

# COMPLIANCE ASSESSMENT WITH DIRECTIVE 2014/30/EU

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Equipment name:  
Part number:

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Test report no: CEM  
RELEASE:0

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## 1 Purpose

The following test report presents all the results obtained at assesment test on .

## 2 List of standards and tests performed

Based on product standards :

EN 50130-4: 2011

Applied test standards:

EN 61000-4-2: 2009,  
EN 61000-4-3: 2006 / A1 : 2008 / A2 : 2010,  
EN 61000-4-4: 2012,  
EN 61000-4-5: 2014 / A1 : 2017 ,  
EN 61000-4-6: 2014,  
EN 61000-4-11: 2004 / A1: 2017,  
EN 55022:2010  
EN 61000-3-2: 2014  
EN 61000-3-3: 2013

Tests	Procedure	Severity of levels	
<b>Immunity tests</b>			
1. Repetitive electrical fast transients	EN 61000-4-4	2 kV on main; 1 kV on other circuits	A
2. Surge immunity test	EN 61000-4-5	2kV on main; 1kV on other circuits	A
3. Electrostatic discharge	EN 61000-4-2	8kV on the air; 6kV contact	A
4. Radiated electromagnetic field	EN 61000-4-3	3V/m; 10V/m	A
5. Conducted disturbances	EN 61000-4-6	3V/m; 10V/m	A
6. Voltage dips and variations	EN 61000-4-11	60%, 200ms; 100%, 100ms	A
<b>Emission measurements</b>			
7. Radiated emissions	EN 55022	Within the limits	A
8. Conducted disturbances	EN 55022	Within the limits	A
<b>Other emission measurements</b>			
9. Harmonic current emissions	EN 61000-3-2	Within the limits	N/A
10. Voltage fluctuations and flicker	EN 61000-3-3	Within the limits	N/A

A: test case apply to the test object

N/A : test case does not apply to the test object

N/R : No performed

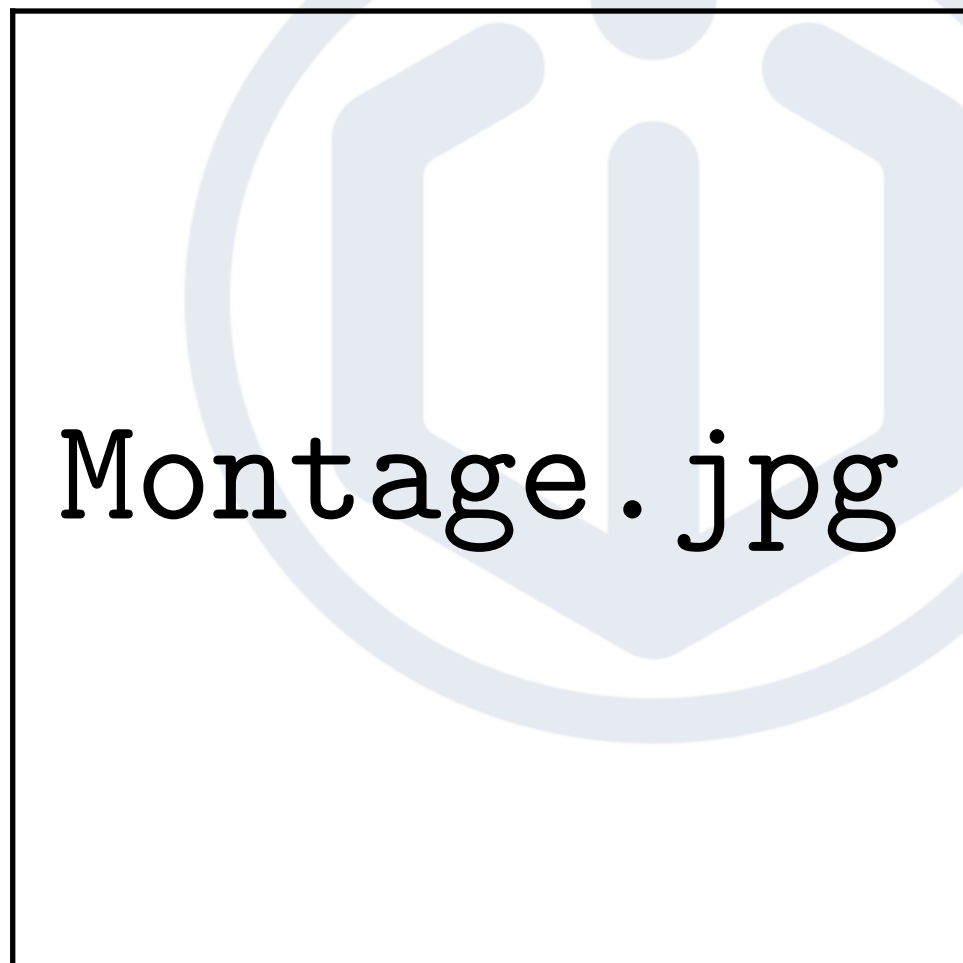
### 3 Description and features of the equipment under test

Voltage supply :

Consumption :

Electronic card release :

### 4 Wiring diagram



### 5 Test setup

### 6 Operating mode

XX  
XX

## 7 Abbreviations used in this report

FC : Normal behavior

FI : Abnormal behavior

P: Pass

F : Fail

### **Behavior criteria:**

1. normal behavior ;
2. Temporary deterioration or self-recovering loss of function when the disturbance is removed ;
3. Temporary deterioration or loss of function requiring a reset of the system or the intervention of an operator;
4. Temporary deterioration or loss of non-recoverable function due to damage.

## 8 Rapid transient immunity tests in bursts on supply circuits

Standard : EN 61000-4-4

Test equipment: Haefely PEFT Junior

### 8.1 Test conditions

See wiring diagram.

