



Test Report

EN 55022 Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

EN 55024 Information technology equipment – Immunity characteristics – Limits and methods of measurement

Report Reference No. : CTL1307101096-E
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Date of issue : July 18, 2013
Testing Laboratory Name : Shenzhen CTL Electromagnetic Technology Co., Ltd.
Address : Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China
Testing location/ procedure : Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing methods

Applicant's name : Acrel Co., Ltd.
Address : No.253 YuLv Rd.Jiading District Shanghai China

Test specification:
Standard : **EN 55022: 2010+AC: 2011 EN 55024: 2010**
EN 61000-3-2: 2006+A2:2009 EN 61000-3-3: 2008
Non-standard test method..... : /

Test Report Form No. : CTLRF10001
TRF Originator : Shenzhen CTL Electromagnetic Technology Co., Ltd
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Test item description..... : Multi-loop monitoring device
Manufacturer : Acrel Co., Ltd.
Listed Models..... : AMC16MA, AMC16MD, AMC16Z, AMC16K
Trade Mark..... : N/A
Ratings..... : AC 230V 50Hz
Result..... : **Positive**

EMC -- Test Report

Test Report No. : CTL1307101096-E	July 16, 2013
	Date of issue

Equipment under Test : Multi-loop monitoring device

Listed Models : Acrel Co., Ltd.

Applicant : BEIJING EPSOLAR TECHNOLOGY CO., LTD.

Address : No.253 YuLv Rd.Jiading District Shanghai China

Manufacturer : Acrel Co., Ltd.

Address : No.253 YuLv Rd.Jiading District Shanghai China

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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1. TEST STANDARDS

The tests were performed according to following standards:

[EN 55022: 2010+AC: 2011](#) Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

[EN 55024: 2010](#) Information technology equipment – Immunity characteristics – Limits

[EN 61000-3-2: 2006+A2:2009](#) Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)

[EN 61000-3-3:2008](#) Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection



2. SUMMARY

2.1. General Remarks:

Date of receipt of test sample : July 10, 2013

Testing commenced on : July 10, 2013

Testing concluded on : July 16, 2013

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : 230V / 50 Hz 115V / 60Hz
 12 V DC 24 V DC
 Other (specified in blank below)

/

2.3. Short description of the Equipment under Test (EUT)

The EUT is a Multi-loop monitoring device.

Series number: prototype

2.4. EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

The tests are carried out with surge protective devices disconnected.

Test program (customer specific)

Emissions tests.....: According to EN55022, searching for the highest disturbance.

Immunity tests: According to EN55024, searching for the highest susceptibility.

Harmonics current..... : According to EN 61000-3-2, searching for the highest disturbance.

Voltage fluctuation..... : According to EN 61000-3-3, searching for the highest disturbance.

2.5. EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

■ - supplied by the manufacturer

o - supplied by the lab

2.6. Performance Criteria

Definition related to the performance level:

- based on the used product standard
 based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2008.

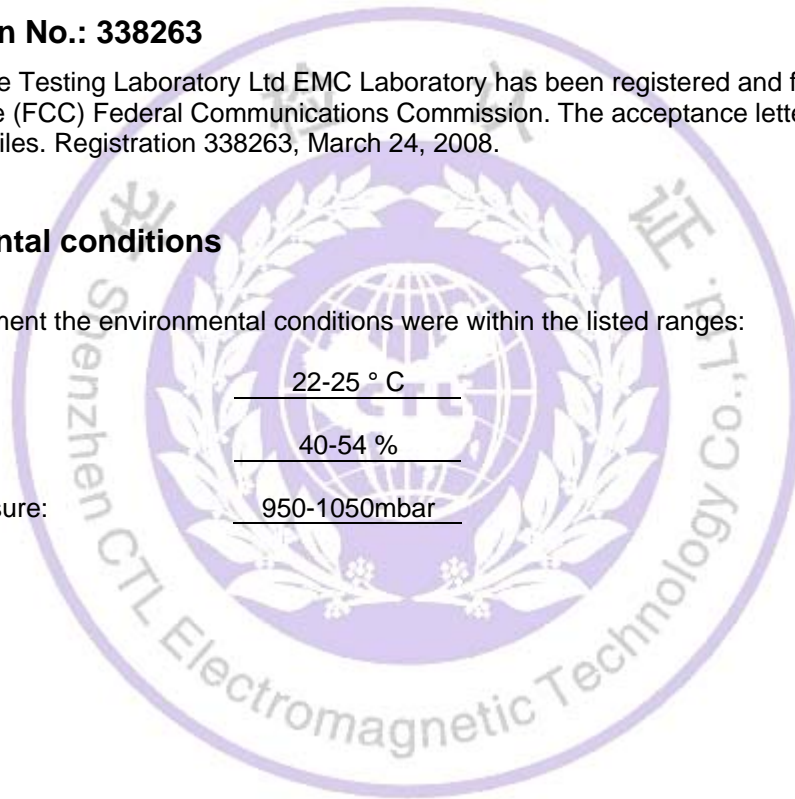
FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>22-25 ° C</u>
Humidity:	<u>40-54 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>



