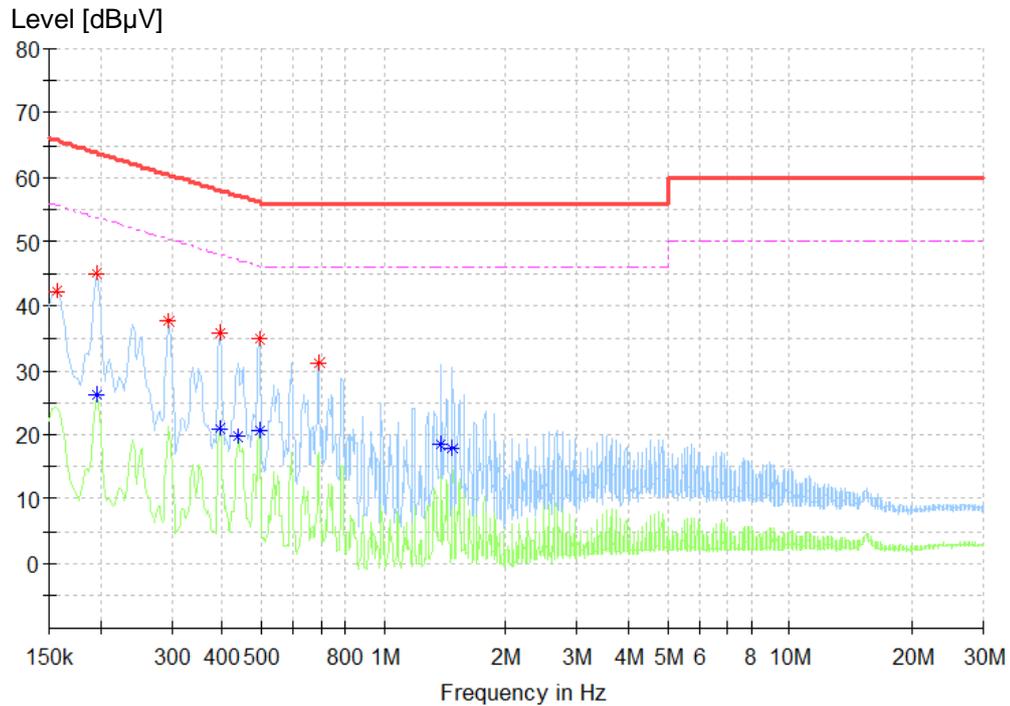
**Figure 7: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L on mode 4**


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.156750	42.31	65.63	23.32	L1
0.197250	44.59	63.73	19.14	L1
0.296250	37.35	60.35	23.00	L1
0.393000	35.77	58.00	22.23	L1
0.492000	35.01	56.13	21.12	L1
0.591000	31.25	56.00	24.75	L1

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.197250	25.62	53.73	28.10	L1
0.393000	20.86	48.00	27.14	L1
0.492000	20.91	46.13	25.23	L1
0.690000	17.15	46.00	28.85	L1
1.378500	18.63	46.00	27.37	L1
1.477500	17.77	46.00	28.23	L1

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


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.156750	42.38	65.63	23.26	N
0.197250	45.11	63.73	18.62	N
0.296250	37.54	60.35	22.81	N
0.393000	35.84	58.00	22.16	N
0.492000	34.91	56.13	21.23	N
0.690000	31.13	56.00	24.87	N

Final average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line
0.197250	26.07	53.73	27.65	N
0.395250	21.02	47.95	26.93	N
0.438000	19.73	47.10	27.37	N
0.492000	20.76	46.13	25.38	N
1.378500	18.53	46.00	27.47	N
1.477500	17.73	46.00	28.27	N

## 5.2 Emission in the Frequency Range above 30 MHz

### 5.2.1 Radiated emission (30-1000 MHz)

<b>Result:</b>	<b>Passed</b>
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Date of testing	: 2025-04-11
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
Limits	: Quasi-peak limits (3 m distance): 30 – 88 MHz, 40 dB $\mu$ V/m; 88 – 216 MHz, 43.5 dB $\mu$ V/m; 216 – 1000 MHz, 46 dB $\mu$ V/m (see Note 1)
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	: Modes 1, 2, 3, 4 defined in clause 2.3
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 16.2 dB at 60.676250 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, “x” means quasi-peak test results.

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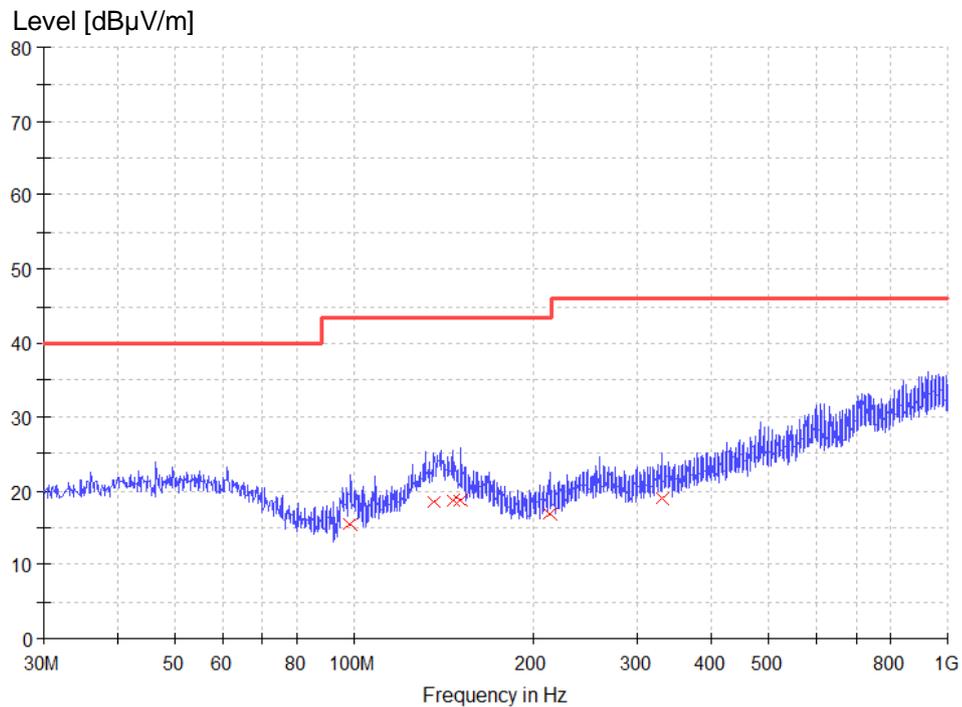
Notes on following tables of radiated emission results and conversions:

QuasiPeak (dB $\mu$ 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)

