

Prüfbericht-Nr.: Test report no.:	CN25V4SF 001	Auftrags-Nr.: Order no.:	326124384	Seite 1 von 38 Page 1 of 38
Kunden-Referenz-Nr.: Client reference no.:	2089836	Auftragsdatum: Order date:	2025-03-18	
Auftraggeber: Client:	Pylon Technologies Co., Ltd. No.300, Miaoqiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, P.R. China			
Prüfgegenstand: Test item:	Rechargeable Li-ion Battery			
Bezeichnung / Typ-Nr.: Identification / Type no.:	FB-L-5.12-EU, FB-L-5.12-EU-Pro			
Auftrags-Inhalt: Order content:	TÜV Rheinland EMC service			
Prüfgrundlage: Test specification:	EN IEC 61000-6-1:2019 EN IEC 61000-6-2:2019 EN IEC 61000-6-3:2021 EN IEC 61000-6-4:2019	IEC 61000-6-1:2016 IEC 61000-6-2:2016 IEC 61000-6-3:2020 IEC 61000-6-4:2018		
Wareneingangsdatum: Date of sample receipt:	2025-08-22			
Prüfmuster-Nr.: Test sample no.:	A004074633-001			
Prüfzeitraum: Testing period:	2025-09-07 ~ 2025-09-08			
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:	 Leo Z. H Zhang	genehmigt von: authorized by:	 Somuns Chen	
Datum: Date:	2025-09-12	Ausstellungsdatum: Issue date:	2025-09-12	
Stellung / Position:	Project engineer	Stellung / Position:	Authorizer	
Sonstiges / Other:	The emission requirements of EN IEC 61000-6-3:2021 and immunity requirements of EN IEC 61000-6-2:2019 are stricter than those of EN IEC 61000-6-4:2019 and EN IEC 61000-6-1:2019 respectively. Therefore, all tests were performed according to EN IEC 61000-6-3:2021 and EN IEC 61000-6-2:2019. Refer to clause 2.2 for details.			
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.</i> <i>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
CN25V4SF 001	2025-09-12	Initial release.

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1 Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland (Suzhou) 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 are in accordance with CISPR 16-1 series standards for measurement of radio interference.

Refer to Clause 8 for test and measurement instruments.

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2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary rechargeable Li-ion battery. For further information, refer to the user's manual.

2.2 Ratings and System Details

Type designation	FB-L-5.12-EU	FB-L-5.12-EU-Pro
Rated Energy	5.12 kWh	
Rated Capacity	100 Ah	
Nominal Voltage	DC 51.2 V	
Charge Voltage	DC 56 – 56.8 V	
Max. Charging Current	100 A	
Max. Discharging Current	100 A	
Short Current/Duration	< 1000 A/1 ms	
Protection Class	I	
Weight	44.5±0.5 kg	45.8±0.5 kg

Identities and differences:

In electrical characteristics, the above models are similar with each other. The only difference between them is the model FB-L-5.12-EU-Pro has heating function. Therefore, all EMC tests were performed on model FB-L-5.12-EU-Pro.

2.3 Independent Operation Modes

The basic operation modes are:

1. Charge mode;
2. Discharge mode.

Refer to user's manual for further information.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.5 Submitted Documents

Electric circuit diagram and rating labels.

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.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

3.3 Test Operation and Test Software

During the tests, the EUT was monitored by the software specified by the manufacturer.

3.4 Special Accessories and Auxiliary Equipment

During the tests, a PC (model: T14, manufacturer: Lenovo) was used as auxiliary equipment.

3.5 Countermeasures to achieve EMC Compliance

No special measure is employed during the tests to achieve the requirement.

4 Conformity Decision Rule

For all EMI tests (when included in this report), as measurement uncertainties are less than the values U_{CISPR} given in CISPR 16-4-2, compliance with the limits is determined by comparing measurement results directly with corresponding limits without taking into consideration of measurement uncertainties. For all EMS tests (when included in this report), measurement uncertainties are not considered as well according to corresponding test standards.

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5 Test Results EMISSION

5.1 Emission in the Frequency Range up to 30 MHz

5.1.1 DC Power port Continuous Disturbance Voltage

Result:		Passed
Date of testing	: 2025-09-07	
Test procedure	: EN IEC 61000-6-3:2021 and CISPR 16-2-1	
Frequency range	: 0.15 – 30 MHz	
Limits	: EN IEC 61000-6-3:2021, Table 5 Quasi-peak limits: 0.15-0.5 MHz, 79 dB μ V; 0.5-30 MHz, 73 dB μ V; Average limits: 0.15-0.5 MHz, 66 dB μ V; 0.5-30 MHz, 60 dB μ V	
Operation modes	: Charge and discharge mode	
Test voltage	: DC 51.2 V	
Kind of test site	: Shielded room	
Ambient conditions	: Temperature: 26.3 °C; Relative humidity: 41.2 %	
Expanded measurement uncertainty($k=2$)	: 2.33 dB	

The measurement setup was made 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 placed on a 0.8 m high wooden table. The EUT was placed 0.8 m away from the AMN. The part of 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 0.3m and 0.4m.

The following figures and tables were those measured by an automatic measuring system. Both Quasi-Peak and Average Value were measured. A previous test was firstly performed with Peak detector and Average detector. In the Figures, “ $\times$ ” means Quasi-Peak Value and “ $+$ ” means Average Value which was measured in final measurement.

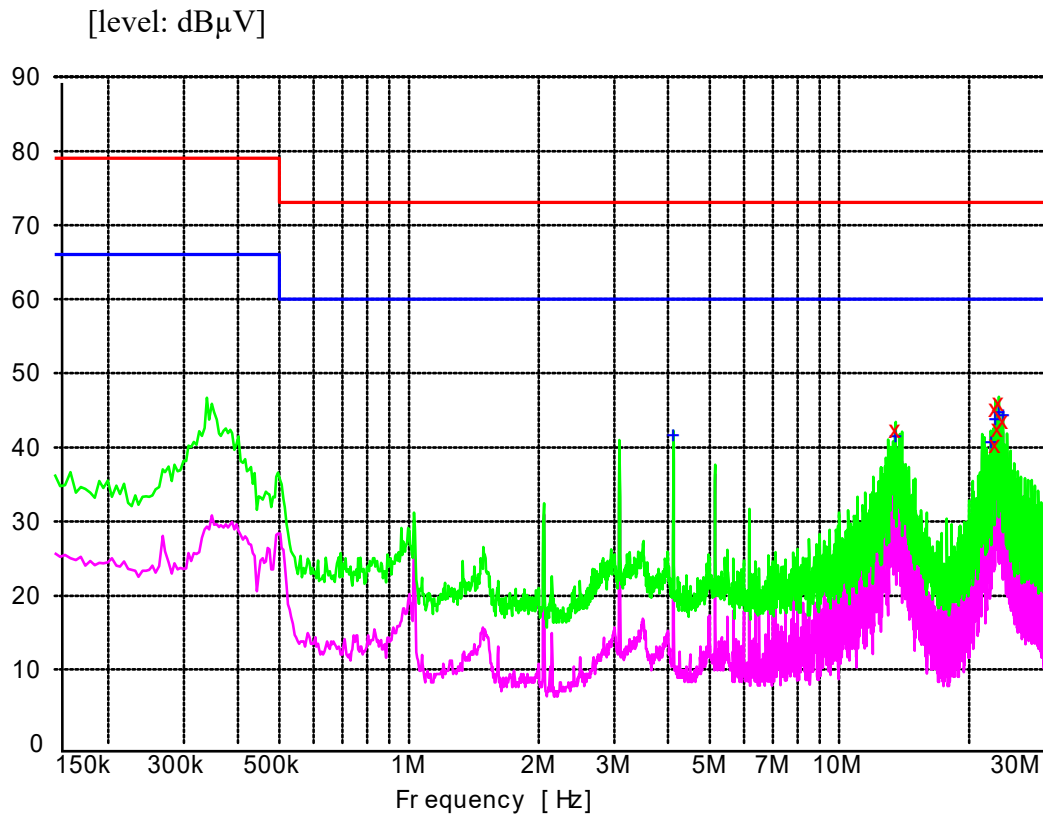
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Figure 1: Spectral diagram and measurement results of conducted emission, DC power port, charge mode, positive pole



Final quasi-peak measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
13.501500	42.40	10.9	73.0	30.6	+	GND
23.001000	45.20	11.2	73.0	27.8	+	GND
23.082000	40.40	11.2	73.0	32.6	+	GND
23.338500	42.50	11.2	73.0	30.5	+	GND
23.500500	46.00	11.2	73.0	27.0	+	GND
24.000000	43.60	11.3	73.0	29.4	+	GND

Final average measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
4.114500	41.60	10.4	60.0	18.4	+	GND
13.501500	41.50	10.9	60.0	18.5	+	GND
22.501500	40.60	11.2	60.0	19.4	+	GND
23.001000	43.80	11.2	60.0	16.2	+	GND
23.500500	44.70	11.2	60.0	15.3	+	GND
24.000000	44.30	11.3	60.0	15.7	+	GND

