KEMA HIGH-VOLTAGE LABORATORY

SUMMARY Order no.: 70970101

CLIENT
Sixnet, LLC
Ballston Lake, NY, United States of America

SUMMARY OF TEST REPORT NO.
09-1461

MATERIAL TESTED

Manufacturer	Sixnet, LLC Ballston Lake, NY, United States of America			
Object description	Industrial ethernet switch			
Type	EL228			
Sample data				
Variant	Serial number	Software version	Hardware version	
EL228 EUT 1	934000407	--	--	
EL228 EUT 2	934000384	--	--	
EL228-AA-1 Unit 2	--	--	--	

Vaux = 85 - 264 VAC; 90-300 VDC
24 10/100 Mbps SM / MM, ST / SC fiber optic interface ports
4 1 Gbps electrical / optical ports

The test samples are selected such that they represent the complete product type since testing all possible hardware and software variants will be impossible. The results apply only to the objects tested. The responsibility for conformity of any object having the same designations with that tested rests with the Manufacturer.

TEST PROGRAMME
Environmental tests according IEC 61850-3 and IEEE 1613:
- EMC requirements (IEC 61000-4 series, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-6-5, IEEE C37.90 series);
- Climatic environmental requirements (IEC 60068 series);
- Mechanical requirements (IEC 60068 series and IEEE 1613);
- Dielectric requirements (IEC 60255-5 and IEEE 1613).

DATE AND PLACE OF THE TESTS
From 1 October 2009 until 7 January 2010 in the KEMA High-Voltage Laboratory, Arnhem, the Netherlands.

PERSONS ATTENDING THE TESTS (partly)

Mr A. Hilberink — Sixnet, Hellendoorn, the Netherlands

THE TESTS WERE CARRIED OUT BY

Mr H.C. Koerts — KEMA High-Voltage Laboratory, Arnhem, the Netherlands

SUMMARY AND CONCLUSION

The results obtained relate only to the work ordered and the material tested.

Electromagnetic compatibility

test	standard	test level / test details
electrostatic discharges	IEC 61000-4-2 IEEE 1613, class 1	8 kV contact, 15 kV air Remark: power / output contact connector not tested.
electromagnetic fields	IEC 61000-4-3 IEEE 1613 class 2	80 MHz – 1 GHz; AM 80% 1kHz and pulse 100% 1 Hz (keying) 20 V/m prior to modulation, 1400 MHz – 2700 MHz, AM 80%, 1 kHz, 10 V/m prior to modulation
fast transients	IEC 61000-4-4 IEEE 1613, class 1	4 kV
surges	IEC 61000-4-5	4 kV LL, 2 kV LE
conducted RF immunity	IEC 61000-4-6	150 kHz – 80 MHz; AM 80% 1kHz 10 V
PF magnetic fields	IEC 61000-4-8	100 A/m continuous 1000 A/m 3 seconds
100 kHz oscillatory magnetic field	IEC 61000-4-10	30 A/m
1 MHz oscillatory magnetic field	IEC 61000-4-10	30 A/m
voltage dips, short interruptions and voltage variations	IEC 61000-4-11 IEEE 1613	50 to 1000 ms interruption (details in report). 40% residual voltage; 200 ms 70% residual voltage; 500 ms. 5 seconds interruption. Gradual shut down / start-up (DC). Reversed polarity (DC).
ripple on DC power supply	IEEE 1613	5%
100 kHz oscillatory waves	IEC 61000-4-18	2,5 kV CM; 2,5 kV DM
1 MHz oscillatory waves	IEC 61000-4-18 IEEE 1613, class 2	2,5 kV CM; 2,5 kV DM

Climatic environmental conditions

test	standard	test level / test details
operating	IEC 60721-3-3 IEC 60068-2-6 IEEE 1613, class 2	-40 °C - +70 °C
storage	IEC 60721-3-3 IEC 60068-2-6 IEEE 1613	-40 °C - +85 °C
humidity	IEC 60721-3-3 IEC 60068-2-78 IEEE 1613, class 2	95% / +40 °C 96 hours

Mechanical environmental conditions

test	standard	test level / test details
stationary vibration	IEC 60721-3-3 IEC 60068-2-6	class 3M6
shock	IEC 60721-3-3 IEC 60068-2-27	class 3M6
free fall	IEC 60870-2-2 IEC 60068-2-31 IEEE 1613	class Cm 250 mm
static load	IEC 60870-2-2 IEC 60721-3-3	class Cm, 5 kPa class 3M6
seismic	IEC 60255-21-3	class 2

Dielectric tests

PF voltage withstand	IEC 60255-5 IEEE 1613	2 kV 0,5 kV (communication ports)
impulse voltage	IEC 60255-5 IEEE 1613	5 kV

The tests were passed.

IEEE 1613 performance class 1: communication errors or interruption during tests, automatic recovery
IEEE 1613 performance class 2: without communication errors or interruption during the test.

KEMA Nederland B.V.

S.A.M. Verhoeven
KEMA High-Voltage Laboratory

Arnhem, 11 January 2010