EMC TEST REPORT

Test item description:	Electric vehicle AC charging box
Trademark(s):	CenWell®
Model/Type reference:	CW-3-BEE-32A, CW-1-DZQ-AAA, Model reference difference table refer to see page 3.
S/N:	/
Report No.:	CTB26042904101E01
Applicant's name:	Guangdong Cenwell Technology Co., Ltd
Address:	Building A and office, No. 1 Xinmin First Street, Ma'an Town, Huicheng District, Huizhou City, Guangdong Province, China.
Manufacturer:	Guangdong Cenwell Technology Co., Ltd
Address:	Building A and office, No. 1 Xinmin First Street, Ma'an Town, Huicheng District, Huizhou City, Guangdong Province, China.
Prepared by:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Sample No.:	26042904101
Date of Receipt:	Jun. 04, 2026
Date of Test(s):	Jun. 04, 2026 to Jun. 23, 2026
Date of Issue:	Jul. 09, 2026
Test Standard(s):	EN IEC 61851-21-2:2021 EN 61000-3-12:2011+A1:2024, EN IEC 61000-3-11:2019
Test Result:	Pass

In the configuration tested, the EUT complied with the standards specified above.

Compiled by:	Reviewed by:	Approved by:
Alex Li	Leo Huang	Rita Xiao

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. The tested sample(s) and the sample information are provided by the applicant. The authenticity, accuracy, and completeness of the provided information are the sole responsibility of the applicant. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The result decision rules of our laboratory are based solely on the direct comparison between the actual measured values of test results and the standard limits, without considering the measurement uncertainty."★" indicates the testing items were fulfilled by subcontracted lab. "※" indicates the items are not in CNAS accreditation scope.

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1. Description of version

Report No.	Issue Date	Description	Approved
CTB26042904101E01	Jul. 09, 2026	Original	Valid

Model reference difference table as flow:

Model number	Input		Output
CW-1-DZQ-AAA	230-400Vac 50/60Hz 32A Max		230-400Vac 50/60Hz 32A Max 22KW Max
CW-1-DZQ-AAA	1	1	1 represents single-phase power
		3	3 represents three-phase power.
	D	A	A indicates an oval casing
		B	B indicates a diamond-shaped casing
		C	C indicates a cordless casing;
		D	D indicates an iron casing;
		E	E indicates a square casing
	Z	A	A indicates Australian standard plug;
		C	C indicates Chinese national standard plug;
		D	D indicates Thai plug;
		E	E indicates European or Korean plug;
		F	F indicates Swiss plug;
		H	H indicates no plug on the input side;
		I	I indicates Indian plug;
		J	J indicates Japanese plug;
		M	M indicates Argentine plug;
		Q	Q indicates Italian plug;
		R	R indicates Russian plug;
		S	S indicates American plug;
		T	T indicates Taiwanese plug;
		U	U indicates British/Singapore/Saudi/Malaysian plug;
		V	V indicates South African plug;
		X	X indicates Brazilian plug;
		Y	Y indicates Israeli plug;
		Z	Z indicates Indonesian plug.
	Q	C	C = China standard charging cable;
		E	E = European standard charging cable;
		S	S = American standard charging cable;
		T	T = Tesla standard charging cable.
	AAA	AAA Variable:	06–32 A (names vary by output current) For example: 06 = 06 A; 16 A = 16 A; 32 A = 32 A

2. Test summary

Emission		
Test Item	Test Method	Result
Conducted Emission（CE）	EN IEC 61851-21-2	PASS
Radiated emissions at frequencies up to 1 GHz(RE below 1G)		PASS
Radiated emissions at frequencies above 1 GHz(RE above 1G)		N/A[2]
Harmonic current emissions(H)	EN 61000-3-12	PASS
Voltage changes, voltage fluctuations and flicker(F)	EN IEC 61000-3-11	PASS
Immunity(EN IEC 61851-21-2)		
Test Item	Test Method	Result
Electrostatic discharges (ESD)	IEC 61000-4-2	PASS
Radiated RF fields(RS)	IEC 61000-4-3	PASS
Electrical fast transients/bursts(EFT)	IEC 61000-4-4	PASS
Voltage Surges	IEC 61000-4-5	PASS
Conducted RF fields(CS)	IEC 61000-4-6	PASS
Magnetic fields	IEC 61000-4-8	N/A[1]
Voltage dips and interruptions(Dips)	IEC 61000-4-34	PASS

Note: N/A is abbreviation for Not Applicable.

1. The Product doesn't contain any device susceptible to magnetic fields.
2. The internal operating frequency of this product is less than 108MHz and it is not applicable.

3. Measurement uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %

Test Item	Frequency	Expanded Uncertainty (U_{Lab})
Conducted Emission	150 kHz to 30 MHz	No.1 ± 3.4 dB No.2 ± 3.5 dB
Radiated Emission	30 MHz to 1000 MHz	No.1 ± 4.9 dB No.2 ± 4.6 dB
Radiated Emission	1000 MHz to 6000 MHz	No.1 ± 4.9 dB, No.2 ± 4.8 dB

4. General information

4.1. Description of EUT

Test item description	Electric vehicle AC charging box
Trademark(s)	CenWell®
Model/Type reference	CW-3-BEE-32A
Serial Model No.	CW-1-DZQ-AAA, Model reference difference table refer to see page 3.
Model Difference	The motherboard is the same, and the principle of the face cover is the same. Test sample model: CW-3-BEE-32A.
Rated Power	Max 22kW
Rated Voltage& current	Input: 230-400Vac 50/60Hz 32A Max Output: 230-400Vac 50/60Hz 32A Max 22KW Max
Highest Internal Frequency	<108MHz
Configuration	☒ Table-top ☐ Floor-standing
Classification	☐ Class A ☒ Class B
The highest frequency of the internal sources of the EUT	☒ less than 108 MHz, the measurement shall only be made up to 1 GHz. ☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. ☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. ☐ above 1 GHz, the measurement shall be made up to 6 GHz.
Adapter Information	/

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.2. Description of Accessory Device

Description	Manufacturer	Model	Specification	Note
Adjustable resistance cabinet	JH	JH-RYF-66KW380C-W6K-D	/	☐Applicant ☒CTB

External I/O Cable

Cable Description	Shielded Type	Ferrite Core	Length(m)	Note
/	☐Shielded ☐Non-shielded	☐Yes ☐No	/	☐Applicant ☐CTB

4.3. Test conditions

Temperature: 15-25℃
Relative Humidity: 30-60%RH
Atmospheric pressure: 800hPa-1060hPa

4.4. Block diagram of EUT configuration



4.5. Operating condition of EUT

The test system was pre-tested based on the consideration of all possible combinations of EUT operation modes according to test plan. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively. All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, (*)the worst data were recorded and reported.

Pretest Test Mode	Description	Test Voltage
Mode 1*	Waiting Mode	AC 400V/50Hz
Mode 2*	Charge Mode(20%)	AC 400V/50Hz
Mode 3*	Charge Mode(80%)	AC 400V/50Hz

Conducted emission test		
Final Test Mode	Description	Test Voltage
Mode 2*	Charge Mode(20%)	AC 400V/50Hz

Radiated emission test		
Final Test Mode	Description	Test Voltage
Mode 2*	Charge Mode(20%)	AC 400V/50Hz

Harmonic current emissions & Voltage changes, voltage fluctuations and flicker test		
Final Test Mode	Description	Test Voltage
Mode 2*	Charge Mode(20%)	AC 400V/50Hz

Immunity test		
Final Test Mode	Description	Test Voltage
Mode 1*	Waiting Mode	AC 400V/50Hz
Mode 2*	Charge Mode(20%)	AC 400V/50Hz

5. List of Test and Measurement Instruments

No.2 Continuous disturbance						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	ISN	Schwarzbeck	NTFM8158	183	/	2027/6/11
2	ISN	Schwarzbeck	CAT5 8158	473	/	2027/6/21
3	Voltage Probe	Schwarzbeck	TK 9420	01189	/	2027/5/15
4	Current Probe	FCC	F-52B	199453	/	2027/5/21
5	966 chamber	C/ R/ T	966	/	/	2026/11/14
6	Control Room	C/ R/ T	533	/	/	2026/11/14
7	Pulse limiter	EMC Solutions	ESH3-Z2	102727	/	2027/5/13
8	EMI TEST RECEIVER	R&S	ESCI7	100861	/	2027/5/15
9	LISN	Schwarzbeck	NNLK 8129	00584	/	2027/5/15
10	LISN	Schwarzbeck	PVDC 8301	00144	/	2027/5/15
11	EMI test software	Farad	EZ-EMC	/	Ver. FARAD-3A1+	/

Radiated emission(No.2 Chamber)						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2026/11/14
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2027/5/14
3	Broadband Antenna	Schwarzbeck	VULB 9168	1471	/	2026/9/20
4	Preamplifier	Agilent	8449B	3008A01838	/	2027/5/14
5	Preamplifier	Schwarzbeck	BBV 9743 B	00500	/	2027/5/15
6	EMI TEST RECEIVER	R&S	ESCI7	100861	/	2027/5/15
7	Apectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2027/5/13
8	EMI test software	Farad	EZ-EMC	/	Ver. FARAD-3A1+	/
9	Coaxial cable	Rosenberg	8m	/	/	2027/5/15
10	Coaxial cable	Times	2m	/	/	2027/5/15
11	Coaxial cable	Times	2m	/	/	2027/5/15
12	Coaxial cable	Times	1m	/	/	2027/5/15
13	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2027/5/16

Harmonic current emission& Voltage changes, voltage fluctuations and flicker						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	Three-phase harmonic scintillation	Schloder	LMG641	07552407	/	2027/5/13
2	Three-phase harmonic power supply	CI	RS90-3P1-380-LF-XV650-SNK	/	/	2027/5/14
3	Three-phase 75A impedance network	Yian	YIAN-3-75	375025	/	2027/5/14
4	Harmonic flicker test system software GMC	GMC	LMG600 Control 3.130	/	LMG600 Control 3.130	/

Electrostatic discharges						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	ESD Simulator	TESTQ	NSG437	329	V01.00	2027/5/17

Injected currents						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	C/S Test System	SKET	CITS-150K230M-75W	SK20210604	20H2	2027/6/11
2	CDN	SKET	CDN-150K230M-M2/M3-16A	21302	/	2027/5/15
3	CDN	Schaffner	CDNT400	/	/	2027/6/21
4	Attenuator	PRIMA	WDTS100-6-4-B	/	/	2027/5/13
5	Electromagnetic Injection Clamp	Prima	PECL-100	/	/	2027/5/25
6	50Ω Load	SKET	TL-DC01G-2W-50BNC	/	/	2027/5/14
7	CS test software	SKET	EMC-S	V2.0.0.11	/	/
8	M5 Coupled decoupling network	HTEC	CDN M5	234902	/	2027/5/15

Surges & Fast transients						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	Isolation transformer	Soulemc	HIT 90K	234915	/	/
2	Coupled decoupling network	Soulemc	SCDN SR200A	234909	/	2027/3/1
3	Combination surge wave module	Soulemc	SCWG 10KP	234906	/	2027/3/1
4	Communication surge wave module	Soulemc	STSG 10KP	234907	/	2027/3/1
5	surge computer	Soulemc	SCWG 10KP	234905	V0.1.0	/
6	Unshielded Symmetric Communication Line Coupling Network	Soulemc	SCN 8T	234910	/	2027/3/1
7	Unshielded symmetrical communication line decoupling network	Soulemc	SDE 8T	234911	/	2027/3/1
8	Capacitive coupling clamp	Soulemc	SCCC.4	234912	/	2027/3/1
9	EFT Clamp SHVcable	Soulemc	50 欧，1.5M	/	/	/
10	Surge LAN cable	Soulemc	（8 线）1M	/	/	/
11	Surge LAN cable	Soulemc	（8 线）1.2M	/	/	/
12	EFT generator	Soulemc	SUCG 5000E	231903	V1.3.4	2027/3/1
13	EFT Coupled decoupling network	Soulemc	SCDN E200A	234904	/	2027/3/1

Voltage dips						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	DIPS fault simulator	Soulemc	SSAG 3P200T	234913	V1.5.4	2027/3/2

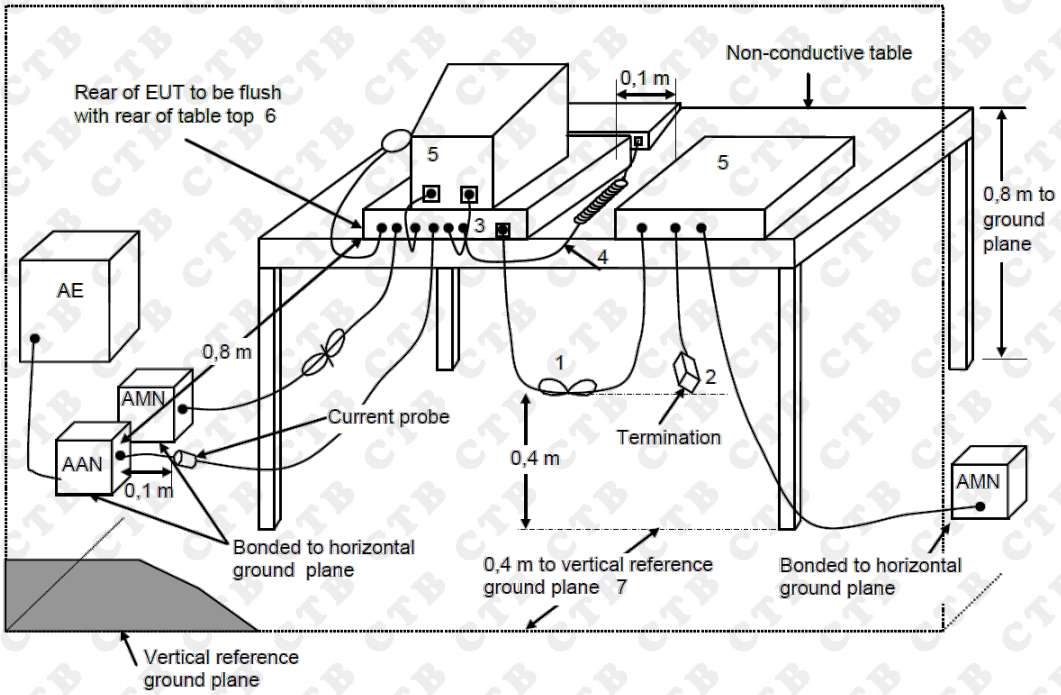
Radio frequency electromagnetic field						
No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2026/11/14
2	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2027/5/14
3	Stacked Double Log.-Per. Antenna	SKET	STLP 9129 Plus	2106070106	/	/
4	Switch Controller	SKET	RFSU-DC18G-4C	2106070105	/	/
5	RF Power Meter	Agilent	E9304A	MY41490462	/	2027/5/14
6	RF Power Meter	Agilent	E9301A	MY41495675	/	2027/5/14
7	E-Field Probe	Narda	EP-601	811ZX10305	/	2027/5/27
8	Power Amplifier	SKET	HAP-80M01G-250W	2106070103	/	2027/5/14
9	Power Amplifier	SKET	HAP-01G 06G-75W	2106070104	/	2027/5/14
10	Audio Analysis	R&S	ATS-1	ATS 1-41152	/	2027/5/14
11	Audio Output Matching Network	SKET	RCO Network	/	/	2026/11/6
12	Power Meter	Agilent	E4419B	GB42421440	/	2027/5/14
13	RS test software	SKET	EMC-S	V2.0.0.19	/	/