3.4. Test Description

Emission Measurement		
Radiated Emission	EN 55022: 2010+AC: 2011	PASS
Conduction Emission	EN 55022: 2010+AC: 2011	PASS
Harmonic Current	EN 61000-3-2: 2006+A2:2009	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2008	PASS
Immunity Measurement		
Electrostatic Discharge	EN 55024: 2010 IEC 61000-4-2: 2008	PASS
RF Field Strength Susceptibility	EN 55024: 2010 IEC 61000-4-3: 2010	PASS
Electrical Fast Transient/Burst Test	EN 55024: 2010 IEC 61000-4-4: 2012	PASS
Surge Test	EN 55024: 2010 IEC 61000-4-5: 2005	PASS
Conducted Susceptibility Test	EN 55024: 2010 IEC 61000-4-6: 2008	PASS
Power Frequency Magnetic Field Susceptibility Test	EN 55024: 2010 IEC 61000-4-8: 2009	PASS
Voltage Dips and Interruptions Test	EN 55024: 2010 IEC 61000-4-11: 2004	PASS

Remark: The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	±4.22dB	(1)
Conducted Emission	0.15~30MHz	±3.29dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	ROHDE & SCHWARZ	HL562	100015	2013/04
2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESI 26	100009	2013/04
3	RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	2013/04
4	TURNTABLE	ETS	2088	2149	2013/04
5	ANTENNA MAST	ETS	2075	2346	2013/04
6	EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	N/A	2013/04

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	2013/04
2	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2013/04
3	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100044	2013/04
4	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2013/04

Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	2013/04
2	Harmonic And Flicker Analyzer	EM TEST	DPA503S1	0500-10	2013/04

Voltage Fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	2013/04
2	Harmonic And Flicker Analyzer	EM TEST	DPA503S1	0500-10	2013/04

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	EM TEST	DITOC0103Z	0301-04	2013/04

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	SIGNAL GENERATOR	IFR	2032	203002/100	2013/04
2	AMPLIFIER	AR	150W1000	301584	2013/04

3	DUAL DIRECTIONAL COUPLER	AR	DC6080	301508	2013/04
4	POWER HEAD	AR	PH2000	301193	2013/04
5	POWER METER	AR	PM2002	302799	2013/04

Electrical Fast Transient/Burst

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2013/04

Surge

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA COMPACT SIMULATOR	EM TEST	UCS500M6	0500-19	2013/04

Conducted Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	IFR	2023A	202304/060	2013/04
2	Amplifier	AR	75A250	302205	2013/04
3	Dual Directional Coupler	AR	DC2600	302389	2013/04
4	6db Attenuator	EMTEST	ATT6/75	0010230A	2013/04
5	EM CLAMP	LÜTHI	EM101	335625	2013/04
6	CDN	EMTEST	CDN M3	0802-03	2013/04

Power Frequency Magnetic Field Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA COMPACT SIMULATOR	EM TEST	UCS500M6	202304/060	2013/04
2	MOTOR DRIVEN VOLTAGE TRANSFORMER	EM TEST	MV2616	302205	2013/04
3	CURRENT TRANSFORMER	EM TEST	MC2630	302389	2013/04
4	MAGNETIC COIL	EM TEST	MS100	0010230A	2013/04

Voltage Dips and Interruptions

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2013/04
2	Motor Driven Voltage Transformer	EM TEST	MV2616	0301-11	2013/04

4. TEST CONDITIONS AND RESULTS

4.1. Radiated Emission

For test instruments and accessories used see section 3.6.

4.1.1. Description of the test location

Test location: Shielded room No. 2

4.1.2. Limits of disturbance(EN55022 B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

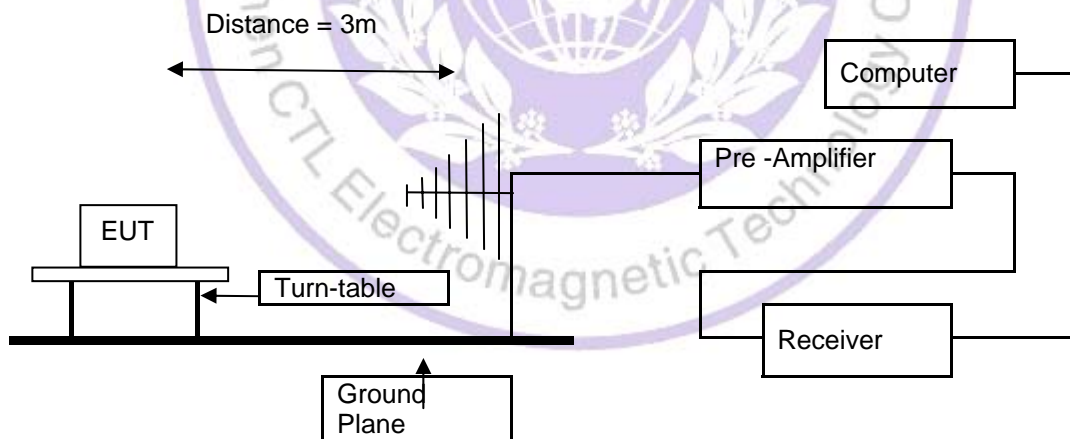
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.3. Description of the test set-up

4.1.3.1. Operating Condition

The EUT is set to work shall be carried out with full load mode during the test, and the maximum emanating results are recorded.

