Shenzhen EBO Technology Co., Ltd.

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Telephone: +86-755-29451282,
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TEST REPORT

Applicant:	ZHEJIANG HECHUAN TECHNOLOGY CO., LTD
Address of Applicant:	No. 9, Fucai Road, Longyou Industrial Zone, Quzhou City, Zhejiang Province, P.R. China
Equipment Under Test (EUT)	
Product Name:	PLC
Brand Name :	HCFA
Model No.:	Please refer to page 6.
Applicable standards:	EN 61131-2:2007
	EN 55032:2015
	EN 55024:2010+A1:2015
	EN 61000-3-2:2014
	EN 61000-3-3:2013
Date of sample receipt:	August 18, 2017
Date of Test:	August 18, 2017 To August 24, 2017
Date of report issued:	August 24, 2017
Test Result :	PASS *

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

Authorized Signature:

Kevin Yu
Laboratory Manager

2 Version

Version No.	Date	Description
00	*August 24, 2017*	*Original*

Prepared By:  ***Date:*** *August 24, 2017*

Project Engineer

Reviewed By:  ***Date:*** *August 24, 2017*

Reviewer

3 Contents

4 Test Summary

Test Item	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission	EN 55032/EN 61131-2	CISPR 16-1-1	Table A.2&Table 27	PASS
Disturbance voltages	EN 55032/EN 61131-2	CISPR 16-1-2	Table A.9&Table 27	PASS
Harmonic Emission	EN 61000-3-2	EN 61000-3-2	Class A	PASS
Flicker Emission	EN 61000-3-3	EN 61000-3-3	Clause 5 of EN 61000-3-3	PASS
Electrostatic discharges（ESD）	EN 55024/EN 61131-2	EN 61000-4-2	Contact ±2, 4 kV Air ±2, 4, 8 kV	PASS
Radio-frequency electromagnetic field Amplitude modulated	EN 55024/EN 61131-2	EN 61000-4-3	10V/m,3V/m,1V/m 80%, 1kHz, AM	PASS
Electrical Fast Transients	EN 55024/EN 61131-2	EN 61000-4- 4	AC±2.0kV	PASS
Surges	EN 55024/EN 61131-2	EN 61000-4-5	Table 4	PASS
Injected currents（radio-frequency common mode）	EN 55024/EN 61131-2	EN 61000-4-6	10Vrms (emf), 80%, 1kHz Amp. Mod.	PASS
Voltage dips and short interruptions	EN 55024/EN 61131-2	EN 61000-4-11	0 % UT * for 1per 40 % UT * for 10per 70 % UT * for 25per 0 % UT * for 250per	PASS

5 General Information

5.1 Client Information

Applicant:	ZHEJIANG HECHUAN TECHNOLOGY CO., LTD
Address of Applicant:	No. 9, Fucai Road, Longyou Industrial Zone, Quzhou City, Zhejiang Province, P.R. China
Manufacturer/ Factory:	ZHEJIANG HECHUAN TECHNOLOGY CO., LTD
Address of Manufacturer / Factory:	No. 9, Fucai Road, Longyou Industrial Zone, Quzhou City, Zhejiang Province, P.R. China

5.2 General Description of E.U.T

Product Name:	CNC LATHE AND MILLING MACHINE CONTROL SYSTEM
Brand Name:	HCFA
Model No.:	Please refer to page 6.
Test Model No.:	HCA8-64X64YT-A
Power Supply:	Input: AC 100V-240V , 850mA, 85W, 50/60Hz Output: 24V ⎓ 2.7A, 65W 5V ⎓ 2.7A,

5.3 Test mode

Test mode:	
On mode	Keep the EUT in the operation status

5.4 Description of Support Units

None.

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Monitoring of EUT for All Immunity Test

Visual:	Monitor the EUT operating status.
Audio:	N/A

Model No.:

LX1N-24M*	LX1N-40M*	LX1N-60M*	LX1N-14M*
LX1S-14X10Y*	LX1S-10M*	LX1S-14M*	LX1S-16M*
LX1S-20M*	LX1S-24M*	LX1S-30M*	HCA1-6X4Y*
HCA1-8X6Y*	HCA1-12X8Y*	HCA1-16X14Y*	HCA2-8X6Y*
HCA2-14X10Y*	HCA2-24X16Y*	HCA2-36X24Y*	HCA8-64X64Y*
HCA8-8X8Y*	HCA8-16X16Y*	HCA8-24X24Y*	HCA8-32X32Y*
HCA8-40X40Y*	HCA8C-8X8Y*	HCA8C-16X16Y*	HCA2C-8X8Y*
HCA8C-32X32Y*	HCA1P-8X6Y*	HCA1P-12X8Y*	HCA1P-16X14Y*
HCA1P-6X4Y*	HCA2P-14X10Y*	HCA2P-24X16Y*	HCA2P-36X24Y*
HCA8P-24X24Y*	HCA8P-32X32Y*	HCA8P-40X40Y*	HCA8P-16X16Y*
HCA8-64X64YT-A			
* Contain: R, R-D, T, T-D, T(12X12YT), R-A, T-A, T-P4, T-P3, T-P0, T-P2, T-D2, T-P1			

TX1N-1DA-BD	TX1N-232-BD	TX1N-2AD-BD	TX1N-422-BD
TX1N-485-BD-2	TX1N-485-BD-4	TX1N-4EX2EYT-BD	TX1N-BAT-BD
TX1N-EEPROM-8L	TX2N-16EX	TX2N-16EYR	TX2N-16EYT
TX2N-1PG	TX2N-2AD	TX2N-2DA	HCA8C-2PG
TX2N-8ER	TX2N-8EX	TX2N-8EYR	TX2N-8EYT
TX-ERASE	TX-USB-AW	HCA8C-4DA-ADP	HCA8C-4AD-ADP
HCA8C-2PG-D	HCA8C-4PT-ADP	HCA8C-4PNK-ADP	HCA8C-3A-ADP
HCA8C-16EX-C	HCA8C-4EX4EYR	HCA8C-16EYT-C	HCA8C-4EX4EYT
HCA8C-8EX	HCA8C-16EX	HCA8C-8EYR	HCA8C-16EYR
HCA8C-8EYT	HCA8C-16EYT	HCA8C-8EX8EYT	HCA8C-8EX8EYR
HCA8C-C24-ADP	HCA8C-CNV5V-TX2N	HCA8C-8EX8EYT-C	HCA8C-4AD
HCA8C-POWER	HCA8C-4DA	HCA8C-2AD-H	HCA8C-4TC
HCA8-4TC	HCA8C-CBT	HCA8C-CBR	HCA8C-2LC
HCA8C-4PT	HCA8-4PT	HCA8C-2HC	HCA8C-4WK
HCA8C-4PG-D	HCA8C-4PG	HCA8C-8AD	HCA8C-4AD4DA
HCA8-8AD	HCA8-4DA	HCA8-4AD	HCA8C-MNET-M
HCA8C-MNET-8X8YT	HCA8-ENET-L	HCA8C-ENET-ADP	HCA8C-4PG-H
HCA8-2DA	HCA8-2AD	HCA8-3A	HC-LINK16D
HC-LINK16T	HC-LINK16R	HC-LINK16DT	HC-LINK16DR
HC-LINK32DT	HC-LINK32T	HC-LINK32D	HCA8-16CCL-M
HCA8-64CCL	HCA8C-4AD2DA	HCA8C-4GM	MNET-SV
HCA8P-4AD-ADP	HCA8P-4DA-ADP	HCA8P-4AD2DA-ADP	HCA8P-4AD4DA-ADP
HCA8P-ENET-ADP	HCA8-1PG	HCA8C-1PG	TX0N-3A
TX0N-65EC	TX0N-30EC	HCA8-3A	

6 Test Instruments List

Radiated Emission						
No.	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date**	**Cal.Due date**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	Jul. 6 2017	Jul. 5 2018
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	Jul. 6 2017	Jul. 5 2018
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	Jul. 6 2017	Jul. 5 2018
5	RF Amplifier	HP	8347A	GTS204	Jul. 6 2017	Jul. 5 2018
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial cable	GTS	N/A	GTS210	Jul. 6 2017	Jul. 5 2018
8	Coaxial Cable	GTS	N/A	GTS211	Jul. 6 2017	Jul. 5 2018
9	Thermo meter	KTJ	TA328	GTS256	Jul. 6 2017	Jul. 5 2018

