

EMC TESTING CENTER OF THE COMPANY «INTERSTANDARD»

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№ POCC RU.0001.21M354



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Electromagnetic Compatibility

Test of: Gigabit Ethernet Analyzer

Model Number: "BERcut-ET/ETL"

Applicant: JSC NTC "Metrotek"

Test Type: Compliance

Test Specification: EN 55022:2006 + A1:2007

EN 55024:1998+A1:2001+A2:2003

EN 61000-3-2:2006

EN 61000-3-3:1995+A1:2001+A2:2005

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Test Engineer

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1. Client Information

Company Name: JSC NTC "Metrotek"

Address: 52, Ectrozavodskaya str., Moscow, Russia,

Contact name: Company director: A.M.Feldman

Tel./Fax: +74959610071

2. Equipment Under Test (EUT)

2.1 Identification Of EUT

Model Number:	BERcut-ET/ETL
Unique Identifier:	S/N 8501
Description of EUT:	BERcut-ET is intended for ethernet network equipment testing.
Supply Voltage:	AC adapter-input: 100-240VAC 50/60 Hz 0,5A, Output: DC 11-13V 1.63-1.38A; Internal rechargeable battery – 4.8V
Ports present:	Ethernet A/B ports LAN port (Ethernet) USB DC 12V
Accessories Supplied:	AC Adapter GS18A12 MEANWELL Ethernet patch-cord USB cord

3. Test Specification, Methods and Procedures

3.1 Test Specification(s)

Standard	Title
EN55022 : 2006 A1:2007	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
EN 55024 : 1998 A1 : 2001 A2 : 2003	Information Technology Equipment - Immunity characteristics. Limits and methods of measurement
EN 61000-3-2:2006	Electromagnetic compatibility Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3:1995 A1:2001 A2:2005	Electromagnetic compatibility Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated of 16A or less

3.2 Purpose Of Test

To perform the relevant tests and assess the product for compliance with the above specification.

3.3 Methods and Procedures

The standards listed on the previous page refer to the following tests: -

Basic Standard	Date	Description
EN55022 A1	2006 2007	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement <i>Conducted Emissions class B</i> <i>Radiated Emissions class A</i>
EN 61000-3-2	2006	Electromagnetic compatibility <i>Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)</i>
EN 61000-3-3: A1 A2	1995 2001 2005	Electromagnetic compatibility <i>Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated of 16A or less</i>
EN 61000-4-2 A1 A2	1995 1998 2001	Testing and measurement techniques. <i>Electrostatic discharge immunity test.</i>
EN 61000-4-3	2006	Testing and measurement techniques. <i>Radiated, radio frequency, electromagnetic field immunity test</i>
EN 61000-4-4	2004	Testing and measurement techniques. <i>Electrical fast transient/burst immunity test.</i>
EN 61000-4-5	2006	Testing and measurement techniques. <i>Surge immunity test.</i>
EN 61000-4-6	2007	Testing and measurement techniques. <i>Immunity to conducted disturbances, induced by radio frequency fields</i>
EN 61000-4-8 A1	1993 2001	Testing and measurement techniques. <i>Power frequency magnetic field immunity test</i>
EN 61000-4-11	2004	Testing and measurement techniques.. <i>Voltage dips, short interruptions and voltage variations immunity tests</i>

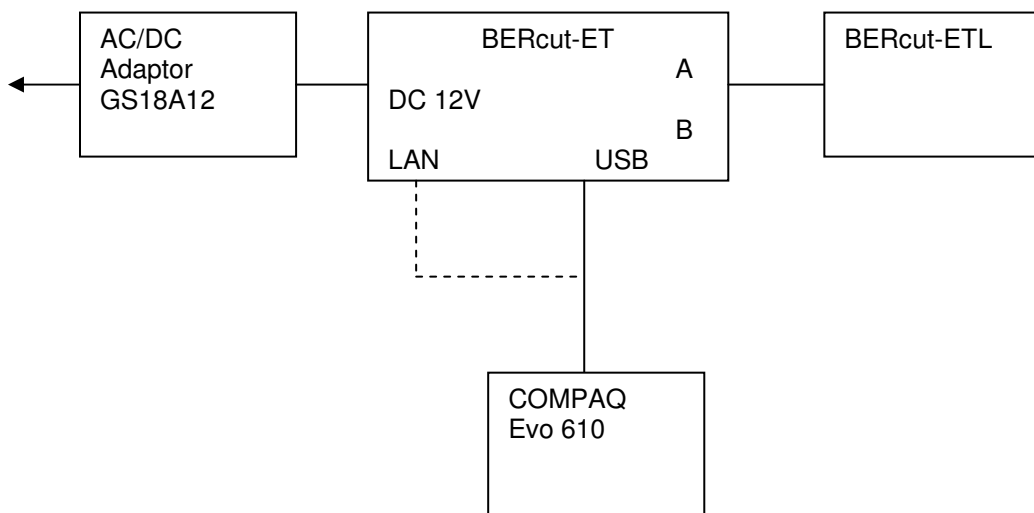
4. Deviations or Exclusions from the Test Specifications

For dated and undated references to basic standards, please refer to page 5 for which version we have tested against.

