



EMC TEST REPORT

No. 130700020SHA-001

Applicant	: ELMARK INDUSTRIES SC 2 Dobrudzha blvd., Dobrich, Bulgaria
Manufacturer	: ELMARK INDUSTRIES SC 2 Dobrudzha blvd., Dobrich, Bulgaria
Equipment	: Moulded case circuit-breakers
Type/Model	: DS-1
Test Result	:PASS

SUMMARY

The equipment comply with the requirements according to the following standards:

EN60947-2: 2006+A1: 2009: Low-voltage switchgear and controlgear-Part 2: Circuit-breakers

Date of issue: October 29, 2013

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1. GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

EUT	:	Moulded case circuit-breakers
Description of EUT	:	The EUT is a circuit-breaker.
Model number	:	DS-1
Rating	:	Ue=415V(3P), Ui=690V, Uimp=6kV, 50/60Hz, Cat. B In=160~400A Icu=65kA, Ics=42kA, Icw=5kA/1s
Mains lead	:	None
Data cable	:	None
Class of equipment	:	A

1.2 Description of Client

Applicant	:	ELMARK INDUSTRIES SC 2 Dobrudzha blvd., Dobrich, Bulgaria
Person of contact	:	Miroslav Denkov
Telephone	:	+359 896 668801
Telefax	:	-
Manufacturer	:	ELMARK INDUSTRIES SC 2 Dobrudzha blvd., Dobrich, Bulgaria

2. TEST SPECIFICATIONS

2.1 Standards

EN60947-2: 2006+A1: 2009: Low-voltage switchgear and controlgear-Part 2: Circuit-breakers-Annex F

2.2 Mode of operation during the test / Test peripherals used

The EUT shall be supplied at the rated operational voltage, or, in the case of a range of rated operational voltages, at any convenient voltage within this range.

The current setting I_R shall be adjusted to the minimum value.

Emission and immunity tests are type tests and shall be carried out under representative conditions.

2.3 Instrument list

Selected Instrument	Model	EC no.	Valid until date
Multi-functional comprehensive performance test system	40kA	8318CA07A	7/3/2014
ESD Gun	MS61000-2B	8315DA07A	10/14/3013
Programmable ac current equipment	FW1-1000	8571CA12A	11/11/2013
Therom-Hygrograph	ZDR-F20	8337CB08A	6/18/2014
Therom-Hygrograph	ZDR-F20	8339CB08A	10/14/2013
Analog signal generator	N5181A	8601CA12A	11/3/2013
Power meter	4242	8602CA12A	11/3/2013
Radio frequency switch	NS4900	8603CA12A	11/5/2013
Power amplifier	AS0102-65	8604CA12A	11/3/2013
Power amplifier	80RF1000-175	8605CA12A	11/3/2013
Semi anechoic chamber	SAC-3M	8699DA12A	8/24/2017
Combination of launch wire coupler	STLP 9128D C6021-10	8615DA12A 8613CA12A	
Programmable ac current equipment	FW1-4000	8637CA13A	6/3/2014
EFT generator	EMS61000-4B	8313DA07A	10/11/2013
Surge generator	EMS61000-5C	8314DA07A	5/6/2014
Conduction, radiation immunity test system	NSG 4070	8618CA12A	11/3/2013
Attenuator	ATN 6050	8619CA12A	11/3/2013
CDN	CDN M016	8620CA12A	11/3/2013
CDN	CDN M116	8621CA12A	11/3/2013
Receiving antenna	VULB 9160	8616CA12A	10/16/2013
Test Receiver	ESCI	8609CA12A	11/3/2013
Pre-amplifier	310N	8612CA12A	11/3/2013



2.4. Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai.

TEST ITEM	RESULT	NOTE
Conducted RF disturbances	NA	
Radiated RF disturbances	Pass	
Harmonics	NA	
Voltage fluctuations	NA	
Harmonic currents	Pass	
Electrostatic Discharge (ESD)	Pass	
Radiated radio-frequency electromagnetic fields	Pass	
Electric Fast Transients /bursts (EFT/B)	Pass	
Surges	Pass	
Conducted disturbances induced by radio-frequency fields	Pass	
Current dips	Pass	

Notes: 1: NA =Not Applicable

Emission Test

3. Conducted RF disturbances

Test result: NA

3.1 Terminal Voltage Limits

3.1.1 Limits for conducted disturbance voltage at the mains ports of class A device

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

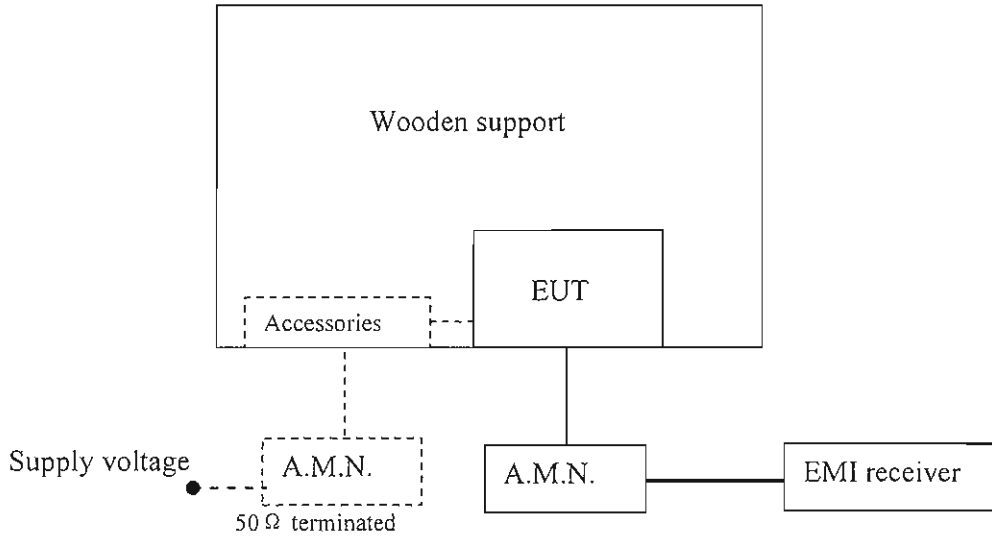
3.1.2 Limits for conducted disturbance voltage at the mains ports of class B device

