

Test Report #412.132.1 Rev.0

EMC tests on the devices/equipment:

Cuteline-Modules

Equipment under Test:

Description: input and output extensions
Model: Cuteline-Modules

Applicant/ Manufacturer: Huegli Tech AG
 Murgenthalstrasse 30
 CH-4900 Langenthal, Switzerland

Test laboratory: CEcert GmbH.
 Alter Holzhafen 19
 D-23966 Wismar, Germany

Summary of Test and Certification:

Tests:	Standards:	Result:
Emission:		
Conducted emission	EN 61326-1:2006	PASS
Radiated emission	EN 61326-1:2006	PASS
Interference immunity:		
Electrostatic discharge	EN 61326-1:2006	PASS
Electromagnetic field	EN 61326-1:2006	PASS
Electrical Fast Transient (Burst)	EN 61326-1:2006	PASS
Surge immunity	EN 61326-1:2006	PASS
Conducted disturbances, induced by RF-fields	EN 61326-1:2006	PASS
Magnetic field (power-frequency)	EN 61326-1:2006	PASS

Explanation:

PASS – The EUT meets the test requirements. FAIL – The EUT does not meet the requirements N/A – Test is not applicable.

Evaluation :

The Equipment under Test (EuT) meets the EMC requirements of the EN 61326-1 for class B equipment and industrial environment.

Period of test: 2012-06-07 - 2012-06-08

This test report with appendix consists of **29** pages.

1. General information on the test item(s)

Description: input and output extensions
Model: Cuteline-Modules
Serial no.: --

Manufacturer/Customer: Huegli Tech AG
Contact person: Mr. Fischer

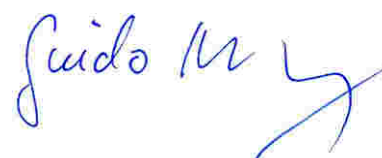
Brief description:

EMC test of input and output modules to observe and control of several generators or motors in industrial and commercial applications.

Steps to EMC, suppressions: none

Participant in the tests: Mr. Fischer

Responsible for the technical content of the test report:

	name	signature
Examiner	Guido Mumerey Andreas Schenk	

Head of Test Laboratory	Bernd Schmidt
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Note:

The CEcert GmbH assures the applicant that the tests are carried out within the scope of the tests outlined under point 2 and in accordance with the test specifications outlined under point 3. Any exceptions or deviations will be clearly indicated.

The results contained in this test report are relevant exclusively to the item(s) submitted for testing. The CEcert GmbH: is not liable for any conclusions and generalizations which may be drawn from the test results and applied to further samples and examples of the type of device represented by the item submitted for testing.

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Report history Log:

Ref.	Date of issue	Comment	Approved by
412.132.1 Rev.0	2012-06-20	first certification	A. Schenk

2. Test Specification

2.1. Emission

Applied standards:

EN 61326-1:2006

EN 61000-6-3:2011

Classification: **B** (residential, commercial and light industry)

Note: Due to device characteristic / classification, information according to chapter 7.2 of the EN 61326-1:2006 has to be included in the accompanying documents.

Tests performed:

Test method:	Basic Standard:	Chapter:
Conducted disturbance (EC)	IEC/CISPR 16-2-1:2008	4.1.
Radiated disturbance (ER)	IEC/CISPR 11:2006	4.2.

Exceptions and explanations: none

2.2. Susceptibility

Applied standards:

EN 61326-1:2006

Classification: **industrial requirements**

Tests performed:

Test method:	Basic Standard:	Chapter:
Electrostatic discharge – ESD (ID)	IEC 61000-4-2:2008	5. 1.
Electromagnetic field (IR)	IEC 61000-4-3:2007	5. 2.
Electrical Fast Transient / Burst (ICI1)	IEC 61000-4-4:2010	5. 3.
Surge immunity (ICI2)	IEC 61000-4-5:2005	5. 4.
Conducted disturbances, induced by RF fields (ICS)	IEC 61000-4-6:2008	5. 5.
Magnetic fields (power-frequency) (IM1)	IEC 61000-4-8:2009	5. 6.

Exceptions and explanations: none

2.3. Low frequency phenomena, line feedback

none

2.4. Applied non-standard methods

none

3. Specification of the device/equipment

3.1. Configuration

Description:	Model:	Type No.:	Manufacturer:	Notes:
Product:				
input and output extensions	Cuteline-Modules	--	Huegli Tech AG	
Components:				
Analogue output module	4 outputs	Rev. D	Huegli Tech AG	Aout4
Binary output module	8 outputs	Rev. C	Huegli Tech AG	Bout8
Binary input module	8 inputs	Rev. C	Huegli Tech AG	Bin8
Analogue input module Voltage/Current	8 inputs	Rev. D	Huegli Tech AG	Ain8 UI
Accessories/peripherals:				
Generator simulator	IS-NT-Starter Kit	--	InteliSys	
Notebook	standard	--	--	To control the simulator
Simulators: none				
Software: nn				

3.2. Cables and Lines

Interface:	Type/model/plug:	Length:	Shielding:	Comments:
4x DC supply line	2-wire	1,4 m	yes	
4x CAN	2-wire	1,4 m	yes	
Binary out to in	2-wire	1,0 m	yes	Bout8 and Bin8
Analog out to in UI	2-wire	1,0 m	yes	Aout4 and Ain8 UI

3.3. Particulars related to EMC

System frequencies: --
 Earth / Grounding: None (but screens earthed on one module far side)
 Shielding: None

3.4. Notes and/or sketches

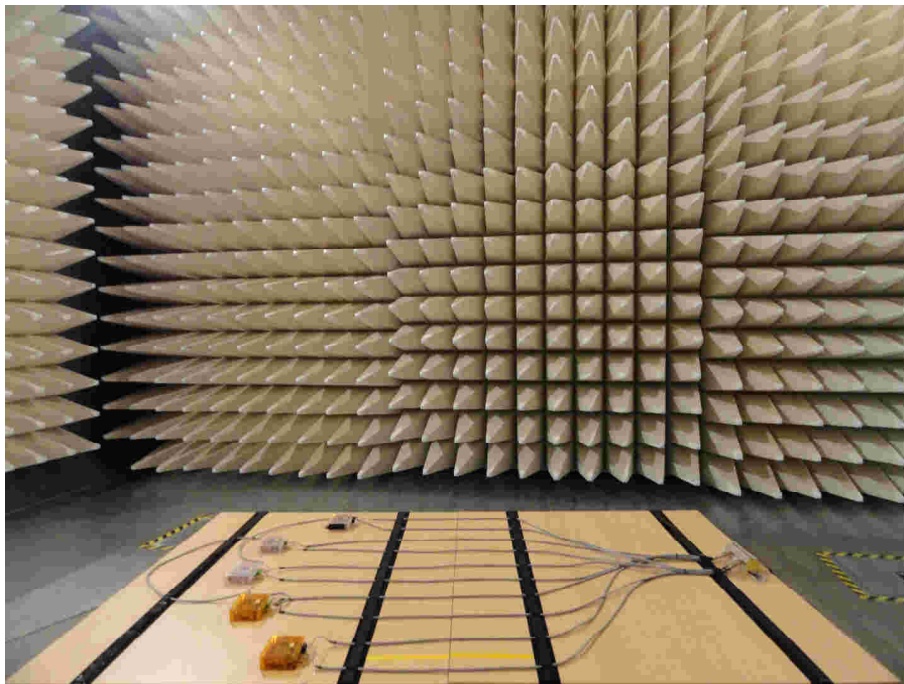


Fig. 1: Test set-up radiated disturbances



Fig. 2: EUT

Dimension of EuT: **12 x 10 x 4 cm**

3.5. Operating condition of the product

The status of the test object during the tests represented its normal area of deployment.

test mode: All modules communicated permanent with the generator simulator. Additionally an analog output was read back by an analog input and an binary output were read back by an binary input. During the immunity tests the communication and the correct state of the outputs and inputs were observed with the help of the generator simulator.