5. Operation of the EUT During Testing

5.1 Configuration and Peripherals

COMPAQ Evo 610 notebook and BERcut-ETL were used as auxiliary equipment during the tests.



5.2 Operating Mode and Environmental Conditions

The operating modes and environmental conditions used for each individual test are described in the test results section of this report.

5.3 Performance Criteria

Performance Criterion A

The apparatus shall continue to operate as intended without operator intervention during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance Criterion B

After the test the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance Criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.
Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5.4 Monitoring of the EUT

The following was monitored during the testing:

- I) Data loss percentage measured by built-in test tools
(no data loss allowed)
- II) changes in programmable parameters
- III) changes of operating mode

No effects listed above allowed.

6. Test Results

6.1 General Comments

Details of the test methods used can be found in the EMC Testing Center procedures manual.

6.2 Modifications Made to the EUT

No modifications were made to the EUT during the testing process.

6.3 Summary of Test Results

Basic Standard	Test	Result
EN 55022	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement <i>Conducted Emissions. Mains ports</i>	Complied Class B
EN 55022	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement <i>Conducted Emissions. Telecommunication ports</i>	Complied Class B
EN 55022	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement <i>Radiated Emissions.</i>	Complied Class A
EN 61000-3-2	Electromagnetic compatibility <i>Harmonics</i>	Complied
EN 61000-3-3	Electromagnetic compatibility <i>Flicker</i>	Complied
EN 61000-4-2	Testing and measurement techniques. <i>Electrostatic discharge immunity test.</i>	Complied
EN 61000-4-3	Testing and measurement techniques. <i>Radio Frequency immunity test.</i>	Complied
EN 61000-4-4	Testing and measurement techniques. <i>Electrical fast transient/burst immunity test.</i>	Complied
EN 61000-4-5	Testing and measurement techniques. <i>Surge immunity test.</i>	Complied
EN 61000-4-6	Testing and measurement techniques. <i>Conducted Immunity</i>	Complied
EN 61000-4-8	Testing and measurement techniques. Magnetic Field Immunity	Complied
EN 61000-4-11	Testing and measurement techniques. Voltage Dips and interruptions	Complied

Note: The product does not include devices susceptible to magnetic fields such as CRT monitors, Hall elements, electrodynamic microphones, magnetic field sensors, so Power Frequency Magnetic field Immunity test not required (EN 55024, table 1).

Result

In the configuration tested, the EUT complies with the test standards detailed above.

Full details of all tests can be found in the test results section of this report.

6.4 Conducted Emissions Test Results

Basic Standard	EN 55022 : 2006
Limit	Class B

Operating Mode

Interface setup: Port A – Speed Automatic, Autoneg. On
 Port B - Speed Automatic, Autoneg. On
 RFC-2544 Setup Topology: Tx port A, Rx port B
 RFC-2544 Setup Frames: 64
 RFC-2544 Setup Throughput: Enabled Yes; Rate, % 100; Trial's 600
 RFC-2544 Setup Latency: Enabled No
 RFC-2544 Setup Frame Loss: Enabled No

Test Results

Port: Mains ports

Line Terminal Worst Case Emissions

Frequency (MHz)	Quasi Peak Measurement (dB μ V/m)	Quasi Peak Limit (dB μ V/m)
0.20	50.5	63.8
0.27	47.5	61.3
0.40	47.0	57.8
0.42	48.4	57.6
0.47	41.5	56.4
0.48	41.9	56.3
0.55	40.7	56.0
0.68	41.3	56.0
1.67	40.2	56.0
2.49	42.5	56.0

Frequency (MHz)	Average Measurement (dB μ V)	Average Limit (dB μ V)
0.20	31.5	53.8
0.27	31.9	51.3
0.40	36.2	47.8
0.42	24.1	47.6
0.47	30.0	46.4
0.48	25.2	46.3
0.55	27.0	46.0
0.68	23.5	46.0
1.67	24.3	46.0
2.49	28.9	46.0