$t_m$  : 5ns

$t_d$  : 50ns

Burts duration : 15ms

Period: 300ms

Test duration : 60s minimum

### 8.2 Test results

#### 8.2.1 On power ports

Level	Voltage	Remark	Result	Verdict
1	+/- 0.5 kV	FC	1	C
2	+/- 1 kV	FC	1	C
3	+/- 2 kV	FC	1	C
X	+/- 3-4 kV	FC	1	C

#### 8.2.2 On I/O signal, data and control ports

Level	Volatge	Remark	Result	Verdict
1	+/- 0.5 kV	FC	1	C
2	+/- 1 kV	FC	1	C
3	+/- 2 kV	FC	1	C
X	+/- 3 – 4 kV	FC	1	C

## 9 Rapid transient immunity tests in bursts on lines and terminals

Standard: EN 61000-4-4

Test equipment: Haefely PEFT Junior

Decoupling network: Haefely 093 506-1

### 9.1 Test conditions

See wiring diagram

Rising time: 5ns

Decreasing time: 50ns

Burst duration : 15ms

Period: 300ms

Test duration: 60s minimum

### 9.2 Test results

#### 9.2.1 On I/O signal, data and control ports

Level	Voltage	remark	Behavior	Verdict
1	+/- 0.5 kV	FC	1	C
2	+/- 1 kV	FC	1	C
3	+/- 2 kV	FC	1	C
X	+/- 3 – 4 kV	FC	1	C



## 10 Surge test immunity on circuits

Standard : EN 61000-4-5

Test equipment:

Profiline système SCHAFFNER

NSG 2050, PNW 2055

Surge wave : 8/20 $\mu$ s

### 10.1 Common mode test conditions

See wiring diagram

Number of surges : 5 / phase angle

Delay between surges : 1 /mn

Source impedance : 12 Ohms

Coupling: L-PE; N-PE; L-N-PE

### 10.2 Test results

Class	Voltage	Remark	Result	Verdict
1	+/- 0.5 kV	FC	1	C
2	+/- 1 kV	FC	1	C
3	+/- 2 kV	FC	1	C
X	+/- 3 – 4 kV	FC	1	C

### 10.3 Differentiel mode test conditions

Number of surges : 5

Delay between surges: 1 /mn

Source impedance : 2 Ohms

### 10.4 Test results

Class	Voltage	Remark	Result	Verdict
1	+/- 0.5 kV	FC	1	C
2	+/- 1 kV	FC	1	C

## 11 Surge test immunity on on lines and terminals

Standard : EN 61000-4-5

Test equipment: Proflin système SCHAFFNER

NSG 2050 / PNW 2055

Surge wave: 8/20 $\mu$ s

Coupling network CDN 117, INA 170, INA 2055

### 11.1 Test conditions

See wiring diagram

Number of surges: 5

Delay between surges : 1 min

Source impedance : 2 ohms

Common mode: 40 Ohms + 0,5 $\mu$ F

### 11.2 Surge test on lines and terminals

Class	Voltage	Remark	Result	Verdict
1	+/- 0.5 kV	FC	1	C
2	+/- 1 kV	FC	1	C
3	+/- 2 kV	FC	1	C
X	+/- 3 kV – 4kV	FC	1	C

## 12 Electrostatic discharge immunity tests

### 12.1 Indirect contact discharges

Standard : EN 61000-4-2

Test equipment : Haefely PSB 25B

$C_d + C_s = 150 \text{ pF}$  ;  $R_d = 330 \text{ Ohms}$

#### 12.1.1 Test conditions

See wiring diagram

10 contact discharges per point on the horizontal plane

10 contact discharges per point on vertical plane

For test points location, refer §20

#### 12.1.2 Test results

**Discharges on horizontal plane**

Points	Voltage	Remark	Result	Verdict
1-4	+/- 4 kV	FC	1	C
1-4	+/- 5 kV	FC	1	C
1-4	+/- 6 kV	FC	1	C
1-4	+/- 8 kV	FC	1	C

**Discharges on vertical plane**

Points	Voltage	remark	Result	Verdict
1-4	+/- 4 kV	FC	1	C
1-4	+/- 5 kV	FC	1	C
1-4	+/- 6 kV	FC	1	C
1-4	+/- 8 kV	FC	1	C

## 12.2 Direct discharges

### 12.2.1 Test conditions

See wiring diagram

10 contact discharges per point

10 discharges per point in the air

For test points location, refer §20

### 12.2.2 Test results

#### Air discharges

Points	Voltage	Remark	Results	verdict
1 à 5	+/- 4 kV	FC	1	C
1 à 5	+/- 8 kV	FC	1	C
1 à 5	+/- 12 kV	FC	1	C
1 à 5	+/- 15 kV	FC	1	C

#### Contact discharges

Points	Voltage	Remark	Result	Verdict
1 à 5	+/- 4 kV	FC	1	C
1 à 5	+/- 5 kV	FC	1	C
1 à 5	+/- 6 kV	FC	1	C
1 à 5	+/- 8 kV	FC	1	C

## 13 Radiated, radio-frequency, electromagnetic field immunity test

Standard : EN 61000-4-3

Test equipment :  
SML02 ROHDE & SCHWARZ AmplifierWA1000  
Antenne AS2 ; probe PCB  
Probe H-fied: PR 1000

### 13.1 Test conditions

See wiring diagram  
Severity : 3V/m ou 10V/m  
Frequency range: 30MHz à 1Ghz  
Modulation: 80% 1kHz sinusoïdal