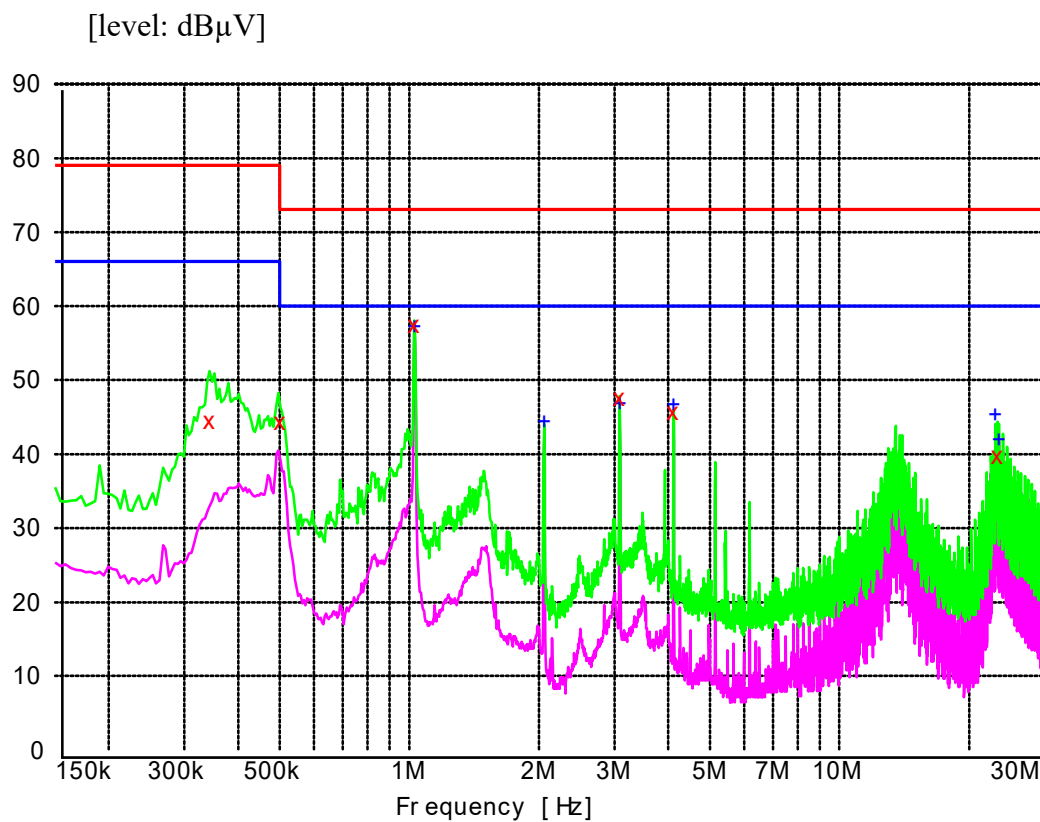
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Figure 2: Spectral diagram and measurement results of conducted emission, DC power port, charge mode, negative pole



Final quasi-peak measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.343500	44.50	10.8	79.0	34.5	-	GND
0.501000	44.40	10.4	73.0	28.6	-	GND
1.027500	57.40	10.4	73.0	15.6	-	GND
3.088500	47.60	10.4	73.0	25.4	-	GND
4.114500	45.70	10.4	73.0	27.3	-	GND
23.338500	39.80	11.2	73.0	33.2	-	GND

Final average measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
1.027500	57.20	10.4	60.0	2.8	-	GND
2.058000	44.40	10.4	60.0	15.6	-	GND
3.088500	46.80	10.4	60.0	13.2	-	GND
4.114500	46.60	10.4	60.0	13.4	-	GND
23.001000	45.40	11.2	60.0	14.6	-	GND
23.500500	42.00	11.2	60.0	18.0	-	GND

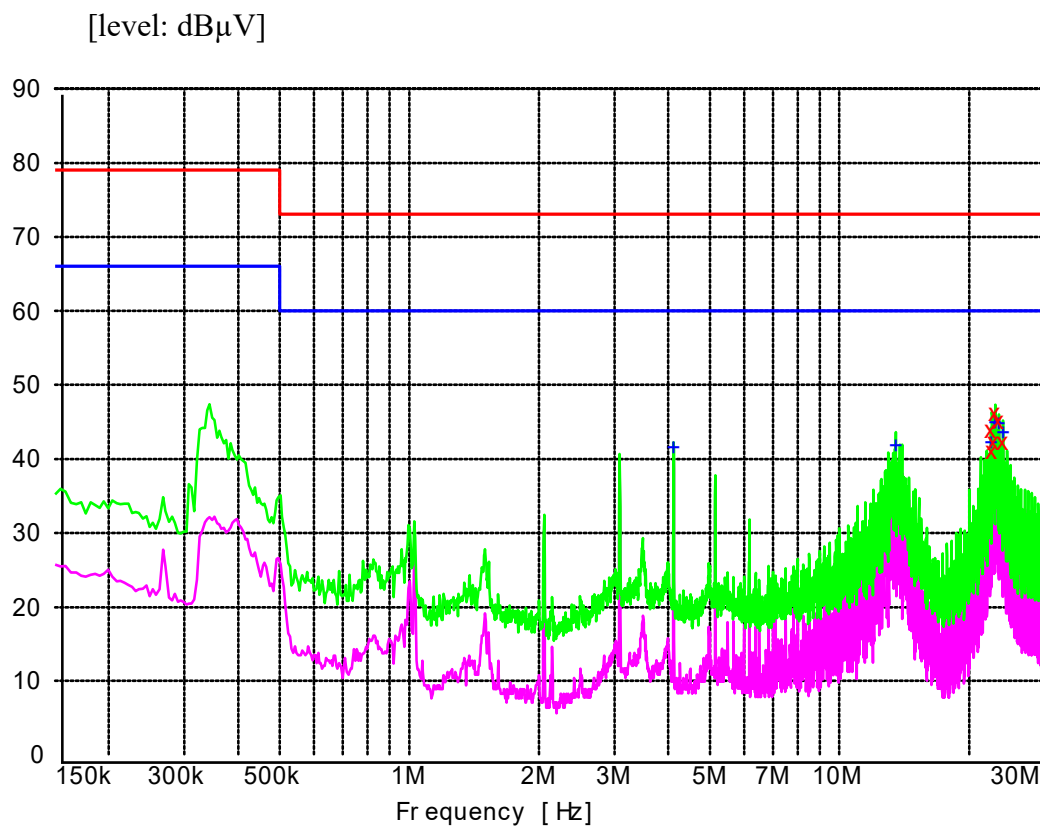
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Figure 3: Spectral diagram and measurement results of conducted emission, DC power port, discharge mode, positive pole



Final quasi-peak measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
22.501500	44.00	11.2	73.0	29.0	+	GND
22.663500	41.20	11.2	73.0	31.8	+	GND
22.839000	42.40	11.2	73.0	30.6	+	GND
23.001000	46.30	11.2	73.0	26.7	+	GND
23.500500	45.10	11.2	73.0	27.9	+	GND
24.000000	42.40	11.3	73.0	30.6	+	GND

Final average measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
4.114500	41.50	10.4	60.0	18.5	+	GND
13.501500	41.70	10.9	60.0	18.3	+	GND
22.501500	42.20	11.2	60.0	17.8	+	GND
23.001000	44.90	11.2	60.0	15.1	+	GND
23.500500	44.70	11.2	60.0	15.3	+	GND
24.000000	43.50	11.3	60.0	16.5	+	GND

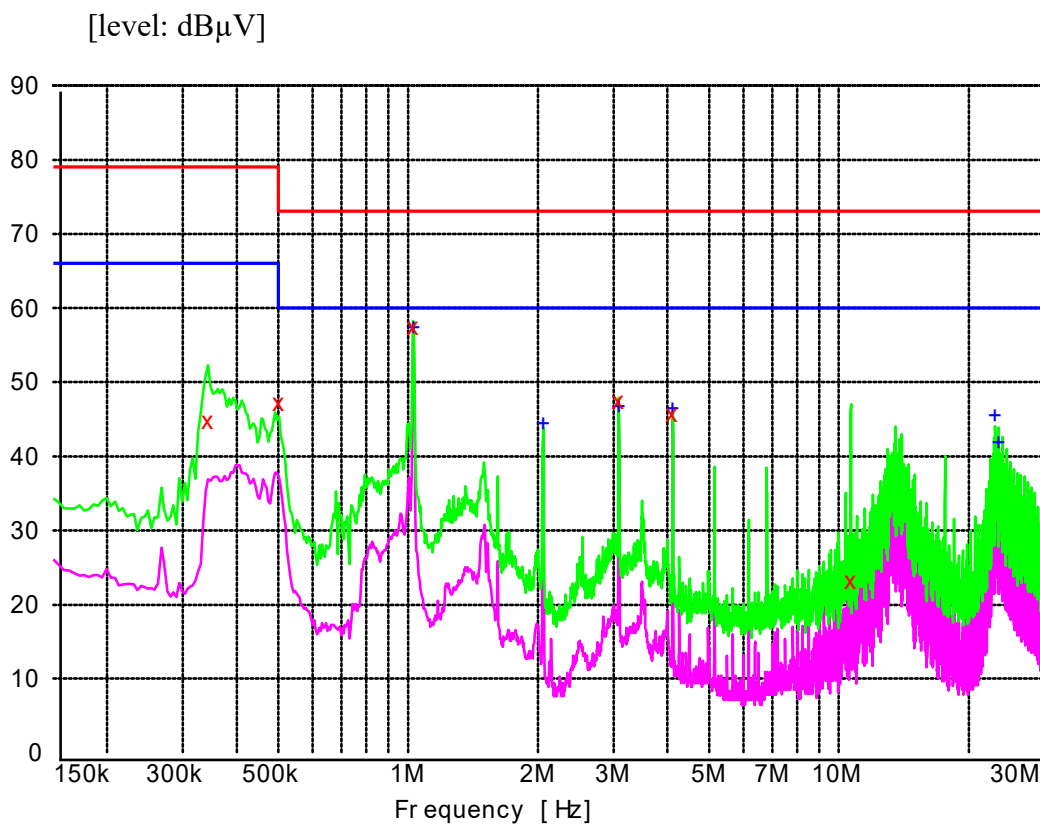
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Figure 4: Spectral diagram and measurement results of conducted emission, DC power port, discharge mode, negative pole