Neutral Terminal Worst Case Emissions

Frequency (MHz)	Quasi Peak Measurement (dBμV)	Quasi Peak Limit (dBμV)
0.19	51.3	63.9
0.27	48.3	61.1
0.46	43.7	56.7
0.55	45.7	56.0
0.68	41.1	56.0
0.72	42.9	56.0
0.85	41.5	56.0
0.95	43.8	56.0
0.98	43.7	56.0
2.92	41.6	56.0

Frequency (MHz)	Average Measurement (dBμV)	Average Limit (dBμV)
0.19	36.0	53.9
0.27	36.5	51.1
0.46	26.6	46.7
0.55	31.5	46.0
0.68	23.2	46.0
0.72	22.8	46.0
0.85	21.2	46.0
0.95	30.0	46.0
0.98	23.4	46.0
2.92	24.4	46.0

Port: Telecommunication ports

Port: A/B Ethernet

Frequency (MHz)	Quasi Peak Measurement (dBμV)	Quasi Peak Limit (dBμV)
0.21299	57.4	81.1
0.31724	52.0	77.8
0.64472	53.6	74.0
0.83862	53.7	74.0
1.59908	52.6	74.0
11.91032	55.5	74.0
15.00648	57.6	74.0
16.91168	58.4	74.0
20.31323	57.2	74.0
26.21296	56.8	74.0

Frequency (MHz)	Average Measurement (dBμV)	Average Limit (dBμV)
0.18453	36.1	72.3
0.31977	50.7	67.7
0.76215	45.7	64.0
0.83197	49.4	64.0
1.59908	43.4	64.0
6.55214	42.7	64.0
8.59096	45.0	64.0
12.69427	49.9	64.0

Note: Rate of data transmission is 100 Mb

Port: LAN

Frequency (MHz)	Quasi Peak Measurement (dB μ V)	Quasi Peak Limit (dB μ V)
0.22164	61.1	80.8
0.32233	52.5	77.7
0.65507	52.4	74.0
1.62476	51.8	74.0
5.49860	55.1	74
5.63162	55.6	74.0
7.03928	54.1	74.0
8.59096	55.3	74.0
12.19846	65.9	74.0
15.61642	66.3	74.0
16.77746	63.9	74.0
20.80466	64.2	74.0
24.59415	57.0	74.0

Frequency (MHz)	Average Measurement (dB μ V)	Average Limit (dB μ V)
0.15735	49.1	73.6
0.22164	59.3	70.8
0.32491	50.1	67.6
0.39026	50.7	66.0
0.78059	46.6	64.0
0.88673	46.3	64.0
2.97708	46.4	64.0
4.22721	45.7	64.0
5.24190	47.7	64.0
5.90740	56.6	64.0
7.03928	51.7	64.0
8.59096	53.3	64.0
12.19846	63.8	64.0

Note: Distance function mode

Mains ports Conducted Emissions Test Configuration



Telecommunication Ports Conducted Emissions Test Configuration



Conducted Emissions Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	43 %
Barometric Pressure	744 mmHg

Conducted Emissions Measurement Uncertainties

Amplitude	± 2.9dB
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Measurement uncertainty is calculated in accordance with : CISPR 16-4: 2009.

Conducted Emissions Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
LISN	PMM L3-32	0120F90401	16.05.2008	16.05.2010
Test receiver	Rohde&Schwarz ESS	0830262/004	19.05.2009	19.05.2010
ISN	ISN T400	16870	01.10.2008	01.10.2010

6.5 Radiated Emissions Test Results

Basic Standard	EN 55022: 2006
Limit	Class A

Operating Mode

Interface setup:	Port A – Speed Automatic, Autoneg. On Port B - Speed Automatic, Autoneg. On
RFC-2544 Setup Topology:	Tx port A, Rx port B
RFC-2544 Setup Frames:	64
RFC-2544 Setup Throughput:	Enabled Yes; Rate, % 100; Trial's 600
RFC-2544 Setup Latency:	Enabled No
RFC-2544 Setup Frame Loss:	Enabled No

Test Results

Note: The graphical plots show the radiated emissions pre-test with peak detector.
 The tables indicate the compliance measurement in an anechoic screened chamber at 10 m for the worst case emissions.