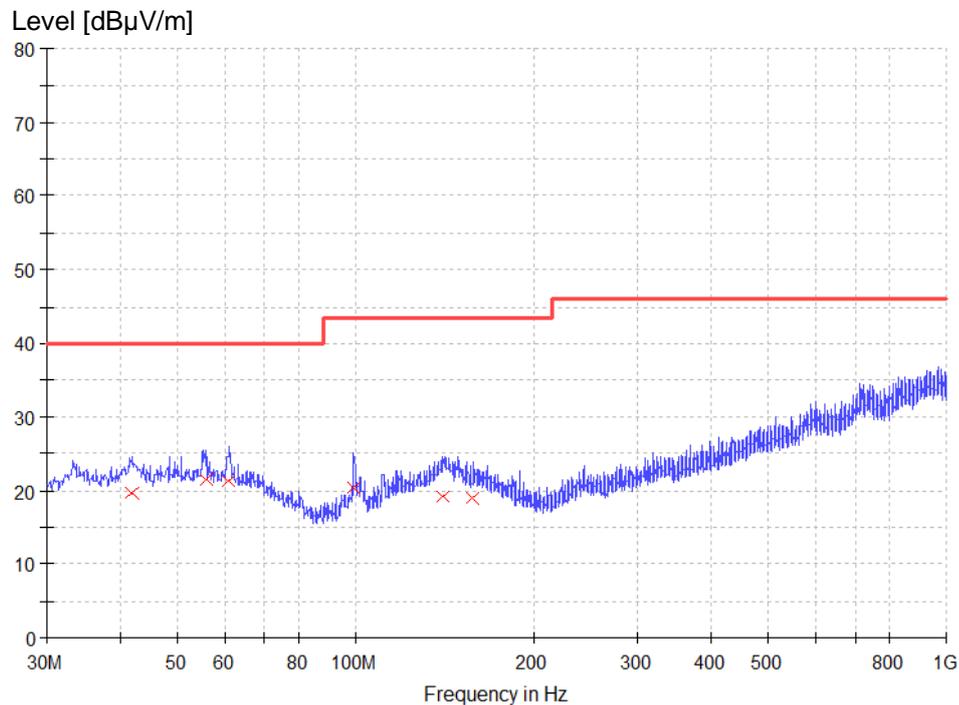
Margin: Limit (dB $\mu$ V/m) - QuasiPeak (dB $\mu$ V/m)

*Note 1: 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 on mode 1**


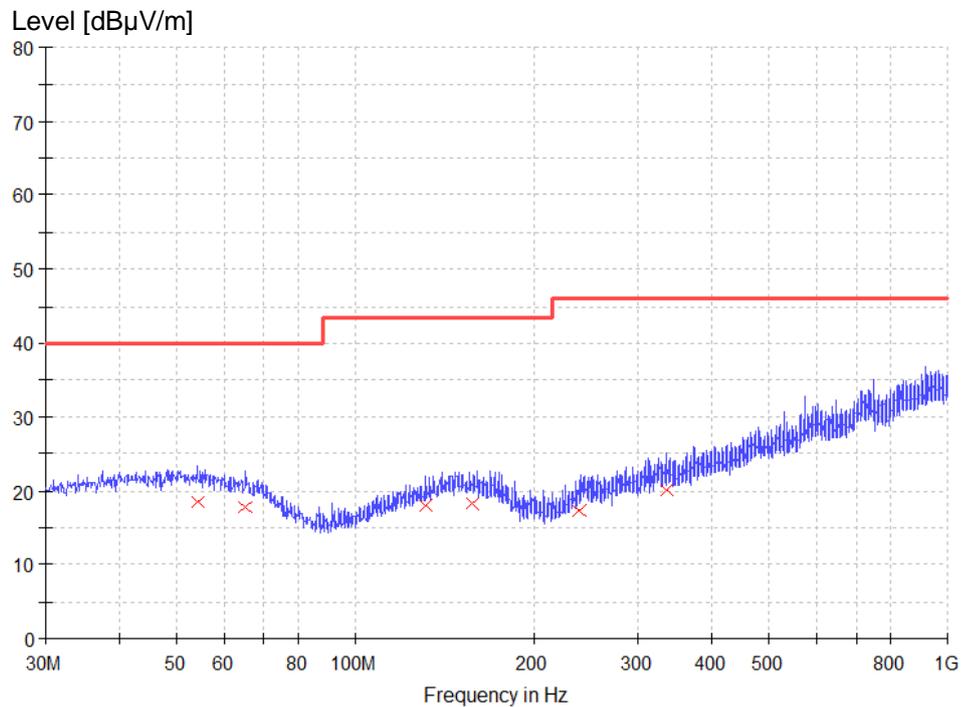
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
98.263750	15.5	120.000	150.0	H	62.0	9.2	28.0	43.5
136.700000	18.4	120.000	200.0	H	138.0	13.3	25.1	43.5
146.278750	18.7	120.000	150.0	H	-37.0	14.0	24.8	43.5
151.371250	18.8	120.000	100.0	H	170.0	14.3	24.7	43.5
213.087500	16.9	120.000	200.0	H	-5.0	10.7	26.6	43.5
330.821250	18.9	120.000	150.0	H	129.0	15.7	27.1	46.0

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


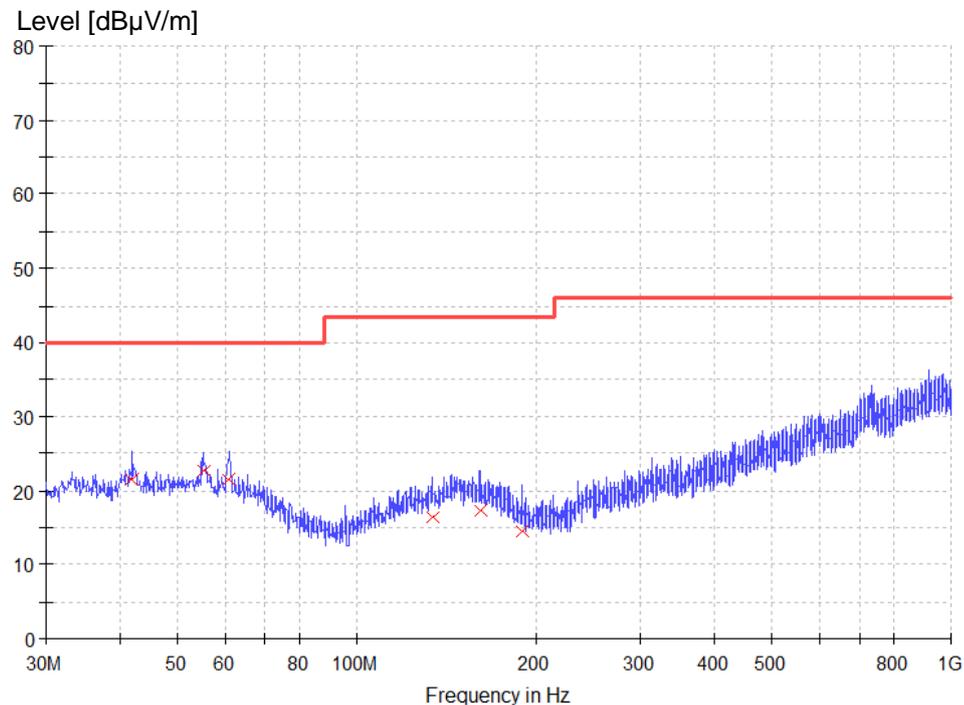
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
41.882500	19.7	120.000	150.0	V	-23.0	14.1	20.3	40.0
55.583750	21.6	120.000	150.0	V	-170.0	14.1	18.5	40.0
60.918750	21.3	120.000	150.0	V	-85.0	13.6	18.8	40.0
99.476250	20.3	120.000	100.0	V	-138.0	9.3	23.2	43.5
140.822500	19.2	120.000	100.0	V	-83.0	13.7	24.3	43.5
158.161250	19.0	120.000	100.0	V	106.0	14.3	24.5	43.5