Power supply: 24 V DC

Climatic conditions during the tests:

Ambient temperature: 15 °C - 35 °C (if not otherwise specified in this report)
Relatively air humidity: 25 % - 75 % (if not otherwise specified in this report)
Air pressure: 86 kPa - 106 kPa (860 mbar - 1060 mbar)

3.6. Simulation of operating conditions

None

3.7. Sampling particulars

The product was tested as a single device.

Measurements and Test Results

4. Emission

4.0.1 Particulars of measuring uncertainties and tolerance range

The calculated uncertainties and tolerance ranges of the Tests are in accordance with the requirements of IEC/CISPR 16-4.

4.0.2 Preliminary remarks and classification

Classification:

Group 1: ISM equipment with intentionally internal used conducted RF-energy

Group 2: ISM equipment in which the intentionally generated RF energy is used as radiation for treatment of materials.

Class A: Equipment to use in non-domestic properties and facilities with direct connection to the low-voltage supply system

Class B: Equipment for use in residential properties, light-industrial locations, business or commercial premises, outdoor locations

The device is classified as follows:

Group 1, Class B.

4.0.3 Pre information

The test object was tested with the configuration and operating conditions described in section 3.

Notes on measuring the radiated measurements:

The spectrographs have a logarithmic frequency division. Measurements with the Peak-detector were used to assess the product. If these measuring values are in the range of the Quasi-Peak or Average limits, the frequencies are measured using the Quasi-Peak or Average detector.

4.1. Conducted Emissions (EC)

Basic standard: EN 61326-1:2006

Measuring set-up: CISPR 16-2-1

Measuring process:

For the pre-test a spectrum analyzer was used (configuration with the highest emission) to find out the conducted emissions. Then the conducted emissions were measured with a Line Impedance Stabilization Network (LISN) and a measuring receiver. The Measurement was carried out in a shielded, absorber-lined cabin.

- **DC supply line:**

The main ports were measured on both phases unsymmetrical (to protective earth) with a V-LISN and a receiver in accordance to CISPR 16. In agreement with the manufacturer the limits of the EN 61000-6-3 (for DC supply lines) were chosen, because the EN 55011 defines no explicit limits for DC supply lines.

Measuring results:

operating condition	wire/line	frequency range [Hz]	results diagram/table	Compliance Pass/ Fail/ N/A
test mode	DC supply line +24V (all modules)	150 k - 30 M	see annex	PASS
test mode	DC supply line GND (all modules)	150 k - 30 M	see annex	PASS

Final test results (frequencies, max hold level) see appendix.

Measurement results:

According to the above test set-up the equipment under test specified in chapter 3 meets the conducted emission requirements in accordance with EN 61326-1:2006 class B.

4.2. Radiated Emissions (ER)

Basic standard: EN 61326-1:2006

Measuring set-up: CISPR 16-2-3 (see photo documentation)

Measuring process:

A prescan with in horizontal and vertical polarization was done at the beginning. The accessories/peripherals were placed inside the test set-up.

The radiated emissions were measured in the whole frequency range with the maximum level. The position of the equipment and the antenna height were changed during the measurements.

Measurement results:

Operating condition	Frequency range [MHz]	Polarization	Position of the EUT / Antenna height	Test results diagram/table	Compliance Pass/ Fail/ N/A
test mode	30 – 1000	horizontal, vertical	0 - 360° / 1 - 4 m	see annex	PASS

Measuring Distance: **3 m**

During this EMC test several relevant interference emission from the test object could be determined. Final test results (frequencies, max hold level) see appendix.

The measurement environment was the shielded, absorber-lined hall.

Measurement results:

According to the above test set-up the equipment under test specified in chapter 3 meets the radiated emission requirements in accordance with EN 61326-1:2006 class B.

5. Susceptibility

5.0 Performance criteria of failure at the immunity tests

Performance criteria of IEC 61326-1:

Performance criterion A:

During the test normal operating performance as specified by the manufacturer.

Performance criterion B:

During the test a temporary function decrease or loss of function is allowed, if the function is self recoverable.

Performance criterion C:

During the test a temporary function decrease or loss of function is allowed, if the function is recoverable by operator intervention or a system reset.

Particular performance criteria determined by the manufacturer:

none

5.1. Electrostatic Discharge – ESD (ID)

Required performance criterion: B

Test set-up:

The test set-up was conforming to the standard IEC 61000-4-2 for desk-type equipment.

Test process:

At each test point there were for each polarity, at least 10 discharges. The product was monitored during this test. The test object and the measuring values were observed as to whether any deviation from normal performance occurred. The periphery was arranged beside the horizontal coupling plate for the indirect discharge.

Tests:

working condition:	point of discharge	test:	test level:	polarity	Compliance Pass/ Fail/ N/A
test mode	Enclosure (all sides, all modules), dip switches, cables	D,L	2 kV	pos./neg.	PASS
test mode		D,L	4 kV	pos./neg.	PASS
test mode		D,L	8 kV	pos./neg.	PASS
test mode	Coupling plate	I,H,V	2 kV	pos./neg.	PASS
test mode		I,H,V	4 kV	pos./neg.	PASS
test mode	Screws enclosure, Screen connection	D,K	2 kV	pos./neg.	PASS
test mode		D,K	4 kV	pos./neg.	PASS

Note:

D	direct discharge onto the test object	L	air discharge
I	indirect discharge onto the test object	H	horizontal coupling plate under the EUT
K	contact discharge	V	vertical coupling plate

Environmental Conditions while test:

Humidity: **56,6 % rH**

Temperature: **22,1 °C**

Functional test after test procedure: PASS

Test results:

During the contact discharge with +4kV on the horizontal coupling plate a reset of the Aout4 module could be observed. The function was reinstated themselves at the end of the test. During the air discharge on the dip switches (all modules) a reset of the respective module could be observed. The function was reinstated themselves after the end of the test. At all other tests no relevant influencing function of the equipment was detected. The performance criterion for the immunity was met.

According to the above test set-up the equipment under test specified in chapter 3 complies with the electrostatic discharge requirements, in accordance with EN 61326-1:2006.

5.2. High Frequency Electromagnetic Fields (IR)

Required performance criterion: A

Test set-up:

The test set-up was conforming to the standard IEC 61000-4-3 for desk-type equipment.

The equipment was built up 0,8 m over the ground plane. The field strength was calibrated in a distance of 3 m. There the Equipment under Test was placed.

- Antenna distance: 3 m
- Time per step, depends on the reaction time of the product: 2 sec.
- Test level: **10 V/m** (80 – 1000 MHz)
3 V/m (1,4 – 2,7 GHz *)

*) according manufacturer specification the test in the frequency range from 2 – 2,7 GHz was performed with higher tests level

Test procedure:

The output of the level in the frequency range was gradually changed in steps of 1% of the first frequency and then 1% of the frequency before.

Tests:

Operating conditions:	Frequency range: [MHz]	Modulation:	Polarization, Antenna direction	Comments/Test report	Compliance Pass/ Fail/ N/A
test mode	80 – 1000	80 % AM, 1 kHz	horizontal, front	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	vertical, front	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	horizontal, left	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	vertical, left	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	horizontal, right	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	vertical, right	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	horizontal, back	see annex	PASS
test mode	80 – 1000	80 % AM, 1 kHz	vertical, back	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	horizontal, front	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	vertical, front	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	horizontal, left	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	vertical, left	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	horizontal, right	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	vertical, right	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	horizontal, back	see annex	PASS
test mode	1400 – 2700	80 % AM, 1 kHz	vertical, back	see annex	PASS

Functional test after test procedure: PASS

Test results:

No relevant influencing functions of the equipment were detected during this EMC-Test. The performance criterion for the immunity was met. There was no function failure nor loss of data, neither was there any change in the working conditions.

According to the above test set-up the equipment under test specified in chapter 3 complies with the immunity requirements in respect of high frequency electromagnetic field, in accordance with EN 61326-1:2006.

5.3. Fast Transients – Burst (ICI1)

Required performance criterion: **B**

Test set-up:

The test set-up was conforming to the standard IEC 61000-4-4.