Horizontal Polarisation Worst Case Emissions

Frequency (MHz)	Quasi Peak Measurement (dB μ V/m)	Quasi Peak Limit (dB μ V/m)
93.27	30.0	40.0
114.55	36.5	40.0
117.22	32.0	40.0
125.02	35.5	40.0
127.88	37.2	40.0
207.81	29.1	40.0
250.02	39.4	47.0
375.03	33.9	47.0
625.01	41.0	47.0
750.01	35.0	47.0

Vertical Polarisation Worst Case Emissions

Frequency (MHz)	Quasi Peak Measurement (dB μ V/m)	Quasi Peak Limit (dB μ V/m)
95.91	39.5	40.0
125.02	32.5	40.0
151.86	23.9	40.0
157.84	25.9	40.0
202.48	23.5	40.0
375.01	27.8	47.0
500.03	29.1	47.0
625.01	35.2	47.0
750.01	37.7	47.0
875.02	37.2	47.0

Horizontal/Vertical Polarisation Worst Case Emissions

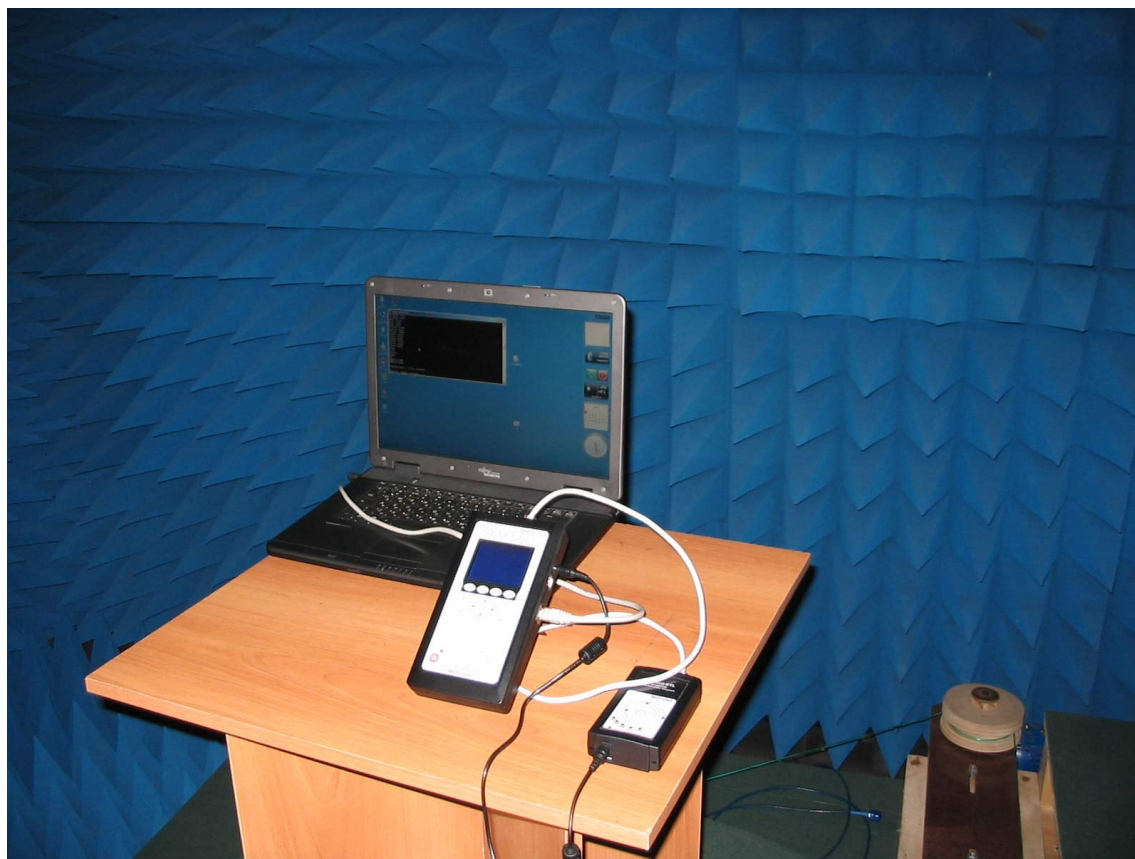
Frequency (MHz)	Peak Measurement (dB μ V/m)	Peak Limit (dB μ V/m)
1003	44.59	70
1030	46.04	70
1130	45.29	70
1255	45.46	70
1378	41.96	70
1503	43.75	70
1628	47.5	70
1840	43.69	70

Note 1: Average measurements were not performed, as peak readings don't exceed the average limit.

Note 2: Measurements were performed up to 2000 MHz as according to the manufacturer information the maximum operating frequency is less 125 MHz. See EN 55022, 6.2.