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


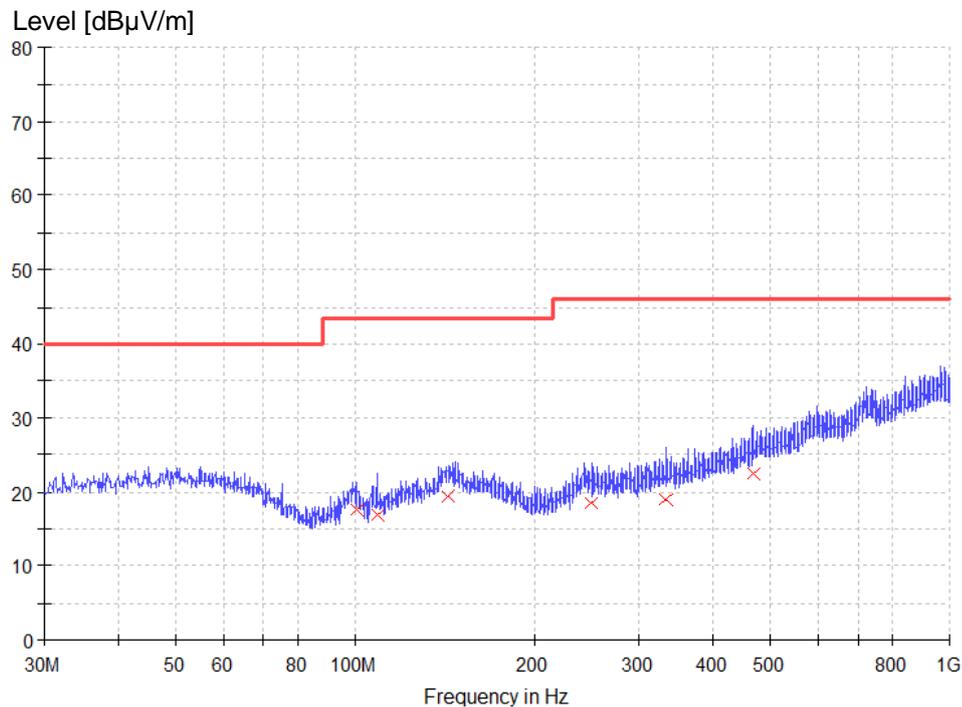
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
54.007500	18.5	120.000	150.0	H	67.0	14.3	21.5	40.0
65.283750	17.8	120.000	100.0	H	116.0	13.1	22.2	40.0
131.486250	18.1	120.000	200.0	H	48.0	13.0	25.4	43.5
157.676250	18.3	120.000	100.0	H	-120.0	14.3	25.2	43.5
238.671250	17.4	120.000	200.0	H	-158.0	12.9	28.6	46.0
335.550000	20.1	120.000	150.0	H	152.0	15.9	25.9	46.0

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


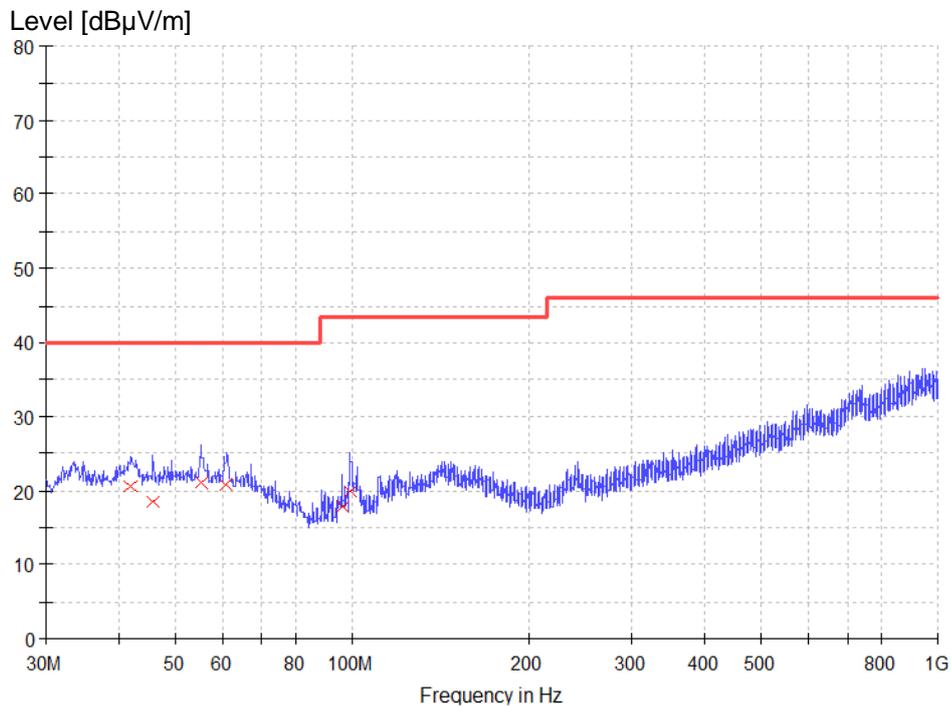
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
41.882500	21.5	120.000	200.0	V	-158.0	14.1	18.5	40.0
55.220000	22.8	120.000	200.0	V	10.0	14.2	17.2	40.0
61.040000	21.5	120.000	150.0	V	-85.0	13.5	18.5	40.0
134.396250	16.3	120.000	200.0	V	85.0	13.2	27.2	43.5
161.920000	17.2	120.000	200.0	V	-133.0	14.2	26.3	43.5
190.050000	14.5	120.000	200.0	V	82.0	11.5	29.0	43.5