Disturbance voltages:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS252	Jul. 6 2017	Jul. 5 2018
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 6 2017	Jul. 5 2018
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 6 2017	Jul. 5 2018
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 6 2017	Jul. 5 2018
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK8127	GTS226	Jul. 6 2017	Jul. 5 2018
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 6 2017	Jul. 5 2018
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	Jul. 6 2017	Jul. 5 2018

Harmonic/Flicker:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Power Analyzer	EMTEST	DPA500	GTS235	Jul. 6 2017	Jul. 5 2018
2	AC Power Source	EMTEST	ACS500	GTS236	Jul. 6 2017	Jul. 5 2018
3	Test software	EMTEST	ACS	N/A	N/A	N/A
4	Thermo meter	KTJ	TA328	GTS256	Jul. 6 2017	Jul. 5 2018

Electrostatic discharge:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date**	**Cal.Due date**
1	ESD Simulator	EMPEK	ESD-2030A	GTS242	Jul. 6 2017	Jul. 05 2018
2	Thermo meter	KTJ	TA328	GTS243	Jul. 6 2017	Jul. 05 2018

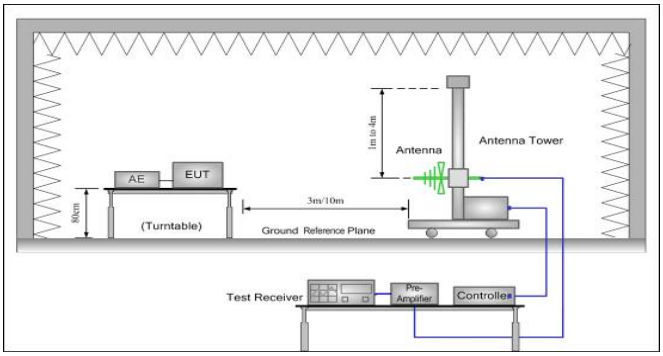
EFT, Surge, Voltage dips and Interruption:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	EMTEST system	EMTEST	UCS500N	GTS239	Jul. 6 2017	Jul. 05 2018
2	Thermo meter	KTJ	TA328	GTS256	Jul. 6 2017	Jul. 05 2018

Conducted Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	RF-Generator	SCHAFFNER	NSG 2070	SEL0039	Jul. 6 2017	Jul. 5 2018
2	Coupling/Decoupling Network	SCHAFFNER	CDN M016	SEL0040	Jul. 6 2017	Jul. 5 2018
3	EM CLAMP	SCHAFFNER	KEMZ 801	SEL0041	Jul. 6 2017	Jul. 5 2018

Radiated Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	Jul. 6 2017	Jul. 5 2018
2	Signal Generator	Rohde & Schwarz	SML03	SEL0068	Jul. 6 2017	Jul. 5 2018
3	RF Amplifier 30M-1GHz	Amplifier Research	250W1000A	SEL0066	Jul. 6 2017	Jul. 5 2018
4	RF Amplifier 0.8-3.0GHz	Amplifier Research	60S1G3	SEL0065	Jul. 6 2017	Jul. 5 2018
5	Power Meter	Rohde & Schwarz	NRVD	SEL0069	Jul. 6 2017	Jul. 5 2018
6	Power Sensor	Rohde & Schwarz	URV5-Z2	SEL0071	Jul. 6 2017	Jul. 5 2018
7	Power Sensor	Rohde & Schwarz	URV5-Z2	SEL0072	Jul. 6 2017	Jul. 5 2018
8	Software EMC32	Rohde & Schwarz	EMC32-S	SEL0082	N/A	N/A
9	Log-periodic Antenna	Amplifier Research	AT1080	SEL0073	N/A	N/A
10	Antenna Tripod	Amplifier Research	TP1000A	SEL0074	N/A	N/A
11	High Gain Horn Antenna (0.8-5GHz)	Amplifier Research	AT4002A	SEL0075	N/A	N/A
12	Audio Analyzer	Rohde & Schwarz	UPL 16	SEL0076	Jul. 6 2017	Jul. 5 2018
13	Nexus conditioning amplifier	B&K	2690	SEL0078	Jul. 6 2017	Jul. 5 2018
14	Mouth simulator	B&K	4227	SEL0079	Jul. 6 2017	Jul. 5 2018
15	Sound level calibrator	B&K	4231	SEL0080	Jul. 6 2017	Jul. 5 2018
16	Universal radio communication tester	Rohde & Schwarz	CMU200	SEL0081	Jul. 6 2017	Jul. 5 2018

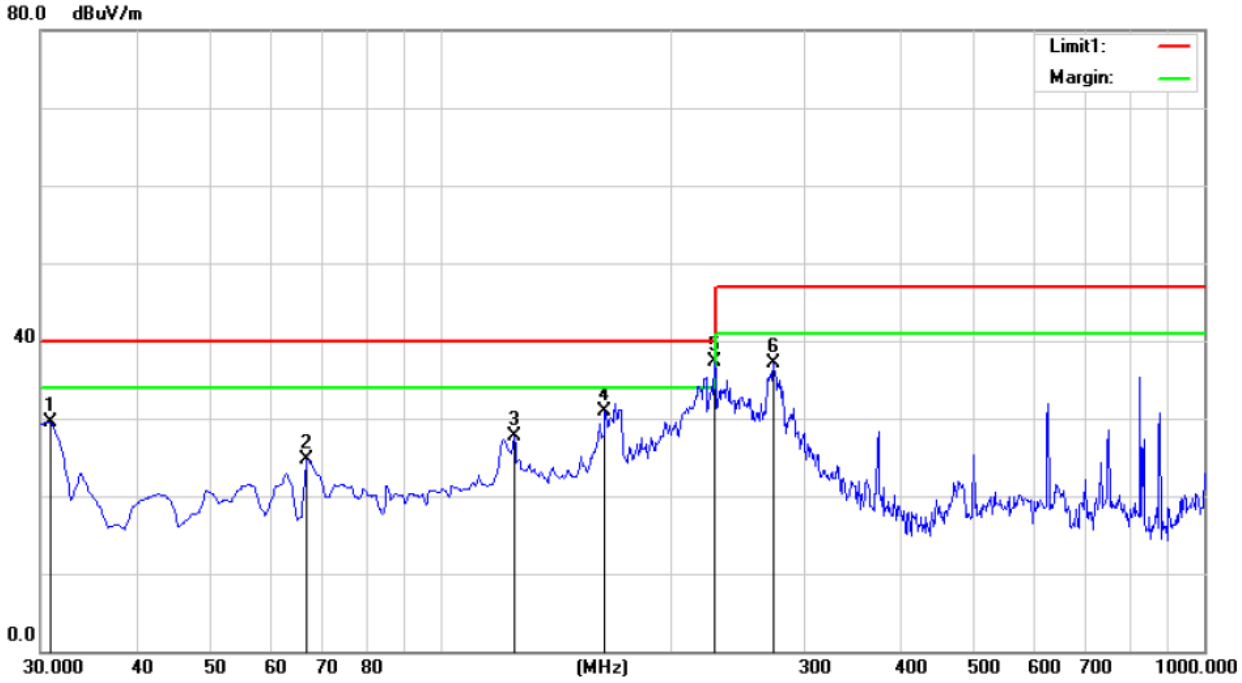
7 Emission Test Results

7.1 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>EN 55032/EN 61131-2</td></tr>
<tr><td>Test Method:</td><td>CISPR 16-1</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 1GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 10m</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBμV/m @10m)</th><th>Value</th></tr>
<tr><td>30MHz-230MHz</td><td>40.00</td><td>Quasi-peak</td></tr>
<tr><td>230MHz-1GHz</td><td>47.00</td><td>Quasi-peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Procedure:</td><td>1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.</td></tr>
<tr><td>Test environment:</td><td>Temp.: 25 °C | Humid.: 52% | Press.: 1 012mbar</td></tr>
<tr><td>Measurement Record:</td><td>Uncertainty: ± 4.50dB</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

