ELETTA®
FLOW MONITORS

# *Declaration of Conformity*

*for*

*Electromagnetic Compatibility according to the Directive 2014/30/EU*
*Electromagnetic Compatibility Regulations 2016*

*The company Eletta Flow AB, Sweden, hereby declares that the Flow Monitors denominated Eletta D-series and M-series, manufactured by Eletta Flow AB, intended for metering, monitoring and controlling of liquid or gas flow in piping systems, are in accordance with:*

a) *The COUNCIL DIRECTIVE of 26th February 2014 on the approximation of the laws of the Member States concerning electromagnetic compatibility.*

b) *In compliance with the specifications:*

*EN IEC 61000-6-2:2019*
*EN IEC 61000-6-3:2021*
*EN/(IEC) 61000-6-3:2007+A1*

*according to reports no. 622-20134-10-RO and 621-20045-10-RO.*

*Kungens Kurva, 28 November 2022*

*Eletta Flow AB*

*Niclas Johansson*
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VAT No: SE556050496001

# DELTA Test Report

TEST REPORT issued by an Accredited Testing Laboratory

Accred. no. 1688
Testing
ISO/IEC 17025

## EMC oM3 is |

## Performed for Eletta Flow AB

621 2 45 1 R
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is a subsidiary company of
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| | |
|---|---|
| **Title** | EMC test of M3 Display |
| **Test object** | M3 Display |
| **Report no.** | 621-20045-10-R0 |
| **Test period** | 15 February 2021 to 28 May 2021 |
| **Client** | Eletta Flow AB<br>Mälarvägen 3<br>141 71 Segeltorp<br>Sweden |
| **Contact person** | Ahmad Jasim<br>E-mail: ahmad.jasim@eletta.com |
| **Manufacturer** | Eletta Flow AB |
| **Specifications** | EN IEC 61000-6-2:2019, EN/(IEC) 61000-6-3:2007+A1 |
| **Results** | The test object was found to be in compliance with the specifications, as listed in Section 1 |
| **Test personnel** | Jan Högkvist, Lars Johnsson |
| **Date** | 02 July 2021 |

**Project Manager**

Jan Högkvist Specialist
DELTA

**Responsible**

Lars Johnsson. Head of quality
DELTA

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# 1. Summary of tests

| *Tests* | *Test et ods* | *Resu ts* |
|---|---|---|
| mmunity to electrostatic discharges | N ( C) 61 4 2:2 | Passed |
| mmunity to radio frequency electromagnetic fields | N ( C) 61 4 3:2 2 | Passed |
| mmunity to fast transients | N ( C) 61 4 4:2 12 | Passed |
| mmunity to surge transients | N ( C) 61 4 5:2 14 A1 | Passed |
| mmunity to conducted radio frequency disturbances | N ( C) 61 4 6:2 14 | Passed |
| mmunity to power frequency magnetic field | N ( C) 61 4 8:2 1 | Not performe Note 1 |
| Measurement of radio frequency electromagnetic field | C SPR 16 2 3:2 16 | Passed |

**Note 1: The test object contains no magnetically sensitive devices.**

The edition of the basic standards above is equal or newer than those referenced in the standard below.

*onc usion*

**The test object mentioned in this report meets relevant requirements of the standards stated below with respect to the test listed above.**

- **N C 61 6 2:2 1 lectromagnetic compatibility ( MC) Part 6 2: Generic standards mmunity for industrial environments**
- **N ( C) 61 6 3:2 A1 lectromagnetic compatibility ( MC) P Generic standards mission standard for residential commercial and light industrial environments**

**The test results relate only to the object tested.**

# 2. Test object and auxiliary equipm

## 2.1 Test object

**Photo 2.1.1 M3 Display with air pump**

***Test ob ect . .***

| | |
|---|---|
| **Name of test object** | **M3 Display** |
| **Model type** | **M3 Display** |
| **Part no.** | |
| **Serial no.** | |
| **FCC D** | |
| **Manufacturer** | **letta Flow AB** |
| **Supply voltage** | **18 28 Vdc (24Vdc nominal)** |
| **Software version** | **v1.1** |
| **ardware version** | **V1.2** |
| **Cycle time** | |
| **ighest frequency generated or used** | **8 M z** |
| **Comment** | |
| **Received** | **Date: 15 Feb. 2 21 Status: Prototype** |

## 2.2 Auxiliary equipment


**Photo 2.2.1 Auxiliary equipment.**

*Au i iary e uip ent . .*

| | |
|---|---|
| **Name of auxiliary equipment** | **Sphygmomanometer with air pump** |
| **Model type** | |
| **Part no.** | |
| **Manufacturer** | |
| **Comment** | **Auxiliary equipment supplied by the client who also has the responsibility for its correct function and set up.** |
| | **sed for simulating pressure to the test object** |

*Au i iary e uip ent . .*

| | |
|---|---|
| **Name of auxiliary equipment** | **Digital multimeter** |
| **Model type** | **8** |
| **D LTA ident no.** | **B353** |
| **Manufacturer** | **Fluke** |
| **Comment** | **Auxiliary equipment supplied by D LTA who also has the responsibility for its correct function and set up.** |
| | **sed to measure the input current to the test object** |

*Au i iary e uip ent . .*

| | |
|---|---|
| **Name of auxiliary equipment** | **Digital multimeter** |
| **Model type** | **Metra it ltra BT** |
| **D LTA ident no.** | **3611** |
| **Manufacturer** | **Metra att** |
| **Comment** | **Auxiliary equipment supplied by D LTA who also has the responsibility for its correct function and set up.**<br>**sed to measure the input current to the test object** |

*Au i iary e uip ent . .*

| | |
|---|---|
| **Name of auxiliary equipment** | **Power supply** |
| **Model type** | **3** |
| **D LTA ident no.** | **A1** |
| **Manufacturer** | **Powerbox** |
| **Supply voltage** | **Output set to 24 VDC** |
| **Comment** | **Auxiliary equipment supplied by D LTA who also has the responsibility for its correct function and set up.**<br>**sed for power to the test object** |

# 3. General test conditions

## 3.1 Test setup during test

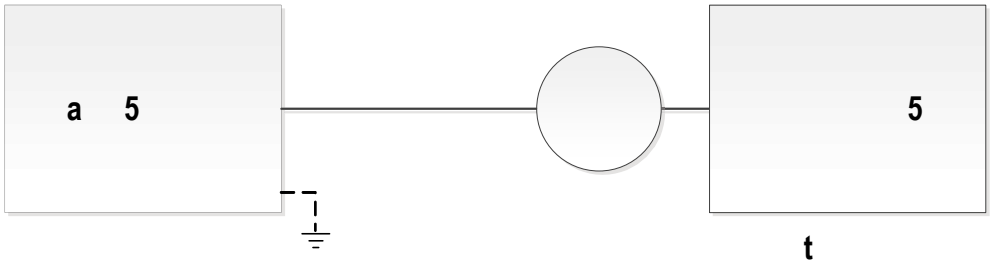



**Figure 3.1.1 Block diagram of test object with cables and auxiliary equipment.**

### 3.1.1 Cables

**The following cables were used during test.**

| Port name | Port type | Shielded unshielded | Length during test m | Maximum length m | Remar s |
|---|---|---|---|---|---|
| DC power signal | DC power signal | nshielded | .3 | 2.5 | 3 Cable with ferrite M12 |

### 3.1.2 Description and intended use of test ob

**The object is used for measuring the flow of liquid and gas and utilizes differential pressure to calculate the flow of the medium.**

### 3.1.3 Test modes and supervision during immun

**The object connected to manual air pump to simulate a differential pressure inside the object. The test was monitored by measuring the output current and visually observing the display.**

### 3.1.4 Test modes during emission tests

**The object connected to manual air pump to simulate a differential pressure inside the object.**

### 3.1.5 Nominal power consumption

**Power supply of 18VDC and 4mA output signal 5m**
**Power supply of 28VDC and 2 mA output signal 56 m**

## 3.2 Criteria for compliance during immuni

**Performance criteria according to corresponding standard were applied during immunity tests as follows:**

***enera***

**The test object shall not become dangerous or unsafe as a result of the application of the tests.**

***Perfor ance criterion A***

**The test object shall continue to operate as intended during the test.**

**nfluence on the analog mA output signal shall be 1 .**

**nfluence on the display indicator shall be 5**

**No error or warning signals are allowed.**

**The test object is not allowed to change operating mode.**

***Perfor ance criterion***

**The test object shall continue to operate as intended after the test.**

**No change of operating state or stored data are allowed.**

***Perfor ance criterion***

**The test object is allowed to have temporary degradation or loss of function or performance which requires operator intervention or systems reset.**

## 3.3 Modifications of the test object

**The following modification was implemented to the test object.**

- **1. n order to improve the result of surge transient immunity test the following modification was implemented:**

  ***u capacitor c ose to t e processor.***

  **The bulk capacitor with a value of 1 F was added close to the processor to stabilize the power supply.**

  **nough energy was stored to compensate short disturbances in the supplied power and created a smooth decrease in power if the supplied power was cut off.**

  **This did not completely solve the issue since the processor could still reach an undefined state if the power would stabilize between 1. V and 1.8V. This issue was solved by the brown out detection.**

  ***ro n out detection.***

  **This was a software solution that solved the issue with an undefined state in the processor. The processor would completely restart if a significant disturbance in the power supply was detected. The significant disturbance is a sustained power supply voltage of less than 1.8V.**

  ***T S diode bet een t e and protecti e eart .***

  **This was added to prevent any overvoltage spikes on the 3V3 power plane. Abruptly changing the supplied power on and off could cause voltage spikes on the power plane and potentially damage the processor.**

  ***Reinforced ground connection***

  **The grounding connection between the PCB and protective earth was reinforced with a woven copper strip. This helped divert any unwanted transients from the input and power plane.**

## 3.4 Test sequence

**The tests described in this test report were performed in the following sequence:**

1. **mmunity to radio frequency electromagnetic fields**
2. **mmunity to electrostatic discharges**
3. **mmunity to fast transients**
4. **mmunity to surge transients. Failed with grounded T.**
5. **mmunity to fast transients with grounded T.**
6. **Modification 1 implemented. See section 3.3 for details.**
7. **mmunity to surge transients. Retest. Passed.**
8. **mmunity to conducted radio frequency disturbances**
9. **Measurement of radio frequency electromagnetic field**

# 4. Test results

## 4.1 Immunity to electrostatic discharges

| | | | |
|---|---|---|---|
| Test object | M3 Display | Project no. | 621 2 45 |
| Type | M3 Display | Date | 15 Feb. 2 21 |
| Serial no. | | Initials | AN |
| Specification | EN IEC 61 6 2 2 1 | Required Perf. criter. | B |

| | | | |
|---|---|---|---|
| Test method | EN IEC 61 4 2 2 | Temperature | 2 °C |
| Characteristics | Discharge network: 150 pF, 330 Ω | umidity | 36 R |
| Test equipm. | EMC Transient lab V ster s Setup VIC2 | ncertainty | 1.1 dB |

| Surface under test | Test standard name of surface | Coupling of discharges | No of disch. each combin. | Amplitude V | Passed | Remar s |
|---|---|---|---|---|---|---|
| Enclosure Indirect discharge | Enclosure | CP contact | 1 | 4 | es | See Photo 4.1.2 |
| Enclosure Indirect discharge | Enclosure | VCP contact | 1 | 4 | es | See Photo 4.1.3 and 4.1.4 |
| Metallic connector housing and case | Metallic | Direct contact | 1 | 4 | es | See Photo 4.1.5 and 4.1.6 |
| Plastic enclosure display and connector housing | Insulated | Direct air | 1 | 2 4 a | es | See Photo 4.1. |

**Criteria for compliance** See Section 3.2

**Test result** The discharges caused no malfunctions

**Compliant** es

**Comments** During the test the T case was not separately grounded.

**Photo 4.1.1 Test setup regarding immunity to electrostatic discharges.**

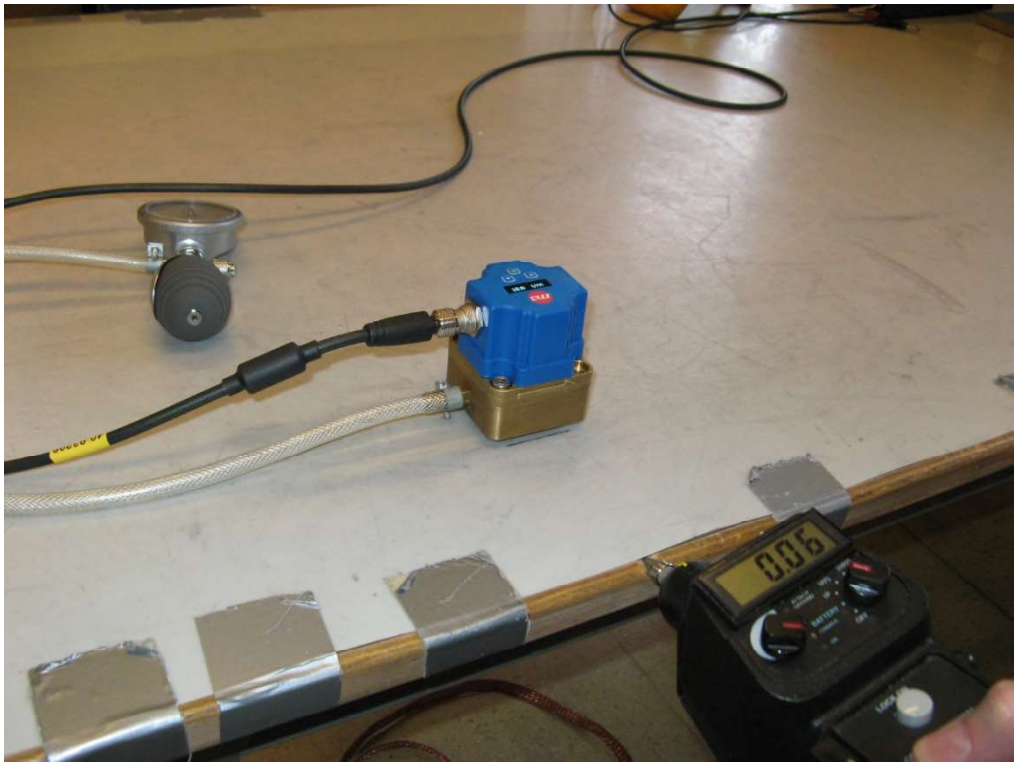


**Photo 4.1.2 Test setup regarding immunity to electrostatic discharges. Discharges via CP indirect coupling in four directions.**

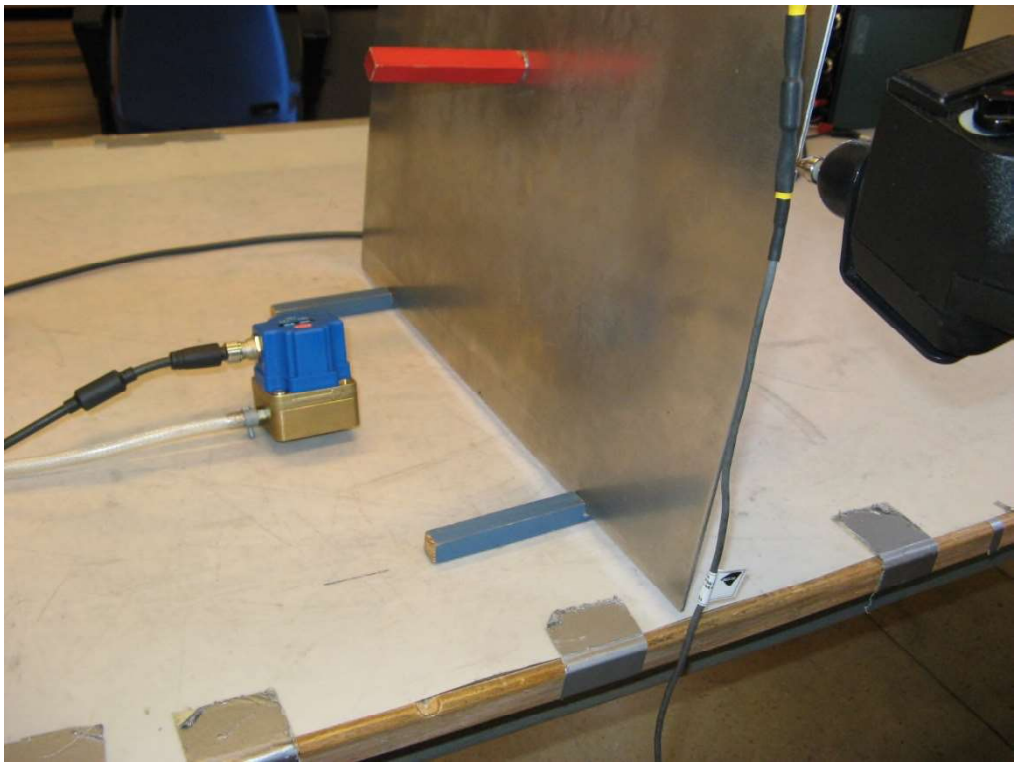


**Photo 4.1.3** Test setup regarding immunity to electrostatic discharges. Discharges via VCP indirect coupling in five directions.

**Photo 4.1.4** Test setup regarding immunity to electrostatic discharges. Discharges via VCP indirect coupling.

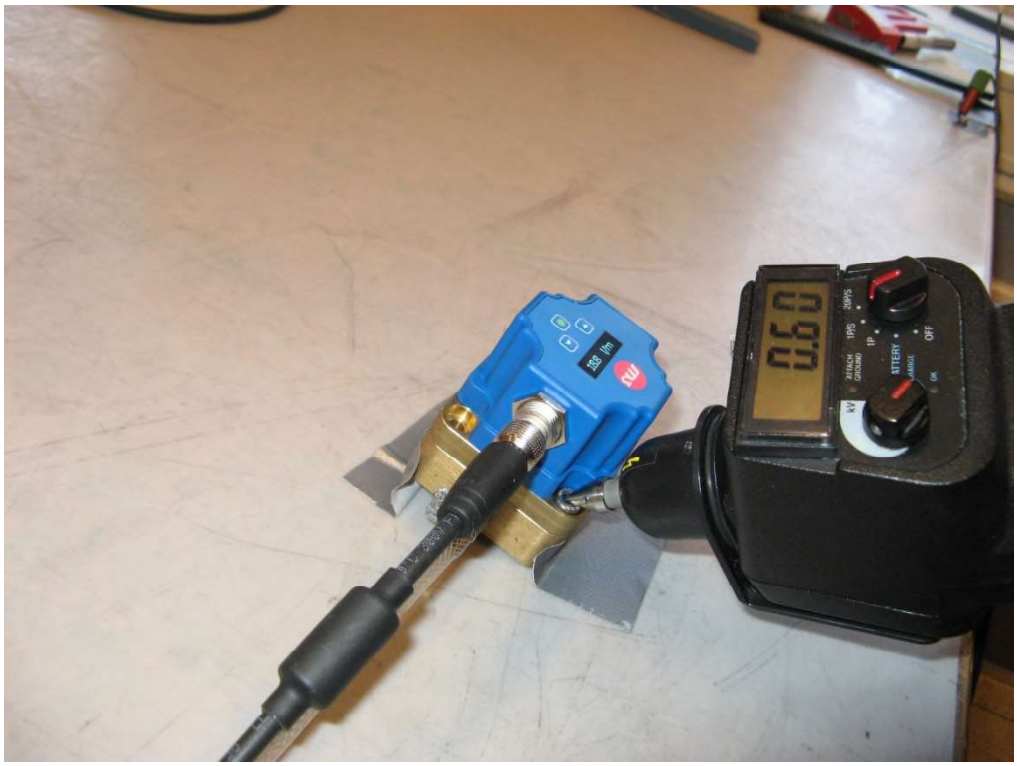


**Photo 4.1.5** Test setup regarding immunity to direct contact electrostatic discharges.

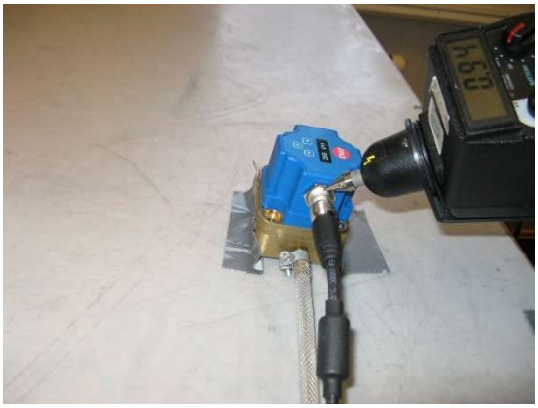


**Photo 4.1.6** Test setup regarding immunity to electrostatic discharges. Sample of test points for direct contact discharges.

