

TEST REPORT ISO 7176-21

Wheelchairs —. Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and scooters, and battery chargers.

Report Reference No..... : B-E2506D2548

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Date of Test..... : 2025-06-09 to 2025-07-17

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China

Applicant's name..... : Suzhou Jiujiuba Medical Equipment Co., Ltd

Address..... : Room 301, building 3, No. 60, Fumin South Road, DalangTown,
Dongguan City, Guangdong Province, China

Test specification..... :

Standard..... : ISO 7176-21:2009
EN 60601-1-2:2015+A1:2021

The device described above is tested by Beide (Shenzhen) Product Service Limited to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and it's performance criterion. The test results are contained in this test report. Beide (Shenzhen) Product Service Limited is assumed of full responsibility for the accuracy and completeness of these tests. Also, this report shows that the EUT is technically compliant with the ISO 7176-21, EN IEC 61000-3-2 and EN 61000-3-3 and IEC 60601-1-2 requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of Beide (Shenzhen) Product Service Limited. Note: P=PASS, F=Fail, N/A= Not Applicable

Test item description..... : Electric climbing wheelchair

Manufacturer..... : Suzhou Jiujiuba Medical Equipment Co., Ltd

Model/Type reference..... : WD58-8



List Model..... : /

Power Ratings.....: Battery Charger:
Input: 100-240V~, 50/60Hz, 2.5A, CLASS II
Output: DC 29.4V, 2.8A
Battery: 25.5V, 12.5Ah

Result.....: **PASS**



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APPENDIX II (EUT PHOTOS)

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1.TEST RESULTS SUMMARY

Test Results Summary

Emission Measurement		
Radiation Emission Test	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 CISPR 11:2015+A1:2016+A2:2019(Class B)	PASS
Conducted Emission Test	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 CISPR 11:2015+A1:2016+A2:2019(Class B)	PASS
Harmonic Current Emissions	EN 60601-1-2:2015+A1:2021 EN IEC 61000-3-2:2019+A1:2021	PASS
Voltage Fluctuations and Flicker	EN 60601-1-2:2015+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021	PASS
Immunity Measurement		
Electrostatic Discharge(ESD)	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 IEC 61000-4-2:2008	PASS
Radio-Frequency Electromagnetic Field Amplitude Modulated (RS)	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 IEC 61000-4-3:2020	PASS
Electrical Fast Transient/Burst Test (EFT)	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 IEC 61000-4-4:2012	PASS
Radio-Frequency Continuous Conducted (CS)	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 IEC 61000-4-6:2013+COR1:2015	PASS
Voltage Dips and Interruptions	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 IEC 61000-4-11:2020	PASS
Surges	ISO 7176-21:2009 EN 60601-1-2:2015+A1:2021 IEC 61000-4-5:2014+A1:2017	PASS

2.General Information

2.1.Report Information

1.1.1. This report is not a certificate of quality, it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BEIDE approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BEIDE in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by applicant, BEIDE therefore assumes no responsibility for the accuracy of information on the brand names, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the applicant at an additional fee. No third part can obtain a copy of this report through BEIDE, unless the applicant has authorized BEIDE in writing to do so.

2.2.Description of Device (EUT)

Description	: Electric climbing wheelchair
Number Model	: WD58-8
Applicant	: Suzhou Jiujiuba Medical Equipment Co., Ltd Room 301, building 3, No. 60, Fumin South Road, DalangTown, Dongguan City, Guangdong Province, China
Manufacturer	: Suzhou Jiujiuba Medical Equipment Co., Ltd Room 301, building 3, No. 60, Fumin South Road, DalangTown, Dongguan City, Guangdong Province, China
Wheelchair Drive:	(7.1.2 Operation of ISO 7176-21) Switch on the wheelchair. Set the control device for a drive wheel speed of $50 \% \pm 10 \%$ of the maximum speed in the forward direction. Additionally, set the control device such that the steering servo is at the straight ahead position (the steered wheel angle is at $0^{\circ} \pm 1^{\circ}$).
Off-board and carry-on battery chargers:	(7.4 Off-board and carry-on battery chargers of ISO 7176-21) Discharge the battery set of the charger test load (6.5) to the cut-off voltage specified by the battery manufacturer, within a tolerance of $+5^{00}\%$. Operate the battery charger in accordance with the charger manufacturer's instructions for use, but using the charger test load in place of the load specified by the manufacturer.

2.3. Description of Test modes

Standard	Test mode
CISPR 11 Conducted Emission	Charging mode
CISPR 11 Radiated Emission	Driving and Charging mode
IEC 61000-3-2 Harmonic current Emission	Charging mode
IEC 61000-3-3 Flicker	Charging mode
IEC 61000-4-2 ESD	Driving and Charging mode
IEC 61000-4-3 RS	Driving and Charging mode
IEC 61000-4-4 EFT	Charging mode
IEC 61000-4-5 Surge	Charging mode
IEC 61000-4-6 CS	Charging mode
IEC 61000-4-8 PFMF	Driving and Charging mode
IEC 61000-4-11 DIP	Charging mode

2.4. Product Information

型号 Model	wd58-5	材质 Material	80%铝合金 80% aluminum alloy
净重 Weight(kg)	40	颜色 Colour	军绿色 Army green
功能 Function	爬楼电动 Climbing electric	载重 Load(kg)	120
电机 electrical machinery	250w	锂电池 Lithium battery	29.4v13a
展开尺寸 Unfolded Size	96×60(66)×119cm	折叠尺寸 Folded Size	96×60(66)×58cm
爬楼续航 Climbing endurance	上下70层楼 70 floors up and down	充电 Charge	智能充电充满自停 Full of self stopping
电量 quantity of electricity	液晶显示 Liquid crystal display	爬楼 Climbing the stairs	可调速 Adjustable speed

2.5. Test Uncertainty

Conducted Emission Uncertainty = $\pm 3.6\text{dB}$

Radiated Emission Uncertainty = $\pm 5.2\text{dB}$

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

2.6. Test Conditions

Temperature: 22℃-28℃

Relative Humidity: 45%-68%

2.7.Performance criteria of immunity test

Functional requirement of wheelchair

- The automatic brakes shall not release.
- The electrically powered devices which are not used for driving (such servo-assisted leg supports and seating systems with stand-up functions) shall not move.
- For category A, B, C, D, E and F wheelchairs (wheelchairs with electronic speed control), the average wheel speed change, (ΔS_{avg}) calculated shall not exceed $\pm 20\%$.
- For category A and D wheelchairs (wheelchairs with electronic differential steering), the differential wheel speed change (ΔS_{diff}) shall not exceed $\pm 25\%$.
- For category B and E wheelchairs (wheelchairs with electronic servo steering), the maximum permissible change in steering servo position or steered wheel angle is that corresponding to a turning radius of 4 m.

Functional requirement of wheelchair with an on-board battery charger when charging. (5.3 of ISO 7176-21)

- The driven wheels shall not move.
- The automatic brakes shall not release.
- The electrically powered devices which are not used for driving (such servo-assisted leg supports and seating systems with stand-up functions) shall not move.
- The battery charger shall continue to operate in accordance with its specification without operator intervention.

Functional requirement of wheelchair with an off-board and carry-on battery charger when charging. (5.4 of ISO 7176-21)

- The battery charger shall continue to operate in accordance with its specification without operator intervention.

3.TEST INSTRUMENT USED

3.1.For Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Aglient	E4402B-ESA	US1192821	2025.03.06	1 Year
2.	EMI Test Receiver	ROHDE&SCHWARZ	ESPI	101206	2025.03.06	1Year
3.	L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2025.03.06	1Year
4.	L.I.S.N.	EMCO	3825/2	11977C	2025.03.06	1 Year

3.2.For Radiation Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Rohde&schwarz	FSEA20	DE25181	2025.03.06	1 Year
2.	Positioning Controller	C&C	CC-C-1F	N/A	2025.03.06	1 Year
3.	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-333	2025.03.06	1 Year
4.	Horn Antenna	Schwarzbeck	BBHX9120	9120-426	2025.03.06	1 Year
5.	RF Switch	EM	EMSW18	SW060023	2025.03.06	1 Year
6.	Amplifier	Agilent	8447F	3113A06717	2025.03.06	1 Year
7.	Coaxial Cable	Schwarzbeck	AK9513	9513-10	2025.03.06	1 Year
8.	EMI Test Receiver	Rohde&schwarz	ESPI	25498514	2025.03.06	1 Year

3.3.For Harmonic / Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Conditioning Unit	SCHAFFNER	CCN1000-1	23980/7	2025.03.06	1 Year
2.	Signal Phase Impedance Network	SCHAFFNER	INA2152	0929-2	2025.03.06	1 Year
3.	5KVA AC Power Source	SCHAFFNER	NSG1007	2983332	2025.03.06	1 Year

3.4.For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	Noiseken	ESS-200AX	0223	2025.03.07	1 Year

3.5.For Radio Frequency Electromagnetic Field

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2032	203002/100	2025.03.07	1 Year
2.	Amplifier	A&R	150W1000	301584	2025.03.07	1 Year
3.	Dual Directional Coupler	A&R	DC6080	301508	2025.03.07	1 Year
4.	Power Head	A&R	PH2000	301193	2025.03.07	1 Year
5.	Power Meter	A&R	PM2002	302799	2025.03.07	1 Year
6.	Field Monitor	A&R	FM5004	300329	2025.03.07	1 Year
7.	Field Probe	A&R	FP5000	300221	2025.03.07	1 Year

3.6.For Electrical Fast Transient/Burst Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2025.03.07	1 Year

3.7.For Surge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	HAEFELY	PSURGE4.1	080107-04	2025.03.07	1 Year

3.8.For Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2032	203002/100	2025.03.07	1 Year
2.	Amplifier	A&R	150W1000	301584	2025.03.07	NCR

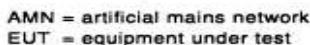
3.9.For magnetic field immunity test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Multifunctional Compact Immunity Test system	HEAFELY	CCS 600 No.: EE071	083732-18	2025.03.07	1 Year

3.10.For Voltage Dips and Interruptions Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	HEAFELY	PLINE 1610	083732-18	2025.03.07	1 Year

4.1. Block Diagram of Test Setup



Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	56 ~ 66*	46 ~ 56*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