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


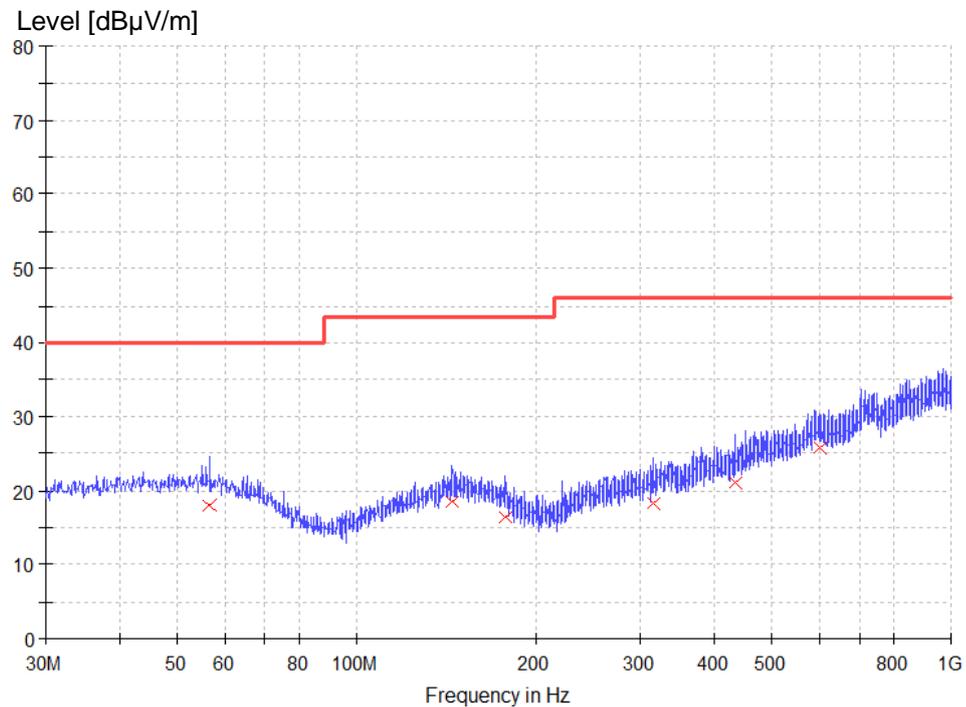
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
100.810000	17.5	120.000	150.0	H	110.0	9.5	26.0	43.5
108.933750	16.9	120.000	100.0	H	-143.0	10.8	26.7	43.5
143.975000	19.4	120.000	200.0	H	94.0	13.9	24.1	43.5
249.462500	18.4	120.000	200.0	H	170.0	13.0	27.6	46.0
333.367500	19.0	120.000	150.0	H	86.0	15.8	27.0	46.0
467.955000	22.4	120.000	100.0	H	76.0	19.1	23.6	46.0

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


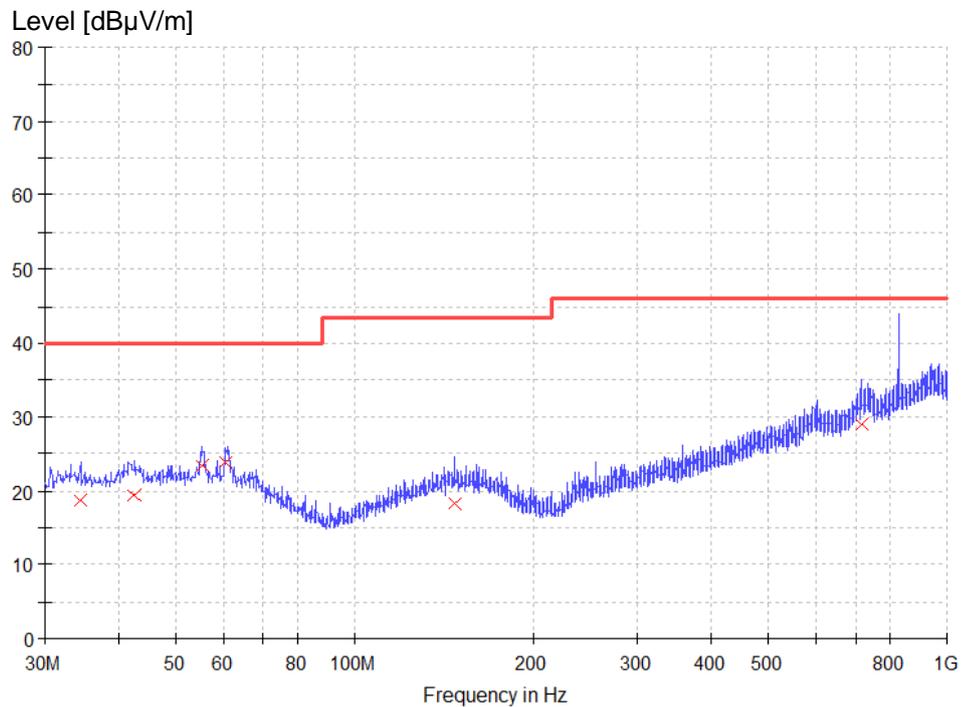
Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
41.882500	20.5	120.000	200.0	V	-28.0	14.1	19.5	40.0
45.762500	18.5	120.000	100.0	V	36.0	14.2	21.5	40.0
55.341250	21.1	120.000	100.0	V	19.0	14.1	19.0	40.0
60.918750	20.8	120.000	150.0	V	-57.0	13.6	19.3	40.0
96.445000	17.9	120.000	200.0	V	-175.0	9.0	25.6	43.5
99.355000	20.0	120.000	200.0	V	-161.0	9.3	23.5	43.5

**Figure 15: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization on 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)
56.553750	18.1	120.000	100.0	H	114.0	14.0	21.9	40.0
145.066250	18.5	120.000	150.0	H	-99.0	14.0	25.0	43.5
178.288750	16.4	120.000	100.0	H	-62.0	12.9	27.1	43.5
315.180000	18.2	120.000	150.0	H	-94.0	14.9	27.8	46.0
433.277500	21.1	120.000	200.0	H	-69.0	17.9	24.9	46.0
600.602500	25.6	120.000	200.0	H	85.0	22.2	20.4	46.0

**Figure 16: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization on 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)
34.486250	18.8	120.000	100.0	V	-167.0	13.4	21.2	40.0
42.488750	19.4	120.000	150.0	V	-177.0	14.2	20.6	40.0
55.220000	23.5	120.000	200.0	V	98.0	14.2	16.5	40.0
60.676250	23.8	120.000	150.0	V	88.0	13.6	16.2	40.0
147.612500	18.3	120.000	200.0	V	134.0	14.1	25.2	43.5
717.245000	29.1	120.000	200.0	V	137.0	24.7	16.9	46.0