4.1.3.2. Configuration of test setup



4.1.4. Test result

The requirements are **Fulfilled**

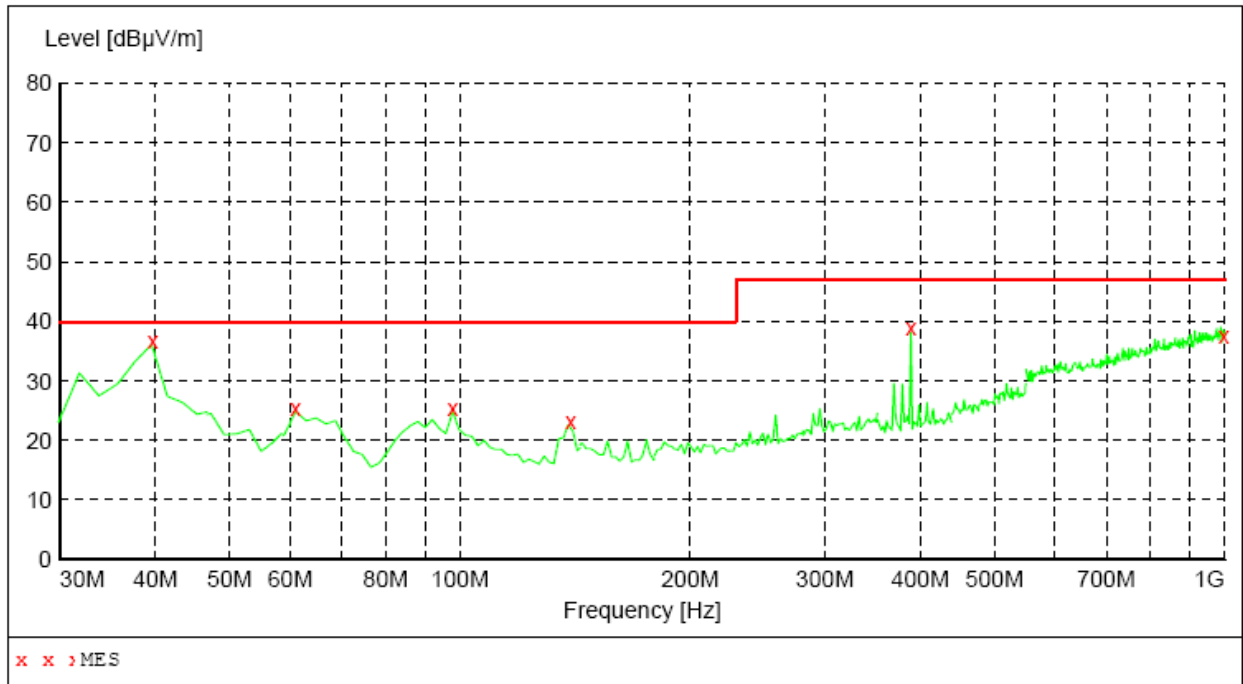
Band Width: 120KHz

Frequency Range: 30MHz to 1000MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



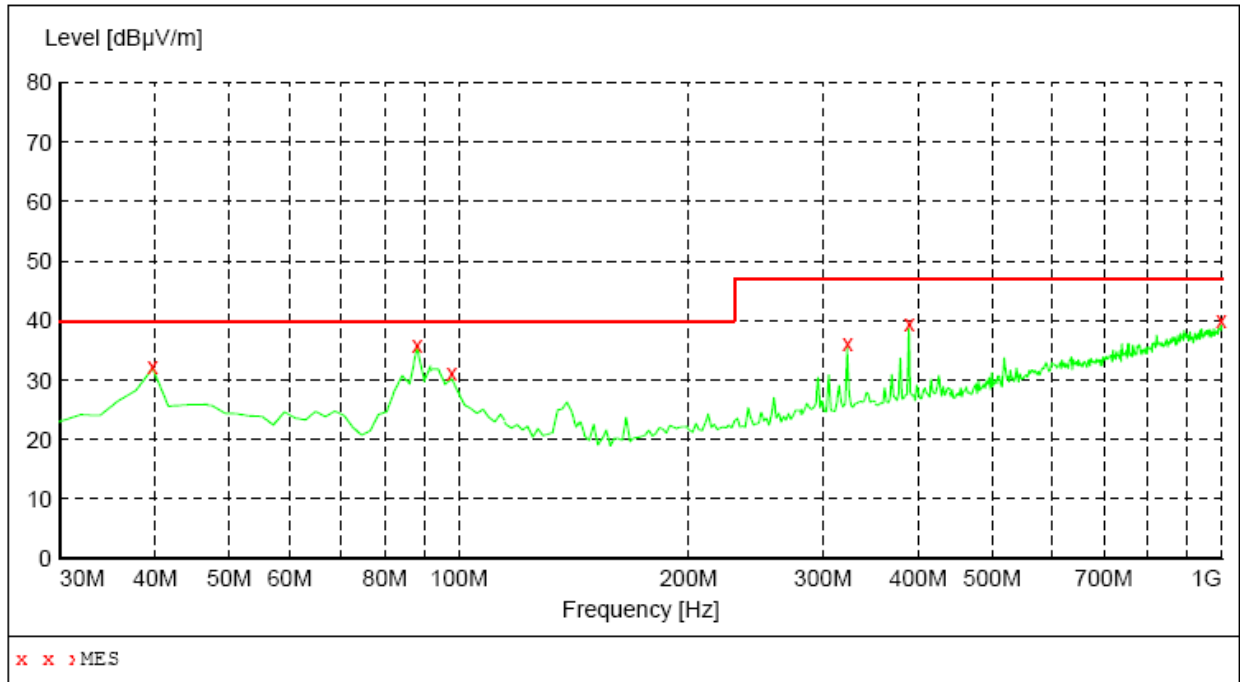
MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	35.10	15.8	40.0	4.9	QP	100.0	0.00	VERTICAL
61.040000	24.80	14.2	40.0	15.2	QP	100.0	0.00	VERTICAL
97.900000	25.80	17.4	40.0	14.2	QP	100.0	0.00	VERTICAL
138.640000	22.40	13.2	40.0	17.6	QP	100.0	0.00	VERTICAL
388.900000	38.20	21.2	47.0	8.8	QP	100.0	0.00	VERTICAL
988.360000	36.80	32.2	47.0	10.2	QP	100.0	0.00	VERTICAL



SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	32.10	15.8	40.0	7.9	QP	300.0	0.00	HORIZONTAL
88.200000	35.80	15.5	40.0	4.2	QP	300.0	0.00	HORIZONTAL
97.900000	31.60	17.4	40.0	8.4	QP	300.0	0.00	HORIZONTAL
322.940000	36.20	19.3	47.0	10.8	QP	100.0	0.00	HORIZONTAL
388.900000	39.30	21.2	47.0	7.7	QP	100.0	0.00	HORIZONTAL
998.060000	39.60	32.3	47.0	7.4	QP	100.0	0.00	HORIZONTAL



4.2. Conducted disturbance

For test instruments and accessories used see section 3.6.

4.2.1. Description of the test location

Test location: Shielded room No. 1

4.2.2. Limits of disturbance

Limit of disturbance voltage at the mains terminals

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

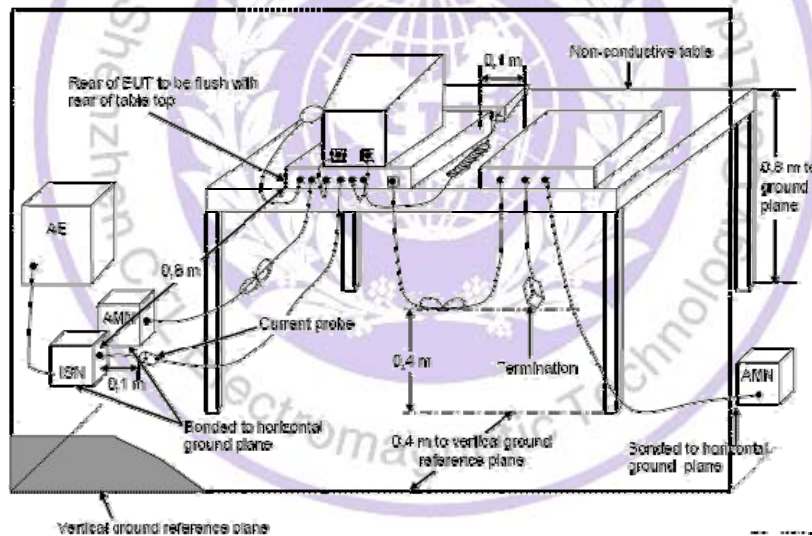
4.2.3. Description of the test set-up

4.2.3.1. Operating Condition

The EUT is set to work shall be carried out full load mode during the test, and the maximum emanating results are recorded.

4.2.3.2. Configuration of test setup

Mains terminals:



4.2.4. Test result

The requirements are **Fulfilled**

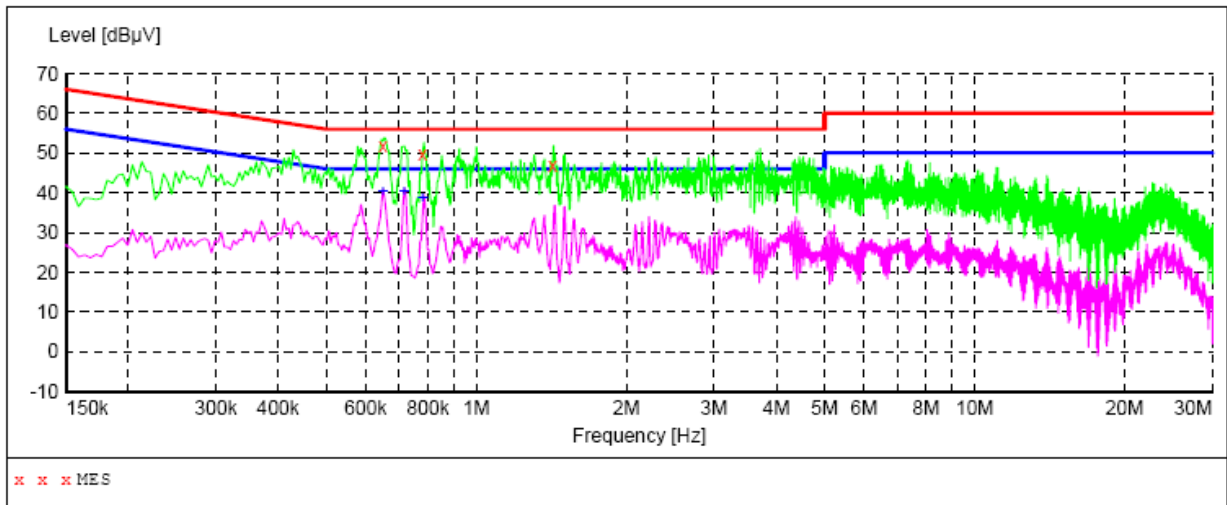
Band Width: 9KHz

Frequency Range: 150KHz to 30MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

