

Prüfbericht-Nr.: <i>Test Report No.:</i>	CN25ESUA 001	Auftrags-Nr.: <i>Order No.:</i>	326091769	Seite 1 von 38 <i>Page 1 of 38</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	1288983	Auftragsdatum: <i>Order date.:</i>	2025-03-28	
Auftraggeber: <i>Client:</i>	IKEA of Sweden AB Box 702, SE-343 81, Älmhult Sweden			
Prüfgegenstand: <i>Test item:</i>	SOLSKYDD portable Bluetooth speaker 19			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	E2504			
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland EMC service			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15, Subpart B:2023 Class B ICES-003:2020			
Wareneingangsdatum: <i>Date of receipt:</i>	2025-03-12	Refer to the EUT photos file		
Prüfmuster-Nr.: <i>Test sample No.:</i>	A003940720-012~014			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report			
Ort der Prüfung: <i>Place of testing:</i>	Refer to clause 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: / tested by: <i>Xuelan Zhang</i> XueLan Zhang	genehmigt von: / authorized by: <i>Jacky Chen</i> Jacky C.L. Chen			
Datum: / Date: 2025-06-13	Datum: / Date: 2025-06-13			
Stellung: / Position: Project engineer	Stellung: / Position: Authorizer			
Sonstiges / Other:	FCC ID: FHO-E2504 IC: 10912A-E2504 Test Firm Name: TUV Rheinland (Shanghai) Co., Ltd. Designation Number: CN1396 Test Firm Registration Number: 930979			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested				
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Anmerkungen
Remarks

- | | |
|----------|--|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.
Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.</i></p> <p><i>Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p> |
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| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.
Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</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> |

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Revision history of test report:

Report number	Issue date	Contents and reason for change if appropriate
CN25ESUA 001	2025-06-13	Initial release.

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1 Test Sites

1.1 Test Facilities

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

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

Refer to Clause 6 for test and measurement instruments.

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is a SOLSKYDD portable Bluetooth speaker 19. For the further information, refer to the user's manual.

2.2 Ratings and System Details

Rated input : DC 5 V, 2 A
Battery Capacity : 7.2 V, 2600 mAh
Audio output : 10 W
Protection class : III

The model has two batteries, the below is the battery information:

Component	Model	Manufacturer
Battery 1#	ICBL7.2-18-B1	IKEA
Battery 2#	ICBL7.2-18-USBC-B1	IKEA

All the EMC tests were performed on the samples with battery 1# and battery 2#.

2.3 Independent Operation Modess

The basic operation mode is the below,

1. Continuous playing 1 kHz audio signal by Bluetooth with power supply.
2. Continuous playing 1 kHz audio signal by Bluetooth with computer.

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 2.4 GHz.

2.7 Submitted Documents

Circuit diagram, user's manual and rating label.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

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

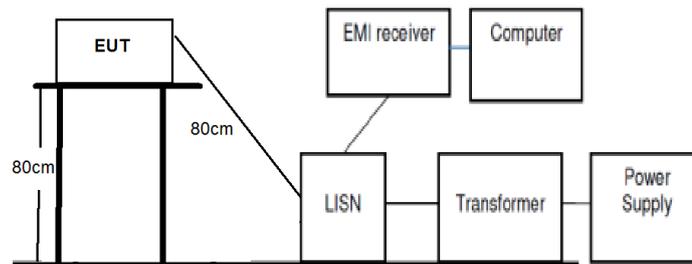
Refer to the related paragraph of this report.

The sequence of testing:

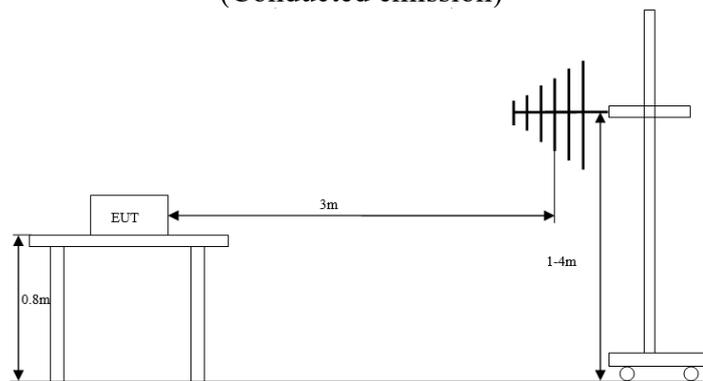
1. Radiated emission tests were performed on 2025-03-26.
2. Conducted emission tests were performed on 2025-03-26.

3.2 Equipment and cable arrangement

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



(Conducted emission)



(Radiated emission)

3.3 Test Software

No special test software was used during the tests.

3.4 Special Accessories and Auxiliary Equipment

During the tests, the below equipment were used.

No.	Equipment	Model	Manufacturer
1	Mobile phone	iPhone 15	Apple
2	Computer	ThinkPad T450	lenovo
3	Power supply	ICPSW5-5NA-1	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_{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 Mains Terminal Continuous Disturbance Voltage

Result:	Passed
Date of testing	: 2025-03-26
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, 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 as defined in clause 2.3
Ambient condition	: Temperature: 20.2 °C; Relative humidity: 48.2 %
Expanded measurement uncertainty ($k=2$)	: 2.33 dB The minimum margin to the limit is 8.25 dB at 0.199500 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.

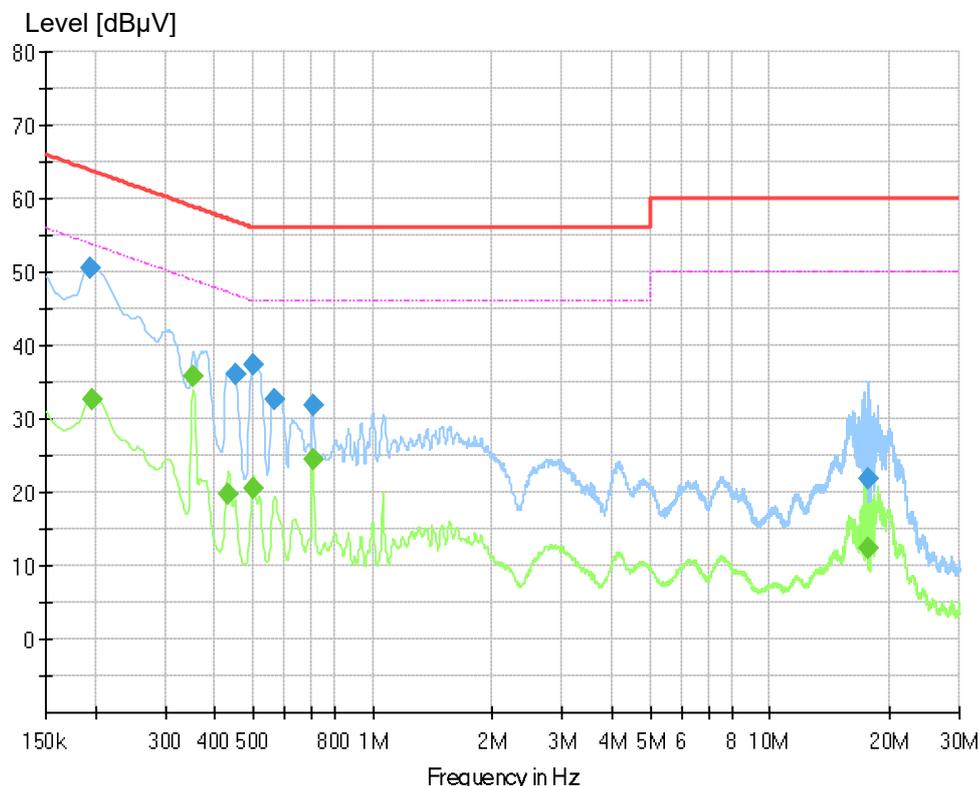
The disturbance voltage test was performed on the neutral line and phase line of the power supply of the EUT respectively.

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, “◆” mean Quasi-Peak Value and “◇” mean 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, Sample with battery 1#

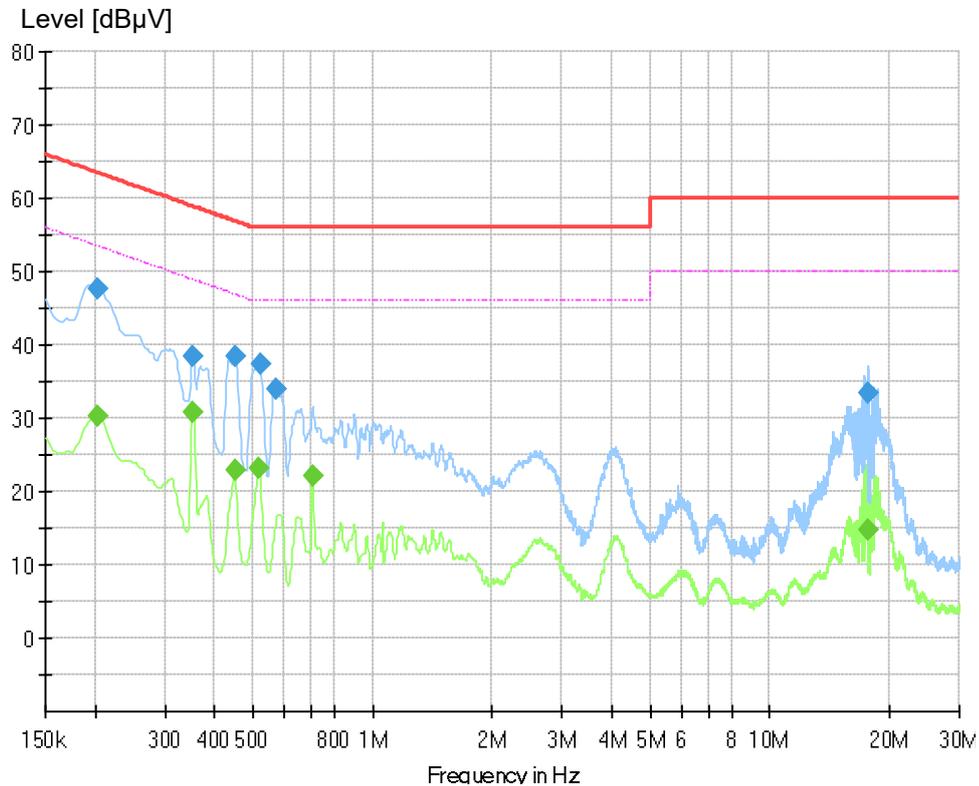


Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.195000	50.61	63.82	13.21	1000.0	9.000	L1	10.3
0.449250	36.10	56.89	20.79	1000.0	9.000	L1	10.3
0.498750	37.36	56.02	18.66	1000.0	9.000	L1	10.3
0.566250	32.58	56.00	23.42	1000.0	9.000	L1	10.3
0.705750	31.95	56.00	24.05	1000.0	9.000	L1	10.3
17.713500	21.95	60.00	38.05	1000.0	9.000	L1	11.0

