

# Test Report



---

## Supplementary type approval testing of M1000 Alarm Annunciator and M3000 Analog Alarm Annunciator

### Performed for Selco A/S

DANAK-197639

Project no.: E502468-1

Page 1 of 9

4 annexes

04 October 2004

#### **DELTA**

Danish Electronics,  
Light & Acoustics

Venlighedsvej 4  
2970 Hørsholm  
Denmark

Tel. (+45) 72 19 40 00  
Fax (+45) 72 19 40 01  
[www.delta.dk](http://www.delta.dk)




<b>Title</b>	Supplementary type approval testing of M1000 Alarm Annunciator and M3000 Analog Alarm Annunciator
<b>Test objects</b>	M1000 Alarm Annunciator M3000 Analog Alarm Annunciator Detailed information is given in <i>sections 2.1 to 2.2</i>
<b>Report no.</b>	DANAK-197639
<b>Project no.</b>	E502468-1
<b>Test period</b>	8 September 2004
<b>Client</b>	Selco A/S Meterbuen 6-12 2740 Skovlunde Denmark
<b>Manufacturer</b>	Selco A/S
<b>Specifications</b>	IEC 60945: Fourth edition, 2002 "Maritime navigation and radio communication equipment and systems - General requirements - Methods of testing and required test results"  IACS E10: Rev.4 May 2004. Test Specification for Type Approval. "Test specification applicable, but not confined, to all equipment used for: - Control, protection and safety; - internal communication."  IEC 60533: Second edition, 1999. "Electrical and electronic installations in ships – Electromagnetic compatibility"
<b>Results</b>	No malfunctions were detected. The criteria for compliance are listed in <i>section 3.2</i> .
<b>Test personnel</b>	Ms. Daniela Coman

**Date** 04 October 2004

**Project manager** 

---

Niels Engel  
DELTA

**Responsible** 

---

Kim A. Schmidt, B.Sc.M.E.  
DELTA

<b>Table of contents</b>		<b>Page</b>
<b>1.</b>	<b>Summary of test</b>	<b>5</b>
1.1	Test requirements	5
1.2	Conclusion	5
<b>2.</b>	<b>Test specimen(s)</b>	<b>6</b>
2.1	Test object: M1000 Alarm Annunciator	6
2.2	Test object: M3000 Analog Alarm Annunciator	6
2.3	AUX equipment:: H0300 Event Logger	6
<b>3.</b>	<b>General test conditions</b>	<b>7</b>
3.1	Test set-up	7
3.2	Criteria for compliance	7
3.3	Functional test	7
3.4	Standard environment	7
<b>4.</b>	<b>Test and results</b>	<b>8</b>
4.1	Radiated emissions	8
4.2	Radiated radio frequency interference	9

Annex 1 List of instruments (1 page)

Annex 2 Photos (1 page)

Annex 3 Test set-up (from Selco A/S) (1 page)

Annex 4 Test record sheets – Radiated emissions (1 page)

## 1. Summary of test

### 1.1 Test requirements

The present test report concerns the supplementary type approval testing of the M1000 Alarm Annunciator and the M3000 Analog Alarm Annunciator (named M1000 and M3000 in the following). The M1000 and the M3000 mentioned in this test report have been subjected to previous type approval testing ref. test reports DANAK-195378/DELTA-K251196-3, rev. 2 and DANAK-195254/DELTA-K251196-6.

The purpose of the supplementary type approval testing is to provide the necessary documentation for maintaining the type approval.

Consequently, the supplementary type approval testing of the M1000 and the M3000 was limited to the following tests:

<b>Test</b>	<b>Test method</b>
Radiated emissions, 1000-2000 MHz.	CISPR 16-1:1999
Radiated radio frequency interference, 1000-2000 MHz.	EN 61000-4-3:2002

### 1.2 Conclusion

The test objects mentioned in this report meet the selected requirements of the standards stated below.

- IEC 60945:2002
- IACS E10:2004
- IEC 60533:1999

The test results relate only to the specimens tested.

## 2. Test specimen(s)

### 2.1 Test object: M1000 Alarm Annunciator

Manufacturer	Selco A/S
Model	M1000-24-00
Serial no.	33 60 58
Supply voltage	24 VDC
Operational mode	Normal operational mode

### 2.2 Test object: M3000 Analog Alarm Annunciator

Manufacturer	Selco A/S
Model	M3000-30-00
Serial no.	33 66 37
Supply voltage	24 VDC
Operational mode	Normal operational mode

### 2.3 AUX equipment:: H0300 Event Logger

Manufacturers	Selco A/S
Model	H0300
Serial no.	37 35 32
Operational mode	RS485 communication, logging alarms and events

### **3. General test conditions**

#### **3.1 Test set-up**

A drawing of the test set-up is enclosed in *annex 3*.