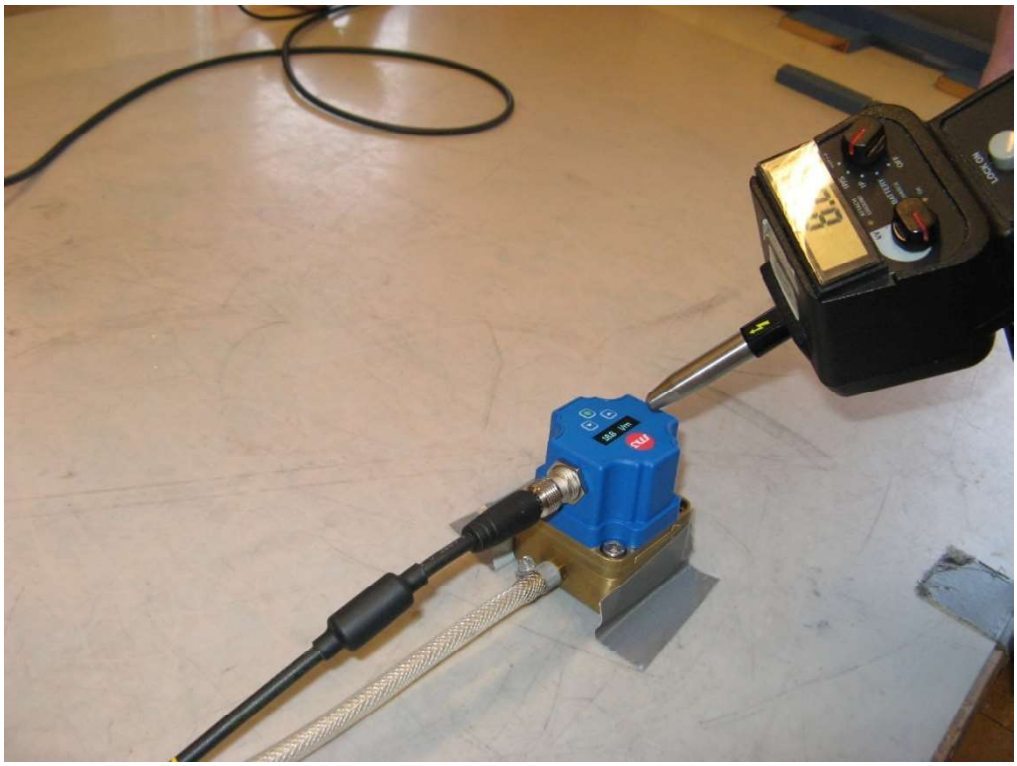


**Photo 4.1. Test setup regarding immunity to direct air electrostatic discharges.**

## 4.2 Immunity to radio frequency electroma

| | | | |
|---|---|---|---|
| Test object | M3 Display | Project no. | 621 2 |
| Type | M3 Display | Date | 15 Feb. 2 21 |
| Serial no. | | Initials | AN |
| Specification | EN IEC 61 6 2 2 5 EN IEC 61 | Required Perf. criter. | 6 2 2 A |

| | | | |
|---|---|---|---|
| Test method | EN IEC 61 4 3 2 2 | Temperature | 23 °C |
| Characteristics | 16 point pre Calibration | umidity | 1 R |
| Test equipm. | . 1 G EMC all B V ster s Setup VIE4<br>1 6 G EMC all B V ster s Setup VIE3 | ncertainty | 1. dB |

| Frequency range | Modulation | Field direction | Amplitud V m | Passed | Remar s |
|---|---|---|---|---|---|
| Front side exposed to the field | | | | | |
| 1 | AM 1 | ori ontal | 1 | es | Note 1 |
| 1 | AM 1 | Vertical | 1 | es | |
| 1.4 6 G | AM 1 | ori ontal | 3 | es | |
| 1.4 6 G | AM 1 | Vertical | 3 | es | |
| Bottom side exposed to the field | | | | | |
| 1 | AM 1 | ori ontal | 1 | es | Note 1 |
| 1 | AM 1 | Vertical | 1 | es | |
| 1.4 6 G | AM 1 | ori ontal | 3 | es | |
| 1.4 6 G | AM 1 | Vertical | 3 | es | |
| Left side with cable inlet exposed to the field | | | | | |
| 1 | AM 1 | ori ontal | 1 | es | Note 1 |
| 1 | AM 1 | Vertical | 1 | es | |
| 1.4 6 G | AM 1 | ori ontal | 3 | es | |
| 1.4 6 G | AM 1 | Vertical | 3 | es | |

Note 1 The display reading was influenced between 12 162 M . The deviation of the reading was <1.5 but the measured current was not affected. Criteria A was fulfilled.

| | |
|---|---|
| **Criteria for compliance** | **See Section 3.2** |
| **Test result** | **The radio frequency electromagnetic field caused no malfunctions** |
| **Compliant** | **es** |
| **Setup comments** | **Frequency step: 1 dwell time: 1 second** |
| **Comments** | **The test shall normally be performed with the field generating antenna facing each side of the test object.**<br>**hen technically justified the test object can be tested by exposing fewer faces to the generating antenna.**<br>**n agreement with the client the sides assumed to be most susceptive were tested here.**<br>**During the test the T case was not separately grounded.** |


**Photo 4.2.1 Test setup regarding immunity to radio frequency electromagnetic field for test between 8 1 M z.**

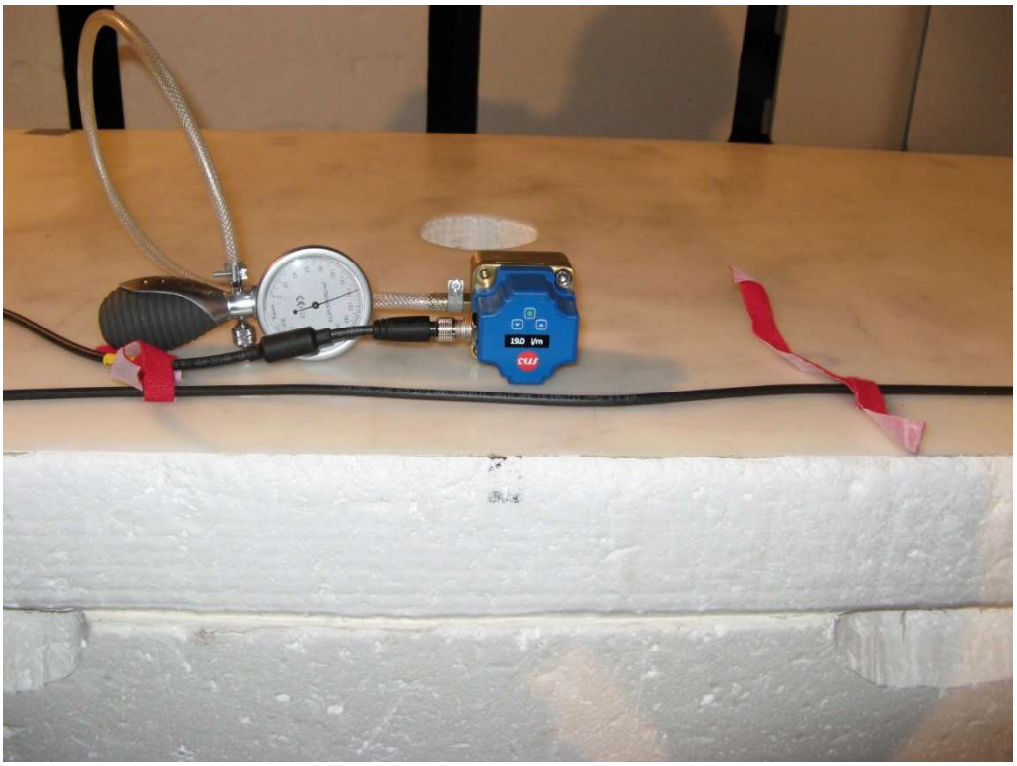


**Photo 4.2.2** Test setup regarding immunity to radio frequency electromagnetic field. Front side exposed to the field.

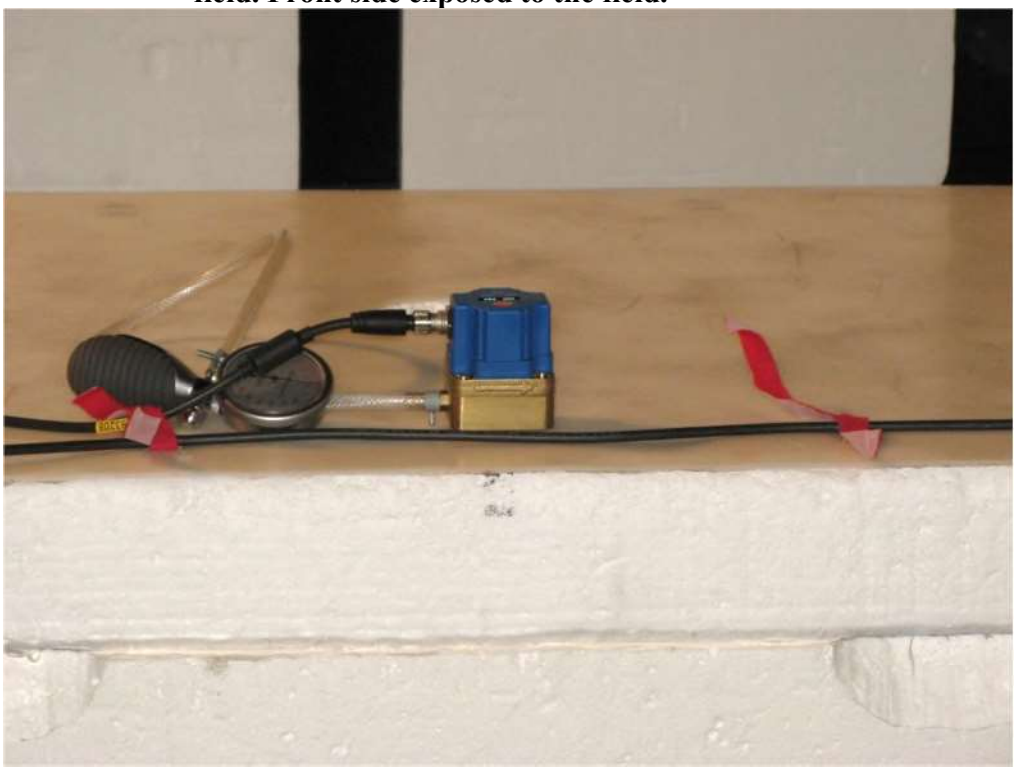


**Photo 4.2.3** Test setup regarding immunity to radio frequency electromagnetic field. Bottom side exposed to the field.

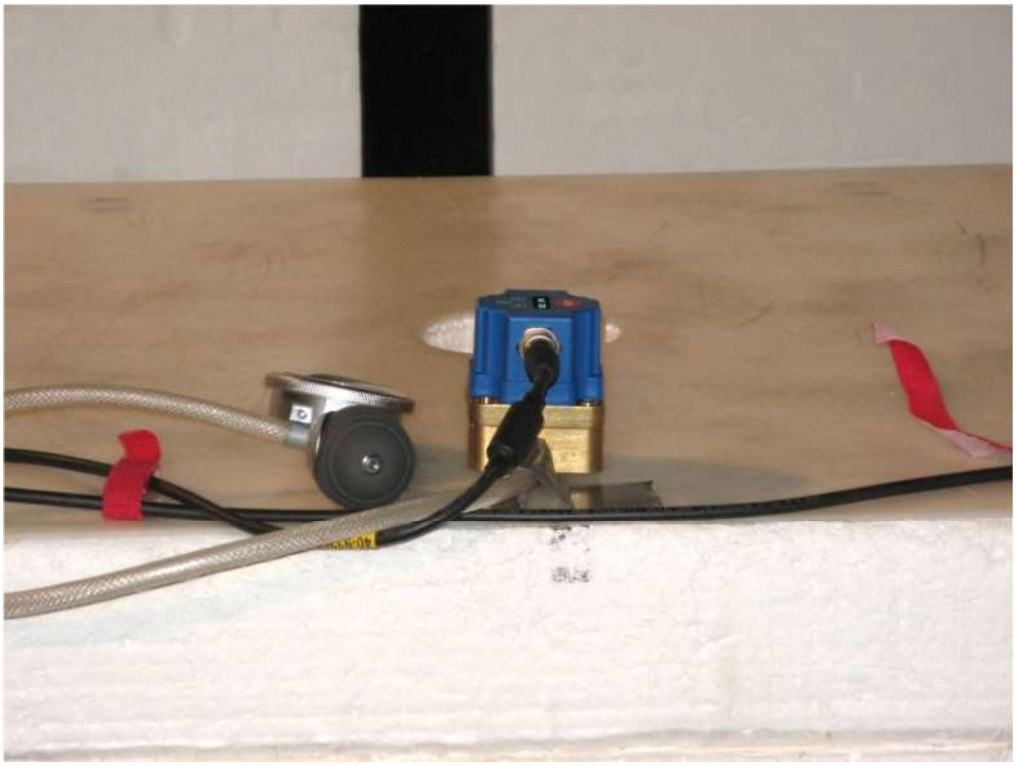


**Photo 4.2.4** Test setup regarding immunity to radio frequency electromagnetic field. Left side (with cable inlet) exposed to the field.

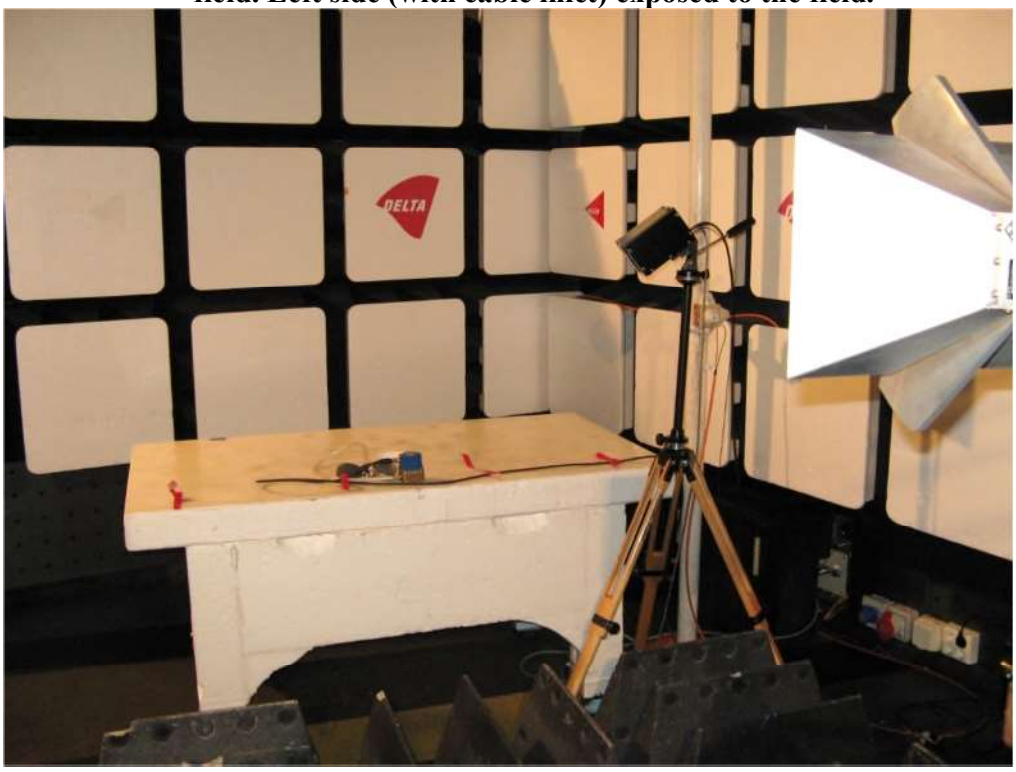



**Photo 4.2.5** Test setup regarding immunity to radio frequency electromagnetic field for test above 1 G z.

## 4.3 Immunity to fast transients

| | | | |
|---|---|---|---|
| Test object | M3 Display | Project no. | 621 2 45 |
| Type | M3 Display | Date | 15 Feb. 1 Mar. 2 21 |
| Serial no. | | Initials | AN |
| Specification | EN IEC 61 6 2 2 1 | Required Perf. criter. | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Test method | EN IEC 61 4 4 2 12 | | | | | Temperature | 23 °C |
| Characteristics | 5 bursts of 15 3 ms and 1 bursts of | | | | | umidity | 31 R |
| Test equipm. | EMC Transient lab V ster s Setup VIB1 | | | | | ncertainty | 1.1 dB |
| Manufacturer s name of port | Test standard s name of port | Coupling | Burs frequency | Amplitude V | Passed | Remar s | |
| DC power signal | Cable | Cap.clamp | GP 5 | | 1 | es | Note 1 |
| DC power signal | Cable | Cap.clamp | GP 1 | | 1 | es | Note 1 |
| DC power signal | Cable | Cap.clamp | GP 5 | | 1 | es | Note 2 |
| DC power signal | Cable | Cap.clamp | GP 1 | | 1 | es | Note 2 |

GP Ground reference Plane
Note 1 Test object grounded.
Note 2 Test object not grounded.

