



Test Report No. P/12/01/54

Subject of test: **Data-logger type BOX-ESGM**
Manufacturer mySCADA Technologies, s.r.o.

Test standards: CSN EN 61000-4-2 ed.2:2009
CSN EN 61000-4-3 ed3:2006 + A1 + A2
CSN EN 61000-4-4 ed2:2005 + A1
CSN EN 61000-4-5 ed.2:2007
CSN EN 61000-4-6 ed.3:2009
CSN EN 55022 ed2:2007 + A1 art. 6, 10

Related standards: CSN EN 61326-1:2006
CSN EN 61000-6-1 ed2:2007
CSN EN 61000-6-2 ed3:2006
CSN EN 61000-6-3 ed2:2007
CSN EN 61000-6-4 ed2:2007
CSN EN 55024 ed.2:2011

Customer: mySCADA Technologies, s.r.o.
Na Kodymce 972/3, 160 00 Praha 6, Dejvice

Purchase Order Number: E-mail 10.9.2012

Person in charge: Zdenek Stastny, laboratory manager

Hereafter presented test results are applied to the tested equipment exclusively and they must not substitute other documents.

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<u>Filing date of test subject:</u>	4.10.2012
<u>Time and place of test:</u>	4.10.2012, Test Room ABEGU, a.s.
<u>Subject of test:</u>	Data-logger type BOX-ESGM S/N 982920862
<u>Manufacturer:</u>	mySCADA Technologies s.r.o.
<u>Customer:</u>	mySCADA Technologies s.r.o.
<u>Customer assistant:</u>	Martin Stacha
<u>Documentation:</u>	Wiring diagram, Operation manual
<u>Goal of test:</u>	1. Check-up level of immunity against electromagnetic disturbance. 2. Check-up level of transmitted electromagnetic disturbance.
<u>Date of report issue:</u>	7.12.2012
<u>Number of report pages:</u>	10
<u>Number of attachment pages:</u>	0
<u>Elaborated by:</u>	Zdenek Stastny, Jan Rerabek
<u>Approved by:</u>	Zdenek Stastny, laboratory manager
<u>Distribution of test report:</u>	1. mySCADA Technologies s.r.o. 2. ABEGU, a. s., ZKUSEBNA

Test classification, uncertainty of measurement:

- Function of subject (equipment under test - EUT) classified on the basis of operating condition and functional specification, as in the following (by generic standards CSN EN 61000-6-1, CSN EN 61000-6-2, product family standards CSN EN 55024, CSN EN 61326-1 and following test standards CSN EN 61000-4):
 - Criterion A: Normal performance within the specification limits.
 - Criterion B: Temporary degradation or loss of function or performance which is self-recoverable.
 - Criterion C: Temporary degradation or loss of function or performance which requires operator intervention or systems reset.
 - Criterion D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software or loss of data.Formulation of uncertainty of measurement for the immunity test is not relevant.
- Emission level of EUT by the requirement of standards CSN EN 61000-6-3, CSN EN 61000-6-4, CSN EN 61326-1 and following test standard CSN EN 55022. The results are present with total uncertainty U . This uncertainty is defined as standard uncertainty multiplied by coefficient $k=2$, which warrants confidence interval approximately 95 % for standard distribution.

Traceability to national standards of measurement:

1. External calibrations;
2. Factory reference standard - digital multimeter model 2000, No. E-4.1-010, external calibration by CMI;
3. Factory reference standard - digital scope HP 54616B, No. E-4.1-035, external calibration by CMI.

Equipment configuration:

EUT was installed by customer in accordance to requirements in operation manual. DC power supply input was connected to accumulator 24V 7Ah through artificial networks in according to requirements in the test standards. The function of EUT was checked on the PC, which one was connected to EUT through LAN communication. The response to signal PING was checked.

