PRO EM235/PM335 Power Quality Class S Test Report

Model:	PRO EM235/PM335 Series
P/N:	PM335-5-50/EM235-5-50
S/N:	662779/665066
Testing date:	1.08.2022 – 07.09.2022
Tested by:	SATEC

The equipment used in the tests:

Model:	CMC 256 Plus
Manufacturer:	OMICRON
S/N:	AN843T
Certificate No:	22ATKA02018

Environment:

Temperature: 23 ± 2C, humidity 40 ÷ 65%

Testing standard:

Tested according to IEC61000-4-30.

Test conditions:

- In accordance with section 6 of IEC 61000-4-30 standard tests were provided at different values of the influence quantities under three different test conditions.
- The testing parameters adapted according to the testing equipment ability.
- All values are determined according to the standard unless otherwise stated.

Contents

1. Reference

1.1 International standards

1. EN50160: Voltage characteristics of electricity supplied by public electricity networks
2. IEC61000-4-30: Testing and measurement techniques – Power quality measurement methods
3. IEC61000-4-15: Testing and measurement techniques – Flickermeter – Functional and design specifications
4. IEC61000-4-7: Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto.
5. IEC61000-2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances

2. Frequency

2.1 Test State 1

2.2 General test parameters

- Nominal frequency: $f_n = 50Hz$.
- Five frequency points: 42.5, 46.25, 50, 53.75, and 57.5Hz.
- Permitted uncertainty (permitted max error according to the standard): 0.05Hz.

2.2.1 Test parameters

- Nominal voltage $U_n = 230$v.
- The test was performed without the influences of flicker, unbalance, harmonics, and interharmonics.

2.2.2 Test results

	Reference freq (Hz)	Measured freq (Hz)	Error (Hz)	Status
Point 1	42.5	42.5	0	Pass
Point 2	46.25	46.25	0	Pass
Point 3	50	50	0	Pass
Point 4	53.75	53.75	0	Pass
Point 5	57.5	57.5	0	Pass

2.3 Test State 2:

2.3.1 Test parameters

- Nominal voltage $U_n = 230$v.
- Flicker voltage modulation: $\Delta V = 2.055$v.
- Unbalance voltage: $U_{Phase\ 1} = 0.73U_n, U_{Phase\ 2} = 0.8U_n, U_{Phase\ 3} = 0.87U_n$.
- Harmonics voltage: U_3= 23v, U_5 = 11.5v, U_{29}= 11.5v.
- The phase angles of harmonics: $\varphi_3 = \varphi_5 = \varphi_{29}$ = 0deg.
- Interharmonic voltage: 2.3v (375Hz).

2.3.2 Test results

	Reference freq (Hz)	Measured freq (Hz)	Error (Hz)	Status
Point 1	42.5	42.5	0	Pass
Point 2	46.25	46.25	0	Pass
Point 3	50	50	0	Pass
Point 4	53.75	53.75	0	Pass
Point 5	57.5	57.5	0	Pass

2.4 Test State 3:

2.4.1 Test parameters

- Nominal voltage $U_n = 230$v.
  (In test state 3, all influence quantities were chosen from *Un=230v* except for unbalance. For that influence quantities $U_{n2} = 157$v nominal voltage was chosen.)
- Unbalance voltage: $U_{Phase\ 1} = 1.52U_{n2}, U_{Phase\ 2} = 1.4U_{n2}, U_{Phase\ 3} = 1.28U_{n2}$.
- Harmonics voltage: U_7= 23v, U_{13} = 11.5v, U_{25}= 11.5v.
- The phase angles of harmonics: φ_7 =180deg, $\varphi_{13} = \varphi_{25}$ = 0deg.
- Interharmonic voltage: 2.3v (175Hz).
- Flicker voltage modulation: $\Delta V = 6.64$v.

2.4.2 Test results

	Reference freq (Hz)	Measured freq (Hz)	Error (Hz)	Status
Point 1	42.5	42.5	0	Pass
Point 2	46.25	46.25	0	Pass
Point 3	50	50	0	Pass
Point 4	53.75	53.75	0	Pass
Point 5	57.5	57.5	0	Pass

3. Voltage magnitude

3.1 Test State 1:

3.1.1 Test parameters

- Nominal voltage $U_n = 230$v.
- Nominal frequency: $f_n = 50Hz$.
- Five U_{din} voltage points: $0.2U_n, 0.45U_n, 0.7U_n, 0.95U_n, 1.2U_n$.
- Test voltage: $U_{test} = U_{din}$
- Permitted uncertainty: 0.5% of U_{din}.
- The test was performed without the influences of flicker, unbalance, harmonics, and interharmonics.

3.1.2 Test results

Point 1: U_{din}= $0.2U_n = 46$v				
	U_{test} (V)	$U_{measured}$ (V)	Error (%)	Status
Phase 1	46	46.058	0.126	Pass
Phase 2	46	46.013	0.028	Pass
Phase 3	46	45.981	0.041	Pass
Point 2: $U_{din} = 0.45U_n = 103.5$v				
	U_{test} (V)	$U_{measured}$ (V)	Error (%)	Status
Phase 1	103.5	103.6	0.096	Pass
Phase 2	103.5	103.554	0.052	Pass
Phase 3	103.5	103.535	0.033	Pass
Point 3: $U_{din} = 0.7U_n = 161$v				
	U_{test} (V)	$U_{measured}$ (V)	Error (%)	Status
Phase 1	161	161.126	0.078	Pass
Phase 2	161	161.083	0.051	Pass
Phase 3	161	161.003	0.001	Pass
Point 4: U_{din}= $0.95U_n = 218.5$v				
	U_{test} (V)	$U_{measured}$ (V)	Error (%)	**Status**
Phase 1	218.5	218.597	0.044	Pass
Phase 2	218.5	218.573	0.033	Pass
Phase 3	218.5	218.481	0.009	Pass
Point 5: $U_{din} = 1.2U_n = 276$v				
	U_{test} (V)	$U_{measured}$ (V)	Error (%)	**Status**
Phase 1	276	276.16	0.057	Pass
Phase 2	276	276.16	0.057	Pass
Phase 3	276	276.024	0.008	Pass