### 5.2.2 Radiated Emission (1-18 GHz)

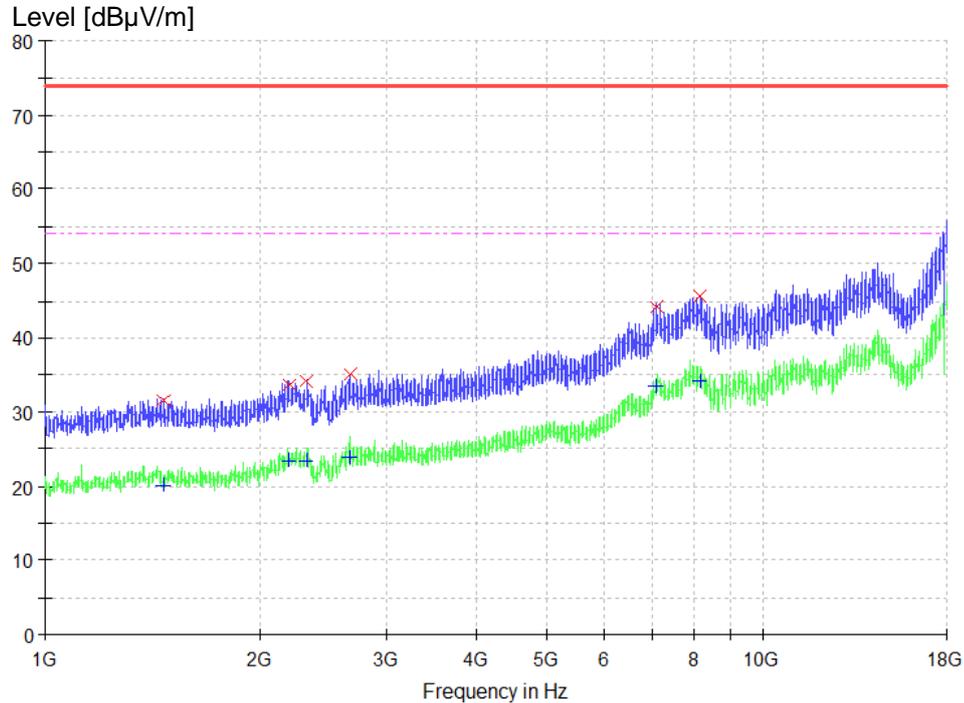
**Result:**
**Passed**

Date of testing	: 2025-04-10
Port	: Enclosure
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-2-3
Product classification	: Class B
Limit	: Peak limits (3 m distance): 1–18 GHz, 74 dB $\mu$ V/m Average limits (3 m distance): 1–18 GHz, 54 dB $\mu$ V/m
Frequency range	: 1 – 18 GHz (see Note 2)
Kind of test site	: Absorber-lined semi-anechoic chamber
Test distance	: 3 m
Test voltage	: AC 120 V, 60 Hz
Operational mode	: Modes 1, 2, 3, 4 defined in clause 2.3
Earthing	: No earth
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 17.0 dB at 14428.406250 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, “×” and “+” means measurement results with peak detector and average detector.

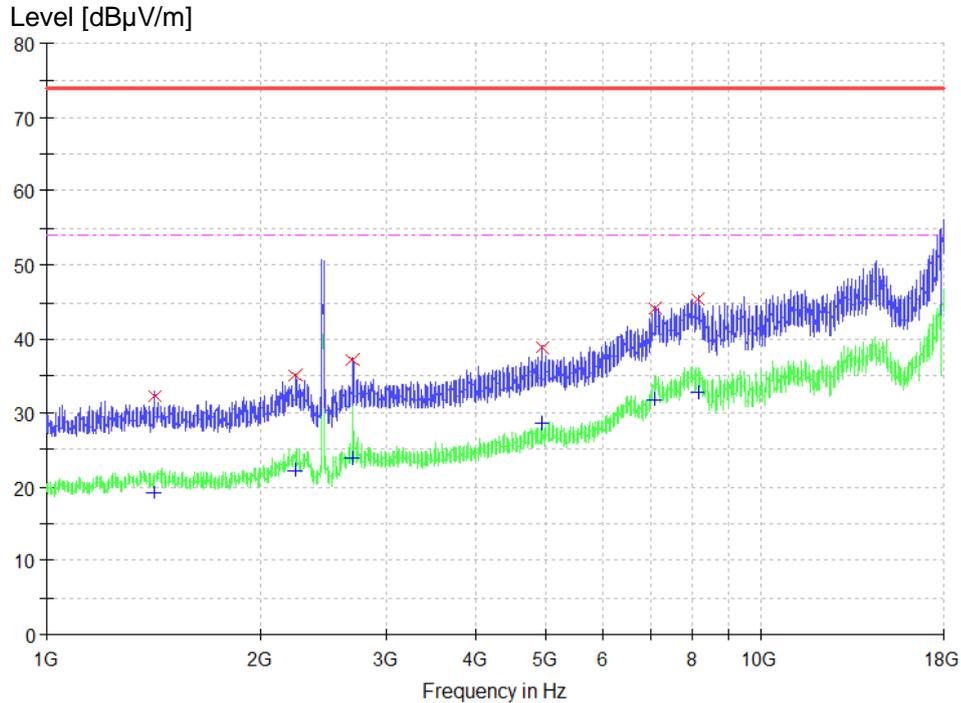
*Note 2: The highest frequency in the EUT is 2480 MHz. According to FCC Part 15 subpart B §15.33 (b) (1), the upper frequency for radiated emission measurement is 18 GHz.*

**Figure 17: Spectral Diagrams and measurement results, 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)
1465.906250	31.5	1000.0	1000.000	100.0	H	-128.0	-18.7	42.5	74.0
2184.156250	33.8	1000.0	1000.000	200.0	H	159.0	-15.9	40.2	74.0
2318.031250	34.1	1000.0	1000.000	200.0	H	21.0	-15.8	39.9	74.0
2659.625000	35.1	1000.0	1000.000	200.0	H	-167.0	-15.5	38.9	74.0
7112.031250	44.1	1000.0	1000.000	100.0	H	134.0	-5.2	29.9	74.0
8173.468750	45.5	1000.0	1000.000	150.0	H	-108.0	-4.5	28.5	74.0

**Final average measurement result:**

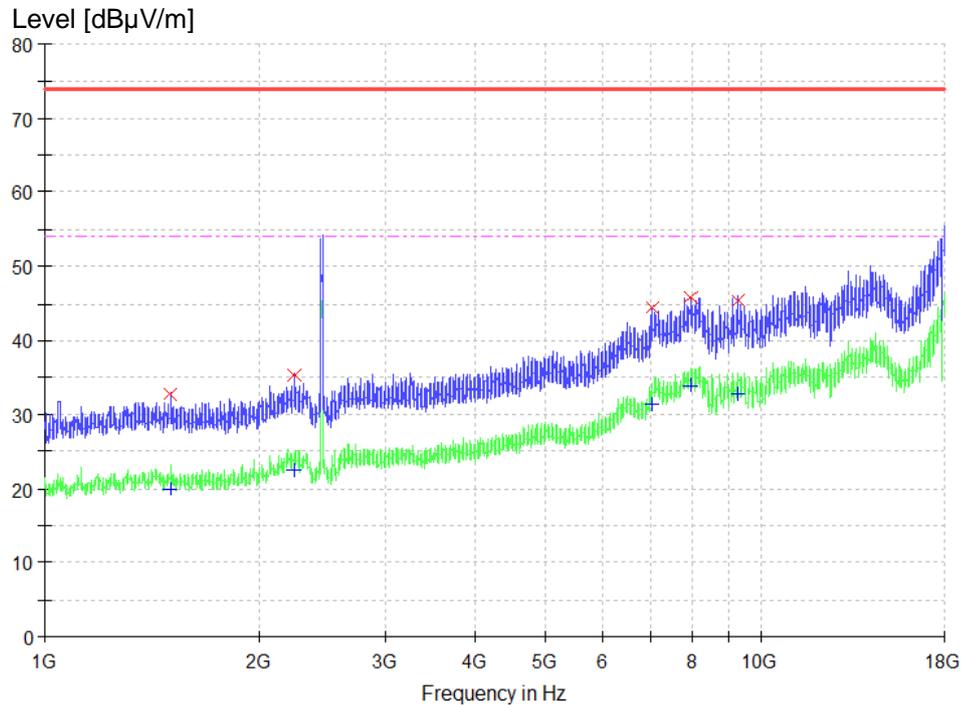
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1465.906250	20.1	1000.0	1000.000	100.0	H	-128.0	-18.7	33.9	54.0
2184.156250	23.5	1000.0	1000.000	200.0	H	159.0	-15.9	30.5	54.0
2318.031250	23.5	1000.0	1000.000	200.0	H	21.0	-15.8	30.5	54.0
2659.625000	23.9	1000.0	1000.000	200.0	H	-167.0	-15.5	30.1	54.0
7112.031250	33.4	1000.0	1000.000	100.0	H	134.0	-5.2	20.6	54.0
8173.468750	34.2	1000.0	1000.000	150.0	H	-108.0	-4.5	19.8	54.0