Final quasi-peak measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.343500	44.70	10.8	79.0	34.3	-	GND
0.501000	47.20	10.4	73.0	25.8	-	GND
1.027500	57.40	10.4	73.0	15.6	-	GND
3.088500	47.50	10.4	73.0	25.5	-	GND
4.114500	45.70	10.4	73.0	27.3	-	GND
10.662000	23.20	10.8	73.0	49.8	-	GND

Final average measurement results:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
1.027500	57.30	10.4	60.0	2.7	-	GND
2.058000	44.40	10.4	60.0	15.6	-	GND
3.088500	46.80	10.4	60.0	13.2	-	GND
4.114500	46.50	10.4	60.0	13.5	-	GND
23.001000	45.50	11.2	60.0	14.5	-	GND
23.500500	41.90	11.2	60.0	18.1	-	GND

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5.1.2 Asymmetric Mode Disturbance

Result:

Passed

Date of testing : 2025-09-07
 Test procedure : EN IEC 61000-6-3:2021 and CISPR 32
 Frequency range : 0.15 – 30 MHz
 Limits : EN IEC 61000-6-3:2021, Table 6
 Quasi-peak limits: 0.15-0.5 MHz, 40-30 dB μ A; 0.5-30 MHz, 30 dB μ A; Average limits: 0.15-0.5 MHz, 30-20 dB μ A; 0.5-30 MHz, 20 dB μ A
 Kind of test site : Shielded room
 Supply voltage : DC 51.2 V
 Operation modes : Continuously operating with Bluetooth connection
 Earthing : Earthing through power cord.
 Ambient conditions : Temperature: 24.9 °C; Relative humidity: 58.6 %
 Expanded measurement uncertainty ($k=2$) : 1.45 dB

The measurement equipment like test receivers, artificial asymmetrical network (AAN) and Artificial Mains Network (AMN) are in compliance with CISPR 16-1 series standards. An internal calibration with the test receiver was conducted prior to each measurement. The EUT operated with the supply voltage and frequency as above. Prior to the measurements the EUT operated with enough time (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

The measurement setup was made in a shielded room. The EUT was placed on a wooden table at a height of 0.8 m above the ground reference ground (GRP) and positioned 0.8 m apart from the AMN and the delta-network. 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 wired network port was connected to an AAN. The distance between the EUT and the AAN is about 80 cm. All cables connected to EUT were isolated from the GRP by insulating materials with a thickness of 0.1 m.

The following figures and tables were those measured by an automatic measuring system. Both quasi-peak and average values were measured. In the following figures, “ $\times$ ” means Quasi-Peak Value and “+” means Average Value which was measured in final measurement. The quasi-peak values were compared with the quasi-peak limits (red limit line) and the average values were compared with the average line (pink limit line) to determine whether the EUT fulfill this requirement.

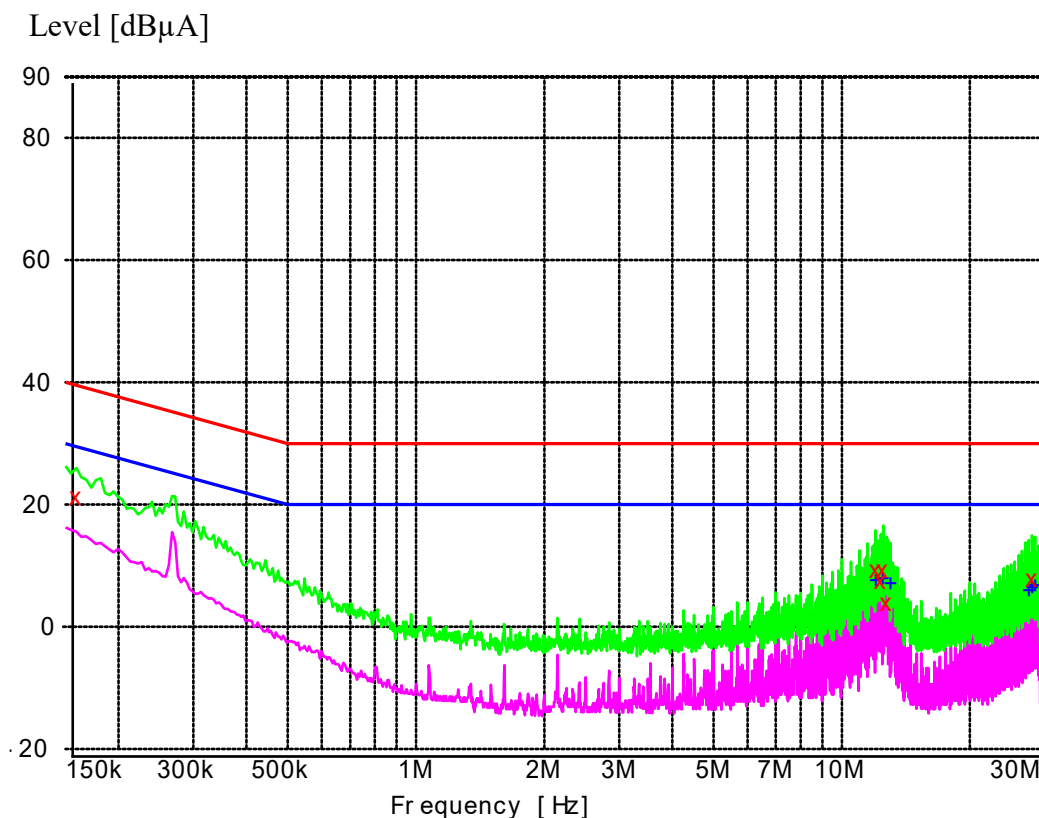
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Figure 5: Spectral diagram and measurement results of conducted emission, wired network port, charge mode



Final quasi-peak measurement results:

Frequency MHz	Level dBμA	Transd dB	Limit dBμA	Margin dB
0.159000	21.40	3.6	39.5	18.1
11.998500	9.40	-9.5	30.0	20.6
12.336000	7.60	-9.5	30.0	22.4
12.498000	9.40	-9.5	30.0	20.6
12.763500	4.00	-9.5	30.0	26.0
28.000500	7.90	-9.2	30.0	22.1

Final average measurement results:

Frequency MHz	Level dBμA	Transd dB	Limit dBμA	Margin dB
11.998500	7.60	-9.5	20.0	12.4
12.502500	7.80	-9.5	20.0	12.2
13.002000	7.10	-9.5	20.0	12.9
27.501000	5.90	-9.2	20.0	14.1
28.000500	6.50	-9.2	20.0	13.5
28.500000	6.70	-9.2	20.0	13.3

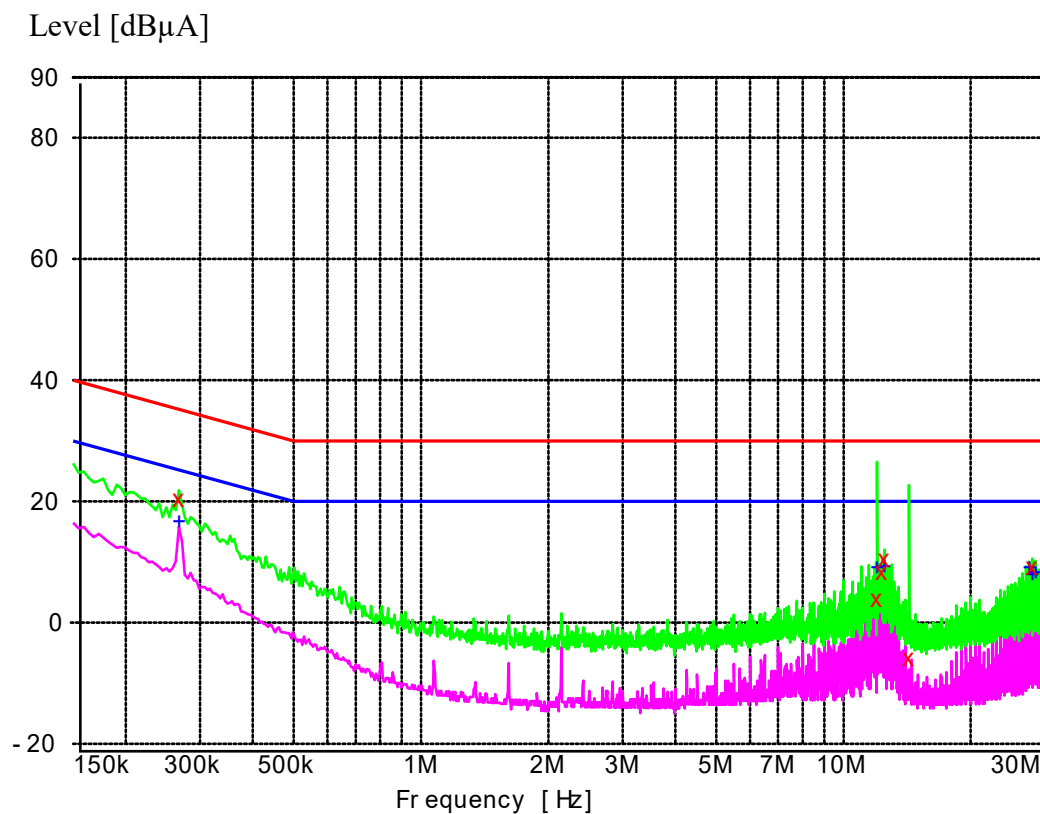
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Figure 6: Spectral diagram and measurement results of conducted emission, wired network port, discharge mode



Final quasi-peak measurement results:

Frequency MHz	Level dBμA	Transd dB	Limit dBμA	Margin dB
0.267000	20.40	-0.3	35.2	14.8
12.007500	4.00	-9.5	30.0	26.0
12.336000	8.50	-9.5	30.0	21.5
12.498000	10.50	-9.5	30.0	19.5
14.266500	-5.80	-9.4	30.0	35.8
28.000500	9.20	-9.2	30.0	20.8