Final Average measurement result:

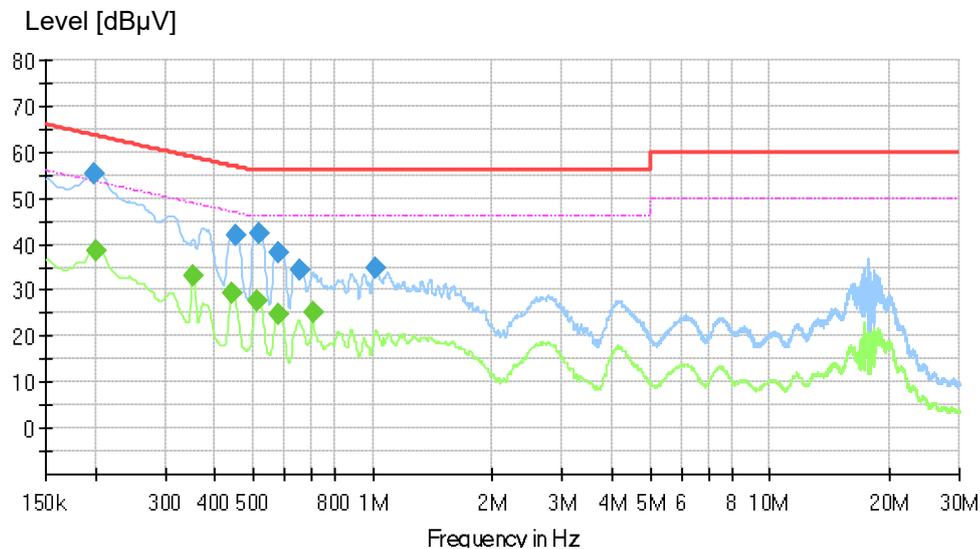
Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.197250	32.57	53.73	21.16	1000.0	9.000	L1	10.3
0.352500	35.90	48.90	13.00	1000.0	9.000	L1	10.3
0.433500	19.65	47.19	27.53	1000.0	9.000	L1	10.3
0.501000	20.65	46.00	25.35	1000.0	9.000	L1	10.3
0.705750	24.59	46.00	21.41	1000.0	9.000	L1	10.3
17.713500	12.28	50.00	37.72	1000.0	9.000	L1	11.0

Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, Sample with battery 1#

Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.204000	47.57	63.45	15.88	1000.0	9.000	N	10.8
0.352500	38.53	58.90	20.38	1000.0	9.000	N	10.4
0.449250	38.40	56.89	18.49	1000.0	9.000	N	10.3
0.521250	37.40	56.00	18.60	1000.0	9.000	N	10.2
0.570750	34.04	56.00	21.96	1000.0	9.000	N	10.3
17.616750	33.50	60.00	26.50	1000.0	9.000	N	11.2

Final Average measurement result:

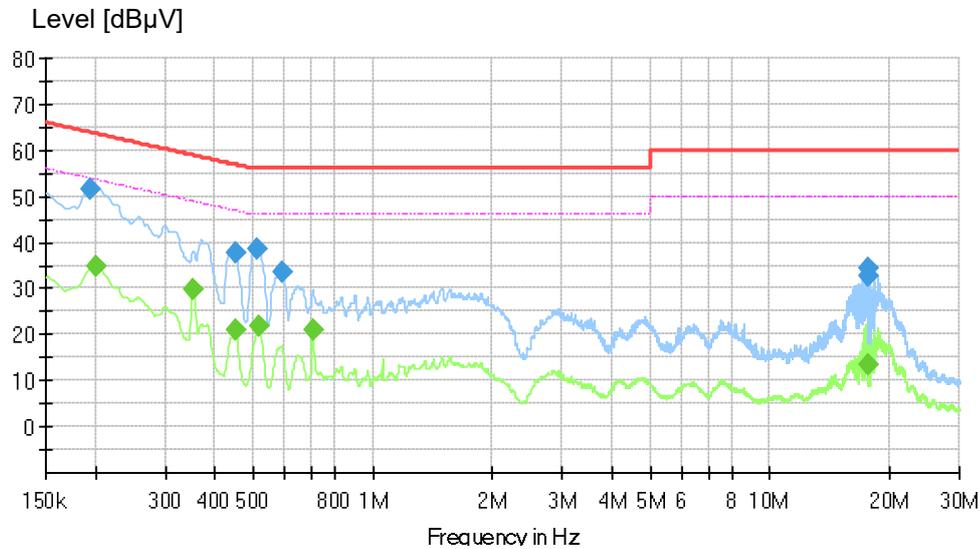
Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.204000	30.22	53.45	23.23	1000.0	9.000	N	10.8
0.352500	30.69	48.90	18.21	1000.0	9.000	N	10.4
0.449250	22.99	46.89	23.90	1000.0	9.000	N	10.3
0.519000	23.11	46.00	22.89	1000.0	9.000	N	10.2
0.705750	22.17	46.00	23.83	1000.0	9.000	N	10.4
17.686500	14.65	50.00	35.35	1000.0	9.000	N	11.2

Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, L, Sample with battery 2#

Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.199500	55.38	63.63	8.25	L1	10.3
0.453750	42.03	56.81	14.77	L1	10.3
0.519000	42.22	56.00	13.78	L1	10.3
0.577500	38.33	56.00	17.67	L1	10.3
0.654000	34.32	56.00	21.68	L1	10.3
1.018500	34.73	56.00	21.27	L1	10.7

Final Average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.201750	38.36	53.54	15.18	L1	10.3
0.352500	33.14	48.90	15.76	L1	10.3
0.442500	29.15	47.02	17.86	L1	10.3
0.512250	27.80	46.00	18.20	L1	10.3
0.579750	24.91	46.00	21.09	L1	10.3
0.705750	25.01	46.00	20.99	L1	10.3

Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz – 30 MHz, N, Sample with battery 2#

Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.195000	51.73	63.82	12.09	N	10.7
0.451500	37.78	56.85	19.07	N	10.3
0.510000	38.36	56.00	17.64	N	10.2
0.591000	33.33	56.00	22.67	N	10.3
17.643750	34.44	60.00	25.56	N	11.2
17.713500	32.73	60.00	27.27	N	11.2

Final Average measurement result:

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.201750	34.95	53.54	18.59	N	10.8
0.352500	29.90	48.90	19.00	N	10.4
0.451500	20.83	46.85	26.02	N	10.3
0.519000	21.80	46.00	24.20	N	10.2
0.705750	21.17	46.00	24.83	N	10.4
17.713500	13.29	50.00	36.71	N	11.2

5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated emission (30 MHz - 1 GHz)

Result:	Passed
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Date of testing	: 2025-03-26
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ICES-003:2020, ANSI C63.4-2014 and CISPR 16-2-3
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 – 960 MHz, 46 dB μ V/m; Above 960 MHz, 54 dB μ 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
Operational mode	: Modes 1, 2 as defined in clause 2.3
Input voltage	: AC 120 V; 60 Hz; DC 5 V
Ambient condition	: Temperature: 20.3 °C; Relative humidity: 49.5 %
Expanded measurement uncertainty ($k=2$)	: 5.40 dB The minimum margin to the limit is 9.5 dB at 941.315000 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 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. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following spectral diagram, “×” means quasi-peak test results.