### 13.2 Test results

Level	Remark	Result	Verdict
3 V/m	FC	1	C
10V/m	FC	1	C

## 14 Immunity to conducted disturbances, induced by radio-frequency fields

Standard : EN 61000-4-6

Test equipment:

SML02 ROHDE & SCHWARZ Amplificateur MRF 80

Coupling network: CDN 1 et attenuator - 6 dB

### 14.1 Test conditions

See wiring diagram

Level : 140 dB $\mu$ V / 10V rms ; 129.5 dB $\mu$ V / 3V rms

Frequency range : balayage de 0.15 MHz à 80 MHz

Modulation: 80 % 1kHz sinusoïdal

Pulse modulation: 1Hz 0.5s ON; 0.5s OFF

### 14.2 test results

Level	Remark	Result	Verdict
140dB $\mu$ V	FC	1	C

## 15 Voltage variations immunity tests

Standard : EN 61000-4-11

Test equipment: 108-TMX SCHAFFNER

Driven by: NSG 1006

### 15.1 Test conditions

See wiring diagram

Level: 230V +10%, 230 V - 15%

### 15.2 Test results

Level	Duration	Remark	Result	Verdict
+10%	10 s	FC	1	C
-15%	10 s	FC	1	C

## 16 Voltage dips, short interruptions immunity tests

Standard : EN 61000-4-11

Test equipment: 108-TMX SCHAFFNER

Driven by: NSG 1006

### 16.1 Test conditions

See wiring diagram

Applied on main supply voltage circuit

Duration of voltage shorts: 10 ; 20 ; 100 ; 200 ms

Duration of voltage dips: 10 ; 20 ; 100 ms

Number of voltage fluctuations: 3 /durée

Delay between fluctuations : 10s

### 16.2 Test results

Level	Duration	Remark	Result	Verdict
60%	0,5; 1;5;10 periods	FC	1	C
100%	0,5; 1; 5 periods	FC	1	C



## 17 Radiated emission measurements

Standard : EN 55022 Classe B

Test equipment: xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxx

### 17.1 Test conditions

See wiring diagram

Bandwith : 120kHz

Frequency range : 30MHz – 1GHz

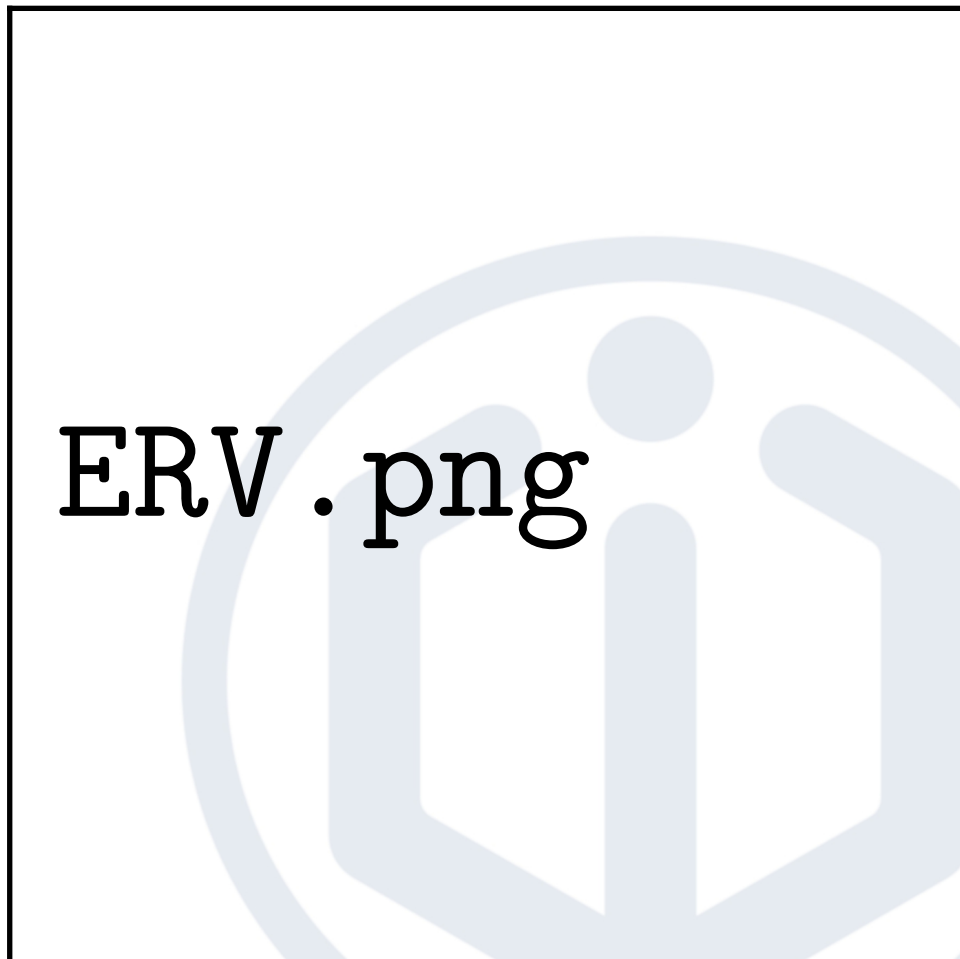
### 17.2 Test results

Level	Polarity	Remark	Verdict
Voir graphe	Horizontale	1	C
Voir graphe	Verticale	1	C