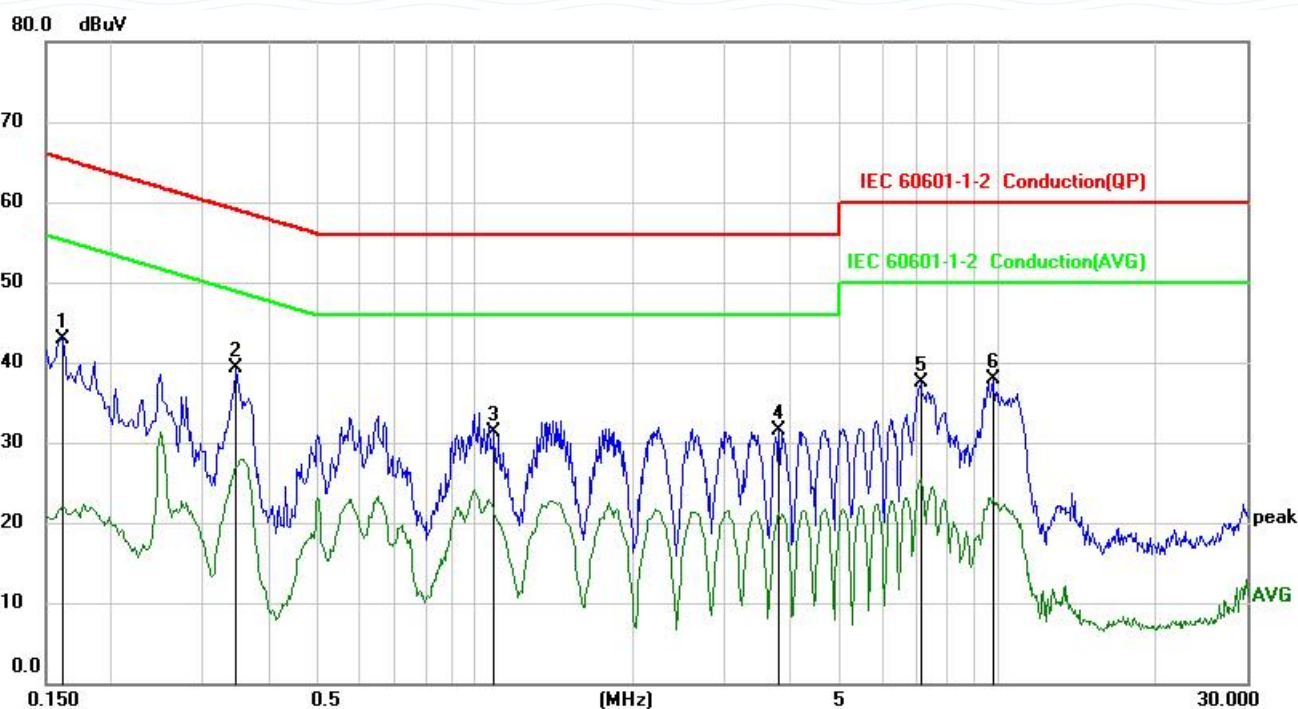
Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

Tested in accordance with 9.1.2 of ISO 7176-21, the battery charger shall meet the mains terminal disturbance limits specified in CISPR 11 for group 1, class B equipment. Support the charger test load as specified in CISPR 11 for floor-standing equipment. Perform the mains terminal disturbance test specified in CISPR 11 equipment. On the battery charger as table-top. The bandwidth of the test receiver (R&S Test Receiver ESPI) is set at 10kHz.

The frequency range from 150 kHz to 30 MHz is investigated. The scanning waveform are attached within Appendix I.

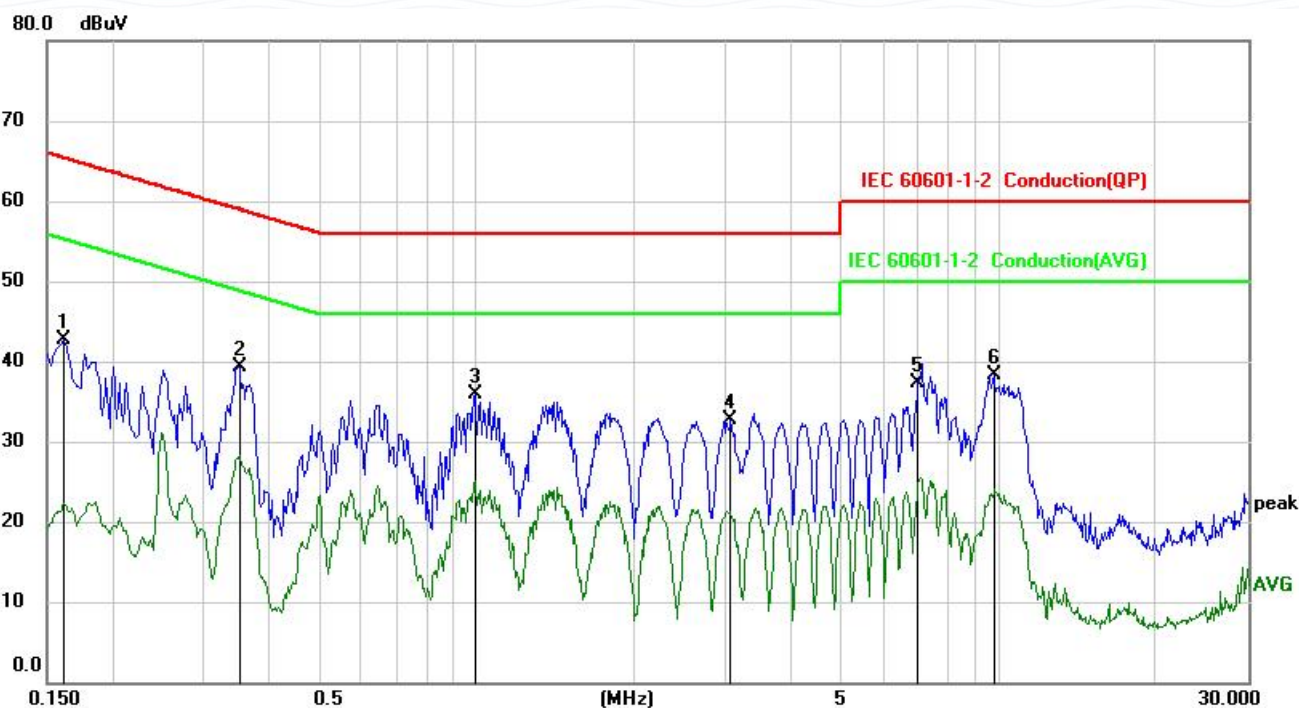
The test result is in conformance with the requirement

Job No.:		Polarization:	Neutral
Standard:	CISPR 11 IEC 60601-1-2	Power Source:	AC 230V~
Test item:	Conduct Emission Test	Temp.(°C)/Hum.(%RH):	24°C/53%RH
EUT:	Electric climbing wheelchair	Date:	2025-07-07
Model:	WD58-8	Distance:	
Note:	For charger		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1620	32.93	9.93	42.86	65.36	-22.50	peak	
2	*	0.3480	29.27	9.95	39.22	59.01	-19.79	peak	
3		1.0830	21.47	9.91	31.38	56.00	-24.62	peak	
4		3.8040	21.45	9.96	31.41	56.00	-24.59	peak	
5		7.1190	27.38	10.12	37.50	60.00	-22.50	peak	
6		9.7620	27.62	10.20	37.82	60.00	-22.18	peak	

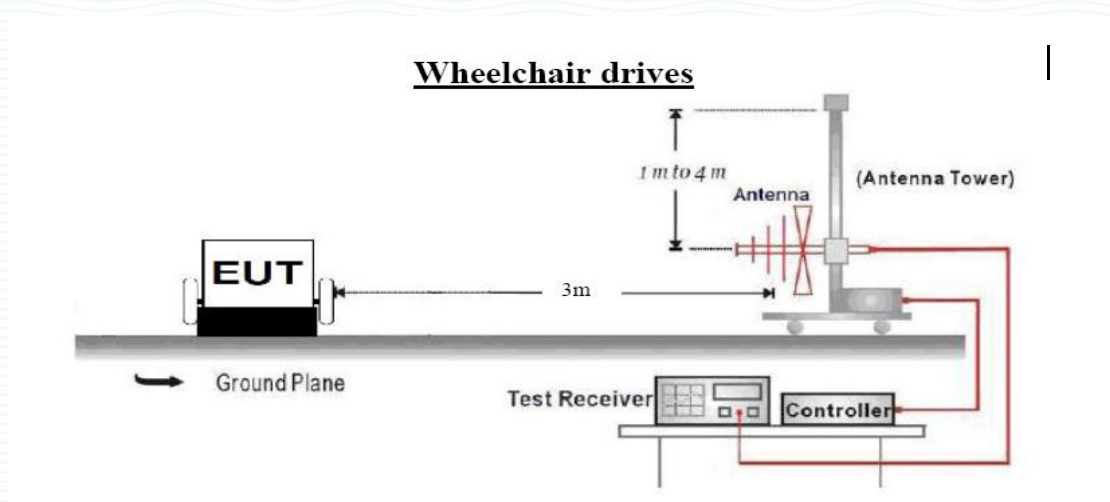
Job No.:		Polarization:	Line
Standard:	CISPR 11 IEC 60601-1-2	Power Source:	AC 230V~
Test item:	Conduct Emission Test	Temp.(°C)/Hum.(%RH):	24°C/53%RH
EUT:	Electric climbing wheelchair	Date:	2025-07-07
Model:	WD58-8	Distance:	
Note:	For charger		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1620	32.87	9.93	42.80	65.36	-22.56	peak	
2	*	0.3509	29.45	9.95	39.40	58.94	-19.54	peak	
3		0.9900	26.04	9.92	35.96	56.00	-20.04	peak	
4		3.0690	22.70	9.96	32.66	56.00	-23.34	peak	
5		7.0020	27.15	10.12	37.27	60.00	-22.73	peak	
6		9.7709	28.20	10.20	38.40	60.00	-21.60	peak	

5. Radiation Emission Test (Eut Battery Charger And Wheelchair)

5.1. Block Diagram of Test Setup



5.2. Radiation Emission Limit

All emanations from a Class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Notes: 1. The tighter limit shall apply at the edge between two frequency bands.

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

5.3. Description of the test

Tested in accordance with 9.2.1 of ISO 7176-21. The wheelchair shall meet the radiated emissions limits specified in CISPR 11 for group 1, class B equipment.

Perform the radiated emissions test specified in CISPR 11 on the battery charger as table-top equipment.

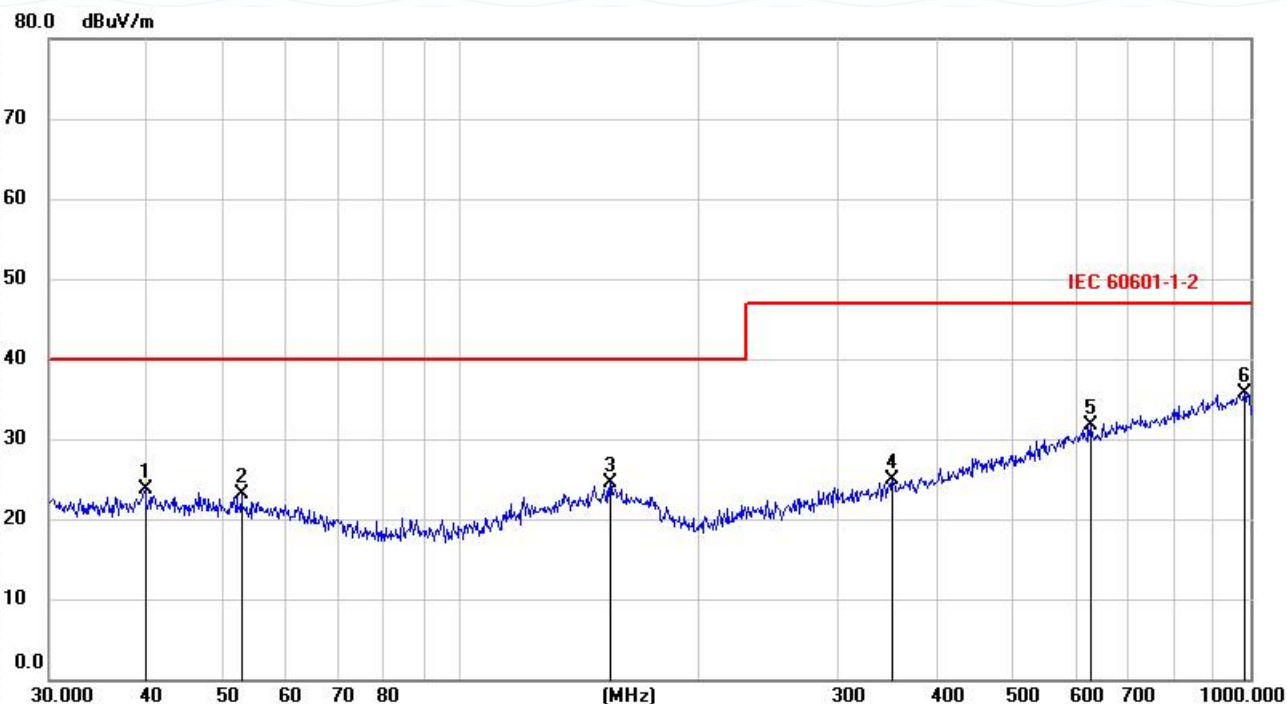
The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna(calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