Note 1: The class B limits of FCC 47 CFR Part 15, Subpart B:2023 is stricter than those ICES-003:2020 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

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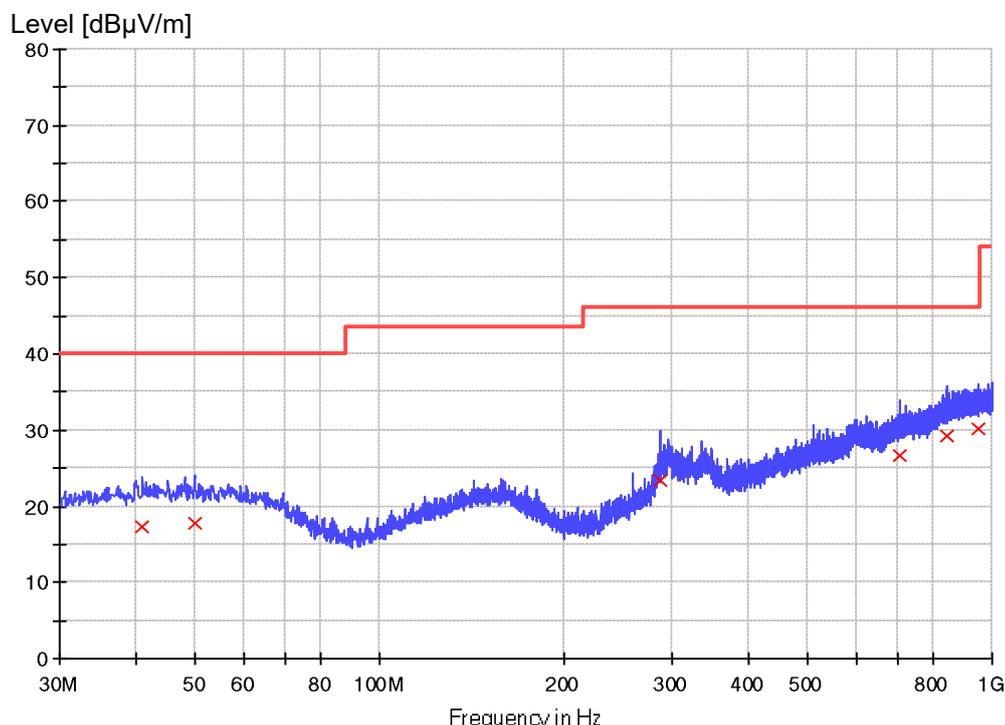
Notes on following tables of radiated emission results and conversions:

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)

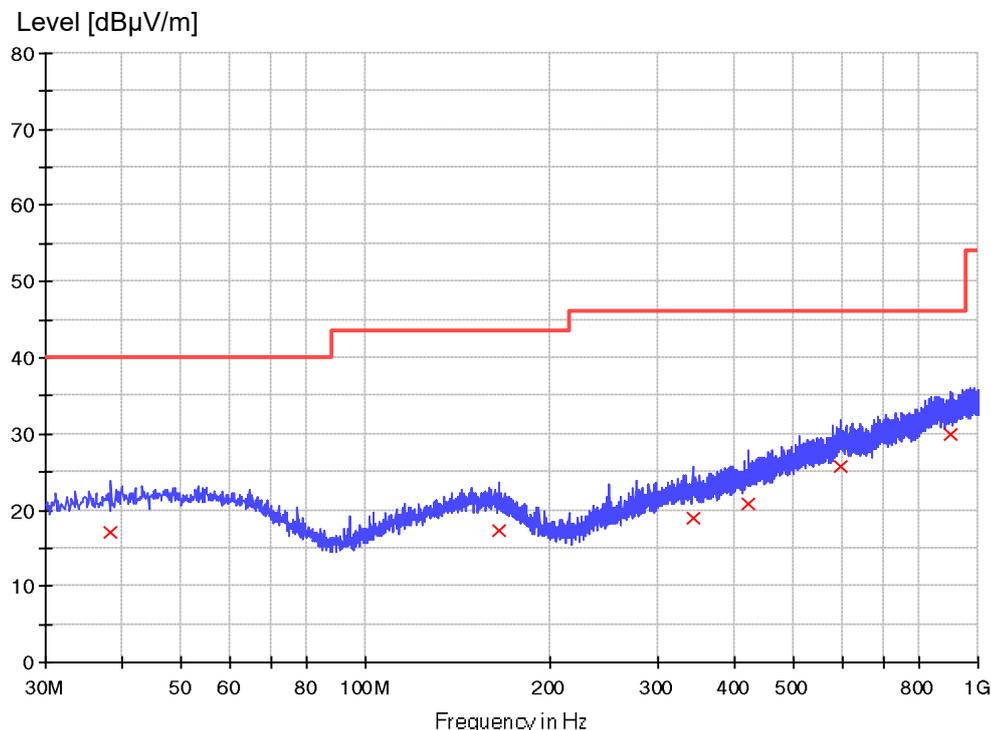
Figure 5: Spectral Diagrams and measurement results, horizontal polarization (30 MHz to 1 GHz), mode 1, Sample with battery 1#



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
41.033750	17.3	120.000	100.0	H	61.0	14.0	22.7	40.0
49.763750	17.7	120.000	150.0	H	-114.0	14.3	22.3	40.0
288.020000	23.3	120.000	140.0	H	99.0	14.2	22.7	46.0
708.393750	26.7	120.000	100.0	H	62.0	23.0	19.3	46.0
843.466250	29.2	120.000	150.0	H	-18.0	24.9	16.9	46.0
948.590000	30.2	120.000	110.0	H	-21.0	26.0	15.8	46.0

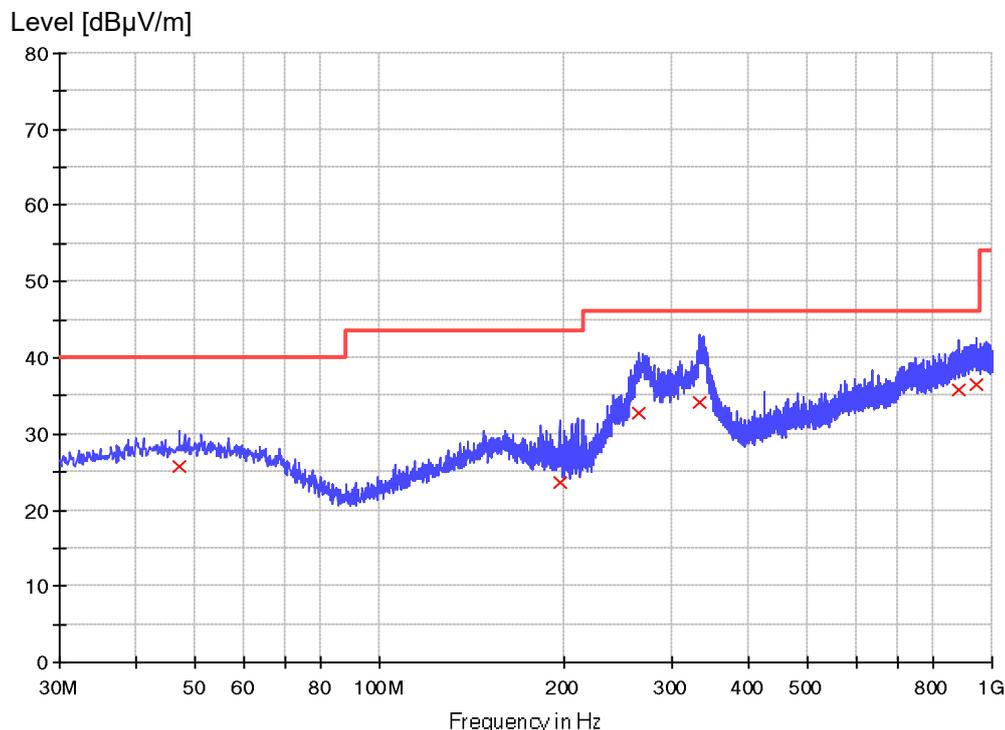
Figure 6: Spectral Diagrams and measurement results, vertical polarization (30 MHz to 1 GHz), mode 1, Sample with battery 1#



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
38.366250	17.1	120.000	120.0	V	-141.0	13.8	22.9	40.0
164.951250	17.4	120.000	130.0	V	23.0	14.2	26.1	43.5
341.612500	19.0	120.000	150.0	V	-123.0	15.5	27.0	46.0
420.910000	20.8	120.000	120.0	V	104.0	17.5	25.2	46.0
596.965000	25.8	120.000	120.0	V	63.0	22.0	20.2	46.0
904.940000	29.9	120.000	100.0	V	6.0	25.3	16.1	46.0

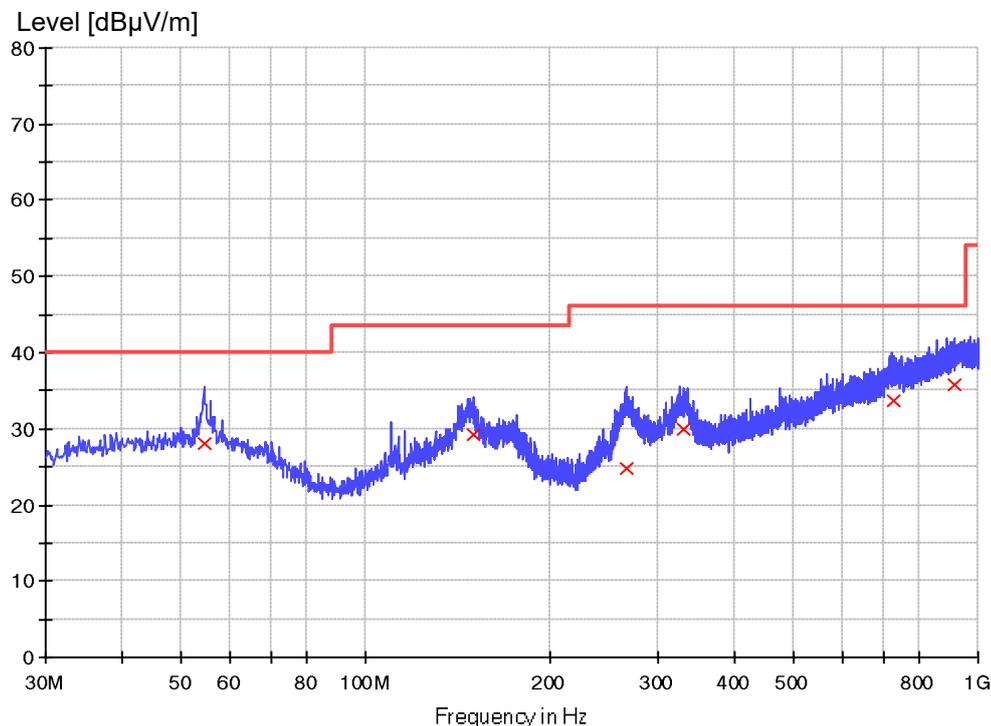
Figure 7: Spectral Diagrams and measurement results, horizontal polarization (30 MHz to 1 GHz), mode 2, Sample with battery 1#