SCAN TABLE: "Vol (9K-30M)FIN NEW"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.649500	51.80	10.3	56	4.2	QP	L1	GND
0.780000	49.70	10.3	56	6.3	QP	L1	GND
1.423500	46.70	10.4	56	9.3	QP	L1	GND

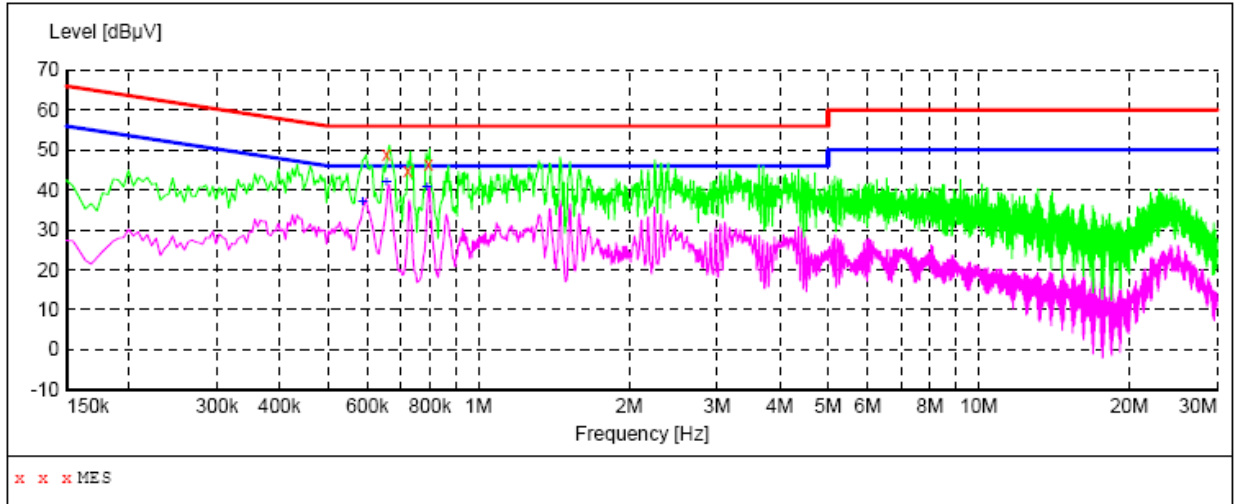
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.649500	40.50	10.3	46	5.5	AV	L1	GND
0.717000	40.20	10.3	46	5.8	AV	L1	GND
0.780000	38.70	10.3	46	7.3	AV	L1	GND



SCAN TABLE: "Vol (9K-30M)FIN NEW"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	48.80	10.3	56	7.2	QP	N	GND
0.721500	44.70	10.3	56	11.3	QP	N	GND
0.793500	46.30	10.3	56	9.7	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.586500	36.90	10.3	46	9.1	AV	N	GND
0.654000	41.90	10.3	46	4.1	AV	N	GND
0.789000	40.90	10.3	46	5.1	AV	N	GND



4.3. Harmonic current

For test instruments and accessories used see section 3.6.

4.3.1. Description of the test location

Test location: Shielded room No. 3

4.3.1. Limits of Harmonic Current

Test configuration and procedure see clause 7.1 of standard EN 61000-3-2: 2006+A1:2009.

4.3.2. Description of the test set-up

4.3.2.1. Operating Condition

The EUT is normal working mode during the test, and the maximum emanating results are recorded.

4.3.2.2. Test Configuration and Procedure

Test configuration and procedure see clause 6.2.2 and Appendix C of standard EN 61000-3-2: 2006+A1:2009.

4.3.3. Test result

N/A Not Applicable.



4.4. Voltage Fluctuation and Flicker

For test instruments and accessories used see section 3.6.

4.4.1. Description of the test location

Test location: Shielded room No. 3

4.4.2. Limits of Voltage Fluctuation and Flicker

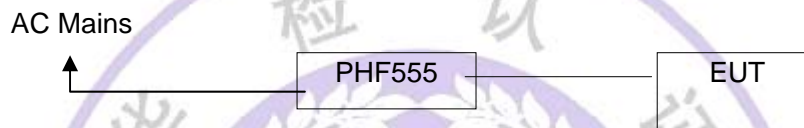
Test configuration and procedure see clause 5 of standard EN 61000-3-3: 2008.

4.4.3. Description of the test set-up

4.4.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the maximum emanating results are recorded.

4.4.3.2. Configuration of test setup



4.4.4. Test result

The requirements are

Fulfilled

Remarks: The limits are kept. For detailed results, please see the following page(s).