Radiated Emissions Test Configuration





Radiated Emissions Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	44 %
Barometric Pressure	746 mmHg

Radiated Emissions Measurement Uncertainties

Amplitude	± 5.1dB
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Measurement uncertainty is calculated in accordance with the requirements of CISPR 16-4:2009

Radiated Emissions Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Test Receiver	Rohde&Schwarz ESS	0830262/004	19.05.2009	19.05.2010
	HP 8542E	3906A00279/3705A00246	22.05.2009	22.05.2010
Antenna	EMCO 3144,	9906-1059	22.04.2008	22.04.2010
	EMKO 3109	9906-3228	22.04.2008	22.04.2010

6.6 Harmonics Test Results

Basic Standard	EN 61000-3-2 : 2006
Equipment Classification	A
Test Time:	2.5 minutes

Operating Mode

Interface setup: Port A – Speed Automatic, Autoneg. On
 Port B - Speed Automatic, Autoneg. On
 RFC-2544 Setup Topology: Tx port A, Rx port B
 RFC-2544 Setup Frames: 64
 RFC-2544 Setup Throughput: Enabled Yes; Rate, % 100; Trial's 600
 RFC-2544 Setup Latency: Enabled No
 RFC-2544 Setup Frame Loss: Enabled No

Test Results

Supply Voltage: 225.9 to 227.3 Vrms 321.5 Vpk Frequency: 50.00 Hz
 THD: 0.1% Crest Factor: 1.415 peak at: 89.8 deg
 Supply meets IEC requirements.

Load Power: 7.51 to 16.82 W 39.45 VA Power Factor: 0.426

Load Current: 89 to 174 mArms 738 mApk Crest Factor: 4.268

Limits: EN 61000-3-2:2006 +A2:2009 Class A limits
 No limits apply: Load below 75W

Technical Note

For equipment which falls into the "Class D" category of the test specification EN 61000-3-2, the limits of harmonics currents are calculated for each 320 ms time-window (for a 50 Hz test voltage). Both the input current and input voltage are measured continuously and simultaneously, allowing calculation of the input power and thus the setting of dynamic Class D harmonic current limits against this input power.

Harmonics Environmental Conditions

Power Supply	230V, 50Hz
Temperature	22 °C
Relative Humidity	45 %
Barometric Pressure	739 mmHg

Harmonics Measurement Uncertainties

Voltage	<± 0.2%
Current	<± 0.2% of selected range

Harmonics Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Power and Harmonics Analyser with Flickermeter	ZESZimmer № 12415 LMQ 95	A050356 07870503	14.04.2008	14.04.2010

6.7 Flicker Test Results

Basic Standard	EN 61000-3-3:1995 A1:2001 A2:2005
Test Time	10 minutes (1 observation period)
Parameters Evaluated	P_{st} , d_{max} , $d(t)$, d_c

Operating Mode

Interface setup: Port A – Speed Automatic, Autoneg. On
 Port B - Speed Automatic, Autoneg. On
 RFC-2544 Setup Topology: Tx port A, Rx port B
 RFC-2544 Setup Frames: 64
 RFC-2544 Setup Throughput: Enabled Yes; Rate, % 100; Trial's 600
 RFC-2544 Setup Latency: Enabled No
 RFC-2544 Setup Frame Loss: Enabled No

Test Results

	dmax [%]	d(t) [%]	dc [%]	Pst	
Limits:	4.00	3.30	3.30	1.000	
Measured	0.01	0.00	0.00	0.00	

Flicker Environmental Conditions

Power Supply	230V, 50Hz
Temperature	22°C
Relative Humidity	44 %
Barometric Pressure	739 mmHg

Flicker Measurement Uncertainties

P_{ST} Error	< ± 5%
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Flicker Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Power and Harmonics Analyser with Flickermeter	ZESZimmer № 12415 LMQ 95	A050356 07870503	14.04.2008	14.04.2010

Harmonics and Flicker Test Configuration



6.8 Electrostatic Discharge Test Results

Basic Standard used as a guide	EN 61000-4-2:1995 A1:1998 A2:2001
Performance Criteria	B

Port: Enclosure
Test Level: ± 4 kV contact discharge
 ± 8 kV air discharge.
 (Contact discharge is the preferred method, and air discharge is to be used where contact discharge is not possible).

Operating Mode

Interface setup: Port A – Speed Automatic, Autoneg. On
 Port B - Speed Automatic, Autoneg. On
 RFC-2544 Setup Topology: Tx port A, Rx port B
 RFC-2544 Setup Frames: 64
 RFC-2544 Setup Throughput: Enabled Yes; Rate, % 100; Trial's 600
 RFC-2544 Setup Latency: Enabled No
 RFC-2544 Setup Frame Loss: Enabled No

Test Results

Test Voltage (kV)	Discharge Type	Application	Observation
± 2	Air	Enclosure	Note 1
± 4	Air	Enclosure	Note 1
± 8	Air	Enclosure	Note 1
± 2	Contact	Enclosure	Note 2
± 4	Contact	Enclosure	Note 2
± 2	Contact	VCP	Note 1
± 4	Contact	VCP	Note 1
± 2	Contact	HCP	Note 1
± 4	Contact	HCP	Note 1

Air discharge was applied only where contact discharge was not possible.