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
47.096250	25.8	120.000	110.0	H	41.0	20.7	14.2	40.0
196.476250	23.6	120.000	150.0	H	-69.0	16.8	19.9	43.5
265.710000	32.7	120.000	130.0	H	127.0	19.7	13.4	46.0
333.488750	34.1	120.000	110.0	H	-161.0	21.8	11.9	46.0
881.538750	35.7	120.000	120.0	H	3.0	31.1	10.3	46.0
941.315000	36.5	120.000	120.0	H	96.0	32.3	9.5	46.0

Figure 8: Spectral Diagrams and measurement results, vertical polarization (30 MHz to 1 GHz), mode 2, Sample with battery 1#

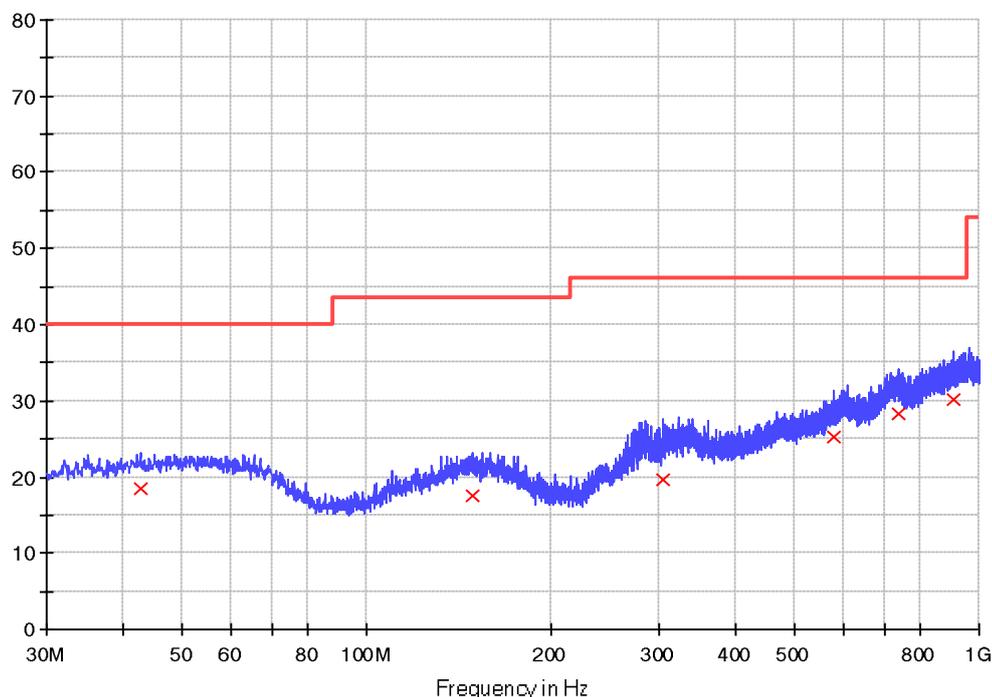


Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
54.371250	28.0	120.000	130.0	V	-138.0	20.6	12.0	40.0
150.158750	29.2	120.000	150.0	V	43.0	20.4	14.3	43.5
265.831250	24.8	120.000	140.0	V	64.0	19.7	21.2	46.0
329.851250	29.9	120.000	130.0	V	-58.0	21.7	16.1	46.0
729.612500	33.7	120.000	130.0	V	-24.0	30.1	12.3	46.0
913.791250	35.9	120.000	110.0	V	-175.0	31.6	10.1	46.0

Figure 9: Spectral Diagrams and measurement results, horizontal polarization (30 MHz to 1 GHz), mode 1, Sample with battery 2#

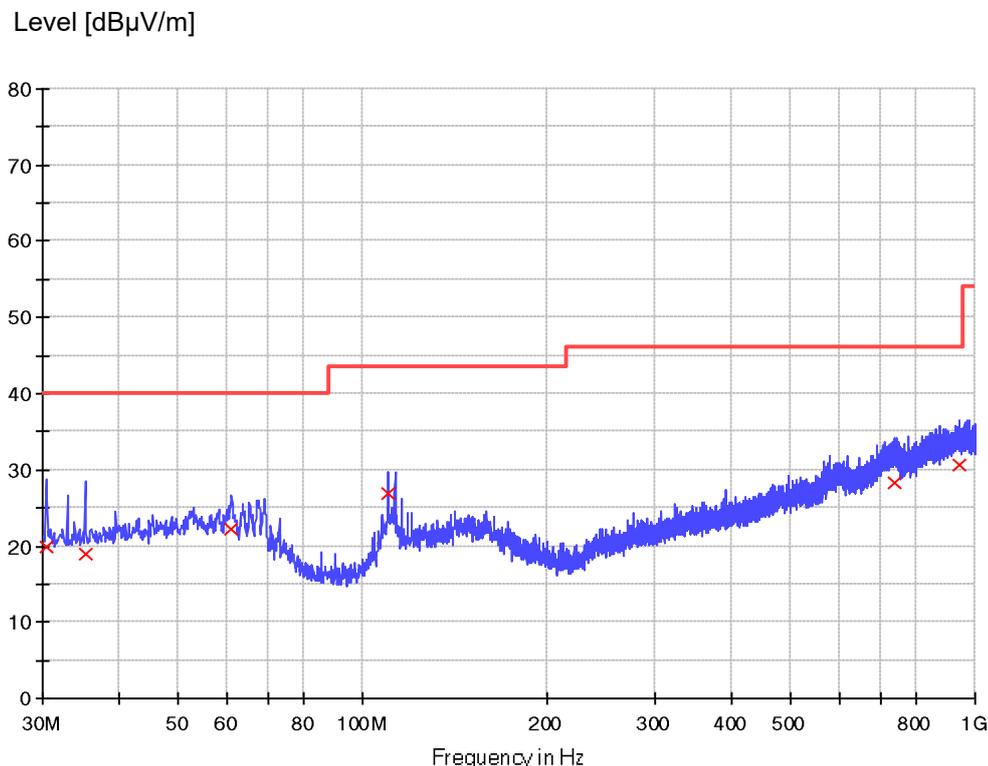
Level [dBµV/m]



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
42.731250	18.6	120.000	110.0	H	24.0	14.2	21.4	40.0
148.946250	17.6	120.000	150.0	H	17.0	14.2	25.9	43.5
305.601250	19.7	120.000	110.0	H	-9.0	14.9	26.3	46.0
577.565000	25.2	120.000	110.0	H	32.0	21.6	20.8	46.0
736.887500	28.4	120.000	140.0	H	-113.0	24.9	17.6	46.0
911.366250	30.2	120.000	100.0	H	-38.0	25.8	15.8	46.0

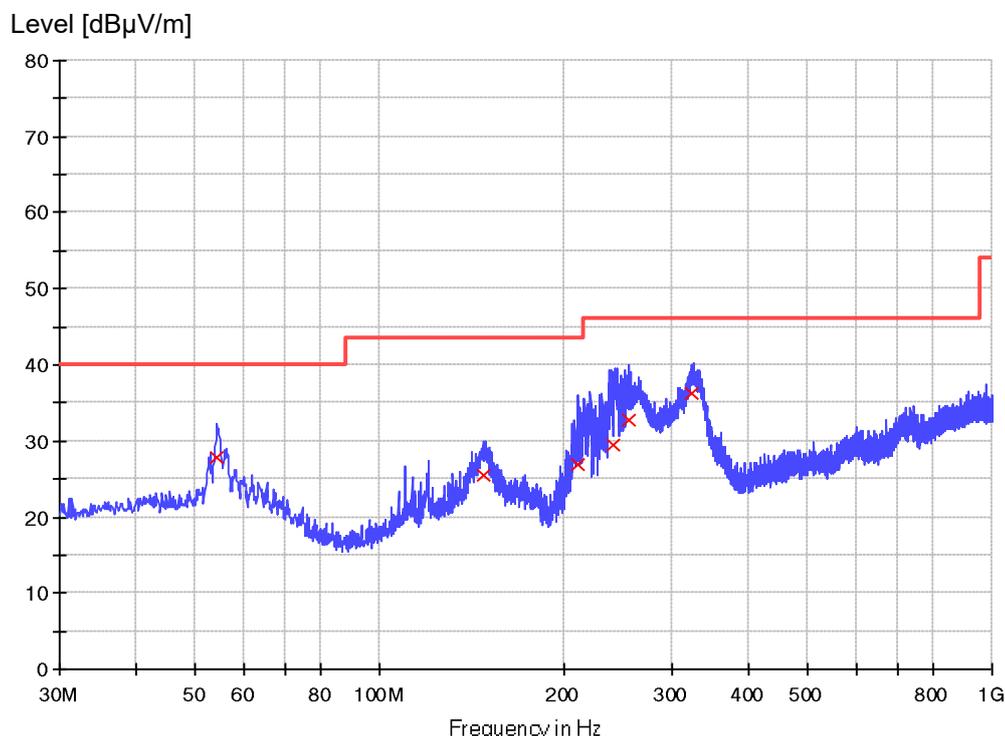
Figure 10: Spectral Diagrams and measurement results, vertical polarization (30 MHz to 1 GHz), mode 1, Sample with battery 2#



