UltraTech
Group of Labs

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Ultratech's Accreditations:

0685

91038

1309

Industry Canada
Industrie Canada
Approved Test Facility
46390-2049

NvLap Lab Code 200093-0

SL2-IN-E-1119R

Korea KCC-RRL
CA2049

3000 Bristol Circle,
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Website: www.ultratech-labs.com
Email: vic@ultratech-labs.com

June 4, 2010

Elprotronic Inc.
16 Crossroads Drive
Richarmond Hill, Ontario
Canada, L4E 5C9

Attn.: **Dr. Gregory Czajkowski**

Subject: **Verification Testing in accordance with CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 EMC Requirements - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements**

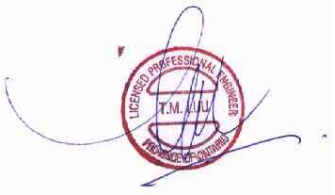
Product: **Flash Programming Adapter**
Model: **USB-FPA**

Dear Dr. Czajkowski,

The product sample has been tested in accordance with **CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 - Electromagnetic Compatibility Requirements - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements,** and the results and observation were recorded in the engineering report, Our File No.: ELP007-EN24

Enclosed you will find copies of the engineering report. If you have any queries, please do not hesitate to contact us.

Yours truly,



Tri Minh Luu, P.Eng
Vice President - Engineering

Encl.

VERIFICATION CERTIFICATE

NOT TRANSFERABLE

This Verification Certificate is hereby issued to the named GRANTEE and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below:

GRANTEE:	Elprotronic Inc.
Address:	16 Crossroads Drive Richarmond Hill, Ontario Canada, L4E 5C9
Contact Person:	Dr. Gregory Czajkowski Phone #: 905-780-5789/436-2879 Fax #: 905-780-2414 Email Address: gregory@elprotronic.com
Equipment Type:	Information Technology Equipment
Product Name:	Flash Programming Adapter
Model No.:	USB-FPA
The above product was tested by UltraTech Engineering Labs Inc. and found to comply with:	CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 - Electromagnetic Compatibility Requirements - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements

Note(s): *See attached report, UltraTech's File No.: ELP007-EN24, dated* June 4, 2010 *for details and conditions of Verification Compliance.*

Approved by: Tri M. Luu, P.Eng.
V.P. – Engineering

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax.: (905) 829-8050
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91038	1309	46390-2049	NvLap Lab Code 200093-0	SL2-IN-E-1119R	Korea KCC-RRL CA2049

DECLARATION OF CONFORMITY

APPPLICATION OF COUNCIL DIRECTIVE(S):	**2004/108/EC - The EMC Directive**
GRANTEE: **ADDRESS:**	Elprotronic Inc. 16 Crossroads Drive Richarmond Hill, Ontario Canada, L4E 5C9
Equipment Type: **Product Name:** **Model No.:**	Information Technology Equipment Flash Programming Adapter USB-FPA

I, the undersigned, hereby, declare that the above device has been tested and found to comply with the following standard(s):

STANDARD(S) TO WHICH CONFORMITY IS DECLARED:	• **CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003** - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements
Test Laboratories:	Ultratech Engineering Labs Inc. 3000 Bristol Circle Oakville, Ontario, Canada L6H 6G4

European CISPR 22:2008-09 / EN 55022:2006

Applicant:

Signature:

Full Name: *Dr. Gregory Czajkowski*
Title: *AMD*
Full Address: *Elprotronic Inc.*
16 Crossroads Drive
Richmond Hill, Ontario
Canada, L4E 5C9
Phone No.: *905-780-5789/436-2879*
Email Address: *gregory@elprotronic.com*

Legal Representative in Europe:

Signature:

Full Name:
Title:
Full Address:

Phone No.:
Email Address:

Summary of Applicable Test Results

STANDARD	DESCRIPTION	SEVERITY APPLIED	PERFORMANCE CRITERIA MET	PERFORMANCE CRITERIA ALLOWED
IEC 61000-4-2 **EN 61000-4-2**	Electrostatic Discharge	▪ ±4kV Contact Discharge (Direct & Indirect) ▪ ±8kV Air Discharge	**A**	**B**
IEC 61000-4-3 **EN61000-4-3** **ENV 50204**	Radiated RF Immunity	▪ 3 V/m, 80-1000 MHz, 1 kHz 80% AM Modulation ▪ 3 V/m. 895 to 905 MHz, 200Hz Pulse Modulation	**A**	**A**
IEC 61000-4-4 **EN 61000-4-4**	Electrical Fast Transient	▪ ± 1kV on AC Lines ▪ ± 0.5 kV on I/O Lines	**A**	**B**
EN 61000-4-5 **EN 61000-4-5**	Surge Withstand Immunity	▪ ± 2kV Common Mode on AC Lines ▪ ± 1kV Differential mode on AC lines ▪ ± 1kV Common mode ports that connected to outdoor telecom cables ▪ ± 0.5kV Common mode ports that connected to indoor telecom cables and DC input supply (if longer than 10 m)	**N/A** **(see note)**	**B** **B** **B** **B**
IEC 61000-4-6 **EN 61000-4-6**	Conducted RF Immunity	▪ 3V, 0.15-80 MHz, 1kHz 80% AM modulation on AC & I/O Lines	**A**	**A**
IEC 61000-4-8 **EN 61000-4-8**	Magnetic Field Immunity	▪ 50 Hz, 1 A/m	**N/A** **(see note 1)**	**A**
IEC 61000-4-11 **EN 61000-4-11**	▪ Voltage Dips ▪ Voltage Dips ▪ Voltage Interruption	▪ Dip 30% - 0.5 Sec. Interval on AC ▪ Reduction >95% for 10m Sec. interval ▪ Reduction >95% for 5 Sec. interval	**N/A** **(see note)**	**C** **B** **C**
IEC 61000-3-2 **EN61000-3-2**	Harmonic Current Emissions	▪ Class A (Other) ▪ Class B (Portable Equipment) ▪ Class C (Lighting Equipment) ▪ Class D (Special Current Waveform)	**N/A** **(see note)**	**PASS**
IEC 61000-3-3 **EN61000-3-3**	Voltage Fluctuation and Flicker in Low-Voltage Supply Systems	▪ Voltage Fluctuation ▪ Flicker	**N/A** **(see note)**	**PASS** **PASS**

NOTE:
N/A – not applicable for DC supplied from a close connected host system.

NOTE 1:

N/A – No magnetic sensitive components

ENGINEERING TEST REPORT

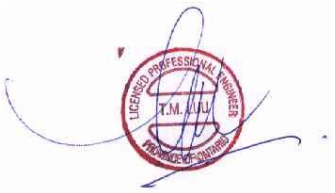
Flash Programming Adapter
Model No.: USB-FPA

Applicant: **Elprotronic Inc.**
16 Crossroads Drive
Richarmond Hill, Ontario
Canada, L4E 5C9

In Accordance With

EUROPEAN STANDARD
CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003
ELECTROMAGNETIC COMPATIBILITY REQUIREMENTS
Information Technology Equipment
Immunity Characteristics - Limits and Methods of Measurements

UltraTech's File No.: ELP007-EN24

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: June 4, 2010	
Report Prepared by: Chau Le Issued Date: June 4, 2010	Tested by: Nimisha Delsai, Dennis Luu & Qaun Ngo, EMC Technicians Test Dates: May 18, 20 & 21, 2010

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax.: (905) 829-8050
Website: www.ultratech-labs.com Email: vic@ultratech-labs.com, Email: tri.luu@sympatico.ca

91038	1309	46390-2049	NvLap Lab Code 200093-0	SL2-IN-E-1119R	Korea KCC-RRL CA2049

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003
Title	Electromagnetic Compatibility Requirements, - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements.
Purpose of Test:	To gain CE Declaration of Conformity Compliance in accordance with CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003
Method of Measurements:	The immunity tests were performed in accordance with CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003, EN 61000-3-2, EN 61000-3-3 and EN 61000-4-2 through EN 61000-4-11.
Environmental Classification:	▪ Residential ▪ Light-industry, Commercial

The CISPR publication applies to information technology equipment (ITE) as defined in CISPR 22.

Harmonized standards prepared by ETIS, which cover the immunity requirements for telecommunications network equipment take precedence over this standard.

Procedures are defined for the measurement of the ITE and limits are specified which are developed for ITE and within the frequency range from 0 Hz to 400 GHz.

The object of the Standard EN 55024:1998 is to establish requirements which will provide an adequate level of intrinsic immunity so that the equipment will operate as intended in its environment.

For exceptional environment conditions, special mitigation measures may be required.

Owning to testing and performance assessment considerations, some tests are specified in defined frequency bands or at selected frequencies. Equipment which fulfils the requirements at these frequencies is deemed to fulfil the requirements in the entire frequency range form 0 Hz to 400 GHz for electromagnetic phenomena.

The object of the Standard EN 55024:1998 is to define the immunity test requirements for equipment defined in the scope in relation to continuous and transient, conducted and radiated disturbances, including electrostatic discharge (ESD)

The test requirements are specified for each port considered.

Notes:

1. Safety considerations are not covered in the Standard EN 55024:1998
2. In special cases, situations will arise where the level of disturbance may exceed the levels specified in the Standard EN 55024:1998, for example where a hand-held terminal is used in proximity to an equipment. In these instances special mitigation measures may have to be employed.

1.2. APPLICABILITY OVERVIEW TABLES

It may be determined from consideration of the technical characteristics and/or intended operational environment of a particular EUT that some tests are technically inappropriate. In such a case, the decision and justification not to test these parameters shall be recorded in the test report. Decisions on the applicability of individual tests shall be based on information contained in user document and/or installation instructions, and consideration of the technical design.

CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements**.**

STANDARD	DESCRIPTION	SEVERITY APPLIED	PERFORMANCE CRITERIA
IEC 61000-4-2 **EN 61000-4-2**	Electrostatic Discharge	▪ 4kV Contact Discharge (Direct & Indirect) ▪ 8kV Air Discharge	**B**
IEC 61000-4-3 **EN61000-4-3** **ENV 50204**	Radiated RF Immunity	▪ 3 V/m, 80-1000 MHz, 1 kHz 80% AM Modulation ▪ 3 V/m. 900MHz, 200Hz Pulse Modulation	**A**
IEC 61000-4-4 **EN 61000-4-4**	Electrical Fast Transient	▪ ± 1kV on AC/DC Lines ▪ ± 0.5 kV on I/O Lines	**B**
EN 61000-4-5 **EN 61000-4-5**	Surge Withstand Immunity	▪ ± 2kV Common Mode on AC Lines ▪ ± 1kV Differential mode on AC lines ▪ ± 1kV Common mode ports that connected to outdoor telecom cables ▪ ± 0.5kV Common mode ports that connected to indoor telecom cables and DC input supply (if longer than 10 m)	**B** **B** **B** **B**
IEC 61000-4-6 **EN 61000-4-6**	Conducted RF Immunity	▪ 3V, 0.15-80 MHz, 1kHz 80% AM modulation on AC, DC & I/O Lines	**A**
IEC 61000-4-8 **EN 61000-4-8**	Magnetic Field Immunity	▪ 50 Hz, 1 A/m	**A**
IEC 61000-4-11 **EN 61000-4-11**	▪ Voltage Dips ▪ Voltage Dips ▪ Voltage Interruption	▪ Dip 30% - 0.5 Sec. Interval on AC ▪ Reduction >95% for 10m Sec. interval ▪ Reduction >95% for 5 Sec. interval	**C** **B** **C**
IEC 61000-3-2 **EN61000-3-2**	Harmonic Current Emissions	▪ Class A (Other) ▪ Class B (Portable Equipment) ▪ Class C (Lighting Equipment) or ▪ Class D (Special Current Waveform)	**PASS**
IEC 61000-3-3 **EN61000-3-3**	Voltage Fluctuation and Flicker in Low-Voltage Supply Systems	▪ Voltage Fluctuation ▪ Flicker	**PASS** **PASS**

1.3. NORMATIVE REFERENCES

The methods and procedures used for the measurements contained in this report are details in the following reference standards:

Publication	YEAR	Title	EN/HD	Year
2004/108/EC	2004	Council Directive on the Approximation of the Laws of the Member States Relating Electromagnetic Compatibility		
IEC 50(151)	1978	International Electrotechnical Vocabulary (IEV), Chapter 151: Electrical and Magnetic Devices	-	1995
IEC 50(161)	1990	Chapter 161: Electromagnetic Compatibility	-	1996
IEC 61000-3-2	2005	Electromagnetic Compatibility (EMC) Part 3: Limits Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)	EN 61000-3-2	2006
IEC 61000-3-3	2002	Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16A	EN 61000-3-3 +A1 +A2	1995 2001 2005
IEC 61000-4-2	1995	Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test – Basic EMC publication	EM 61000-4-4	2001
IEC 61000-4-3	2002-09	Radiated radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-4	2004	Section 4: Electrical fast transient/burst immunity test – Basic EMC publication	EN 61000-4-4	2004
IEC 61000-4-5	1995	Section 5: Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	1996	Section 6: Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2007
IEC 61000-4-11	2004-03	Section 11: Voltage dips, short interruptions and voltage variations immunity tests – Basic EMC publication	EN 61000-4-11	2004
CISPR 24 +A1 +A2	1997 2001 2002	Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurements	EN 55024 +A1 +A2	1998 2001 2003

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT:	
Name:	Elprotronic Inc.
Address:	16 Crossroads Drive Ricmond Hill, Ontario Canada, L4E 5C9
Contact Person:	Dr. Gregory Czajkowski Phone #: 905-780-5789 Fax #: 905-780-2414 Email Address: gregory@elprotronic.com

MANUFACTURER:	
Name:	Elprotronic Inc.
Address:	16 Crossroads Drive Ricmond Hill, Ontario Canada, L4E 5C9
Contact Person:	Dr. Gregory Czajkowski Phone #: 905-780-5789/416-436-2879 Fax #: 905-780-2414 Email Address: gregory@elprotronic.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name	Elprotronic Inc.
Product Name	Flash Programming Adapter
Model Name or Number	USB-FPA
Serial Number	20100562
Type of Equipment	Information Technology Equipment
Oscillators' Frequencies	24.00 MHz
CPUs' Frequencies	48.00 MHz (CPU), 480.0 MHz (SIE), 1.0 MHz (Aux.CPU)
Power input source:	DC derived from host (from PC via USB)

2.3. LIST OF COMPONENTS/PARTS OF THE EUT

None

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	USB	1	USB type B	shielded
2	Ribbon cable	1	14-pins header	Non-shielded

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Brand name:	HP X004300 (PC)
Part Number:	PZ013UT#ABA
Serial Number:	2UA63108C5
Cable Type:	Shielded
Connected to EUT's Port:	USB

Ancillary Equipment # 2	
Brand name:	Monitor ACER
Model Name or Number:	X223W
Serial Number:	ETLAZ090478130394A3610
Cable Type:	Shielded
Connected to HP Port:	HD15

Ancillary Equipment # 3	
Brand name:	Microsoft Mouse
Part Number:	X800472-105
Cable Type:	Shielded
Connected to EUT's Port:	USB

Ancillary Equipment # 4	
Brand name:	Dell Keyboard
Model Name or Number:	RT7DJ1W
Serial Number:	37172-990-2045
Cable Type:	Shielded
Connected to EUT's Port:	PS2

Ancillary Equipment # 5	
Brand name:	Speaker Cyber Acoustics Speakers
Model Name or Number:	CS1818
Cable Type:	Non-shielded
Connected to EUT's Port:	¼" inch

Ancillary Equipment # 6	
Brand name:	Cyber Acoutics Microphone
Cable Type:	Non-shielded
Connected to EUT's Port:	¼" inch

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	230Vac 50Hz

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS

The USB-FPA Flash Programming Adapter, powered from PC via USB cable is dedicated to program the microcontroller's flash memory or communicate with the microcontroller's for debugging purpose. PC software is making communication with the USB-FPA during the test.

3.3. BLOCK DIAGRAM OF TEST SETUP

The following drawings show details of the test setup for Electromagnetic Radiation Disturbance measurements

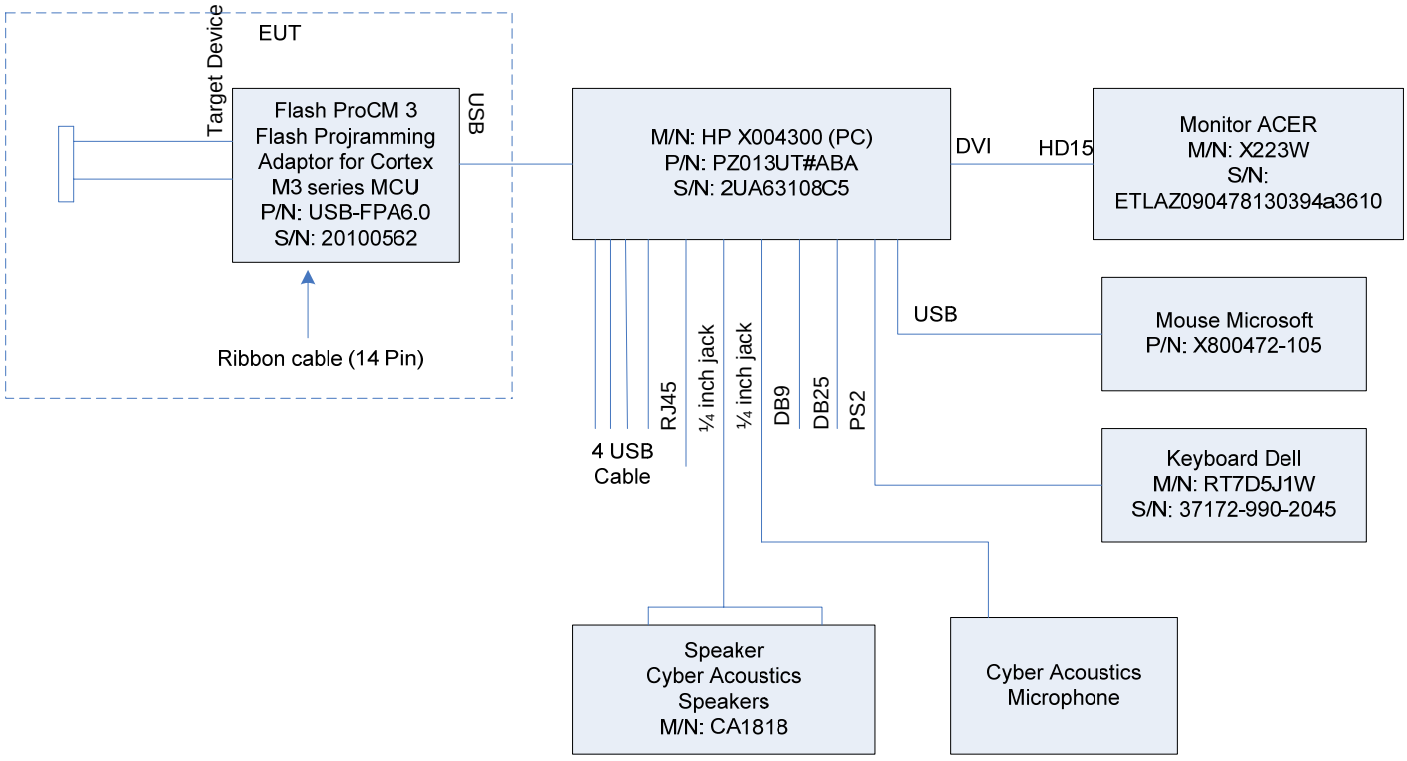


EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

4.2. SUMMARY OF EMC IMMUNITY TEST RESULTS

STANDARD	DESCRIPTION	SEVERITY APPLIED	PERFORMANCE CRITERIA MET	PERFORMANCE CRITERIA ALLOWED
IEC 61000-4-2 **EN 61000-4-2**	Electrostatic Discharge	▪ ±4kV Contact Discharge (Direct & Indirect) ▪ ±8kV Air Discharge	**A**	**B**
IEC 61000-4-3 **EN61000-4-3** **ENV 50204**	Radiated RF Immunity	▪ 3 V/m, 80-1000 MHz, 1 kHz 80% AM Modulation ▪ 3 V/m. 895 to 905 MHz, 200Hz Pulse Modulation	**A**	**A**
IEC 61000-4-4 **EN 61000-4-4**	Electrical Fast Transient	▪ ± 1kV on AC Lines ▪ ± 0.5 kV on I/O Lines	**A**	**B**
EN 61000-4-5 **EN 61000-4-5**	Surge Withstand Immunity	▪ ± 2kV Common Mode on AC Lines ▪ ± 1kV Differential mode on AC lines ▪ ± 1kV Common mode ports that connected to outdoor telecom cables ▪ ± 0.5kV Common mode ports that connected to indoor telecom cables and DC input supply (if longer than 10 m)	**N/A** **(see note)**	**B** **B** **B** **B**
IEC 61000-4-6 **EN 61000-4-6**	Conducted RF Immunity	▪ 3V, 0.15-80 MHz, 1kHz 80% AM modulation on AC & I/O Lines	**A**	**A**
IEC 61000-4-8 **EN 61000-4-8**	Magnetic Field Immunity	▪ 50 Hz, 1 A/m	**N/A** **(see note)**	**A**
IEC 61000-4-11 **EN 61000-4-11**	▪ Voltage Dips ▪ Voltage Dips ▪ Voltage Interruption	▪ Dip 30% - 0.5 Sec. Interval on AC ▪ Reduction >95% for 10m Sec. interval ▪ Reduction >95% for 5 Sec. interval	**N/A** **(see note)**	**C** **B** **C**
IEC 61000-3-2 **EN61000-3-2**	Harmonic Current Emissions	▪ Class A (Other) ▪ Class B (Portable Equipment) ▪ Class C (Lighting Equipment) ▪ Class D (Special Current Waveform)	**N/A** **(see note)**	**PASS**
IEC 61000-3-3 **EN61000-3-3**	Voltage Fluctuation and Flicker in Low-Voltage Supply Systems	▪ Voltage Fluctuation ▪ Flicker	**N/A** **(see note)**	**PASS** **PASS**

NOTE:
N/A – not applicable for DC supplied from a close connected host system.