VCP = Vertical Coupling Plane
 HCP = Horizontal Coupling Plane

Note 1: No degradation in performance of the EUT was observed during the test.

Note 2: False data loss indication (2%) was observed after applying contact ESD discharge to the metallic shells of the Ethernet connectors. The client accepts this is acceptable degradation (in accordance with the technical specification up to 5 %).

For VCP and HCP tests, discharges were made on each of the four sides of the EUT.

The result 'Enclosure' refers to all possible discharge points around the enclosure.

Electrostatic Discharge Test Configuration



Electrostatic Discharge Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	41 %
Barometric Pressure	742 mmHg

Electrostatic Discharge Measurement Uncertainties

The instruments specified are subject to periodic calibration. Monthly controls ensure, with 95% confidence level, that the instruments remain within the calibrated levels.

Electrostatic Discharge Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
ESD Simulator	ESP30/P18 EM TEST	0999-03	01.06.2008	01.06.2010

6.9 Radiated Immunity Test Results

Basic Standard	EN61000-4-3: 2006
Performance Criteria	A

Port:	Enclosure
Test Level:	3 V/m
Frequency Range:	80MHz – 2GHz
Test Level:	1V/m
Frequency Range:	2GHz- 2,7GHz
Dwell Time:	2 second
Modulation:	80%, 1kHz Amplitude Modulation.

Operating Mode

Interface setup:	Port A – Speed Automatic, Autoneg. On Port B - Speed Automatic, Autoneg. On
RFC-2544 Setup Topology:	Tx port A, Rx port B
RFC-2544 Setup Frames:	64
RFC-2544 Setup Throughput:	Enabled Yes; Rate, % 100; Trial's 600
RFC-2544 Setup Latency:	Enabled No
RFC-2544 Setup Frame Loss:	Enabled No

Test Results

EUT Face	Polarity	Observations
Front	Horizontal	Note 1
Front	Vertical	Note 1
Rear	Horizontal	Note 1
Rear	Vertical	Note 1
LHS	Horizontal	Note 1
LHS	Vertical	Note 1
RHS	Horizontal	Note 1
RHS	Vertical	Note 1

Note 1: No degradation in performance of the EUT was observed during the test.

Radiated Immunity Test Configuration



Radiated Immunity Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	42 %
Barometric Pressure	749 mmHg

Radiated Immunity Measurement Uncertainties

Field Level (Field Probe Uncertainty)	± 3.2dB
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Radiated Immunity Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Antenna	EMCO 3144	9906-1059	22.04.2008	22.04.2010
Antenna	BBHA 9120 D	495	23.04.2008	23.04.2010
Amplifier	Kalmus LA1000VUFG	-	22.04.2008	22.04.2010
Amplifier	PRANA AP 32 SW210A	0508-0684	23.04.2008	23.04.2010
Signal Generator	Aeroflex IFR 2032	203003/007	23.04.2008	23.04.2010

6.10 Fast Transients/Burst Test Results

Basic Standard	EN 61000-4-4 : 2004
Performance Criterion	B

Port: Mains Supply Lead, Signal/Other Leads

Operating Mode

Interface setup:	Port A – Speed Automatic, Autoneg. On Port B - Speed Automatic, Autoneg. On
RFC-2544 Setup Topology:	Tx port A, Rx port B
RFC-2544 Setup Frames:	64
RFC-2544 Setup Throughput:	Enabled Yes; Rate, % 100; Trial's 600
RFC-2544 Setup Latency:	Enabled No
RFC-2544 Setup Frame Loss:	Enabled No

Test Results (Mains Supply Lead)

Line	Test Voltage (kV)	Coupling (Direct / Clamp)	Observations
Line	±0,5	Direct	Note 1
Line	±1	Direct	Note 1
Neutral	±0,5	Direct	Note 1
Neutral	±1	Direct	Note 1
Earth	±0,5	Direct	Note 1
Earth	±1	Direct	Note 1
Earth	±0,5	Direct	Note 1
Line+Neutral+Earth	±1	Direct	Note 1

Test Results (Signal/Other Leads)

Line	Test Voltage (kV)	Coupling (Direct / Clamp)	Observations
Port A	±0.5	Clamp	Note 1
Port B	±0.5	Clamp	Note 1
Port LAN	±0.5	Clamp	Note 1

The test duration was 1 minute, with a 30-second recovery time, repetition rate 5 kHz.

