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Subject:	ANNEXES to COMMISSION REGULATION (EU) .../... of XXX laying down ecodesign requirements for external power supplies, wireless chargers, wireless charging pads, battery chargers for portable batteries of general use and USB Type-C cables, pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EU) 2019/1782

Delegations will find attached document D103547/03 ANNEXES 1 to 6.

Encl.: D103547/03 ANNEXES 1 to 6

EUROPEAN
COMMISSION

Brussels, XXX
D103547/03
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ANNEXES 1 to 6

ANNEXES

to

COMMISSION REGULATION (EU) .../...

of XXX

laying down ecodesign requirements for external power supplies, wireless chargers, wireless charging pads, battery chargers for portable batteries of general use and USB Type-C cables, pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EU) 2019/1782

ANNEX I

Definitions applicable for the purposes of the Annexes

(1) ‘no-load condition’ means the condition in which the input of an EPS is connected to the mains power source but no power output is connected to any primary load;

(2) ‘basic-voltage EPS’ means an EPS that is not a low-voltage EPS;

(3) ‘low load efficiency’ means the active mode efficiency at 10% of the nameplate output power;

(4) ‘average active efficiency’ means the average of the active mode efficiencies at 25%, 50%, 75% and 100% of the nameplate output power;

(5) ‘multiple-voltage EPS’ means an EPS able to convert AC power from a mains power source to more than one output voltage and provide them simultaneously to more than one power outputs;

(6) ‘dynamic EPS’ means an EPS designed to be able to supply a maximum power only for a short period of time in the order of several minutes, followed by a lower power that can be indefinitely sustained, denoted also as guaranteed power;

(7) ‘guaranteed power’ means the lower power provided by a dynamic power supply that can be indefinitely sustained;

(8) ‘user-selectable EPS’ means a single-voltage EPS that allows users to select more than one output voltage;

(9) ‘standby mode’ means a condition as defined in Article 2, point (3) of Commission Regulation (EU) 2023/826 ([1]);

(10) ‘USB Type-C port’ means an EPS port that meets the requirements laid down in the ‘Universal Serial Bus Type-C® Cable and Connector Specification, Release 2.4, October 2024’, issued by the USB 3.0 Promoter Group and the USB-IF;

(11) ‘interoperable EPS’ means an adaptive AC-DC EPS that meets the requirements set out in point 3(b) of Annex II to this Regulation;

(12) ‘electrical enclosure’ means a cabinet for electrical or electronic equipment used to prevent electrical shock to end-users and protect the contents from the environment. The equipment can be, for example, fastened on standardised mounting rails. Socket back boxes fitted into walls or similar building structures intended to house electrical outlets, switches, or other similar devices, are not considered electrical enclosures for the purpose of this Regulation;

(13) ‘power tool’ means an electrical or electronic tool falling within the category provided for in point 6 of Annex II to Directive 2012/19/EU of the European Parliament and of the Council ([2]);

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[1] Commission Regulation (EU) 2023/826 of 17 April 2023 laying down ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 1275/2008 and (EC) No 107/2009 (OJ L 103, 18.4.2023, p. 29, ELI: http://data.europa.eu/eli/reg/2023/826/oj).

[2] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38, ELI: http://data.europa.eu/eli/dir/2012/19/oj).

(14) ‘charging cradle’ means a consumer product which connects by means of conduction, either through direct contact or a fixed connector attached to its main body, to a battery-powered product which is placed in it for the purpose of charging. A charging cradle with the power supply integrated into the same unit and which meets the criteria laid down in point (1) of Article 2 of this Regulation is an EPS;

(15) ‘power over Ethernet injector’ means an EPS which has one or more Ethernet input and/or one or more Ethernet output ports, and is able to deliver power to one or several consumer products connected to the Ethernet output port(s);

(16) ‘peak power demand’ means the maximum power higher than the nameplate output power which can be required by the powered consumer product from the EPS for a very short time during normal operation;

(17) ‘fixed output voltages’ means a set of defined standard output voltages of an adaptive EPS. The USB-PD fixed voltages are 5 V, 9 V, 15 V, 20 V, 28 V, 36 V and 48 V;

(18) ‘USB Type-C receptacle’ means a receptacle that meets the requirements laid down in the ‘Universal Serial Bus Type-C® Cable and Connector Specification, Release 2.4, October 2024’, issued by the USB 3.0 Promoter Group and the USB-IF;

(19) ‘shared capacity ports’ means the power outputs of an EPS where the sum of their nameplate output power when operated individually is greater than the maximum achievable combined output power when operated simultaneously;

(20) ‘class I interoperable EPS’ means an interoperable EPS with at least one provision for basic protection and a connection to a protective conductor as provision for fault protection, in line with with international standards;

(21) ‘class II interoperable EPS’ means an interoperable EPS with basic insulation as provision for basic protection, and supplementary insulation as provision for fault protection, or in which basic protection and fault protection are provided by reinforced insulation, in line with international standards;

(22) ‘shared capacity USB-PD ports’ means shared capacity ports that meet the requirements laid down in ‘Universal Serial Bus Power Delivery Specification, Revision 3.2, Version 1.1, 2024-10’ issued by the USB 3.0 Promoter Group and the USB-IF;

(23) ‘equivalent model’ means a model which has the same technical characteristics relevant for all aspects of the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier.