Mains:

The impulse was coupled at the main ports directly with the integrated coupling network (coupling capacity 33 nF) in the generator for fast transients.

Signal and Data lines:

No tests performed on Signal and Data lines due to the length restriction to less than 3 m in accordance to manufactures/applicants declaration.

If necessary the Simulators and auxiliary equipment was decoupled.

Tests:

Burst duration: **15 ms** Frequency: **5 kHz**
 Repetition: **300 ms**

Working condition:	Wire/lines:	Test level:	Polarity:	Comments/Observations	Compliance Pass/ Fail/ N/A
test mode	DC supply line Aout4 (+24V; GND; +24V+GND)	0,5 kV	pos./neg.		PASS
test mode	DC supply line Aout4 (+24V; GND; +24V+GND)	1 kV	pos./neg.		PASS
test mode	DC supply line Aout4 (+24V; GND; +24V+GND)	2 kV	pos./neg.		PASS
test mode	CAN Aout4	0,5 kV	pos./neg.		PASS
test mode	CAN Aout4	1 kV	pos./neg.		PASS
test mode	Analog output Aout4	0,5 kV	pos./neg.		PASS
test mode	Analog output Aout4	1 kV	pos./neg.		PASS
test mode	DC supply line Bout8 (+24V; GND; +24V+GND)	0,5 kV	pos./neg.		PASS
test mode	DC supply line Bout8 (+24V; GND; +24V+GND)	1 kV	pos./neg.		PASS
test mode	DC supply line Bout8 (+24V; GND; +24V+GND)	2 kV	pos./neg.		PASS
test mode	CAN Bout8	0,5 kV	pos./neg.		PASS
test mode	CAN Bout8	1 kV	pos./neg.		PASS
test mode	Binary output Bout8	0,5 kV	pos./neg.		PASS
test mode	Binary output Bout8	1 kV	pos./neg.		PASS
test mode	DC supply line Bin8 (+24V; GND; +24V+GND)	0,5 kV	pos./neg.		PASS
test mode	DC supply line Bin8 (+24V; GND; +24V+GND)	1 kV	pos./neg.		PASS
test mode	DC supply line Bin8 (+24V; GND; +24V+GND)	2 kV	pos./neg.		PASS
test mode	CAN Bin8	0,5 kV	pos./neg.		PASS
test mode	CAN Bin8	1 kV	pos./neg.		PASS
test mode	Binary input Bin8	0,5 kV	pos./neg.		PASS
test mode	Binary input Bin8	1 kV	pos./neg.		PASS
test mode	DC supply line Ain8 UI (+24V; GND; +24V+GND)	0,5 kV	pos./neg.		PASS
test mode	DC supply line Ain8 UI (+24V; GND; +24V+GND)	1 kV	pos./neg.		PASS

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test mode	DC supply line Ain8 UI (+24V; GND; +24V+GND)	2 kV	pos./neg.		PASS
test mode	CAN Ain8 UI	0,5 kV	pos./neg.		PASS
test mode	CAN Ain8 UI	1 kV	pos./neg.		PASS
test mode	Analog input Ain8 UI	0,5 kV	pos./neg.		PASS
test mode	Analog input Ain8 UI	1 kV	pos./neg.		PASS

Test time (each case): at least 2 min

Functional test after test procedure: PASS

Test results:

No relevant influencing functions of the equipment were detected during this EMC-Test. The performance criterion for the immunity was met. There was no function failure nor loss of data, neither was there any change in the working conditions.

According to the above test set-up the equipment under test specified in chapter 3 complies with the Fast Transients (Burst) requirements in accordance with EN 61326-1:2006.

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Coupling comment :	KK	Capacitive Coupling	sy	symmetrical
	AK	Arrester Coupling	as	asymmetrical
	GK	Galvanic Coupling		

Functional test after test procedure: PASS**Test results:**

No relevant influencing functions of the equipment were detected during this EMC-Test. The performance criterion for the immunity was met. There was no function failure nor loss of data, neither was there any change in the working conditions.

According to the above test set-up the equipment under test specified in chapter 3 complies with the surge-requirements in accordance with EN 61326-1:2006.

5.5. Conducted disturbances, induced by radio-frequency fields (ICS)

Required performance criterion: A

Test set-up: The tests were performed in accordance to IEC 61000-4-6.

Information about the test:

The output of the level in the frequency range was gradually changed in steps of 1% of the first frequency and then 1% of the frequency before.

Time per step: **1 sec.**
 Frequency range: **150 kHz - 80 MHz**
 Modulation: **1 kHz, 80% AM**

Tests:

working conditions:	wire / line:	test level:	coupling- and decoupling network	notes:	Compliance Pass/ Fail/ N/A
test mode	DC supply line Aout4	3 V	CDN M2	see annex	PASS
test mode	CAN Aout4	3 V	Direct on screen	see annex	PASS
test mode	Analog out Aout4	3 V	Direct on screen	see annex	PASS
test mode	DC supply line Bout8	3 V	CDN M2	see annex	PASS
test mode	CAN Bout8	3 V	Direct on screen	see annex	PASS
test mode	Binary out Bout8	3 V	Direct on screen	see annex	PASS
test mode	DC supply line Bin8	3 V	CDN M2	see annex	PASS
test mode	CAN Bin8	3 V	Direct on screen	see annex	PASS
test mode	Binary in Bin8	3 V	Direct on screen	see annex	PASS
test mode	DC supply line Ain8 UI	3 V	CDN M2	see annex	PASS
test mode	CAN Ain8 UI	3 V	Direct on screen	see annex	PASS
test mode	Analog in Ain8 UI	3 V	Direct on screen	see annex	PASS

Functional test after test procedure: PASS

Test results:

No relevant influencing functions of the equipment were detected during this EMC-Test. The performance criterion for the immunity was met. There was no function failure nor loss of data, neither was there any change in the working conditions.

According to the above test set-up the equipment under test specified in part 3 complies with the requirements of conducted disturbances, induced by radio-frequency fields, in accordance with EN 61326-1:2006.

5.6. Magnetic Field with Power-frequency (IM)

Required performance criterion: A

Test set-up:

The tests were performed in accordance to IEC 61000-4-8.

The main parts of the configuration are a ground plane, a sufficient big inductance coil with a well known coil factor for producing a homogeny magnetic field and a test generator with sufficient current supply.

A square inductance coil with 1 m x 1 m was used for generation of the magnetic field.

Tests:

working conditions:	equipment:	test level:	duration:	Compliance Pass/ Fail/ N/A
test mode	Aout4 whole configuration x-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Aout4 whole configuration y-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Aout4 whole configuration z-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Aout4 whole configuration x-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Aout4 whole configuration y-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Aout4 whole configuration z-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Bout8 whole configuration x-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Bout8 whole configuration y-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Bout8 whole configuration z-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Bout8 whole configuration x-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Bout8 whole configuration y-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Bout8 whole configuration z-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Bin8 whole configuration x-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Bin8 whole configuration y-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Bin8 whole configuration z-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Bin8 whole configuration x-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Bin8 whole configuration y-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Bin8 whole configuration z-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Ain8 UI whole configuration x-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Ain8 UI whole configuration y-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Ain8 UI whole configuration z-axis	30 A/m, 50 Hz	5 min	PASS
test mode	Ain8 UI whole configuration x-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Ain8 UI whole configuration y-axis	30 A/m, 60 Hz	5 min	PASS
test mode	Ain8 UI whole configuration z-axis	30 A/m, 60 Hz	5 min	PASS

Functional test after test procedure: PASS

Test results:

No relevant influencing functions of the equipment were detected during this EMC-Test. The performance criterion for the immunity was met. There was no function failure nor loss of data, neither was there any change in the working conditions.

According to the above test set-up the equipment under test specified in part 3 complies with the magnetic field requirements with power-frequency, in accordance with EN 61326-1:2006.