6. Emission

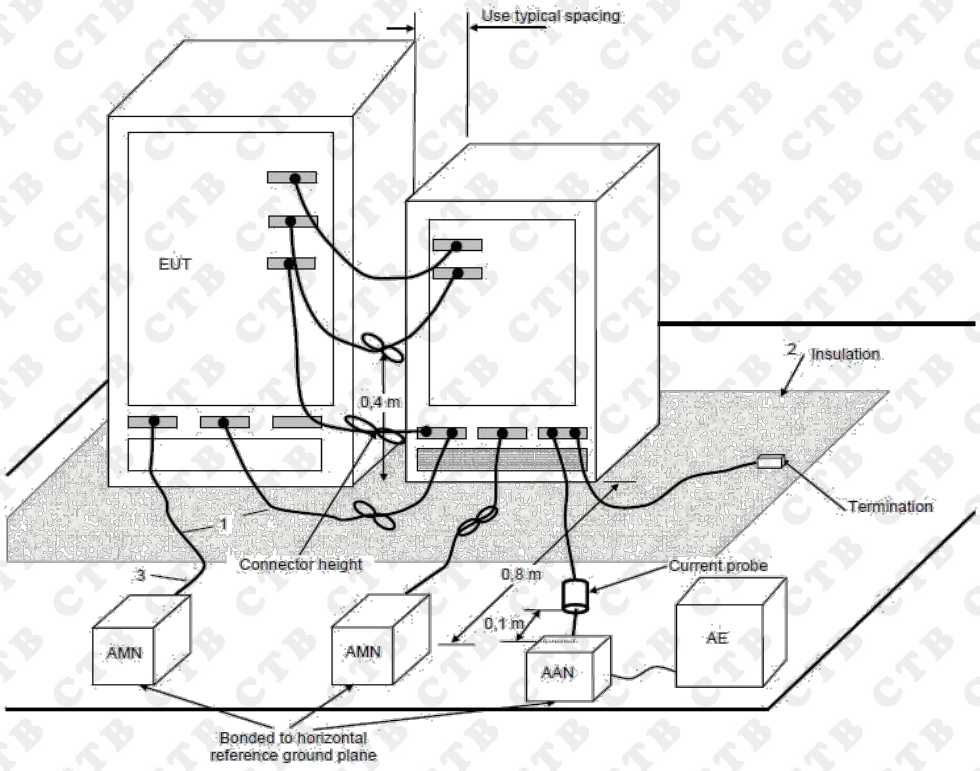
6.1. Conducted emission

6.1.1. Block diagram of test setup

For table-top equipment



For floor standing equipment



6.1.2. Limit

Disturbance voltage limits for class A equipment for AC power input port

Frequency range MHz	Rated power of ≤ 20 kVA		Rated power of > 20 kVA [a)]		High power electronic systems and equipment, rated power of > 75 kVA [b)]	
	Quasi-peak dB(μV)	Average dB(μV)	Quasi-peak dB(μV)	Average dB(μV)	Quasi-peak dB(μV)	Average dB(μV)
0,15 to 0,50	79	66	100	90	130	120
0,50 to 5	73	60	86	76	125	115
5 to 30	73	60	90 to 73	80 to 60	115	105

At the transition frequency, the more stringent limit shall apply.

a) These limits apply to equipment with a rated power > 20 kVA and intended to be connected to a dedicatedpower transformer or generator, and which is not connected to low voltage (LV) overhead power lines. For equipment not intended to be connected to a user specific power transformer, the limits for ≤ 20 kVA apply.l The manufacturer, and/or supplier shall provide information on installation measures that can be used tol reduce emissions from the installed equipment. In particular, it shall be indicated that this equipment isl intended to be connected to a dedicated power transformer or generator and not to LV overhead power lines.

b) These limits apply only to high power electronic systems and equipment with a rated power > 75 kVA when intended to be installed as follows:

- installation is supplied from a dedicated power transformer or generator, and which is not connected to low voltage (LV) overhead power lines;
- installation is physically separated from residential environments by distance greater than 30 m or by a structure which acts as a barrier to radiated phenomena;
- the manufacturer and/or supplier shall indicate that this equipment meets the disturbance voltage limits for high power electronic systems and equipment of rated input power > 75 kVA and provide information on installation measures to be applied by the installer. In particular, it shall be indicated that thisl equipment is intended to be used in an installation which is powered by a dedicated power transformer orgenerator and not by LV overhead power lines.

Disturbance voltage limits for class B equipment for AC power input port

Frequency range MHz	Coupling device	Detector type / bandwidth	Limits dB(μV)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	66 to 56
0,5 to 5			56
5 to 30			60
0,15 to 0,5		Average / 9 kHz	56 to 46
0,5 to 5			46
5 to 30			50

Disturbance voltage limits for DC power input port

Frequency range MHz	Rated power of ≤ 20 kVA		Rated power of > 20 kVA [a)]	
	Quasi-peak dB(μV)	Average dB(μV)	Quasi-peak dB(μV)	Average dB(μV)
0,15 to 0,50	79	66	100	90
0,50 to 5	73	60	86	76
5 to 30	73	60	90 to 73	80 to 60

Disturbance voltage limits for class A equipment for AC CPT port

Frequency range MHz	Coupling device	Detector type / bandwidth	Limits dB(μV)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	79
0,50 to 30			73
0,15 to 0,5		Average / 9 kHz	66
0,50 to 30			60

Disturbance voltage limits for class B equipment for AC CPT port

Frequency range MHz	Coupling device	Detector type / bandwidth	Limits dB(μV)
0,15 to 0,50	AMN	Quasi Peak / 9 kHz	0,15 to 0,50
0,50 to 5			0,50 to 5
5 to 30			5 to 30
0,15 to 0,50		Average / 9 kHz	56 to 46
0,50 to 5			46
5 to 30			50

Disturbance voltage limits for DC CPT port

Frequency range MHz	Rated power of ≤ 20 kVA		Rated power of > 20 kVA [a)]	
	Quasi-peak dB(μV)	Average dB(μV)	Quasi-peak dB(μV)	Average dB(μV)
0,15 to 0,50	79	66	100	90
0,50 to 5	73	60	86	76
5 to 30	73	60	90 to 73	80 to 60

Requirements for asymmetric mode conducted emissions from Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μV)
0,15 to 0,5	AAN	Quasi Peak / 9 kHz	97 to 87
0,5 to 30			87
0,15 to 0,5		Average / 9 kHz	84 to 74
0,5 to 30			74

Requirements for asymmetric mode conducted emissions from Class B equipment

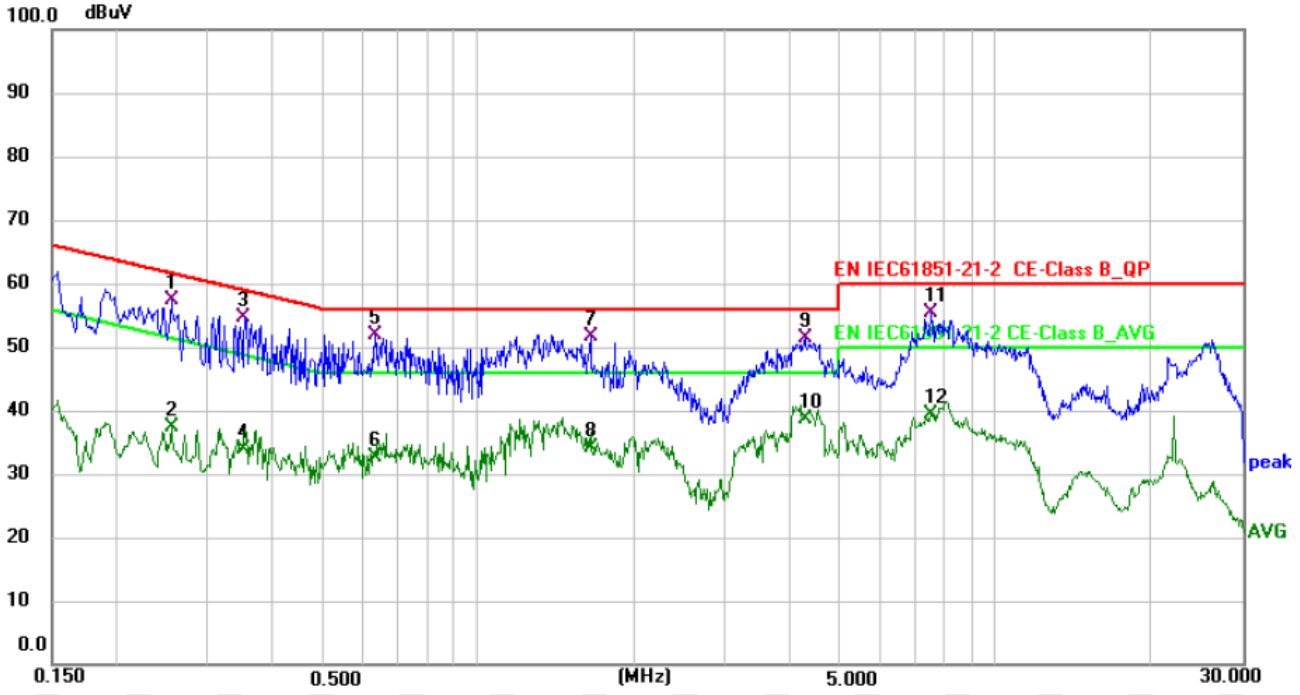
Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μV)
0,15 to 0,5	AAN	Quasi Peak / 9 kHz	84 to 74
0,5 to 30			74
0,15 to 0,5		Average / 9 kHz	74 to 64
0,5 to 30			64

6.1.3. Test procedure

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.1.4. Test results

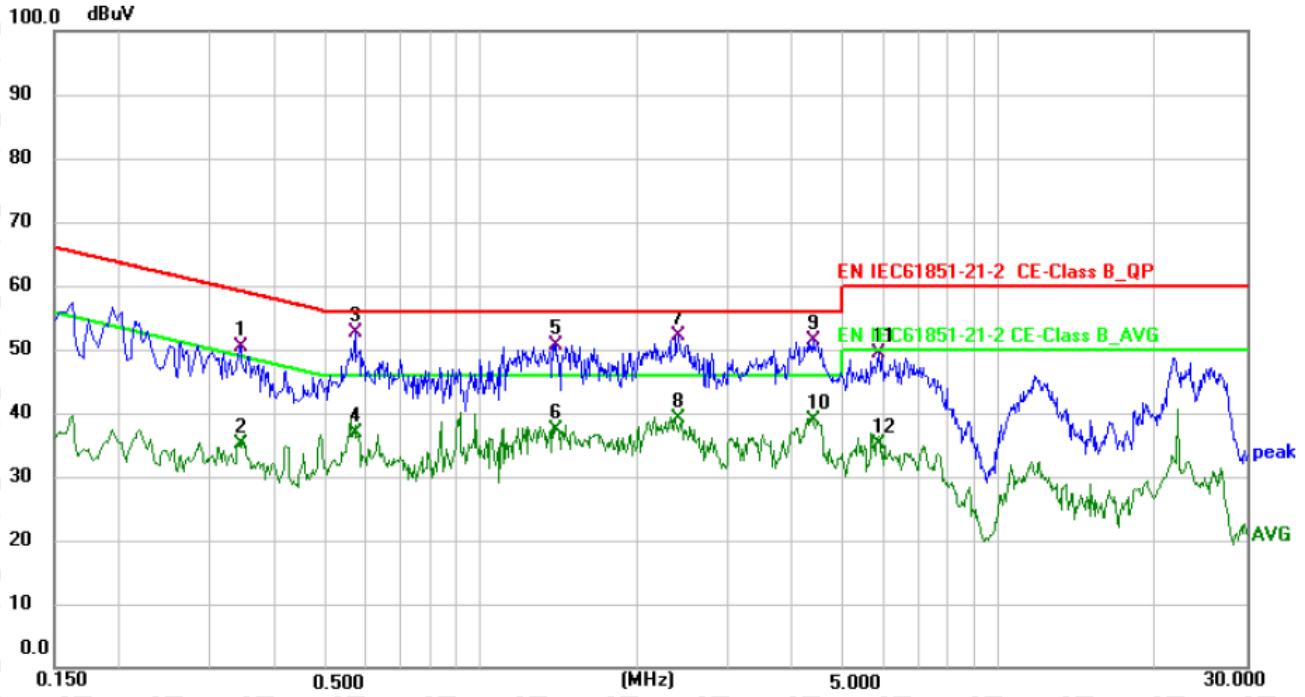
Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Phase :	L1
Test Voltage :	AC 400V/50Hz	Test Mode:	Mode 2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2540	37.89	19.38	57.27	61.63	-4.36	QP
2	0.2540	18.11	19.38	37.49	51.63	-14.14	AVG
3	0.3537	35.31	19.20	54.51	58.88	-4.37	QP
4	0.3537	14.59	19.20	33.79	48.88	-15.09	AVG
5 *	0.6300	32.49	19.40	51.89	56.00	-4.11	QP
6	0.6300	13.34	19.40	32.74	46.00	-13.26	AVG
7	1.6500	32.25	19.50	51.75	56.00	-4.25	QP
8	1.6500	14.61	19.50	34.11	46.00	-11.89	AVG
9	4.2860	32.06	19.37	51.43	56.00	-4.57	QP
10	4.2860	19.37	19.37	38.74	46.00	-7.26	AVG
11	7.5180	36.01	19.33	55.34	60.00	-4.66	QP
12	7.5180	19.94	19.33	39.27	50.00	-10.73	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

