

COMMISSION REGULATION (EU) 2023/1670**of 16 June 2023****laying down ecodesign requirements for smartphones, mobile phones other than smartphones, cordless phones and slate tablets pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation (EU) 2023/826****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ⁽¹⁾, and in particular Article 15(1) thereof,

Whereas:

- (1) Pursuant to Directive 2009/125/EC, the Commission should set ecodesign requirements for energy-related products which account for significant volumes of sales and trade in the Union and which have a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs.
- (2) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of mobile phones, cordless phones and slate tablets. The study has been carried out with stakeholders and interested parties from the Union and third countries, and the results have been made publicly available.
- (3) The steep increase in the demand for smartphones and tablets, combined with their increased functionality, has resulted in increased demand for energy and materials needed to manufacture these devices on the EU market, accompanied by an increase in their associated environmental impacts. In addition, devices are often replaced prematurely by users and are, at the end of their useful life, not sufficiently reused or recycled, leading to a waste of resources. Against this background, the preparatory study identified environmental aspects to be addressed in this Regulation. Those aspects mainly concern resource efficiency and include the avoidance of premature obsolescence, repairability, reliability of the products and their key components such as batteries and display, reusability and recyclability.
- (4) Ecodesign requirements should harmonise resource efficiency requirements for mobile phones, cordless phones and slate tablets throughout the Union for the internal market to operate better and in order to improve the environmental performance of those products. In light of this aim and the environmental aspects to be addressed, the preparatory study showed that ecodesign requirements should relate to design for reliability, including resistance to accidental drops, scratch resistance, protection from dust and water, and battery longevity, to the ability to be disassembled and repaired, to the availability of operating system version upgrades, to data deletion and the transfer of functionalities after use, to the provision of appropriate information for users, repairers and recyclers as well as to battery endurance.
- (5) In order to ensure that devices are able to be effectively repaired, a range of spare parts should be available to professional repairers or end users. Those spare parts should, regardless of whether they are new or used, have the effect of upgrading or restoring the functionality of the device in which they are installed.
- (6) In order to ensure that devices are able to be effectively repaired, the price of spare parts should be reasonable and should not discourage repair. To create transparency and incentivise the setting of reasonable prices, the indicative pre-tax price for spare parts provided pursuant to this Regulation should be accessible on a free access website.

⁽¹⁾ OJ L 285, 31.10.2009, p. 10.

- (7) It is currently not possible, or extremely difficult, for the owners of mobile phones, including smartphones, and tablets to change the operating system of their device, which is chosen and maintained by the manufacturer through regular updates. Such updates generally lead to the establishment of a range of major and minor versions. Updates may be used to ensure the continued security of a device, to correct errors in the operating system or to offer new functionalities to users. They may be offered voluntarily or might be required to be offered by Union law. In order to improve the reliability of devices, therefore, it needs to be ensured that users keep receiving such updates for a minimum period of time and at no cost, including for a period after the manufacturer stops selling the relevant product model. Such updates should be offered either as updates to the latest available operating system version that has to be installable on the device, or as updates to the operating system version that was installed on the product model at the moment of the end of placement on the market, or subsequent versions.
- (8) The requirement concerning a functionality for secure erasure of the encryption key could be implemented by means of technical solutions such as, but not limited to, a functionality implemented in firmware, typically in the bootloader, in software included in a self-contained bootable environment, or in software installable in the supported operating systems provided with the product.
- (9) The total primary energy consumption of the installed base in the EU27 of mobile phones, cordless phones and slate tablets in 2020 over their lifecycle was 39,5 TWh (of which 28,5 TWh for smartphones, 1,6 TWh for mobile phones other than smartphones, 1,8 TWh for cordless phones and 7,6 TWh for slate tablets), which includes a major share of primary energy consumption in production outside the EU27. Of these 39,5 TWh, the share attributed to electricity consumption - for both production and use - is 26,6 TWh (19,2 TWh, 0,9 TWh, 1,1 TWh and 5,4 TWh, respectively, for smartphones, mobile phones other than smartphones, cordless phones and slate tablets). Without regulatory measures, those values are projected to decrease slightly to 39,3 TWh (29,3 TWh, 1,5 TWh, 1,4 TWh and 7,3 TWh, respectively, for smartphones, mobile phones other than smartphones, cordless phones and slate tablets) of primary energy in 2030. The combined effect of this Regulation and Commission Delegated Regulation (EU) 2023/1669 ⁽²⁾ is expected to limit this 2030 value to 25,4 TWh (18,2 TWh, 1,0 TWh, 1,1 TWh and 5,2 TWh, respectively, for smartphones, mobile phones other than smartphones, cordless phones and slate tablets), saving around 33 % on the primary energy consumption of smartphones, mobile phones other than smartphones, cordless phones and slate tablets compared to what would happen if no measures were taken.
- (10) The relevant product parameters should be measured using reliable, accurate and reproducible methods. Those methods should take into account recognised state-of-the-art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council ⁽³⁾.
- (11) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures.
- (12) To facilitate compliance checks, manufacturers, importers or authorised representatives should provide information in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC in so far as that information relates to the requirements laid down in this Regulation.
- (13) For market surveillance purposes, manufacturers, importers or authorised representatives should be allowed to refer to the product database if the technical documentation as per Delegated Regulation (EU) 2023/1669 contains the same information.

⁽²⁾ Commission Delegated Regulation (EU) 2023/1669 of 16 June 2023 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to the energy labelling of smartphones and slate tablets (See page 9 of this Official Journal).

⁽³⁾ Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

- (14) In order to protect consumers and to avoid that the rules laid down in this Regulation are circumvented, products that automatically alter their performance in test conditions to improve the declared parameters should be prohibited.
- (15) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to make information on the environmental performance of products subject to this Regulation over their life cycle widely available and easily accessible, in accordance with Directive 2009/125/EC, Annex I, part 3, point (2).
- (16) A review of this Regulation should assess the appropriateness and effectiveness of its provisions in achieving its goals. The timing of the review should take into account, among other factors, whether all provisions have been implemented and show an effect on the market.
- (17) Commission Regulation (EU) 2023/826 (*) should be amended to exclude cordless phones from its scope in order to prevent any overlap with the same products in the scope of this Regulation.
- (18) The entry into application of ecodesign requirements should be 21 months after the entry into force of this Regulation, in order to give manufacturers sufficient time to redesign their products subject to this Regulation.
- (19) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC,

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market of smartphones, other mobile phones, cordless phones and slate tablets.
2. This Regulation does not apply to the following products:
 - (a) mobile phones and tablets with a flexible main display which the user can unroll and roll up partly or fully;
 - (b) smartphones for high security communication.

Article 2

Definitions

1. For the purposes of this Regulation, the following definitions shall apply:
 - (1) 'mobile phone' means a cordless handheld electronic device, which has the following characteristics:
 - (a) it is designed for long-range voice communication over either a cellular telecommunications network or a satellite based telecommunications network, requiring a SIM card, eSIM or similar means to identify the connected parties;
 - (b) it is designed for battery mode usage, while connection to mains via an external power supply and/or wireless power transmission is mainly for battery charging purposes;
 - (c) it is not designed to be worn on the wrist.

(*) 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).

- (2) 'smartphone' means a mobile phone, which has the following characteristics:
 - (a) it is characterised by wireless network connection, mobile use of internet services, an operating system optimised for handheld use and the ability to accept original and third-party software applications;
 - (b) it has an integrated touch screen display with a viewable diagonal size of 10,16 centimetres (or 4,0 inches) or more, but less than 17,78 centimetres (or 7,0 inches);
 - (c) where the device has a foldable display or has more than one display, at least one of the displays falls into the size range in either opened or closed mode.
- (3) 'smartphone for high security communication' means a smartphone, which has the following characteristics:
 - (a) it is accredited, or otherwise approved by the designated authority in a Member State or is in the process of accreditation or other approval to transmit, process or store classified information;
 - (b) it is intended for professional users only;
 - (c) it is capable of detecting physical intrusion to the hardware, including for intrusion detection at least a controller, related wiring, flexible printed circuit board circuitry for drill protection integrated to the device chassis and integrated tamper loops on the main printed circuit board.
- (4) 'professional user' means any natural or legal person, to whom a product has been made available for use in the course of their industrial or professional activities;
- (5) 'cordless phone' means a cordless handheld electronic device which has the following characteristics:
 - (a) it is designed for long-range voice communication over a landline telecommunications network;
 - (b) it is connected to a base station through a radio interface;
 - (c) it is designed for battery mode usage, while connection to mains via an external power supply is mainly for battery charging purposes.
- (6) 'base station' means a device that acts as the bridge between the network connection (telephone or Internet connection) and one or several cordless phone handsets, but does not provide router functionality for any other devices. A base station typically provides also the build-in charging cradle to recharge the handset;
- (7) 'charging cradle' means a device that acts as the charging unit for a single cordless phone handset, but does not provide network connection functionality;
- (8) 'slate tablet' means a device that is designed for portability and has the following characteristics:
 - (a) it has an integrated touch-sensitive display with a viewable diagonal size greater than or equal to 17,78 centimetres (or 7,0 inches) and less than 44,20 centimetres (or 17,4 inches);
 - (b) it does not have an integrated, physically attached keyboard in its designed configuration;
 - (c) it primarily relies on a wireless network connection;
 - (d) it is powered by an internal battery and is not intended to work without battery;
 - (e) it is placed on the market with an operating system designed for mobile platforms, identical or analogous to smartphones;
- (9) 'model identifier' means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark or the same manufacturer's, importer's or authorised representative's name;
- (10) 'product database' means a collection of data concerning products, which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, an online portal for accessibility and a compliance part, with clearly specified accessibility and security requirements, as laid down in Regulation (EU) 2017/1369;

- (11) 'equivalent model' means a model which has the same technical characteristics relevant for 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.
2. For the purposes of Annexes II to V, the definitions set out in Annex I shall apply.

Article 3

Ecodesign requirements

The ecodesign requirements set out in Annex II shall apply from the dates indicated therein.

Article 4

Conformity assessment

1. The conformity assessment procedure as referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.
2. For the purposes of conformity assessment pursuant to Article 8(2) of Directive 2009/125/EC, the technical documentation shall contain a copy of the product information provided in accordance with Annex II to this Regulation, and the details and the results of the calculations set out in Annex III to this Regulation.
3. Where the information included in the technical documentation for a particular model has been obtained:
 - (a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or
 - (b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer, or both,

the technical documentation shall include the details of such calculation, the assessment undertaken by the manufacturer to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different manufacturers.

The technical documentation shall include a list of all equivalent models, including the model identifiers.

4. The technical documentation shall also include the information in the order and as set out in Annex VI to Delegated Regulation (EU) 2023/1669. For market surveillance purposes, manufacturers, importers or authorised representatives may, without prejudice to point 2(g) of Annex IV to Directive 2009/125/EC, refer to the technical documentation uploaded to the product database which contains the same information laid down in Delegated Regulation (EU) 2023/1669.

Article 5

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure laid down in Annex IV to this Regulation when performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC.

*Article 6***Circumvention**

1. Manufacturers, importers or authorised representatives shall not place on the market products designed to alter their behaviour or properties when tested by Member State authorities performing checks on product compliance, in order to reach a more favourable result for any of the declared values of the parameters covered by ecodesign requirements included in this Regulation applicable at the time of the placing on the market of the products.