Note 1: False data loss indication (4%) was observed during Fast Transients/Burst applying. The client accepts this is acceptable degradation (in accordance with the technical specification up to 5%)

Fast Transients/Burst Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	41 %
Barometric Pressure	738 mmHg

Fast Transients /Burst Measurement Uncertainties

The instruments specified are subject to periodic calibration. Monthly controls ensure, with 95% confidence level, that the instruments remain within the calibrated levels.

Fast Burst Transients Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Disturbance simulator	EFT 500 EM TEST	1198-07	04.06.2008	04.06.2010

6.11 Surge Test Results

Basic Standard	EN 61000-4-5 : 2006
Performance Criterion	B

Port: Mains Supply Lead

Note: Signal leads were not tested as in accordance with the technical specification for the product only local mains leads not extended outside the building have to be tested. See EN 55024, table 2, note 2.

Operating Mode

Interface setup:	Port A – Speed Automatic, Autoneg. On Port B - Speed Automatic, Autoneg. On
RFC-2544 Setup Topology:	Tx port A, Rx port B
RFC-2544 Setup Frames:	64
RFC-2544 Setup Throughput:	Enabled Yes; Rate, % 100; Trial's 600
RFC-2544 Setup Latency:	Enabled No
RFC-2544 Setup Frame Loss:	Enabled No

Test Results

Pulse Application	Test Voltage (± kV)	Observations
Line – Earth	0.5, 1, 2	Note 1
Neutral – Earth	0.5, 1, 2	Note 1
Line - Neutral	0.5, 1	Note 1

Note 1: No degradation in performance of the EUT was observed during the test.

Surge Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	42%
Barometric Pressure	738 mmHg

Surge Measurement Uncertainties

The instruments specified are subject to periodic calibration. Monthly controls ensure, with 95% confidence level, that the instruments remain within the calibrated levels.

Surge Test Equipment Used.

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Disturbance simulator	VCS 500 M EM TEST	0498-08	05.06.2008	05.06.2010

6.12 Voltage Dips Test Results

Basic Standard	EN 61000-4-11 : 2004
Performance Criterion	B/C

Port: Mains Supply Lead

Operating Mode

Interface setup: Port A – Speed Automatic, Autoneg. On
 Port B - Speed Automatic, Autoneg. On
 RFC-2544 Setup Topology: Tx port A, Rx port B
 RFC-2544 Setup Frames: 64
 RFC-2544 Setup Throughput: Enabled Yes; Rate, % 100; Trial's 600
 RFC-2544 Setup Latency: Enabled No
 RFC-2544 Setup Frame Loss: Enabled No

Test Results

Reduction level %	Duration (periods)	Performance Criterion	Observation
97	0,5	B	Note 1
30	25	C	Note 1
97	250	C	Note 1

Note 1: No degradation in performance of the EUT was observed during the test.

Voltage Dips Environmental Conditions

Power Supply	230V, 50Hz
Temperature	21°C
Relative Humidity	43%
Barometric Pressure	740 mmHg