**Criteria for compliance** See Section 3.2

**Test result** The fast transients caused no malfunctions

**Compliant** es

**Test time** 1 min polarity

**Comments** The T was tested with the case both grounded and not grounded

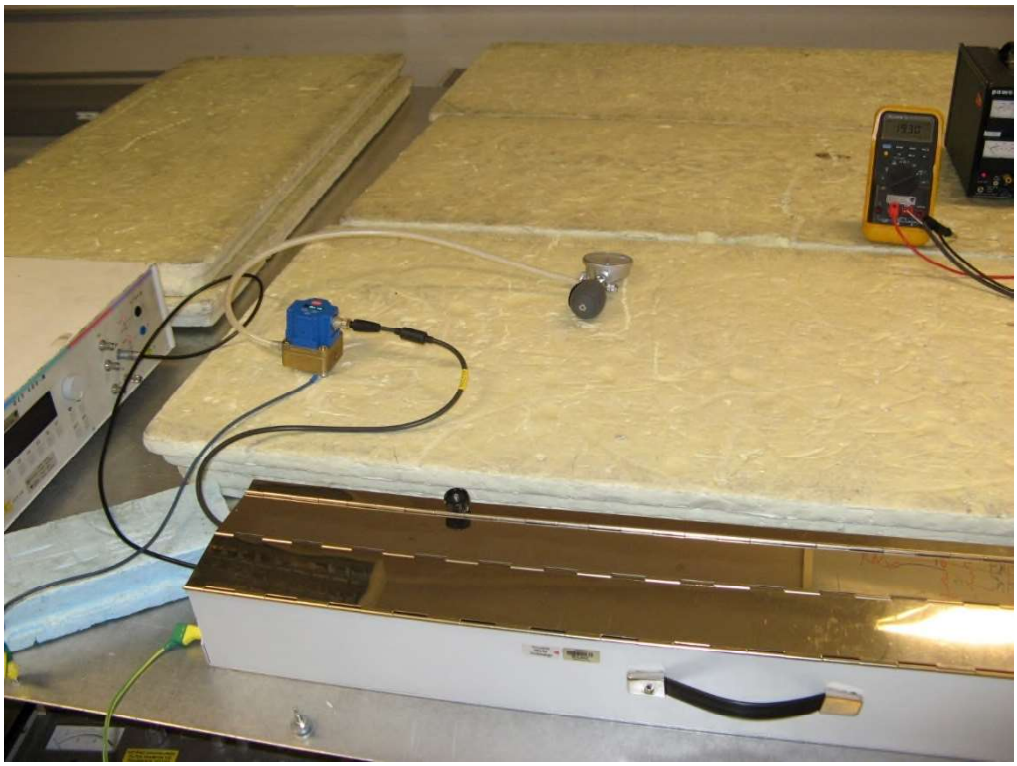


**Photo 4.3.1** Test setup regarding immunity to fast transients on power signal port. Test object grounded.

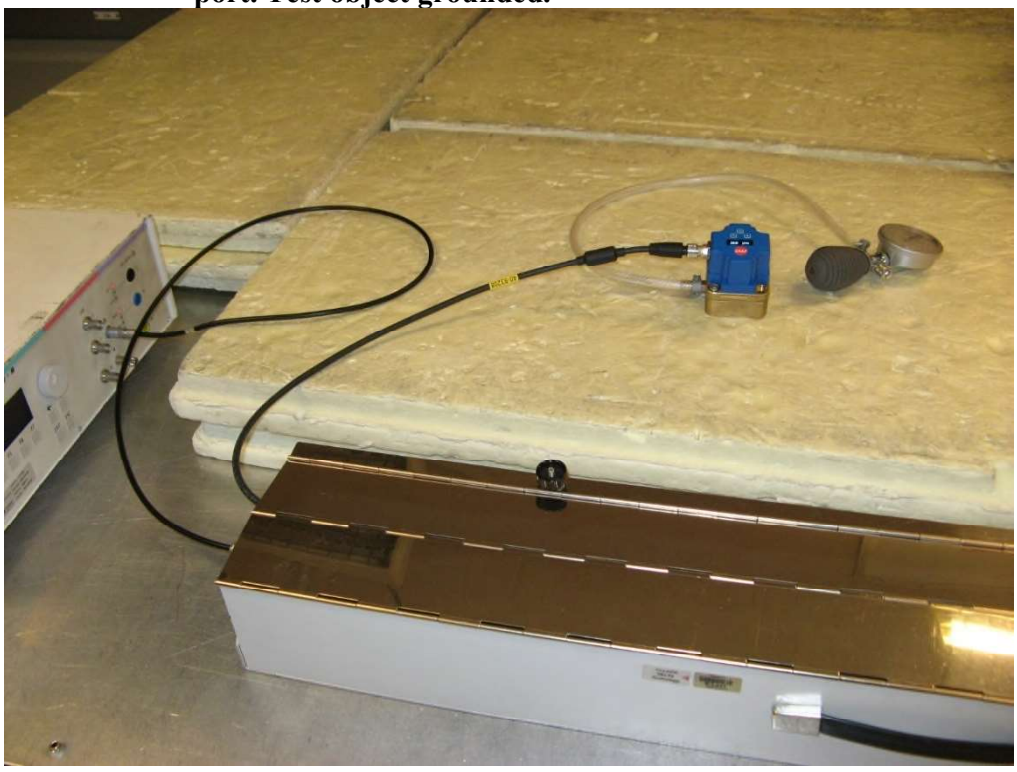


**Photo 4.3.2** Test setup regarding immunity to fast transients on power signal port. Test object not grounded.

## 4.4 Immunity to surge transients

| | | | |
|---|---|---|---|
| Test object | M3 Display | Project no. | 621 2 45 |
| Type | M3 Display | Date | 15 Feb.<br>25 May 2 21 |
| Serial no. | | Initials | AN |
| Specification | EN IEC 61 6 2 2 1 | Required Perf. criter. | B |

| | | | |
|---|---|---|---|
| Test method | EN IEC 61 4 5 2 14 A1 | Temperature | 23 °C |
| Characteristics | Open circuit volt. 1.2µs5Short circuit curr. µs 2 | umidity | 36 R |
| Test equipm. | EMC Transient lab V ster s Setup VID1 | ncertainty | 1.1 dB |

| Manufacturer name of port | Test standard name of port | Coupling and generato impedance | No of surges each combin. | Amplitud V | Passed | Remar |
|---|---|---|---|---|---|---|
| DC power + signal | Unshield.lines | +VDC-PE 42 Ω, 0.5 µF | 5 | | .5 ds | Note 1 |
| DC power signal | nshield.lines | 0V-PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 1 |
| DC power + signal | Unshield.lines | +VDC-PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 2 |
| DC power signal | nshield.lines | 0V-PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 2 |

Note 1 Test object grounded.
Note 2 Test object not grounded.

**Time between tests** 1 s

**Criteria for compliance** See section 3.2

**Test result** ith grounded case the test object restarts for each pulse at 1 kV test level. owever it returns directly to the same condition as before which means that criterion B is met. Modification 1 was implemented.

**Compliant** es

**Comments** The T was tested with the case both grounded and not grounded

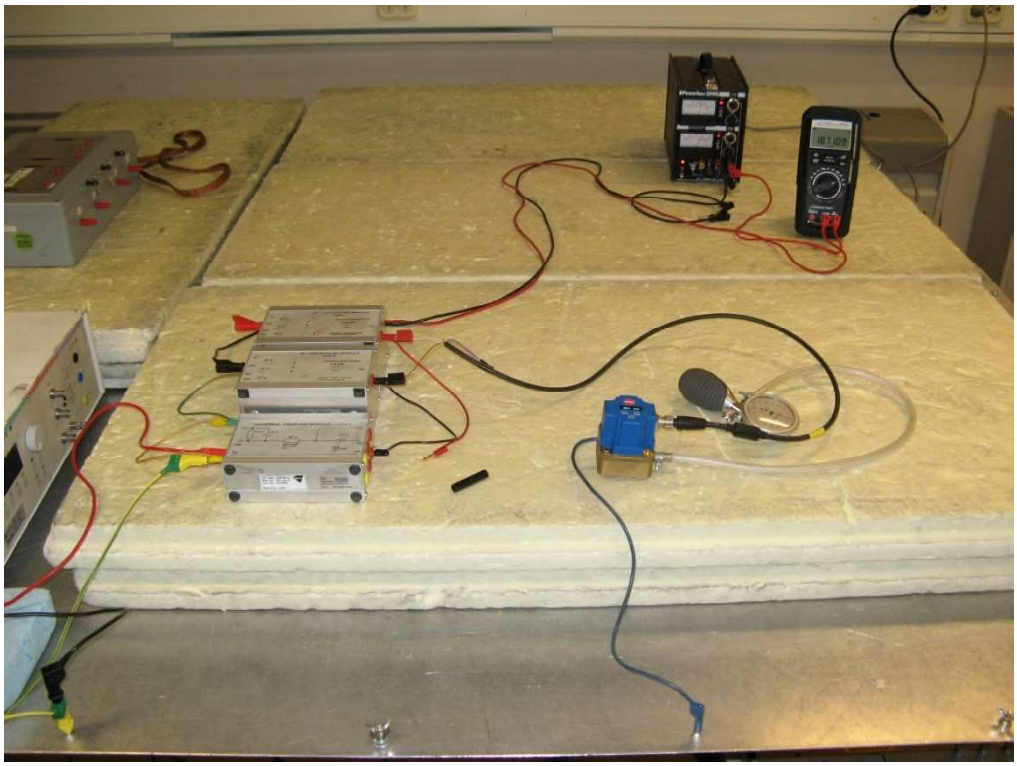


**Photo 4.4.1 Test setup regarding immunity to surge transients.**

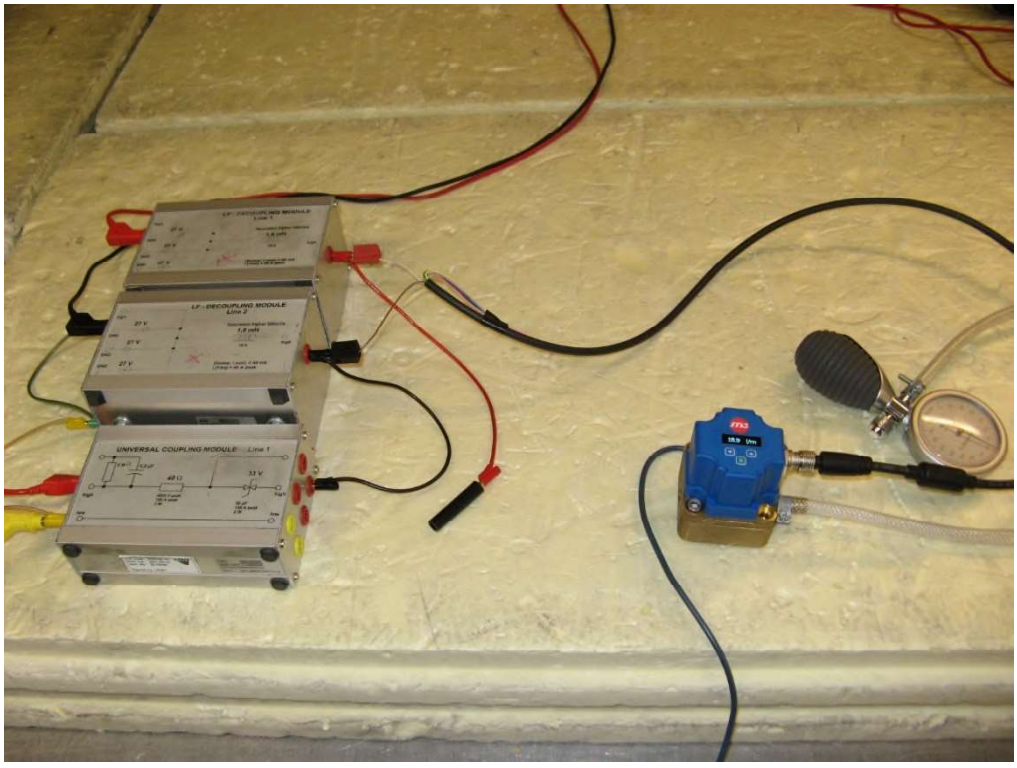



**Photo 4.4.2 Test setup regarding immunity to surge transients on power signal port. Test object grounded.**

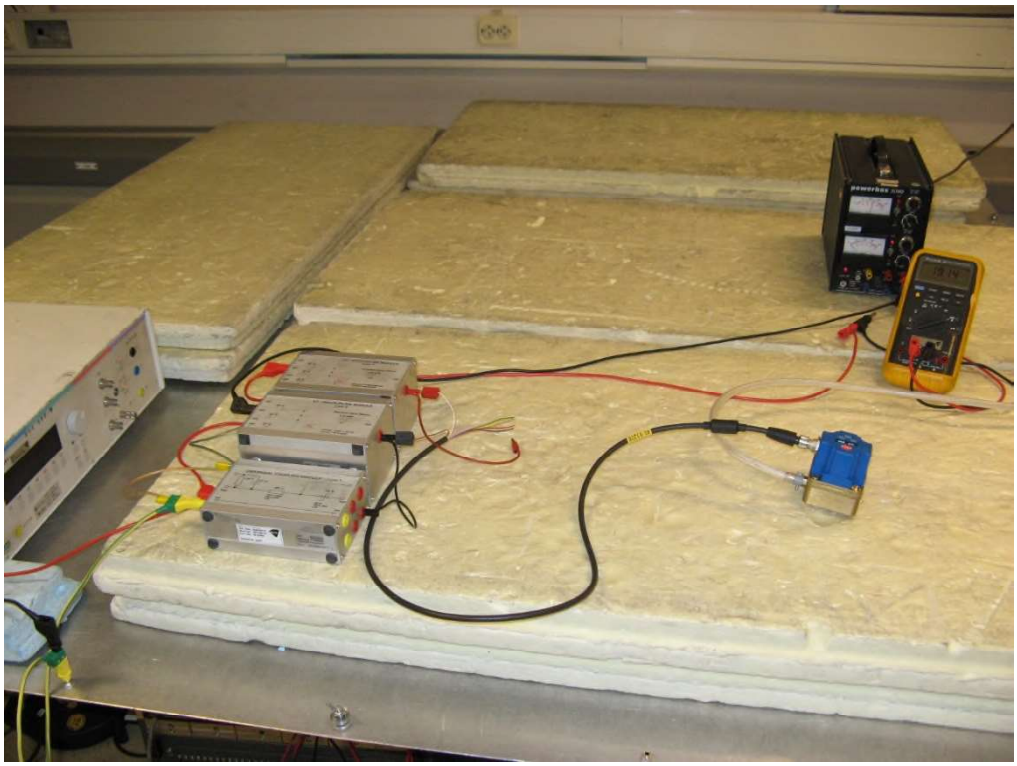


**Photo 4.4.3** Test setup regarding immunity to surge transients on power signal port. Test object not grounded.

## 4.5 Immunity to conducted radio frequency

| | | | |
|---|---|---|---|
| Test object | M3 Display | Project no. | 621 2 45 |
| Type | M3 Display | Date | 25 May. 2 21 |
| Serial no. | | Initials | AN |
| Specification | EN IEC 61 6 2 2 1 | Required Perf. criter. | A |

| | | | | | | |
|---|---|---|---|---|---|---|
| Test method | EN IEC 61 4 6 2 14 | | | Temperature | 23 °C | |
| Characteristics | Frequency range .15 M modulation | | | umidity | 36 R | |
| Test equipm. | EMC Transient lab V ster s Setup VIA3 | | | ncertainty | 1.4 dB | |
| Manufacturer s name of port | Test standard s name of port | Coupling Networ | Amplitude V | Passed | Remar s | |
| DC power signal | nshielded lines | CDN M2 TE | A544 | 1 | es | Note 1 |
| DC power signal | nshielded lines | CDN M2 TE | A544 | 1 | es Note 3 | Note 2 |

Note 1 Test object grounded.
Note 2 Test object not grounded.
Note 3 The display reading was influenced between 55 M . The deviation of the reading was 1.6 but the measured current was not affected. Criteria A was fulfilled.

**Criteria for compliance** See Section 3.2

**Test result** The disturbances caused no malfunctions

**Compliant** es

**Setup comments** Frequency step: 1 dwell time: 1 second

**Comments** The T was tested with the case both grounded and not grounded

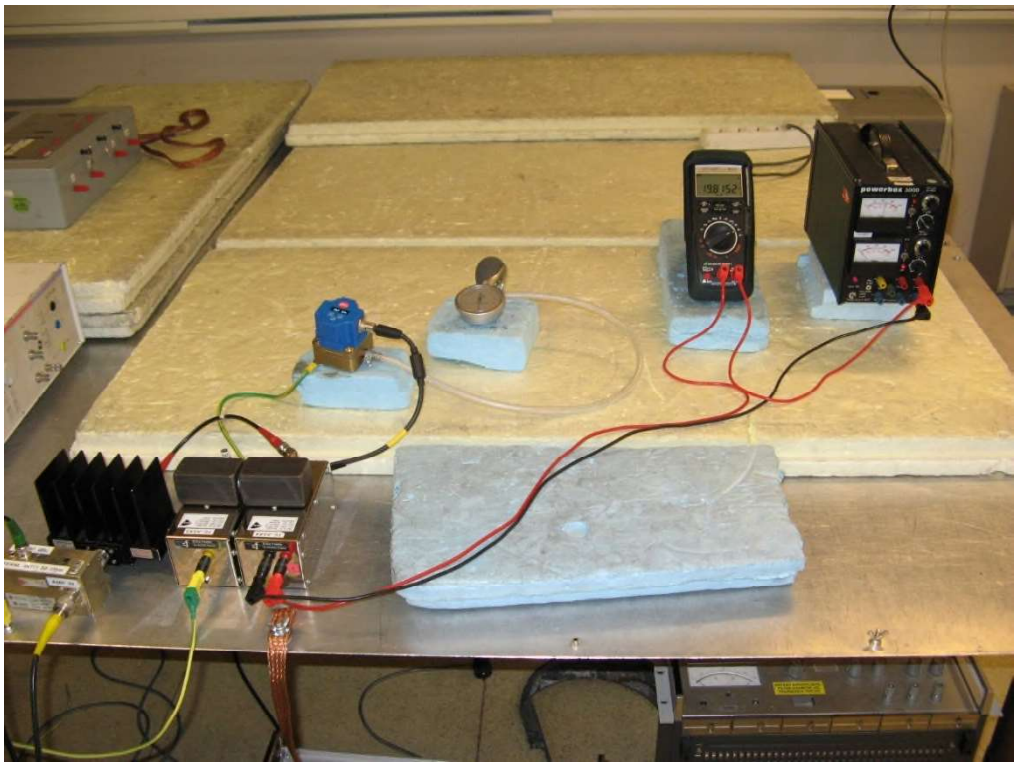


**Photo 4.5.1** Test setup regarding immunity to conducted radio frequency disturbances.

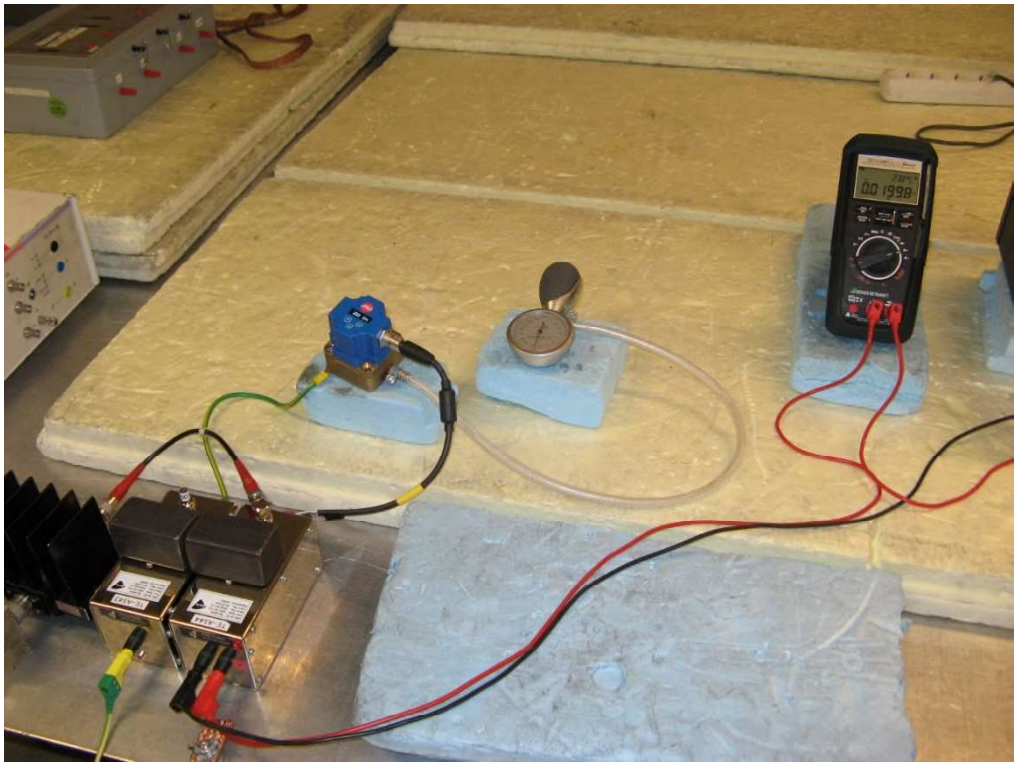


**Photo 4.5.2** Test setup regarding immunity to conducted radio frequency disturbances on power signal port. Test object grounded.

