INSTITUTE FOR TESTING AND CERTIFICATION, A.S.

Testing Laboratory of Electrical Products
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L 1004.3

TESTING LABORATORY No. 1004.3
accredited by the Czech Institute for Accreditation, o. p. s
according to ČSN EN ISO/IEC 17025:2005

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TEST REPORT
ABOUT THE ELECTROMAGNETIC COMPATIBILITY TEST
of the ENA075

AKREDITOVANÁ ZKUŠEBNÍ LABORATOŘ Č.1004.3 Institut pro testování a certifikaci, a.s.

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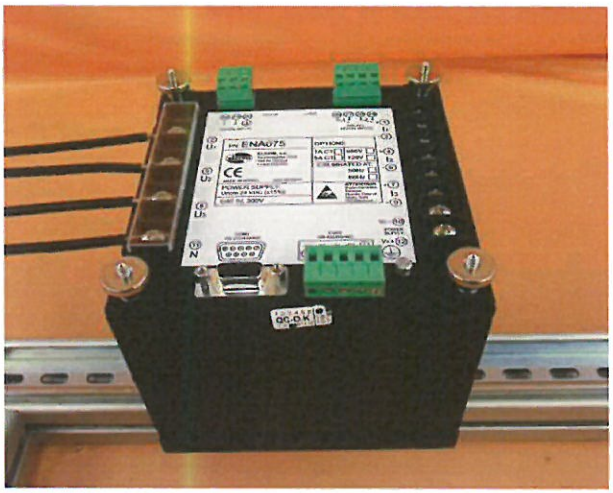
	Applicant (Copy No 2, 3)

1. General Specifications

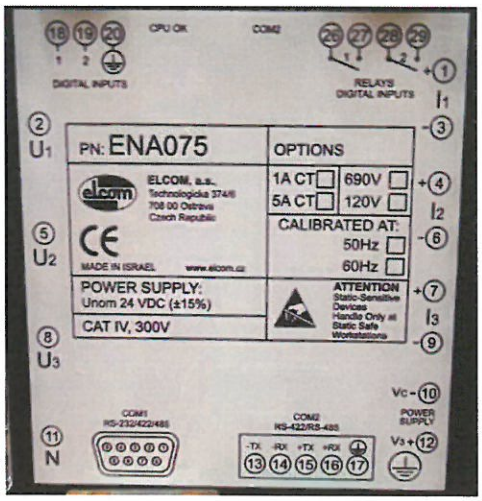
1.1. Equipment Under Test (EUT)

One sample the ENA075, with serial number 1234393 was delivered to Institute for testing and certification on 2018-02-21. ATL 1004.3 started the requested tests under Job No 414103724.

Picture 1.1.A – EUT



Picture 1.1.B – EUT rating label



1.2. Applicant

ELCOM a.s.
Na Větrově 34
142 00 Praha 4
Czech Republic

Company ID: 25077155
Tax ID: CZ25077155

Order No.:
as of: 2018-02-21

1.3. Manufacturer

ELCOM a.s.
Na Větrově 34
142 00 Praha 4
Czech Republic

1.4. Test Period

Started on: 2018-02-21
Finished on: 2018-02-21

1.5. Test Conditions

Ambient temperature: (+15 up to +35) °C / (+59 up to +95) °F
Barometric pressure: (86 up to 106) kPa
Relative humidity: (25 – 75) %

1.6. Regulations used

i	*Regulation used*	*As Czech implementation of*
1	ČSN EN 61326-1 ed.2:2013	EN 61326-1:2013
2	ČSN EN 55011 ed.4:2017	EN 55011:2016
3	ČSN EN 61000-4-2 ed.2:2009	EN 61000-4-2:2009
4	ČSN EN 61000-4-3 ed.3:2006+A1:2008 +A2:2011	EN 61000-4-3:2006+A1:2007+A2:2010
5	ČSN EN 61000-4-4 ed.3:2013	EN 61000-4-4:2012
6	ČSN EN 61000-4-5 ed.3:2015	EN 61000-4-5:2014
7	ČSN EN 61000-4-6 ed.4:2014	EN 61000-4-6:2014

1.7. Test Instruments and Equipment

i	*Instrument / Equipment*	*Serial No*
1	Test Receiver Rohde & Schwarz ESIB 7	100318
2	Antenna Frankonia BTA-H	97061002
3	Antenna Rohde & Schwarz HF 906	359287/003
4	RF generator Rohde & Schwarz SMH	862490/007
5	RF generator Rohde & Schwarz SME 03	834617/007
6	RF Amplifier AR 10W1000B	21532
7	RF Amplifier MILMEGA AS0840-30-17	10140028
8	RF Amplifier Frankonia FLH-200B1 rev.D	1055/1741
9	Generator Haefely PEFT-Junior	583333-82
10	Generator Haefely PSURGE 4010	080888/07
11	Coupling Network IP 6.2	145348
12	Coupling Network DEC1A	145312
13	Coupling Clamp KEMZ 801	14299
14	Coupling Network MEB M3	14413

