EMC TEST REPORT

of

DISTRIBUTION PANEL FOR ENERGY EFFICIENCY

ENERKEEPER / EKS34-150

Measurements date ..... : 2015 / 07 / 06 - 08

Test site of measurements..... : Testing area in the facilities of **Enerkeeper Benelup 2, S.L.**
Located in the following address:
Calle Marqués de Monteagudo, 22 – 1º Dcha.
46393 MADRID (Madrid)

Applicant ..... : Enerkeeper Benelup 2 S.L.
Address ..... : Calle Marqués de Monteagudo, 22 – 1º Dcha.
46393 MADRID (Madrid)

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Applicant ..... : **Enerkeeper Benelup 2, S.L.**
Address ..... : Calle Marqués de Monteagudo, 22 – 1º Dcha.
46393 MADRID (Madrid)
Test site ..... : Facilities of**: Enerkeeper Benelup 2, S.L.**
Address ..... : Calle Marqués de Monteagudo, 22 – 1º Dcha
46393 MADRID (Madrid)

Test date ..... : 2015/07/06-08
Sample tested / product ..... : Distribution panel for energy efficiency
State of EUT / check date ..... : Correct & operative / 2015-07-06
Supplier / installer ..... : Enerkeeper Benelup 2, S.L.
Trademark ..... : Enerkeeper
Model ..... : EKS34-150 *
Serial Nº /Manufacturing date : --
Ratings ..... : 400 V 3~; 50 Hz, 400 A
Derived Models not tested ..... : EKS34-10, EKS34-20, EKS34-30, EKS34-40, EKS34-50, EKS34-75, EKS34-100, EKS34-200, EKS34-250, EKS34-300, EKS34-400, EKS34-450, EKS34-500, EKS34-630, EKS34-700, EKS34-800, EKS34-1000, EKS34-1200; EKS34-1500, EKS34-1600, EKS34-1700; EKS34-1750, EKS34-2000, EKS34-2500.

* The differences between model tested and derived models are the dimensions and current supported. (see table in annex III)

Applied Standards ..... : UNE-EN 61000-6-4:2007+Err.:2008+A1:2011

UNE-EN 61000-6-2:2006+Err.:2009
- UNE-EN 61000-4-2:2010
- UNE-EN 61000-4-3:2007+A1:2008+A2:2011
- UNE-EN 61000-4-4:2013
- UNE-EN 61000-4-5:2015
- UNE-EN 61000-4-6:2014
- UNE-EN 61000-4-8:2011
- UNE-EN 61000-4-11:2005

Results ..... : The obtained results apply only to the particular samples tested object of the present test report; the more unfavourable values of the checks and tests performed are contained herein.

Conclusion ..... : According to the results obtained, as far as investigated, the sample tested is considered to be IN CONFORMITY in the test condition performed with the prescriptions indicated in the specifications applied, taken in account the essential or main objective of EMC Directive.

For evidence of the applicant, this test report is issued in Madrid, 31st August 2015

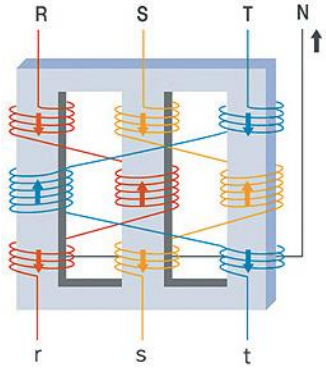
Tested by Project engineer EMC	Verified by EMC Reviewer	Approved by Technical Manager of Test Laboratory
	SGS Tecnos, S.A. Laboratorio de Ensayos E&E	
RUBÉN BELLO TORRALBO	JAVIER MORGADO DURÁN	FERNANDO MONTES CLAVER

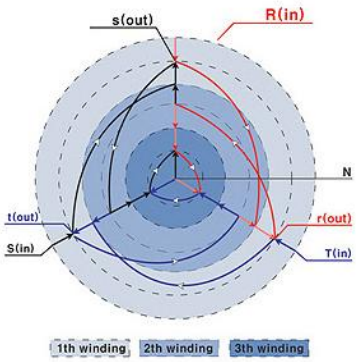
GENERAL DESCRIPTION OF SAMPLE VERIFIED

The equipment tested was located in the Facilities of **Enerkeeper Benelup 2, S.L.**.Energy saving and efficiency equipments.

Enerkeeper b2 equipments reduce wasted energy factors such as: Reactive, Harmonics and Offsets. Enerkeeper b2 power saving devices are designed for companies in which electricity consumption is significant.

The fundamental basis of EnerKeeper ™ is the ATW (Auto Transformer Winding) technology, a system of winding zigzag autotransformer consisting of a ferro-magnetic, building a core of three-phase columns. In each column there are three coils with opposite polarities. Connecting coils differently to a designation zigzag classical cross compositions are obtained in the three columns. The coil winding is transferred from one magnetic next with counterclockwise winding core then returns to the first core change direction again.





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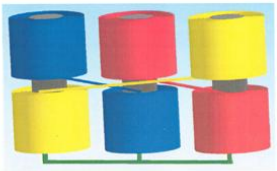
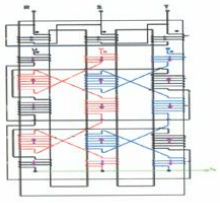
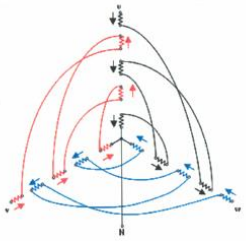


Nuevo diseño



Diseño standard

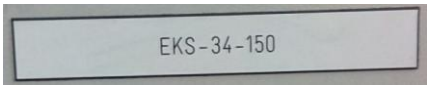


The coil winding is transferred from one magnetic next with counterclockwise winding core and then returns to the first core change direction again. It is performed on each core in a zigzag pattern.

It is the structure of a zigzag autotransformer winding remains constant magnetic flux. The opposite direction of current flow in each phase reduces distortion in the waveform of the intensity that causes harmonics and basically imbalances..

components

- Fan
- Acoustic and visual warning



- Operation indicator - Manual switch - Analyzer information display - ATS (automatic bypass switch) - MCCB or ACB - Zigzag autotransformer EnerKeeper	
The state of the sample verified was correct and with the full operability necessary to perform the test and checking requested to the issuing of this test report.	

PRELIMINARS, SCOPE AND OBJECT

Enerkeeper Benelup 2 had designed and developed the equipments with electrical and electronic components.

Evaluation of Conformity with the Electromagnetic Compatibility, according with the corresponding standards which were requested the applicant. As consequence of it, Enerkeeper Benelup 2 contracts to SGS Tecnos, S.A. the corresponding EMC study and analysis to check the EMC, emission and immunity test, to evaluate the adequacy with levels or limits requested.

Due to the above mentioned, between 6th to 8th July of 2015, the staff of SGS Tecnos, S.A. had been carried out the tests and measurements to check the corresponding verification.

The **scope** of this report must be considered for the equipments and/or installation verified, taking in account the test site evaluated and measurement conditions in the moment of the checking.

Due to the design type with electronics device, incorporated in the EQUIPMET UNDER TEST, could be exist susceptibility to be affect by EMC levels, where it was operative.

The **object** of this study is the valuation that the present levels are not source of malfunction of equipments in the installation and checking of minimum immunity levels to guarantee the correct operability with interferences existing in normal environments.

Moreover, the levels generated / issued are compared with the limits established by the Normative for laboratory test conditions in order to verify the more complete adequacy possible. The performing of emission measurements are carried out previously with the equipment switched off and later with equipment connected in operative mode. The immunity tests had been performed with the equipment connected in operative mode.

This procedure had as object the evaluation “in situ” of the adequacy to the operation environment of the equipments. And by comparison evaluate the EMC and the possible interferences generated by the system analyzed.

As part of the study, the levels obtained are compared with technical characteristics related with immunity, the susceptibility levels and EMC influences.

REFERENCES OF APPLIED STANDARDS

The measurements and tests performed, related with EMC had been performed according to the SGS Tecnos, S.A. procedures, based upon the following Standards / Rules:

- **COUNCIL DIRECTIVE 2004/108/CE, 15th December of 2004,** relative to the legislation of States members in electromagnetic compatibility matters.
  (Mandatory Directive from 20/07/2007, and replacing to the Directive 89/336/CEE. The new Directive, basically; have the same criterion of 89/336, including in more specific way the systems and installations)

- **ROYAL DECREE 1580/2006, 22th December,** establishing the conformity procedures and protection requirements related with the electromagnetic compatibility of equipments, systems and installations.

- **STANDARD UNE-EN 61000-6-4:** Generic standard of emission in industrial environments.

- **STANDARD UNE-EN 61000-6-2:** Generic standard of immunity in industrial environments.

- **STANDARD UNE-EN 61000-4-2:** Electromagnetic compatibility; Testing and measurement techniques. Electrostatic discharge immunity test.

- **STANDARD UNE-EN 61000-4-3:** Electromagnetic compatibility; Testing and measurement techniques. Radiated, radio-frequency, electromagnetic field immunity test.