Measurements in horizontal polarity

ERH . png

## Measurements in vertical polarity



## 18 Conducted emission measurements

Standard : 55022 Classe B

Test equipment: \*\*\*\*\*

### 18.1 Test conditions

See wiring diagram

Bandwith: 9 kHz

Frequency range: 0.15 MHz – 30 MHz

### 18.2 Test results

Level	Polarity	Remark	Verdict
See graph	Phase	1	C
See graph	Neutral	1	C

Measurements on phase

ECL . png

Measurements on neutral



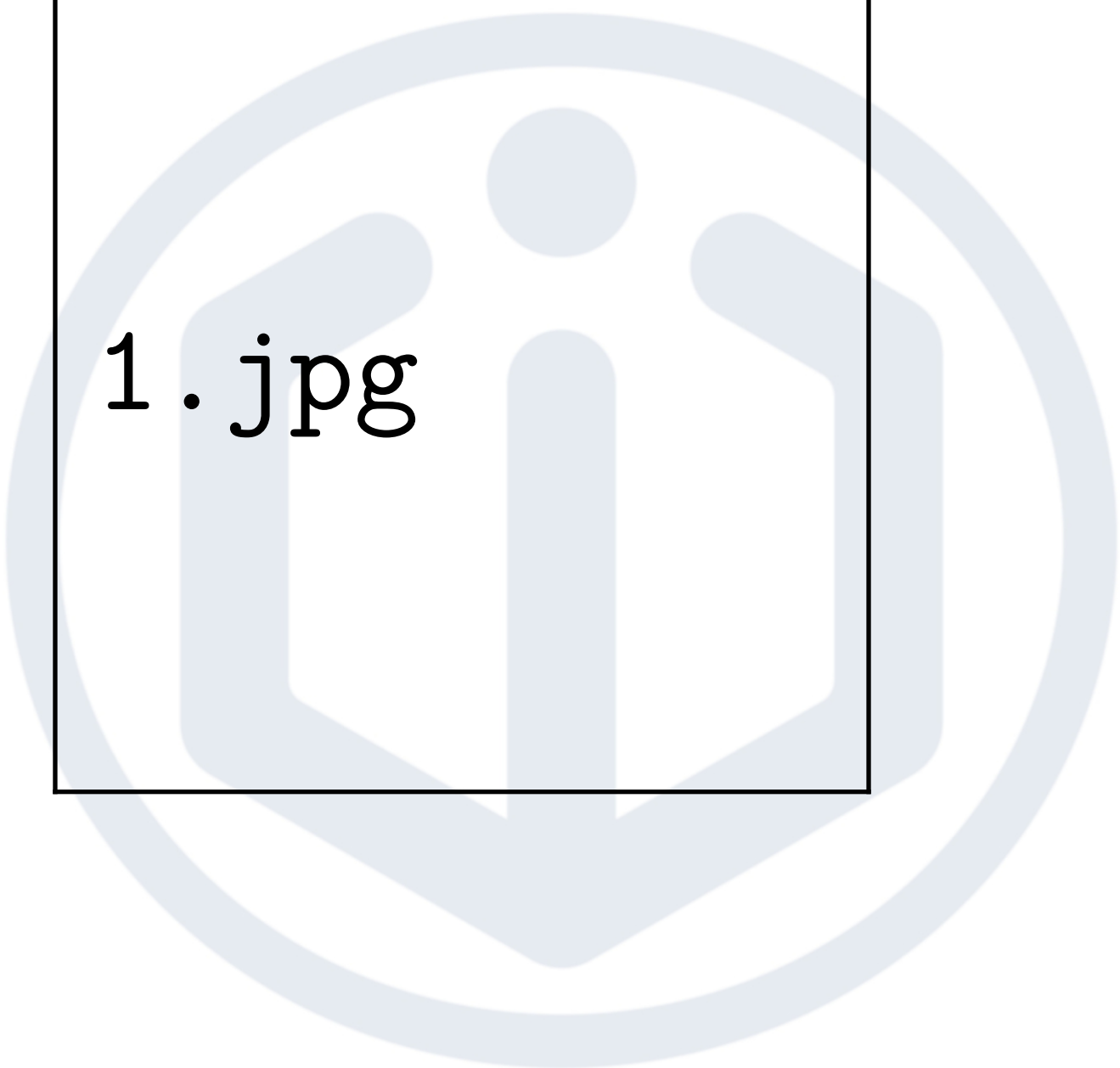
ECN . png

## 19 Summary of test results and compliance notice

Test	Procedure	Result
<b>Immunity tests</b>		
1. Repetitive electrical fast transients	EN 61000-4-4	C
2. Surge immunity test	EN 61000-4-5	C
3. Electrostatic discharge	EN 61000-4-2	C
4. Radiated electromagnetic field	EN 61000-4-3	C
5. Conducted disturbances	EN 61000-4-6	C
6. Voltage dips and variations	EN 61000-4-11	C
<b>Emission measurements</b>		
7. Radiated emissions	EN 55022	C
8. Conducted disturbances	EN 55022	C
<b>Other emission measurements</b>		
9. Harmonic current emissions	EN 61000-3-2	N/A
10. Voltage fluctuations and flicker	EN 61000-3-3	N/A

Le complies with european directive 2014/30/UE.

## 20 Internal and external photographs of the EUT



1.jpg



11.jpg



12.jpg

Fig 1 – Photos du clavier PROFIL100EC



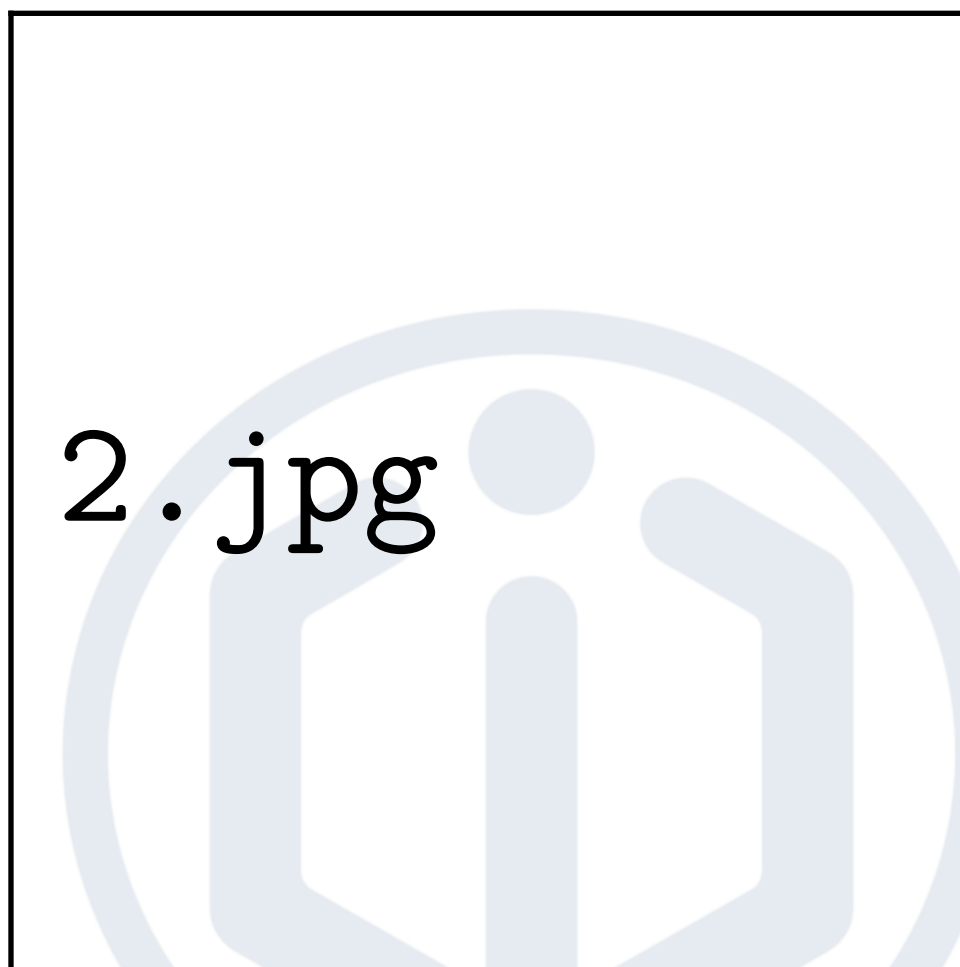


Fig 2 – Boitier électronique déporté

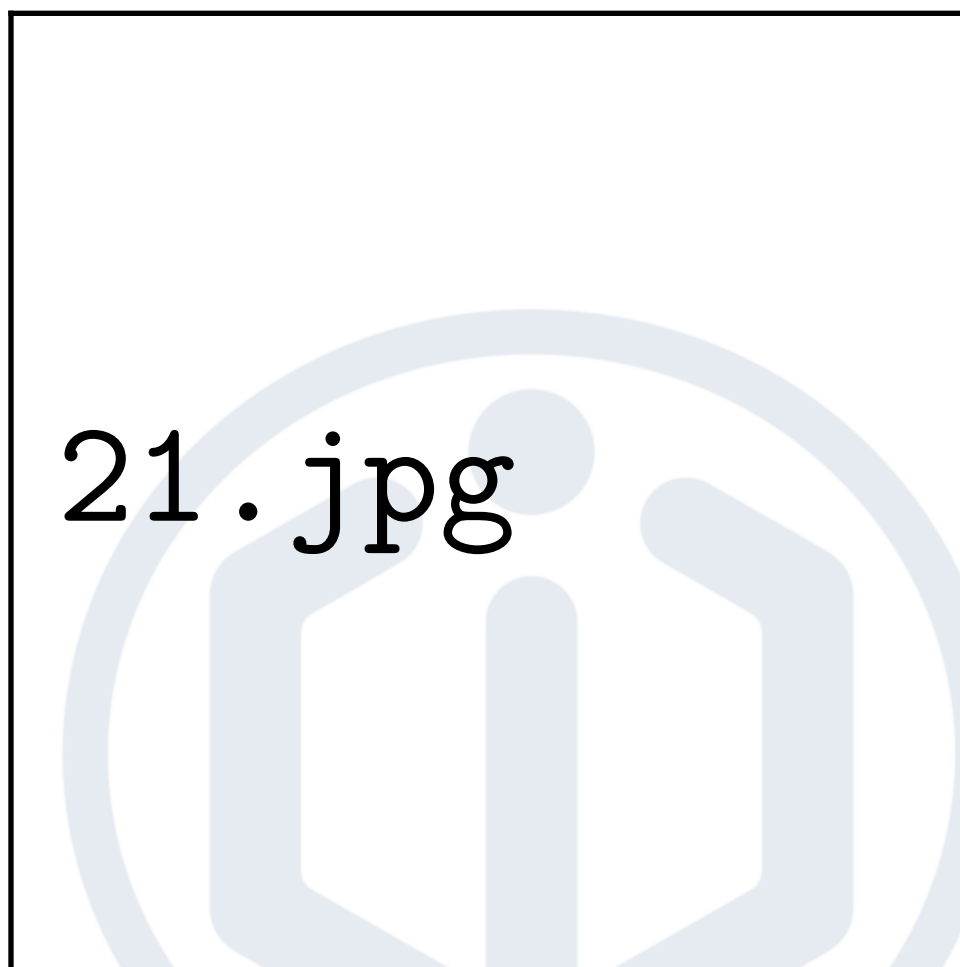


Fig 3 – Carte électronique dans le boîtier déporté



22.jpg

Fig 4 – Carte électronique face composants



23 . jpg

Fig 5 – Carte électronique face soudures

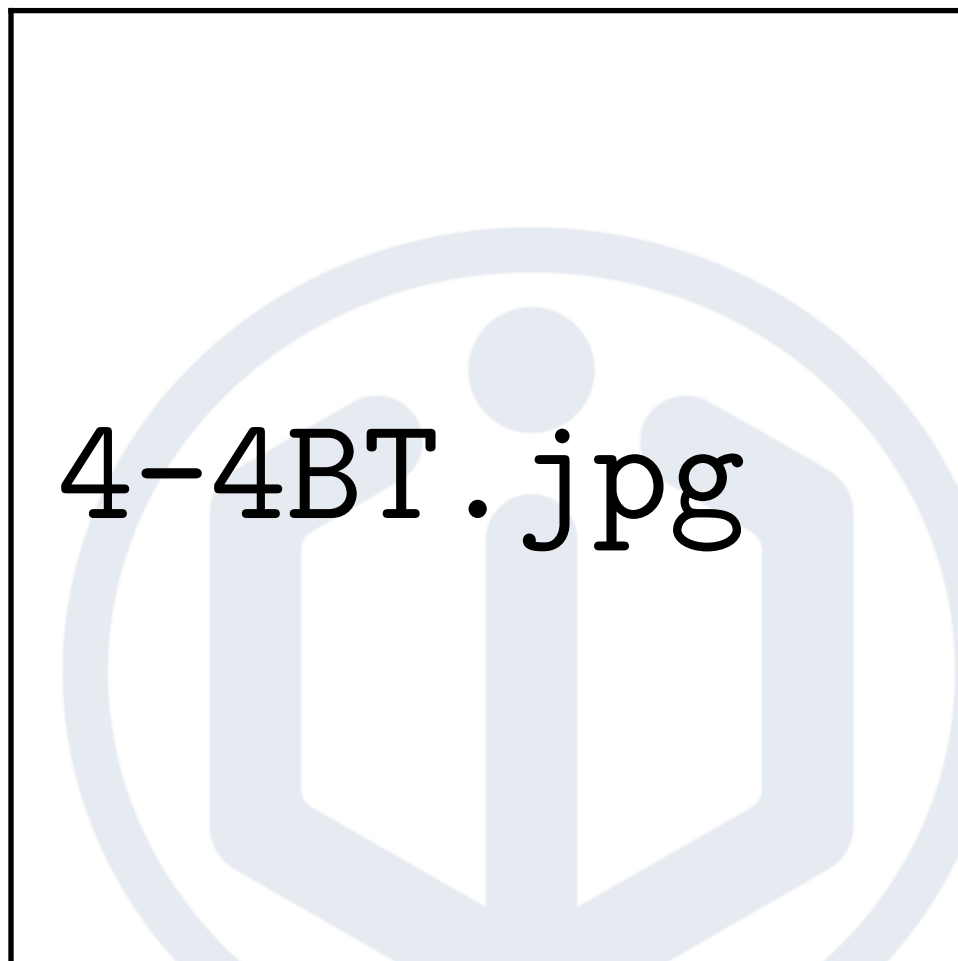


Fig 6 – Repetitive electrical fast transients test immunity on primary circuits



55C.jpg