This includes, but is not limited to, products designed to be able to detect they are being tested (e.g. by recognising the test conditions or test cycle) and to automatically alter their behaviour or properties in response and products pre-set to alter their behaviour or properties at the time of testing.

2. Manufacturers, importers or authorised representatives shall not prescribe test instructions, specific for when these products are tested by Member State authorities performing checks on product compliance, that alter the behaviour or the properties of products in order to reach a more favourable result for any of the declared values of the parameters covered by ecodesign requirements included in this Regulation applicable at the time of the placing on the market of the products.

This includes, but is not limited to, prescribing a manual alteration of a product in preparation to the test that alters its behaviour or properties from the perspective of the normal use by the user.

3. Manufacturers, importers or authorised representatives shall not place on the market products designed to alter their behaviour or properties within a short period after putting the product into service leading to a worsening of any of the declared value of the parameters covered by ecodesign requirements included in this Regulation applicable at the time of the placing on the market of the products.

*Article 7***Indicative benchmarks**

The indicative benchmarks for the best-performing products and technologies available on the market on 20 September 2023 are set out in Annex V.

*Article 8***Review**

The Commission shall review this Regulation in the light of technological progress and present the result of this assessment including, if appropriate, a draft revision proposal, to the Consultation Forum established pursuant to Article 14(1) of Regulation (EU) 2017/1369 of the European Parliament and of the Council ^(¹) by 20 September 2027.

The review shall in particular assess:

- (a) the need to revise the scope of this Regulation to reflect market evolution;
- (b) the appropriateness of including smart wearables in the scope of this Regulation and of laying down generic and specific requirements for these;
- (c) the appropriateness of setting specific ecodesign requirements on the resistance of slate tablets to accidental drops;
- (d) the appropriateness of increasing the stringency of the requirement on battery endurance in cycles;
- (e) the appropriateness of defining a standardised battery that could be used interchangeably across a range of mobile phones and slate tablets;

⁽¹⁾ Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

- (f) the need to set out requirements to enable or improve repair and upgradeability with used or third-party spare parts;
- (g) the need to revise or extend the list of spare parts, of spare parts availability per target group including professional repairers and end-users, and of repair information for which requirements are set out;
- (h) the inclusion of further chemical elements in the information requirements in Annex II;
- (i) the need to include reliability requirements related to foldable devices;
- (j) the appropriateness to impose requirements on the recycled content of materials;
- (k) the appropriateness of imposing further information requirements on spare part prices;
- (l) the option for manufacturers to make data for 3D printing of plastic components (e.g. battery compartment cover, buttons etc.) publicly available on a free-access website, either in addition to their obligation to make these spare parts available to professional repairers or end-users or as a means to fulfil this obligation;
- (m) the appropriateness to prohibit serialisation of parts;
- (n) the appropriateness of requirements regarding functionality updates to the operating system;
- (o) the appropriateness of the exemptions for foldable devices;
- (p) the appropriateness of setting ecodesign requirements for mobile phones with a flexible main display which the user can unroll and roll up partly or fully;
- (q) the appropriateness of extension of the periods for availability of updates to the operating system;
- (r) the appropriateness of extension of the period for availability of spare parts.

Article 9

Amendment to Regulation (EU) 2023/826

Regulation (EU) 2023/826 is amended as follows:

In point 3 of Annex II the entry ‘other equipment for the purpose of recording or reproducing sound or images, including signals or other technologies for the distribution of sound and image other than by telecommunications, but excluding electronic displays covered by Regulation (EU) 2019/2021 and projectors with mechanisms for exchanging the lenses with others with different focal length’ is replaced by the following:

‘other equipment for the purpose of recording or reproducing sound or images, including signals or other technologies for the distribution of sound and image other than by telecommunications, but excluding electronic displays covered by Regulation (EU) 2019/2021, cordless phones covered by Regulation (EU) 2023/1669, and projectors with mechanisms for exchanging the lenses with others with different focal length.’

Article 10

Entry into force and application

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

It shall apply from 20 June 2025. Article 6 shall apply from 20 September 2023.

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

Done at Brussels, 16 June 2023.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX I

Definitions applicable to the Annexes

- (1) 'networked standby' means networked standby within the meaning of Article 2(10) of Regulation (EU) 2023/826;
- (2) 'P_n' is the power consumption in networked standby mode, expressed in Watt and rounded to two decimal places;
- (3) 'spare part' means a separate part that can replace a part with the same or similar function in a mobile phone, cordless phone or slate tablet. The functionality of the mobile phone, cordless phone or slate tablet is restored or upgraded when the part is replaced by a spare part. Spare parts may be used parts;
- (4) 'serialised part' means a part which has a unique code that is paired to an individual unit of a device and whose replacement by a spare part requires the pairing of that spare part to the device by means of a software code to ensure full functionality of the spare part and the device;
- (5) 'professional repairer' means an operator or undertaking which performs repair and professional maintenance of mobile phones, cordless phones or slate tablets, either as a service or with a view to the subsequent resale of the repaired device;
- (6) 'fastener' means a hardware device or substance that mechanically, magnetically or by other means connects or fixes two or more objects, parts or pieces. A hardware device which in addition serves an electrical function shall also be considered a fastener;
- (7) 'required fastener' means any fastener to be disassembled according to the repair instructions provided by manufacturers, importers or authorised representatives to get access to a part which is meant to be replaced by a spare part;
- (8) 'reusable fastener' means a fastener that can be completely reused in the reassembly for the same purpose and that does no damage either to the product or to the fastener itself during the disassembly or reassembly process in a way that makes their multiple reuse impossible;
- (9) 'resupplied fastener' means a removable fastener that is supplied at no additional cost with the spare part which it is intended to connect or fix; adhesives shall be considered resupplied fasteners if they are supplied with the spare part in a quantity that is sufficient for the reassembly, at no additional cost;
- (10) 'removable fastener' means a fastener that is not a reusable fastener, but whose removal does not damage the product, or leave residue, which precludes reassembly;
- (11) 'battery' means any part consisting of one or several battery cells, including, as relevant to the product model, an electronic circuitry with battery-related sensors for battery management, housing(s), battery tray, brackets, shieldings, thermal interface materials, and electric connections to other assemblies of the device;
- (12) 'back cover' or 'back cover assembly' means the main backside housing, including one or more of the following elements, as relevant to the product model: the frame, a backside cover layer attached to the main back cover body, rear-facing camera lens covers, printed antennas, brackets, shieldings, gaskets, electric connections to other assemblies of the device and thermal interface materials;
- (13) 'auxiliary microphone' means a microphone that is not essential for user's voice signals, but provides secondary functions, such as, but not limited to, ambient noise reduction;
- (14) 'front-facing camera assembly' means any part consisting of one or several cameras oriented towards the user of the device, including, as relevant to the product model:
 - (a) camera components and related sensors;
 - (b) flashlight components;
 - (c) optical components;
 - (d) mechanical components needed for functions such as image stabilisation and focus;
 - (e) module housing(s);
 - (f) brackets;
 - (g) shieldings;

- (h) signal lights;
 - (i) auxiliary microphones;
 - (j) electric connections to other assemblies of the device;
- (15) 'rear-facing camera assembly' means any part consisting of one or several cameras oriented to the rear side of the device, including, as relevant to the product model:
- (a) camera components and related sensors;
 - (b) flashlight components;
 - (c) optical components;
 - (d) mechanical components needed for functions such as image stabilisation and focus;
 - (e) module housing(s);
 - (f) brackets;
 - (g) shieldings;
 - (h) auxiliary microphones;
 - (i) electric connections to other assemblies of the device;
- (16) 'external audio connector' means a connector for audio signals to connect to a headset or external loudspeakers or similar audio device, including, as relevant to the product model, brackets, gaskets and electric connections to other assemblies of the device;
- (17) 'external charging port' means a port for wired battery charging, possibly also used for data exchange and reverse charging of another device, which is composed of a USB-C receptacle and a related housing and including, as relevant to the product model, brackets, gaskets and electric connections to other assemblies of the device;
- (18) 'mechanical button' means a mechanical switch or an assembly of mechanical switches that can be depressed or a slider button which can be mechanically moved to switch on or off functions such as volume, triggering the camera, or switching on or off the device and including, as relevant to the product model, brackets, gaskets and electric connections to other assemblies of the device;
- (19) 'main microphone(s)' means the microphone(s) intended for the user's voice signals including, as relevant to the product model, gaskets and electric connections to other assemblies of the device;
- (20) 'speaker' means any loudspeaker and any mechanical part to generate sound, including, as relevant to the product model, module housing(s), gaskets and electric connections to other assemblies of the device;
- (21) 'hinge assembly' means a part that allows a device to be folded while preserving its operational integrity including, where relevant, module housings;
- (22) 'mechanical display folding mechanism' means a part that allows a device, including its display, to be folded while preserving its operational integrity;
- (23) 'charger' means an external power supply to charge the battery of and provide electrical power to a battery-powered mobile phone, cordless phone or slate tablet;
- (24) 'SIM tray and memory card tray' means a movable tray for a removable SIM card or memory card;
- (25) 'display assembly' means the assembly of display unit and where relevant front panel digitiser unit, including, as relevant to the product model:
- (a) backplate;
 - (b) shielding;
 - (c) display frame;
 - (d) backlight units;
 - (e) electronics circuitry including:
 - (i) display driver but excluding the main graphics processing unit functionality;

- (ii) row and column controllers;
 - (iii) touch signal circuitry;
 - (iv) electric connections to other assemblies of the device;
- (26) 'protective foil for foldable display' means a protective film designed to be attached to the display of a foldable device to enhance the reliability and to reduce mechanical wear of the screen surface;
- (27) 'free access website' means a website that can be accessed without having to pay or to provide personal information, including an email address or phone number;
- (28) 'failure analysis' means a process of collecting and analysing data to identify the part of a mobile phone, cordless phone or slate tablet which causes a malfunction;
- (29) 'separate protective cover' means a protective cover which may be shipped with a mobile phone, cordless phone or slate tablet, but does not serve as a required part of the housing and is not considered an integral part of the product;
- (30) 'encryption' means a (reversible) transformation of data by a cryptographic algorithm to produce ciphertext, namely to hide the information content of the data;
- (31) 'key' means a sequence of symbols that controls the operation of a cryptographic transformation (e.g., encipherment, decipherment);
- (32) 'disassembly' means a process whereby a product is separated into its parts and/or components in such a way that it could subsequently be reassembled and made operational;
- (33) 'operating system' means the general type of pre-installed software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input-output control and data management; it is normally subject to regular updates leading to the establishment of a range of major and minor versions; it includes any pre-installed software applications which the user cannot uninstall;
- (34) 'security update' means an operating system update, including security patches, if relevant for a given device, whose main purpose is to provide enhanced security for the device;
- (35) 'corrective update' means an operating system update, including corrective patches, whose purpose is to provide corrections to bugs, errors or malfunctions in the operating system;
- (36) 'functionality update' means an operating system update whose main purpose is to implement new functionalities;
- (37) 'rated capacity' means the amount of electricity declared by the manufacturer that a battery can deliver during a 5-hour period when measured under specified conditions, expressed in milliampere-hours (mAh);
- (38) 'battery endurance in cycles' means the number of charge/discharge cycles a battery can withstand until its usable electrical capacity has reached 80 % of its rated capacity, expressed in cycles;
- (39) 'state of charge' means the available capacity in a battery expressed as a percentage of rated capacity;
- (40) 'state of health' means a measure of the general condition of a rechargeable battery and its ability to deliver the specified performance compared with its initial condition, expressed as the remaining full charge capacity relative to the rated capacity, in %;
- (41) 'battery management system' means an electronic device that controls or manages the electric and thermal functions of the battery, that manages and stores the data on the parameters for recording the date of manufacturing of the battery, date of first use of the battery, number of charge/discharge cycles, and the state of health of the battery, and that communicates with the product in which the battery is incorporated;
- (42) 'remaining capacity' of a battery means the capacity with the battery keeping normal peak performance and measured relative to when the product was new;
- (43) 'smart charging' means an adaptive battery charging profile based on algorithms learning from user behaviour to optimise the charging profile in terms of reducing battery lifetime limiting effects;