3.2 Test State 2

3.2.1 Test parameters

- Nominal voltage: $U_n = 230v$.
- Nominal frequency: $f_n = 50Hz$.
- Five U_{din} voltage points: $0.2U_n, 0.45U_n, 0.7U_n, 0.95U_n, 1.2U_n$.
- Flicker voltage modulation: $\Delta V = 2.055$v.
- Test frequency: f_{test}= *49Hz* (found as $f_n - 1Hz$).
- Permitted uncertainty: 0.5% of U_{test} (U_{test} includes phase unbalance, harmonics, interharmonics, and flicker RMS magnitude).
- Unbalance voltage: $U_{Phase\ 1} = 0.73U_{din}, U_{Phase\ 2} = 0.8U_{din}, U_{Phase\ 3} = 0.87U_{din}$.
- The phase angles of harmonics: $\varphi_3 = \varphi_5 = \varphi_{29} = 0$deg.

3.2.2 Test results

Point 1:
$U_{din} = 0.2U_n = 46$v
Harmonics voltage: U_3= 4.6v, U_5 = 2.3v, U_{29}= 2.3v.
Interharmonic voltage: 0.46v (375Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	35.066	35.076	0.0282	33.039	32.922	0.356	Pass
Phase 2	38.247	38.221	0.069	36.216	36.105	0.307	Pass
Phase 3	41.434	41.418	0.040	39.40	39.488	0.223	Pass

Point 2:
$U_{din} = 0.45U_n = 103.5$v
Harmonics voltage: U_3= 10.35v, U_5 = 5.175v, U_{29}=5.175v.
Interharmonic voltage: 1.035v (375Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	77.631	77.708	0.098	75.604	75.683	0.103	Pass
Phase 2	84.786	84.804	0.020	82.755	82.759	0.004	Pass
Phase 3	91.956	91.951	0.005	89.921	89.888	0.037	Pass

Point 3:
$U_{din} = 0.7U_n = 161$v
Harmonics voltage: U_3= 16.1v, U_5 = 8.05v, U_{29}=8.05v.
Interharmonic voltage: 1.61v (375Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	120.196	120.259	0.051	118.170	118.247	0.064	Pass
Phase 2	131.326	131.383	0.043	129.295	129.405	0.085	Pass
Phase 3	142.477	142.541	0.044	140.442	140.413	0.021	Pass

Point 4:
$U_{din} = 0.95U_n = 218.5$v
Harmonics voltage: U_3= 21.85v, U_5 = 10.925v, U_{29}=10.925v.
Interharmonic voltage: 2.185v (375Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	162.762	162.81	0.029	160.735	160.707	0.018	Pass
Phase 2	177.865	177.914	0.027	175.834	175.955	0.068	Pass
Phase 3	192.999	192.998	0.000	190.964	190.888	0.040	Pass

Point 5:
$U_{din} = 1.2U_n = 276$v
Harmonics voltage: U_3= 27.6v, U_5 = 13.8v, U_{29}=13.8v.
Interharmonic voltage: 1.38v.

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	205.327	205.318	0.004	203.301	203.306	0.002	Pass
Phase 2	224.405	224.456	0.022	222.374	222.566	0.086	Pass
Phase 3	243.520	243.58	0.024	241.485	241.307	0.074	Pass

3.3 Test State 3

3.3.1 Test parameters

- Nominal voltage: $U_n = 190v$.
- Nominal frequency: $f_n = 50Hz$
- Four U_{din} voltage points: $0.2U_n, 0.45U_n, 0.7U_n, 0.90U_n$.
- Flicker voltage modulation: $\Delta V = 5.487$v.
- Test frequency: f_{test}=51Hz ($f_n + 1Hz$).
- Permitted uncertainty: 0.5% of U_{test} (U_{test} includes phase unbalance, harmonics, interharmonics, and flicker RMS magnitude).
- Unbalance voltage: $U_{Phase\ 1} = 1.52U_{din}, U_{Phase\ 2} = 1.4U_{din}, U_{Phase\ 3} = 1.28U_{din}$.
- The phase angles of harmonics: φ_7=180deg, $\varphi_{13} = \varphi_{25}$ = 0deg.

3.3.2 Test results

Point 1:
$U_{din} = 0.2U_n = 38$v
Harmonics voltage: U_7= 3.8v, U_{13} = 1.9v, U_{25}= 1.9v.
Interharmonic voltage: 0.38v (175Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	60.683	60.952	0.442	55.214	55.195	0.034	Pass
Phase 2	56.138	56.082	0.09	50.672	50.688	0.031	Pass
Phase 3	51.595	51.509	0.167	46.133	46.181	0.103	Pass

Point 2:
$U_{din} = 0.45U_n = 85.5$v
Harmonics voltage: U_7= 8.55v, U_{13} = 4.275v, U_{25}= 4.275v.
Interharmonic voltage: 0.855v (175Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	133.118	133.314	0.146	127.649	127.582	0.052	Pass
Phase 2	122.893	122.604	0.235	117.427	117.46	0.027	Pass
Phase 3	112.674	112.772	0.086	107.212	107.37	0.146	Pass

Point 3:
$U_{din} = 0.7U_n = 133$v
Harmonics voltage: U_7= 13.3v, U_{13} = 6.65v, U_{25}= 6.65v.
Interharmonic voltage: 1.33v (175Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	205.554	205.847	0.142	200.085	200.124	0.019	Pass
Phase 2	189.649	189.124	0.276	184.183	184.199	0.008	Pass
Phase 3	173.753	173.952	0.114	168.291	168.352	0.035	Pass

Point 4:
$U_{din} = 0.9U_n = 171$v
Harmonics voltage: U_7= 17.1v, U_{13} = 8.55v, U_{25}= 8.55v.
Interharmonic voltage: 1.71v (175Hz).