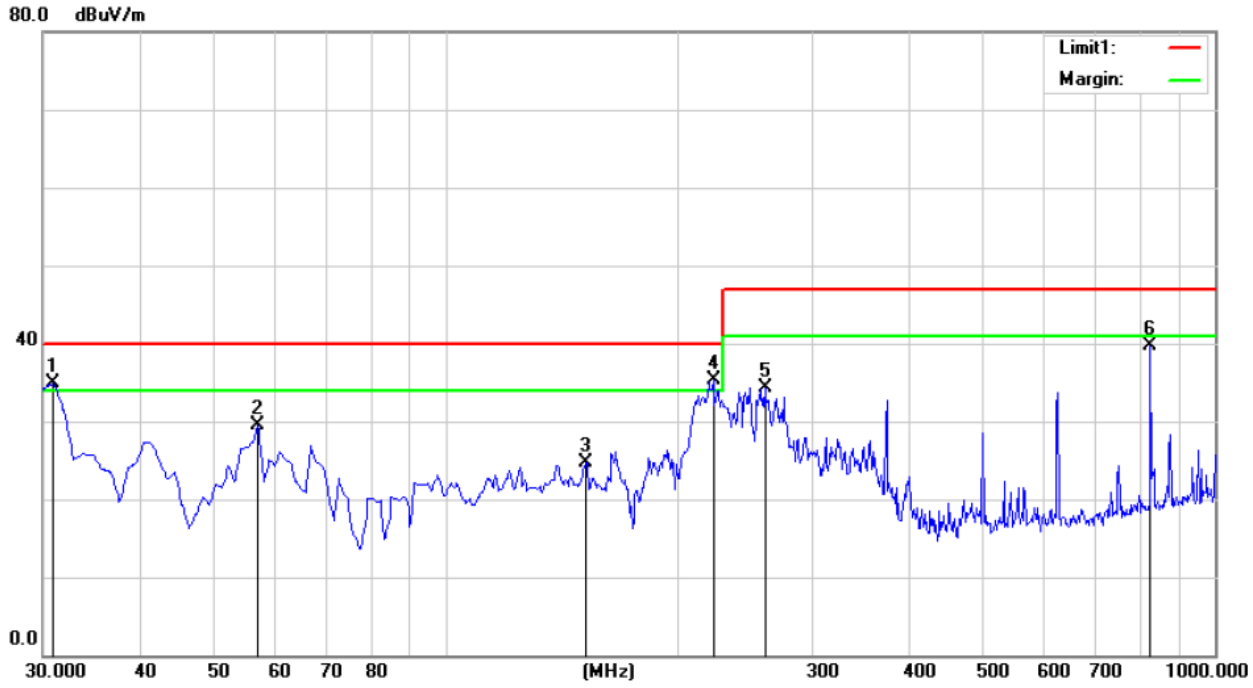
Measurement Data

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		30.9700	62.82	-33.26	29.56	40.00	-10.44	QP			
2		66.8600	58.48	-33.69	24.79	40.00	-15.21	QP			
3		125.0600	62.43	-34.79	27.64	40.00	-12.36	QP			
4		164.8300	65.75	-34.91	30.84	40.00	-9.16	QP			
5	*	228.8500	68.47	-31.25	37.22	40.00	-2.78	QP			
6		273.4700	67.31	-30.11	37.20	47.00	-9.80	QP			

Vertical:



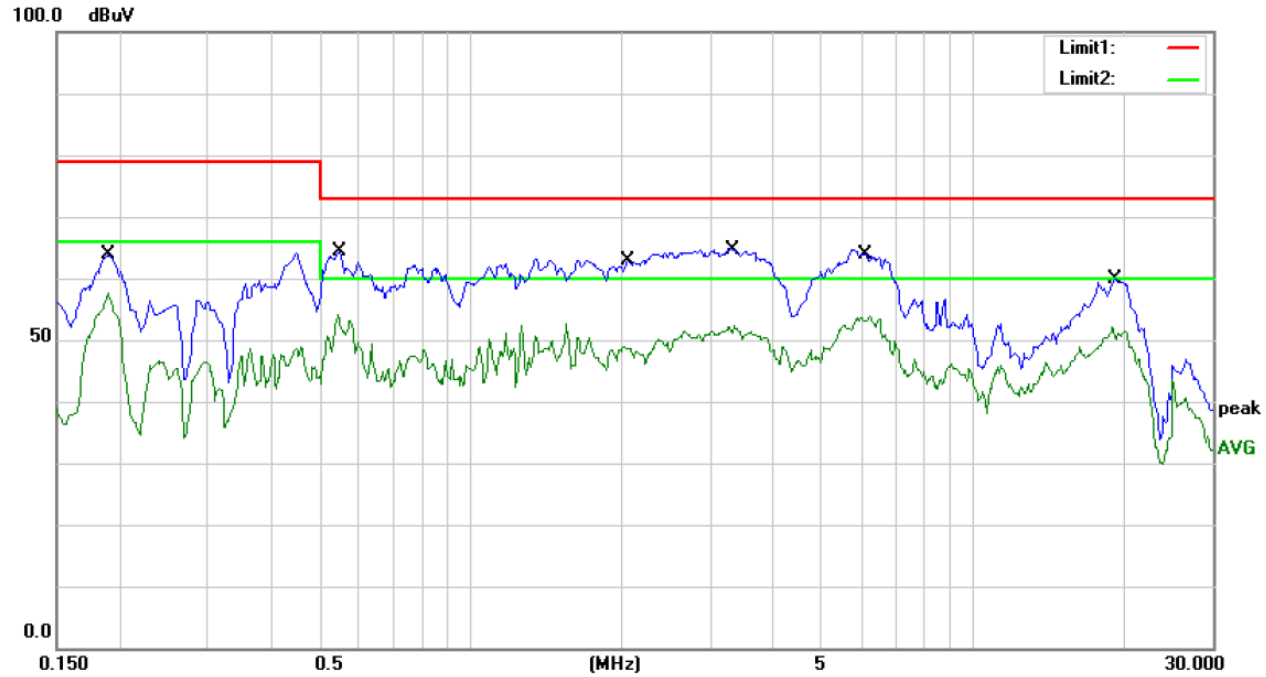
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	!	30.9700	67.84	-32.87	34.97	40.00	-5.03	QP			
2		57.1600	58.95	-29.53	29.42	40.00	-10.58	QP			
3		152.2200	59.32	-34.61	24.71	40.00	-15.29	QP			
4	*	223.0300	65.70	-30.37	35.33	40.00	-4.67	QP			
5		260.8600	63.67	-29.27	34.40	47.00	-12.60	QP			
6		826.3700	57.82	-18.21	39.61	47.00	-7.39	QP			

7.2 Disturbance voltages

<table>
<tr><td>Test Requirement:</td><td colspan="5">EN 55032/EN 61131-2</td></tr>
<tr><td>Test Method:</td><td colspan="5">CISPR 16-1-2</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">0.15MHz to 30MHz</td></tr>
<tr><td>Receiver setup:</td><td colspan="5">RBW=0.15MHz, VBW=30MHz</td></tr>
<tr><td>Limit:</td><td colspan="5"><table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBμV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>79</td><td>66</td></tr>
<tr><td>0.5-5</td><td>73</td><td>60</td></tr>
<tr><td>5-30</td><td>73</td><td>60</td></tr>
</table></td></tr>
<tr><td>Detector:</td><td colspan="5">9kHz resolution bandwidth between 150kHz & 30MHz
Quasi-peak & average if maximised peak within 6dB of average limit (150kHz-30MHz)</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>24 °C</td><td>Humid.:</td><td>51%</td><td>Press.:</td><td>1 012mbar</td></tr>
<tr><td>Measurement Record:</td><td colspan="5">Uncertainty: ± 3.45dB</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="5">Passed</td></tr>
</table>

