

EMC PRE-COMPLIANCE TEST REPORT

3SET

Date: 11.5.2013
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1. PRODUCT

Test item Description	Building automation controlling unit
Trade Mark	3SET
Model/Type reference	3SET
Serial number	Prototype 1
Customer	Selega Tuote Oy
	Lasse Honkala
	Saarenmaantie 3
	45360 Valkeala
Contact Person	Lasse Honkala
Manufacturer	Selega Tuote Oy

2. LABORATORY INFORMATION

Test Laboratory	Electriel Oy
	Leenankuja 2 LH118
	02230 Espoo
	FINLAND

3. TEST SUMMARY

3.1 Test Standards

EMC-tests were performed according to measurement method specified in the reference standards - described as below

Test Requirements	Description
EN 61326-1 (2006)	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

IEC 61000-6-2 (2005)

Immunity for industrial environments

3.2 Test Results

Test Method	Result (Pass/Fail)
EN 61000-4-2 (1995) Electrostatic discharge immunity test	Pass
EN 61000-4-4 (2002) Radiated, radio-frequency,electromagnetic field immunity test	Pass
EN 55011 (1998) Radiated, ISM Equioment-Radio disturbance characteristics - Limits and methods of measurement	Pass

4. SYSTEM INFORMATION

4.1 System Configuration

Device	Model/Type	Manufacturer	Serial Number
EUT	3SET	3SET	
AE			
AE			
AE	DC power Supply		

EUT: Equipment Under Tests
 AE: Auxiliarity Equipment

4.2 Power Specification

EUT Power Connection	Machine Singboard	Tested
Voltage	24 VDC	24 VDC
Current	-	-
Frequency	DC	DC

4.3 General Configuration Features

EUT is a lighting controlling unit for intelligent houses.

Led lights were used to monitor the functioning of the device during the tests.

5. OPERATIONAL CONDITIONS

5.1 Operation mode

EUT was in normal operation mode.

5.2 Performances criteria for immunity testing

- A The EUT has to operate as intended during and after the test.
- B The EUT has to operate as intended after the test.
- C The EUT can have lost of function but after the test an operator can easily restart the function.

6. IMMUNITY TESTS

6.1 Electrostatic Discharge Immunity Test (ESD)

Test conditions

Testing Method	EN 61000-4-2 AM1 AM2	1995 1998 2001	
Climatic Condition	21,5 °C	30 %RH	1000 mbar
Site Place	Electriel Oy laboratory of Espoo		
Test Date	11.5.2013		
Tested by	Tapio Pernu		

6.1.1 Test Set-up

Size of the room is 5 m x 3 m x 3 m. The EUT is placed on a table above the ground reference plane. On the table-top is situated a horizontal coupling plane (HCP) which is connected via 2x470k resistor to the ground reference plane. The EUT is insulated on non-conductive support 20 mm thickness from the horizontal-coupling plane.

6.1.2 Applying the discharges

ESD test was carried out only for the sensor probe part of the EUT. The direct contact discharges are applied to the conductive parts of the EUT and the air discharges are applied to the non-conductive parts of the EUT. The indirect contact discharges are applied to the EUT by discharging to the horizontal (HCP) and to the vertical coupling plane (VCP). At least 10 discharges are applied on each test level and test point.

	Test levels / kV	Performance criteria
Contact discharge	±8 kV	B
Indirect contact (VCP)	±8 kV	B
Air discharge	±8 kV	B

6.1.3 Test Results

Air discharge: housing	Test level	Notes	Result
Non-conductive parts	±8 kV	No observed loss of function	Passed

Air discharge: connectors	Test level	Notes	Result
Conductive parts	±8 kV	No observed loss of function	Passed

Indirect contact discharge	Test level	Notes	Result
HCP and VCP	±8 kV	No observed loss of function	Passed

6.2 Radiated, Radio Frequency, Electromagnetic field immunity test

Test conditions

Testing Method	EN 61000-4-3	2002	
Climatic Condition	21,5 °C	30 %RH	1000 mbar
Site Place	Electriel Oy laboratory of Espoo		
Test Date	11.5.2013		
Tested by	Tapio Pernu		

6.2.1 Test Set-up

Size of the room is 5 m x 3 m x 3 m. The EUT is placed on a non-conductive wall 50 cm above the ground reference plane. The EUT is positioned on a calibrated test place.

6.2.2 Testing Procedure

Testing is carried out on horizontal and vertical antenna positions. Only 0° side of the EUT is tested.