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
 2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

3.2 Block Diagram of Test Setup

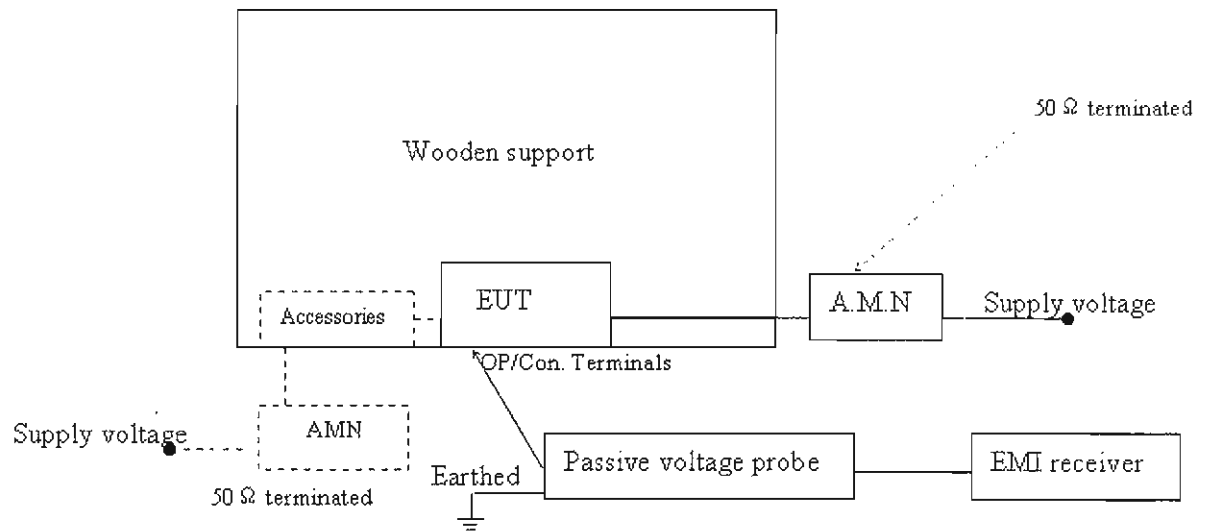
At mains terminal



For table top equipment, wooden support is 0.8m height table

For floor standing equipment, wooden support is 0.1m height rack.

At output and control terminals



Note:
 ————— : power line
 ————— : signal line
 - - - - - : means the test setup while available

3.3 Test Setup and Test Procedure

The EUT was set to achieve the maximum emission level.

The mains terminal disturbance voltage was measured with the EUT in a shielded room.

The EUT was connected to AC power source through an Artificial Mains Network which provide a 50Ω linear impedance

Artificial hand is used if appropriate.

The EUT was placed on a 0.8m high non-metallic table above a metallic plane, The wall of shielded room used as Ground Reference Plane (GRP)

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver ESCS 30 was set at 9kHz.

The frequency range from 150kHz to 30MHz was checked.

Amplitude measurements were performed with a quasi-peak detector and, if necessary, with an average detector.

3.4 Test Protocol

Temperature : °C
Relative Humidity : %
Waveform

Frequency (MHz)	Quasi-peak		Average	
	Disturbance level Permitted limit dB(uV)		Disturbance level Permitted limit dB(uV)	
0.15		79		66
0.24		79		66
0.55		73		60
1.40		73		60
3.50		73		60
22.00		73		60
30.00		73		60

Note: * means the emission level 10dB lower than the relevant limit.

3.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty at mains terminal: $\pm 1.99\text{dB}$ (0.15-30MHz), $\pm 2.09\text{dB}$ (9-150kHz)

Measurement uncertainty at load/control terminal: $\pm 1.99\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

3.6 Additions, Deviations and Exclusions from Standards

None.

4. Radiated RF disturbances

Test result: PASS

4.1 Radiated emission limit from frequency range 30MHz – 1000MHz

4.1.1 Limits for radiated disturbance of class A device

Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10M
30-230	50	40
230-1000	57	47

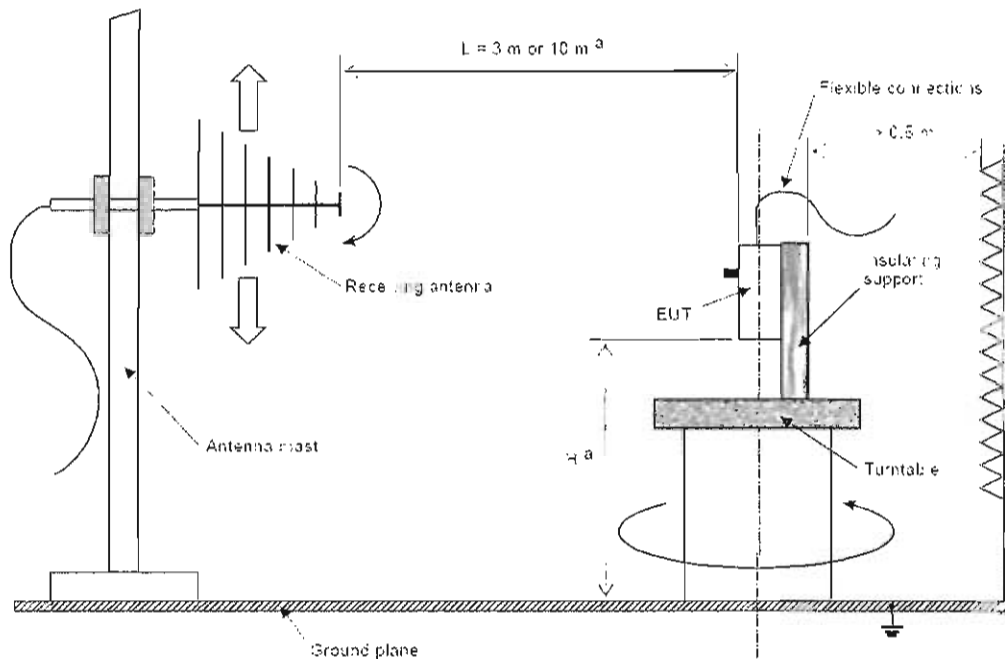
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.