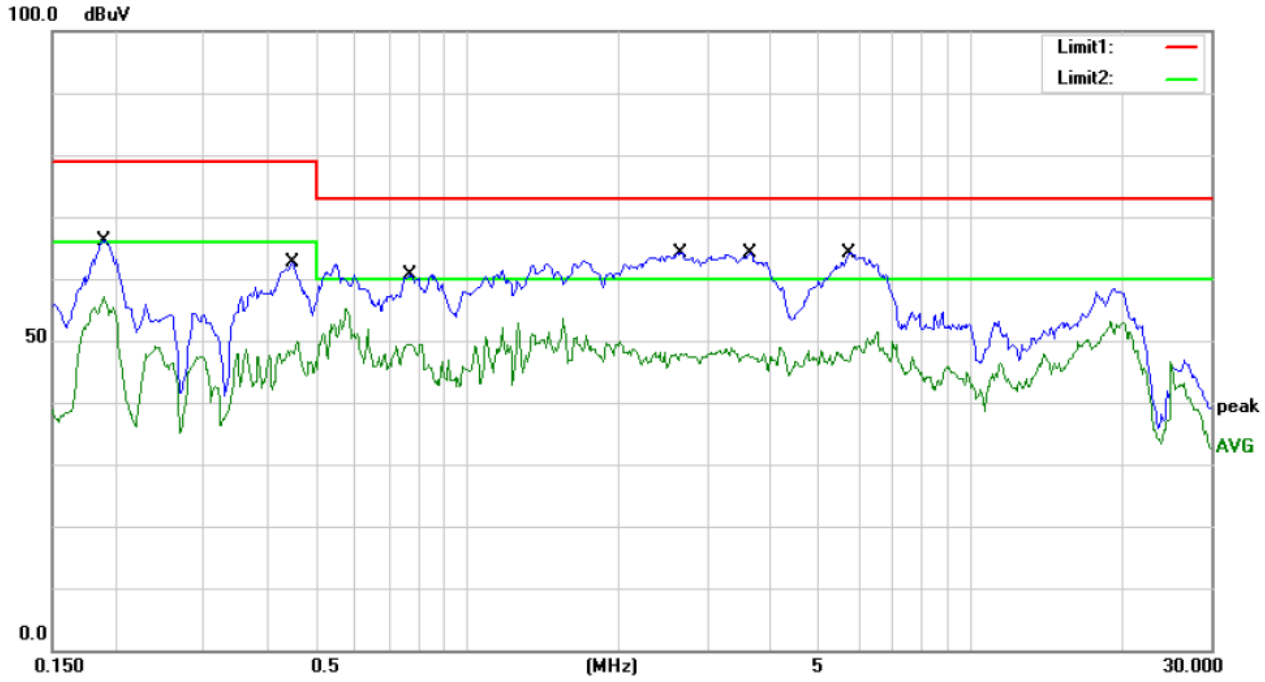
Measurement Data

Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1882	63.51	0.00	63.51	79.00	-15.49	QP	
2		0.1882	57.63	0.00	57.63	66.00	-8.37	AVG	
3		0.5493	64.46	0.00	64.46	73.00	-8.54	QP	
4	*	0.5493	54.13	0.00	54.13	60.00	-5.87	AVG	
5		2.0550	63.00	0.00	63.00	73.00	-10.00	QP	
6		2.0550	52.73	0.00	52.73	60.00	-7.27	AVG	
7		3.3635	64.47	0.00	64.47	73.00	-8.53	QP	
8		3.3635	52.44	0.00	52.44	60.00	-7.56	AVG	
9		6.0884	63.87	0.00	63.87	73.00	-9.13	QP	
10		6.0884	53.88	0.00	53.88	60.00	-6.12	AVG	
11		19.1220	59.96	0.00	59.96	73.00	-13.04	QP	
12		19.1220	52.18	0.00	52.18	60.00	-7.82	AVG	

Neutral:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1901	66.20	0.00	66.20	79.00	-12.80	QP	
2		0.1901	57.13	0.00	57.13	66.00	-8.87	AVG	
3		0.4490	62.60	0.00	62.60	79.00	-16.40	QP	
4		0.4490	53.49	0.00	53.49	66.00	-12.51	AVG	
5		0.7711	60.68	0.00	60.68	73.00	-12.32	QP	
6	*	0.7711	52.80	0.00	52.80	60.00	-7.20	AVG	
7		2.6500	64.23	0.00	64.23	73.00	-8.77	QP	
8		2.6500	50.76	0.00	50.76	60.00	-9.24	AVG	
9		3.6417	64.07	0.00	64.07	73.00	-8.93	QP	
10		3.6417	48.99	0.00	48.99	60.00	-11.01	AVG	
11		5.7134	64.20	0.00	64.20	73.00	-8.80	QP	
12		5.7134	51.36	0.00	51.36	60.00	-8.64	AVG	

7.3 Harmonics Test Results

Test Requirement:	EN 61000-3-2					
Test Method:	EN 61000-3-2					
Freqiemcu range:	100Hz to 2kHz					
Measurement Time:	2.5 min					
Class/Severity:	Class A					
Detector:	As per EN 61000-3-2					
Test environment:	Temp.:	24°C	Humid.:	51	Press.:	1 010bar
Test Instruments:	Refer to section 5 for details					
Test mode:	Refer to section 4.3 for details					
Test results:	Passed					

7.4 Flicker Test Result

Test Requirement:	EN 61000-3-3					
Test Method:	EN 61000-3-3					
Class/Severity:	Clause 5 of EN 61000-3-3					
Measurement Time:	10 min					
Detector:	As per EN 61000-3-3					
Test environment:	Temp.:	24°C	Humid.:	51%	Press.:	1 012mbar
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Passed					

Measurement Data

	EUT values	Limit	Result
Pst	0.013	1.00	PASS
Plt	0.012	0.65	PASS
Dc[%]	0.000	3.30	PASS
Dmax %]	0.093	4.00	PASS
Dt [s]	0.000	0.50	PASS

8 Immunity Test Results

8.1 Performance Criteria Description

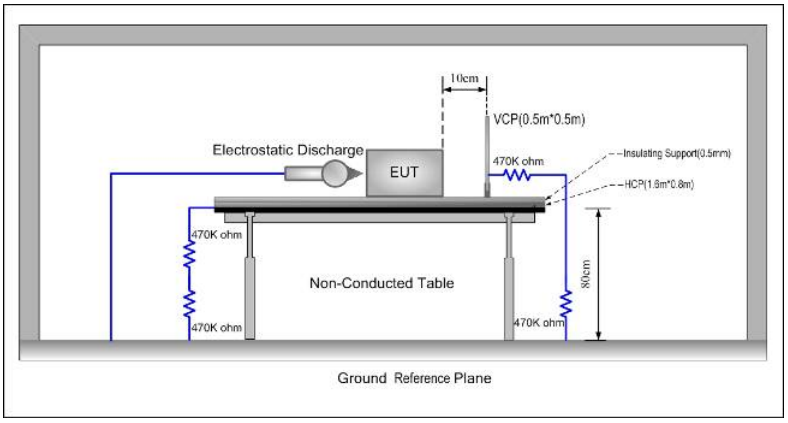
Clause 8.3.2 of EN 61131-2

Performance criterion		
Criterion	Operation	
	During test	After test
A	The PLC-system shall continue to operate as intended. No loss of function or performance, according to PFVPs (2.5)	The PLC-system shall continue to operate as intended
B	Degradation of performance accepted Examples: analogue values vary within manufacturer-specified limits, communication delay times vary within manufacturer-specified limits, flickering on HMI display, etc. No change of operating mode Examples: loss of data or uncorrected errors in communication, unintentional state changes of digital I/O which are seen by the system or test set-up, etc. No irreversible loss of stored data, according to PFVPs (2.5)	The PLC-system shall continue to operate as intended. Temporary degradation of performance must be self-recoverable
C	Loss of functions accepted, but no destruction of hardware or software (programme or data)	The PLC-system shall continue to operate as intended automatically, after manual restart or power off/power on

Clause 5 of EN 55024

Criterion A:	The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion C	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

8.2 Electrostatic Discharge

Test Requirement:	EN 55024/EN 61131-2
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge:±2kV, ±4kV Air Discharge: ±2kV, ±4kV, ±8kV HCP/VCP: ±2kV, ±4kV
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	**1. Air discharge:** The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed **2. Contact Discharge:** The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. **3. Indirect discharge for horizontal coupling plane** At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

	Consideration should be given to exposing all sides of the EUT. **4. Indirect discharge for vertical coupling plane** At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test mode:	Refer to section 6 for details
Test Instruments:	Refer to section 5.3 for details
Test results:	Passed

Measurement Record:

Test points:	I: Metal, Port, Screw
	II: Crevice

Direct discharge

Discharge Voltage (KV)	**Type of discharge**	**Test points**	Observations **(Performance Criterion)**	**Result**
± 4	Contact	I	A	Pass
± 8	Air	II	A	Pass