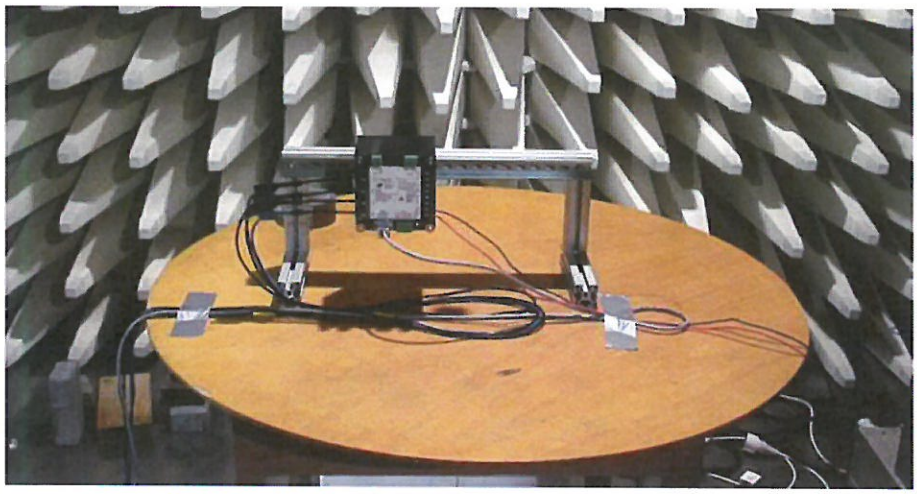
All listed equipment has been duly calibrated and they passed a regular metrological inspection.

1.8. EUT Installation

EUT was supplied from the DC mains of 24V using non-shielded two-wire cable length of 1.5 m (4.9 ft.). The voltage measurement inputs were connected to the power main 230V/50Hz. Non-shielded COM cable length of 3 m (9.8 ft.) was connected to the EUT COM1 connector. The checking software was installed in the PC.

2. EMC TESTS OF RADIATED INTERFERENCE

Picture 2.A – EUT during radiated interferences measurement



2.1. Radiated Field

Requirement in	**ČSN EN 61326-1, Clause 7**
Testing method	**ČSN EN 55011, Clause 8.3**
Test specification	The field strength levels, radiated by the EUT into environment on frequencies of 30 MHz up to 1 GHz. The measurement was carried out in the anechoic chamber at the distance of 3 m (9.8 ft.) and recalculated for the distance of 10 m (32.8 ft.) The Selective Microvoltmeter with a quasi-peak type detector was connected to the measuring antenna. The values of radiated electromagnetic field were subsequently measured at horizontal as well as vertical polarization of the measuring antenna. The maximum of emission was searched for horizontal and for vertical polarization by rotation of device and by turning the high of antenna. The EUT was placed on the wooden table 0.8 m (2.6 ft.) above ground reference plane in the shielded anechoic chamber. EUT was in the operation mode during the test.
Measurement uncertainty	U = ± 5.2 dB (specified for the coverage coefficient k = 2 and the confidence probability of 95 %)
Results	**PASSED, Class A**

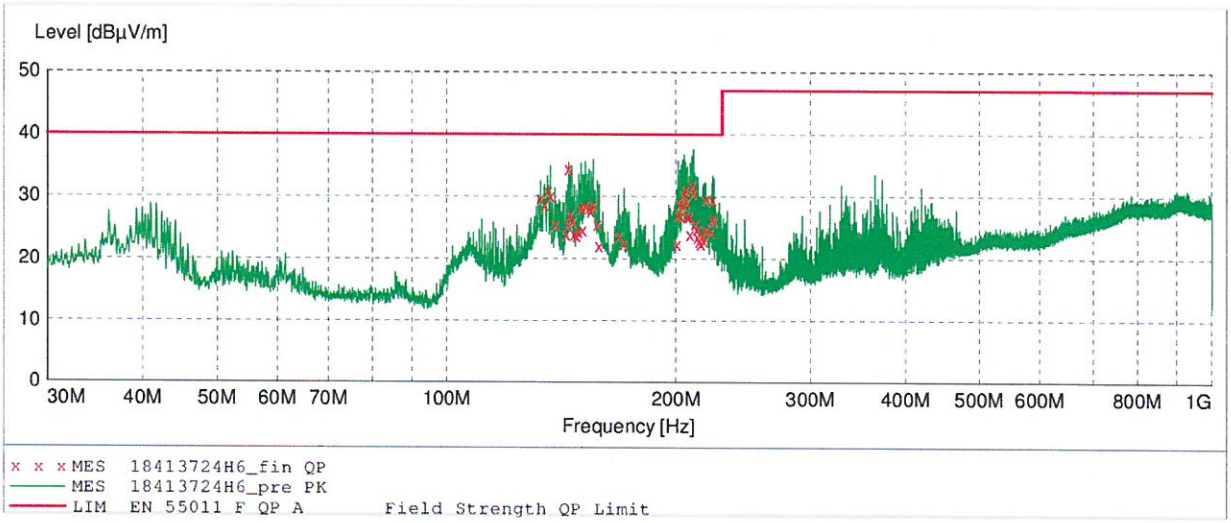
Limits of the radiated emissions (measuring distance 10 m) of the class A according to ČSN EN 55011, Table 6