ANNEX II

Ecodesign requirements referred to in Article 3

1. Energy efficiency requirements

The following energy efficiency requirements shall apply:

(a) The no-load condition power consumption of EPS shall not exceed the values set out in Table 1.

Table 1 – No-load power consumption limit values for EPS

Nameplate output power	**Single-voltage AC-DC EPS Basic-Voltage**	**Single-voltage AC-DC EPS Low-Voltage**	**Single-voltage AC-AC EPS Basic-Voltage**	**Single-voltage AC-AC EPS Low-Voltage**	**Multiple-voltage EPS except adaptive EPS**	**Multiple-voltage adaptive EPS ***
$P_{out} \leq 49$ W	0,075 W	0,075 W	0,150 W	0,100 W	0,100 W	0,075 W + (N-1) × 0,025 W
49 W < $P_{out} \leq 250$ W	0,150 W	0,150 W	0,150 W	0,210 W	0,150 W	0,150 W + (N-1) × 0,025 W
$P_{out} > 250$ W	0,150 W	0,150 W	0,300 W	0,500 W	0,150 W	0,150 W + (N-1) × 0,025 W

* For multiple-voltage adaptive EPS the no-load power consumption shall not exceed 0,300 W regardless of the number of adaptive ports and unique fixed output voltages supplied through other power outputs. N is the sum of the number of adaptive ports and the number of unique fixed output voltages supplied through other power outputs.

(b) The low load efficiency shall not be less than the values set out in Table 2 for EPS with a nameplate output power exceeding 10 W, except for adaptive EPS.

Table 2 – Low load efficiency limit values for EPS except for adaptive EPS

Nameplate output power	**Single-voltage AC-DC EPS Basic-Voltage**	**Single-voltage AC-AC EPS Basic-Voltage**	**Single-voltage EPS Low-Voltage**	**Multiple-voltage EPS**
10 W < $P_{out} \leq 49$ W	0,071 × ln(P_{out}/1 W) – 0,00115 × P_{out}/1 W +	0,0582 × ln(P_{out}/1 W) – 0,00104 × P_{out}/1 W +	0,0834 × ln(P_{out}/1 W) – 0,0011 × P_{out}/1 W +	0,078 × ln(P_{out}/1 W) – 0,0013 × P_{out}/1 W +

	0,61	0,667	0,549	0,58
49 W < P_{out}	0,83	0,842	0,82	0,82

(c) The low load efficiency shall not be less than the values set out in Table 3 for adaptive EPS with a nameplate output power exceeding 10 W.

Table 3 – Low load efficiency limit values for adaptive EPS

Nameplate output power	**Single-voltage adaptive EPS Basic-Voltage**	**Single-voltage adaptive EPS Low-Voltage**	**Multiple-voltage adaptive EPS**
10 W < P_{out} ≤ 49 W	0,071 × ln(P_{out}/1 W) – 0,00115 × P_{out}/1 W + 0,57	0,0834 × ln(P_{out}/1 W) – 0,0011 × P_{out}/1 W + 0,509	0,078 × ln(P_{out}/1 W) – 0,0013 × P_{out}/1 W + 0,54
49 W < P_{out}	0,79	0,78	0,78

(d) The average active efficiency of EPS shall not be less than the values set out in Table 4.

Table 4 – Average active efficiency limit values for EPS

Nameplate output power	**Single-voltage AC-DC EPS Basic-Voltage**	**Single-voltage AC-AC EPS Basic-Voltage**	**Single-voltage EPS Low-Voltage**	**Multiple-voltage EPS**
P_{out} ≤ 1 W	0,5 × P_{out}/1 W+ 0,169	0,5 × P_{out}/1 W+ 0,169	0,517 × P_{out}/1 W+ 0,091	0,497 × P_{out}/1 W+ 0,067
1 W < P_{out} ≤ 49 W	0,071 × ln(P_{out}/1 W) – 0,00115 × P_{out}/1 W+ 0,67	0,0582 × ln(P_{out}/1 W) – 0,00104 × P_{out}/1 W+ 0,727	0,0834 × ln(P_{out}/1 W) – 0,0011 × P_{out}/1 W+ 0,609	0,078 × ln(P_{out}/1 W) – 0,0013 × P_{out}/1 W + 0,64
49 W < P_{out}	0,89	0,902	0,88	0,88

(e) The relevant load conditions are set out in Table 5.