#### **3.2 Criteria for compliance**

No change of the actual operational state of the test objects is allowed.

#### **3.3 Functional test**

A functional test was performed before, during (if specified) and after each test. The functional test was carried out in accordance with the functional test procedure provided by the customer.

The functional test procedure is given in section 4.3 and annex 4 of the previous test reports ref. test reports DANAK-195378/ DELTA-K251196-3, rev. 2 and DANAK-195254/DELTA-K251196-6.

#### **3.4 Standard environment**

Normal environmental condition:

Temperature	:	15°C to 35°C
Humidity	:	25 %RH to 75 %RH
Air pressure	:	86 kPa to 106 kPa (860 mbar to 1060 mbar)
Power supply voltage	:	$U_{\text{nom.}} \pm 3\%$

## 4. Test and results

### 4.1 Radiated emissions

#### Specifications

CISPR 16-1 (1999-10): Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus.

#### Severity and procedure

Frequency range	:	1000-2000 MHz	
Limits (quasi-peak)	:	0.15-0.3 MHz	: 80-52 dB $\mu$ V/m
		0.3-30 MHz	: 52-34 dB $\mu$ V/m
		30-2000 MHz	: 54 dB $\mu$ V/m, except for
		156-165 MHz	: 24 dB $\mu$ V/m quasi-peak or 30 dB $\mu$ V/m peak

The electric field is measured with antennas at a distance of 3 m.

The test specimen is energised and in normal operational mode during the measurement.

#### Results

The radiated emissions were within the specified limits. Test record sheets of the radiated emission measurements are enclosed in *annex 4*.



## 4.2 Radiated radio frequency interference

### Specifications

IEC 61000-4-3 (2002-03): Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.

### Severity and procedure

Frequency range : 1000-2000 MHz  
Field strength : 10 V/m  
Modulation : 80% AM, 400 Hz sine wave

The test is performed in a semi-anechoic room. The field is generated using linearly polarised broadband antennas.

The test specimens are energised and in normal operational mode during the exposure. The test specimens are observed during the exposure, and a functional test is performed after the exposure.

### Results

No malfunction was observed during the exposure, and the function of the test specimens was OK after the exposure.

**Annex 1**

**List of instruments**

**(1 page)**

## List of instruments

<b>NO.</b>	<b>DESCRIPTION</b>	<b>MANUFAC- TURER</b>	<b>TYPE NO.</b>
DMEAS	Software	Detectus	ver. 1.0
IE-B915	EMI Test receiver 20-2000 MHz	Rohde & Schwarz	ESVS10
E-P402	Microwave amplifier	Miteq	AFS5-00101000- 30-10P-5
E-I839	Antenna Horn 1-18 GHz	ARA	DRG-118/A
IE-B919	LISN 2 x 10A 9k-30MHz	Rohde & Schwarz	ESH3-Z5
E-I838	Amplifier 0.8-2.2 GHz 8W	Milmega	AS0822-8B
E-H908	Signal generator 10 kHz - 2.4 GHz	Marconi	2024

