TEST REPORT

Applicant: HNC ELECTRIC LIMITED

Address of Applicant: Suite A1, 12/F., Ritz Plaza, 122 Austin Road TST., Kowloon. Hong Kong.

Equipment Under Test (EUT)

Product Name: PLC

Brand Name: HNC Electric

Model No.: Please refer to pages 6 to 7

Applicable standards: EN 55011:2016+A11:2020

EN 61131-2:2007

Date of sample receipt: August 12, 2020

Date of Test: August 12, 2020 To August 20, 2020

Date of report issued: August 20, 2020

Test Result : PASS *

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

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.

Authorized Signature

Kevin Wang
Laboratory Manager

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2 Version

Version No.	Date	Description
00	*August 20, 2020*	*Original*

Prepared By: Gary Wang ***Date:*** *August 20, 2020*

Project Engineer

Reviewed By: Kevin Wang ***Date:*** *August 20, 2020*

Reviewer

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4 Test Summary

Test Item	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz-1GHz)	EN 61131-2	CISPR 11	Class A, Group1	PASS
Electrostatic discharges	EN 61131-2	IEC 61000-4-2	Contact ±4 kV Air±8 kV	PASS
Radiated Immunity (80MHz-1GHz, 1.4GHz-2GHz)	EN 61131-2	IEC 61000-4-3	10V/m 80%, 1kHz, AM	PASS

Remark:

Pass: Comply with the essential requirements in the standard.

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5 General Information

5.1 Client Information

Applicant:	HNC ELECTRIC LIMITED
Address of Applicant:	Suite A1, 12/F., Ritz Plaza, 122 Austin Road TST., Kowloon. Hong Kong.
Manufacturer:	HNC ELECTRIC LIMITED
Address of Manufacturer:	Suite A1, 12/F., Ritz Plaza, 122 Austin Road TST., Kowloon. Hong Kong.

5.2 General Description of E.U.T

Product Name:	PLC
Brand Name:	HNC Electric
Model No.:	Please refer to pages 6 to 7
Test Model No.:	HCS-8X8Y-TN
Power Supply:	DC 24V

5.3 Test mode

On mode:	Keep the EUT in the operation status.

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number
MEILI	DC POWER SUPPLY	MCH-305A	011121168

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

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Model No.:

HCS-8X8Y-TN	HCS-6X4Y-R	HCS-6X4Y-TN	HCS-6X4Y-TP
HCS-8X8Y-R	HCS-8X8Y-TP	HCS-4X4Y4A-R	HCS-4X4Y4A-TN
HCS-4X4Y4A-TP	HCG-8X8Y-R	HCG-8X8Y-TN	HCG-8X8Y-TP
HCG-4X4Y4A-R	HCG-4X4Y4A-TN	HCG-4X4Y4A-TP	HCM-8X8Y-R
HCM-8X8Y-TN	HCM-8X8Y-TP	AE-8X	AE-8Y-R
AE-8Y-TN	AE-8Y-TP	AE-4X4Y-R	AE-4X4Y-TN
AE-4X4Y-TP	AE-16X	AE-16Y-R	AE-16Y-TN
AE-16Y-TP	AE-8X8Y-R	AE-8X8Y-TN	AE-8X8Y-TP
AE-4AD	AE-4DA	AE-2AD2DA	AE-8AD
AE-8DA	AE-4AD4DA	AE-4TC	AE-4RC
AE-8TC	AE-4DT	AE-1C	HCCS-6X4Y-R
HCCS-6X4Y-Re	HCCS-6X4Y-TN	HCCS-6X4Y-TNe	HCCS-6X4Y-TP
HCCS-6X4Y-TPe	HCCS-8X8Y-R	HCCS-8X8Y-Re	HCCS-8X8Y-TN
HCCS-8X8Y-TNe	HCCS-8X8Y-TP	HCCS-8X8Y-TPe	HCCS-16X8Y-R
HCCS-16X8Y-Re	HCCS-16X8Y-TN	HCCS-16X8Y-TNe	HCCS-16X8Y-TP
HCCS-16X8Y-TPe	HCCS-16X16Y-R	HCCS-16X16Y-Re	HCCS-16X16Y-TN
HCCS-16X16Y-TNe	HCCS-16X16Y-TP	HCCS-16X16Y-TPe	HCCS-28X20Y-R
HCCS-28X20YRe	HCCS-28X20Y-TN	HCCS-28X20Y-TNe	HCCS-28X20Y-TP
HCCS-28X20Y-TPe	HCCS-36X24Y-R	HCCS-36X24YRe	HCCS-36X24Y-TN
HCCS-36X24Y-TNe	HCCS-36X24Y-TP	HCCS-36X24Y-TPe	HCCG-8X8Y-R
HCCG-8X8Y-Re	HCCG-8X8Y-TN	HCCG-8X8Y-TNe	HCCG-8X8Y-TP
HCCG-8X8Y-TPe	HCCG-16X8Y-R	HCCG-16X8Y-Re	HCCG-16X8Y-TN
HCCG-16X8Y-TNe	HCCG-16X8Y-TP	HCCG-16X8Y-TPe	HCCG-16X16Y-R
HCCG-16X16Y-Re	HCCG-16X16Y-TN	HCCG-16X16Y-TNe	HCCG-16X16Y-TP
HCCG-16X16Y-TPe	HCCG-28X20Y-R	HCCG-28X20YRe	HCCG-28X20Y-TN
HCCG-28X20Y-TNe	HCCG-28X20Y-TP	HCCG-28X20Y-TPe	HCCG-36X24Y-R
HCCG-36X24YRe	HCCG-36X24Y-TN	HCCG-36X24Y-TNe	HCCG-36X24Y-TP
HCCG-36X24Y-TPe	HCCM-8X8Y-R	HCCM-8X8Y-Re	HCCM-8X8Y-TN
HCCM-8X8Y-TNe	HCCM-8X8Y-TP	HCCM-8X8Y-TPe	HCCM-16X8Y-R
HCCM-16X8Y-Re	HCCM-16X8Y-TN	HCCM-16X8Y-TNe	HCCM-16X8Y-TP
HCCM-16X8Y-TPe	HCCM-16X16Y-R	HCCM-16X16Y-Re	HCCM-16X16Y-TN
HCCM-16X16Y-TNe	HCCM-16X16Y-TP	HCCM-16X16Y-TPe	HCCM-20X20-R
HCCM-20X20Re	HCCM-20X20-TN	HCCM-20X20-TNe	HCCM-20X20-TP
HCCM-20X20-TPe	HCCM-36X24Y-R	HCCM-36X24YRe	HCCM-36X24Y-TN

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HCCM-36X24Y-TNe	HCCM-36X24Y-TP	HCCM-36X24Y-TPe	HCCX-8X6Y2A-R
HCCX-8X6Y2A-Re	HCCX-8X6Y2A-TN	HCCX-8X6Y2A-TNe	HCCX-8X6Y2A-TP
HCCX-8X6Y2A-TPe	HCCX-8X6Y6A-R	HCCX-8X6Y6A-Re	HCCX-8X6Y6A-TN
HCCX-8X6Y6A-TNe	HCCX-8X6Y6A-TP	HCCX-8X6Y6A-TPe	TE-8X
TE-8Y-R	TE-8Y-TN	TE-8Y-TP	TE-4X4Y-R
TE-4X4Y-TN	TE-4X4Y-TP	TE-16X	TE-16Y-R
TE-16Y-TN	TE-16Y-TP	TE-8X8Y-R	TE-8X8Y-TN
TE-8X8Y-TP	TE-24X	TE-12X12Y-R	TE-12X12Y-TN
TE-12X12Y-TP	TE-40X	TE-36Y-R	TE-36Y-TN
TE-36Y-TP	TE-20X20Y-R	TE-20X20Y-TN	TE-20X20Y-TP
TE-32X32Y-R	TE-32X32Y-TN	TE-32X32Y-TP	TE-24Xe
TE-12X12Y-Re	TE-12X12Y-TNe	TE-12X12Y-TPe	TE-40Xe
TE-36Y-Re	TE-36Y-TNe	TE-36Y-TPe	TE-20X20Y-Re
TE-20X20Y-TNe	TE-20X20Y-TPe	TE-32X32Y-Re	TE-32X32Y-TNe
TE-32X32Y-TPe	TE-4AD	TE-4DA	TE-2AD2DA
TE-8AD	TE-8DA	TE-4AD4DA	TE-8ADe
TE-8DAe	TE-4AD4DAe	TE-4DT	TE-32DT
TE-4TC	TE-4RC	TE-8TC	TE-8RC
TE-8RCe	TE-1WG	TE-2WG	TE-1C
Remark: All models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and appearance color for commercial purpose.			

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6 Test Instruments List

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	Jul. 3 2016	Jul. 2 2021
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	June. 24 2020	June. 23 2021
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	June. 24 2020	June. 23 2021
5	Double-ridged horn antenna	SCHWARZBECK	9120D	GTS208	June. 24 2020	June. 23 2021
6	RF Amplifier	HP	8347A	GTS204	June. 24 2020	June. 23 2021
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	June. 24 2020	June. 23 2021
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS211	N/A	N/A
11	Thermo meter	KTJ	TA328	GTS256	June. 24 2020	June. 23 2021

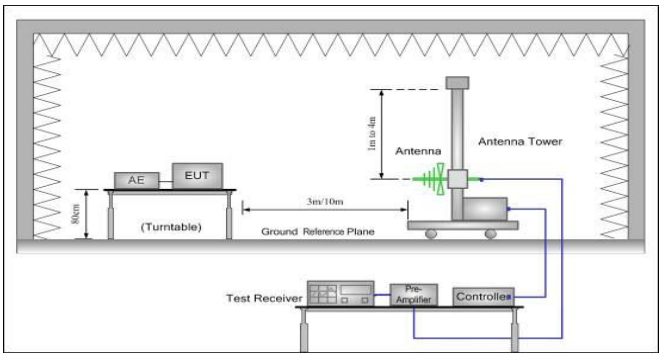
ESD:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	June. 24 2020	June. 23 2021
2	Thermo meter	KTJ	TA328	GTS243	June. 24 2020	June. 23 2021

Radiated Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial NO.**	**Cal.Date (mm-dd-yy)**	**Cal.Due Date (mm-dd-yy)**
1	Signal Generator	Rohde & Schwarz	SMT03	100059	Jan. 16 2020	Jan. 15 2021
2	Power Amplifier	AR	150W1000	300999	Jan. 16 2020	Jan. 15 2021
3	Power Amplifier	AR	25S1G4AM1	305993	Jan. 16 2020	Jan. 15 2021
4	Power Amplifier	AR	150A220M6	305965	Jan. 16 2020	Jan. 15 2021
5	Broadband antenna	CHASE	CBL6111C	2576	Jan. 16 2020	Jan. 15 2021
6	Horn Antenna	AR	AT4002A	2783	Jan. 16 2020	Jan. 15 2021

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7 Emission Test Results

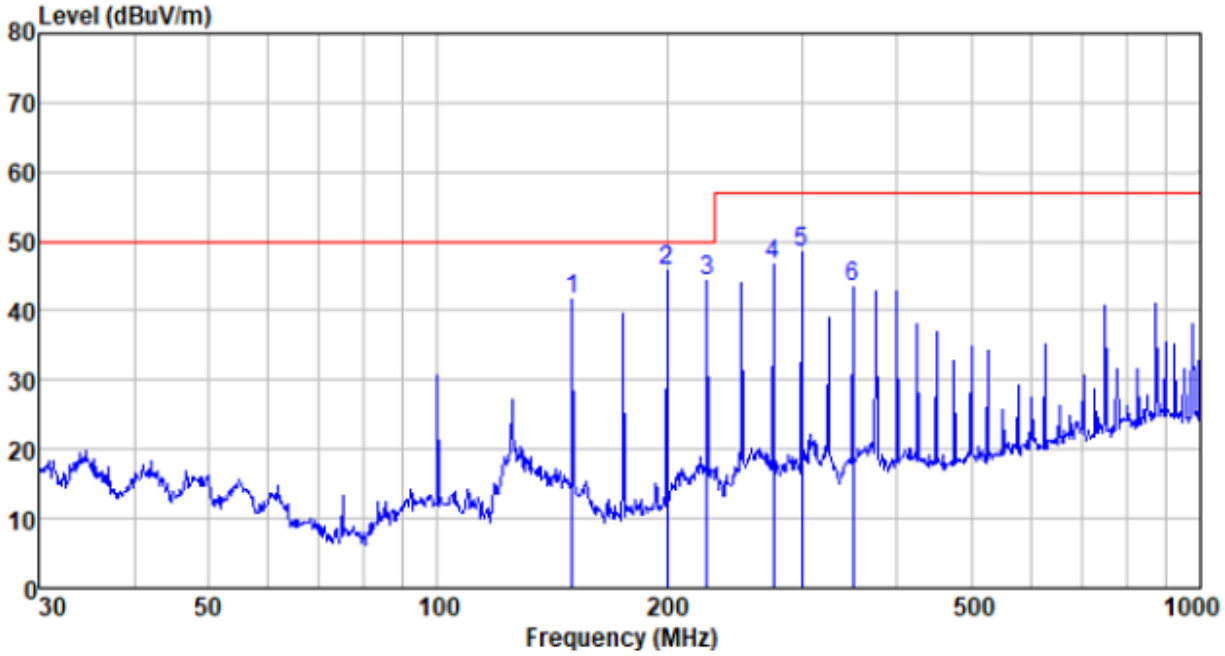
7.1 Radiated Emission

Test Requirement:	EN 61131-2/EN 55011
Test Method:	CISPR 11
Test Frequency Range:	30MHz to 1GHz
Class / Severity:	Class A
Measurement Distance:	3m
Limit:	Frequency / Limit (dBμV/m @3m) / Value 30MHz-230MHz / 50.00 / Quasi-peak 230MHz-1GHz / 57.00 / Quasi-peak
Test setup:	
Test Procedure:	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.
Test environment:	Temp.: 25 °C ¦ Humid.: 52% ¦ Press.: 1 012mbar
Measurement Record:	**Uncertainty: ± 4.50dB**
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

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Measurement Data

Test mode:	On mode	Polarization:	Horizontal

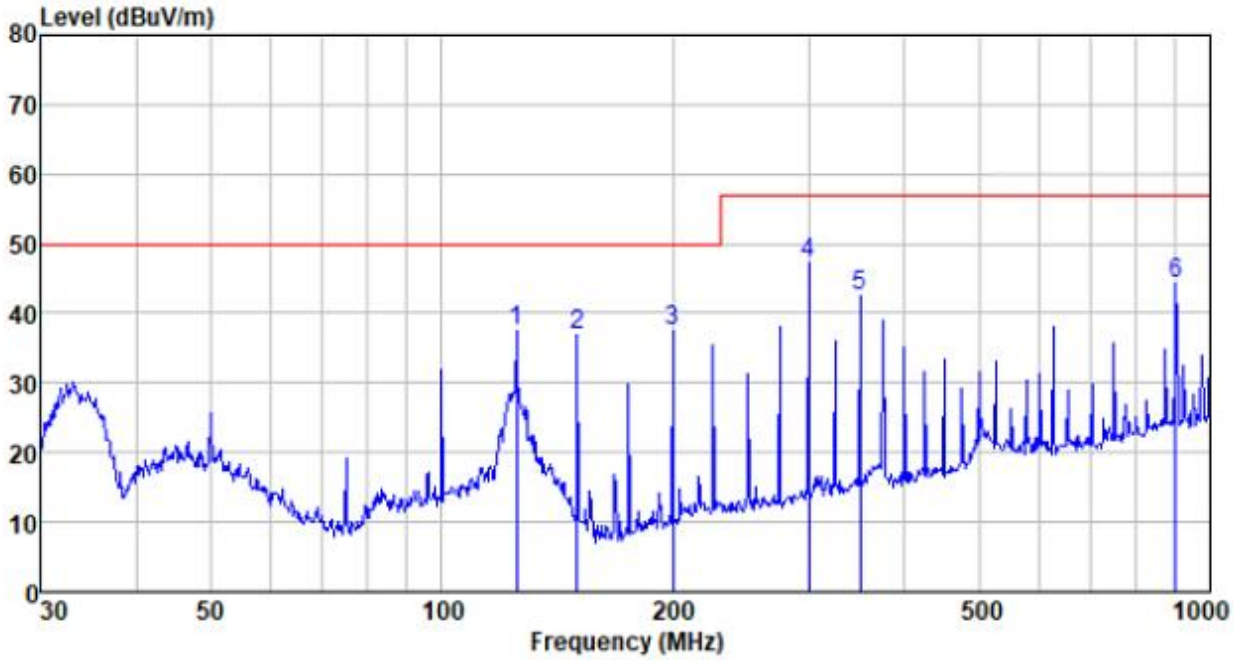


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
150.011	69.42	7.65	1.57	37.08	41.56	50.00	-8.44	QP
199.986	70.90	10.40	1.84	37.33	45.81	50.00	-4.19	QP
225.308	68.40	11.35	1.99	37.36	44.38	50.00	-5.62	QP
275.157	68.98	12.91	2.25	37.40	46.74	57.00	-10.26	QP
300.367	69.98	13.60	2.36	37.42	48.52	57.00	-8.48	QP
350.477	63.86	14.53	2.62	37.47	43.54	57.00	-13.46	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

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Test mode:	On mode	Polarization:	Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
125.007	64.13	8.81	1.40	36.92	37.42	50.00	-12.58	QP
150.011	64.66	7.65	1.57	37.08	36.80	50.00	-13.20	QP
199.986	62.69	10.40	1.84	37.33	37.60	50.00	-12.40	QP
300.367	68.71	13.60	2.36	37.42	47.25	57.00	-9.75	QP
350.477	62.77	14.53	2.62	37.47	42.45	57.00	-14.55	QP
903.309	54.56	22.30	4.87	37.60	44.13	57.00	-12.87	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

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8 Immunity Test Results

8.1 General Performance Criteria Description in EN 61131-2

Criterion A: The equipment shall continue to operate as intended without operator intervention.

No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment 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, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Criterion B: During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended.

The performance level may be replaced by a permissible loss of performance.

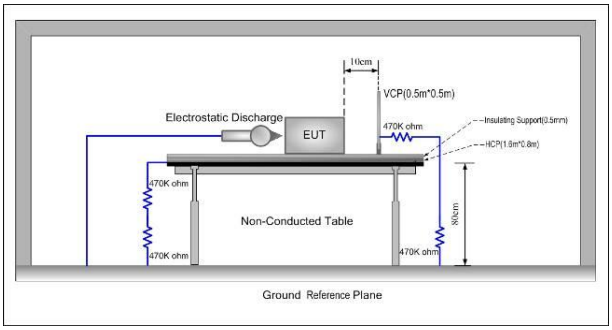
If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

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8.2 Electrostatic Discharge

Test Requirement:	EN 61131-2
Test Method:	IEC 61000-4-2
Discharge Voltage:	Contact Discharge:±4kV Air Discharge: ±8kV HCP/VCP:±4kV
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Performance Criterion:	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

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	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.: 1012mbar
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: N/A
	II: Seams, all port, Indicator light

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

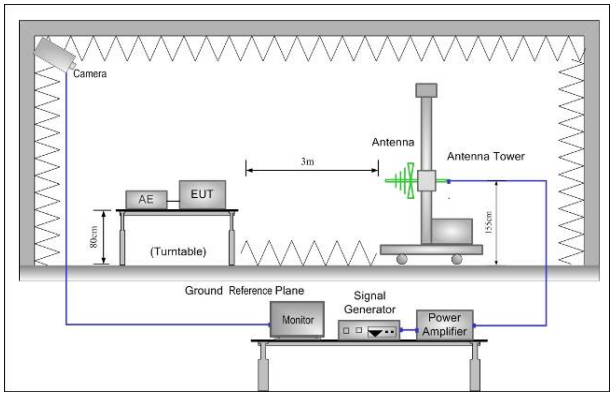
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

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

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8.3 Radiated Immunity

Test Requirement:	EN 61131-2
Test Method:	IEC 61000-4-3
Frequency range:	80MHz to 1GHz, 1.4GHz-2.0GHz
Test Level:	10 V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	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

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	monitor the performance of the EUT.		
Test environment:	Temp.: 25°C	Humid.: 52%	Press.: 1012mbar
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	10 V/m	1 kHz, 80 % Amp. Mod, 1% increment, dwell time=2seconds	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
1.4GHz-2.0GHz	10 V/m	1 kHz, 80 % Amp. Mod, 1% increment, dwell time=2seconds	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

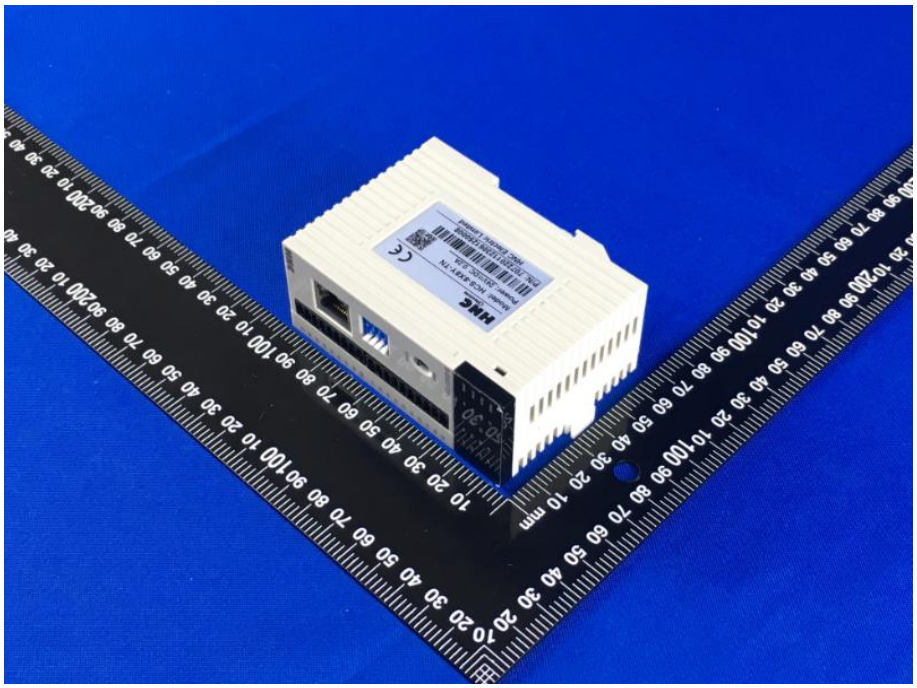
Remarks:

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

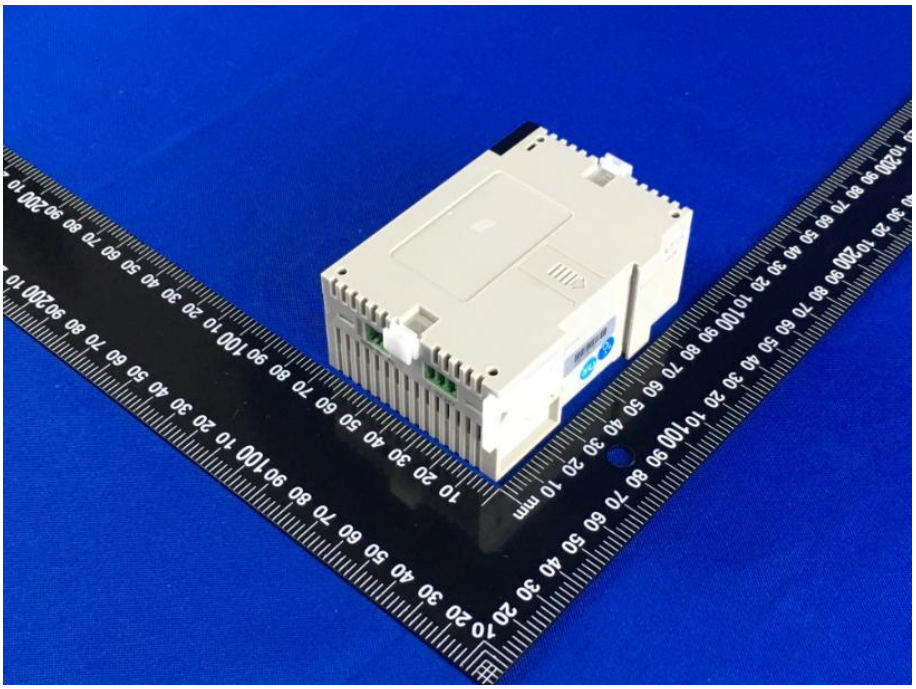
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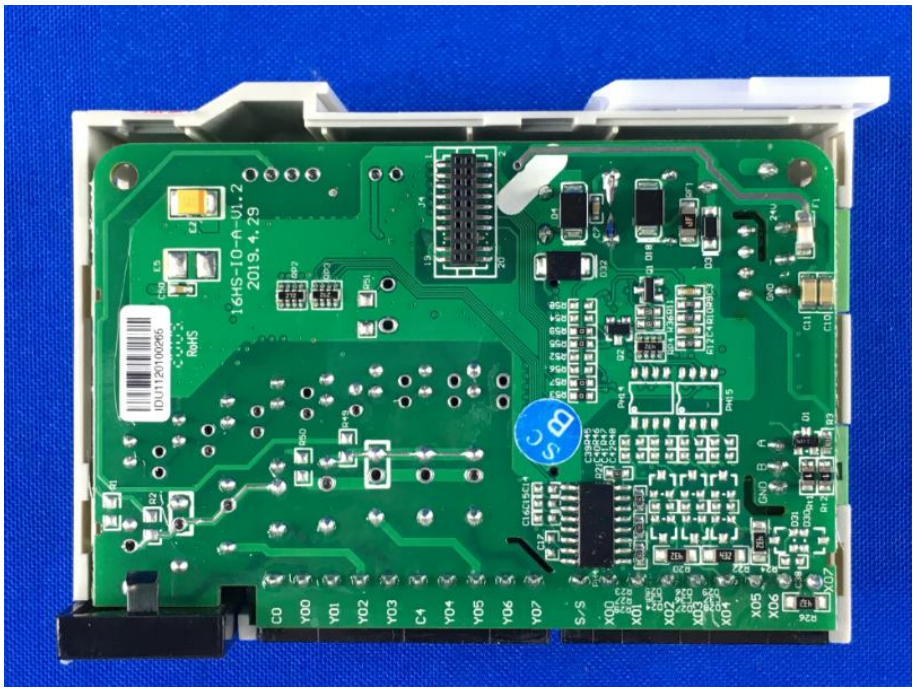
9 Photographs of the EUT



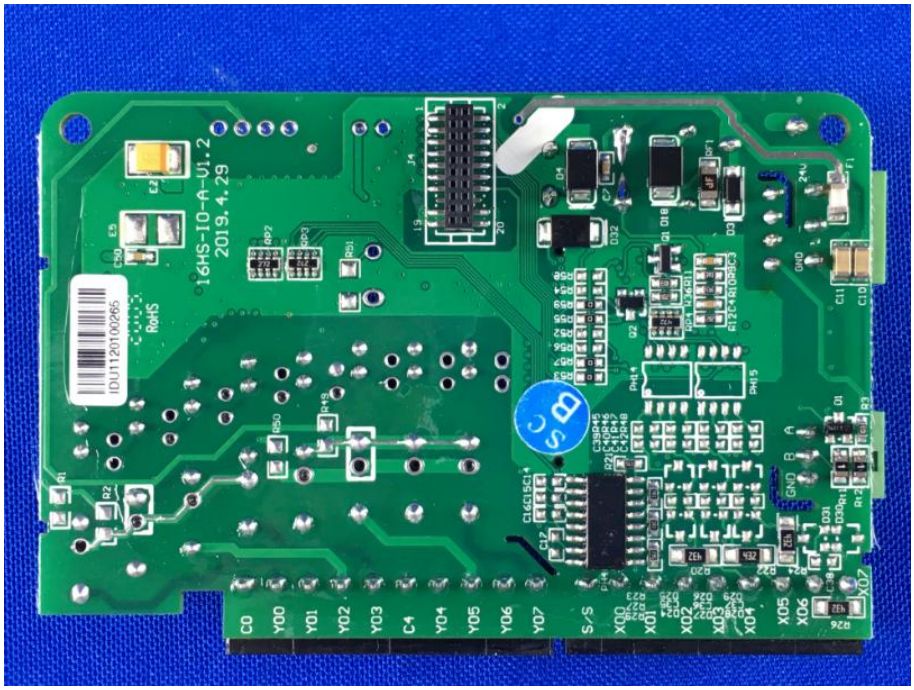


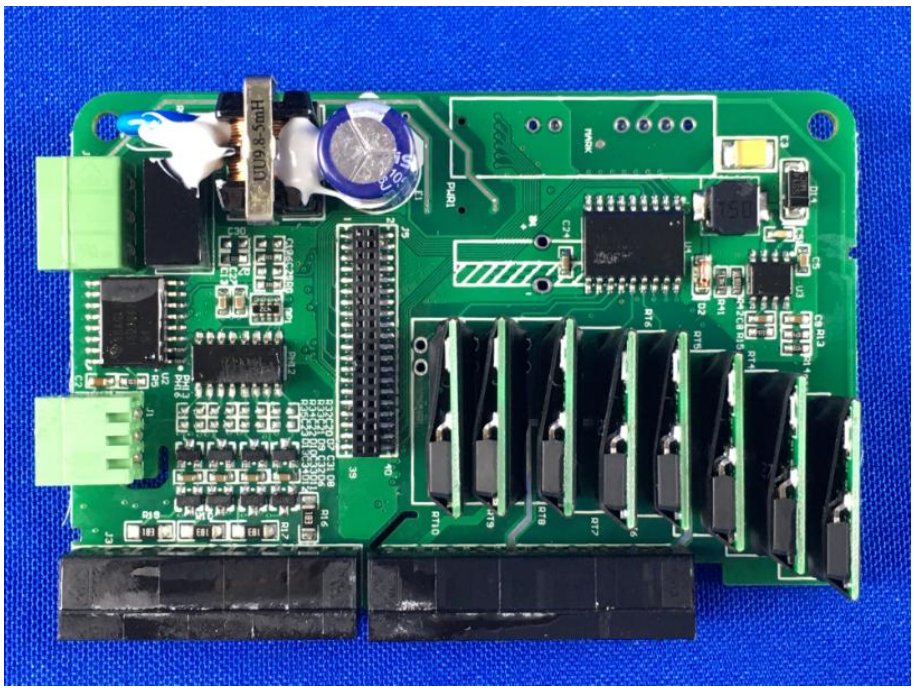
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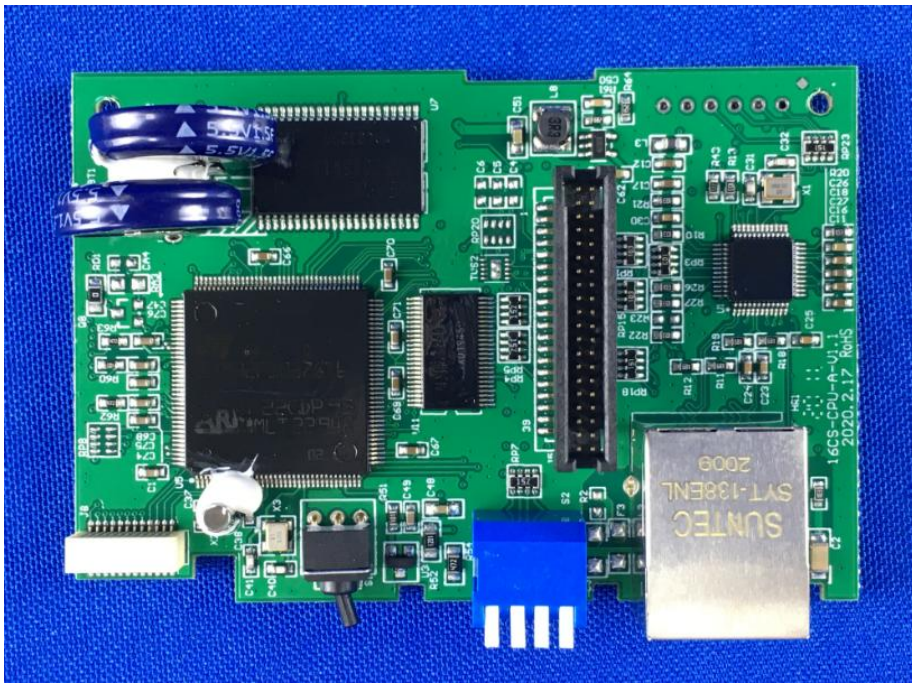


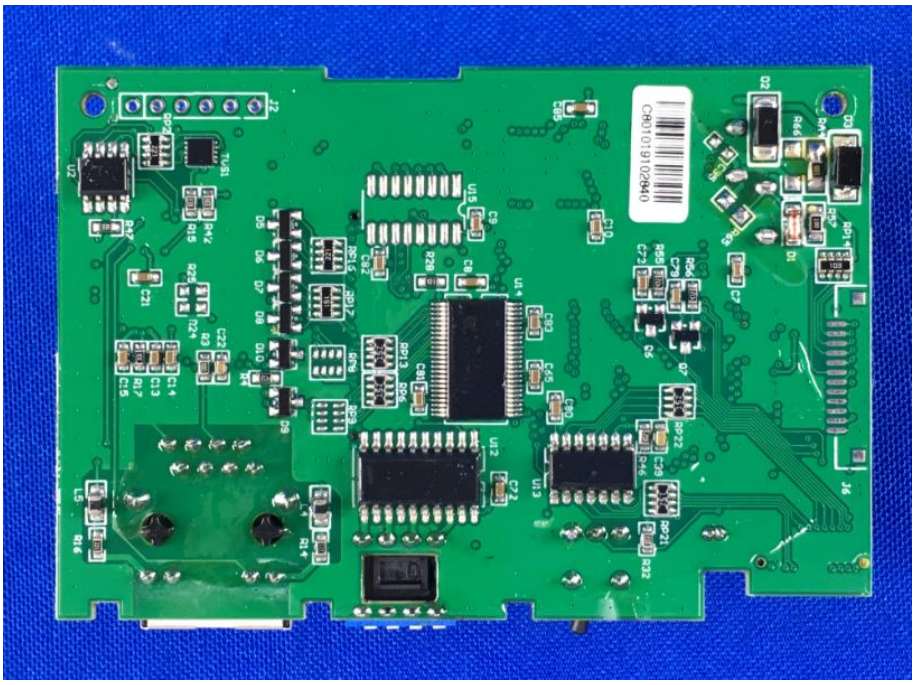
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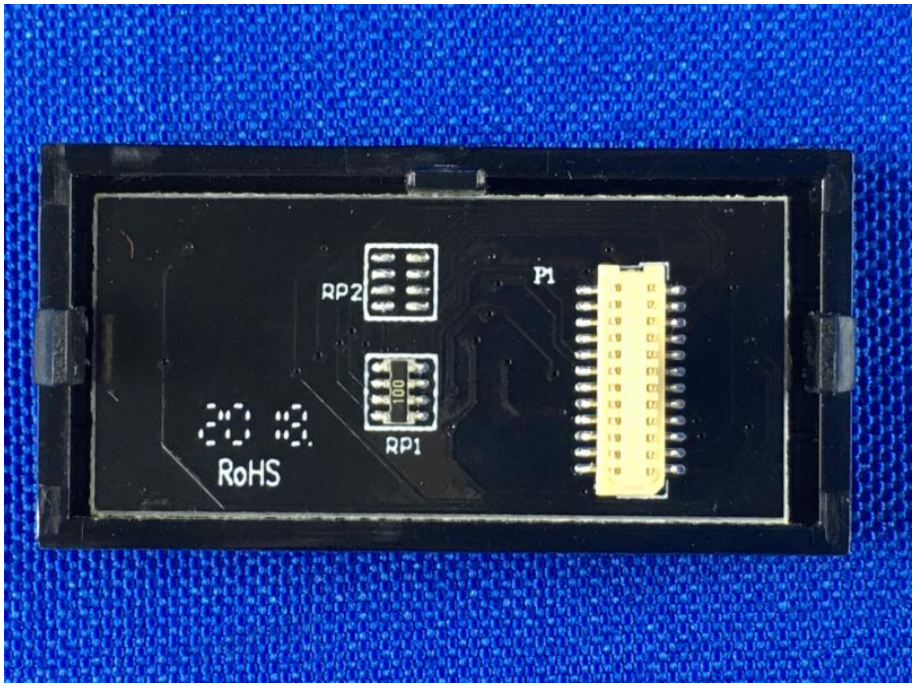


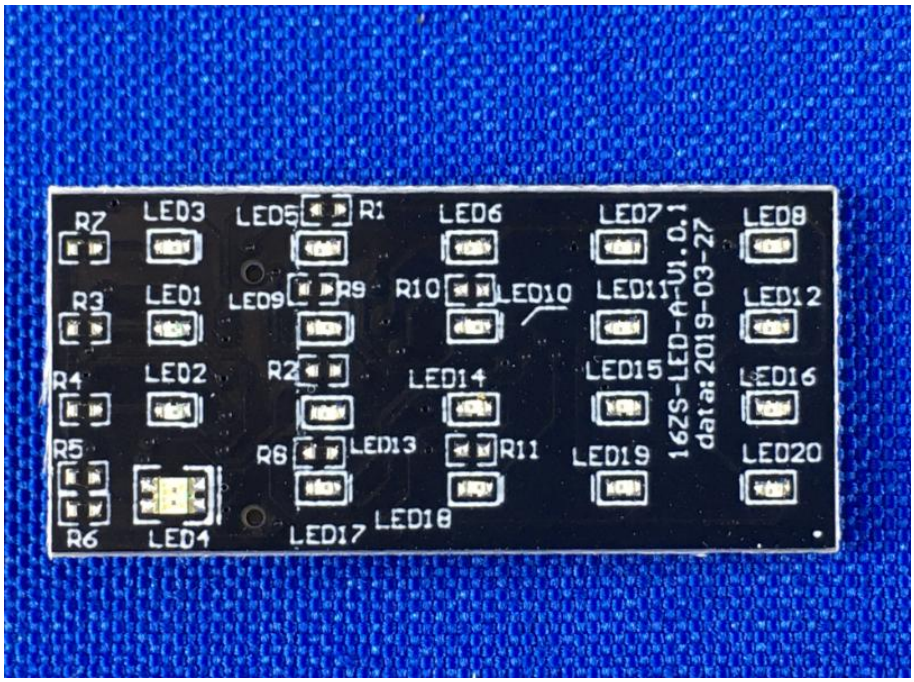
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