NOTE 1:
N/A – No magnetic sensitive components

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC IMMUNITY

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in Exhibit 6 of this report.

Decisions on the applicability of individual tests are based on information contained in user document and/or installation instructions, and consideration of the technical design of the EUT.

5.2. MEASUREMENT EQUIPMENT USED:

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures EN 55024:1998 and EN 61000 Part 3 (Sections 2 & 3) and Part 4 (Sections 2 through 11).

5.3. PERFORMANCE CRITERIA:

Throughout the EMC immunity tests for the EUT in these sub-paragraphs shall meet the performance criteria specified in CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003

Performance Criteria

Criteria	During Test	After Test
A	Operate as intended Degradation of performance No loss of function	Operate as intended No degradation of performance No loss of function
B	Loss of function (one or more)	Operate as intended No degradation of performance Functions self-recoverable
C	Loss of function (one or more)	Operate as intended No degradation of performance Functions recoverable by the operator

5.4. ELECTROSTATIC DISCHARGE @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 & EN 61000-4-2

5.4.1. LIMITS @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003

The equipment shall meet the Criteria B during the application of tests:

ELECTROSTATIC DISCHARGE LEVELS	
CONTACT DISCHARGES	**AIR DISCHARGE**
±2 kV and ±4 kV	±2 kV, ±4 kV, ±6 kV and ±8 kV

5.4.2. METHOD OF MEASUREMENTS

Refer to Exhibit 6 of this test report & EN61000-4-2

5.4.3. TEST EQUIPMENT LIST

Test Instrument		Manufacturer	Model No.	Serial No.
[1]	Schaffner ESD Gun	Schaffner	**P/N:** 601-131B	601-131B

5.4.4. TEST DATA

5.4.4.1. Indirect Contact Discharge to Horizontal Coupling Plane Located underneath the EUT.

APPLIED TO EUT'S LOCATION	LEVEL (kV)	DISCHARGE COUNT	NOTE	OBSERVATION
Front	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed
Left Side	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed
Right Side	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed
Rear	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed

5.4.4.2. Indirect Contact Discharge to Vertical Coupling Plane Located 10 cm away from the EUT.

APPLIED TO EUT'S LOCATION	LEVEL (kV)	DISCHARGE COUNT	NOTE	OBSERVATION
Front	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed
Left Side	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed
Right Side	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed
Rear	+2	10		No performance degradation was observed
	-2	10		No performance degradation was observed
	+4	10		No performance degradation was observed
	-4	10		No performance degradation was observed

5.4.4.3. Direct Contact Discharge to the EUT.

Test No.	APPLIED TO EUT'S LOCATION	LEVEL (kV)	DISCHARGE COUNT	NOTE	OBSERVATION
1	**USB Shell**	+2	10		No performance degradation was observed
		-2	10		No performance degradation was observed
		+4	10		No performance degradation was observed
		-4	10		No performance degradation was observed

5.4.4.4. Air Discharge to the Non-conducting Parts of EUT.

Test No.	APPLIED TO EUT'S LOCATION	LEVEL (kV)	DISCHARGE COUNT	NOTE	OBSERVATION
1	**Link cable**	+2	10		No performance degradation was observed
		-2	10		No performance degradation was observed
		+4	10		No performance degradation was observed
		-4	10		No performance degradation was observed
		+6	10		No performance degradation was observed
		-6	10		No performance degradation was observed
		+8	10		No performance degradation was observed
		-8	10		No performance degradation was observed
2	**USB cable**	+2	10		No performance degradation was observed
		-2	10		No performance degradation was observed
		+4	10		No performance degradation was observed
		-4	10		No performance degradation was observed
		+6	10		No performance degradation was observed
		-6	10		No performance degradation was observed
		+8	10		No performance degradation was observed
		-8	10		No performance degradation was observed
3	**Top of case**	+2	10		No performance degradation was observed
		-2	10		No performance degradation was observed
		+4	10		No performance degradation was observed
		-4	10		No performance degradation was observed
		+6	10		No performance degradation was observed
		-6	10		No performance degradation was observed
		+8	10		No performance degradation was observed
		-8	10		No performance degradation was observed
4	**Left and right sides**	+2	10		No performance degradation was observed
		-2	10		No performance degradation was observed
		+4	10		No performance degradation was observed
		-4	10		No performance degradation was observed
		+6	10		No performance degradation was observed
		-6	10		No performance degradation was observed
		+8	10		No performance degradation was observed
		-8	10		No performance degradation was observed
5	**Bottom of case**	+2	10		No performance degradation was observed
		-2	10		No performance degradation was observed
		+4	10		No performance degradation was observed
		-4	10		No performance degradation was observed
		+6	10		No performance degradation was observed
		-6	10		No performance degradation was observed
		+8	10		No performance degradation was observed
		-8	10		No performance degradation was observed

Continued….

5.4.5. PHOTOGRAPHS OF TEST SETUP

Refer to the following photographs for setup and arrangement of equipment under tests.


ELP-007Q

5.5. R.F. ELECTROMAGNETIC FIELDS @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 & EN 61000-4-3

5.5.1. LIMITS @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003

The equipment shall meet the Criteria A during the application of tests:

RADIO FREQUENCY ELECTROMAGNETIC FIELD	
Test Frequency	**RF Signal**
80 to 1000 MHz	3 V/m, 80%AM modulation with 1 kHz Sine Wave Signal

5.5.2. METHOD OF MEASUREMENTS

Refer to Exhibit 6 of this test report & EN61000-4-3

Setup - 3 V/m Amplitude Modulated & Pulse Modulated Fields	
Method Used:	Biconnilog antenna and full anechoic chamber
Minimum Field Strength Exposure:	3 V/m (measured un-modulated carrier)
Frequency Range/Modulation	▪ 80-400 MHz, 80% AM modulation using 1 kHz sine modulating signal ▪ 400-1000 MHz, 80% AM modulation using 1 kHz sine modulating signal ▪ 900 $\pm$ 5 MHz, 200 Hz Pulse Modulation
Antenna Polarization:	Vertical & Horizontal
Test Distance:	3m from faces of the EUT to geometric center of radiating antenna
Frequency Steps:	▪ 200 kHz in 26 - 50MHz band ▪ 500 kHz in 50 - 100 MHz band ▪ 1 MHz in 100- 200 MHz band ▪ 2 MHz in 200 - 500 MHz band ▪ 5 MHz in 500 - 1000 MHz band
Dwell Time:	1000 mS minimum
Sweep Rate:	1 x 10^{-3} decades/second minimum
Exposures:	Front, Back, Left, Right, Top, Bottom of the EUT

5.5.3. TEST EQUIPMENT LIST

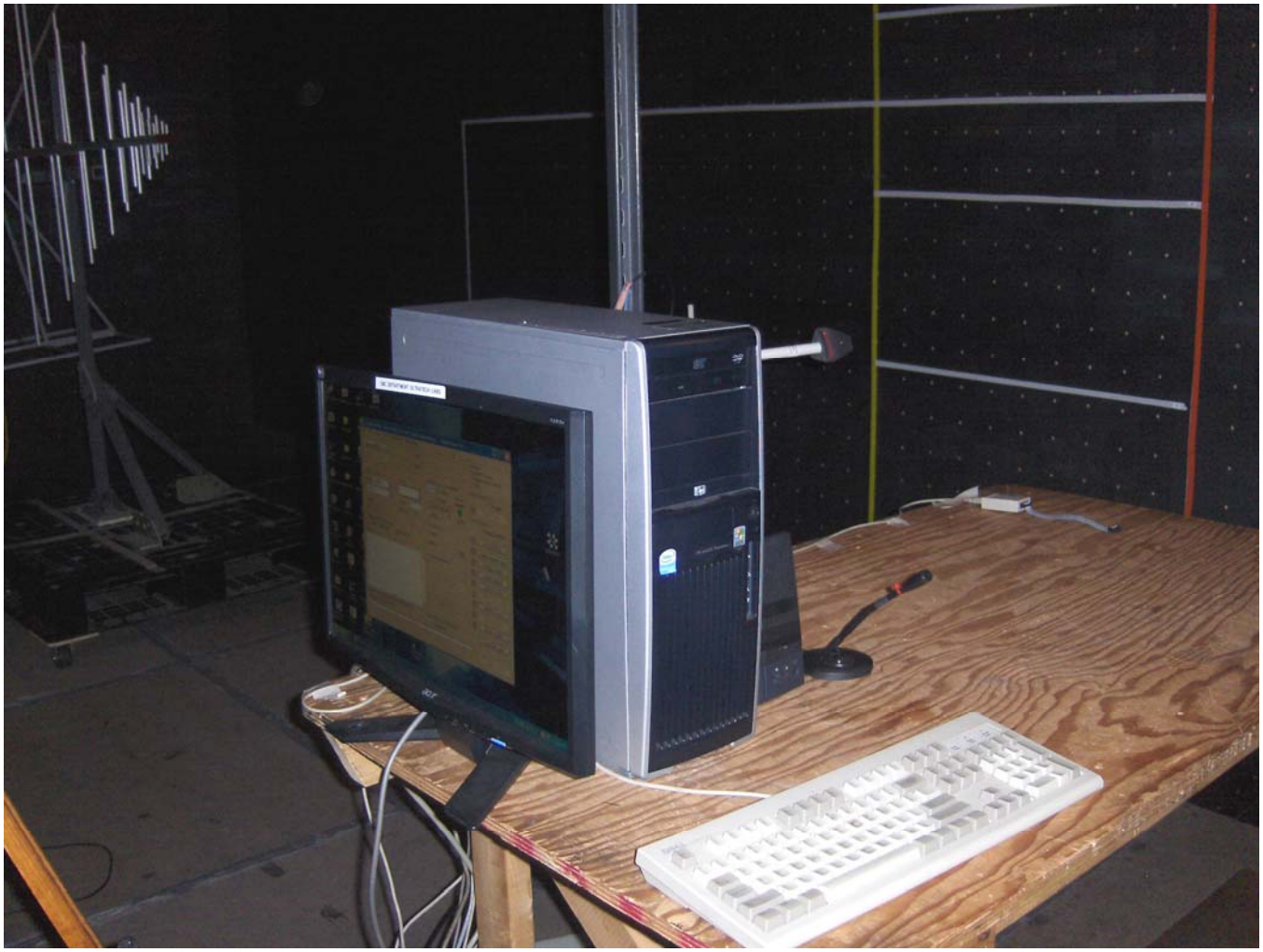
Test Instrument	Manufacturer	Model No.	Serial No.
IFR Signal Generator,	IFR	2025	202304/137
Field Probe	ETS Lindgen	HI6053	00084283
RF Power Amplifier	Ophir	GRF5041	1004
RF Power Amplifier	Ophir	5162RE	1002
Biconilog Antenna,	EMCO	3142	1028
Power meter	HP	438A	3513U04639
Power Sensor	HP	8481A	2552A51276
40dB dual directional coupler	Werlatone	C5081-10	35585
Coaxial Resistor	Termaline	80M	3338
12'x24'x12' Fully Anechoic Chamber	Braden	-	-
Personal Computer with Ultratech EMC Control Software for Windows Version EMC 2000 Rev. 2009			

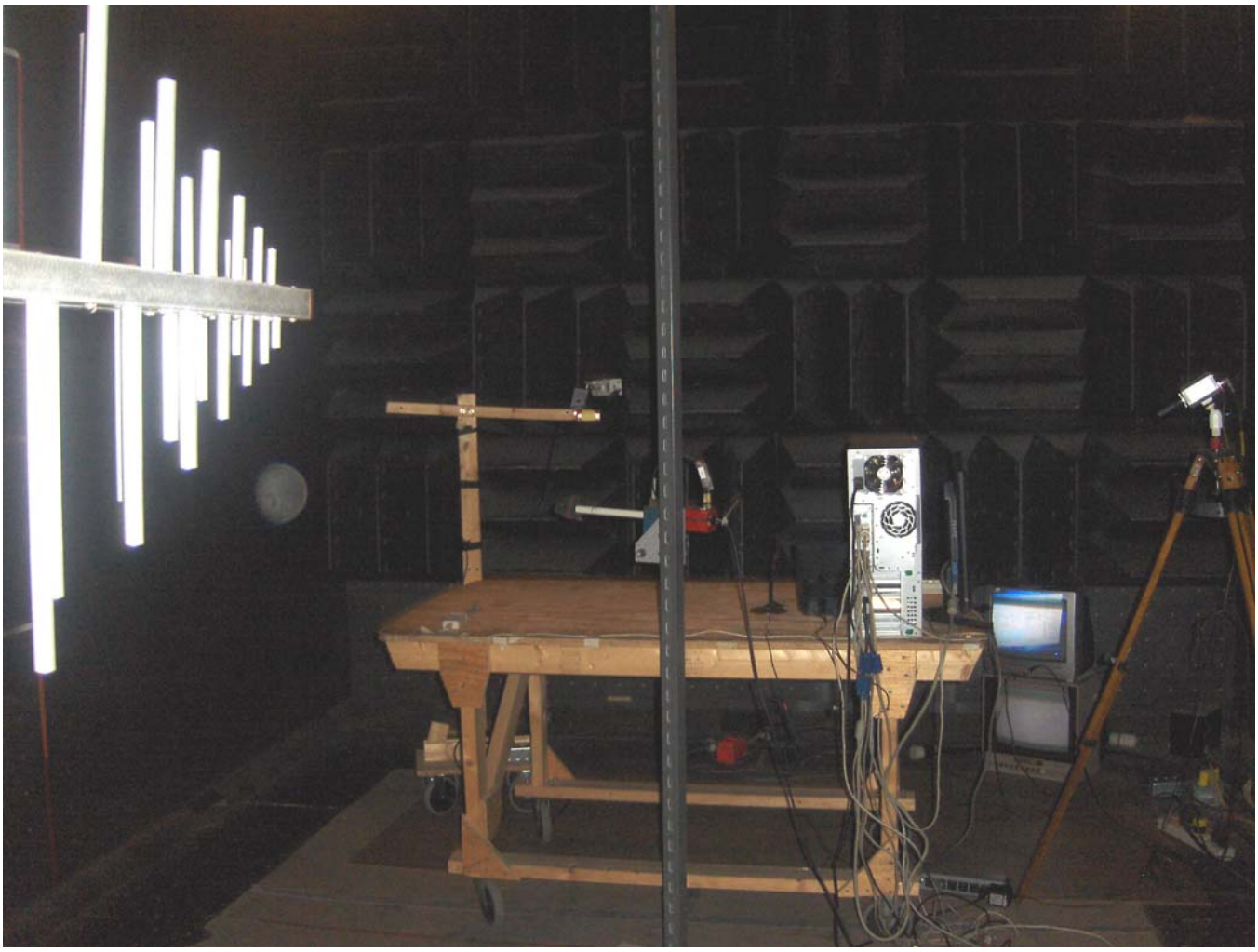
5.5.4. TEST DATA

EUT Face Exposed	Radiating Antenna Polarization	Electric Fields @ 3 V/m 80-1000 MHz, 80% AM Mod with 1 kHz Sine Wave Signal	Electric Field @ 3 V/m, 895 to 905 MHz, 200 Hz Pulse Modulation
Front	**Horizontal**	No performance degradation was observed:	No performance degradation was observed:
	Vertical	No performance degradation was observed:	No performance degradation was observed:
Back	**Horizontal**	No performance degradation was observed:	No performance degradation was observed:
	Vertical	No performance degradation was observed:	No performance degradation was observed:
Left Side	**Horizontal**	No performance degradation was observed:	No performance degradation was observed:
	Vertical	No performance degradation was observed:	No performance degradation was observed:
Right Side	**Horizontal**	No performance degradation was observed:	No performance degradation was observed:
	Vertical	No performance degradation was observed:	No performance degradation was observed:
Top	**Horizontal**	No performance degradation was observed:	No performance degradation was observed:
	Vertical	No performance degradation was observed:	No performance degradation was observed:
Bottom	**Horizontal**	No performance degradation was observed:	No performance degradation was observed:
	Vertical	No performance degradation was observed:	No performance degradation was observed:

5.5.5. PHOTOGRAPHS OF TEST SETUP

Refer to the following photographs for setup and arrangement of equipment under tests.





5.6. ELECTRICAL FAST TRANSIENT @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 & EN 61000-4-4

5.6.1. LIMITS @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003

The equipment shall meet the Criteria B during the application of tests:

FAST TRANSIENT COMMON MODE	
Port Tested	**Test Levels**
AC Mains Input Ports	• 0.5 kV Peak, Tr/Th = 5/50 nS, Rep Frequency: 5 kHz, Test duration = 1 minute • 1.0 kV Peak, Tr/Th = 5/50 nS, Rep Frequency: 5 kHz, Test duration = 1 minute
DC, Signal, Control, Telecom I/O Ports (with cables longer than 3 m)	• 0.5 kV Peak, Tr/Th = 5/50 nS, Rep Frequency: 5 kHz, Test duration = 1 minute

5.6.2. METHOD OF MEASUREMENTS

Refer to Exhibit 6 of this test report & EN61000-4-4

5.6.3. TEST EQUIPMENT LIST

	Test Instrument	Manufacturer	Model No.	Serial No.
[1]	EFT Burst Generator	Haefely	083485-02	P90.1
[2]	EFT 3 Phase Coupling/Decoupling	Haefely	FP-eFT 32.1	083 6023-16

5.6.4. TEST DATA

5.6.4.1. CABLE TESTED: AC INPUT PORT (Non-shielded Cable)

Not applicable for DC supply

5.6.4.2. CABLE TESTED: I/O PORTS WITH CABLES > 3 meters

5.6.4.2.1. Cable #1: USB (Shielded)

EFT VOLTAGE LEVEL	
+ 0.5 kV	**- 0.5 kV**
No performance degradation was observed	No performance degradation was observed

5.6.4.2.2. Cable #2: Ribbon Cable (Shielded)

EFT VOLTAGE LEVEL	
+ 0.5 kV	**- 0.5 kV**
No performance degradation was observed	No performance degradation was observed

5.6.5. PHOTOGRAPHS OF TEST SETUP

Refer to the following photographs for setup and arrangement of equipment under tests.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5.7. R.F. CONDUCTED IMMUNITY @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003 & EN 61000-4-6

5.7.1. LIMITS @ CISPR 24:1997 +A1:2001 +A2:2002 / EN 55024:1998 +A1:2001 +A2:2003

The equipment shall meet the Criteria A during the application of tests:

RF CONDUCTED COMMON MODE		
Port Tested	**Test Frequency**	**RF Signals**
AC Mains I/O Power Port	150 kHz to 80 MHz	3 V, 80%AM modulation with 1 kHz Sine Wave Signal. Note 1
Signal, Control & Telecom I/O Ports (with cable longer 3 m)	150 kHz to 80 MHz	3 V, 80%AM modulation with 1 kHz Sine Wave Signal. Note 1
DC I/O Power Ports	150 kHz to 80 MHz	3 V, 80%AM modulation with 1kHz Sine Wave Signal. Note 1

5.7.2. METHOD OF MEASUREMENTS

Refer to Exhibit 6 of this test report & EN61000-4-6

5.7.3. TEST EQUIPMENT LIST

Test Instrument		Manufacturer	Model No.	Serial No.
[1]	RF Millivoltmeter	Boonton	9200A	--
[2]	RF Millivoltmeter	Boonton	9200A	204
[3]	Signal Generator	IFR	2025	202304/141
[4]	Current Probe (Monitoring)	Fischer Custom Communication	F-33-4	26
[5]	Dual Directional Coupler	Werlatone	C-5081-10	35584
[6]	50 ohm load (Dc-18GHz)	Narda	377BNM	--
[7]	CDN		2391 (100Ω)	21
[8]	CDN		F-120-9	53

5.7.4. TEST DATA

5.7.4.1. Test Signals

Method Used:	Direct Coupling using Coupling/De-coupling Networks
Severity Level Used:	3 V (measured un-modulated carrier)
Frequency Range/Modulation	▪ 150 kHz to 80 MHz, 80% AM modulation using 1 kHz sine modulating signal
Frequency Steps:	▪ 1 kHz in 100 – 200 kHz band ▪ 2 kHz in 200 – 500 kHz band ▪ 5 kHz in 500 – 1 MHz band ▪ 10 kHz in 1 – 2 MHz band ▪ 20 kHz in 2 – 5 MHz band ▪ 50 kHz in 5 – 10 MHz band ▪ 100 kHz in 10 – 100 MHz band ▪ 1 MHz in 100 – 200 MHz band
Dwell Time:	1000 mS minimum
Sweep Rate:	1 x 10^{-3} decades/second minimum

5.7.4.2. USB Cable

CABLE TYPE:	**Shielded**	
CABLE LENGTH:	>3m	
COUPLING/DECOUPLING NETWORK:	2391 (100 Ω)	S/N: 21 (Cal Due – May 20, 2011)
OBSERVATION:	No performance degradation was observed	

5.7.4.3. Ribbon Cable

CABLE TYPE:	**Non-shielded**	
CABLE LENGTH:	<3m	
COUPLING/DECOUPLING NETWORK:	F-120-9	S/N: 53 (Cal Due – May 03, 2011)
OBSERVATION:	No performance degradation was observed	

5.7.5. PHOTOGRAPHS OF TEST SETUP

Refer to the following photographs for setup and arrangement of equipment under tests.


ELP-007Q

EXHIBIT 6. MEASUREMENT METHODS FOR EMC IMMUNITY MEASUREMENTS

6.1. ELECTROSTATIC DISCHARGE REQUIREMENTS @ EN 61000-4-2

6.1.1. INTRODUCTION

These tests were conducted on a sample of the equipment for the purpose of Verification compliance with EN 61000-4-2 - Electromagnetic Compatibility Requirements, Part 2: Electrostatic Discharge Requirements.

The problem of protecting equipment against the discharge of static electricity has gained considerable importance for manufacturers and users. The extensive use of microelectronics components has emphasized the need to define the aspects of the problem and to seek a solution in order to enhance product/system reliability. The problem of static electricity accumulation and subsequent discharges becomes more relevant for uncontrolled environments and the widespread application of equipment and systems in a wide range of industrial plants.

Equipment may also be subjected to electromagnetic energies whenever discharges occur from personnel to nearby object. Additionally, discharges can occur between metal objects, such as chairs and tables, in the proximity of equipment.

The effect of operator discharge may be a simple malfunction of the equipment or damage of electronic components. The dominant effects can be attributed to the parameters of the discharge current (rise time, duration, etc..)

The generation of electrostatic charges is especially favored by the combination of synthetic fabrics and dry atmosphere. There are many possible variations in the charging process. A common situation is one in which an operator walks over a carpet and at each step loses or gains electrons from his body to the fabric. Friction between the operator's clothing and his chair can also produce an exchange of charges. The operator's body may be charged either directly or by electrostatic induction's; in the latter case, a conducting carpet will give no protection unless the operator is adequately earthened to it.

Electrostatic potentials exceeding 15,000 volts are not uncommon in carpeted office environments where humidity levels are relatively low. Too the human body, air discharges become noticeable at about 4,000 volts. At about 8,000 volts, air discharges start becoming uncomfortable and the discharge is just audible. At 15,000 volts, air discharges are downright unpleasant and the spark arcs across 1 cm air gaps with a bluish tint accompanied by a loud crack. At these levels, direct air discharges to printed circuit boards can cause permanent damage to programmable and memory logic.

6.1.2. OBJECTIVE

The objective of this test is to determine the degradation of the performance of the EQUIPMENT UNDER TEST (EUT) when subjected to electrostatic discharges; the electrostatic discharges may occur from the personnel to the objects near the EUT (indirect discharge) or directly to EUT (direct discharge).

6.1.3. APPLICATION OF THE STATIC ELECTRICITY DISCHARGES

Applicable discharge locations (HCP, VCP, points, surfaces etc ...), discharge methods (contact or air), voltage level, polarity, number of discharges, results and etc... were recorded in the TEST DATA.

6.1.4. DIRECT APPLICATION OF DISCHARGES TO EUT

Direct contact discharge was applied to all conductive points. Where contact discharge could not be obtained on insulated surfaces, air discharge was applied.

Wherever applicable, The direct application of discharges to EUT was performed as follows:

- User accessible points and surfaces of EUT during normal operation.
- Points accessible for maintenance purposes (not allowed unless agreed by the manufacturer and user).
- The test was performed with single discharges on pre-selected points. The time interval between successive single discharges (at least 10 discharges) was at least 1 second. Longer intervals might be necessary to determine whether a system failure had occurred.

  Note: The points to which the discharges were applied, and test voltage polarity to be used might be selected by means of an exploration carried out at a repetition rate of 20 discharges per second, or more.

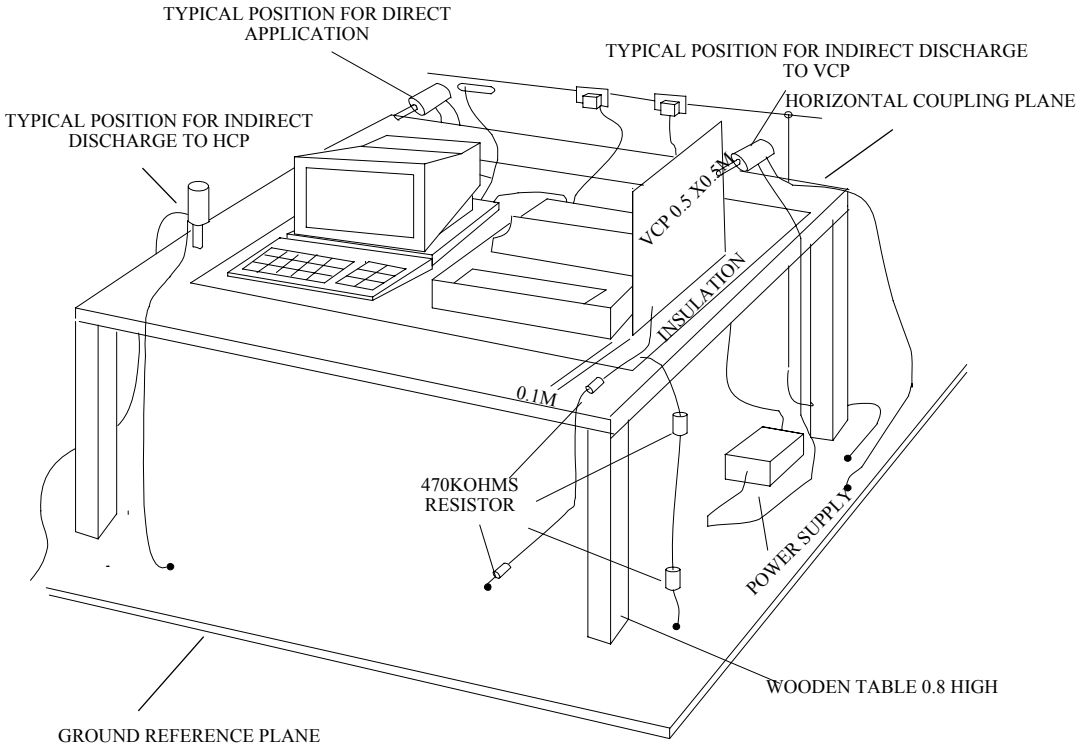
- ESD generator was held perpendicular to the surface to which the discharge was applied, this improved the repeatability of test results.
- The discharge return cable of the generator was always kept at a distance of at least 0.2m from the EUT whilst the discharged was being applied.
- In the case of contact discharges, the tip of the discharge electrode touched the EUT, before the discharge switch was operated.
- If the coating was not declared as insulating coating by the equipment manufacturer, then the pointed tip of the generator was used to penetrate the coating so as to make contact with the conducting substrate.
- In the case of air discharges, the round discharge tip of the discharge electrode was approached **as fast as possible (without causing mechanical damage) to touch the EUT**. After each discharge, the ESD generator (discharge electrode) was removed from the EUT. This procedure was repeated until the discharges were completed. In the case of the air discharge test, the contact relay, which was used for contact discharge, was removed.

6.1.5. INDIRECT APPLICATION OF DISCHARGES TO EUT

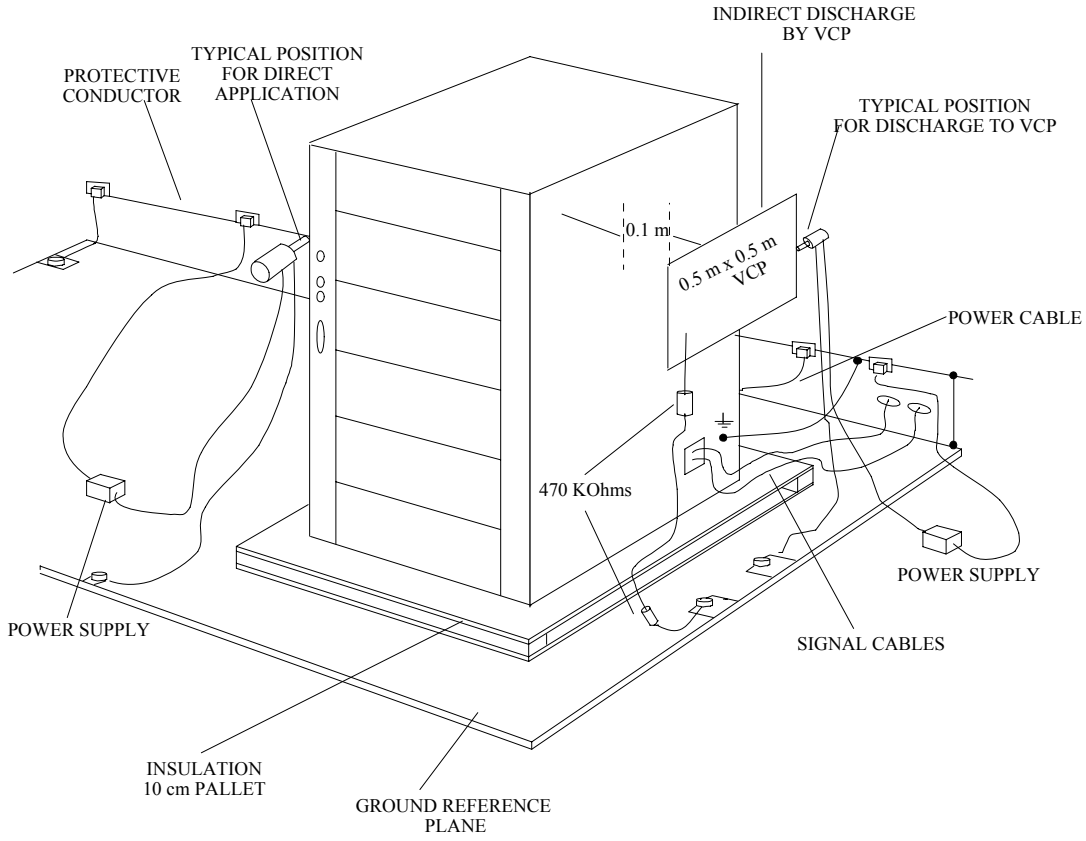
Discharges to objects placed or installed near to the EUT were simulated by applying the discharges of the ESD generator to a coupling plane, in the contact discharge mode.

- **Horizontal Coupling Plane (HCP) under the EUT**: At least 10 single discharges (in the most sensitive polarity) were applied to the HCP, at points on each side of the EUT (front, rear, left and right sides). The ESD generator was positioned vertically at a distance of 0.1 m from the EUT, with the discharge electrode touching the coupling plane.

- **Vertical Coupling Plane (VCP) under the EUT**: At least 10 single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the VCP. The VCP, of dimensions 0.5m x 0.5m, was placed parallel to, and positioned at a distance of 0.1 m from the EUT. Discharges were applied to the VCP, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.



EXAMPLE OF TEST SET-UP FOR TABLE-TOP EQUIPMENT, LABORATORY TESTS



**EXAMPLE OF TEST SET-UP FOR FLOOR STANDING EQUIPMENT,
LABORATORY TESTS**

6.1.6. RADIATED IMMUNITY REQUIREMENTS @ EN 61000-4-3

6.1.7. INTRODUCTION

These tests were conducted on a sample of the equipment for the purpose of Verifying compliance with **EN 61000-4-3 - Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment, Part 3: Immunity to radio-frequency radiated electromagnetic fields**.

Most electronic equipment is in some manner affected by electromagnetic radiation. This radiation is frequently generated by such sources as the small hand-held radio transceivers that are used by operating, maintenance, and security personnel, fixed station radio, television transmitters, vehicle radio transmitters, and various industrial electromagnetic sources.

In addition to electromagnetic energy deliberately generated, there is spurious radiation caused by devices such as welders, thyristors, fluorescent lights, switches operating inductive loads, etc. For the most part, this interference manifests itself as conducted electrical interference and, as such, is dealt with in other parts of the standard. Methods employed to prevent effects from electromagnetic fields will normally also reduce the effects from these sources.

The electromagnetic environment is determined by the strength of the electromagnetic field (field strength in volts per meter). The field strength is not easily measured without sophisticated instrumentation nor is it easily calculated by classical equations and formulae because of the effect of surrounding structures or the proximity of other equipment that will distort and/or reflect the electromagnetic waves.

6.1.8. OBJECTIVE

The objective of this test is to determine the degradation of the performance of the EQUIPMENT UNDER TEST (EUT) when subjected to radio-frequency radiated electromagnetic fields at levels which are typical of commercial environments.

6.1.9. UNIT OF MEASUREMENTS

Measurements of radiated field strengths are reported in units of volts per meter [V/m] at the distance specified in the report, where it is applicable.

6.1.10. LOCATIONS OF TEST SITE

The Radiated Immunity Tests were performed in UltraTech's anechoic chamber, 24’(L) by 12'(W) by 12'(H).

6.1.11. TEST PROCEDURES

The radiated immunity measurements were conducted in accordance with IEC 61000-4-3, Electromagnetic Compatibility Requirements - Generic Immunity Standard - Part 3: Immunity to Radiated Fields.

The radiating antenna method is used for exposing the EUT to radiated electromagnetic waves. The tests are carried out in a fully shielded anechoic 12’x24’x12’ chamber to contain the high fields generated so as not to interfere with local communications.

A uniform field of 0 to+6dB (1 to 2 times the required field strength) covering 1.5x1.5 meters square is established using an un-modulated carrier within the anechoic chamber using a 16 point field calibration as per the requirements of the standard. The calibration is performed on an un-modulated carrier using an isotropic field strength meter and probe. The probe is placed at a height of 1.5 meter from the floor of the chamber , at a distance of 3 meters from the geometric center of the biconi-log antenna. The frequency is swept over the amplifier range and the signal generator level at each frequency step is adjusted to maintain a field of 1.5 times the required field strength at that point to within a 0 to +10% tolerance. (Since the field is allowed to vary between 1 to 2 times within the test area, setting the center point of the area to 1.5 times the required field will ensure an average field within the required 0 to +6dB tolerance requirements). The adjusted level at each frequency is recorded in a calibration file and the process is repeated for each antenna polarization, each amplifier range and for each field strength calibration level. After the single point leveled calibration is performed, measurements of the field strength using the calibration file at sixteen 50cm equidistant points within the square test area is performed and 12 out of 16 points (75% of the area) at each frequency step must fall within the uniformity criteria before the chamber is deemed to meet

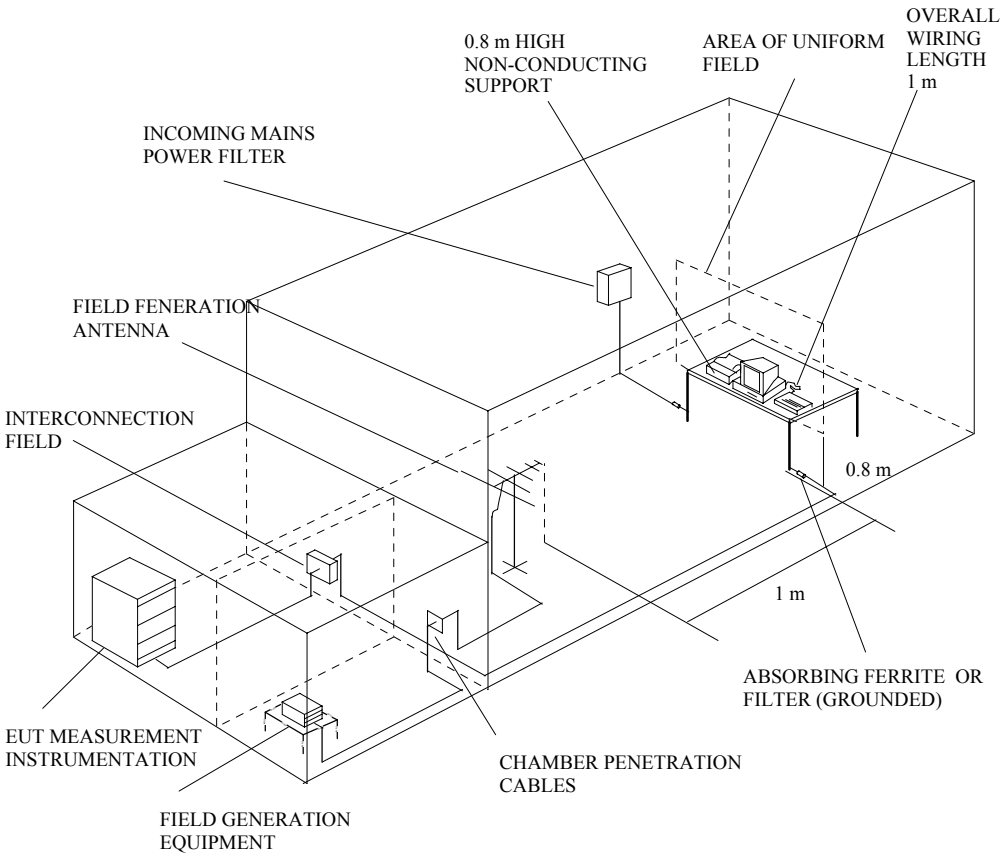
the uniformity criteria required by the standard.

Prior to each test, a verification sweep using the appropriate calibration file is performed on the empty test volume to ensure that the field is within specification. For floor mounted equipment, the field strength is also measured at a 40 cm height and reported in the test result section of the report.

A maximum step size of 1% of the fundamental is used in accordance with the standard and the calibration data entered into a file and a dwell time of at least 1 second is used to maintain a sweep rate of no greater than 1.5x10-3 decades/S. If it is determined that the EUT cannot respond within a one second time frame, the dwell time is increased appropriately. The geometric center of the radiating antenna is positioned 3 meters away from the EUT and both polarization's of the antenna is used. All six faces (four sides, top and bottom) of the EUT are then selected for direct exposure to the electromagnetic fields unless the EUT is large whereby the four sides are selected. The EUT is configured with all ports connected to support/ancillary or simulation equipment with cable lengths to provide for at least 1 meter exposure in the field.

During the application of the EM field, the field strength in the vicinity of the EUT is monitored to determine what the actual field strength the EUT is being subjected to since distortion of the calibrated field is expected once the EUT is installed within the test volume. Should a failure occur, the field strength at that frequency can be manually set to determine the immunity threshold of the device under test.

The performance of the EUT is monitored for any degradation during the application of the field using closed circuit monitors, fiber-optic coupled RS-232 serial interfaces or waveform monitoring using oscilloscopes or chart recorders.



EXAMPLE OF SUITABLE TEST FACILITY

6.2. ELECTRICAL FAST TRANSIENT REQUIREMENTS @ EN 61000-4-4

6.2.1. INTRODUCTION

These tests were conducted on a sample of the equipment for the purpose of Verifying compliance with EN 61000-4-4, Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment, Part 4: Electrical Fast Transient/Burst Requirements.

6.2.2. OBJECTIVE

The objective of this test is to determine the degradation of the performance of the EQUIPMENT UNDER TEST (EUT) when subjected to repetitive fast transients (bursts), on power supply, I/O signal, data or control lines.

Types of transient interference are those originating from switching transients (interruption inductive loads, relay contact bounce, etc...)

The actual test level will be stated in the measurement data in this report.

6.2.3. TEST PROCEDURES

The following requirements apply to test performed in laboratories with the environmental reference conditions specified in 8.1 of EN61000-4-4

EUTs, whether stationary floor-mounted or table top, and equipment designed to be mounted in other configurations, shall be place on a ground reference plane and shall be insulated from it by an insulating support 0.1 m ± 0.01m thick (see Figure 7).

In the case of table-top equipment, the EUT should be located 0.1 m ± 0.01m above the ground reference plane (see Figure 7). Equipment normally mounted on ceiling or walls shall be tested as table-top equipment with the EUT located 0.1 m ± 0.01m above the ground reference plane.

The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.

The ground reference plane shall be a metallic sheet (copper or aluminum) of 0.25 mm minimum thickness, other metallic materials may be used but they shall have 0.65 mm minimum thickness.

The minimum area of the ground reference plane is 1 m x 1 m. The actual size depends on the dimensions of the EUT.

The ground reference plane shall project beyond the EUT by at least 0.1 m on all sides.

The ground reference plane shall be connected to the protective earth.

The EUT shall be arranged and connected to satisfy its functional requirements, according to the equipment installation specifications.

The minimum distance between the EUT and all other conductive structures (e.g. the walls of a shielded room), except the ground reference plane shall be more than 0.5 m.

All cables to the EUT shall be placed on the insulation support 0.1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.

The EUT shall be connected to the earthing system in accordance with the manufacturer's installation specifications, no additional earthing connections are allowed.

The connection impedance of the coupling/decoupling network earth cables to the ground reference plane and all bondings shall provide a low inductance.

Either a direct coupling network or a capacitive clamp shall be used for the application of the test voltages. The test voltages shall be coupled to al l of the EUT ports including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.

Decoupling networks shall be used to protect auxiliary equipment and public networks.

When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, shall be 0.5m.

Unless otherwise specified in the product standard or the product family standard, the length of the signal and power lines between the coupling device and the EUT shall be 0.5m ±0.05m.

If the manufacturer provides a non-detachable supply cable more than 0.5m ± 0.05m long with the equipment, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1 m above the ground reference plane.

Examples of the test set-up for laboratory test are given in Figures 7 below

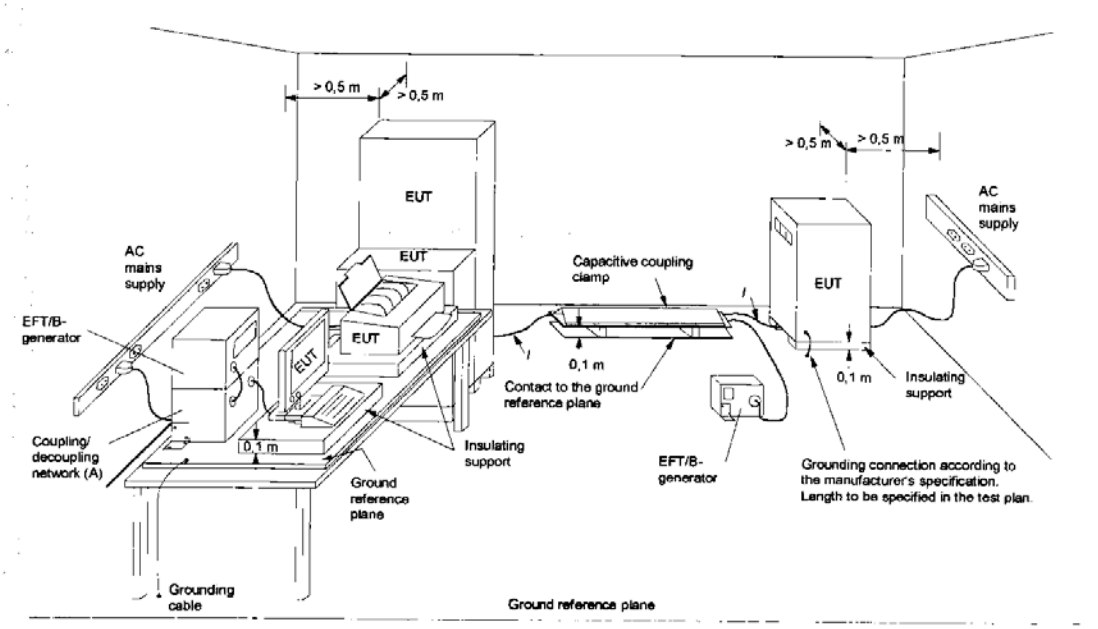
6.2.3.1. Test on the Power Supply Lines and on Protective Earth Terminals

Test voltage was applied between each of the power supply conductors and the protective earth at the power supply outlet to which the EUT was designed to be connected.

6.2.3.2. Test on I/O Circuits and Communication Lines

- As far as possible, the capacitive coupling clamp was used for coupling the test voltage onto the lines. If the clamp cannot be used due to mechanical problems (size, cable routing) in cabling, it may be replaced by a tape or conductive foil enveloping the lines under test. The capacitance of this coupling arrangement with foil or tape should be equivalent to that of the standard coupling clamp.

- The ET/B generator was coupled to the terminals of the lines via discrete 100pF capacitors instead of the distributed capacitance of the clamp or of the foil arrangement. Grounding of the coaxial cable from the test generator was made in vicinity of the coupling point. Application of the test voltage to the connectors (hot wires) of coaxial or shielded communications lines was not permitted.



Key

l length between clamp and the EUT to be tested (should be 0,5 m ± 0,05 m)

(A) location for supply line coupling

(B) location for signal lines coupling

Figure 7 – General test set-up for laboratory type tests

6.3. CONDUCTED RF IMMUNITY @ EN 61000-4-6

6.3.1. INTRODUCTION

These tests were conducted on a sample of the equipment for the purpose of Verification compliance with EN 61000-4-6 - Electromagnetic Compatibility for Electrical and Electronic Equipment, Conducted Immunity Requirements.

The source of disturbance covered by this standard is basically electromagnetic field that may act on the whole length of cables connected to an installed equipment. The dimensions of the disturbed equipment, mostly a sub-part of a larger system, are assumed to be small compared with the wavelengths involved. The in-going and out-going leads; e.g. Mains, communications lines, interface cables, will therefore behave as passive receiving antenna networks because they can be several wavelengths long. Between these antenna networks, the vulnerable or susceptible equipment is exposed to currents flowing through the equipment.

Cable systems connected to an equipment are assumed to be in resonant mode ($\lambda/4$, $\lambda/2$, open or folded dipoles) and as such represented by coupling and de-coupling network systems having a common mode impedance of 150 ohms towards a ground reference plane.

6.3.2. OBJECTIVE

The objective of this test is to determine the degradation of the performance of the EQUIPMENT UNDER TEST (EUT) when subjected to radio frequency disturbances coupled to cables connected to power mains, signal lines and earth connections. The rf disturbance is in the frequency range of 9KHz to 80MHz.

The actual test level will be stated in the measurement data in this report.

6.3.3. TEST SETUP AND APPLICATION

A metal ground reference plane larger than the dimensions of the EUT by at least 20cm is used. This ground reference plane is the floor of the shielded room where the tests were conducted to minimize interference with local communications.

The EUT is placed on an insulating support 10cm above the ground reference plane. On all cables to be tested, coupling and de-coupling networks are inserted. These coupling and de-coupling networks are placed directly on the ground reference plane between 10 to 30 cm away from the EUT. All cables shall be located between 3 to 5 cm above the ground reference plane wherever possible.

Where the EUT is provided with one or more dedicated earth terminals, they are connected to the ground reference plane through a de-coupling network such that the 50/60 Hz impedance is maintained.

Where the EUT is comprised of many sub-units, each sub-unit shall be tested separately unless the inter-connecting cables are less than 1 meter.

Where the EUT has several cables placed in close proximity over a length of more than 10 meters, they shall be treated as one cable and current injection shall be applied.

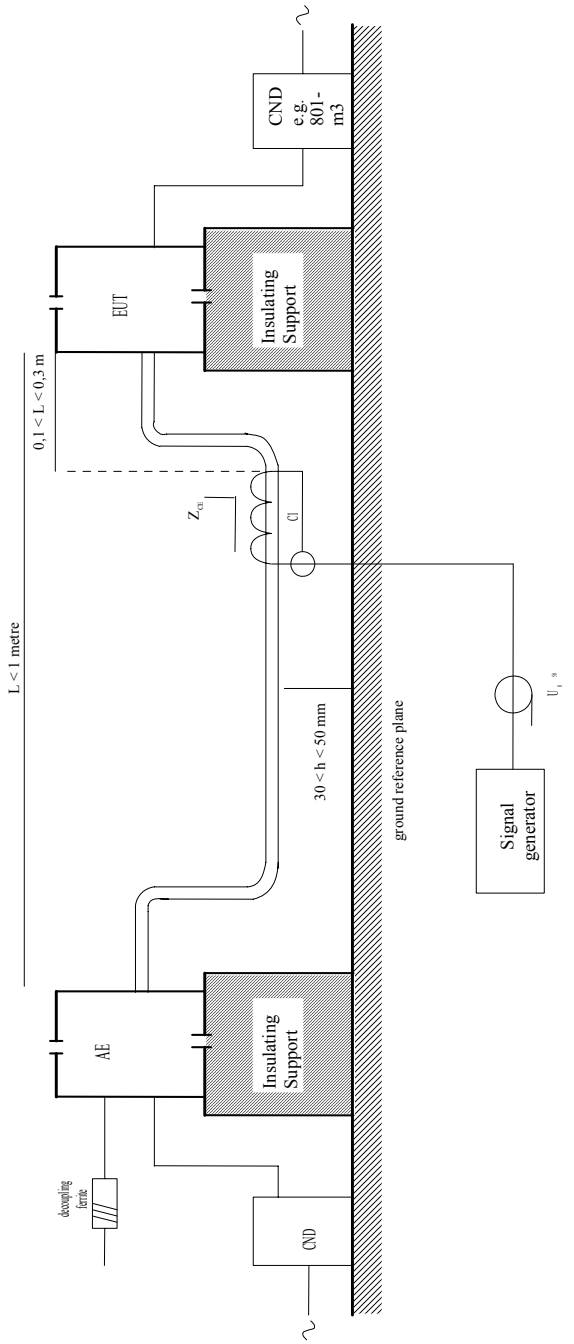


Fig 1. Principle of coupling according to the Clamp Injection Method.