Examined tests:

- A.01: Electrostatic discharge immunity test by CSN EN 61000-4-2
- A.02: Radiated, radio-frequency, electromagnetic field immunity test by CSN EN 61000-4-3
- A.03: Fast transient burst immunity test by CSN EN 61000-4-4
- A.04: Surge immunity test by CSN EN 61000-4-5
- A.05: Immunity to conducted disturbances induced by radio-frequency fields by CSN EN 61000-4-6
- B.03: Electromagnetic field intensity measuring by CSN EN 55022

Tested interfaces:

1. DC power 2-24V
2. communication
3. equipment surface

Test procedure and result:

A.01 Electrostatic discharge immunity test

Test standard: CSN EN 61000-4-2 ed.2:2009
 Test equipment: Test generator SRG 200 ID. A-4.1-001
 Electrode for contact discharge (fig. 3b at test standard)
 Port under test: Front panel of EUT by fig. 6 at test standard – points next to
 connectors Eternet, Pigibag, RS-232/485 and FlashCard
 Test values: 2 - 4 kV for contact discharge
 Criterion request: B
 Number of pulses: 10 pulses for each test value and polarity, time among two pulses not
 less than 10 s
 Note: Communication with control PC was disconnected during test.
 Function of communication was checked after each test.

Electrostatic discharge immunity test CSN EN 61000-4-2:1997 + A1 + Z1						
Subject of test	Data-logger type BOX-ESGM S/N 982920862, manufacturer mySCADA Technologies, s.r.o.					
Temperature:	22 ± 3 °C	Immunity level				Note
Humidity:	50 ± 5 %	1	2	3	4	
EUT configuration, Port under test	Test value for contact discharge				Coupling path: Contact discharge	
	2 kV	4 kV	6 kV	8 kV		
	Criterion					
Point next to connector Eternet	B	B	n. a.	n. a.	Response to signal PING after test no more than 2ms.	
Point next to connector Pigibag	B	B	n. a.	n. a.	Response to signal PING after test no more than 2ms.	
Point next to connector RS-232/485	B	B	n. a.	n. a.	Response to signal PING after test no more than 2ms.	
Point next to connector FlashCard	B	B	n. a.	n. a.	Response to signal PING after test no more than 2ms.	
n.a. ... test value was not applied - see test program						
Test identification	Test sequence number	Date		Examined by		
A.01	4	4.10.2012		Stastny		

Result evaluation (interpretation): No unacceptable changes were detected during test.

A.02 Radio-frequency field immunity test

Test standard: CSN EN 61000-4-3 ed.3:2006 + A1 + A2
 Test equipment: Signal generator SM 300 ID. A-4.1-017
 Power amplifier 30W1000A ID. A-4.1-004
 Power amplifier 10S1G4A ID. A-4.1-018
 Log-periodical antenna AT 1080 ID. A-4.1-005
 Horn antenna AT 4002A ID. A-4.1-019
 Electric field meter CTR 1001A ID. A-4.1-007

Port under test: Front panel with connectors
 Top side of module

Coupling path: Electromagnetic

Frequency range: 80 - 3000 MHz
 Frequency step: 1 %
 Frequency time: 1 s

Test values: 1 - 3 - 10 V/m, amplitude modulation 80 % / 1 kHz
 Polarization: horizontal, vertical
 Criterion request: A

Note: Test was made in the outside environment. Electric field transmitted by antenna was monitoring next to EUT and regulated to nominal value in the feedback loop.
 The test with lower value shall not be necessary if the result of test with higher value is in criterion A.

Radiated, radio-frequency, electromagnetic field immunity test CSN EN 61000-4-3 ed.3:2006					
Subject of test	Data-logger type BOX-ESGM S/N 982920862, manufacturer mySCADA Technologies, s.r.o.				
Temperature:	22 ± 3 °C	Immunity level			Note
Humidity:	50 ± 5 %	1	2	3	
EUT configuration, Port under test	Test value (80MHz - 1GHz)			Coupling path: Electromagnetic - antenna AT 1080 Distance / height of antenna 3,0 / 1,7 m	
	1 V/m	3 V/m	10 V/m		
	Criterion - HP, AM 80%/1kHz				
Front panel with connectors	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
Top side of module	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
	Criterion - VP, AM 80%/1kHz				
Front panel with connectors	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
Top side of module	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
	Test value (1 - 3GHz)			Electromagnetic - antenna AT 4002A Distance / height of antenna 3,0 / 1,7 m	
	Criterion - HP, AM 80%/1kHz				
Front panel with connectors	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
Top side of module	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
	Criterion - VP, AM 80%/1kHz				
Front panel with connectors	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
Top side of module	n.a.	n.a.	A	Response to signal PING no more than 2ms.	
n.a. ... test value was not applied - see test program HP (VP) ... horizontal (vertical) antenna polarization AM (PM) ... amplitude (pulse) modulation					
Test identification	Test sequence number	Date		Examined by	
A.02	5	4.10.2012		Rerabek, Stastny	

Result evaluation (interpretation): No unacceptable changes were detected during test.

A.03 Fast transient burst immunity test

Test standard: CSN EN 61000-4-4 ed.2:2005 + A1
 Test equipment: Test generator PPG 4kV FAST ID. A-4.1-021a
 Coupling clamp KK 400 ID. A-4.1-009b
 Port under test: Unshielded cable to DC power supply input 2-24V
 Unshielded cable to communication Ethernet
 Unshielded cable to communication Pigibag
 Shielded cable to communication Pigibag
 Shielded cable to communication RS-232/485
 Coupling path: Capacitive - coupling clamp KK 400
 Test values: 0,25 - 0,5 - 1 - 2 kV, positive and negative polarity, pulse frequency
 5 kHz, burst time 15 ms
 Criterion request: B
 Time of test: 60 s for each coupling, test value and polarity
 Note: The test with lower value shall not be necessary if the result of test with
 higher value is in criterion A.

Fast transient burst immunity test CSN EN 61000-4-4 ed.2:2005 + A1						
Subject of test	Data-logger type BOX-ESGM S/N 982920862, manufacturer mySCADA Technologies, s.r.o.					
Temperature:	22 ± 3 °C	Immunity level				Note
Humidity:	50 ± 5 %	1	2	3	4	
EUT configuration, Port under test	Test value				Coupling path: Capacitive clamp KK 400	
	250 V	500 V	1 kV	2 kV		
	Criterion for $f_{imp} = 5$ kHz					
Unshielded cable to DC power supply input 2-24V	n.a.	A	A	A		
Unshielded cable to communication Ethernet	n.a.	A	A	A		
Unshielded cable to communication Pigibag	n.a.	A	A	B	Criterion B - for test value +2kV communication failure	
Shielded cable to communication Pigibag	n.a.	n.a.	n.a.	A		
Shielded cable to communication RS-232/485	n.a.	A	A	A		
n.a. ... test value was not applied - see test program						
Test identification	Test sequence number	Date		Examined by		
A.03	1	4.40.2012		Stastny		

Result evaluation (interpretation): No unacceptable changes were detected during test.

A.04 Surge immunity test

Test standard: CSN EN 61000-4-5 ed.2:2007
 Test equipment: Test generator PPG 4kV SLOW ID. A-4.1-021b
 Coupling network SRF 511 ID. A-4.1-010a
 Coupling device SRF 512 ID. A-4.1-010c
 Port under test: DC power supply input 2-24V, line to line mode, interference to (+)-(-)
 Coupling path: Artificial network - coupling device SRF 511 + SRF 512
 Test values: 0,5 - 1 kV for line to line mode, positive and negative polarity, output generator impedance 42 Ω
 Criterion request: B
 Number of pulses: 5 for each level and polarity, time among two pulses not less than 10 s

Surge immunity test CSN EN 61000-4-5 ed.2:2007					
Subject of test	Data-logger type BOX-ESGM S/N 982920862, manufacturer mySCADA Technologies, s.r.o.				
Temperature:	22 ± 3 °C	Immunity level			Note
Humidity:	50 ± 5 %	1	2	3	
EUT configuration, Port under test	Test value - line to line mode				Coupling path: Artificial network SRF 511 + SRF 512, output generator impedance 2 Ω
	n.d.	0,5 kV	1 kV	2 kV	
	Criterion				
2-24V L(+)-L(-)	-	A	A	n.a.	
n.a. ... test value was not applied - see test program					
n.d. ... immunity level was not defined - see test standard					
Test identification	Test sequence number	Date		Examined by	
A.04	3	4.10.2012		Stastny	

Result evaluation (interpretation): No unacceptable changes were detected during test.

A.05 Immunity to conducted disturbances induced by radio-frequency

Test standard: CSN EN 61000-4-6 ed.3:2009
 Test equipment: Signal generator SM 300 ID. A-4.1-017
 Power amplifier 25A250A ID. A-4.1-011
 Ferrite clamp F-2031 ID. A-4.1-012
 Frequency range: 0,15 - 80 MHz, amplitude modulation 80 %, 1 kHz
 Frequency step: 1 %
 Frequency time: 1 s
 Port under test: Unshielded cable to DC power supply input 2-24V
 Unshielded cable to communication Ethernet
 Unshielded cable to communication Pigibag
 Shielded cable to communication Ethernet
 Shielded cable to communication RS-232/485
 Coupling path: Electromagnetic - ferrite clamp F-2031
 Test values: 1 - 3 - 10 V
 Note: The test with lower value shall not be necessary if the result of test with higher value is in criterion A.

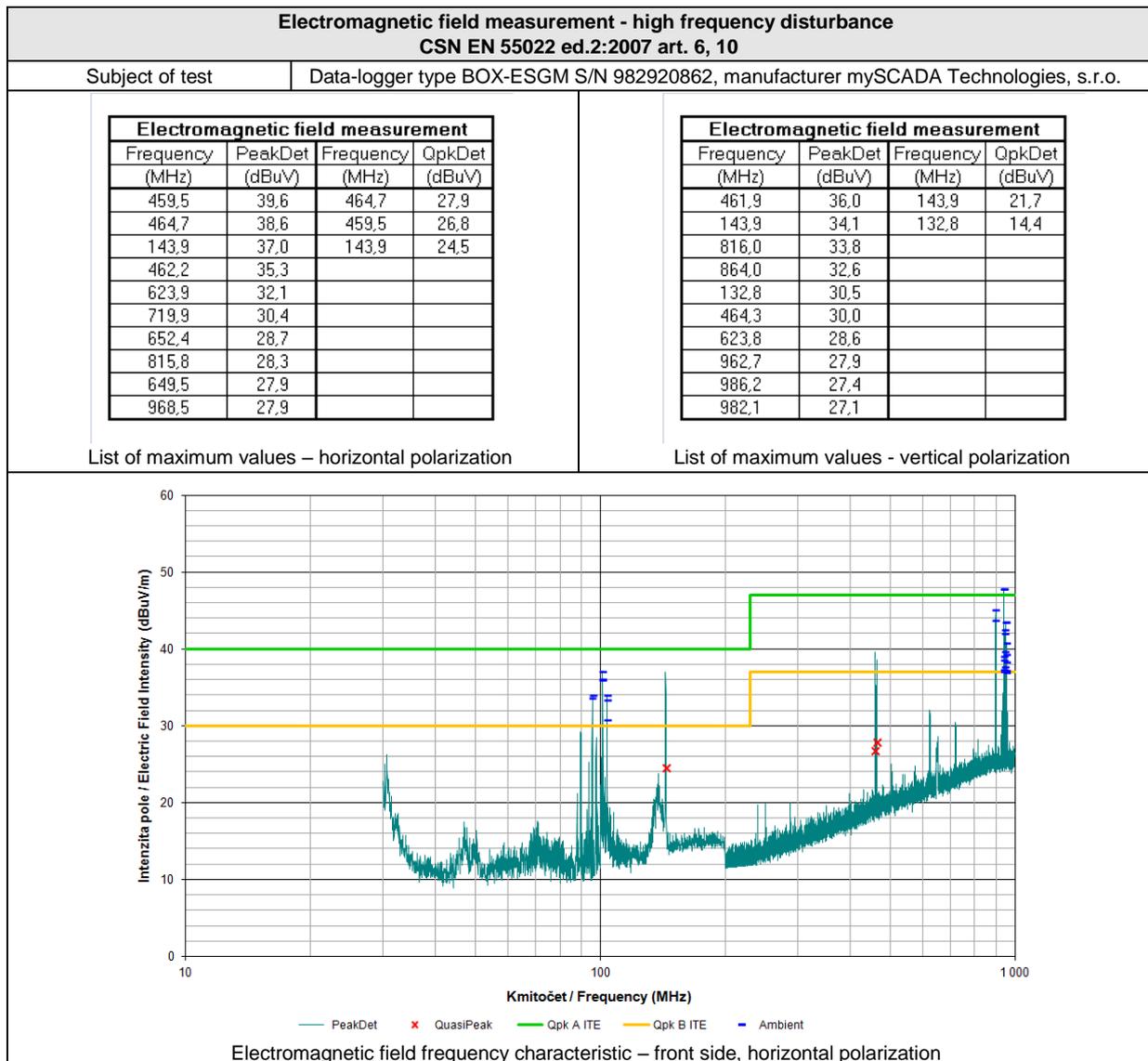
Immunity to conducted disturbances induced by radio-frequency CSN EN 61000-4-6 ed.3:2009					
Subject of test	Data-logger type BOX-ESGM S/N 982920862, manufacturer mySCADA Technologies, s.r.o.				
Temperature:	22 ± 3 °C	Immunity level			Note
Humidity:	50 ± 5 %	1	2	3	
EUT configuration, Port under test	Test value (0,15 - 80 MHz)			Coupling path: Electromagnetic - ferrite clamp F-2031	
	1 V	3 V	10 V		
	Criterion - AM 80%/1kHz				
Unshielded cable to DC power supply input 2-24V	n.a.	n.a.	A		
Unshielded cable to communication Ethernet	n.a.	A	B	Criterion B - for frequency range 50 to 80 MHz and test value 10 V communication failure	
Shielded cable to communication Ethernet	n.a.	n.a.	A		
Unshielded cable to communication Pigibag	n.a.	n.a.	A		
Shielded cable to communication RS-232/485	n.a.	n.a.	A		
n.a. ... test value was not applied - see test program AM (PM) ... amplitude (pulse) modulation					
Test identification	Test sequence number	Date		Examined by	
A.05	2	4.10.2012		Stastny	