- **STANDARD UNE-EN 61000-4-4:** Electromagnetic compatibility; Testing and measurement techniques. Electrical fast transient/burst immunity test.

- **STANDARD UNE-EN 61000-4-5:** Electromagnetic compatibility; Testing and measurement techniques. Surge immunity test.

- **STANDARD UNE-EN 61000-4-6:** Electromagnetic compatibility; Testing and measurement techniques. Immunity to conducted disturbances, induced by radio-frequency fields.

- **STANDARD UNE-EN 61000-4-8:** Electromagnetic compatibility; Testing and measurement techniques. Power frequency magnetic field immunity test.

- **STANDARD UNE-EN 61000-4-11:** Electromagnetic compatibility; Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests.

REMARK: *the standards "UNE- EN" edited by AENOR are the official version, in Spanish language, of European standards "EN", which adopting the International standard "IEC" ó "CISPR"; in consequence the contain of standards with the same code reference or numerical designation are the same in substance.*

EQUIPMENT USED

- **EMI Receiver**.
  Trademark / Model: PMM / 9010 & 9060
  Frequency range: 10 Hz - 6 GHz
  Code Nº : DIE 610010

- **Antenna Bilogical**
  Trademark / Model: A.H. SYSTEMS / SAS-521F-7
  Frequency range: 25 MHz – 7 GHz
  Code Nº: DIE 610188

- **RF Passive Probe**
  Trademark / Model: PMM / SCH-1-1000
  Frequency range: **9** kHz – 3 MHz
  Code Nº: DIE 610210

- **EMC Tester**
  Trademark / Model: EMC PARTNER / TRA3000-F-S
  Specifications: EFT, SURGES
  Code Nº: DIE 580100-1

- **Tree Phase Coupling Decoupling Network**
  Trademark / Model: EMC PARTNER / CDN2000-06-32
  Characteristics: 32 A; 3 phases+N+G
  Code Nº: DIE 580100-2

- **Electrostatic discharges Simulator**
  Trademark / Model: HAEFELY / ONYX30
  Specifications: 0 - 30 kV
  Code Nº: DIE 500147

- **Amplifiers of RF**
  Trademark / Model: FRANKONIA / FLL-25, AMPLIFIER RESEARCH / 25W1000M7 and FRANKONIA / FLG-30C
  Frequency range: 10 KHz - 250 MHz, 100 MHz – 1000 MHz and 1 – 3 GHz
  Code Nº: DIE 431108, 431104 and 431108

- **Generator of RF**
  Trademark / Model: PMM / 3030
  Frequency range: 9 KHz - 3000 MHz
  Code Nº: DIE 520200

- **Coupling / decoupling network**
  Trademark / Model: FCC / 801-M5-25
  Characteristics: 50Hz-60Hz, 25A
  Code Nº: DIE 600006

- **Electromagnetic meter of fields**
  Trademark / Model: NARDA / EFA-300
  Frequency range: 50Hz /60Hz
  Code Nº: DIE 550020

- **Squared coil of 1 meter edge**
  Trademark / Model: SGS / --
  Characteristics: 86 feed back
  Code Nº // calibration dates: DIE 550007

MEASUREMENTS OF CONTINUOUS DISTURBANCE VOLTAGES OF MAINS SUPPLY TERMINALS

STANDARD APPLIED: UNE-EN 61000-6-4

1. - General data:

Frequency range verified (MHz).....: 0,15 to 30
Meter indication.....: QUASI-PEAK (blue) & AVERAGE (red)
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Basic meter equipments .....: - RF Passive Voltage Probe PMM / SCH-1-1000
- EMI Receiver PMM / 9010

2. - Limits:

FREQUENCY RANGE (MHz)	LIMITS dB (µV)	
	QUASI – PEAK VALUE	AVERAGE VALUE
0,15 a 0,5	79	66
0,5 a 30	73	60

3. - Test conditions:

- Supply lines tested: L1, L2, L3 (phases) in mains input terminal.
- Initial measurement (background): Equipment under test (EUT) switched off.
- Operation modes:
  - EUT switched off to measure the background level.
  - EUT operative in AUTO. Mode without load.

4. - Graphics:

The Annex I show the graphics of results obtained during the tests.

5. - Frequencies study and evaluation:

Preliminary remark:

QP (sweep = blue line) level is measured with standardized Band-Width, specific pondered net-filter and integrated during a period (at least 1s); In this way of measurement the magnitude obtained of QP levels is lower than PK level, for non-repetitive signal, if signal is a constant pure tone, the obtained level is almost the same.

AV (sweep = red line) level is other type of measure averaged in a time, evaluated with other established limit, is a similar measurement to QP. The AV-levels are ever lower than QP-levels.

MEASUREMENTS OF CONTINUOUS DISTURBANCE VOLTAGES OF MAINS SUPPLY TERMINALS (cont.)

6. - Frequencies study and evaluation (cont.):

Analysis / study:

The background levels show that are above than the limits between 150 kHz and 1,3 MHz
In the rest of the frequency range the levels are below than the limits established.
The pages 2 and 3 of the Annex I show the graphs phases (L1, L2 and L3).

With the Equipment in operating mode, the RF disturbance shows a similar spectrum of levels and spectral density in all the lines checked.

An increase of levels measured respect to background levels is not observed.

The following considerations should be taken into account before and after measurements:

- The limit established by the standard is the corresponding for testing of one equipment or system in laboratory conditions, using a coupling network in the power supply lines which filters the spurious disturbance inherent to the line. In consequence only is measured the emission of equipment under test (E.U.T), no influence of background. In this case the influence of these equipments in same installation adding their inherent disturbance.

- By other part, considering the minimum immunity level required by standard EN 61000-6-2 and 61000-4-6 for industrial equipment, (3-10V = 130-140 dBμV, levels which could be appreciated degradation or loss of functionality), in the measurement is observed that maximum value does not exceed in any case 90 dBμV at the frequency of 0,34 MHz..

  The type of equipments to be connected in the installation site of EUT must be according with industrial category.

Verdict / conclusion:

After analyzing the results obtained, **it cannot give a clear conclusion** between the frequencies of 0.15 MHz and 1.3 MHz due to the level of background noise. At other frequencies can be considered that the equipment does not generate noise that is well above the limits of the standard applied.

However according to the above (analysis, evaluation and justification), the tested equipment is considered **IN CONFORMITY** with the essential aim of the EMC directive as it relates to the Conducted Emission under conditions in which the test was performed.

MEASUREMENTS OF RADIATED ELECTROMAGNETIC DISTURBANCE

STANDARD APPLIED: UNE-EN 61000-6-4

1.- General data:

Frequency sweep (MHz).....: 30 to 6000 (internal frequencies unknown)
Meter indication.....: Peak value (green), Quasi-peak (blue) and Average (red)
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Distance from EUT to antennae (m) .....: 3
Height of measurement antenna (m).....: 1,3
Measurement points.....: Front side (Other sides shielded, front side is the most vulnerable)
Basic meter equipments .....: - EMI Receiver PMM / 9010 & 9060
- Antenna Bilogical SAS-521F-7

2.- Limits 30 to 1000 MHz:

FREQUENCY RANGE (MHz)	QUASIPEAK LIMIT FOR MEASUREMENT DISTANCE OF 10 m (dBµV/m)	QUASIPEAK LIMIT APPLIED FOR MEASUREMENT DISTANCE OF 3 m (dBµV/m)
30 to 230	40	40 + 10 = 47 (*)
230 to 1000	47	47 + 10 = 57 (*)

FREQUENCY RANGE (MHz)	PEAK LIMIT FOR MEASUREMENT DISTANCE OF 3 m (dBµV/m)	AVERAGE LIMIT FOR MEASUREMENT DISTANCE OF 3 m (dBµV/m)
1000 to 3000	76	56
3000 to 6000	80	60

(*)The measurements corresponding to this test, have been performed in situ between 3 meters of distance, (due to the particular disposition of equipment installed) and the applied limits have been corrected according to the indications of clause 10.8 of the Standard EN 55022where the following relation is indicated: L2=L1 (d1/d2) where *dn* is a distance in meters and *Ln* is the limit in µV/m.

3.- Test conditions:

- Antenna polarization: Vertical and Horizontal.
- Operation modes:
  - EUT switched off to measure the background level.
  - EUT operative in AUTO. Mode without load

4.- Graphics:

The pages of the Annex II show the graphics of results obtained during the tests.

In the graphics of Annex II are showed the QUASI-PEAK values (blue), PEAK (green); and BACKGROUND SWEEP (pink) to compare with the limits QUASIPEAK (red line); PEAK (light blue line) and AVERAGE (yellow line)

5.- Frequencies study and evaluation:

Preliminary remark:

PK-level (green) is the maximum peak-value of the spectrum's envelope.

QP-level (blue) is measured with standardized Band-Width, specific pondered net-filter and integrated during a period (at least 1s); In this way of measurement the magnitude obtained of QP levels is lower than PK level, for non-repetitive signal, if signal is a constant pure tone, the obtained level is almost the same.

AV level (red) is other type of measure averaged in a time, e, is a similar measurement to QP. The AV-levels are ever lower than QP-levels.