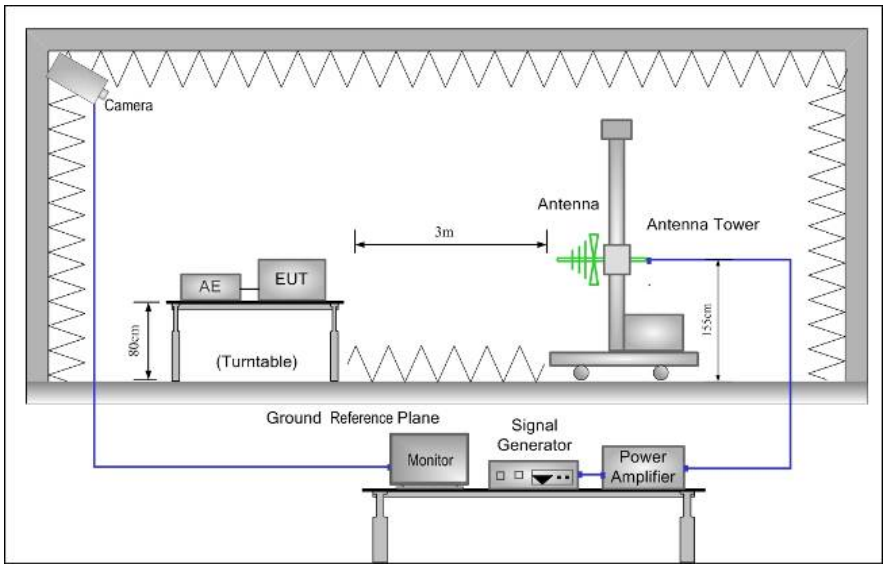
Indirect discharge

Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

8.3 Radio-frequency electromagnetic fields

Test Requirement:	EN 55024/EN 61131-2
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz
Test Level:	10 V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Were the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing

	each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.
Test environment:	Temp.: 25°C Humid.: 52% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

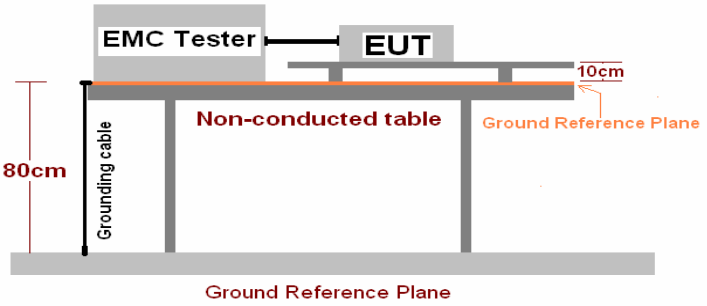
Measurement Record:

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-1 GHz 1.4GHz-2GHz 2GHz-2.7GHz	10 V/m 3 V/m 1 V/m	1 kHz, 80 % Amp. Mod, 1% increment, dwell time=3seconds	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

Remarks:

A: No degradation in the performance of the E.U.T. was observed.

8.4 Electrical Fast Transients

Test Requirement:	EN 55024/EN 61131-2
Test Method:	EN 61000-4-4
Test Level:	2.0kV on AC port
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	2 minute per level & polarity
Performance Criterion:	B
Test setup:	
Test Procedure:	The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. Test on Signal Ports, Telecommunication Ports and Control Ports: The EUT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes. Test on power supply ports: The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes. The length of the signal and power lines between the coupling device and the EUT is 0.5m
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

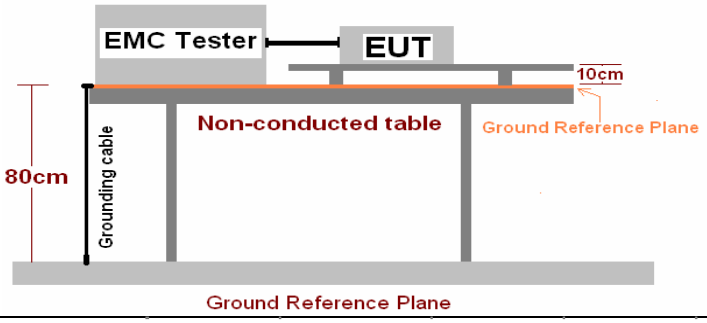
Measurement Record:

Lead under Test	Level (kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	+/- 2kV	Direct	A	Pass
N	+/- 2kV	Direct	A	Pass
PE	+/- 2kV	Direct	A	Pass
L-N	+/- 2kV	Direct	A	Pass
L-PE	+/- 2kV	Direct	A	Pass
N-PE	+/- 2kV	Direct	A	Pass
L-N-PE	+/- 2kV	Direct	A	Pass

Remark:

A: No degradation in the performance of the E.U.T. was observed.

8.5 Surges

Test Requirement:	EN 55024/EN 61131-2
Test Method:	EN 61000-4-5
Test Level:	1kV Live to Neutral: Differential mode
Polarity:	Positive & Negative
Generator source impedance:	2Ω(line-line coupling)
No. of surges:	5 positive at 90° , 5 negative at 270°
Performance Criterion:	C
Test setup:	
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Remark:

Table 10 – Surges – Test levels at input a.c. power ports

Characteristics		Test levels		
		Device		
		Self-ballasted lamps and semi-luminaires	Luminaires and independent auxiliaries	
			Input power	
			≤25 W	>25 W
Wave-shape data		1,2/50 µs	1,2/50 µs	1,2/50 µs
Test levels	line to line	±0,5 kV	±0,5 kV	±1,0 kV
	line to ground	±1,0 kV	±1,0 kV	±2,0 kV
NOTE In addition to the specified test level, all lower test levels as detailed in IEC 61000-4-5 should also be satisfied.				

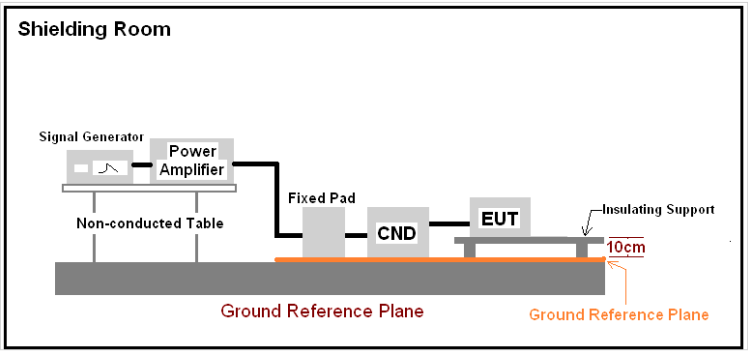
Measurement Record:

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)
L-N	+/-1kv	5	60s	0,90,180,270	A
L-PE	+/-2kv	5	60s	0,90,180,270	A
N-PE	+/-2kv	5	60s	0,90,180,270	A

Remark:

A: No degradation in the performance of the E.U.T. was observed.

8.6 Immunity to ambient electromagnetic fields

Test Requirement:	EN 55024/EN 61131-2
Test Method:	EN 61000-4-6
Frequency range:	0.15MHz to 80MHz
Test Level:	10V rms on AC Ports
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	1) Let the EUT work in test mode and test it. 2) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placedon the ground plane about 0.3m from EUT. Cables between CDN andEUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 3) The disturbance signal described below is injected to EUT through CDN. 4) The EUT operates within its operational mode(s) under intendedclimatic conditions after power on. 5) 5) The frequency range is swept from 0.150MHz to 80MHz using 10Vsignal level, and with the disturbance signal 80% amplitude modulatedwith a 1kHz sine wave. 6) 6) The rate of sweep shall notexceed 1.5*10-3decades/s. Where thefrequency is swept incrementally; thestep size shall not exceed 1% ofthe start and thereafter 1% of the preceding frequency value. 7) 7) Recording the EUT operating situation during compliance testing anddecide the EUT immunity criterion.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

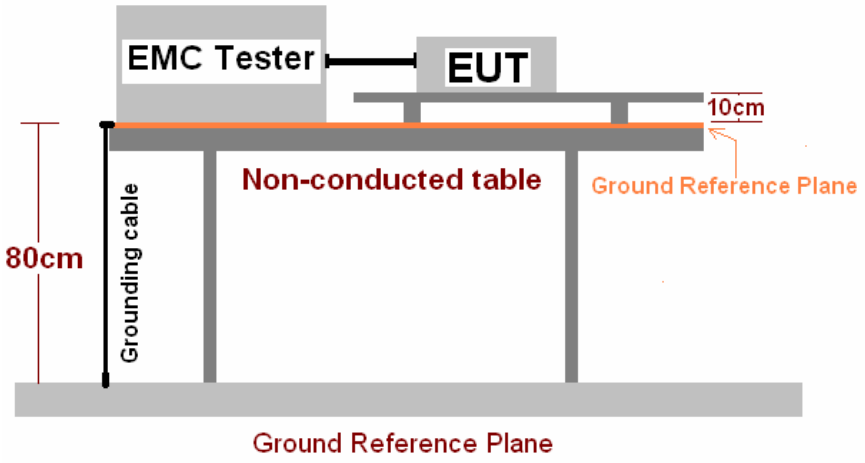
Measurement Record:

Frequency	Injected Position	Test Level	Modulation	Step Size	Dwell Time	Observations (Performance Criterion)
150kHz to 80MHz	AC Main	10Vrms	80%, 1kHz Amp. Mod.	1%	2s	A

Remark:

A: No loss of function was observed.