**Figure 18: Spectral Diagrams and measurement results, 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 - PK+ (dB)	Limit - PK+ (dBµV/m)
1417.562500	32.3	1000.0	1000.000	150.0	V	-7.0	-18.6	41.7	74.0
2234.093750	35.2	1000.0	1000.000	100.0	V	27.0	-15.6	38.8	74.0
2686.187500	37.1	1000.0	1000.000	150.0	V	-174.0	-15.4	36.9	74.0
4952.500000	38.9	1000.0	1000.000	100.0	V	-149.0	-11.2	35.1	74.0
7097.156250	44.1	1000.0	1000.000	200.0	V	23.0	-5.3	29.9	74.0
8178.250000	45.5	1000.0	1000.000	150.0	V	-100.0	-4.6	28.5	74.0

**Final average measurement result:**

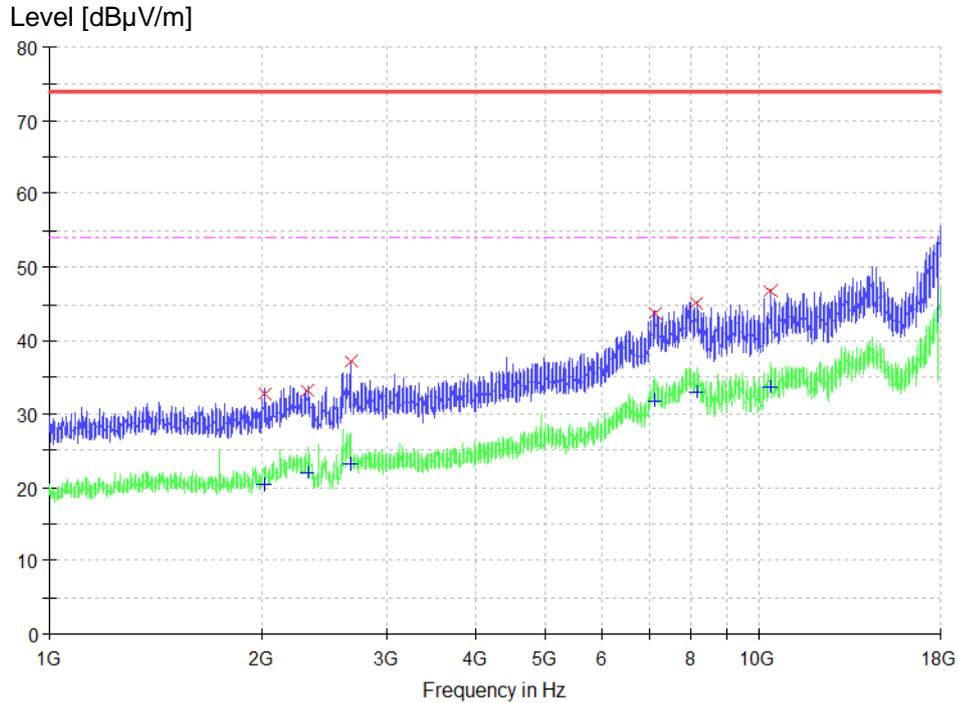
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1417.562500	19.3	1000.0	1000.000	150.0	V	-7.0	-18.6	34.7	54.0
2234.093750	22.3	1000.0	1000.000	100.0	V	27.0	-15.6	31.7	54.0
2686.187500	23.9	1000.0	1000.000	150.0	V	-174.0	-15.4	30.1	54.0
4952.500000	28.5	1000.0	1000.000	100.0	V	-149.0	-11.2	25.5	54.0
7097.156250	31.7	1000.0	1000.000	200.0	V	23.0	-5.3	22.3	54.0
8178.250000	32.9	1000.0	1000.000	150.0	V	-100.0	-4.6	21.2	54.0

**Figure 19: Spectral Diagrams and measurement results, 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)
1501.500000	32.8	1000.0	1000.000	150.0	H	35.0	-18.7	41.2	74.0
2236.218750	35.2	1000.0	1000.000	100.0	H	52.0	-15.6	38.8	74.0
7071.656250	44.5	1000.0	1000.000	150.0	H	82.0	-5.6	29.5	74.0
7978.500000	45.8	1000.0	1000.000	100.0	H	86.0	-3.6	28.2	74.0
9265.187500	45.4	1000.0	1000.000	100.0	H	32.0	-4.3	28.6	74.0

**Final average measurement result:**

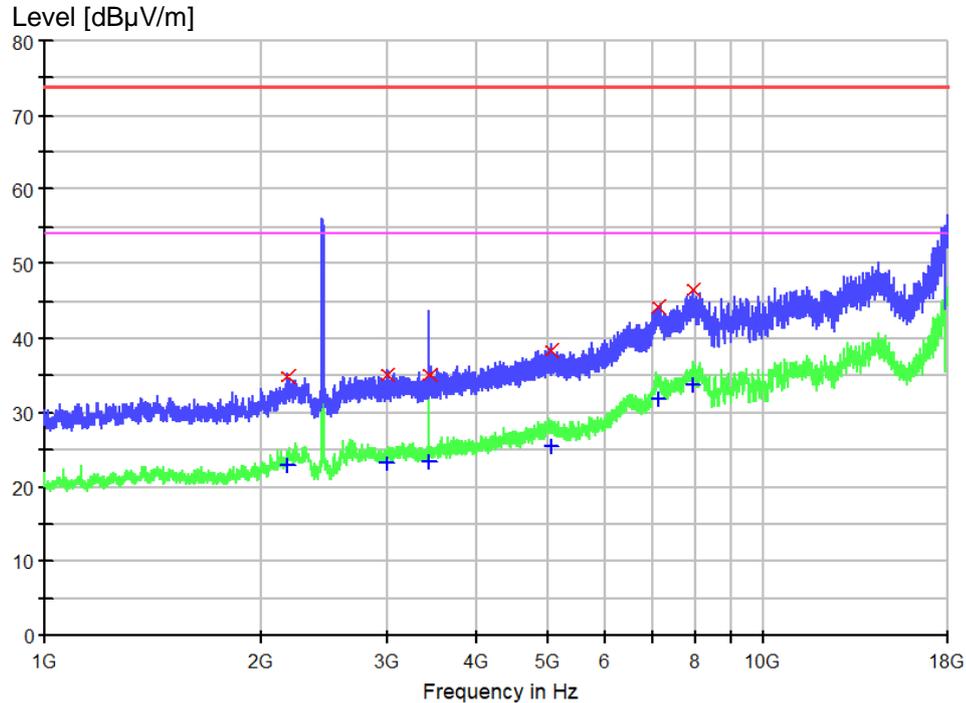
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1501.500000	19.8	1000.0	1000.000	150.0	H	35.0	-18.7	34.2	54.0
2236.218750	22.5	1000.0	1000.000	100.0	H	52.0	-15.6	31.5	54.0
7071.656250	31.4	1000.0	1000.000	150.0	H	82.0	-5.6	22.6	54.0
7978.500000	34.0	1000.0	1000.000	100.0	H	86.0	-3.6	20.0	54.0
9265.187500	32.9	1000.0	1000.000	100.0	H	32.0	-4.3	21.2	54.0