Analysis / study:

30 to 1000 MHz

In general all the levels are below limit for frequencies between 30 to 1000 MHz. Punctually the limit is exceeded for frequencies corresponding to radio-telecommunication services, (over 872-960 MHz mobile phones, 470-853 Bands UHF TV broadcast, 380-460 MHz UHF internal mobile radiocom. walkie-talkie, 148-223 MHz broadcasting and land mobile; and 88-108 MHz FM radio-broadcast).

The comparison, of the magnitude and spectral density, between the measurements corresponding to the ambient (with EUT switched off) and the measurement performed with the EUT operative, shows a very similar levels in the range of frequencies 30-1000 MHz analyzed, *(they're almost identically, considering variability of background*).

1000 to 6000 MHz

In general all the levels are below limit for frequencies between 1 to 6 GHz. Punctually the limit is exceeded for frequencies corresponding to radio-telecommunication services, over 1,7-2,450 GHz land mobile (UMTS (3G) 1920-1980 uplink, UMTS (3G) 2110-2170 downlink; 2450 MHz Bluetooth).

The comparison, of the magnitude and spectral density, between the measurements corresponding to the ambient (with EUT switched off) and the measurement performed with the EUT operative, shows a very similar levels in the range of frequencies 1000-6000 MHz analyzed, *(they're almost identically, considering variability of background*).

In consequence can be understandable that EUT does not contribute with additional and significant radiated disturbance to the existing in the environment where the equipment is installed. There is no (significant) disturbance above immunity levels requested, and no negative influence due to the operation of EUT.

Verdict / conclusion:

According to the results obtained and the above exposed, (analysis, evaluation and justifications), **the sample tested is considered IN CONFORMITY with the requirements of this test** in the test conditions performed except in the frequencies corresponding to radio-telecommunication services, where background levels are exceed the limits and it is not possible to give a clear verdict.

However the tested equipment is considered **IN CONFORMITY** with the essential aim of the EMC directive as it relates to the Radiated Emission due to the levels does not exceed in any case 100 dBµV.

IMMUNITY TO ELECTROSTATIC DISCHARGE

STANDARD APPLIED: UNE-EN 61000-6-2; UNE-EN 61000-4-2

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: B
Performance criterion of the manufacturer .: NOT INDICATED
Test Voltage (kV) .....: 8/4 (Non conductive accessible parts / Conductive)
Application Mode.....: Air discharge / Contact discharge
Polarity .....: Positive and negative
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Temperature (ºC).....: 27 ± 2
Operation modes .....: Operative mode (AUTO.) without load

BASICAL TEST EQUIPMENT:

- ESD generator
- Other accessories

POINTS OF APPLICATION ON THE EQUIPMENT:

See Annex IV

RESULTS:

The operation of the equipment is according to the normal performance expected; no degradation or loss of function is appreciated.

The equipment not becomes dangerous as a result of the application of the test.

According to the above exposed, the equipment under test is IN CONFORMITY, in the test conditions performed, with the requirements defined by the Standard for this test.

IMMUNITY TO AMPLITUDE MODULATED RADIO FREQUENCY ELECTROMAGNETIC FIELDS

STANDARDS: UNE-EN 61000-6-2; UNE-EN 61000-4-3

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: A
Performance criterion of the manufacturer ...: NOT INDICATED
Frequency sweep (MHz).....: 80 to 1000; 1400 to 2700
Modulation characteristics .....: 80% AM (1kHz)
Field strength level (V/m).....: 10 (80 to 1000 MHz); 3 (1400 to 2000 MHz) and 1 (2000 to 2700 MHz), unmodulated
Polarization.....: Vertical / Horizontal
EUT Orientation .....: Frontal
EUT Supply voltage (Vac) .....: 400V (3 ~), 50Hz
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Function modes.....: Operative mode (AUTO.) without load

MAIN TEST EQUIPMENT:

- Signal generator
- Isotropic field monitor.
- RF Amplifier.
- Log.-Periodic Antenna.

RESULTS:

The EUT operated correctly, without any degradation of functionality or appreciable loss of functions.

The equipment does not become dangerous as a result of the application of the test.

Due to the above, the EUT is considered to be IN CONFORMITY with the requirements indicated in the applied test specifications

INMUNITY TO ELECTRICAL FAST TRANSIENT / BURST

STANDARD APPLIED: UNE-EN 61000-6-2; UNE-EN 61000-4-4

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: B
Performance criterion of the manufacturer .: NOT INDICATED
Test voltage (kV).....: 2
Repetition frequency of the impulses.(kHz).: 5
Rise time of the impulses (ns) .....: 5
Impulse duration (ns) .....: 50
Burst duration (ms) .....: 15
Burst period (ms).....: 300
Application points .....: AC input terminals
Coupling mode .....: Direct coupling
Polarity of the impulses .....: Negative / Positive
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz
Operation modes .....: Operative mode (AUTO.) without load

BASICAL TEST EQUIPMENT:

- EFT Generator
- CDN 2000 network
- Other accessories

RESULTS:

The operation of the equipment is according to the normal performance expected; no degradation or loss of function is appreciated.

The equipment not becomes dangerous as a result of the application of the test.

According to the above exposed, the equipment under test is IN CONFORMITY, in the test conditions performed, with the requirements defined by the Standard to this test.

SURGE INMUNITY TEST

STANDARD APPLIED: UNE-EN 61000-6-2; UNE-EN 61000-4-5

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: B
Performance criterion of the manufacturer .: NO INDICATED
Test voltage (kV) Differential mode .....: 1
Test voltage (kV) Common mode .....: 2
Points of Application.....: AC input terminals
Wave form of the surge voltage (μs) .....: 1,2/50
Polarity .....: Positive / Negative
Number of impulses by test.....: 5
Repetition rate .....: 1 pulse/minute
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Operation modes .....: Operative mode (AUTO.) without load
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz

BASICAL TEST EQUIPMENT:

- Surges Generator
- CDN 2000 network
- Other accessories

RESULTS:

The operation of the equipments is according to the normal performance expected; no degradation or loss of function is appreciated.

The equipments not become dangerous as a result of the application of the test.

According to the above exposed, the equipment under test is in CONFORMITY, in the test conditions performed, with the requirements defined by the Standard to this test.

CONDUCTED DISTURBANCES, INDUCED BY RADIO FREQUENCY FIELDS

STANDARD APPLIED: UNE-EN 61000-6-2; UNE-EN 61000-4-6

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: A
Performance criterion of the manufacturer .: NO INDICATED
Frequency sweep (MHz).....: 0,15 to 80
Level (V rms).....: 10
Coupling Points of Application.....: AC input terminals
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Modulation characteristics .....: 80% AM, 1 kHz, sinusoidal wave
Common-mode Impedance.....: 150 Ω
Coupling modes .....: Injection clamp
Operation modes.....: Operative (AUTO.) without load
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz

BASICAL TEST EQUIPMENT:

- Signal Generator
- RF Amplifier
- Injection clamp EM 101
- Other accessories

RESULTS:

The operation of the equipment is according to expected normal performance; no degradation or loss of functionality is appreciated.

The equipments not become dangerous as a result of the application of the test.

According to the above exposed, and the performance criterion indicated in the standard, the equipment under test is in CONFORMITY, in the test conditions performed, with the requirements defined by the Standard to this test.

NOTE: according to the Standard in the bands UIT 47-68 MHz the level is 3 V/m

IMMUNITY TO MAGNETIC FIELD OF MAIN POWER SUPPLY FREQUENCY

STANDARDS: UNE-EN 6000-6-2; UNE-EN 61000-4-8

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: A
Performance criterion of the manufacturer .: NOT INDICATED
Sweep of frequencies (Hz) .....: 50
Field level.(Arms/m).....: 30 (level applied for industrial equipment)
Position .....: Control panels
Orientation .....: 3 axis
Test site.....: Facilities of Enerkeeper Benelup 2, S.L.
Operation modes .....: Operative Mode (AUTO.) without load
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz

MAIN TEST EQUIPMENT:

- Autotransformer
- Meter of electrical and magnetic field (ELF)
- Field coil (86 turns)
- Other accessories

RESULTS:

The operation of the equipment is according to expected normal performance; no degradation or loss of functionality is appreciated.

The equipment does not become dangerous as a result of the application of the test.

According to the above exposed, and the performance criterion indicated in the standard, the equipment under test is in CONFORMITY, in the test conditions performed, with the requirements defined by the Standard to this test.

VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS

STANDARD APPLIED: UNE-EN 6000-6-2; UNE-EN 61000-4-11

TEST SPECIFICATIONS:

Performance criterion of the Standard.....: C
Performance criterion of the manufacturer .: NO INDICATED
Voltage variations (Decrease %).....: 30 / 60 / 100
Time for decreasing voltage (ms).....: 500 / 200 / 20 & 5000
Test site.....: --
Operating modes .....: --
Supply voltage of the equipment tested (V).: 400V (3 ~), 50Hz

BASICAL TEST EQUIPMENT:

N/A

RESULTS:

Test not performed according Standard and the input current of the equipment under test > 16 A per phase.