4.1.2 Limits for radiated disturbance of class B device

Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10M
30-230	40	30
230-1000	47	37

Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.

4.2 Block diagram of test set up



^a See CISPR 11/CISPR 22.

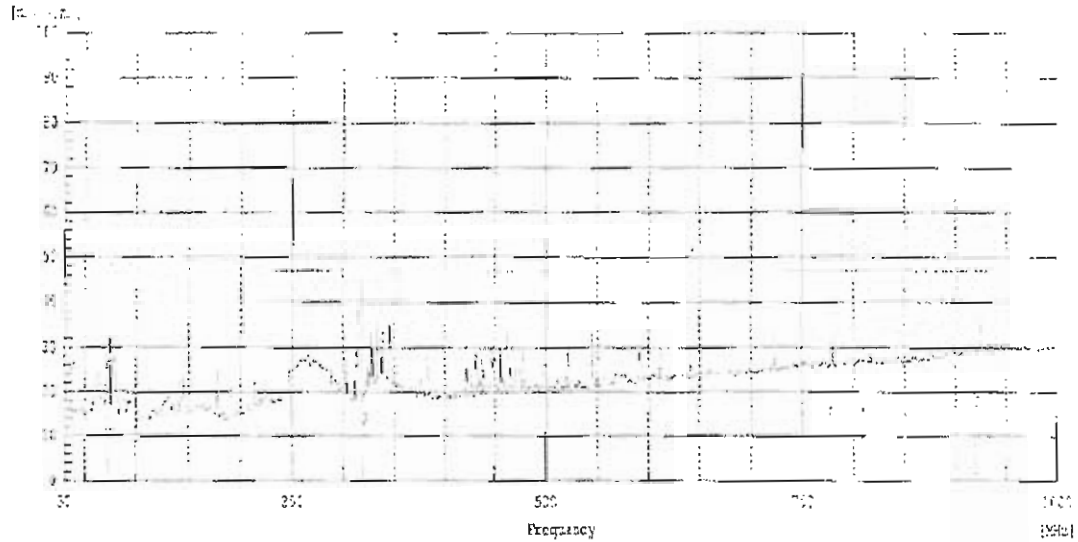
4.3 Test Setup and Test Procedure

The measurement was applied in a OATS.
Measurement was performed according to CISPR 22.
The bandwidth setting on R&S Test Receiver ESI26 was 120kHz.
The frequency range from 30MHz to 1000MHz was checked.

4.4 Test Protocol

Temperature: 26°C Relative humidity: 52%

Waveform



Final Result

No.	Frequency [MHz]	Pol	Reading [dB(μV)]	c.f	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	36.896	V	44.3	-18.9	25.3	40.0	14.6	107.0	139.2
2	13.650	H	33.6	21.0	12.5	40.0	27.5	312.0	233.7
3	319.419	H	10.8	-15.9	13.9	47.0	33.1	376.0	308.3
4	780.364	H	21.4	-0.6	15.6	47.0	31.4	357.0	299.4
5	808.986	V	22.1	-6.1	16.0	47.0	30.7	104.0	131.3
6	920.101	H	22.0	-4.0	18.0	47.0	29.0	367.0	272.9

4.5 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of radiated emission is: ± 5.31dB

The measurement uncertainty is given with a confidence of 95%, k=2.

The measurement uncertainty is traceable to internal procedure TI-036.

4.6 Additions, Deviations and Exclusions from Standards

None

Immunity Test

Performance criteria

Performance criterion A:

For step 1, the circuit-breaker when loaded at 0,9 times the current setting shall not trip and the monitoring functions, if any, shall correctly indicate the status of the circuit-breaker.

For step 2, when loaded at 2,0 times the current setting, the circuit-breaker shall trip within 0,9 times the minimum value and 1,1 times the maximum value of the manufacturer's time current characteristic, and the monitoring functions, if any, shall correctly indicate the status of the circuit-breaker.

Performance criterion B:

During the test, the circuit-breaker when loaded at 0,9 times the current setting shall not trip. After the test, the circuit-breaker shall comply with the manufacturer's time current characteristic when loaded at 2,0 times the current setting and the monitoring functions, if any, shall correctly indicate the status of the circuit-breaker.

Basic EMC standard for immunity test

IEC 61000-4-2: Electromagnetic Compatibility (EMC) – Part 4- 2: testing and measurement techniques – electrostatic discharge immunity test

IEC 61000-4-3: Electromagnetic Compatibility (EMC) – Part 4- 3: testing and measurement techniques – radiated, radio frequency, electromagnetic field immunity test

IEC61000-4-4: Electromagnetic Compatibility (EMC) – Part 4- 4: testing and measurement techniques – electric fast transient/burst immunity test

IEC 61000-4-5: Electromagnetic Compatibility (EMC) – Part 4- 5: testing and measurement techniques – section 5: surge immunity test

IEC 61000-4-6: Electromagnetic Compatibility (EMC) – Part 4- 6: testing and measurement techniques – section 6: immunity to conducted disturbance, induced by radio frequency field

IEC61000-4-11: Electromagnetic Compatibility (EMC) – Part 4- 11: testing and measurement techniques –voltage dips, short interruption and voltage variations immunity test

IEC 61000-4-13: Electromagnetic Compatibility (EMC) – Part 4-13: testing and measurement techniques –harmonics and interharmonics including mains signaling at a.c. power port, low frequency immunity tests

Note: For the above standards, the latest edition (including any amendments) applies.

5. Harmonic currents

Test result

PASS

5.1 Severity Level and Performance Criterion

5.1.1 Test level

The test current waveform shall consist of one of the following two options:

– option a): two waveforms applied successively:

- a waveform consisting of a fundamental and a third harmonic component;
- a waveform consisting of a fundamental and a fifth harmonic component.

– option b): a waveform consisting of a fundamental and a third, fifth and seventh

harmonic component.