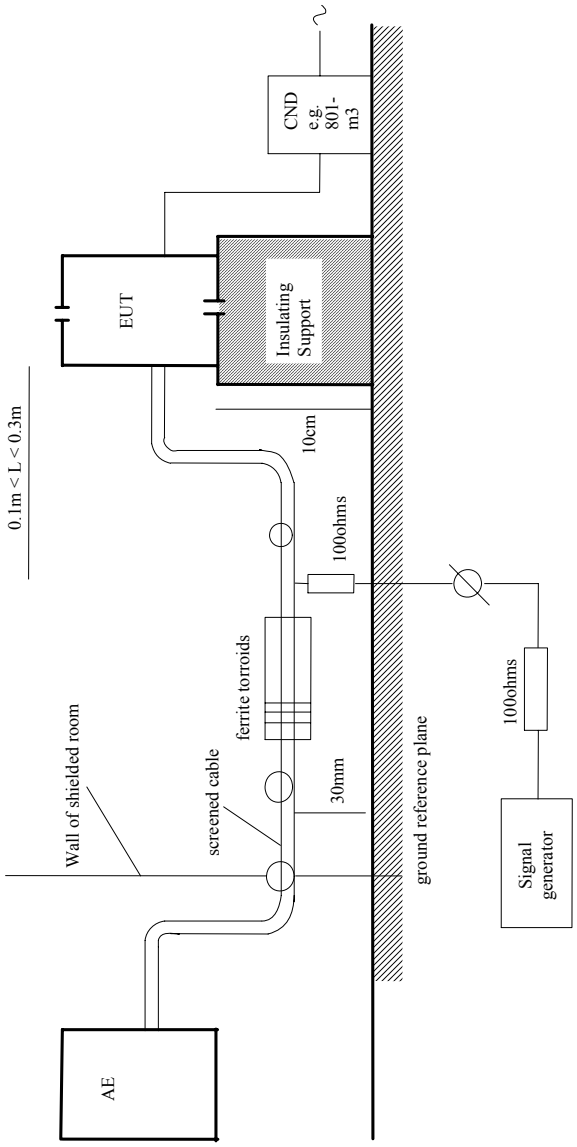


Fig 2. Principle of Direct Coupling to Screened Cables

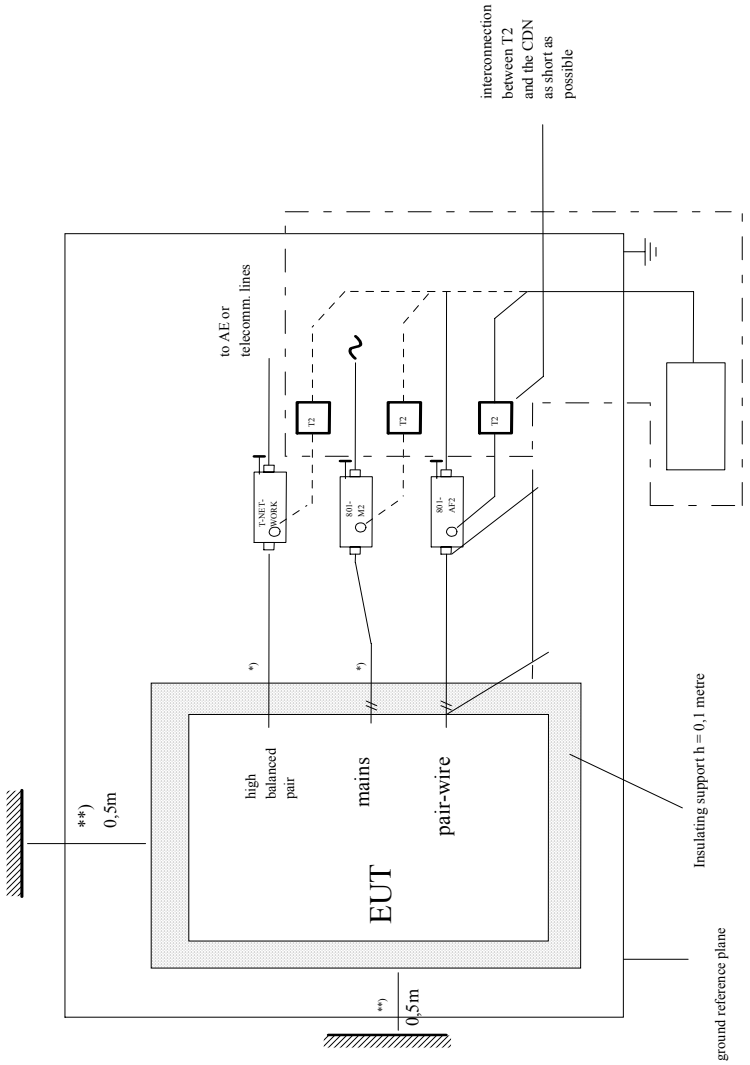


Fig. 3 Test setup for a single unit system for the immunity method to Conducted RF Disturbances

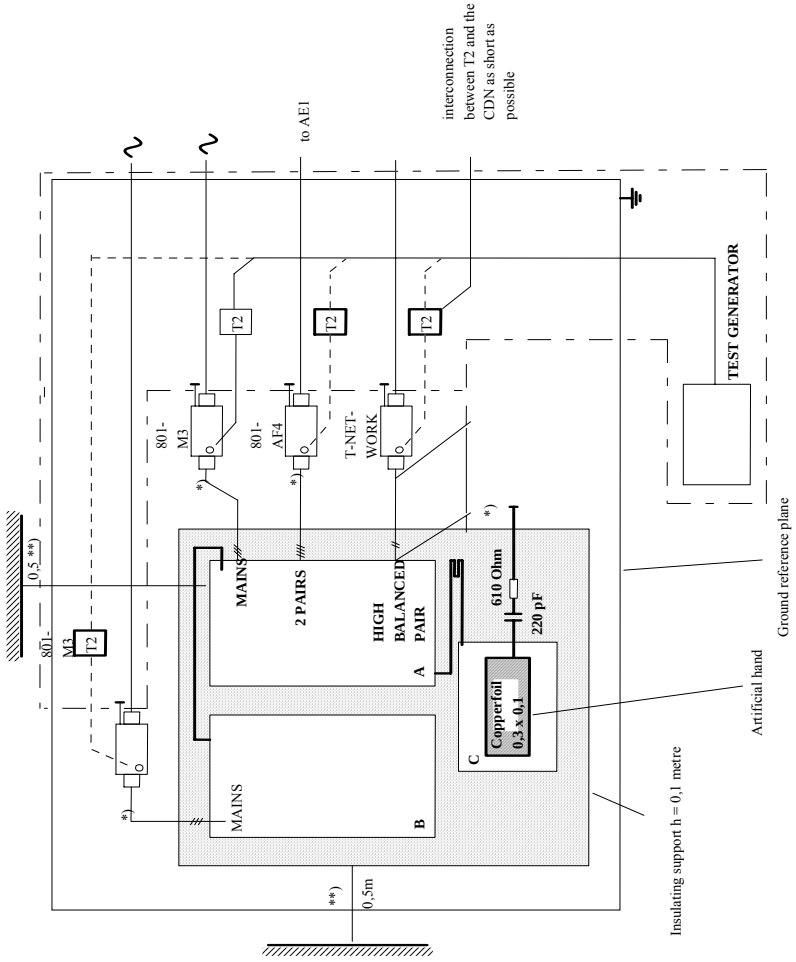
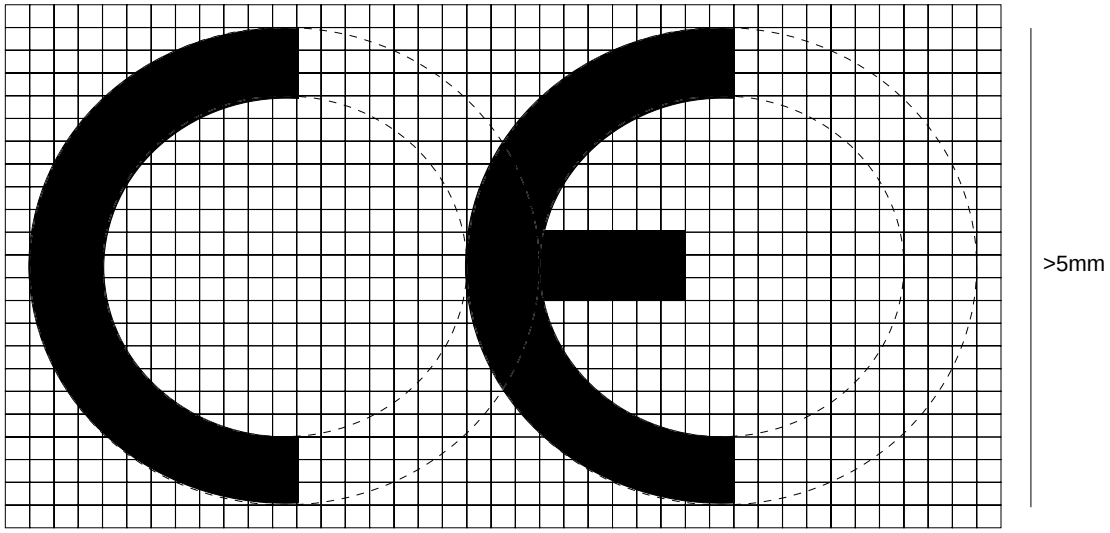


Fig. 4. Test setup for a multi-unit system for immunity method to Conducted RF Disturbances

EXHIBIT 7. LABELLING REQUIREMENTS

The CE Mark with respect to the EMC Directive 2004/108/EC



The CE mark shall consist of the initials "CE" taking the following form

- If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
- Where apparatus is the subject of other Directives covering other aspects and which also provide for the CE conformity marking, the latter shall indicate that the appliances are also presumed to conform to those other Directives.
- However, where one or more of these Directives allow the manufacturer, during a transitional period, to choose which arrangements to apply, the CE mark shall indicate conformity only to the Directives applied by the manufacturer. In this case, particulars of the Directive applied, as published in the Official Journal of the European Communities, must be given in the documents, notices or instructions required by the Directives and accompanying such apparatus.

The various components of the CE marking must have substantially the same vertical dimension, which may not be less than 5mm.