Other testing parameters are described in the following table:

Test frequency range	80-1000 MHz and 1,4-2,7 GHz with 1 MHz steps
Test Level	10 V/m
Performance criteria	A

6.2.3 Test Results

Antenna Polarization	Notes	Result
Horizontal	No observed loss of function	Passed
Vertical	No observed loss of function	Passed

7. EMISSION MEASUREMENTS

7.1 Radiated RF interference emission measurements in the frequency range 30-1000 MHz

Test conditions

Testing Method	EN 55011 Amend. A1 Amend A2	1998 1999 2002	Radiated emission part
Measurement uncertainty	30-1000 MHz	±4,2 dB	95 % confidence expanded (k=2)
Climatic Condition	21,5 °C	30 %RH	1000 mbar
Site Place	Electriell Oy laboratory of Espoo		
Test Date	11.5.2013		
Tested by	Tapio Pernu		

7.1.1 Test Set-up

Test site is RF-isolated chamber. Size of the chamber is 5 m x 3 m x 3 m. The EUT is placed on a table 80 cm above the ground reference plane.

7.1.2 Measuring Procedure

The measuring is carried out at the 30-1000 MHz frequency range, with horizontal and vertical antenna polarizations. With both antenna polarizations the EUT emissions are measured using the peak detector and the resolution bandwidth of 120 KHz. The test set-up is rotated during the measurement from 0° to 315° with 45° steps (eight directions) and scanned with antenna heights 1 m. The Highest peaks are measured with the quasi-peak detector with the bandwidth of 120 kHz. Measurement distance is 1,5 meters and the results are corresponding to 10 meter antenna to EUT distance.

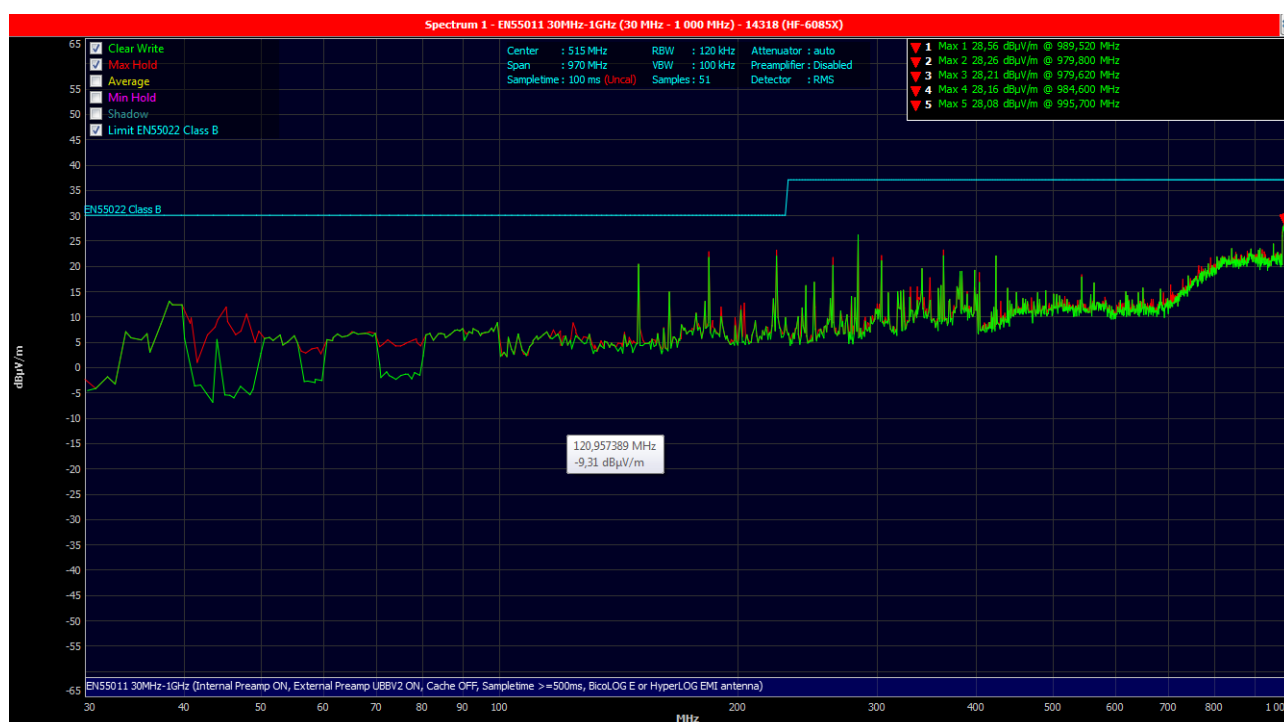
Limits values for EN55011 Class B Group 1 Equipment.

Frequency MHz	Group 1 Class B Quasi-peak dB μ V/m
30-230	30
230-1000	37

7.1.3 Test Results

Test	Test Result
Radiated emission test	Passed

Note: If the measurement result is below the limit by a margin less than the measurement uncertainty, it is not possible to define at a level of confidence of 95 %.



Final Quasi Peak results worst case frequencies after finding maximum of the emissions from the EUT with antenna height scan and the EUT rotations (0-360°).