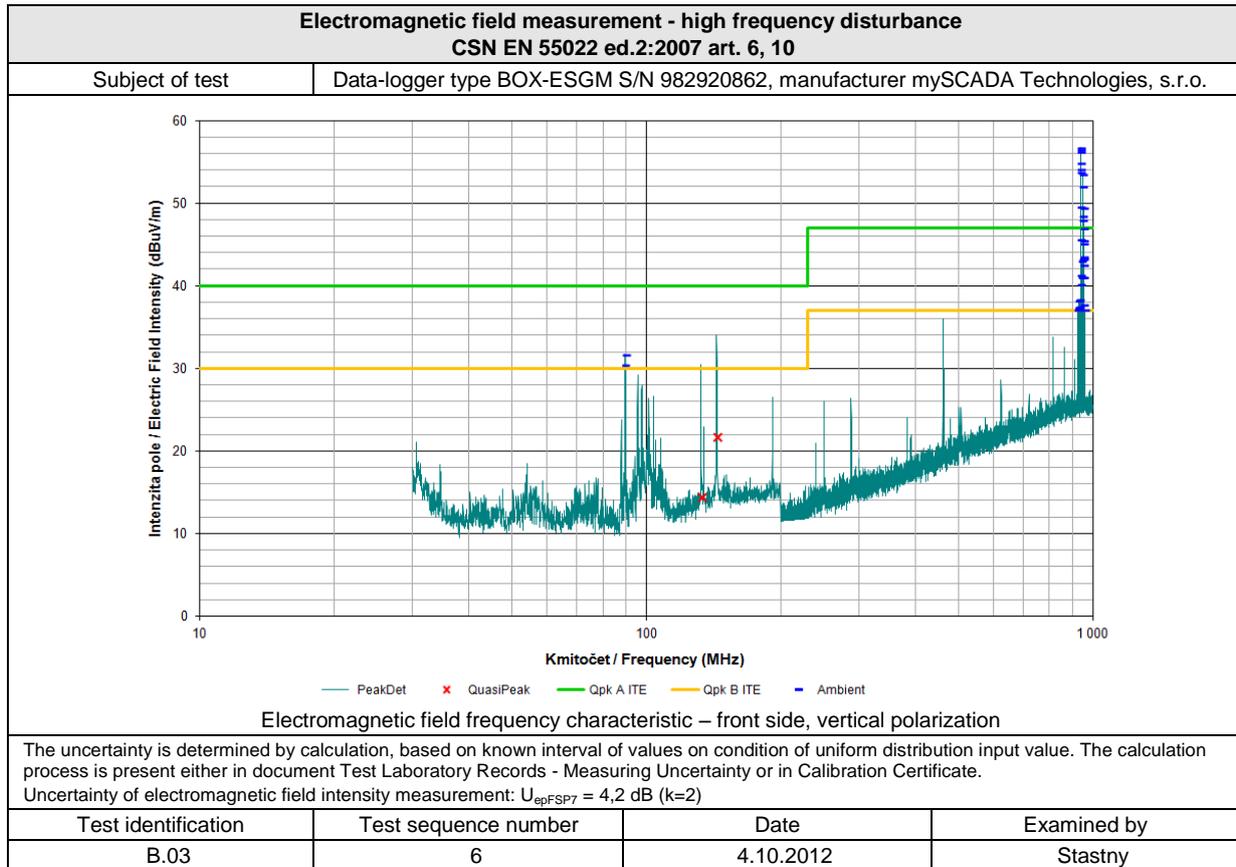
Result evaluation (interpretation): Communication failure was detected during test to unshielded cable to communication Ethernet. No other unacceptable changes were detected during test.

B.03 Electromagnetic field intensity measurement (high-frequency disturbance)

Test standard: CSN EN 55022 ed.2:2007 art. 6, 10
 Test equipment: Spectral analyzer FSP 7 ID. B-4.1-027
 Broadband preamplifier LN 1000A ID. B-4.1-027a
 Biconical antenna BC 01 ID. B-4.1-026a
 Log-periodical antenna LP 02 ID. B-4.1-026b
 Software Fsp7_ep_cd.xls

Coupling path: Electromagnetic
 Frequency range: 30 to 200 MHz (BC 01)
 200 to 1000 MHz (LP 02)
 Bandwidth: 120 kHz
 Detector: Peak, quasi-peak, average
 Note: The procedure by appendix B in CSN EN 55022 was used for measuring data evaluation.
 The test was made in the non-shielding room. The procedure by art. 8 in CSN EN 55022 was used for measuring data evaluation.





Result evaluation (interpretation): The level of electromagnetic field intensity - class A according to CSN EN 55022 ed.2, in accordance to CSN EN 61000-6-4 ed.2 and CSN EN 61326-1.