**Annex 2**

**Photos**

**(1 page)**

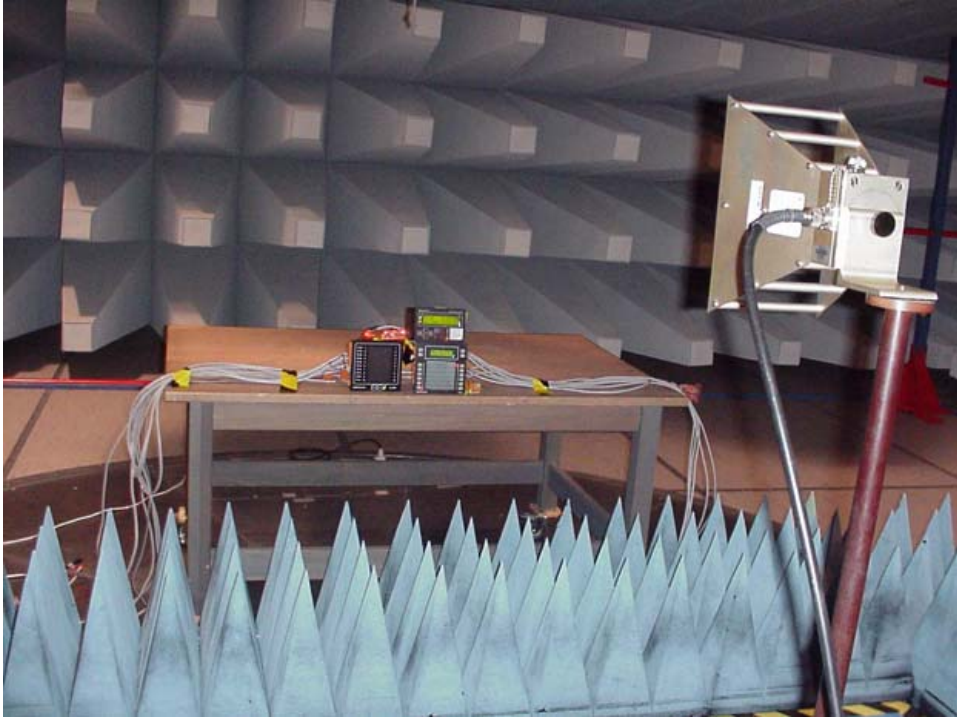


PHOTO 1. Radiated radio frequency interference, 1000-2000 MHz.



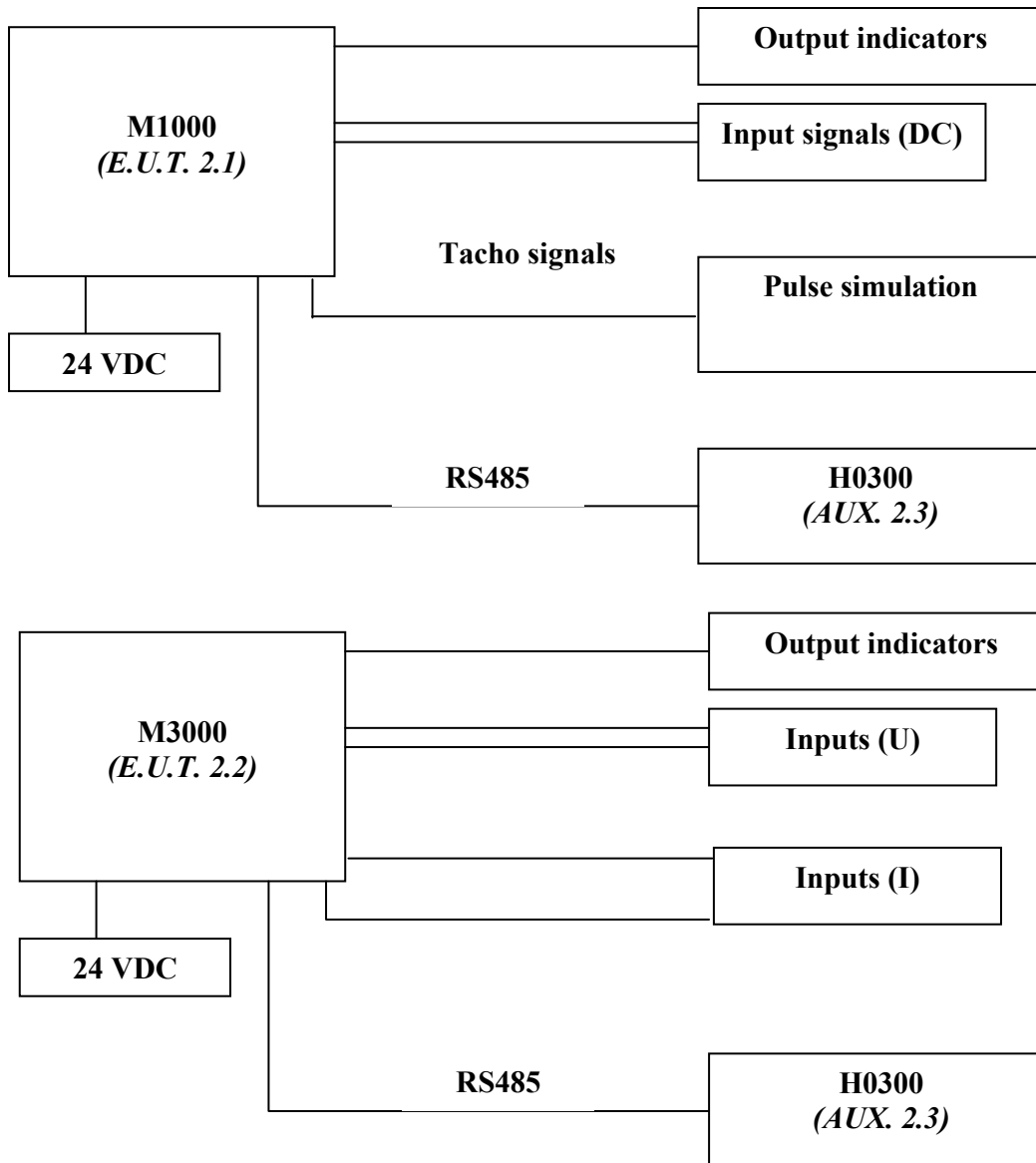
PHOTO 2. Radiated emissions, 1000-2000 MHz.