Table 5 – Load conditions for EPS

Percentage of reference output current *,**	
Load condition 1	100% ± 2%pp
Load condition 2	75% ± 2%pp
Load condition 3	50% ± 2%pp
Load condition 4	25% ± 2%pp
Load condition 5 (low load condition)	10% ± 1%pp
Load condition 6 (no-load condition)	0%

* The reference output current shall be the nameplate output current except for USB-PD ports which can supply 3 A at the lowest output voltage for which the reference output current at the lowest output voltage shall be 2 A for load conditions 1 to 4 and 6.

** For shared capacity ports, the reference output current shall be derated according to the proportional allocation method.

(f) For EPS with multiple power outputs, the nameplate output power (P_{out}) shall be the sum of the nameplate output power of each power output when providing power at the specified load conditions.

(g) For dynamic EPS, the nameplate output power for the purpose of the energy efficiency requirements (P_{out}) shall be the guaranteed power.

(h) Adaptive EPS, including multiple-voltage adaptive EPS, shall meet the no-load power consumption limit values laid down in point (a) only at the lowest nameplate output voltage. For this purpose, the nameplate output power (P_{out}) shall be the nameplate output power at the lowest nameplate output voltage, with the exception of USB-PD ports of EPS which can supply 3 A at that voltage for which P_{out} shall be the product between that voltage and the reference output current of 2 A.

(i) Adaptive EPS, including multiple-voltage adaptive EPS, shall meet the low load and average active efficiency limit values laid down in points (c) and (d) at both the lowest and highest nameplate output voltage in each case. For the average active efficiency, the nameplate output power (P_{out}) shall be the nameplate output power at the lowest and highest nameplate output voltage respectively, with the exception of USB-PD ports of EPS which can supply 3 A at the lowest output voltage for which P_{out} at that voltage shall be the product between that voltage and the reference output current of 2 A. For low load efficiency, the nameplate output power (P_{out}) shall be the nameplate output power at the lowest and highest nameplate output voltage respectively.

(j) A multiple-voltage EPS shall meet the energy efficiency requirements for multiple-voltage EPS regardless whether any of its power outputs fulfills at any output voltage the criteria for a low-voltage or basic-voltage EPS.

(k) If a single-voltage adaptive EPS fulfils at the lowest output voltage the criteria for a low-voltage EPS, it shall meet at that condition the energy efficiency requirements for low-voltage EPS.

(l) A user-selectable EPS shall meet the energy efficiency requirements at the lowest and highest selectable nameplate output voltage. If at the lowest output voltage it fulfils the criteria for a low-voltage EPS, it shall meet at that condition the energy efficiency requirements for low-voltage EPS, otherwise those for basic-voltage EPS. If at the highest output voltage it fulfils the criteria for a low-voltage EPS, it shall meet at that condition the energy efficiency requirements for low-voltage EPS, otherwise those for basic-voltage EPS.

(m) For EPS fulfilling other main functions in addition to converting mains electricity into DC or AC power, the components that fulfil these other functions may be disconnected or disabled, provided that this does not affect the ability of the product to convert mains electricity into DC or AC power.

(n) The standby mode power consumption of wireless charging pads except for wireless charging pads connected with the EPS by a DC cable hard-wired at both ends, shall not be higher than 0,50 W at the DC input.

(o) The standby mode power consumption of wireless chargers with the power supply integrated into the same unit and wireless charging pads connected with the EPS by a DC cable hard-wired at both ends shall not be higher than 0,80 W at the AC input.

(p) If a wireless charger with the power supply integrated into the same unit or a wireless charging pad fulfils other main functions in addition to transmitting power by inductive coupling, the components of the product that fulfil these functions may be disconnected or disabled before testing so that the test measurements do not include the additional power used by them, as long as disconnecting or disabling such components does not affect the power transmission ability of the product.

2. Power output performance requirements

(a) The declared output voltage of EPS as referred to in Table 8 shall not be more than 10% less than the corresponding nameplate output voltage for power outputs other than those of USB Type-C or USB-PD ports at any of the applicable nameplate output currents.

(b) The declared output voltage as referred to in Table 8 shall not be more than 5% less than the corresponding nameplate output voltage for the power outputs of USB Type-C or USB-PD ports at any of the applicable nameplate output currents.

(c) For adaptive power supplies points (a) and (b) apply to each fixed output voltage of each port operated individually. For shared capacity ports, they apply also to the applicable 100% load condition.

3. Interoperability requirements

(a) An AC-DC EPS shall be an interoperable EPS that meets all the requirements set out in point (b) unless it fulfils the requirements set out in point (c).

(b) An interoperable EPS shall satisfy all the following requirements:

(1) it shall be fitted with at least one USB Type-C or USB-PD port;

(2) the operation of the USB Type-C and USB-PD ports shall be independent from any power output unless they are shared capacity USB-PD ports which may depend on one another;

(3) the maximum nameplate output power of a single power output shall be supplied at a USB Type-C or USB-PD port;

(4) it shall have no hard-wired output cable at the USB Type-C or USB-PD ports.