Test currents shall be

– for option a):

test of the third harmonic and peak factor

- 72 % of fundamental component \leq third harmonic \leq 88 % of fundamental

component;

- peak factor: $2,0 \pm 0,2$;

test of the fifth harmonic and peak factor

- 45 % of fundamental component \leq fifth harmonic \leq 55 % of fundamental component;

- peak factor: $1,9 \pm 0,2$;

– for option b):

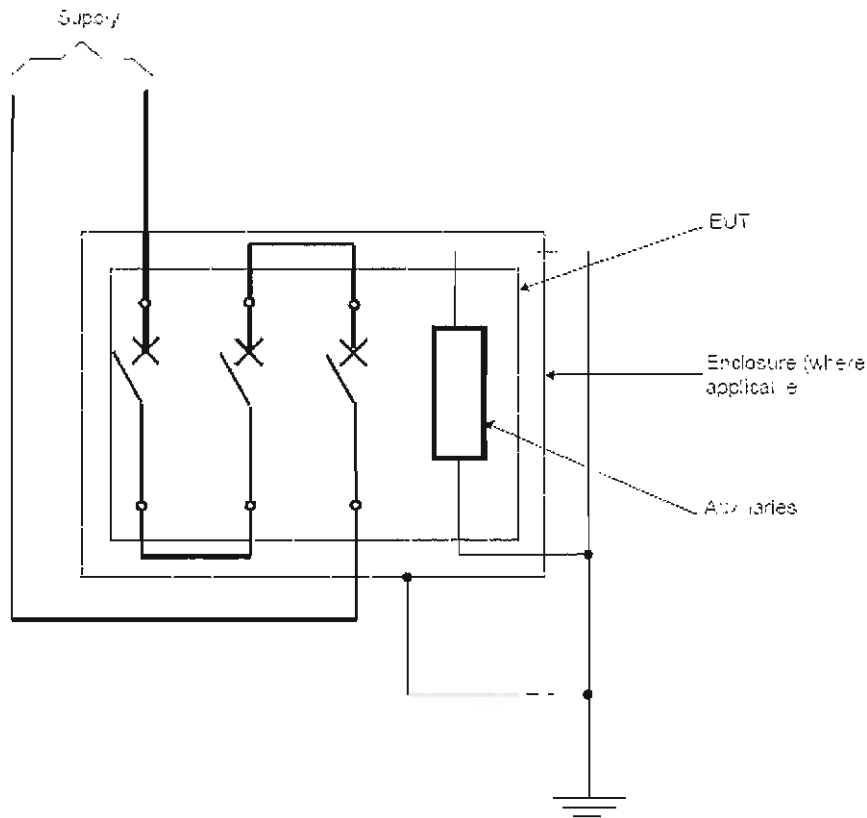
the test current, for each period, consists of two equal opposite half-waves defined as follows:

- current conduction time, for each half-wave is \leq 21 % of the period;
- peak factor: $\geq 2,1$.

5.1.2 Performance Criterion

Performance criterion A

5.2 Block Diagram of Test Setup



5.3 Test Setup and Test Procedure

The tests shall be performed on two-phase poles, chosen at random in accordance with item b) of 7.2.1.2.4 carrying the test current at any convenient voltage, connections being in accordance with Figure F.2. For releases with a phase loss sensitive feature, connections shall be made in accordance with Figures F.3 or F.4, as applicable.

Undervoltage releases, if any, shall either be energized or disabled. All other auxiliaries shall be disconnected during the test.

The duration of the test to verify the immunity to unwanted tripping (at 0,9 times the current setting) shall be 10 times the tripping time, which corresponds to twice the current setting.



5.4 Test Protocol

Temperature : 26°C
Relative Humidity: 52%

Step	Pass/ Fail
Step1	Pass
Step2	Pass

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements

6. Electrostatic Discharge (ESD)

Test result **PASS**

6.1 Severity Level and Performance Criterion

6.1.1 Test level

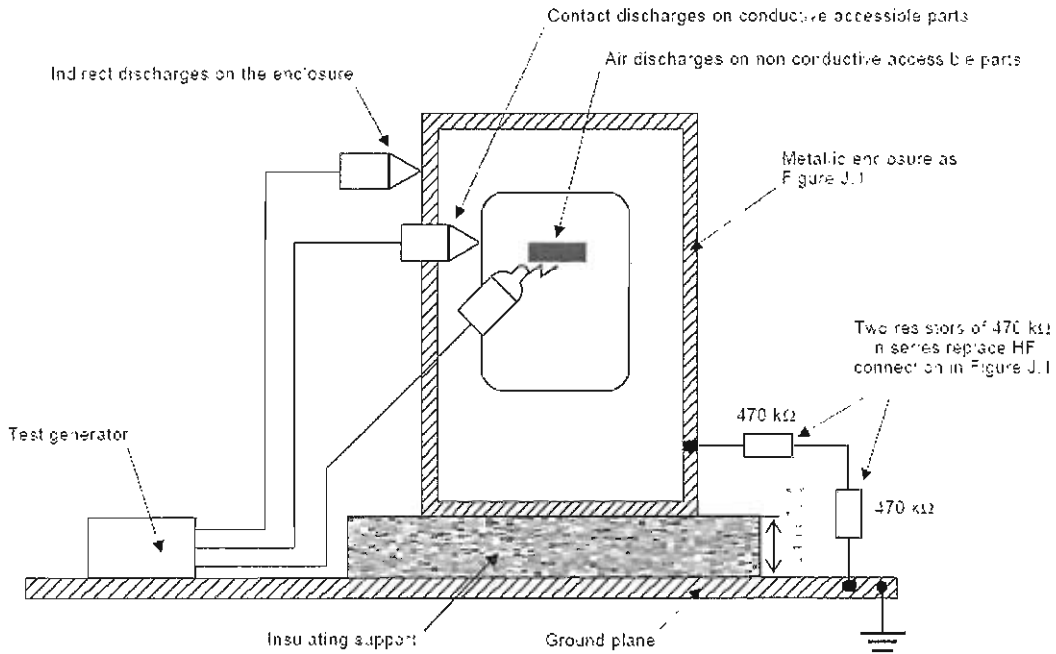
1a – Contact discharge		1b – Air discharge	
Level	Test voltage kV	Level	Test voltage kV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
X	Special	X	Special

Notes: 1. "X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.
2. The gray rows were the selected test level.

6.1.2 Performance Criterion

Performance criterion B

6.2 Block Diagram of Test Setup



6.3 Test Setup and Test Procedure

The direct discharge tests shall be performed only on parts of the EUT normally accessible to the user, such as setting means, keyboards, displays, pushbuttons etc. The application points shall be stated in the test report.

Direct discharges are made 10 times for each polarity, at intervals of ≥ 1 s.

Indirect discharges shall be applied at selected points on the surface of the enclosure; the test at such points is made 10 times, for each polarity, at intervals of ≥ 1 s.

6.4 Test Protocol

Temperature : 26°C
Relative Humidity: 52%

Direct discharge was applied at the following selected points:

Test point #	Test level [kV]	Air/Contact	Polarity (+/-)	Pass/Fail	Comment
A	8	Contact	+/-	Pass	all touchable screws of enclosure
B	8	Contact	+/-	Pass	Accessible metal parts of the EUT
C	8	Air	+/-	Pass	Air gap of the switch, button
D	8	Air	+/-	Pass	The air in-taking opening
E	8	Air	+/-	Pass	Slots around the EUT

Indirect contact discharges were applied to the VCP and the HCP at the following selected points:

Point	Description	Point	Result
HCP f	0,1m from the front of the EUT	Edge of centre,coner on HCP	Pass
HCP b	0,1m from the back of the EUT	Edge of centre,coner on HCP	Pass
HCP r	0,1m from the right side of the EUT	Edge of centre,coner on HCP	Pass
HCP l	0,1m from the left side of the EUT	Edge of centre,coner on HCP	Pass
VCP f	0,1m from the front of the EUT	Edge of centre,coner on VCP	Pass
VCP b	0,1m from the back of the EUT	Edge of centre,coner on VCP	Pass
VCP r	0,1m from the right of the EUT	Edge of centre,coner on VCP	Pass
VCP l	0,1m from the left of the EUT	Edge of centre,coner on VCP	Pass

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements



7. Radiated radio-frequency electromagnetic fields

Test result **PASS**

7.1 Severity Level and Performance Criterion

7.1.1 Test level

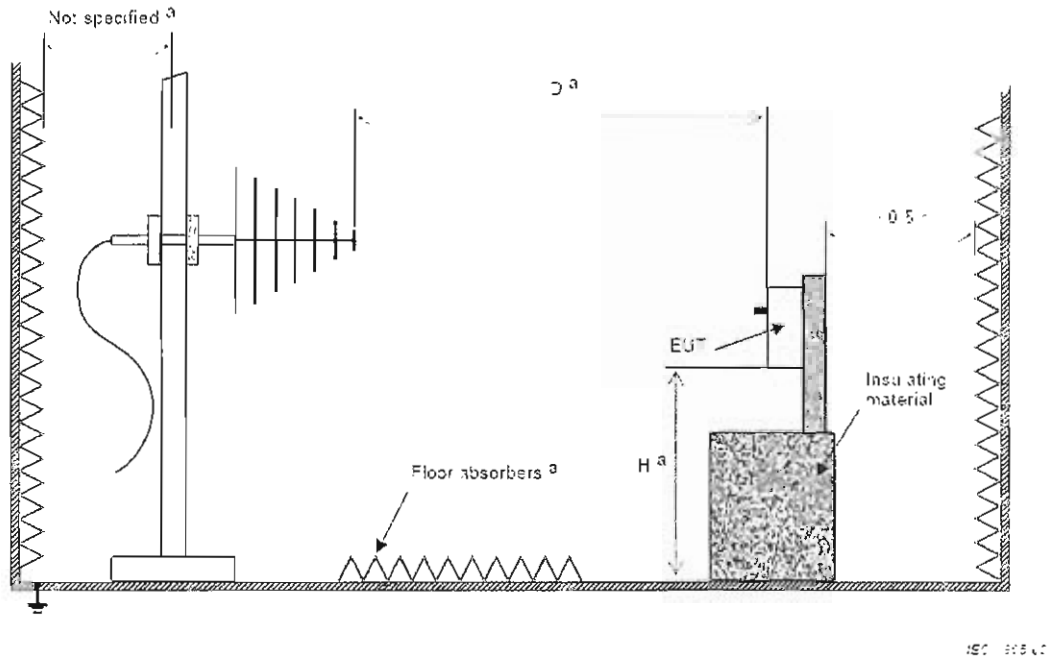
Level	Test field strength V/m
1	1
2	3
3	10
X	Special

Note: 1. X is an open test level, this level may be given in the product specification.
2. The gray row is the selected test level.

7.1.2 Performance Criterion

Performance criterion A

7.2 Block diagram of test setup



^a See IEC 61000-4-3.

7.3 Test Setup and Test Procedure

The EUT shall be tested on the front face only

Tests shall be performed with both horizontal and vertical antenna polarization.

The test is performed in two steps: a first step (step 1) where the EUT is tested for unwanted operation on the whole range of frequencies, and a second step (step 2) where the EUT is tested for correct operation at discrete frequencies.

For step 1, the frequency shall be swept over the ranges of 80 MHz to 1 000 MHz and 1 400 MHz to 2 000 MHz, in accordance with Clause 8 of IEC 61000-4-3. The dwell time of the amplitude modulated carrier for each frequency shall be between 500 ms and 1 000 ms, and the step size shall be 1 % of the previous frequency. The actual dwell time shall be stated in the test report.

For step 2, to verify the functional characteristics, the test shall be performed at each of the following frequencies: 80; 100; 120; 180; 240; 320; 480; 640; 960; 1 400 and 1 920 MHz, the operation being verified after the field at each frequency has stabilized.



7.4 Test Protocol

Temperature : 26°C
Relative Humidity: 52%

Test no.:	Frequency (MHz)	Polarization	Dwell time ms	Test level V/m	Exposed location	Result
1	80-1000 1400-2000	H & V	1000	10	Front	Pass
2	80,100,120, 180,240,320, 480,640,960, 1400,1920	H & V	--	10	Front	Pass

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements

8. Electric Fast Transients/Bursts

Test result **PASS**

8.1 Severity Level and Performance Criterion

8.1.1 Test level

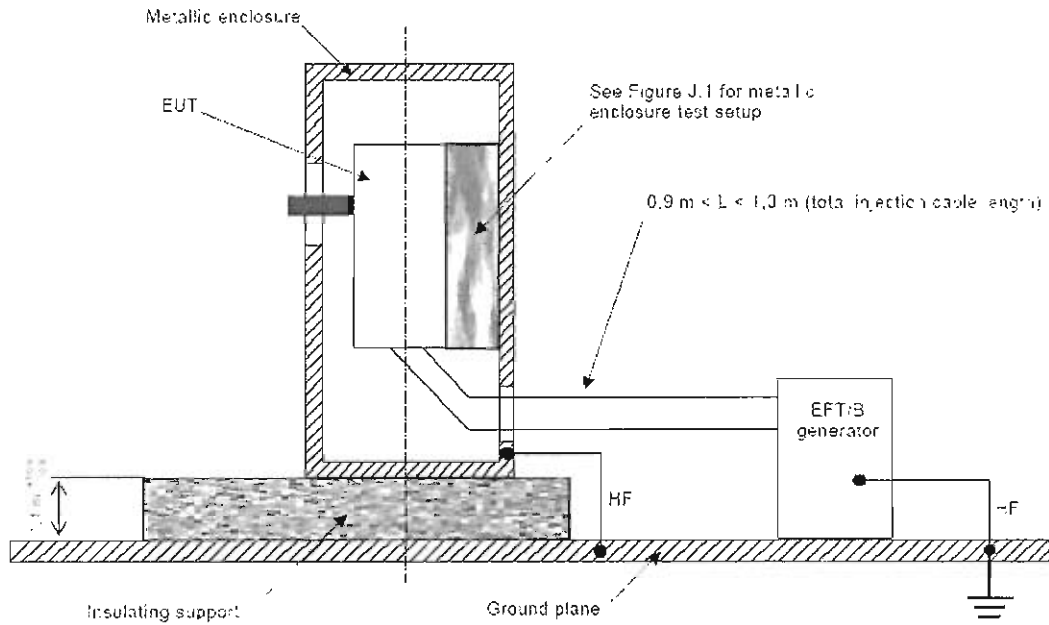
Open circuit output test voltage(+/-10%) and repetition rate of the impulses (+/- 20%)				
Level	On power supply port PE		On I/O (input & output) signal, data and control ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	5	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	2.5	2	5
X	Special	Special	Special	Special

Notes : 1. "X" is a an open level. The level has to be specified in the dedicated equipment specification.
2. The gray rows were the selected test level.

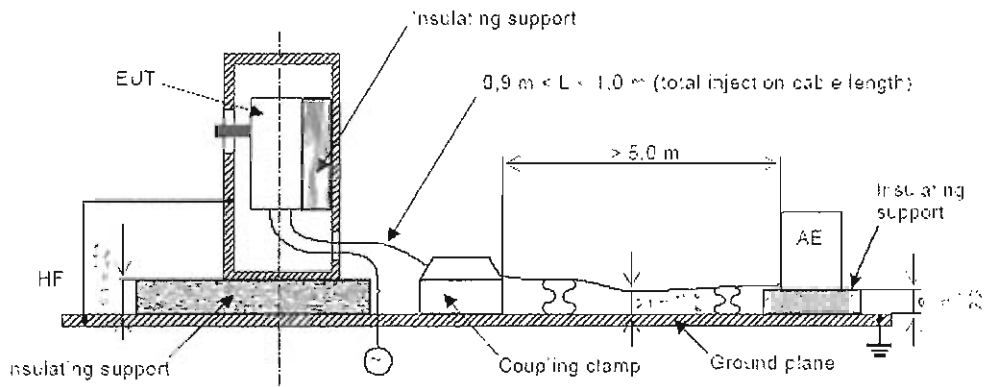
8.1.2 Performance Criterion

Performance criterion A. However, temporary changes to the monitoring functions (e.g. unwanted LED illumination) during the tests are acceptable, in which case the correct functioning of the monitoring shall be verified after the tests. For step 2, the disturbance shall be applied until the circuit-breaker trips.

8.2 Block Diagram of Test Setup



On power lines



ISO 17025

Key

AE auxiliary equipment

HF high frequency connection

On signal lines

8.3 Test Setup and Test Procedure

The test shall be performed with the EUT in a specific enclosure

For power and auxiliary supply ports, the coupling-decoupling network shall be used

For signal ports the coupling-decoupling network or the clamp injection method shall be used, as applicable

The disturbance shall be applied for 1 min, except where otherwise specified.

8.4 Test Protocol

Temperature : 26°C
 Relative Humidity: 52%

Test No. #	Level [kV] ($U_e \geq 100V$ or $U_e < 100V$)	Polarity +/-	Line for test	Pass/ Fail	Comment
1	4	+/-	L1	P	
2	4	+/-	L2	P	
3	4	+/-	L3	P	

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements



9. Surges

Test result **PASS**

9.1 Severity Level and Performance Criterion

9.1.1 Test level

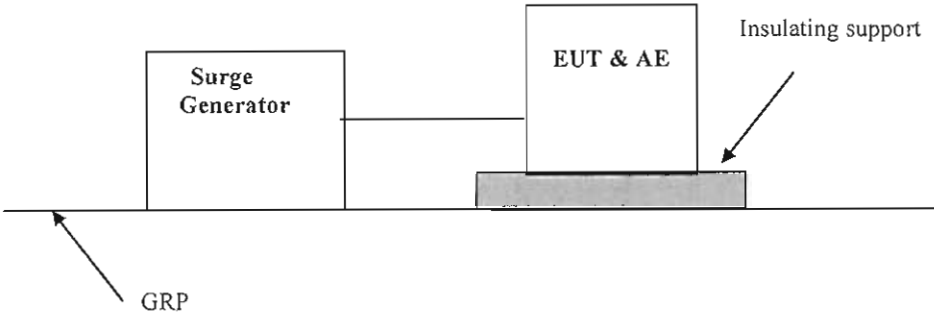
Level	Open-Circuit test voltage +/-10% kV
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special

Notes: 1."X" is an open class. This level can be specified in the product Specification
2. The gray rows are the selected level. Class 2 is applied to Phase to Phase (L-N)
Class 3 is applied to Phase to PE (L-PE),(N-PE)

9.1.2 Performance Criterion

Performance criterion B

9.2 Block Diagram of Test Setup



9.3 Test Setup and Test Procedure

The test shall be carried out with the EUT in a specific enclosure. Pulses with both positive and negative polarity shall be applied, the phase angles being 0° and 90°.

A series of five pulses is applied for each polarity and each phase angle (total number of pulses: 20), the interval between two pulses being approximately 1 min. A shorter interval may be used by agreement with the manufacturer.

9.4 Test Protocol

Temperature : 26°C
Relative Humidity: 52%

Test No. #	Level [kV] (Ue>=100 Vor Ue<100V)	Polarity +/-	Line for test	Pass/ Fail
1	2	+/-	a.c. Mains (line to line)	Pass
2	4	+/-	a.c. Mains (line to earth)	Pass
3	0.5	+/-	DC (line to line)	NA
4	0.5	+/-	DC (line to earth)	
5	1	+/-	Signal(line to line)	
6	2	+/-	Signal (line to earth)	
Notes: "NA" means not applicable. "X" is for other available lines.				

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements

10. Conducted Disturbances, Induced by Radio-frequency Fields

Test result **PASS**

10.1 Severity Level and Performance Criterion

10.1.1 Test level

Frequency range 150kHz – 230MHz		
Level	Voltage level (e.m.f.)	
	U0 [dB(uV)]	U0 (V)
1	120	1
2	130	3
3	140	10
X	Special	Special

Notes: 1. "X" is an open level
2. The gray row is the selected test level.

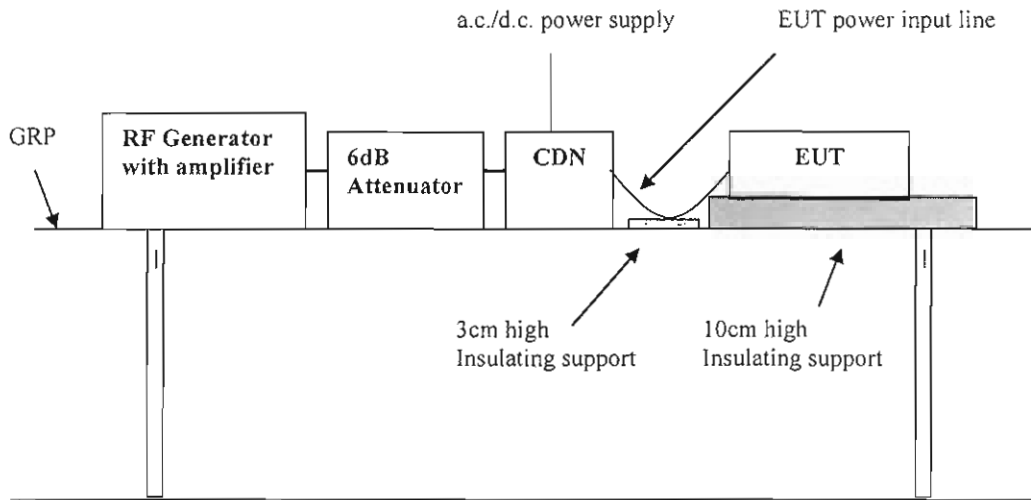
10.1.2 Performance Criterion

Performance criterion A

10.2 Diagram of Test Setup

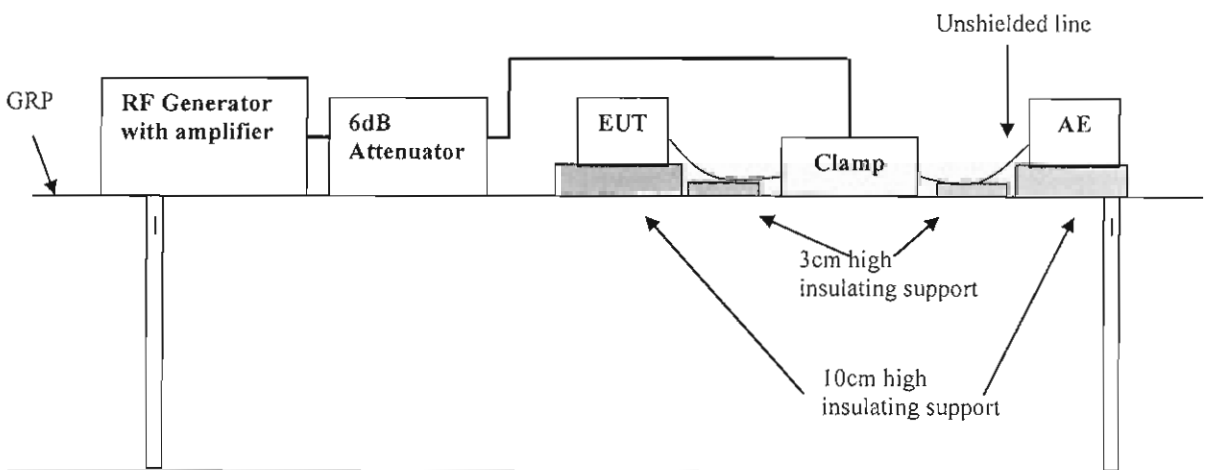
10.2.1 Block Diagram for a.c./d.c input power line