Fig 7 – Conducted emissions measurement



4-2.jpg

Fig 8 – Electrostatic discharge test immunity

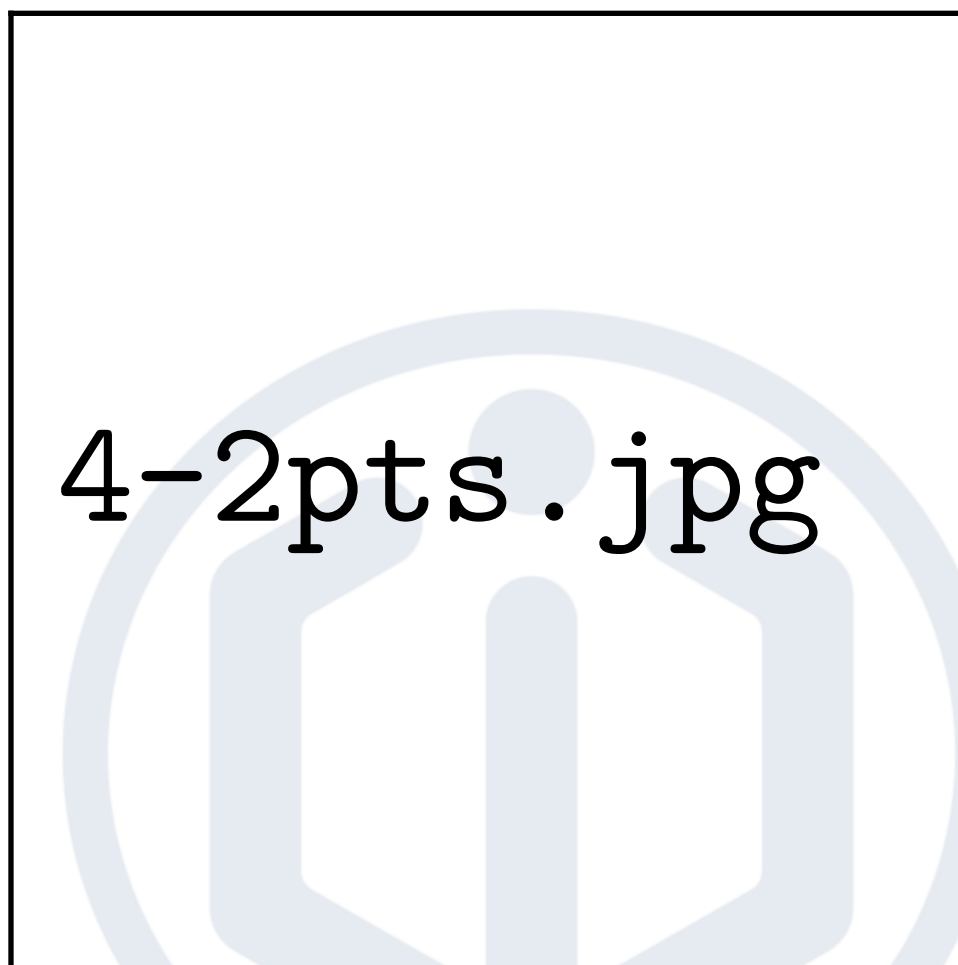


Fig 9 – Test points location for Electrostatic discharge test immunity



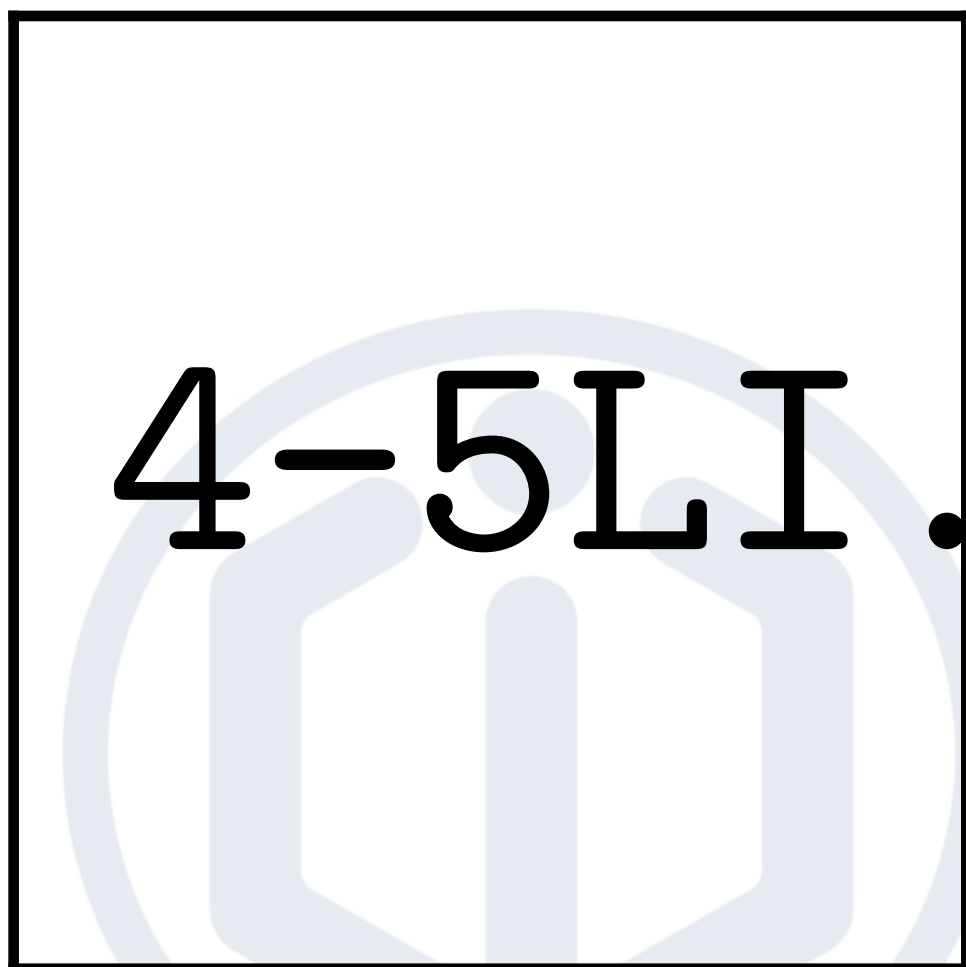