Frequency Range (MHz)	*Quasi-Peak Limits dB (μV/m)*
30 up to 230	40
230 up to 1,000	47

Graph 2.1.A

Electric Field Strength

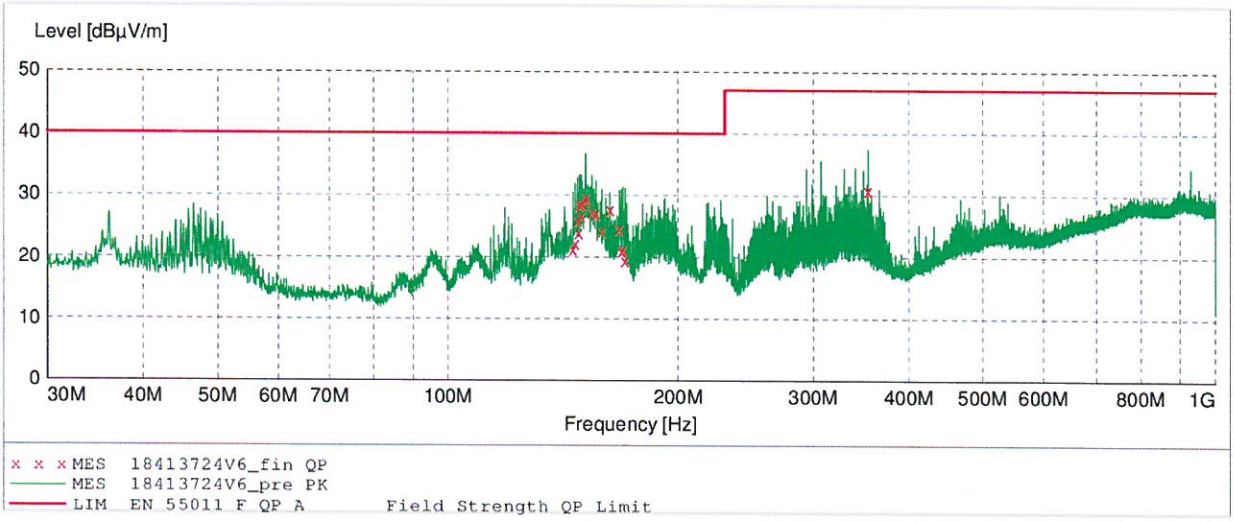
EUT: ENA 075
Manufacturer: ELCOM a.s.
Operating Condition:
Test Site:
Operator: V.Vaculik
Test Specification: Horizontal
Comment: pøikostøeno
Start of Test: 21.2.2018 / 10:59:50



Graph 2.1.B

Electric Field Strength

EUT: ENA 075
Manufacturer: ELCOM a.s.
Operating Condition:
Test Site:
Operator: V.Vaculik
Test Specification: Vertical
Comment: pøikostøeno
Start of Test: 21.2.2018 / 11:09:09



3. EMC IMMUNITY

EUT was placed on a table for required test. EUT was in the operating mode, connected according to clause 1.8, during the test.

If the regulations mentioned below require performance Criterion A, change of measurement value, error message, or reset of the EUT is not allowed during the test.

3.1. Electrostatic Discharge Immunity

Requirement in	**ČSN EN 61326-1, Clause 6.2. table 2**
Testing method	**ČSN EN 61000-4-2**
Test specification	The air method was applied for non-conductive surfaces while contact discharges were used for conductive parts. Twenty discharges were applied to each metallic place (Ten discharges with positive polarity a ten with negative polarity). Discharge points are shown on the pictures. The EUT was placed on an insulating pad on a table 0.8 m (2.6 ft.) above the reference grounding surface. EUT was in the operating mode during the test.
Results	**PASSED, Performance Criterion A**

Table 3.1.A – ESD immunity test parameters and performance

Level	+ 4 kV	- 4 kV	+ 6 kV	- 6 kV	+ 8 kV	- 8 kV
Contact Discharge	A	A	-	-	-	-
Air Discharge	-	-	-	-	A	A

A ... Performance Criterion A (no function of the EUT was affected)