6. Information about the measurement equipment

Invent No.	Description	Model/Type	Manufacturer	Serial-No.	Test method	Calibration	Next Calibration
001/01	EMI Receiver (20- 1000MHz)	ESVS-10	R&S	843207/008	EC, EP, ER, E1-EUB	2012,05	2013,03
002/01	EMI Receiver (9kHz - 30MHz)	ESHS-10	R&S	842884/013	EC, EP, ER	2012,05	2013,03
002/02	EMI Receiver (20Hz - 26,5GHz)	ESIB 26	R&S	100135	EC, EP, ER	2012,04	2013,03
002/03	EMI Receiver (9kHz - 7GHz)	ESCI 7	R&S	100795	EC, EP, ER	2012,04	2013,03
003/01	Two-line-V-artificial mains network 16A	ESH3-Z5	R&S	843012/025	EC, ER	2012,04	2013,03
003/02	V- artificial mains network 5μH/50Ω	ESH 3-Z6	R&S	837950/008	EC,E1-EUB	2012,04	2013,03
003/03	V- artificial mains network 5μH/50Ω	ESH 3-Z6	R&S	843864/030	EC,E1-EUB	2012,04	2013,03
003/04	Two-line-V-artificial mains network 2 x 10A	NNB 2/16	Rolf Heine	2/16-96017B	EC, EP, ER	2012,04	2013,03
003/05	Four-line-V-artificial mains network 4 x 25A	ESH2-Z5	R&S	100099	EC, EP, ER	2011,04	2013,03
003/06	V- artificial mains network 5 μH/50Ω	AN2050	EM Test	70116	EC,E1-EUB	2011,02	2013,03
003/07	V- artificial mains network 5 μH/50Ω	AN2051	EM Test	70117	EC,E1-EUB	2011,02	2013,03
004/01	Dual directional coupler (0,8-4,2GHz)	DC 7144	ar	--	IR	2012,04	2013,03
004/02	Dual directional coupler	DC 6180 M1	ar	--	IR	2012,02	2013,03
004/03	directional coupler 80-1000MHz	DC6180A	ar	335212	IR	2011,09	2012,09
004/04	directional coupler 0,8-4,2GHz	DC7144A	ar	334023	IR	2011,09	2012,09
008/01	Biconical antenna (20-300MHz)	HK116	R&S	842938/005	ER	2012,04	2013,03
008/02	Log.- per. antenna (200-1300MHz)	HL 223	R&S	843338/004	ER	2011,09	2012,09
008/03	Loop Antenna 60 cm (1kHz-30MHz)	HFH2-Z2	R&S	880665/0012	ER	2011,09	2012,09
008/04	Ultralog antenna (30MHz-3GHz)	HL562	R&S	100065	ER	2011,10	2012,09
008/05	Magnetic field antenna 1x1m 1-100A/m	MF 1000	EMC	1000-35	IM	2012,04	2013,03
008/06	Chase antenna (30MHz - 1GHz)	CBL 6111B	EMC	1925	IR, E1-EUB	2012,05	2013,03
008/07	Active rod Antenna (10kHz - 80MHz)	HE 010	R&S	100139	ER	2011,09	2012,09
008/08	Log.- per. Antenna (80MHz - 1GHz)	AT 1080	ar	305184	IR	2012,04	2013,03
008/09	Magnetic field antenna for RE 101	MFA 01	CEcert	--	ER, IR	2012,05	2013,03
008/10	Broadband horn antenna (1-18GHz)	BBHA 9120 D	Schwarzb.	348	ER, IR	2011,09	2012,09
008/11	Horn antenna (0,8- 5GHz)	AT 4002 A	ar	304917	ER, IR	2012,04	2013,03
008/13	Biconical antenna (20- 200 MHz)	VHBD 9134	Schwarzb.	9134-036	E1-KFZ	2012,04	2013,03
008/19	Log.- per. Antenna (80MHz-1GHz)	JB-3	Sunol Science Corp	A090210	ER	2011,12	2012,09
008/20	Horn antenna (1 - 18GHz)	HAX-18	Frankonia		ER	2012,04	2013,03
008/21	Log.- per. Antenna (80MHz-1GHz)	ATL 80M1G	ar	0337327	IR	2012,04	2013,03
012/01	Power supply	6560	Chroma	462	EMV	2012,04	2013,03
013/00	Artificial mains network	NI 2415	ZES	A9703016	MC1, MC2	2011,09	2012,09
014/05	Capacitive coupling clamp	ESD 101-66	EMC	--	ICI	2012,05	2013,03
014/06	Surge-coupling kit for signal lines	TRA1Z10B	EMC	--	ICI	2012,05	2013,03
014/09	ESD-discharge kit	ESD 30C	EM Test	V0521100389	ID	2010,10	2012,09
014/10	Generator for transients	TRA 2000	EMC	790	ID,ICI,IM, E1-EUB	2012,04	2013,03
014/11	ESD-discharge kit	ESD2000	EMC	169	ID	2012,04	2013,03
014/12	Power supply	PS3	EMC	12	ID,ICI,IM, E1-EUB	2012,04	2013,03
014/13	3 phase CDN for Transient 2000	CDN2000-06-32	EMC	133	ID,ICI,IM,	2011,01	2013,09
014/14	Multifunction Generator	TRA 3000 F-S	H+H GmbH	1241	ID,ICI,IM, E1-EUB	2012,04	2013,03
014/15	Capacitive coupling clamp	CN-EFT1000	EMC	732	ICI	2011,10	2012,09