(c) An AC-DC EPS is not required to be an interoperable EPS if it satisfies at least one of the following conditions:

(1) it has a nameplate output power greater than 100 W;

(2) it has a nameplate output voltage higher than 48 V;

(3) it has a maximum nameplate output voltage less than or equal to 4,5 V;

(4) it has a nameplate output voltage higher than 20 V combined with a nameplate output power less than 25 W;

(5) it is a user-selectable EPS;

(6) it is a power over Ethernet injector;

(7) it is a charging cradle;

(8) it is designed, tested and marketed to be exclusively installed in an electrical enclosure with a permanent AC mains connection that is not designed to be accessed or detached by end-users;

(9) it is designed, tested and marketed to be used exclusively with any of the following consumer products:

i. consumer products whose operation requires a DC power supply cable longer than 4 m;

ii. consumer products designed, tested and marketed to be exclusively installed inside or on a wall, ceiling or similar building structures;

iii. consumer products designed to be powered in a wet environment which require that the EPS is subject to a liquid ingress protection level of IPX3 or higher as a result of applicable safety, performance or reliability requirements or standards;

iv. consumer products whose operation require that the EPS withstands electrostatic discharge at test levels greater than 8 kV for contact discharge and 15 kV for air discharge, as a result of applicable safety performance or reliability requirements or standards;

v. consumer products within the scope of Directive 2009/48/EC of the European Parliament and of the Council ([3]), including their charging cradles, or with electric model trains and their accessories;

vi. power tools, including their charging cradles or other accessories, which fulfil one of the following conditions:

– operate with removable batteries;

– operate with integrated batteries with a nominal voltage higher than 7,2 V;

– are designed, tested and marketed for outdoor use;

[3] Directive 2009/48/EC of the European Parliament and of the Council of 18 June 2009 on the safety of toys, (OJ L 170, 30.6.2009, p. 1–37, ELI: http://data.europa.eu/eli/dir/2009/48/oj).

vii. audio equipment used primarily for recording, processing or reproducing sound, which has no internal battery charging circuit;

viii. consumer products with a peak power demand of more than 130% of their nameplate output power for more than 15 ms, provided that the nameplate output power and the peak power can not be supplied by a USB-PD port at the same fixed output voltage;

ix. corded phones or base stations for cordless phones which have an analogue line connection.

(d) Each USB Type-C receptacle of EPS shall be associated with a USB Type-C or a USB-PD port.

(e) The following equipment shall be powered by interoperable EPS and fitted at the DC input with a USB Type-C receptacle associated to a USB Type-C or USB-PD port, unless the prongs for insertion into the mains socket form an integral part of the main body of that equipment:

(1) battery chargers for portable batteries of general use, with an input power not exceeding 100 W;

(2) wireless chargers and wireless charging pads which are not intended to be used with the equipment falling under the scope of point 3(c), and which are not fastened to a support or secured in a specific location.

(f) Cables placed on the market with USB Type-C plugs at both ends shall be USB Type-C cables.

4. Surge resistibility requirements for interoperable EPS

(a) A Class I or Class II interoperable EPS shall meet the power output performance requirements laid down in point (b) after it is subject to the surge test procedure set out in Annex IV point 3 (g).

(b) The EPS shall be able to supply the output voltage as referred to in Table 8 of this Annex at any of the applicable nameplate output currents taking into account the corresponding verification tolerance laid down in Table 9 of Annex V. For adaptive power supplies this applies to each fixed output voltage of each port operated individually. For shared capacity ports, they apply also to the applicable 100% load condition.

5. Information requirements

(a) The nameplate of EPS shall include the applicable information set out in Table 6.

Table 6 – Nameplate information requirements for EPS

Nameplate information	Value and precision*	Unit	Notes
Output power	XXX,X	W	The nameplate output power shall be calculated by multiplying the nameplate output voltage and the corresponding nameplate output current provided in Table 7. The nameplate output voltage or, where applicable, the nameplate output voltage range, and the maximum nameplate output power shall be provided for each single power output. For shared capacity ports, the maximum combined nameplate output power shall also be provided. The total maximum nameplate output power shall also be provided. For dynamic EPS, parameters corresponding to the guaranteed output power shall be provided and they shall be denoted accordingly. Where applicable, the nameplate shall display the text 'USB-PD' as part of the information provided for each USB-PD port.
Output voltage AC or Output voltage DC	XX,X	V	
Total maximum output power	XXX,X	W	
Maximum combined output power for shared capacity ports (if applicable)	XXX,X	W	
Guaranteed output power for dynamic EPS (if applicable)	XXX,X	W	
The text 'USB-PD' as part of the information provided for each USB-PD port (where applicable)	-	-	

* The decimal place is optional if its value is 0.