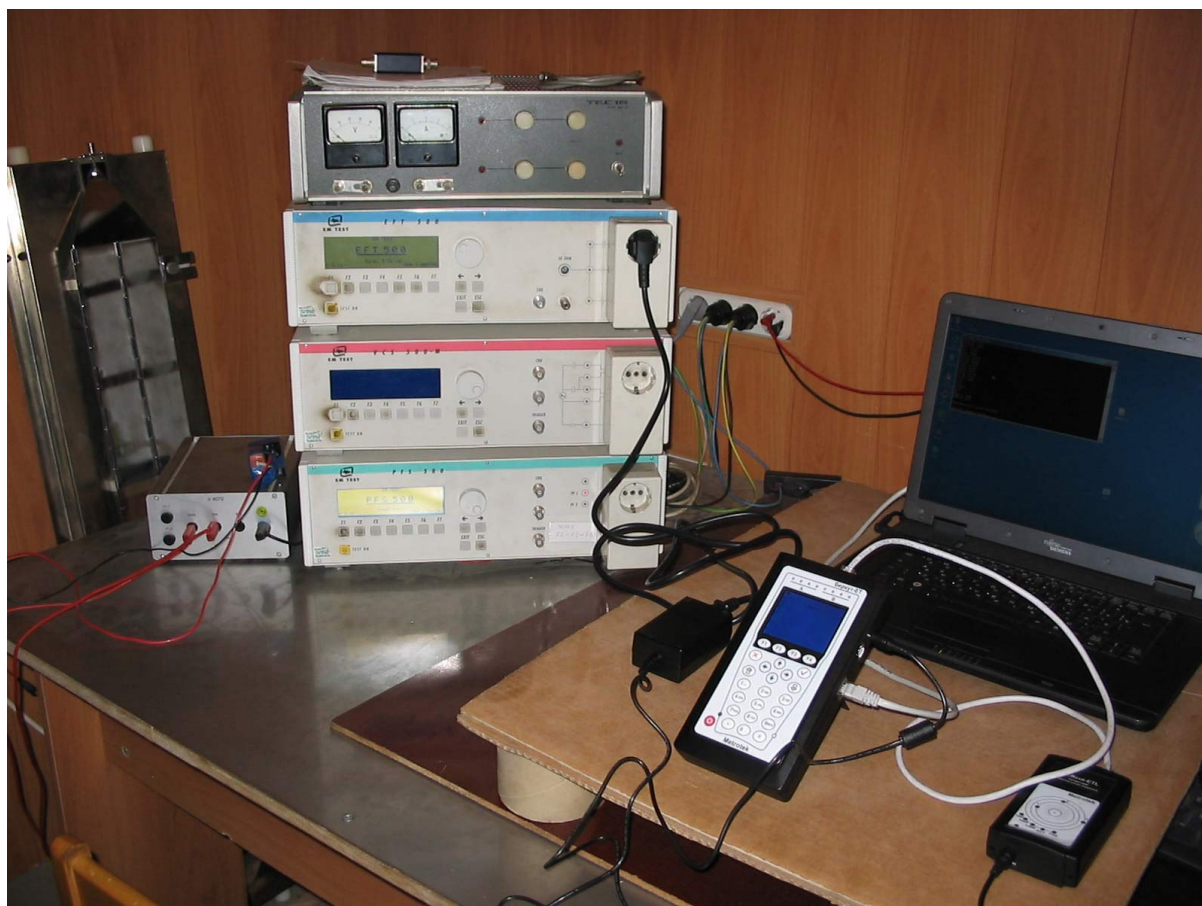
Voltage Dips Measurement Uncertainties

The instruments specified are subject to periodic calibration. Monthly controls ensure, with 95% confidence level, that the instruments remain within the calibrated levels.

Voltage Dips Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Disturbance simulator	PFS 500 EM TEST	0499-01	04.06.2008	04.06.2010

Fast Transients/Burst, Surge and Voltage Dips Test Configuration



6.13 Conducted Immunity Test Results

Basic Standard	EN 61000-4-6 : 2007
Performance Criteria	A

Port: Mains Supply Lead, Signal/Other Leads (A/B, LAN)
Test level 3V
Frequency Range: 0.15 to 80MHz
Dwell Time: 2 second
Frequency Step Size: 1%
Modulation: 80%, 1kHz Amplitude Modulation

Operating Mode

Interface setup: Port A – Speed Automatic, Autoneg. On
 Port B - Speed Automatic, Autoneg. On
 RFC-2544 Setup Topology: Tx port A, Rx port B
 RFC-2544 Setup Frames: 64
 RFC-2544 Setup Throughput: Enabled Yes; Rate, % 100; Trial's 600
 RFC-2544 Setup Latency: Enabled No
 RFC-2544 Setup Frame Loss: Enabled No

Test Results (Mains Supply Lead)

Test Voltage (Vrms)	Frequency Range (MHz)	Observations
3	0.15 – 80	Note 1

Test Results (Signal/Other Leads)

Test Voltage (Vrms)	Frequency Range (MHz)	Observations
3	0.15 – 80	Note 1

Note 1: No degradation in the performance of the EUT was observed during the test.

Conducted Immunity Test Configuration



Conducted Immunity Environmental Conditions

Power Supply	230V, 50Hz
Temperature	22°C
Relative Humidity	45%
Barometric Pressure	740 mmHg

Conducted Immunity Measurement Uncertainties

The instruments specified are subject to periodic calibration. Monthly controls ensure, with 95% confidence level, that the instruments remain within the calibrated levels.

Conducted Immunity Test Equipment Used

Equipment Type	Model Number	Serial Number	Cal. Date	Cal. Due
Amplifier	Kalmus 137C	-	10.06.2008	10.06.2010
Coupling / Decoupling Network	USR 2/4	-	10.06.2008	10.06.2010
Signal Generator	HP 8648 B	3P47U02340	10.06.2008	10.06.2010

7. Appendixes