Test Report: 412132_1 HUEGLI TECH CUTELINE

015/01	Load dump generator	LD 200 B	EM Test	0701- 08	ICI	2012,05	2013,03
015/02	Micro Pulse Generator	MPG 200 B	EM Test	0104- 01	ICI	2012,04	2013,03
015/03	Coupling clamp	ACC	EM Test		ICI	2012,04	2013,09
015/06	Voltage Drop Generator	VDS200	EM Test	V06081012	ICI	2012,04	2013,03
				00			
015/08	Oscillatory compact simulator	OCS 500 M6 / 3Phase / 32A	EM Test	V08211037	ICI	2010,09	2012,09
015/09	Pulse Generator	NSG 500 B	Schaffn.	268	ICI	2012,05	2013,03
017/00	1 - channel power meter	LMG95	ZES	8060505	MC1, MC2	2012,02	2013,03
019/00	Signal generator (9kHz - 1040MHz)	SMY 01	R&S	842483/030	ICS, IR, E1-EUB	2011,12	2012,09
019/02	Signal generator (9kHz - 1,1GHz)	SML 01	R&S	101415	IR, ICS, E1-EUB	2011,10	2012,09
019/03	Signal generator (1- 20 GHz)	SMR 20	R&S	100547	IR, E1-EUB	2011,10	2012,09
019/04	Comparison Noise Emitter (9kHz - 2GHz)	NE 3000	ar	305380	ER	2011,09	2012,09
019/05	Signal generator (9kHz - 3,2GHz)	SMC100A	R&S	102135	IR, ICS, E1-EUB	2010,11	2012,09
019/06	Signal generator (9kHz - 1,1GHz)	SMC100A	R&S	102134	IR, E1-EUB	2010,11	2012,09
020/01	Power amplifier < 250MHz 75W	75A250	ar	18681	IR, ICS, E1-EUB	2011,10	2012,09
020/03	Broadband microwave amplifier (0,8- 4,2GHz 25W)	25S1G4A	ar	305439	IR, E1-EUB	2012,04	2013,03
020/04	Broadband rf amplifier (0,08- 1GHz 500W)	500W1000A	ar	305559	IR, E1-EUB	2012,02	2013,03
020/05	Broadband rf amplifier (1- 11GHz 27 dB)	LN1G11	ar	313109	IR	2011,10	2012,09
020/07	Broadband rf amplifier (10kHz - 1GHz 30 dB)	LN1000B	ar	312735	IR	2011,10	2012,09
020/09	Broadband rf amplifier (10- 100MHz 500W)	KAA4040	ar	10405-1	IR, E1-EUB	2012,04	2013,03
020/10	Broadband rf amplifier (10kHz - 100MHz 150W)	150A100B	ar	332515	IR	2011,09	2012,09
020/11	Broadband rf amplifier (80 - 1000 MHz)	250W1000A	ar	335036	IR	2011,09	2012,09
020/12	Broadband rf amplifier (0,8 - 4,2GHz)	60S1G4	ar	335054	IR	2012,04	2013,03
022/01	Power meter, single channel	NRVS	R&S	843209/009	ICS, IR, E1-EUB	2011,09	2012,09
022/02	Power meter, single channel	NRVS	R&S	843537/030	ICS, IR, E1-EUB	2011,09	2012,09
022/03	Power meter, dual channel	NRVD	R&S	100644	ICS, IR, E1-EUB	2011,09	2012,09
023/01	10-V-voltage probe (Insertion unit)	URV5-Z2	R&S	842558/075	ICS, IR	2011,09	2012,09
023/02	100-V-voltage probe (Insertion unit)	URV5-Z4	R&S	842619	ICS, IR	2011,09	2012,09
023/03	Thermal power sensor 50Ω	NRV- Z53	R&S	100084	ICS, IR	2011,09	2012,09
023/04	Thermal power sensor 50Ω	NRV- Z51	R&S	100608	IR, ICS, E1-EUB	2011,09	2012,09
023/05	100-V-voltage probe (Insertion unit)	URV5-Z4	R&S	100569	ICS, IR	2011,10	2012,09
024/01	EM- field analyzer system	EFA3	W&G	G-0093	MR	2010,09	2013,09
024/02	H- field sensor	2245/90.10	W&G	H-0033	MR	2010,09	2013,09
024/03	E- field sensor	2245/90.30	W&G	K-0048	MR	2010,09	2013,09
025/01	EM Radiation Monitor	EMR-30	W&G	2244/30	IR	2011,10	2012,09
025/02	E- field probe	Typ 8	W&G	2244/90.20	IR	2011,10	2012,09
025/03	E- field probe	RadiSense	Dare	01D00057S	Kal	2012,01	2013,09
				NO			
031/02	EM Coupling clamp	203i	FCC	168	ICS	2012,01	2012,09
031/03	EM Coupling clamp	KEMZ 801	TESEQ	32364	ICS	2011,11	2012,09
032/01	CDN, M 1 Conductor, 16A	KEN 801 M1	MEB	12059	ICS	2012,01	2012,09
032/02	CDN, C 1 line, coaxial	FCC-801-C1	FCC	73	ICS	2012,01	2012,09
032/03	CDN, M 3 Conductor, 16A	FCC-801-M3-16AMP	FCC	175	ICS	2012,01	2012,09
032/04	CDN, M 2 Conductor, 16A	FCC-801-M2-16AMP	FCC	86	ICS	2012,01	2012,09
032/05	CDN, M 3 Conductor, 16A	FCC-801-M3-16AMP	FCC	2022	ICS	2012,01	2012,09
032/06	CDN, M 2 Conductor, 16A	FCC-801-M2-16AMP	FCC	2013	ICS	2012,01	2012,09
032/07	CDN, AF 4 Conductor, unshielded signal lines	FCC-801-AF4	FCC	51	ICS	2012,01	2012,09
032/08	CDN, S 4 Conductor, shielded signal lines	FCC-801-S4	FCC	19	ICS	2012,01	2012,09

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032/09	CDN, T 4 Conductor,symmetry signal lines	FCC-801-T4	FCC	74	ICS	2012,01	2012,09
032/12	Impedance stabilization network	ISN T400	Schaffn.	15534	ICS, EC	2012,01	2012,09
032/14	CDN, 9 Conductor,shielded signal lines	FCC-801-S9	FCC	1001	ICS	2012,01	2012,09
032/15	CDN, 25 Conductor,shielded signal lines	FCC-801-S25	FCC	1002	ICS	2012,01	2012,09
032/16	CDN, M 5 Conductor, 32A	FCC-801-M5	FCC	4019	ICS	2012,01	2012,09
032/17	Impedance stabilization network	ISN T200	Schaffn.	16886	ICS, EC	2012,01	2012,09
032/18	100 Ohm direct coupler	Typ 100	CEcert	2	ICS	2012,01	2012,09
032/19	CDN, M 2 Conductor, 16A	CDN M216-10	TESEQ	31989	ICS	2011,11	2012,09
032/20	CDN, M 3 Conductor, 16A	CDN M316-10	TESEQ	30388	ICS	2011,11	2012,09
032/21	CDN, ST 8Conductor, shielded ,symmetry signal lines	CDN ST08A	TESEQ	32263	ICS	2011,11	2012,09
032/22	100 Ohm direct coupler	Typ 100	CEcert	3	ICS	2012,04	2013,03
033/01	Coaxial attenuator 6dB 100W	R417706118	Radiall	LOT: 0117/1	ICS	2012,04	2013,03
033/02	Coaxial attenuator 6dB 100W	R417706118	Radiall	LOT: 0117/2	ICS	2012,04	2013,03
033/03	Coaxial attenuator 20dB 10W	ESH2Z11	R&S	9349.7518.52	ER	2012,04	2013,03
033/04	Coaxial attenuator 6dB 100W	24-6-34	Weinschel	AT 3598	ICS	2012,04	2013,03
033/05	Pulse limiter	ESH3-Z2	R&S	100199	EC	2012,04	2013,03
033/06	Fixed coaxial attenuator 2dB	1 R-2	Weinschel	LDC 9751	IR	2012,04	2013,03
033/08	Pulse limiter	ESH3-Z2	R&S	0357.8810.54	EC	2012,04	2013,03
033/09	Coaxial attenuator 6dB 300W	50FH-006-300	JFW IND.		ICS	2012,04	2013,03
034/01	RF current probe	F-36-2	FCC	36		2012,05	2013,03
034/02	RF current probe	F-55	FCC	34	EC	2012,05	2013,03
035/01	Bulk current injection probe (100kHz - 400MHz)	95242-1	EMCO	50989	E1-EUB	2011,09	2012,09
035/02	Bulk current injection probe	95236-1	ETS	32243	ICS	2011,09	2012,09
035/03	Bulk current injection probe	F-120-6A	FCC	100010	ICS	2012,01	2012,09
052/03	Triple Timer	PM052/03	Glunz Uhren	--	EMV	2012,04	2013,03
052/04	Triple Timer	PM052/04	Glunz Uhren	--	EMV	2012,04	2013,03
054/00	Digital Oscilloscope	DL9140	Yokogawa	91F104187	E1-EUB	2010,10	2012,09
059/06	Climatic tester	THB4141	AIRFLOW	03900185	ID	2012,04	2013,03
065/06	Data logger	SP-2000-20R	Veriteq	09122166	EMV	2012,04	2013,03
065/09	Data logger temp./humid.	SP-2000-20R-117	Veriteq	11062233	EMV	2012,04	2013,03
070/02	semi anechoic chamber	10- Meter	Frankonia	--	ER, EC, IR, ...	2010,04	2013,03
070/03	semi anechoic chamber immunity	3- Meter	Frankonia	--	ER, EC, IR, ...	2012,04	2013,03
070/04	semi anechoic chamber immunity	1- Meter	Frankonia	--	ER, EC, IR, ...	2012,05	2013,03
070/06	semi anechoic chamber immunity	3- Meter	Frankonia	--	ER, EC, IR, ...	2011,08	2014,03
070/07	semi anechoic chamber immunity	3- Meter	Frankonia	--	ER, EC, IR, ...	2012,04	2013,03
071/01	RF cable long	Bl - K9 (8m)	emv	--	ER, IR	2012,05	2013,03
071/02	RF cable short	Bl	emv	--	ER, IR	2012,04	2013,03
071/04	Cable fully anechoic chamber	1 Meter	emv	--	E1-EUB	2012,04	2013,03
071/05	RF cable	3m Messstrecke (7m+2m)			ER, IR	2011,10	2012,09

Test method:

EC	conducted emission measurement	ID	ESD
ER	radiated emission measurement	IR	electromagnetic field immunity
EP	power line radiation	ICII	electrical transient immunity
MC1	harmonics current	ICS	conducted disturbance immunity
MC2	flicker	IMS	magnetic fields immunity (power frequency, transient)
DIPS	voltage variation and dips	E1-EUB	electronic components used in vehicles