(b) Interoperable EPS shall be affixed with the Common Charger logo as specified in Annex III on their nameplate or enclosure, packaging and in the instruction manual. The logo shall also be displayed in a visible manner in the manufacturer's free acces website referred to in point (g)(2).

(c) The Common Charger logo shall not be affixed on or used in relation to the marketing of other products than interoperable EPS, unless required by Union law.

(d) Interoperable EPS shall be marked at each USB Type-C and USB-PD port with that port's maximum output power. Shared capacity USB-PD ports shall also indicate graphically the maximum combined output power that they share. The font size shall not be less than 2,56 mm in height.

(e) USB Type-C cables shall be marked on the overmoulds of the two plugs with the text '60W' or '240W' in accordance with the maximum supported power. The font size

shall not be of less than 1,2 mm in height for the text ‘60’ or ‘240’ and not of less than 0,6 mm in height for the letter ‘W‘.

(f) The information displayed pursuant to point (a), (b), (d) and (e) shall be clearly visible, legible, and indelible.

(g) For EPS, the information set out in Table 7 shall be published in:

(1) the technical data sheet or user manual supplied with the EPS, unless an internet link or a QR code linking to the free access website referred to in point (2) is supplied with the EPS;

(2) a free access website of the EPS manufacturer, its authorised representative or the importer for a period of at least 10 years after the placing on the market of the last unit of the model concerned.

Table 7 – Product information for EPS

Information published	**Value and precision***	**Unit**	**Notes**
Manufacturer’s name or trademark, commercial registration number and address	-	-	-
Model identifier	-	-	-
EPS type	- AC/DC EPS - AC/AC EPS - interoperable EPS - single-voltage EPS - multiple-voltage EPS - basic-voltage EPS - low-voltage EPS - adaptive EPS - EPS with shared capacity ports - dynamic EPS - user-selectable EPS - other	-	Select all applicable types.
Number of power outputs	XX	-	-
Input voltage	XXX	V	Value or range. The corresponding values declared in response to the requirements of Directive 2014/35/EU([4]) shall be included.
Input AC	XX	Hz	

[4] Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of

frequency			
Nameplate output voltage	XX,X	V	The notes laid down in Table 6 shall apply. In addition, where applicable, the combination of nameplate output power, voltage and current shall be provided for each single power output at each fixed output voltage. For each set of shared capacity ports, the maximum combined nameplate output power shall be provided together with corresponding output voltage and current for each port.
Nameplate output current	XX,X	A	
Nameplate output power	XXX,X	W	
Power delivery standard (if applicable)	-	-	Name and version of all supported standards.
Number of adaptive ports (if applicable)	XX	-	Number of adaptive ports.
Number of unique fixed output voltages supplied by an adaptive EPS through non-adaptive ports (if applicable)	X	-	Number and value of the unique fixed voltages.
Average active efficiency	XX,X	%	Calculated as the arithmetical mean of the 'Active mode efficiency' at load conditions 1 to 4 in Table 5. For adaptive EPS and user-selectable EPS it applies for the lowest and highest output voltage.
Low load efficiency (10%) (if applicable)	XX,X	%	Value of the 'Active mode efficiency' at load condition 5 in Table 5. For adaptive EPS and user-selectable EPS it applies for the lowest and highest output voltage. EPS with a nameplate output power of 10 W or less shall be exempted from the requirement in this row.

electrical equipment designed for use within certain voltage limits, (OJ L 96, 29.3.2014, p. 357–374, ELI: http://data.europa.eu/eli/dir/2014/35/oj).

No-load power consumption	X,XXX	W	Value at load condition 6 in Table 5. For adaptive EPS it applies for the lowest output voltage. For user-selectable EPS it applies for the lowest and highest output voltage
Total harmonic distortion of the input voltage	X,X	%	Indicative values at load conditions 1, 3 and 5 (where applicable) in Table 5. For adaptive EPS and user-selectable EPS it applies for the lowest and highest output voltage.
True power factor	X,XX	-	
Total harmonic distortion of the input current	XXX	%	

***** The decimal place is optional if its value is 0.

6. Technical documentation

The technical documentation for the purposes of conformity assessment pursuant to Article 4 shall contain the following elements:

(a) the reference of the standard(s) used for the conformity assessment of the applicable requirement(s);

(b) for EPS:

(1)

Table 8 – Technical documentation for EPS

Declared Parameter	Notes
Output currents (mA) *	Declared at load conditions 1 to 5 of Table 5 for EPS with a nameplate output power exceeding 10 W, otherwise at load conditions 1 to 4 of Table 5, and where applicable also at the additional conditions required in Table 6 and Table 7 and Annex IV.
Output voltages (V) *	
Active output powers (W)	Declared at load conditions 1 to 5 of Table 5 for EPS with a nameplate output power exceeding 10 W, otherwise at load conditions 1 to 4 of Table 5, and where applicable also at the additional conditions required in Table 6 and Table 7 and Annex IV. For USB Type-C and USB-PD ports, the following cable correction factor shall be subtracted from each measurement result: $R_{cable} \times {I_{out}}^2$, where