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Customer:	Acrel Co., Ltd.
Mains supply voltage:	AC 230V/ 50Hz
Ambient Temperature:	25°C
Humidity:	51%
E. U. T.:	Multi-loop monitoring device
Date of test:	11:10 12 July, 2013
Tester:	Tony

Test Result	PASS
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Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.127	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.127	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.091	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.092	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.095	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.091	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.094	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.094	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.095	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

4.5. Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.5.1. Description of the test location and date

Test location: Shielded room No. 3

Date of test: July 10, 2013

Operator: NADA

4.5.2. Severity levels of electrostatic discharge

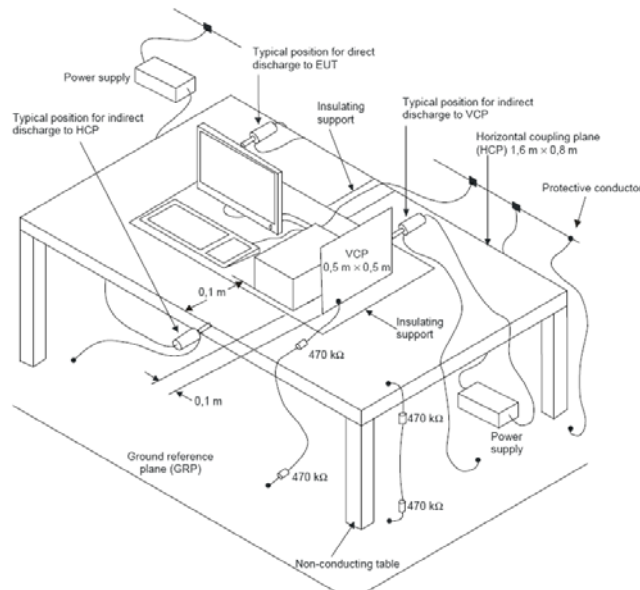
Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

4.5.3. Description of the test set-up

4.5.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the maximum emanating results are recorded.

4.5.3.2. Configuration of test setup



4.6. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

4.6.1. Description of the test location and date

Test location: Shielded room No. 2

Date of test: July 11, 2013

Operator: Bove

4.6.2. Severity levels of radiated, radio-frequency, electromagnetic field

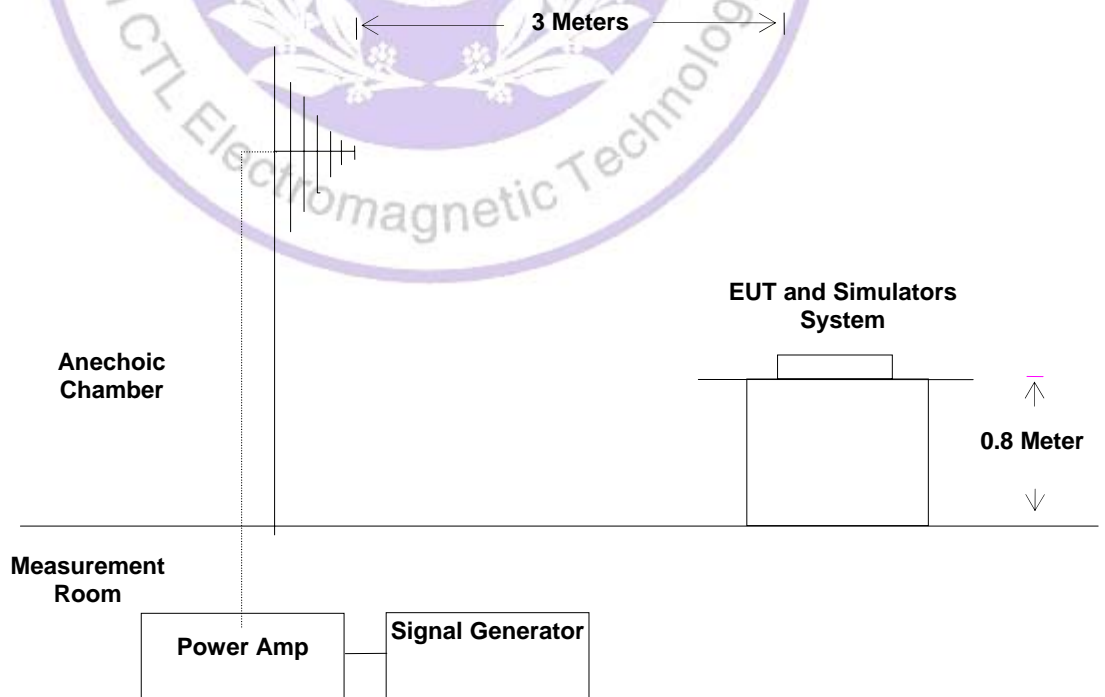
Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X	Special

4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the maximum emanating results are recorded.

4.6.3.2. Configuration of test setup



4.6.4. Test specification:

<u>Frequency range:</u>	■ 80 MHz to 1000 MHz
<u>Field strength:</u>	■ 3 V/m
<u>EUT - antenna separation:</u>	■ 3 m
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1000Hz
<u>Frequency step:</u>	■ 1 % with 3 s dwell time
<u>Antenna polarisation:</u>	■ horizontal ■ vertical

4.6.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).