**Figure 20: Spectral Diagrams and measurement results, 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)
2006.187500	32.8	1000.0	1000.000	100.0	V	101.0	-17.7	41.2	74.0
2312.718750	33.3	1000.0	1000.000	100.0	V	-9.0	-15.8	40.7	74.0
2659.093750	37.3	1000.0	1000.000	200.0	V	-84.0	-15.6	36.7	74.0
7160.375000	43.8	1000.0	1000.000	150.0	V	77.0	-5.6	30.2	74.0
8189.406250	45.2	1000.0	1000.000	100.0	V	152.0	-4.6	28.8	74.0
10372.312500	46.8	1000.0	1000.000	200.0	V	-15.0	-2.7	27.2	74.0

**Final average measurement result:**

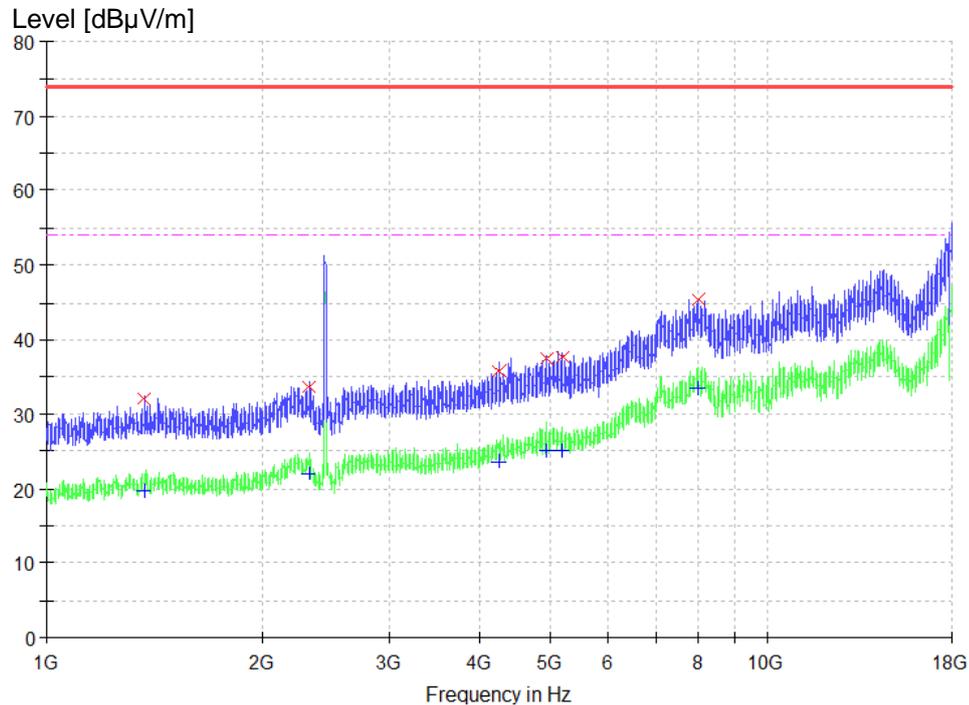
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/)
2006.187500	20.5	1000.0	1000.000	100.0	V	101.0	-17.7	33.6	54.0
2312.718750	22.0	1000.0	1000.000	100.0	V	-9.0	-15.8	32.0	54.0
2659.093750	23.2	1000.0	1000.000	200.0	V	-84.0	-15.6	30.8	54.0
7160.375000	31.7	1000.0	1000.000	150.0	V	77.0	-5.6	22.3	54.0
8189.406250	32.9	1000.0	1000.000	100.0	V	152.0	-4.6	21.1	54.0
10372.312500	33.8	1000.0	1000.000	200.0	V	-15.0	-2.7	20.2	54.0

**Figure 21: Spectral Diagrams and measurement results, 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)
2177.250000	34.9	1000.0	1000.000	200.0	H	-71.0	-15.9	39.1	74.0
3001.750000	35.2	1000.0	1000.000	150.0	H	-88.0	-15.0	38.8	74.0
3417.187500	35.2	1000.0	1000.000	150.0	H	-1.0	-14.9	38.9	74.0
5074.156250	38.4	1000.0	1000.000	200.0	H	-144.0	-11.0	35.6	74.0
7146.031250	44.1	1000.0	1000.000	100.0	H	-132.0	-5.5	29.9	74.0
7956.187500	46.5	1000.0	1000.000	100.0	H	165.0	-3.6	27.5	74.0

**Final average measurement result:**

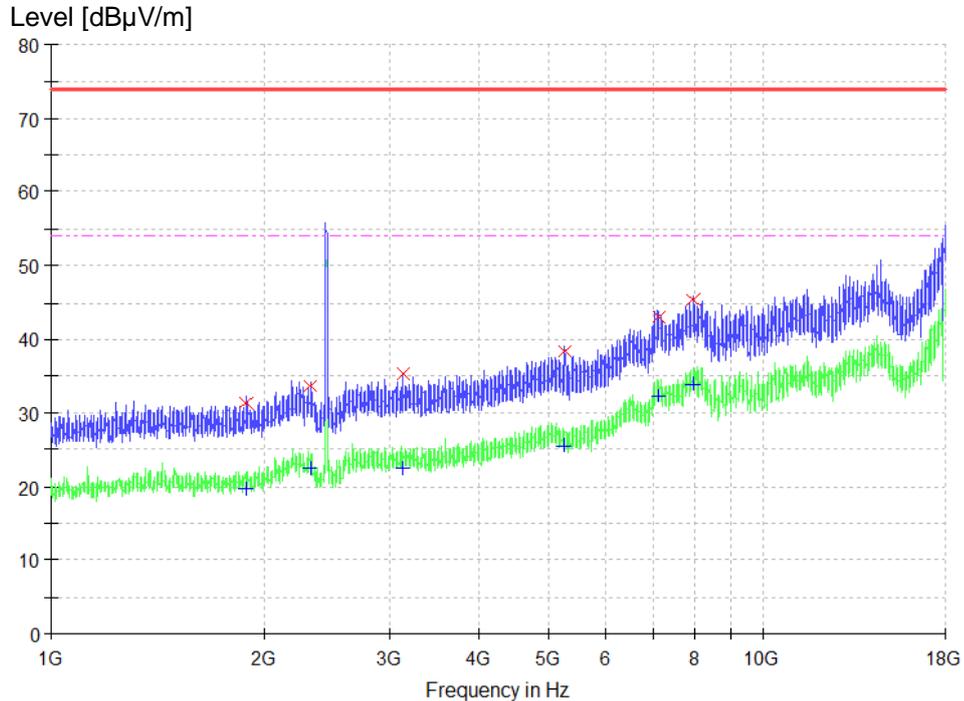
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2177.250000	23.0	1000.0	1000.000	200.0	H	-71.0	-15.9	31.0	54.0
3001.750000	23.2	1000.0	1000.000	150.0	H	-88.0	-15.0	30.8	54.0
3417.187500	23.5	1000.0	1000.000	150.0	H	-1.0	-14.9	30.5	54.0
5074.156250	25.6	1000.0	1000.000	200.0	H	-144.0	-11.0	28.4	54.0
7146.031250	31.9	1000.0	1000.000	100.0	H	-132.0	-5.5	22.1	54.0
7956.187500	33.7	1000.0	1000.000	100.0	H	165.0	-3.6	20.3	54.0