8.7 Voltage Dips and Voltage Interruptions

Test Requirement:	EN 55024/EN 61131-2
Test Method:	EN 61000-4-11
Test Level:	0% of U(Supply Voltage) for 1 Periods 40 % of U(Supply Voltage) for 10 Periods 70% of U(Supply Voltage) for 25 Periods 0 % of U(Supply Voltage) for 250 Periods
No. of Dips /Interruptions:	3 per Level
Performance Criterion:	100% VD ----Performance criterion: B
	30% VD ----Performance criterion: C
Test setup:	
Test Procedure:	1>.The EUT and test generator were setup as shown on above setup photo. 2>.The interruptions are introduced at selected phase angles with specified duration. 3>.Record any degradation of performance.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

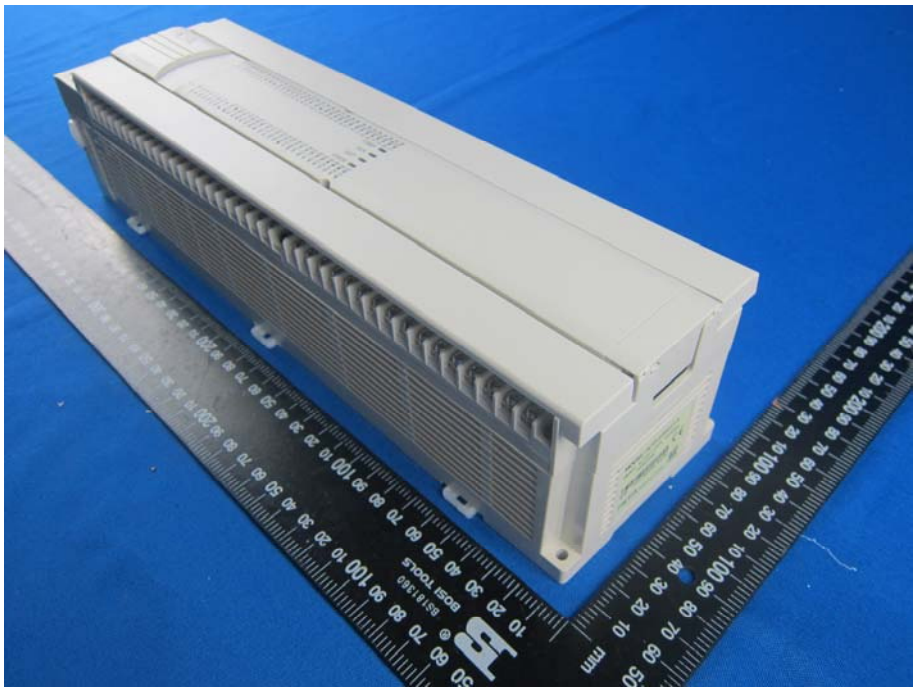
Measurement Record:

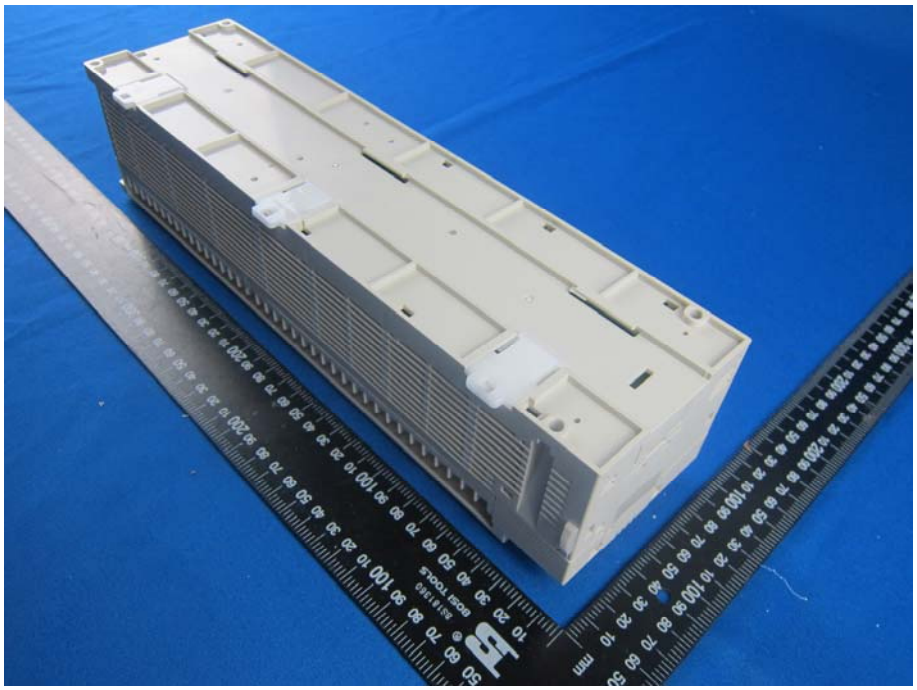
Test Level % U_T	Duration (Periods)	Phase angle	No of dropout	Time Between dropout	Observations (Performance Criterion)
0	1	0°, 180°	20	10S	B
40	10	0°,180°	20	10S	B
70	25	0°,180°	20	10S	B
0	250	0°,180°	20	10S	C

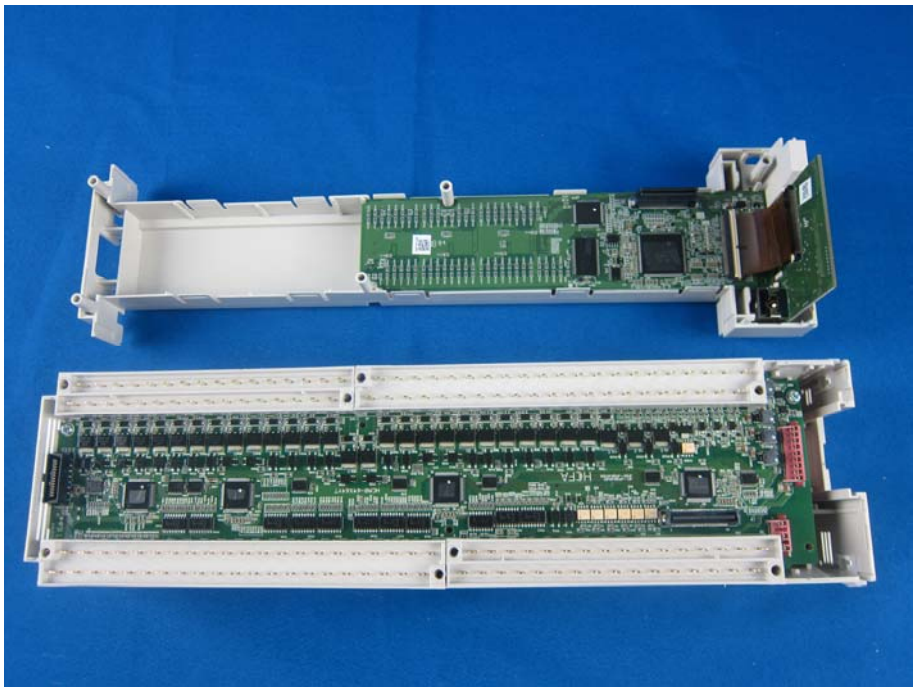
Remark:

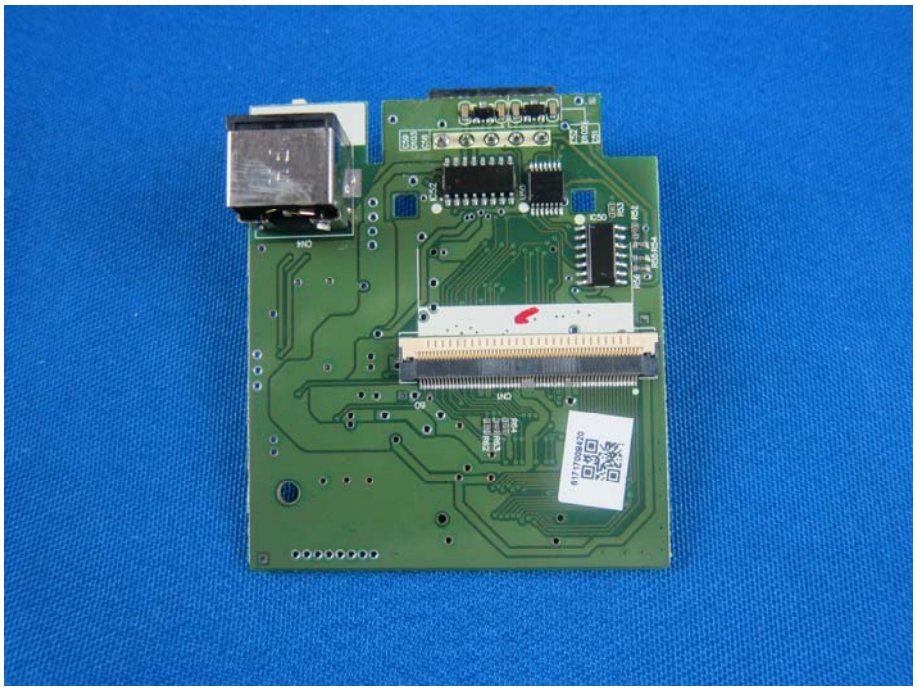
C: Test in 0%, 250P, EUT stop work, but could be recoverable by itself.