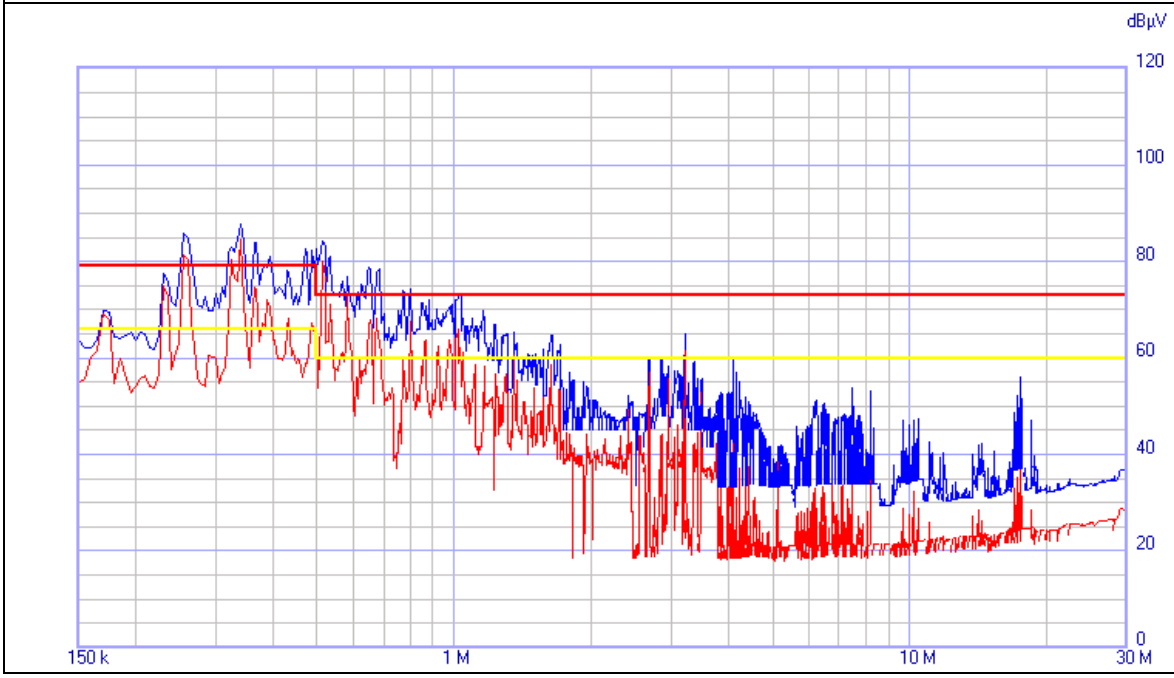
Test applicable to equipments with input current < 16 A per phase.

ANNEX I

R.F. CONDUCTED EMISSION R.F.
(150 kHz - 30 MHz)

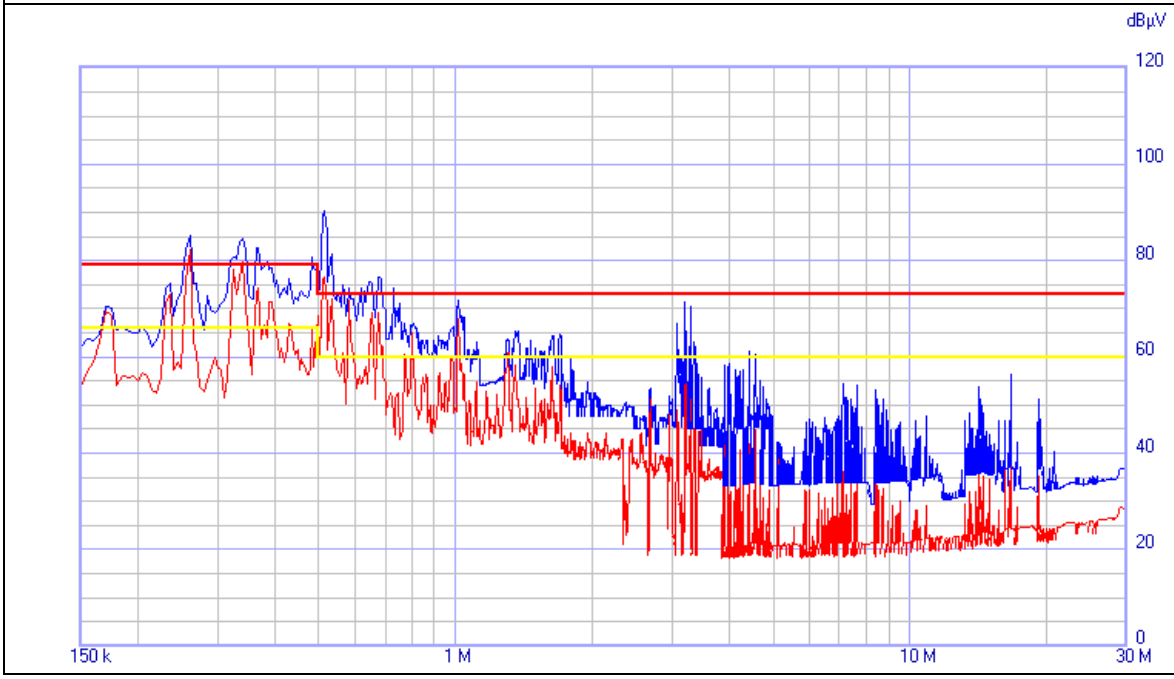
Conducted Emission 0,15-30 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT OFF, BACKGROUND NOISE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4; limits QUASIPEAK (QP): red line and AVERAGE (AV): yellow line	
Comment:	Measurements in Phase L1 of power supply; sweeps QP (blue) and AV (red)	Power Supply: 400 V (3 ~); 50 Hz



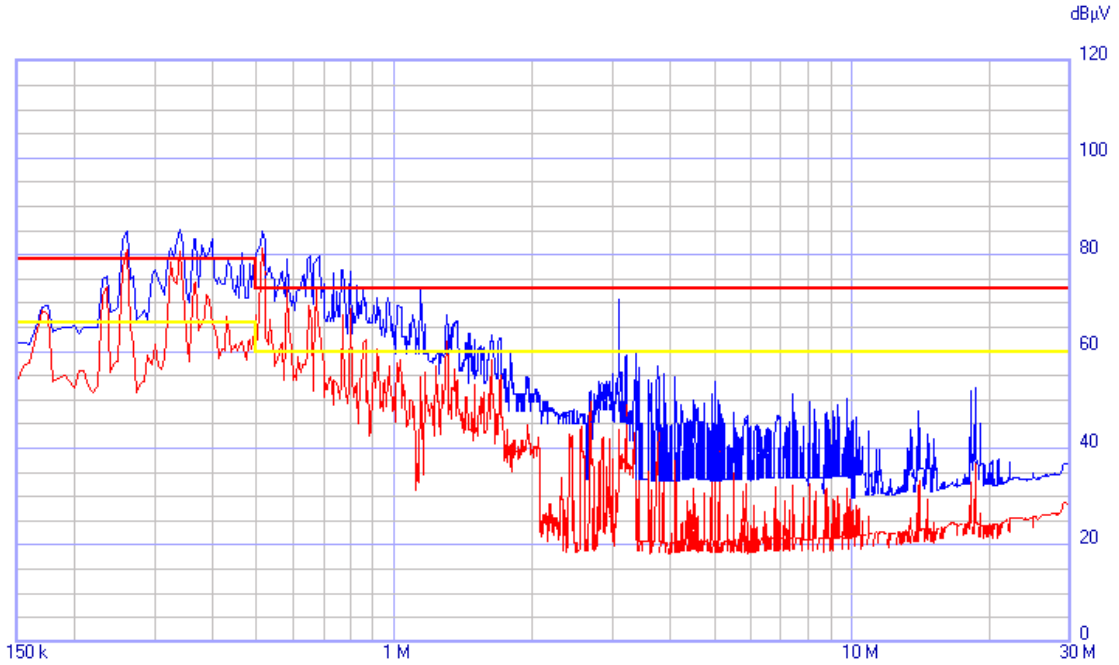
Conducted Emission 0,15-30 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT OFF, BACKGROUND NOISE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4; limits QUASIPEAK (QP): red line and AVERAGE (AV): yellow line	
Comment:	Measurements in Phase L2 of power supply; sweeps QP (blue) and AV (red)	Power Supply: 400 V (3 ~); 50 Hz



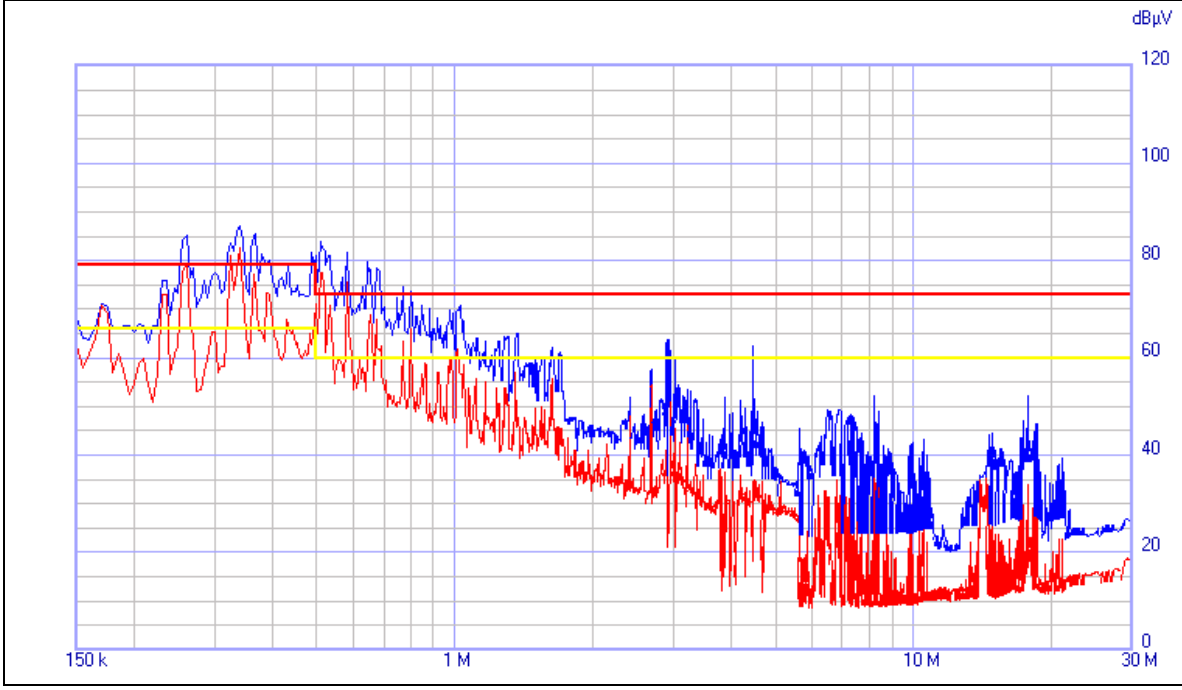
Conducted Emission 0,15-30 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT OFF, BACKGROUND NOISE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4; limits QUASIPEAK (QP): red line and AVERAGE (AV): yellow line	
Comment:	Measurements in Phase L3 of power supply; sweeps QP (blue) and AV (red)	Power Supply: 400 V (3 ~); 50 Hz



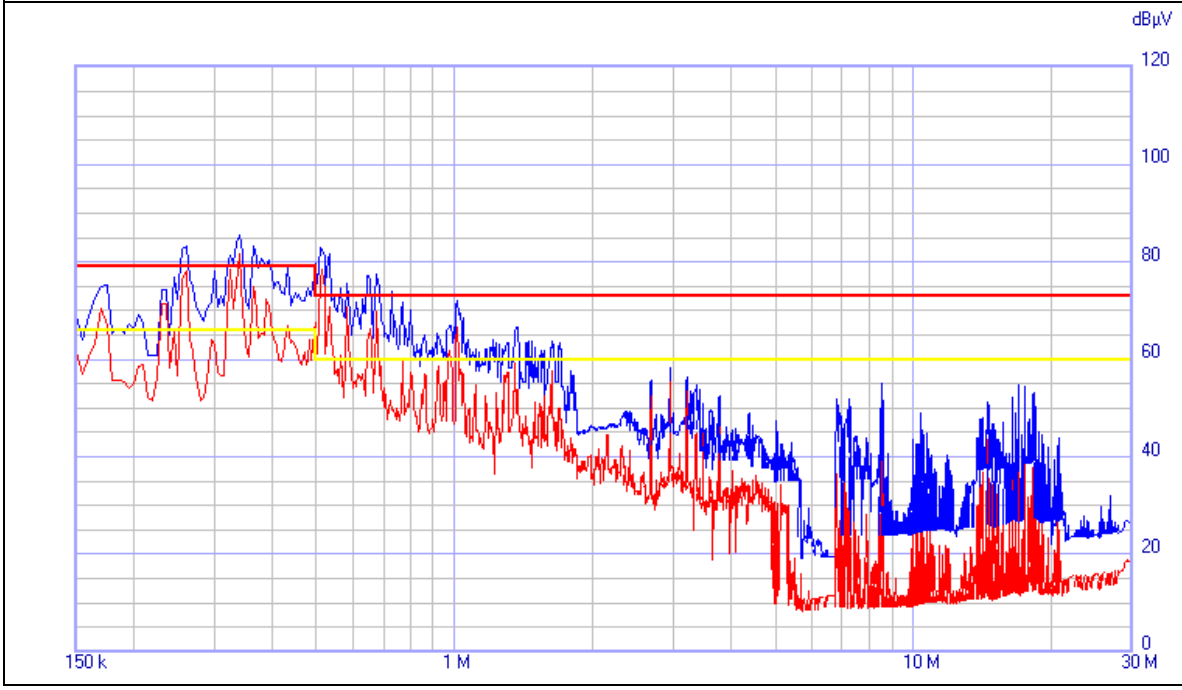
Conducted Emission 0,15-30 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT IN OPERATIVE MODE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4; limits QUASIPEAK (QP): red line and AVERAGE (AV): yellow line	
Comment:	Measurements in Phase L1 of power supply; sweeps QP (blue) and AV (red)	Power Supply: 400 V (3 ~); 50 Hz



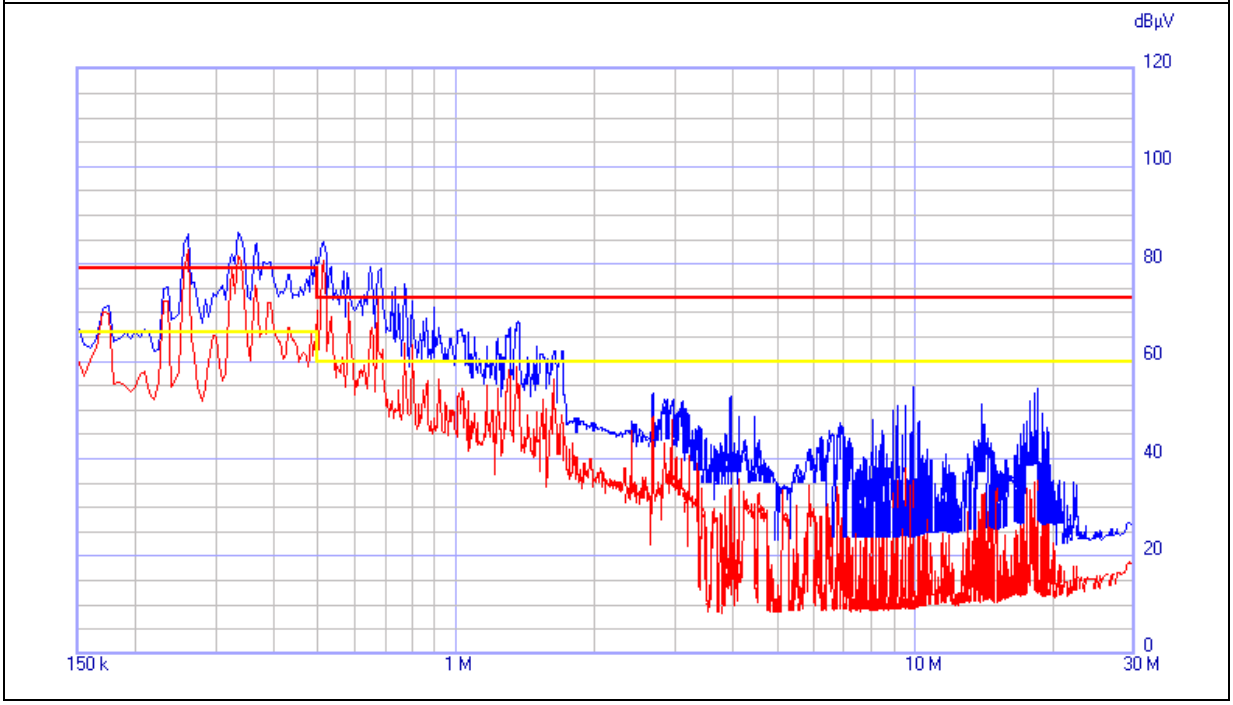
Conducted Emission 0,15-30 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT IN OPERATIVE MODE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4; limits QUASIPEAK (QP): red line and AVERAGE (AV): yellow line	
Comment:	Measurements in Phase L2 of power supply; sweeps QP (blue) and AV (red)	Power Supply: 400 V (3 ~); 50 Hz



Conducted Emission 0,15-30 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT IN OPERATIVE MODE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4; limits QUASIPEAK (QP): red line and AVERAGE (AV): yellow line	
Comment:	Measurements in Phase L3 of power supply; sweeps QP (blue) and AV (red)	Power Supply: 400 V (3 ~); 50 Hz