**Annex 3**

**Test set-up  
(from Selco A/S)**

**(1 page)**

**Test set-up**



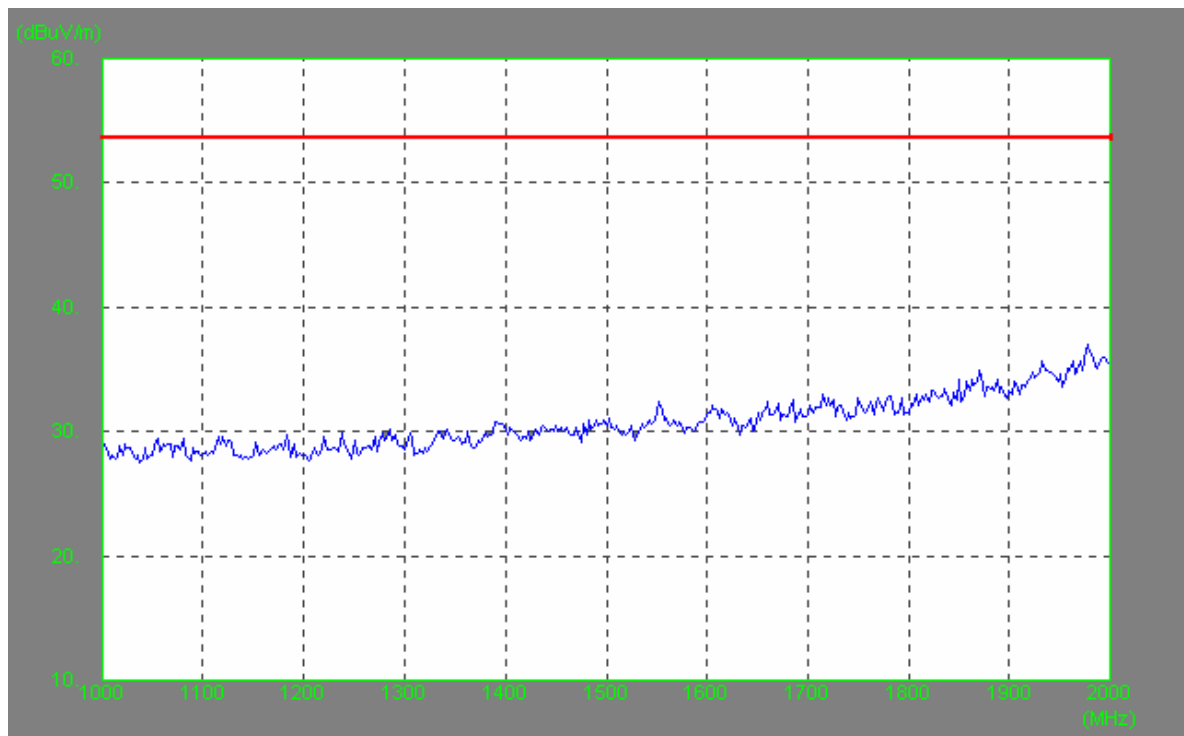
**Annex 4**

**Test record sheets – Radiated emissions**

**(1 page)**



EUT: M3000, M1000, H0300  
Manufacturer: Selco A/S  
Operating Condition: Normal operational modes  
Test Site: EMI  
Operator: DC - E502468-1  
Test Specification: IACS E10:2004 / IEC 60945:2002  
Comment: Sheet 1 - Final max. QP scan  
Start of Test: 2004-09-08



Graph 1. Radiated emission 1-2 GHz.