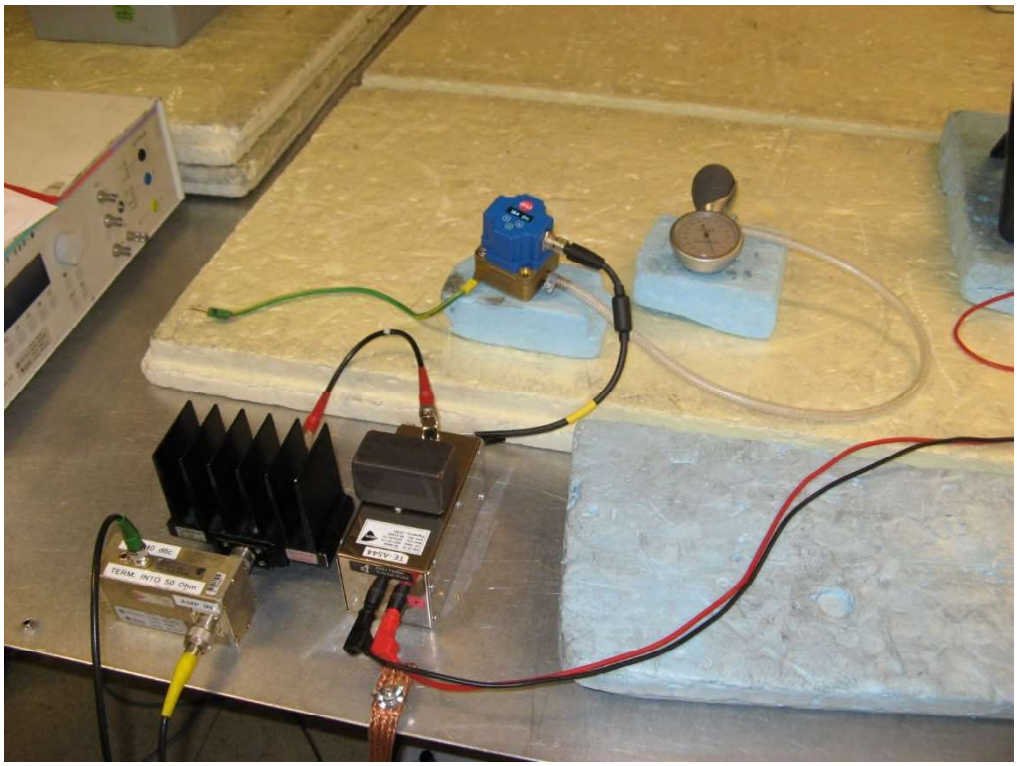


**Photo 4.5.3 Test setup regarding immunity to conducted radio frequency disturbances on power signal port. Test object not grounded.**

## 4.6 Measurement of radio frequency electr

| | | | |
|---|---|---|---|
| Test object | M3 Display | Project no. | 621 2 45 |
| Type | M3 Display | Date | 2 May. 2 21 |
| Serial no. | | Initials | LA |
| Specification | EN IEC 61 6 3 2 A1 | Frequency | 3 1 M |

| | | | |
|---|---|---|---|
| Test method | CISPR 16 2 3 2 16 | Temperature | 22 °C |
| Characteristics | Complete search antenna distance 1 m | umidity | 41 R |
| Detector | Pea and quasi pea | Bandwidth | 12 |
| Test equipm. | EMC all A V ster s Setup VEC1 | ncertainty | 5. dB |

**Test result** The measured field strengths were below the limit

**Compliant** es

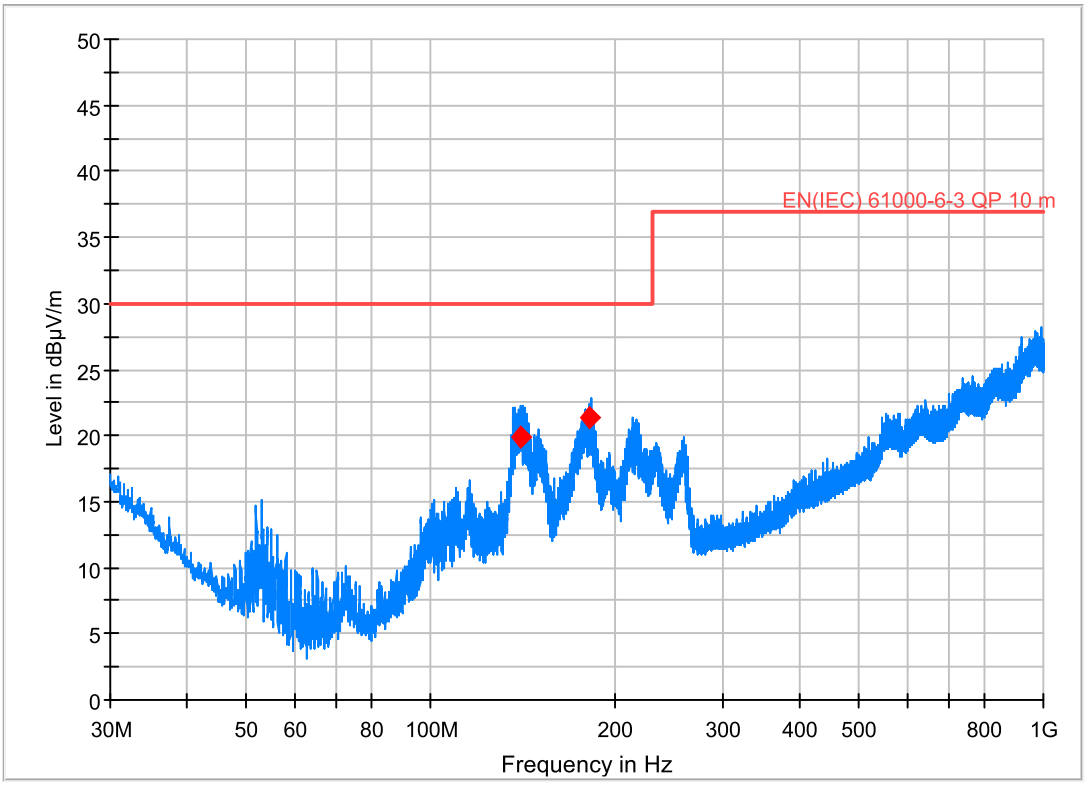
**Comments** Final maximal measurements by variation of turntable azimuth antenna height and antenna polarisation.

CMAD absorption clamp was used on power supply cable.

During the test the T case was not separately grounded.

# Radiated emission. Complete measurement 30 - 1000 MHz

| | |
|---|---|
| Test Description: | Radiated emission. Complete measurement 30 - 1000 MHz |
| Date: | 2021-05-28 |
| EUT Name: | M3 Display |
| Manufacturer: | Eletta Flow AB |
| Serial Number: | 000 |
| Operating Conditions: | Normal operation. 24 VDC supply. 22 l/m "flow" |
| Test Site: | DELTA Development Technology AB |
| Operator Name: | Lars J |
| Test Specification: | EN/(IEC) 61000-6-3:2007+A1 |
| Comment: | |




## Final_Result

| Frequency (MHz) | uasiPeak (dB V/m) | Limit (dB V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|
| 140.220000 | 19.94 | 30.00 | 10.06 | 1000.0 | 120.000 | 116.0 | V | 234.0 | -7.1 |
| 182.340000 | 21.30 | 30.00 | 8.70 | 1000.0 | 120.000 | 292.0 | H | 138.0 | -9.5 |

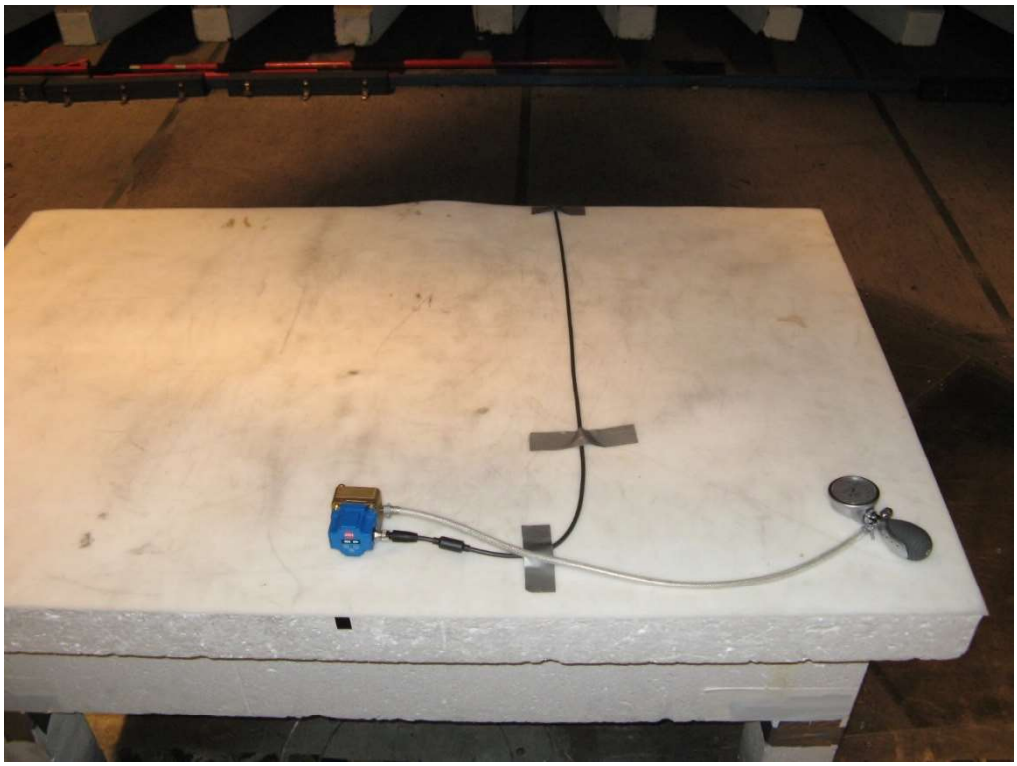


**Photo 4.6.1** Test setup regarding measurement of radio frequency electro magnetic field.

**Photo 4.6.2** Test setup regarding measurement of radio frequency electro magnetic field. Front view.

**Photo 4.6.3** **Test setup regarding measurement of radio frequency electro magnetic field. Rear view.**

# 5. National registrations and accre

## 5.1 SWEDAC Accreditation

| | |
|---|---|
| *Organi ation* | **Swedish Board for Accreditation and Conformity Assessment S DAC see www.swedac.se and www.ilac.org** |
| *Registration u ber* | **1688** |

**S DAC is part of LAC ( nternational Laboratory Accreditation Cooperation) including its MRA (Mutual Recognition Arrangement).**

## 5.2 FCC Registrations

| | |
|---|---|
| *Organi ation* | **Federal Communications Commission SA** |
| *Designation nu ber* | **S 4** |
| *o pany u ber* | **18** |
| *aci ities* | **MC chamber A 3 m and 1 m** |

## 5.3 ISED Registrations

| | |
|---|---|
| *Organi ation* | **nnovation Science and conomic Development Canada** |
| *Designation nu ber* | **S 6** |
| *o pany u ber* | **34 A** |
| *aci ities* | **MC chamber A 3 m and 1 m** |

# 6. List of instruments

| Setup VEC1 | | | | | |
|---|---|---|---|---|---|
| Measurement of radio frequency electromagnetic field | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Software | Rohde Schwar | EMC32 ver. 1 | .6 .15 5. dB |
| ☒ | 36 2 | Measuring receiver | Rohde Schwar | ES 26 | |
| ☒ | IE B 2 | Antenna Bilog | Chase | CBL6111A | |
| ☒ | 36151 | Preamplifier | FORCE | Preamp .5M | 4G |
| ☒ | 36166 | Power supply | Mascot | 6 23 Mod. | |
| ☐ | 3613 | CMAD Absorption clamp | DELTA | CMAD D25 16 1 | 4 |
| ☒ | 36 1 | Controller | Maturo | NCD | |
| ☒ | 36 2 | Tilt antenna mast | Maturo | TAM 4. E | |
| ☒ | | Turntable | einrich Deisel | DT 44 | |

| Setup VIA3 | | | | | |
|---|---|---|---|---|---|
| Immunity to conducted radio frequency disturbances | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Software | Rohde Schwar | EMC32 ver. 1 | .6 . 1.4 dB |
| ☒ | E | Signal generator | Marconi | 2 24 | |
| ☒ | E | Amplifier | Amplifier Research | 5A25 | |
| ☒ | 3614 | Average Power Sensor | Rohde Schwar | NRP1 A | |
| ☒ | E I 26 | 4 dBc Voltage Sampler | DELTA Denmar | | |
| ☒ | E I 22 | RF attenuator 6 dB | Weinschel Corp | 65 6 3 | |
| ☒[1] | TE A543 | CDN .15 23 M | Eri a Fiedler | CDN M1 | |
| ☒[1] | TE A544 | CDN .15 23 M | Eri a Fiedler | CDN M2 | |
| Note 1 see test sheet for usage of CDN or EM clamp | | | | | |

| Setup VIB1 | | | | | |
|---|---|---|---|---|---|
| Immunity to fast transients | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 35 | Software | EM TEST | ISMIEC ver. 4.1 | 1.1 dB |
| ☒ | E L444 | Burst Surge generator | EM TEST | CS 5 M4 | |
| ☒ | 36 26 | Coupling networ | EM TEST | CNI 5 3 | |
| ☒ | E L443 | Coupling clamp | EM TEST | F | |

| Setup VIC2 | | | | | |
|---|---|---|---|---|---|
| Immunity to electrostatic discharges | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 2 3 | ESD simulator | eyTe | Mini ap M | 15 EC 1.1 dB |

| Setup VID1 | | | | | |
|---|---|---|---|---|---|
| Immunity to surge transients | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 35 | Software | EM TEST | ISMIEC ver. 4.1 | 1.1 dB |
| ☒ | E L444 | Burst Surge generator | EM TEST | CS 5 M4 | |
| ☒ | E 534 | Coupling module | EMC Partner | CN | |
| ☒ | E 536 | Decoupling module LF | EMC Partner | DN LF1 | |
| ☒ | E 53 | Decoupling module LF | EMC Partner | DN LF2 | |

| Setup VIE3 | | | | | |
|---|---|---|---|---|---|
| Immunity to radio frequency electromagnetic fields | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Software | Rohde Schwar | EMC32 ver. 1 | .6 .2 1. dB |
| ☒ | 361 2 | Signal Generator | Rohde Schwar | SMB1 A | |
| ☒ | 3 4 | Field Strength Meter | Amplifier Research | AR FM 2 | |
| ☒ | IE B 6 | E field Sensor | Amplifier Research | FP 2 | |
| ☒ | 361 3 | Average Power Sensor | Rohde Schwar | NRP 1 | |
| ☒ | 361 4 | Average Power Sensor | Rohde Schwar | NRP 1 | |
| ☒ | 361 | Broadband Amplifier | Rohde Schwar | BBA15 D2 | |
| ☒ | 361 1 | Broadband Amplifier | Rohde Schwar | BBA15 E1 | |
| ☒ | 361 5 | orn Antenna | Rohde Schwar | F | |

| Setup VIE4 | | | | | |
|---|---|---|---|---|---|
| Immunity to radio frequency electromagnetic fields | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Software | Rohde Schwar | EMC32 ver. 1 | .6 .2 1. dB |
| ☒ | 361 5 | Signal Generator | Rohde Schwar | SMB1 B | |
| ☒ | 3 4 | Field Strength Meter | Amplifier Research | FM 2 | |
| ☒ | IE B 6 | E field Sensor | Amplifier Research | FP 2 | |
| ☒ | 361 6 | Average Power Sensor | Rohde Schwar | NRP6AN | |
| ☒ | 361 | Average Power Sensor | Rohde Schwar | NRP6AN | |
| ☒ | 361 4 | Broadband Amplifier | Rohde Schwar | BBA15 BC125 | |
| ☒ | 351 5 | Antenna Log Periodic | Rohde Schwar | L 23 A1 | |
| ☒ | 2 451 | Antenna Tower | EMCO | 1 5 | |
| ☒ | 2 452 | Tower Controller | EMCO | 1 5 | |

| Other instruments used | | | | | |
|---|---|---|---|---|---|
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 3514 | Temperature and hygrometer | Ecolog | T 1 | |
| ☒ | IM A3 | Temperature and hygrometer | Vaisala | MI31 | |

# DELTA Test Report

TEST REPORT issued by an Accredited Testing Laboratory

Accred. no. 1688
Testing
ISO/IEC 17025

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## EM tes of D series upgrade

## Perfor ed for E etta o A

622 2 134 1 R
Page 1 of 3

8 August 2 22


DELTA De e op ent
Tec no ogy A
Finnsl tten
le troni gatan 4
21 36 ster s
S eden

Tel. 21 31 44 8
infose delta.d
: se.madebydelta.com

Ban giro 5534 28
AT S 5565562 1

D LTA De elopment
Technology AB
is a subsidiary company of
FORC Technology

| | |
|---|---|
| **Title** | EMC test of D-series upgrade |
| **Test object** | D-series |
| **Report no.** | 622-20134-10-R0 |
| **Test period** | 03 May 2022 to 06 June 2022 |
| **Client** | Eletta Flow AB<br>Mälarvägen 3<br>141 71 Segeltorp<br>Sweden |
| **Contact person** | Ahmad Jasim<br>E-mail: ahmad.jasim@eletta.com |
| **Manufacturer** | Eletta Flow AB |
| **Specifications** | EN IEC 61000-6-2:2019, EN IEC 61000-6-3:2021 |
| **Results** | The test object was found to be in compliance with the specifications, as listed in Section 1 |
| **Test personnel** | Jan Högkvist |
| **Date** | 08 August 2022 |

**Project Manager**

Jan Högkvist Specialist
DELTA

**Responsible**

Lars Johnsson. Head of quality
DELTA

*Tab e of contents* *Page*

## . Su ary of tests

| Tests | Test methods | Results |
|---|---|---|
| Immunity to electrostatic discharges | EN/( | |
| Immunity to radiEdN/f(rIeEqCu)em6c1y000-4-3:2020 electromagnetic fields | | |
| Immunity to fast transients | EN/(IEC) | |
| Immunity to surge transients | EN/(IEC) | |
| Immunity to condEuNc/t(eldECr)ad6i1c000-4-6:2014 frequency disturbances | | |
| Immunity to powEerN/f(rIeEqCu)em6c1y000-4-8:2010 magnetic field | Note 1 | |
| Measurement of rCaldSiPdR f1r6e-c2u-e3n:c2y016 electromagnetic field | | Pa |

Note 1: The test object contains no magnetic

The given result is based on a shared risk uncertainty.

The edition of the basic standards above is equa below.

**Conclusion**

The test object mentioned in this report m below, with respect to the test listed abo

- EN IEC 61000-6-2:2019 "Electromagnetic Generic standards - Immunity for indust
- EN IEC 61000-6-3:2021 "Electromagnetic Generic standards – Emission standard f industrial environments"

The test results relate only to the object

# . Test ob ect and au i iary e uip ent

## . Test ob ect


Photo 2.1.1 D-series upgrade

### Test o ect 2.1.1

| | |
|---|---|
| Name of test object | D-series upgrade |
| Model / type | D-series |
| Part no. | - |
| Serial no. | 00000 |
| FCC ID | - |
| Manufacturer | Eletta Flow AB |
| Supply voltage | 19 - 28 Vdc (24Vdc |
| Software version | V3.0 |
| Hardware version | V1.1 |
| Cycle time | - |
| Highest frequency used | 32 MHz generated or |
| Comment | |
| Received | Date: 03 May. 2022 Sta |

## . *Au i iary e uip ent*


Photo 2.2.1 Auxiliary equipment.