Final average measurement results:

Frequency MHz	Level dBμA	Transd dB	Limit dBμA	Margin dB
0.267000	16.70	-0.3	25.2	8.5
11.998500	9.10	-9.5	20.0	10.9
12.502500	9.20	-9.5	20.0	10.8
27.501000	9.10	-9.2	20.0	10.9
28.000500	8.00	-9.2	20.0	12.0
28.500000	8.20	-9.2	20.0	11.8

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5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated emission

Result:	Passed
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Date of testing : 2025-09-07
 Test procedure : EN IEC 61000-6-3:2021 and CISPR 16-2-3
 Frequency range : 30 – 1000 MHz (see Note 1)
 Limits : EN IEC 61000-6-3:2021, Table 6
 Quasi-peak limits (3 m measurement distance):
 30-230 MHz, 40 dB μ V/m;
 230-1000 MHz, 47 dB μ V/m
 Kind of test site : Semi-anechoic Chamber
 Test distance : 3 m
 Operation mode : Charge and discharge mode
 Test voltage : DC 51.2 V
 Ambient condition : Temperature: 25.7 °C; Relative humidity: 44.8 %
 Expanded measurement uncertainty ($k=2$) : 5.40 dB

The radiated disturbance was measured in the frequency range from 30 MHz to 1000 MHz according to EN IEC 61000-6-3:2021.

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 wooden table, which is 0.8 m high. The turn 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. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak detector at those critical frequencies during the preview test. In the following figure, “ $\times$ ” means measurement results with quasi-peak detector.

***Note 1:** The highest frequency of the internal sources of the EUT is less than 108 MHz, so this measurement was only performed up to 1 GHz.*

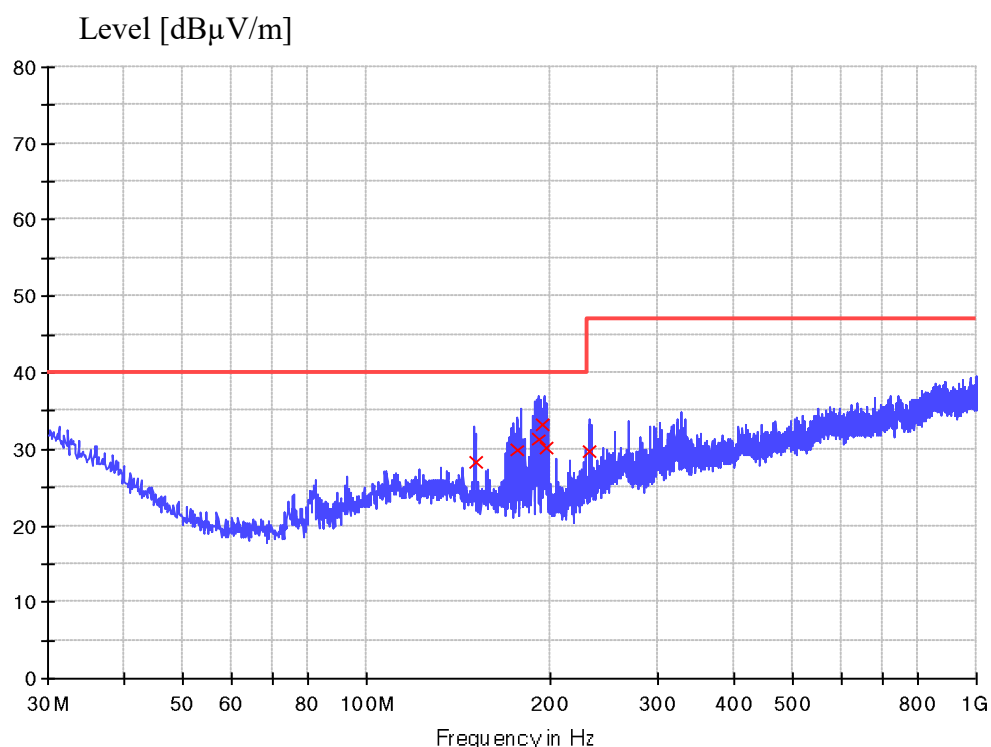
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Figure 7: Spectral diagram and measurement results of radiated emission, 30-1000 MHz, charge mode, horizontal polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
150.765000	28.2	1000.0	120.000	320.0	H	35.0	17.0	11.8	40.0
175.985000	30.0	1000.0	120.000	160.0	H	66.0	16.1	10.0	40.0
190.656250	31.4	1000.0	120.000	260.0	H	-64.0	15.8	8.6	40.0
194.051250	33.3	1000.0	120.000	180.0	H	-33.0	15.8	6.7	40.0
196.840000	30.3	1000.0	120.000	105.0	H	119.0	15.9	9.7	40.0
231.638750	29.8	1000.0	120.000	190.0	H	-180.0	17.5	17.3	47.0

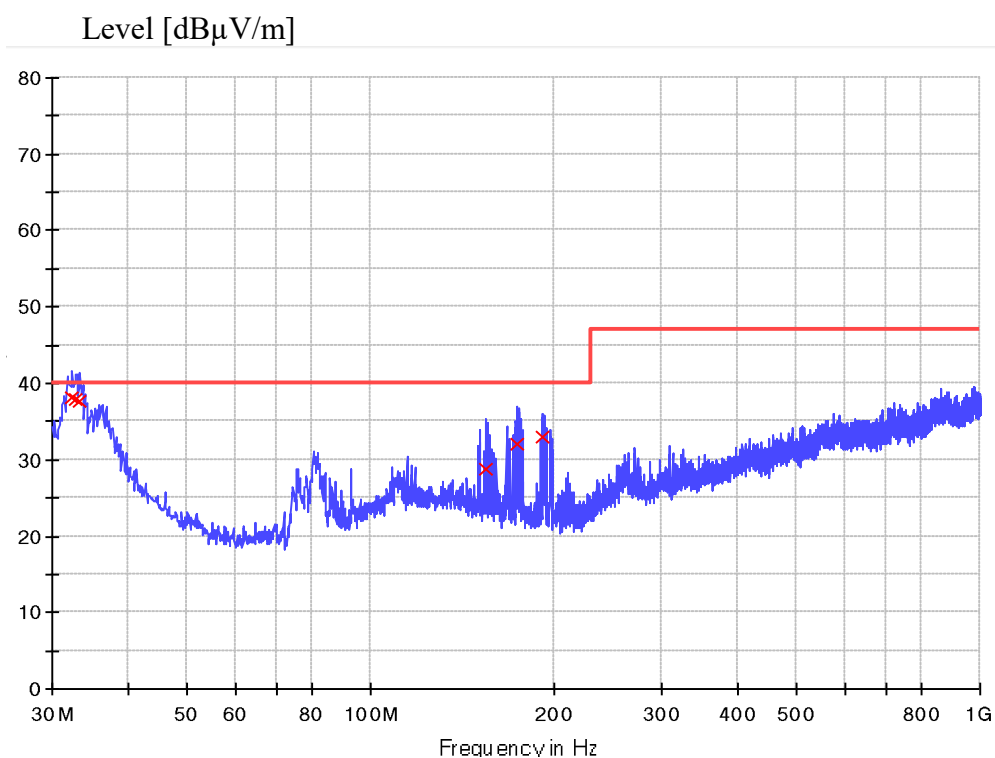
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Figure 8: Spectral diagram and measurement results of radiated emission, 30-1000 MHz, charge mode, vertical polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
32.320000	38.0	1000.0	120.000	100.0	V	-178.0	24.1	2.0	40.0
32.800000	38.0	1000.0	120.000	105.0	V	36.0	23.8	2.0	40.0
33.280000	37.7	1000.0	120.000	130.0	V	116.0	23.6	2.3	40.0
154.640000	28.8	1000.0	120.000	190.0	V	117.0	16.9	11.2	40.0
173.800000	32.1	1000.0	120.000	260.0	V	-94.0	16.1	7.9	40.0
191.760000	33.1	1000.0	120.000	220.0	V	66.0	15.8	6.9	40.0