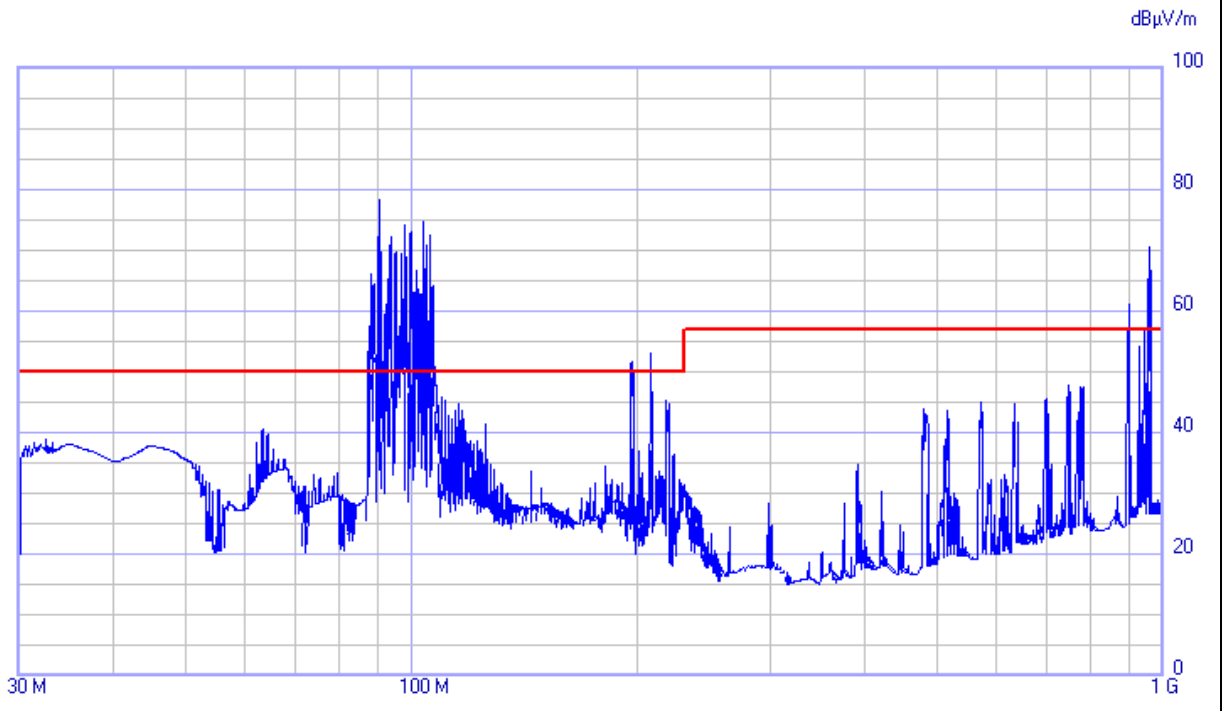


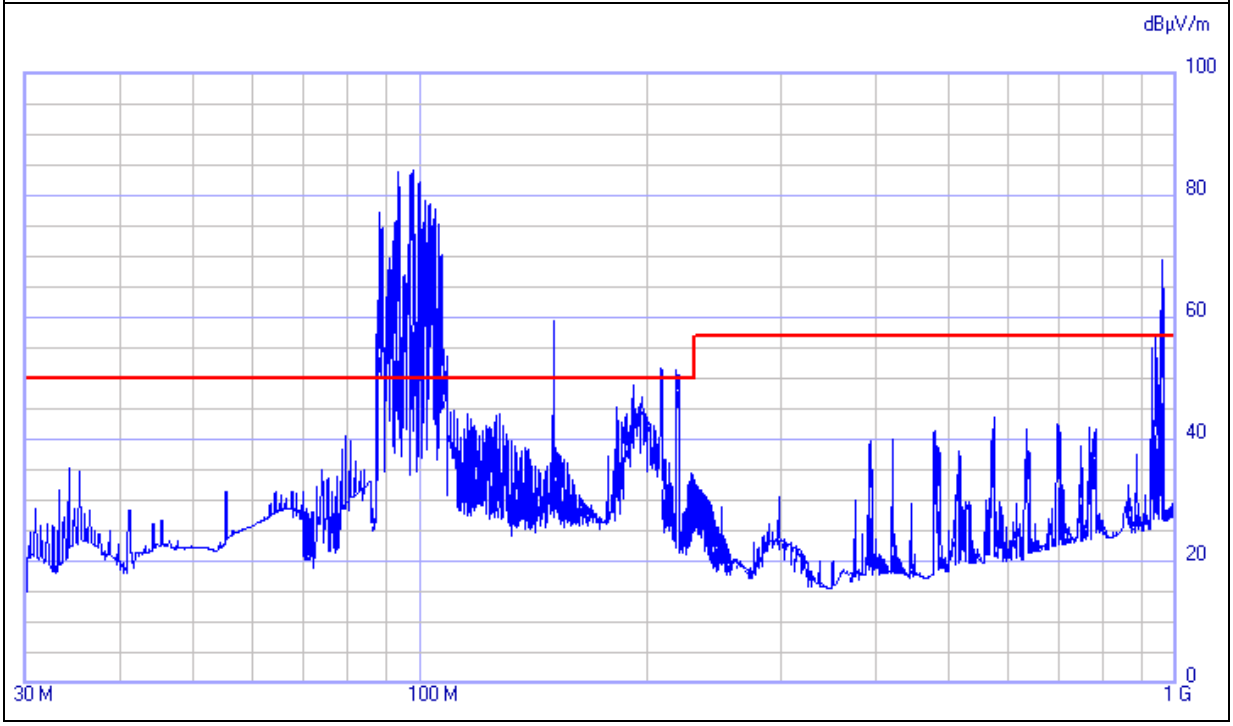
ANNEX II

RADIATED EMISSION R.F.
(30 MHz - 1000 MHz)

Radiated Emission 30-1000 MHz

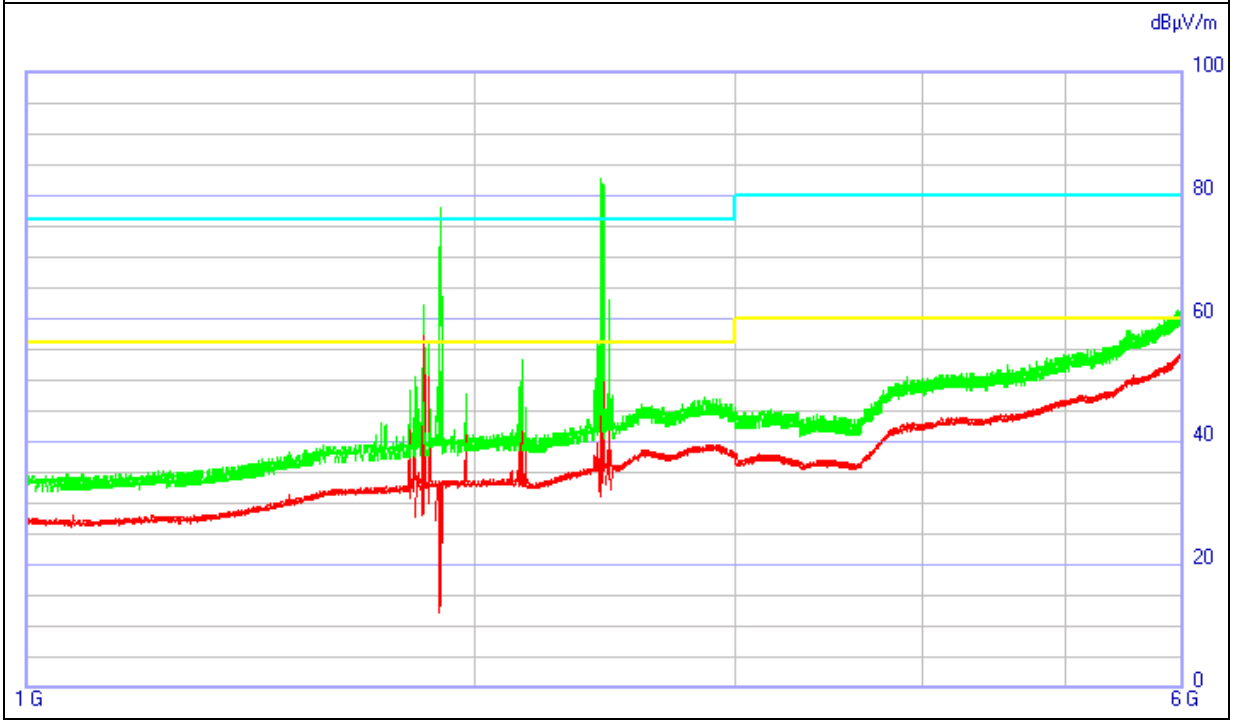
EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT OFF, BACKGROUND NOISE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4 limit QUASIPEAK (QP) red line; **measurements at 3 m**	
Comment:	**HORIZONTAL & VERTICAL** POLARIZATION; sweep QPK (blue)	

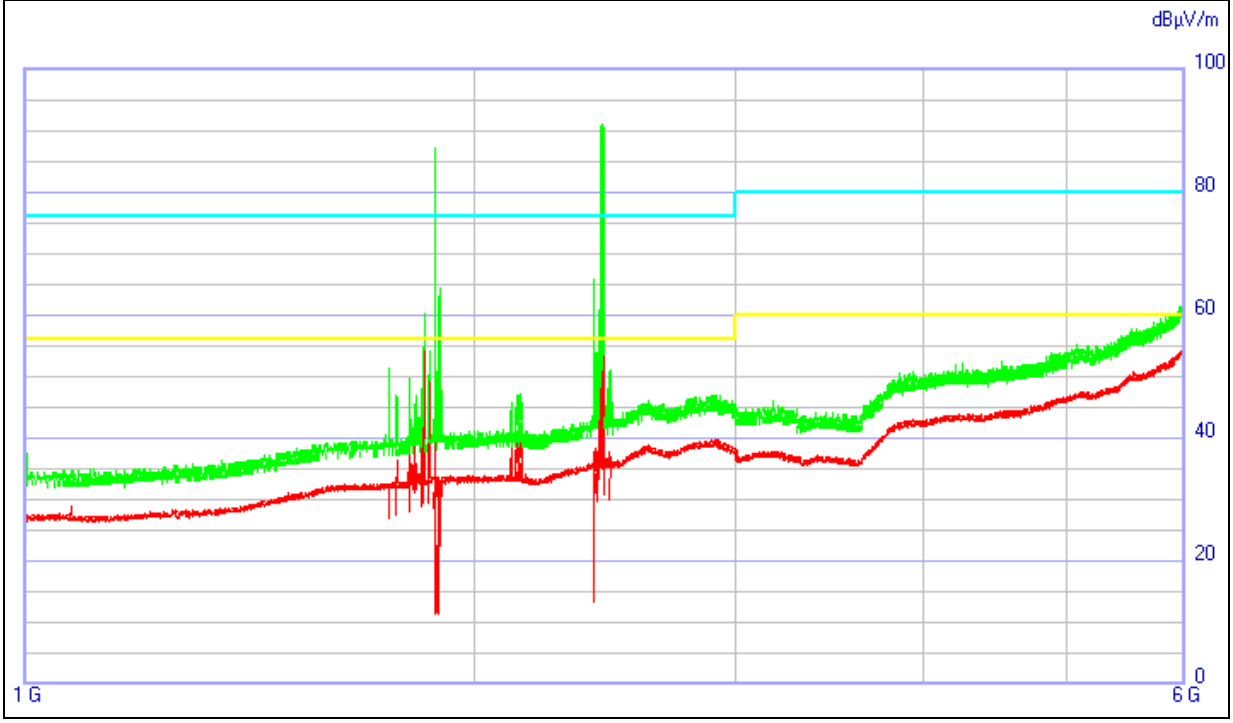




Radiated Emission 1000-6000 MHz

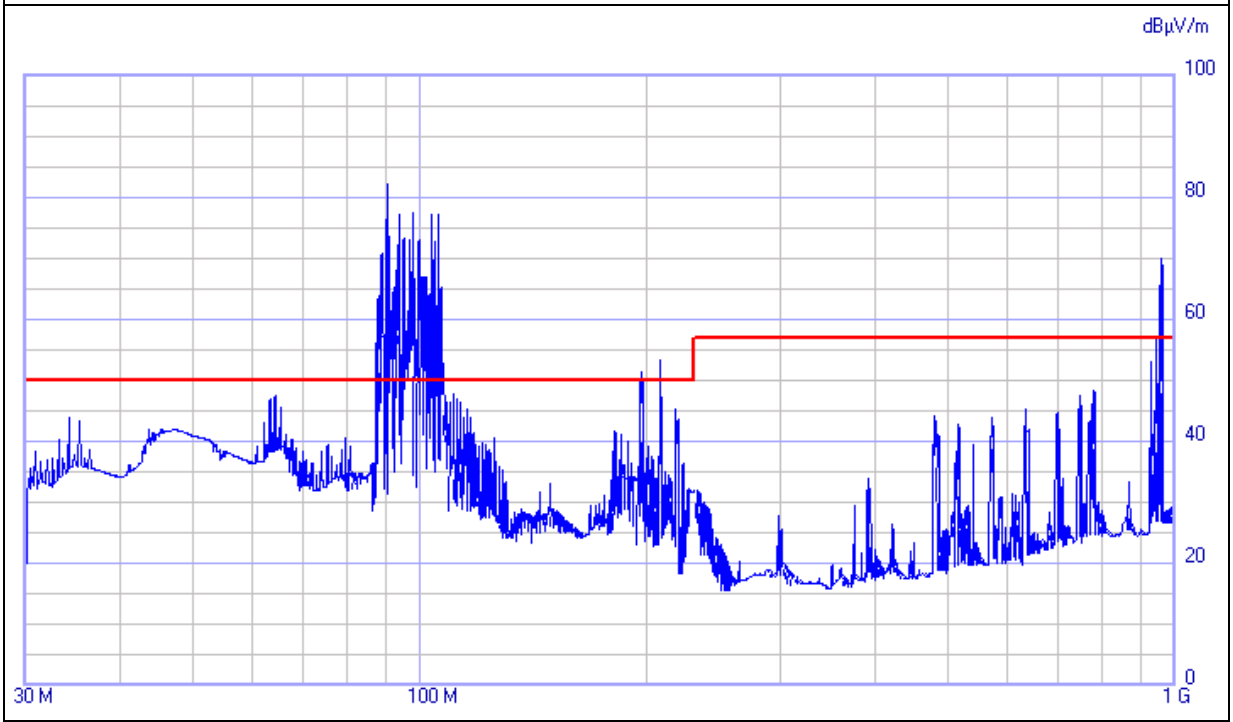
EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	EQUIPMENT OFF, BACKGROUND NOISE	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4 limit PEAK (PK) light blue line and AVERAGE (AV) yellow line; **measurements at 3 m**	
Comment:	**HORIZONTAL & VERTICAL** POLARIZATION; sweep PK (green) and AV (red)	