5.4. Radiation Emission Test Results

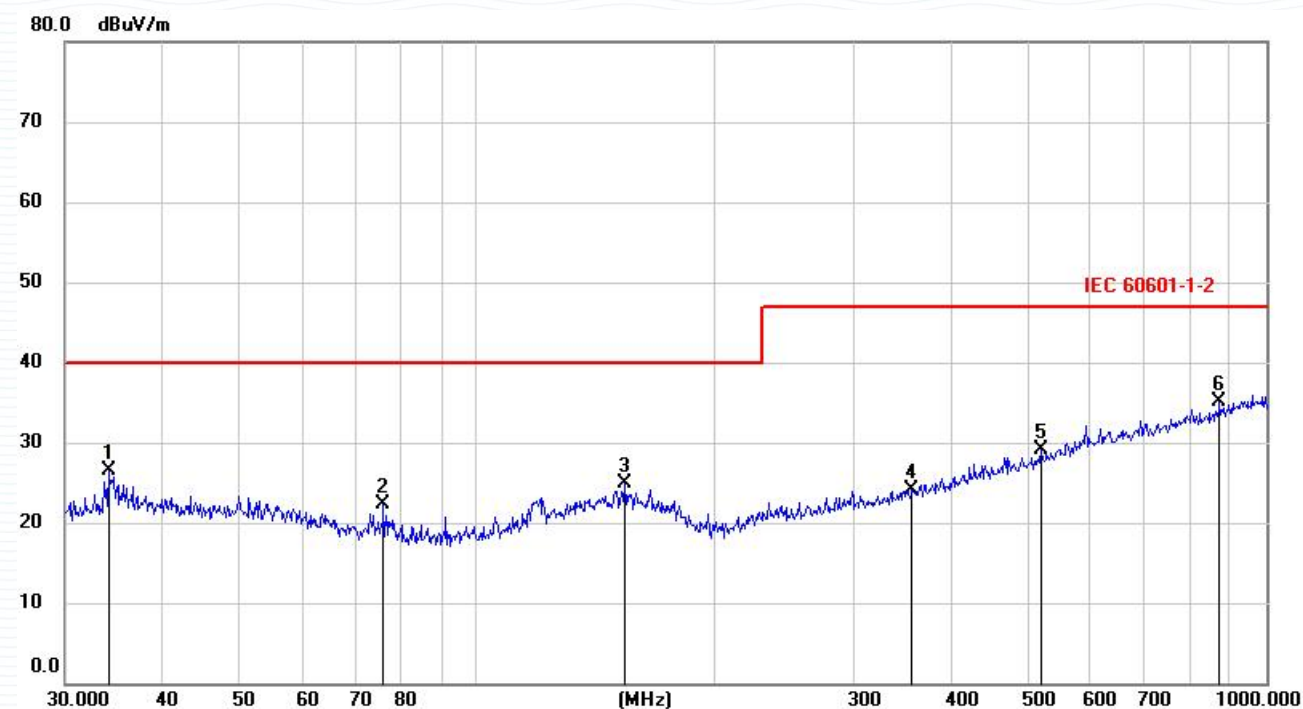
The test result is in conformance with the requirement.

Job No.:		Polarization:	Horizontal
Standard:	CISPR 11 IEC 60601-1-2	Power Source:	AC 230V~
Test item:	Radiation Emission Test	Date:	2025-07-07
Temp.(°C)/Hum.(%RH):	24°C/53%RH		
EUT:	Electric climbing wheelchair		
Model:	WD58-8	Distance:	3m
Note:	For charger		



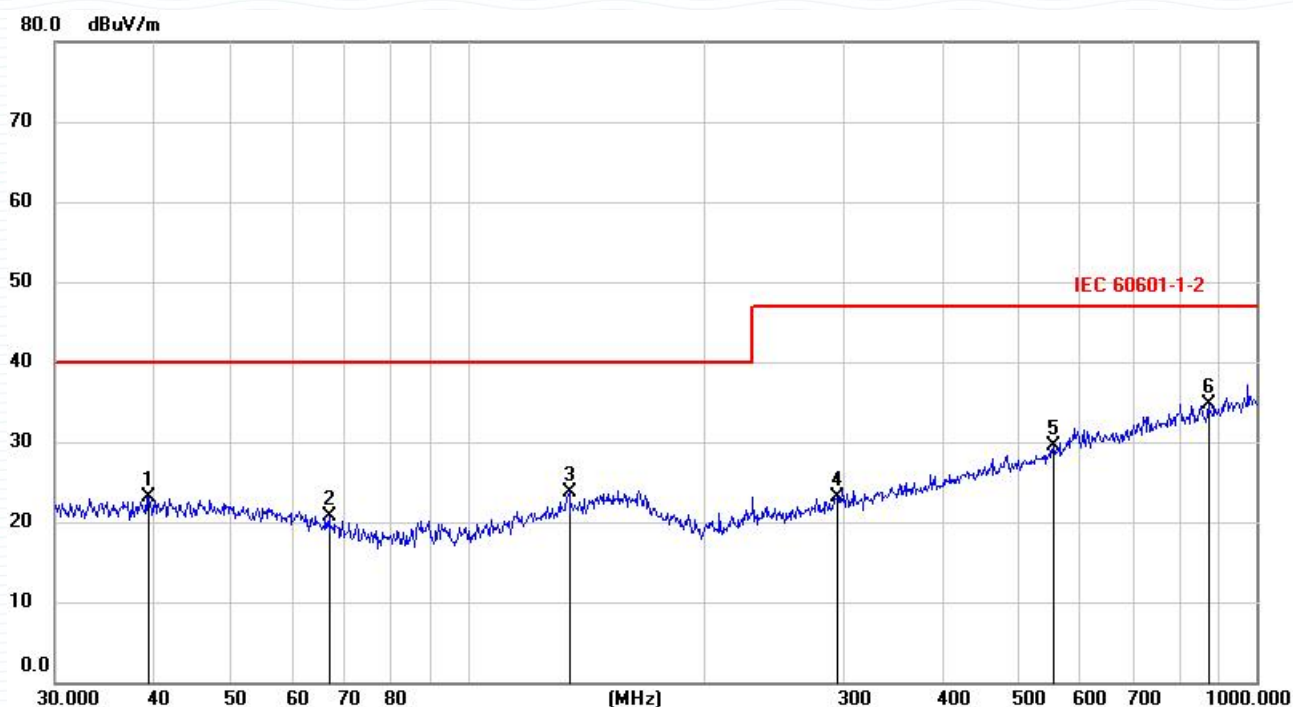
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		39.7612	9.23	14.47	23.70	40.00	-16.30	peak		
2		52.5876	9.37	13.79	23.16	40.00	-16.84	peak		
3		154.6216	9.38	15.05	24.43	40.00	-15.57	peak		
4		352.6959	9.55	15.28	24.83	47.00	-22.17	peak		
5		629.1830	10.79	20.83	31.62	47.00	-15.38	peak		
6	*	984.9198	10.94	24.71	35.65	47.00	-11.35	peak		

Job No.:		Polarization:	Vertical
Standard:	CISPR 11 IEC 60601-1-2	Power Source:	AC 230V~
Test item:	Radiation Emission Test	Date:	2025-07-07
Temp.(°C)/Hum.(%RH):	24°C/53%RH		
EUT:	Electric climbing wheelchair		
Model:	WD58-8	Distance:	3m
Note:	For charger		



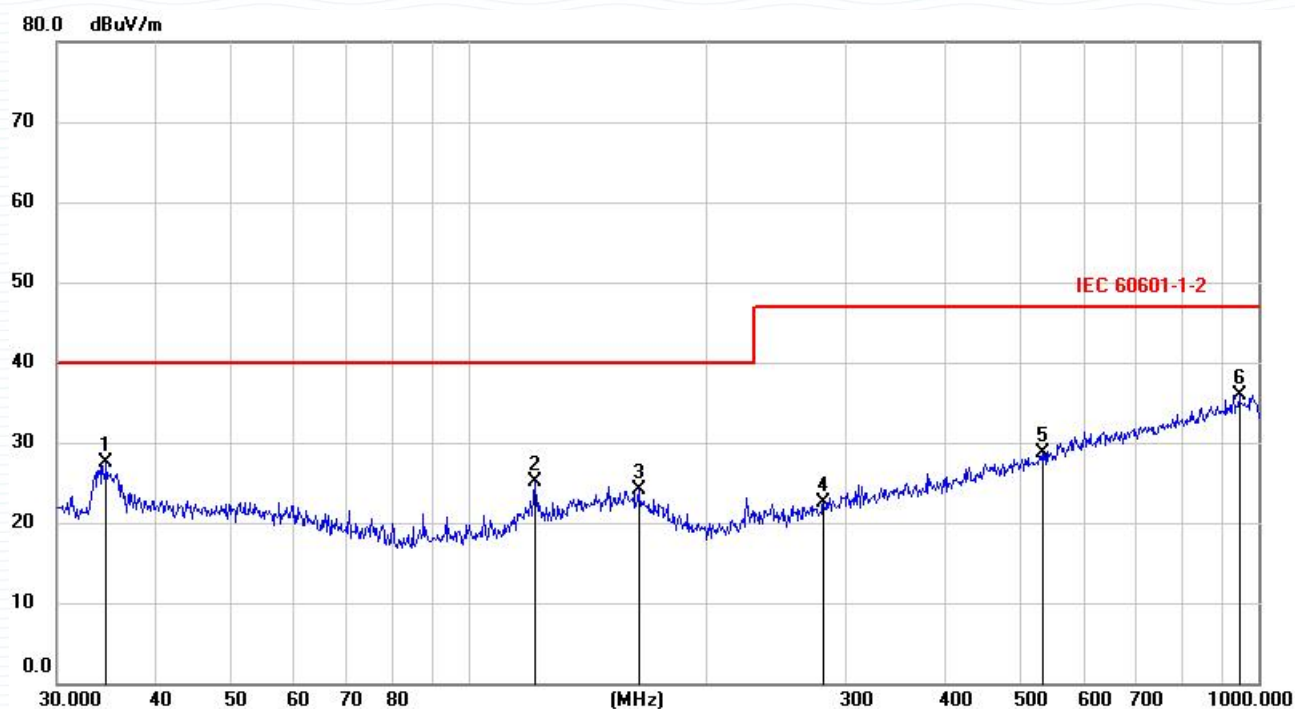
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		34.0484	12.73	13.70	26.43	40.00	-13.57	peak		
2		76.1552	11.84	10.45	22.29	40.00	-17.71	peak		
3		153.8464	9.77	15.05	24.82	40.00	-15.18	peak		
4		356.1759	8.77	15.35	24.12	47.00	-22.88	peak		
5		518.0951	10.64	18.55	29.19	47.00	-17.81	peak		
6	*	873.7137	11.48	23.70	35.18	47.00	-11.82	peak		