3.2. Field Immunity

Requirement in	**ČSN EN 61326-1, Clause 6.2. table 2**
Testing method	**ČSN EN 61000-4-3**
Test specification	EUT was placed in a shielded anechoic chamber, on a wooden table, 80 cm (2.6 ft.) above the grounding surface. The test was performed in operation mode during the test.
Results	**PASSED, Performance Criterion A**

Tabulka 3.2.A – field immunity test parameters

Maximal change frequency	1% logarithmic step
Time step	2s

Table 3.2.B – Field immunity test parameters and performance

Frequencies	*AM*	*Mod. Frequency*	*Polarisation*	*Field intensity [V]*	*Performance*
80 MHz – 1 GHz	80%	1 kHz	Horizontal	10	A
1,4 GHz – 2 GHz	80%	1 kHz	Horizontal	3	A
2 MHz – 2,7 GHz	80%	1 kHz	Horizontal	1	A
80 MHz – 1 GHz	80%	1 kHz	Vertical	10	A
1,4 GHz – 2 GHz	80%	1 kHz	Vertical	3	A
2 MHz – 2,7 GHz	80%	1 kHz	Vertical	1	A

A ... Performance Criterion A (no function of the EUT under was affected)

3.3. Electrical Fast Transients/Burst Immunity

Requirement in	**ČSN EN 61326-1, table 2**
Testing method	**ČSN EN 61000-4-4**
Test specification	The pulse groups were injected directly into the individual supply leads terminal +24V and terminal -24V. The EUT was placed 0.1 m (0.3 ft.) above the reference grounding surface on a table with the height of 0.8 m (2.6 ft.). The minimum distance from any metallic objects was more than 0.6 m (1.9 ft.) from the EUT. The distance between the pulse generator and the EUT was 1.0 m (3.3 ft.). EUT was in the operating mode during the test.
Results	**PASSED, Performance Criterion A**

Table 3.3.A – fast transients/burst immunity test parameters

Pulse group width	15 ms
Pulse group period	300 ms
Repeating frequency of the pulse groups	5 kHz
Duration positive / negative pulses:	1 minute for each conductor

Table 3.3.B – fast transients/burst immunity tests parameters and performance

Level	+1 kV	-1 kV	+ 2 kV	- 2 kV
Terminal +24V	-	-	A	A
Terminal -24V	-	-	A	A

A ... Performance Criterion A (no function of the EUT was affected)

3.4. Surge Immunity

Requirement in	**ČSN EN 61326-1, table 2**
Testing method	**ČSN EN 61000-4-5**
Test specification	The surges were applied directly between the: • terminal +24V and terminal -24V • terminal +24V and Ground • terminal -24V and Ground The EUT was placed 0.1 m (0.33 ft.) above the ground reference plane on a table with the height of 0.8 m (2.63 ft.). EUT was in operation mode during the test
Results	**PASSED, Performance Criterion A**

Table 3.4.A – surge immunity test parameters

Shape of pulses	1.2/50 μs open-circuit voltage, 8/20 μs short-circuit current
Phase of injected signal with reference to the mains	0°
Number of surges	5
Interval between surges	10 s

Table 3.4.B –surge immunity tests parameters and performance

Level	+0.5 kV	- 0.5 kV	+1 kV	- 1 kV	+ 2 kV	- 2 kV
+24V and -24V terminals	-	-	A	A	-	-
+24V and PE terminals	-	-	-	-	A	A
-24V and PE terminals	-	-	-	-	A	A

A ... Performance Criterion A (no function of the EUT was affected)

3.5. Immunity to Conducted Disturbances Induced by RF Fields

Requirement in	**ČSN EN 61326-1, table 2**
Testing method	**ČSN EN 61000-4-6**
Test specification	The conducted spurious signals were injected into main using CDN MEB M3. EUT was placed 0.1 m (0,33 ft.) above ground reference plane on the wooden table height of 0.8 m (2.63 ft.). EUT was in the operating mode during the test.
Results	**PASSED, Performance Criterion A**

Table 3.5.A – field immunity test parameters

Maximal change frequency	1% logarithmic step
Time step	2s

Table 3.5.B – Field immunity test parameters and performance

	Frequencies	*AM*	*Mod. frequency*	*Severity level [V]*	*Performance*
Mains conductors	150 kHz – 80 MHz	80%	1 kHz	10	A

A ... Performance Criterion A (no function of the EUT was affected)

4. CONCLUSIONS

ENA075 complies with requirements of the following regulations in the range of performed tests:

- **EN 61326-1:2013**
- **EN 55011:2016 class A**
- **EN 61000-4-2:2009 criterion A**
- **EN 61000-4-3:2006 criterion A**
- **EN 61000-4-4:2012 criterion A**
- **EN 61000-4-5:2014 criterion A**
- **EN 61000-4-6:2014 criterion A**

END OF THE REPORT