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.363750	19.9	120.000	150.0	V	-169.0	12.9	20.1	40.0
35.213750	18.9	120.000	100.0	V	-130.0	13.4	21.1	40.0
61.161250	22.2	120.000	150.0	V	103.0	13.5	17.8	40.0
110.146250	26.9	120.000	150.0	V	21.0	10.9	16.6	43.5
737.251250	28.4	120.000	120.0	V	9.0	24.8	17.6	46.0
943.982500	30.7	120.000	110.0	V	28.0	26.5	15.3	46.0

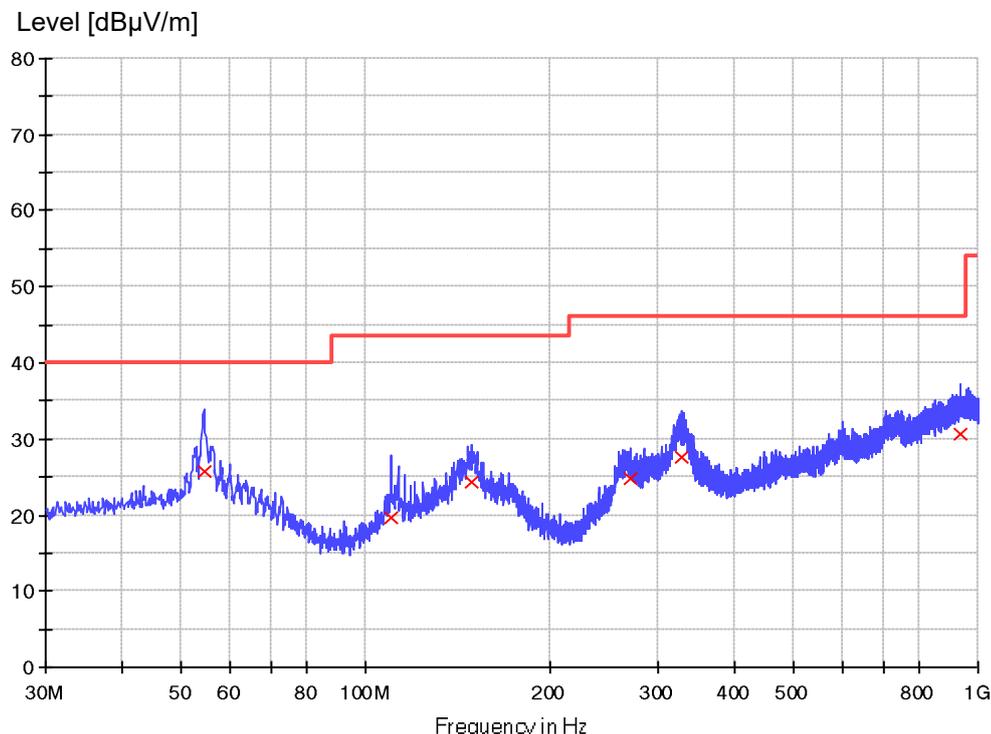
Figure 11: Spectral Diagrams and measurement results, horizontal polarization (30 MHz to 1 GHz), mode 2, Sample with battery 2#



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
54.250000	27.8	120.000	120.0	H	103.0	14.2	12.2	40.0
147.733750	25.5	120.000	100.0	H	-179.0	14.1	18.0	43.5
210.177500	27.0	120.000	120.0	H	54.0	10.7	16.5	43.5
240.611250	29.5	120.000	120.0	H	-112.0	13.2	16.5	46.0
255.767500	32.6	120.000	150.0	H	-130.0	13.4	13.4	46.0
324.273750	36.3	120.000	150.0	H	-23.0	15.6	9.8	46.0

Figure 12: Spectral Diagrams and measurement results, vertical polarization (30 MHz to 1 GHz), mode 2, Sample with battery 2#



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
54.371250	25.8	120.000	110.0	V	-41.0	14.2	14.2	40.0
110.025000	19.7	120.000	150.0	V	-100.0	10.9	23.8	43.5
148.582500	24.3	120.000	100.0	V	-139.0	14.2	19.2	43.5
270.560000	24.8	120.000	110.0	V	172.0	13.7	21.2	46.0
328.396250	27.7	120.000	130.0	V	18.0	15.6	18.3	46.0
934.403750	30.6	120.000	120.0	V	-127.0	26.3	15.4	46.0

5.2.2 Radiated emission (Above 1 GHz)

Result:	Passed
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Date of testing	: 2025-03-26
Port	: Enclosure
Test procedure	: FCC 47 CFR Part 15, Subpart B:2023, ANSI C63.4-2014 and CISPR 16-2-3 ICES-003:2020
Limit	: Above 1 GHz, Peak limit: 74 dB μ V/m; Average limit: 54 dB μ V/m
Frequency range	: 1-18 GHz Note: The highest frequency in the EUT is 2.4 GHz. According to FCC Part 15 subpart B §15.33 (b) (1), the upper frequency for radiated emission measurement is 12 GHz. The actual test frequency is up to 18 GHz.
Bandwidth of EMI receiver for final measurement	: 1000 kHz
Measurement time for final measurement	: 1 s
Test distance	: 3 m
Kind of test site	: Semi-anechoic chamber
Operational mode	: Modes 1, 2 as defined in clause 2.3
Input voltage	: AC 120 V; 60 Hz (with power supply) DC 5 V (with computer)
Earthing	: No earthing
Ambient condition	: Temperature: 20.3 °C; Relative humidity: 49.5 %
Expanded measurement uncertainty ($k=2$)	: 5.08 dB The minimum margin to the limit is 7.0 dB at 17972.375000 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 a poly table, which is 0.8 m high. The wooden table was rotated 360° around and 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. The final test was performed with peak detector and average detector at those critical frequencies during the preview test. In the following figure, “x(red)” means measurement results with peak detector and “+ (blue)” means measurement results with average detector.

Notes on following tables of radiated emission results and conversions:

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Peak (dB μ V/m): final measurement results by using peak detector

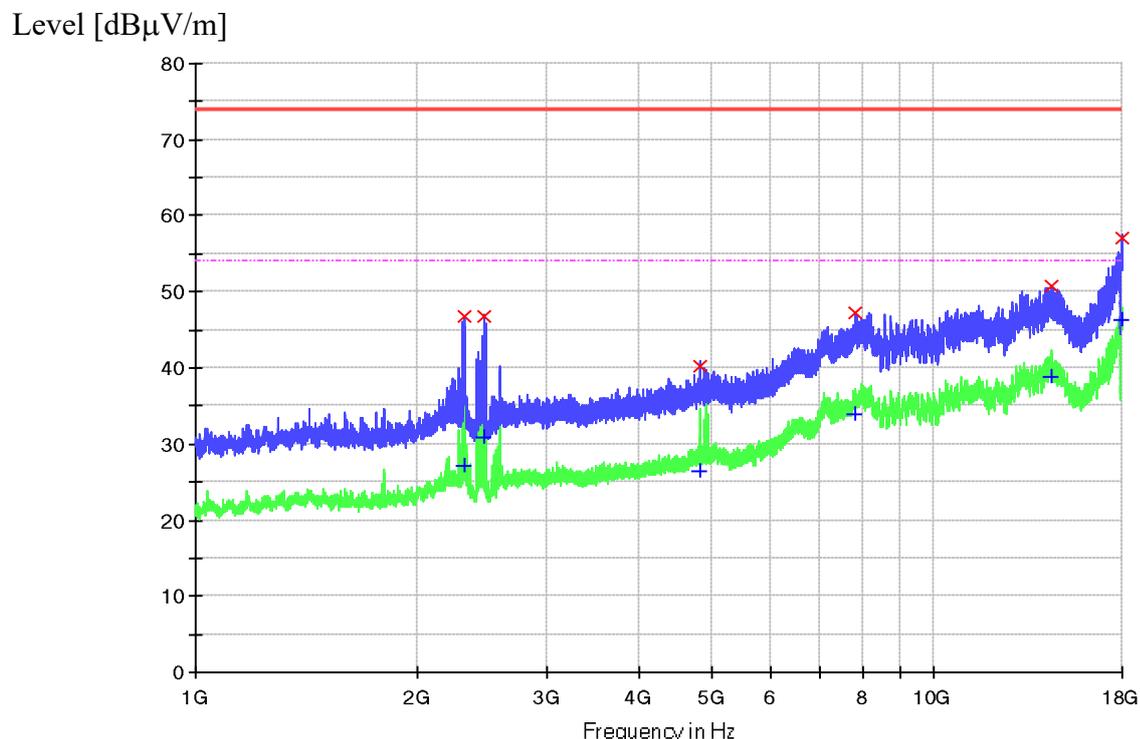
Average (dB μ V/m): final measurement results by using average detector

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

Margin: Limit PK (dB μ V/m) - Peak (dB μ V/m)

Limit CAV (dB μ V/m) – Average (dB μ V/m)

Figure 13: Spectral Diagrams and measurement results, 1-18 GHz, horizontal polarization, mode 1, Sample with battery 1#



Final Peak measurement results:

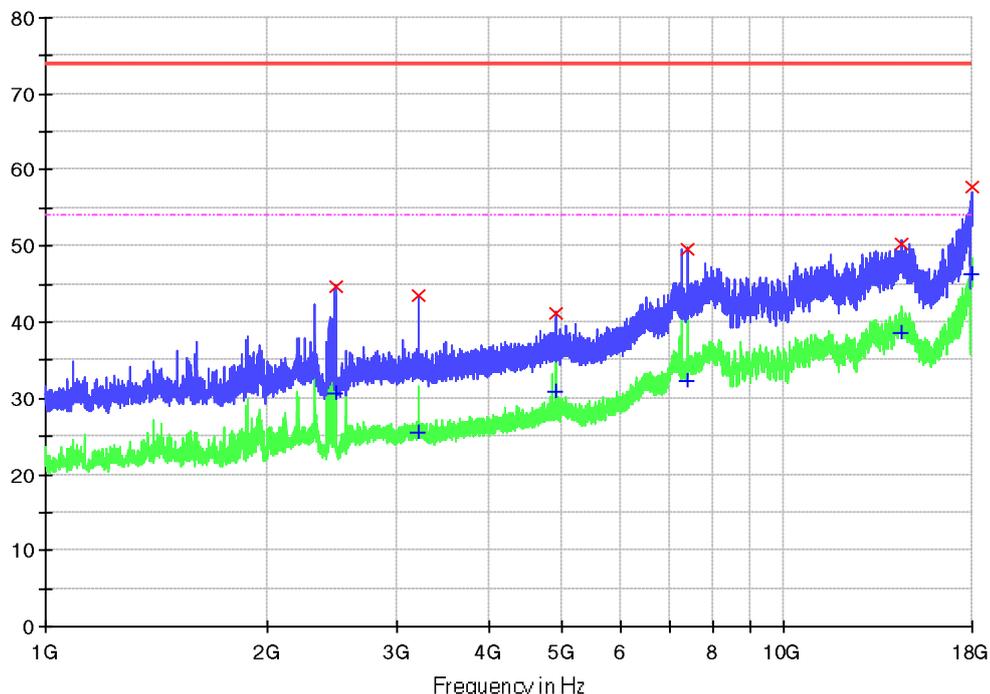
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2311.656250	46.9	1000.0	1000.000	130.0	H	-104.0	-15.8	27.1	74.0
2463.593750	46.7	1000.0	1000.000	140.0	H	-127.0	-16.2	27.3	74.0
4819.687500	40.2	1000.0	1000.000	140.0	H	-14.0	-11.3	33.8	74.0
7846.750000	47.3	1000.0	1000.000	130.0	H	133.0	-4.6	26.7	74.0
14409.281250	50.7	1000.0	1000.000	150.0	H	-154.0	2.4	23.3	74.0
17981.937500	57.2	1000.0	1000.000	100.0	H	125.0	12.1	16.8	74.0

Final Average measurement results:

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)
2311.656250	27.2	1000.0	1000.000	130.0	H	-104.0	-15.8	26.8	54.0
2463.593750	31.0	1000.0	1000.000	140.0	H	-127.0	-16.2	23.0	54.0
4819.687500	26.5	1000.0	1000.000	140.0	H	-14.0	-11.3	27.5	54.0
7846.750000	33.9	1000.0	1000.000	130.0	H	133.0	-4.6	20.1	54.0
14409.281250	38.8	1000.0	1000.000	150.0	H	-154.0	2.4	15.2	54.0
17981.937500	46.4	1000.0	1000.000	100.0	H	125.0	12.1	7.6	54.0

Figure 14: Spectral Diagrams and measurement results, 1-18 GHz, vertical polarization, mode 1, Sample with battery 1#

Level [dB μ V/m]



Final Peak measurement results:

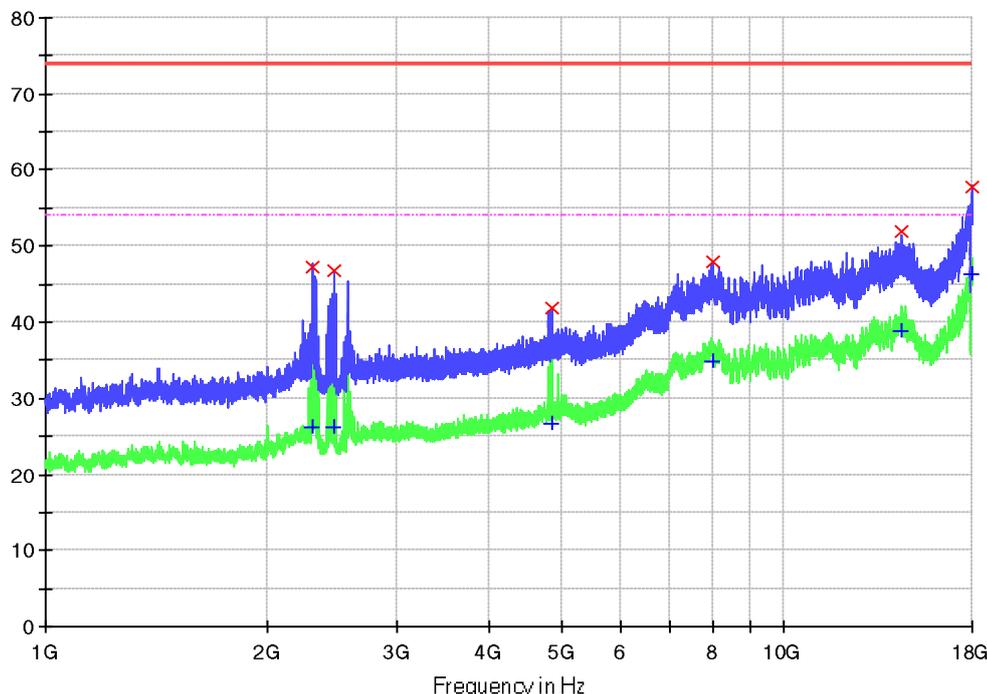
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dB μ V/)
2467.843750	44.7	1000.0	1000.000	120.0	V	-27.0	-16.2	29.3	74.0
3193.531250	43.6	1000.0	1000.000	120.0	V	-73.0	-14.7	30.5	74.0
4928.062500	41.3	1000.0	1000.000	100.0	V	70.0	-11.2	32.8	74.0
7398.375000	49.6	1000.0	1000.000	120.0	V	-75.0	-6.2	24.4	74.0
14396.000000	50.2	1000.0	1000.000	110.0	V	114.0	2.4	23.8	74.0
17984.062500	57.8	1000.0	1000.000	150.0	V	162.0	12.1	16.3	74.0

Final Average measurement results:

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dB μ V/)
2467.843750	30.5	1000.0	1000.000	120.0	V	-27.0	-16.2	23.5	54.0
3193.531250	25.6	1000.0	1000.000	120.0	V	-73.0	-14.7	28.4	54.0
4928.062500	30.9	1000.0	1000.000	100.0	V	70.0	-11.2	23.1	54.0
7398.375000	32.4	1000.0	1000.000	120.0	V	-75.0	-6.2	21.6	54.0
14396.000000	38.7	1000.0	1000.000	110.0	V	114.0	2.4	15.3	54.0
17984.062500	46.4	1000.0	1000.000	150.0	V	162.0	12.1	7.6	54.0

Figure 15: Spectral Diagrams and measurement results, 1-18 GHz, horizontal polarization, mode 2, Sample with battery 1#

Level [dB μ V/m]



Final Peak measurement results:

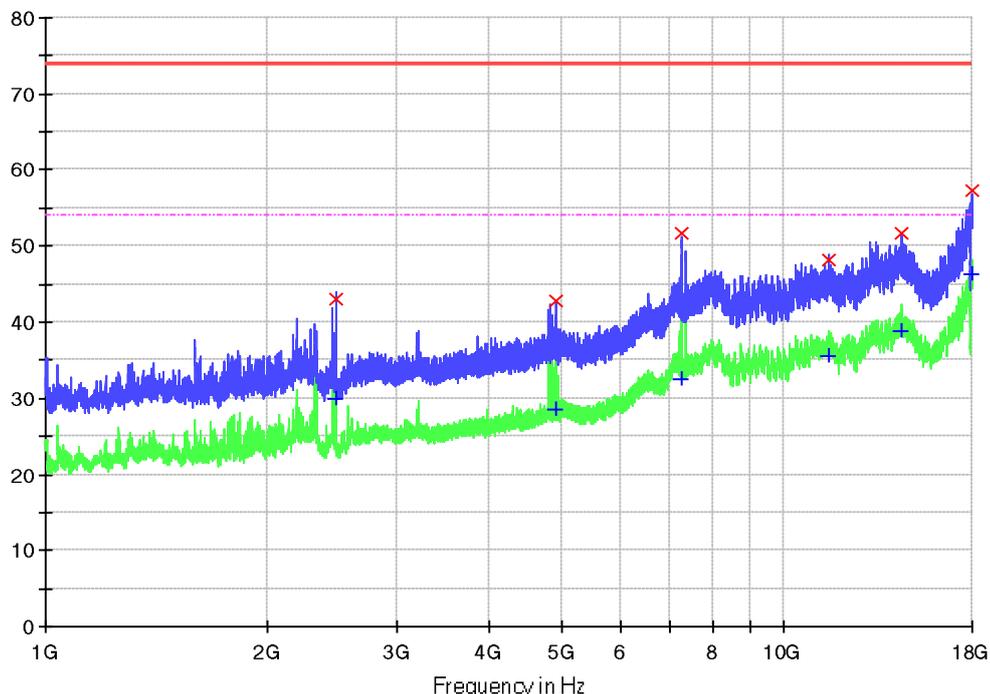
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dB μ V/)
2304.218750	47.4	1000.0	1000.000	110.0	H	113.0	-15.8	26.7	74.0
2465.718750	46.9	1000.0	1000.000	150.0	H	-154.0	-16.2	27.1	74.0
4868.562500	42.0	1000.0	1000.000	100.0	H	-76.0	-11.3	32.0	74.0
8005.062500	47.9	1000.0	1000.000	110.0	H	105.0	-3.5	26.1	74.0
14411.937500	52.0	1000.0	1000.000	120.0	H	-177.0	2.4	22.0	74.0
17972.375000	57.7	1000.0	1000.000	100.0	H	-133.0	11.9	16.3	74.0