Job No.:		Polarization:	Horizontal
Standard:	CISPR 11 IEC 60601-1-2	Power Source:	DC24V
Test item:	Radiation Emission Test	Date:	2025-07-07
Temp.(°C)/Hum.(%RH):	24°C/53%RH		
EUT:	Electric climbing wheelchair		
Model:	WD58-8	Distance:	3m
Note:	Working		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		39.4925	8.61	14.46	23.07	40.00	-16.93	peak		
2		66.7871	8.83	11.86	20.69	40.00	-19.31	peak		
3		135.0160	9.78	13.95	23.73	40.00	-16.27	peak		
4		294.8365	9.13	13.99	23.12	47.00	-23.88	peak		
5		553.9182	10.29	19.26	29.55	47.00	-17.45	peak		
6	*	871.6736	11.05	23.68	34.73	47.00	-12.27	peak		

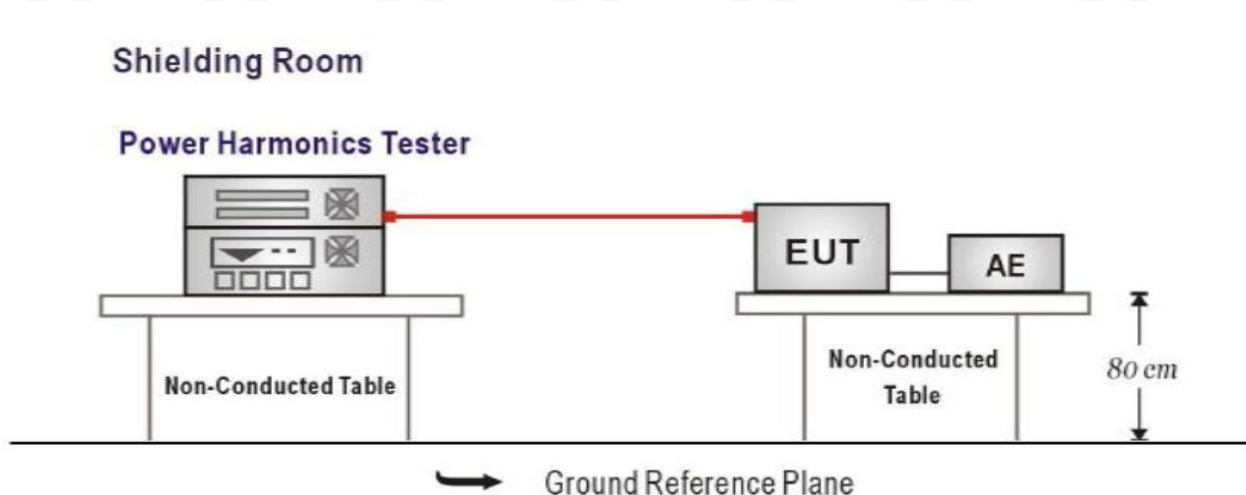
Job No.:		Polarization:	Vertical
Standard:	CISPR 11 IEC 60601-1-2	Power Source:	DC24V
Test item:	Radiation Emission Test	Date:	2025-07-07
Temp.(°C)/Hum.(%RH):	24°C/53%RH		
EUT:	Electric climbing wheelchair		
Model:	WD58-8	Distance:	3m
Note:	Working		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		34.7115	13.81	13.73	27.54	40.00	-12.46	peak		
2		121.1514	12.02	13.10	25.12	40.00	-14.88	peak		
3		163.9657	9.48	14.66	24.14	40.00	-15.86	peak		
4		281.1060	8.85	13.60	22.45	47.00	-24.55	peak		
5		533.3332	9.72	18.91	28.63	47.00	-18.37	peak		
6	*	947.7634	11.38	24.62	36.00	47.00	-11.00	peak		

6. Harmonic Current Emission Test (Eut Battery Charger)

6.1. Block Diagram of Test Setup



6.2. Test Standard

Basic Standard	Harmonic order n	Maximum permissible harmonic current A
IEC 61000-3-2	Odd harmonic	
	3	2.30
	5	1.14
	7	0.77
	9	0.40
	11	0.33
	13	0.21
	$15 \leq n \leq 39$	$0.15 \times 15/n$
	Even harmonic	
	2	1.08
	4	0.43
	6	0.30
	$8 \leq n \leq 40$	$0.23 \times 8/n$

6.3. Description of the test

1. Tested in accordance with 9.3.2 of ISO 7176-21, the battery charger shall meet the requirements of IEC 61000-3-2.
2. Fully charge the battery set of the charger test load and then discharge the battery set at its 5 h rate, $15 \pm 5\%$, for (60 ± 5) min.
Perform the harmonic current emissions test on the battery charger as specified in IEC 61000-3-2.

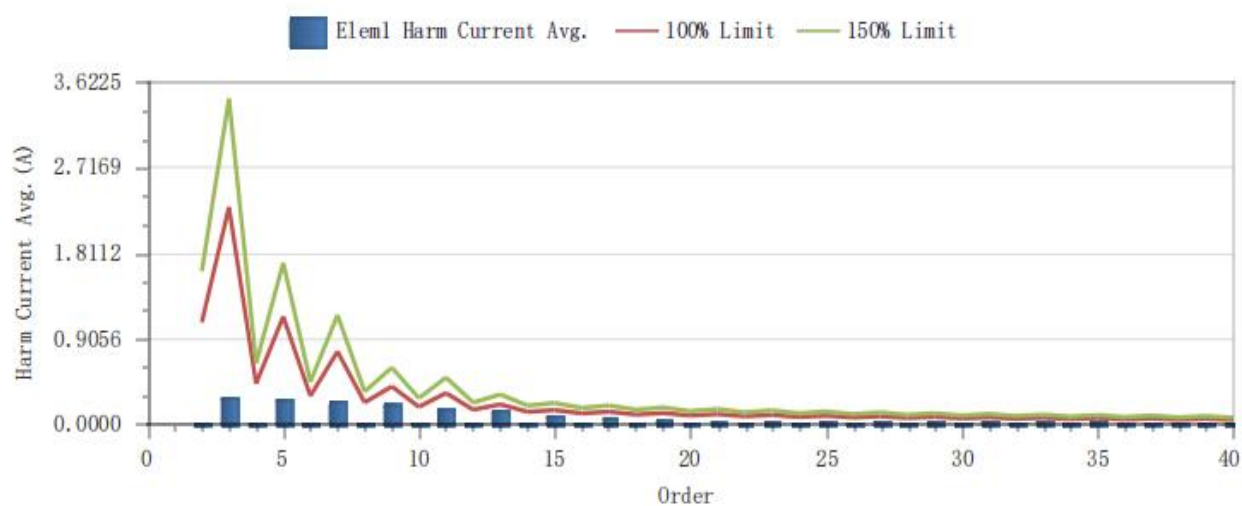
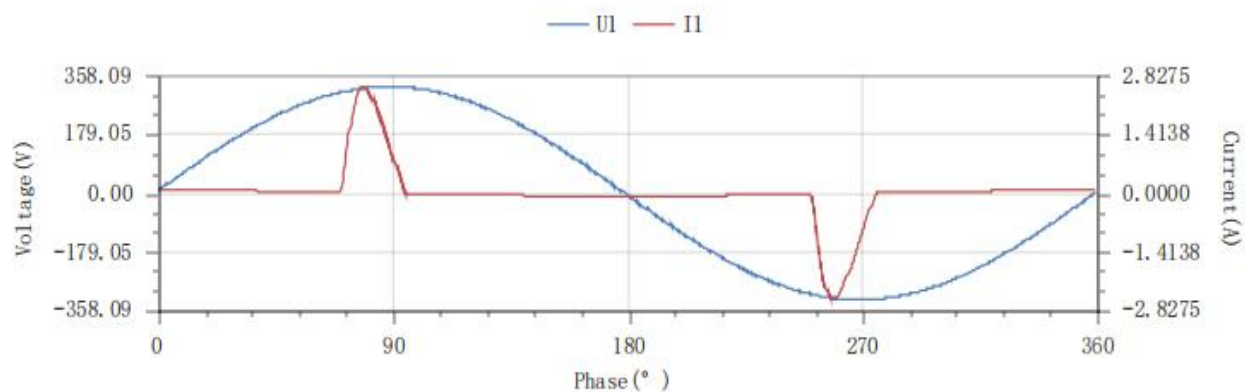
6.4. Test Results

The test result is in conformance with the requirement.

Comments :

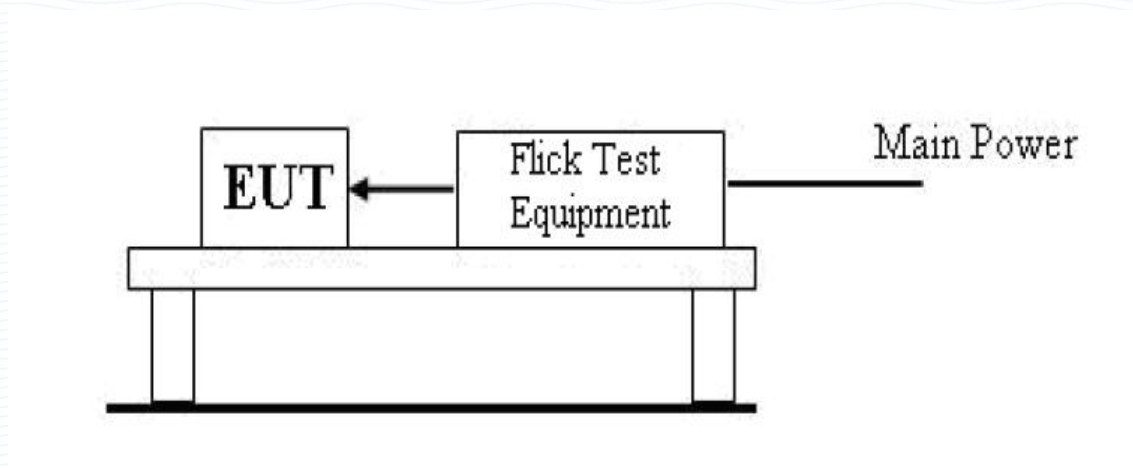
Customer :

Result : Pass



7.Voltage Fluctuations & Flicker Test (Eut Battery Charger)

7.1.Block Diagram of Test Setup



7.2.Test Standard

Basic Standard	Test Item	Limit	Note
IEC 61000-3-3	P_{ST}	1.0	P_{ST} means short-term flicker
	P_{IT}	0.65	P_{IT} means long-term flicker
	$d(t)$	500ms	$d(t)$ means maximum time exceed 3.3%
	$d_C(\%)$	3.3%	$d_C(\%)$ means relative steady state voltage change
	$d_{max}(\%)$	4%	$d_{max}(\%)$ mean maximum relative voltage change

7.3.Description of the test

1. Tested in accordance with 9.4.2, the battery charger shall meet the requirements of IEC 61000-3-3.
2. Perform the voltage fluctuations and flicker test on the battery charger as specified in IEC 61000-3-3.