	U_{test}^{max} (V)	$U_{measured}^{max}$ (V)	U^{max} Error (%)	U_{test}^{min} (V)	$U_{measured}^{min}$ (V)	U^{min} Error (%)	Status
Phase 1	263.502	263.465	0.014	258.033	258.061	0.010	Pass
Phase 2	243.053	243.066	0.005	237.587	237.588	0.000	Pass
Phase 3	222.617	222.604	0.006	217.155	217.207	0.023	Pass

4. Supply voltage unbalance

4.1 General test parameters

- Five test points:

1. $u_2 = 1\%$ & $u_0 = 5\%$
2. $u_2 = 2\%$ & $u_0 = 4\%$
3. $u_2 = 3\%$ & $u_0 = 3\%$
4. $u_2 = 4\%$ & $u_0 = 2\%$
5. $u_2 = 5\%$ & $u_0 = 1\%$.

- Permitted Uncertainty: 0.3% for u_2 and u_0.
- The negative sequence ratio is $u_2 = \frac{U_2}{U_1}$ and the zero-sequence ratio is $u_0 = \frac{U_0}{U_1}$ (U_1 is the positive sequence component, U_2 is the negative sequence component, and U_0 is the zero-sequence component).

4.2 Test State 1

4.2.1 Test parameters

- Positive sequence: $U_1 = 230$v.
- Test frequency: $f_{test} = f_n = 50Hz$.
- The test was performed without the influence of flicker, unbalance, harmonics, and interharmonics.

4.2.2 Test results

	u_2 (%)	u_0 (%)	u_2 measured (%)	u_0 measured (%)	u_2 error (%)	u_0 error (%)	Status
Point 1	1	5	1	5	0	0	Pass
Point 2	2	4	2	4	0	0	Pass
Point 3	3	3	3	3	0	0	Pass
Point 4	4	2	4	2	0	0	Pass
Point 5	5	1	5	1	0	0	Pass

4.3 Test State 2

4.3.1 Test parameters

- Positive sequence: $U_1 = 230$v.
- Test frequency: f_{test}= *49Hz* ($found\ as\ f_n - 1Hz$).
- Flicker voltage modulation: $\Delta V = 2.055$.
- Harmonics voltage: U_3= 23v, U_5 = 11.5v, U_{29}= 11.5v.
- The phase angles of harmonics: $\varphi_3 = \varphi_5 = \varphi_{29}$ = 0deg.
- Interharmonic voltage: 2.3v (375Hz).

4.3.2 Test results

	u_2 (%)	u_0 (%)	u_2 measured (%)	u_0 measured (%)	u_2 error (%)	u_0 error (%)	Status
Point 1	1	5	1	5	0	0	Pass
Point 2	2	4	2.2	4	0.2	0	Pass
Point 3	3	3	3	3	0	0	Pass
Point 4	4	2	4.1	1.9	0.1	0.1	Pass
Point 5	5	1	4.8	1	0.2	0	Pass

4.4 Test State 3

4.4.1 Test parameters

- Positive sequence: $U_1 = 190$v.
- Test frequency: $f_{test} = f_n + 1Hz = 51Hz$.
- Flicker voltage modulation: $\Delta V = 5.487$v.
- Harmonics voltage: U_7= 19v, U_{13} = 9.5v, U_{25}= 9.5v.
- The phase angles of harmonics: φ_7 =180deg, φ_{13} = φ_{25} = 0deg.
- Interharmonic voltage: 1.9v (175Hz).

4.4.2 Test results

	u_2 (%)	u_0 (%)	u_2 measured (%)	u_0 measured (%)	u_2 error (%)	u_0 error (%)	**Status**
Point 1	1	5	1	5.1	0	0.1	Pass
Point 2	2	4	1.8	3.9	0.2	0.1	Pass
Point 3	3	3	2.7	2.9	0.3	0.1	Pass
Point 4	4	2	3.7	1.8	0.3	0.2	Pass
Point 5	5	1	5.1	0.9	0.1	0.1	Pass

5. Voltage Dip

5.1 Test parameters

- Nominal voltage $U_n = 230$v.
- Nominal frequency: $f_n = 50Hz$.
- Threshold: $0.89U_n$ (*204.7v*)
- Hysteresis: $0.02U_n$ (*4.6v*)
- Permitted voltage uncertainty: *1%* of U_n (*2.3v*)
- Permitted duration uncertainty: 1-cycle (*0.02sec*)
- The test was performed without the influence of flicker, unbalance, harmonics, and interharmonics.