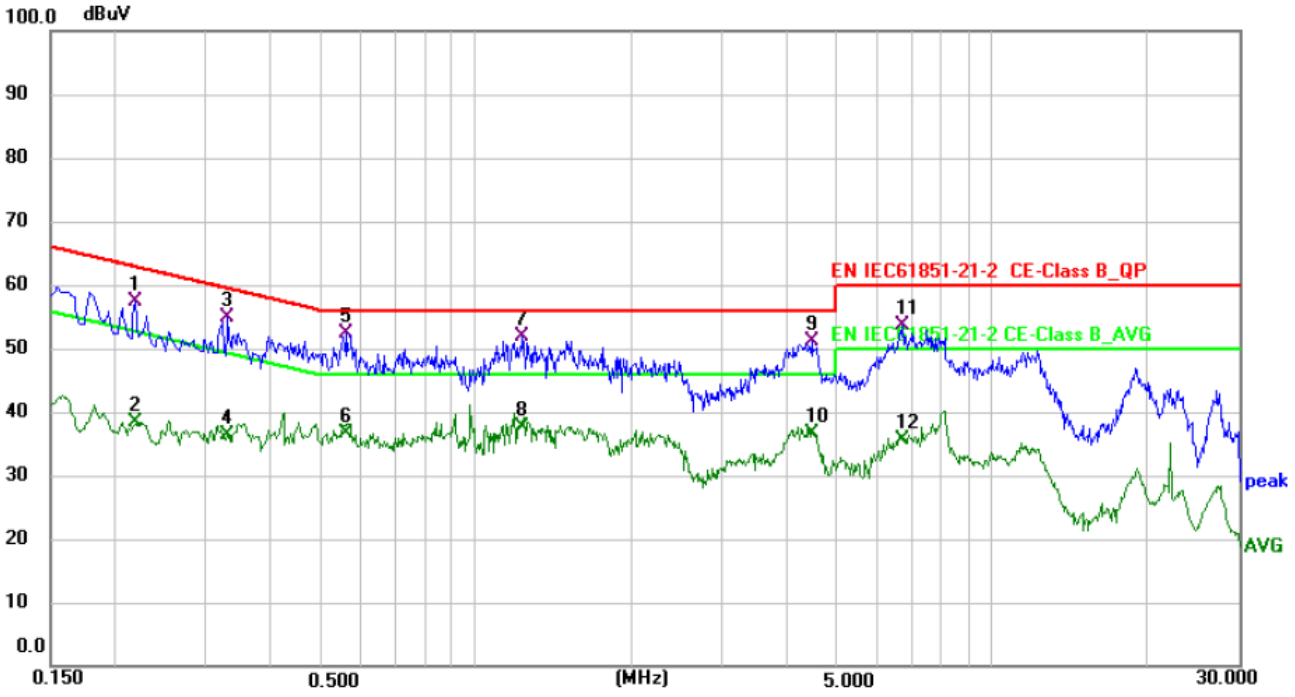
Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Phase :	L2
Test Voltage :	AC 400V/50Hz	Test Mode:	Mode 2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3420	31.30	19.18	50.48	59.15	-8.67	QP
2	0.3420	15.88	19.18	35.06	49.15	-14.09	AVG
3 *	0.5700	33.26	19.37	52.63	56.00	-3.37	QP
4	0.5700	17.41	19.37	36.78	46.00	-9.22	AVG
5	1.4020	31.22	19.50	50.72	56.00	-5.28	QP
6	1.4020	17.86	19.50	37.36	46.00	-8.64	AVG
7	2.4060	32.55	19.50	52.05	56.00	-3.95	QP
8	2.4060	19.62	19.50	39.12	46.00	-6.88	AVG
9	4.3700	32.02	19.36	51.38	56.00	-4.62	QP
10	4.3700	19.49	19.36	38.85	46.00	-7.15	AVG
11	5.8380	30.05	19.30	49.35	60.00	-10.65	QP
12	5.8380	15.76	19.30	35.06	50.00	-14.94	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

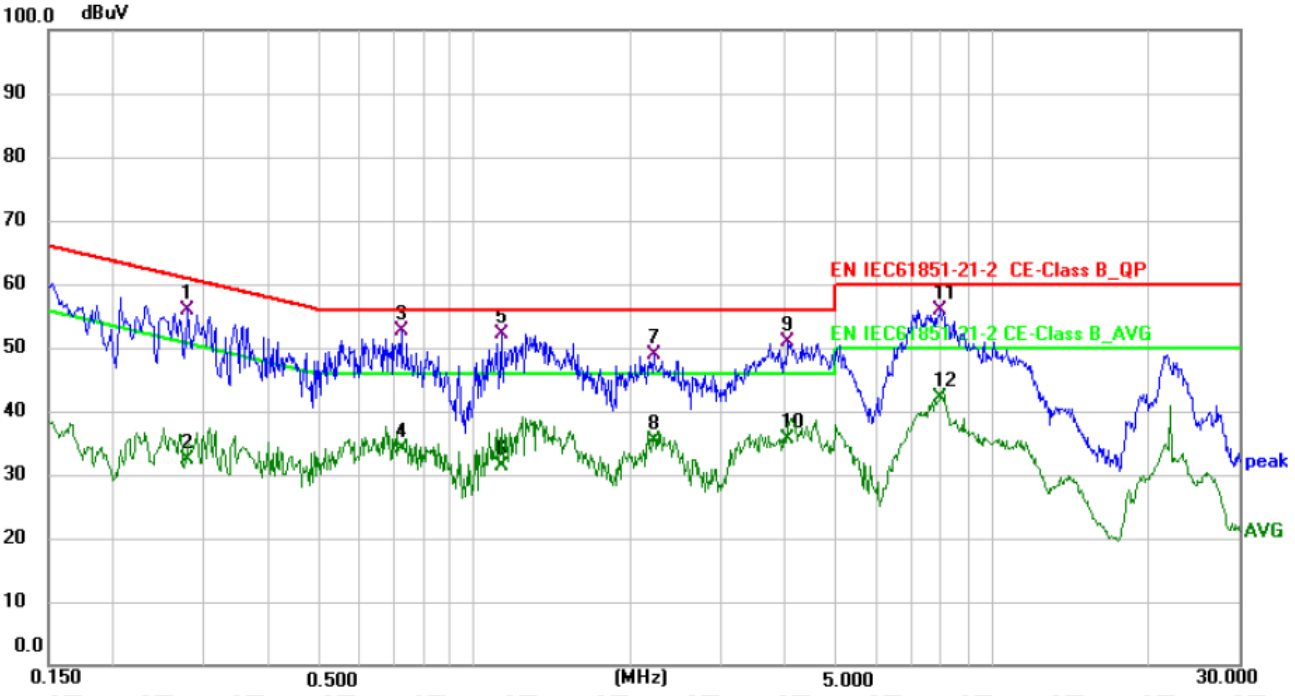
Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Phase :	L3
Test Voltage :	AC 400V/50Hz	Test Mode:	Mode 2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2180	37.83	19.53	57.36	62.89	-5.53	QP
2	0.2180	18.97	19.53	38.50	52.89	-14.39	AVG
3	0.3300	35.62	19.16	54.78	59.45	-4.67	QP
4	0.3300	17.22	19.16	36.38	49.45	-13.07	AVG
5 *	0.5620	33.10	19.36	52.46	56.00	-3.54	QP
6	0.5620	17.19	19.36	36.55	46.00	-9.45	AVG
7	1.2340	32.27	19.50	51.77	56.00	-4.23	QP
8	1.2340	18.01	19.50	37.51	46.00	-8.49	AVG
9	4.4740	31.83	19.35	51.18	56.00	-4.82	QP
10	4.4740	17.21	19.35	36.56	46.00	-9.44	AVG
11	6.7220	34.21	19.30	53.51	60.00	-6.49	QP
12	6.7220	16.29	19.30	35.59	50.00	-14.41	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Phase :	N
Test Voltage :	AC 400V/50Hz	Test Mode:	Mode 2



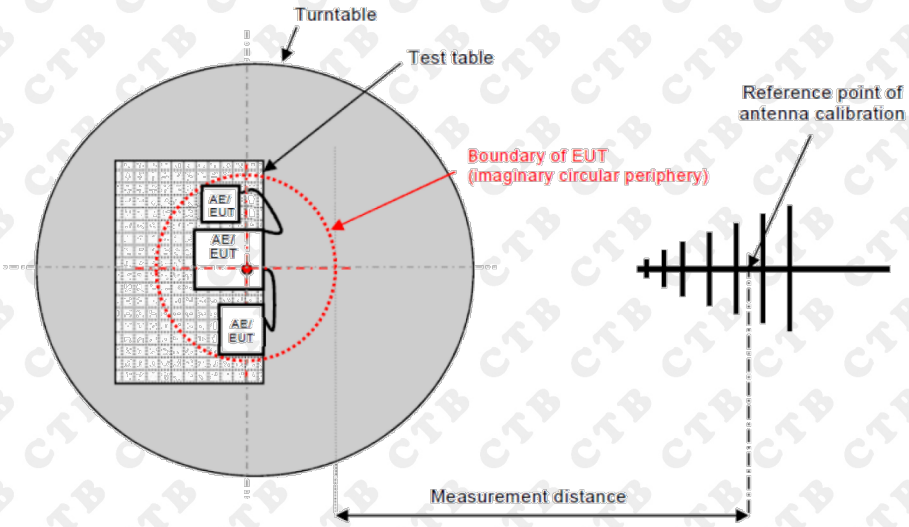
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2779	36.77	19.23	56.00	60.88	-4.88	QP
2	0.2779	13.19	19.23	32.42	50.88	-18.46	AVG
3 *	0.7220	33.22	19.42	52.64	56.00	-3.36	QP
4	0.7220	14.76	19.42	34.18	46.00	-11.82	AVG
5	1.1260	32.62	19.50	52.12	56.00	-3.88	QP
6	1.1260	11.84	19.50	31.34	46.00	-14.66	AVG
7	2.2180	29.36	19.50	48.86	56.00	-7.14	QP
8	2.2180	15.92	19.50	35.42	46.00	-10.58	AVG
9	4.0420	31.45	19.40	50.85	56.00	-5.15	QP
10	4.0420	16.11	19.40	35.51	46.00	-10.49	AVG
11	7.9660	36.48	19.36	55.84	60.00	-4.16	QP
12	7.9660	22.66	19.36	42.02	50.00	-7.98	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

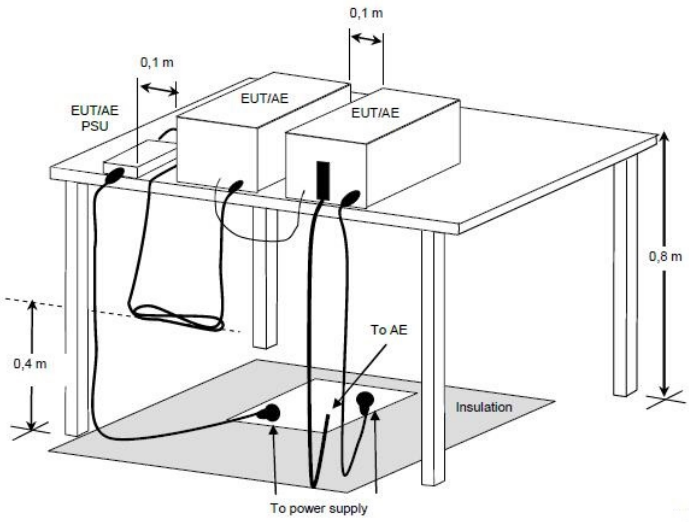
6.2. Radiated emissions

6.2.1. Block diagram of test setup

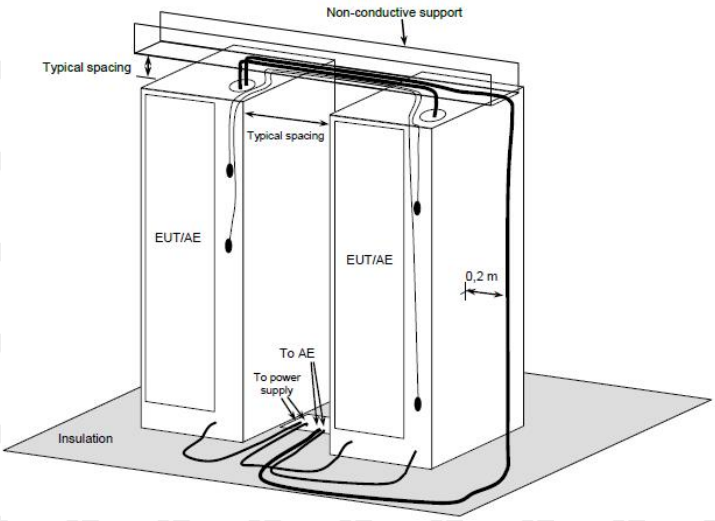
Measurement distance



For table-top equipment



For floor standing equipment



6.2.2. Limit

Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment

Frequency range MHz	Measurement			Limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	40
230 to 1 000				47

Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment

Frequency range MHz	Measurement			Class A limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 3 000	FSOATS	3	Average / 1MHz	56
3 000 to 6 000				60
1 000 to 3 000		3	Peak / 1MHz	76
3 000 to 6 000				80

Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment

Frequency range MHz	Measurement			Limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	30
230 to 1 000				37

Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment

Frequency range MHz	Measurement			Class A limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 3 000	FSOATS	3	Average / 1MHz	50
3 000 to 6 000				54
1 000 to 3 000		3	Peak / 1MHz	70
3 000 to 6 000				74

6.2.3. Test procedure

a. The measuring distance of at 10 m shall be used for measurements at frequency up to1GHz.For frequencies above 1GHz, any suitable measuring distance may be used.

b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then

Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.

e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.