7.4.Test Results

The test result is in conformance with the requirement.

Power Analyzer: Voltech PM6000 SN: 200006700495 Firmware Version: v1.22.07RC6

Channel(s):

1. SN: 090015501951, 28 Adjusted Date: 16 APR 2013. 2. SN:None Adjusted Date:None

3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None

5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None

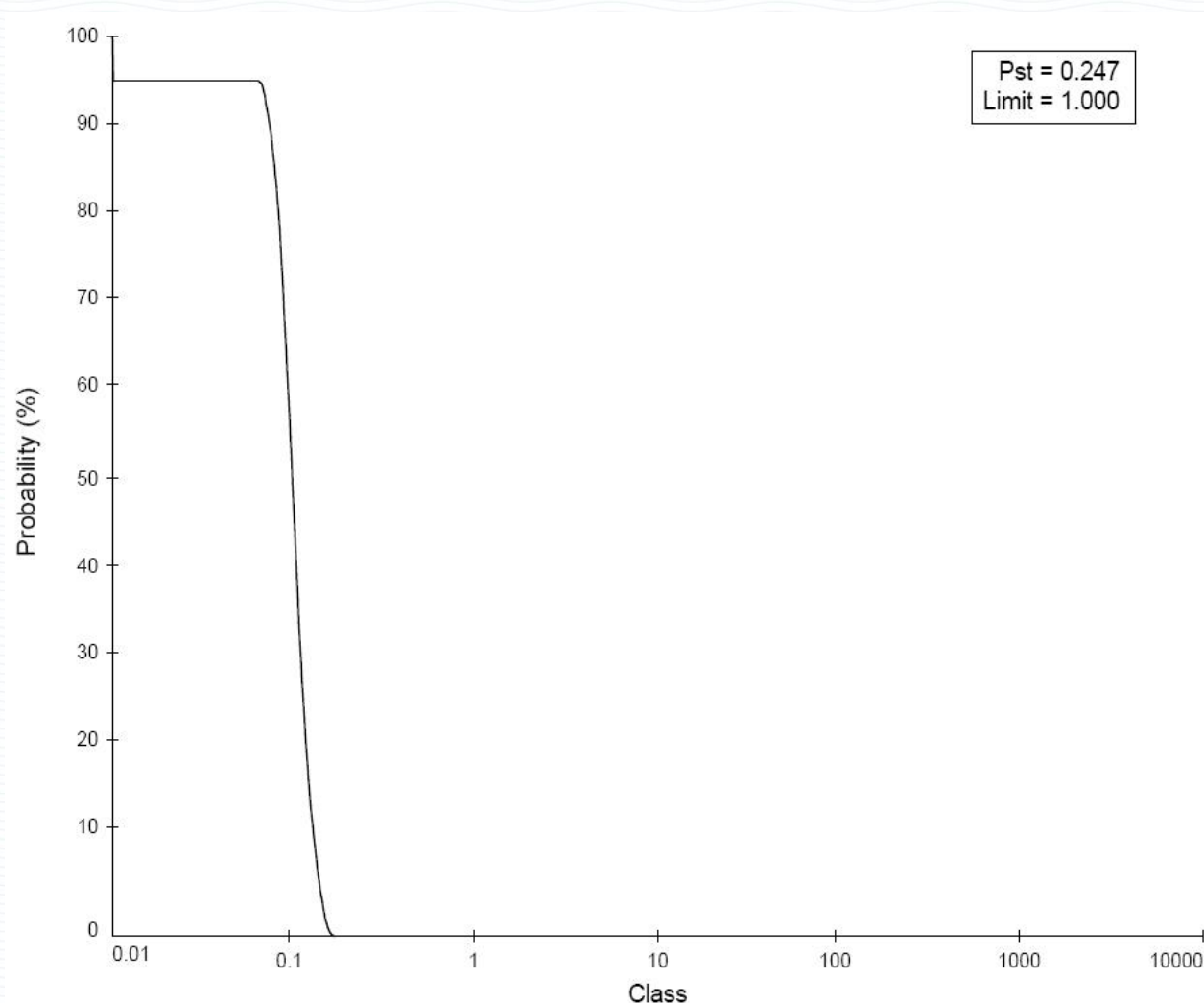
Shunt(s):

1. SN: 091024301771, 4 Adjusted Date: 16 APR 2013. 2. SN:None Adjusted Date:None

3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None

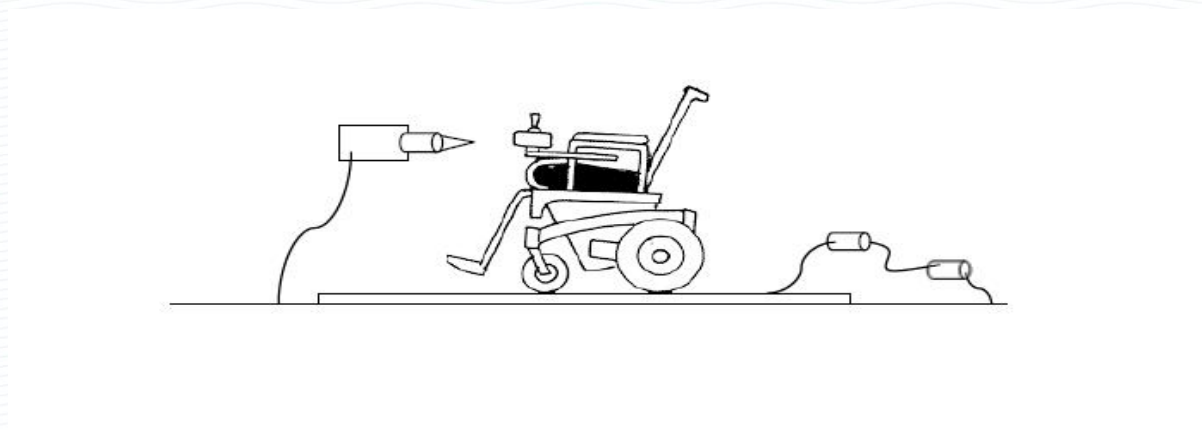
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None

AC Source: Mains / Manual Source



8. Electrostatic Discharge Test (Eut Wheelchair)

8.1. Block Diagram of Test Setup



8.2. Test specification

Basic Standard	Test Item	Test Port	Test Specification
IEC 61000-4-2	Test Specification	Human Body Mode	±6KV Contact ,VCP ±8KV Air Discharge
IEC 61000-4-2		Charged Frame	±8KV Charge Voltage

8.3. Description of the test

1. Tested in accordance with 10.1.1 of ISO 7176-21.
2. Human body model

Test the wheelchair as specified in IEC 61000-4-2 for floor-standing equipment, with exceptions as follows: perform indirect discharge testing only using the vertical coupling plane (VCP); do not use the horizontal coupling plane. Place the support system on the ground plane.

3. Charged frame

Use a ground reference plane as specified in IEC 61000-4-2 for testing floor-standing equipment. Prepare the wheelchair. Place the support system on the ground plane. Connect one end of the discharge ground strap and the discharge return cable of the ESD generator ground strap to the ground plane with low impedance bonds. Establish one test point at each location around the perimeter of the wheelchair that may come into contact with grounded metal structures during normal operation. Set up the test generator for air discharges.

Place the discharge tip of the ESD generator in direct electrical contact with that part of the wheelchair frame that is closest to the test point. Charge the frame to the test level using the ESD generator. Keeping the tip of the ESD generator in place, make a discharge by moving the discharge strap to the test point as quickly as practicable.

Make ten discharges of each polarity (positive and negative) to each test point.

8.4. Test Results

The test result is in conformance with the requirement.

Electrostatic Discharge Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-07-10

Applicant	: Suzhou Jiujiuba Medical Equipment Co., Ltd	Test Date	: 2025-07-10
EUT	: Electric climbing wheelchair	Temperature	: 24℃
M/N	: WD58-8	Humidity	: 51%
Test Voltage	: DC24V	Test Mode	: ON
Test Engineer : Jack			
Air Discharge: $\pm 2\text{Kv} \pm 4\text{Kv} \pm 6\text{Kv}$ For each point positive 10 times and negative 10 times discharge.			
Contact Discharge: $\pm 2\text{Kv} \pm 4\text{Kv} \pm 8\text{Kv}$			
Location		Kind	Result
		1 Air Discharge C-Contact Discharge	
Cable	1 points	A	PASS
Connector cover	1 points	A	PASS
Switch lever	1 points	A	PASS
Switch button	1 points	A	PASS
Indicator	1 points	A	PASS
Control knob	1 points	A	PASS
Battery charger case	6 points	A	PASS
HCP	5 points	A	PASS
VCP	5 points	A	PASS

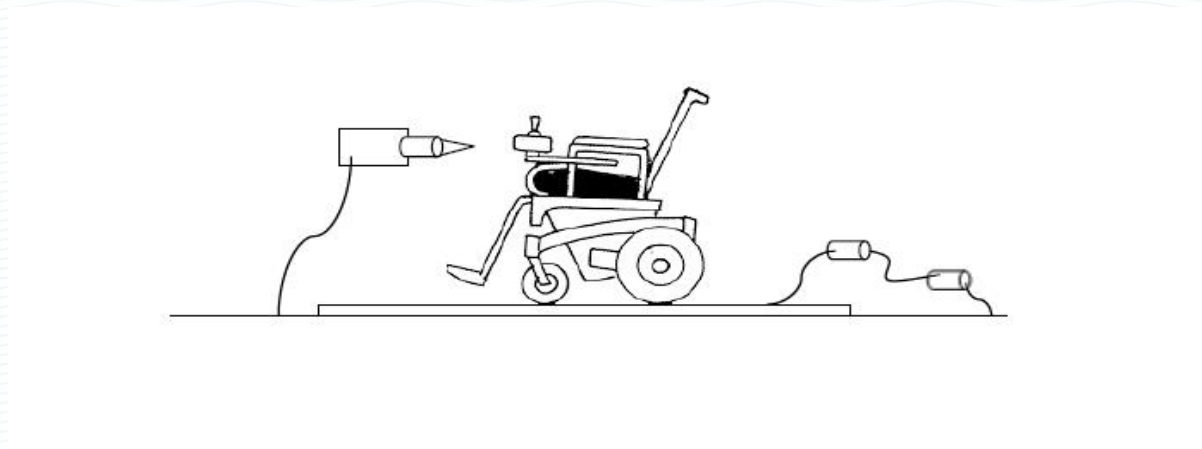
Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

Reviewer:

Austin Zhang

9. Electrostatic Discharge Test (Eut Battery Charger)

9.1. Block Diagram of Test Setup



9.2. Test specification

Basic Standard	Test Item	Test Specification
IEC 61000-4-2	Battery charger	±6KV Contact ,VCP ±8KV Air Discharge

9.3. Description of the test

1. Testing the battery charger in accordance with 10.1.3 of ISO 7176-21, using test levels of ± 2 kV, ± 4 kV and ± 6 kV for contact discharges and test levels of ± 2 kV, ± 4 kV and ± 8 kV for air discharges, during each discharge and for 2 s following each discharge or set of discharges, the battery charger shall continue to operate in accordance with its specification without operator intervention.
2. Prepare the battery charger as specified in 7.4. of ISO 7176-21. Support the charger test load as specified in IEC 61000-4-2 for floor-standing equipment.
3. Test the battery charger as specified in IEC 61000-4-2 for table-top equipment.
4. Establish test points at the following locations:
 - a) one test point on each cable, connector housing, switch lever or button, control, knob and indicator;
 - b) one test point on each face if the enclosure of the battery charger is approximately cubical;
 - c) one test point on each surface that would most closely approximate that of a cubical enclosure of similar size, to a maximum of six points if the enclosure of the battery charger is non-cubical.
4. Apply ten discharges of each polarity (positive and negative) at each applicable test level to each test point. Apply contact discharges and/or air discharges in accordance with the guidance given in IEC 61000-4-2.