### Auxiliary equipment 2.2.1

| | |
|---|---|
| Name of auxiliary equipment | Digital mult |
| Model / type | MetraHit 18S |
| DELTA ident no. | IE-C966 |
| Manufacturer | Metrawatt |
| Comment | Auxiliary equipment supp<br>the responsibility for its c<br>Used to measure the output c |

### Auxiliary equipment 2.2.2

| | |
|---|---|
| Name of auxiliary equipment | Digital mult |
| Model / type | 34401A |
| DELTA ident no. | 36061 |
| Manufacturer | Agilent |
| Comment | Auxiliary equipment supp<br>the responsibility for its c<br>Used to measure the output c |

## Auxiliary equipment 2.2.3

| | |
|---|---|
| Name of auxiliary equipment | Power supply |
| Model / type | B60-10R |
| DELTA ident no. | IE-C183 |
| Manufacturer | Oltronix |
| Supply voltage | Output set to 24 VDC |
| Comment | Auxiliary equipment supp<br>the responsibility for its c<br>Used for power to the test o |

## . eera test conditions

### . Test setup during test

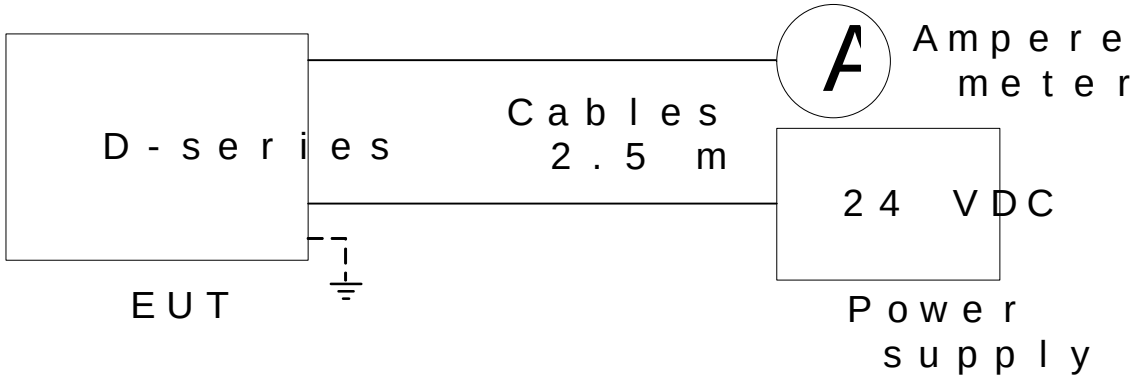



Figure 3.1.1 Block diagram of test object

### . . ab es

The following cables were used during test

| Port name | Port type | Shielded unshielded | Length during test m | Maximum length m | Remarks |
|---|---|---|---|---|---|
| DC power | DC power | nshielded | .3 | 2.5 | 3 |
| Analog output | signal | nshielded | .3 | 2.5 | 3 |

### . . Description and intended use of test ob ect

The object is used for measuring the flow pressure to calculate the flow of the medi

### . . Test odes and super ision during i unity and e ission tests

The potentiometer that measuring mechanica

The flow monitored on a display. The flow current between the object and the power s

The test was monitored by measuring the ou display.

### . . o ina po er consu ption

Nominal 24 VDC. 2.4 W.

. *riteria for co p iance during i unity test*

Performance criteria according to correspo
tests as follows:

**G eneral**

The test object shall not become dangerous
tests.

**Per ormance criterion A**

The test object shall continue to operate

Influence on the analog mA output signal s

Influence on the display indicator shall b

No error or warning signals are allowed.

The test object is not allowed to change o

**Per ormance criterion B**

The test object shall continue to operate

No change of operating state or stored dat

**Per ormance criterion C**

The test object is allowed to have tempora
performance which requires operator interv

. ***Modifications of t e test ob ect***

The following modification was implemented

. 1. In order to improve the result of Su
immunity test the following modificatio
The following components were misplaced

| Compo | nent Desc | ription |
|---|---|---|
| R4 | B72500E | 0250K060 |
| D3 | CDSF414 | 8 |
| C8 | 22nF | |

. ***Test se uence***

The tests described in this test report we

1. Measurement of radio frequency electro
2. Immunity to radio frequency electromag
3. Immunity to fast transients
4. Immunity to surge transients. Failed.
5. Immunity to conducted radio frequency
6. Immunity to electrostatic discharges
7. Modification 1 implemented. See sectio
8. Immunity to surge transients. Retest.
9. Immunity to conducted radio frequency

## . Test resu ts

### . I unity to e ectrostatic disc arges

| | | | |
|---|---|---|---|
| Test object | D series upgrade | Project no. | 622 2 134 |
| Type | D series | Date | 1 May 2 22 |
| Serial no. | | nitials | AN |
| Specification | N C 61 6 2:2 1 | Required Perf. criter. | B |

| | | | |
|---|---|---|---|
| Test method Characteristic | N C 61 4 2:2 Discharge network: 150 pF, 330 Ω | Temperature umidity | 24 °C 35 R |
| Test equipm. | MC Transient lab ster s Setup C2 | ncertainty | 1.1 dB |

| Surface under test | Test standard name of surface | Coupling of discharges | No of disch. each combin. | Amplitude | Passed | Remar s |
|---|---|---|---|---|---|---|
| nclosure ndirect discharge | nclosure | CP contac | 1 | 4 | es | See Photo 4.1.2 and 4.1.3 |
| nclosure ndirect discharge | nclosure | CP contac | 1 | 4 | es | See Photo 4.1.4 and 4.1.5 |
| Metallic case and scre s | Metallic | Direct contac | 1 | 4 | es | See Photo 4.1.6 4.1. and 4.1.8 |
| Plastic display | nsulated | Direct air | 1 | 2 4 | es | See Photo 4.1. |

Criteria for compliance See Section 3.2

Test result The discharges caused

Compliant Yes. Criterion A fulfill

Comments The EUT was tested with th grounded

Photo 4.1.1 Test setup regarding immunity

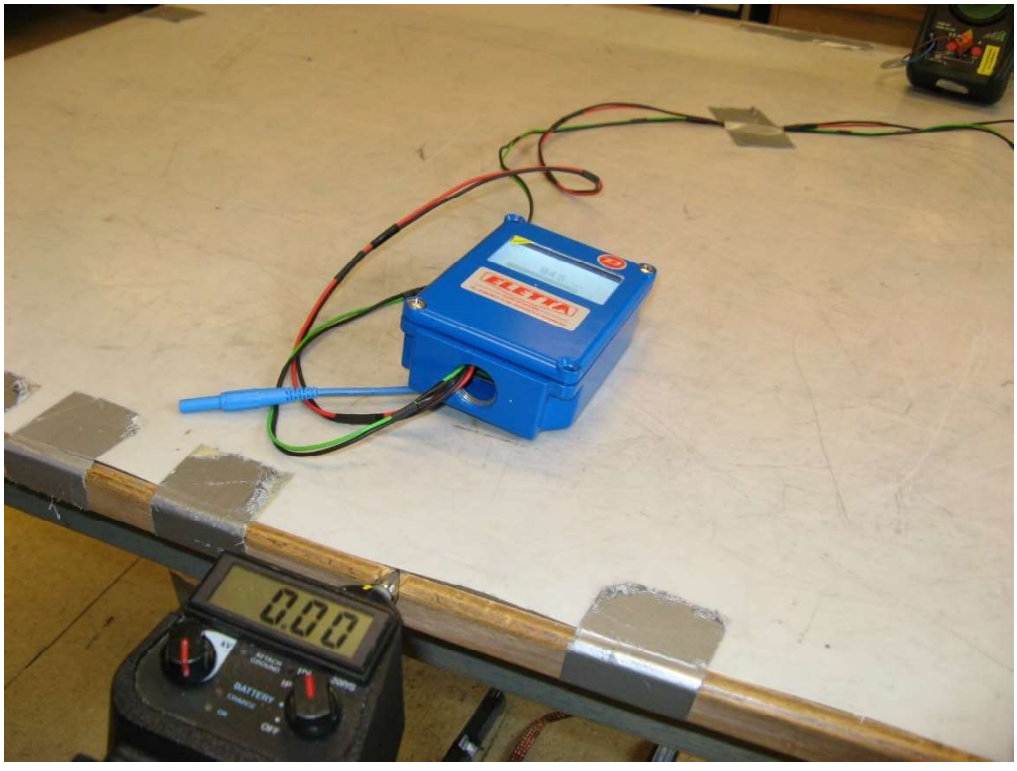



Photo 4.1.2 Test setup regarding immunity Discharges via HCP indirect coupling

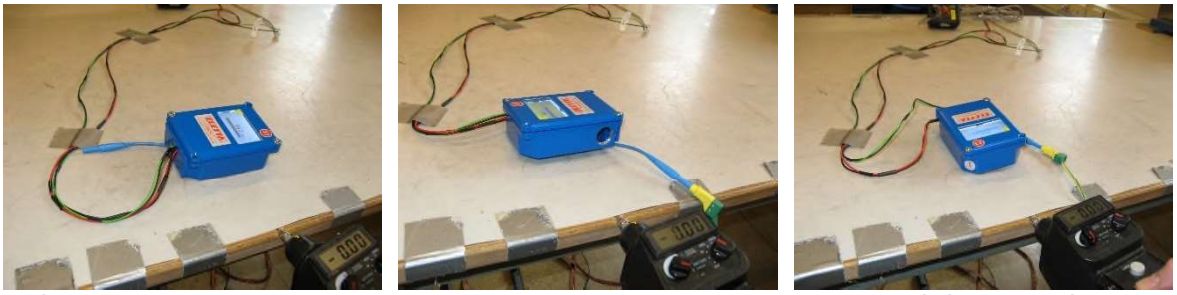


Photo 4.1.3 Test setup regarding immunity Discharges via HCP indirect coupling.

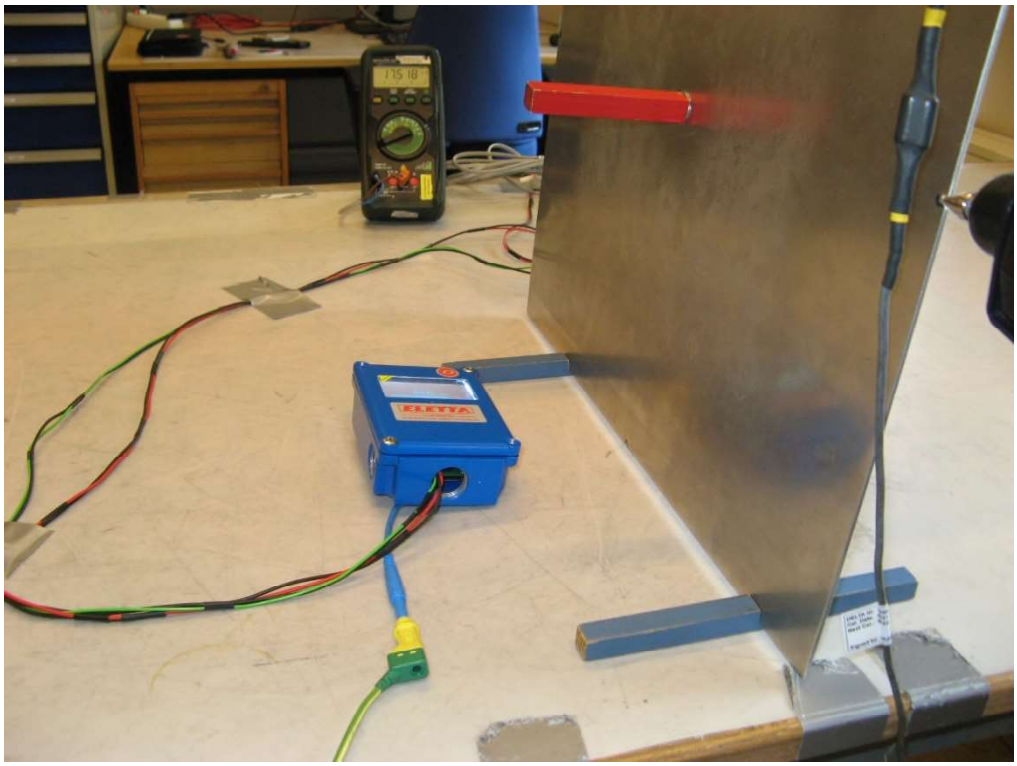


Photo 4.1.4 Test setup regarding immunity Discharges via VCP indirect coupling

Photo 4.1.5 Test setup regarding immunity Discharges via VCP indirect coupling.

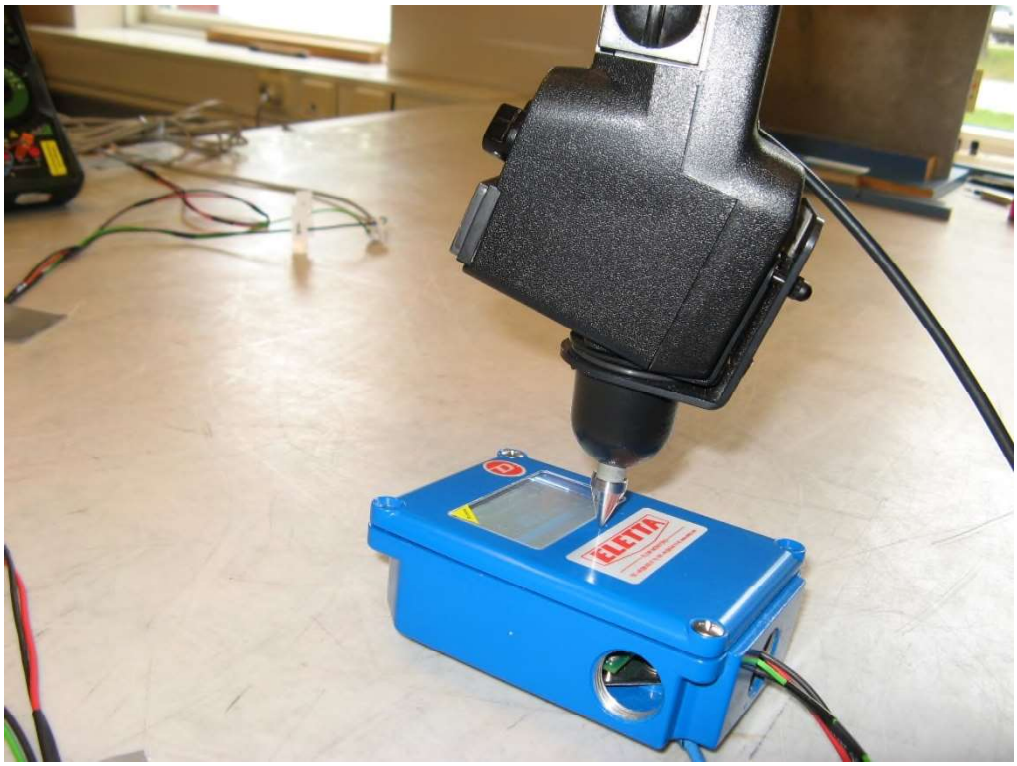



Photo 4.1.6 Test setup regarding immunity discharges.

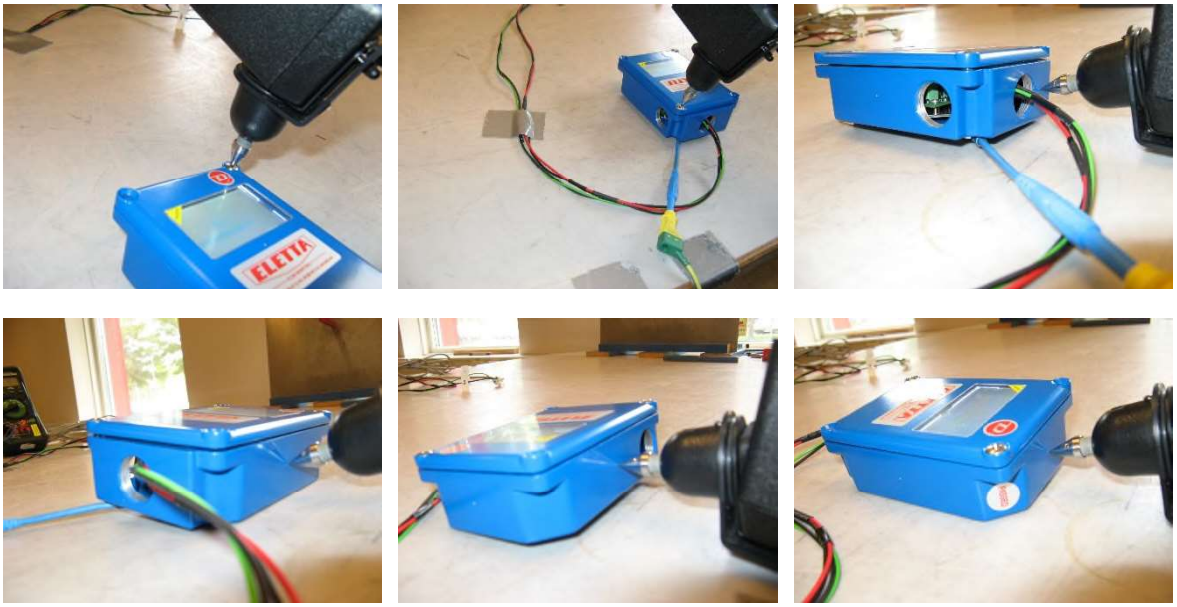



Photo 4.1.7 Test setup regarding immunity Test points for direct contact discha

Photo 4.1.8 Test setup regarding immunity
Test points for direct contact discha


Photo 4.1.9 Test setup regarding immunity

## . I unity to radio fre uency e ectro agnetic fie d

| | | | |
|---|---|---|---|
| Test object | D series upgrade | Project no. | 622 2 134 |
| Type | D series | Date | 5 May 2 22 |
| Serial no. | | nitials | AN |
| Specification | N C 61 6 2:2 1 | Required Perf. criter. | A |

| | | | |
|---|---|---|---|
| Test method<br>Characteristics | N C 61 4 3:2 2<br>16 point pre Calibration | Temperature<br>umidity | 24 °C<br>26 R |
| Test equipm. | . 8 1 G z: MC all B ster s Setup<br>1 6 G z: MC all B ster s Setup 3 | 4 ncertainty | 1.8 dB |

| Frequency range | Modulation | Field direction | Amplitu m | Passed | Remar s |
|---|---|---|---|---|---|
| Front side exposed to the field | | | | | |
| 8 1 M | 8 AM 1 | orizontal | 1 | es | Note 1 |
| 8 1 M | 8 AM 1 | ertical | 1 | es | Note 1 |
| 1.4 6 G z | 8 AM 1 | orizontal | 3 | es | |
| 1.4 6 G z | 8 AM 1 | ertical | 3 | es | |
| Bottom side ith cable inlet exposed to the field | | | | | |
| 8 1 M | 8 AM 1 | orizontal | 1 | es | Note 1 |
| 8 1 M | 8 AM 1 | ertical | 1 | es | Note 1 |
| 1.4 6 G z | 8 AM 1 | orizontal | 3 | es | |
| 1.4 6 G z | 8 AM 1 | ertical | 3 | es | |
| Left side exposed to the field | | | | | |
| 8 1 M | 8 AM 1 | orizontal | 1 | es | Note 1 |
| 8 1 M | 8 AM 1 | ertical | 1 | es | Note 1 |
| 1.4 6 G z | 8 AM 1 | orizontal | 3 | es | |
| 1.4 6 G z | 8 AM 1 | ertical | 3 | es | |

Note 1: The display reading had a small de iation belo 1 M z. The de iation of the reading as less than 2 but the measured current as not affected. Criteria A as fulfilled.

Criteria for compliance See Section 3.2

Test result The radio frequency el
malfunctions

Compliant Yes

Setup comments Frequency step: 1 %, d

Comments The test shall normally be
generating antenna facing each
When technically justified the
exposing fewer faces to the ge

In agreement with the client,
susceptive were tested here.

During the test the EUT case w

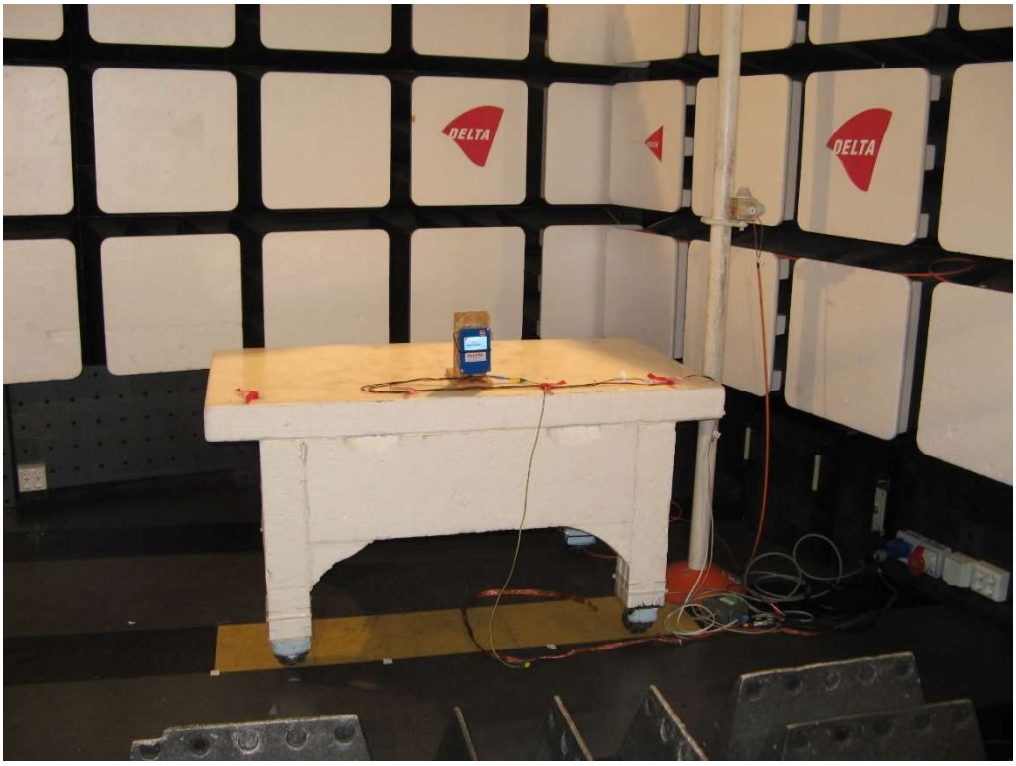



Photo 4.2.1 Test setup regarding immunit
field for test between 80-1000 MHz.