- (44) 'R_{rec}' means the recyclability rate, expressed in %;
 - (45) 'ingress protection rating' means the extent of protection provided by an enclosure against ingress of solid foreign objects and/or against ingress of water, measured according to standardised test methods and expressed with a coding system to indicate the degree of such protection;
 - (46) 'date of placement on the market' means the date of placing on the market of the first unit of a product model;
 - (47) 'date of end of placement on the market' means the date of placing on the market of the last unit of a product model;
 - (48) 'secure deletion of the encryption key' means the effective erasure of the encryption key used to encrypt and decrypt data, overwriting the key completely in such a way that access to the original key, or parts of it, becomes infeasible;
 - (49) 'proprietary tool' means a tool that is not available for purchase by the general public or for which any applicable patents are not available to licence under fair, reasonable and non-discriminatory terms;
 - (50) 'basic tools' means a screwdriver for slotted heads, a screwdriver for cross recess screws, a screwdriver for hexalobular recess heads, a hexagon socket key, a combination wrench, combination pliers, combination pliers for wire stripping and terminal crimping, half round nose pliers, diagonal cutters, multigrip pliers, locking pliers, a prying lever, tweezers, magnifying glass, a spudger and a pick;
 - (51) 'commercially available tool' means a tool that is available for purchase by the general public and is neither basic tools nor a proprietary tool;
 - (52) 'production-equivalent environment' means an environment that is comparable with the environment in which a product was manufactured;
 - (53) 'use environment' means an environment where the product is in use;
 - (54) 'workshop environment' means an environment, that is neither a use environment nor a production-equivalent environment, and where machinery and/or tools are used under controlled conditions as suitable for the repair activities;
 - (55) 'generalist' means a person with general knowledge of basic repair techniques and safety precautions;
 - (56) 'layman' means a person without any specific repair experience or related qualifications;
 - (57) 'declared values' means the values provided by the manufacturer, importer or authorised representative for the stated, calculated or measured technical parameters in accordance with Article 4, for the verification of compliance by the Member State authorities;
 - (58) 'fully extended state' means a state of the device whereby movable parts as intended for use, such as displays and keyboards, are unfolded, flipped open or similarly extended in a way that the projected area of length times width is maximised.
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ANNEX II

Ecodesign requirements**A. MOBILE PHONES OTHER THAN SMARTPHONES****1. RESOURCE EFFICIENCY REQUIREMENTS****1.1. Design for repair and reuse****(1) Availability of spare parts:**

(a) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market, when present:

- (i) battery or batteries;
- (ii) front-facing camera assembly;
- (iii) rear-facing camera assembly;
- (iv) external audio connector(s);
- (v) external charging port(s);
- (vi) mechanical button(s);
- (vii) main microphone(s);
- (viii) speaker(s);
- (ix) hinge assembly;
- (x) mechanical display folding mechanism.

(b) Spare parts concerned by points (a) and (c) shall not be assemblies comprising more than one of the listed spare part types, with the following exceptions:

- (i) microphones may be part of a loudspeaker or external charging port assembly;
- (ii) external audio connector(s) may be combined with the external charging port(s) as the same port(s);
- (iii) external charging port(s) may be combined with the external audio connector(s) as the same port(s);
- (iv) hinge assembly may be part of a mechanical display folding mechanism;
- (v) microphone, speaker(s), buttons and external connectors may be combined with a higher level assembly if the following reliability requirements are met:
 - the power button has a contact closure cycle resistance $\geq 225\,000$ cycles;
 - the volume button has a contact closure cycle resistance $\geq 100\,000$ cycles;
 - the charging connector has an insertion/extraction cycle resistance $\geq 12\,000$ cycles.

(c) From 20 June 2025 or from one month after the date of placement on the market, whichever is later:

(i) manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market:

- (a) battery or batteries;
- (b) back cover or back cover assembly, if to be fully removed for replacement of the battery;
- (c) protective foil for foldable displays;
- (d) display assembly;

- (e) charger, unless the device complies with Article 3(4) of Directive 2014/53/EU ⁽¹⁾;
 - (f) SIM tray and memory card tray, if there is an external slot for a SIM tray or memory card tray.
- (ii) manufacturers, importers or authorised representatives may provide the battery or batteries referred to in point (i)(a) only to professional repairers if manufacturers, importers or authorised representatives ensure that the following requirements are met:
- (a) after 500 full charge cycles the battery has, in a fully charged state, a remaining capacity of at least 83 % of the rated capacity;
 - (b) the battery endurance in cycles achieves a minimum of 1 000 full charge cycles and after 1 000 full charge cycles the battery has, in a fully charged state, a remaining capacity of at least 80 % of the rated capacity;
 - (c) the device meets IP67 rating.
- (d) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, the list of spare parts concerned by point (a) and (c) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, until the end of the period of availability of these spare parts;

(2) Access to repair and maintenance information

- (a) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 7 years after the date of end of placement on the market, provide access to repair and maintenance information to professional repairers for parts covered by points 1(a) and (c) in the following conditions, unless that information is made publicly available at the free access website of the manufacturer, importer or authorised representative:
- (a) The manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair mobile phones other than smartphones and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;
 - (b) Manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;
 - (c) Manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;
 - (d) Once registered, a professional repairer shall have access, within 1 working day after requesting it, to the requested repair and maintenance information. The information may be provided for an equivalent model or model of the same family, if relevant;

⁽¹⁾ Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (OJ L 153, 22.5.2014, p. 62).

- (e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace parts covered by point 1(a) and (c) and shall at least include:
- (i) the unequivocal product identification;
 - (ii) a disassembly map or exploded view;
 - (iii) wiring and connection diagrams, as required for failure analysis;
 - (iv) electronic board diagrams;
 - (v) a list of necessary repair and test equipment;
 - (vi) technical manual of instructions for repair, including marking of the individual steps;
 - (vii) diagnostic fault and error information (including manufacturer-specific codes, where applicable);
 - (viii) component and diagnosis information (such as minimum and maximum theoretical values for measurements);
 - (ix) instructions for software and firmware (including reset software);
 - (x) information on how to access data records of reported failure incidents stored on the device, where applicable, with the exception of personal identifiable information such as related to user behavior and location information;
 - (xi) information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with points 2 (a) and (b);
- (f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information.
- (b) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, repair instructions and maintenance information for parts concerned by point 1(c) shall be publicly available at the free access website of the manufacturer, importer or authorised representative, until at least 7 years after the date of end of placement on the market. This information shall contain the level of detail needed to be able to replace parts covered by point 1(c).
- (3) Maximum delivery time of spare parts
- (a) manufacturers, importers or authorised representatives shall ensure that:
- (i) during the first 5 years of the period referred to in points 1(a) and (c), spare parts are delivered within 5 working days after having received the order;
 - (ii) during the remaining 2 years of the period referred to in points 1(a) and (c), spare parts are delivered within 10 working days after having received the order.
- (b) In the case of spare parts concerned by point 1(a), the availability of spare parts may be limited to professional repairers registered in accordance with point 2 (a) and (b).
- (4) Information on the price of spare parts
- During the period referred to in points 1(a) and (c), manufacturers, importers or authorised representatives shall provide indicative pre-tax prices at least in euro for spare parts listed in points 1(a) and (c), including the pre-tax price of fasteners and tools, if supplied with the spare part, on the free access website of the manufacturer, importer or authorised representative.

(5) Disassembly requirements

Manufacturers, importers or authorised representatives shall meet the following disassembly requirements:

- (a) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of the display assembly and of parts referred to in point 1(a), with the exception of the battery or batteries, meets the following criteria:
- (i) fasteners shall be removable, resupplied or reusable;
 - (ii) the process for replacement shall be feasible in at least one of the following ways:
 - with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - with commercially available tools.
 - (iii) the process for replacement shall, as a minimum, be able to be carried out in a workshop environment;
 - (iv) the process for replacement shall, as a minimum, be able to be carried out by a generalist.
- (b) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of parts referred to in point 1(c), with the exception of the battery or batteries, meets the following criteria:
- (i) fasteners shall be removable, resupplied or reusable;
 - (ii) the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - (iii) the process for replacement shall be able to be carried out in a use environment;
 - (iv) the process for replacement shall be able to be carried out by a layman.
- (c) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for battery replacement:
- (i) meets the following criteria:
 - fasteners shall be resupplied or reusable;
 - the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - the process for replacement shall be able to be carried out in a use environment;
 - the process for replacement shall be able to be carried out by a layman.
 - (ii) or, as an alternative to point (i), ensure that:
 - the process for battery replacement meets the criteria set out in (a);
 - after 500 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 83 % of the rated capacity;
 - the battery endurance in cycles achieves a minimum of 1 000 full charge cycles, and after 1 000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 % of the rated capacity;
 - the device is at least dust tight and protected against immersion in water up to one meter depth for a minimum of 30 minutes.

(6) Requirements for preparation for reuse

From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that devices include a software function, that resets the device to its factory settings and erases securely by default all personal information including but not limited to address book, text messages, pictures, videos, settings and call history.