4.7. Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

4.7.1. Description of the test location

Test location: Shielded room No. 3

Date of test: July 12, 2013

Operator: Tony

4.7.2. Severity levels of electrical fast transients / Burst

Severity level: ±1000V for AC power supply lines

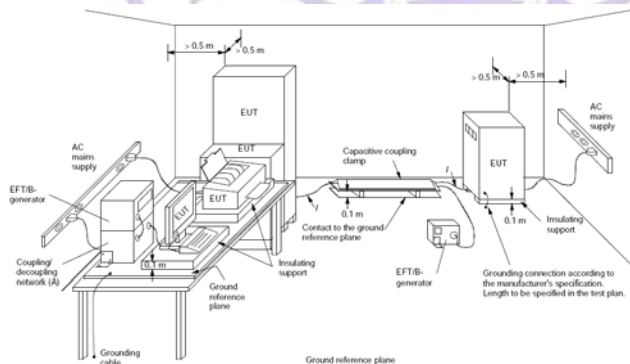
Open Circuit Output Test Voltage ±10%				
Level	For Power Supply Lines		For I / O (Input / Output) Signal Data and Control Lines	
	V peak(KV)	Repetition Frequency (KHz)	V peak(KV)	Repetition Frequency (KHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

4.7.3. Description of the test set-up

4.7.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the maximum emanating results are recorded.

4.7.3.2. Configuration of test setup



4.7.4. Test specification:

Coupling network: 0.5 kV 1 kV 2 kV

Coupling clamp: 0.5 kV 1 kV 2 kV

Burst frequency: 5.0 kHz

Coupling duration: ≥ 60 s

Polarity: positive negative

4.7.5. Coupling points

Cable description:

AC power line : L, N, L+N

Screening:

screened

unscreened

Status:

passive

active

Signal transmission:

analogue

digital

Length:

1.5 m

4.7.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).



4.8. Surge

For test instruments and accessories used see section 3.6.

4.8.1. Description of the test location

Test location: Test location No. 3

Date of test: July 12, 2013

Operator: Andy

4.8.2. Severity levels of surge

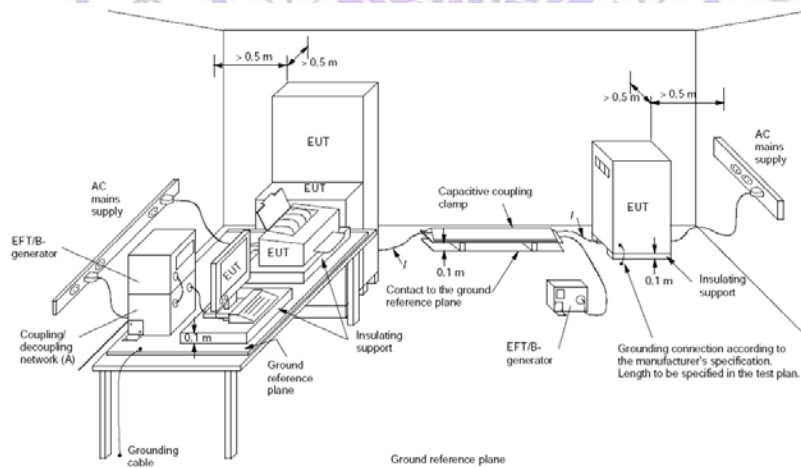
Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

4.8.3. Description of the test set-up

4.8.3.1. Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the maximum emanating results are recorded.

4.8.3.2. Configuration of test setup



4.8.4. Test specification:

Pulse amplitude-Power line sym.:
Source impedance: $2\ \Omega + 18\mu\text{F}$

0.5 kV 1 kV 2 kV 4 kV

Pulse amplitude-Power line un sym:
Source impedance: $12\ \Omega + 9\mu\text{F}$

0.5 kV 1 kV 2 kV 4 kV

Signal line:

0.5 kV 1 kV 2 kV 4 kV

Number of surges:

5 Surges/Phase angle

Phase angle:

0° 90° 180° 270°

Repetition rate:

60 s

Polarity:

positive negative

4.8.5. Coupling points

Cable description:

AC power line: L+N

Screening:

screened unshielded

Status:

passive active

Signal transmission:

analogue digital

Length:

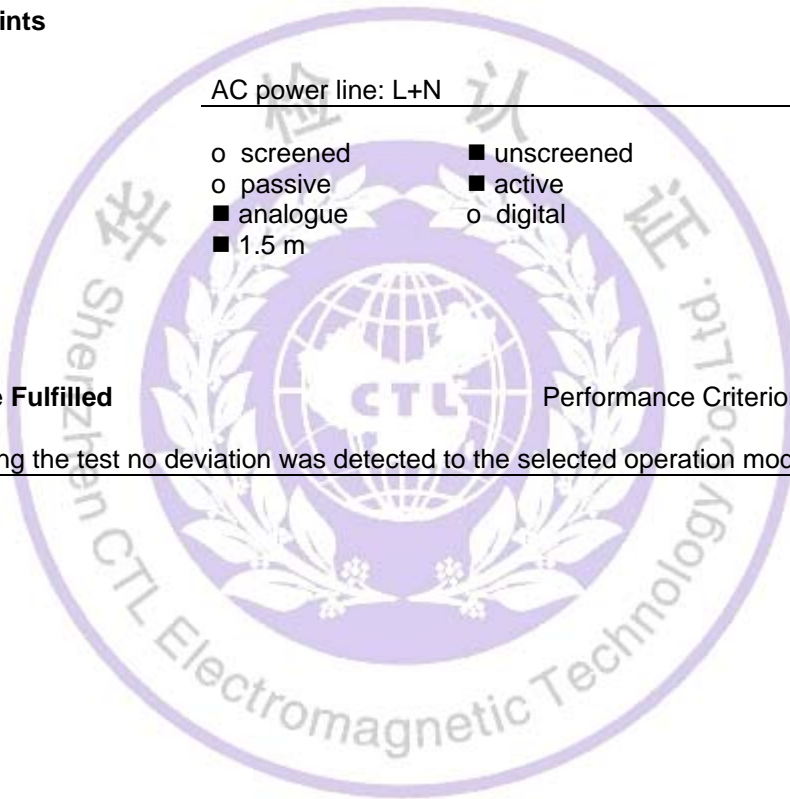
1.5 m

4.8.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).