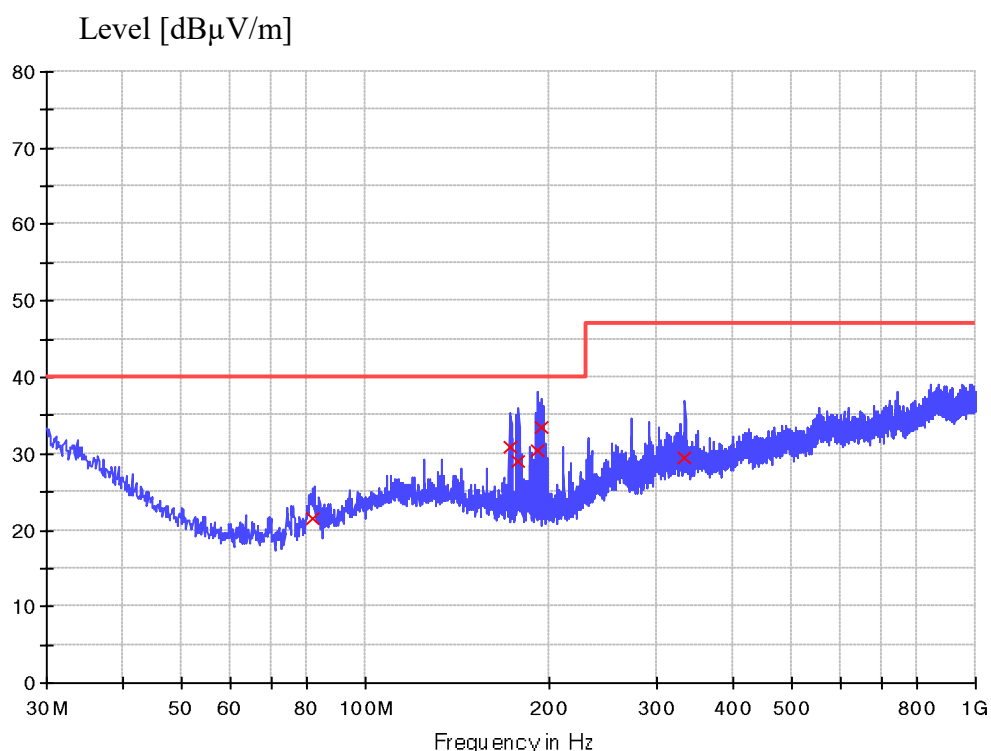
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Figure 9: Spectral diagram and measurement results of radiated emission, 30-1000 MHz, discharge mode, horizontal polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
82.137500	21.5	1000.0	120.000	100.0	H	164.0	14.1	18.5	40.0
172.105000	30.9	1000.0	120.000	100.0	H	35.0	16.2	9.1	40.0
178.288750	29.1	1000.0	120.000	100.0	H	66.0	16.1	10.9	40.0
191.262500	30.3	1000.0	120.000	100.0	H	-94.0	15.8	9.7	40.0
193.566250	33.5	1000.0	120.000	100.0	H	6.0	15.8	6.5	40.0
334.095000	29.5	1000.0	120.000	100.0	H	118.0	21.2	17.6	47.0

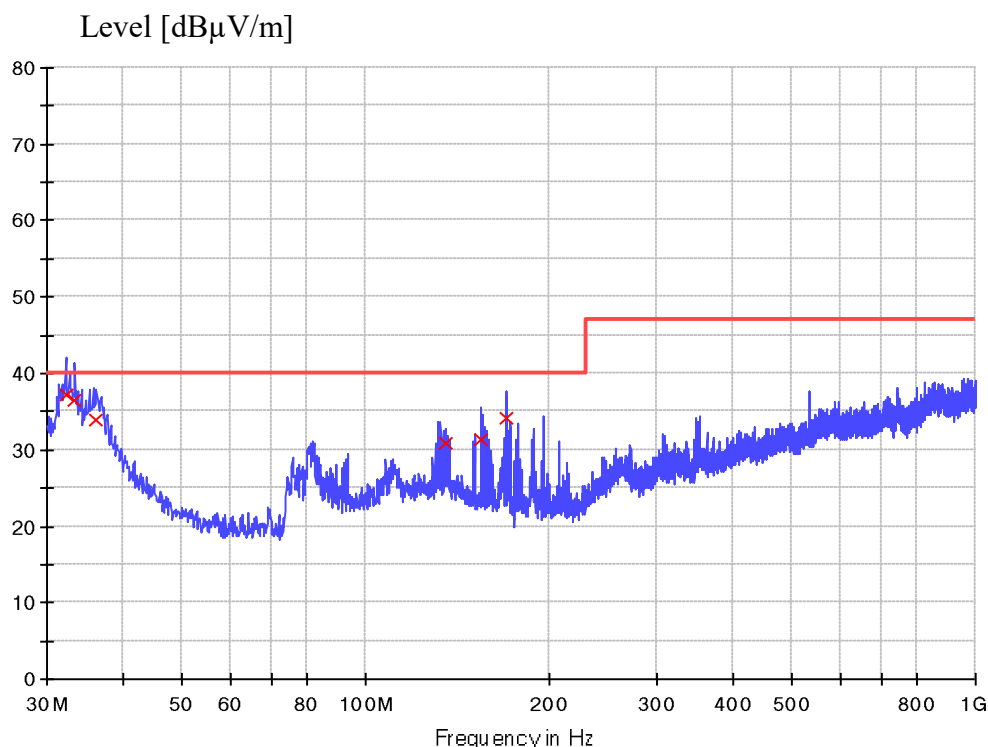
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Figure 10: Spectral diagram and measurement results of radiated emission, 30-1000 MHz, discharge mode, vertical polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
32.200000	37.1	1000.0	120.000	180.0	V	180.0	24.2	2.9	40.0
33.280000	36.6	1000.0	120.000	120.0	V	-33.0	23.6	3.4	40.0
36.200000	33.8	1000.0	120.000	130.0	V	-162.0	21.9	6.2	40.0
135.000000	31.0	1000.0	120.000	165.0	V	-64.0	18.3	9.0	40.0
154.160000	31.5	1000.0	120.000	100.0	V	13.0	16.9	8.6	40.0
170.400000	34.2	1000.0	120.000	260.0	V	-67.0	16.2	5.8	40.0

6 Test Results I M M U N I T Y

During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

The particular performance criterion for the immunity tests are as listed in clause 4 of EN IEC 61000-6-2:2019 is listed as follows:

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of those may be derived from the product description and documentation, and from what the user may reasonably expect from apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of those may be derived from the product description and documentation, and from what the user may reasonably expect from apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Date of testing: 2025-09-07 ~ 2025-09-08

Room temperature: 23.7 – 24.7 °C

Relative Humidity: 41.8 – 44.1 %

6.1 Enclosure

6.1.1 Electrostatic Discharge

Result:	Passed
----------------	---------------

Test setup and ESD-Generator are according to IEC 61000-4-2 which is specified by EN IEC 61000-6-2:2019.

The EUT is placed on 0.8 m wooden table above the ground plane. And the minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5 m.

The reference ground plane is an aluminium sheet of 0.25 mm minimum thickness. The reference ground plane is connected to the protective earth. The size of the ground plane is 2 m × 2 m.

A horizontal coupling plane (HCP), 1.6 m × 0.8 m, placed on the table and isolate the EUT 0.5 mm thick. A vertical coupling plane of dimensions 0.5m × 0.5m is placed parallel to and positioned at a distance of 0.1 m from the EUT.

Test procedure	: IEC 61000-4-2
Test level	: Table 1 of EN IEC 61000-6-2:2019 ±4.0 kV contact discharge; ±2.0 kV, ±4.0 kV, ±8.0 kV air discharge
Polarity	: Positive / Negative
Number of discharges	: 10 at each point
Operational mode	: Charge and discharge mode
Type of equipment	: Table-top
Performance criteria	: B
Ambient condition:	: Temp: 25.8 °C, Relative humidity: 40.7 %, Atm. Pressure: 101.1 kPa
Test voltage	: DC 51.2 V

Table 1: ESD, Positive / Negative Polarity test results

Position	Kind of Discharge	Result	Remarks
Switch & LED	Air discharge	Pass	During the test, the EUT worked as intended and no degradation of performance.
Gaps of the enclosure	Air discharge	Pass	
Button	Air discharge	Pass	
Display screen	Air discharge	Pass	
Screws	Contact discharge	Pass	During the test, the EUT worked as intended and no degradation of performance.
Metallic enclosure	Contact discharge	Pass	
Coupling plane (both HCP & VCP)	Contact discharge	Pass	

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6.1.2 Radio Frequency Electromagnetic Field

Result:

Passed

The test was performed inside a modified-anechoic chamber. The distance between the tip of the antenna and the side of system tested is 3 m (80 – 1000 MHz) and 3.6 m (1.4 – 6.0 GHz). The field uniformity of the 1.5 m × 1.5 m plane where the surface of the EUT tested coincides with is regularly calibrated to ensure the 0 – 6 dB field uniformity criterion as specified by IEC 61000-4-3 is met.

The four sides of the system were tested sequentially. The test was performed with the electric field in horizontal and vertical polarizations respectively.

Basic standard : IEC 61000-4-3
Test level : Table 1 of EN IEC 61000-6-2:2019
80 – 1000 MHz, 10 V/m
1.4 – 6.0 GHz, 3 V/m
Step size : 1 %
Modulation : 80 % AM, 1 kHz
Dwell time : 3 s
Type of equipment : Table-top
Operation mode : Charge and discharge mode
Test voltage : DC 51.2 V
Performance criteria : A

Table 2: RF electromagnetic field immunity test results

Field polarization	Position	Result	Observation
Horizontal polarization	Front side	Pass	No degradation of performance or loss of function
	Rear side		
	Left side		
	Right side		
Vertical polarization	Front side	Pass	No degradation of performance or loss of function
	Rear side		
	Left side		
	Right side		

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6.1.3 Power frequency magnetic field

Result:

Passed

The immunity against power frequency magnetic fields were tested in accordance to IEC 61000-4-8 which is specified by EN IEC 61000-6-2:2019.

Basic standard : IEC 61000-4-8:2009
Test level : Table 1 of EN IEC 61000-6-2:2019
30 A/m, 50 Hz and 60 Hz
Test duration : 2 minutes
Type of equipment : Table-top
Operation mode : Charge and discharge mode
Test voltage : DC 51.2 V
Performance criteria : A

Table 3: Power frequency magnetic field test results

Field polarization	Actual performance	Result
X	During the test, the EUT worked as intended and no degradation of performance.	Pass
Y		Pass
Z		Pass

6.2 Power Ports and Signal Ports

6.2.1 Electrical fast transients and bursts

Result:	Passed
----------------	---------------

Test setup and the fast transient noise generator was according to IEC 61000-4-4 which is specified by EN IEC 61000-6-2:2019.

The EUT is placed on 0.1 m wood support above the reference ground plane. And the minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5 m.

The length between the coupling device and the EUT is less than 1.0 m. The excess length of the cable shall be folded to avoid a flat coil and situated at a distance of 0.1 m above the ground reference plane.

The reference ground plane is an aluminium sheet of 0.25 mm minimum thickness. The reference ground plane is connected to the protective earth. The size of the ground plane is 2 m × 2 m.