	I_{out} is the output current, and R_{cable} = 0,130 Ω if the maximum nameplate output current of that port is not higher than 3 A, otherwise R_{cable} = 0,100 Ω. Where applicable, the active output power (W) shall be the sum of the active output power at each power output.
Root mean square input power (W)	Declared at load conditions 1 to 6 of Table 5 for EPS with a nameplate output power exceeding 10 W, otherwise at load conditions 1 to 4 and 6 of Table 5, and where applicable also at the additional conditions required in Table 6 and Table 7 and Annex IV.
Root mean square input voltage (V)	
Active mode efficiency	Calculated by dividing the declared 'Active output power' by the declared 'Root mean square input power' at load conditions 1 to 5 of Table 5 for EPS with a nameplate output power exceeding 10 W, otherwise at load conditions 1 to 4 of Table 5.
Average active efficiency	Calculated as arithmetical mean of the declared 'Active mode efficiency' at load conditions 1 to 4.

* For AC output voltage, these shall be root mean square values.

The relevant load conditions are set out in Table 5.

For adaptive EPS and user-selectable EPS the test conditions laid down in Table 7 apply.

The same precision shall be used as for the corresponding parameters required in Table 7.

(2) the specification of the test cable(s) used, if the EPS is not an interoperable EPS or not supplied with a cable.

(c) for adaptive EPS: specifications of the supported power delivery protocols relevant to the requirements of this Regulation.

(d) for interoperable EPS:

(1) documentation demonstrating compliance with the requirements set out in point 3(b);

(2) documentation demonstrating compliance with the surge resistibility requirements laid down in point 4.

(e) for EPS exempt from the interoperability requirements pursuant to point 3(c):

(1) reference to the relevant sub-point of point 3(c);

(2) supporting documentation, if applicable also concerning the associated powered consumer product(s) referred to in point 3(c)(9), demonstrating that the conditions for the exemption are met.

(f) for EPS fulfilling other main functions in addition to converting mains electricity into DC or AC power: instructions on how to disconnect or disable the components of the product that fulfil these functions, provided that this does not affect the ability of the product to convert mains electricity into DC or AC power.

(g) for wireless chargers with the power supply integrated into the same unit:

(1) the manufacturer's name or trademark, commercial registration number and address;

(2) the model identifier;

(3) declared power consumption in standby mode (W).

(h) for wireless charging pads:

(1) the manufacturer's name or trademark, commercial registration number and address;

(2) the model identifier;

(3) input voltage (V) or input voltage range (if applicable);

(4) specification of the power delivery protocol supported (if applicable);

(5) model identifier of the EPS used for testing (if applicable);

(6) declared power consumption in standby mode (W);

(7) documentation demonstrating compliance with point 3(e)(2) (if applicable).

(i) for battery chargers for portable batteries of general use subject to the requirements laid down in point 3(e)(1):

(1) the manufacturer's name or trademark, commercial registration number and address;

(2) the model identifier;

(3) documentation demonstrating compliance with point 3(e)(1).

(j) for USB Type-C cables: documentation demonstrating compliance with the requirements laid down in point 3(f).

ANNEX III

Common Charger logo

1. Logo design

Whereby:

(1) The logo shall have a height (A) of at least 5 mm when affixed to the nameplate, or 7 mm when affixed to the enclosure, packaging or the instruction manual. If the logo is enlarged, the proportions set out in the drawings shall be maintained.

(2) The reference colours for the logo shall be blue #25408f and yellow #fdb933. When CMYK colours are used, the reference shall be blue (100% cyan + 90% magenta + 10% yellow + 0% black) and yellow (0% cyan + 30% magenta + 90% yellow + 0% black). When RGB colours are used, the reference shall be blue (37 red + 64 green + 143 blue) and yellow (253 red + 185 green + 51 blue).

(3) The font used in the logo shall be Quicksand Bold.

(4) 'XX' shall be replaced by the value of the maximum nameplate output power provided by a single USB Type-C or USB-PD port. For dynamic EPS this value shall be the guaranteed output power.

(5) If the logo is used on a dark background, it may be used in the following design by replacing the blue colour with that dark background colour:

(6) The logo may be used in the following black and white designs or other analogous monochrome designs, if the product nameplate, enclosure, packaging, or instruction manual only use those colours:


XXW
XXW

ANNEX IV

Measurements and calculations

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made either using harmonised standards whose reference numbers have been published for this purpose in the Official Journal of the European Union or using other reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art methods.

2. Where a parameter is declared pursuant to Article 4 its declared value shall be used by the manufacturer, importer or authorised representative for the calculations in this Annex.