1.2. Design for reliability

From 20 June 2025:

- (1) Resistance to accidental drops: Manufacturers, importers or authorised representatives shall ensure that the devices pass 45 falls without any protective foil or separate protective cover, except for foldable mobile phones other than smartphones designed to be used with a protective foil on the foldable display, without loss of functionality, following the test procedure set out in Annex III; foldable mobile phones other than smartphones designed to be used with a protective foil on the foldable display shall pass 35 falls in the un-extended state and 15 falls in the extended state, without loss of functionality, following the test procedure set out in Annex III and tested with the protective foil.
- (2) Scratch resistance: Manufacturers, importers or authorised representatives shall ensure that the screen of the device passes the hardness level 4 on the Mohs hardness scale, except for foldable mobile phones other than smartphones designed to be used with a protective foil on the foldable display.
- (3) Protection from dust and water: Manufacturers, importers or authorised representatives shall ensure that the devices are protected against the ingress of solid foreign objects of size bigger than 1 millimeter and splashing of water.
- (4) Battery endurance in cycles: Manufacturers, importers or authorised representatives shall ensure that the devices achieve at least 500 cycles at 80 % remaining capacity, to be tested under charging conditions where the charging rate is limited by the battery management system and not by the power delivery capabilities of the power supply.
- (5) Battery management:
 - (i) manufacturers, importers or authorised representatives shall include an optional charging feature selectable by the user which terminates the charging process automatically, when the battery is charged to 80 % of its full capacity. When this feature is enabled, manufacturers, importers, or authorised representatives may enable the device to periodically fully charge the battery for the purposes of maintaining accurate battery state of charge estimates. The user shall be informed automatically when charging the device for the first time or during the installation process, that the life span of the battery can be extended if the feature is selected and the battery is regularly charged only to 80 % of its full capacity;
 - (ii) manufacturers, importers or authorised representatives shall provide a power management feature which by default ensures that once the battery is fully charged there is no further charging power supplied to the battery unless the charge level drops below 95 % of its maximum charge capacity.
- (6) Operating system updates:
 - (a) from the date of end of placement on the market to at least 5 years after that date, manufacturers, importers or authorised representatives shall, if they provide security updates, corrective updates or functionality updates to an operating system, make such updates available at no cost for all units of a product model with the same operating system;
 - (b) the requirement referred to in point (a) shall apply both to operating system updates offered voluntarily by manufacturers, importers or authorised representatives and to operating system updates provided to comply with Union law;
 - (c) security updates or corrective updates mentioned under point (a) need to be available to the user at the latest 4 months after the public release of the source code of an update of the underlying operating system or, if the source code is not publicly released, after an update of the same operating system is released by the operating system provider or on any other product of the same brand;
 - (d) functionality updates mentioned under point (a) need to be available to the user at the latest 6 months after the public release of the source code of an update of the underlying operating system or, if the source code is not publicly released, after an update of the same operating system is released by the operating system provider or on any other product of the same brand;
 - (e) an operating system update may combine security, corrective and functionality updates.

1.3. Marking of plastic components

From 20 June 2025, plastic components heavier than 50 g shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks '>' and '<' as specified in available standards. The marking shall be legible.

Plastic components shall be exempt from marking requirements provided the following conditions are fulfilled:

- (i) the marking is not possible because of the shape or size;
- (ii) the marking would impact on the performance or functionality of the plastic component;
- (iii) marking is technically not possible because of the molding method.

For the following plastic components no marking shall be required:

- (i) packaging, tape, labels and stretch wraps;
- (ii) wiring, cables and connectors, rubber parts and any other component where not enough appropriate surface area is available for the marking to be of a legible size;
- (iii) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
- (iv) transparent parts where the marking would obstruct the function of the part in question.

1.4. Recyclability requirements

From 20 June 2025:

- (1) Manufacturers, importers or their authorised representatives shall, without prejudice to Article 15(1) of Directive 2012/19/EU of the European Parliament and of the Council⁽²⁾, make available, on a free access website, the dismantling information needed to access any of the products components referred to in Annex VII, point 1, of Directive 2012/19/EU.
- (2) The information referred to in point (1) shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (3) The information referred to in point (1) shall be available until at least 15 years after the placing on the market of the last unit of a product model.

2. INFORMATION REQUIREMENTS

From 20 June 2025:

- (1) Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free access websites of the manufacturer, importer or authorised representative the following information:
 - (a) compatibility with removable memory cards, if any;
 - (b) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - (i) cobalt in the battery (weight range: less than 2 g, between 2 g and 5 g, above 5 g);
 - (ii) tantalum in capacitors (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g);
 - (iii) neodymium in loud speakers, vibration motors, and other magnets (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g);
 - (iv) gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,1 g, above 0,1 g).
 - (c) the indicative value of the recyclability rate R_{cy} :

⁽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).

- (d) the indicative percentage of recycled content for the product or a part thereof, where available; if not available, the recycled content should be indicated as “not known” or “not available”;
 - (e) ingress protection rating;
 - (f) minimum battery endurance in cycles in number of cycles;
 - (g) in case of foldable devices, it shall be indicated that ‘This device did not undergo a scratch resistance test’.
- (2) Manufacturers, importers or authorised representatives shall provide user instructions in the form of a user manual on a free access website of the manufacturer, importer or authorised representative. Those instructions shall include instructions for battery maintenance, including the following:
- (i) impacts on battery lifetime related to exposure of the device to elevated temperatures, suboptimal charging patterns, fast charging and other known adverse factors;
 - (ii) effects of switching off radio connections, such as WiFi, Bluetooth, on power consumption;
 - (iii) information about whether the device supports other features, which extend battery lifetime, such as smart charging and about how these features are activated or under which conditions they work best.
- (3) Where the package does not include a charger, the user instructions referred to in point 2 shall include the following information: “For environmental reasons this package does not include a charger. This device can be powered with most USB power adapters and a cable with USB Type-C plug.”.

B. SMARTPHONES

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) Availability of spare parts

- (a) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market, when present:
- (i) battery or batteries;
 - (ii) front-facing camera assembly;
 - (iii) rear-facing camera assembly;
 - (iv) external audio connector(s);
 - (v) external charging port(s);
 - (vi) mechanical button(s);
 - (vii) main microphone(s);
 - (viii) speaker(s);
 - (ix) hinge assembly;
 - (x) mechanical display folding mechanism.
- (b) Spare parts concerned by points (a) and (c) shall not be assemblies comprising more than one of the listed spare part types, with the following exceptions:
- (i) microphones may be part of a loudspeaker or external charging port assembly;
 - (ii) external audio connector(s) may be combined with the external charging port(s) as the same port(s);
 - (iii) external charging port(s) may be combined with the external audio connector(s) as the same port(s);
 - (iv) hinge assembly may be part of a mechanical display folding mechanism;

- (v) microphone, speaker(s), buttons and external connectors may be combined with a higher level assembly if the following reliability requirements are met:
 - the device meets IP67 rating;
 - the power button has a contact closure cycle resistance $\geq 225\,000$ cycles;
 - the volume button has a contact closure cycle resistance $\geq 100\,000$ cycles;
 - the charging connector has a insertion/extraction cycle resistance $\geq 12\,000$ cycles.
- (c) From 20 June 2025 or from one month after the date of placement on the market, whichever is later:
 - (i) manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market:
 - (a) battery or batteries;
 - (b) back cover or back cover assembly, if to be fully removed for replacement of the battery;
 - (c) protective foil for foldable displays;
 - (d) display assembly;
 - (e) charger, unless the device complies with Article 3(4) of Directive 2014/53/EU;
 - (f) SIM tray and memory card tray, if there is an external slot for a SIM tray or memory card tray.
 - (ii) manufacturers, importers or authorised representatives may provide the battery or batteries referred to in point (i)(a) only to professional repairers if manufacturers, importers or authorised representatives ensure that the following requirements are met:
 - (a) after 500 full charge cycles the battery has, in a fully charged state, a remaining capacity of at least 83 % of the rated capacity;
 - (b) the battery endurance in cycles achieves a minimum of 1 000 full charge cycles and after 1 000 full charge cycles the battery has, in a fully charged state, a remaining capacity of at least 80 % of the rated capacity;
 - (c) the device meets IP67 rating.
- (d) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, the list of spare parts concerned by points (a) and (c) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, until the end of the period of availability of these spare parts.

(2) Access to repair and maintenance information

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 7 years after the date of end of placement on the market, provide access to repair and maintenance information to professional repairers for parts covered by points 1(a) and (c) in the following conditions, unless that information is made publicly available at the free access website of the manufacturer, importer or authorised representative:

- (a) The manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair smartphones and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;

- (b) Manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;
- (c) Manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;
- (d) Once registered, a professional repairer shall have access, within 1 working day after requesting it, to the requested repair and maintenance information. The information may be provided for an equivalent model or model of the same family, if relevant;
- (e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace parts covered by point 1(a) and (c) and shall at least include:
 - (i) the unequivocal product identification;
 - (ii) a disassembly map or exploded view;
 - (iii) wiring and connection diagrams, as required for failure analysis;
 - (iv) electronic board diagrams;
 - (v) a list of necessary repair and test equipment;
 - (vi) technical manual of instructions for repair, including marking of the individual steps;
 - (vii) diagnostic fault and error information (including manufacturer-specific codes, where applicable);
 - (viii) component and diagnosis information (such as minimum and maximum theoretical values for measurements);
 - (ix) instructions for software and firmware (including reset software);
 - (x) information on how to access data records of reported failure incidents stored on the device, where applicable, with the exception of personal identifiable information such as related to user behavior and location information;
 - (xi) information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with points 2 (a) and (b);
- (f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information.

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, repair instructions and maintenance information for parts concerned by point 1(c) shall be publicly available at the free access website of the manufacturer, importer or authorised representative, until at least 7 years after the date of end of placement on the market. This information shall contain the level of detail needed to be able to replace parts covered by point 1(c).

(3) Maximum delivery time of spare parts

- (a) manufacturers, importers or authorised representatives shall ensure that:
 - (i) during the first 5 years of the period referred to in points 1(a) and (c), spare parts are delivered within 5 working days after having received the order;
 - (ii) during the remaining 2 years of the period referred to in points 1(a) and (c), spare parts are delivered within 10 working days after having received the order;

- (b) In the case of spare parts concerned by point 1(a), the availability of spare parts may be limited to professional repairers registered in accordance with points 2 (a) and (b).

(4) Information on the price of spare parts

During the period referred to in points 1(a) and (c), manufacturers, importers or authorised representatives shall provide indicative pre-tax prices at least in euro for spare parts listed in points 1(a) and (c), including the pre-tax price of fasteners and tools, if supplied with the spare part, on the free access website of the manufacturer, importer or authorised representative.

(5) Disassembly requirements

Manufacturers, importers or authorised representatives shall meet the following disassembly requirements:

- (a) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of the display assembly and of parts referred to in point 1(a), with the exception of the battery or batteries, meets the following criteria:

- (i) fasteners shall be removable, resupplied or reusable;
- (ii) the process for replacement shall be feasible in at least one of the following ways:
 - with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - with commercially available tools.
- (iii) the process for replacement shall, as a minimum, be able to be carried out in a workshop environment;
- (iv) the process for replacement shall, as a minimum, be able to be carried out by a generalist.

- (b) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of parts referred to in point 1(c), with the exception of the battery or batteries, meets the following criteria:

- (i) fasteners shall be removable, resupplied or reusable;
- (ii) the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
- (iii) the process for replacement shall be able to be carried out in a use environment;
- (iv) the process for replacement shall be able to be carried out by a layman.

- (c) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for battery replacement:

- (i) meets the following criteria:
 - fasteners shall be resupplied or reusable;
 - the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - the process for replacement shall be able to be carried out in a use environment;
 - the process for replacement shall be able to be carried out by a layman.
- (ii) or, as an alternative to point (i), ensure that
 - the process for battery replacement meets the criteria set out in (a);
 - after 500 full charge cycles the battery must have in a fully charged state, a remaining capacity of at least 83 % of the rated capacity;

- the battery endurance in cycles achieves a minimum of 1 000 full charge cycles, and after 1 000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 % of the rated capacity;
- the device is at least dust tight and protected against immersion in water up to one meter depth for a minimum of 30 minutes.