Test procedure	: IEC 61000-4-4
Test level	: Table 2, 3 of EN IEC 61000-6-2:2019 ±1 kV, 5 kHz for DC power port ±1 kV, 5 kHz for signal port
Polarity	: +/-
Coupling duration	: 2 min/polarity
Operation mode	: Charge and discharge mode
Test voltage	: DC 51.2 V
Type of equipment	: Table-top
Performance criteria	: B

Table 4: EFT/B immunity test results

Tested cable	Result	Remarks
DC power port	Pass	During the test, the EUT worked as intended and no degradation of performance.
Signal port	Pass	

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6.2.2 Conducted disturbances, induced by RF fields

Result:

Passed

Test setup and the test generator were according to IEC 61000-4-6 which is specified by EN IEC 61000-6-2:2019.

The EUT is placed on 0.1 m wood support above the reference ground plane. And the minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5 m.

The coupling and decoupling networks was placed on the ground reference plane, making direct contact with it at about 0.1-0.3 meter from EUT. The cable between EUT and CDN is as short as possible and not bundled nor wrapped. The height of cable between the EUT and the coupling and decoupling networks above the ground reference plane was 50 mm.

For the DC power port and signal port, the disturbance signal was coupled via an EM clamp.

Basic standard	: IEC 61000-4-6
Test level	: Table 2, 3 of EN IEC 61000-6-2:2019, 10 V
Frequency range	: 0.15 – 80 MHz
Modulation	: 80 % AM, 1kHz
Frequency scan speed	: Frequency step: 1 %; dwell time: 3 s
Operation mode	: Charge and discharge mode
Test voltage	: DC 51.2 V
Type of equipment	: Table-top
Performance criteria	: A

Table 5: Conducted disturbances immunity test results

Coupling mode	Result	Remarks
DC power port	Pass	During the test, the EUT worked as intended and no degradation of performance.
Signal port	Pass	

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6.2.3 Surges

Result:

Passed

Test setup and test generator were according to IEC 61000-4-5 which is specified by EN IEC 61000-6-2:2019. The EUT is placed on a 0.1 m wood support.

For the DC power port and signal port, the disturbance signal was coupled via a CDN.

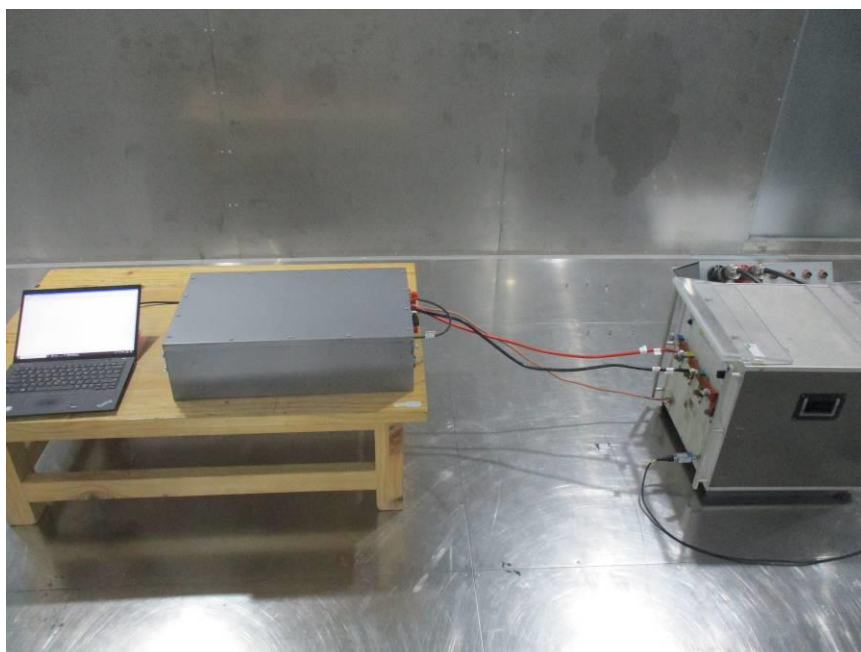
Test procedure : IEC 61000-4-5
 Test level : Table 2, 3 of EN IEC 61000-6-2:2019
 : ± 0.5 kV, ± 1 kV (DC power port, line-to earth)
 : ± 0.5 kV (DC power port, line-to-line)
 : ± 0.5 kV, ± 1 kV (signal port, line-to earth)
 T_r/T_d : 1.2 / 50 μ s (open-circuit voltage)
 : 8 / 20 μ s (short-circuit current)
 Polarity : Positive / Negative
 Pulse number : 5 pulses for each polarity
 Coupling phase : Asynchronous
 Repetition rate : 1 pulse/min
 Operation mode : Charge and discharge mode
 Test voltage : DC 51.2 V
 Type of equipment : Table-top
 Performance criteria : B

Table 6: Surge immunity test results

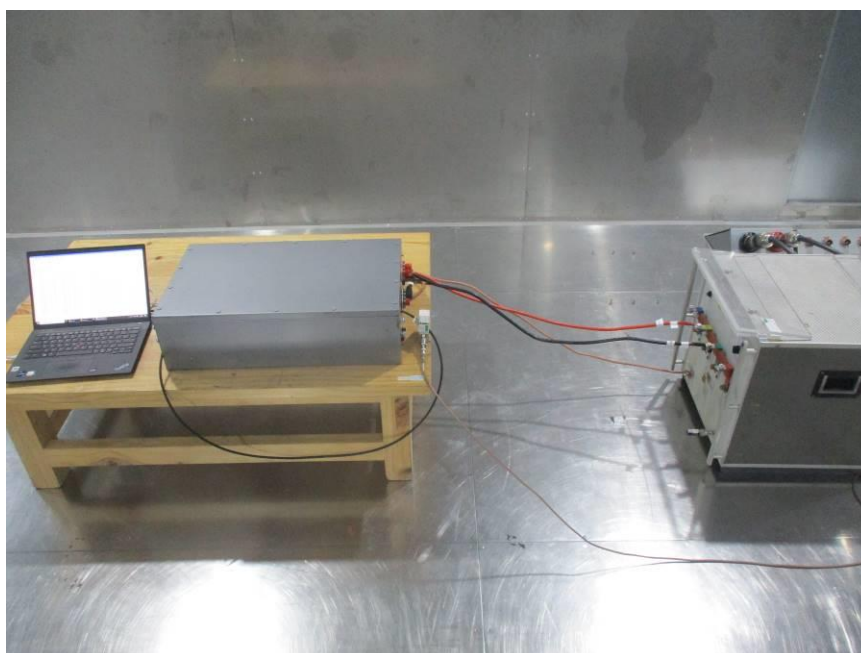
Coupling mode	Result	Remarks
DC power port	Pass	During the test, the EUT worked as intended and no degradation of performance.
Signal port	Pass	

7 Photographs of the Test Set-Up

Photograph 1: Set-up for measurement of disturbance voltage



(DC power port)

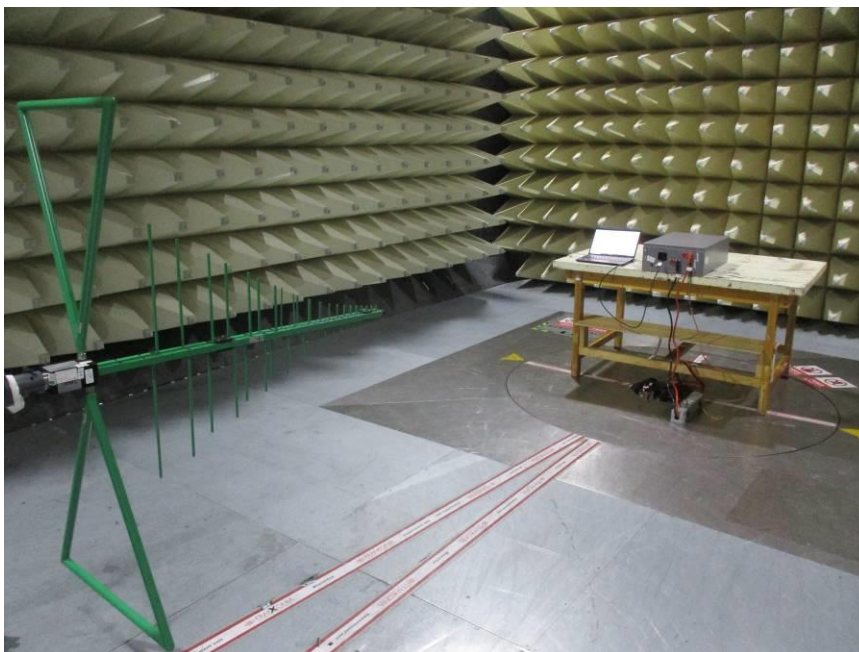


(Wired network port)

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Photograph 2: Set-up for measurement of radiated emission



Photograph 3: Set-up for immunity test of electrostatic discharge



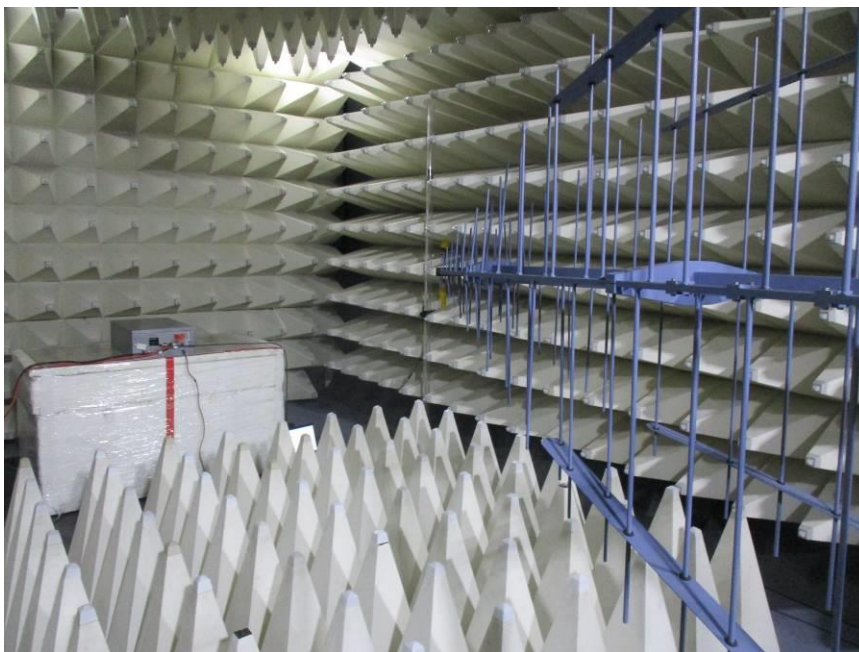
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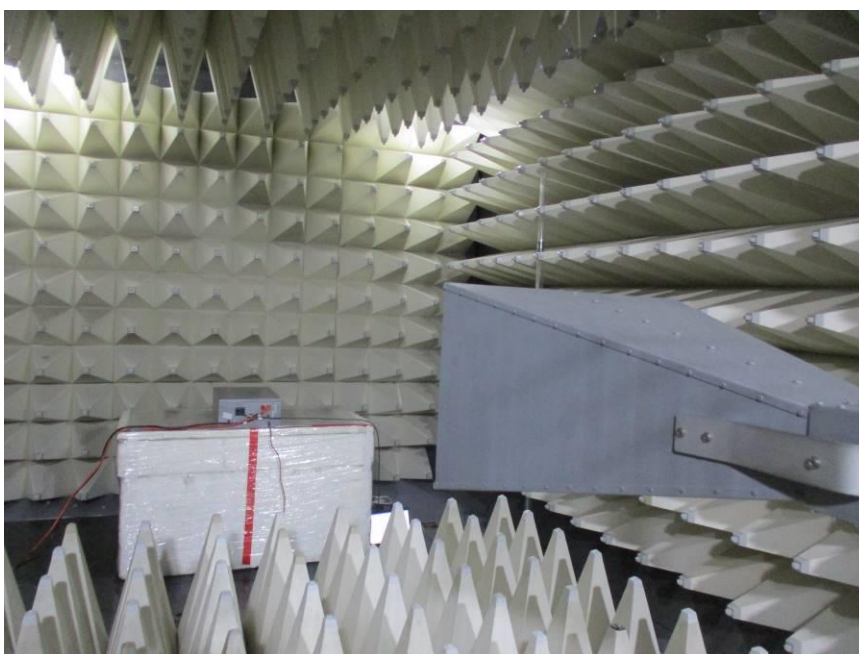
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Photograph 4: Set-up for immunity test of RF electromagnetic field



(80-1000 MHz)



(1.4-6.0 GHz)

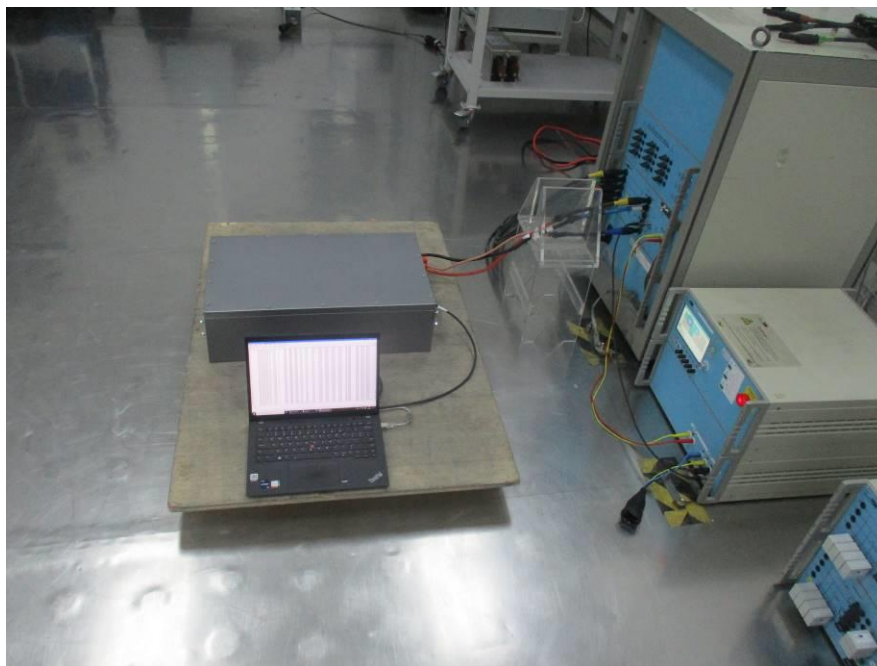
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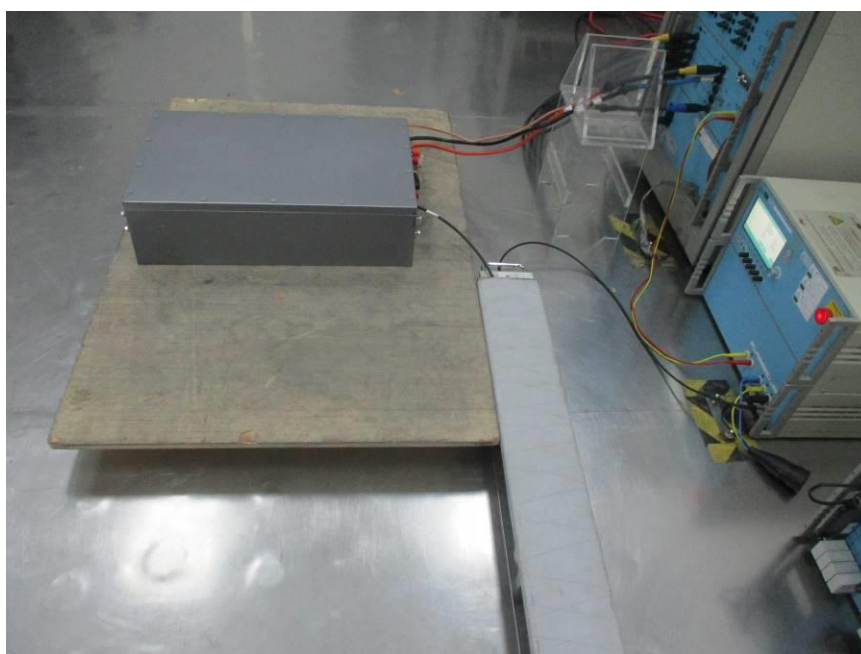
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Photograph 5: Set-up for immunity test of electrical fast transients/burst



(DC power port)

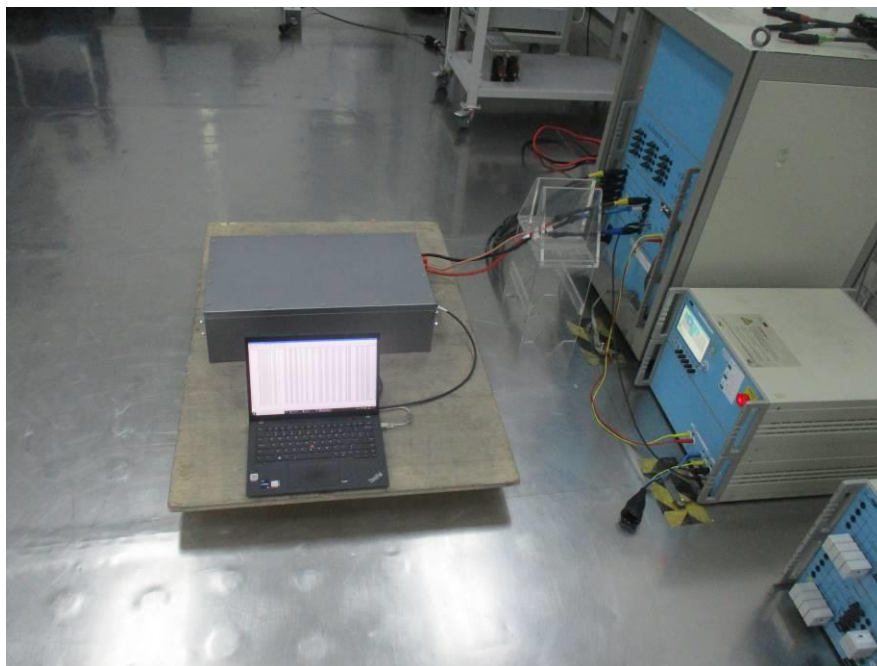


(Signal port)

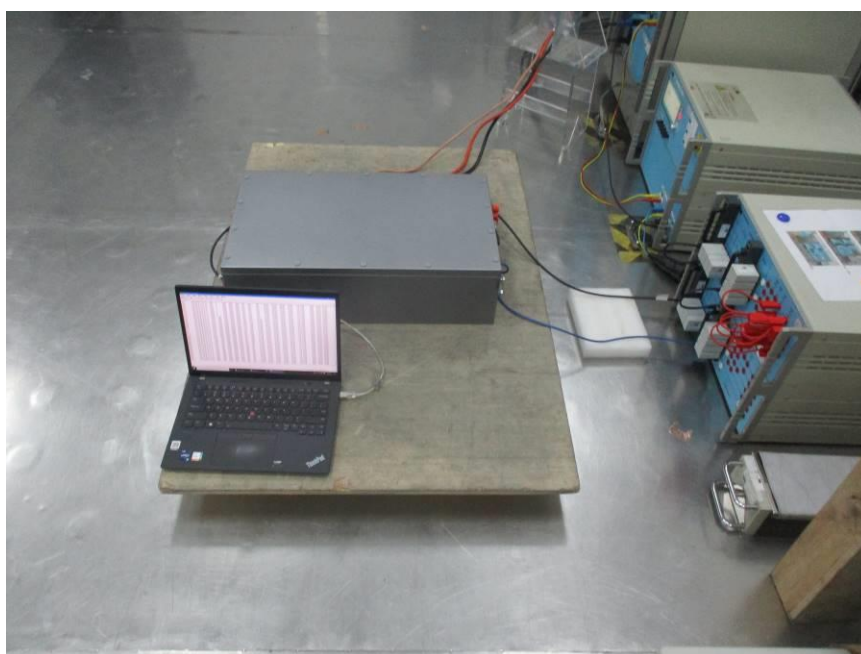
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Photograph 6: Set-up for immunity test of surge



(DC power port)



(Signal port)

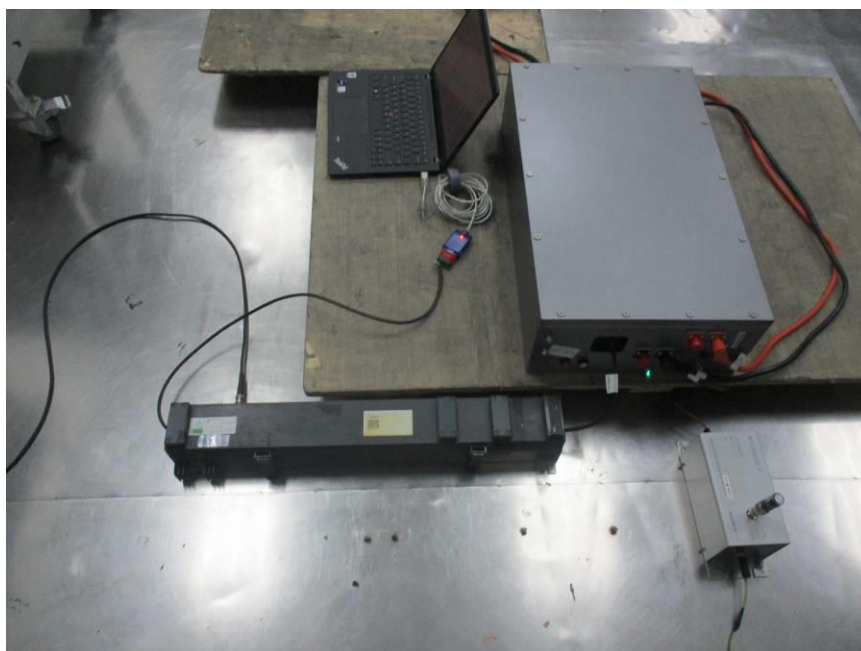
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Photograph 7: Set-up for immunity test of conducted disturbances



(DC power port)

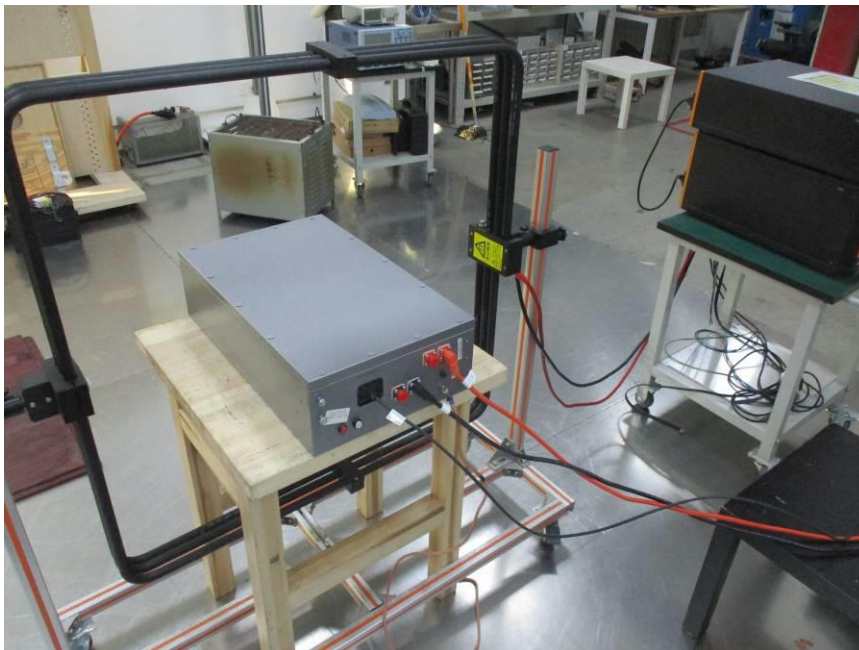


(Signal port)

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Photograph 8: Set-up for immunity test of power frequency magnetic field



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8 List of Test and Measurement Instruments

Equipment no	Name	Model	Serial no	Manufacturer	Calibration date	Due date
EMC-C-051	Artificial mains network	NNLK 8121	8121463	Schwarzbeck	2025-07-11	2026-07-11
EMC-C-023	EMI test receiver	ESIB26	100227	Rohde & Schwarz	2025-03-27	2026-03-27
EMC-S-001	EMI test software	ESIB-K1 (1.20)	1108.0194.00	Rohde & Schwarz	N/A	N/A
EMC-C-317	Thermohygro meter	608-H1	2283796621	testo	2025-06-10	2026-06-10
EMC-C-015	RF current probe	EZ-17	100159	Rohde & Schwarz	2025-07-03	2026-07-03
EMC-S-032	EMI measurement software	EMC32-MEB (10.60.20)	100697	Rohde & Schwarz	N/A	N/A
EMC-C-155	BiLog antenna	CBL 6112D	40530	Teseq	2025-03-24	2026-09-24
EMC-C-121	Thermohygro meter	608-H1	1241320265	testo	2025-06-05	2026-06-05
EMC-C-066	EMI test receiver	ESCI	100280	Rohde & Schwarz	2024-10-17	2025-10-17
EMC-C-001	3 m semi-anechoic chamber	SAC3	FJ129002	Frankonia	2023-12-03	2026-12-03
EMC-C-320	Thermohygro meter and barometer	622	39534423	testo	2025-07-29	2026-07-29
EMC-C-201	ESD generator	NSG 437	1770	Teseq	2025-03-11	2026-03-11
EMC-C-318	Thermohygro meter	608-H1	2283796622	testo	2025-06-10	2026-06-10
EMC-C-306	Capacitive coupling clamp	CN-EFT1000	103468-1978	EMC Partner	2024-10-17	2025-10-17
EMC-C-305	Multi-function generator	IMU-MGE	109937-1624	EMC Partner	2024-10-17	2025-10-17
EMC-C-307	3-phase coupling/deco upling network	CDN-A-6-125	109037-3132	EMC Partner	2024-10-17	2025-10-17
EMC-C-308	Surge signal line CDN	CDN-UTP8 ED3	106326-1633	EMC Partner	2024-10-17	2025-10-17
EMC-C-357	Conducted immunity test system	CIT-100-75	10343-1	Frankonia Test-Systems	2024-10-29	2025-10-29
EMC-S-307	CS measurement software	HELIA (1.3.9.330)	3-6252304	Frankonia Test-Systems	N/A	N/A
EMC-C-113	Coupling/deco upling network	CDN M116	21567	Schaffner	2025-06-25	2026-06-25
EMC-C-187	EM clamp	KEMZ 801	19231	Schaffner	2025-08-10	2026-08-10
EMC-C-203	Magnetic field tester	MFS1200/MF T1200/TCXS11 3	ES045000822 003/ES046000 122003/TCXS2 1103117	3CTest	2025-07-11	2026-07-11

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EMC-C-382	Clamp meter	F381	66460122WS	Fluke	2025-04-07	2026-04-07
EMC-C-365	Thermohygro meter	608-H1	2485149145	testo	2025-07-11	2026-07-11
EMC-C-185	40 dB dual-directional coupler	C6187	15381	Werlatone	2025-01-21	2026-01-21
EMC-C-096	Power amplifier	AS0206-50	1035578	MILMEGA	2024-12-05	2025-12-05
EMC-C-097	Broadband field meter	NBM-520/EF1891	C-0120/A-0387	Narda	2025-07-01	2026-07-01
EMC-C-120	Thermohygro meter	608-H1	1241320264	testo	2025-06-05	2026-06-05
EMC-C-132	Fully anechoic chamber	FAC3plus	FJ139001	Frankonia	2023-12-03	2026-12-03
EMC-C-162	Average power sensor	NRP6AN	101102	Rohde & Schwarz	2025-07-29	2026-07-29
EMC-C-163	Average power sensor	NRP6AN	101103	Rohde & Schwarz	2025-07-29	2026-07-29
EMC-C-184	40 dB dual-directional coupler	C5982	15370	Werlatone	2025-01-21	2026-01-21
EMC-C-194	Signal generator	SMB100A (40 GHz)	181256	Rohde & Schwarz	2024-12-10	2025-12-10
EMC-C-209	Power amplifier	NTWPA-00810500	22093259	Nanjing RFLIGHT	2024-10-17	2025-10-17
EMC-NC-032	EMS antenna	HL 046	100039	Rohde & Schwarz	N/A	N/A
EMC-NC-055	Double ridged horn antenna	BBHA 9120 E	224	Schwarzbeck	N/A	N/A
EMC-S-033	EMS measurement software	EMC32-S (10.60.20)	100957	Rohde & Schwarz	N/A	N/A
EMC-C-182	Power amplifier	AS0825-170	1085685	MILMEGA	2025-07-29	2026-07-29

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