Fig 11 – Surge immunity test on I/O ports and terminals

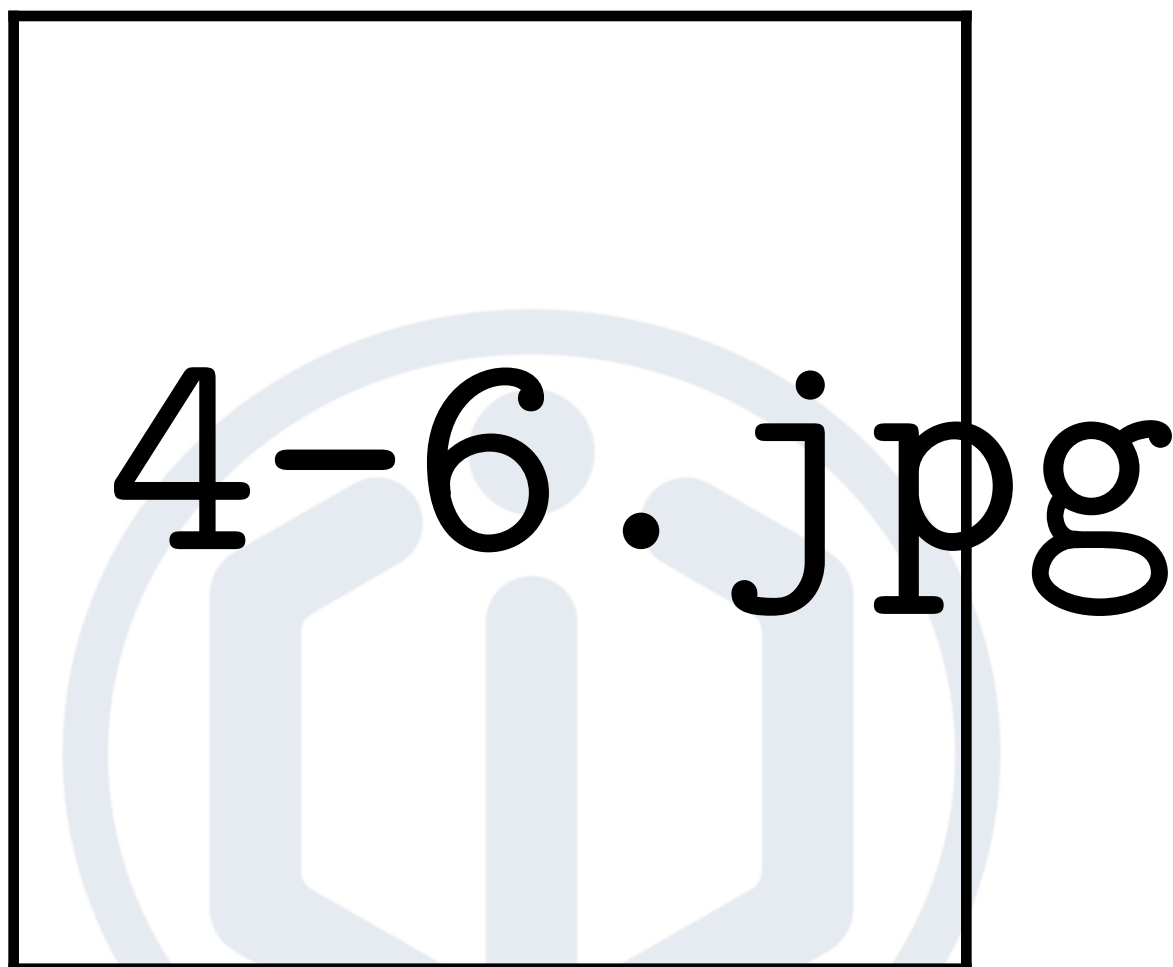


Fig 12 – Conducted disturbances, induced by radio-frequency fields immunity test

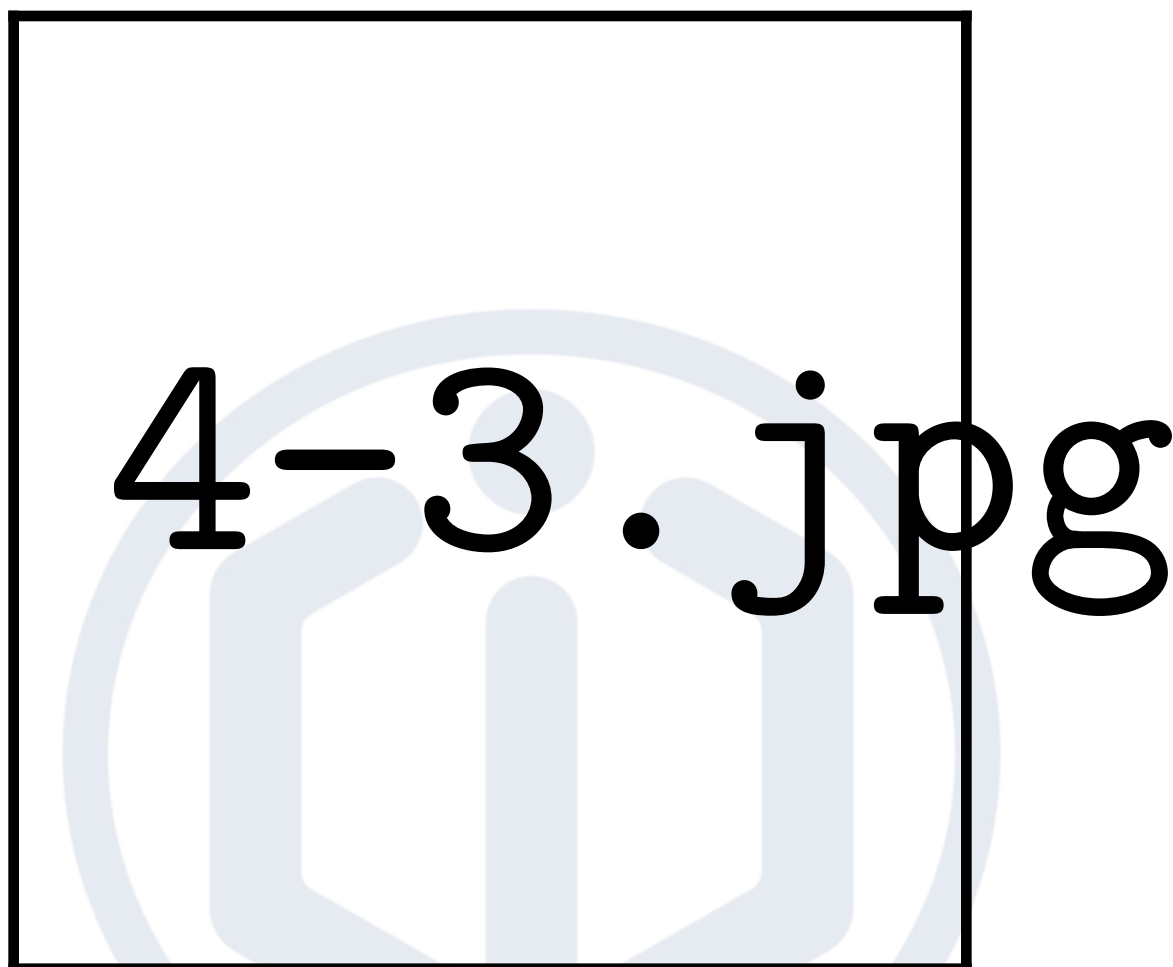


Fig 13 – Radiated, radiofrequency, electromagnetic field immunity test