(6) Requirements for preparation for reuse

From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that devices:

- (a) encrypt by default, using a random encryption key, the user data stored in the internal storage of the device;
- (b) include a software function, that resets the device to its factory settings and erases securely by default the encryption key and generates a new one;
- (c) record the following data from the battery management system in the system settings or another location accessible for end-users:
 - (i) date of manufacturing of the battery;
 - (ii) date of first use of the battery after the set-up of the device by the first user;
 - (iii) number of full charge/discharge cycles (reference: rated capacity);
 - (iv) measured state of health (remaining full charge capacity relative to the rated capacity in %).

(7) Replacement of serialised parts

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 7 years after the date of end of placement on the market:

- (a) In case the parts to be replaced by spare parts referred to in point 1(a) are serialised parts, provide non-discriminatory access for professional repairers to any software tools, firmware or similar auxiliary means needed to ensure the full functionality of those spare parts and of the device in which such spare parts are installed during and after the replacement;
- (b) In case the parts to be replaced by spare parts referred to in point 1(c) are serialised parts, provide non-discriminatory access for professional repairers and end-users to any software tools, firmware or similar auxiliary means needed to ensure the full functionality of those spare parts and of the device in which such spare parts are installed during and after the replacement;
- (c) Provide, on a free access website of the manufacturer, importer or authorised representative, a description of the procedure for the notification and authorisation of the intended replacement of serialised parts by the owner of the device referred to in point (d); the procedure shall allow for remotely providing the notification and authorisation;
- (d) Before providing access to the software tools, firmware or similar auxiliary means referred to in points (a) and (b), the manufacturer, importer or authorised representative may only require to have received a notification and authorisation of the intended part replacement by the owner of the device. Such notification and authorisation may also be provided by a professional repairer with the explicit written consent of the owner;
- (e) Manufacturers, importers or authorised representatives shall provide access to the software tools, firmware or similar auxiliary means referred to in points (a) and (b) within 3 working days after having received the request and, where applicable, the notification and authorisation referred to in point (d);
- (f) The access to the software tools, firmware or similar auxiliary means referred to in point (a) may, as regards professional repairers, be limited to professional repairers registered in accordance with points 2(a) and (b).

1.2. Design for reliability

From 20 June 2025:

- (1) Resistance to accidental drops: Manufacturers, importers or authorised representatives shall ensure that the devices pass 45 falls without any protective foil or separate protective cover, except for foldable smartphones designed to be used with a protective foil on the foldable display, without loss of functionality, following the test procedure set out in Annex III; foldable smartphones designed to be used with a protective foil on the foldable display shall pass 35 falls in the un-extended state and 15 falls in the extended state, without loss of functionality, following the test procedure set out in Annex III and tested with the protective foil.
- (2) Scratch resistance: Manufacturers, importers or authorised representatives shall ensure that the screen of the device passes the hardness level 4 on the Mohs hardness scale, except for foldable smartphones designed to be used with a protective foil on the foldable display.
- (3) Protection from dust and water: Manufacturers, importers or authorised representatives shall ensure that the devices are protected against the ingress of solid foreign objects of size bigger than 1 millimeter and splashing of water.
- (4) Battery endurance in cycles: Manufacturers, importers or authorised representatives shall ensure that the devices achieve at least 800 cycles at 80 % remaining capacity, to be tested under charging conditions where the charging rate is limited by the battery management system and not by the power delivery capabilities of the power supply.
- (5) Battery management:
 - (i) manufacturers, importers or authorised representatives shall include an optional charging feature selectable by the user which terminates the charging process automatically, when the battery is charged to 80 % of its full capacity. When this feature is enabled, manufacturers, importers, or authorised representatives may enable the device to periodically fully charge the battery for the purposes of maintaining accurate battery state of charge estimates. The user shall be informed automatically when charging the device for the first time or during the installation process, that the life span of the battery can be extended if the feature is selected and the battery is regularly charged only to 80 % of its full capacity;
 - (ii) manufacturers, importers or authorised representatives shall provide a power management feature which by default ensures that once the battery is fully charged there is no further charging power supplied to the battery unless the charge level drops below 95 % of its maximum charge capacity.
- (6) Operating system updates:
 - (a) from the date of end of placement on the market to at least 5 years after that date, manufacturers, importers or authorised representatives shall, if they provide security updates, corrective updates or functionality updates to an operating system, make such updates available at no cost for all units of a product model with the same operating system;
 - (b) the requirement referred to in point (a) shall apply both to operating system updates offered voluntarily by manufacturers, importers or authorised representatives and to operating system updates provided to comply with Union law;
 - (c) security updates or corrective updates mentioned under point (a) need to be available to the user at the latest 4 months after the public release of the source code of an update of the underlying operating system or, if the source code is not publicly released, after an update of the same operating system is released by the operating system provider or on any other product of the same brand;
 - (d) functionality updates mentioned under point (a) need to be available to the user at the latest 6 months after the public release of the source code of an update of the underlying operating system or, if the source code is not publicly released, after an update of the same operating system is released by the operating system provider or on any other product of the same brand;
 - (e) an operating system update may combine security, corrective and functionality updates;

- (f) when a functionality update provided by a manufacturer, importer or authorised representative shows a negative impact on device performance, manufacturers, importers or authorised representatives shall modify the released operating system to ensure at least the same performance as before the update within a reasonable period of time, free of charge and without causing significant inconvenience to the end-user, except if the end-user has given explicit consent for the negative impact prior to the update.

1.3. Marking of plastic components

From 20 June 2025, plastic components heavier than 50 g shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks '>' and '<' as specified in available standards. The marking shall be legible.

Plastic components shall be exempt from marking requirements provided the following conditions are fulfilled:

- (i) the marking is not possible because of the shape or size;
- (ii) the marking would impact on the performance or functionality of the plastic component;
- (iii) marking is technically not possible because of the molding method.

For the following plastic components no marking shall be required:

- (i) packaging, tape, labels and stretch wraps;
- (ii) wiring, cables and connectors, rubber parts and any other component where not enough appropriate surface area is available for the marking to be of a legible size;
- (iii) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
- (iv) transparent parts where the marking would obstruct the function of the part in question.

1.4. Recyclability requirements

From 20 June 2025:

- (1) Manufacturers, importers or their authorised representatives shall, without prejudice to Article 15(1) of Directive 2012/19/EU, make available, on a free access website, the dismantling information needed to access any of the products components referred to in Annex VII, point 1, of Directive 2012/19/EU.
- (2) The information referred to in point (1) shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (3) The information referred to in point (1) shall be available until at least 15 years after the placing on the market of the last unit of a product model.

2. INFORMATION REQUIREMENTS

From 20 June 2025:

- (1) Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free access websites of the manufacturer, importer or authorised representative the following information:
 - (a) compatibility with removable memory cards, if any;
 - (b) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - (i) cobalt in the battery (weight range: less than 2 g, between 2 g and 10 g, above 10 g);
 - (ii) tantalum in capacitors (weight range: less than 0,01 g, between 0,01 g and 0,1 g, above 0,1 g);
 - (iii) neodymium in loud speakers, vibration motors, and other magnets (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g);

- (iv) gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,05 g, above 0,05 g).
 - (c) the indicative value of the recyclability rate R_{cyc} ;
 - (d) the indicative percentage of recycled content for the product or a part thereof, where available; if not available, the recycled content should be indicated as “not known” or “not available”;
 - (e) ingress protection rating;
 - (f) minimum battery endurance in cycles in number of cycles;
 - (g) in case of foldable devices, it shall be indicated that ‘This device did not undergo a scratch resistance test’.
- (2) Manufacturers, importers or authorised representatives shall provide user instructions in the form of a user manual on a free access website of the manufacturer, importer or authorised representative, and shall include:
- (a) how to access on the device information from the battery management system on:
 - (i) date of manufacturing of the battery;
 - (ii) date of first use of the battery after the set-up of the device by the first user;
 - (iii) number of full charge/discharge cycles (reference: rated capacity);
 - (iv) measured state of health (remaining full charge capacity relative to the rated capacity in %).
 - (b) instructions for battery maintenance, including the following:
 - (i) impacts on battery lifetime related to exposure of the device to elevated temperatures, suboptimal charging patterns, fast charging and other known adverse factors;
 - (ii) effects of switching off radio connections, such as WiFi, Bluetooth, on power consumption;
 - (iii) information about whether the device supports other features, which extend battery lifetime, such as smart charging and about how these features are activated or under which conditions they work best.
- (3) Manufacturers, importers or authorised representatives shall ensure that:
- (a) Information that data encryption is enabled by default is displayed to the user in the course of configuring a new device, including an explanation that this eases data erasure through factory reset.
 - (b) If wireless charging is selected, a message notifying the user that wireless charging will likely increase the energy use in the charging of the battery.
- (4) Where the package does not include a charger, the user instructions referred to in point 2 shall include the following information: “For environmental reasons this package does not include a charger. This device can be powered with most USB power adapters and a cable with USB Type-C plug.”.

C. CORDLESS PHONES

1. LOW POWER MODES

From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that cordless phones meet the following requirements:

- (1) the networked standby power consumption P_n of a base station shipped with a cordless phone shall not exceed 1 W, regardless of whether a handset is on the base station;
- (2) the standby power consumption P_n of a charging cradle without base station functionality shipped with a cordless phone shall not exceed 0,6 W with the charged handset on the charging cradle and 0,3 W without the handset on the charging cradle.

2. RESOURCE EFFICIENCY REQUIREMENTS

2.1. Design for repair and reuse

(1) Availability of spare parts

(a) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market, when present:

(i) display assembly;

(ii) external audio connector(s);

(iii) external charging port(s);

(iv) mechanical button(s);

(v) main microphone(s);

(vi) speaker(s);

(b) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, until at least 7 years after the date of end of placement on the market:

(i) battery or batteries;

(ii) battery compartment cover;

(iii) charger unless the basestation is equipped with the USB Type-C receptacle, which should remain accessible and operational at all times;

(iv) charging cradle;

(c) Spare parts concerned by points (a) and (b) shall not be assemblies comprising more than one of the listed spare part types;

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, the list of spare parts concerned by points (a) and (b) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, until the end of the period of availability of these spare parts.

Cordless phones shall be designed for the use of rechargeable batteries with standardised physical dimensions.

(2) Access to repair and maintenance information

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 7 years after the date of end of placement on the market, provide access to repair and maintenance information to professional repairers for parts covered by points 1(a) and (b) in the following conditions, unless that information is made publicly available at the free access website of the manufacturer, importer or authorised representative:

(a) The manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:

(i) the professional repairer has the technical competence to repair cordless phones and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

(ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State.

- (b) Manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;
- (c) Manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;
- (d) Once registered, a professional repairer shall have access, within 1 working day after requesting it, to the requested repair and maintenance information. The information may be provided for an equivalent model or model of the same family, if relevant;
- (e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace parts covered by points 1(a) and (b) and shall at least include:
 - (i) the unequivocal product identification;
 - (ii) a disassembly map or exploded view;
 - (iii) wiring and connection diagrams, as required for failure analysis;
 - (iv) electronic board diagrams;
 - (v) a list of necessary repair and test equipment;
 - (vi) technical manual of instructions for repair, including marking of the individual steps;
 - (vii) diagnostic fault and error information (including manufacturer-specific codes, where applicable);
 - (viii) component and diagnosis information (such as minimum and maximum theoretical values for measurements);
 - (ix) instructions for software and firmware (including reset software);
 - (x) information on how to access data records of reported failure incidents stored on the device, where applicable, with the exception of personal identifiable information such as related to user behavior and location information;
 - (xi) information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with points 2 (a) and (b).
- (f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information.