5.2 Test results

Event 1

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Duration (sec)				
204.7	230	230	0.04	0 - 0.04				
Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	204.7	0.04	V1	204.7	0.03	0.01	0	Pass

Event 2

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Duration (sec)				
204.7	197.8	230	1.2	0 - 1.2				
Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	204.7	1.2	V1	204.6	1.203	0.003	0.1	Pass
V2	197.8	1.2	V2	197.8	1.203	0.003	0	Pass

Event 3

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Duration (sec)
204.7	202.4	200.1	0.44	0 - 0.44

Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	204.7	0.44	V1	204.7	0.437	0.003	0	Pass
V2	202.4	0.44	V2	202.4	0.437	0.003	0	Pass
V3	200.1	0.44	V3	200.1	0.437	0.003	0	Pass

Event 4

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Duration (sec)
230	204.7	34.5	0.5	0 - 0.5
193.2	163.3	230	0.055	0.5 - 0.555

Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	193.2	0.555	V1	193.2	0.563	0.008	0	Pass
V2	163.3	0.555	V2	163.3	0.563	0.008	0	Pass
V3	34.6	0.555	V3	34.5	0.563	0.008	0.1	Pass

Event 5

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Duration (sec)
230	115	230	0.16	0 - 0.16
230	230	115	0.1	0.16 - 0.26
230	230	115	0.877	0.26 - 1.137

Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V2	115	1.137	V2	115	1.147	0.01	0	Pass
V3	115	1.137	V3	115.1	1.147	0.01	0.1	Pass

6. Voltage Swell

6.1 Test parameters

- Nominal voltage $U_n = 230v$.
- Nominal frequency: $f_n = 50Hz$.
- Threshold: $1.1U_n$ (*253v*)
- Hysteresis: $0.02U_n$ (*4.6v*)
- Permitted voltage uncertainty: *1%* of U_n (*2.3v*)
- Permitted duration uncertainty: 1-cycle (*0.02sec*)
- The test was performed without the influence of flicker, unbalance, harmonics, and interharmonics.

6.2 Test results

Event 1

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)				
260	230	230	0.04	0 - 0.04				
Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	260	0.04	V1	260	0.03	0.01	0	Pass

Event 2

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)				
257	285	260	1.2	0 - 1.2				
Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	257	1.2	V1	257	1.18	0.02	0	Pass
V2	285	1.2	V2	285.2	1.18	0.02	0.2	Pass
V3	260	1.2	V3	260.1	1.18	0.02	0.1	Pass

Event 3

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)
230	230	257	0.13	0 - 0.13
292	230	230	1	0.13 -1.13
230	297	230	0.04	1.13 - 1.17

Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	292	1.17	V1	292.2	1.163	0.007	0.2	Pass
V2	297	1.17	V2	297.1	1.163	0.007	0.1	Pass
V3	257	1.17	V3	257.1	1.163	0.007	0.1	Pass

Event 4

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)
230	266	230	0.16	0 - 0.16
230	230	266	0.1	0.16 - 0.26
260	230	230	0.877	0.26 - 1.137

Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	260	1.137	V1	260.2	1.123	0.014	0.2	Pass
V2	266	1.137	V2	266.1	1.123	0.014	0.1	Pass
V3	266	1.137	V3	265.9	1.123	0.014	0.1	Pass

Event 5

Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)
230	230	265	60	0 - 60
270	230	230	0.05	60 - 60.05

Desirable measurements according to the standard			Device measurements					
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Voltage RMS Error (V)	Status
V1	270	60.05	V1	270.2	60.047	0.003	0.2	Pass
V3	265	60.05	V3	265.1	60.047	0.003	0.1	Pass

7. Voltage Interruption

7.1 Test parameters

- Nominal voltage $U_n = 230v$.
- Nominal frequency: $f_n = 50Hz$.
- Threshold: $0.05U_n$ (*11.5v*)
- Hysteresis: $0.02U_n$ (*4.6v*)
- Permitted duration uncertainty: 1-cycle (*0.02sec*)
- The test was performed without flicker, unbalance, harmonics, and interharmonics.

7.2 Test results

Event 1							
Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)			
2.3	4.6	6.9	0.04	0 - 0.04			
Desirable measurements according to the standard			Device measurements				
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Status
V1	2.3	0.04	V1	2.2	0.027	0.013	Pass
Event 2							
Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)			
0	0	6.9	0.08	0 - 0.08			
Desirable measurements according to the standard			Device measurements				
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Status
V1,V2	0	0.08	V1,V2	0	0.063	0.017	Pass
Event 3							
Phase 1 (V)	Phase 2 (V)	Phase 3 (V)	Time (sec)	Total Duration (sec)			
0	0	0	30	0 - 30			
Desirable measurements according to the standard			Device measurements				
Phase	Voltage RMS (V)	Duration (Sec)	Phase	Voltage RMS (V)	Duration (sec)	Duration Error (sec)	Status
V1,V2,V3	0	30	V1,V2	0	29.984	0.016	Pass

8. Flicker

8.1 General test parameters

- Rectangular voltage changes.
- Five P_{st} flicker points: *0.4, 1, 2, 4.*
- For each P_{st} point, four different modulation frequencies (CPM) were chosen.
- Permitted flicker Uncertainty: 5% of the expected P_{st} value.
- Nominal frequency: $f_n = 50Hz$.

8.2 Test State 1

8.2.1 Test parameters

- Nominal voltage: $U_n = 230$v.
- Test frequency: $f_{test} = f_n = 50Hz$.
- The test was performed without the influence of voltage unbalance, harmonics, and interharmonics.