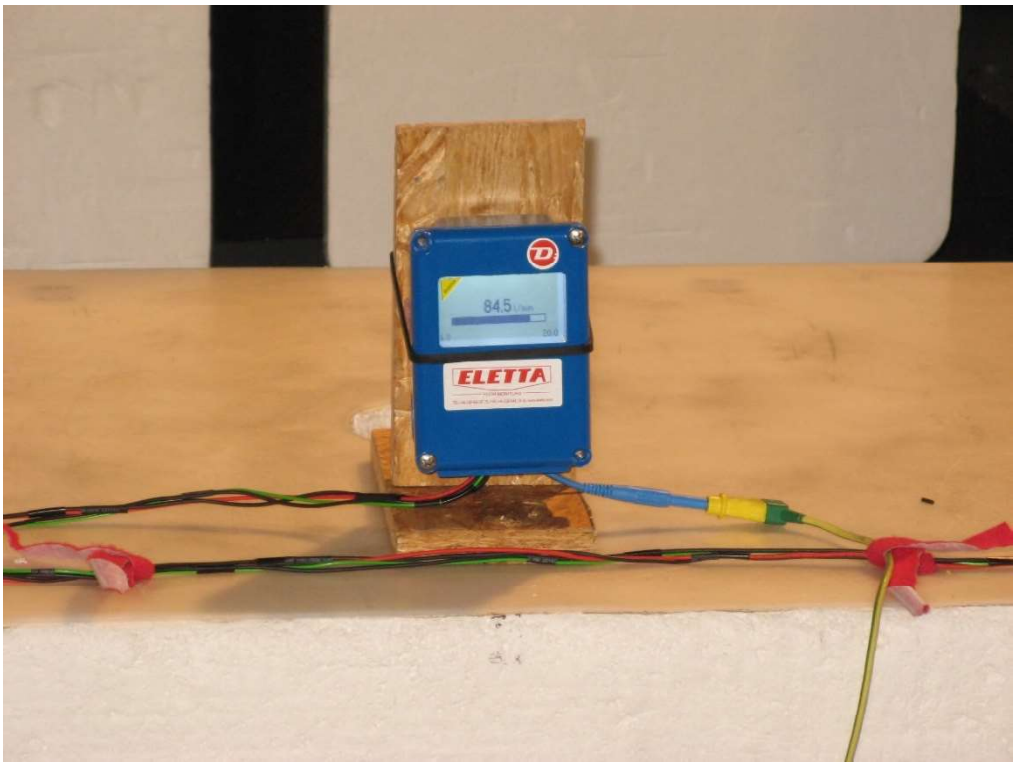



Photo 4.2.2 Test setup regarding immunit
field. Front side exposed to the fi

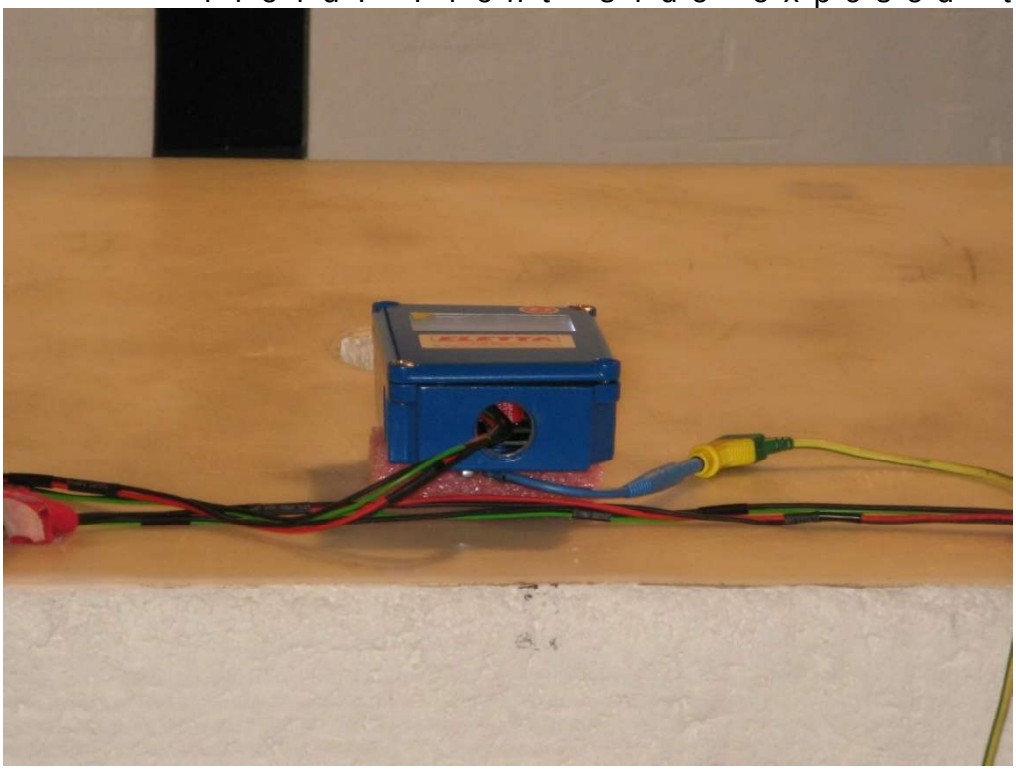


Photo 4.2.3 Test setup regarding immunit
field. Bottom side (with cable inle

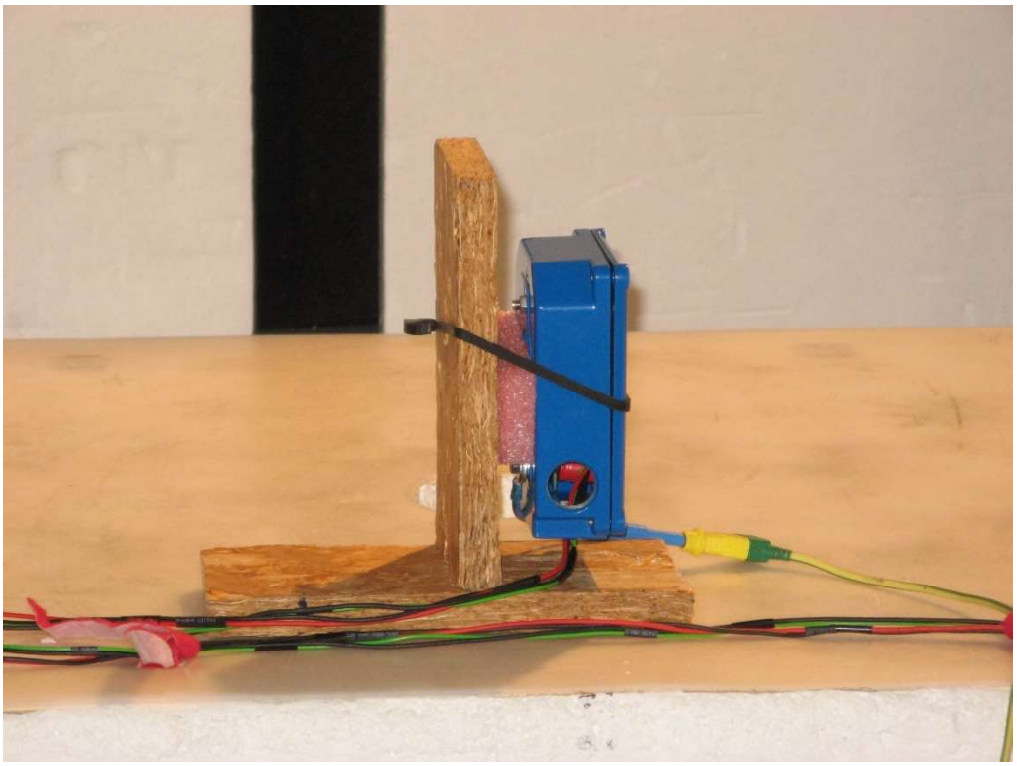


Photo 4.2.4 Test setup regarding immunit
field. Left side exposed to the fie

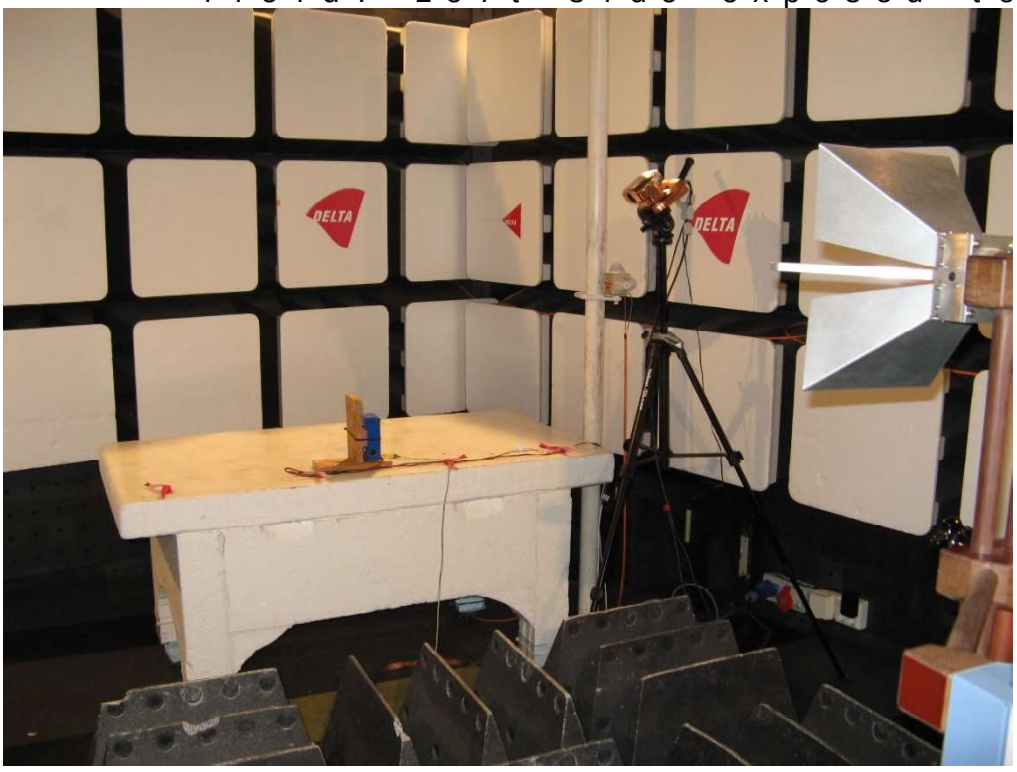



Photo 4.2.5 Test setup regarding immunit
field for test above 1 GHz.

## . I unity to fast transients

| | | | |
|---|---|---|---|
| Test object | D series upgrade | Project no. | 622 2 134 |
| Type | D series | Date | May 2 22 |
| Serial no. | | nitials | AN |
| Specification | N C 61 6 2:2 1 | Required Perf. criter. | B |

| | | | |
|---|---|---|---|
| Test method | N C 61 4 4:2 12 | Temperature | 24 °C |
| Characteristic | 5 z bursts of 15 3 ms and 1 z bursts of | umidity | 22 R |
| Test equipm. | MC Transient lab ster s Setup B1 | ncertainty | 1.1 dB |

| Manufacturer s name of port | Test standard s name of port | Coupling | Burs frequency z | Amplitude | Passed | Remar s | |
|---|---|---|---|---|---|---|---|
| DC po er | DC po er | All leads | GP | 5 | 1 | es | Note 1 |
| DC po er | DC po er | All leads | GP | 1 | 1 | es | Note 1 |
| DC po er | DC po er | All leads | GP | 5 | 1 | es | Note 2 |
| DC po er | DC po er | All leads | GP | 1 | 1 | es | Note 2 |
| Analog output | Cable | Cap.clamp | GP | 5 | 1 | es | Note 1 |
| Analog output | Cable | Cap.clamp | GP | 1 | 1 | es | Note 1 |
| Analog output | Cable | Cap.clamp | GP | 5 | 1 | es | Note 2 |
| Analog output | Cable | Cap.clamp | GP | 1 | 1 | es | Note 2 |

GP Ground reference Plane
Note 1: Test object grounded.
Note 2: Test object not grounded.

Criteria for compliance See Section 3.2

Test result The fast transients ca

Compliant Yes

Test time 1 min/polarity

Comments The EUT was tested with th
grounded

Photo 4.3.1 Test setup regarding immunity

Photo 4.3.2 Test setup regarding immunity
Test object case not grounded.

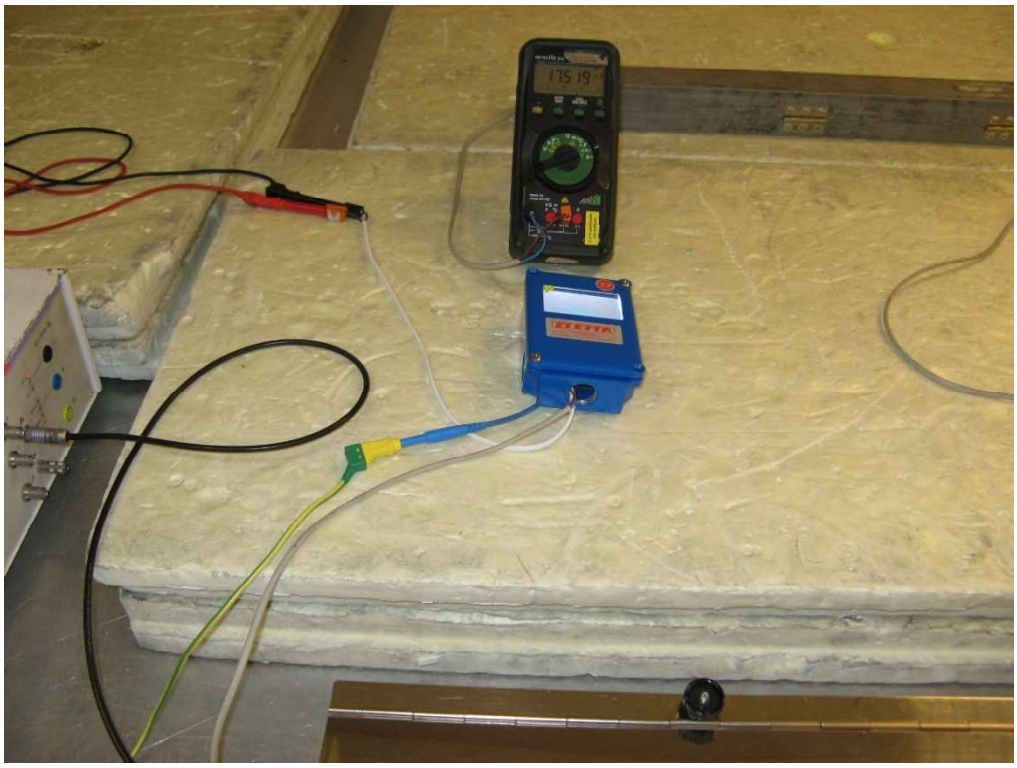


Photo 4.3.3 Test setup regarding immunity port. Test object case grounded.

## . I unity to surge transients

| | | | |
|---|---|---|---|
| Test object | D series upgrade | Project no. | 622 2 134 |
| Type | D series | Date | May<br>une 2 22 |
| Serial no. | | nitials | AN |
| Specification | N C 61 6 2:2 1 | Required Perf. criter. | B |

| | | | |
|---|---|---|---|
| Test method | N C 61 4 5:2 14 A1 | Temperature | 24 °C |
| Characteristic | Open circuit olt.: 1 s. Short circuit curr.: 8 s 2 | umidity | 41 R |
| Test equipm. | MC Transient lab ster s Setup D5 | ncertainty | 1.1 dB |

| Manufacture name of port | Test standard name of port | Coupling and genera impedance | No of surges each combin. | Amplitu | Passed | Remar |
|---|---|---|---|---|---|---|
| DC po er | DC po er | +VDC - PE 42 Ω, 0.5 µF | 5 | | .5 es | Note 1 |
| DC po er | DC po er | 0 V - PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 1 |
| DC po er | DC po er | +VDC - 0 V 42 Ω, 0.5 µF | 5 | | .5 | Note 1 |
| DC po er | DC po er | +VDC - PE 42 Ω, 0.5 µF | 5 | | .5 es | Note 2 |
| DC po er | DC po er | 0 V - PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 2 |
| DC po er | DC po er | +VDC - 0 V 42 Ω, 0.5 µF | 5 | | .5 | Note 2 |
| Analog output | Unshielded lines | +VDC - PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 1 |
| Analog output | nshielded lines | 0 V - PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 1 |
| Analog output | nshielded lines | +VDC - PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 2 |
| Analog output | nshielded lines | 0 V - PE 42 Ω, 0.5 µF | 5 | | .5 1 | Note 2 |

Note 1: Test object grounded.
Note 2: Test object not grounded.