3. Without prejudice to point 1 of this Annex, measurements and calculations as part of any reliable, accurate and reproducible method used, shall be made in accordance with the following provisions:

   (a) Output measurements of USB Type-C and USB-PD ports of EPS shall be made at their output receptacles using for each such port a test-fixture with a Type-C plug, regardless of whether or not the EPS is supplied with a cable. A correction factor accounting for a round-trip cable resistance of 0,130 Ω shall be applied if the maximum nameplate output current of that port is not higher than 3 A, otherwise a correction factor accounting for a resistance of 0,100 Ω shall be applied. The resistance of the contact between the output receptacle and the Type-C plug of the test-fixture is included in the correction factors.

   (b) Output measurements of EPS at power outputs other than USB Type-C or USB-PD ports shall be made at the product-load side of the output cable supplied with the EPS by the manufacturer, its authorised representative or the importer. If the EPS is supplied with more than one cable the longest output cable shall be used. If the EPS is not supplied with a cable it must be tested with a 1 m long output copper wire or cable with a conductor cross-sectional area:

      (a) equal to 0,519 mm^2 (AWG 20), if $I \leq 3$ A,

      (b) equal to 0,653 mm^2 (AWG 19), if $3 A < I \leq 5$ A,

      (c) not higher than $\frac{I}{7.5}$ mm^2, if $I > 5$ A,

      where I is the maximum nameplate output current (A) at that port. For AC/AC EPS I represents the root mean square current.

   (c) 'Proportional allocation method' means a set of rules for EPS with shared capacity ports, for determining the load condition of each power output when the sum of the nameplate output power of the individual power outputs is greater than the their total maximum combined output power when operated simultaneously, at a specific testing condition. The derating factor is the ratio between the total maximum combined output power and the sum of the nameplate output power of the individual power outputs of the shared capacity ports. The derated output current of each power output is the product between the derating factor and its nameplate output current.

   (d) If an EPS fulfils other main functions in addition to converting mains electricity into DC or AC power, components of the EPS that fulfil these

functions may be disconnected or disabled before testing so that the test measurements do not include the additional power used by them, as long as disconnecting or disabling such components does not affect the power conversion ability of the EPS, and as long the housing of the EPS is closed before the test.

(e) A dynamic EPS shall be tested at load conditions based only on the guaranteed power.

(f) Regardless of the AC source type, the total harmonic distortion of the supply voltage of an EPS shall not exceed 2%, up to and including the 13^{th} harmonic.

(g) For the surge test for interoperable EPS:

For a Class I interoperable EPS the surge test consists of 10 alternating ± surges applied at its AC mains power connection between line and line, and line and earth (ground) respectively, in the form of combination waveforms with rise and hold times Tr/Th of 1,2/50 µs for the open circuit voltage and Tr/Th of 8/20 µs for the short circuit current, at a test level of 2,5 kV.

For a Class II interoperable EPS the surge test consists of 10 alternating ± surges applied at its AC mains power connection between line and line, in the form of combination waveforms with rise and hold times Tr/Th of 1,2/50 µs for the open circuit voltage and Tr/Th of 8/20 µs for the short circuit current, at a test level of 2,5 kV.

The test is considered passed if the tested unit complies after the test with the requirements in Annex II point 4. Otherwise the test is considered failed.

(h) The measurement of the standby mode power consumption of wireless chargers with the power supply integrated into the same unit and of wireless charging pads connected with the EPS by a DC cable hard-wired at both ends shall be made in accordance with standardised methods of measurement of electrical power consumption in standby mode(s) for household electrical appliances.

(i) The measurement of the standby mode power consumption of wireless charging pads which are not connected with the EPS by a DC cable hard-wired at both ends, shall be made in accordance with the following requirements regardless whether they are supplied or not with an EPS:

(a) the device shall be measured in the condition as delivered to the end-user (factory setting) without any object placed on it;

(b) the power consumption shall be determined at the DC input. Depending on the EPS connection the measurement shall be at the receptacle or at the plug of the hard-wired power supply cable;

(c) the power source shall be able to supply the DC input voltage and power specified for the wireless charging pad;

(d) if the wireless charging pad can be powered by adaptive EPS at different DC voltages, it shall be powered by such an EPS supporting all specified voltage levels. The measurement shall be at the input voltage set by the wireless charging pad;

(e) the standby mode power consumption shall be the average power determined for a duration of not less than 10 minutes.

(j) If a wireless charger with the power supply integrated into the same unit or a wireless charging pad fulfils other main functions in addition to transmitting power by inductive coupling, components of the product that fulfil these functions may be disconnected or disabled before testing so that the test measurements do not include the additional power used by them, as long as disconnecting or disabling such components does not affect the power transmission ability of the product.

4. Until the publication of the references of the relevant harmonised standards in the Official Journal, use shall be made of the transitional testing methods set out in point 5, or of other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art methods.

5. For adaptive EPS, EPS with multiple power outputs and user-selectable EPS, the test procedure of the Department of Energy of the United States of America, laid down in Appendix Z to Subpart B of Part 430 of Title 10, Chapter II, Subchapter D of the Code of Federal Regulations, 87 FR 51221, in its version applicable on 19 August 2022, may be used as a transitional test method, using mains electricity.