**Figure 22: Spectral Diagrams and measurement results, 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)
1367.625000	32.1	1000.0	1000.000	200.0	V	21.0	-18.7	41.9	74.0
2312.718750	33.8	1000.0	1000.000	150.0	V	-29.0	-15.8	40.2	74.0
4250.187500	35.9	1000.0	1000.000	150.0	V	120.0	-12.8	38.1	74.0
4937.625000	37.5	1000.0	1000.000	150.0	V	129.0	-11.2	36.5	74.0
5181.468750	37.6	1000.0	1000.000	150.0	V	92.0	-11.3	36.4	74.0
8008.250000	45.3	1000.0	1000.000	100.0	V	16.0	-3.5	28.7	74.0

**Final average measurement result:**

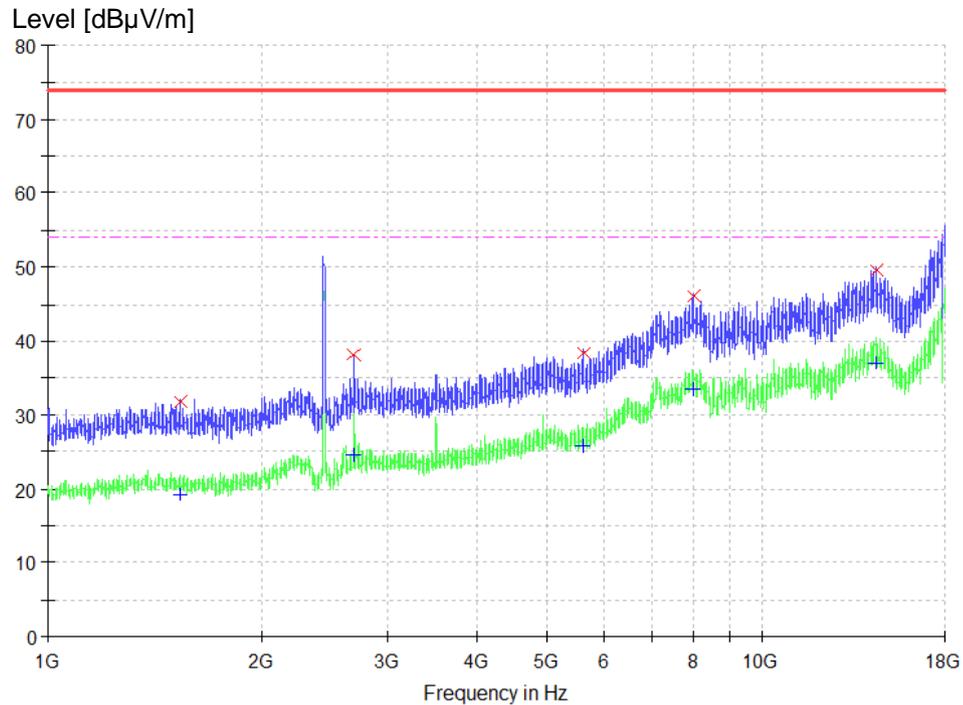
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1367.625000	19.7	1000.0	1000.000	200.0	V	21.0	-18.7	34.3	54.0
2312.718750	22.0	1000.0	1000.000	150.0	V	-29.0	-15.8	32.0	54.0
4250.187500	23.5	1000.0	1000.000	150.0	V	120.0	-12.8	30.5	54.0
4937.625000	25.1	1000.0	1000.000	150.0	V	129.0	-11.2	28.9	54.0
5181.468750	25.1	1000.0	1000.000	150.0	V	92.0	-11.3	29.0	54.0
8008.250000	33.5	1000.0	1000.000	100.0	V	16.0	-3.5	20.5	54.0

**Figure 23: Spectral Diagrams and measurement results, 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)
1881.875000	31.4	1000.0	1000.000	200.0	H	25.0	-18.4	42.6	74.0
2311.125000	33.8	1000.0	1000.000	200.0	H	178.0	-15.8	40.2	74.0
3121.812500	35.3	1000.0	1000.000	150.0	H	-54.0	-14.7	38.7	74.0
5272.843750	38.3	1000.0	1000.000	150.0	H	-88.0	-11.6	35.7	74.0
7123.187500	43.1	1000.0	1000.000	100.0	H	-70.0	-5.3	30.9	74.0
7979.031250	45.3	1000.0	1000.000	200.0	H	85.0	-3.6	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)
1881.875000	19.8	1000.0	1000.000	200.0	H	25.0	-18.4	34.2	54.0
2311.125000	22.4	1000.0	1000.000	200.0	H	178.0	-15.8	31.6	54.0
3121.812500	22.4	1000.0	1000.000	150.0	H	-54.0	-14.7	31.6	54.0
5272.843750	25.5	1000.0	1000.000	150.0	H	-88.0	-11.6	28.5	54.0
7123.187500	32.2	1000.0	1000.000	100.0	H	-70.0	-5.3	21.8	54.0
7979.031250	33.9	1000.0	1000.000	200.0	H	85.0	-3.6	20.1	54.0

**Figure 24: Spectral Diagrams and measurement results, 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)
1536.031250	31.9	1000.0	1000.000	100.0	V	-50.0	-18.9	42.1	74.0
2686.718750	38.1	1000.0	1000.000	100.0	V	-136.0	-15.4	35.9	74.0
5611.250000	38.4	1000.0	1000.000	150.0	V	137.0	-11.2	35.6	74.0
8007.718750	46.1	1000.0	1000.000	150.0	V	-43.0	-3.5	27.9	74.0
14428.406250	49.5	1000.0	1000.000	100.0	V	154.0	2.4	24.5	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)
1536.031250	19.2	1000.0	1000.000	100.0	V	-50.0	-18.9	34.8	54.0
2686.718750	24.7	1000.0	1000.000	100.0	V	-136.0	-15.4	29.4	54.0
5611.250000	25.7	1000.0	1000.000	150.0	V	137.0	-11.2	28.3	54.0
8007.718750	33.5	1000.0	1000.000	150.0	V	-43.0	-3.5	20.5	54.0
14428.406250	37.1	1000.0	1000.000	100.0	V	154.0	2.4	17.0	54.0

## **6 Photographs of the Test Set-Up**

Refer to the test setup file.

## 7 List of Test and Measurement Instruments

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

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**End of test report**