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, repair instructions and maintenance information for parts concerned by point 1(b) shall be publicly available at the free access website of the manufacturer, importer or authorised representative, until at least 7 years after the date of end of placement on the market. This information shall contain the level of detail needed to be able to replace parts covered by point 1(b).

(3) Maximum delivery time of spare parts

- (a) manufacturers, importers or authorised representatives shall ensure that:
 - (i) during the first 5 years of the period referred to in points 1(a) and (b), spare parts are delivered within 5 working days after having received the order;

- (ii) during the remaining 2 years of the period referred to in points 1(a) and (b), spare parts are delivered within 10 working days after having received the order.
- (b) In the case of spare parts concerned by point 1(a), the availability of spare parts may be limited to professional repairers registered in accordance with points 2 (a) and (b).

(4) Information on the price of spare parts

During the period referred to in points 1(a) and (b), manufacturers, importers or authorised representatives shall provide indicative pre-tax prices at least in euro for spare parts listed in points 1(a) and (b), including the pre-tax price of fasteners and tools, if supplied with the spare part, on the free access website of the manufacturer, importer or authorised representative.

(5) Disassembly requirements

Manufacturers, importers or authorised representatives shall meet the following disassembly requirements:

- (a) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of parts referred to in point 1(a) meets the following criteria:
 - (i) fasteners shall be removable, resupplied or reusable or resupplied;
 - (ii) the process for replacement shall be feasible in at least one of the following ways:
 - with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - with commercially available tools;
 - (iii) the process for replacement shall, as a minimum, be able to be carried out in a workshop environment;
 - (iv) the process for replacement shall, as a minimum, be able to be carried out by a generalist.
- (b) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for battery replacement meets the following criteria:
 - (i) fasteners shall be reusable or resupplied;
 - (ii) the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - (iii) the process for replacement shall be able to be carried out in a use environment;
 - (iv) the process for replacement shall be able to be carried out by a layman.
- (c) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for display assembly replacement meets the following criteria:
 - (i) fasteners shall be removable, resupplied or reusable;
 - (ii) the process for replacement shall be feasible in at least one of the following ways:
 - with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - with commercially available tools;
 - (iii) the process for replacement shall be able to be carried out in a workshop environment;
 - (iv) the process for replacement shall be able to be carried out by a generalist.

(6) Requirements for preparation for reuse

From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that devices include a software function, that resets the device to its factory settings and erases securely by default all personal information including but not limited to address book, text messages, pictures, videos, settings and call history.

2.2. Marking of plastic components

From 20 June 2025, plastic components heavier than 50 g shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks '>' and '<' as specified in available standards. The marking shall be legible.

Plastic components shall be exempt from marking requirements provided the following conditions are fulfilled:

- (i) the marking is not possible because of the shape or size;
- (ii) the marking would impact on the performance or functionality of the plastic component;
- (iii) marking is technically not possible because of the molding method.

For the following plastic components no marking shall be required:

- (i) packaging, tape, labels and stretch wraps;
- (ii) wiring, cables and connectors, rubber parts and any other component where not enough appropriate surface area is available for the marking to be of a legible size;
- (iii) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
- (iv) transparent parts where the marking would obstruct the function of the part in question.

2.3. Recyclability requirements

From 20 June 2025:

- (1) Manufacturers, importers or their authorised representatives shall, without prejudice to Article 15(1) of Directive 2012/19/EU, make available, on a free access website, the dismantling information needed to access any of the products components referred to in Annex VII, point 1, of Directive 2012/19/EU.
- (2) The information referred to in point (1) shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (3) The information referred to in point (1) shall be available until at least 15 years after the placing on the market of the last unit of a product model.

3. INFORMATION REQUIREMENTS

From 20 June 2025:

- (1) Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free access websites of the manufacturer, importer or authorised representative the following information:
 - (a) compatibility with removable memory cards, if any;
 - (b) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - (i) cobalt in the battery (weight range: less than 0,5 g, between 0,5 g and 3 g, above 3 g);
 - (ii) tantalum in capacitors (weight range: less than 0,01 g, between 0,01 g and 0,2 g, above 0,2 g);
 - (iii) neodymium in loud speakers, vibration motors, and other magnets (weight range: less than 0,1 g, between 0,1 g and 0,5 g, above 0,5 g);
 - (iv) gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,1 g, above 0,1 g);
 - (c) the indicative value of the recyclability rate R_{cyc} ;
 - (d) the indicative percentage of recycled content for the product or a part thereof, where available; if not available, the recycled content should be indicated as "not known" or "not available";

- (2) Manufacturers, importers or authorised representatives shall provide user instructions in the form of a user manual on a free access website of the manufacturer, importer or authorised representative. Where the package does not include a charger, the user instructions shall include the following information: “For environmental reasons this package does not include a charger. This device can be powered with most USB power adapters and a cable with USB Type-C plug.”.

D. SLATE TABLETS

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) Availability of spare parts

- (a) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market, when present:

- (i) battery or batteries;
- (ii) front-facing camera assembly;
- (iii) rear-facing camera assembly;
- (iv) external audio connector(s);
- (v) external charging port(s);
- (vi) mechanical button(s);
- (vii) main microphone(s);
- (viii) speaker(s);
- (ix) hinge assembly;
- (x) mechanical display folding mechanism.

- (b) Spare parts concerned by points (a) and (c) shall not be assemblies comprising more than one of the listed spare part types, with the following exceptions:

- (i) microphones may be part of a loudspeaker or external charging port assembly;
- (ii) external audio connector(s) may be combined with the external charging port(s) as the same port(s);
- (iii) external charging port(s) may be combined with the external audio connector(s) as the same port(s);
- (iv) hinge assembly may be part of a mechanical display folding mechanism;
- (v) microphone, speaker(s), buttons and external connectors may be combined with a higher level assembly if the following reliability requirements are met:
 - the device meets IP42 rating;
 - the power button has a contact closure cycle resistance $\geq 20\,000$ cycles;
 - the volume button has a contact closure cycle resistance $\geq 10\,000$ cycles;
 - the charging connector has a insertion/extraction cycle resistance $\geq 3\,000$ cycles.

- (c) From 20 June 2025 or from one month after the date of placement on the market, whichever is later:

- (i) manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market:
 - (a) battery or batteries;
 - (b) back cover or back cover assembly, if to be fully removed for replacement of the battery;
 - (c) protective foil for foldable displays;

- (d) display assembly;
 - (e) charger, unless the device complies with Article 3(4) of Directive 2014/53/EU;
 - (f) SIM tray and memory card tray, if there is an external slot for a SIM tray or memory card tray.
- (ii) manufacturers, importers or authorised representatives may provide the battery or batteries referred to in point (i)(a) only to professional repairers if manufacturers, importers or authorised representatives ensure that the following requirements are met:
- (a) the device meets IP42 rating;
 - (b) after 500 full charge cycles the battery has, in a fully charged state, a remaining capacity of at least 83 % of the rated capacity;
 - (c) the battery endurance in cycles achieves a minimum of 1 000 full charge cycles and after 1 000 full charge cycles the battery has, in a fully charged state, a remaining capacity of at least 80 % of the rated capacity.
- (d) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, the list of spare parts concerned by points (a) and (c) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, until the end of the period of availability of these spare parts.

(2) Access to repair and maintenance information

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 7 years after the date of end of placement on the market, provide access to repair and maintenance information to professional repairers for parts covered by points 1(a) and (c) in the following conditions, unless that information is made publicly available at the free access website of the manufacturer, importer or authorised representative:

- (a) The manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair slate tablets and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;
- (b) Manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;
- (c) Manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;
- (d) Once registered, a professional repairer shall have access, within 1 working day after requesting it, to the requested repair and maintenance information. The information may be provided for an equivalent model or model of the same family, if relevant;
- (e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace parts covered by point 1(a) and (c) and shall at least include:
 - (i) the unequivocal product identification;

- (ii) a disassembly map or exploded view;
 - (iii) wiring and connection diagrams, as required for failure analysis;
 - (iv) electronic board diagrams;
 - (v) a list of necessary repair and test equipment;
 - (vi) technical manual of instructions for repair, including marking of the individual steps;
 - (vii) diagnostic fault and error information (including manufacturer-specific codes, where applicable);
 - (viii) component and diagnosis information (such as minimum and maximum theoretical values for measurements);
 - (ix) instructions for software and firmware (including reset software);
 - (x) information on how to access data records of reported failure incidents stored on the device, where applicable, with the exception of personal identifiable information such as related to user behavior and location information;
 - (xi) information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with points 2(a) and (b);
- (f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information.

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, repair instructions and maintenance information for parts concerned by point 1(c) shall be publicly available at the free access website of the manufacturer, importer or authorised representative, until at least 7 years after the date of end of placement on the market. This information shall contain the level of detail needed to be able to replace parts covered by point 1(c).

(3) Maximum delivery time of spare parts

- (a) manufacturers, importers or authorised representatives shall ensure that:
- (i) during the first 5 years of the period referred to in points 1(a) and (c), spare parts are delivered within 5 working days after having received the order;
 - (ii) during the remaining 2 years of the period referred to in points 1(a) and (c), spare parts are delivered within 10 working days after having received the order.
- (b) In the case of spare parts concerned by point 1(a), the availability of spare parts may be limited to professional repairers registered in accordance with points 2(a) and (b).

(4) Information on the price of spare parts

During the period referred to in points 1(a) and (c), manufacturers, importers or authorised representatives shall provide indicative pre-tax prices at least in euro for spare parts listed in points 1(a) and (c), including the pre-tax price of fasteners and tools, if supplied with the spare part, on the free access website of the manufacturer, importer or authorised representative.

(5) Disassembly requirements

Manufacturers, importers or authorised representatives shall meet the following disassembly requirements:

- (a) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of the display assembly and of parts referred to in point 1(a), with the exception of the battery or batteries, meets the following criteria:
- (i) fasteners shall be removable, resupplied or reusable;

- (ii) the process for replacement shall be feasible in at least one of the following ways:
 - with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - with commercially available tools;
 - (iii) the process for replacement shall, as a minimum, be able to be carried out in a workshop environment;
 - (iv) the process for replacement shall, as a minimum, be able to be carried out by a generalist.
- (b) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for replacement of parts referred to in point 1(c), with the exception of the battery or batteries, meets the following criteria:
- (i) fasteners shall be removable, resupplied or reusable;
 - (ii) the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - (iii) the process for replacement shall be able to be carried out in a use environment;
 - (iv) the process for replacement shall be able to be carried out by a layman.
- (c) From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that the process for battery replacement:
- (i) meets the following criteria:
 - fasteners shall be resupplied or reusable;
 - the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;
 - the process for replacement shall be able to be carried out in a use environment;
 - the process for replacement shall be able to be carried out by a layman.
 - (ii) or, as an alternative to point (i), ensure that
 - the process for battery replacement meets the criteria set out in (a);
 - the device meets IP42 rating;
 - after 500 full charge cycles the battery must have in a fully charged state, a remaining capacity of at least 83 % of the rated capacity;
 - the battery endurance in cycles achieves a minimum of 1 000 full charge cycles, and after 1 000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 % of the rated capacity.