f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.2.4. Test results

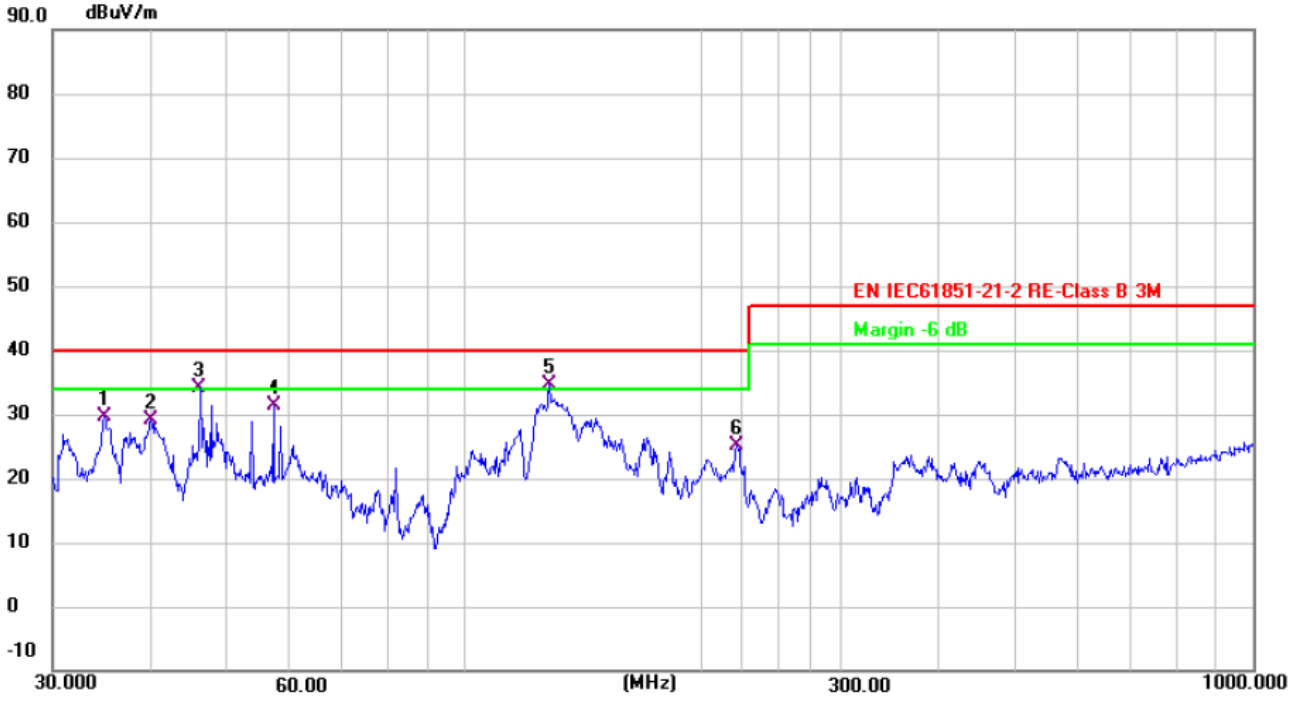
Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	AC 400V/50Hz	Test Mode:	Mode 2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.1278	33.74	-13.41	20.33	40.00	-19.67	QP
2	126.3286	37.71	-15.33	22.38	40.00	-17.62	QP
3	148.9625	35.64	-12.35	23.29	40.00	-16.71	QP
4 *	217.5443	38.45	-15.13	23.32	40.00	-16.68	QP
5	296.1836	36.26	-12.29	23.97	47.00	-23.03	QP
6	447.9822	35.75	-9.19	26.56	47.00	-20.44	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	AC 400V/50Hz	Test Mode:	Mode 2

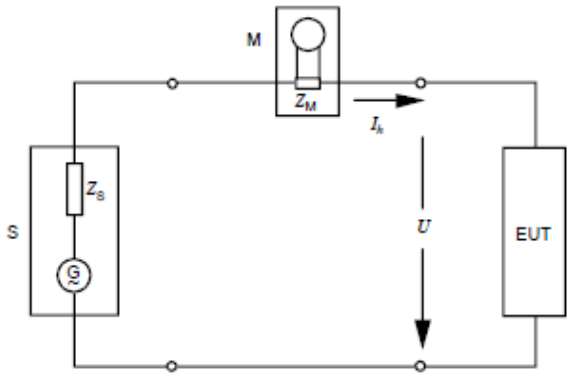


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	34.8823	43.05	-13.43	29.62	40.00	-10.38	QP
2	39.9942	42.11	-13.07	29.04	40.00	-10.96	QP
3 !	46.1779	47.20	-13.14	34.06	40.00	-5.94	QP
4	57.1914	44.83	-13.57	31.26	40.00	-8.74	QP
5 *	128.1130	49.64	-15.03	34.61	40.00	-5.39	QP
6	221.3921	40.05	-15.00	25.05	40.00	-14.95	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

6.3. Harmonic current emissions

6.3.1. Block diagram of test setup



S power supply source

M measurement equipment

EUT equipment under test

Z_M input impedance of measurement equipment

I_h harmonic component of order *h* of the line current

U test voltage

Z_S internal impedance of the supply source

G open-loop voltage of the supply source

6.3.2. Test Specification

Basic Standard(s)	:	☐EN IEC 61000-3-2 ☒EN 61000-3-12
Measurement Equipment requirement	:	IEC 61000-4-7
Measured Harmonics	:	1 – 40
Equipment Class	:	☐A ☐B ☐C ☐D
Limits	:	☐ Clause 7 Table 1 Limits for Class A equipment ☐ Clause 7.3 Limits for Class B equipment ☐ Clause 7 Table 2 Limits for Class C equipment ☐ Clause 7 Table 3 Limits for Class D equipment ☒ Clause 5 Table 2- Current emission limits for equipment other than balanced three-phase equipment ☐ Clause 5 Table 3-Current emission limits for balanced three-phase equipment ☐ Clause 5 Table 4 - Current emission limits for balanced three-phase equipment under specified conditions (a, b, c) ☐ Clause 5 Table 5 - Current emission limits for balanced three-phase equipment under specified conditions (d, e, f)

6.3.3.Test Procedure

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.

b. The classification of EUT is according to section 5 of EN 61000-3-2. The EUT is classified as follows:

Class A: Equipment not specified as belonging to Class B, C or D shall be considered as Class A equipment.

Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to600 W of the following types: Personal computers and personal computer monitors and television receivers.

c. The correspondent test program of test instrument to measure the current harmonic semanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

6.3.4.Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 2
Test Voltage :	AC 400V/50Hz		

f_{cycle}	50.0017 Hz	$U_{trms,\ L1}$	230.365 V	$U_{trms,\ L2}$	230.555 V
$U_{trms,\ L3}$	230.647 V	$U_{pp,\ L1}$	652.06 V	$U_{pp,\ L2}$	652.535 V
$U_{pp,\ L3}$	652.847 V	$U_{dc,\ L1}$	-639.019 mV	$U_{dc,\ L2}$	-349.8 mV
$U_{dc,\ L3}$	-284.397 mV	$U_{cf,\ L1}$	1.41752	$U_{cf,\ L2}$	1.41676
$U_{cf,\ L3}$	1.41675	$I_{trms,\ L1}$	9.66334 A	$I_{trms,\ L2}$	9.71145 A
$I_{trms,\ L3}$	9.69101 A	$I_{pp,\ L1}$	27.5498 A	$I_{pp,\ L2}$	27.4897 A
$I_{pp,\ L3}$	27.4342 A	$I_{dc,\ L1}$	-43.313 mA	$I_{dc,\ L2}$	-21.04 mA
$I_{dc,\ L3}$	-27.15 mA	$I_{cf,\ L1}$	1.42997	$I_{cf,\ L2}$	1.41763
$I_{cf,\ L3}$	1.41852	P_{L1}	2.22605 kW	P_{L2}	2.23899 kW
P_{L3}	2.23518 kW	Q_{L1}	14.1351 var	Q_{L2}	11.022 var
Q_{L3}	9.83024 var	S_{L1}	2.2261 kVA	S_{L2}	2.23902 kVA
S_{L3}	2.2352 kVA	PF_{L1}	0.99998	PF_{L2}	0.99999
PF_{L3}	0.99999				

Table 2 Harmonic Current Test (61000-3-12) [L1]	OK		
Rsce Min Test	OK		Rsce min 33, EUT connectable at any point in supply system.
Rsce Test	OK		Rsce 33.00 ≥ Rsce min limit 33
H2 Test	OK		
100 % Average Test	OK	0.1 %	Limit met (0.002 A ≤ 2.640 A)
150 % Smoothed Test	OK	0.1 %	Limit met (0.002 A ≤ 3.960 A)
H3 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.025 A ≤ 7.128 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.025 A ≤ 10.692 A)
H4 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.004 A ≤ 1.320 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.004 A ≤ 1.980 A)
H5 Test	OK		
100 % Average Test	OK	0.5 %	Limit met (0.016 A ≤ 3.531 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.016 A ≤ 5.297 A)
H6 Test	OK		
100 % Average Test	OK	0.2 %	Limit met (0.002 A ≤ 0.880 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.002 A ≤ 1.320 A)
H7 Test	OK		
100 % Average Test	OK	0.9 %	Limit met (0.022 A ≤ 2.376 A)
150 % Smoothed Test	OK	0.6 %	Limit met (0.022 A ≤ 3.564 A)
H8 Test	OK		

100 % Average Test	OK	0.4 %	Limit met (0.003 A ≤ 0.660 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.003 A ≤ 0.990 A)
H9 Test	OK		
100 % Average Test	OK	1.0 %	Limit met (0.010 A ≤ 0.990 A)
150 % Smoothed Test	OK	0.7 %	Limit met (0.011 A ≤ 1.485 A)
H10 Test	OK		
100 % Average Test	OK	0.5 %	Limit met (0.002 A ≤ 0.528 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.002 A ≤ 0.792 A)
H11 Test	OK		
100 % Average Test	OK	1.9 %	Limit met (0.020 A ≤ 1.023 A)
150 % Smoothed Test	OK	1.3 %	Limit met (0.020 A ≤ 1.535 A)
H12 Test	OK		
100 % Average Test	OK	0.5 %	Limit met (0.002 A ≤ 0.440 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.002 A ≤ 0.660 A)
H13 Test	OK		
100 % Average Test	OK	1.3 %	Limit met (0.008 A ≤ 0.660 A)
150 % Smoothed Test	OK	0.9 %	Limit met (0.008 A ≤ 0.990 A)
THC Test	OK	0.7 %	THC ok (0.056 A ≤ 7.590 A)
PWHC Test	OK	2.2 %	PWHC ok (0.164 A ≤ 7.590 A)
Table 2 Harmonic Current Test (61000-3-12) [L2]	OK		
Rsce Min Test	OK		Rsce min 33, EUT connectable at any point in supply system.
Rsce Test	OK		Rsce 33.00 ≥ Rsce min limit 33
H2 Test	OK		
100 % Average Test	OK	0.1 %	Limit met (0.001 A ≤ 2.640 A)
150 % Smoothed Test	OK	0.0 %	Limit met (0.001 A ≤ 3.960 A)
H3 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.023 A ≤ 7.128 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.023 A ≤ 10.692 A)
H4 Test	OK		
100 % Average Test	OK	0.0 %	Limit met (0.001 A ≤ 1.320 A)
150 % Smoothed Test	OK	0.0 %	Limit met (0.001 A ≤ 1.980 A)
H5 Test	OK		
100 % Average Test	OK	0.5 %	Limit met (0.018 A ≤ 3.531 A)
150 % Smoothed Test	OK	0.4 %	Limit met (0.019 A ≤

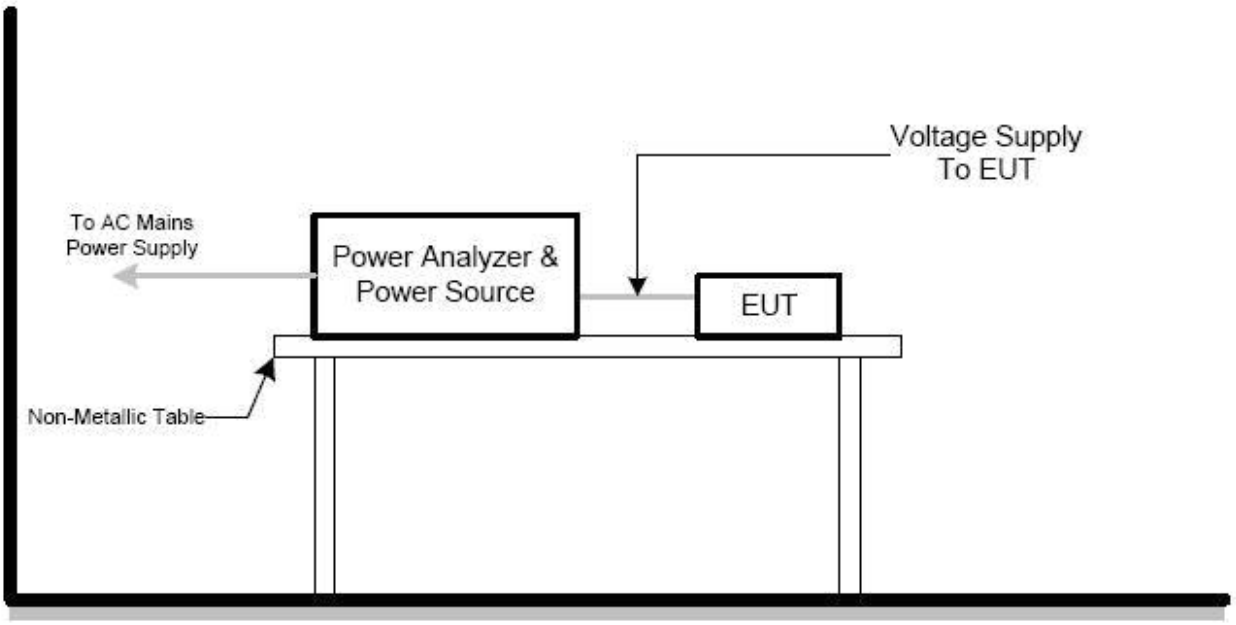
			5.297 A)
H6 Test	OK		
100 % Average Test	OK	0.1 %	Limit met (0.001 A ≤ 0.880 A)
150 % Smoothed Test	OK	0.1 %	Limit met (0.001 A ≤ 1.320 A)
H7 Test	OK		
100 % Average Test	OK	0.7 %	Limit met (0.016 A ≤ 2.376 A)
150 % Smoothed Test	OK	0.5 %	Limit met (0.016 A ≤ 3.564 A)
H8 Test	OK		
100 % Average Test	OK	0.2 %	Limit met (0.001 A ≤ 0.660 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.001 A ≤ 0.990 A)
H9 Test	OK		
100 % Average Test	OK	1.4 %	Limit met (0.014 A ≤ 0.990 A)
150 % Smoothed Test	OK	1.0 %	Limit met (0.014 A ≤ 1.485 A)
H10 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.001 A ≤ 0.528 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.001 A ≤ 0.792 A)
H11 Test	OK		
100 % Average Test	OK	1.2 %	Limit met (0.012 A ≤ 1.023 A)
150 % Smoothed Test	OK	0.8 %	Limit met (0.013 A ≤ 1.535 A)
H12 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.001 A ≤ 0.440 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.001 A ≤ 0.660 A)
H12 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.001 A ≤ 0.440 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.001 A ≤ 0.660 A)
H13 Test	OK		
100 % Average Test	OK	1.7 %	Limit met (0.011 A ≤ 0.660 A)
150 % Smoothed Test	OK	1.1 %	Limit met (0.011 A ≤ 0.990 A)
THC Test	OK	0.6 %	THC ok (0.046 A ≤ 7.590 A)
PWHC Test	OK	1.5 %	PWHC ok (0.112 A ≤ 7.590 A)