Block Diagram for a.c./d.c input power line

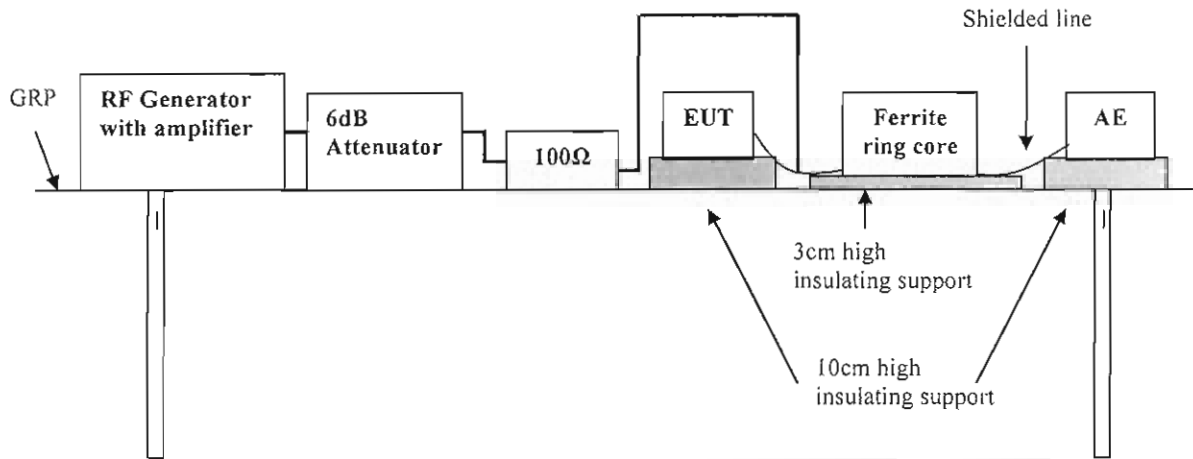


10.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

Unshielded line



Shielded line



10.3 Test Setup and Test Procedure

The EUT shall be tested in free air

The test is performed in two steps: a first step (step 1) where the EUT is tested for unwanted operation on the whole range of frequencies, and a second step (step 2) where the EUT is tested for correct operation at discrete frequencies.

For step 1 the frequency shall be swept over the range of 150 kHz to 80 MHz in accordance with Clause 5 of IEC 61000-4-6. The dwell time of the amplitude modulated carrier for each frequency shall be between 500 ms and 1 000 ms, and the step size shall be 1 % of the previous frequency. The actual dwell time shall be stated in the test report.

For step 2, to verify the functional characteristics, the test shall be performed at each of the following frequencies: 0,150; 0,300; 0,450; 0,600; 0,900; 1,20; 1,80; 2,40; 3,60; 4,80; 7,20; 9,60; 12,0; 19,2; 27,0; 49,4; 72,0 and 80,0 MHz, the operation being verified after the level of the disturbing voltage at each frequency has stabilized.

10.4 Test Protocol

Temperature : 26°C
Relative Humidity: 52%

Test No.	Frequency (MHz)	Level V (e.m.f.)	Dwell time ms	Amplitude modulation	Injected point	Result
1	0.15~80	10	1000	1kHz 80%	a.c. Mains	Pass
2	0.150,0.300,0.450, 0.600,0.900,1.20, 1.80,2.40,3.60,4.80, 7.20,9.60,12.0,19.2, 27.0,49.4,72.0,80	10	--	1kHz 80%	a.c. Mains	Pass
3	0.15~80	10	1000	1kHz 80%	Signal lines	-
4	0.150,0.300,0.450, 0.600,0.900,1.20, 1.80,2.40,3.60,4.80, 7.20,9.60,12.0,19.2, 27.0,49.4,72.0,80	10	--	1kHz 80%	Signal lines	-

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements

11. Current dips

Test result **PASS**

11.1 Severity Level and Performance Criterion

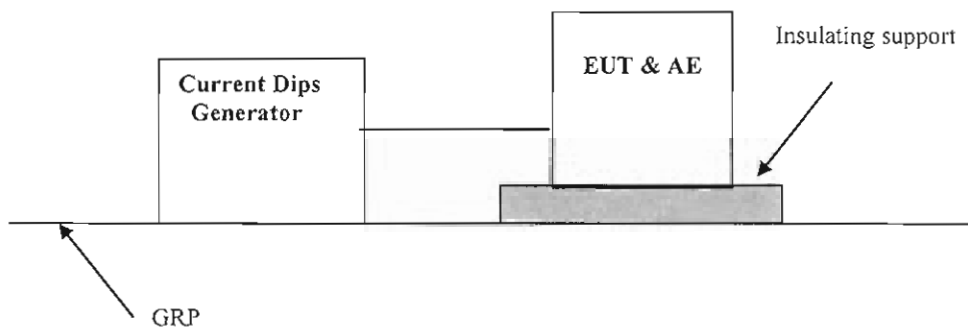
11.1.1 Test level

Test No.	I_D	Δt
1	0	0,5 T
2		1 T
3		5 T
4		25 T
5		50 T
6	0,4 I_R	10 T
7		25 T
8		50 T
9	0,7 I_R	10 T
10		25 T
11		50 T

11.1.2 Performance Criterion

Performance criterion B shall apply, except that the after-test verification is not required.

11.2 Block diagram of test setup



11.3 Test Setup and Test Procedure

The tests shall be performed with a sinusoidal current at any convenient voltage. The current applied shall be according to Figure F.5 and to Table F.1 where I_R is the setting current, I_D is the dip test current and T is the period of the sinusoidal current. The duration of each test shall be between three and four times the maximum tripping time corresponding to twice the current setting or 10 min, whichever is the lower.

11.4 Test Protocol

Temperature : 26 °C
Relative Humidity: 52 %

Test no.	I_D	Δt	Pass/ Fail	Comment
1	0	0.5T	Pass	-
2	0	1T	Pass	-
3	0	5T	Pass	-
4	0	25T	Pass	-
5	0	50T	Pass	-
6	$0.4I_R$	10T	Pass	-
7	$0.4I_R$	25T	Pass	-
8	$0.4I_R$	50T	Pass	-
9	$0.7I_R$	10T	Pass	-
10	$0.7I_R$	25T	Pass	-
11	$0.7I_R$	50T	Pass	-

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements

Appendix I : Photograph of EUT