(6) Requirements for preparation for reuse

From 20 June 2025, manufacturers, importers or authorised representatives shall ensure that devices:

- (a) encrypt by default, using a random encryption key, the user data stored in the internal storage of the device;
- (b) include a software function, that resets the device to its factory settings and erases securely by default the encryption key and generates a new one;
- (c) record the following data from the battery management system in the system settings or another location accessible for end-users:
 - (i) date of manufacturing of the battery;
 - (ii) date of first use of the battery after the set-up of the device by the first user;
 - (iii) number of full charge/discharge cycles (reference: rated capacity);
 - (iv) measured state of health (remaining full charge capacity relative to the rated capacity in %).

(7) Replacement of serialised parts

From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 7 years after the date of end of placement on the market:

- (a) In case the parts to be replaced by spare parts referred to in point 1(a) are serialised parts, provide non-discriminatory access for professional repairers to any software tools, firmware or similar auxiliary means needed to ensure the full functionality of those spare parts and of the device in which such spare parts are installed during and after the replacement;
- (b) In case the parts to be replaced by spare parts referred to in point 1(c) are serialised parts, provide non-discriminatory access for professional repairers and end-users to any software tools, firmware or similar auxiliary means needed to ensure the full functionality of those spare parts and of the device in which such spare parts are installed during and after the replacement;
- (c) Provide, on a free access website of the manufacturer, importer or authorised representative, a description of the procedure for the notification and authorisation of the intended replacement of serialised parts by the owner of the device referred to in point (d); the procedure shall allow for remotely providing the notification and authorisation;
- (d) Before providing access to the software tools, firmware or similar auxiliary means referred to in points (a) and (b), the manufacturer, importer or authorised representative may only require to have received a notification and authorisation of the intended part replacement by the owner of the device. Such notification and authorisation may also be provided by a professional repairer with the explicit written consent of the owner;
- (e) Manufacturers, importers or authorised representatives shall provide access to the software tools, firmware or similar auxiliary means referred to in points (a) and (b) within 3 working days after having received the request and, where applicable, the notification and authorisation referred to in point (d);
- (f) The access to the software tools, firmware or similar auxiliary means referred to in point (a) may, as regards professional repairers, be limited to professional repairers registered in accordance with points 2(a) and (b).

1.2. Design for reliability

From 20 June 2025:

- (1) Scratch resistance: Manufacturers, importers or authorised representatives shall ensure that the screen of the device passes the hardness level 4 on the Mohs hardness scale, except for foldable slate tablets designed to be used with a protective foil on the foldable display.
- (2) Protection from accidental spills: Manufacturers, importers or authorised representatives shall ensure that the devices are protected against accidental spills of water.
- (3) Battery endurance in cycles: Manufacturers, importers or authorised representatives shall ensure that the devices achieve at least 800 cycles at 80 % remaining capacity, to be tested under charging conditions where the charging rate is limited by the battery management system and not by the power delivery capabilities of the power supply.
- (4) Battery management:
 - (i) manufacturers, importers or authorised representatives shall include an optional charging feature selectable by the user which terminates the charging process automatically, when the battery is charged to 80 % of its full capacity. When this feature is enabled, manufacturers, importers, or authorised representatives may enable the device to periodically fully charge the battery for the purposes of maintaining accurate battery state of charge estimates. The user shall be informed automatically when charging the device for the first time or during the installation process, that the life span of the battery can be extended if the feature is selected and the battery is regularly charged only to 80 % of its full capacity;

- (ii) manufacturers, importers or authorised representatives shall provide a power management feature which by default ensures that once the battery is fully charged there is no further charging power supplied to the battery unless the charge level drops below 95 % of its maximum charge capacity.
- (5) Operating system updates:
- (a) from the date of end of placement on the market to at least 5 years after that date, manufacturers, importers or authorised representatives shall, if they provide security updates, corrective updates or functionality updates to an operating system, make such updates available at no cost for all units of a product model with the same operating system;
 - (b) the requirement referred to in point (a) shall apply both to operating system updates offered voluntarily by manufacturers, importers or authorised representatives and to operating system updates provided to comply with Union law;
 - (c) security updates or corrective updates mentioned under point (a) need to be available to the user at the latest 4 months after the public release of the source code of an update of the underlying operating system or, if the source code is not publicly released, after an update of the same operating system is released by the operating system provider or on any other product of the same brand;
 - (d) functionality updates mentioned under point (a) need to be available to the user at the latest 6 months after the public release of the source code of an update of the underlying operating system or, if the source code is not publicly released, after an update of the same operating system is released by the operating system provider or on any other product of the same brand;
 - (e) an operating system update may combine security, corrective and functionality updates;
 - (f) when a functionality update provided by a manufacturer, importer or authorised representative shows a negative impact on device performance, manufacturers, importers or authorised representatives shall modify the released operating system to ensure at least the same performance as before the update within a reasonable period of time, free of charge and without causing significant inconvenience to the end-user, except if the end-user has given explicit consent for the negative impact prior to the update.

1.3. Marking of plastic components

From 20 June 2025, plastic components heavier than 50 g shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks '>' and '<' as specified in available standards. The marking shall be legible.

Plastic components shall be exempt from marking requirements provided the following conditions are fulfilled:

- (i) the marking is not possible because of the shape or size;
- (ii) the marking would impact on the performance or functionality of the plastic component;
- (iii) marking is technically not possible because of the molding method.

For the following plastic components no marking shall be required:

- (i) packaging, tape, labels and stretch wraps;
- (ii) wiring, cables and connectors, rubber parts and any other component where not enough appropriate surface area is available for the marking to be of a legible size;
- (iii) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
- (iv) transparent parts where the marking would obstruct the function of the part in question.

1.4. Recyclability requirements

From 20 June 2025:

- (1) Manufacturers, importers or their authorised representatives shall, without prejudice to Article 15(1) of Directive 2012/19/EU, make available, on a free access website, the dismantling information needed to access any of the products components referred to in Annex VII, point 1, of Directive 2012/19/EU.
- (2) The information referred to in point (1) shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (3) The information referred to in point (1) shall be available until at least 15 years after the placing on the market of the last unit of a product model.

2. INFORMATION REQUIREMENTS

From 20 June 2025:

- (1) Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free access websites of the manufacturer, importer or authorised representative the following information:
 - (a) compatibility with removable memory cards, if any;
 - (b) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - (i) cobalt in the battery (weight range: less than 10 g, between 10 g and 20 g, above 20 g);
 - (ii) tantalum in capacitors (weight range: less than 0,01 g, between 0,01 g and 0,1 g, above 0,1 g);
 - (iii) neodymium in loud speakers, vibration motors, and other magnets (weight range: less than 0,2 g, between 0,2 g and 1 g, above 1 g);
 - (iv) gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,1 g, above 0,1 g);
 - (c) the indicative value of the recyclability rate R_{cyc} ;
 - (d) the indicative percentage of recycled content for the product or a part thereof, where available; if not available, the recycled content should be indicated as “not known” or “not available”;
 - (e) ingress protection rating;
 - (f) minimum battery endurance in cycles in number of cycles;
 - (g) in case of foldable devices, it shall be indicated that ‘This device did not undergo a scratch resistance test’.
- (2) Manufacturers, importers or authorised representatives shall provide user instructions in the form of a user manual on a free access website of the manufacturer, importer or authorised representative, and shall include:
 - (a) how to access on the device information from the battery management system on:
 - (i) date of manufacturing of the battery;
 - (ii) date of first use of the battery after the set-up of the device by the first user;
 - (iii) number of full charge/discharge cycles (reference: rated capacity);
 - (iv) measured state of health (remaining full charge capacity relative to the rated capacity in %);
 - (b) instructions for battery maintenance, including the following:
 - (i) impacts on battery lifetime related to exposure of the device to elevated temperatures, suboptimal charging patterns, fast charging and other known adverse factors;

- (ii) effects of switching off radio connections, such as WiFi, Bluetooth, on power consumption;
 - (iii) information about whether the device supports other features, which extend battery lifetime, such as smart charging and about how these features are activated or under which conditions they work best.
 - (3) Manufacturers, importers or authorised representatives shall ensure that:
 - (a) Information that data encryption is enabled by default is displayed to the user in the course of configuring a new device, including an explanation that this eases data erasure through factory reset;
 - (b) If wireless charging is selected, a message notifying the user that wireless charging will likely increase the energy use in the charging of the battery.
 - (4) Where the package does not include a charger, the user instructions referred to in point 2 shall include the following information: “For environmental reasons this package does not include a charger. This device can be powered with most USB power adapters and a cable with USB Type-C plug.”.
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ANNEX III

Measurements and calculations

1. For the purposes of compliance and verification of compliance with the requirements laid down in this Regulation, measurements and calculations shall be made using harmonised standards, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art methods and are in line with the provisions set out below. The reference numbers of those harmonised standards have been published for this purpose in the Official Journal of the European Union (OJ).
2. In the absence of relevant standards and until the publication of the references of the relevant harmonised standards in the OJ, the transitional testing methods set out in Annex IIIa or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, shall be used.
3. Cordless phones placed on the market with a base station shall be tested for networked standby power consumption, with the following test settings:
 - (a) Tests shall be performed on the base station both without the handset on the base station as well as with the charged handset on the base station.
 - (b) The devices shall be measured in the condition as delivered to the end-user(factory setting).
 - (c) The power consumptions shall be measured as average power consumptions over a time period of 10 minutes.
 - (d) The measurements shall be carried out with a mains supply voltage of $230V \pm 1 \%$.
4. Cordless phones placed on the market with a charging cradle shall be tested for standby power consumption, with the following test settings:
 - (a) Tests shall be performed with the charged handset placed on the charging cradle.
 - (b) The devices shall be measured in the condition as delivered to the end-user (factory setting).
 - (c) The power consumptions shall be measured as average power consumptions over a time period of 10 minutes.
 - (d) The measurements shall to be carried out with a mains supply voltage of $230V \pm 1 \%$.
5. Batteries of mobile phones and slate tablets shall be tested according to the default charging algorithms implemented by the manufacturer. The resulting number of cycles shall be rounded down to full hundreds and stated as " $\geq x00$ ".
6. Ingress protection against particle and moisture ingress shall be expressed as an IP code, corresponding with the levels listed in Table 1. Tests shall be performed without protective cover.