Time between tests 10 s

Criteria for compliance See section 3.2

Test result The disturbances cause
modification 1 implemented

Compliant Yes

Comments The EUT was tested with th
grounded

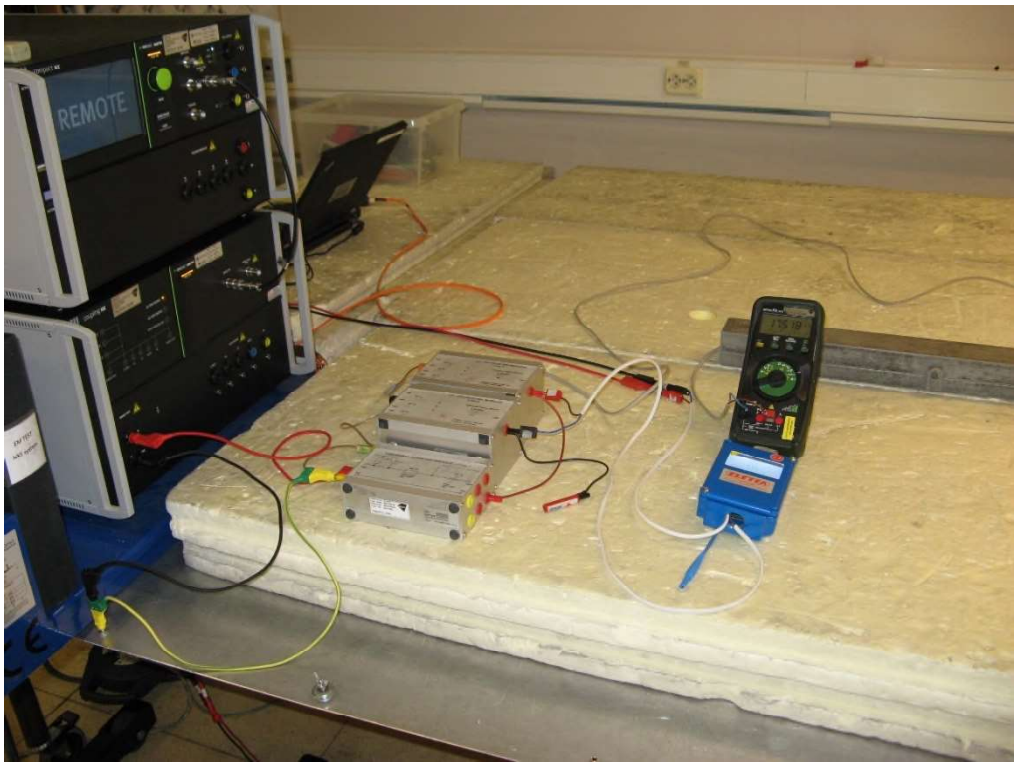



Photo 4.4.1 Test setup regarding immunity

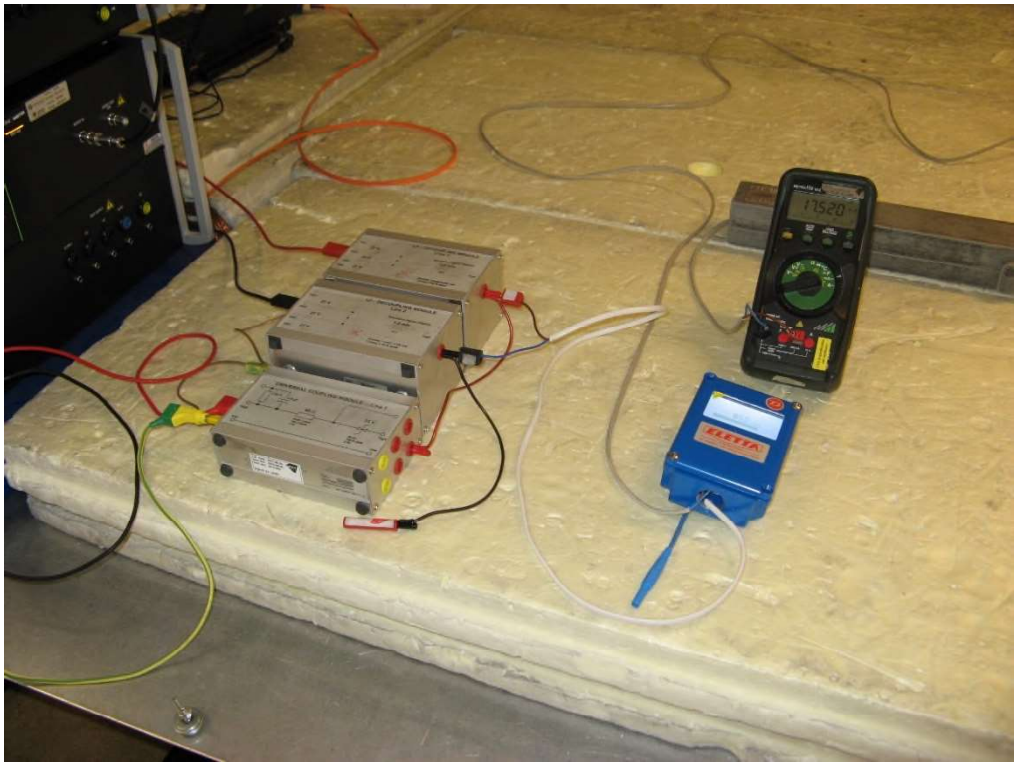


Photo 4.4.2 Test setup regarding immunity
Test object case not grounded.

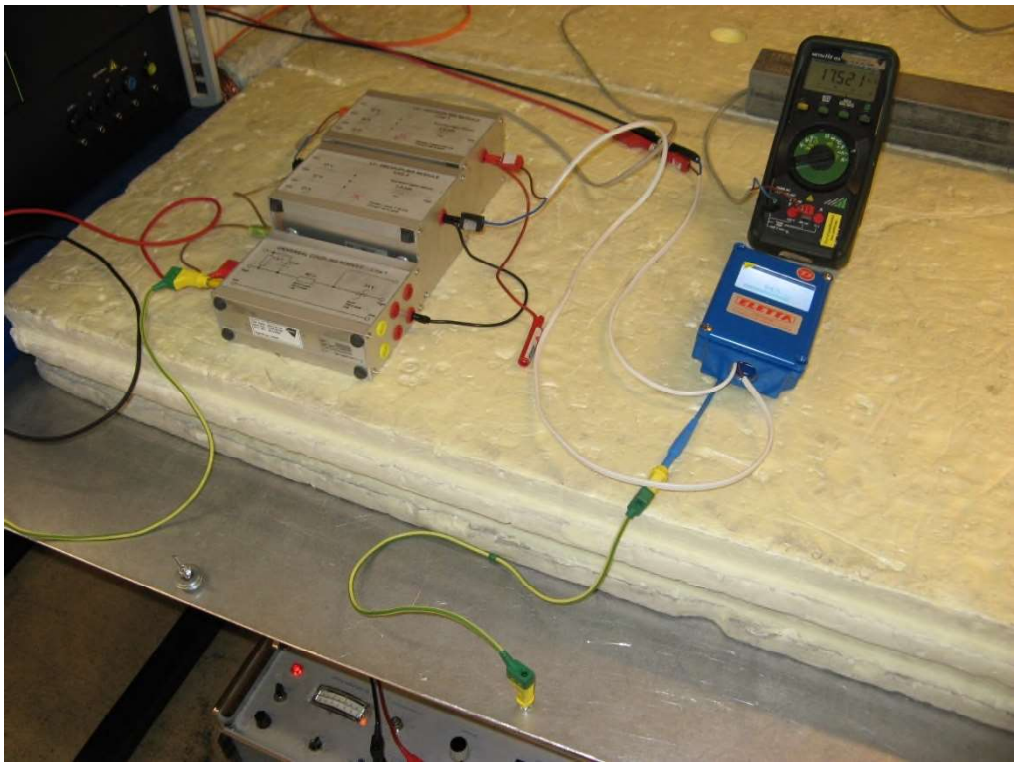


Photo 4.4.3 Test setup regarding immunity port. Test object case grounded.

## . I unity to conducted radio fre uency disturbances

| | | | |
|---|---|---|---|
| Test object | D series upgrade | Project no. | 622 2 134 |
| Type | D series | Date | May<br>une 2 22 |
| Serial no. | | nitials | AN |
| Specification | N C 61 6 2:2 1 | Required Perf. criter. | A |

| | | | |
|---|---|---|---|
| Test method | N C 61 4 6:2 14 | Temperature | 24 °C |
| Characteristic | Frequency range: .15 8 M z modulation: 8 | umidity | 41 R |
| Test equipm. | MC Transient lab ster s Setup A3 | ncertainty | 1.4 dB |

| Manufacturer s name of port | Test standard s name of port | Coupling Net or | Amplitude | Passed | Remar s | |
|---|---|---|---|---|---|---|
| DC po er | DC po er | CDN M2 T | A544 | 1 | es | Note 1 |
| DC po er | DC po er | CDN M2 T | A544 | 1 | es | Note 2 |
| Analog output | nshielded cable | CDN AF2 1 | D | 1 1 | es | Note |
| Analog output | nshielded cable | CDN AF2 1 | D | 1 1 | es | Note |

Note 1: Test object grounded.
Note 2: Test object not grounded.

Criteria for compliance See Section 3.2

Test result The disturbances cause
modification 1 implemented

Compliant Yes

Setup comments Frequency step: 1 %, d

Comments The EUT was tested with th
grounded

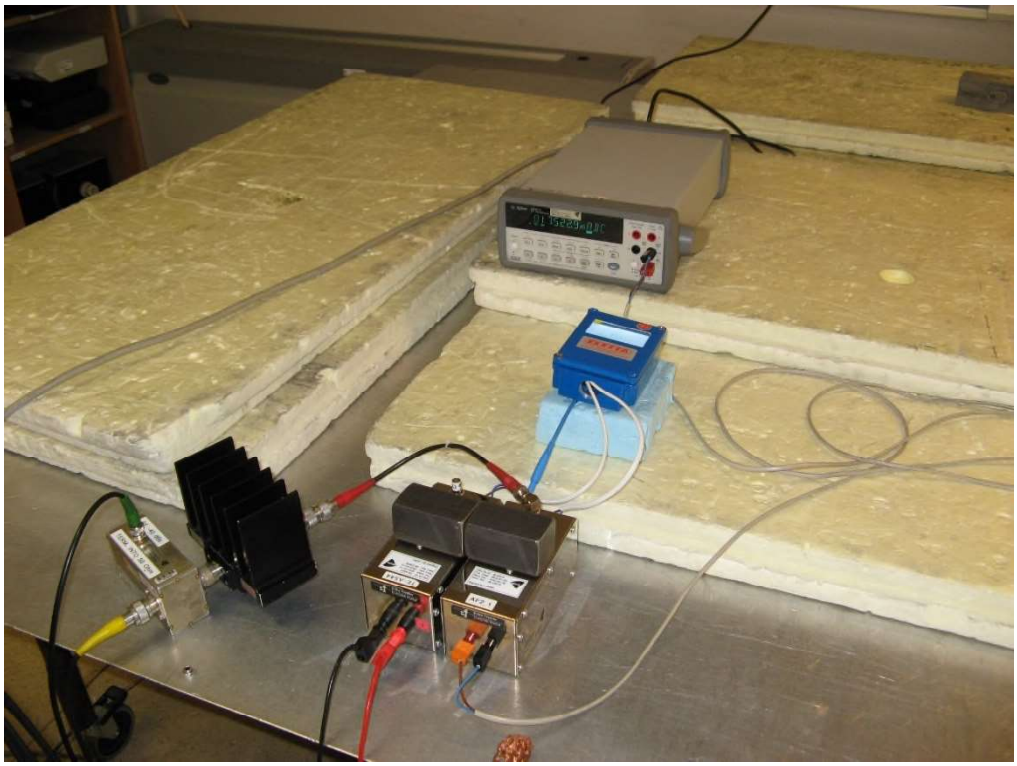


Photo 4.5.1 Test setup regarding immunity disturbances.

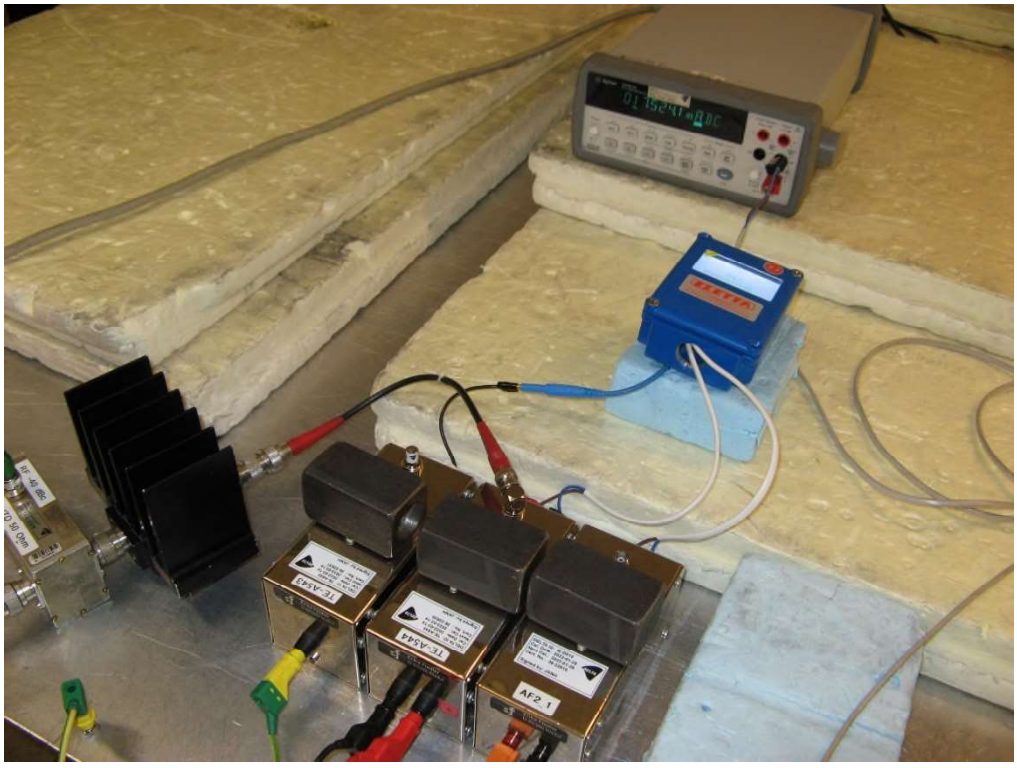


Photo 4.5.2 Test setup regarding immunity disturbances on DC power port. Test

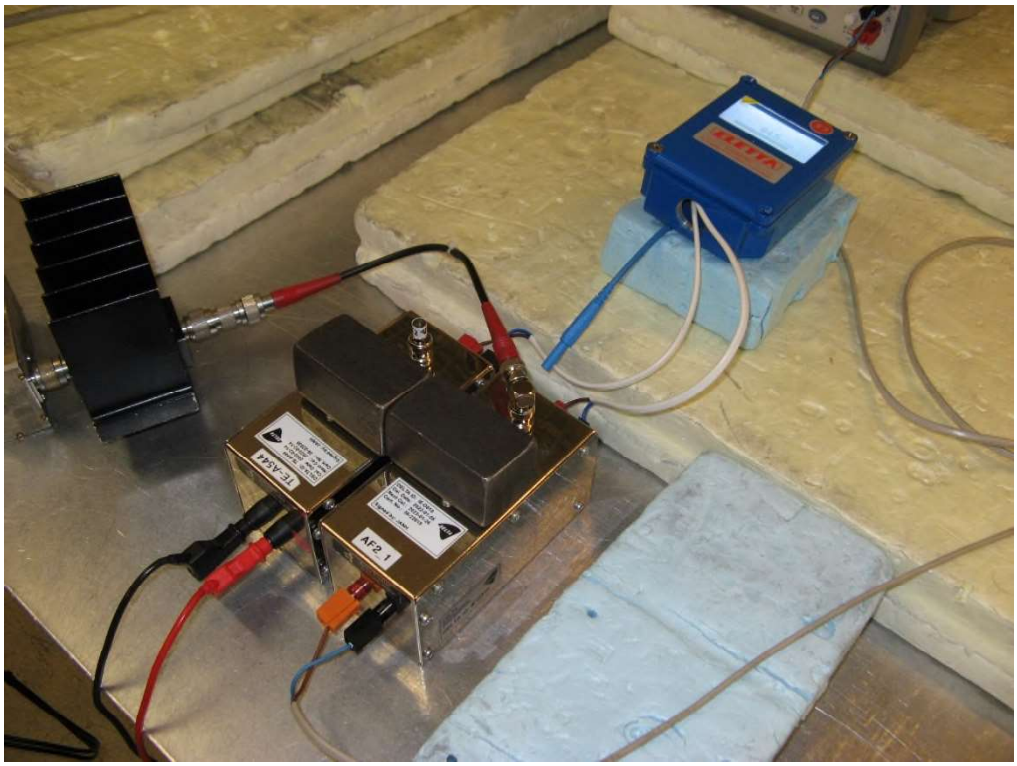


Photo 4.5.3 Test setup regarding immunity disturbances on analog output port.

## . Measure ent of radio fre uency e ectro agnetic fie d

| | | | |
|---|---|---|---|
| Test object | D series upgrade | Project no. | 622 2 134 |
| Type | D series | Date | 3 May 2 22 |
| Serial no. | | nitials | AN |
| Specification | N C 61 6 3:2 21 | Frequency | 3 1 M z |

| | | | |
|---|---|---|---|
| Test method<br>Characteristic | C SPR 16 2 3:2 16<br>Complete search antenna distance 1 m | Temperature<br>umidity | 21 °C<br>38 R |
| Detector | Pea and quasi pea | Band idth | 12 z |
| Test equipm. | MC all A ster s Setup C1 | ncertainty | 5. dB |

Test result The measured field str

Compliant Yes

Comments 16 scans measurement were
grounded and not grounded.
The highest measured radiated
with the case not grounded.
See the 3 graphs in the figure
not grounded, grounded and com

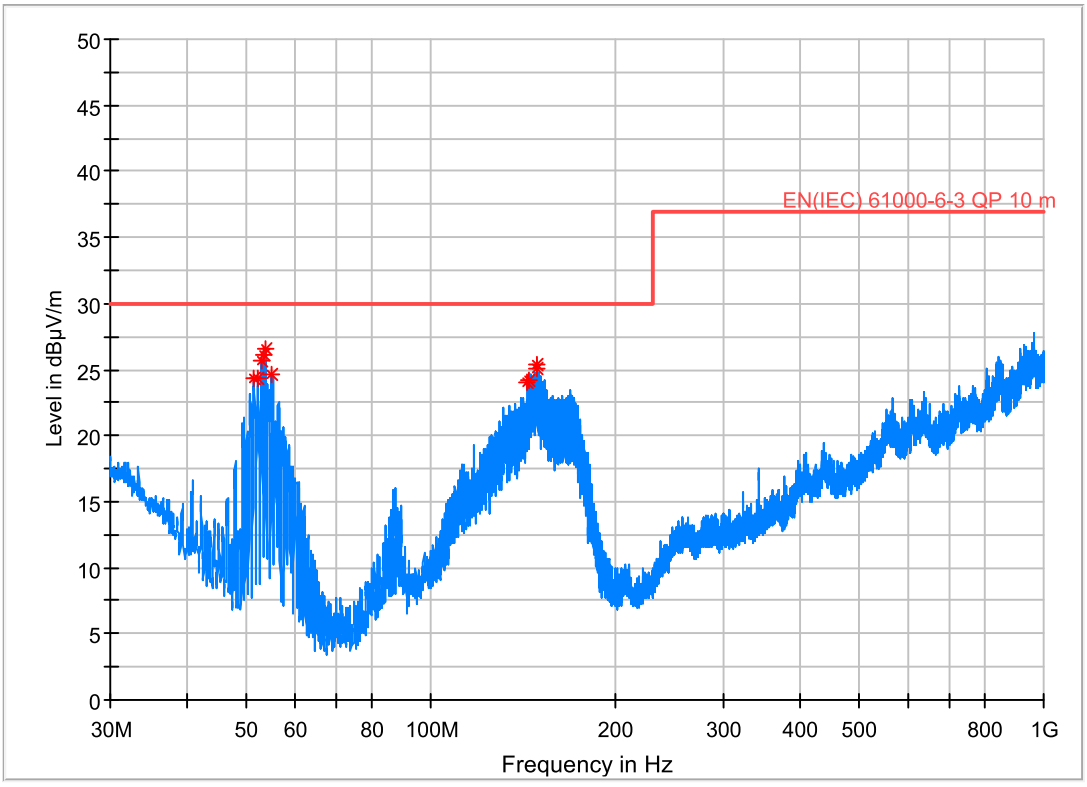
The complete measurement was p
with the case not grounded.

Final maximal measurements by
azimuth, antenna height, and a

CMAD absorption clamps were us
cable and analog output cable.