Annex List :

Test (description)	Page
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Conducted RF-disturbance induced by RF-fields; CAN, analog in and out, binary in and out	29

CEcert GmbH

EUT:
 Serial Number:
 Manufacturer:
 Operating Condition:
 Test Engineer:
 Test Specification:
 Comment:

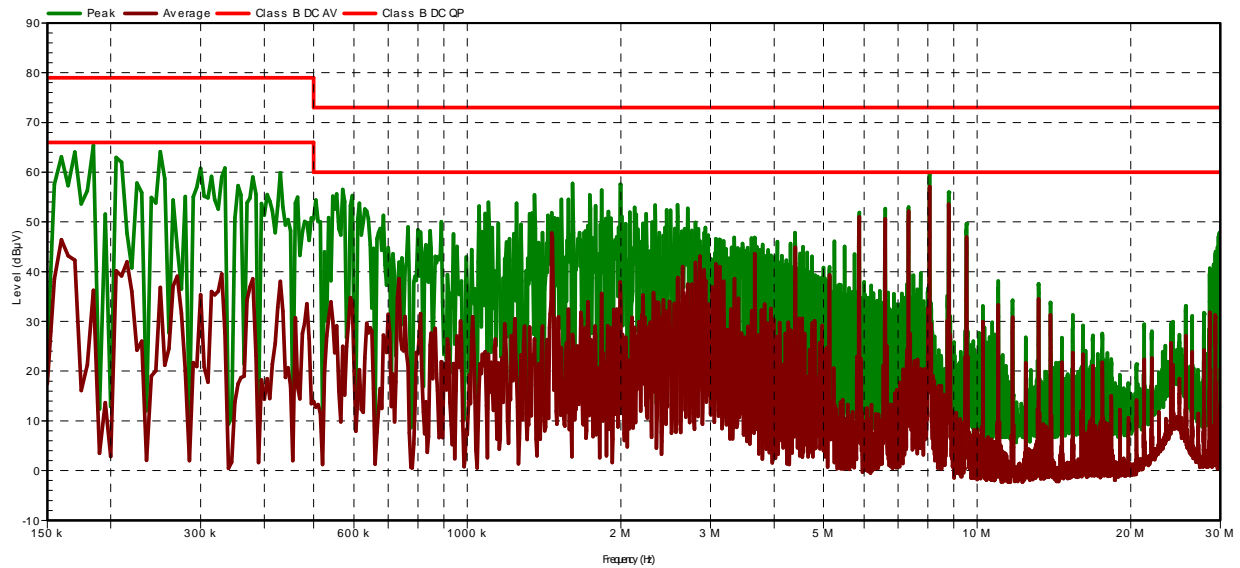
Conducted Emissions

Cuteline-Modules
 --
 Huegli Tech AG
 test mode
 Andreas Schenk
 Line +24V
 all modules

Scan Settings:

Frequency Range: 0,15 MHz – 30 MHz
 Receiver Bandwidth: 9 kHz
 Measure Time: 15 ms (Prescan)
 3 s (Final QP)
 3 s (Final AV)

Prescan:



Detected Peaks:

Frequency (MHz)	PK Value (dBµV)	AVG MaxHold (dBµV)	QP Value (dBµV)	AVG Limit (dBµV)	QP Limit (dBµV)	Result
8,07	60,7	57,1	59	60	73	Pass

CEcert GmbH

EUT:

Serial Number:

Manufacturer:

Operating Condition:

Test Engineer:

Test Specification:

Comment:

Conducted Emissions

Cuteline-Modules

--

Huegli Tech AG

test mode

Andreas Schenk

Line GND

all modules

Scan Settings:

Frequency Range:

0,15 MHz – 30 MHz

Receiver Bandwidth:

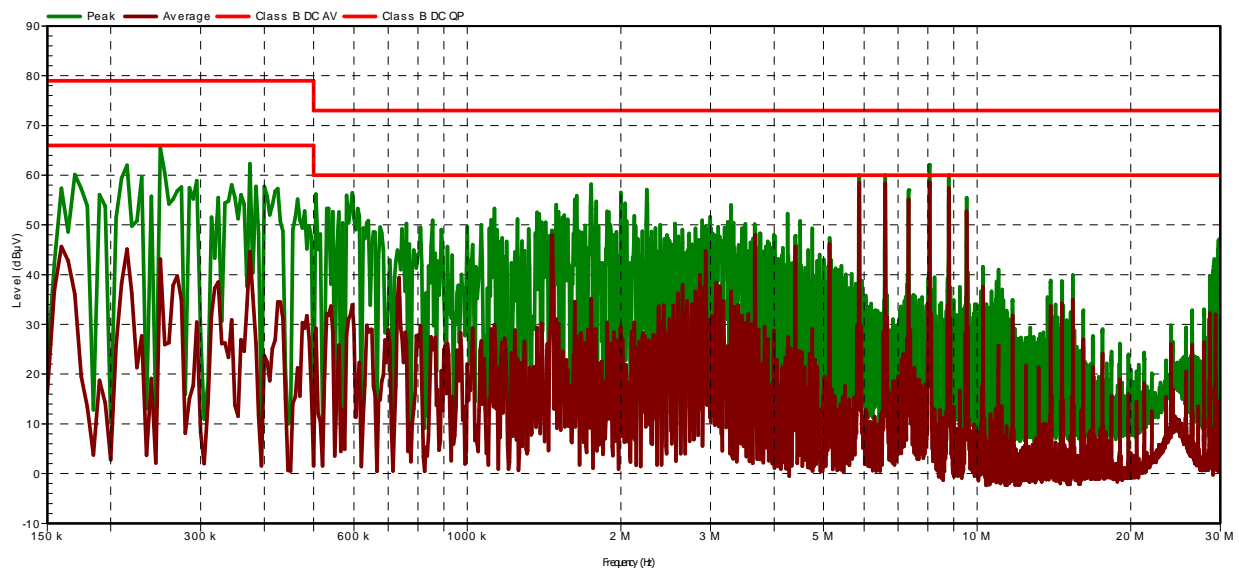
9 kHz

Measure Time:

15 ms (Prescan)

3 s (Final QP)

3 s (Final AV)

Prescan:**Detected Peaks:**

Frequency (MHz)	PK Value (dBµV)	AVG MaxHold (dBµV)	QP Value (dBµV)	AVG Limit (dBµV)	QP Limit (dBµV)	Result
5,87	60,6	58,5	59,2	60	73	Pass
6,605	60,1	58,3	58,7	60	73	Pass
7,34	58,7	55,2	56	60	73	Pass
8,07	62,2	58,6	61,7	60	73	Pass
8,805	60	57,4	59,5	60	73	Pass

CEcert GmbH

EUT:

Serial Number:

Manufacturer:

Operating Condition:

Test Engineer:

Comment:

Radiated Emissions

Cuteline-Modules

--

Huegli Tech AG

test mode

Andreas Schenk

Scan Settings:

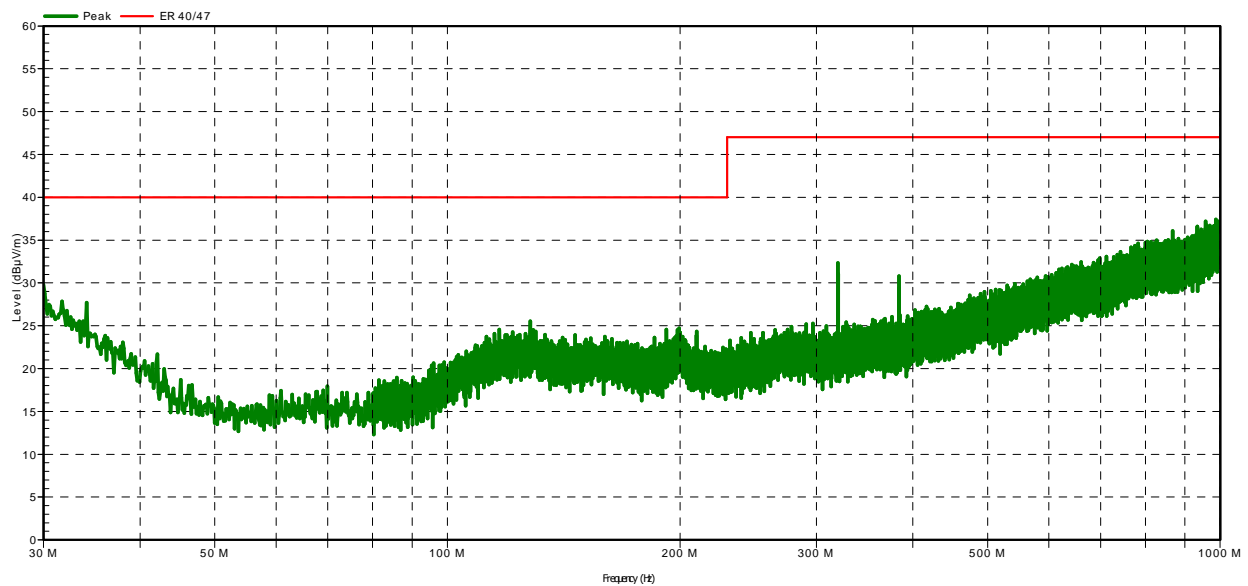
Frequency Range: 30 MHz – 1000 MHz

Receiver Bandwidth: 120 kHz

Measure Time: 15 ms (Prescan), 3 s (Final Measurement)

Measurement Distance: 3 m

Prescan (MAX Hold Graph):



Detected Peaks:

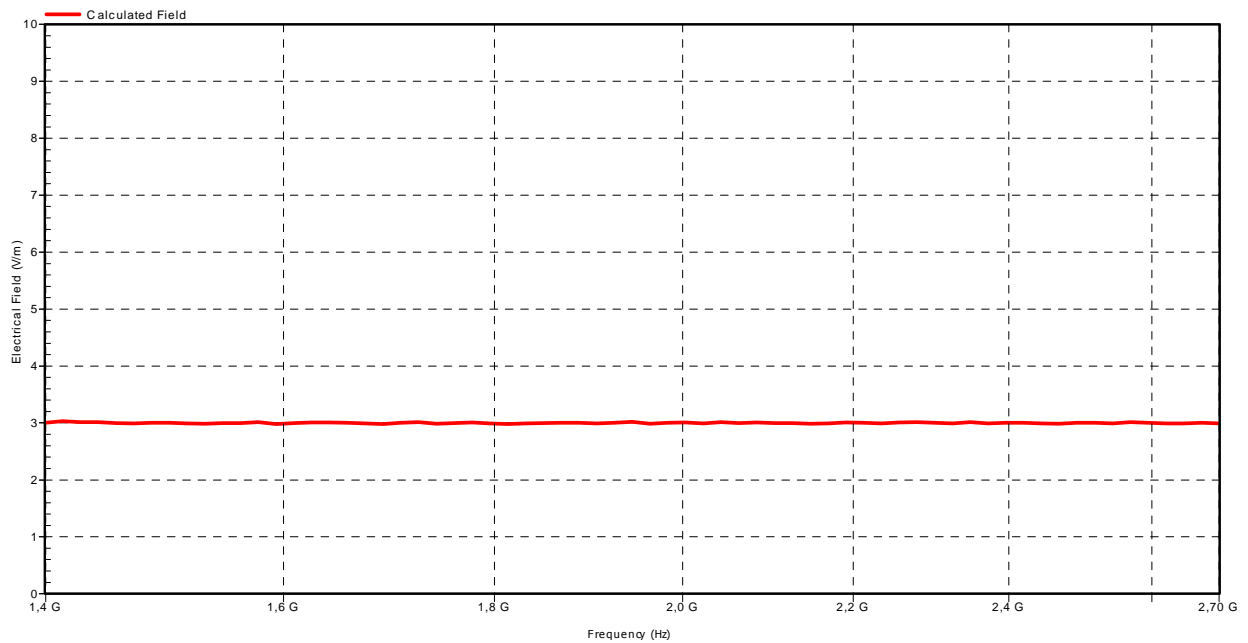
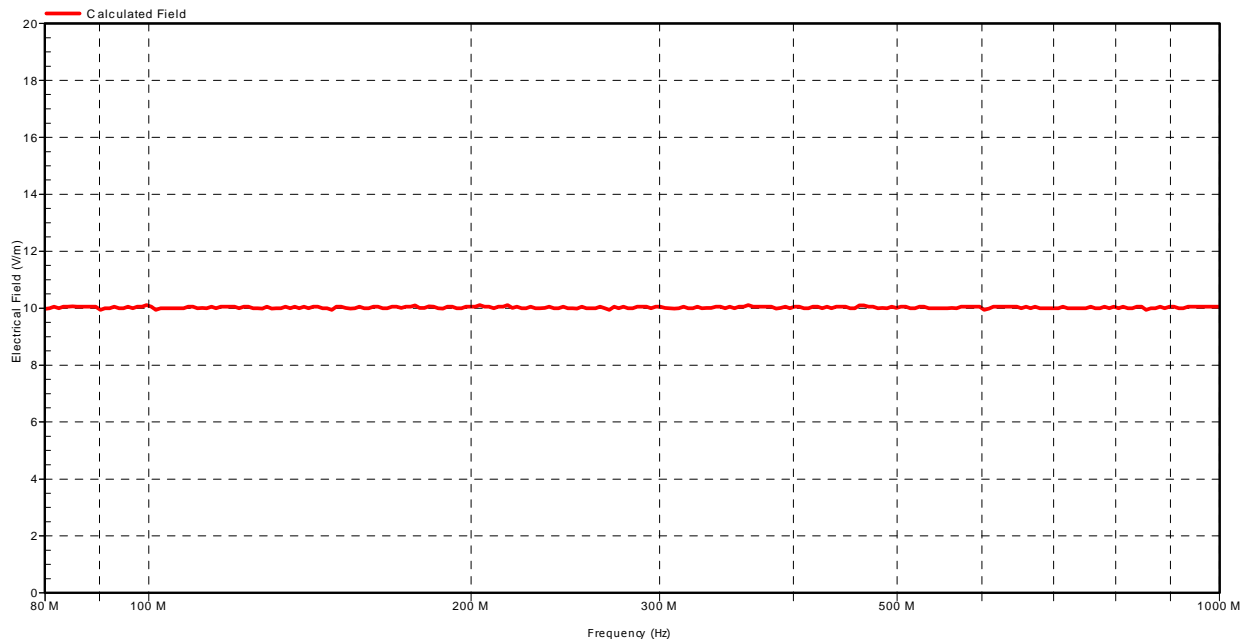
none

CEcert GmbH
IEC 61000-4-3

Radiated Immunity

EUT:	Cuteline-Modules
Serial Number:	--
Manufacturer:	Huegli Tech AG
Operating Condition:	test mode
Test Engineer:	Andreas Schenk
Antenna Polarisation:	horizontal
Comment:	

Field strength:



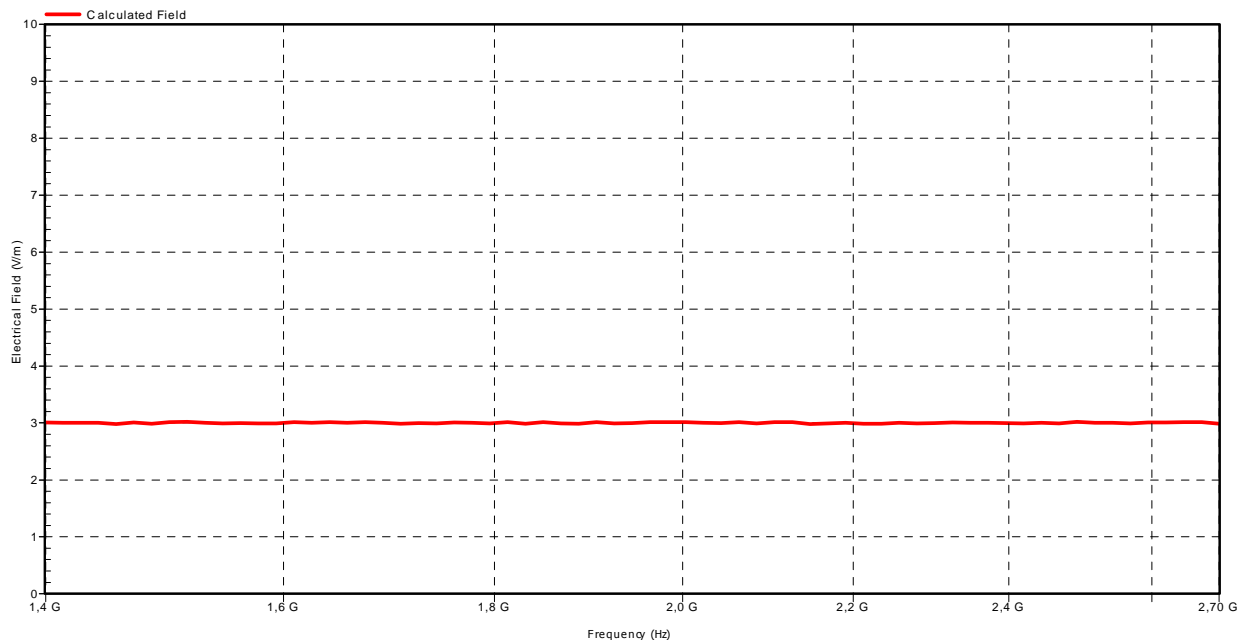
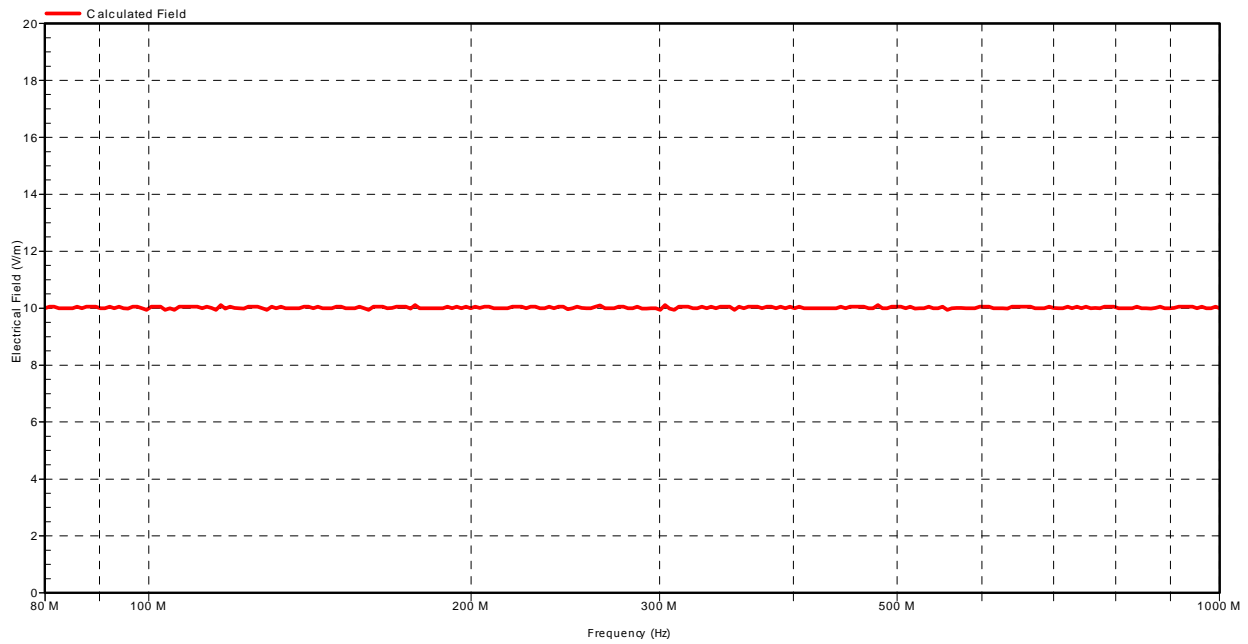
CEcert GmbH
IEC 61000-4-3

Radiated Immunity

EUT:
Serial Number:
Manufacturer:
Operating Condition:
Test Engineer:
Antenna Polarisation:
Comment:

Cuteline-Modules
--
Huegli Tech AG
test mode
Andreas Schenk
vertical

Field strength:



**CEcert GmbH
IEC 61000-4-6**

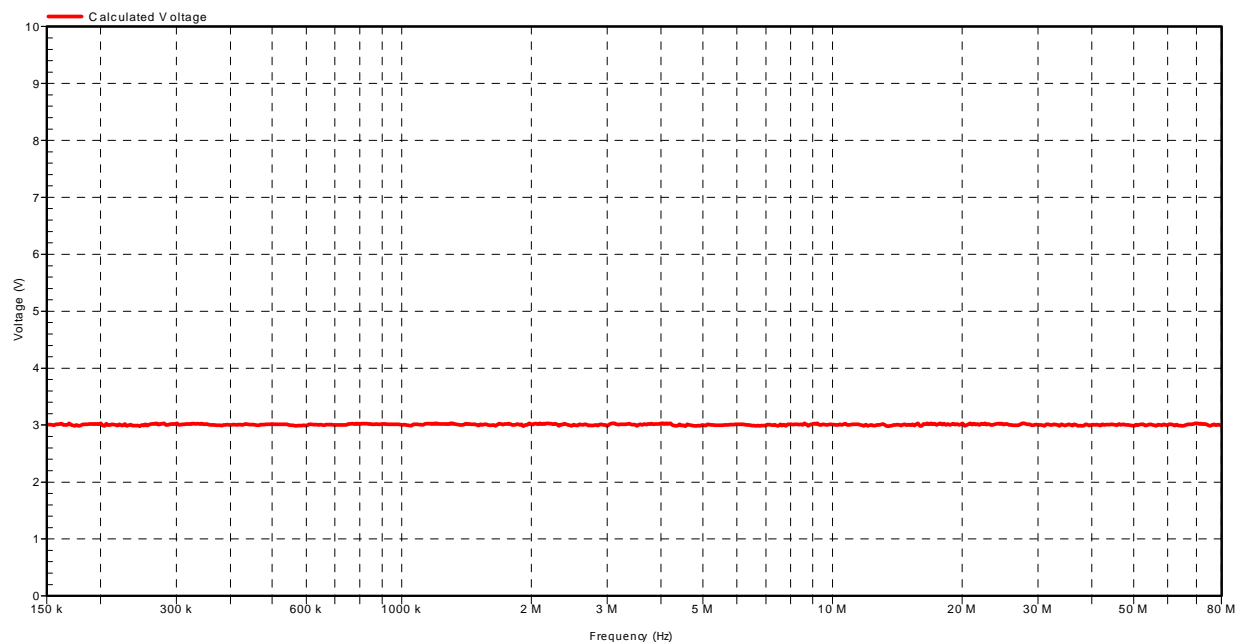
EUT:
Serial Number:
Manufacturer:
Operating Condition:
Test Engineer:
Comment:

Conducted Immunity

Cuteline-Modules
--
Huegli Tech AG
test mode
Andreas Schenk
DC supply line

Test settings :

Frequency Range: 0,15 MHz – 80 MHz
Test Level: 3 V
Modulation: AM: 1 kHz, 80 %
Logarithmic Step: 1 % of previous test frequency
Dwell Time: 1 second(s)

Test Level:

**CEcert GmbH
IEC 61000-4-6**

EUT:
Serial Number:
Manufacturer:
Operating Condition:
Test Engineer:
Comment:

Conducted Immunity

Cuteline-Modules
--
Huegli Tech AG
test mode
Andreas Schenk
CAN, analog in and out, binary in and out

Test settings :

Frequency Range: 0,15 MHz – 80 MHz
Test Level: 3 V
Modulation: AM: 1 kHz, 80 %
Logarithmic Step: 1 % of previous test frequency
Dwell Time: 1 second(s)

Test Level: