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COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, xxx
C(2008) YYY

Draft

COMMISSION REGULATION

of [...]

**implementing Directive 2005/32/EC of the European Parliament and of the Council with
regard to ecodesign requirements for no-load condition electric power consumption and
average active efficiency of external power supplies**

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(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council¹ and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

- (1) Under Directive 2005/32/EC ecodesign requirements are to be set by the Commission for energy using products representing significant volumes of sales and trade, having a significant environmental impact and presenting significant potential for improvement in terms of their environmental impact without entailing excessive costs.
- (2) Article 16(2) of Directive 2005/32/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Consultation Forum, the Commission will as appropriate introduce an implementing measure for office equipment and consumer electronics.
- (3) Office equipment and consumer electronics are often powered by external power supplies (EPS) which convert electricity from the mains power source. The power conversion efficiency of external power supplies is an important aspect of the energy performance of such products, and thus external power supplies are one of the priority product groups for which ecodesign requirements should be established.
- (4) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of external power supplies. The study has been carried out together with stakeholders and interested parties from the Community and third countries, and the results have been made publicly available.
- (5) It is stated in the preparatory study that external power supplies are placed on the Community market in large quantities, with their annual energy consumption in all life cycle stages being the most significant environmental aspect, and their annual

¹ OJ L 191, 22.7.2005, p. 29.

electricity consumption due to losses for power conversion and no-load amounting to 17 TWh, corresponding to 6.8 Mt of CO₂ emissions. In the absence of measures this consumption is predicted to increase to 31 TWh in 2020. It has been concluded that the life-cycle energy consumption and the use-phase electricity consumption can be improved significantly.

- (6) Improvements in the electricity consumption of external power supplies should be achieved by applying existing non-proprietary cost effective technologies that can reduce the total costs of purchasing and operating external power supplies.
- (7) Ecodesign requirements should harmonise electricity consumption requirements for no-load condition power consumption and average active efficiency of external power supplies throughout the Community, thus contributing to the functioning of the internal market and to the improvement of the environmental performance of these products.
- (8) The ecodesign requirements should not have negative impact on the functionality of the product and should not affect negatively health, safety and the environment. In particular, the benefits of reducing electricity consumption during the use phase should more than offset potential additional environmental impacts during the production phase.
- (9) The two-staged entry into force of the ecodesign requirements should provide an appropriate timeframe for manufacturers to redesign products. The timing of the stages should be such that negative impacts on the functionalities of equipment on the market are avoided, and cost impacts for manufacturers, in particular small and medium-sized enterprises, are taken into account, while ensuring timely achievement of the objectives of the Regulation. Measurements of the power consumption should be performed taking into account the generally recognised state of the art. Manufacturers may use harmonised standards established in accordance with Article 10 of Directive 2005/32/EC.
- (10) This Regulation should increase the market penetration of technologies that improve the life-cycle environmental impact of external power supplies, leading to estimated life-cycle energy savings of 118 PJ and electricity savings of 9 TWh by 2020, respectively, compared to the situation without taking any measures.
- (11) In conformity with Article 8 of Directive 2005/32/EC, this Regulation should specify that the applicable conformity assessment procedures are the internal design control set out in Annex IV of Directive 2005/32/EC and the management system set out in Annex V of Directive 2005/32/EC.
- (12) In order to facilitate compliance checks manufacturers should be requested to provide information in the technical documentation referred to in Annexes IV and V of Directive 2005/32/EC on average active efficiency and no-load electric power consumption.
- (13) Benchmarks for currently available technologies with high active efficiency and low no-load power consumption should be identified. This will help to ensure the wide availability and easy accessibility of information, in particular for small and medium-sized enterprises and very small firms, which will further facilitate the integration of best design technologies for reducing energy consumption.
- (14) Ecodesign requirements for the no-load condition of low voltage external power supplies address the same environmental impact parameter as ecodesign requirements for the off-mode condition of electrical and electronic household and office equipment

placed on the market with a low voltage external power supply. As ecodesign requirements for the no-load condition of low voltage external power supplies should be more demanding than ecodesign requirements for off-mode condition of electrical and electronic household and office equipment placed on the market with a low voltage external power supply, the requirements of Regulation (EC) No .../... of [...] implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off-mode power consumption of electrical and electronic household and office equipment², should not apply to electrical and electronic household and office equipment which is placed on the market with a low voltage external power supply. Regulation (EC) No .../... should therefore be amended accordingly.

- (15) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2005/32/EC,

HAS ADOPTED THE FOLLOWING REGULATION:

Article 1
Subject matter and scope

1. This Regulation establishes ecodesign requirements related to electric power consumption in no-load condition and average active efficiency of external power supplies.
2. This Regulation shall not apply to:
 - (a) voltage convertors,
 - (b) un-interruptible power supplies,
 - (c) battery chargers,
 - (d) halogen lighting convertors,
 - (e) external power supplies for medical devices,
 - (f) external power supplies placed on the market no later than 30 June 2015 as a service part or spare part for an identical external power supply which was placed on the market not later than one year after this Regulation has come into force, under the condition that the service part or spare part, or its packaging, clearly indicates the primary load product(s) for which the spare part or service part is intended to be used with.

Article 2
Definitions

For the purposes of this Regulation, the definitions set out in Directive 2005/32/EC shall apply.

The following definitions shall also apply:

- | (1) "external power supply" ([EPS](#)) means a device which meets all of the following criteria:
- | | (a) it is designed to convert alternating current (AC) power input from the mains power source input into lower voltage direct current (DC) or AC output;

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- (b) it is able to convert to only one DC or AC output voltage at a time;
 - (e)(b) it is intended to be used with a separate device that constitutes the primary load;
 - (d)(c) it is contained in a physical enclosure separate from the device that constitutes the primary load;
 - (e)(d) it is connected to the device that constitutes the primary load via a removable or hard-wired male/female electrical connection, cable, cord or other wiring;
 - (f)(e) it has nameplate output power not exceeding 250 Watts;
 - (g)(f) it is intended for use with electrical and electronic household and office equipment as referred to in Article 2 (1) of Regulation (EC) No .../...
- (2) "low voltage external power supply" means an external power supply with a nameplate output voltage of less than 6 Volts and a nameplate output current greater than or equal to 550 milliamperes;
- (2)(3) "multiple voltage output external power supply" means an external power supply that can convert line voltage AC input into more than one simultaneous lower-voltage output at a time".
- (3)(4) "Halogen lighting convertor" means an external power supply used with extra low voltage tungsten halogen lamps;
- (4)(5) "un-interruptible power supply" means a device providing automatically backup power when the electrical power from the mains power source drops to an unacceptable voltage level;
- (5)(6) "battery charger" means a device which connects directly to a removable battery at its output interface;
- (6)(7) "voltage convertor" means a device converting 230V mains power source output to 110V power output with characteristics similar to mains power source output characteristics;
- (7)(8) "nameplate output power" (P_0) means the output power as specified by the manufacturer;
- (8)(9) "no-load condition" means the condition in which the input of an external power supply is connected to the mains power source, but the output is not connected to any primary load;
- (9)(10) "active mode" means a condition in which the input of an external power supply is connected to the mains power source, and the output is connected to a load;
- (10)(11) "active mode efficiency" means the ratio of the power produced by an external power supply in active mode, to the input power required to produce it;
- (11)(12) "average active efficiency" means the average of the active mode efficiencies at 25%, 50%, 75% and 100% of the nameplate output power.

Article 3 *Ecodesign requirements*

The ecodesign requirements related to no-load electric power consumption and average active efficiency of external power supplies placed on the market are set out in Annex I.

Article 4
Conformity assessment

The procedure for assessing conformity referred to in Article 8 of Directive 2005/32/EC shall be the internal design control system set out in Annex IV of Directive 2005/32/EC or the management system for assessing conformity set out in Annex V of Directive 2005/32/EC.

Article 5
Verification procedure for market surveillance purposes

Surveillance checks shall be carried out in accordance with the verification procedure set out in Annex II.

Article 6
Indicative Benchmarks

The indicative benchmarks for best-performing products and technology currently available on the market are identified in Annex III.

Article 7
Revision

No later than July 2019 after the entry into force of this Regulation the Commission shall review it in the light of technological progress and present the result of this review to the Consultation Forum. In particular the potential to address the following shall be assessed at the next review: to include wireless charging technologies within scope, to address high power EPS (>250W), to include requirements for active energy efficiency at 10% load, to address resource efficiency considerations.

Article 8
Amendment to Regulation (EC) No .../...

Regulation (EC) No .../... is amended as follows:

(1) The following second paragraph is added to Article 1:

"This Regulation shall not apply to electrical and electronic household and office equipment placed on the market with a low voltage external power supply."

(2) The following point 9 is added to Article 2:

"9. low voltage external power supply" means an external power supply with a nameplate output voltage of less than 6 Volts and a nameplate output current greater than or equal to 550 milliamperes."

Article 9
Entry into force

This Regulation shall enter into force on the 20th day following that of its publication in the *Official Journal of the European Union*.

Point 1(a) of Annex I shall apply as from one year after the date referred to in the first paragraph.

Point 1(b) of Annex I shall apply as from two years after the date referred to in the first paragraph.

Article 10

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

*For the Commission
Member of the Commission*

ANNEX I
Ecodesign requirements

1. NO-LOAD POWER CONSUMPTION AND AVERAGE ACTIVE EFFICIENCY

- a) ***One year*** after this Regulation has come into force:

For all external power supplies except multiple voltage output EPS:

The no-load condition power consumption shall not exceed 0.50 Watt.

The average active efficiency shall be not less than:

$0.500 \cdot P_0$, for $P_0 < 1.0$ Watt;

$0.090 \cdot \ln(P_0) + 0.500$, for $1.0 \text{ Watt} \leq P_0 \leq 51.0 \text{ Watts}$;

0.850 , for $P_0 > 51.0$ Watts.

- b) ***Two years*** after this Regulation has come into force:

For all external power supplies except multiple voltage output EPS:

The no-load condition power consumption shall not exceed the following limits:

| | AC-AC external power supplies, except low voltage external power supplies | AC-DC external power supplies except low voltage external power supplies | Low voltage external power supplies |
|-----------------------|---|--|-------------------------------------|
| $P_0 \leq 51.0$ Watts | 0.50 Watt | 0.30 Watt | 0.30 Watt |
| $P_0 > 51.0$ Watts | 0.50 Watt | 0.50 Watt | n/a |

The average active efficiency shall be not less than the following limits:

| | AC-AC and AC-DC external power supplies, except low voltage external power supplies | Low voltage external power supplies |
|------------------------------------|---|-------------------------------------|
| $P_0 \leq 1.0$ Watt | $0.480 \cdot P_0 + 0.140$ | $0.497 \cdot P_0 + 0.067$ |
| $1.0 \text{ Watt} < P_0 \leq 51.0$ | $0.063 \cdot \ln(P_0) + 0.622$ | $0.075 \cdot \ln(P_0) + 0.561$ |

| | | |
|-----------------------------|-------|-------|
| Watts | | |
| P _O > 51.0 Watts | 0.870 | 0.860 |

c) -As from January 2017

The no-load condition power consumption shall not exceed the following limits:

| | <u>P_O ≤ 49.0 Watts</u> | <u>49.0 Watt < P_O ≤ 250 Watts</u> |
|---|-----------------------------------|---|
| <u>AC-AC external power supplies, except low voltage EPS and multiple voltage output EPS.</u> | <u>0.210 Watt</u> | <u>0.210 Watt</u> |
| <u>AC-DC external power supplies except low voltage EPS and multiple voltage output EPS.</u> | <u>0.100 Watt</u> | <u>0.210 Watt</u> |
| <u>Low voltage external power supplies</u> | <u>0.100 Watt</u> | <u>0.210 Watt</u> |
| <u>Multiple voltage output external power supplies</u> | <u>0.300 Watt</u> | <u>0.300 Watt</u> |

The average active efficiency shall be not less than the following limits:

| | <u>P_O ≤ 1.0 Watt</u> | <u>1.0 Watt < P_O ≤ 49.0 Watts</u> | <u>49.0 Watt < P_O ≤ 250 Watts</u> |
|---|---|--|---|
| <u>AC-AC external power supplies, except low voltage EPS and multiple voltage output EPS.</u> | <u>$\frac{0.5}{0.160} \cdot P_O +$</u> | <u>$0.071 \cdot \ln(P_O) - 0.0014 \cdot \frac{P_O}{P_O + 0.67}$</u> | <u>0.880</u> |
| <u>AC-DC external power supplies except low voltage EPS and multiple voltage</u> | <u>$\frac{0.5}{0.160} \cdot P_O +$</u> | <u>$0.071 \cdot \ln(P_O) - 0.0014 \cdot \frac{P_O}{P_O + 0.67}$</u> | <u>0.880</u> |

| | | | |
|--|---------------------------|--|--------------|
| <u>output EPS.</u> | | | |
| <u>Low voltage external power supplies</u> | $0.517 \cdot P_O + 0.087$ | $0.0834 \cdot \ln(P_O) - 0.0014 \cdot \frac{P_O}{P_O + 0.609}$ | <u>0.870</u> |
| <u>Multiple voltage output external power supplies</u> | $0.497 \cdot P_O + 0.067$ | $0.075 \cdot \ln(P_O) + 0.561$ | <u>0.860</u> |

d)-As from January 2018

The no-load condition power consumption shall not exceed the following limits:

| | | |
|---|---|---|
| | <u>$P_O \leq 49.0$ Watts</u> | <u>$49.0 \text{ Watt} < P_O \leq 250 \text{ Watts}$</u> |
| <u>AC-AC external power supplies, except low voltage EPS and multiple voltage output EPS.</u> | <u>0.075 Watt</u> | <u>0.150 Watt</u> |
| <u>AC-DC external power supplies except low voltage EPS and multiple voltage output EPS.</u> | <u>0.075 Watt</u> | <u>0.150 Watt</u> |
| <u>Low voltage external power supplies</u> | <u>0.075 Watt</u> | <u>0.150 Watt</u> |
| <u>Multiple voltage output external power supplies</u> | <u>0.300 Watt</u> | <u>0.300 Watt</u> |

The average active efficiency shall be not less than the following limits:

| | | | |
|---|---|---|---|
| | <u>$P_O \leq 1.0$ Watt</u> | <u>$1.0 \text{ Watt} < P_O \leq 49.0 \text{ Watts}$</u> | <u>$49.0 \text{ Watt} < P_O \leq 250 \text{ Watts}$</u> |
| <u>AC-AC external power supplies, except low voltage EPS and multiple voltage output EPS.</u> | <u>$0.5 \cdot P_O + 0.169$</u> | <u>$0.071 \cdot \ln(P_O) - 0.00115 \cdot \frac{\ln(P_O)}{P_O} + 0.670$</u> | <u>0.890</u> |

| | | | |
|--|---|---|--------------|
| <u>AC-DC external power supplies except low voltage EPS and multiple voltage output EPS.</u> | <u>$0.5 \cdot P_O + 0.169$</u> | <u>$0.071 \cdot \ln(P_O) - 0.00115 \cdot \ln(P_O) + 0.670$</u> | <u>0.890</u> |
| <u>Low voltage external power supplies</u> | <u>$0.517 \cdot P_O + 0.091$</u> | <u>$0.0834 \cdot \ln(P_O) - 0.0011 \cdot P_O + 0.609$</u> | <u>0.880</u> |
| <u>Multiple voltage output external power supplies</u> | <u>$0.497 \cdot P_O + 0.067$</u> | <u>$0.075 \cdot \ln(P_O) + 0.561$</u> | <u>0.860</u> |

2. MEASUREMENTS

The no-load condition power consumption and the average active efficiency referred to in Point 1 shall be established by a reliable, accurate and reproducible measurement procedure, which takes into account the generally recognised state of the art.

Measurements of power of 0.50 Watt or greater shall be made with an uncertainty of less than or equal to 2% at the 95% confidence level. Measurements of power of less than 0.50 Watt shall be made with an uncertainty of less than or equal to 0.01 Watt at the 95% confidence level.

3. INFORMATION TO BE PROVIDED BY MANUFACTURERS

For the purposes of conformity assessment pursuant to Article 4, manufacturers shall provide in the technical documentation and make publicly available on free-access websites the following information for AC-AC and AC-DC external power supplies, including low voltage external power supplies and multiple voltage output external power supplies:

| Reported Quantity | Description |
|--|--|
| Root mean square (Rms) Output Current (mA) | |
| Rms Output Voltage (V) | Measured at Load Conditions 1 – <u>5</u> |
| Active Output Power (W) | |
| Rms Input Voltage (V) | |
| Rms Input Power (W) | Measured at Load Conditions 1 – <u>6</u> |
| Total Harmonic Distortion (THD) | |

| | |
|--------------------------------|---|
| True Power Factor | |
| Power Consumed (W) | Calculated at Load Condition 1 – 4, Measured at Load Condition <u>6</u> |
| Efficiency | Calculated at Load Conditions 1 – 4 |
| Average Efficiency | Arithmetic Average of Efficiency at Load Conditions 1 – 4 |
| <u>Efficiency at 10 % load</u> | <u>Measured at Load Condition 5</u> |

The relevant load conditions are as follows:

| Percentage of Nameplate Output Current | |
|--|---------------------------------|
| Load Condition 1 | 100 % \pm 2% |
| Load Condition 2 | 75 % \pm 2% |
| Load Condition 3 | 50 % \pm 2% |
| Load Condition 4 | 25 % \pm 2% |
| <u>Load Condition 5</u> | <u>10 % \pm 2%</u> |
| Load Condition <u>6</u> | 0 % (no-load condition) |

ANNEX II **Verification procedure**

When performing the market surveillance checks referred to in Article 3 (2) of Directive 2005/32/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex I.

1. *Authorities of the Member State shall test one single unit.*
2. *The model shall be considered to comply with the provisions set out in Annex I, if:*
 - (a) *the result for no-load condition does not exceed the applicable limit value set out in Annex I by more than 0.10 W, and*
 - (b) *the arithmetic average of efficiency at load conditions 1-4 as defined in Annex I does not fall below the applicable limit value for average active efficiency by more than 5%.*
3. *If the results referred to in points 2(a) and (b) are not achieved, three additional units of the same model shall be tested.*
4. *After three additional units of the same model have been tested, the model shall be considered to comply with the requirements if:*
 - (a) *the average of the results for no-load condition does not exceed the applicable limit value set out in Annex I by more than 0.10 W, and*
 - (b) *the average of the arithmetic averages of efficiency at load conditions 1-4 as defined in Annex I does not fall below the applicable limit value for average active efficiency by more than 5%.*
5. *If the results referred to in points 4(a) and (b) are not achieved, the model shall be considered not to comply with the requirements. (to be amended by omnibus amendment on tolerances)*

ANNEX III **Indicative Benchmarks referred to in Article 6**

a) No-load condition

The lowest available no-load condition power consumption of external power supplies can be approximated by:

- 0. 002 Wattor less, for $P_O \leq 49.0$ Watts;
- 0.010 Wattor less, for $P_O > 49.0$ Watts;

b) Average active efficiency

The best available active average efficiency of external power supplies according to most recent available data (status March-2015) can be approximated by:

- 0.767, for $P_O \leq 1.0$ Watt;
- 0.905 for $1.0 \text{ Watt} < P_O \leq 49.0$ Watts;
- 0. 962 for $49.0 \text{ Watts} < P_O \leq 250.0$ Watts.

| –