# Radiated emission. 16 scans measuremen

| | |
|---|---|
| Test Description: | Radiated emission. 16 scans measurement 30 - 1000 MHz |
| Date: | 2022-05-03 |
| EUT Name: | D-series upgrade |
| Manufacturer: | Eletta Flow AB |
| Serial Number: | 00000 |
| Operating Conditions: | Supply voltage 24 VDC |
| Test Site: | DELTA Development Technology AB |
| Operator Name: | Jan Högkvist |
| Test Specification: | EN IEC 61000-6-3:2021 |
| Comment: | Not grounded |

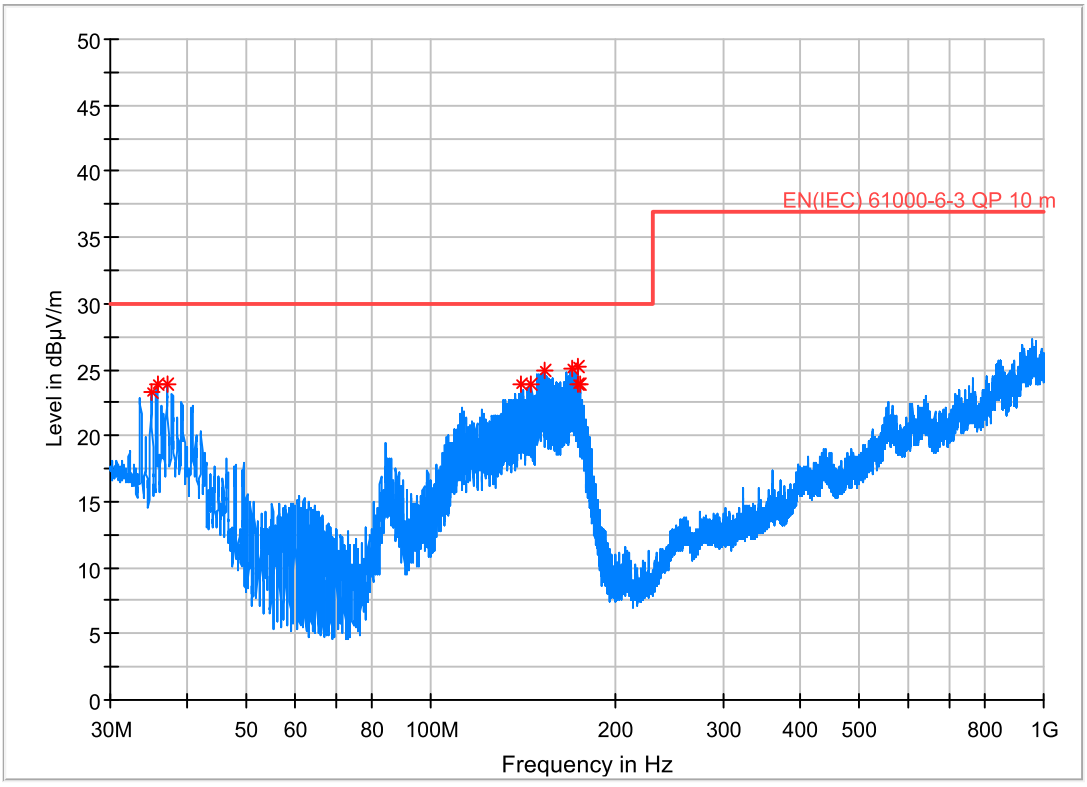



## Critical_Freqs

| Frequen (MHz) | MaxPe (dBµV | Limi (dBµV | Marg (dB | Heig (cm | Po | Azimu (deg | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 51.57 | 24. | 30. | 5. | 100 | V | 90 | -11 |
| 52.290000 | 24.34 | | 30.00 | | 5.66 | 100.0 | V 90.0 -11 |
| 52.83 | 25. | 30. | 4. | 100 | V | 90 | -11 |
| 53.55 | 26. | 30. | 3. | 100 | V | 90 | -11 |
| 53.700000 | 26.54 | 3.43 | 30100 | 0.0 | V | | 90.0 -11.9 |
| 54.96 | 24. | 30. | 5. | 100 | V | 90 | -12 |
| 144.0 | 24. | 30. | 5. | 100 | V | 0 | -7 |
| 144.870000 | 24.25 | | 30.00 | | 5.75 | 100.0 | V 0.0 -7 |
| 148.4 | 25. | 30. | 4. | 100 | V | 0 | -7 |
| 149.0 | 25. | 30. | 4. | 100 | V | 0 | -7 |

# Radiated emission. 16 scans measuremen

| | |
|---|---|
| Test Description: | Radiated emission. 16 scans measurement 30 - 1000 MHz |
| Date: | 2022-05-03 |
| EUT Name: | D-series upgrade |
| Manufacturer: | Eletta Flow AB |
| Serial Number: | 00000 |
| Operating Conditions: | Supply voltage 24 VDC |
| Test Site: | DELTA Development Technology AB |
| Operator Name: | Jan Högkvist |
| Test Specification: | EN IEC 61000-6-3:2021 |
| Comment: | Grounded |

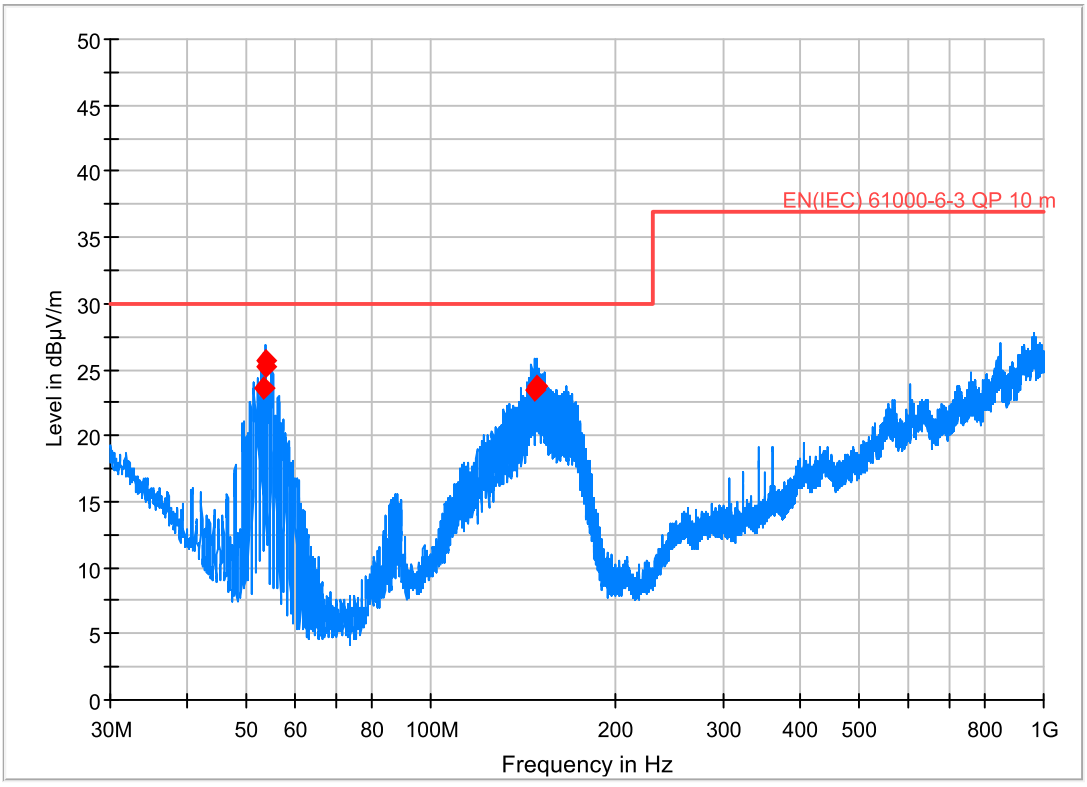



## Critical_Freqs

| Frequen (MHz) | MaxPe (dBµV | Limi (dBµV | Marg (dB | Heig (cm | Po | Azimu (deg | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|
| 35.07 | 23. | 30. | 6. | 100 | V | 270 | -3. |
| 35.700000 | 23.87 | 30.00 | 6.13 | 100.0 | V | 270.0 | -3. |
| 37.11 | 23. | 30. | 6. | 100 | V | 270 | -4. |
| 140.4 | 23. | 30. | 6. | 100 | V | 0 | -7. |
| 145.440000 | 23.86 | 30.00 | 6.14 | 100.0 | V | 0.0 | -7. |
| 153.3 | 24. | 30. | 5. | 100 | V | 180 | -7. |
| 169.8 | 25. | 30. | 4. | 100 | V | 0 | -8. |
| 173.340000 | 25.21 | 4.79 | 30 | 1.000 | 0.0 | V | 0.0 | -8.9 |
| 174.0 | 23. | 30. | 6. | 100 | V | 0 | -9. |
| 174.8 | 23. | 30. | 6. | 100 | V | 0 | -9. |

# Radiated emission. Complete measuremen

| | |
|---|---|
| Test Description: | Radiated emission. Complete measurement 30 - 1000 MHz |
| Date: | 2022-05-03 |
| EUT Name: | D-series upgrade |
| Manufacturer: | Eletta Flow AB |
| Serial Number: | 00000 |
| Operating Conditions: | Supply voltage 24 VDC |
| Test Site: | DELTA Development Technology AB |
| Operator Name: | Jan Högkvist |
| Test Specification: | EN IEC 61000-6-3:2021 |
| Comment: | Test object not grounded |




# Final_Result

| Frequen (MHz) | QuasiP (dBµV/ | Limi (dBµV | Marg (dB | Meas. (ms) | Bandwi (kHz) | Heig (cm | Pol | Azimu (deg | Corr. (dB/m) | |
|---|---|---|---|---|---|---|---|---|---|---|
| 53.49 | 23. | 30. | 6. | 100 | 120. | 150 | V | 135 | -11 | |
| 53.700000 | | 25.67 | | 30.00 | 4.33 | | 1000.0 | | 120.000 | 1 |
| 53.73 | 25. | 30. | 4. | 100 | 120. | 103 | V | 126 | -11 | |
| 147.5 | 23. | 30. | 6. | 100 | 120. | 126 | V | 334 | -7 | |
| 148.980000 | | 23.76 | | 30.00 | 6.24 | | 1000.0 | | 120.000 | 1 |

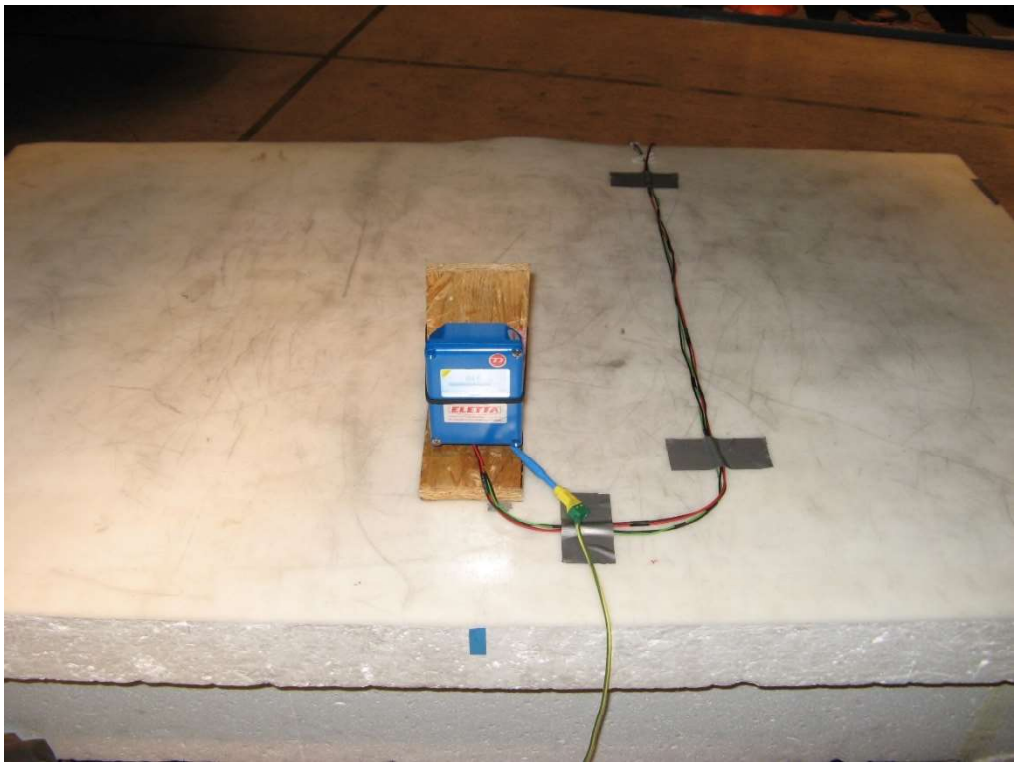


Photo 4.6.1 Test setup regarding measurem
magnetic field. Test object case gro

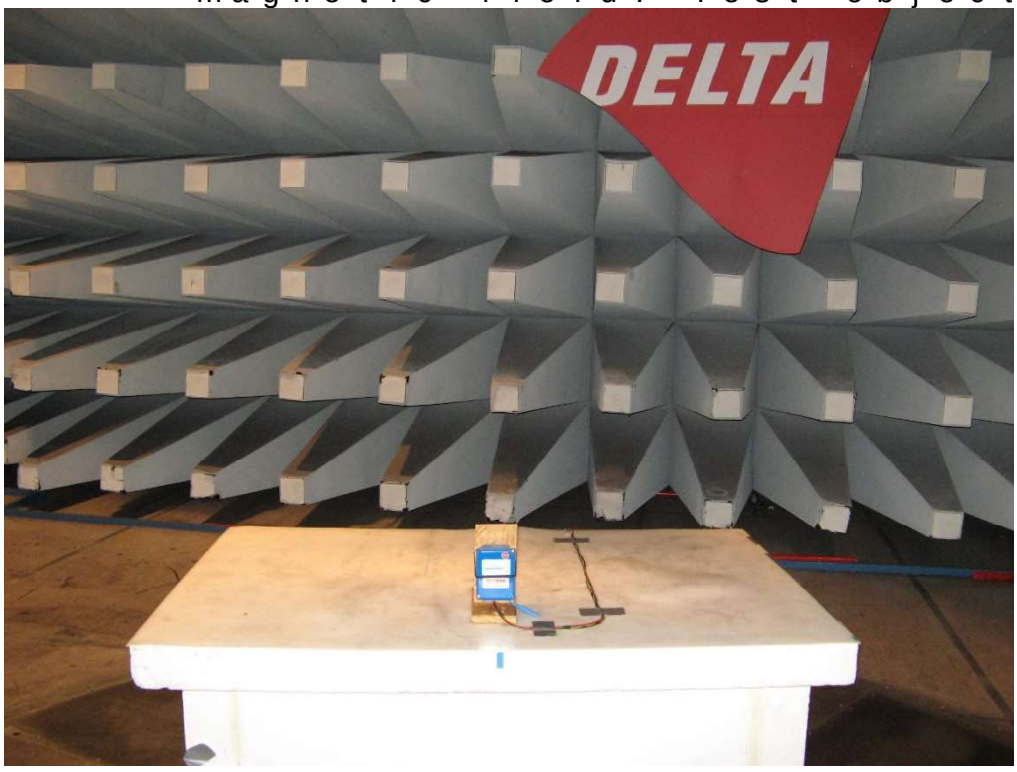



Photo 4.6.2 Test setup regarding measurem
magnetic field. Front view. Test obj

Photo 4.6.3 Test setup regarding measurem
magnetic field. Rear view.

## . ationa registrations and accreditations

### . S EDA Accreditation

**O rganization** Swedish Board for Accreditation
SWEDAC www.swedac.se and www.ilac.org

**Registration um er** 1688

SWEDAC is part of ILAC (International Labo
including its MRA (Mutual Recognition Arra

### . Registrations

**O rganization** Federal Communications Commissio

**D esignation num er** SE0004

**Company um er** 187770

**Facilities** EMC chamber A 3 m and 10 m

### . ISED Registrations

**O rganization** Innovation, Science and Economic

**D esignation num er** SE0006

**Company um er** 9347A

**Facilities** EMC chamber A 3 m and 10 m

## . List of instru ents

| Setup E | | | | | |
|---|---|---|---|---|---|
| Measure ent of radio fre uency e ectro agnetic fie d | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Soft are | Rohde Sch | arz MC32 | er. 1 .6 .15 5. dB |
| ☒ | 362 5 | Measuring recei er | Rohde Sch | arz S 44 | |
| ☒ | B | 28 Antenna Bilog | Chase | CBL6111A | |
| ☒ | 36151 | Preamplifier | FORC | Preamp .5M | z 4G z |
| ☒ | 36166 | Po er supply | Mascot | 6823 Mod. | |
| ☐ | 3612 | CMAD Absorption c amp D LTA | | CMAD D25 | 16 1 4 |
| ☐ | 3613 | CMAD Absorption c amp D LTA | | CMAD D25 | 16 1 4 |
| ☒ | 36 1 | Controller | Maturo | NCD | |
| ☒ | 36 2 | Tilt antenna mast | Maturo | TAM 4. | |
| ☒ | | Turntable | einrich Deisel | DT 44 | |

| Setup IA | | | | | |
|---|---|---|---|---|---|
| I unity to conducted radio fre uency disturbances | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Soft are | Rohde Sch | arz MC32 | er. 1 .6 . 1.4 dB |
| ☒ | | 8 Signal generator | Marconi | 2 24 | |
| ☒ | | Amplifier | Amplifier Research | 5A25 | |
| ☒ | 36148 | A erage Po er Sens or | Rohde Sch | arz NRP18A | |
| ☒ | 26 | 4 dBc oltage Sampler | D LTA | Denmar | |
| ☒ | 22 | RF attenuator 6 dB | einschel | Corp 65 6 3 | |
| ☒[1] | D | 1 CDN .15 | 8 M z | ri a Fiedler | CDN AF2 1 |
| ☒[1] | T A543 | CDN .15 23 | M z | ri a Fiedler | CDN M1 |
| ☒[1] | T A544 | CDN .15 23 | M z | ri a Fiedler | CDN M2 |
| Note 1: see test sheet for usage of CDN or M clamp | | | | | |

| Setup I | | | | | |
|---|---|---|---|---|---|
| I unity to fast transients | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 35 | Soft are | M T ST | SM C | er. 4.1 1.1 dB |
| ☒ | L444 | Burst Surge gene ator | M T ST | CS 5 | M4 |
| ☒ | 36 26 | Coupling net or | M T ST | CN 5 3 | |
| ☒ | L443 | Coupling clamp | M T ST | F | |

| Setup I | | | | | |
|---|---|---|---|---|---|
| I unity to e ectrostatic disc arges | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 2 838 | SD simulator | eyTe | Mini ap M | 15 C 1.1 dB |

| Setup ID | | | | | |
|---|---|---|---|---|---|
| I unity to surge transients | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36165 | Soft are | M T ST | iec.control er. .2.2 | 1.1 dB |
| ☒ | 36158 | Transient generator | M T ST | Compact N 5 bspt 1 3 16 | |
| ☒ | 3615 | Coupling decoupling net o | M T ST | coupling N 5 R bs 3 48 32 | |
| ☒ | 534 | Coupling module | MC Partner | CN | |
| ☒ | 536 | Decoupling module LF | MC Partner | DN LF1 | |
| ☒ | 53 | Decoupling module LF | MC Partner | DN LF2 | |

| Setup IE | | | | | |
|---|---|---|---|---|---|
| I unity to radio fre uency e ectro agnetic fie ds | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Soft are | Rohde Sch arz | MC32 | er. 1 .6 .2 1.8 dB |
| ☒ | 361 2 | Signal Generator | Rohde Sch arz | SMB1 A | |
| ☒ | 3 4 | Field Strength Meter | Amplifier Research | AR FM 2 | |
| ☒ | B885 | field Sensor | Amplifier Research | FP 2 | |
| ☒ | 361 3 | A erage Po er Sensor | Rohde Sch arz | NRP | 1 |
| ☒ | 361 4 | A erage Po er Sensor | Rohde Sch arz | NRP | 1 |
| ☒ | 361 | Broadband Amplifier | Rohde Sch arz | BBA15 | D2 |
| ☒ | 361 1 | Broadband Amplifier | Rohde Sch arz | BBA15 | 1 |
| ☒ | 361 5 | orn Antenna | Rohde Sch arz | F | |

| Setup IE | | | | | |
|---|---|---|---|---|---|
| I unity to radio fre uency e ectro agnetic fie ds | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 36 | Soft are | Rohde Sch arz | MC32 | er. 1 .6 .2 1.8 dB |
| ☒ | 36185 | Signal Generator | Rohde Sch arz | SMB1 B | |
| ☒ | 3 4 | Field Strength Meter | Amplifier Research | FM 2 | |
| ☒ | B885 | field Sensor | Amplifier Research | FP 2 | |
| ☒ | 36186 | A erage Po er Sensor | Rohde Sch arz | NRP6AN | |
| ☒ | 3618 | A erage Po er Sensor | Rohde Sch arz | NRP6AN | |
| ☒ | 36184 | Broadband Amplifier | Rohde Sch arz | BBA15 | BC125 |
| ☒ | 361 2 | Antenna Log Periodic. | Sch arzbec | STLP 128 | |
| ☒ | | Antenna To er | MCO | 1 5 | |
| ☒ | | To er Controller | einrich Deisel | D 1 | |

| Ot er instru ents used | | | | | |
|---|---|---|---|---|---|
| Used | ID no. | Description | Manufacturer | Type no. | Setup uncertainty |
| ☒ | 3514 | Temperature and hygrometer | colog | T 1 | |
| ☒ | M A3 | 8 Temperature and hygrometer | aisala | M 31 | |