ANNEX V

Verification procedure for market surveillance purposes referred to in Article 5

1. The verification tolerances defined in this Annex relate only to the verification by Member State authorities of the declared values and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting those values with a view to achieving compliance or to communicate better performance by any means.

2. Where a model does not comply with the requirements laid down in Article 40 of Regulation (EU) 2024/1781, the model and all equivalent models shall be considered non-compliant.

3. As part of verifying the compliance of a product model with the requirements laid down in this Regulation, the authorities of the Member States shall apply the following procedure:

   (a) the Member State authorities shall verify one single unit of the model;

   (b) the model shall be considered to comply with the requirements set out in this Regulation if all the following conditions are fulfilled:

      (1) the declared values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC and, where applicable, the values used to calculate those values are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to point 2(g) of that Annex;

      (2) the declared values meet any requirements laid down in this Regulation and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values;

      (3) when the Member State authorities check the unit of the model, it complies with

         i. the interoperability requirements in point 3 of Annex II to this Regulation, and

         ii. the information requirements in point 5 of Annex II to this Regulation, as applicable;

      (4) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from those measurements) comply with the respective verification tolerances set out in Table 9.

4. Where the conditions set out in points 3(b)(1), (2) or (3) are not met, the model and all equivalent models shall be considered not to comply with this Regulation.

5. If the condition set out in point 3(b)(4) is not met, with the exception of the surge resistibility requirement, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more equivalent models.

6. The model shall be considered to comply with the applicable requirements if, for the three units referred to in point 5, the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 9.

7. If the condition set out in point 3(b)(4) is not met as regards the surge resisibilility requirements, the Member State authorities shall select three additional units of the same model or of an equivalent model for testing. The model and all equivalent models shall be considered not to comply with this Regulation as soon as the test is failed by one of the three additional units. In this case, the other units not yet tested do not need to be tested. The model shall be considered to comply if the test is passed by each of the three additional units.

8. Where the condition set out in points 6 or 7 is not met, the model and all equivalent models shall be considered to be not in compliance with this Regulation.

9. The Member State authorities shall without delay provide all relevant information to the authorities of the other Member States and to the Commission through the information and communication system referred to in Article 34 of Regulation (EU) 2019/1020 of the European Parliament and of the Council([5]) after a decision has been taken on the model's non-compliance pursuant to points 2, 4, or 8 of this Annex.

10. The Member State authorities shall use the measurement and calculation methods set out in Annex IV.

11. The Member State authorities shall only apply the verification tolerances that are set out in Table 9. They shall use only the procedure described in this Annex for the requirements referred to in this Annex. For the parameters in Table 9, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

12. The parameters 'Input voltage' and 'Input AC frequency' of EPS as required in Table 7 of Annex II to this Regulation shall not be subject to compliance verification under this Regulation. The parameters 'Active output power (W)' and 'Root mean square input power (W)' of EPS as required in Table 8 of the same Annex, and 'Input voltage (V) or input voltage range (if applicable)' of wireless charging pads as required in point 6(h)(3) of the same Annex are meant not to be verified.

Table 9 – Verification tolerances

[5] Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011 (OJ L 169, 25.6.2019, p. 1, ELI: http://data.europa.eu/eli/reg/2019/1020/oj).

Parameter	Verification tolerance
For EPS	
Output voltage (V) *	The determined value ** shall not be lower than the declared value by more than 2%.
Active mode efficiency at each of the applicable load conditions	The determined value ** shall not be lower than 0,95 times the declared value.
Power consumed (W) at no-load condition	The determined value ** shall not exceed the declared value by more than 0,01 W.
For wireless chargers and wireless charging pads	
Power consumed (W) in standby mode	The determined value ** shall not exceed the declared value by more than 0,01 W.

* For AC output voltage, these shall be root mean square values.

** In the case of the three additional units tested as prescribed in point 5, the determined value means the arithmetical mean of the values determined for those three additional units.

ANNEX VI

Benchmarks referred to in Article 6

At the time of entry into force of this Regulation, the best available technologies (BAT) on the market for single voltage AC-DC EPS in terms of their no-load power consumption, low load efficiency and average active efficiency have been identified as follows:

(a) no-load condition:

The lowest identified no-load power consumption of an EPS declared by a manufacturer is:

0,02 W for $P_{out} \leq 250$ W;

(b) low load efficiency (10%):

(1) for $P_{out} \leq 49$ W, the BAT low load efficiency increases progressively to 89,6%;

(2) for $P_{out} > 49$ W, the BAT low load efficiency reaches 91,7%;

(c) average active efficiency:

(1) for $P_{out} \leq 49$ W, the BAT average active efficiency increases progressively to 92,6%;

(2) for $P_{out} > 49$ W, the BAT average active efficiency reaches 93,2%.