Table 2 Harmonic Current Test (61000-3-12) [L3]	OK		
Rsce Min Test	OK		Rsce min 33, EUT connectable at any point in supply system.
Rsce Test	OK		Rsce 33.00 ≥ Rsce min limit 33
H2 Test	OK		
100 % Average Test	OK	0.2 %	Limit met (0.006 A ≤ 2.640 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.006 A ≤ 3.960 A)
H3 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.018 A ≤ 7.128 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.018 A ≤ 10.692 A)
H4 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.004 A ≤ 1.320 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.004 A ≤ 1.980 A)
H5 Test	OK		
100 % Average Test	OK	0.4 %	Limit met (0.014 A ≤ 3.531 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.015 A ≤ 5.297 A)
H6 Test	OK		
100 % Average Test	OK	0.3 %	Limit met (0.003 A ≤ 0.880 A)
150 % Smoothed Test	OK	0.2 %	Limit met (0.003 A ≤ 1.320 A)
H7 Test	OK		
100 % Average Test	OK	0.6 %	Limit met (0.013 A ≤ 2.376 A)
150 % Smoothed Test	OK	0.4 %	Limit met (0.013 A ≤ 3.564 A)
H8 Test	OK		
100 % Average Test	OK	0.4 %	Limit met (0.003 A ≤ 0.660 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.003 A ≤ 0.990 A)
H9 Test	OK		
100 % Average Test	OK	1.2 %	Limit met (0.012 A ≤ 0.990 A)
150 % Smoothed Test	OK	0.8 %	Limit met (0.012 A ≤ 1.485 A)
H10 Test	OK		
100 % Average Test	OK	0.5 %	Limit met (0.002 A ≤ 0.528 A)
150 % Smoothed Test	OK	0.3 %	Limit met (0.002 A ≤ 0.792 A)

H11 Test	OK		
100 % Average Test	OK	1.1 %	Limit met (0.011 A ≤ 1.023 A)
150 % Smoothed Test	OK	0.7 %	Limit met (0.011 A ≤ 1.535 A)
H12 Test	OK		
100 % Average Test	OK	0.5 %	Limit met (0.002 A ≤ 0.440 A)
150 % Smoothed Test	OK	0.4 %	Limit met (0.002 A ≤ 0.660 A)
H13 Test	OK		
100 % Average Test	OK	1.6 %	Limit met (0.010 A ≤ 0.660 A)
150 % Smoothed Test	OK	1.1 %	Limit met (0.010 A ≤ 0.990 A)
THC Test	OK	0.5 %	THC ok (0.041 A ≤ 7.590 A)
PWHC Test	OK	1.4 %	PWHC ok (0.110 A ≤ 7.590 A)

6.4. Voltage changes, voltage fluctuations and flicker

6.4.1. Block diagram of test setup



6.4.2. Test Specification

Basic Standard(s)	:	☐EN 61000-3-3 ☒EN IEC 61000-3-11
Measurement Equipment requirement	:	IEC 61000-4-15
Limits	:	Clause 5

6.4.3. Test procedure

a. EUT is placed on a wooden table with a height of 0,8m/0.1m in the EMC lab.

b. Apply a 230V/50Hz or 400V/50Hz rated test voltage which shall be maintained within ±2.0% and the frequency within ±0.5% of the nominal value to EUT.

6.4.4.Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 2
Test Voltage :	AC 400V/50Hz		

Additional Measurands

f_{cycle}	50.0017 Hz	$P_{st,\ L1}(1)$	0.04955	$P_{st,\ L2}(1)$	0.0391
$P_{st,\ L3}(1)$	0.03316	$P_{st,\ L1}(2)$	0.04891	$P_{st,\ L2}(2)$	0.03847
$P_{st,\ L3}(2)$	0.03383	$P_{st,\ L1}(3)$	0.73105	$P_{st,\ L2}(3)$	0.70595
$P_{st,\ L3}(3)$	0.59971	$P_{st,\ L1}(4)$	0.05076	$P_{st,\ L2}(4)$	0.03912
$P_{st,\ L3}(4)$	0.03371	$P_{st,\ L1}(5)$	0.05057	$P_{st,\ L2}(5)$	0.03921
$P_{st,\ L3}(5)$	0.03337	$P_{st,\ L1}(6)$	0.04933	$P_{st,\ L2}(6)$	0.03853
$P_{st,\ L3}(6)$	0.0329	$P_{st,\ L1}(7)$	0.04993	$P_{st,\ L2}(7)$	0.03882
$P_{st,\ L3}(7)$	0.03328	$P_{st,\ L1}(8)$	0.04929	$P_{st,\ L2}(8)$	0.03885
$P_{st,\ L3}(8)$	0.03439	$P_{st,\ L1}(9)$	0.04931	$P_{st,\ L2}(9)$	0.03861
$P_{st,\ L3}(9)$	0.03329	$P_{st,\ L1}(10)$	0.04956	$P_{st,\ L2}(10)$	0.03837
$P_{st,\ L3}(10)$	0.0327	$P_{lt,\ L1}$	0.33965	$P_{lt,\ L2}$	0.32784
$P_{lt,\ L3}$	0.27851	$U_{trms,\ L1}$	228.209 V	$U_{trms,\ L2}$	228.403 V
$U_{trms,\ L3}$	228.44 V	$U_{pp,\ L1}$	646.041 V	$U_{pp,\ L2}$	646.463 V
$U_{pp,\ L3}$	646.384 V	$U_{dc,\ L1}$	-575.292 mV	$U_{dc,\ L2}$	-303.996 mV
$U_{dc,\ L3}$	-256.759 mV	$U_{cf,\ L1}$	1.41816	$U_{cf,\ L2}$	1.41647
$U_{cf,\ L3}$	1.4159	$I_{trms,\ L1}$	9.58264 A	$I_{trms,\ L2}$	9.62294 A
$I_{trms,\ L3}$	9.59805 A	$I_{pp,\ L1}$	27.319 A	$I_{pp,\ L2}$	27.2394 A
$I_{pp,\ L3}$	27.1632 A	$I_{dc,\ L1}$	-43.2896 mA	$I_{dc,\ L2}$	-18.6009 mA
$I_{dc,\ L3}$	-29.6693 mA	$I_{cf,\ L1}$	1.43188	$I_{cf,\ L2}$	1.4172
$I_{cf,\ L3}$	1.41814	P_{L1}	2.1868 kW	P_{L2}	2.19788 kW
P_{L3}	2.19255 kW	Q_{L1}	14.1119 var	Q_{L2}	10.8643 var
Q_{L3}	10.0583 var	S_{L1}	2.18684 kVA	S_{L2}	2.19791 kVA
S_{L3}	2.19257 kVA	PF_{L1}	0.99998	PF_{L2}	0.99999
PF_{L3}	0.99999				

Test Name	Test Result	Limit Usage	Info
dc Test [L1]	OK		
dmax Test [L1]	OK	48.0 %	1.92 % ≤ 4.00 %
Pst Test [L1]	OK	73.1 %	0.731 ≤ 1.000
Plt Test [L1]	OK	52.3 %	0.340 ≤ 0.650
tmax Test [L1]	OK		
dc Test [L2]	OK	32.5 %	1.07 % ≤ 3.30 %
dmax Test [L2]	OK	46.9 %	1.87 % ≤ 4.00 %
Pst Test [L2]	OK	70.6 %	0.706 ≤ 1.000
Plt Test [L2]	OK	50.4 %	0.328 ≤ 0.650
tmax Test [L2]	OK		
dc Test [L3]	OK	31.3 %	1.03 % ≤ 3.30 %
dmax Test [L3]	OK	40.5 %	1.62 % ≤ 4.00 %
Pst Test [L3]	OK	60.0 %	0.600 ≤ 1.000
Plt Test [L3]	OK	42.8 %	0.279 ≤ 0.650
tmax Test [L3]	OK		

7. Immunity

Performance criteria

Performance criterion A

The EUT shall continue to operate as intended within the tolerances defined by the EUT manufacturer during and after the application of the appropriate tests. It shall not change the state in which it is operating (i.e. charging shall continue if in charge mode and shall remain idle if in waiting mode)

Performance criterion B

The EUT shall continue to operate as intended within the tolerances defined by the EUT manufacturer at the completion of the applicable tests. Additionally, during the application of the appropriate tests the primary functions of the charger shall be maintained (within the tolerances defined by the EUT manufacturer). Secondary functions (for example displays, etc.) may degrade in performance during the test but shall resume to the original condition subsequent to testing. Subsequent to the application of the applicable test, the EUT shall not have changed the state in which it is operating (i.e. charging shall continue if in charge mode and shall remain idle if in waiting mode).

Performance criterion C

During and after completion of the appropriate tests, the EUT can change to a failsafe condition. This state requires user intervention to restart the charge cycle or the automatic resumption of charging if the safety condition have been fulfilled as defined in IEC 61851-1:2017 (simplified mode 3).

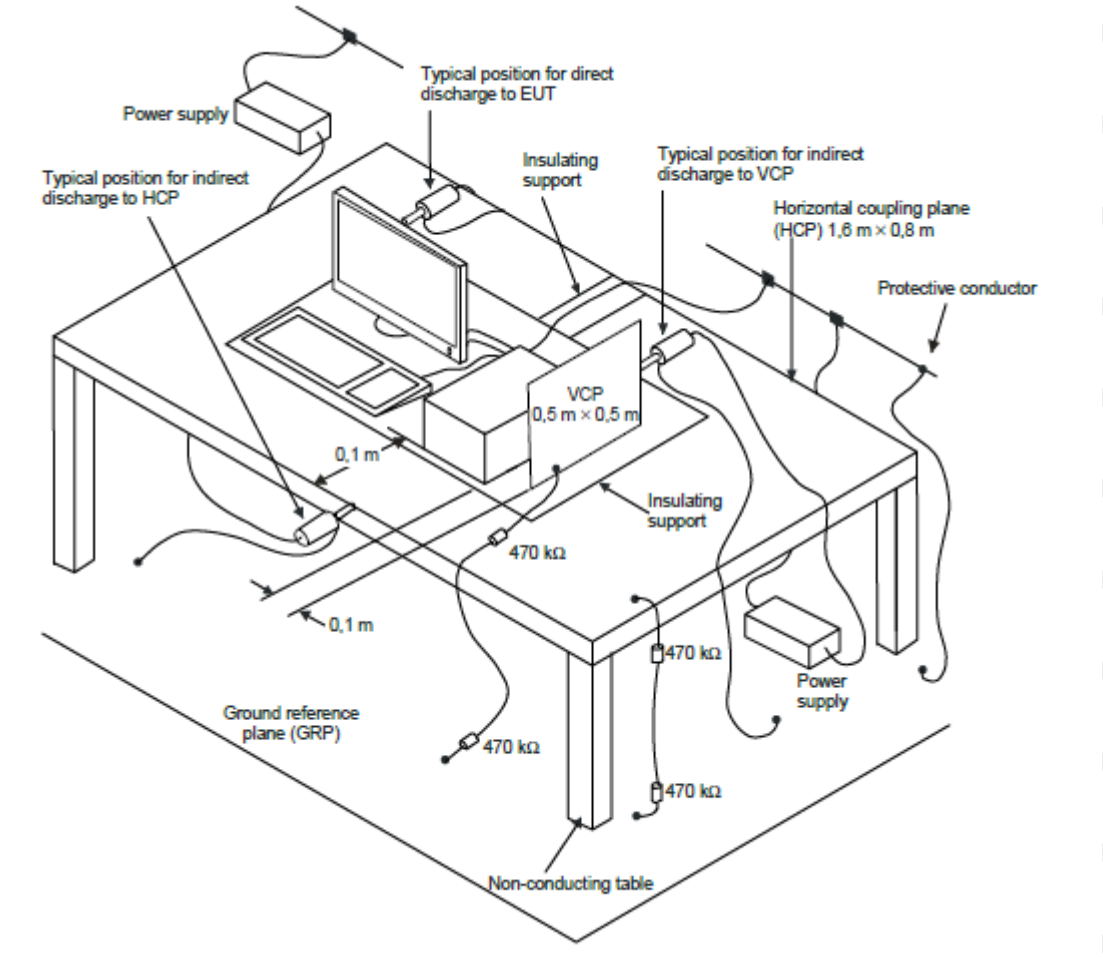
7.1. Electrostatic discharges

7.1.1. Test standard and Levels

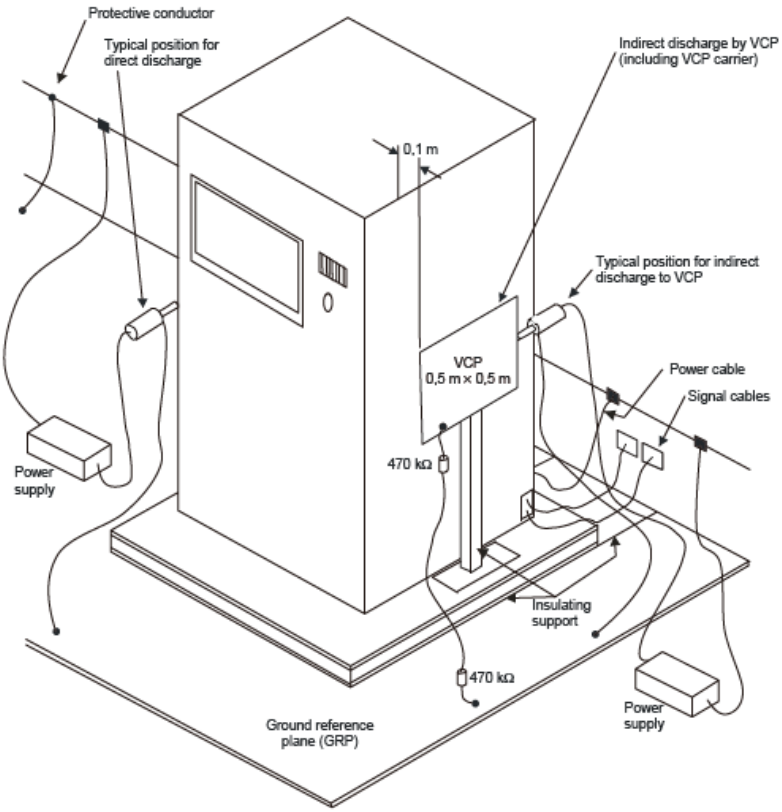
Environmental phenomenon	Test specifications	Basic standard
Electrostatic discharge	±8 kV air discharge	IEC 61000-4-2
	±4 kV contact discharge	

7.1.2. Block diagram of test setup

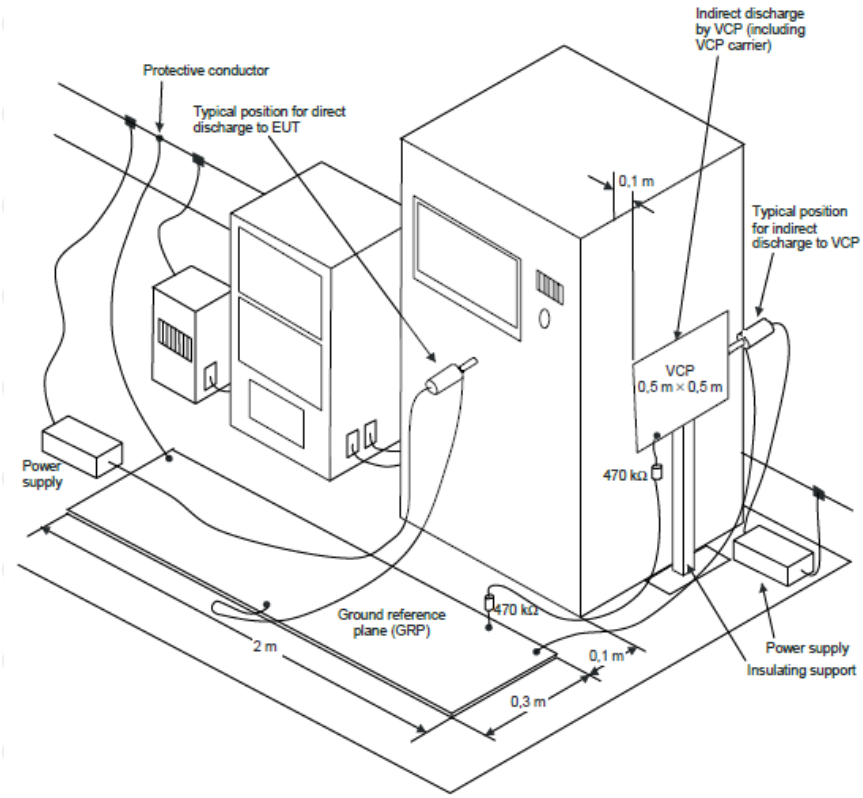
For table-top equipment



For floor standing equipment



For table-top & floor standing equipment



7.1.3. Test Procedure

1. Air discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

2. Contact discharge:

All the procedure shall be same as Section 1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

4. Indirect discharge for vertical coupling plane

At least 20 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.1.4. Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 1&Mode 2
Test Voltage :	AC 400V/50Hz		

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Performance Criterion	Required Criterion
Contact Discharge	Conductive Surfaces	4	10	B	A
	Indirect Discharge HCP	4	10	B	A
	Indirect Discharge VCP	4	10	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A
Note: N/A					

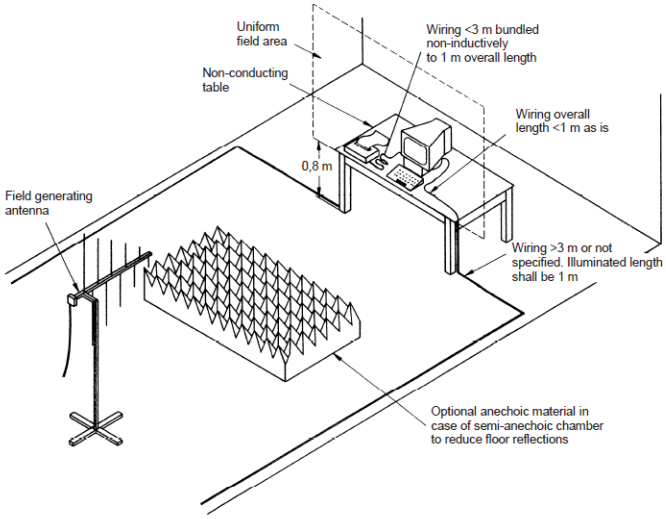
7.2. Radiated RF fields

7.2.1. Test standard and Levels

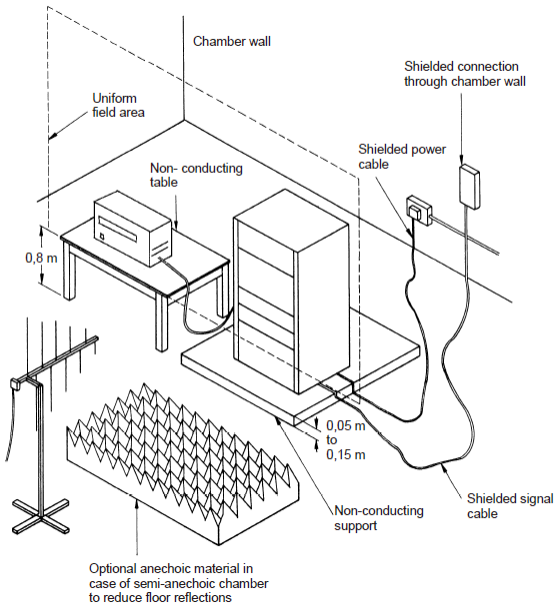
Characteristics	Test levels	Test levels	Basic standard
Frequency range	80 MHz to 1000 MHz	1400 MHz to 2000 MHz 2000 MHz to 2700 MHz	IEC 61000-4-3
Test level	3 V/m (unmodulated)	3 V/m (unmodulated)	
Modulation	1 kHz, 80 % AM, sine wave	1 kHz, 80 % AM, sine wave	

7.2.2. Block diagram of test setup

For table-top equipment



For floor standing equipment



7.2.3. Test Procedure

Measurement was performed in full-anechoic chamber.

Measurement procedure was applied according to EN 61000-4-3 clause 8.

The test method and equipment was specified by EN 61000-4-3.

7.2.4. Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 1&Mode 2
Test Voltage :	AC 400V/50Hz		

Frequency range [MHz]	Test Level [V/m]	Polarization	EUT Face	Performance Criterion	Required Criterion
80 to 1000, 1400 to 2000 2000 to 2700	3	Horizontal & Vertical	Front/ Rear	A	A
			Right/ Left	A	A
			Top/ Underside	A	A
Note: N/A					

7.3. Electrical fast transients/bursts

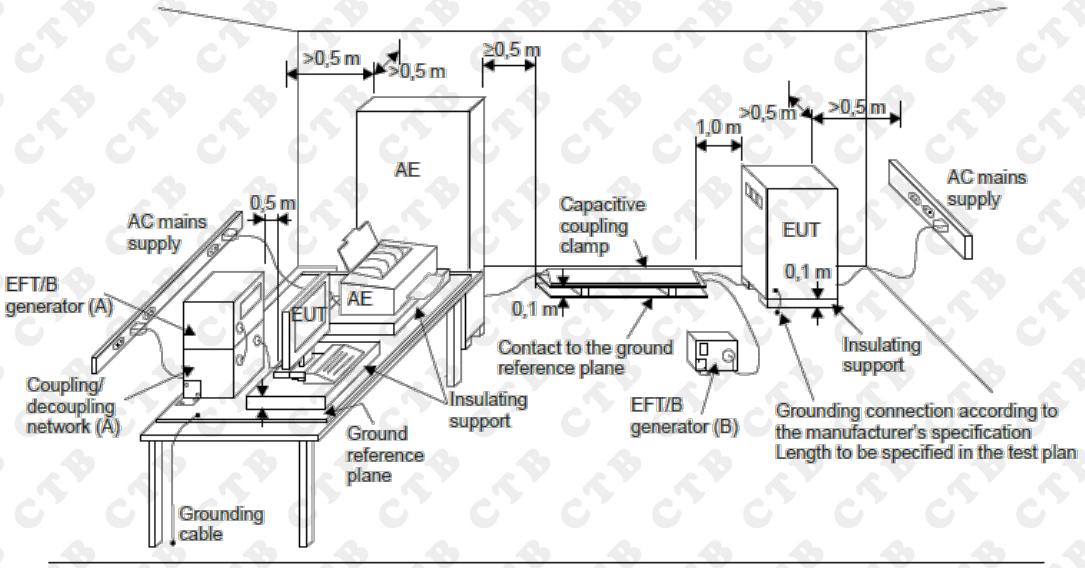
7.3.1. Test standard and Levels

Test levels at ports for Wired network and signal/control		
Characteristics	Test levels	Basic Standard
Open circuit test voltage	±1 kV	IEC 61000-4-4
Rise time/hold time	5/50 ns	
Repetition frequency	5 kHz	
Note1: Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specificationis greater than 3 m. Note2: Tested using the capacitive coupling clamp defined in IEC 61000-4-4:2012; at the CPT port, the clamp shall be over thewhole charging cable.		

Test levels at ports for CPT		
Characteristics	Test levels	Basic Standard
Open circuit test voltage	±2 kV	IEC 61000-4-4
Rise time/hold time	5/50 ns	
Repetition frequency	5 kHz	
Note1: Tests are not required if the power input and output are directly connected in charge mode using a mechanical switching device. Note2: Tested using the capacitive coupling clamp defined in IEC 61000-4-4:2012; at the CPT port, the clamp shall be over thewhole charging cable.		

Test levels at ports for Power input (AC)		
Characteristics	Test levels	Basic Standard
Open circuit test voltage	±2 kV	IEC 61000-4-4
Rise time/hold time	5/50 ns	
Repetition frequency	5 kHz	
Note 1: Test also applies to signal/control ports where they are directly connected to the power port (e.g. open relay contacts thatcan be directly connected to the AC mains). Note 2: For surge/burst testing, use a capable CDN.		

7.3.2. Block diagram of test setup



7.3.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-4 clause 8.

The test method and equipment was specified by EN 61000-4-4.

7.3.4. Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 1&Mode 2
Test Voltage :	AC 400V/50Hz		

Coupling	Voltage (kV)	Polarity	Performance Criterion	Required Criterion
AC Mains L1-L2-L3-N-P	2.0	±	B	A
Signal Line	2.0	±	B	N/A
DC Ports	2.0	±	B	N/A
Note: N/A				

7.4. Voltage Surges

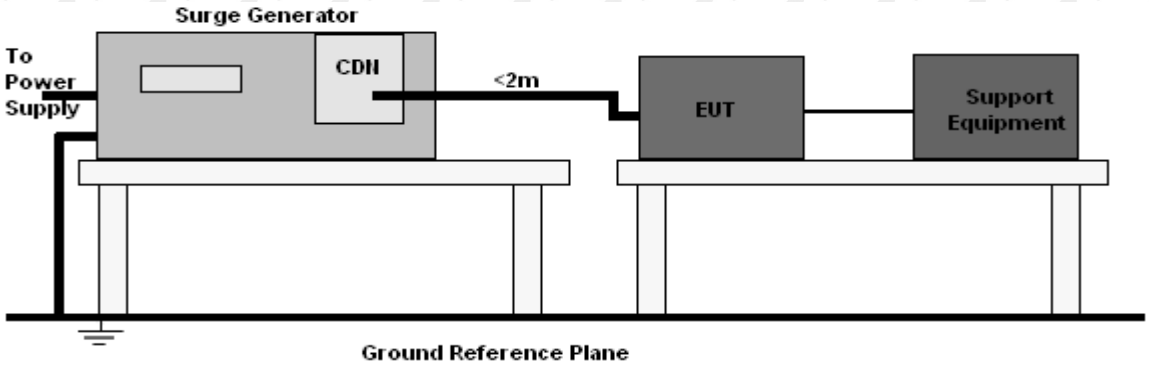
7.4.1. Test standard and Levels

Wired network and signal/control ports		
Environmental phenomenon	Test specifications	Basic Standard
Surge	1,2/50 (8/20) μs	IEC 61000-4-5
	±1 kV	
Note 1: Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification is greater than 30 m. Note 2: For surge/burst testing, use a capable CDN.		

CPT ports		
Environmental phenomenon	Test specifications	Basic Standard
Surge	1,2/50 (8/20) μs	IEC 61000-4-5
	±2 kV line-to-earth	
	±1 kV line-to-line	
Note 1: Tests are not required if the power input and output are directly connected in charge mode using a mechanical switching device. Note 2: Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification is greater than 30 m. Note 3: Tests shall be done only in charge mode (surge: since surge protection devices wear out; magnetic field: charge current has influence). Note 4: For surge on power lines of CPT port, use a capable CDN.		

Power input (AC) ports		
Environmental phenomenon	Test specifications	Basic Standard
Surge	1,2/50 (8/20) μs	IEC 61000-4-5
	±2 kV line-to-earth	
	±1 kV line-to-line	
Note 1: Tests shall be done only in charge mode (surge: since surge protection devices wear out; magnetic field: charge current has influence). Note 2: For surge/burst testing, use a capable CDN.		

7.4.2. Block diagram of test setup



7.4.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-5 clause 8.

The test method and equipment was specified by EN 61000-4-5.

7.4.4. Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 1&Mode 2
Test Voltage :	AC 400V/50Hz		

Coupling	Level [kV]	Polarity	Phase angles [°]	Performance Criterion	Required Criterion
L1-L2-L3-to-Neutral	1	±	0, 90, 180, 270	B	A
L1-L2-L3-to-Earth	2	±	0, 90, 180, 270	B	A
Neutral-to-Earth	2	±	0, 90, 180, 270	B	A
Note: N/A					

7.5. Conducted RF fields

7.5.1. Test standard and Levels

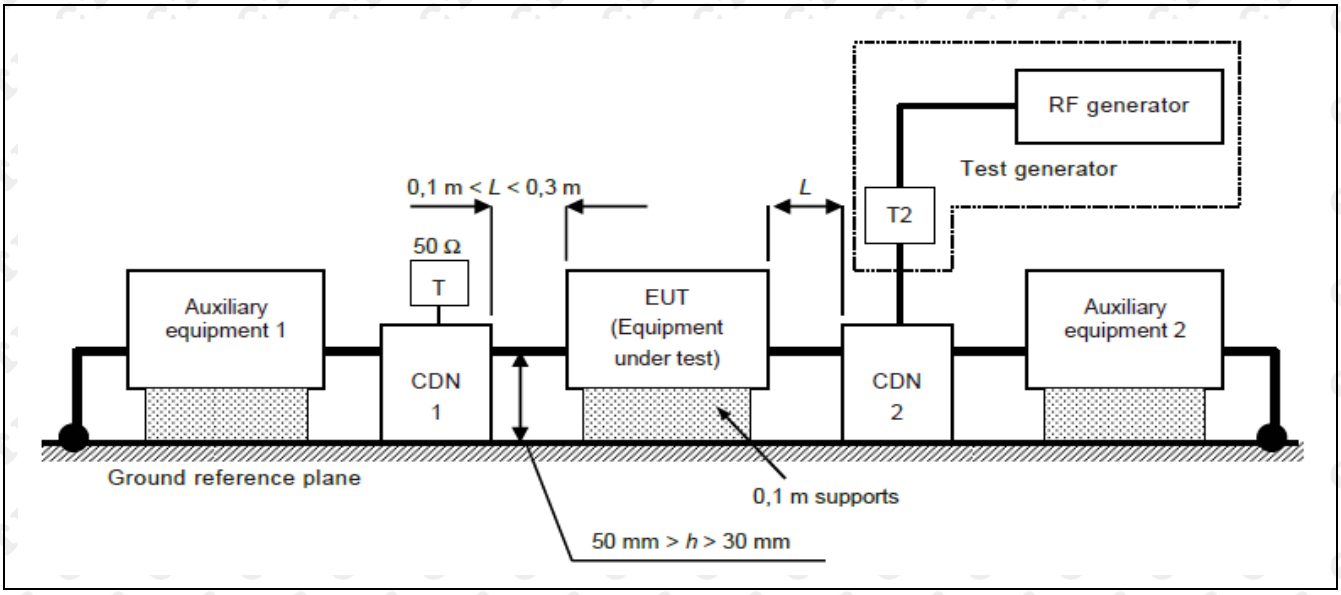
Wired network and signal/control ports		
Environmental phenomenon	Test specifications	Basic Standard
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 80 MHz, 3 V	IEC 61000-4-6
Note : Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specificationl is greater than 3 m.		