Final Average measurement results:

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dB μ V/)
2304.218750	26.2	1000.0	1000.000	110.0	H	113.0	-15.8	27.8	54.0
2465.718750	26.2	1000.0	1000.000	150.0	H	-154.0	-16.2	27.8	54.0
4868.562500	26.8	1000.0	1000.000	100.0	H	-76.0	-11.3	27.2	54.0
8005.062500	34.9	1000.0	1000.000	110.0	H	105.0	-3.5	19.1	54.0
14411.937500	38.8	1000.0	1000.000	120.0	H	-177.0	2.4	15.2	54.0
17972.375000	46.4	1000.0	1000.000	100.0	H	-133.0	11.9	7.7	54.0

Figure 16: Spectral Diagrams and measurement results, 1-18 GHz, vertical polarization, mode 2, Sample with battery 1#

Level [dB μ V/m]



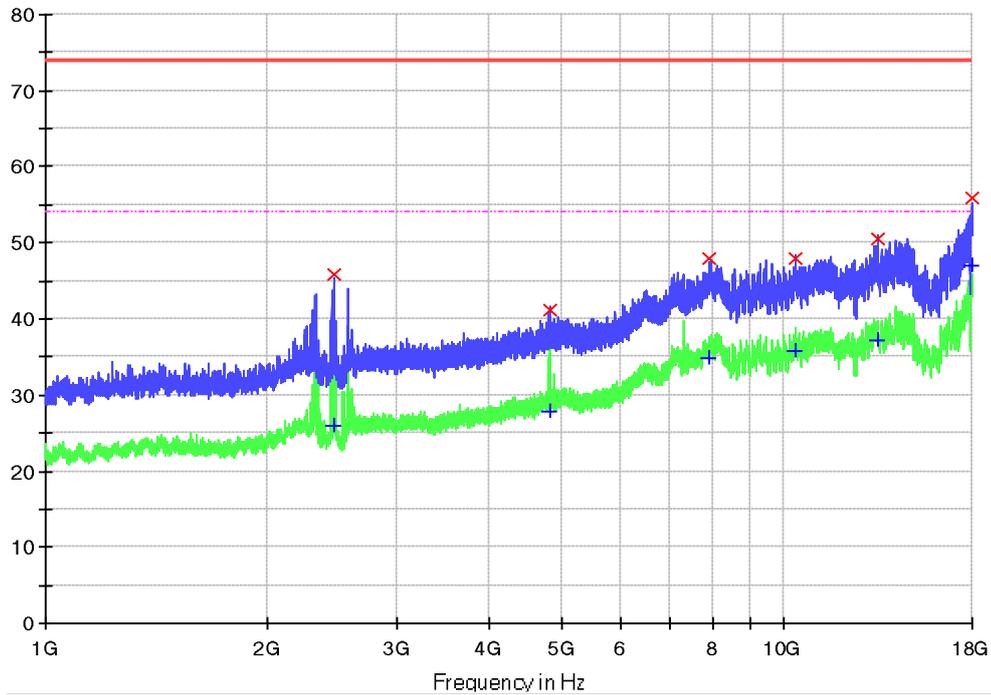
Final Peak measurement results:

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dB μ V/)
2477.406250	43.0	1000.0	1000.000	150.0	V	-157.0	-16.2	31.0	74.0
4927.531250	42.7	1000.0	1000.000	100.0	V	-56.0	-11.2	31.3	74.0
7263.437500	51.7	1000.0	1000.000	150.0	V	105.0	-6.4	22.3	74.0
11513.968750	48.3	1000.0	1000.000	150.0	V	141.0	-1.6	25.7	74.0
14401.312500	51.6	1000.0	1000.000	120.0	V	-149.0	2.4	22.4	74.0
17971.843750	57.3	1000.0	1000.000	130.0	V	-155.0	11.9	16.7	74.0

Final Average measurement results:

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dB μ V/)
2477.406250	29.8	1000.0	1000.000	150.0	V	-157.0	-16.2	24.2	54.0
4927.531250	28.6	1000.0	1000.000	100.0	V	-56.0	-11.2	25.4	54.0
7263.437500	32.6	1000.0	1000.000	150.0	V	105.0	-6.4	21.4	54.0
11513.968750	35.6	1000.0	1000.000	150.0	V	141.0	-1.6	18.4	54.0
14401.312500	38.8	1000.0	1000.000	120.0	V	-149.0	2.4	15.2	54.0
17971.843750	46.3	1000.0	1000.000	130.0	V	-155.0	11.9	7.7	54.0

Figure 17: Spectral Diagrams and measurement results, 1-18 GHz, horizontal polarization, mode 1, Sample with battery 2#

 Level [dB μ V/m]

Final Peak measurement results:

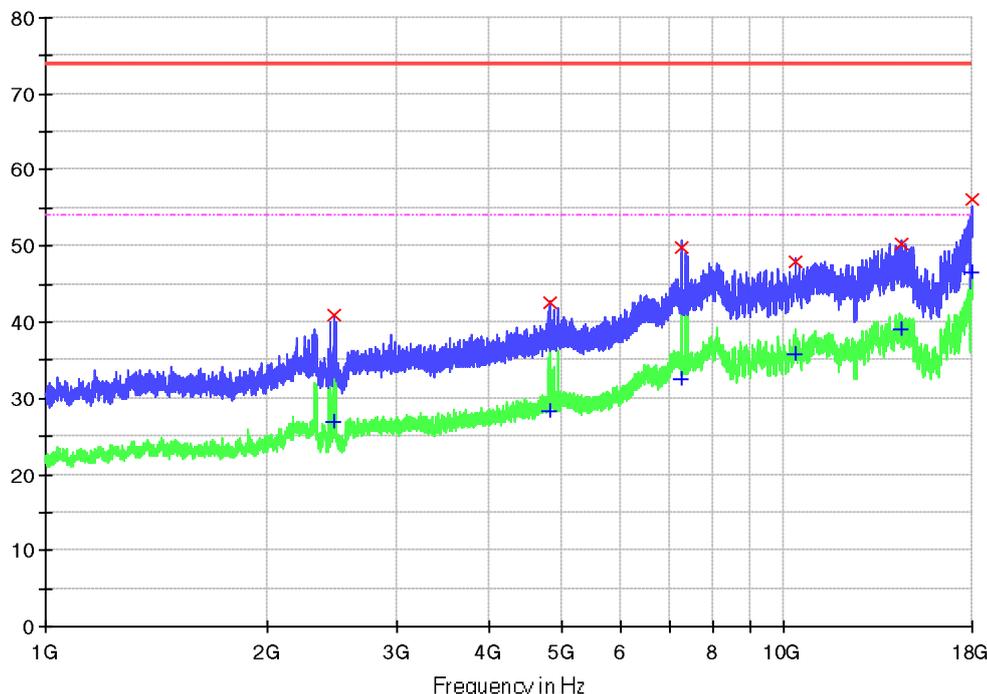
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dB μ V/)
2465.718750	45.8	1000.0	1000.000	110.0	H	-124.0	-16.2	28.2	74.0
4810.656250	41.2	1000.0	1000.000	150.0	H	148.0	-11.3	32.8	74.0
7931.750000	48.0	1000.0	1000.000	100.0	H	66.0	-3.7	26.0	74.0
10361.687500	48.1	1000.0	1000.000	100.0	H	-120.0	-2.7	25.9	74.0
13396.187500	50.4	1000.0	1000.000	120.0	H	164.0	-0.3	23.6	74.0
17972.375000	55.9	1000.0	1000.000	140.0	H	80.0	11.9	18.1	74.0

Final Average measurement results:

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dB μ V/)
2465.718750	26.0	1000.0	1000.000	110.0	H	-124.0	-16.2	28.0	54.0
4810.656250	27.9	1000.0	1000.000	150.0	H	148.0	-11.3	26.1	54.0
7931.750000	34.9	1000.0	1000.000	100.0	H	66.0	-3.7	19.1	54.0
10361.687500	35.9	1000.0	1000.000	100.0	H	-120.0	-2.7	18.2	54.0
13396.187500	37.2	1000.0	1000.000	120.0	H	164.0	-0.3	16.8	54.0
17972.375000	47.0	1000.0	1000.000	140.0	H	80.0	11.9	7.0	54.0

Figure 18: Spectral Diagrams and measurement results, 1-18 GHz, vertical polarization, mode 1, Sample with battery 2#

Level [dBμV/m]



Final Peak measurement results:

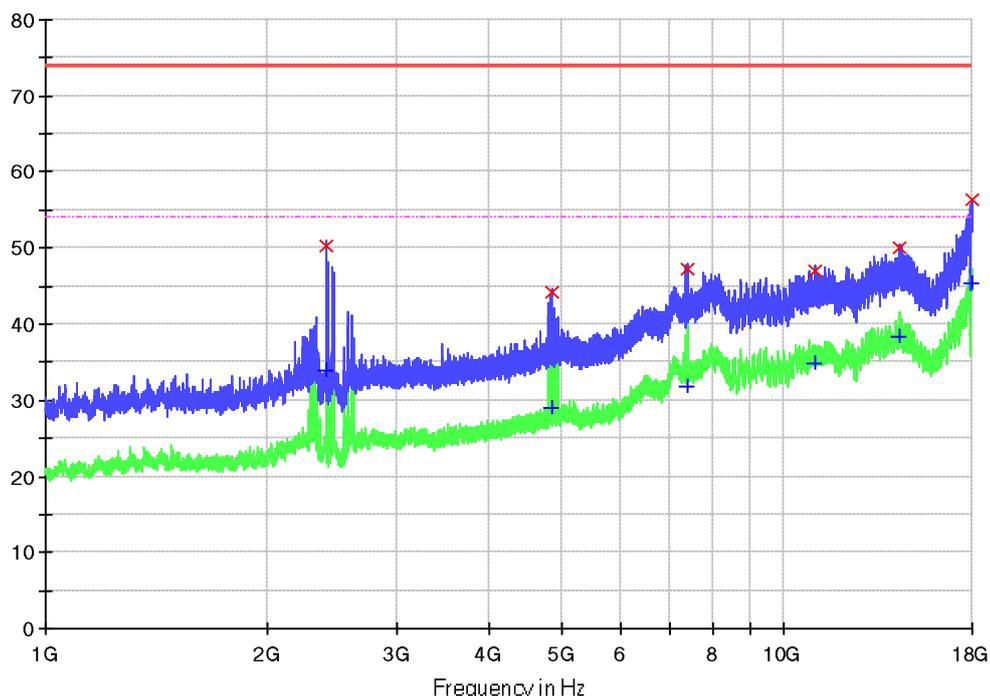
Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)
2464.656250	40.9	1000.0	1000.000	110.0	V	130.0	-16.2	33.1	74.0
4833.500000	42.6	1000.0	1000.000	140.0	V	151.0	-11.3	31.4	74.0
7287.875000	49.9	1000.0	1000.000	110.0	V	-101.0	-6.5	24.1	74.0
10361.156250	47.9	1000.0	1000.000	100.0	V	133.0	-2.7	26.1	74.0
14403.968750	50.2	1000.0	1000.000	110.0	V	-97.0	2.4	23.8	74.0
17954.312500	56.2	1000.0	1000.000	150.0	V	-170.0	11.6	17.8	74.0

Final Average measurement results:

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)
2464.656250	26.9	1000.0	1000.000	110.0	V	130.0	-16.2	27.1	54.0
4833.500000	28.3	1000.0	1000.000	140.0	V	151.0	-11.3	25.7	54.0
7287.875000	32.6	1000.0	1000.000	110.0	V	-101.0	-6.5	21.5	54.0
10361.156250	35.9	1000.0	1000.000	100.0	V	133.0	-2.7	18.1	54.0
14403.968750	39.0	1000.0	1000.000	110.0	V	-97.0	2.4	15.0	54.0
17954.312500	46.6	1000.0	1000.000	150.0	V	-170.0	11.6	7.4	54.0

Figure 19: Spectral Diagrams and measurement results, 1-18 GHz, horizontal polarization, mode 2, Sample with battery 2#

Level [dB μ V/m]



Final Peak measurement results:

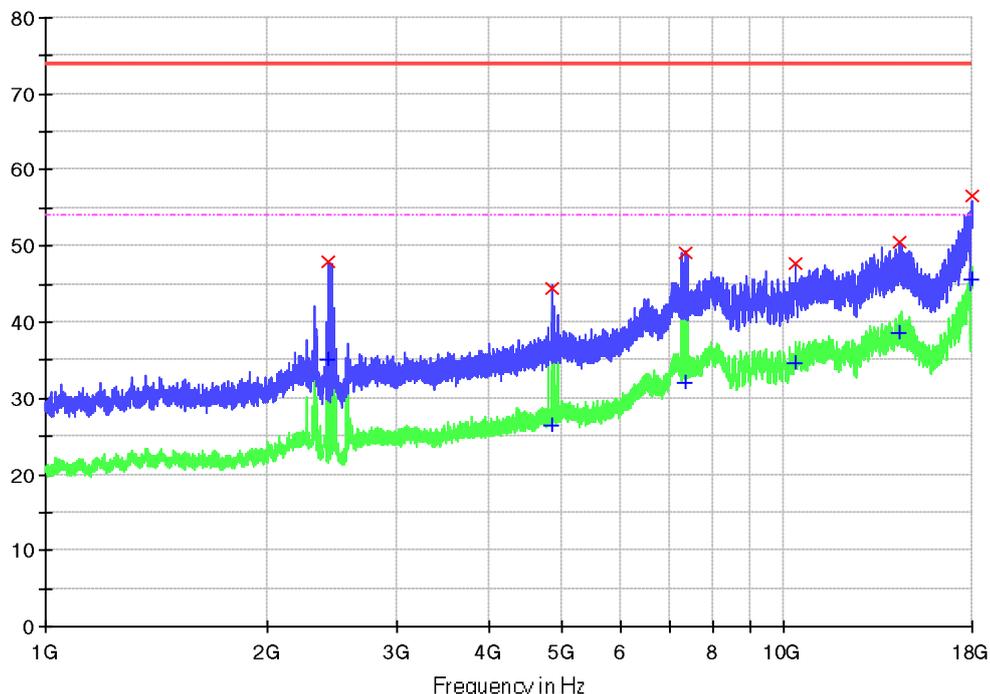
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dB μ V/)
2405.687500	50.4	1000.0	1000.000	150.0	H	-96.0	-16.0	23.7	74.0
4840.406250	44.3	1000.0	1000.000	110.0	H	3.0	-11.3	29.7	74.0
7407.937500	47.2	1000.0	1000.000	130.0	H	134.0	-6.2	26.8	74.0
11029.468750	47.1	1000.0	1000.000	100.0	H	-65.0	-2.3	26.9	74.0
14357.218750	50.1	1000.0	1000.000	100.0	H	-101.0	2.2	23.9	74.0
17968.656250	56.3	1000.0	1000.000	110.0	H	50.0	11.8	17.7	74.0

Final Average measurement results:

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dB μ V/)
2405.687500	33.9	1000.0	1000.000	150.0	H	-96.0	-16.0	20.2	54.0
4840.406250	29.1	1000.0	1000.000	110.0	H	3.0	-11.3	24.9	54.0
7407.937500	31.9	1000.0	1000.000	130.0	H	134.0	-6.2	22.1	54.0
11029.468750	34.9	1000.0	1000.000	100.0	H	-65.0	-2.3	19.1	54.0
14357.218750	38.3	1000.0	1000.000	100.0	H	-101.0	2.2	15.7	54.0
17968.656250	45.3	1000.0	1000.000	110.0	H	50.0	11.8	8.7	54.0

Figure 20: Spectral Diagrams and measurement results, 1-18 GHz, vertical polarization, mode 2, Sample with battery 2#

Level [dB μ V/m]



Final Peak measurement results:

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dB μ V/)
2420.031250	48.0	1000.0	1000.000	100.0	V	-81.0	-16.1	26.0	74.0
4857.406250	44.5	1000.0	1000.000	150.0	V	166.0	-11.3	29.5	74.0
7348.968750	49.1	1000.0	1000.000	110.0	V	157.0	-6.4	24.9	74.0
10350.000000	47.7	1000.0	1000.000	100.0	V	-80.0	-2.7	26.3	74.0
14380.062500	50.6	1000.0	1000.000	100.0	V	-89.0	2.3	23.4	74.0
17974.500000	56.7	1000.0	1000.000	120.0	V	-81.0	11.9	17.3	74.0

Final Average measurement results:

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dB μ V/)
2420.031250	35.0	1000.0	1000.000	100.0	V	-81.0	-16.1	19.0	54.0
4857.406250	26.3	1000.0	1000.000	150.0	V	166.0	-11.3	27.7	54.0
7348.968750	32.1	1000.0	1000.000	110.0	V	157.0	-6.4	21.9	54.0
10350.000000	34.6	1000.0	1000.000	100.0	V	-80.0	-2.7	19.4	54.0
14380.062500	38.6	1000.0	1000.000	100.0	V	-89.0	2.3	15.4	54.0
17974.500000	45.7	1000.0	1000.000	120.0	V	-81.0	11.9	8.3	54.0

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6 Photographs of the Test Set-Up

Refer to the test setup file.

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7 List of Test and Measurement Instruments

Equip. no.	Equipment name	Model	Serial no.	Manufacturer	Cal. date	Due date
EMC-C-195	EMI test receiver	ESR3	102794	Rohde & Schwarz	2024-08-03	2025-08-03
EMC-C-366	Thermohygrometer	608-H1	2485149174	testo	2024-07-26	2025-07-26
EMC-S-028	EMI measurement software	EMC32-E+ (10.60.20)	100150	Rohde & Schwarz	N/A	N/A
EMC-C-190	Artificial mains network	ENV432	101514	Rohde & Schwarz	2024-10-11	2025-10-11
EMC-C-373	Trilog broadband antenna	VULB 9168	1771	Schwarzbeck	2024-11-23	2025-11-23
EMC-C-001	3 m semi-anechoic chamber	SAC3	FJ129002	Frankonia	2023-12-03	2026-12-03
EMC-C-066	EMI test receiver	ESCI	100280	Rohde & Schwarz	2024-10-17	2025-10-17
EMC-C-155	BiLog antenna	CBL 6112D	40530	Teseq	2023-04-20	2026-04-20
EMC-S-032	EMI measurement software	EMC32-MEB (10.60.20)	100697	Rohde & Schwarz	N/A	N/A
EMC-C-121	Thermohygrometer	608-H1	1241320265	testo	2024-06-25	2025-06-25
EMC-C-019	Double ridged horn antenna	BBHA 9120 D	9120D-433	Schwarzbeck	2025-02-28	2026-02-28
EMC-C-161	Spectrum analyser	FSV40	101258	Rohde & Schwarz	2024-07-15	2025-07-15
EMC-C-175	Preamplifier	EMC051845SE	980612	EMCI Taiwan	2024-07-24	2025-07-24

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End of test report