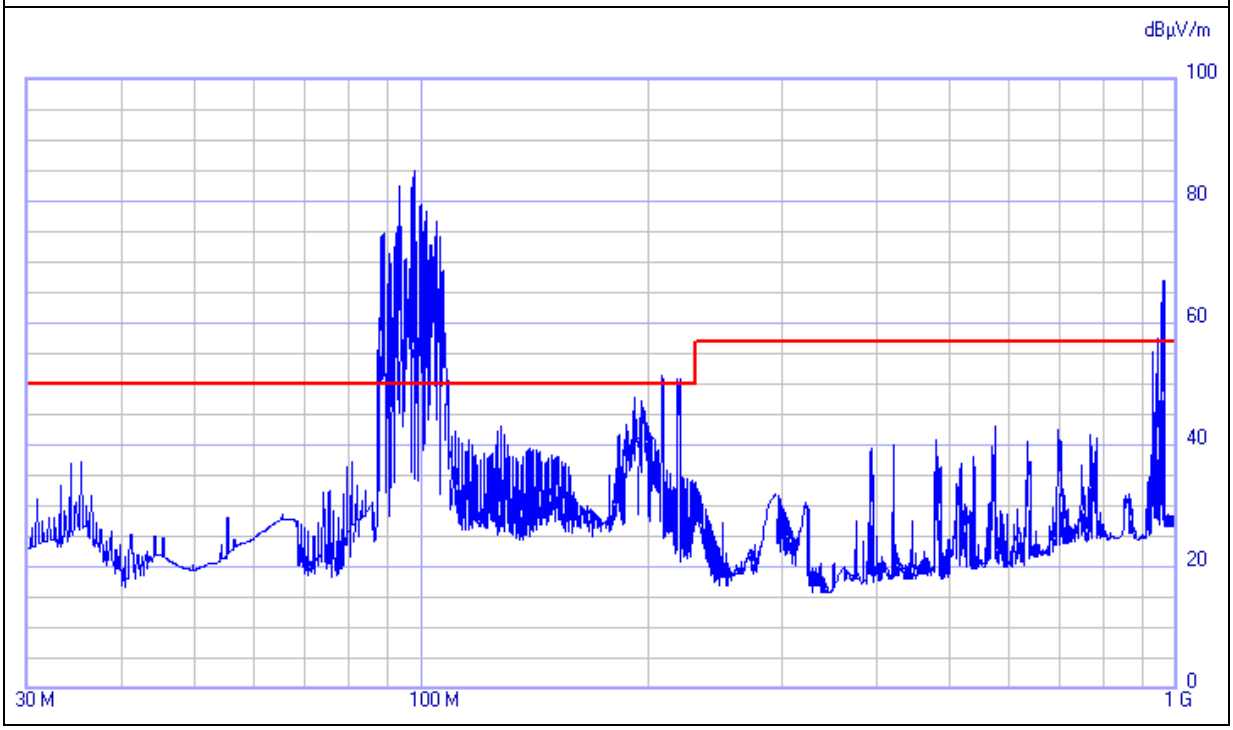




Radiated Emission 30-1000 MHz

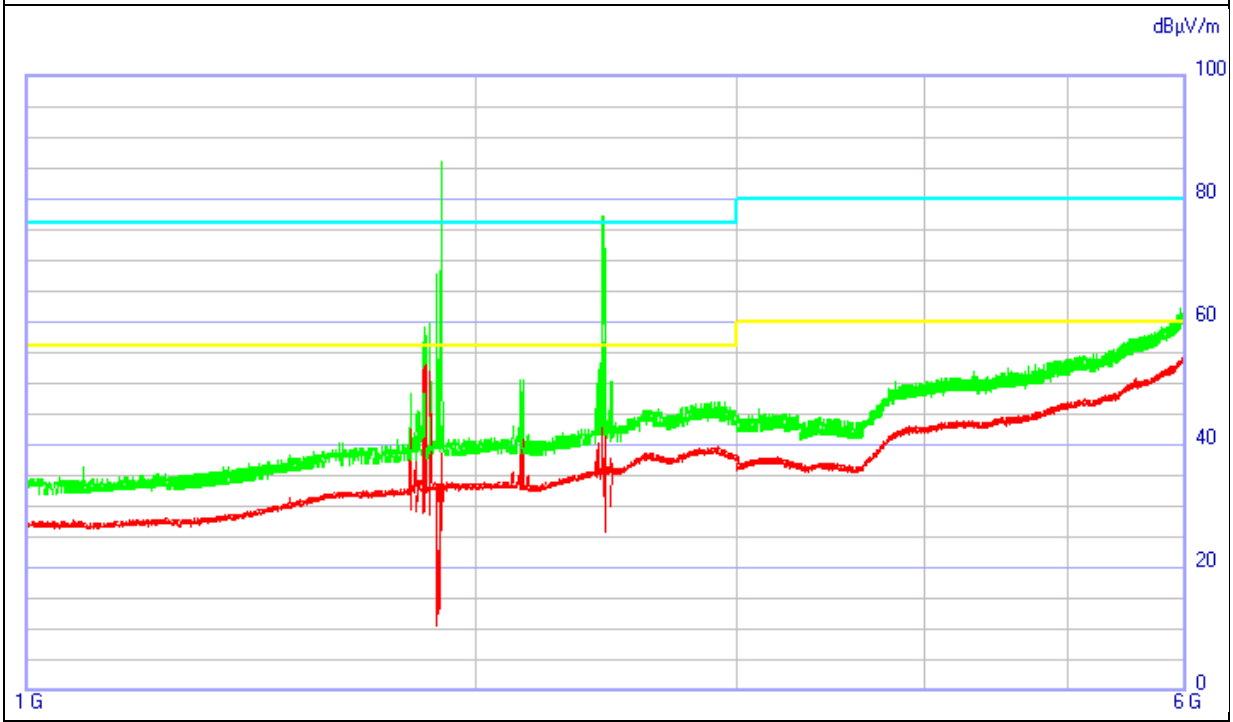
EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	OPERATIVE MODE; **FRONT SIDE**	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4 limit QUASIPEAK (QP) red line; **measurements at 3 m**	
Comment:	**HORIZONTAL & VERTICAL** POLARIZATION; sweep QPK (blue)	

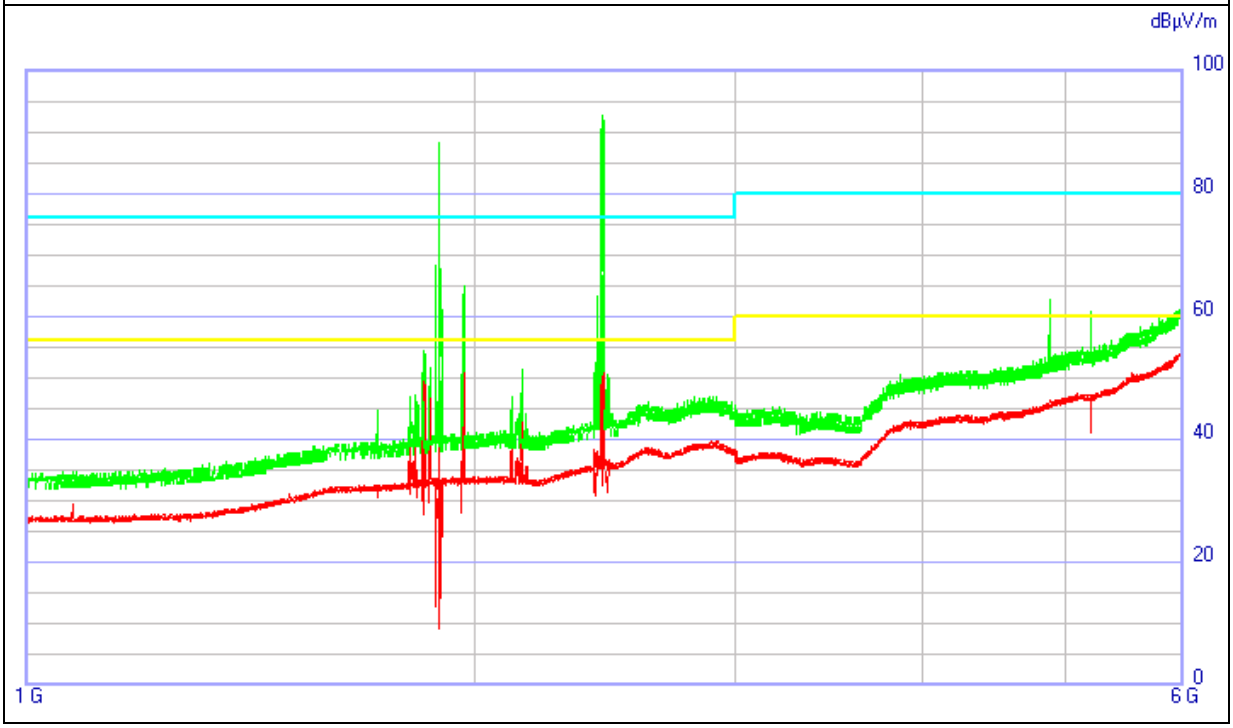




Radiated Emission 1000-6000 MHz

EUT:	DISTRIBUTION PANEL FOR ENERGY EFFICIENCY	ENERKEEPER / EKS-34-150
Manuf.:	Enerkeeper Benelup 2, S.L.	
Op. Cond.:	OPERATIVE MODE; **FRONT SIDE**	
Operator:	RBT 2215/0677	
Test Spec.:	UNE-EN 61000-6-4 limit PEAK (PK) light blue line and AVERAGE (AV) yellow line; **measurements at 3 m**	
Comment:	**HORIZONTAL & VERTICAL** POLARIZATION; sweep PK (green) and AV (red)	





ANNEX III

(PICTURES)

RADIATED EMISSION TEST

CONDUCTED EMISSION TEST

RADIATED IMMUNITY TEST

EFT INMUNITY TEST

SURGE IMMUNITY TEST

CONDUCTED INMUNITY TEST

MAGNETIC FIELD IMMUNITY TEST

DIFFERENCES BETWEEN MODELS

Model	Dimensions	Ratings
EKS34-10	800 x 600 x 300	20 A / / 50 Hz / / 400 V
EKS34-20	800 x 600 x 300	40 A / / 50 Hz / / 400 V
EKS34-30	800 x 600 x 300	60 A / / 50 Hz / / 400 V
EKS34-40	800 x 600 x 300	80 A / / 50 Hz / / 400 V
EKS34-50	1500 x 600 x 600	100 A / / 50 Hz / / 400 V
EKS34-75	1500 x 600 x 600	150 A / / 50 Hz / / 400 V
EKS34-100	1500 x 600 x 600	200 A / / 50 Hz / / 400 V
EKS34-150	1500 x 600 x 600	300 A / / 50 Hz / / 400 V
EKS34-200	1800 x 900 x 800	400 A / / 50 Hz / / 400 V
EKS34-250	1800 x 900 x 800	500 A / / 50 Hz / / 400 V
EKS34-300	1800 x 900 x 800	600 A / / 50 Hz / / 400 V
EKS34-400	1800 x 900 x 800	800 A / / 50 Hz / / 400 V
EKS34-450	1800 x 900 x 800	900 A / / 50 Hz / / 400 V
EKS34-500	1800 x 900 x 800	1000 A / / 50 Hz / / 400 V
EKS34-630	2000 x 1200 x 1600	1250 A / / 50 Hz / / 400 V
EKS34-700	2000 x 1200 x 1600	1400 A / / 50 Hz / / 400 V
EKS34-800	2000 x 1200 x 1600	1600 A / / 50 Hz / / 400 V
EKS34-1000	2000 x 1200 x 1600	2000 A / / 50 Hz / / 400 V
EKS34-1200	2000x 1400 x 1800	2400 A / / 50 Hz / / 400 V
EKS34-1500	2000x 1400 x 1800	3000 A / / 50 Hz / / 400 V
EKS34-1600	2000x 1400 x 1800	3200 A / / 50 Hz / / 400 V
EKS34-1700	2000x 1400 x 1800	3200 A / / 50 Hz / / 400 V
EKS34-1750	2000x 1400 x 1800	3200 A / / 50 Hz / / 400 V
EKS34-2000	2000x 1400 x 1800	4000 A / / 50 Hz / / 400 V
EKS34-2500	2000x 1400 x 1800	4000 A / / 50 Hz / / 400 V

ANNEX IV

(POINTS OF APPLICATION - ESD)

IMMUNITY TO ELECTROSTATIC DISCHARGE
POINTS OF APPLICATION ON THE EQUIPMENT
(discharges air: red; discharges contact: blue)