4.9. Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

4.9.1. Description of the test location

Test location: Shielded room No. 3

Date of test: July 11, 2013

Operator: Andy

4.9.2. Severity levels of conducted disturbances

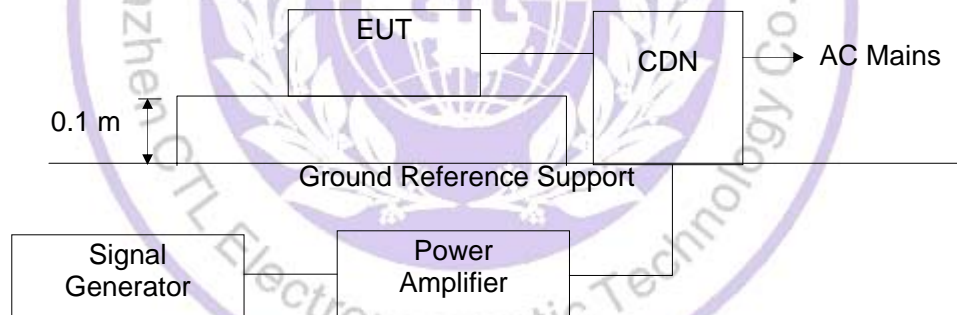
Level	Field Strength (V)
1.	1
2.	3
3.	10
X	Special

4.9.3. Description of the test set-up

4.9.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the maximum emanating results are recorded.

4.9.3.2. Configuration of test setup



4.9.4. Test specification:

- Frequency range: ■ 0.15 MHz to 80 MHz
- Test voltage: ■ 3 V
- Modulation:
 - AM: 80 %
 - sinusoidal 1000Hz
- Frequency step: ■ 1 % with 3 s dwell time

4.9.5. Coupling points

Cable description	AC power line	
Screening:	<input type="radio"/> screened	<input checked="" type="checkbox"/> unscreened
Status:	<input type="radio"/> passive	<input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue	<input type="radio"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m	

4.9.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).



4.10. Magnetic Field Immunity

For test instruments and accessories used see section 3.6.

4.10.1. Description of the test location

Test location: Shielded room No.3

Date of test: July 12, 2013

Operator: Andy

4.10.2. Severity levels of magnetic field immunity

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X.	Special

4.10.3. Description of the test set-up

4.10.3.1. Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the maximum emanating results are recorded.

4.10.4. Test specification:

Test frequency: 50 Hz

Continuous field: 1 A/m

Test duration: 5 m

Antenna factor: 0.917 A/m

Axis: x-axis y-axis z-axis

4.10.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.11. Voltage Dips and Interruptions

For test instruments and accessories used see section 3.6.

4.11.1. Description of the test location

Test location: Test location No. 3

Date of test: July 15, 2013

Operator: NADA

4.11.2. Severity levels of electrostatic discharge

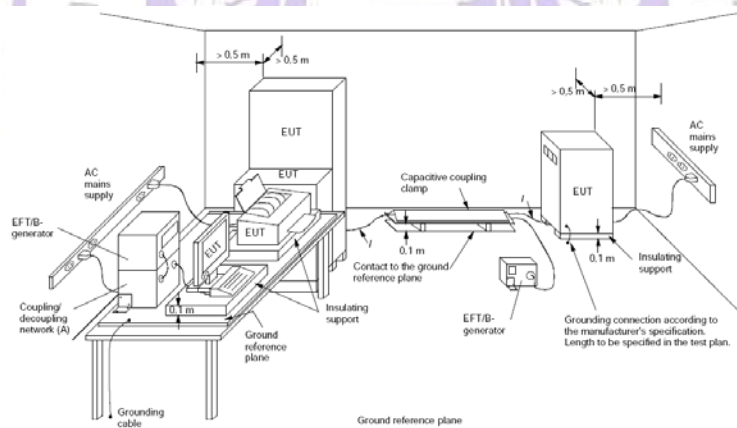
Test Level (%Ut)	Voltage Dip And Short Interruptions (%Ut)	Performance Criterion	Duration (In Period)
0	100	B	0.5
0	100	C	250
70	30	C	25

4.11.3. Description of the test set-up

4.11.3.1. Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the maximum emanating results are recorded.

4.11.3.2. Configuration of test setup



4.11.4. Test specification:

Nominal Mains Voltage (V_N): ■ 230 V AC

Number of voltage fluctuations: ■ 3

Level of reduction(dip) / duration: ■ 100 % / 10ms ■ 30 % / 500ms

Nominal Mains Voltage (V_N): ■ 230 V AC

Number of Interruptions: ■ 3

Duration of the Interruption: ■ 5000 ms

4.11.5. Test result

The requirements are **Fulfilled**
Performance Criterion **See section 4.11.2**

Remarks: During the test no deviation was detected to the selected operation mode(s).