9.4. Test Results

The test result is in conformance with the requirement.

Electrostatic Discharge Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-07-10

Applicant	: Suzhou Jiujiuba Medical Equipment Co., Ltd	Test Date	: 2025-07-10
EUT	: Battery Charger	Temperature	: 24°C
M/N	: ZB2402ML	Humidity	: 51%
Test Voltage	: AC 230V/50Hz	Test Mode	: ON
Test Engineer : Jack			
Air Discharge: $\pm 2\text{KV} \pm 4\text{KV} \pm 6\text{KV}$ For each point positive 10 times and negative 10 times discharge.			
Contact Discharge: $\pm 2\text{KV} \pm 4\text{KV} \pm 8\text{KV}$			
Location		Kind Air Discharge C-Contact Discharge	Result
Cable	1 points	A	PASS
Battery charger case	6 points	A	PASS
Connector housing	1 points	A	PASS
Light	1 points	A	PASS
Seams	1 points	A	PASS
H/VCP(Battery Charger)	1 points	A	PASS
H/VCP(Four Sides)	1 points	A	PASS

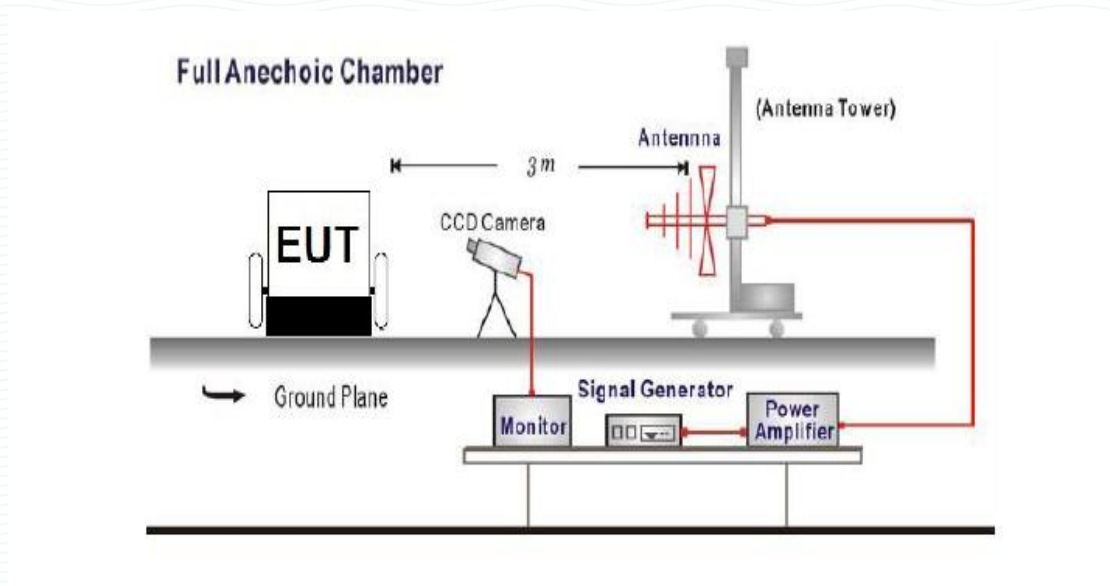
Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

Reviewer:

Bustin Zhang

10. Rf Field Strength Susceptibility Test (Eut Wheelchair Drives)

10.1. Block Diagram of Test Setup



10.2. Test specification

Basic Standard	Test Specification	Units
IEC61000-4-3	80-2700	MHz
	10	V/m
	80	(Unmodulated,rms)
		% AM (1kHz)

Performance criterion : A

10.3. Description of the test

1. Tested in accordance with 10.2.1.2 Anechoic or semi-anechoic chamber test method of ISO 7176-21.
2. Perform the radiated R.F. field immunity test specified in IEC 61000-4-3 on the wheelchair as table-top equipment. Ensure that each frequency step does not exceed 1 % of the current frequency.
3. Monitor the output of the power amplifier to ensure that it is not saturating. Maintain the output at the required level for at least 2 s. Measure the wheel speed and the servo steering angle. The 2 s dwell time while the R.F. field is still applied
4. Use an anechoic or semi-anechoic chamber as specified in IEC 61000-4-3. Orient the wheelchair so that:
 - a) the forward direction of travel is toward the antenna;
 - b) the rearward direction of travel is toward the antenna;
 - c) the forward direction of travel is perpendicular to the axis of the antenna, with the antenna facing the side of the wheelchair on which the control device is located or in the case that the control device is centrally located, the side of the wheelchair where most of the electronic control units are located or most of the cables are routed.Position the wheelchair so that the appropriate vertical plane closest to the antenna coincides with the uniform field area (UFA). For each orientation of the wheelchair, carry out the test with both horizontal and vertical polarization.

10.4. Test Results

The test result is in conformance with the requirement.

RF Field Strength Susceptibility Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-06-17

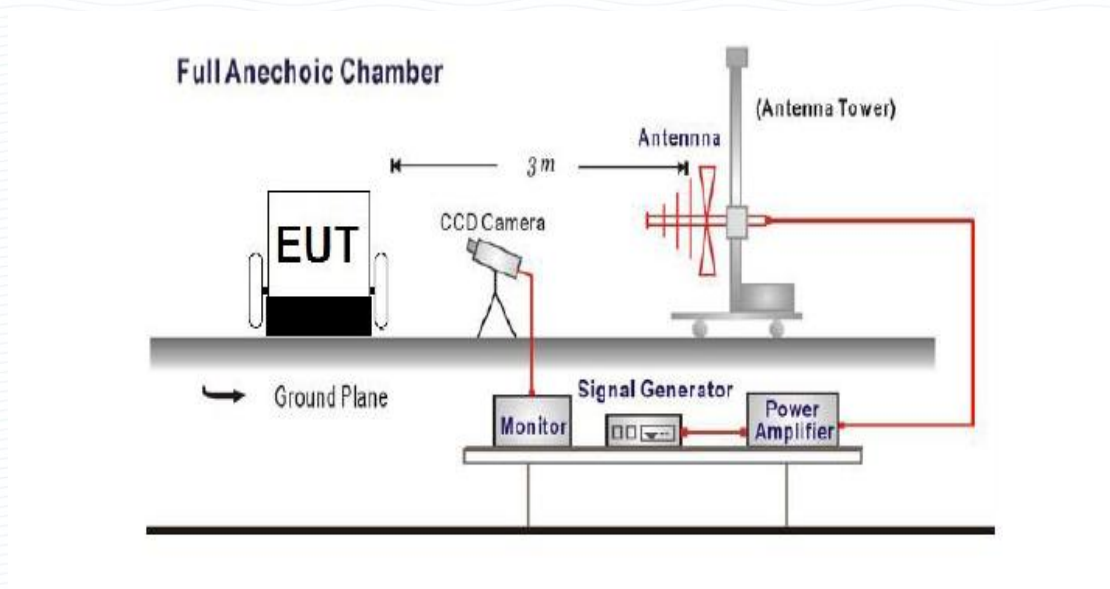
Applicant	: Suzhou Jiujiuba Medical Equipment Co., Ltd	Test Date	: 2025-06-17
EUT	: Electric climbing wheelchair	Temperature	: 24°C
M/N	: WD58-8	Humidity	: 53%
Test Voltage	: DC24V	Test Mode	: ON
Test Engineer	: Jack	Frequency Range	: --
Modulation:	☒ AM ☐ Pulse ☐ none	1 kHz	80%
Criterion	: A		
	Frequency Range: 80 MHz~2.7 GHz		
Steps	1%	1%	
	Horizontal	Vertical	
Front	Pass	Pass	
Right	Pass	Pass	
Rear	Pass	Pass	
Left	Pass	Pass	

Reviewer :

Austin Zhang

11.Rf Field Strength Susceptibility Test (Eut Battery Charger)

11.1. Block Diagram of Test Setup



11.2. Test specification

Basic Standard	Phenomena	Test Specification	Units
IEC61000-4-3	Radio-Frequency	80-1000	MHz
	Electromagnetic	3	V/m
	Field.	80	(Unmodulated,rms)
	Amplitude Modulated.		% AM (1kHz)

Performance criterion : A

11.3. Description of the test

1. Testing the battery charger in accordance with 10.2.3 of ISO 7176-21, using a test level of 3 V/m from 80 MHz to 1 GHz, the battery charger shall continue to operate in accordance with its specification without operator intervention.
2. Support the charger test load as specified in IEC 61000-4-3 for floor-standing equipment.
2. Perform the radiated R.F. field immunity test specified in IEC 61000-4-3 on the battery charger as table-top equipment.
3. Where the frequency is increased in a continuous sweep, the rate of increase shall not be greater than 1 % per 500 ms.
4. Where the frequency is increased in steps, ensure that each frequency step does not exceed 1 % of the current frequency and that the dwell time at each frequency is not less than 500 ms.
5. Carry out the test with the antenna facing each side of the battery charger, using both horizontal and vertical polarization.

11.4. Test Results

The test result is in conformance with the requirement.

RF Field Strength Susceptibility Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-06-17

Applicant	: Suzhou Jiujiuba Medical Equipment Co., Ltd	Test Date	: 2025-06-17
EUT	: Battery Charger	Temperature	: 24°C
M/N	: ZB2402ML	Humidity	: 53%
Test Voltage	: AC 230V/50Hz	Test Mode	: ON
Test Engineer	: Jack	Frequency Range	: --
Modulation: ☒ AM ☐ Pulse ☐ none 1 kHz 80%			
Criterion : A			
		Frequency Range: 80-1000 MHz	
Steps	1%	1%	
	Horizontal	Vertical	
Front	Pass	Pass	
Right	Pass	Pass	
Rear	Pass	Pass	
Left	Pass	Pass	

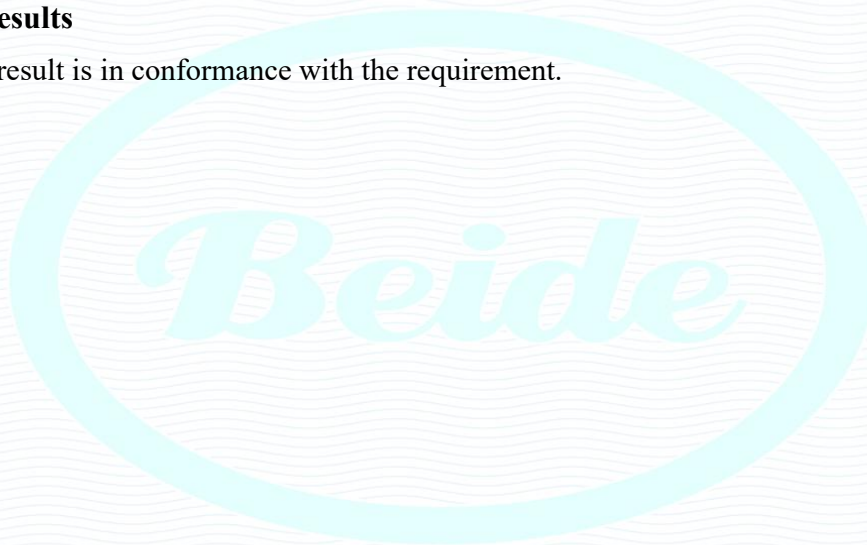
Reviewer : Austin Zhang

12.3. Description of the test

1. Testing the battery charger in accordance with 10.3.2 of ISO 7176-21, using test level 2 specified in IEC 61000-4-4, the battery charger shall continue to operate in accordance with its specification without operator intervention.
2. Perform the laboratory type test specified in IEC 61000-4-4 on the a.c. mains port of the battery charger a stable-top equipment, with the following provisions:
 - support the charger test load as specified in IEC 61000-4-4 for floor-standing equipment;
 - use a repetition rate of 100 kHz;
 - use both polarities of test voltage;Test for not less than 1 min and not more than 2 min for each polarity of test voltage.

12.4. Test Results

The test result is in conformance with the requirement.



Electrical Fast Transient/Burst Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-07-10

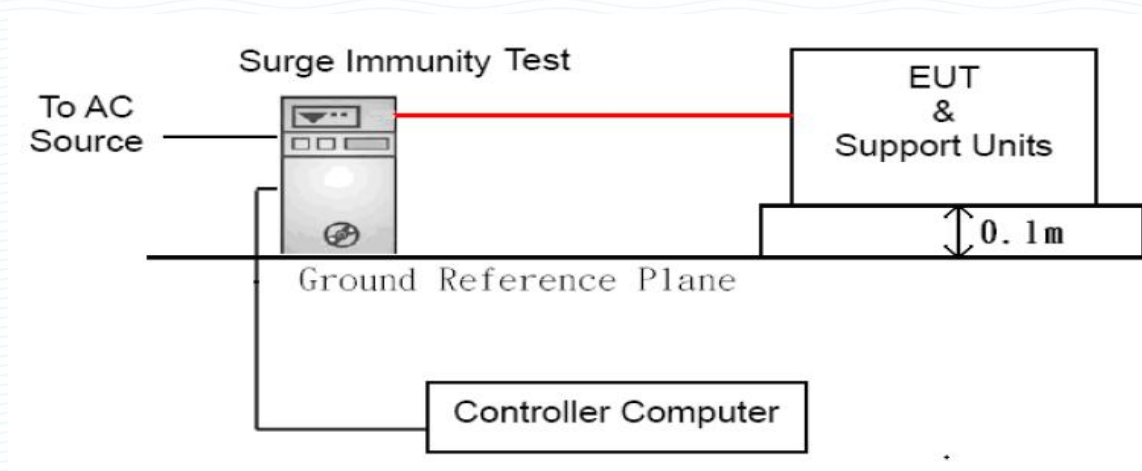
Applicant	: Suzhou Jiujiuba Medical Equipment Co., Ltd	Test Date	: 2025-07-10						
EUT	: Battery charger	Temperature	: 24℃						
M/N	: ZB2402ML	Humidity	: 53%						
Test Voltage	: AC 230V/50Hz	Test Mode	: ON						
Test Engineer : Jack									
Inject Place : AC Mains									
Inject Line	Voltage kV	Inject Time(s)	Inject Method	Results	Inject Line	Voltage kV	Inject Time(s)	Inject Method	Results
Inject Line	Voltage kV	Inject Time(s)	Inject Method	Results	Inject Line	Voltage kV	Inject Time(s)	Inject Method	Results
L1	±1	120	Direct	PASS					
N	±1	120	Direct	PASS					
L1+N	±2	120	Direct	PASS					

Reviewer:

Bustin Zhong

13. Surge Test (Eut Battery Charger)

13.1. Block Diagram of Test Setup



13.2. Test specification

Basic Standard	Test Port	Test Specification	Units
IEC 61000-4-5		1.2/50(8/20)	Tr/Td μ s
	Line to Earth	± 2	kV
	Line to Line	± 1	kV

Performance criterion : **B**

13.3. Description of the test

1. Testing the battery charger in accordance with 10.4.2 of ISO 7176-21, using test level 2 specified in IEC 61000-4-5, the battery charger shall continue to operate in accordance with its specification without operator intervention.
2. Perform the surge immunity test specified in IEC 61000-4-5 on the a.c. mains port of the battery charger, with the following provisions:
 apply five positive and five negative pulses each at 0°, 90°, 180° and 270°;
 apply successive pulses at periods of 60 s or less.

13.4. Test Results

The test result is in conformance with the requirement.

Surge Immunity Test Results

Beide (Shenzhen) Product Service Limited.

Date: 2025-07-10

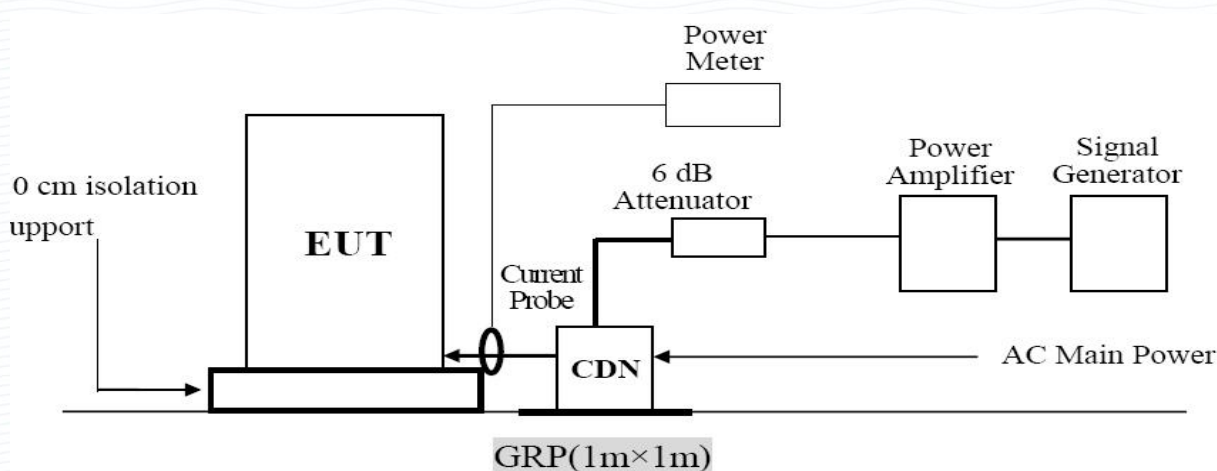
Applicant : <u>Suzhou Jiujiuba Medical Equipment Co., Ltd</u> EUT : <u>Battery charger</u> M/N : <u>ZB2402ML</u> Test Voltage : <u>AC230V/50Hz</u>				Test Date : <u>2025-07-10</u> Temperature : <u>24°C</u> Humidity : <u>53%</u> Test Mode : <u>ON</u>	
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (kV) EN 61000-4-5	Result
L1-N	+	0	5	1	Pass
	+	90	5	1	Pass
	+	180	5	1	Pass
	+	270	5	1	Pass
	-	0	5	1	Pass
	-	90	5	1	Pass
	-	180	5	1	Pass
	-	270	5	1	Pass
Remark:					

Reviewer:

Austin Zhang

14. Injected Currents Susceptibility Test (Eut Battery Charger)

14.1. Block Diagram of Test Setup



14.2. Test specification

Basic Standard	Phenomena	Test Specification	Units
IEC 61000-4-6	Radio-Frequency	0.15-80	MHz
	Common Mode	6	V(rms)
	Amplitude	80	(Unmodulated,rms)
	Modulated.	150	% AM (1kHz) Source Impedance Ω

Performance criterion: A

14.3. Description of the test

1. Testing the battery charger in accordance with 10.5.2 of ISO 7176-21, using test level 2 specified in IEC 61000-4-6, from 150 kHz to 80 MHz, the battery charger shall continue to operate in accordance with its specification without operator intervention.
2. Perform the conducted disturbance immunity test specified in IEC 61000-4-6 on the a.c. mains port of the battery charger as table-top equipment. Ensure the dwell time at each frequency is not less than 2 s.

14.4. Test Results

The test result is in conformance with the requirement.

Injected Currents Susceptibility Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-07-10

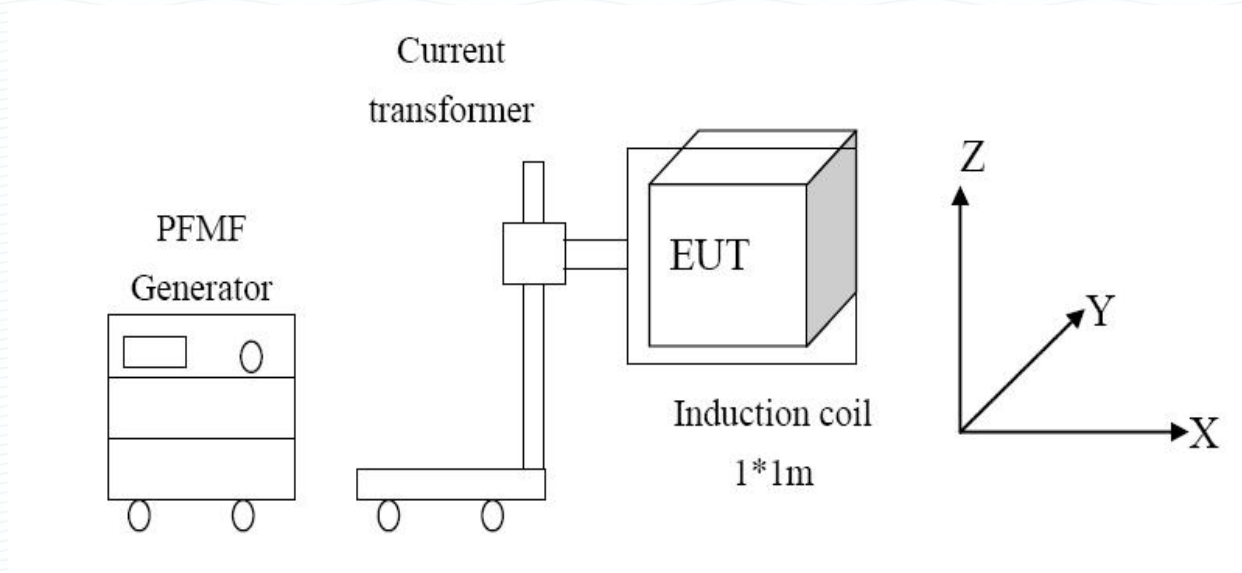
Applicant : <u>Suzhou Jiujiuba Medical Equipment Co., Ltd</u>		Test Date : <u>2025-07-10</u>		
EUT : <u>Battery charger</u>		Temperature : <u>24°C</u>		
M/N : <u>ZB2402ML</u>		Humidity : <u>53%</u>		
Test Voltage : <u>AC230V/50Hz</u>		Test Mode : <u>ON</u>		
Test Engineer : <u>Jack</u>				
Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 ~ 80	AC Mains	6V(rms), Unmodulated	A	PASS
Remark : 1. Modulation Signal:1kHz 80% AM 2. Dwell Time: 1sec 3.step:1%		Note:		

Reviewer:

Austin Zhong

15. Magnetic Field Immunity Test (Eut Wheelchair Drives)

15.1. Block Diagram of Test Setup



15.2. Test specification

Frequency	Magnetic Field Strength	Basic Standard
50/60Hz	30A/m	IEC 61000-4-8

Performance criterion: A

15.3. Description of the test

1. The wheelchair is tested in accordance with 10.6 of ISO 7176-21, using test level 4 specified in IEC 61000-4-8.
2. Perform the continuous field immunity test specified in IEC 61000-4-8 on the wheelchair as table-top equipment. Test the wheelchair for not less than 1 min for each orientation of the applied field.

15.4. Test Results

The test result is in conformance with the requirement.

Magnetic Field Immunity Test Results

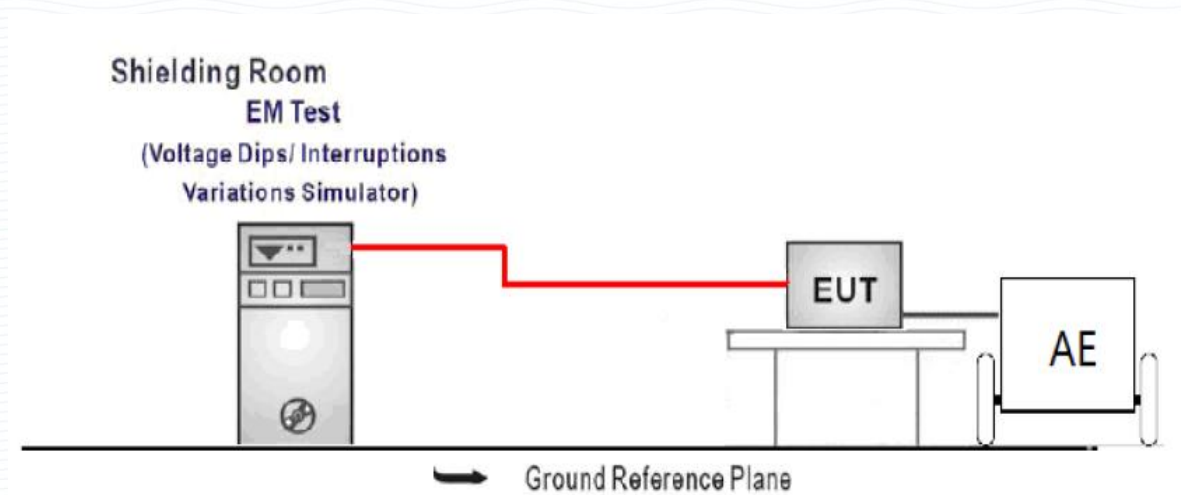
Beide (Shenzhen) Product Service Limited

Date: 2025-07-10

Applicant : <u>Suzhou Jiujuba Medical Equipment Co., Ltd</u> EUT : <u>Electric climbing wheelchair</u> M/N : <u>WD58-8</u> Test Mode: <u>ON</u> Test Voltage: <u>DC24V</u>			Test Date : <u>2025-07-10</u> Temperature : <u>24°C</u> Humidity : <u>49%</u> Test Engineer : <u>Jack</u>	
Test Level	Testing Duration	Coil Orientation	Criterion	Result
30A/m	2 mins	X	A	PASS
30A/m	2 mins	Y	A	PASS
30A/m	2 mins	Z	A	PASS
Remark:			Test Equipment : Magnetic Field Tester EM TEST	

16. Voltage Dips And Interruptions Test (Eut Battery Charger)

16.1. Block Diagram of Test Setup



16.2. Test specification

Basic Standard	Test Level in % of rated voltage	Test Duration cycle / ms
IEC 61000-4-11	0	0.5/10
	0	1/20
	70	25/500
	0	250/5000

Performance criterion : A&B

16.3. Description of the test

1. During and following testing in accordance with 10.7.2 of ISO 7176-21, using the Class 2 test level specified in IEC 61000-4-11, the battery charger may exhibit a temporary loss of function or degradation of performance, but it shall cease when the disturbance ceases, and the charger shall recover its normal performance without operator intervention.
2. Perform the voltage dips and short interruption tests specified in IEC 61000-4-11 on the a.c. mains port of the battery charger.

16.4. Test Results

The test result is in conformance with the requirement.

Voltage Dips And Interruptions Test Results

Beide (Shenzhen) Product Service Limited

Date: 2025-07-10

Applicant : <u>Suzhou Jiujiuba Medical Equipment Co., Ltd</u> EUT : <u>Batter charger</u> M/N : <u>ZB2402ML</u> Power Supply: <u>AC230V/50Hz</u>			Test Date : <u>2025-07-10</u> Temperature : <u>24°C</u> Humidity : <u>53%</u>			
☒ Single Test Voltage			☐ Dual Test Voltage			
Test Model: ON						
Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in period)	Phase Angle	Criterion	Result	PASS
0	100	0.5P	0-360	B	B	Pass
0	100	1P	0-360	B	B	Pass
70	30	25P	0-360	B	B	Pass
0	100	250P	0-360	B	B	Pass
Remark: U _T is the rated voltage for the equipment.						

Reviewer:

Austin Zhang

APPENDIX II (EUT Photos)

Figure 1
CONDUCTED EMISSION TEST



Figure 2
RADIATION EMISSION TEST

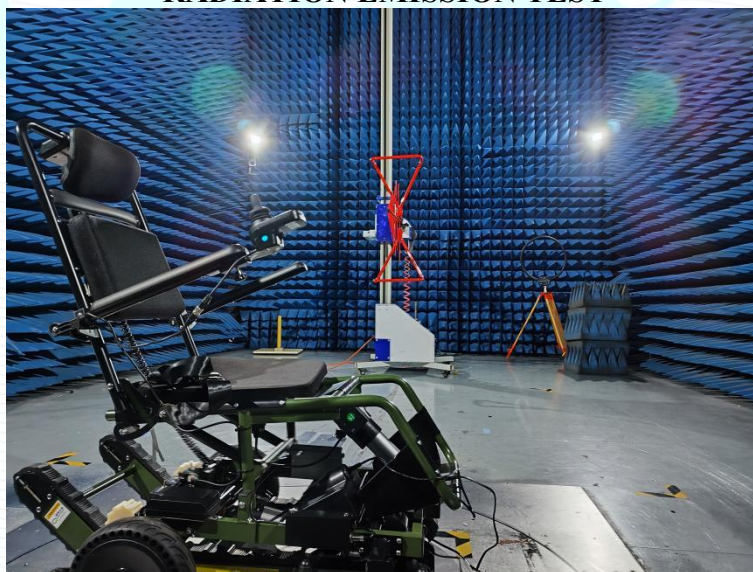


Figure 3
APPEARANCE OF EUT



Figure 4
APPEARANCE OF EUT



Figure 5
APPEARANCE OF EUT



Figure 6
APPEARANCE OF EUT



Figure 7
APPEARANCE OF EUT

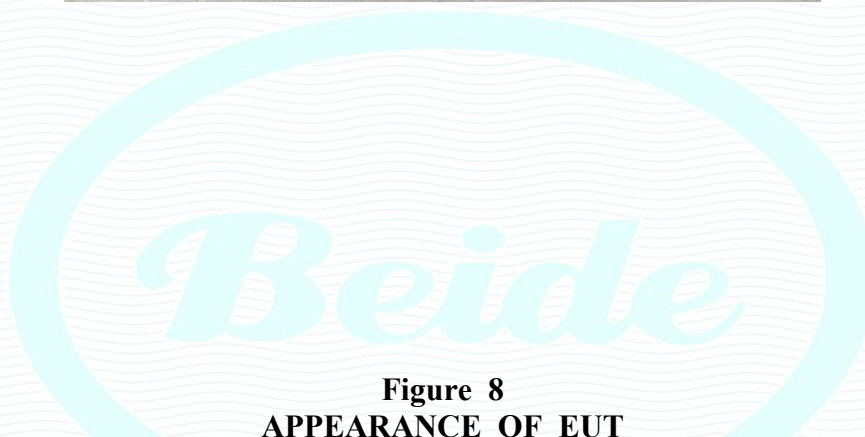


Figure 8
APPEARANCE OF EUT



Figure 9
APPEARANCE OF EUT



Figure 10
APPEARANCE OF EUT



Figure 11
APPEARANCE OF EUT



Figure 12
APPEARANCE OF EUT



Figure 13
APPEARANCE OF EUT



Figure 14
APPEARANCE OF EUT

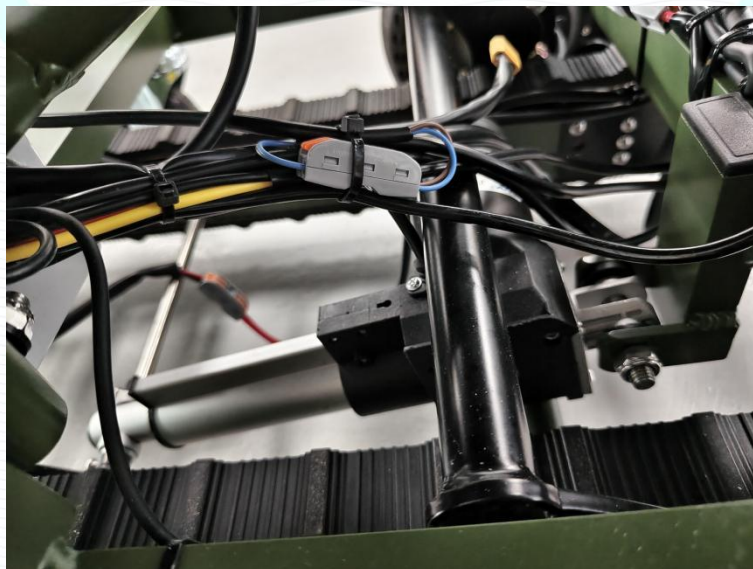


Figure 15
APPEARANCE OF EUT



Figure 16
APPEARANCE OF EUT

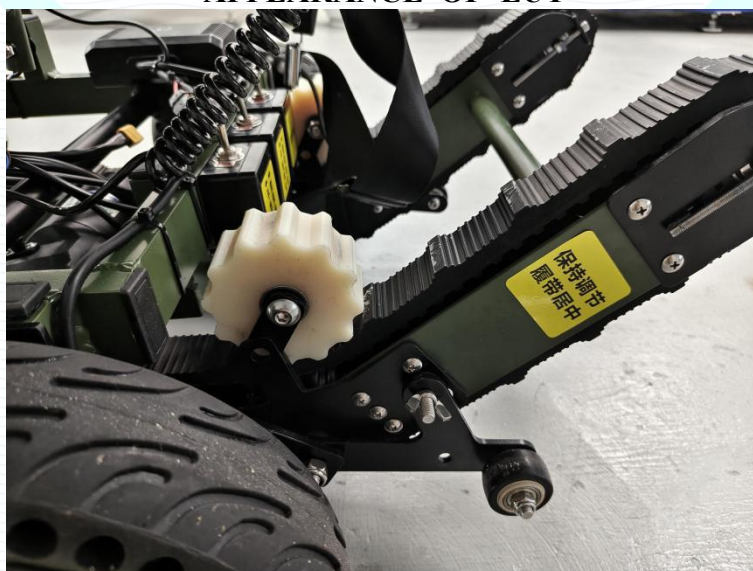


Figure 17
APPEARANCE OF EUT



Figure 18
APPEARANCE OF EUT