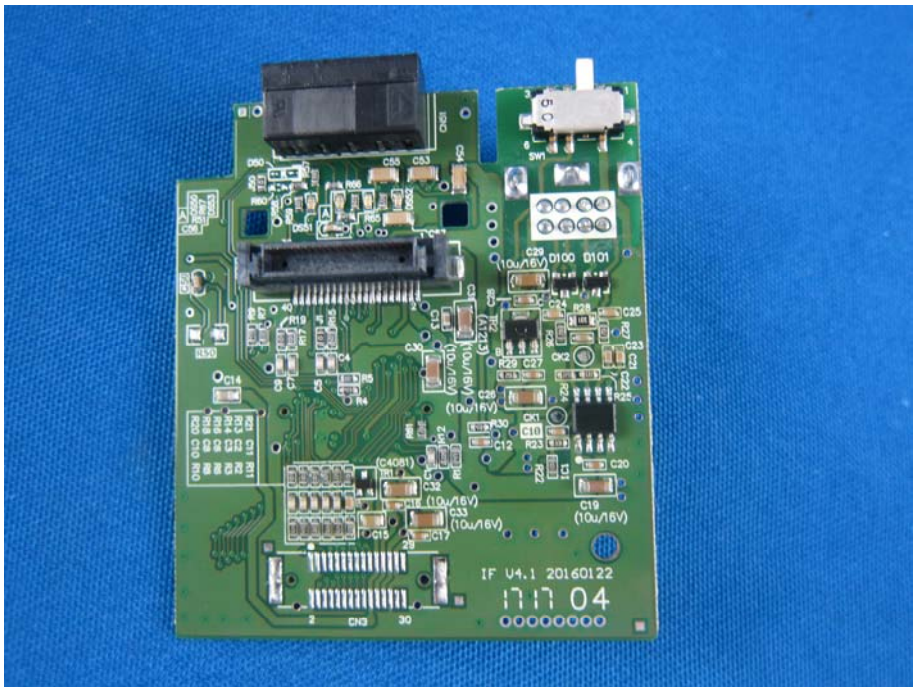
9 Photographs of the EUT

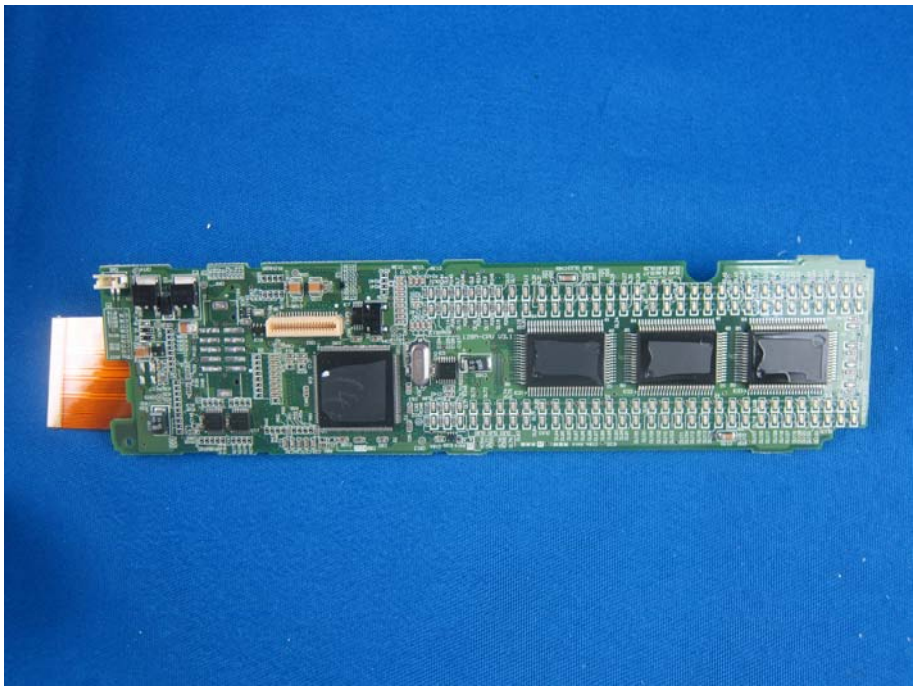


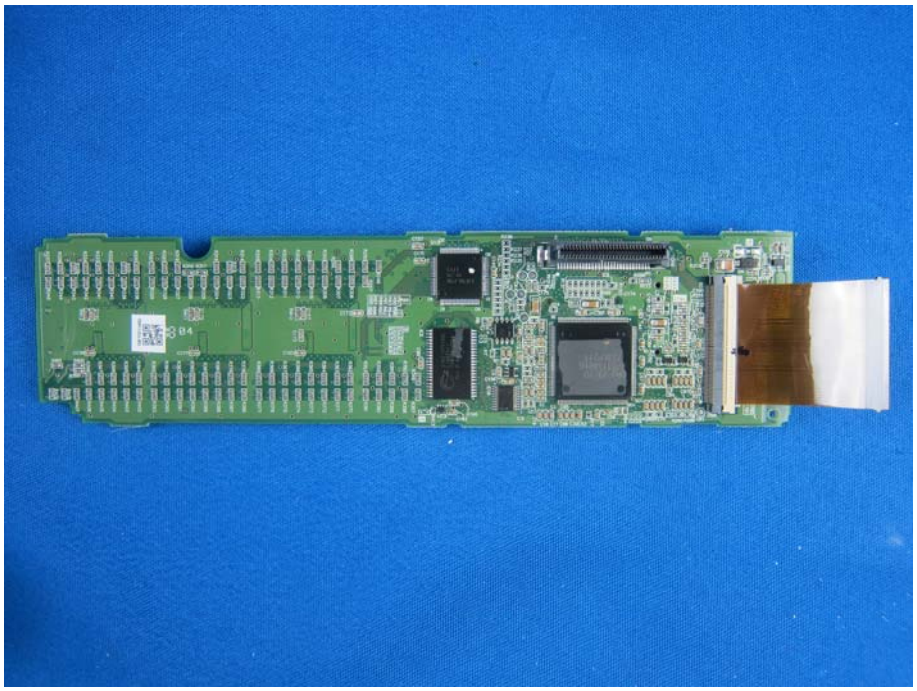


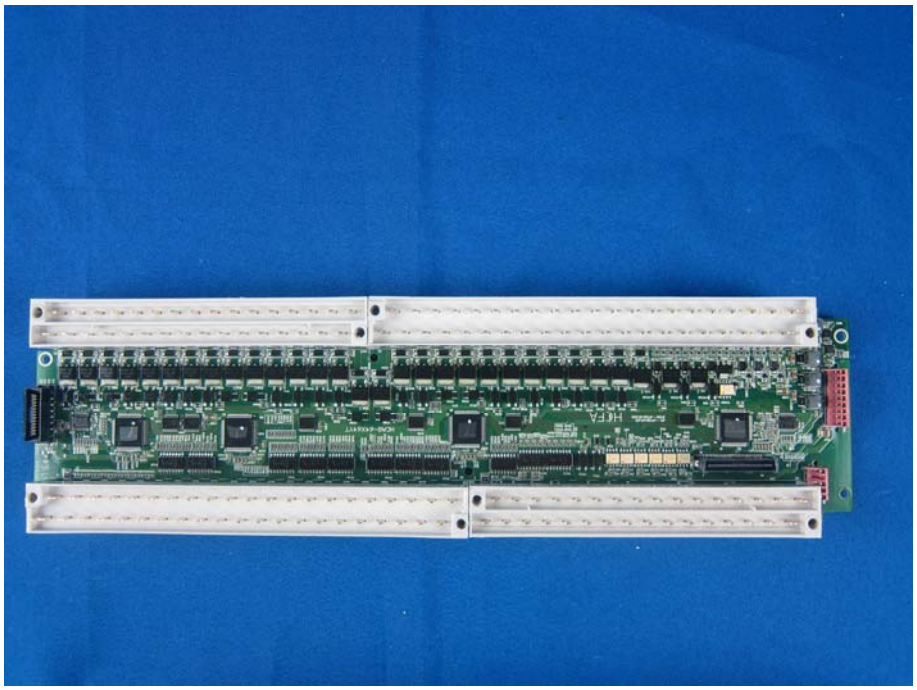


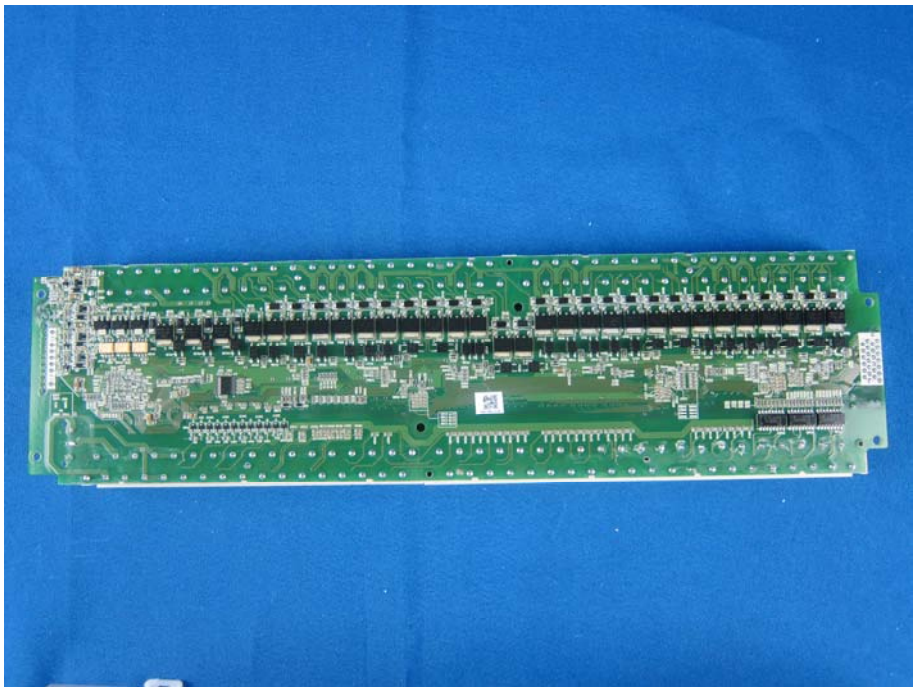


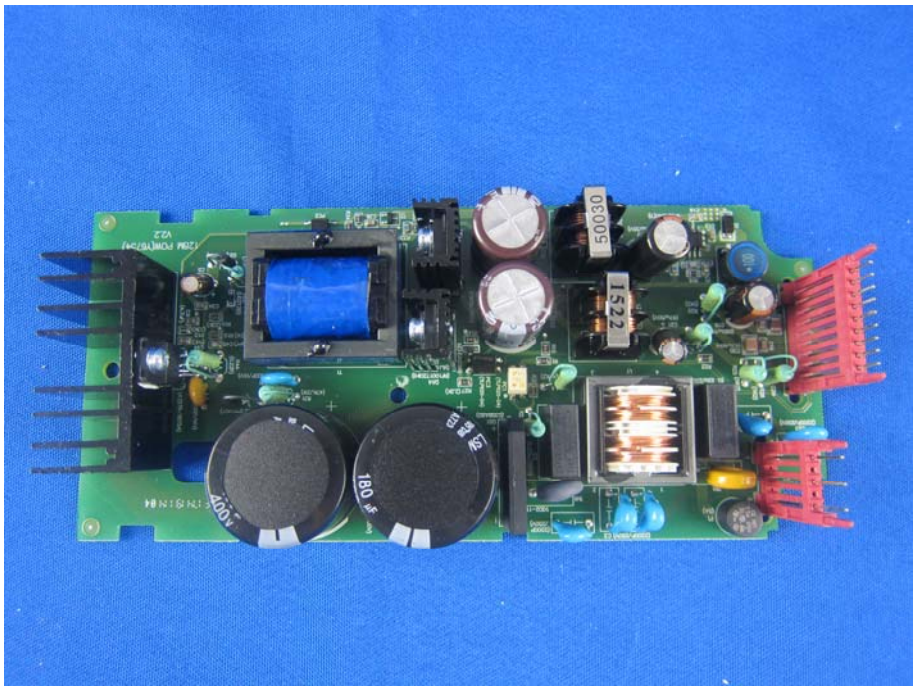


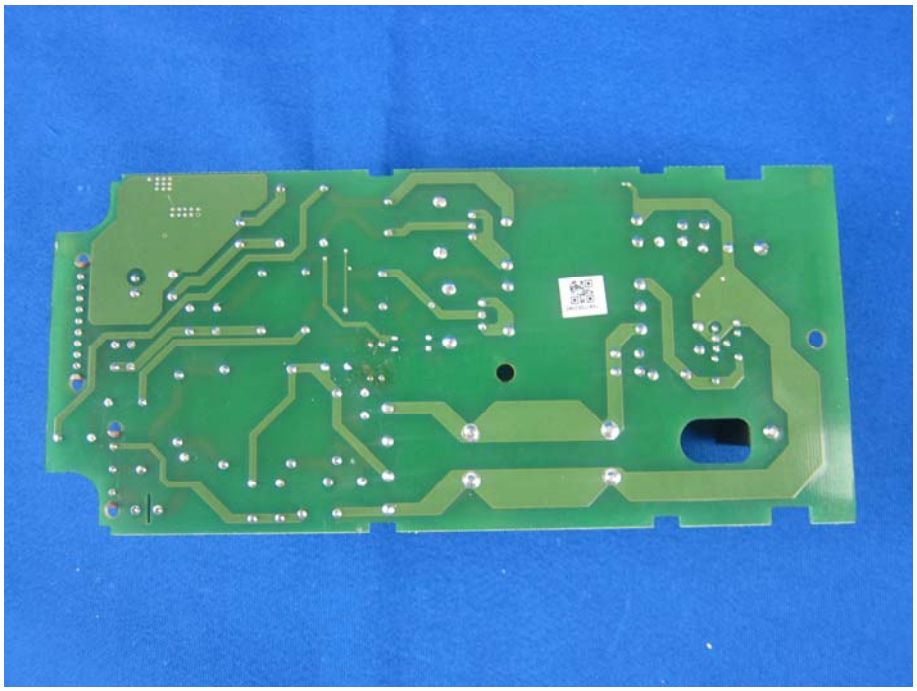












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