CPT ports		
Environmental phenomenon	Test specifications	Basic Standard
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 80 MHz, 10 V	IEC 61000-4-6
Note 1: The test level specified is the RMS value of the unmodulated carrier. Note 2: Tested using the EM coupling clamp defined in IEC 61000-4-6:2013; at the CPT port, the clamp shall be over the whole charging cable.		

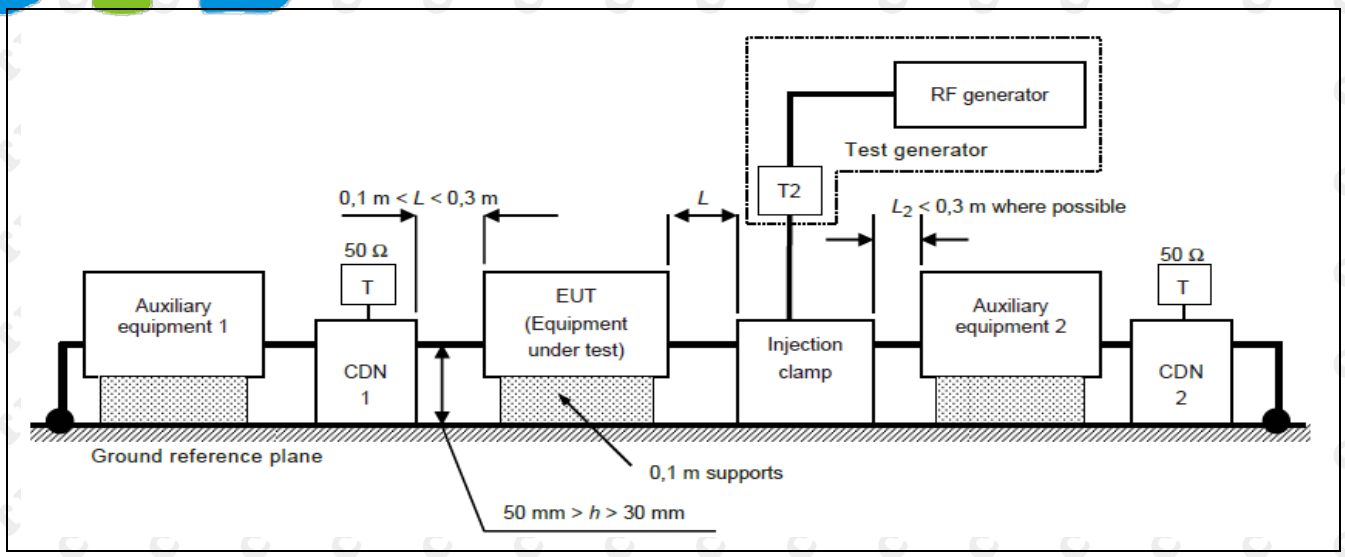
Power input (AC) ports		
Environmental phenomenon	Test specifications	Basic Standard
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 80 MHz, 3 V	IEC 61000-4-6
Note: The test level specified is the RMS value of the unmodulated carrier.		

7.5.2. Block diagram of test setup

For input a.c. power port:



For signal lines and control lines:



7.5.3. Test Procedure

Measurement procedure was applied according to EN 61000-4-6 clause 8.

The test method and equipment was specified by EN 61000-4-6.

7.5.4. Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 1&Mode 2
Test Voltage :	AC 400V/50Hz		

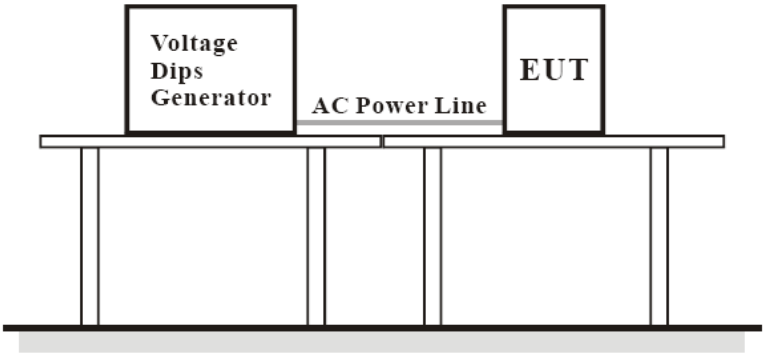
Inject Line	Frequency (MHz)	Voltage Level (V r.m.s.)	Performance Criterion	Required Criterion
a.c. port	0.15 - 80	3	A	A
CPT Ports	0.15 - 80	3	A	N/A
Signal Ports	0.15 - 80	3	A	N/A
Note: N/A				

7.6. Voltage dips and interruptions

7.6.1. Test standard and Levels

Environmental phenomena		Test level in % U_T	Durations for Voltage dips and interruptions		Basic standard
			50Hz	60Hz	
Voltage dips in % U_T	100	0	1 cycle	1 cycle	IEC 61000-4-11(≤ 16A) IEC 61000-4-34(> 16A) Voltage change shall occur at zero crossing
	60	40	10 cycle	12 cycle	
	30	70	25 cycle	30 cycle	
	100	0	250 cycle	300 cycle	
U_T is the rated voltage of the equipment under test.					

7.6.2. Block diagram of test setup



7.6.3. Test Procedure

Measurement was performed in shielded room.
Measurement procedure was applied according to EN 61000-4-11 clause 8.
The test method and equipment was specified by EN 61000-4-11.

7.6.4. Test Result

Temperature:	23℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Mode:	Mode 1&Mode 2
Test Voltage :	AC 400V/50Hz		

Test Level % U_T	Voltage dips in % U_T	Duration (cycles)		Performance Criterion	Required Criterion
		50Hz	60Hz		
40	60	10	12	B	B
70	30	25	30	B	B
0	30	1	1	B	B
0	100	250	300	C	B
Note: The EUT test is completed, the system automatically recovers to normal operation.					