8.2.2 Test results

Pst (Tested)	CPM	ΔU/Un (%)	ΔU (Volt)	Pst (Measured)	Error (%)	Status
0.4	1	2.715	2.4978	0.418	4.5	Pass
0.4	7	1.45	1.334	0.4	0	Pass
0.4	110	0.722	0.66424	0.4	0	Pass
0.4	4000	2.343	2.15556	0.4	0	Pass
1	1	2.715	6.2445	1.02	2	Pass
1	7	1.45	3.335	0.99	1	Pass
1	1620	0.407	0.9361	1.01	1	Pass
1	4000	2.343	5.3889	1	0	Pass
2	1	2.715	12.489	2.05	2.5	Pass
2	39	0.894	4.1124	1.97	1.5	Pass
2	1620	0.407	1.8722	2	0	Pass
2	4000	2.343	10.7778	1.99	0.5	Pass
4	1	2.715	24.978	4.1	2.5	Pass
4	7	1.45	13.34	3.93	1.75	Pass
4	1620	0.407	3.7444	3.98	0.5	Pass
4	4000	2.343	21.5556	3.97	0.75	Pass

8.3 Test State 2

8.3.1 Test parameters

- Nominal voltage: $U_n = 230$v.
- Test frequency: f_{test}= *49Hz* ($found\ as\ f_n - 1Hz$).
- Harmonics voltage: U_3= 23v, U_5 = 11.5v, U_{29}= 11.5v.
- The phase angles of harmonics: $\varphi_3 = \varphi_5 = \varphi_{29}$ = 0deg.
- Interharmonic voltage: *2.3v* (*375Hz*).
- Unbalance voltage: $U_{Phase\ 1} = 0.73U_n$, $U_{Phase\ 2} = 0.8U_n$, $U_{Phase\ 3} = 0.87U_n$.
- Total channel voltage: $U_{Channel\ 1} = 170.26v$, $U_{Channel\ 2} = 186.15v$, $U_{Channel\ 3} = 202.08v$.
  (Total channel voltage includes voltage unbalance, harmonics, and interharmonics RMS voltage. The ΔU, changes of the RMS values, obtained from total phase voltage).

8.3.2 Test results

Pst (Tested)	CPM	ΔU/Un (%)	ΔU (Volt)	Pst (Measured)	Error (%)	Status
Phase 1						
0.4	1	2.715	1.85	0.41	2.5	Pass
0.4	7	1.45	0.98	0.41	2.5	Pass
0.4	110	0.722	0.49	0.41	2.5	Pass
0.4	4000	2.343	1.59	0.418	4.5	Pass
Phase 2						
1	1	2.715	5.05	1.03	3	Pass
1	7	1.45	2.7	0.99	1	Pass
1	1620	0.407	0.75	0.97	3	Pass
1	4000	2.343	4.36	1	0	Pass
Phase 3						
2	1	2.715	10.97	2.04	2	Pass
2	39	0.894	3.61	1.96	2	Pass
2	1620	0.407	1.64	1.92	4	Pass
2	4000	2.343	9.46	2	0	Pass
Phase 1						
4	1	2.715	18.49	4.05	1.25	Pass
4	7	1.45	9.87	3.92	2	Pass
4	1620	0.407	2.77	3.81	4.75	Pass
4	4000	2.343	15.95	3.97	0.75	Pass

8.4 Test State 3

8.4.1 Test parameters

- Test frequency: f_{test}= 51Hz ($found\ as\ f_n + 1Hz$).
- Nominal voltage: U_n = 120v
- Harmonics voltage: U_7 = 12v, U_{13} = 6v, U_{25} = 6v.
- The phase angles of harmonics: φ_7 =180deg, φ_{13} = φ_{25} = 0deg.
- Interharmonic voltage: 1.2v (175Hz).
- Unbalance voltage: $U_{Phase\ 1} = 1.52U_n$, $U_{Phase\ 2} = 1.4U_n$, $U_{Phase\ 3} = 1.28U_n$.
- Total channel voltage: $U_{Channel\ 1} = 183v$, $U_{Channel\ 2} = 168.6v$, $U_{Channel\ 3} = 154.3v$.
  (Total phase voltage includes unbalance, harmonics, and interharmonics RMS voltage. The ΔU, changes of the RMS values, obtained from total phase voltage).

8.4.2 Test results

Pst (Tested)	CPM	ΔU/Un (%)	ΔU (Volt)	Pst (Measured)	Error (%)	Status
Phase 1						
0.4	1	2.715	1.98	0.41	2.5	Pass
0.4	7	1.45	1.06	0.40	0	Pass
0.4	110	0.722	0.52	0.40	0	Pass
Phase 2						
1	1	2.715	4.57	1.01	1	Pass
1	7	1.45	2.44	0.98	2	Pass
1	1620	0.407	0.68	1.03	3	Pass
Phase 3						
2	1	2.715	8.37	2.02	1	Pass
2	39	0.894	2.75	1.95	2.5	Pass
2	1620	0.407	1.25	2.04	2	Pass
Phase 1						
4	1	2.715	19.87	4.07	1.75	Pass
4	7	1.45	10.61	3.87	3.25	Pass
4	1620	0.407	2.97	4.07	1.75	Pass

9. Harmonics

9.1 General test parameters

- Five points of the measuring range (10% to 100%) are: 10%, 30%, 50%, 80%, and 100%.
- Nominal frequency: $f_n = 50Hz$.
- Permitted uncertainty:
  If: The expected harmonic's amplitude (U_h) is $U_h \geq 3\%$ of nominal voltage (U_n), then the uncertainty is: 10% of the expected harmonic's amplitude.
  If: The expected harmonic's amplitude (U_h) is $U_h \leq 3\%$ of nominal voltage (U_n), then the uncertainty is: 0.3% of the nominal voltage.

9.2 Test State 1:

9.2.1 Test parameters

- Nominal voltage $U_n = 230$v.
- Test frequency: $f_{test} = f_n = 50Hz$.
- The test was performed without the influence of flicker, unbalance, harmonics, and interharmonics.

9.2.2 Test results

Odd harmonics				
Harmonics order	Expected (% of *Un*)	Measured (% of *Un*)	Error (% of *Un*)	Status
Point 1				
5	0.8000	0.79	0.01	Pass
7	0.7000	0.69	0.01	Pass
13	0.4500	0.45	0.00	Pass
19	0.4000	0.39	0.01	Pass
31	0.2978	0.29	0.01	Pass
37	0.2726	0.27	0.00	Pass
41	0.2590	0.25	0.01	Pass
49	0.2369	0.23	0.01	Pass
Point 2				
5	2.4000	2.39	0.01	Pass
7	2.1000	2.08	0.02	Pass
13	1.3500	1.34	0.01	Pass
19	1.2000	1.19	0.01	Pass
31	0.8935	0.89	0.00	Pass
37	0.8179	0.81	0.01	Pass
41	0.7770	0.77	0.01	Pass
49	0.7107	0.71	0.00	Pass
Point 3				
5	4.0000	3.98	0.02	Pass
7	3.5000	3.48	0.02	Pass
13	2.2500	2.23	0.02	Pass
19	2.0000	1.98	0.02	Pass

31	1.4892	1.48	0.01	Pass
37	1.3631	1.35	0.01	Pass
41	1.2949	1.29	0.00	Pass
49	1.1845	1.18	0.00	Pass

Point 4				
5	6.4000	6.38	0.02	Pass
7	5.6000	5.56	0.04	Pass
13	3.6000	3.57	0.03	Pass
19	3.2000	3.18	0.02	Pass
31	2.3827	2.37	0.01	Pass
37	2.1810	2.17	0.01	Pass
41	2.0719	2.06	0.01	Pass
49	1.8952	1.9	0.00	Pass
Point 5				
5	8.0000	7.97	0.03	Pass
7	7.0000	6.96	0.04	Pass
13	4.5000	4.47	0.03	Pass
19	4.0000	3.98	0.02	Pass
31	2.9784	2.97	0.01	Pass
37	2.7262	2.72	0.01	Pass
41	2.5898	2.58	0.01	Pass
49	2.3690	2.37	0.00	Pass

Odd harmonics divisible by three				
Harmonics order	Expected (% of *Un*)	Measured (% of *Un*)	Error (% of *Un*)	Status
Point 1				
3	0.6	0.59	0.01	Pass
9	0.25	0.24	0.01	Pass
15	0.2	0.19	0.01	Pass
21	0.175	0.17	0.005	Pass
27	0.1	0.29	0.19	Pass
33	0.1	0.27	0.17	Pass
39	0.1	0.25	0.15	Pass
45	0.1	0.11	0.01	Pass
Point 2				
3	1.8	1.79	0.01	Pass
9	0.75	0.74	0.01	Pass
15	0.6	0.59	0.01	Pass
21	0.525	0.52	0.01	Pass
27	0.3	0.29	0.01	Pass
33	0.3	0.3	0.00	Pass
39	0.3	0.3	0.00	Pass
45	0.3	0.31	0.01	Pass

Point 3				
3	3	2.98	0.02	Pass
9	1.25	1.24	0.01	Pass
15	1	0.99	0.01	Pass
21	0.875	0.87	0.01	Pass
27	0.5	0.49	0.01	Pass
33	0.5	0.49	0.01	Pass
39	0.5	0.5	0.00	Pass
45	0.5	0.5	0.00	Pass
Point 4				
3	4.8	4.78	0.02	Pass
9	2	1.99	0.01	Pass
15	1.6	1.58	0.02	Pass
21	1.4	1.4	0.00	Pass
27	0.8	0.8	0.00	Pass
33	0.8	0.79	0.01	Pass
39	0.8	0.8	0.00	Pass
45	0.8	0.8	0.00	Pass
Point 5				
3	6	5.98	0.02	Pass
9	2.5	2.49	0.01	Pass
15	2	1.98	0.02	Pass
21	1.75	1.74	0.01	Pass
27	1	0.8	0.20	Pass
33	1	1	0.00	Pass
39	1	0.99	0.01	Pass
45	1	0.99	0.01	Pass

Even harmonics				
Harmonics order	Expected (% of *Un*)	Measured (% of *Un*)	Error (% of *Un*)	Status
Point 1				
2	0.3000	0.31	0.01	Pass
6	0.1	0	0.1	Pass
14	0.1	0	0.1	Pass
20	0.1	0.1	0	Pass
28	0.1	0	0.1	Pass
34	0.1	0.1	0	Pass
40	0.1	0	0.1	Pass
48	0.1	0	0.1	Pass

Point 2				
2	0.9	0.89	0.01	Pass
6	0.3	0.29	0.01	Pass
14	0.3	0.31	0.01	Pass
20	0.3	0.31	0.01	Pass
28	0.3	0.31	0.01	Pass
34	0.3	0.3	0.00	Pass
40	0.3	0.3	0.00	Pass
48	0.3	0.3	0.00	Pass
Point 3				
2	1.5	1.5	0.00	Pass
6	0.5	0.48	0.02	Pass
14	0.5	0.5	0.00	Pass
20	0.5	0.5	0.00	Pass
28	0.5	0.5	0.00	Pass
34	0.5	0.51	0.01	Pass
40	0.5	0.5	0.00	Pass
48	0.5	0.5	0.00	Pass
Point 4				
2	2.4	2.4	0.00	Pass
6	0.8	0.79	0.01	Pass
14	0.8	0.8	0.00	Pass
20	0.8	0.79	0.01	Pass
28	0.8	0.81	0.01	Pass
34	0.8	0.81	0.01	Pass
40	0.8	0.79	0.01	Pass
48	0.8	0.8	0.00	Pass
Point 5				
2	3	3	0.00	Pass
6	1	0.98	0.02	Pass
14	1	1.01	0.01	Pass
20	1	1	0.00	Pass
28	1	1	0.00	Pass
34	1	0.99	0.01	Pass
40	1	0.99	0.01	Pass
48	1	1	0.00	Pass

9.3 Test State 2

9.3.1 Test parameters

- Nominal voltage $U_n = 230$v.
- Test frequency: $f_{test} = f_n - 1 = 49Hz$.
- Interharmonic voltage: 2.3v (375Hz).
- Voltage U_{test} is one of the unbalance phase voltages.
- Flicker and unbalance according to the standard.

9.3.2 Test results

Odd harmonics				
Harmonics order	Expected (% of U_{test})	Measured (% of U_{test})	Error (% of U_{test})	Status
Point 1				
5	0.80	0.79	0.01	Pass
7	0.70	0.69	0.01	Pass
13	0.45	0.44	0.01	Pass
19	0.40	0.38	0.02	Pass
31	0.30	0.29	0.01	Pass
37	0.27	0.27	0.00	Pass
41	0.26	0.25	0.01	Pass
49	0.24	0.23	0.01	Pass
Point 2				
5	2.40	2.38	0.02	Pass
7	2.10	2.08	0.02	Pass
13	1.35	1.34	0.01	Pass
19	1.20	1.19	0.01	Pass
31	0.89	0.89	0.00	Pass
37	0.82	0.81	0.01	Pass
41	0.78	0.77	0.01	Pass
49	0.71	0.71	0.00	Pass
Point 3				
5	4.00	3.94	0.06	Pass
7	3.50	3.48	0.02	Pass
13	2.25	2.23	0.02	Pass
19	2.00	1.98	0.02	Pass
31	1.49	1.48	0.01	Pass
37	1.36	1.36	0.00	Pass
41	1.29	1.29	0.00	Pass
49	1.18	1.18	0.00	Pass

Point 4				
5	6.40	6.33	0.07	Pass
7	5.60	5.57	0.03	Pass
13	3.60	3.57	0.03	Pass
19	3.20	3.18	0.02	Pass
31	2.38	2.38	0.00	Pass
37	2.18	2.17	0.01	Pass
41	2.07	2.06	0.01	Pass
49	1.90	1.89	0.01	Pass
Point 5				
5	8.00	7.93	0.07	Pass
7	7.00	6.96	0.04	Pass
13	4.50	4.46	0.04	Pass
19	4.00	3.98	0.02	Pass
31	2.98	2.97	0.01	Pass
37	2.73	2.71	0.02	Pass
41	2.59	2.58	0.01	Pass
49	2.37	2.37	0.00	Pass

Odd harmonics divisible by three				
Harmonics order	Expected (% of U_{test})	Measured (% of U_{test})	Error (% of U_{test})	Status
Point 1				
3	0.6	0.59	0.01	Pass
9	0.25	0.24	0.01	Pass
15	0.2	0.19	0.01	Pass
21	0.175	0.17	0.005	Pass
27	0.1	0.1	0	Pass
33	0.1	0	0.1	Pass
39	0.1	0.25	0.15	Pass
45	0.1	0.11	0.01	Pass
Point 2				
3	1.8	1.78	0.02	Pass
9	0.75	0.73	0.02	Pass
15	0.6	0.59	0.01	Pass
21	0.525	0.52	0.01	Pass
27	0.3	0.29	0.01	Pass
33	0.3	0.29	0.01	Pass
39	0.3	0.3	0.00	Pass
45	0.3	0.3	0.00	Pass

Point 3				
3	3	2.97	0.03	Pass
9	1.25	1.23	0.02	Pass
15	1	0.99	0.01	Pass
21	0.875	0.87	0.01	Pass
27	0.5	0.49	0.01	Pass
33	0.5	0.49	0.01	Pass
39	0.5	0.5	0.00	Pass
45	0.5	0.5	0.00	Pass
Point 4				
3	4.8	4.77	0.03	Pass
9	2	1.98	0.02	Pass
15	1.6	1.59	0.01	Pass
21	1.4	1.39	0.01	Pass
27	0.8	0.8	0.00	Pass
33	0.8	0.79	0.01	Pass
39	0.8	0.8	0.00	Pass
45	0.8	0.8	0.00	Pass
Point 5				
3	6	5.95	0.05	Pass
9	2.5	2.48	0.02	Pass
15	2	1.98	0.02	Pass
21	1.75	1.74	0.01	Pass
27	1	1	0.00	Pass
33	1	0.99	0.01	Pass
39	1	0.99	0.01	Pass
45	1	1	0.00	Pass

Even harmonics				
Harmonics order	Expected (% of U_{test})	Measured (% of U_{test})	Error (% of U_{test})	Status
Point 1				
2	0.3000	0.29	0.01	Pass
6	0.1	0	0.1	Pass
14	0.1	0.1	0	Pass
20	0.1	0	0.1	Pass
28	0.1	0.1	0	Pass
34	0.1	0.1	0	Pass
40	0.1	0.1	0	Pass
48	0.1	0.1	0	Pass

Point 2				
2	0.9	0.91	0.01	Pass
6	0.3	0.29	0.01	Pass
14	0.3	0.31	0.01	Pass
20	0.3	0.3	0.00	Pass
28	0.3	0.31	0.01	Pass
34	0.3	0.3	0.00	Pass
40	0.3	0.3	0.00	Pass
48	0.3	0.3	0.00	Pass
Point 3				
2	1.5	1.51	0.01	Pass
6	0.5	0.49	0.01	Pass
14	0.5	0.5	0.00	Pass
20	0.5	0.5	0.00	Pass
28	0.5	0.5	0.00	Pass
34	0.5	0.51	0.01	Pass
40	0.5	0.5	0.00	Pass
48	0.5	0.5	0.00	Pass
Point 4				
2	2.4	2.4	0.00	Pass
6	0.8	0.79	0.01	Pass
14	0.8	0.8	0.00	Pass
20	0.8	0.79	0.01	Pass
28	0.8	0.81	0.01	Pass
34	0.8	0.81	0.01	Pass
40	0.8	0.79	0.01	Pass
48	0.8	0.8	0.00	Pass
Point 5				
2	3	3	0.00	Pass
6	1	0.98	0.02	Pass
14	1	1.01	0.01	Pass
20	1	1	0.00	Pass
28	1	1	0.00	Pass
34	1	0.99	0.01	Pass
40	1	0.99	0.01	Pass
48	1	1	0.00	Pass

9.4 Test State 3

9.4.1 Test parameters

- Nominal voltage $U_n = 120$v.
- Test frequency: $f_{test} = f_n + 1 = 51Hz$.
- Interharmonic voltage: 1.2v (175Hz).
- Voltage U_{test} is one of the unbalance phase voltages.
- Flicker and unbalance according to the standard.

9.4.2 Test results

Odd harmonics				
Harmonics order	Expected (% of U_{test})	Measured (% of U_{test})	Error (% of U_{test})	Status
Point 1				
5	0.80	0.77	0.03	Pass
13	0.45	0.43	0.02	Pass
19	0.40	0.39	0.01	Pass
37	0.27	0.26	0.01	Pass
41	0.26	0.25	0.01	Pass
49	0.24	0.23	0.01	Pass
Point 2				
5	2.40	2.35	0.05	Pass
13	1.35	1.34	0.01	Pass
19	1.20	1.19	0.01	Pass
37	0.82	0.81	0.01	Pass
41	0.78	0.77	0.01	Pass
49	0.71	0.71	0.00	Pass
Point 3				
5	4.00	3.94	0.06	Pass
13	2.25	2.22	0.03	Pass
19	2.00	1.98	0.02	Pass
37	1.36	1.35	0.01	Pass
41	1.29	1.29	0.00	Pass
49	1.18	1.18	0.00	Pass
Point 4				
5	6.40	6.44	0.04	Pass
13	3.60	3.57	0.03	Pass
19	3.20	3.18	0.02	Pass
37	2.18	2.17	0.01	Pass
41	2.07	2.06	0.01	Pass
49	1.90	1.89	0.01	Pass

Point 5				
5	8.00	7.87	0.13	Pass
13	4.50	4.47	0.03	Pass
19	4.00	3.98	0.02	Pass
37	2.73	2.71	0.02	Pass
41	2.59	2.58	0.01	Pass
49	2.37	2.36	0.01	Pass

Odd harmonics divisible by three				
Harmonics order	Expected (% of U_{test})	Measured (% of U_{test})	Error (% of U_{test})	Status
Point 1				
9	0.25	0.24	0.01	Pass
15	0.2	0.19	0.01	Pass
21	0.175	0.17	0.005	Pass
33	0.1	0	0.1	Pass
39	0.1	0	0.1	Pass
45	0.1	0	0.1	Pass
Point 2				
9	0.75	0.74	0.01	Pass
15	0.6	0.58	0.02	Pass
21	0.525	0.52	0.01	Pass
33	0.3	0.3	0.00	Pass
39	0.3	0.3	0.00	Pass
45	0.3	0.29	0.01	Pass
Point 3				
9	1.25	1.24	0.01	Pass
15	1	0.98	0.02	Pass
21	0.875	0.87	0.01	Pass
33	0.5	0.5	0.00	Pass
39	0.5	0.49	0.01	Pass
45	0.5	0.49	0.01	Pass
Point 4				
9	2	1.98	0.02	Pass
15	1.6	1.58	0.02	Pass
21	1.4	1.39	0.01	Pass
33	0.8	0.79	0.01	Pass
39	0.8	0.8	0.00	Pass
45	0.8	0.79	0.01	Pass

Point 5				
9	2.5	2.48	0.02	Pass
15	2	1.98	0.02	Pass
21	1.75	1.74	0.01	Pass
33	1	0.99	0.01	Pass
39	1	0.99	0.01	Pass
45	1	0.99	0.01	Pass

Even harmonics				
Harmonics order	Expected (% of U_{test})	Measured (% of U_{test})	Error (% of U_{test})	Status
Point 1				
6	0.1	0	0.1	Pass
14	0.1	0	0.1	Pass
20	0.1	0	0.1	Pass
28	0.1	0	0.1	Pass
34	0.1	0	0.1	Pass
40	0.1	0	0.1	Pass
Point 2				
6	0.3	0.3	0.00	Pass
14	0.3	0.31	0.01	Pass
20	0.3	0.3	0.00	Pass
28	0.3	0.31	0.01	Pass
34	0.3	0.3	0.00	Pass
40	0.3	0.3	0.00	Pass
Point 3				
6	0.5	0.5	0.00	Pass
14	0.5	0.49	0.01	Pass
20	0.5	0.49	0.01	Pass
28	0.5	0.5	0.00	Pass
34	0.5	0.51	0.01	Pass
40	0.5	0.5	0.00	Pass
Point 4				
6	0.8	0.79	0.01	Pass
14	0.8	0.8	0.00	Pass
20	0.8	0.8	0.00	Pass
28	0.8	0.81	0.01	Pass
34	0.8	0.8	0.00	Pass
40	0.8	0.79	0.01	Pass

Point 5				
6	1	0.98	0.02	Pass
14	1	1.01	0.01	Pass
20	1	1	0.00	Pass
28	1	0.98	0.02	Pass
34	1	0.99	0.01	Pass
40	1	0.98	0.02	Pass

Conclusion:
This certificate contains the results of the tests performed according to test plan covered by the standard IEC61000-4-30.
This certificate refers to the item tested.
Tested Meter passed all the tests and found compliant to class S according to IEC61000-4-30.