Table 1

Ingress protection rating levels

Rating level	Ingress of solid foreign objects	Ingress of water with harmful effects
	Object size	Protection against
2	Protected from touch by fingers and ≥ 12 mm	water spray less than 15 degrees from vertical
3	$\geq 2,5$ mm	water spray less than 60 degrees from vertical
4	≥ 1 mm	splashing of water
5	dust-protected	jetting of water

6	dust-tight	powerful jetting of water
7	n.a.	temporary immersion, 1 m depth
8	n.a.	continuous immersion, 1 m or more depth

7. Resistance to accidental drops or repeated free fall reliability is measured through the number of falls without defect in the repeated free fall test. The repeated free fall tests shall be performed with five units of each model for each of the applicable test cases. The resistance to accidental drops is the number of falls which have been passed by at least four out of the five units under test. The number of falls per unit shall be determined with the following test conditions:
- (a) without protective foils and separate protective cover, if any, for non-foldable devices;
 - (b) with a protective foil on the display for foldable devices, first in the un-extended state and then in the fully extended state on the same unit under test in line with Table 2;
 - (c) fall height 1 m;
 - (d) after a defined number of falls corresponding to the intervals specified in Table 2, the unit under test has to be functional without defect, with particular reference to the following functionalities, where applicable:
 - (i) integrity of screen;
 - (ii) display with less than 10 pixel defects or similar malfunctions;
 - (iii) all cameras, tested for still images and videos;
 - (iv) mobile communication;
 - (v) Bluetooth connectivity;
 - (vi) WiFi connectivity;
 - (vii) battery charging: wired and wireless;
 - (viii) display touch sensitivity;
 - (ix) responsive buttons and switches;
 - (x) vibration alarm;
 - (xi) main microphone(s);
 - (xii) loudspeaker;
 - (xiii) headset audio.
 - (e) cracks of the frame or backside shall not be considered a defect as long as full functionality and safe use of the unit under test is given;
 - (f) cracks of the touchscreen and of any other cover layers of a display shall not be considered a defect as long as full functionality and safe use of the unit under test is given;
 - (g) in case of no determined defect the test shall be continued, placing the unit under test in the tumble tester in the same orientation the device was found when the test was interrupted;
 - (h) for non-foldable devices, in case of a determined defect and in any case after 157 falls the test of the unit is terminated;
 - (i) for foldable devices, in case of a determined defect and in any case after 175 falls the test of the unit is terminated.

Table 2

Test intervals for determining if the unit is defective (smartphones)

Non-foldable device	Foldable device
45	35 un-extended state + 15 additional falls in fully extended state

ANNEX IIIa

Transitional methods

Table 3

References and qualifying notes for mobile phones, cordless phones and slate tablets

Parameter	Source	Reference Test Method / Title	Notes
Disassembly requirements	CEN	EN 45554:2020	Fasteners: please refer to Table A.1 of the standard Tools: please refer to Table A.2 of the standard, unless differently specified in this Regulation Working environment: please refer to Table A.4 of the standard Skill level: please refer to Table A.5 of the standard
Protection against particles and water	IEC	IEC 60529:1989/ AMD2:2013/ COR1:2019	dust tight and protected against immersion in water up to 1 meter depth: IP67 protected against the ingress of solid foreign objects of size bigger than 1 millimeter and splashing of water: IP44
Protection from accidental spills	European Commission		A spilling test shall be performed, by letting 220 mL of de-ionized water flow, without applying additional pressure, from 5 cm away from one edge of the slate tablet (distance between edge of cup in tilted state to the unit under test), followed by use of a paper towel to gently absorb excess liquid on the slate tablet. The slate tablet should dwell for 24 hours prior to functional inspection (as specified below). The procedure has to be conducted for each edge of the tablet in the display up orientation. Each time after having run the above test procedure, the unit under test has to be functional without defect, with particular reference to the following functionalities, where applicable: <ul style="list-style-type: none"> (i) all cameras, tested for still images and videos; (ii) mobile communication; (iii) Bluetooth connectivity; (iv) WiFi connectivity; (v) battery charging: wired and wireless; (vi) display touch sensitivity; (vii) responsive buttons and switches; (viii) vibration alarm; (ix) main microphone(s); (x) loudspeaker; (xi) headset audio.

Rated capacity and battery endurance in cycles	CENELEC	IEC EN 61960-3:2017	<p>Battery endurance in cycles shall be measured with the following test sequence:</p> <ol style="list-style-type: none"> 1) one cycle at 0,2C discharge rate and measure capacity 2) cycles 2-499 at 0,5C discharge rate 3) repeat step 1 <p>To determine the number of cycles beyond 500 cycles, the test shall be continued</p> <ol style="list-style-type: none"> 4) 99 cycles at 0,5 C discharge rate 5) repeat step 1 6) repeat steps 4 and 5 until measured capacity is below 80% <p>Tests shall be performed with an external power source, which does not limit the power draw of the battery and leaves it to the specified default charging algorithm to regulate the charging rate.</p>
Scratch hardness	CEN	EN 15771:2010	Scratch hardness shall be tested on the visible display area, without protective cover on the display
Recycled content of the product or of a part	CEN	EN 45557:2020	
Standardised physical dimensions of rechargeable batteries	IEC	IEC 60086-2:2015	
Base station simulator for battery endurance test	ETSI	ETSI TR 125 914 - V16.0.0, chapter 9	
Battery endurance test ambient conditions	ECMA	ECMA 383	Ambient temperature (23±5) °C, relative humidity 10 % to 80 %, ambient light (250±50) Lux
Resistance to accidental drops	IEC	IEC 60068-2-31, Free fall repeated - Procedure 2	Mobile phones shall be tested for resistance to accidental drops, fall height 1 meter; the test has to be performed with 5 units consecutively and is passed, if at least 4 units pass the test.
Contact closure cycle resistance	ASTM	ASTM-F1578-07	<p>Buttons shall be tested as integrated in the device. The device itself acts as the contact closure monitoring device by responding as intended to a button push. The test probe orientation shall be 90 degrees to sample. In case of volume buttons, the criterion applies individually to both, the volume up and the volume down segment of a combined button. Fail criterion: Device fails to respond to button push as intended. Test report according to ASTM-F1578-07 except for the electrical characteristic changes.</p> <p>The test shall be performed with one unit, which might be the same for all buttons or one unit per button.</p>

Insertion/extraction cycle resistance	IEC, EIA	EN ISO 62680-1-3 EIA-364-09D	The test shall be done at a rate of 500 ± 50 cycles per hour and no physical damage to any part of the charging port shall occur; in case the device is sold with a charging cable, this cable has to be used; in case the device is sold without a charging cable the cable shall be specified by the manufacturer, importer or authorised representative. The test shall be performed with one unit.
R_{cyc}		EN 45555:2019	To be calculated as mass based recyclability rate, with the following reference end-of-life scenario: — Battery: Co, Li ($R_{cyc, Li}$ 90 %) masses count towards recyclability rate — Mono-material parts removed when extracting the battery: Steel, Al, Mg, plastics or copper masses count towards recyclability rate — All other parts: Cu, Co, Sn ($R_{cyc, Sn}$ 50 %), Ni ($R_{cyc, Ni}$ 85 %), In ($R_{cyc, In}$ 50%), Au, Ag, PGM ($R_{cyc, PGM}$ 95 %) masses count towards recyclability rate
Critical raw material (CRM) content		EN 45558:2019	To be applied to gold following the same approach as for CRMs
Secure deletion	NIST	Guidelines for Media Sanitization, NIST Special Publication 800-88 - Revision 1	

ANNEX IV

Verification procedure for market surveillance purposes

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.

Where a model is not in conformity with the requirements laid down in Article 6 of this Regulation, the model and all equivalent models shall be considered not compliant.

As part of verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following procedure for the requirements referred to in Annex II:

1. The Member State authorities shall verify one single unit of the model pursuant to points 2(a), (b), (c) and (d), except for the requirement referred to in point 1.2.1 of parts A and B of Annex II (resistance to accidental drops), where the test shall be performed with five units of the model pursuant to point 2 (e), and except for the requirement referred to in point 1.2.4 of part A and B and point 1.2.3 of part D of Annex II (battery endurance in cycles), where the test shall be performed with five units of the model pursuant to point 2 (f).
2. The model shall be considered to comply with the applicable requirements where all of the following conditions are fulfilled:
 - (a) the values given in the technical documentation pursuant to Annex IV, point 2, to Directive 2009/125/EC (declared values), 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 (g) thereof;
 - (b) 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;
 - (c) when the Member State authorities check the unit of the model, it complies with the requirements, except for the requirements for which points (d), (e) and (f) apply;
 - (d) 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 these measurements) comply with the respective verification tolerances as set out in Table 4;
 - (e) when the Member State authorities test five units of the model, the determined values (that is the values of the relevant parameters as measured in testing and the values calculated from those measurements) comply with the respective pass rate as given in Table 5;
 - (f) when the Member State authorities test the five units of the model, the arithmetic mean of the determined values (that is the values of the relevant parameters as measured in testing and the values calculated from these measurements) complies with the respective verification tolerances as given in Table 4.
3. If the results referred to in point 2(a), (b), (c) or (f) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
4. If the result referred to in point 2(d) is not achieved, the Member State authorities shall select three additional units of the same model for testing.
5. If the result referred to in point 2(e) is not achieved, the Member State authorities shall select five additional units of the same model for testing. As an alternative, the 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 these units tested pursuant to point 4, where applicable, the arithmetical mean of the determined values complies with the respective verification tolerances set out in Table 4.

7. The model shall be considered to comply with the applicable requirements if for these five units tested pursuant to point 5, where applicable, the pass rate complies with the respective values given in Table 5.
8. If the results referred to in point 6 or 7 are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
9. The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay once a decision has been taken on the non-compliance of the model according to point 3 or 8 or according to the second paragraph of this Annex.

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

The Member State authorities shall only apply the verification tolerances that are set out in Table 4 and shall use only the procedure described in the third paragraph for the requirements set out in this Annex. For the parameters in Table 4, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 4

Verification tolerances

Parameters	Verification tolerances
networked standby power consumption [W] and standby power consumption [W]	The determined value ⁽⁴⁾ shall not be more than 0,10 W higher than the declared value.
battery endurance in cycles – default settings [cycles]	The determined value ⁽⁴⁾ shall not be more than 20 cycles lower than the declared value.
rated battery capacity (C_{rated} [mAh])	The determined value ⁽⁴⁾ shall not be more than 10% higher than the declared value.
remaining battery capacity (%)	The determined value ⁽⁴⁾ shall not be more than 2% points lower than the declared value.
ingress protection rating (IPxx)	To be verified according to the standard referred to under Annex IIIa for this parameter.
protection from accidental spills	To be verified according to the standard referred to under Annex IIIa for this parameter.

⁽⁴⁾ in the case of three additional units tested as prescribed in point 4, the determined value means the arithmetic mean of the values determined for these three additional units.

Table 5

Pass rates for resistance to accidental drops

Parameters	Pass rate tolerances
resistance to accidental drops	The determined value corresponding to the declared value shall be met by at least 80 % of the tested units.

ANNEX V

Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market was identified as follows:

Mobile phones:

- (1) resistance to accidental drops: >100 falls; >>100 falls for ruggedized devices;
- (2) scratch resistance: 6;
- (3) ingress protection rating: IP68 (in combination with user-replaceable battery);
- (4) battery endurance in cycles: 1 200 cycles.

Cordless phones:

- (5) standby power cordless phones with base station: 0,4 W;
- (6) standby power cordless phones with charging cradle only: < 0,05 W;
- (7) ingress protection rating: IP65;
- (8) compatibility with standard size batteries: yes.

Slate tablets:

- (9) scratch resistance: 6;
 - (10) ingress protection rating: IP68;
 - (11) battery endurance in cycles: 1 000 cycles.
-