8. Photographs of test setup

RE



CE



H&F



ESD



Surge



EFT



Dips



CS



RS



9. Photographs of EUT

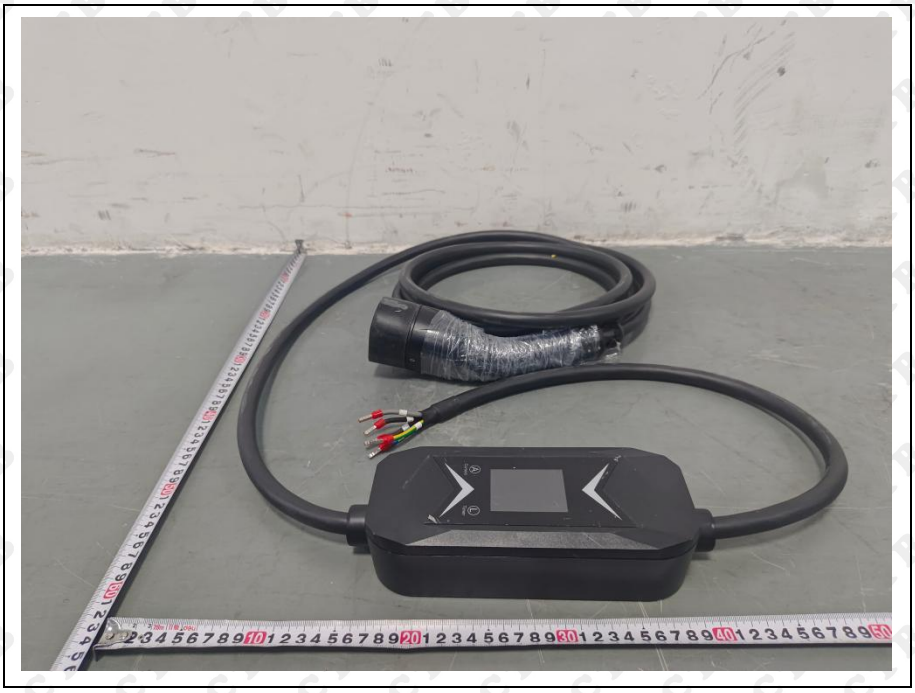
EUT photo 1



EUT photo 2



EUT photo 3



EUT photo 4



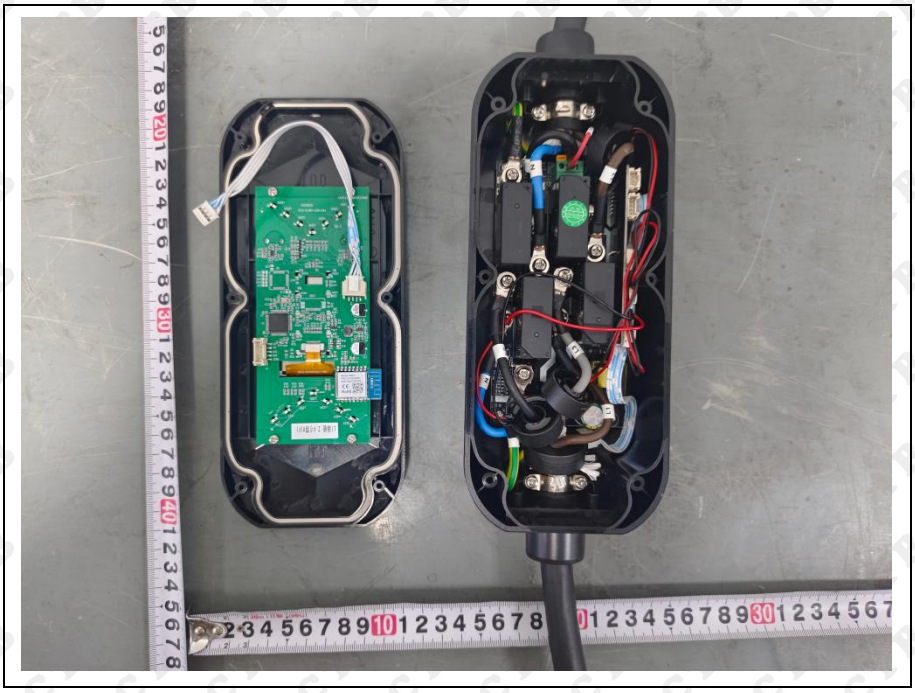
EUT photo 5



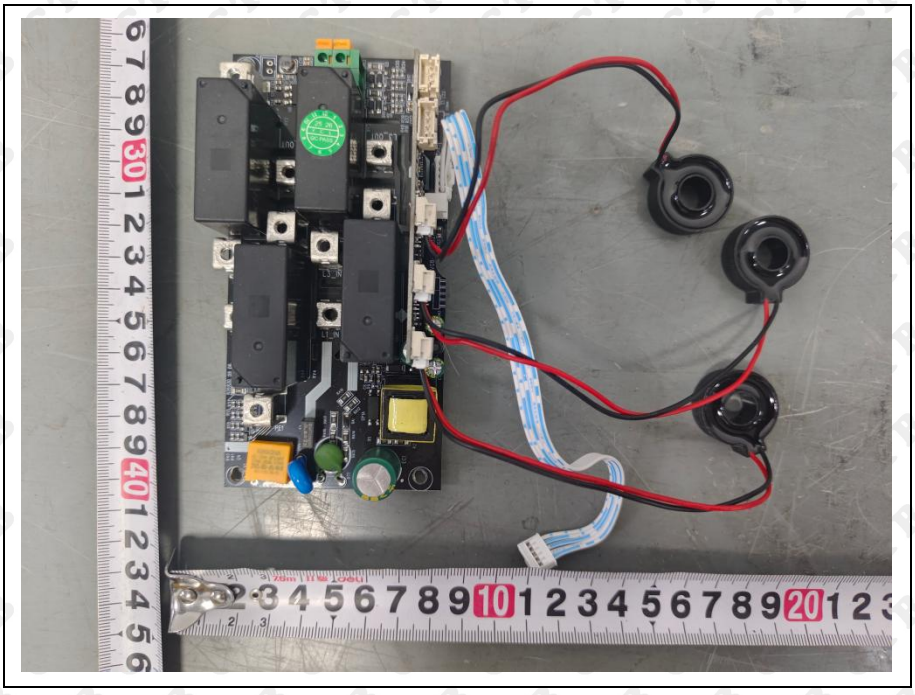
EUT photo 6



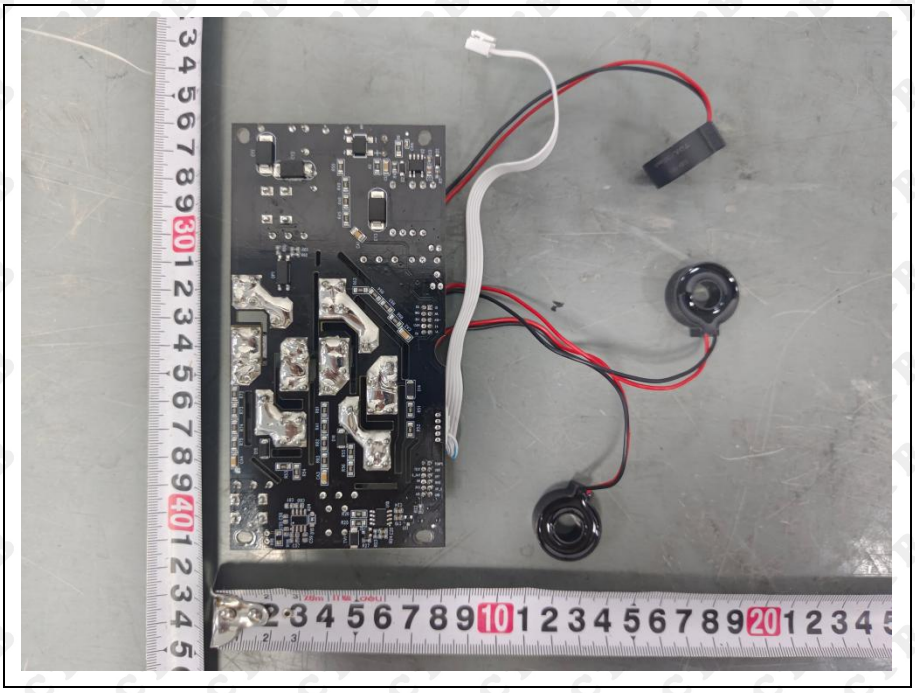
EUT photo 7



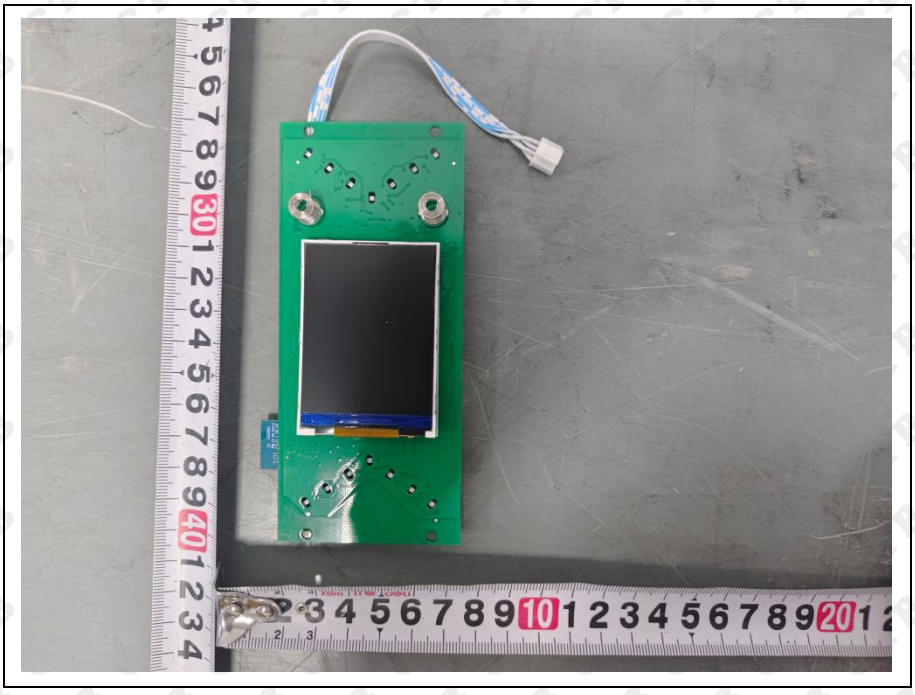
EUT photo 8



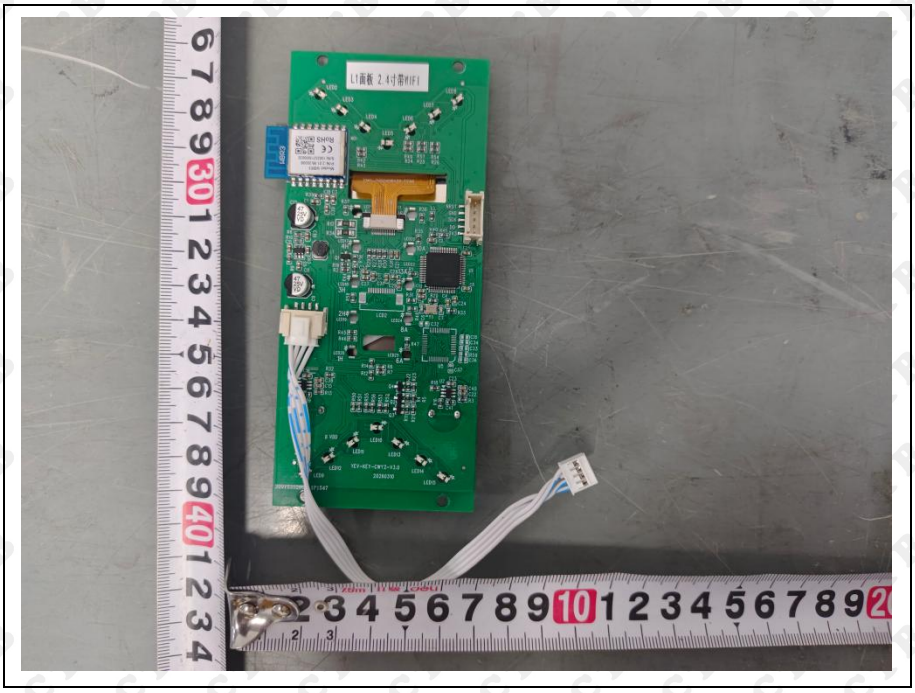
EUT photo 9



EUT photo 10



EUT photo 11



EUT photo 12



EUT photo 13



EUT photo 14



EUT photo 15



EUT photo 16



EUT photo 17



EUT photo 18



EUT photo 19



EUT photo 20



EUT photo 21



EUT photo 22



EUT photo 23



EUT photo 24



EUT photo 25



EUT photo 26



EUT photo 27



EUT photo 28



EUT photo 29



EUT photo 30



EUT photo 31



EUT photo 32



EUT photo 33



EUT photo 34



EUT photo 35



EUT photo 36



EUT photo 37



EUT photo 38



EUT photo 39



EUT photo 40



EUT photo 41



EUT photo 42



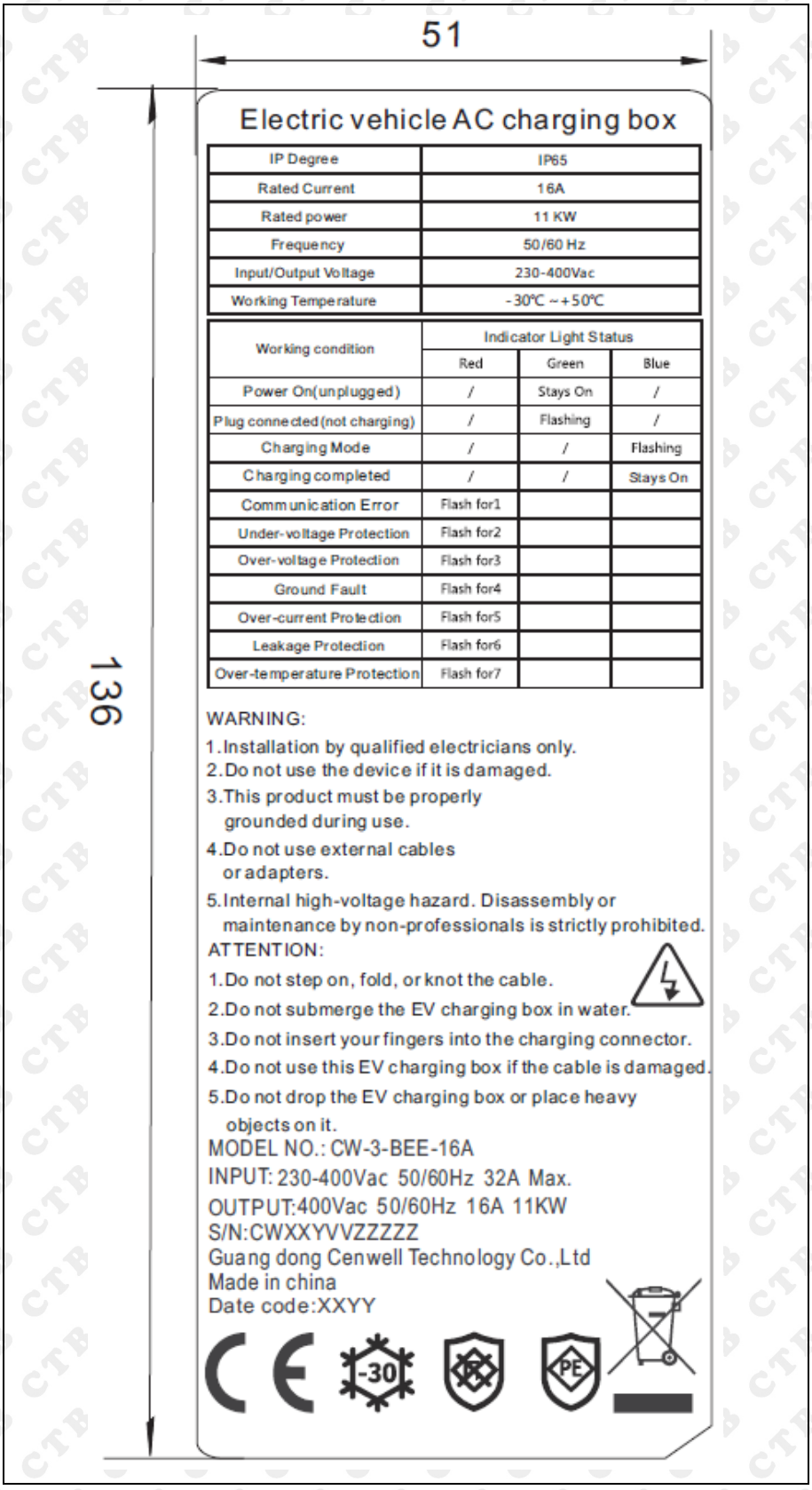
EUT photo 43



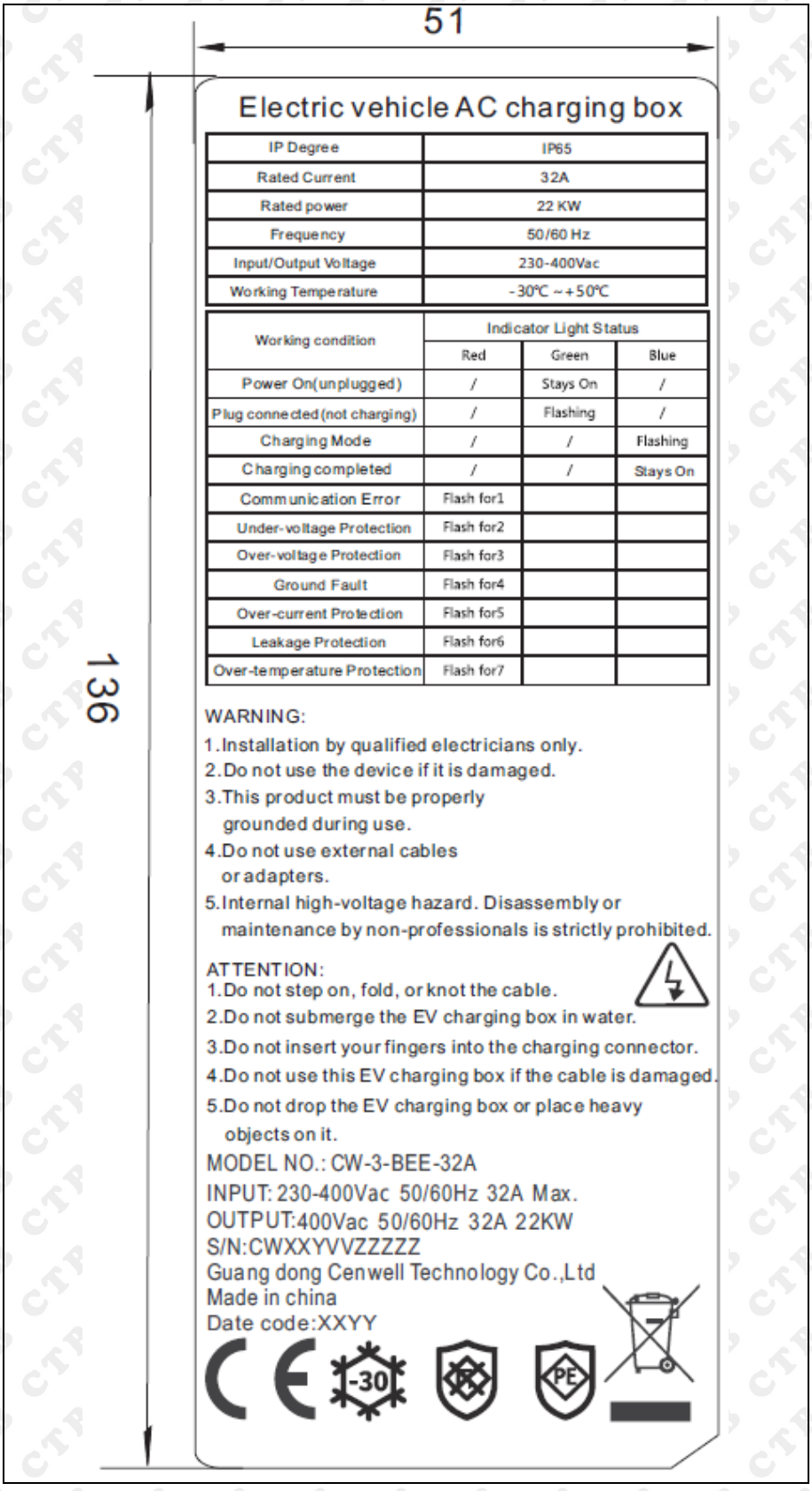
EUT photo 44



EUT photo 45


51
136
Electric vehicle AC charging box
IP Degree IP65
Rated Current 16A
Rated power 11 KW
Frequency 50/60 Hz
Input/Output Voltage 230-400Vac
Working Temperature -30℃ ~+50℃
Working condition
Indicator Light Status
Red Green Blue
Power On(unplugged) / Stays On /
Plug connected(not charging) / Flashing /
Charging Mode / / Flashing
Charging completed / / Stays On
Communication Error Flash for1
Under-voltage Protection Flash for2
Over-voltage Protection Flash for3
Ground Fault Flash for4
Over-current Protection Flash for5
Leakage Protection Flash for6
Over-temperature Protection Flash for7
WARNING:
1.Installation by qualified electricians only.
2.Do not use the device if it is damaged.
3.This product must be properly grounded during use.
4.Do not use external cables or adapters.
5.Internal high-voltage hazard. Disassembly or maintenance by non-professionals is strictly prohibited.
ATTENTION:
1.Do not step on, fold, or knot the cable.
2.Do not submerge the EV charging box in water.
3.Do not insert your fingers into the charging connector.
4.Do not use this EV charging box if the cable is damaged.
5.Do not drop the EV charging box or place heavy objects on it.
MODEL NO.: CW-3-BEE-16A
INPUT: 230-400Vac 50/60Hz 32A Max.
OUTPUT:400Vac 50/60Hz 16A 11KW
S/N:CWXXYVVZZZZZ
Guang dong Cenwell Technology Co.,Ltd
Made in china
Date code:XXYY
-30
PE

EUT photo 46



End of report